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August 30, 2011

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BY HAND DELIVERY

Mr. Eric Solorio, Siting Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Pio Pico Energy Center Project (11-AFC-1)
California Independent System Operator's Cluster 2 Phase II Interconnection Study Report, Group Report for the San Diego Gas & Electric Area

Dear Mr. Solorio:

On behalf of Applicant Pio Pico Energy Center, LLC, please find enclosed herewith the California Independent System Operator's Cluster 2 Phase II Interconnection Study Report, Group Report for the San Diego Gas & Electric Area (the "Study"). Please note that certain portions of the Study were deemed confidential; therefore, those portions deemed as such have been redacted or have been submitted to the Executive Director's office under the July 25, 2011 Designation of Confidentiality.

Due to the very voluminous nature of the Study, Applicant is providing one (1) paper copy and two (2) electronic copies to the Docket Unit. Parties will be served with an electronic copy provided on a disk.

Should you have any questions regarding this filing, please contact Kim Hellwig or me at (916) 447-0700.

Very truly yours,

Melissa A. Foster

MAF:kjh
Enclosures
cc: See Proof of Service List

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE *PIO PICO ENERGY CENTER, LLC*

Docket No. 11-AFC-1
PROOF OF SERVICE
(Revised 5/15/11)

Pio Pico Energy Center, LLC
Letter to Eric Solorio, Siting Project Manager, California Energy Commission, dated August 30, 2011 re California Independent System Operator's Cluster 2 Phase II Interconnection Study Report, Group Report for the San Diego Gas & Electric Area

APPLICANT

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DECLARATION OF SERVICE

I, Judith M. Warmuth, declare that on August 30, 2011, I deposited copies of the aforementioned document and, if applicable, a disc containing the aforementioned document in the United States mail at 500 Capitol Mall, Suite 1600, Sacramento, California 95814, with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

AND/OR

Transmission via electronic mail, personal delivery and first class U.S. mail were consistent with the requirements of California Code of Regulations, Title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Judith M. Warmuth

August 23, 2011

Mr. Gary Chandler
President
Pio Pico Energy Center, LLC
2542 Singletree
South Jordan, UT 84095-2769

Subject: Pio Pico Energy Center Project
Cluster Phase II Interconnection Study

Dear Mr. Chandler:

Attached is the Cluster Phase II Interconnection Study Report for the interconnection of the proposed Pio Pico Energy Center Project (Project) to the CAISO Controlled Grid. The CAISO and SDG&E performed the Phase II Interconnection Study in accordance with the CAISO's GIP tariff.

The study has identified that the Project contributes to the need for Network Upgrades in accordance with the CAISO's GIP tariff. A cost estimate of the Network Upgrades is provided in the study report. In addition, the study report provides a cost estimate of the Interconnection Facilities to interconnect the Project to the CAISO Controlled Grid.

Please review the report and prepare comments and questions for the Results Meeting. The Phase II Interconnection Study Results Meeting will be coordinated and scheduled within 30 calendar days following receipt of this Phase II Interconnection Study report.

Sincerely,

Robert Sparks
Manager of Regional Transmission - South

Attachment

via e-mail:

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CAISO Regional Transmission South

C1C2 Projects Phase II Interconnection Study Report

Group Report for SDG&E Area

Final Report

California ISO
Shaping a Renewed Future

August 24, 2011

This study has been completed in coordination with San Diego Gas & Electric Company per CAISO Tariff Appendix Y Generator Interconnection Procedures (GIP) for Interconnection Requests in a Queue Cluster Window

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Appendix F – Power Flow Contingency List
Appendix G – Short Circuit Results
Appendix H – Transient Stability Switching Sequences
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Definitions

APS	Arizona Public Service
C1C2 Projects	Cluster 1, Cluster 2, and SGIP Transition Cluster generation projects listed in the CAISO Queue being evaluated in this Phase II Study
CAISO	California Independent System Operator Corporation
CFE	Comisión Federal de Electricidad
CPUC	California Public Utilities Commission
COD	Commercial Operation Date
CT	Combustion Turbine
Cut Plane	SDG&E Cut Plane is the aggregate flow of: South of SONGS (5-230 kV lines), 2-500/230 kV transformer banks at Suncrest Substation, all 500/230 kV transformer banks at Miguel Substation, 1-230 kV Otay Mesa-Tijuana line, and the flow across the Q72 transmission system
Deliverability Assessment	CAISO's Deliverability Assessment
EO	Energy Only Deliverability Status
ECO	SDG&E's proposed East County Substation located between the Imperial Valley and Miguel substations
FC	Full Capacity Deliverability Status
FERC	Federal Energy Regulatory Commission
GIP	Generator Interconnection Procedures
IC	Interconnection Customer
IID	Imperial Irrigation District
IV	Imperial Valley
LFB	Local Furnishing Bond
LGIA	Large Generator Interconnection Agreement
LGIP	Large Generator Interconnection Procedures
Max	Maximum generation output
NERC	North American Electric Reliability Corporation
NG	Natural Gas
PEN	Palomar Energy switchyard
Phase I Study	Cluster 1 and Cluster 2 Phase I Study
PTO	Participating Transmission Owner
RAS	Remedial Action Scheme (also known as SPS)
POI	Point of Interconnection
POS	Plan of Service
PV	Photovoltaic
RASRS	Remedial Action Schemes Reliability Subcommittee
S	Solar
SCE	Southern California Edison Company
SCIT	Southern California Import Transmission
SDG&E	San Diego Gas & Electric Company
SGIP	Small Generator Interconnection Procedures
SPS	Special Protection System (also known as RAS)
SRPL	Sunrise Powerlink
ST	Steam Turbine
SWPL	Southwest Powerlink
TCA	Transmission Control Agreement
TJI	Tijuana Substation
W	Wind
WECC	Western Electricity Coordinating Council
WT	Wind Turbine

1. Executive Summary

In accordance with the Federal Energy Regulatory Commission (FERC) approved Generator Interconnection Procedures (GIP) for Interconnection Requests in a Queue Cluster Window (CAISO FERC Electric Tariff Appendix Y), this Phase II Study was initiated to determine the combined impact of all the Cluster 1, Cluster 2, and Small Generator Interconnection Procedures Transition Cluster projects (C1C2 Projects) on the CAISO Controlled Grid.

Twelve (12) generation projects totaling a maximum net-output-to-grid of 1,716.5 MW are included in SDG&E's grouping of C1C2 Projects. The projects consist of two Cluster 1 projects, seven Cluster 2 projects, and three Small Generator Interconnection Procedures Transition Cluster (SGIP TC) projects. The Commercial Operation Dates proposed by these projects range from year 2012 to 2016. The study year represents SDG&E's 2014 system load and transmission system topology. This study report provides the following:

A. Transmission system impacts caused by the addition of the C1C2 Projects,

B. System reinforcements necessary to mitigate the adverse impacts of the C1C2 Projects under various system conditions studied, and

C. A list of required facilities, a cost responsibility for Network Upgrades assigned to each Interconnection Request, and a non-binding, good faith estimate of the cost and time to construct the upgrades for each Interconnection Request.

To determine the system impacts caused by the C1C2 Projects, the following studies were performed:

A. Deliverability Assessment

B. Steady-State Power Flow

C. Steady-State Reactive Power Deficiency

D. Short Circuit Duty

E. Transient Stability

F. Post-Transient Voltage Stability

G. Post-Transient Reactive Power Deficiency

H. Operational Studies

The results of the above studies indicated that the C1C2 Projects are responsible for:

A. Overloading several transmission facilities in the CAISO Controlled Grid,

B. Overloading one (1) transmission line in the Imperial Irrigation District (IID), and

C. Increasing the available fault current at the Comisión Federal de Electricidad (CFE) 230 kV bus connecting to Otay Mesa.

Network Upgrades[1] within the CAISO control grid to mitigate identified problems have been proposed in this report. The following tables show a summary of the estimated costs for proposed Network Upgrades in the CAISO Controlled Grid.

Table 1.1: Reliability Network Upgrades

	Description of Upgrade	Cost (x 1,000)
1	Participate in existing Imperial Valley SPS for multiple N-1 and N-2 contingencies	[redacted]
2	Participate in proposed ECO 500/230 kV transformer bank outage SPS (included in IV SPS cost)	[redacted]
3	Implement an SPS to protect ECO 230/138 kV transformer bank	[redacted]
4	Implement an SPS to protect Bernardo-Felicita Tap 69 kV line for N-2 of Escondido-Palomar Energy 230 kV lines #1 and #2	[redacted]
5	Participate in existing Otay Mesa Energy Center Generator SPS for N-1 and N-2 contingencies (included in Mission-Old Town SPS cost)	[redacted]
6	Implement an SPS to protect Mission-Old Town 230 kV line for N-2 contingencies	[redacted]
7	Implement an SPS to trip the San Luis Rey 138/69 kV transformer bank to prevent overload of Cannon-San Luis Rey 138 kV line for an N-2 contingency	[redacted]
	TOTAL	[redacted]

Table 1.2: Delivery Network Upgrades on SDG&E Transmission System

	Description of Upgrade	Cost (x 1,000)
1	Reconfigure TL23041 and TL23042 at Miguel Substation to create two Otay Mesa-Miguel 230 kV lines	[redacted]
2	Install 2nd ECO 230/138 kV transformer bank	[redacted]
3	Reconductor Escondido-Palomar Energy 230 kV lines #1 and #2	[redacted]
4	Reconductor Friars-Doublet Tap 138 kV line	[redacted]
	TOTAL	[redacted]

[1] The transmission facilities, beyond the Point of interconnection (POI), necessary to interconnect the Project, which would not have been necessary but for the interconnection of the Project.

Table 1.3: Delivery Network Upgrades on SCE Transmission System

	Description of Upgrade	Estimated Cost x 1,000 Constant Dollar (OD Year) *(Note 1)*
East of Lugo		
1	Loop Lugo-Mohave 500 kV T/L into Pisgah Sub	[redacted]
2	Add Series Cap Banks on Nipton-Pisgah & Mohave-Pisgah 500 kV T/Ls	[redacted]
Eastern Bulk System Upgrades		
3	New Red Bluff-Valley 500 kV T/L	[redacted]
4	Colorado River-Red Bluff No.3 500 kV T/L	[redacted]
TOTAL		[redacted]

Notes for Table 1.3:

Note 1: SCE's Phase II cost estimating is done in 'constant' dollars 2011 and then escalated to the estimated O.D.year. For the Phase II Phase II study, the estimated O.D. is derived by assuming the duration of the work element will begin approximately in January 2012, which is roughly the CAISO tariff scheduled completion date of the Phase II study plus 90 days for the LGIA signing period. For instance, if a work element is estimated to take a total of 24 months (permitting, design, procurement, and construction), then the estimated O.D. would be January 2014. If an IC's requested O.D. (in-service) is beyond the estimated O.D. of a work element, the IC's requested O.D. is used.

The upgrades in the tables above do not include Interconnection Facilities and Non-Network Non-CAISO transmission upgrades (CFE and IID upgrades), which are the obligation of each Interconnection Customer to coordinate with the Affected Systems Operators, identify the mitigations, and finance. The Interconnection Facilities relating to each individual project are discussed in the corresponding Appendix A, Individual Project Report.

CFE was identified as an Affected System Operator in the short circuit analysis due to the addition of the C1C2 Projects and their associated Delivery Network Upgrades. The short circuit study results showed a twenty-seven percent increase in available fault current at the Tijuana 230 kV bus. Due to the equivalent representation of CFE's system, it is unknown if any circuit breakers are overstressed. Coordination with CFE is required so CFE can perform studies with its detailed system model to investigate and determine if mitigation is required.

IID was identified as an Affected System Operator in the steady-state analysis due to the addition of the C1C2 Projects and their associated Delivery Network Upgrades. The steady-state thermal study identified one (1) transmission line overload under Category A conditions. Coordination with IID is required to determine if mitigation is required.

Project-specific confidential information for each project is not included in this Group Report. Each generation project will have its own Individual Project Report in Appendix A. Appendix A will include project information, Point of Interconnection (POI), dynamic models, Reliability Study results, and costs to interconnect and mitigate impacts on the transmission system. This Group Report includes only general results based on the cumulative impact of the projects evaluated in this Phase II Study.

Given the magnitude of the identified upgrades, a good faith estimate to license/permit, design, procure material, and construct the SDG&E facilities could be 36 months from the submittal of written authorization to proceed after the execution of all required Generator Interconnection Agreements (GIAs).

2. Cluster Interconnection Information

Twelve (12) generation projects totaling a maximum net-output-to-grid of 1,716.5 MW are included in SDG&E's C1C2 Projects Phase II Study. Table 2.1 lists SDG&E's C1C2 Projects with essential data obtained from the CAISO Controlled Grid Generation Queue. C1C2 Projects in SDG&E's Phase II Study utilize various fuel resources. Three (3) generation projects utilize wind turbines, seven (7) generation projects utilize solar photovoltaic systems, and two (2) generation projects utilize natural gas-fired generation.

Table 2.1: SDG&E C1C2 Projects

CAISO Queue Position	Point of Interconnection	Max MW	FC/EO	Fuel/Type	Commercial Operation Date
493	Sunrise Powerlink 500 kV Line	299	FC	Wind / Wind Turbine	12/31/2013
510	Imperial Valley Substation 230 kV Bus	200	FC	Solar / PV	1/1/2016
555	Boulevard Substation 138 kV Bus	92	FC	Wind / Wind Turbine	12/30/2014
561	Imperial Valley Substation 230 kV Bus	200	FC	Solar / PV	6/1/2014
565	Miguel–Mission 230 kV Line	100	FC	Natural Gas / Reciprocating Engine	5/15/2014
574	Otay Mesa Substation 230 kV Bus	308	FC	Natural Gas / Combustion Turbine	3/1/2014
583	Boulevard Substation 138 kV Bus	57.5	EO	Wind / Wind Turbine	7/14/2014
590	Imperial Valley Substation 230 kV Bus	150	FC	Solar / PV	12/31/2012
608	Imperial Valley Substation 230 kV Bus	250	FC	Solar / PV	1/1/2016
621	Imperial Valley Substation 12 kV Bus	20	EO	Solar / PV	10/1/2012
644A	ECO Substation 138 kV Bus	20	EO	Solar / PV	6/1/2013
653ED	Boulevard Substation 69 kV Bus	20	EO	Solar / PV	10/31/2013
	Total Generation	**1,716.5**			

SDG&E performed the Reliability Study under the direction of the CAISO. For the Reliability Study, all Cluster 1, Cluster 2, and SGIP Transition Cluster generator projects were dispatched and studied simultaneously. Figure 2.1 shows the proposed generator interconnections at Boulevard Substation, East County (ECO) Substation, Imperial Valley Substation, and Sunrise Powerlink. Figure 2.2 shows the two projects in the electrical vicinity of Otay Mesa.

Figure 2.1: C1C2 Project Interconnections in East

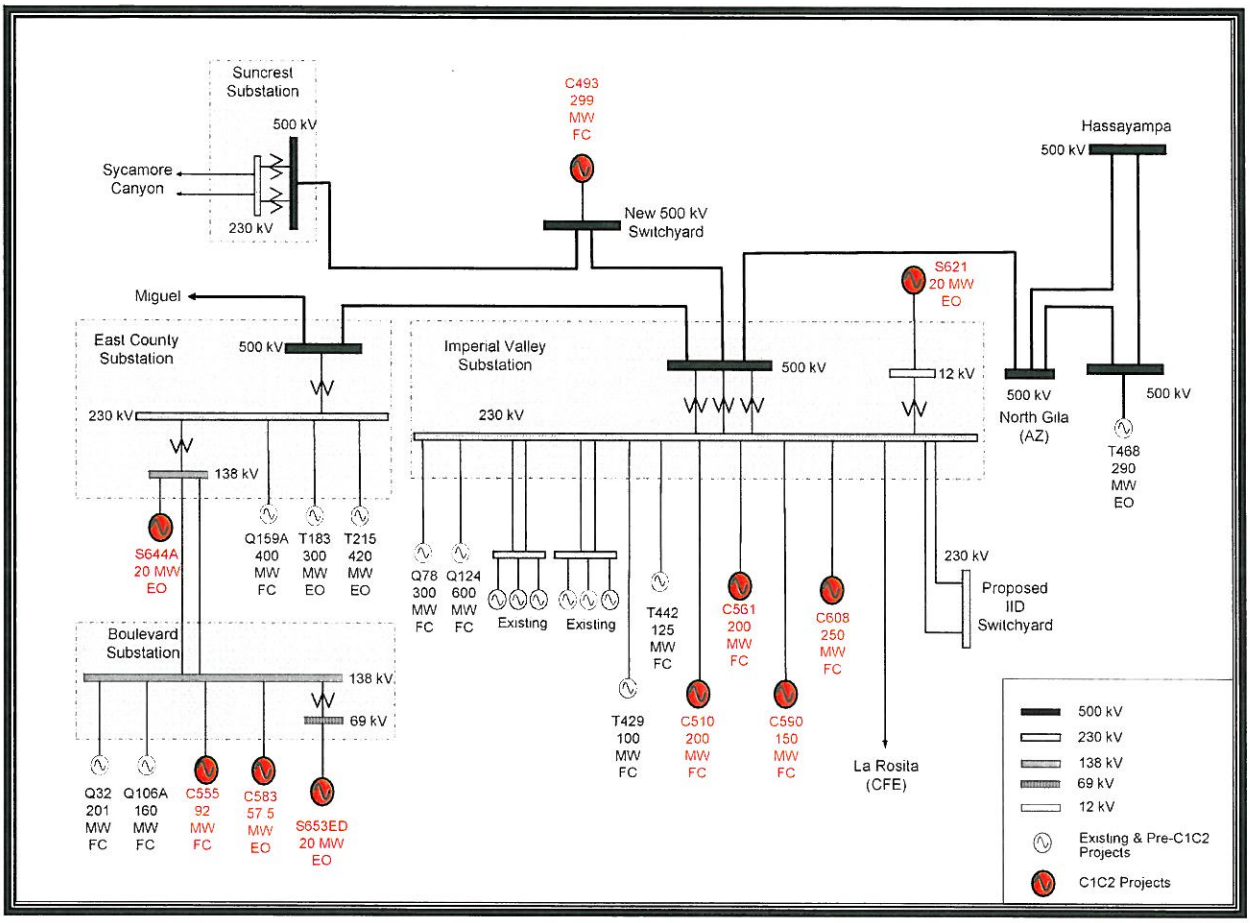
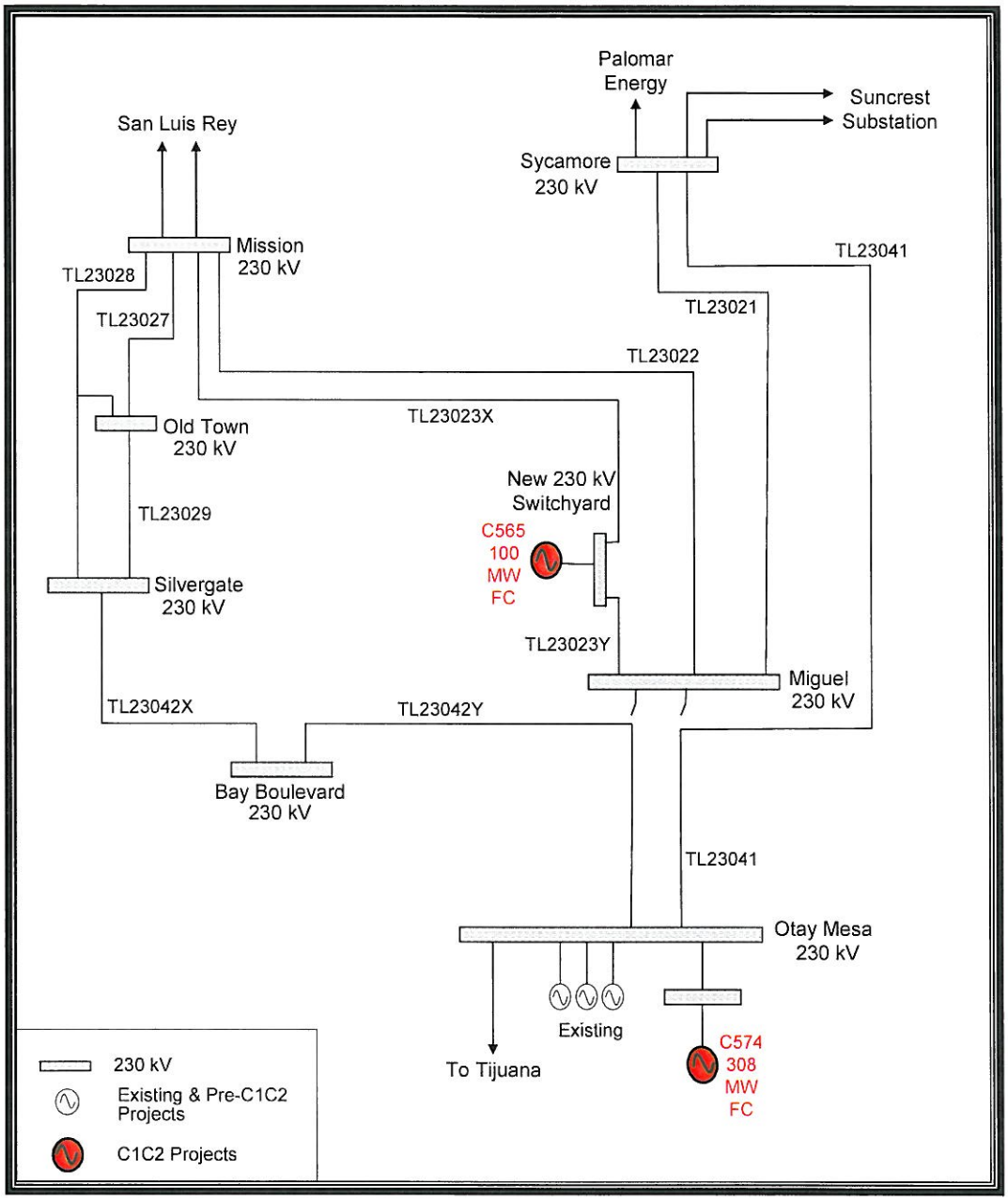


Figure 2.2: C1C2 Project Interconnections near Otay Mesa



3. Study Objectives

This Phase II Interconnection study was performed in accordance with Section 7.1 of Appendix Y of the CAISO tariff, which states:

"The Phase II Interconnection Study shall:

(i) update, as necessary, analyses performed in the Phase I Interconnection Studies to account for the withdrawal of Interconnection Requests,

(ii) identify final Reliability Network Upgrades needed to physically interconnect the Large Generating Facilities,

(iii) assign responsibility for financing the identified final Reliability Network Upgrades,

(iv) identify, following coordination with the CAISO's Transmission Planning Process, final Delivery Network Upgrades needed to interconnect those Large Generating Facilities selecting Full Capacity Deliverability Status,

(v) assign responsibility for financing Delivery Network Upgrades needed to interconnect those Large Generating Facilities selecting Full Capacity Deliverability Status,

(vi) identify for each Interconnection Request final Point of Interconnection and Participating TO's Interconnection Facilities,

(vii) provide a +/-20% estimate for each Interconnection Request of the final Participating TO's Interconnection Facilities,

(viii) optimize in-service timing requirements based on operational studies in order to maximize achievement of the Commercial Operation Dates of the Large Generating Facilities, and

(ix) if it is determined that the Delivery Network Upgrades cannot be completed by the Interconnection Customer's identified Commercial Operation Date, provided that operating procedures necessary to allow the Large Generating Facility to interconnect as an energy-only resource, on an interim-only basis, will be developed and utilized until the Delivery Network Upgrades for the Large Generating Facility are completed and placed into service.

This same section continues and further states that the Phase II Interconnection Study shall:

(x) specify and estimate the cost of the equipment, engineering, procurement and construction work, including the financial impacts (i.e., on Local Furnishing Bonds), if any, and schedule for effecting remedial measures that address such financial impacts, needed on the CAISO Controlled Grid to implement the conclusions of the updated Phase II Interconnection Study technical analyses in accordance with Good Utility Practice to physically and electrically connect the

Interconnection Customer's Interconnection Facilities to the CAISO Controlled Grid.

(xi) also identify the electrical switching configuration of the connection equipment, including, without limitation: the transformer, switchgear, meters, and other station equipment; the nature and estimated cost of any Participating TO's Interconnection Facilities and Network Upgrades necessary to accomplish the interconnection; and an estimate of the time required to complete the construction and installation of such facilities.

All the required analyses were completed to identify the Interconnection Facilities and Network Upgrades necessary to safely and reliably interconnect the C1C2 Projects into the CAISO Controlled Grid. An estimated cost and construction schedule for these facilities has also been provided in this report.

4. Study Assumptions

4.1 Power Flow Base Cases

4.1.1 Deliverability Assessment

The Deliverability Assessment was performed by the CAISO pursuant to the On-Peak and Off-Peak Deliverability Assessment Methodologies to ensure the Deliverability Status requested by the IC. Generation projects requesting EO Deliverability Status were modeled with zero MW output in the Deliverability Assessment. Generation projects requesting FC Deliverability Status were modeled at their Net Qualifying Capacity (NQC) in the On-Peak and Off-Peak Deliverability Assessments to evaluate deliverability.

In the On-Peak scenario, the Summer Peak Qualified Capacity (QC) for proposed FC generation projects is set to 64% of the requested PMax for wind generation and 100% of the requested PMax for solar generation initially. The Summer Peak QC may be adjusted to 40% of the requested PMax for wind generation and 85% for solar generation if a mix of different fuel type generation is identified in the Deliverability Assessment as the 5% DFAX group for a transmission limitation. In the Off-Peak scenario, the proposed FC wind generation is dispatched at its requested PMax and solar generation at 85% of its requested PMax. Gas-fired combustion turbines were assumed to be off-line.

The base cases studied reflect a 2014 SDG&E system configuration with all CAISO-approved transmission projects through 2014. In addition, pre-C1C2 Projects with associated Network Upgrades and Special Protection Systems were modeled. A second Hassayampa-North Gila 500 kV transmission line planned for 2014 in Arizona Public Service's service territory was included in the base cases.

4.1.2 Reliability Study

The Reliability Study evaluated the C1C2 Projects under Heavy Summer and Light Load system conditions. The SDG&E transmission system configuration used for the Reliability Study base cases was the same as for the Deliverability Assessment. In an attempt to capture the most adverse condition, the Reliability Study modeled simultaneous maximum dispatch for both pre-C1C2 Projects (higher-queued) and C1C2 Projects in the electrical vicinity of the projects being studied. 230-500 kV facilities in APS's and CFE's transmission systems and the 61-230 kV IID transmission system were monitored for adverse impacts caused by the addition of the C1C2 Projects.

The Heavy Summer and Light Load cases used for the Reliability Study evaluated steady-state thermal loading, short circuit breaker rating, transient stability, post-transient voltage stability, and SDG&E operating voltage and reactive power requirements. The descriptions of each case are listed in Table 4.1.

Definitions for abbreviations used to define cases in Table 4.1:

A. **Pre:** Base case modeling pre-C1C2 Projects scenario

B. **Pst:** Base case modeling post-C1C2 Projects scenario

C. **Up:** Base case modeling post-C1C2 Projects scenario with Delivery Network Upgrades

D. **Numeric suffixes:** Revision number

Table 4.1: Reliability Study Case Description

Season Heavy Summer or Light Load	Pre/Post	Case Name
Heavy Summer	Pre	C1c2_hs_pre_r12.sav
	Post	C1c2_hs_pstup_r15.sav
Light Load	Pre	C1c2_ll_pre_r12.sav
	Post	C1c2_ll_pstup_r15.sav

4.2 Load and Import

4.2.1 Deliverability Assessment

The Deliverability Assessment On-Peak case modeled 5,171 MW load + losses (1-in-5 load forecast) in the SDG&E system with an import target as shown in Table 4.2. The Off-Peak case modeled 2,585 MW load + losses in the SDG&E system with path flow target as shown in Table 4.3.

Table 4.2: On-Peak Deliverability Assessment Import Target

Branch Group (BG) Name	BG Import Direction	Net Import MW	Import Unused ETC MW
Lugo_victrville_BG	N-S	1138	171
COI_BG	N-S	3770	548
BLYTHE_BG	E-W	107	0
CASCADE_BG	N-S	1	0
CFE_BG	S-N	-55	0
ELDORADO_BG	E-W	1158	0
IID-SCE_BG	E-W	315	0
IID-SDGE_BG	E-W	-159	0
INYO_BG	E-W	0	0
LAUGHLIN_BG	E-W	0	0
MCCULLGH_BG	E-W	30	316
MEAD_BG	E-W	469	505
MERCHANT_BG	E-W	439	0
N.GILABK4_BG	E-W	-140	168
NOB_BG	N-S	1469	0
PALOVRDE_BG	E-W	3139	175
PARKER_BG	E-W	108	27
SILVERPK_BG	E-W	0	0
SUMMIT_BG	E-W	0	0
SYLMAR-AC_BG	E-W	0	471

Table 4.3: Off-Peak Path Flows

Path	Spring Ave. Flow (MW)	Fall Ave. Flow (MW)	Spring Max Flow (MW)	Fall Max Flow (MW)
Path 66 (N-S)	2957		4382	
Path 49 (E-W)		5734		7015
Path 46 (E-W)		6446		8575
Path 66 Period	May 1 thru June 1		May 1 thru June 1	
Path 46 and 49 Period		Oct 1 thru Nov 1		Oct 1 thru Nov 1

4.2.2 Reliability Study

The Reliability Study evaluated the SDG&E system for two adverse conditions. Power flow base cases representing the 2014 Heavy Summer load conditions and 2014 Light Load conditions were used to evaluate the impact of the proposed C1C2 Projects.

The SDG&E Cut Plane encircles SDG&E's In-Basin transmission system, load, and generation. The SDG&E Cut Plane is the aggregate flow of: South of SONGS (5-230 kV transmission lines), 2-500/230 kV transformer banks at Suncrest Substation, 2-500/230 kV transformer banks at Miguel Substation, 1-230 kV Otay Mesa-Tijuana transmission line, and the flow through the Q72 project transmission system.

The Heavy Summer cases represented high load and relatively high Cut Plane imports. The SDG&E system was modeled with a 5,277 MW (load + losses) target (1-in-10 CEC load forecast) and a 3,700 MW Cut Plane import target.

The Light Load cases represented low load and relatively high Cut Plane imports. The SDG&E system was modeled with a 2,902 MW (load + losses) target (55% of the 1-in-10 CEC load forecast) and a 1,450 MW Cut Plane import target.

While it is impractical to study all combinations of system load and generation levels during all seasons and at all times of the day, the base cases were developed to represent stressed scenarios of loading and generation conditions for the various clusters. The load, resource, and dispatch summary table is included in Appendix C.

4.3 Generation Dispatch

The generation dispatch differed for the Deliverability Assessment and the Reliability Study as follows:

4.3.1 Deliverability Assessment

C1C2 Projects had the option of choosing a Deliverability Status of FC or EO. All generators, regardless of Deliverability Status, are responsible for Interconnection Facilities and Reliability Network Upgrades. The Deliverability Assessment studied only FC generators for their ability to deliver their output to the CAISO Grid. According the posted Deliverability Assessment Methodology, EO resources are dispatched only if it is necessary to balance load and maintain expected import levels, however these units should not contribute to any facility overloads or mitigate any overloads. More details about the dispatch used in the Deliverability Assessment can be found in the Deliverability Assessment Methodologies.

4.3.2 Reliability Study

In the Reliability Study, an attempt was made to dispatch all generation in the study area, including SDG&E's pre-C1C2 Projects, at maximum generation output. Curtailment of existing or higher-queued generation was required for certain scenarios as discussed in Section 7. The base case assumptions are listed in Table 4.4.

SDG&E's Out-of-Basin generation includes existing and proposed generation interconnected at the ECO Substation, Boulevard Substation, Imperial Valley Substation, Imperial Valley-Suncrest 500 kV transmission line (Sunrise Powerlink), and North Gila-Hassayampa 500 kV transmission line.

Table 4.4: Reliability Study Base Case Assumptions, MW

		Light Load	Heavy Summer
		Pre-C1C2 Projects case	Pre-C1C2 Projects case
CAISO Load +Losses			
SDG&E			
	Load+Losses	2867	5308
	Area Generation	3763	3917
	Exports	896	-1390
SDG&E Cut Plane		1449	3710
In-Basin Generation		1502	1349
Out-of-Basin Generation		2415	2415
PG&E			
	Load+Losses	15147	29721
	Area Generation	11506	26965
	Exports	-3668	-2755
SCE			
	Load+Losses	15347	26177
	Area Generation	9928	19003
	Exports	-5419	-7173
IID			
	Load+Losses	523	1035
	Area Generation	986	1247
	Exports	462	212
CFE			
	Load+Losses	1156	2801
	Area Generation	1506	3001
	Exports	350	200
Arizona (Area 14)			
	Load+Losses	10668	22566
	Area Generation	17582	29552
	Exports	6913	6897
Path 43 (North of SONGS) "+" flow is exiting SDG&E		2206	1442
Path 44 (South of SONGS) "-" flow is exiting SDG&E and "+" flow is entering SDG&E		-59	708
Path 45 (CFE-SDG&E) "+" flow is entering SDG&E		350	200
Path 66 (COI)		2366	4366
SCIT (Southern CA Import Transmission)		4942	13647

4.4 New Transmission Projects

All CAISO-approved projects with in-service dates before or in 2014 were modeled in the base cases. In addition, some CAISO-approved projects that are expected to be operational after that time or SDG&E-approved projects were included if the CAISO and SDG&E agreed to the reasons for including those projects. Table 4.5 lists the planned SDG&E system additions and upgrades modeled in the cases.

Table 4.5: Planned SDG&E System Additions and Upgrades

Project
Proposed East County Substation 500/230/138 kV (also known as ECO) *(Note 1)*
Proposed Boulevard 138/69/12 kV Substation *(Note 1)*
Proposed Boulevard-ECO 138 kV Transmission Line *(Note 1)*
Sunrise Powerlink 500 kV Transmission Project
Bay Boulevard Substation – South Bay Substation Relocation Project *(Note 2)*
Reconfigure Carlton Hills-Sycamore-Santee and Carlton Hills-Mission to Carlton Hills-Sycamore and Sycamore-Santee 138 kV Transmission Lines
Second 230/138 kV Transformer Bank at Miguel
Reconductor East Gate-Rose Canyon 69 kV Transmission Line
Reconductor Peñasquitos-Del Mar 69 kV Transmission Line
New Escondido- Ash 69 kV Transmission Line # 2
Reconductor San Luis Rey-Melrose tap 69 kV Line Section
Reconductor Poway-Pomerado 69 kV Transmission Line
Replace Los Coches 138/69 kV Bank 51
Upgrade terminal line equipment on TL642A South Bay – Montgomery Tap 69 kV *(Note 3)*
Upgrade terminal line equipment on TL603B Sweetwater - Sweetwater Tap 69 kV *(Note 3)*
Upgrade TL644 South Bay – Sweetwater 69 kV
New Sycamore-Bernardo 69 kV Transmission Line
South Orange County Reliability Project

Note 1: The Permit to Construct for East County Substation and associated Boulevard Substation upgrades are currently under review by the CPUC.

Note 2: The Permit to Construct for the South Bay Relocation Project is currently under review by the CPUC and the coastal permit is under review by the California Coastal Commission. The relocated substation will be named Bay Boulevard.

Note 3: This project does not require CAISO approval. SDG&E intends to increase the rating of the line. The proposed rating was modeled to ensure that it is adequate for C1C2 Projects.

4.5 Pre-C1C2 Projects

All pre-C1C2 Projects, as listed in Table 4.6, were modeled in the base cases. However, some generation projects were either turned off or modeled with reduced output to create a more stressed case for the Reliability Study and to observe generation dispatch limitations as discussed in Section 7.2.

Table 4.6: Pre-C1C2 Projects

Queue Position	Point of Interconnection
13	Olivenhain-Bernardo-Rancho Santa Fe 69 kV Line
32	Boulevard Substation 138 kV
72	Proposed Lee Lake Substation
78	Imperial Valley Substation 230 kV Bus
103	Border Substation 69 kV
106A	Boulevard Substation 138 kV
124	Imperial Valley Substation 230 kV Bus
137	Encina Substation 230kV Bus
150	Border Substation 69 kV
159A	Imperial Valley-Miguel via proposed ECO 500/230 kV Sub 230 kV Bus
183	Imperial Valley-Miguel via proposed ECO 500/230 kV Sub 230 kV Bus
189	Encina 138 kV Substation
215	Imperial Valley-Miguel via proposed 230/500 kV Sub 230 kV Bus
337	Borrego Substation 69 kV
429	Imperial Valley Substation 230 kV
442	Imperial Valley Substation 230 kV
468	Hassayampa-North Gila 500 kV Line
480	Borrego Substation 69 kV
WDAT #2	Borrego 12 kV

Reliability Network Upgrades and Delivery Network Upgrades associated with the projects listed in Table 4.6 were also modeled in the base cases if they were identified in the cluster process or if there is an executed Large Generator Interconnection Agreement (LGIA) with the Interconnection Customer and the mitigation is listed in the LGIA. Network Upgrades for pre-C1C2 Projects are listed in Table 4.7.

Table 4.7: Network Upgrades and SPSs for Pre-C1C2 Projects

Project
3rd Imperial Valley 500/230 kV Transformer Bank
Reconductor Border-Border Tap 69 kV, Otay-Otay Lake Tap 69 kV, and Otay Lake Tap-San Ysidro 69 kV Transmission Lines
Upgrade Pala-Monserate Tap 69 kV Transmission Line
Upgrade Monserate-Monserate Tap 69 kV Transmission Line
Dispatch limitation and accompanying SPS to limit ECO and Boulevard generation to a maximum of 1,150 MW
New Camp Pendleton 500/230 kV Substation with associated transmission line upgrades *(Note 1)*

Note 1: On November 2, 2009, FERC issued an order accepting CAISO joint compliance filing with SDG&E of revisions to the unexecuted LGIA for the SDG&E portion of the [Q72] project and declared the LGIA effective as of May 11, 2008. The unexecuted LGIA is therefore treated as executed and the upgrades are modeled as described in the "Conceptual One-Line Diagram" and "Description of Transmission Line Upgrades" sections of the unexecuted LGIA.

4.6 Other SPSs and Operator Actions

4.6.1 Imperial Valley SPS

The output from the existing and queued generation connected to the Imperial Valley Substation must comply with the CAISO generation tripping limitation of 1,150 MW for a Category B contingency and 1,400 MW tripping limitation of net generation, for a Category C contingency. New generation in the area (a project connecting to Imperial Valley and/or Boulevard and/or ECO substations and/or the C493 switchyard) will also be required to participate in the existing Imperial Valley generation SPS, which mitigates adverse impacts to the SDG&E, CFE, and IID transmission systems by tripping generation following various N-1 and N-2 contingencies. (CFE has an internal SPS that monitors the CFE 230 kV lines, La Rosita–Rumorosa and La Rosita-Herradura. During non-summer operation, if loading is above 388 MVA on either line and TL23050 (Imperial Valley–La Rosita 230 kV line) flow is from Imperial Valley to La Rosita, a trip signal will be sent in two seconds to open TL23050. During summer operation, TL23040 (Otay Mesa-Tijuana) is tripped instead of TL23050).

The following 500 kV contingencies will result in tripping of generation projects connecting to the Imperial Valley and/or Boulevard and/or ECO substations and/or the C493 switchyard:

A. Category B contingencies with up to 1,150 MW of generation tripping

1. Imperial Valley-ECO 500 kV line (eastern segment of Southwest Powerlink (SWPL) after looping into ECO)

2. ECO-Miguel 500 kV line (western segment of SWPL after looping into ECO)

3. Imperial Valley-C493 500 kV line (segment of Sunrise Powerlink (SRPL) after looping into C493)

4. C493-Suncrest 500 kV line (segment of Sunrise Powerlink after looping into C493)

B. Category C contingencies with up to 1,400 MW of generation tripping

1. Imperial Valley-ECO 500 kV line (segment of SWPL after looping into ECO) and Imperial Valley-C493 500 kV line (segment of Sunrise Powerlink after looping into C493).

2. North of Miguel N-2

A. Miguel-Mission 230 kV lines #1 and #2

B. Miguel-Sycamore 230 kV lines #1 and #2

3. Imperial Valley Stuck Breaker

A. Imperial Valley-North Gila 500 kV line and Imperial Valley 500/230 kV transformer bank

B. Imperial Valley-C493 500 kV line and Imperial Valley 500/230 kV transformer bank

In addition to the contingencies mentioned above, there are additional conditions under which the generators may be tripped. With Sunrise Powerlink in-service, the IV SPS must be re-evaluated to incorporate contingencies, including Sunrise Powerlink, and to establish new generation tripping limits (or verify existing limits). All new SPSs and modifications to existing SPSs are subject to review by Affected System Operators, members of the Imperial Valley RAS Technical Committee, and review and approval by WECC RASRS.

4.6.2 Operating Procedures

Additional provisions and operating procedures (which may include curtailing the output of C1C2 Projects during planned or extended forced outages) may be required for reliable operation of the transmission system. These procedures, if needed, will be developed before the projects' Commercial Operation Dates in coordination with CAISO Grid Operations and SDG&E Grid Operations.

5. Study Criteria and Methodology

The CAISO Controlled Grid Reliability Criteria, which incorporates the Western Electricity Coordinating Council (WECC) and the North American Electric Reliability Corporation (NERC) planning criteria, were used to evaluate the impact of the C1C2 Projects on the CAISO Controlled Grid.

5.1 Steady-State Study Criteria

5.1.1 Normal Overloads

Normal overloads are those that exceed 100 percent of continuous facility ratings. The WECC/NERC Criteria require the loading of all transmission system facilities to be within their normal, continuous ratings. Normal overloads (Category A) refer to overloads that occur during normal operating conditions (no contingency, N-0).

5.1.2 Emergency Overloads

Emergency overloads are those that exceed 100 percent of emergency ratings. Emergency overloads refer to overloads that occur during single element contingencies (Category B, N-1) and multiple element contingencies (Category C, N-2).

5.1.3 Voltage Violations

SDG&E's voltage criteria for Category A, B, and C are listed below. Violations will occur if voltage deviations exceed the specified ranges for the following operating conditions:

A. Category A: Steady-state voltage criteria require all bus voltages to be within +/-5% nominal voltage for normal operating conditions.

B. Category B or Category C: Steady-state voltage criteria require 69 kV, 138 kV, and 230 kV bus voltages to be within +5%/-10% nominal voltage following Category B or C contingencies. Steady-state voltage criteria require 500 kV buses to be within distinct ranges, as listed below, following Category B or Category C contingencies:

1. Imperial Valley 500 kV Bus: +10%/-5.5% from nominal voltage (500 kV)
2. Miguel 500 kV Bus: +10%/-5.5% from nominal voltage (500 kV)
3. North Gila 500 kV Bus: +10%/-0% from nominal voltage (500 kV)

5.1.4 Contingencies

The contingencies used in this analysis are provided in Appendix F. Various categories of three line-to-ground (3LG) and single line-to-ground (SLG) faults were applied for the contingencies used as summarized in Table 5.1.

Table 5.1: Power Flow Contingencies

Contingencies	Description
CAISO Category A (No contingency)	All facilities in-service – Normal Conditions
CAISO Category B	• B1 - Any single generator outages. • B2 - Any single transmission circuit outages. • B3 - Any single transformer outages. • Selected overlapping single generator and transmission circuit outages. *(Note 1)*
CAISO Category C	• C1 - SLG Fault, with Normal Clearing: Bus outages (60-230 kV) • C2 - SLG Fault, with Normal Clearing: Breaker failures (excluding bus tie and sectionalizing breakers) at the same bus section above. • C3 - Combination of any two-generator/transmission line/transformer outages.

Note 1: The Reliability Study cases modeled relatively high imports *and low internal generation. The low internal generation represents the effect of a single generator outage.*

Although most of the CAISO Category C contingencies are considered during the study, it is impractical to study all possible combinations of any two elements being out of service throughout the system. Therefore, as allowed under NERC standard TPL-003-0 R1.3.1, only selected credible and/or critical Category C contingencies (C1 – C3) that were deemed most severe were evaluated in this study.

5.2 Short Circuit Duty Criteria

Short circuit studies are performed to determine the maximum fault duty on all buses in the SDG&E service territory. This study determines the impact of increased fault current resulting from the addition of C1C2 Projects plus their associated Delivery Network Upgrades. The cost allocation for upgrading overstressed breakers is based on the total amount of fault current contribution of each generator. The total amount of fault current is calculated by adding the fault current contribution of the generator project and the fault current contribution of their associated Delivery Network Upgrades. The ASPEN OneLiner Version 11.7 with Breaker Rating Module program was used to conduct the detailed short circuit studies simulating three line-to-ground (3LG) and single line-to-ground (SLG) faults.

The criteria in Table 5.2 are used to determine when SDG&E transmission circuit breakers will become overstressed.

Table 5.2: SDG&E Short Circuit Breaker Duty Criteria Summary

Equipment	Disturbance	Criteria
• Existing Generator Breakers • Non-Generator Breakers ≥ 30 Years Old	SLG and 3LG faults	No fault current exceeds 100% of the nameplate interrupting rating
Existing Non-Generator Breakers < 30 Years Old	SLG and 3LG faults	No fault current exceeds 115% of the nameplate interrupting rating

5.3 Transient Stability Criteria

Transient stability analysis is a time-based simulation that assesses the performance of the power system during (and shortly following) a disturbance. Transient stability studies are performed to ensure system stability following critical faults on the system.

The system is considered stable if the following conditions are met:

A. All machines in the WECC interconnected system must remain in synchronism as demonstrated by relative rotor angles (unless modeling problems are identified and concurrence is reached that a problem does not really exist).

B. A stability simulation will be deemed to exhibit positive damping if a line defined by the peaks of the machine relative rotor angle swing curves tends to intersect a second line connecting the valleys of the curves with the passing of time.

C. Corresponding lines on bus voltage swing curves will likewise tend to intersect. A stability simulation, which satisfies these conditions, will be defined as stable.

D. Duration of a stability simulation run will be ten seconds unless a longer time is required to ascertain damping.

E. The transient performance analysis will start immediately after the fault clearing and conclude at the end of the simulation.

F. A case will be defined as marginally stable if it appears to have zero percent damping and the voltage dips are within (or at) the WECC Reliability Criteria limits.

Performance of the transmission system is measured against the WECC Reliability Criteria and the NERC Planning Standards.

Table 5.3 describes and Figure 5.1 illustrates the NERC/WECC Voltage and Frequency Performance Reliability Criteria. The reliability and performance criteria are applied to the entire WECC transmission system.

Table 5.3: WECC Disturbance-Performance Table of Allowable Effects on Other Systems (in addition to NERC requirements)

NERC and WECC Categories	Outage Frequency Associated with the Performance Category (Outage/Year)	Transient Voltage Dip Standard *(Note 1)*	Minimum Transient Frequency Standard	Post-Transient Voltage Deviation Standard
A System normal	Not Applicable	Nothing in Addition to NERC		
B One element out-of-service	≥ 0.33	Not to exceed **25%** at load buses or **30%** at non-load buses. Not to exceed **20% for more than 20 cycles** at load buses.	Not below **59.6 Hz** for 6 cycles or more at a load bus	Not to exceed **5%** at any bus
C Two or more elements out-of-service	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed **20% for more than 40 cycles** at load buses.	Not below **59.0 Hz** for 6 cycles or more at a load bus	Not to exceed **10%** at any bus
D Extreme multiple-element outage	< 0.033	Nothing in addition to NERC		

Note 1: As an example in applying the WECC Disturbance-Performance Table, Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.

Figure 5.1: WECC Voltage Performance Criteria Figure W-1

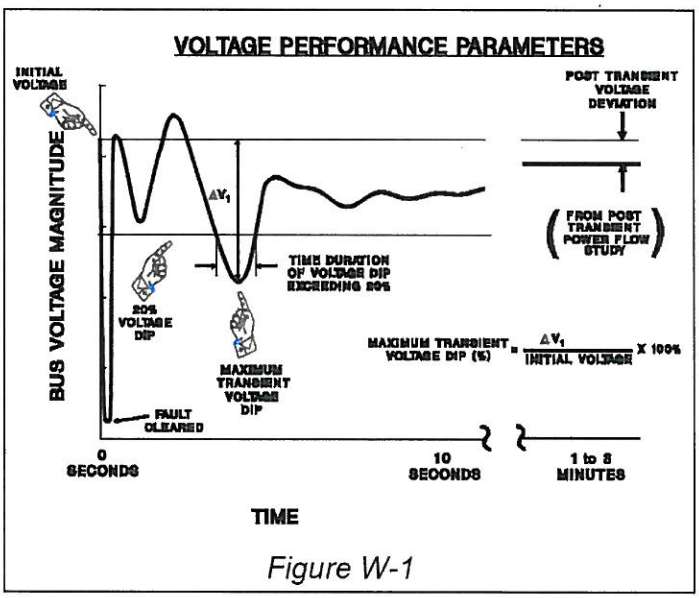


Figure W-1

5.4 Post-Transient Voltage Stability Criteria

The last column of the Table 5.3 above describes the Post-Transient Voltage Stability Criteria, as required by NERC/WECC; Figure 5.1 illustrates the criteria set forth in Table 5.3. It should be noted that the post-transient voltage performance is based on deviations from the initial bus voltage prior to the corresponding contingency. For major SDG&E 500 kV and 230 kV contingencies, the governor power flow is utilized to test for post-transient voltage deviations.

5.5 Post-Transient Reactive Power Deficiency Criteria

Table 5.4 summarizes the voltage support and reactive power criteria in the NERC/WECC Planning Standards.

The system performance will be evaluated according to the NERC/WECC planning criteria.

Table 5.4: Reactive Power Deficiency Criteria Summary

Performance Level/Category	Disturbance	Reactive Power Deficiency Criteria
B	Generator One Circuit One Transformer DC Single Pole Block	Governor power flow to reach convergence at 105% of load level or operational transfer capability
C	Two Generators Two Circuits DC Bipolar Block	Governor power flow to reach convergence at 102.5% of load level or operational transfer capability

5.6 Steady-State Reactive Power Deficiency Criteria

Table 5.5 summarizes the power factor criteria per the CAISO tariff. The voltage at the POI must be within criteria under normal and contingency conditions.

Table 5.5: Power Factor Criteria Summary

Generation Type	Power Factor Criteria
Asynchronous Generator	0.95 lagging to 0.95 leading at the POI, if identified as being needed in the Phase II Study
All other Generator Types	0.90 lagging to 0.95 leading at Generator terminals

A reactive power deficiency (adequacy) analysis is performed in the Phase II Study to determine the need and justification for instituting the Power Factor Criteria for asynchronous generating facilities.

The analysis is done in two steps. First, cluster projects will be grouped by geographic region and modeled with unity power factor at the generator terminals. Under stressed conditions, the projects will then be dispatched by geographic region to measure the effect on the voltage and reactive power profile at the Point of Interconnection. Second, if the first step identifies the need

for projects to provide reactive support, projects will be modeled and dispatched with 0.95 leading to 0.95 lagging power factor range to identify if the range is effective in mitigating the reactive power performance problem identified.

Normal condition (N-0) and the CAISO Category "B" and "C" contingencies will be analyzed. The study will be performed for both pre- and post-project additions and the results will determine:

A. Whether the addition of the project(s) causes normal condition voltages out of the allowable normal min/max range.

B. Whether the addition of the project(s) causes excessive voltage deviation from the pre-contingency level.

Synchronous generators will be required to provide power factor range of 0.90 lagging to 0.95 leading at the generator terminals per the CAISO tariff.

5.7 Affected Systems Criteria

The CAISO will coordinate with potential Affected System Operators in accordance with GIP Section 3.7. If study results identify system impacts to electric systems other than SDG&E's, then the results are identified in the Group Report and/or the Individual Project Report, as appropriate.

6. Deliverability Assessment

The Deliverability Assessment was performed by the CAISO according to the On-Peak and Off-Peak Deliverability Assessment Methodologies posted on the CAISO website at: http://www.caiso.com/1c44/1c44b5c31cce0.html.

This assessment was performed for generation projects that requested Full Capacity status only. Generation projects requesting Energy Only status were modeled with zero (0) MW output in the Deliverability Assessment base cases.

6.1 On-Peak Deliverability Assessment

The assessment was performed following the On-Peak Deliverability Assessment methodology (http://www.caiso.com/23d7/23d7e41c14580.pdf). The main steps of the On-Peak Deliverability Assessment are described below.

Master Deliverability Assessment Base Case

A master base case was developed for the C1C2 Projects' On-Peak Deliverability Assessment, which modeled all the queued generation projects up to Cluster 1 and 2. The resources in the master base case are dispatched as follows:

A. Existing capacity resources are dispatched at 80% of summer peak Net Qualifying Capacity.

B. Proposed full capacity resources are dispatched to balance load and maintain expected imports, but not exceeding 80% of summer peak NQC.

C. Energy Only resources are set off-line.

D. Imports are at the maximum summer peak simultaneous historical level by branch group as shown in Table 4.1.

E. Non-pump load is at the 1-in-5 peak load level for CAISO.

F. Pump load is dispatched within expected range for summer peak load hours.

SDG&E Group Deliverability Assessment Base Case

The SDG&E group Deliverability Assessment base case was developed from the master base case by dispatching all proposed Full Capacity resources in the SDG&E System to 80% of the NQC.

Screening for Potential Deliverability Problems Using DC Power Flow Tool

A DC transfer capability/contingency analysis tool was used to identify potential deliverability problems. For each analyzed facility, an electrical circle was drawn which includes all generating units including unused Existing Transmission Contract (ETC) injections that have a 5% or greater

A. Distribution factor (DFAX) = Δ flow on the analyzed facility / Δ output of the generating unit *100% or

B. Flow impact = DFAX * NQC / Applicable rating of the analyzed facility *100%.

Load flow simulations were performed, which study the worst-case combination of generator output within each 5% Circle.

Verifying and Refining the Analysis Using AC Power Flow Tool

The outputs of capacity units in the 5% Circle were increased starting with units with the largest impact on the transmission facility. No more than twenty units were increased to their maximum output. In addition, no more than 1,500 MW of generation was increased. All remaining generation within the Control Area was proportionally displaced, to maintain a load and resource balance.

When the 20 units with the highest impact on the facility can be increased more than 1,500 MW, the impact of the remaining amount of generation to be increased was considered using a Facility Loading Adder. The Facility Loading Adder was calculated by taking the remaining MW amount available from the 20 units with the highest impact multiplied by the DFAX for each unit. An equivalent MW amount of generation with negative DFAXs was also included in the Facility Loading Adder, up to 20 units. If the net impact from the Facility Loading Adders was negative, the impact was set to zero and the flow on the analyzed facility without applying Facility Loading Adders was reported.

The results of the On-Peak Deliverability Assessment for the C1C2 Projects in the SDG&E area are summarized in Table 6.1.

Table 6.1: On-Peak Deliverability Assessment Results for SDG&E Area

Contingency	Overloaded Facilities	Rating	Max Flow/Rating
Base Case	Miguel Tap-Southbay 230kV #1	2289 Amps	101%
Trip Silvergate-Southbay 230 kV #1	Sweetwater-Sweetwater Tap 69 kV #1	2091 Amps	137%
Trip Silvergate-Southbay 230 kV #1	Division-Sampson 69 kV #1	1439 Amps	130%
Trip Otay Mesa-Miguel Tap-South Bay 230 kV #1 & Telegraph Canyon-Grant Hill 138 kV #1	Miguel Tap-Sycamore 230 kV #1	2289 Amps	112%
Trip Silvergate-South Bay 230 kV #1	Naval Station Metering-Sweetwater Tap 69 kV #1	1799 Amps	107%
Trip Otay Mesa-Miguel Tap-Sycamore 230 kV #1 & Miguel-Sycamore 230 kV #1	Miguel Tap-South Bay 230 kV #1	2952 Amps	101%
Trip Silvergate-South Bay 230 kV #1	Silvergate-National City 69 kV #1	803 Amps	117%
Trip Silvergate-Old Town 230 kV #1 & Silvergate-Mission-Old Town 230 kV #1	Silvergate-Urban 69 kV #1	837 Amps	107%
Trip Silvergate-South Bay 230 kV #1	Southbay-Sweetwater 69 kV #1	1707 Amps	177%
Trip Division-Sampson 69 kV #1	National City-Sweetwater Tap 69 kV #1	854 Amps	105%
Trip Division-Sampson 69 kV #1	Silvergate-National City 69 kV #1	803 Amps	119%
Trip Southbay-Sweetwater 69 kV #1	Montgomery Tap-Sweetwater 69 kV #1	1548 Amps	115%
Trip Escondido-Palomar 230 kV #1	Escondido-Palomar 230 kV #2	2289 Amps	105%
Trip Escondido-Palomar 230 kV #2	Escondido-Palomar 230 kV #1	2289 Amps	105%
Trip Miguel-Otay Mesa 230 kV #1	Miguel-Otay Mesa 230 kV #2	3150 Amps	104%
Trip Miguel-Otay Mesa 230 kV #2	Miguel-Otay Mesa 230 kV #1	3150 Amps	104%
Trip Silvergate-Old Town 230 kV #1 & Silvergate-Mission-Old Town 230 kV #1	Mission-Old Town 230 kV #1	1145 Amps	106%
Trip Old Town-Penasquitos 230 kV #1	Doublet Tap-Friars 138 kV #1	631 Amps	103%
Trip Encina-San Luis Rey 230 kV #1 & Encina-San Luis Rey-Palomar 230 kV #1	San Luis Rey 138/69 kV #1	160 MVA	136%
Trip Encina-San Luis Rey 230 kV #1 & Encina-San Luis Rey-Palomar 230 kV #1	Cannon-San Luis Rey 138 kV #1	854 Amps	106%
Trip Miguel 500/230kV #2	Miguel 500/230kV #1	1329 MVA	106%
Trip Miguel 500/230kV #1	Miguel 500/230kV #2	1344 MVA	106%

Similarly, the On-Peak Deliverability Assessment was performed for the SCE East of Lugo (EOL) group which involved developing the SCE EOL group Deliverability Assessment base case by dispatching all generation in the SCE EOL area to 80% of NQC. The assessment identified that generation projects in the SDG&E system contribute to the following overloads in SCE's EOL system.

Table 6.2: On-Peak Deliverability Assessment Results for SCE EOL Area

Contingency	Overloaded Facilities	Rating (Amps)	Max Flow/Rating
PaloVerde-ColoradoRiver 500 kV Ckt 1	Lugo-Victorville 500 kV Ckt 1	2598	103%
Lugo-Pisgah 500 kV Ckt 1&2	Lugo-Victorville 500 kV Ckt 1	2598	120%
Lugo-Pisgah 500 kV Ckt 1&2	Lugo-Mojave 500 kV Ckt 1	2221	107%
ColoradoRiver-RedBluff 500 kV Ckt 1&2	N.Gila-ImperialValley 500 kV Ckt 1	2572	115%
ColoradoRiver-RedBluff 500 kV Ckt 1&2	Lugo-Victorville 500 kV Ckt 1	2598	119%
Devers-RedBluff 500 kV Ckt 1&2	North Gila-Imperial Valley 500 kV Ckt 1	2572	116%
Devers-RedBluff 500 kV Ckt 1&2	Lugo-Victorville 500 kV Ckt 1	2598	124%
Devers-RedBluff 500 kV Ckt 1	Devers-RedBluff 500 kV Ckt 2	2987	125%
Devers-RedBluff 500 kV Ckt 2	Devers-RedBluff 500 kV Ckt 1	2987	125%

6.2 Off-Peak Deliverability Assessment

The assessment was performed following the Off-Peak Deliverability Assessment methodology (http://www.caiso.com/23d7/23d7e46815090.pdf).

The Off-Peak Deliverability Assessment base case modeled proposed generation interconnection projects in the SDG&E area. The resources were dispatched as follows:

A. Wind generation at its maximum nameplate output

B. Solar generation at 85% of its nameplate output

C. Hydro generation at its high hydro dispatch level for the spring off-peak load period

D. Gas-fired combustion turbines off-line

E. Gas-fired combined-cycle units at minimum load or off-line

F. Qualifying Facilities at historical output for off-peak period

G. Imports at average historical schedules for off-peak period

The Delivery and Reliability Network Upgrades identified in the On-Peak Deliverability Assessment and reliability assessment were modeled in the Off-Peak Deliverability Assessment.

A contingency analysis was performed using the Off-Peak Deliverability Assessment base case. The table below summarizes the overloads identified in the Off-peak Deliverability Assessment.

Table 6.3: Off-Peak Deliverability Assessment Results for SDG&E Area

Contingency	Overloaded Facilities	Rating	Max Flow/Rating
Base Case	ECO 230/138 kV #1	392 MVA	115%

6.3 Required Network Upgrades

6.3.1 Reconfigure TL23041 and TL23042 at Miguel to create two Otay Mesa-Miguel 230 kV lines

To mitigate Category A, B, and C overloads in the Otay Mesa area, the following upgrade is needed:

Reconfigure TL23041 and TL23042 at Miguel to create two Otay Mesa-Miguel 230 kV lines

6.3.2 Install 2nd ECO 230/138 kV transformer bank

To mitigate a Category A overload on the ECO 230/138 kV transformer bank, the following upgrade is needed:

Install a second ECO 230/138 kV transformer bank

6.3.3 Reconductor Escondido-Palomar Energy 230 kV #1 and #2 lines

To mitigate Category B overloads on the two Escondido-Palomar 230 kV lines, the following upgrades are needed:

Reconductor Escondido-Palomar Energy 230 kV lines #1 and #2

6.3.4 Reconductor Friars-Doublet Tap 138 kV line

To mitigate a Category B overload on the Friars-Doublet Tap 138 kV line, the following upgrade is needed:

Reconductor Friars-Doublet Tap 138 kV line

6.3.5 Participate in Existing Imperial Valley SPS

To mitigate the Category B violations on the Miguel 500/230 kV transformer banks, the following upgrade is needed:

Continue to use the existing Imperial Valley SPS that trips generation, as needed, at the C493 switchyard and the Boulevard, ECO, and Imperial Valley substations for the outages of either of the Miguel 500/230 kV transformer banks.

6.3.6 Participate in Existing Otay Mesa Energy Center Generator SPS

To mitigate the Category B violations on the Otay Mesa-Miguel 230 kV lines, the following upgrade is needed:

Modify existing SPS that trips generation at Otay Mesa for outages of Otay Mesa-Miguel 230 kV lines

6.3.7 Implement an SPS to protect Mission-Old Town 230 kV transmission line

To mitigate the Category C violation on the Mission-Old Town 230 kV line, the following upgrade is needed:

Install SPS to trip some of the C1C2 generators for the outage of Silvergate-Old Town 230 kV and Silvergate-Old Town-Mission 230 kV lines

6.3.8 Implement SPS to protect Cannon-San Luis Rey 138 kV transmission line

To mitigate the Category C violation on the Cannon San Luis Rey 138 kV line and San Luis Rey 138/69 kV transformer, the following upgrade is needed:

Install SPS to trip the San Luis Rey 138/69 kV transformer for the outage of Encina-San Luis Rey 230 kV and Encina-San Luis Rey-Palomar 230 kV lines

6.3.9 Upgrades in SCE System

Some of SDG&E's C1C2 Projects contribute to overloads in the SCE area. To mitigate these overloads, the following upgrades are needed:

A. Loop Lugo-Mohave 500 kV transmission line into Pisgah Substation

B. Add Series Capacitor Banks on Nipton-Pisgah & Mohave-Pisgah 500 kV transmission lines

C. Add new Red Bluff-Valley 500 kV transmission line

D. Add Colorado River-Red Bluff No.3 500 kV transmission line

Figure 6.1 shows the SCE and SDG&E 500 kV system pre-mitigation.

Figure 6.1: SCE and SDG&E 500 kV System Diagram Pre-Mitigation

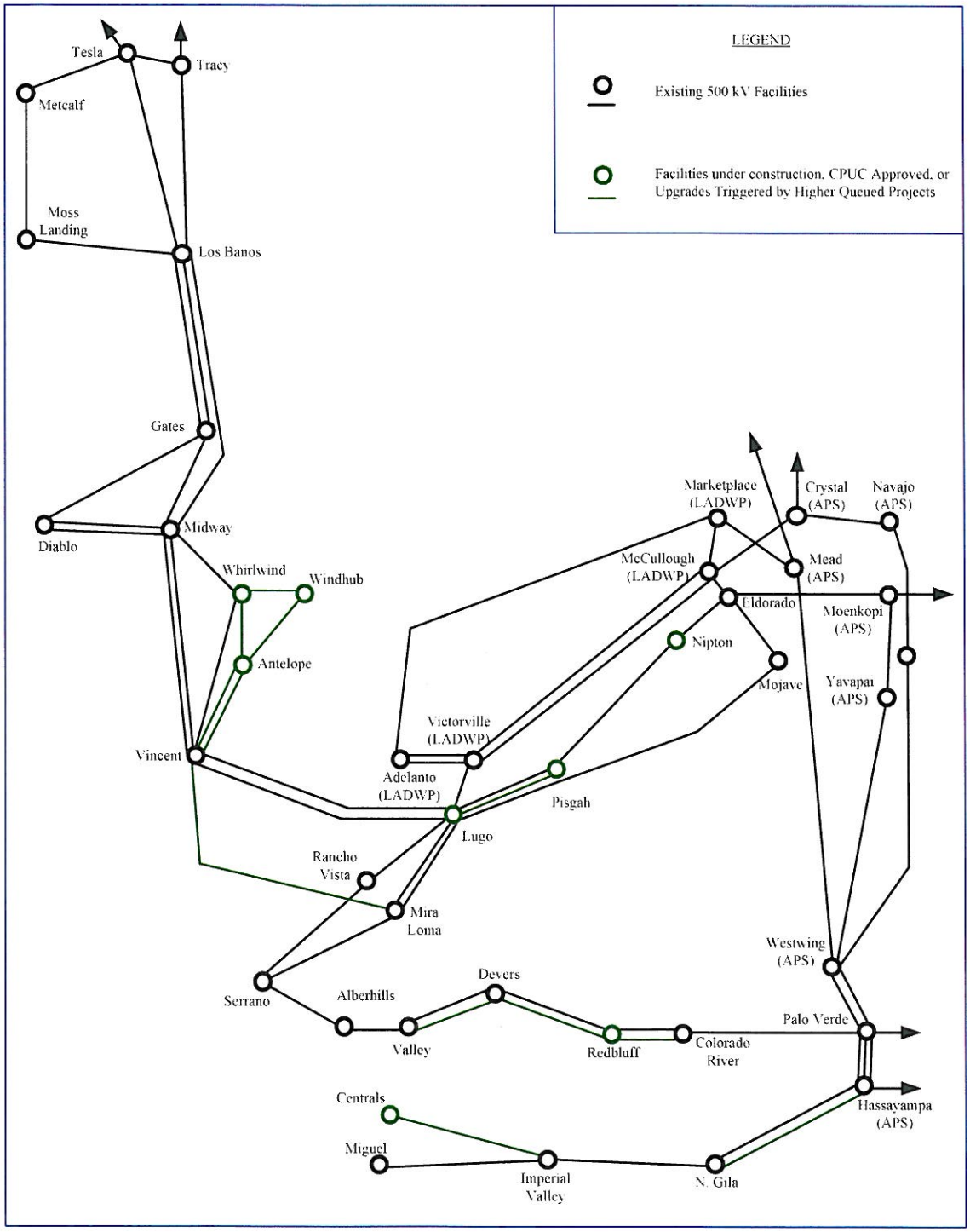
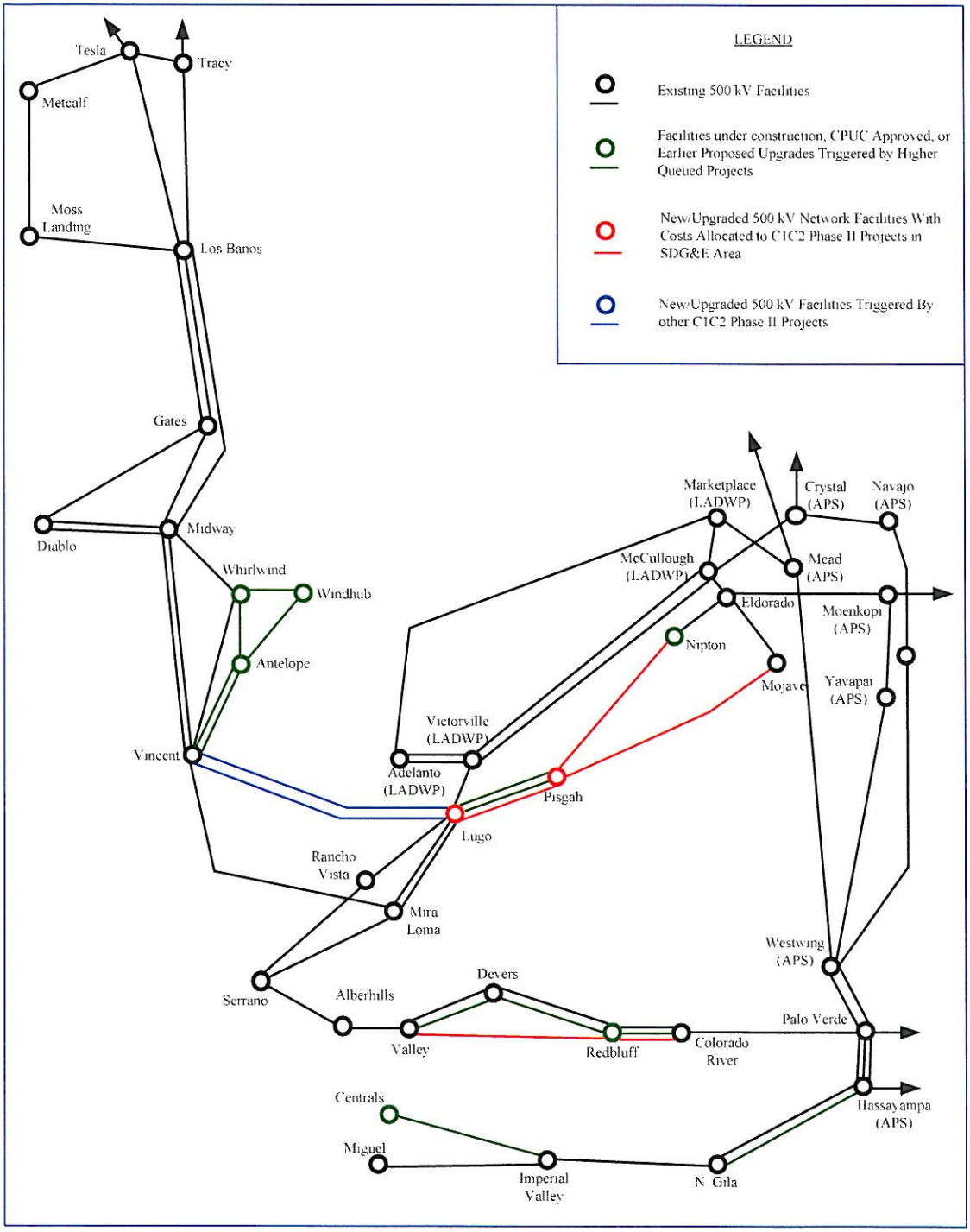


Figure 6.2 shows the SCE and SDG&E 500 kV system post-mitigation.

Figure 6.2: SCE and SDG&E 500 kV System Diagram Post-Mitigation



6.4 Operational Deliverability Assessment

The tariff allows the Generating Facilities to interconnect as Energy Only resources on an interim-only basis before all the required Delivery Network Upgrades are in-service. In the Phase II Study, CAISO performed the operational Deliverability Assessment to provide information on the interim deliverability for the Phase II projects requesting Full Capacity deliverability status. Such interim and partial deliverability is for information only.

The operational Deliverability Assessment follows the same On-Peak Deliverability Assessment methodology as described in Section 6.1. The key components of the operational Deliverability Assessments are discussed below.

Study Years

The assessment for the SDG&E area was performed for years 2012 through 2016.

Assumptions for Generation Interconnection Projects

The Phase II projects and generation projects queued ahead of Cluster 1 and Cluster 2 are modeled in the operational Deliverability Assessment according to the latest Commercial Operation Date (COD) information available. A project is modeled in a study year if the COD of the project is before the summer of the study year.

Table 6.4: Generation Projects in SDG&E Area Modeled in the Operational Deliverability Assessment

Queue Position	PMAX	Point of Interconnection	First Operational Deliverability Study Year
13	40	Olivehain-Bernardo-Rancho Santa Fe 69kV line	2012
32	201	Boulevard Station 138kV Bus	2013
78	300	Imperial Valley Sub 230kV Bus	2013
103	27	Border Sub 69 kV Bus	2013
124	600	Imperial Valley Substation 230kV bus	2013
137	260	Encina Substation 230kV bus	2013
150	47.4	Border Substation	2013
189	260	Encina 138kV Substation	2013
159A	400	Imperial Valley-Miguel new 230/500kV Sub 230kV bus	2013
337	25.75	Borrego Substation 69kV	2013
510	200	Imperial Valley Substation 230kV bus	2013
590	150	Imperial Valley Sub 230kV bus	2013
608	250	Imperial Valley Sub 230kV bus	2013
72	500	Proposed Lee Lake Substation	2014
442	125	Imperial Valley 230kV	2014
493	299	Sunrise Powerlink 500kV line	2014
561	200	Imperial Valley Sub 230kV bus	2014
565	100	Miguel-Mission 230kV	2014
574	308	Otay Mesa Sub 230kV Bus	2014
429	100	Imperial Valley Substation	2015
555	92	Boulevard Substation 138kV	2015
106A	160	Boulevard Sub 138kV Bus	2015

Assumptions for Transmission Upgrades

Transmission upgrades are modeled in the operational Deliverability Assessment based on their estimated COD. A transmission upgrade is modeled in a study year if the estimated COD is before the summer of the study year. All the required SPSs are assumed to be in-service when the associated generation project is in commercial operation.

Table 6.5: Transmission Upgrades in SDG&E Area in the Operational Deliverability Assessment

Network Upgrade	First Operational Deliverability Study Year
Proposed East County Substation 500/230/138 kV (also known as ECO)	2013
Proposed Boulevard 138/69/12 kV Substation	2013
Proposed Boulevard-ECO 138 kV Transmission Line	2013
Sunrise Powerlink 500 kV Transmission Project	2012
Bay Boulevard Substation – South Bay Substation Relocation Project	2014
Reconfigure Carlton Hills-Sycamore-Santee and Carlton Hills-Mission to Carlton Hills-Sycamore and Sycamore-Santee 138 kV Transmission Lines	2012
Second 230/138 kV Transformer Bank at Miguel	2012
Reconductor East Gate-Rose Canyon 69 kV Transmission Line	2012
Reconductor Peñasquitos-Del Mar 69 kV Transmission Line	2012
New Escondido- Ash 69 kV Transmission Line # 2	2012
Reconductor San Luis Rey-Melrose tap 69 kV Line Section	2012
Reconductor Poway-Pomerado 69 kV Transmission Line	2014
Replace Los Coches 138/69 kV Bank 51	2013
Upgrade terminal line equipment on TL642A South Bay – Montgomery Tap 69 kV	2012
Upgrade terminal line equipment on TL603B Sweetwater - Sweetwater Tap 69 kV	2014
Upgrade TL644 South Bay – Sweetwater 69 kV	2013
New Sycamore-Bernardo 69 kV Transmission Line	2015
South Orange County Reliability Project	2015

Method for Determining Deliverable Partial Capacity

Assuming system conditions cannot accommodate the full deliverability of all generators in the study area that will be in commercial operation for the study year, the partial deliverability of each generator is determined from the amount of its power output that can be accommodated on a portion of the transmission constraint that is binding in the deliverability power flow. For each generator, the portion of the binding transmission constraint is calculated as a function of the queue position, generator's size and its flow impact on the constraint.

For each deliverability constraint facility, the available capacity without the generation projects being tested is allocated to projects in the order from higher queued projects to lower queued projects until it is depleted. The projects in the same cluster are considered to have the same queue position. If there is available partial capacity for projects in the same cluster, each project's partial deliverability capacity is determined based on the generator's size and its flow impact.

The deliverability constraints and partial deliverability amounts for particular projects are presented in the applicable Appendix A, Individual Project Reports.

7. Reliability Study Steady-State Analysis

7.1 Detailed Base Case Assumptions

The Reliability Study evaluated SDG&E's transmission system under stressed conditions. The steady-state studies identified thermal overloads due to the dispatch of C1C2 Projects. C1C2 Projects were dispatched as one cluster.

The steady-state power flow analysis in the Reliability Study was performed to ensure that with the proposed interconnections SDG&E's transmission system remains in full compliance with North American Electric Reliability Corporation (NERC) reliability standards TPL-001, 002, 003 and 004. The results of this power flow analysis will serve as documentation that the reliability impacts of new facilities and their connections on interconnected transmission systems are evaluated.

The CAISO and SDG&E cannot guarantee that C1C2 Projects can operate at maximum rated output at all times without adverse system impacts, especially during the times and seasons not studied in the Phase II Study.

The following power flow base cases were used for the analysis in the Phase II Study:

A. 2014 Heavy Summer Base Case:

   The Phase II Reliability Study Heavy Summer case modeled all approved projects in the SDG&E area. The SDG&E system was modeled with a 5,277 MW (load + losses) target (1-in-10 CEC 2014 load forecast) and a 3,700 MW Cut Plane import target. The Heavy Summer case includes transmission system updates provided by CFE and IID. The loads and topology of other WECC areas replicated the 2015 Heavy Summer 3-Scenario approved base case (15hs2a.sav). The Heavy Summer case modeled relatively high cut-plane imports and low In-Basin generation.

B. 2014 Light Load Base Case:

   The Phase II Reliability Study case modeled all approved projects in the SDG&E area. The SDG&E system was modeled with a 2,902 MW (load + losses) target (55% of the 1-in-10 CEC 2014 load forecast) and a 1,450 MW Cut Plane import target. The Light Load case includes transmission system updates provided by CFE and IID. The loads and topology of other WECC areas replicated the 2014 Light Autumn 1-Scenario approved base case (14la1sa.sav). The Light Load case modeled relatively high cut-plane imports and low In-Basin generation.

While it is impractical to study all combinations of system load and generation levels during all seasons and at all times of the day, these two seasons represent extreme loading and generation conditions for the study area.

These base cases modeled all CAISO-approved SDG&E transmission projects that would be operational by 2014 and any CAISO-approved projects that will be operational after 2014, provided that CAISO and SDG&E agreed to the reason for including these projects. All approved SDG&E transmission projects were added to the case as described in Section 4. The

base cases also modeled all proposed generation projects in the SDG&E area which are higher than the C1C2 Projects in the CAISO Controlled Grid Generation Queue. These generation projects were modeled along with their proposed transmission upgrades necessary for their interconnection as noted in Section 4. However, some generation projects that are electrically remote from the C1C2 Projects were either turned off or modeled with reduced output to balance the loads and resources in the power flow model. Please see Appendix C for additional details regarding SDG&E generation dispatch.

The Deliverability Assessment identified both Reliability Network Upgrades (RNUs) and Delivery Network Upgrades (DNUs). All upgrades identified in the Deliverability Assessment were modeled in the Reliability Study Post-C1C2 cases, as listed in Tables 7.1 and 7.2.

Table 7.1: Deliverability Assessment Identified RNUs Modeled in the Reliability Study

	Description of Upgrade
1	Participate in existing Imperial Valley SPS for multiple N-1 and N-2 contingencies
2	Participate in existing Otay Mesa Energy Center Generator SPS for N-1 and N-2 contingencies
3	Implement an SPS to trip C1C2 generation to protect Mission-Old Town 230 kV line for N-2 contingencies
4	Implement an SPS to trip the San Luis Rey 138/69 kV transformer bank to prevent overload of Cannon-San Luis Rey 138 kV line for an N-2 contingency

Table 7.2: Deliverability Assessment Identified DNUs Modeled in the Reliability Study

	Description of Upgrade
1	Reconfigure TL23041 and TL23042 at Miguel Substation to create two Otay Mesa-Miguel 230 kV lines
2	Install 2nd ECO 230/138 kV transformer bank
3	Reconductor Escondido-Palomar Energy 230 kV lines #1 and #2
4	Reconductor Friars-Doublet Tap 138 kV line

7.2 Reliability Study Steady-State Results

SDG&E's Reliability Study dispatched all C1C2 Projects regardless of Deliverability Status. Dispatched generation includes existing and queued generation. The results of the Reliability Study's steady-state power flow analysis and the associated power flow plots for the C1C2 Projects are shown in Appendices D and E, respectively.

Not all pre-C1C2 Projects may be simultaneously dispatched at rated output due to the constraints summarized below:

A. Generation projects interconnecting to ECO and Boulevard Substation are limited to 1,150 MW due to the CAISO N-1 generation tripping limit (for N-1 of a single ECO 500/230 kV transformer bank). This limitation is maintained between both the pre-C1C2 Projects and post-C1C2 Projects cases. Furthermore, in order to dispatch generation from C1C2 Projects connected to Boulevard or ECO, the output of higher-queued projects connecting to Boulevard or ECO substations was reduced. Generators connecting at Boulevard or ECO substations will be required to participate in the proposed ECO/Boulevard SPS which trips all dispatched generation connected at ECO 230 and/or 138 kV and Boulevard substations in the event of an N-1 of the ECO 500/230 kV transformer.

B. Constraints included observing the Path 43 North of SONGS maximum flow limit of 2,440 MW. Reduction of the output of the existing gas-fired generation at Imperial Valley Substation allows these conditions to be met after dispatching the C1C2 Projects. The existing gas-fired generation at Imperial Valley Substation was modeled off in all cases, both pre-C1C2 Projects and post-C1C2 Projects, to simulate a worst case scenario for steady-state voltage, post-transient, and transient studies. Dispatching the existing gas-fired generation at Imperial Valley Substation is a worst case scenario for Light Load thermal conditions. If the existing gas-fired generation at Imperial Valley Substation were dispatched in the Light Load conditions, the output of the C1C2 Projects would be limited.

C. Dispatching existing generation at the Otay Mesa switchyard with C1C2 Projects shows an N-0 overload, 103%, on the Old Town-Penasquitos 230 kV line. Reducing 100 MW of existing generation at Otay Mesa switchyard allows full dispatch of C1C2 Projects. Reducing imports from CFE also allows full dispatch of C1C2 Projects. If the existing generation at Otay Mesa switchyard were fully dispatched and import from CFE is at the level shown in Table 4.4, then during Light Load conditions the output of the C1C2 Projects would be limited.

7.2.1 Steady-State Thermal Results for C1C2 Projects in SDG&E System

The scenarios studied include Network Upgrades identified in the Deliverability Assessment, as noted in Tables 7.1 and 7.2, and dispatch constraints, as noted in Section 7.2. The thermal overloads listed in Table 7.3 require mitigation in addition to the Network Upgrades identified by the Deliverability Assessment.

Table 7.3: Reliability Study Thermal Results

Contingency	Overloaded Facilities	Season	Rating (MVA)	Pre-C1C2 Loading	Post-C1C2 Loading
Category C: Escondido-Palomar Energy 230 kV lines #1 and #2	Bernardo-Felicita Tap 69 kV	Light Load	102	0.72	1.13
Category B: ECO 230/138 kV transformer banks #1 or #2	ECO 230/138 kV transformer banks #1 or #2	Light Load	477	Not in-service	1.13
		Heavy Summer	477	Not in-service	1.12
Category C: Stuck Breaker (Old Town-Silvergate 230 kV & Old-Town-Mission-Silvergate 230 kV) with the Deliverability Assessment identified SPS	Mission-Old Town 230 kV line	Heavy Summer	456	0.840	1.03

7.2.2 Steady-State Voltage Results in SDG&E System

No steady-state voltage violations were observed in the SDG&E transmission system due to the addition of the C1C2 Projects.

7.2.3 Steady-State Reactive Power Deficiency Analysis Results

The results of the steady-state reactive power deficiency analysis did not identify a reactive power deficiency with asynchronous C1C2 Projects modeled with unity power factor at the generator terminals. The addition of C1C2 Projects does not cause new voltage deviations greater than the allowable 5% following contingencies. Also, the addition of the asynchronous C1C2 Projects does not cause any SDG&E system voltages to exceed minimum and maximum thresholds. However, since it is impractical to study all system conditions SDG&E Grid Operations may face in real time, asynchronous generator projects are urged to construct generators with 0.95 lagging to 0.95 leading power factor range capability to meet SDG&E's specified voltage schedule. Detailed results of the steady-state reactive power deficiency analysis are provided in Appendix L.

7.2.4 Affected Systems

The Reliability Study identified IID's and CFE's transmission systems as impacted due to the dispatch of the C1C2 Projects. However, by participating in the IV SPS, the impact to the CFE transmission systems appears to be mitigated. Due to the IV SPS, no overloads were identified in the CFE transmission systems as a result of the addition of the C1C2 Projects.

The results of the steady-state thermal analysis indicate that the addition of C1C2 Projects caused one (1) new Category A overload, no new Category B overloads, and no new Category C overloads on the IID transmission system. Both pre-C1C2 Projects and post-C1C2 Projects results show one (1) facility overload for two Category C outages, however because of the pre existing condition the overload is not a result of C1C2 Projects. Table 7.4 summarizes the overloads observed in the IID transmission system. Pre-existing overloads are shown for informational purposes only.

Table 7.4: Affected Systems - IID Thermal Results

Contingency	Overloaded Facilities	Season	Rating (MVA) (Continuous/ Emergency)	Pre-C1C2 Loading	Post-C1C2 Loading
Category A: *(Note 1)*	ELCENTSW 161/92 kV	Light Load	125/137	0.91	1.04
Category A: *(Note 1)*	KNOB-PILOTKNB 161 kV	Light Load	165/165	1.01	1.16
Category C: IID IVSUB-ELCENTSW 230 kV #1 and #2	YUCCA-PILOTKNB 161 kV	Light Load	134/134	0.99	1.04
Category C: IID IVSUB-IMPRLVLY 230 kV #1 and #2				1.06	1.15

Note 1: Also overloads for Category B and Category C

8. Short Circuit Duty Analysis

Using SDG&E's short circuit duty criteria as summarized in Section 5.2, Table 5.2, short circuit studies were performed to determine the maximum fault duty on all buses in the SDG&E service territory. This study determined the impact of increased fault current resulting from C1C2 Projects plus the associated Delivery Network Upgrades.

The short circuit analysis results are provided in Appendix G.

8.1 Results

8.1.1 SDG&E Transmission System

Short circuit analysis results indicate that the addition of all C1C2 Projects plus the associated Delivery Network Upgrades will not cause any SDG&E circuit breakers to become overstressed.

The ICs are not responsible for mitigating any pre-existing overstressed circuit breakers.

8.1.2 Affected Systems

8.1.2.1 CFE Transmission System

CFE was identified as an Affected System Operator in the short circuit analysis due to the addition of C1C2 Projects and their associated Delivery Network Upgrades. The short circuit study results showed that the addition of some C1C2 Projects and their associated Delivery Network Upgrades caused the available fault current at CFE's Tijuana 230 kV bus to increase by 27%. SDG&E's short circuit model does not include a detailed model for the CFE system. SDG&E explicitly models connections to CFE's Tijuana 230 kV and La Rosita 230 kV buses, however only equivalent representations of all other CFE facilities are modeled. Since SDG&E does not model details of the CFE system in the short circuit study case, including circuit breakers in the CFE system, it is unknown what, if any, circuit breakers are overstressed. The CAISO will coordinate, to the extent possible, further communications and short circuit study efforts between CFE and the responsible C1C2 Project developers so CFE can study, investigate, and identify necessary mitigation.

9. Transient Stability Analysis

The transient stability analysis was conducted to ensure that the addition of the C1C2 Projects will not adversely impact the stability of the interconnected system following disturbances and abnormal system conditions. In performing the analysis, both Heavy Summer and Light Load cases were evaluated. Two (2) 2015 Reliability Study Heavy Summer base cases (as described in Table 9.1) and two (2) 2015 Reliability Study Light Load base cases (as described in Table 9.2) were used.

Table 9.1: Transient Stability Heavy Summer Base Cases

	Base Case	Description
1	c1c2-hs-pre-r12.sav	Pre-Cluster 1 & 2 base case with high In-Basin generation
2	c1c2-hs-pstup-r15.sav	Post-Cluster 1 & 2 base case with high In-Basin generation

Table 9.2: Transient Stability Light Load Base Cases

	Base Case	Description
1	c1c2-ll-pre-r12.sav	Pre-Cluster 1 & 2 base case with high In-Basin generation
2	c1c2-ll-pstup-r15.sav	Post-Cluster 1 & 2 base case with high In-Basin generation

The C1C2 Projects were analyzed per the criteria set forth in Section 5.3 to identify adverse impacts to the WECC system. Each pre-C1C2 Project case was subjected to 31 disturbances and each post-C1C2 Projects case was subjected to 32 disturbances to determine the system performance under transient conditions following disturbances on the SDG&E and neighboring transmission systems. If the voltage at any of the monitored buses deviated by more than that allowed by the standard shown in Table 5.3, the C1C2 Projects were deemed to be in violation of WECC/NERC criteria. Pursuant to LGIA Appendix H, the C1C2 Projects were also reviewed to ensure they did not trip offline during low voltage conditions (caused by a disturbance) for a specified time period (low voltage ride-through). Details of the general results (not project-specific) are covered in Appendix I (Worst Case Analysis) and Appendix J (Transient Stability Plots). The project-specific results are provided in Appendix A.

9.1 Transient Stability Study Scenarios

Disturbance simulations were performed for a study period of 10 seconds for pre-C1C2 Project cases and 20 seconds for post-C1C2 Project cases to determine whether the C1C2 Projects would cause any system instability during a variety of line and generator outages. Category B and Category C line and generator outages in the vicinity of the C1C2 Projects were used for this evaluation.

Disturbances, or switching sequences, are simulated by the "switch" files outlined in Table 9.3: Switch Files. The pre-C1C2 Project cases were subjected to only the first 31 disturbances listed

in Table 9.3 and the post-C1C2 Project cases were subjected to the first 29 disturbances and the 32nd disturbance. A description of the switching sequences is provided in Appendix H.

Table 9.3: Switch Files

	Switch Files
1	C493-SCR-slo.swt
2	Dev-Val-slo.swt
3	FLAT.swt
4	HAA-NGila-slo.swt
5	HDWSH-NGila-slo.swt
6	IV-C493-slo.swt
7	IV-ECO-RAS-slo.swt
8	IV-ECO-slo.swt
9	IV-RAS-dlo.swt
10	IV-RASX-dlo.swt
11	IVECO-RASX-slo.swt
12	IVROA(IV)-slo.swt
13	IVROA(ROA)-slo.swt
14	MES-HAA-slo.swt
15	ML-ECO-RAS_slo.swt
16	ML-MS-RAS-dlo.swt
17	MLECO-RASX-slo.swt
18	NGila-IV-slo.swt
19	pal-col-slo.swt
20	PaloVerde-g1.swt
21	PaloVerde-g2.swt
22	PEN-ES-dlo.swt
23	PEN-SX-slo.swt
24	PEN230kv-dlo.swt
25	SO-SA-dlo.swt
26	SO-SA-MS-dlo.swt
27	SO-TA-dlo.swt
28	SONG-g1.swt
29	SONGS-g2.swt
30	OM-MLX-SX-prec1c2-dlo.swt (only for pre-C1C2 Projects)
31	OM-SY-prec1c2-dlo.swt (only for pre-C1C2 Projects)
32	OM-MLX-SX-postc1c2-dlo.swt (only for post-C1C2 Projects)

9.2 Parameters Monitored to Evaluate System Stability Performance

9.2.1 Rotor Angle

The rotor angle plots shown in Appendix J provide a measure for determining how the proposed generation units would swing with respect to one another. The plots also provide a measure of how the units would swing with respect to other generation units in the area.

9.2.2 Bus Voltage

The bus voltage plots, in conjunction with the relative rotor angle plots, also shown in Appendix J, provide a means of detecting out-of-step conditions. The bus voltage plots are useful in assessing the magnitude and the duration of post-disturbance voltage dips and peak-to-peak voltage oscillations. The bus voltage plots also give an indication of system damping and the level to which voltages are expected to recover in steady-state conditions. In addition to obtaining the bus voltage deviations from plots, Appendix I contains information on the bus voltage deviations from the Worst Condition Analysis.

9.2.3 Bus Frequency

The bus frequency plots, also shown in Appendix J, provide information on the magnitude and the duration of post-fault frequency swings with the Project in-service. These plots indicate the extent of possible over-frequency or under-frequency, which can occur because of the imbalance between the generation and load within an area. In addition to obtaining this information from plots, Appendix I contains information on the frequency deviations as shown from the Worst Condition Analysis.

9.2.4 Other Parameters

The following parameters can also be monitored when required:

Generator Terminal Power	Bus Angle
Generator Terminal Voltage	Line Flow
Generator Rotor Speed	Voltage Spread
Generator Field Voltage	Frequency Spread

9.3 Results

9.3.1 SDG&E Transmission System

The results of the transient stability analysis indicated that the addition of C1C2 Projects does not cause any transient stability issues.

9.3.2 Affected Systems

The transient stability analysis did not identify any Affected Systems due to the addition of the C1C2 Projects.

10. Post-Transient Voltage Stability Analysis

Using the Heavy Summer and Light Load cases described in Section 7.1, post-transient voltage stability analysis indicated that, under the studied conditions and system configuration (including all Delivery Network Upgrades), the addition of C1C2 Projects did not result in any post-transient voltage deviations of 5% or more for Category B contingencies and 10% or more for Category C contingencies from the pre-project levels or cause the SDG&E transmission system to fail to meet applicable voltage criteria.

C1C2 Projects will not be responsible for pre-existing post-transient voltage deviations.

Detailed results of this analysis are provided in Appendix K.

11. Post-Transient Reactive Power Deficiency Analysis

Using the Heavy Summer and Light Load cases described in Section 7.1, the reactive power deficiency analysis indicated that, under the studied conditions and system configuration (including all Delivery Network Upgrades for C1C2 Projects), cases converged for a 5% SDG&E area load increase followed by Category B contingencies and a 2.5% SDG&E area load increase followed by Category C contingencies.

The reactive power deficiency analysis results indicated that the addition of all C1C2 Projects (including the associated Delivery Network Upgrades) did not cause post-transient reactive power deficiency on the SDG&E transmission system.

Detailed results of this analysis are provided in Appendix K.

12. Mitigation

The mitigation requirements triggered by the C1C2 Projects, based on the results described in Sections 6-11, are as follows.

12.1 Facilities for Project Interconnections

The plan of service for the Reliability Network Upgrades required for the physical interconnection of the C1C2 Projects is discussed in detail in each Individual Project Report (Appendix A).

12.2 Delivery Network Upgrades

The scope for the Delivery Network Upgrades for C1C2 Projects in the SDG&E System is discussed below.

12.2.1 Reconfigure TL23041 and TL23042 at Miguel Substation to create two Otay Mesa-Miguel 230 kV lines

A. Install 1-230 kV breaker, 2-230 kV disconnects, relaying, new steel pole, and 600 feet of bundled 900 ACSS/AW for TL23041, Otay Mesa-Miguel-Sycamore 230 kV line

B. Install 1-230 kV breaker and relaying for TL23042, Miguel-Otay Mesa-Bay Boulevard 230 kV line

12.2.2 Install 2nd ECO 230/138 kV transformer bank

A. Install a second ECO 230/138 kV transformer bank

B. Install 2-230 kV breakers, 2-230 kV disconnects, 2-138 kV breakers, and 2-138 kV disconnects

12.2.3 Reconductor Escondido-Palomar Energy 230 kV #1 and #2 lines

A. Reconductor the spans of 605 ACSS/AW to 900 ACSS/AW on Escondido-Palomar Energy 230 kV lines #1 and #2

B. Relocate two overhead 69 kV circuits and convert to underground

C. Install 8-230 kV disconnects and adjust relaying at Escondido Substation

12.2.4 Reconductor Friars-Doublet Tap 138 kV line

A. Reconductor 10,500 feet of 400 MCM with 636 ACSR/AW

B. Reconductor 1750 AL underground cable in the substation getaways to 1750 CU

12.3 Reliability Network Upgrades

12.3.1 Special Protection Systems

Per the CAISO guidelines, all SPSs are classified as Reliability Network Upgrades because their cost is less than [redacted]. This is to prevent overburdening of CAISO's congestion management system which can increase processing time to a point that could create reliability concerns.

12.3.1.1 Imperial Valley SPS

Currently, there is an Imperial Valley Special Protection System in place which limits the impact of generation plants connected to the Imperial Valley Substation for various N-1 and N-2 contingencies and mitigates adverse impacts to the SDG&E, CFE, and IID's transmission systems. Participation in this existing IV SPS is proposed as a Reliability Network Upgrade.

The Imperial Valley area generation output is currently limited by the CAISO criteria of 1,150 MW of generation tripping for a Category B contingency and 1,400 MW of generation tripping for a Category C contingency. Study results for the C1C2 Projects showed that tripping 1,400 MW of generation for N-2 and 1,150 MW of generation for N-1 contingencies mitigated any adverse impacts on neighboring systems. No additional generation tripping was required beyond the 1,400 MW limit for N-2 or 1,150 MW for N-1.

Currently, there are 1,070 MW of generation connected at Imperial Valley Substation which is subject to the Imperial Valley generation tripping SPS. It should be assumed that any generation which would impact the facilities protected by the Imperial Valley SPS would be included in the generation tripping scheme covered by this SPS. Some of the C1C2 Projects will be subject to this SPS. The details are provided in Appendix A.

All new SPSs and modifications to the existing ones are subject to review by Affected System Operators, members of the Imperial Valley RAS Technical Committee, and review and approval by the WECC RASRS.

12.3.1.2 Participate in Proposed ECO 500/230 kV transformer bank outage SPS

In the event of the N-1 contingency of the 500/230 kV transformer bank at ECO Substation, all generation interconnected at Boulevard and ECO substations must be tripped by this SPS. In addition, as described in Section 7.2, the combined generation dispatch at these two substations is limited to 1,150 MW. It is assumed that any generation interconnected at Boulevard and ECO substations will participate in generation reduction, via this SPS, to prevent generation dispatch greater than 1,150 MW. Some of the C1C2 Projects will be subject to this SPS. The details are provided in Appendix A.

12.3.1.3 Implement an SPS to protect ECO 230/138 kV transformer banks

Under the N-1 contingency of one ECO 230/138 kV transformer bank, the addition of C1C2 Projects connected at ECO 138 kV and Boulevard 138 KV substations, causes the remaining ECO 230/138 kV transformer bank to overload. An SPS is proposed to trip generation connected at Boulevard and ECO substations until the overload is relieved. Some of the C1C2 Projects will be subject to this SPS. The details are provided in Appendix A.

12.3.1.4 Implement an SPS to protect Bernardo-Felicita Tap 69 kV transmission line

The addition of C1C2 Projects caused an emergency rating overload on the Bernardo-Felicita Tap 69 kV transmission line following an N-2 contingency of Escondido-Palomar Energy 230 kV lines #1 and #2. An SPS is proposed to trip C1C2 Projects after detecting an emergency rating overload on the Bernardo-Felicita Tap 69 kV transmission line and detecting the outage of Escondido-Palomar Energy 230 kV lines #1 and #2. Some of the C1C2 Projects will be subject to this SPS. The details are provided in Appendix A.

12.3.1.5 Participate in Existing Otay Mesa Energy Center Generator SPS

Currently, there is an SPS to trip existing generation at Otay Mesa Energy Center to protect CFE's transmission system in the event of an N-2 contingency of the Otay Mesa-Miguel/Bay Blvd Tap-Bay Blvd 230 kV and Otay Mesa-Miguel/Sycamore Tap-Sycamore 230 kV transmission lines. Some of the C1C2 Projects will be add to this existing SPS. The details are provided in Appendix A.

In addition, the SPS will be modified to monitor the parallel Miguel-Otay Mesa 230 kV lines #1 and #2. An SPS is proposed to trip some C1C2 Projects after detecting an emergency rating overload of one line following the N-1 contingency of the parallel line. Some of C1C2 Projects will be subject to this modification of the SPS. The details are provided in Appendix A.

12.3.1.6 Implement an SPS to protect Mission-Old Town 230 kV transmission line

The addition of C1C2 Projects caused an emergency rating overload on the Mission-Old Town 230 kV transmission following a Category C contingency, either a stuck breaker of Old Town 230 kV 1T or N-2 of Silvergate-Old Town 230 kV lines #1 and #2. An SPS is proposed to trip C1C2 Projects after detecting an emergency rating overload on the Mission-Old Town 230 kV transmission line and detecting the outage of both Silvergate-Old Town 230 kV #1 and #2 transmission lines. Some of the C1C2 Projects will be subject to this SPS. The details are provided in Appendix A.

12.3.1.7 Implement an SPS to protect Cannon-San Luis Rey 138 KV transmission line

The addition of C1C2 Projects caused emergency rating overloads on the San Luis Rey 138/69 kV transformer bank and Cannon-San Luis Rey 138 kV transmission line following an N-2 contingency of Encina-San Luis Rey 230 kV line and Encina-San Luis Rey-Palomar Energy 230 kV line. An SPS is proposed to trip the San Luis Rey 138/69 kV transformer bank after detecting overloads on the San Luis Rey 138/69 kV transformer bank or Cannon-San Luis Rey 138 kV transmission line. Some of the C1C2 Projects will be responsible to finance the cost of this SPS. The details are provided in Appendix A.

12.3.2 Mitigation for Steady-State Voltage Violation

There were no steady-state voltage violations identified to mitigate.

12.3.3 Mitigation for Short Circuit Duty

There were no overstressed circuit breakers in SDG&E's transmission system due to the C1C2 Projects.

12.3.4 Mitigation for Transient Stability

There were no transient stability issues identified to mitigate.

12.3.5 Mitigation for Post-Transient Voltage Stability

There were no post-transient stability issues identified to mitigate.

12.3.6 Mitigation for Post-Transient Reactive Power Deficiency

There were no reactive power deficiency issues identified to mitigate.

12.3.7 Mitigation for Steady-State Reactive Power Deficiency

There were no reactive power deficiency violations identified to mitigate. Since it is impractical to study all system conditions SDG&E Grid Operations may face in real time, asynchronous generator projects are urged to construct generators with 0.95 lagging to 0.95 leading power factor range capability in order to meet SDG&E's specified voltage schedule. Synchronous generators will be required to provide 0.90 lagging to 0.95 leading power factor per LGIA 9.6.1.

12.4 Neighboring Utility Upgrades – SCE System

The proposed scope of work for the Delivery Network Upgrades for C1C2 Projects in the SCE System is discussed below.

12.4.1 Loop Lugo-Mohave 500 kV T/L into Pisgah Sub

Loop Lugo-Mohave 500 kV transmission line into Pisgah Substation

12.4.2 Add Series Cap Banks on Nipton-Pisgah & Mohave-Pisgah 500 kV T/Ls

Add Series Capacitor Banks on Nipton-Pisgah & Mohave-Pisgah 500 kV T/Ls

12.4.3 New Red Bluff-Valley 500 kV T/L

Add new Red Bluff-Valley 500 kV transmission line

12.4.4 Colorado River-Red Bluff No.3 500 kV T/L

Add Colorado River-Red Bluff No.3 500 kV transmission line

13. Environmental Evaluation/Permitting

See Individual Project Reports for discussion on potential environmental evaluation and permitting issues associated with specific projects. The intent of the section is not to describe the entire permitting process, but to inform the ICs that a significant amount of time may be needed for the permitting process.

13.1 CPUC General Order 131-D

SDG&E is subject to the jurisdiction of the California Public Utilities Commission (CPUC) and must comply with CPUC General Order 131-D (Order) on the construction, modification, alteration, or addition of all electric transmission facilities (i.e., lines, substations, switchyards, etc.). This includes facilities to be constructed by others and deeded to SDG&E. In most cases where SDG&E's electric facilities are under 200 kV and are part of a larger project (i.e. electric generation plant), the Order exempts SDG&E from obtaining an approval from the CPUC provided its planned facilities have been included in the larger project's California Environmental Quality Act (CEQA) review, the review has included circulation with the State Clearinghouse, and the project's lead agency (i.e., California Energy Commission) finds no significant unavoidable environmental impacts. SDG&E or the project developer may proceed with construction once SDG&E has filed notice with the CPUC and the public on the project's exempt status, and the public has had a chance to protest SDG&E's claim of exemption. If SDG&E facilities are not included in the larger project's CEQA review, or if the project does not qualify for the exemption, SDG&E may need to seek approval from the CPUC (i.e., Permit to Construct) taking as much as 18 months or more since the CPUC would need to conduct its own environmental evaluation (i.e. Negative Declaration or Environmental Impact Report).

When SDG&E's transmission lines are designed for immediate or eventual operation at 200 kV or more, the Order requires SDG&E to obtain a Certificate of Public Convenience and Necessity (CPCN) from the CPUC unless one of the following exemptions applies: the replacement of existing power line facilities or supporting structures with equivalent facilities or structures, the minor relocation of existing facilities, the conversion of existing overhead lines (greater than 200 kV) to underground, or the placing of new or additional conductors, insulators, or their accessories on or replacement of supporting structures already built. Obtaining a CPCN can take as much as 24 months if the CPUC needs to conduct its own CEQA review.

Regardless of the voltage of the PTO's Interconnection Facilities, SDG&E recommends that the project proponent include those facilities in its project description and application to the lead agency performing CEQA review on the project. The lead agency must consider the environmental impacts of the interconnection electric facility, whether built by the developer with the intent to transfer ownership to SDG&E or to be built and owned by SDG&E directly. If the lead agency makes a finding of no significant unavoidable environmental impacts from construction of substation or under 200 kV power line facilities, SDG&E may be able to file an Advice Letter with the CPUC and publish public notice of the proposed construction of the facilities. The noticing process takes about 90 days if no protests are filed, but should be done as early as possible so that a protest does not delay

construction. SDG&E has no control over the time it takes the CPUC to respond when issues arise. If the protest is granted, SDG&E may then need to apply for a formal permit to construct the project (i.e. Permit to Construct).

Please see Section III, in General Order 131-D. This document can be found in the CPUC's web page at:

http://www.cpuc.ca.gov/PUBLISHED/GENERAL_ORDER/589.htm

13.2 CPUC Section 851

Because SDG&E is subject to the jurisdiction of the CPUC, it must also comply with Public Utilities Code Section 851. Among other things, this code provision requires SDG&E to obtain CPUC approval of leases and licenses to use SDG&E property, including rights-of-way granted to third parties for Interconnection Facilities. Obtaining CPUC approval for a Section 851 application can take several months or years, and requires compliance with the California Environmental Quality Act (CEQA). SDG&E recommends that Section 851 issues be identified as early as possible so that the necessary application can be prepared and processed. As with GO 131-D compliance, SDG&E recommends that the project proponent include any facilities that may be affected by Section 851 in the lead agency CEQA review so that the CPUC does not need to undertake additional CEQA review in connection with its Section 851 approval.

14. Upgrades, Cost Estimates, and Time to Construct Estimates

The cost estimates are good faith estimates and are based on the published unit costs, when applicable. Customized costs were developed when the unit costs did not reflect the unique circumstances of a project. The customized costs include: anticipated land acquisition costs, environmental mitigation, licensing/permitting, looping lines into substations, new switchyards, substation upgrades not included in unit costs, and PTO's Interconnection Facilities.

The Commercial Operation Dates of the C1C2 Projects are dependent on the completed construction and energizing of the identified Network Upgrades. Projects may connect before the Delivery Network Upgrades are in-service with an interim-EO status. Based on the needed time to license/permit, design, procure material, and construct, it may not be feasible to complete all the Delivery Network Upgrades needed for this cluster before the requested Commercial Operation Dates.

Some of the projects also require Reliability Network Upgrades to accommodate their physical interconnections. Based on the time needed to license/permit, design, procure material, and construct, it may not be feasible to complete all Reliability Network Upgrades necessary for all the C1C2 Projects before the requested In-Service Dates. Projects cannot connect until all Reliability Network Upgrades are in-service. Specific details are presented in the Individual Project Reports for applicable projects.

Costs for each generation project are confidential and are not published in this Group Report. Each IC is also receiving an Individual Project Report (Appendix A), specific only to their generation project, containing the details of the IC's cost responsibilities.

The estimated cost of **Reliability Network Upgrades** identified in this Group Study is assigned to all Interconnection Requests in that Group Study according to the following rules: (a) short circuit related Reliability Network Upgrades will be assigned pro rata on the basis of the total short circuit duty contribution of each Generating Facility and its associated Network Upgrades, (b) for all other Reliability Network Upgrades, the cost will be assigned pro rata on the basis of the maximum megawatt electrical output of each proposed new Large Generating Facility or the amount of megawatt increase in the generating capacity of each existing Generating Facility as listed by the Interconnection Customer in its Interconnection Request. The Reliability Network Upgrades required for a project to "physically" interconnect (i.e. bus extension, new switchyard, etc.) are presented only in the Individual Project Reports. Some mitigation measures are related to the telecommunications needed for each individual SPS. SPS costs may have two components. The cost for the SDG&E protection and communication equipment for the monitored facilities is assigned pro rata on the basis of the maximum megawatt electrical output of each project. The cost for the protection and communication equipment to interface between SDG&E and each project is assigned directly to the participating project.

The estimated cost of all **Delivery Network Upgrades** identified in the Deliverability Assessment are assigned to all Interconnection Requests selecting Full Capacity Deliverability Status based on the flow impact of each such Large Generating Facility on the Delivery Network Upgrades as determined by the generation distribution factor methodology.

The estimated cost of all **PTO's Interconnection Facilities** is assigned to each Interconnection Request individually. The cost estimates for the PTO's Interconnection Facilities are all site specific and details are provided in each Individual Project Report.

The cost of the mitigation plan for overloads of SDG&E facilities attributed to the C1C2 Projects evaluated as a cluster is [redacted] as shown in Table 14.1. In addition, all of the C1C2 Projects requesting Full Capacity in the SDG&E area were also identified as contributing to SCE overloads. Network Upgrades associated with the SCE overloads are shown in Table 14.2. The cost of the mitigation plan for overloads on SCE facilities attributed to SDG&E and SCE C1C2 Projects is [redacted] The cost shown in Table 14.2 is the total cost of the upgrades for SDG&E and SCE C1C2 Projects. Participating SDG&E C1C2 Projects will only pay their allocated cost and the SCE C1C2 Projects will pay their share of this total cost.

PTO's Interconnection Facilities and Reliability Network Upgrades required to physically interconnect specific projects are identified (as appropriate) in each project's Appendix A. The non-binding, good faith estimate of time to construct (license/permit, design, procure material, and construct) the facilities identified in the report will be project-specific and will be based upon the assumption that the environmental permitting obtained by the IC is adequate for permitting all SDG&E activities.

It is assumed that the Interconnection Customers will include the PTO's Interconnection Facilities and Network Upgrades work scope in their environmental impact study/report to the regulatory agency having jurisdiction over the permitting of their project. In the time to construct estimates, SDG&E included the time required for a PTC or CPCN, if it was anticipated. If the CPUC requires licensing when it was not anticipated by SDG&E, timing for the upgrade could be extended by two to three years.

Table 14.1: SDG&E Network Upgrades, Estimated Costs, Estimated Time to Construct

Type of Upgrade	Upgrade		Estimated Cost x 1,000 *(Note 1)*	Estimated Time to Construct *(Note 2)*
Reliability Network Upgrades	Participate in existing Imperial Valley SPS for multiple N-1 and N-2 contingencies *(Notes 3 & 4)*	SDG&E protection and communication equipment for Imperial Valley Substation, ECO Substation, and C493 switchyard *(Note 5)*	[redacted]	12 Months
		Protection and communication equipment to interface between SDG&E and projects *(Note 6)*	[redacted]	12 Months
	Participate in proposed ECO 500/230 kV transformer bank outage SPS *(Note 3)*	SDG&E protection and communication equipment for ECO Substation (assumed installed with higher-queued projects) *(Note 5)*	[redacted]	-
		Protection and communication equipment to interface between SDG&E and projects (included in IV SPS cost) *(Note 6)*	[redacted]	-
	Implement an SPS to protect ECO 230/138 kV transformer banks *(Note 3)*	SDG&E protection and communication equipment for ECO Substation and Boulevard Substation *(Note 5)*	[redacted]	12 Months
		Protection and communication equipment to interface between SDG&E and projects (included in IV SPS cost) *(Note 6)*	[redacted]	-
	Implement an SPS to protect Bernardo-Felicita Tap 69 kV line for N-2 of Escondido-Palomar Energy 230 kV lines #1 and #2 *(Note 3)*	SDG&E protection and communication equipment for Bernardo Substation, Escondido Substation, and Palomar Energy *(Note 5)*	[redacted]	12 Months
		Protection and communication equipment to interface between SDG&E and projects (included in IV SPS cost) *(Note 6)*	[redacted]	-
	Participate in existing Otay Mesa Energy Center Generator SPS for N-1 and N-2 contingencies *(Note 3)*	SDG&E protection and communication equipment for Miguel Substation and Otay Mesa (already installed) *(Note 5)*	[redacted]	-
		Protection and communication equipment to interface between SDG&E and projects (included in Mission-Old Town SPS cost) *(Note 6)*	[redacted]	-
	Implement an SPS to protect Mission-Old Town 230 kV line for N-2 contingencies *(Note 3)*	SDG&E protection and communication equipment for Mission Substation, Old Town Substation, and Silvergate Substation *(Note 5)*	[redacted]	12 Months
		Protection and communication equipment to interface between SDG&E and projects *(Note 6)*	[redacted]	12 Months
	Implement an SPS to trip the San Luis Rey 138/69 kV transformer bank to prevent overload of Cannon-San Luis Rey 138 kV line for an N-2 *(Note 3)*	SDG&E protection and communication equipment for San Luis Rey Substation, Cannon Substation, and Encina Substation *(Note 5)*	[redacted]	12 Months
		Protection and communication equipment to interface between SDG&E and projects (included in Mission-Old Town SPS cost) *(Note 6)*	[redacted]	-

Type of Upgrade	Upgrade		Estimated Cost x 1,000 *(Note 1)*	Estimated Time to Construct *(Note 2)*
Delivery Network Upgrades	Reconfigure TL23041 and TL23042 at Miguel Substation to create two Otay Mesa-Miguel 230 kV lines	For TL23041, Otay Mesa-Miguel-Sycamore 230 kV line: Install 1-230 kV breaker, 2-230 kV disconnects, and relaying Install a new anchor-bolted dead end steel pole Install approximately 600 feet of bundled 900 ACSS/AW For TL23042, Miguel-Otay Mesa-Bay Boulevard 230 kV line: Install 1-230 kV breaker and relaying	[redacted]	18 Months
	Install 2nd ECO 230/138 kV transformer bank	Install 2nd 230/138 kV transformer bank at ECO Substation Install 2-230 kV breakers, 2-230 kV disconnects, 2-138 kV breakers, and 2-138 kV disconnects Install all associated structures and relaying	[redacted]	36 Months
	Reconductor Escondido-Palomar Energy 230 kV lines #1 and #2	Reconductor the spans of 605 ACSS/AW to 900 ACSS/AW on Escondido-Palomar Energy 230 kV lines #1 and #2 Install new cross arms for 230 kV pole Z202015 Relocate two overhead 69 kV circuits and convert to underground Remove one existing 69 kV cable pole, extend the underground trench package 600 feet into the substation, remove cable and splice in new cable, terminate at two underground rack positions in Escondido Substation Install 8-230 kV disconnects and adjust relaying at Escondido Substation	[redacted]	12 Months
	Reconductor Friars -Doublet Tap 138 kV line	Reconductor 10,500 feet of 400 MCM with 636 ACSR/AW Reconductor 1750 AL underground cable in the substation getaways to 1750 CU	[redacted]	12 Months
Total			[redacted]	**36 Months**

Notes for Table 14.1:

Note 1: *Estimated costs in "as year spent" dollars and in thousands of $ dollars, excluding Allowance for Funds Used During Construction (AFUDC). Estimated costs include land purchases and licensing/permitting costs, when appropriate.*

Note 2: *Time to construct estimates include time for licensing/permitting, when appropriate. The estimated time to construct is for a typical project; construction duration may change due to the number of projects simultaneously in construction. Multiple projects impact resources, system outage availability, and environmental windows of construction. A key assumption is SDG&E will need to obtain CPUC licensing and regulatory approvals prior to design, procurement, and construction of the proposed facilities. The time to construct is not cumulative.*

Note 3: *Per CAISO guidelines, all Special Protection Systems are classified as Reliability Network Upgrades because their cost is less than $1 million per project. This is to prevent overburdening of CAISO's congestion management system which can increase processing time to a point that could create reliability concerns.*

Note 4: *The existing Imperial Valley SPS protects SDG&E, CFE, and IID following various N-1 and N-2 contingencies. All new SPSs and modifications to existing SPSs are subject to review by Affected System Operators, members of the Imperial Valley RAS Technical Committee, and review and approval by the WECC RASRS.*

Note 5: *The SPS cost includes the equipment on the PTO's system. This is a one-time setup and equipment cost. The SPS cost does not include any control, protection, and/or fiber-optic communication costs at the projects' facility.*

Note 6: *The SPS cost includes project-specific equipment required on the PTO's system for interface with the projects, as well as equipment provided to the projects for installation at the projects' facility. Additional SPSs would require updated logic, but minimal/no cost.*

Table 14.2: SCE Network Upgrades, Estimated Costs, Estimated Time to Construct

Type of Upgrade	Upgrade		Estimated Cost x 1,000 Constant Dollar (2011) *(Note 2)*	Estimated Cost x 1,000 Constant Dollar (OD Year) *(Note 2)*		Estimated Time to Construct *(Note 1)*
Delivery Network Upgrades	Loop Lugo-Mohave 500 kV T/L into Pisgah Sub	Loop Lugo-Mohave 500 kV T/L into Pisgah Substation	[redacted]	[redacted]	2018	72 Months
	Add Series Cap Banks on Nipton-Pisgah & Mohave-Pisgah 500 kV T/Ls	Add series caps on the Nipton-Pisgah & Mohave-Pisgah 500 kV T/Ls	[redacted]	[redacted]	2018	72 Months
	New Red Bluff-Valley 500 kV T/L	Build new Red Bluff-Valley 500 kV T/L	[redacted]	[redacted]	2019	84 Months
	New Colorado River-Red Bluff No.3 500 kV T/L	Build new Colorado River-Red Bluff No.3 500 kV T/L	[redacted]	[redacted]	2019	84 Months
Total			[redacted]	[redacted]		**84 Months**

Notes for Table 14.2:

Note 1: *The estimated time to construct (ETC) is for a typical project; schedules duration may change due to number of projects approved and release dates. Stacked projects impact resources, system outage availability, and environmental windows of construction. Assumption is SCE will need to obtain CPUC licensing and regulatory approvals prior to design, procurement and construction of the proposed facilities required to serve the interconnection customer and prerequisite facilities are in-service.*

Note 2: *SCE's Phase II cost estimating is done in 'constant' dollars 2011 and then escalated to the estimated O.D.year. For the Phase II Phase II study, the estimated O.D. is derived by assuming the duration of the work element will begin approximately in January 2012, which is roughly the CAISO tariff scheduled completion date of the Phase II study plus 90 days for the LGIA signing period. For instance, if a work element is estimated to take a total of 24 months (permitting, design, procurement, and construction), then the estimated O.D. would be January 2014. If an IC's requested O.D. (in-service) is beyond the estimated O.D. of a work element, the IC's requested O.D. is used.*

15. Coordination with Affected Systems

CAISO Appendix Y GIP Tariff, Section 3.7 requires the CAISO to notify the Affected System Operators that are potentially affected by the C1C2 Projects. The CAISO will also coordinate the studies, performed by or under the direction of the Affected System Operators and at the cost to the Interconnection Customer, required to determine the impact on any Affected Systems, to the extent possible.

Due to the participation of the C1C2 Projects, as necessary, in the IV SPS, no overloads were identified in the CFE transmission system as a result of the addition of C1C2 Projects.

IID was identified as an Affected System for one (1) Category A overload as shown in Table 7.4 due to the addition of C1C2 Projects.

CFE was identified as an Affected System in the short circuit analysis due to the addition of C1C2 Projects and their associated Delivery Network Upgrades. The short circuit study results showed a seven percent increase in fault current at the equivalent Tijuana 230 kV bus. Coordination with CFE is needed to determine if mitigation is required.

The CAISO will coordinate, to the extent possible, further communications and study efforts between CFE, IID, and the appropriate project developers.

16. Local Furnishing Bonds

SDG&E has financed or refinanced substantial portions of its wholly-owned transmission and distribution systems with proceeds from [redacted] of outstanding Local Furnishing Bonds (LFBs) issued by the City of San Diego and the City of Chula Vista. This includes the costs of SDG&E's wholly owned electric transmission and distribution facilities located in San Diego and Orange Counties (the "Local Furnishing Transmission System"). Interest on these LFBs is tax-exempt. If the proposed projects comprising the C1C2 Project would impair the tax-exempt status of interest on these LFBs under the Internal Revenue Code, Treasury Regulations and applicable IRS private letter rulings (an "Impairment"), the Interconnection Customers will be required to pay any costs SDG&E incurs in mitigating the Impairment.

For the reasons described below, it does not, at this time, appear that energy produced by generators comprising the C1C2 Projects will cause an Impairment involving the Amended Annual Net Importer Test set forth in the IRS supplemental letter ruling dated July 7, 2009. This situation will continue to be monitored to determine if this conclusion remains the reasonable expectation based on any change in material facts relevant to determining whether an Impairment may arise. Further, under the CAISO Tariff and Transmission Control Agreement ("TCA"), the CAISO is obligated to affect such remedial measures as might be available to avoid an Impairment involving the Amended Annual Net Importer Test set forth in the IRS supplemental letter ruling dated July 7, 2009 that would otherwise trigger a redemption or defeasance of the LFBs.

SDG&E completed a GridView production modeling analysis to determine the post-C1C2 Projects cumulative net inbound flow assuming all of the C1C2 Projects are operational. A chronologic hourly economic simulation of the WECC electric system (generation, loads and transmission network) was performed for a single year to determine whether electric energy from the eight projects, in combination with other local generation and SDG&E's share of electric energy from other non-local generation resources, may cause an actual or deemed cumulative annual net outbound flow of electric energy from SDG&E's Local Furnishing Transmission System in violation of the Encumbrances set forth in SDG&E's Appendix B to the TCA with the CAISO.

For the purposes of this analysis, any generation connected to the Southwest Powerlink west of the Imperial Valley Substation, connected to the Sunrise Powerlink, or is owned by SDG&E (regardless of location), is treated as internal generation. Any generation connected at the Imperial Valley Substation or east of Imperial Valley Substation was treated as external and was not counted towards the net outbound flow. The simulation encompassed all queued generation projects connecting to SDG&E's Local Furnishing Transmission System, including all the C1C2 Projects. The results of this net inbound flow analysis are summarized in Table 16.1

Table 16.1: Summary of Net Inbound Flow Analysis for C1C2 Projects

Interfaces	Net Inbound (Outbound) Flows (GW-hr)
Net Import at Miguel	9593
Net Path 44 Import (South of SONGS)	2594
Net Tijuana-Otay Mesa Import	530
Net Import at Suncrest Substation	4746
Net Lake Elsinore Import (flow across the Q72 transmission system)	403
20% SDG&E San Onofre Generation	(3488)
100% SDG&E Utility Owned Generation outside area	(2254)
ECO Net Generation	(5002)
Net Inbound (Outbound) Flow	**7123**

As the net flow is 7,123 GW-hr inbound for the simulation year, this is an indication that the actual and reasonably anticipated flows of electricity into and out of the Local Furnishing Transmission System will not become outbound on a net annual basis following the addition of the C1C2 Projects. (Apparent differences are due to rounding.)

SDG&E also completed an assessment to determine whether the generation associated with the projects will cause an Impairment involving the "Character Test" under applicable IRS private letter rulings as supplemented from time to time where SDG&E is required to acquire any facilities sooner, larger, more costly, or of a different design than is needed for the purpose of providing electric service to SDG&E's retail electric customers who receive electric energy delivery service, electric energy supply service, and transmission service from SDG&E within San Diego County and portions of Orange County. Two chronologic hourly economic simulations of the WECC electric system (generation, loads and transmission network) are performed for a single year to project average line flows on LFB-funded transmission lines before and after the projects comprising the C1C2 Projects are brought on-line. The purpose of comparing the average line flows before and after the C1C2 Projects is to determine if the additional generation will interfere with the use of SDG&E's Local Furnishing Transmission System for the purpose of providing electric service to SDG&E's retail bundled service customers.

The results of the average flow analysis described in the immediately preceding paragraph are summarized in Table 16.2.

Table 16.2: Summary of Average Flow Analysis for C1C2 Projects

Facility		Rating (MVA)		Average Line Flows (MW)		
Pre-C1C2 Line	Post-C1C2 Line	Pre-C1C2	Post-C1C2	Pre-C1C2	Post-C1C2	Delta
Imperial Valley-ECO 500 kV #1	Imperial Valley-ECO 500 kV #1	2252	2252	459	516	-57
ECO-Miguel 500 kV	ECO-Miguel 500 kV	2252	2252	972	1095	-123
Otay Mesa-Silvergate 230 kV	Otay Mesa-Miguel I	912	1175	192	81	112
-	Miguel-Silvergate	-	912	192	379	-186
Otay Mesa-Sycamore Canyon 230 kV	Otay Mesa-Miguel II	912	1175	30	81	-50
-	Miguel-Sycamore	-	912	30	100	-69
Otay Mesa-Tijuana 230 kV	Otay Mesa-Tijuana 230 kV	797	797	-116	-61	-55

For this study year, average line flows on some LFB-funded facilities vary. However, the average flows are below 50% of the ratings for all facilities, indicating that there is adequate capacity on LFB-funded facilities to both serve SDG&E's retail bundled service customers and accommodate the C1C2 Projects.

Based on these analyses, SDG&E's present reasonable expectation in connection with all projects comprising the C1C2 Projects, in aggregate, is that:

A. An Impairment involving the Character Test will not occur from the construction and energization of the PTO's Interconnection Facilities and Network Upgrades within the Local Furnishing Transmission System that are required for the projects if the energy from the projects is sold exclusively to SDG&E. However, in the event energy from the projects is not sold exclusively to SDG&E, then an Impairment involving the Character Test may occur and the means by which such Impairment, if any, is resolved is set forth in the SDG&E Appendix B (SDG&E Encumbrances) to the Transmission Control Agreement. Certain project developers may be required to submit to FERC an application under Sections 211/213 of the Federal Power Act to avoid causing an impairment involving the Character Test under applicable IRS private letter rulings as supplemented from time to time.

B. The actual and reasonably anticipated flows of electricity into and out of the Local Furnishing Transmission System will not become outbound on a net annual basis following the addition of the C1C2 Projects.

Appendix B

CAISO Controlled Grid Generation Queue

The California ISO Controlled Grid Generation Queue for 4-22-2011

				Generating Facility		Maximum MWs		Deliverability Status	Location		Point of Interconnection				Study Availability				
Queue Position	Interconnection Request Receive Date	Queue Date	Application Status	Type	Fuel	Summer	Winter	Full Capacity or Energy Only (FC/EO)	County	State	Utility	Station or Transmission Line	Proposed On-line Date (as filed with IR)	Current On-line Date	Feasibility Study (IFS)	System Impact Study *or* Phase I Cluster Study	Facilities Study (FAS) *or* Phase II Cluster Study	Optional Study (OS)	Interconnection Agreement Status
1	9/30/1998	9/30/1998	Active - A39	WT	W	16.5			Riverside	CA	SCE	Devers-Garnet 115 kV line (Tap)	3/1/1999	12/31/2010	NA	Complete	Complete		Executed IFA
3	4/21/2000	6/14/2000	Active - Serial	CT	NG	850			Riverside	CA	SCE	Devers Substation 230 kV Bus	1/1/2004	6/1/2010	NA	Complete	Re-study Complete	Complete	Executed
6	8/23/2000	8/23/2000	Active - Serial	CC	NG	1156			San Joaquin	CA	PGE	Tesla Sub 230 kV Bus E	6/1/2008	11/30/2014	NA	Re-Study Complete	Complete	Complete	Executed LGIA
7	8/16/2000	10/6/2000	Active - Serial	CC	NG	630			Los Angeles	CA	SCE	El Segundo 220 kV Bus	8/1/2009	6/1/2013	NA	Complete	Complete	Complete	Executed
13	1/3/2003	1/3/2003	Active - Serial	H	WTR	40			San Diego	CA	SDGE	Olivehain-Bernardo-Rancho Santa Fe 69kV line	7/1/2007	7/1/2011	NA	Complete	Complete		Executed
16	3/11/2003	3/11/2003	Active - Serial	WT	W	55.5			Santa Barbara	CA	PGE	Cabrillo	6/1/2006	12/31/2011	NA	Complete	Complete		Executed GSFA
17	3/18/2003	3/18/2003	Active - Serial	CC	NG	520			Riverside	CA	SCE	Devers-Palo Verde 500 kV line near Blythe	1/1/2006	6/11/2010	NA	Complete	Complete		In Progress
20	8/19/2003	9/4/2003	Active - Serial	WT	W	300			Kern	CA	SCE	Antelope	12/31/2006	10/31/2011	NA	Re-Study Complete	Re-study Complete		Executed LGIA
32	5/12/2004	5/24/2004	Active - Serial	WT	W	201			San Diego	CA	SDGE	Boulevard Sub 138kV Bus	9/1/2007	11/1/2012	NA	Complete	Complete		Executed
39	11/11/2004	11/11/2004	Active - Serial	WT	W	200			Solano	CA	PGE	New Birds Lndng Sw Sta near Contra Costa PP Sub	12/31/2008	12/22/2009	NA	Complete	Complete		Executed
41	11/9/2004	11/18/2004	Active - A39	CT	NG	157			Kern	CA	SCE	Pastoria Substation	7/31/2006	6/1/2011	NA	Complete	Complete		
42	11/24/2004	11/26/2004	Active - Serial	CT	NG	300			Fresno	CA	PGE	McCall Substation	5/31/2007	3/31/2013	NA	Complete	Complete		Executed
45	12/1/2004	12/1/2004	Active - Serial	CT	NG	361			Alameda	CA	PGE	Eastshore substation	7/31/2006	6/1/2013	NA	Complete	Re-study Complete		Executed
49	12/14/2004	12/14/2004	Active - Serial	WT	W	100.5			Riverside	CA	SCE	Devers Substation	12/1/2006	7/31/2011	NA	Re-Study Complete	Re-study Complete		In Progress
57	12/1/2004	2/8/2005	Active - Serial	CC	NG	715			Colusa	CA	PGE	Between Cottonwood and Vaca-Dixon	1/1/2010	5/1/2010	NA	Complete	Complete		Executed
58	1/25/2005	2/22/2005	Active - Serial	ST	G	62			Mineral	NV	SCE	Control 115kV Substation	10/7/2007	2/1/2012	NA	Complete	Complete	TAS II Completed	Executed - Filed Unexecuted
60	3/28/2005	3/28/2005	Active - Serial	CT	NG	94			Kern	CA	PGE	Kern Oil Substation 115 kV	3/31/2007	3/31/2013	NA	Complete	Complete		Executed
66	5/6/2005	5/6/2005	Active - Serial	CT	NG	500.5			Los Angeles	CA	SCE	Walnut Substation	9/1/2007	1/3/2013	NA	Re-Study Complete	Complete		Executed
67	3/28/2005	5/9/2005	Active - Serial	CC	NG	245			Alameda	CA	PGE	Eastshore Substation	7/31/2008	6/1/2013	NA	Complete	Re-study Complete		Executed
68	3/30/2005	5/11/2005	Active - Serial	PV	S	850			San Bernardino	CA	SCE	Pisgah Sub 230 kV Bus	12/31/2009	3/31/2012	Waived	Re-Study Complete	Complete	Complete	Executed LGIA
72	4/26/2005	6/21/2005	Active - Serial	H	WTR	500			Riverside	CA	SCE/SDGE	Proposed Lee Lake Substation	12/31/2008	5/23/2012	NA	Complete	Complete		(SCE) In Progress (SDGE) Filed Unexecuted
73	6/6/2005	6/27/2005	Active - Serial	WT	W	250			Kern	CA	SCE	Whirlwind Sub 230kV Bus	12/31/2007	9/1/2012	NA	Complete	Complete		In Progress
78	8/31/2005	8/31/2005	Active - Serial	Other	S	300			Imperial	CA	SDGE	Imperial Valley Sub 230kV bus	12/31/2009	5/31/2012	Waived	Complete	Complete		Executed
79	5/24/2005	9/7/2005	Active - Serial	WT	W	51			Kern	CA	SCE	Windhub Sub 66kV bus	6/1/2006	3/31/2010	Complete	Complete	Complete		Executed
84	11/22/2005	12/1/2005	Active - Serial	WT	W	340			Kern	CA	SCE	Whirlwind Sub 230kV Bus	12/31/2009	12/31/2011	NA	Complete	Complete		In Progress
86A	1/20/2006	1/20/2006	Active - Serial	WT	W	33.1			Kern	CA	SCE	Vincent Substation	1/1/2008	10/1/2009	NA	Complete	Complete		In Progress
86B	1/20/2006	1/20/2006	Active - Serial	WT	W	34			Kern	CA	SCE	Canwind Substation	1/1/2008	10/1/2009	NA	Complete	Complete		
91	2/22/2006	2/22/2006	Active - Serial	WT	W	51			Kern	CA	SCE	Windhub Sub 66kV bus	3/31/2010	3/31/2010	NA	Complete	Complete		Executed LGIA
92	2/23/2006	2/23/2006	Active - Serial	CC	NG	570			Los Angeles	CA	SCE	Vincent Sub 230 kV Bus	7/1/2009	8/1/2010	NA	Complete	Complete		In Progress
93	2/15/2006	3/1/2006	Active - Serial	WT	W	220			Kern	CA	SCE	Tehachapi Conceptual Substation #1	12/31/2008	12/31/2012	NA	Complete	Complete		In Progress
94	3/1/2006	3/1/2006	Active - Serial	WT	W	180			Kern	CA	SCE	Highwind Sub 220kV Bus	12/31/2008	12/31/2011	NA	Complete	Complete		In Progress
95	3/1/2006	3/1/2006	Active - Serial	WT	W	550			Kern	CA	SCE	Tehachapi Conceptual Substation #1	12/31/2009	2/15/2012	NA	Complete	Complete		Executed LGIA
96	3/1/2006	3/1/2006	Active - Serial	WT	W	600			Kern	CA	SCE	Tehachapi Conceptual Substation #1	12/31/2009	11/30/2011	NA	Complete	Complete		Executed LGIA
97	3/1/2006	3/1/2006	Active - Serial	WT	W	160			Kern	CA	SCE	Whirlwind Sub 220kV bus	12/31/2009	12/31/2013	NA	Complete	Complete		In Progress
100	4/5/2006	4/5/2006	Active - Serial	WT	W	120			Kern	CA	SCE	Vincent Substation through Sagebrush 230 kV line	12/31/2007	12/31/2012	NA	Complete	Complete		Executed LGIA
103	5/2/2006	5/2/2006	Active - Serial	ST	B	27			San Diego	CA	SDGE	Border Sub 69 kV Bus	12/1/2008	5/13/2011	Complete	Complete	Complete		Executed LGIA
106A	5/1/2006	6/6/2006	Active - Serial	WT	W	160			San Diego	CA	SDGE	Boulevard Sub 138kV Bus	6/30/2008	12/31/2014	Complete	Complete	Complete		Executed LGIA
108	6/9/2006	6/9/2006	Active - Serial	WT	W	128			Solano	CA	PGE	Lambie-Contra Costa 230 kV	3/1/2011	3/5/2012	Complete	Complete	Complete	Complete	Executed LGIA
111	6/23/2006	6/26/2006	Active - A39	ST	B	16			Kern	CA	PGE	Tap of Chevron 70kv tran line	8/31/2009	12/15/2012	NA	Complete	Complete		Executed GSFA
113	6/29/2006	6/30/2006	Active - Serial	WT	W	30			Solano	CA	PGE	Birds Landing	4/1/2009	4/1/2012	Complete	Complete	Waived		Executed LGIA
119	8/8/2006	8/8/2006	Active - Serial	WT	W	500			Kern	CA	SCE	Windhub Sub 230kV Bus	12/31/2010	12/31/2013	Complete	Complete	Complete		In Progress
124	8/22/2006	8/22/2006	Active - Serial	Other	S	600			Imperial	CA	SDGE	Imperial Valley Substation 230kV bus	3/1/2011	5/1/2012	Waived	Complete	Complete		Executed
125	8/22/2006	8/22/2006	Active - Serial	ST	S	250			San Bernardino	CA	SCE	Coolwater-Kramer 230kv line	8/1/2010	8/1/2010	Complete	Complete	Complete	Complete	Executed
126	8/31/2006	8/31/2006	Active - Serial	WT	W	1500			Clark	NV	SCE	Eldorado Substation	12/31/2011	12/31/2011	Complete	Complete	Tendered		
131	9/25/2006	9/25/2006	Active - Serial	ST	S	100			San Bernardino	CA	SCE	Loop new sub connecting to Eldorado-Mtn Pass 115kV line	6/30/2010	6/30/2010	Complete	Complete	Complete		Executed LGIA
132	9/27/2006	9/27/2006	Active - Serial	WT	W	297			Kern	CA	SCE	Highwind Substation 230kV bus	12/31/2009	6/30/2012	Complete	Complete	Complete		In Progress
135	10/10/2006	10/10/2006	Active - Serial	WT	W	60			San Bernardino	CA	SCE	Lugo-Pisgah 230kV line	9/30/2008	12/31/2013	Complete	Complete	Complete		Executed
137	10/11/2006	10/17/2006	Active - Serial	CC	NG	260			San Diego	CA	SDGE	Encina Substation 230kV bus	8/1/2008	3/1/2013	Waived	Complete	Complete		Executed LGIA
138	10/23/2006	10/23/2006	Active - Serial	WT	W	150			Riverside	CA	SCE	Devers-Vista 230kV #1	12/31/2008	3/1/2012	Waived	Complete	Complete		In Progress
142	11/6/2006	11/6/2006	Active - Serial	ST	S	80			San Bernardino	CA	SCE	Kramer Substation	12/31/2009	9/1/2011	Complete	Complete	Tendered		
146	11/16/2006	11/16/2006	Active - Serial	PV	S	150			Riverside	CA	SCE	Red Bluff Substation 230kV switchyard	12/1/2008	12/30/2015	Complete	Complete	Complete		Executed LGIA
147	11/16/2006	11/16/2006	Active - Serial	PV	S	400			Riverside	CA	SCE	Red Bluff Substation 230kV switchyard	2/1/2010	12/30/2015	Complete	Complete	Complete		Executed LGIA
150	11/16/2006	11/16/2006	Active - Serial	CT	NG	49.4			San Diego	CA	SDGE	Border Substation	5/31/2008	5/15/2011	Complete	Re-Study Complete	Complete		In Progress
153	11/22/2006	11/22/2006	Active - Serial	WT	W	100			Kern	CA	SCE	Whirlwind Substation 230kV	5/30/2008	12/31/2012	Waived	Complete	Complete		
154	**11/28/2006**	**11/30/2006**	**Active - Trans Cluster**	**ST**	**S**	**250**		**FC**	**Kern**	**CA**	**SCE**	**Kramer 230 kV Substation**	**12/31/2009**	**6/1/2015**	**Complete**	**Complete**	**Complete**		**In Progress**
156	12/5/2006	12/5/2006	Active - Serial	WT	W	201			San Bernardino	CA	SCE	Lugo-Pisgah 230kV line	3/1/2009	3/1/2012	Waived	Complete	Complete		
159A	12/6/2006	12/22/2006	Active - Serial	WT	W	400			La Rumorosa, Baja CA	Mexico	SDGE	Imperial Valley-Miguel new 230/500kV Sub 230kV bus	6/1/2009	5/31/2013	Complete	Complete	Complete		In Progress
161	12/27/2006	1/4/2007	Active - Serial	CT	NG	220			Los Angeles	CA	SCE	Harborgen Substation	5/1/2009	3/1/2012	Waived	Re-Study Complete	Complete		In Progress
162	1/5/2007	1/5/2007	Active - Serial	ST	S	114			San Bernardino	CA	SCE	Loop new sub connecting Eldorado-Mtn Pass 115kV line	6/30/2010	6/30/2010	Waived	Complete	Complete		Executed LGIA
163	**1/9/2007**	**1/9/2007**	**Active - Trans Cluster**	**PV**	**S**	**300**		**FC**	**San Bernardino**	**CA**	**SCE**	**Mountain Pass Substation 115kV**	**12/31/2010**	**12/31/2015**	**Complete**	**Complete**	**Complete**		**In Progress**
166	1/23/2007	1/23/2007	Active - Serial	PV	S	210			San Luis Obispo	CA	PGE	Midway-Morrow Bay 230kV line	12/31/2010	12/31/2013	Complete	Complete	Complete		Executed LGIA
172	2/8/2007	2/15/2007	Active - Serial	CC	NG	508			San Joaquin	CA	PGE	Tesla-Bellota 230kV lines	5/15/2011	5/1/2014	Complete	Complete	Complete		Executed LGIA
175	**2/21/2007**	**2/21/2007**	**Active - Trans Cluster**	**WT**	**W**	**650**		**FC**	**Kern**	**CA**	**SCE**	**SCE Proposed Whirlwind 230kV Substation**	**9/30/2008**	**12/31/2014**	**Complete**	**Complete**	**Complete**		**In Progress**
183	**3/5/2007**	**3/5/2007**	**Active - Trans Cluster**	**WT**	**W**	**300**		**EO**	**La Rumorosa, Baja CA**	**Mexico**	**SDGE**	**Imperial Valley-Miguel 230/500kV Sub 230kV bus (ECO)**	**11/1/2009**	**1/3/2014**	**Complete**	**Complete**	**Complete**		**In Progress**
184	3/5/2007	3/5/2007	Active - Serial	ST	G	32			Sonoma	CA	PGE	Geysers #3 – Cloverdale 115 kV Line	1/1/2010	12/15/2010	Complete	Complete	Complete		Executed LGIA
188	**3/23/2007**	**3/23/2007**	**Active - Trans Cluster**	**WT**	**W**	**200**		**EO**	**Kern**	**CA**	**SCE**	**Windhub Substation 230kV**	**12/15/2013**	**12/1/2012**	**Complete**	**Complete**	**Complete**		**In Progress**
189	3/30/2007	3/30/2007	Active - Serial	CC	NG	260			San Diego	CA	SDGE	Encina 138kV Substation	5/1/2010	3/1/2013	Waived	Complete	Complete		Executed
190	3/30/2007	3/30/2007	Active - Serial	CT	NG	330			San Diego	CA	SDGE	Otay Mesa Energy Center 230kV Substation	3/1/2011	5/1/2013	Complete	Complete	Complete		In Progress
193	**3/19/2007**	**4/4/2007**	**Active - Trans Cluster**	**ST**	**S**	**500**		**FC**	**Riverside**	**CA**	**SCE**	**Colorado River Substation**	**12/31/2010**	**7/1/2013**	**Complete**	**Complete**	**Complete**		**In Progress**
194	4/5/2007	4/5/2007	Active - Serial	ST	S	190			San Luis Obispo	CA	PGE	230kV lines near Carrizo Plain Substation	12/31/2010	9/1/2013	Complete	Complete	Complete		Executed LGIA
205	**4/20/2007**	**4/20/2007**	**Active - Trans Cluster**	**ST**	**S**	**300**		**EO**	**Clark**	**NV**	**SCE**	**El Dorado 220kV Switchyard**	**12/31/2010**	**12/31/2014**	**Complete**	**Complete**	**Complete**		**In Progress**

				Generating Facility		Maximum MWs		Deliverability Status	Location		Point of Interconnection			Study Availability				
Queue Position	Interconnection Request Receive Date	Queue Date	Application Status	Type	Fuel	Summer	Winter	Full Capacity or Energy Only (FC/EO)	County	State	Utility	Station or Transmission Line	Proposed On-line Date (as filed with IR)	Current On-line Date	Feasibility Study (IFS)	System Impact Study *or* Phase I Cluster Study	Facilities Study (FAS) *or* Phase II Cluster Study	Optional Study (OS)	Interconnection Agreement Status
212	5/9/2007	5/9/2007	Active - Serial	WT	W	50			Humboldt	CA	PGE	Rio Dell Substation 60kV	10/30/2010	12/15/2013	Complete	Complete	Complete		Executed
215	**5/21/2007**	**5/21/2007**	**Active - Trans Cluster**	**WT**	**W**	**420**		**EO**	**La Rumorosa, Baja CA**	**Mexico**	**SDGE**	**Imperial Valley-Miguel 230/500kV Sub 230kV bus (ECO)**	**5/1/2011**	**12/31/2014**	**Complete**	**Complete**	**Complete**		**In Progress**
219	5/7/2007	5/23/2007	Active - Serial	CT	NG	50			Riverside	CA	SCE	Midpoint Substation 500kV	6/1/2012	6/1/2012	Complete	Waived	Waived		In Progress
222	**5/23/2007**	**5/23/2007**	**Active - Trans Cluster**	**WT**	**W**	**78**		**FC**	**Solano**	**CA**	**PGE**	**Birds Landing Substation 230kV**	**12/31/2010**	**12/31/2011**	**Complete**	**Complete**	**Complete**		**Executed LGIA**
233	6/27/2007	6/27/2007	Active - Serial	ST	S	200			San Bernardino	CA	SCE	Ivanpah Substation 230kV	6/30/2012	6/30/2012	Waived	Complete	Complete		Executed LGIA
239	**7/11/2007**	**7/11/2007**	**Active - Trans Cluster**	**PV**	**S**	**250**		**FC**	**San Luis Obispo**	**CA**	**PGE**	**Midway-Morro Bay 230kV line**	**12/1/2010**	**12/31/2011**	**Complete**	**Complete**	**Complete**		**Executed LGIA**
240	7/12/2007	7/12/2007	Active - Serial	ST	S	400			San Bernardino	CA	SCE	Pisgah Sub 230kV	6/30/2014	6/30/2014	Waived	Complete	In Progress		
241	7/12/2007	7/12/2007	Active - Serial	ST	S	400			San Bernardino	CA	SCE	Pisgah Sub 230kV	6/30/2015	6/30/2015	Waived	Complete	In Progress		
242	**7/13/2007**	**7/13/2007**	**Active - Trans Cluster**	**PV**	**S**	**150**		**FC**	**San Luis Obispo**	**CA**	**PGE**	**Morro Bay-Midway 230kV line**	**9/1/2012**	**6/30/2014**	**In Progress**	**Complete**	**Complete**		**In Progress**
248	7/30/2007	7/30/2007	Active - Serial	CC	NG	67			San Joaquin	CA	PGE	Tesla-Bellota 230kV line	5/15/2011	5/1/2014	Waived	Complete	Complete		Executed LGIA
250	**7/30/2007**	**7/30/2007**	**Active - Trans Cluster**	**WT**	**W**	**66.2**		**FC**	**Lake and Colusa**	**CA**	**PGE**	**Redbud-Cortina 115kV line**	**8/1/2009**	**12/31/2012**	**Complete**	**Complete**	**Complete**		**Executed**
254	**8/21/2007**	**8/21/2007**	**Active - Trans Cluster**	**CC**	**NG**	**600**		**FC**	**Kings**	**CA**	**PGE**	**Gates Substation 230kV bus**	**6/1/2012**	**6/1/2012**	**Complete**	**Complete**	**Complete**		**In Progress**
258	**9/12/2007**	**9/12/2007**	**Active - Trans Cluster**	**CC**	**NG**	**651**		**FC**	**Contra Costa**	**CA**	**PGE**	**Contra Costa Substation 230kV bus**	**2/1/2012**	**12/1/2013**	**Waived**	**Complete**	**Complete**		**In Progress**
267	10/23/2007	10/23/2007	Active - Serial	CC	NG	280			San Joaquin	CA	PGE	Gold Hill-Eight Mile 230kV lines	4/16/2012	4/16/2012	Waived	Waived	Complete		Executed LGIA
268	10/24/2007	10/24/2007	Active - Serial	ST	NG	145			San Joaquin	CA	PGE	Tesla-Manteca 115kV line via Schulte Switchyard	4/1/2013	4/1/2013	Waived	Complete	Complete	Complete	Executed LGIA
272	**11/1/2007**	**11/1/2007**	**Active - Trans Cluster**	**CC/PV**	**NG/S**	**25/125**		**FC**	**Kings**	**CA**	**PGE**	**Henrietta Substation 70kV bus**	**6/1/2012**	**5/1/2013**	**Complete**	**Complete**	**Complete**		**In Progress**
282	**12/11/2007**	**12/12/2007**	**Active - Trans Cluster**	**ST**	**B**	**8**		**FC**	**Madera**	**CA**	**PGE**	**Tap Dairyland-Mendota 115 kV line**	**5/31/2008**	**12/31/2010**	**Waived**	**Complete**	**Complete**		**Tendered**
294	**1/15/2008**	**1/16/2008**	**Active - Trans Cluster**	**ST**	**S**	**1000**		**FC**	**Riverside**	**CA**	**SCE**	**Midpoint Substation 500kV**	**6/1/2012**	**7/1/2013**	**Complete**	**Complete**	**Complete**		**Executed LGIA**
297	**1/18/2008**	**1/18/2008**	**Active - Trans Cluster**	**ST**	**S**	**66**		**FC**	**Los Angeles**	**CA**	**SCE**	**Neenach-Bailey 66kV line**	**12/1/2009**	**3/31/2012**	**Waived**	**Complete**	**Complete**		**In Progress**
300	**1/29/2008**	**2/4/2008**	**Active - Trans Cluster**	**CC**	**NG**	**400**		**FC**	**Kern**	**CA**	**PGE**	**Midway-Wheeler Ridge #1 and #2 230kV line**	**9/1/2014**	**9/1/2015**	**Complete**	**Complete**	**Complete**		**Tendered**
304	**2/28/2008**	**2/28/2008**	**Active - Trans Cluster**	**PV**	**S**	**50**		**FC**	**Tulare**	**CA**	**PGE**	**Smyrna-Alpaugh 115kV line**	**5/3/2010**	**12/31/2012**	**Complete**	**Complete**	**Complete**		**Executed LGIA**
320	**3/12/2008**	**3/12/2008**	**Active - Trans Cluster**	**CT**	**NG**	**100**	**214**	**FC**	**Contra Costa**	**CA**	**PGE**	**Contra Costa Substation 230kV switchyard**	**4/29/2011**	**5/1/2013**	**Waived**	**Complete**	**Complete**		**Executed LGIA**
334	**4/4/2008**	**4/4/2008**	**Active - Trans Cluster**	**CT**	**NG**	**195.9**		**FC**	**Alameda**	**CA**	**PGE**	**Kelso Substation 230kV bus**	**6/1/2012**	**7/1/2012**	**Complete**	**Complete**	**Complete**		**In Progress**
337	**4/2/2008**	**4/18/2008**	**Active - Trans Cluster**	**PV**	**S**	**25.75**		**FC**	**San Diego**	**CA**	**SDGE**	**Borrego Substation 69kV**	**4/1/2011**	**4/1/2012**	**Waived**	**Complete**	**Complete**		**In Progress**
340	4/2/2008	4/22/2008	Active - SGIP	PV	S	20		EO	Tulare	CA	PGE	Smyrna-Alpaugh 115kV line	5/1/2010	4/1/2011	Waived	Complete	Complete		Executed SGIA
342	**4/25/2008**	**4/25/2008**	**Active - Trans Cluster**	**PV**	**S**	**50**		**FC**	**Los Angeles**	**CA**	**SCE**	**Del Sur Substation 66kV**	**5/1/2011**	**7/1/2013**	**Waived**	**Complete**	**Complete**		**In Progress**
348	**4/25/2008**	**4/25/2008**	**Active - Trans Cluster**	**PV**	**S**	**40**		**FC**	**Kern**	**CA**	**SCE**	**Corum-Goldtown 66kV line**	**5/1/2011**	**6/1/2013**	**Waived**	**Complete**	**Complete**		**In Progress**
349	**4/25/2008**	**4/25/2008**	**Active - Trans Cluster**	**PV**	**S**	**100**		**FC**	**Kern**	**CA**	**SCE**	**Goldtown Substation 66kV**	**5/1/2013**	**6/1/2013**	**Waived**	**Complete**	**Complete**		**In Progress**
356	**4/28/2008**	**4/28/2008**	**Active - Trans Cluster**	**PV**	**S**	**40**		**FC**	**Santa Barbara**	**CA**	**PGE**	**Taft-Cuyama #1 70kV line**	**5/1/2011**	**1/1/2013**	**Waived**	**Complete**	**Complete**		**In Progress**
365	**5/6/2008**	**5/12/2008**	**Active - Trans Cluster**	**ST**	**S**	**500**		**FC**	**Riverside**	**CA**	**SCE**	**Midpoint Substation**	**12/28/2013**	**7/1/2013**	**Waived**	**Complete**	**Complete**		**Executed LGIA**
372	5/21/2008	5/21/2008	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Jacobs Corner Substation 70kV bus	11/1/2010	11/1/2010	Waived	Complete	Complete		Executed SGIA
378	**5/28/2008**	**5/28/2008**	**Active - Trans Cluster**	**CC**	**NG**	**120**		**FC**	**Santa Clara**	**CA**	**PGE**	**Los Esteros Substation 115kV bus**	**6/1/2011**	**6/1/2013**	**Waived**	**Complete**	**Complete**		**Executed**
383	**5/29/2008**	**5/29/2008**	**Active - Trans Cluster**	**CC**	**NG**	**85**		**FC**	**Los Angeles**	**CA**	**SCE**	**Arco Gen #1 & #2 230kV lines**	**5/31/2012**	**12/1/2012**	**Waived**	**Complete**	**Complete**		**In Progress**
407	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**PV**	**S**	**325**		**FC**	**Kern**	**CA**	**SCE**	**Cottonwind-Whirlwind 230kV line**	**7/1/2012**	**12/1/2014**	**Waived**	**Complete**	**Complete**		**In Progress**
408	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**PV**	**S**	**325**		**FC**	**Kern**	**CA**	**SCE**	**Cottonwind-Whirlwind 230kV line**	**7/1/2012**	**12/1/2014**	**Waived**	**Complete**	**Complete**		**In Progress**
409	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**WT**	**W**	**150**		**EO**	**Kern**	**CA**	**SCE**	**Highwind Substation 230kV**	**10/1/2011**	**12/31/2012**	**Waived**	**Complete**	**Complete**		**In Progress**
412	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**PV**	**S**	**250**		**FC**	**Los Angeles**	**CA**	**SCE**	**Whirlwind Substation 230kV**	**8/1/2012**	**12/1/2013**	**Waived**	**Complete**	**Complete**		**Executed LGIA**
417	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**WT**	**W**	**14**		**FC**	**Contra Costa**	**CA**	**PGE**	**Pittsburg-Tesla 230kV line**	**9/30/2010**	**9/30/2010**	**Waived**	**Complete**	**Complete**		**In Progress**
421	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**ST**	**S**	**49.5**		**FC**	**Riverside**	**CA**	**SCE**	**Eagle Mountain Substation**	**2/1/2012**	**2/1/2012**	**Waived**	**Complete**	**Complete**		**In Progress**
429	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**ST**	**S**	**100**		**FC**	**Imperial**	**CA**	**SDGE**	**Imperial Valley Substation**	**7/1/2014**	**4/1/2015**	**Waived**	**Complete**	**Complete**		**In Progress**
442	**5/30/2008**	**5/30/2008**	**Active - Trans Cluster**	**PV**	**S**	**125**		**FC**	**Imperial**	**CA**	**SDGE**	**Imperial Valley 230kV**	**5/1/2013**	**1/1/2014**	**Waived**	**Complete**	**Complete**		**In Progress**
467	**5/30/2008**	**6/2/2008**	**Active - Trans Cluster**	**ST**	**S**	**230**		**FC**	**Clark**	**NV**	**SCE**	**Eldorado-Ivanpah 230kV line**	**8/1/2012**	**10/1/2015**	**Waived**	**Complete**	**Complete**		**In Progress**
468	**5/30/2008**	**6/2/2008**	**Active - Trans Cluster**	**PV**	**S**	**290**		**EO**	**Yuma**	**AZ**	**SDGE**	**Hassayampa-North Gila 500kV line**	**8/1/2012**	**6/30/2014**	**Waived**	**Complete**	**Complete**		**Executed LGIA**
470	7/30/2008	7/30/2008	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Jacobs Corner Substation 70kV bus	3/1/2011	3/1/2011	Waived	Complete	Complete		Executed SGIA
471	7/30/2008	7/30/2008	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Jacobs Corner Substation 70kV bus	7/1/2011	7/1/2011	Waived	Complete	Complete		Executed SGIA
473	9/3/2008	9/12/2008	Active - SGIP	PV	S	20		EO	Tulare	CA	PGE	Smyrna-Alpaugh 115kV line	5/1/2010	5/1/2010	Waived	Complete	Complete		Executed SGIA
474	9/11/2008	9/15/2008	Active - SGIP	PV	S	19.9		EO	San Bernardino	CA	SCE	Dunn Siding Substation	6/1/2011	6/1/2011	Waived	Complete	In Progress		
476	10/23/2008	10/23/2008	Active - SGIP	RE	LFG	9.9		EO	Marin	CA	PGE	Lakeville #2 60 kV line	5/29/2010	5/29/2010	Waived	Complete	Complete		Executed SGIA
477	2/2/2009	2/6/2009	Active - SGIP	RE	LFG	4		EO	Butte	CA	PGE	Centerville-Table Mountain 60kV line	3/31/2010	4/17/2011	Waived	Waived	Complete		Executed SGIA
478	2/17/2009	2/17/2009	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Corcoran-Kingsburg 115kV #2 line	11/1/2011	11/1/2011	Waived	Complete	Complete		Tendered
479	3/13/2009	3/13/2009	Active - SGIP	PV	S	20		EO	Tulare	CA	PGE	Smyrna-Alpaugh 115kV line	10/1/2011	10/1/2011	Waived	Complete	Complete		Executed SGIA
480	3/16/2009	3/16/2009	Active - SGIP	PV	S	20		EO	San Diego	CA	SDGE	Borrego Substation 69kV switchyard	12/31/2010	12/1/2011	Complete	Waived ISISA	In Progress		
481	4/6/2009	4/20/2009	Active - SGIP	ST	B	18.4		EO	Amador	CA	PGE	Valley Springs-Martel #2 60kV line	4/1/2010	4/1/2010	Waived	Complete	Complete		Executed SGIA
482	4/24/2009	4/24/2009	Active - SGIP	PV	S	20		EO	Tulare	CA	PGE	Smyrna-Alpaugh 115kV line	4/1/2012	4/1/2012	Waived	Complete	Complete		Tendered
483	4/29/2009	4/29/2009	Active - SGIP	PV	S	10		EO	Kern	CA	SCE	Vincent Substation	6/1/2010	6/1/2010	Waived	Complete			
484	6/11/2009	6/11/2009	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Arco-Carneras 70 kV Line	9/30/2011	9/30/2011	Waived	Complete	Complete		Executed
485	6/3/2009	6/18/2009	Active - SGIP TC	WT	W	20		EO	Kern	CA	SCE	Highwind Substation 230kV bus	6/30/2012	12/15/2012	Complete	Waived	In Progress		
486	6/29/2009	6/29/2009	Active - SGIP	PV	S	20		EO	Kern	CA	SCE	Antelope-Neenach 66kV line	1/1/2012	1/1/2012	Complete	Complete	In Progress		
488	4/6/2009	7/31/2009	Active - Cluster #1	ST	S	92		FC	Clark	NV	SCE	Eldorado Substation 230kV	9/30/2012	9/30/2012	Waived	Complete			
489	5/26/2009	7/31/2009	Active - Cluster #1	WT	W	98.9		FC	Solano	CA	PGE	Birds Landing Substation 230kV	5/31/2011	5/31/2011	Waived	Complete	Complete		In Progress
490	6/3/2009	7/31/2009	Active - Cluster #1	ST	NU	48		FC	San Diego	CA	SCE	San Onofre Nuclear Generating Station 230kV switchyard	12/31/2012	12/31/2012	Waived	Complete			
491	6/4/2009	7/31/2009	Active - Cluster #1	PV	S	230		FC	San Bernardino	CA	SCE	Coolwater-Dunn Siding 115kV line	6/1/2014	4/1/2014	Waived	Complete			
493	7/16/2009	7/31/2009	Active - Cluster #1	WT	W	299		FC	Imperial	CA	SDGE	Sunrise Powerlink 500kV line	12/31/2013	12/31/2013	Waived	Complete			
494	7/20/2009	7/31/2009	Active - Cluster #1	PV	S	350		FC	Kern	CA	SCE	Windhub Substation 230kV	12/1/2015	9/1/2015	Waived	Complete			
495	7/24/2009	7/31/2009	Active - Cluster #1	H	WTR	7.2		FC	Tuolumne	CA	PGE	Tulloch 115kV tap	10/1/2011	12/31/2012	Waived	Complete	In Progress		
502	7/28/2009	7/31/2009	Active - Cluster #1	PV	S	20		FC	Clark	NV	SCE	Eldorado-Ivanpah 230kV line	5/1/2016	10/1/2015	Waived	Complete			
503	7/28/2009	7/31/2009	Active - Cluster #1	PV	S	155		FC	Clark	NV	SCE	Eldorado Substation 230kV bus	1/1/2016	3/1/2015	Waived	Complete			
506	7/30/2009	7/31/2009	Active - Cluster #1	PV	S	300		EO	Kern	CA	SCE	Whirlwind Substation 230kV	7/31/2015	1/31/2015	Waived	Complete			
510	7/31/2009	7/31/2009	Active - Cluster #1	PV	S	200		FC	Imperial	CA	SDGE	Imperial Valley Substation 230kV bus	1/1/2012	7/1/2012	Waived	Complete			
512	7/31/2009	7/31/2009	Active - Cluster #1	PV	S	26		FC	Los Angeles	CA	SCE	Neenach Substation 66kV	2/15/2012	12/1/2013	Waived	Complete			
513	7/31/2009	7/31/2009	Active - Cluster #1	PV	S	141		FC	Los Angeles	CA	SCE	Whirlwind Substation 230kV	8/1/2013	8/1/2014	Waived	Complete			
514	7/31/2009	7/31/2009	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Arco Substation 69kV bus	12/15/2010	12/15/2010	Waived	Complete	Complete		Tendered
515	8/12/2009	8/12/2009	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Kramer-Ransburg 115kV line	4/1/2011	4/1/2011	Waived	Complete	In Progress		
517	8/19/2009	8/19/2009	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Kern-Old River #1 70kV line	12/31/2012	12/31/2012	Waived	Complete	Complete		In Progress
521	8/19/2009	8/19/2009	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Goldtown-Corum 66kV line	12/31/2014	12/31/2013	Complete	Complete			
522	8/19/2009	8/19/2009	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Goldtown-Lancaster 66kV line	12/31/2014	12/31/2013	Complete	Complete			
522A	8/19/2009	8/19/2009	Active - SGIP	PV	S	20		EO	Kern	CA	SCE	Rosamond Substation 66kV	12/31/2013	12/31/2013	Waived	Complete			
522B	8/19/2009	8/19/2009	Active - SGIP	PV	S	20		EO	Kern	CA	SCE	Rosamond leg of the Cal Cement-Monolith-Rosamond-Wind Farm 66kV line	12/31/2012	12/31/2012	Waived	Complete			

				Generating Facility		Maximum MWs		Deliverability Status	Location		Point of Interconnection				Study Availability				
Queue Position	Interconnection Request Receive Date	Queue Date	Application Status	Type	Fuel	Summer	Winter	Full Capacity or Energy Only (FC/EO)	County	State	Utility	Station or Transmission Line	Proposed On-line Date (as filed with IR)	Current On-line Date	Feasibility Study (IFS)	System Impact Study *or* Phase I Cluster Study	Facilities Study (FAS) *or* Phase II Cluster Study	Optional Study (OS)	Interconnection Agreement Status
522C	8/19/2009	8/19/2009	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Kern River-Cummings 66kV line	12/31/2013	12/31/2013	Waived	In Progress			
523	8/21/2009	8/21/2009	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Arco Substation 70kV bus	10/30/2011	10/30/2011	Waived	Complete	Complete		
526	9/11/2009	9/11/2009	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Schindler-Coalinga #2 70kV line	1/1/2012	1/1/2012	Waived	Complete	Complete		
529	10/19/2009	10/19/2009	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Corcoran- Kingsburg #1 115kV line	8/1/2013	8/1/2013	Waived	Complete	Complete		In Progress
529A	10/23/2009	10/23/2009	Active - SGIP	RE/PV	LFG/S	6.5/8		EO	Fresno	CA	PGE	Helm-Kerman 70kV line	4/1/2011	4/1/2011	Complete	Complete	In Progress		
530	10/29/2009	10/29/2009	Active - SGIP	PV	S	20		EO	Tulare	CA	PGE	Corcoran-Smyrna 115kV line	7/1/2011	7/1/2011	Waived	Complete	Complete		In Progress
531A	10/29/2009	10/29/2009	Active - SGIP	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Del Sur 69kV line	6/1/2011	6/1/2011	Complete	Waived	Complete		
532	11/2/2009	11/2/2009	Active - SGIP	ST	S	20		EO	Fresno	CA	PGE	Schindler-Huron-Gates 70kV line	1/1/2012	1/1/2012	Waived	Complete	Complete		
534	8/4/2009	11/13/2009	Active - SGIP	PV	S	20		EO	San Benito	CA	PGE	Moss Landing-Panoche #2 230kV line	6/30/2011	6/30/2011	Waived	Complete	Tendered		
537A	11/23/2009	11/23/2009	Active - SGIP	WT	W	19.5		EO	Kern	CA	SCE	Highwind Substation	4/1/2011	4/1/2011	Waived	Complete	In Progress		
538	12/16/2009	12/16/2009	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Oro Loma-Mendota 69kV line	1/1/2012	1/1/2012	Waived	Complete	In Progress		
539	12/18/2009	12/18/2009	Active - SGIP	PV	S	20		EO	Stanislaus	CA	PGE	Salado-Newman #1 60kV line	1/1/2011	6/1/2011	Waived	Complete	Complete		Tendered
540	12/22/2009	12/22/2009	Active - SGIP	PV	S	20		EO	Los Angeles	CA	SCE	Little Rock-Piute 69kV line	5/1/2011	5/1/2011	Waived	Complete	In Progress		
541	1/5/2010	1/5/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Panoche-Oro Loma 115kV Line	1/1/2012	1/1/2012	Waived	Tendered	In Progress		
542	1/6/2010	1/6/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Schindler Sub 115kV bus	1/1/2012	1/1/2012	Waived	Complete	In Progress		
543	1/6/2010	1/6/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Schindler Sub 70kV bus	1/1/2012	1/1/2012	Waived	Complete	In Progress		
545	1/6/2010	1/6/2010	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Wheeler Ridge-Lakeview 70kV	10/31/2011	10/31/2011	Waived	Complete	Complete		
546	1/6/2010	1/6/2010	Active - SGIP	PV	S	15		EO	Los Angeles	CA	SCE	Redman-Piute 66kV Tap	12/1/2012	12/1/2012	Waived	Complete	In Progress		
547	1/6/2010	1/6/2010	Active - SGIP	PV	S	20		EO	Los Angeles	CA	SCE	Loop Redman-Lancaster 66kV	12/1/2012	12/1/2012	Waived	Complete	In Progress		
548	11/19/2009	1/15/2010	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Mercy Springs Substation 70kV	10/31/2011	10/31/2011	Waived	Complete	Complete		In Progress
550	12/4/2009	1/19/2010	Active - SGIP	PV	S	20		EO	Tulare	CA	PGE	Merced #1 70 kV	12/15/2011	12/15/2011	Waived	Complete	In Progress		
551	1/27/2010	1/27/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Wheeler Ridge Sub 70kV bus	10/31/2011	10/31/2011	Waived	In Progress			
552	10/2/2009	2/1/2010	Active - Cluster #2	PV	S	60		FC	San Bernardino	CA	SCE	Lugo-Pisgah #1 230kV	3/1/2012	4/30/2012	Waived	Complete			
554	1/26/2010	2/1/2010	Active - Cluster #2	WT	W	138		FC	Shasta	CA	PGE	Pit River 1-Cottonwood 230kV	10/31/2013	12/31/2013	Waived	Complete			In Progress
555	1/26/2010	2/1/2010	Active - Cluster #2	WT	W	92		FC	San Diego	CA	SDGE	Boulevard Substation 138kV Bus	11/22/2013	12/30/2014		Complete			
557	1/27/2010	2/1/2010	Active - Cluster #2	PV	S	19.75		FC	Tulare	CA	PGE	Smyrna-Alpaugh 115kV	4/1/2013	4/1/2013	Waived	Complete			
558	1/27/2010	2/1/2010	Active - Cluster #2	PV	S	19.75		FC	Kings	CA	PGE	Corcoran-Kingsburg #2 115kV	6/1/2013	6/1/2013	Waived	Complete			
559	1/27/2010	2/1/2010	Active - Cluster #2	PV	S	67.5		FC	Kern	CA	PGE	Wheeler Ridge-Lamont 115kV	7/1/2012	1/31/2014	Waived	Complete			
560	1/27/2010	2/1/2010	Active - Cluster #2	PV	S	132		FC	Merced	CA	PGE	Los Banos-Dos Amigos 230kV	7/1/2012	3/31/2013	Waived	Complete			
561	1/27/2010	2/1/2010	Active - Cluster #2	PV	S	200		FC	Imperial	CA	SDGE	Imperial Valley Sub 230kV bus	2/1/2013	6/1/2014		Complete			
565	1/27/2010	2/1/2010	Active - Cluster #2	RE	NG	100		FC	San Diego	CA	SDGE	Miguel-Mission 230kV	5/31/2014	5/15/2014		Complete			
568	1/28/2010	2/1/2010	Active - Cluster #2	CC	NG	25		FC	Alameda	CA	PGE	Eastshore Substation 230kV Bus	5/1/2013	6/1/2012	Waived	Complete			
569	1/28/2010	2/1/2010	Active - Cluster #2	CC	NG	600		FC	Sutter	CA	PGE	Table Mountain-Tesla 500kV	5/1/2013	5/1/2013	Waived	Complete			
574	1/29/2010	2/1/2010	Active - Cluster #2	CT	NG	308		FC	San Diego	CA	SDGE	Otay Mesa Sub 230 kV Bus	5/1/2013	12/1/2013		Complete			
576	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	485		FC	Riverside	CA	SCE	Colorado River Sub 230kV Bus	12/31/2013	12/31/2013	Waived	Complete			
577	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	220		FC	Merced	CA	PGE	Los Banos-Westley 230kV	12/31/2013	12/31/2013	Waived	Complete	In Progress		
581	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	100		FC	Kings	CA	PGE	Henrietta-GWF 115kV	5/1/2013	12/31/2013	Waived	Complete			
583	1/29/2010	2/1/2010	Active - Cluster #2	WT	W	57.5		EO	San Diego	CA	SDGE	Boulevard Sub 138kV Bus	12/31/2012	7/14/2014		Complete			
585	1/29/2010	2/1/2010	Active - Cluster #2	WT	W	150		EO	Los Angeles	CA	SCE	Antelope Sub 220kV Bus	2/28/2013	2/28/2013	Waived	Complete			
586	1/29/2010	2/1/2010	Active - Cluster #2	ST	G	49.9		FC	Sonoma	CA	PGE	Geysers #17-Fulton 230kV	6/1/2013	5/31/2013	Waived	Complete	In Progress		
588	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	200		FC	Riverside	CA	SCE	Red Bluff Substation 230kV	12/1/2012	6/1/2013	Waived	Complete			
589	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	60		FC	San Bernardino	CA	SCE	Victor Substation 115kV	12/1/2012	9/1/2013	Waived	Complete			
590	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	150		FC	Imperial	CA	SDGE	Imperial Valley Sub 230kV bus	12/31/2012	12/31/2012		Complete			
592	1/29/2010	2/1/2010	Active - Cluster #2	PV	S	250		FC	Kings	CA	PGE	Midway-Gates & Arco-Gates 230kV	12/31/2012	2/28/2013	Waived	Complete			
593	1/30/2010	2/1/2010	Active - Cluster #2	PV	S	310		FC	San Bernardino	CA	SCE	Mohave Generating Station 500kV bus	7/7/2014	7/7/2014	Waived	Tendered			
602	1/30/2010	2/1/2010	Active - Cluster #2	PV	S	150		FC	Kern	CA	SCE	Whirlwind Substation 230kV	7/1/2013	7/1/2013	Waived	Complete			
606	2/1/2010	2/1/2010	Active - Cluster #2	CC	NG	20		FC	San Joaquin	CA	PGE	Schulte Switching Station 115kV bus	6/1/2012	6/1/2012	Waived	Complete			
607	2/1/2010	2/1/2010	Active - Cluster #2	PV	S	60		FC	Fresno	CA	PGE	Mendota Substation 115 kV bus	10/1/2012	12/1/2012	Waived	Complete			
608	2/1/2010	2/1/2010	Active - Cluster #2	PV	S	250		FC	Imperial	CA	SDGE	Imperial Valley Sub 230kV bus	5/1/2013	1/1/2016		Complete			
609	2/2/2010	2/2/2010	Active - SGIP	PV	S	20		EO	Los Angeles	CA	SCE	Tap line west of Rosamond Sub	6/30/2012	6/30/2012	Waived	Complete			
610	2/4/2010	2/5/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Stroud SW STA-Schindler 70kV	12/1/2012	12/1/2012	Waived	Complete	Tendered		
612	2/19/2010	2/19/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Panoche-Schindler 115kV	1/1/2012	1/1/2012	Waived	Complete	In Progress		
613	2/19/2010	2/19/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	San Joaquin-Schindler 69kV	1/1/2012	1/1/2012	Waived	Complete	In Progress		
613A	2/23/2010	2/24/2010	Active - SGIP TC	WT	W	20		EO	Kern	CA	SCE	Monolith Sub 66 kV Bus	6/1/2011	6/1/2011	Complete				
614	3/2/2010	3/2/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Merced-Madera 70kV	5/1/2011	5/1/2011	Waived	Complete	In Progress		
614A	3/4/2010	3/4/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Goldtown-Lancaster 66kV	12/31/2011	12/31/2011	Waived	Tendered			
617	3/22/2010	3/22/2010	Active - SGIP	PV	S	20		EO	San Joaquin	CA	PGE	Tesla-Tracy 115kV	3/1/2011	3/1/2011	Waived	Complete	In Progress		
617A	3/30/2010	3/30/2010	Active - SGIP	PV	S	20		EO	Los Angeles	CA	SCE	Piute-Redman 66kV	12/1/2012	12/1/2012	Waived	In Progress			
620	4/26/2010	4/26/2010	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Copus Road Sub 70kV bus	12/31/2011	12/31/2011	Waived	Tendered			
620A	4/26/2010	4/26/2010	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Lakeview Sub 70kV bus	12/31/2011	12/31/2011	Waived	Tendered			
621	3/3/2010	4/26/2010	Active - SGIP TC	PV	S	20		EO	Imperial	CA	SDGE	Imperial Valley Sub 12kV Bus	8/1/2012	8/1/2012	Complete				
621A	5/5/2010	5/5/2010	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Arvin Sub 70kV bus	3/31/2012	3/31/2012	Waived	Tendered			
622	12/21/2009	5/6/2010	Active - SGIP	PV	S	10		EO	Kern	CA	PGE	Temblor-King Ellis 70kV	12/1/2011	12/1/2011	Waived	Tendered			
622B	5/5/2010	5/5/2010	Active - SGIP	PV	S	20		EO	Kern	CA	PGE	Wheeler Ride Sub 115kV Bus	3/31/2012	3/31/2012	Waived	Tendered	In Progress		
625	5/14/2010	5/14/2010	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Henrietta-Tulare Lake 70kV	12/31/2011	12/31/2011	Waived	Tendered			
626	5/17/2010	5/17/2010	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Henrietta-Guernsey 70kV	12/31/2011	12/31/2011	Waived	Tendered			
628	5/18/2010	5/18/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Cal Cement 66kV	12/31/2013	12/31/2013	Waived	Tendered			
631	5/24/2010	5/24/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Helms-Schindler 70kV	6/30/2012	6/30/2012	Waived	Complete	In Progress		
632	5/25/2010	5/25/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	Wesix 70kV Tap	12/31/2012	12/31/2012	Waived	Complete	In Progress		
632AA	5/26/2010	5/26/2010	Active - SGIP TC	PV	S	13		EO	Riverside	CA	SCE	Devers-Farrell 115kV	8/1/2011	5/1/2012					
632B	6/1/2010	6/1/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Stroud-Stroud SW 70 kV	12/1/2012	12/1/2012	Waived	In Progress			
632C	6/1/2010	6/1/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Helm-Stroud SW 70kV	12/1/2012	12/1/2012	Waived	In Progress			
633	6/2/2010	6/2/2010	Active - SGIP	PV	S	20		EO	Fresno	CA	PGE	West Jayne Avenue 69kV	7/10/2011	7/10/2011	Waived	Tendered			
634	6/30/2010	6/30/2010	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Camden Junction-Lemoore Tap 70kV	12/31/2012	12/31/2012	Waived	Tendered			
635	7/1/2010	7/1/2010	Active - SGIP TC	PV	S	20		EO	Merced	CA	PGE	Oro Loma-Canal 70kV	6/15/2012	6/15/2012	Waived	In Progress			
636	7/2/2010	7/6/2010	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Henrietta-Armstrong 70kV	12/31/2012	12/31/2012	Waived	Tendered			
637	7/2/2010	7/6/2010	Active - SGIP	PV	S	20		EO	Kings	CA	PGE	Henrietta-Jacobs Corner 70kV	12/31/2012	12/31/2012	Waived	Tendered			
638	7/8/2010	7/8/2010	Active - SGIP	PV	S	15		EO	Fresno	CA	PGE	Coalinga 1-Gates 70kV	12/31/2012	12/31/2012	Waived	Tendered			
639	5/26/2010	7/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Redman-Piute 66kV	11/1/2011	1/1/2013		In Progress			

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640	5/26/2010	7/15/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Rosamond 66kV - Tap 52	11/1/2011	1/1/2013		In Progress			
640A	7/20/2010	7/20/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Schindler Sub 115 kV Bus	12/15/2011	12/15/2011	Waived				
640B	7/20/2010	7/20/2010	Active - SGIP TC	PV	S	20		EO	Merced	CA	PGE	Oro Loma-El Nido 115kV	12/15/2011	12/25/2011	Waived				
642	7/30/2010	7/30/2010	Active - SGIP TC	PV	S	20		EO	Glenn	CA	PGE	Elk Creek 60kV Tap	7/1/2011	7/1/2011	Waived	In Progress			
643	7/26/2010	7/31/2010	Active - Cluster #3	WT	W	149.5		FC	Fresno	CA	PGE	Los Banos-San Luis PGP #1 230 kV	12/31/2014	12/31/2014		Tendered			
643A	7/29/2010	7/31/2010	Active - Cluster #3	PV	S	300		FC	Kern	CA	PGE	Arco Sub 230 kV Bus	12/31/2014	12/31/2014		Tendered			
643AA	7/26/2010	7/31/2010	Active - Cluster #3	WT	W	200.1		FC	Los Angeles	CA	**SCE**	Antelope Sub 230 kV Bus	12/31/2012	12/31/2012					
643AB	7/30/2010	7/31/2010	Active - Cluster #3	ST	S	260		FC	Los Angeles	CA	**SCE**	Whirlwind Sub 230 kV Bus	1/1/2015	1/1/2015					
643AC	7/30/2010	7/31/2010	Active - Cluster #3	ST	S	750		FC	Riverside	CA	**SCE**	Colorado River Sub 220 kV Bus	1/1/2015	1/1/2015					
643AD	7/30/2010	7/31/2010	Active - Cluster #3	ST	G	95		FC	Inyo	CA	**SCE**	Kramer Sub 220 kV Bus	7/1/2012	7/1/2012					
643D	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	150		FC	Kings	CA	PGE	Angiola Sub 70 kV Bus	12/31/2014	12/31/2014		Tendered			
643AE	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	146		FC	Riverside	CA	**SCE**	Red Bluff Sub 230 kV Bus	1/1/2014	1/1/2014					
643E	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	200		FC	Fresno	CA	PGE	Schindler Sub 115 kV Bus	12/31/2014	12/31/2014		Tendered			
643AF	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	500		FC	Riverside	CA	**SCE**	Colorado River Sub 500 kV Bus	10/30/2015	10/30/2015					
643F	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	220		FC	Placer	CA	PGE	Rio Oso-Lockford 230 kV	3/1/2014	3/1/2014		Tendered			
643AG	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	50		FC	Inyo	CA	**SCE**	Control-Inyokern 115 kV	1/1/2014	1/1/2014					
643G	7/20/2010	7/31/2010	Active - Cluster #3	ST	B	27.15		FC	Shasta	CA	PGE	Cascade-Cottonwood 115 kV	3/1/2012	3/1/2012		Tendered			
643AH	7/29/2010	7/31/2010	Active - Cluster #3	PV	S	170		FC	Riverside	CA	**SCE**	Blythe - Eagle Mountain 161 kV	1/1/2014	1/1/2014					
643H	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	600		FC	Kings	CA	PGE	Gates-Gregg 230 kV	5/1/2015	5/1/2015		Tendered			
643AI	7/29/2010	7/31/2010	Active - Cluster #3	PV	S	300		FC	Clark	NV	**SCE**	Eldorado Sub 220 kV Bus	11/30/2014	11/30/2014					
643I	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	200		FC	Fresno	CA	PGE	Mendota-Dairyland 115 kV	3/1/2014	3/1/2014		Tendered			
643AJ	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	100		FC	Kern	CA	**SCE**	Whirlwind Sub 230 kV Bus	6/1/2013	6/1/2013					
643J	7/30/2010	7/31/2010	Active - Cluster #3	CT/PV	NG/S	49/120		FC	Fresno	CA	PGE	Coalinga #2-Schindler 70 kV	4/1/2017	4/1/2017		Tendered			
643AK	7/30/2010	7/31/2010	Active - Cluster #3	ST	G	5.6		FC	Churchill	NV	**SCE**	Control Sub 115 kV Bus	12/31/2011	12/31/2011					
643K	7/30/2010	7/31/2010	Active - Cluster #3	CT/PV	NG/S	49/240		FC	Fresno	CA	PGE	Mendota-San Joaquin-Helm 70 kV	4/1/2017	4/1/2017		Tendered			
643AL	7/30/2010	7/31/2010	Active - Cluster #3	ST	S	1000		FC	Yuma	AZ	**SCE**	Palo Verde-Devers #1 500 kV	1/1/2015	1/1/2015					
643L	7/30/2010	7/31/2010	Active - Cluster #3	CT/PV	NG/S	49/240		FC	Fresno	CA	PGE	Panoche–Schindler #1 & #2 115 kV	4/1/2017	4/1/2017		Tendered			
643AM	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	49		FC	Imperial	CA	**SDGE**	Imperial Valley Sub 230 kV Bus	3/1/2014	3/1/2014					
643M	7/30/2010	7/31/2010	Active - Cluster #3	CT/PV	NG/S	49/240		FC	Fresno	CA	PGE	Panoche–Schindler #1 & #2 115 kV	4/1/2017	4/1/2017		Tendered			
643AN	7/30/2010	7/31/2010	Active - Cluster #3	WT/PV	W/S	66/20		FC	San Diego	CA	**SDGE**	Boulevard Sub 138 kV Bus	11/22/2013	11/22/2013					
643N	7/30/2010	7/31/2010	Active - Cluster #3	CT/PV	NG/S	49/120		FC	Fresno	CA	PGE	Helm-Stroud Sw Sta 70 kV	4/1/2017	4/1/2017		Tendered			
643AO	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	200		FC	Imperial	CA	**SDGE**	Imperial Valley 230 kV Switchyard	6/1/2014	6/1/2014					
643O	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	125		FC	Yolo	CA	PGE	Brighton–Davis 115 kV	3/1/2014	3/1/2014		Tendered			
643AP	7/30/2010	7/31/2010	Active - Cluster #3	WT	W	250.45		FC	Imperial	CA	**SDGE**	Sunrise Powerlink 500 kV	12/31/2013	12/31/2013					
643AQ	7/31/2010	7/31/2010	Active - Cluster #3	PV	S	238		FC	Yuma	AZ	**SDGE**	Hassayampa-North Gila 500 kV line	6/1/2013	6/1/2013					
643AR	7/30/2010	7/31/2010	Active - Cluster #3	ST	G	364.2		FC	Churchil/Pershing	NV	**SCE**	Control Sub 115 kV Bus	6/1/2016	6/1/2016					
643R	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	200		FC	Kern	CA	SCE	Whirlwind Sub 230 kV Bus	6/1/2013	6/1/2013					
643AS	7/31/2010	7/31/2010	Active - Cluster #3	PV	S	200		FC	Riverside	CA	**SCE**	Colorado River Sub 500 kV Bus	6/1/2013	6/1/2013					
643S	7/30/2010	7/31/2010	Active - Cluster #3	CT/PV	NG/S	49/480		FC	Fresno	CA	SCE	Vestal Sub 230 kV Bus	6/1/2013	6/1/2013					
643AT	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	242		FC	Clark	NV	**SCE**	Mead-Eldorado 230 kV	12/31/2013	12/31/2013					
643T	7/30/2010	7/31/2010	Active - Cluster #3	CC/PV	NG/S	1250/700		FC	Maricopa	AZ	SDGE	Hassayampa-North Gila 500 kV line	10/31/2015	10/31/2015					
643U	7/31/2010	7/31/2010	Active - Cluster #3	PV	S	500		FC	Imperial	CA	SDGE	Imperial Valley Sub 230 kV Bus	1/30/2014	1/30/2014					
643V	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	250		FC	Imperial	CA	SDGE	Imperial Valley Sub 230 kV Bus	9/30/2013	9/30/2013					
643W	7/8/2010	7/31/2010	Active - Cluster #3	PV	S	200		FC	Kings	CA	**PGE**	Gates-Gregg 230 kV and Gates-McCall 230 kV	6/30/2014	6/30/2014					
643X	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	500		FC	Fresno	CA	**PGE**	Helm-Panoche 230 kV and Panoche-Kearney 230 kV	1/30/2014	1/30/2014					
643Y	7/30/2010	7/31/2010	Active - Cluster #3	PV	S	80		FC	Kings	CA	**PGE**	Henrietta-Leprino Food 115 kV	7/1/2013	7/1/2013					
643Z	7/31/2010	7/31/2010	Active - Cluster #3	WT/PV	W/S	800/200		FC	Kern	CA	**SCE**	Whirlwind-Windhub 500 kV	11/1/2013	11/1/2013					
644	8/16/2010	8/16/2010	Active - SGIP TC	PV	S	20		EO	Madera	CA	PGE	Dairyland - Legrand 115 kV	1/1/2012	1/1/2012	Waived				
644A	8/17/2010	8/17/2010	Active - SGIP TC	PV	S	20		EO	San Diego	CA	SDGE	East County Sub 138kV Bus	5/1/2012	12/1/2012					
645	8/19/2010	8/19/2010	Active - SGIP TC	PV	S	20		EO	Monterey	CA	PGE	Jolon - Coburn 60 kV	2/1/2012	2/1/2012	Waived	In Progress			
645A	8/23/2010	8/23/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Weedpatch-Wheeler Ridge 70kV	12/1/2012	12/1/2012	Waived				
646	8/25/2010	8/25/2010	Active - SGIP TC	PV	S	8		EO	Fresno	CA	PGE	Chaney #1 115kV Tap	3/1/2013	3/1/2013	Waived	In Progress			
647	8/25/2010	8/25/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Oro Loma 70kV	4/1/2012	4/30/2012	Waived	In Progress			
648	8/25/2010	8/25/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Panoche-Oro Loma 115kV Tap	4/2/2012	4/30/2012	Waived	In Progress			
649	8/25/2010	8/25/2010	Active - SGIP TC	PV	S	11.75		EO	Fresno	CA	PGE	Stroud-Helm 70kV	3/1/2013	3/1/2013	Waived	In Progress			
649A	9/15/2010	8/25/2010	Active - SGIP TC	PV	S	14		EO	Solano	CA	PGE	Dixon-Vaca #2 60kV	3/1/2013	3/1/2013					
649B	9/4/2010	9/4/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Del Sur-Rosamond 66 kV	12/31/2013	12/31/2013		In Progress			
649C	9/4/2010	9/4/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Cal Cement 66 kV	12/31/2013	12/31/2013					
650A	9/8/2010	9/8/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Lancaster-Purify-Redman 66 kV	12/31/2013	12/1/2013					
650AA	9/8/2010	9/8/2010	Active - SGIP TC	PV	S	15		EO	Los Angeles	CA	SCE	Rosamond-Del Sur 66 KV	12/31/2013	12/31/2013					
650AB	9/8/2010	9/8/2010	Active - SGIP TC	PV	S	20		EO	Kings	CA	PGE	Henrietta-Tulare Lake 70kV	12/31/2012	12/31/2012					
650AC	9/8/2010	9/8/2010	Active - SGIP TC	PV	S	20		EO	Kings	CA	PGE	Henrietta Sub 70kV Bus	12/25/2011	12/31/2012	Waived	In Progress			
651	9/16/2010	9/16/2010	Active - SGIP TC	PV	S	20		EO	Yuba	CA	PGE	Nicolaus-Marysville 60kV	6/1/2012	8/1/2012					
651A	9/21/2010	9/21/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antlelope Sub 66 kV Bus	6/30/2012	6/30/2012					
652	9/23/2010	9/23/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Woodward-Sanger 115kV	6/15/2013	6/15/2013					
653	9/29/2010	9/29/2010	Active - SGIP TC	PV	S	20		EO	Kings	CA	PGE	Arco-Tulare Lake 70 kV	1/15/2013	1/15/2013					
653A	9/29/2010	9/29/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Arco Sub 70 kV Bus	1/15/2013	1/15/2013					
653BA	9/29/2010	9/29/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Kern River-Cummings 66kV	12/31/2012	12/31/2012					
653EA	9/30/2010	9/30/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Copus-Old River 70 kV	4/1/2012	4/1/2012					
653FA	10/13/2010	10/13/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Lancaster-Little Rock-Piute 66kV	12/31/2013	12/31/2013					
653B	9/29/2010	9/29/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Belridge-Temblor 115 kV	5/1/2013	5/2/2013					
653EB	9/30/2010	9/30/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Midway-La Paloma 230kV	7/1/2013	5/1/2013					
653FB	10/13/2010	10/13/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Lancaster-Little Rock-Piute 66kV	12/31/2013	12/31/2013					
653D	9/30/2010	9/30/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Panoche-Mendota 115kV	1/1/2012	6/1/2012					
653ED	9/30/2010	9/30/2010	Active - SGIP TC	PV	S	20		EO	San Diego	CA	SDGE	Boulevard Sub 69 kV Bus	4/1/2013	4/1/2013					
653E	9/30/2010	9/30/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Helm Sub 70 kV Bus	1/1/2012	1/1/2012					
653EF	10/5/2010	10/5/2010	Active - SGIP TC	WT	W	20		EO	Kern	CA	SCE	Cal Cement-Monolith-Windland 66 kV	6/30/2011	6/30/2011					
653F	10/7/2010	10/13/2010	Active - SGIP TC	PV	S	12		EO	Yolo	CA	PGE	Woodland-Davis 115 kV	5/1/2012	5/1/2012					
653G	10/20/2010	10/20/2010	Active - SGIP TC	PV	S	20		EO	Fresno	CA	PGE	Mendota-San Joaquin-Helm 70 kV	3/1/2013	3/1/2013					
653H	10/20/2010	10/20/2010	Active - SGIP TC	PV	S	10		EO	Lancaster	CA	SCE	Antelope Sub 66 kV Bus	12/31/2013	12/31/2013					
654	10/25/2010	10/25/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	PGE	Semitropic-Midway #2 115kV	5/1/2013	5/2/2013					

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656	11/11/2010	11/11/2010	Active - SGIP TC	PV	S	10		EO	Kern	CA	PGE	Taft-Elk Hills 70 kV	12/31/2013	12/31/2013					
657A	11/15/2010	11/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Neenach 66kV	12/1/2013	12/20/2013					
657B	11/19/2010	11/19/2010	Active - SGIP TC	PV	S	20		EO	Kern	CA	SCE	Goldtown-Corum 66 KV	12/1/2013	12/20/2013					
658	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Lanpri-Shuttle 66 kV	12/31/2013	12/17/2012					
659	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope Sub 66 kV Bus	12/31/2013	12/31/2013					
660	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope Sub 66 kV Bus	12/31/2013	12/17/2012					
661	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope-Rosamond 66kV	12/31/2013	12/31/2013					
662	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Antelope Sub 66 kV Bus	12/31/2013	12/17/2012					
663	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Lancaster-Redman-Purify 66kV	7/1/2013	7/1/2013					
664	12/15/2010	12/15/2010	Active - SGIP TC	PV	S	20		EO	Los Angeles	CA	SCE	Piute Sub 66 kV Bus	12/31/2012	12/31/2012					
665	2/25/2011	2/25/2011	Fast Track	PV	S	5		EO	Fresno	CA	PGE	Derrick Tap 70kV	1/12/2012	1/12/2012					
666	3/2/2011	3/22/2011	Fast Track	PV	S	5		EO	Contra Costa	CA	PGE	Pittsburg-Kirker-Columbia Steel 115 kV	12/31/2012	12/31/2012					
TBD	7/30/2010		Active - Cluster #4	PV	S	300		FC	Clark	NV	SCE	Eldorado Sub 220 kV Bus	5/31/2014	5/31/2014					
TBD	11/2/2010		Active - Cluster #4	PV	S	200		FC	Imperial	CA	SDGE	8 miles southeast of the Imperial Valley (IV) Sub	6/1/2014	6/1/2014					
TBD	7/30/2010		Active - Cluster #4	PV	S	300		FC	Kern	CA	SCE	Whirlwind Sub 230 kV Bus	3/31/2015	3/31/2015					
TBD	12/2/2010		Active - Cluster #4	WT	W	200		FC	San Bernardino	CA	SCE	Baker Sub 115 kV Bus	9/1/2014	9/1/2014					
TBD	7/30/2010		Active - Cluster #4	WT	W	720		FC	Baja California	Mexico	SDGE	ECO Sub 230 kV Bus	12/31/2014	12/31/2014					
TBD	3/3/2011		ISP	WT	W	78.2		FC	Contra Costa	CA	PGE	Newark-Contra Costa 230 kV	12/1/2011	12/1/2011					

Legend:

- **Application Status Key:** A39=Amendment 39 Procedures (Appendix W), Serial=Standard Large Generator Interconnection Procedures (Appendix U), Trans(ition) Cluster=Appendix 2 to Large Generator Interconnection Procedures in a Queue Cluster Window (Appendix Y), Numbered Clusters=Large Generator Interconnection Procedures in a Queue Cluster Window (Appendix Y), SGIP=Small Generator Interconnection Procedure (Appendix S), **Complete**=project is in Commercial Operation, ISP=Independent Study Process, TC=Transition Cluster
- **Generator Type Key:** IC=Internal Combustion, ST=Steam Turbine, CT=Combustion Turbine, CC=Combined Cycle, H=Hydro, WT=Wind Turbine, PV=Photovoltaic, RE=Reciprocating Engine
- **Fuel Type Key:** W=Wind, NU=Nuclear, NG=Natural Gas, O=Oil, C=Coal, B=Biomass, S=Solar, LFG=Land Fill Gas, WTR=Water, G=Geothermal, HR=Heat Recovery

Appendix C

Load, Resource, and Dispatch Summary Table

Load and Resource Summary: C1C2 Projects Phase II Study for Stressed Thermal Cases

Case Names	C1C2_hs_Pre_R12.sav	C1C2_hs_Pre_R15.sav	C1C2_ll_Pre_R12.sav	C1C2_ll_Pre_R15.sav
CAISO Recommended Plan Of Service *	**No**	**Yes**	**No**	**Yes**
Boulevard Area- Cluster 1 & Cluster 2	**Off**	**190 MW**	**Off**	**190 MW**
Imperial Valley Area - Cluster 1 & Cluster 2	**Off**	**1,119 MW**	**Off**	**1,119 MW**
Internal Area- Cluster 1 & Cluster 2	**Off**	**408 MW**	**Off**	**408 MW**
Season	**Heavy Summer**		**Light Load**	
Load	5120	5120	2739	2739
Losses	187	227	128	215
Load + Losses (actual)	**5307**	**5347**	**2867**	**2954**
Path 44 South of SONGS (North Bound)	708	178	-56	-215
LEAPS 500/230 kV Flow @ 230 kV (To SDG&E)	4	-6	-447	-892
Miguel 500/230 kV Flow @ 230 kV	1637	1599	1057	1081
Central 500/230 kV Flow @ 230 kV	902	1043	492	698
Tijuana-Otay Mesa 230 kV @ OM	459	511	403	505
SDG&E Import Cut Plane: (Total)	**3710**	**3325**	**1449**	**1177**
Sunrise (at IV)	911	459	494	-758
Sunrise (at CE)	902	1043	492	408
Imperial Valley - North Gila 500 kV #1 (West))	932	241	-177	699
Imperial Valley - ECO 500 kV(West)	549	502	-42	-27
ECO-Miguel 500 kV	1651	1613	1063	1088
Path 45 SDG&E-CFE (south to north)	200	200	350	350
SDG&E to IID IV-IV(IID)Sub 230 kV #1 and #2 (north)	176	428	281	-7
Path 43 North of Songs (south to north)	1442	1971	2206	^ 2366
Path 49 East Of River	4422	4464	5511	5695
SCIT	13647	12212	4942	4477

Full Capacity (FC)
Energy Only (EO)

Out of-basin Generation

	ECO Generation						**Fuel Type**	**MAX MW**
Q32	Boulevard	201	201	201	201		W	201
Q106A	Boulevard	160	160	160	160		W	160
Q159A	ECO	^^ 200	^^ 200	^^ 200	^^ 200		W	400
Q183	ECO	^^ 250	^^ 150	^^ 250	^^ 150	EO	W	300
Q215	ECO	^^ 339	^^ 249	^^ 339	^^ 249	EO	W	420
S644A	ECO	0	20	0	20	FC	W	20
C555	Boulevard	0	92	0	92	FC	W	92
C583	Boulevard	0	57.5	0	57.5	EO	W	57.5
S653ED	Boulevard	0	20	0	20	FC	NG	20
	Sub-total ECO Generation	**1150**	**1150**	**1150**	**1150**			**1671**
	Sub-total Boulevard/ECO 138 kV	**361**	**551**	**361**	**551**			**590**
	Sub-total Boulevard Area Cluster 1 & Cluster 2	**0**	**189.5**	**0**	**189.5**			**189.5**
	Imperial Valley Area							**MAX**
N/A	Existing	+ 0	+ 0	+ 0	^+ 0		NG	1070
Q78	IV-230	300	300	300	300		ST	300
Q124	IV-230	450	450	450	450		ST	600
Q429	IV-230	100	100	100	100	FC	ST	100
Q442	IV-230	125	125	125	125	FC	SPV	125
Q493	Sunrise Powerlink	0	299	0	299	FC	W	299
Q510	IV-230	0	200	0	200	FC	SPV	200
C561	IV-230	0	200	0	200	FC	SPV	200
C590	IV-230	0	150	0	150	FC	SPV	150
C608	IV-230	0	250	0	250	FC	SPV	250
S621	IV-12	0	20	0	20	EO	SPV	20
	Sub-total Imperial Valley Area	**975**	**2094**	**975**	**2094**			**3314**
	Sub-total Imperial Valley Area Cluster 1 & Cluster 2	**0**	**1119**	**0**	**1119**			**1119**
	North Gila Haasayampa Area Generation							**MAX**
Q468	AZ NG-HAA 500 kV	290	290	290	290	EO	SPV	290
	Sub-total North Gila Haasayampa Area	**290**	**290**	**290**	**290**			**290**
	Total Out-of-Basin Generation	**2415**	**3534**	**2415**	**3534**			**5275**

In-basin Generation

Internal Generation								
QF	**Sub-total**	**182**	**182**	**182**	**182**			**192**
	PEN (CT1, CT2 & ST1)	512	514	506	529			565
	OTAYM (CT1, CT2 & ST1)	615	615	615	^^^ 515			615
	LkHod (G1+G2)	0	0	0	0			40
Priority One	**Sub-total**	**1127**	**1129**	**1121**	**1044**			**N/A**
	ENCINA 5	0	0	0	0			0
	ENCINA 4	50	50	0	0			299
	EC GEN	49.9	49.9	0	0			49.9
	ES GEN	0	0	0	0			35
	MEF_MR1	0	0	0	0			44
	MEF_MR2	47.5	47.5	0	0			47.5
	CALPeak_EC	0	0	0	0			42
	CALPeak_BD	0	0	0	0			42
	CALPeak_ES	0	0	0	0			42
	ELCAJNGT	0	0	0	0			13
	LRKSPBD1	0	0	0	0			46
	LRKSPBD2	0	0	0	0			46
	KUMEYAAY	20	20	20	20		W	50
	OY GEN	0	0	0	0			35
	EL CAJON	0	0	0	0			49.9
	PALA	0	0	0	0			99
Priority Two	**Sub-total**	**167**	**167**	**20**	**20**			**N/A**
CAISO Internal Queue								
Q72	Proposed Lee Lake Sub	0	0	0	0			500
Q103	Border	0	0	0	0			27
Q137	Encina	0	0	0	0			260
Q150	Border	0	0	0	0			49.4
Q189	Encina	0	0	0	0			260
Q337	Borrego	25.75	25.75	25.75	25.75	FC	SPV	25.75
S480	Borrego	0	0	0	0	EO	S	20
Q565	Sycamore-Miguel 230 kV line	0	100	0	100	FC	NG	100
Q574	Otay Mesa	0	308	0	308	FC	NG	308
	Sub-total CAISO Internal Queue	**26**	**434**	**26**	**434**			**1550**
	Sub-total Internal Area Cluster 1 & Cluster 2	**0**	**408**	**0**	**408**			**408**
	Total In Basin Generation	**1502**	**1912**	**1349**	**1680**			**N/A**
	Total	**3917**	**5446**	**3764**	**5213**			

Adjusting area 24 and area 30 generation to compensate for Cluster 3 generation
* ISO Plan of Service: Close the Taps at Miguel 230 kV, Reconductor Escondido-Palomar Energy 230 kV #1 and #2, Reconductor Friars-Doublet Tap 138 kV, SPSs as identified in the group report
^ Existing Imperial Valley generation adjusted to maintain flow on the WECC Path 43, NOS, below the limit of 2440 MW
+ Imperial Valley gas fired generation turned off to create a more stressed case for voltage, post transient, and transient studies
^^N-1 of a single ECO 500/230 kV bank isolates all generation at Boulevard and ECO. The CAISO allows a maximum of 1150 MW of generation tripping for this single contingency. Generation at ECO and Boulevard is limited to a maximum of 1150 MW.
^^^ Generation limitaiton to prevent an N-0 overload on Old Town-Penasquitos 230 kV

Appendix D

Steady-State Power Flow Results: Thermal and Voltage

C1C2 Projects Phase II Steady-State Thermal Results

Case Names	C1C2_hs_Pre_R12.sav	C1C2_hs_Pre_R15.sav	C1C2_ll_Pre_R12.sav	C1C2_ll_Pre_R15.sav
CAISO Recommended Plan Of Service *	No	Yes	No	Yes
Boulevard Area- Cluster 1 & Cluster 2	Off	189.5 MW	Off	189.5MW
Imperial Valley Area - Cluster 1 & Cluster 2	Off	1,119 MW	Off	1,119 MW
Internal Area- Cluster 1 & Cluster 2	Off	408 MW	Off	408 MW

								Data			
AREA	MITIGATION	BRANCH DESCRIPTION	CATEGORY	CONTINGENCY DESCRIPTION	MVA1	MVA2	RVU	c1c2_hs_pre_r12*	c1c2_hs_pstup_r15*	c1c2_ll_pre_r12*	c1c2_ll_pstup_r15*
SDG&E	Pre-Cluster1/Cluster2	BAY BLVD 69 IMPRLBCH 69 1	C	Otay 69kV E Bus	55.0	70.0	70.0	1.065	1.031	0.589	0.524
	Pre-Cluster1/Cluster2	BAY BLVD 69 OTAY 69 2	C	Bay Blvd 69kV N Bus	100.0	100.0	100.0	1.151	1.113	0.613	0.546
	Pre-Cluster1/Cluster2	BAY BLVD 69 SWEETWTR 69 1	B	TL23026 SILVERGT - BAY BLVD ck 1 NO SPS	204.0	204.0	204.0	1.329	1.087	1.116	0.736
				TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574 trip	204.0	204.0	204.0	1.329	1.047	1.116	0.697
				TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574, C565 trip	204.0	204.0	204.0	1.329	1.053	1.116	0.701
* ISO Plan of Service: Close the Taps at Miguel 230 kV, Reconductor Escondido-Palomar Energy 230 kV #1 and #2,			C	Bay Blvd 69kV S Bus	204.0	204.0	204.0	1.110	1.150	0.711	0.651
	Need SPS to trip C1-2 generation for this Cat C	BERNARDO 69 FELCTATP 69 1	C	PEN-ES #1 + #2 230 kV	102.1	102.1	102.1	0.587	0.791	0.723	1.134
	Pre-Cluster1/Cluster2	BERNARDO 69 R.CARMEL 69 1	B	TL06913 POWAY-POMERADO ck 1	68.0	68.0	68.0	1.136	1.200	0.644	0.737
			C	AR-SX + SX-BE	68.0	68.0	68.0	1.126	1.238	0.730	0.891
				Pomerado 69kV E Bus	68.0	68.0	68.0	1.136	1.200	0.644	0.737
				POM-SX #1+#2	68.0	68.0	68.0	1.806	1.871	0.981	1.073
				Poway 69kV Bus	68.0	68.0	68.0	1.659	1.664	0.855	0.860
	Pre-Cluster1/Cluster2	DEL MAR 69 DELMARTP 69 1	C	Del Mar 69kV E Bus	50.0	50.0	50.0	1.324	1.337	0.700	0.722
	Need SPS to trip ECO generation	ECO 230 ECO 138 1	B	ECO BK 61 230/138	392.0	477.0	477.0	Not in Service	1.124	Not in Service	1.130
	Need SPS to trip ECO generation	ECO 230 ECO 138 2	B	ECO BK 60 230/138	392.0	477.0	477.0	Not in Service	1.124	Not in Service	1.130
	Pre-Cluster1/Cluster2	ESCNDIDO 69 ESCNDIDO 230 2	C	ESCNDIDO 230 kV 2N CB	224.0	261.0	261.0	1.099	1.055	0.496	0.415
	Pre-Cluster1/Cluster2	GARFIELD 69 EL CAJON 69 1	C	Murray 69kV N Bus	97.0	102.0	102.0	1.201	1.193	0.642	0.633
	Pre-Cluster1/Cluster2	MELROSE 69 MELRSETP 69 1	C	SA-ME + ME-SA	102.0	102.0	102.0	1.051	1.047	0.544	0.538
	Pre-Cluster1/Cluster2	MIGUEL 230 MIGUELMP 500 1	C	MIGUEL 230 kV 2T CB	1120.0	1329.0	1329.0	1.091	1.027	0.710	0.687
	Existing TL 643 OLS to trip ML70/71 as mitigation	MIGUEL 69 JAMACHA 69 2	C	Miguel 69kV S Bus	136.0	143.0	143.0	0.979	1.026	0.559	0.659
	DA identified SPS to trip C565, C574 is not sufficient Need SPS to trip C565, C57 4 and other C1/C2 generation that particpate in ML 230 kv arragnements	OLD TOWN 230 MISSION 230 1	C	OLD TOWN 230 kV 1T CB (No SPS - for pre only)	456.0	456.0	456.0	0.840	N/A (SPS post)	0.555	0.956
				SG-OT 230kV #1+#2 (No SPS - for pre only)	456.0	456.0	456.0	0.840	N/A (SPS post)	0.555	0.956
				OLD TOWN 230 kV 1T CB (DA sps 574, 565-for post only)	456.0	456.0	456.0	N/A (no SPS pre)	1.030	0.555	0.846
				SG-OT 230kV #1+#2 (DA sps 574, 565-for post only)	456.0	456.0	456.0	N/A (no SPS pre)	1.030	0.555	0.846
	Pre-Cluster1/Cluster2	PENSQTOS 69 DELMARTP 69 1	C	PQ-TP + PQ-GE	97.0	136.0	136.0	1.031	1.031	0.545	0.548
	MVA2 = 174.0 Re-rate through GA is sufficient	POWAY 69 POMERADO 69 1	B	TL06961 SYCAMORE-BERNARDO 69 ck 1	148.0	148.0	148.0	0.990	1.075	0.610	0.731
			C	AR-SX + SX-BE	148.0	148.0	148.0	1.243	1.344	0.759	0.903
				ESCO 69 kV BUS	148.0	148.0	148.0	0.975	1.005	0.549	0.593
				ES-ESCO + ESCO-GLMQF GEN	148.0	148.0	148.0	0.975	1.005	0.549	0.593
				PEN-ES #1 + #2 230 kV	148.0	148.0	148.0	1.006	1.113	0.738	0.950
				SX-CC + SX-BE	148.0	148.0	148.0	1.011	1.100	0.626	0.752
				SX-PEN 230 kV + AR-SX 69 kV B	148.0	148.0	148.0	0.939	1.056	0.630	0.805
	Pre-Cluster1/Cluster2	POWAY 69 R.CARMEL 69 1	C	AR-SX + SX-BE	97.0	114.0	114.0	1.193	1.260	0.709	0.806
	Pre-Cluster1/Cluster2	SILVERGT 69 URBAN 69 1	C	SG-CR + SG-B	85.0	100.0	100.0	1.082	1.170	0.646	0.679
	Pre-Cluster1/Cluster2	SYCAMORE 69 BERNARDO 69 1	C	POM-SX #1+#2	170.0	170.0	170.0	1.055	1.127	0.627	0.729
				Poway 69kV Bus	170.0	170.0	170.0	0.970	1.031	0.576	0.663
	Pre-Cluster1/Cluster2	TOREYPNS 69 DUNHILTP 69 1	C	PQ-TP + PQ-GE	114.0	114.0	114.0	1.063	1.062	0.561	0.561
SCE	SCE is Not an Affect System	J.HINDS 230 MIRAGE 230 1	B	ML BK80/81 w/IV-NG + 1150 MW	357.0	357.0	357.0	1.006	0.944	0.108	0.120
				PALO VERDE - COLORADO RIVER ck 1	357.0	357.0	357.0	1.044	1.071	0.100	0.098
IID	IID-Affected System for Cat A (B & C also)	ELCENTSW 161 ELSTEAMP 92 1		Base system (n-0) (Cat B and C not shown)	125.0	137.0	125.0	0.654	0.818	0.910	1.035
	Pre-C1C2 IID-Affected System for Cat A (B & C also)	KNOB 161 PILOTKNB 161 1		Base system (n-0) (Cat B and C not shown)	165.0	165.0	165.0	0.538	0.715	1.009	1.162
	Pre-C1C2 IID-Affected System for Cat C	YUCCA161 161 PILOTKNB 161 1	C	IID-IVSUB - ELCENTSW 1+2	134.0	134.0	134.0	0.151	0.225	0.993	1.041
				IID-IVSUB - IMPRLVLY 230 kV ck1/2	134.0	134.0	134.0	0.220	0.346	1.062	1.154

* ISO Plan of Service: Close the Taps at Miguel 230 kV, Reconductor Escondido-Palomar Energy 230 kV #1 and #2, Reconductor Friars-Doublet Tap 138 kV, SPSs as identified in the group report

C1C2 Projects Phase II Steady-State Voltage Violations

Case Names	C1C2_hs_Pre_R12.sav	C1C2_hs_Pre_R15.sav	C1C2_ll_Pre_R12.sav	C1C2_ll_Pre_R15.sav
CAISO Recommended Plan Of Service *	**No**	**Yes**	**No**	**Yes**
Boulevard Area- Cluster 1 & Cluster 2	**Off**	**189.5 MW**	**Off**	**189.5MW**
Imperial Valley Area - Cluster 1 & Cluster 2	**Off**	**1,119 MW**	**Off**	**1,119 MW**
Internal Area- Cluster 1 & Cluster 2	**Off**	**408 MW**	**Off**	**408 MW**

SDG&E	BRANCH DESCRIPTION	CATEGORY	CONTINGENCY DESCRIPTION	Data PU			
69 kV	BORREGO 69	B	ECO-ML + TL 23050	1.0597	1.0212	1.0227	1.0256
		C	SONGS unit2/3 22	1.0390	1.0169	1.0506	1.0367
	MIGUEL 69	B	ECO BK 80 230/500	1.0450	1.0261	1.0562	1.0512

No steady statevoltage violation due to Cluster 1 or Cluster 2

* ISO Plan of Service: Close the Taps at Miguel 230 kV, Reconductor Escondido-Palomar Energy 230 kV #1 and #2, Reconductor Friars-Doublet Tap 138 kV, SPSs as identified in the group report

Appendix E

Power Flow Plots

List of Figures

Figure E1: C1C2 Projects Phase II, Pre External Heavy Summer

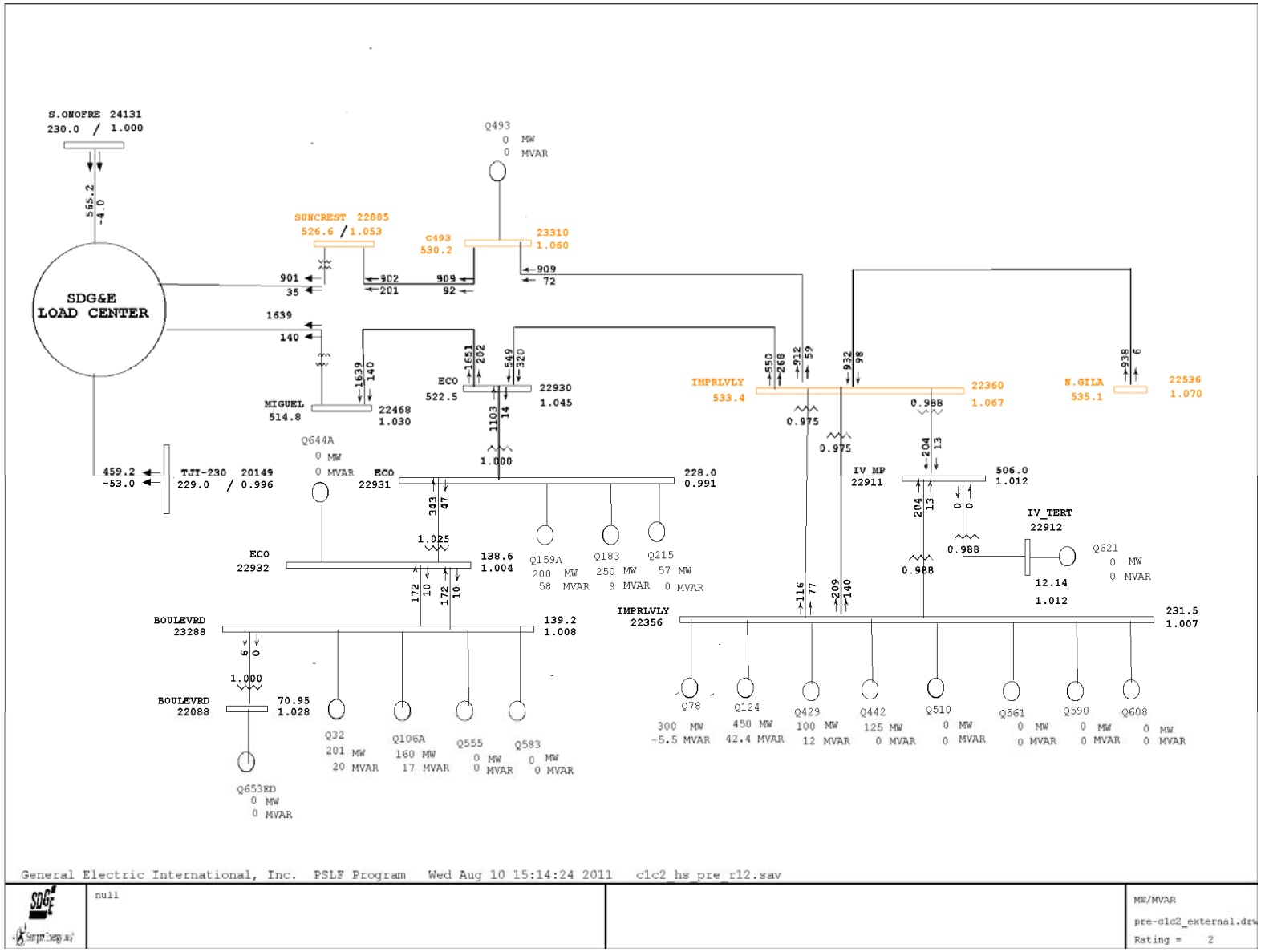


Figure E2: C1C2 Projects Phase II, Pre Internal Heavy Summer

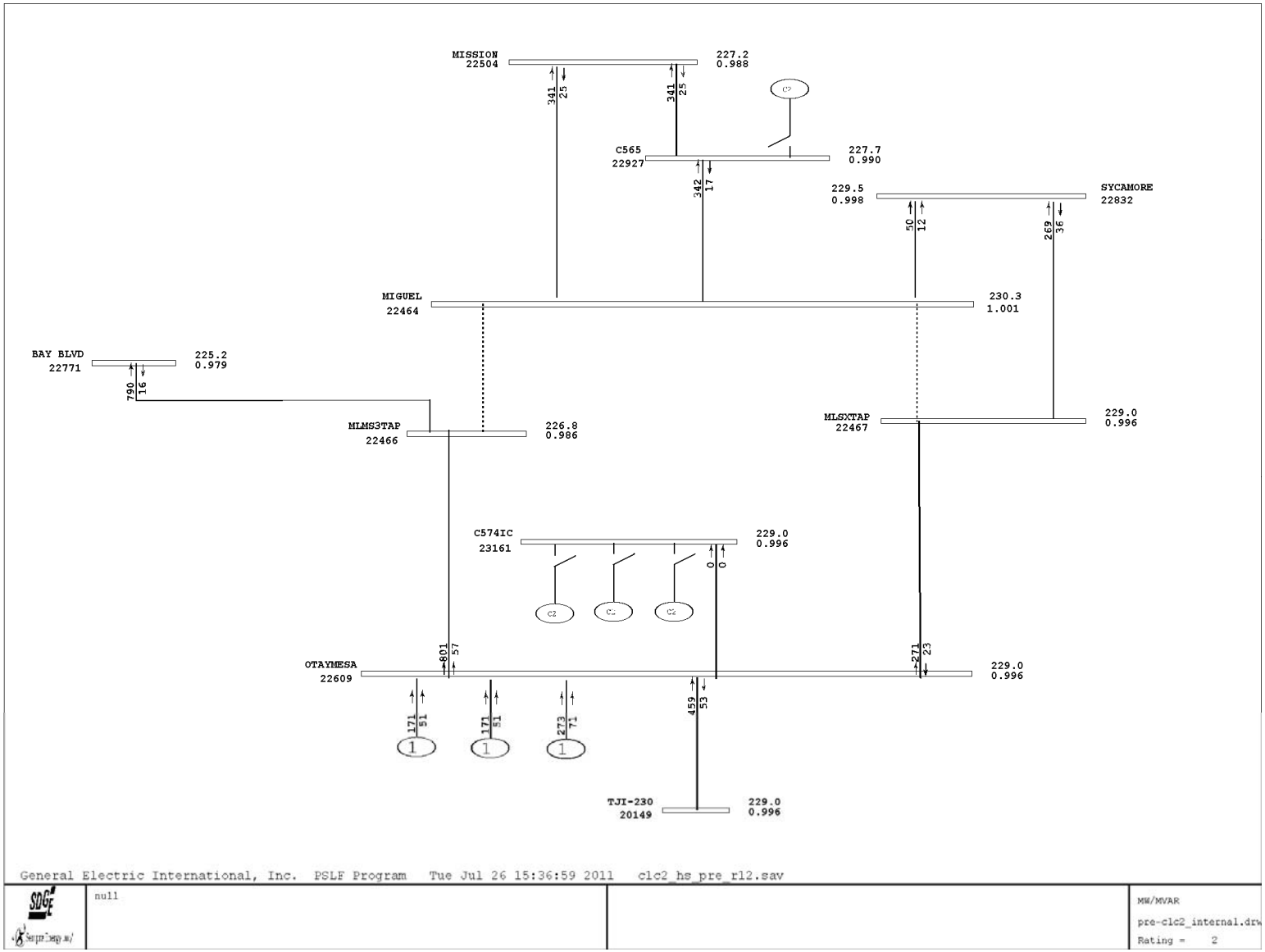


Figure E3: C1C2 Projects Phase II, Post External Heavy Summer

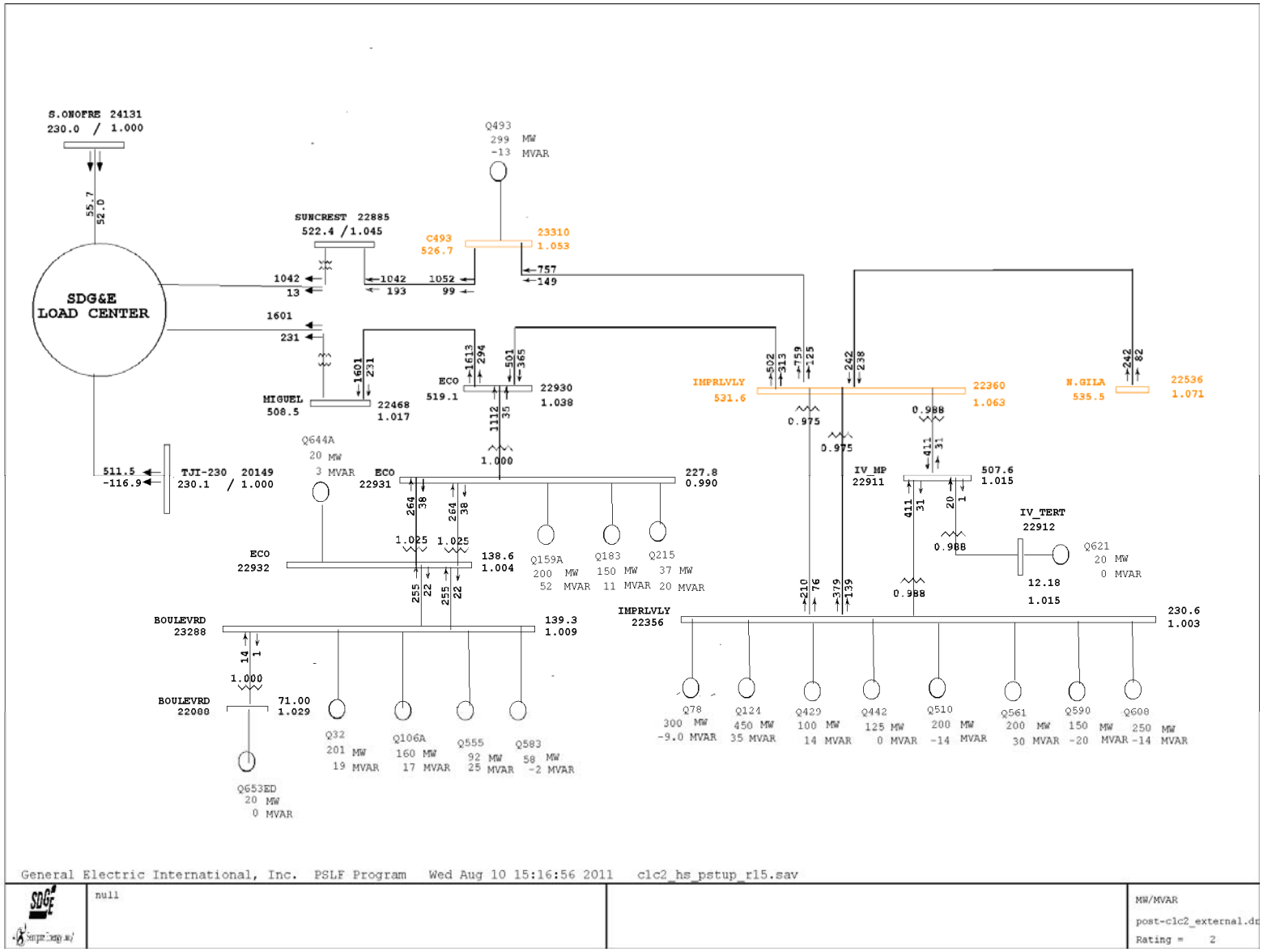


Figure E4: C1C2 Projects Phase II, Post Internal Heavy Summer

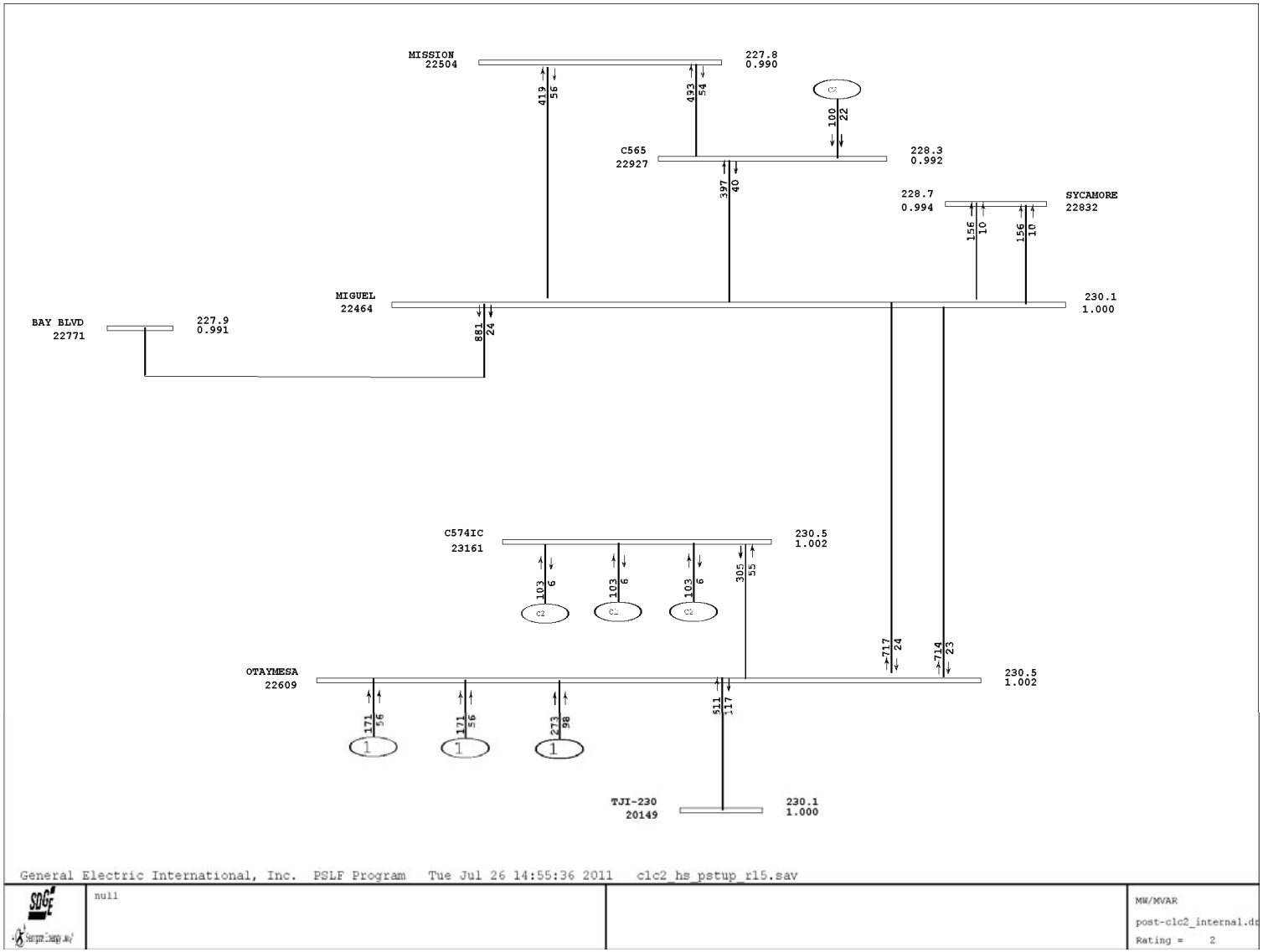


Figure E5: C1C2 Projects Phase II, Pre External Light Load

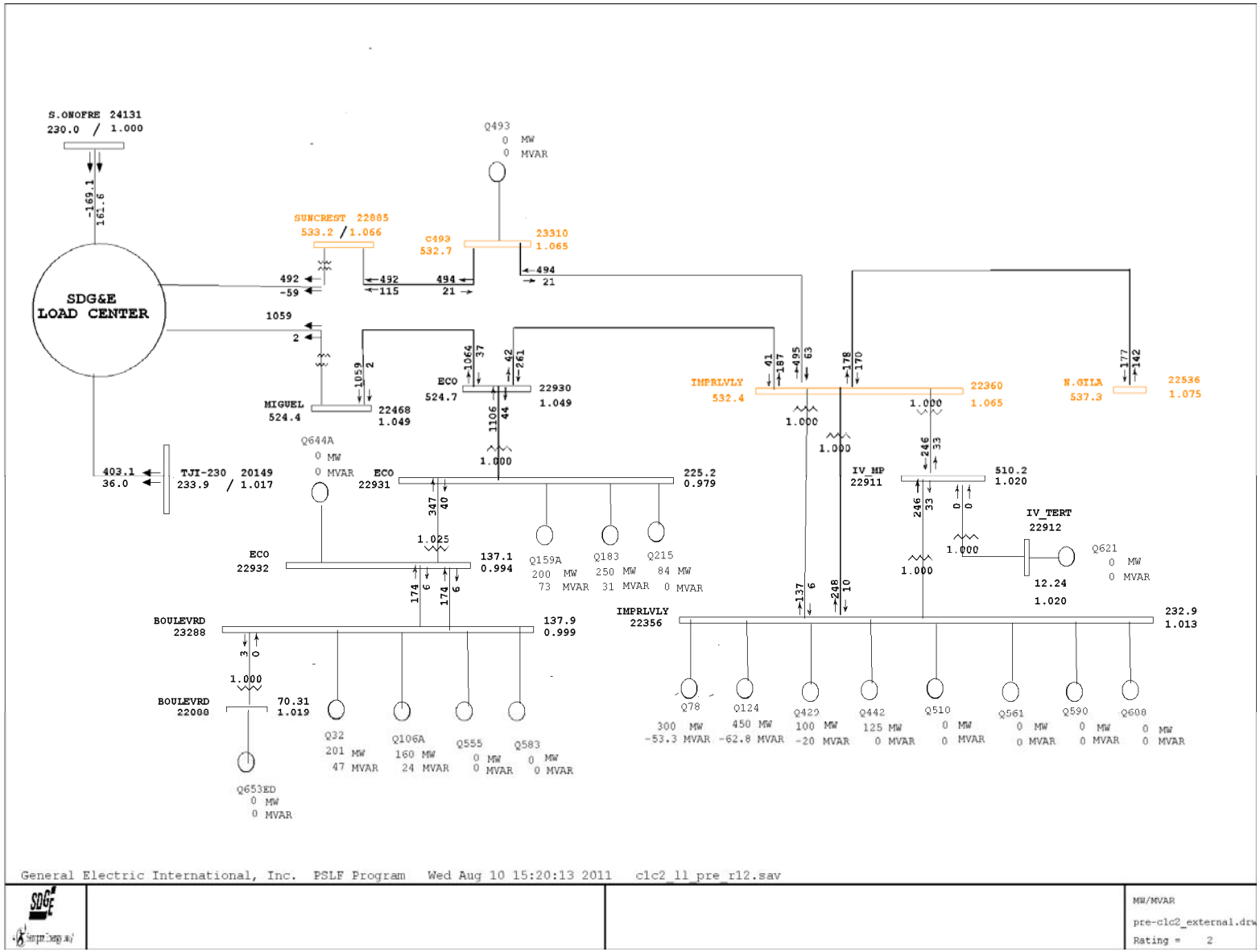


Figure E6: C1C2 Projects Phase II, Pre Internal Light Load

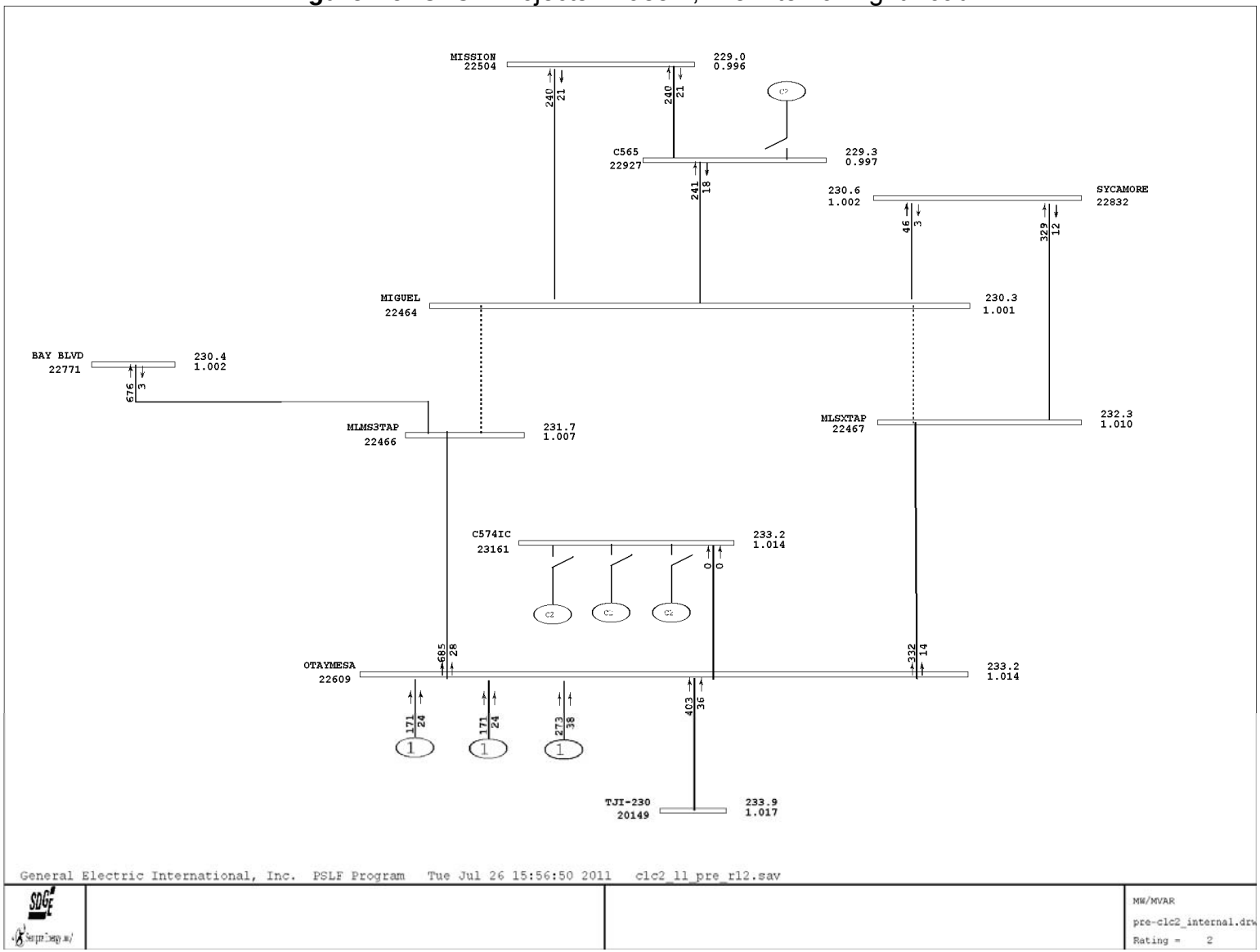


Figure E7: C1C2 Projects Phase II, Post External Light Load

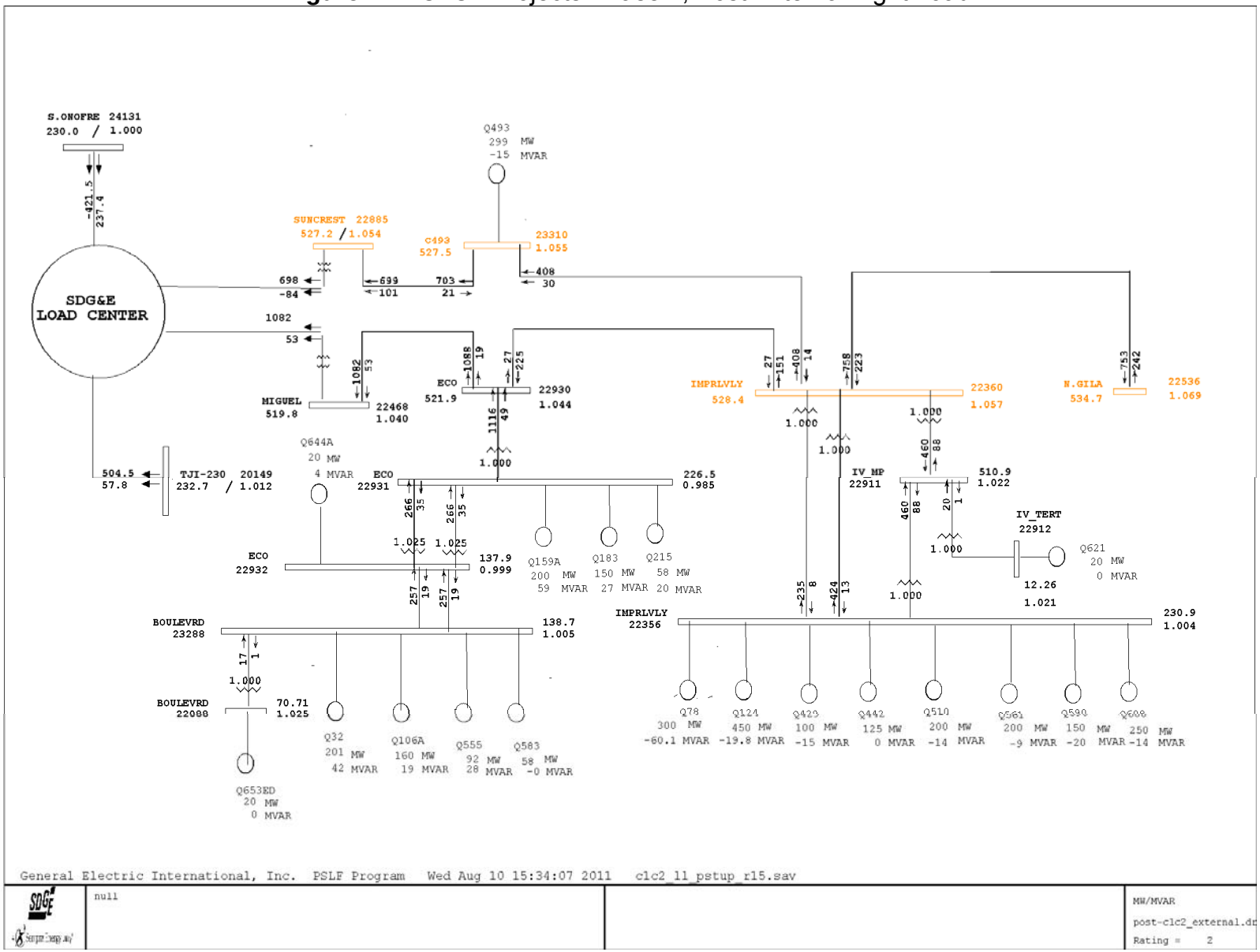
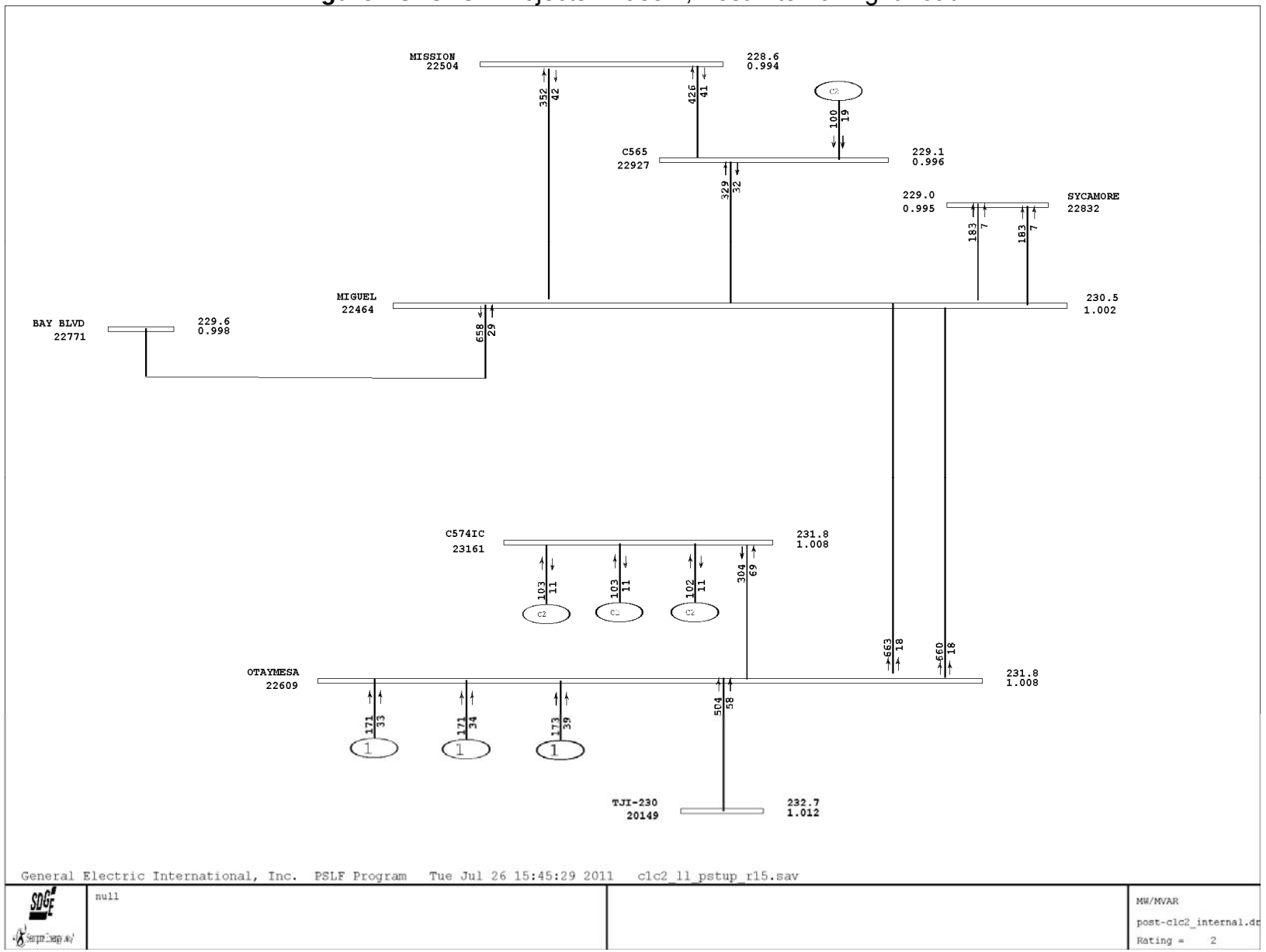


Figure E8: C1C2 Projects Phase II, Post Internal Light Load



Appendix F

Power Flow Contingency List

```
# Thermal Contingency Outage List
#
# Cluster 1/Cluster 2 Phase II
#
#
#
#
################################################################
# CLUSTER PROJECT CONTINGENCIES
################################################################
C565-ML "C565 - MIGUEL 230 KV" "N-1" "B"
        1 "C565 230" "MIGUEL 230" "1 " 1 0
        0
MS-C565 "MISSION - C565 230 KV" "N-1" "B"
        1 "MISSION 230" "C565 230" "1 " 1 0
        0
MS-5T "MISSION 230 KV 5T STUCK BREAKER" "N-2" "C"
        1 "MISSION 230" "C565 230" "1 " 1 0
        1 "MIGUEL 230" "MISSION 230" "2 " 1 0
        20 "C12_1400a.p"
        0
################################################################
# CONTINGENCIES RELATED TO Miguel 230 kV Reconfiguration
################################################################
OM-ML_SPS "OTAY MESA - MIGUEL 230 KV #1 + #2 SPS" "N-2" "C"
        1 "OTAYMESA 230" "MIGUEL 230" "1 " 1 0
        1 "OTAYMESA 230" "MIGUEL 230" "2 " 1 0
        20 "OM_GENS.p"
        0
ML-SX_SPS "SYCAMORE - MIGUEL 230 KV #1 + #2 SPS" "N-2" "C"
        1 "SYCAMORE 230" "MIGUEL 230" "1 " 1 0
        1 "SYCAMORE 230" "MIGUEL 230" "2 " 1 0
        20 "C12_1400a.p"
        0
13815/23042 "GH-TC 138 KV, OM-BAY BLVD 230 KV" "N-2" "C"
        1 "GRNT HLL 138" "TELECYN 138" "1 " 1 0
        1 "BAY BLVD 230" "OTAYMESA 230" "1 " 1 0
        0
TL23042  "OTAY MESA - BAY BLVD 230 KV (ML TAP 7X)" "N-1" "B"
        8 "MLMS3TAP 230"
        0
TL23041  "OTAY MESA - SYCAMORE 230 KV (ML TAP 4X)" "N-1" "B"
        8 "MLSXTAP 230"
        0
################################################################
# SDG&E 500 kV Transmission Line Outages (Category B: N-1)
################################################################
#IV-ECO_NOSPS  "50004  IMPRLVLY-ECO   ck 1       "  "N-1" "B"
#           1 "IMPRLVLY 500"  "ECO      500"  "1 "   1  0
#           0
#ECO-ML_NOSPS  "50001  MIGUEL-ECO     ck 1       "  "N-1" "B"
#           1 "ECO      500"  "MIGUEL    500"  "1 "  1  0
#           0
IV-NG  "50002 N.GILA-IMPRLVLY ck 1       "  "N-1" "B"
           1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
           0
IV-SCR  "50003 IMPRLVLY-SUNCREST      ck 1"  "N-1" "B"
           1 "IMPRLVLY 500"  "SUNCREST 500"  "1 "   1  0
           0
HAA-HDW  "HAA - HDW ck 1                 "  "N-1" "B"
           1 "HASSYAMP 500"  "HDWSH    500"  "1 "   1  0
```

```
            0
HDW-NG   "HDW - NG ck 1                  "  "N-1" "B"
            1 "HDWSH    500"  "N.GILA   500"  "1 "   1  0
            0
HAA-MES "HASSAYAMPA - MESQUITE 500 KV" "N-1" "B"
            1 "HASSYAMP 500" "MESQUITE 500" "2 " 1  0
            0
MES-QX  "MESQUITE - QX 500 KV" "N-1" "B"
            1 "MESQUITE 500" "QX   500" "1 " 1  0
            0
QX-HDW "QX - HDW 500 KV" "N-1" "B"
            1 "HDWSH 500" "QX   500" "1 " 1  0
            0
IV-C493  "IMPRLVLY - C493 ck 1 SPS"  "N-1" "B"
            1 "IMPRLVLY 500" "C493 500" "1 " 1  0
            20 "C12_1150a.p"
            0
C493-SUNCREST "C493 - SUNCREST ck 1" "N-1" "B"
            1 "C493 500" "SUNCREST 500" "1 " 1  0
            20 "C12_1150a.p"
            0
HAA-NG"HASSAYAMPA - N.GILA 500 KV" "N-1" "B"
            1 "HASSYAMP 500" "N.GILA 500" "1 " 1  0
            0
################################################################
# APS/SCE 500 kV Line Outages (Category B: N-1)
################################################################
PV-CLR "PALO VERDE - COLORADO RIVER ck 1" "N-1" "B"
            1 "PALOVRDE 500" "COLRIVER 500" "1 " 1 0
            0
PV-RUDD "PALO VERDE - RUDD ck 1" "N-1" "B"
            1 "PALOVRDE 500" "RUDD 500" "1 " 1 0
            0
################################################################
# SDG&E 500 kV Stuck Breaker Outages (Category C: N-2)
################################################################
IV-8022 "IV 8022 50002 & BK81 CB"  "CB"  "C"
            1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "   0
            0
IV-8022 "IV 8022 50002 & BK81 CB"  "CB"  "C"
            1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "   0
            20 "C12_1400a.p"
            0
IV-8032 "IV 8032 50001 & BK82 CB"  "CB"  "C"
            1 "IMPRLVLY 500" "ECO 500" "1 " 1  0
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "3 "   0
            0
IV-8032 "IV 8032 50001 & BK82 CB"  "CB"  "C"
            1 "IMPRLVLY 500" "ECO 500" "1 " 1  0
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "3 "   0
            20 "C12_1400a.p"
            0
IV-8042 "IV 8042 50003 & BK83 CB"  "CB"  "C"
            1 "IMPRLVLY 500" "C493 500" "1 " 1  0
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "2 "  0
            0
IV-8042 "IV 8042 50003 & BK83 CB"  "CB"  "C"
            1 "IMPRLVLY 500" "C493 500" "1 " 1  0
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "2 "  0
```

```
        20 "C12_1400a.p"
        0
############################################################
# SDG&E 230 kV Transmission Line Outages (Category B: N-1)
############################################################
TL23001  "TL23001 SANLUSRY - MISSION ck 1"  "N-1" "B"
        1 "SANLUSRY 230"  "MISSION  230"  "1 "   1  0
        0
TL23002  "TL23002 SANLUSRY-S.ONOFRE  ck 2"  "N-1" "B"
        1 "SANLUSRY 230"  "S.ONOFRE 230"  "2 "   1  0
        0
TL23003  "TL23003 SANLUSRY - ENCINA  ck 1"  "N-1" "B"
        1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
        0
TL23004  "TL23004 SANLUSRY - MISSION ck 2"  "N-1" "B"
        1 "SANLUSRY 230"  "MISSION  230"  "2 "   1  0
        0
TL23006  "TL23006 SANLUSRY - SONGS   ck 1"  "N-1" "B"
        1 "SANLUSRY 230"  "S.ONOFRE 230"  "1 "   1  0
        0
TL23007  "TL23007 TALEGA - SONGS     ck 1"  "N-1" "B"
        1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
        0
############################################################
# ISD 2016
# M-SOCRP
# DELETE TL23007 REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#TL23007  "TL23007 CAPSTRNO - SONGS     ck 1"  "N-1" "B"
#       1 "CAPSTRNO 230"  "S.ONOFRE 230"  "1 "   1  0
#       0
TL23010  "TL23010 SANLUSRY - SONGS   ck 3"  "N-1" "B"
        1 "SANLUSRY 230"  "S.ONOFRE 230"  "3 "   1  0
        0
TL23011  "TL23011 ENCINA-PEN-SANLUSRY ck1"  "N-1" "B"
        1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
        1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
        1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        0
############################################################
# NEXT 3 OUTAGE DEFINITIONS SIMULATE ONE ELEMENT OF MULTI-TERMINAL LINE OUTAGE
############################################################
TL23011A "TL23011 ENCINA-PEN-SANLUSRY TAP A" "N-1" "B"
#       1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
        1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
#       1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        0
TL23011B "TL23011 ENCINA-PEN-SANLUSRY TAP B" "N-1" "B"
        1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
#       1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
#       1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        0
TL23011C "TL23011 ENCINA-PEN-SANLUSRY TAP C" "N-1" "B"
#       1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
#       1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
        1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        0
TL23012  "TL23012 PENSQTOS - ENCINA  ck 1"  "N-1" "B"
        1 "PENSQTOS 230"  "ENCINA   230"  "1 "   1  0
        0
TL23013  "TL23013 PENSQTOS - OT      ck 1"  "N-1" "B"
```

```
          1 "PENSQTOS 230"  "OLD TOWN 230"  "1 "   1  0
          0
TL23014  "TL23014 PEN-ESCNDIDO ck 1"  "N-1" "B"
          1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
          0
TL23015  "TL23015 PEN-ESCNDIDO ck 2"  "N-1" "B"
          1 "PEN      230"  "ESCNDIDO 230"  "2 "   1  0
          0
TL23021  "TL23021 MIGUEL - SYCAMORE  ck 1"  "N-1" "B"
          1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
          0
TL23022  "TL23022 MIGUEL - MISSION   ck 1"  "N-1" "B"
          1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
          0
TL23023  "TL23023 MIGUEL - MISSION   ck 2"  "N-1" "B"
          1 "MIGUEL   230"  "MISSION  230"  "2"    1  0
          0
TL23026 "TL23026 SILVERGT - BAY BLVD ck 1 NO SPS"  "N-1" "B"
          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
          0
#TL23026s "TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190 trip"  "N-1" "B"
#          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
#          8 "Q190_Bus 230"
#          0
TL23026s1 "TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574 trip"  "N-1" "B"
          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
          #8 "Q190_Bus 230"
          8 "C574IC   230"
          0
TL23026s2 "TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574, C565 trip"  "N-1" "B"
          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
          #8 "Q190_Bus 230"
          8 "C574IC   230"
          8 "C565_IC   230"
          0
TL23026s3 "TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574 C565, Q124 trip"  "N-1" "B"
          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
         #8 "Q190_Bus 230"
          8 "C574IC   230"
          8 "C565_IC   230"
          8 "Q124     230"
          0
TL23026s3 "TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574 C565, Q124 trip"  "N-1" "B"
          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
         # 8 "Q190_Bus 230"
          8 "C574IC   230"
          8 "C565_IC   230"
          8 "Q124     230"
          0
TL23026s3 "TL23026 SILVERGT - BAY BLVD ck 1 SPS Q190, C574 C565, OMEC CC trip"  "N-1" "B"
          1 "SILVERGT 230"  "BAY BLVD  230"  "1 "   1  0
         # 8 "Q190_Bus 230"
          8 "C574IC   230"
          8 "C565_IC  230"
          8 "OTAYMST1  16"
          8 "OTAYMGT1  18"
          8 "OTAYMGT2  18"
          0
TL23027  "TL23027 OLD TOWN - MISSION ck 1"  "N-1" "B"
          1 "OLD TOWN 230"  "MISSION  230"  "1 "   1  0
          0
```

```
TL23028 "TL23028 SILVERGT - OT - MISSION "  "N-1" "B"
          1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "   1  0
          1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "   1  0
          1 "MISSION  230"  "OLDTWNTP 230"  "1 "   1  0
          0
############################################################
# NEXT 3 OUTAGE DEFINITIONS SIMULATE ONE ELEMENT OF MULTI-TERMINAL LINE OUTAGE
############################################################
TL23028A "TL23028 SILVERGT-OT-MISSION TAP A"  "N-1" "B"
          1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "   1  0
#         1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "   1  0
#         1 "MISSION  230"  "OLDTWNTP 230"  "1 "   1  0
          0
TL23028B "TL23028 SILVERGT-OT-MISSION TAP B"  "N-1" "B"
#         1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "   1  0
#         1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "   1  0
          1 "MISSION  230"  "OLDTWNTP 230"  "1 "   1  0
          0
TL23028C "TL23028 SILVERGT-OT-MISSION TAP C"  "N-1" "B"
#         1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "   1  0
          1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "   1  0
#         1 "MISSION  230"  "OLDTWNTP 230"  "1 "   1  0
          0
TL23029 "TL23029 SILVERGT-OLD TOWN"  "N-1" "B"
          1 "SILVERGT 230"  "OLD TOWN 230"  "1 "   1  0
          0
TL23030  "TL23030 ESCNDIDO-TALEGA   ck 1"  "N-1" "B"
          1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
          0
############################################################
# ISD 2016
# M-SOCRP
# DELETE TL23030 REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#TL23030 "TL23030 ES-TA-CP         ck 1"  "N-1" "B"
#         1 "TA230 TAP 230"  "CAPSTRNO  230" "1 "   1  0
#         1 "TA230 TAP 230"  "TALEGA    230" "1 "   1  0
#         1 "TA230 TAP 230"  "ESCNDIDO  230" "1 "   1  0
#         0
#TL23030A "TL23030A ES-TA-CP         ck 1"  "N-1" "B"
#         1 "TA230 TAP 230"  "CAPSTRNO  230" "1 "   1  0
#         1 "TA230 TAP 230"  "TALEGA    230" "1 "   1  0
#         1 "TA230 TAP 230"  "ESCNDIDO  230" "1 "   1  0
#         0
#TL23030B "TL23030B ES-TA-CP         ck 1"  "N-1" "B"
#         1 "TA230 TAP 230"  "CAPSTRNO  230" "1 "   1  0
#         1 "TA230 TAP 230"  "TALEGA    230" "1 "   1  0
#         1 "TA230 TAP 230"  "ESCNDIDO  230" "1 "   1  0
#         0
#TL23030C "TL23030A ES-TA-CP         ck 1"  "N-1" "B"
#         1 "TA230 TAP 230"  "CAPSTRNO  230" "1 "   1  0
#         1 "TA230 TAP 230"  "TALEGA    230" "1 "   1  0
#         1 "TA230 TAP 230"  "ESCNDIDO  230" "1 "   1  0
#         0
TL23040 "TL23040 OTAYMESA-TJI "  "N-1" "B"
          1 "OTAYMESA 230"  "TJI-230  230"  "1 "   1  0
          0
TL23045  "TL23045 INTB - IMPRLVLY    ck 1"  "N-1" "B"
          1 "INTB     230"  "IMPRLVLY 230"  "1 "   1  0
          0
TL23046  "TL23046 INTB - IMPRLVLY    ck 2"  "N-1" "B"
```

```
            1 "INTB     230"  "IMPRLVLY 230"  "2 "   1  0
            0
TL23047  "TL23047 IV-GEN - IMPRLVLY  ck 1"  "N-1" "B"
            1 "IV-GEN   230"  "IMPRLVLY 230"  "1 "   1  0
            0
TL23048  "TL23048 IV-GEN - IMPRLVLY  ck 2"  "N-1" "B"
            1 "IV-GEN   230"  "IMPRLVLY 230"  "2 "   1  0
            0
TL23050  "TL23050 IMPRLVLY - ROA-230 ck 1"  "N-1" "B"
            1 "IMPRLVLY 230"  "ROA-230  230"  "1 "   1  0
            0
TL23051  "TL23051 SYCAMORE - PEN     ck 1"  "N-1" "B"
            1 "PEN      230"  "SYCAMORE 230"  "1 "   1  0
            0
TL23052  "TL23052 TALEGA - S.ONOFRE  ck 2"  "N-1" "B"
            1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
            0
TL23053  "TL23053 PENSQTOS - ENCINA  ck 2"  "N-1" "B"
            1 "PENSQTOS 230"  "ENCINA   230"  "2 "   1  0
            0
TL23054 "TL23054 SUNCREST-SYCAMORE 230 ck 1"  "N-1" "B"
            1 "SUNCREST 230"  "SYCAMORE 230"  "1 "   1  0
            0
TL23055 "TL23055 SUNCREST-SYCAMORE 230 ck 2"  "N-1" "B"
            1 "SUNCREST 230"  "SYCAMORE 230"  "2 "   1  0
            0
############################################################
# Place Holder for TL23065 PQ-MS
# TL23028 OT-SG-MS will be changed to OT-SG
############################################################
#TL_230S  "TL230S IMPRLVLY - ELCENTRO ck 1"  "N-1" "B"
#            1 "IMPRLVLY 230"  "ELCENTRO 230"  "1 "   1  0
#            0
IID_IV-ELCENTSW_1 "IID-IVSUB - ELCENTSW ck 1" "N-1" "B"
            1 "IID-IVSUB 230" "ELCENTSW 230" "1 " 1 0
            0
IID_IV-ELCENTSW_2 "IID-IVSUB - ELCENTSW ck 2" "N-1" "B"
            1 "IID-IVSUB 230" "ELCENTSW 230" "2 " 1 0
            0
IID_IV-ELCNT_1_2 "IID-IVSUB - ELCENTSW 1+2" "N-2" "C"
            1 "IID-IVSUB 230" "ELCENTSW 230" "1 " 1 0
            1 "IID-IVSUB 230" "ELCENTSW 230" "2 " 1 0
            0
IID_IV-IV "IID-IVSUB - IMPRLVLY 230 kV ck1/2" "N-2" "C"
            1 "IID-IVSUB 230" "IMPRLVLY 230" "1 " 1 0
            1 "IID-IVSUB 230" "IMPRLVLY 230" "2 " 1 0
            0
############################################################
# DIXILINE 230KV LINE TO IMPERIAL VALLEY
############################################################
#TL_230D  "TL230D IMPRLVLY - DIXIE230 ck 1"  "N-1" "B"
#            1 "IMPRLVLY 230"  "DIXIE230 230"  "1 "   1  0
#            0
IID_IV-DIXIELAN "IID-IVSUB - DIXIELAND ck 1" "N-1" "B"
            1 "DIXIELAN 230" "IID-IVSUB 230" "1 " 1 0
            0
############################################################
# SDG&E 138 kV Transmission Line Outages (Category B: N-1)
############################################################
TL13801  "TL13801 CANNON-ENCINA    ck 1"  "N-1" "B"
            1 "CANNON   138"  "ENCINA 138"  "1 "   1  0
```

```
          0
TL13802  "TL13802 CANNON-SANLUSRY    ck 1"  "N-1" "B"
          1 "CANNON   138"  "SANLUSRY 138"  "1 "   1  0
          0
TL13804  "TL13804 BATIQTOS-PENSQTOS-ENCINA"  "N-1" "B"
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
          1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          0
##############################################################
# NEXT 3 OUTAGE DEFINITIONS SIMULATE ONE ELEMENT OF MULTI-TERMINAL LINE OUTAGE
##############################################################
TL13804A  "TL13804 BQ-PQ-EN        TAP A"  "N-1" "B"
#         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
#         1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          0
TL13804B  "TTL13804 BQ-PQ-EN        TAP B"  "N-1" "B"
#         1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
#         1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
          1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          0
TL13804C  "TL13804 BQ-PQ-EN        TAP C"  "N-1" "B"
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
#         1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
#         1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          0
TL13805 "TL13805 PALOMAR-BATIQTOS ck 1"  "N-1" "B"
          1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
          0
TL13806 "TL13806 ENCINA-PALOMAR ck 1"  "N-1" "B"
          1 "ENCINA   138"  "PALOMAR  138"  "1 "   1  0
          0
TL13809  "TL13809 PRCTRVLY-TELECYN  ck 1 "  "N-1" "B"
          1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
          0
TL13810  "TL13810 DOUBLET-FRIARS-PENSQTOS"  "N-1" "B"
          1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
          1 "FRIARS   138"  "DOUBLTTP 138"  "1 "   1  0
          1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
          0
##############################################################
# NEXT 3 OUTAGE DEFINITIONS SIMULATE ONE ELEMENT OF MULTI-TERMINAL LINE OUTAGE
##############################################################
TL13810A  "TL13810 DOUBLET-FRIARS-PENSQTOS A"  "N-1" "B"
#         1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
          1 "FRIARS   138"  "DOUBLTTP 138"  "1 "   1  0
#         1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
          0
TL13810B  "TL13810 DOUBLET-FRIARS-PENSQTOS B"  "N-1" "B"
#         1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
#         1 "FRIARS   138"  "DOUBLTTP 138"  "1 "   1  0
          1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
          0
TL13810C  "TL13810 DOUBLET-FRIARS-PENSQTOS C"  "N-1" "B"
          1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
#         1 "FRIARS   138"  "DOUBLTTP 138"  "1 "   1  0
#         1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
          0
TL13811  "TL13811 SHADOWR-CHCARITA   CK 1"  "N-1" "B"
          1 "SHADOWR  138"  "CHCARITA 138"  "1 "   1  0
```

```
          0
TL13812  "TL13812 TALEGA - SANMATEO  ck 1"  "N-1" "B"
          1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
          0
TL13815 "TL13815 GRNT HLL - TELECYN ck 1"  "N-1" "B"
          1 "GRNT HLL 138"  "TELECYN  138"  "1 "   1  0
          0
TL13816  "TL13816 CAPSTRNO - PICO    ck 1"  "N-1" "B"
          1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
          0
TL13819 "TL13819 SANTEE - LOSCOCHS   ck 1"  "N-1" "B"
          1 "LOSCOCHS 138"  "SANTEE   138"  "1 "   1  0
          0
TL13820 "TL13820 SYCAMORE-CHCARITA   ck 1"  "N-1" "B"
          1 "SYCAMORE 138"  "CHCARITA 138"  "1 "   1  0
          0
TL13821  "TL13821  SYCAMORE-SANTEE   ck 1"  "N-1" "B"
          1 "SYCAMORE 138"  "SANTEE   138"  "1 "   1  0
          0
TL13822  "TL13822 MISSION - CARLTNHS ck 1"  "N-1" "B"
          1 "MISSION  138"  "CARLTNHS 138"  "1 "   1  0
          0
TL13824  "TL13824 LOSCOCHS-TELCYN-ML60  ck 1"  "N-1" "B"
          1 "LOSCOCHS 138"  "ML60 TAP 138"  "1 "   1  0
          1 "TELECYN  138"  "ML60 TAP 138"  "1 "   1  0
          1 "ML60 TAP  138"  "MIGUEL60 138" "1 "   1  0
          0
##########################################################################
# NEXT 3 OUTAGE DEFINITIONS SIMULATE ONE ELEMENT OF MULTI-TERMINAL LINE OUTAGE
##########################################################################
TL13824A  "TL13824 TELECYN-ML60 TAP      "  "N-1" "B"
          1 "TELECYN  138"  "ML60 TAP 138"  "1 "   1  0
          0
TL13824B  "TL13824 LOSCOCHS-ML60 TAP     "  "N-1" "B"
          1 "LOSCOCHS 138"  "ML60 TAP 138"  "1 "   1  0
          0
TL13824C  "TL13824 ML60 TAP-MIGUEL60 ck 1"  "N-1" "B"
          1 "ML60 TAP 138"  "MIGUEL60 138"  "1 "   1  0
          0
TL13825  "TL13825 SHADOWR-BATIQTOS  CK 1"  "N-1" "B"
          1 "SHADOWR  138"  "BATIQTOS 138"  "1 "   1  0
          0
TL13826  "TL13826 PRCTRVLY-MIGUEL   ck 1"  "N-1" "B"
          1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
          0
TL13827  "TL13827 FRIARS-MISSION  ck 1"  "N-1" "B"
          1 "FRIARS   138"  "MISSION  138"  "1 "   1  0
          0
TL13828  "TL13828  SYCAMORE-CARLTNHS ck 1"  "N-1" "B"
          1 "SYCAMORE 138"  "CARLTNHS 138"  "1 "   1  0
          0
TL13830  "TL13830 MARGARTA-TRABUCO  ck 1"  "N-1" "B"
          1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
          0
TL13831 "TL13831 TALEGA-R.MSNVJO  ck 1"  "N-1" "B"
          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "   1  0
          0
TL13833  "TL13833 TALEGA-TRABUCO  ck 1"  "N-1" "B"
          1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
          0
##########################################################
```

```
# ISD 2016
# M-SOCRP
# DELETE TL13833 REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#TL13833A "TL13833A TALEGA-CAPSTRNO ck 1"  "N-1" "B"
#          1 "TALEGA   138"  "CAPSTRNO 138"  "1 "   1  0
#          0
#TL13833B "TL13833B CAPSTRNO-TRABUCO ck 2" "N-1" "B"
#          1 "CAPSTRNO 138"  "TRABUCO  138"  "2 "   1  0
#          0
TL13834  "TL13834 CAPSTRNO-TRABUCO  ck 1"  "N-1" "B"
          1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
          0
TL13835  "TL13835 SANMATEO-LAGNA NL-TA TAP ck 1"  "N-1" "B"
          1 "SANMATEO 138"  "TA TAP    138"  "1 "   1  0
          1 "TA TAP   138"  "LAGNA NL  138"  "1 "   1  0
          1 "TALEGA   138"  "TA TAP    138"  "1 "   1  0
          0
############################################################
# NEXT 3 OUTAGE DEFINITIONS SIMULATE ONE ELEMENT OF MULTI-TERMINAL LINE OUTAGE
############################################################
TL13835A  "TL13835 SANMATEO-LAGNA NL-TA TAP A"  "N-1" "B"
          1 "SANMATEO 138"  "TA TAP    138"  "1 "   1  0
#         1 "TA TAP   138"  "LAGNA NL  138"  "1 "   1  0
#         1 "TALEGA   138"  "TA TAP    138"  "1 "   1  0
          0
TL13835B  "TL13835 SANMATEO-LAGNA NL-TA TAP B"  "N-1" "B"
#         1 "SANMATEO 138"  "TA TAP    138"  "1 "   1  0
          1 "TA TAP   138"  "LAGNA NL  138"  "1 "   1  0
#         1 "TALEGA   138"  "TA TAP    138"  "1 "   1  0
          0
TL13835C  "TL13835 SANMATEO-LAGNA NL-TA TAP C"  "N-1" "B"
#         1 "SANMATEO 138"  "TA TAP    138"  "1 "   1  0
#         1 "TA TAP   138"  "LAGNA NL  138"  "1 "   1  0
          1 "TALEGA   138"  "TA TAP    138"  "1 "   1  0
          0
############################################################
# ISD 2016
# M-SOCRP
# DELETE TL13835 & ALL PARTS REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#TL13835A "TL13835A TALEGA-SANMATEO ck 2    " "N-1" "B"
#          1 "TALEGA   138"  "SANMATEO 138"  "2 "   1  0
#          0
#TL13835B "TL13835B CAPSTRNO-LAGNA NL ck 2  " "N-1" "B"
#          1 "CAPSTRNO  138" "LAGNA NL 138"  "2 "   1  0
#          0
TL13836  "TL13836 TALEGA-PICO     ck 1 "  "N-1" "B"
          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
          0
TL13837  "TL13837 CAPSTRNO-LAGNA NL ck 1"  "N-1" "B"
          1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
          0
TL13838 "TL13838 R.MSNVJO-MARGARTA  ck 1"  "N-1" "B"
          1 "R.MSNVJO 138"  "MARGARTA 138"  "1 "   1  0
          0
TL13840  "TL13840 MISSION-GRNT HLL ck 1 "  "N-1" "B"
          1 "MISSION  138"  "GRNT HLL 138"  "1 "   1  0
          0
TL13843  "TL13843 ENCINA-SHADOWR   ck 1 "  "N-1" "B"
          1 "ENCINA  138"  "SHADOWR   138"  "1 "   1  0
```

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        0
TL138XX  "TL138XX ECO-BOULEVRD      ck1"  "N-1" "B"
        1 "ECO      138"  "BOULEVRD 138"  "1 "   1  0
        0
TL138YY  "TL138YY ECO-BOULEVRD      ck2"  "N-1" "B"
        1 "ECO      138"  "BOULEVRD 138"  "2 "   1  0
        0
##############################################################
# SDG&E 69 kV Transmission Line Outages (Category B: N-1)
##############################################################
TL0600  "TL0600 CM-KY-RN            ck 1"  "N-1" "B"
        1 "CLAIRMNT  69"  "CLARMTTP  69"  "1 "   1  0
        1 "KEARNY    69"  "CLARMTTP  69"  "1 "   1  0
        1 "ROSE CYN  69"  "CLARMTTP  69"  "1 "   1  0
        0
TL0601  "TL0601 B-URBAN     ck 1"  "N-1" "B"
        1 "B        69"  "URBAN     69"  "1 "   1  0
        0
TL0602  "TL0602 B-SILVERGT   ck 1"  "N-1" "B"
        1 "B        69"  "SILVERGT  69"  "1 "   1  0
        0
TL0603  "TL0603 NC-NSM-SW           ck 1"  "N-1" "B"
        1 "NATNLCTY  69"  "SWTWTRTP  69"  "1 "   1  0
        1 "NAVSTMTR  69"  "SWTWTRTP  69"  "1 "   1  0
        1 "SWEETWTR  69"  "SWTWTRTP  69"  "1 "   1  0
        0
TL0604  "TL0604 OLD TOWN-KETTNER   ck 1"  "N-1" "B"
        1 "OLD TOWN  69"  "KETTNER   69"  "1 "   1  0
        0
TL0605  "TL0605 SILVERGT-URBAN     ck 1"  "N-1" "B"
        1 "SILVERGT   69"  "URBAN     69"  "1 "   1  0
        0
TL0606  "TL0606 DIVISION-NAVSTMTR  ck 1"  "N-1" "B"
        1 "DIVISION  69"  "NAVSTMTR  69"  "1 "   1  0
        0
TL0608  "TL0608 STREAMVW-CHOLLAS   ck 1"  "N-1" "B"
        1 "STREAMVW  69"  "CHOLLAS   69"  "1 "   1  0
        0
TL0609  "TL0609 KETTNER-B  ck 1"  "N-1" "B"
        1 "KETTNER   69"  "B        69"  "1 "   1  0
        0
TL0610  "TL0610 DEL MAR-PENSQTOS     ck 1"  "N-1" "B"
        1 "DEL MAR   69"  "PENSQTOS  69"  "1 "   1  0
        0
TL0611  "TL0611 OLD TOWN-POINTLMA  ck 1"  "N-1" "B"
        1 "OLD TOWN  69"  "POINTLMA  69"  "1 "   1  0
        0
TL0612  "TL0612 OLD TOWN-POINTLMA  ck 2"  "N-1" "B"
        1 "OLD TOWN  69"  "POINTLMA  69"  "2 "   1  0
        0
TL0613  "TL0613 PACFCBCH-OLD TOWN  ck 1"  "N-1" "B"
        1 "PACFCBCH  69"  "OLD TOWN  69"  "1 "   1  0
        0
TL0614  "TL0614 CHOLLAS-SWEETWTR  ck 1"  "N-1" "B"
        1 "CHOLLAS   69"  "SWEETWTR  69"  "1 "   1  0
        0
TL0615  "TL0615 CABRILLO-POINTLMA  ck 1"  "N-1" "B"
        1 "CABRILLO  69"  "POINTLMA  69"  "1 "  1 0
        0
TL0616  "TL0616 Lkhodges-R.Santa Fe  ck 1"  "N-1" "B"
        1 "Lkhodges  69"  "BERNDOTP  69"  "1 "   1  0
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          1 "BERNDOTP  69"  "R.SNTAFE  69"  "1 "   1  0
          0
TL0617  "TL0617 PB-RN-LJ           ck 1"  "N-1" "B"
          1 "ROSCYNTP  69"  "PACFCBCH  69"  "1 "   1  0
          1 "ROSCYNTP  69"  "ROSE CYN  69"  "1 "   1  0
          1 "ROSCYNTP  69"  "LA JOLLA  69"  "1 "   1  0
      0
TL0618  "TL0618 MISSION-MURRAY    ck 1"  "N-1" "B"
          1 "MISSION   69"  "MURRAY    69"  "1 "   1  0
          0
TL0619  "TL0619 MISSION-MURRAY    ck 2"  "N-1" "B"
          1 "MISSION   69"  "MURRAY    69"  "2 "   1  0
          0
TL0620  "TL0620 MURRAY-GARFIELD  ck 1"  "N-1" "B"
          1 "MURRAY    69"  "GARFIELD  69"  "1 "   1  0
          0
TL0621  "TL0621 PARADISE-MIGUEL    ck 1"  "N-1" "B"
          1 "PARADISE  69"  "MIGUEL    69"  "1 "   1  0
          0
TL0622  "TL0622 CHOLLAS-SPRNGVLY  ck 1"  "N-1" "B"
          1 "CHOLLAS   69"  "SPRNGVLY  69"  "1 "   1  0
          0
TL0623  "TL0623 IB-OY-SYO          ck 1"  "N-1" "B"
          1 "IMPRLBCH  69"  "OTAY  TP  69"  "1 "   1  0
          1 "SANYSDRO  69"  "OTAY  TP  69"  "1 "   1  0
          1 "OTAY      69"  "OTAY  TP  69"  "1 "   1  0
          0
TL0624  "TL0624 EL CAJON-JAMACHA    ck 1"  "N-1" "B"
          1 "EL CAJON  69"  "JAMACHA   69"  "1 "   1  0
          0
TL0625  "TL0625  DE-LL           ck 1"  "N-1" "B"
          1 "LOVELAND  69"  "DESCANSO  69"  "1 "   1  0
      0
TL0626  "TL0626 ST-BC-DE ck 1"  "N-1" "B"
          1 "BLDCRKTP  69"  "DESCANSO  69"  "1 "   1  0
          1 "BLDCRKTP  69"  "SANTYSBL  69"  "1 "   1  0
          1 "BLDCRKTP  69"  "BOLDRCRK  69"  "1 "   1  0
          0
TL0627  "TL0627 MIGUEL -JAMACHA   ck 1"  "N-1" "B"
          1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
          0
TL0628  "TL0628 ML-SW-SU-PD         ck 1"  "N-1" "B"
          4 "SUNYSIDE  69"  "10"   0
          1 "MIGUELTP  69"  "MIGUEL    69"  "1 "   1  0
          1 "SWEETWTR  69"  "MIGUELTP  69"  "1 "   1  0
          1 "SUNYSDTP  69"  "MIGUELTP  69"  "1 "   1  0
          1 "SUNYSIDE  69"  "SUNYSDTP  69"  "1 "   1  0
          1 "PARADISE  69"  "SUNYSDTP  69"  "1 "   1  0
          0
TL0629  "TL0629 BU-CW-CN-GC         ck 1"  "N-1" "B"
          4 "GLENCLIF  69"  "10"   0
          4 "BOULEVRD  69"  "10"   0
          4 "CRESTWD   69"  "10"   0
          8 "GLNCLFTP  69"
          8 "CAMERNTP  69"
          8 "CRESTWD   69"
          8 "BOULEVRD  69"
          8 "GLENCLIF  69"
          1 "CAMERNTP  69"  "CAMERON   69"  "1 "   1  0
          1 "CAMERNTP  69"  "GLNCLFTP  69"  "1 "   1  0
          1 "CAMERNTP  69"  "CRESTWD   69"  "1 "   1  0
```

```
          1 "DESCANSO  69"  "GLNCLFTP  69"  "1 "   1  0
          1 "GLENCLIF  69"  "GLNCLFTP  69"  "1 "   1  0
          0
TL0630  "TL0630 EL CAJON-GRANITE   ck 1"  "N-1" "B"
          1 "EL CAJON  69"  "GRANITE   69"  "1 "   1  0
          0
TL0631  "TL0631 EL CAJON-LOSCOCHS  ck 1"  "N-1" "B"
          1 "EL CAJON  69"  "LOSCOCHS  69"  "1 "   1  0
          0
TL0632  "TL0632 ML-GR-LC           ck 1"  "N-1" "B"
          1 "GRANITTP  69"  "MIGUEL   69"  "1 "   1  0
          1 "GRANITTP  69"  "GRANITE  69"  "1 "   1  0
          1 "GRANITTP  69"  "LOSCOCHS 69"  "1 "   1  0
          0
TL0633  "TL0633 BERNARDO-R.CARMEL  ck 1"  "N-1" "B"
          1 "BERNARDO  69"  "R.CARMEL  69"  "1 "   1  0
          0
TL0634  "TL0634 ESCO-WC-POW        ck 1"  "N-1" "B"
          4 "WARENCYN  69"  "10"   0
          1 "ESCO      69"  "WARCYNTP  69"  "1 "   1  0
          1 "WARENCYN  69"  "WARCYNTP  69"  "1 "   1  0
          1 "POWAY     69"  "WARCYNTP  69"  "1 "   1  0
          0
TL0635  "TL0635 CREELMAN - LOSCOCHS  ck 1"  "N-1" "B"
          1 "CREELMAN  69"  "LOSCOCHS  69"  "1 "   1  0
          0
TL0636  "TL0636 LOSCOCHS - ELLIOTT   ck 1"  "N-1" "B"
          1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
          0
TL0637  "TL0637 SANTYSBL - CREELMAN  ck 1"  "N-1" "B"
          1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
          0
TL0639  "TL0639 SYCAMORE - ELLIOTT   ck 1"  "N-1" "B"
          1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
          0
TL0640  "TL0640 PARADISE - CHOLLAS   ck 1"  "N-1" "B"
          1 "PARADISE  69"  "CHOLLAS   69"  "1 "   1  0
          0
TL0641 "TL0641 BAY BLVD - MONTGMRY   ck 1"  "N-1" "B"
          1 "BAY BLVD   69"  "MONTGMRY  69"  "1 "   1  0
     0
TL0642  "TL0642 MG - SW - BAY BLVD  ck 1"  "N-1" "B"
          1 "MONTGMRY  69"  "MONTGYTP  69"  "1 "   1  0
          1 "SWEETWTR  69"  "MONTGYTP  69"  "1 "   1  0
          1 "BAY BLVD  69"  "MONTGYTP  69"  "1 "   1  0
          0
TL0643  "TL0643 MIGUEL - JAMACHA     ck 2"  "N-1" "B"
          1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
          0
TL0644  "TL0644 BAY BLVD - SWEETWTR  ck 1"  "N-1" "B"
          1 "BAY BLVD  69"  "SWEETWTR  69"  "1 "   1  0
          0

TL0645  "TL0645 BAY BLVD-OTAY  ck 1"  "N-1" "B"
          1 "BAY BLVD  69"  "OTAY     69"  "1 "   1  0
          0
TL0646  "TL0646 BAY BLVD-OTAY  ck 2"  "N-1" "B"
          1 "BAY BLVD  69"  "OTAY     69"  "2 "   1  0
          0
TL0647  "TL0647 BAY BLVD-IMPRLBCH  ck 1"  "N-1" "B"
          1 "BAY BLVD  69"  "IMPRLBCH  69"  "1 "   1  0
```

```
        0
TL0648  "TL0648 POWAY-R.CARMEL  ck 1"  "N-1" "B"
        1 "POWAY    69"  "R.CARMEL  69"  "1 "   1  0
        0
TL0649  "TL0649 BD-OY-SYO          ck 1"  "N-1" "B"
        4 "OTAYLAKE  69"  "10"   0
        1 "BORDER    69"  "BORDERTP  69"  "1 "   1  0
        1 "OTAYLAKE  69"  "BORDERTP  69"  "1 "   1  0
        1 "OTAYLKTP  69"  "BORDERTP  69"  "1 "   1  0
        1 "OTAY      69"  "OTAYLKTP  69"  "1 "   1  0
        1 "SANYSDRO  69"  "OTAYLKTP  69"  "1 "   1  0
        0
TL0650  "TL0650 B-CORONADO         ck 1"  "N-1" "B"
        1 "B        69"  "CORONADO  69"  "1 "   1  0
        0
TL0651A  "TL0651 WA-SG             ck 1"  "N-1" "B"
        1 "WABASH    69"  "SILVERGT 69"  "1 "   1  0
        0
TL0651B  "TL0652 WABASH-SILVERGT    ck 1"  "N-1" "B"
        1 "WABASH    69"  "STREAMVW 69"  "1 "   1  0
        0
TL0653  "TL0653 MISSION-F          ck 1"  "N-1" "B"
        1 "MISSION   69"  "F        69"  "1 "   1  0
        0
TL0654  "TL0654 MISSION-F          ck 2"  "N-1" "B"
        1 "MISSION   69"  "F        69"  "2 "   1  0
        0
TL0655  "TL0655 SILVERGT-CORONADO   ck 1"  "N-1" "B"
        1 "SILVERGT   69"  "CORONADO  69"  "1 "  1  0
        0
TL0656  "TL0656 SAMPSON-SILVERGT    ck 1"  "N-1" "B"
        1 "SAMPSON   69"  "SILVERGT   69"  "1 "  1  0
        0
TL0657  "TL0657 SAMPSON-SILVERGT    ck 2"  "N-1" "B"
        1 "SAMPSON   69"  "SILVERGT   69"  "2 "  1  0
        0
TL0658  "TL0658 SAMPSON-DIVISION    ck 1"  "N-1" "B"
        1 "SAMPSON   69"  "DIVISION  69"  "1 "   1  0
        0
TL0659  "TL0659 CABRILLO-POINTLMA   ck 2"  "N-1" "B"
        1 "CABRILLO  69"  "POINTLMA  69"  "2 "   1  0
        0
TL0660  "TL0660 ENCNITAS-DEL MAR    ck 1"  "N-1" "B"
        1 "ENCNITAS  69"  "DEL MAR   69"  "1 "   1  0
        0
TL0661  "TL0661 EASTGATE-PENSQTOS   ck 1"  "N-1" "B"
        1 "EASTGATE  69"  "PENSQTOS  69"  "1 "   1  0
        0
TL0662  "TL0662 PENSQTOS -TOREYPNS  ck 1"  "N-1" "B"
        1 "PENSQTOS  69"  "TOREYPNS  69"  "1 "   1  0
        0
TL0663  "TL0663 KEARNY -MISSION     ck 1"  "N-1" "B"
        1 "KEARNY    69"  "MISSION   69"  "1 "   1  0
        0
TL0664  "TL0664 PQ-MR1-RN          ck 1"  "N-1" "B"
        1 "ROSE CYN  69"  "MIRAMRTP  69"  "1 "   1  0
        1 "PENSQTOS  69"  "MIRAMRTP  69"  "1 "   1  0
        1 "MIRAMAR1  69"  "MIRAMRTP  69"  "1 "   1  0
        0
TL0665   "TL0665 MIRASNTO-GENESEE   ck 1"  "N-1" "B"
        1 "MIRASNTO  69"  "GENESEE   69"  "1 "   1  0
```

```
          0
TL0666  "TL0666 PQ-DM-DB-DH-TP       ck 1"  "N-1" "B"
          4 "DUNHILL   69"  "10"   0
          1 "DEL MAR   69"  "DELMARTP  69"  "1 "   1  0
          1 "PENSQTOS  69"  "DELMARTP  69"  "1 "   1  0
          1 "DOUBLTTP  69"  "DELMARTP  69"  "1 "   1  0
          1 "DUNHILTP  69"  "DOUBLTTP  69"  "1 "   1  0
          1 "DUNHILTP  69"  "DUNHILL   69"  "1 "   1  0
          1 "TOREYPNS  69"  "DUNHILTP  69"  "1 "   1  0
          1 "DOUBLTTP  69"  "DOUBLET   69"  "1 "   1  0
          0
TL0667  "TL0667 DEL MAR-PENSQTOS     ck 2"  "N-1" "B"
          1 "DEL MAR   69"  "PENSQTOS  69"  "2 "   1  0
          0
TL0668  "TL0668 FNTNTP-FNTON-MR-MR1    ck 1"  "N-1" "B"
          4 "FENTON    69"  "10"   0
          1 "FENTONTP  69"  "FENTON    69"  "1 "   1  0
          1 "MIRAMAR1  69"  "FENTONTP  69"  "1 "   1  0
          1 "MIRAMAR   69"  "FENTONTP  69"  "1 "   1  0
          0
TL0669  "TL0669 MIRAMAR-SCRIPPS   ck 1"  "N-1" "B"
          1 "MIRAMAR   69"  "SCRIPPS   69"  "1 "   1  0
          0
TL0670  "TL0670 CLAIRMNT-MISSION  ck 1"  "N-1" "B"
          1 "CLAIRMNT  69"  "MISSION   69"  "1 "   1  0
          0
TL0671  "TL0671 MISSION-ELLIOTT   ck 1"  "N-1" "B"
          1 "MISSION   69"  "ELLIOTT   69"  "1 "   1  0
          0
TL0672  "TL0672 KY-KA-MSH         ck1"  "N-1" "B"
          4 "KYOCERA   69"  "10"   0
          1 "KYOCRATP  69"  "KEARNY    69"  "1 "   1  0
          1 "KYOCRATP  69"  "KYOCERA   69"  "1 "   1  0
          1 "MESAHGTS  69"  "KYOCRATP  69"  "1 "   1  0
     0
TL0673  "TL0673 LA JOLLA-ROSE CYN ck 1"  "N-1" "B"
          1 "LA JOLLA  69"  "ROSE CYN  69"  "1 "   1  0
          0
TL0674  "TL0674 NCW-EN-RSF         ck 1"  "N-1" "B"
          1 "ENCNITAS  69"  "R.SNTTP1  69"  "1 "   1  0
          1 "NORTHCTY  69"  "R.SNTTP1  69"  "1 "   1  0
          1 "R.SNTAFE  69"  "R.SNTTP1  69"  "1 "   1  0
          0
TL0675  "TL0675 PENSQTOS-MESA RIM  ck 1"  "N-1" "B"
          1 "PENSQTOS  69"  "MESA RIM  69"  "1 "   1  0
          0
TL0676  "TL0676 MESAHGTS-MISSION   ck 1"  "N-1" "B"
          1 "MESAHGTS  69"  "MISSION   69"  "1 "   1  0
          0
TL0677  "TL0677 MESA RIM-MIRAMAR   ck 1"  "N-1" "B"
          1 "MESA RIM  69"  "MIRAMAR   69"  "1 "   1  0
          0
TL0678  "TL0678 LOSCOCHS-ALPINE    ck 1"  "N-1" "B"
          1 "LOSCOCHS  69"  "ALPINE    69"  "1 "   1  0
          0
TL0679  "TL0679 ESCNDIDO-FELICITA  ck 1"  "N-1" "B"
          1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
          0
TL0680  "TL0680 SA-ME-SM           ck 1"  "N-1" "B"
          1 "MELROSE   69"  "MELRSETP  69"  "1 "   1  0
          1 "SANLUSRY  69"  "MELRSETP  69"  "1 "   1  0
```

```
        1 "SANMRCOS  69"  "MELRSETP  69"  "1 "   1  0
        0
TL0681  "TL0681 ASH-FE-VC          ck 1"  "N-1" "B"
        1 "ASH      69"  "ASH   TP  69"  "1 "   1  0
        1 "FELICITA  69"  "ASH   TP  69"  "1 "   1  0
        1 "VALCNTR   69"  "ASH   TP  69"  "1 "   1  0
        0
TL0682  "TL0682 WARNERS-RINCON    ck 1"  "N-1" "B"
        1 "WARNERS   69"  "RINCON    69"  "1 "   1  0
        0
TL0683  "TL0683 RINCON-LILAC     ck 1 "  "N-1" "B"
        1 "RINCON    69"  "LILAC     69"  "1 "   1  0
        0
TL0684  "TL0684 ESCNDIDO-SANMRCOS  ck 1"  "N-1" "B"
        1 "ESCNDIDO  69"  "SANMRCOS  69"  "1 "   1  0
        0
TL0685  "TL0685 WARNERS-SANTYSBL  ck 1"  "N-1" "B"
        1 "WARNERS   69"  "SANTYSBL  69"  "1 "   1  0
        0
TL0686  "TL0686 WARNERS-NARROWS  ck 1"  "N-1" "B"
        4 "BORREGO   12.5"  "10"   0
        5 "NARROWS   69"    "b"    0
        6 "BORREGO   12.5"  "sd"   0
        1 "WARNERS   69"  "NARROWS   69"  "1 "   1  0
        0
TL0687  "TL0687 BORREGO-NARROWS   ck 1"  "N-1" "B"
        4 "BORREGO   12.5"  "10"   0
        6 "BORREGO   12.5"  "sd"   0
        1 "BORREGO   69"  "NARROWS   69"  "1 "   1  0
        0
TL0688  "TL0688 ESCNDIDO-LILAC     ck 1"  "N-1" "B"
        1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
        0
TL0689  "TL0689 ES-FE-BR           ck 1"  "N-1" "B"
        1 "BERNARDO  69"  "FELCTATP  69"  "1 "   1  0
        1 "ESCNDIDO  69"  "FELCTATP  69"  "1 "   1  0
        1 "FELICITA  69"  "FELCTATP  69"  "1 "   1  0
        0
TL0690  "TL0690 SA-OS-STU-LP        ck 1"  "N-1" "B"
        4 "STUART    69"  "10"   0
        1 "OCNSDETP  69"  "OCEANSDE  69"  "1 "   1  0
        1 "OCNSDETP  69"  "SANLUSRY  69"  "1 "   1  0
        1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
        1 "STUARTTP  69"  "LASPULGS  69"  "1 "   1  0
        1 "STUART    69"  "STUARTTP  69"  "1 "   1  0
        0
TL0691  "TL0691 AVCDTP-AVCAD-PND-MNSRT   ck 1"  "N-1" "B"
        1 "AVOCADO   69"  "AVCADOTP  69"  "1 "   1  0
        1 "PENDLETN  69"  "AVCADOTP  69"  "1 "   1  0
        1 "MONSRATE  69"  "AVCADOTP  69"  "1 "   1  0
        0
TL0692  "TL0692 HORNO-HORNO TP-JPM-LSPL  ck 1"  "N-1" "B"
        4 "HORNO     69"  "10"   0
        1 "HORNO     69"  "HORNO TP  69"  "1 "   1  0
        1 "HORNO TP  69"  "JAP MESA  69"  "1 "   1  0
        1 "LASPULGS  69"  "HORNO TP  69"  "1 "   1  0
        0
TL0693  "TL0693 MELROSE  to SANLUSRY  ck 1"  "N-1" "B"
        1 "MELROSE   69"  "SANLUSRY  69"  "1 "   1  0
        0
TL0694  "TL0694 MN-MHTAP-MH-ME        ck 1"  "N-1" "B"
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          4 "MOROHILL  69"  "10"   0
          1 "MONSRATE  69"  "MORHILTP  69"  "1 "   1  0
          1 "MORHILTP  69"  "MOROHILL  69"  "1 "   1  0
          1 "MORHILTP  69"  "MELROSE   69"  "1 "   1  0
          0
TL0694D "TL0694D SA-ME               ck 2"  "N-1" "B"
          1 "MELROSE   69"  "SANLUSRY  69"  "2 "   1  0
          0
TL0695  "TL0695 CRSTNTS-TALEGATP-JPM-TL  ck 1"  "N-1" "B"
          4 "CRSTNTS   69"  "10"   0
          1 "CRSTNTS   69"  "TALEGATP  69"  "1 "   1  0
          1 "JAP MESA  69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA    69"  "TALEGATP  69"  "1 "   1  0
          0
TL0696  "TL0696 ESCNDIDO-ASH   ck 1"  "N-1" "B"
          1 "ESCNDIDO  69"  "ASH      69"  "1 "   1  0
          0
TL0697  "TL0697 SANLUSRY-OCEANSDE  ck 1"  "N-1" "B"
          1 "SANLUSRY  69"  "OCEANSDE  69"  "1 "   1  0
          0
TL0698  "TL0698 MN-AV-PA           ck 1"  "N-1" "B"
          1 "AVOCADO   69"  "MNSRATTP  69"  "1 "   1  0
          1 "MONSRATE  69"  "MNSRATTP  69"  "1 "   1  0
          1 "PALA      69"  "MNSRATTP  69"  "1 "   1  0
          0
TL0699  "TL0699 B -SILVERGT   ck 2"  "N-1" "B"
          1 "B        69"  "SILVERGT   69"  "2 "   1  0
          0
TL06902 "TL06902 NOISLMTR -CORONADO  ck 1"  "N-1" "B"
          1 "NOISLMTR  69"  "CORONADO  69"  "1 "   1  0
          0
TL06904  "TL06904 LOVELAND-ALPINE    ck 1"  "N-1" "B"
          1 "LOVELAND  69"  "ALPINE    69"  "1 "   1  0
          0
TL06905  "TL06905 GENESEE -PENSQTOS  ck 2"  "N-1" "B"
          1 "GENESEE   69"  "PENSQTOS  69"  "2 "   1  0
          0
TL06906  "TL06906 MIRAMAR-PENSQTOS  ck 1"  "N-1" "B"
          1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
          0
TL06907  "TL06907 GENESEE -UCM       ck 1"  "N-1" "B"
          1 "GENESEE   69"  "UCM      69"  "1 "   1  0
          0
TL06908  "TL06908 ESCNDIDO-ESCO      ck 1"  "N-1" "B"
          1 "ESCNDIDO  69"  "ESCO     69"  "1 "   1  0
          0
TL06910  "TL06910 MIGUEL - BORDER    ck 1"  "N-1" "B"
        1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
          0
TL06911  "TL06911 JAMACHA-SPRNGVLY  ck 1"  "N-1" "B"
          1 "JAMACHA   69"  "SPRNGVLY  69"  "1 "   1  0
          0
TL06912  "TL06912 PENDLETN-SANLUSRY  ck 1"  "N-1" "B"
          1 "PENDLETN  69"  "SANLUSRY  69"  "1 "   1  0
          0
TL06913  "TL06913 POWAY-POMERADO  ck 1"  "N-1" "B"
          1 "POWAY     69"  "POMERADO  69"  "1 "   1  0
          0
TL06914  "TL06914 LOVELAND-LOSCOCHS  ck 1"  "N-1" "B"
          1 "LOVELAND  69"  "LOSCOCHS  69"  "1 "   1  0
          0
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TL06915  "TL06915 POMERADO -SYCAMORE ck 1"  "N-1" "B"
          1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
          0
TL06916  "TL06916 SYCAMORE-SCRIPPS   ck 1"  "N-1" "B"
          1 "SYCAMORE  69"  "SCRIPPS   69"  "1 "   1  0
          0
TL06917  "TL06917 CREELMAN-SYCAMORE  ck 1"  "N-1" "B"
          1 "CREELMAN  69"  "SYCAMORE  69"  "1 "   1  0
          0
TL06918  "TL06918 ESCO-GOALLINE  ck 1 "  "N-1" "B"
          1 "ESCO     69"  "GOALLINE  69"  "1 "   1  0
          3 "GOALLINE  69"  "1 "  0
          0
TL06920  "TL06920 ARTESN-SYCAMORE  ck 1 "  "N-1" "B"
          1 "ARTESN    69"  "SYCAMORE 69"  "1 "   1  0
          0
TL06923  "TL06923 BARRETT -CAMERON   ck 1"  "N-1" "B"
          1 "BARRETT   69"  "CAMERON   69"  "1 "   1  0
          0
TL06924  "TL06924 POMERADO -SYCAMORE ck 2"  "N-1" "B"
          1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
          0
TL06925 "TL06925 GARFIELD-EL CAJON  ck 1"  "N-1" "B"
          1 "GARFIELD  69"  "EL CAJON  69"  "1 "   1  0
          0
TL06926  "TL06926 RINCON -VALCNTR   ck 1"  "N-1" "B"
          1 "RINCON    69"  "VALCNTR   69"  "1 "   1  0
          0
TL06927  "TL06927 EASTGATE-ROSE CYN  ck 1"  "N-1" "B"
          1 "EASTGATE  69"  "ROSE CYN  69"  "1 "   1  0
          0
TL06929  "TL06929 OTAY to OY GEN  69 ck 1"  "N-1" "B"
      1 "OTAY     69"  "OY GEN    69"  "1 "  1 0
          3 "OY GEN  13.80"  "1 "   0
      0
TL06930  "TL06930 OMWD-ESCNDIDO      ck 1"  "N-1" "B"
          1 "OMWD     69"  "ESCNDIDO  69"  "1 "   1  0
          0
TL06931  "TL06931 BOULEVRD-CRESTWD   ck 1"  "N-1" "B"
      8 "BOULEVRD 69"
          4 "BOULEVRD  69"  "10"   0
          1 "BOULEVRD  69"  "CRESTWD   69"  "1 "   1  0
          0
TL06932  "TL06932 LILAC -PALA        ck 1"  "N-1" "B"
          1 "LILAC     69"  "PALA     69"  "1 "   1  0
          0
TL06933  "TL06933 ESCNDIDO-ES GEN    ck 1"  "N-1" "B"
      1 "ESCNDIDO  69"  "ES GEN    69"  "1 "  1 0
          3 "ES GEN  13.80"  "1 "   0
      0
TLO6934  "TL06934 ESCNDIDO-CALPK ES  ck 1"  "N-1" "B"
      1 "ESCNDIDO  69"  "CALPK_ES  69"  "1 "  1 0
          3 "CALPK_ES  13.80"  "1 "   0
          0
TL06935  "TL06935 BORDER-LRKSP_BD 69 ck 1"  "N-1" "B"
      1 "BORDER    69"  "LRKSP_BD  69"  "1 "  1 0
      3 "LRKSPBD1  13.80"    "1 "  0
      3 "LRKSPBD2  13.80"    "1 "  0
          0
TL06936  "TL69036 BORDER-CALPK_BD 69 ck 1"  "N-1" "B"
      1 "BORDER    69"  "CALPK_BD  69"  "1 "  1 0
```

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      3 "CALPK_BD  13.80"    "1 "  0
          0
TL06938  "TL06938 EL CAJON-CALPK_EC  ck 1"  "N-1" "B"
      1 "EL CAJON  69"  "CALPK_EC  69"  "1 "  1 0
      3 "CALPK_EC  13.80"    "1 "  0
          0
TL06939  "TL06939 BERNARDO-ARTESN    ck 1"  "N-1" "B"
          1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
          0
TL06943  "TL069 TOREYPNS  to UCM     ck 1"  "N-1" "B"
          1 "TOREYPNS   69"  "UCM      69"  "1 "   1  0
          0
TL06945  "TL6945 Lkhodges-OMWD 69     ck1"  "N-1" "B"
          1 "Lkhodges 69"   "OMWD     69"  "1 "   1  0
          0
TL06946 "TL06946 CRESTWD-KUMEYAAY 69 ck1"  "N-1" "B"
      1 "CRESTWD   69"  "KUMEYAAY  69"  "1 "  1 0
      3 "KUMEYAAY   0.69"    "1 "  0
      0
TL06949  "TL06949 SILVERGT-NATNLCTY 69 ck 1"  "N-1" "B"
          1 "SILVERGT  69"  "NATNLCTY  69"  "1 "  1 0
          0
TL06950  "TL6950 DIVISION-NAVSTMTR 69 ck 2"  "N-1" "B"
          1 "DIVISION  69"  "NAVSTMTR  69"  "2 "  1 0
          0
TL06951 "TL6951 PA99MW - PA 69      ck 1"  "N-1" "B "
          1 "PA99MW    69"  "PALA      69"  "1 "  1 0
          0
TL06952  "TL06952 NORTHCTY-PENSQTOS  69 ck 1"  "N-1" "B"
          1 "NORTHCTY  69"  "PENSQTOS  69"  "1 "  1 0
          0
TL06954  "TL06954 NOISLMTR-CORONADO  69 ck 1"  "N-1" "B"
          1 "NOISLMTR  69"  "CORONADO  69"  "1 "  1 0
          0
TL06956  "TL06596 ESCNDIDO-ASH      ck 2"  "N-1" "B"
          1 "ESCNDIDO  69"  "ASH       69"  "2 "   1  0
          0
TL06957 "TL06957 LL-BAR           ck 1"  "N-1" "B"
          1 "BARRETT   69"  "LOVELAND  69"  "1 "   1  0
          0
TL06959  "TL06959 MIRASNTO-PENSQTOS  ck 1"  "N-1" "B"
          1 "MIRASNTO  69"  "PENSQTOS  69"  "1 "   1  0
          0
TL06961 "TL06961 SYCAMORE-BERNARDO 69 ck 1" "N-1"  "B"
          1 "SYCAMORE  69"  "BERNARDO  69"  "1 "   1  0
          0
################################################################
# SDG&E Bulk Power Transformer Single Outage
################################################################

################################################################
# Bay Boulevard Banks
################################################################
BB70 "BB BK 70 230/69   "  "T-1" "B"
      2 "BAY BLVD 230 "  "BAY BLVD 69"  "1 "  0
      0
BB72 "BB BK 72 230/69   "  "T-1" "B"
      2 "BAY BLVD 230 "  "BAY BLVD 69"  "2 "  0
      0
BU50 "BU BK 50 138/69   "  "T-1" "B"
          2 "BOULEVRD 138"  "BOULEVRD  69"  "1 "  0
```

```
            0
############################################################
# ISD 2016
# M-SOCRP
############################################################
#CP60 "CP BK 60 230/138  "  "T-1" "B"
#           2 "CAPSTRNO 230"  "CAPSTRNO 138"  "1 "  0
#           0
#CP61 "CP BK 61 230/138  "  "T-1" "B"
#           2 "CAPSTRNO 230"  "CAPSTRNO 138"  "2 "  0
#           0
ECO60 "ECO BK 60 230/138"  "T-1" "B"
            2 "ECO      230"  "ECO      138"  "1 "  0
            0
ECO61 "ECO BK 61 230/138"  "T-1" "B"
            2 "ECO      230"  "ECO      138"  "2 "  0
            0
#ECO80 "ECO BK 80 230/500"  "T-1" "B"
#           2 "ECO      230"  "ECO      500"  "1 "  0
#           0
ECO80 "ECO BK 80 230/500" "T-1" "B"
           8 "ECO_MP 500"
           0
EA60  "EA BK 60 230/138  "  "T-1" "B"
            2 "ENCINA   230"  "ENCINA   138"  "1 "  0
            0
ES70  "ES BK 70 69/230"  "T-1" "B"
            2 "ESCNDIDO  69"  "ESCNDIDO 230"  "1 "  0
            6 "ESCNDIDO 230"  "sd "   0
            0
ES71  "ES BK 71 69/230"  "T-1" "B"
            2 "ESCNDIDO  69"  "ESCNDIDO 230"  "2 "  0
            6 "ESCNDIDO 230"  "sd"   0
            0
ES72  "ES 72 BK 69/230"  "T-1" "B"
            2 "ESCNDIDO  69"  "ESCNDIDO 230"  "3 "  0
            0
IV80  "IV BK 80 230/500"  "T-1" "B"
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "2 "  0
            0
#
# Changed outage ID from IV81 to IV81A
#
IV81A  "IV BK 81 230/500"  "T-1" "B"
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "  0
            0
#
# Outage of BK81 may/may not trigger trip of TL23050
#
IV81B  "IV BK81 & IV-ROA CFE SPS"  "T-1" "B"
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "  0
            1 "IMPRLVLY 230"  "ROA-230  230"  "1 "  1  0
            0
#
# Outage of BK81 may/may not trigger trip of TL23040
#
IV81C  "IV BK81 & OMEC-TJI CFE SPS"  "T-1" "B"
            2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "  0
            1 "OTAYMESA 230"  "TJI-230  230"  "1 "   1  0
            0
IV82  "IV BK 82 230/500"  "T-1" "B"
```

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          2 "IMPRLVLY 230"  "IMPRLVLY 500"  "3 "  0
          0
LC50  "LC BK 50 138/69"  "T-1" "B"
          2 "LOSCOCHS 138"  "LOSCOCHS  69"  "1 "  0
          0
LC51  "LC BK 51 69/138"  "T-1" "B"
          2 "LOSCOCHS  69"  "LOSCOCHS 138"  "2 "  0
          0
ML60  "ML BK 60 230/138"  "T-1" "B"
          2 "MIGUEL    230"  "MIGUEL60   138"  "1 "  0
          0
ML61  "ML BK 61 230/138"  "T-1" "B"
          2 "MIGUEL    230"  "MIGUEL   138"  "2 "  0
          0
ML70  "ML BK 70 69/230"  "T-1" "B"
          2 "MIGUEL    69"  "MIGUEL   230"  "1 "  0
          0
ML71  "ML BK 71 69/230"  "T-1" "B"
          2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
          0
#only test Miguel bank 80/81 outages with SPSs
#ML80  "ML BK 80 230/500            ck 1"  "T-1" "B"
#          2 "MIGUEL   230"  "MIGUELMP 500"  "1 "  0
#          2 "MIGUEL    12"  "MIGUELMP 500"  "1 "  0
#          2 "MIGUEL   500"  "MIGUELMP 500"  "1 "  0
#          0
#ML81  "ML BK 81 230/500            ck 2"  "T-1" "B"
#          2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
#          0
MS50  "MS BK 50 138/69                "  "T-1" "B"
          2 "MISSION  138"  "MISSION   69"  "1 "  0
          0
MS51  "MS BK 51 138/69                "  "T-1" "B"
          2 "MISSION  138"  "MISSION   69"  "2 "  0
          0
MS52    "MS BK 52 138/69              "  "T-1" "B"
          2 "MISSION  138"  "MISSION   69"  "3 "  0
          0
MS60  "MS BK 60 230/138"  "T-1" "B"
          2 "MISSION  230"  "MISSION  138"  "1 "  0
          0
MS61  "MS BK 61 230/138"  "T-1" "B"
          2 "MISSION  230"  "MISSION  138"  "2 "  0
          0
MS70  "MS BK 70 230/69"  "T-1" "B"
          2 "MISSION  230"  "MISSION   69"  "1 "  0
          0
NG500/69  "NG 500/69"  "T-1" "B"
          2 "N.GILA   500"  "N.GILA    69"  "1 "  0
          0
OT70  "OT BK 70 69/230"  "T-1" "B"
          2 "OLD TOWN  69"  "OLD TOWN 230"  "1 "  0
          0
OT71  "OT BK 71 69/230"  "T-1" "B"
          2 "OLD TOWN  69"  "OLD TOWN 230"  "2 "  0
          0
PQ50    "PQ BK 50 138/69"  "T-1" "B"
          2 "PENSQTOS 138"  "PENSQTOS  69"  "1 "  0
          0
PQ51    "PQ BK 51 69/138"  "T-1" "B"
          2 "PENSQTOS  69"  "PENSQTOS 138"  "2 "  0
```

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          0
PQ52     "PQ BK 52 69/138"  "T-1" "B"
          2 "PENSQTOS  69"  "PENSQTOS 138"  "3 "  0
          0
PQ60     "PQ60 PENSQTOS-PENSQTOS ck 1"  "T-1" "B"
          2 "PENSQTOS 230"  "PENSQTOS 138"  "1 "  0
          0
PQ70  "PQ BK 70 230/69"  "T-1" "B"
          2 "PENSQTOS 230"  "PENSQTOS  69"  "1 "  0
          0
PQ71  "PQ BK 71 230/69"  "T-1" "B"
          2 "PENSQTOS 230"  "PENSQTOS  69"  "2 "  0
          0
SA51     "SA BK 51 138/69"  "T-1" "B"
          2 "SANLUSRY 138"  "SANLUSRY  69"  "1 "  0
          0
SA70  "SA  BK 70 69/230"  "T-1" "B"
          2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
          0
SA71  "SA BK 71 69/230"  "T-1" "B"
          2 "SANLUSRY  69"  "SANLUSRY 230"  "2 "  0
          0
SA72  "SA BK 72 69/230"  "T-1" "B"
          2 "SANLUSRY  69"  "SANLUSRY 230"  "3 "  0
          0
SC80    "SUNCREST BK80 230/500"  "N-1" "B"
         2 "SUNCREST 230"  "SNCRSTMP 500"  "1 "  0
         2 "SUNCREST  12"  "SNCRSTMP 500"  "1 "  0
         2 "SUNCREST 500"  "SNCRSTMP 500"  "1 "  0
         0
SC81    "SUNCREST BK81 230/500"  "N-1" "B"
         2 "SUNCREST 230"  "SNCRSTMP 500"  "2 "  0
         2 "SUNCREST  12"  "SNCRSTMP 500"  "2 "  0
         2 "SUNCREST 500"  "SNCRSTMP 500"  "2 "  0
         0
SG70  "SG BK 70 230/69"  "T-1" "B"
          2 "SILVERGT 230"  "SILVERGT 69"  "1 "  0
          0
SG72  "SG BK 71 230/69"  "T-1" "B"
          2 "SILVERGT 230"  "SILVERGT 69"  "2 "  0
          0
SX60  "SX BK 60 230/138"  "T-1" "B"
          2 "SYCAMORE 230"  "SYCAMORE 138"  "1 "  0
          0
SX70  "SX BK 70 230/69"  "T-1" "B"
          2 "SYCAMORE 230"  "SYCAMORE  69"  "1 "  0
          0
SX71  "SX BK 71 230/69"  "T-1" "B"
          2 "SYCAMORE 230"  "SYCAMORE  69"  "3 "  0
          0
SX72  "SX BK 72 230/69"  "T-1" "B"
          2 "SYCAMORE 230"  "SYCAMORE  69"  "2 "  0
          0
TA50     "TA BK 50 69/138"  "T-1" "B"
          2 "TALEGA    69"  "TALEGA   138"  "1 "  0
          0
TA60  "TA BK 60 230/138"  "T-1" "B"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          0
TA62  "TA BK 62 230/138"  "T-1" "B"
          2 "TALEGA   230"  "TALEGA   138"  "2 "  0
```

```
          0
TA61  "TA BK 61 230/138"  "T-1" "B"
          2 "TALEGA   230"  "TALEGA   138"  "3 "  0
          0
TA63  "TA BK 63 230/138"  "T-1" "B"
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          0
##############################################################
# SDG&E Selected Generator Outage (Category B: G-1)
##############################################################
Q103 "Q103  13.80"  "G-1" "B"
          3 "Q103  13.80"  "Q "   0
          0
CALPK-BD " CALPK_BD  13.80"  "G-1" "B"
          3 "CALPK_BD  13.80"  "1 "   0
          0
CALPK-EC " CALPK_EC  13.80"  "G-1" "B"
          3 "CALPK_EC  13.80"  "1 "   0
          0
CALPK-ES " CALPK_ES  13.80"  "G-1" "B"
          3 "CALPK_ES  13.80"  "1 "   0
          0
DIVISION " DIV QF  13.80"  "G-1" "B"
          3 "DIVISION  69"  "1 "   0
          0
EA1     "EA1  14.40"  "G-1" "B"
          3 "ENCINA 1  14.40"  "1 "   0
          0
EA2     "EA2  14.40"  "G-1" "B"
          3 "ENCINA 2  14.40"  "1 "   0
          0
EA3     "EA3  14.40"  "G-1" "B"
          3 "ENCINA 3  14.40"  "1 "   0
          0
EA4     "EA4  22"  "G-1" "B"
          3 "ENCINA 4  22"  "1 "   0
          0
EA5     "EA5  24"  "G-1" "B"
          3 "ENCINA 5  24"  "1 "   0
          0
#EC GEN2  "EC GEN2  "  "G-1"  "B"
#         3 "EC GEN2   13.8"  "1 "  0
#         0
GOALLINE " GOALLINE    69"  "G-1" "B"
          3 "GOALLINE  69"  "1 "  0
          0
KUM      " KUMEYAAY   0.69"  "G-1" "B"
       3 "KUMEYAAY   0.69"    "1 "  0
          0
LkHod1  " LkHodG1  13.8"  "G-1" "B"
          3 "LkHodG1  13.8"  "1 "   0
          0
LkHod2  " LkHodG2  13.8"  "G-1" "B"
          3 "LkHodG2  13.8"  "1 "   0
          0
LRKSPBD1 "LRKSP_BD 1 13.80"  "G-1" "B"
          3 "LRKSPBD1  13.80"  "1 "   0
          0
LRKSPBD2 "LRKSP_BD 2 13.80"  "G-1" "B"
          3 "LRKSPBD2  13.80"  "1 "   0
          0
```

```
ES-GEN " ES_GEN  13.80"  "G-1" "B"
          3 "ES GEN  13.80"  "1 "   0
          0
OY-GEN " OY-GEN  13.80"  "G-1" "B"
          3 "OY GEN  13.80"  "1 "   0
          0
MEF-MR1 " MEF-MR1  13.80"  "G-1" "B"
          3 "MEF MR1   13.80"  "1 "   0
          0
MEF-MR2 " MEF-MR1  13.80"  "G-1" "B"
          3 "MEF MR2   13.80"  "1 "   0
          0
NIM-GT   "NOISLMTR  69"  "G-1" "B"
          3 "NOISLMTR  69"    "1 "  0
          0
OTAYMESA "OTAY MGP 2x1"  "G-1" "B"
          3 "OTAYMGT1 18.0"  "1 "   0
          3 "OTAYMGT2 18.0"  "1 "   0
          3 "OTAYMST1 16.0"  "1 "   0
          0
PEN      "PEN 2x1 18" "G-1" "B"
          3 "PEN_CT1   18"  "1 "  0
          3 "PEN_CT2   18"  "1 "  0
          3 "PEN_ST    18"  "1 "  0
          0
POINTLMA " PNTLMA QF  69"  "G-1" "B"
          3 "POINTLMA  69"    "1 "  0
          0
SONGS2   "SONGS unit2  22"  "G-1" "B"
          3 "S.ONOFR2  22"    "2 "  0
          0
SONGS3   "SONGS unit3  22"  "G-1" "B"
          3 "S.ONOFR3  22"    "3 "  0
          0
INTRGEN  "INTRGEN "  "G-1" "B"
          3 "INTBCT    16.0"  "1 "  0
          3 "INTBST    18.0"  "1 "  0
          0
IV_GENS "IV GENS "  "G-1" "B"
          3 "IV GEN1   21.0"  "1 "  0
          3 "IV GEN2   18.0"  "1 "  0
          3 "IV GEN3   18.0"  "1 "  0
          0
LRP-U1  "LRP-U1  "  "G-1" "B"
          3 "LRP-U1    16.0"  "1 "  0
          0
PA_PKRS "PA_PKRS "  "G-1" "B"
          3 "PA99MWQ1  13.8"  "1 "  0
          3 "PA99MWQ2  13.8"  "1 "  0
          0
#######################################################################
# Cat C N-2 COMMON STRUCTURE Contingencies
#PSLF contingency list is different than Grid Ops Contingency
#Reference Manual as a result of dfferent criteria
#######################################################################
# SDG&E Common Structure Outages (Category C: N-2)
#######################################################################
23001/23004 "SA-MS 1 + SA-MS 2 230 kV"  "N-2" "C"
          1 "SANLUSRY 230"  "MISSION  230"  "1 "   1  0
          1 "SANLUSRY 230"  "MISSION  230"  "2 "   1  0
          0
```

```
23002/23010 "SA-SO 2 + SO-SA 3 230 kV"  "N-2" "C"
          1 "SANLUSRY 230"  "S.ONOFRE 230"  "2 "   1  0
          1 "SANLUSRY 230"  "S.ONOFRE 230"  "3 "   1  0
          0
23003/23011 "SA-EA 230 kV + SA-ES-EA 230 kV"  "N-2" "C"
          1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
          1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
          1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
          1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
          0
23007/23052 "TA-SO 1 + 2 230 kV          "  "N-2" "C"
          1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
          1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
          0
############################################################
#ISD 2016
#  M-SOCRP
# DELETE THE ABOVE 23007/23052 AND REPLACE WITH THE
# FOLLOWING TWO COMMON CORRIDOR FAILURES
############################################################
#23007/23030 "CP-SONGS + ES-CP-TA        "  "N-2" "C"
#          1 "CAPSTRNO  230"  "S.ONOFRE  230" "1 "   1  0
#          1 "TA230 TAP 230"  "CAPSTRNO  230" "1 "   1  0
#          1 "TA230 TAP 230"  "TALEGA    230" "1 "   1  0
#          1 "TA230 TAP 230"  "ESCNDIDO  230" "1 "   1  0
#          0
#23007/23052 "TA-SO + CAP-SO 230 kV          "  "N-2" "C"
#          1 "CAPSTRN  230"  "S.ONOFRE 230"  "1 "   1  0
#          1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
#          0
23011/23012 "23011/12 EA-PEN-SA & EA-PQ  "  "N-2" "C"
          1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
          1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
          1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
          1 "PENSQTOS 230"  "ENCINA   230"  "1 "   1  0
          0
23011/23051 "SX-PEN + PEN-EA-SA 230 kV   "  "N-2" "C"
          1 "SYCAMORE 230"  "PEN      230"  "1 "   1  0
          1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
          1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
          1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
          0
23011/13805 "SA-EA-PEN 230kV + BQ-PA 138kV"  "N-2" "C"
          1 "ENCINA   230"  "ENCINATP 230"  "1 "   1  0
          1 "SANLUSRY 230"  "ENCINATP 230"  "1 "   1  0
          1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
          1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
          0
23012/23053 "PQ-EA #1 & #2              "  "N-2" "C"
          1 "PENSQTOS 230"  "ENCINA   230"  "1 "   1  0
          1 "PENSQTOS 230"  "ENCINA   230"  "2 "   1  0
          0
23014/23015 "PEN-ES #1 + #2 230 kV        "  "N-2" "C"
          1 "PEN      230"  "ESCNDIDO 230"  "1 "   1  0
          1 "PEN      230"  "ESCNDIDO 230"  "2 "   1  0
          0
23022/23023 "ML-MS 230 kV #1&#2          "  "N-2" "C"
          1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
          1 "MIGUEL   230"  "MISSION  230"  "2 "   1  0
          0
23027/23028 "23027/28 OT-MS & OT-SG-MS   "  "N-2" "C"
```

```
        1 "OLD TOWN 230"  "MISSION  230"  "1 "   1  0
        1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "   1  0
        1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "   1  0
        1 "MISSION  230"  "OLDTWNTP 230"  "1 "   1  0
        0
23028/23029 "SG-OT 230kV #1+#2          "  "N-2" "C"
        1 "SILVERGT 230"  "OLD TOWN 230"  "1 "   1  0
        1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "   1  0
        1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "   1  0
        1 "MISSION  230"  "OLDTWNTP 230"  "1 "   1  0
        0
23030/6932 "ES-TA 230 kV & LI-PA 69 kV     "  "N-2" "C"
        1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
        1 "LILAC     69"  "PALA      69"  "1 "   1  0
        0
23003/23053 "23003/53 SA-EN & PQ-EA      "  "N-2" "C"
        1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
        1 "PENSQTOS 230"  "ENCINA   230"  "2 "   1  0
        0
23006/13802 "23006/13802 SA-SONGS & SA-CAN"  "N-2" "C"
        1 "SANLUSRY 230"  "S.ONOFRE 230"  "1 "   1  0
        1 "CANNON   138"  "SANLUSRY 138"  "1 "   1  0
        0
23011/13805 "23011/13805 EA-PEN-SA & PA-BQ "  "N-2" "C"
        1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
        1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
        1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
        0
23011/13806 "EA-SA-PEN 230 kV + EA-PA 138 kV "  "N-2" "C"
        1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
        1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
        1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        1 "ENCINA   138"  "PALOMAR  138"  "1 "   1  0
        0
23011/13825 "EA-SA-PEN 230 kV + BQ-SH 138 kV "  "N-2" "C"
        1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
        1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
        1 "PEN      230"  "ENCINATP 230"  "1 "   1  0
        1 "SHADOWR  138"  "BATIQTOS 138"  "1 "   1  0
        0
23051/6920 "SX-PEN 230 kV + BE-AR 69 kV  "  "N-2" "C"
        1 "SYCAMORE 230"  "PEN      230"  "1 "   1  0
        1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
        0
23051A/6920B "SX-PEN 230 kV + AR-SX 69 kV   B"  "N-2" "C"
        1 "SYCAMORE 230"  "PEN      230"  "1 "   1  0
        1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
        0
23054/23055 "SX-SUNCREST           230kv"  "N-2" "C"
        1 "SUNCREST 230"  "SYCAMORE 230"  "1 "   1  0
        1 "SUNCREST 230"  "SYCAMORE 230"  "2 "   1  0
        0
13802/13843 "CAN-SA + EA-CAN 138 kV       "  "N-2" "C"
        1 "ENCINA   138"  "CANNON   138"  "1 "   1  0
        1 "ENCINA  138"  "SHADOWR   138"  "1 "   1  0
        4 "CANNON   138"  "10"   0
        0
13801/13804 "EA-CAN & EA-BQ-PQ           "  "N-2" "C"
        1 "ENCINA   138"  "CANNON   138"  "1 "   1  0
        1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
```

```
          1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
          1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          0
13804/13806 "EA-PA + EA-BQ-PQ 138 kV     "   "N-2" "C"
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "PENSQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          1 "ENCINA   138"  "PALOMAR  138"  "1 "   1  0
          0
13804/6906 "EA-BQ-PQ 138 kV + MR-PQ  69 kV"  "N-2" "C"
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
          1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
          0
13806/23011 "13806/23011 EA-PAR + EA-PEN-SA" "N-2" "C"
          1 "ENCINATP 230"  "ENCINA   230"  "1 "   1  0
          1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
          1 "PEN 230"       "ENCINATP 230"  "1 "   1  0
          1 "ENCINA 138"    "PALOMAR  138"  "1 "   1  0
          0
13809/13824 "13809/13824 PV-TC & LC-MLT-TC-ML60"  "N-2" "C"
          1 "PRCTRVLY 138"  "TELECYN   138" "1 "   1  0
          1 "LOSCOCHS 138"  "ML60 TAP  138" "1 "   1  0
          1 "ML60 TAP 138"  "TELECYN   138" "1 "   1  0
          1 "ML60 TAP 138"  "MIGUEL60  138" "1 "   1  0
          0
13810/670 "DB-FR-MIR 138 kV + CM-MS 69 kV"   "N-2" "C"
          1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
          1 "FRIARS   138"  "DOUBLTTP 138"  "1 "   1  0
          1 "PENSQTOS 138"  "DOUBLTTP 138"  "1 "   1  0
          1 "CLAIRMNT  69"  "MISSION   69"  "1 "   1  0
          0
13812/695 "13812/695 TA-SMO & TA-JM-CI   "  "N-2" "C"
          4 "CRSTNTS   69"  "10"   0
          1 "CRSTNTS   69"  "TALEGATP  69"  "1 "   1  0
          1 "JAP MESA  69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA    69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
          0
13812/13835 "SMO-LNL + TA-SMO              "  "N-2" "C"
          1 "TALEGA 138"   "SANMATEO  138"  "1 "   1  0
          1 "SANMATEO 138" "TA TAP    138"  "1 "   1  0
          1 "TA TAP 138"   "LAGNA NL  138"  "1 "   1  0
          1 "TALEGA 138"   "TA TAP    138"  "1 "   1  0
     0
############################################################
# ISD 2016
# M-SOCRP
# DELETE 13812/13835A REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#13812/13835A "TA-SMO + TA-SMO          "  "N-2" "C"
#          1 "TALEGA 138"   "SANMATEO  138"  "1 "   1  0
#          1 "TALEGA 138"   "SANMATEO  138"  "2 "   1  0
#          0
13816/13833 "PI-CP & TA-TB              "  "N-2" "C"
          1 "PICO     138"  "CAPSTRNO 138"  "1 "   1  0
          1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
          0
############################################################
# ISD 2016
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# M-SOCRP
# DELETE 13816/13833A REPLACE WITH THE FOLLOWING CONTINGENCY
##############################################################
#13816/13833A "PI-CP & TA-CP              "  "N-2" "C"
#          1 "PICO     138"  "CAPSTRNO 138"  "1 "   1  0
#          1 "TALEGA   138"  "CAPSTRNO 138"  "1 "   1
#          0
13819/636   "LC-SN + LC-EL             "   "N-2" "C"
          1 "LOSCOCHS 138"  "SANTEE   138"  "1 "   1  0
          1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
          0
13820/6920  "SX-CC + AR-SX             "   "N-2" "C"
          1 "SYCAMORE 138"  "CHCARITA 138"  "1 "   1  0
          1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
          0
13820/6961  "SX-CC + SX-BE             "   "N-2" "C"
          1 "SYCAMORE 138"  "CHCARITA 138"  "1 "   1  0
          1 "SYCAMORE  69"  "BERNARDO  69"  "1 "   1  0
          0
13821/636   "SX-SN + LC-EL             "  "N-2" "C"
          1 "SYCAMORE 138"  "SANTEE   138"  "1 "   1  0
          1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
          0
13822/636  "TL13822 + TL636 69kV"  "N-2" "C"
          1 "MISSION  138"  "CARLTNHS  138"  "1 "   1  0
          1 "LOSCOCHS  69"  "ELLIOTT    69"  "1 "   1  0
     0
13822/671  "TL13822 + MS-EL 69kV"  "N-2" "C"
          1 "MISSION  138"  "CARLTNHS  138"  "1 "   1  0
          1 "MISSION   69"  "ELLIOTT    69"  "1 "   1  0
     0
13822/671 "LC-SN + MS-EL       ck 1"  "N-2" "C"
          1 "LOSCOCHS 138"  "SANTEE    138"  "1 "   1  0
          1 "LOSCOCHS  69"  "ELLIOTT    69"  "1 "   1  0
     0
13824/23023 "13824/23023 LC-MLT-TC-ML60+ ML-MS "  "N-2" "C"
          1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
          1 "LOSCOCHS 138"  "ML60 TAP 138"  "1 "   1  0
          1 "ML60 TAP 138"  "TELECYN  138"  "1 "   1  0
          1 "ML60 TAP 138"  "MIGUEL60 138"  "1 "   1  0
          0
13824/632  "LC-MLT-TC-ML60+ML-LC 138/69 kV" "N-2" "C"
          1 "LOSCOCHS 138"  "ML60 TAP 138"  "1 "   1  0
          1 "ML60 TAP 138"  "TELECYN  138"  "1 "   1  0
          1 "ML60 TAP 138"  "MIGUEL60 138" "1 "   1  0
          1 "MIGUEL    69"  "GRANITTP  69"  "1 "   1  0
          0
13825/23051 "13825/23051  SH-BQ + PEN-SX"  "N-2" "C"
          1 "PEN 230"  "SYCAMORE     230"  "1 "   1  0
          1 "SHADOWR 138"  "BATIQTOS  138"  "1 "   1  0
          0

13825/13811 "SH-CC AND SH-BQ    138 kV   "  "N-2" "C"
          1 "SHADOWR  138"  "CHCARITA 138"  "1 "   1  0
          1 "BATIQTOS 138"  "SHADOWR  138"  "1 "   1  0
          0
13827/670 "FR-MS 138 kV + CM-MS 69 kV    "   "N-2" "C"
          1 "FRIARS   138"  "MISSION  138"  "1 "   1  0
          1 "CLAIRMNT  69"  "MISSION   69"  "1 "   1  0
          0
13828/13822 "SX-CH + MS-CH      138kV     "  "N-2" "C"
```

```
          1 "SYCAMORE 138"  "CARLTNHS  138"  "1 "   1  0
          1 "MISSION  138"  "CARLTNHS  138"  "1 "   1  0
          0
13835/13833 "TA-TB + LNL-TA TAP-SMO 138 kV"  "N-2" "C"
          1 "TALEGA   138"  "TRABUCO   138"  "1 "   1  0
          1 "SANMATEO 138"  "TA TAP    138"  "1 "   1  0
          1 "TA TAP   138"  "LAGNA NL  138"  "1 "   1  0
          1 "TALEGA   138"  "TA TAP    138"  "1 "   1  0
          0
############################################################
# ISD 2016
# M-SOCRP
# DELETE 13835/13833
############################################################
13836/13833 "TA-TB + TA-PI          ck 1"  "N-2" "C"
          1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
          0
600/672  "CM-KY-RN + KY-KA-MSH"           "N-2" "C"
          8 "KYOCRATP 69"
          8 "KYOCERA  69"
          4 "KYOCERA  69" "10" 0
          1 "KYOCRATP 69"  "KYOCERA  69"     "1 "   1  0
          1 "MESAHGTS 69"  "KYOCRATP 69"     "1 "   1  0
          1 "KEARNY   69"  "KYOCRATP 69"     "1 "   1  0
          1 "CLAIRMNT 69"  "CLARMTTP 69"     "1 "   1  0
          1 "KEARNY   69"  "CLARMTTP 69"     "1 "   1  0
          1 "ROSE CYN 69"  "CLARMTTP 69"     "1 "   1  0
          0
601/602  "B-UB + B-SG"                    "N-2" "C"
      1 "B   69"      "URBAN     69"    "1 "   1  0
      1 "B   69"      "SILVERGT  69"    "1 "   1  0
      0
606/6950  "DI-NSM 69kV #1+#2" "N-2" "C"
          1 "DIVISION   69"  "NAVSTMTR  69"  "1 "   1  0
          1 "DIVISION   69"  "NAVSTMTR  69"  "2 "   1  0
          0
614/651  "CSW-SW + WA-SG                    "   "N-2" "C"
      1 "WABASH 69"     "SILVERGT 69"  "1 "   1  0
      1 "CHOLLAS 69"    "SWEETWTR 69"  "1 "   1  0
      0
616/6939 "LHM-BE-RSF + BE-AR             "   "N-2" "C"
          1 "Lkhodges 69"   "BERNDOTP  69"  "1 "   1  0
          1 "BERNDOTP  69"  "R.SNTAFE  69"  "1 "   1  0
          1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
          0
622/640  "CSW-SV + PD-CSW               "  "N-2"  "C"
      1 "PARADISE 69"   "CHOLLAS   69"  "1 "   1  0
      1 "CHOLLAS  69"   "SPRNGVLY  69"  "1 "   1  0
      0
623/6929 "IB-OY-SYO + OT-OT GEN         "   "N-2"  "C"
          1 "OTAY     69"   "OY GEN    69"  "1 "   1  0
          1 "IMPRLBCH 69"   "OTAY  TP  69"  "1 "   1  0
          1 "SANYSDRO 69"   "OTAY  TP  69"  "1 "   1  0
          1 "OTAY     69"   "OTAY  TP  69"  "1 "   1  0
          3 "OY GEN  13.80"  "1 "   0
          0
624/630  "EC-JM + EC-GR                 "   "N-2"  "C"
      1 "EL CAJON 69"   "JAMACHA   69"  "1 "   1  0
      1 "EL CAJON 69"   "GRANITE   69"  "1 "   1  0
      0
```

```
626/637  "DE-ST-BC + CRE-ST            "  "N-2"  "C"
          1 "BLDCRKTP  69"  "DESCANSO  69"  "1 "   1  0
          1 "BLDCRKTP  69"  "SANTYSBL  69"  "1 "   1  0
          1 "BLDCRKTP  69"  "BOLDRCRK  69"  "1 "   1  0
          1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
          0
628/6910 "ML-SW-SU-PD + ML-BD          "   "N-2"  "C"
          1 "MIGUEL    69"  "BORDER   69"  "1 "   1  0
          1 "MIGUELTP   69"  "MIGUEL   69"  "1 "   1  0
          1 "SWEETWTR   69"  "MIGUELTP 69"  "1 "   1  0
          1 "SUNYSDTP   69"  "MIGUELTP 69"  "1 "   1  0
          1 "SUNYSIDE   69"  "SUNYSDTP 69"  "1 "   1  0
          1 "PARADISE   69"  "SUNYSDTP 69"  "1 "   1  0
          4 "SUNYSIDE   69"  "10"  0
          0
631/6914 "EC-LC  +  LL-LC              "   "N-2"  "C"
      1 "LOVELAND   69"  "LOSCOCHS 69"  "1 "   1  0
      1 "EL CAJON   69"  "LOSCOCHS 69"  "1 "   1  0
      0
634/681  "ESCO-WC-POW + ASH-FE-VC      "   "N-2"  "C"
      1 "ASH       69"  "ASH   TP 69"  "1 "   1  0
      1 "FELICITA   69"  "ASH   TP 69"  "1 "   1  0
      1 "VALCNTR    69"  "ASH   TP 69"  "1 "   1  0
      1 "ESCO      69"  "WARCYNTP 69"  "1 "   1  0
      1 "WARENCYN   69"  "WARCYNTP 69"  "1 "   1  0
      1 "POWAY     69"  "WARCYNTP 69"  "1 "   1  0
      4 "WARENCYN   69"  "10"  0
      0
636/639  "LC-EL & SX-EL 69 kV "  "N-2" "C"
          1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
          1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
          0
643/627 "ML-JM 1 + 2 69 kV             "  "N-2"  "C"
          1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
          1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
          0
655/699  "SG-CR + SG-B                 "   "N-2"  "C"
      1 "SILVERGT  69"  "CORONADO  69"  "1 "   1  0
      1 "B        69"  "SILVERGT  69"  "2 "   1  0
      0
661/664  "PQ-EG + PQ-MR1-RN            "  "N-2"  "C"
          1 "EASTGATE  69"  "PENSQTOS   69"  "1 "   1  0
          1 "PENSQTOS  69"  "MIRAMRTP   69"  "1 "   1  0
          1 "MIRAMAR1  69"  "MIRAMRTP   69"  "1 "   1  0
          1 "ROSE CYN  69"  "MIRAMRTP   69"  "1 "   1  0
      0
662/6905 "PQ-TP + PQ-GE                "  "N-2"  "C"
          1 "PENSQTOS  69"  "TOREYPNS   69"  "1 "   1  0
          1 "GENESEE   69"  "PENSQTOS   69"  "2 "   1  0
          0
662/13810 "PQ-TP + PQ-DB-FR            "  "N-2"  "C"
          1 "PENSQTOS  69"  "TOREYPNS   69"  "1 "   1  0
          1 "DOUBLET  138"  "DOUBLTTP  138"  "1 "   1  0
          1 "FRIARS   138"  "DOUBLTTP  138"  "1 "   1  0
          1 "DOUBLTTP 138"  "PENSQTOS  138"  "1 "   1  0
          0
664/668  "PQ-MR1-RN + FE-MR1-MR        "  "N-2"  "C"
          1 "ROSE CYN  69"  "MIRAMRTP  69"  "1 "   1  0
          1 "PENSQTOS  69"  "MIRAMRTP  69"  "1 "   1  0
          1 "MIRAMAR1  69"  "MIRAMRTP  69"  "1 "   1  0
          4 "FENTON    69"  "10"   0
```

```
          1 "FENTON    69"  "FENTONTP  69"  "1 "   1  0
          1 "MIRAMAR1  69"  "FENTONTP  69"  "1 "   1  0
          1 "MIRAMAR   69"  "FENTONTP  69"  "1 "   1  0
          0
6906/675 "MR-PQ + PQ-MRM               "  "N-2"  "C"
          1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
          1 "PENSQTOS  69"  "MESA RIM  69"  "1 "   1  0
          0
677/6906 "MRM-MR + PQ-MR               "  "N-2"  "C"
          1 "MESA RIM  69"  "MIRAMAR   69"  "1 "   1  0
          1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
          0
679/6930 "ES-FE + ES-OV                "  "N-2"  "C"
          1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
          1 "OMWD      69"  "ESCNDIDO  69"  "1 "   1  0
          0
688/23030 "ES-LI + ES-TA               "  "N-2"  "C"
          1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
          1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
          0
689/6934 "ES-FE-BR + ES-ES GEN2        "  "N-2"  "C"
          1 "BERNARDO  69"  "FELCTATP  69"  "1 "   1  0
          1 "ESCNDIDO  69"  "FELCTATP  69"  "1 "   1  0
          1 "FELICITA  69"  "FELCTATP  69"  "1 "   1  0
          1 "ESCNDIDO  69"  "CALPK_ES  69"  "1 "   1  0
          3 "CALPK_ES 13.80"  "1 " 0
          0
690/697  "STU-OC-SA-LP + SA-OC         "  "N-2"  "C"
          4 "STUART    69"  "10"   0
          1 "OCNSDETP  69"  "OCEANSDE  69"  "1 "   1  0
          1 "OCNSDETP  69"  "SANLUSRY  69"  "1 "   1  0
          1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
          1 "LASPULGS  69"  "STUARTTP  69"  "1 "   1  0
          1 "SANLUSRY  69"  "OCEANSDE  69"  "1 "   1  0
          0
690/6912 "STU-OC-SA-LP + SA-PE         "  "N-2"  "C"
          4 "STUART    69"  "10"   0
          1 "OCNSDETP  69"  "OCEANSDE  69"  "1 "   1  0
          1 "OCNSDETP  69"  "SANLUSRY  69"  "1 "   1  0
          1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
          1 "STUARTTP  69"  "LASPULGS  69"  "1 "   1  0
          1 "PENDLETN  69"  "SANLUSRY  69"  "1 "   1  0
          0
693/694D  "SA-ME + ME-SA               "  "N-2"  "C"
          1 "MELROSE  69"  "SANLUSRY   69"  "1 "   1  0
          1 "MELROSE  69"  "SANLUSRY   69"  "2 "   1  0
          0
695/13812 "JA-TA-CI +SMO-TA            "  "N-2"  "C"
          1 "CRSTNTS  69"  "TALEGATP   69"  "1 "   1  0
          1 "JAP MESA 69"  "TALEGATP   69"  "1 "   1  0
          1 "TALEGA   69"  "TALEGATP   69"  "1 "   1  0
          1 "TALEGA  138"  "SANMATEO  138"  "1 "   1  0
          0
697/6912 "SA-OC + SA-PN                "  "N-2"  "C"
       1 "PENDLETN 69"  "SANLUSRY   69"  "1 "   1  0
       1 "SANLUSRY 69"  "OCEANSDE   69"  "1 "   1  0
          0
6908/6918 "ES-ESCO + ESCO-GLMQF GEN    "  "N-2"  "C"
          1 "ESCNDIDO 69"  "ESCO       69"  "1 "   1  0
          1 "ESCO     69"  "GOALLINE   69"  "1 "   1  0
          3 "GOALLINE 69"  "1 " 0
```

```
        0
6920/6961 "AR-SX + SX-BE                "  "N-2"  "C"
        1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
        1 "SYCAMORE  69"  "BERNARDO  69"  "1 "   1  0
        0
6924/6915 "POM-SX #1+#2                 "  "N-2"  "C"
        1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
        1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
        0
6930/6945 "ES-OV + OV-LHM               "  "N-2"  "C"
        1 "OMWD     69"  "ESCNDIDO   69"  "1 "   1  0
        1 "Lkhodges 69"  "OMWD       69"  "1 "   1  0
        0
6932/23030 "PA-LI + TA-ES               "  "N-2"  "C"
        1 "LILAC     69"  "PALA      69"  "1 "   1  0
        1 "ESCNDIDO 230"  "TALEGA    230"  "1 "   1  0
        0
6959/13810 "PQ-GE + PQ-DB-FR                "N-2"  "C"
        1 "DOUBLET  138"  "DOUBLTTP  138"  "1 "   1  0
        1 "DOUBLTTP 138"  "FRIARS    138"  "1 "   1  0
        1 "DOUBLTTP 138"  "PENSQTOS  138"  "1 "   1  0
        1 "MIRASNTO  69"  "PENSQTOS   69"  "1 "   1  0
        0
##############################################################
##############################################################
# SPECIFIC AREA CONTINGENCIES
##############################################################
##############################################################
# ORANGE COUNTY
##############################################################
# NERC Category C (bus fault) ORANGE COUNTY CONTINGENCIES
##############################################################

B_CP138NO "CAPISTRANO 138KV N" "BUS" "C"
        1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
        6 "CAPSTRNO 138"  "sd"   0
        0

##############################################################
# N-2 ORANGE COUNTY CONTINGENCIES
##############################################################
23007/23010 "TA-SO 1 + SA-SO 3 230 kV   "  "N-2" "C"
        1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
        1 "SANLUSRY 230"  "S.ONOFRE 230"  "3 "   1  0
        0
23030/23006 "ES-TA 1 + SA-SO 2 230 kV   "  "N-2" "C"
        1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
        1 "SANLUSRY 230"  "S.ONOFRE 230"  "1 "   1  0
        0
13837/13812 "CP-LNL 1 + TA-SMO 1 138 kV "  "N-2" "C"
        1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
        1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
        0
13837/13836 "CP-LNL 1 + TA-PI 1 138 kV  "  "N-2" "C"
        1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
        1 "TALEGA   138"  "PICO     138"  "1 "   1  0
        0
13837/13830 "CP-LNL 1 + MAR-TB 1 138 kV "  "N-2" "C"
        1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
        1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
        0
```

```
13836/13833 "TA-PI 1  138 + TA-TB 1 138 "  "N-2" "C"
          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
          1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
          0
############################################################
# ISD 2016
# M-SOCRP
# DELETE 13836/13833A REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#13836/13833A "TA-PI 1  138 + TA-CP 1 138 "  "N-2" "C"
#          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
#          1 "TALEGA   138"  "CAPSTRNO 138"  "1 "   1  0
#          0

13834/13836 "CP-TB 1 + TA-PI 1 138 kV   "  "N-2" "C"
          1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
          0
13833/13831 "TA-TB 1 + TA-RMV 1 138 kV "  "N-2" "C"
          1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "   1  0
          0
############################################################
# ISD 2016
# M-SOCRP
# DELETE 13836/13833A REPLACE WITH THE FOLLOWING CONTINGENCY
############################################################
#13833A/13831 "TA-RMV + TA-CP          "  "N-2" "C"
#          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "   1  0
#          1 "TALEGA   138"  "CAPSTRNO 138"  "1 "   1  0
#          0
13816/13831 "CP-PI 1 + TA-RMV 1 138 kV "  "N-2" "C"
          1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "   1  0
          0
13816/13834 "CP-PI 1 + CP-TB 1 138 kV   "  "N-2" "C"
          1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
          1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
          0
13830/13836 "MAR-TB 1 138 + TA-PI 1 138 "  "N-2" "C"
          1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
          0
695/13831A "TA-JA-CI 69 + TA-RMV 1 138   "  "N-2" "C"
          4 "CRSTNTS   69"  "10"   0
          1 "CRSTNTS   69"  "TALEGATP  69"  "1 "   1  0
          1 "JAP MESA  69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA    69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "   1  0
          0
695/13836 "TA-JA-CI 69 + TA-PI 1 138    "  "N-2" "C"
          4 "CRSTNTS   69"  "10"   0
          1 "CRSTNTS   69"  "TALEGATP  69"  "1 "   1  0
          1 "JAP MESA  69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA    69"  "TALEGATP  69"  "1 "   1  0
          1 "TALEGA   138"  "PICO     138"  "1 "   1  0
          0
692/23007 "HO-LP-JA 1 69 + "  "N-2" "C"
          4 "HORNO     69"  "10"   0
          1 "HORNO     69"  "HORNO TP  69"  "1 "   1  0
          1 "HORNO TP  69"  "JAP MESA  69"  "1 "   1  0
```

```
        1 "LASPULGS  69"  "HORNO TP  69"  "1 "   1  0
        1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
        0
692/23052 "HO-LP-JA 1 69 + "  "N-2" "C"
        4 "HORNO     69"  "10"   0
        1 "HORNO     69"  "HORNO TP  69"  "1 "   1  0
        1 "HORNO TP  69"  "JAP MESA  69"  "1 "   1  0
        1 "LASPULGS  69"  "HORNO TP  69"  "1 "   1  0
        1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
        0

########################################################################
# Cat C Bus Outage Contingencies
########################################################################
########################################################################
# SDG&E Bus Section Outages (Category C: Bus Section)
# Note: Alphabetical Order
# A number of substations' bus outage effects are obvious i.e.
# a drop in that sub's load.  So the outage's effect minus the load
# drop has been studies with under the N-1 category.
# These have been deleted:  Station F Friars Narrows
########################################################################
Bus_AR69 "ARTESIAN 69  kV BUS"  "BUS" "C"
        1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
        1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
        0
Bus_AV69 "Avocado 69kV Bus"  "BUS" "C"
        1 "AVCADOTP  69"  "AVOCADO   69"  "1 "   1  0
        1 "AVOCADO   69"  "MNSRATTP  69"  "1 "   1  0
        4 "AVOCADO   69"  "10"   0
        0
Bus_B69N "Station B 69kV N Bus"  "BUS" "C"
        1 "B         69"  "CORONADO  69"  "1 "   1  0
        1 "B         69"  "SILVERGT  69"  "2 "   1  0
        1 "KETTNER   69"  "B         69"  "1 "   1  0
        0
Bus_B69S "Station B 69kV S Bus"  "BUS" "C"
        1 "B         69"  "SILVERGT   69"  "1 "   1  0
        1 "B         69"  "URBAN     69"  "1 "   1  0
        0
Bus_BAR69 "Barrett 69kV Bus"  "BUS" "C"
        1 "BARRETT   69"  "CAMERON   69"  "1 "   1  0
        1 "BARRETT   69"  "LOVELAND  69"  "1 "   1  0
        4 "BARRETT   69"  "10"   0
        0
Bus_BB69N "Bay Blvd 69kV N Bus"  "BUS" "C"
        1 "BAY BLVD  69"  "SWEETWTR  69"  "1 "   1  0
        1 "BAY BLVD  69"  "OTAY      69"  "1 "   1  0
        1 "BAY BLVD  69"  "IMPRLBCH  69"  "1 "   1  0
        0
Bus_BB69S "Bay Blvd 69kV S Bus"  "BUS" "C"
        1 "BAY BLVD  69"  "MONTGMRY  69"  "1 "   1  0
        1 "BAY BLVD  69"  "OTAY      69"  "2 "   1  0
        1 "BAY BLVD  69"  "MONTGYTP  69"  "1 "   1  0
        0
Bus_BLV69 "BOULEVARD 69kV BUS"  "BUS" "C"
        1 "BOULEVRD  69"  "CRESTWD    69" "1 "   1  0
        2 "BOULEVRD 138"  "BOULEVRD  69"  "1 "   1  0
        4 "BOULEVRD  69"  "10"  0
        0
Bus_BD69N "BORDER N 69 kV BUS"  "BUS" "C"
```

```
      1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
      1 "BORDER    69"  "LRKSP_BD  69"  "1 "  1 0
      3 "LRKSPBD1  13.80"    "1 "  0
      3 "LRKSPBD2  13.80"    "1 "  0
          0
Bus_BD69S "BORDER S 69 kV BUS"  "BUS" "C"
          1 "BORDER    69"  "BORDERTP  69"  "1 "   1  0
      1 "BORDER    69"  "CALPK_BD  69"  "1 "  1 0
      3 "CALPK_BD  13.80"    "1 "  0
          0
Bus_BO69  "BORREGO 69 kV BUS"  "BUS"  "C"
          1 "BORREGO   69"  "NARROWS   69"  "1 "   1  0
          1 "BORREGO   69"  "T337_HV   69"  "1 "   1  0
          2 "BORREGO   69"  "BORREGO   12.5"  "1 "   0
          2 "BORREGO   69"  "BORREGO   12.5"  "2 "   0
          3 "T337_G  0.21"  "T "  0
          0
Bus_BE69E "Bernardo 69kV E Bus"  "BUS" "C"
          1 "BERNARDO  69"  "R.CARMEL  69"  "1 "   1  0
          0
Bus_BQ138E "Batiquitos 138kV E Bus"  "BUS" "C"
          1 "BATIQTOS 138"  "SHADOWR  138"  "1 "   1  0
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          0
Bus_CN69 "Cameron 69kV Bus"  "BUS" "C"
          1 "BARRETT   69"  "CAMERON   69"  "1 "   1  0
          1 "CAMERNTP  69"  "CAMERON   69"  "1 "   1  0
          4 "CAMERON   69"  "10"   0
          0
Bus_CP138S "Capistrano 138kV S Bus"  "BUS" "C"
          1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
          1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
          0
Bus_CR69W "Coronado 69kV W Bus"  "BUS" "C"
          1 "NOISLMTR  69"  "CORONADO  69"  "1 "   1  0
          1 "CORONADO  69"  "B         69"  "1 "   1  0
          0
Bus_CRE69E "Creelman 69kV E Bus"  "BUS" "C"
          1 "CREELMAN  69"  "LOSCOCHS  69"  "1 "   1  0
          1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
          0
Bus_CSW69-E "Chollas E 69kV Bus"   "BUS" "C"
          1 "STREAMVW  69"  "CHOLLAS   69"  "1 "   1  0
          1 "PARADISE  69"  "CHOLLAS   69"  "1 "   1  0
          0
Bus_CSW69-W "Chollas W 69kV Bus"   "BUS" "C"
          1 "CHOLLAS   69"  "SWEETWTR  69"  "1 "   1  0
          1 "CHOLLAS   69"  "SPRNGVLY  69"  "1 "   1  0
          0
Bus_CW69  "CRESTWOOD 69 kV Bus"   "BUS" "C"
      1 "CRESTWD   69"  "KUMEYAAY  69"  "1 "  1 0
      3 "KUMEYAAY   0.69"    "1 "  0
      8 "BOULEVRD  69"
          4 "BOULEVRD  69"  "10"   0
          1 "BOULEVRD  69"  "CRESTWD   69"  "1 "   1  0
          0
Bus_DE69 "Descanso 69kV Bus"  "BUS" "C"
          1 "LOVELAND  69"  "DESCANSO  69"  "1 "   1  0
          1 "BLDCRKTP  69"  "DESCANSO  69"  "1 "   1  0
          1 "DESCANSO  69"  "GLNCLFTP  69"  "1 "   1  0
          4 "DESCANSO  69"  "10"   0
```

```
        0
Bus_DI69-W  "DIVISION W 69  kV Bus "  "BUS" "C"
        1 "DIVISION  69"  "SAMPSON   69"  "1 "   1  0
        1 "DIVISION  69"  "NAVSTMTR  69"  "2 "   1  0
        0
Bus_DI69-E  "DIVISION E 69  kV Bus "  "BUS" "C"
        1 "DIVISION  69"  "NAVSTMTR  69"  "1 "   1  0
        3 "DIVISION  69"  "1 "   0
        0
Bus_DM69E "Del Mar 69kV E Bus"  "BUS" "C"
        1 "DEL MAR   69"  "PENSQTOS  69"  "1 "   1  0
        1 "DEL MAR   69"  "PENSQTOS  69"  "2 "   1  0
        0
Bus_DM69W "Del Mar 69kV W Bus"  "BUS" "C"
        1 "ENCNITAS  69"  "DEL MAR   69"  "1 "   1  0
        1 "DEL MAR   69"  "DELMARTP  69"  "1 "   1  0
        0
Bus_EC69N "El Cajon 69kV N Bus"  "BUS" "C"
        1 "EL CAJON  69"  "LOSCOCHS  69"  "1 "   1  0
        1 "GARFIELD  69"  "EL CAJON  69"  "1 "   1  0
        1 "CALPK_EC  69"  "EL CAJON  69"  "1 "   1  0
        8 "CALPK_EC 13.8"
        0
Bus_EC69S "El Cajon 69kV S Bus"  "BUS" "C"
        1 "EL CAJON  69"  "GRANITE   69"  "1 "   1  0
        1 "EL CAJON  69"  "JAMACHA   69"  "1 "   1  0
        0
Bus_EL69N "Elliot 69kV N Bus"  "BUS" "C"
        1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
        1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
        0
Bus_ES69NW "Escondido 69kV NW Bus"  "BUS" "C"
        1 "ESCNDIDO  69"  "SANMRCOS  69"  "1 "   1  0
        1 "ESCNDIDO  69"  "ES GEN    69"  "1 "   1  0
        3 "ES GEN 13.8"
        0
Bus_ES69SW "Escondido 69kV SW Bus"  "BUS" "C"
        1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
        1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
        0
Bus_ES69NE "Escondido 69kV NE Bus"  "BUS" "C"
        1 "ESCNDIDO  69"  "FELCTATP  69"  "1 "   1  0
        1 "ESCNDIDO  69"  "ASH       69"  "1 "   1  0
        0
Bus_ES69SE "Escondido 69kV SE Bus"  "BUS" "C"
        1 "CALPK_ES  69"  "ESCNDIDO  69"  "1 "   1  0
        1 "ESCNDIDO  69"  "ASH       69"  "1 "   1  0
        1 "ESCNDIDO  69"  "ESCO      69"  "1 "   1  0
        8 "CALPK_ES 13.8"
        0
Bus_ESCO69N "ESCO 69 kV BUS " "BUS" "C"
        1 "ESCNDIDO  69"  "ESCO      69"  "1 "   1  0
        1 "ESCO      69"  "GOALLINE  69"  "1 "   1  0
        3 "GOALLINE  69"  "1 "  0
        0
Bus_FE69S "Felicita 69kV S Bus"  "BUS" "C"
        1 "ESCNDIDO  69"  "FELICITA  69"  "1 "   1  0
        1 "FELICITA  69"  "ASH   TP  69"  "1 "   1  0
        0
Bus_GA69 "GARFIELD 69 kV BUS"  "BUS" "C"
        1 "MURRAY    69"  "GARFIELD  69"  "1 "   1  0
```

```
        1 "GARFIELD  69"  "EL CAJON  69"  "1 "   1  0
        0
Bus_GE69S "Genesee 69kV S Bus"  "BUS" "C"
        1 "GENESEE   69"  "UCM      69"  "1 "   1  0
        #ISD 2014 mirasorrento sub
        #1 "MIRASNTO  69"  "GENESEE   69"  "1 "   1  0
        0
Bus_JM69N "Jamacha 69kV N Bus"  "BUS" "C"
        1 "JAMACHA   69"  "SPRNGVLY  69"  "1 "   1  0
        1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
        0
Bus_JM69S "Jamacha 69kV S Bus"  "BUS" "C"
        1 "EL CAJON  69"  "JAMACHA   69"  "1 "   1  0
        1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
        0
Bus_KY69E "Kearny 69kV E Bus"  "BUS" "C"
        1 "KEARNY    69"  "MISSION   69"  "1 "   1  0
        0
Bus_KY69W "Kearny 69kV W Bus"  "BUS" "C"
        1 "KEARNY    69"  "CLARMTTP  69"  "1 "   1  0
        0
Bus_LC69E "Los Coches 69kV E Bus"  "BUS" "C"
        1 "LOSCOCHS  69"  "GRANITTP  69"  "1 "   1  0
        1 "LOSCOCHS  69"  "ALPINE    69"  "1 "   1  0
        2 "LOSCOCHS 138"  "LOSCOCHS  69"  "2 "   0
        0
Bus_LC69W "Los Coches 69kV W Bus"  "BUS" "C"
        1 "CREELMAN  69"  "LOSCOCHS  69"  "1 "   1  0
        1 "EL CAJON  69"  "LOSCOCHS  69"  "1 "   1  0
        1 "LOSCOCHS  69"  "LOVELAND  69"  "1 "   1  0
        1 "LOSCOCHS  69"  "ELLIOTT   69"  "1 "   1  0
        2 "LOSCOCHS 138"  "LOSCOCHS  69"  "1 "   0
        0
Bus_LI69S "Lilac 69kV S Bus"  "BUS" "C"
        1 "ESCNDIDO  69"  "LILAC     69"  "1 "   1  0
        1 "RINCON    69"  "LILAC     69"  "1 "   1  0
        0
Bus_LL69 "Loveland 69kV Bus"  "BUS" "C"
        1 "LOVELAND  69"  "ALPINE    69"  "1 "   1  0
        1 "BARRETT   69"  "LOVELAND  69"  "1 "   1  0
        1 "LOSCOCHS  69"  "LOVELAND  69"  "1 "   1  0
        1 "LOVELAND  69"  "DESCANSO  69"  "1 "   1  0
        4 "LOVELAND  69"  "10"   0
        0
Bus_LP69 "Las Pulgas 69kV Bus"  "BUS" "C"
        1 "LASPULGS  69"  "HORNO TP  69"  "1 "   1  0
        1 "STUARTTP  69"  "LASPULGS  69"  "1 "   1  0
        4 "LASPULGS  69"  "10"   0
        0
Bus_MG69 "Montgomery 69kV Bus"  "BUS" "C"
        1 "BAY BLVD  69"  "MONTGMRY  69"  "1 "   1  0
        1 "MONTGMRY  69"  "MONTGYTP  69"  "1 "   1  0
        4 "MONTGMRY  69"  "10"   0
        0
Bus_ML69N "Miguel 69kV N Bus"  "BUS" "C"
        1 "MIGUEL    69"  "GRANITTP  69"  "1 "   1  0
        1 "MIGUEL    69"  "JAMACHA   69"  "2 "   1  0
        0
Bus_ML69S "Miguel 69kV S Bus"  "BUS" "C"
        1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
        1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
```

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          1 "MIGUELTP  69"  "MIGUEL    69"  "1 "   1  0
          1 "PARADISE  69"  "MIGUEL    69"  "1 "   1  0
          0
Bus_MN69 "Monserate 69kV S Bus"  "BUS" "C"
          1 "MONSRATE  69"  "MNSRATTP  69"  "1 "   1  0
          1 "MONSRATE  69"  "MORHILTP  69"  "1 "   1  0
          0
Bus_MR69E "Miramar 69kV E Bus"  "BUS" "C"
          1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
          1 "MIRAMAR   69"  "SCRIPPS   69"  "1 "   1  0
          0
Bus_MR69W "Miramar 69kV W Bus"  "BUS" "C"
          1 "MIRAMAR   69"  "FENTONTP  69"  "1 "   1  0
          1 "MESA RIM  69"  "MIRAMAR   69"  "1 "   1  0
          0
Bus_MRGT69 "Miramar1 (GT) 69kV Bus"  "BUS" "C"
          1 "MIRAMAR1  69"  "MIRAMRTP  69"  "1 "   1  0
          1 "MIRAMAR1  69"  "FENTONTP  69"  "1 "   1  0
          8 "MEF MR1   13.80"
          8 "MEF MR2   13.80"
          0
Bus_MS69N "Mission 69kV N Bus"  "BUS" "C"
          1 "KEARNY    69"  "MISSION   69"  "1 "   1  0
          1 "MISSION   69"  "CLAIRMNT  69"  "1 "   1  0
          1 "MISSION   69"  "F         69"  "2 "   1  0
          1 "MISSION   69"  "MURRAY    69"  "1 "   1  0
          0
Bus_MS69S "Mission 69kV S Bus"  "BUS" "C"
          1 "MESAHGTS  69"  "MISSION   69"  "1 "   1  0
          1 "MISSION   69"  "ELLIOTT   69"  "1 "   1  0
          1 "MISSION   69"  "F         69"  "1 "   1  0
          1 "MISSION   69"  "MURRAY    69"  "2 "   1  0
          2 "MISSION  138"  "MISSION   69"  "2 "   0
          0
Bus_MY69N "Murray 69kV N Bus"  "BUS" "C"
          1 "MISSION   69"  "MURRAY    69"  "1 "   1  0
          1 "MISSION   69"  "MURRAY    69"  "2 "   1  0
          0
Bus_NC69 "National City 69kV Bus"  "BUS" "C"
          1 "NATNLCTY  69"  "SWTWTRTP  69"  "1 "   1  0
          1 "NATNLCTY  69"  "SILVERGT  69"  "1 "   1  0
          4 "NATNLCTY  69"  "10"   0
          0
Bus_NSM69-W "NAVAL STA MTR W 69kV Bus"  "BUS" "C"
          1 "NAVSTMTR  69"  "SWTWTRTP  69"  "1 "   1  0
          1 "DIVISION  69"  "NAVSTMTR  69"  "2 "  1 0
          0
Bus_NW69 "NARROWS 69  kV BUS" "BUS" "C"
          1 "WARNERS   69"  "NARROWS   69"  "1 "   1  0
          1 "BORREGO   69"  "NARROWS   69"  "1 "   1  0
          4 "BORREGO   12.5"  "10"   0
          5 "NARROWS   69"    "b"    0
          6 "BORREGO   12.5"  "sd"   0
          0
#
# DELETED OS69 BUS OUTAGE DEFINITION  IT WAS A STUCK BREAKER DEFINITION
#
Bus_OV69 "OLIVENHAIN 69 kV BUS" "BUS" "C"
          1 "OMWD      69"  "Lkhodges  69"  "1 "   1  0
          1 "OMWD      69"  "ESCNDIDO  69"  "1 "   1  0
          4 "OMWD      69"  "10"   0
```

```
        0
Bus_OY69E "Otay 69kV E Bus"   "BUS" "C"
        1 "OTAY     69"  "OTAYLKTP  69"  "1 "   1  0
        1 "OTAY     69"  "OTAY  TP  69"  "1 "   1  0
        1 "BAY BLVD  69"  "OTAY     69"  "1 "   1  0
        1 "BAY BLVD  69"  "OTAY     69"  "2 "   1  0
        1 "OY GEN    69"  "OTAY     69"  "1 "   1  0
        8 "OY GEN   13.80"
        8 "OTAY     69"
        0
Bus_PA69 "PALA 69 kV BUS" "BUS" "C"
        1 "PALA     69"  "MNSRATTP  69"  "1 "   1  0
        1 "LILAC    69"  "PALA     69"  "1 "   1  0
        1 "PA99MW    69"  "PALA     69"  "1 "   1  0
        3 "PA99MWQ1 13.8"  "1 "  0
        3 "PA99MWQ2 13.8"  "1 "  0
        4 "PALA     69"  "10"   0
        0
Bus_PD69 "Paradise 69kV Bus"  "BUS" "C"
        1 "PARADISE  69"  "CHOLLAS   69"  "1 "   1  0
        1 "PARADISE  69"  "SUNYSDTP  69"  "1 "   1  0
        0
Bus_PL69E "Point Loma 69kV E Bus"  "BUS" "C"
        1 "OLD TOWN  69"  "POINTLMA  69"  "1 "   1  0
        1 "CABRILLO  69"  "POINTLMA  69"  "2 "   1  0
        0
Bus_PL69W "Point Loma 69kV W Bus"  "BUS" "C"
        1 "OLD TOWN  69"  "POINTLMA  69"  "2 "   1  0
        1 "CABRILLO  69"  "POINTLMA  69"  "1 "   1  0
        0
Bus_PO69 "Poway 69kV Bus"  "BUS" "C"
        1 "POWAY    69"  "WARCYNTP  69"  "1 "   1  0
        1 "POWAY    69"  "POMERADO  69"  "1 "   1  0
        0
Bus_POM69E "Pomerado 69kV E Bus"  "BUS" "C"
        1 "POWAY    69"  "POMERADO  69"  "1 "   1  0
        1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
        0
Bus_PQ69NE "Penasquitos 69kV NE Bus"  "BUS" "C"
        1 "PENSQTOS  69"  "MIRAMRTP  69"  "1 "   1  0
        1 "GENESEE   69"  "PENSQTOS  69"  "2 "   1  0
        6 "PENSQTOS  69"  "sd"  0
        0
Bus_PQ69NW "Penasquitos 69kV NW Bus"  "BUS" "C"
        1 "DEL MAR   69"  "PENSQTOS  69"  "1 "   1  0
        1 "MIRAMAR   69"  "PENSQTOS  69"  "1 "   1  0
        0
Bus_PQ69SE "Penasquitos 69kV SE Bus"  "BUS" "C"
        1 "PENSQTOS  69"  "EASTGATE  69"  "1 "   1  0
        1 "PENSQTOS  69"  "MESA RIM  69"  "1 "   1  0
        1 "PENSQTOS  69"  "TOREYPNS  69"  "1 "   1  0
        6 "PENSQTOS  69"  "sd"  0
        0
Bus_PQ69SW "Penasquitos 69kV SW Bus"  "BUS" "C"
        1 "PENSQTOS  69"  "DELMARTP  69"  "1 "   1  0
        1 "DEL MAR   69"  "PENSQTOS  69"  "2 "   1  0
        0
Bus_PV138 "Proctor Valley 138kV Bus"  "BUS" "C"
        1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
        1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
        4 "PRCTRVLY 138"  "10"   0
```

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        0
Bus_RIN69N "Rincon 69kV N Bus"  "BUS" "C"
        1 "RINCON    69"  "LILAC     69"  "1 "   1  0
        1 "WARNERS   69"  "RINCON    69"  "1 "   1  0
        0
Bus_RN69W "Rose Canyon 69kV W Bus"  "BUS" "C"
        1 "EASTGATE  69"  "ROSE CYN  69"  "1 "   1  0
        1 "LA JOLLA  69"  "ROSE CYN  69"  "1 "   1  0
        0
Bus_S69N "SAMPSON 69kV N Bus"  "BUS" "C"
        1 "SAMPSON   69"  "SILVERGT   69"  "2 "   1  0
        1 "SAMPSON   69"  "DIVISION  69"  "1 "   1  0
        0
Bus_SA69NW "San Luis Rey 69kV NW Bus"  "BUS" "C"
        1 "MELROSE   69"  "SANLUSRY  69"  "1 "   1  0
        1 "OCNSDETP  69"  "SANLUSRY  69"  "1 "   1  0
        0
Bus_SA69SW "San Luis Rey 69kV SW Bus"  "BUS" "C"
        1 "SANLUSRY  69"  "OCEANSDE  69"  "1 "   1  0
        1 "MELRSETP  69"  "SANLUSRY  69"  "1 "   1  0
        0
Bus_SH138E "Shadow Ridge 138kV East Bus"  "BUS" "C"
        1 "SHADOWR  138"  "CHCARITA 138"  "1 "   1  0
        1 "SHADOWR  138"  "BATIQTOS 138"  "1 "   1  0
        0
Bus_SH138W "Shadow Ridge 138kV West Bus"  "BUS" "C"
        1 "SHADOWR  138"  "ENCINA   138"  "1 "   1  0
        6 "SHADOWR  138"    "sd"  0
        0
Bus_SG69NE "SILVERGT 69kV NE Bus"  "BUS" "C"
        1 "SAMPSON   69"  "SILVERGT  69"  "2 "   1  0
        6 "SILVERGT  69"  "sd"  0
        0
Bus_SG69SE "SILVERGT 69kV SE Bus"  "BUS" "C"
        1 "SAMPSON   69"  "SILVERGT  69"  "1 "   1  0
        1 "SILVERGT  69"  "NATNLCTY  69"  "1 "   1  0
        0
Bus_SG69NW "SILVERGT 69kV NW Bus"  "BUS" "C"
        1 "CORONADO  69"  "SILVERGT   69"  "1 "   1  0
        1 "WABASH    69"  "SILVERGT   69"  "1 "   1  0
        0
Bus_SG69SW "SILVERGT 69kV SW Bus"  "BUS" "C"
        1 "B         69"  "SILVERGT   69"  "1 "   1  0
        6 "SILVERGT  69"  "sd"   0
        0
Bus_SW69 "Sweetwater 69kV Bus      "  "BUS" "C"
        1 "SWEETWTR  69"  "CHOLLAS   69"  "1 "   1  0
        1 "SWEETWTR  69"  "MIGUELTP  69"  "1 "   1  0
        1 "SWEETWTR  69"  "MONTGYTP  69"  "1 "   1  0
        1 "BAY BLVD  69"  "SWEETWTR  69"  "1 "   1  0
        1 "SWTWTRTP  69"  "SWEETWTR  69"  "1 "   1  0
        8 "SWEETWTR  69"
        4 "SWEETWTR  69"  "10"   0
        0
Bus_SX69S "Sycamore 69kV S Bus"  "BUS" "C"
        1 "ARTESN    69"  "SYCAMORE  69"  "1 "   1  0
        1 "SYCAMORE  69"  "ELLIOTT   69"  "1 "   1  0
        1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
        0
Bus_ST69 "Santa Ysabel 69kV Bus"  "BUS" "C"
        1 "WARNERS   69"  "SANTYSBL  69"  "1 "   1  0
```

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        1 "BLDCRKTP  69"  "SANTYSBL  69"  "1 "   1  0
        1 "SANTYSBL  69"  "CREELMAN  69"  "1 "   1  0
        4 "SANTYSBL  69"  "10"   0
        0
Bus_TB138S "Trabuco 138kV S Bus"  "BUS" "C"
        1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
        1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
        0
Bus_TP69N "TORREY PINES 69 kV BUS"  "BUS" "C"
        1 "TOREYPNS  69"  "DUNHILTP  69"  "1 "   1  0
        1 "TOREYPNS   69"  "UCM     69"  "1 "   1  0
        0
Bus_VC69 "Valycntr 69kV Bus"  "BUS" "C"
        1 "VALCNTR   69"  "ASH   TP  69"  "1 "   1  0
        1 "RINCON    69"  "VALCNTR   69"  "1 "   1  0
        4 "VALCNTR   69"  "10"   0
        0
Bus_WA69 "Wabash 69kV Bus"  "BUS" "C"
        1 "WABASH    69"  "SILVERGT   69"  "1 "   1  0
        1 "WABASH    69"  "STREAMVW  69"  "1 "   1  0
        4 "WABASH    69"  "10"   0
        0
Bus_WR69 "Warners 69kV Bus"  "BUS" "C"
        8 "NARROWS   69"
        8 "BORREGO   69"
        1 "NARROWS   69"  "WARNERS   69"  "1 "   1  0
        1 "WARNERS   69"  "RINCON    69"  "1 "   1  0
        1 "WARNERS   69"  "SANTYSBL  69"  "1 "   1  0
        4 "WARNERS   69"  "10"   0
        0
#####################################################################
# Cat C Stuck Breaker Contingencies
#####################################################################
# SDG&E Stuck Breaker Outages (Category C: Stuck Breaker)
# Note: Alphabetical Order
# Note: This section matches the Grid Operations stuck breaker list
#       used in the 2009-10 Contingency Reference Manual
#####################################################################
IV-8022 "IV 8022 50002 & BK81 CB"  "CB"  "C"
        1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
        2 "IMPRLVLY 230"  "IMPRLVLY 500"  "1 "   0
        0
IV-8032 "IV 8032 50001 & BK82 CB"  "CB"  "C"
        1 "IMPRLVLY 500"  "ECO   500"  "1 "   1  0
        2 "IMPRLVLY 230"  "IMPRLVLY 500"  "3 "   0
        3 "INTBCT    16.0"  "1 "  0
        3 "INTBST    18.0"  "1 "  0
        3 "IV GEN1   21.0"  "1 "  0
        3 "IV GEN2   18.0"  "1 "  0
        3 "IV GEN3   18.0"  "1 "  0
        3 "LRP-U1    16.0"  "1 "  0
        0
EA-1E  "ENCINA 230 kV 1E CB"  "CB" "C"
        2 "ENCINA   230"  "ENCINA   138"  "1 "  0
        1 "PENSQTOS 230"  "ENCINA   230"  "1 "  1 0
        0
EA-1T  "ENCINA 230 kV 1T CB"  "CB" "C"
        1 "PENSQTOS 230"  "ENCINA   230"  "1 "  1 0
        1 "ENCINATP 230"  "ENCINA   230"  "1 "  1 0
        0
EA-1W  "ENCINA 230 kV 1W CB"  "CB" "C"
```

```
          1 "ENCINATP 230"  "ENCINA   230"  "1 "  1 0
          3 "ENCINA 5  24"   "1 "   0
          0
EA-2E  "ENCINA 230 kV 2E CB"  "CB" "C"
          2 "ENCINA   230"  "ENCINA   138"  "1 "  0
          1 "PENSQTOS 230"  "ENCINA   230"  "2 "  1 0
          0
EA-2T  "ENCINA 230 kV 2T CB"  "CB" "C"
          1 "PENSQTOS 230"   "ENCINA   230"  "2 "  1  0
          3 "ENCINA 5  24"   "1 "   0
          0
EA-2W  "ENCINA 230 kV 2W CB"  "CB" "C"
          1 "ENCINA   230"  "SANLUSRY 230"  "1 "   1  0
          3 "ENCINA 5  24"  "1 "    0
          0
ES-1N  "ESCNDIDO 230 kV 1N CB" "CB" "C"
          2 "ESCNDIDO  69"  "ESCNDIDO 230"  "1 "  0
          1 "ESCNDIDO 230"  "TALEGA   230"  "1 "  1 0
         20 "ES-1N.p"
          0
ES-1S  "ESCNDIDO 230 kV 1S CB" "CB" "C"
          2 "ESCNDIDO  69"  "ESCNDIDO 230"  "2 "  0
          1 "PEN      230"  "ESCNDIDO 230"  "1 "  1 0
         20 "ES-1N.p"
          0
ES-1T  "ESCNDIDO 230 kV 1T CB" "CB" "C"
          1 "ESCNDIDO 230"  "TALEGA   230"  "1 "  1 0
          1 "PEN      230"  "ESCNDIDO 230"  "2 "  1 0
         20 "ES-1N.p"
          0
ES-2N  "ESCNDIDO 230 kV 2N CB" "CB" "C"
          2 "ESCNDIDO  69"  "ESCNDIDO 230"  "1 "  0
          2 "ESCNDIDO  69"  "ESCNDIDO 230"  "3 "  0
          0
ES-2S  "ESCNDIDO 230 kV 2S CB" "CB" "C"
          2 "ESCNDIDO  69"  "ESCNDIDO 230"  "2 "  0
          1 "PEN      230"  "ESCNDIDO 230"  "2 "  1 0
         20 "ES-1N.p"
          0
ES-2T  "ESCNDIDO 230 kV 2T CB" "CB" "C"
          2 "ESCNDIDO  69"  "ESCNDIDO 230"  "3 "  0
          1 "PEN      230"  "ESCNDIDO 230"  "2 "  1 0
          0
IV-11T "IV 11T CB BK80&IV-ROA" "CB" "C"
          2 "IMPRLVLY 230"  "IMPRLVLY 500"  "2 "  0
          1 "IMPRLVLY 230"  "ROA-230  230"  "1 "  1 0
          0
ML-2T  "MIGUEL 230 kV 2T CB" "CB" "C"
          2 "MIGUEL   230"  "MIGUEL   500"  "2 "  0
          1 "MIGUEL   230"  "SYCAMORE 230"  "1 "  1 0
          0
#
# IF TAP OPEN ON 23042 ONLY BK60 TRIPS
#
ML-7T-B   "MIGUEL 230 kV 7T B CB" "CB" "C"
          2 "MIGUEL   230"  "MIGUEL   138"  "2 "   1  0
          0
MS-1T  "MISSION 230 kV 1T CB" "CB" "C"
          2 "MISSION  230"  "MISSION  138"  "1 "  0
          1 "MISSION  230"  "OLDTWNTP 230"  "1 "  1  0
          0
```

```
MS-2T  "MISSION 230 kV 2T CB" "CB" "C"
          2 "MISSION  230"  "MISSION   69"  "1 "  0
          1 "OLD TOWN 230"  "MISSION  230"  "1 "  1 0
          0
MS-3T  "MISSION 230 kV 3T CB" "CB" "C"
          2 "MISSION  230"  "MISSION  138"  "2 "  0
          1 "SANLUSRY 230"  "MISSION  230"  "2 "  1 0
          0
#MS-5T  "MISSION 230 kV 5T CB" "CB" "C"
#         1 "MIGUEL   230"  "MISSION  230"  "1 "   1  0
#         1 "MIGUEL   230"  "MISSION  230"  "2 "   1  0
#         0
OT-1N "OLD TOWN 230 kV 1N CB" "CB" "C"
          2 "OLD TOWN  69"  "OLD TOWN 230"  "1 "  1 0
          1 "SILVERGT 230"  "OLD TOWN 230"  "1 "  1 0
          0
OT-1T "OLD TOWN 230 kV 1T CB" "CB" "C"
          1 "SILVERGT 230"  "OLD TOWN 230"  "1 "  1 0
          1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "  1 0
          1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "  1 0
          1 "MISSION  230"  "OLDTWNTP 230"  "1 "  1 0
          0
OT-1S "OLD TOWN 230 kV 1S CB" "CB" "C"
          2 "OLD TOWN  69"  "OLD TOWN 230"  "2 "  1 0
          1 "OLD TOWN 230"  "OLDTWNTP 230"  "1 "  1 0
          1 "SILVERGT 230"  "OLDTWNTP 230"  "1 "  1 0
          1 "OLDTWNTP 230"  "MISSION  230"  "1 "  1 0
          0
OT-2N  "OLD TOWN 230 kV 2N CB" "CB" "C"
          1 "PENSQTOS 230"  "OLD TOWN 230"  "1 "  1 0
          2 "OLD TOWN  69"  "OLD TOWN 230"  "1 "  0
          0
OT-2S  "OLD TOWN 230 kV 2S CB" "CB" "C"
          2 "OLD TOWN  69"  "OLD TOWN 230"  "2 "  0
          1 "OLD TOWN 230"  "MISSION  230"  "1 "  1 0
          0
OT-2T  "OLD TOWN 230 kV 2T CB" "CB" "C"
          1 "PENSQTOS 230"  "OLD TOWN 230"  "1 "  1 0
          1 "OLD TOWN 230"  "MISSION  230"  "1 "  1 0
          0
SA-1T  "SANLUSRY 230 kV 1T CB" "CB" "C"
          1 "SANLUSRY 230"  "S.ONOFRE 230"  "1 "   1  0
          1 "SANLUSRY 230"  "S.ONOFRE 230"  "2 "   1  0
          0
SA-2T  "SANLUSRY 230 kV 2T CB" "CB" "C"
          2 "SANLUSRY  69"  "SANLUSRY 230"  "1 "  0
          1 "SANLUSRY 230"  "MISSION  230"  "1 "  1 0
          0
SA-3T  "SANLUSRY 230 kV 3T CB" "CB" "C"
          1 "SANLUSRY 230"  "S.ONOFRE 230"  "3 "  1 0
          1 "SANLUSRY 230"  "ENCINA   230"  "1 "   1  0
          0
SA-4T  "SANLUSRY 230 kV 4T CB" "CB" "C"
          2 "SANLUSRY  69"  "SANLUSRY 230"  "3 "  0
          1 "ENCINATP 230"  "SANLUSRY 230"  "1 "   1  0
          0
SA-5T  "SANLUSRY 230 kV 5T CB" "CB" "C"
          2 "SANLUSRY 230"  "SANLUSRY  69"  "2 "  0
          1 "SANLUSRY 230"  "MISSION  230"  "2 "  1 0
          0
SX-21T "SYCAMORE 230 kV 21T CB" "CB" "C"
```

```
          1 "PEN      230"  "SYCAMORE 230"  "1 "   1  0
          1 "SUNCREST 230"  "SYCAMORE 230"  "1 "   1  0
          0
SX-22T "SYCAMORE 230 kV 22T CB" "CB" "C"
          1 "SUNCREST 230"  "SYCAMORE 230"  "2 "   1  0
          1 "MIGUEL   230"  "SYCAMORE 230"  "1 "   1  0
          0
TA-1W "TALEGA 230 kV 1W CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          1 "TALEGA   230"  "S.ONOFRE 230"  "2 "  1 0
          0
TA-1T "TALEGA 230 kV 1T CB" "CB" "C"
          1 "TALEGA   230"  "S.ONOFRE 230"  "2 "  1 0
          6 "TALEGA   230"  "sd" 0
          0
TA-1E "TALEGA 230 kV 1E CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          6 "TALEGA   230"  "sd" 0
          0
TA-2E "TALEGA 230 kV 2E CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          1 "ESCNDIDO 230"  "TALEGA   230"  "1 "  1 0
          0
TA-2T "TALEGA 230 kV 2T CB" "CB" "C"
          1 "TALEGA   230"  "S.ONOFRE 230"  "1 "  1 0
          1 "ESCNDIDO 230"  "TALEGA   230"  "1 "  1 0
          0
TA-2W  "TALEGA 230 kV 2W CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          1 "TALEGA   230"  "S.ONOFRE 230"  "1 "  1 0
          0
TA-4E  "TALEGA 230 kV 4E CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "3 "  0
          0
TA-4T  "TALEGA 230 kV 4T CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "3 "  0
          2 "TALEGA   230"  "TALEGA   138"  "2 "  0
          0
TA-4W  "TALEGA 230 kV 4W CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "2 "  0
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          0
##############################################################################
#    STUCK CIRCUIT BREAKERS (138 kV)                                         #
##############################################################################
#
# POST SUNRISE TL13811 NOT CONNECTED TO ES 138 kV
#
#ES50-1N  "ESCONDIDO 50 138 kV  CB" "CB" "C"
#          2 "ESCNDO50 138"  "ESCNDIDO  69"  "2 "  0
#          1 "SHADOWR  138"  "ESCNDO50 138"  "1 "  1 0
#          0
CC-BT   "CHICARITA 138 kV BT CB"  "CB"  "C"
          1 "SYCAMORE 138"  "CHCARITA 138"  "1 "   1  0
          1 "SHADOWR  138"  "CHCARITA 138"  "1 "   1  0
          0
LC-1N  "LOSCOCHS 138 kV 1N CB" "CB" "C"
          2 "LOSCOCHS 138"  "LOSCOCHS  69"  "1 "  0
          1 "LOSCOCHS 138"  "SANTEE   138"  "1 "  1 0
          0
```

```
LC-1S  "LOSCOCHS 138 kV 1S CB" "CB" "C"
          2 "LOSCOCHS  69"  "LOSCOCHS 138"  "2 "  0
          1 "LOSCOCHS 138"  "SANTEE   138"  "1 "  1 0
          0
LC-4N  "LOSCOCHS 138 kV 4N CB" "CB" "C"
          2 "LOSCOCHS 138"  "LOSCOCHS  69"  "1 "   0
          1 "LOSCOCHS 138"  "ML60 TAP 138"  "1 "   1  0
          1 "ML60 TAP 138"  "TELECYN  138"  "1 "   1  0
          1 "ML60 TAP 138"  "MIGUEL60 138"  "1 "   1  0
          0
LC-4S  "LOSCOCHS 138 kV 4S CB" "CB" "C"
          2 "LOSCOCHS  69"  "LOSCOCHS 138"  "2 "  0
          1 "LOSCOCHS 138"  "ML60 TAP 138"  "1 "   1  0
          1 "ML60 TAP 138"  "TELECYN  138"  "1 "   1  0
          1 "ML60 TAP 138"  "MIGUEL60 138" "1 "   1  0
          0
PQ-6N  "PENSQTOS 138 kV 6N CB" "CB" "C"
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "BATIQTP  138"  "PENSQTOS 138"  "1 "   1  0
          1 "ENCINA   138"  "BATIQTP  138"  "1 "   1  0
          1 "DOUBLET  138"  "DOUBLTTP 138"  "1 "   1  0
          1 "FRIARS   138"  "DOUBLTTP 138"  "1 "   1  0
          1 "DOUBLTTP 138"  "PENSQTOS 138"  "1 "   1  0
          0
#
#PQ-6S  13807 CONSUMED BY NEW 23053 EA-PQ #2
#
TA-5E  "TALEGA 138 kV 5E CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "3 "  0
          0
TA-5T  "TALEGA 138 kV 5T CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "3 "  0
          2 "TALEGA   230"  "TALEGA   138"  "2 "  0
          0
TA-5W  "TALEGA 138 kV 5W CB" "CB" "C"
          2 "TALEGA   138"  "TALEGA    69"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "2 "  0
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          0
TA-6T  "TALEGA 138 kV 6T CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          1 "TALEGA   138"  "SANMATEO 138"  "1 "  1 0
          0
TA-6W  "TALEGA 138 kV 6W CB" "CB" "C"
          2 "TALEGA    69"  "TALEGA   138"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          1 "TALEGA   138"  "SANMATEO 138"  "1 "  1 0
          0
TA-7T  "TALEGA 138 kV 7T CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          1 "TALEGA   138"  "TRABUCO  138"  "1 "  1 0
          0
TA-7W  "TALEGA 138 kV 7W CB" "CB" "C"
          2 "TALEGA    69"  "TALEGA   138"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          1 "TALEGA   138"  "TRABUCO  138"  "1 "  1 0
          0
TA-8E  "TALEGA 138 kV 8E CB" "CB" "C"
          2 "TALEGA   230"  "TALEGA   138"  "1 "  0
          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "  1 0
```

```
          0
TA-8T  "TALEGA 138 kV 8T CB" "CB" "C"
          1 "TALEGA   138"  "R.MSNVJO 138"  "1 "  1 0
          1 "TALEGA   138"  "PICO     138"  "1 "  1 0
          0
TA-8W  "TALEGA 138 kV 8W CB" "CB" "C"
          2 "TALEGA    69"  "TALEGA   138"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          1 "TALEGA   138"  "PICO     138"  "1 "  1 0
          0
TA-BK50  "TALEGA 138 kV BK50 CB" "CB" "C"
          2 "TALEGA    69"  "TALEGA   138"  "1 "  0
          2 "TALEGA   230"  "TALEGA   138"  "4 "  0
          0
TB-CB    "TRABUCO 138 kV 13830 or13834 CB" "CB" "C"
          1 "MARGARTA 138"  "TRABUCO  138"  "1 "  1 0
          1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "  1 0
          0
##########################################################################
#     STUCK CIRCUIT BREAKERS (69 kV)
##########################################################################
EG-BT  "EASTGATE 69 kV   CB"  "CB" "C"
          1 "EASTGATE  69"  "ROSE CYN  69"  "1 "   1  0
          1 "EASTGATE  69"  "PENSQTOS  69"  "1 "   1  0
          8 "EASTGATE  69"
          0
LKHD69 "LKHODGES 69 kV BT" "BUS" "C"
          1 "Lkhodges  69"  "OMWD      69"  "1 "   1  0
          1 "Lkhodges  69"  "BERNDOTP  69"  "1 "   1  0
          3 "LkHodG1  13.8"  "1 "  0
          3 "LkHodG2  13.8"  "1 "  0
          0
##########################################################
# SDG&E 69kV 138kV N-3 Bus Outages
# (69kV 138kV Entire Yard Outages)
# (Category C)
##########################################################
Sub_BE69EW "Bernardo 69kV E+W Bus" "SUB" "C"
          1 "BERNARDO  69"  "R.CARMEL  69"  "1 "   1  0
          1 "BERNARDO  69"  "FELCTATP  69"  "1 "   1  0
          1 "BERNARDO  69"  "ARTESN    69"  "1 "   1  0
          4 "BERNARDO  69"  "10" 0
          0
Sub_BQ-BT  "BATIQTOS 138 kV BT CB" "SUB" "C"
          1 "BATIQTOS 138"  "BATIQTP  138"  "1 "   1  0
          1 "BATIQTOS 138"  "SHADOWR  138"  "1 "   1  0
          1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
          0
Sub_CAN_BT "CANNON    138 kV BT CB" "SUB" "C"
          1 "CANNON   138"  "ENCINA   138"  "1 "   1  0
          1 "CANNON   138"  "SANLUSRY 138"  "1 "   1  0
          0
Sub_CH_BT  "CARLTNHS  138 kV BT CB" "SUB" "C"
          1 "MISSION  138"  "CARLTNHS 138"  "1 "   1  0
          1 "SYCAMORE 138"  "CARLTNHS 138"  "1 "   1  0
          0
Sub_CP_BT  "CAPSTRNO  138 kV BT CB" "SUB" "C"
          1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
          1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
          1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
          6 "CAPSTRNO 138"  "sd" 0
```

```
        0
############################################################
# ISD 2016
# M-SOCRP
# Delete Sub_RMV_BT replace with the following contingency
############################################################
#Sub_CP_BT  "CAPSTRNO  138 kV BT CB" "SUB" "C"
#         1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
#         1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
#         1 "CAPSTRNO 138"  "TRABUCO  138"  "2 "   1  0
#         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
#         1 "CAPSTRNO 138"  "LAGNA NL 138"  "2 "   1  0
#         1 "TALEGA   138"  "CAPSTRNO 138"  "1 "   1  0
#         6 "CAPSTRNO 138"  "sd" 0
#         0
Sub_FR_BT  "FRIARS 138 kV BT CB" "SUB" "C"
         1 "DOUBLTTP 138"  "FRIARS   138"  "1 "   1  0
         1 "FRIARS   138"  "MISSION  138"  "1 "   1  0
         0
Sub_GHL_BT "GRNT HLL 138kV BT CB" "SUB" "C"
         1 "GRNT HLL 138"  "TELECYN  138"  "1 "   1  0
         1 "MISSION  138"  "GRNT HLL 138"  "1 "   1  0
         0
Sub_LNL_BT "LAGUNA NIGUEL 138kV CB" "SUB" "C"
         1 "SANMATEO 138"  "TA TAP   138"  "1 "   1  0
         1 "TA TAP   138"  "LAGNA NL 138"  "1 "   1  0
         1 "TALEGA   138"  "TA TAP   138"  "1 "   1  0
         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
         0
############################################################
# ISD 2016
# M-SOCRP
# Delete Sub_RMV_BT replace with the following contingency
############################################################
#Sub_LNL_BT "LAGUNA NIGUEL 138kV  BT CB" "SUB" "C"
#         1 "CAPSTRNO 138"  "LAGNA NL 138"  "1 "   1  0
#         1 "CAPSTRNO  138" "LAGNA NL 138"  "2 "   1  0
#         0
Sub_MAR_BT "MARGARITA 138kV BT CB " "SUB" "C"
         1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
         1 "R.MSNVJO 138"  "MARGARTA 138"  "1 "   1  0
         0
Sub_PAR_BT "PALOMAR 138kV   BT CB " "SUB" "C"
         1 "PALOMAR  138"  "BATIQTOS 138"  "1 "   1  0
         1 "ENCINA   138"  "PALOMAR  138"  "1 "   1  0
         6 "PALOMAR  138"  "sd"  0
         0
Sub_PI_BT  "PICO 138kV      BT CB " "SUB" "C"
         1 "TALEGA   138"  "PICO     138"  "1 "   1  0
         1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
         0
Sub_PV_BT  "PRCTRVLY 138kV   BT CB" "SUB" "C"
         1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
         1 "PRCTRVLY 138"  "MIGUEL   138"  "1 "   1  0
         0
Sub_SN_BT  "SANTEE  138kV    BT CB" "SUB" "C"
         1 "LOSCOCHS 138"  "SANTEE   138"  "1 "   1  0
         1 "SYCAMORE 138"  "SANTEE   138"  "1 "   1  0
         0
Sub_SH_BT  "SHADOWR 138kV    BT CB" "SUB" "C"
         1 "SHADOWR  138"  "CHCARITA 138"  "1 "   1  0
```

```
            1 "SHADOWR  138"  "BATIQTOS 138"  "1 "   1  0
            1 "ENCINA   138"  "SHADOWR  138"  "1 "   1  0
            0
Sub_SMO_BT "SAN MATEO 138kV BT CB " "SUB" "C"
            1 "SANMATEO 138"  "TA TAP   138"  "1 "   1  0
            1 "TA TAP   138"  "LAGNA NL 138"  "1 "   1  0
            1 "TALEGA   138"  "TA TAP   138"  "1 "   1  0
            1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
            0
############################################################
# ISD 2016
# M-SOCRP
# Delete Sub_SMO_BT replace with the following contingency
############################################################
#Sub_SMO_BT "SAN MATEO 138kV BT CB " "SUB" "C"
#           1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
#           1 "TALEGA   138"  "SANMATEO 138"  "2 "   1  0
#           0
Sub_SX    "SYCAMORE STUCK 32S OR 32T OR 33T " "SUB" "C"
            1 "SYCAMORE 138"  "CHCARITA 138"  "1 "   1  0
            1 "SYCAMORE 138"  "SANTEE   138"  "1 "   1  0
            2 "SYCAMORE 230"  "SYCAMORE 138"  "1 "   0
            0
Sub_TC_BT  "TELECYN 138kV BT CB  " "SUB" "C"
            1 "PRCTRVLY 138"  "TELECYN  138"  "1 "   1  0
            1 "GRNT HLL 138"  "TELECYN  138"  "1 "   1  0
            6 "TELECYN  138"  "sd" 0
            0
Sub_TB_BT  "TRABUCO 138kV BT CB  " "SUB" "C"
            1 "MARGARTA 138"  "TRABUCO  138"  "1 "   1  0
            1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
            1 "CAPSTRNO 138"  "TRABUCO  138"  "1 "   1  0
            0
############################################################
# SDG&E Generating Station Outages
# (Category D)
############################################################
Gen_SONGSS  "SONGS unit2/3  22"  "G-2" "C"
            3 "S.ONOFR2  22"    "2 "  0
            3 "S.ONOFR3  22"    "3 "  0
            0
############################################################
#
# SPS's
#
############################################################
# NEED TO ADD SPS MODS HERE FOR CLUSTER 1-2 PHASE II
################################################################
# SPS 6.1 500kV IV-ML and IV Generator SPS (protects CFE TJI-ROA 230kV)
#
# Note:  Below contingency may or may not solve if running a post contingency
# epcl which redispatches generation
#IV-ECO_NOSPS "IMPRLVLY - ECO NO SPS" "N-1" "B"
#           1 "IMPRLVLY 500" "ECO 500" "1 " 1  0
#           0
IV-ECO_SPS "IMPRLVLY - ECO SPS" "N-1" "B"
            1 "IMPRLVLY 500" "ECO 500" "1 " 1  0
            20 "C12_1150a.p"
            0
ECO-ML_SPS "ECO - ML SPS" "N-1" "B"
            1 "MIGUEL 500" "ECO 500" "1 " 1  0
```

```
            20 "C12_1150a.p"
            0
ECO-ML_23050  "ECO-ML + TL 23050"  "N-1" "B"
            1  "MIGUEL 500"  "ECO   500"  "1 "  1 0
            1  "IMPRLVLY 230"  "ROA-230  230"  "1 "  1 0
            0
SRPL/SWPL_SPS "IV-ECO + IV-C493 SPS" "N-2" "C"
            1 "IMPRLVLY 500" "ECO 500" "1 " 1  0
            1 "IMPRLVLY 500" "C493 500" "1 " 1  0
            20 "C12_1400a.p"
            0
#################################################################
#SPS6.5G "ML BK80/81              SPS6.5G"  "T-1" "B"
#           2 "MIGUEL   230"  "MIGUELMP 500"  "1 "  0
#           2 "MIGUEL    12"  "MIGUELMP 500"  "1 "  0
#           2 "MIGUEL   500"  "MIGUELMP 500"  "1 "  0
#           1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
#           0
SPS6.6A "ML BK80/81 w/IV-NG + 1150 MW"  "T-1" "B"
            2 "MIGUEL   230"  "MIGUELMP 500"  "1 "  0
            2 "MIGUEL    12"  "MIGUELMP 500"  "1 "  0
            2 "MIGUEL   500"  "MIGUELMP 500"  "1 "  0
            1 "N.GILA   500"  "IMPRLVLY 500"  "1 "   1  0
            20 "C12_1150a.p"
            0
#################################################################
# 6.6. 230kV TL 23040  Otay Mesa – Tijuana SPS
# SPS6.6             230 kV TL 23040 Miguel - Tijuana SPS
# Not enabled during summer months May-Sept
# IV-ML open at either end & 23040 loads above 800 MVA
#50001/23040a  "SWPL TL23050 SPS6.6"  "N-1" "B"
#           1  "IMPRLVLY 500"  "MIGUEL   500"  "1 "  1 0
#           1  "IMPRLVLY 230"  "ROA-230  230"  "1 "  1 0
#           0
#################################################################
# 6.12. 69kV TL 649 SPS
#################################################################
SPS6.12A  "TL649 SPS6.12A          ck 1"  "N-1" "B"
       1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
            3 "CALPK_BD  13.80"  "1 "   0
#           3 "LRKSPBD1  13.80"  "1 "   0
#           3 "LRKSPBD2  13.80"  "1 "   0
            0
SPS6.12B  "TL649 SPS6.12B          ck 1"  "N-1" "B"
       1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
            3 "CALPK_BD  13.80"  "1 "   0
            3 "LRKSPBD1  13.80"  "1 "   0
#           3 "LRKSPBD2  13.80"  "1 "   0
            0
SPS6.12C  "TL649 SPS6.12C          ck 1"  "N-1" "B"
       1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
            3 "CALPK_BD  13.80"  "1 "   0
            3 "LRKSPBD1  13.80"  "1 "   0
            3 "LRKSPBD2  13.80"  "1 "   0
            0
#################################################################
# SPS8.1. 69kV TL 633 at RCL
#################################################################
SPS8.1A "RCL S. BUS OUTAGE 648  SPS8.1A"  "N-1" "B"
            1 "POWAY     69"  "R.CARMEL  69"  "1 "   1  0
            4 "R.CARMEL  69"  "10" 0
```

```
        0
#SPS8.1B "6915 & 6924 N-2  trip RC load SPS8.1B"  "N-1" "B"
#         1 "POMERADO  69"  "SYCAMORE  69"  "1 "   1  0
#         1 "POMERADO  69"  "SYCAMORE  69"  "2 "   1  0
#         4 "R.CARMEL  69"  "10" 0
#         0
##############################################################
# SPS8.2. 69kV TL 695A at TA for N-2 23007/52
##############################################################
SPS8.2 "23007/07 N-2 TRIP 695    SPS8.2"  "N-2" "C"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         1 "TALEGA    69"  "TALEGATP  69"  "1 "   1  0
         0
##############################################################
# SPS8.3 69kV TL 643
##############################################################
SPS8.3 "Bus_ML69S TRIP ML BK71  SPS8.3"  "BUS" "C"
         1 "MIGUEL    69"  "BORDER    69"  "1 "   1  0
         1 "MIGUEL    69"  "JAMACHA   69"  "1 "   1  0
         1 "MIGUELTP  69"  "MIGUEL    69"  "1 "   1  0
         1 "PARADISE  69"  "MIGUEL    69"  "1 "   1  0
         2 "MIGUEL    69"  "MIGUEL   230"  "2 "  0
         0
##############################################################
# SPS8.4. 138kV TL 13812
##############################################################
SPS8.4A "13816/33 N-2 TRIP 13812 SPS8.4A"  "N-2" "C"
         1 "CAPSTRNO 138"  "PICO     138"  "1 "   1  0
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
         0
SPS8.4B "13833/36 N-2 TRIP 13812 SPS8.4B"  "N-2" "C"
         1 "TALEGA   138"  "TRABUCO  138"  "1 "   1  0
         1 "TALEGA   138"  "PICO     138"  "1 "   1  0
         1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
         0
SPS8.4C "13831/36 N-2 TRIP 13812 SPS8.4C"  "N-2" "C"
         1 "TALEGA   138"  "R.MSNVJO 138"  "1 "   1  0
         1 "TALEGA   138"  "PICO     138"  "1 "   1  0
         1 "TALEGA   138"  "SANMATEO 138"  "1 "   1  0
         0
##############################################################
NIPR1   "23052/07/30 OC area             "  "COR" "D"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
         0
##############################################################
# For new NIPR requirements  contingency #331:
#   Outage of all 230kV lines feeding OC area  plus outage of
#   TL690C  OC Tap-STU .
# By the outage of all these lines   OC area is islanded.
##############################################################
NIPR2   "23052/07/30/690C OC Area        "  "COR" "D"
         1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
         1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
         1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
         1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
         0
##############################################################
```

```
# For new NIPR requirements  contingency #332:
#   Outage of two of three 230kV lines feeding OC area  plus outage of
#   TL690C  OC Tap-STU .
# OC area is now connected to rest of the system through TL23030
#   Escondido-Talega.
##############################################################
NIPR3   "23052/07/690C OC Area          "  "COR" "D"
            1 "TALEGA   230"  "S.ONOFRE 230"  "1 "   1  0
            1 "TALEGA   230"  "S.ONOFRE 230"  "2 "   1  0
#           1 "ESCNDIDO 230"  "TALEGA   230"  "1 "   1  0
            1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
            0
##############################################################
# For new NIPR requirements  contingency #333:
#   Outage of all TA 230/69 banks  plus outage of
#   TL690C  OC Tap-STU .
# Outage of these devices dumps the entire OC area load and
#   leaves the 230 kV lines connected with the
#   OC area and rest of the system.
##############################################################
NIPR4   "TA 230/69 banks and TL690C      "  "COR" "D"
            1 "OCNSDETP  69"  "STUARTTP  69"  "1 "   1  0
            2 "TALEGA   230"  "TALEGA   138"  "1 "   1  0
            2 "TALEGA   230"  "TALEGA   138"  "2 "   1  0
            2 "TALEGA   230"  "TALEGA   138"  "3 "   1  0
            2 "TALEGA   230"  "TALEGA   138"  "4 "   1  0
            0
-1
first element type:

   0 = end of contingency
  -1 = end of all Contingencies
   1 = Change line (secdd) status
   2 = Change tran status (tran)
   3 = Change gen status (if status    1  change generation = P)
   4 = Change load status(if status    1  change load = P  const pf)
   5 = Change shunt status
   6 = Change SVD status
   7 = reorder
   8 = isolate a bus
  11 = change dc converter status
  20 = run an epcl for a complex outage
##############################################################
#
# SPECIAL PROTECTION SYSTEMS (FOR CATEGORY B Contingencies)
#
# The below SPS Contingencies simply trip multiple units all at once to estimate
# a sequential tripping scheme.  This will be good enough in most instances.
# However the most realistic SPS Contingencies would solve the case after each
# step of the SPS has passed for example re-solving after each IV Gen
# unit is tripped for SPS6.1. If you desire to model to this level of detail make
# an epcl file to simply solve the case (the single line of code "@ret= soln()"
# will work).  Then insert like this after every step you want solved:
#                               1  "IMPRLVLY 500"  "MIGUEL   500"  "1 "  1 0
#                               20 <filename w/o extension>
#                               3  "LRP-U1    16"    "1 "  0
```

Appendix G

Short Circuit Results

SHORT CIRCUIT STUDY: DUTY VIOLATIONS

Date of Compilation: 7/20/2011

Total Breaker Duty Percentages (>100%): 360

			C1-2 Ph II Pre 7-12-11 SCE		C1-2 Ph II Pst 7-20-11 SCE	
BUS	**BREAKER**	**BKR_CAPA**	**Duty (A)**	**Duty (%)**	**Duty (A)**	**Duty (%)**
CP138 138.kV	CP13816	18000	24,319.0	135.1	24,336.8	135.2
	CP13834	21000	24,248.4	115.5	24,266.1	115.6
	CP13837	21000	24,542.7	116.9	24,560.9	117.0
	CPBT	21000	24,195.5	115.2	24,213.0	115.3
DI 69.kV	DI BK31	40000	42,790.1	107.0	43,184.7	108.0
	DI606	44000	45,628.5	103.7	46,021.6	104.6
	DI6901	40000	41,532.2	103.8	41,929.4	104.8
	DI6950	40000	41,878.2	104.7	42,239.7	105.6
EA138 138.kV	EA1 102E	40000	41,705.7	104.3	41,865.9	104.7
	EA1 102W	40000	41,705.7	104.3	41,865.9	104.7
	EA13804 7E	40000	41,705.7	104.3	41,865.9	104.7
	EA13804 7W	40000	41,705.7	104.3	41,865.9	104.7
	EA13806 5E	40000	40,596.1	101.5	40,742.2	101.9
	EA2 206E	40000	41,705.7	104.3	41,865.9	104.7
	EA2 206W	40000	41,705.7	104.3	41,865.9	104.7
	EA3 309E	40000	41,705.7	104.3	41,865.9	104.7
	EA3 309W	40000	41,705.7	104.3	41,865.9	104.7
	EA4 411E	40000	41,705.7	104.3	41,865.9	104.7
	EA4 411W	40000	41,705.7	104.3	41,865.9	104.7
	EA-AUXBK 8E	40000	41,705.7	104.3	41,865.9	104.7
	EA-AUXBK 8W	40000	41,705.7	104.3	41,865.9	104.7
	EAGT1 4E	40000	41,705.7	104.3	41,865.9	104.7
	EAGT1 4W	40000	41,705.7	104.3	41,865.9	104.7
	EA-GT4 10E	40000	41,705.7	104.3	41,865.9	104.7
	EA-GT4 10W	40000	41,705.7	104.3	41,865.9	104.7
EC3031 12.5kV	EC BK30	20000	27,365.4	136.8	27,338.6	136.7
	EC BK31	23121	27,365.4	118.4	27,338.6	118.2
	EC C547	20000	27,365.4	136.8	27,338.6	136.7
	EC C552	23121	27,365.4	118.4	27,338.6	118.2
	EC C555	25000	27,365.4	109.5	27,338.6	109.4
	EC C71	25000	27,365.4	109.5	27,338.6	109.4
	EC C72	23121	27,365.4	118.4	27,338.6	118.2
	EC C74	23121	27,365.4	118.4	27,338.6	118.2
	EC C77	23121	27,365.4	118.4	27,338.6	118.2
EL 69.kV	EL636	21000	21,566.4	102.7	21,693.9	103.3

			C1-2 Ph II Pre 7-12-11 SCE		C1-2 Ph II Pst 7-20-11 SCE	
BUS	**BREAKER**	**BKR_CAPA**	**Duty (A)**	**Duty (%)**	**Duty (A)**	**Duty (%)**
ES 69.kV	ES30	40000	47,747.6	119.4	47,872.6	119.7
	ES31	40000	47,747.6	119.4	47,872.6	119.7
	ES32 16N	40000	47,747.6	119.4	47,872.6	119.7
	ES50 6N	40000	47,747.6	119.4	47,872.6	119.7
	ES50 6S	40000	47,747.6	119.4	47,872.6	119.7
	ES679 9S	40000	47,562.5	118.9	47,684.5	119.2
	ES684 5N	40000	45,245.1	113.1	45,354.0	113.4
	ES688 1S	40000	46,857.1	117.1	46,976.5	117.4
	ES6908 13S	40000	45,292.0	113.2	45,397.1	113.5
	ES6930 7N	40000	52,088.3	130.2	52,224.6	130.6
	ES6930 7S	40000	52,088.3	130.2	52,224.6	130.6
	ES6933 2N	40000	45,944.2	114.9	46,071.9	115.2
	ES6934 12S	40000	49,834.5	124.6	49,974.3	124.9
	ES696 18S	40000	47,716.0	119.3	47,840.3	119.6
	ES70 3N	40000	47,747.6	119.4	47,872.6	119.7
	ES70 3S	40000	47,747.6	119.4	47,872.6	119.7
	ES71 14N	40000	47,747.6	119.4	47,872.6	119.7
	ES71 14S	40000	47,747.6	119.4	47,872.6	119.7
	ES72 8N	40000	47,747.6	119.4	47,872.6	119.7
	ES72 8S	40000	52,088.3	130.2	52,224.6	130.6
	ESGNDBK 19N	40000	47,747.6	119.4	47,872.6	119.7
	ESGNDBK 19S	40000	47,747.6	119.4	47,872.6	119.7
	ESNBT 10N	40000	47,747.6	119.4	47,872.6	119.7
	ESSBT 10S	40000	47,747.6	119.4	47,872.6	119.7
KE 69.kV	KE609	31500	33,755.5	107.2	34,107.9	108.3
KY 69.kV	KY30	29000	29,358.9	101.2	29,542.6	101.9
LC 69.kV	LCW32	21000	22,582.8	107.5	22,811.4	108.6
ME 69.kV	ME32	12500	19,578.5	156.6	19,598.7	156.8
	ME33	12500	19,578.5	156.6	19,598.7	156.8
	MEBT	8367	15,691.0	187.5	15,700.5	187.6
MG 69.kV	MG30	29000	31,021.7	107.0	31,406.8	108.3
	MG31	29000	31,021.1	107.0	31,406.1	108.3
	MG642	27000	28,549.9	105.7	28,878.9	107.0

			C1-2 Ph II Pre 7-12-11 SCE		C1-2 Ph II Pst 7-20-11 SCE	
BUS	**BREAKER**	**BKR_CAPA**	**Duty (A)**	**Duty (%)**	**Duty (A)**	**Duty (%)**
MS 69.kV	MS30 6S	40000	47,179.6	117.9	48,022.0	120.1
	MS31 6N	40000	47,179.6	117.9	48,022.0	120.1
	MS32 5N	40000	47,179.6	117.9	48,022.0	120.1
	MS33 8S	40000	47,179.6	117.9	48,022.0	120.1
	MS50 3N	40000	47,179.6	117.9	48,022.0	120.1
	MS50 3S	40000	47,179.6	117.9	48,022.0	120.1
	MS51 7S	40000	47,179.6	117.9	48,022.0	120.1
	MS52 9N	40000	47,179.6	117.9	48,022.0	120.1
	MS52 9S	40000	47,179.6	117.9	48,022.0	120.1
	MS618 11N	40000	46,109.7	115.3	46,918.8	117.3
	MS619 10S	40000	46,133.5	115.3	46,943.4	117.4
	MS653 2S	40000	47,179.6	117.9	48,022.0	120.1
	MS654 1N	40000	47,179.6	117.9	48,022.0	120.1
	MS663 10N	40000	45,700.8	114.3	46,530.2	116.3
	MS671 11S	40000	43,102.3	107.8	43,838.4	109.6
	MS676 1S	40000	45,754.9	114.4	46,586.4	116.5
	MS70 4N	40000	47,179.6	117.9	48,022.0	120.1
	MS70 4S	40000	47,179.6	117.9	48,022.0	120.1
PQ 69.kV	PQ50 5N	42000	48,748.6	116.1	49,115.7	116.9
	PQ50 5S	42000	48,748.6	116.1	49,115.7	116.9
	PQ51 10N	38000	48,748.6	128.3	49,115.7	129.3
	PQ51 10S	42000	48,748.6	116.1	49,115.7	116.9
	PQ52 3N	40000	48,748.6	121.9	49,115.7	122.8
	PQ52 3S	38000	48,748.6	128.3	49,115.7	129.3
	PQ610	40000	44,721.9	111.8	45,114.4	112.8
	PQ662 12S	42000	48,745.1	116.1	49,112.2	116.9
	PQ664 13N	40000	42,484.2	106.2	42,795.2	107.0
	PQ665 15N	40000	48,748.6	121.9	49,115.7	122.8
	PQ665 15S	40000	48,748.6	121.9	49,115.7	122.8
	PQ666 2S	40000	48,742.1	121.9	49,109.2	122.8
	PQ675 13S	42000	47,862.2	114.0	48,221.6	114.8
	PQ6905 12N	42000	48,742.7	116.1	49,109.8	116.9
	PQ6906 2N	38000	47,850.5	125.9	48,209.8	126.9
	PQ6952 1N	42000	48,748.6	116.1	49,115.7	116.9
	PQ6952 1S	42000	48,748.6	116.1	49,115.7	116.9
	PQ70 7N	40000	44,727.5	111.8	45,120.0	112.8
	PQ70 7S	40000	44,727.5	111.8	45,120.0	112.8
	PQ71 14N	38000	48,748.6	128.3	49,115.7	129.3
	PQ71 14S	40000	48,748.6	121.9	49,115.7	122.8
	PQNBT	38000	48,748.6	128.3	49,115.7	129.3
	PQSBT	42000	48,748.6	116.1	49,115.7	116.9

			C1-2 Ph II Pre 7-12-11 SCE		C1-2 Ph II Pst 7-20-11 SCE	
BUS	**BREAKER**	**BKR_CAPA**	**Duty (A)**	**Duty (%)**	**Duty (A)**	**Duty (%)**
PQ138 138.kV	PQ13810 6N	21000	31,750.7	151.2	32,002.2	152.4
	PQ13810 6S	21000	31,750.7	151.2	32,002.2	152.4
	PQ50 3N	21000	31,750.7	151.2	32,002.2	152.4
	PQ50 3S	21000	31,750.7	151.2	32,002.2	152.4
RN 69.kV	RN600 5W	12600	24,652.9	195.7	24,772.6	196.6
	RN661 3W	21000	24,652.9	117.4	24,772.6	118.0
S 69.kV	S32	40000			40,069.5	100.2
	S33	40000			40,069.5	100.2
SA 69.kV	SA 9N	40000	43,845.1	109.6	43,951.7	109.9
	SA 9S	40000	43,845.1	109.6	43,951.7	109.9
	SA33	40000	43,845.1	109.6	43,951.7	109.9
	SA34	40000	43,845.1	109.6	43,951.7	109.9
	SA35	40000	43,845.1	109.6	43,951.7	109.9
	SA36 10S	40000	43,845.1	109.6	43,951.7	109.9
	SA51 2N	38000	47,831.0	125.9	47,947.3	126.2
	SA51 2S	38000	47,831.0	125.9	47,947.3	126.2
	SA680	40000	43,161.0	107.9	43,264.9	108.2
	SA690 1N	40000	43,816.7	109.5	43,923.2	109.8
	SA6912	40000	43,314.7	108.3	43,421.2	108.6
	SA693	40000	43,725.0	109.3	43,831.3	109.6
	SA694	40000	43,725.1	109.3	43,831.4	109.6
	SA697 1S	40000	43,832.9	109.6	43,939.5	109.8
	SA70 5N	40000	43,845.1	109.6	43,951.7	109.9
	SA70 5S	40000	43,845.1	109.6	43,951.7	109.9
	SA71 6N	38000	47,831.0	125.9	47,947.3	126.2
	SA71 6S	40000	43,845.1	109.6	43,951.7	109.9
	SAGNDBK	40000	43,845.1	109.6	43,951.7	109.9
SA230KV 230.kV	SA23001 2E	40000	44,235.0	110.6	44,733.3	111.8
	SA23001 2T	40000	44,235.0	110.6	44,733.3	111.8
	SA23002 1W	40000	44,235.0	110.6	44,733.3	111.8
	SA23003 3T	40000	44,235.0	110.6	44,733.3	111.8
	SA23003 3W	40000	44,235.0	110.6	44,733.3	111.8
	SA23004 5E	40000	44,235.0	110.6	44,733.3	111.8
	SA23004 5T	40000	44,235.0	110.6	44,733.3	111.8
	SA23006 1E	40000	44,235.0	110.6	44,733.3	111.8
	SA23006 1T	40000	44,235.0	110.6	44,733.3	111.8
	SA23010 2W	40000	44,235.0	110.6	44,733.3	111.8
	SA23011 4T	40000	44,235.0	110.6	44,733.3	111.8
	SA23011 4W	40000	44,235.0	110.6	44,733.3	111.8
	SA71 5W	40000	44,235.0	110.6	44,733.3	111.8
	SA72 4E	40000	44,235.0	110.6	44,733.3	111.8
	SA73 3E	40000	44,235.0	110.6	44,733.3	111.8

			C1-2 Ph II Pre 7-12-11 SCE		C1-2 Ph II Pst 7-20-11 SCE	
BUS	**BREAKER**	**BKR_CAPA**	**Duty (A)**	**Duty (%)**	**Duty (A)**	**Duty (%)**
SO230 230.kV	SO23002 4162	63000	63,331.5	100.5	63,655.2	101.0
	SO23002 6162	63000	63,331.5	100.5	63,655.2	101.0
	SO23006 4142	63000	63,331.5	100.5	63,655.2	101.0
	SO23006 6142	63000	63,331.5	100.5	63,655.2	101.0
	SO23007 4122	63000	63,331.5	100.5	63,655.2	101.0
	SO23007 6122	63000	63,331.5	100.5	63,655.2	101.0
	SO23010 4182	63000	63,331.5	100.5	63,655.2	101.0
	SO23010 6182	63000	63,331.5	100.5	63,655.2	101.0
	SO23052 4132	63000	63,331.5	100.5	63,655.2	101.0
	SO23052 6132	63000	63,331.5	100.5	63,655.2	101.0
SX 69.kV	SX6916 5N	40000	40,406.6	101.0	40,871.1	102.2
	SX6916 5S	40000	40,406.6	101.0	40,871.1	102.2
	SX6917 2N	40000	40,406.6	101.0	40,871.1	102.2
	SX6917 2S	40000	40,406.6	101.0	40,871.1	102.2
	SX6920	40000	40,041.8	100.1	40,502.7	101.3
	SX70 4N	40000	40,406.6	101.0	40,871.1	102.2
	SX70 4S	40000	40,406.6	101.0	40,871.1	102.2
	SX71 11N	40000	40,406.6	101.0	40,871.1	102.2
	SX71 11S	40000	40,406.6	101.0	40,871.1	102.2
	SX72 XXN	40000	40,406.6	101.0	40,871.1	102.2
	SX72 XXS	40000	40,406.6	101.0	40,871.1	102.2
	SXCAPBK1 7N	40000	40,406.6	101.0	40,871.1	102.2
	SXCAPBK2 9S	40000	40,406.6	101.0	40,871.1	102.2
TJCFE 230.kV					27% Increase from Pre-C1C2	

Appendix H-1

Transient Stability Switching Sequences

Pre Heavy Summer & Light Load

```
RUN
*
*   Flat Run


RUN
*
*   Imperial Valley - C493 500kV Line Out
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*  CC  DRP 700
*
*   Fault bus at SunCrest
FB  0.0  "SUNCREST" 500
*
*   Flash SWPL capacitors
*
*  FC  0.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*  FC  0.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  FC  0.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 1
*
*
*   Clear fault bus at Central
*
CFB 4.0  "SUNCREST" 500
*
*   Trip C493 - SunCrest 500kV
*
DL  8.0  "C493" 500. "SUNCREST" 500. "1 "
*
*
RUN
*
*
*   Loss of Valley - Devers Line
*
*  CC cards for post-transient only
*
*
FB 0.0 "DEVERS  " 500
*
*  FC  0.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 2
*  FC  0.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 4
*
*   Readjust Northwest SVC's
*  CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
*  CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*  CC  RG  0.0 "DALLES 3"  13.8 "1 "  180. -270.
*
*
```

```
*
*  CLEAR FAULT
*
CFB 4.0 "DEVERS  " 500
*
*  REMOVE DEVERS - VALLEY 500 KV LINE
*
DL 4.0 "DEVERS  " 500. "VALLEYSC" 500. "1 "
*
*  RC  4.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 2
*  RC  4.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 4
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*  Add SVC's at Marketplace and Adelanto
*
*  CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
*  CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
RUN
*   Hassyampa - North Gila 500kV Line Out
*   3-phase 4 cycle fault at North Gila
*   No SC bypass
*   Fault bus at North Gila
*
FB  0.0  "N.GILA  " 500.
*
*   Flash SWPL capacitors
*
*  FC  0.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*  FC  0.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  FC  0.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 1
*
*   Readjust Northwest SVC's
*  CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
*  CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*  CC  RG  0.0 "DALLES 3"  13.8 "1 "  180. -270.
*
*
*   Clear fault bus at North Gila
*
CFB 4.0  "N.GILA  " 500.
*
*   Trip Hassyampa - North Gila 500kV line
*
DL  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 "
*
*   Reinsert remaining SWPL capacitors
```

```
*
*  RC  4.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*
*
*   Readjust SCE's Devers SVCs
*
*MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
*MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*  Add SVC's at Marketplace and Adelanto
*
*  CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
*  CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
RUN
*   Imperial Valley - North Gila 500kV Line Out
*   3-phase 4 cycle fault at North Gila
*   No SC bypass
*   Fault bus at North Gila
*
FB  0.0  "N.GILA  " 500.
*
*   Clear fault bus at North Gila
*
CFB 4.0  "N.GILA  " 500.
*
*   Trip Imperial Valley - North Gila line
*
DL  4.0  "HDWSH" 500. "N.GILA  " 500. "1 "
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
RUN
*
*   Imperial Valley - C493 500kV Line Out
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY" 500
*
*   Flash SWPL capacitors
*
*  FC  0.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*  FC  0.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  FC  0.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 1
*
*
```

```
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500
*
*   Trip Imperial Valley - C493 line
*
DL  4.0  "IMPRLVLY" 500. "C493" 500. "1 "
*
*
*
* SPS to drop 1150 MW
*
*DL  4  "IMPRLVLY" 230. "Q124" 230. "1 "
*
TG 4 "Q1242A1Q"  0.48  "Q1"
TG 4 "Q1242A2Q"  0.48  "Q2"
TG 4 "Q1242B1Q"  0.48  "Q3"
TG 4 "Q1243A1Q"  0.48  "Q4"
TG 4 "Q1243A2Q"  0.48  "Q5"
TG 4 "Q1243B1Q"  0.48  "Q6"
*
*DL  4  "IMPRLVLY" 230. "Q78"  230. "1 "
*
TG 4 "Q78_1A1Q"          0.48     "Q1"
TG 4 "Q78_1A2Q"          0.48     "Q2"
TG 4 "Q78_1B1Q"          0.48     "Q3"
*
*DL  4  "IMPRLVLY" 230. "C510" 230. "1 "
*
TG 4 "C510_G1"     0.20     "C1"
TG 4 "C510_G2"     0.20     "C1"
*
*DL  4  "IMPRLVLY" 230. "T429_HB" 230. "1 "
*
TG 4 "T429_G1"    13.80     "T "
*
TG   8 "C590_G1"  0.26 "C2"
*
RUN
*
*   Imperial Valley - ECO 500kV Line1 Out
*   Drop IV Gens
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Inmperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
```

```
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - ECO line1
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   IV Renewable Generation - 1,150 MW maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
```

```
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley - ECO 500kV Line1 Out
*   With Cross Trip RAS
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - ECO line1
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   IV Renewable Generation - 1,150 MW Maximum
*
```

```
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
```

```
*   Trip 23050
*
DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley - ECO 500kV Line Out
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*  CC  DRP 700
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - ECO line1
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley-C493-ECO 500 kV Double line outage
*   Drop IV Gens + additional gens (total 1400MW)
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY  " 500.
```

```
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY  " 500.
*
*   Trip Imperial Valley - C493 line
*   Trip Imperial Valley - ECO line
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
DL  4.0  "IMPRLVLY" 500. "C493" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*  Trip IV Renewable Generation - 1,400 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "T183_G2 "   0.69 "T"
TG   8.0 "T429_G1 "  13.80 "T"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
```

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MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley-C493-ECO 500 kV Double line outage
*   Drop IV Gens + additional gens (total 1400MW)
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Miguel
FB  0.0  "IMPRLVLY  " 500.
*
*   Clear fault bus at Miguel
*
CFB 4.0  "IMPRLVLY " 500.
*
*   Trip Imperial Valley - C493 line
*   Trip Imperial Valley - ECO line
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
DL  4.0  "IMPRLVLY" 500. "C493" 500. "1 "
*
*
```

```
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   Trip IV Renewable Generation - 1,400 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "T183_G2 "   0.69 "T"
TG   8.0 "T429_G1 "  13.80 "T"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
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MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050 winter, Trip 23040 summer
*
DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley-La Rosita 230 kV SLO
*   3-phase 4 cycle fault at IMPRLVLY 230 kV bus
*
FB  0.0  "IMPRLVLY" 230.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 230.
*
*   Trip Imperial Valley – La Rosita line
*
DL  4.0  "IMPRLVLY" 230. "ROA-230 " 230. "1"
*
RUN
*
*   Imperial Valley-La Rosita 230 kV SLO
*   3-phase 4 cycle fault at ROA 230 kV bus
*
FB  0.0  "ROA-230 " 230.
*
*   Clear fault bus at Imperial Valley
*
CFB 6.0  "ROA-230 " 230.
*
*   Trip Imperial Valley – La Rosita line
*
DL  6.0  "IMPRLVLY" 230. "ROA-230 " 230. "1"
*
RUN
*   HASSYAMP-MESQUITE 500kV Line Out
*   3-phase 4 cycle fault at HASSYAMP
*   No SC bypass
*   Fault bus at HASSYAMP
```

```
*
FB  0.0  "HASSYAMP  " 500.
*
*   Clear fault bus at Hassyampa
*
CFB 4.0  "HASSYAMP  " 500.
*
*   Trip HASSYAMP-MESQUITE 500kV line
*
DL  4.0  "HASSYAMP" 500. "MESQUITE" 500. "2 "
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
RUN
*
*   MIguel - ECO 500kV Line Out
*   Drop IV Gens
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Miguel
FB  0.0  "MIGUEL  " 500.
*
*   Clear fault bus at Miguel
*
CFB 4.0  "MIGUEL  " 500.
*
*   Trip Miguel to ECO 500kV
*
DL  4.0  "ECO     " 500. "MIGUEL  " 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   IV Renewable Generation - 1,150 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
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TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
```

```
RUN
*
*   Miguel - ECO 500kV Line Out
*   With Cross Trip RAS
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Miguel
FB  0.0  "MIGUEL  " 500.
*
*   Clear fault bus at Miguel
*
CFB 4.0  "MIGUEL  " 500.
*
*   Trip Miguel - ECO line
*
DL  4.0  "ECO     " 500. "MIGUEL  " 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   IV Renewable Generation - 1,150 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
```

```
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*

RUN
*
*   Imperial MIGUEL - MISSION 230  kV DLO
*   3-phase 4 cycle fault at MIGUEL 230 kV bus
*
FB  0.0  "MIGUEL " 230.
*
*   Clear fault bus at MIGUEL
*
CFB 4.0  "MIGUEL" 230.
*
*   Trip both MIGUEL - MISSION 230  kV lines
*
DL  4.0  "MIGUEL" 230. "MISSION" 230. "1"
DL  4.0  "MIGUEL" 230. "C565" 230. "1"
```

```
*
*  Trip IV Renewable Generation - 1,400 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "T183_G2 "   0.69 "T"
TG   8.0 "T429_G1 "  13.80 "T"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
```

```
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
RUN
*   Hassyampa - North Gila 500kV Line Out
*   3-phase 4 cycle fault at North Gila
*   No SC bypass
*   Fault bus at North Gila
*
FB  0.0  "N.GILA  " 500.
*
*   Clear fault bus at North Gila
*
CFB 4.0  "N.GILA  " 500.
*
*   Trip North Gila - Imperial Valley 500kV line
*
DL  4.0  "N.GILA" 500. "IMPRLVLY  " 500. "1 "
RUN
*
*   SYCAMORE - MLSXTAP - MIGUEL 230 kV DLO
*   3-phase 6 cycle fault at SYCAMORE  230 kV bus
*
*
FB  0.0  "SYCAMORE " 230.
*
*   Clear fault bus at Sycamore Canyon
*   SX TL23021 CB 22T is an OCB (6.0 cycles to clear fault)
*
CFB 6.0  "SYCAMORE " 230.
*
*   Trip OM-MLTAP-SX AND ML-SX (SX-C565) 230 kV lines
*
DL  6.0  "SYCAMORE" 230. "C565   " 230. "1"
DL  6.0  "SYCAMORE" 230. "MLSXTAP" 230. "1"
DL  6.0  "OTAYMESA" 230. "MLSXTAP" 230. "1"
DL  6.0  "MIGUEL  " 230. "MLSXTAP" 230. "1"
*
*   RAS to trip 1,400 MW Maximum IV Renewable Generation may
*   necessary if TL13826 (ML-PV) is overloaded
*


RUN
*
*   OTAYMESA - MLMS3TAP, MLMS3TAP - SY230 230 kV
*   OTAYMESA - SY230 230 KV
*   3-phase 4 cycle fault at OTAYMESA 230 kV bus
*
FB  0.0  "OTAYMESA" 230.
*
*   Clear fault bus at OTAYMESA
```

```
*
CFB 4.0  "OTAYMESA" 230.
*
*   Trip OTAYMESA - SY230 lines
*
DL  4.0  "OTAYMESA" 230. "MLMS3TAP" 230. "1"
DL  4.0  "SY230   " 230. "MLMS3TAP" 230. "1"
DL  4.0  "MIGUEL  " 230. "MLMS3TAP" 230. "1"
DL  4.0  "SY230   " 230. "OTAYMESA" 230. "1"

RUN
*   Paloverde - Colorado River 500kV Line Out
*   3-phase 4 cycle fault at Paloverde
*   No SC bypass
*   Fault bus at Paloverde
*
FB  0.0  "PALOVRDE" 500.
*
*   Clear fault bus at North Gila
*
CFB 4.0  "PALOVRDE" 500.
*
*   Trip Plaoverde - Colorado River 500kV line
*
DL  4.0  "PALOVRDE" 500. "COLRIVER" 500. "1 "
*
*
```

Appendix H-2

Transient Stability Switching Sequences

Post Heavy Summer & Light Load

```
RUN
*
*   Flat Run

RUN
*
*   Imperial Valley - C493 500kV Line Out
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*  CC  DRP 700
*
*   Fault bus at SunCrest
FB  0.0  "SUNCREST" 500
*
*   Flash SWPL capacitors
*
*  FC  0.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*  FC  0.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  FC  0.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 1
*
*
*   Clear fault bus at Central
*
CFB 4.0  "SUNCREST" 500
*
*   Trip C493 - SunCrest 500kV
*
DL  8.0  "C493" 500. "SUNCREST" 500. "1 "
*
*
RUN
*
*
*   Loss of Valley - Devers Line
*
*  CC cards for post-transient only
*
*
FB 0.0 "DEVERS  " 500
*
*  FC  0.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 2
*  FC  0.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 4
*
*   Readjust Northwest SVC's
*  CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
*  CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*  CC  RG  0.0 "DALLES 3"  13.8 "1 "  180. -270.
*
*
*
*  CLEAR FAULT
```

```
*
CFB 4.0 "DEVERS  " 500
*
*  REMOVE DEVERS - VALLEY 500 KV LINE
*
DL 4.0 "DEVERS  " 500. "VALLEYSC" 500. "1 "
*
*  RC  4.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 2
*  RC  4.0 "PALOVRDE" 500. "DEVERS  " 500. "1 " 4
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*  Add SVC's at Marketplace and Adelanto
*
*  CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
*  CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
RUN
*   Hassyampa - North Gila 500kV Line Out
*   3-phase 4 cycle fault at North Gila
*   No SC bypass
*   Fault bus at North Gila
*
FB  0.0  "N.GILA  " 500.
*
*   Flash SWPL capacitors
*
*  FC  0.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*  FC  0.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  FC  0.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 1
*
*   Readjust Northwest SVC's
*  CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
*  CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*  CC  RG  0.0 "DALLES 3"  13.8 "1 "  180. -270.
*
*
*   Clear fault bus at North Gila
*
CFB 4.0  "N.GILA  " 500.
*
*   Trip Hassyampa - North Gila 500kV line
*
DL  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 "
*
*   Reinsert remaining SWPL capacitors
*
*  RC  4.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
```

```
*
*
*   Readjust SCE's Devers SVCs
*
*MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
*MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*  Add SVC's at Marketplace and Adelanto
*
*  CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
*  CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
RUN
*   Imperial Valley - North Gila 500kV Line Out
*   3-phase 4 cycle fault at North Gila
*   No SC bypass
*   Fault bus at North Gila
*
FB  0.0  "N.GILA  " 500.
*
*   Clear fault bus at North Gila
*
CFB 4.0  "N.GILA  " 500.
*
*   Trip Imperial Valley - North Gila line
*
DL  4.0  "HDWSH" 500. "N.GILA  " 500. "1 "
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
RUN
*
*   Imperial Valley - C493 500kV Line Out
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY" 500
*
*   Flash SWPL capacitors
*
*  FC  0.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*  FC  0.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  FC  0.0  "IMPRLVLY" 500. "MIGUEL  " 500. "1 " 1
*
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500
*
```

```
*   Trip Imperial Valley - C493 line
*
DL  4.0  "IMPRLVLY" 500. "C493" 500. "1 "
*
*
*
* SPS to drop 1150 MW
*
*DL  4  "IMPRLVLY" 230. "Q124" 230. "1 "
*
TG 4 "Q1242A1Q"  0.48  "Q1"
TG 4 "Q1242A2Q"  0.48  "Q2"
TG 4 "Q1242B1Q"  0.48  "Q3"
TG 4 "Q1243A1Q"  0.48  "Q4"
TG 4 "Q1243A2Q"  0.48  "Q5"
TG 4 "Q1243B1Q"  0.48  "Q6"
*
*DL  4  "IMPRLVLY" 230. "Q78"  230. "1 "
*
TG 4 "Q78_1A1Q"          0.48     "Q1"
TG 4 "Q78_1A2Q"          0.48     "Q2"
TG 4 "Q78_1B1Q"          0.48     "Q3"
*
*DL  4  "IMPRLVLY" 230. "C510" 230. "1 "
*
TG 4 "C510_G1"     0.20     "C1"
TG 4 "C510_G2"     0.20     "C1"
*
*DL  4  "IMPRLVLY" 230. "T429_HB" 230. "1 "
*
TG 4 "T429_G1"    13.80     "T "
*
TG   8 "C590_G1"  0.26 "C2"
*
RUN
*
*   Imperial Valley - ECO 500kV Line1 Out
*   Drop IV Gens
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Inmperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - ECO line1
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
```

```
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   IV Renewable Generation - 1,150 MW maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
```

```
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley - ECO 500kV Line1 Out
*   With Cross Trip RAS
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - ECO line1
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   IV Renewable Generation - 1,150 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
```

```
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
```

```
RUN
*
*   Imperial Valley - ECO 500kV Line Out
*   3-phase 4 cycle fault at Imperial Valley
*   No SC bypass
*
*  CC  DRP 700
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY" 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 500.
*
*   Trip Imperial Valley - ECO line1
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley-C493-ECO 500 kV Double line outage
*   Drop IV Gens + additional gens (total 1400MW)
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Imperial Valley
FB  0.0  "IMPRLVLY  " 500.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY  " 500.
*
*   Trip Imperial Valley - C493 line
*   Trip Imperial Valley - ECO line
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
```

```
DL  4.0  "IMPRLVLY" 500. "C493" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*  Trip IV Renewable Generation - 1,400 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "T183_G2 "   0.69 "T"
TG   8.0 "T429_G1 "  13.80 "T"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
```

```
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley-C493-ECO 500 kV Double line outage
*   Drop IV Gens + additional gens (total 1400MW)
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Miguel
FB  0.0  "IMPRLVLY  " 500.
*
*   Clear fault bus at Miguel
*
CFB 4.0  "IMPRLVLY " 500.
*
*   Trip Imperial Valley - C493 line
*   Trip Imperial Valley - ECO line
*
DL  4.0  "IMPRLVLY" 500. "ECO" 500. "1 "
DL  4.0  "IMPRLVLY" 500. "C493" 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   Trip IV Renewable Generation - 1,400 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "T183_G2 "   0.69 "T"
```

```
TG   8.0 "T429_G1 "  13.80 "T"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050 winter, Trip 23040 summer
*
DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
```

```
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Imperial Valley-La Rosita 230 kV SLO
*   3-phase 4 cycle fault at IMPRLVLY 230 kV bus
*
FB  0.0  "IMPRLVLY" 230.
*
*   Clear fault bus at Imperial Valley
*
CFB 4.0  "IMPRLVLY" 230.
*
*   Trip Imperial Valley – La Rosita line
*
DL  4.0  "IMPRLVLY" 230. "ROA-230 " 230. "1"
*
RUN
*
*   Imperial Valley-La Rosita 230 kV SLO
*   3-phase 4 cycle fault at ROA 230 kV bus
*
FB  0.0  "ROA-230 " 230.
*
*   Clear fault bus at Imperial Valley
*
CFB 6.0  "ROA-230 " 230.
*
*   Trip Imperial Valley – La Rosita line
*
DL  6.0  "IMPRLVLY" 230. "ROA-230 " 230. "1"
*
RUN
*   HASSYAMP-MESQUITE 500kV Line Out
*   3-phase 4 cycle fault at HASSYAMP
*   No SC bypass
*   Fault bus at HASSYAMP
*
FB  0.0  "HASSYAMP  " 500.
*
*   Clear fault bus at Hassyampa
*
CFB 4.0  "HASSYAMP  " 500.
*
*   Trip HASSYAMP-MESQUITE 500kV line
*
DL  4.0  "HASSYAMP" 500. "MESQUITE" 500. "2 "
*
*   Readjust SCE's Devers SVCs
*
```

```
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
RUN
*
*   MIguel - ECO 500kV Line Out
*   Drop IV Gens
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Miguel
FB  0.0  "MIGUEL  " 500.
*
*   Clear fault bus at Miguel
*
CFB 4.0  "MIGUEL  " 500.
*
*   Trip Miguel to ECO 500kV
*
DL  4.0  "ECO     " 500. "MIGUEL  " 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   IV Renewable Generation - 1,150 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
```

```
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
*  DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*
RUN
*
*   Miguel - ECO 500kV Line Out
*   With Cross Trip RAS
*   3-phase 4 cycle fault at Miguel
*   No SC bypass
*
CC  DRP 700
*
*   Fault bus at Miguel
FB  0.0  "MIGUEL  " 500.
*
*   Clear fault bus at Miguel
*
CFB 4.0  "MIGUEL  " 500.
```

```
*
*   Trip Miguel - ECO line
*
DL  4.0  "ECO     " 500. "MIGUEL  " 500. "1 "
*
*
*   Readjust SCE's Devers SVCs
*
CC MSV 0.0 "DEVRSVC1" 500.0 "1 "  549. -100.
CC MSV 0.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   IV Renewable Generation - 1,150 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
```

```
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
*
*   Trip 23050
*
DL  120.0  "IMPRLVLY" 230. "ROA-230 " 230. "1 "
*
*   Reinsert remaining SWPL capacitors
*  RC  4.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*  RC  4.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 3
*

RUN
*
*   Imperial MIGUEL - MISSION 230  kV DLO
*   3-phase 4 cycle fault at MIGUEL 230 kV bus
*
FB  0.0  "MIGUEL " 230.
*
*   Clear fault bus at MIGUEL
*
CFB 4.0  "MIGUEL" 230.
*
*   Trip both MIGUEL - MISSION 230  kV lines
*
DL  4.0  "MIGUEL" 230. "MISSION" 230. "1"
DL  4.0  "MIGUEL" 230. "C565" 230. "1"
*
*  Trip IV Renewable Generation - 1,400 MW Maximum
*
TG   8.0 "C510_G1  "  0.20 "C1"
TG   8.0 "C510_G2  "  0.20 "C1"
TG   8.0 "Q159A_G1 "  0.69 "Q1"
TG   8.0 "T183_G2 "   0.69 "T"
TG   8.0 "T429_G1 "  13.80 "T"
TG   8.0 "Q78_1A1Q"  0.48. "Q1"
TG   8.0 "Q78_1A2Q"  0.48. "Q2"
TG   8.0 "Q78_1B1Q"  0.48. "Q3"
TG   8.0 "Q1242A1Q"  0.48. "Q1"
TG   8.0 "Q1242A2Q"  0.48. "Q2"
TG   8.0 "Q1242B1Q"  0.48. "Q3"
TG   8.0 "Q1243A1Q"  0.48. "Q4"
TG   8.0 "Q1243A2Q"  0.48. "Q5"
TG   8.0 "Q1243B1Q"  0.48. "Q6"
```

```
*
*   Trip applicable Q78 shunts
MBS  8.0 "Q78_1B1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1B1Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A2Q"  34.5 "b3" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b1" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b2" "D"
MBS  8.0 "Q78_1A1Q"  34.5 "b3" "D"
MBS  8.0 "Q78     "  230. "b1" "D"
MBS  8.0 "Q78     "  230. "b2" "D"
MBS  8.0 "Q78     "  230. "b3" "D"
MBS  8.0 "Q78     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b7" "D"
MBS  8.0 "Q124     "  230. "b6" "D"
MBS  8.0 "Q124     "  230. "b5" "D"
MBS  8.0 "Q124     "  230. "b4" "D"
MBS  8.0 "Q124     "  230. "b3" "D"
MBS  8.0 "Q124     "  230. "b2" "D"
MBS  8.0 "Q124     "  230. "b1" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1242B1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A1Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b3" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243A2Q     "  34.5 "b1" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b2" "D"
MBS  8.0 "Q1243B1Q     "  34.5 "b1" "D"
RUN
*   Hassyampa - North Gila 500kV Line Out
*   3-phase 4 cycle fault at North Gila
*   No SC bypass
*   Fault bus at North Gila
*
FB  0.0  "N.GILA  " 500.
*
*   Clear fault bus at North Gila
*
CFB 4.0  "N.GILA  " 500.
*
*   Trip North Gila - Imperial Valley 500kV line
*
```

```
DL  4.0  "N.GILA" 500. "IMPRLVLY  " 500. "1 "
RUN
*   Paloverde - Colorado River 500kV Line Out
*   3-phase 4 cycle fault at Paloverde
*   No SC bypass
*   Fault bus at Paloverde
*
FB  0.0  "PALOVRDE" 500.
*
*   Clear fault bus at North Gila
*
CFB 4.0  "PALOVRDE" 500.
*
*   Trip Plaoverde - Colorado River 500kV line
*
DL  4.0  "PALOVRDE" 500. "COLRIVER" 500. "1 "
*
*
RUN
*   Loss of 1 Palo Verde generators
*
*  CC cards for post-transient only
*
*  Set Generator MW Dropping
CC  DRP 1444
*
*   Readjust Northwest SVC's
*
CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*  CC  RG  0.0 "DALLES 3"  13.8 "1 "  180. -270.
*
*
*  Trip Palo Verde unit #2
*
TG   0.0 "PALOVRD2"  24. "**"
*
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*
*   This routine will call the FACRI (Fort Rock and Malin MSC)
*      in In-Run EPCL (facri.p)
*   Disregard timing
*
*   Insert Fort Rock series caps
CC  RC  12.6 "CAPTJACK" 500. "GRIZZLY " 500. "1 " 4
CC  RC  12.6 "GRIZZLY " 500. "MALIN   " 500. "1 " 4
CC  RC  12.6 "PONDROSA" 500. "SUMMER L" 500. "1 " 4
*
```

```
*   Switch on Shunt cap at malin as part of FACRI
CC  MBS  13.4 "MALIN   " 500. "c1" "R"
CC  MBS  13.4 "MALIN   " 500. "c2" "R"
*
*   Deenergize Malin Shunt reactors as part of FACRI
CC  MSV  13.4 "MALIN   " 500. "s " 0.0 0.0
*
*   Switch on Olinda Shunt cap
*   CC  MBS   17.5 "OLINDA"   500.    "c "  "R"
*
*   Switch on Table Mountain Shunt cap
*   2 x 217 caps (91 Mvar reactor modeled separately)
*   CC  MBS  90. "TABLE MT" 500. "c1" "R"
*   CC  MBS  90. "TABLE MT" 500. "c2" "R"
*
*  Add SVC's at Marketplace and Adelanto
*
CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
*   CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
RUN
*   Loss of 2 Palo Verde generators
*
*  CC cards for post-transient only
*
*  Set Generator MW Dropping
CC  DRP 2946
*
*   Readjust Northwest SVC's
*
CC  MSV 0.0 "KEEL-SVC" 19.60 "1 "  350. -300.
CC  MSV 0.0 "MV-SVC  " 19.60 "1 "  350. -300.
*  CC  RG  0.0 "DALLES 3"  13.8 "1 "  180. -270.
*
*  Trip Palo Verde units #1 and #2
*
TG   0.0 "PALOVRD1"  24. "**"
TG   0.0 "PALOVRD2"  24. "**"
*
*
*   Readjust SCE's Devers SVCs
*
MSV 6.0 "DEVRSVC1" 500.0 "1 "  549. -100.
MSV 6.0 "DEVRSVC1" 500.0 "2 "  549. -100.
*
*   This routine will call the FACRI (Fort Rock and Malin MSC)
*      in In-Run EPCL (facri.p)
*   Disregard timing
*
*   Insert Fort Rock series caps
CC  RC 12.6 "CAPTJACK" 500. "GRIZZLY " 500. "1 " 4
CC  RC 12.6 "GRIZZLY " 500. "MALIN   " 500. "2 " 4
CC  RC 12.6 "PONDROSA" 500. "SUMMER L" 500. "1 " 4
*
```

```
*   Switch on Shunt caps at malin as part of FACRI
CC  MBS 13.4 "MALIN   " 500. "c1" "R"
CC  MBS 13.4 "MALIN   " 500. "c2" "R"
CC  MSV 13.4 "MALIN   " 500. "s " 0.0 0.0
*
*   Remove reactor at Olinda
*
CC  MLS 17.5 "OLINDA" 500. "MAXWELL" 500. "1 " 1 "D" "f " -1.9
*
*   Switch on Olinda Shunt cap
*
*   CC  MBS  17.5 "OLINDA  " 500. "c1" "R"
*
*   Drop AZ load (120 MW)
*   120.0 + j7.4
*
*MBL   60.0 "AGUAFAPS"  69.0  "AP" M -15 -2.7
*   MBL   60.0 "AGUAFRIA"  230.0 "AP" M -15 -2.7
*MBL   60.0 "PAPAGOBT"  69.0  "AP" M -30 -3.8
*MBL   60.0 "SANTAN  "  69.0  "SR" M -30  0.0
*MBL   60.0 "CORBELRS"  69.0  "SR" M -15 -0.7
*MBL   60.0 "ORME  RS"  69.0  "**" M -15 -0.2
*MBL   60.0 "THUNDRST"  69.0  "**" M -15  0.0
*
*   Switch on Table Mountain Shunt cap
*   2 x 217 caps (91 Mvar reactor modeled separately)
CC  MBS  90. "TABLE MT" 500. "c1" "R"
CC  MBS  90. "TABLE MT" 500. "c2" "R"
*
*   Switch on Metcalf Shunt cap
*   2 x 175 caps (91 Mvar reactor modeled separately)
*
CC  MBS  92. "METCALF " 500. "c1" "R"
CC  MBS  92. "METCALF " 500. "c2" "R"
*
*  Add SVC's at Marketplace and Adelanto (if voltage deviation is > 5%)
*
CC  MBS  120.0 "ADELSVC " 500. "sv" "A" 0.0 1.320
CC  MBS  120.0 "MKTPSVC " 500. "sv" "A" 0.0 1.320
*
*   Switch on Kinport Shunt cap
*
CC  MBS 200. "KINPORT" 345. "1 " "R"
*
```

Appendix I-1

Transient Stability Results

Light Load Pre

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_FLAT.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct	@time
54	NOSE CR9	138.00	vbul	1.023	1.018	0.5	20.000	
54	SUMMIT_7	138.00	vbus	1.023	1.018	0.5	20.000	
40	MCNARY	115.00	vbug	1.036	1.033	0.2	1.131	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25.00	fbul	59.985	2.331
54	MUSKEG2	240.00	fbus	59.985	2.331
40	DEXTER	13.80	fbug	59.923	19.838

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_C493-CE-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct	@time
54	NOSE CR9	138.00	vbul	1.023	1.018	0.5	20.000	
54	SUMMIT_7	138.00	vbus	1.023	1.018	0.5	20.000	
40	MCNARY	115.00	vbug	1.036	1.033	0.2	1.121	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25.00	fbul	59.985	2.321
54	MUSKEG2	240.00	fbus	59.985	2.321
40	DEXTER	13.80	fbug	59.923	19.871

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_Dev-Val-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct	@time
24	VALLEY-S	115.00	vbul	1.016	0.991	2.5	0.317	
24	WDT182_1	115.00	vbus	1.016	0.991	2.5	0.317	
24	DEVRSVC1	500.00	vbug	1.054	1.028	2.5	0.317	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time

8	HGCLD11	0.48	fbul	59.894	0.767
22	Q1243B1Q	34.50	fbus	59.674	0.124
22	Q1243B1Q	0.48	fbug	59.623	0.124

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_HAA-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
8	RTP3ANZA	92.00	vbul	1.022	0.971	5.0	0.317
22	Q124	230.00	vbus	1.013	0.932	7.9	0.317
8	C-3	230.00	vbug	1.014	0.971	4.3	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.785	0.102
22	Q1242A1Q	34.50	fbus	58.767	0.102
22	Q1242A1Q	0.48	fbug	58.582	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_HDWSH-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
8	RTP3ANZA	92.00	vbul	1.022	0.979	4.3	0.317
22	Q124	230.00	vbus	1.013	0.941	7.1	0.317
8	C-3	230.00	vbug	1.014	0.977	3.6	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.785	0.102
22	Q1242A1Q	34.50	fbus	58.756	0.102
22	Q1242A1Q	0.48	fbug	58.568	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IV-C493-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
54	NOSE CR9	138.00	vbul	1.023	0.778	23.9	18.393
54	SUMMIT_7	138.00	vbus	1.023	0.777	24.0	18.393
8	EARTHE2	92.00	vbug	1.052	0.995	5.5	11.236

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.729	0.067
22	ECO	500.00	fbus	57.284	0.067
54	SUMMITG3	13.80	fbug	59.521	19.015

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To
22	ECO	500	fbus	7.1	0.060	0.179

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IV-ECO-RAS-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
54	NOSE CR9	138.00	vbul	1.023	0.776	24.1	18.757
54	SUMMIT_7	138.00	vbus	1.023	0.775	24.2	18.757
40	COID TAP	69.00	vbug	1.013	0.993	2.0	1.507

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To
54	NOSE CR9	138	vbul	1.023		32.1	18.993	19.529	

```
  54  SUMMIT_7    138   vbus        1.023                          33.4
      18.993      19.550
  54  SUMMITTP    138   vbus        1.023                          32.1
      18.993      19.529
  54  AMOCOTAP    138   vbus        1.023                          24.4
      19.015      19.422

 LOWEST FREQUENCY
  AREA      BUS NAME    BUS KV      TYPE          MaxDip       @time

  22  PRCTRVLY    138.00      fbul          59.719       0.105
  22  ECO         500.00      fbus          57.284       0.067
  22  Q1242A1Q      0.48      fbug          58.109       0.112

FREQUENCY LESS THAN 59.6

 AREA BUS NAME    BUS KV      TYPE        Cycles      From  To
  22  ECO         500   fbus          7.1  0.060       0.179




Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IVECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

 AREA BUS NAME    BUS KV      TYPE        Initial     MaxDip      Prct
      @time
  54  NOSE CR9    138.00      vbul        1.023 0.777  24.0 18.846
  54  SUMMIT_7    138.00      vbus        1.023 0.776  24.2 18.846
  40  COID TAP     69.00      vbug        1.013 0.993   2.0  1.507

VOLTAGE CRITERIA VIOLATIONS

 AREA BUS NAME    BUS KV      TYPE        Initial     MaxDip      Prct
      @time       Cycles      From  To

  54  NOSE CR9    138   vbul        1.023                           24.4
      19.081      19.488
  54  SUMMIT_7    138   vbus        1.023                           24.4
      19.081      19.488
  54  SUMMITTP    138   vbus        1.023                           24.4
      19.081      19.488

 LOWEST FREQUENCY
  AREA      BUS NAME    BUS KV      TYPE          MaxDip       @time

  22  PRCTRVLY    138.00      fbul          59.719       0.105
  22  ECO         500.00      fbus          57.284       0.067
  22  Q1242A1Q      0.48      fbug          58.109       0.112

FREQUENCY LESS THAN 59.6
```

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To
22	ECO	500	fbus	6.3 0.060	0.164	

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IV-ECO-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	RTP3ANZA	92.00	vbul	1.022 0.972	4.9	0.326
22	Q124	230.00	vbus	1.013 0.920	9.1	0.326
8	USGYPS	92.00	vbug	1.034 0.986	4.7	0.326

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.729	0.067
22	ECO	500.00	fbus	57.284	0.067
22	Q1242A1Q	0.48	fbug	58.109	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IV-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023 0.758	25.9	15.372
54	SUMMIT_7	138.00	vbus	1.023 0.757	26.0	15.372
40	COID TAP	69.00	vbug	1.013 0.990	2.3	1.486

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.710	16.058
22	ECO	500.00	fbus	57.284	0.067

22	Q1242A1Q	0.48	fbug	58.165	0.112

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IV-RASX-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.771	24.6 16.596
54	SUMMIT_7	138.00	vbus	1.023	0.770	24.8 16.596
40	COID TAP	69.00	vbug	1.013	0.990	2.3 1.479

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.729	0.067
22	ECO	500.00	fbus	57.284	0.067
22	Q1242A1Q	0.48	fbug	58.165	0.112

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IVROA(IV)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	SANFELIP	92.00	vbul	1.027	0.993	3.3 0.369
22	Q124	230.00	vbus	1.013	0.925	8.7 0.369
8	USGYPS	92.00	vbug	1.034	0.998	3.5 0.369

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time

8	DIXIELA2	34.50	fbul	59.530	0.133
22	T442_HB	230.00	fbus	44.912	0.002
22	T442_G1	34.50	fbug	44.918	0.002

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_IVROA(ROA)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	@time	Prct
20	CPU-161	161.00	vbul	1.027	0.957	6.8	0.317
22	Q124	230.00	vbus	1.013	0.940	7.2	0.317
20	TEK-230	230.00	vbug	1.005	0.941	6.4	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	Q106A_C7	34.50	fbul	59.673	0.124
22	Q78_1A1Q	34.50	fbus	58.749	0.100
22	Q78_1A1Q	0.48	fbug	58.599	0.100

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_MES-HAA-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	@time	Prct
14	GILABEND	230.00	vbul	1.020	0.923	9.5	0.317
14	PALOVRDE	500.00	vbus	1.060	0.938	11.5	0.317
24	DEVRSVC1	500.00	vbug	1.054	0.967	8.2	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	Q106A_C7	34.50	fbul	59.764	0.102
22	Q1242A1Q	34.50	fbus	58.695	0.102
22	Q1242A1Q	0.48	fbug	58.513	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_ML-ECO-RAS_slo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.776	24.1 18.629
54	SUMMIT_7	138.00	vbus	1.023	0.775	24.2 18.629
54	LANGDON4	240.00	vbug	1.054	1.036	1.7 18.608

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.844	18.415
22	Q78_1A1Q	34.50	fbus	58.900	0.098
22	Q78_1A1Q	0.48	fbug	58.685	0.098

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_MLECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.880	13.9 20.000
54	SUMMIT_7	138.00	vbus	1.023	0.880	14.0 20.000
40	COID TAP	69.00	vbug	1.013	0.996	1.7 1.471

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	HGCLD11	0.48	fbul	59.872	0.593
22	Q78_1A1Q	34.50	fbus	58.900	0.098

22	Q78_1A1Q	0.48	fbug	58.685	0.098

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_ML-MS-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
54	NOSE CR9	138.00	vbul	1.023	0.770	24.7	16.251
54	SUMMIT_7	138.00	vbus	1.023	0.768	24.9	16.251
40	COID TAP	69.00	vbug	1.013	0.990	2.3	1.443

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.814	16.294
22	Q78_1A1Q	34.50	fbus	58.800	0.098
22	Q78_1A1Q	0.48	fbug	58.572	0.098

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_NGila-IV-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
8	RTP3ANZA	92.00	vbul	1.022	0.959	6.2	0.326
22	Q124	230.00	vbus	1.013	0.919	9.2	0.326
8	USGYPS	92.00	vbug	1.034	0.980	5.3	0.305

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time

8	DIXIELA2	34.50	fbul	59.717	0.112
22	Q1243B1Q	34.50	fbus	58.720	0.112
22	Q1243B1Q	0.48	fbug	58.548	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pre-r12_OM-MLX-SX-prec1c2-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	RTP3ANZA	92.00	vbul	1.022	0.968 5.3	0.317
22	MLSXTAP	230.00	vbus	1.010	0.000 100.0	0.317
8	USGYPS	92.00	vbug	1.034	0.986 4.6	0.317

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To
22	MLSXTAP	230	vbus	1.010	0.000 100.0	0.32			

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	NARROWS	69.00	fbul	59.750	0.081
22	Q78_1A1Q	34.50	fbus	58.925	0.102
22	Q78_1A1Q	0.48	fbug	58.733	0.100

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Appendix I-2

Transient Stability Results

Light Load Post

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_FLAT.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	1.016	0.6 20.000
54	SUMMIT_7	138.00	vbus	1.023	1.017	0.6 20.000
40	COID TAP	69.00	vbug	1.013	1.010	0.3 0.767

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25.00	fbul	59.981	2.267
54	MUSKEG2	240.00	fbus	59.981	2.267
40	DEXTER	13.80	fbug	59.916	19.902

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_C493-CE-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	1.016	0.6 20.000
54	SUMMIT_7	138.00	vbus	1.023	1.017	0.6 20.000
40	COID TAP	69.00	vbug	1.013	1.010	0.3 0.779

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	LONGLK10	25.00	fbul	59.981	2.257
54	MUSKEG2	240.00	fbus	59.981	2.279
40	DEXTER	13.80	fbug	59.917	19.229

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_Dev-Val-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
24	VALLEY-S	115.00	vbul	1.004	0.968	3.6 0.317
24	WDT182_1	115.00	vbus	1.004	0.968	3.6 0.317

24	VALLEYSC	115.00	vbug	1.025	0.992	3.3	0.317	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	HGCLD11	0.48	fbul	59.879	0.767
22	Q1243B1Q	34.50	fbus	59.670	0.124
22	Q1243B1Q	0.48	fbug	59.617	0.124

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_HAA-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
8	RTP3ANZA	92.00	vbul	1.001	0.937	6.4	0.317
22	Q124	230.00	vbus	1.008	0.923	8.5	0.317
8	C-3	230.00	vbug	0.998	0.943	5.5	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.817	0.102
22	Q1242A1Q	34.50	fbus	58.797	0.102
22	Q1242A1Q	0.48	fbug	58.611	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_HDWSH-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
8	RTP3ANZA	92.00	vbul	1.001	0.946	5.5	0.317
22	Q124	230.00	vbus	1.008	0.931	7.6	0.317
8	C-3	230.00	vbug	0.998	0.951	4.7	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.816	0.102
22	Q1242A1Q	34.50	fbus	58.787	0.102
22	Q1242A1Q	0.48	fbug	58.598	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IV-C493-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.744	27.2 11.493
54	SUMMIT_7	138.00	vbus	1.023	0.743	27.4 11.493
8	EARTHE2	92.00	vbug	1.042	0.991	4.9 14.365

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To
54	NOSE CR9	138	vbul	1.023	0.744	27.2	11.49		
54	SUMMIT_7	138	vbus	1.023	0.743	27.4	11.49		
54	SUMMITTP	138	vbus	1.023	0.744	27.2	11.49		
54	AMOCOTAP	138	vbus	1.023	0.756	26.1	11.49		

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.672	11.343
22	C510_3	34.50	fbus	52.102	0.010
54	SUMMITG3	13.80	fbug	42.694	12.543

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IV-ECO-RAS-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.760	25.6 14.515
54	SUMMIT_7	138.00	vbus	1.023	0.759	25.8 14.515
8	EARTHE2	92.00	vbug	1.042	0.968	7.1 14.922

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To
54	NOSE CR9	138	vbul	1.023	0.760	25.6	14.52		
54	SUMMIT_7	138	vbus	1.023	0.759	25.8	14.52		
54	SUMMITTP	138	vbus	1.023	0.761	25.6	14.52		

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.748	15.222
22	C608_T1	34.50	fbus	54.145	0.045
22	Q1242A1Q	0.48	fbug	58.156	0.119

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To
22	Q1241B1	34.5	fbus	6.1	0.098	0.200
22	Q1242A1Q	34.5	fbus	6.1	0.098	0.200
22	Q1242A2Q	34.5	fbus	6.1	0.098	0.200
22	Q1242B1Q	34.5	fbus	6.1	0.098	0.200
22	Q1243A1Q	34.5	fbus	6.1	0.098	0.200
22	Q1243A2Q	34.5	fbus	6.1	0.098	0.200
22	Q1243B1Q	34.5	fbus	6.1	0.098	0.200

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IVECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.757	26.0 14.153
54	SUMMIT_7	138.00	vbus	1.023	0.756	26.1 14.153
8	EARTHE2	92.00	vbug	1.042	0.969	7.0 13.489

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To
54	NOSE CR9	138	vbul	1.023	0.757	26.0	14.15		
54	SUMMIT_7	138	vbus	1.023	0.756	26.1	14.15		
54	SUMMITTP	138	vbus	1.023	0.757	26.0	14.15		

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.701	14.860

22	C608_T1	34.50	fbus	54.145	0.045
22	Q1242A1Q	0.48	fbug	58.156	0.119

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IV-ECO-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	RTP3ANZA	92.00	vbul	1.001	0.945	5.6 0.326
22	Q124	230.00	vbus	1.008	0.911	9.6 0.326
8	USGYPS	92.00	vbug	1.025	0.971	5.3 0.326

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.813	0.112
22	C608_T1	34.50	fbus	54.145	0.045
22	Q1242A1Q	0.48	fbug	58.174	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IV-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.755	26.2 13.122
54	SUMMIT_7	138.00	vbus	1.023	0.753	26.3 13.122
8	EARTHE2	92.00	vbug	1.042	0.968	7.1 13.293

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time

54	NOSE CR9	138.00	fbul	59.709	13.851
22	C608_T1	34.50	fbus	54.145	0.045
22	Q1242A1Q	0.48	fbug	58.199	0.119

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IV-RASX-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.752	26.4 13.146
54	SUMMIT_7	138.00	vbus	1.023	0.751	26.6 13.146
8	EARTHE2	92.00	vbug	1.042	0.969	7.0 12.996

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	NOSE CR9	138.00	fbul	59.707	13.874
22	C608_T1	34.50	fbus	54.145	0.045
22	Q1242A1Q	0.48	fbug	58.199	0.119

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IVROA(IV)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.986	3.6 20.000
22	Q124	230.00	vbus	1.008	0.927	8.1 0.369
8	USGYPS	92.00	vbug	1.025	0.992	3.2 0.369

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.610	0.133
22	C510	230.00	fbus	44.423	0.002
22	C510_G1	0.20	fbug	44.425	0.002

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_IVROA(ROA)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
20	CPU-161	161.00	vbul	1.026	0.960 6.4	0.317
22	Q124	230.00	vbus	1.008	0.927 8.0	0.317
20	TEK-230	230.00	vbug	1.005	0.947 5.8	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	CPU-161	161.00	fbul	59.669	0.595
22	Q78_1A1Q	34.50	fbus	58.764	0.100
22	Q78_1A1Q	0.48	fbug	58.617	0.100

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_MES-HAA-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	LAQUINTA	92.00	vbul	1.022	0.918 10.2	0.317
24	COLRIVER	500.00	vbus	1.055	0.935 11.4	0.317
8	C-3	230.00	vbug	0.998	0.905 9.3	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
24	RECTOR	66.00	fbul	59.821	1.345

22	Q1242A1Q	34.50	fbus	58.860	0.102
22	Q1242A1Q	0.48	fbug	58.696	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_ML-ECO-RAS_slo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.761	25.5 15.244
54	SUMMIT_7	138.00	vbus	1.023	0.760	25.7 15.244
40	COID TAP	69.00	vbug	1.013	0.989	2.3 1.400

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.740	0.105
22	Q1242A1Q	34.50	fbus	58.658	0.105
22	Q1242A1Q	0.48	fbug	58.472	0.105

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_MLECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.768	24.9 15.653
54	SUMMIT_7	138.00	vbus	1.023	0.767	25.1 15.653
40	COID TAP	69.00	vbug	1.013	0.989	2.3 1.407

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To
54	SUMMIT_7	138	vbus	1.023	0.767	25.1	15.65		

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.740	0.105
22	Q1242A1Q	34.50	fbus	58.658	0.105
22	Q1242A1Q	0.48	fbug	58.472	0.105

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_ML-MS-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.758	25.9 13.765
54	SUMMIT_7	138.00	vbus	1.023	0.756	26.1 13.765
22	DIVISION	69.00	vbug	1.018	0.983	3.5 14.644

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	NARROWS	69.00	fbul	59.269	0.052
22	T337_MV	34.50	fbus	57.117	0.052
22	Q1242A1Q	0.48	fbug	58.528	0.105

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_ML-OM-postc1c2-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
54	NOSE CR9	138.00	vbul	1.023	0.888	13.1 20.000
54	SUMMIT_7	138.00	vbus	1.023	0.888	13.2 20.000
20	CUH-230	230.00	vbug	1.010	0.931	7.8 0.436

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	NARROWS	69.00	fbul	58.838	0.100
22	T337_T	34.50	fbus	55.948	0.052
22	S480G1	0.48	fbug	58.476	0.100

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Light Load - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-ll-pstup-r15_NGila-IV-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	RTP3ANZA	92.00	vbul	1.001	0.886	11.6 0.326
22	Q124	230.00	vbus	1.008	0.889	11.8 0.326
8	C-3	230.00	vbug	0.998	0.903	9.5 0.326

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.792	0.112
22	Q1243B1Q	34.50	fbus	58.909	0.112
22	Q1243B1Q	0.48	fbug	58.754	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Appendix I-3

Transient Stability Results

Heavy Summer Pre

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_FLAT.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct	@time
54	FIREBAGT	138.00	vbul	1.042	1.033	0.9	3.231	
54	FIREBAG6	138.00	vbus	1.042	1.033	0.9	3.231	
40	COID TAP	69.00	vbug	1.016	1.013	0.3	1.067	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	RBW LAK9	25.00	fbul	59.987	3.017
54	791S703T	138.00	fbus	59.987	2.995
40	DEXTER	13.80	fbug	59.984	19.902

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_C493-CE-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct	@time
54	FIREBAGT	138.00	vbul	1.042	1.033	0.9	3.221	
54	FIREBAG6	138.00	vbus	1.042	1.033	0.9	3.221	
40	COID TAP	69.00	vbug	1.016	1.013	0.3	1.079	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	RBW LAK9	25.00	fbul	59.987	3.007
54	791S703T	138.00	fbus	59.987	3.007
40	DEXTER	13.80	fbug	59.979	20.000

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_Dev-Val-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct	@time
40	NORTHCST	69.00	vbul	0.957	0.943	1.5	1.838	
40	M REDWTP	69.00	vbus	0.982	0.968	1.5	1.838	
40	COID TAP	69.00	vbug	1.016	1.003	1.2	1.860	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time

24	SEARLES	34.50	fbul	59.918	0.938
22	Q1243B1Q	34.50	fbus	59.889	0.124
24	ESRP P1	6.90	fbug	59.779	0.067

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_HAA-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
20	CNT-230	230.00	vbul	0.999	0.971	2.9	0.317
22	Q124	230.00	vbus	1.015	0.950	6.3	0.317
20	TEK-230	230.00	vbug	1.005	0.978	2.7	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	Q106A_C7	34.50	fbul	59.809	0.231
22	Q78_1A1Q	34.50	fbus	58.696	0.102
22	Q78_1A1Q	0.48	fbug	58.434	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_HDWSH-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
20	CNT-230	230.00	vbul	0.999	0.981	1.9	0.317
22	Q124	230.00	vbus	1.015	0.969	4.5	0.317
20	TEK-230	230.00	vbug	1.005	0.987	1.8	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.847	0.231
22	Q78_1A1Q	34.50	fbus	58.730	0.102
22	Q78_1A1Q	0.48	fbug	58.466	0.100

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IV-C493-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	LAKEVIEW	69.00	vbul	0.931	0.901	3.2	1.657
40	MILE HI	69.00	vbus	0.934	0.903	3.2	1.657
40	COID TAP	69.00	vbug	1.016	0.988	2.7	1.721

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.790	0.067
22	ECO	500.00	fbus	57.570	0.067
20	CIP-U2	13.80	fbug	59.822	0.393

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IV-ECO-RAS-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	LAKEVIEW	69.00	vbul	0.931	0.904	2.9	1.743
22	ECO	500.00	vbus	1.046	1.013	3.2	0.350
40	COID TAP	69.00	vbug	1.016	0.991	2.4	1.786

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.758	0.105
22	ECO	500.00	fbus	57.570	0.067
22	Q78_1A1Q	0.48	fbug	58.411	0.105

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IVECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
40	LAKEVIEW	69.00	vbul	0.931	0.904	2.9 1.736
22	ECO	500.00	vbus	1.046	1.013	3.2 0.350
40	COID TAP	69.00	vbug	1.016	0.991	2.4 1.800

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.758	0.105
22	ECO	500.00	fbus	57.570	0.067
22	Q78_1A1Q	0.48	fbug	58.411	0.105

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IV-ECO-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	RTP3ANZA	92.00	vbul	1.057	1.024	3.2 0.305
22	Q124	230.00	vbus	1.015	0.954	6.0 0.326
8	USGYPS	92.00	vbug	1.054	1.026	2.7 0.305

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.768	0.069
22	ECO	500.00	fbus	57.570	0.067
22	Q1242A1Q	0.48	fbug	58.423	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IV-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
40	NORTHCST	69.00	vbul	0.957	0.927	3.1 1.807

22	MLSXTAP	230.00	vbus	0.996	0.966	3.0	0.307
40	COID TAP	69.00	vbug	1.016	0.989	2.6	1.829

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.790	0.067
22	ECO	500.00	fbus	57.570	0.067
22	Q78_1A1Q	0.48	fbug	58.537	0.105

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IV-RASX-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
40	NORTHCST	69.00	vbul	0.957	0.927	3.1 1.807
22	MLSXTAP	230.00	vbus	0.996	0.965	3.1 0.300
40	COID TAP	69.00	vbug	1.016	0.989	2.6 1.821

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	CPU-161	161.00	fbul	59.691	2.345
22	ECO	500.00	fbus	57.570	0.067
22	Q78_1A1Q	0.48	fbug	58.537	0.105

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IVROA(IV)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	SANFELIP	92.00	vbul	1.056	1.027	2.7 0.369
22	Q124	230.00	vbus	1.015	0.935	7.9 0.369
8	USGYPS	92.00	vbug	1.054	1.024	2.9 0.369

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.548	0.133
22	T442_HB	230.00	fbus	44.912	0.002
22	T442_G1	34.50	fbug	44.918	0.002

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_IVROA(ROA)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	@time	Prct
20	HGO-161	161.00	vbul	0.996	0.907	8.9	0.317
20	CPC-161	161.00	vbus	1.005	0.918	8.7	0.317
20	TEK-230	230.00	vbug	1.005	0.922	8.3	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	Q106A_C7	34.50	fbul	59.602	0.124
22	Q78_1A1Q	34.50	fbus	58.788	0.100
22	Q78_1A1Q	0.48	fbug	58.642	0.100

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_MES-HAA-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	@time	Prct
14	WHITETNK	69.00	vbul	1.019	0.952	6.6	0.317
14	MESQUITE	500.00	vbus	1.065	0.859	19.3	0.617
40	COID TAP	69.00	vbug	1.016	0.972	4.4	2.117

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
24	CSA DIAB	34.50	fbul	59.843	1.752
14	MESQUITE	230.00	fbus	59.706	1.002

14	MES-CT4	18.00	fbug	59.630	0.981

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_ML-ECO-RAS_slo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
22	CREELMAN	69.00	vbul	1.024	0.979 4.4	0.307
22	MIGUEL	500.00	vbus	1.030	0.980 4.9	0.307
22	OTAY	69.00	vbug	1.015	0.973 4.2	0.307

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	PJZ-115	115.00	fbul	59.887	0.564
22	Q78_1A1Q	34.50	fbus	58.997	0.098
22	Q78_1A1Q	0.48	fbug	58.800	0.098

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_MLECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
22	CAMERON	69.00	vbul	1.008	0.964 4.4	0.300
22	SUNCREST	230.00	vbus	1.020	0.949 6.9	2.795
22	OTAY	69.00	vbug	1.015	0.973 4.2	0.300

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	CPU-161	161.00	fbul	59.792	2.302
22	Q78_1A1Q	34.50	fbus	58.997	0.098
22	Q78_1A1Q	0.48	fbug	58.800	0.098

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_ML-MS-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	LAKEVIEW	69.00	vbul	0.931	0.899	3.4	1.721
40	MILE HI	69.00	vbus	0.934	0.902	3.4	1.721
40	COID TAP	69.00	vbug	1.016	0.987	2.8	1.786

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	PRCTRVLY	138.00	fbul	59.852	0.105
22	Q78_1A1Q	34.50	fbus	58.939	0.098
22	Q78_1A1Q	0.48	fbug	58.742	0.098

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_NGila-IV-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
20	CNT-230	230.00	vbul	0.999	0.948	5.2	0.305
22	Q124	230.00	vbus	1.015	0.905	10.8	0.305
8	USGYPS	92.00	vbug	1.054	0.998	5.3	0.305

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	Q106A_C7	34.50	fbul	59.718	0.219
22	Q78_1A1Q	34.50	fbus	58.690	0.112
22	Q78_1A1Q	0.48	fbug	58.461	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Pre Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pre-r12_OM-MLX-SX-prec1c2-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
8	RTP3ANZA	92.00	vbul	1.057	1.023	3.2	0.317
22	MLSXTAP	230.00	vbus	0.996	0.000	100.0	0.317
22	OTAY	69.00	vbug	1.015	0.986	2.9	0.317

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time	Cycles	From	To
22	MLSXTAP	230	vbus	0.996	0.000	100.0	0.32			

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	PJZ-115	115.00	fbul	59.833	0.724
22	Q78_1A1Q	34.50	fbus	58.996	0.100
22	Q78_1A1Q	0.48	fbug	58.806	0.100

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Appendix I-4

Transient Stability Results

Heavy Summer Post

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_FLAT.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
54	FIREBAGT	138.00	vbul	1.042	1.033	0.9	3.145
54	FIREBAG6	138.00	vbus	1.042	1.033	0.9	3.145
40	COID TAP	69.00	vbug	1.013	1.008	0.4	1.024

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	RBW LAK9	25.00	fbul	59.984	2.974
54	791S703T	138.00	fbus	59.984	2.974
40	DEXTER	13.80	fbug	59.927	19.431

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_C493-CE-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
54	FIREBAGT	138.00	vbul	1.042	1.033	0.9	3.157
54	FIREBAG6	138.00	vbus	1.042	1.033	0.9	3.157
40	COID TAP	69.00	vbug	1.013	1.008	0.4	1.014

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	RBW LAK9	25.00	fbul	59.984	2.964
54	791S703T	138.00	fbus	59.984	2.964
40	DEXTER	13.80	fbug	59.922	19.443

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_Dev-Val-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
40	NORTHCST	69.00	vbul	0.958	0.942	1.6	1.838
40	M REDWTP	69.00	vbus	0.983	0.967	1.6	1.838

40	COID TAP	69.00	vbug	1.013	0.999	1.3	1.838	

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
24	SEARLES	34.50	fbul	59.920	0.960
22	Q1243B1Q	34.50	fbus	59.870	0.124
24	ESRP P1	6.90	fbug	59.773	0.067

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_HAA-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
8	SANFELIP	92.00	vbul	1.036	0.995	4.0	0.317
22	Q124	230.00	vbus	1.010	0.928	8.1	0.317
8	USGYPS	92.00	vbug	1.048	1.008	3.8	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.785	0.102
22	Q1242A1Q	34.50	fbus	58.657	0.102
22	Q1242A1Q	0.48	fbug	58.455	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_HDWSH-NGila-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	
8	RTP3ANZA	92.00	vbul	1.034	1.000	3.2	0.317
22	Q124	230.00	vbus	1.010	0.941	6.9	0.317
8	USGYPS	92.00	vbug	1.048	1.017	3.0	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.806	0.102
22	Q1242A1Q	34.50	fbus	58.669	0.102
22	Q1242A1Q	0.48	fbug	58.462	0.102

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IV-C493-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
40	CANBY	69.00	vbul	0.985	0.938	4.8 1.893
8	REG1EX	92.00	vbus	1.055	0.997	5.6 9.500
8	EARTHE2	92.00	vbug	1.056	0.996	5.7 9.500

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
54	RBW LAK9	25.00	fbul	59.834	3.757
22	C608_T1	34.50	fbus	55.085	0.052
22	C493_G1	0.69	fbug	59.655	0.024

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IV-ECO-RAS-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
40	LAKEVIEW	69.00	vbul	0.929	0.894	3.8 1.679
40	BURNS	500.00	vbus	1.060	1.019	3.9 2.179
40	COID TAP	69.00	vbug	1.013	0.981	3.1 1.721

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.761	0.112
22	C510_1	34.50	fbus	54.958	0.052
22	Q1242A1Q	0.48	fbug	58.285	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To
22	C510_1	34.5	fbus	6.7	0.067	0.179
22	C510_2	34.5	fbus	6.7	0.067	0.179

22	C608_1	34.5	fbus	6.7	0.067	0.179
22	C608_2	34.5	fbus	6.7	0.067	0.179
22	C608_T1	34.5	fbus	6.7	0.067	0.179
22	C608_T2	34.5	fbus	6.7	0.067	0.179

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IVECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
40	LAKEVIEW	69.00	vbul	0.929	0.894	3.8	1.679
40	BURNS	500.00	vbus	1.060	1.019	3.9	2.179
40	COID TAP	69.00	vbug	1.013	0.981	3.1	1.729

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.761	0.112
22	C510_1	34.50	fbus	54.958	0.052
22	Q1242A1Q	0.48	fbug	58.285	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IV-ECO-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
8	RTP3ANZA	92.00	vbul	1.034	0.989	4.3	0.326
22	Q124	230.00	vbus	1.010	0.937	7.3	0.326
8	USGYPS	92.00	vbug	1.048	1.011	3.5	0.326

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.761	0.112
22	C510_1	34.50	fbus	54.958	0.052
22	Q1242A1Q	0.48	fbug	58.285	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IV-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	LAKEVIEW	69.00	vbul	0.929	0.893	3.9	1.679
40	BURNS	500.00	vbus	1.060	1.013	4.4	2.093
40	COID TAP	69.00	vbug	1.013	0.979	3.3	1.743

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.775	0.112
22	C510_1	34.50	fbus	54.958	0.052
22	Q1242A1Q	0.48	fbug	58.395	0.112

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IV-RASX-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct	@time
40	LAKEVIEW	69.00	vbul	0.929	0.893	3.9	1.679
40	BURNS	500.00	vbus	1.060	1.013	4.4	2.093
40	COID TAP	69.00	vbug	1.013	0.979	3.3	1.729

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	CPU-161	161.00	fbul	59.702	2.324
22	C510_1	34.50	fbus	54.958	0.052
22	Q1242A1Q	0.48	fbug	58.395	0.112

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IVROA(IV)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
8	SANFELIP	92.00	vbul	1.036	1.007	2.8	0.369
22	Q124	230.00	vbus	1.010	0.930	8.0	0.369
8	USGYPS	92.00	vbug	1.048	1.017	3.0	0.369

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.609	0.133
22	C561A	34.50	fbus	44.206	0.002
22	T429_G1	13.80	fbug	43.886	0.002

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_IVROA(ROA)-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip		Prct @time
20	HGO-161	161.00	vbul	0.995	0.908	8.8	0.317
20	CPC-161	161.00	vbus	1.005	0.918	8.7	0.317
20	TEK-230	230.00	vbug	1.005	0.923	8.2	0.317

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	CPU-161	161.00	fbul	59.594	0.702
22	Q78_1A1Q	34.50	fbus	58.745	0.100
22	Q78_1A1Q	0.48	fbug	58.594	0.100

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_MES-HAA-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
14	BAGDAD	115.00	vbul	0.904	0.843	6.8 0.317
14	MESQUITE	500.00	vbus	1.065	0.837	21.4 0.660
8	C-3	230.00	vbug	1.034	0.980	5.2 0.317

VOLTAGE CRITERIA VIOLATIONS

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time	Cycles	From	To

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
24	CSA DIAB	34.50	fbul	59.828	1.774
14	MESQUITE	230.00	fbus	59.683	1.045
14	MES-ST1	18.00	fbug	59.605	1.045

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_ML-ECO-RAS_slo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
20	PNM-115	115.00	vbul	0.999	0.965	3.4 0.307
22	MIGUEL	500.00	vbus	1.018	0.974	4.3 0.307
40	COID TAP	69.00	vbug	1.013	0.986	2.7 1.786

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.806	0.105
22	Q1242A1Q	34.50	fbus	58.792	0.105
22	Q1242A1Q	0.48	fbug	58.618	0.105

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_MLECO-RASX-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time

20	PNM-115	115.00	vbul	0.999	0.964	3.5	0.300
22	SUNCREST	230.00	vbus	1.013	0.951	6.1	2.817
40	COID TAP	69.00	vbug	1.013	0.986	2.7	1.793

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	CPU-161	161.00	fbul	59.746	2.271
22	Q1242A1Q	34.50	fbus	58.792	0.105
22	Q1242A1Q	0.48	fbug	58.618	0.105

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_ML-MS-RAS-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
40	LAKEVIEW	69.00	vbul	0.929	0.886	4.6 1.721
40	BURNS	500.00	vbus	1.060	1.011	4.7 2.171
40	COID TAP	69.00	vbug	1.013	0.975	3.7 1.764

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
20	PJZ-115	115.00	fbul	59.772	0.607
22	Q1242A1Q	34.50	fbus	58.803	0.105
22	Q1242A1Q	0.48	fbug	58.628	0.105

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_ML-OM-postc1c2-dlo.tab
HIGHEST VOLTAGE DIP DLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
20	TOY-230	230.00	vbul	0.997	0.893	10.5 0.607
20	HRA-230	230.00	vbus	0.997	0.889	10.8 0.607
20	TEK-230	230.00	vbug	1.005	0.940	6.5 0.436

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
22	NARROWS	69.00	fbul	57.743	0.095
22	T337_T	34.50	fbus	55.203	0.095
22	S480G1	0.48	fbug	56.937	0.095

FREQUENCY LESS THAN 59.0

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

Heavy Summer - Post Cluster 1/Cluster 2 Phase II
tran-c1c2-hs-pstup-r15_NGila-IV-slo.tab
HIGHEST VOLTAGE DIP SLO

AREA	BUS NAME	BUS KV	TYPE	Initial	MaxDip	Prct @time
8	SANFELIP	92.00	vbul	1.036	0.988 4.7	0.326
22	Q124	230.00	vbus	1.010	0.915 9.4	0.326
8	USGYPS	92.00	vbug	1.048	0.999 4.7	0.305

LOWEST FREQUENCY

AREA	BUS NAME	BUS KV	TYPE	MaxDip	@time
8	DIXIELA2	34.50	fbul	59.718	0.112
22	Q1242A1Q	34.50	fbus	58.474	0.112
22	Q1243B1Q	0.48	fbug	58.262	0.112

FREQUENCY LESS THAN 59.6

AREA	BUS NAME	BUS KV	TYPE	Cycles	From	To

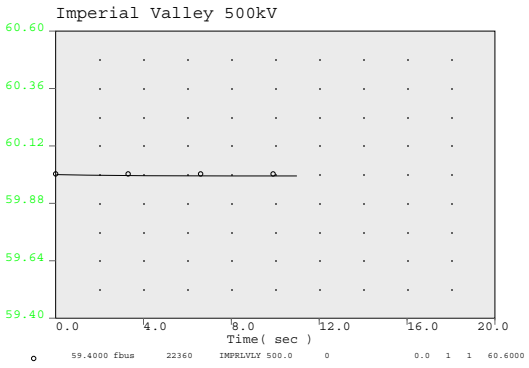
Appendix J-1

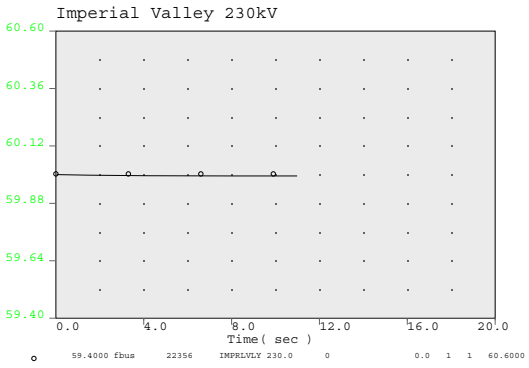
Transient Stability Analysis Plots

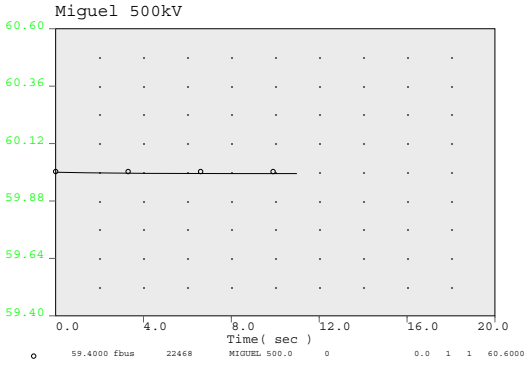
Imperial Valley Area Cluster & Boulevard Cluster

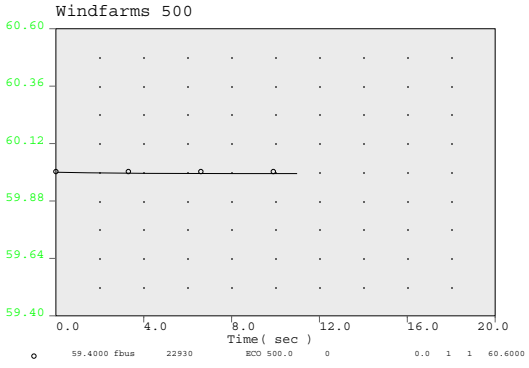
Heavy Summer Pre

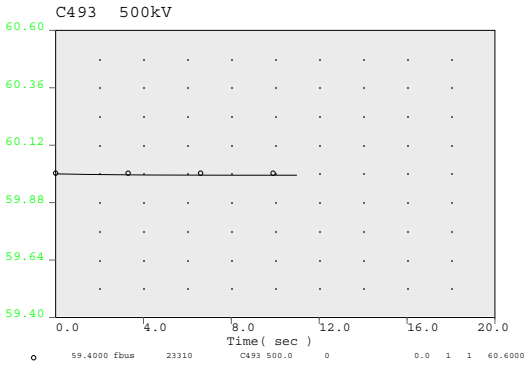
Imperial Valley Area - Frequency

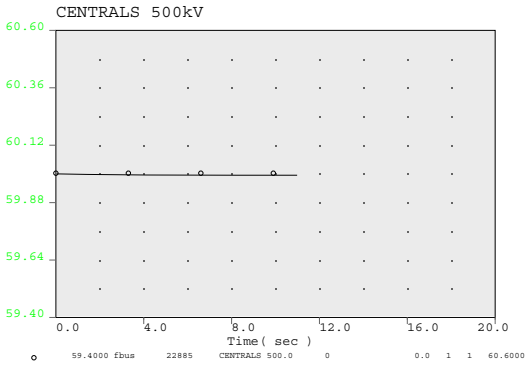






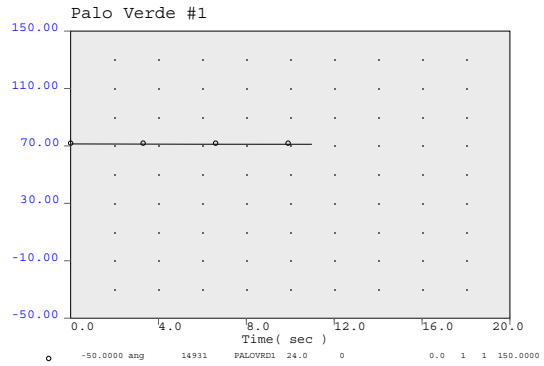


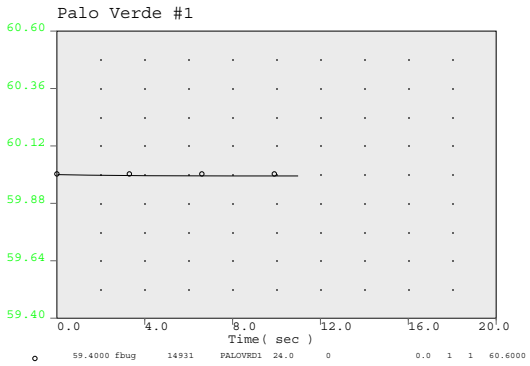


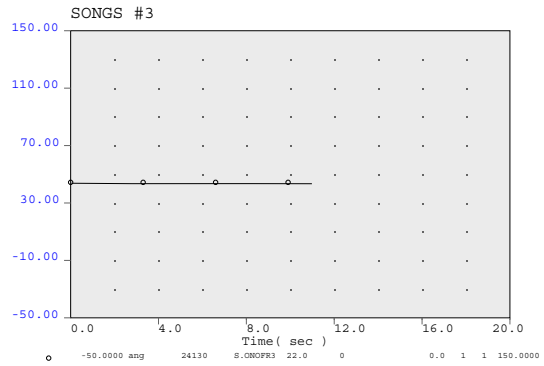


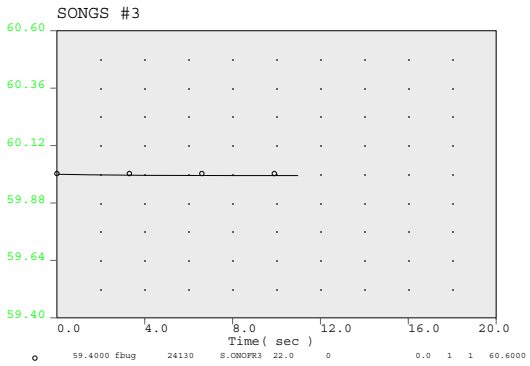
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

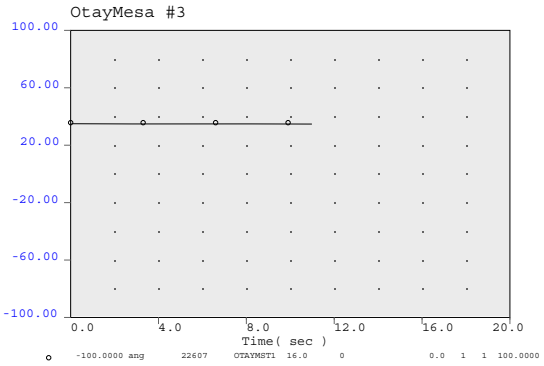
RELATIVE ROTOR ANGLE & FREQUENCY

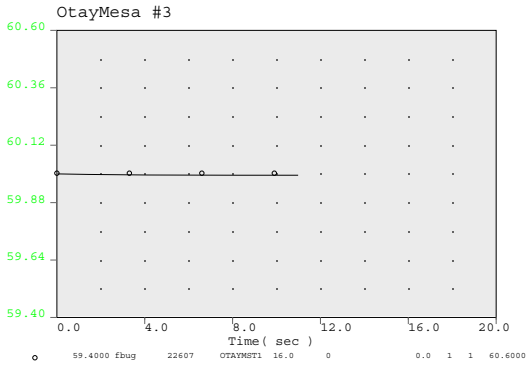










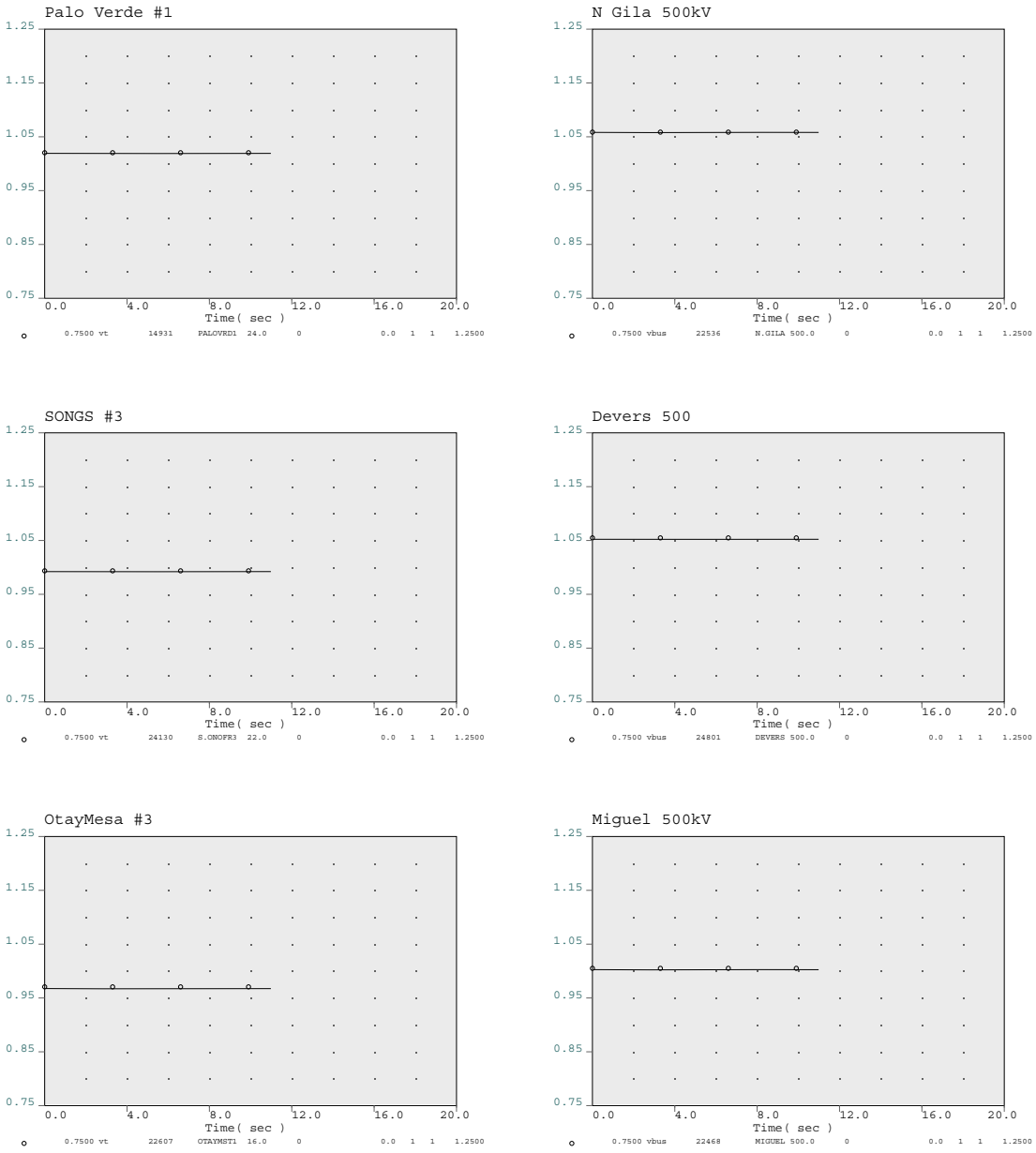


SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

Page 1

SDGE	flat_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:13 2010

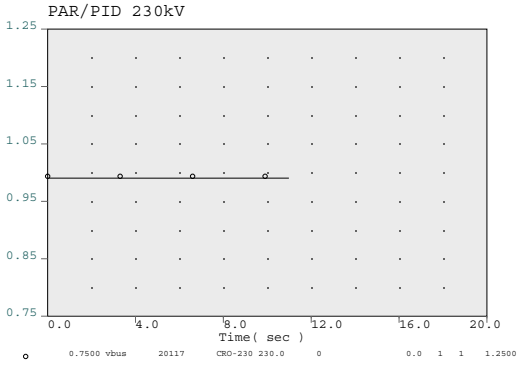
RELATIVE VOLTAGE



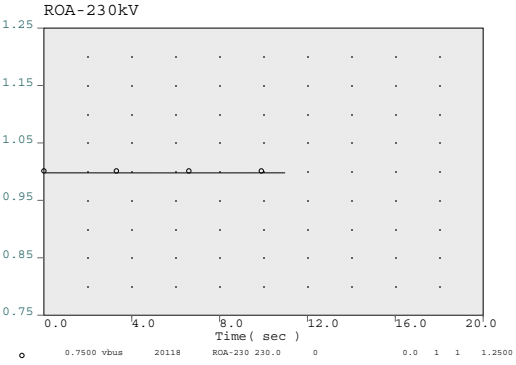
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

Affected System Voltage Check and Comparison

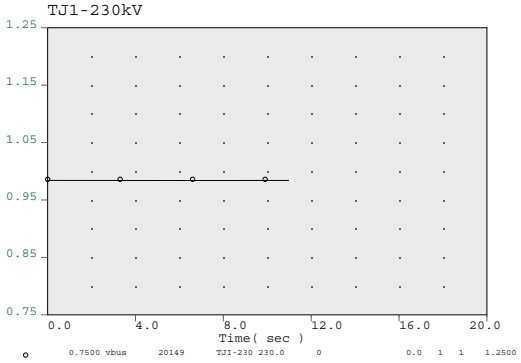
PAR/PID 230kV



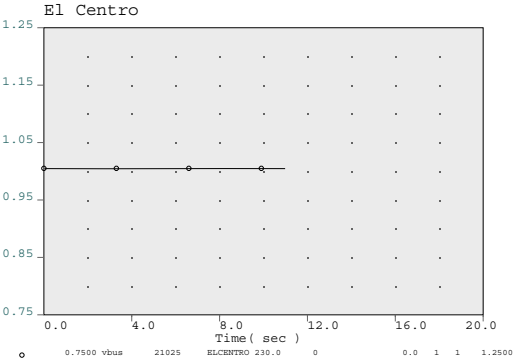
ROA-230kV



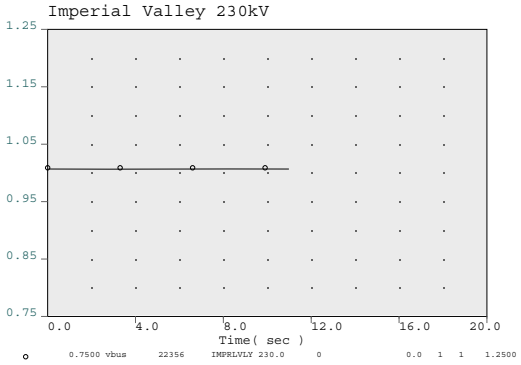
TJ1-230kV



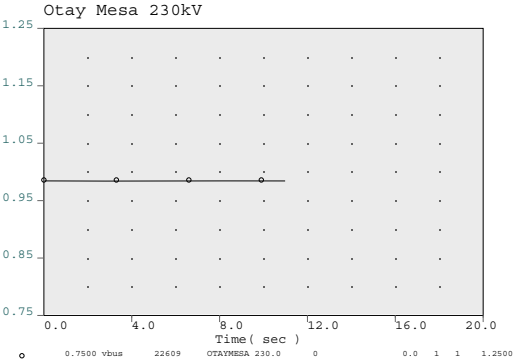
El Centro



Imperial Valley 230kV

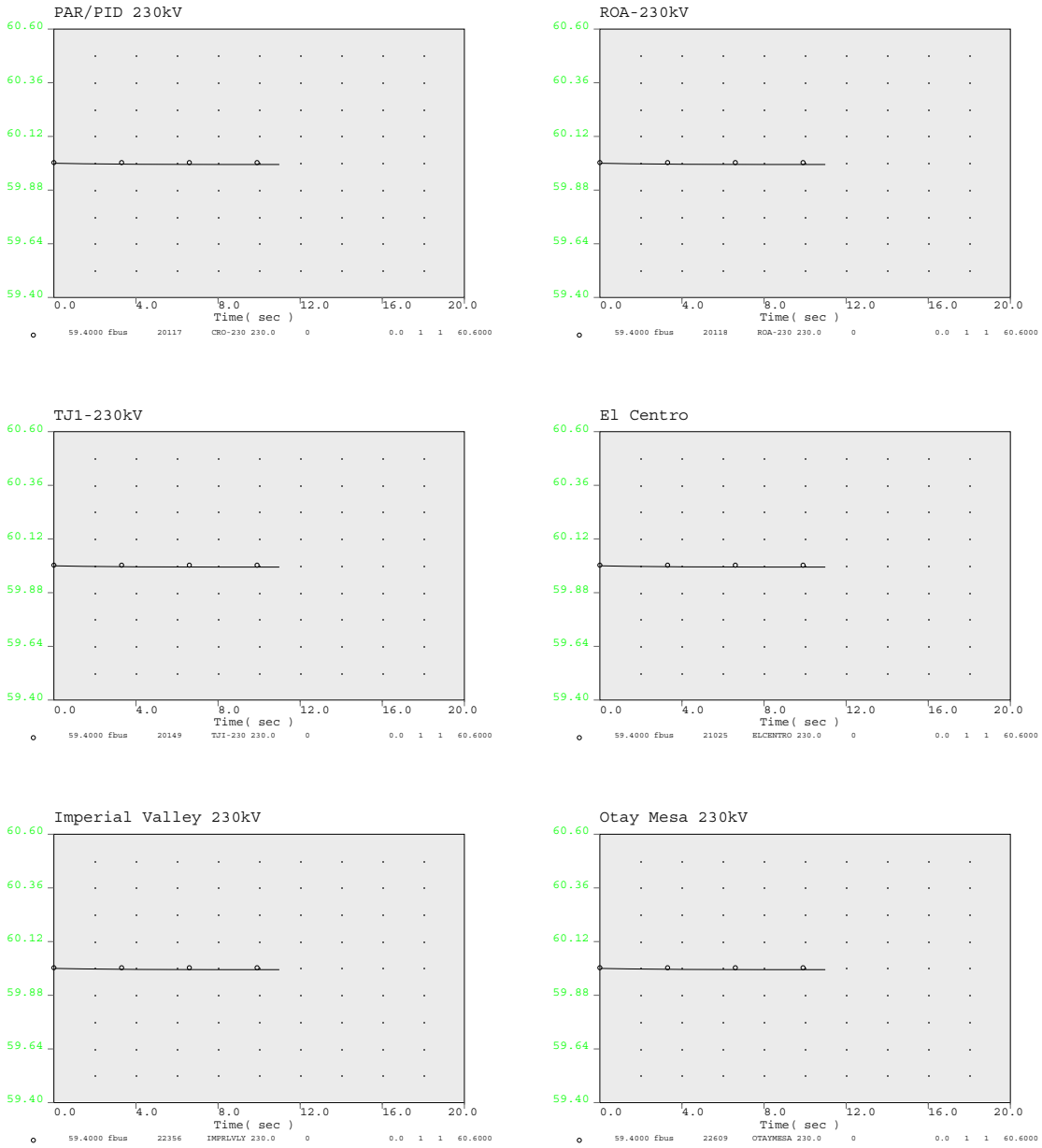


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

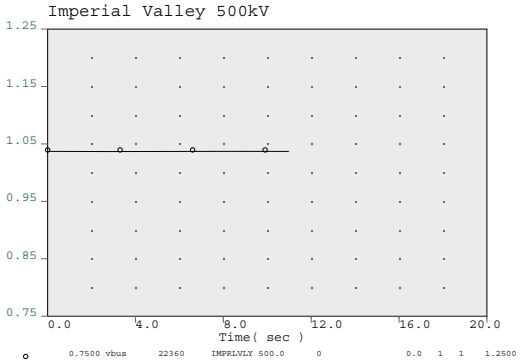
Affected System Frequency Check and Comparison



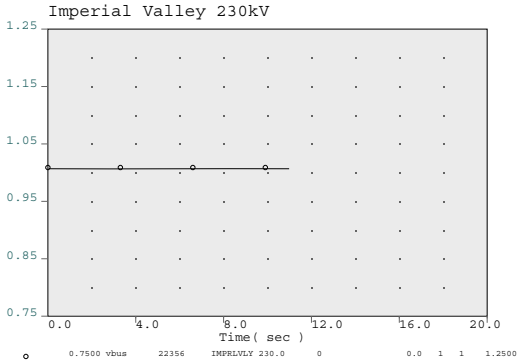
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

Imperial Valley Area - VOLTAGE

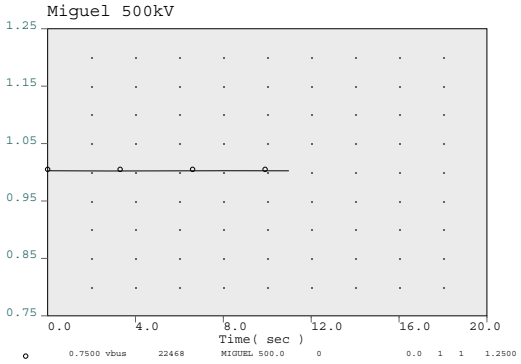
Imperial Valley 500kV



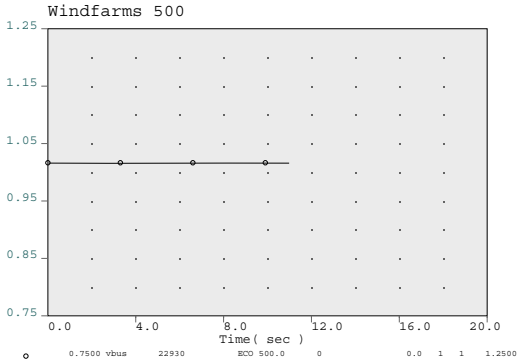
Imperial Valley 230kV



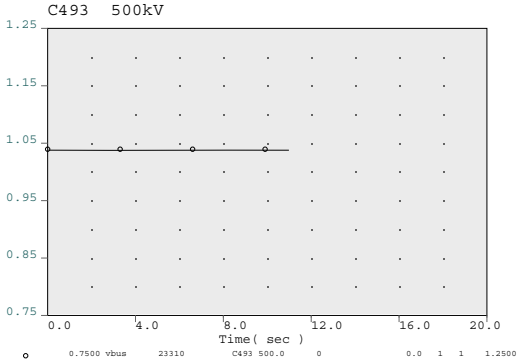
Miguel 500kV



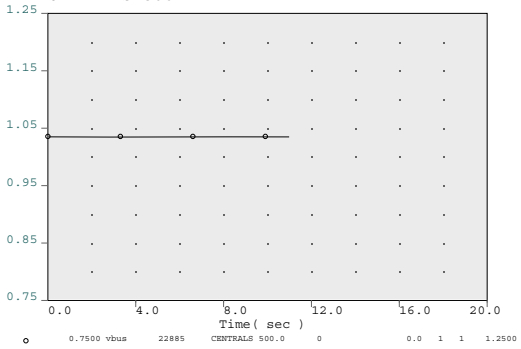
Windfarms 500



C493 500kV

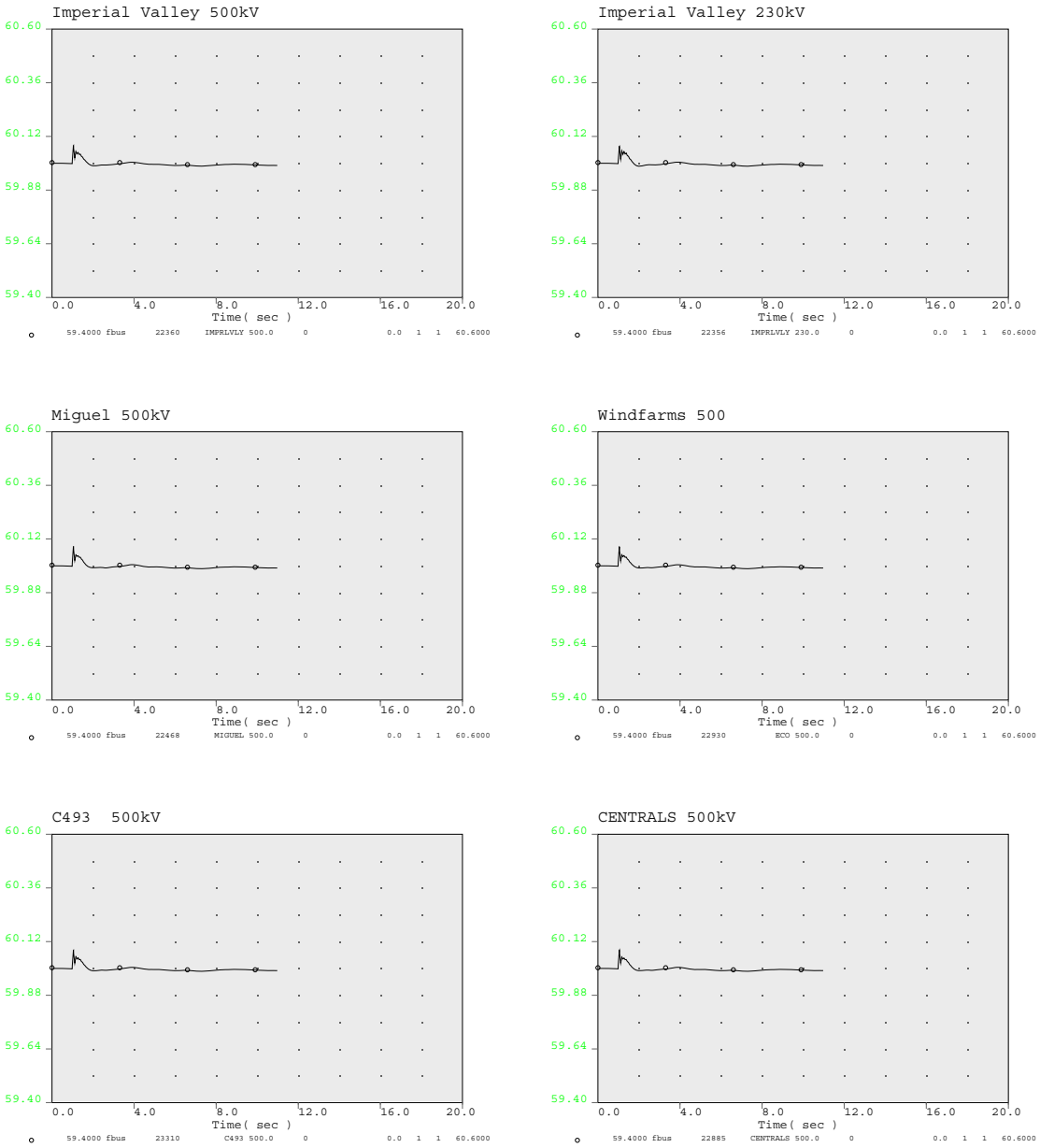


CENTRALS 500kV



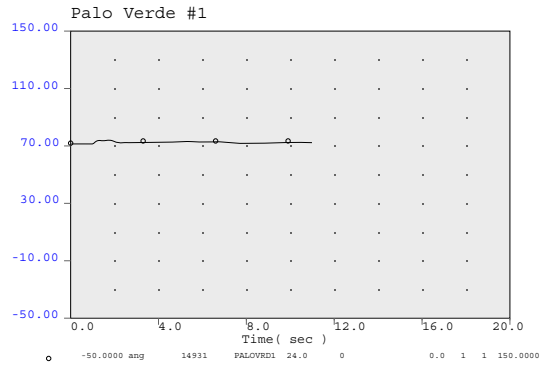
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

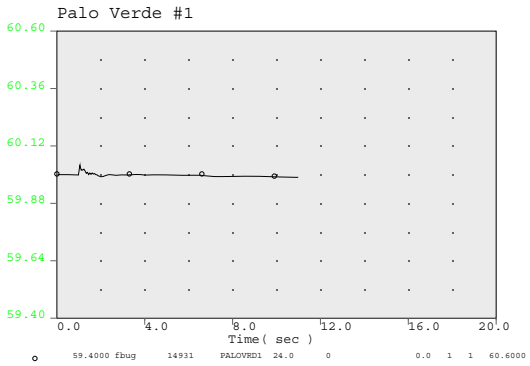
Imperial Valley Area - Frequency

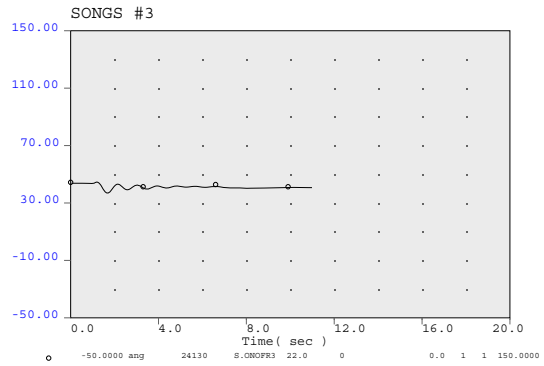


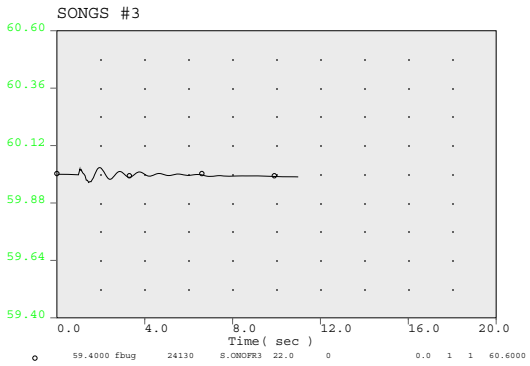
SDG&E Cluster 2 - pre
2014 Heavy Summer
Valley - Devers 500 kV line

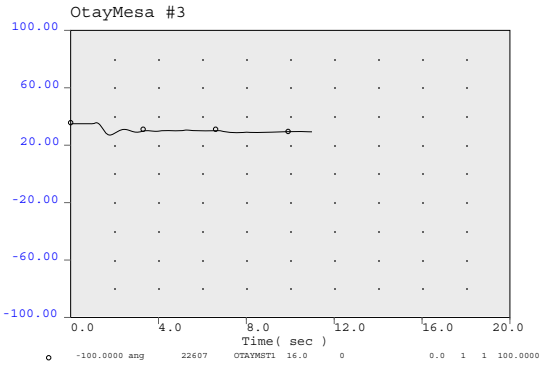
RELATIVE ROTOR ANGLE & FREQUENCY

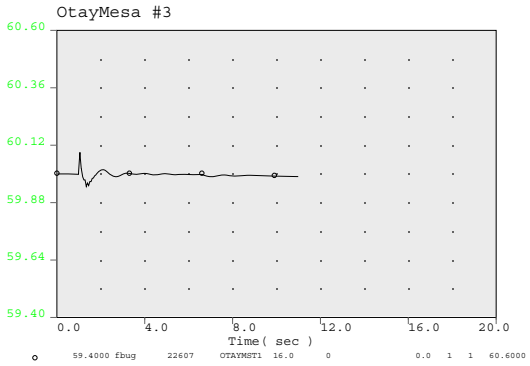












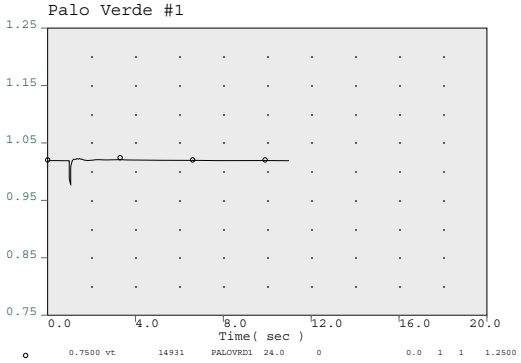
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Page 1

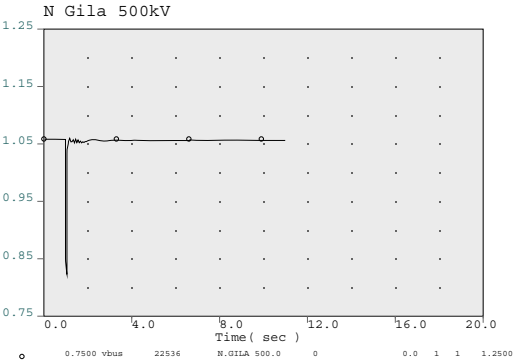
SDGE	C493_Cen_slo_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:42:05 2010

RELATIVE VOLTAGE

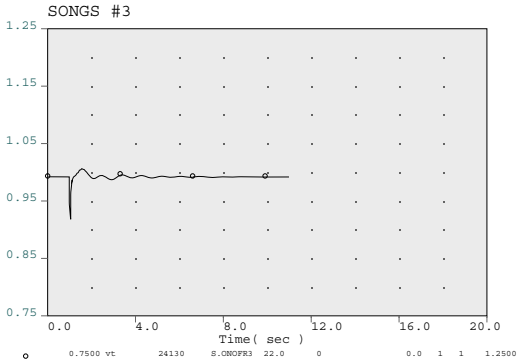
Palo Verde #1



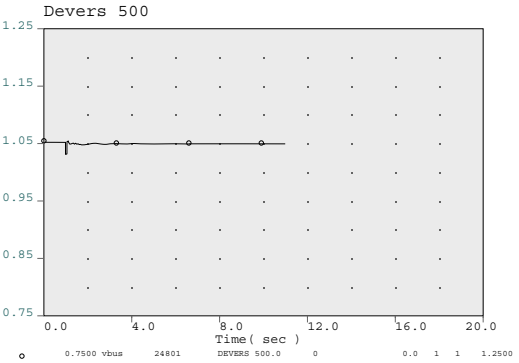
N Gila 500kV



SONGS #3



Devers 500



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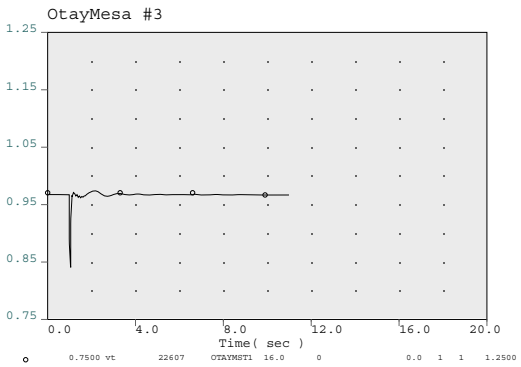
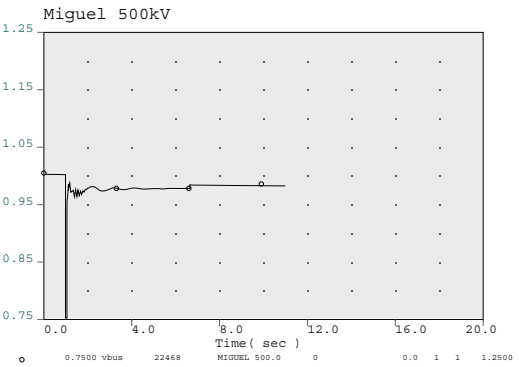


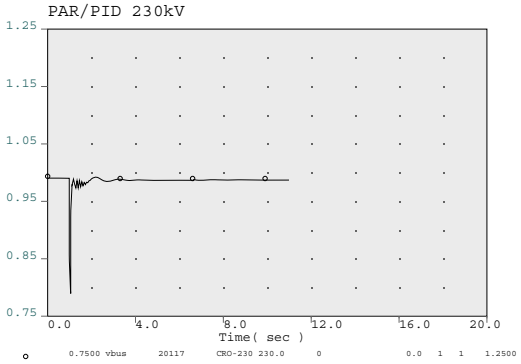
Miguel 500kV



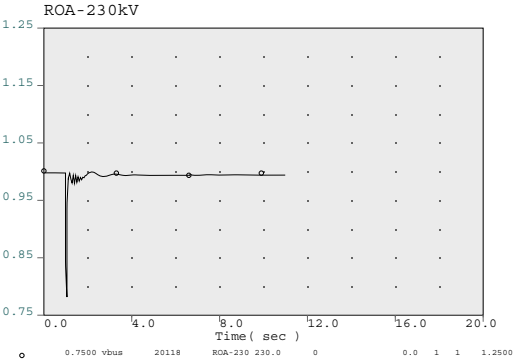
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

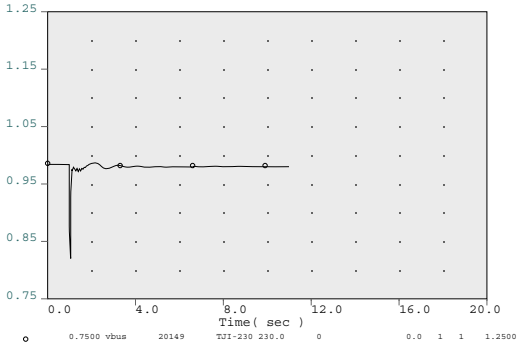
PAR/PID 230kV



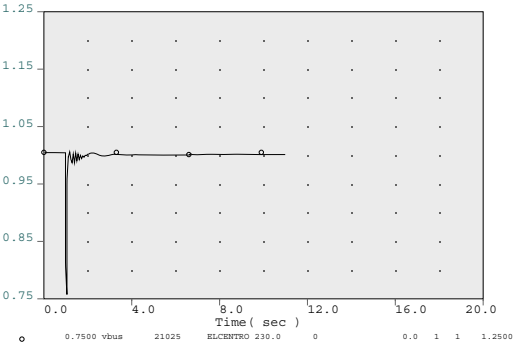
ROA-230kV



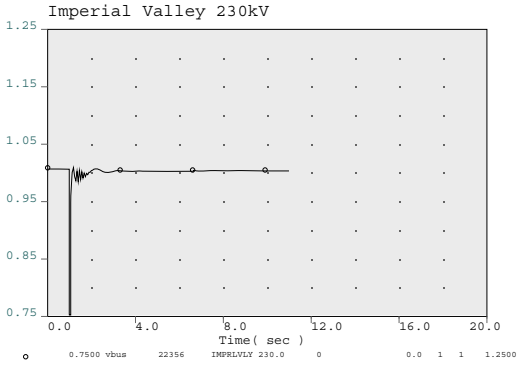
TJ1-230kV



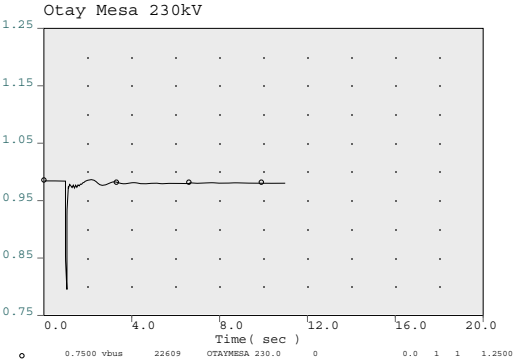
El Centro



Imperial Valley 230kV



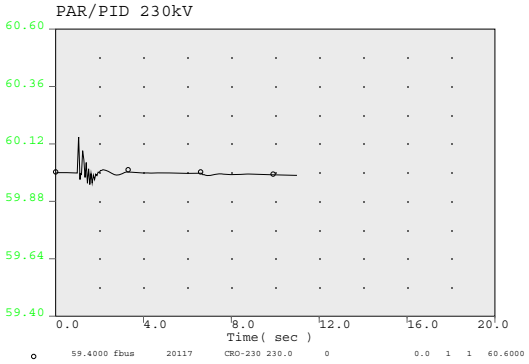
Otay Mesa 230kV



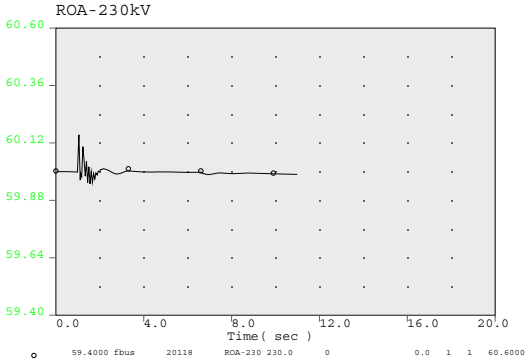
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

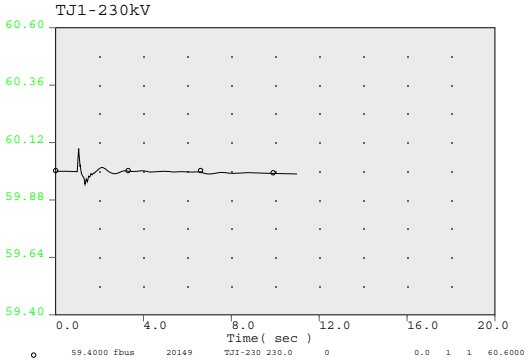
PAR/PID 230kV



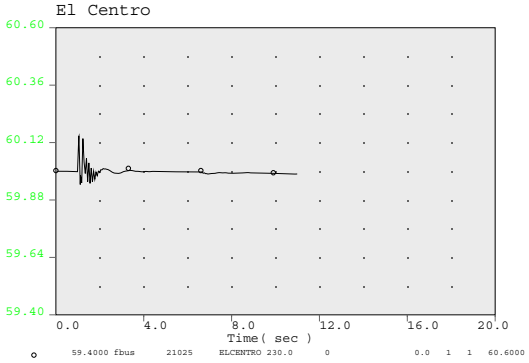
ROA-230kV



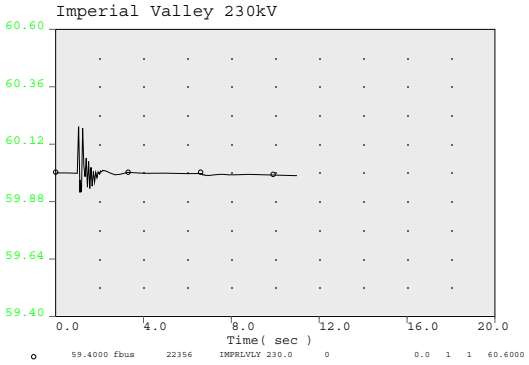
TJ1-230kV



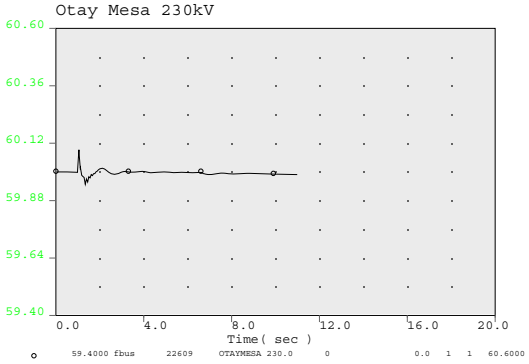
El Centro



Imperial Valley 230kV



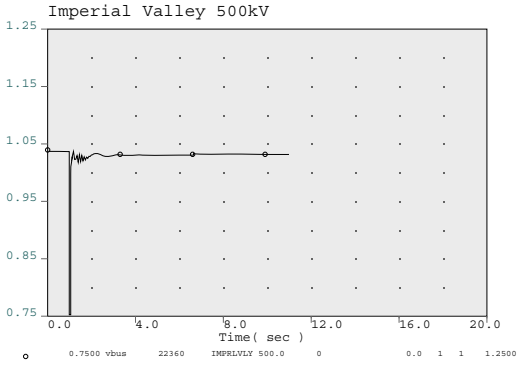
Otay Mesa 230kV



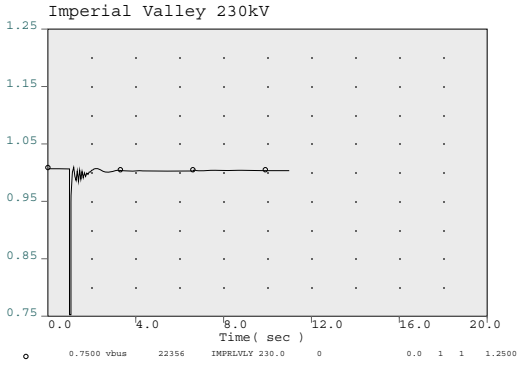
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Imperial Valley Area - VOLTAGE

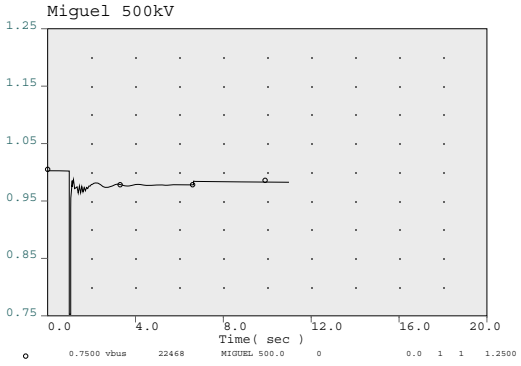
Imperial Valley 500kV



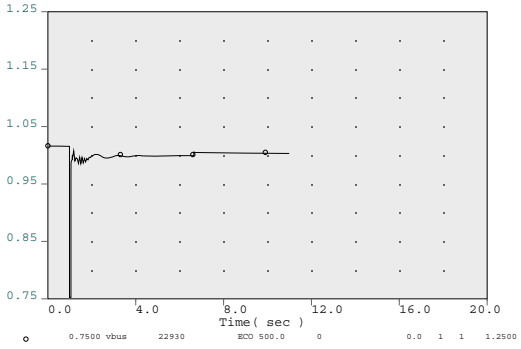
Imperial Valley 230kV



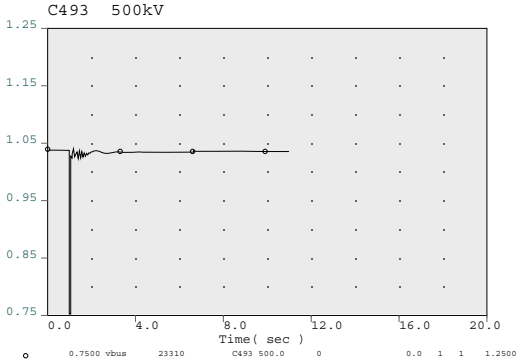
Miguel 500kV



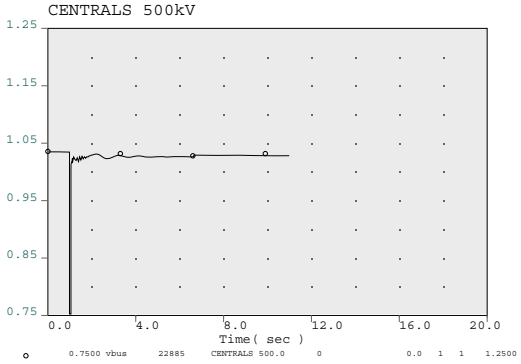
Windfarms 500



C493 500kV

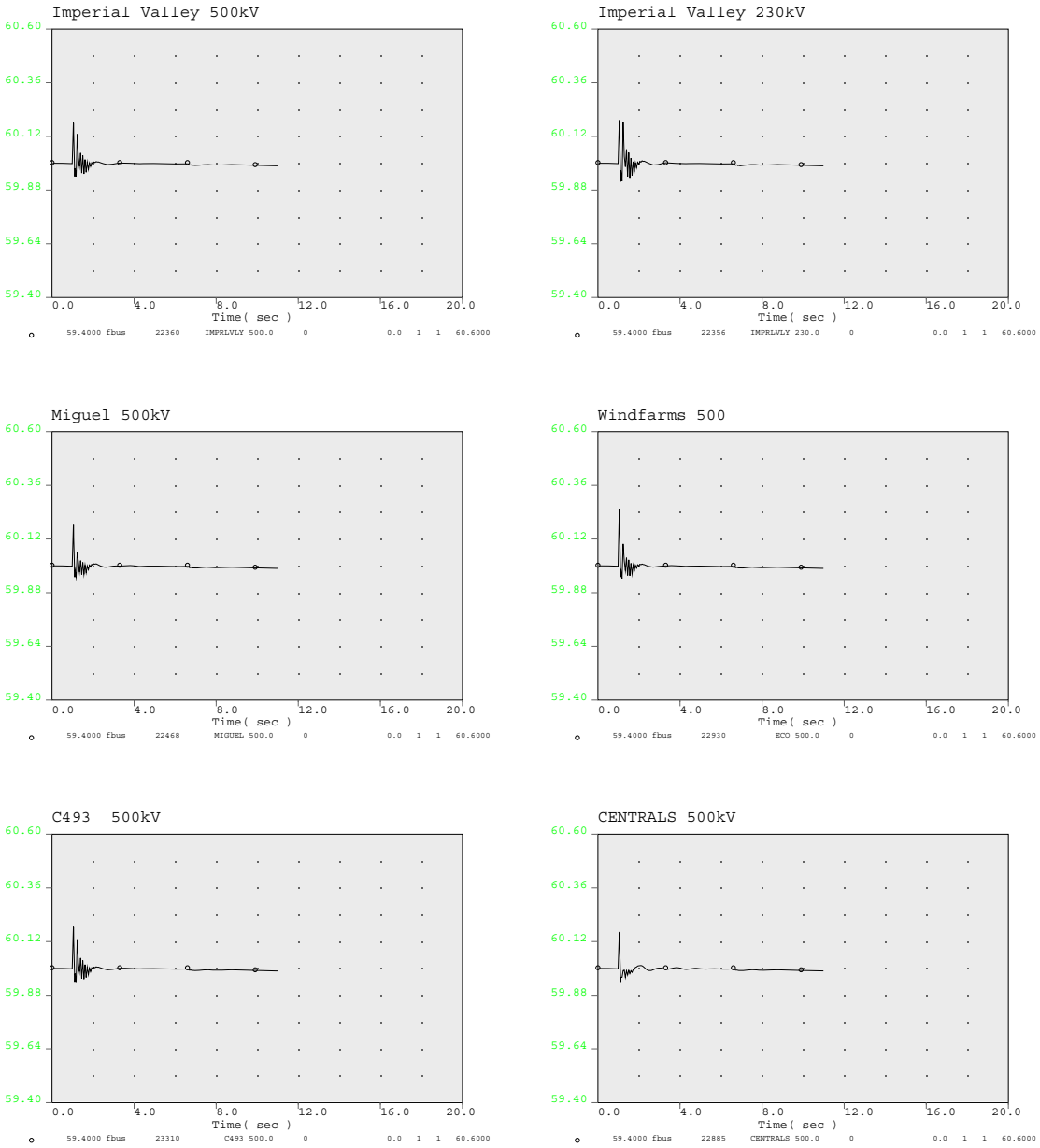


CENTRALS 500kV



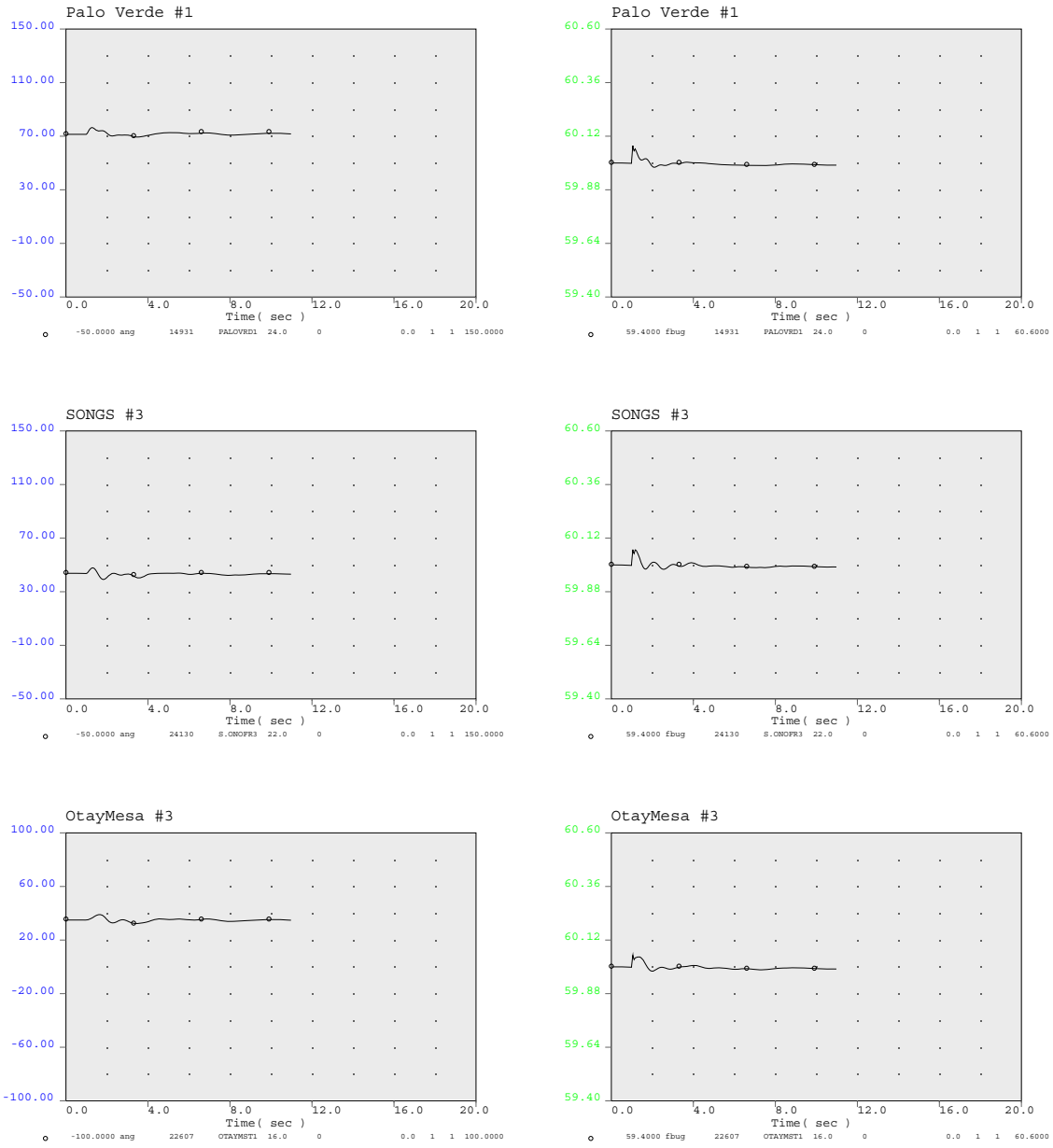
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Imperial Valley Area - Frequency



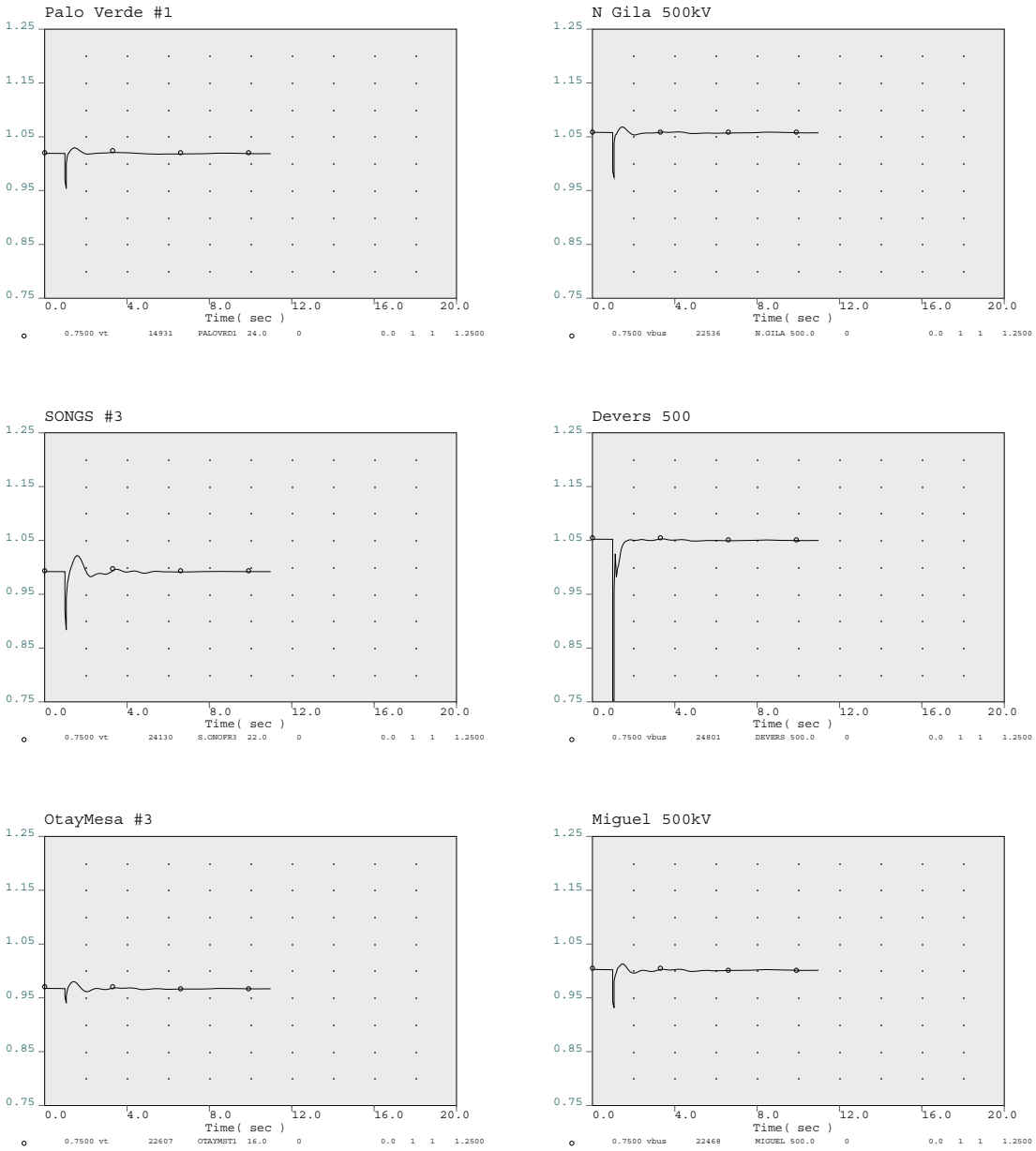
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

RELATIVE ROTOR ANGLE & FREQUENCY



SDG&E Cluster 2 - pre
2014 Heavy Summer
Valley - Devers 500 kV line

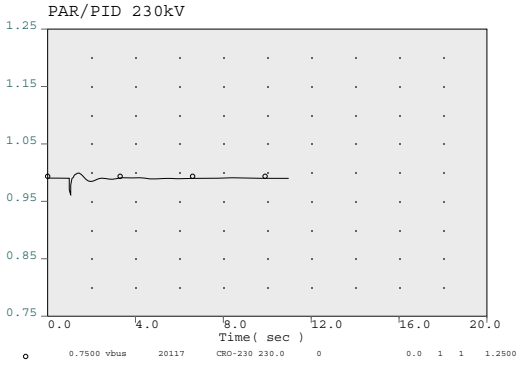
RELATIVE VOLTAGE



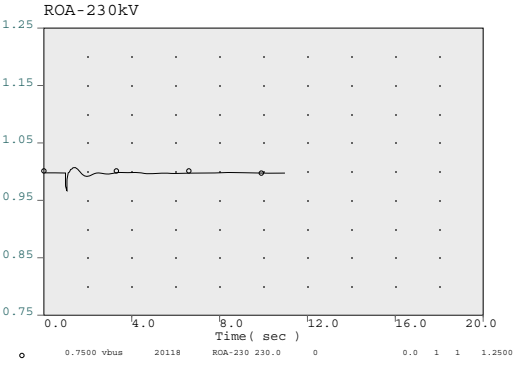
SDG&E Cluster 2 - pre
2014 Heavy Summer
Valley - Devers 500 kV line

Affected System Voltage Check and Comparison

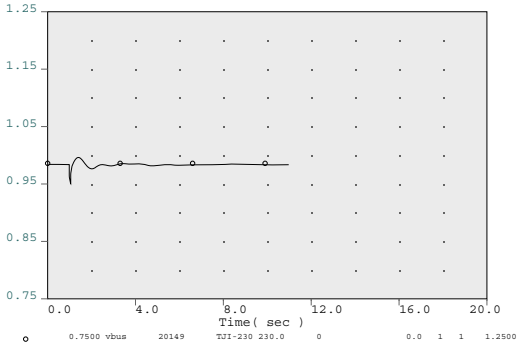
PAR/PID 230kV



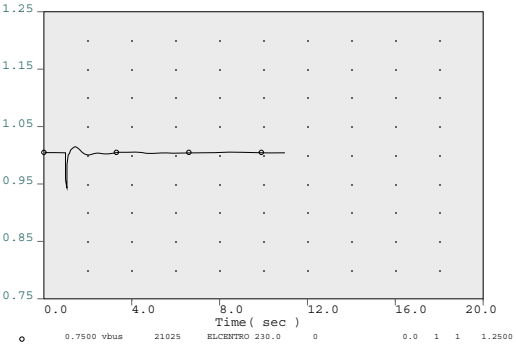
ROA-230kV



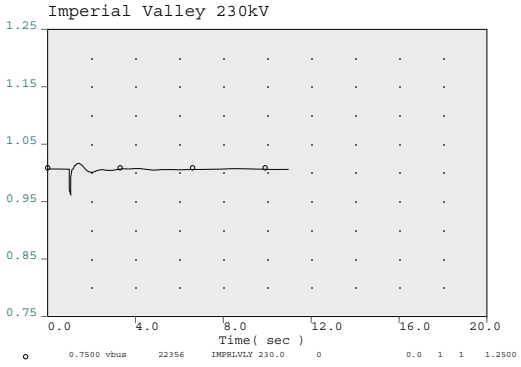
TJ1-230kV



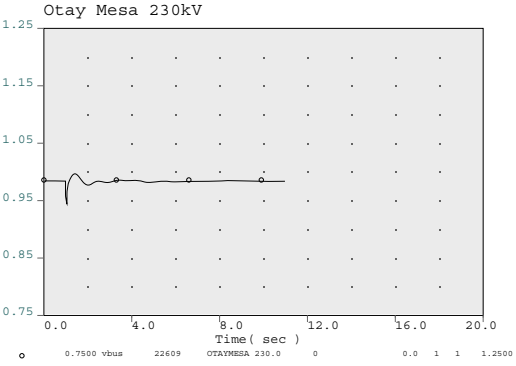
El Centro



Imperial Valley 230kV



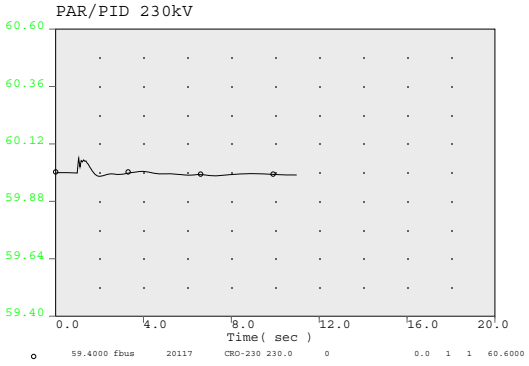
Otay Mesa 230kV



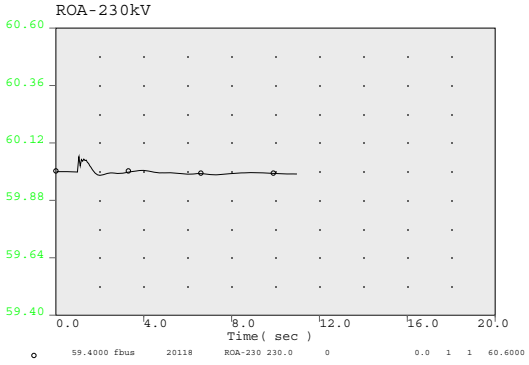
SDG&E Cluster 2 - pre
2014 Heavy Summer
Valley - Devers 500 kV line

Affected System Frequency Check and Comparison

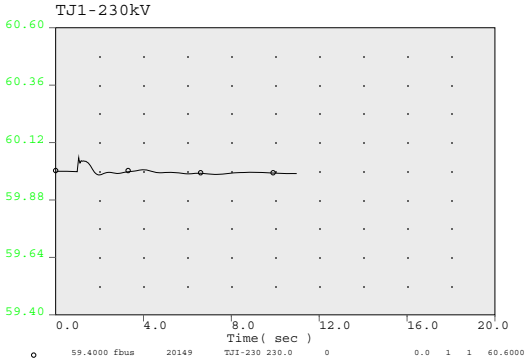
PAR/PID 230kV



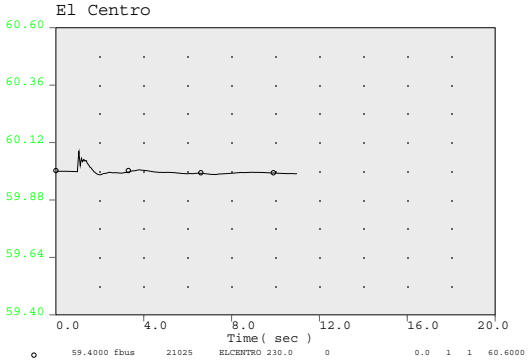
ROA-230kV



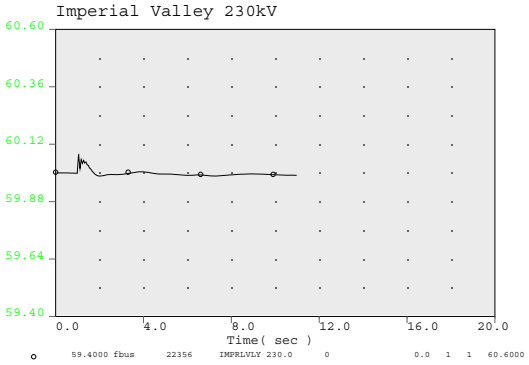
TJ1-230kV



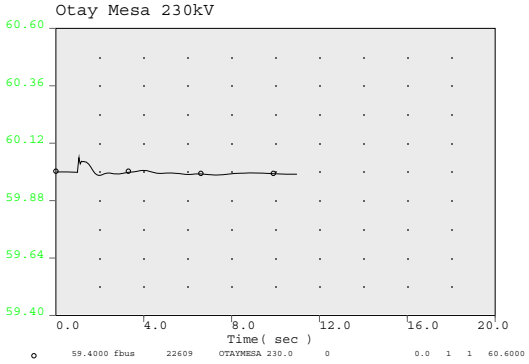
El Centro



Imperial Valley 230kV



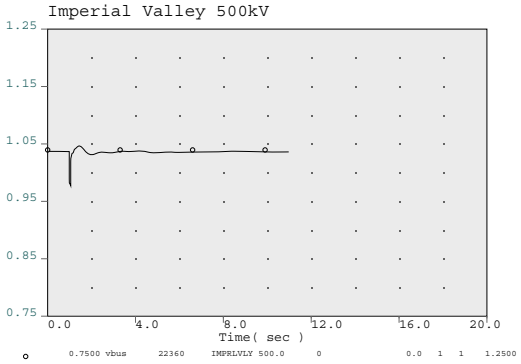
Otay Mesa 230kV



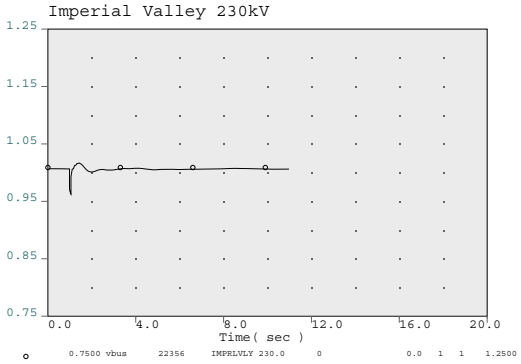
SDG&E Cluster 2 - pre
2014 Heavy Summer
Valley - Devers 500 kV line

Imperial Valley Area - VOLTAGE

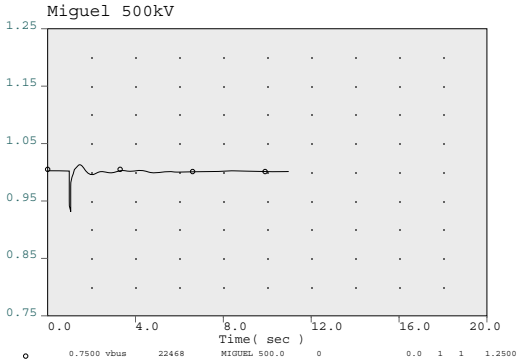
Imperial Valley 500kV



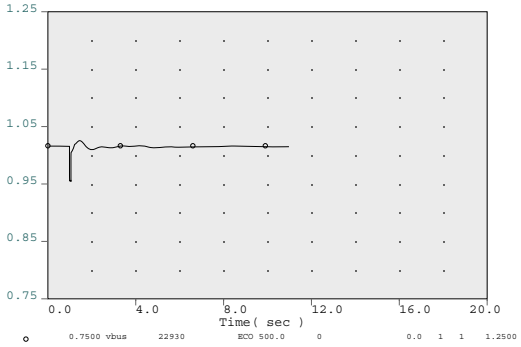
Imperial Valley 230kV



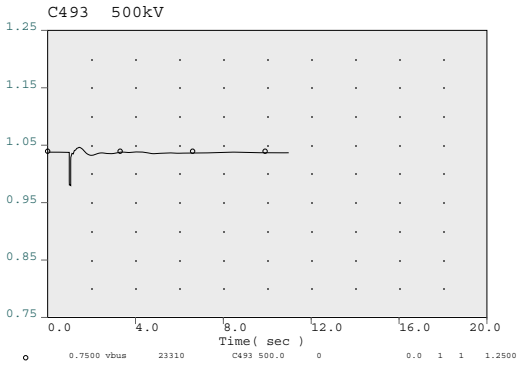
Miguel 500kV



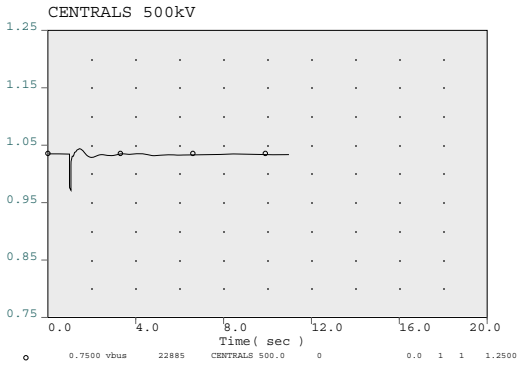
Windfarms 500



C493 500kV

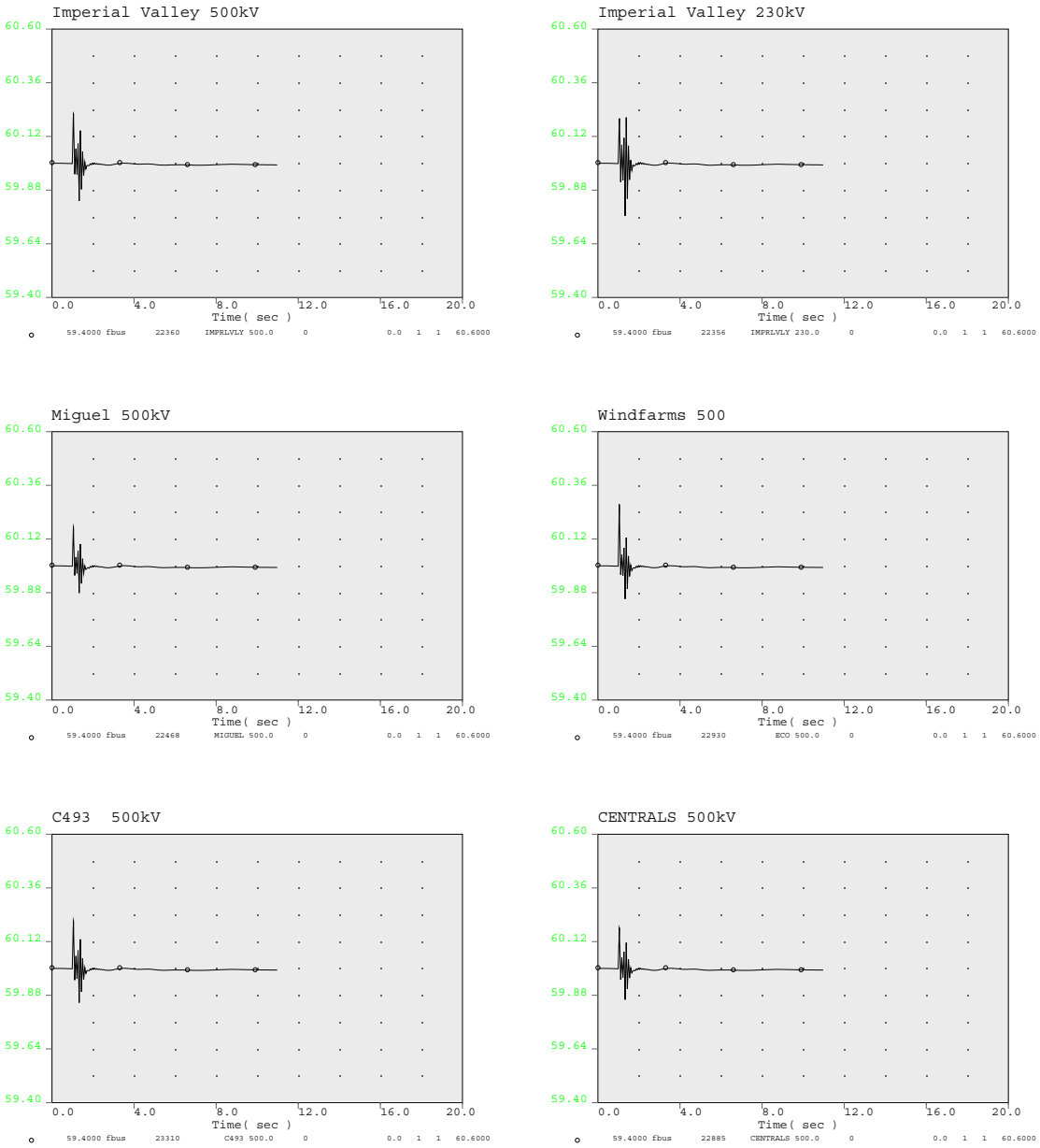


CENTRALS 500kV



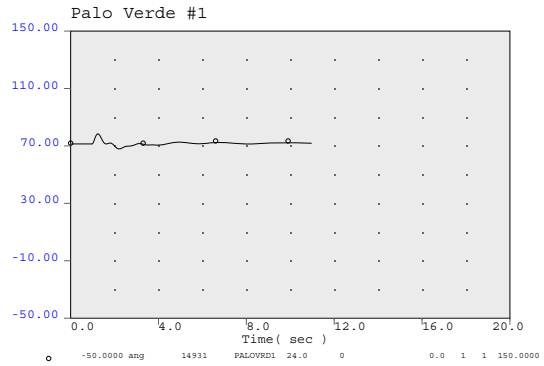
SDG&E Cluster 2 - pre
2014 Heavy Summer
Valley - Devers 500 kV line

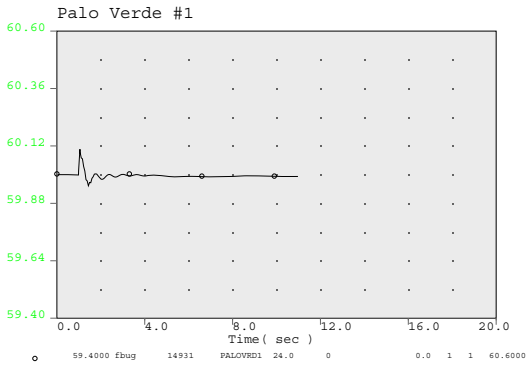
Imperial Valley Area - Frequency

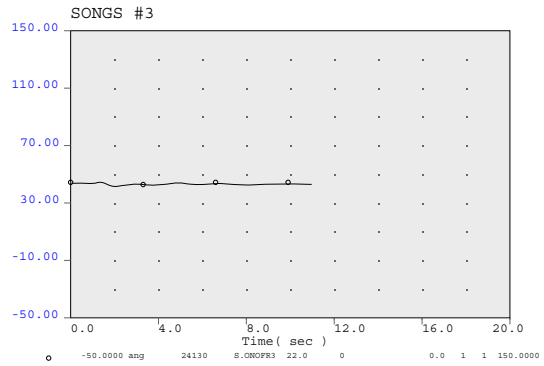


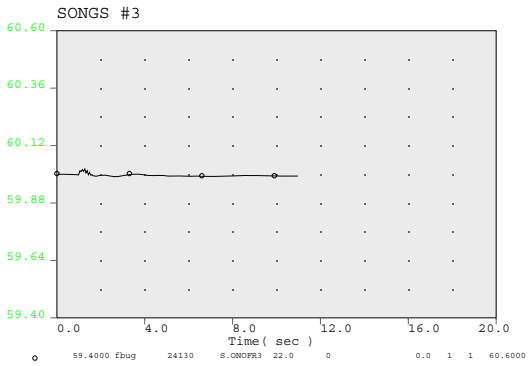
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

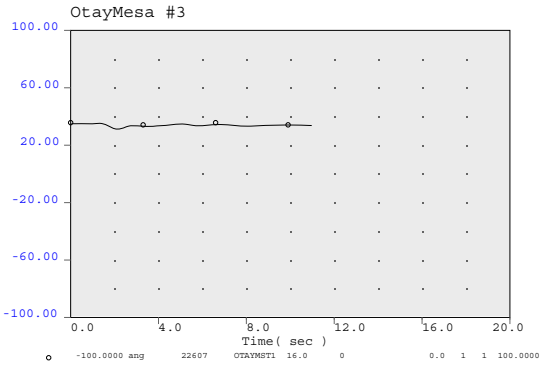
RELATIVE ROTOR ANGLE & FREQUENCY

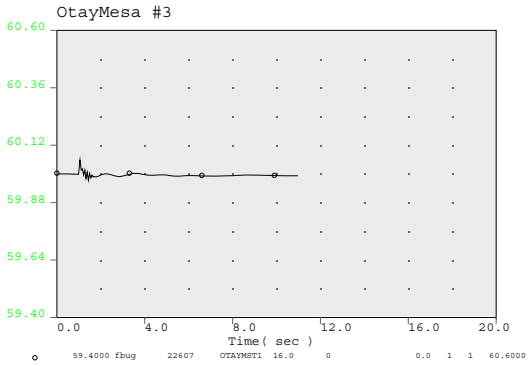










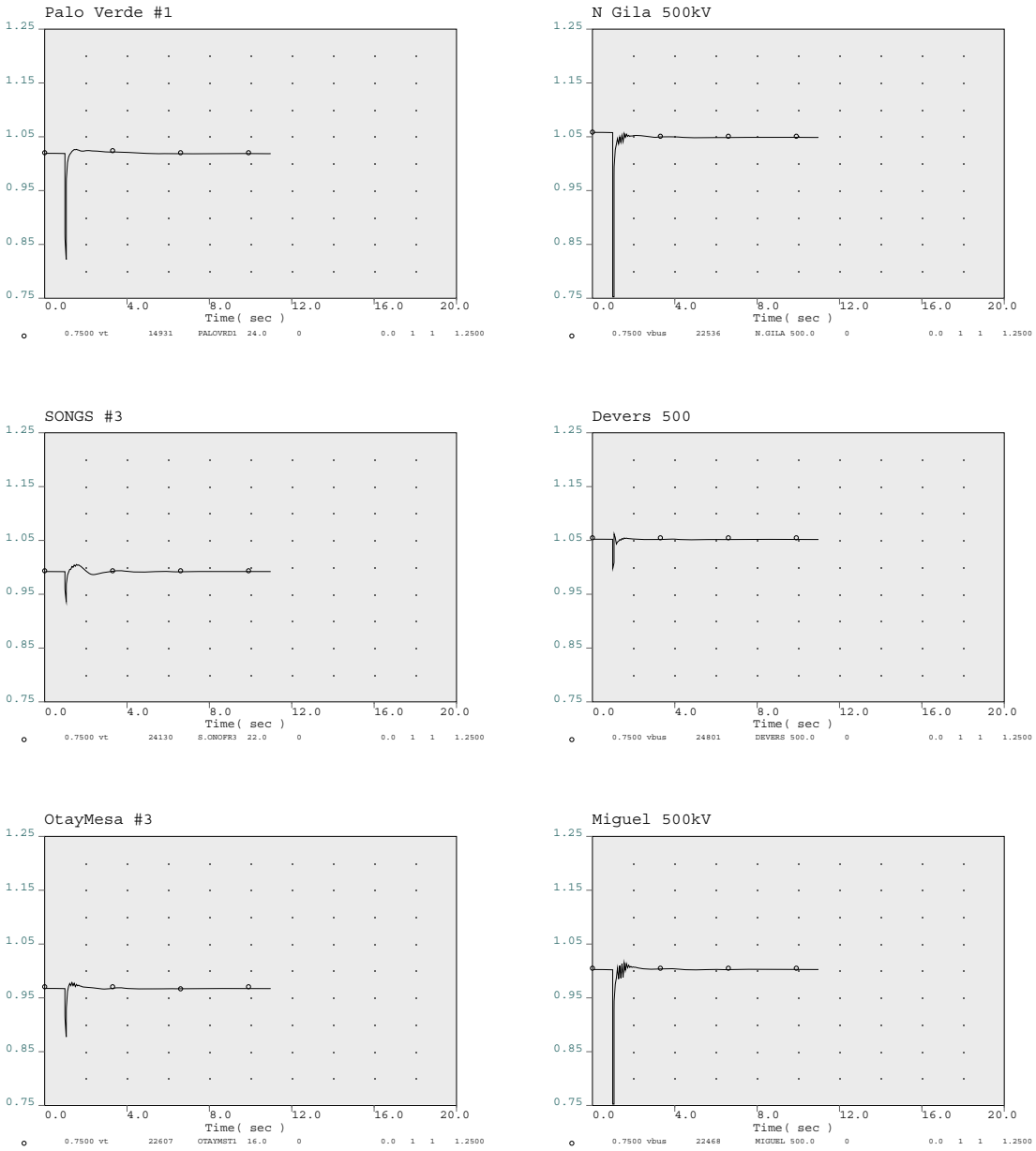


SDG&E Cluster 2 - pre
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Page 1

SDGE	HAA_NGila_slo_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:56 2010

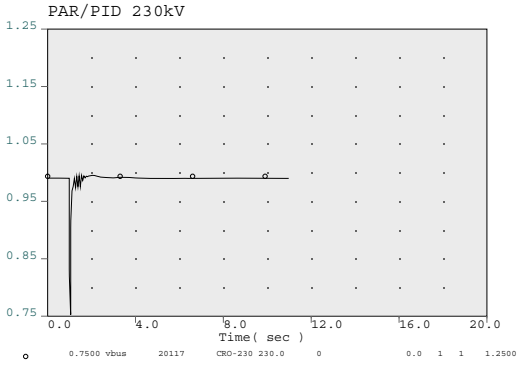
RELATIVE VOLTAGE



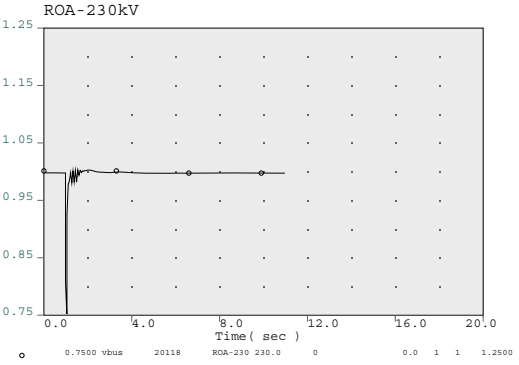
SDG&E Cluster 2 - pre
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

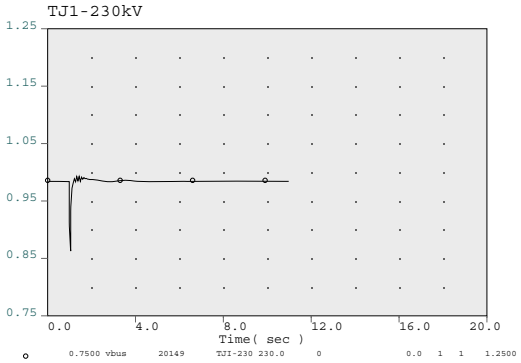
PAR/PID 230kV



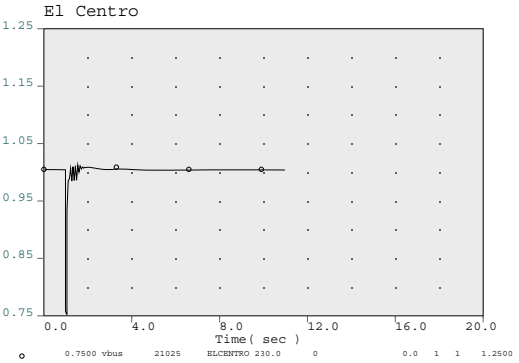
ROA-230kV



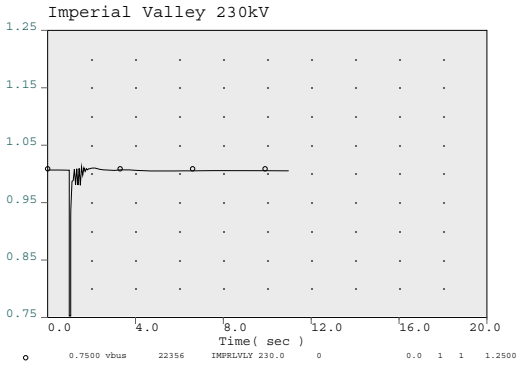
TJ1-230kV



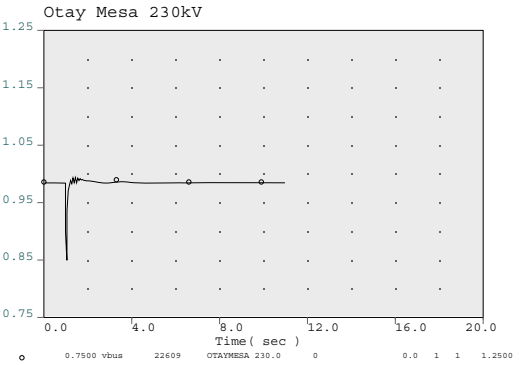
El Centro



Imperial Valley 230kV



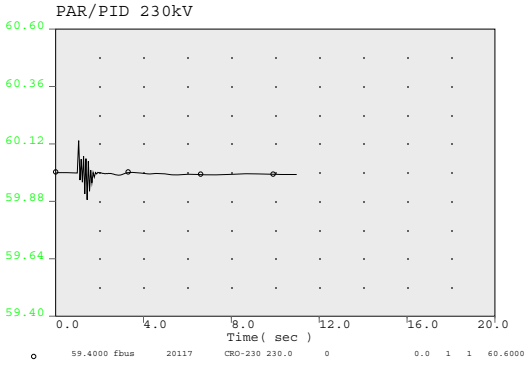
Otay Mesa 230kV



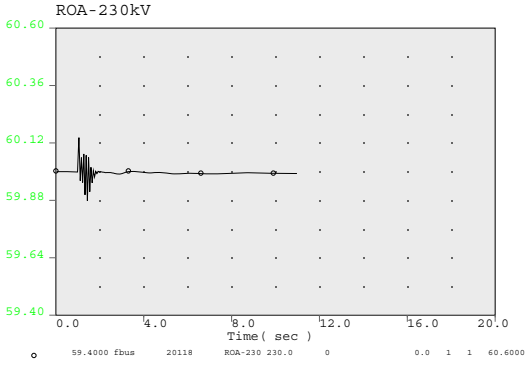
SDG&E Cluster 2 - pre
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Affected System Frequency Check and Comparison

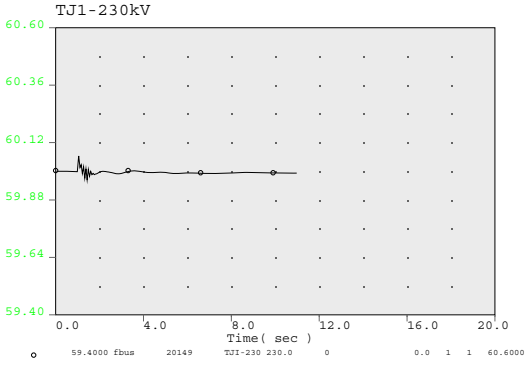
PAR/PID 230kV



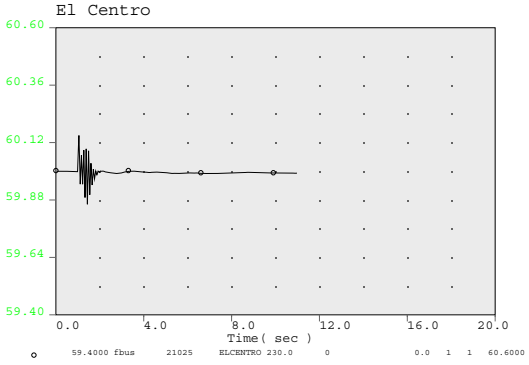
ROA-230kV



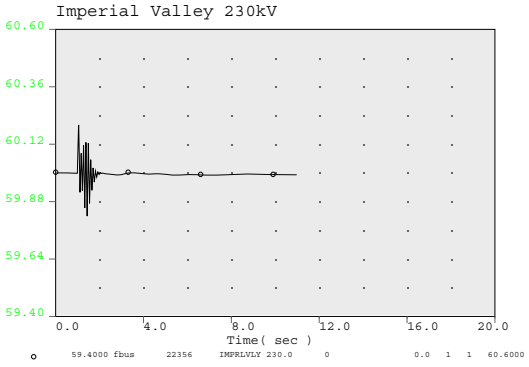
TJ1-230kV



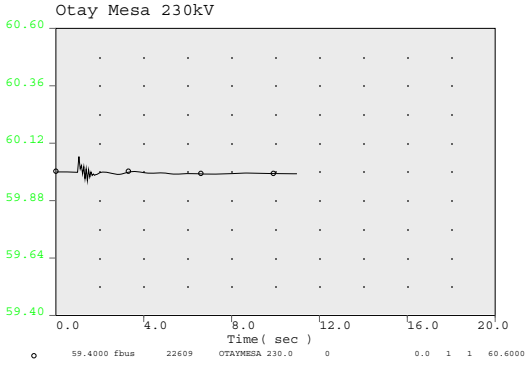
El Centro



Imperial Valley 230kV



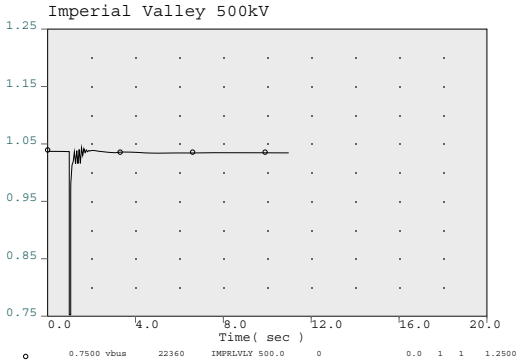
Otay Mesa 230kV



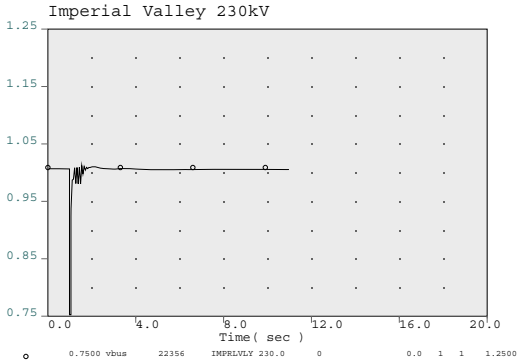
SDG&E Cluster 2 - pre
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

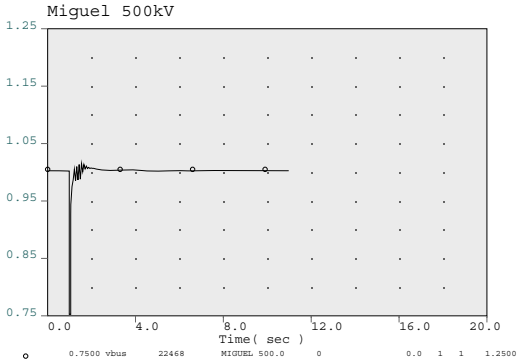
Imperial Valley 500kV



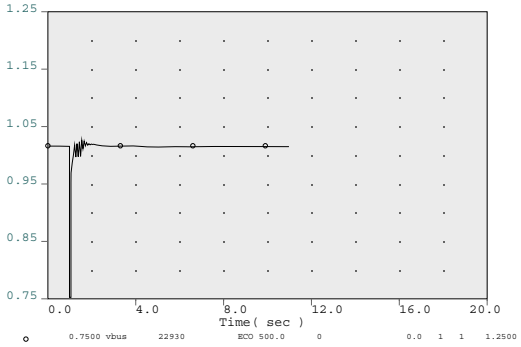
Imperial Valley 230kV



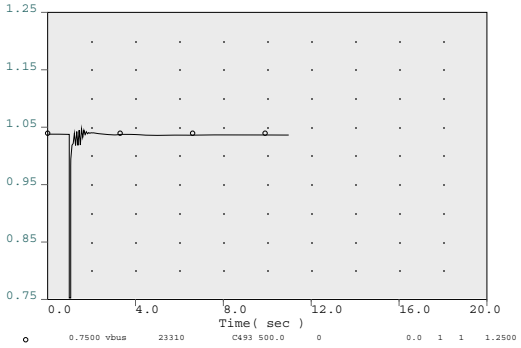
Miguel 500kV



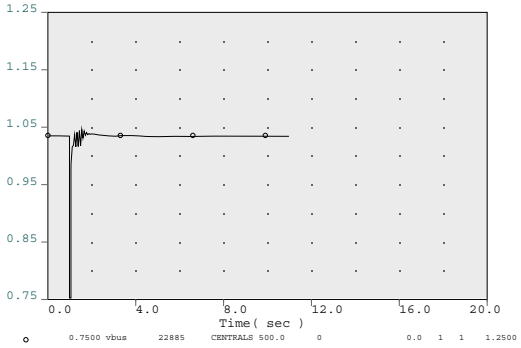
Windfarms 500



C493 500kV



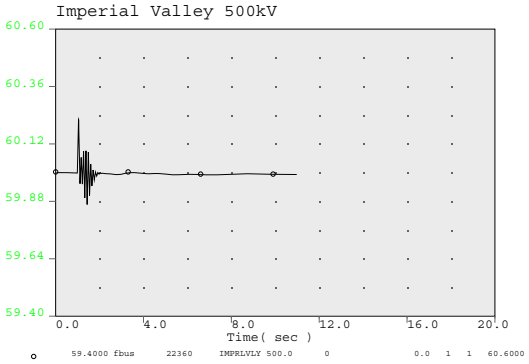
CENTRALS 500kV



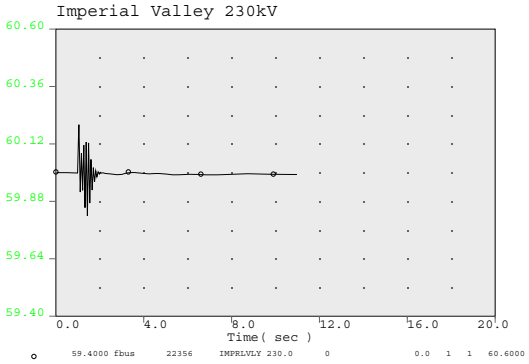
SDG&E Cluster 2 - pre
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - Frequency

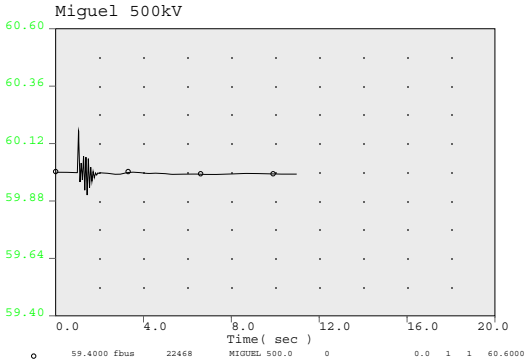
Imperial Valley 500kV



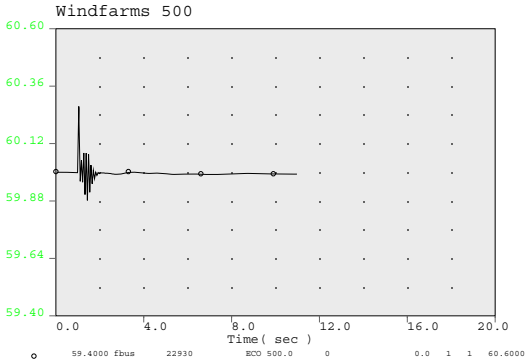
Imperial Valley 230kV



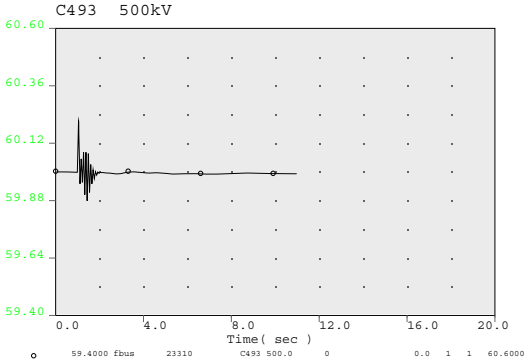
Miguel 500kV



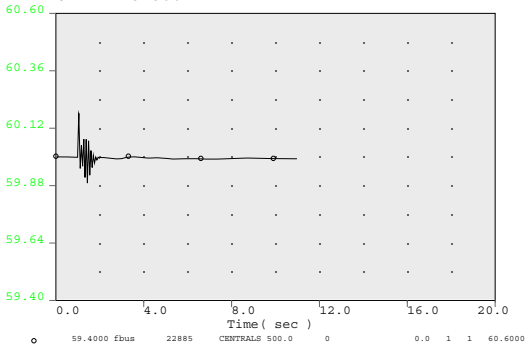
Windfarms 500



C493 500kV

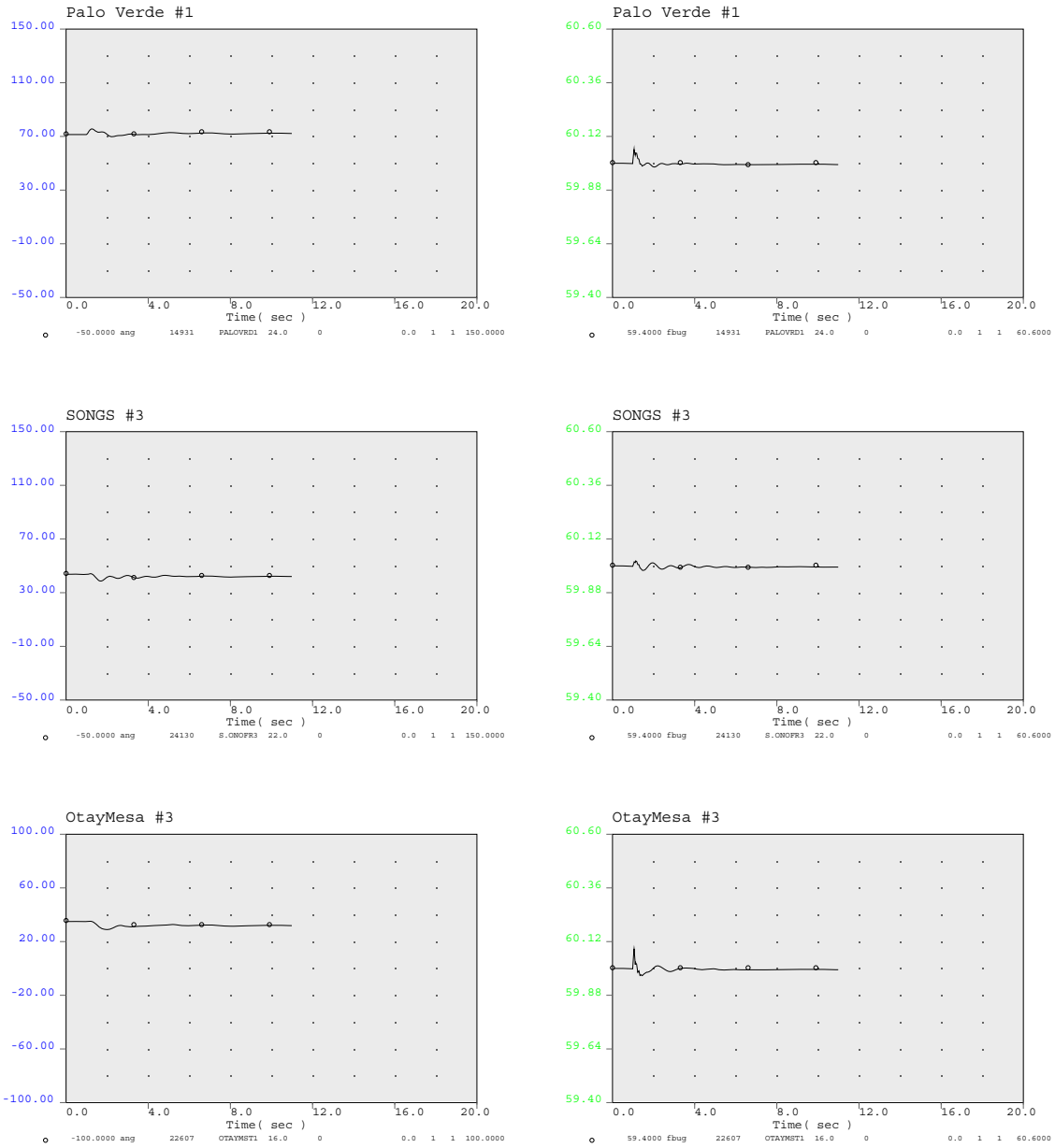


CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY

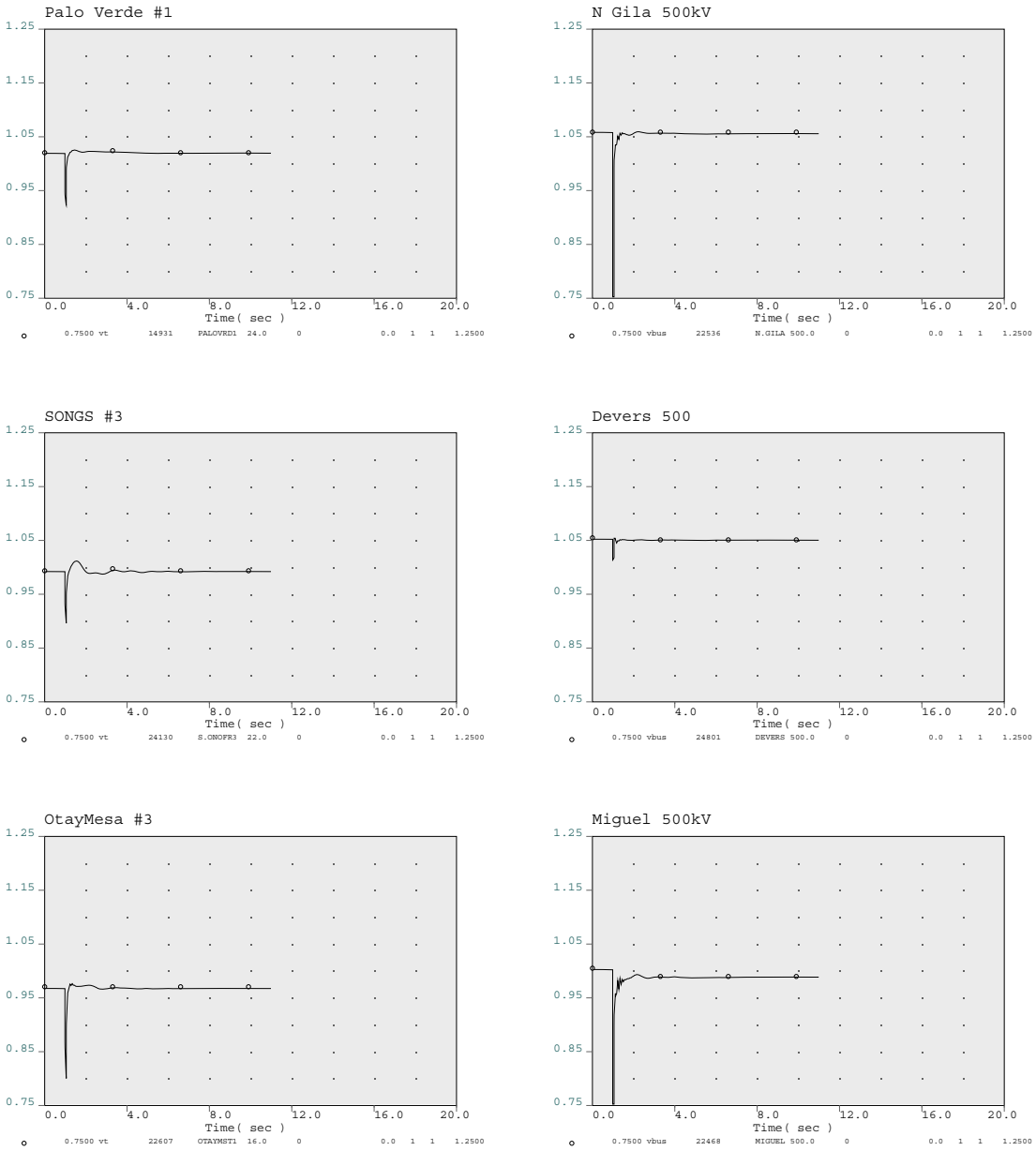


SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Page 1

SDGE	IV_C493_slo_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:42:08 2010

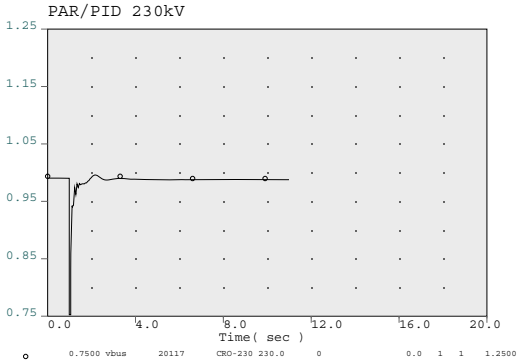
RELATIVE VOLTAGE



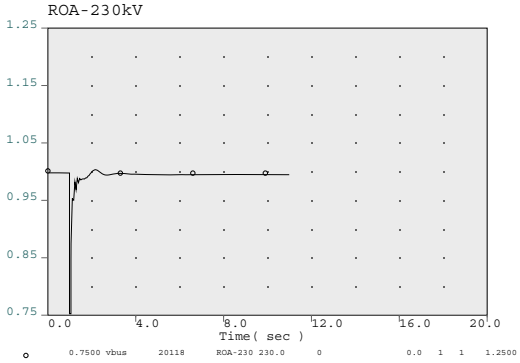
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

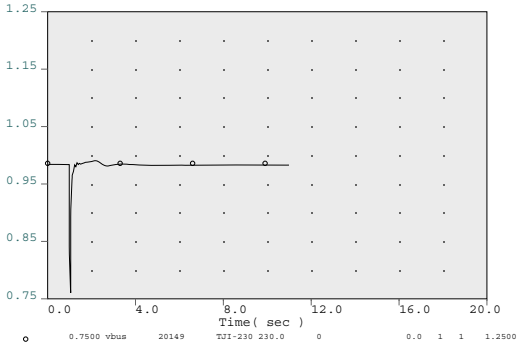
PAR/PID 230kV



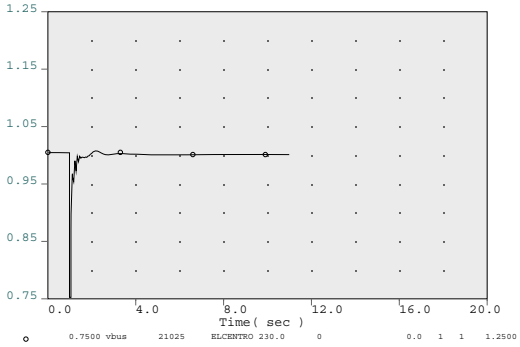
ROA-230kV



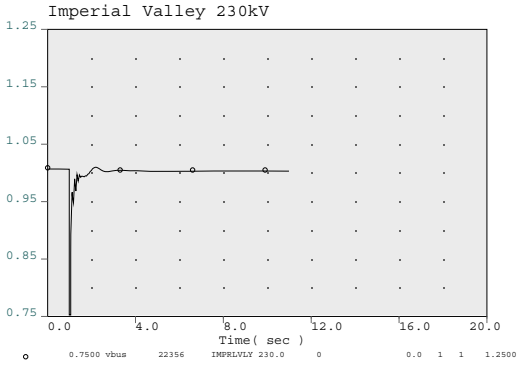
TJ1-230kV



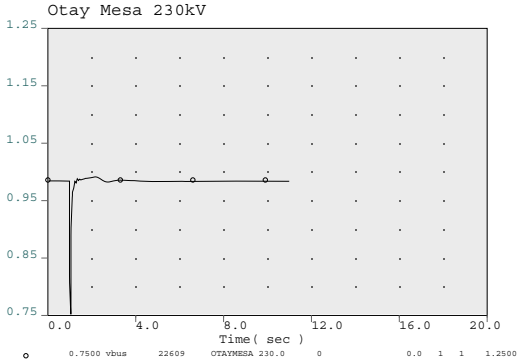
El Centro



Imperial Valley 230kV



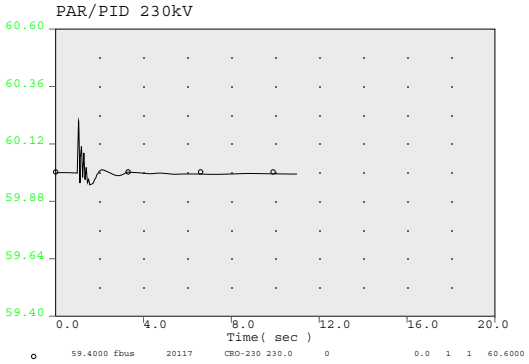
Otay Mesa 230kV



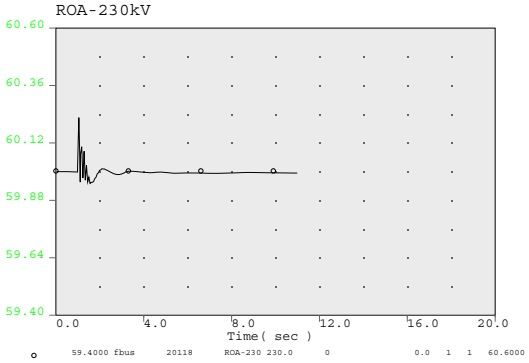
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

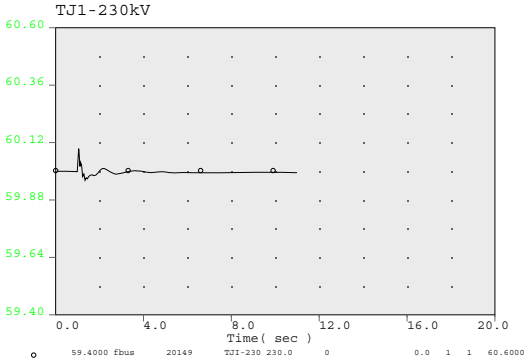
PAR/PID 230kV



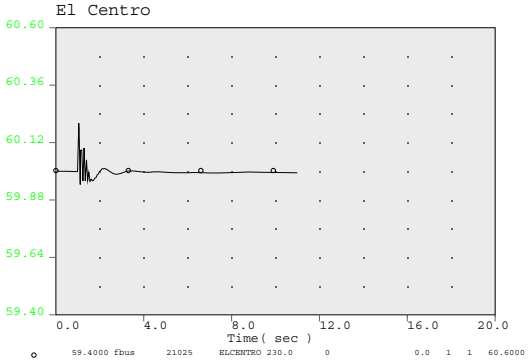
ROA-230kV



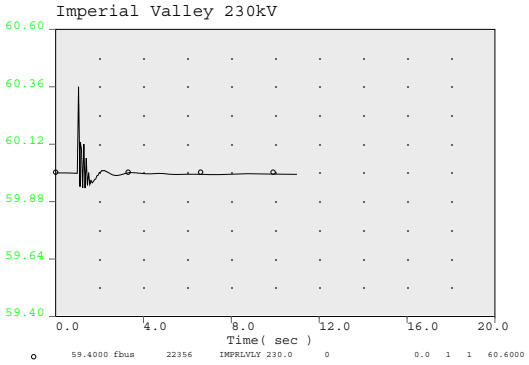
TJ1-230kV



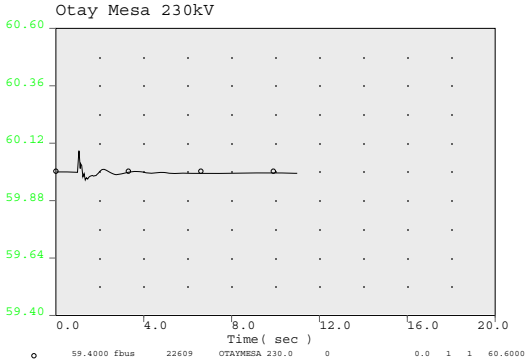
El Centro



Imperial Valley 230kV

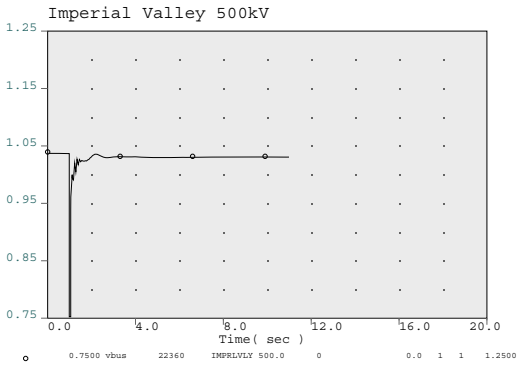


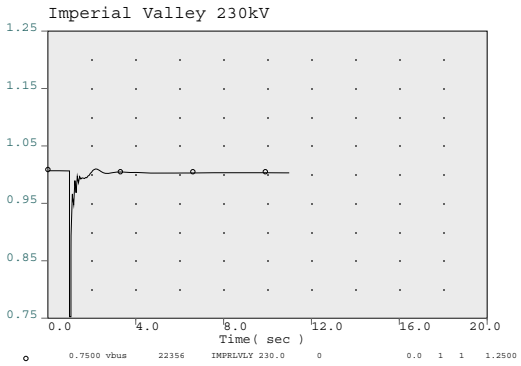
Otay Mesa 230kV

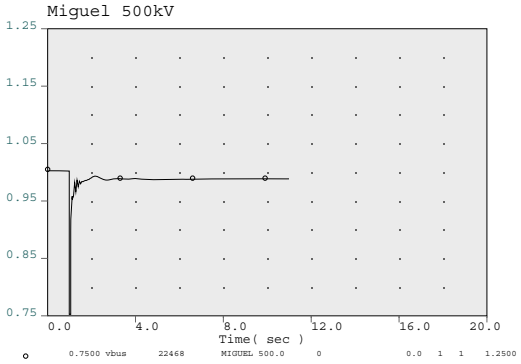


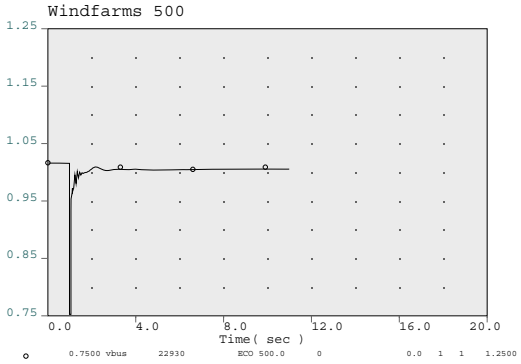
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

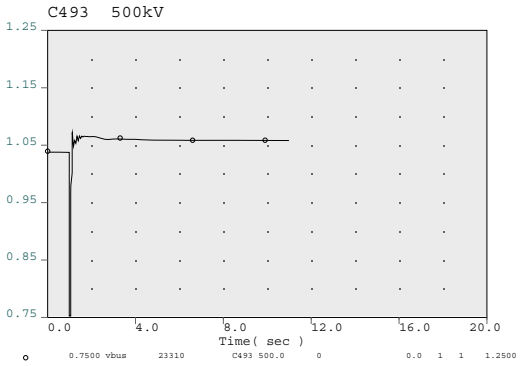
Imperial Valley Area - VOLTAGE

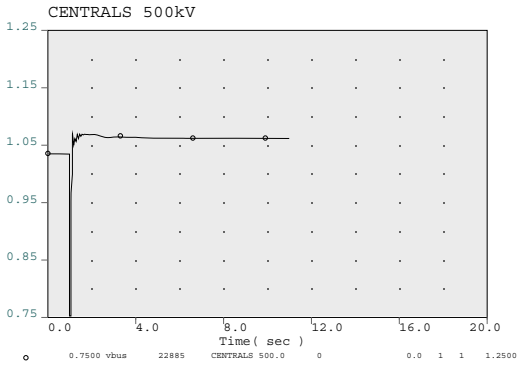






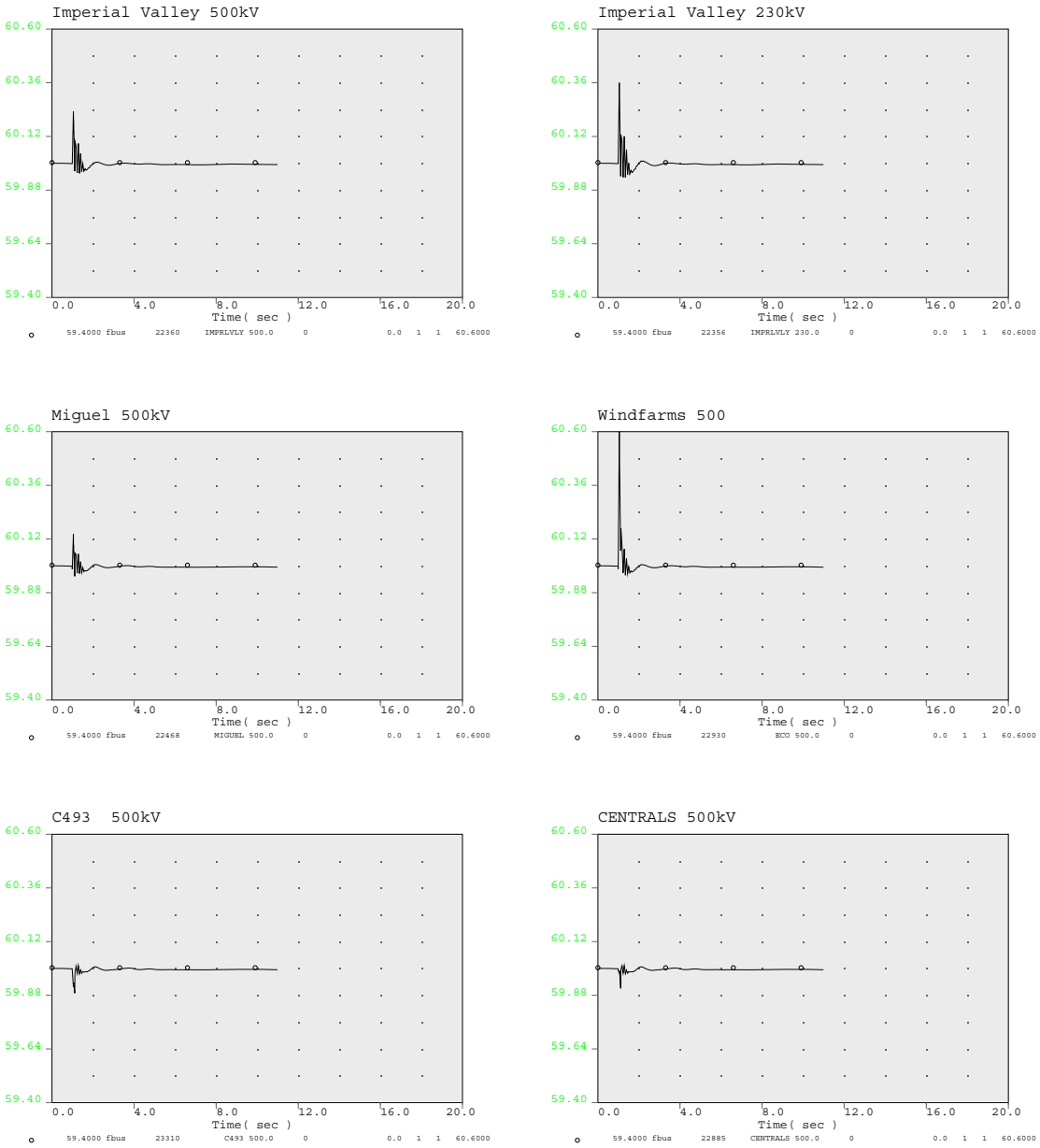






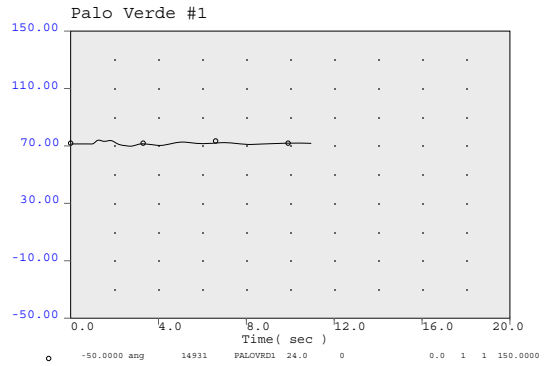
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

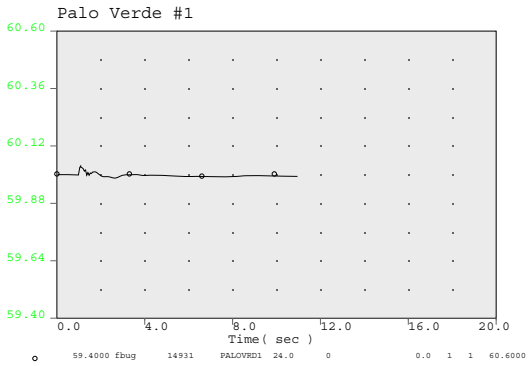
Imperial Valley Area - Frequency

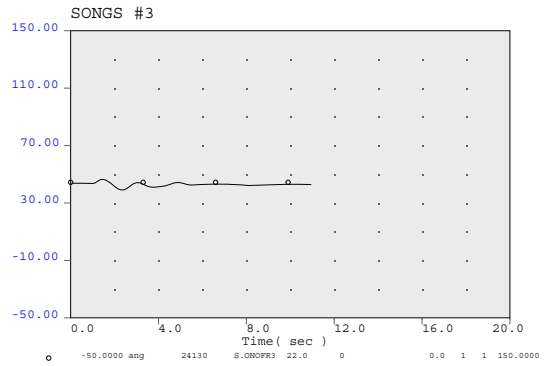


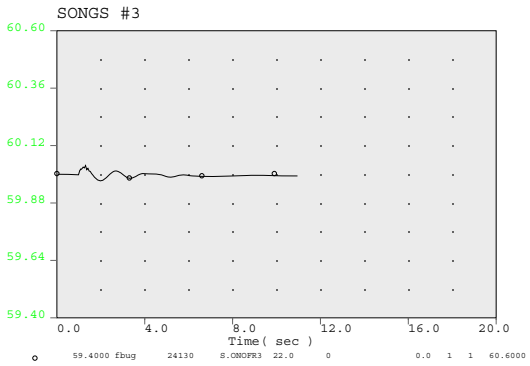
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

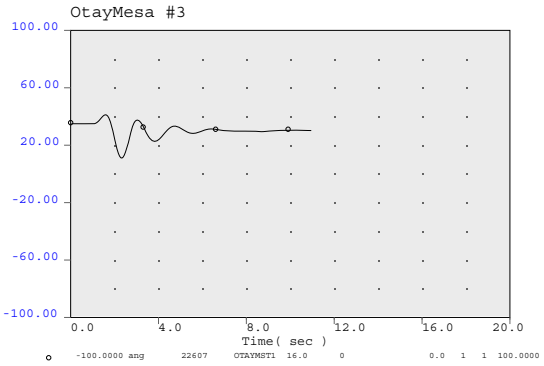
RELATIVE ROTOR ANGLE & FREQUENCY

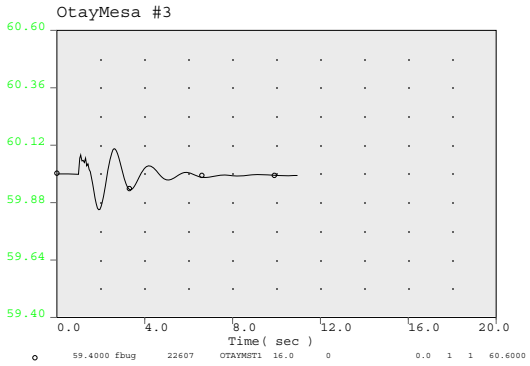










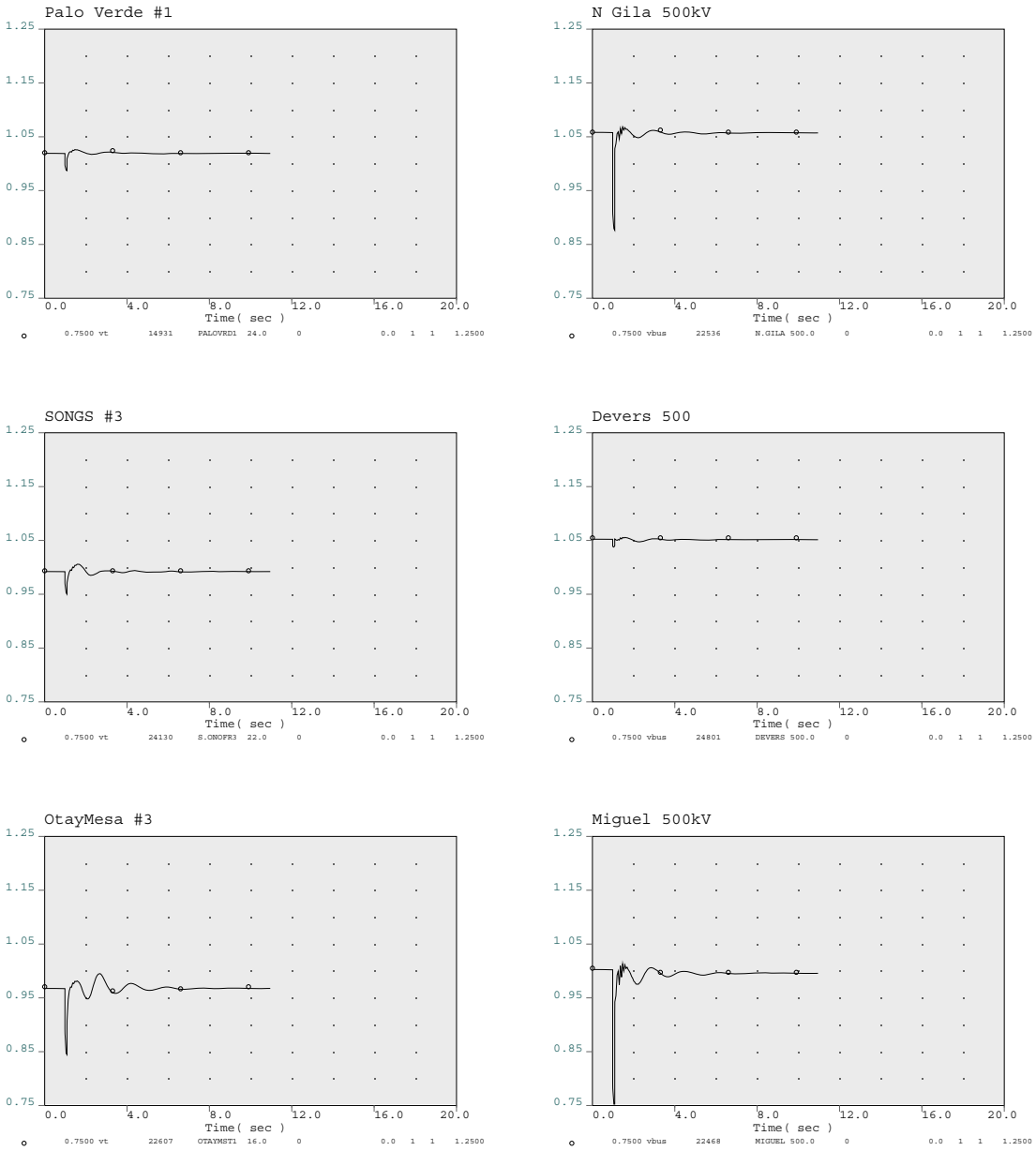


SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Page 1

SDGE	iv_roa_6_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:19 2010

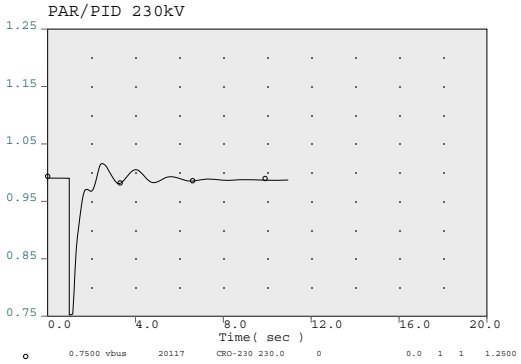
RELATIVE VOLTAGE



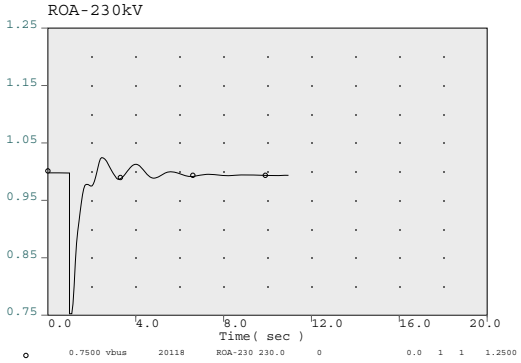
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

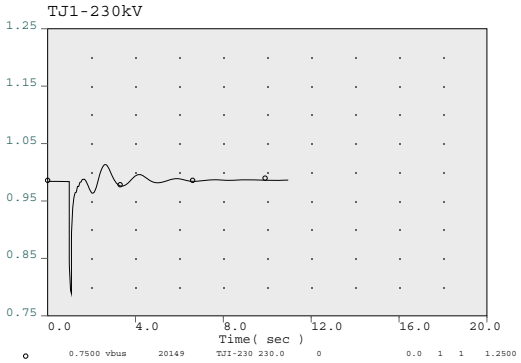
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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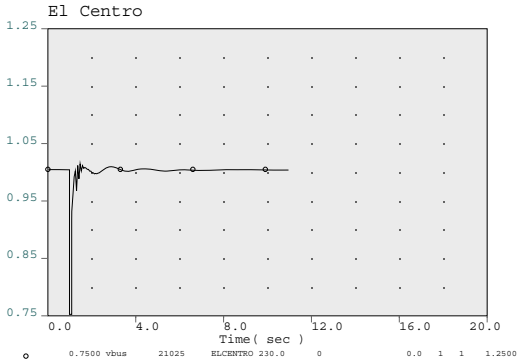
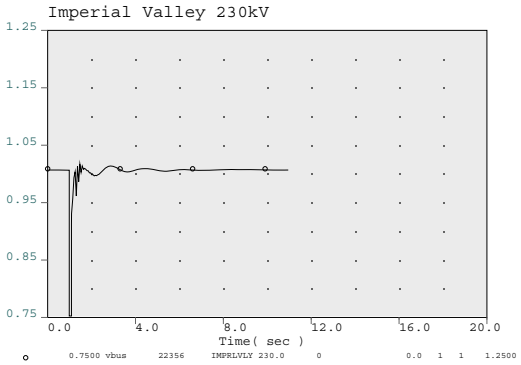
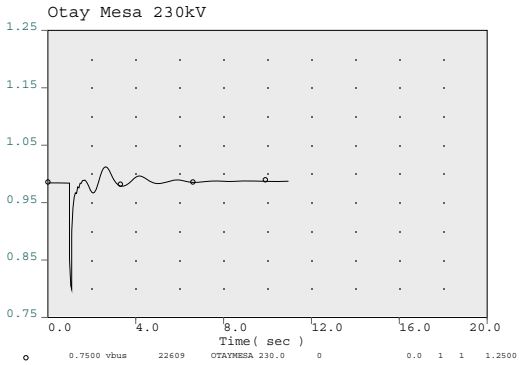


Imperial Valley 230kV



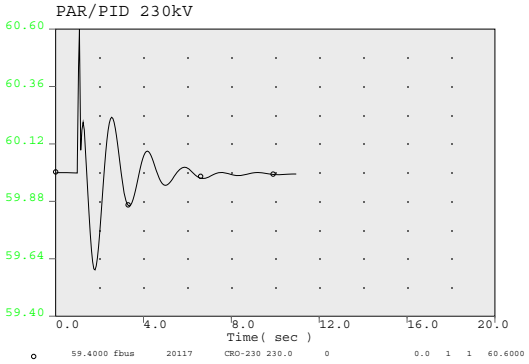
Otay Mesa 230kV



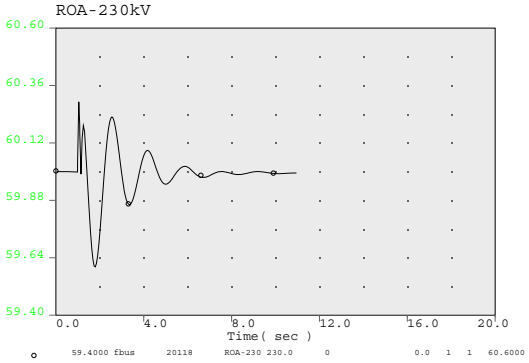
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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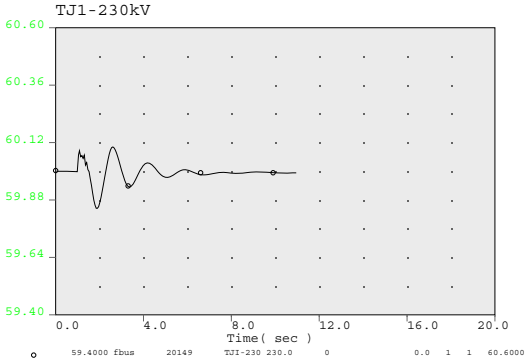
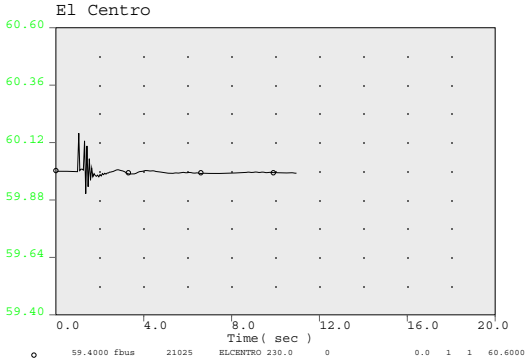
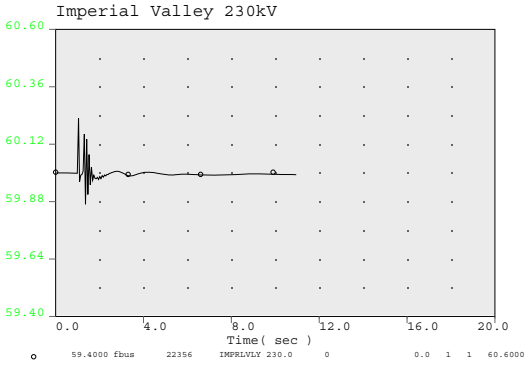


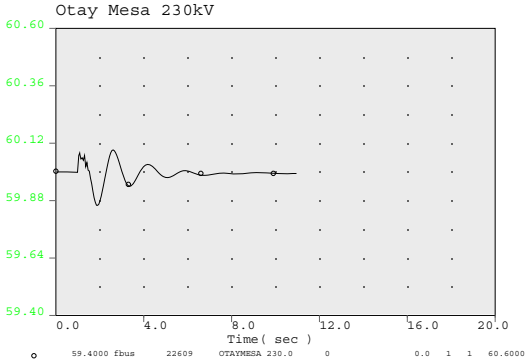
El Centro



Imperial Valley 230kV



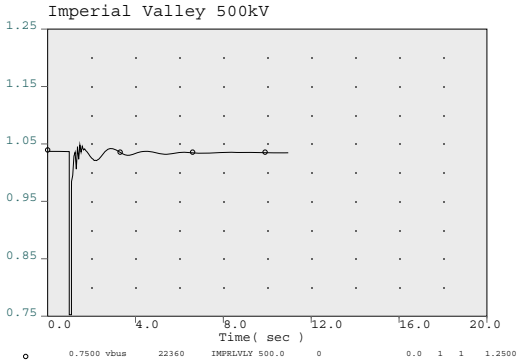
Otay Mesa 230kV



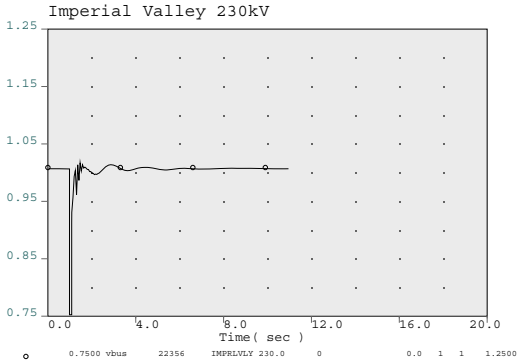
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

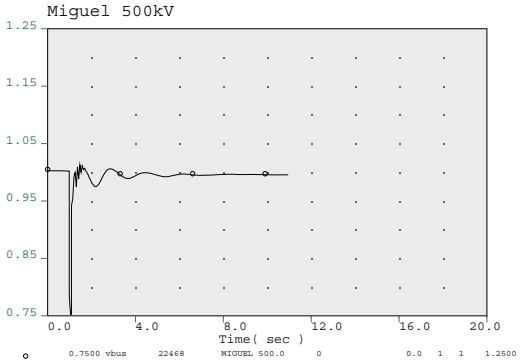
Imperial Valley 500kV



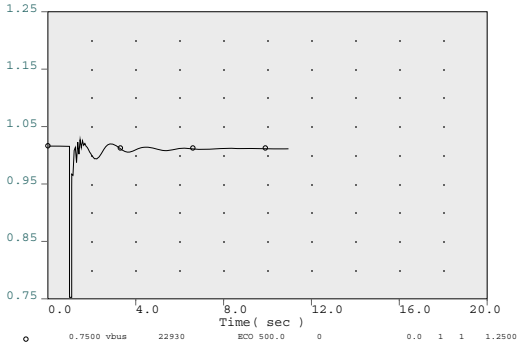
Imperial Valley 230kV



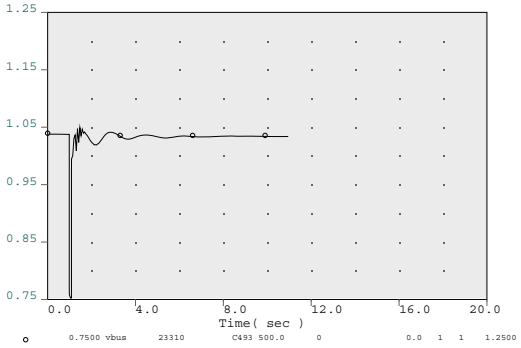
Miguel 500kV



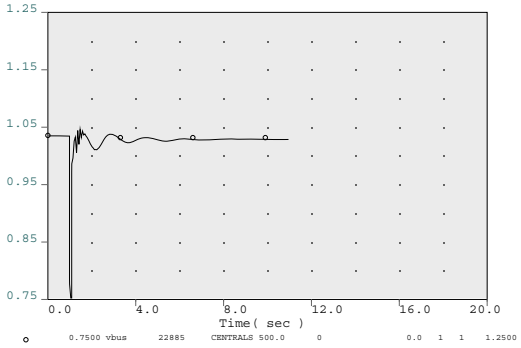
Windfarms 500



C493 500kV



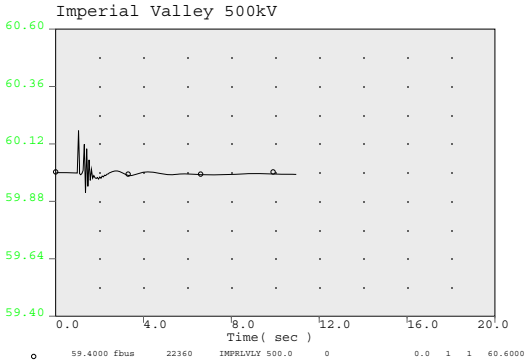
CENTRALS 500kV



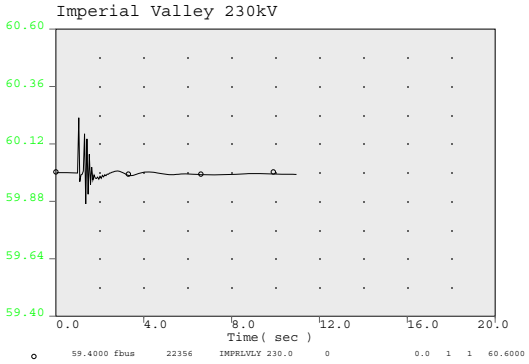
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - Frequency

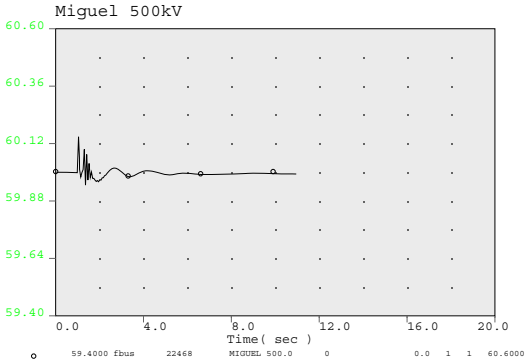
Imperial Valley 500kV



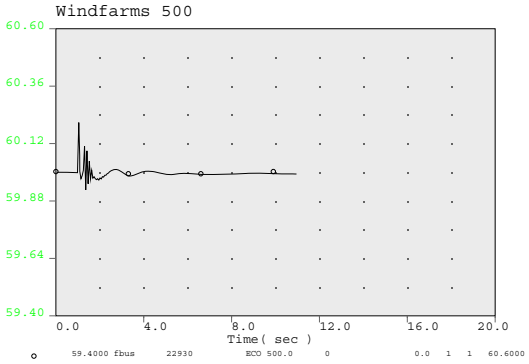
Imperial Valley 230kV



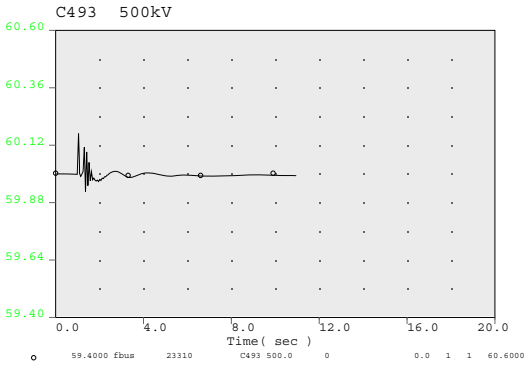
Miguel 500kV



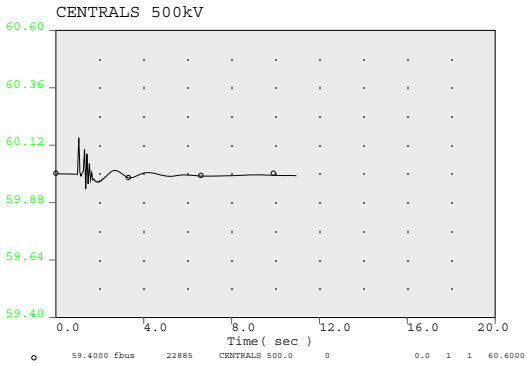
Windfarms 500



C493 500kV

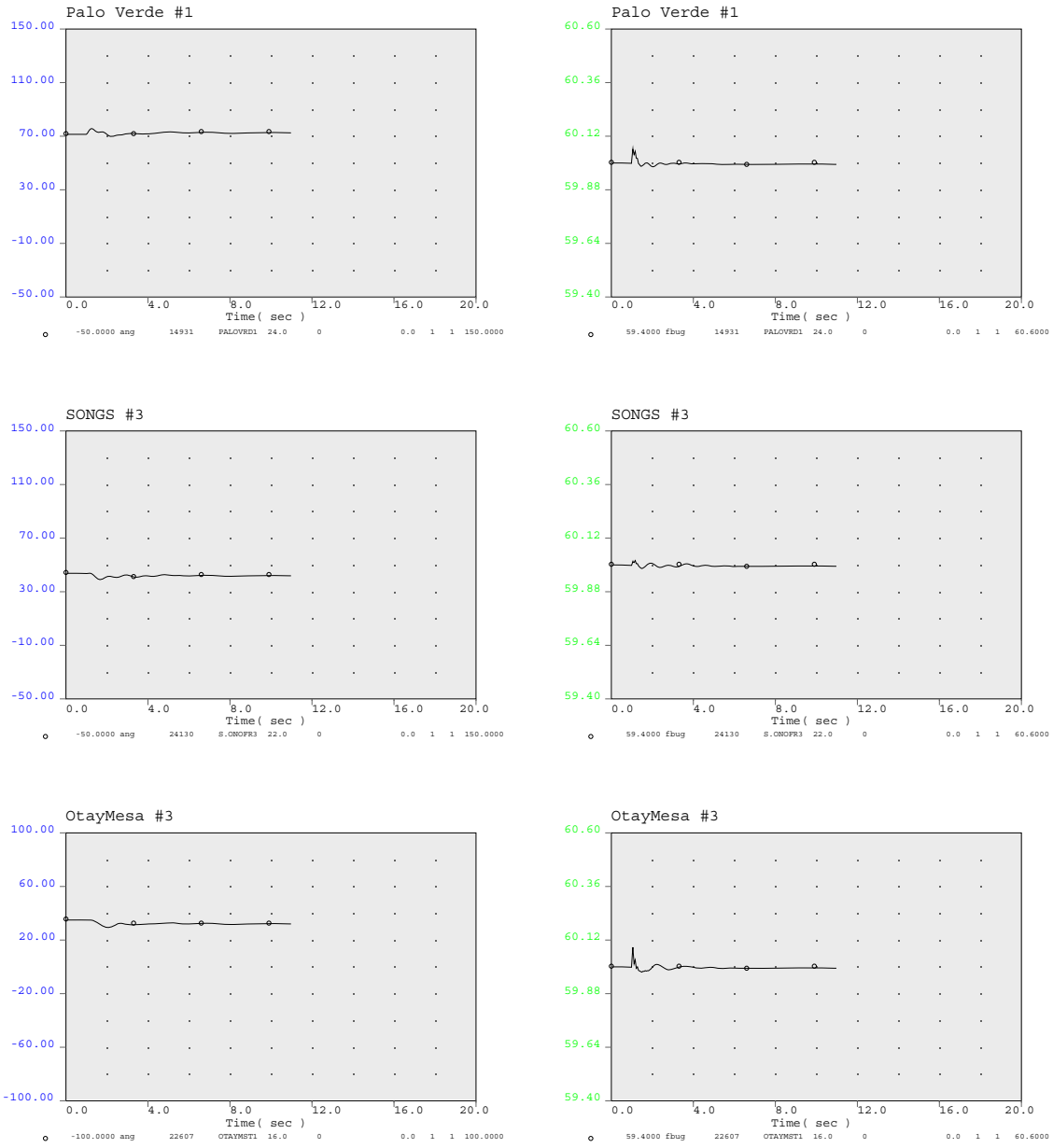


CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

RELATIVE ROTOR ANGLE & FREQUENCY

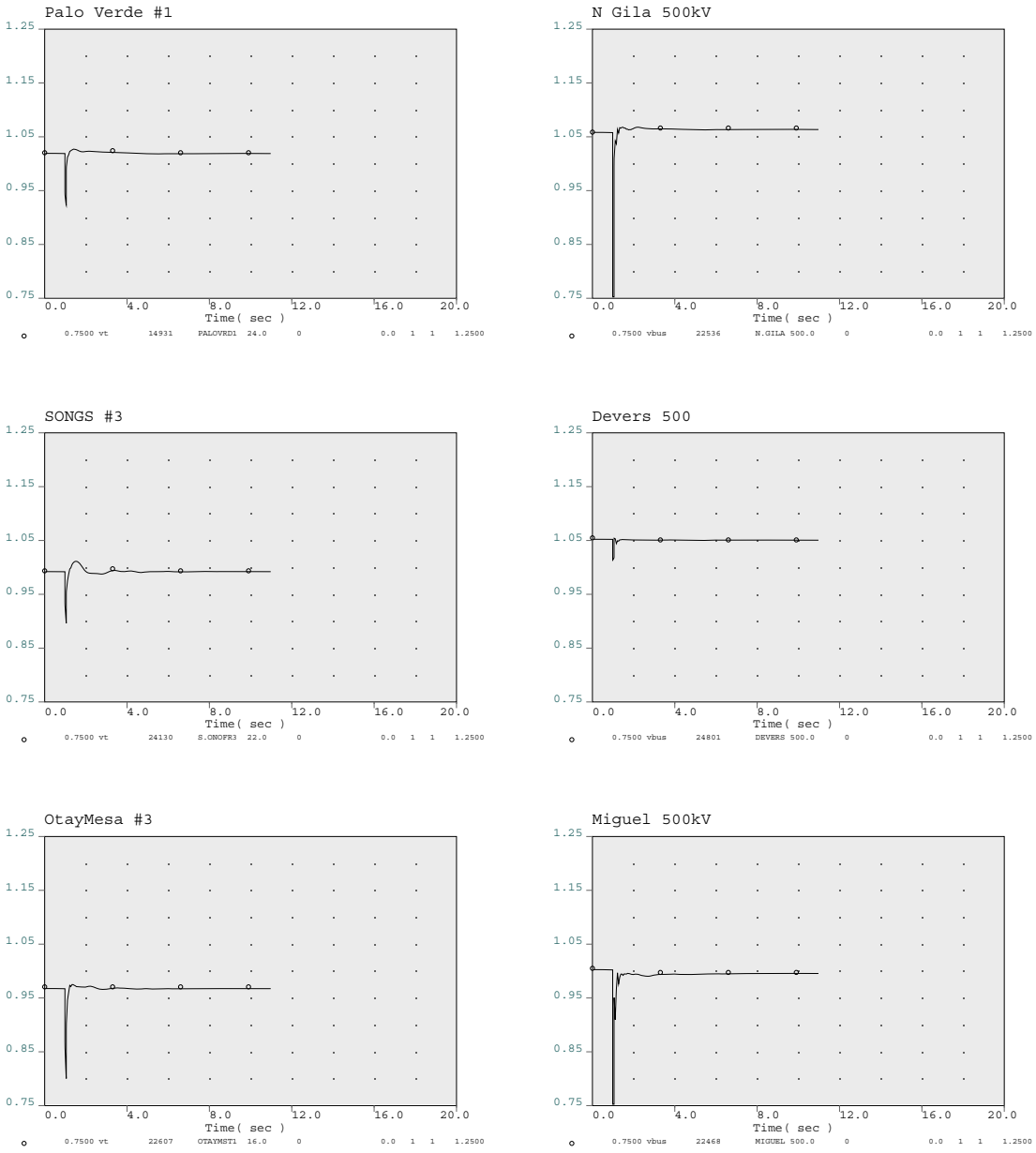


SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Page 1

SDGE	IV_Wnd1_noRAS_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:21 2010

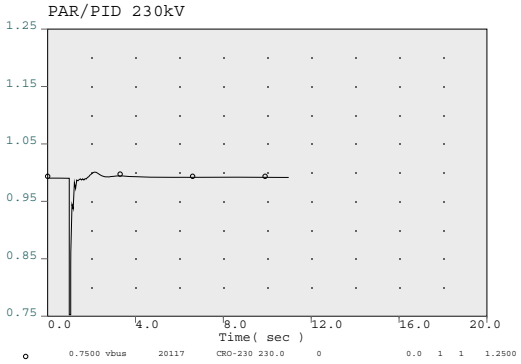
RELATIVE VOLTAGE



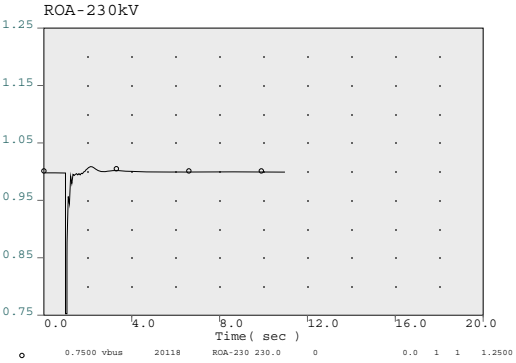
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

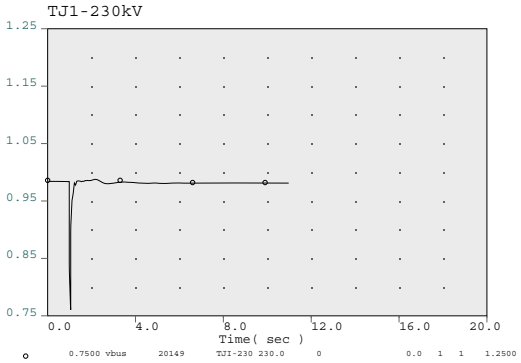
PAR/PID 230kV



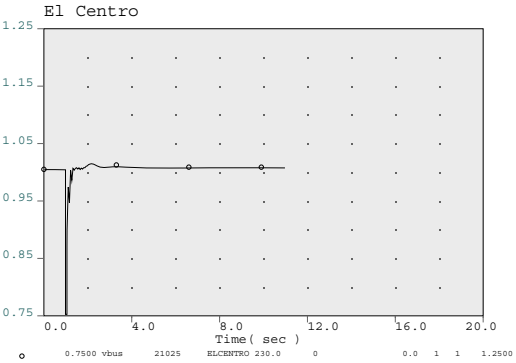
ROA-230kV



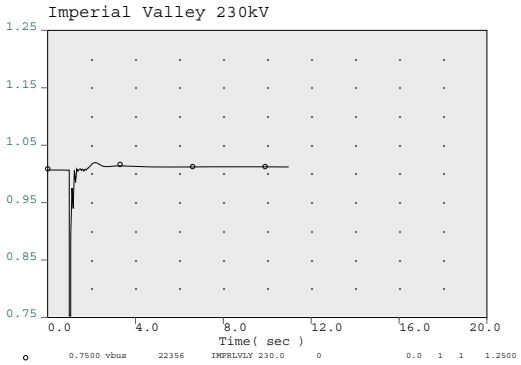
TJ1-230kV



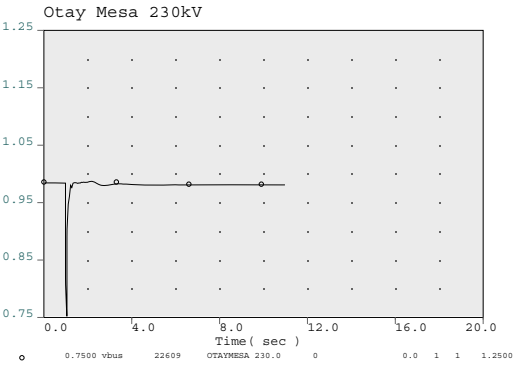
El Centro



Imperial Valley 230kV



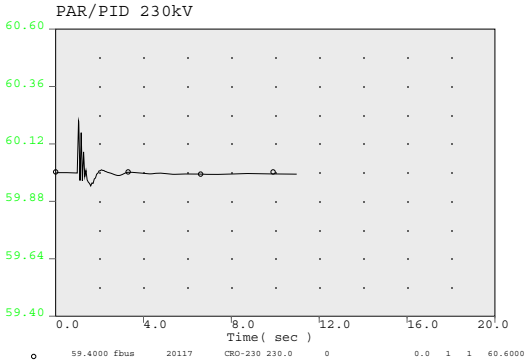
Otay Mesa 230kV



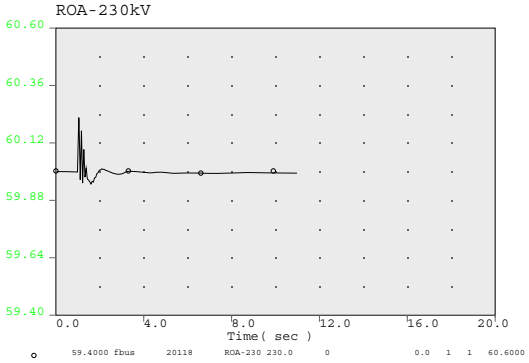
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

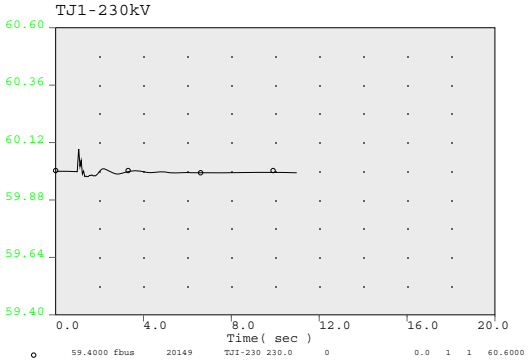
PAR/PID 230kV



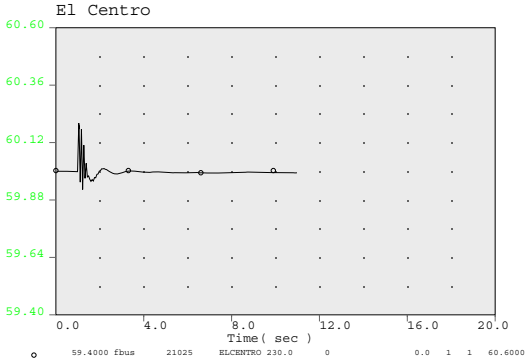
ROA-230kV



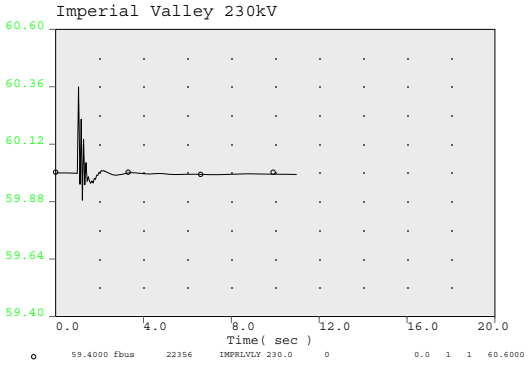
TJ1-230kV



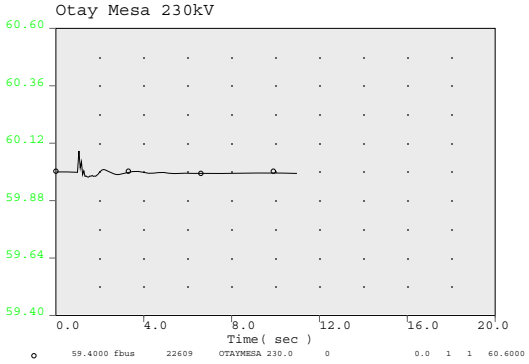
El Centro



Imperial Valley 230kV



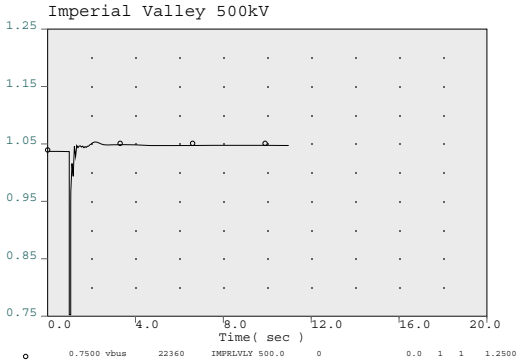
Otay Mesa 230kV



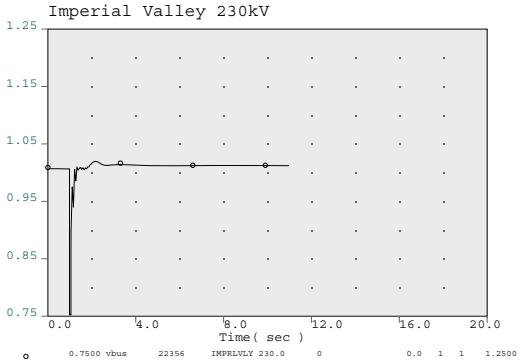
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

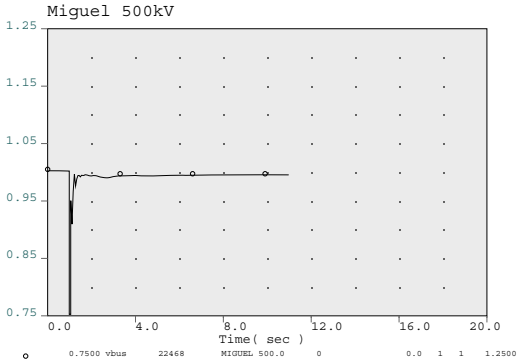
Imperial Valley 500kV



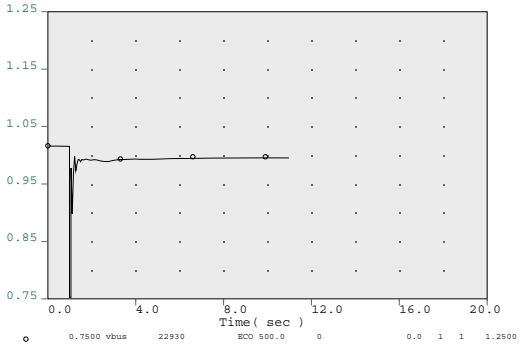
Imperial Valley 230kV



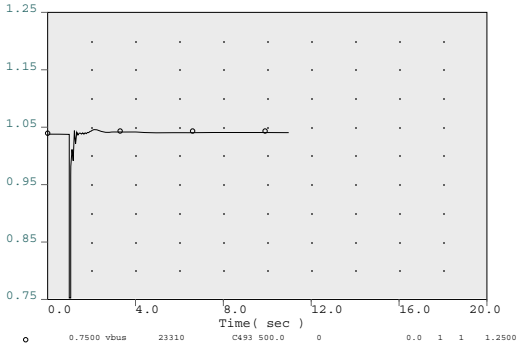
Miguel 500kV



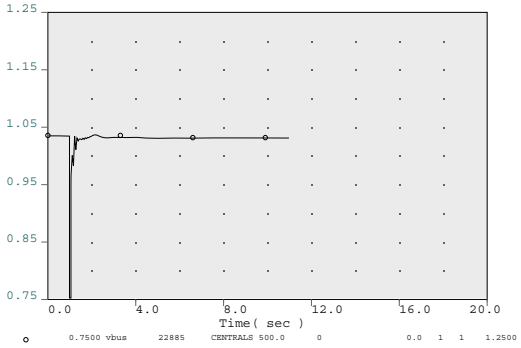
Windfarms 500



C493 500kV



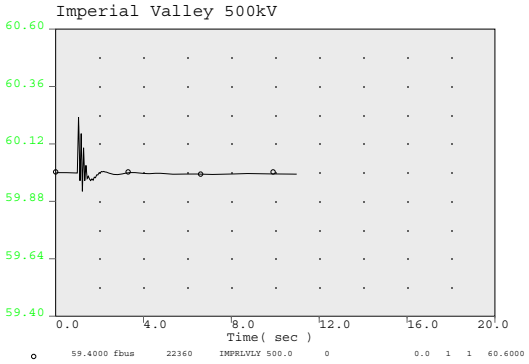
CENTRALS 500kV



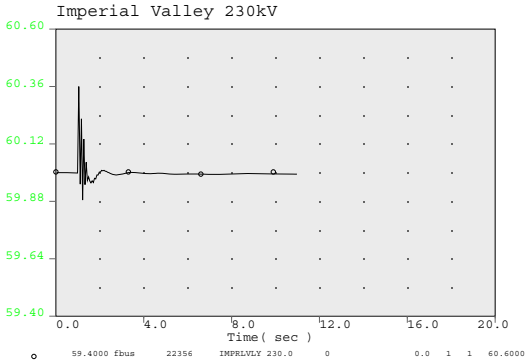
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - Frequency

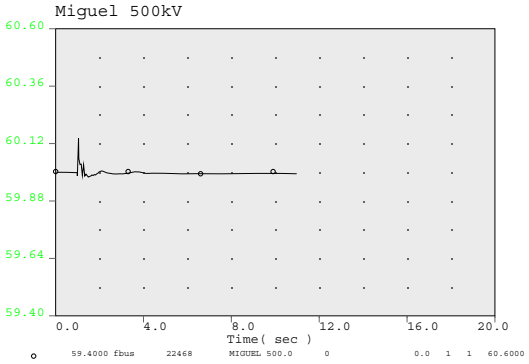
Imperial Valley 500kV



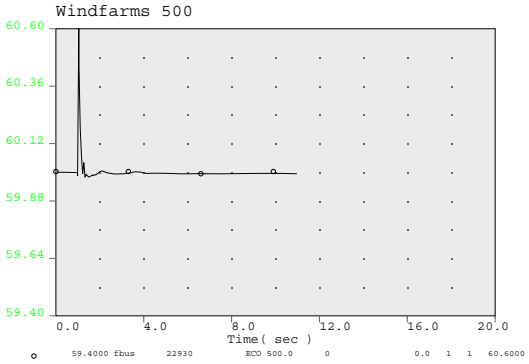
Imperial Valley 230kV



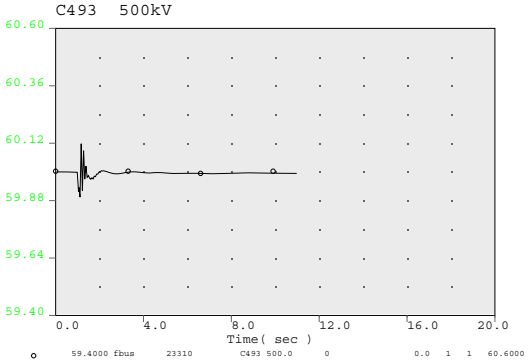
Miguel 500kV



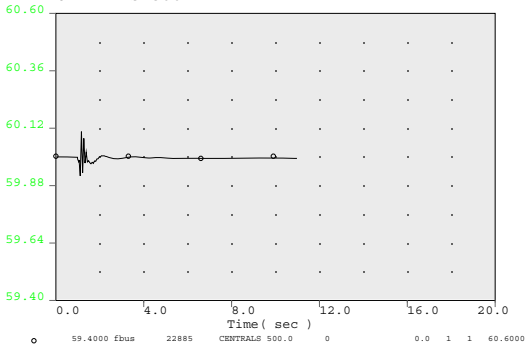
Windfarms 500



C493 500kV

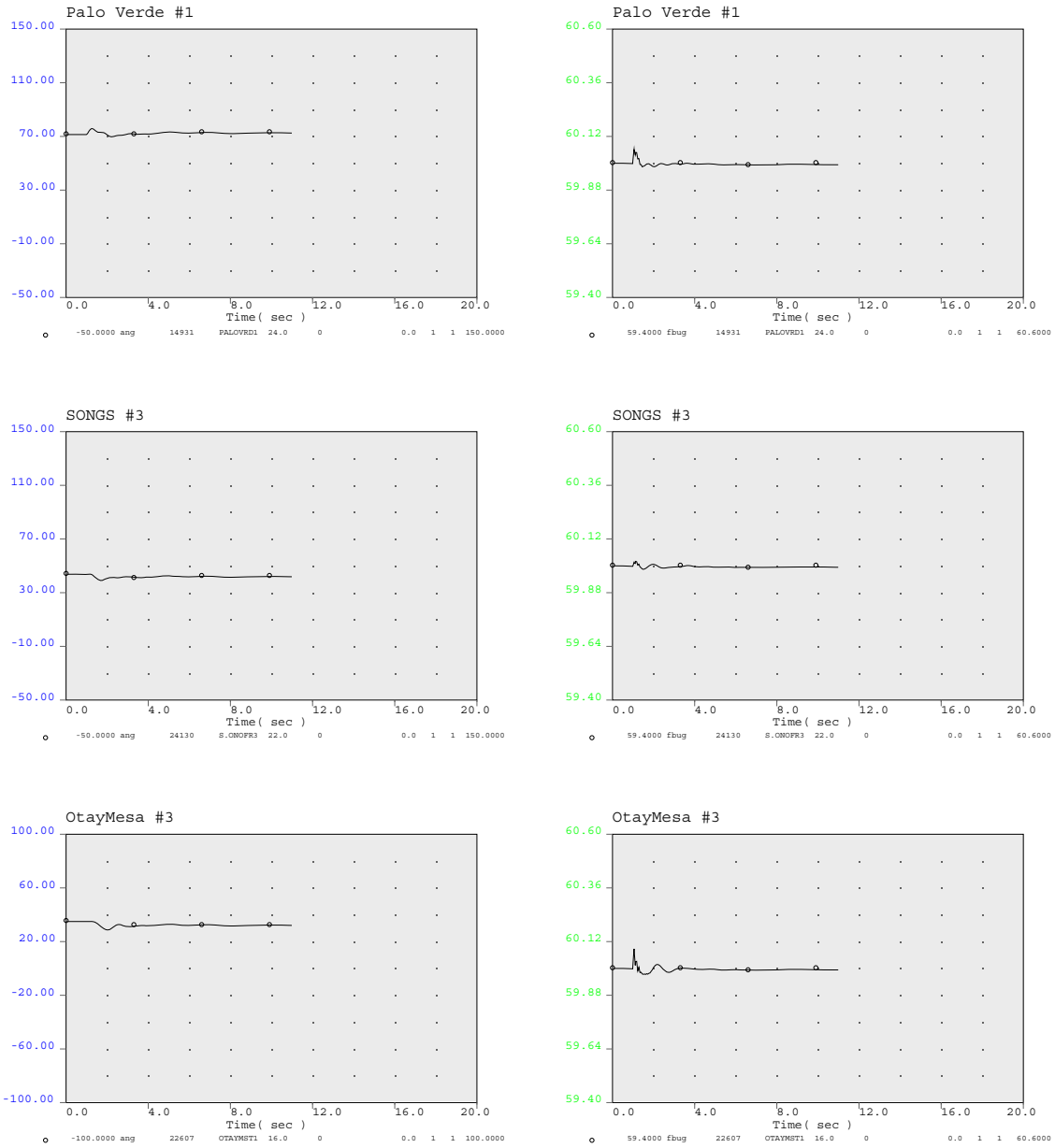


CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

RELATIVE ROTOR ANGLE & FREQUENCY

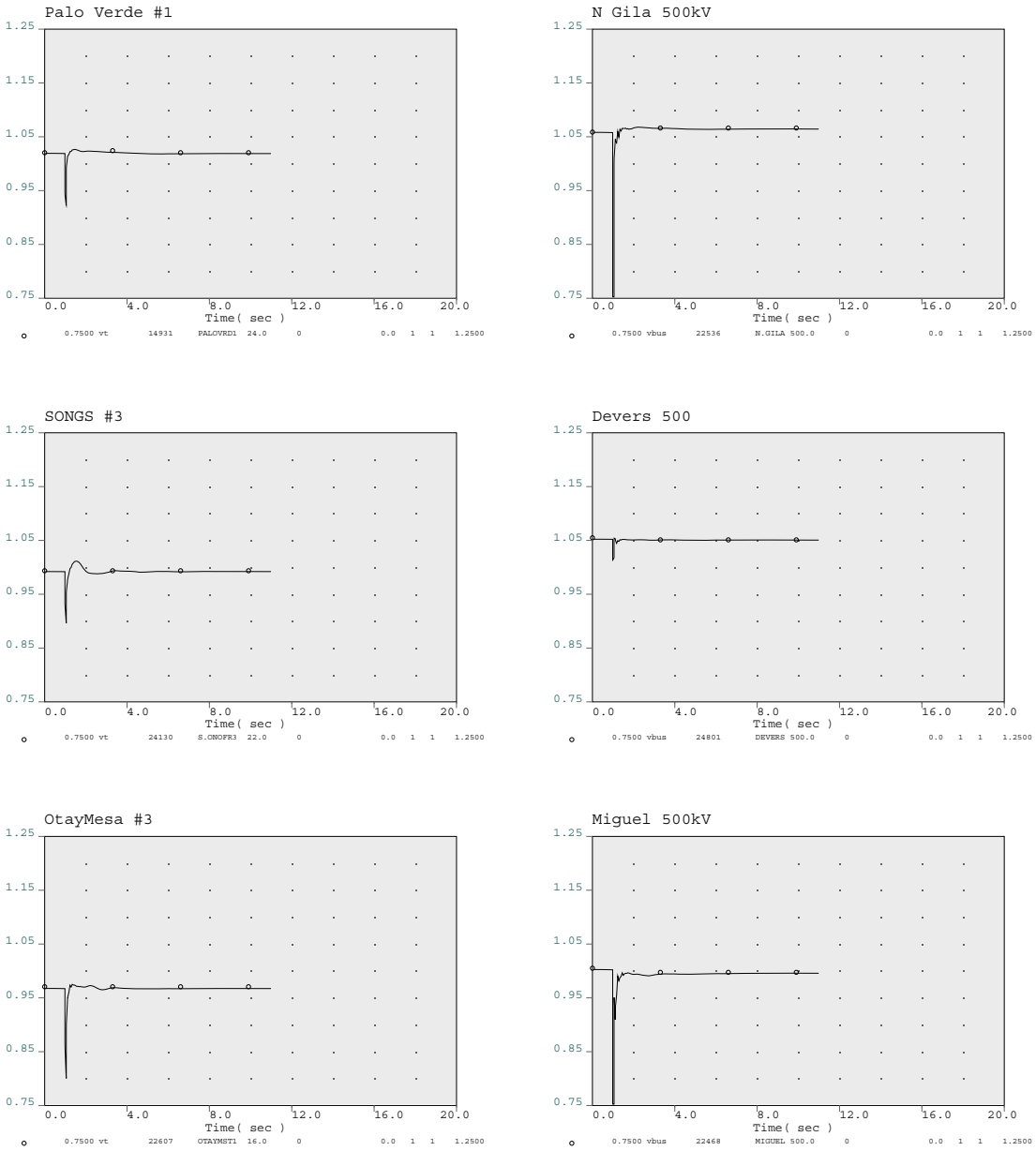


SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Page 1

SDGE	IV_Wnd1_noXTrp_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:24 2010

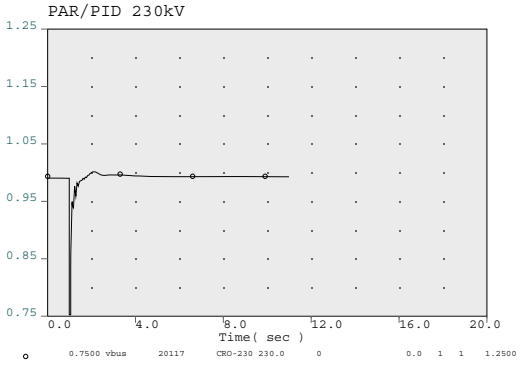
RELATIVE VOLTAGE



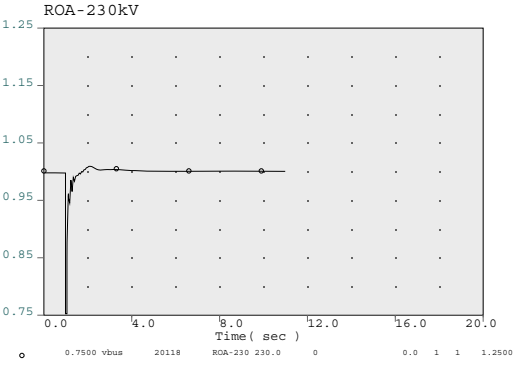
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

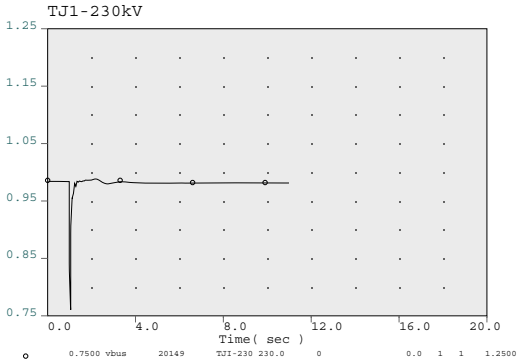
PAR/PID 230kV



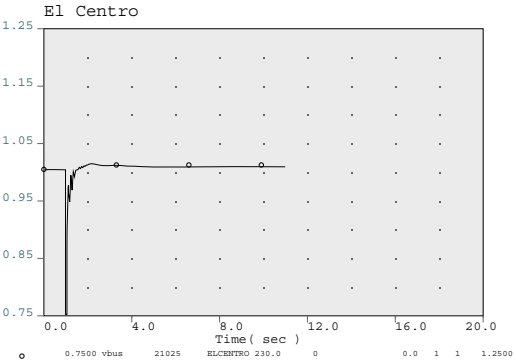
ROA-230kV



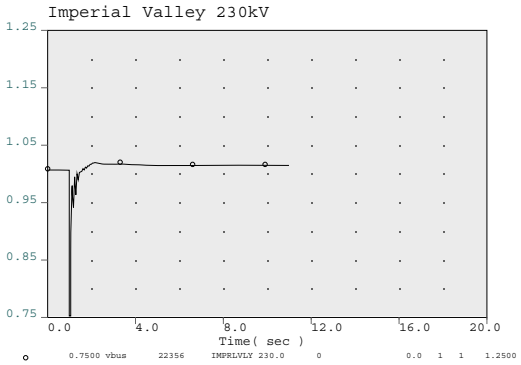
TJ1-230kV



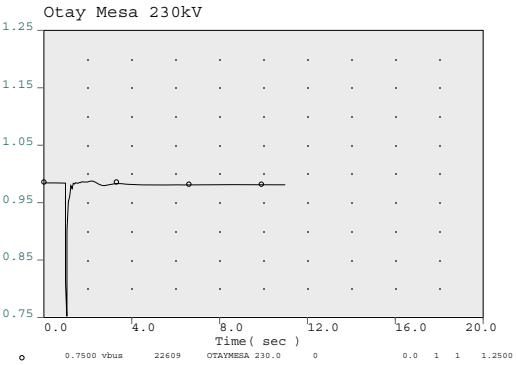
El Centro



Imperial Valley 230kV



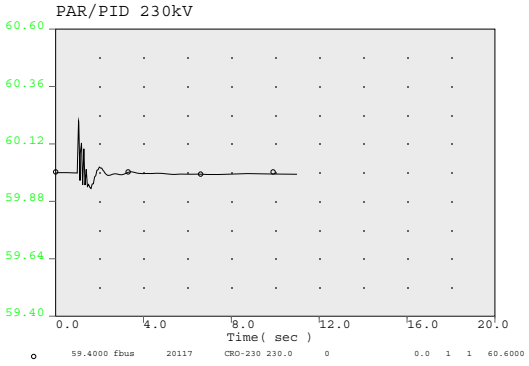
Otay Mesa 230kV



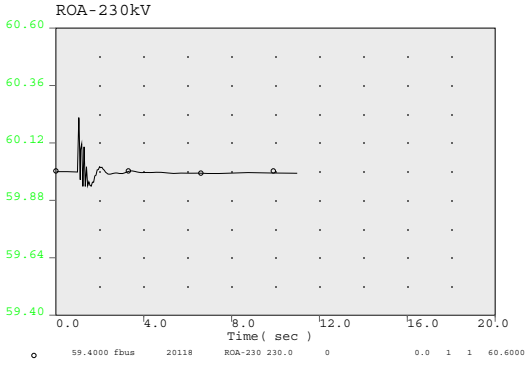
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

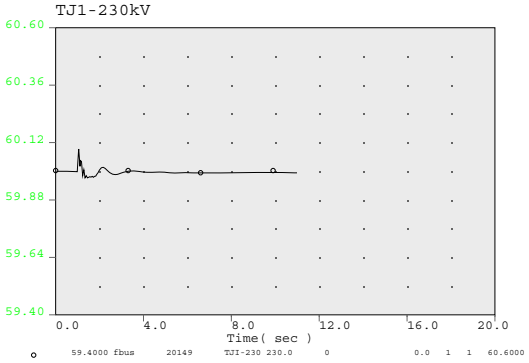
PAR/PID 230kV



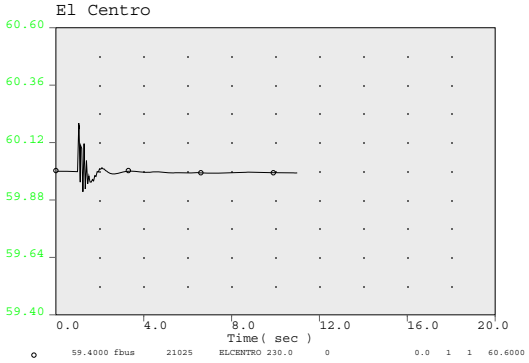
ROA-230kV



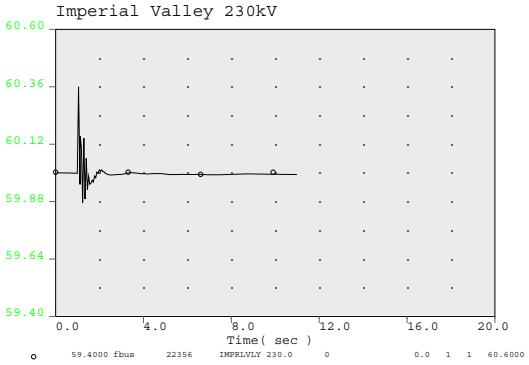
TJ1-230kV



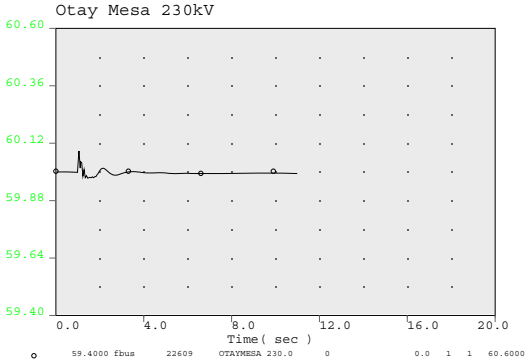
El Centro



Imperial Valley 230kV



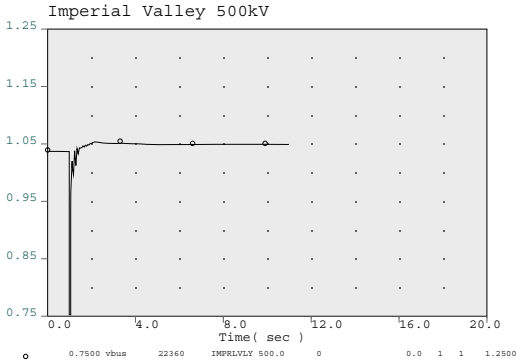
Otay Mesa 230kV



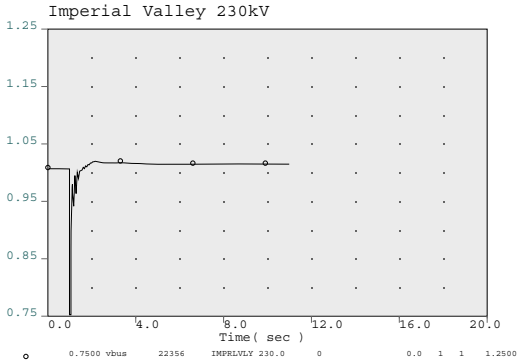
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

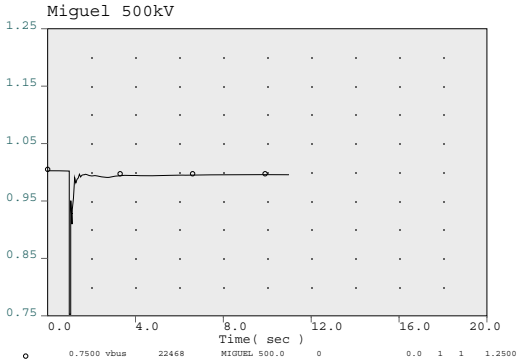
Imperial Valley 500kV



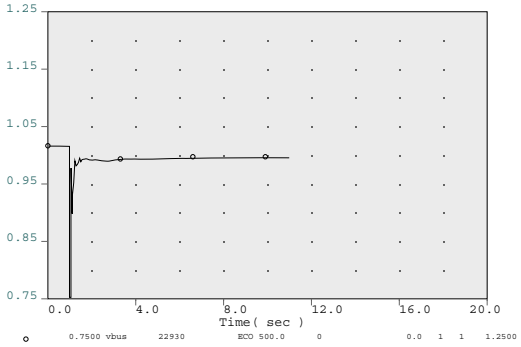
Imperial Valley 230kV



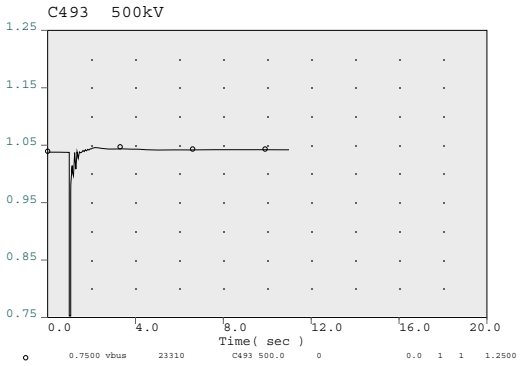
Miguel 500kV



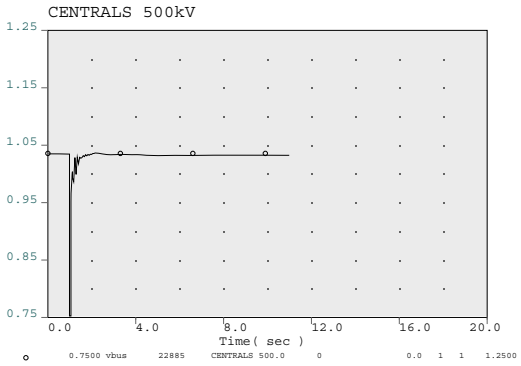
Windfarms 500



C493 500kV

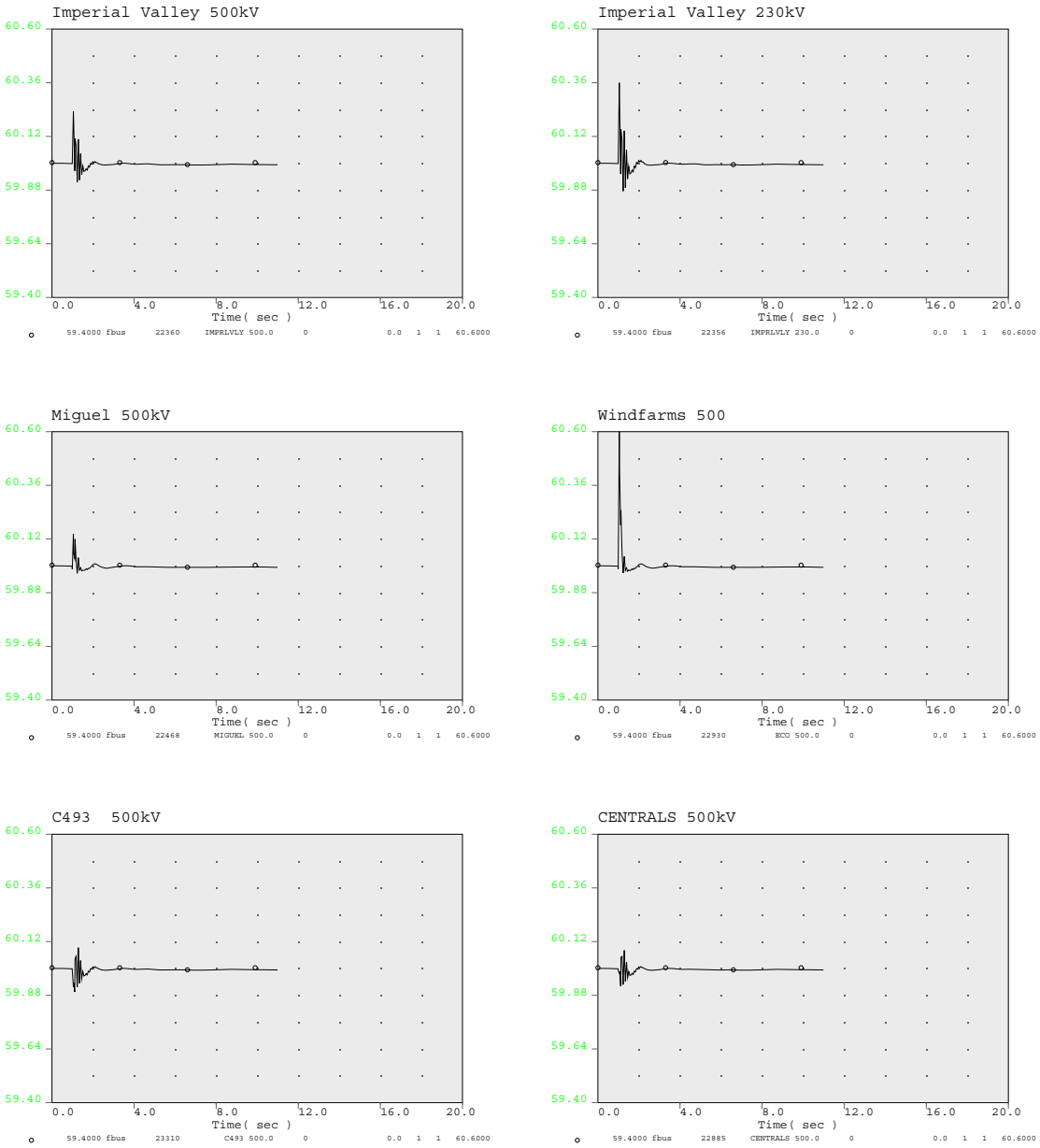


CENTRALS 500kV



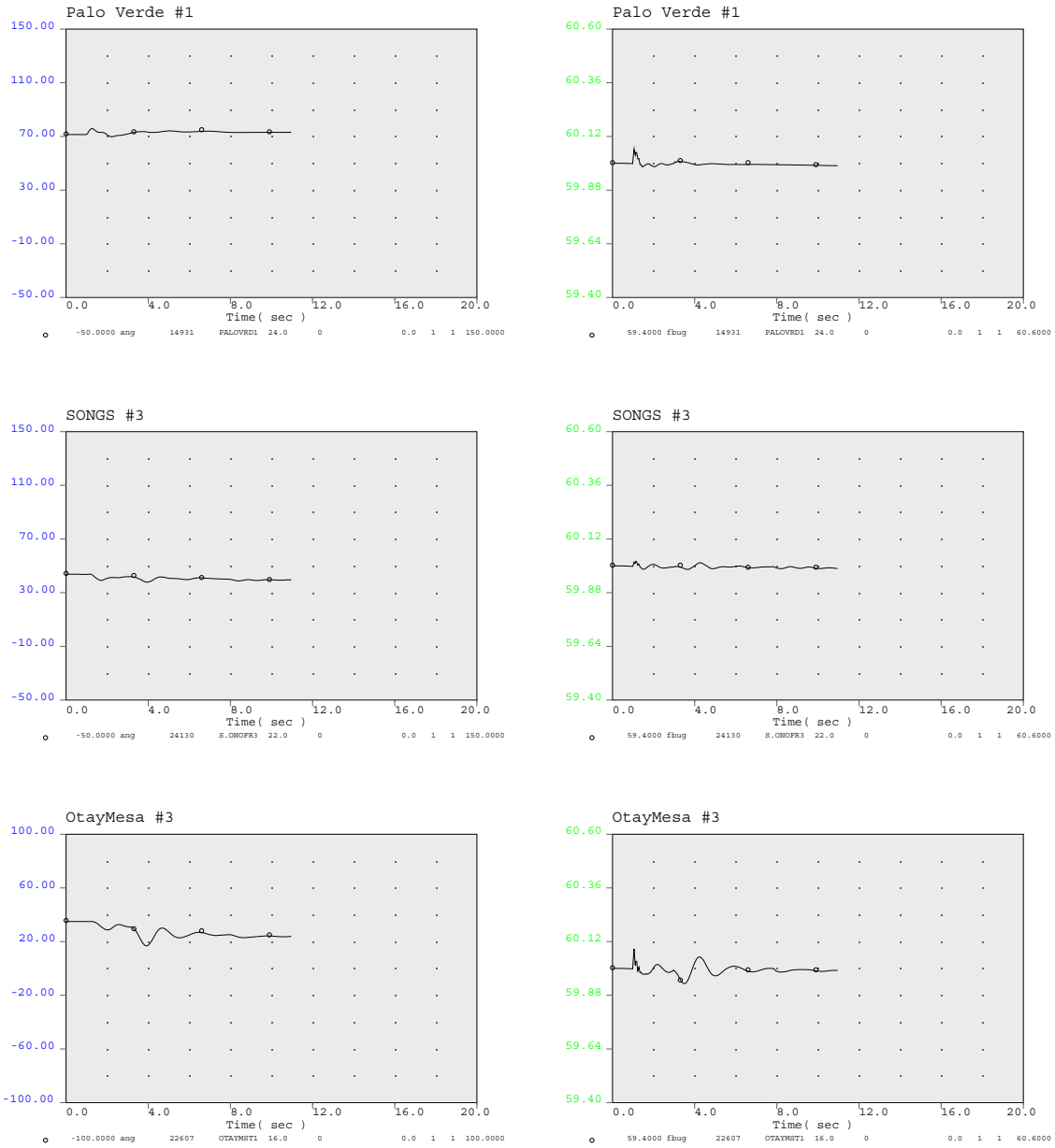
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

RELATIVE ROTOR ANGLE & FREQUENCY

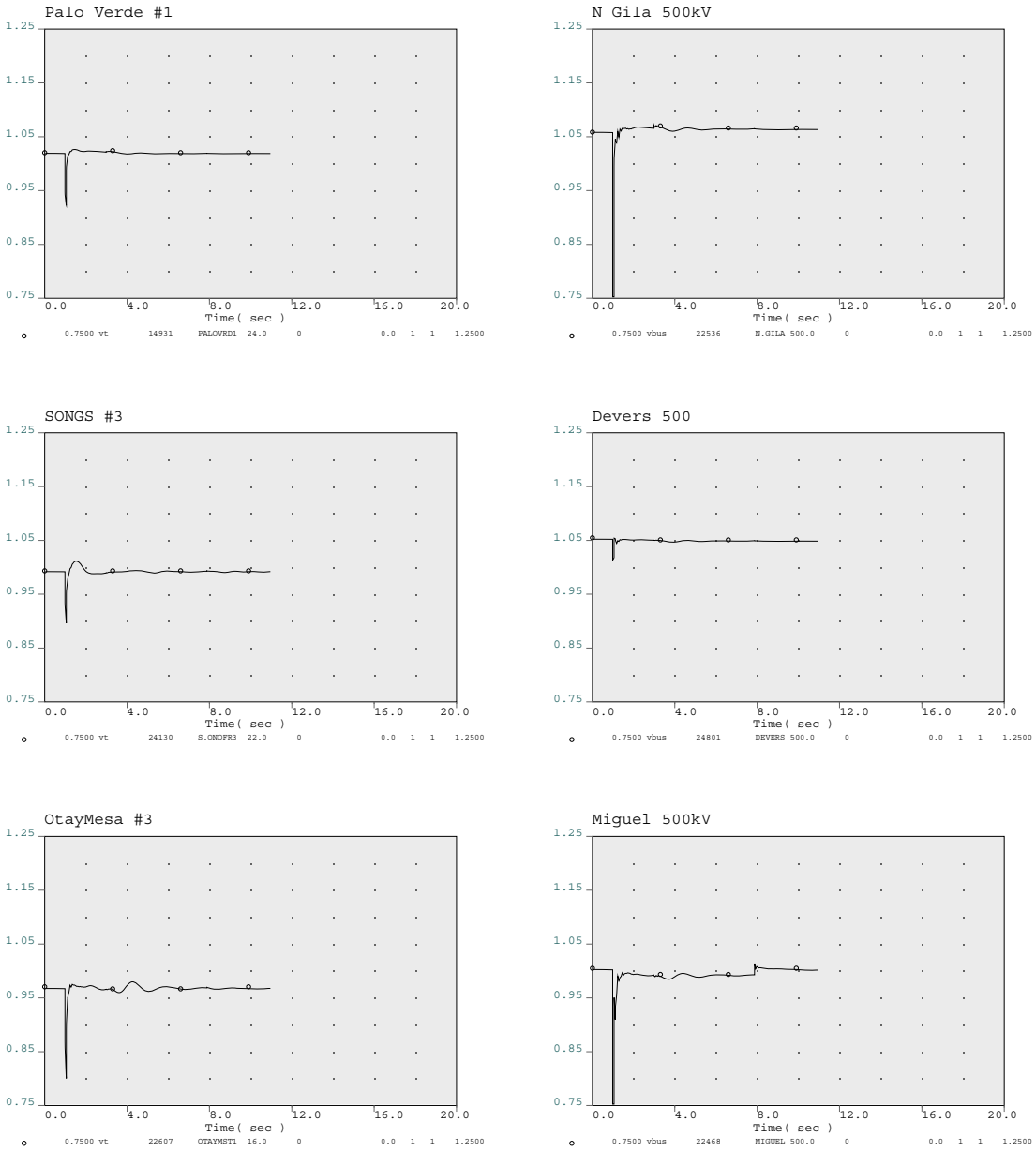


SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Page 1

SDGE	IV_Wnd1_RAS_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:27 2010

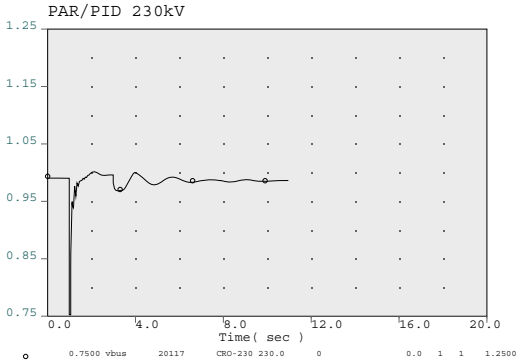
RELATIVE VOLTAGE



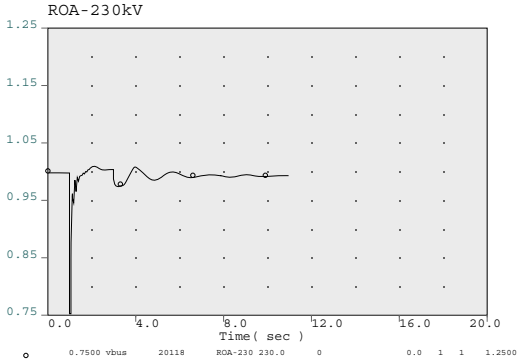
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

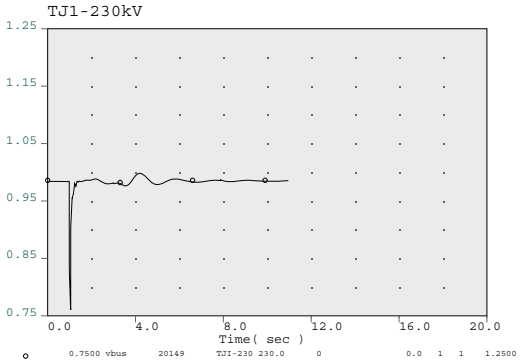
PAR/PID 230kV



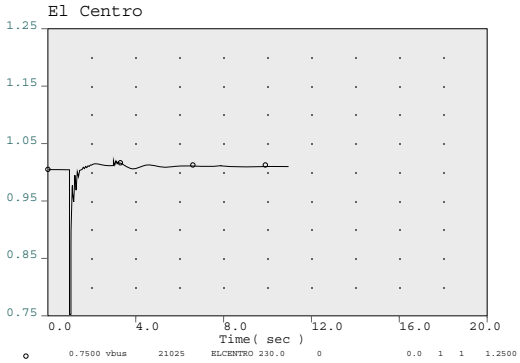
ROA-230kV



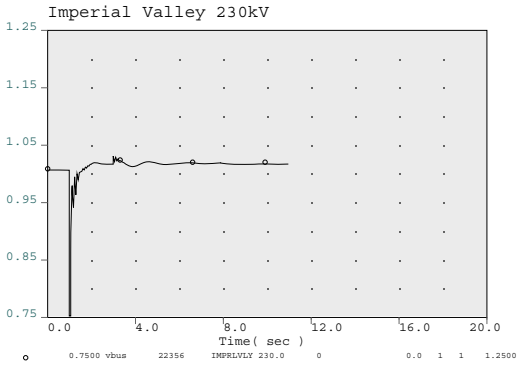
TJ1-230kV



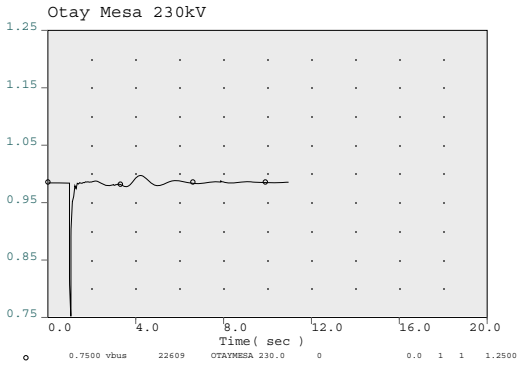
El Centro



Imperial Valley 230kV



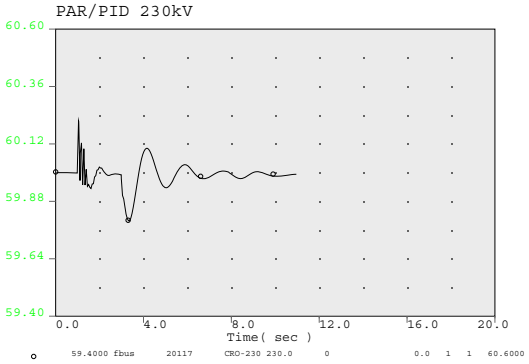
Otay Mesa 230kV



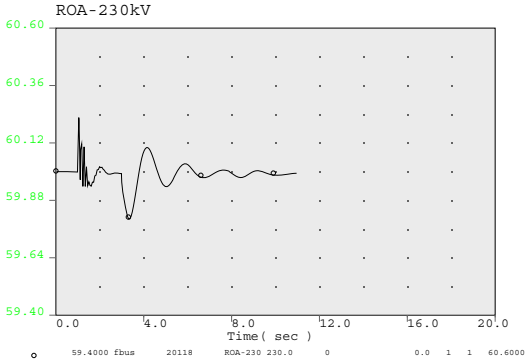
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

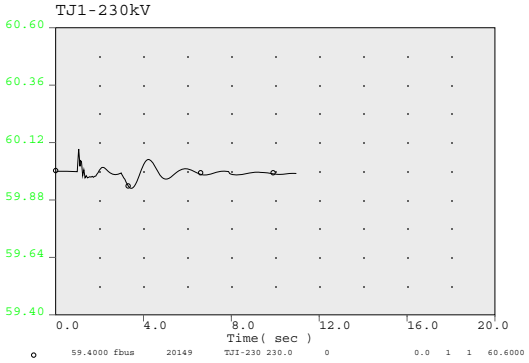
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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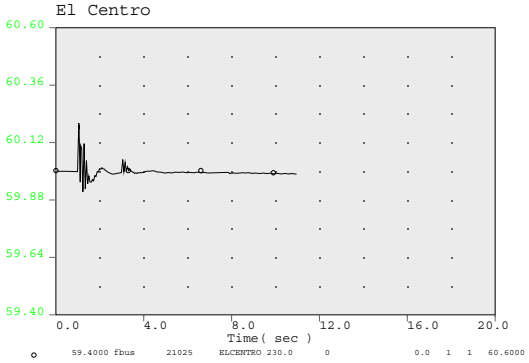
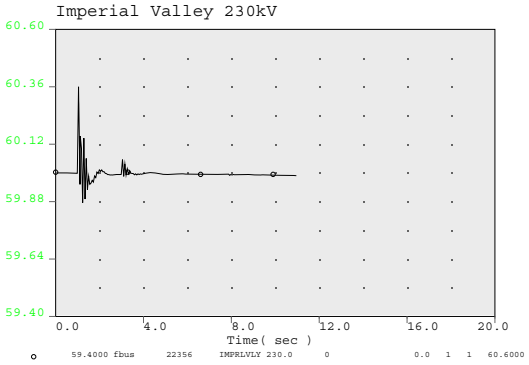
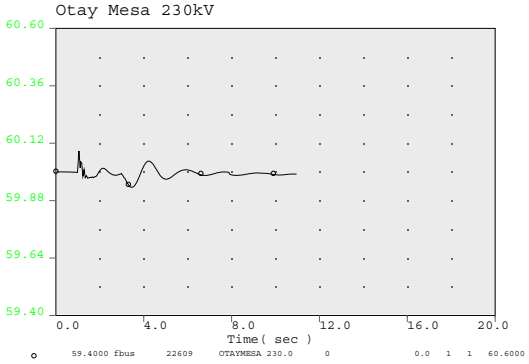


Imperial Valley 230kV



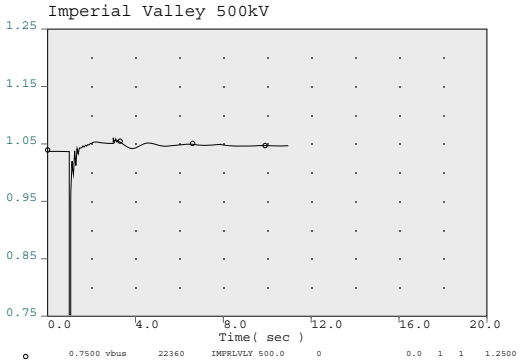
Otay Mesa 230kV



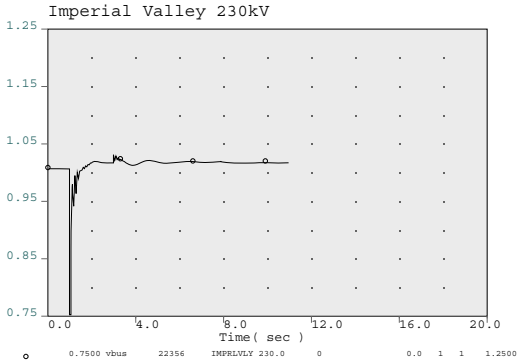
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

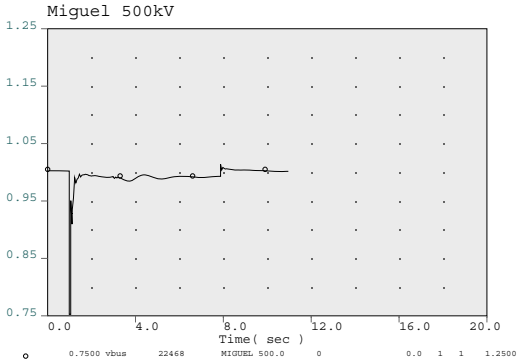
Imperial Valley 500kV



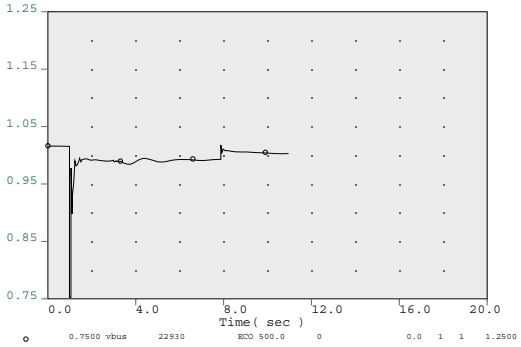
Imperial Valley 230kV



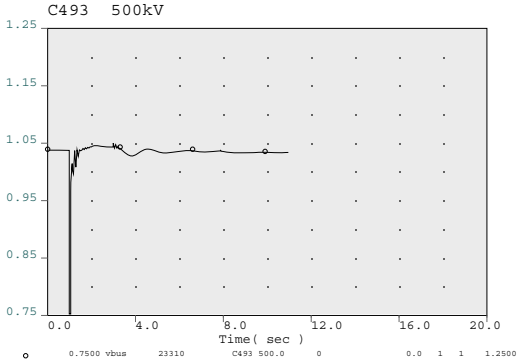
Miguel 500kV



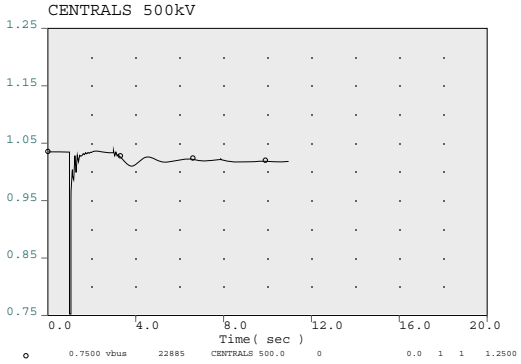
Windfarms 500



C493 500kV



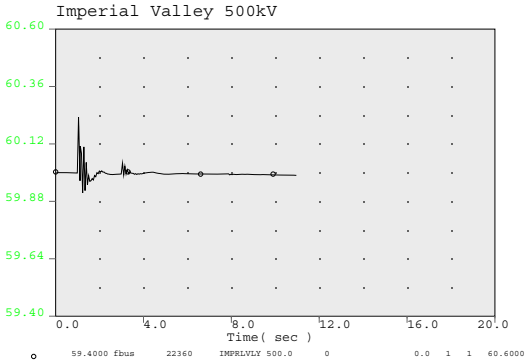
CENTRALS 500kV



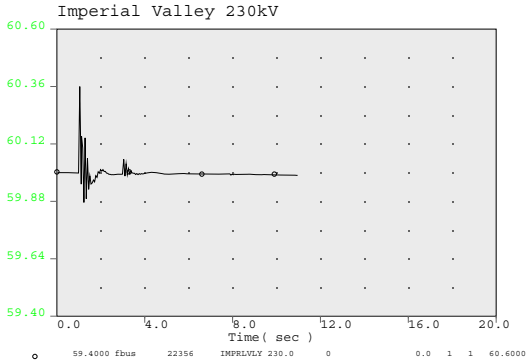
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - Frequency

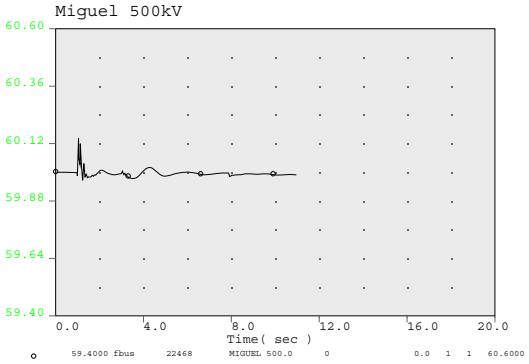
Imperial Valley 500kV



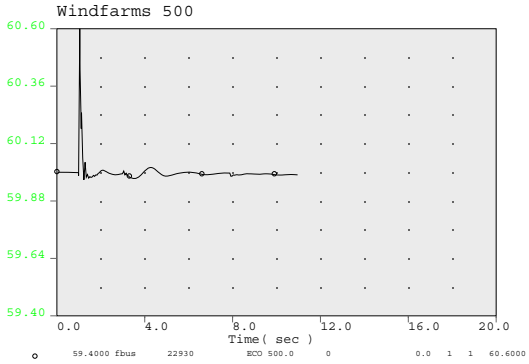
Imperial Valley 230kV



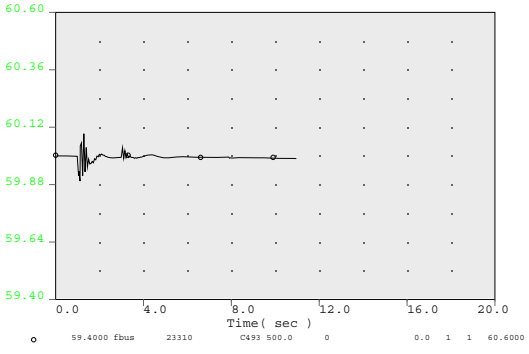
Miguel 500kV



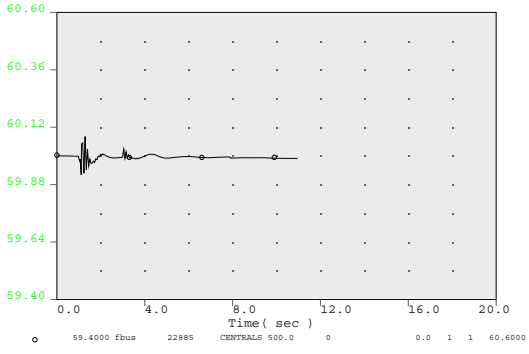
Windfarms 500



C493 500kV

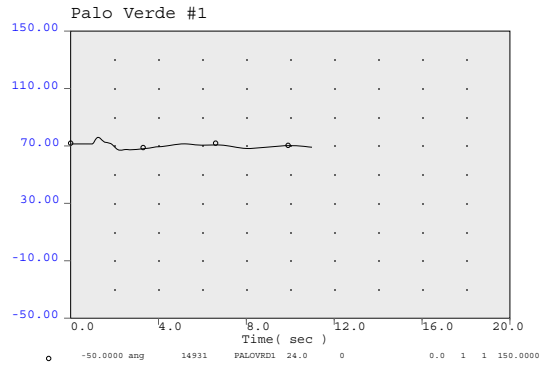


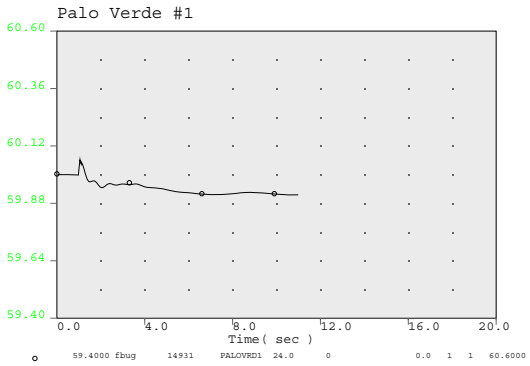
CENTRALS 500kV

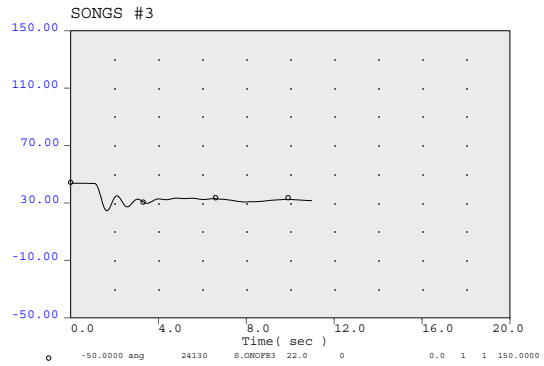


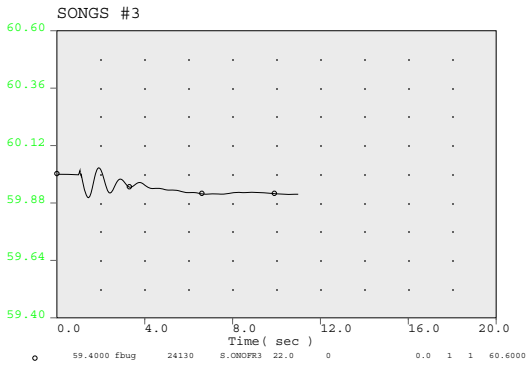
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

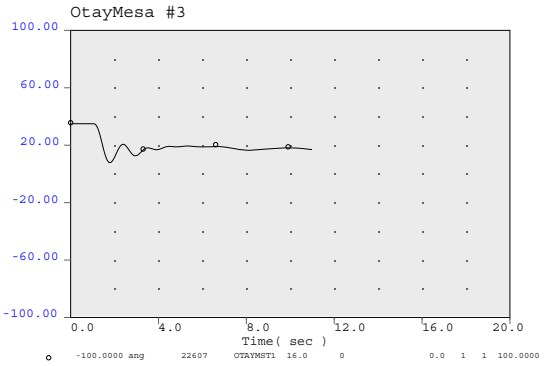
RELATIVE ROTOR ANGLE & FREQUENCY

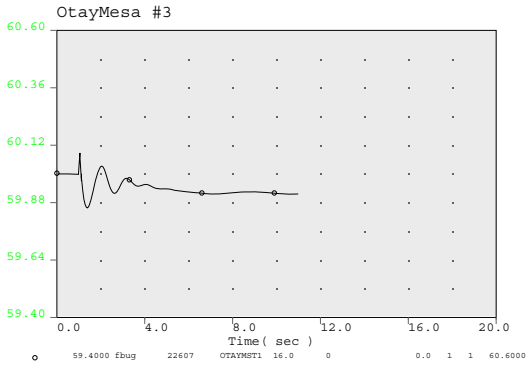










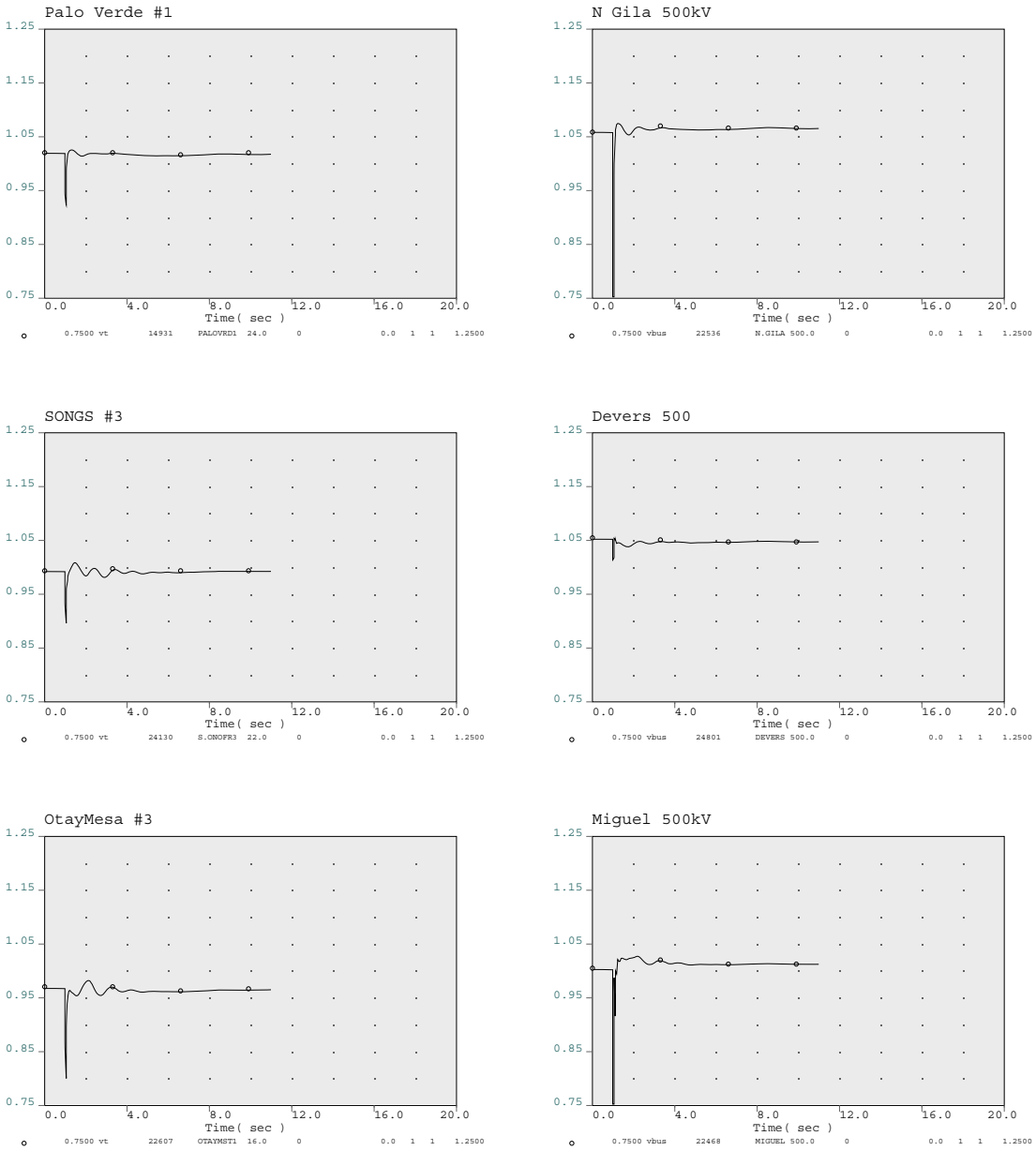


SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Page 1

SDGE	IV_Wnd_dlo_noX_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:30 2010

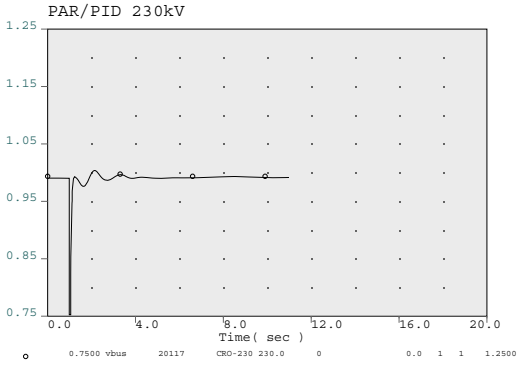
RELATIVE VOLTAGE



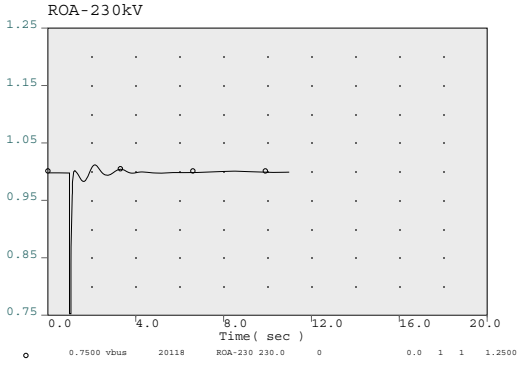
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Affected System Voltage Check and Comparison

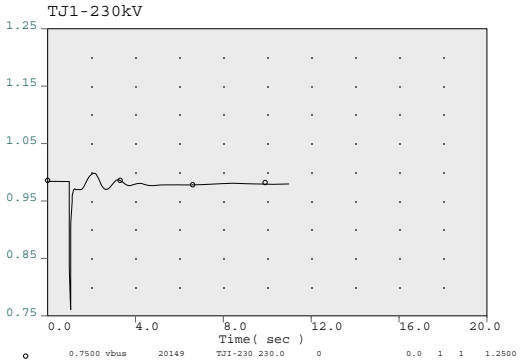
PAR/PID 230kV



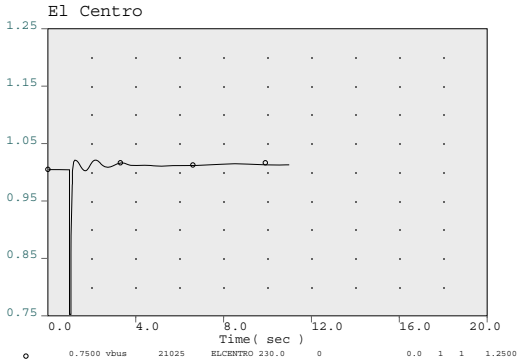
ROA-230kV



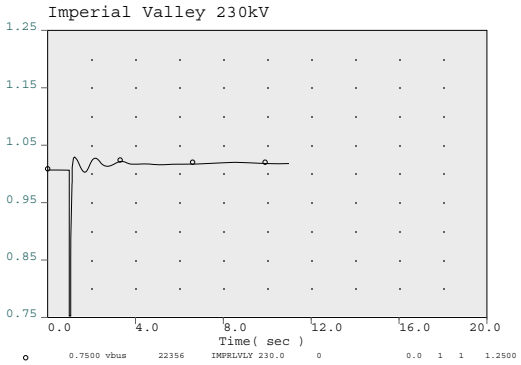
TJ1-230kV



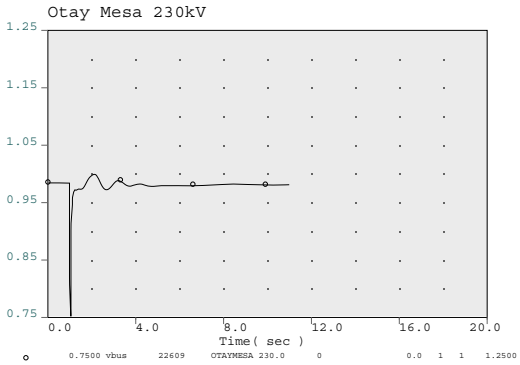
El Centro



Imperial Valley 230kV



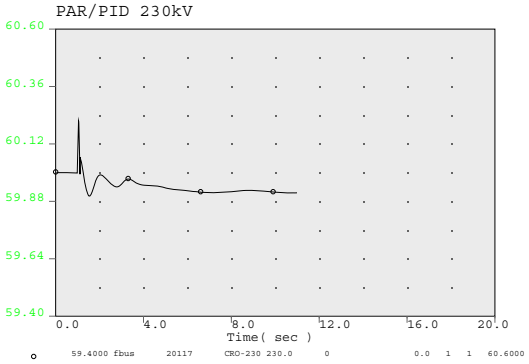
Otay Mesa 230kV



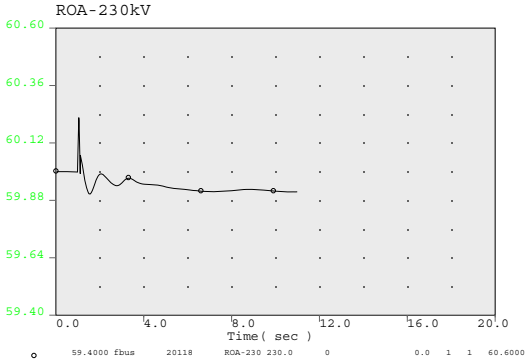
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Affected System Frequency Check and Comparison

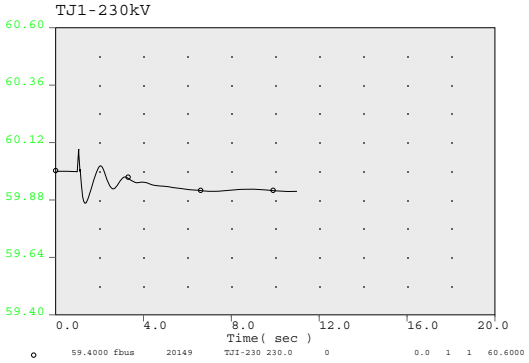
PAR/PID 230kV



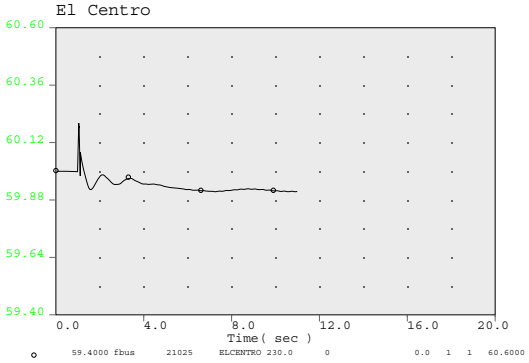
ROA-230kV



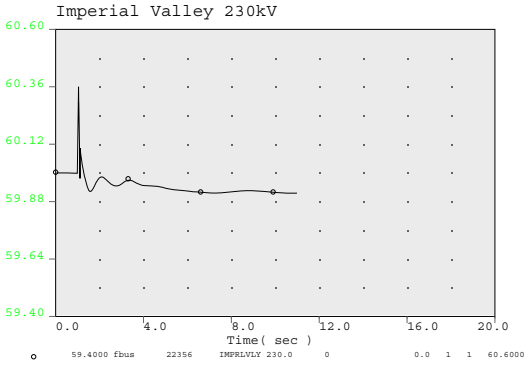
TJ1-230kV



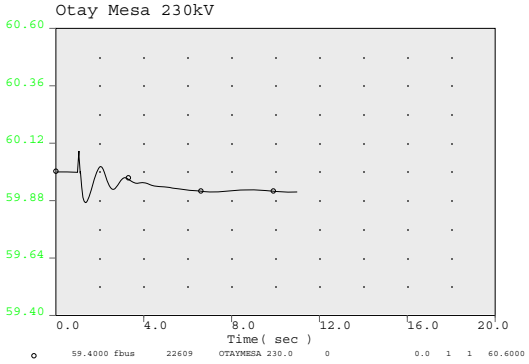
El Centro



Imperial Valley 230kV



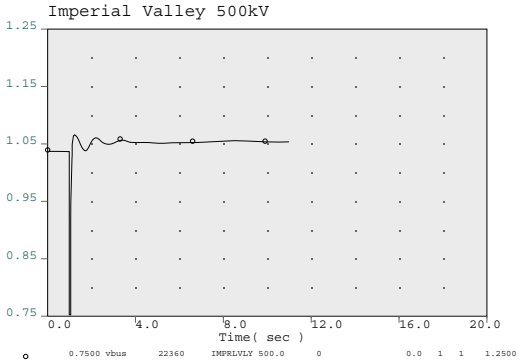
Otay Mesa 230kV



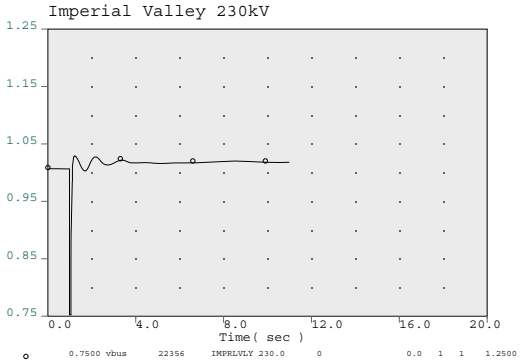
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Imperial Valley Area - VOLTAGE

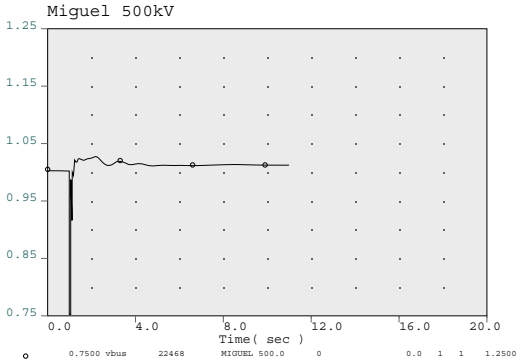
Imperial Valley 500kV



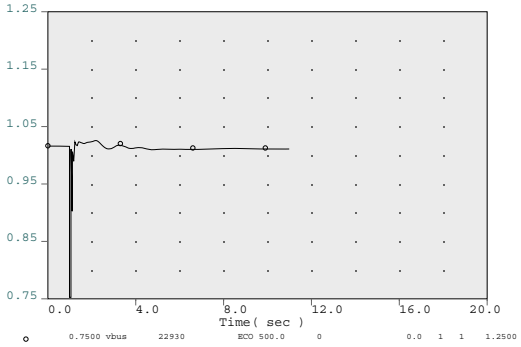
Imperial Valley 230kV



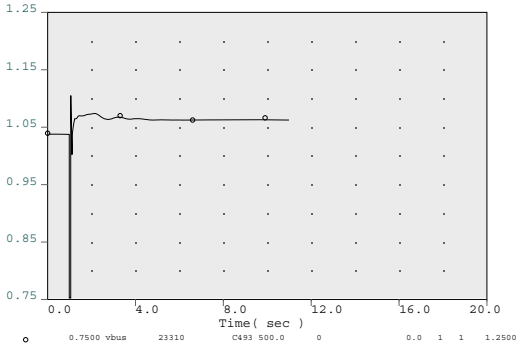
Miguel 500kV



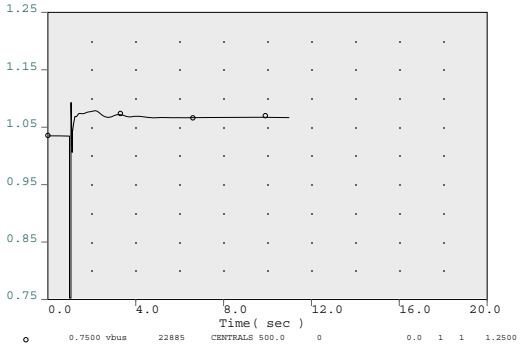
Windfarms 500



C493 500kV

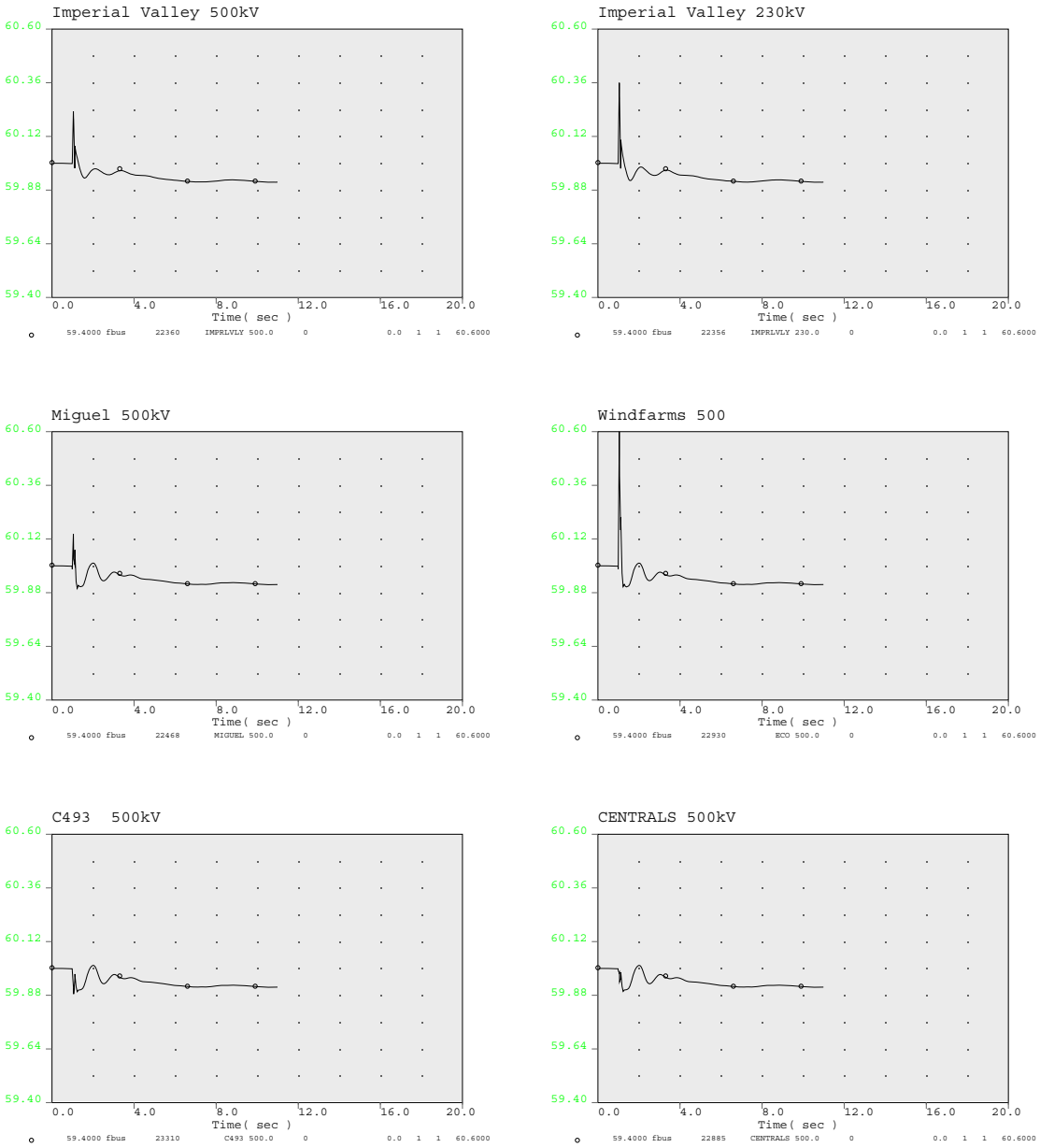


CENTRALS 500kV



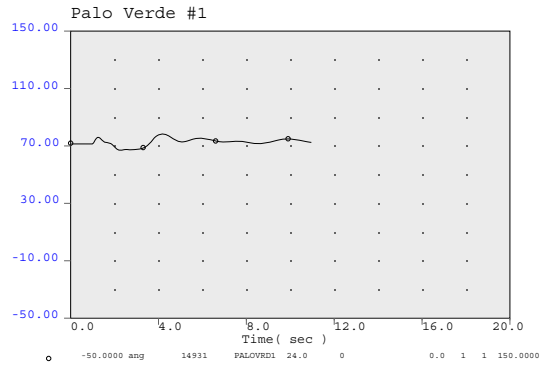
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

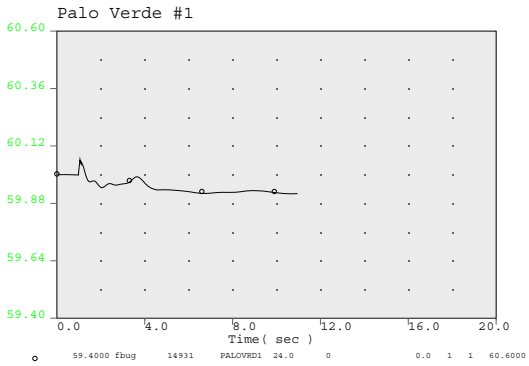
Imperial Valley Area - Frequency

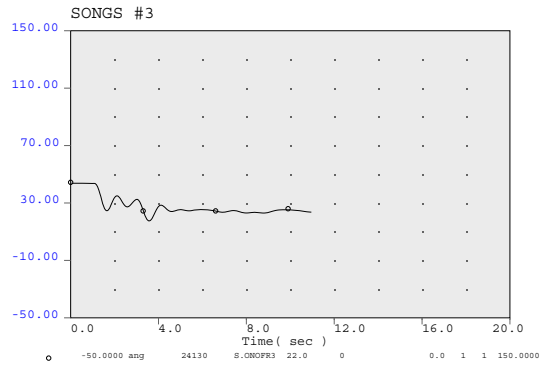


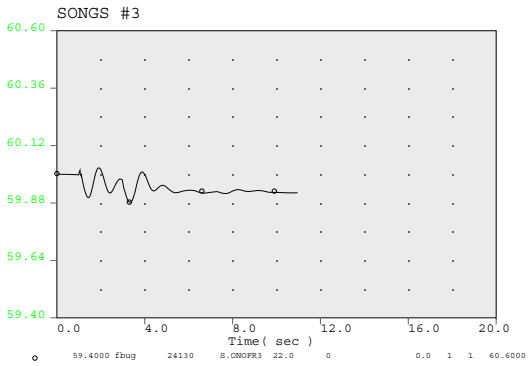
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

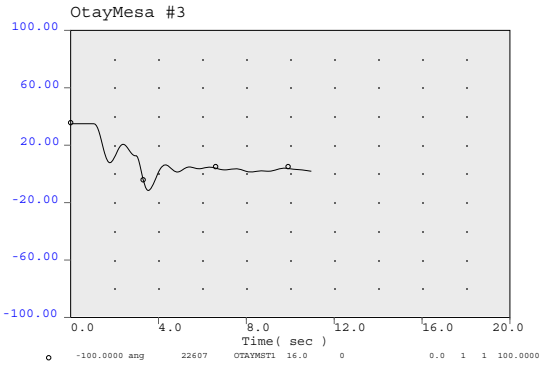
RELATIVE ROTOR ANGLE & FREQUENCY

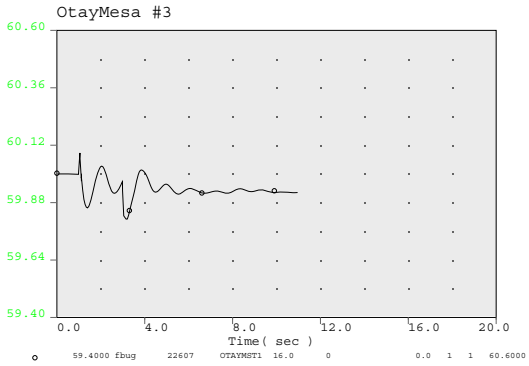










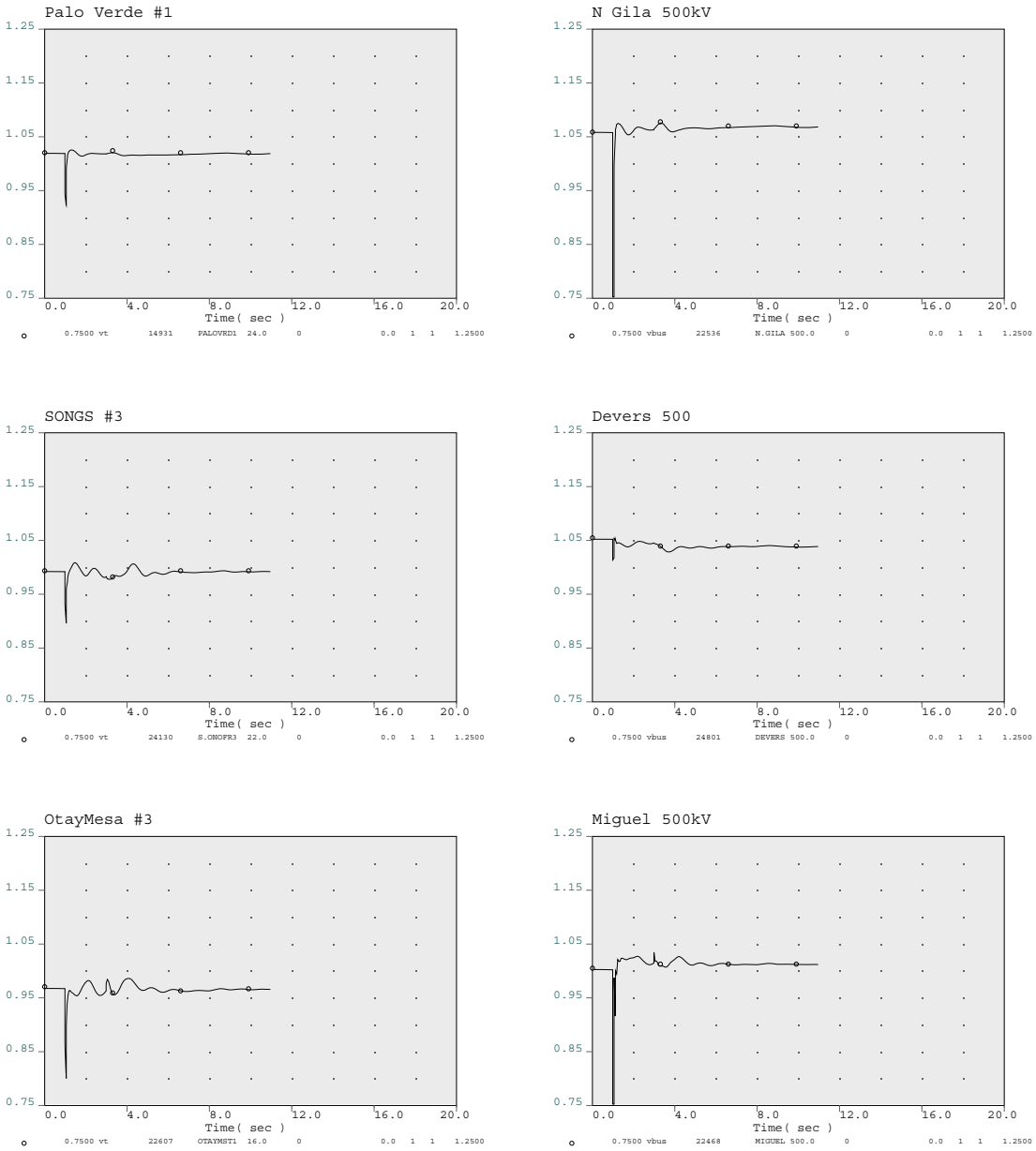


SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Page 1

SDGE	IV_Wnd_dlo_RxR_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:33 2010

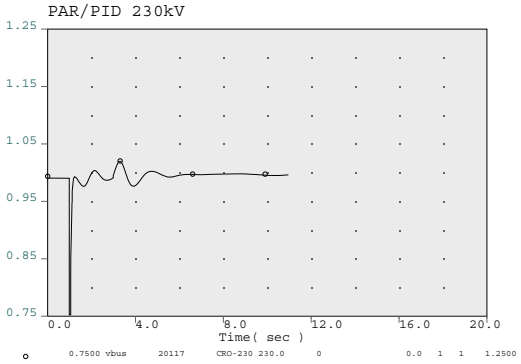
RELATIVE VOLTAGE



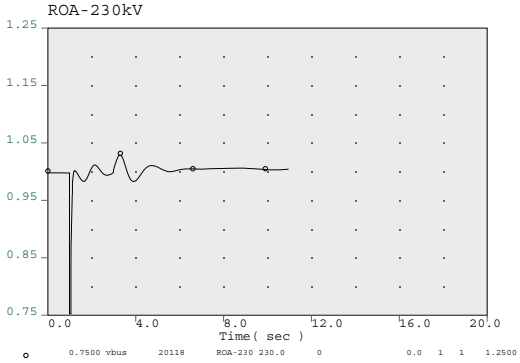
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Affected System Voltage Check and Comparison

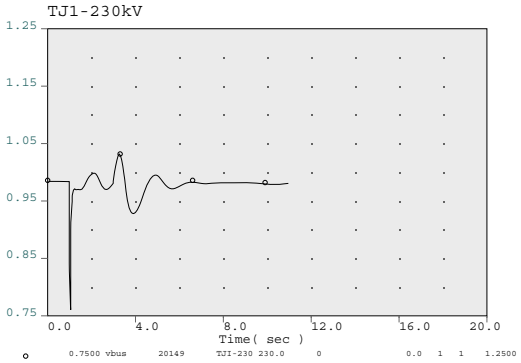
PAR/PID 230kV



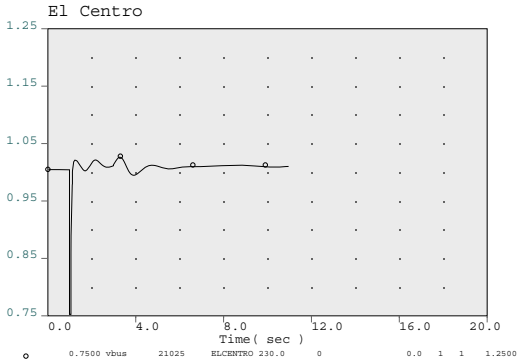
ROA-230kV



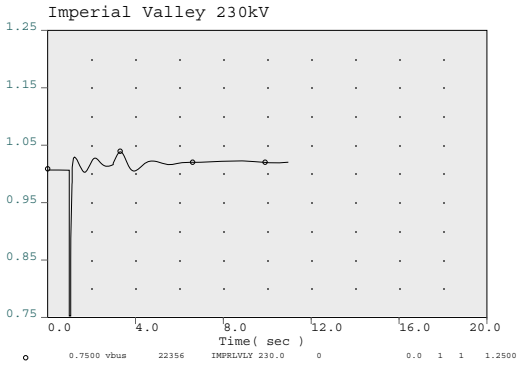
TJ1-230kV



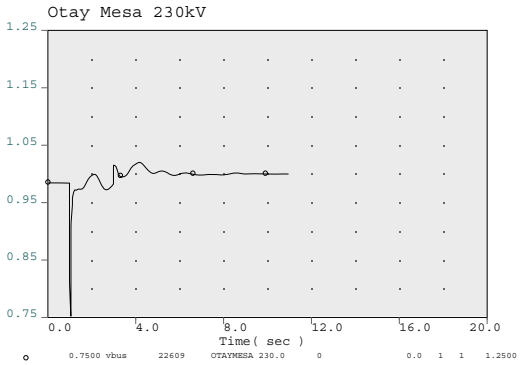
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



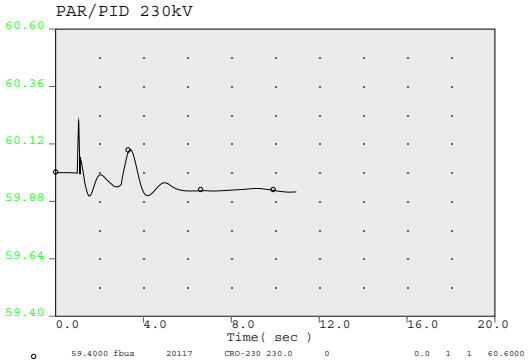
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Page 3

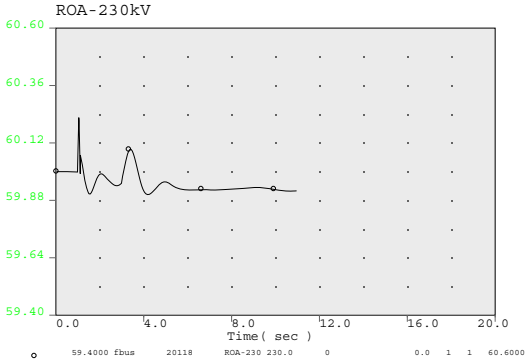
SDGE	IV_Wnd_dlo_RxR_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:33 2010

Affected System Frequency Check and Comparison

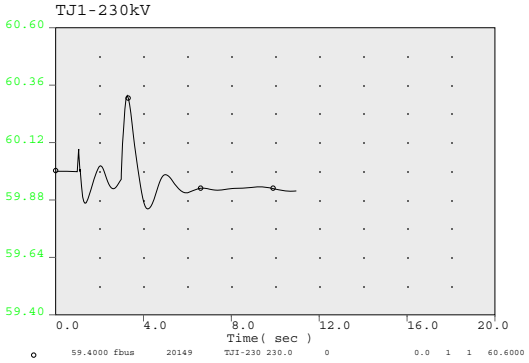
PAR/PID 230kV



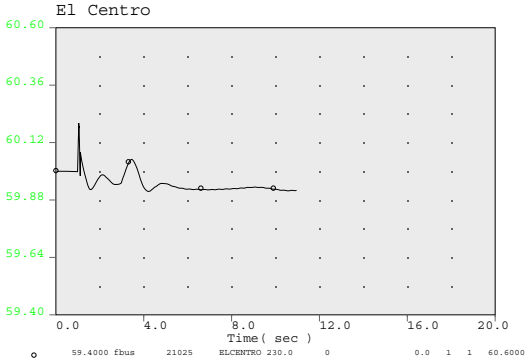
ROA-230kV



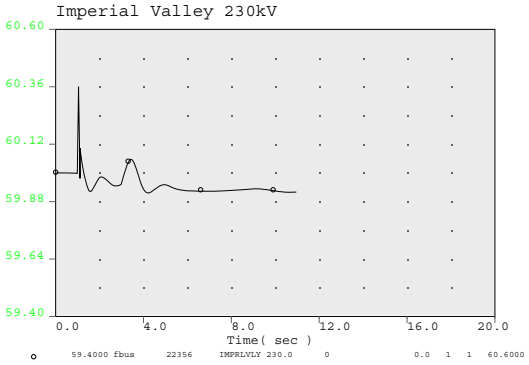
TJ1-230kV



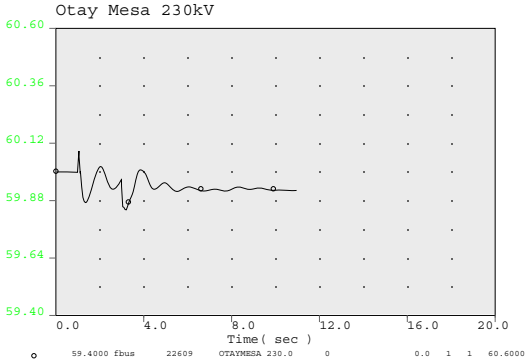
El Centro



Imperial Valley 230kV

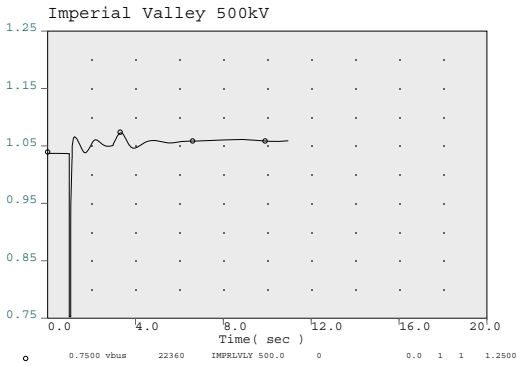


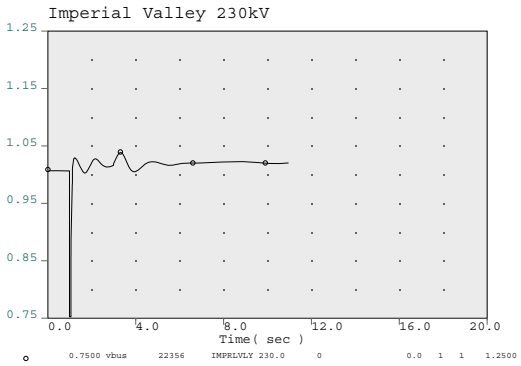
Otay Mesa 230kV

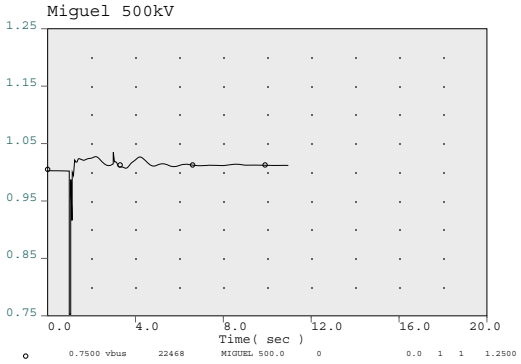


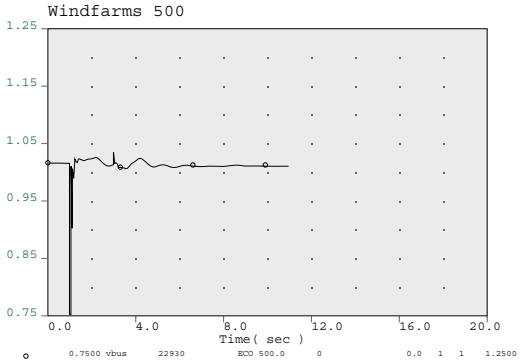
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

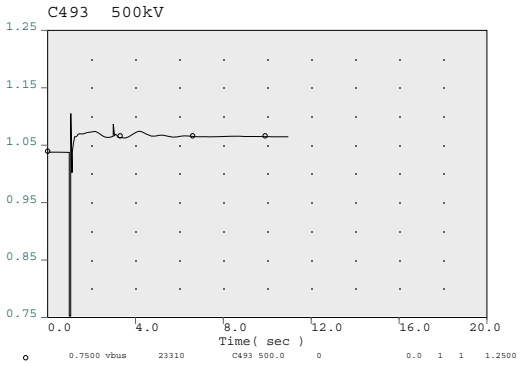
Imperial Valley Area - VOLTAGE

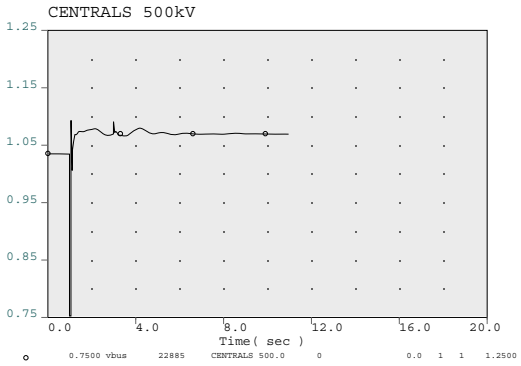






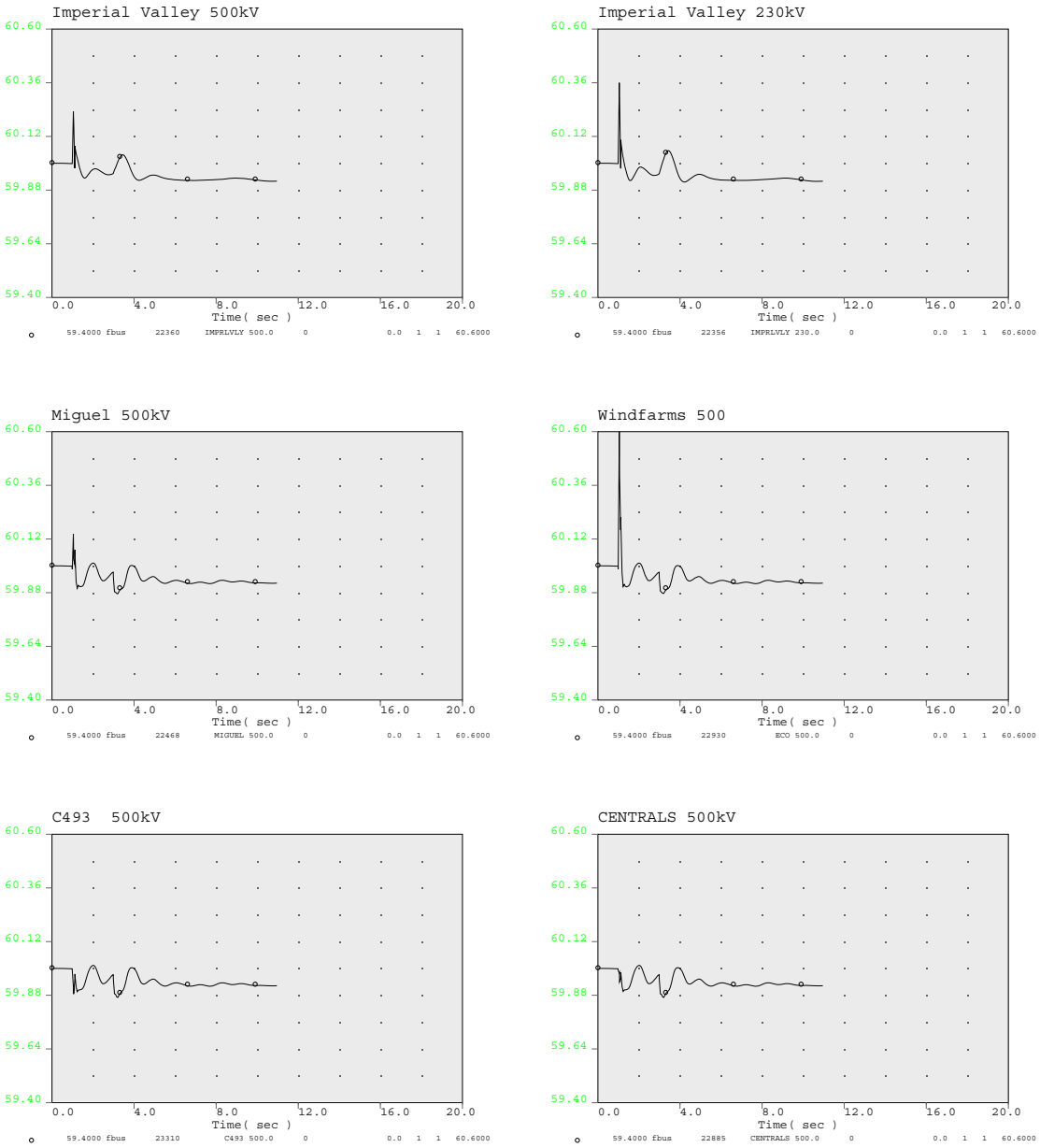






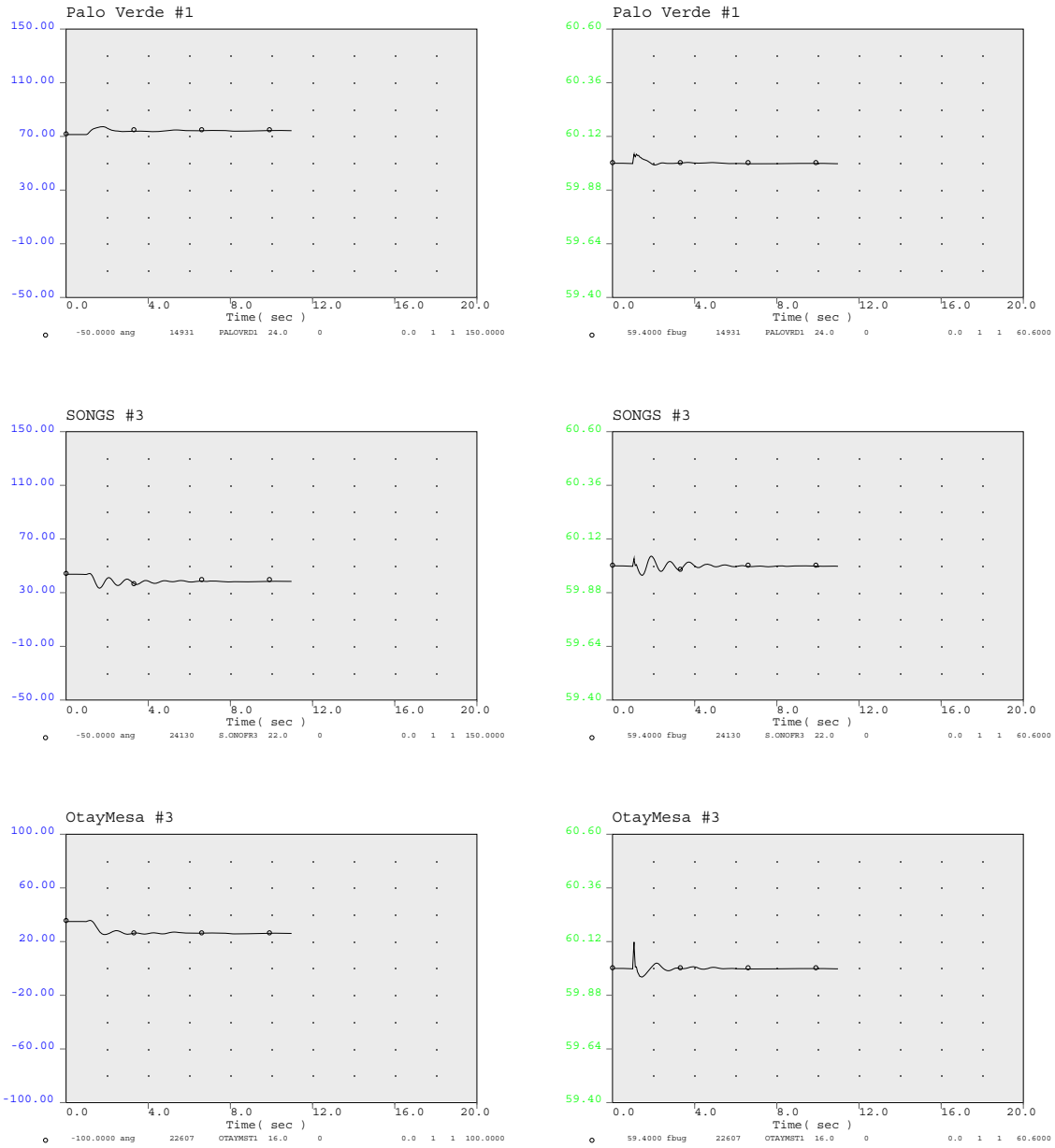
SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Heavy Summer
IV-ECO & IV-C493 500 kV Double line outage

RELATIVE ROTOR ANGLE & FREQUENCY

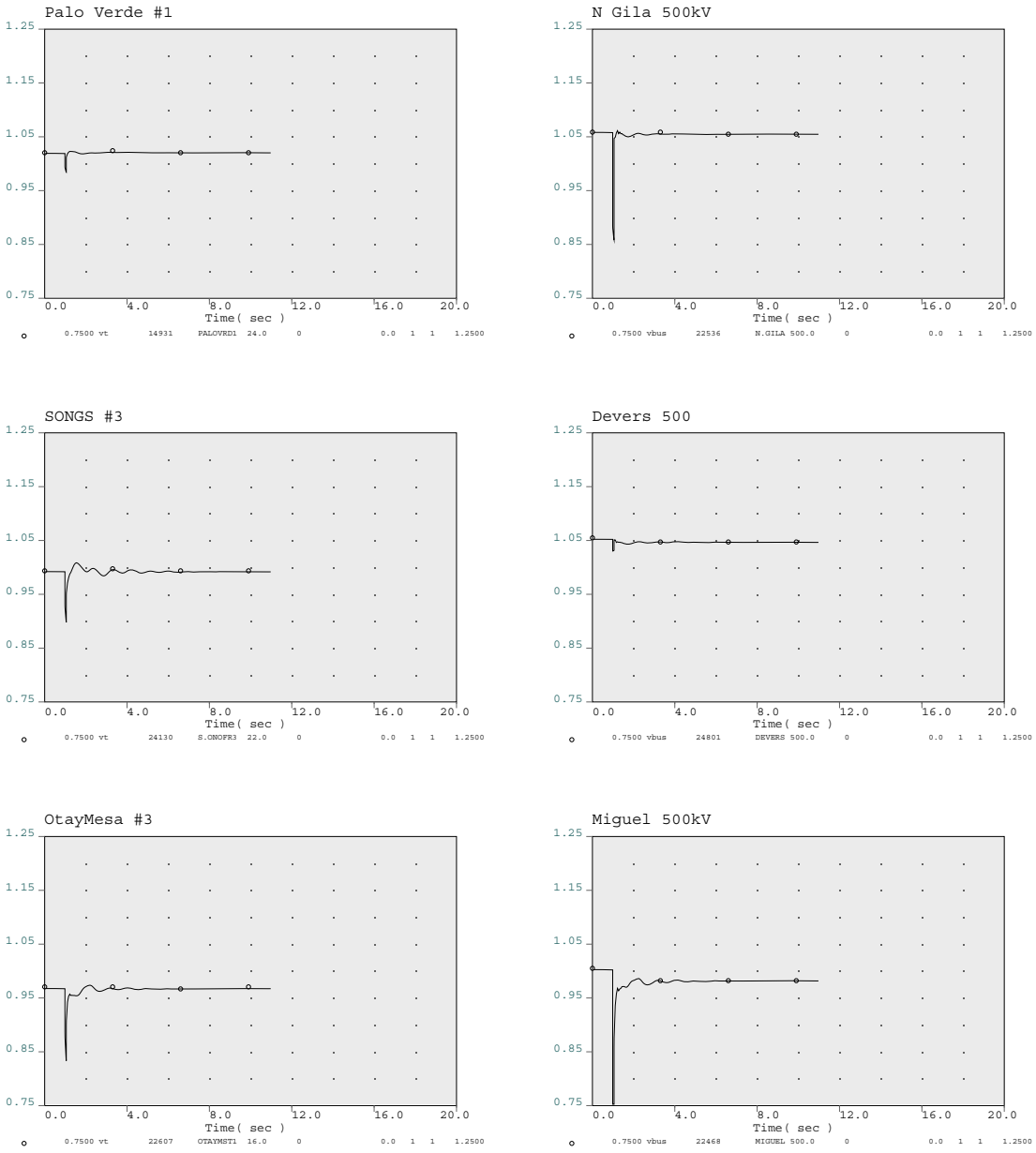


SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Page 1

SDGE	ML_Wnd_noRAS_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:35 2010

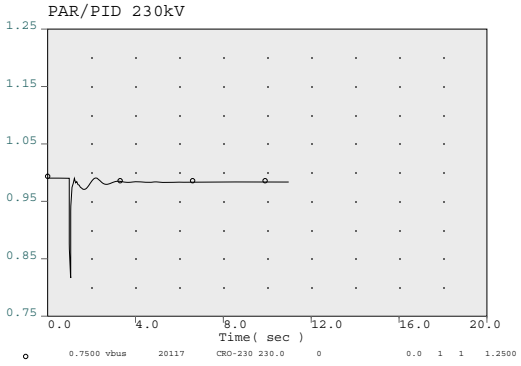
RELATIVE VOLTAGE



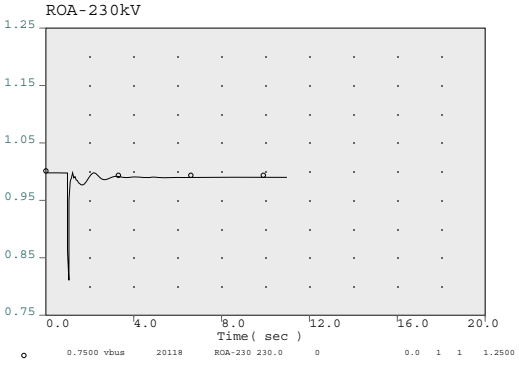
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

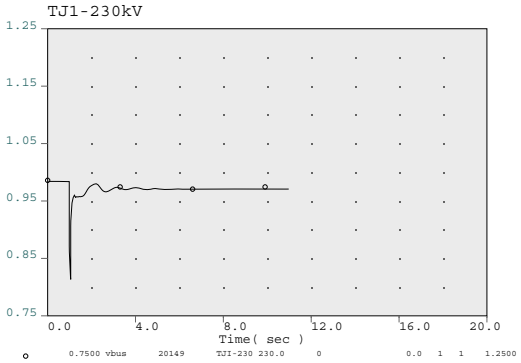
PAR/PID 230kV



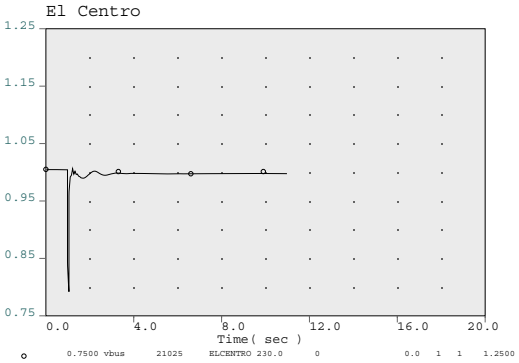
ROA-230kV



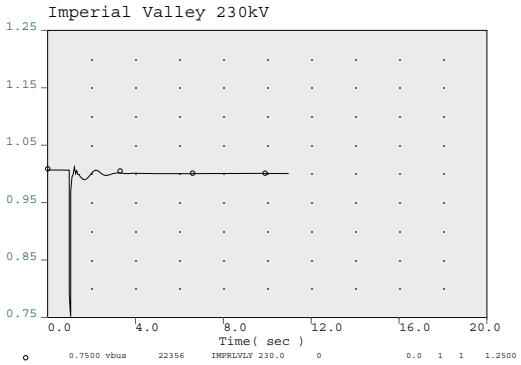
TJ1-230kV



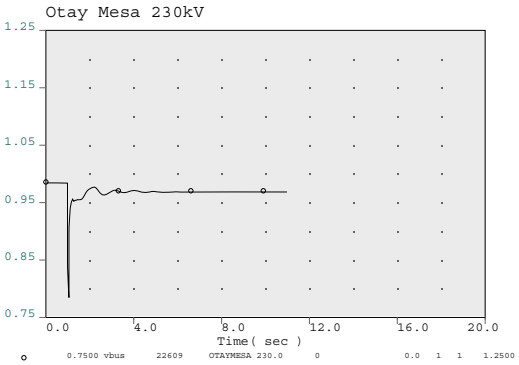
El Centro



Imperial Valley 230kV



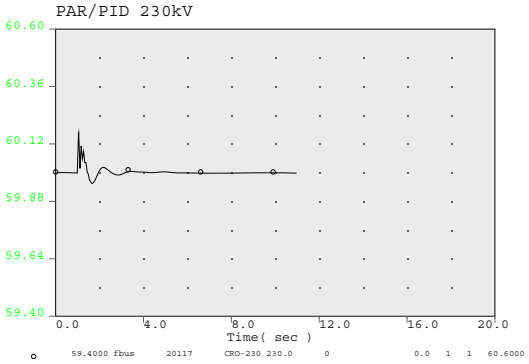
Otay Mesa 230kV



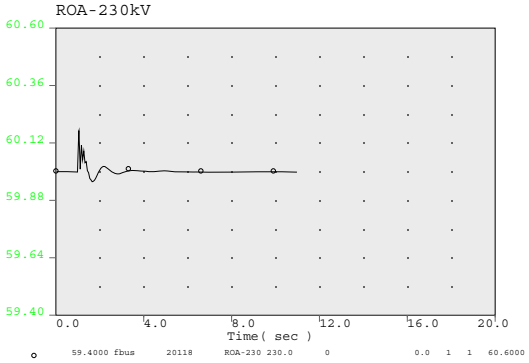
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

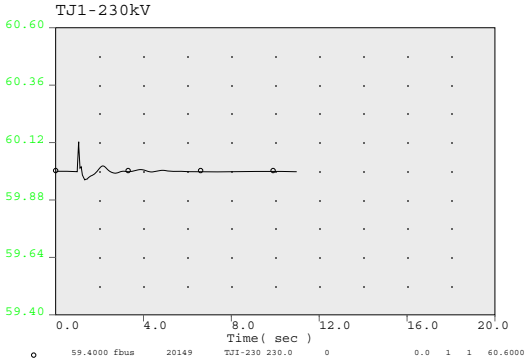
PAR/PID 230kV



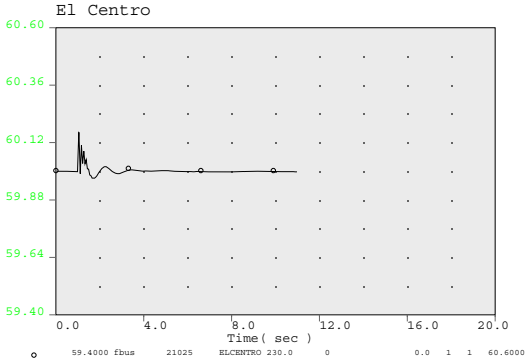
ROA-230kV



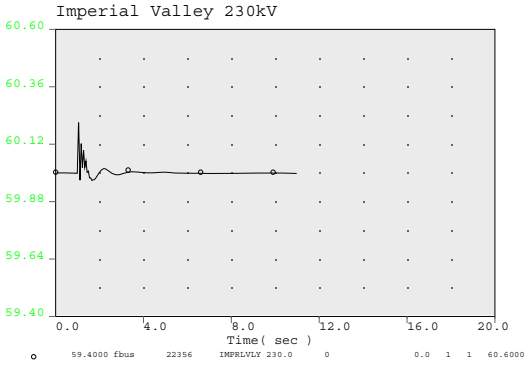
TJ1-230kV



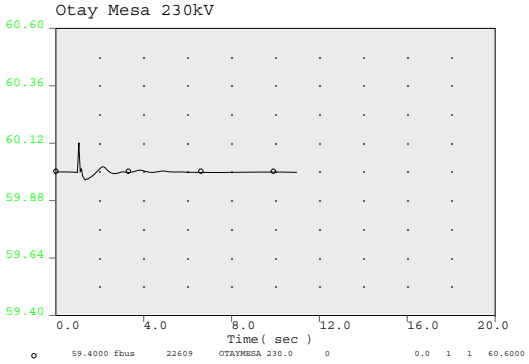
El Centro



Imperial Valley 230kV



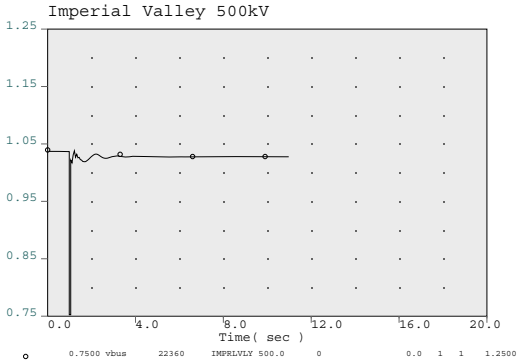
Otay Mesa 230kV



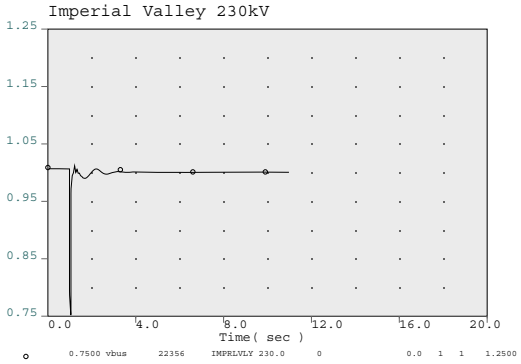
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

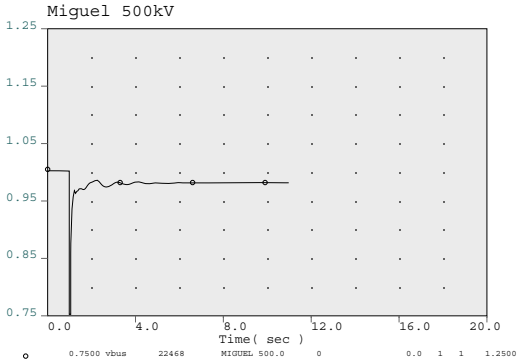
Imperial Valley 500kV



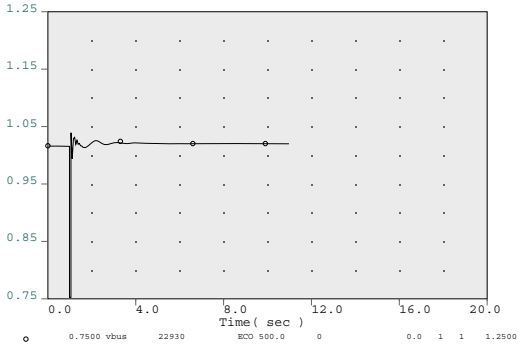
Imperial Valley 230kV



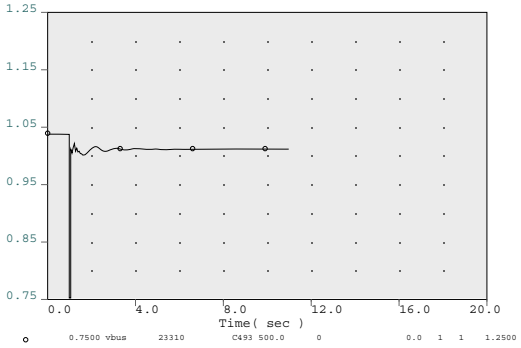
Miguel 500kV



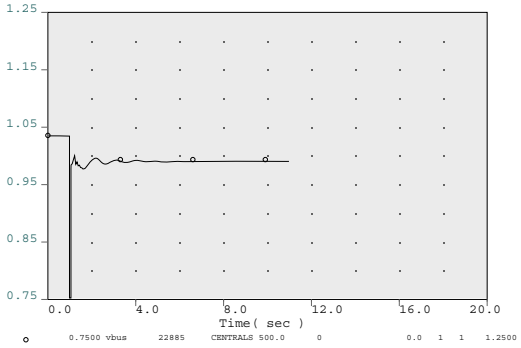
Windfarms 500



C493 500kV

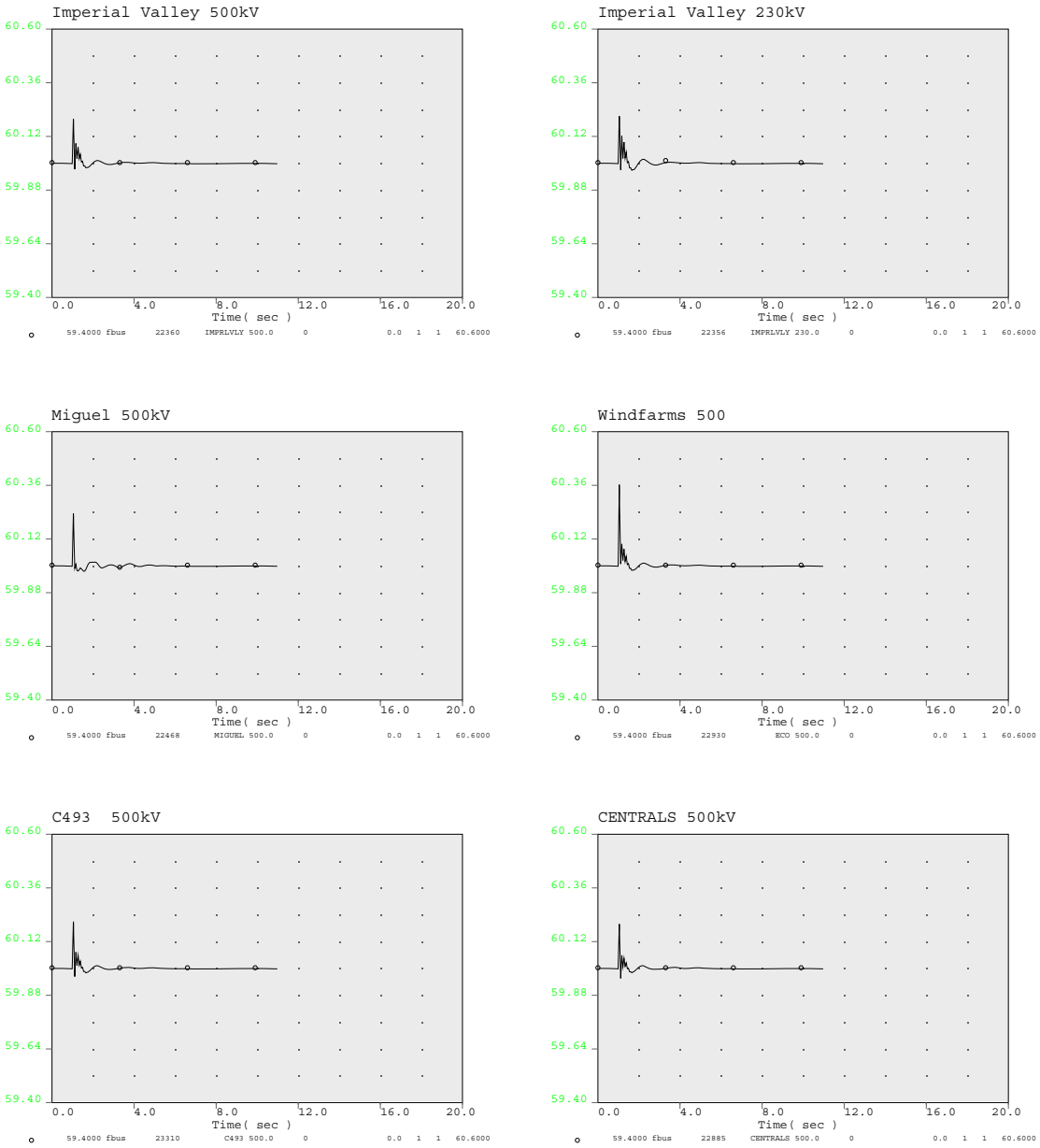


CENTRALS 500kV



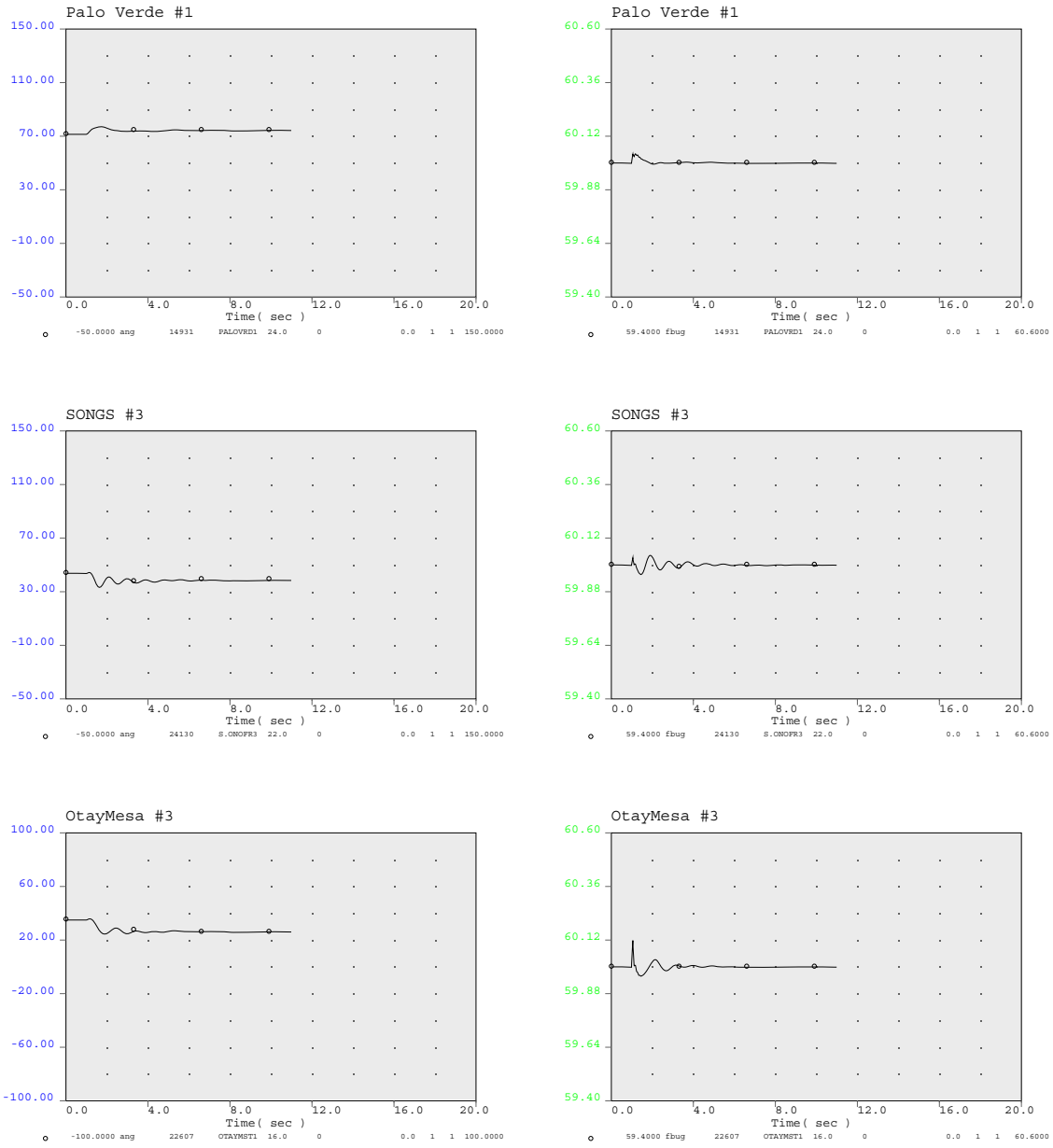
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY

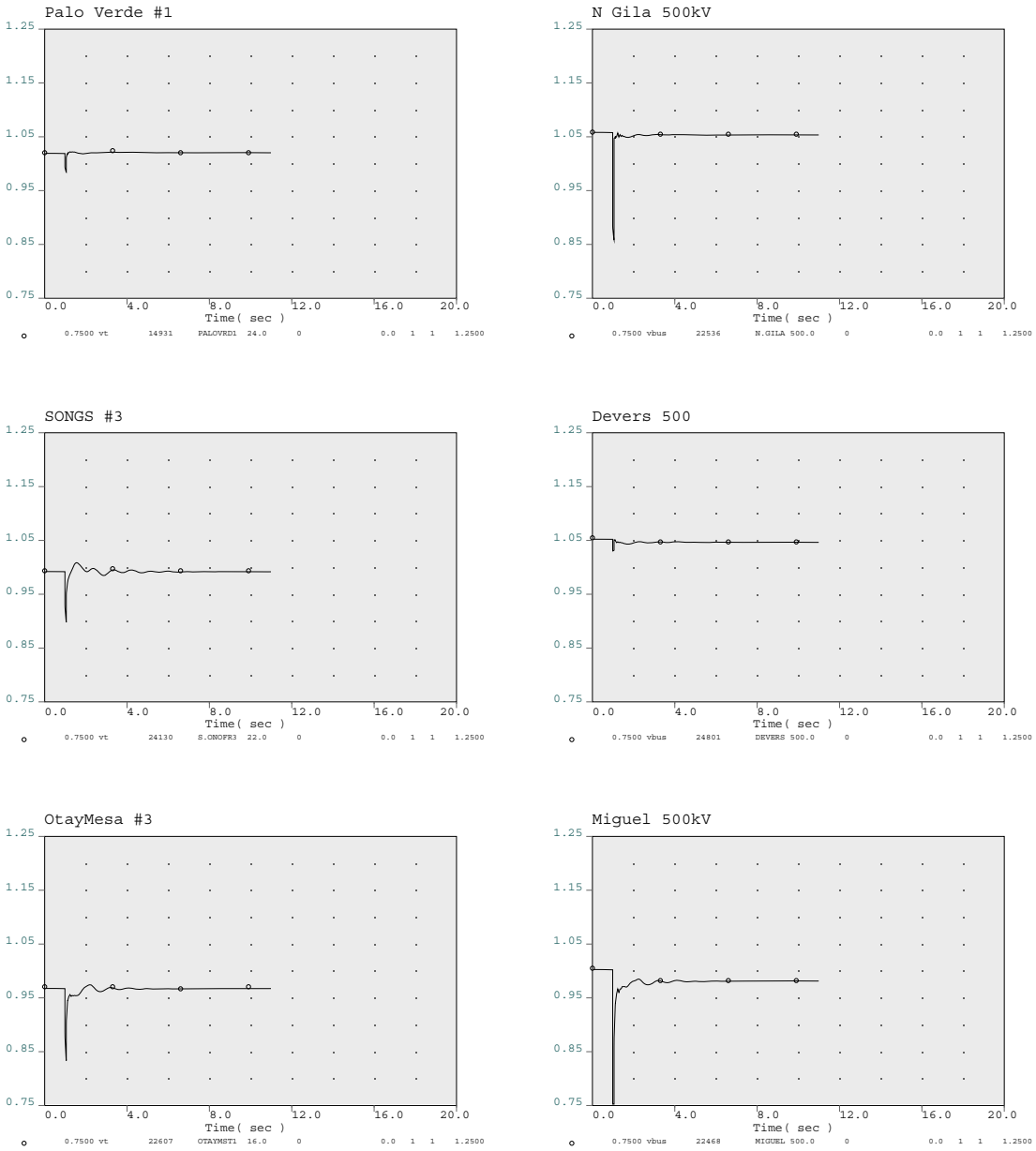


SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Page 1

SDGE	ML_Wnd_noXTrp_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:38 2010

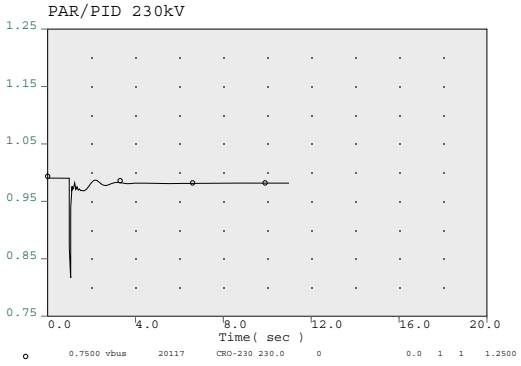
RELATIVE VOLTAGE



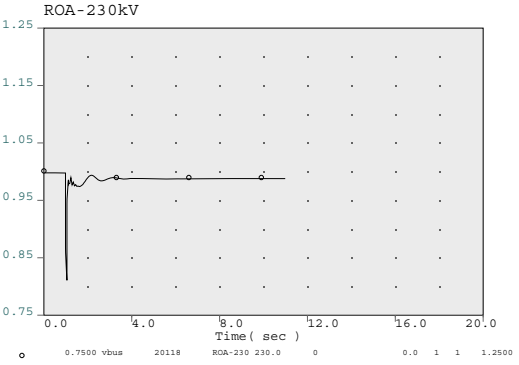
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

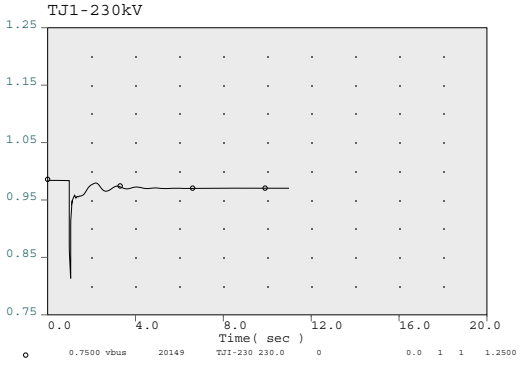
PAR/PID 230kV



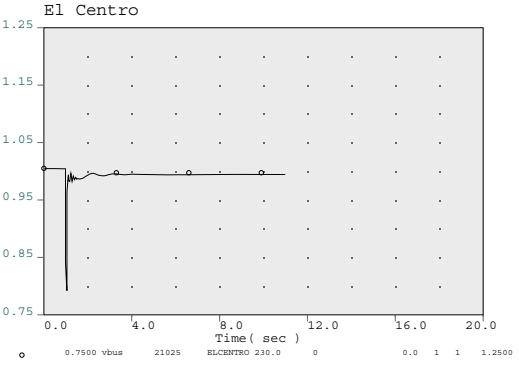
ROA-230kV



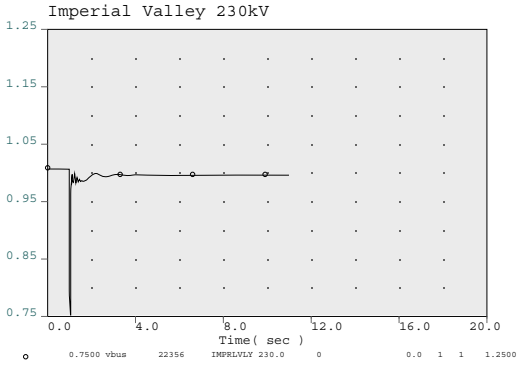
TJ1-230kV



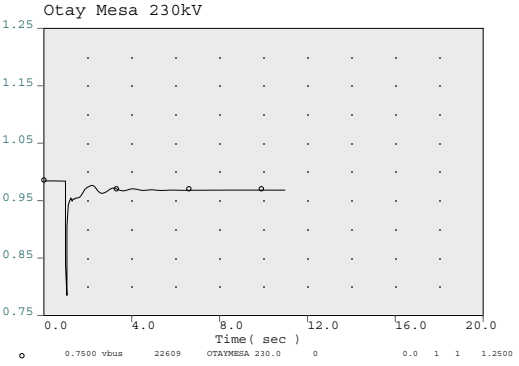
El Centro



Imperial Valley 230kV



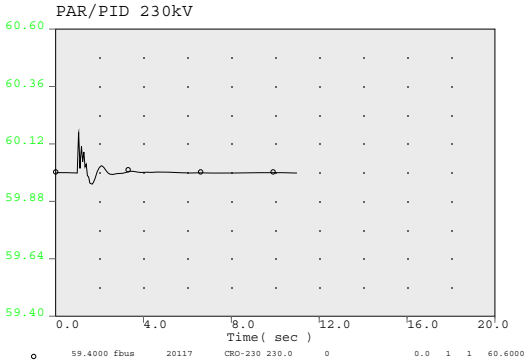
Otay Mesa 230kV



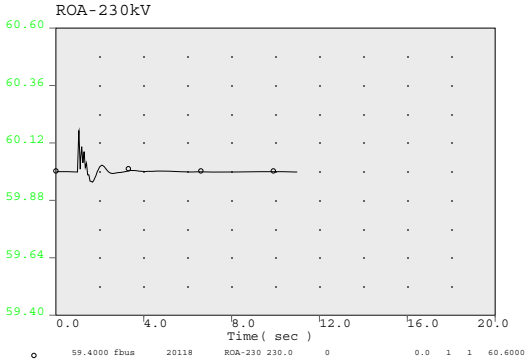
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

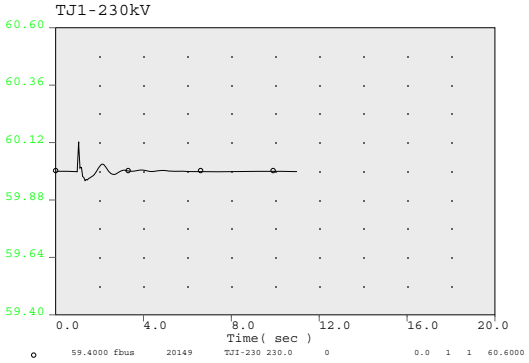
PAR/PID 230kV



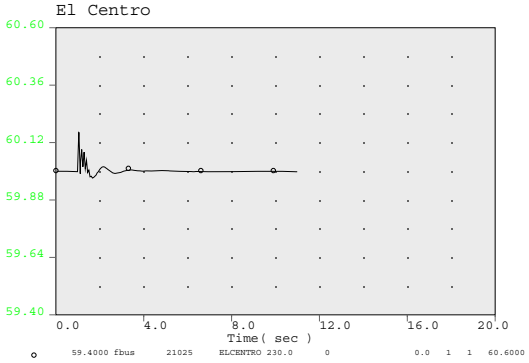
ROA-230kV



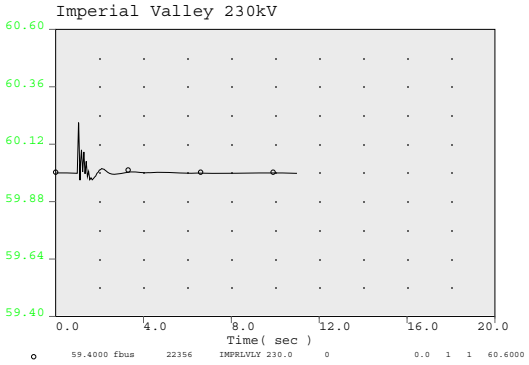
TJ1-230kV



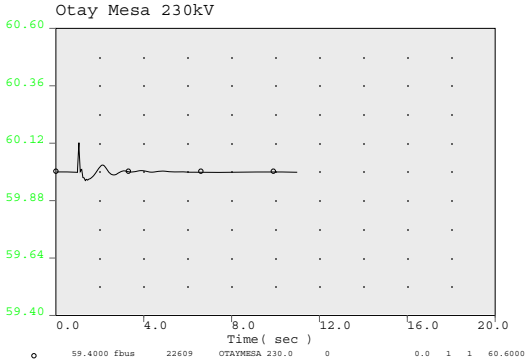
El Centro



Imperial Valley 230kV



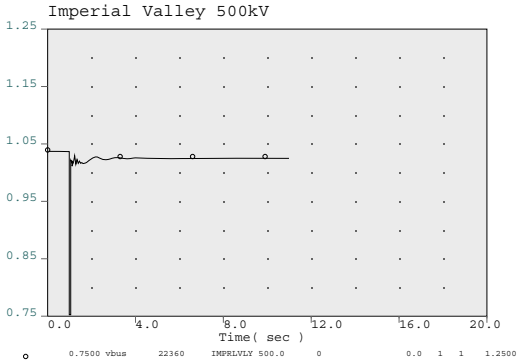
Otay Mesa 230kV



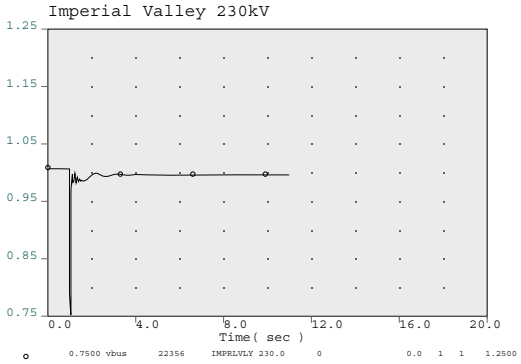
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

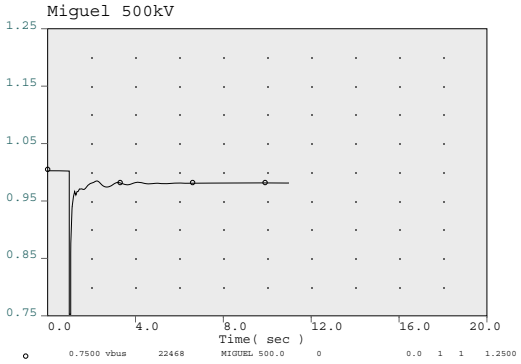
Imperial Valley 500kV



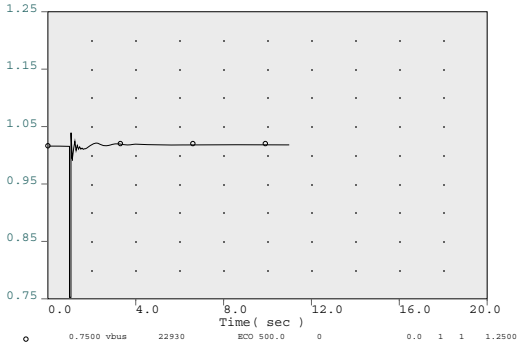
Imperial Valley 230kV



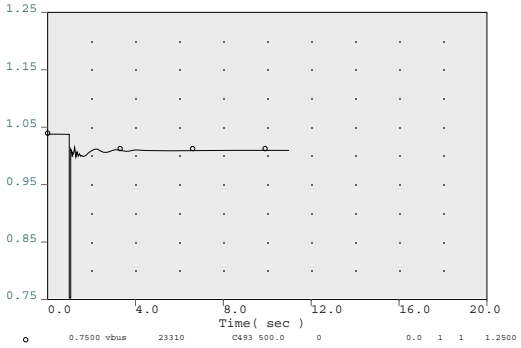
Miguel 500kV



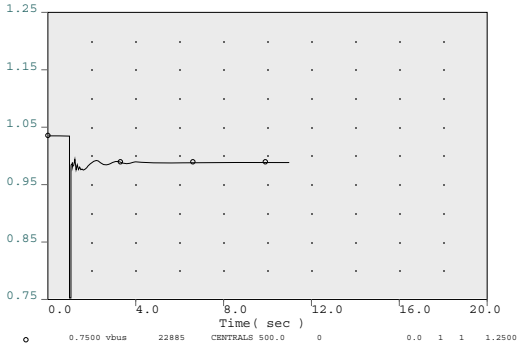
Windfarms 500



C493 500kV



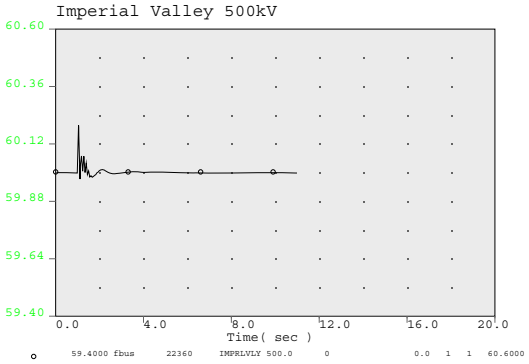
CENTRALS 500kV



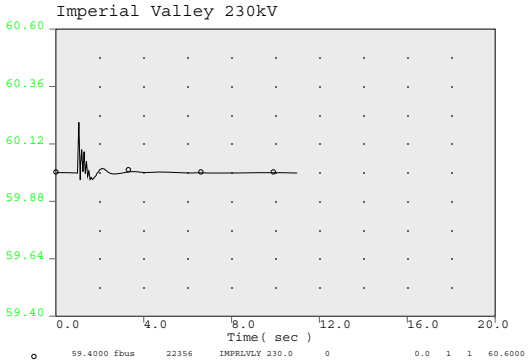
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - Frequency

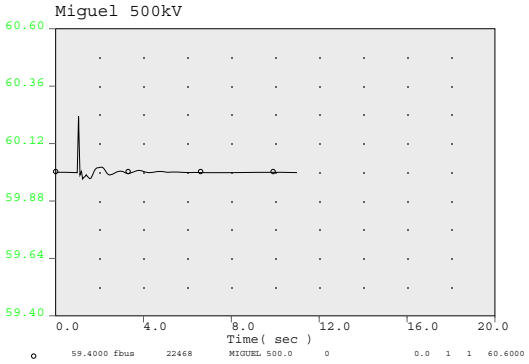
Imperial Valley 500kV



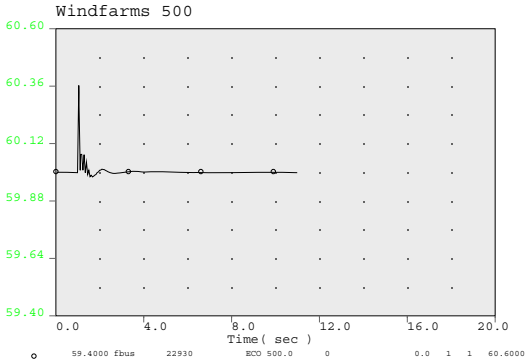
Imperial Valley 230kV



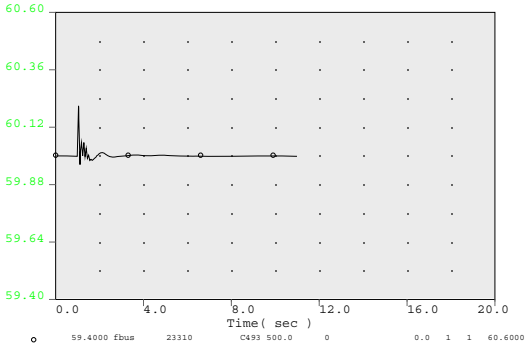
Miguel 500kV



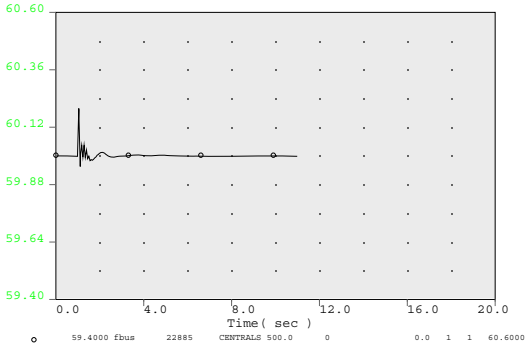
Windfarms 500



C493 500kV

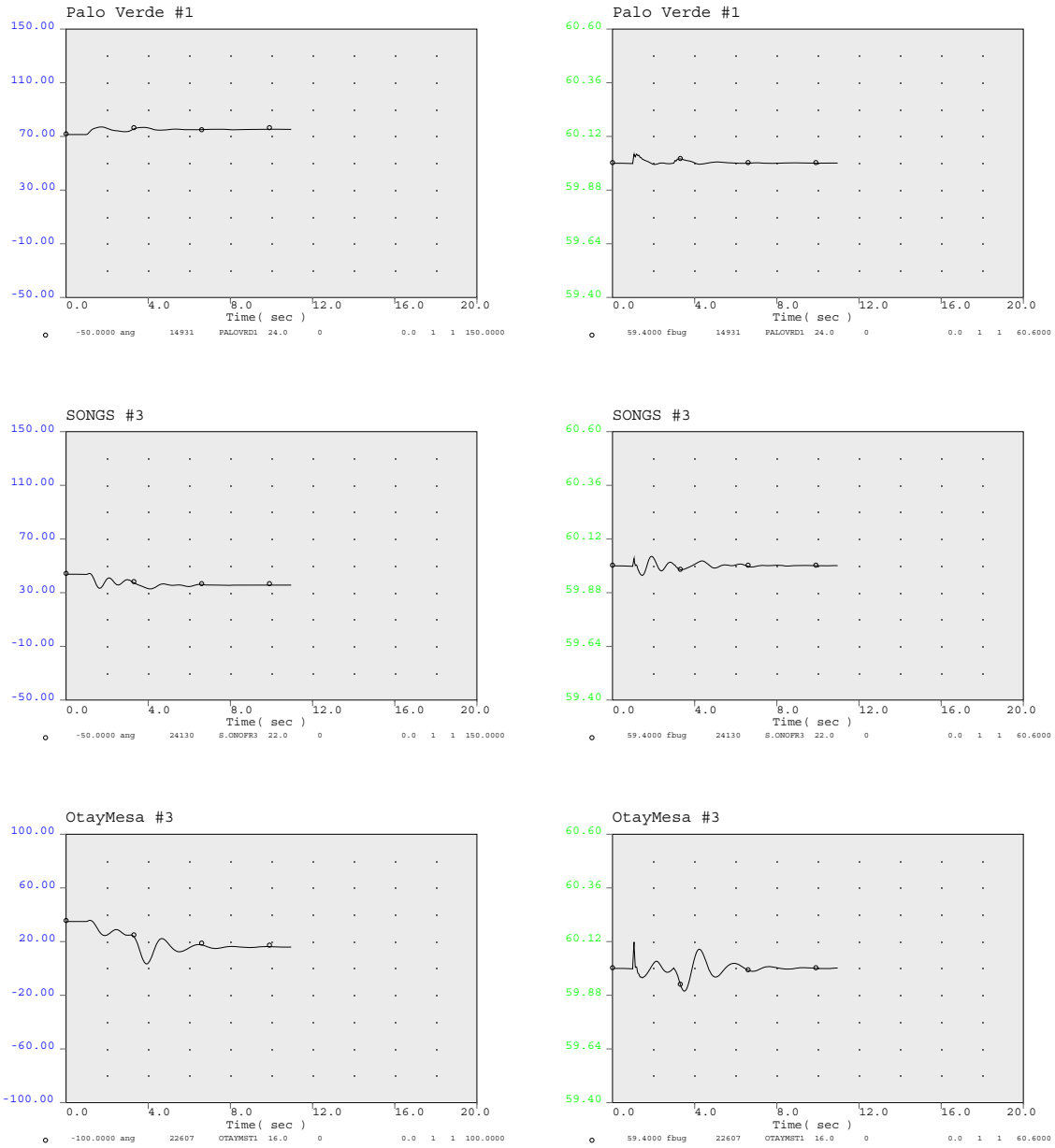


CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY



SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

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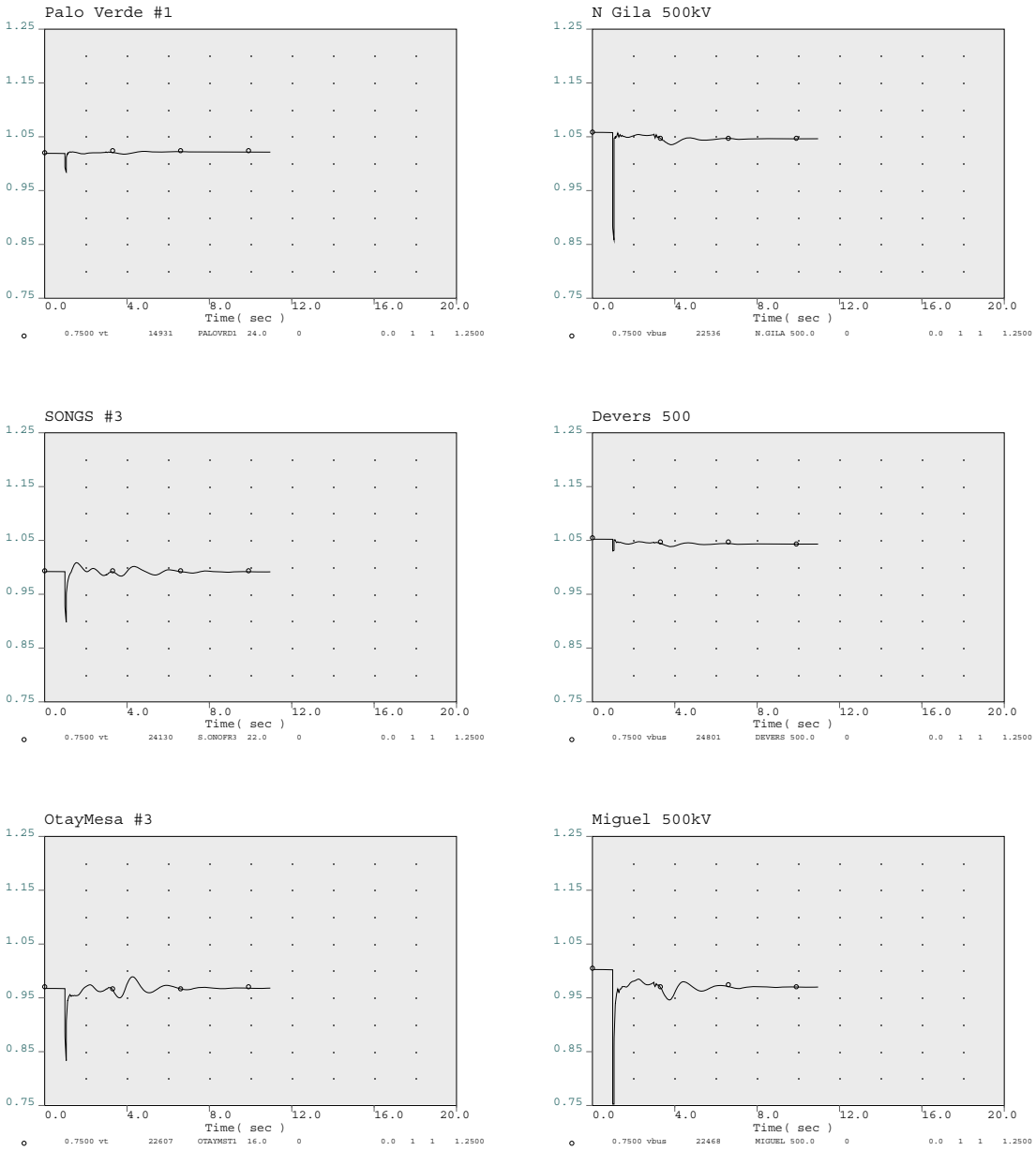
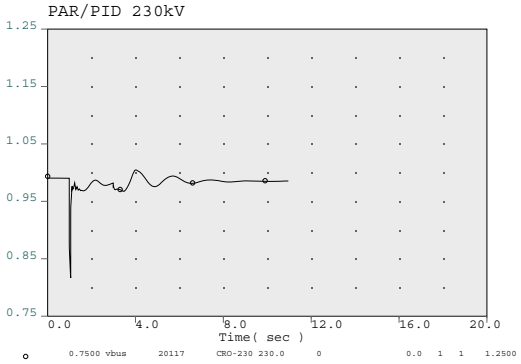
RELATIVE VOLTAGE



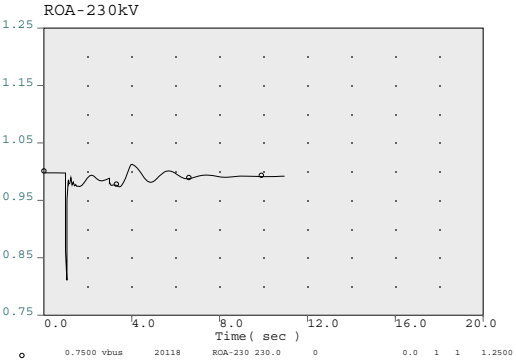
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

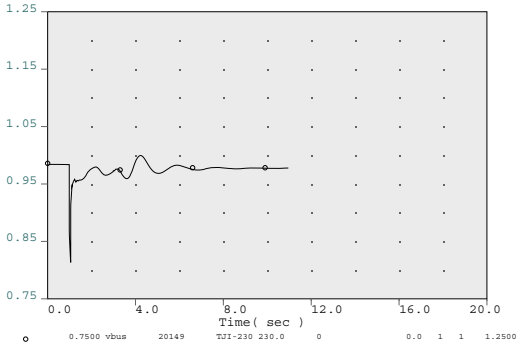
PAR/PID 230kV



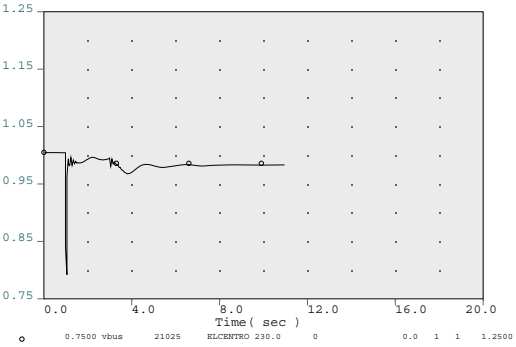
ROA-230kV



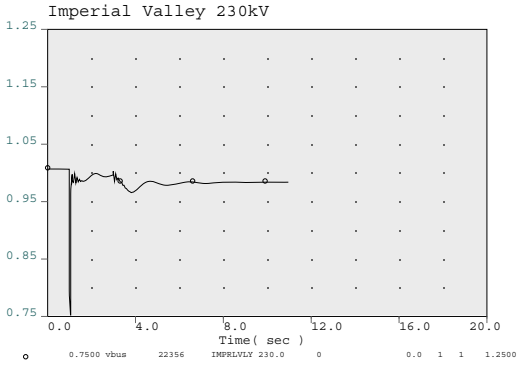
TJ1-230kV



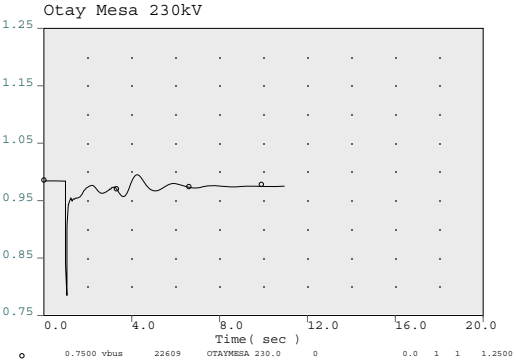
El Centro



Imperial Valley 230kV



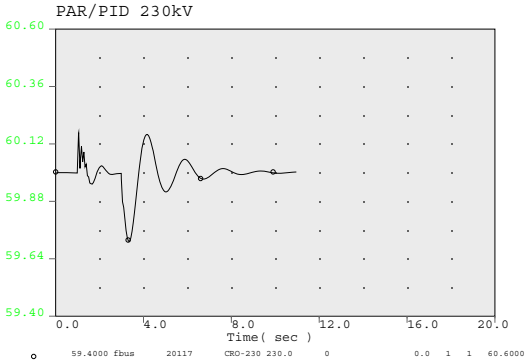
Otay Mesa 230kV



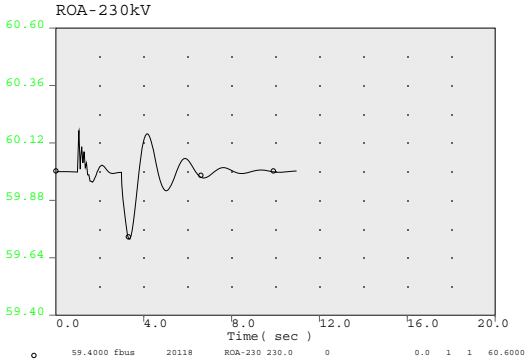
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

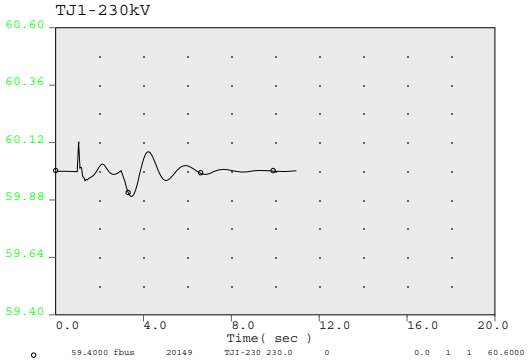
PAR/PID 230kV



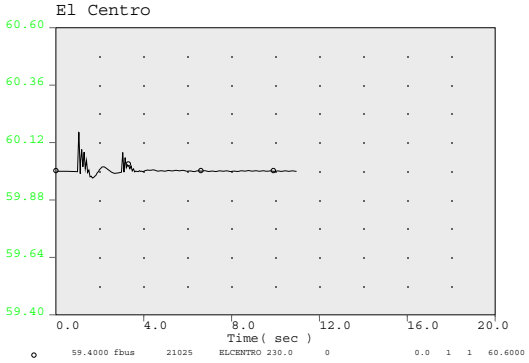
ROA-230kV



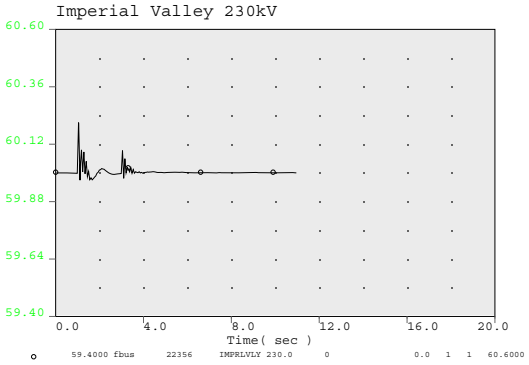
TJ1-230kV



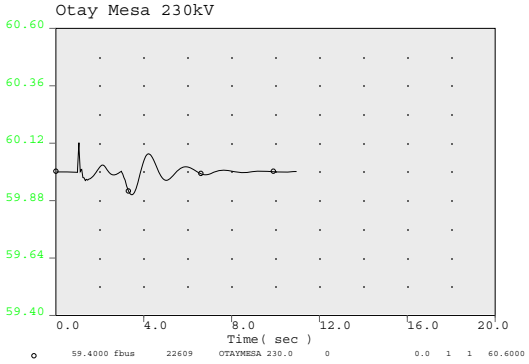
El Centro



Imperial Valley 230kV



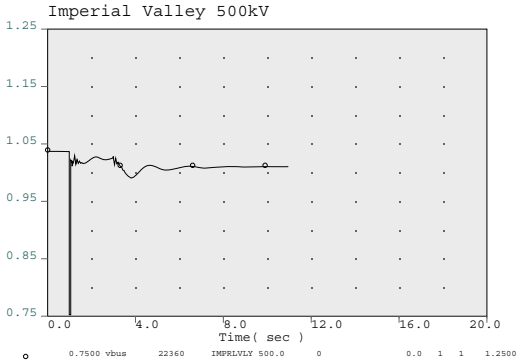
Otay Mesa 230kV



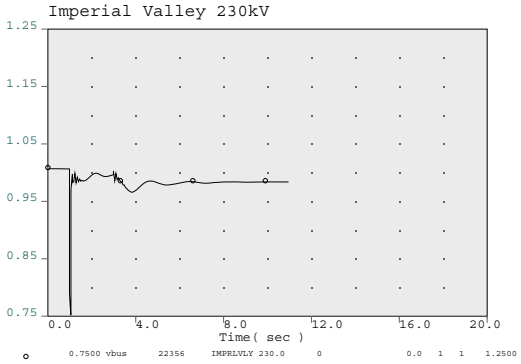
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

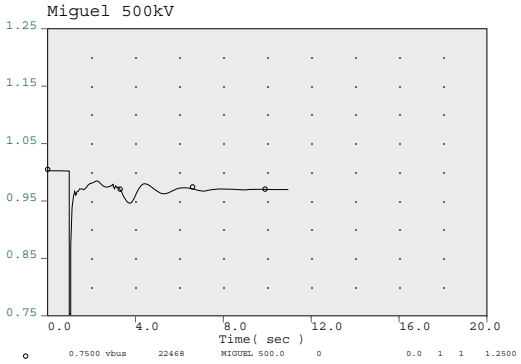
Imperial Valley 500kV



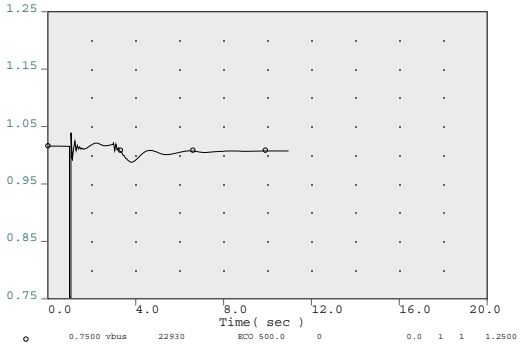
Imperial Valley 230kV



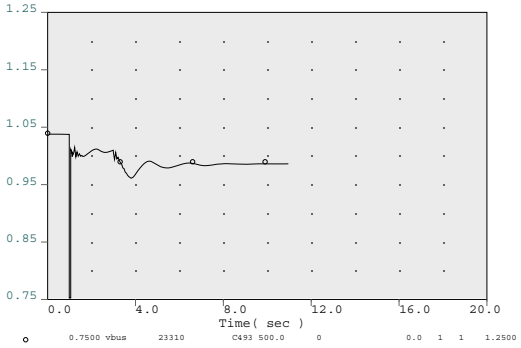
Miguel 500kV



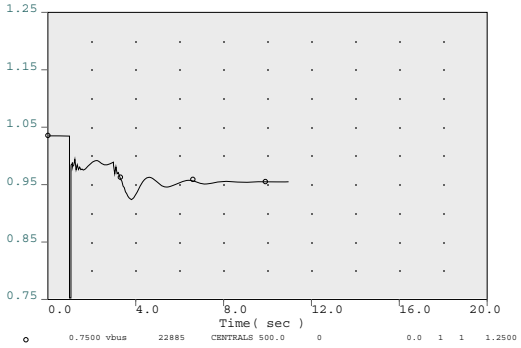
Windfarms 500



C493 500kV

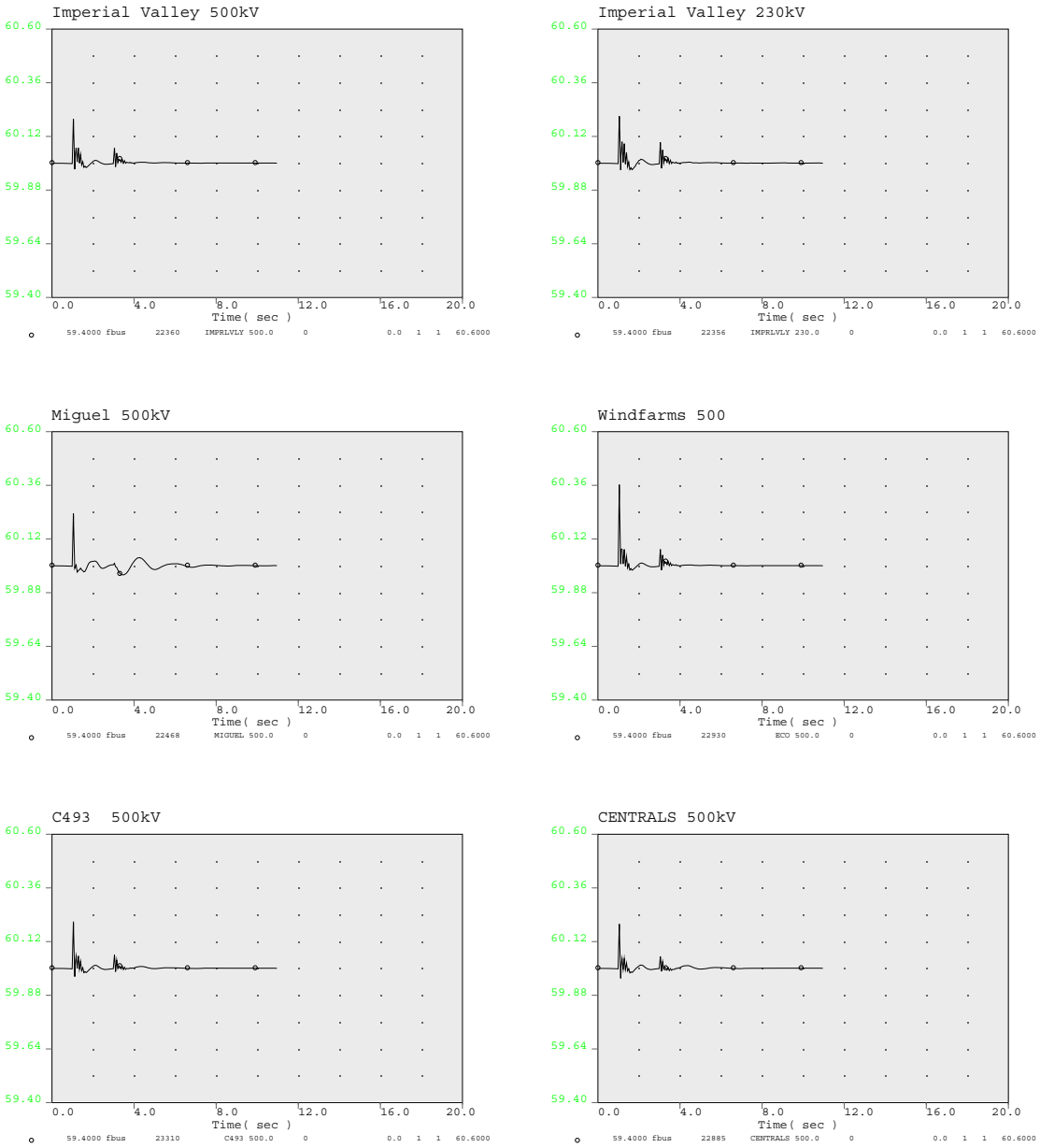


CENTRALS 500kV



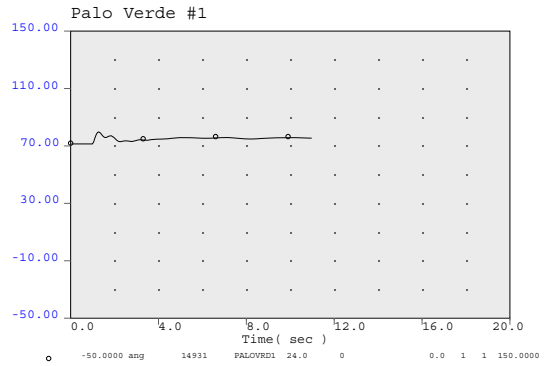
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

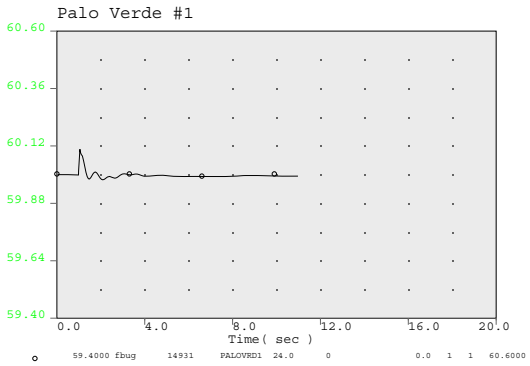
Imperial Valley Area - Frequency

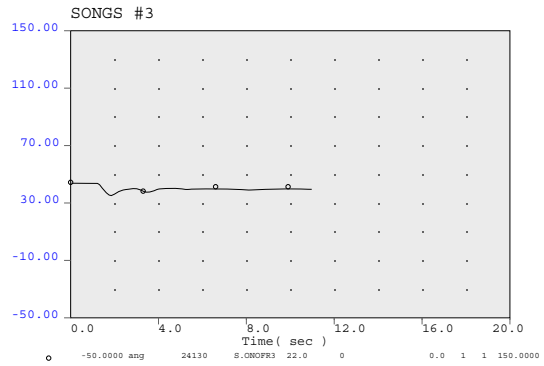


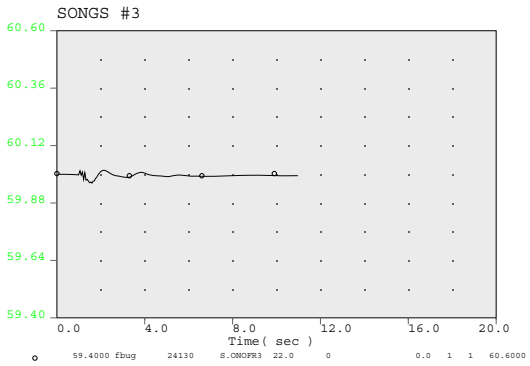
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-ECO 500 kV line

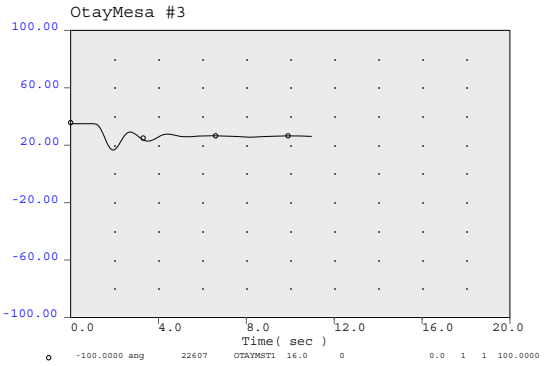
RELATIVE ROTOR ANGLE & FREQUENCY

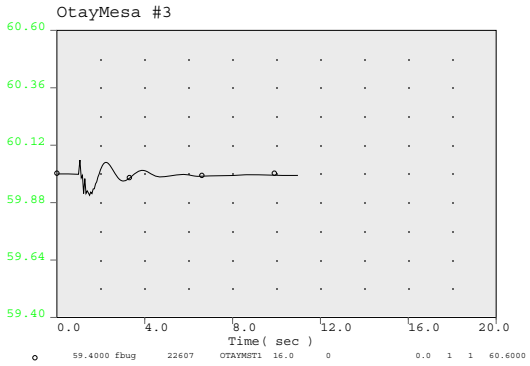










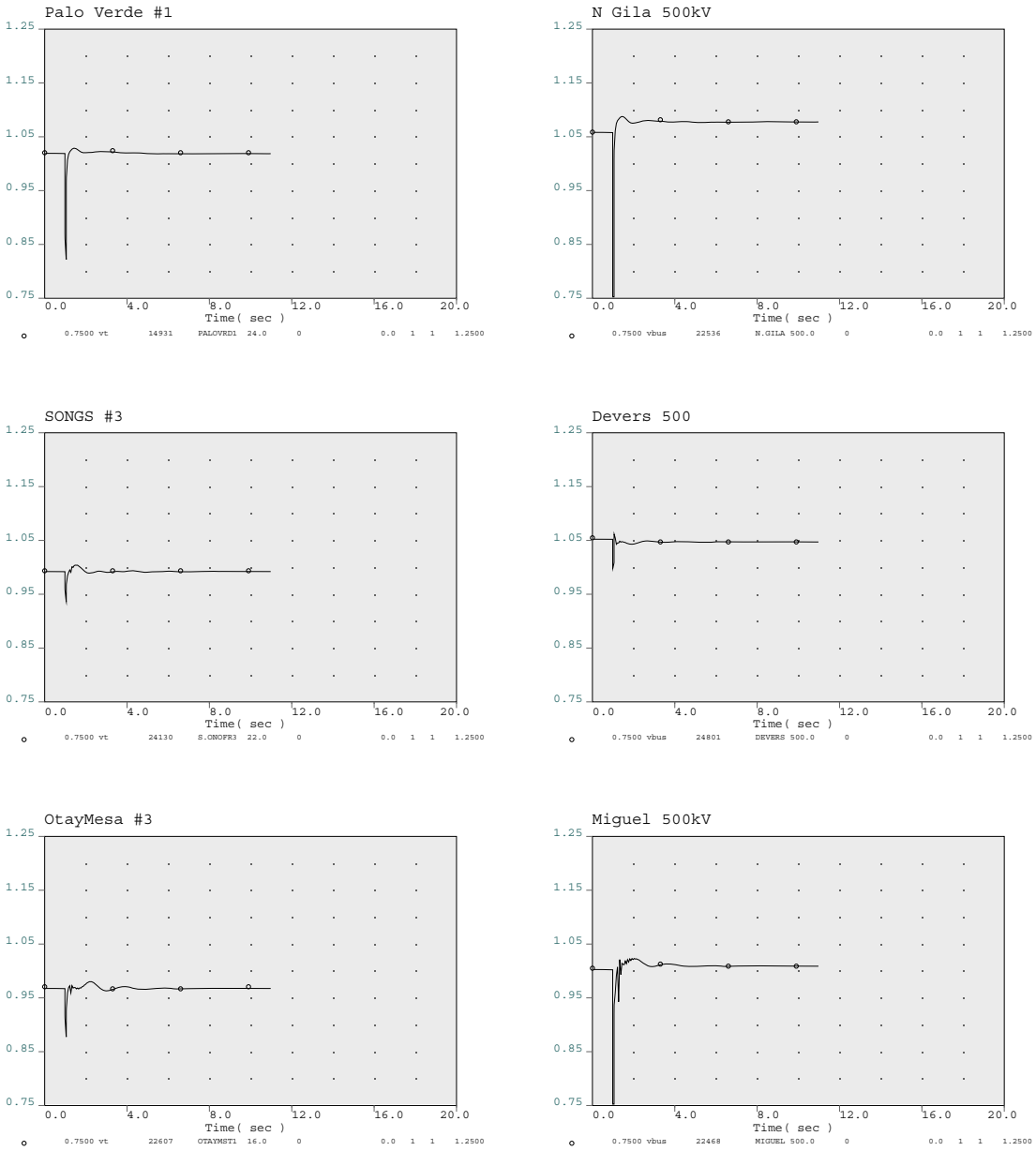


SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Page 1

SDGE	NGila_IV_slo_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:42:11 2010

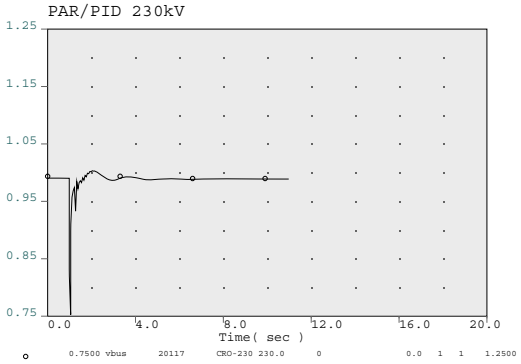
RELATIVE VOLTAGE



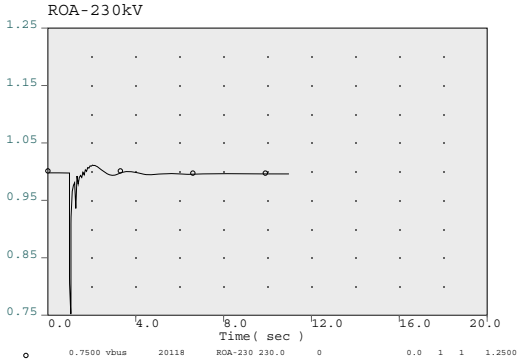
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

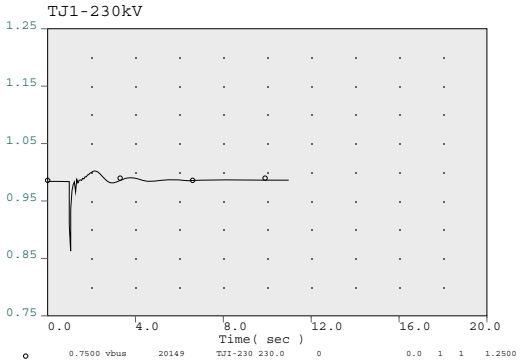
PAR/PID 230kV



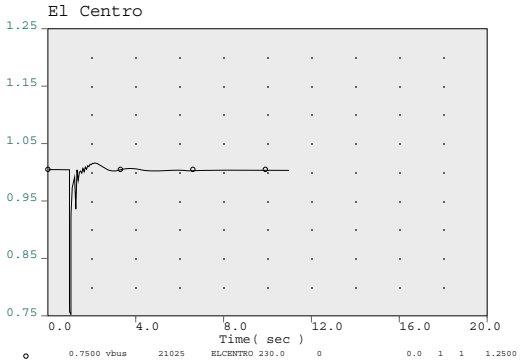
ROA-230kV



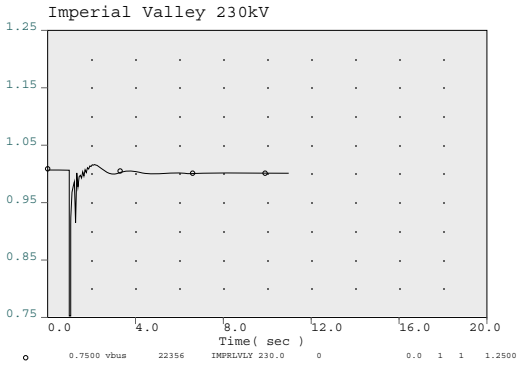
TJ1-230kV



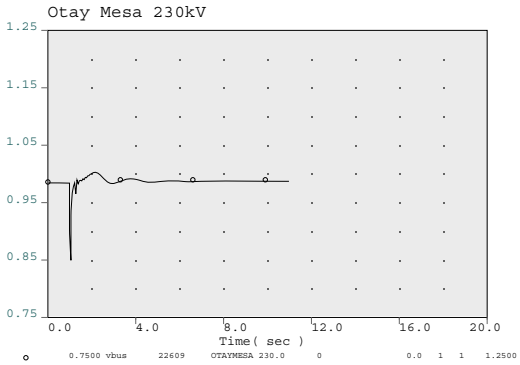
El Centro



Imperial Valley 230kV



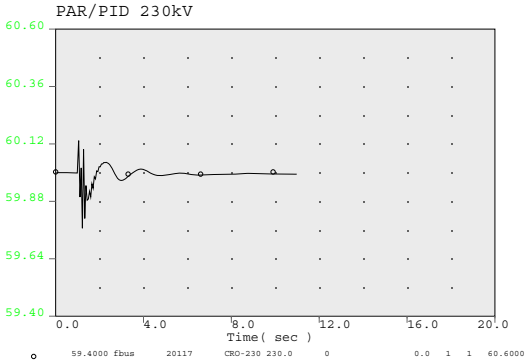
Otay Mesa 230kV



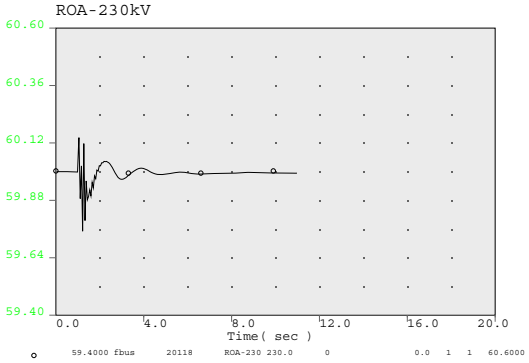
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

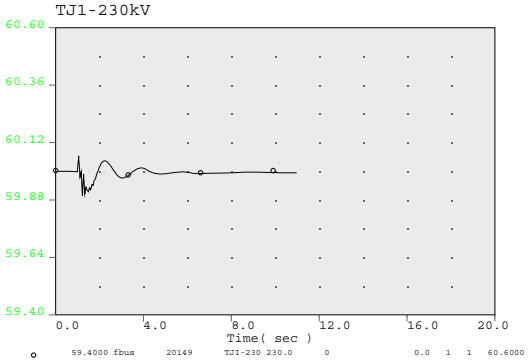
PAR/PID 230kV



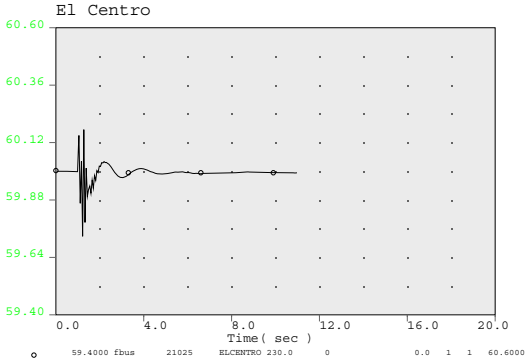
ROA-230kV



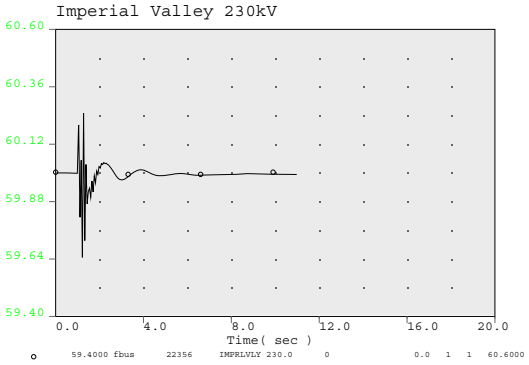
TJ1-230kV



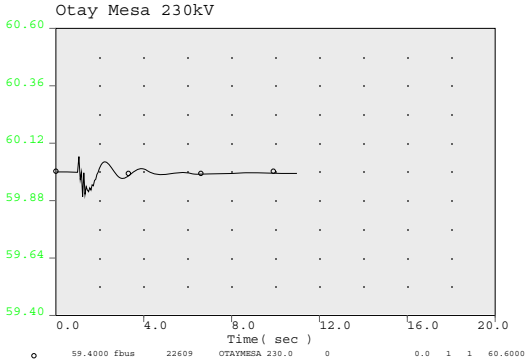
El Centro



Imperial Valley 230kV



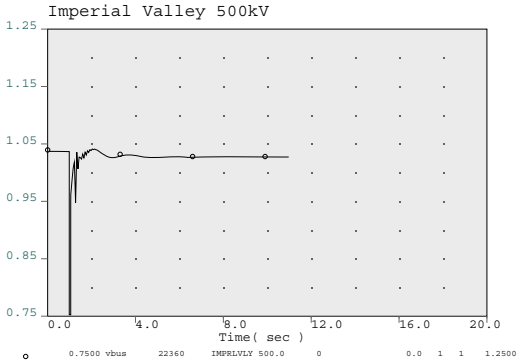
Otay Mesa 230kV



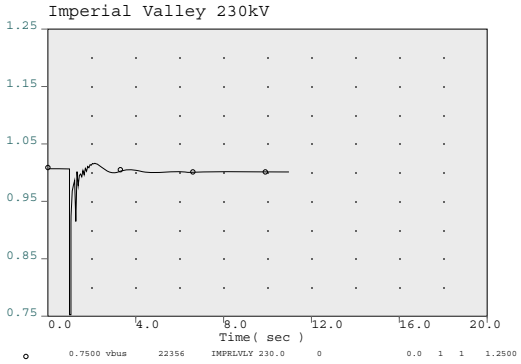
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

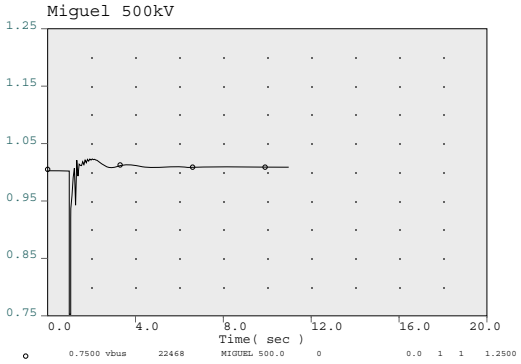
Imperial Valley 500kV



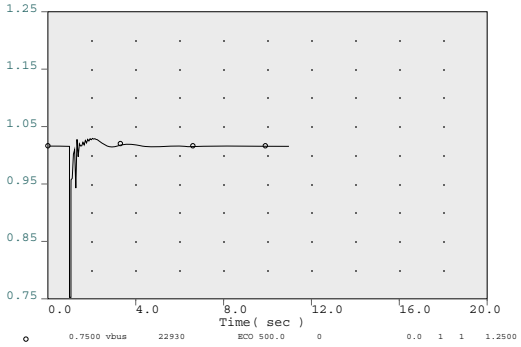
Imperial Valley 230kV



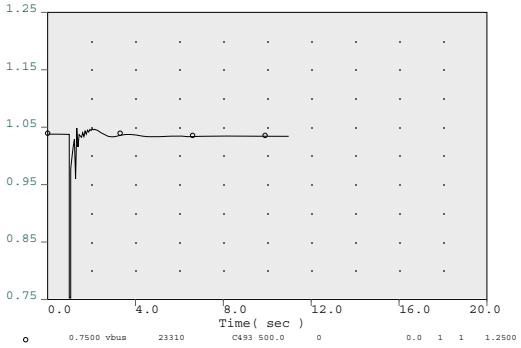
Miguel 500kV



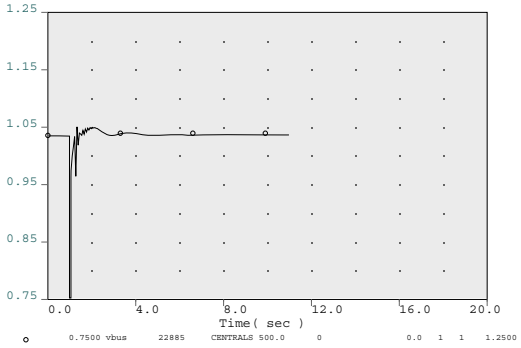
Windfarms 500



C493 500kV



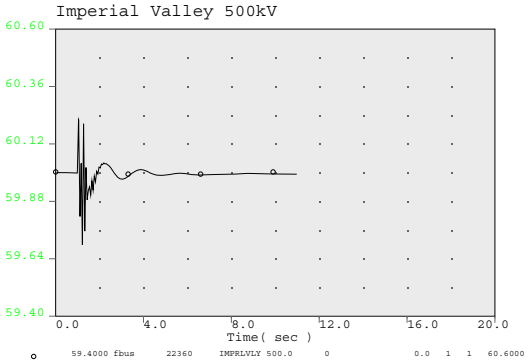
CENTRALS 500kV



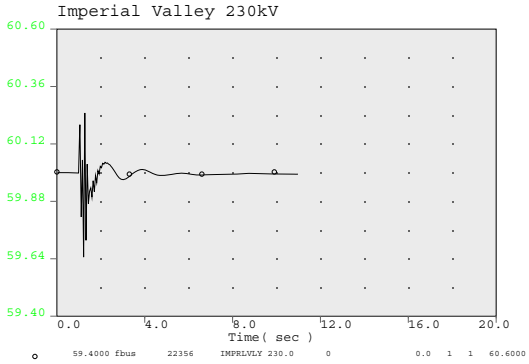
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - Frequency

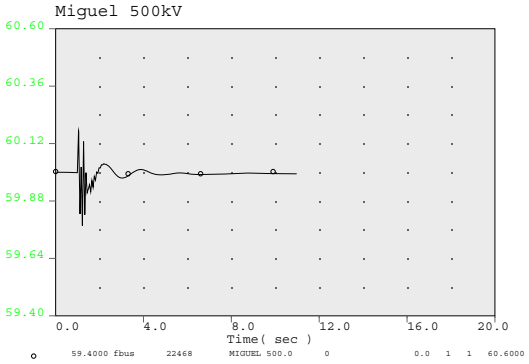
Imperial Valley 500kV



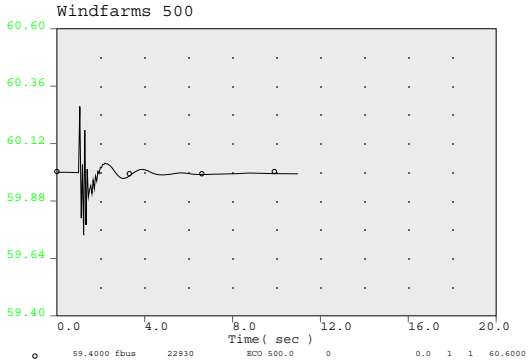
Imperial Valley 230kV



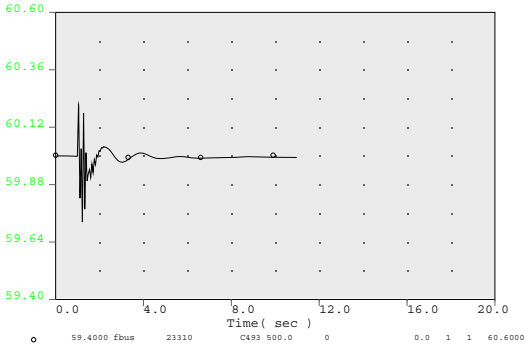
Miguel 500kV



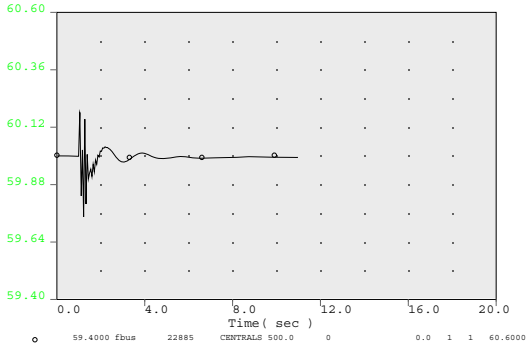
Windfarms 500



C493 500kV

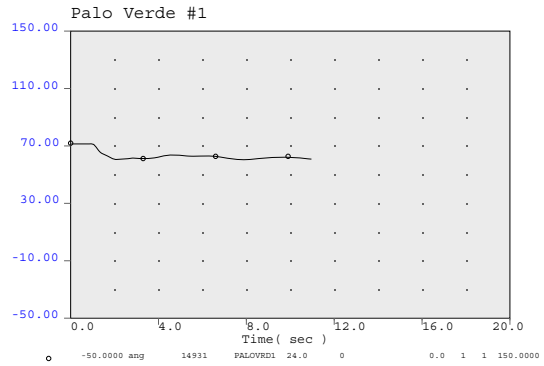


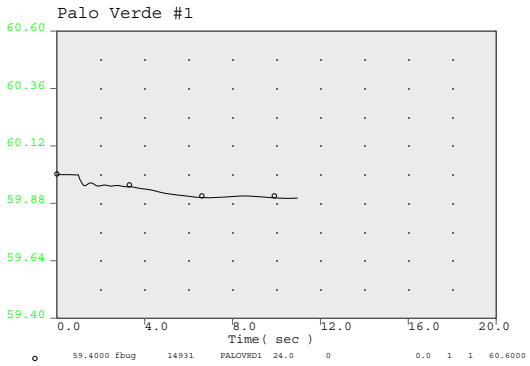
CENTRALS 500kV

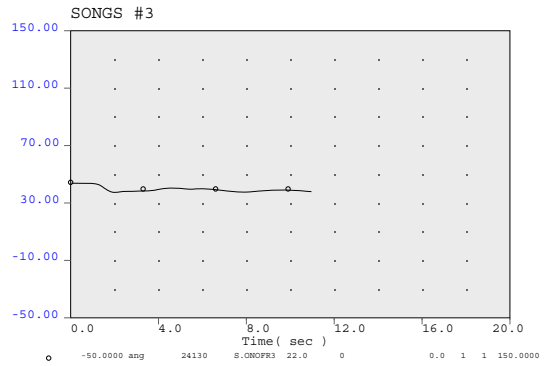


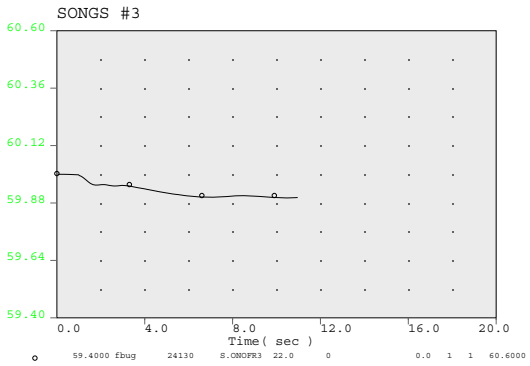
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

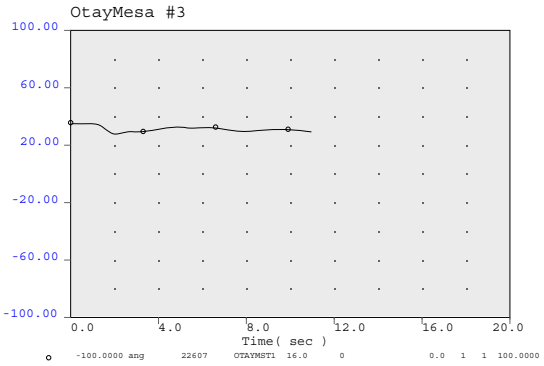
RELATIVE ROTOR ANGLE & FREQUENCY

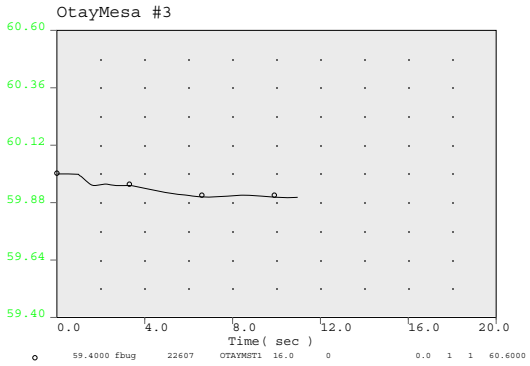






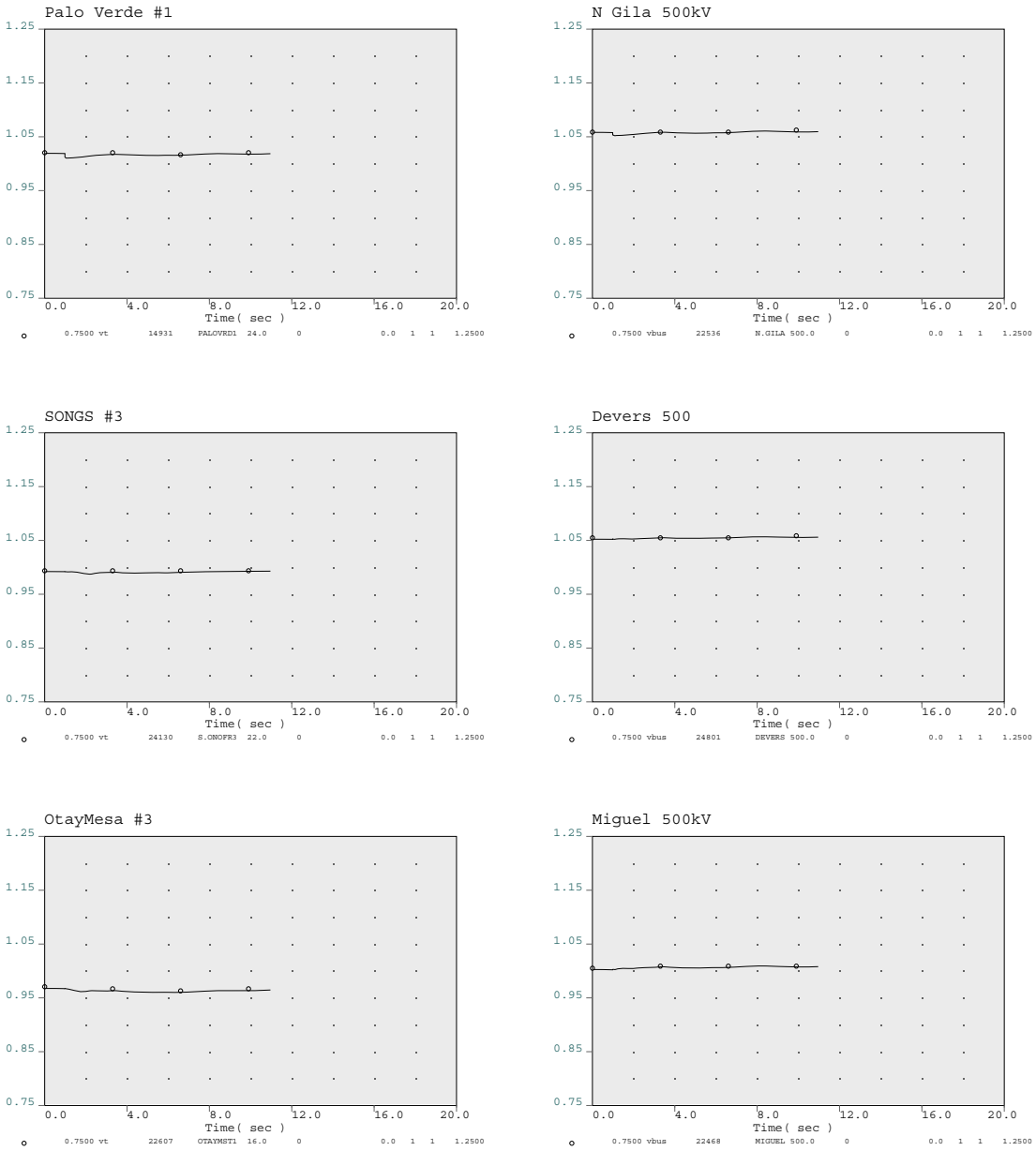






SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

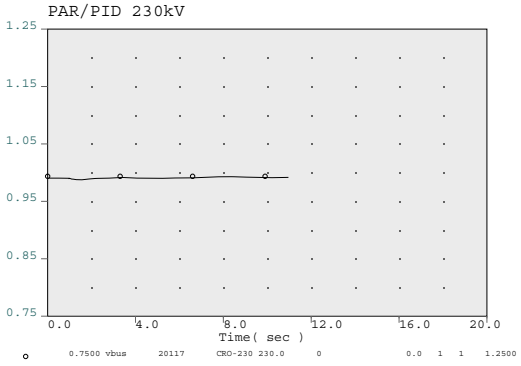
RELATIVE VOLTAGE



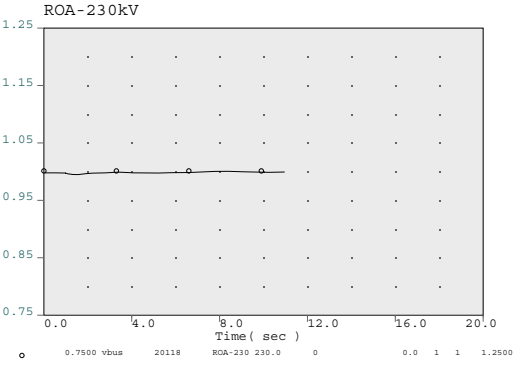
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

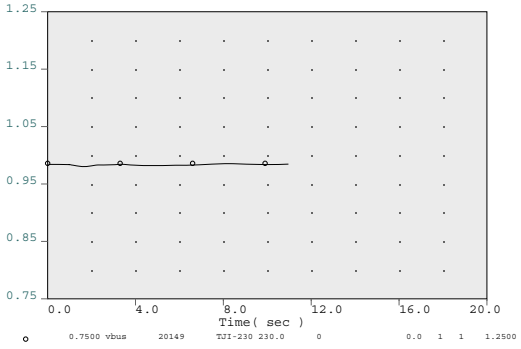
PAR/PID 230kV



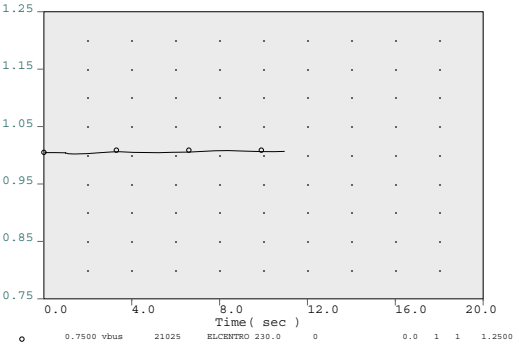
ROA-230kV



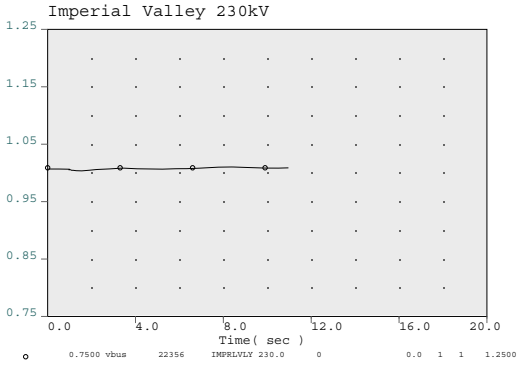
TJ1-230kV



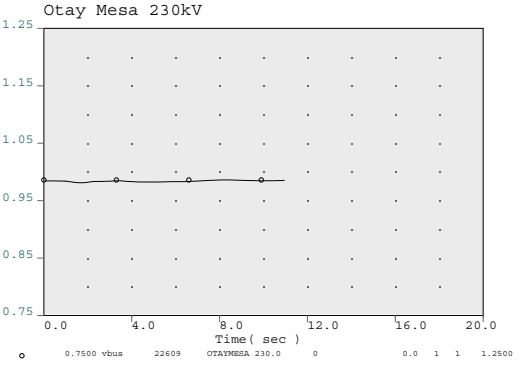
El Centro



Imperial Valley 230kV



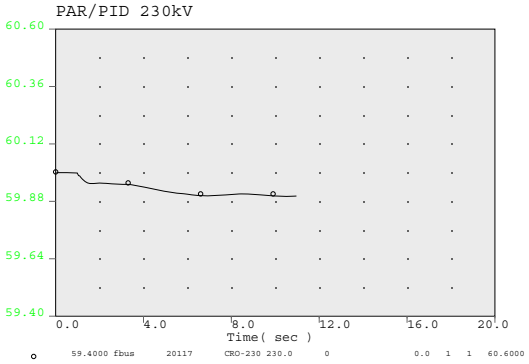
Otay Mesa 230kV



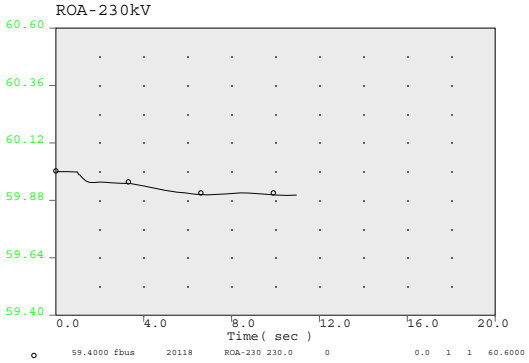
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

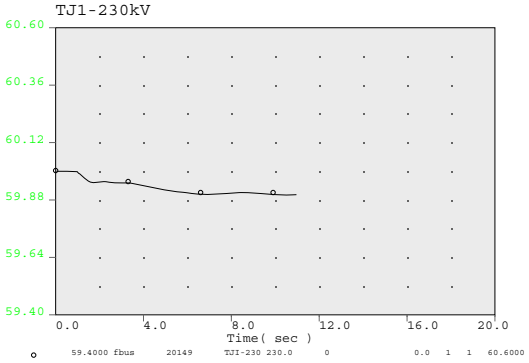
PAR/PID 230kV



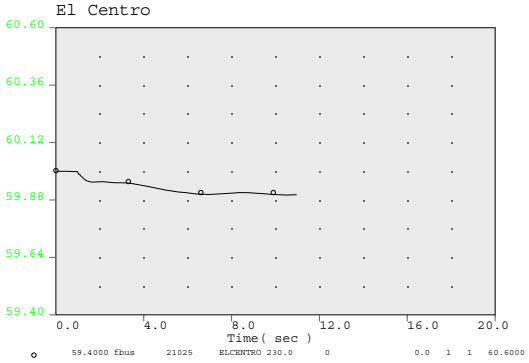
ROA-230kV



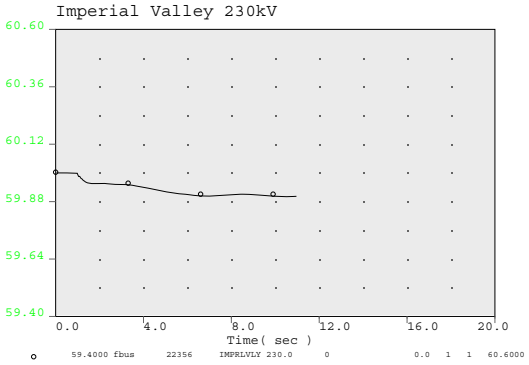
TJ1-230kV



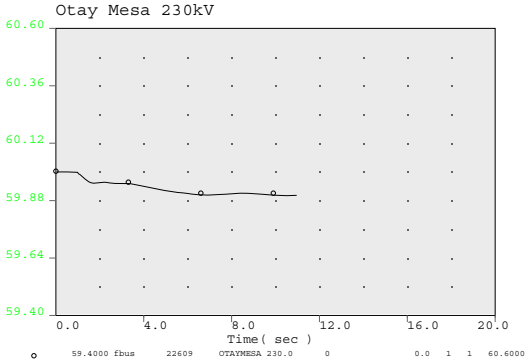
El Centro



Imperial Valley 230kV

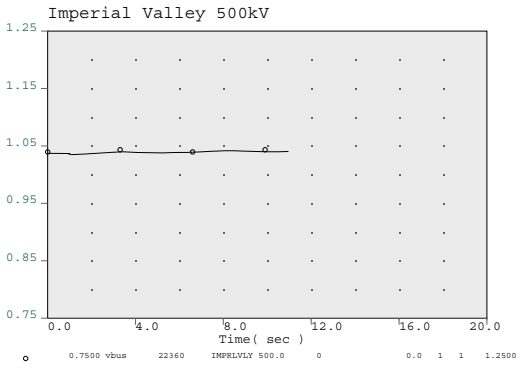


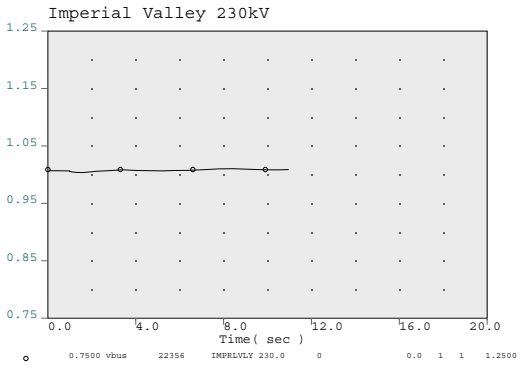
Otay Mesa 230kV

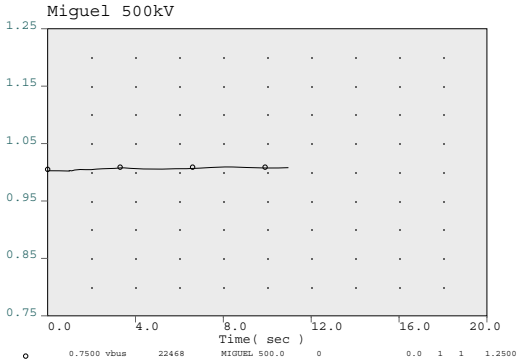


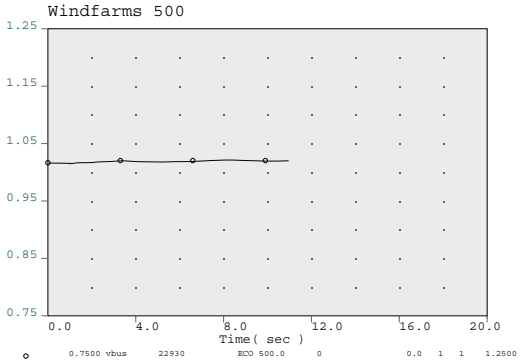
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

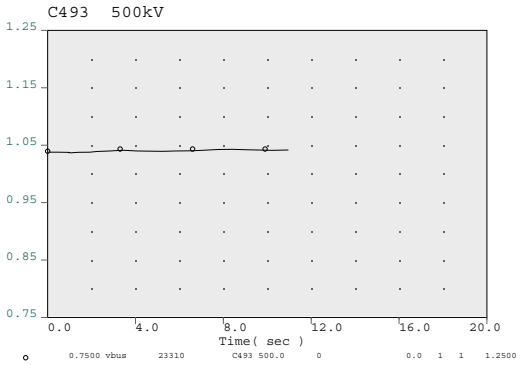
Imperial Valley Area - VOLTAGE

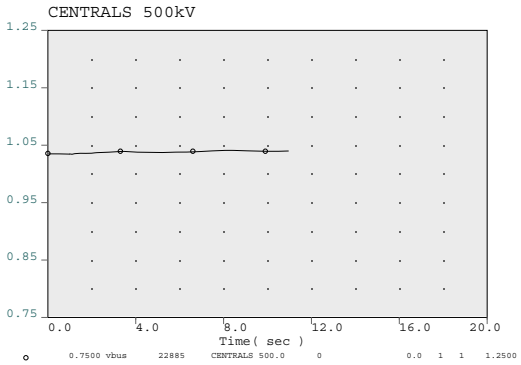








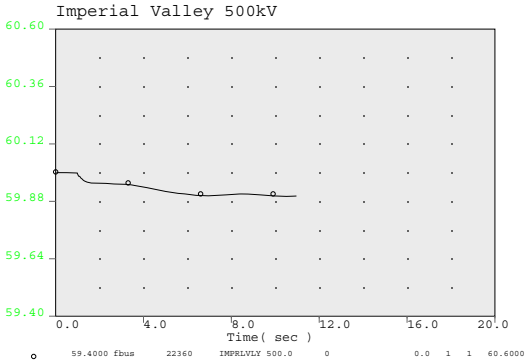




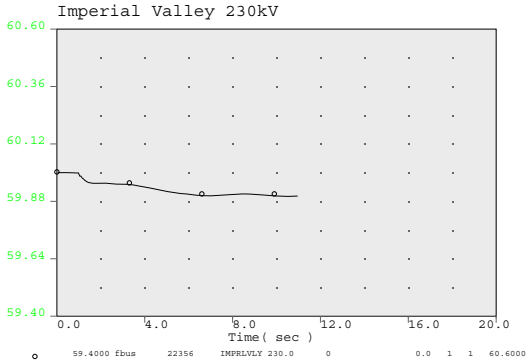
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Imperial Valley Area - Frequency

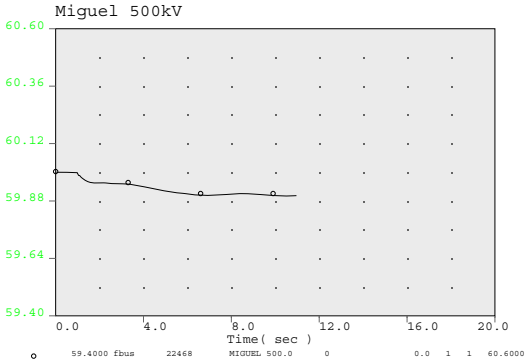
Imperial Valley 500kV



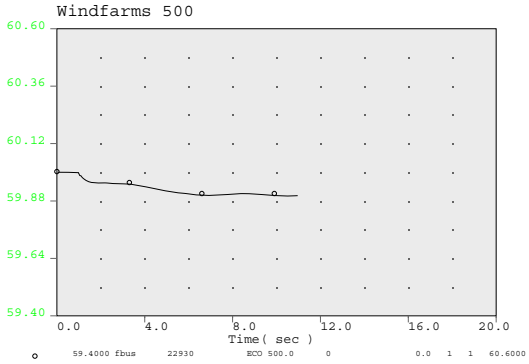
Imperial Valley 230kV



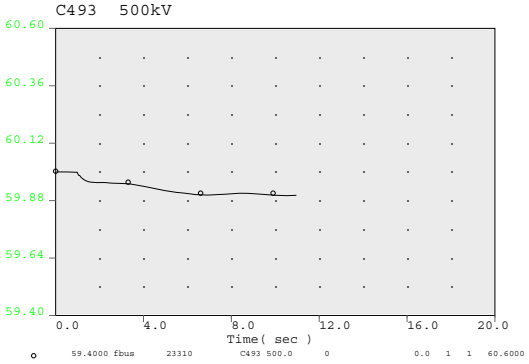
Miguel 500kV



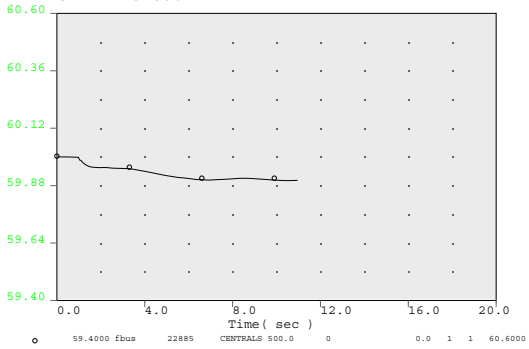
Windfarms 500



C493 500kV

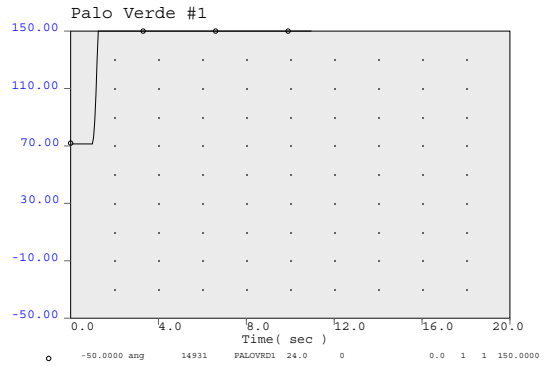


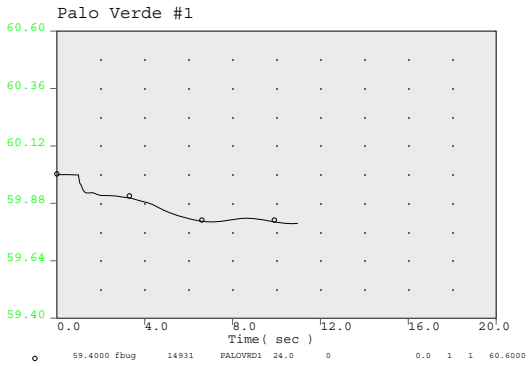
CENTRALS 500kV

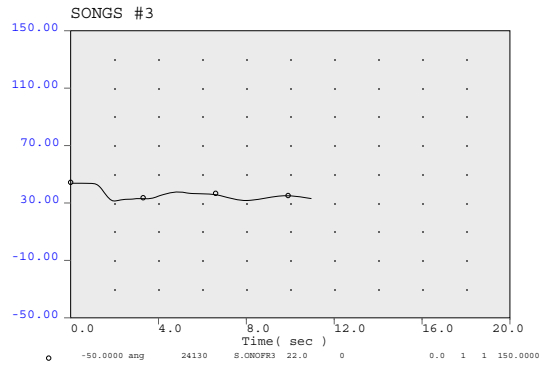


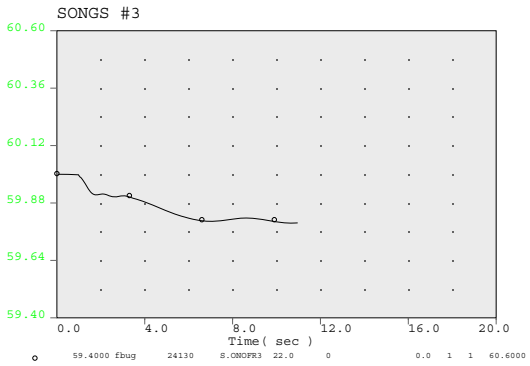
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

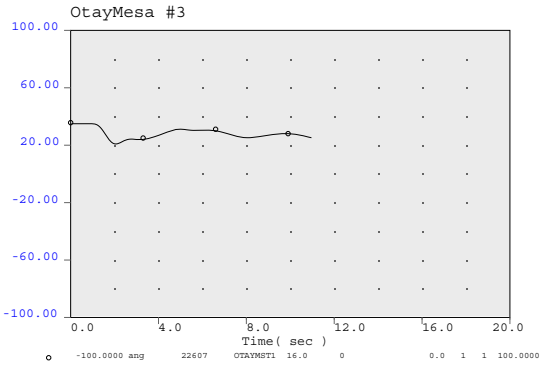
RELATIVE ROTOR ANGLE & FREQUENCY

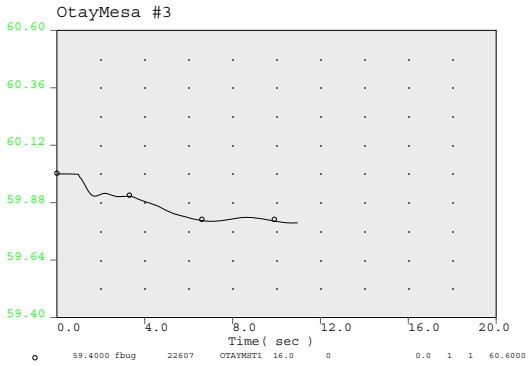








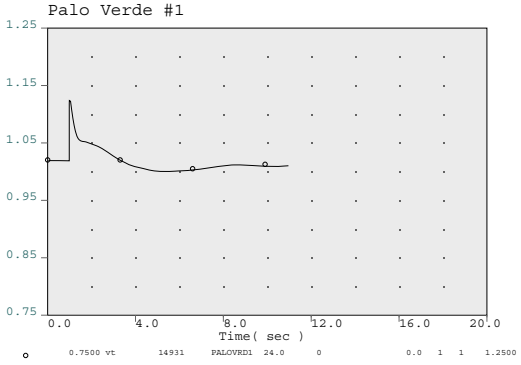




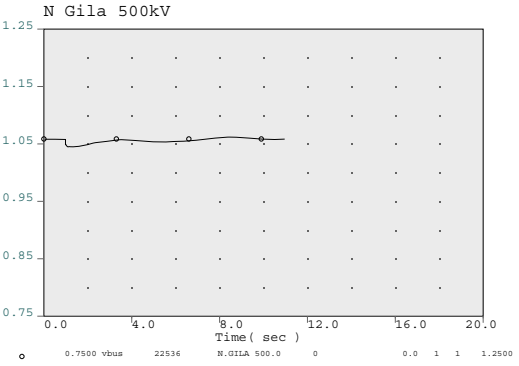
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

RELATIVE VOLTAGE

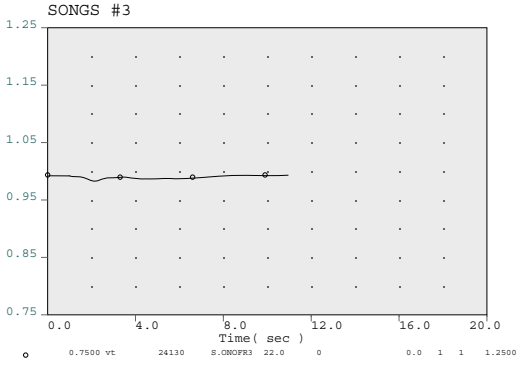
Palo Verde #1



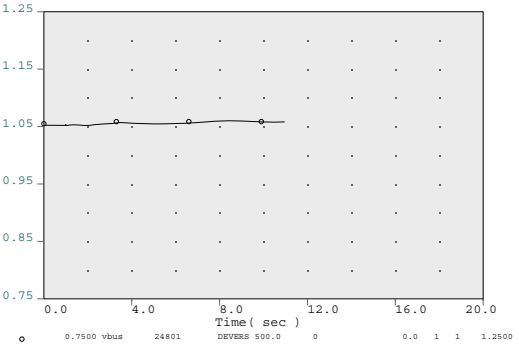
N Gila 500kV



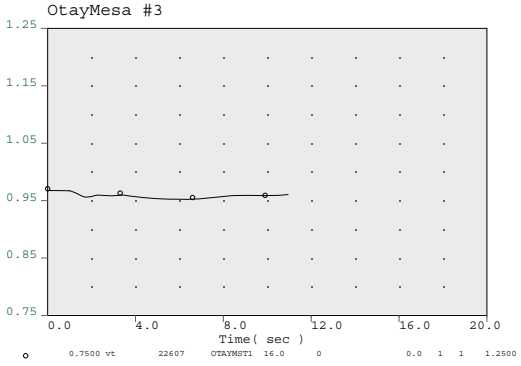
SONGS #3



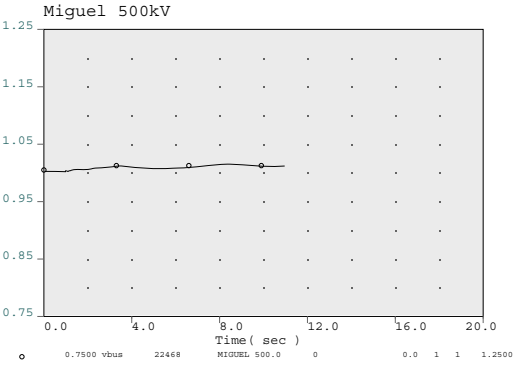
Devers 500



OtayMesa #3



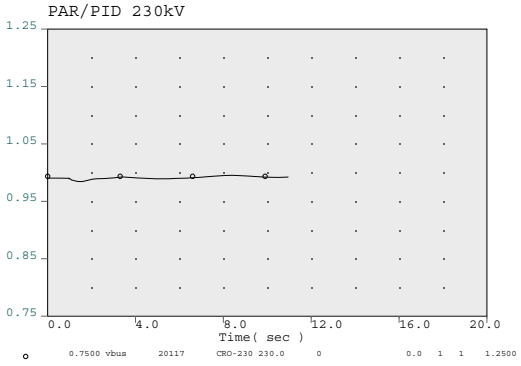
Miguel 500kV



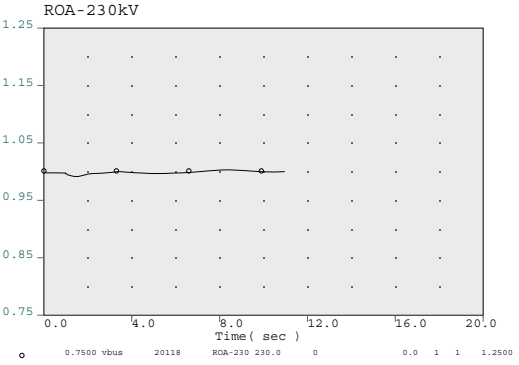
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

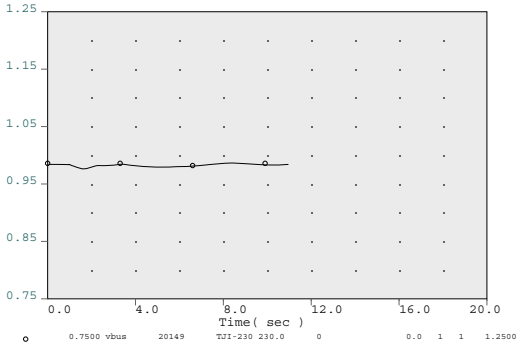
PAR/PID 230kV



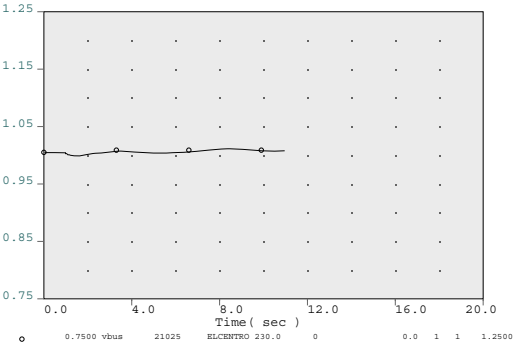
ROA-230kV



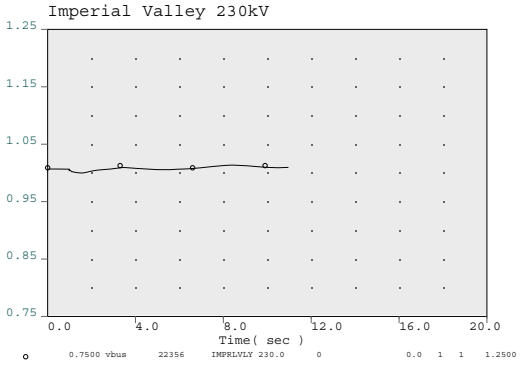
TJ1-230kV



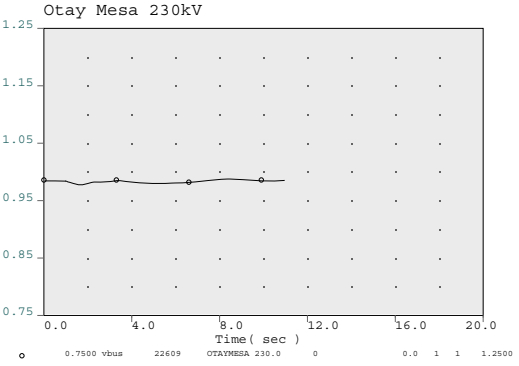
El Centro



Imperial Valley 230kV



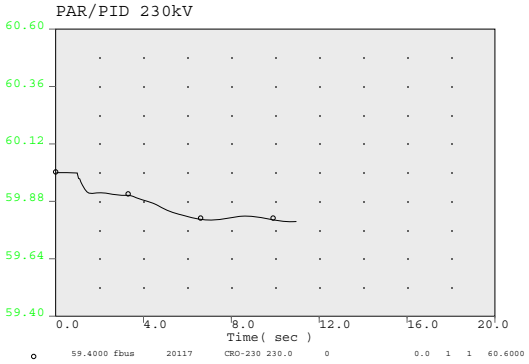
Otay Mesa 230kV



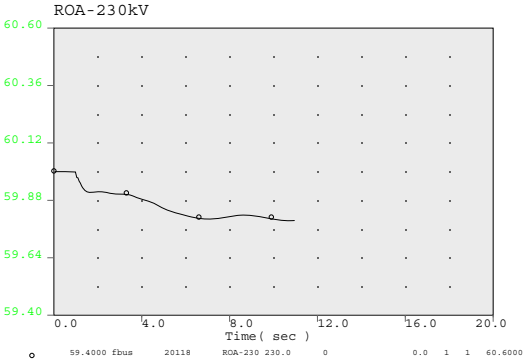
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

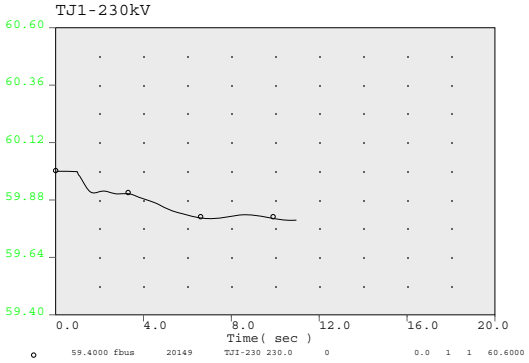
PAR/PID 230kV



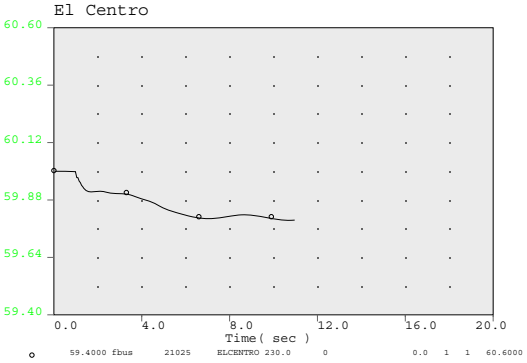
ROA-230kV



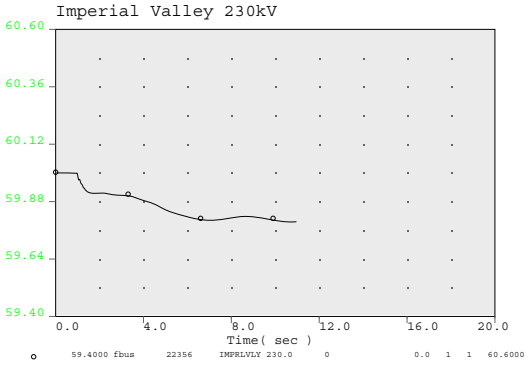
TJ1-230kV



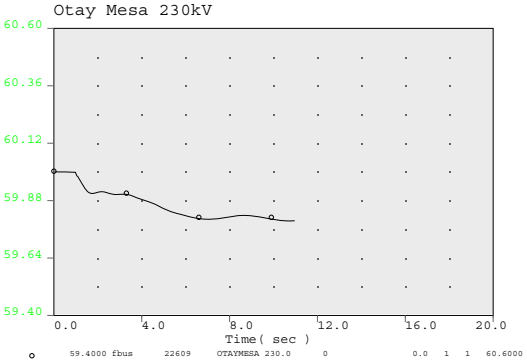
El Centro



Imperial Valley 230kV



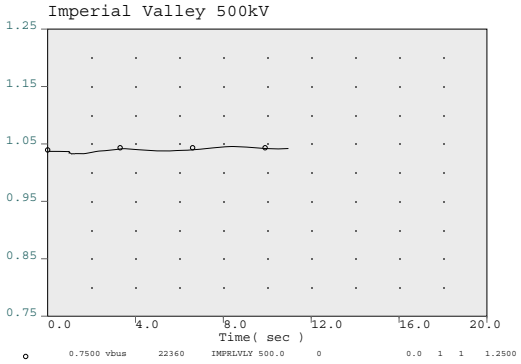
Otay Mesa 230kV



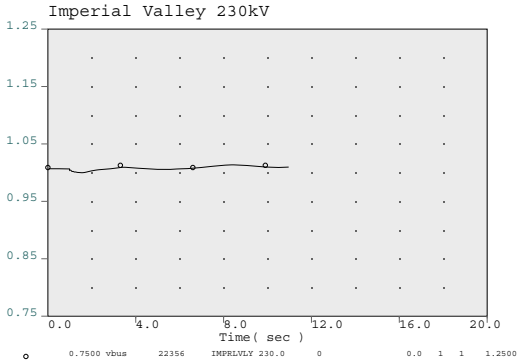
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE

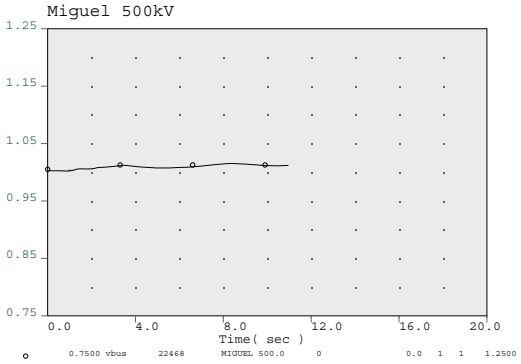
Imperial Valley 500kV



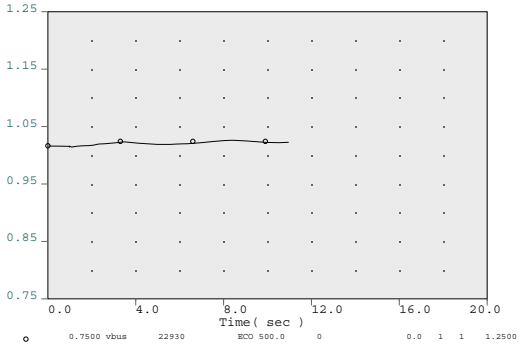
Imperial Valley 230kV



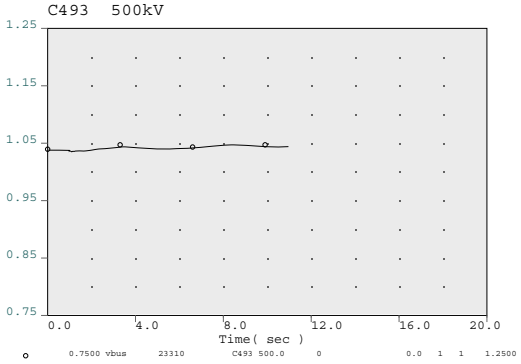
Miguel 500kV



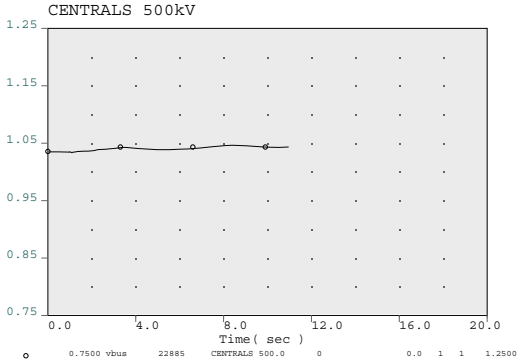
Windfarms 500



C493 500kV

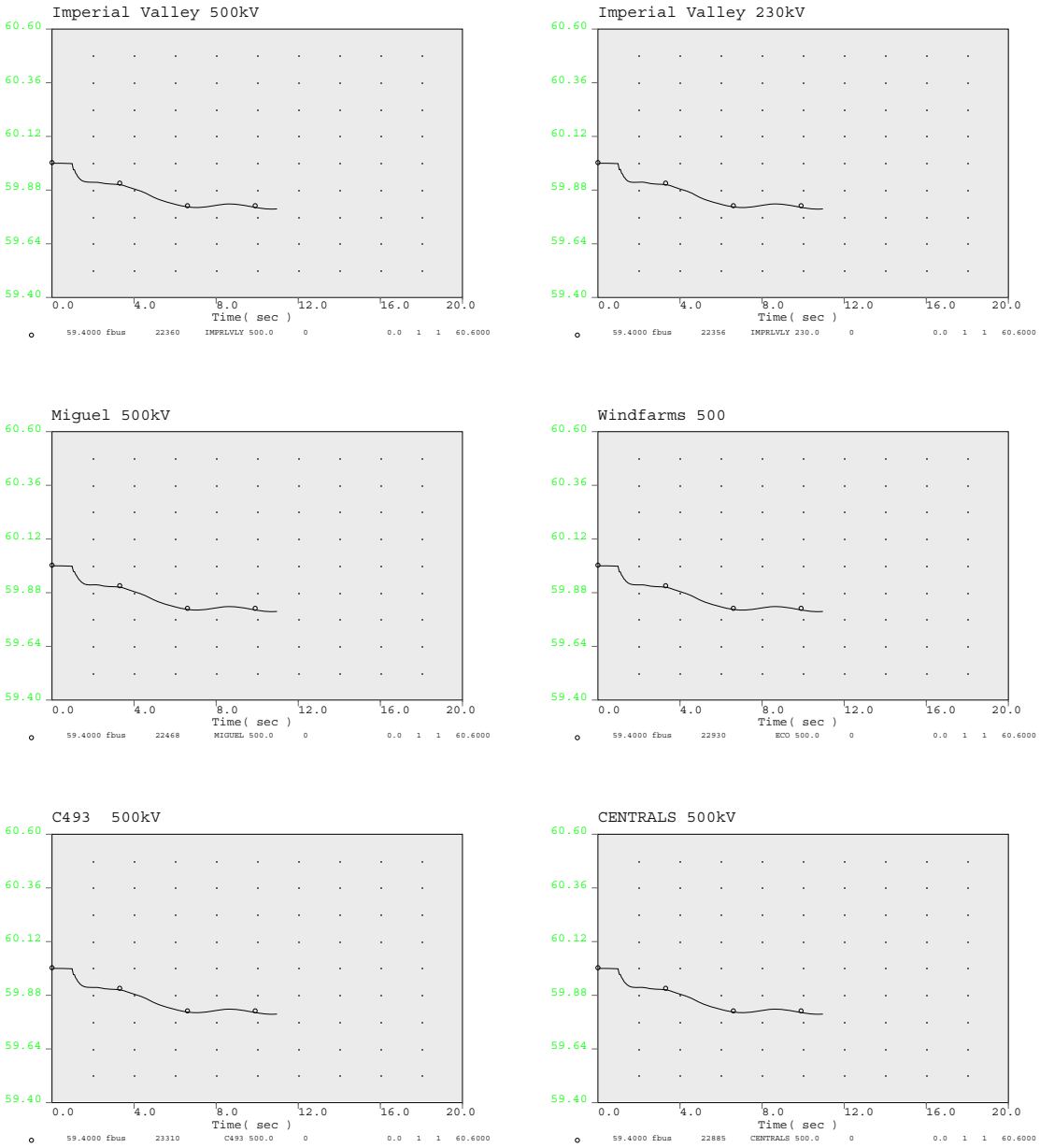


CENTRALS 500kV



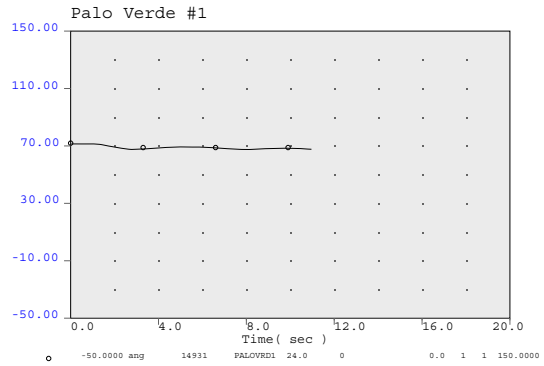
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

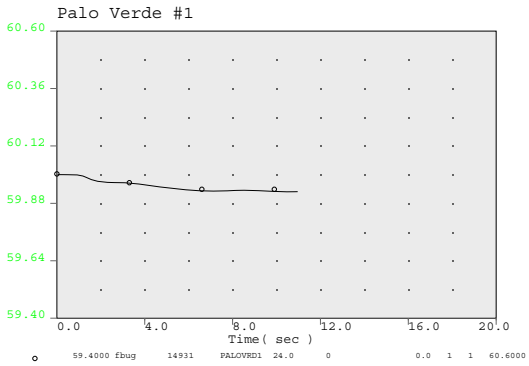
Imperial Valley Area - Frequency

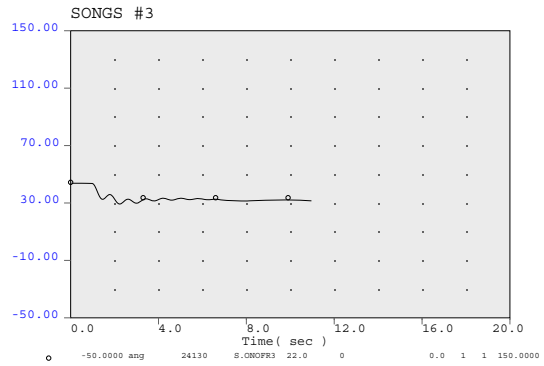


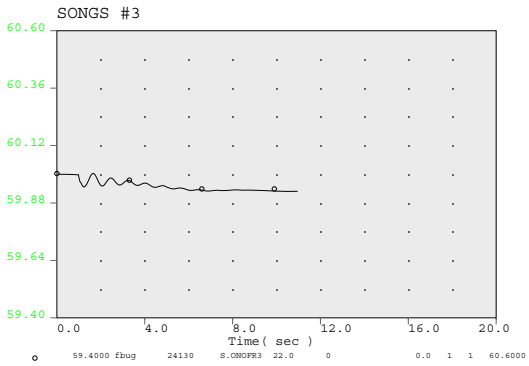
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

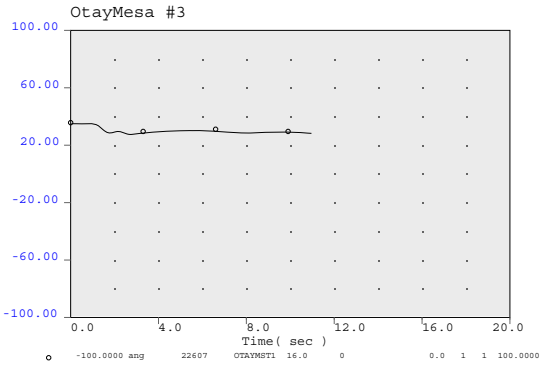
RELATIVE ROTOR ANGLE & FREQUENCY

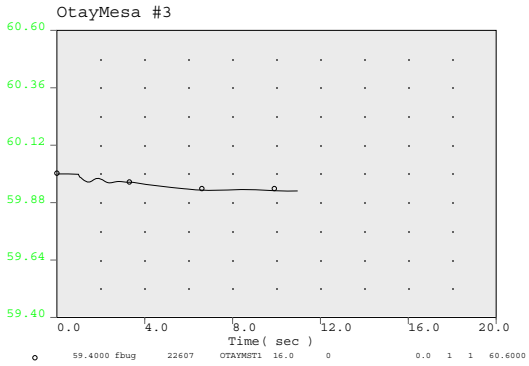










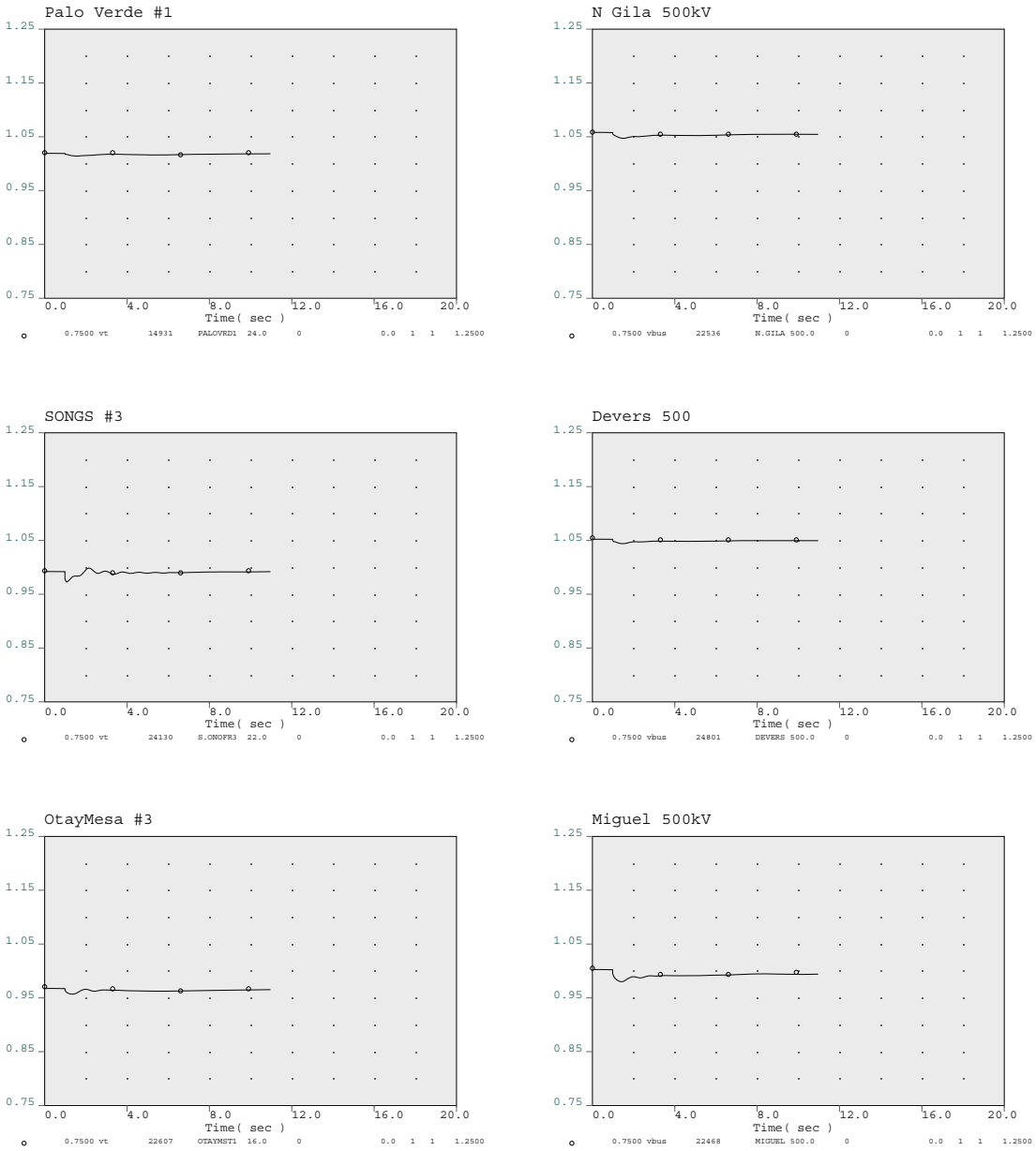


SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Page 1

SDGE	SONGS-g1_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:50 2010

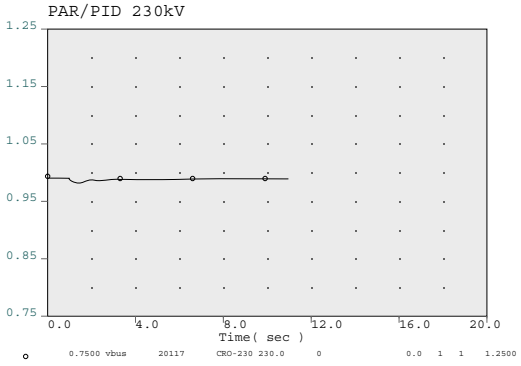
RELATIVE VOLTAGE



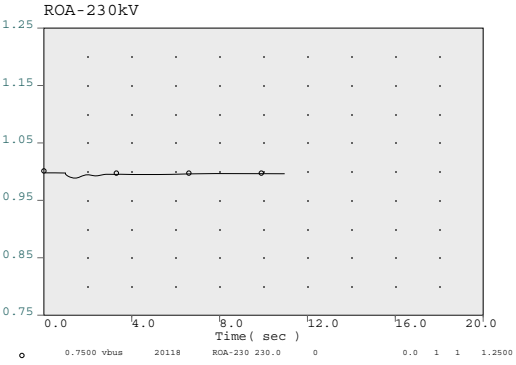
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

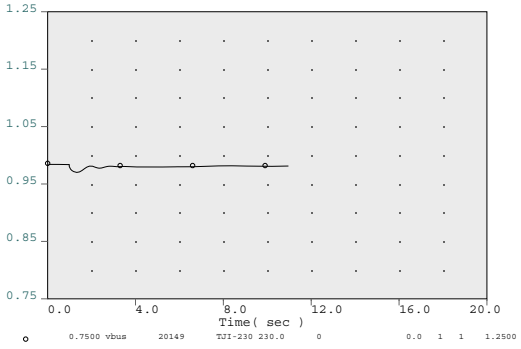
PAR/PID 230kV



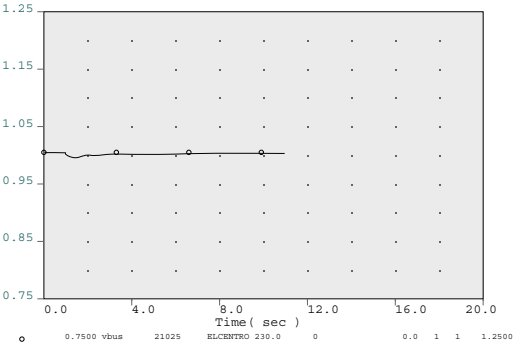
ROA-230kV



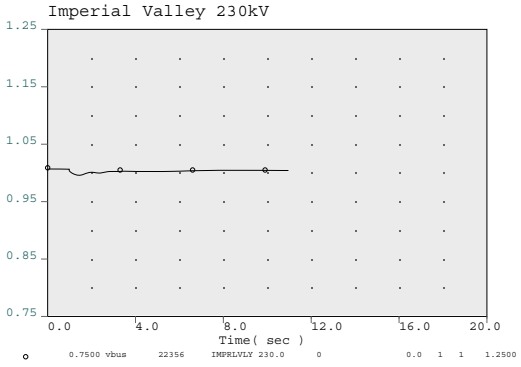
TJ1-230kV



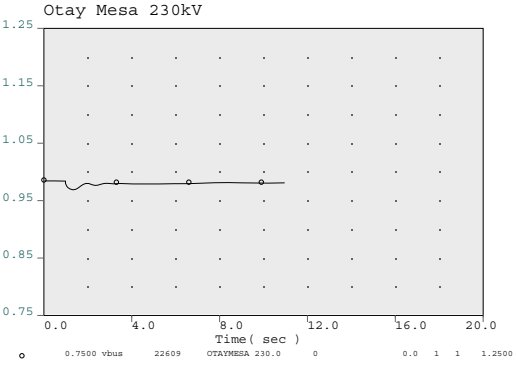
El Centro



Imperial Valley 230kV



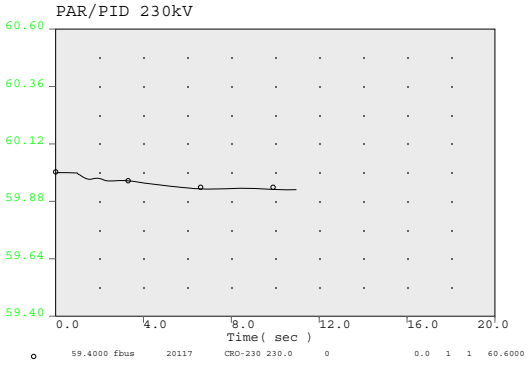
Otay Mesa 230kV



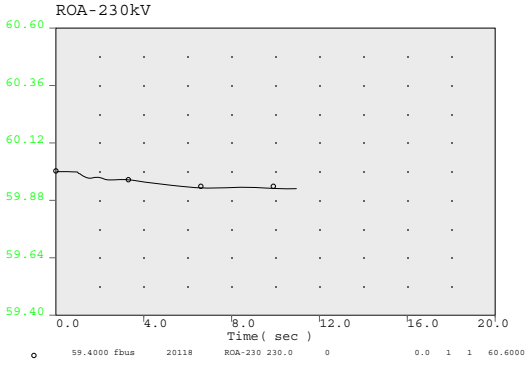
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison

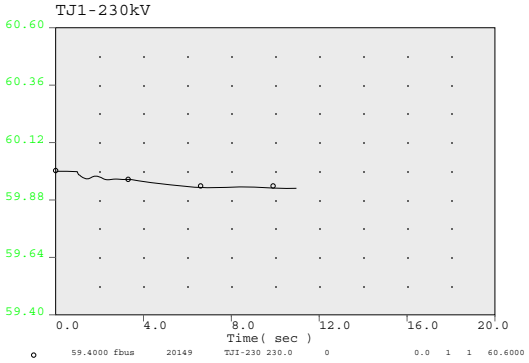
PAR/PID 230kV



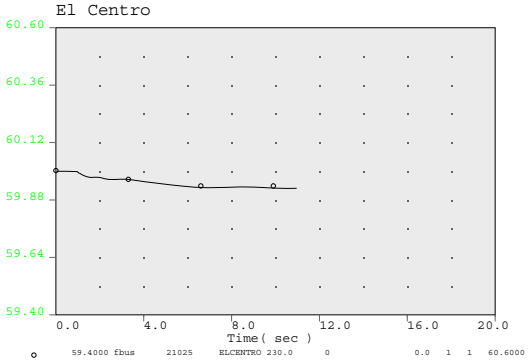
ROA-230kV



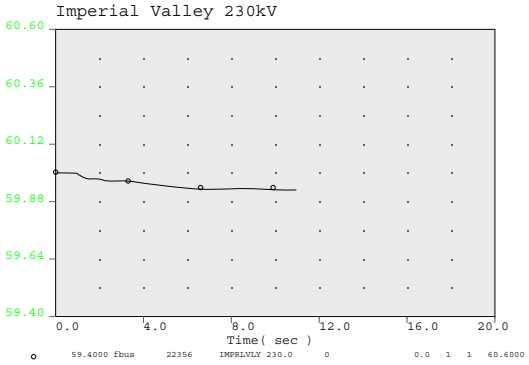
TJ1-230kV



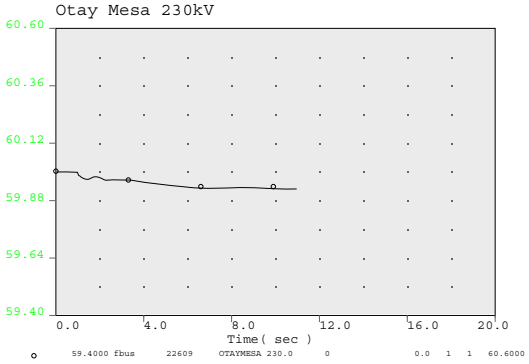
El Centro



Imperial Valley 230kV



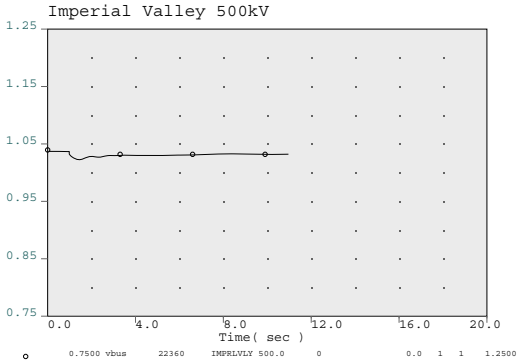
Otay Mesa 230kV



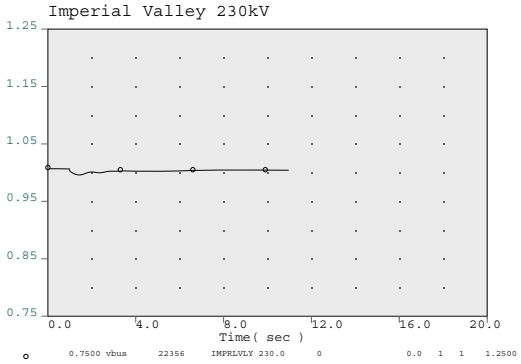
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Imperial Valley Area - VOLTAGE

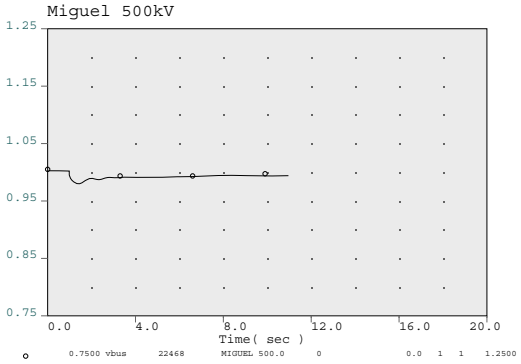
Imperial Valley 500kV



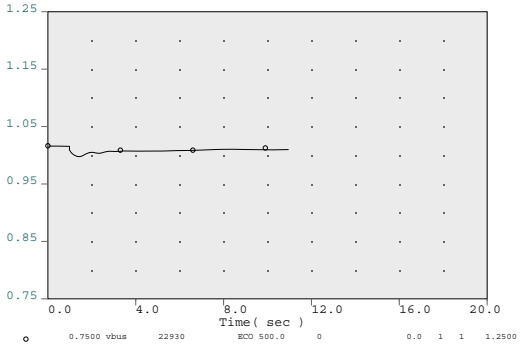
Imperial Valley 230kV



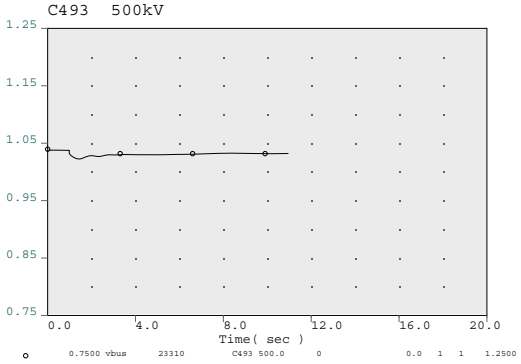
Miguel 500kV



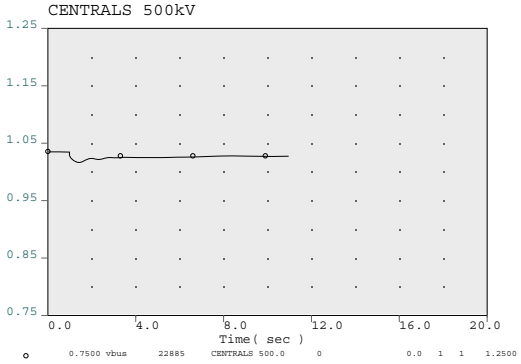
Windfarms 500



C493 500kV

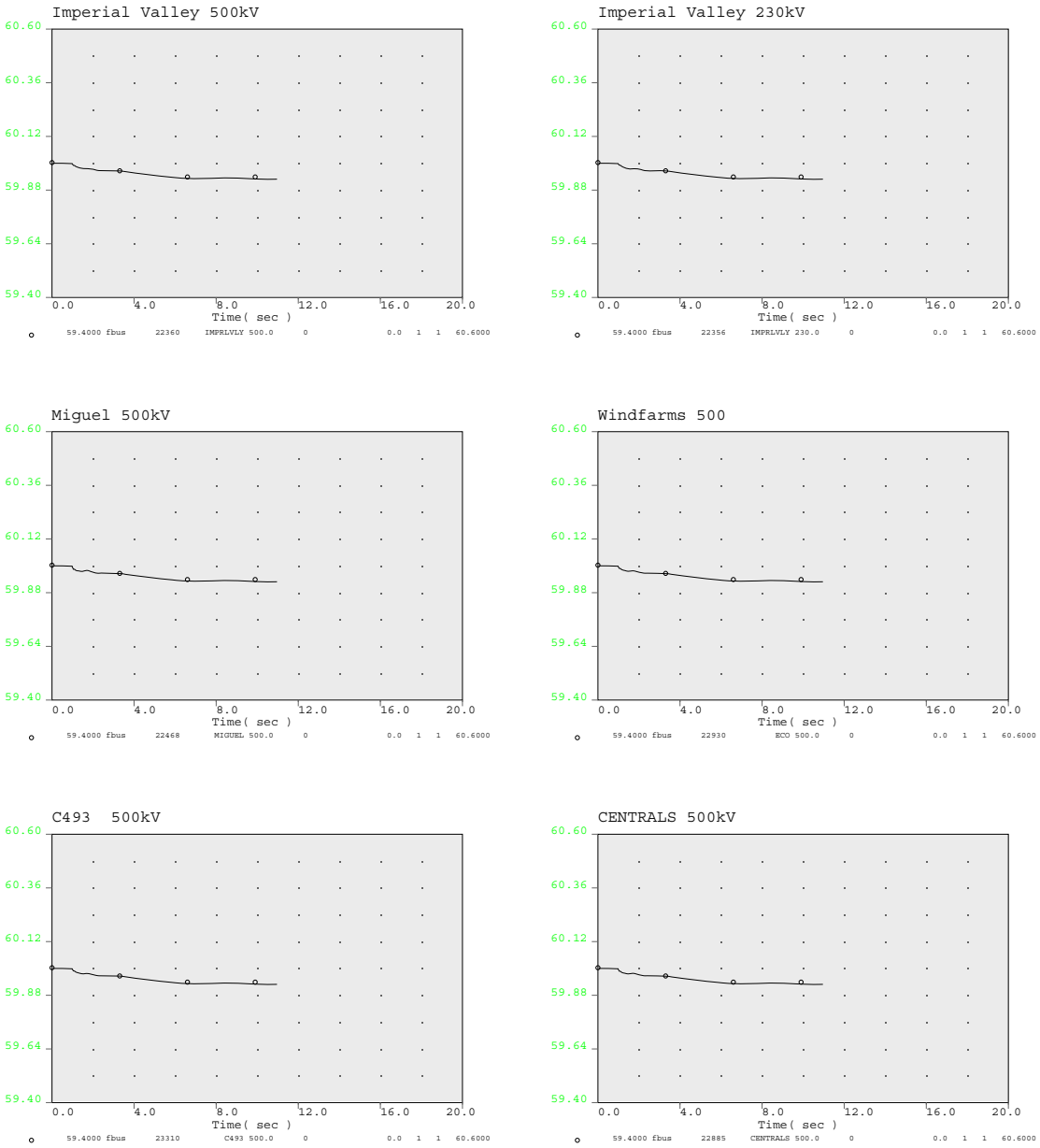


CENTRALS 500kV



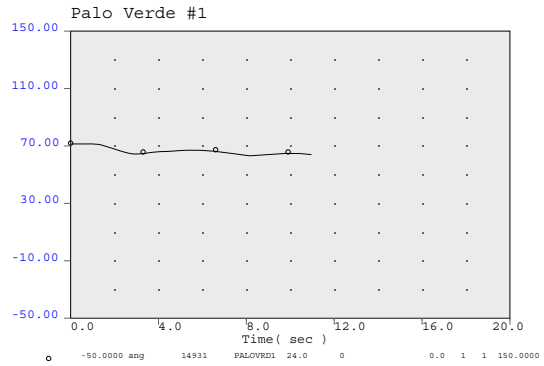
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

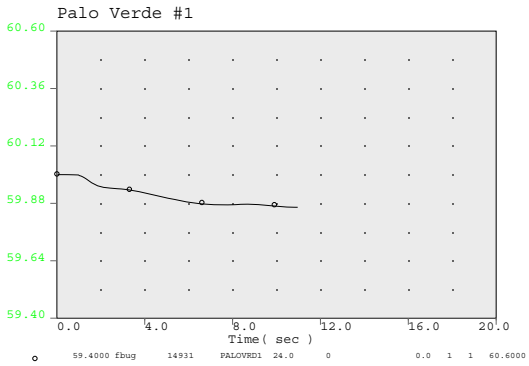
Imperial Valley Area - Frequency

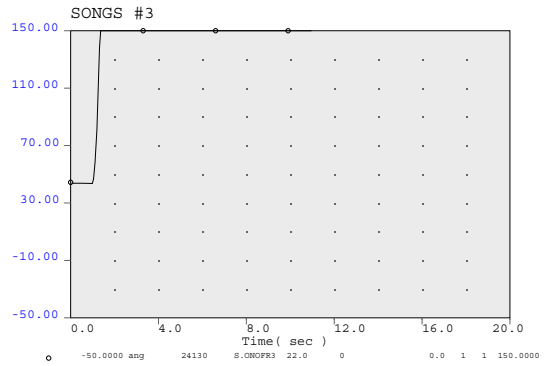


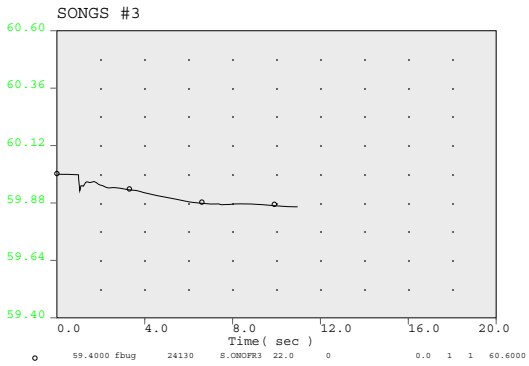
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

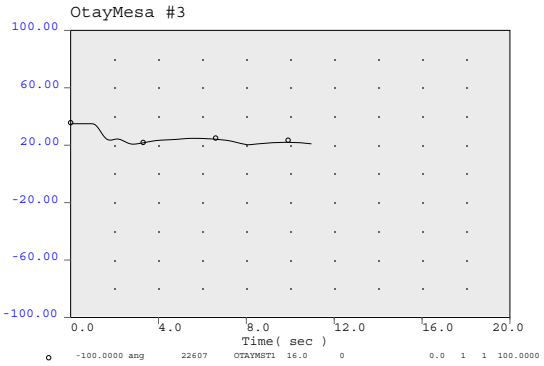
RELATIVE ROTOR ANGLE & FREQUENCY

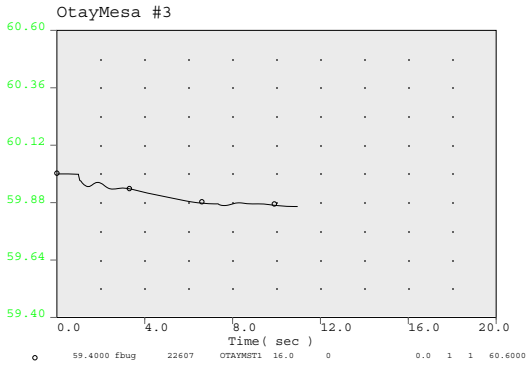










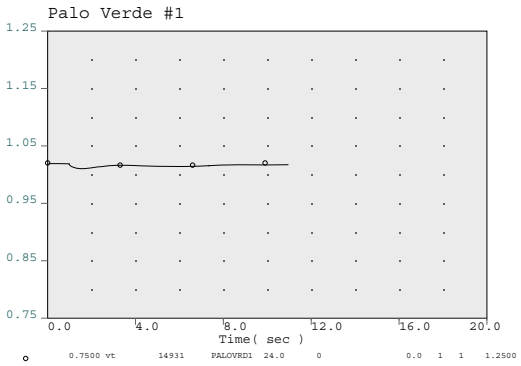


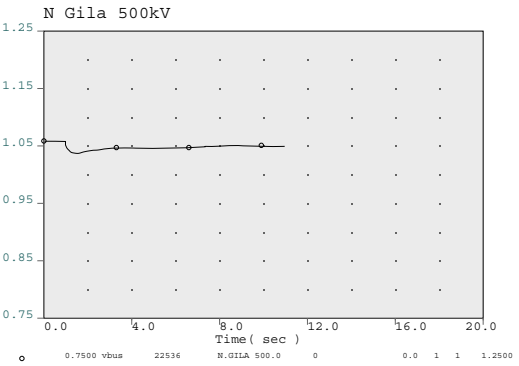
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

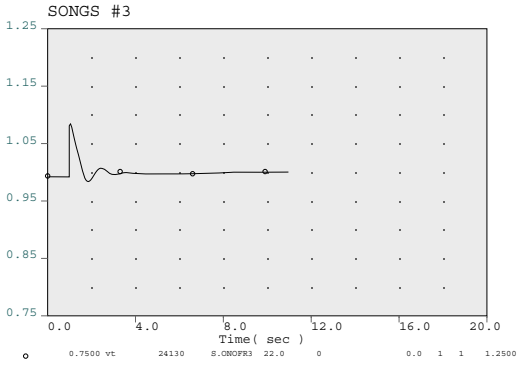
Page 1

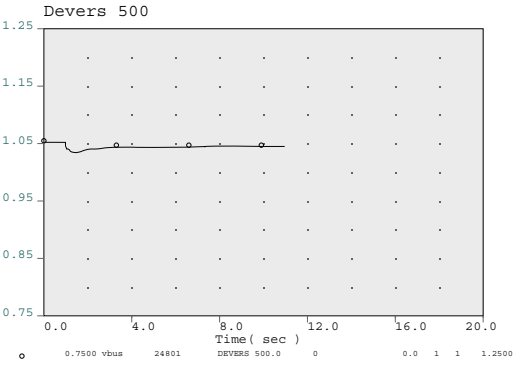
SDGE	SONGS-g2_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:53 2010

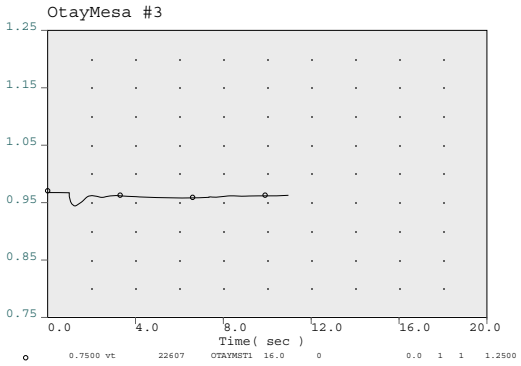
RELATIVE VOLTAGE

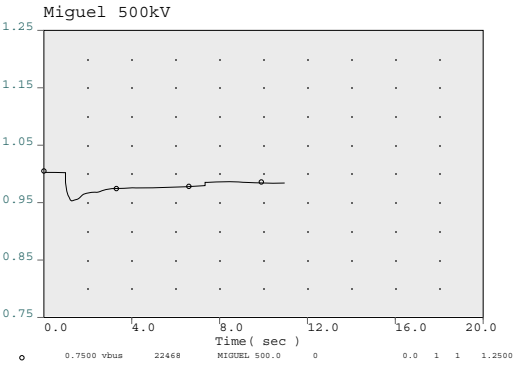








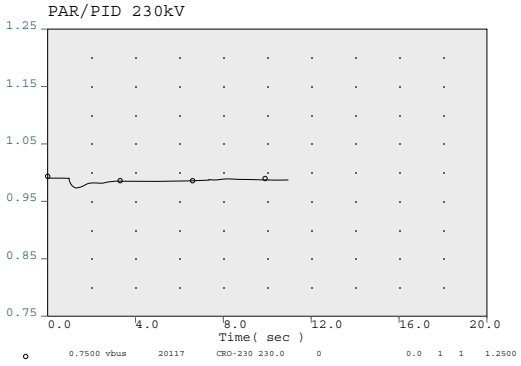




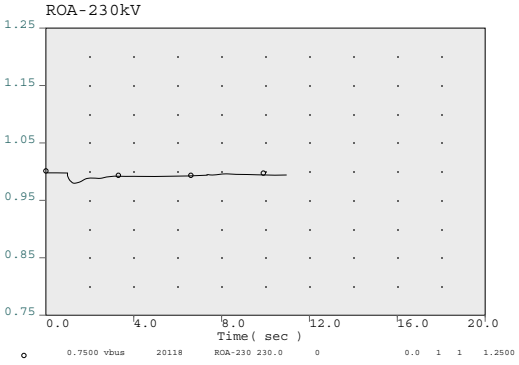
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

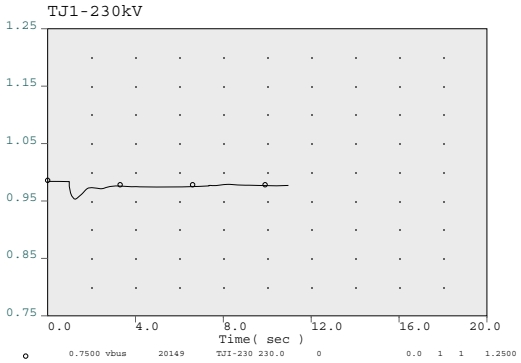
PAR/PID 230kV



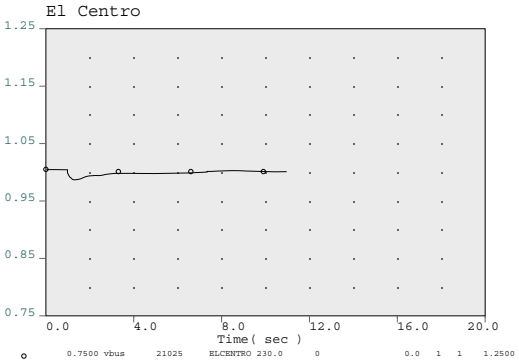
ROA-230kV



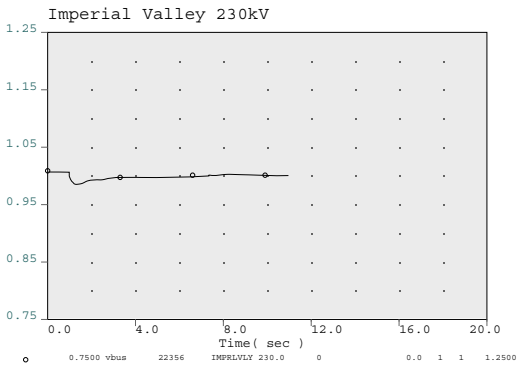
TJ1-230kV



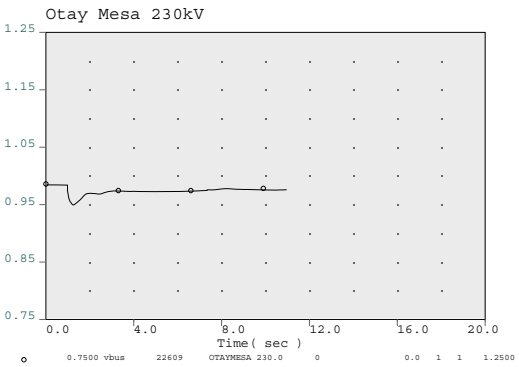
El Centro



Imperial Valley 230kV



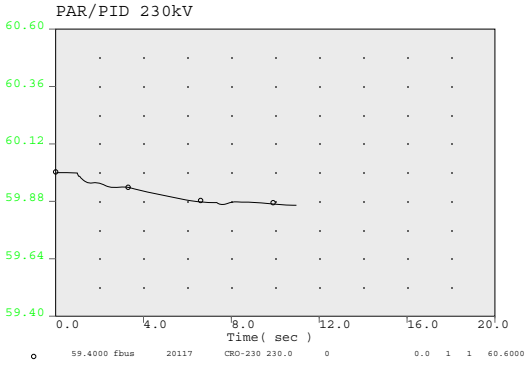
Otay Mesa 230kV



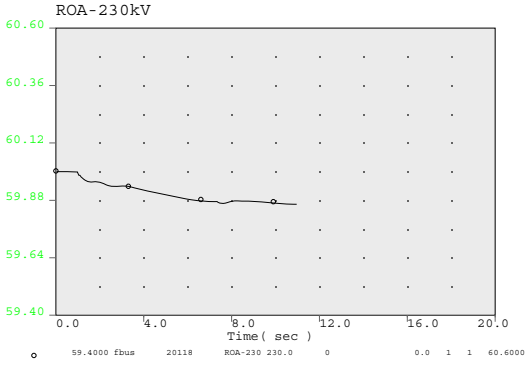
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Affected System Frequency Check and Comparison

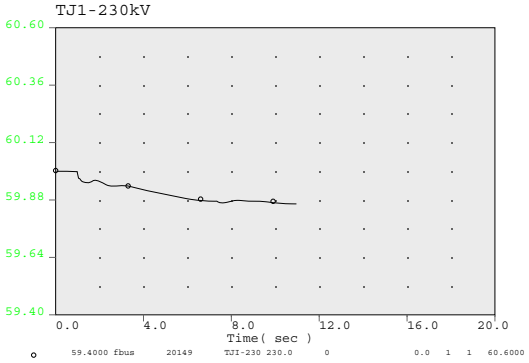
PAR/PID 230kV



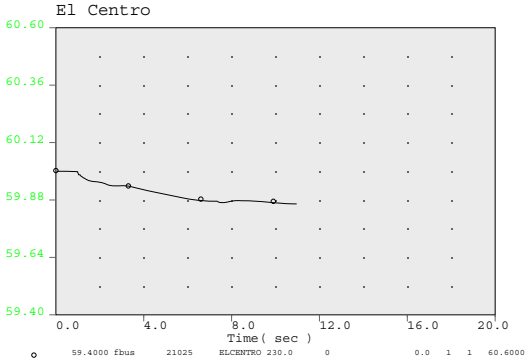
ROA-230kV



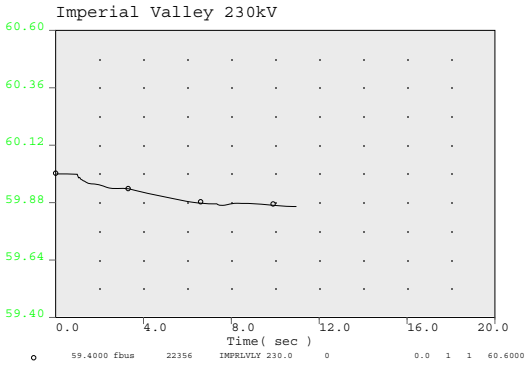
TJ1-230kV



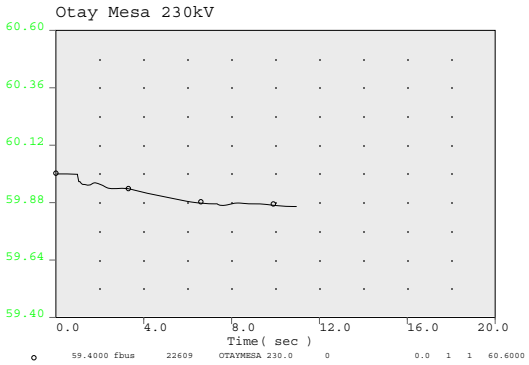
El Centro



Imperial Valley 230kV



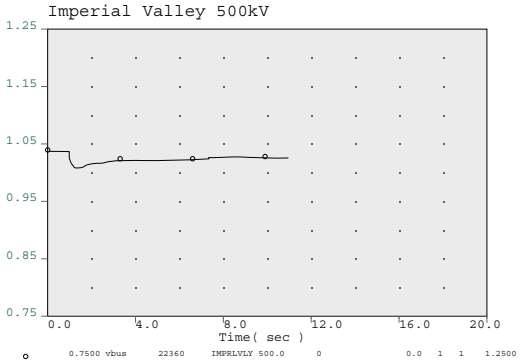
Otay Mesa 230kV



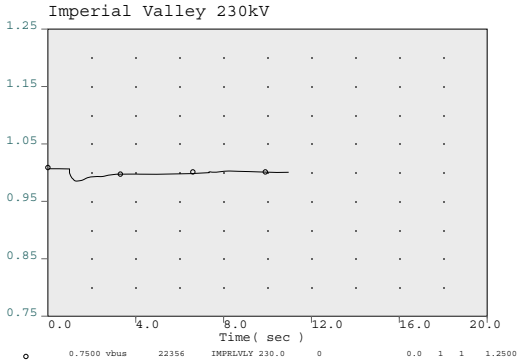
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Imperial Valley Area - VOLTAGE

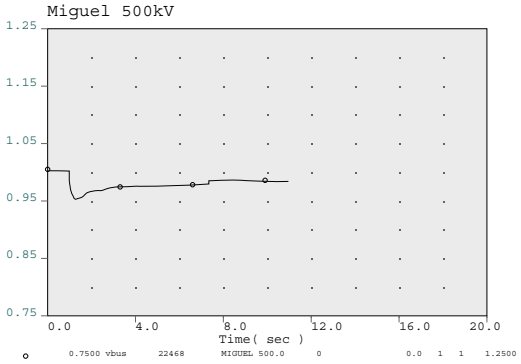
Imperial Valley 500kV



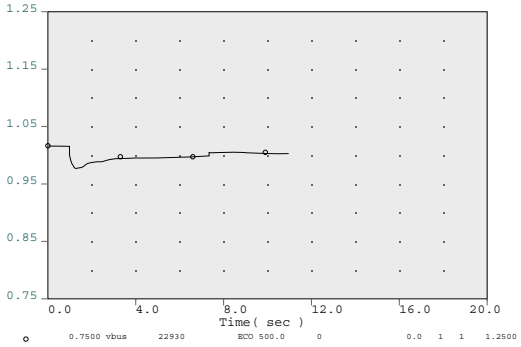
Imperial Valley 230kV



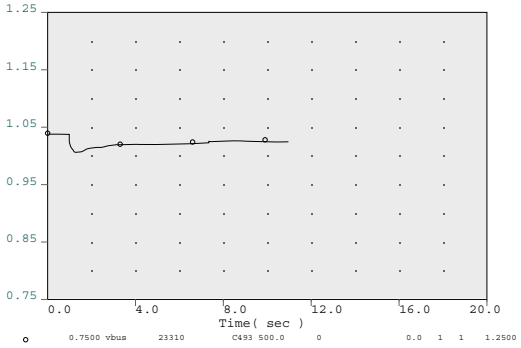
Miguel 500kV



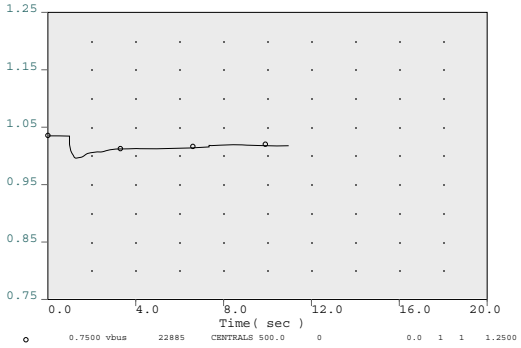
Windfarms 500



C493 500kV

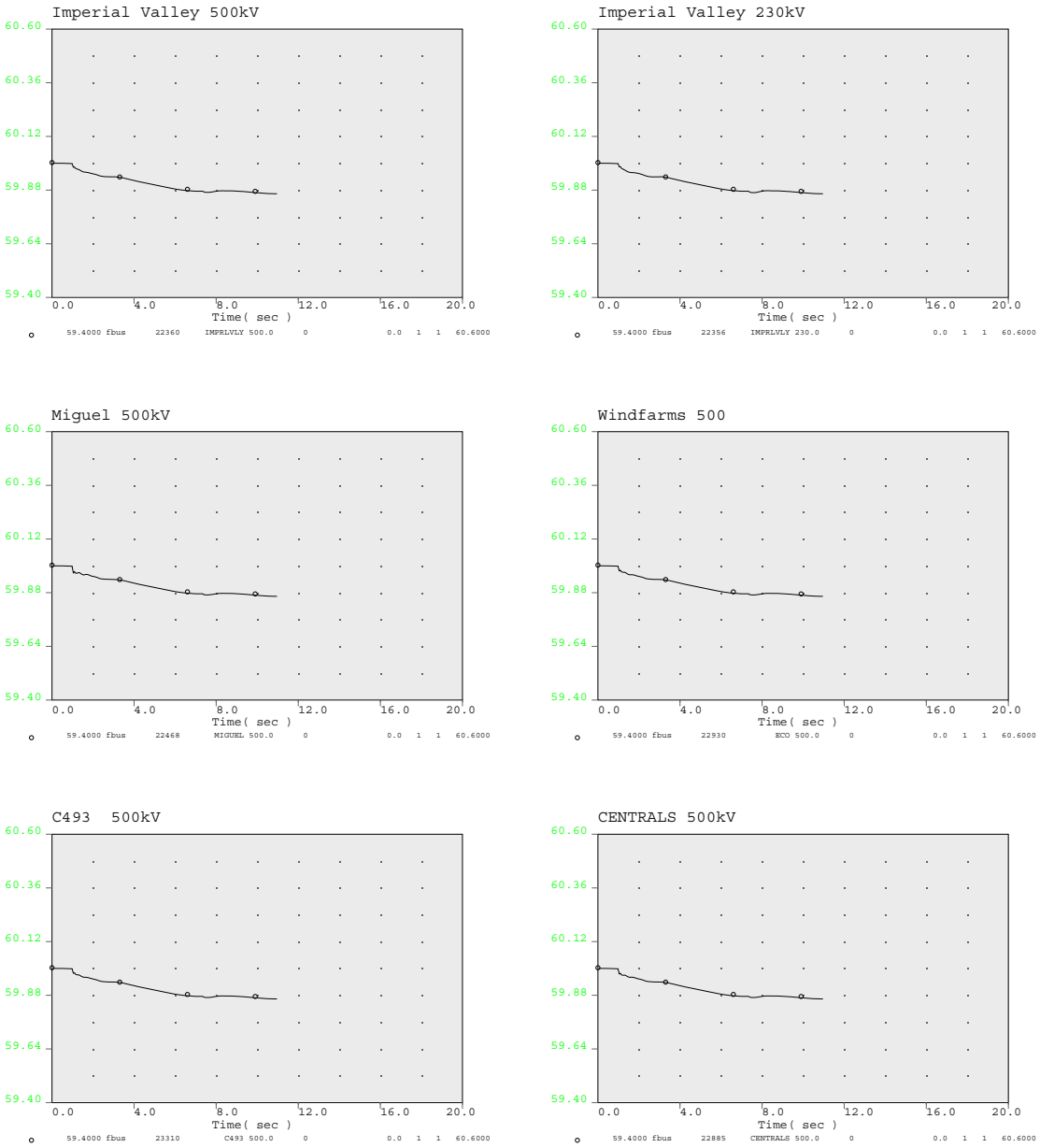


CENTRALS 500kV



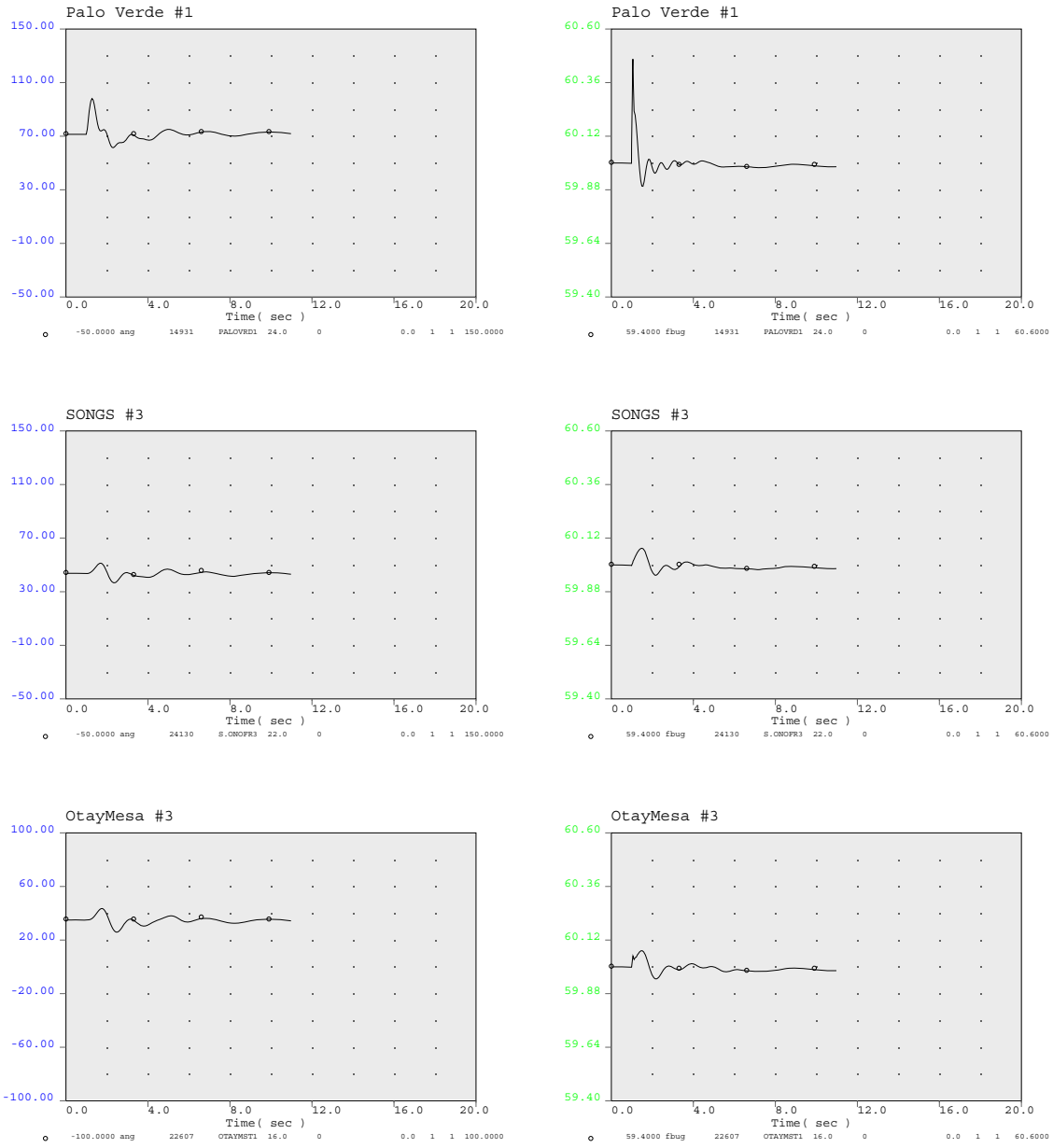
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

RELATIVE ROTOR ANGLE & FREQUENCY

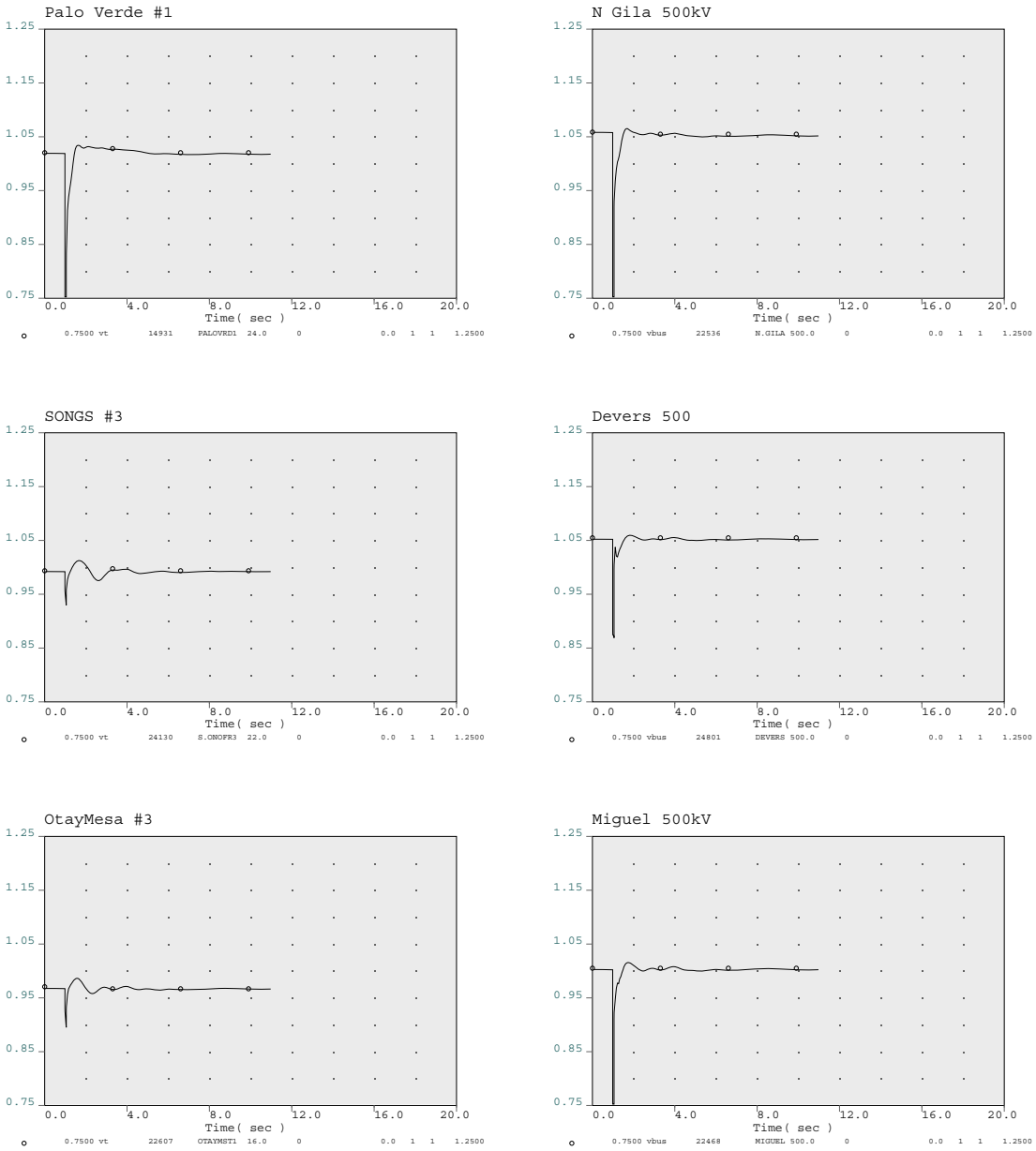


SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-Hassyampa 500 kV line

Page 1

SDGE	T468_HAA_slo_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:41:59 2010

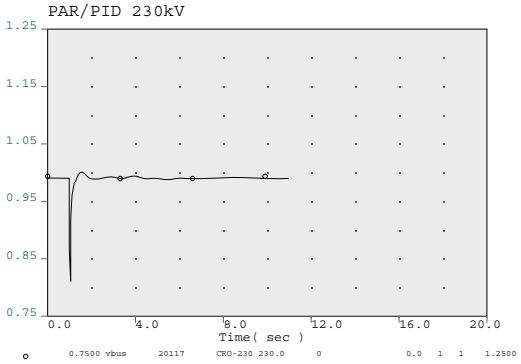
RELATIVE VOLTAGE



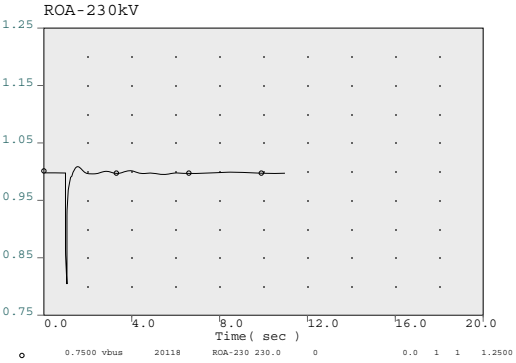
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

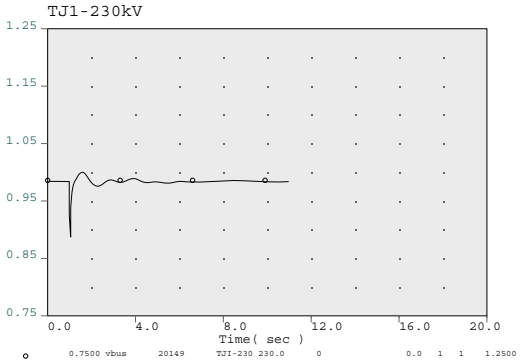
PAR/PID 230kV



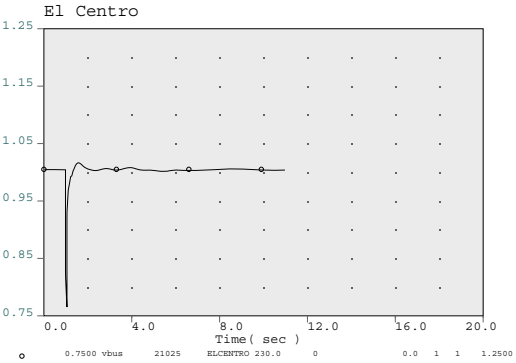
ROA-230kV



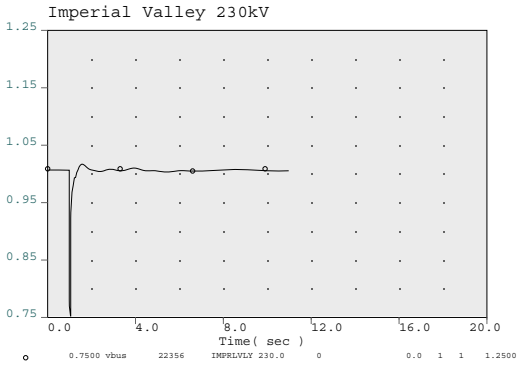
TJ1-230kV



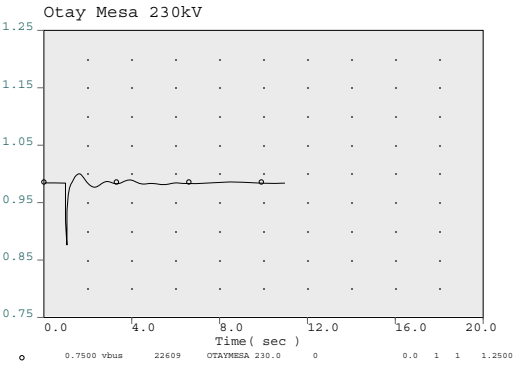
El Centro



Imperial Valley 230kV



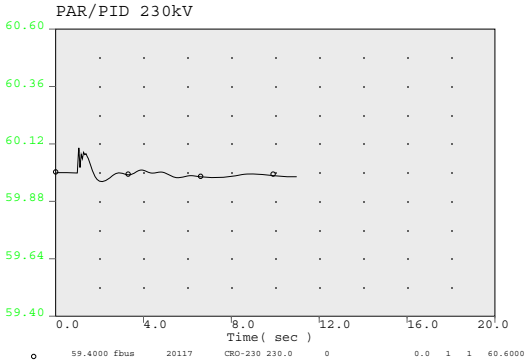
Otay Mesa 230kV



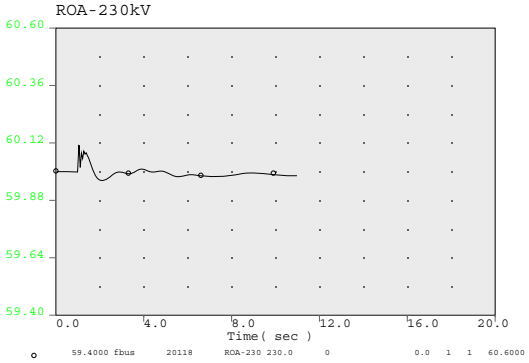
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Frequency Check and Comparison

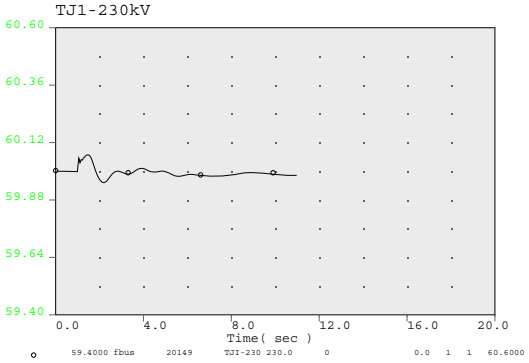
PAR/PID 230kV



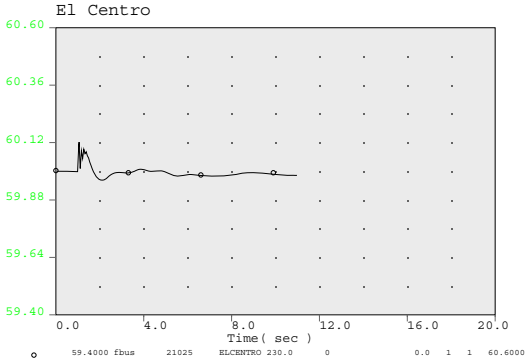
ROA-230kV



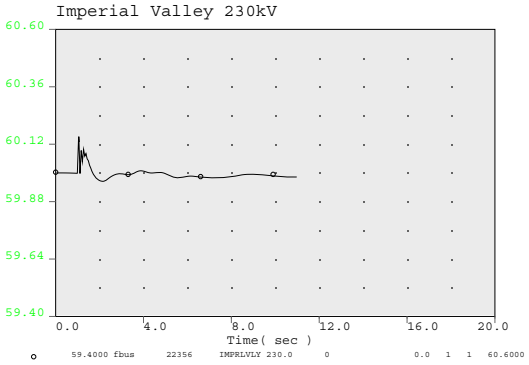
TJ1-230kV



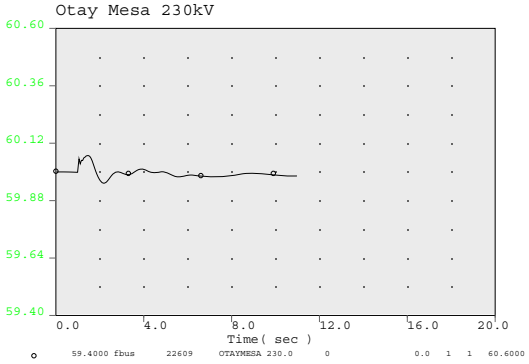
El Centro



Imperial Valley 230kV



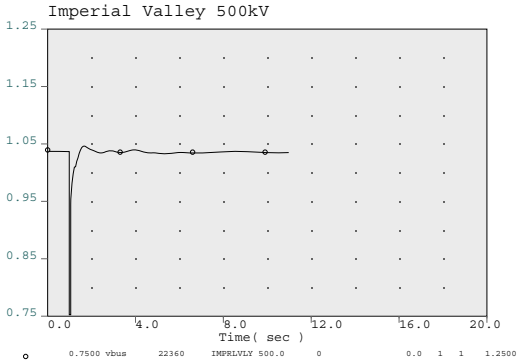
Otay Mesa 230kV



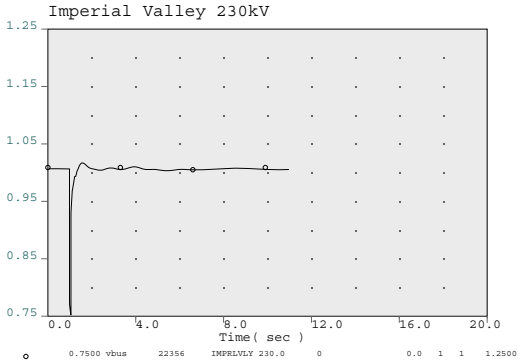
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

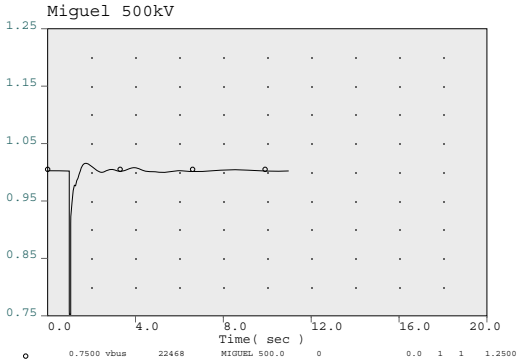
Imperial Valley 500kV



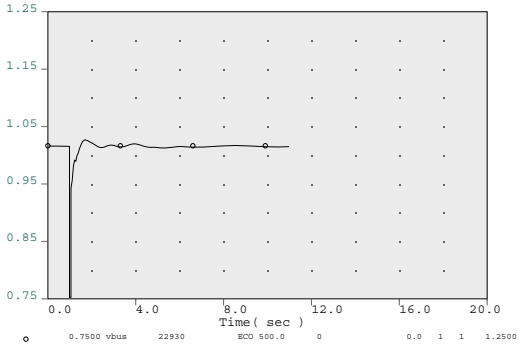
Imperial Valley 230kV



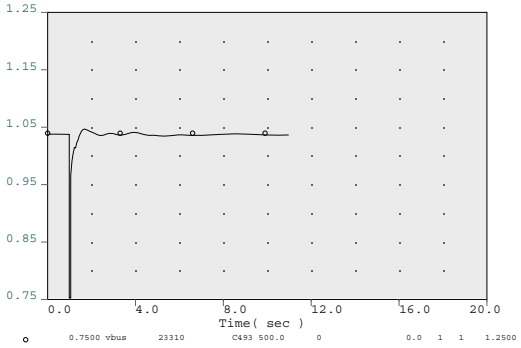
Miguel 500kV



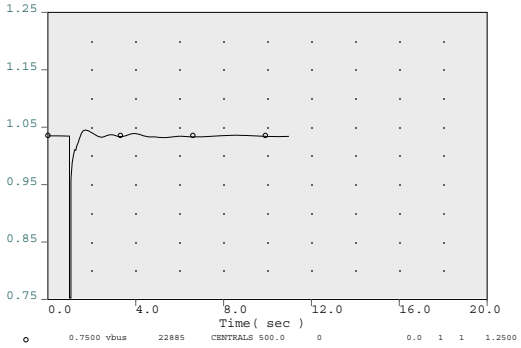
Windfarms 500



C493 500kV

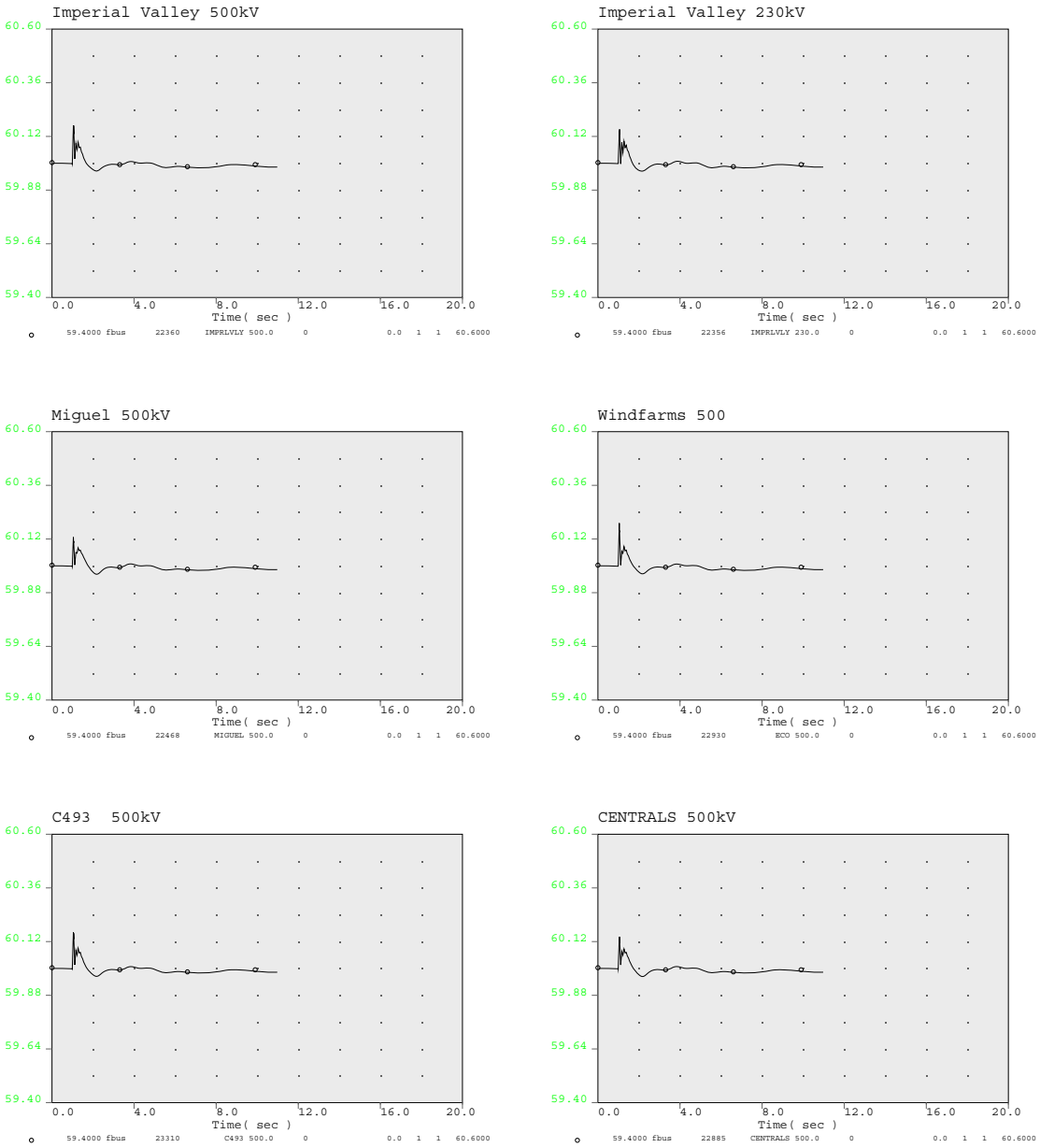


CENTRALS 500kV



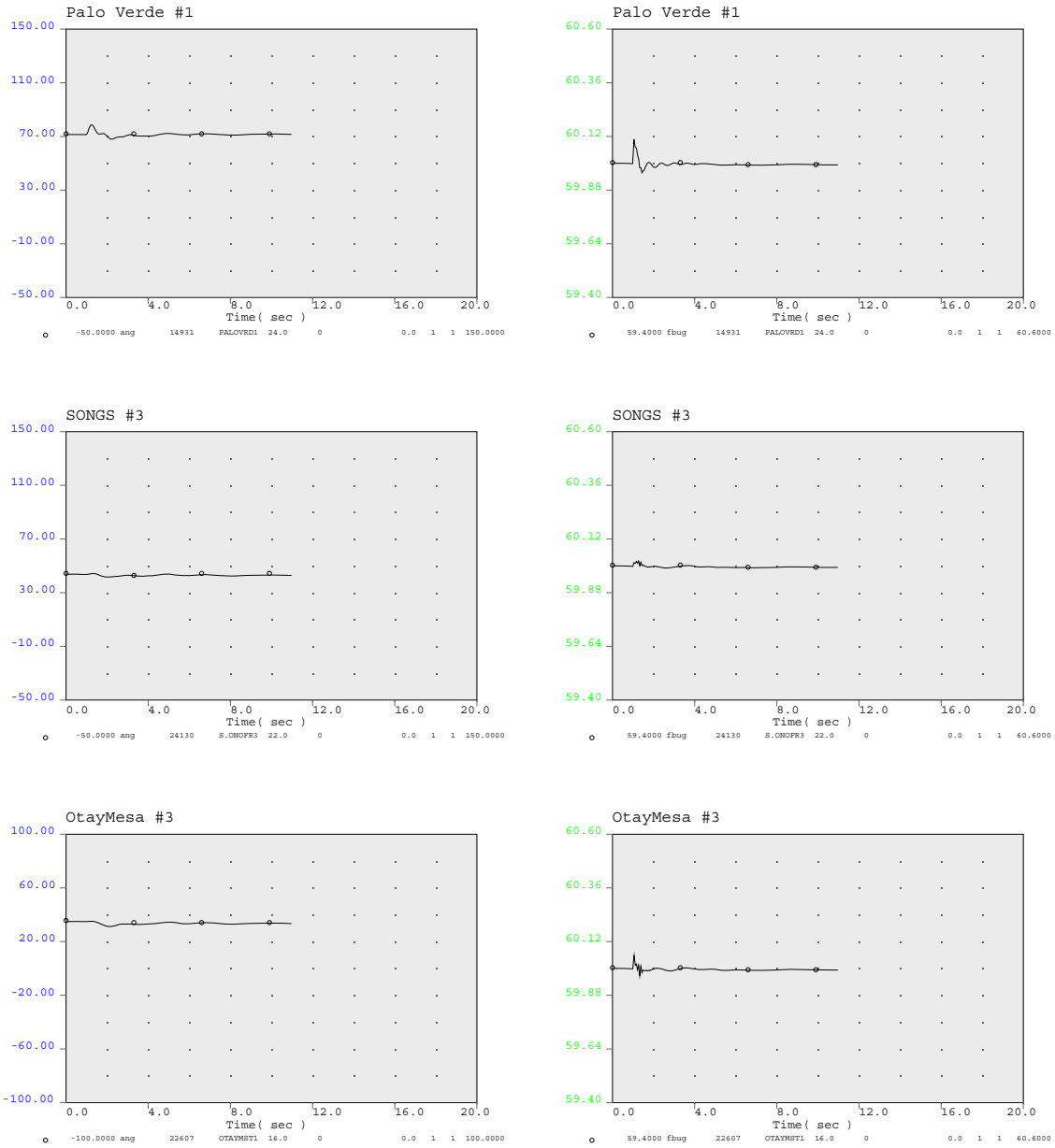
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-Hassyampa 500 kV line

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-Hassyampa 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY

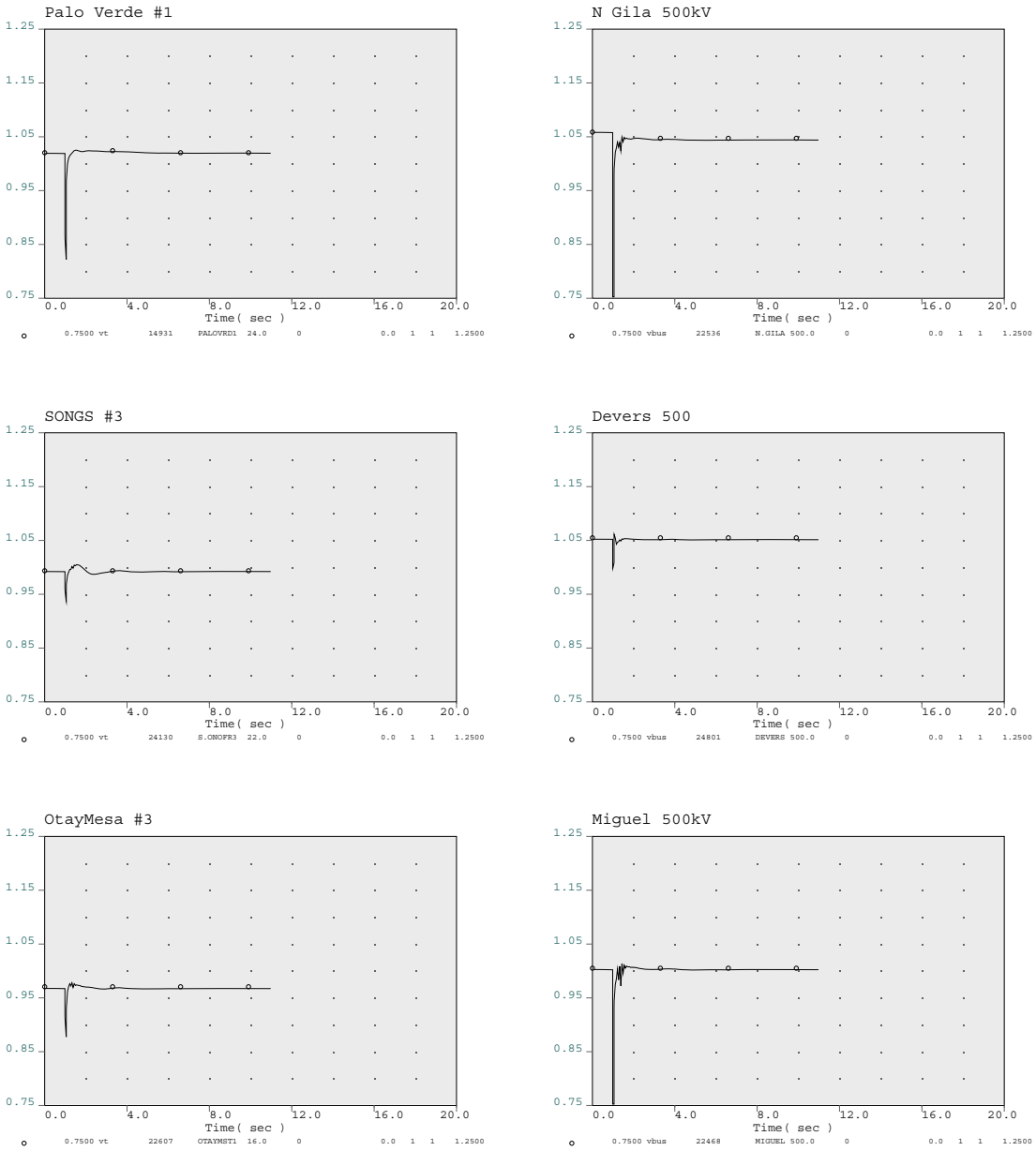


SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Page 1

SDGE	T468_NGila_slo_pre_iv4_hs.chf	p_i\hs\pre_iv4\ws_pre_iv4 Wed Oct 13 15:42:02 2010

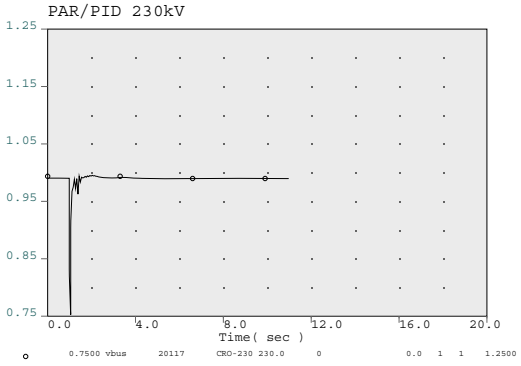
RELATIVE VOLTAGE



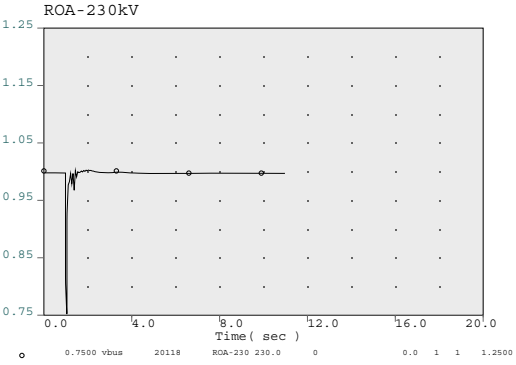
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

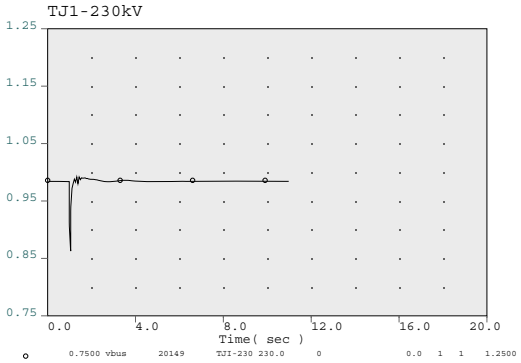
PAR/PID 230kV



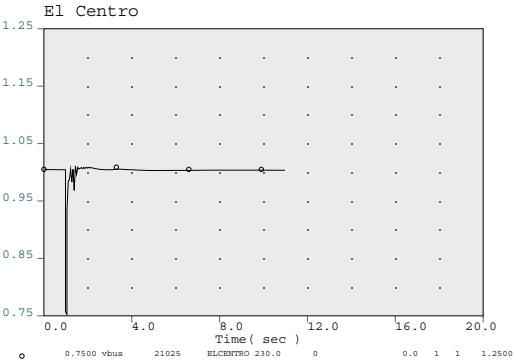
ROA-230kV



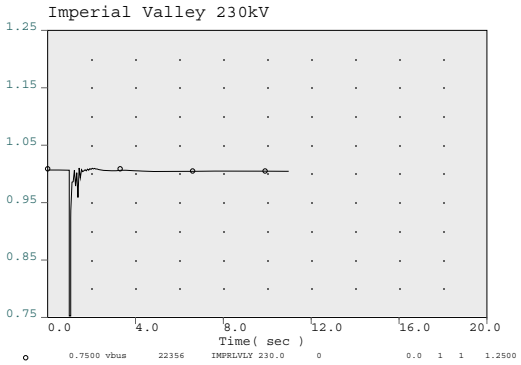
TJ1-230kV



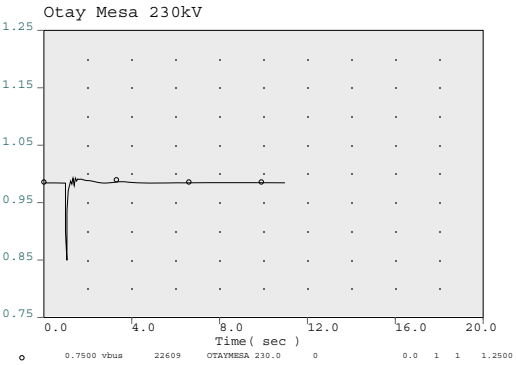
El Centro



Imperial Valley 230kV



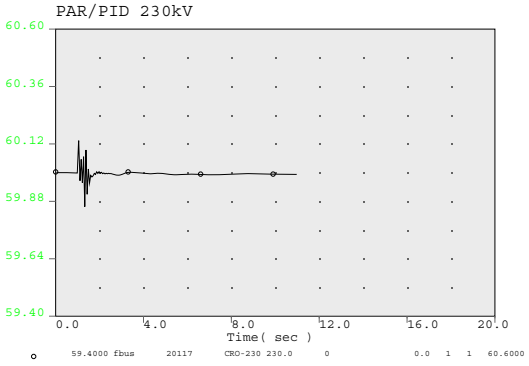
Otay Mesa 230kV



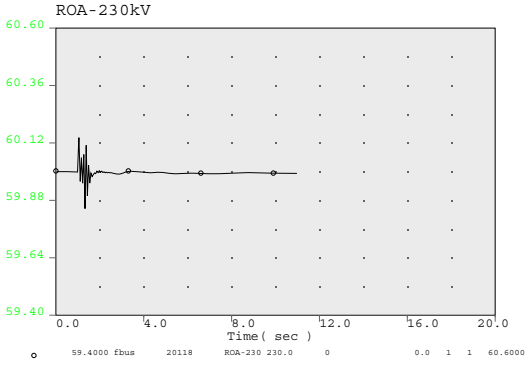
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

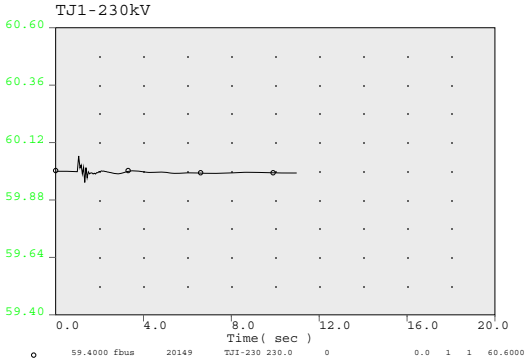
PAR/PID 230kV



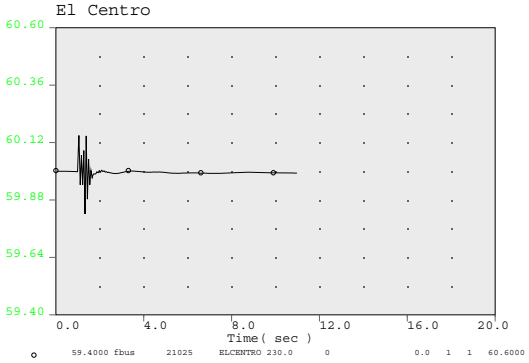
ROA-230kV



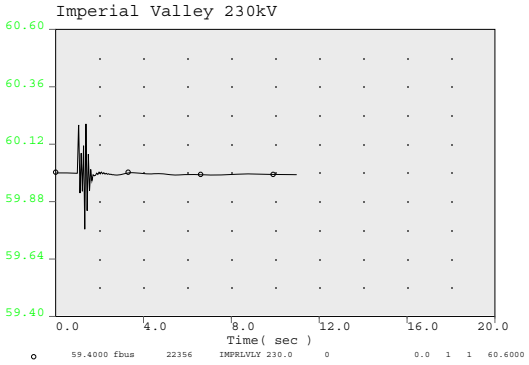
TJ1-230kV



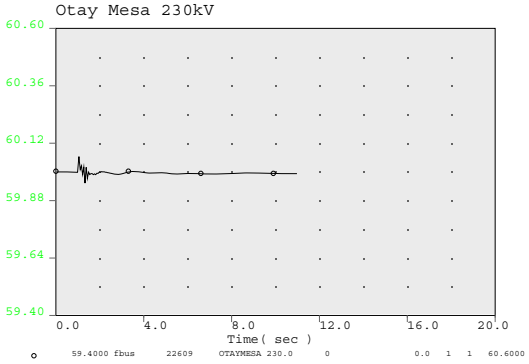
El Centro



Imperial Valley 230kV



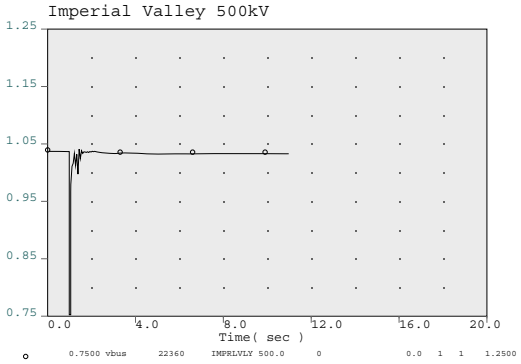
Otay Mesa 230kV



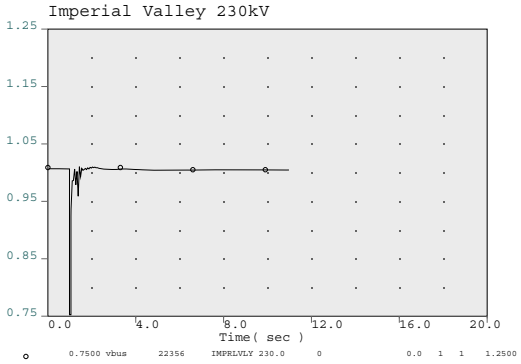
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

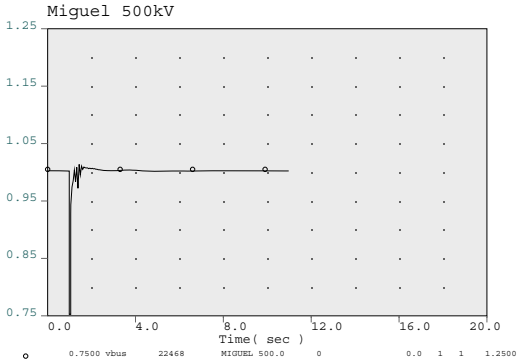
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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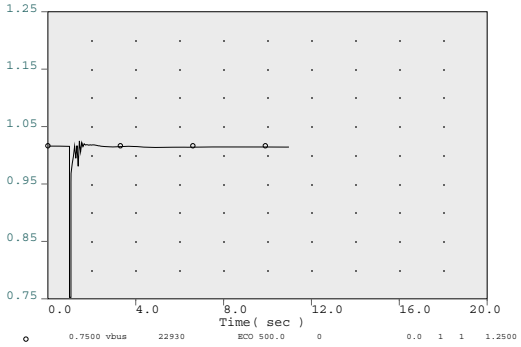
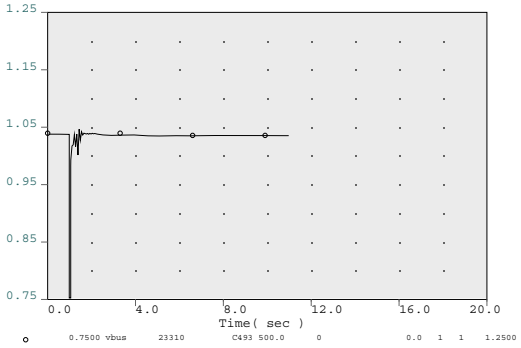
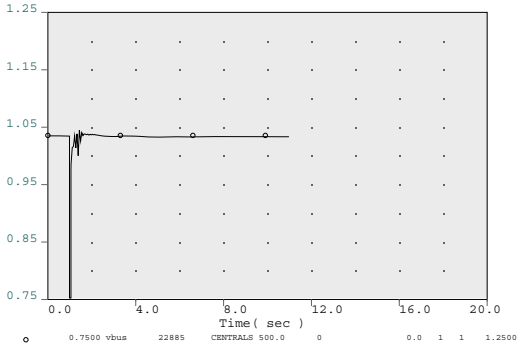


C493 500kV



CENTRALS 500kV



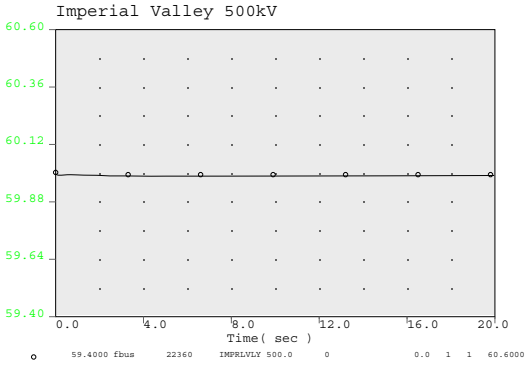
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

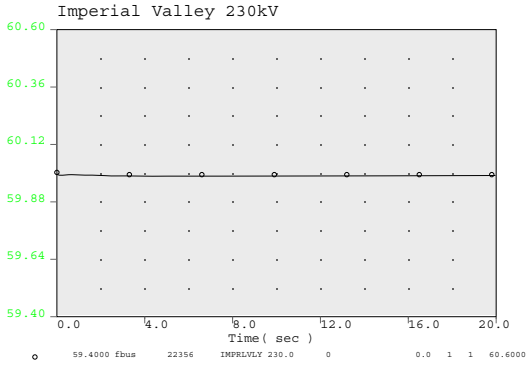
Appendix J-1

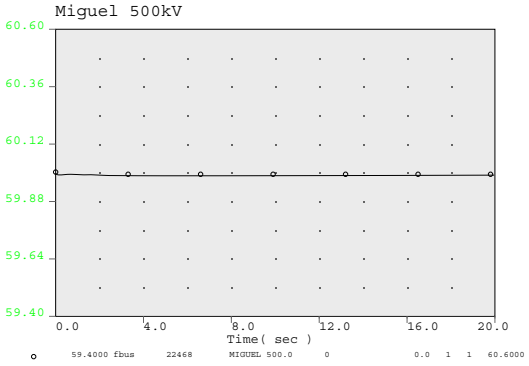
Transient Stability Plots

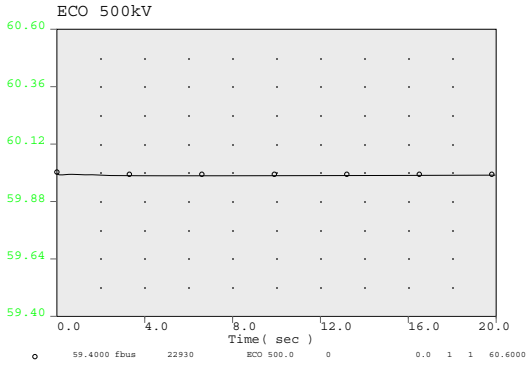
Light Load Pre

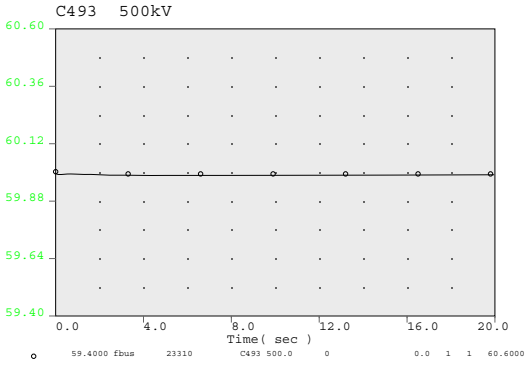
FREQUENCY

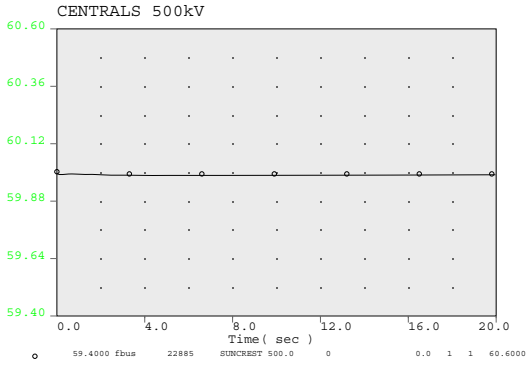






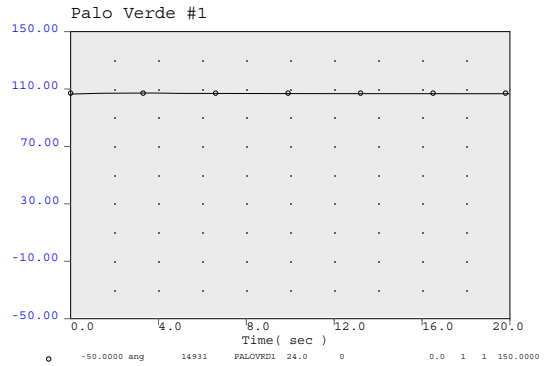


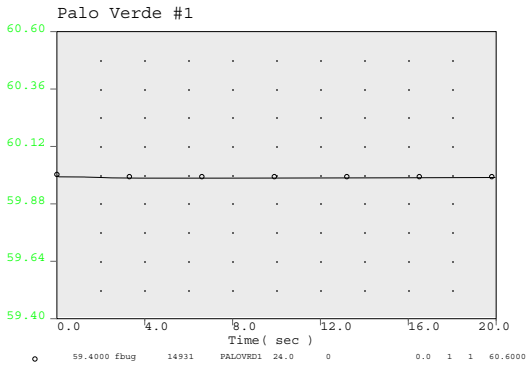


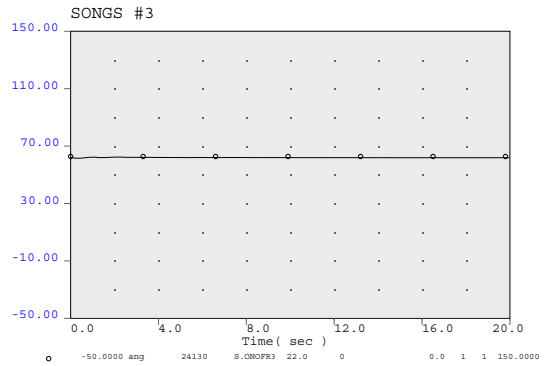


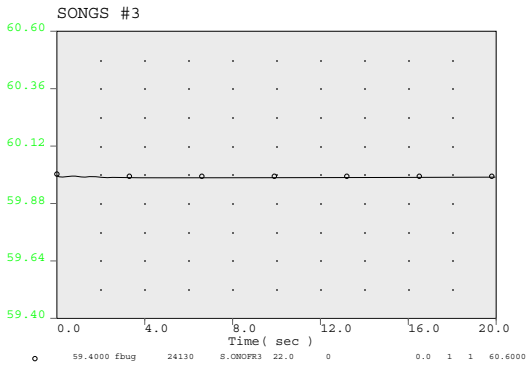
C1 C2 Light Load Pre Without Upgrades

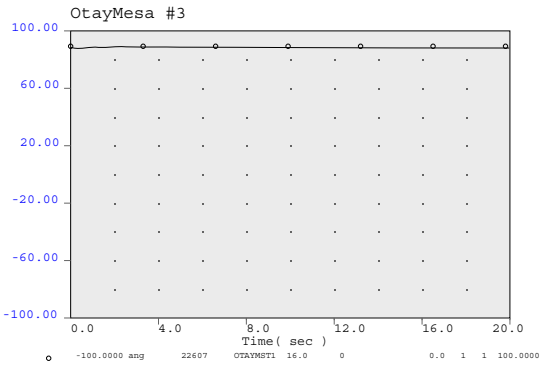
RELATIVE ROTOR ANGLE & FREQUENCY

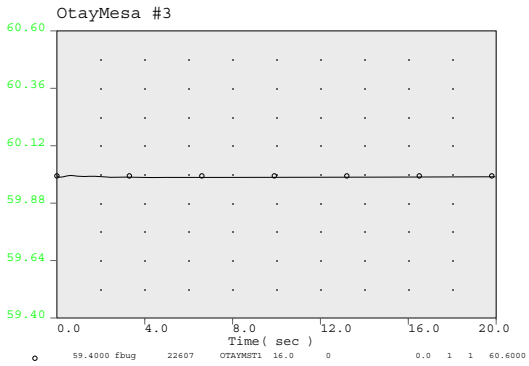












C1 C2 Light Load Pre Without Upgrades

Page 1

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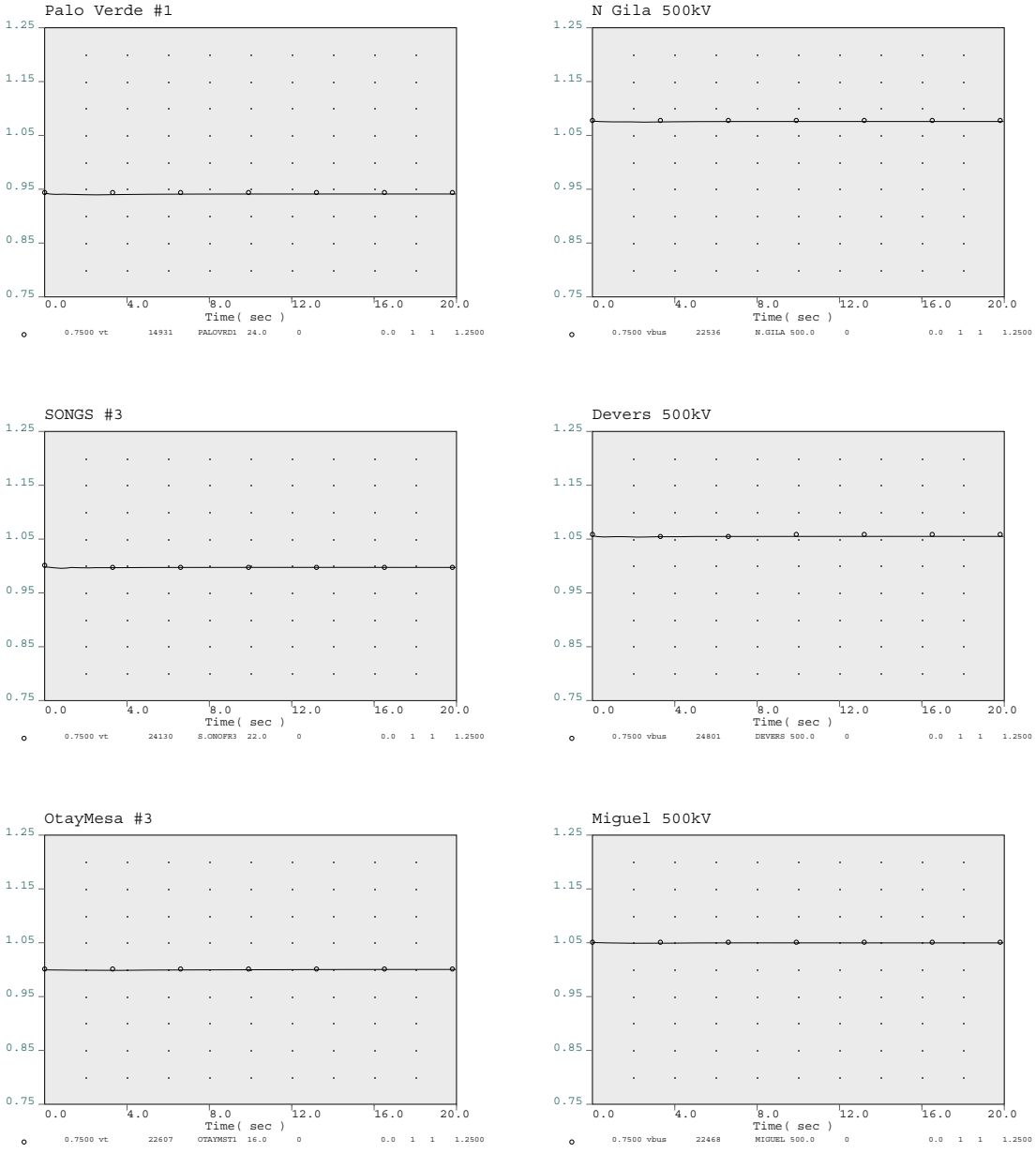
RELATIVE VOLTAGE



C1 C2 Light Load Pre Without Upgrades

Page 2

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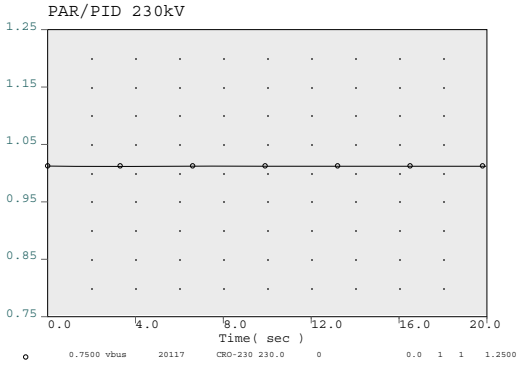
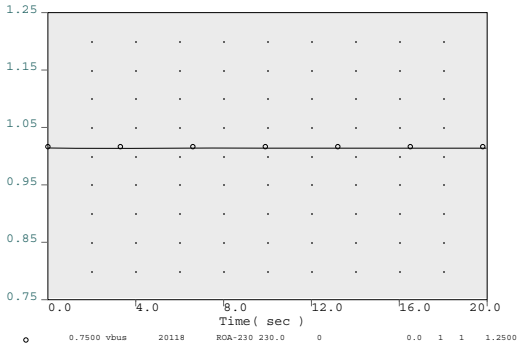
Sun Jul 17 14:48:58 2011

Affected System Voltage Check and Comparison

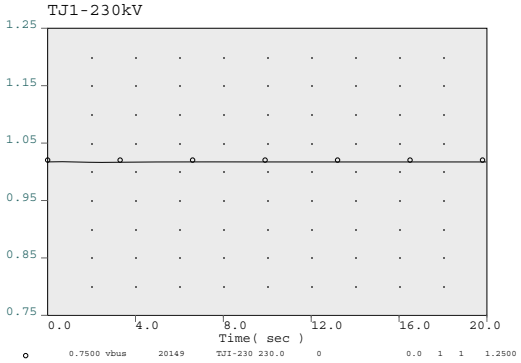
PAR/PID 230kV



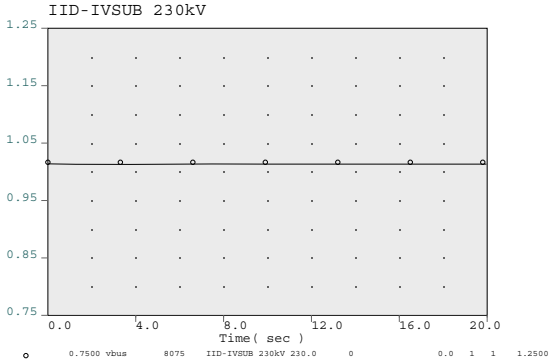
ROA-230kV



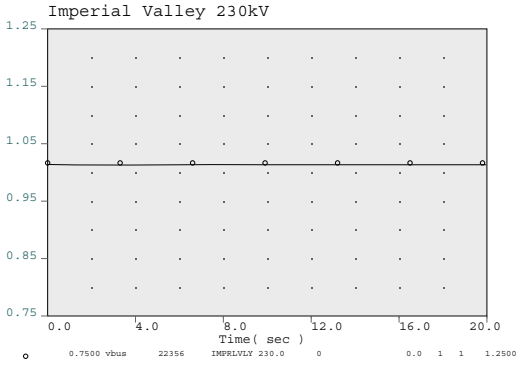
TJ1-230kV



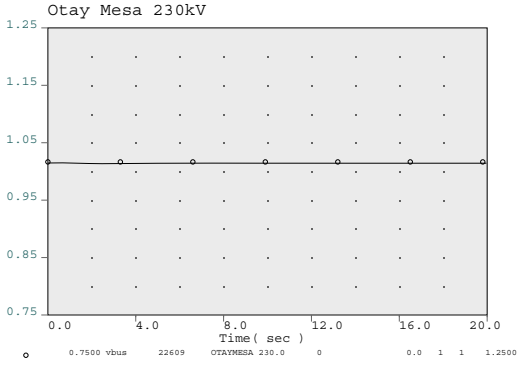
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 3

tran-c1c2-ll-pre-r12_FLAT.chf

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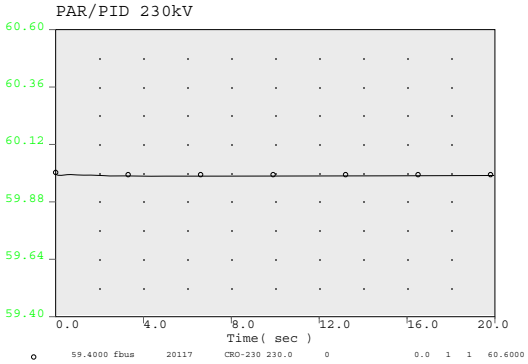
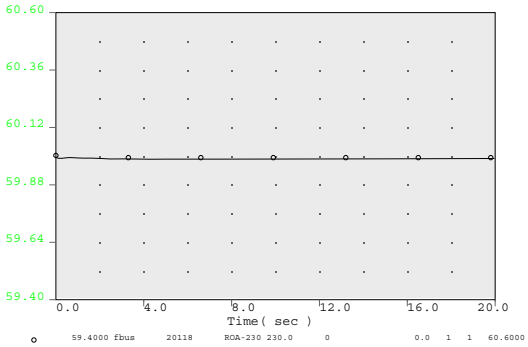
Sun Jul 17 14:48:58 2011

Affected System Frequency Check and Comparison

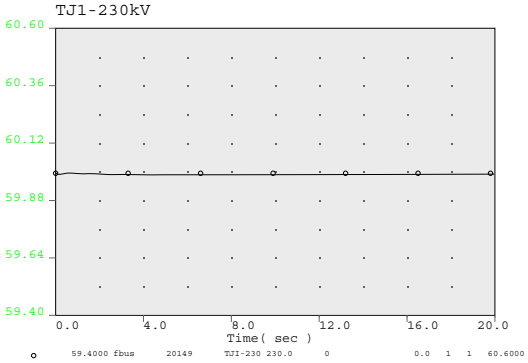
PAR/PID 230kV



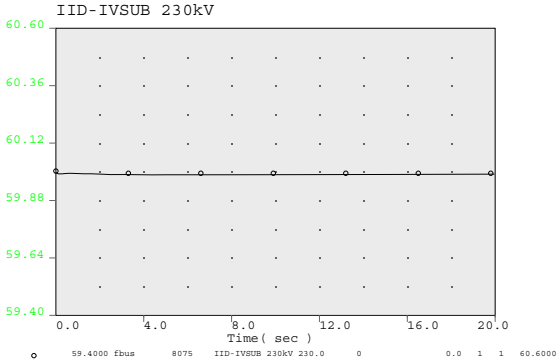
ROA-230kV



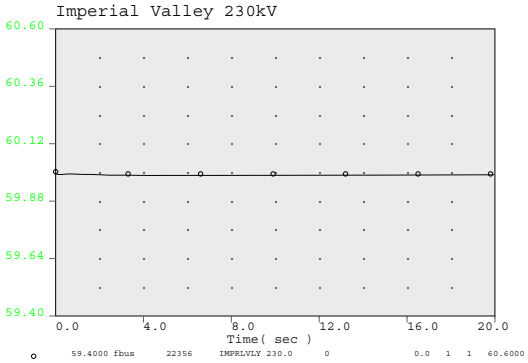
TJ1-230kV



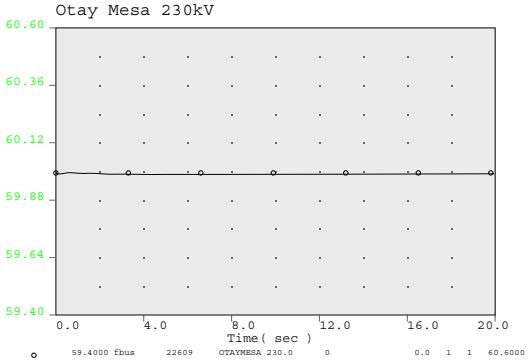
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 4

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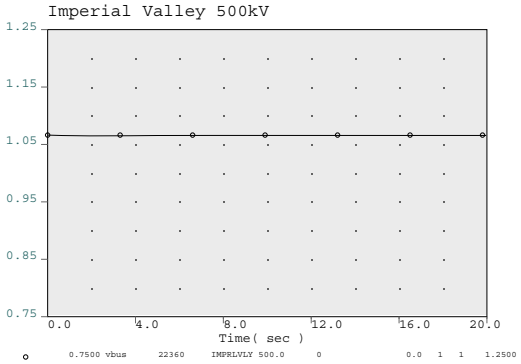
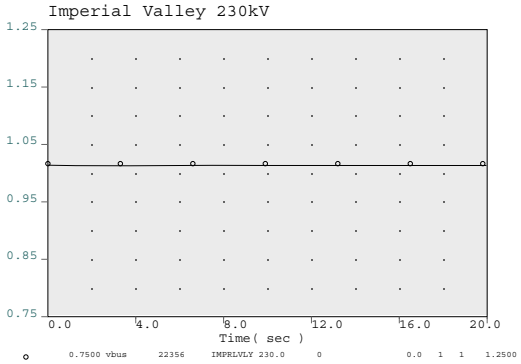
VOLTAGE

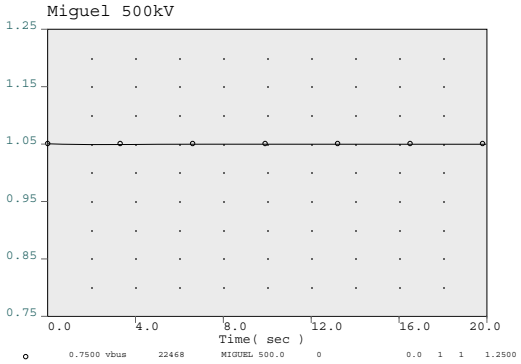
Imperial Valley 500kV



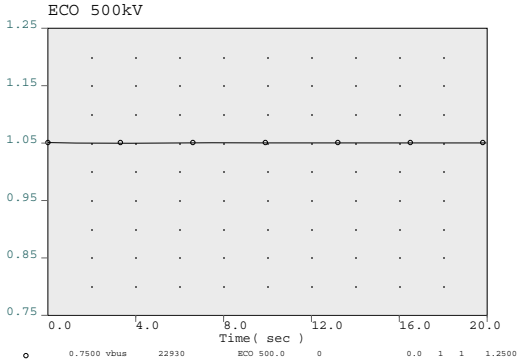
Imperial Valley 230kV



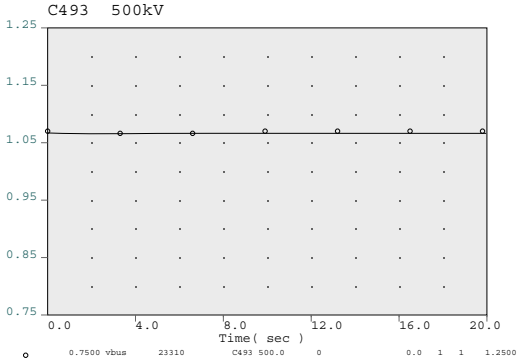
Miguel 500kV



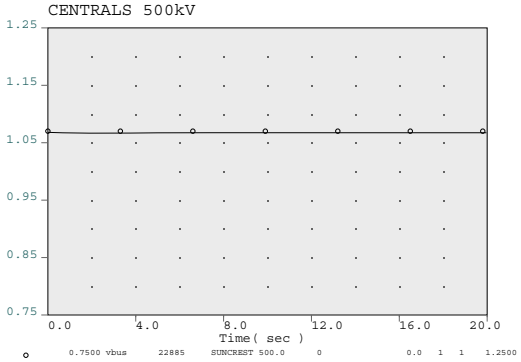
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Light Load Pre Without Upgrades

Page 5

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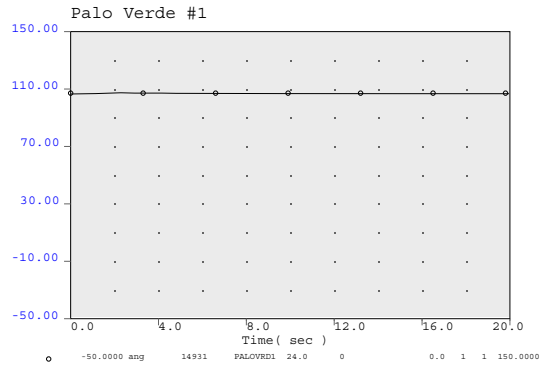
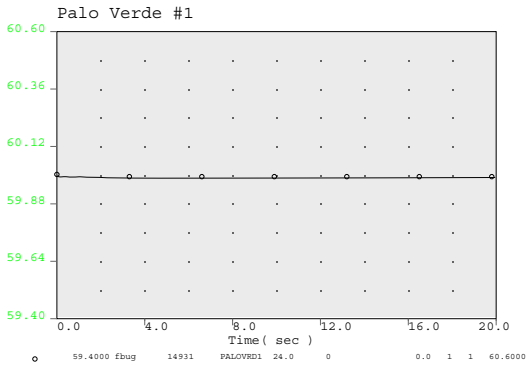
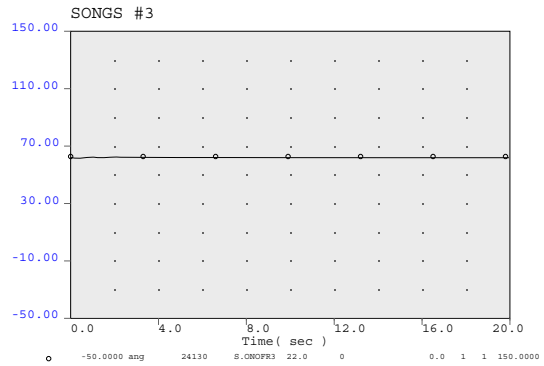
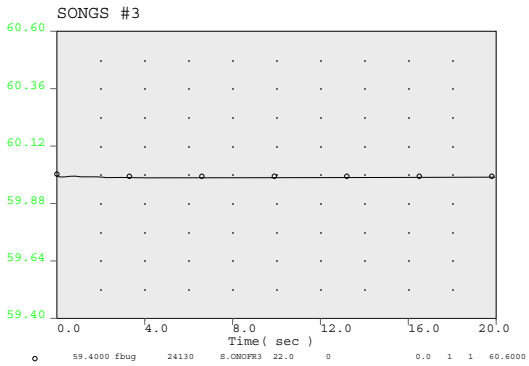
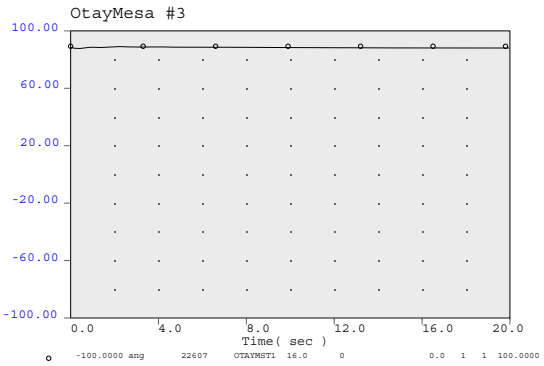
RELATIVE ROTOR ANGLE & FREQUENCY

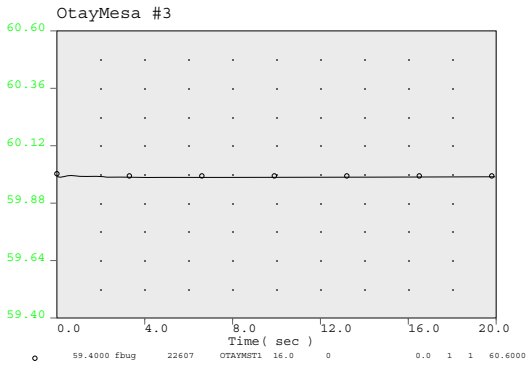












C1 C2 Light Load Pre Without Upgrades

Page 1

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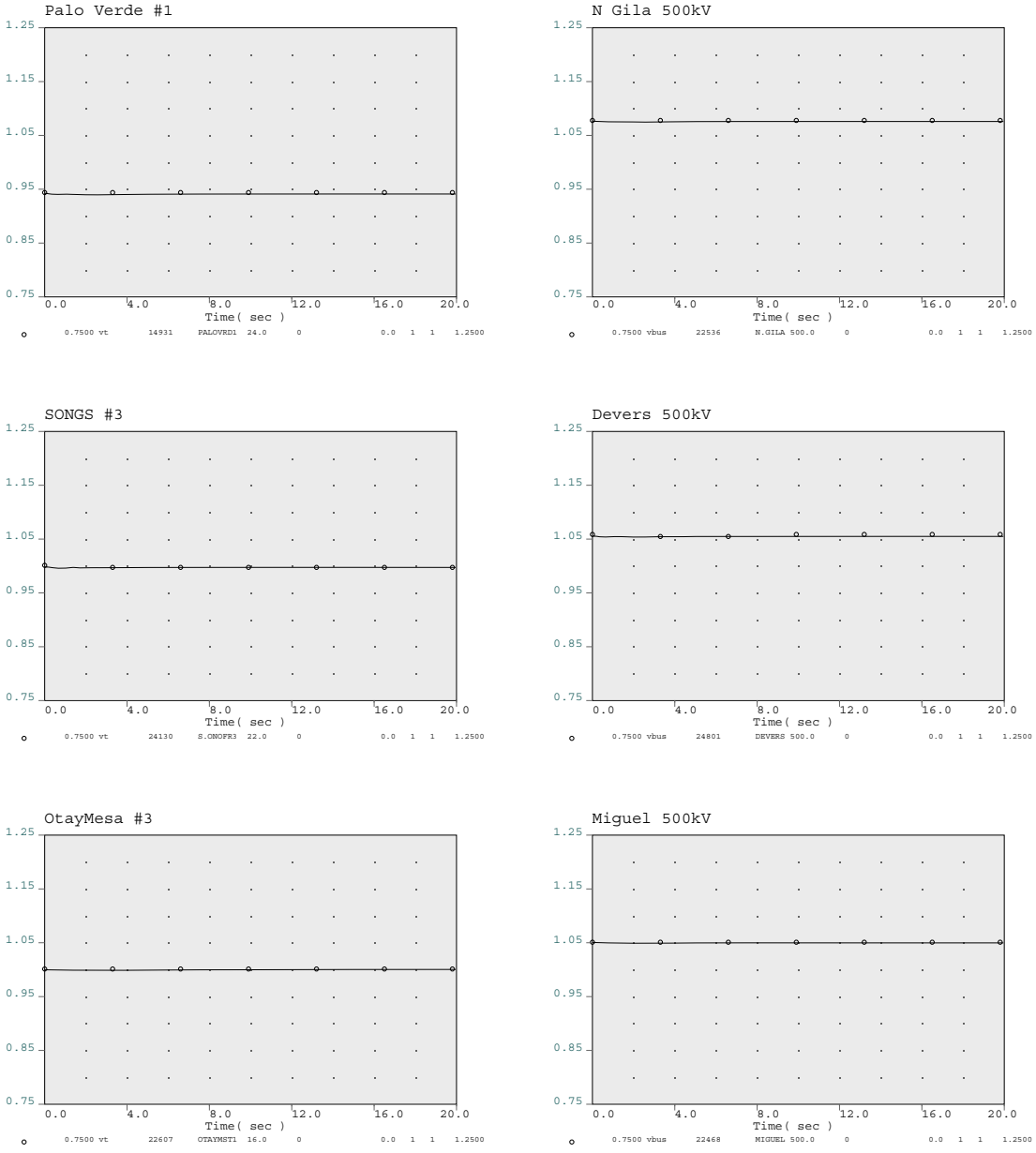
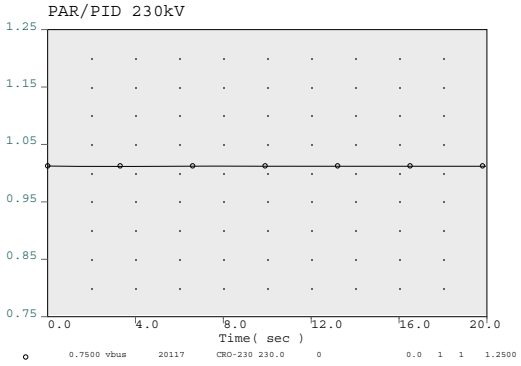
RELATIVE VOLTAGE



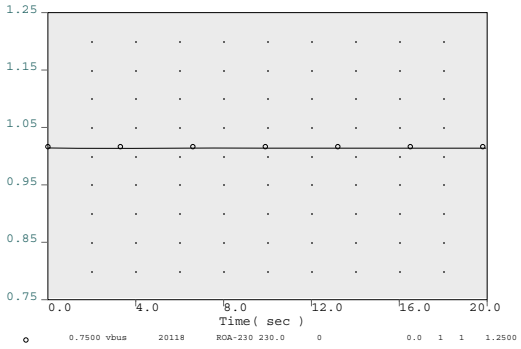
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

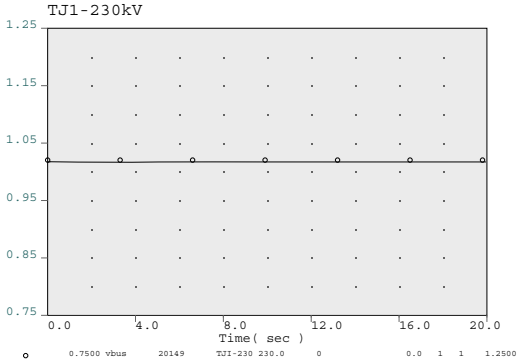
PAR/PID 230kV



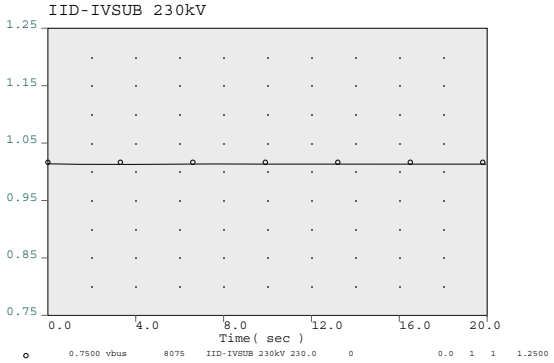
ROA-230kV



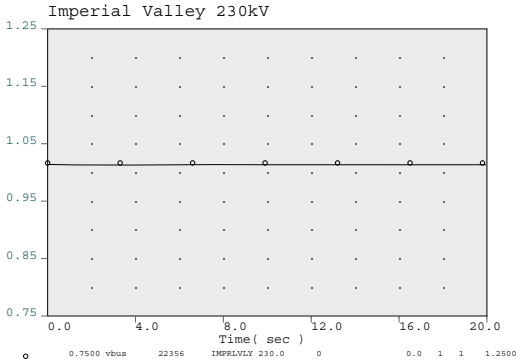
TJ1-230kV



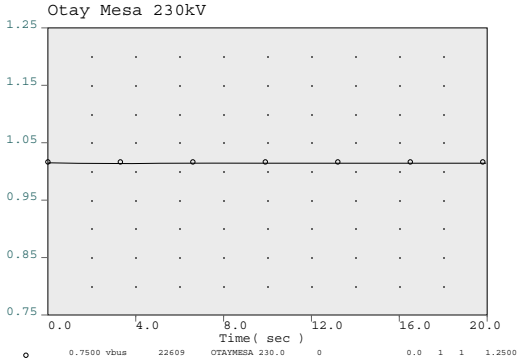
IID-IVSUB 230kV



Imperial Valley 230kV



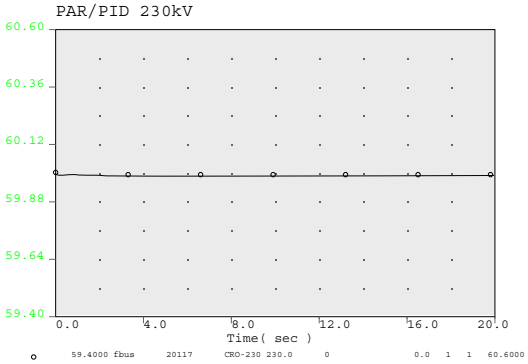
Otay Mesa 230kV



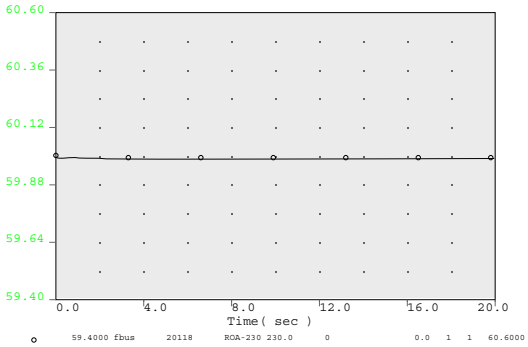
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

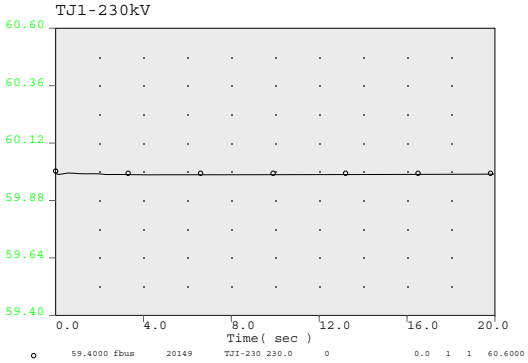
PAR/PID 230kV



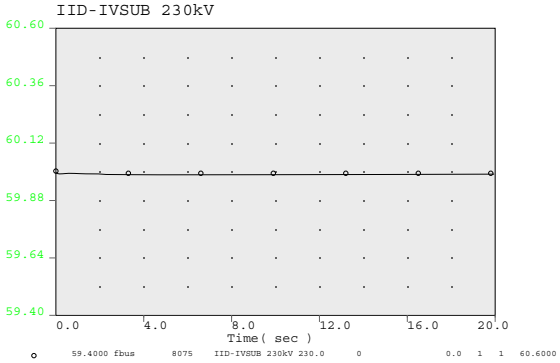
ROA-230kV



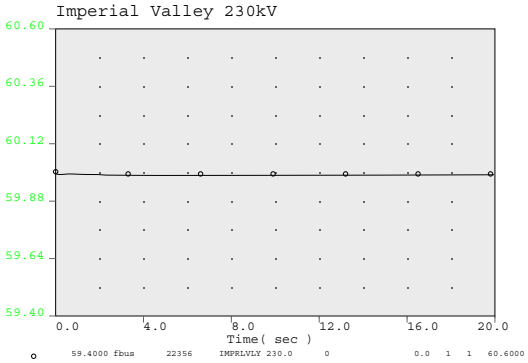
TJ1-230kV



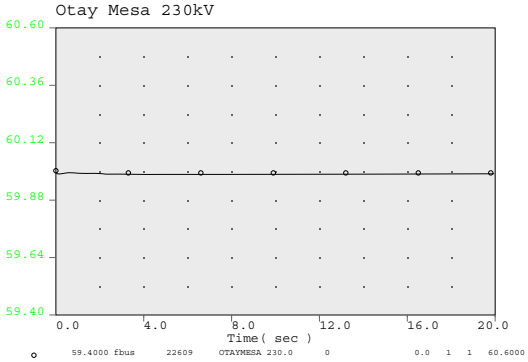
IID-IVSUB 230kV



Imperial Valley 230kV



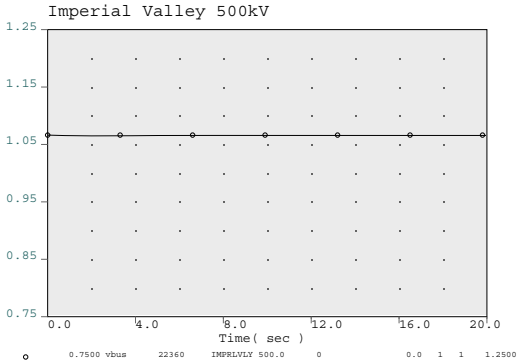
Otay Mesa 230kV



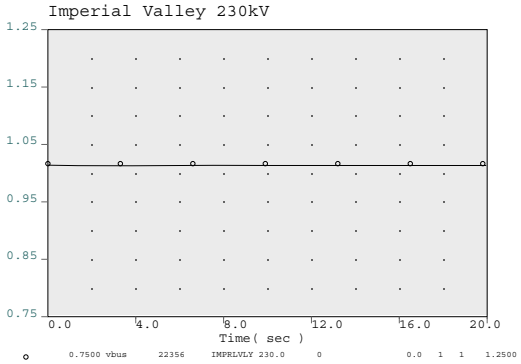
C1 C2 Light Load Pre Without Upgrades

VOLTAGE

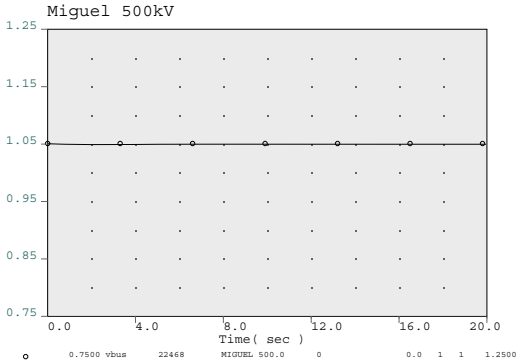
Imperial Valley 500kV



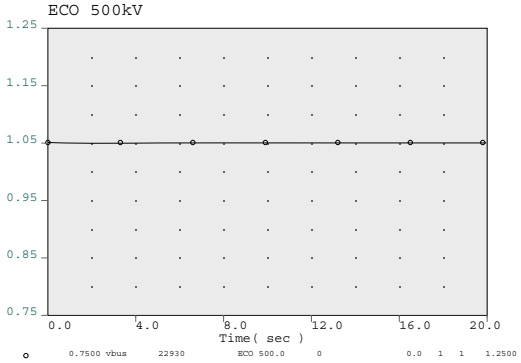
Imperial Valley 230kV



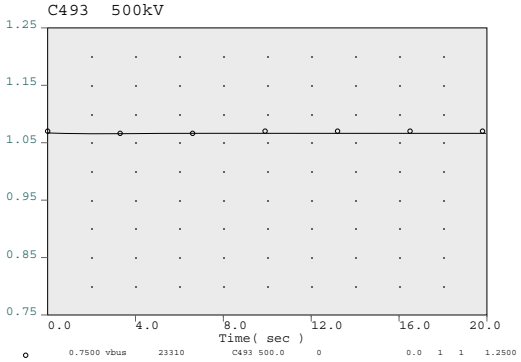
Miguel 500kV



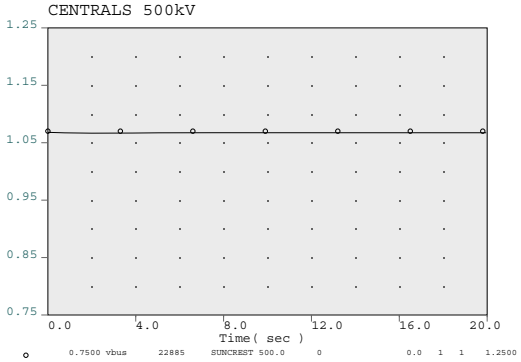
ECO 500kV



C493 500kV



CENTRALS 500kV

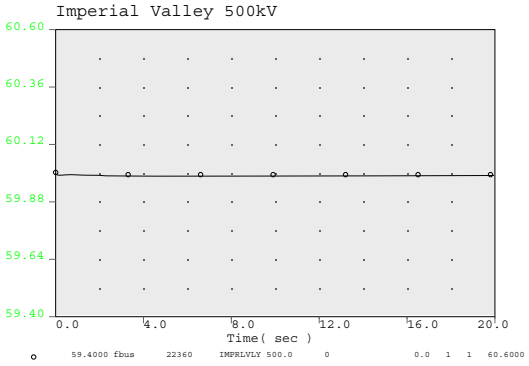


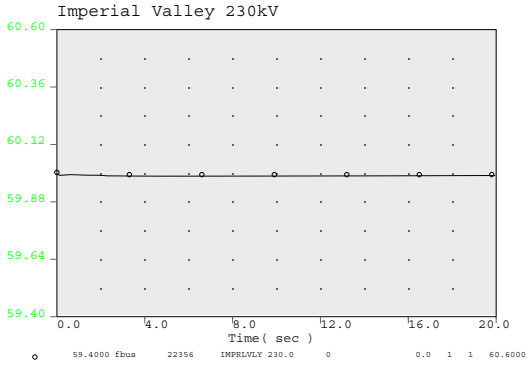
C1 C2 Light Load Pre Without Upgrades

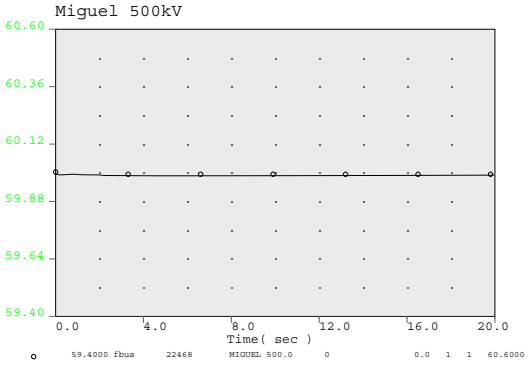
Page 5

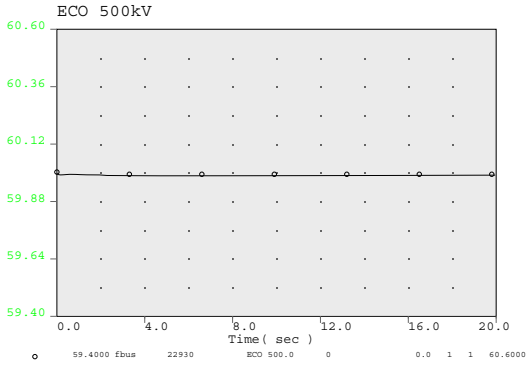
SDGE	tran-c1c2-ll-pre-r12_C493-CE-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:45:29 2011

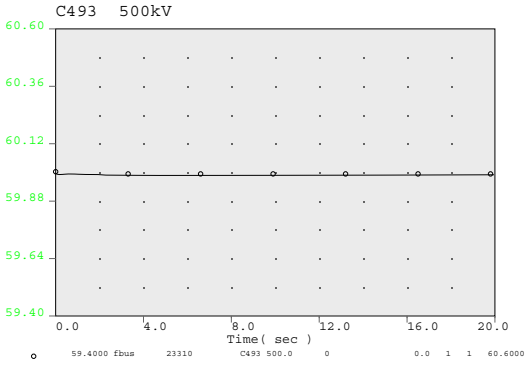
FREQUENCY

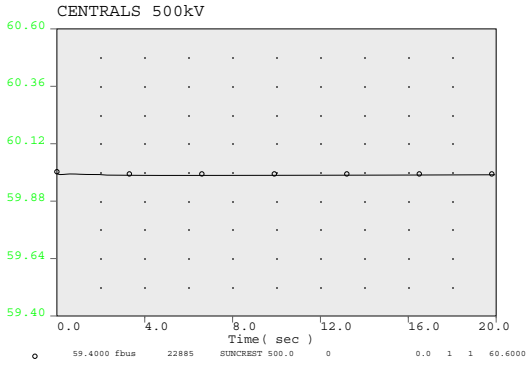










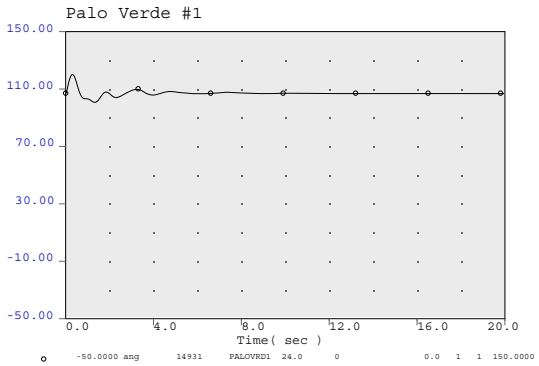


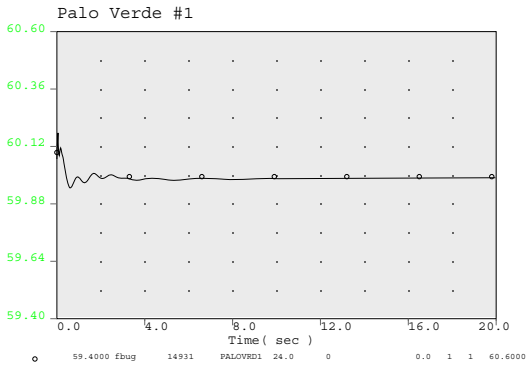
C1 C2 Light Load Pre Without Upgrades

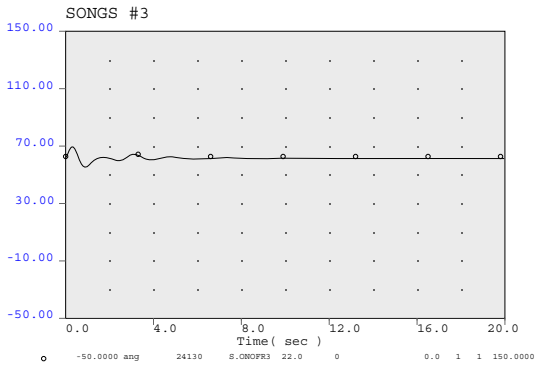
Page 6

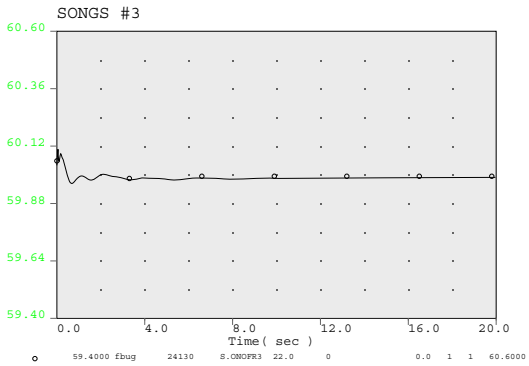
SDGE	tran-c1c2-ll-pre-r12_C493-CE-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:45:29 2011

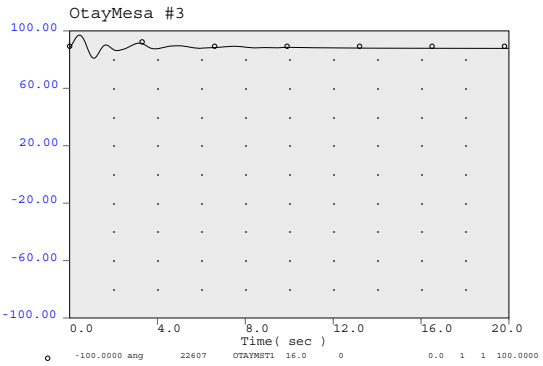
RELATIVE ROTOR ANGLE & FREQUENCY

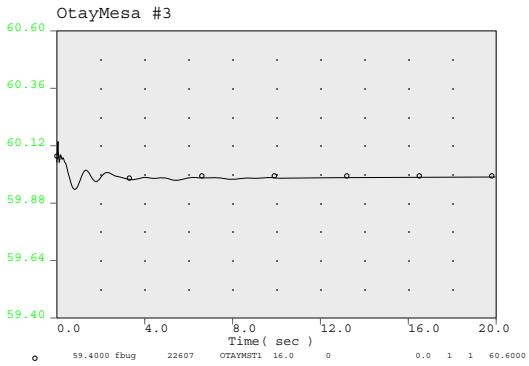












C1 C2 Light Load Pre Without Upgrades

Page 1

SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_Dev-Val-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:47:14 2011

RELATIVE VOLTAGE

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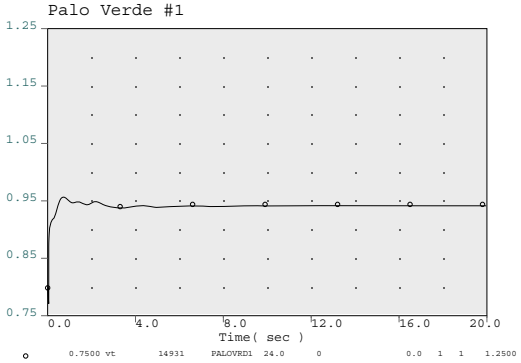
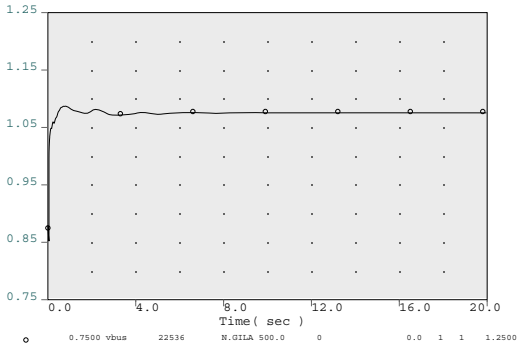
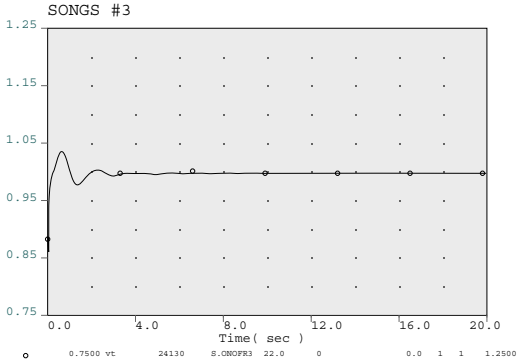


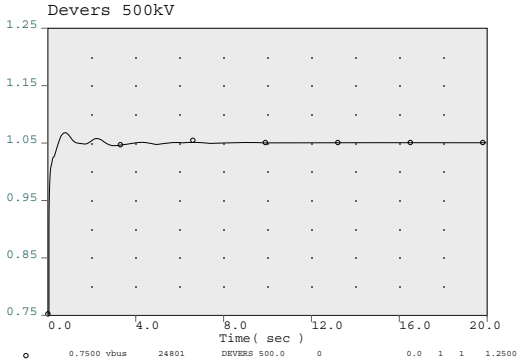
N Gila 500kV



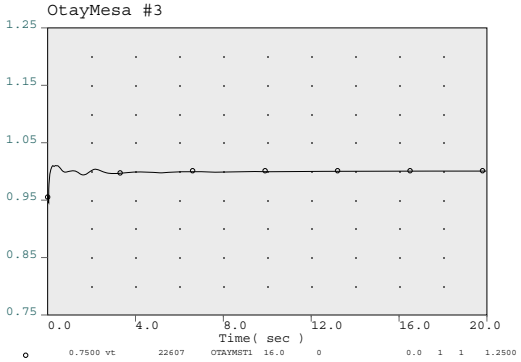
SONGS #3



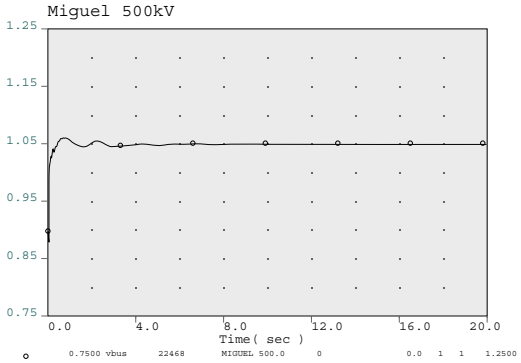
Devers 500kV



OtayMesa #3



Miguel 500kV



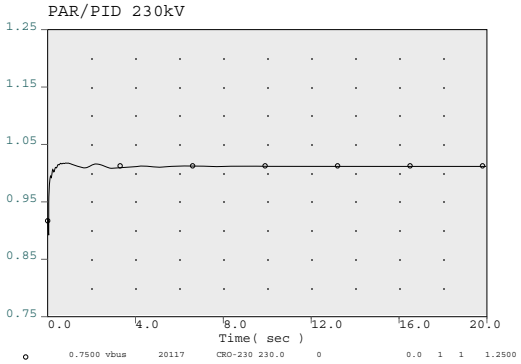
C1 C2 Light Load Pre Without Upgrades

Page 2

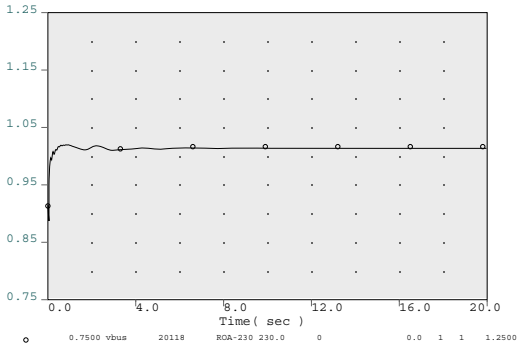
SDGE	tran-c1c2-ll-pre-r12_Dev-Val-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:47:15 2011

Affected System Voltage Check and Comparison

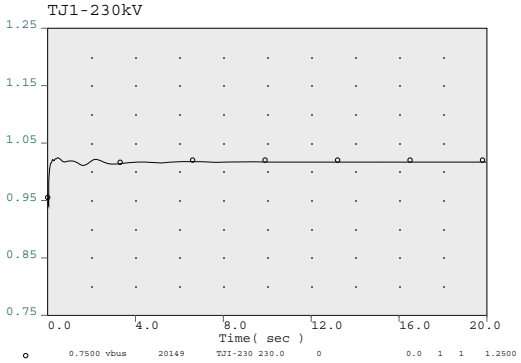
PAR/PID 230kV



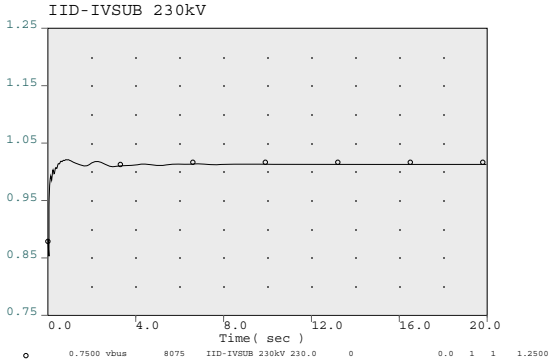
ROA-230kV



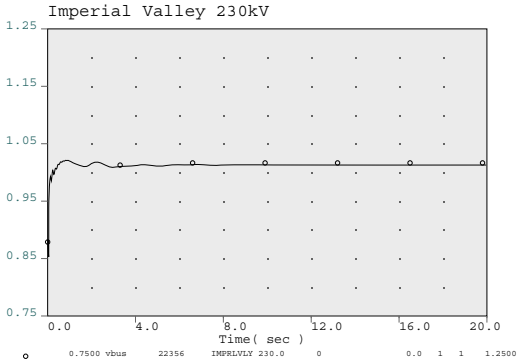
TJ1-230kV



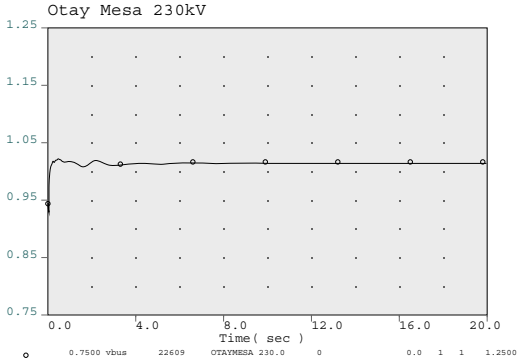
IID-IVSUB 230kV



Imperial Valley 230kV



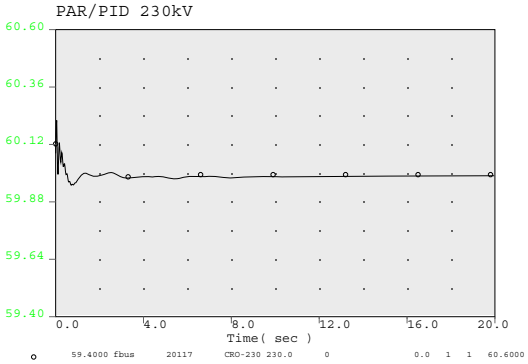
Otay Mesa 230kV



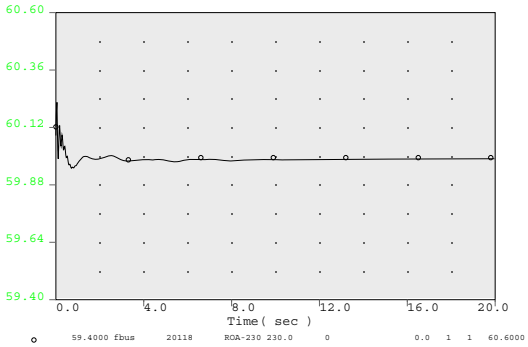
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

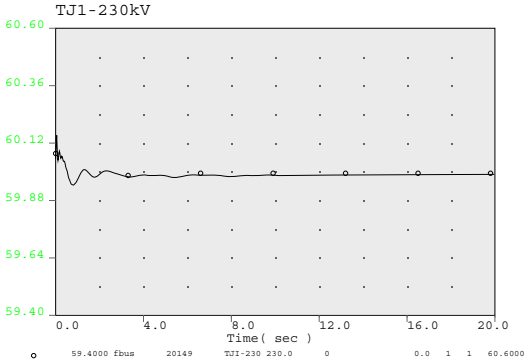
PAR/PID 230kV



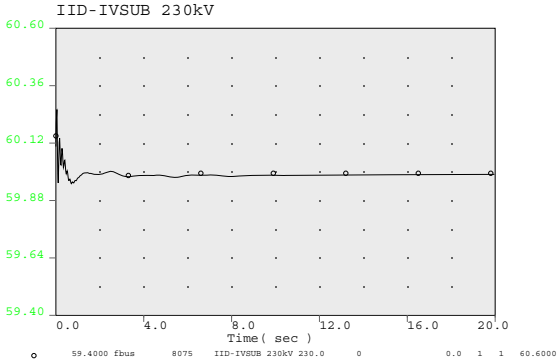
ROA-230kV



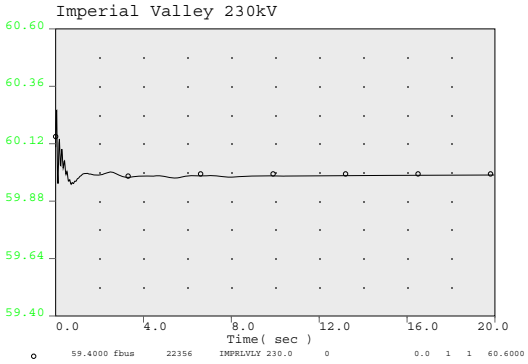
TJ1-230kV



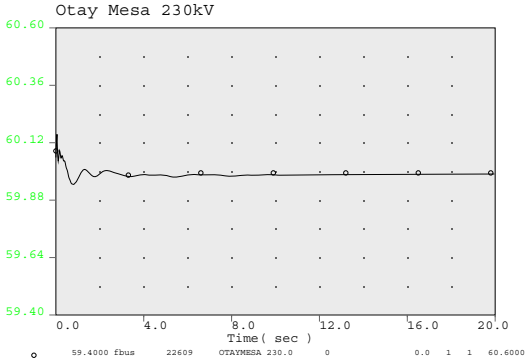
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



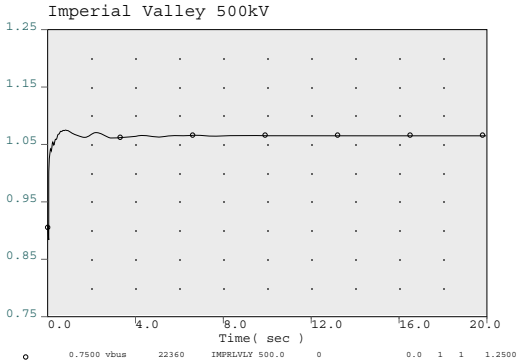
C1 C2 Light Load Pre Without Upgrades

Page 4

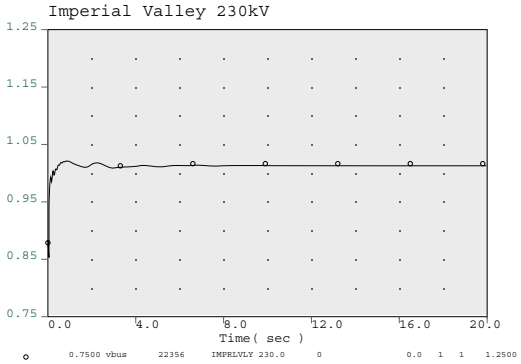
SDGE	tran-c1c2-ll-pre-r12_Dev-Val-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:47:16 2011

VOLTAGE

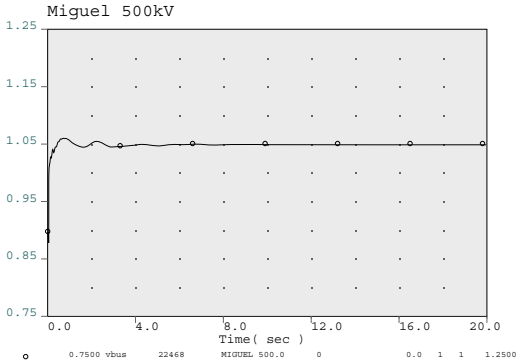
Imperial Valley 500kV



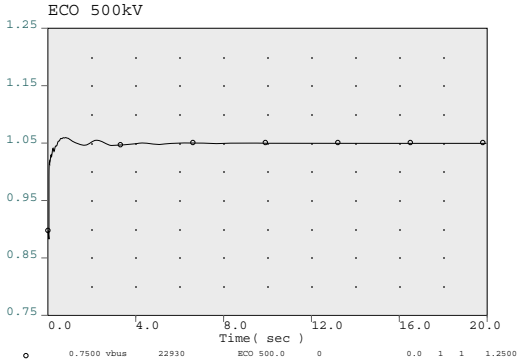
Imperial Valley 230kV



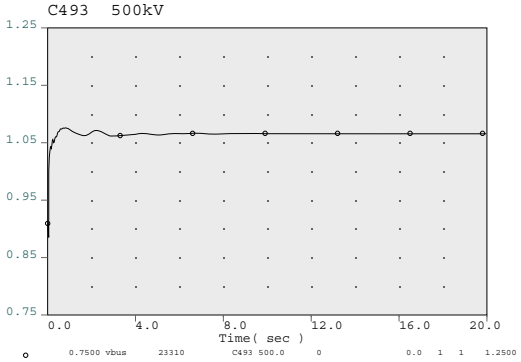
Miguel 500kV



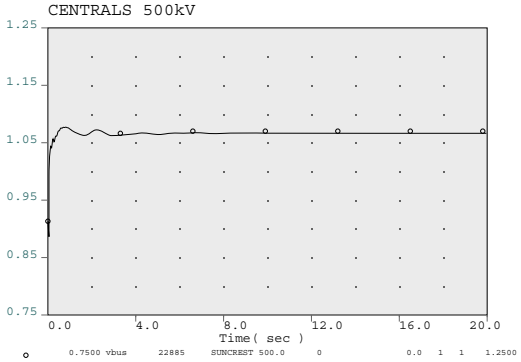
ECO 500kV



C493 500kV



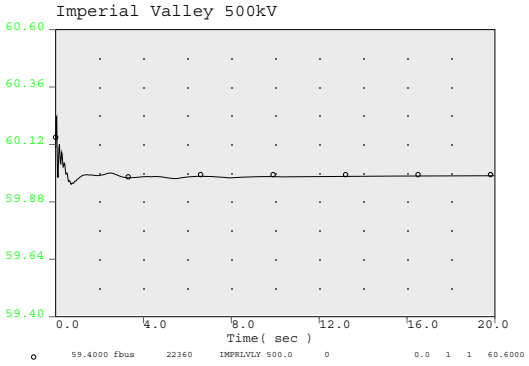
CENTRALS 500kV



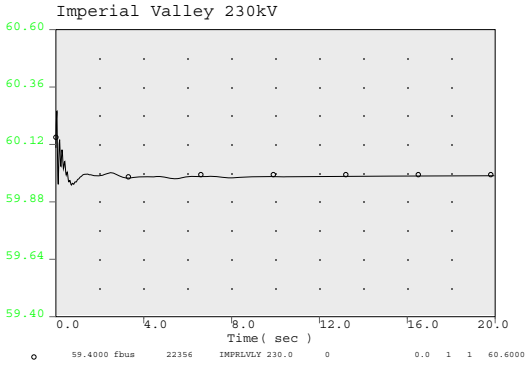
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

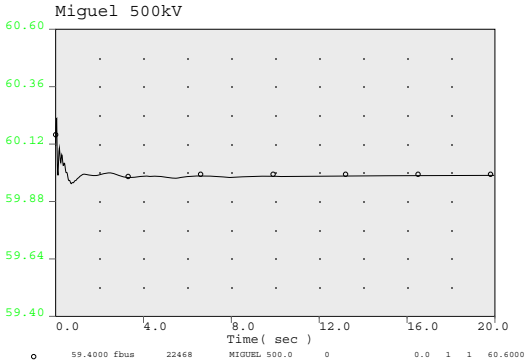
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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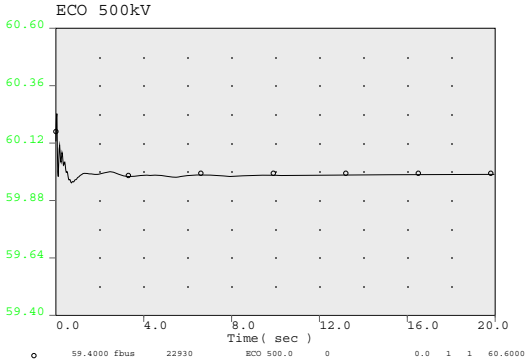
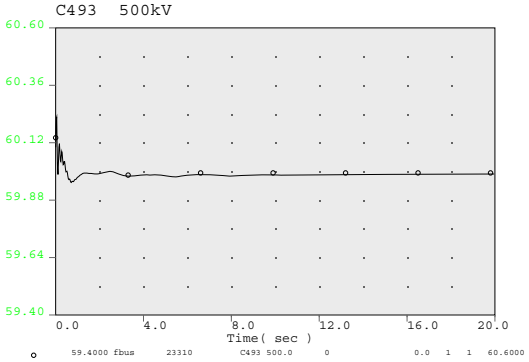
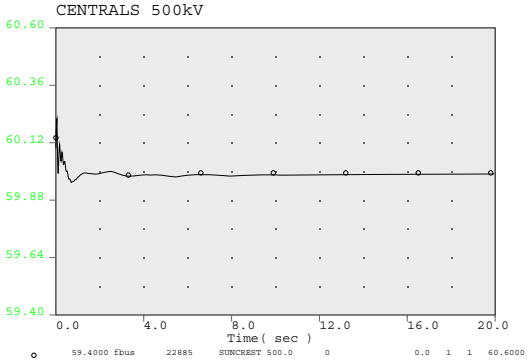


C493 500kV

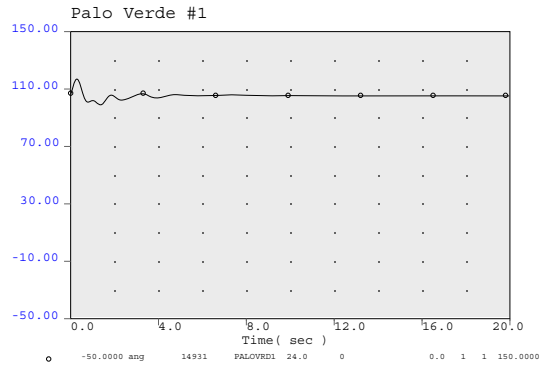


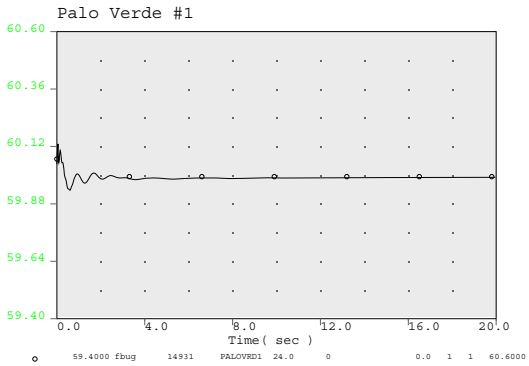
CENTRALS 500kV

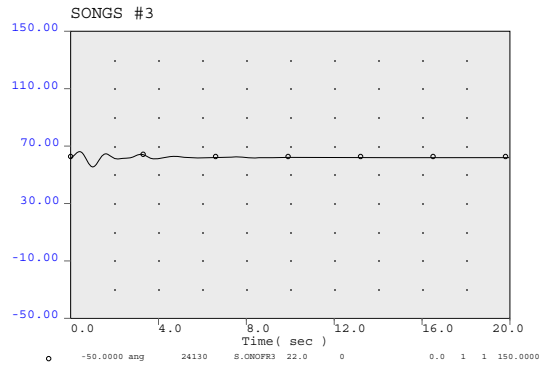


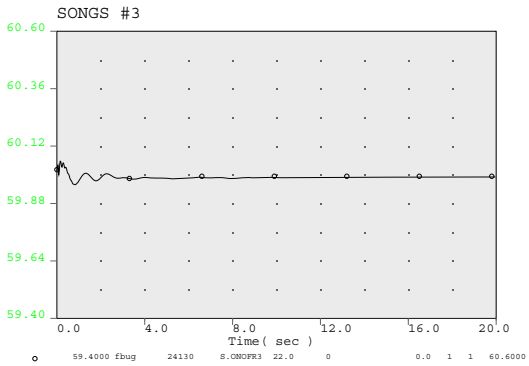
C1 C2 Light Load Pre Without Upgrades

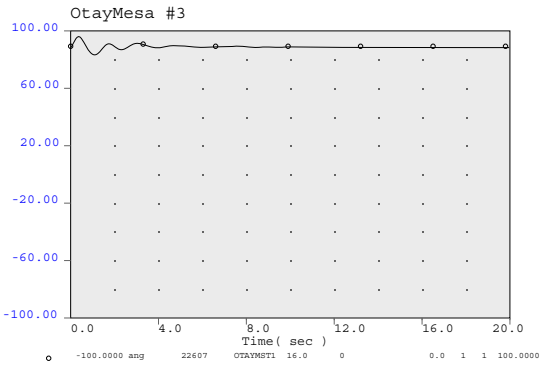
RELATIVE ROTOR ANGLE & FREQUENCY

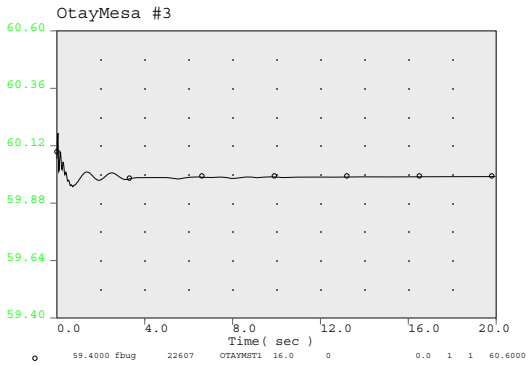








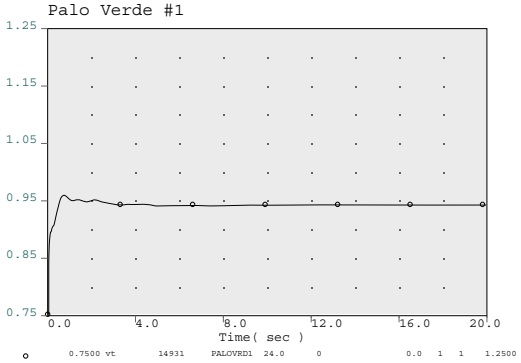




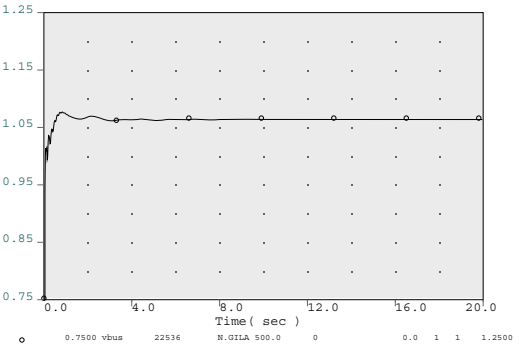
C1 C2 Light Load Pre Without Upgrades

RELATIVE VOLTAGE

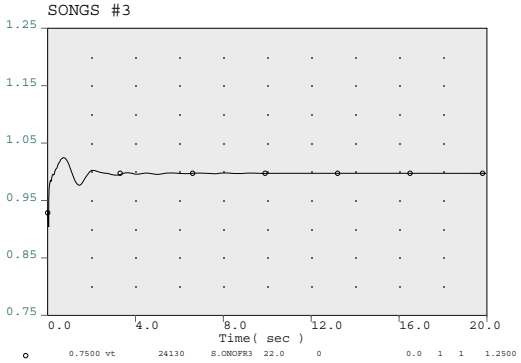
Palo Verde #1



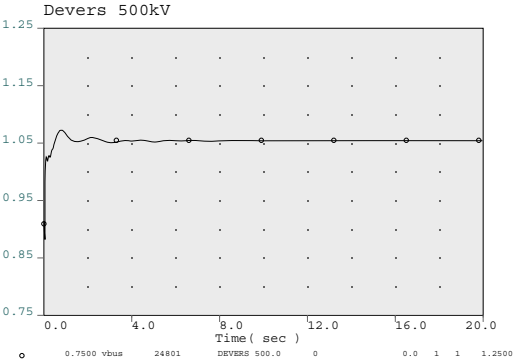
N Gila 500kV



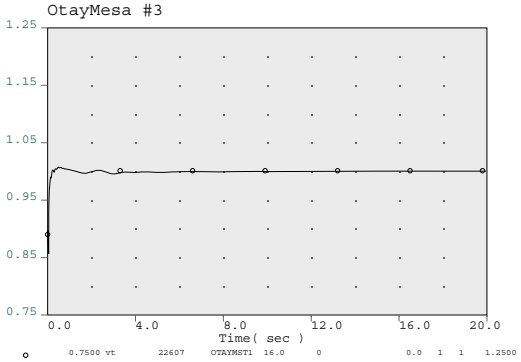
SONGS #3



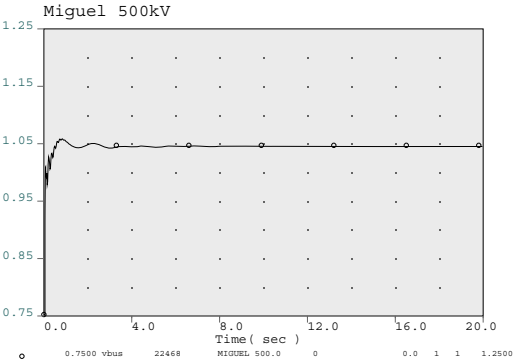
Devers 500kV



OtayMesa #3



Miguel 500kV



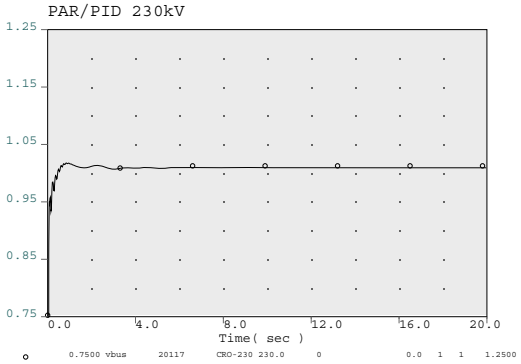
C1 C2 Light Load Pre Without Upgrades

Page 2

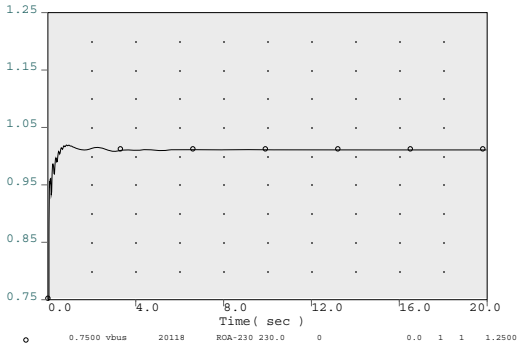
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_HAA-NGila-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:50:49 2011

Affected System Voltage Check and Comparison

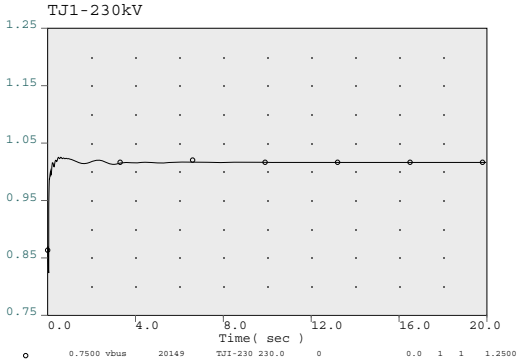
PAR/PID 230kV



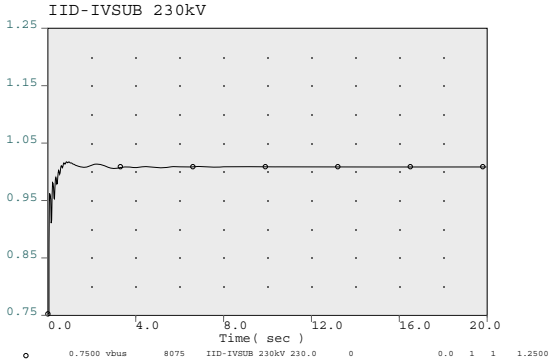
ROA-230kV



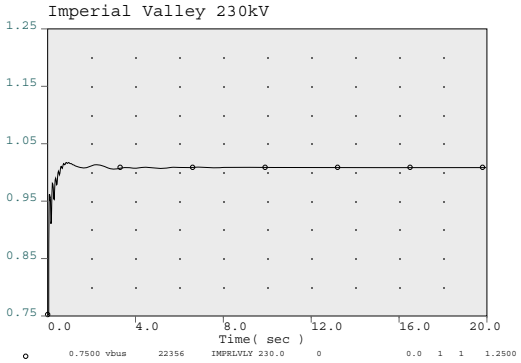
TJ1-230kV



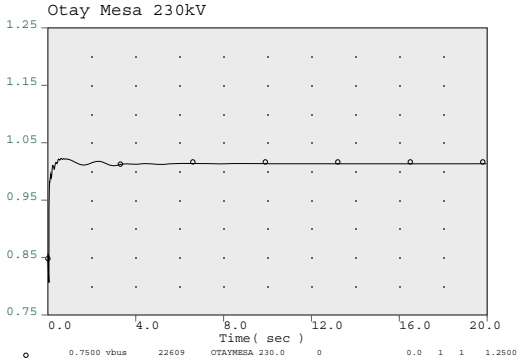
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 3

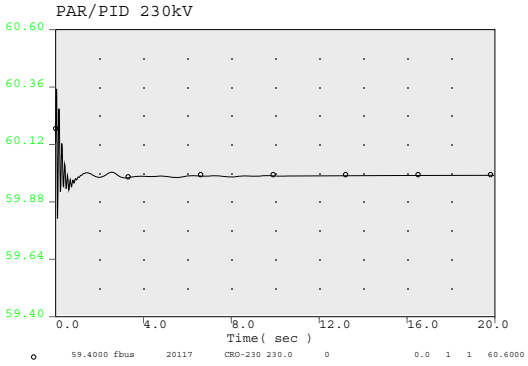
tran-c1c2-ll-pre-r12_HAA-NGila-slo.chf

anstab\ll\pre\ws_pre_c1c2

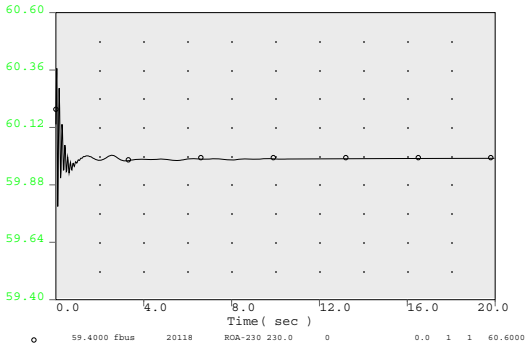
Sun Jul 17 14:50:50 2011

Affected System Frequency Check and Comparison

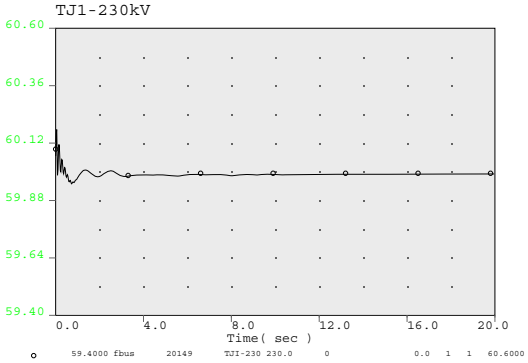
PAR/PID 230kV



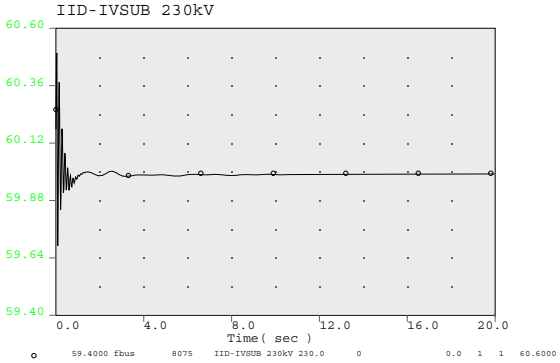
ROA-230kV



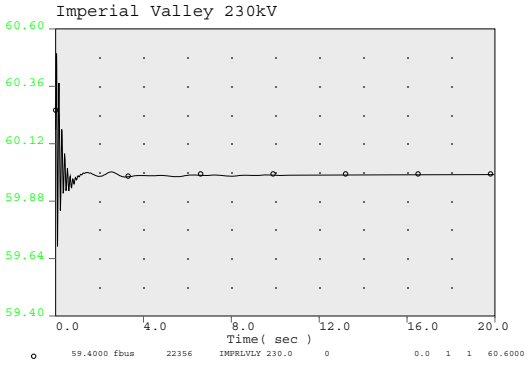
TJ1-230kV



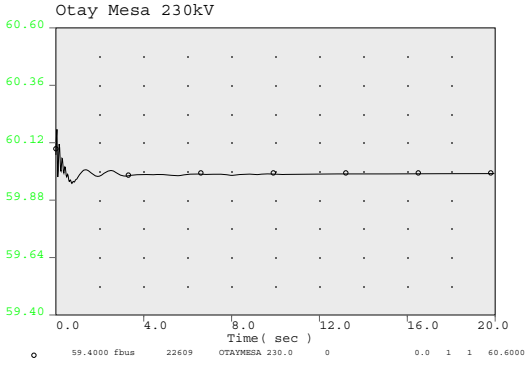
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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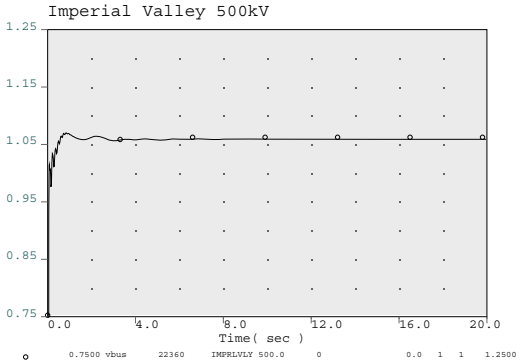
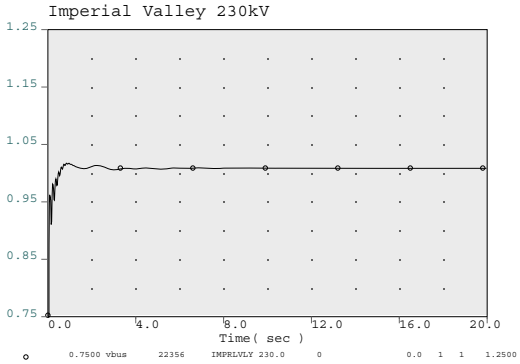
SDGE	tran-c1c2-ll-pre-r12_HAA-NGila-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:50:50 2011

VOLTAGE

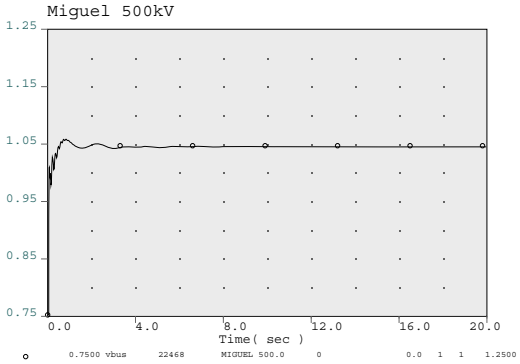
Imperial Valley 500kV



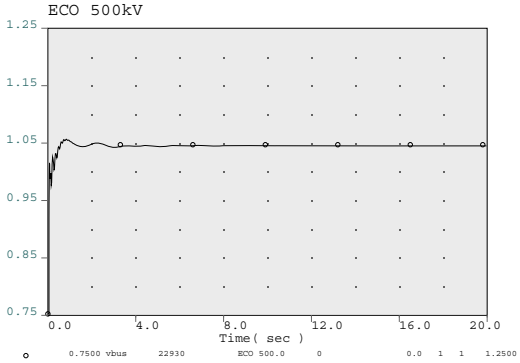
Imperial Valley 230kV



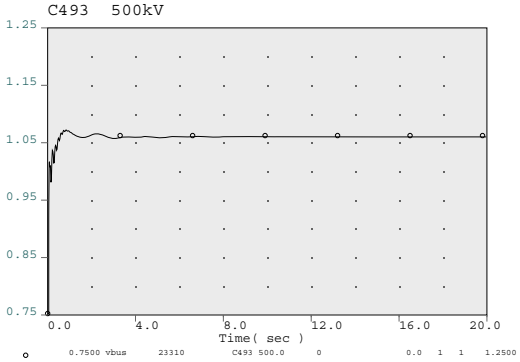
Miguel 500kV



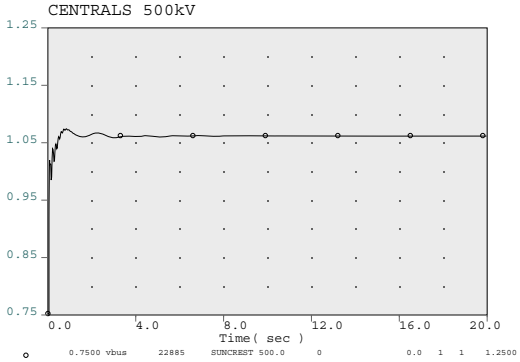
ECO 500kV



C493 500kV



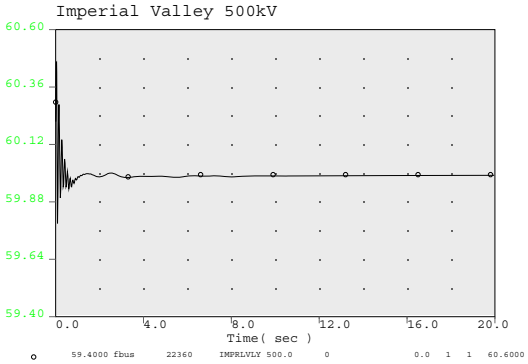
CENTRALS 500kV



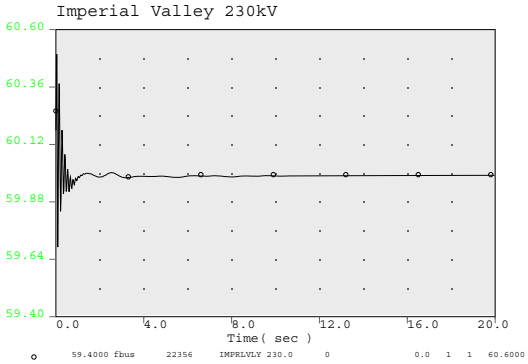
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

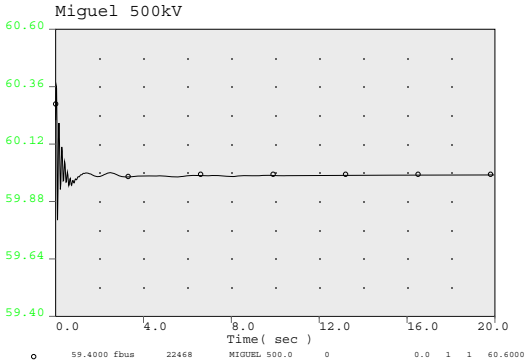
Imperial Valley 500kV



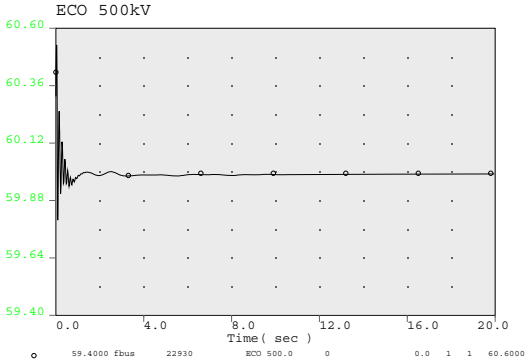
Imperial Valley 230kV



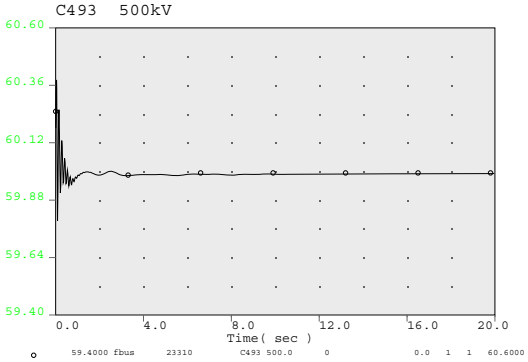
Miguel 500kV



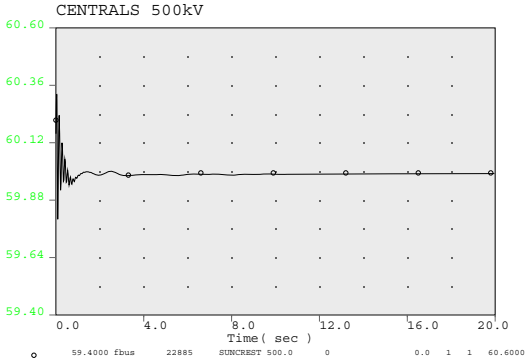
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Light Load Pre Without Upgrades

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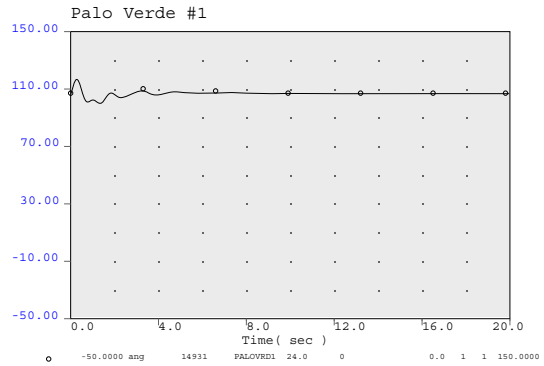
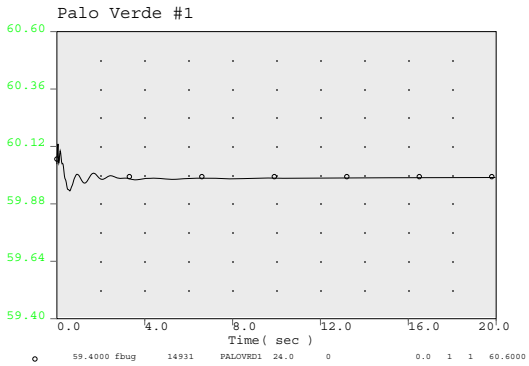
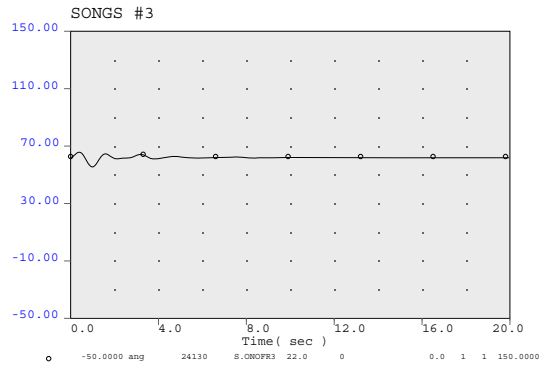
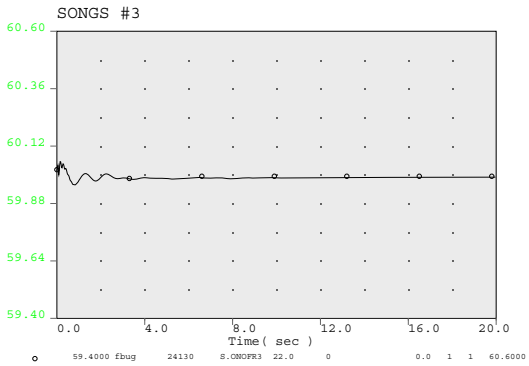
SDGE	tran-c1c2-ll-pre-r12_HAA-NGila-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:50:51 2011

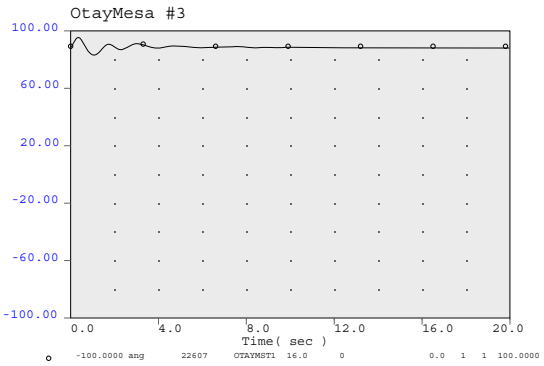
RELATIVE ROTOR ANGLE & FREQUENCY

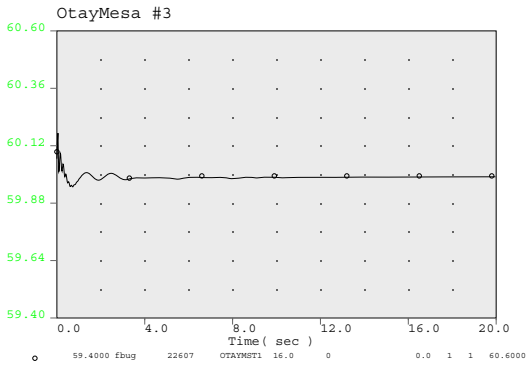












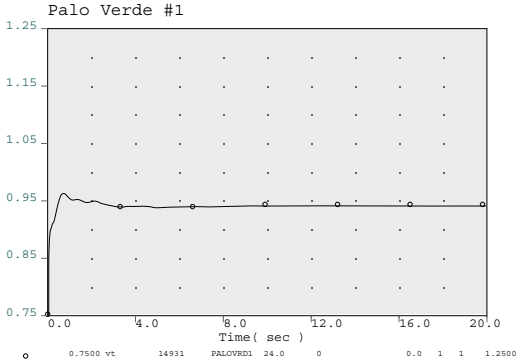
C1 C2 Light Load Pre Without Upgrades

Page 1

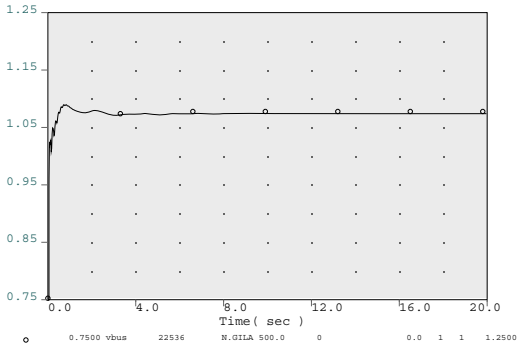
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_HDWSH-NGila-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:52:34 2011

RELATIVE VOLTAGE

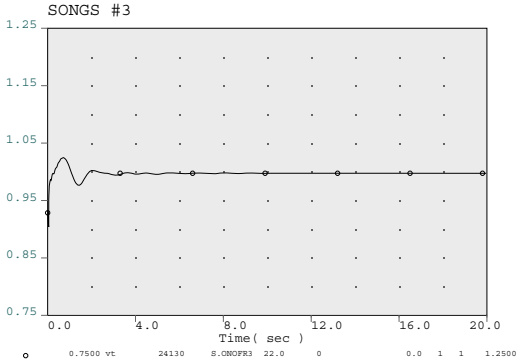
Palo Verde #1



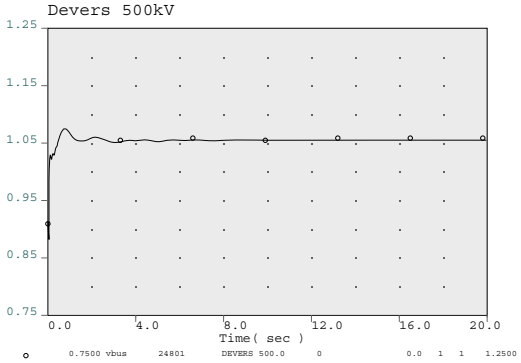
N Gila 500kV



SONGS #3



Devers 500kV



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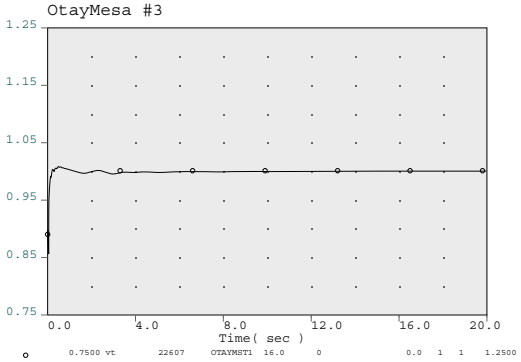
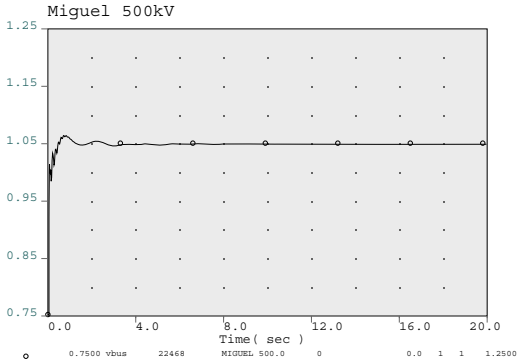


Miguel 500kV



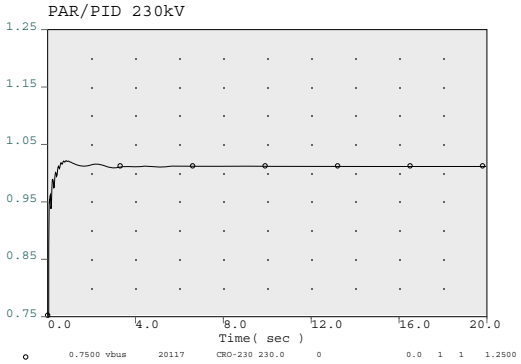
C1 C2 Light Load Pre Without Upgrades

Page 2

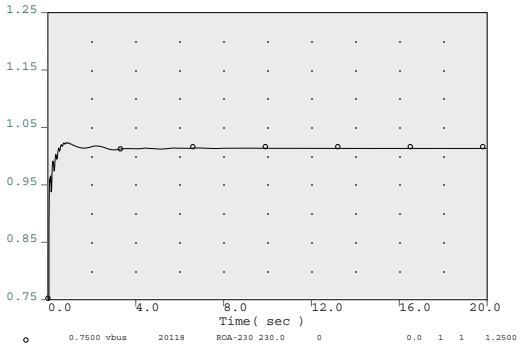
SDGE	tran-c1c2-ll-pre-r12_HDWSH-NGila-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:52:34 2011

Affected System Voltage Check and Comparison

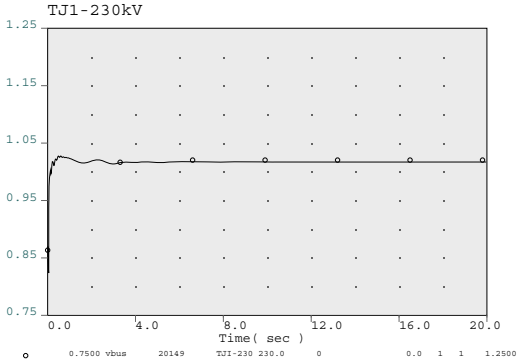
PAR/PID 230kV



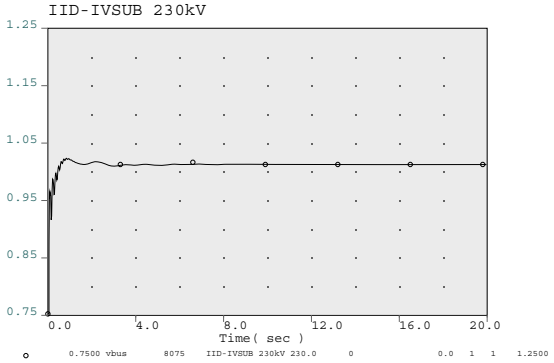
ROA-230kV



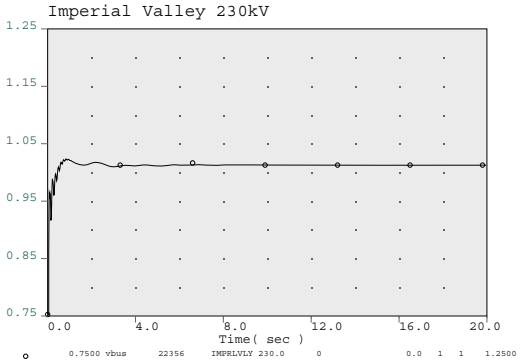
TJ1-230kV



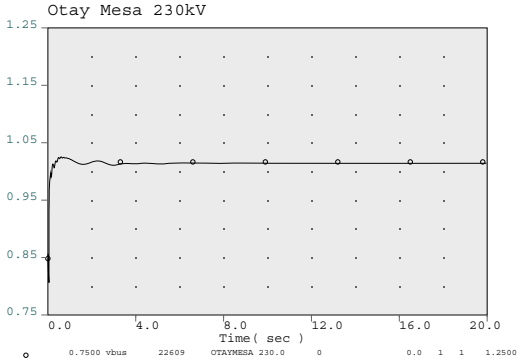
IID-IVSUB 230kV



Imperial Valley 230kV



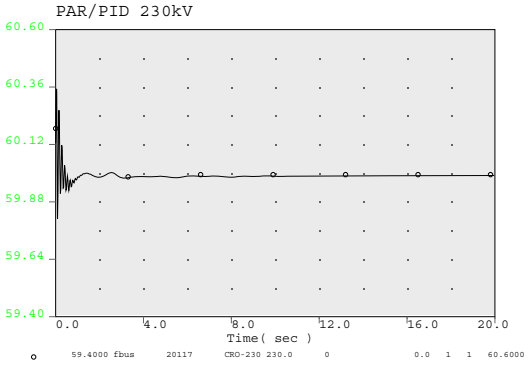
Otay Mesa 230kV



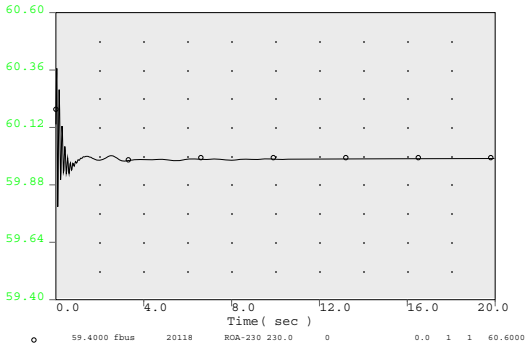
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

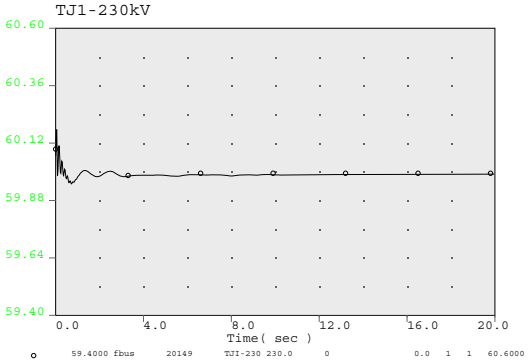
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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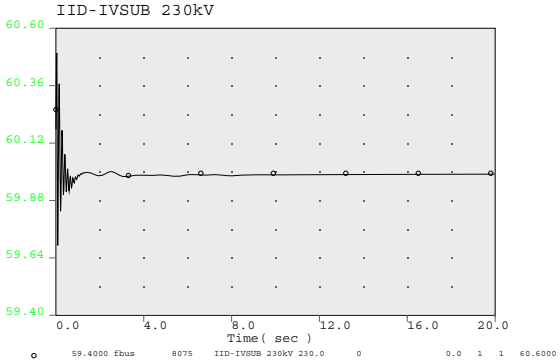
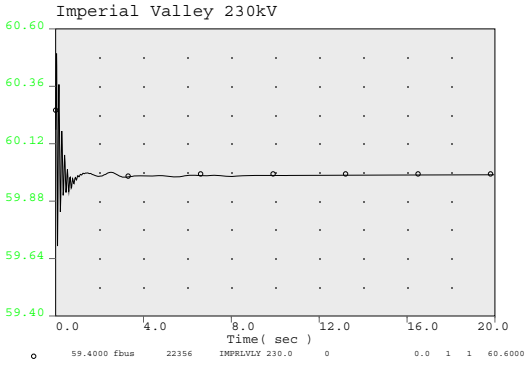
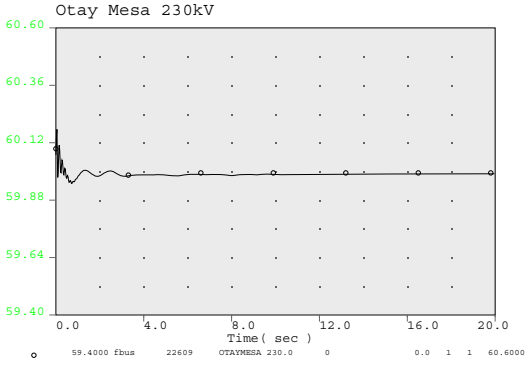


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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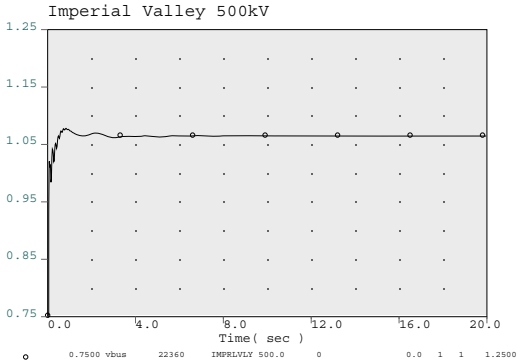
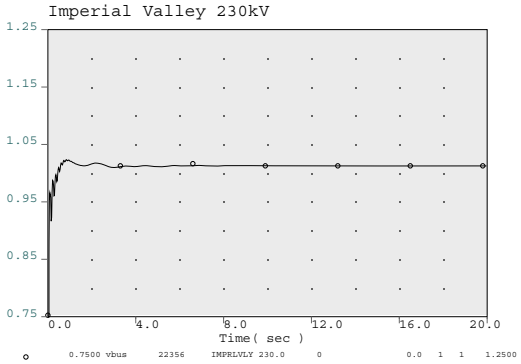
SDGE	tran-c1c2-ll-pre-r12_HDWSH-NGila-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:52:36 2011

VOLTAGE

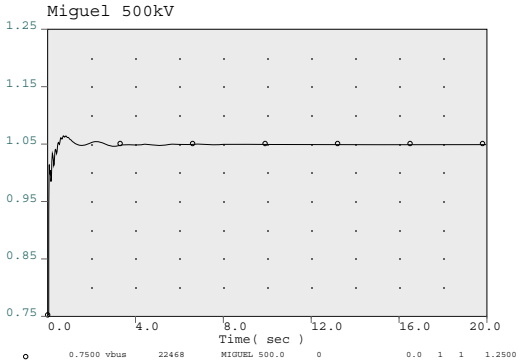
Imperial Valley 500kV



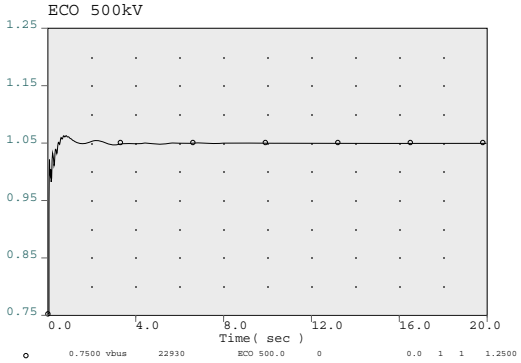
Imperial Valley 230kV



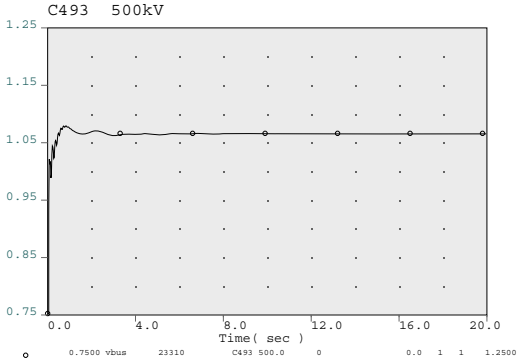
Miguel 500kV



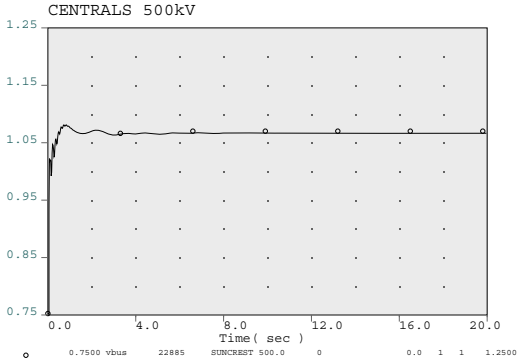
ECO 500kV



C493 500kV



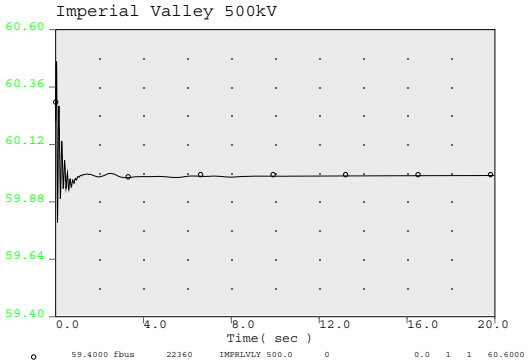
CENTRALS 500kV



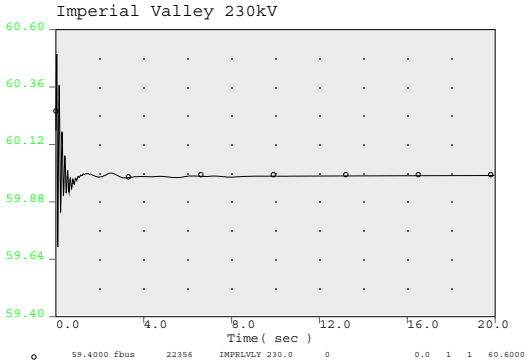
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

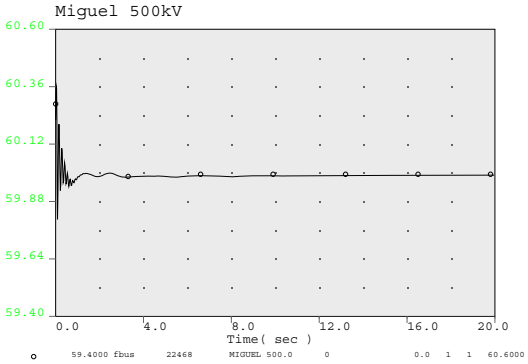
Imperial Valley 500kV



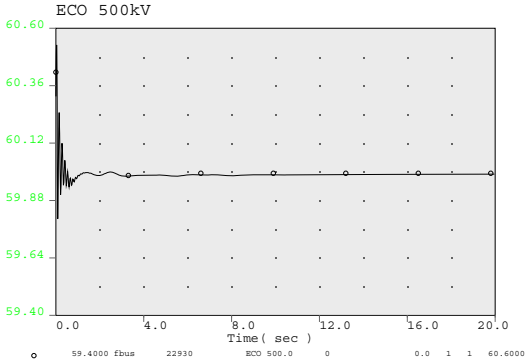
Imperial Valley 230kV



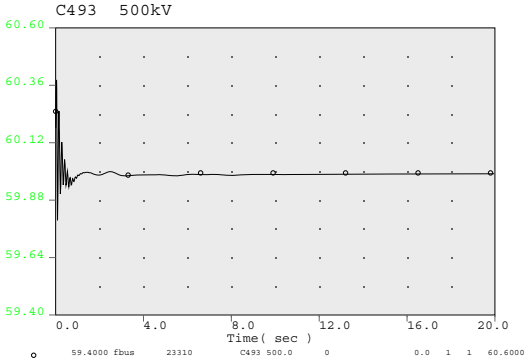
Miguel 500kV



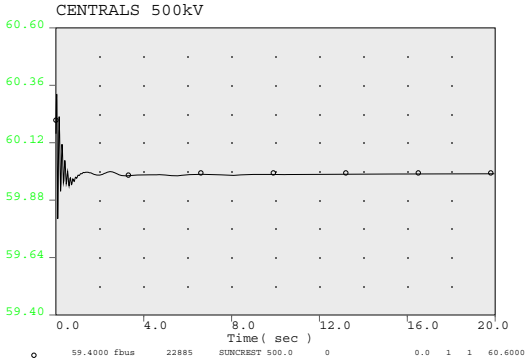
ECO 500kV



C493 500kV

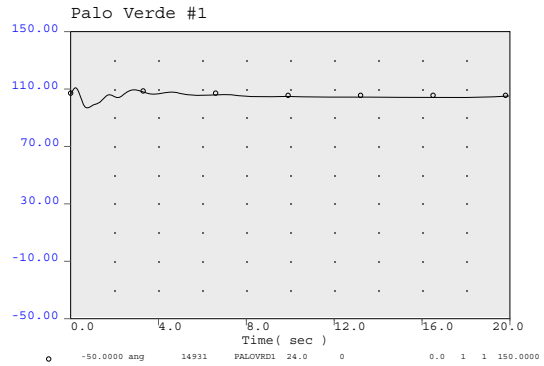


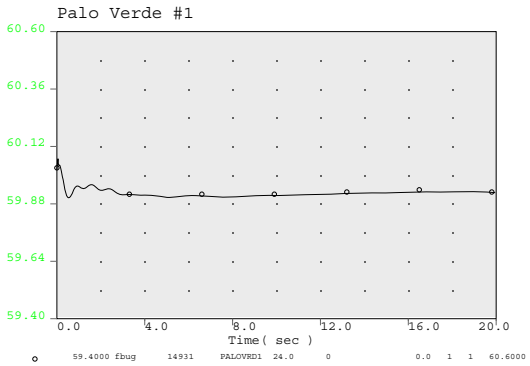
CENTRALS 500kV

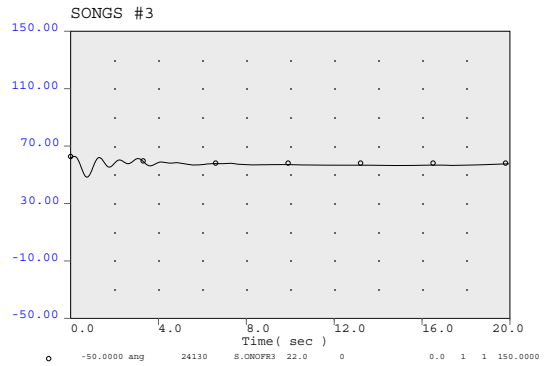


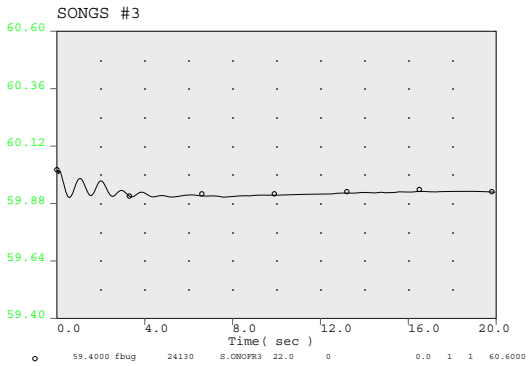
C1 C2 Light Load Pre Without Upgrades

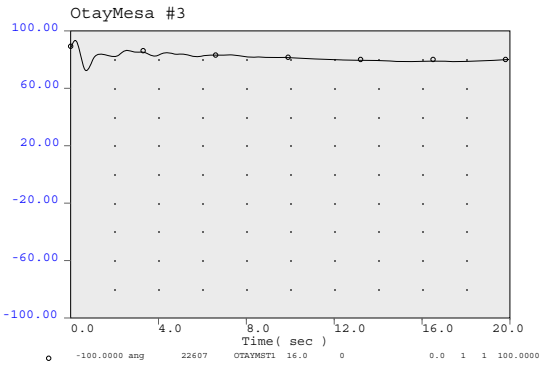
RELATIVE ROTOR ANGLE & FREQUENCY

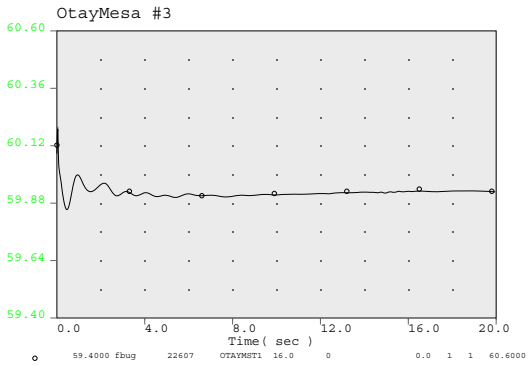












C1 C2 Light Load Pre Without Upgrades

Page 1

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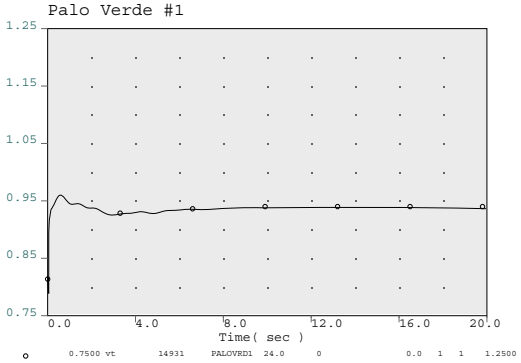
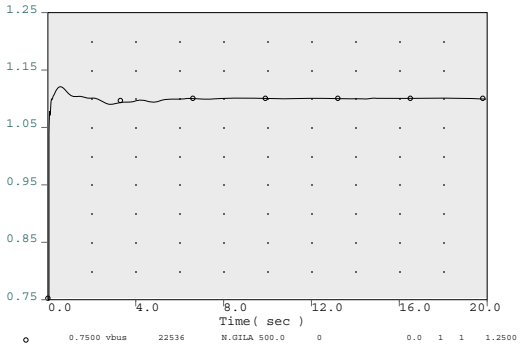
RELATIVE VOLTAGE

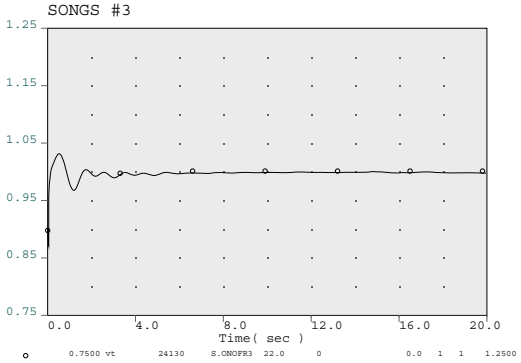
Palo Verde #1



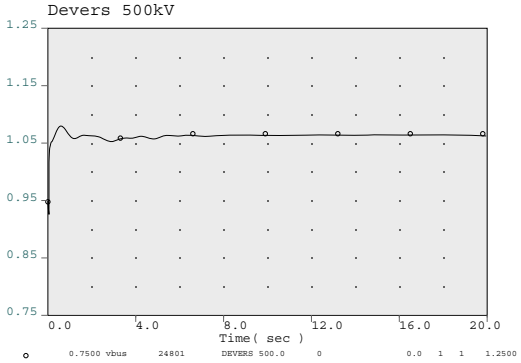
N Gila 500kV



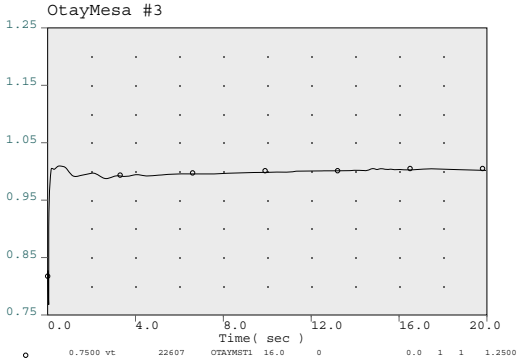
SONGS #3



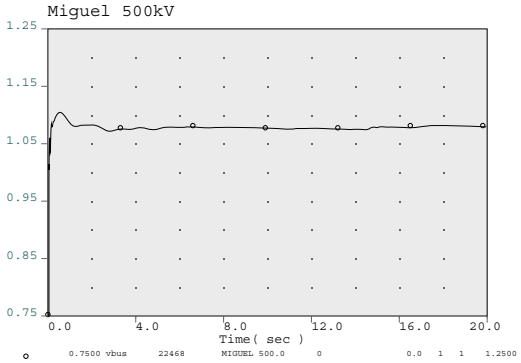
Devers 500kV



OtayMesa #3



Miguel 500kV



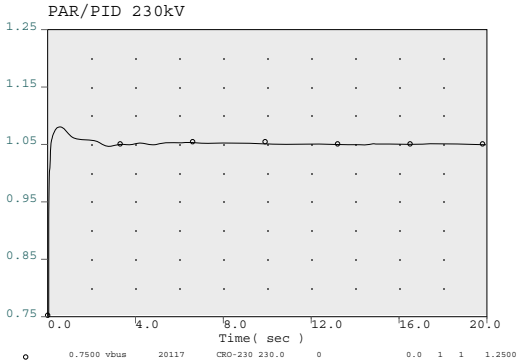
C1 C2 Light Load Pre Without Upgrades

Page 2

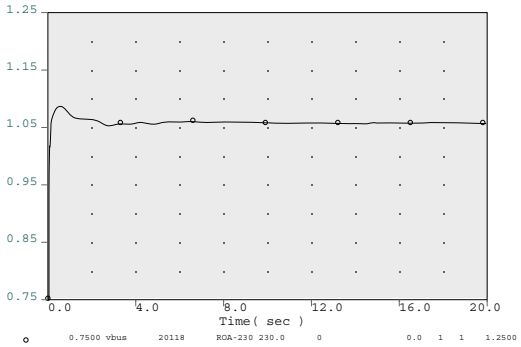
SDGE	tran-c1c2-ll-pre-r12_IV-C493-slo.chf	perl-projects\c1c2\ll\pre Thu Aug 11 11:34:03 2011

Affected System Voltage Check and Comparison

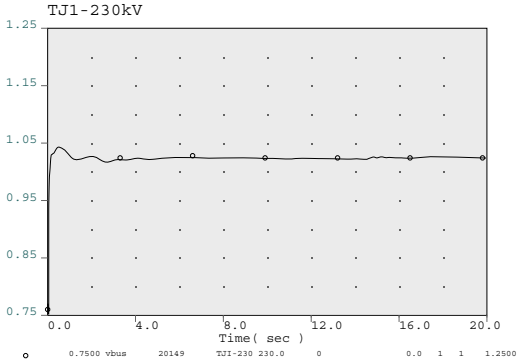
PAR/PID 230kV



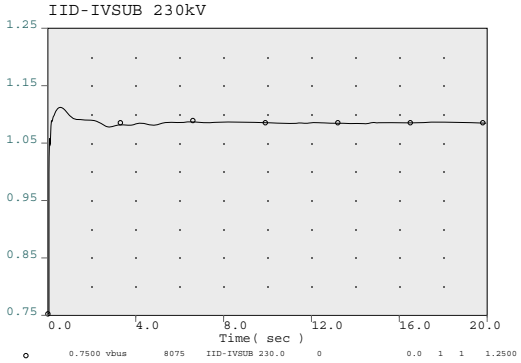
ROA-230kV



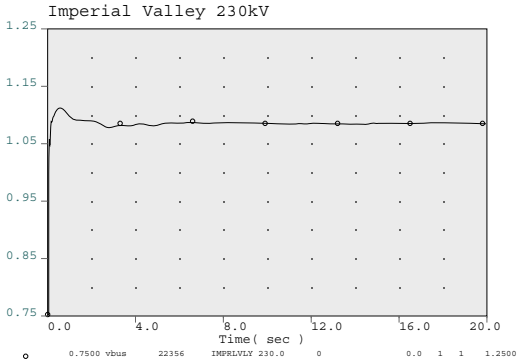
TJ1-230kV



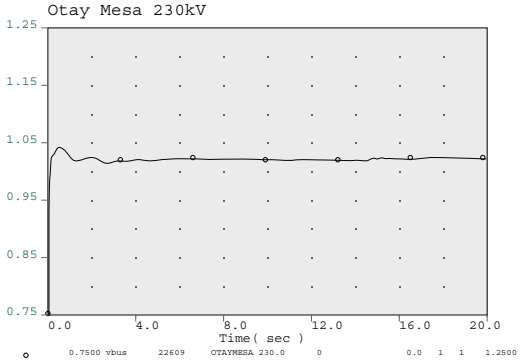
IID-IVSUB 230kV



Imperial Valley 230kV



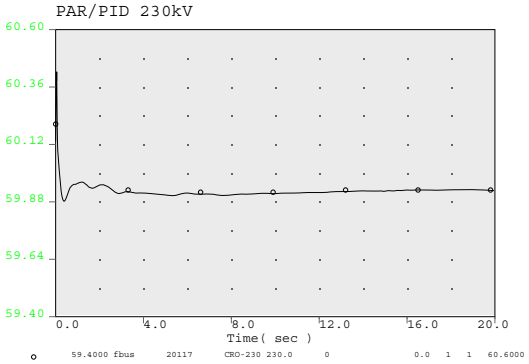
Otay Mesa 230kV



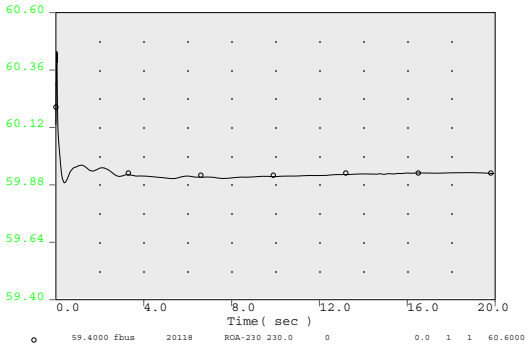
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

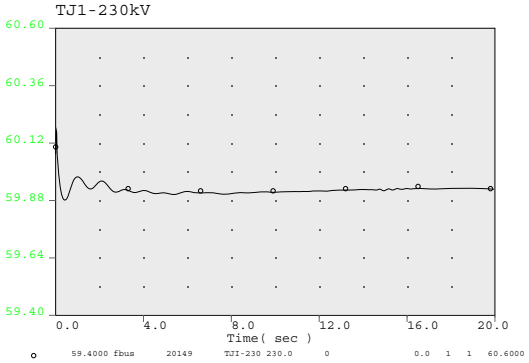
PAR/PID 230kV



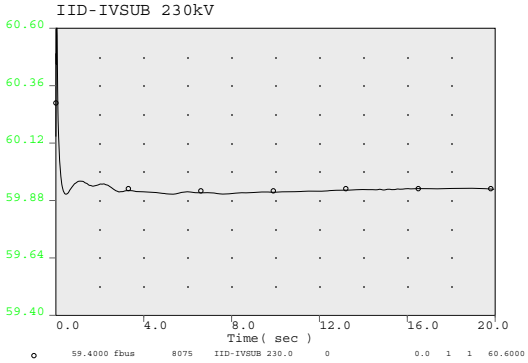
ROA-230kV



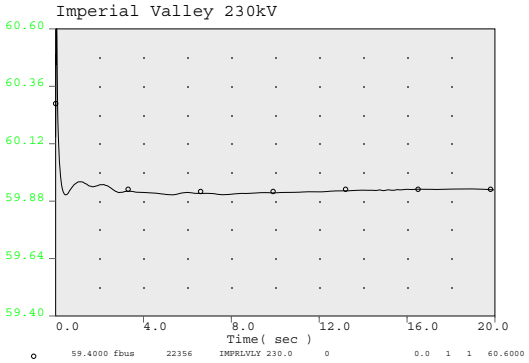
TJ1-230kV



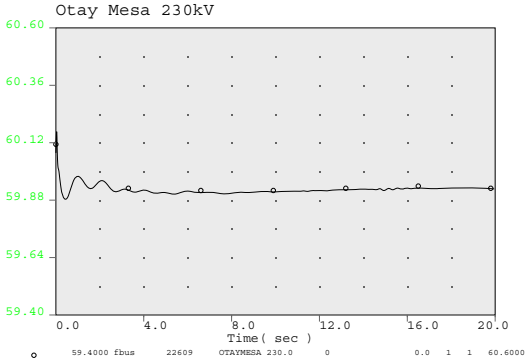
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 4

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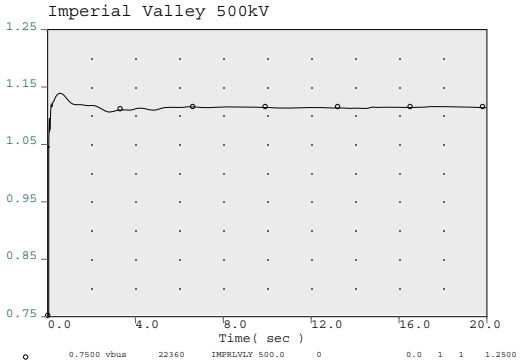
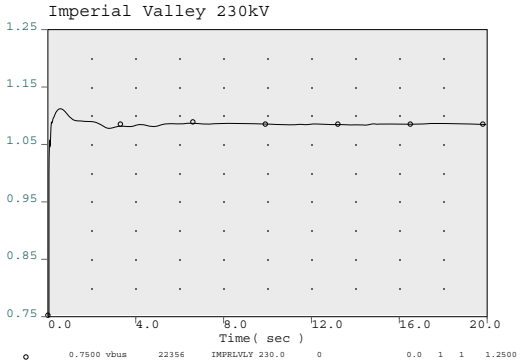
VOLTAGE

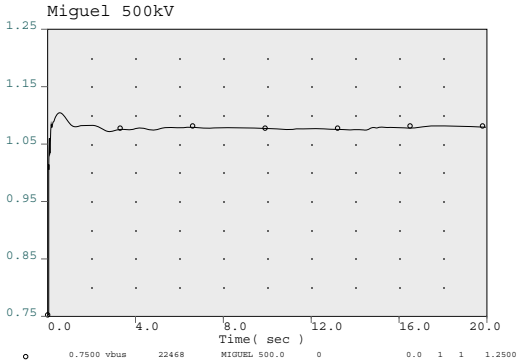
Imperial Valley 500kV



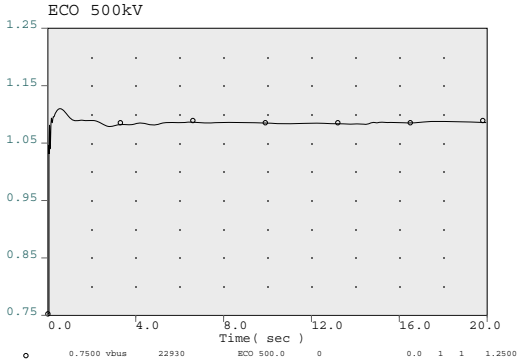
Imperial Valley 230kV



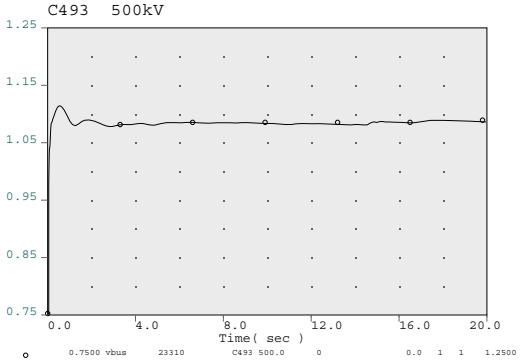
Miguel 500kV



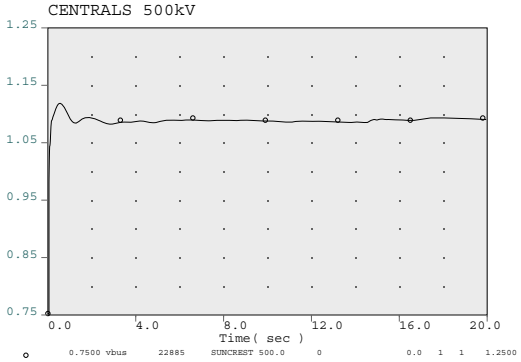
ECO 500kV



C493 500kV



CENTRALS 500kV

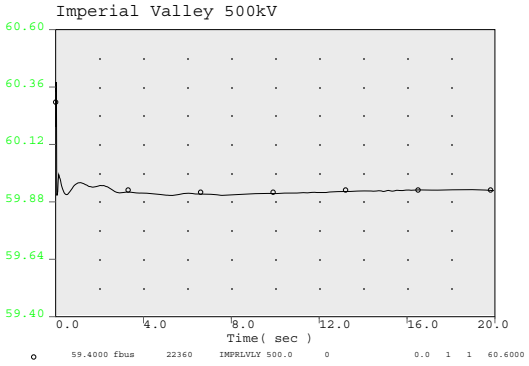


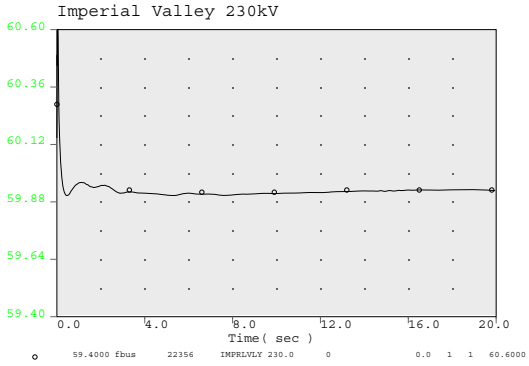
C1 C2 Light Load Pre Without Upgrades

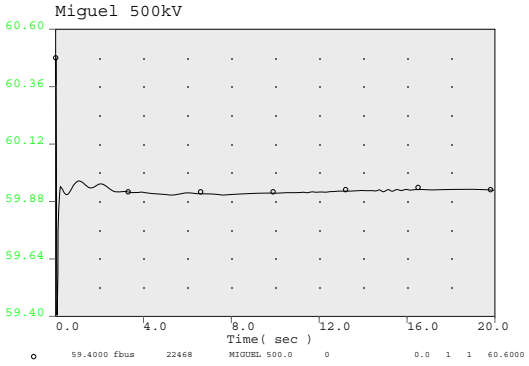
Page 5

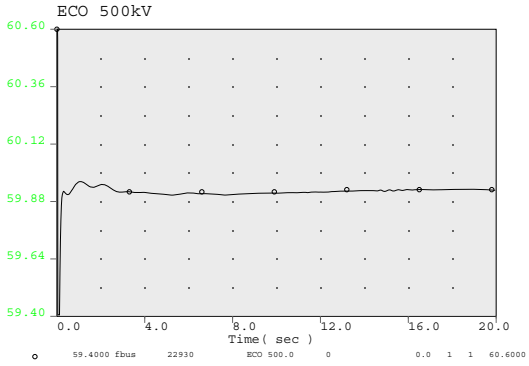
SDGE	tran-c1c2-ll-pre-r12_IV-C493-slo.chf	perl-projects\c1c2\ll\pre Thu Aug 11 11:34:03 2011

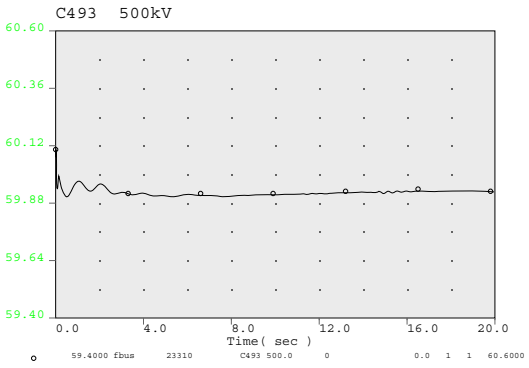
Frequency

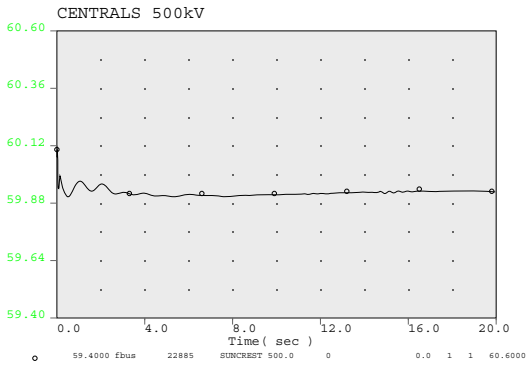










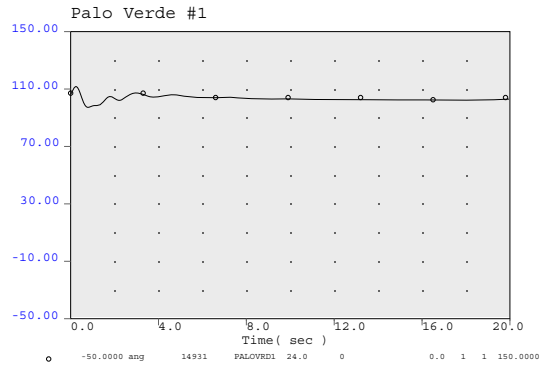


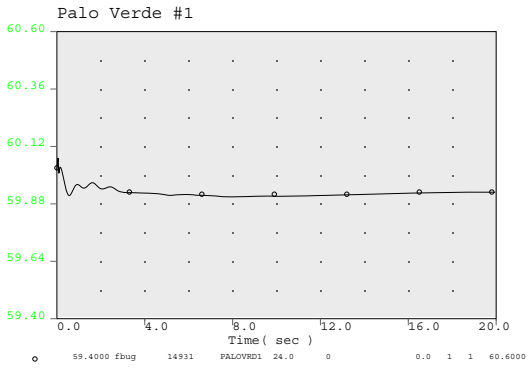
C1 C2 Light Load Pre Without Upgrades

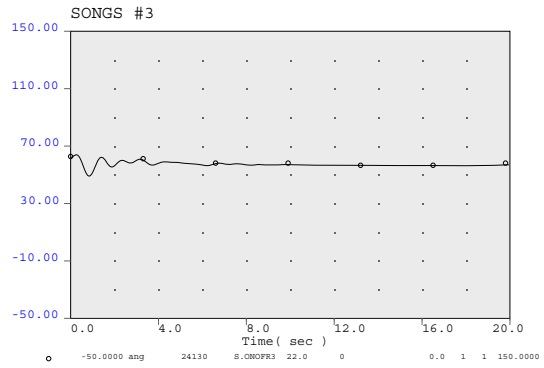
Page 6

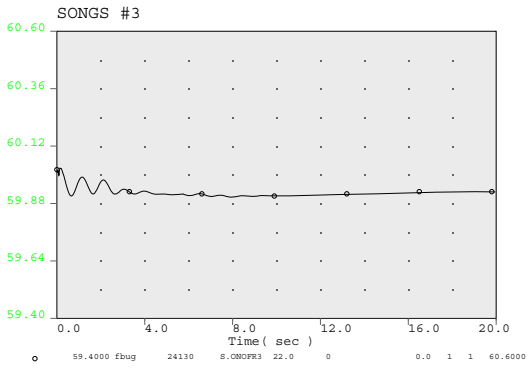
SDGE	tran-c1c2-ll-pre-r12_IV-C493-slo.chf	perl-projects\c1c2\ll\pre Thu Aug 11 11:34:03 2011

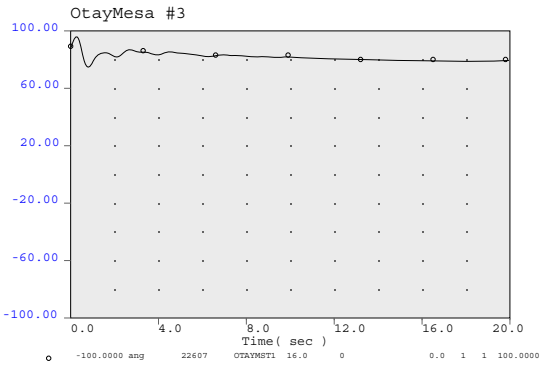
RELATIVE ROTOR ANGLE & FREQUENCY

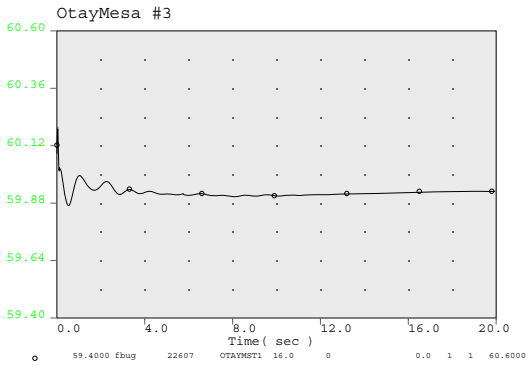












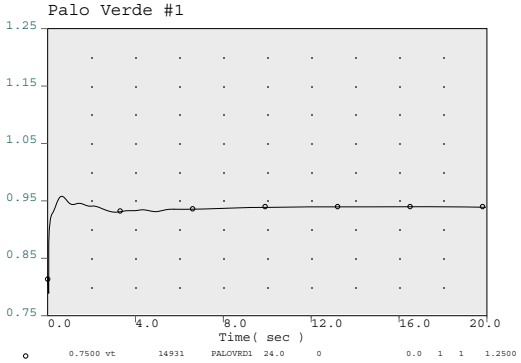
C1 C2 Light Load Pre Without Upgrades

Page 1

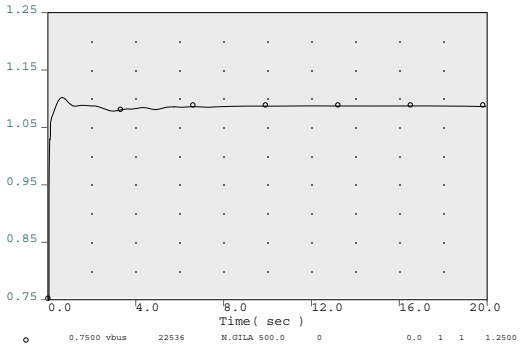
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-RAS-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:54:36 2011

RELATIVE VOLTAGE

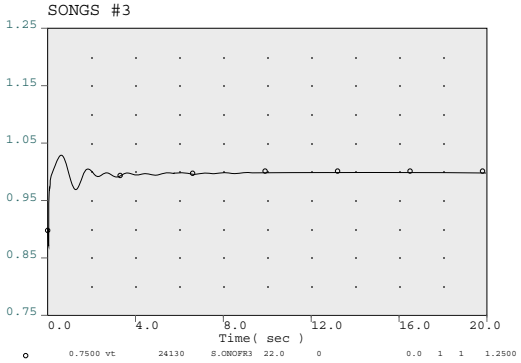
Palo Verde #1



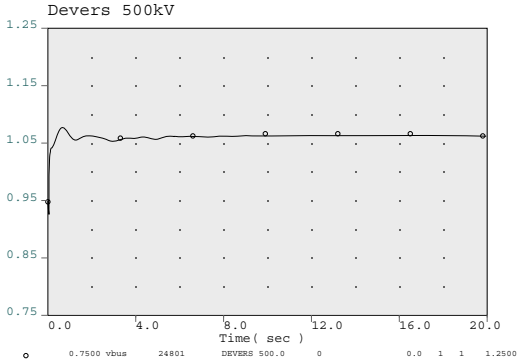
N Gila 500kV



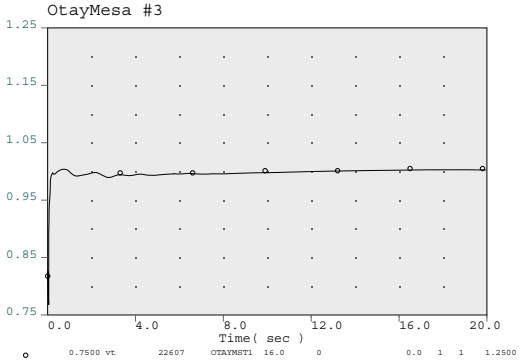
SONGS #3



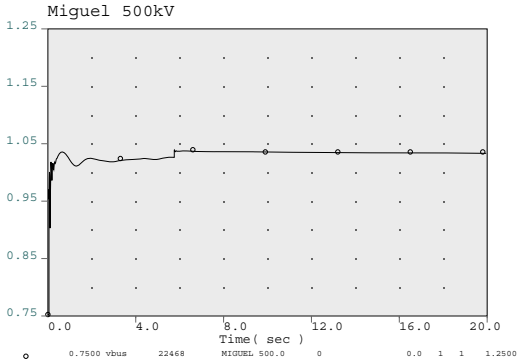
Devers 500kV



OtayMesa #3



Miguel 500kV



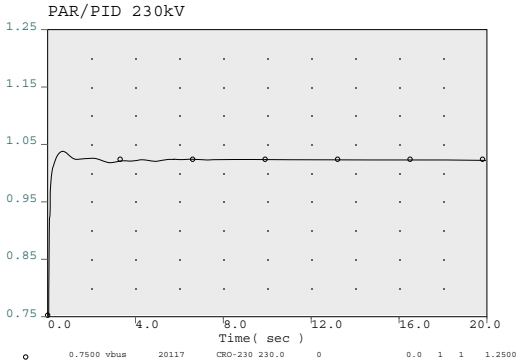
C1 C2 Light Load Pre Without Upgrades

Page 2

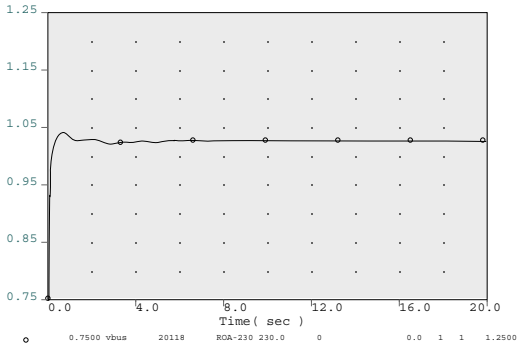
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-RAS-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:54:37 2011

Affected System Voltage Check and Comparison

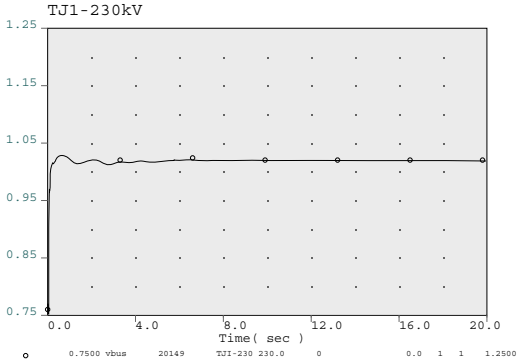
PAR/PID 230kV



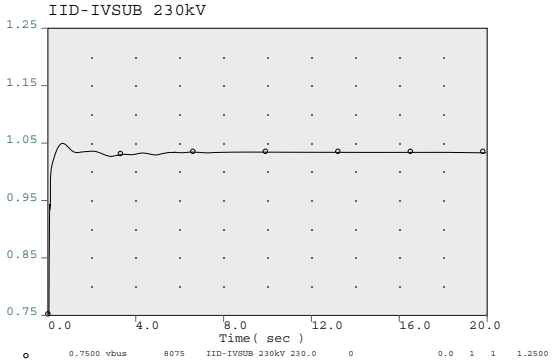
ROA-230kV



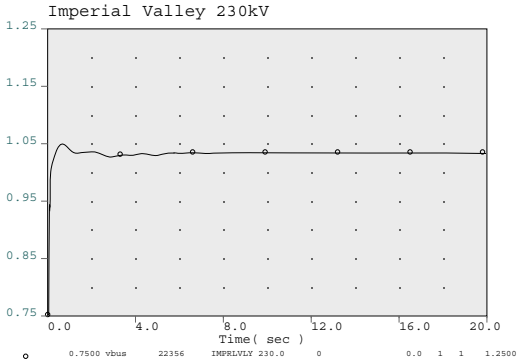
TJ1-230kV



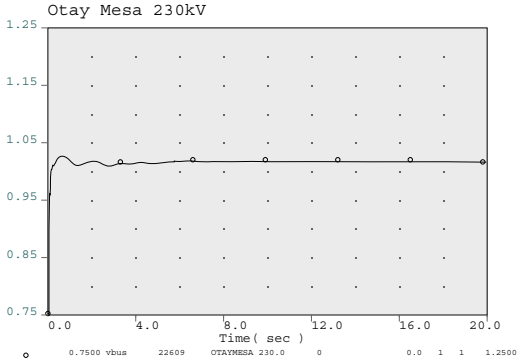
IID-IVSUB 230kV



Imperial Valley 230kV



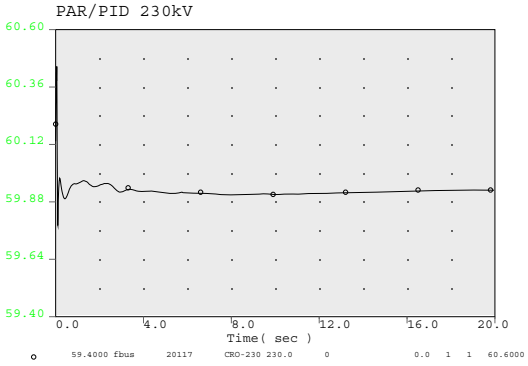
Otay Mesa 230kV



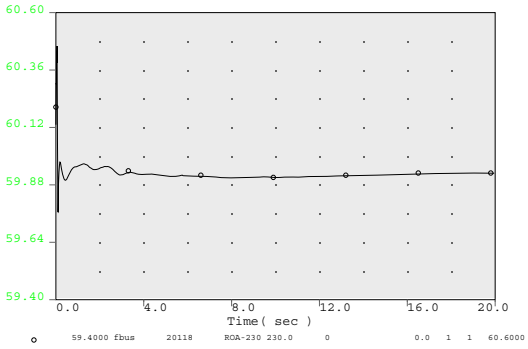
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

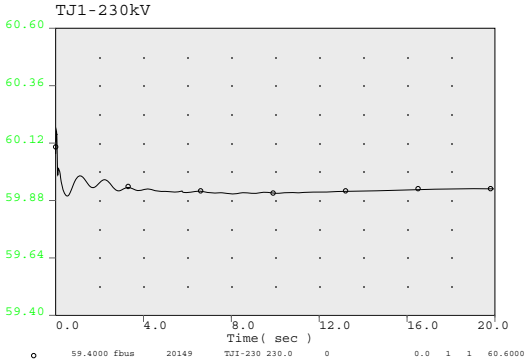
PAR/PID 230kV



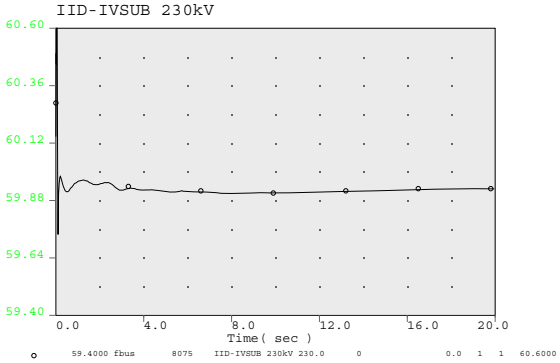
ROA-230kV



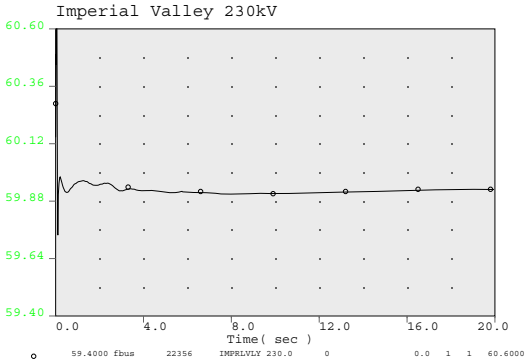
TJ1-230kV



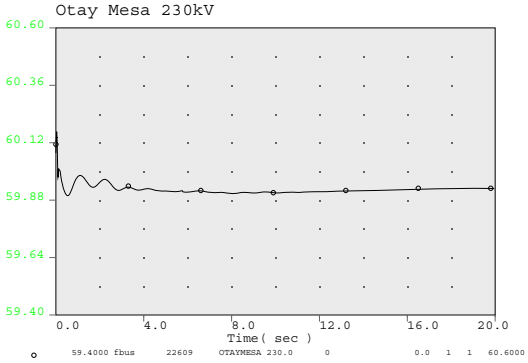
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



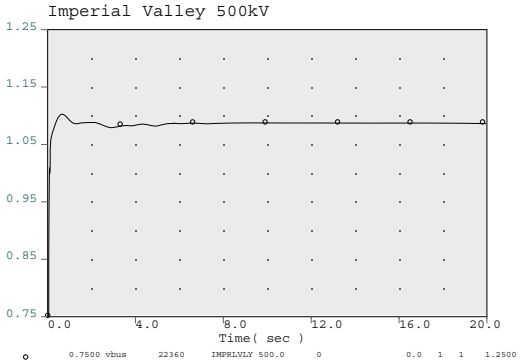
C1 C2 Light Load Pre Without Upgrades

Page 4

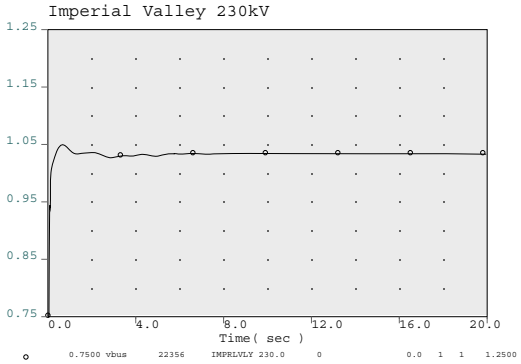
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-RAS-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:54:38 2011

VOLTAGE

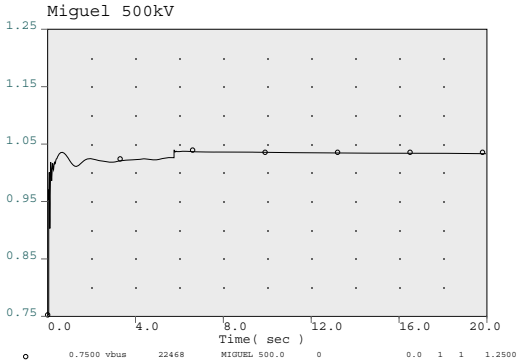
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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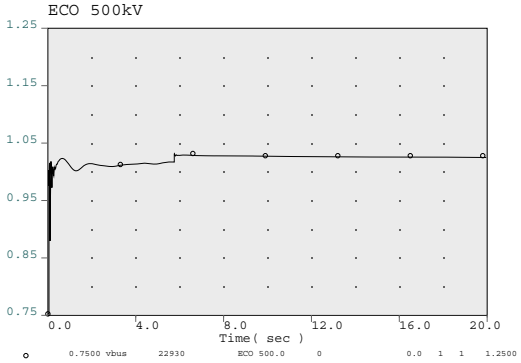
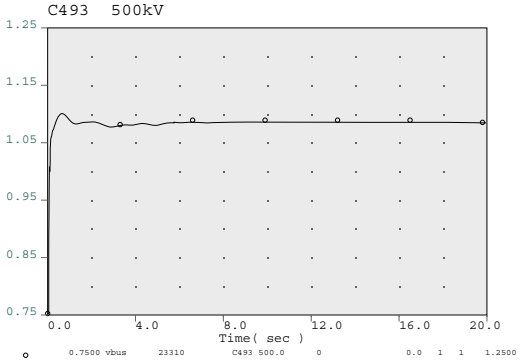
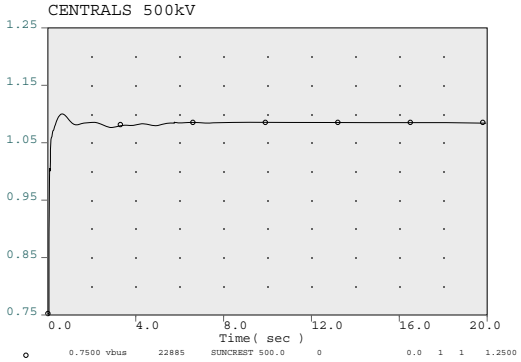


C493 500kV



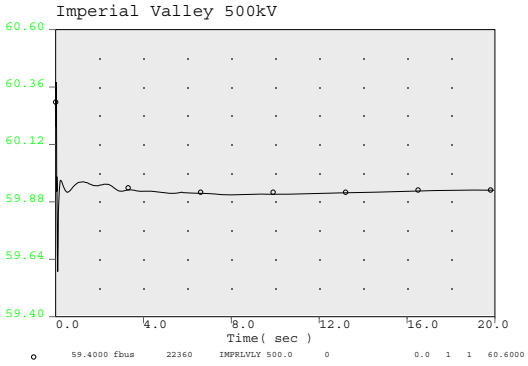
CENTRALS 500kV



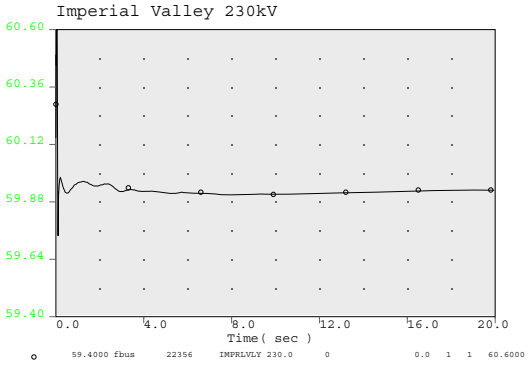
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

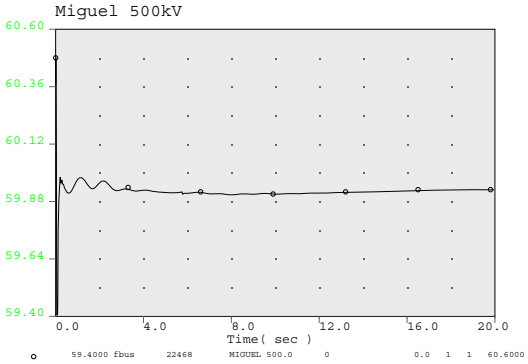
Imperial Valley 500kV



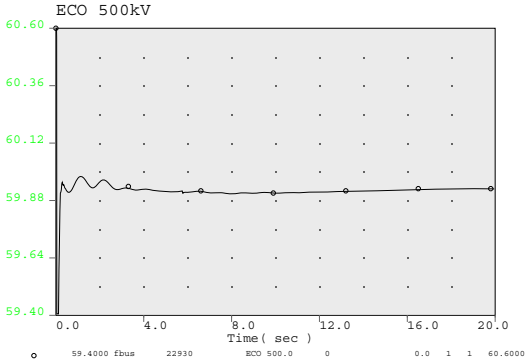
Imperial Valley 230kV



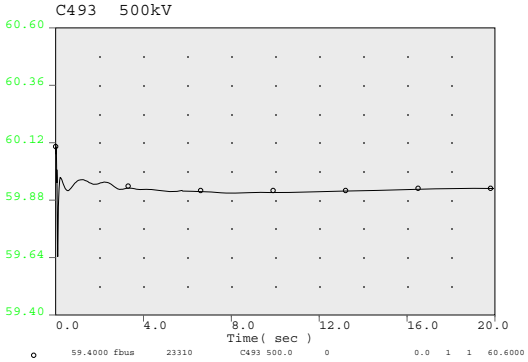
Miguel 500kV



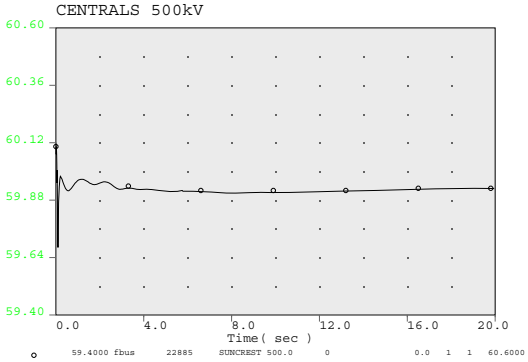
ECO 500kV



C493 500kV

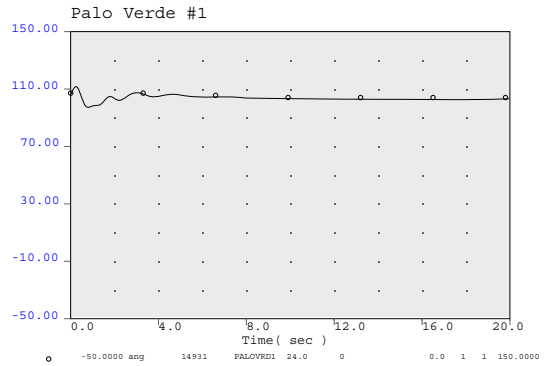


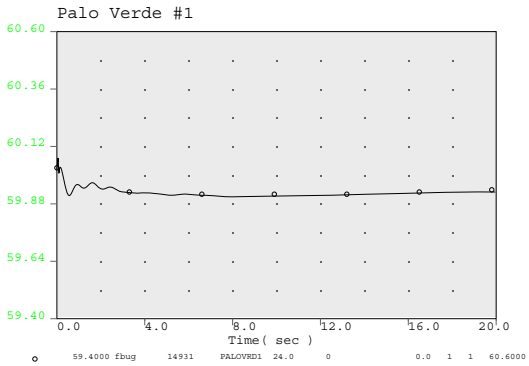
CENTRALS 500kV

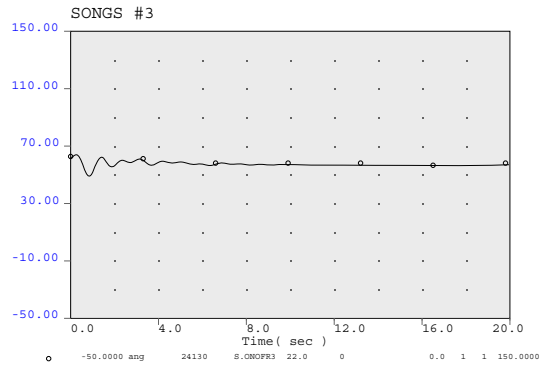


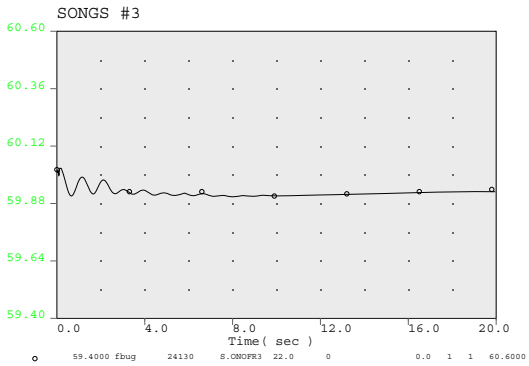
C1 C2 Light Load Pre Without Upgrades

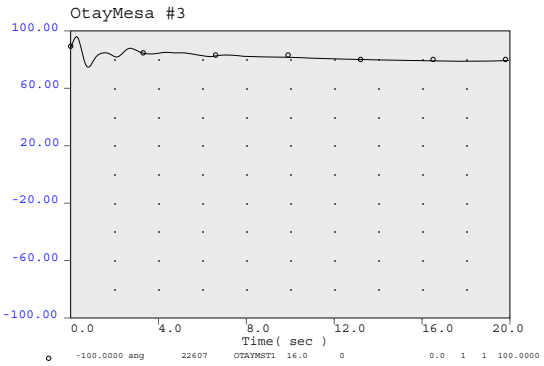
RELATIVE ROTOR ANGLE & FREQUENCY

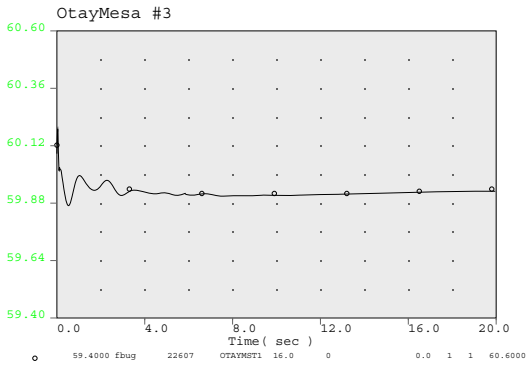












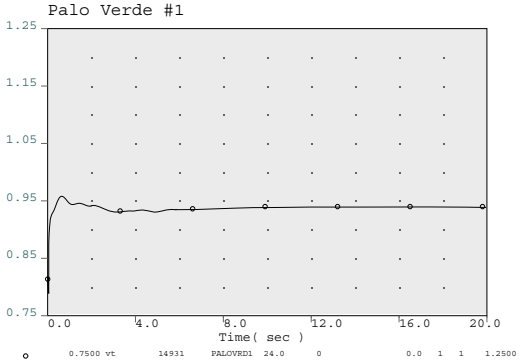
C1 C2 Light Load Pre Without Upgrades

Page 1

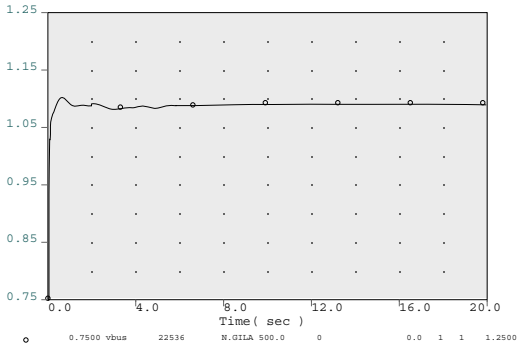
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_IVECO-RASX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:04:16 2011

RELATIVE VOLTAGE

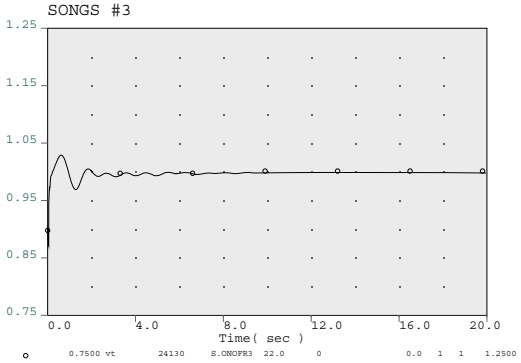
Palo Verde #1



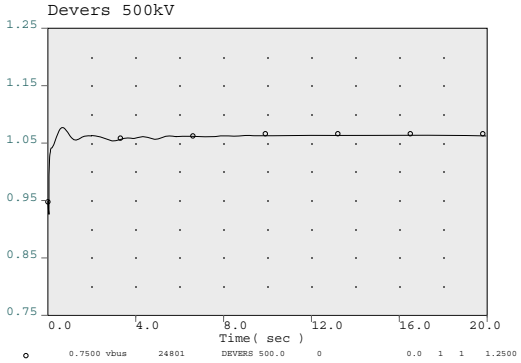
N Gila 500kV



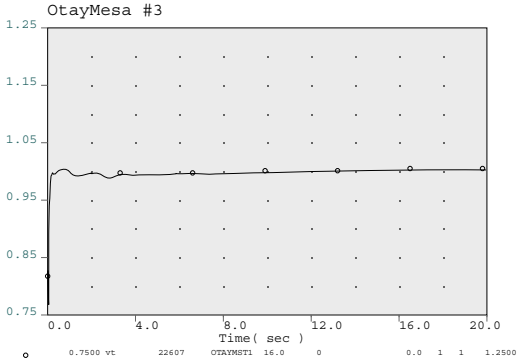
SONGS #3



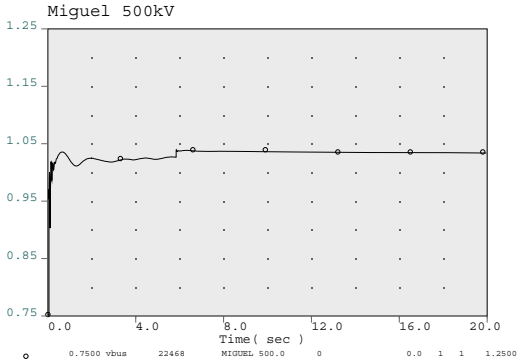
Devers 500kV



OtayMesa #3



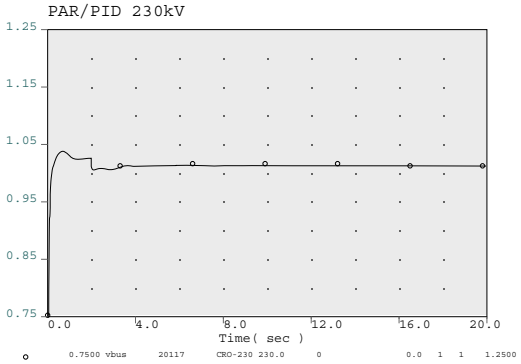
Miguel 500kV



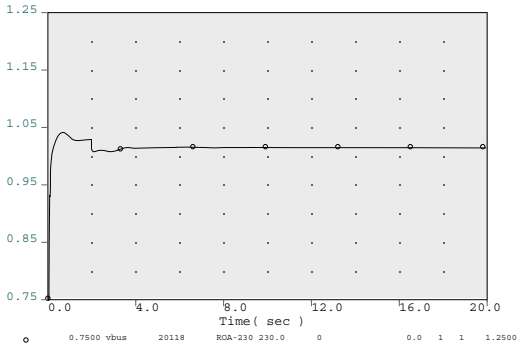
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

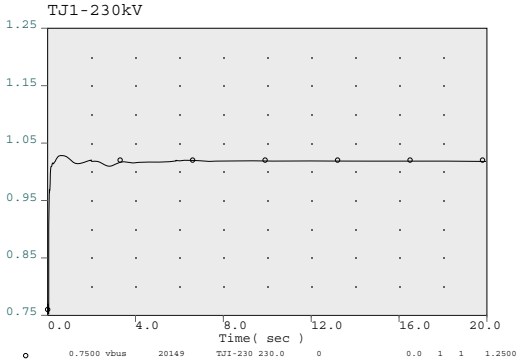
PAR/PID 230kV



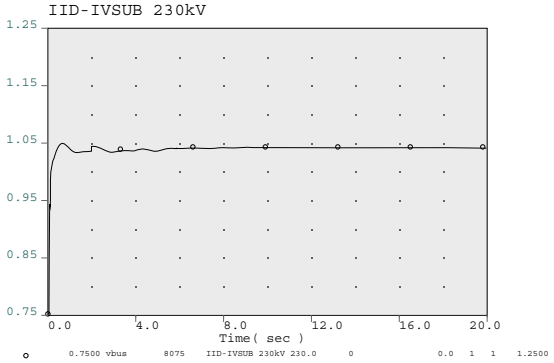
ROA-230kV



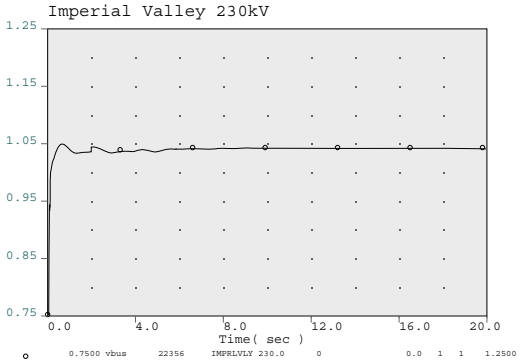
TJ1-230kV



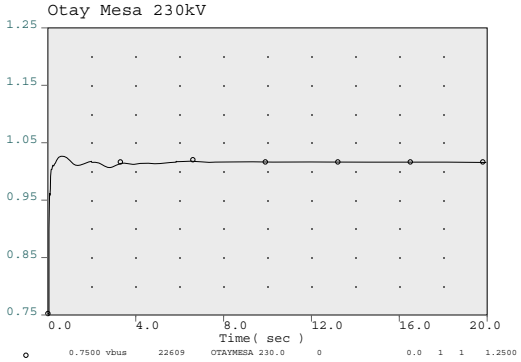
IID-IVSUB 230kV



Imperial Valley 230kV



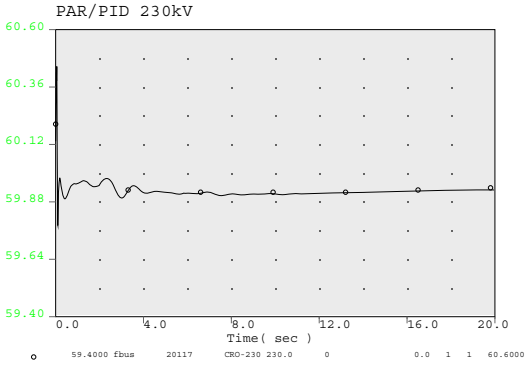
Otay Mesa 230kV



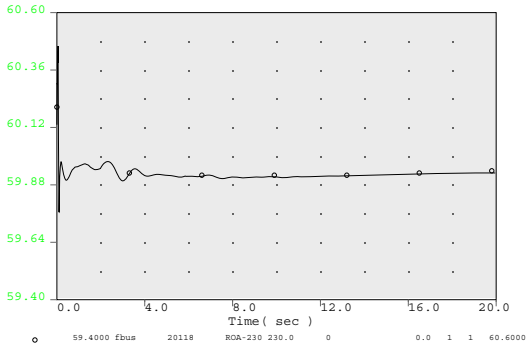
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

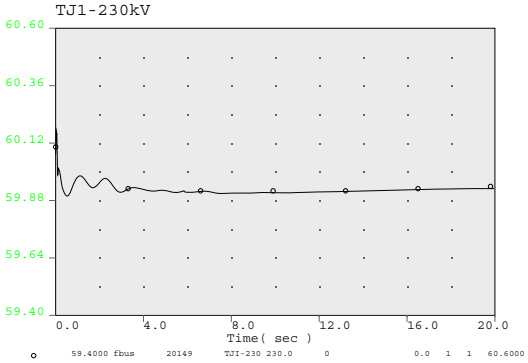
PAR/PID 230kV



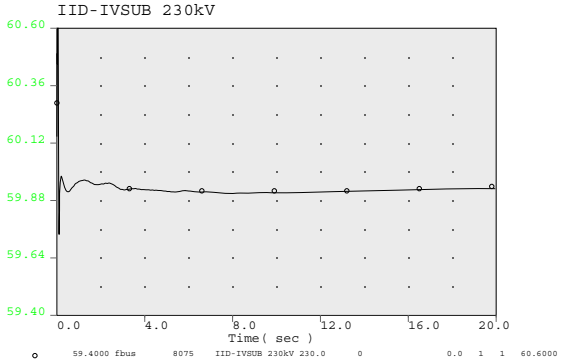
ROA-230kV



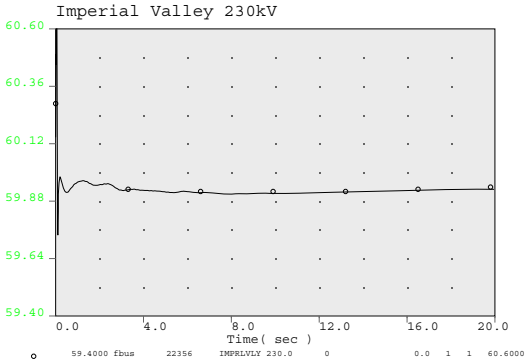
TJ1-230kV



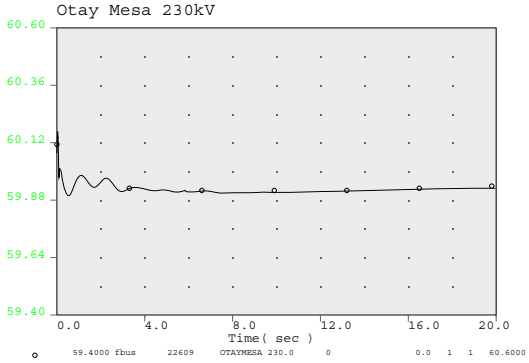
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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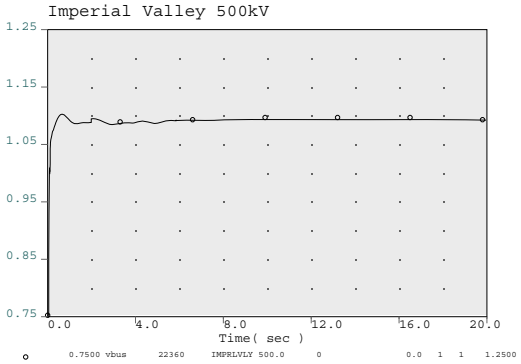
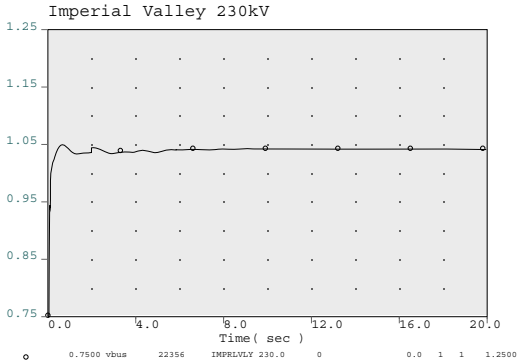
SDGE	tran-c1c2-ll-pre-r12_IVECO-RASX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:04:18 2011

VOLTAGE

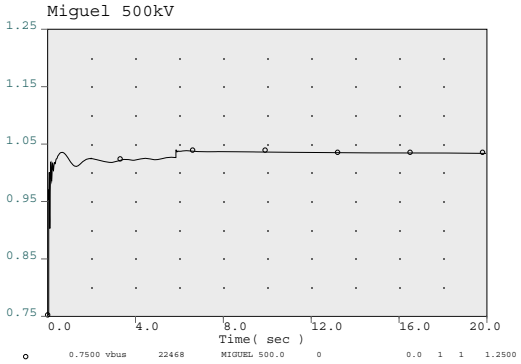
Imperial Valley 500kV



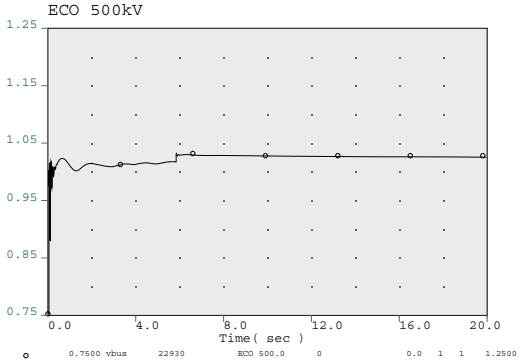
Imperial Valley 230kV



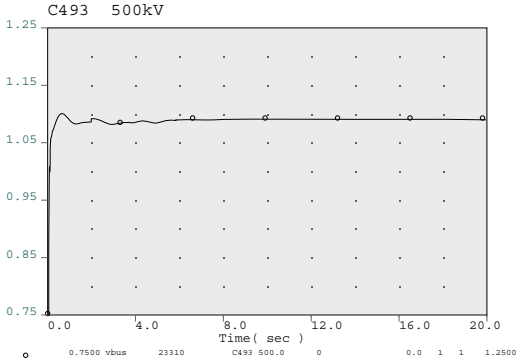
Miguel 500kV



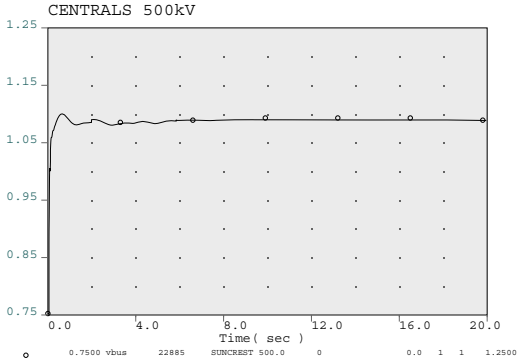
ECO 500kV



C493 500kV



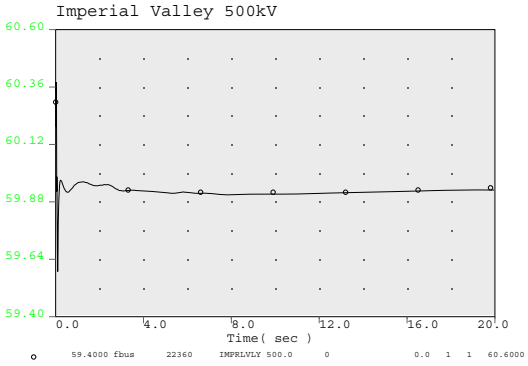
CENTRALS 500kV



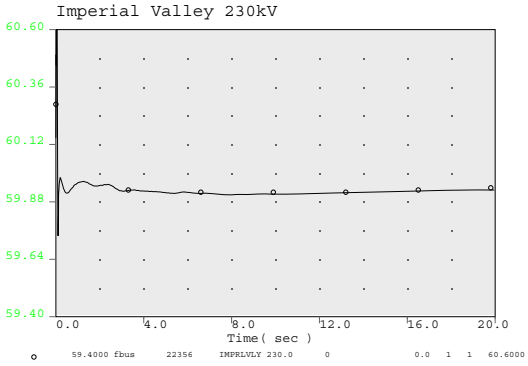
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

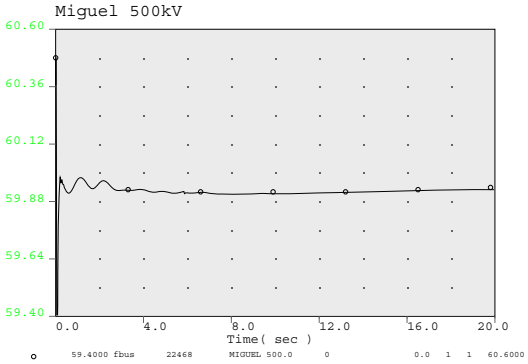
Imperial Valley 500kV



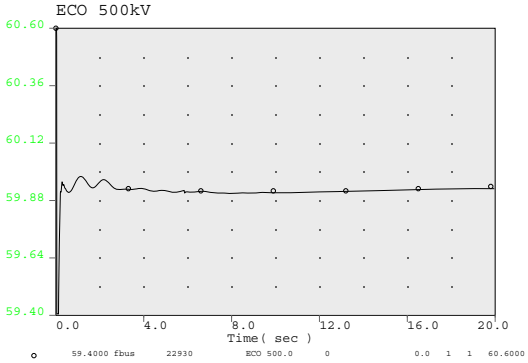
Imperial Valley 230kV



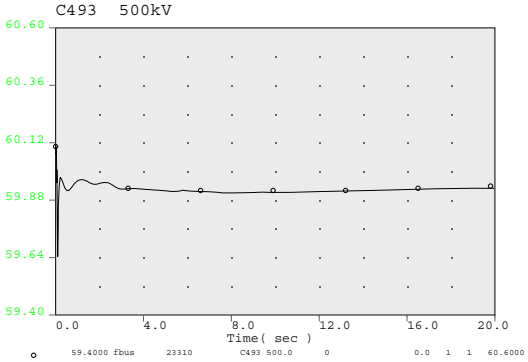
Miguel 500kV



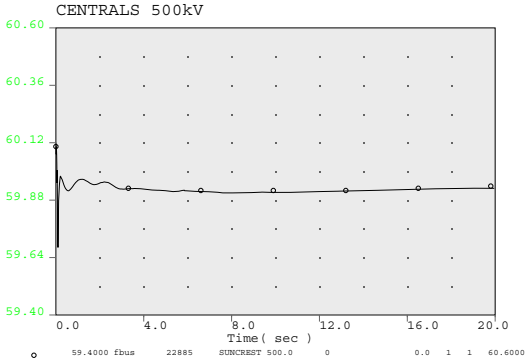
ECO 500kV



C493 500kV

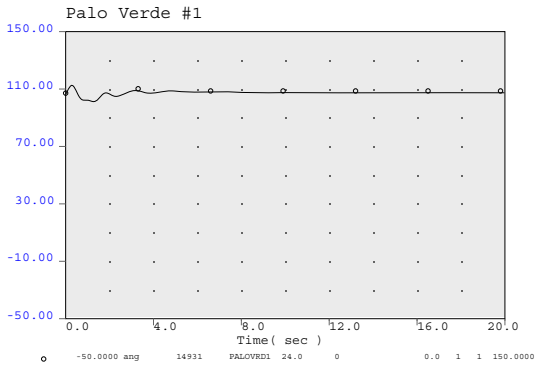


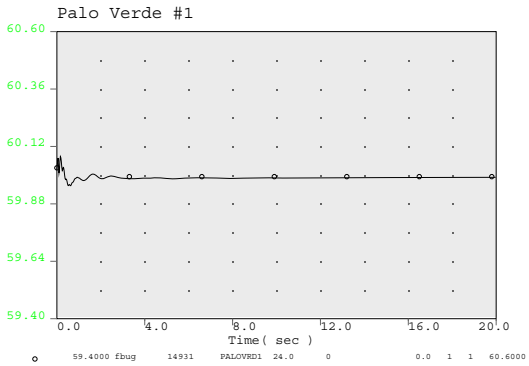
CENTRALS 500kV

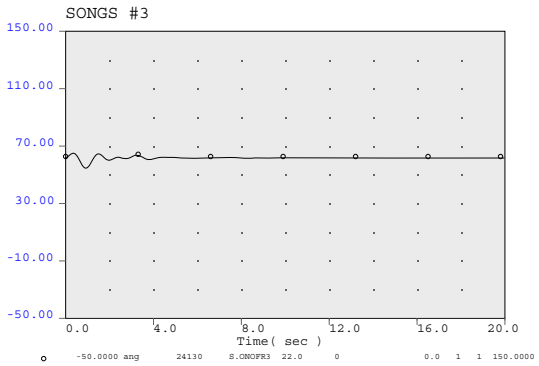


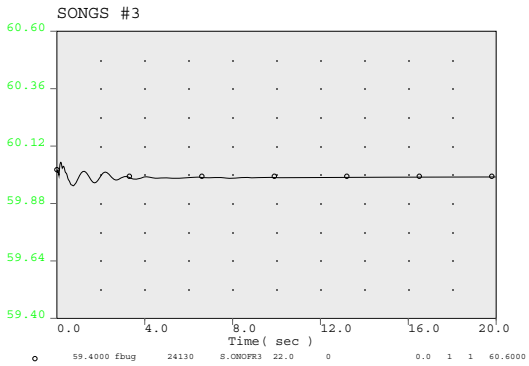
C1 C2 Light Load Pre Without Upgrades

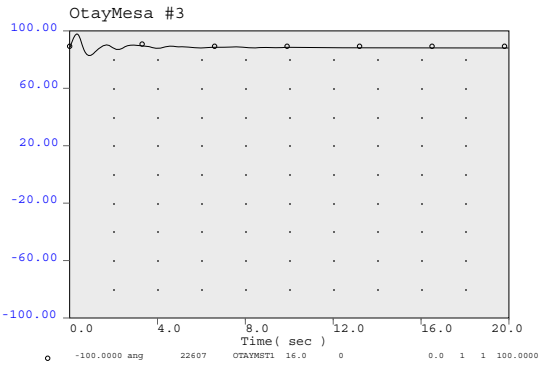
RELATIVE ROTOR ANGLE & FREQUENCY

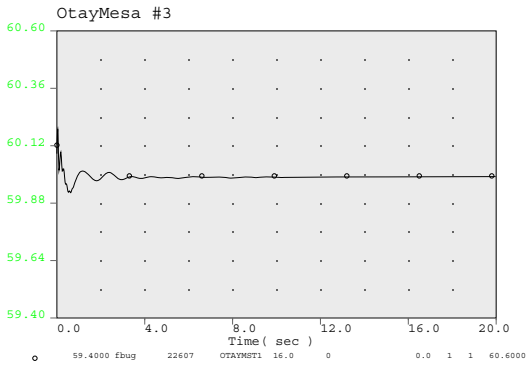












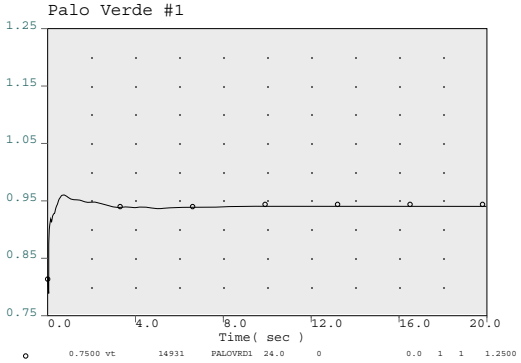
C1 C2 Light Load Pre Without Upgrades

Page 1

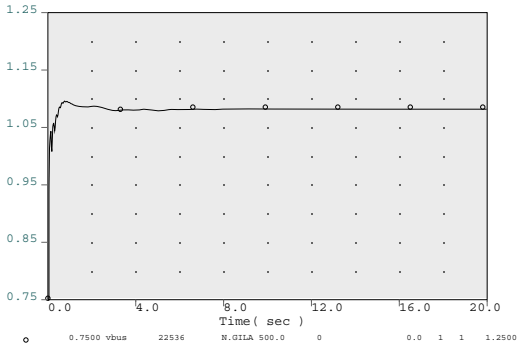
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:56:23 2011

RELATIVE VOLTAGE

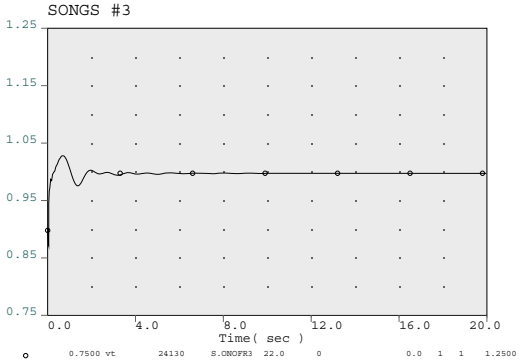
Palo Verde #1



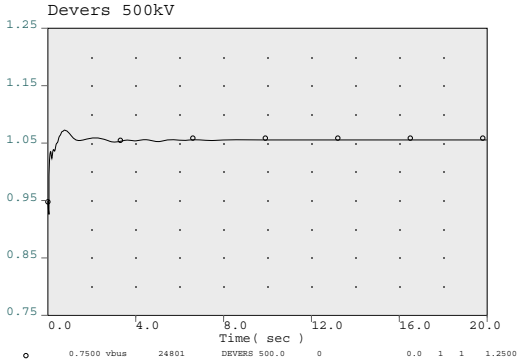
N Gila 500kV



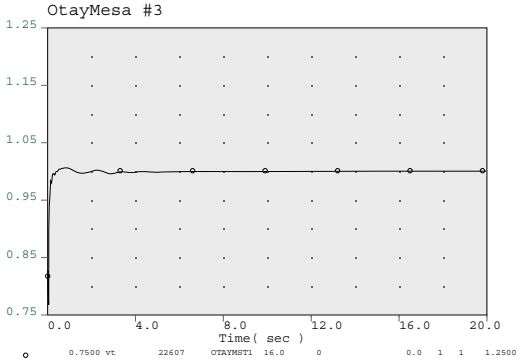
SONGS #3



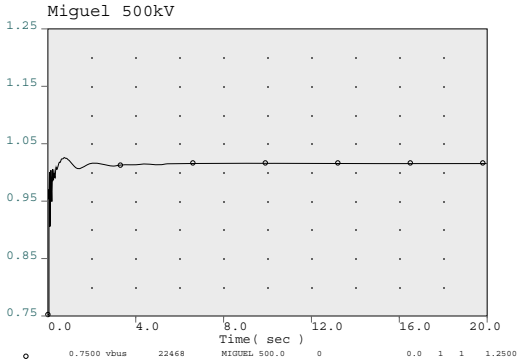
Devers 500kV



OtayMesa #3



Miguel 500kV



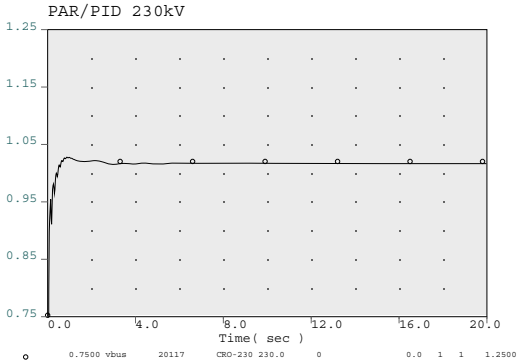
C1 C2 Light Load Pre Without Upgrades

Page 2

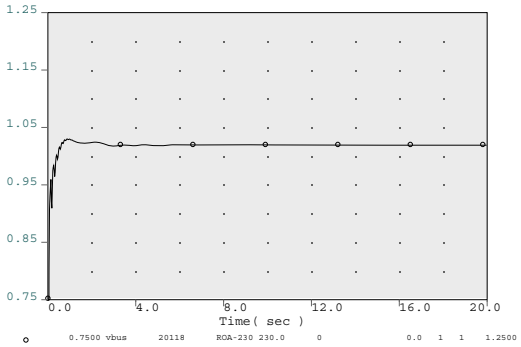
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:56:24 2011

Affected System Voltage Check and Comparison

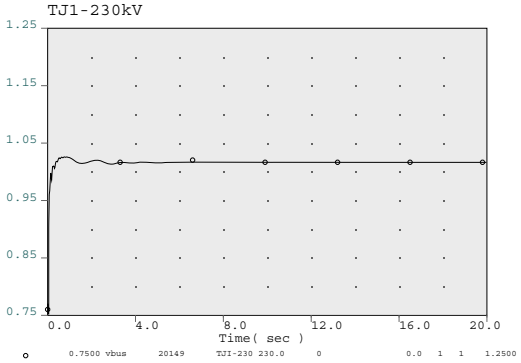
PAR/PID 230kV



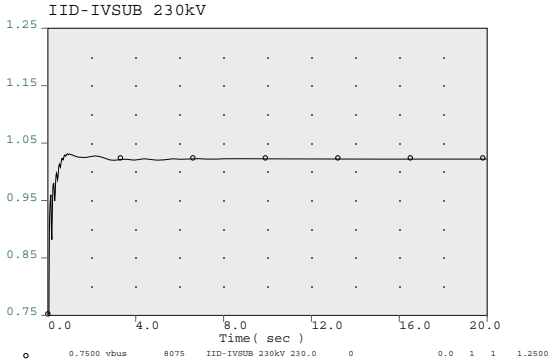
ROA-230kV



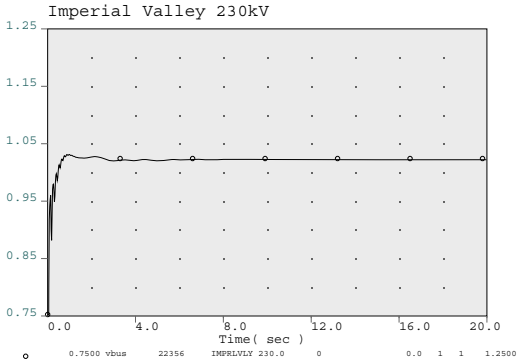
TJ1-230kV



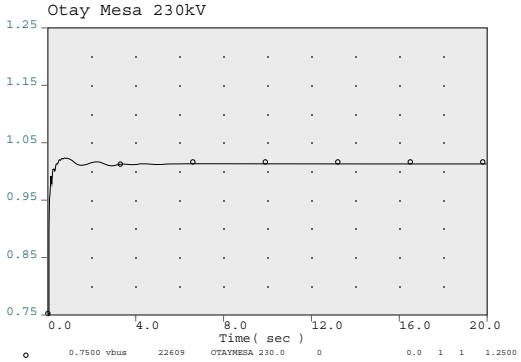
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



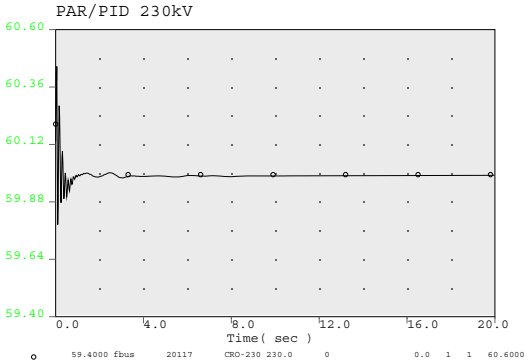
C1 C2 Light Load Pre Without Upgrades

Page 3

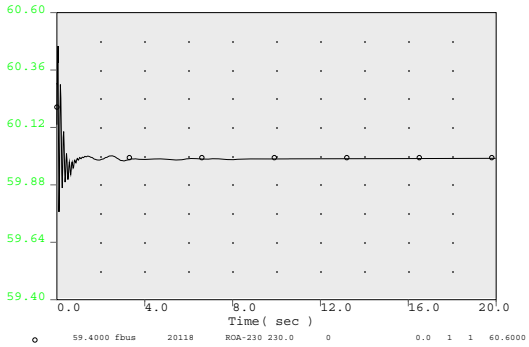
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:56:24 2011

Affected System Frequency Check and Comparison

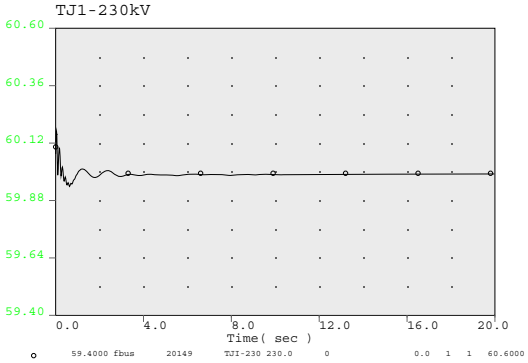
PAR/PID 230kV



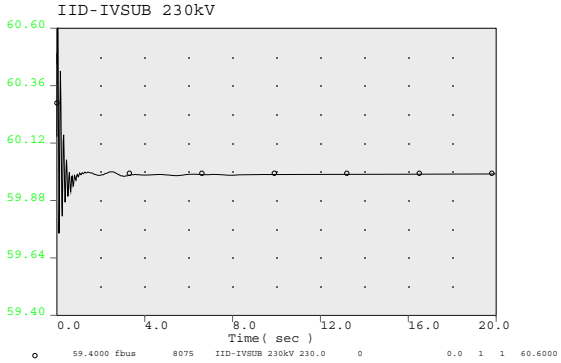
ROA-230kV



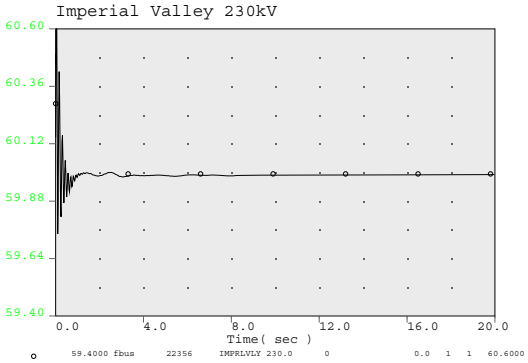
TJ1-230kV



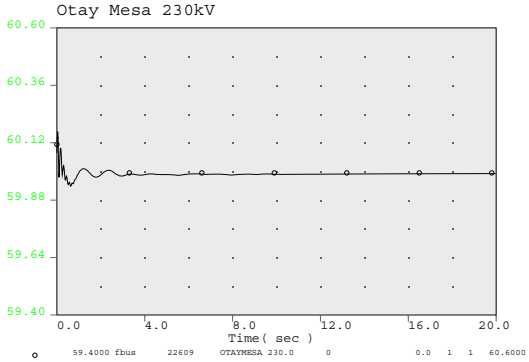
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



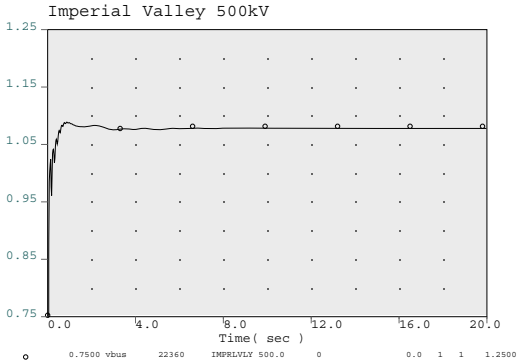
C1 C2 Light Load Pre Without Upgrades

Page 4

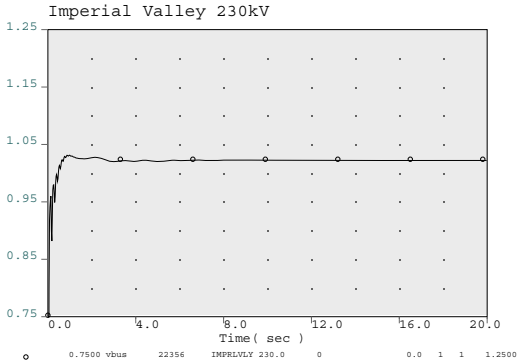
SDGE	tran-c1c2-ll-pre-r12_IV-ECO-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:56:25 2011

VOLTAGE

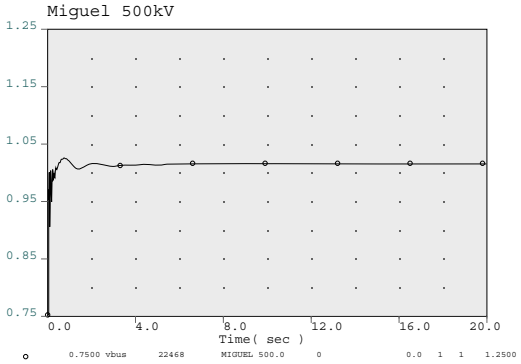
Imperial Valley 500kV



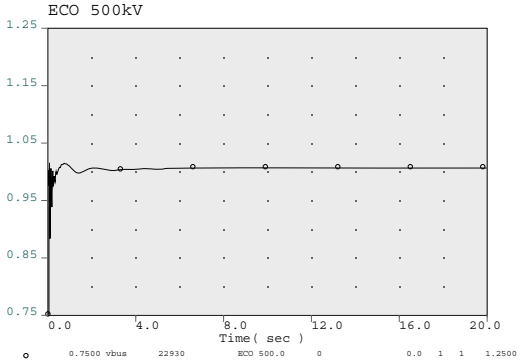
Imperial Valley 230kV



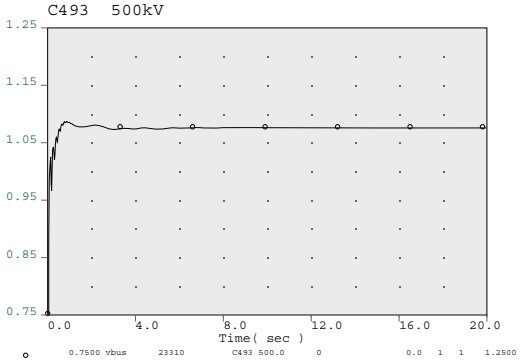
Miguel 500kV



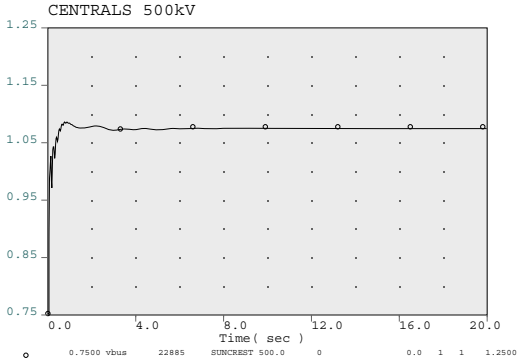
ECO 500kV



C493 500kV



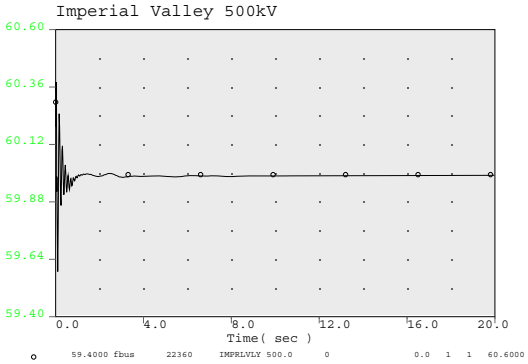
CENTRALS 500kV



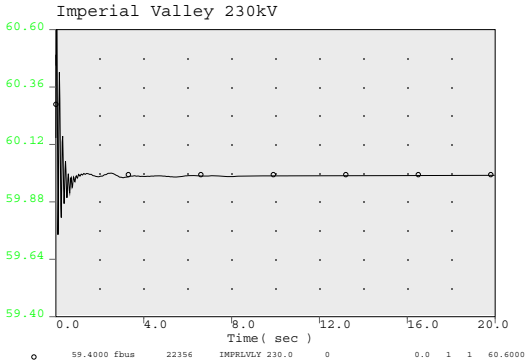
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

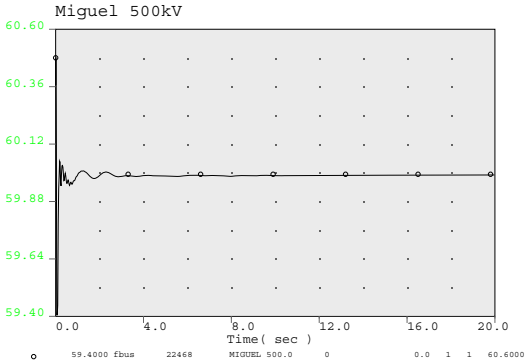
Imperial Valley 500kV



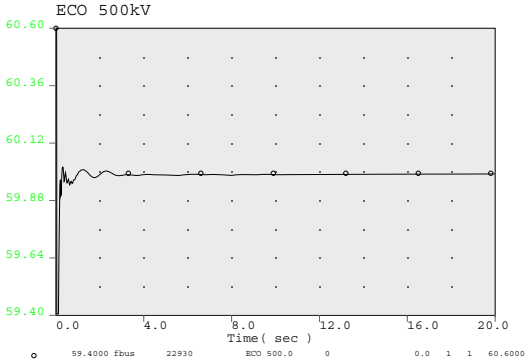
Imperial Valley 230kV



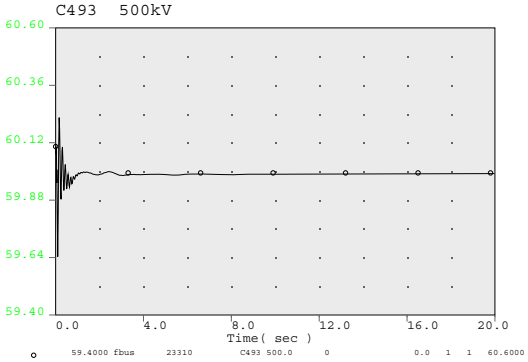
Miguel 500kV



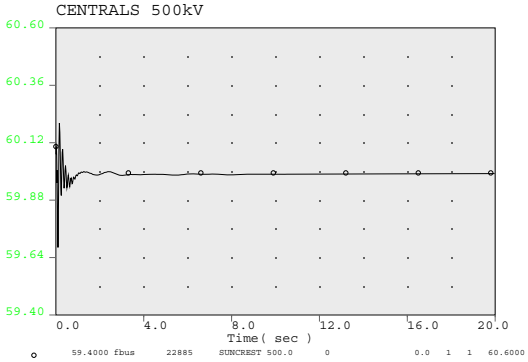
ECO 500kV



C493 500kV

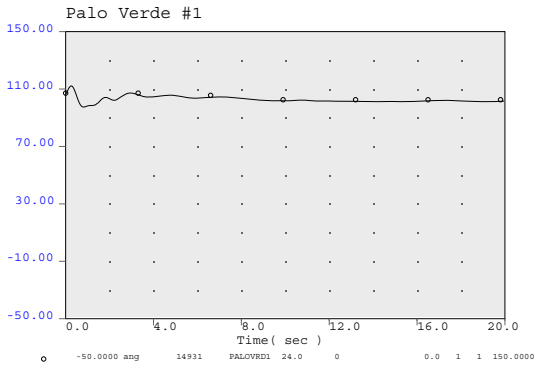


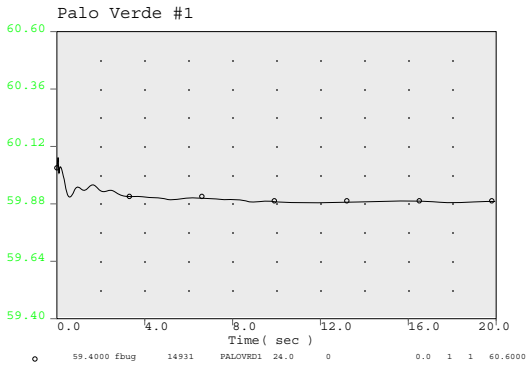
CENTRALS 500kV

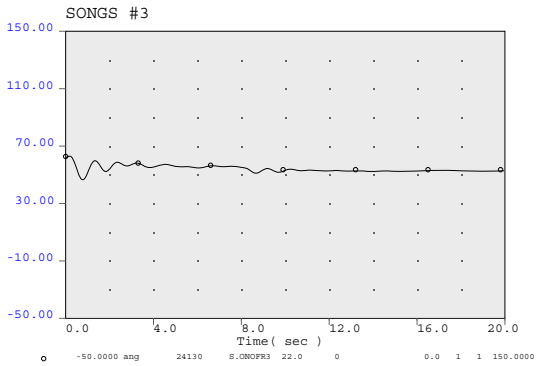


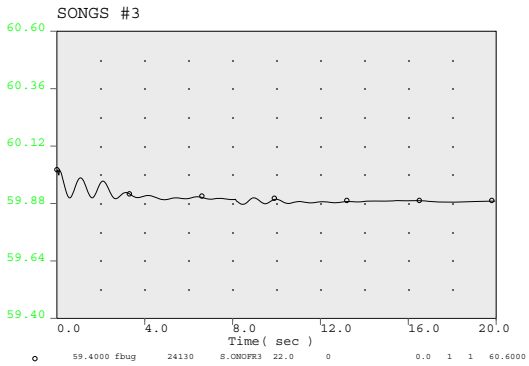
C1 C2 Light Load Pre Without Upgrades

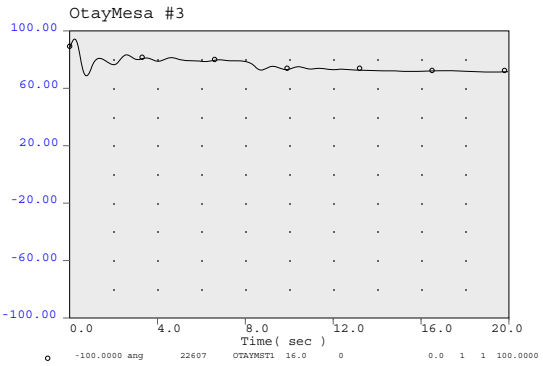
RELATIVE ROTOR ANGLE & FREQUENCY

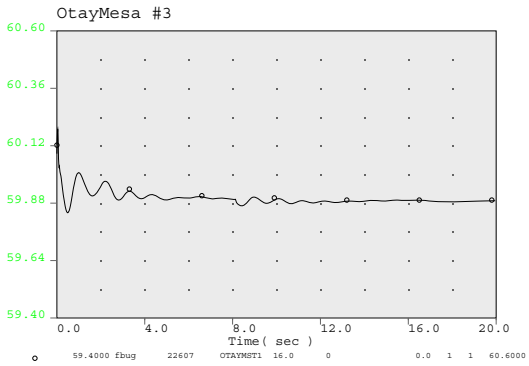








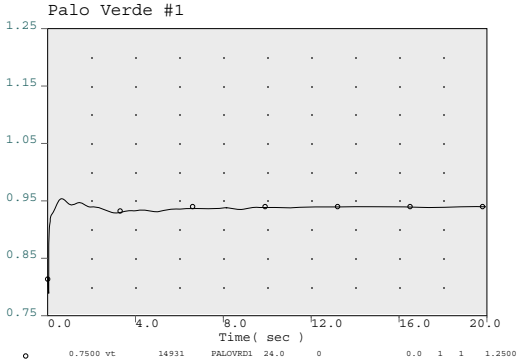




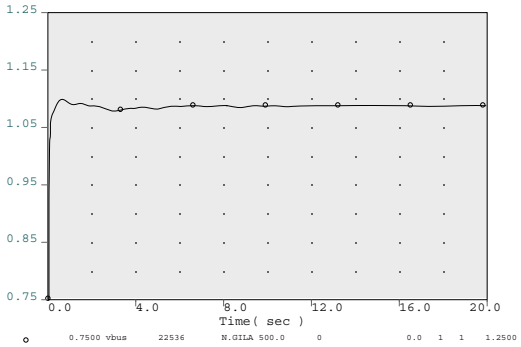
C1 C2 Light Load Pre Without Upgrades

RELATIVE VOLTAGE

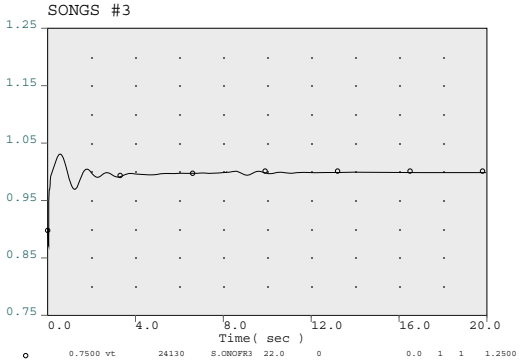
Palo Verde #1



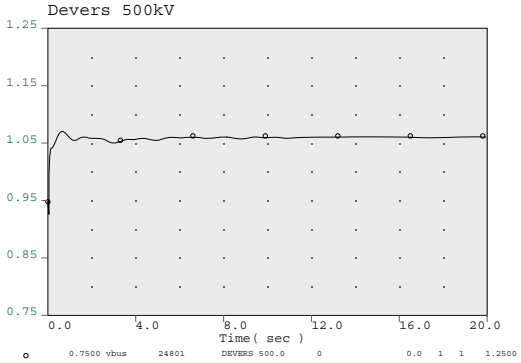
N Gila 500kV



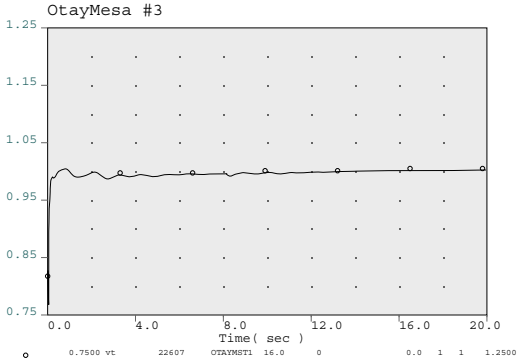
SONGS #3



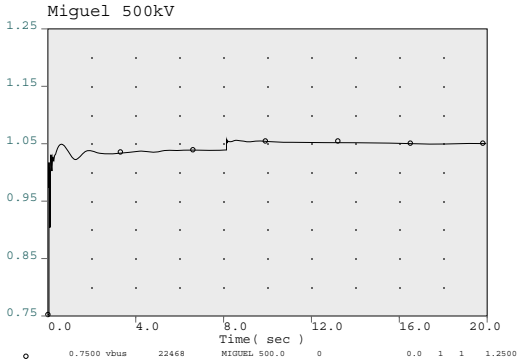
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Light Load Pre Without Upgrades

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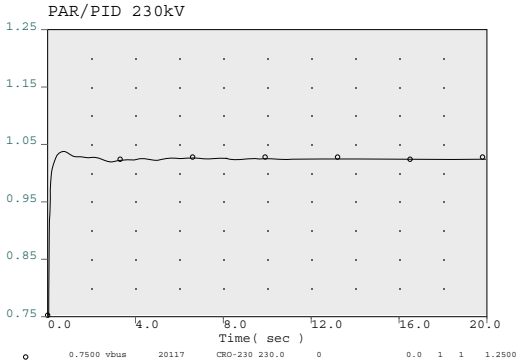
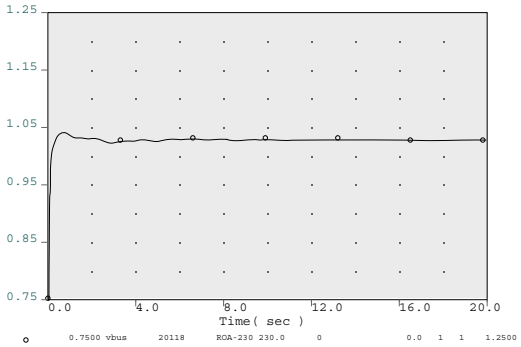
SDGE	tran-c1c2-ll-pre-r12_IV-RAS-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:58:14 2011

Affected System Voltage Check and Comparison

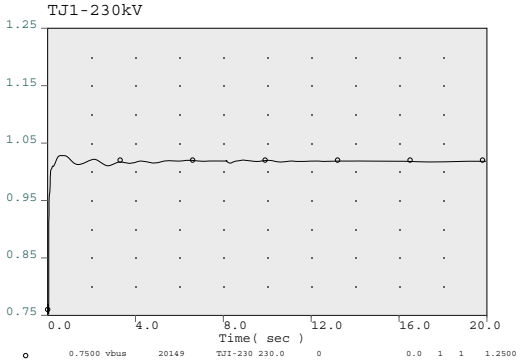
PAR/PID 230kV



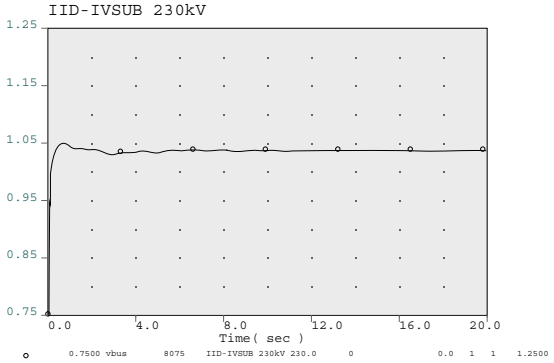
ROA-230kV



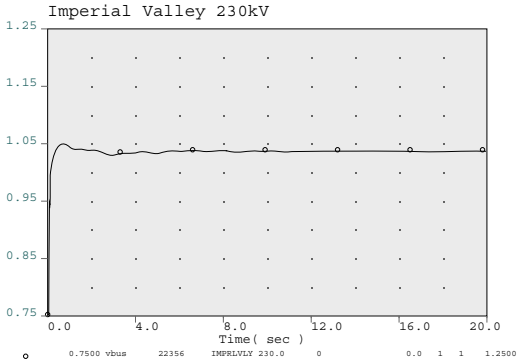
TJ1-230kV



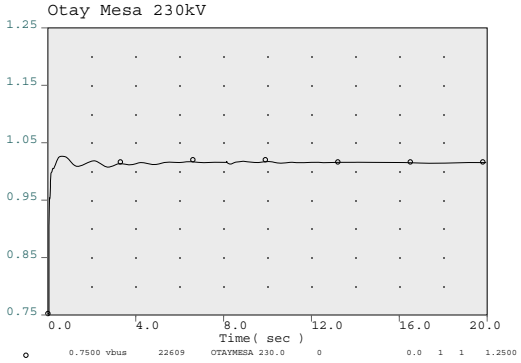
IID-IVSUB 230kV



Imperial Valley 230kV



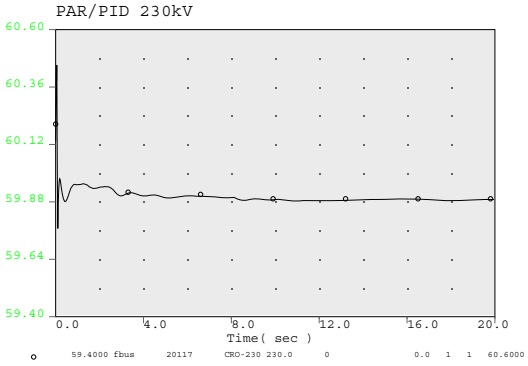
Otay Mesa 230kV



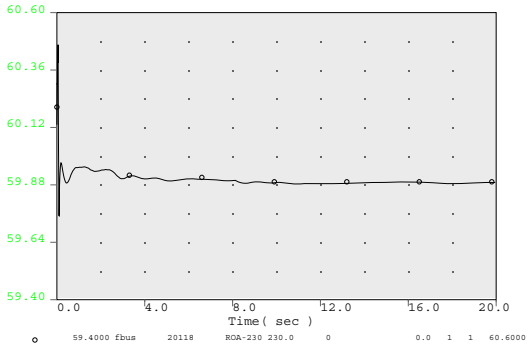
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

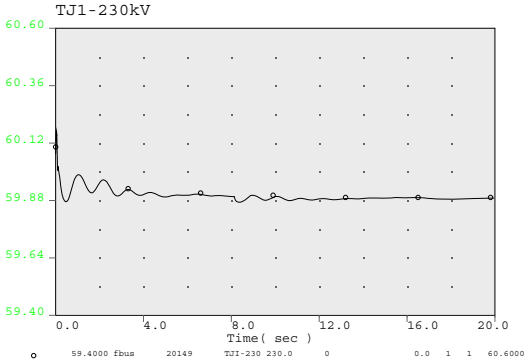
PAR/PID 230kV



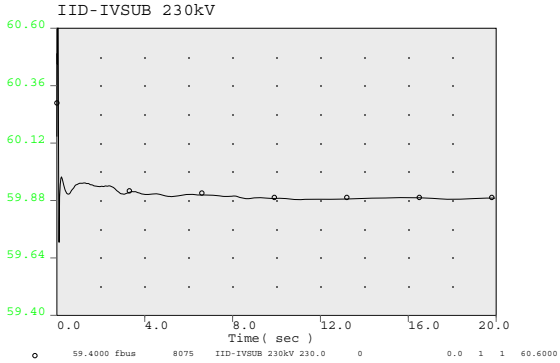
ROA-230kV



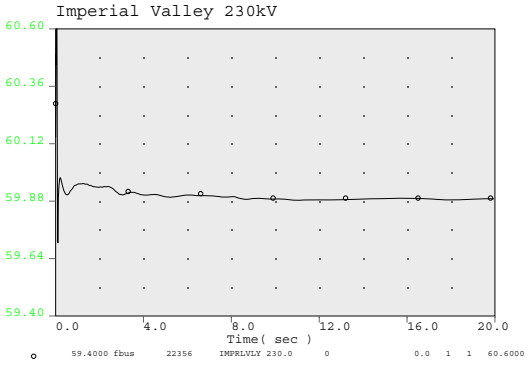
TJ1-230kV



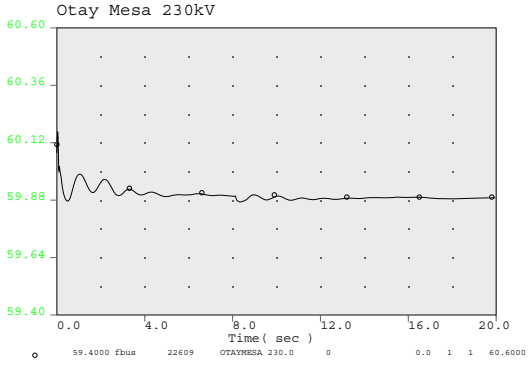
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



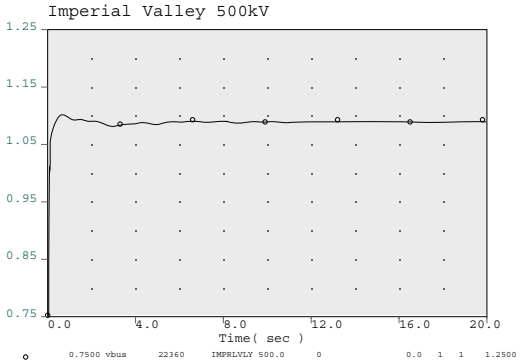
C1 C2 Light Load Pre Without Upgrades

Page 4

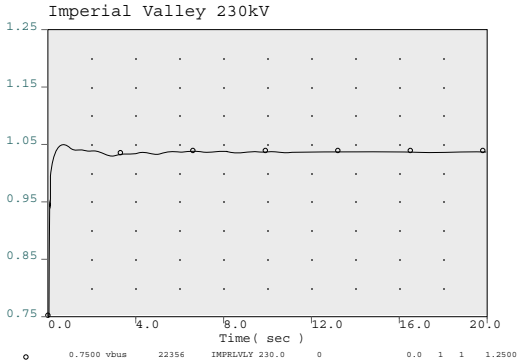
SDGE	tran-c1c2-ll-pre-r12_IV-RAS-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 14:58:15 2011

VOLTAGE

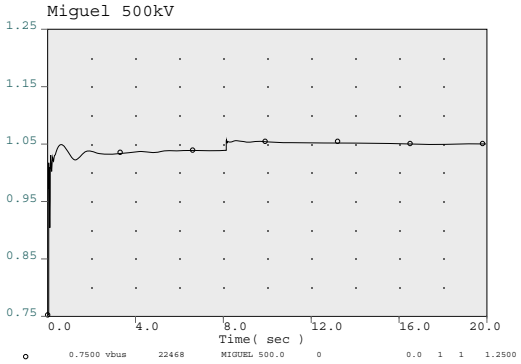
Imperial Valley 500kV



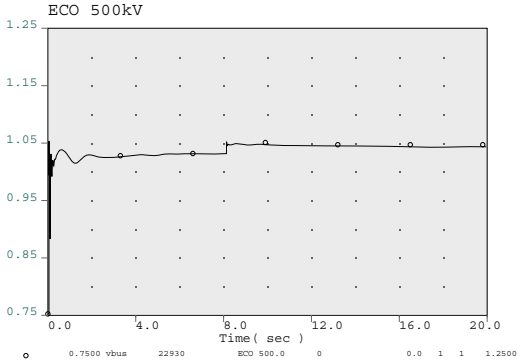
Imperial Valley 230kV



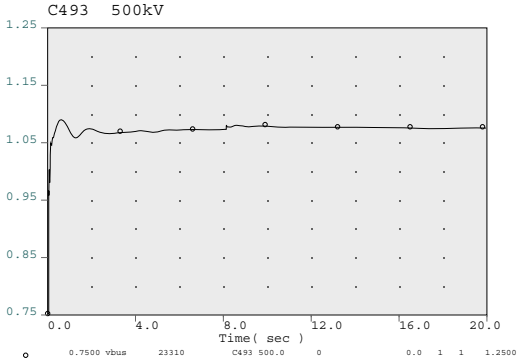
Miguel 500kV



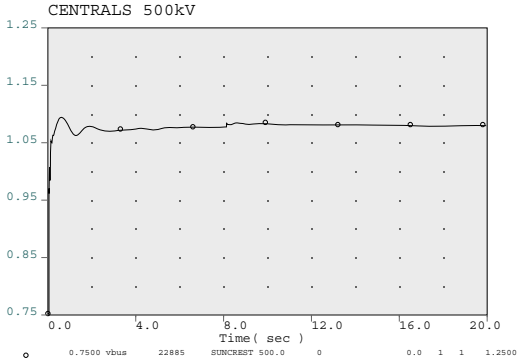
ECO 500kV



C493 500kV



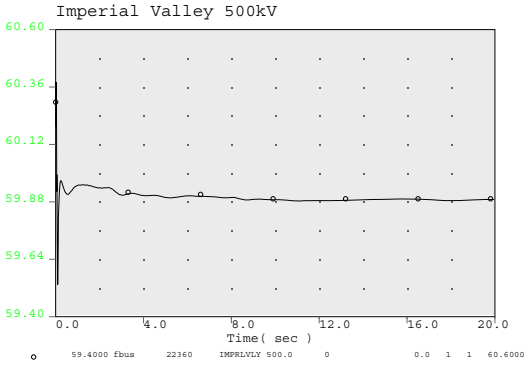
CENTRALS 500kV



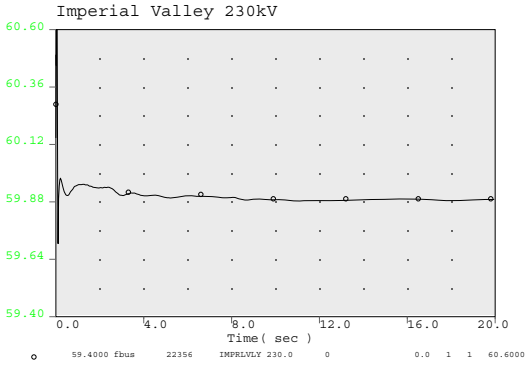
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

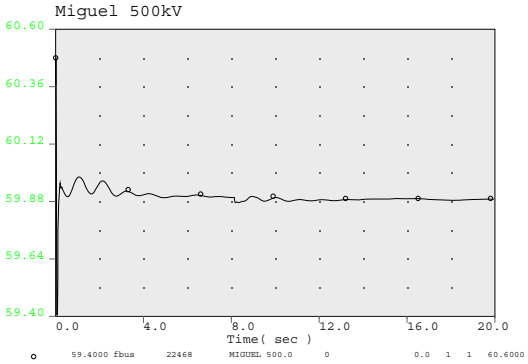
Imperial Valley 500kV



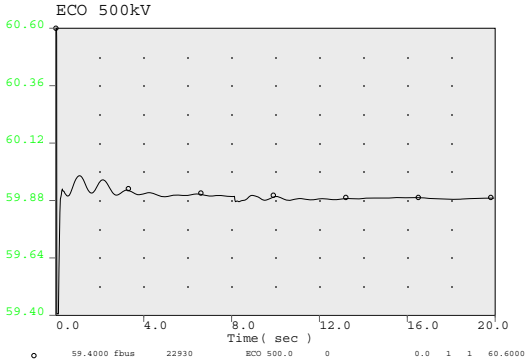
Imperial Valley 230kV



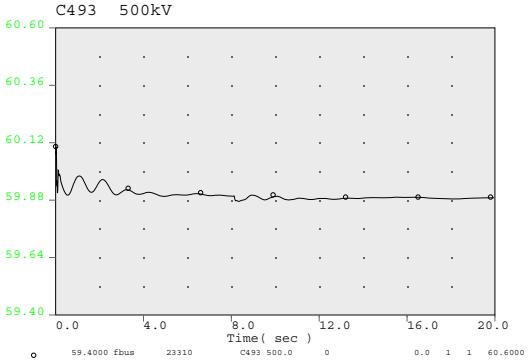
Miguel 500kV



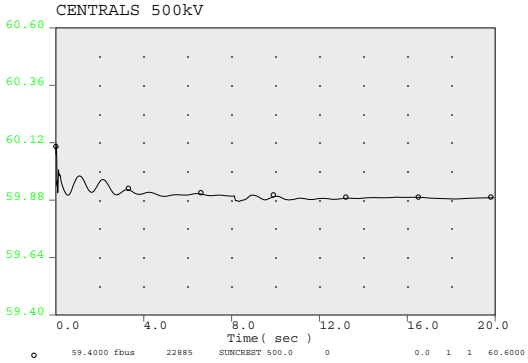
ECO 500kV



C493 500kV

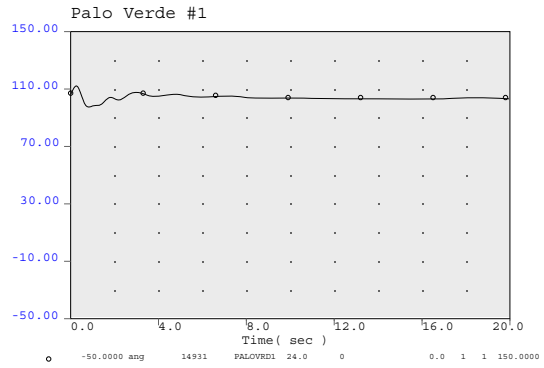


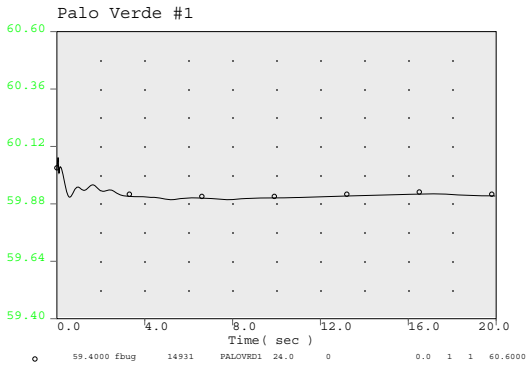
CENTRALS 500kV

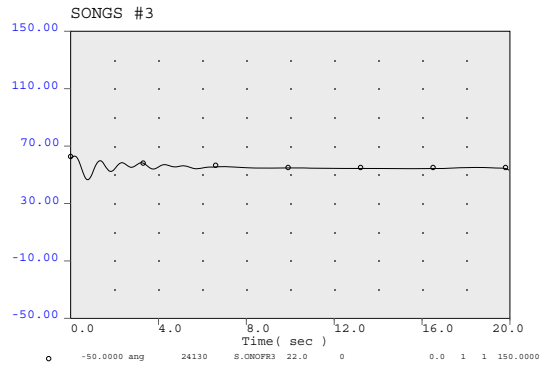


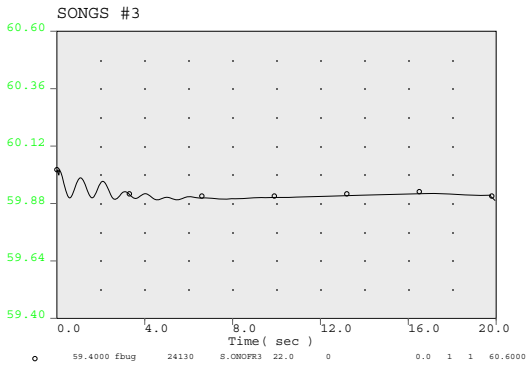
C1 C2 Light Load Pre Without Upgrades

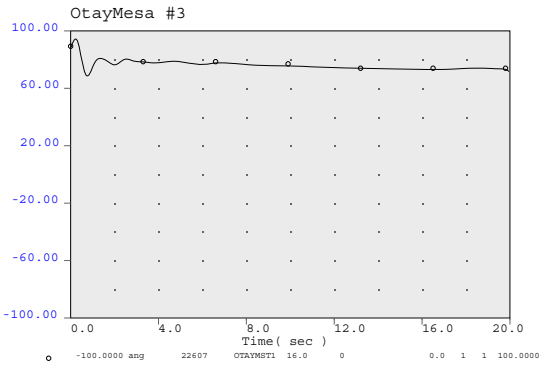
RELATIVE ROTOR ANGLE & FREQUENCY

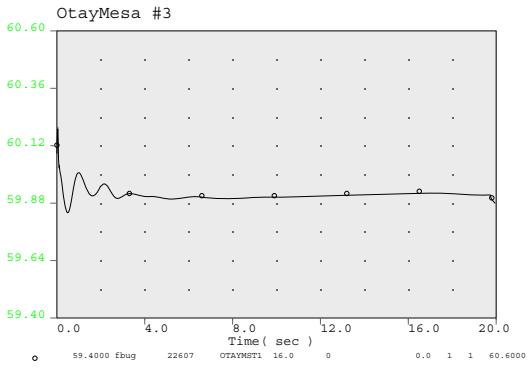












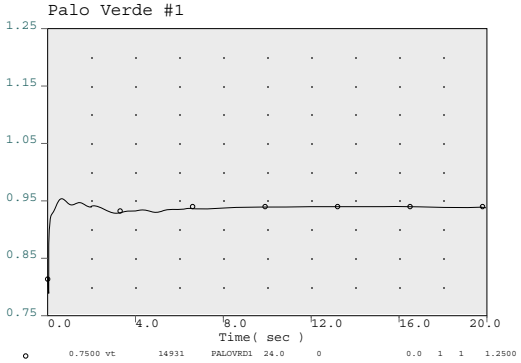
C1 C2 Light Load Pre Without Upgrades

Page 1

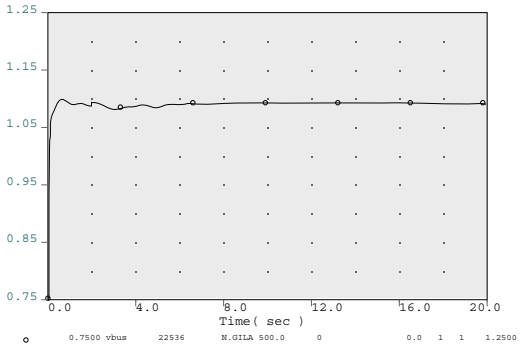
SDGE	tran-c1c2-ll-pre-r12_IV-RASX-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:00:22 2011

RELATIVE VOLTAGE

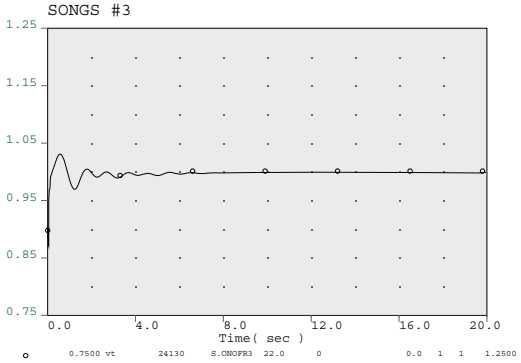
Palo Verde #1



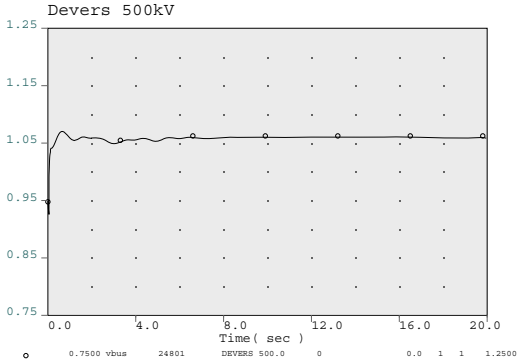
N Gila 500kV



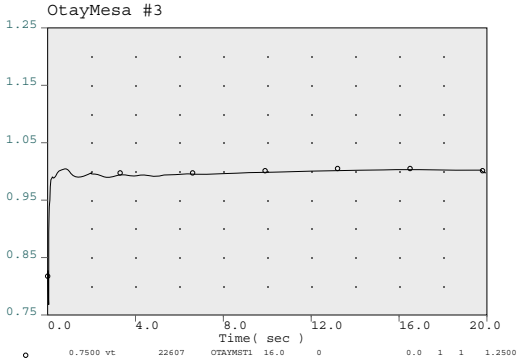
SONGS #3



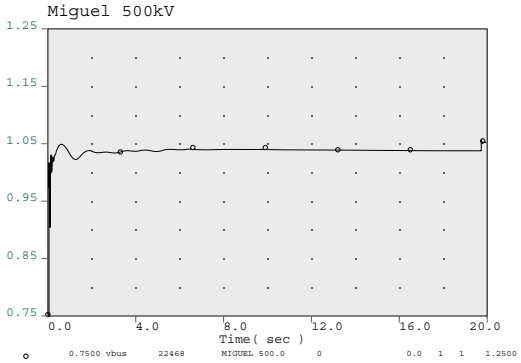
Devers 500kV



OtayMesa #3



Miguel 500kV



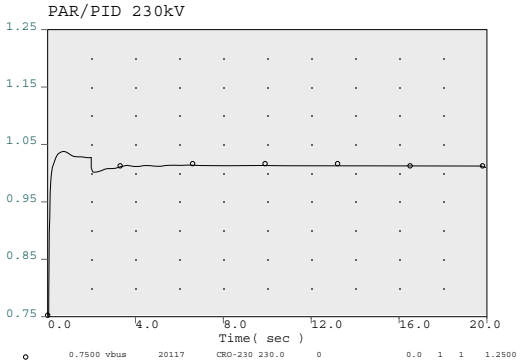
C1 C2 Light Load Pre Without Upgrades

Page 2

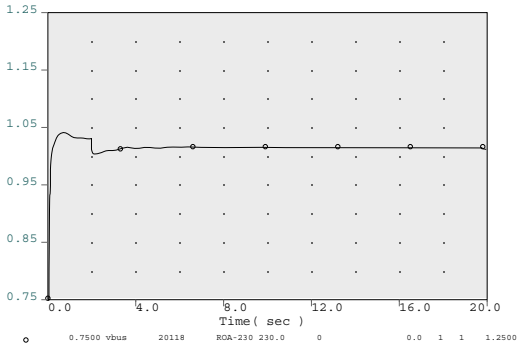
SDGE	tran-c1c2-ll-pre-r12_IV-RASX-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:00:23 2011

Affected System Voltage Check and Comparison

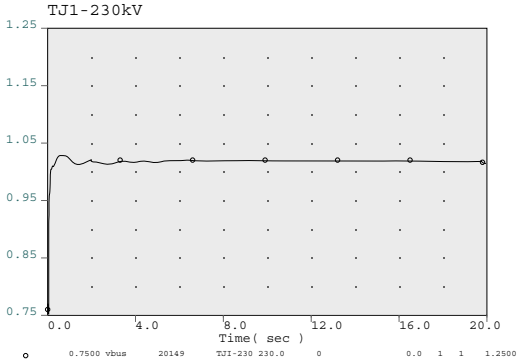
PAR/PID 230kV



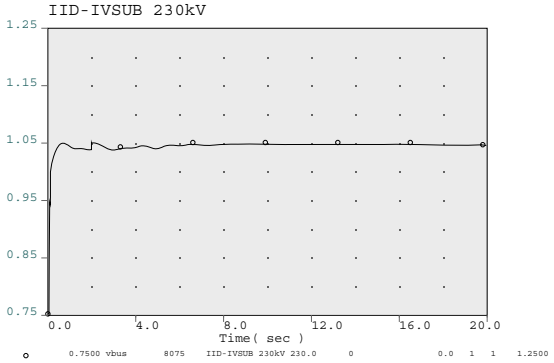
ROA-230kV



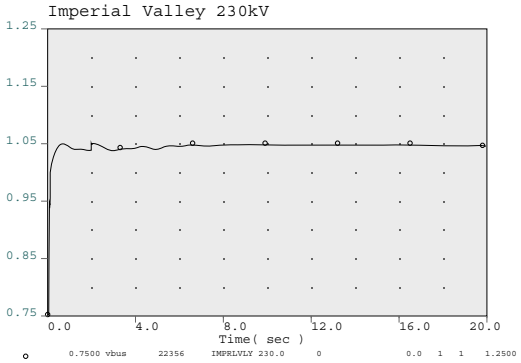
TJ1-230kV



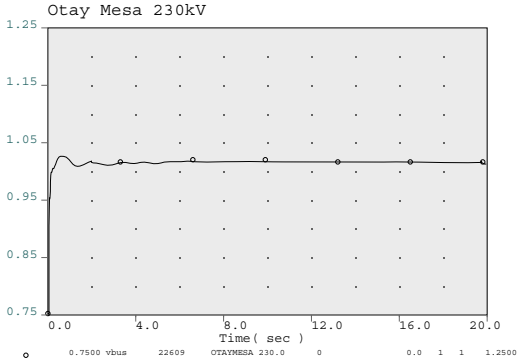
IID-IVSUB 230kV



Imperial Valley 230kV



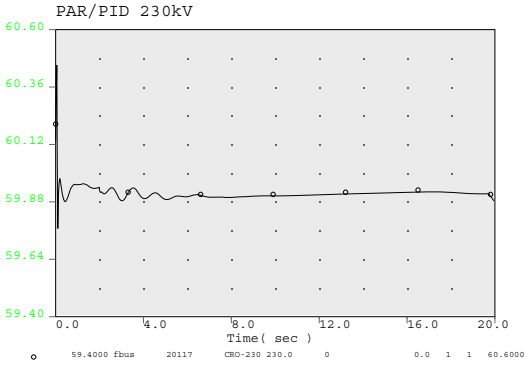
Otay Mesa 230kV



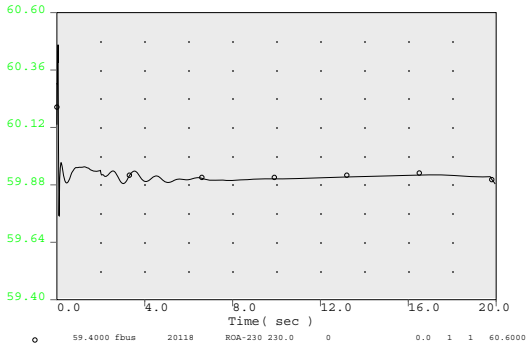
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

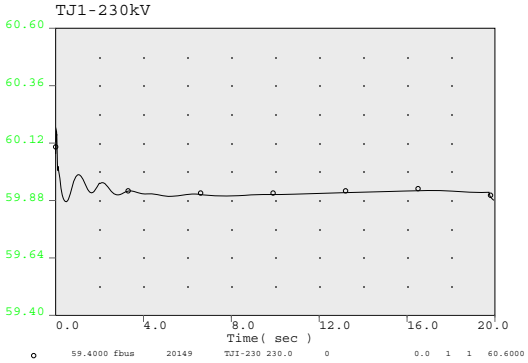
PAR/PID 230kV



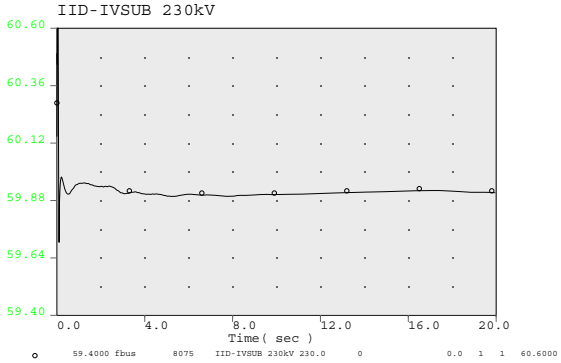
ROA-230kV



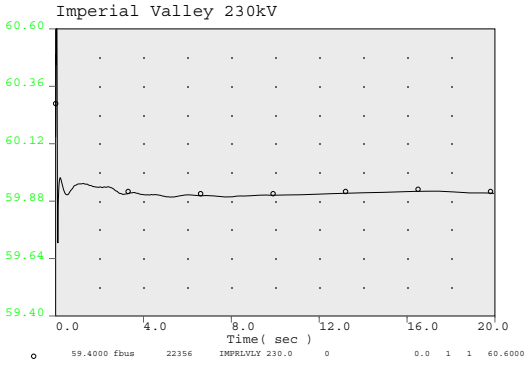
TJ1-230kV



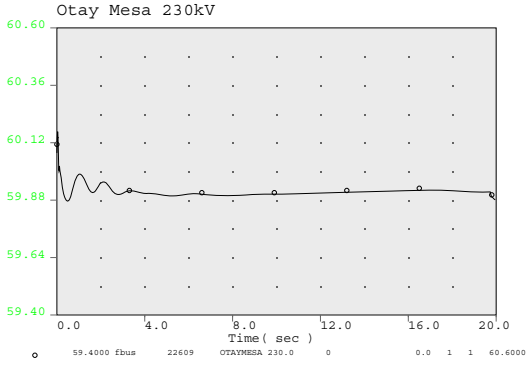
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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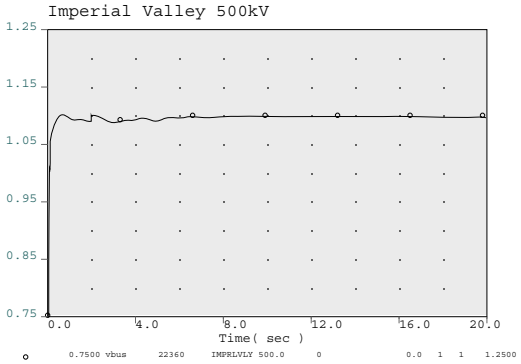
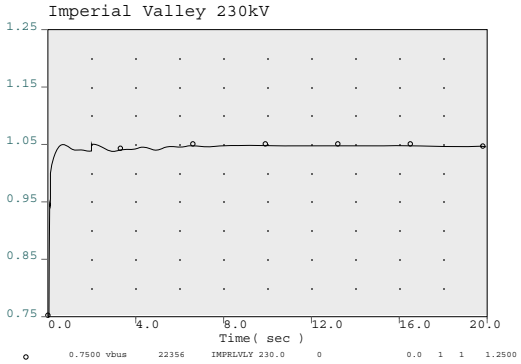
SDGE	tran-c1c2-ll-pre-r12_IV-RASX-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:00:24 2011

VOLTAGE

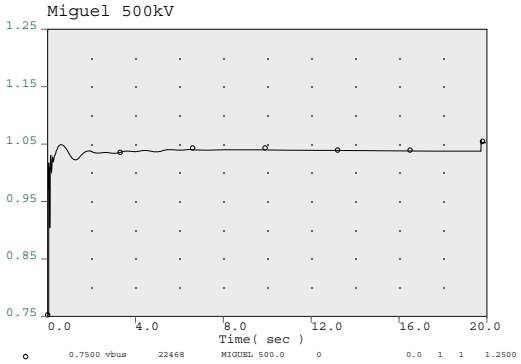
Imperial Valley 500kV



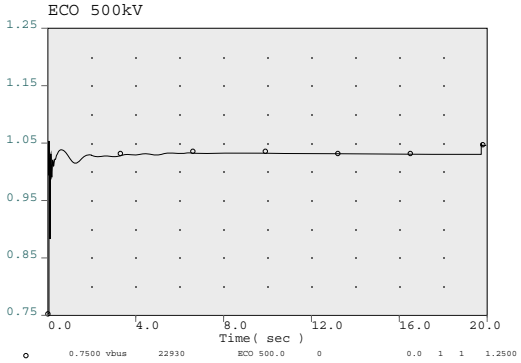
Imperial Valley 230kV



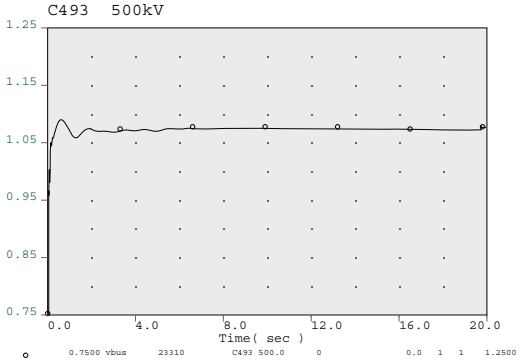
Miguel 500kV



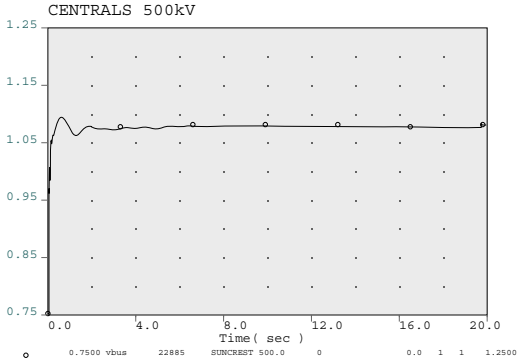
ECO 500kV



C493 500kV

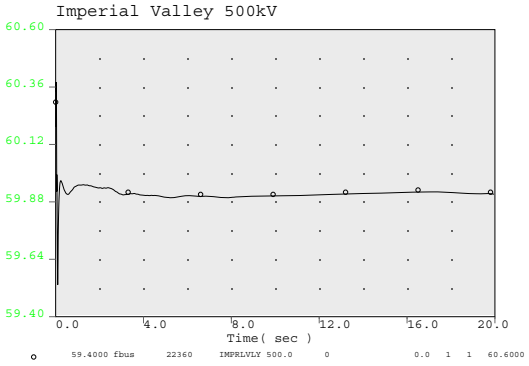


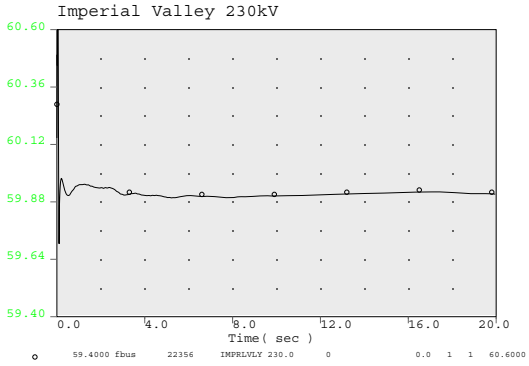
CENTRALS 500kV

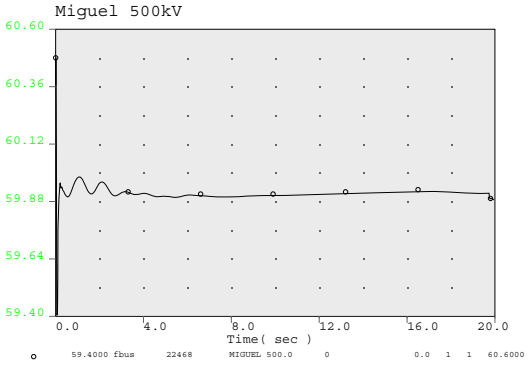


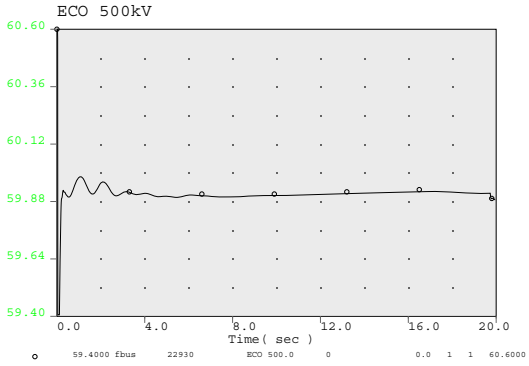
C1 C2 Light Load Pre Without Upgrades

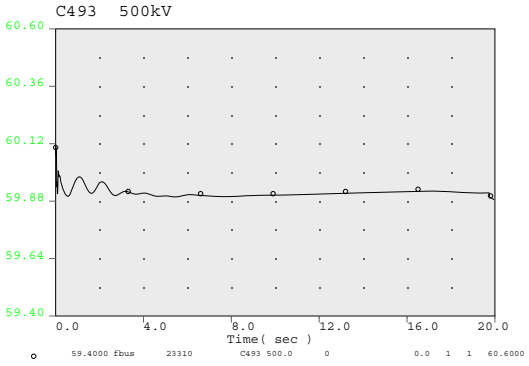
FREQUENCY

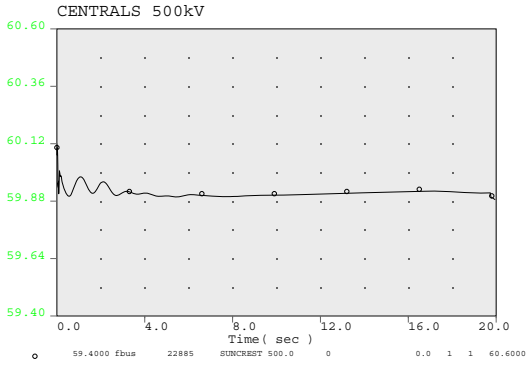












C1 C2 Light Load Pre Without Upgrades

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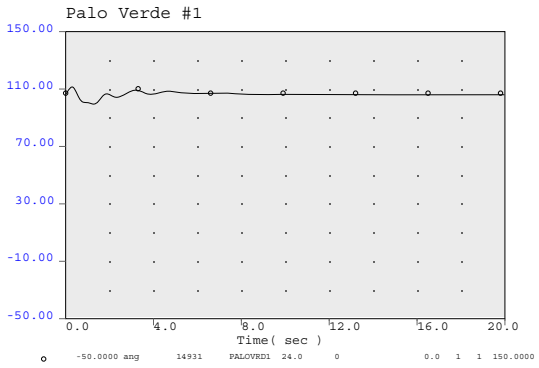
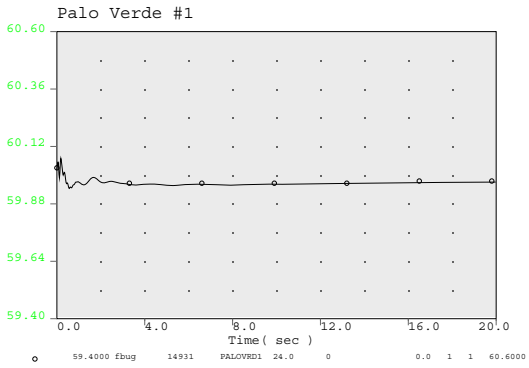
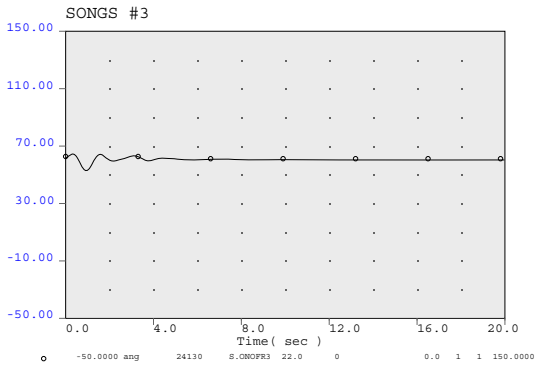
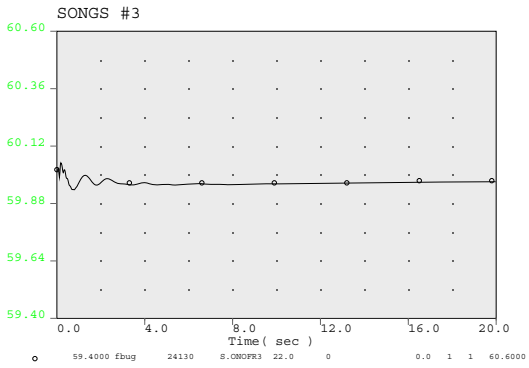
SDGE	tran-c1c2-ll-pre-r12_IV-RASX-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:00:25 2011

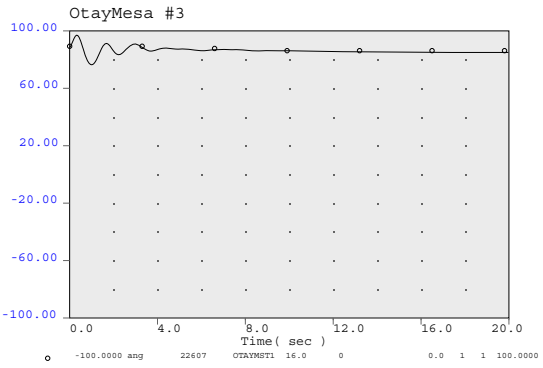
RELATIVE ROTOR ANGLE & FREQUENCY

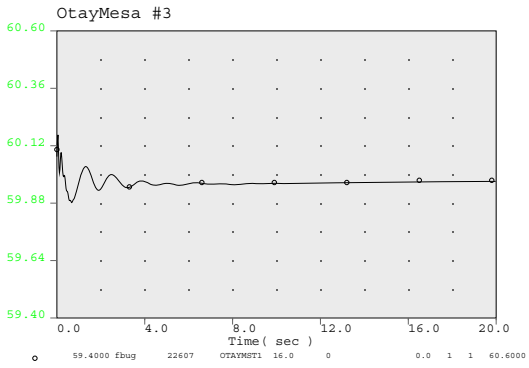












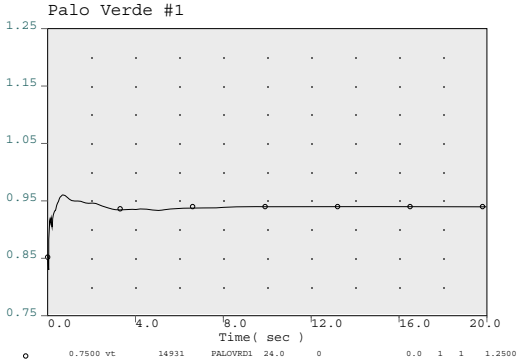
WESTERN ELECTRICITY COORDINATING COUNCIL

Page 1

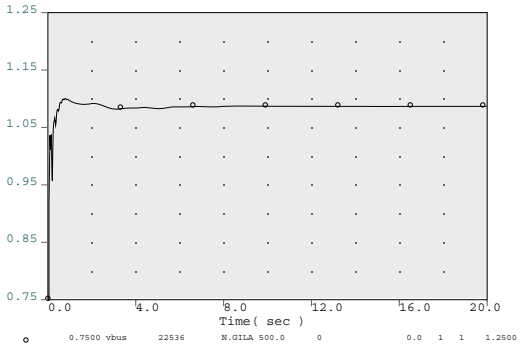
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_IVROA(IV)-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:06:08 2011

RELATIVE VOLTAGE

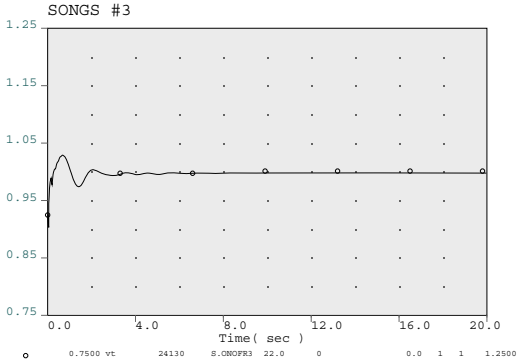
Palo Verde #1



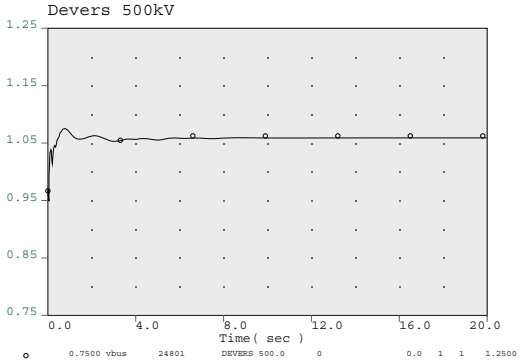
N Gila 500kV



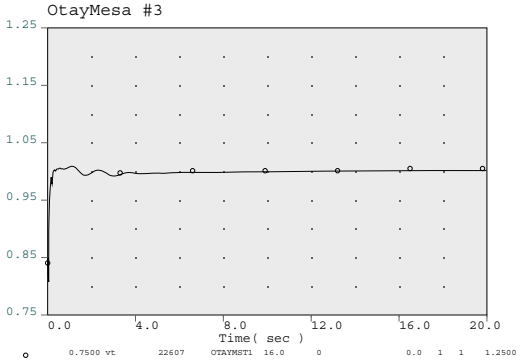
SONGS #3



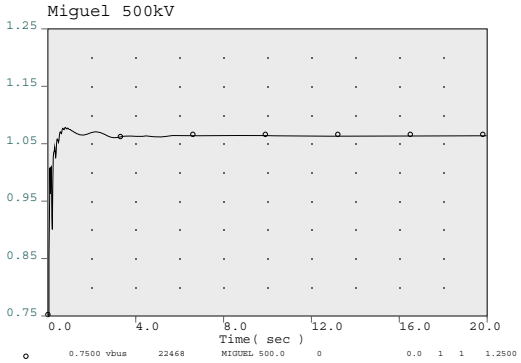
Devers 500kV



OtayMesa #3



Miguel 500kV



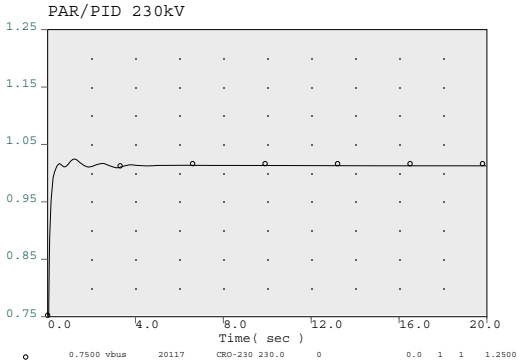
C1 C2 Light Load Pre Without Upgrades

Page 2

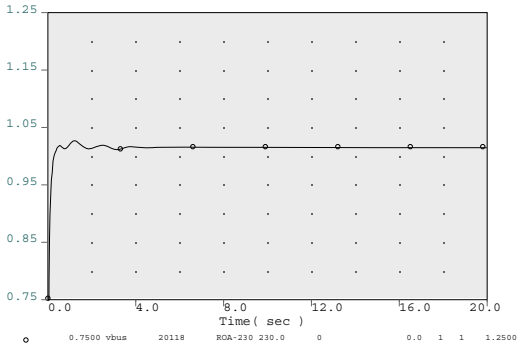
SDGE	tran-c1c2-ll-pre-r12_IVROA(IV)-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:06:09 2011

Affected System Voltage Check and Comparison

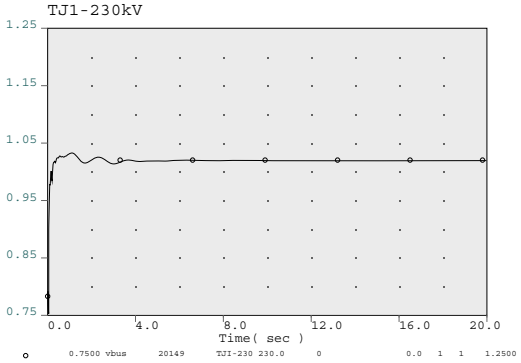
PAR/PID 230kV



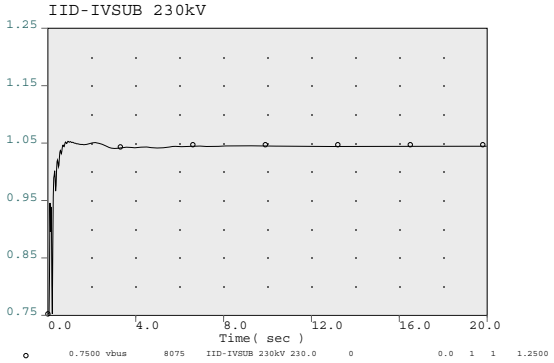
ROA-230kV



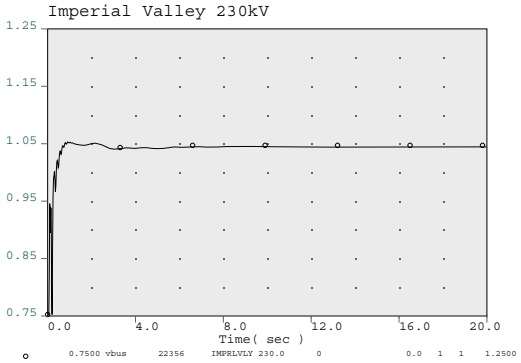
TJ1-230kV



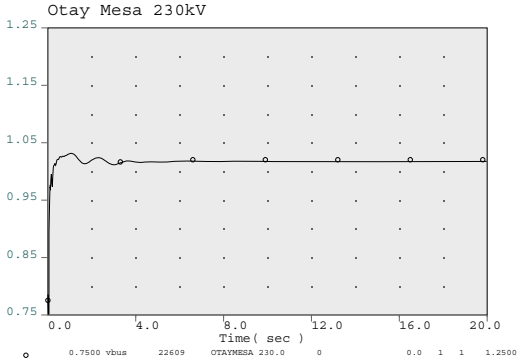
IID-IVSUB 230kV



Imperial Valley 230kV



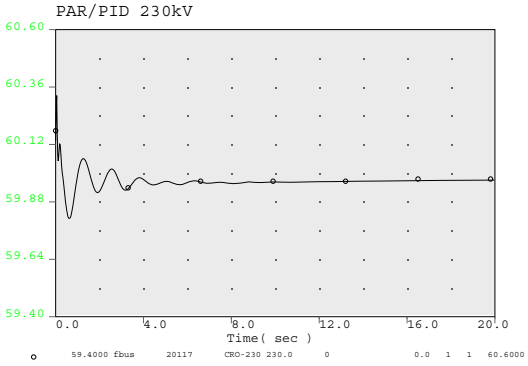
Otay Mesa 230kV



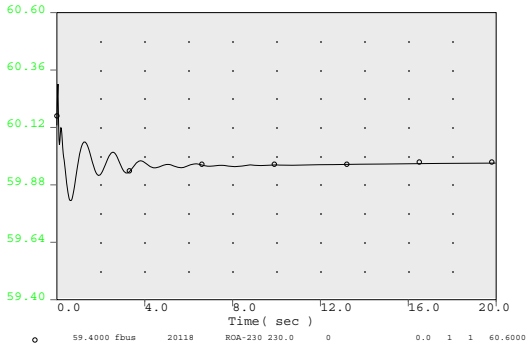
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

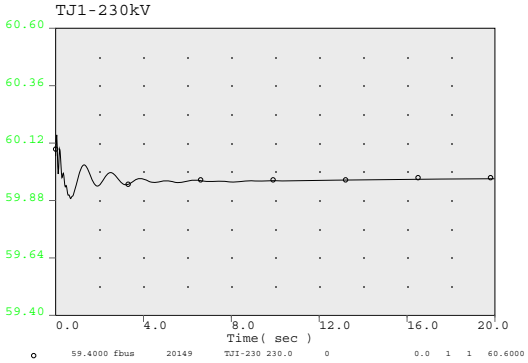
PAR/PID 230kV



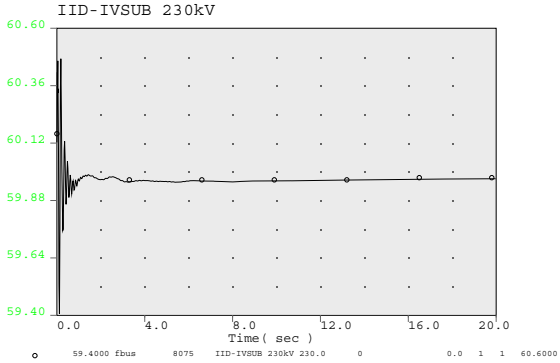
ROA-230kV



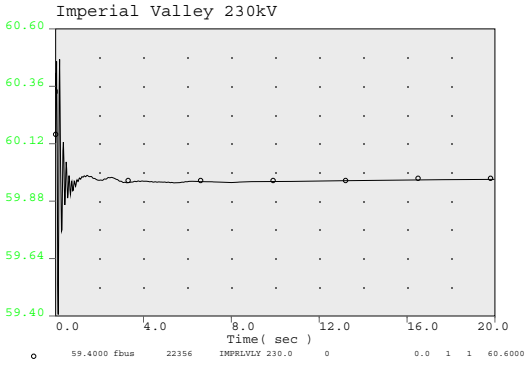
TJ1-230kV



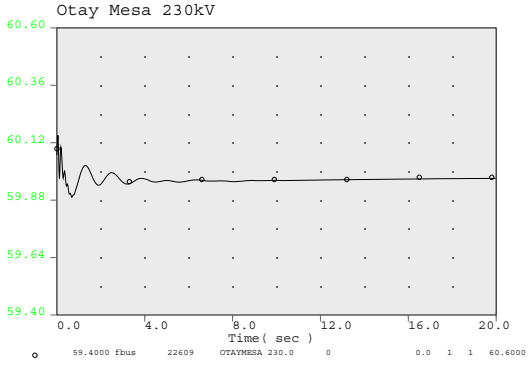
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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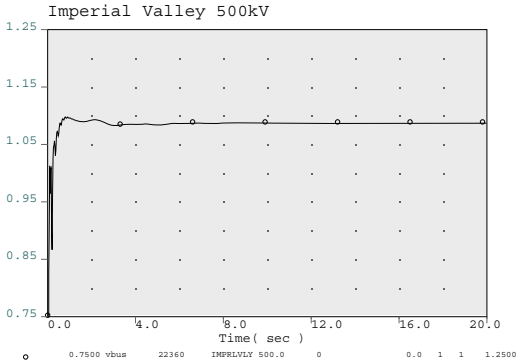
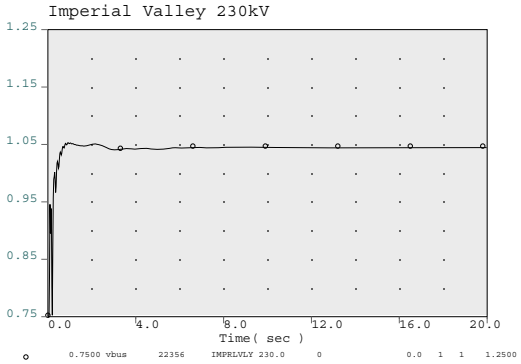
SDGE	tran-c1c2-ll-pre-r12_IVROA(IV)-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:06:09 2011

VOLTAGE

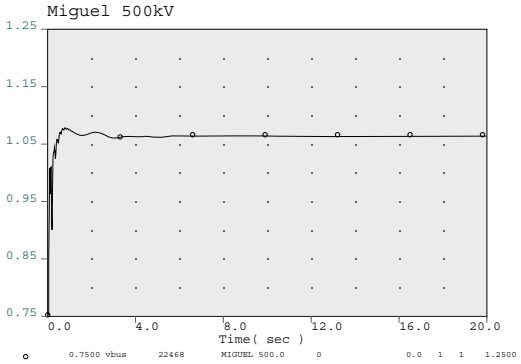
Imperial Valley 500kV



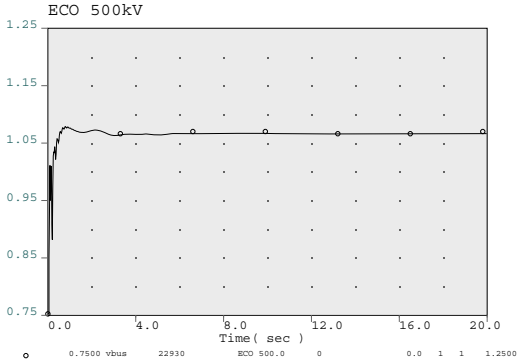
Imperial Valley 230kV



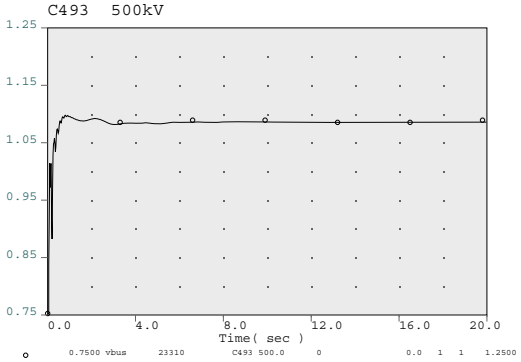
Miguel 500kV



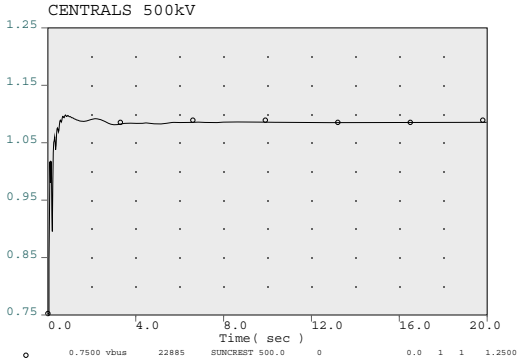
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Light Load Pre Without Upgrades

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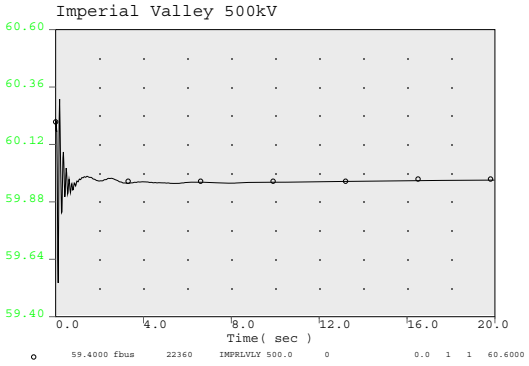
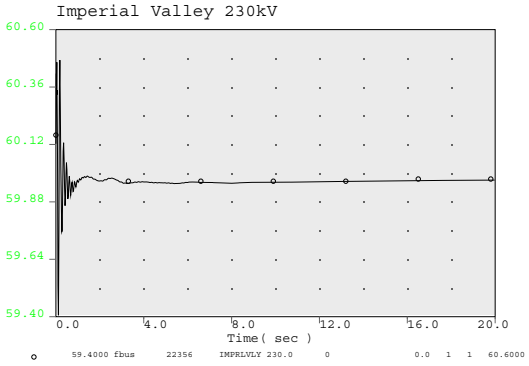
SDGE	tran-c1c2-ll-pre-r12_IVROA(IV)-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:06:10 2011

FREQUENCY

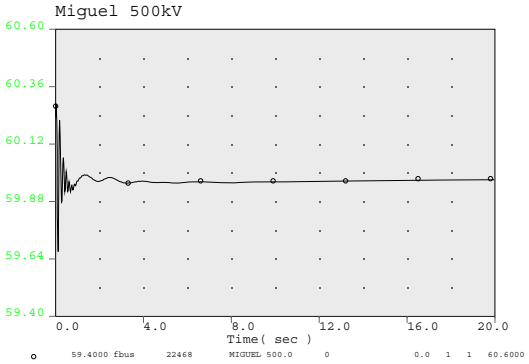
Imperial Valley 500kV



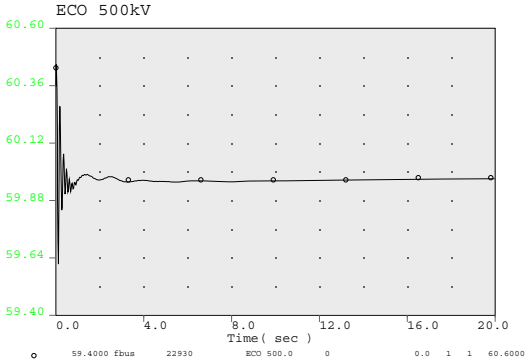
Imperial Valley 230kV



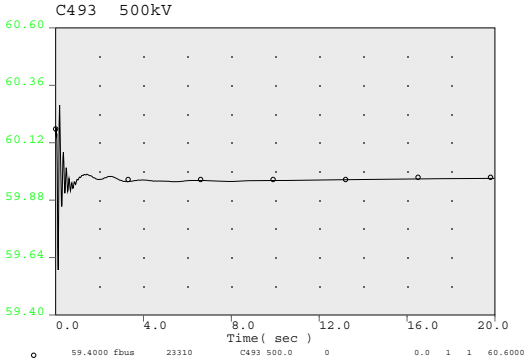
Miguel 500kV



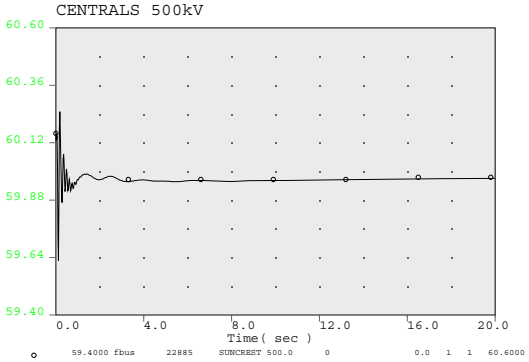
ECO 500kV



C493 500kV



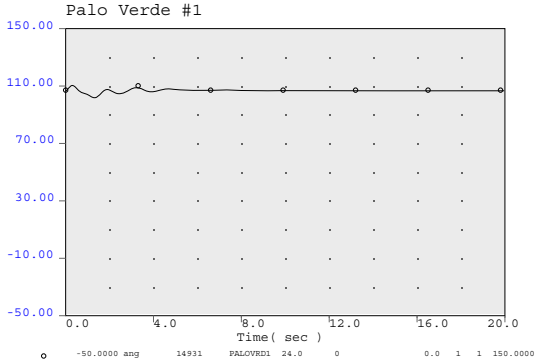
CENTRALS 500kV



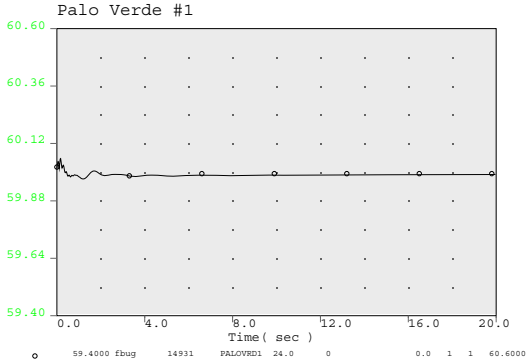
C1 C2 Light Load Pre Without Upgrades

RELATIVE ROTOR ANGLE & FREQUENCY

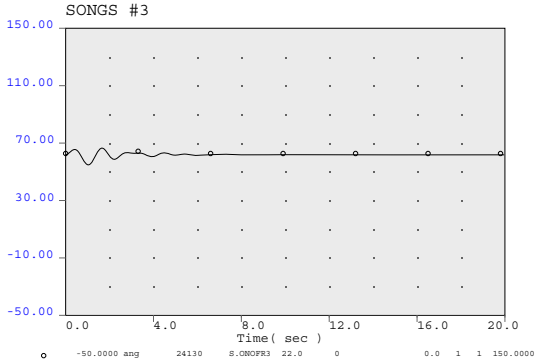
Palo Verde #1



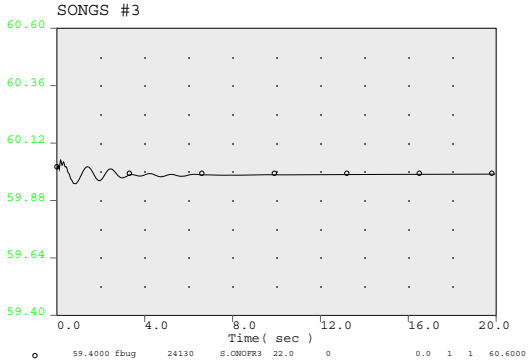
Palo Verde #1



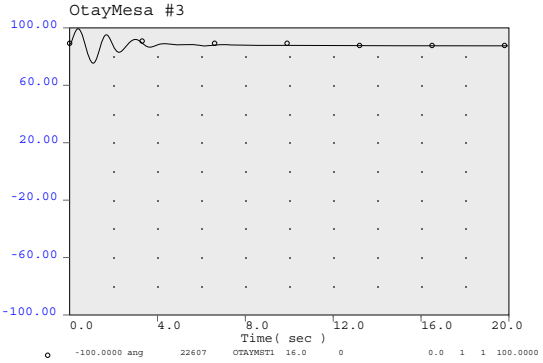
SONGS #3



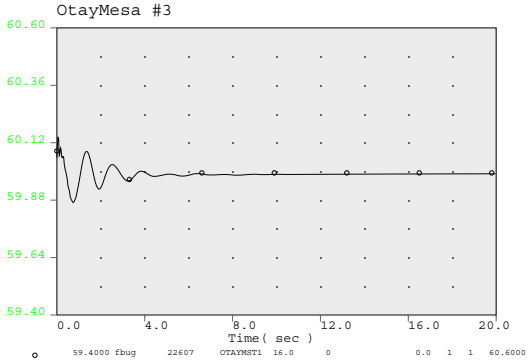
SONGS #3



OtayMesa #3



OtayMesa #3



C1 C2 Light Load Pre Without Upgrades

Page 1

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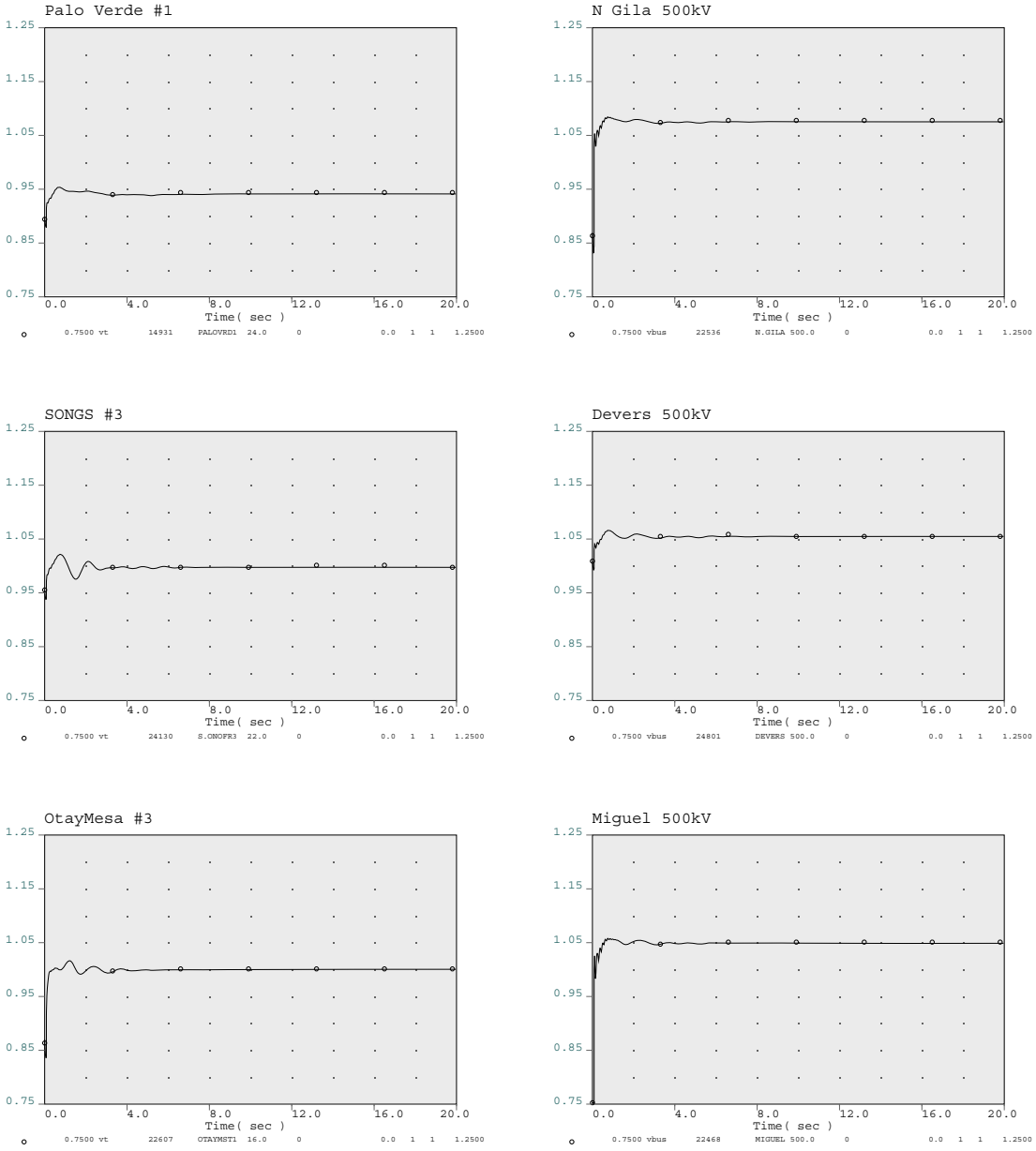
Sun Jul 17 15:07:58 2011

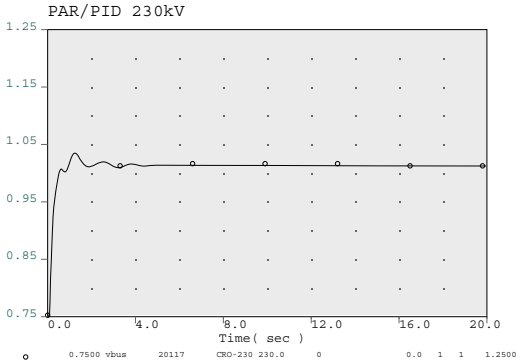
RELATIVE VOLTAGE



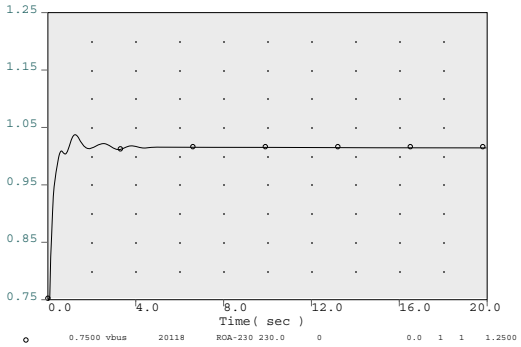
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

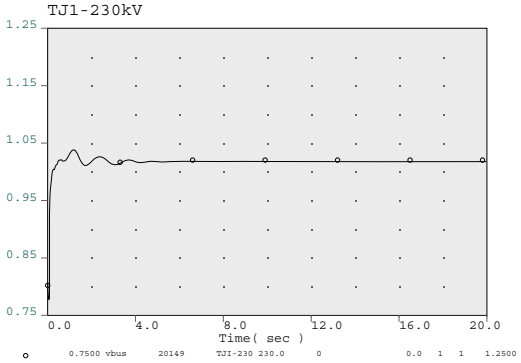
PAR/PID 230kV



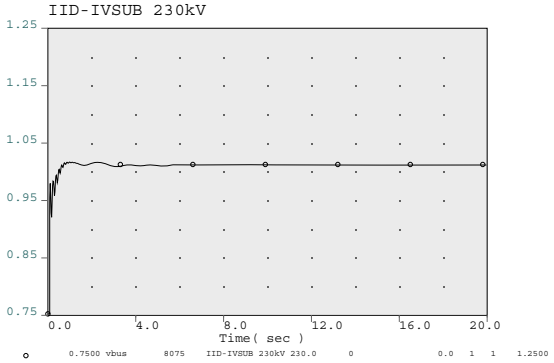
ROA-230kV



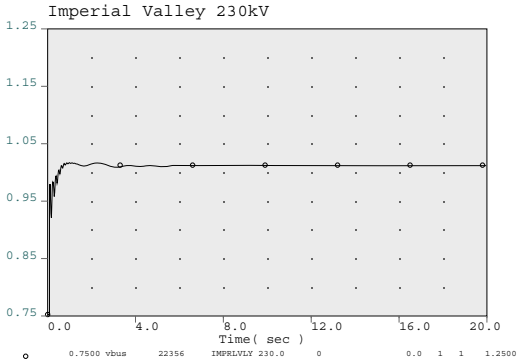
TJ1-230kV



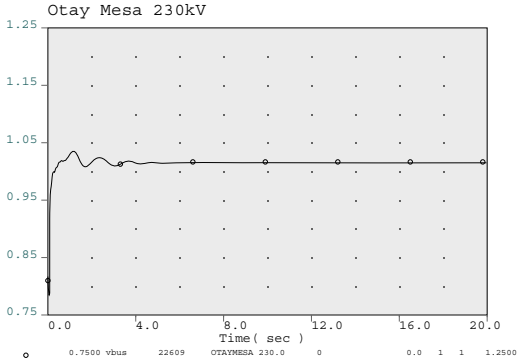
IID-IVSUB 230kV



Imperial Valley 230kV



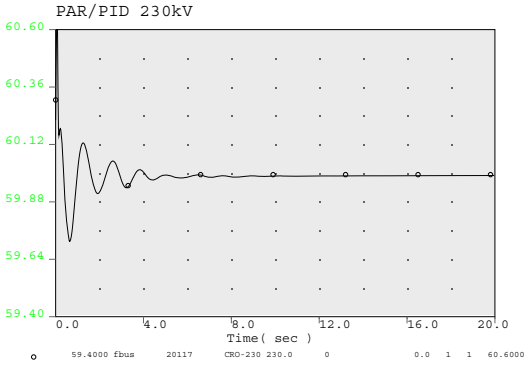
Otay Mesa 230kV



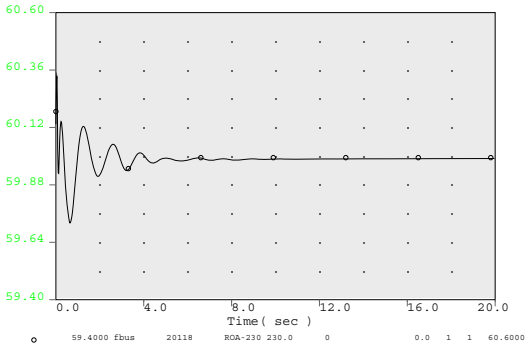
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

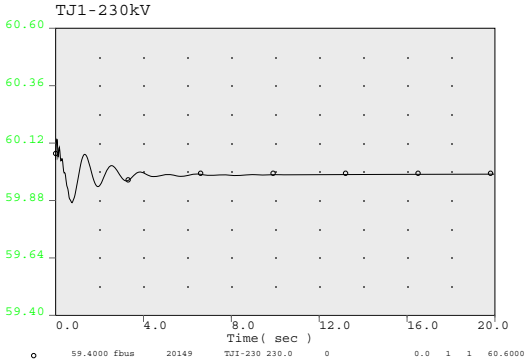
PAR/PID 230kV



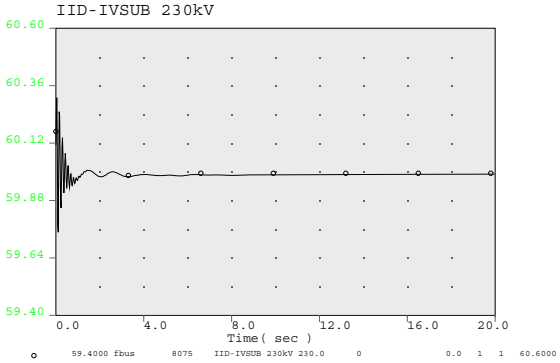
ROA-230kV



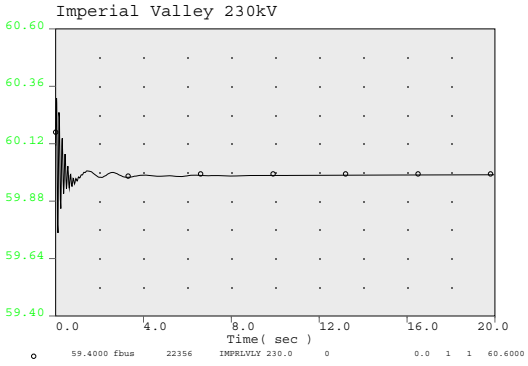
TJ1-230kV



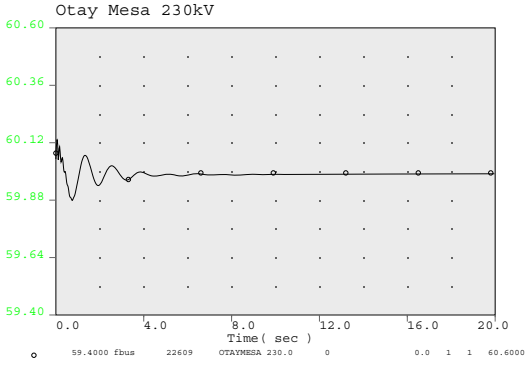
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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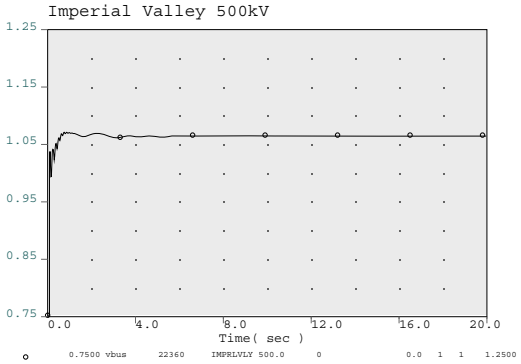
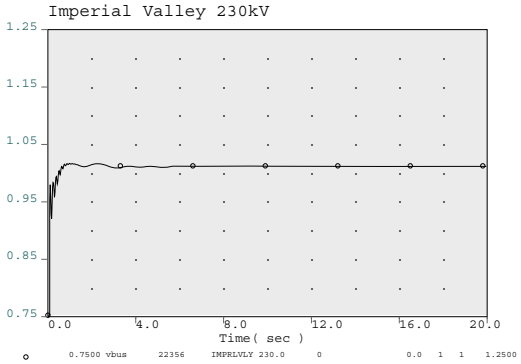
SDGE	tran-c1c2-ll-pre-r12_IVROA(ROA)-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:08:00 2011

VOLTAGE

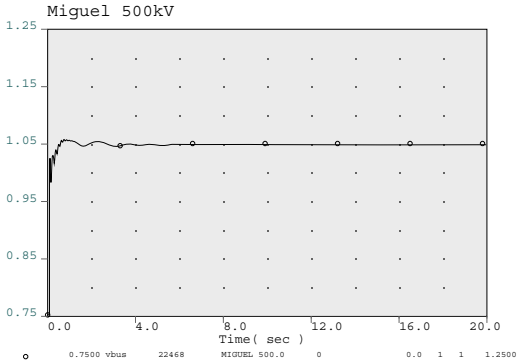
Imperial Valley 500kV



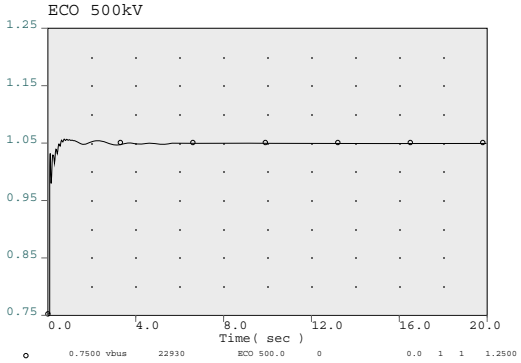
Imperial Valley 230kV



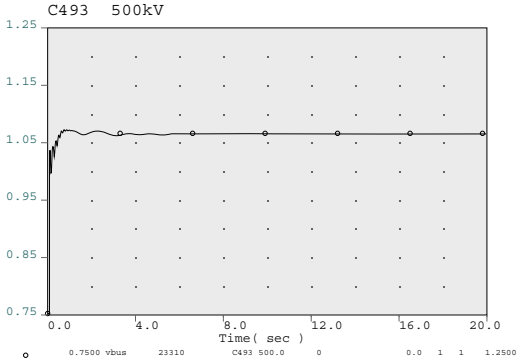
Miguel 500kV



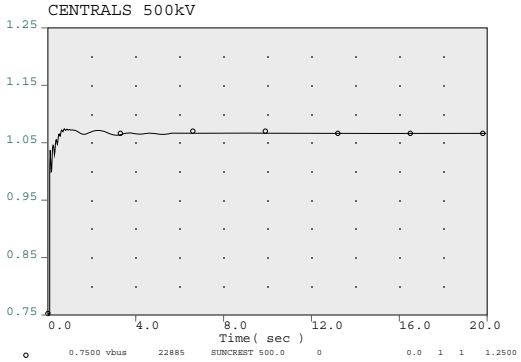
ECO 500kV



C493 500kV



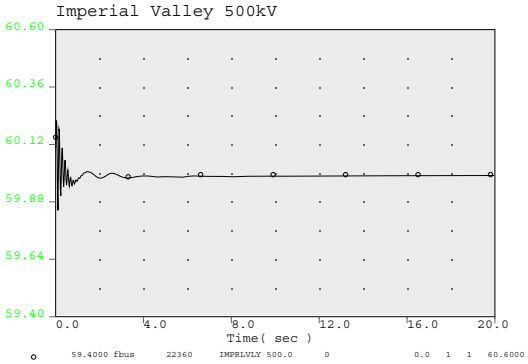
CENTRALS 500kV



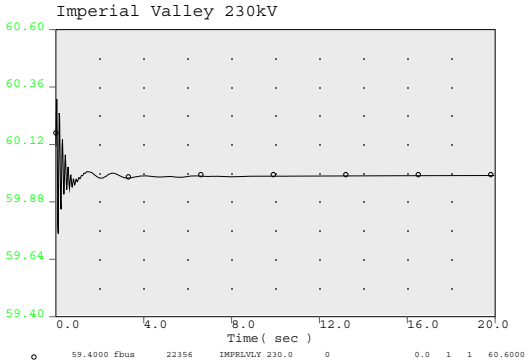
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

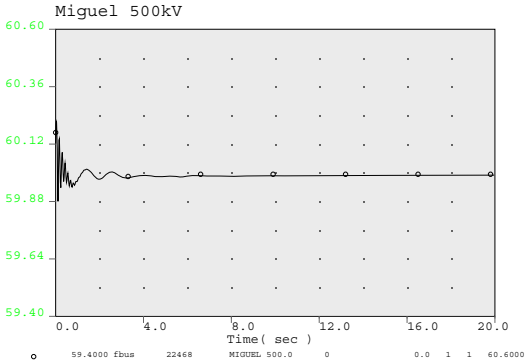
Imperial Valley 500kV



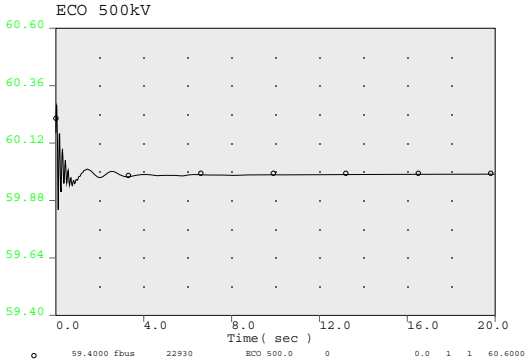
Imperial Valley 230kV



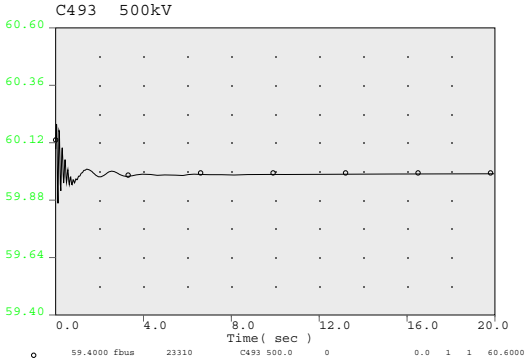
Miguel 500kV



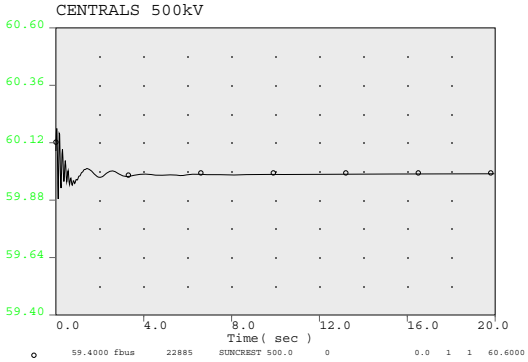
ECO 500kV



C493 500kV

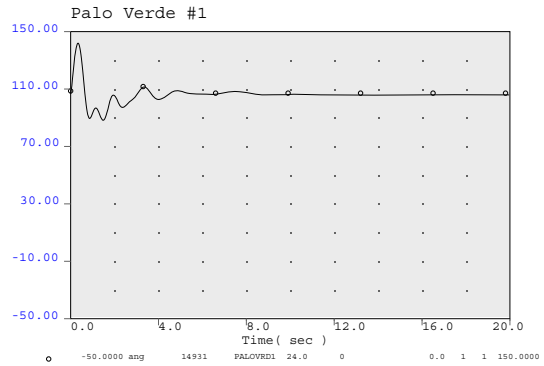


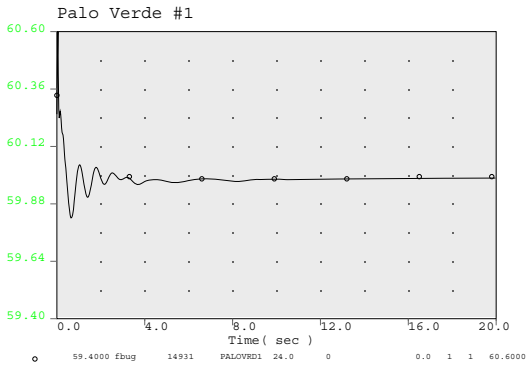
CENTRALS 500kV

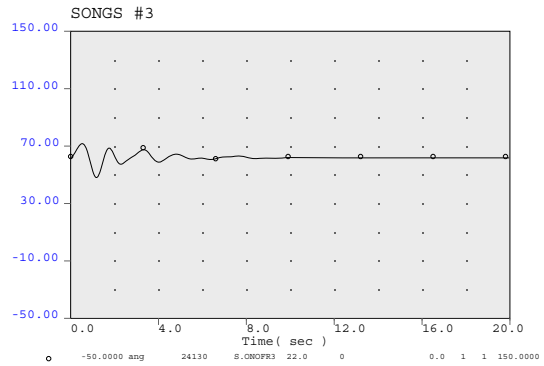


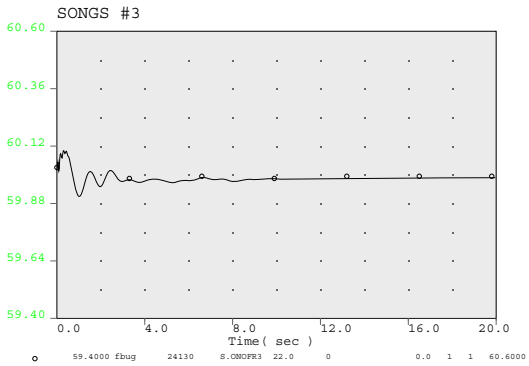
C1 C2 Light Load Pre Without Upgrades

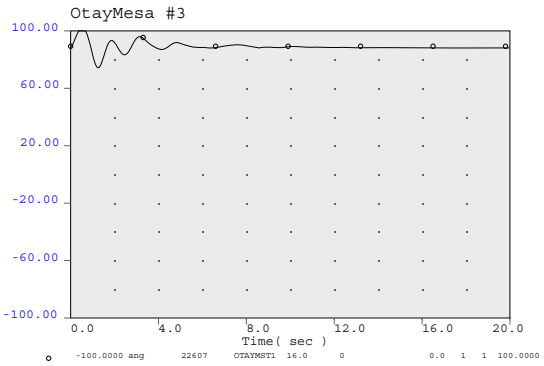
RELATIVE ROTOR ANGLE & FREQUENCY

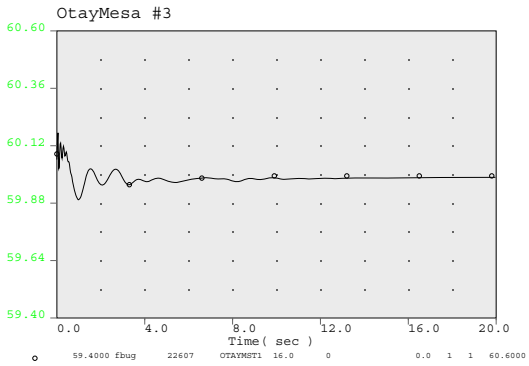












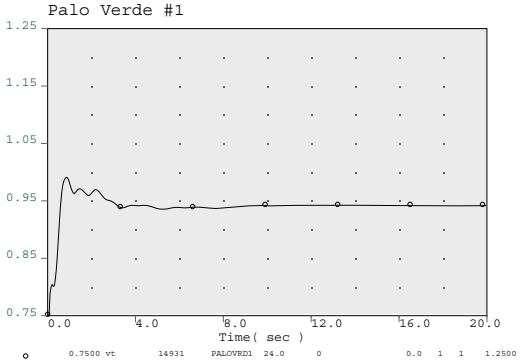
C1 C2 Light Load Pre Without Upgrades

Page 1

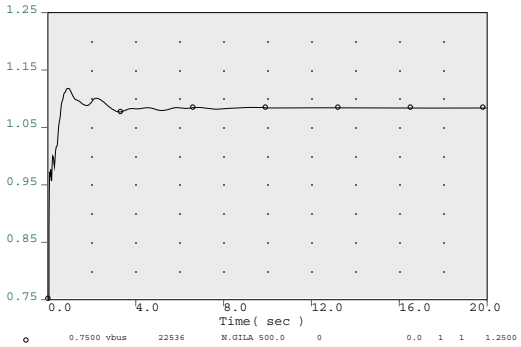
SDGE	tran-c1c2-ll-pre-r12_MES-HAA-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:09:50 2011

RELATIVE VOLTAGE

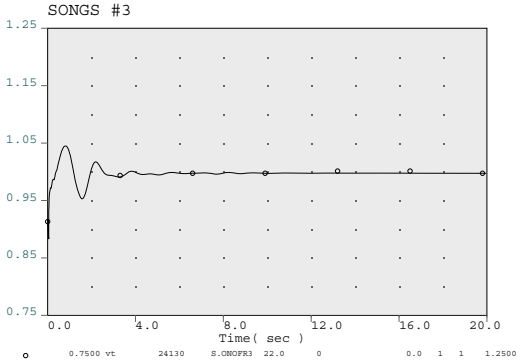
Palo Verde #1



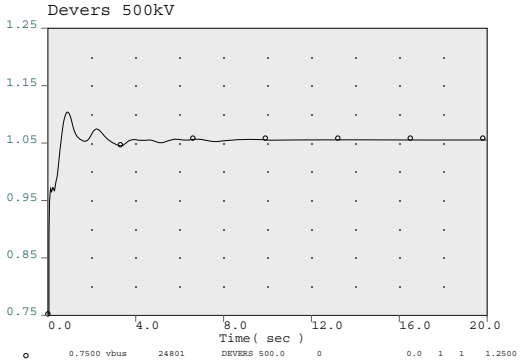
N Gila 500kV



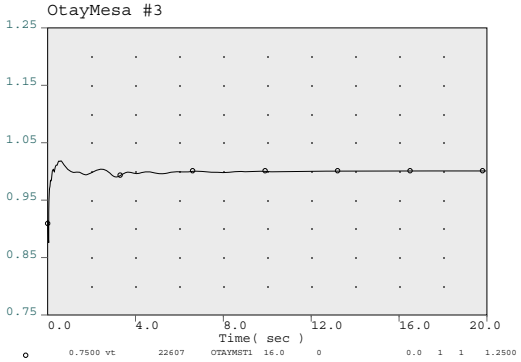
SONGS #3



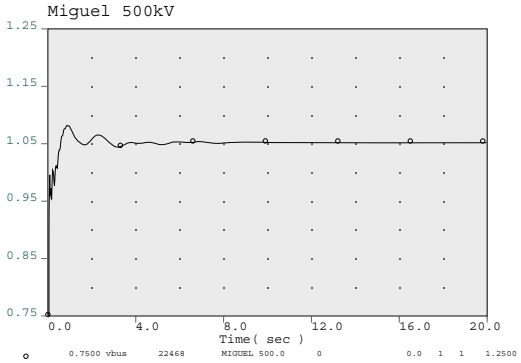
Devers 500kV



OtayMesa #3



Miguel 500kV



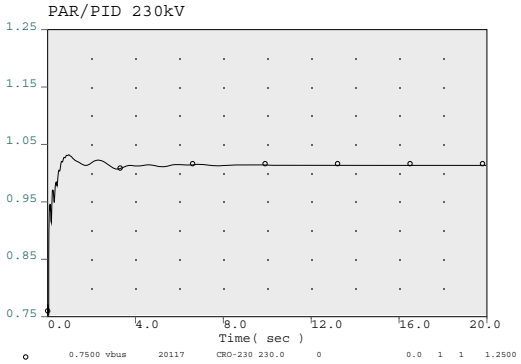
C1 C2 Light Load Pre Without Upgrades

Page 2

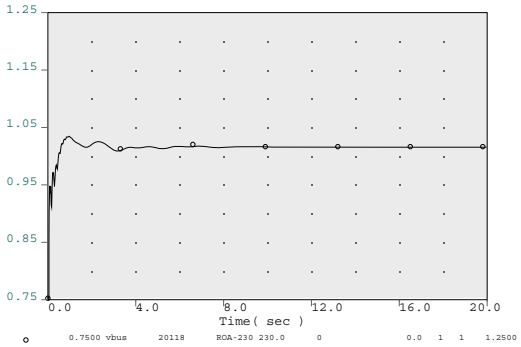
SDGE	tran-c1c2-ll-pre-r12_MES-HAA-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:09:51 2011

Affected System Voltage Check and Comparison

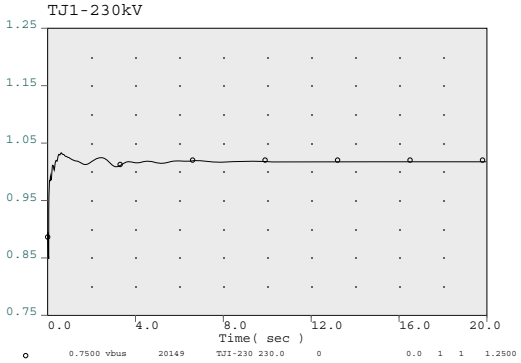
PAR/PID 230kV



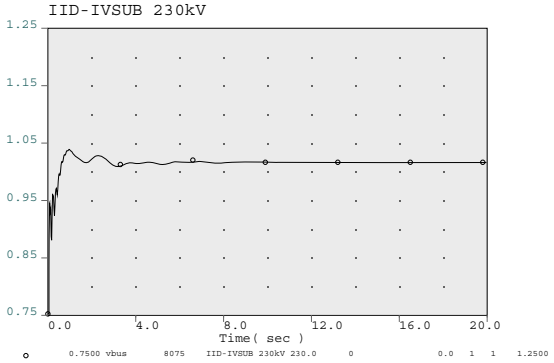
ROA-230kV



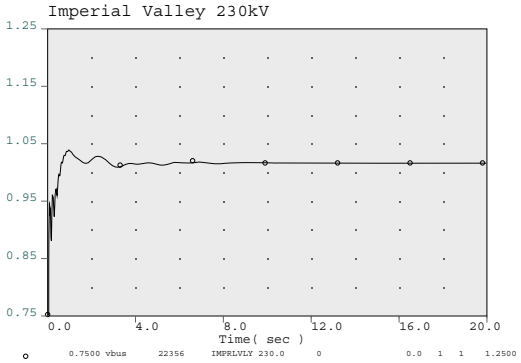
TJ1-230kV



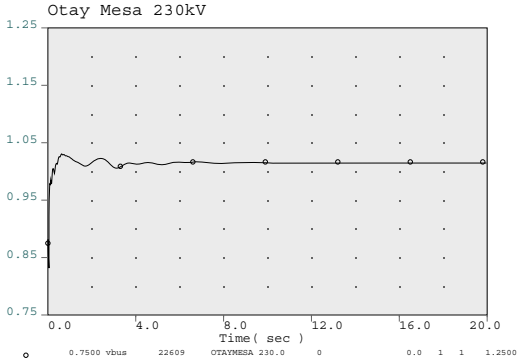
IID-IVSUB 230kV



Imperial Valley 230kV



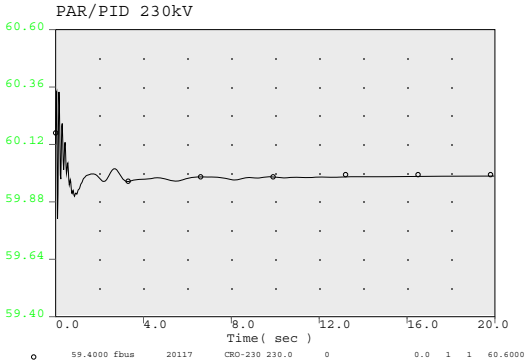
Otay Mesa 230kV



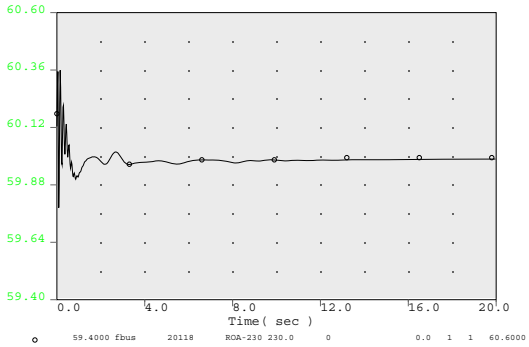
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

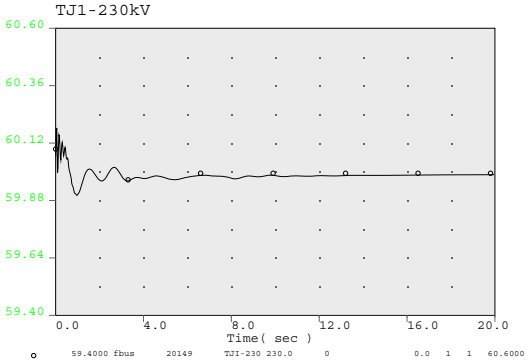
PAR/PID 230kV



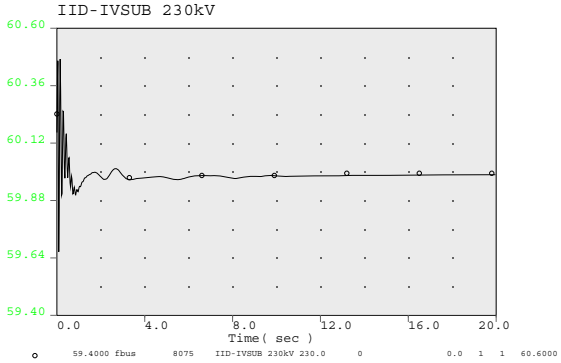
ROA-230kV



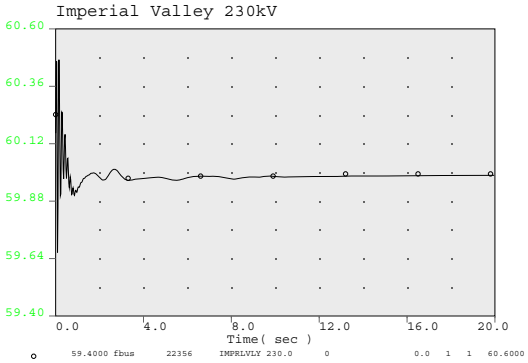
TJ1-230kV



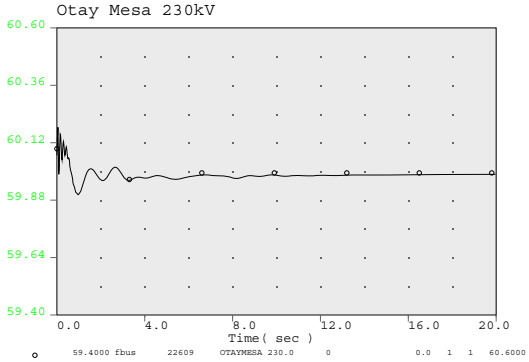
IID-IVSUB 230kV



Imperial Valley 230kV



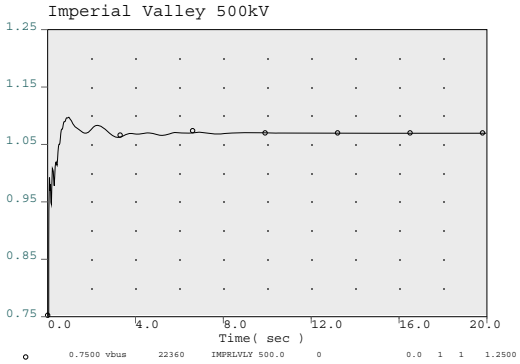
Otay Mesa 230kV



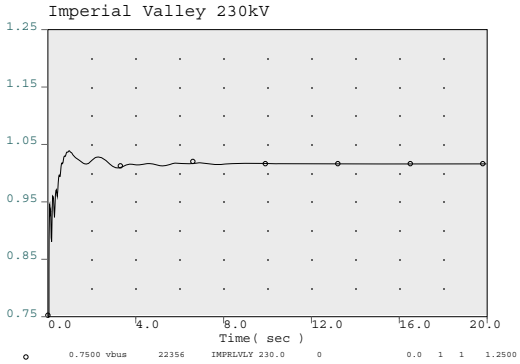
C1 C2 Light Load Pre Without Upgrades

VOLTAGE

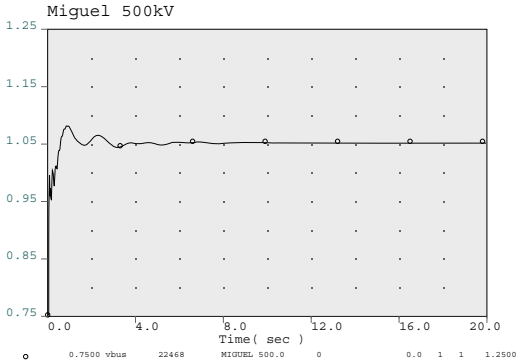
Imperial Valley 500kV



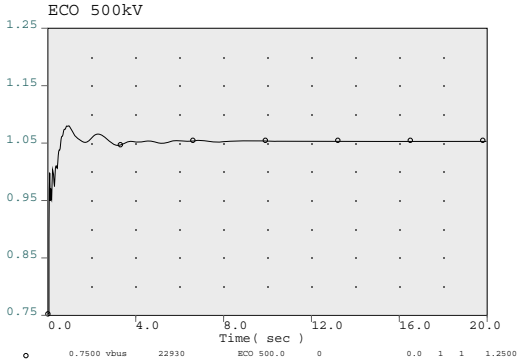
Imperial Valley 230kV



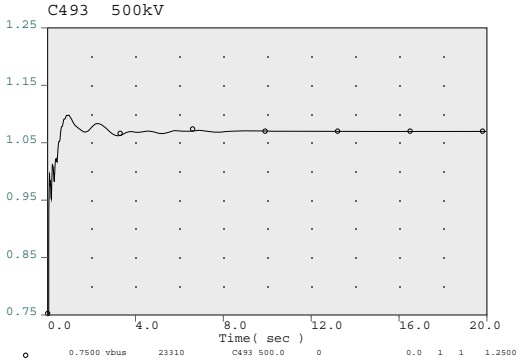
Miguel 500kV



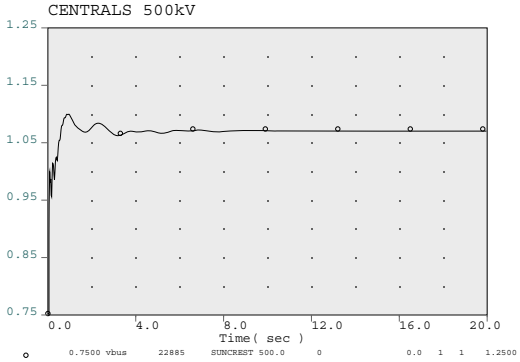
ECO 500kV



C493 500kV



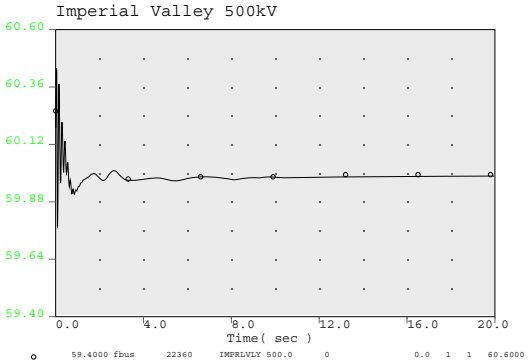
CENTRALS 500kV



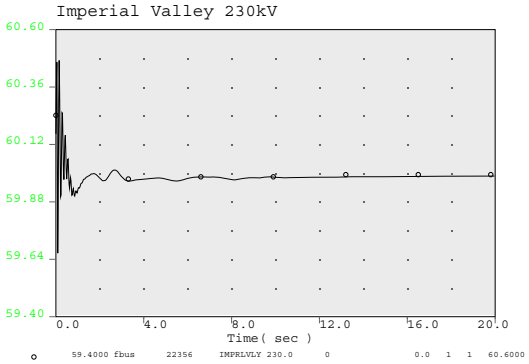
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

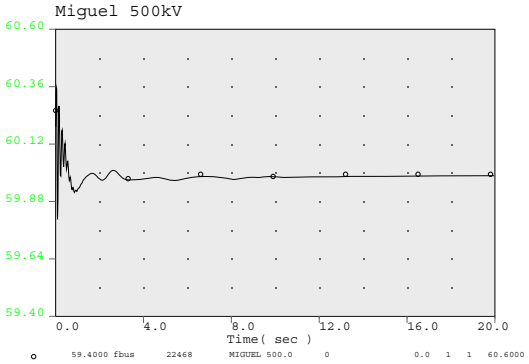
Imperial Valley 500kV



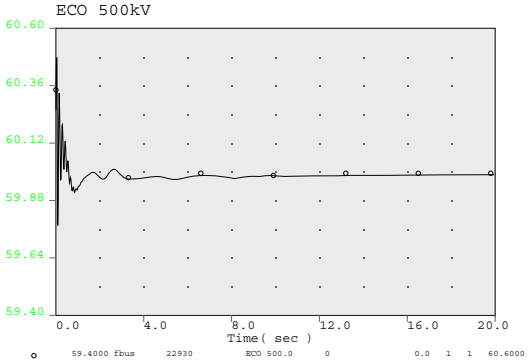
Imperial Valley 230kV



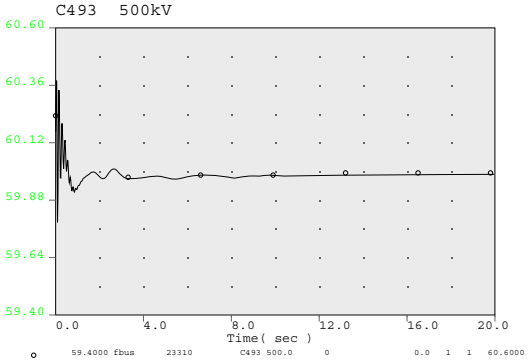
Miguel 500kV



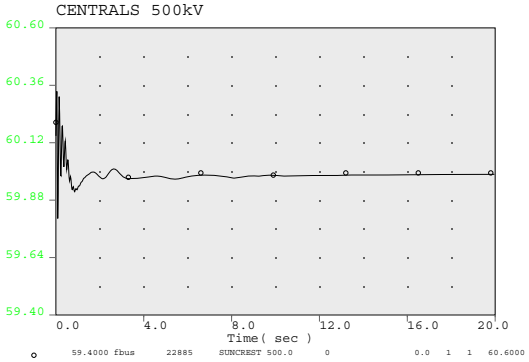
ECO 500kV



C493 500kV

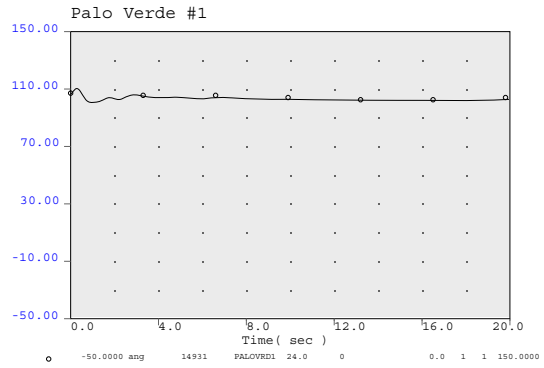


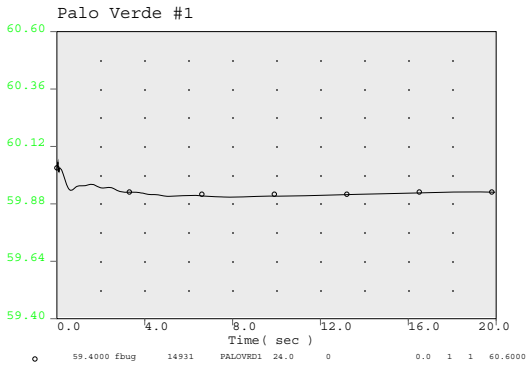
CENTRALS 500kV

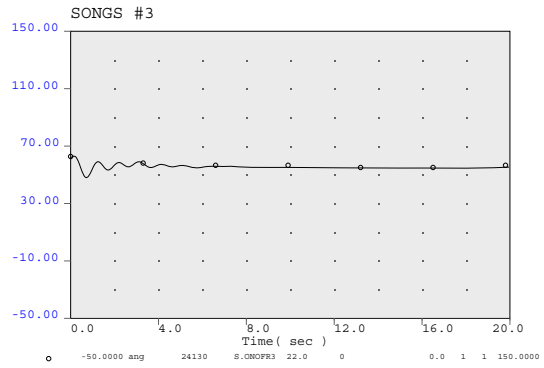


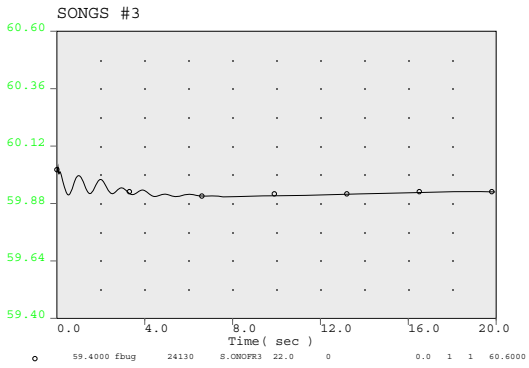
C1 C2 Light Load Pre Without Upgrades

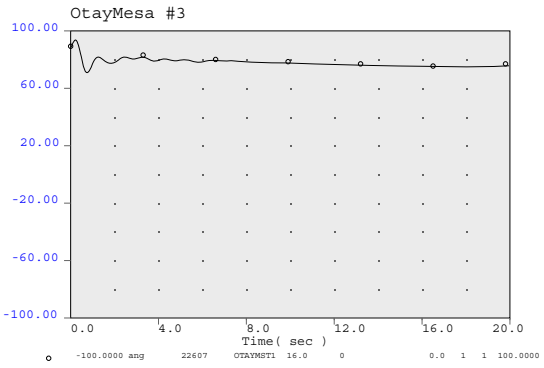
RELATIVE ROTOR ANGLE & FREQUENCY

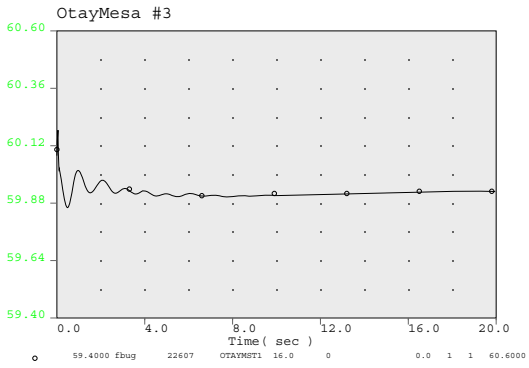












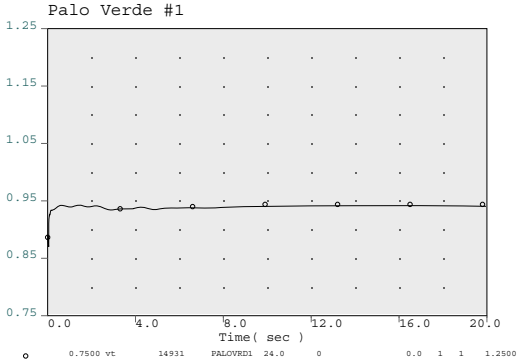
C1 C2 Light Load Pre Without Upgrades

Page 1

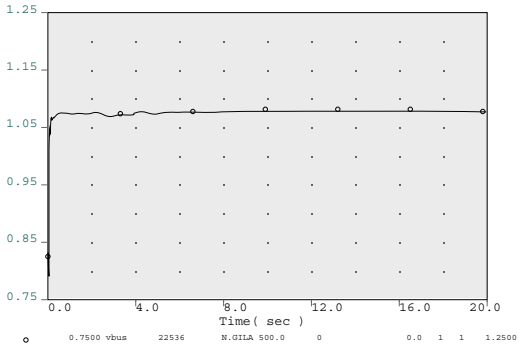
SDGE	tran-c1c2-ll-pre-r12_ML-ECO-RAS_slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:11:40 2011

RELATIVE VOLTAGE

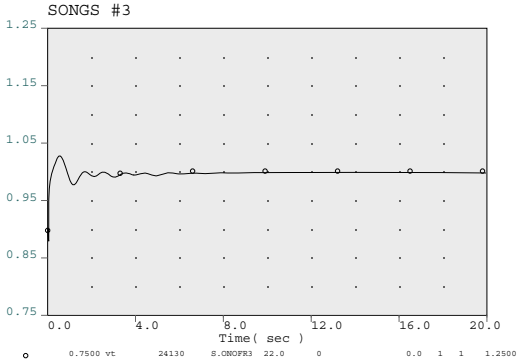
Palo Verde #1



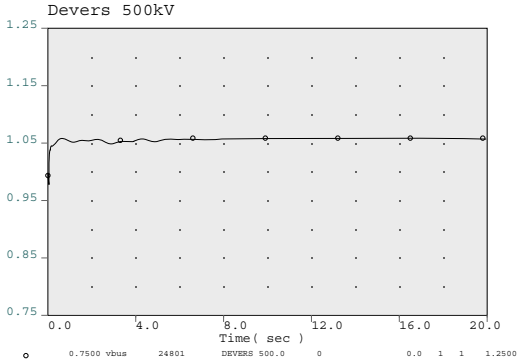
N Gila 500kV



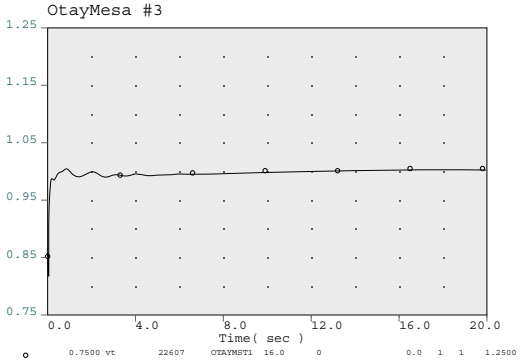
SONGS #3



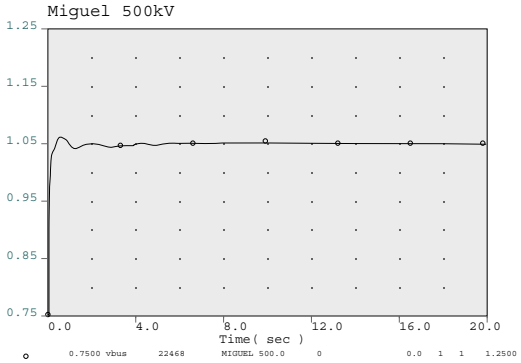
Devers 500kV



OtayMesa #3



Miguel 500kV



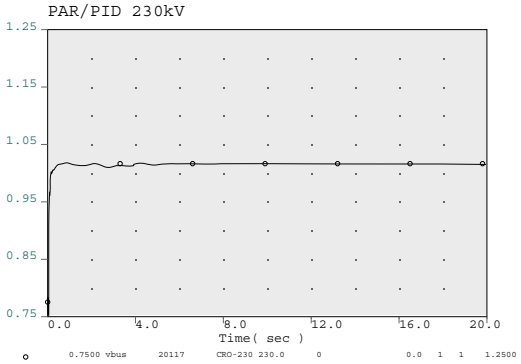
C1 C2 Light Load Pre Without Upgrades

Page 2

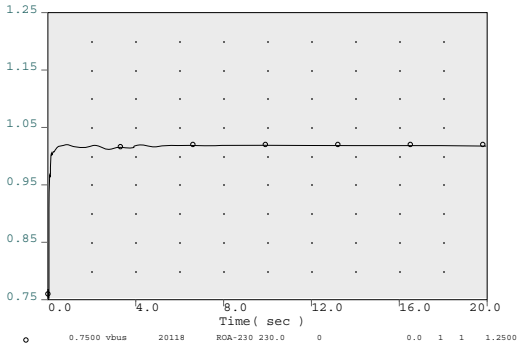
SDGE	tran-c1c2-ll-pre-r12_ML-ECO-RAS_slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:11:41 2011

Affected System Voltage Check and Comparison

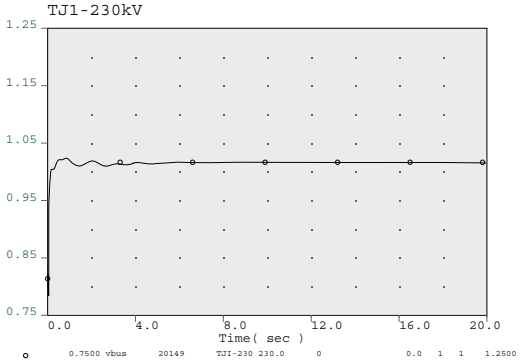
PAR/PID 230kV



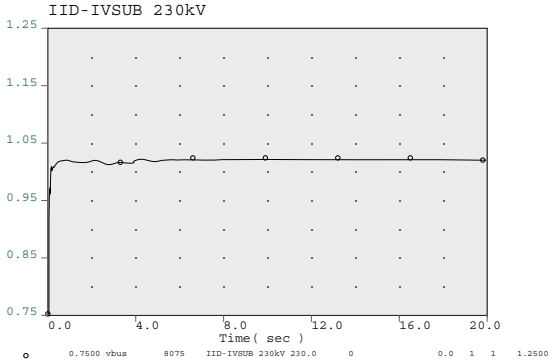
ROA-230kV



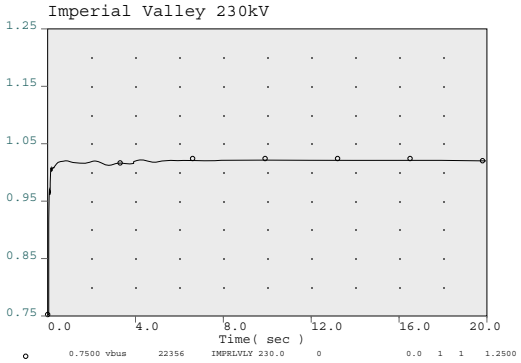
TJ1-230kV



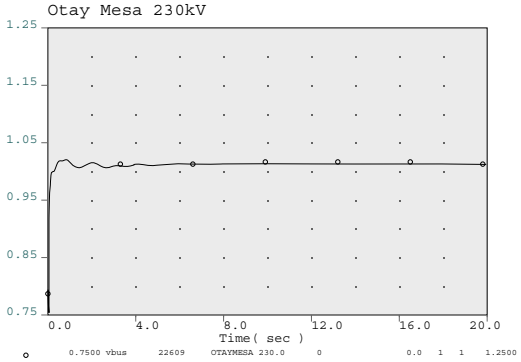
IID-IVSUB 230kV



Imperial Valley 230kV



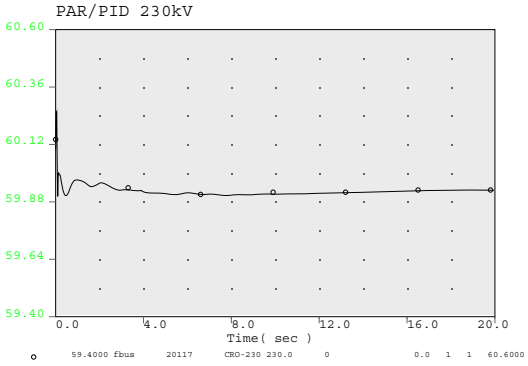
Otay Mesa 230kV



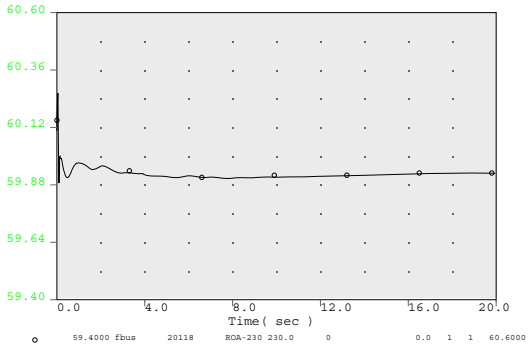
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

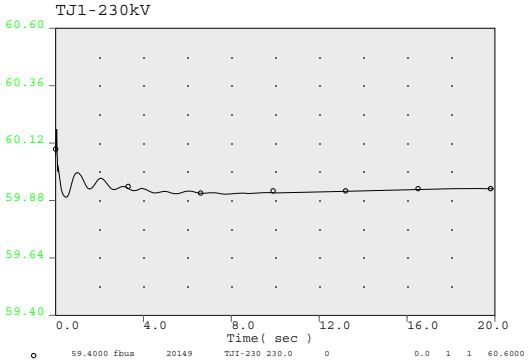
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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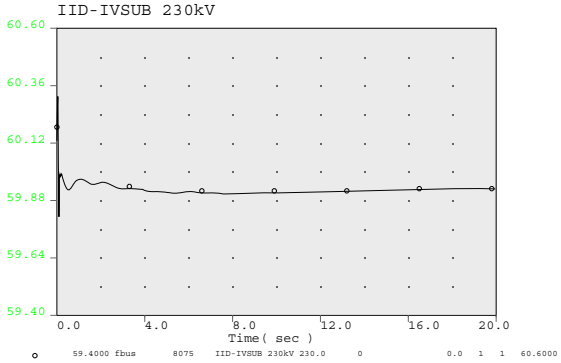
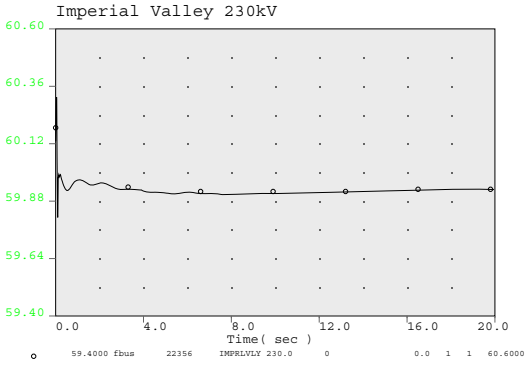
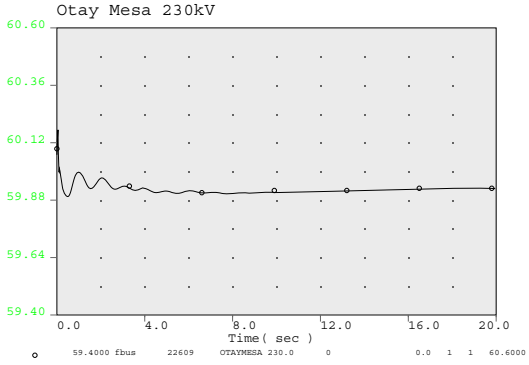


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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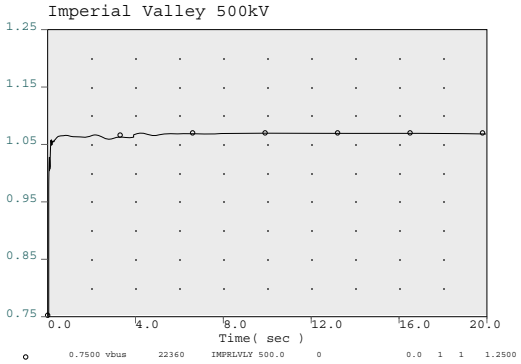
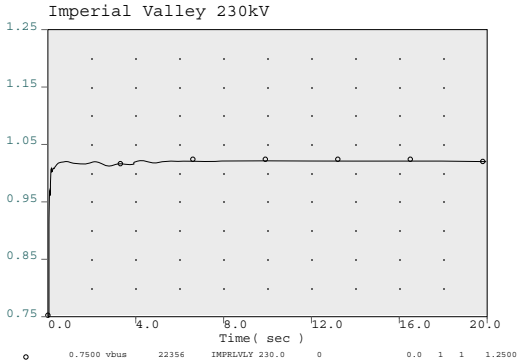
SDGE	tran-c1c2-ll-pre-r12_ML-ECO-RAS_slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:11:42 2011

VOLTAGE

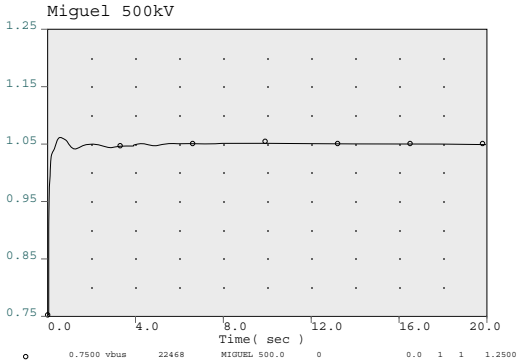
Imperial Valley 500kV



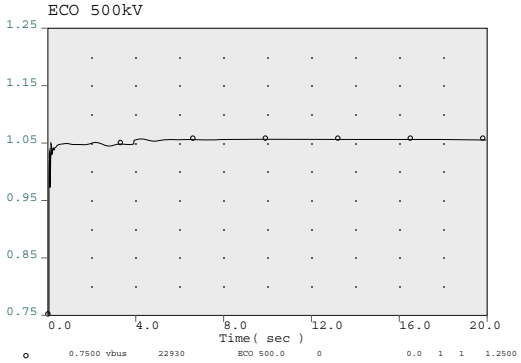
Imperial Valley 230kV



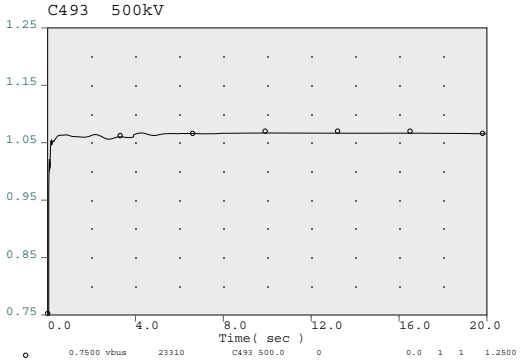
Miguel 500kV



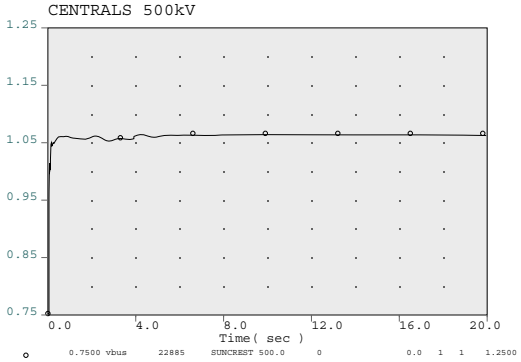
ECO 500kV



C493 500kV



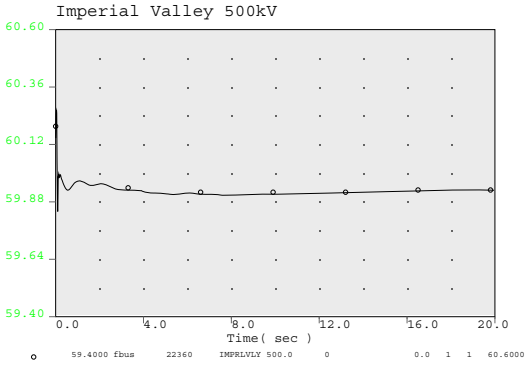
CENTRALS 500kV



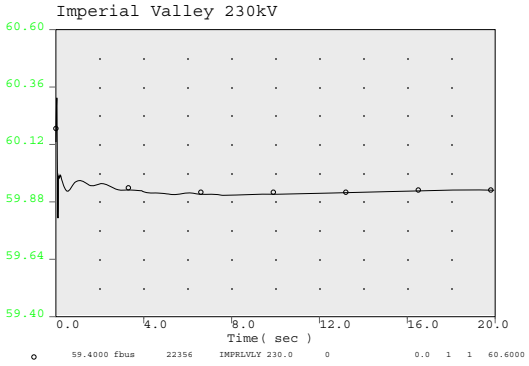
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

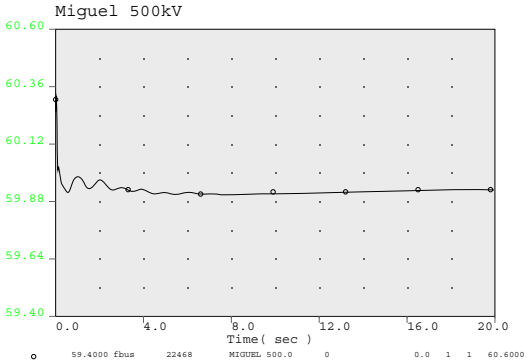
Imperial Valley 500kV



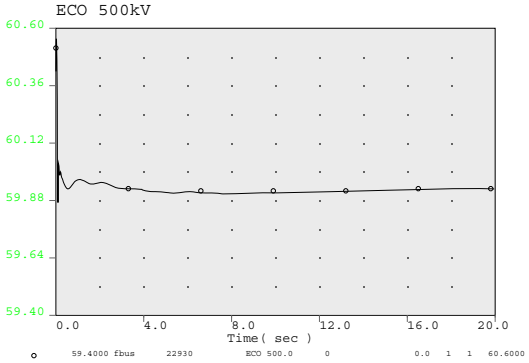
Imperial Valley 230kV



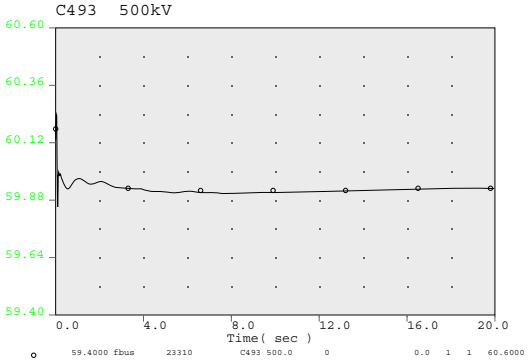
Miguel 500kV



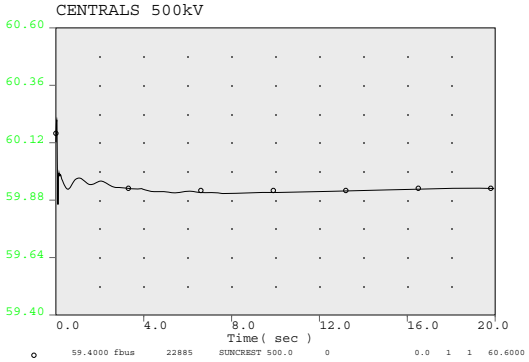
ECO 500kV



C493 500kV

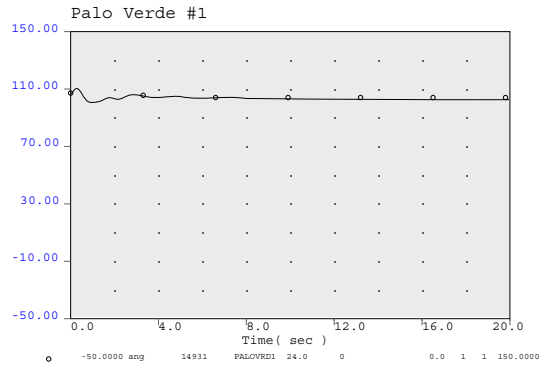


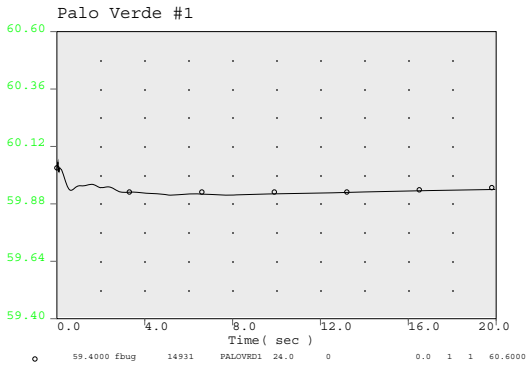
CENTRALS 500kV

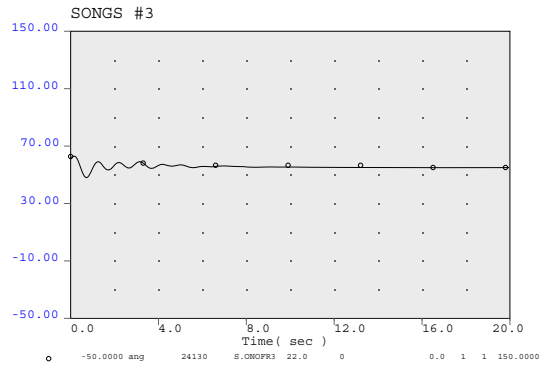


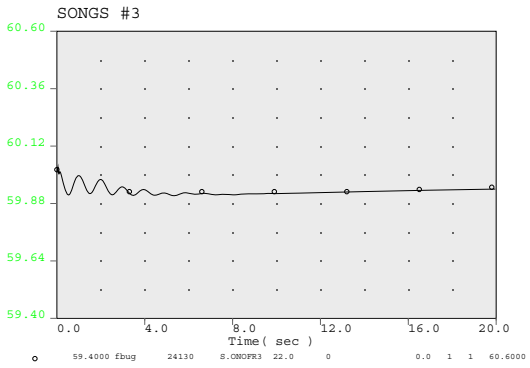
C1 C2 Light Load Pre Without Upgrades

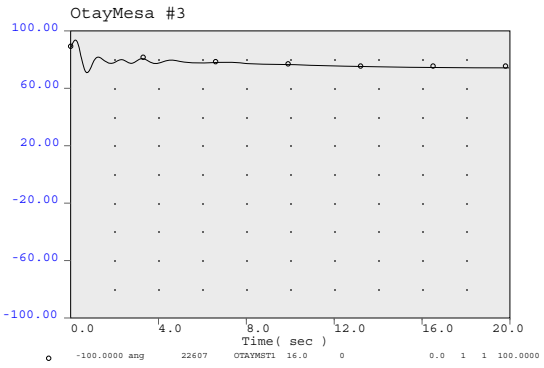
RELATIVE ROTOR ANGLE & FREQUENCY

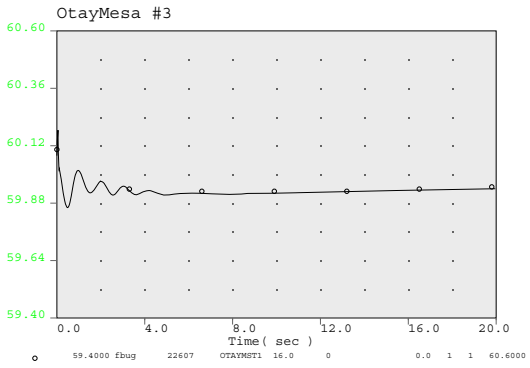












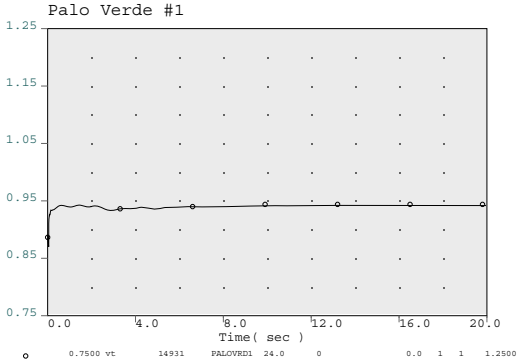
C1 C2 Light Load Pre Without Upgrades

Page 1

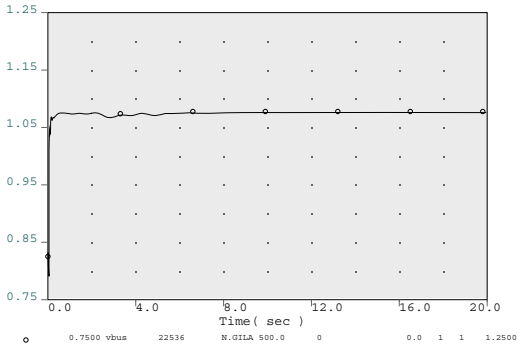
SDGE	tran-c1c2-ll-pre-r12_MLECO-RASX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:15:41 2011

RELATIVE VOLTAGE

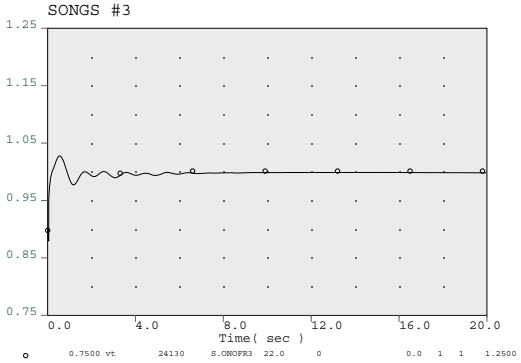
Palo Verde #1



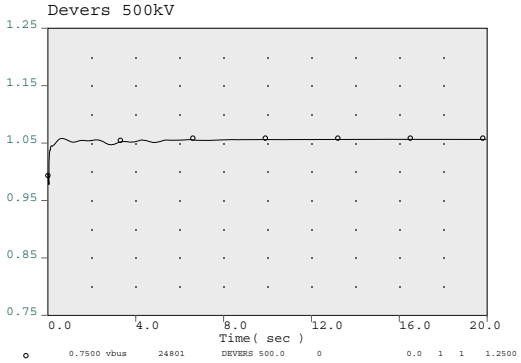
N Gila 500kV



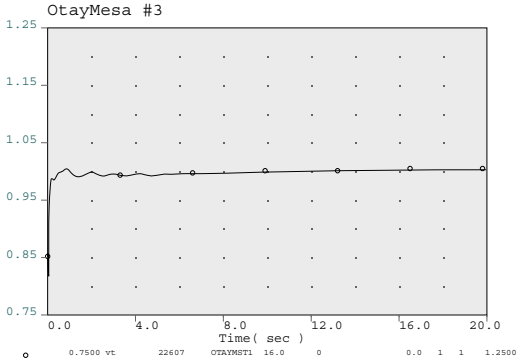
SONGS #3



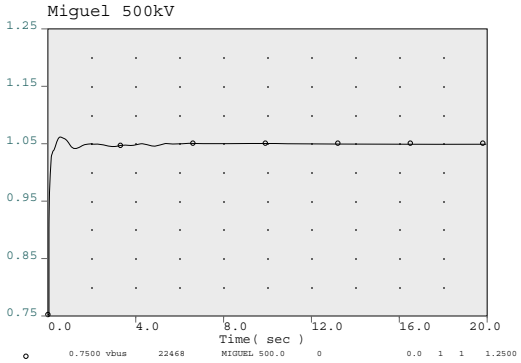
Devers 500kV



OtayMesa #3



Miguel 500kV



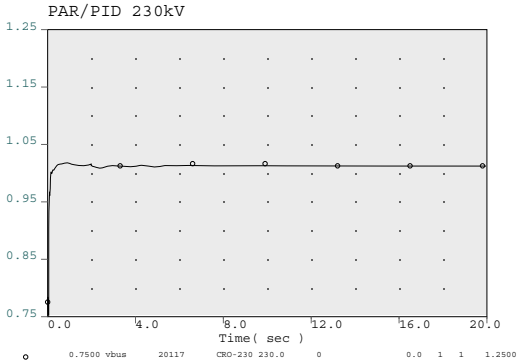
C1 C2 Light Load Pre Without Upgrades

Page 2

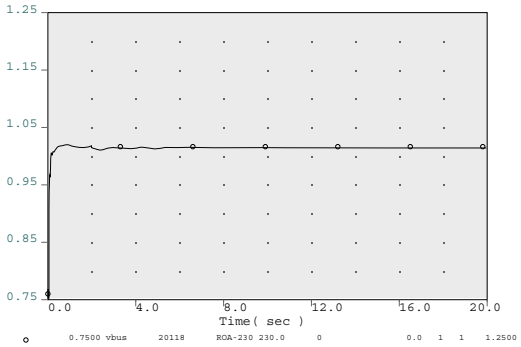
SDGE	tran-c1c2-ll-pre-r12_MLECO-RASX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:15:42 2011

Affected System Voltage Check and Comparison

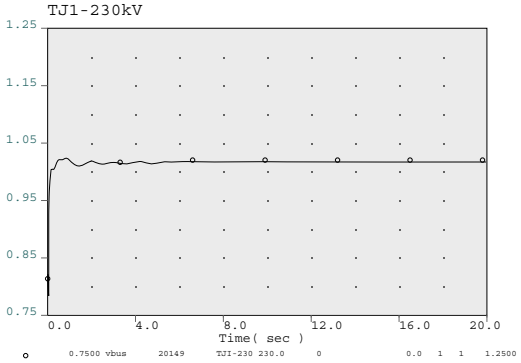
PAR/PID 230kV



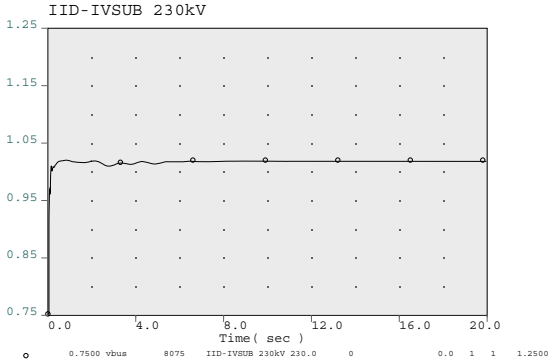
ROA-230kV



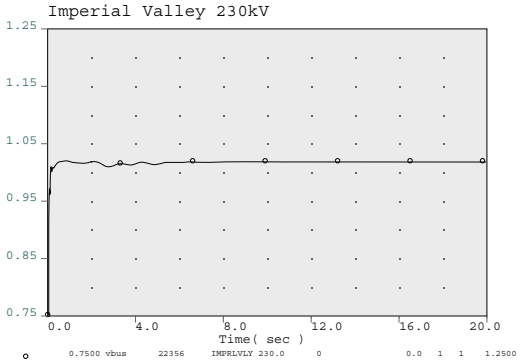
TJ1-230kV



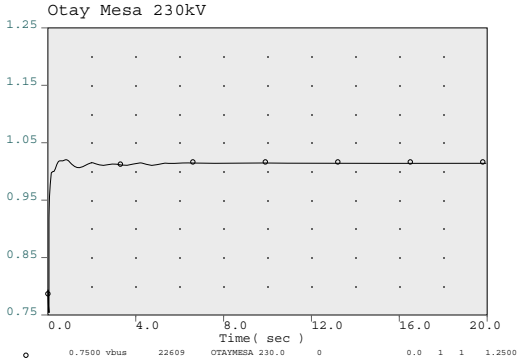
IID-IVSUB 230kV



Imperial Valley 230kV



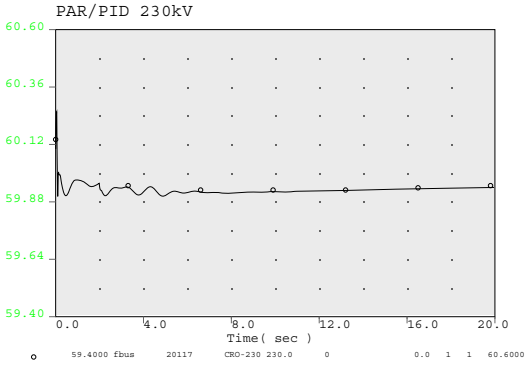
Otay Mesa 230kV



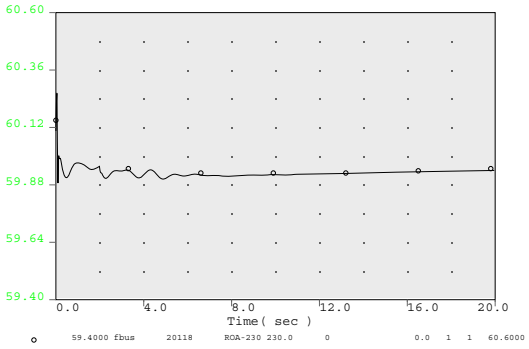
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

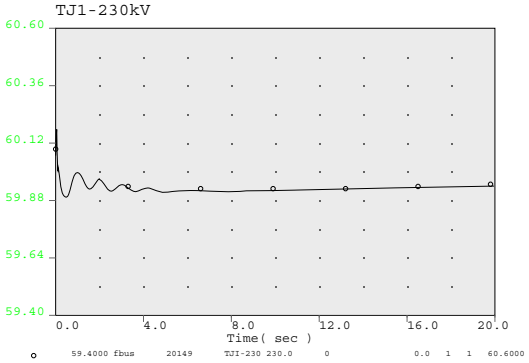
PAR/PID 230kV



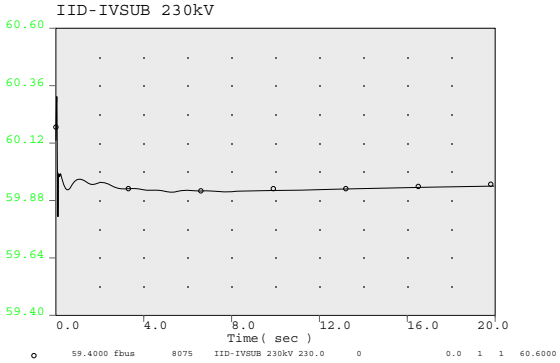
ROA-230kV



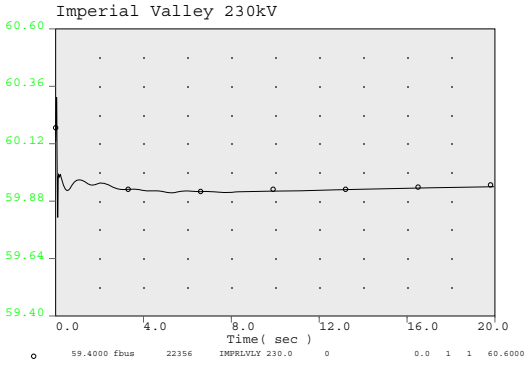
TJ1-230kV



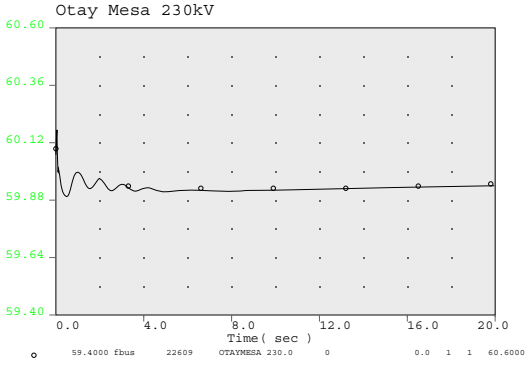
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



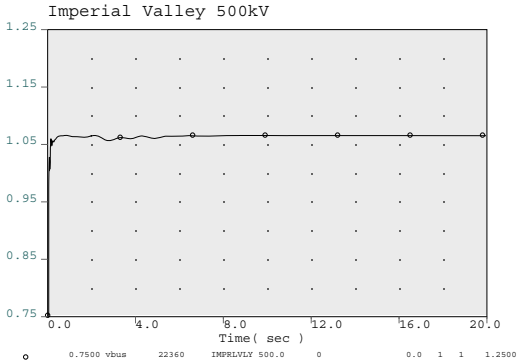
C1 C2 Light Load Pre Without Upgrades

Page 4

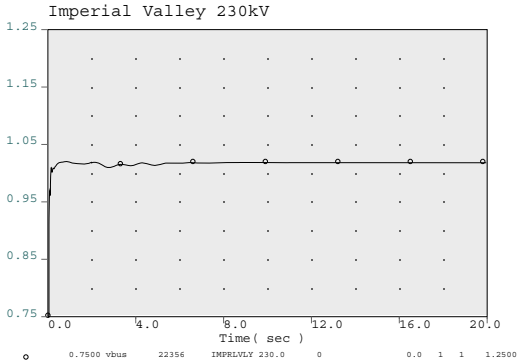
SDGE	tran-c1c2-ll-pre-r12_MLECO-RASX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:15:43 2011

VOLTAGE

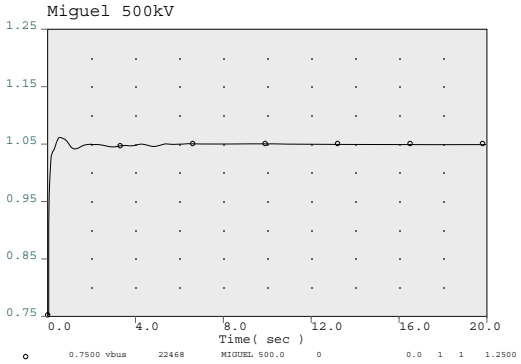
Imperial Valley 500kV



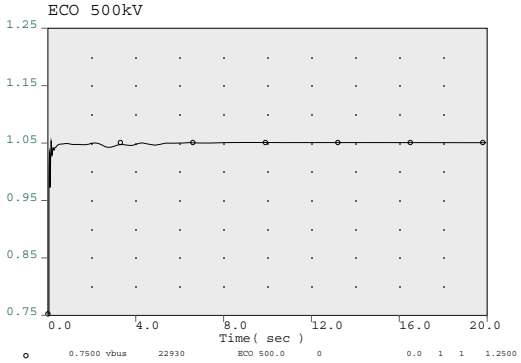
Imperial Valley 230kV



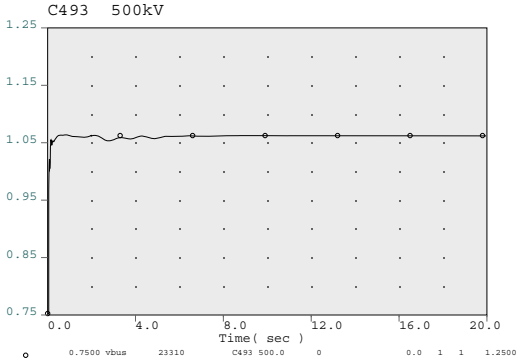
Miguel 500kV



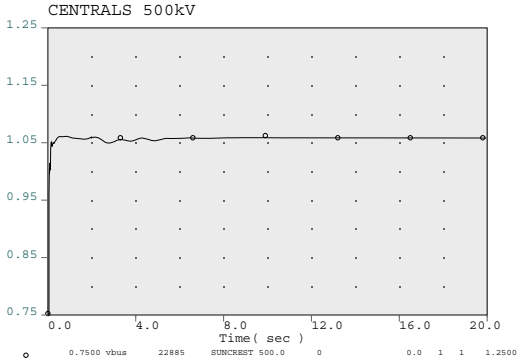
ECO 500kV



C493 500kV



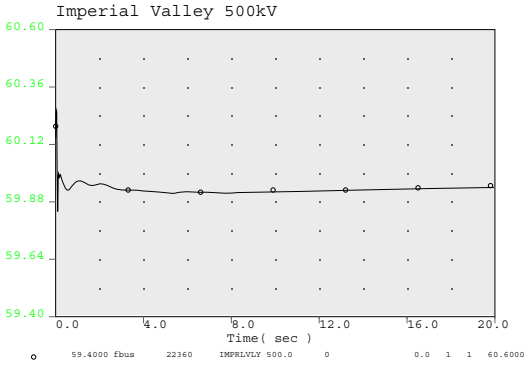
CENTRALS 500kV



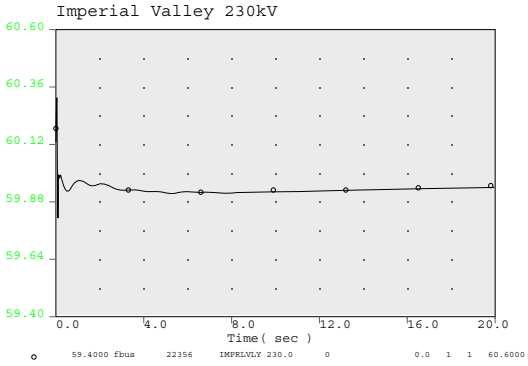
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

Imperial Valley 500kV



Imperial Valley 230kV



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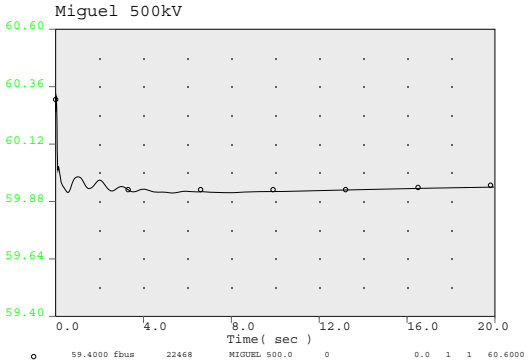

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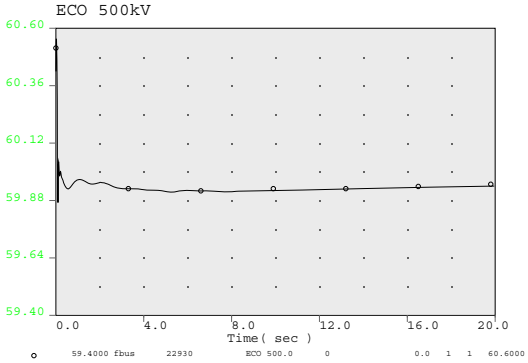
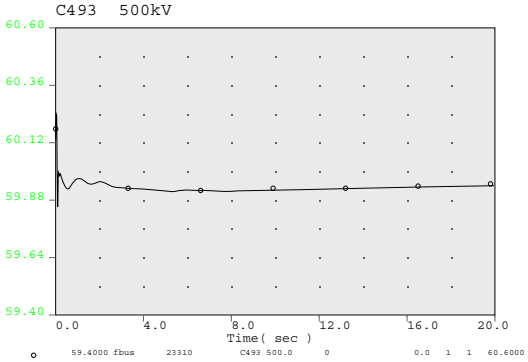
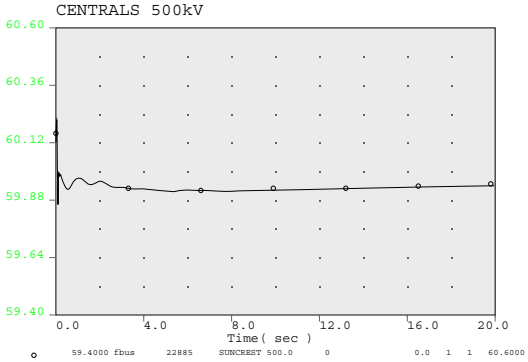


C493 500kV

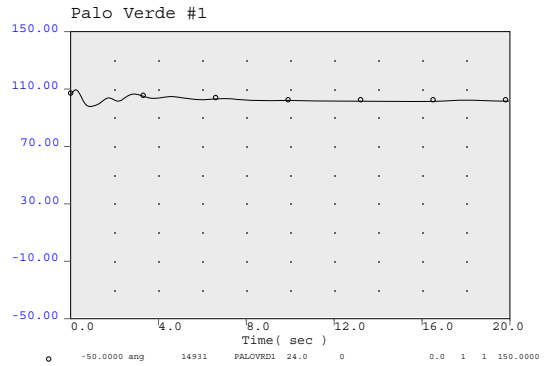


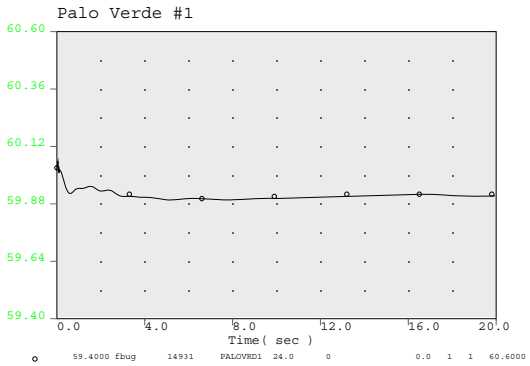
CENTRALS 500kV

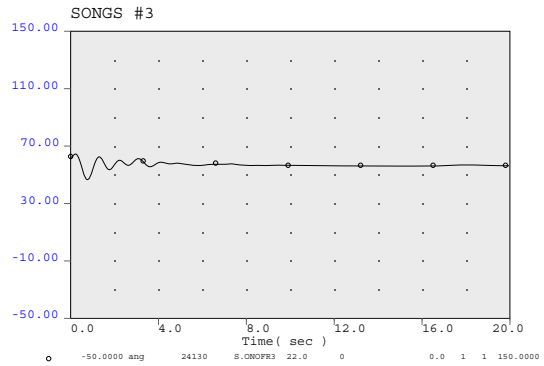


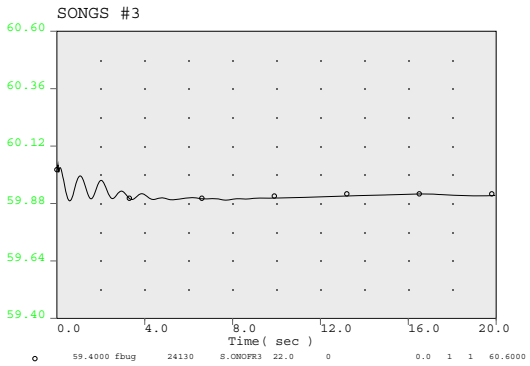
C1 C2 Light Load Pre Without Upgrades

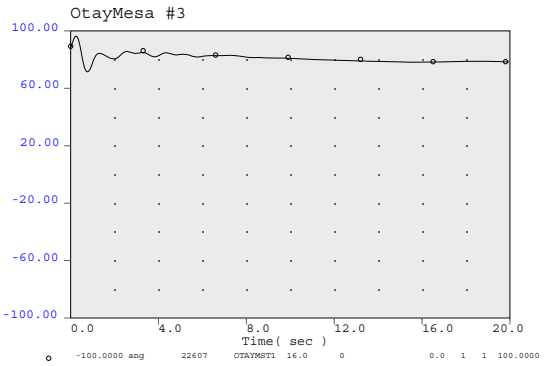
RELATIVE ROTOR ANGLE & FREQUENCY

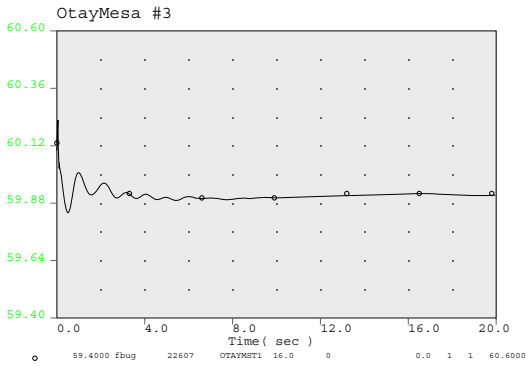












C1 C2 Light Load Pre Without Upgrades

Page 1

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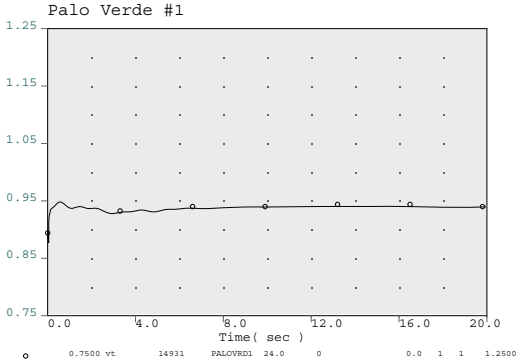
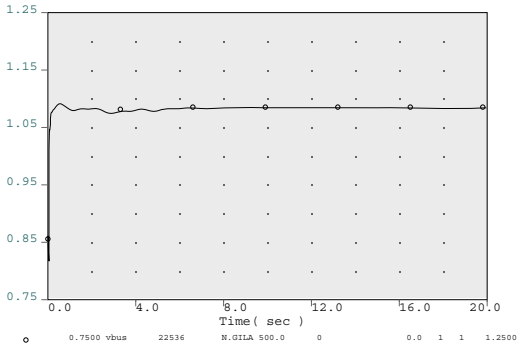
RELATIVE VOLTAGE

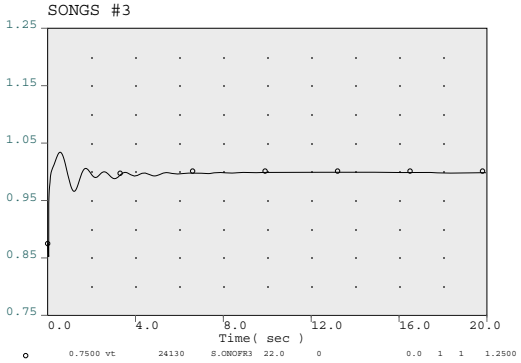
Palo Verde #1



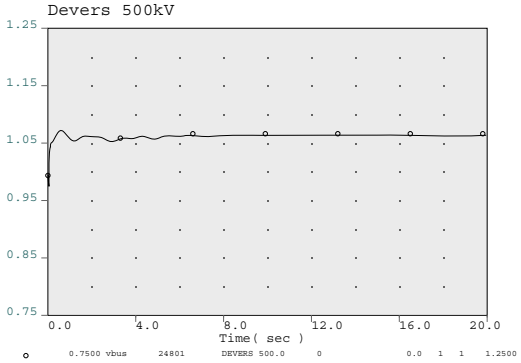
N Gila 500kV



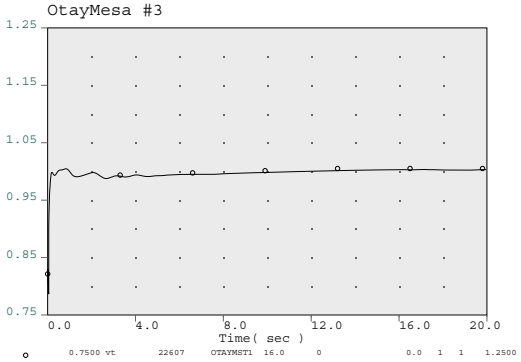
SONGS #3



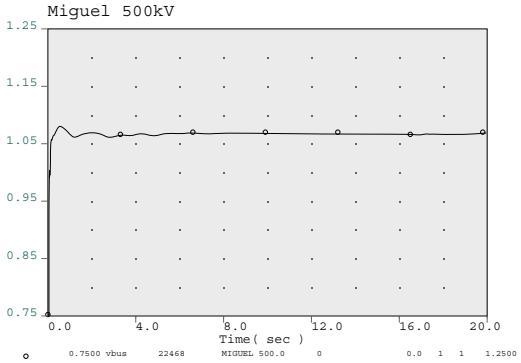
Devers 500kV



OtayMesa #3



Miguel 500kV



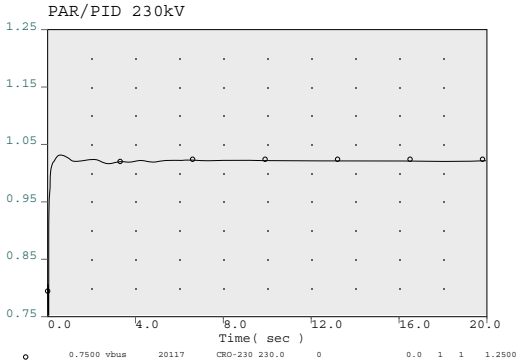
C1 C2 Light Load Pre Without Upgrades

Page 2

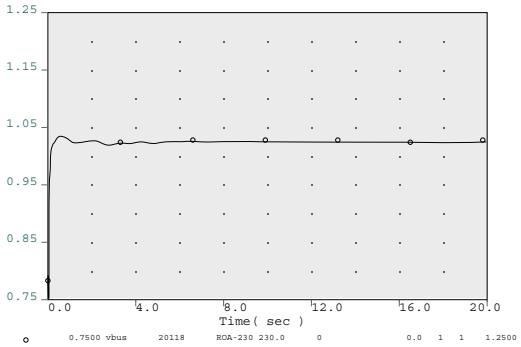
SDGE	tran-c1c2-ll-pre-r12_ML-MS-RAS-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:13:33 2011

Affected System Voltage Check and Comparison

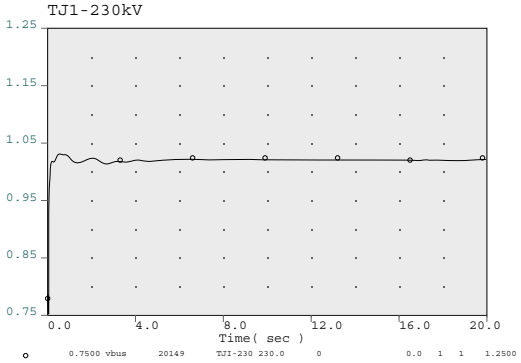
PAR/PID 230kV



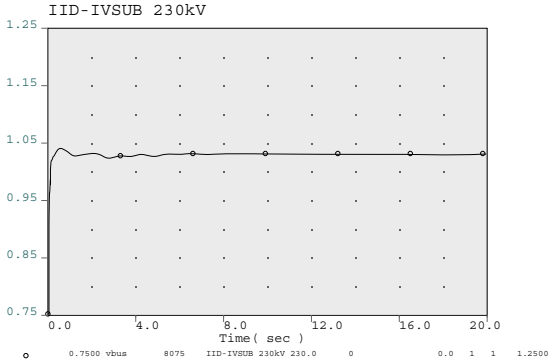
ROA-230kV



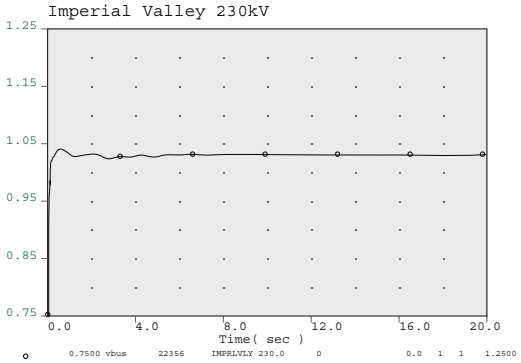
TJ1-230kV



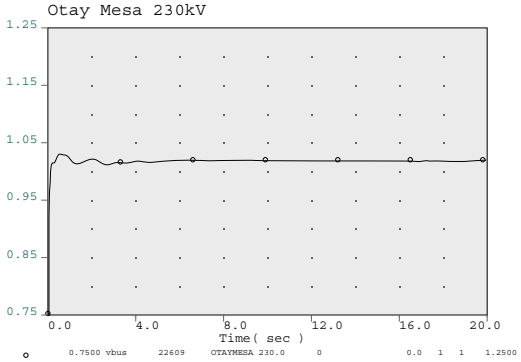
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 3

tran-c1c2-ll-pre-r12_ML-MS-RAS-dlo.chf

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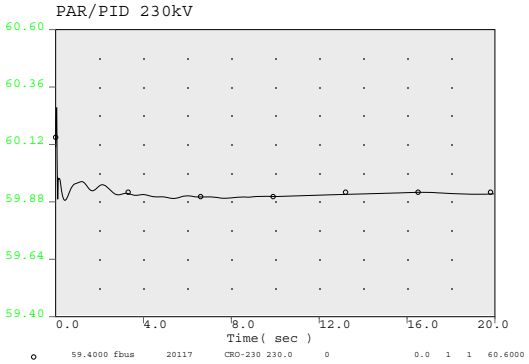
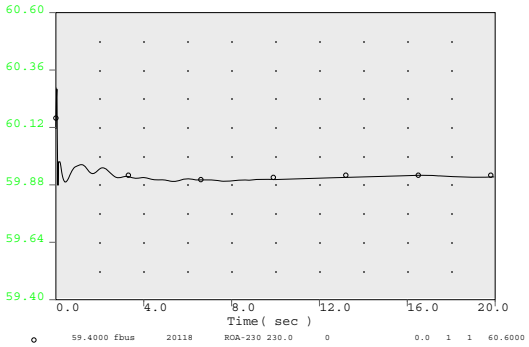
Affected System Frequency Check and Comparison

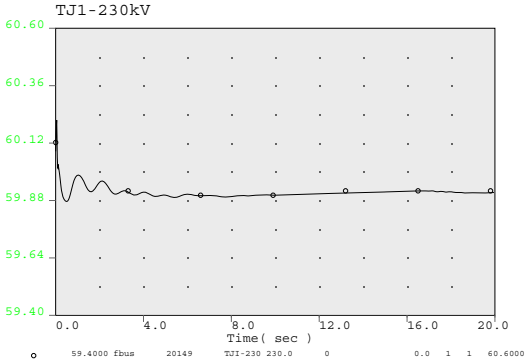
PAR/PID 230kV



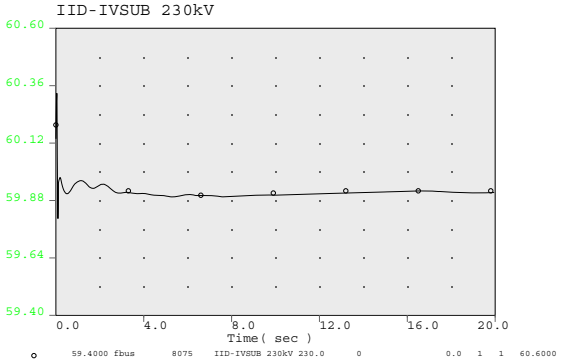
ROA-230kV



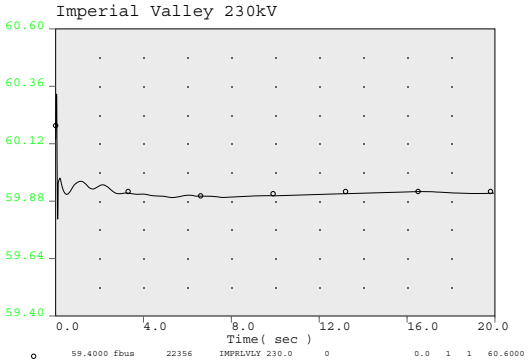
TJ1-230kV



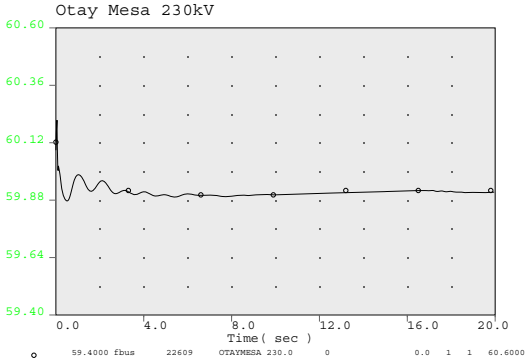
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

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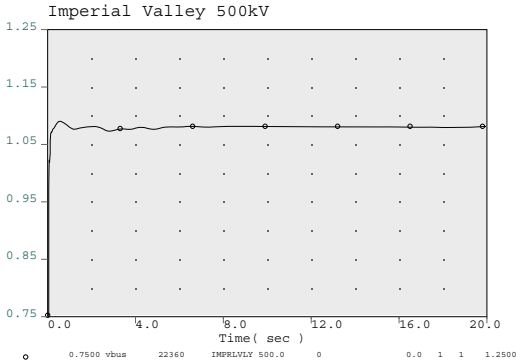
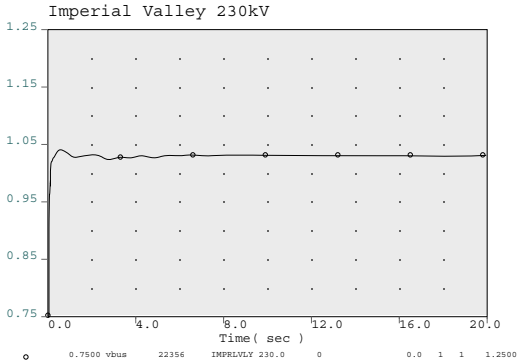
SDGE	tran-c1c2-ll-pre-r12_ML-MS-RAS-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:13:34 2011

VOLTAGE

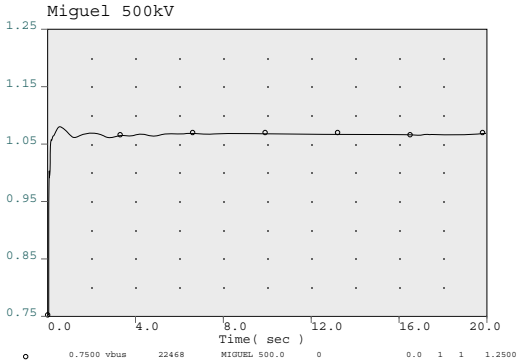
Imperial Valley 500kV



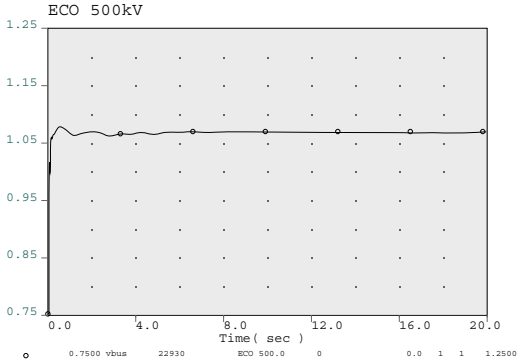
Imperial Valley 230kV



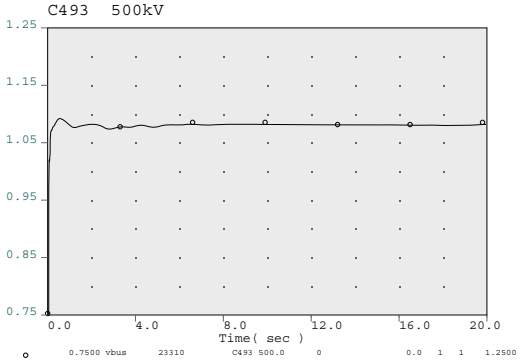
Miguel 500kV



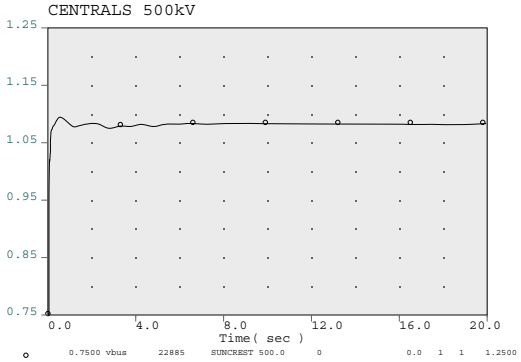
ECO 500kV



C493 500kV



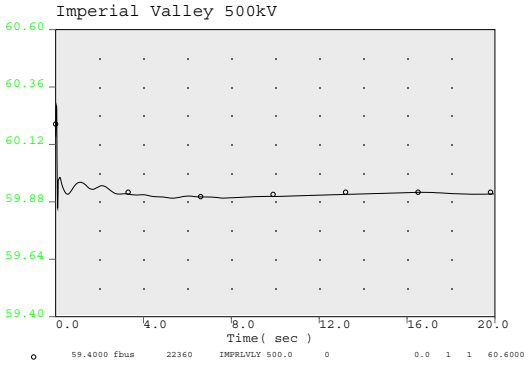
CENTRALS 500kV



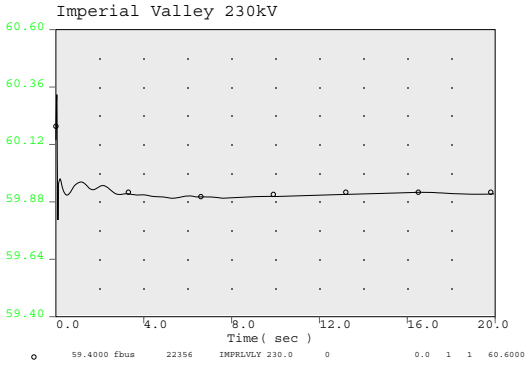
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

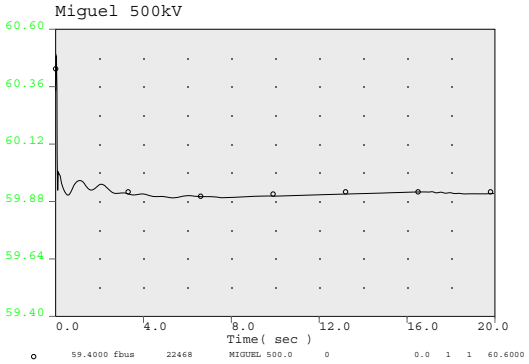
Imperial Valley 500kV



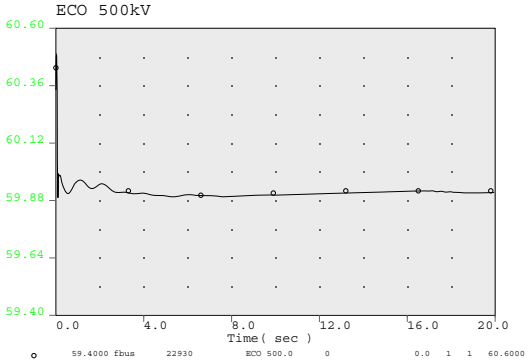
Imperial Valley 230kV



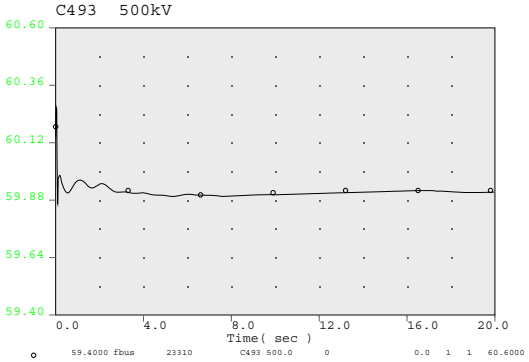
Miguel 500kV



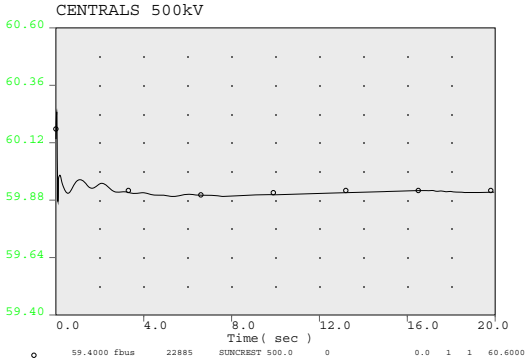
ECO 500kV



C493 500kV

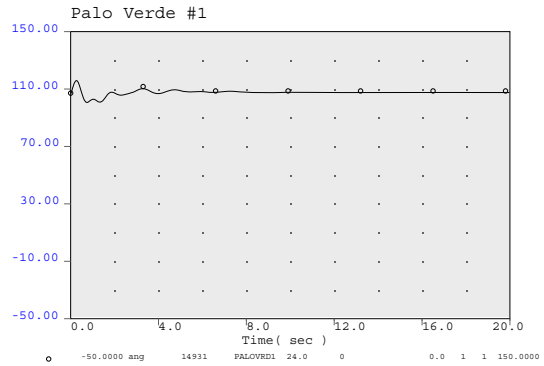


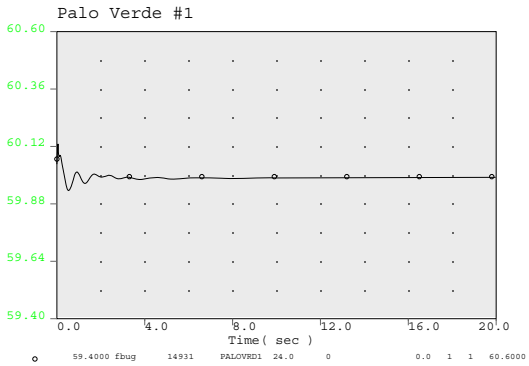
CENTRALS 500kV

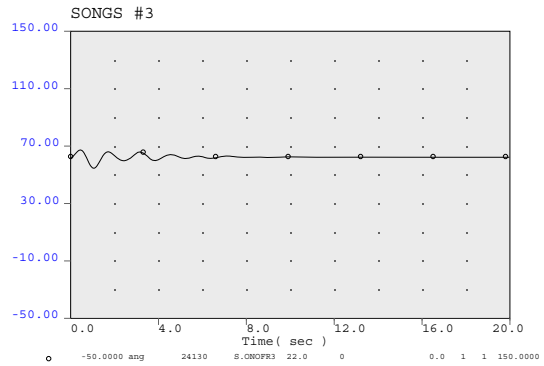


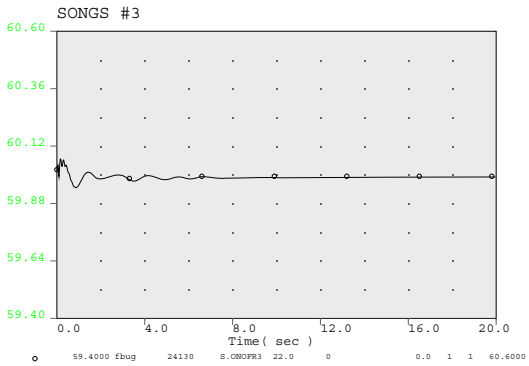
C1 C2 Light Load Pre Without Upgrades

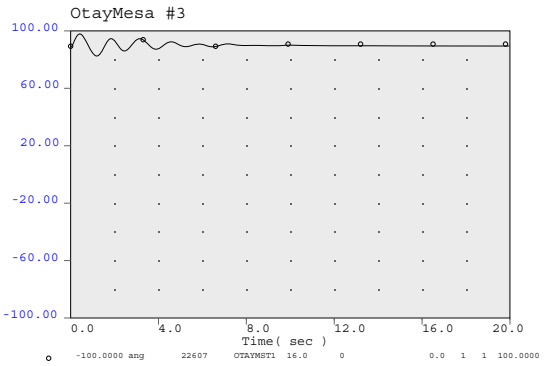
RELATIVE ROTOR ANGLE & FREQUENCY

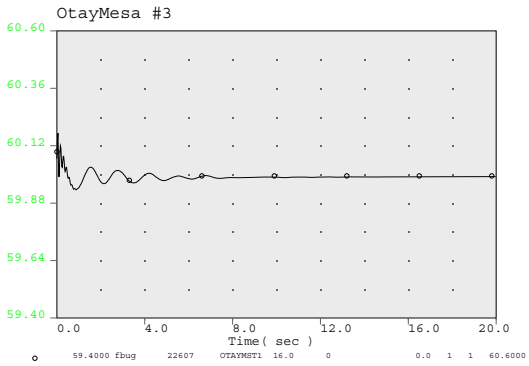












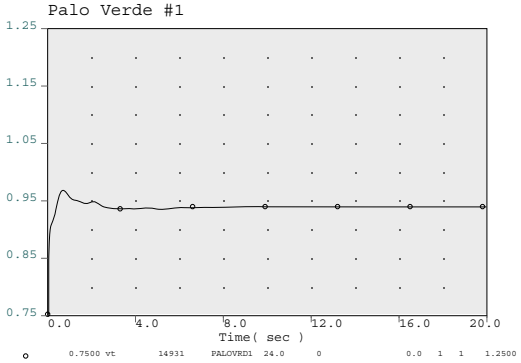
C1 C2 Light Load Pre Without Upgrades

Page 1

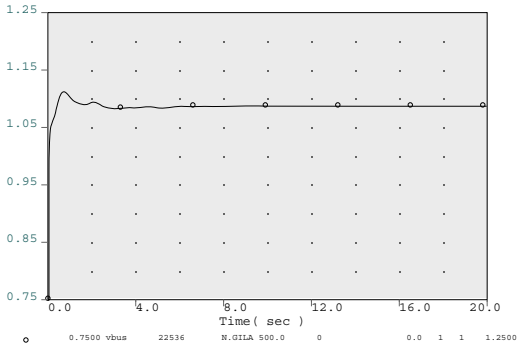
SDGE	tran-c1c2-ll-pre-r12_NGila-IV-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:19:20 2011

RELATIVE VOLTAGE

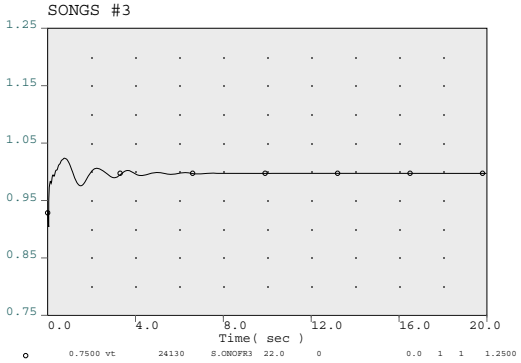
Palo Verde #1



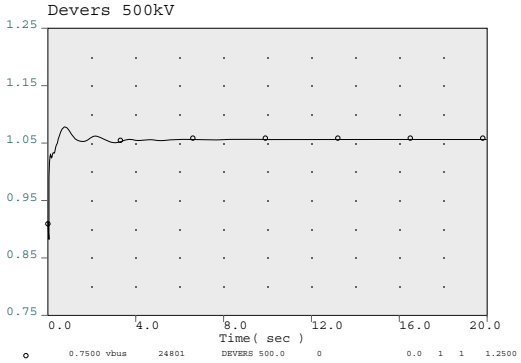
N Gila 500kV



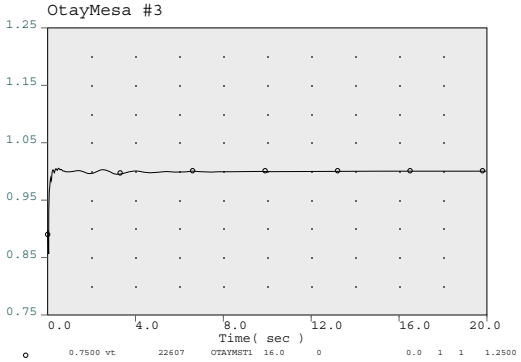
SONGS #3



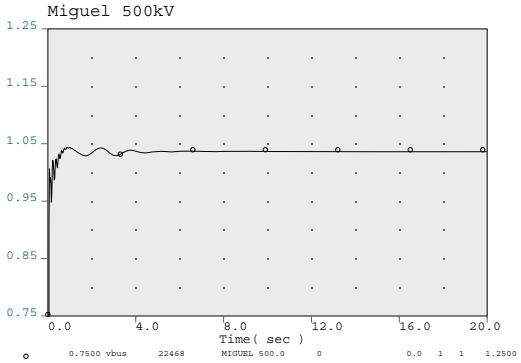
Devers 500kV



OtayMesa #3



Miguel 500kV



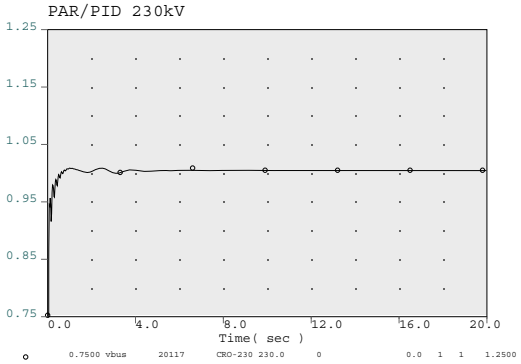
C1 C2 Light Load Pre Without Upgrades

Page 2

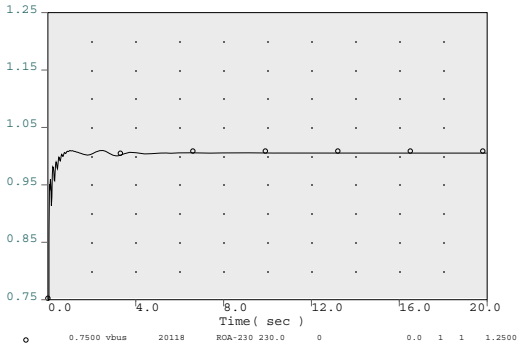
SDGE	tran-c1c2-ll-pre-r12_NGila-IV-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:19:20 2011

Affected System Voltage Check and Comparison

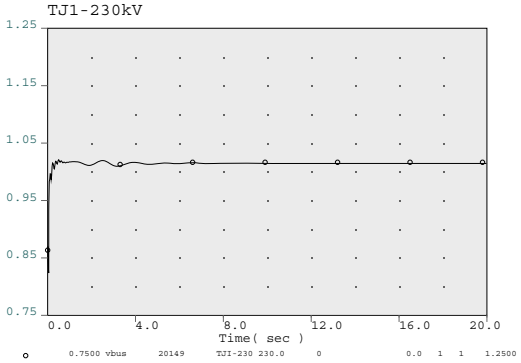
PAR/PID 230kV



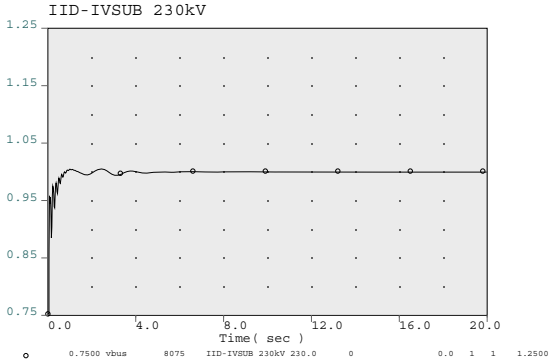
ROA-230kV



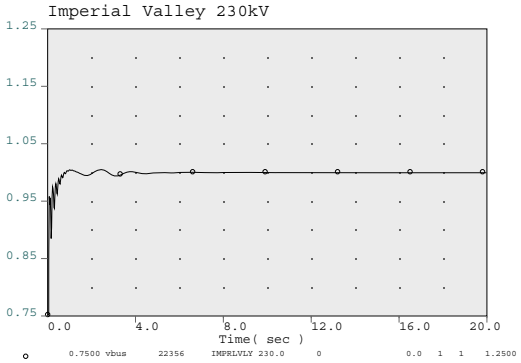
TJ1-230kV



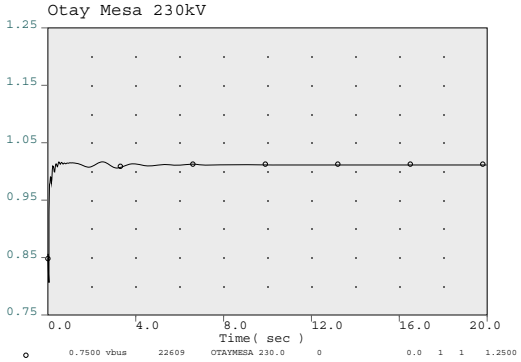
IID-IVSUB 230kV



Imperial Valley 230kV



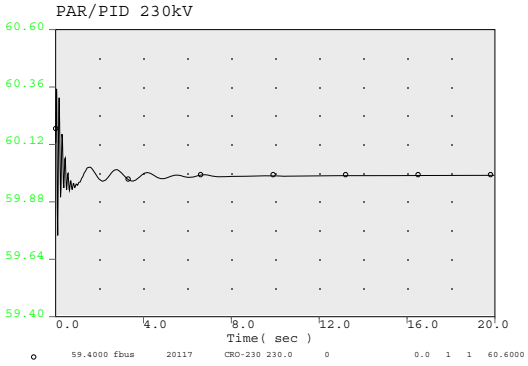
Otay Mesa 230kV



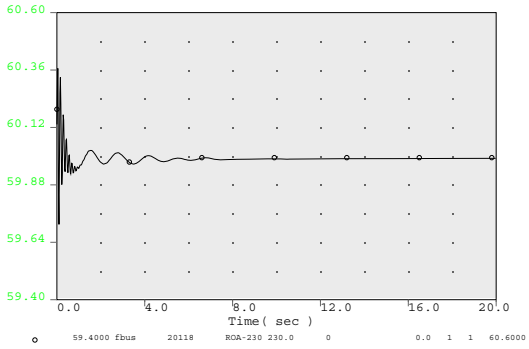
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

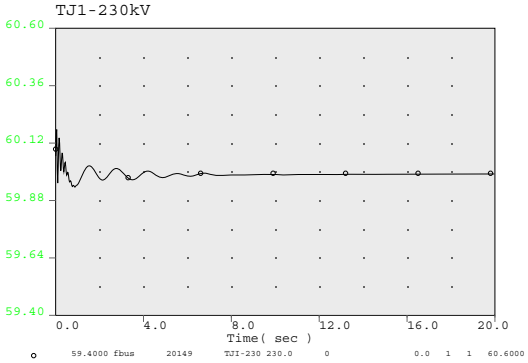
PAR/PID 230kV



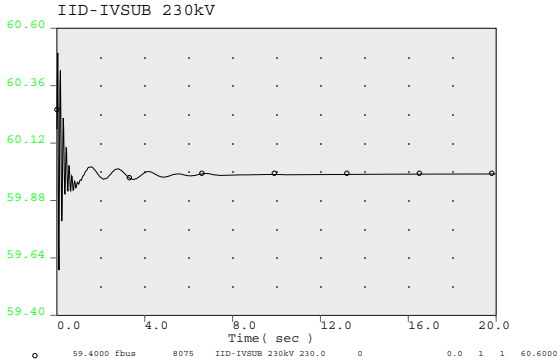
ROA-230kV



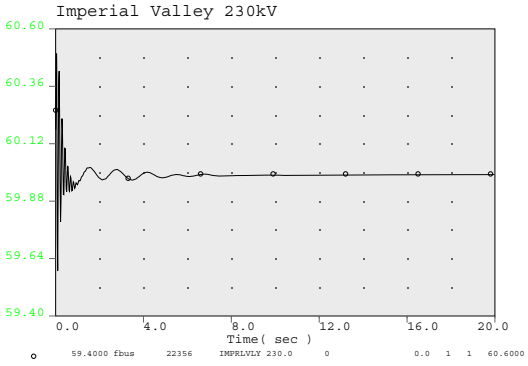
TJ1-230kV



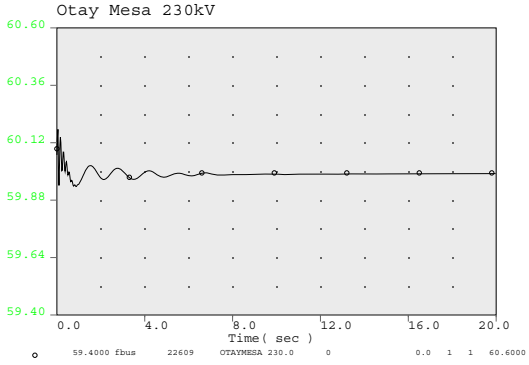
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



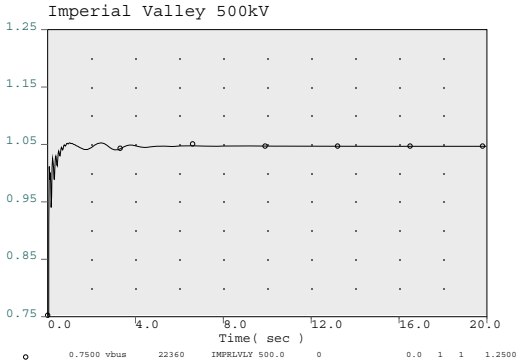
C1 C2 Light Load Pre Without Upgrades

Page 4

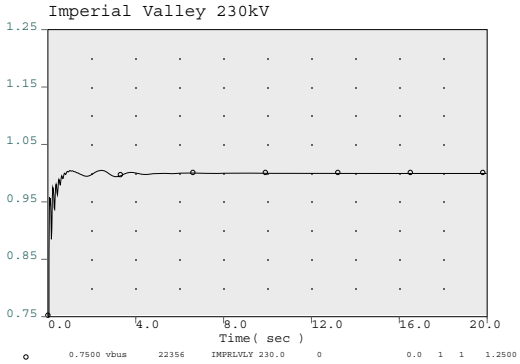
SDGE	tran-c1c2-ll-pre-r12_NGila-IV-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:19:21 2011

VOLTAGE

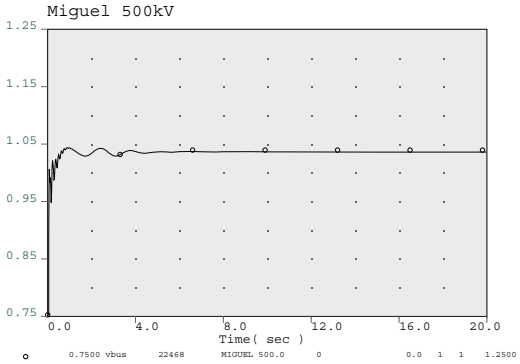
Imperial Valley 500kV



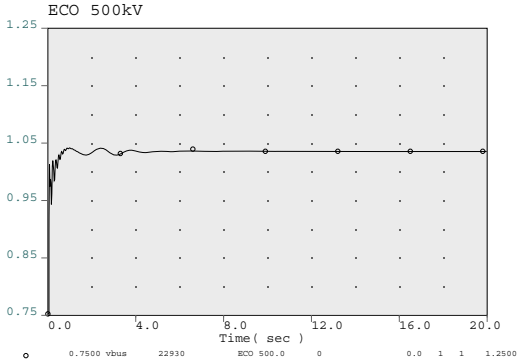
Imperial Valley 230kV



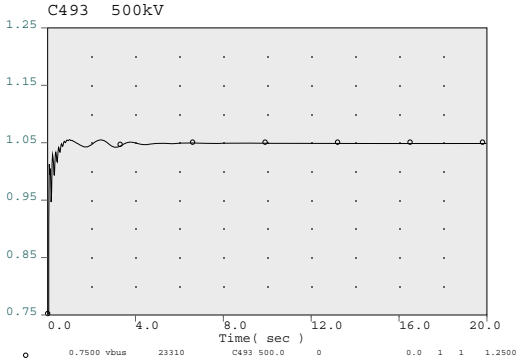
Miguel 500kV



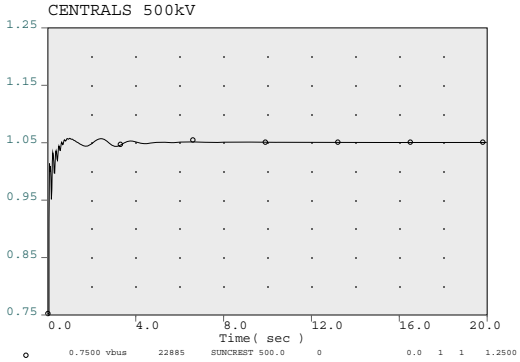
ECO 500kV



C493 500kV



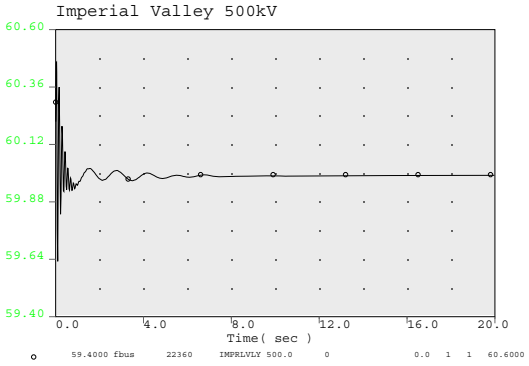
CENTRALS 500kV



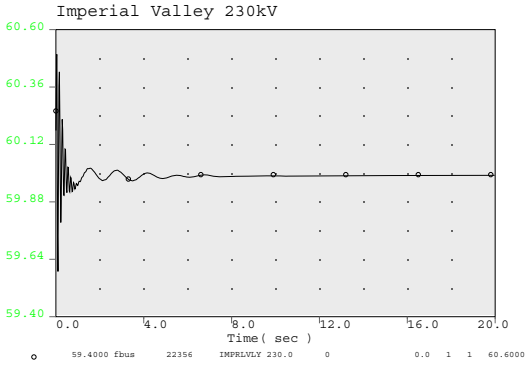
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

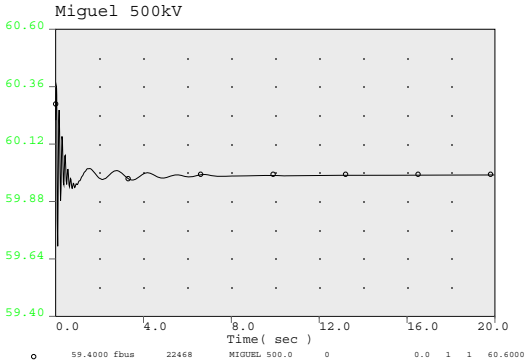
Imperial Valley 500kV



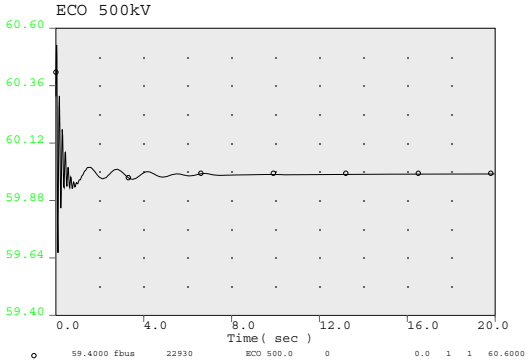
Imperial Valley 230kV



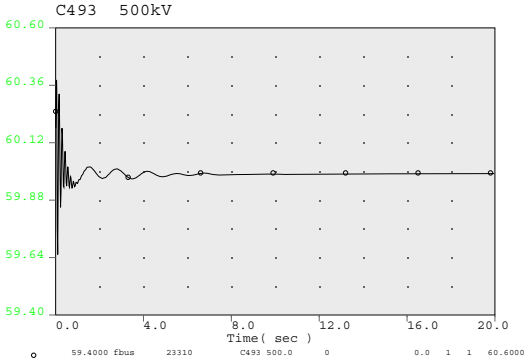
Miguel 500kV



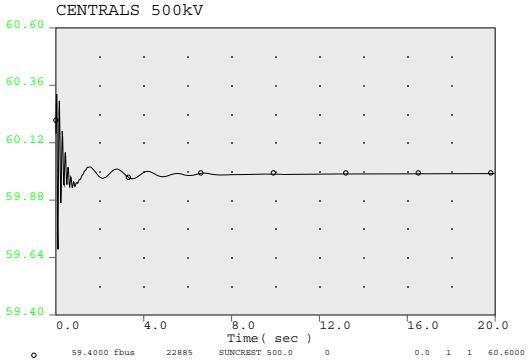
ECO 500kV



C493 500kV

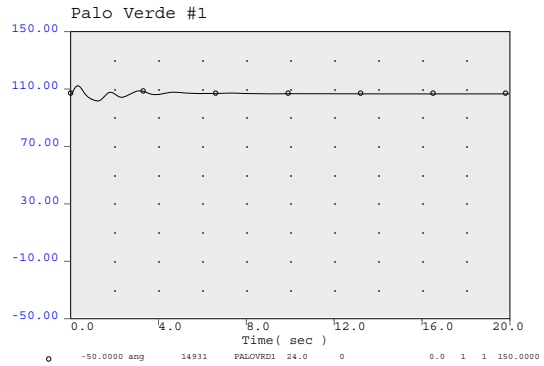


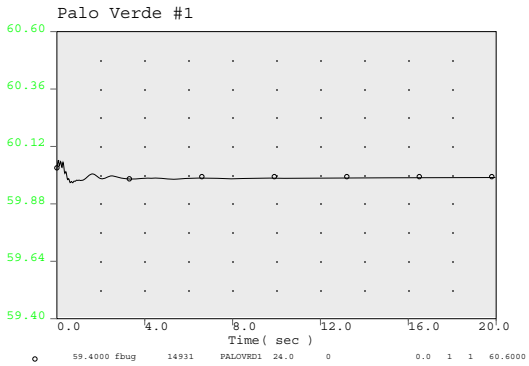
CENTRALS 500kV

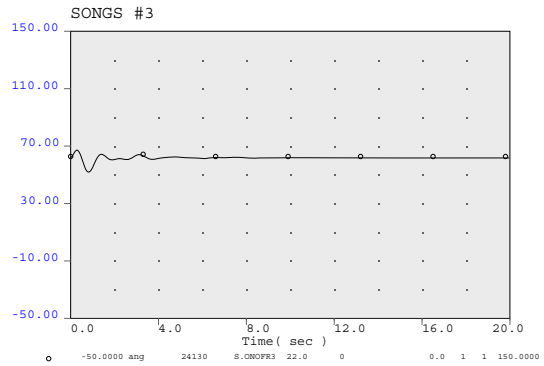


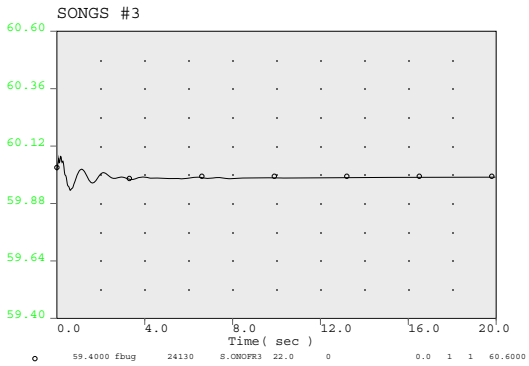
C1 C2 Light Load Pre Without Upgrades

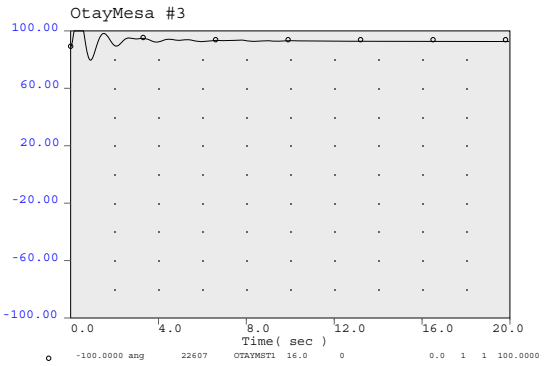
RELATIVE ROTOR ANGLE & FREQUENCY

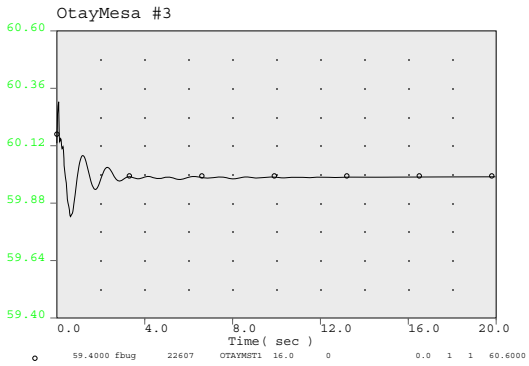












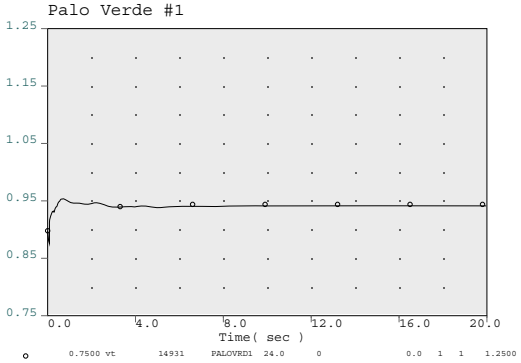
C1 C2 Light Load Pre Without Upgrades

Page 1

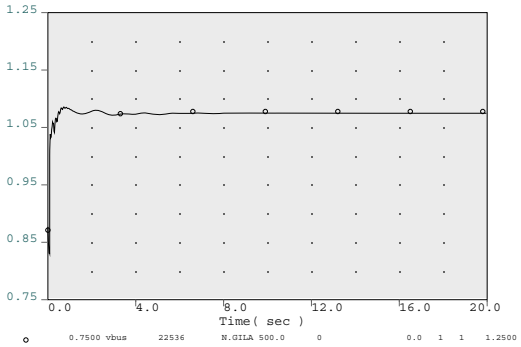
SDGE	tran-c1c2-ll-pre-r12_OM-MLX-SX-prec1c2-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:41:20 2011

RELATIVE VOLTAGE

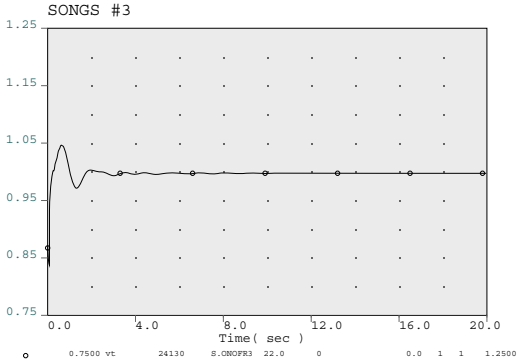
Palo Verde #1



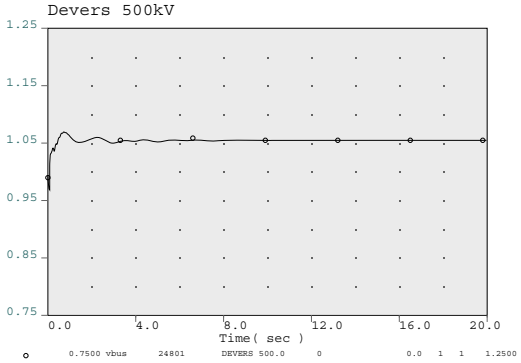
N Gila 500kV



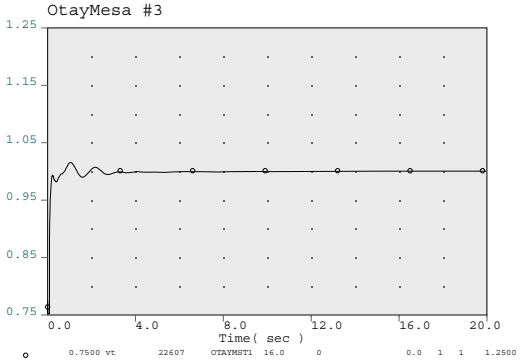
SONGS #3



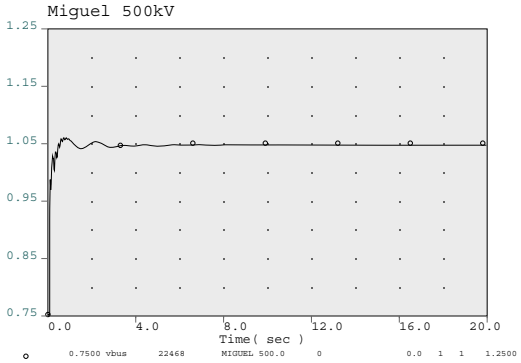
Devers 500kV



OtayMesa #3



Miguel 500kV



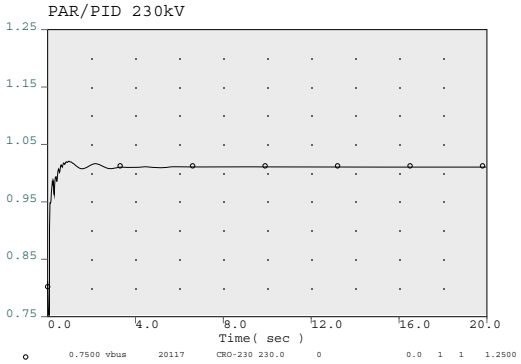
C1 C2 Light Load Pre Without Upgrades

Page 2

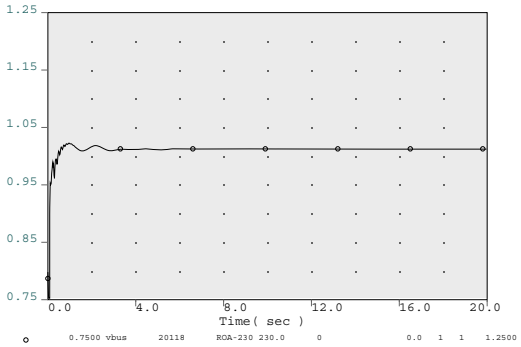
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_OM-MLX-SX-prec1c2-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:41:21 2011

Affected System Voltage Check and Comparison

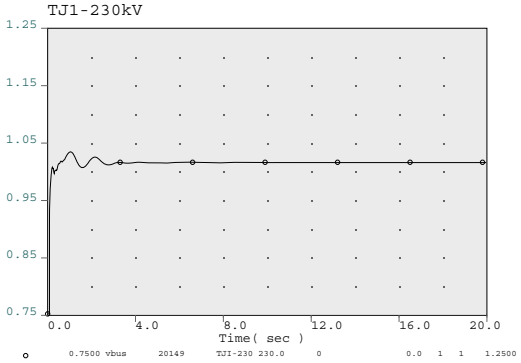
PAR/PID 230kV



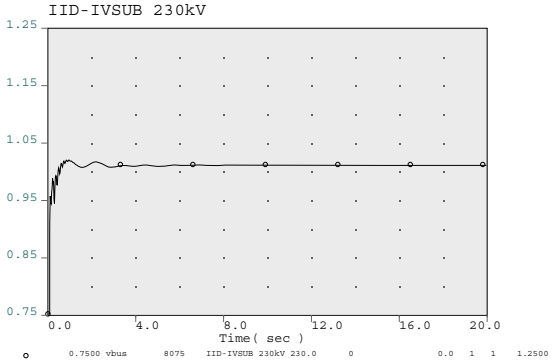
ROA-230kV



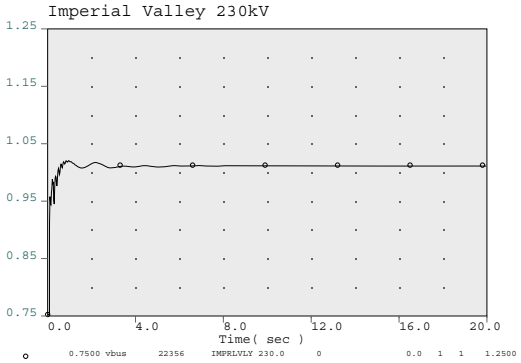
TJ1-230kV



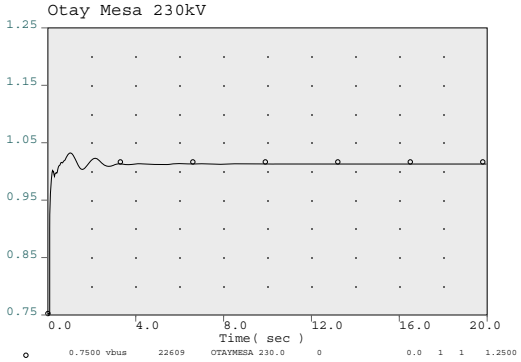
IID-IVSUB 230kV



Imperial Valley 230kV



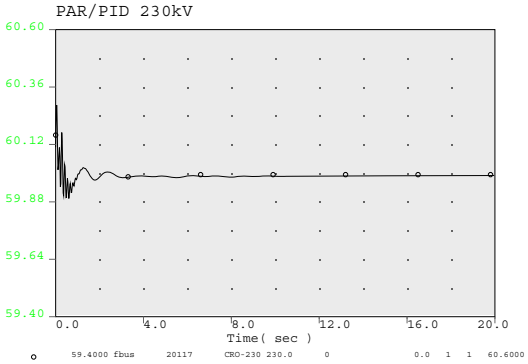
Otay Mesa 230kV



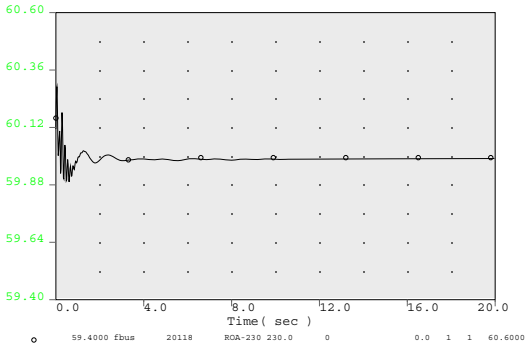
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

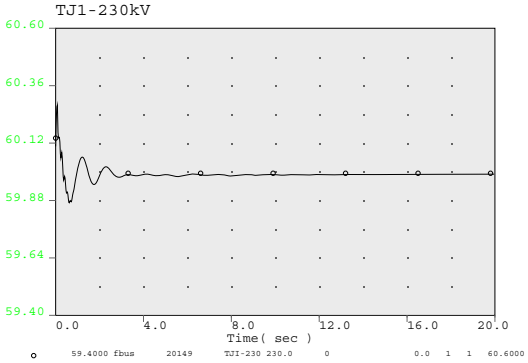
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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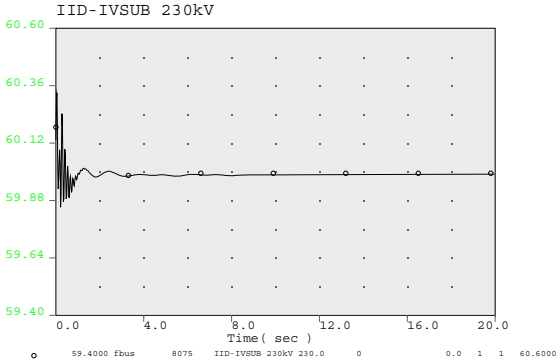
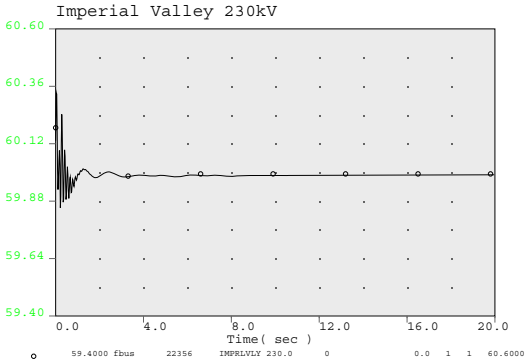
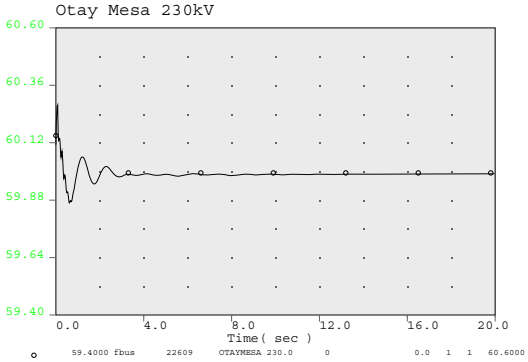


Imperial Valley 230kV



Otay Mesa 230kV



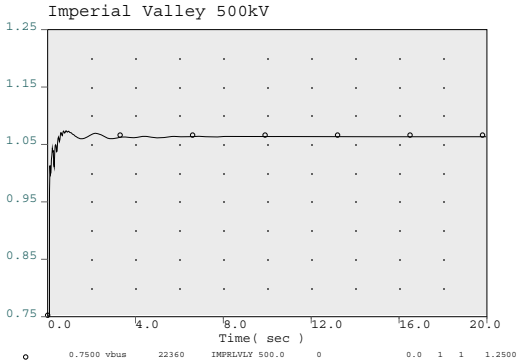
C1 C2 Light Load Pre Without Upgrades

Page 4

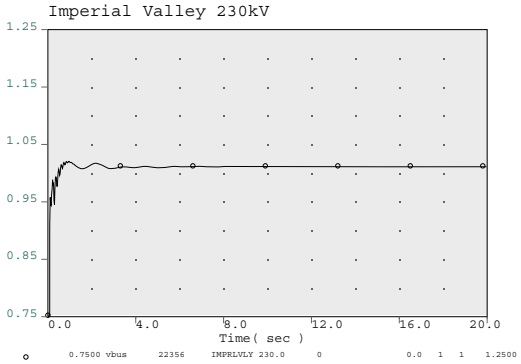
SDGE	tran-c1c2-ll-pre-r12_OM-MLX-SX-prec1c2-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:41:22 2011

VOLTAGE

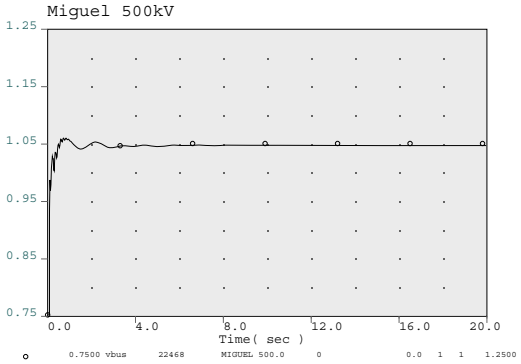
Imperial Valley 500kV



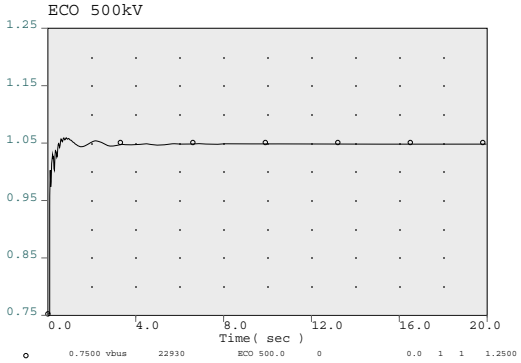
Imperial Valley 230kV



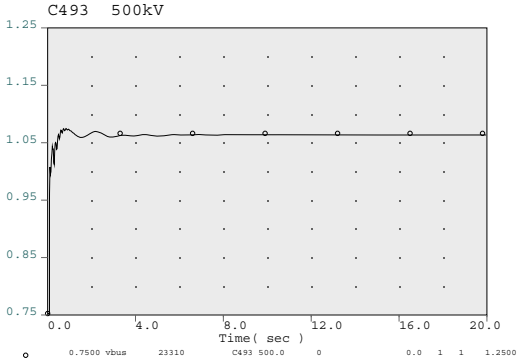
Miguel 500kV



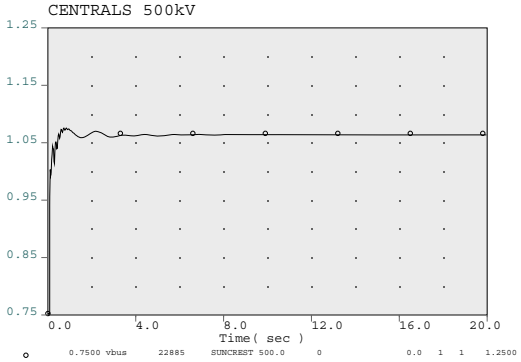
ECO 500kV



C493 500kV



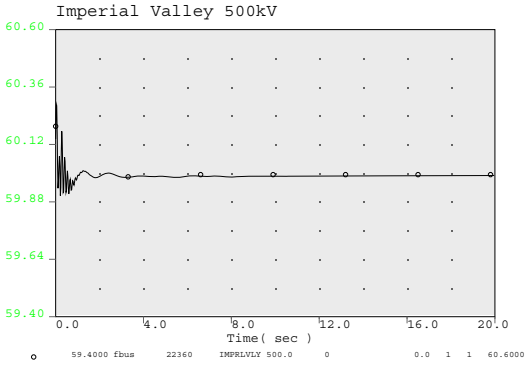
CENTRALS 500kV



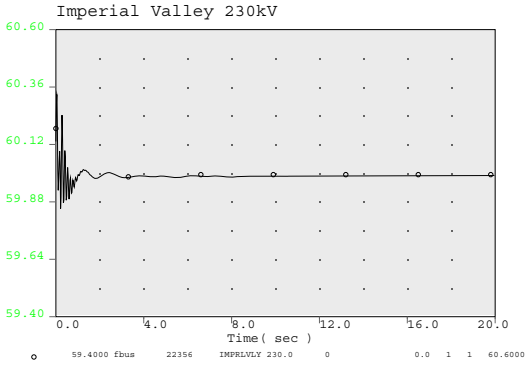
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

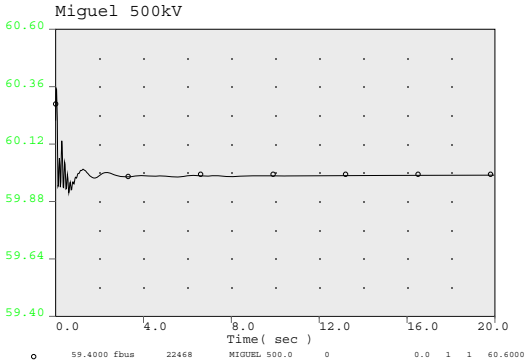
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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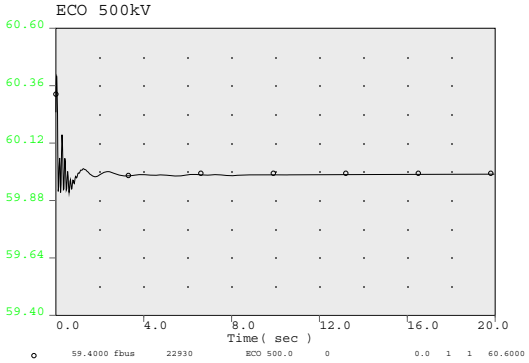
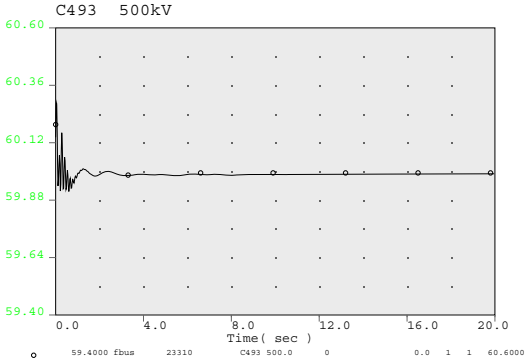
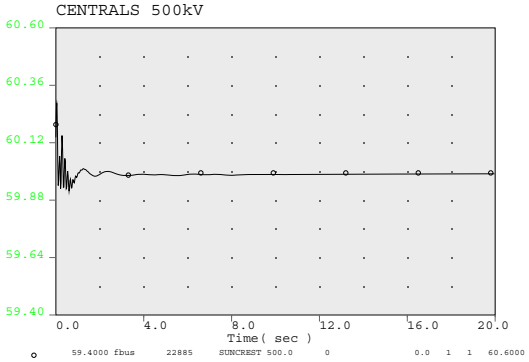


C493 500kV

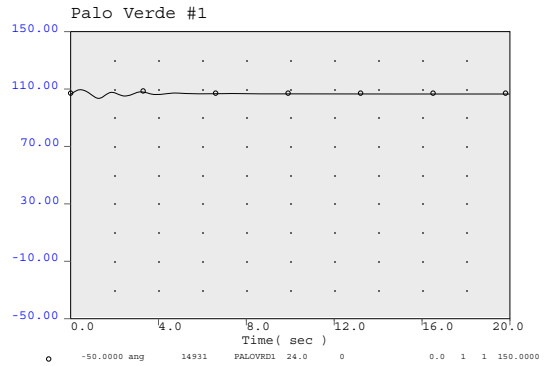


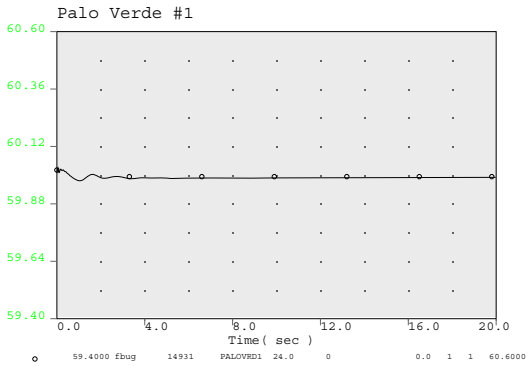
CENTRALS 500kV

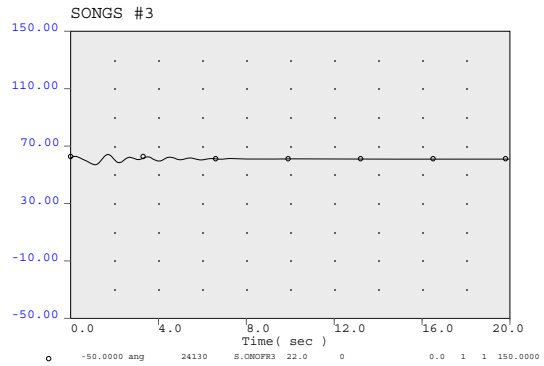


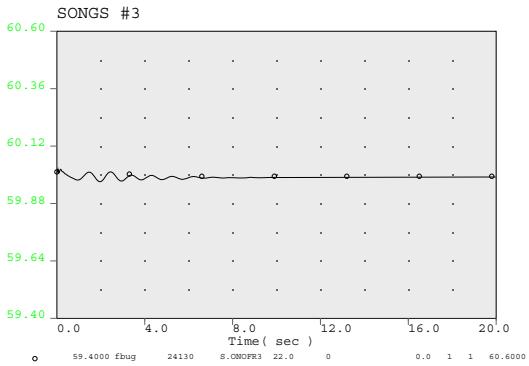
C1 C2 Light Load Pre Without Upgrades

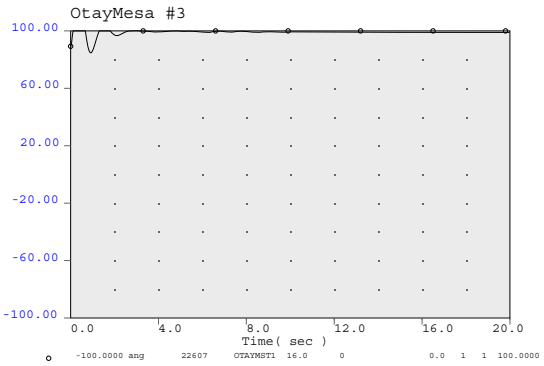
RELATIVE ROTOR ANGLE & FREQUENCY

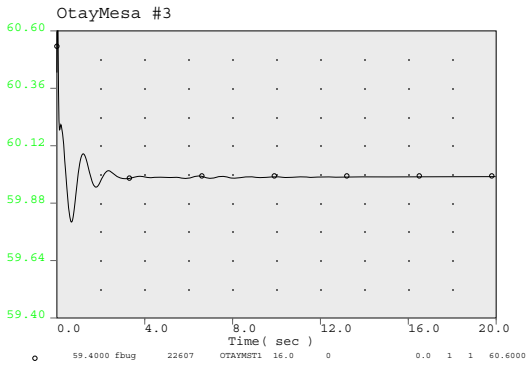












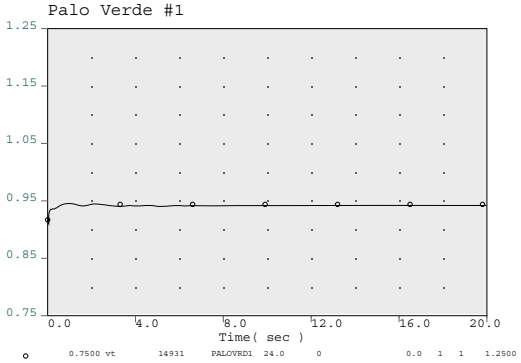
C1 C2 Light Load Pre Without Upgrades

Page 1

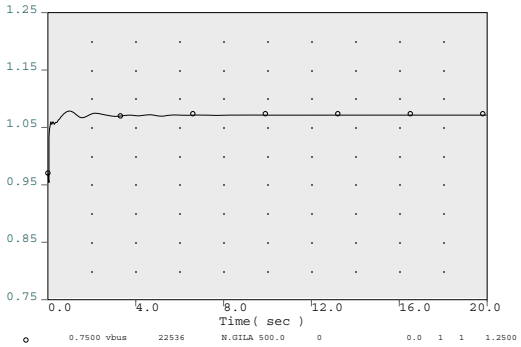
SDGE	tran-c1c2-ll-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:42:55 2011

RELATIVE VOLTAGE

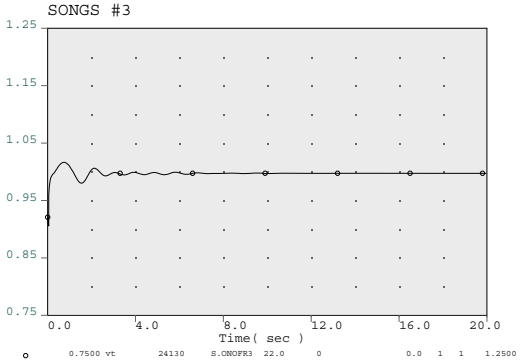
Palo Verde #1



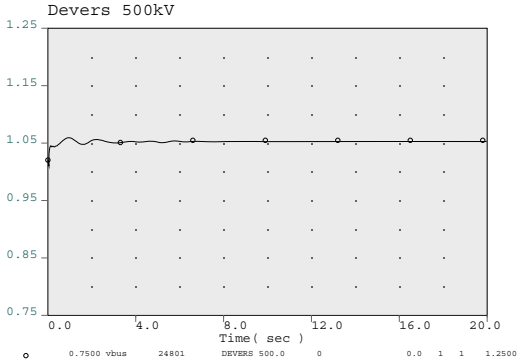
N Gila 500kV



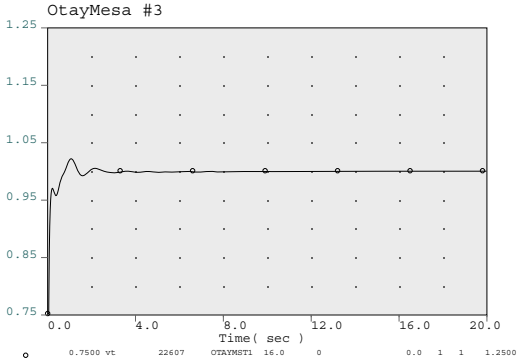
SONGS #3



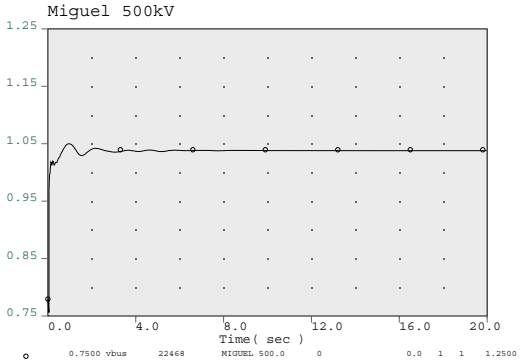
Devers 500kV



OtayMesa #3



Miguel 500kV



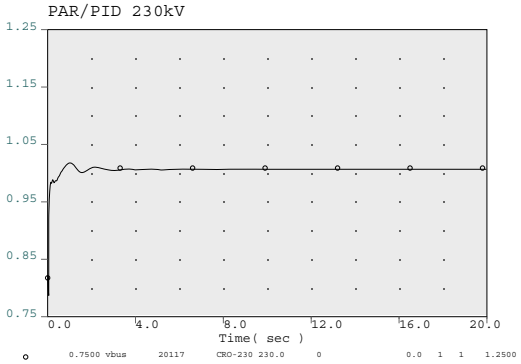
C1 C2 Light Load Pre Without Upgrades

Page 2

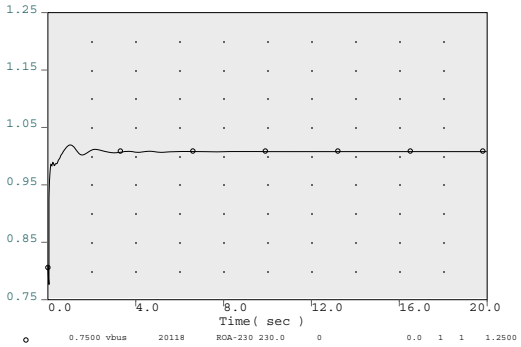
SDGE	tran-c1c2-ll-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:42:55 2011

Affected System Voltage Check and Comparison

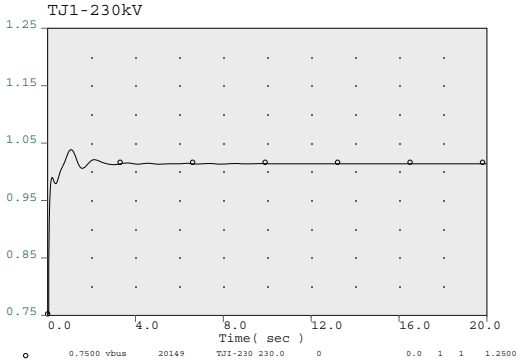
PAR/PID 230kV



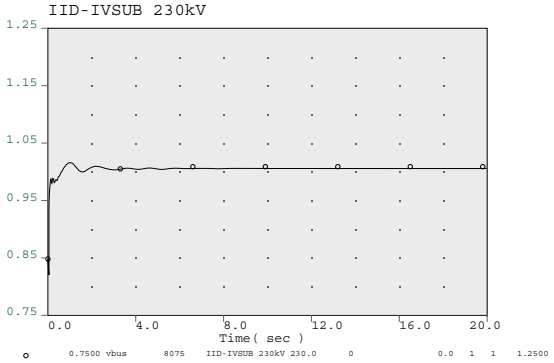
ROA-230kV



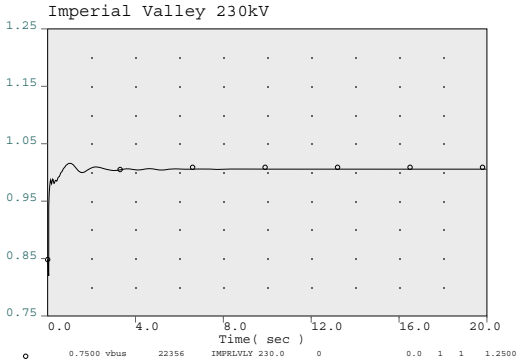
TJ1-230kV



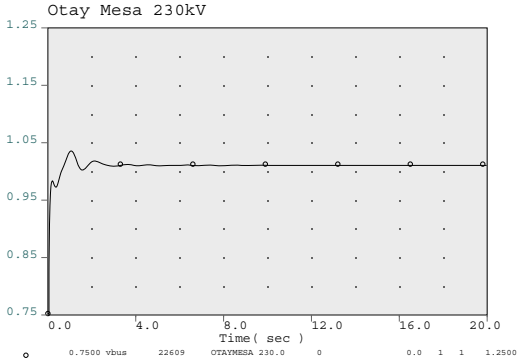
IID-IVSUB 230kV



Imperial Valley 230kV



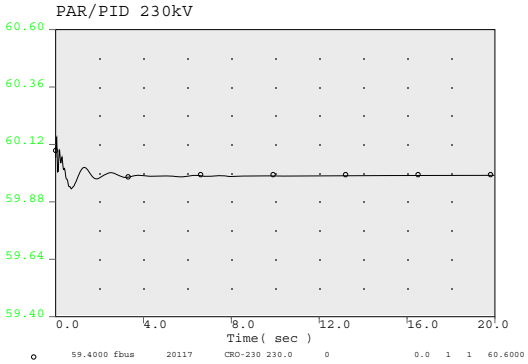
Otay Mesa 230kV



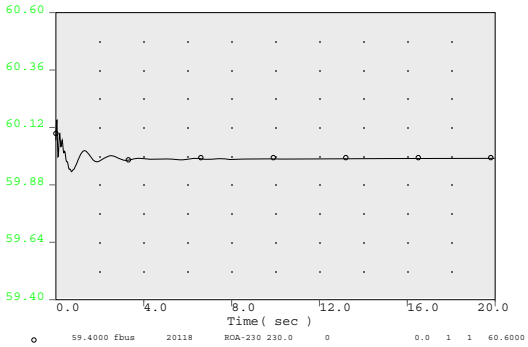
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

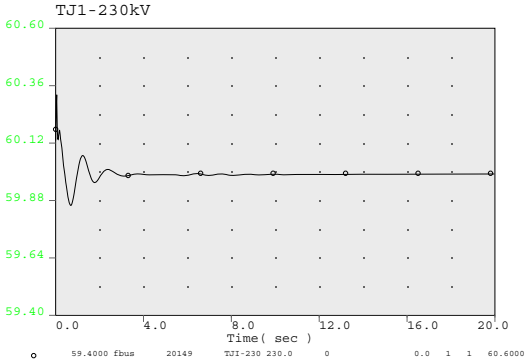
PAR/PID 230kV



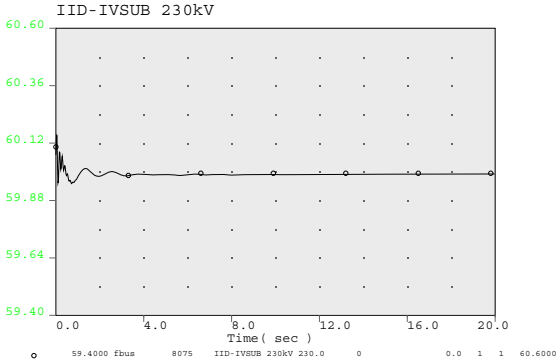
ROA-230kV



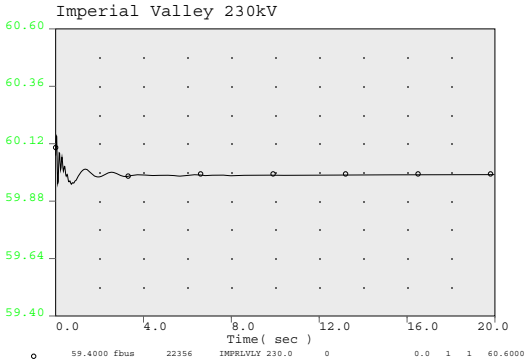
TJ1-230kV



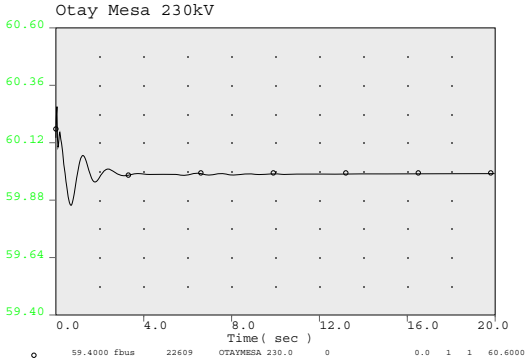
IID-IVSUB 230kV



Imperial Valley 230kV



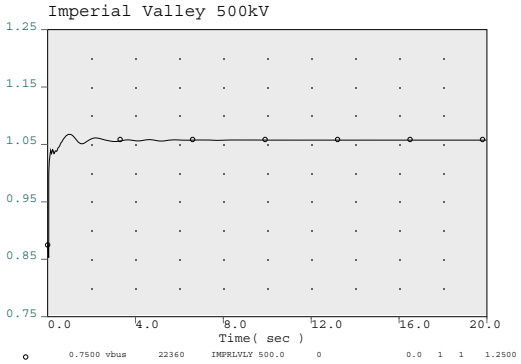
Otay Mesa 230kV



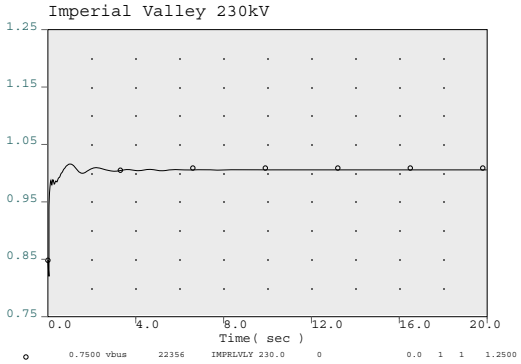
C1 C2 Light Load Pre Without Upgrades

VOLTAGE

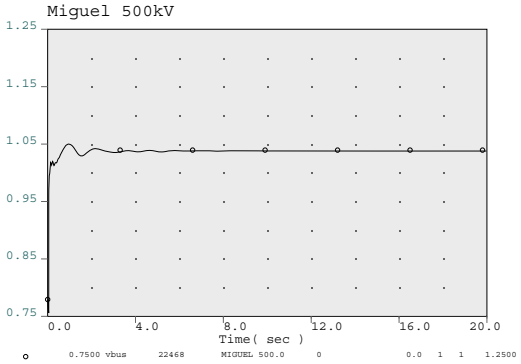
Imperial Valley 500kV



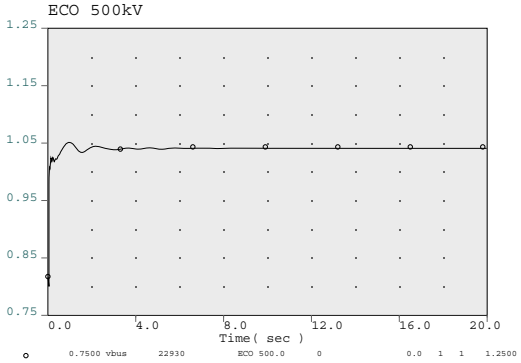
Imperial Valley 230kV



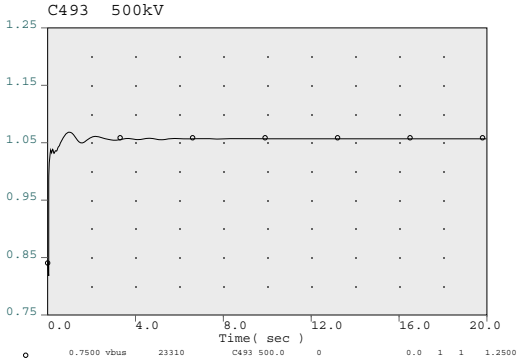
Miguel 500kV



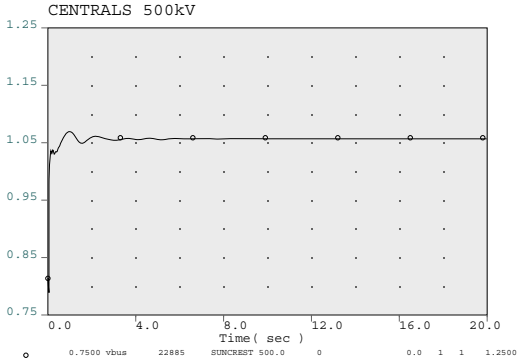
ECO 500kV



C493 500kV

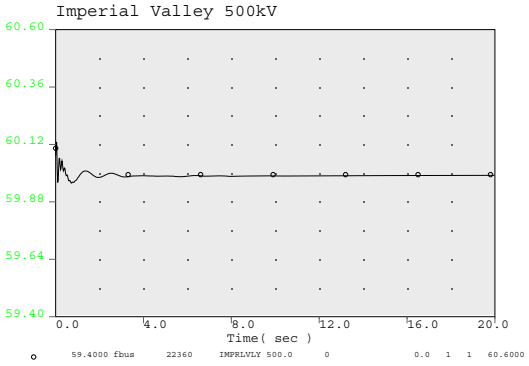


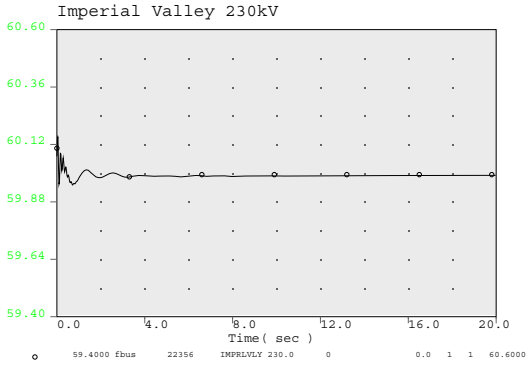
CENTRALS 500kV

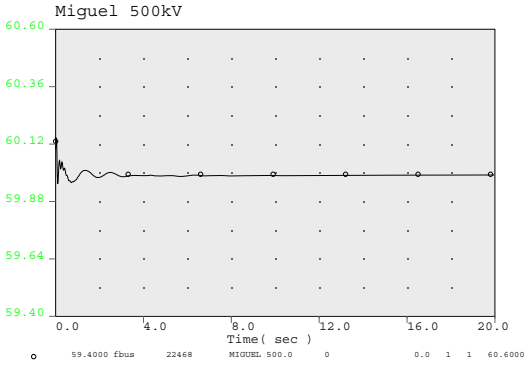


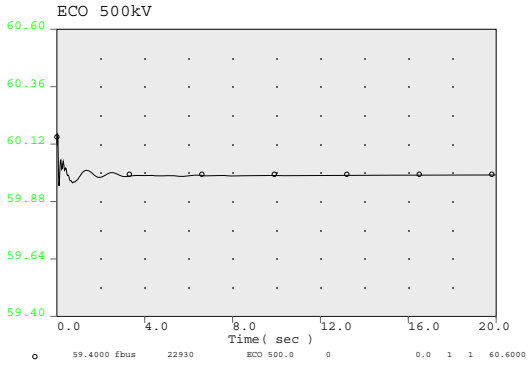
C1 C2 Light Load Pre Without Upgrades

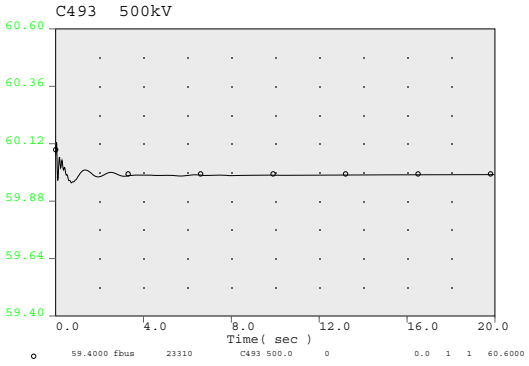
FREQUENCY

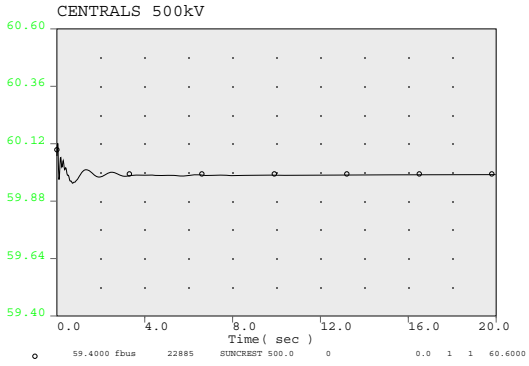










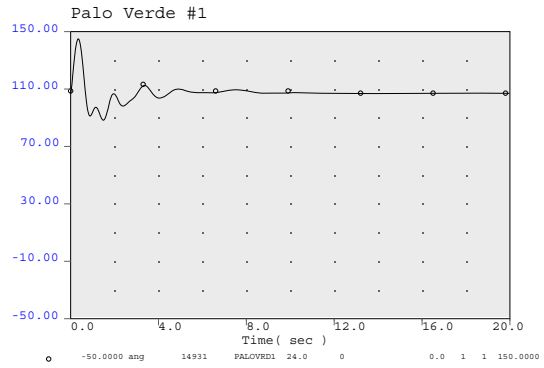


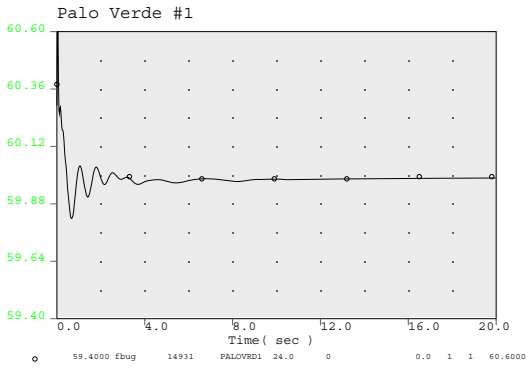
C1 C2 Light Load Pre Without Upgrades

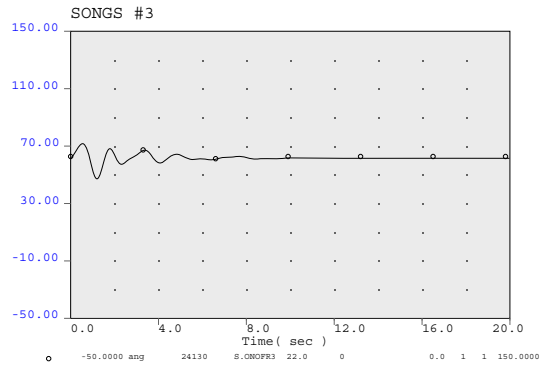
Page 6

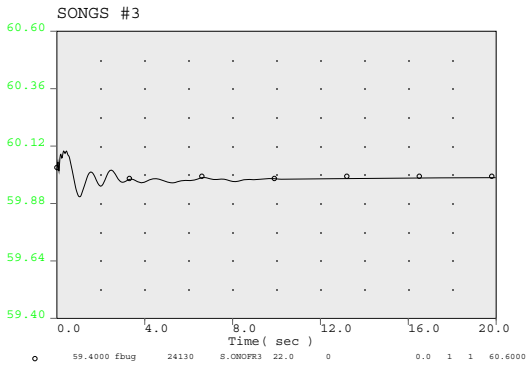
SDGE	tran-c1c2-ll-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:42:57 2011

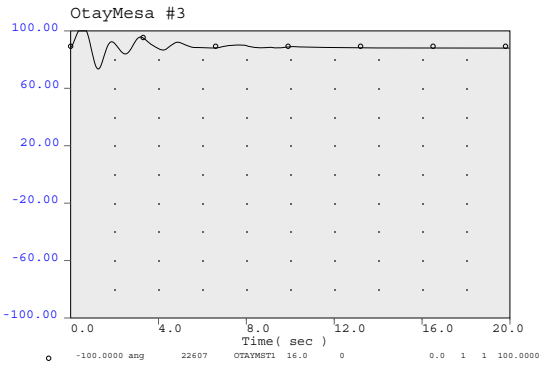
RELATIVE ROTOR ANGLE & FREQUENCY

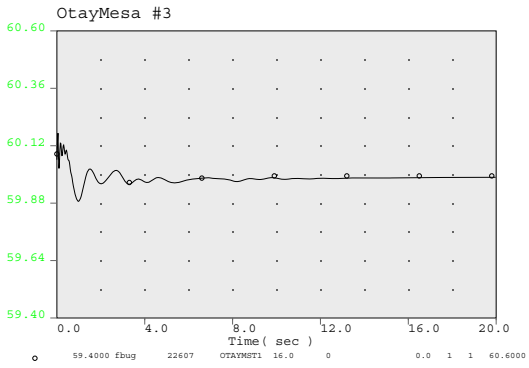












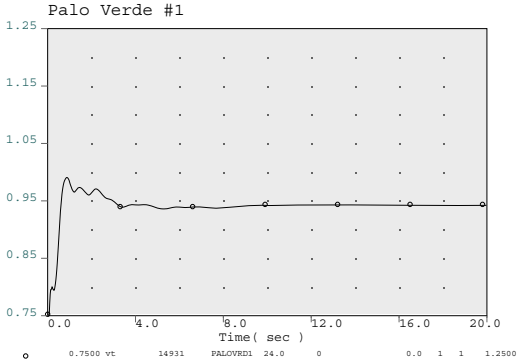
C1 C2 Light Load Pre Without Upgrades

Page 1

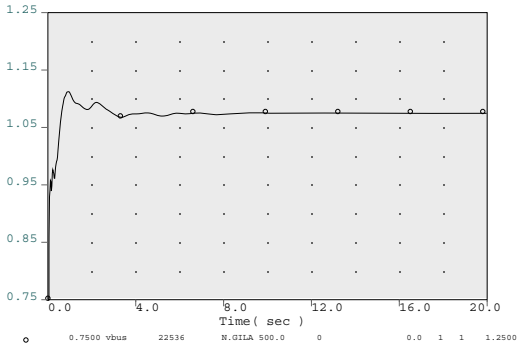
SDGE	tran-c1c2-ll-pre-r12_pal-col-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:21:12 2011

RELATIVE VOLTAGE

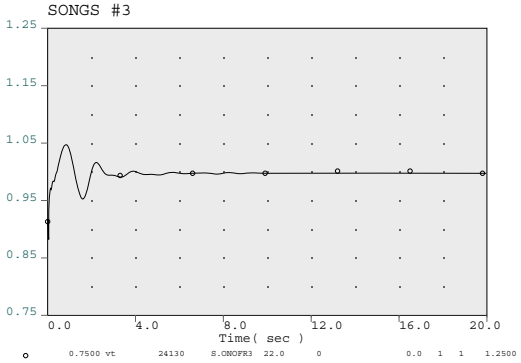
Palo Verde #1



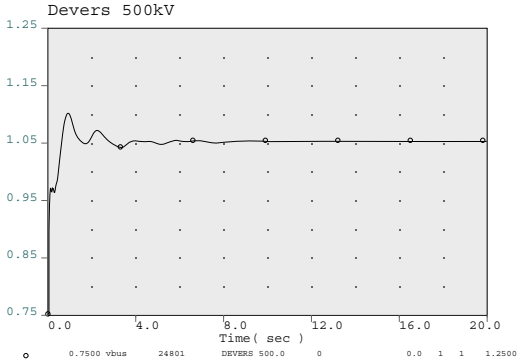
N Gila 500kV



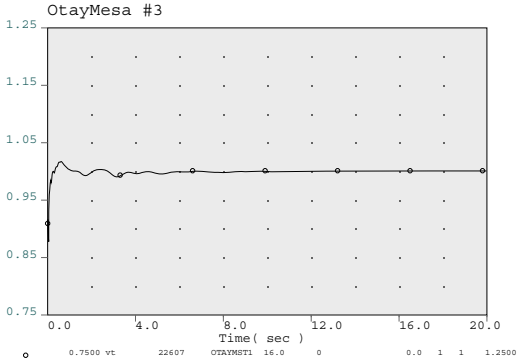
SONGS #3



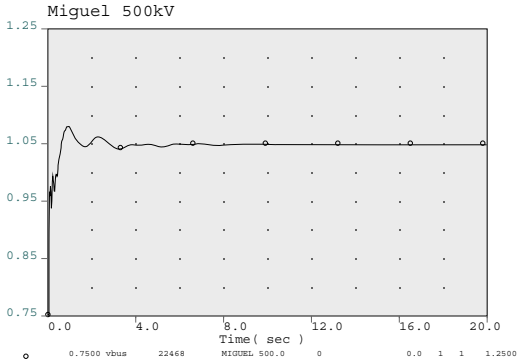
Devers 500kV



OtayMesa #3



Miguel 500kV



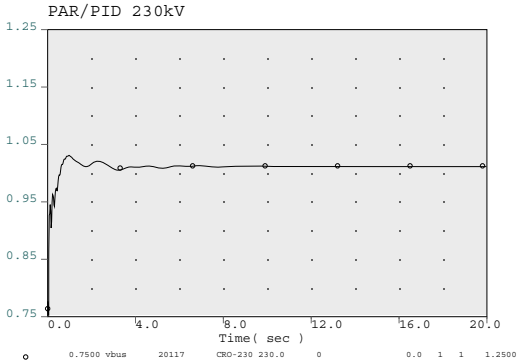
C1 C2 Light Load Pre Without Upgrades

Page 2

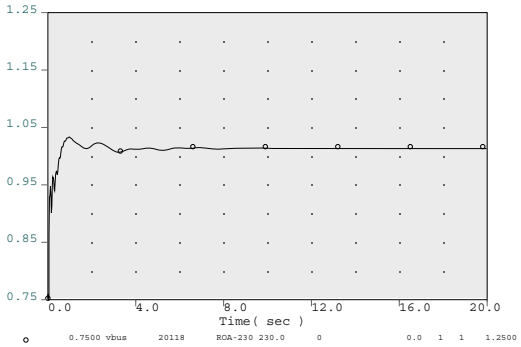
SDGE	tran-c1c2-ll-pre-r12_pal-col-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:21:12 2011

Affected System Voltage Check and Comparison

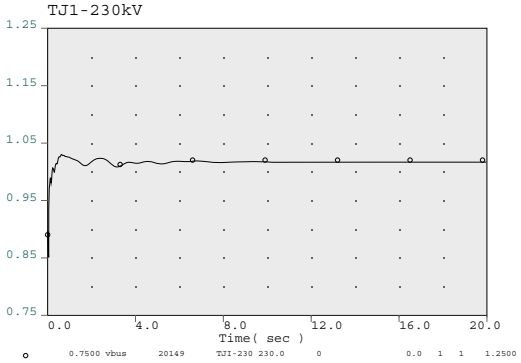
PAR/PID 230kV



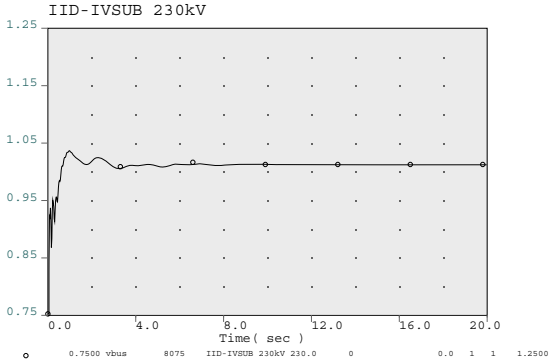
ROA-230kV



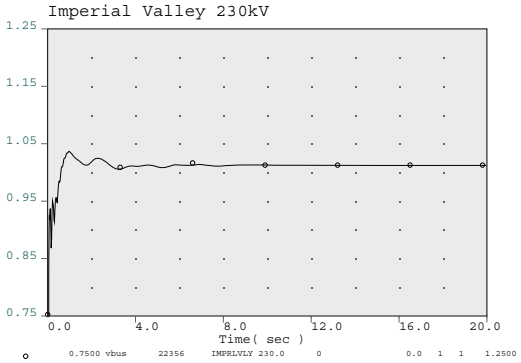
TJ1-230kV



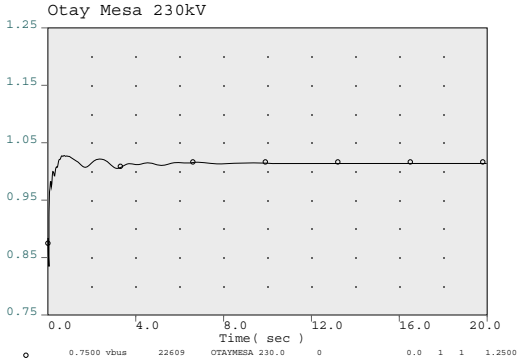
IID-IVSUB 230kV



Imperial Valley 230kV



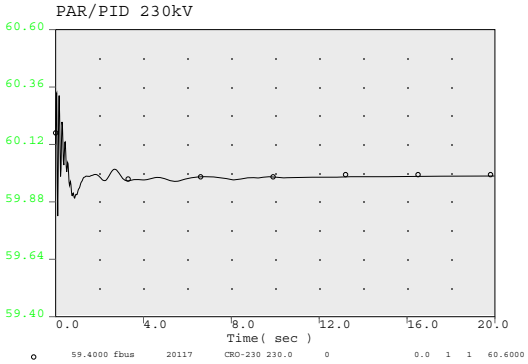
Otay Mesa 230kV



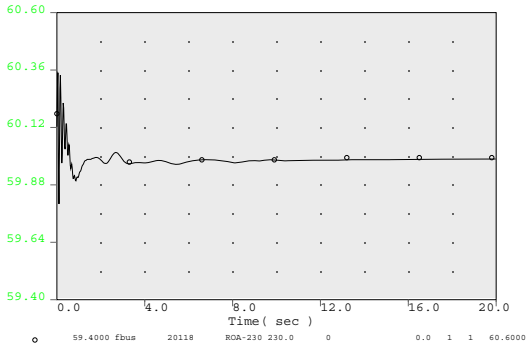
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

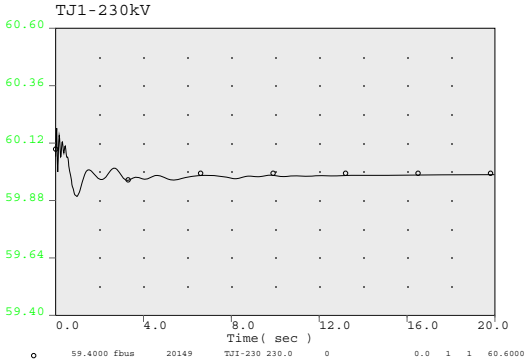
PAR/PID 230kV



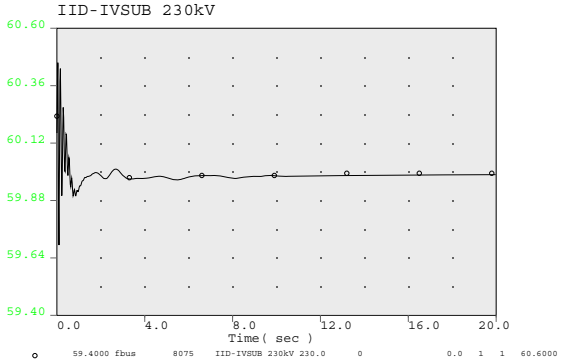
ROA-230kV



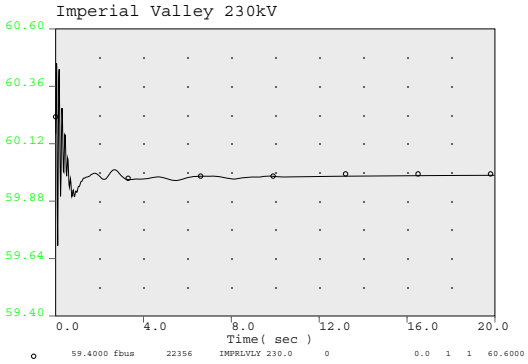
TJ1-230kV



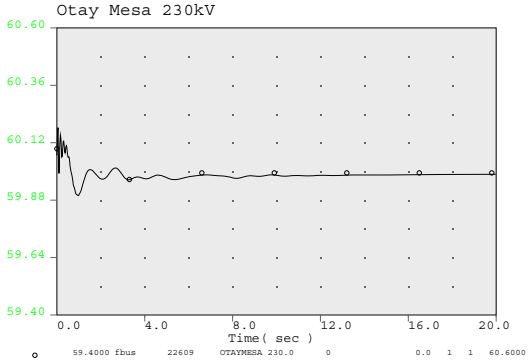
IID-IVSUB 230kV



Imperial Valley 230kV



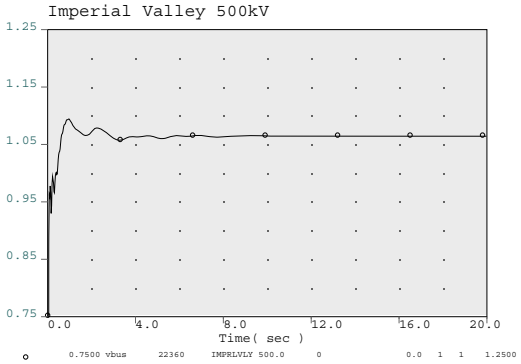
Otay Mesa 230kV



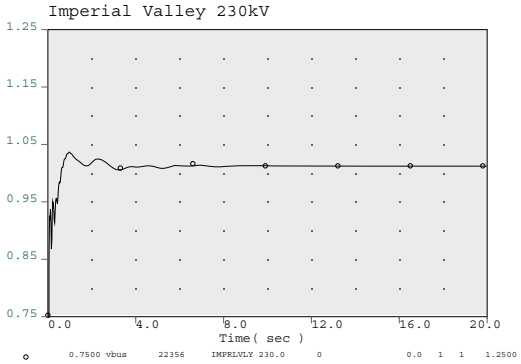
C1 C2 Light Load Pre Without Upgrades

VOLTAGE

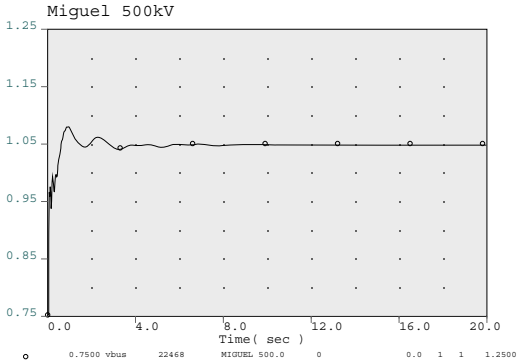
Imperial Valley 500kV



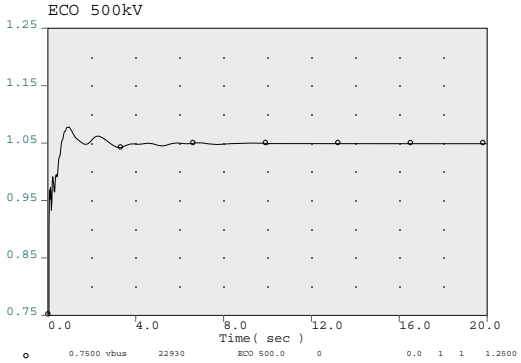
Imperial Valley 230kV



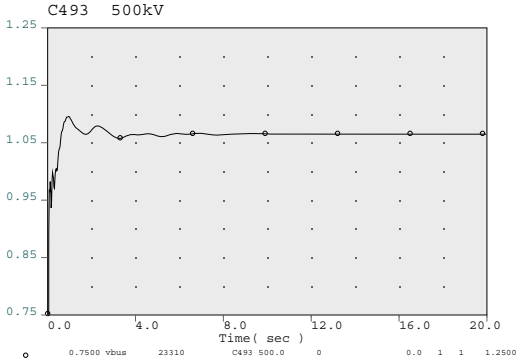
Miguel 500kV



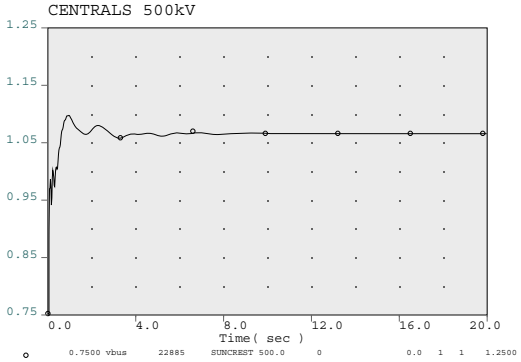
ECO 500kV



C493 500kV



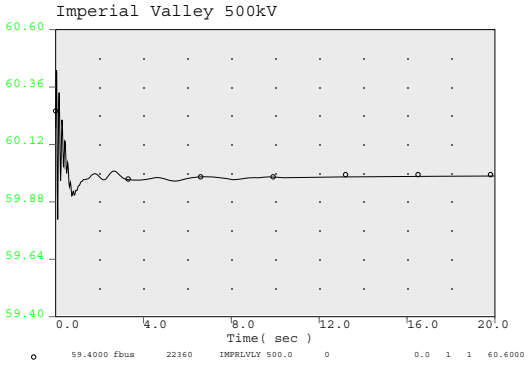
CENTRALS 500kV



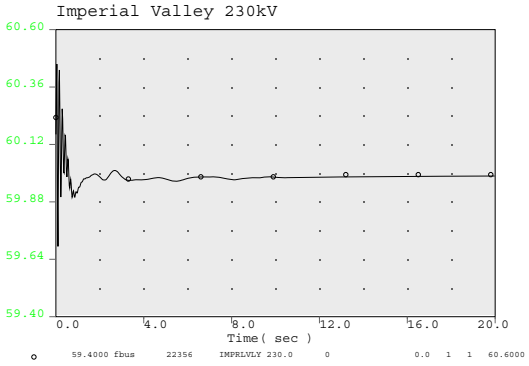
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

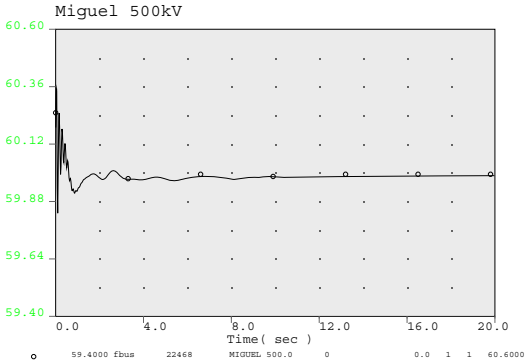
Imperial Valley 500kV



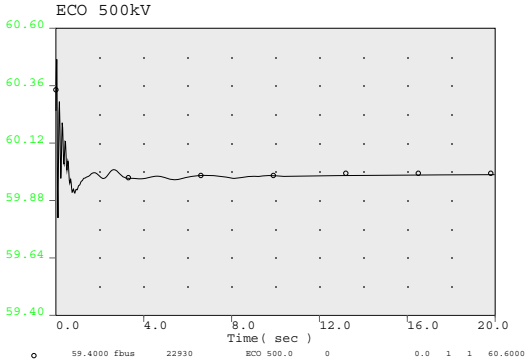
Imperial Valley 230kV



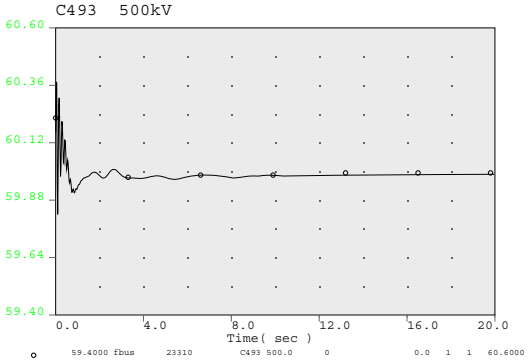
Miguel 500kV



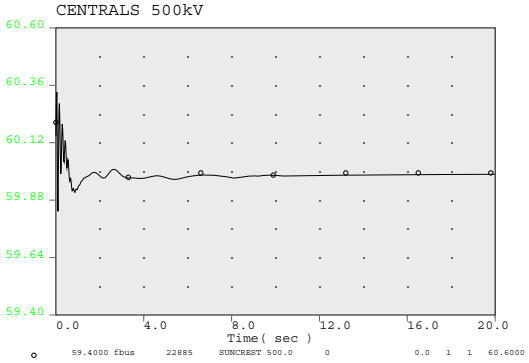
ECO 500kV



C493 500kV

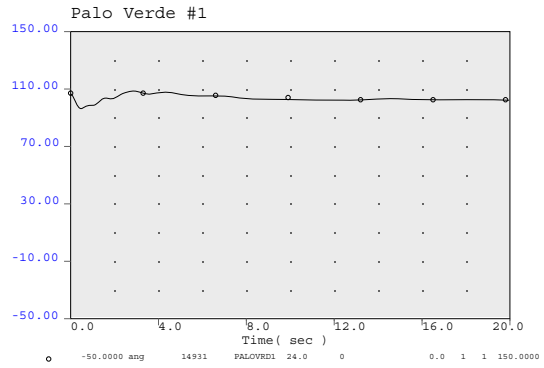


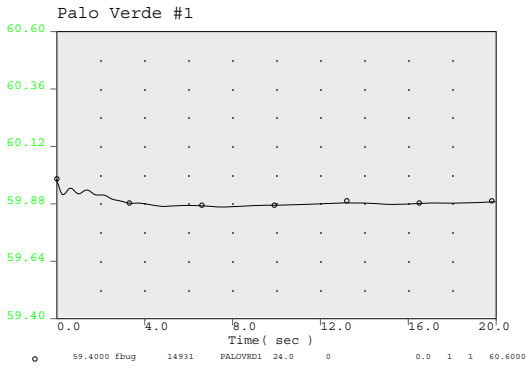
CENTRALS 500kV

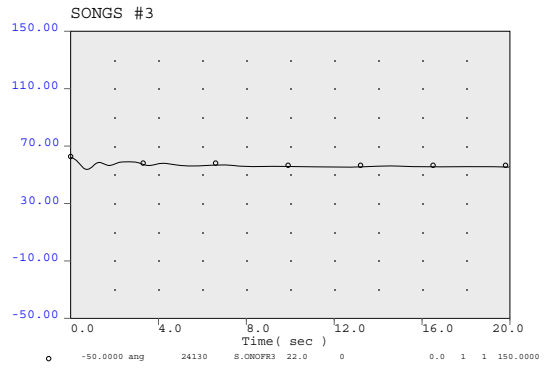


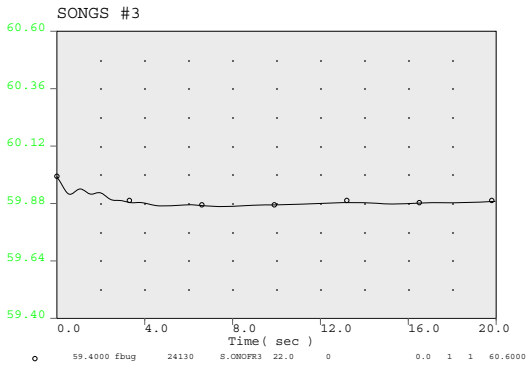
C1 C2 Light Load Pre Without Upgrades

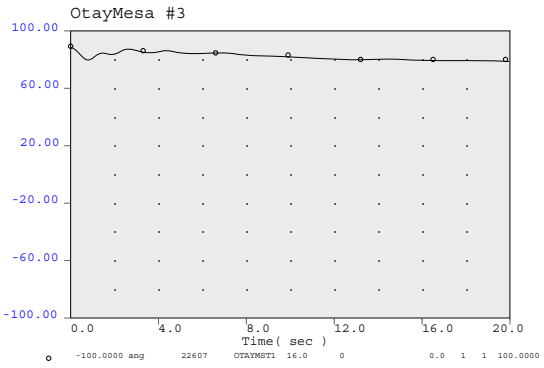
RELATIVE ROTOR ANGLE & FREQUENCY

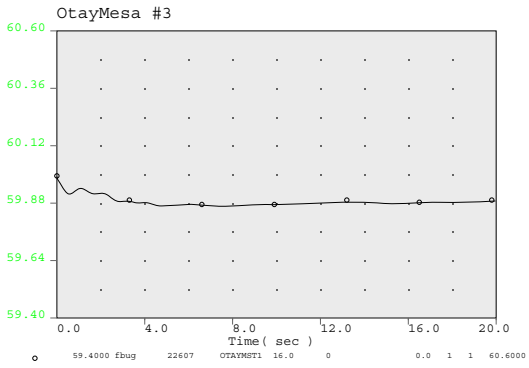










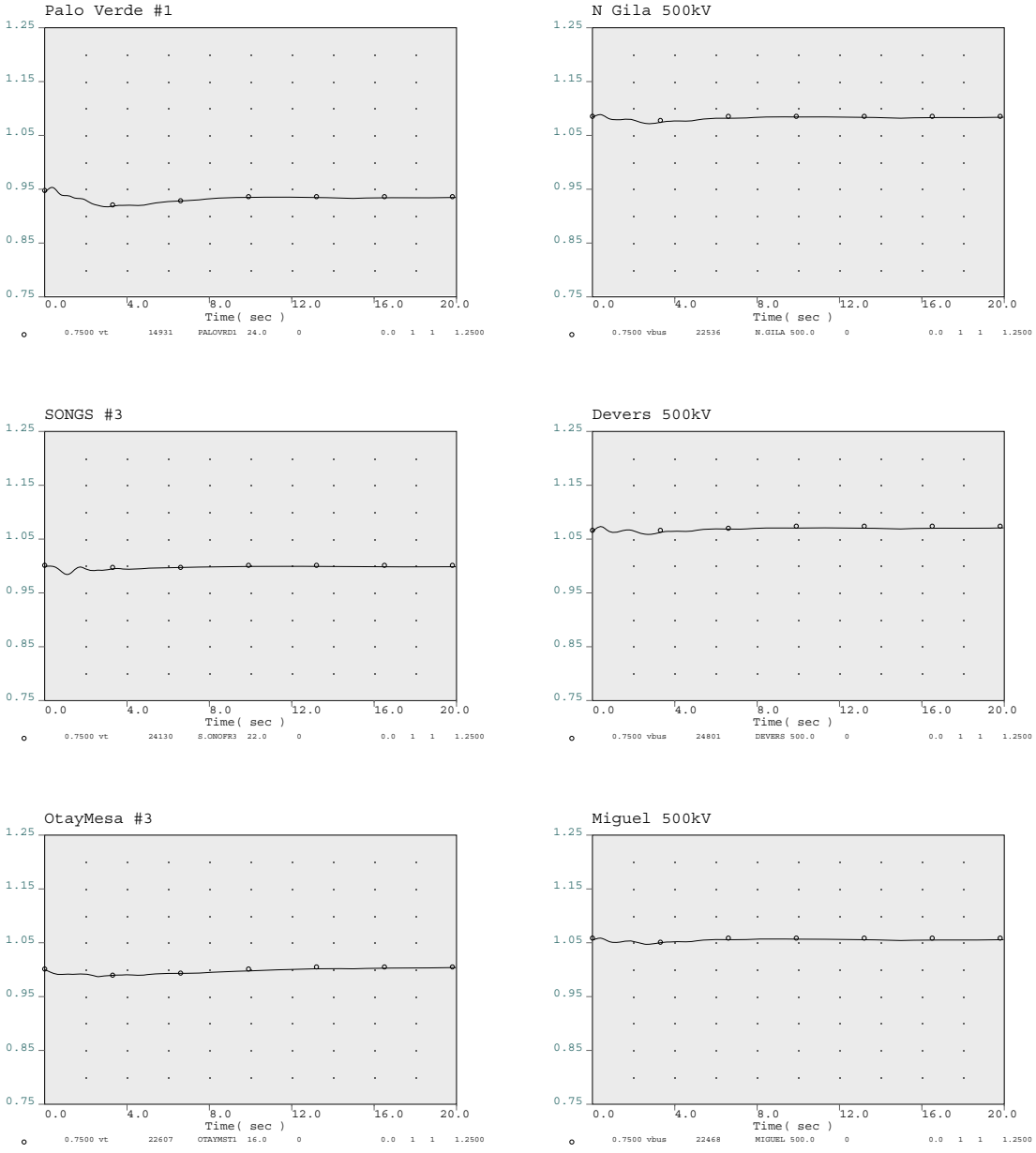


C1 C2 Light Load Pre Without Upgrades

Page 1

SDGE	tran-c1c2-ll-pre-r12_PaloVerde-g1.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:23:03 2011

RELATIVE VOLTAGE



C1 C2 Light Load Pre Without Upgrades

Page 2

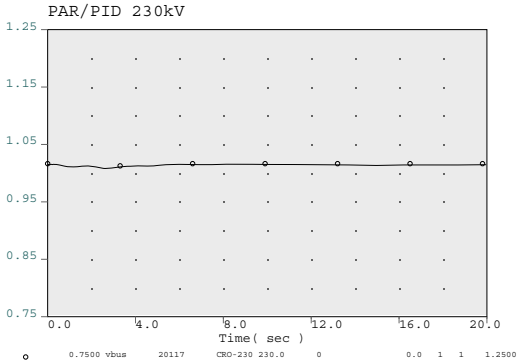
tran-c1c2-ll-pre-r12_PaloVerde-g1.chf

anstab\ll\pre\ws_pre_c1c2

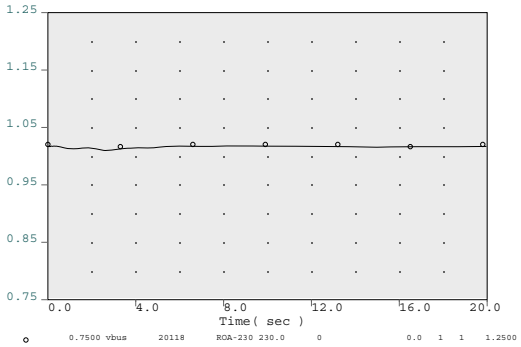
Sun Jul 17 15:23:03 2011

Affected System Voltage Check and Comparison

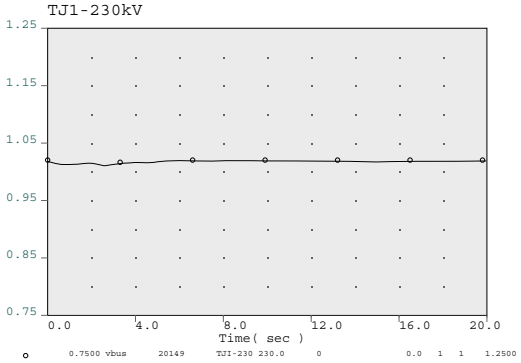
PAR/PID 230kV



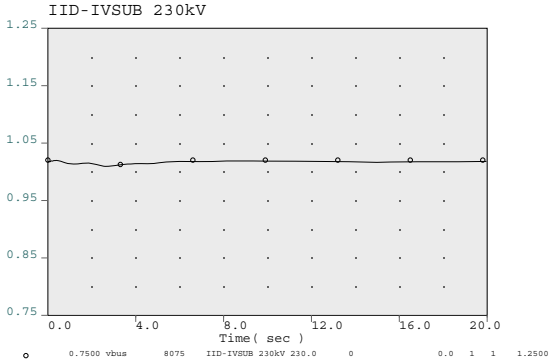
ROA-230kV



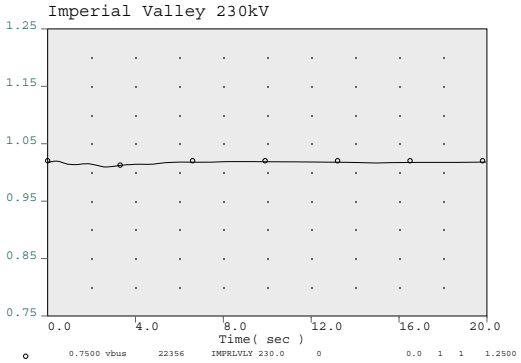
TJ1-230kV



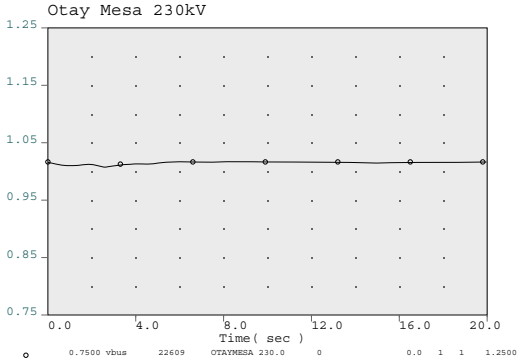
IID-IVSUB 230kV



Imperial Valley 230kV



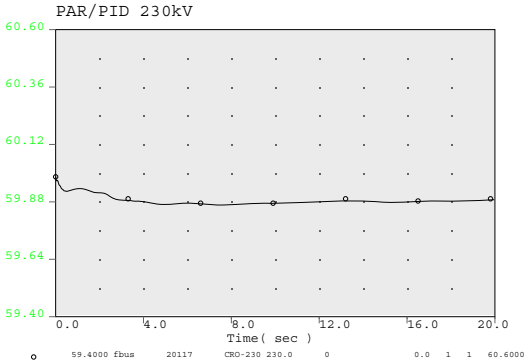
Otay Mesa 230kV



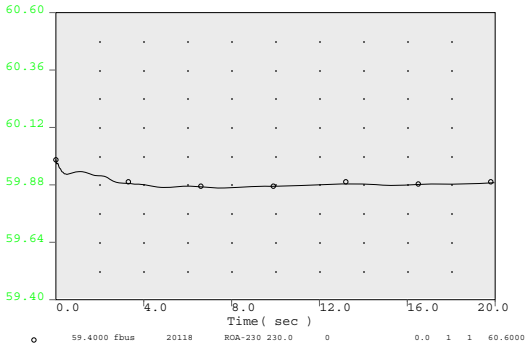
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

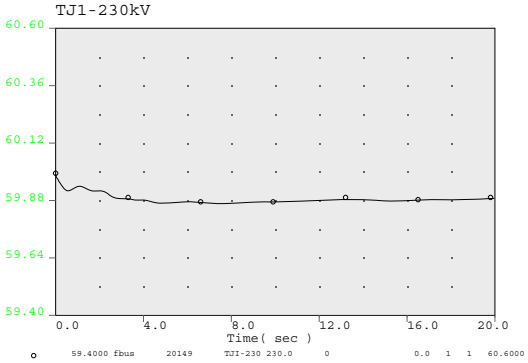
PAR/PID 230kV



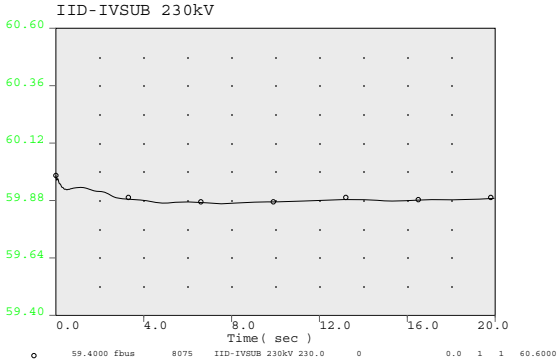
ROA-230kV



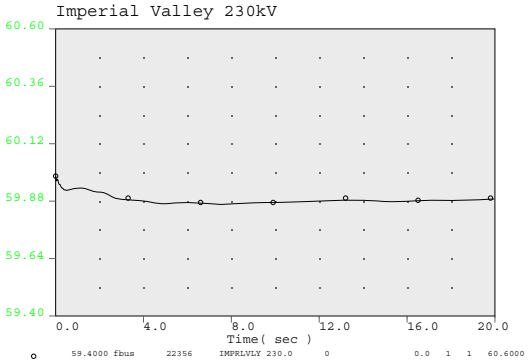
TJ1-230kV



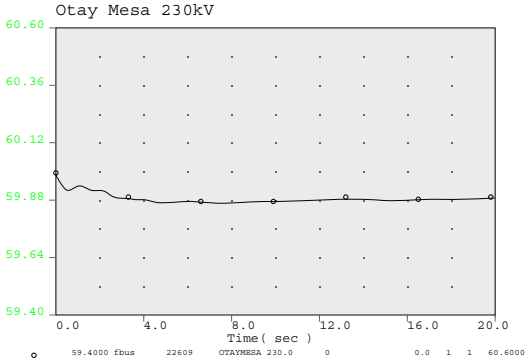
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 4

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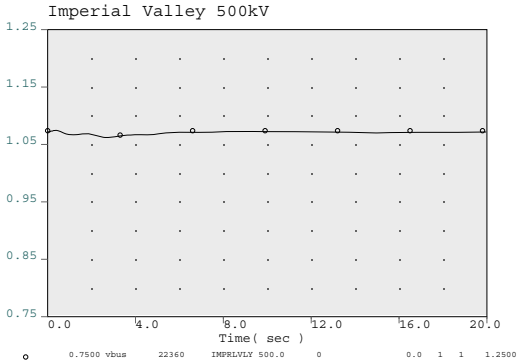
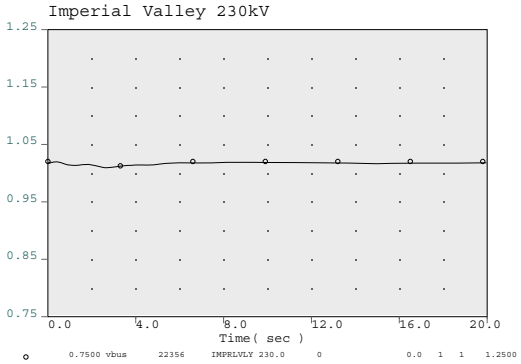
VOLTAGE

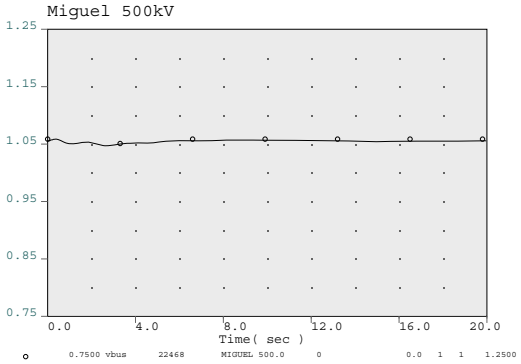
Imperial Valley 500kV



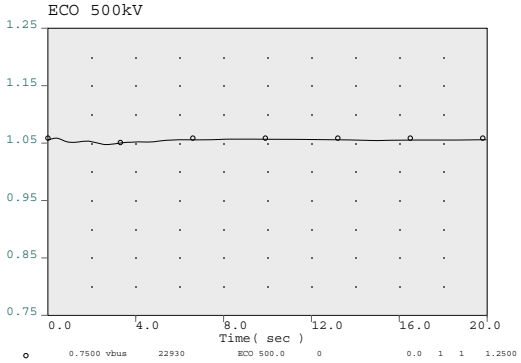
Imperial Valley 230kV



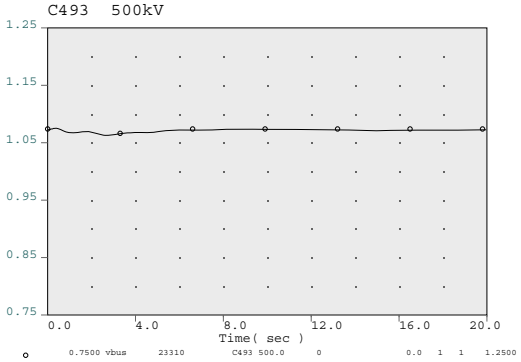
Miguel 500kV



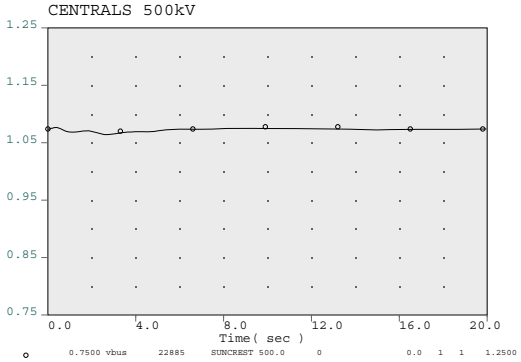
ECO 500kV



C493 500kV



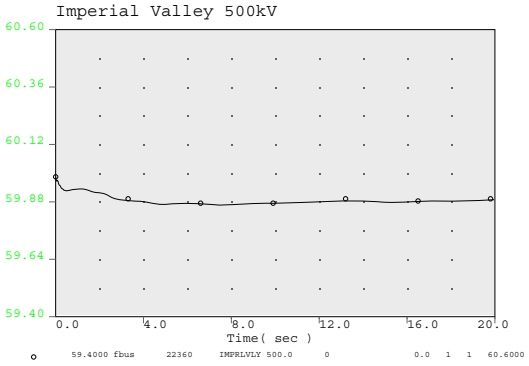
CENTRALS 500kV



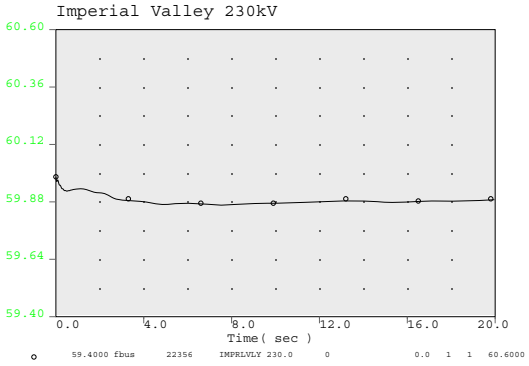
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

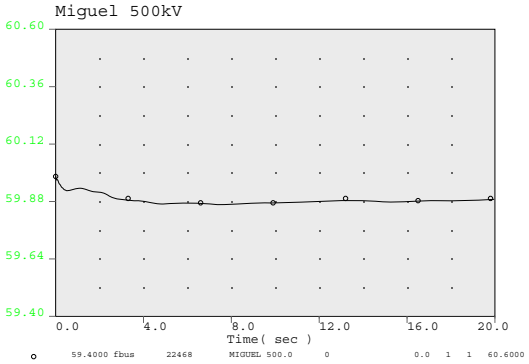
Imperial Valley 500kV



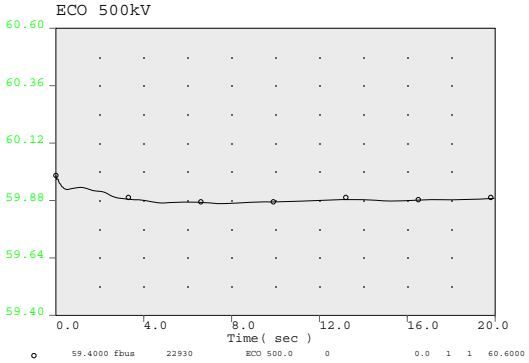
Imperial Valley 230kV



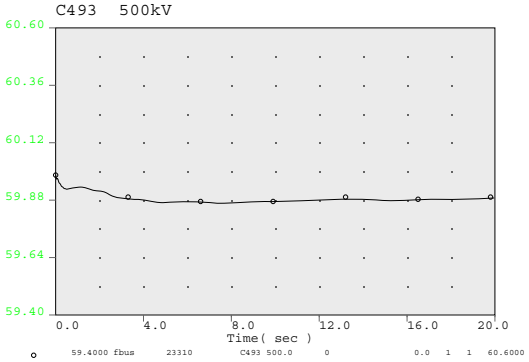
Miguel 500kV



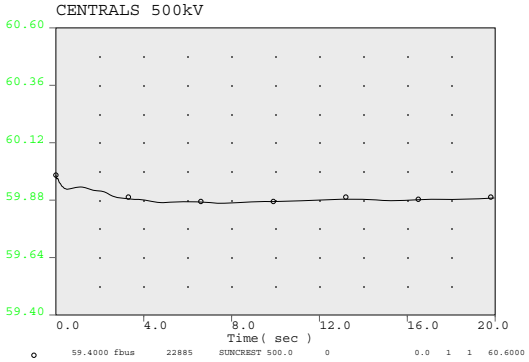
ECO 500kV



C493 500kV

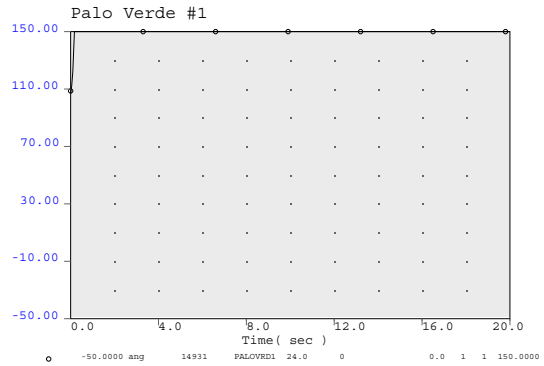


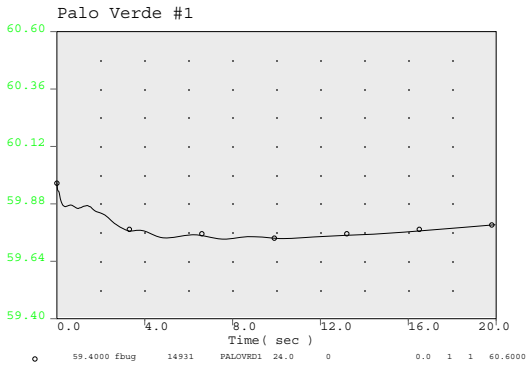
CENTRALS 500kV

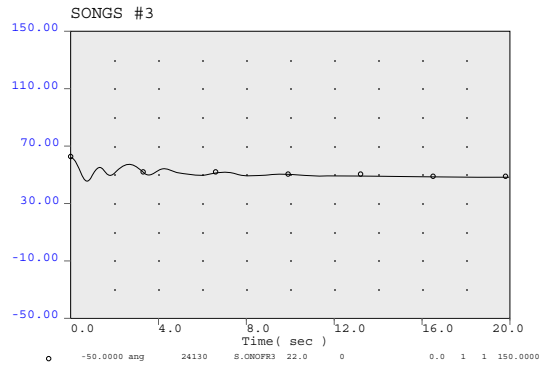


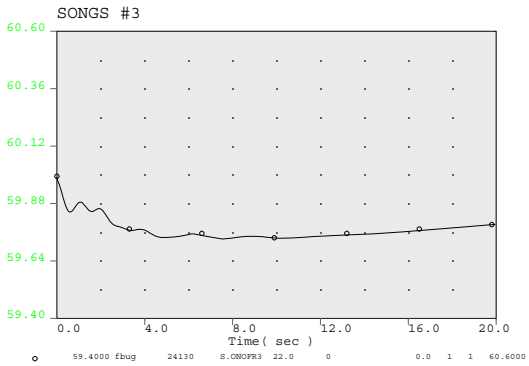
C1 C2 Light Load Pre Without Upgrades

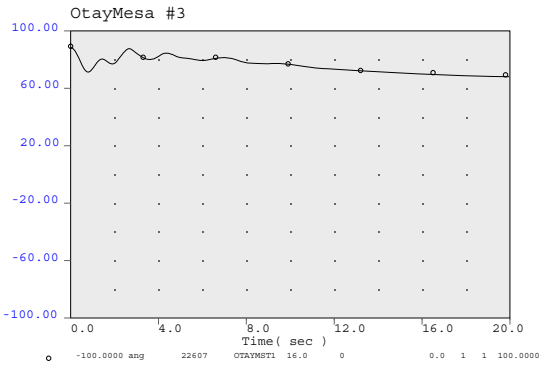
RELATIVE ROTOR ANGLE & FREQUENCY

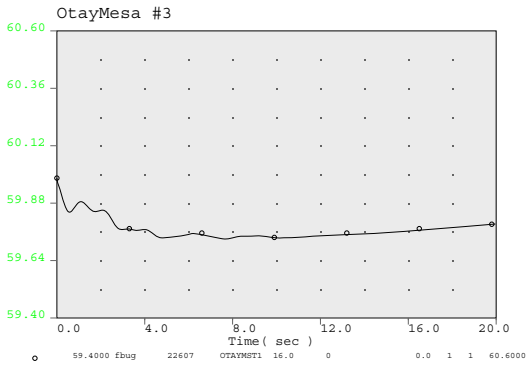










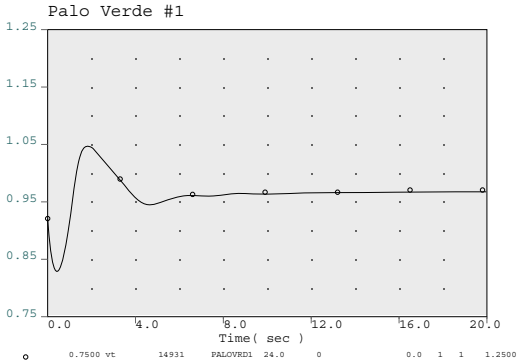


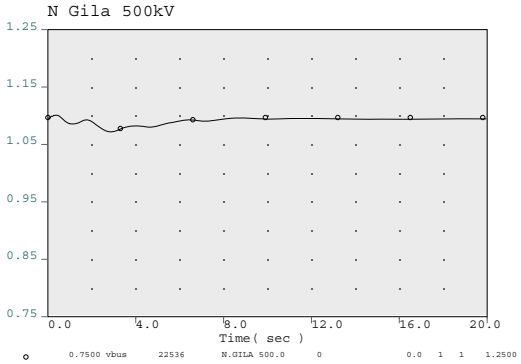
C1 C2 Light Load Pre Without Upgrades

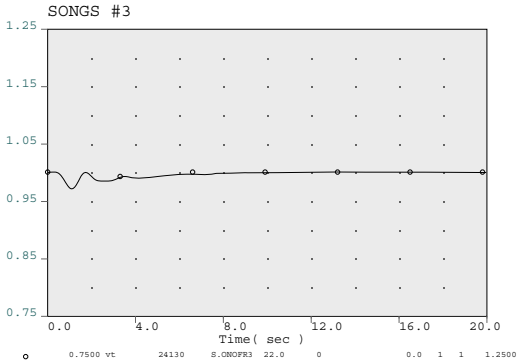
Page 1

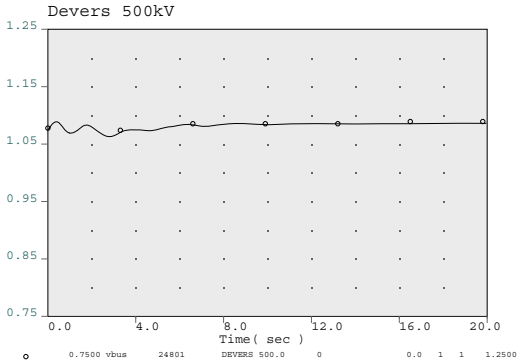
SDGE	tran-c1c2-ll-pre-r12_PaloVerde-g2.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:25:00 2011

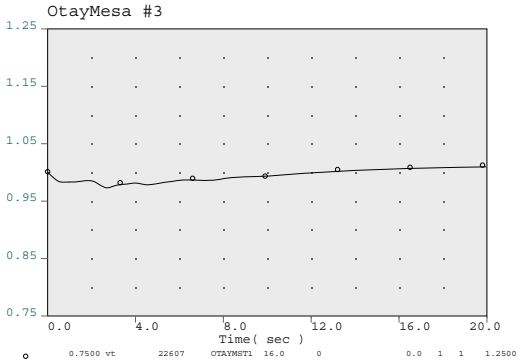
RELATIVE VOLTAGE

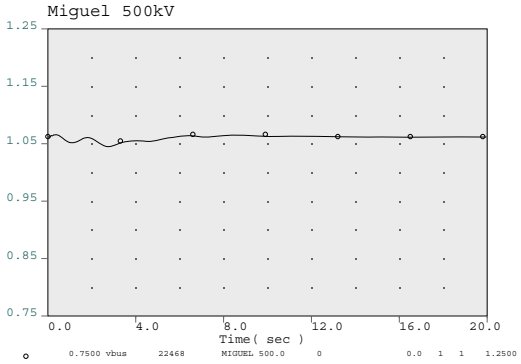








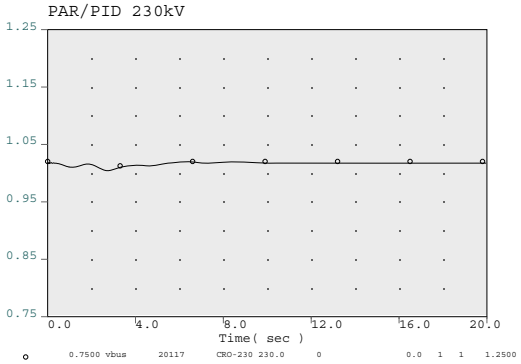




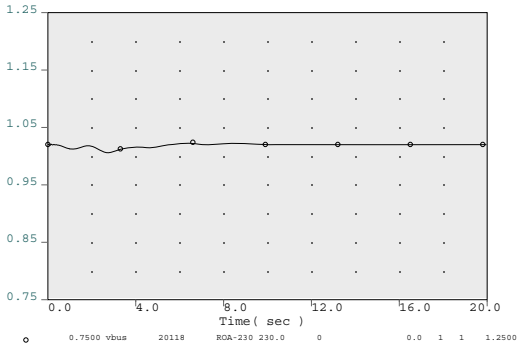
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

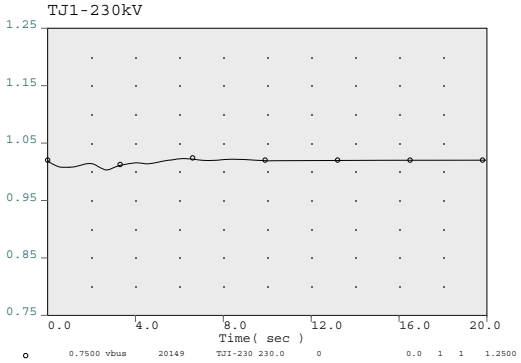
PAR/PID 230kV



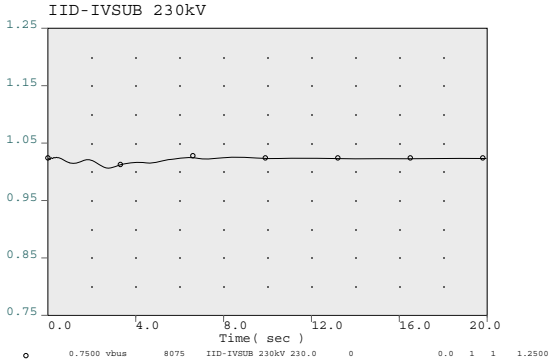
ROA-230kV



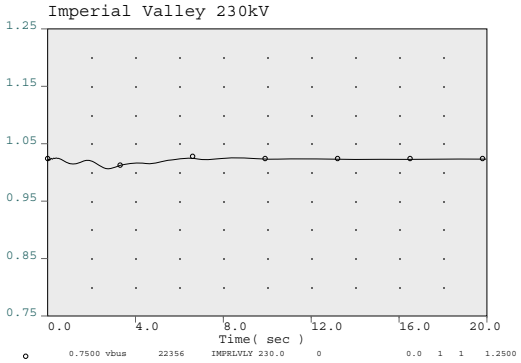
TJ1-230kV



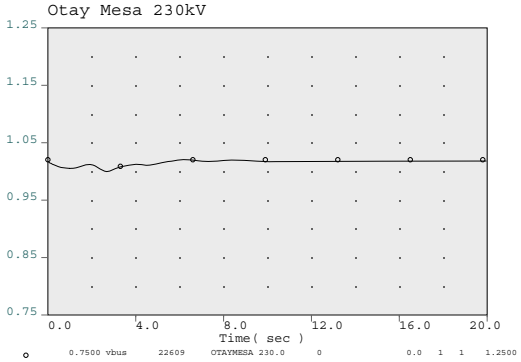
IID-IVSUB 230kV



Imperial Valley 230kV



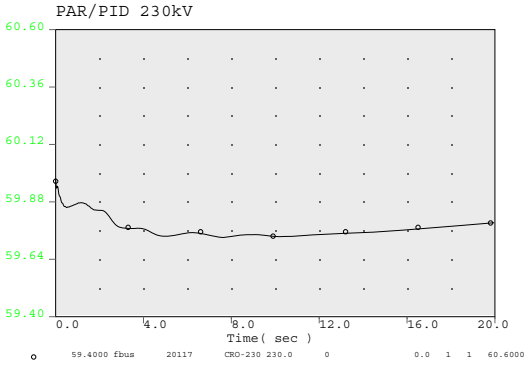
Otay Mesa 230kV



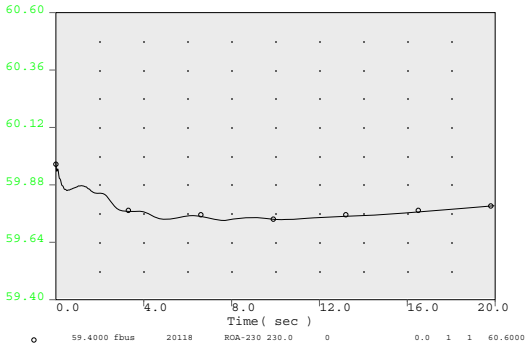
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

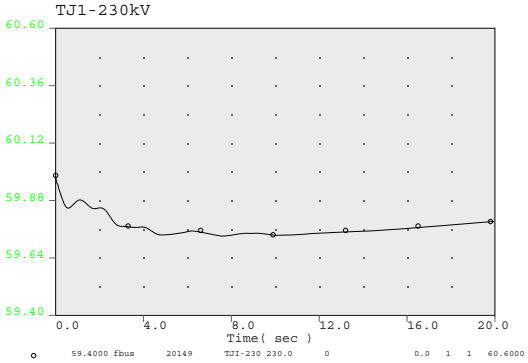
PAR/PID 230kV



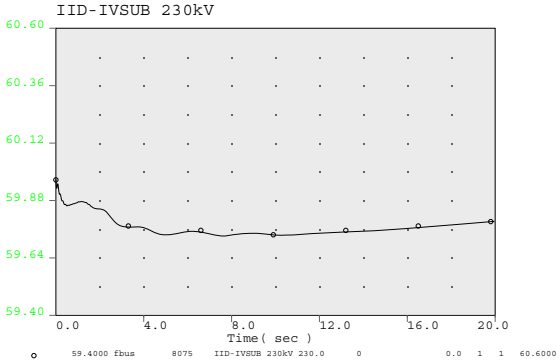
ROA-230kV



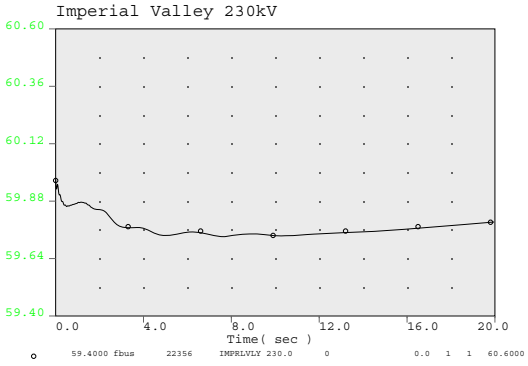
TJ1-230kV



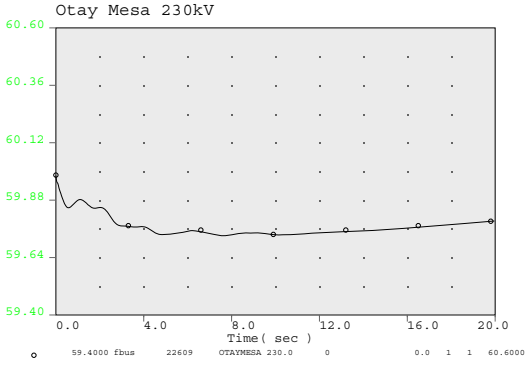
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



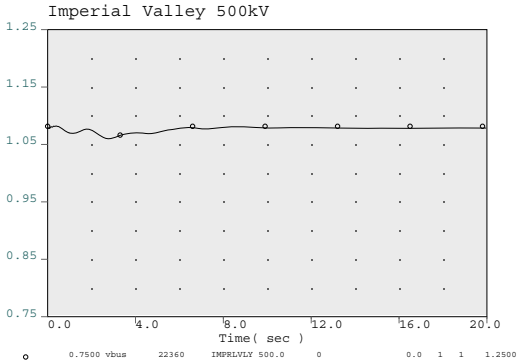
C1 C2 Light Load Pre Without Upgrades

Page 4

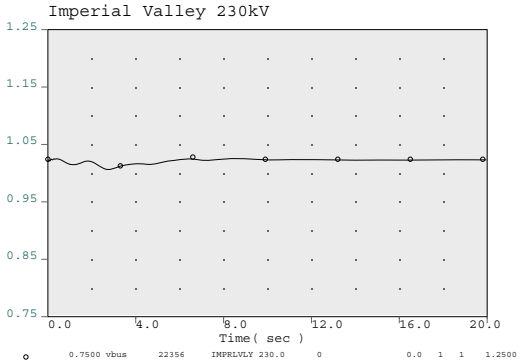
SDGE	tran-c1c2-ll-pre-r12_PaloVerde-g2.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:25:02 2011

VOLTAGE

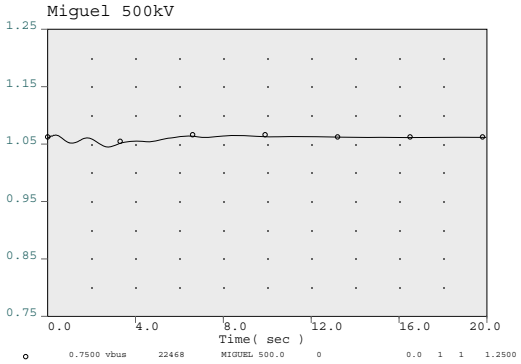
Imperial Valley 500kV



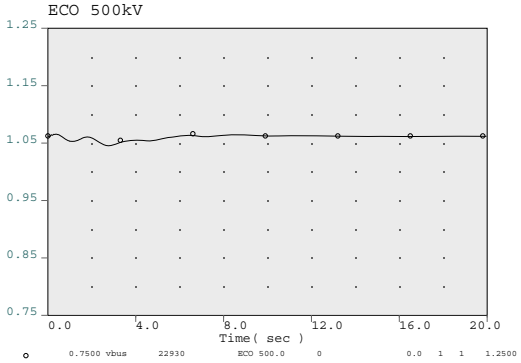
Imperial Valley 230kV



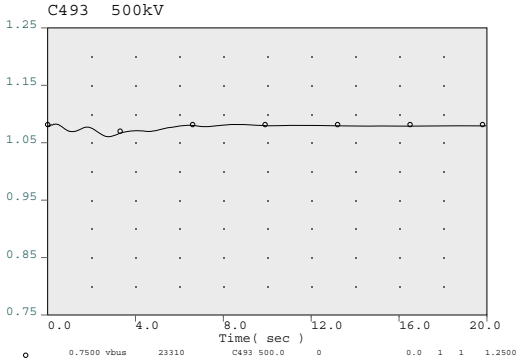
Miguel 500kV



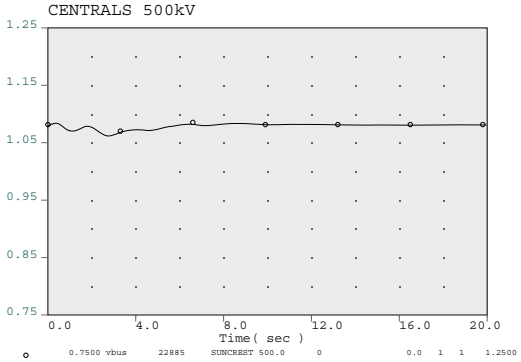
ECO 500kV



C493 500kV



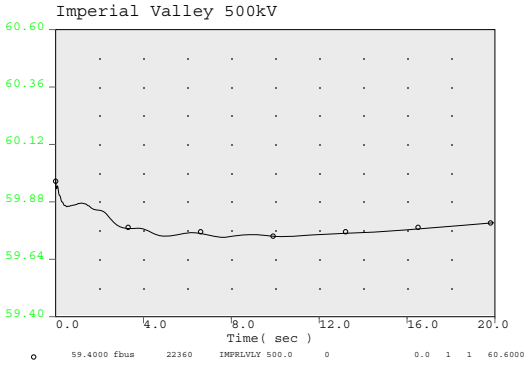
CENTRALS 500kV



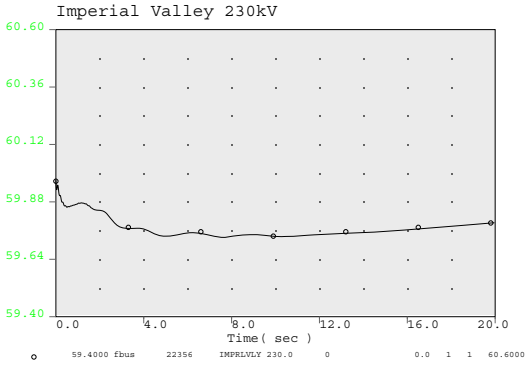
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

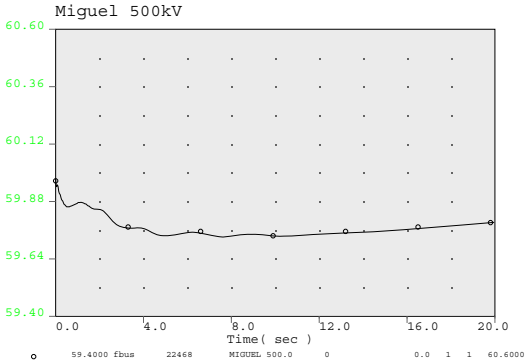
Imperial Valley 500kV



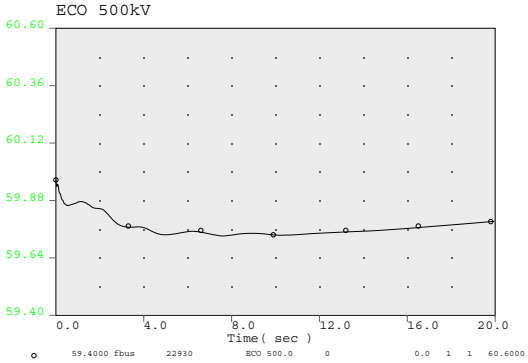
Imperial Valley 230kV



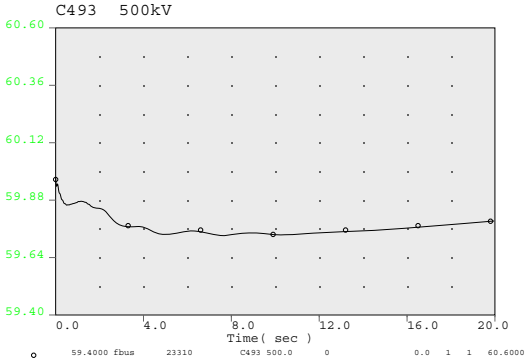
Miguel 500kV



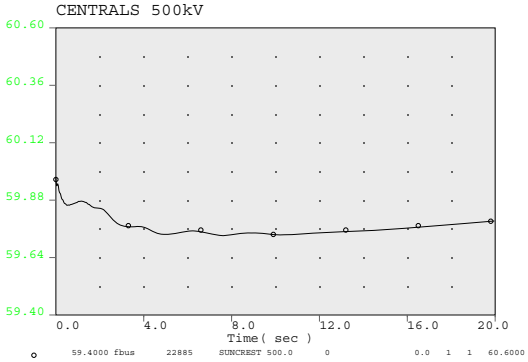
ECO 500kV



C493 500kV

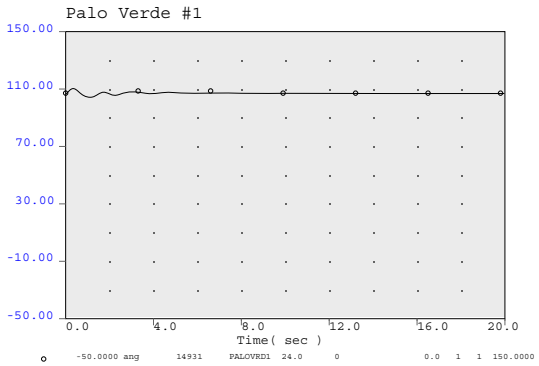


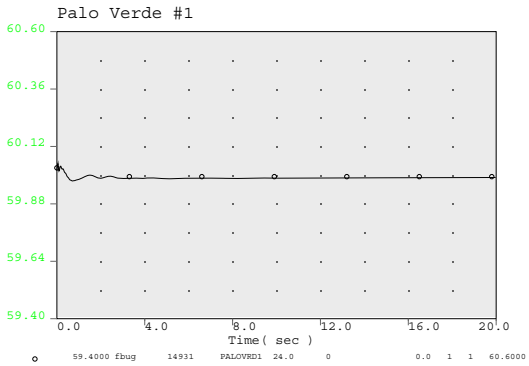
CENTRALS 500kV

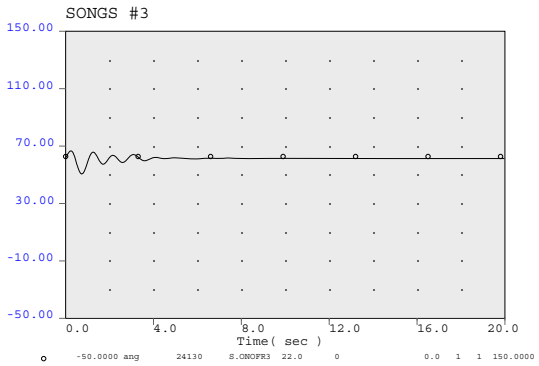


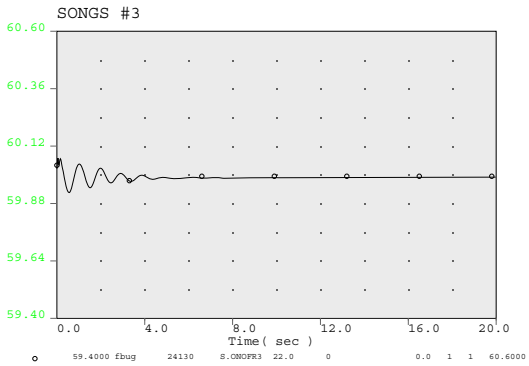
C1 C2 Light Load Pre Without Upgrades

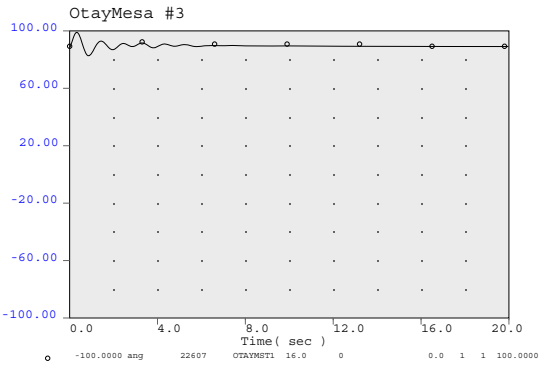
RELATIVE ROTOR ANGLE & FREQUENCY

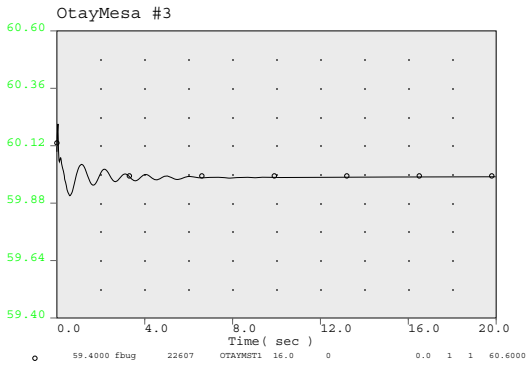












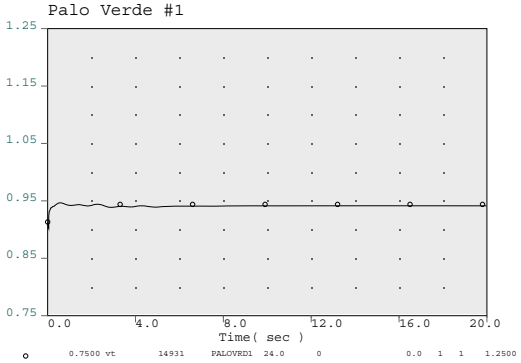
C1 C2 Light Load Pre Without Upgrades

Page 1

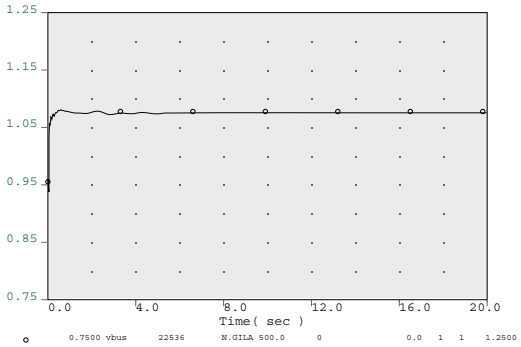
SDGE	tran-c1c2-ll-pre-r12_PEN230kv-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:30:30 2011

RELATIVE VOLTAGE

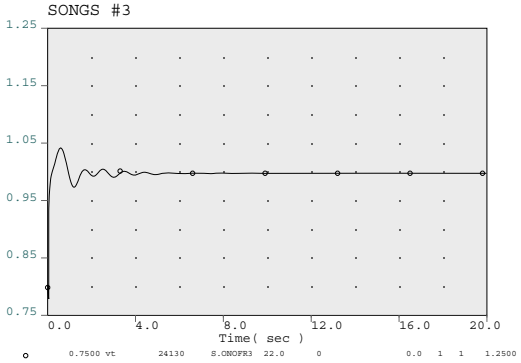
Palo Verde #1



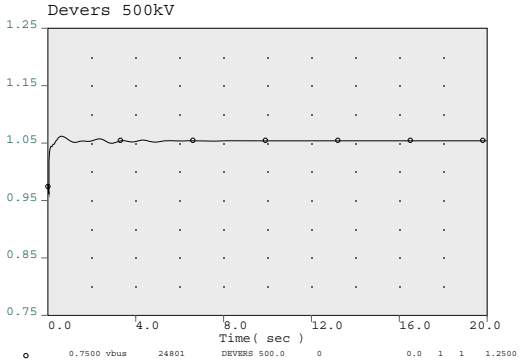
N Gila 500kV



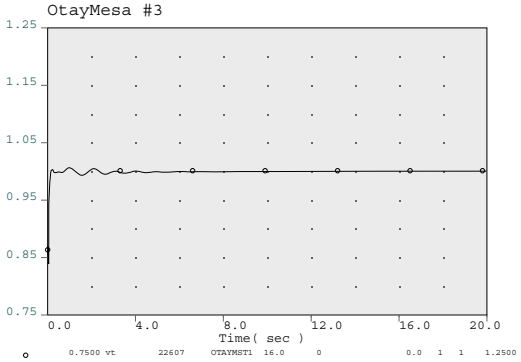
SONGS #3



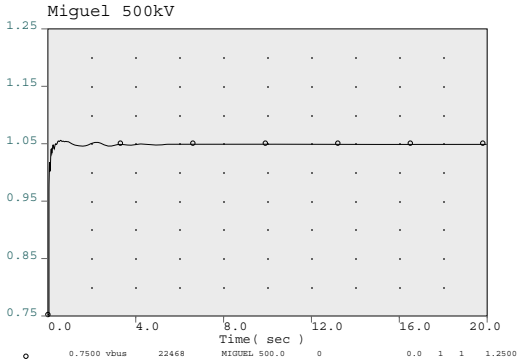
Devers 500kV



OtayMesa #3



Miguel 500kV



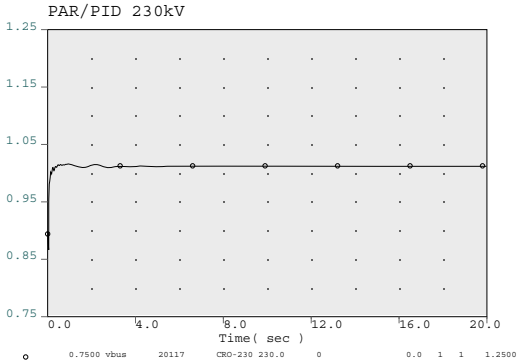
C1 C2 Light Load Pre Without Upgrades

Page 2

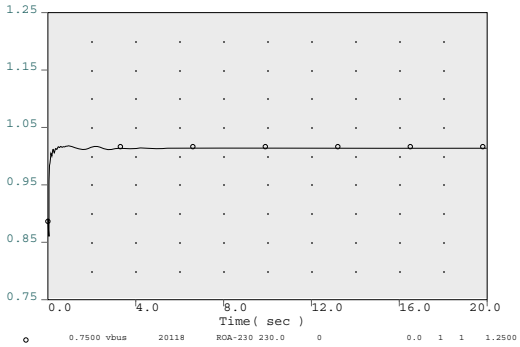
SDGE	tran-c1c2-ll-pre-r12_PEN230kv-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:30:30 2011

Affected System Voltage Check and Comparison

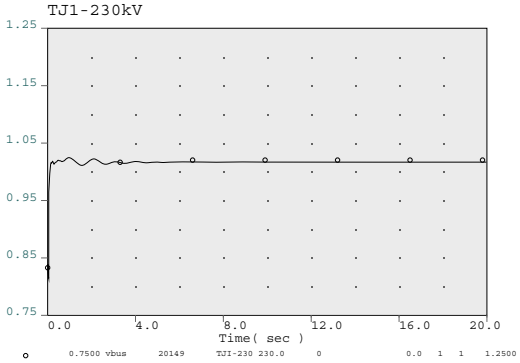
PAR/PID 230kV



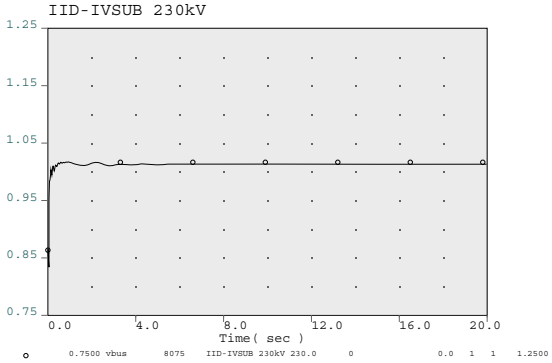
ROA-230kV



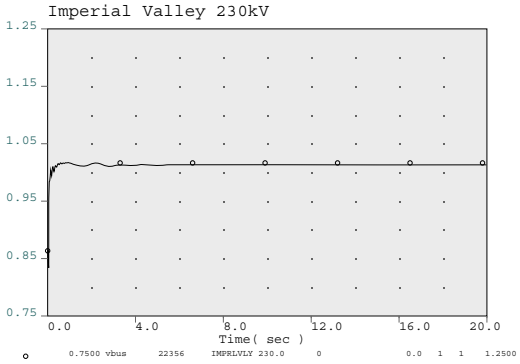
TJ1-230kV



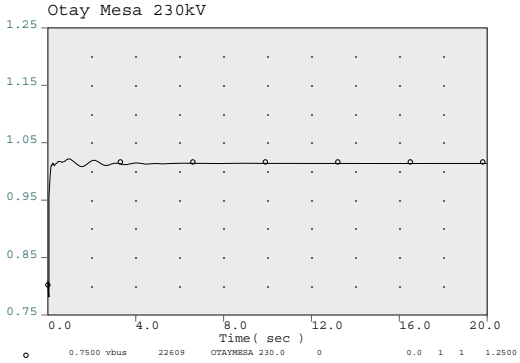
IID-IVSUB 230kV



Imperial Valley 230kV



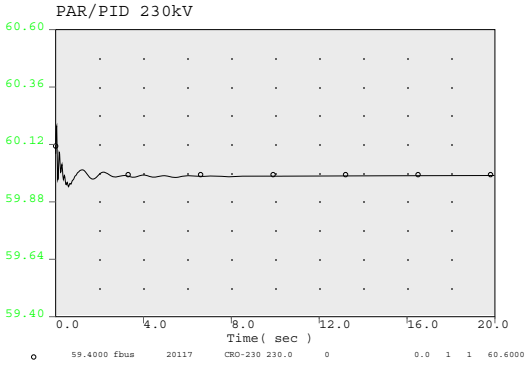
Otay Mesa 230kV



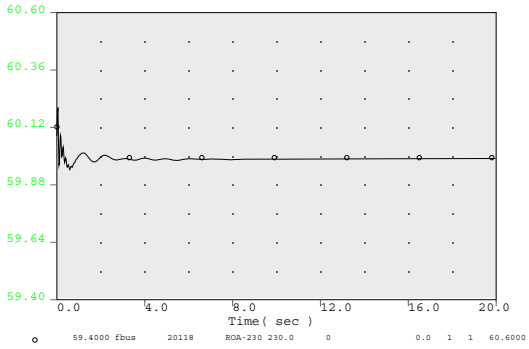
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

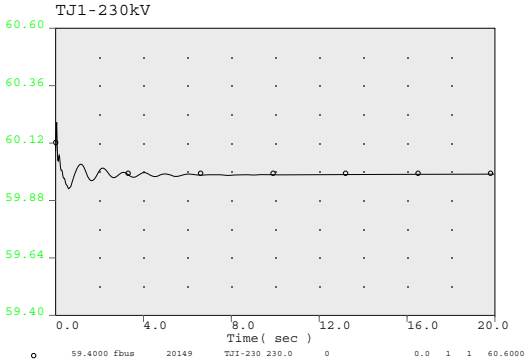
PAR/PID 230kV



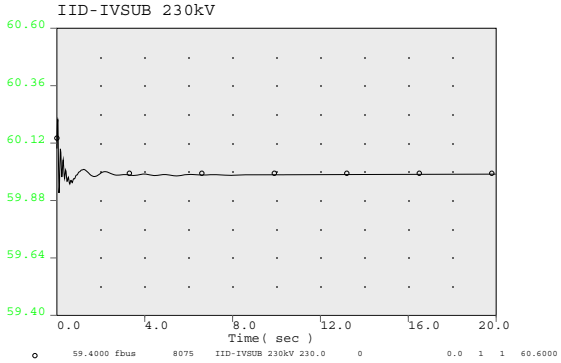
ROA-230kV



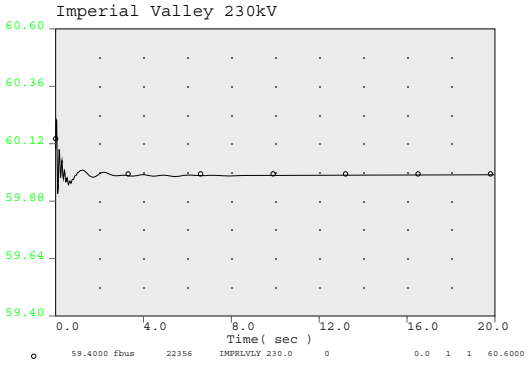
TJ1-230kV



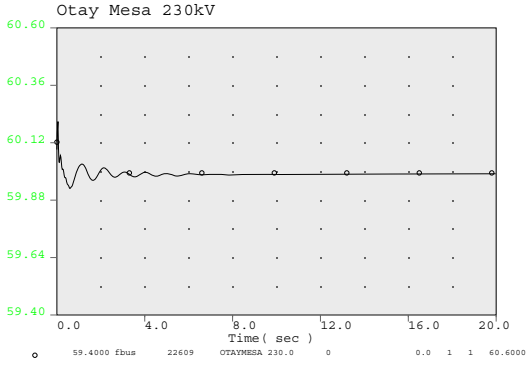
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



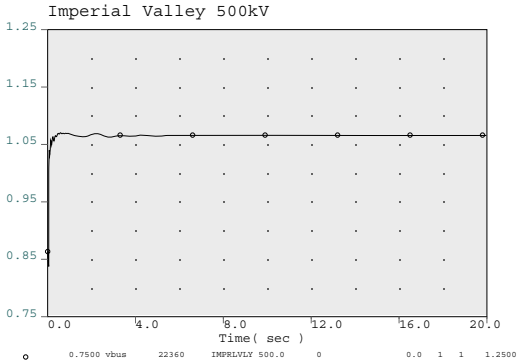
C1 C2 Light Load Pre Without Upgrades

Page 4

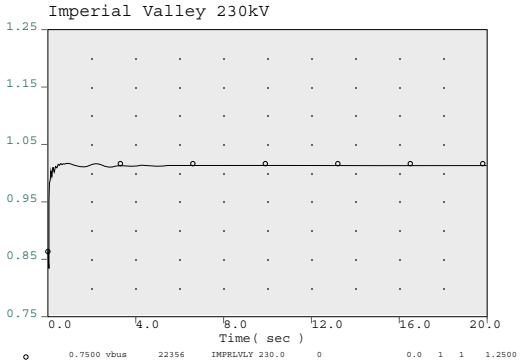
SDGE	tran-c1c2-ll-pre-r12_PEN230kv-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:30:31 2011

VOLTAGE

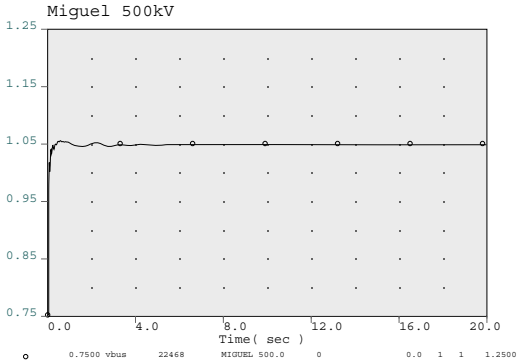
Imperial Valley 500kV



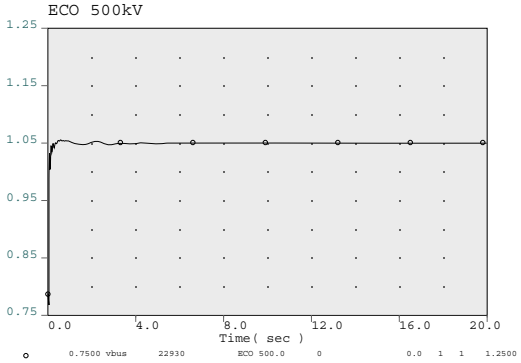
Imperial Valley 230kV



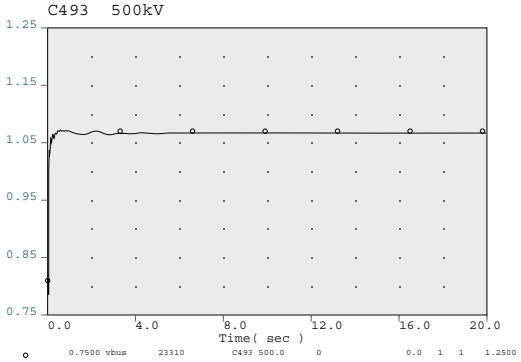
Miguel 500kV



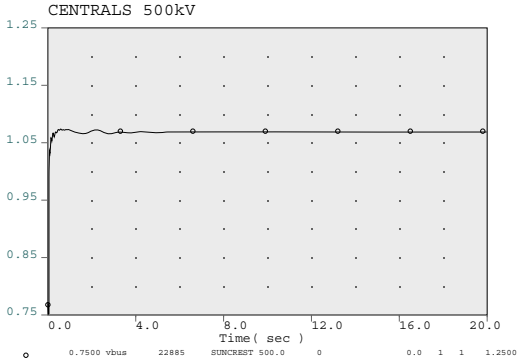
ECO 500kV



C493 500kV

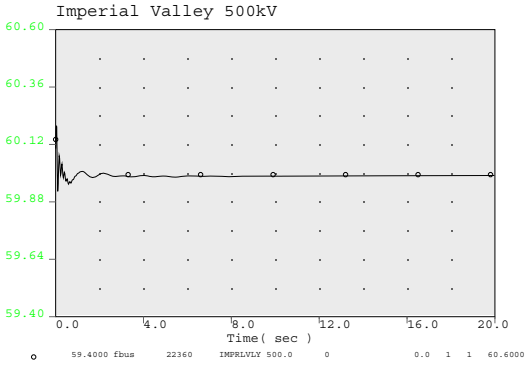


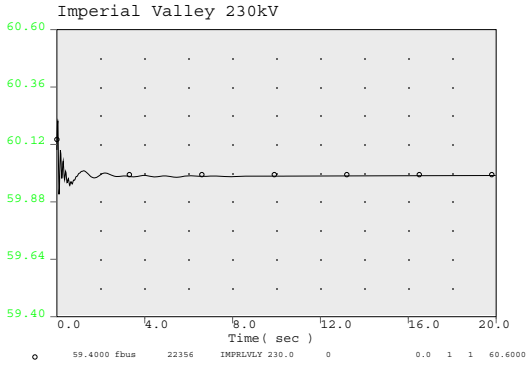
CENTRALS 500kV

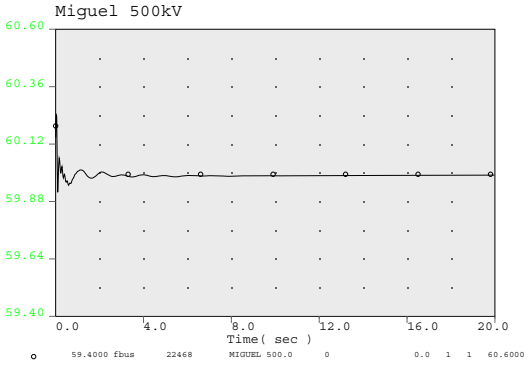


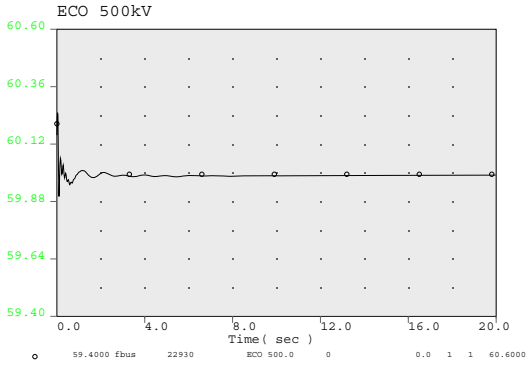
C1 C2 Light Load Pre Without Upgrades

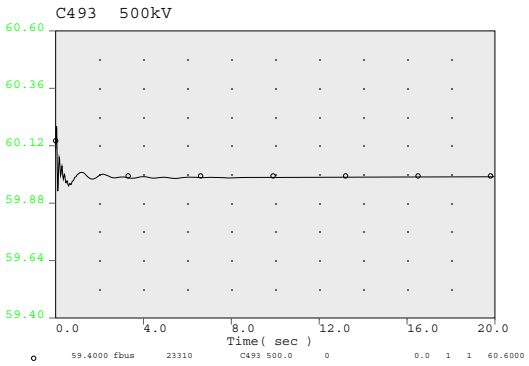
FREQUENCY

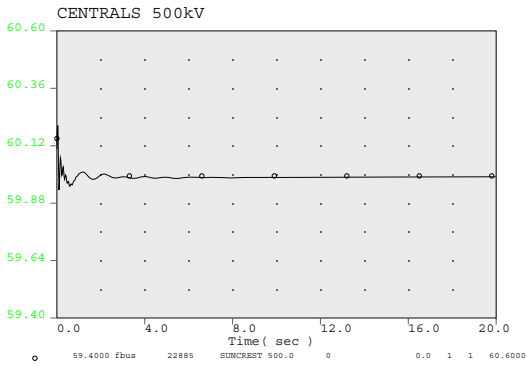










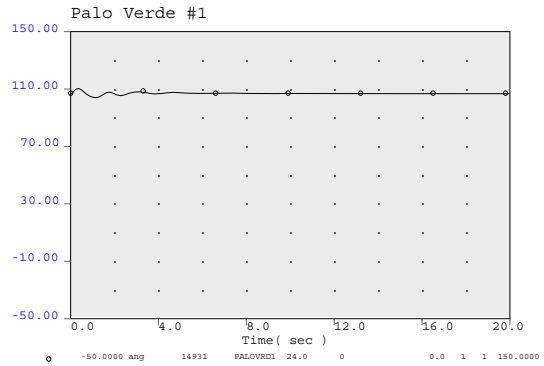


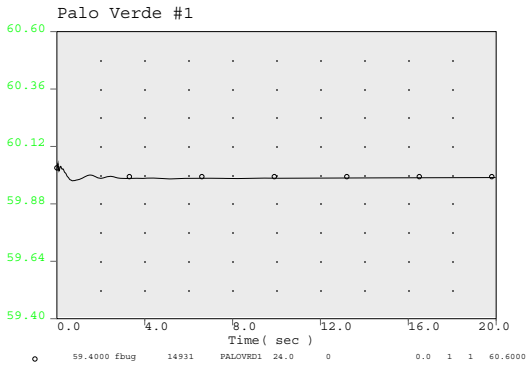
C1 C2 Light Load Pre Without Upgrades

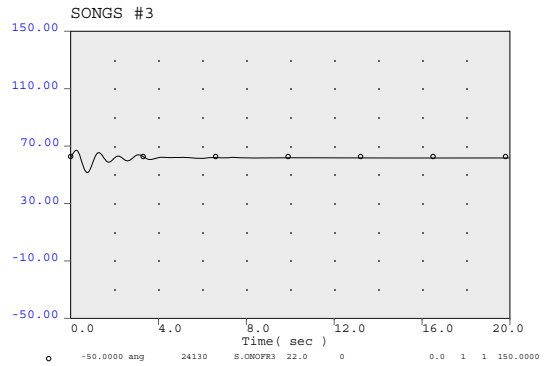
Page 6

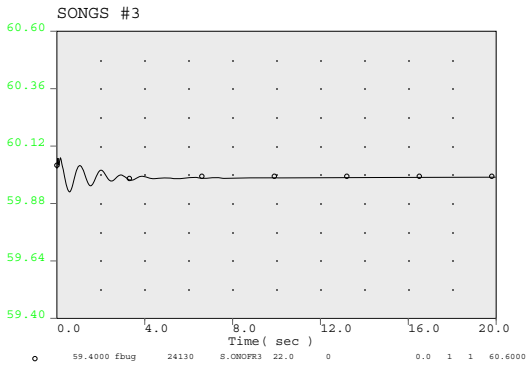
SDGE	tran-c1c2-ll-pre-r12_PEN230kv-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:30:32 2011

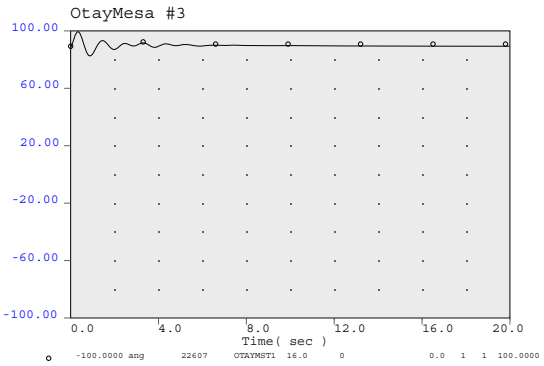
RELATIVE ROTOR ANGLE & FREQUENCY

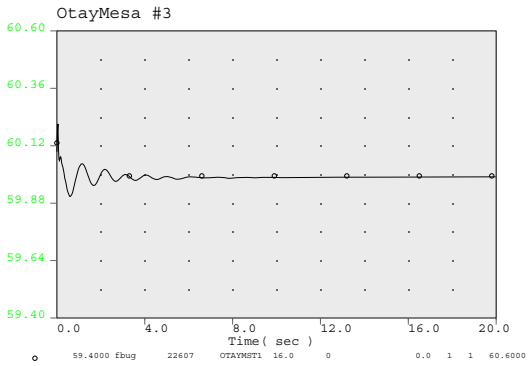












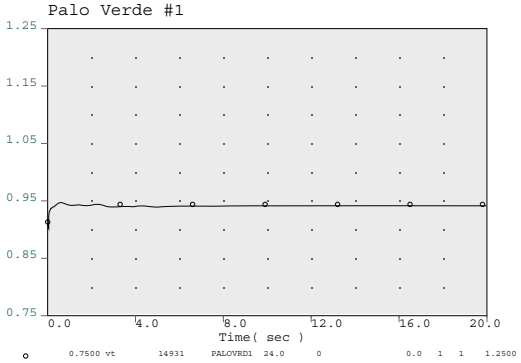
C1 C2 Light Load Pre Without Upgrades

Page 1

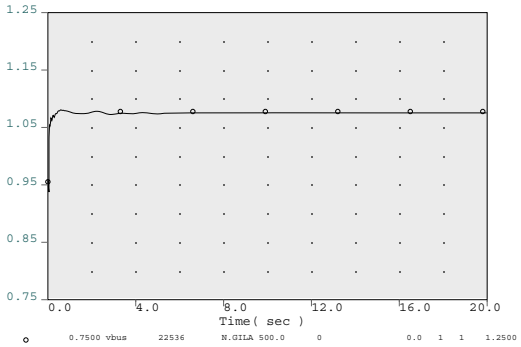
SDGE	tran-c1c2-ll-pre-r12_PEN-ES-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:26:49 2011

RELATIVE VOLTAGE

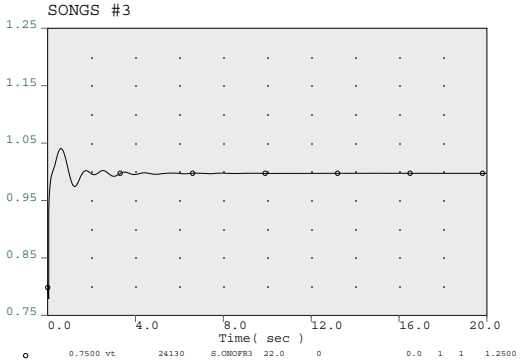
Palo Verde #1



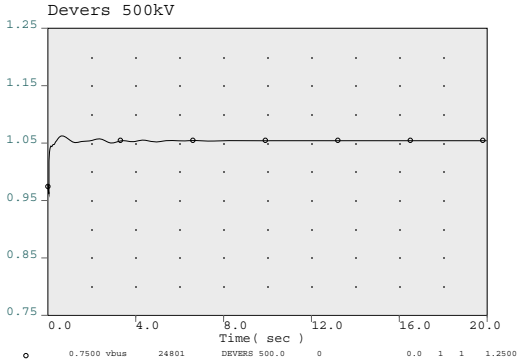
N Gila 500kV



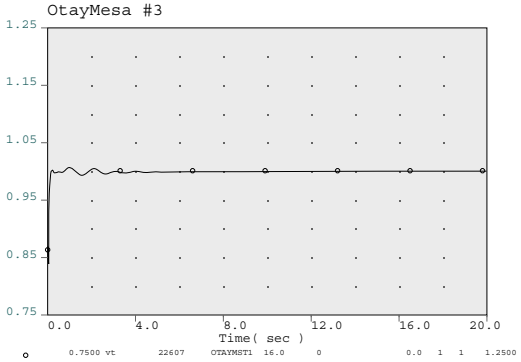
SONGS #3



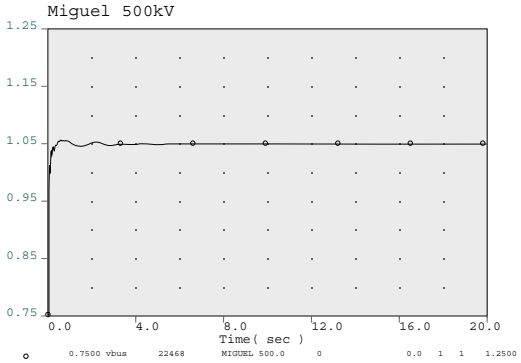
Devers 500kV



OtayMesa #3



Miguel 500kV



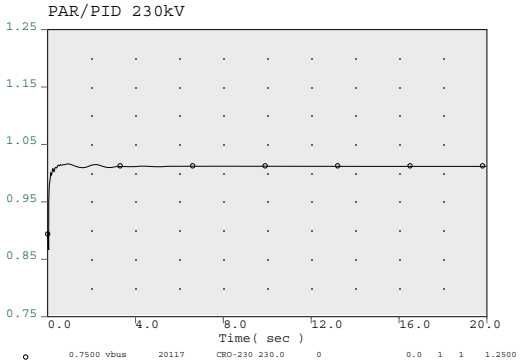
C1 C2 Light Load Pre Without Upgrades

Page 2

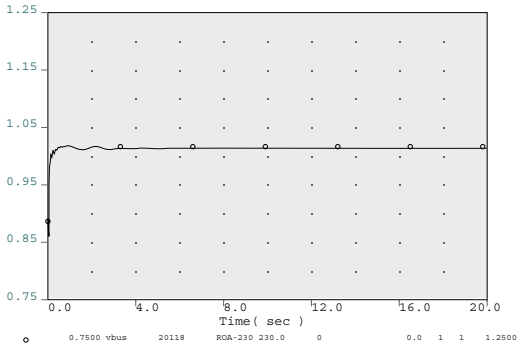
SDGE	tran-c1c2-ll-pre-r12_PEN-ES-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:26:49 2011

Affected System Voltage Check and Comparison

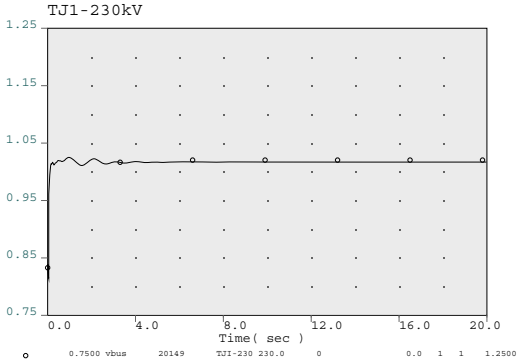
PAR/PID 230kV



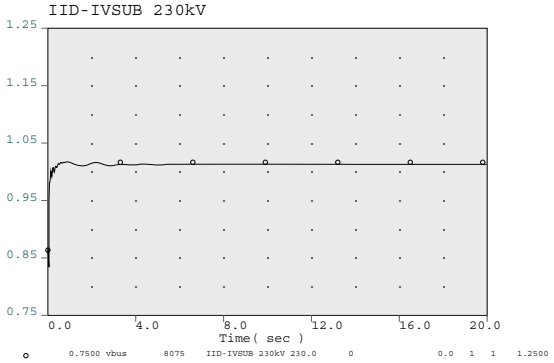
ROA-230kV



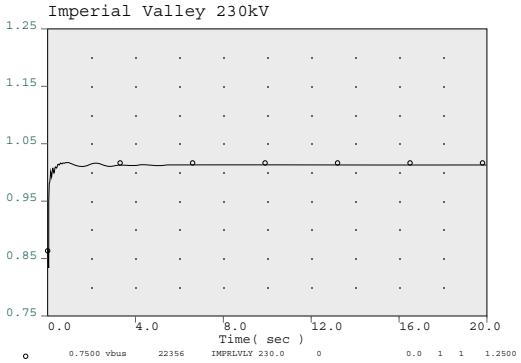
TJ1-230kV



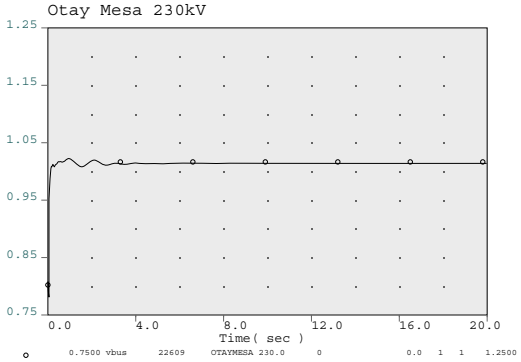
IID-IVSUB 230kV



Imperial Valley 230kV



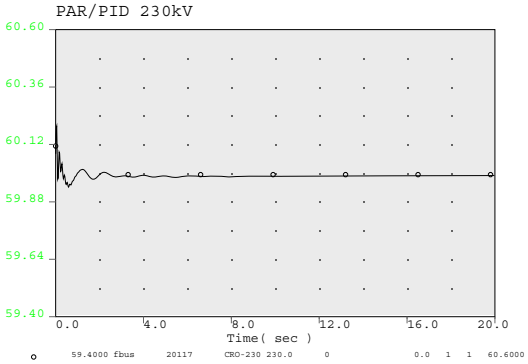
Otay Mesa 230kV



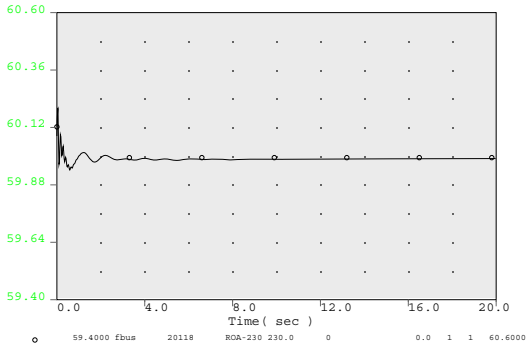
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

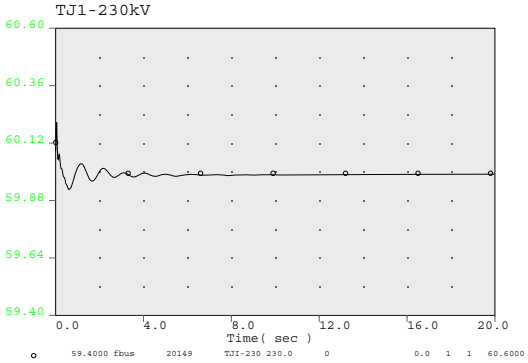
PAR/PID 230kV



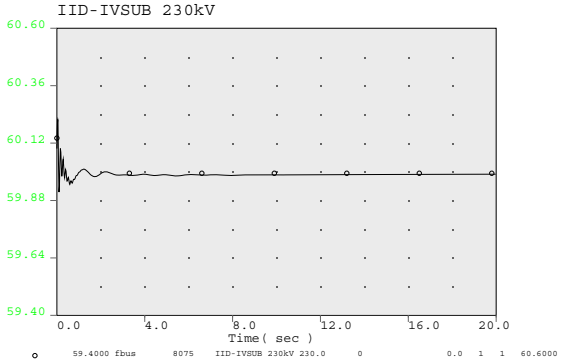
ROA-230kV



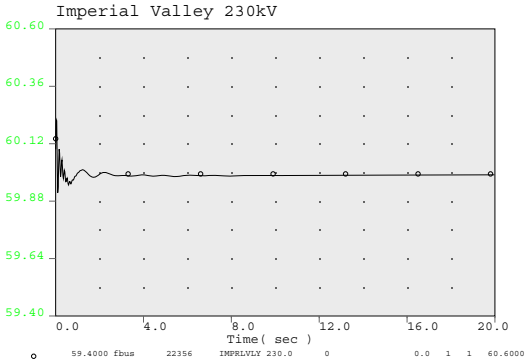
TJ1-230kV



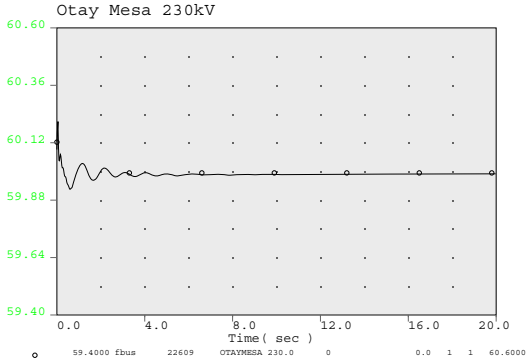
IID-IVSUB 230kV



Imperial Valley 230kV



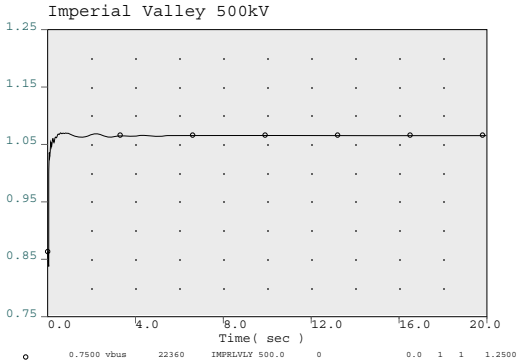
Otay Mesa 230kV



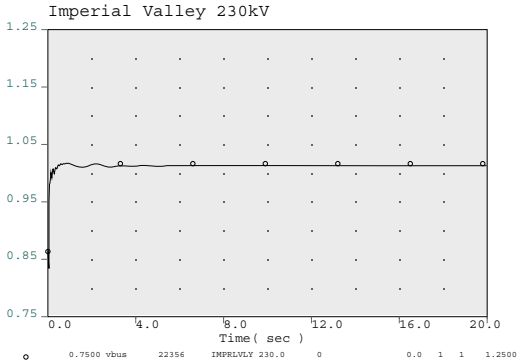
C1 C2 Light Load Pre Without Upgrades

VOLTAGE

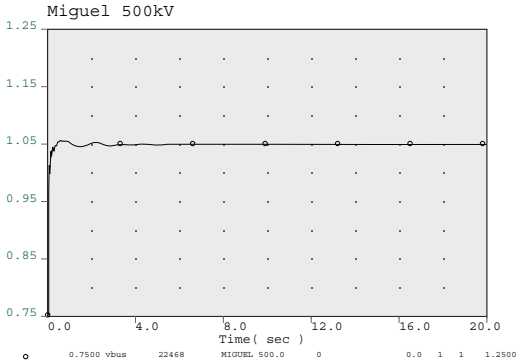
Imperial Valley 500kV



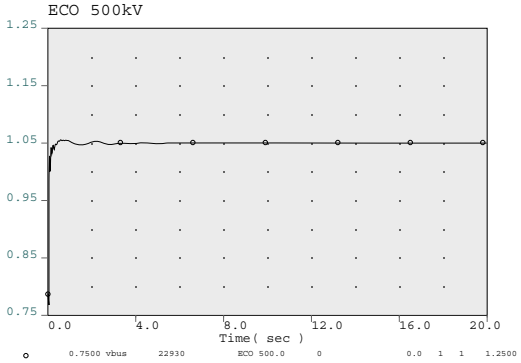
Imperial Valley 230kV



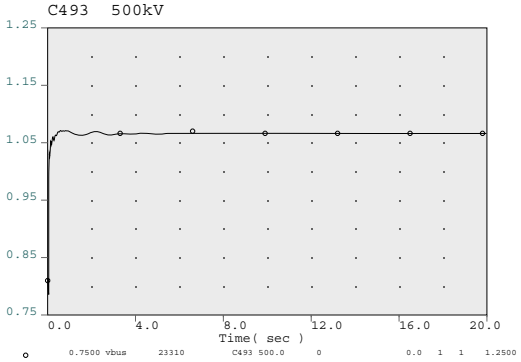
Miguel 500kV



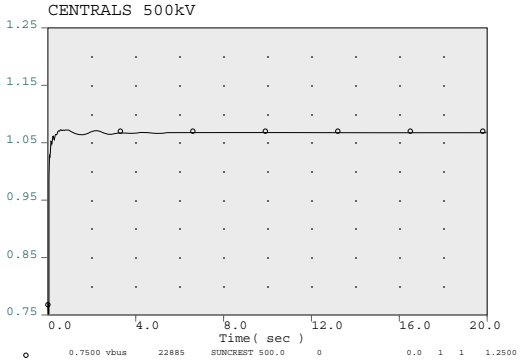
ECO 500kV



C493 500kV



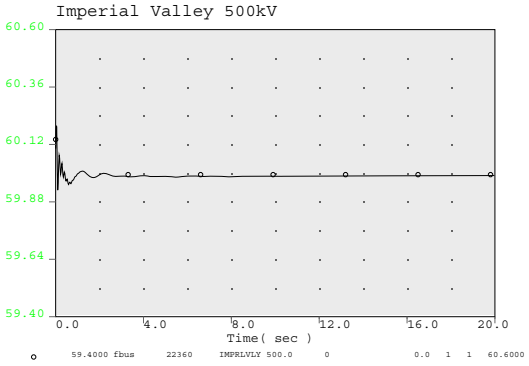
CENTRALS 500kV



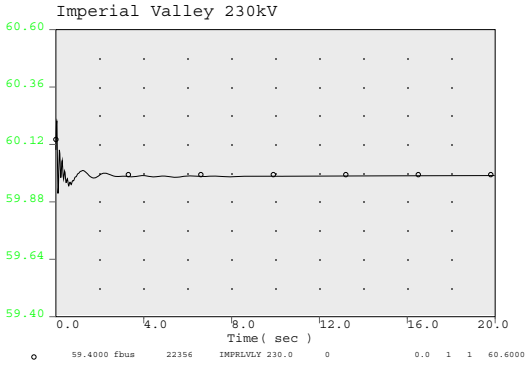
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

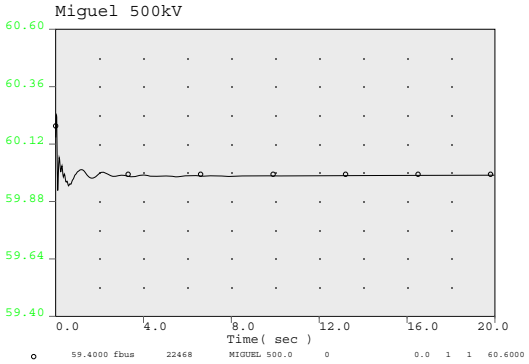
Imperial Valley 500kV



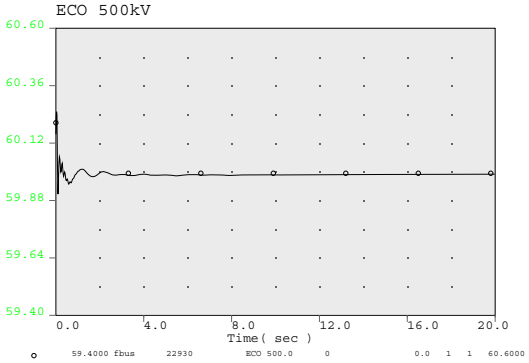
Imperial Valley 230kV



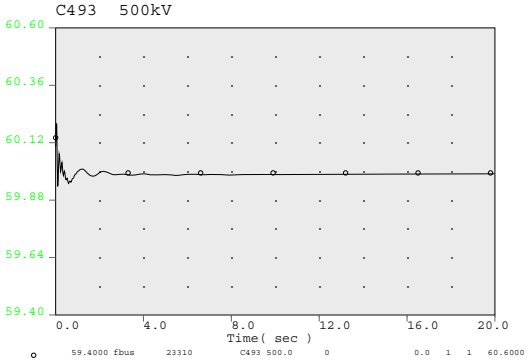
Miguel 500kV



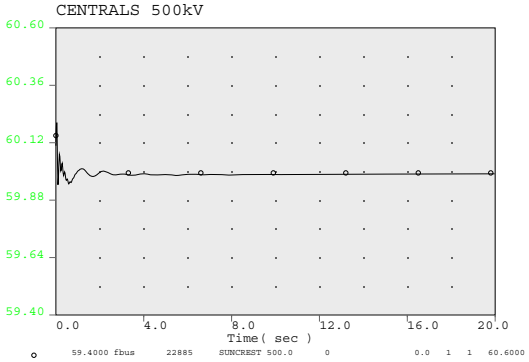
ECO 500kV



C493 500kV

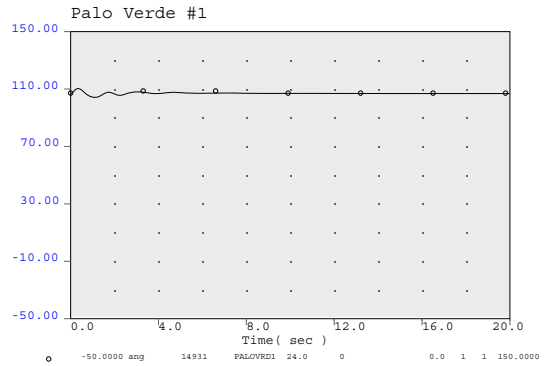


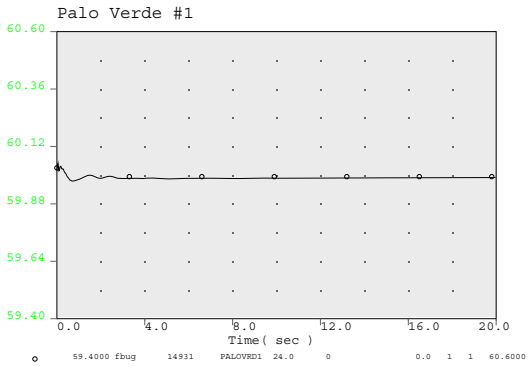
CENTRALS 500kV

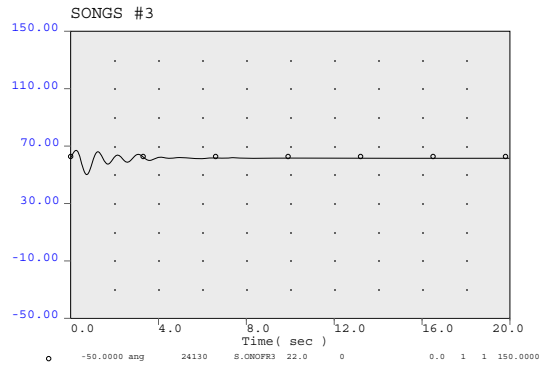


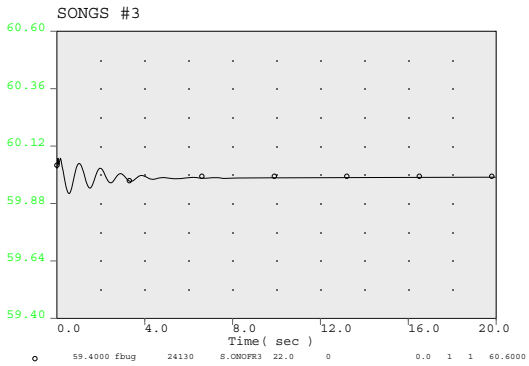
C1 C2 Light Load Pre Without Upgrades

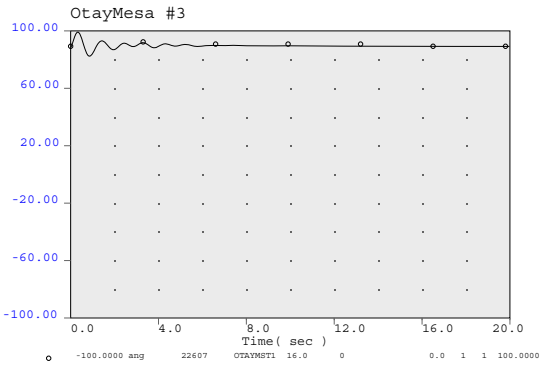
RELATIVE ROTOR ANGLE & FREQUENCY

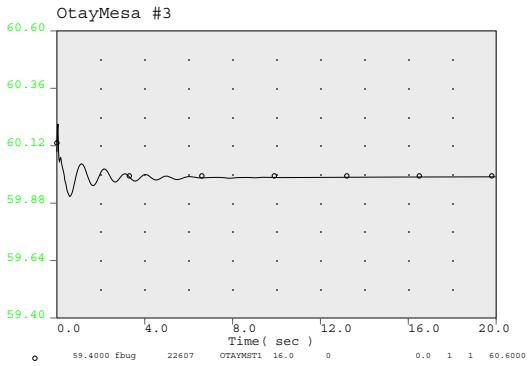












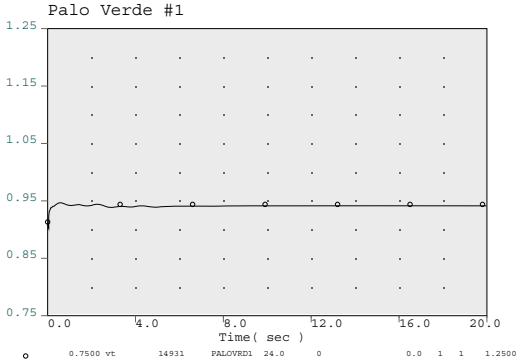
C1 C2 Light Load Pre Without Upgrades

Page 1

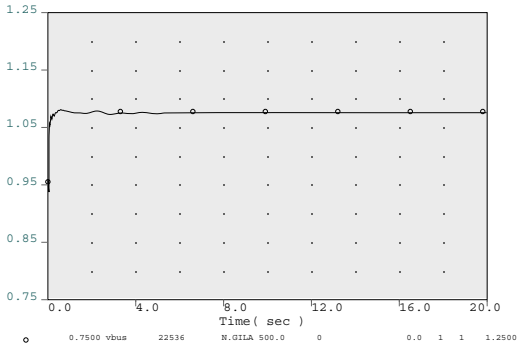
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_PEN-SX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:28:38 2011

RELATIVE VOLTAGE

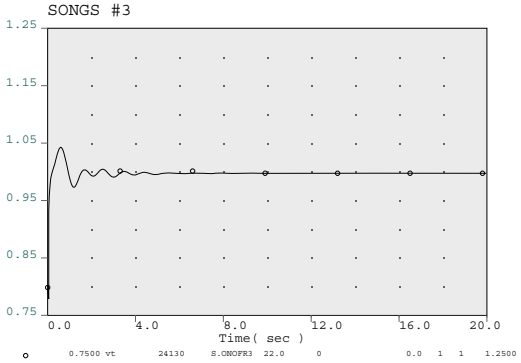
Palo Verde #1



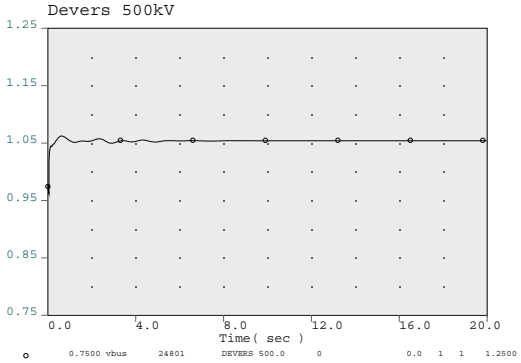
N Gila 500kV



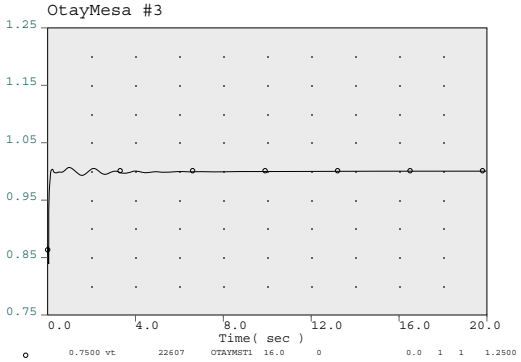
SONGS #3



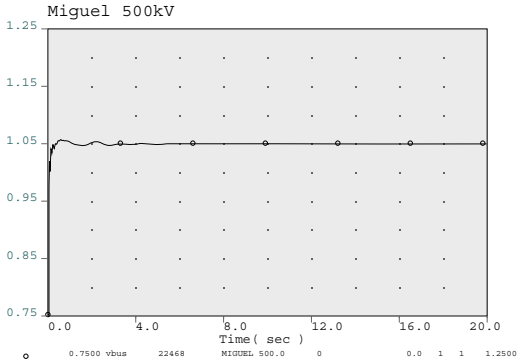
Devers 500kV



OtayMesa #3



Miguel 500kV



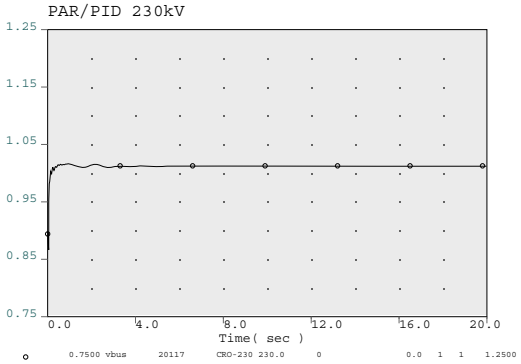
C1 C2 Light Load Pre Without Upgrades

Page 2

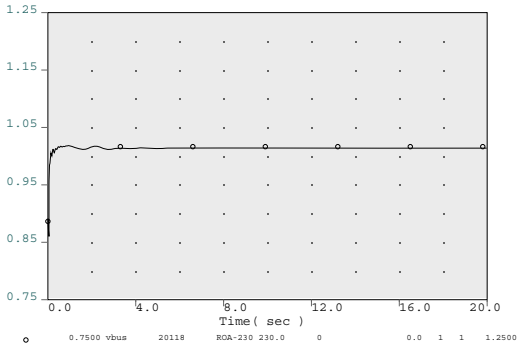
SDGE	tran-c1c2-ll-pre-r12_PEN-SX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:28:39 2011

Affected System Voltage Check and Comparison

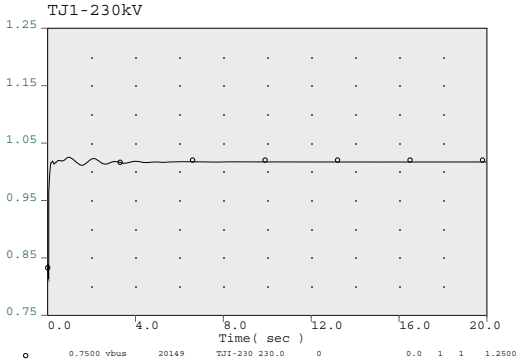
PAR/PID 230kV



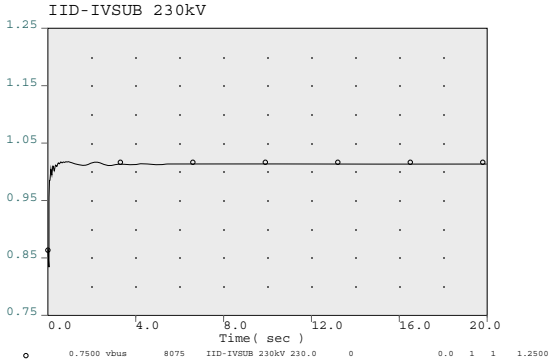
ROA-230kV



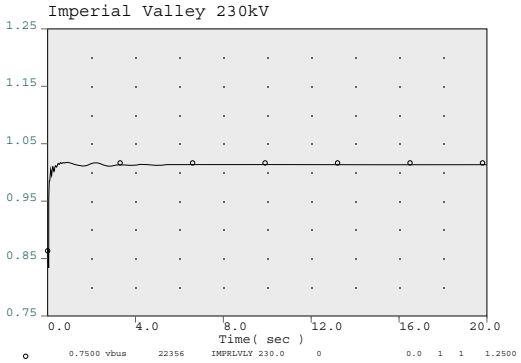
TJ1-230kV



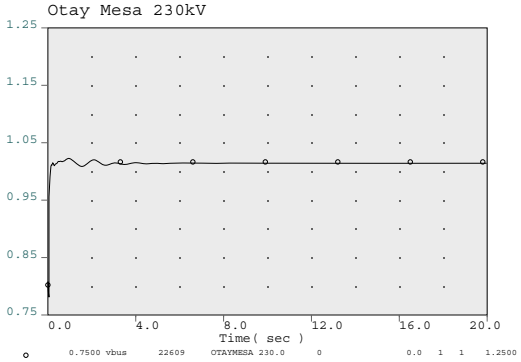
IID-IVSUB 230kV



Imperial Valley 230kV



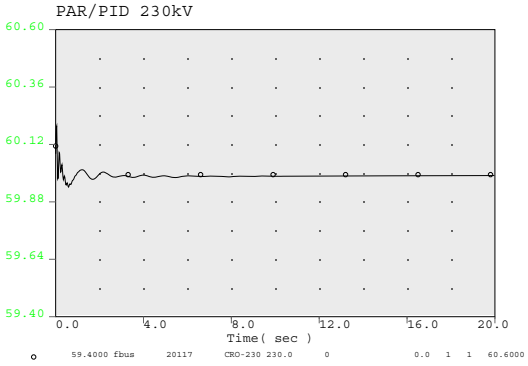
Otay Mesa 230kV



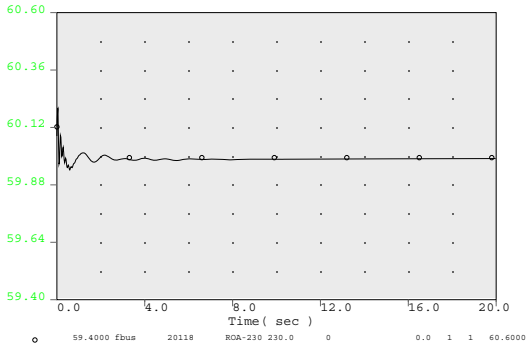
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

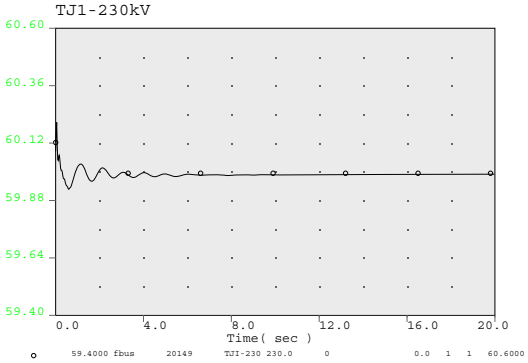
PAR/PID 230kV



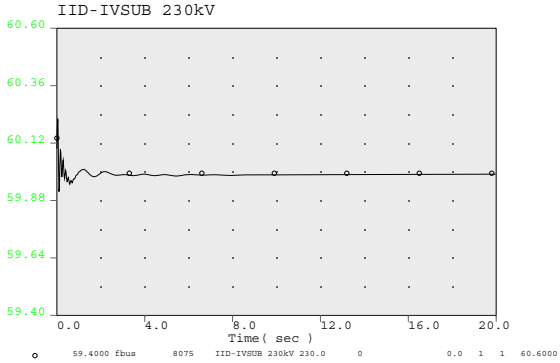
ROA-230kV



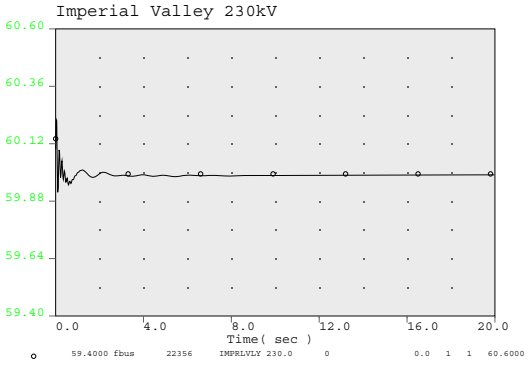
TJ1-230kV



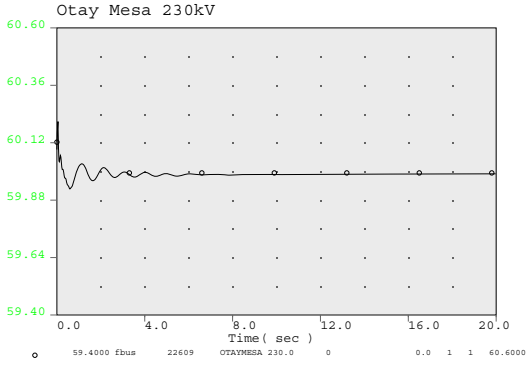
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



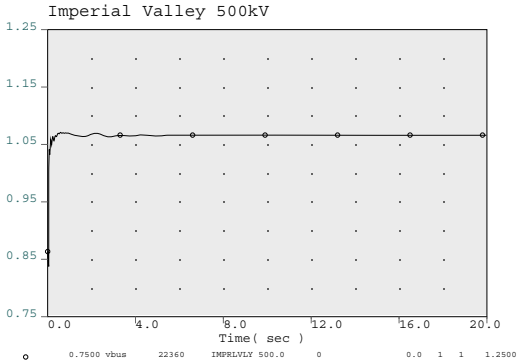
C1 C2 Light Load Pre Without Upgrades

Page 4

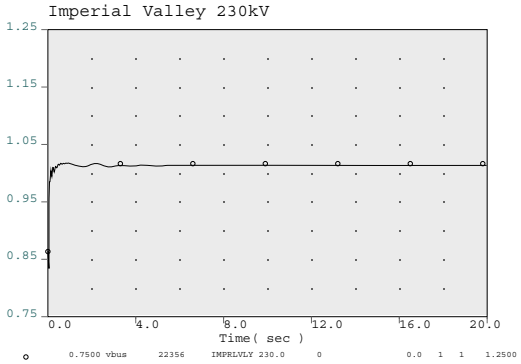
SDGE	tran-c1c2-ll-pre-r12_PEN-SX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:28:40 2011

VOLTAGE

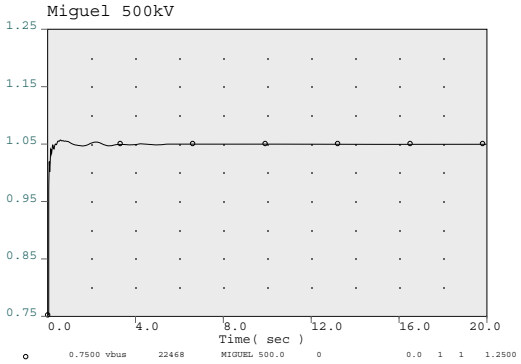
Imperial Valley 500kV



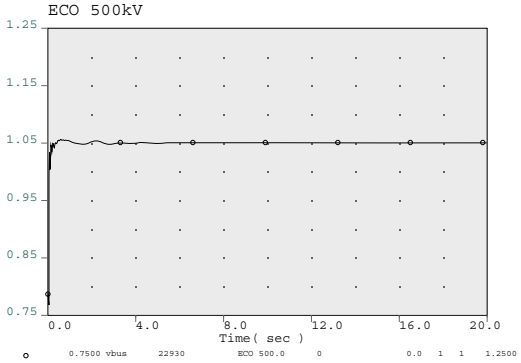
Imperial Valley 230kV



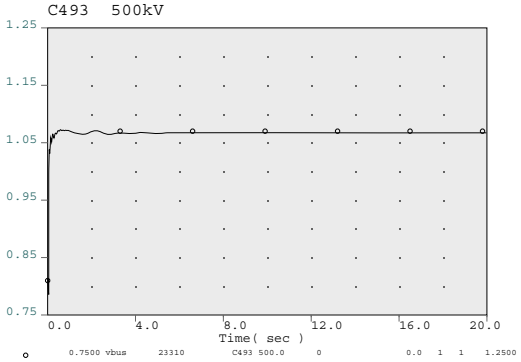
Miguel 500kV



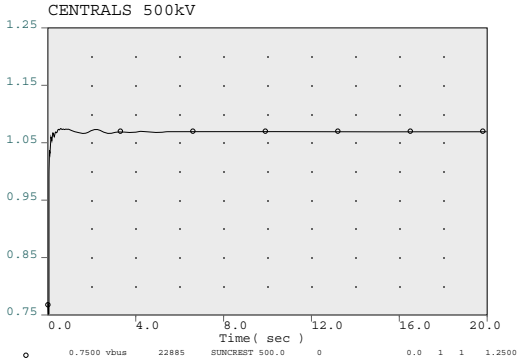
ECO 500kV



C493 500kV

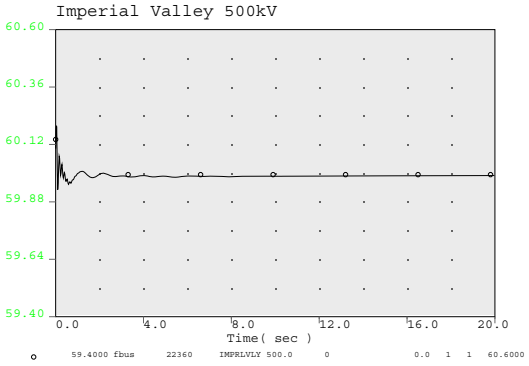


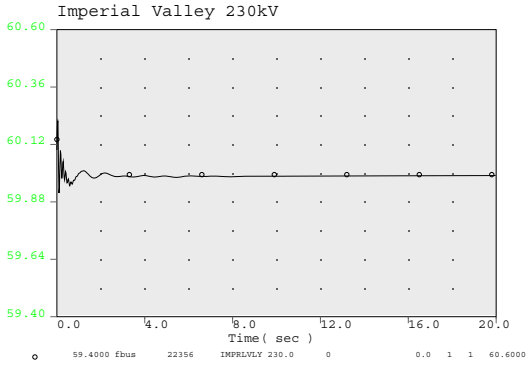
CENTRALS 500kV

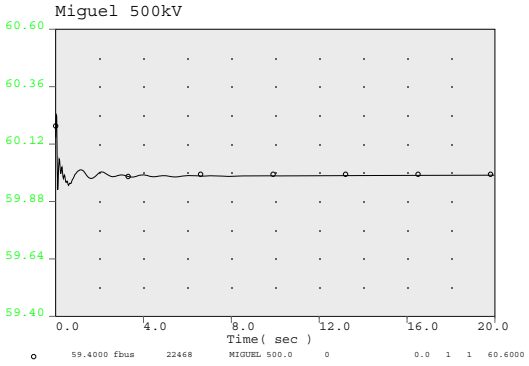


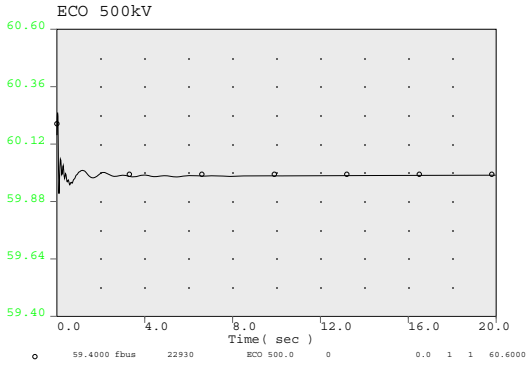
C1 C2 Light Load Pre Without Upgrades

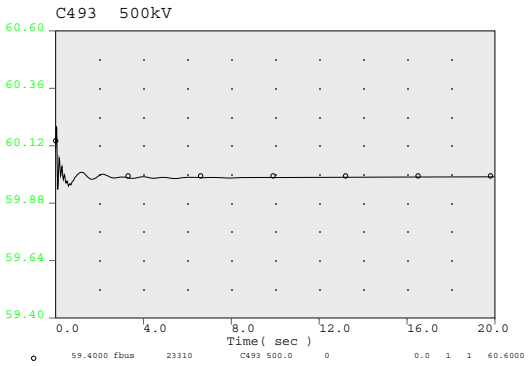
FREQUENCY

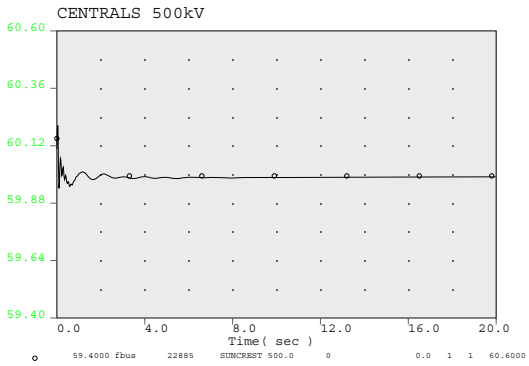










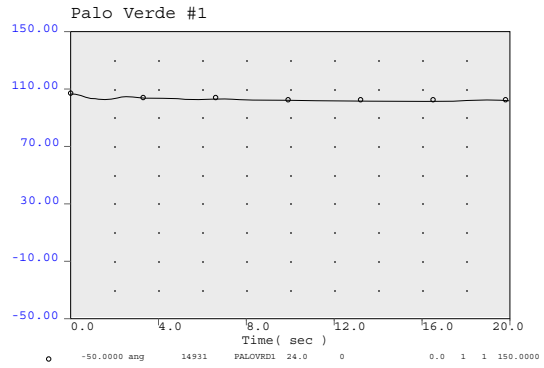


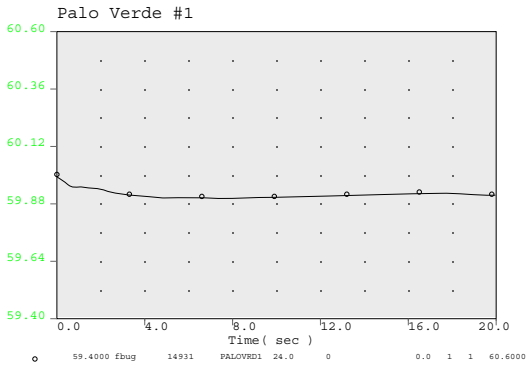
C1 C2 Light Load Pre Without Upgrades

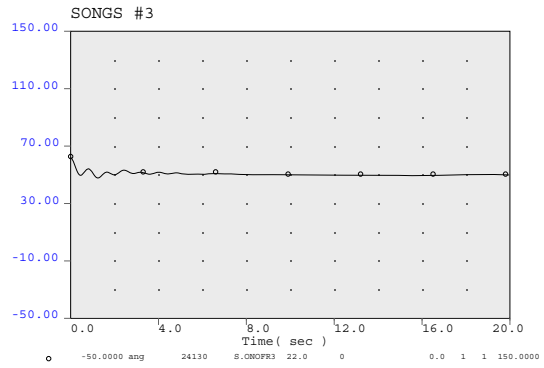
Page 6

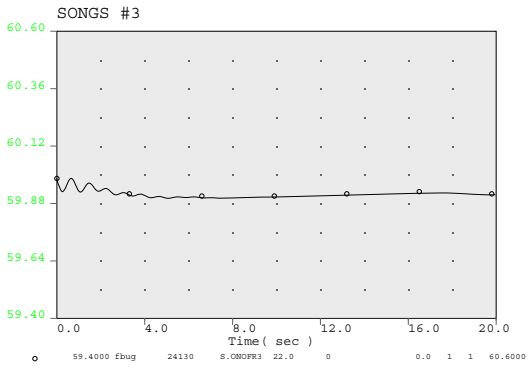
SDGE A Sempra Energy utility	tran-c1c2-ll-pre-r12_PEN-SX-slo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:28:41 2011

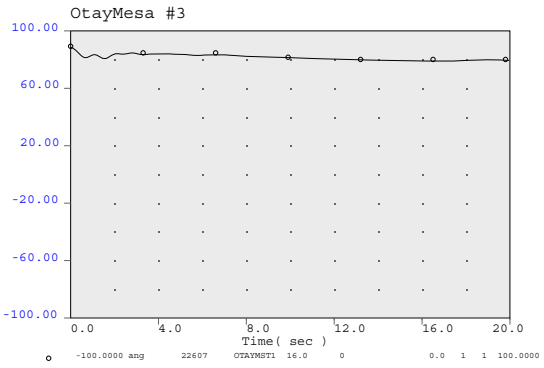
RELATIVE ROTOR ANGLE & FREQUENCY

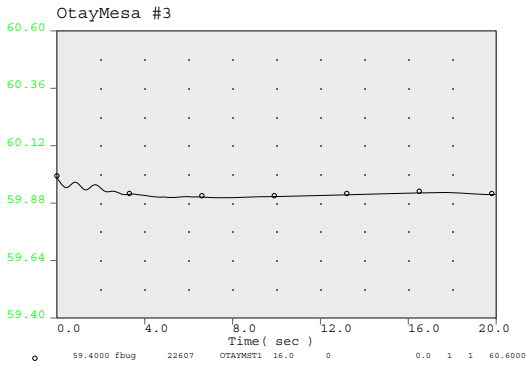










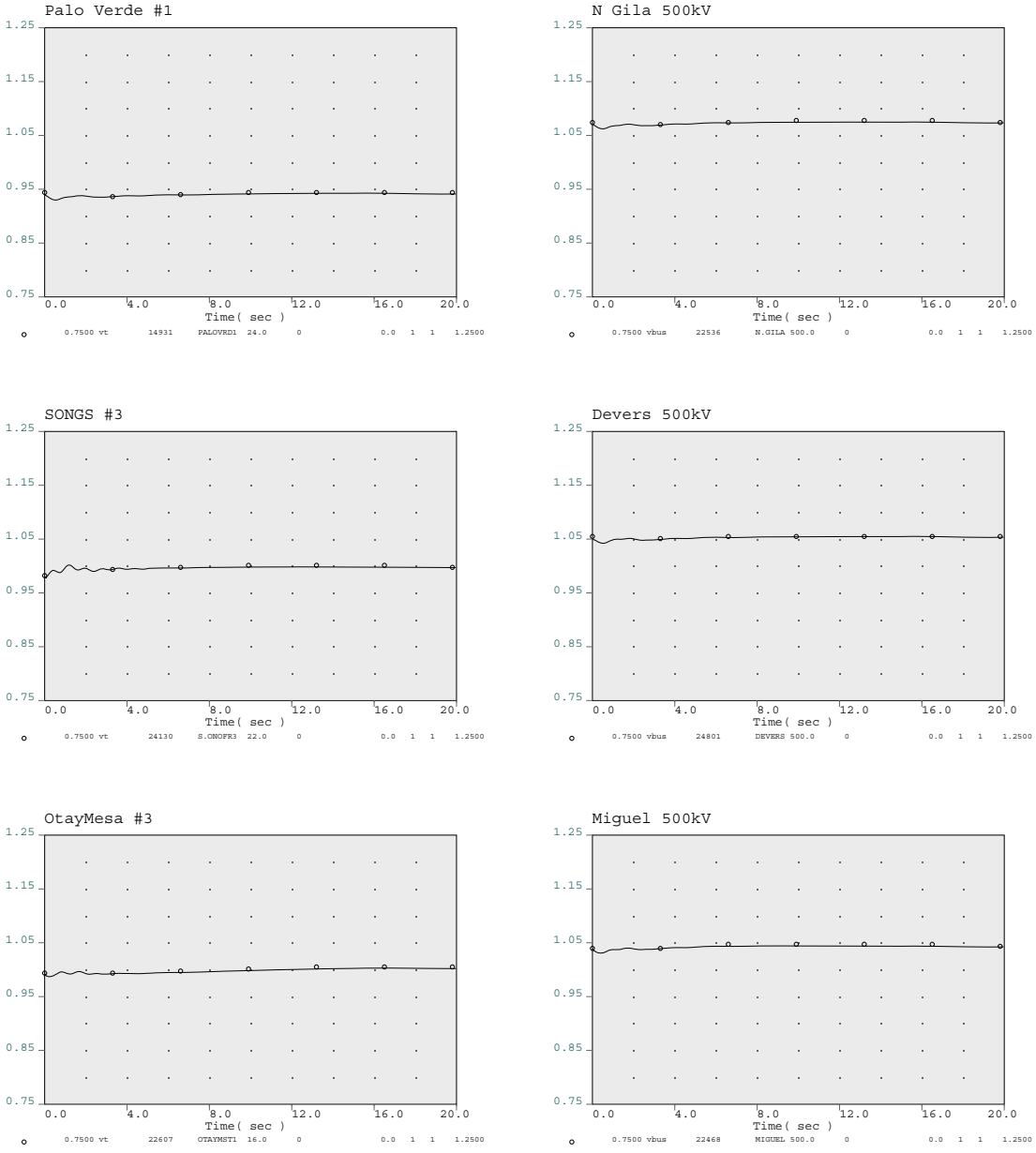


C1 C2 Light Load Pre Without Upgrades

Page 1

SDGE	tran-c1c2-ll-pre-r12_SONG-g1.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:37:44 2011

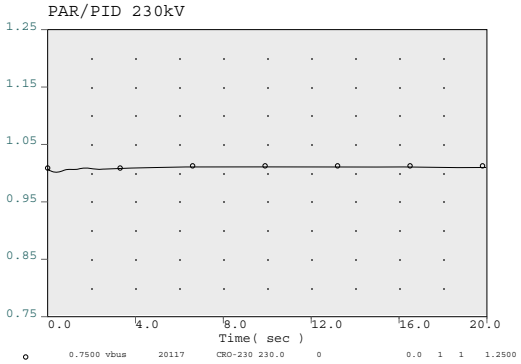
RELATIVE VOLTAGE



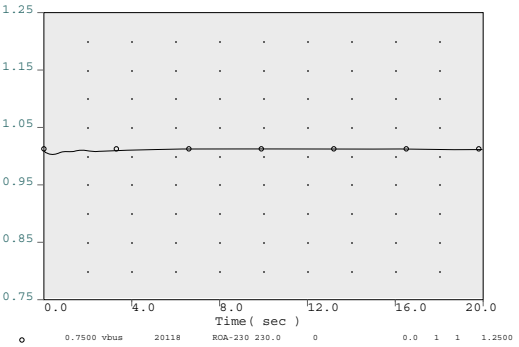
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

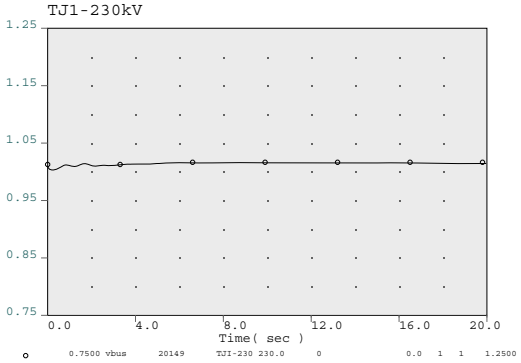
PAR/PID 230kV



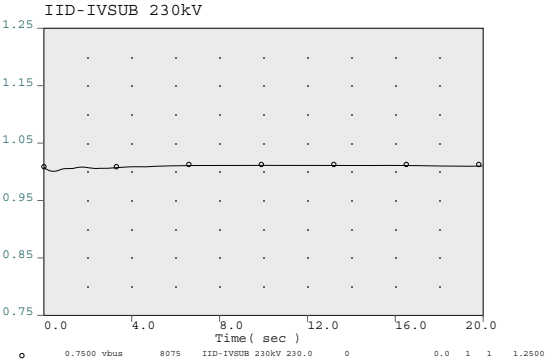
ROA-230kV



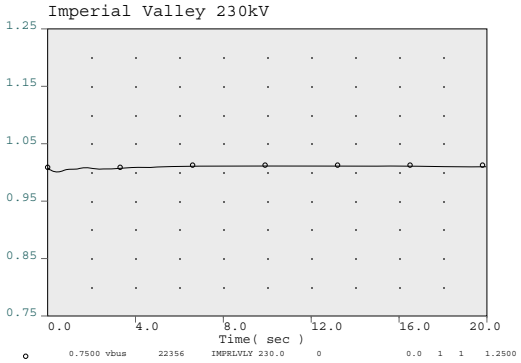
TJ1-230kV



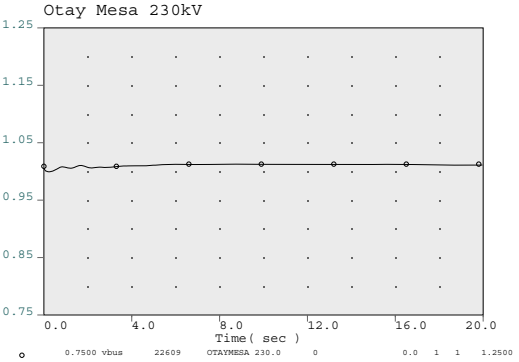
IID-IVSUB 230kV



Imperial Valley 230kV



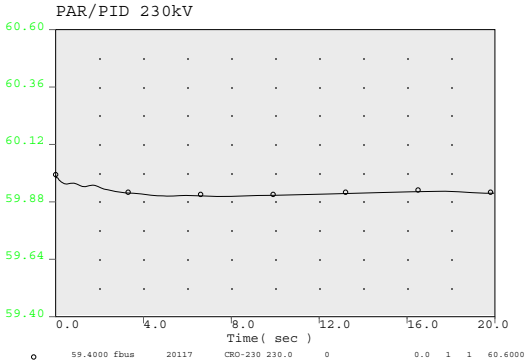
Otay Mesa 230kV



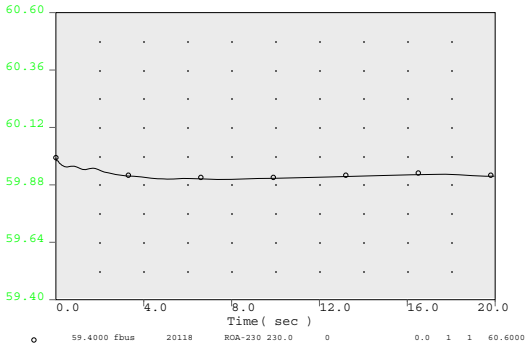
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

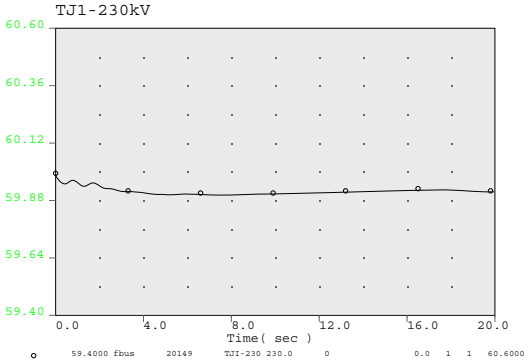
PAR/PID 230kV



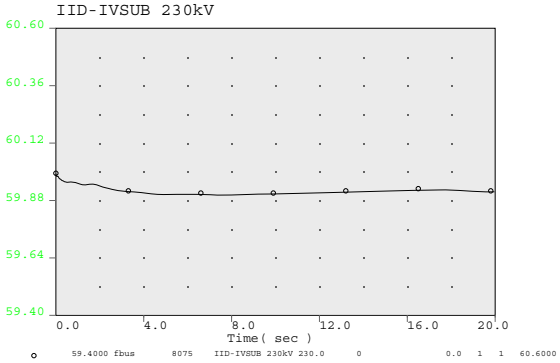
ROA-230kV



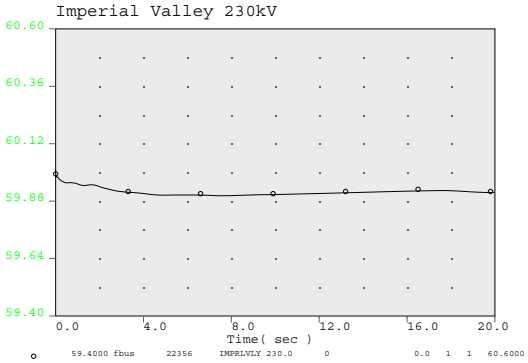
TJ1-230kV



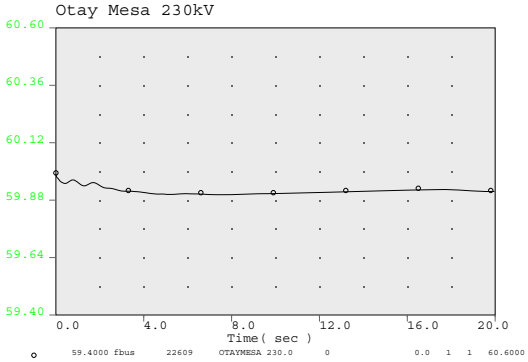
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



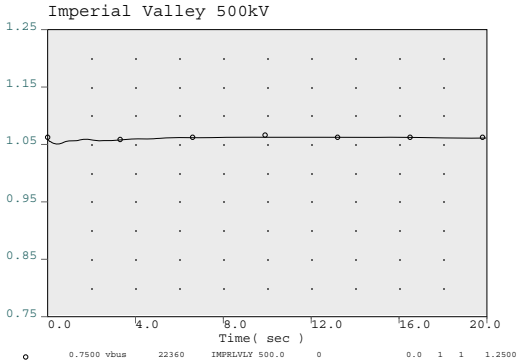
C1 C2 Light Load Pre Without Upgrades

Page 4

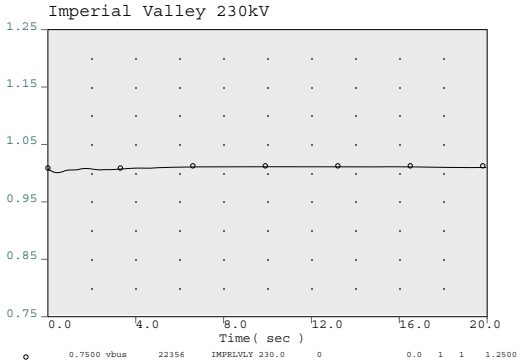
SDGE	tran-c1c2-ll-pre-r12_SONG-g1.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:37:45 2011

VOLTAGE

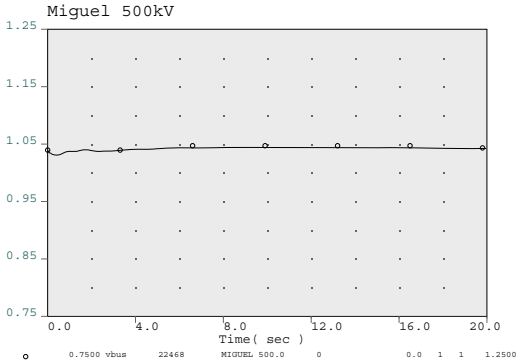
Imperial Valley 500kV



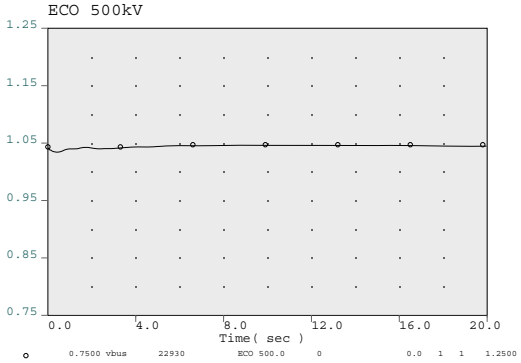
Imperial Valley 230kV



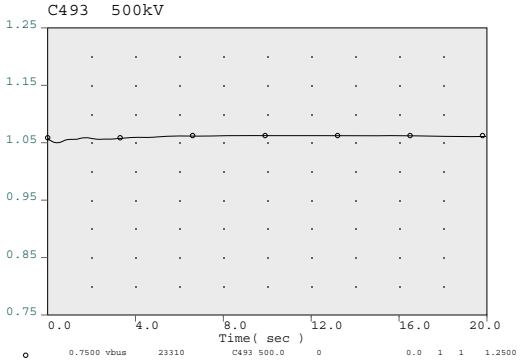
Miguel 500kV



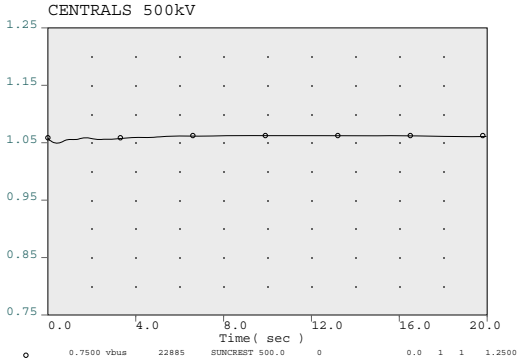
ECO 500kV



C493 500kV



CENTRALS 500kV



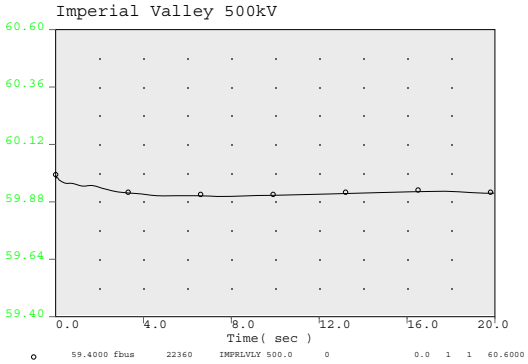
C1 C2 Light Load Pre Without Upgrades

Page 5

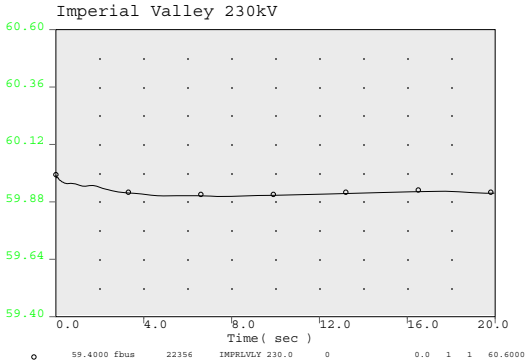
SDGE	tran-c1c2-ll-pre-r12_SONG-g1.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:37:46 2011

FREQUENCY

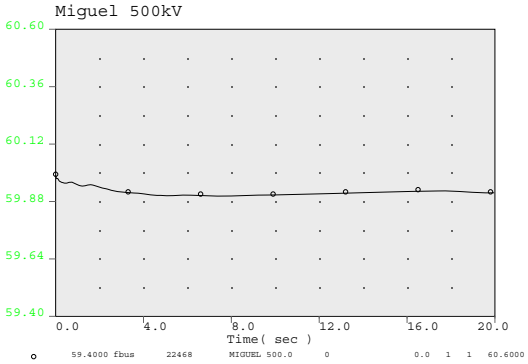
Imperial Valley 500kV



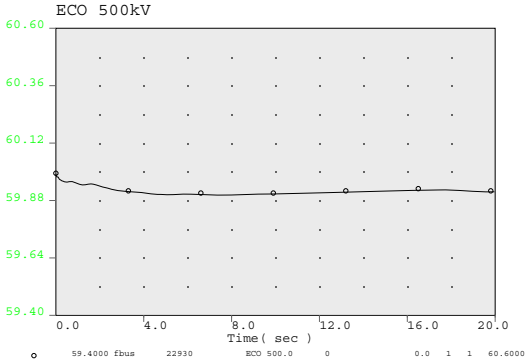
Imperial Valley 230kV



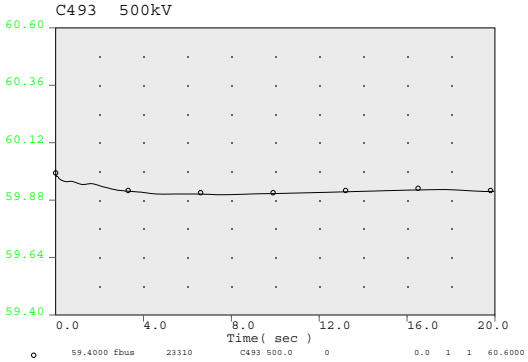
Miguel 500kV



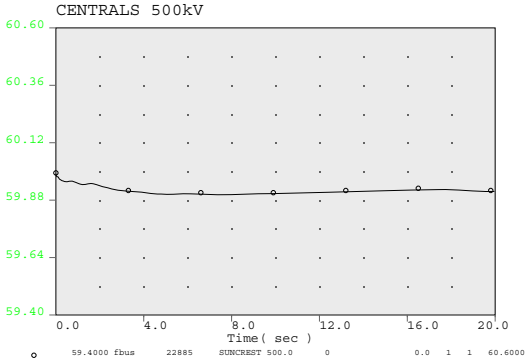
ECO 500kV



C493 500kV

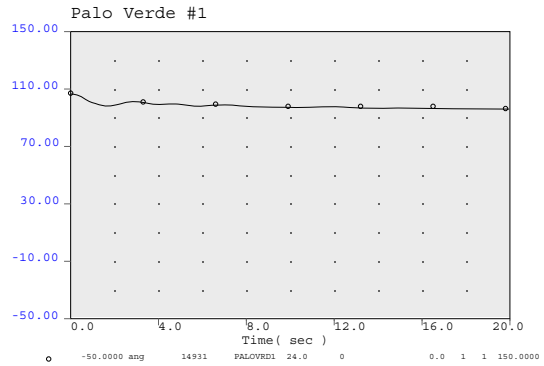


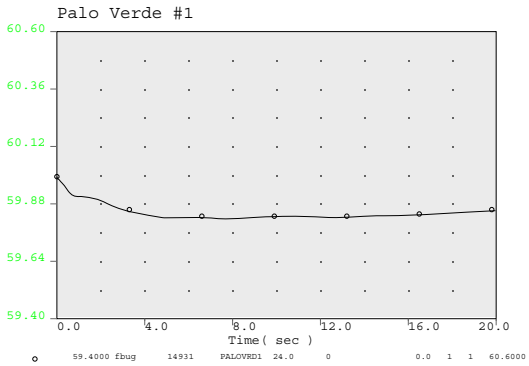
CENTRALS 500kV

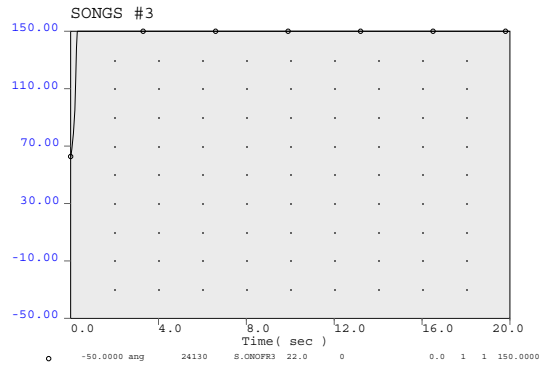


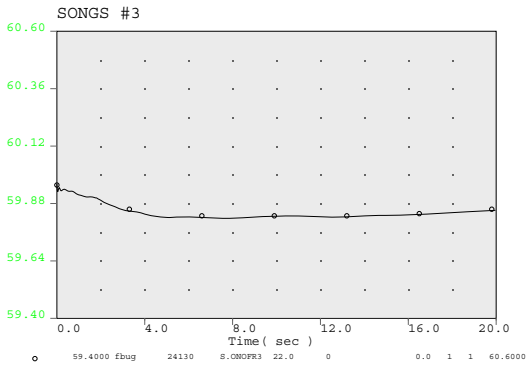
C1 C2 Light Load Pre Without Upgrades

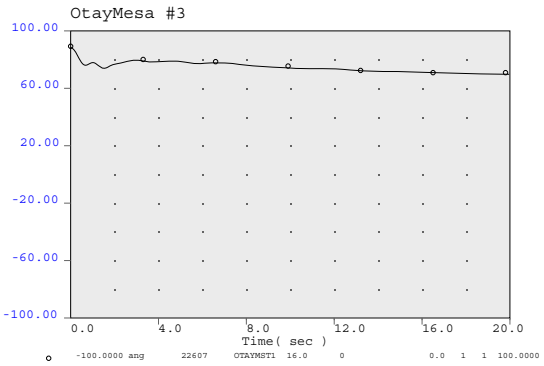
RELATIVE ROTOR ANGLE & FREQUENCY

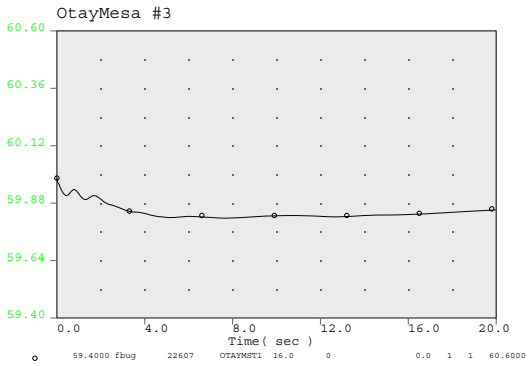










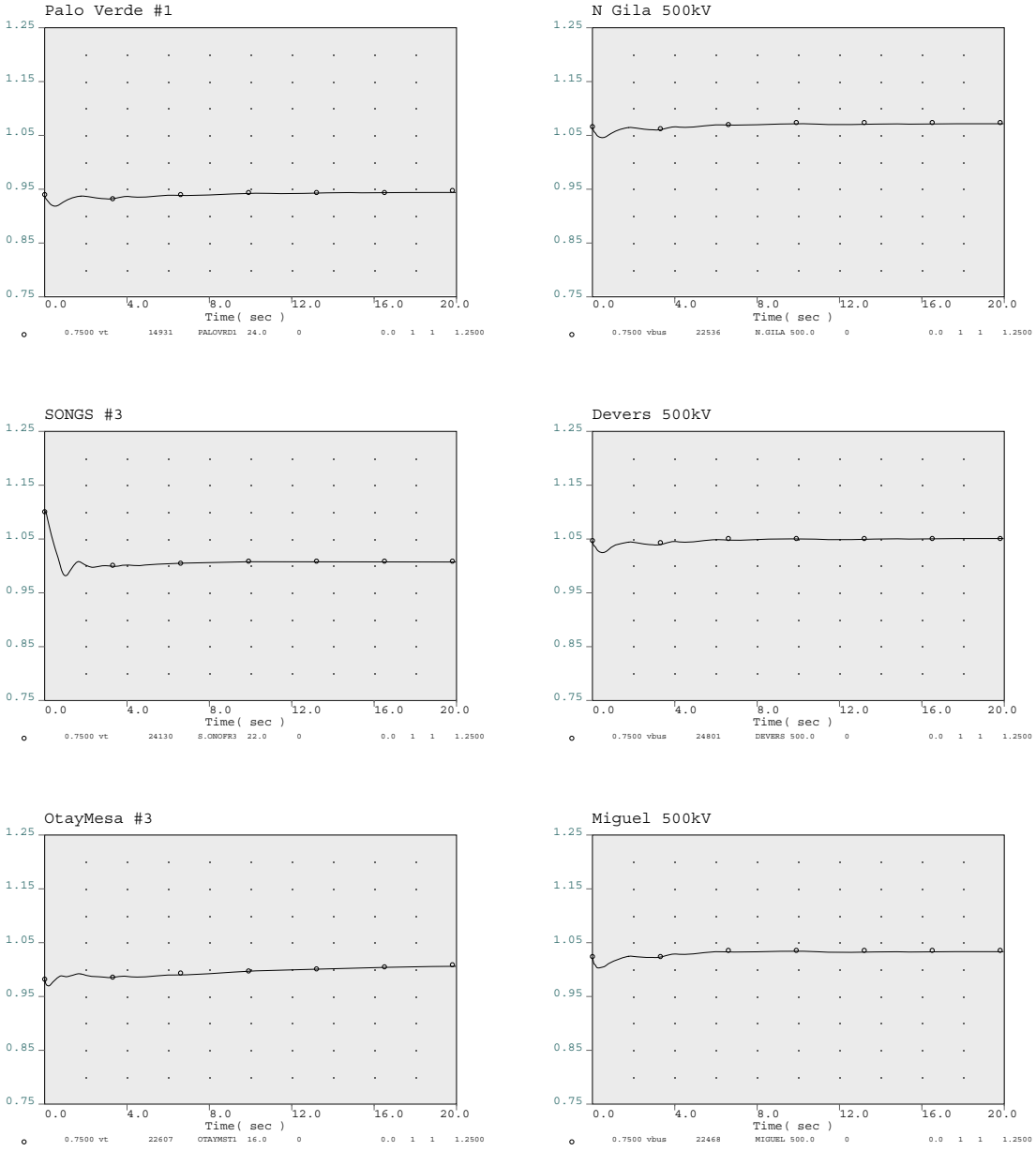


C1 C2 Light Load Pre Without Upgrades

Page 1

SDGE	tran-c1c2-ll-pre-r12_SONGS-g2.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:39:34 2011

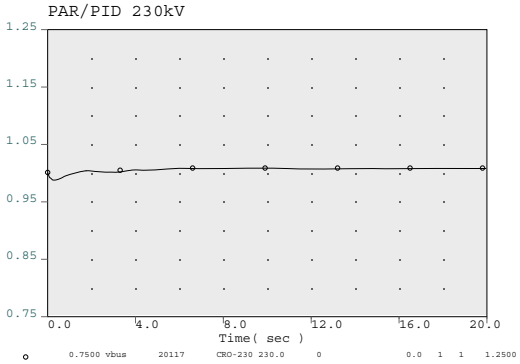
RELATIVE VOLTAGE



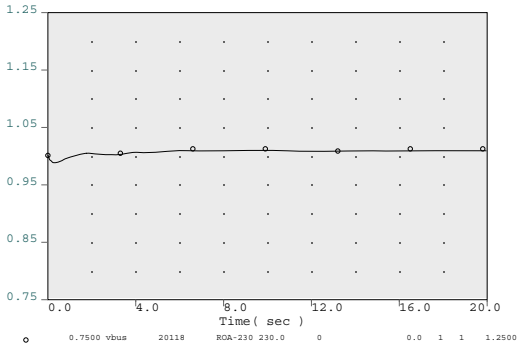
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

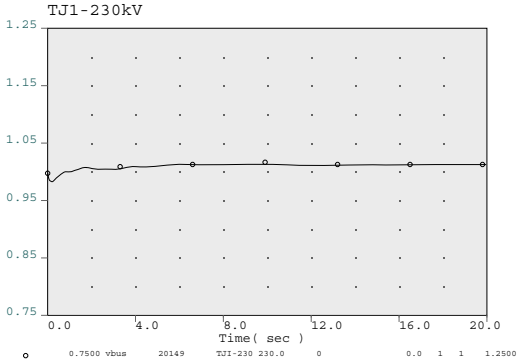
PAR/PID 230kV



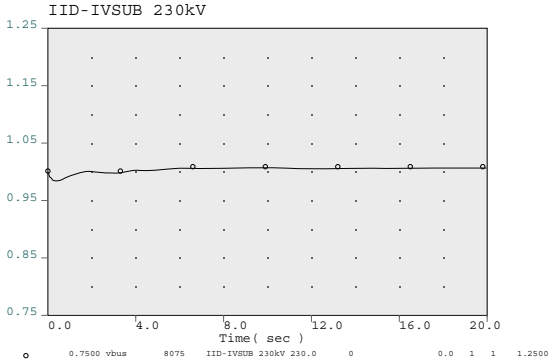
ROA-230kV



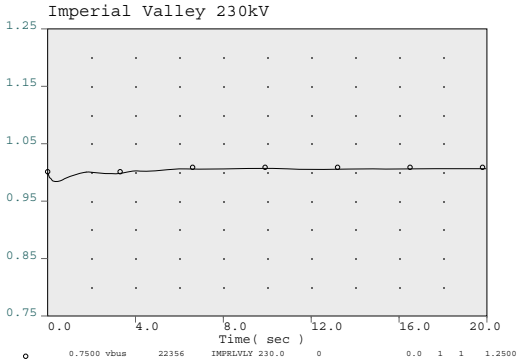
TJ1-230kV



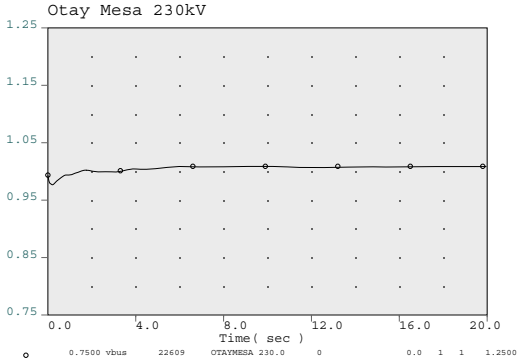
IID-IVSUB 230kV



Imperial Valley 230kV



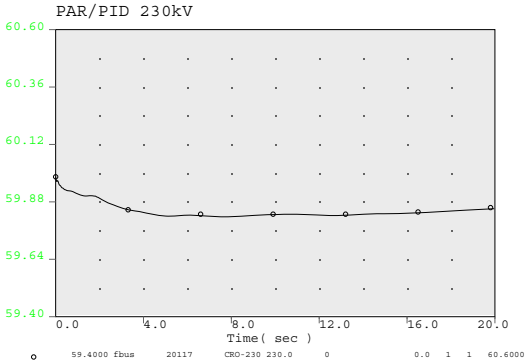
Otay Mesa 230kV



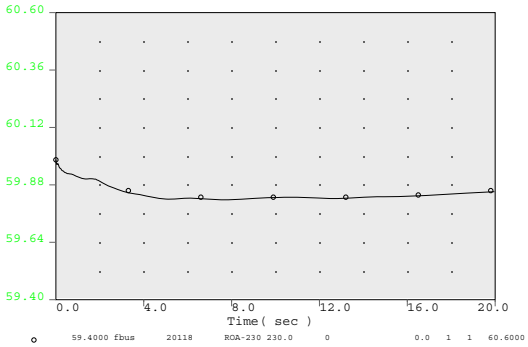
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

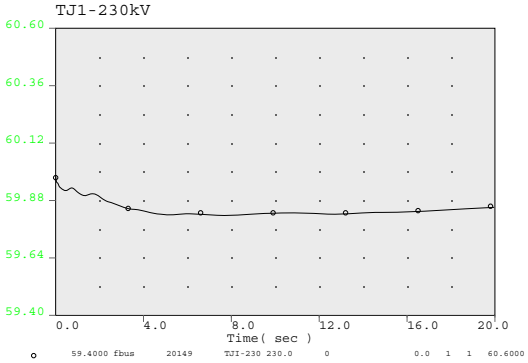
PAR/PID 230kV



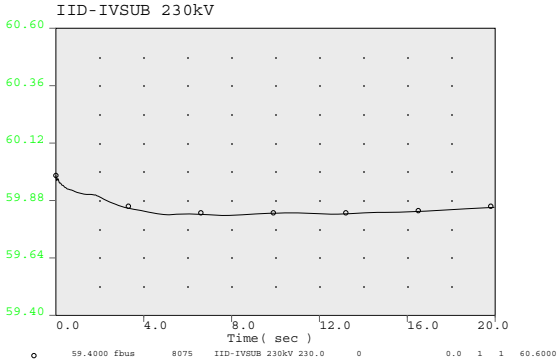
ROA-230kV



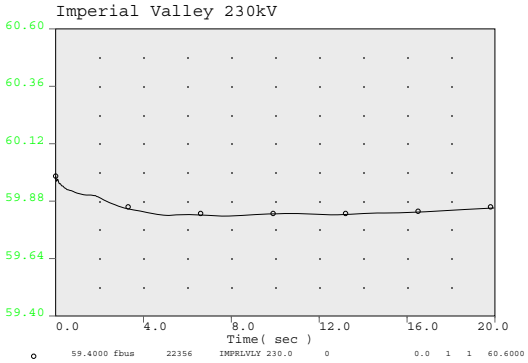
TJ1-230kV



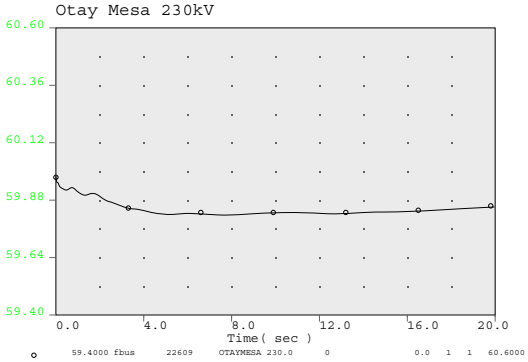
IID-IVSUB 230kV



Imperial Valley 230kV



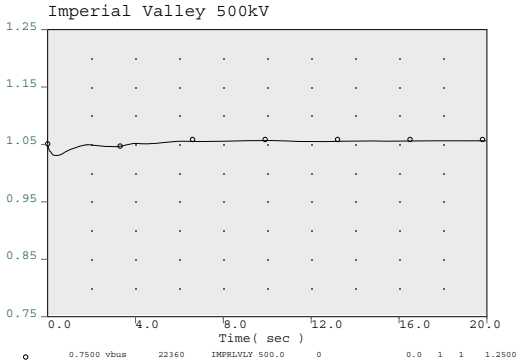
Otay Mesa 230kV



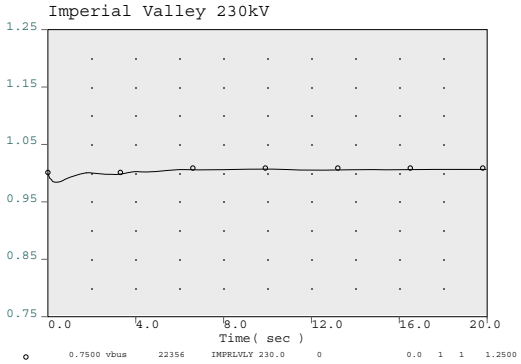
C1 C2 Light Load Pre Without Upgrades

VOLTAGE

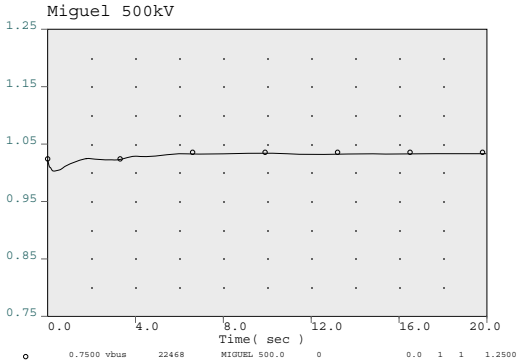
Imperial Valley 500kV



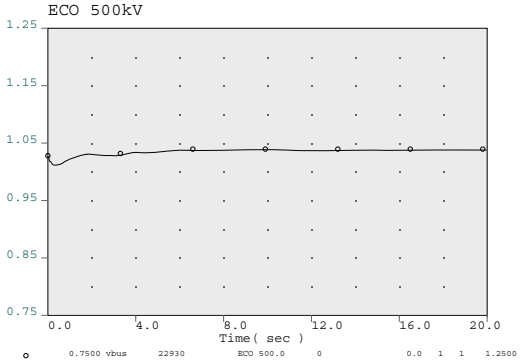
Imperial Valley 230kV



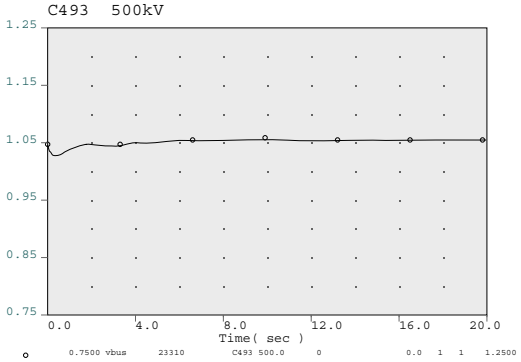
Miguel 500kV



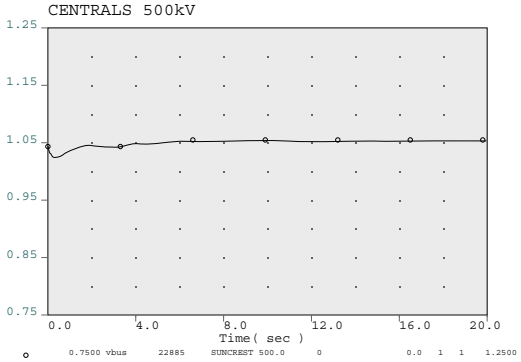
ECO 500kV



C493 500kV



CENTRALS 500kV



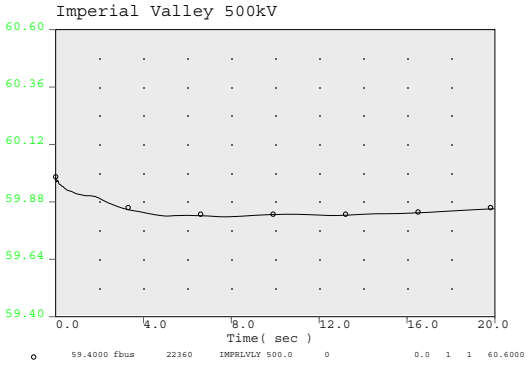
C1 C2 Light Load Pre Without Upgrades

Page 5

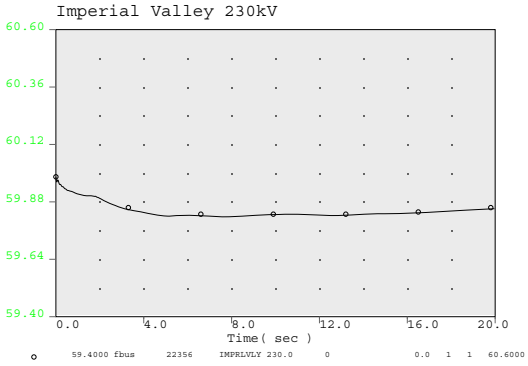
SDGE	tran-c1c2-ll-pre-r12_SONGS-g2.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:39:36 2011

FREQUENCY

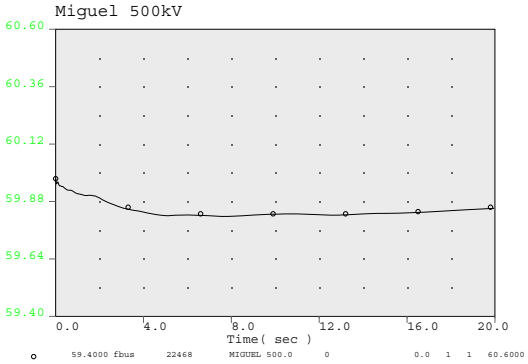
Imperial Valley 500kV



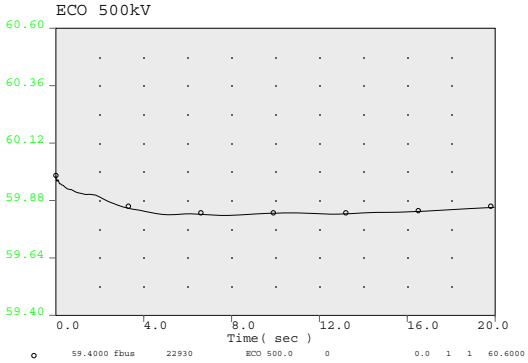
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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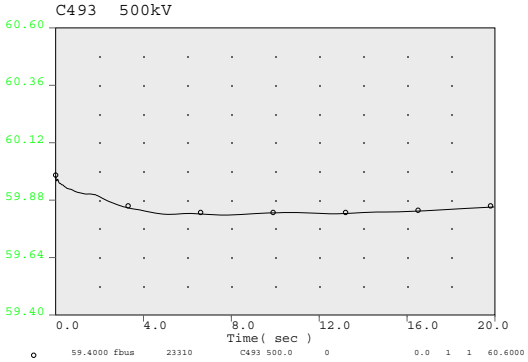
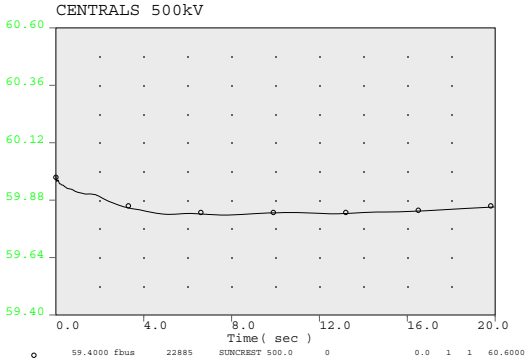
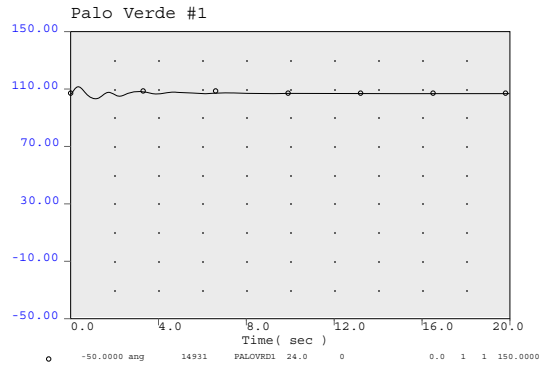


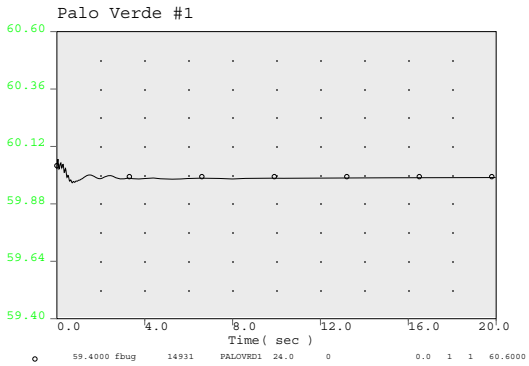
CENTRALS 500kV

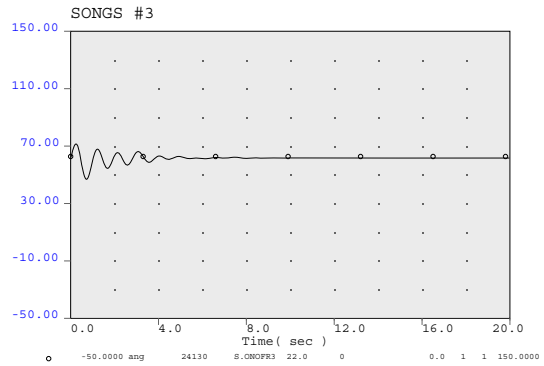


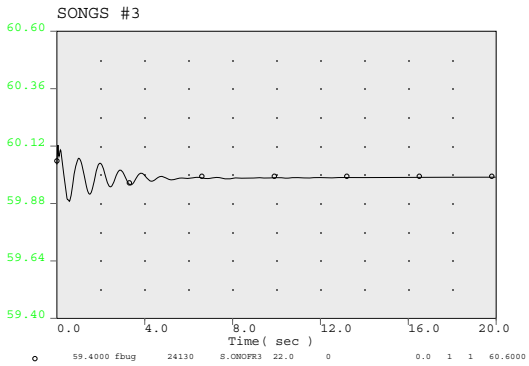
C1 C2 Light Load Pre Without Upgrades

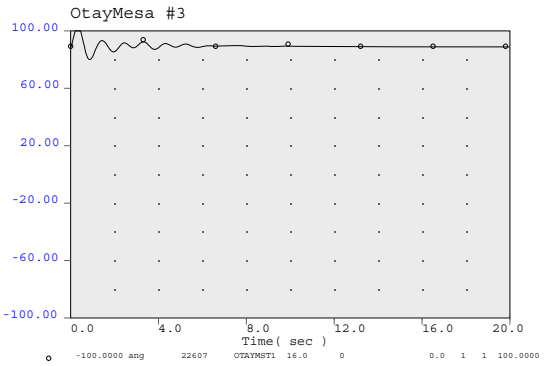
RELATIVE ROTOR ANGLE & FREQUENCY

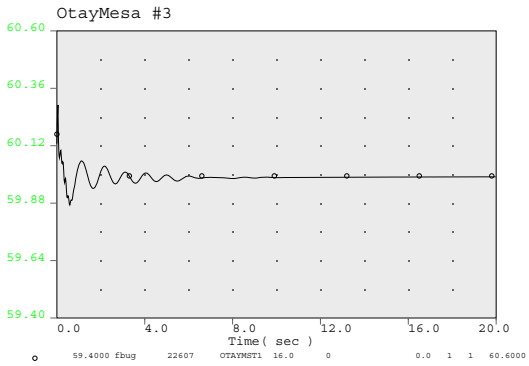










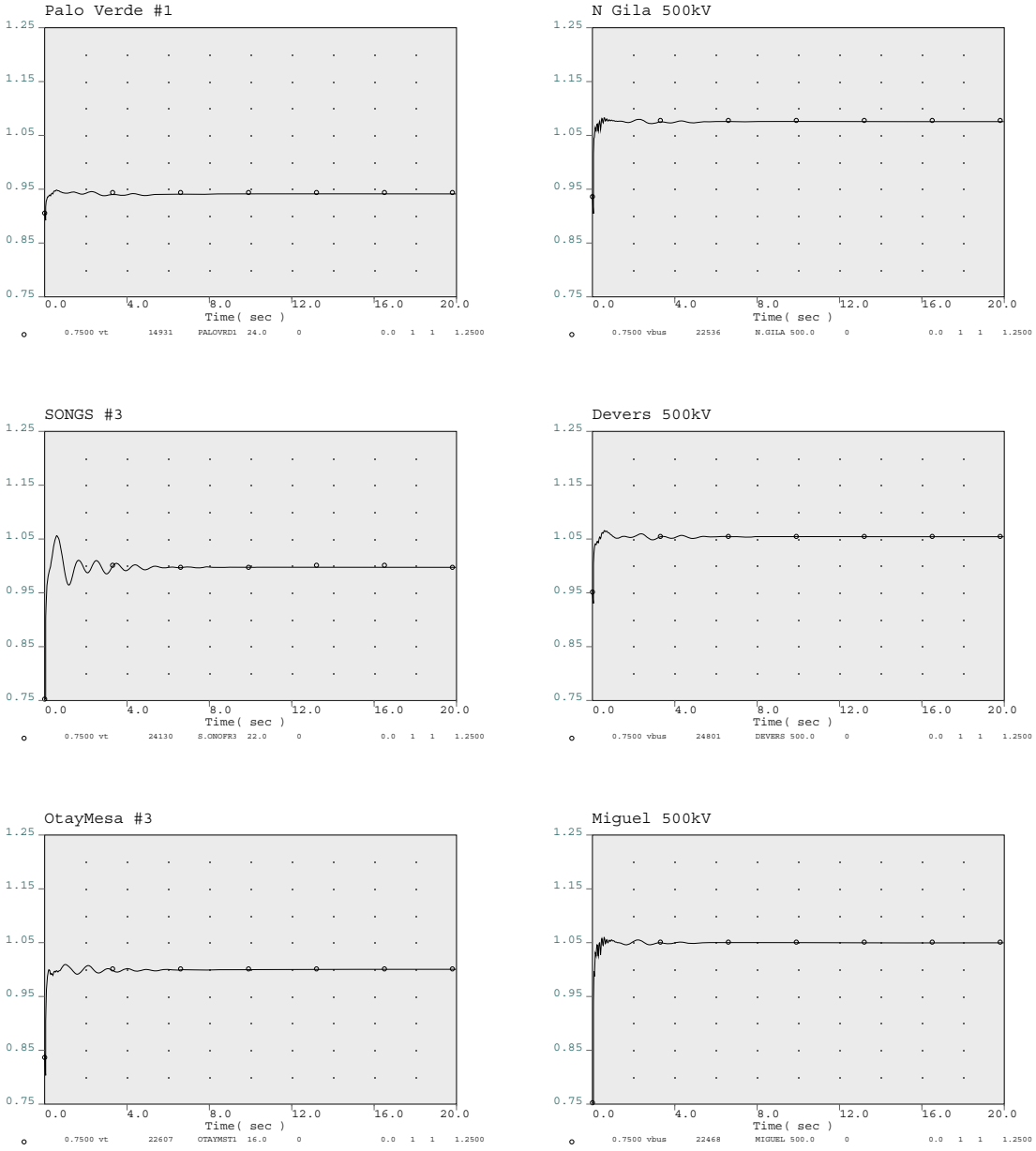


C1 C2 Light Load Pre Without Upgrades

Page 1

SDGE	tran-c1c2-ll-pre-r12_SO-SA-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:32:20 2011

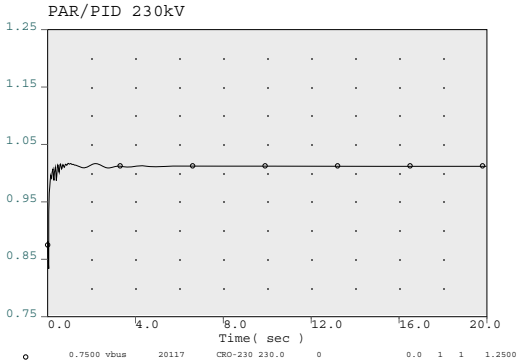
RELATIVE VOLTAGE



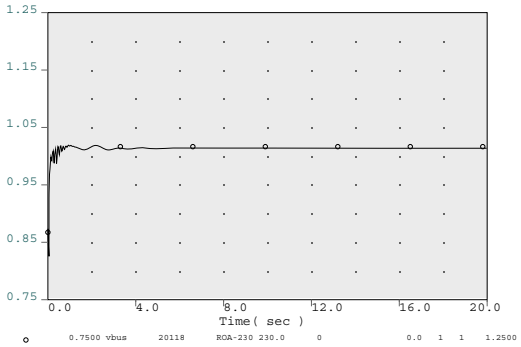
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

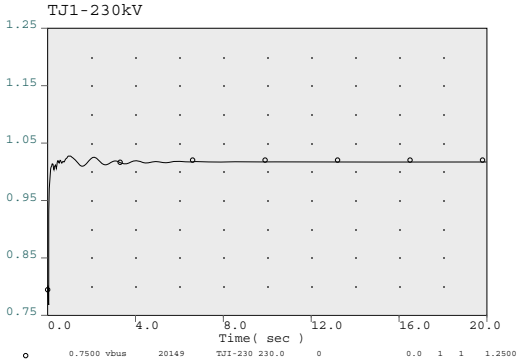
PAR/PID 230kV



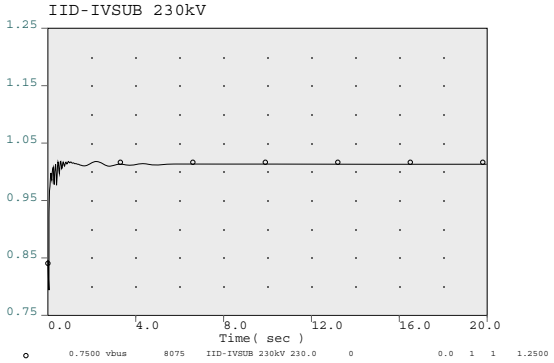
ROA-230kV



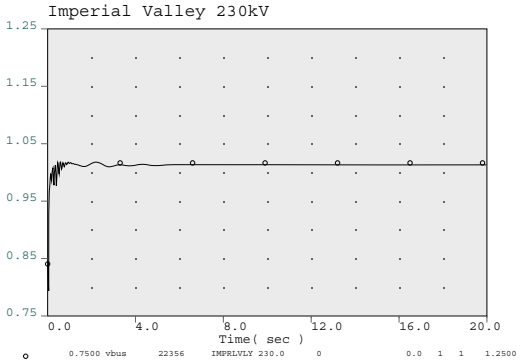
TJ1-230kV



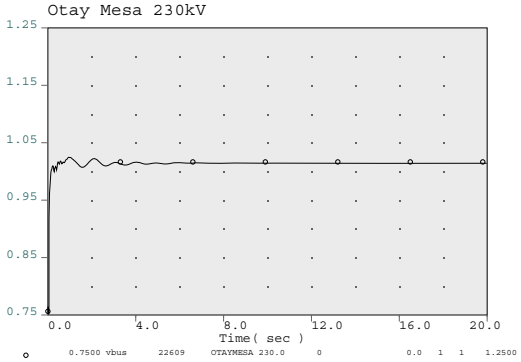
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Pre Without Upgrades

Page 3

tran-c1c2-ll-pre-r12_SO-SA-dlo.chf

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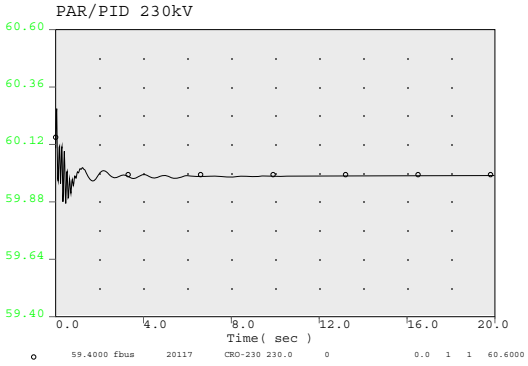
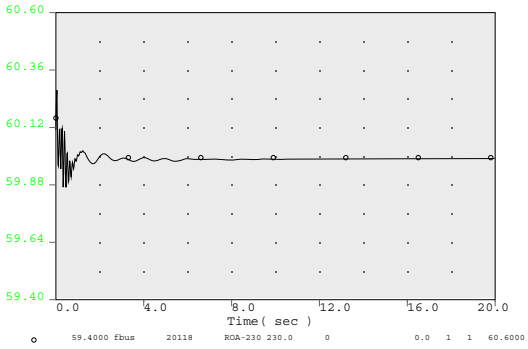
Sun Jul 17 15:32:21 2011

Affected System Frequency Check and Comparison

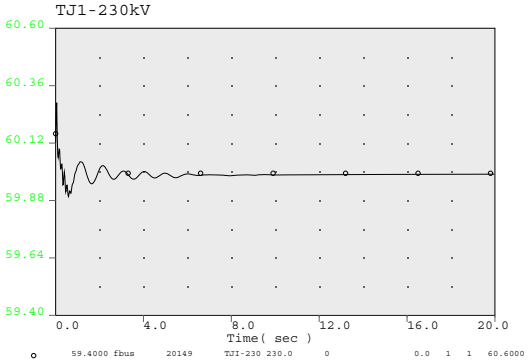
PAR/PID 230kV



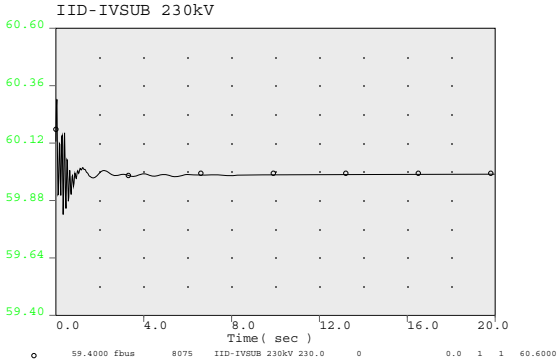
ROA-230kV



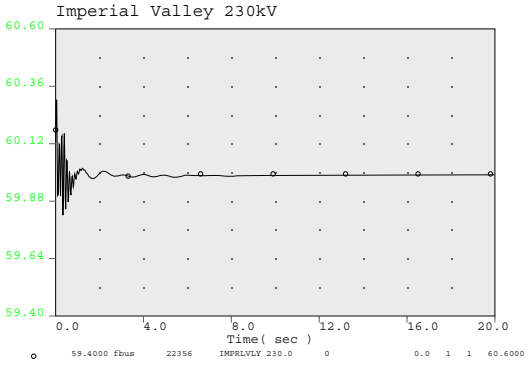
TJ1-230kV



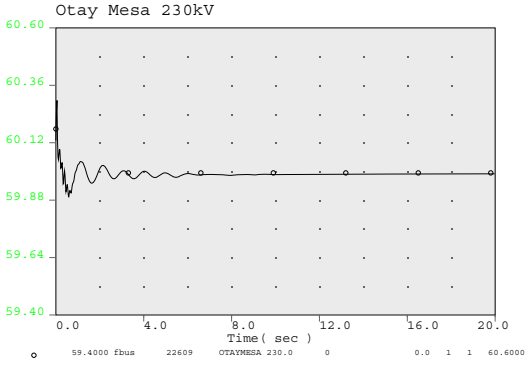
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



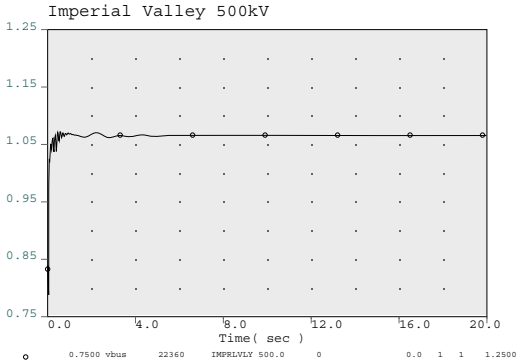
C1 C2 Light Load Pre Without Upgrades

Page 4

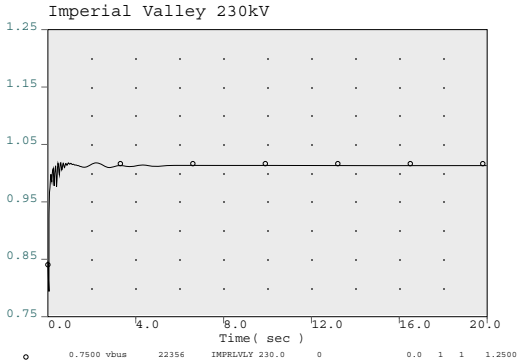
SDGE	tran-c1c2-ll-pre-r12_SO-SA-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:32:22 2011

VOLTAGE

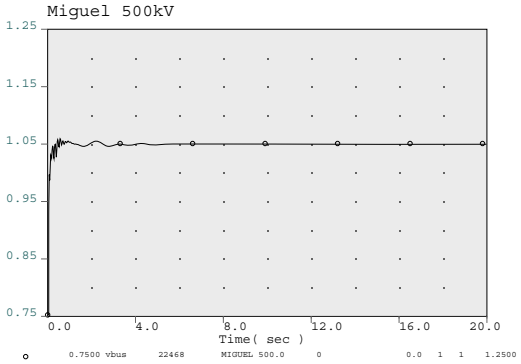
Imperial Valley 500kV



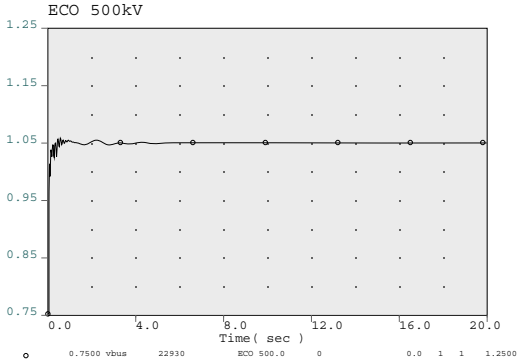
Imperial Valley 230kV



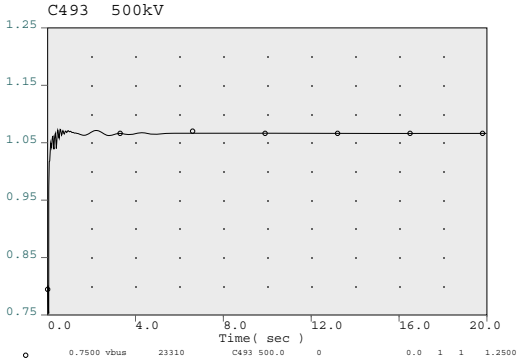
Miguel 500kV



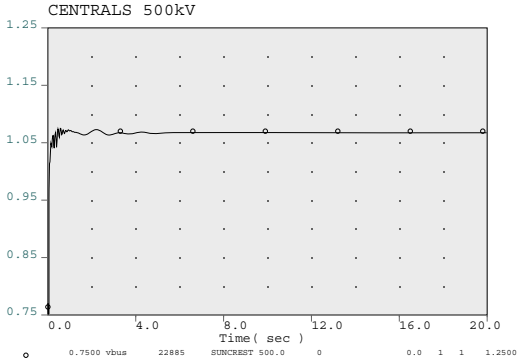
ECO 500kV



C493 500kV



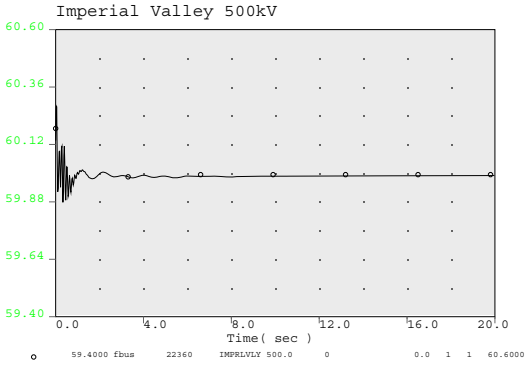
CENTRALS 500kV



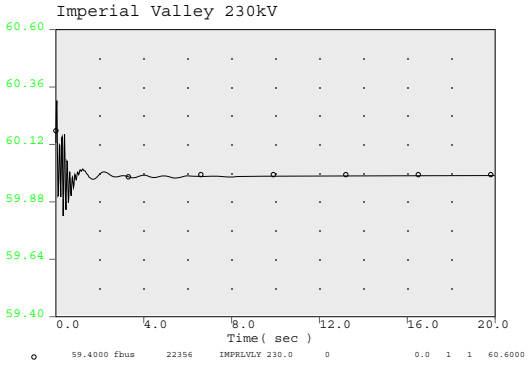
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

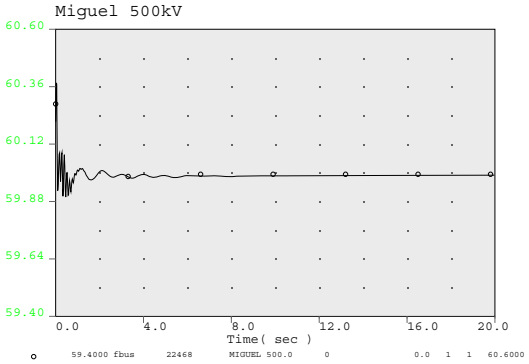
Imperial Valley 500kV



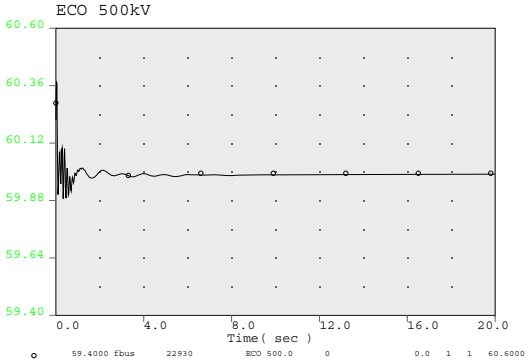
Imperial Valley 230kV



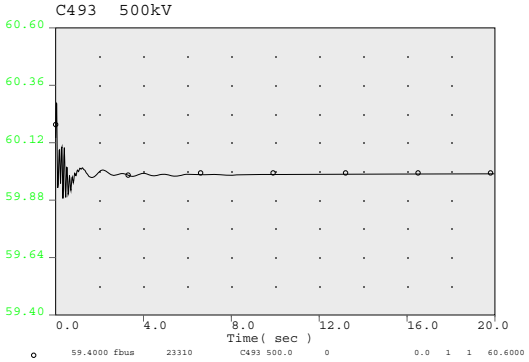
Miguel 500kV



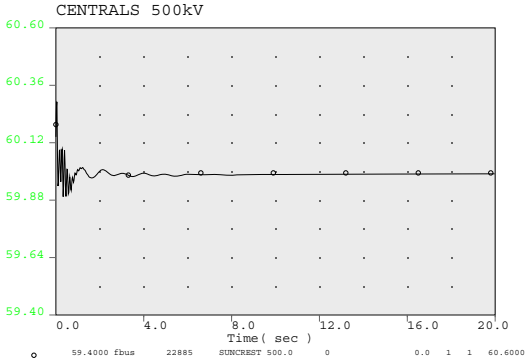
ECO 500kV



C493 500kV

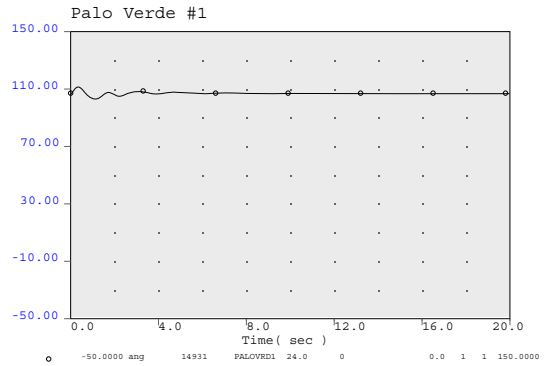


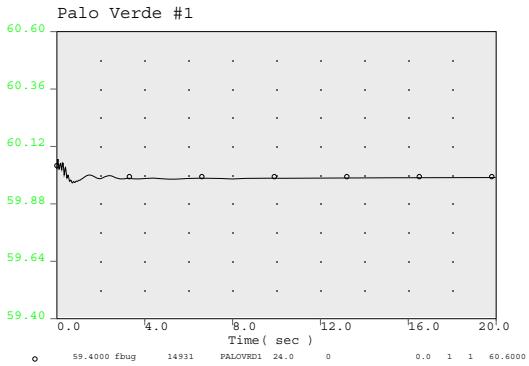
CENTRALS 500kV

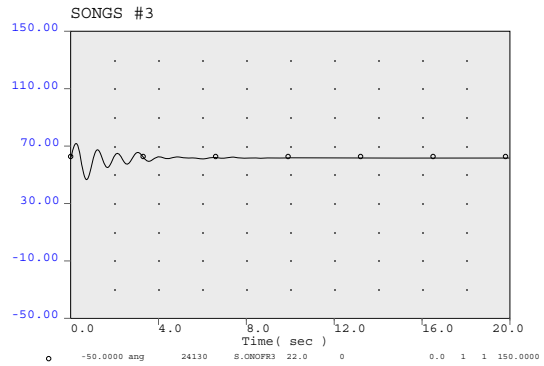


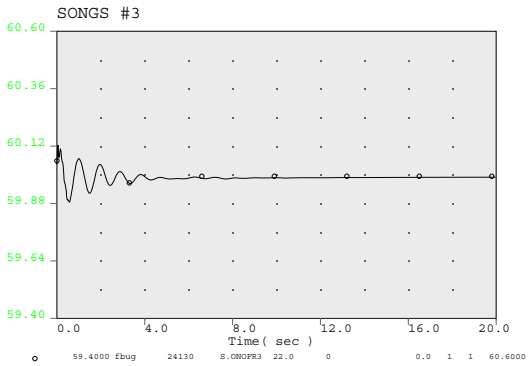
C1 C2 Light Load Pre Without Upgrades

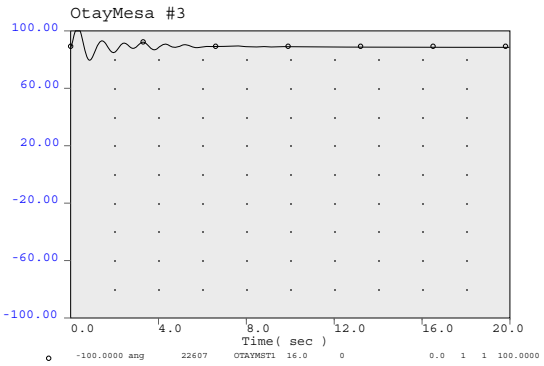
RELATIVE ROTOR ANGLE & FREQUENCY

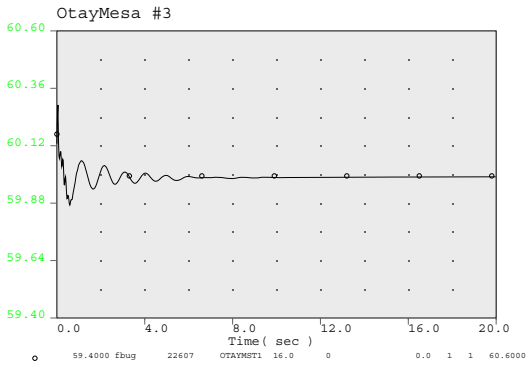












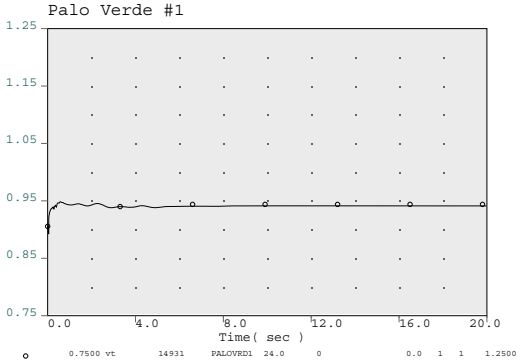
C1 C2 Light Load Pre Without Upgrades

Page 1

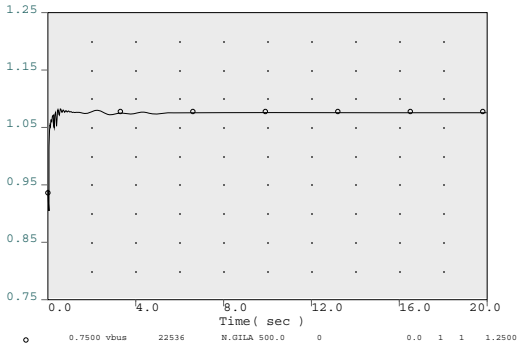
SDGE	tran-c1c2-ll-pre-r12_SO-SA-MS-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:34:07 2011

RELATIVE VOLTAGE

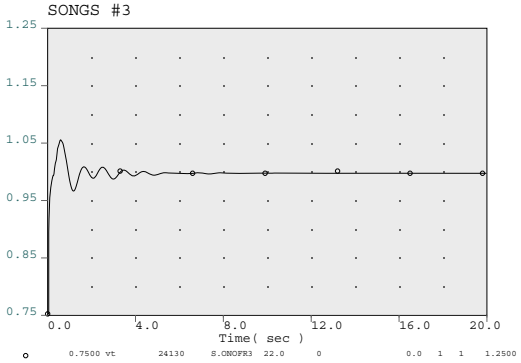
Palo Verde #1



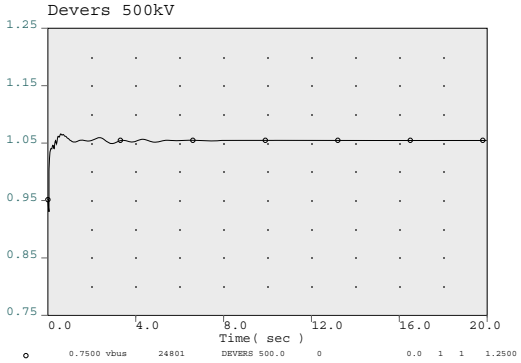
N Gila 500kV



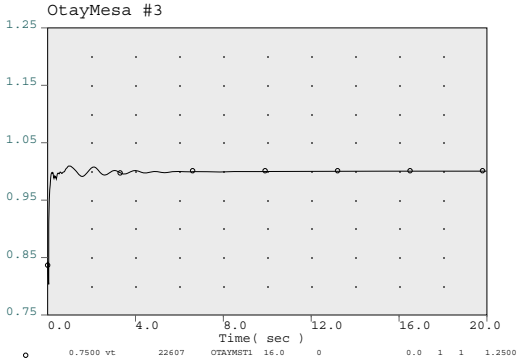
SONGS #3



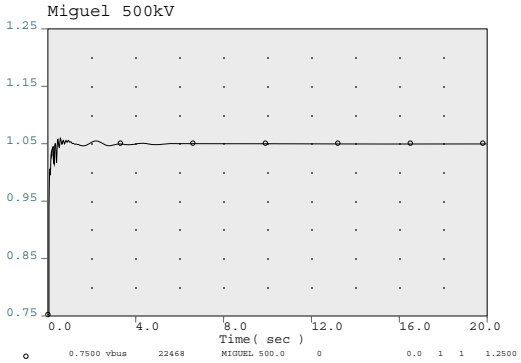
Devers 500kV



OtayMesa #3



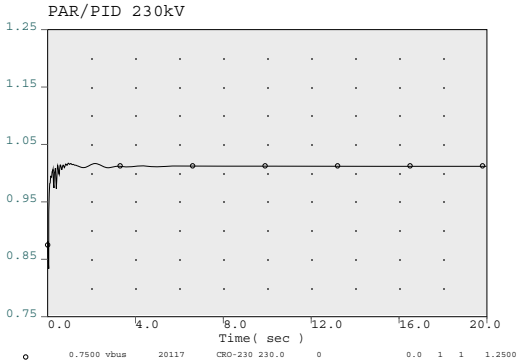
Miguel 500kV



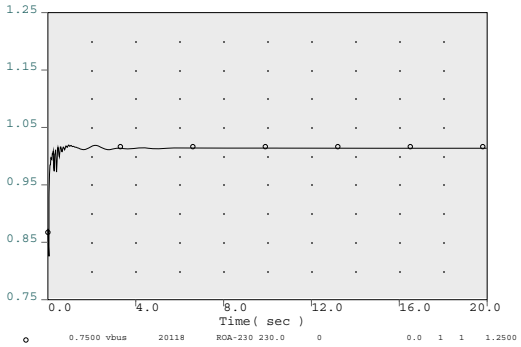
C1 C2 Light Load Pre Without Upgrades

Affected System Voltage Check and Comparison

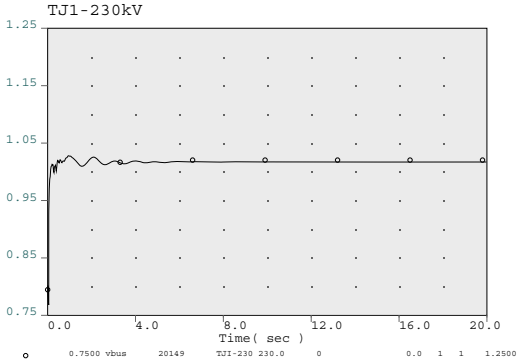
PAR/PID 230kV



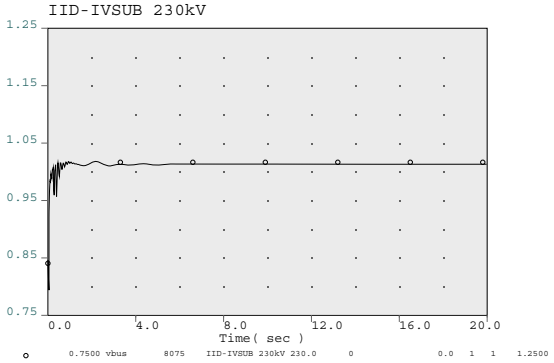
ROA-230kV



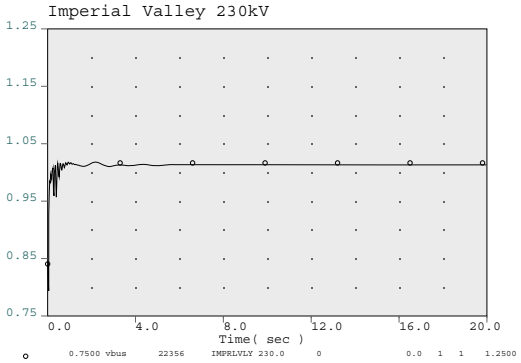
TJ1-230kV



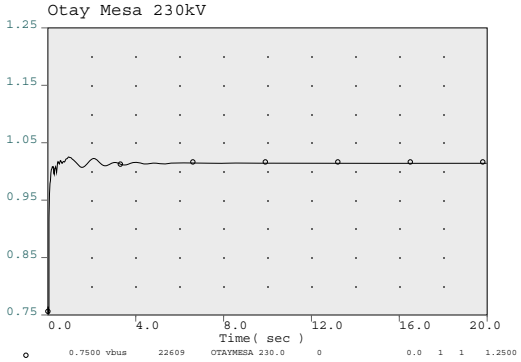
IID-IVSUB 230kV



Imperial Valley 230kV



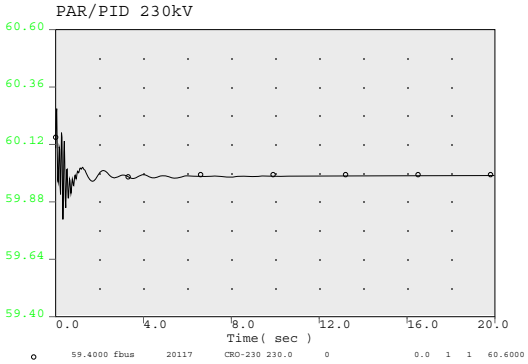
Otay Mesa 230kV



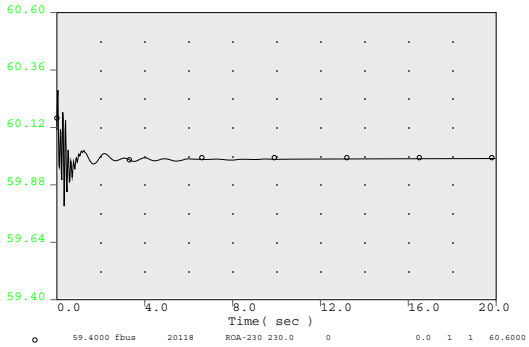
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

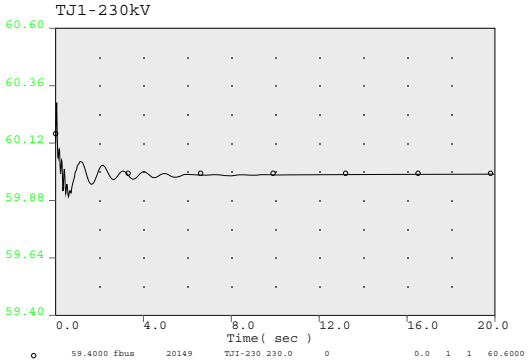
PAR/PID 230kV



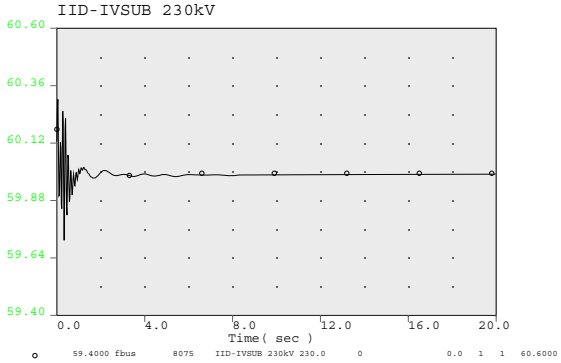
ROA-230kV



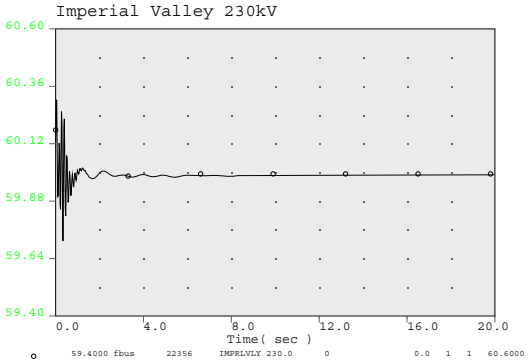
TJ1-230kV



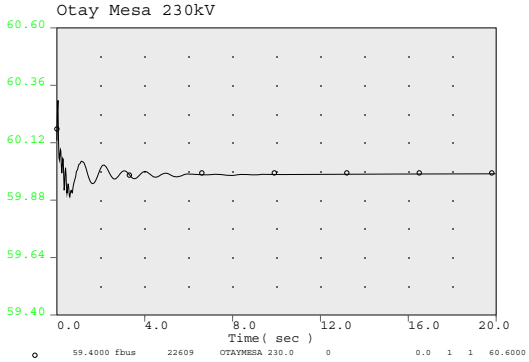
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



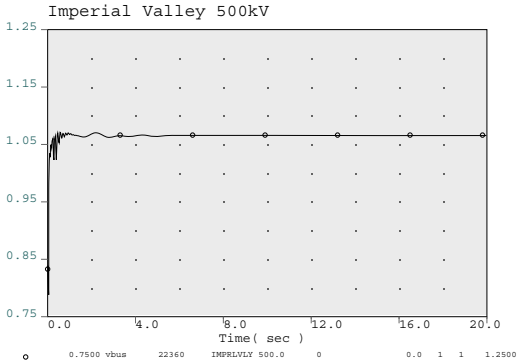
C1 C2 Light Load Pre Without Upgrades

Page 4

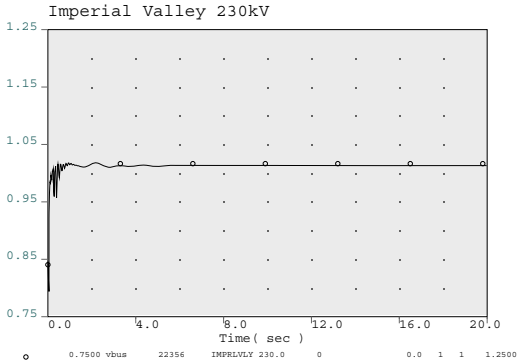
SDGE	tran-c1c2-ll-pre-r12_SO-SA-MS-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:34:09 2011

VOLTAGE

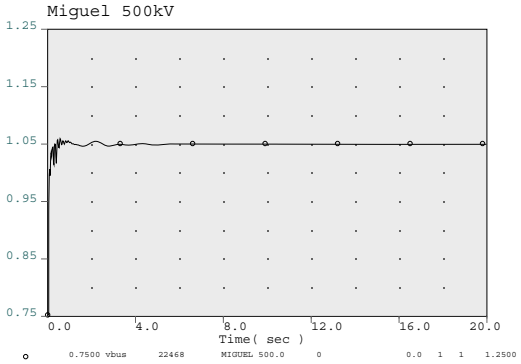
Imperial Valley 500kV



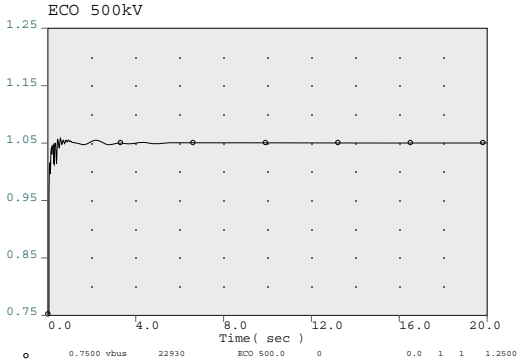
Imperial Valley 230kV



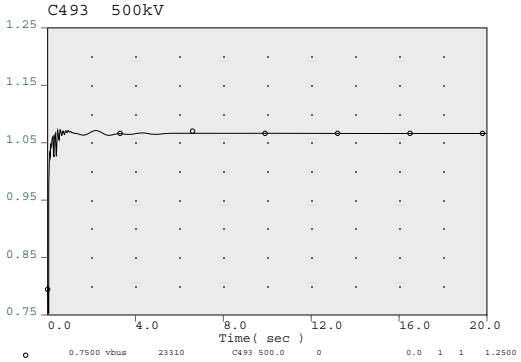
Miguel 500kV



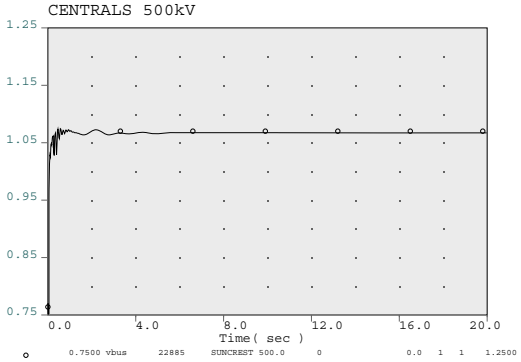
ECO 500kV



C493 500kV



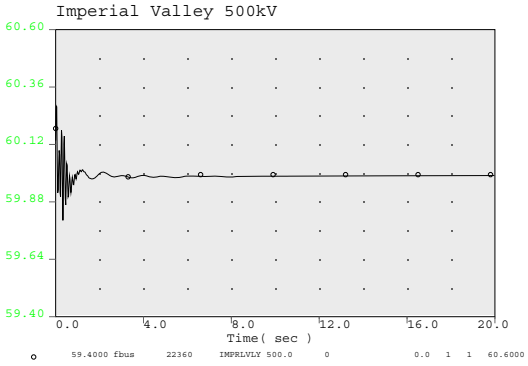
CENTRALS 500kV



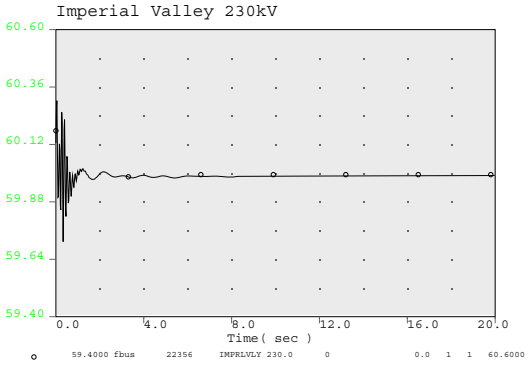
C1 C2 Light Load Pre Without Upgrades

FREQUENCY

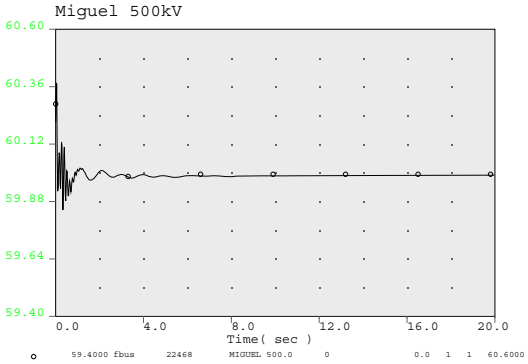
Imperial Valley 500kV



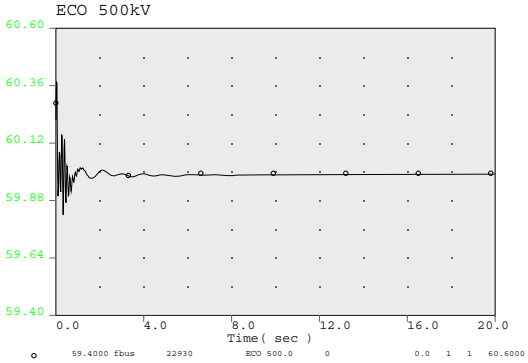
Imperial Valley 230kV



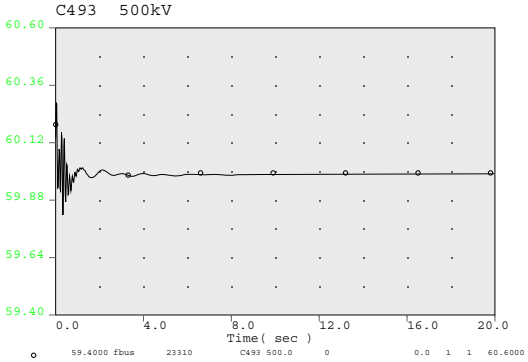
Miguel 500kV



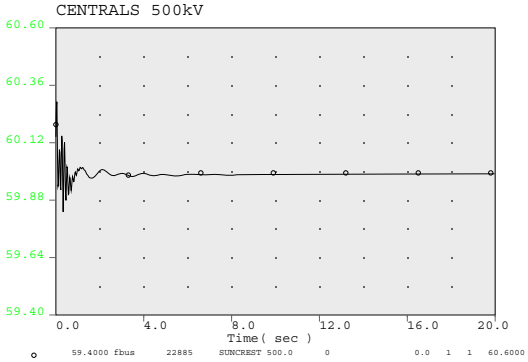
ECO 500kV



C493 500kV

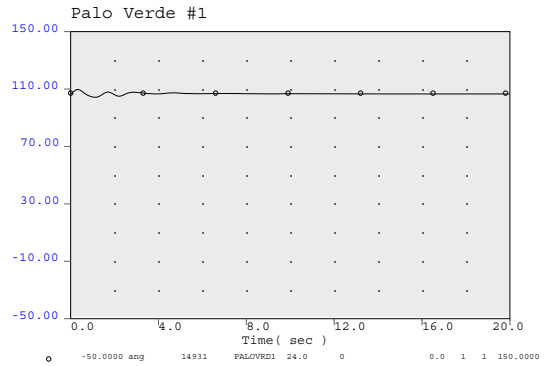


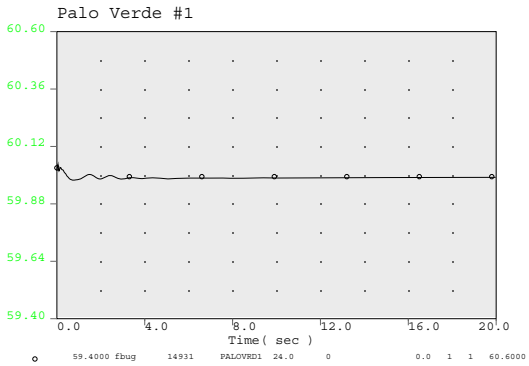
CENTRALS 500kV

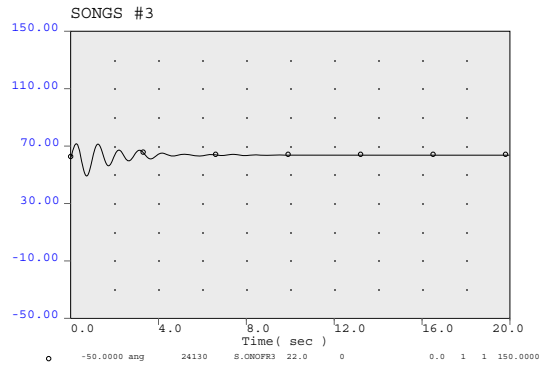


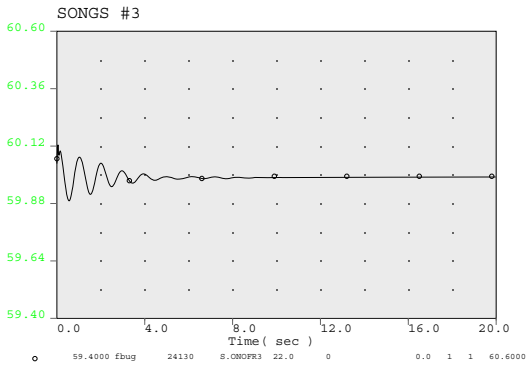
C1 C2 Light Load Pre Without Upgrades

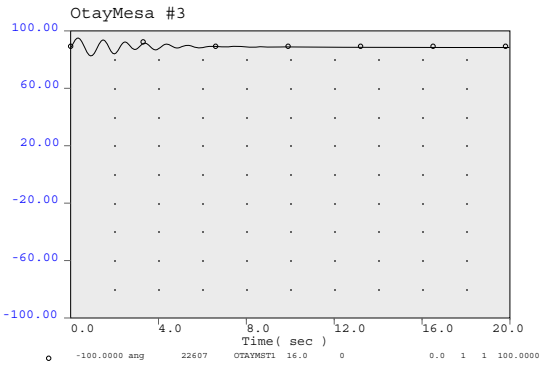
RELATIVE ROTOR ANGLE & FREQUENCY

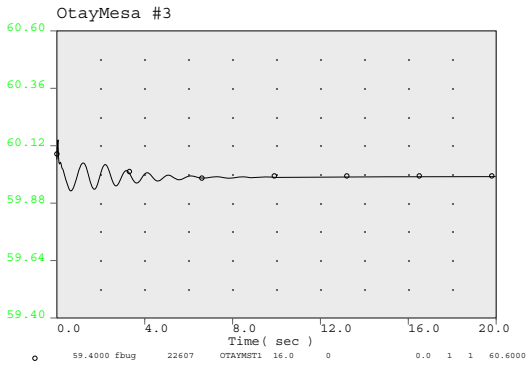












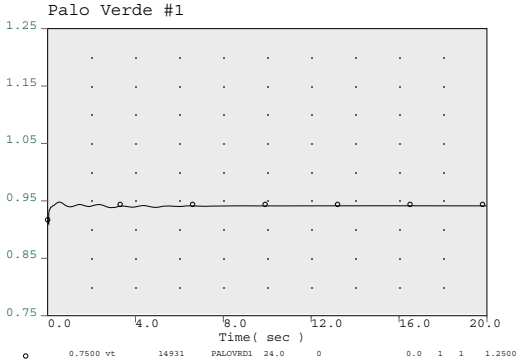
C1 C2 Light Load Pre Without Upgrades

Page 1

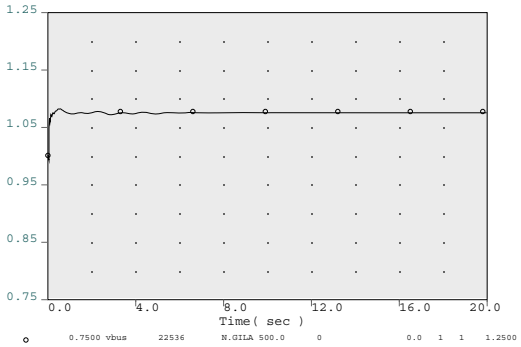
SDGE	tran-c1c2-ll-pre-r12_SO-TA-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:35:54 2011

RELATIVE VOLTAGE

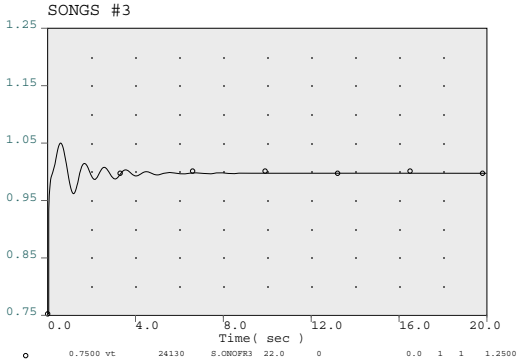
Palo Verde #1



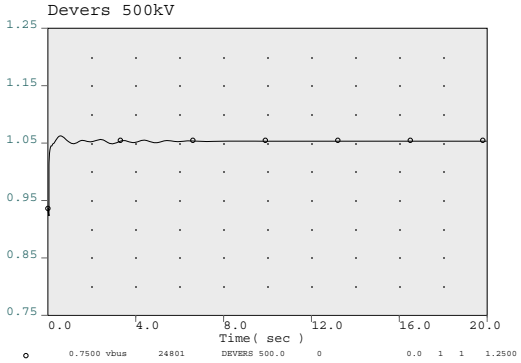
N Gila 500kV



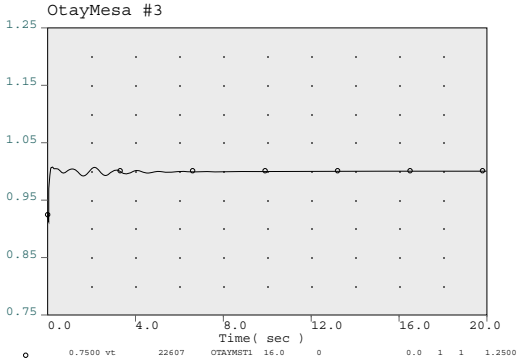
SONGS #3



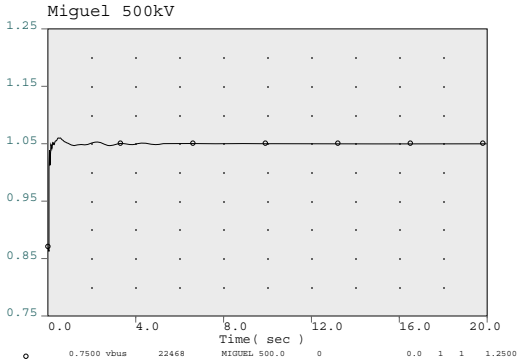
Devers 500kV



OtayMesa #3



Miguel 500kV



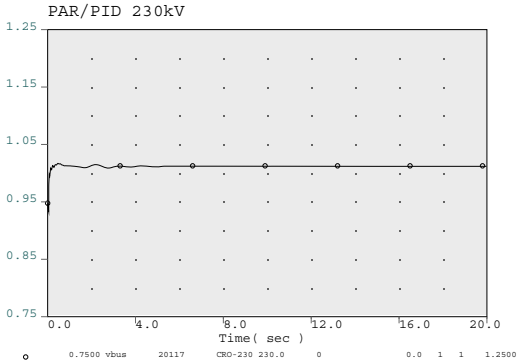
C1 C2 Light Load Pre Without Upgrades

Page 2

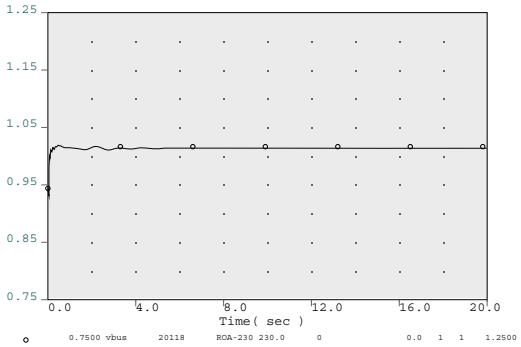
SDGE	tran-c1c2-ll-pre-r12_SO-TA-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:35:54 2011

Affected System Voltage Check and Comparison

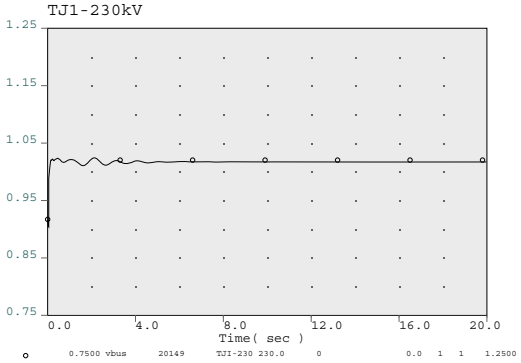
PAR/PID 230kV



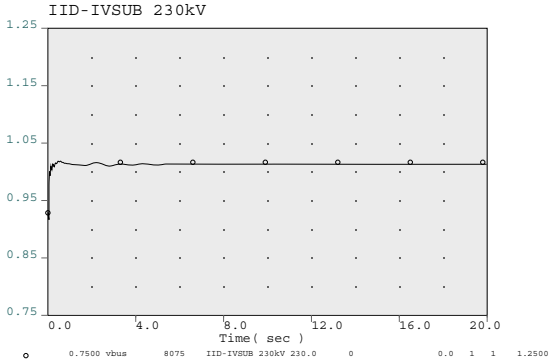
ROA-230kV



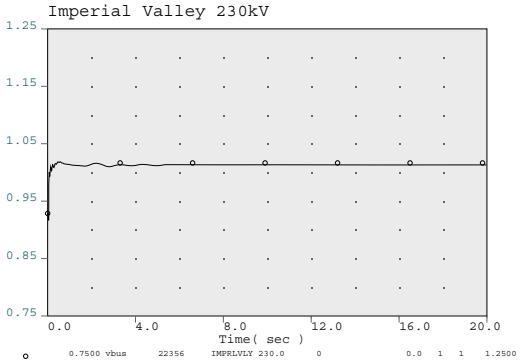
TJ1-230kV



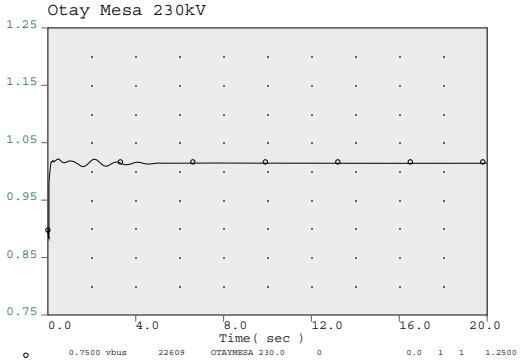
IID-IVSUB 230kV



Imperial Valley 230kV



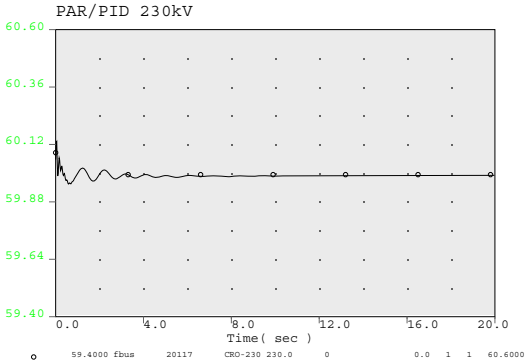
Otay Mesa 230kV



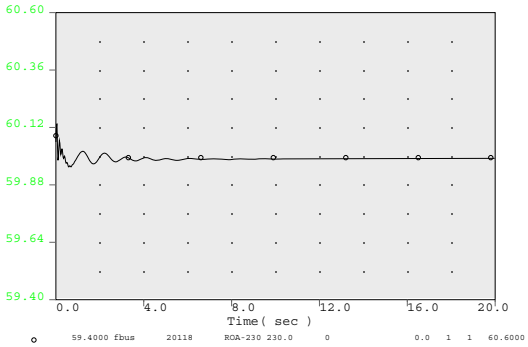
C1 C2 Light Load Pre Without Upgrades

Affected System Frequency Check and Comparison

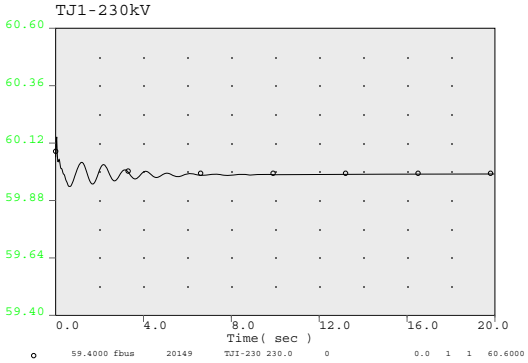
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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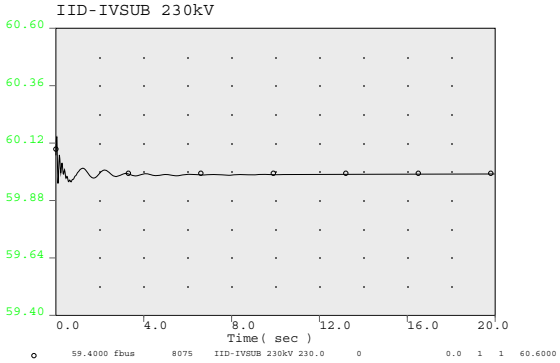

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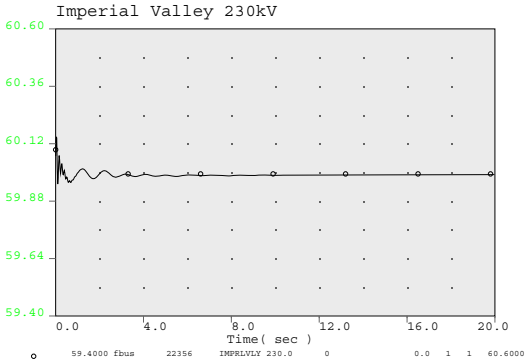
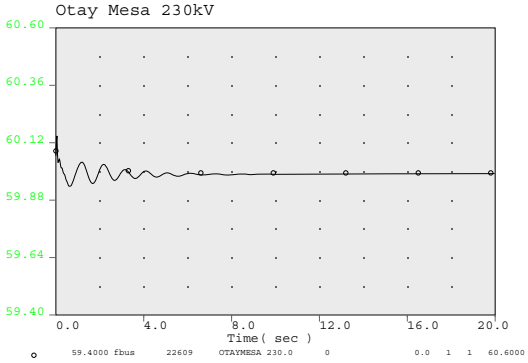


Otay Mesa 230kV



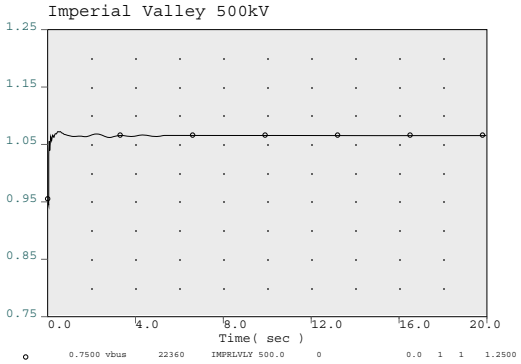
C1 C2 Light Load Pre Without Upgrades

Page 4

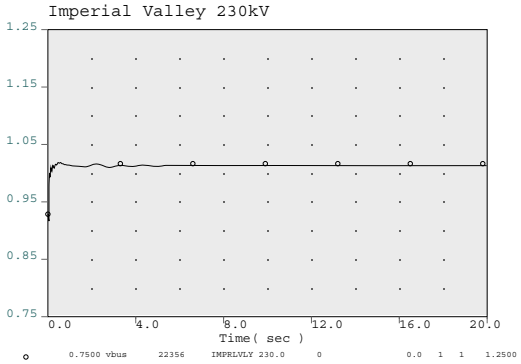
SDGE	tran-c1c2-ll-pre-r12_SO-TA-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:35:55 2011

VOLTAGE

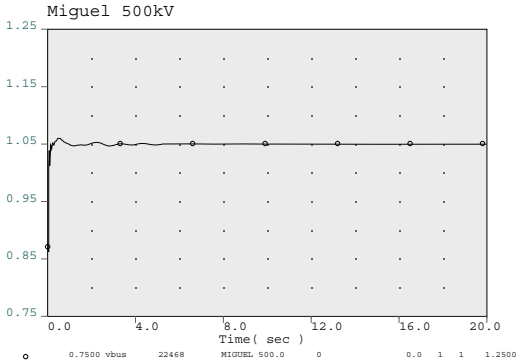
Imperial Valley 500kV



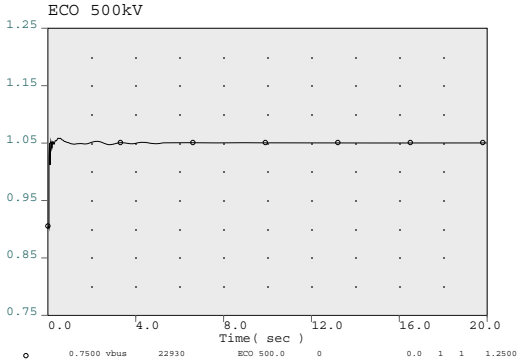
Imperial Valley 230kV



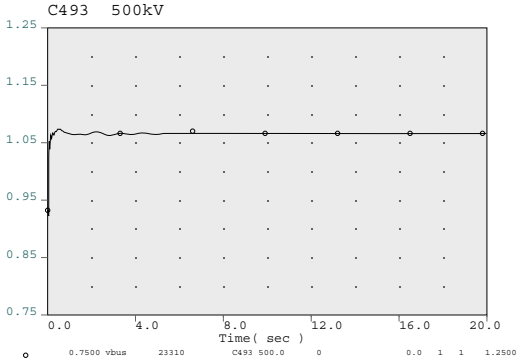
Miguel 500kV



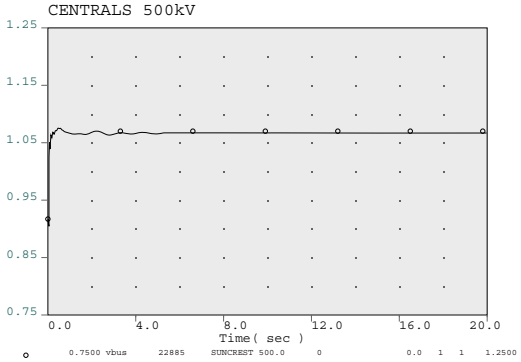
ECO 500kV



C493 500kV

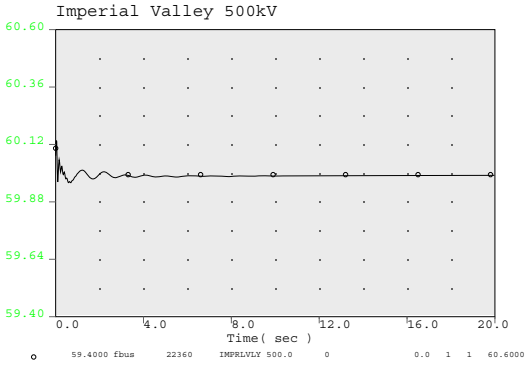


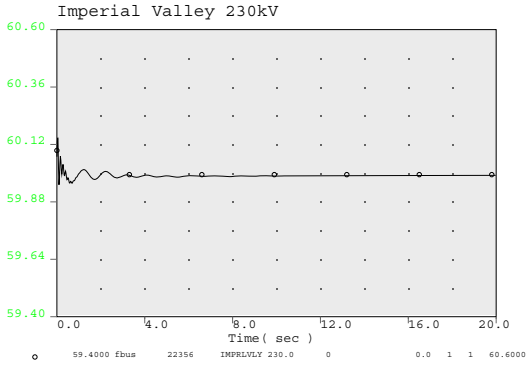
CENTRALS 500kV

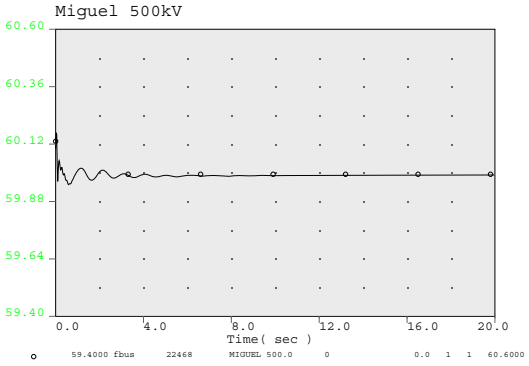


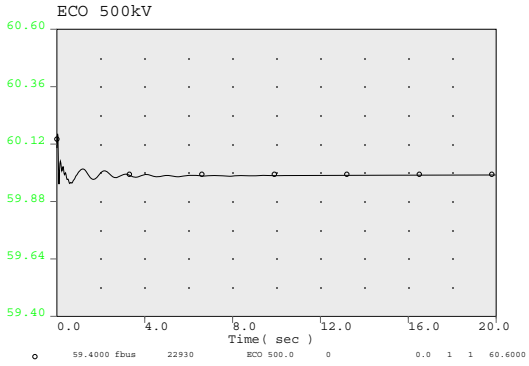
C1 C2 Light Load Pre Without Upgrades

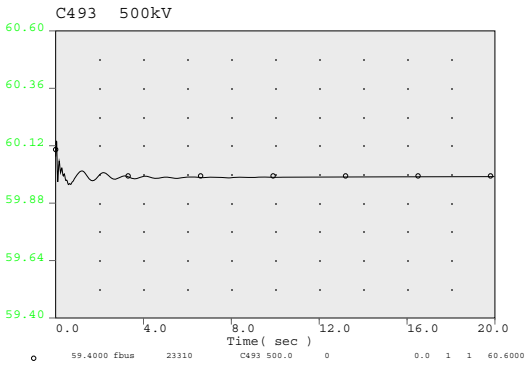
FREQUENCY

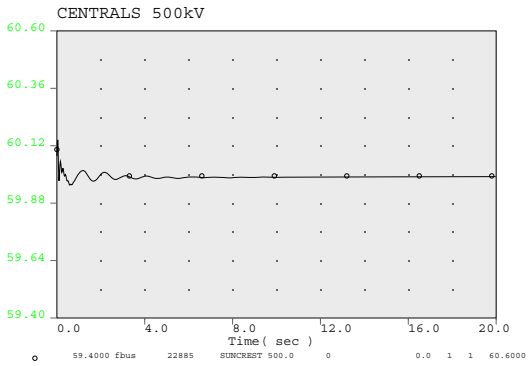












C1 C2 Light Load Pre Without Upgrades

Page 6

SDGE	tran-c1c2-ll-pre-r12_SO-TA-dlo.chf	anstab\ll\pre\ws_pre_c1c2 Sun Jul 17 15:35:57 2011

Appendix J-10

Transient Stability Analysis Plots

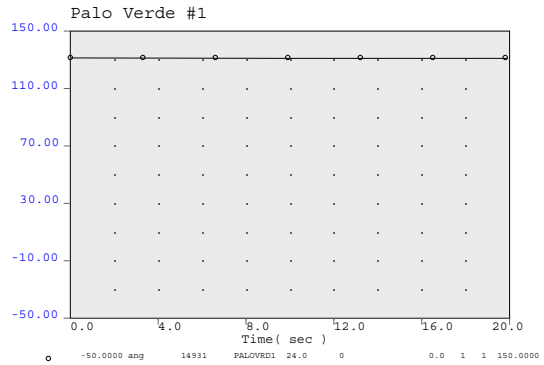
Internal Cluster

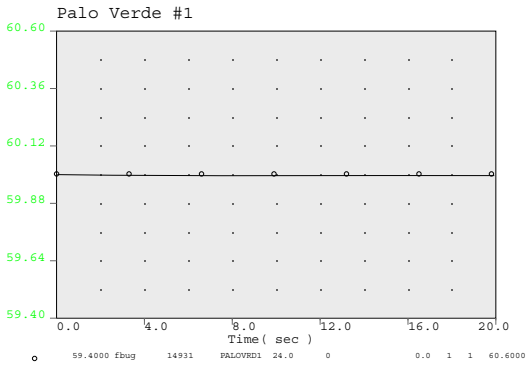
Light Load (Spring or Light Autumn) Post

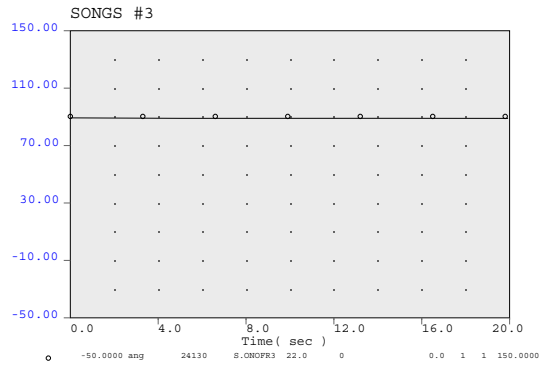
Imperial Valley Area - Frequency

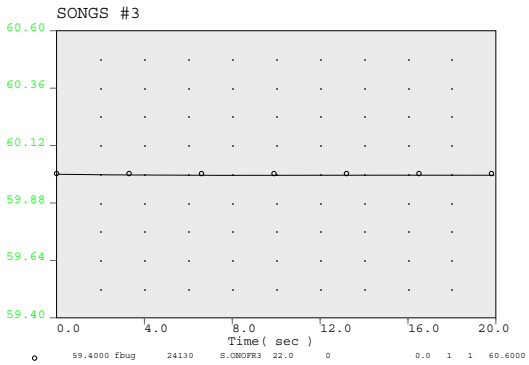
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

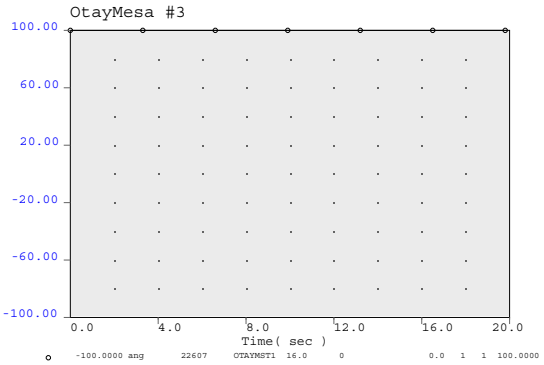
RELATIVE ROTOR ANGLE & FREQUENCY

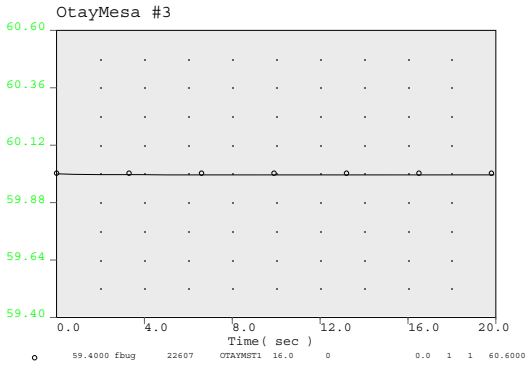












SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Page 1

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RELATIVE VOLTAGE

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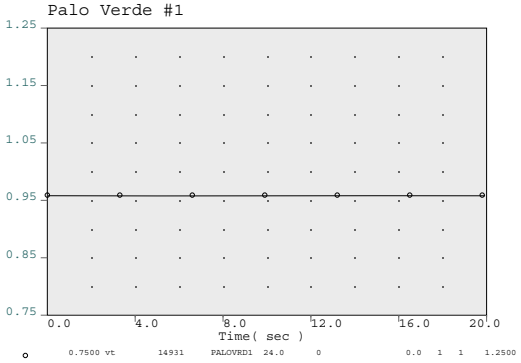
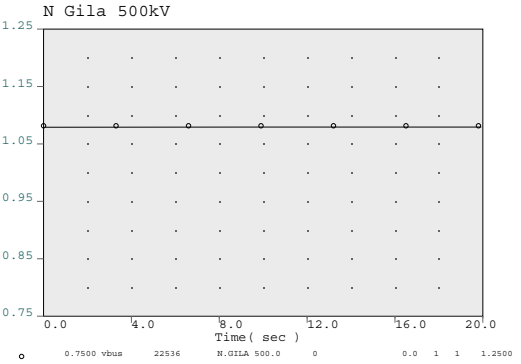


N Gila 500kV



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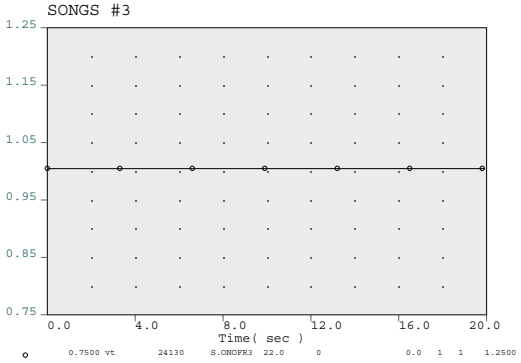
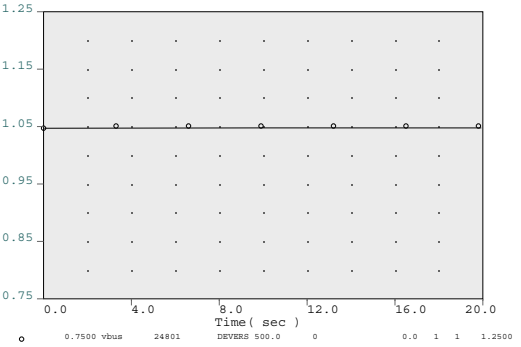
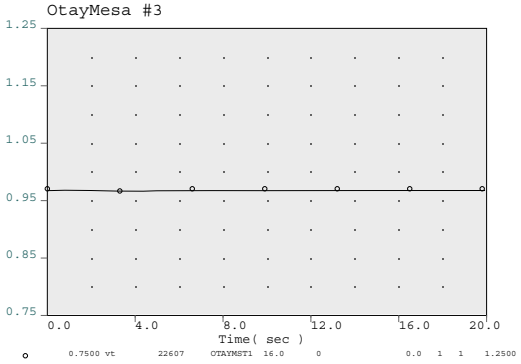


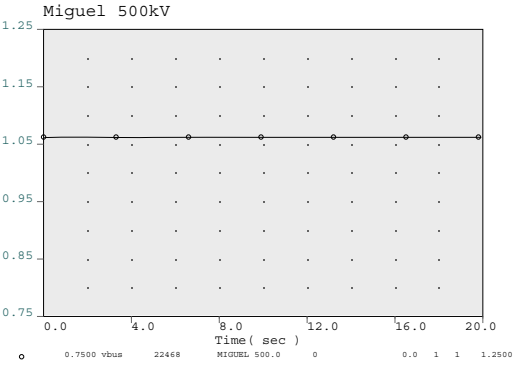
Devers 500



OtayMesa #3



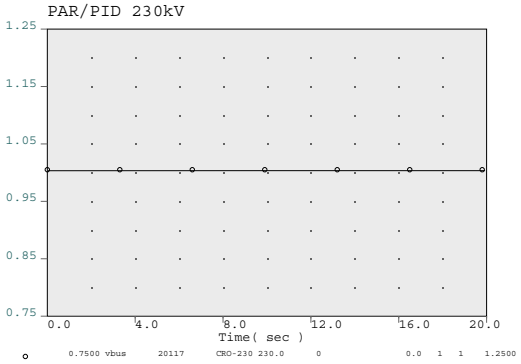
Miguel 500kV



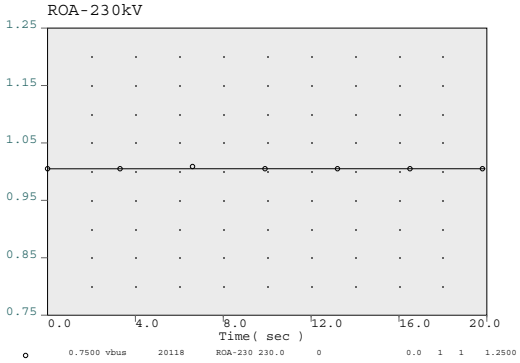
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Voltage Check and Comparison

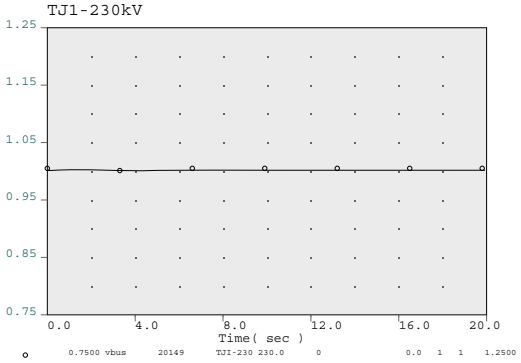
PAR/PID 230kV



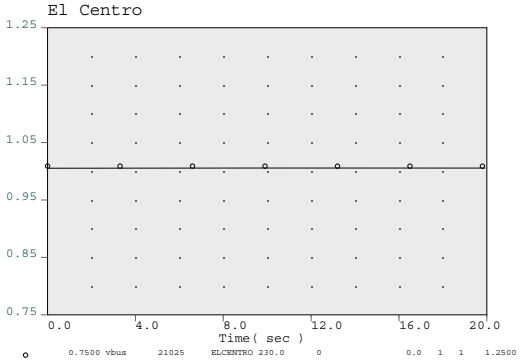
ROA-230kV



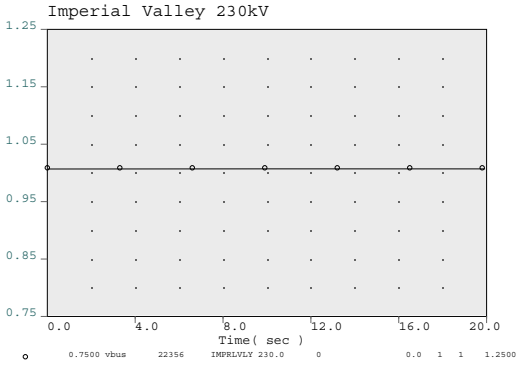
TJ1-230kV



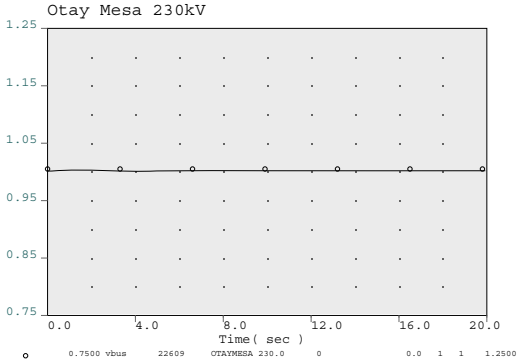
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



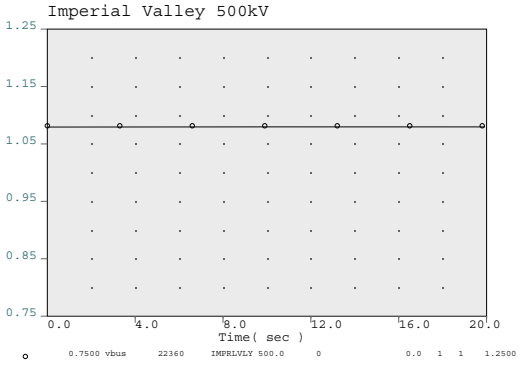
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Frequency Check and Comparison

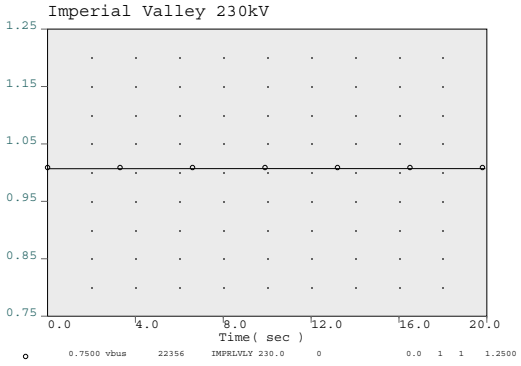
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Imperial Valley Area - VOLTAGE

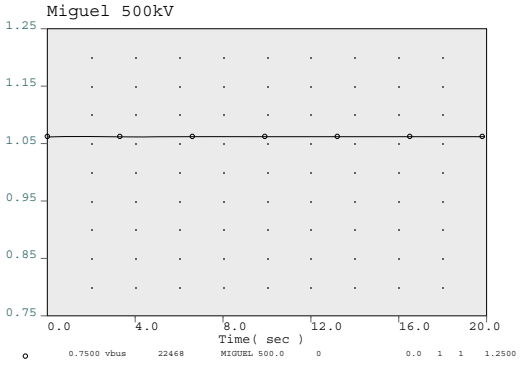
Imperial Valley 500kV



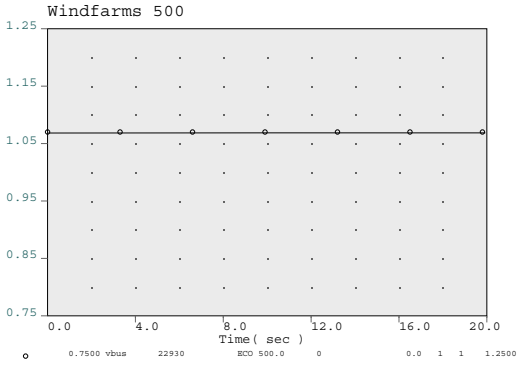
Imperial Valley 230kV



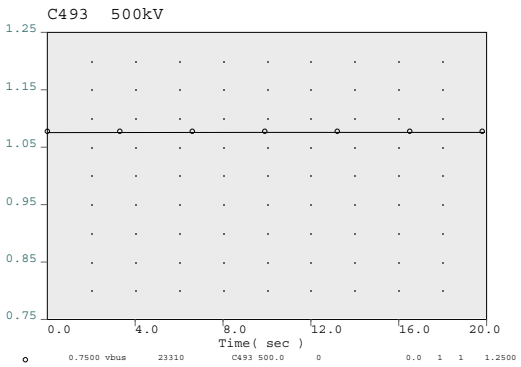
Miguel 500kV



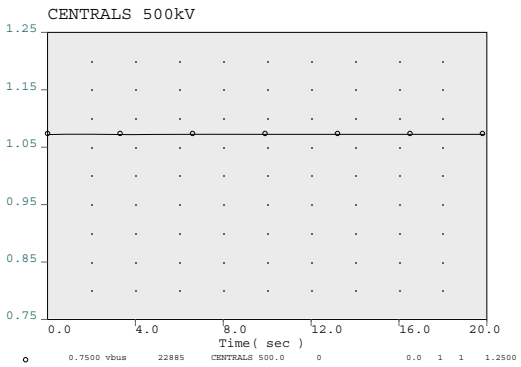
Windfarms 500



C493 500kV



CENTRALS 500kV

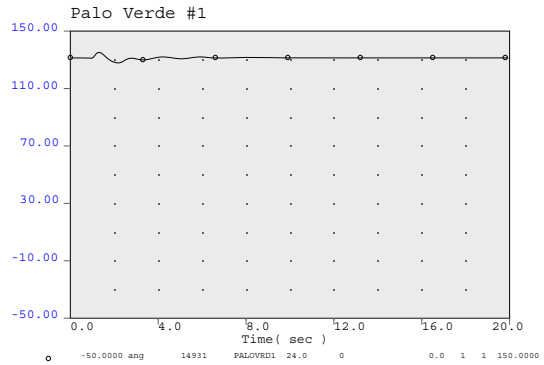


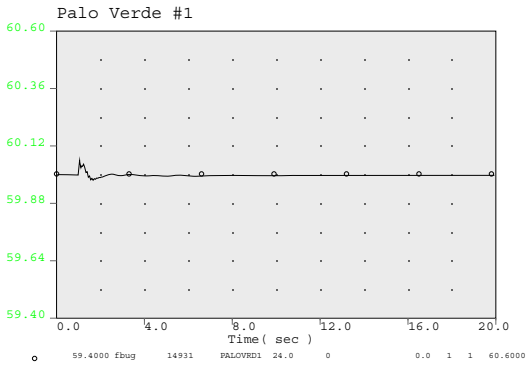
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

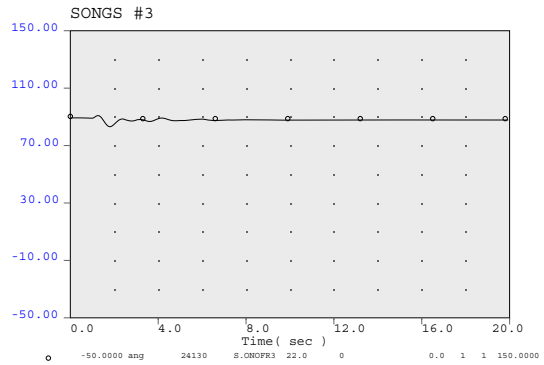
Imperial Valley Area - Frequency

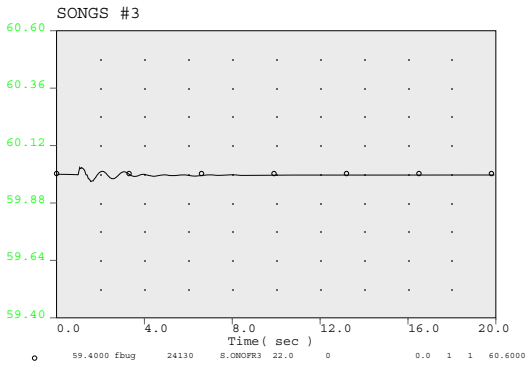
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

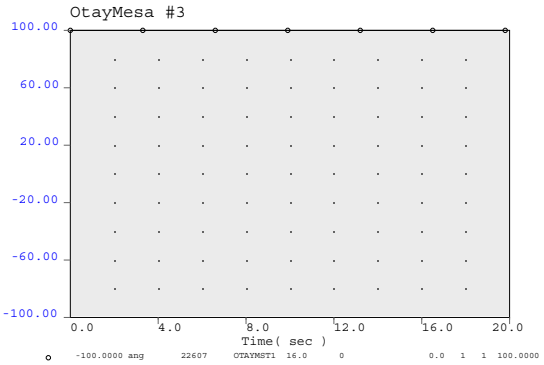
RELATIVE ROTOR ANGLE & FREQUENCY

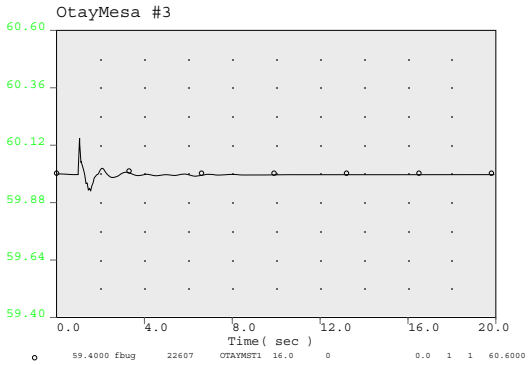












SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

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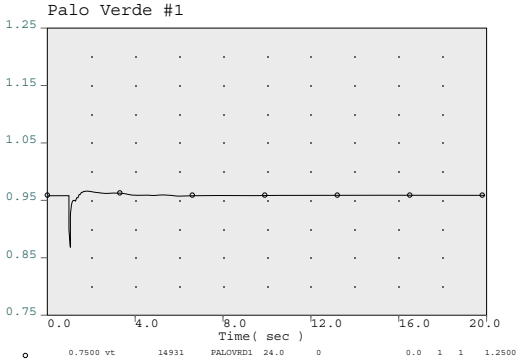
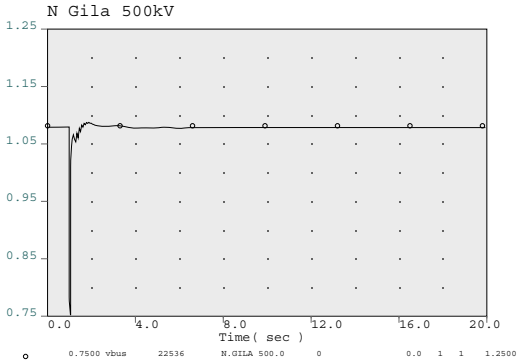
SDGE	C493_Centrals_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:25:57 2010

RELATIVE VOLTAGE

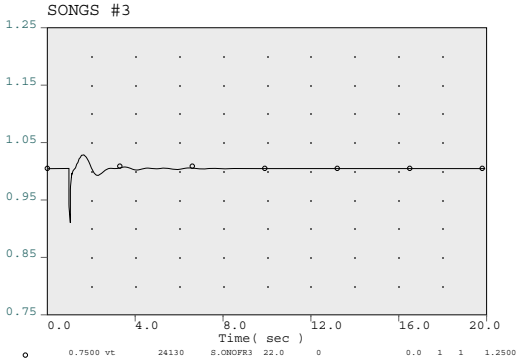
Palo Verde #1



N Gila 500kV



SONGS #3



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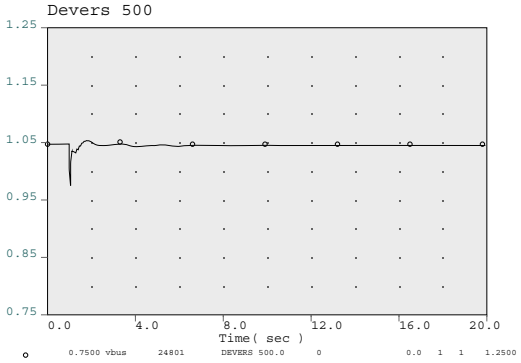
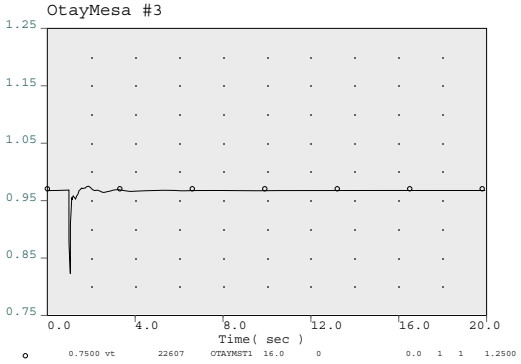
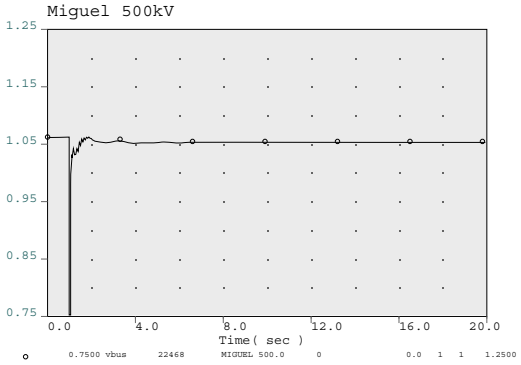


OtayMesa #3



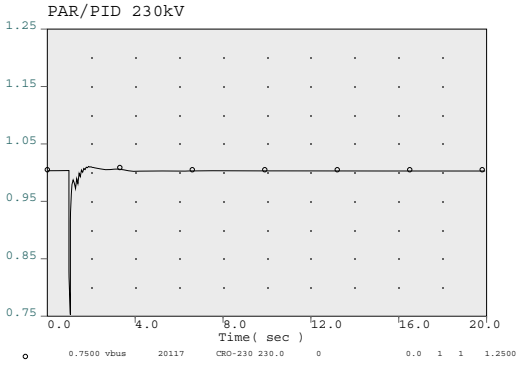
Miguel 500kV



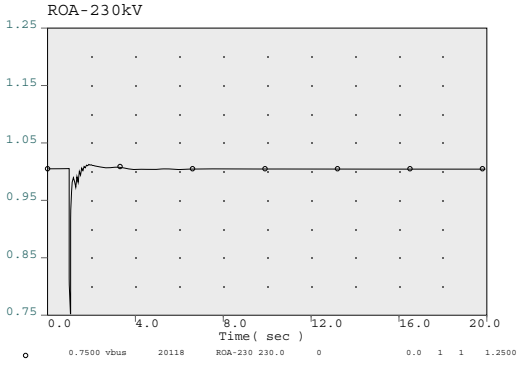
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

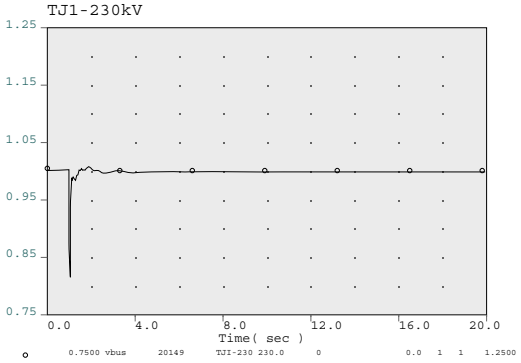
PAR/PID 230kV



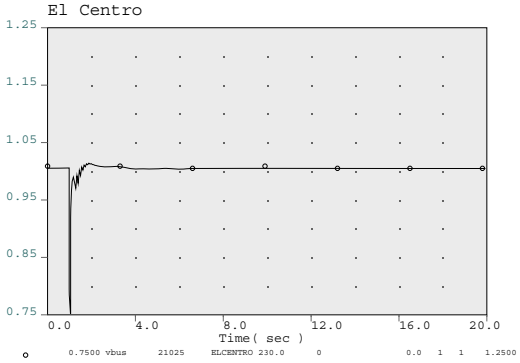
ROA-230kV



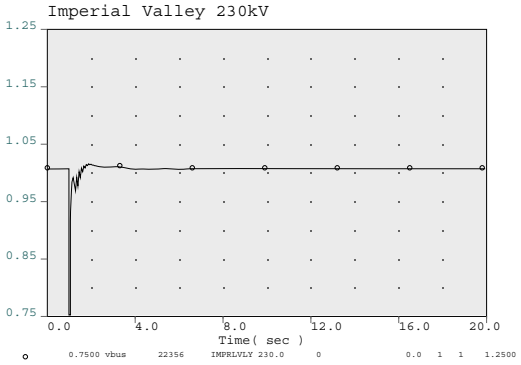
TJ1-230kV



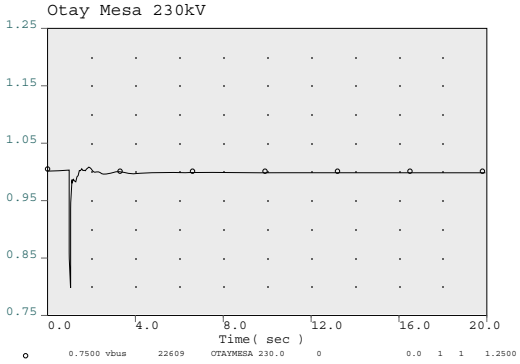
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



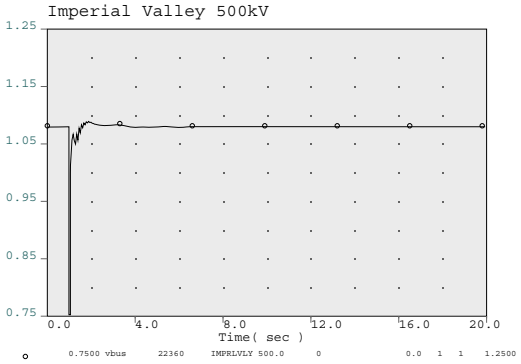
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

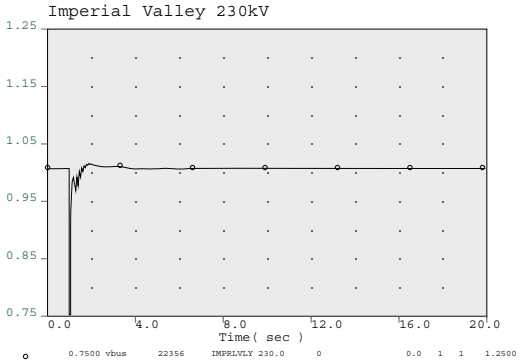
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Imperial Valley Area - VOLTAGE

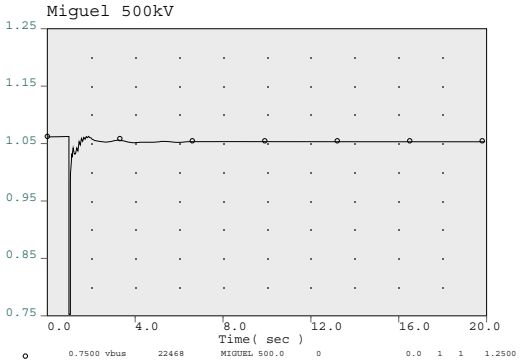
Imperial Valley 500kV



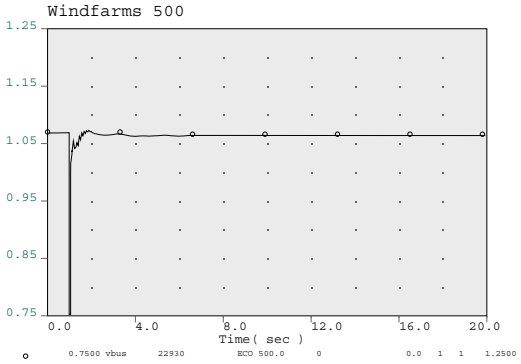
Imperial Valley 230kV



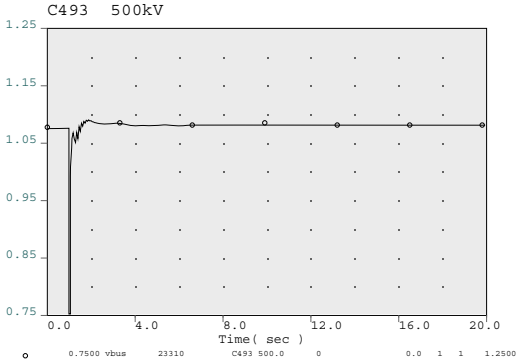
Miguel 500kV



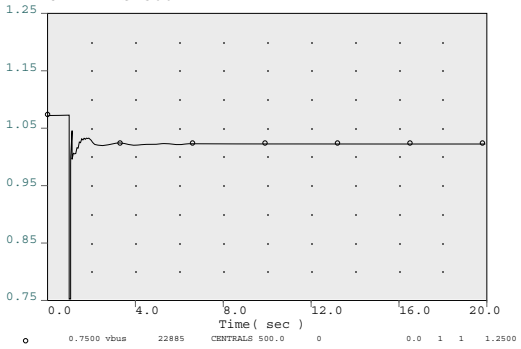
Windfarms 500



C493 500kV

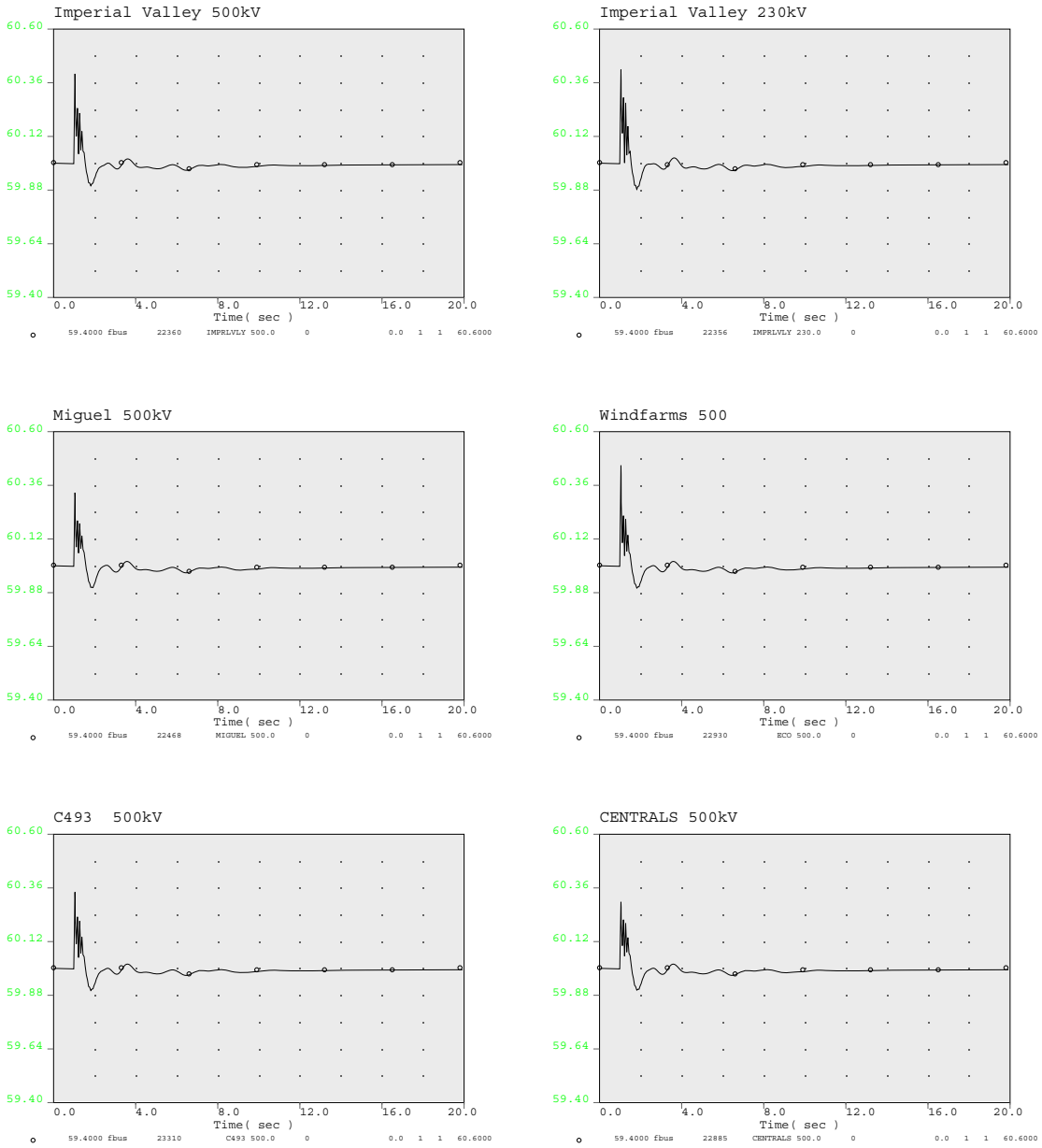


CENTRALS 500kV



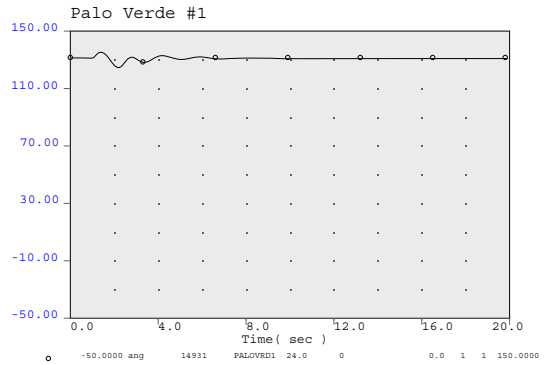
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

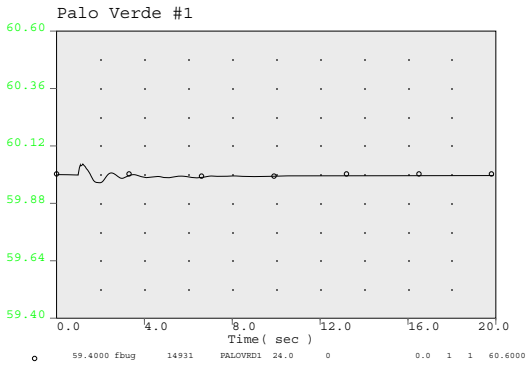
Imperial Valley Area - Frequency

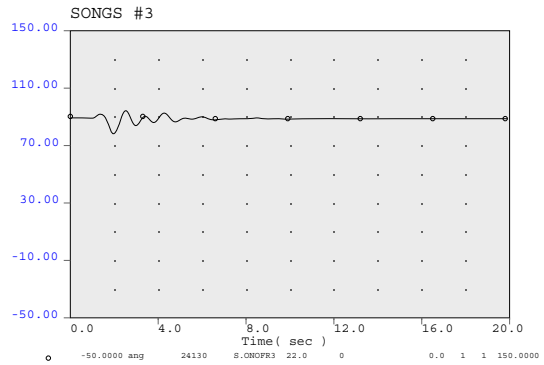


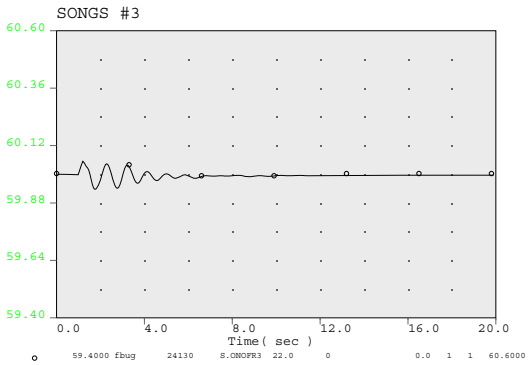
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

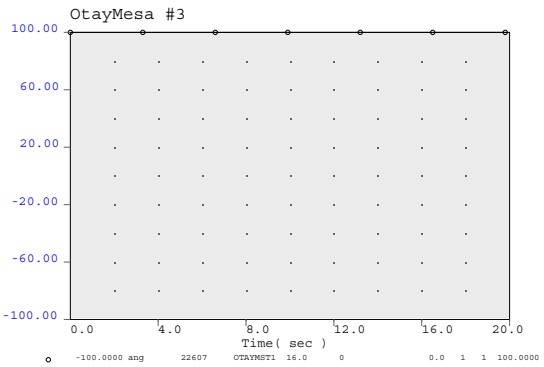
RELATIVE ROTOR ANGLE & FREQUENCY

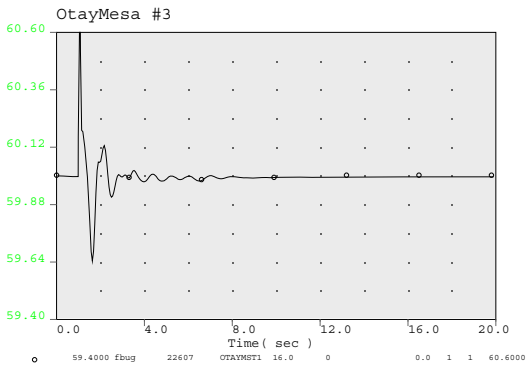








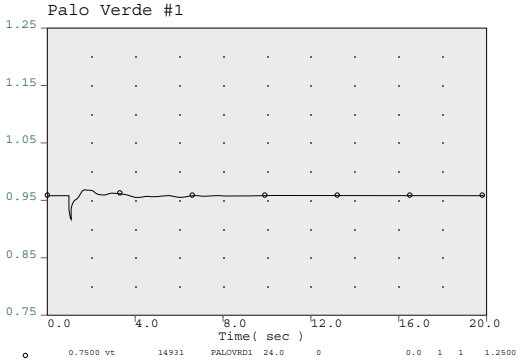




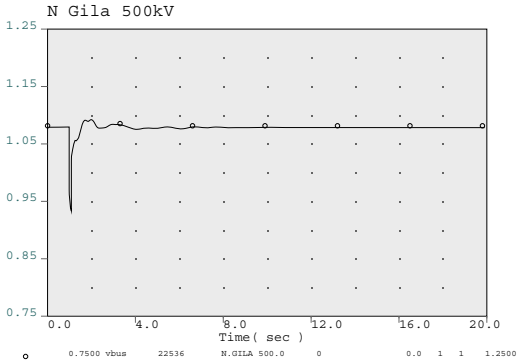
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

RELATIVE VOLTAGE

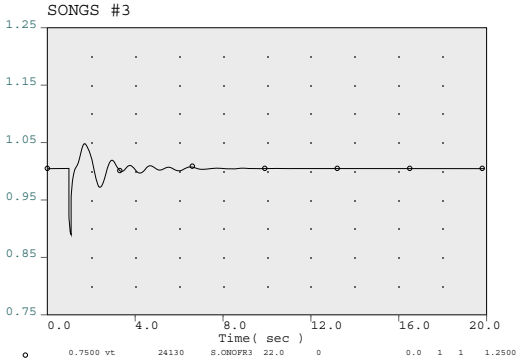
Palo Verde #1



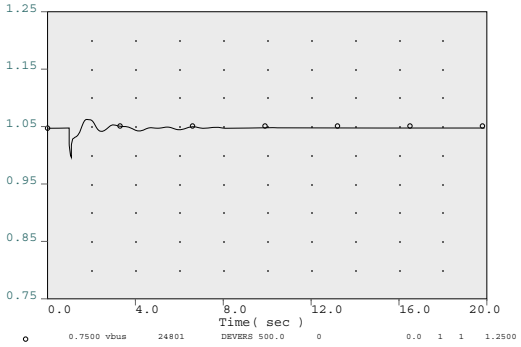
N Gila 500kV



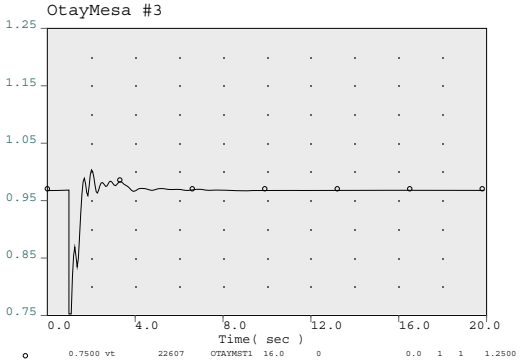
SONGS #3



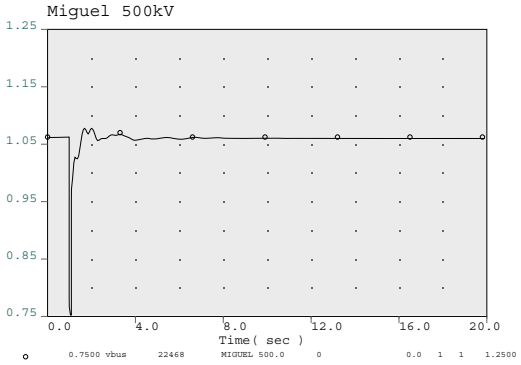
Devers 500



OtayMesa #3



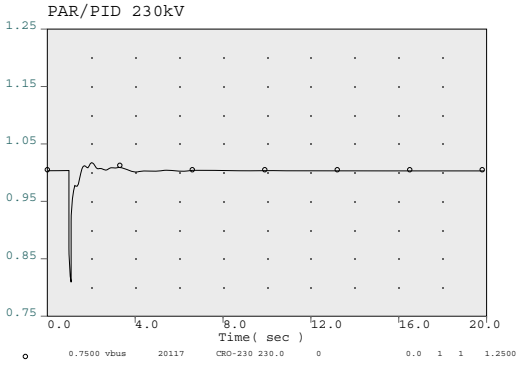
Miguel 500kV



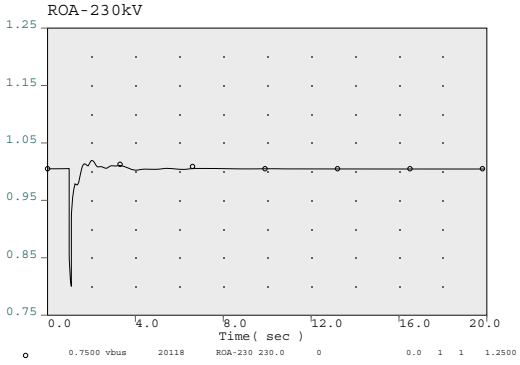
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

Affected System Voltage Check and Comparison

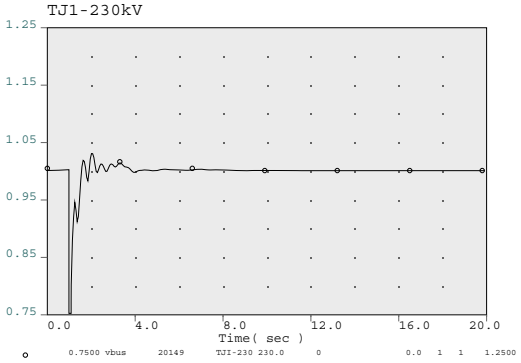
PAR/PID 230kV



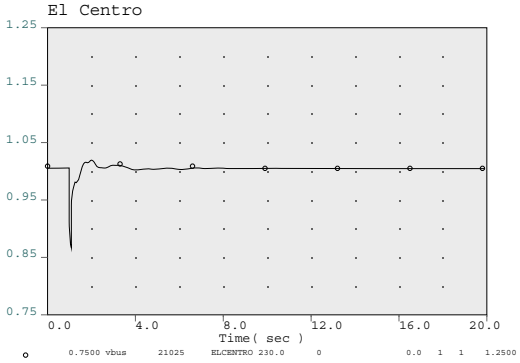
ROA-230kV



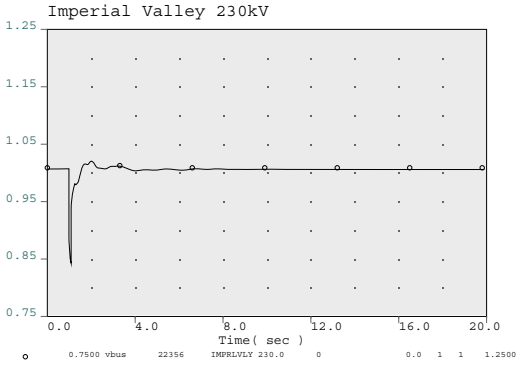
TJ1-230kV



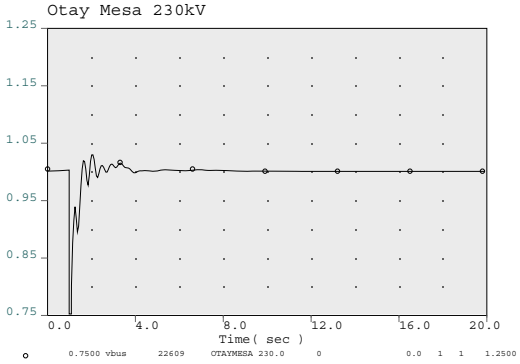
El Centro



Imperial Valley 230kV

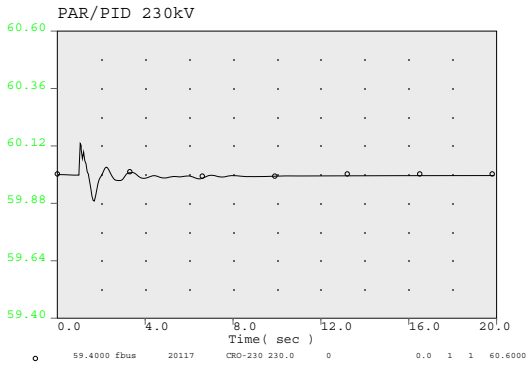


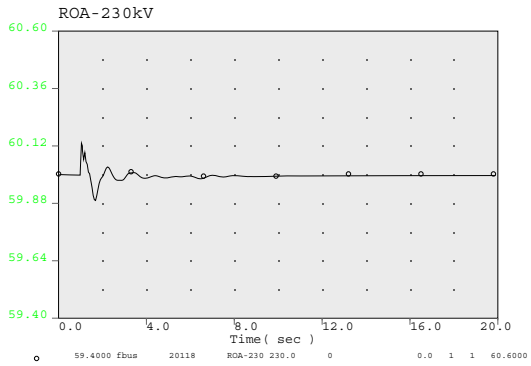
Otay Mesa 230kV

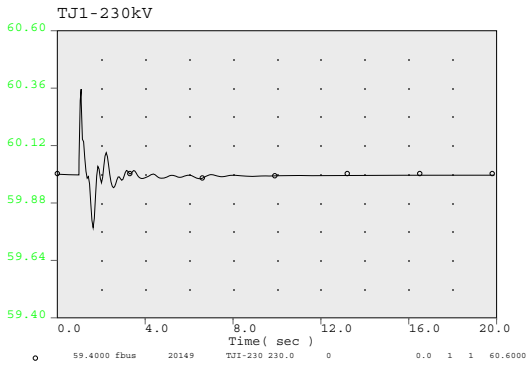


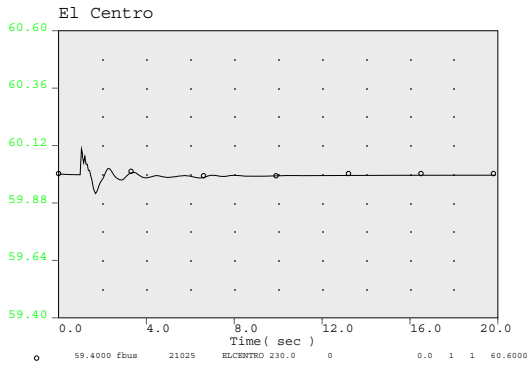
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

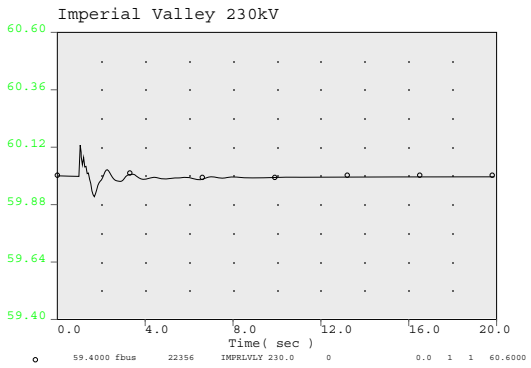
Affected System Frequency Check and Comparison

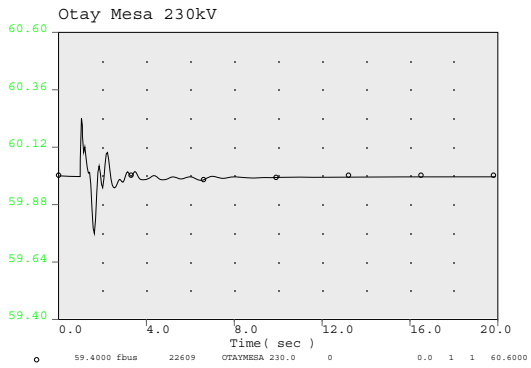








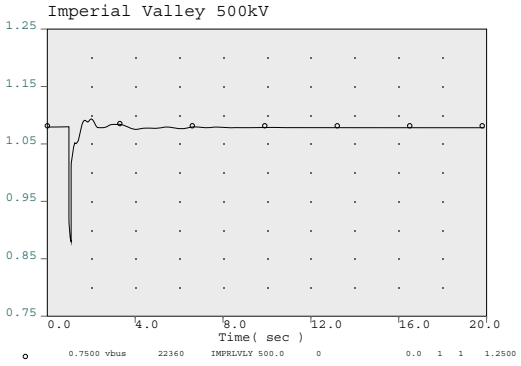




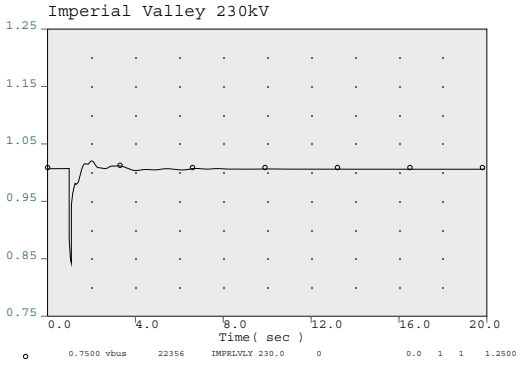
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

Imperial Valley Area - VOLTAGE

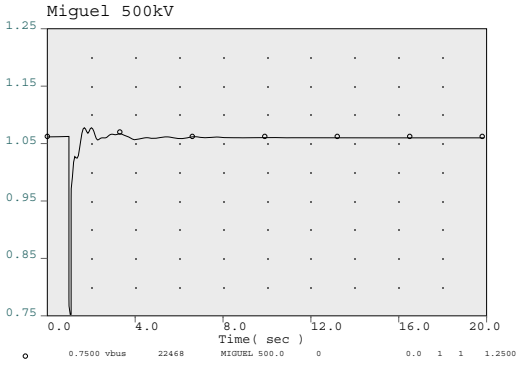
Imperial Valley 500kV



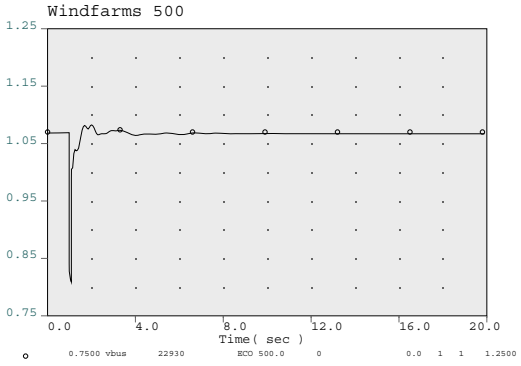
Imperial Valley 230kV



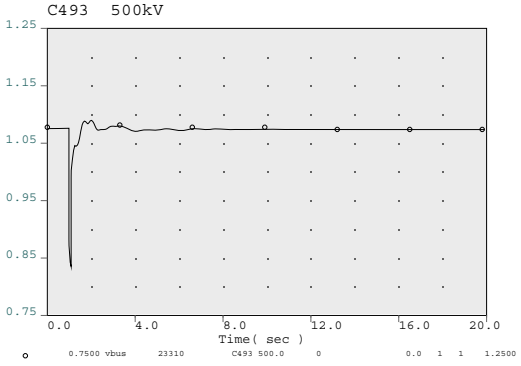
Miguel 500kV



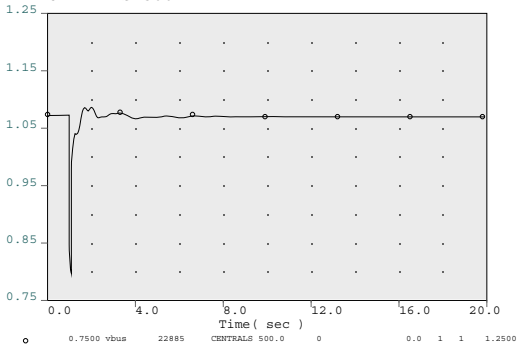
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

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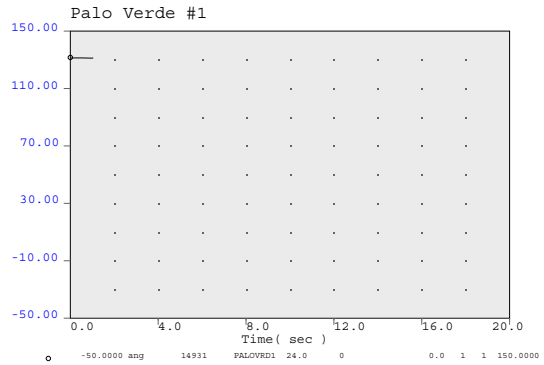
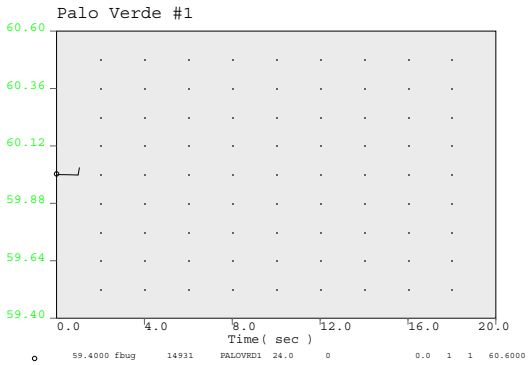
int_C574-SX_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:26:31 2010

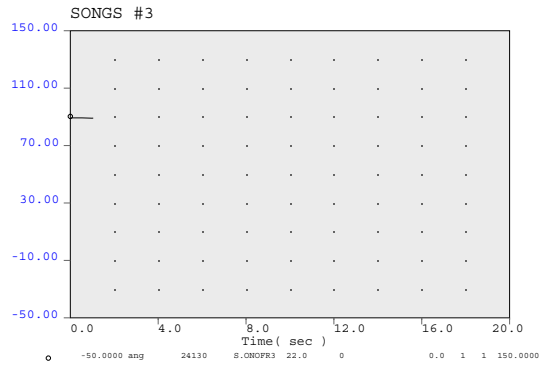
Imperial Valley Area - Frequency

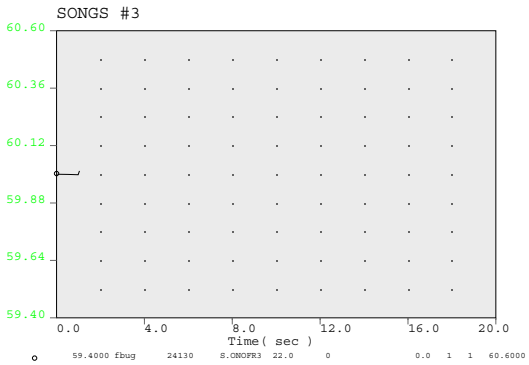
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

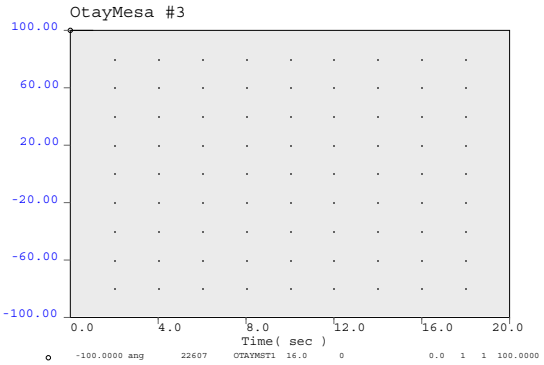
RELATIVE ROTOR ANGLE & FREQUENCY

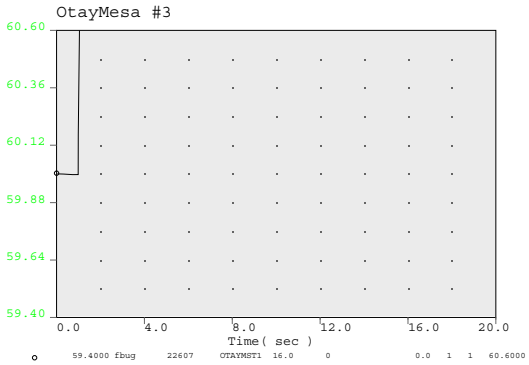












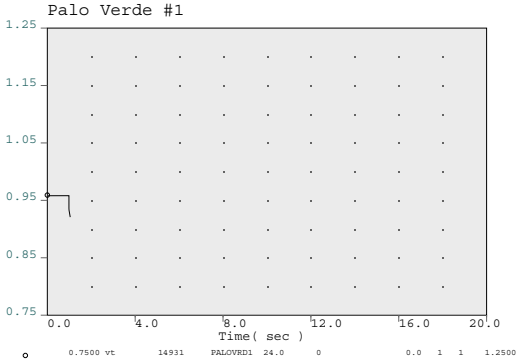
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

Page 1

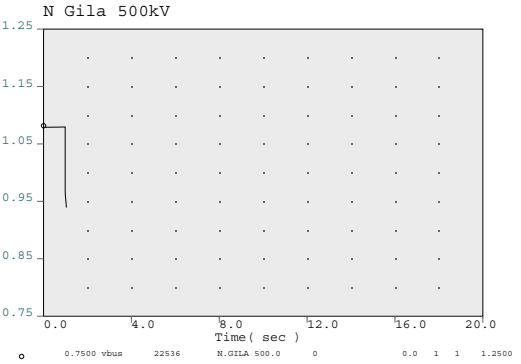
int_C574-SX_SYwRAS_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:26:37 2010

RELATIVE VOLTAGE

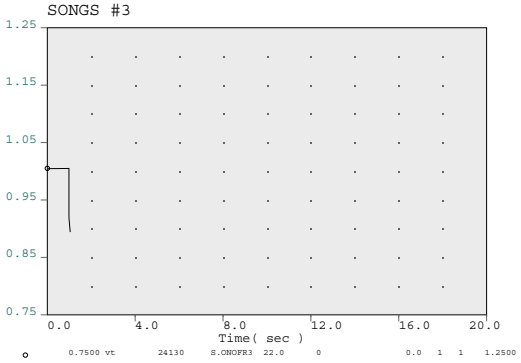
Palo Verde #1



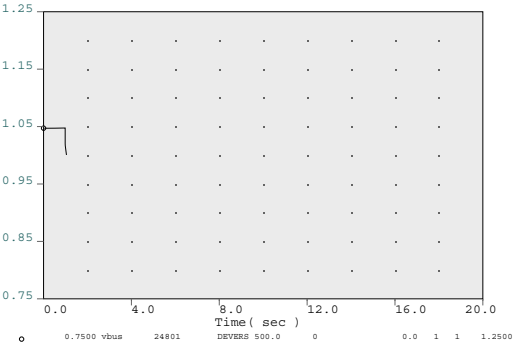
N Gila 500kV



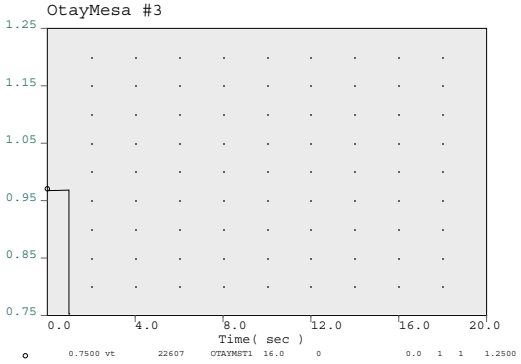
SONGS #3



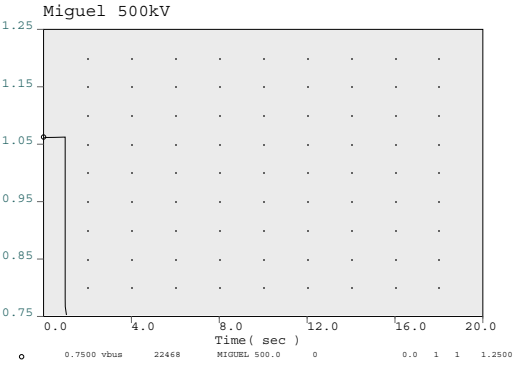
Devers 500



OtayMesa #3



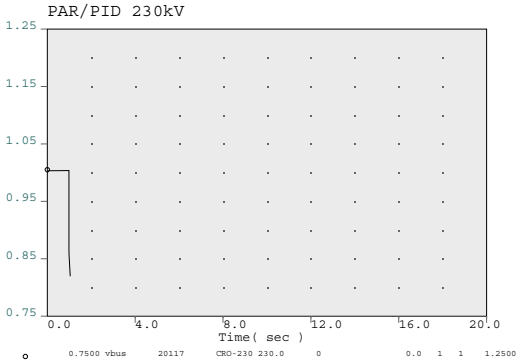
Miguel 500kV



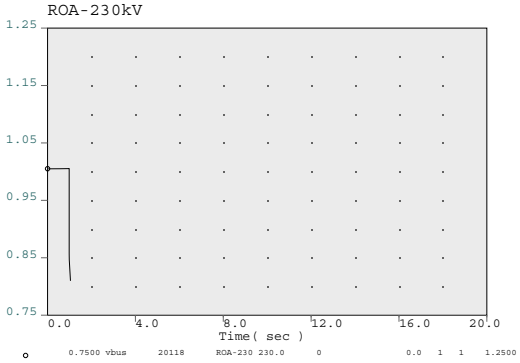
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

Affected System Voltage Check and Comparison

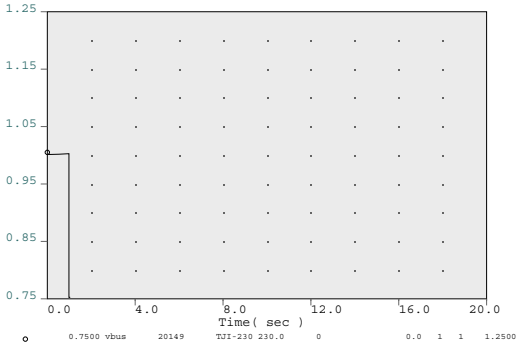
PAR/PID 230kV



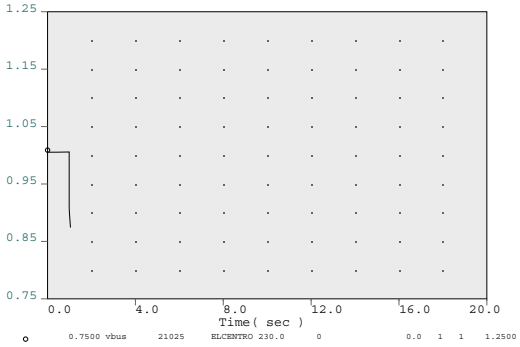
ROA-230kV



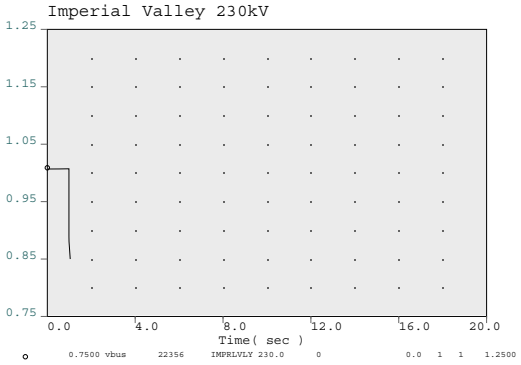
TJ1-230kV



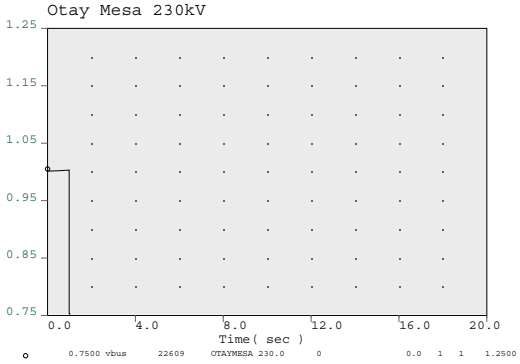
El Centro



Imperial Valley 230kV

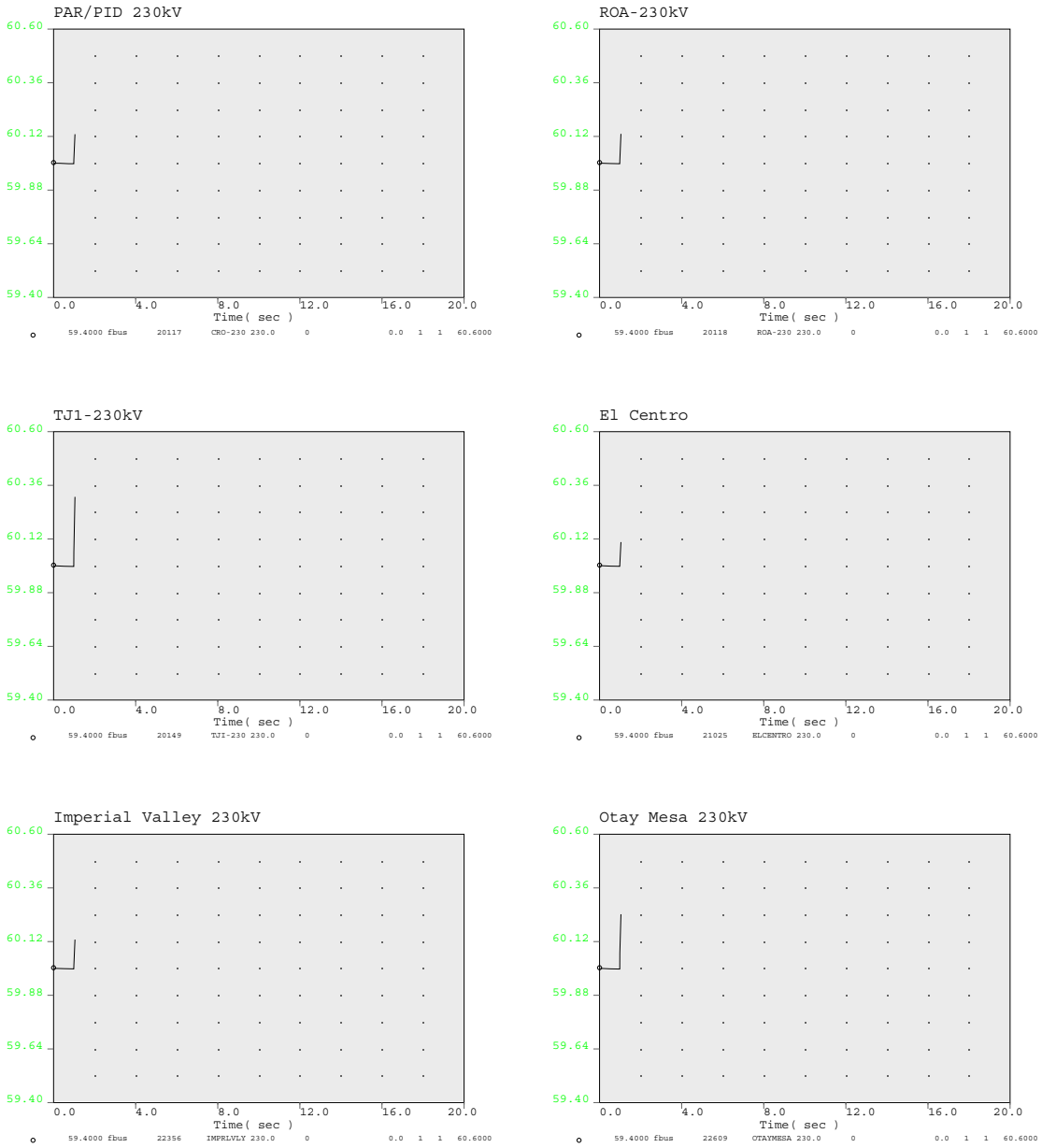


Otay Mesa 230kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

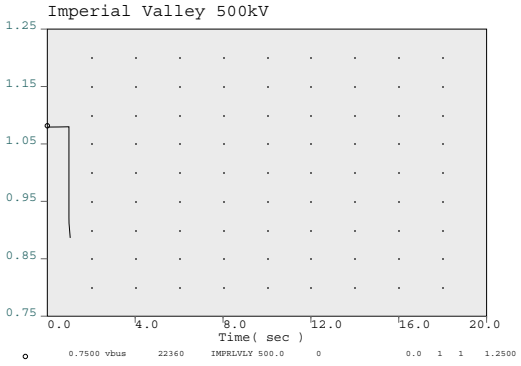
Affected System Frequency Check and Comparison



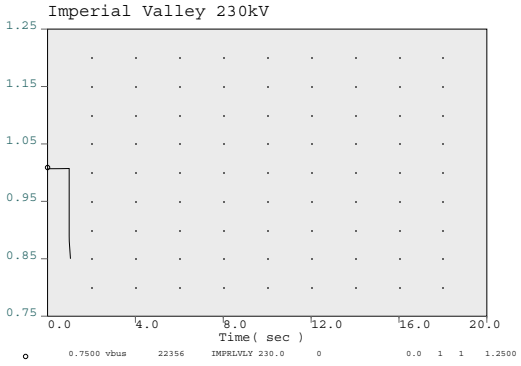
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

Imperial Valley Area - VOLTAGE

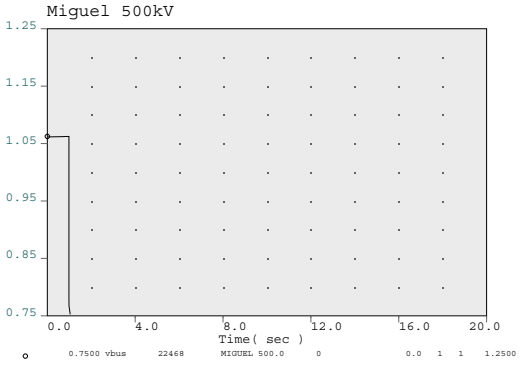
Imperial Valley 500kV



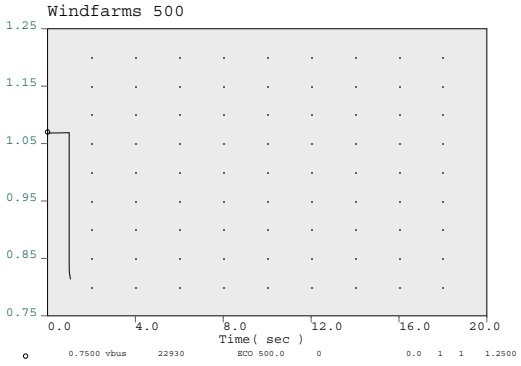
Imperial Valley 230kV



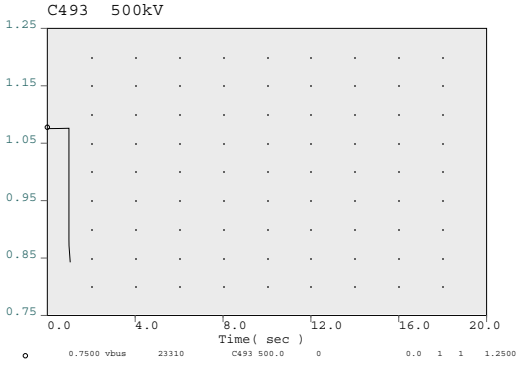
Miguel 500kV



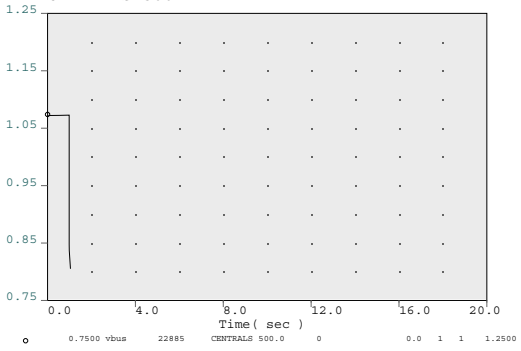
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

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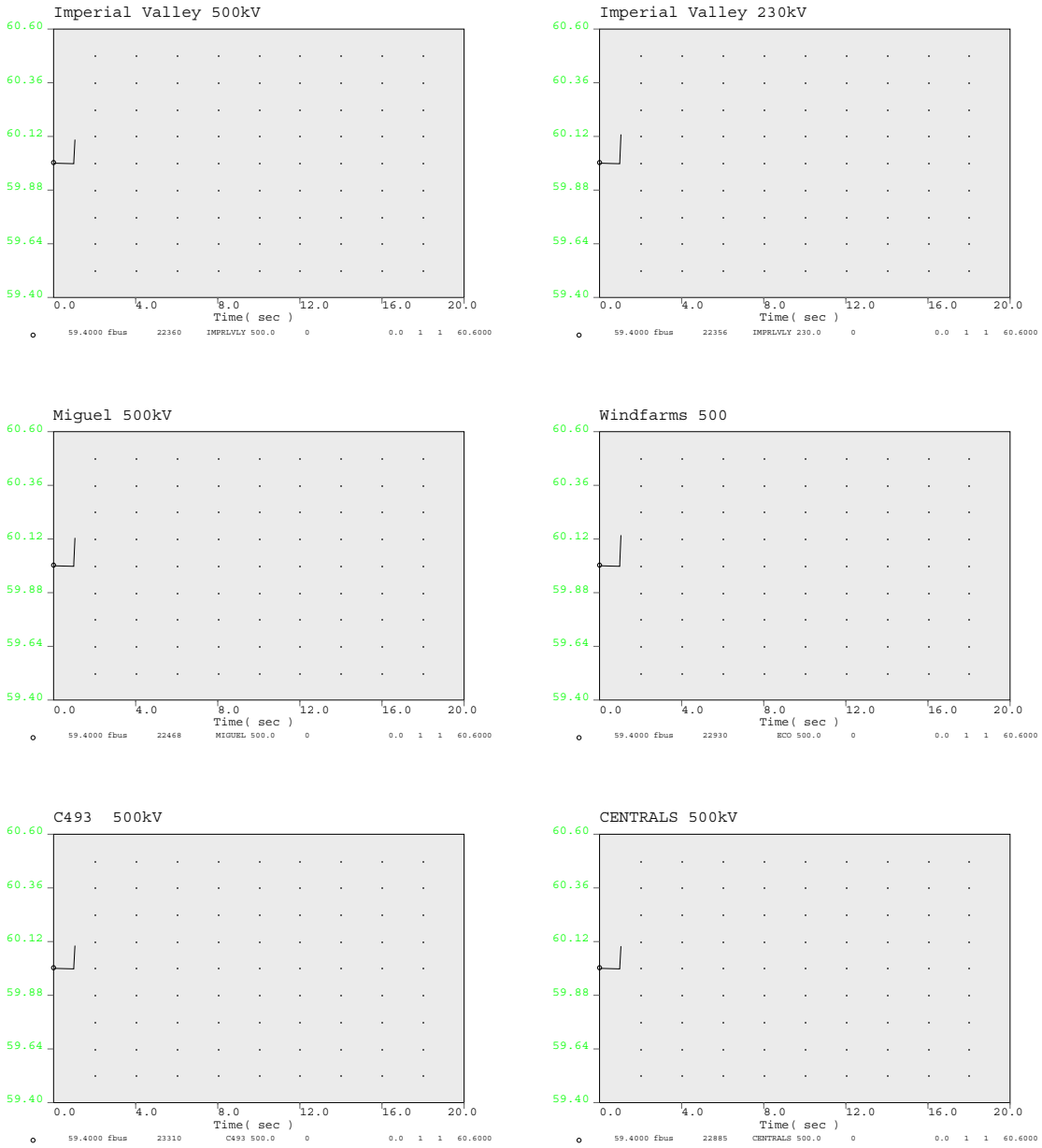
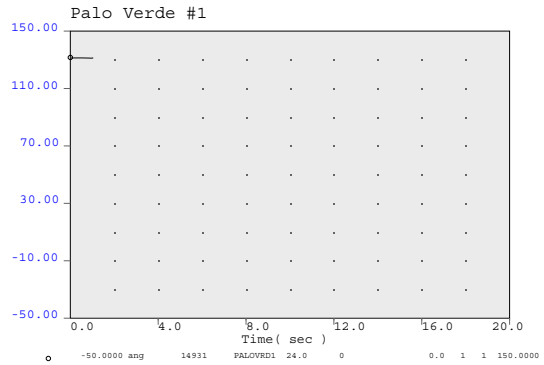
SDGE	int_C574-SX_SYwRAS_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:26:38 2010

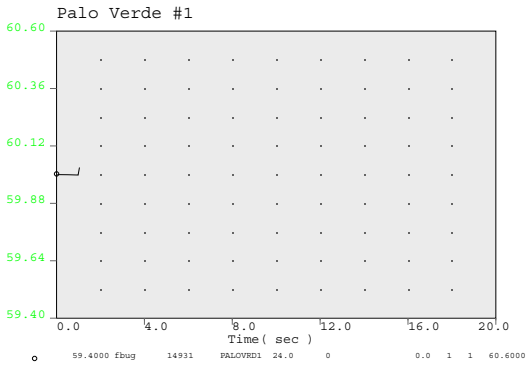
Imperial Valley Area - Frequency

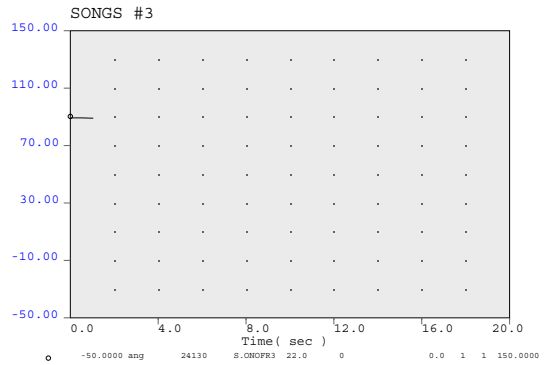


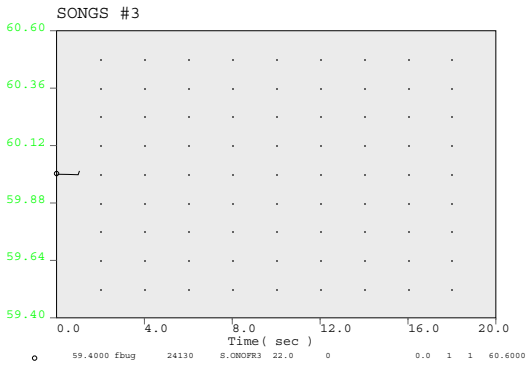
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

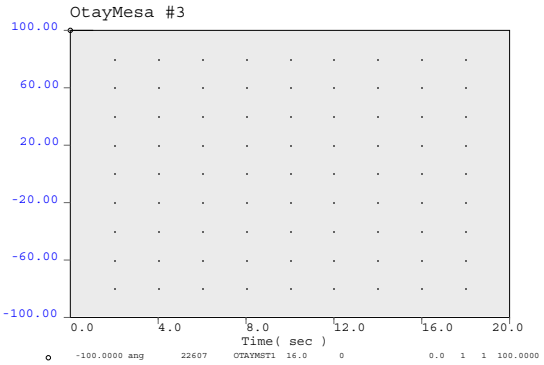
RELATIVE ROTOR ANGLE & FREQUENCY

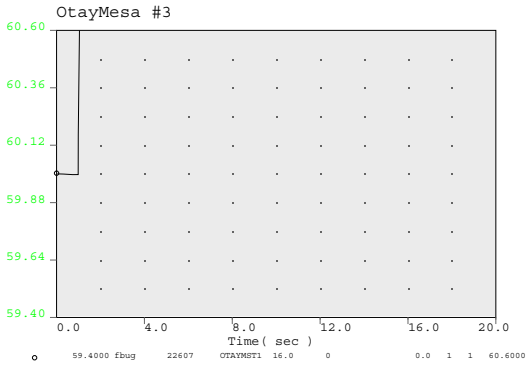












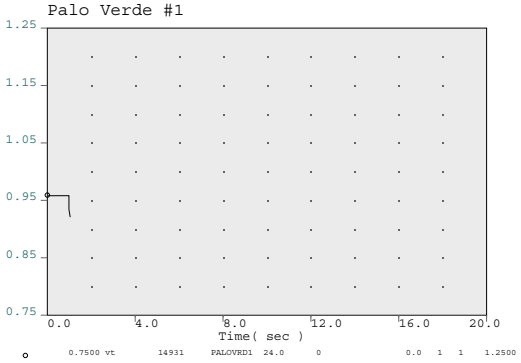
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Page 1

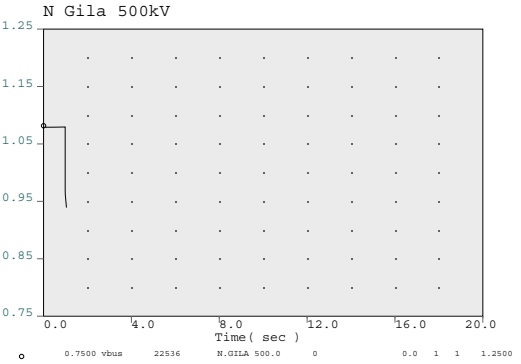
SDGE	int_C574-SY_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:26:43 2010

RELATIVE VOLTAGE

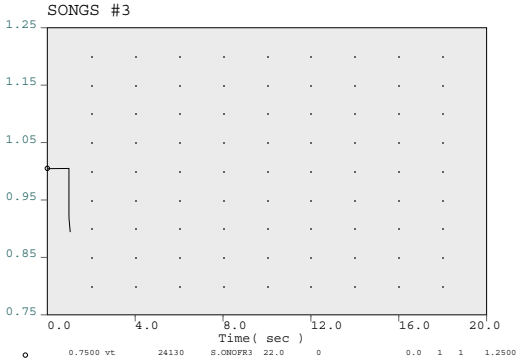
Palo Verde #1



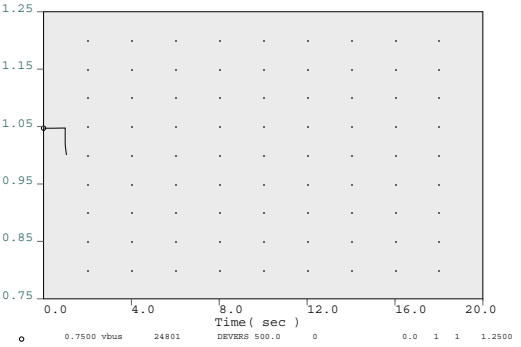
N Gila 500kV



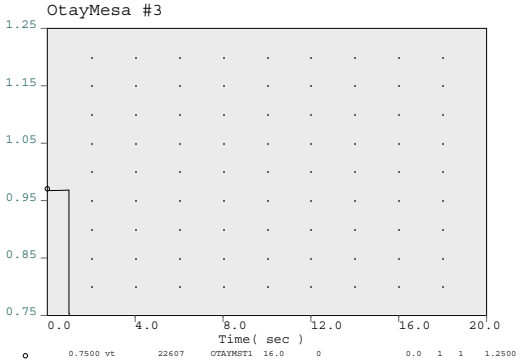
SONGS #3



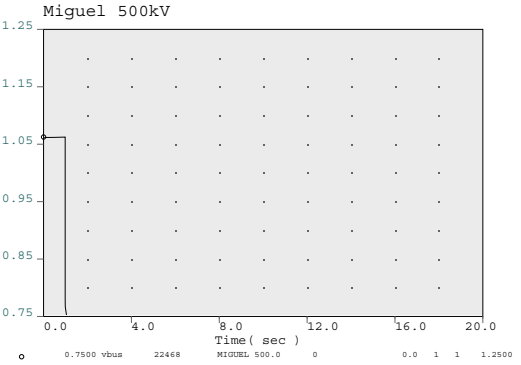
Devers 500



OtayMesa #3



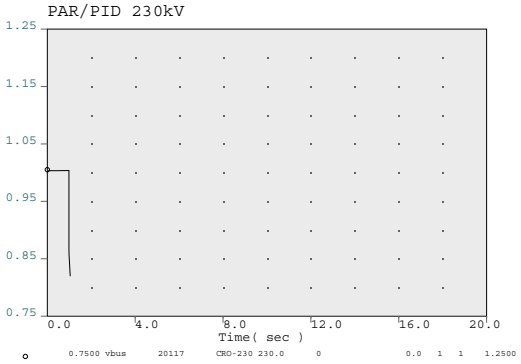
Miguel 500kV



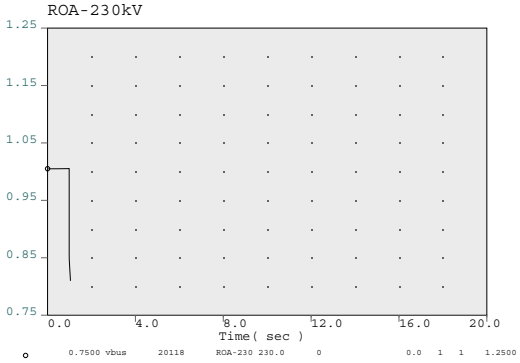
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Affected System Voltage Check and Comparison

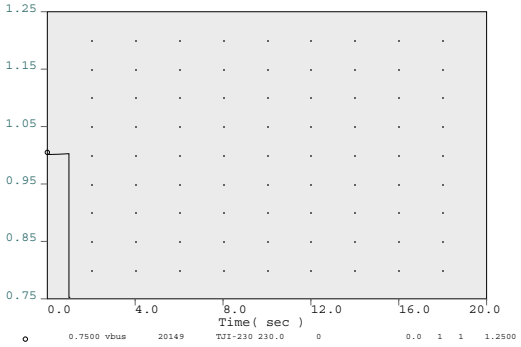
PAR/PID 230kV



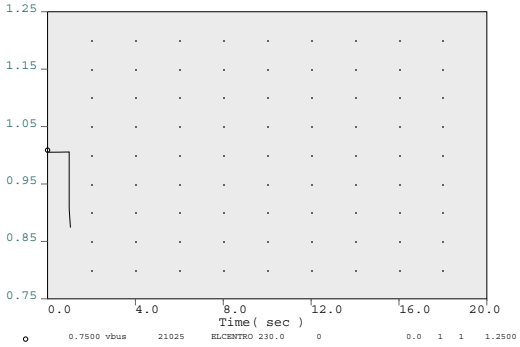
ROA-230kV



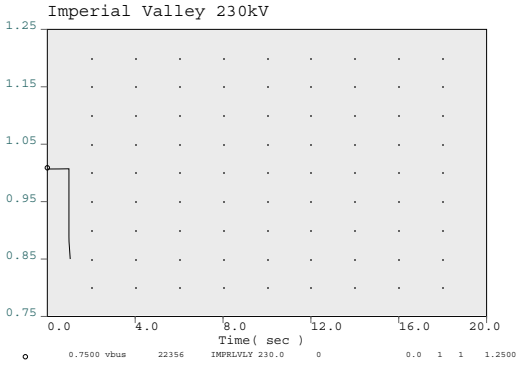
TJ1-230kV



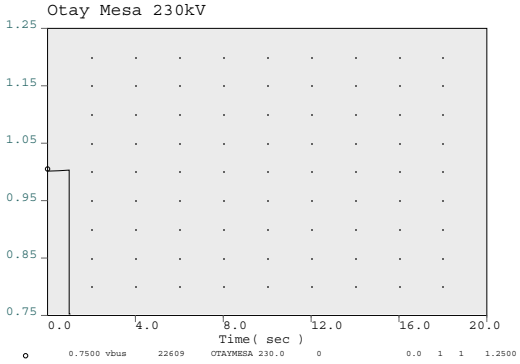
El Centro



Imperial Valley 230kV

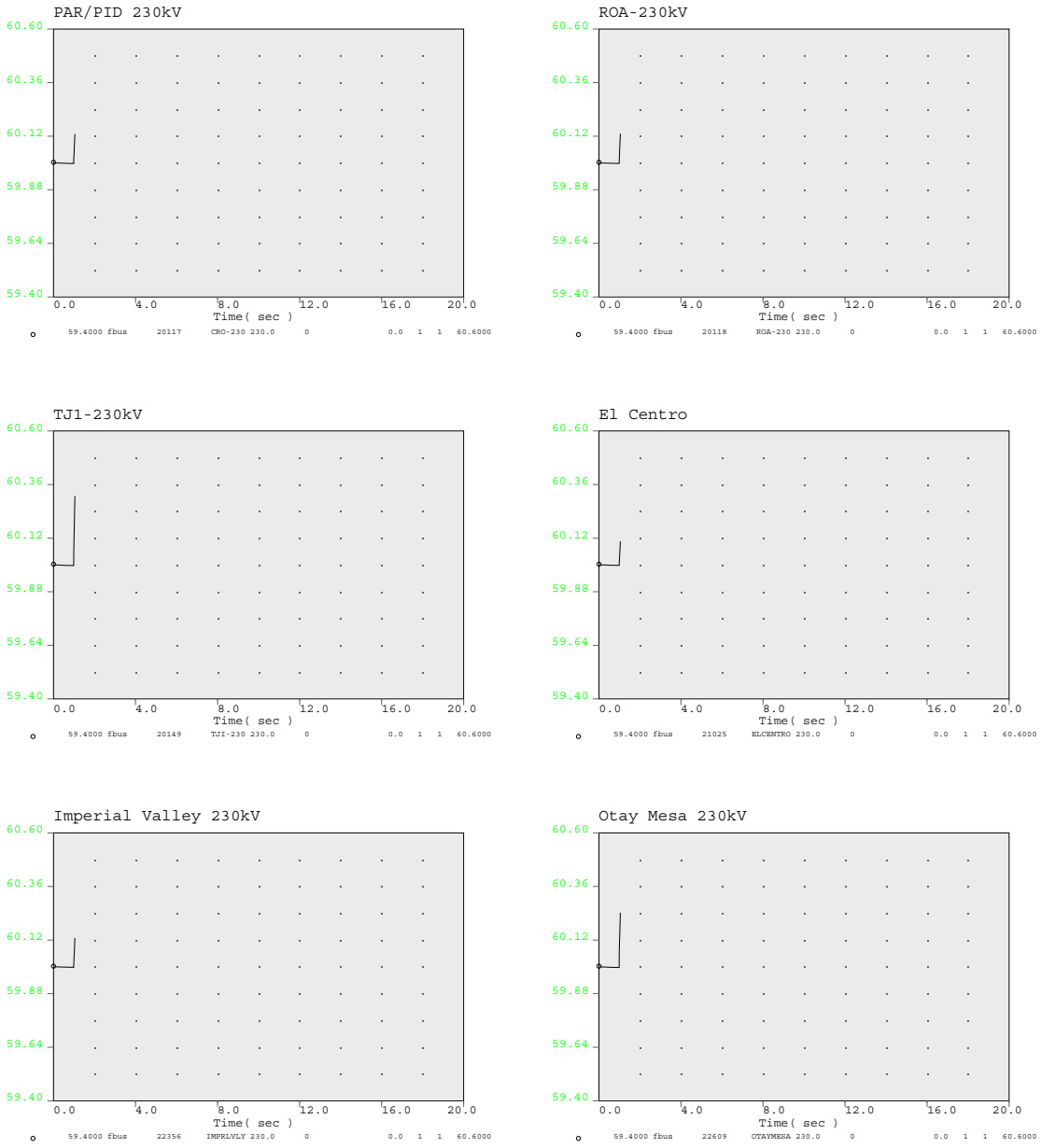


Otay Mesa 230kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

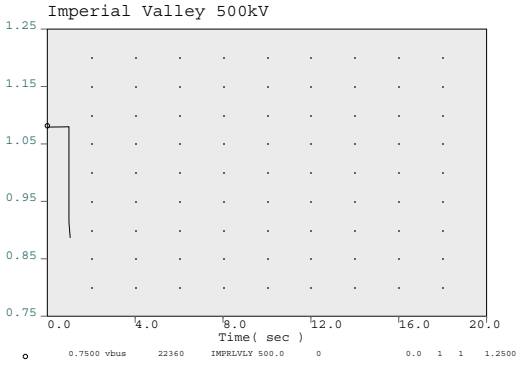
Affected System Frequency Check and Comparison



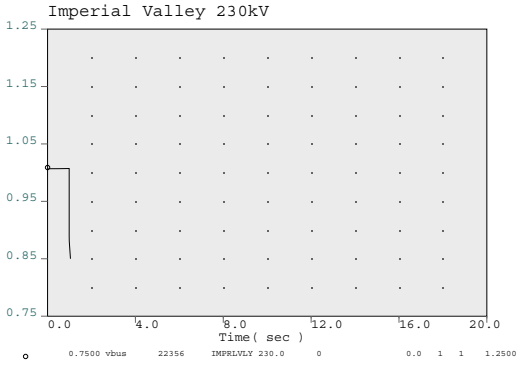
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Imperial Valley Area - VOLTAGE

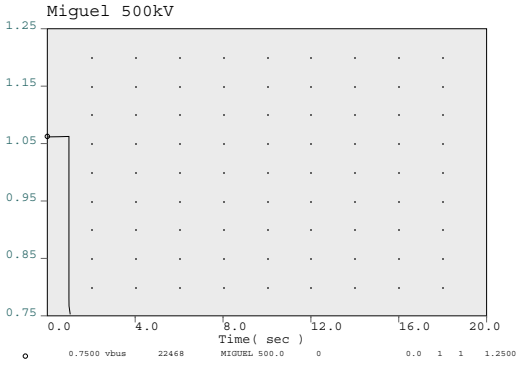
Imperial Valley 500kV



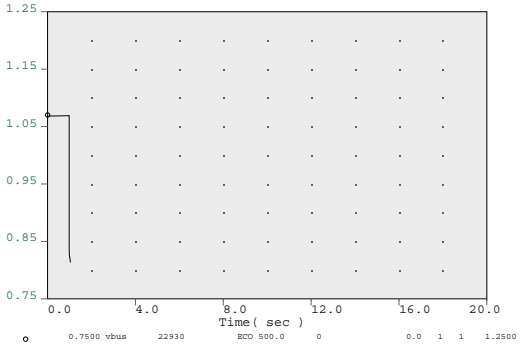
Imperial Valley 230kV



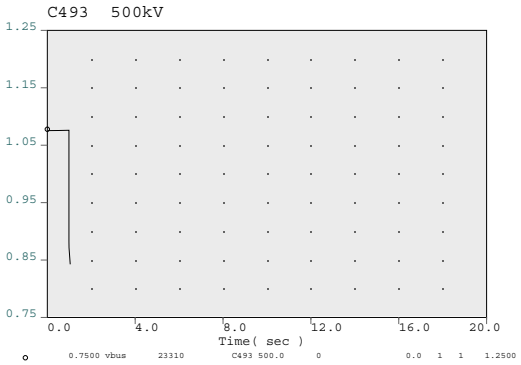
Miguel 500kV



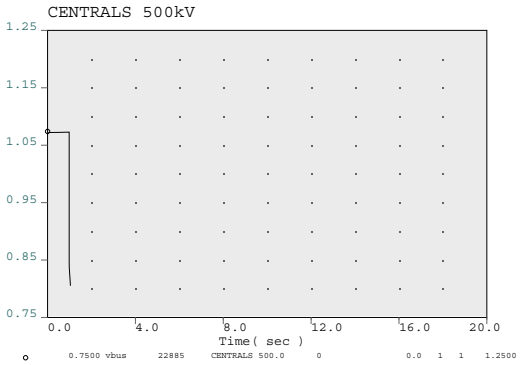
Windfarms 500



C493 500kV

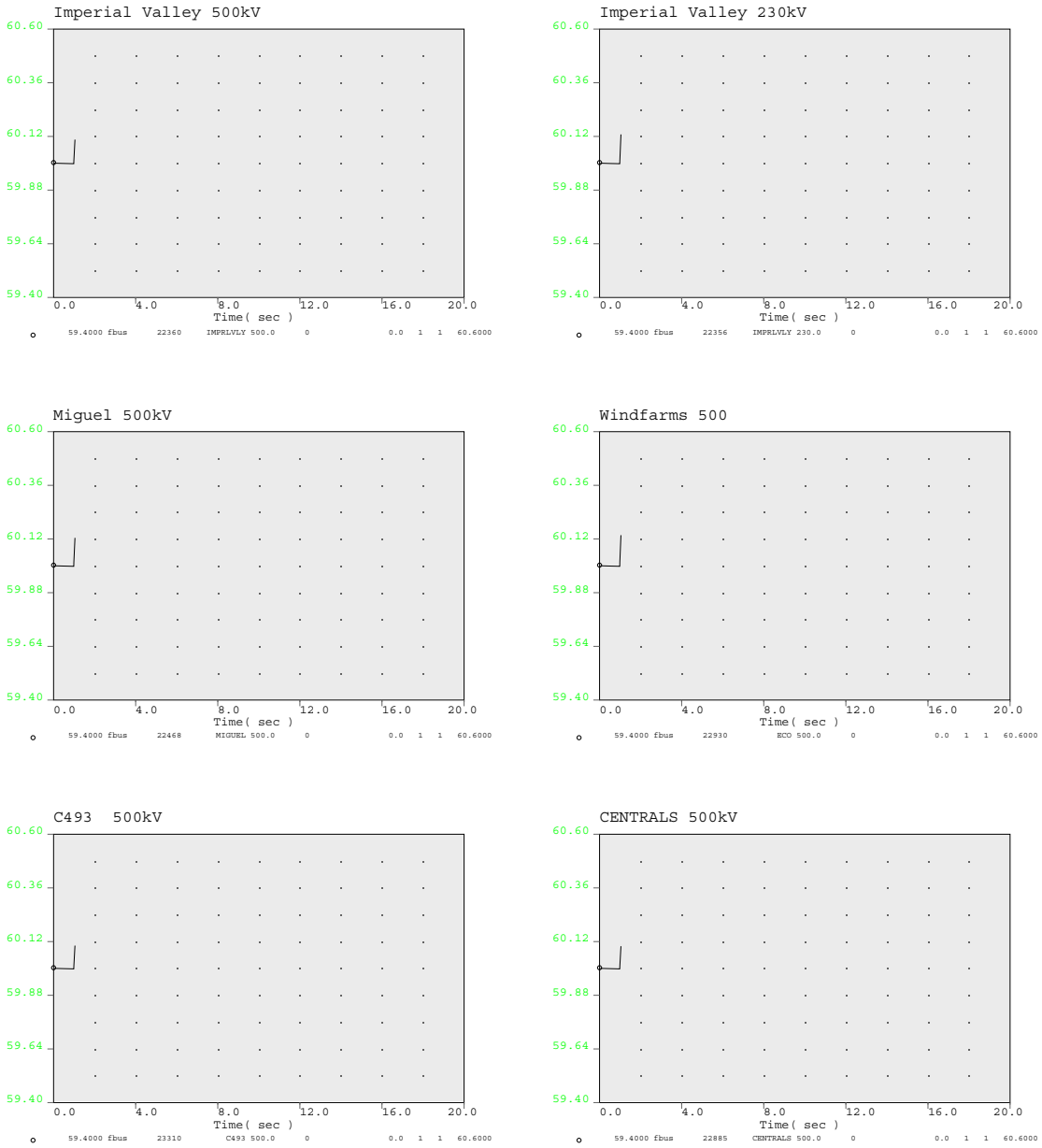


CENTRALS 500kV



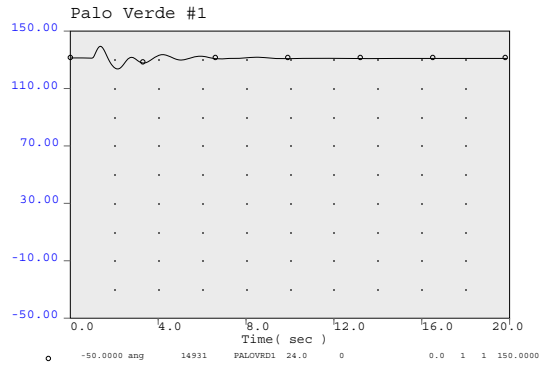
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

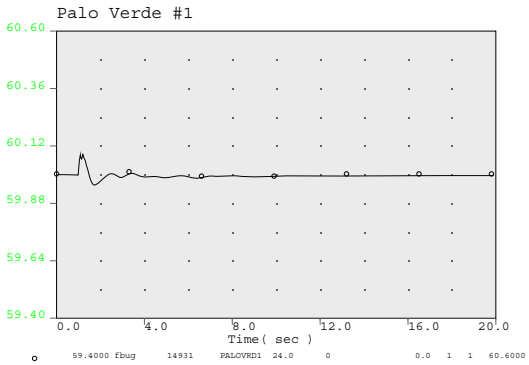
Imperial Valley Area - Frequency

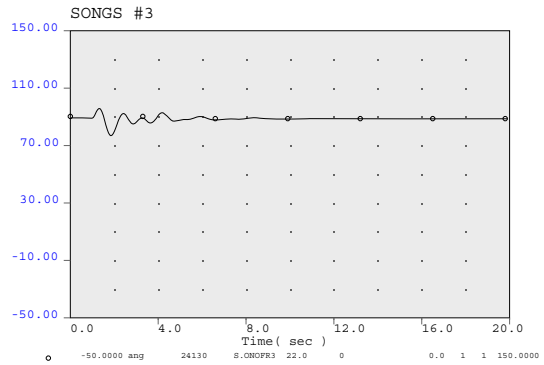


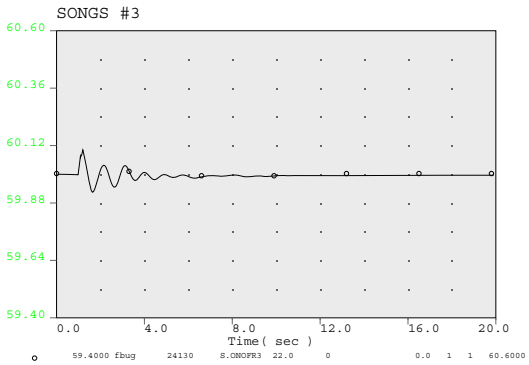
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

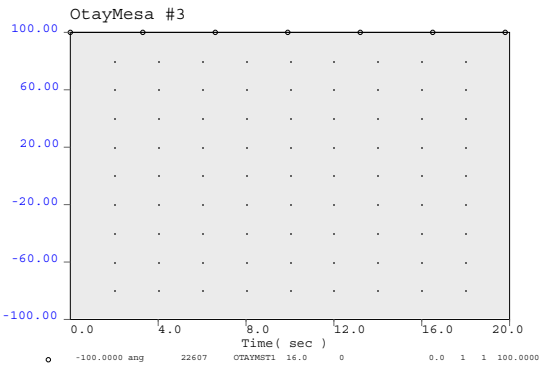
RELATIVE ROTOR ANGLE & FREQUENCY

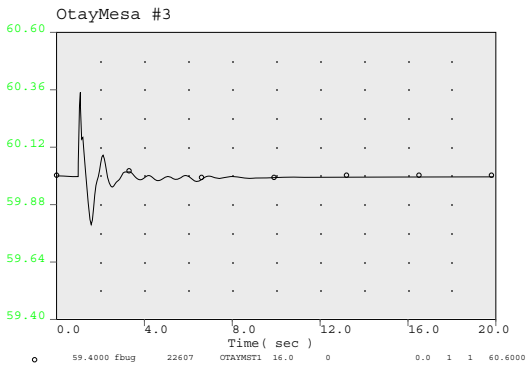












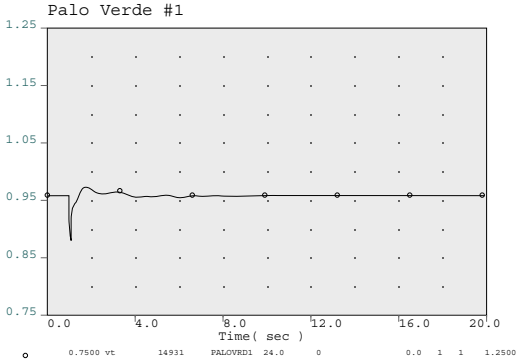
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Page 1

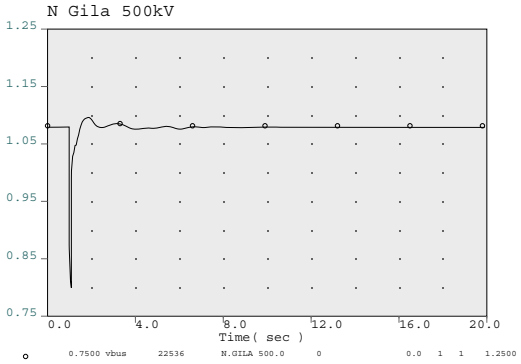
int_SX-C565_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:27:16 2010

RELATIVE VOLTAGE

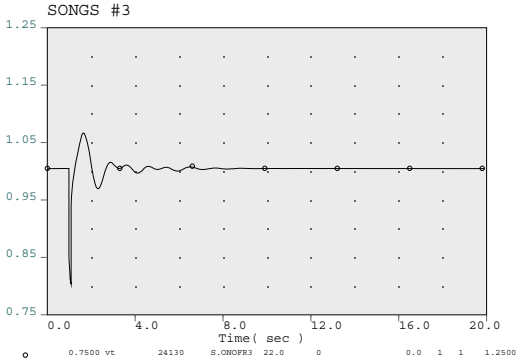
Palo Verde #1



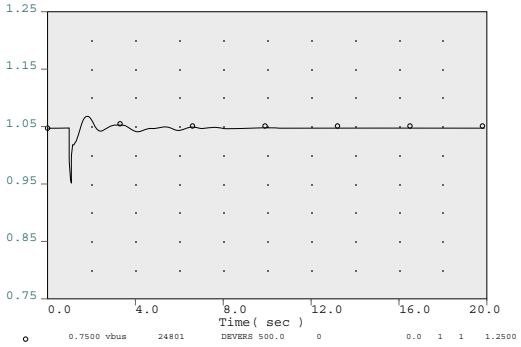
N Gila 500kV



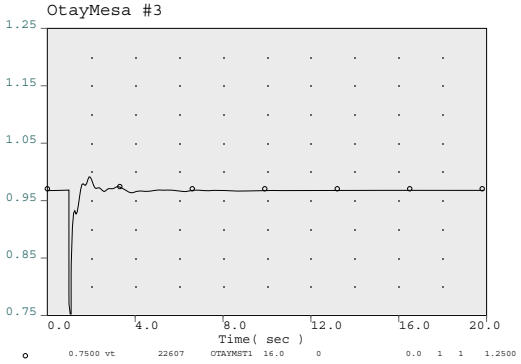
SONGS #3



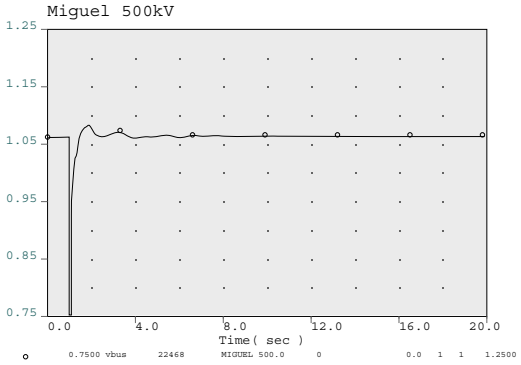
Devers 500



OtayMesa #3



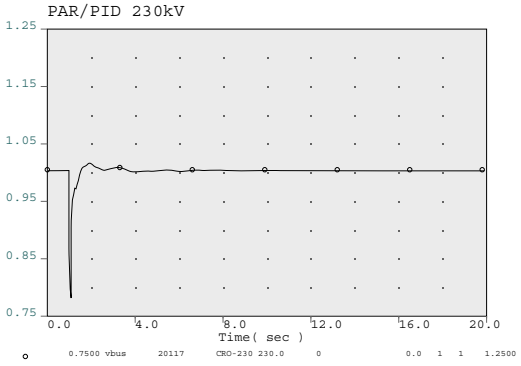
Miguel 500kV



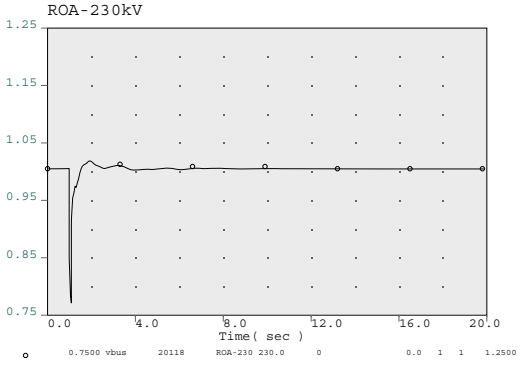
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Affected System Voltage Check and Comparison

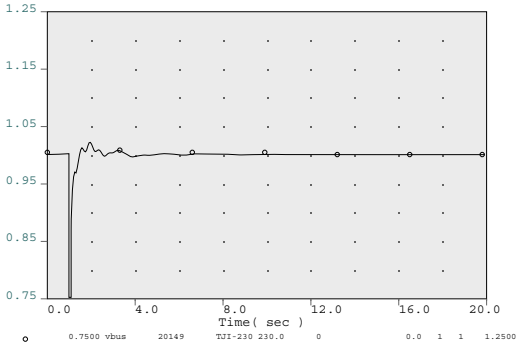
PAR/PID 230kV



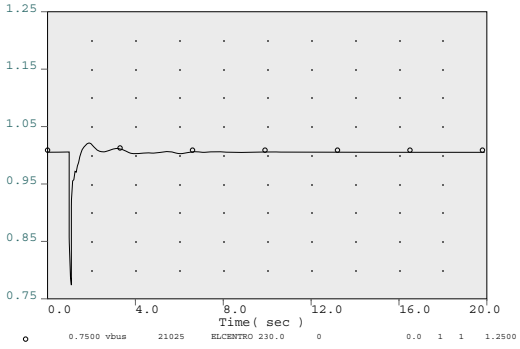
ROA-230kV



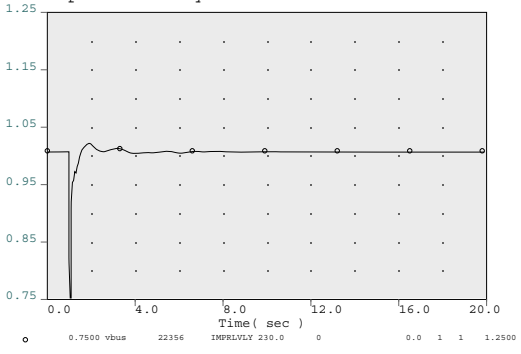
TJ1-230kV



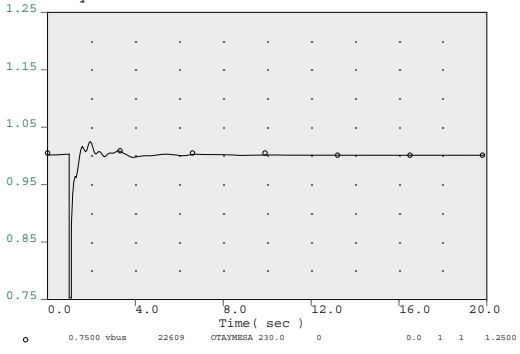
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



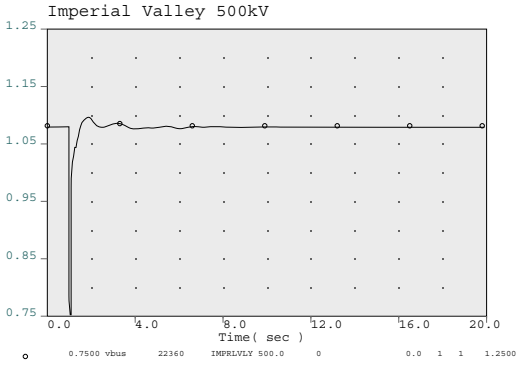
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Affected System Frequency Check and Comparison

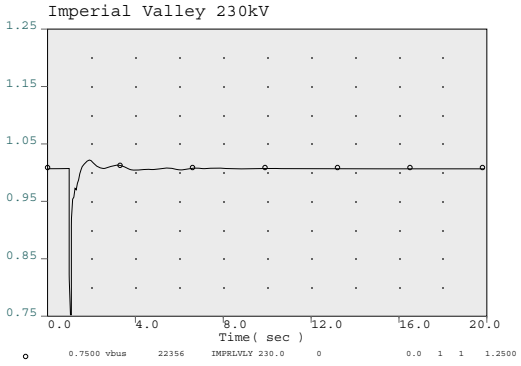
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Imperial Valley Area - VOLTAGE

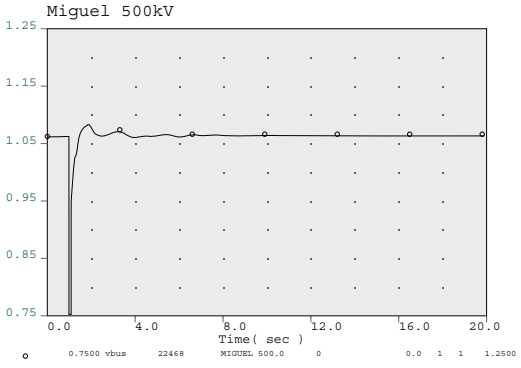
Imperial Valley 500kV



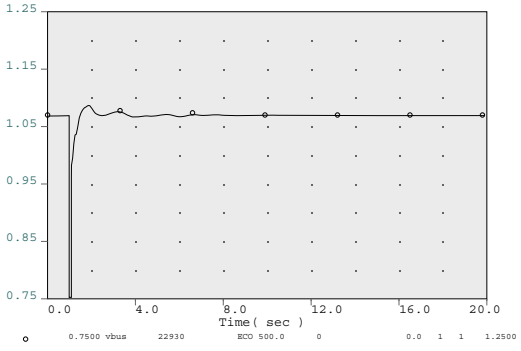
Imperial Valley 230kV



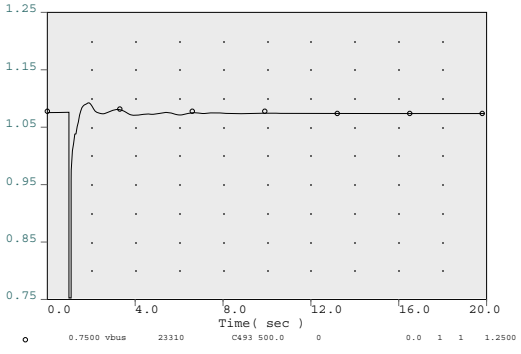
Miguel 500kV



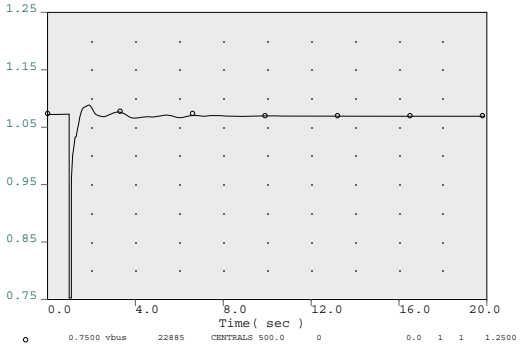
Windfarms 500



C493 500kV



CENTRALS 500kV

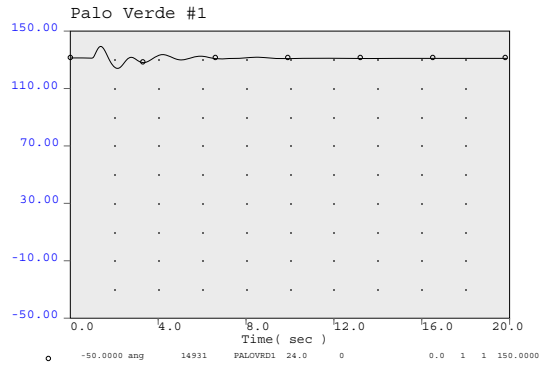


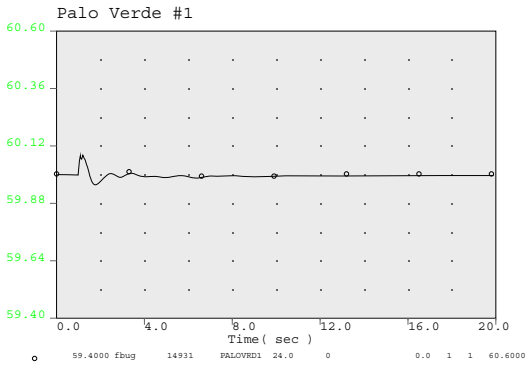
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

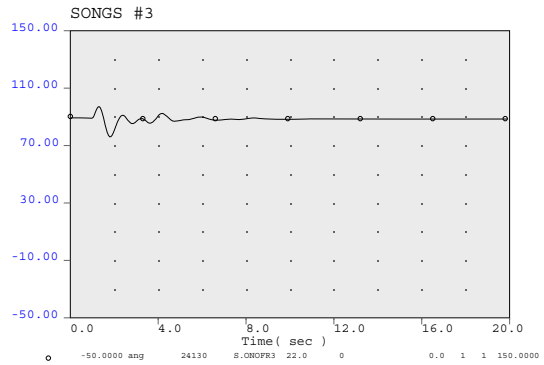
Imperial Valley Area - Frequency

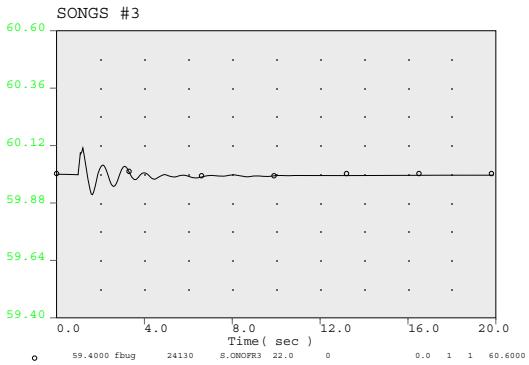
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

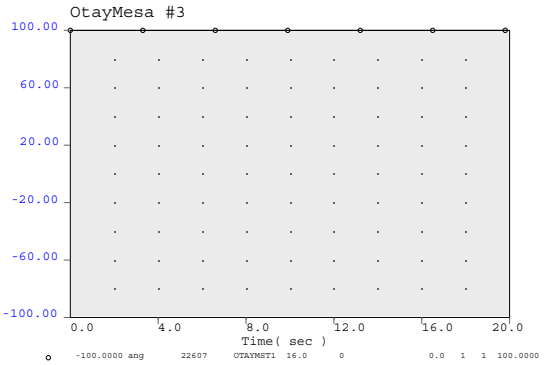
RELATIVE ROTOR ANGLE & FREQUENCY

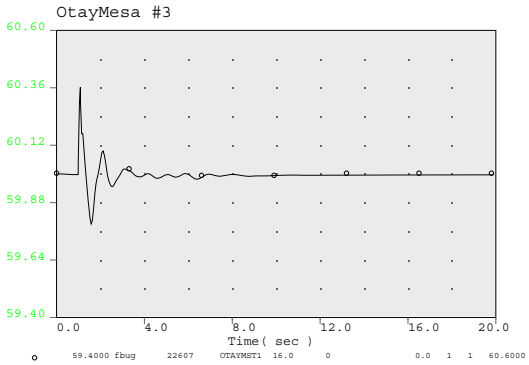












SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

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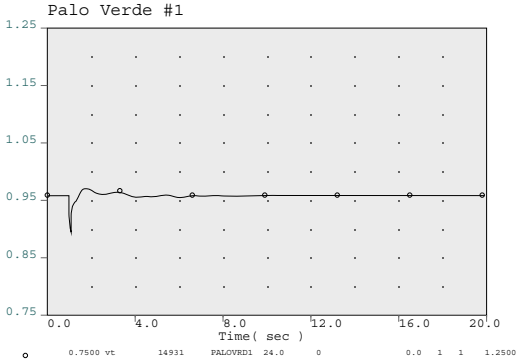
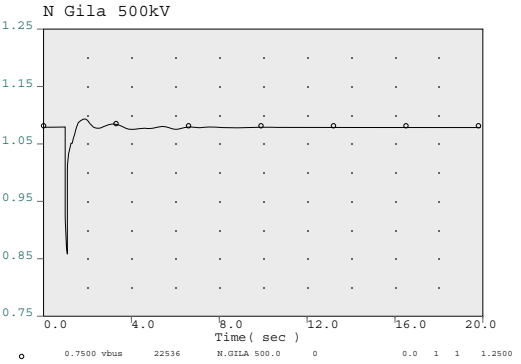
SDGE	int_SX-PQ_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:27:41 2010

RELATIVE VOLTAGE

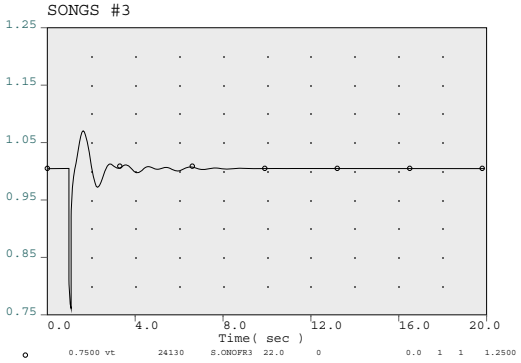
Palo Verde #1



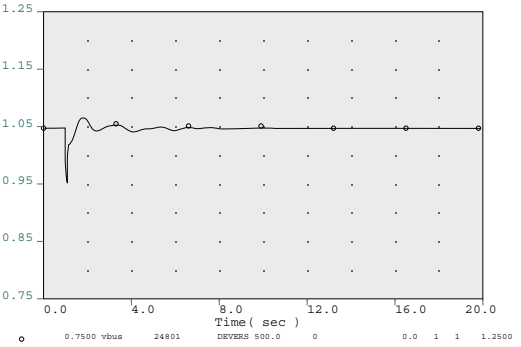
N Gila 500kV



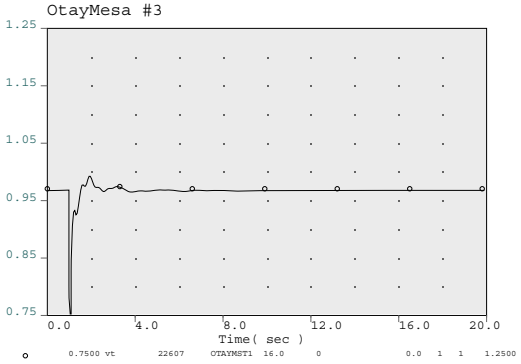
SONGS #3



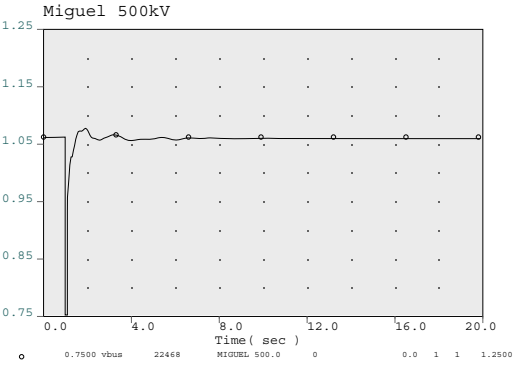
Devers 500



OtayMesa #3



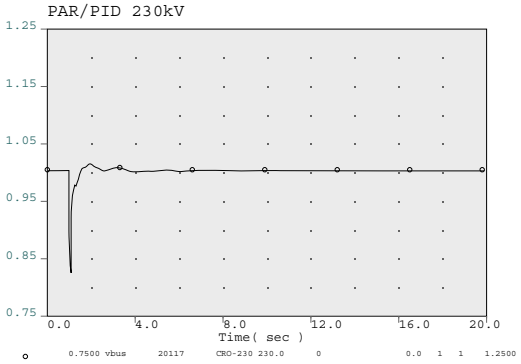
Miguel 500kV



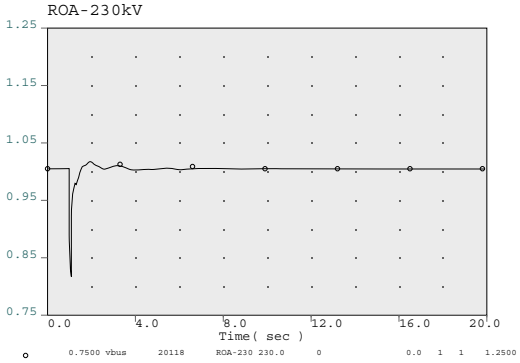
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

Affected System Voltage Check and Comparison

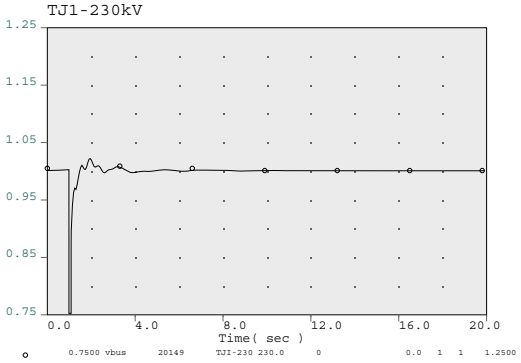
PAR/PID 230kV



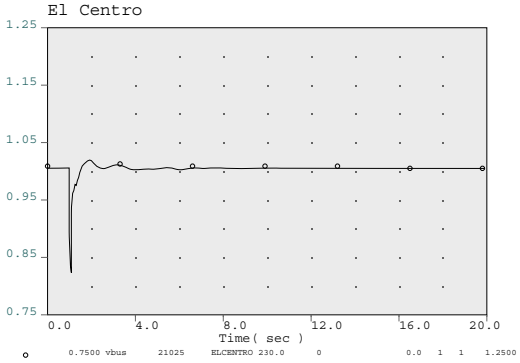
ROA-230kV



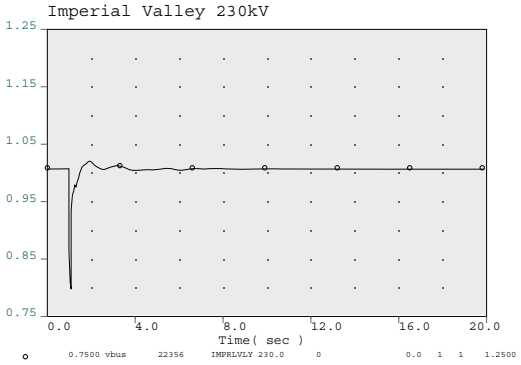
TJ1-230kV



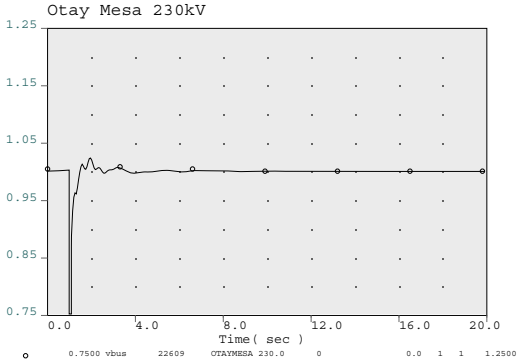
El Centro



Imperial Valley 230kV



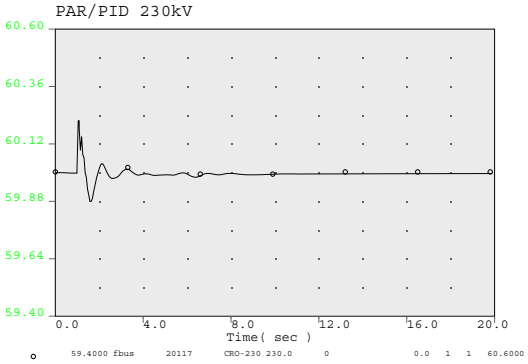
Otay Mesa 230kV



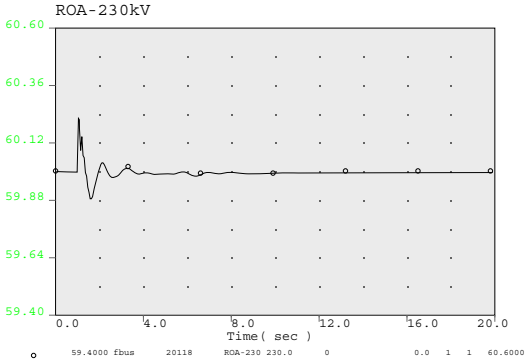
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

Affected System Frequency Check and Comparison

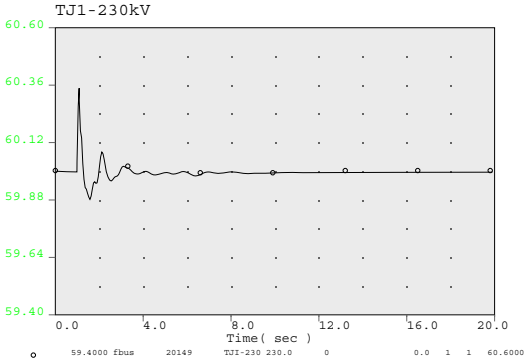
PAR/PID 230kV



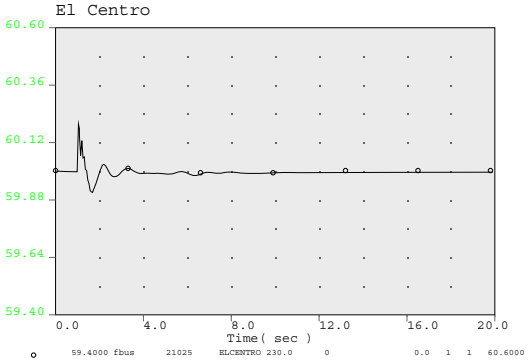
ROA-230kV



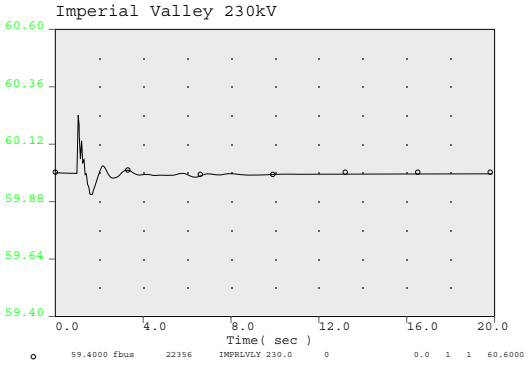
TJ1-230kV



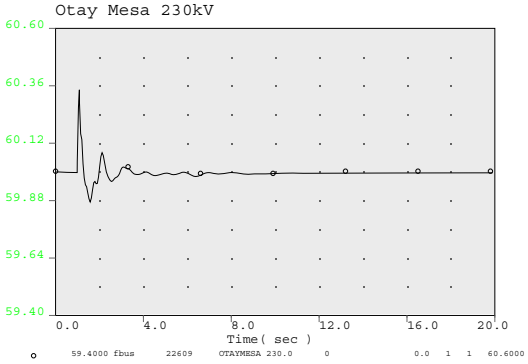
El Centro



Imperial Valley 230kV



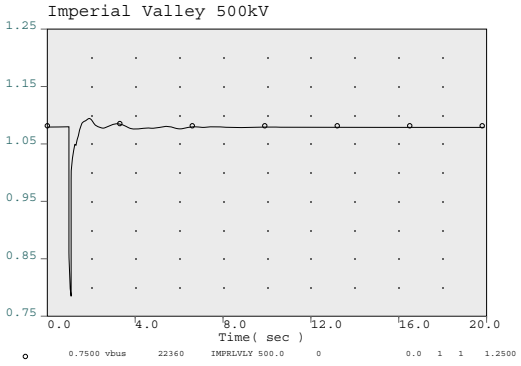
Otay Mesa 230kV



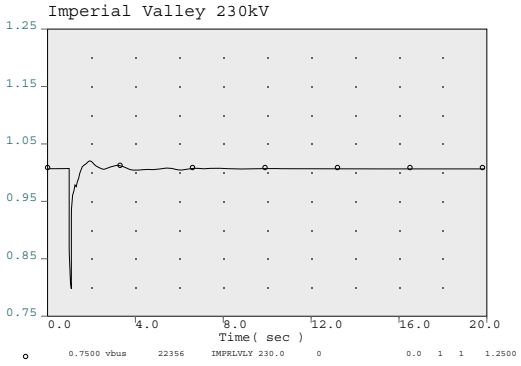
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

Imperial Valley Area - VOLTAGE

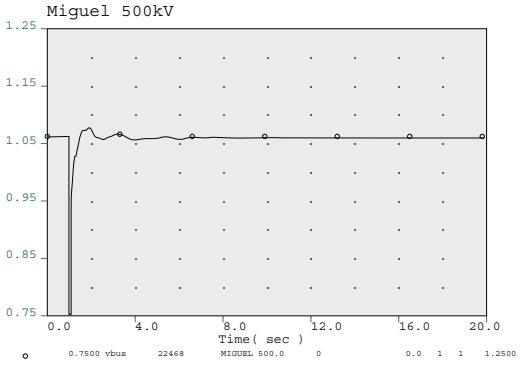
Imperial Valley 500kV



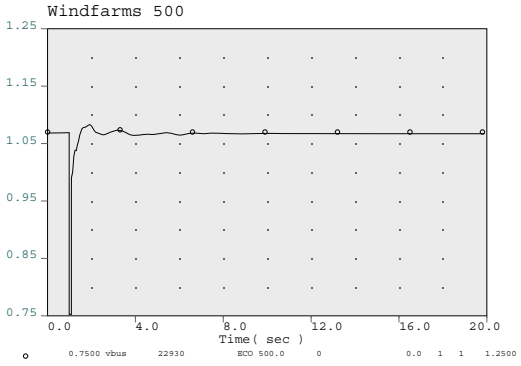
Imperial Valley 230kV



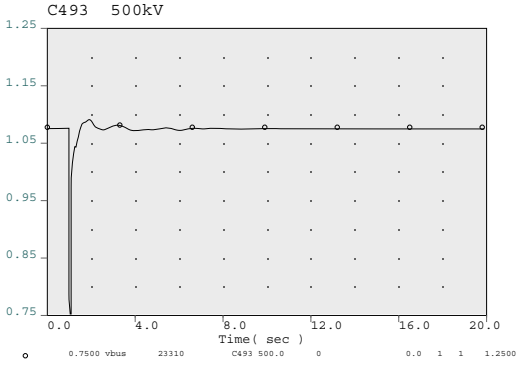
Miguel 500kV



Windfarms 500



C493 500kV



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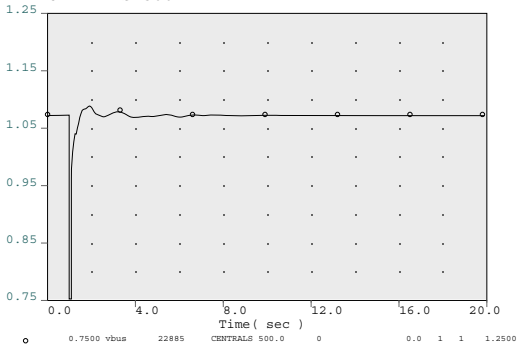
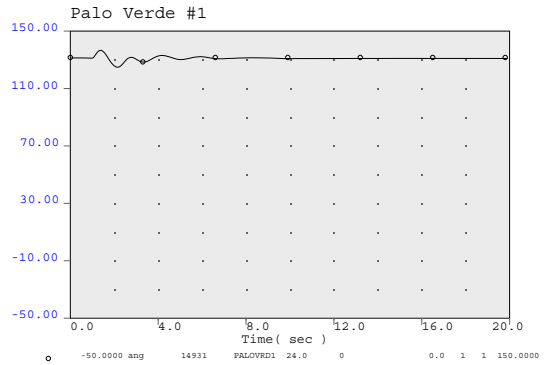


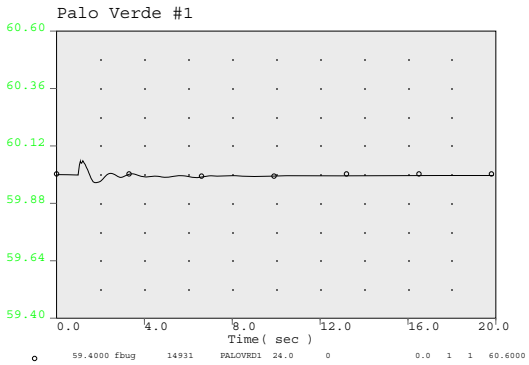
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

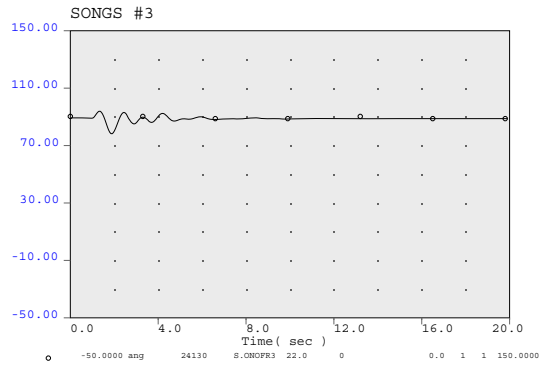
Imperial Valley Area - Frequency

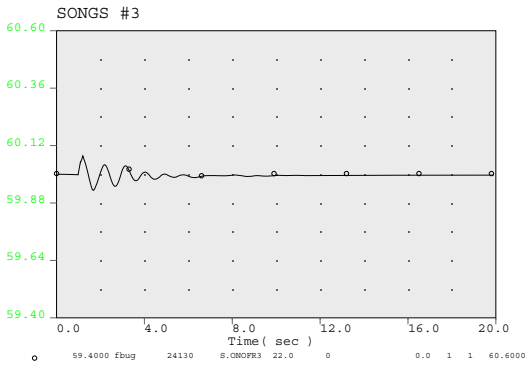
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

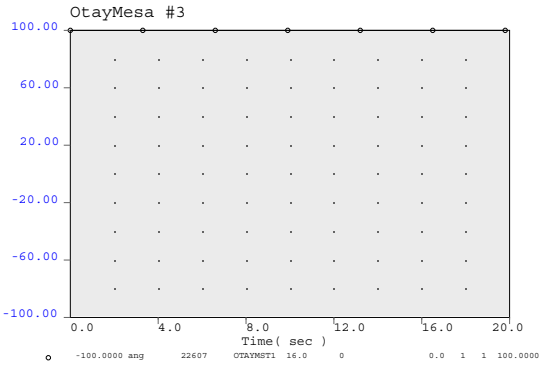
RELATIVE ROTOR ANGLE & FREQUENCY

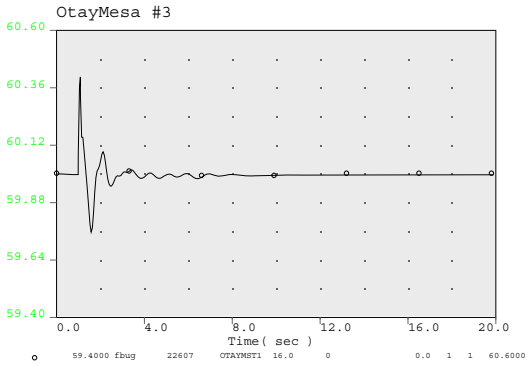












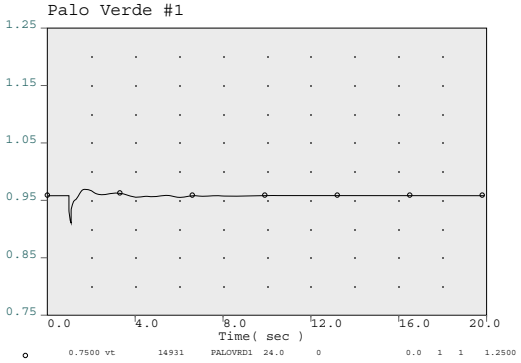
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Page 1

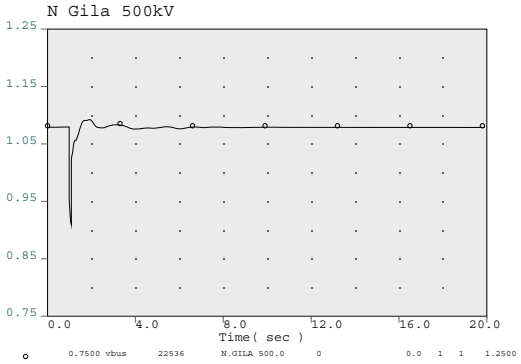
int_SY230-SG_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:28:07 2010

RELATIVE VOLTAGE

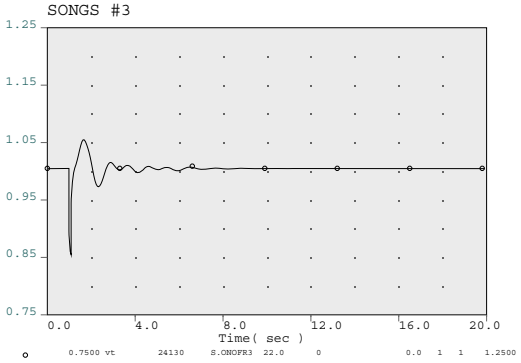
Palo Verde #1



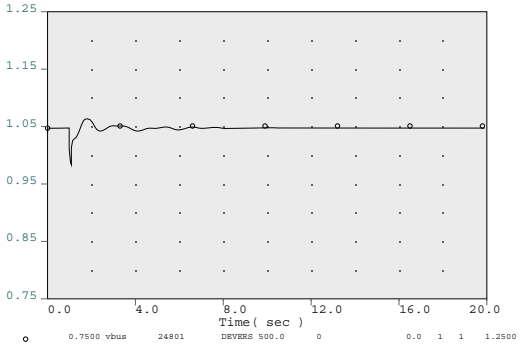
N Gila 500kV



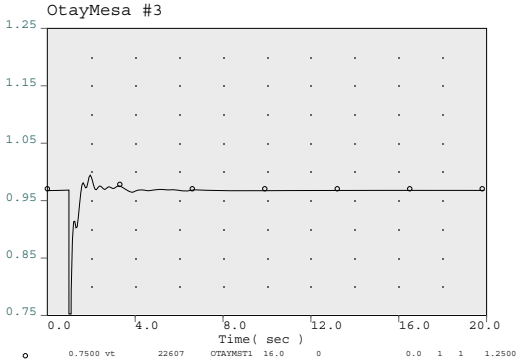
SONGS #3



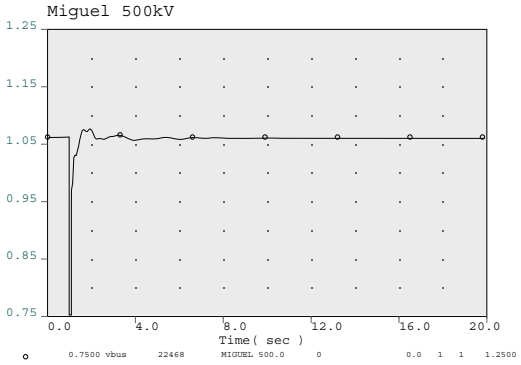
Devers 500



OtayMesa #3



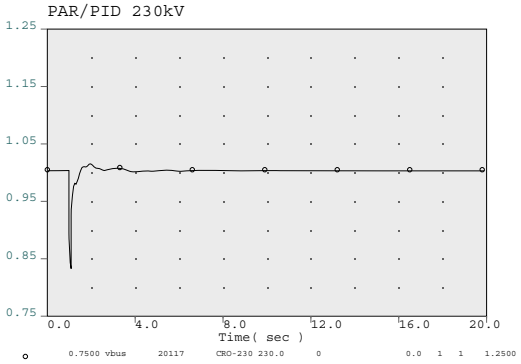
Miguel 500kV



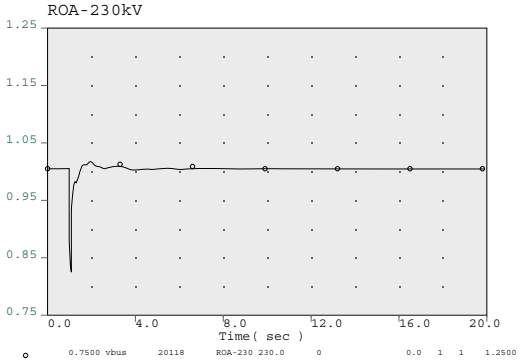
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Affected System Voltage Check and Comparison

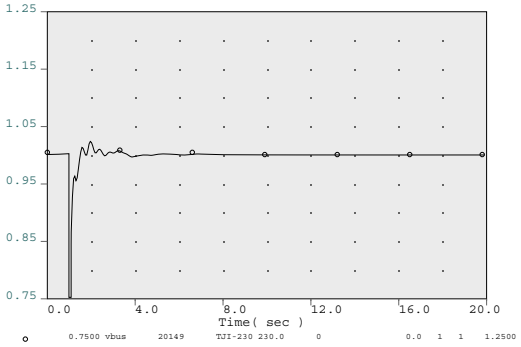
PAR/PID 230kV



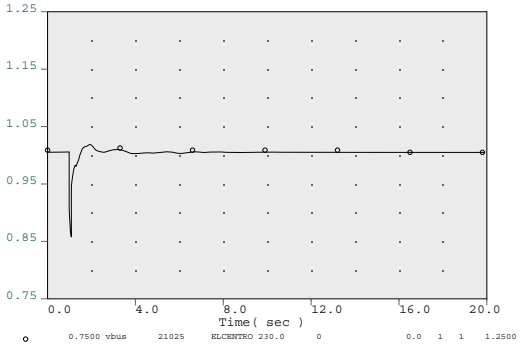
ROA-230kV



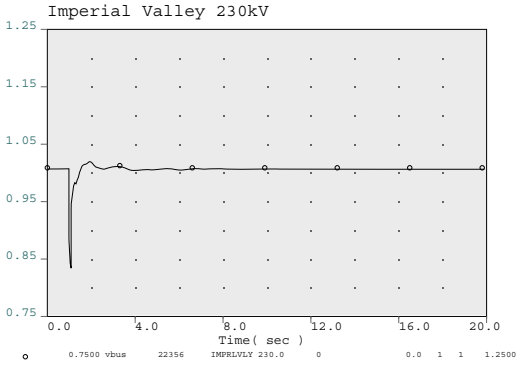
TJ1-230kV



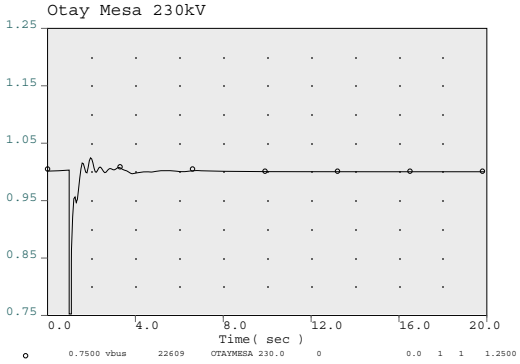
El Centro



Imperial Valley 230kV



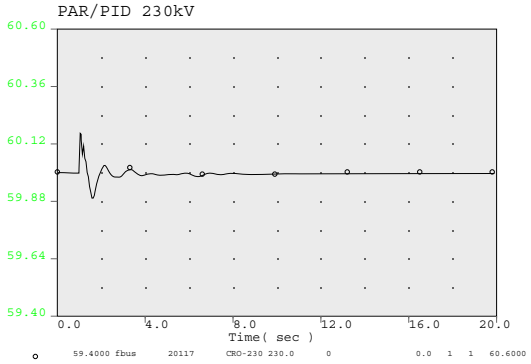
Otay Mesa 230kV



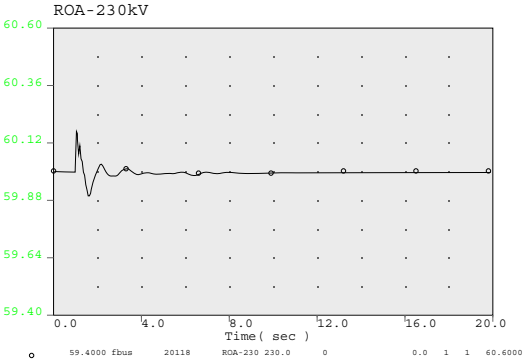
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Affected System Frequency Check and Comparison

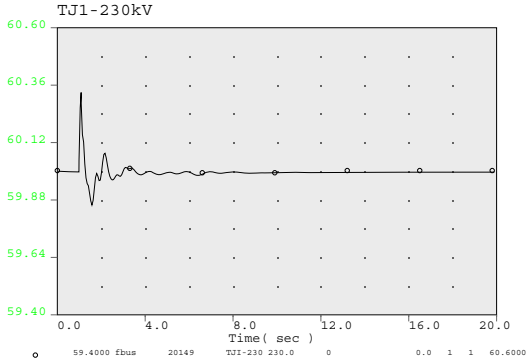
PAR/PID 230kV



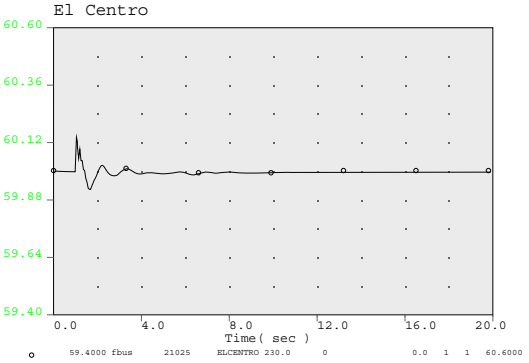
ROA-230kV



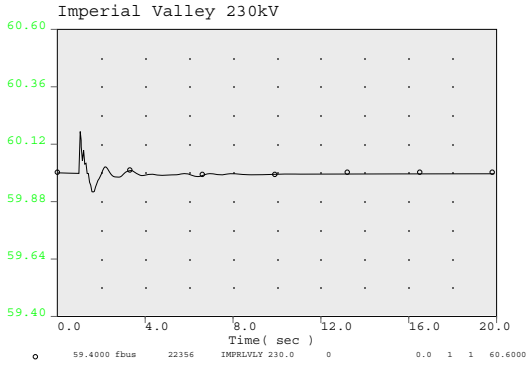
TJ1-230kV



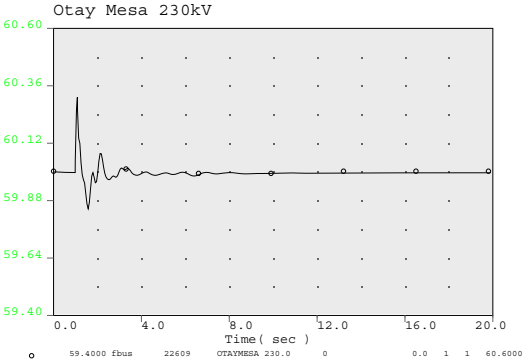
El Centro



Imperial Valley 230kV



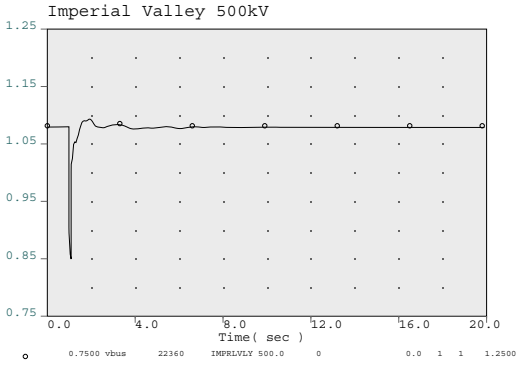
Otay Mesa 230kV



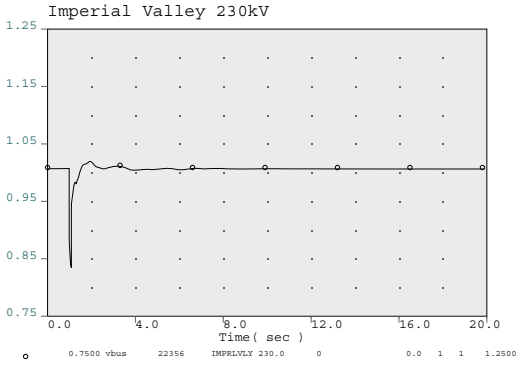
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Imperial Valley Area - VOLTAGE

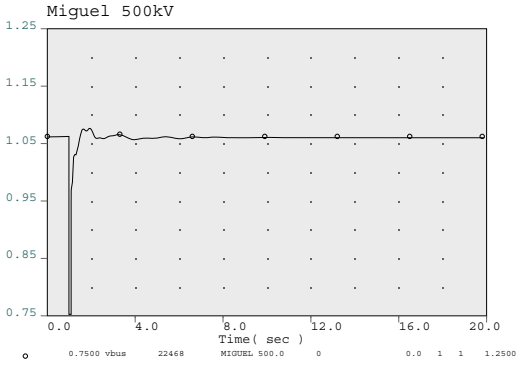
Imperial Valley 500kV



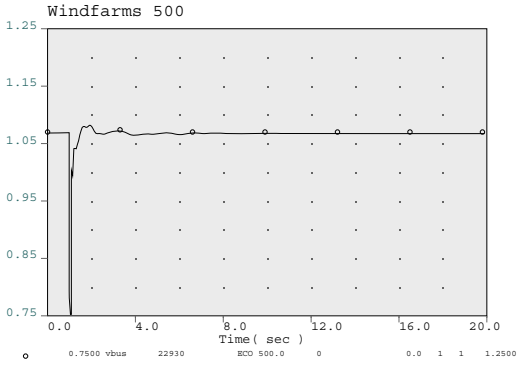
Imperial Valley 230kV



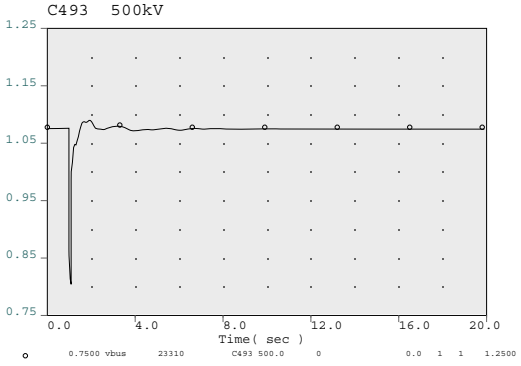
Miguel 500kV



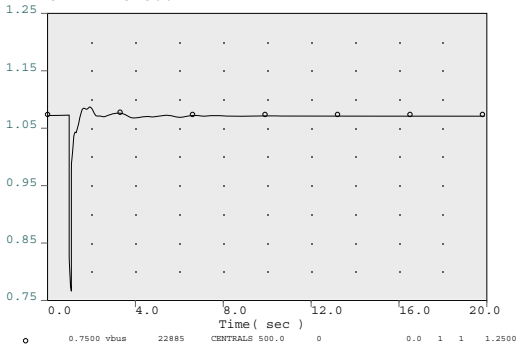
Windfarms 500



C493 500kV



CENTRALS 500kV

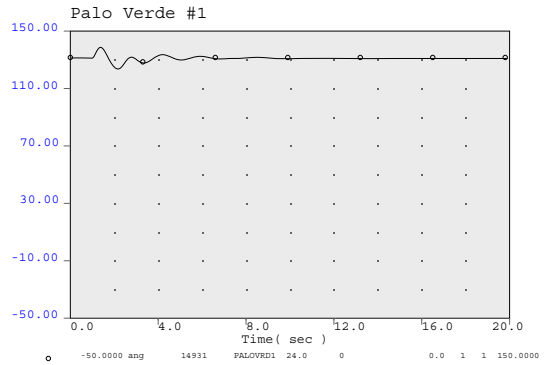


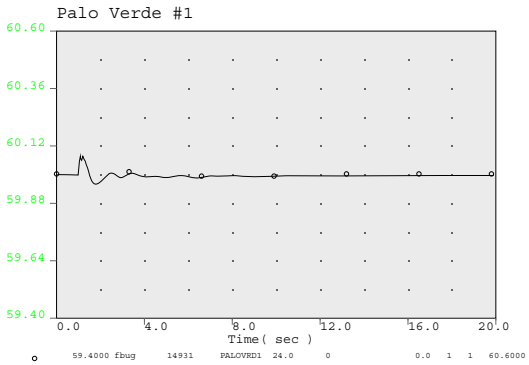
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

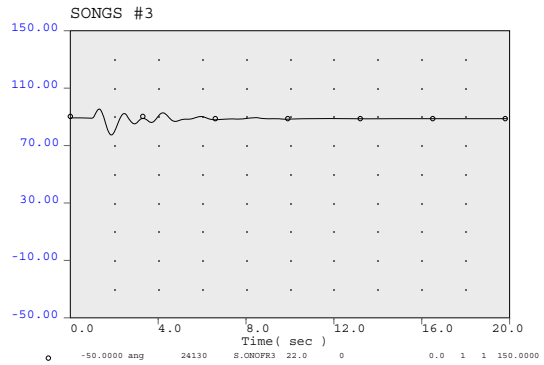
Imperial Valley Area - Frequency

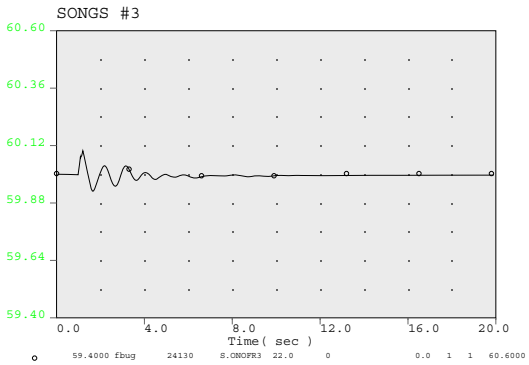
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

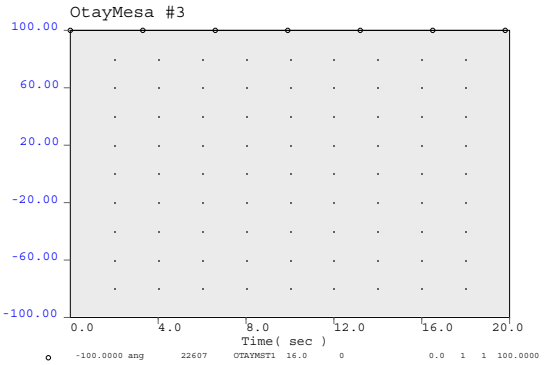
RELATIVE ROTOR ANGLE & FREQUENCY

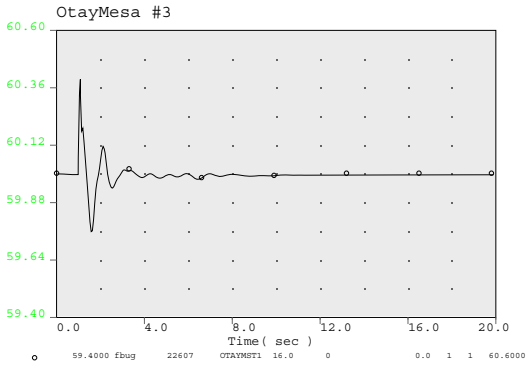












SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

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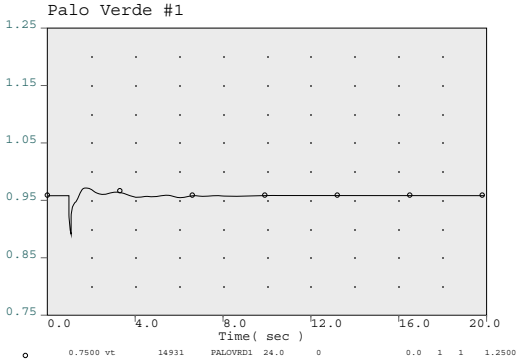
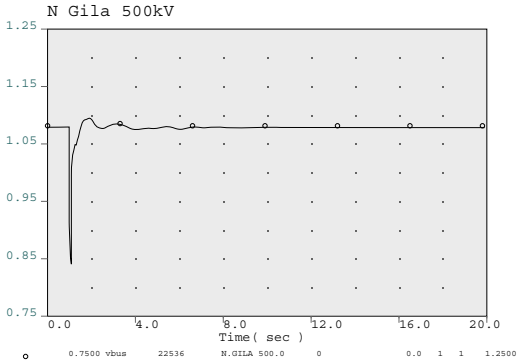
SDGE	int_SY-MS_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:28:34 2010

RELATIVE VOLTAGE

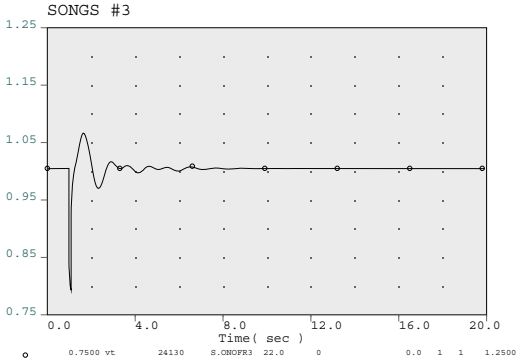
Palo Verde #1



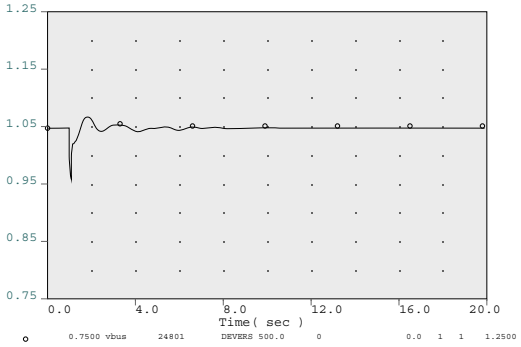
N Gila 500kV



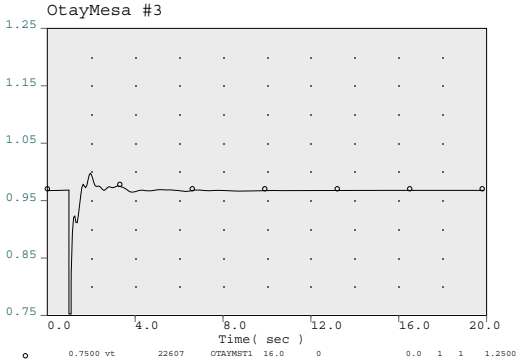
SONGS #3



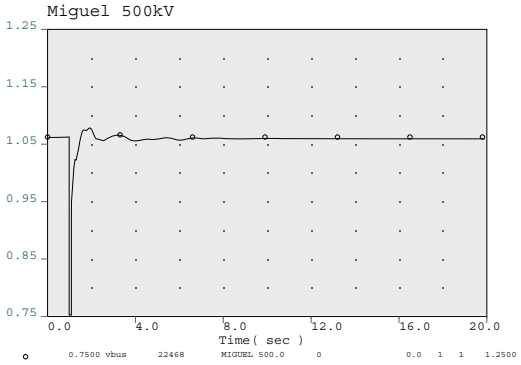
Devers 500



OtayMesa #3



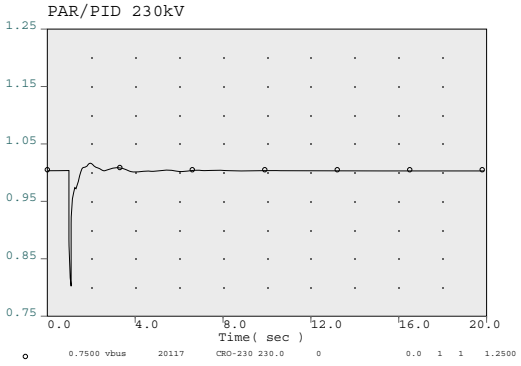
Miguel 500kV



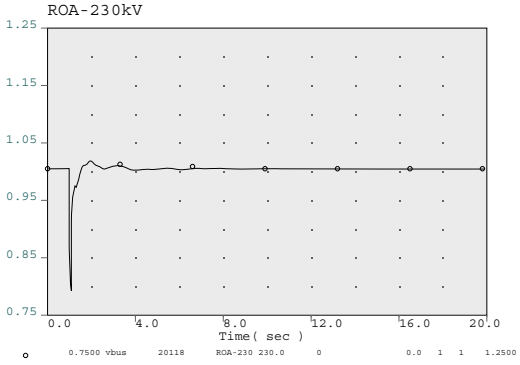
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

Affected System Voltage Check and Comparison

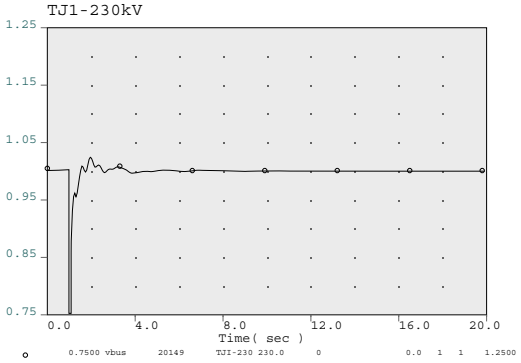
PAR/PID 230kV



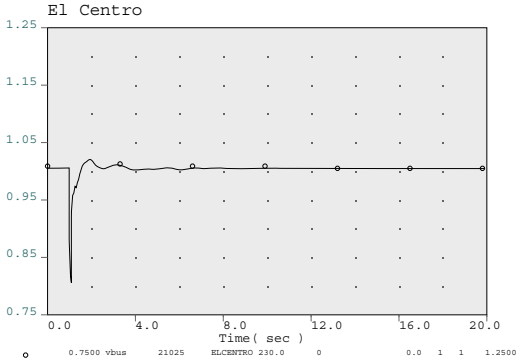
ROA-230kV



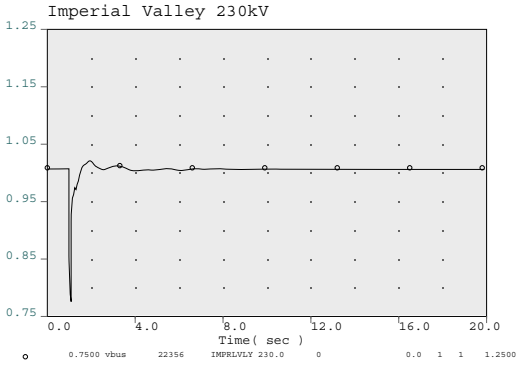
TJ1-230kV



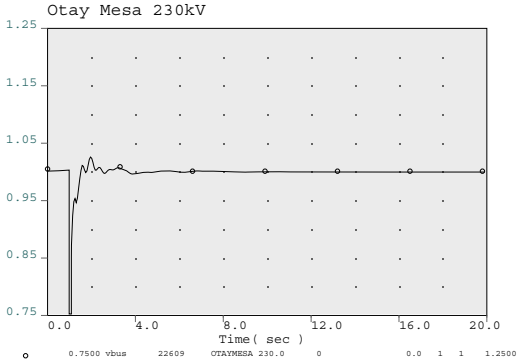
El Centro



Imperial Valley 230kV

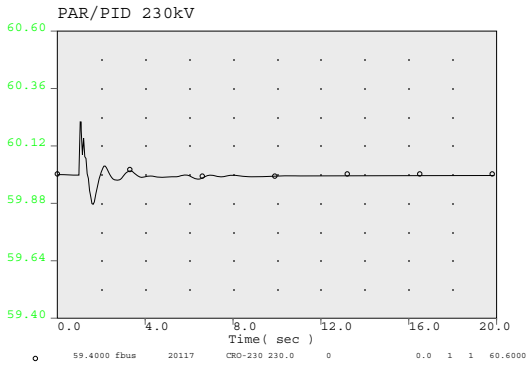


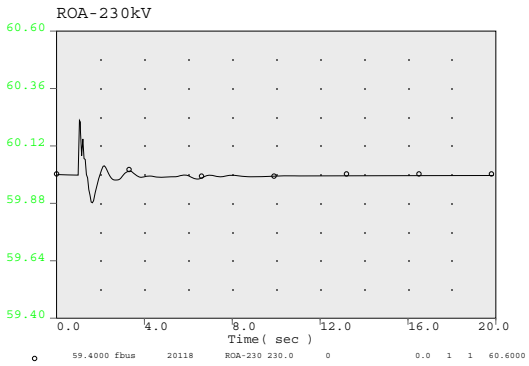
Otay Mesa 230kV

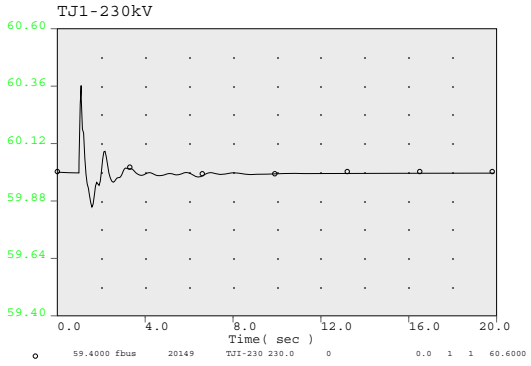


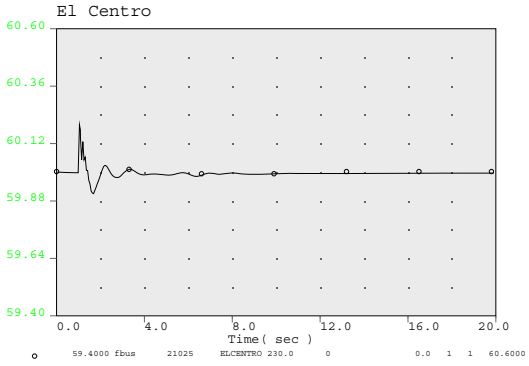
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

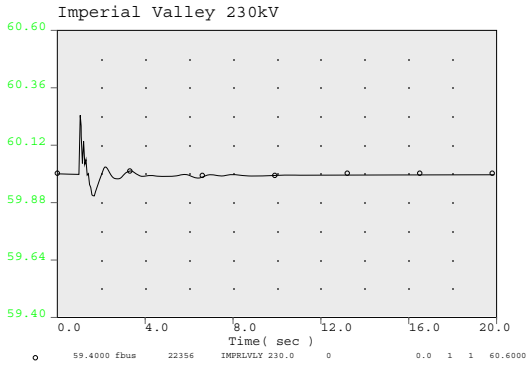
Affected System Frequency Check and Comparison

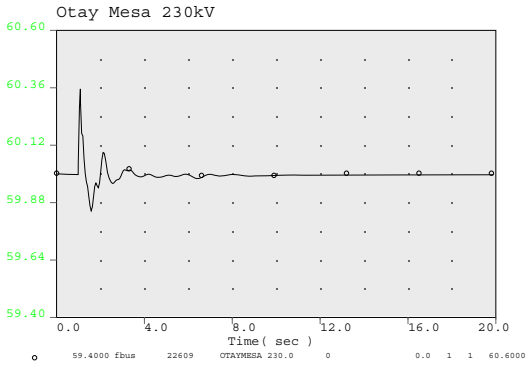








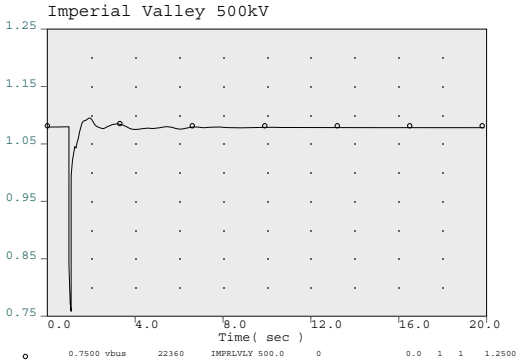




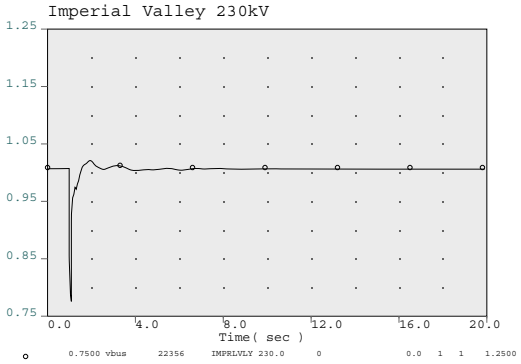
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

Imperial Valley Area - VOLTAGE

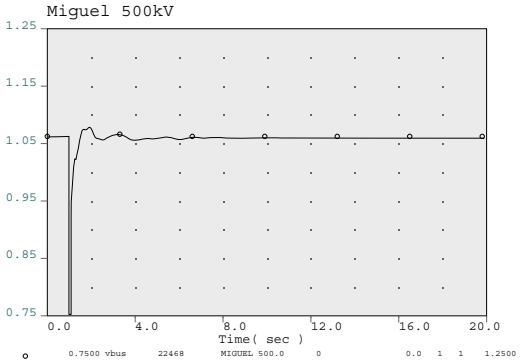
Imperial Valley 500kV



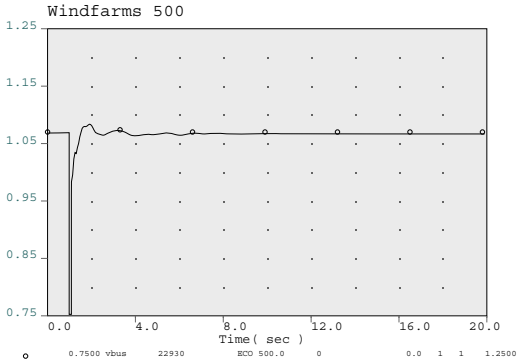
Imperial Valley 230kV



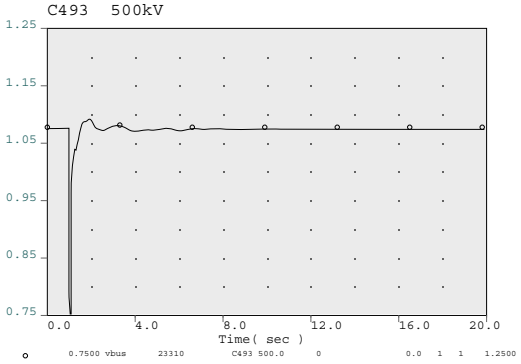
Miguel 500kV



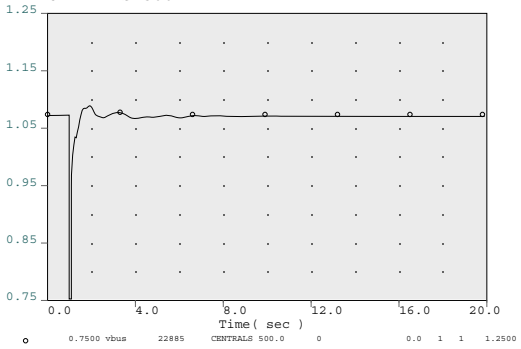
Windfarms 500



C493 500kV

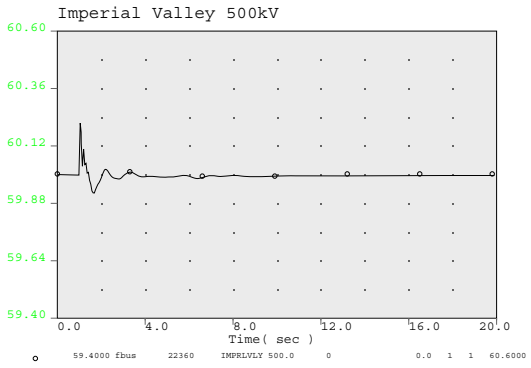


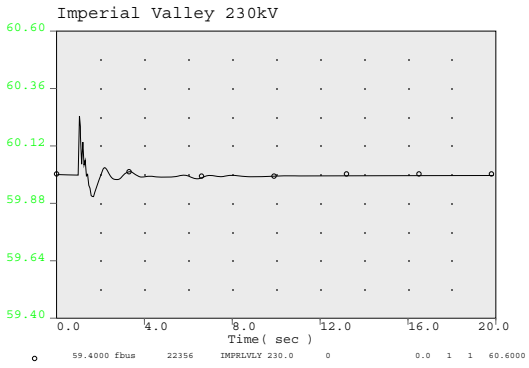
CENTRALS 500kV

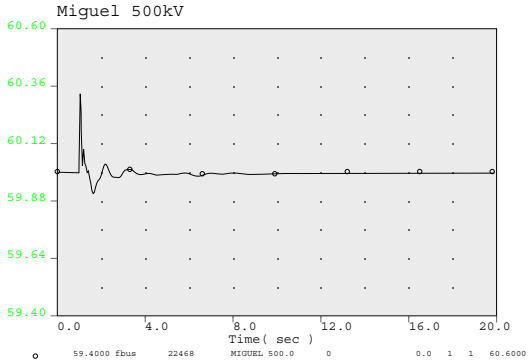


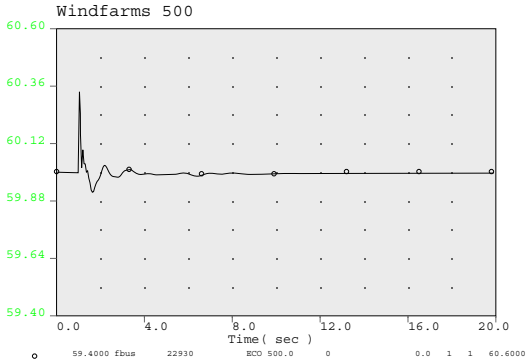
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

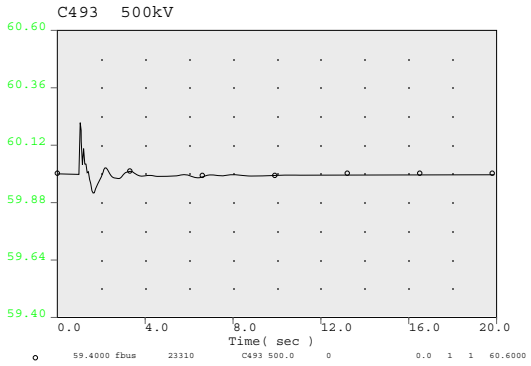
Imperial Valley Area - Frequency

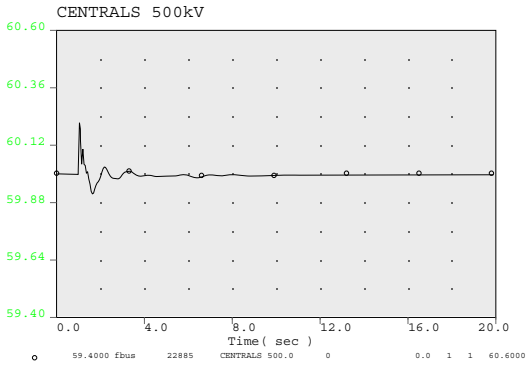






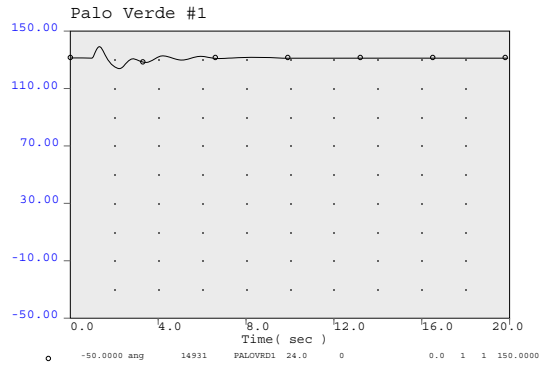


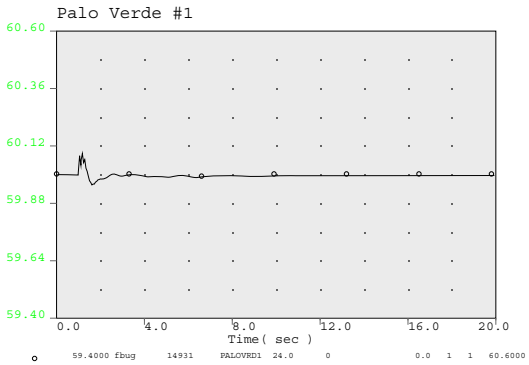


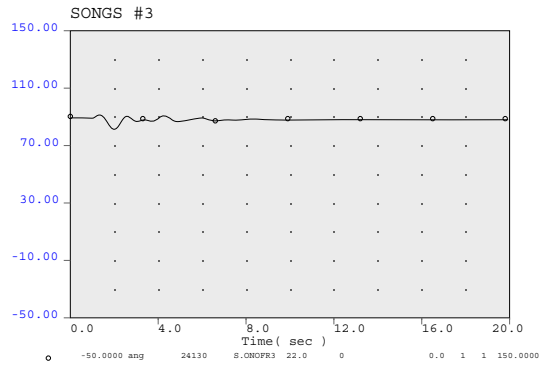


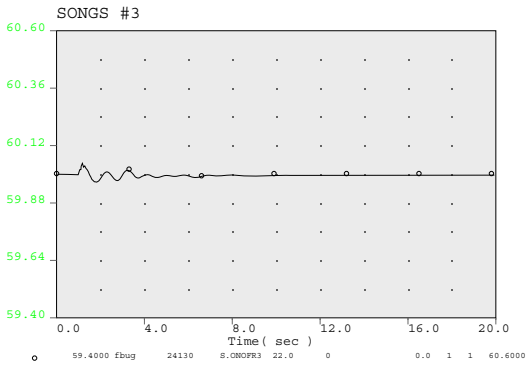
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

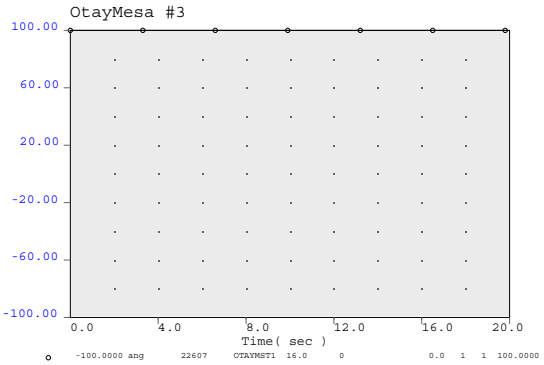
RELATIVE ROTOR ANGLE & FREQUENCY

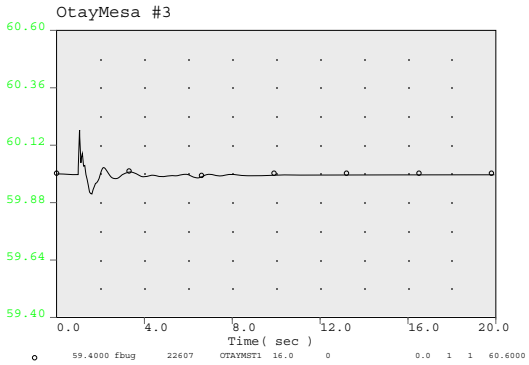












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

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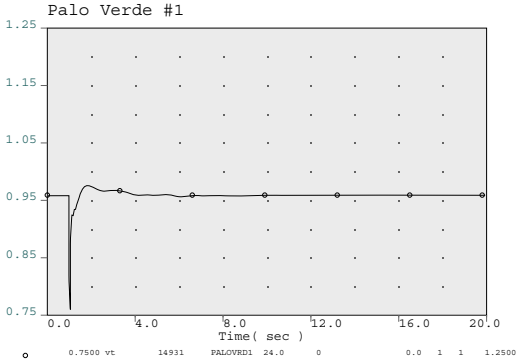
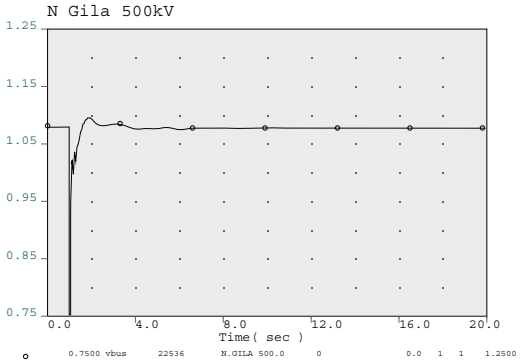
SDGE	IV_C493_slo_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:29:00 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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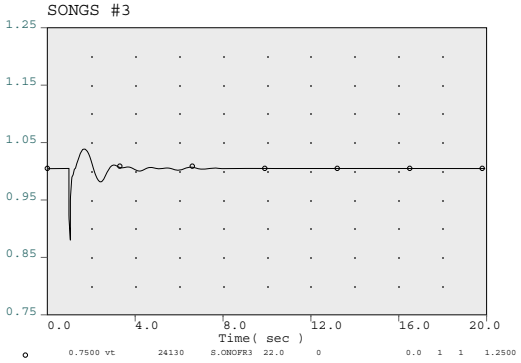
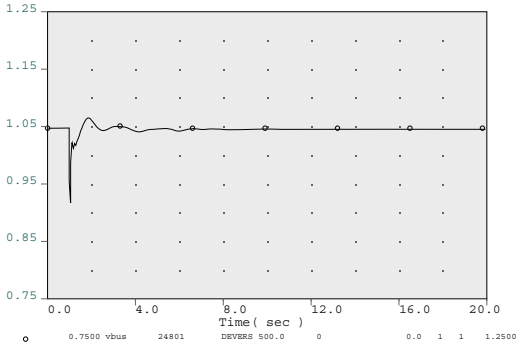
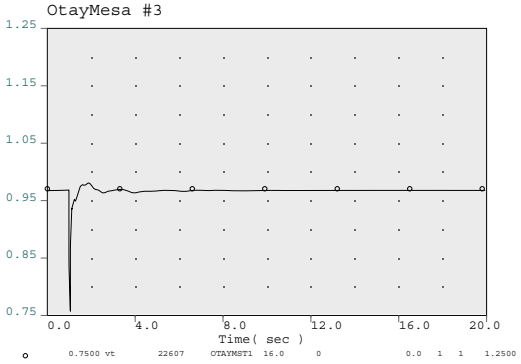


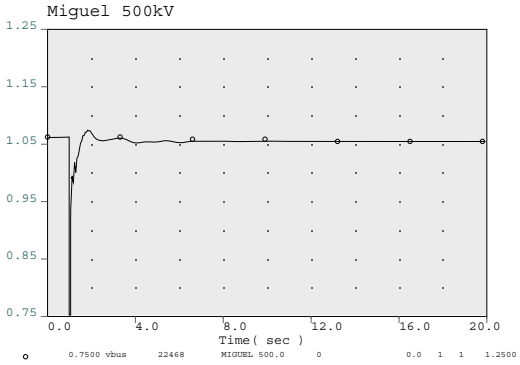
Devers 500



OtayMesa #3



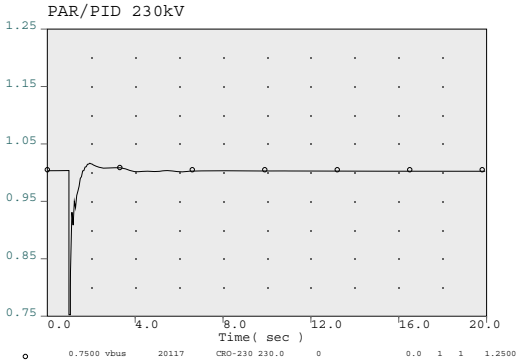
Miguel 500kV



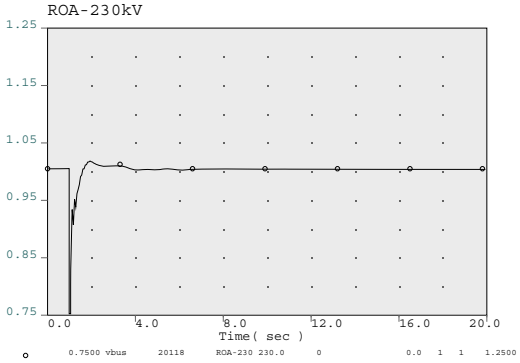
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

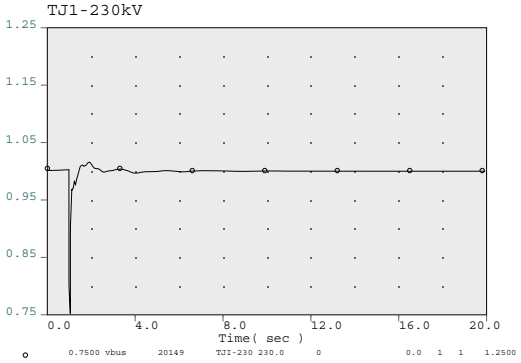
PAR/PID 230kV



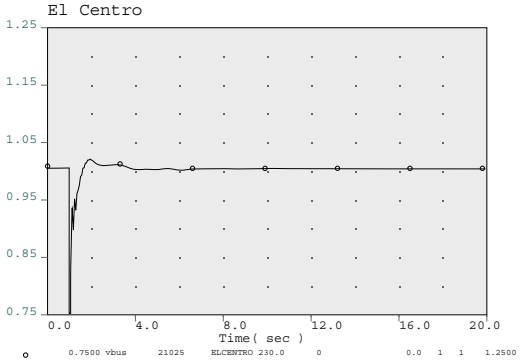
ROA-230kV



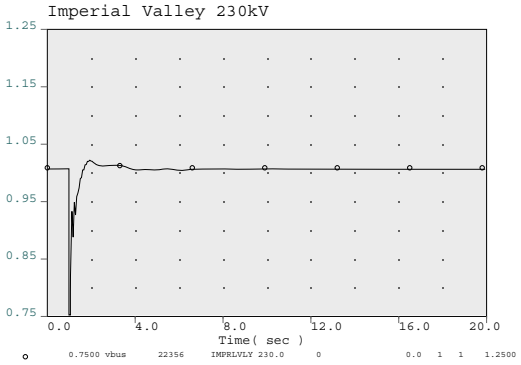
TJ1-230kV



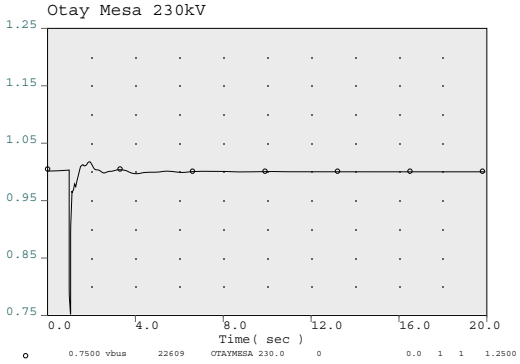
El Centro



Imperial Valley 230kV



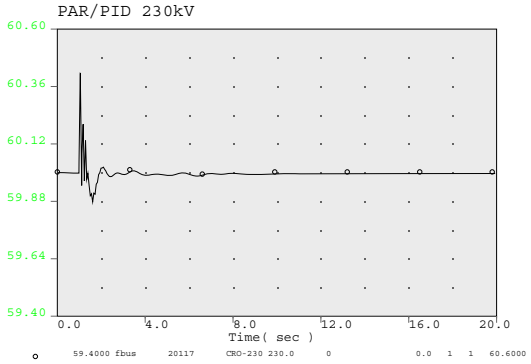
Otay Mesa 230kV



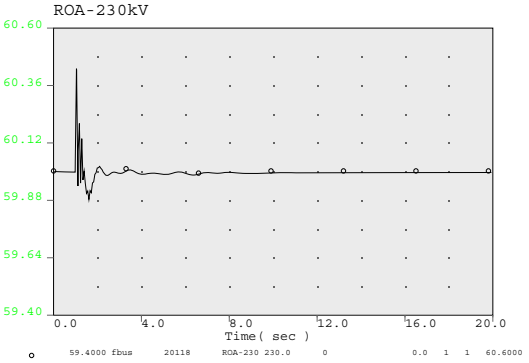
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

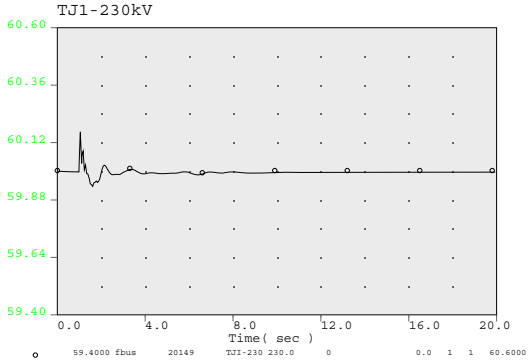
PAR/PID 230kV



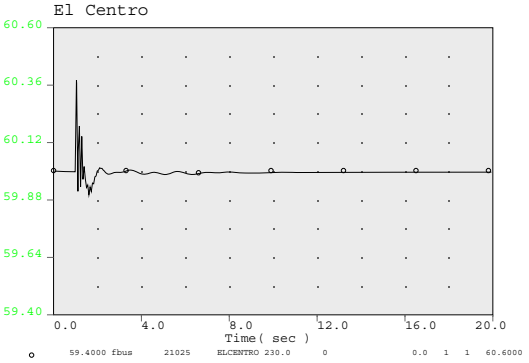
ROA-230kV



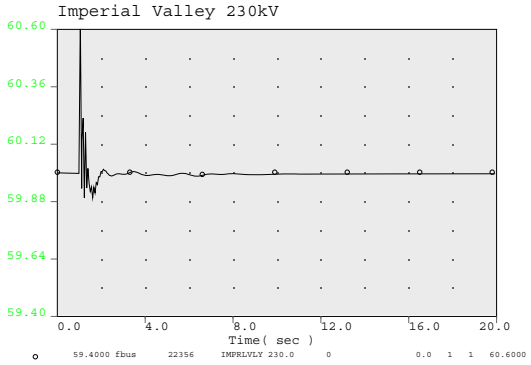
TJ1-230kV



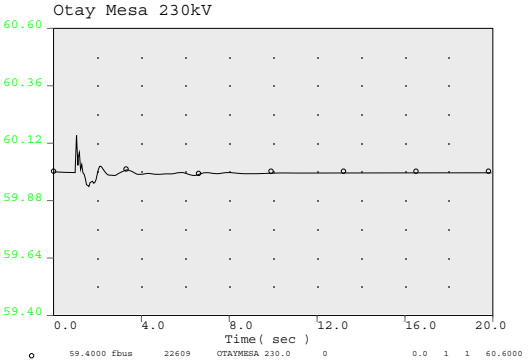
El Centro



Imperial Valley 230kV



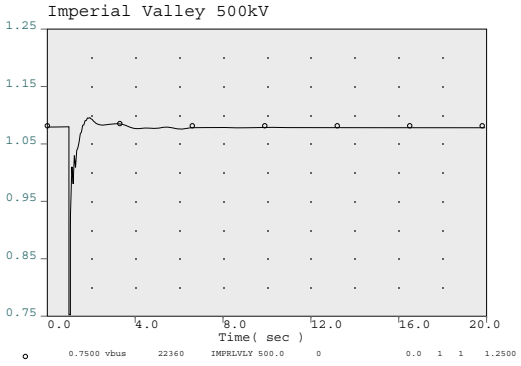
Otay Mesa 230kV



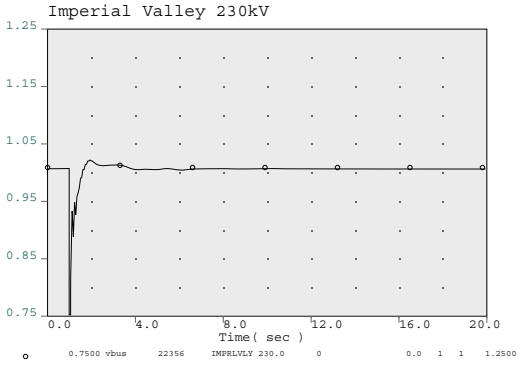
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Imperial Valley Area - VOLTAGE

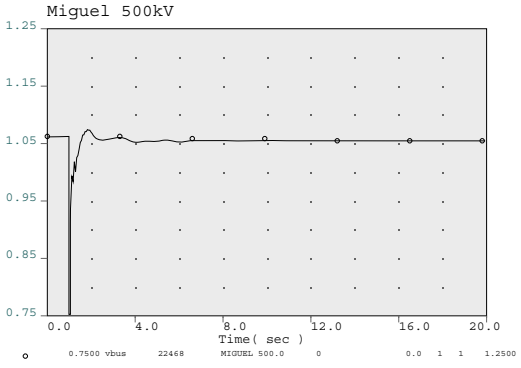
Imperial Valley 500kV



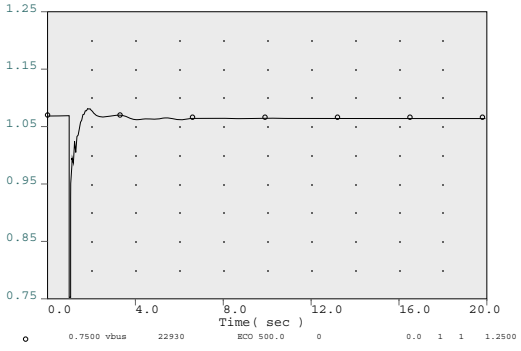
Imperial Valley 230kV



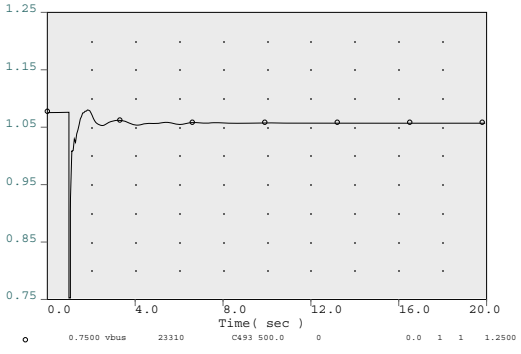
Miguel 500kV



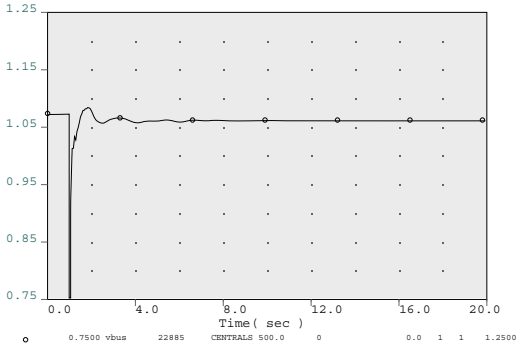
Windfarms 500



C493 500kV



CENTRALS 500kV

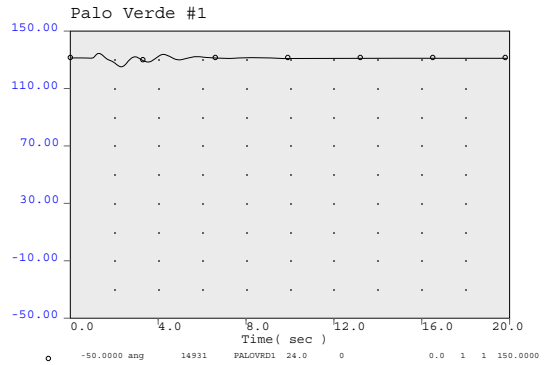


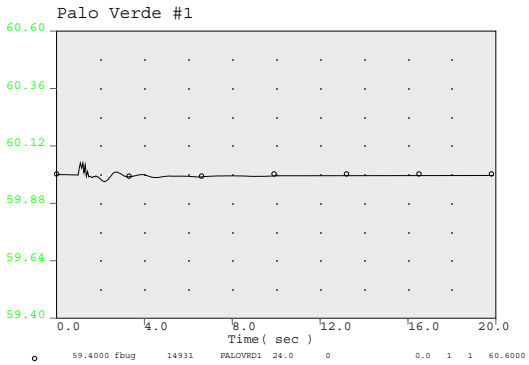
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

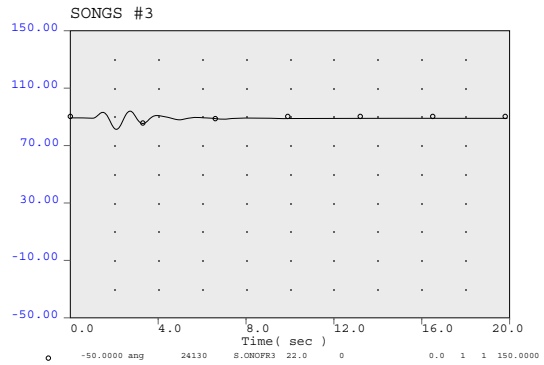
Imperial Valley Area - Frequency

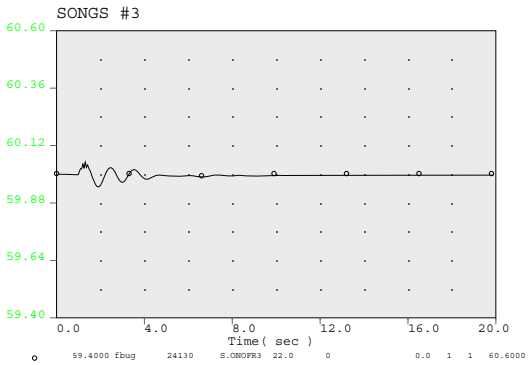
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

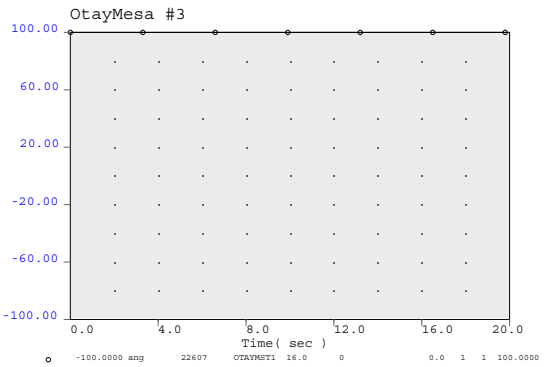
RELATIVE ROTOR ANGLE & FREQUENCY

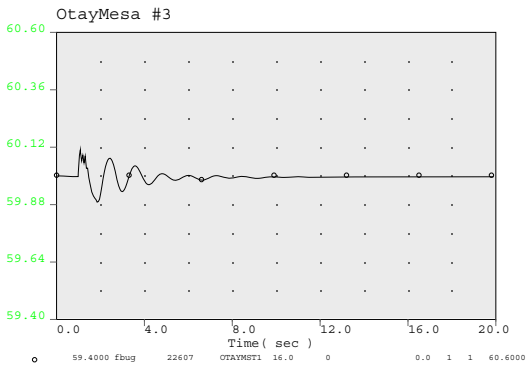












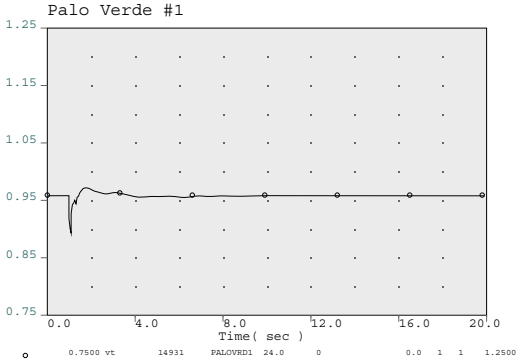
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Page 1

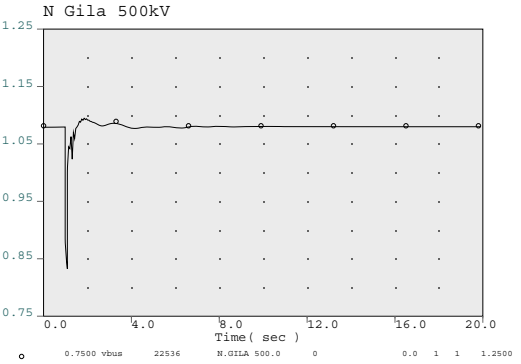
IV_ROA_6_slo_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:29:22 2010

RELATIVE VOLTAGE

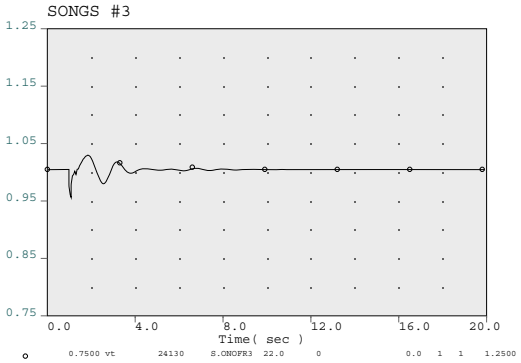
Palo Verde #1



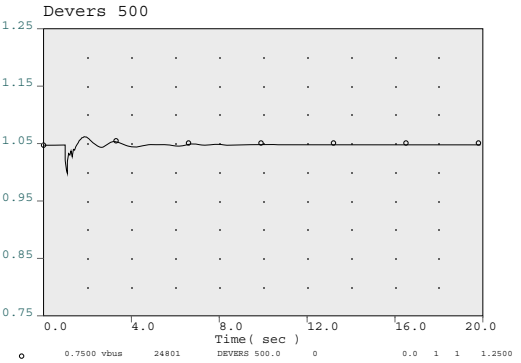
N Gila 500kV



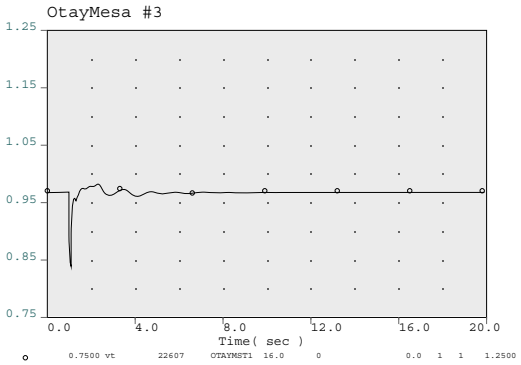
SONGS #3



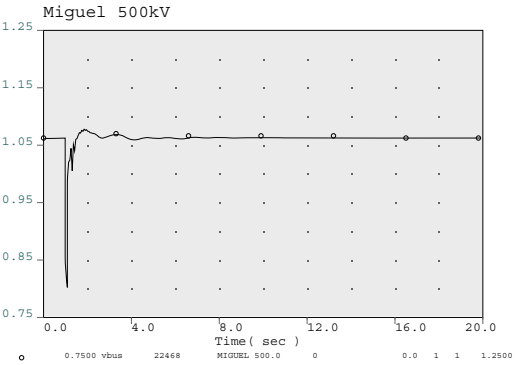
Devers 500



OtayMesa #3



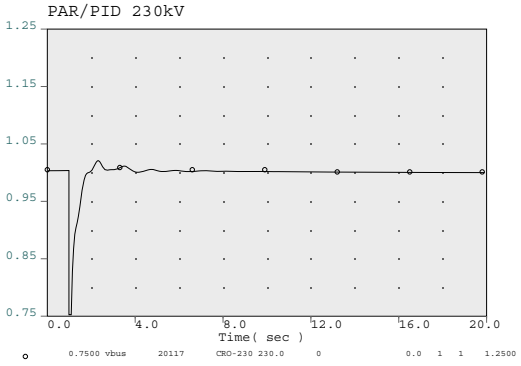
Miguel 500kV



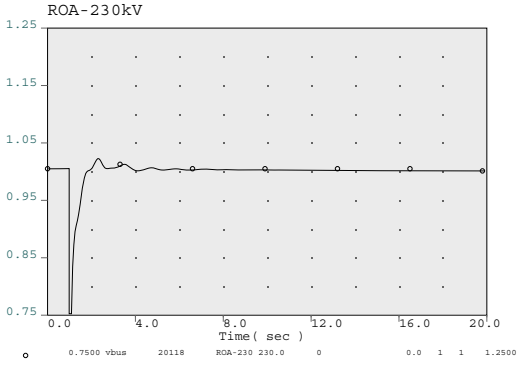
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

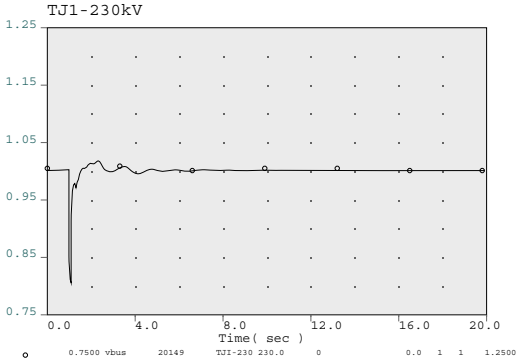
PAR/PID 230kV



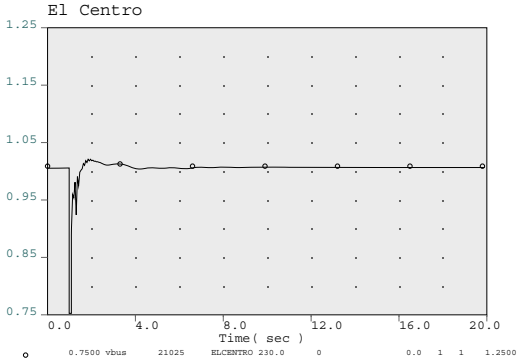
ROA-230kV



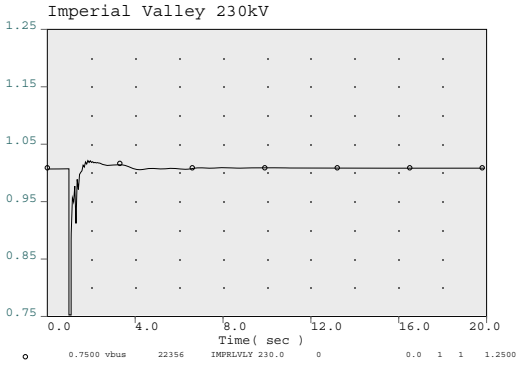
TJ1-230kV



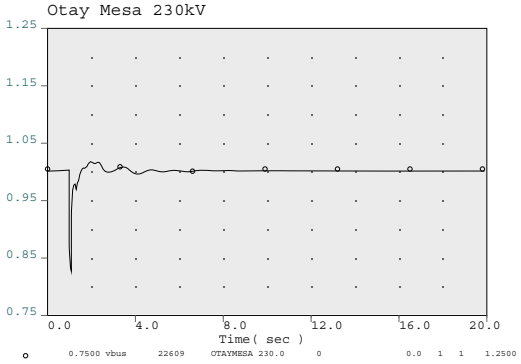
El Centro



Imperial Valley 230kV

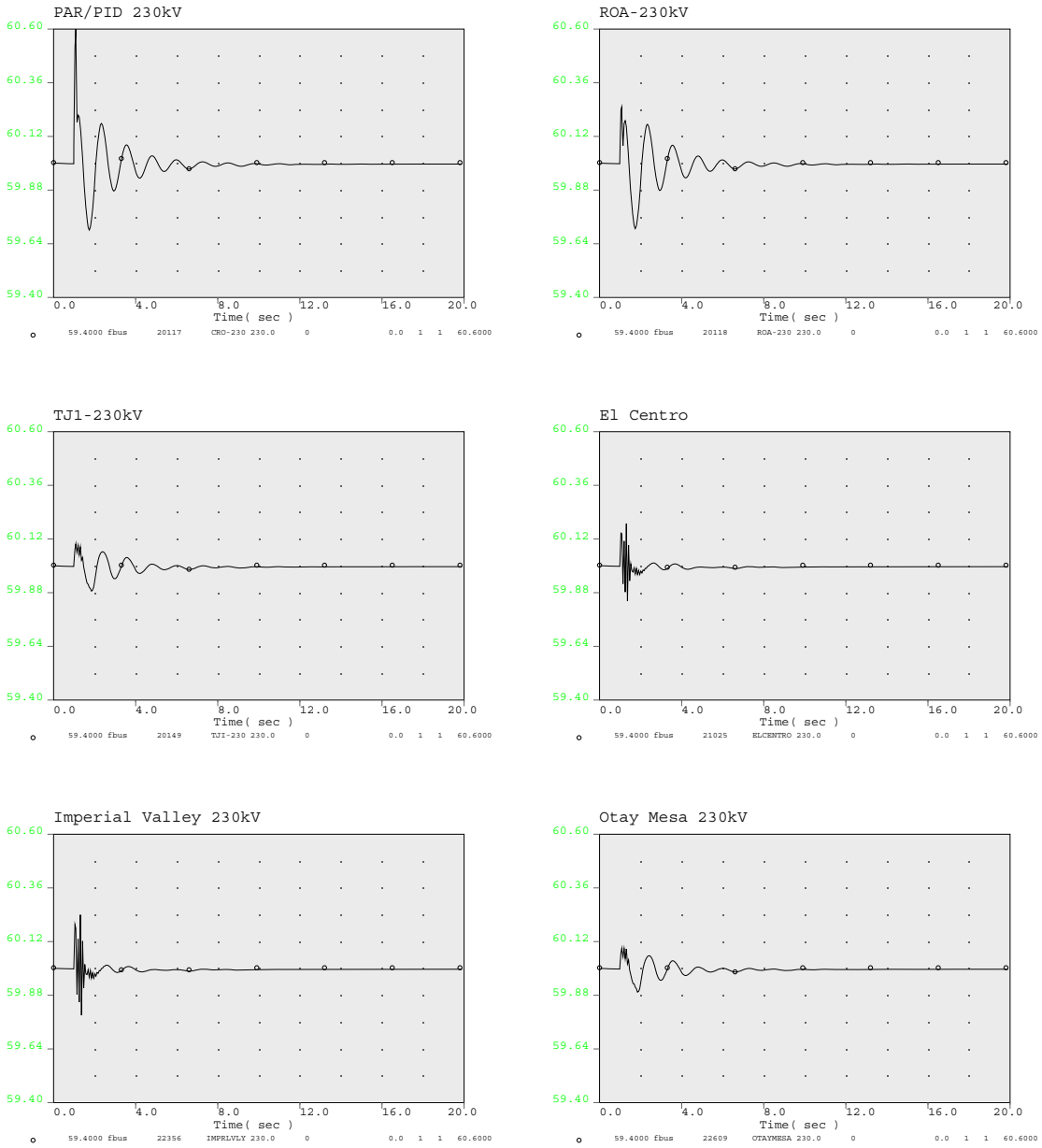


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

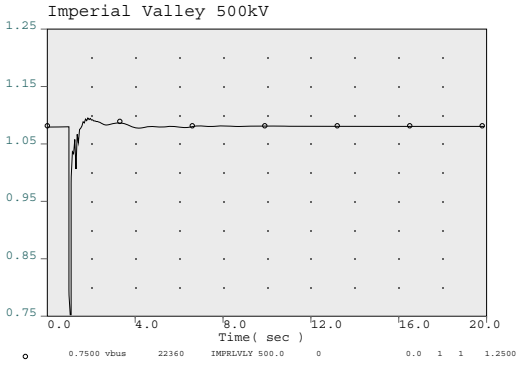
Affected System Frequency Check and Comparison



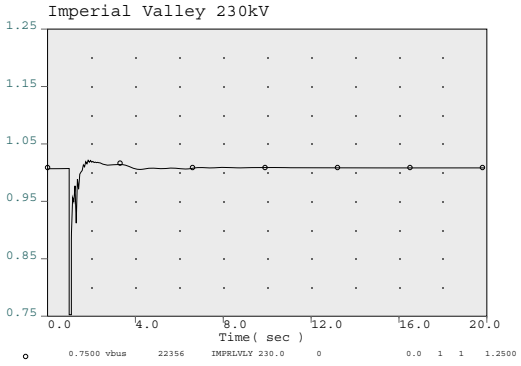
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

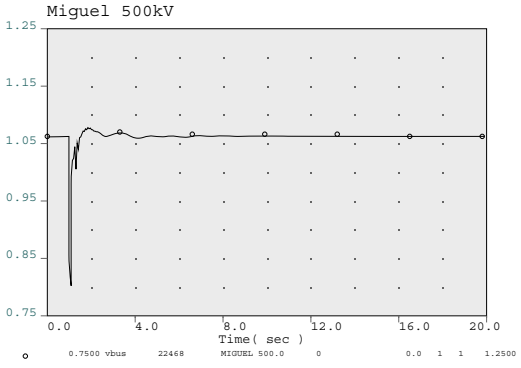
Imperial Valley 500kV



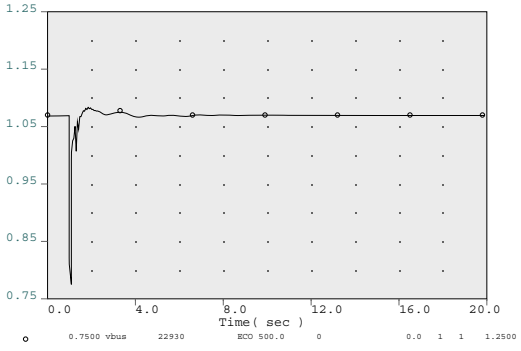
Imperial Valley 230kV



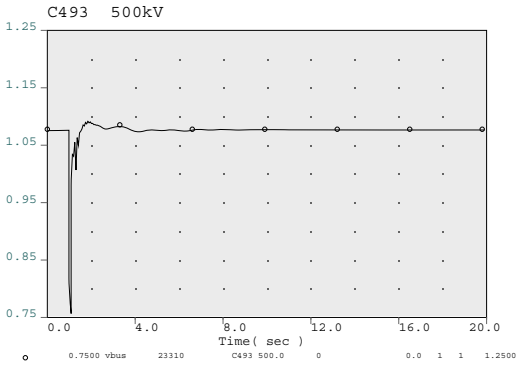
Miguel 500kV



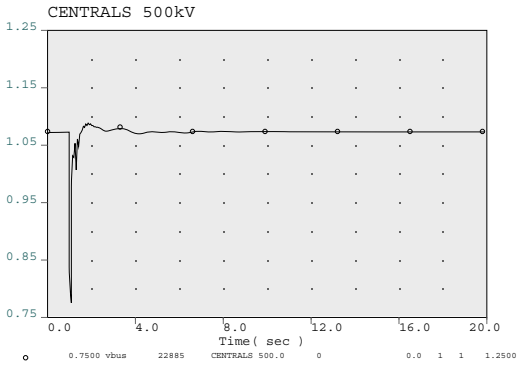
Windfarms 500



C493 500kV

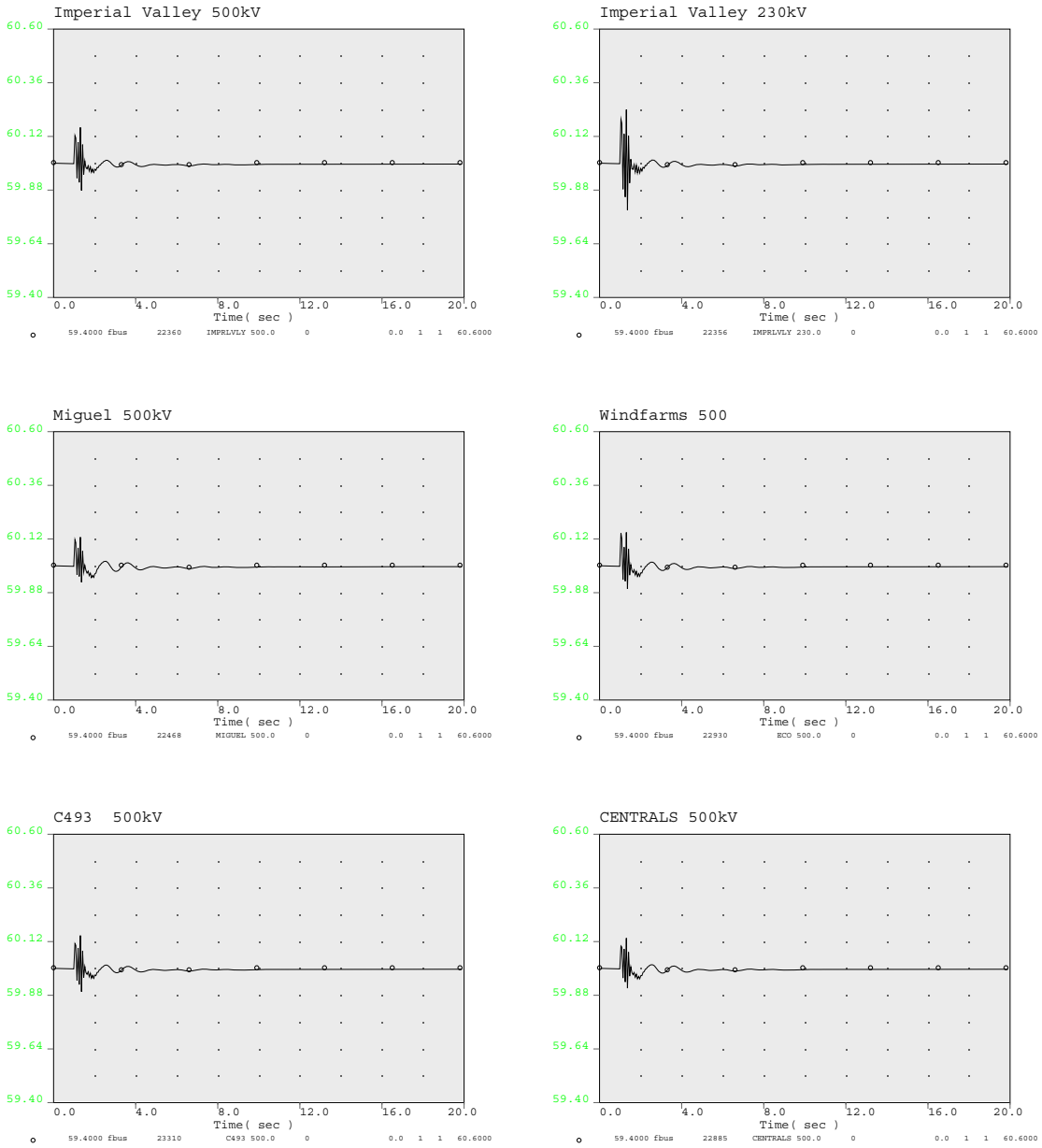


CENTRALS 500kV



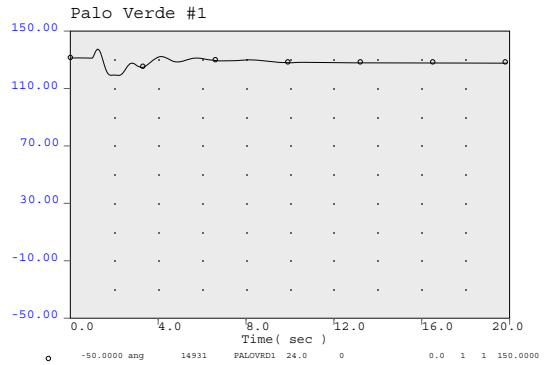
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

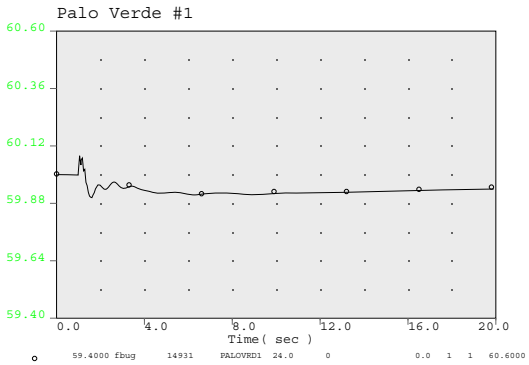
Imperial Valley Area - Frequency

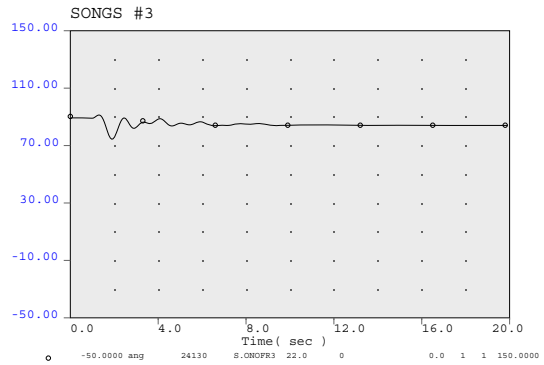


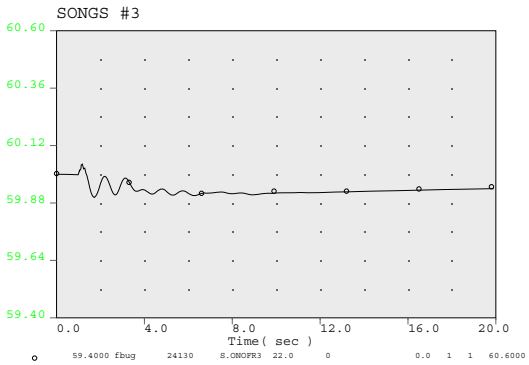
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

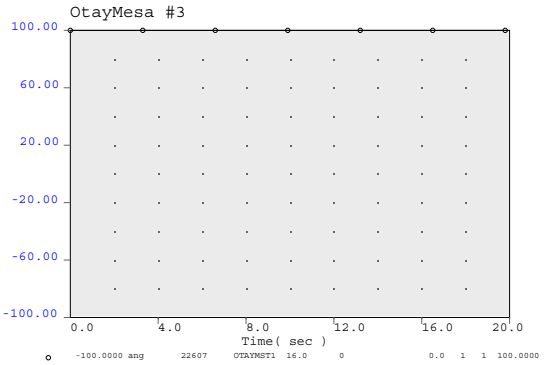
RELATIVE ROTOR ANGLE & FREQUENCY

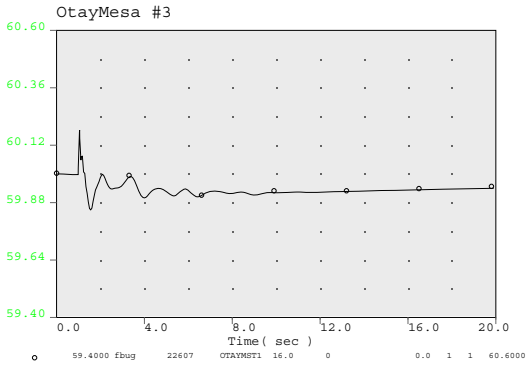












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

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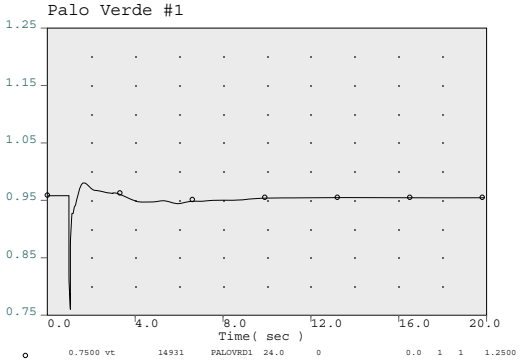
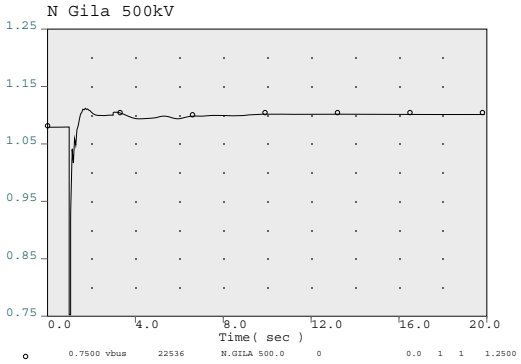
SDGE	IV_Wnd1_RAS_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:29:45 2010

RELATIVE VOLTAGE

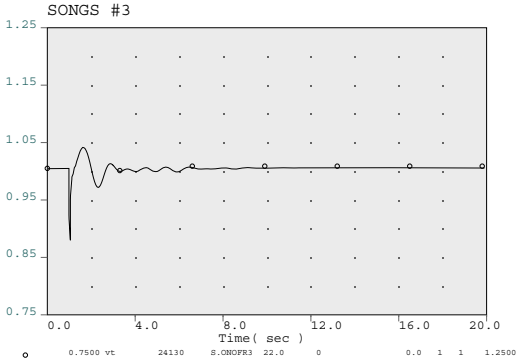
Palo Verde #1



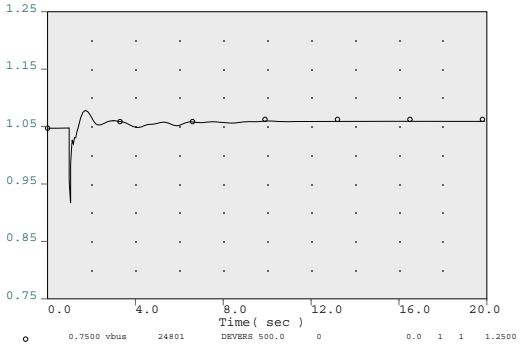
N Gila 500kV



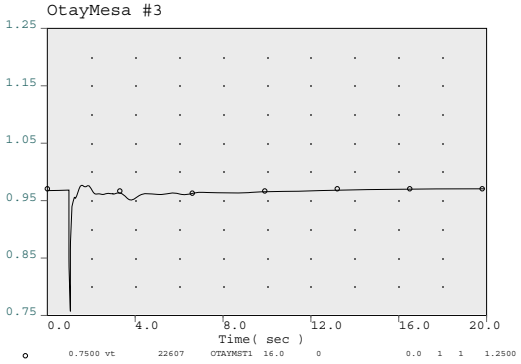
SONGS #3



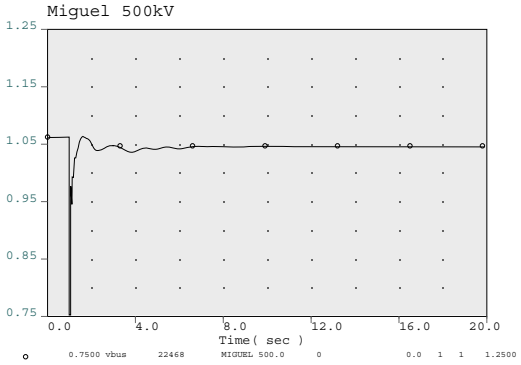
Devers 500



OtayMesa #3



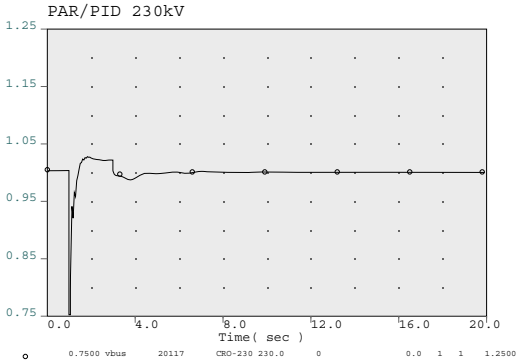
Miguel 500kV



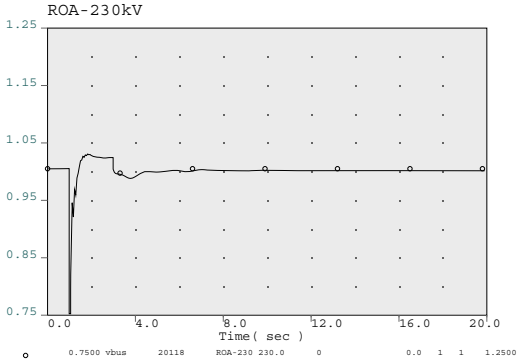
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

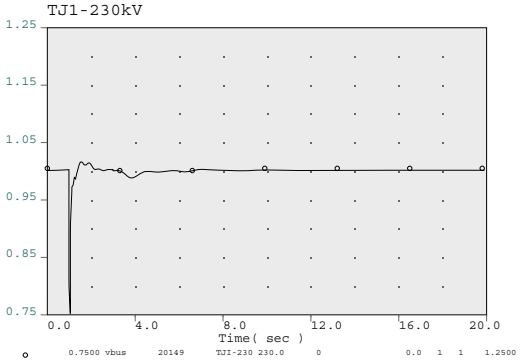
PAR/PID 230kV



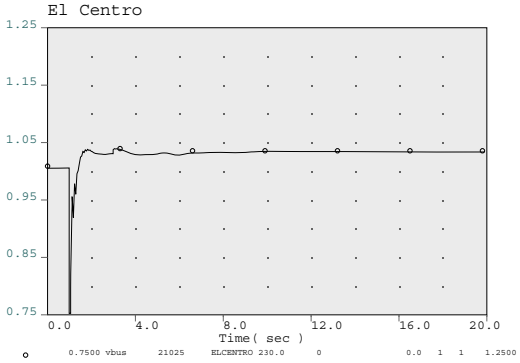
ROA-230kV



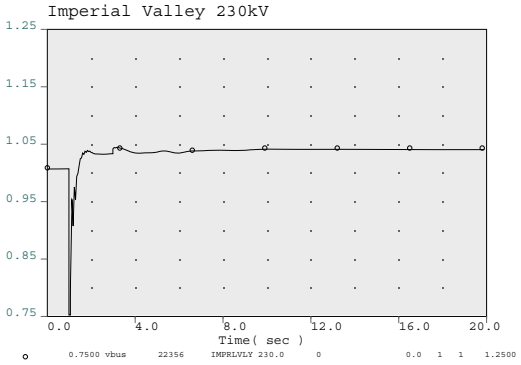
TJ1-230kV



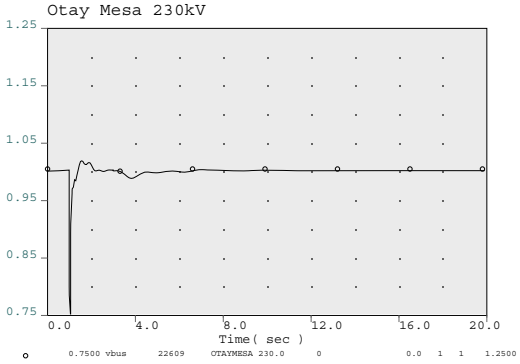
El Centro



Imperial Valley 230kV



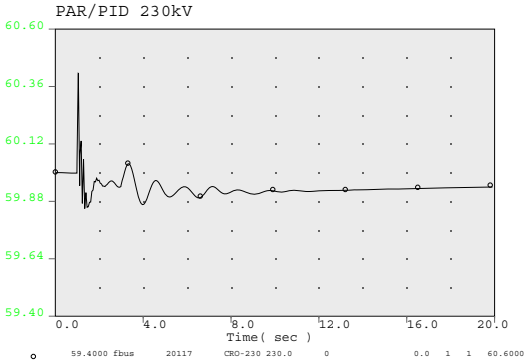
Otay Mesa 230kV



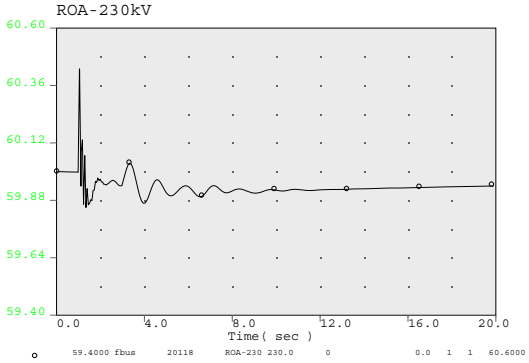
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

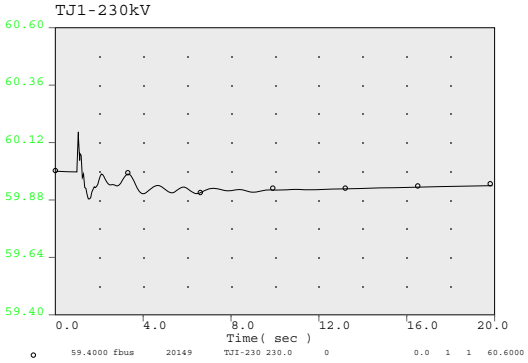
PAR/PID 230kV



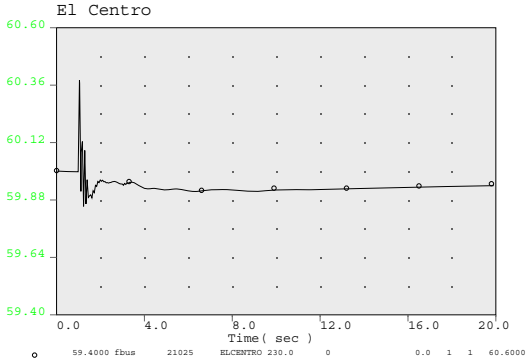
ROA-230kV



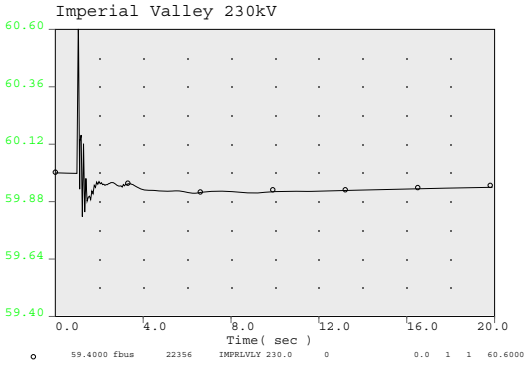
TJ1-230kV



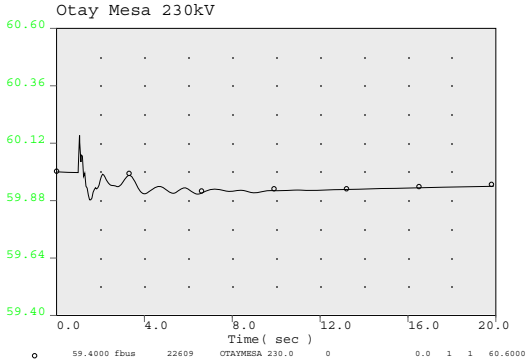
El Centro



Imperial Valley 230kV



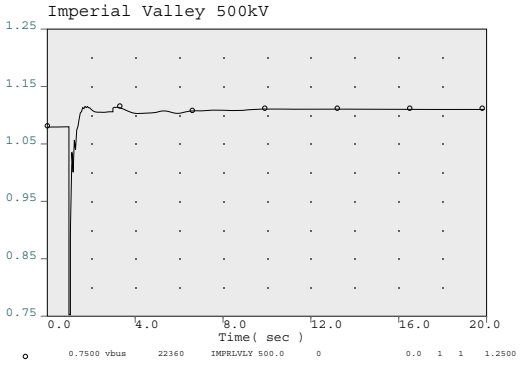
Otay Mesa 230kV



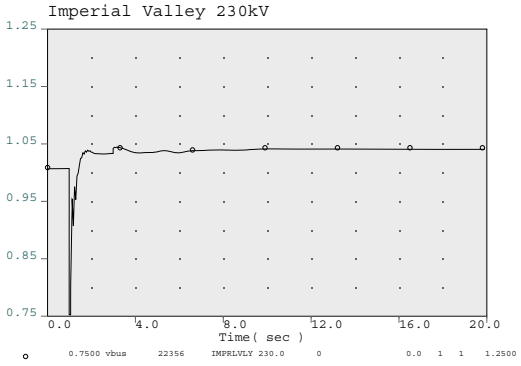
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

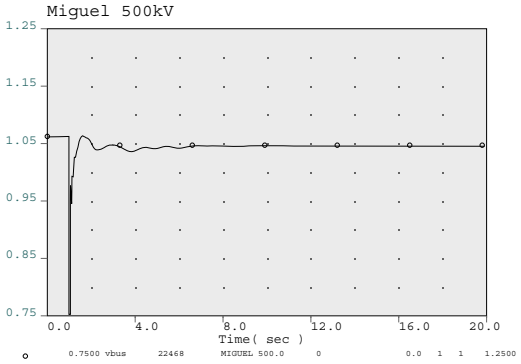
Imperial Valley 500kV



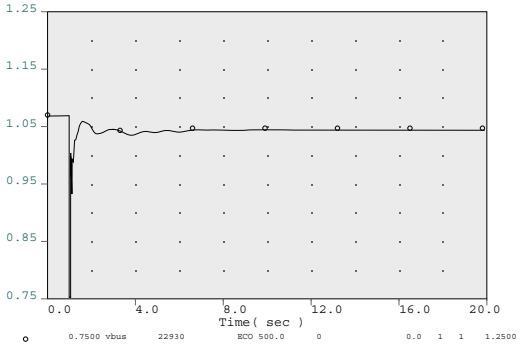
Imperial Valley 230kV



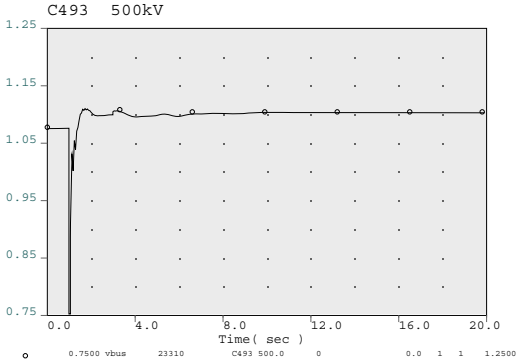
Miguel 500kV



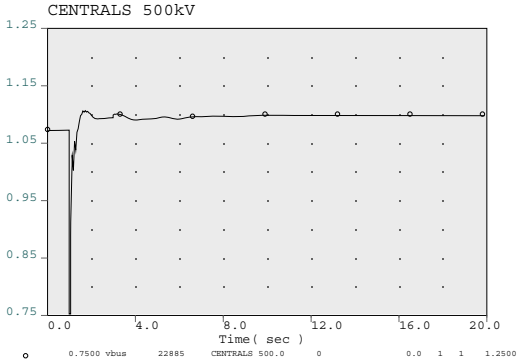
Windfarms 500



C493 500kV

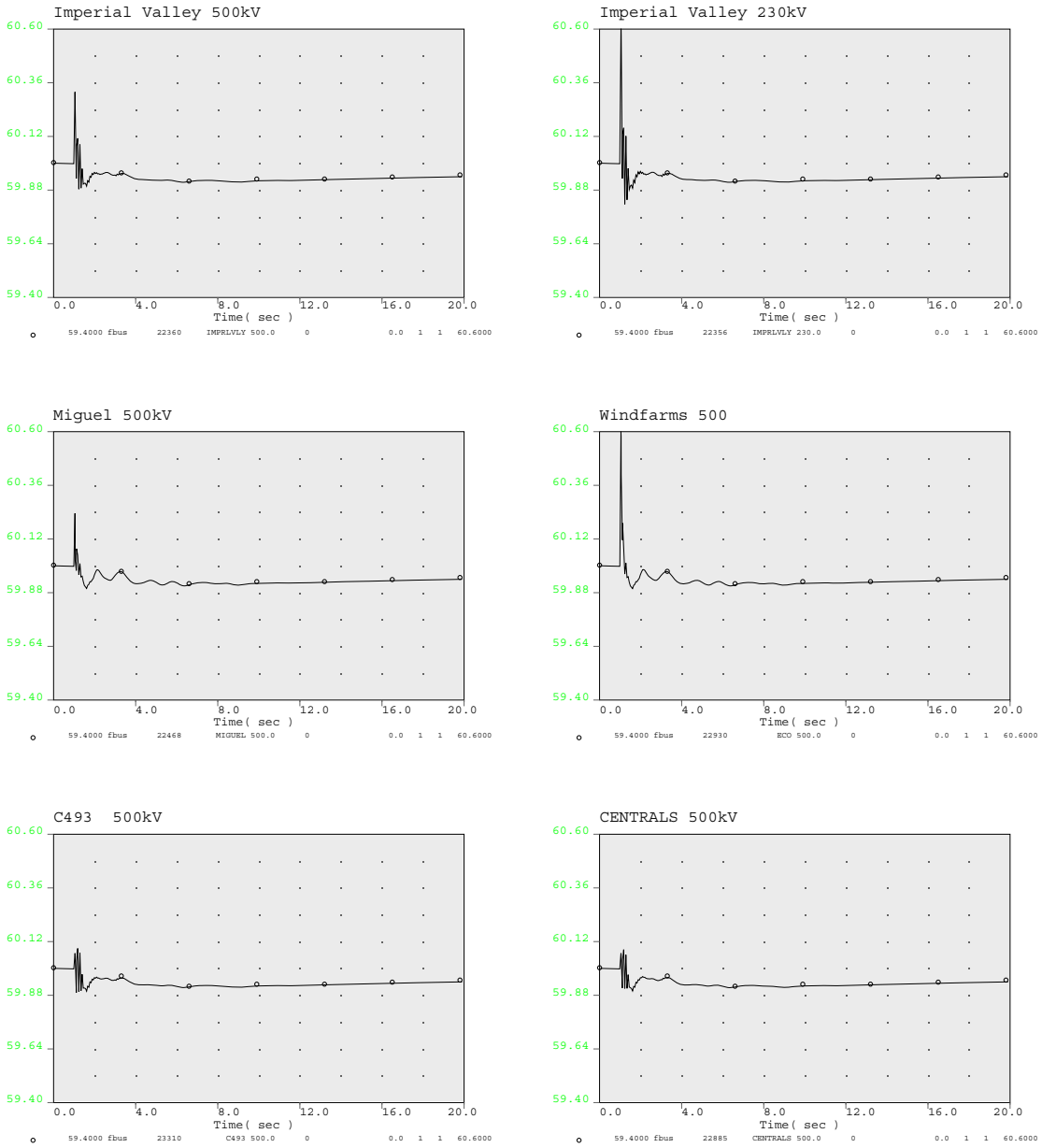


CENTRALS 500kV



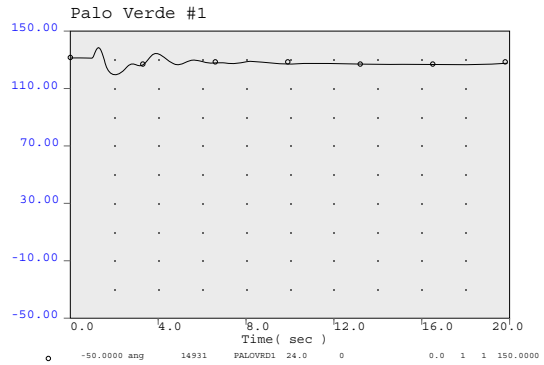
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

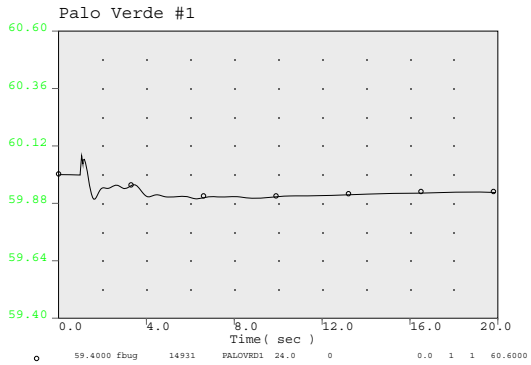
Imperial Valley Area - Frequency

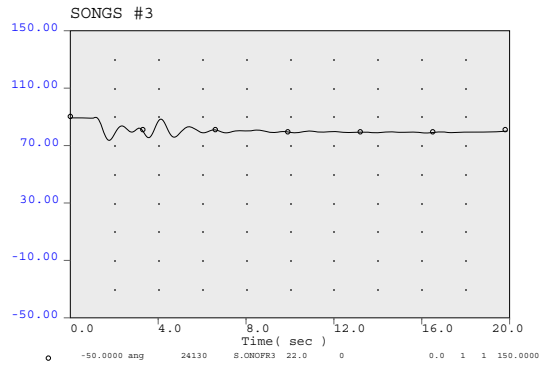


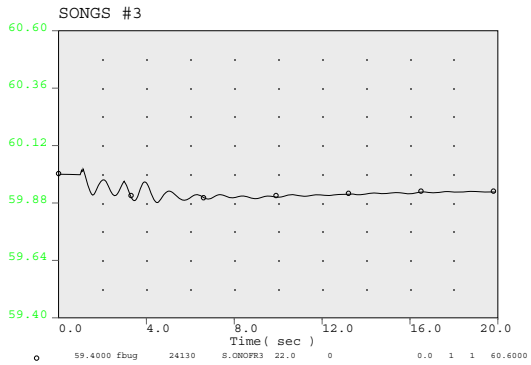
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

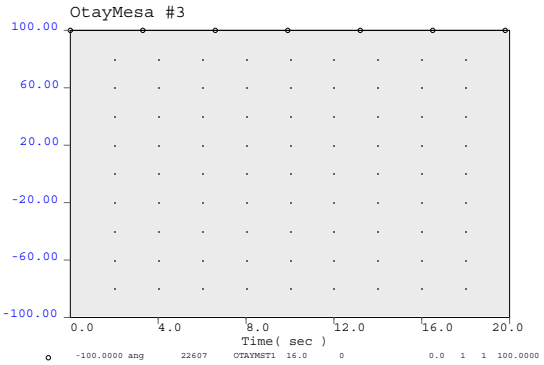
RELATIVE ROTOR ANGLE & FREQUENCY

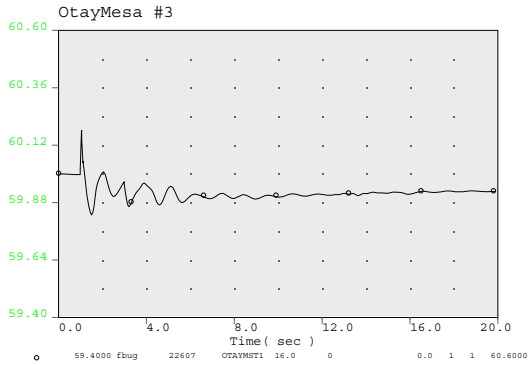












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

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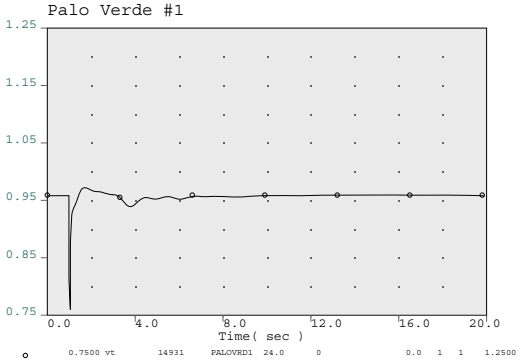
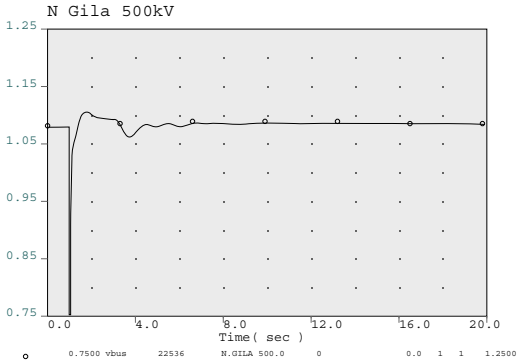
SDGE	IV_Wnd_dlo_RASxR1_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:30:08 2010

RELATIVE VOLTAGE

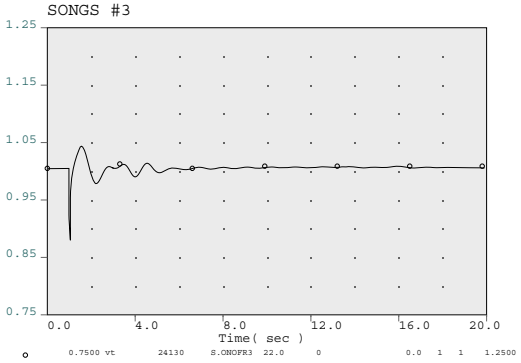
Palo Verde #1



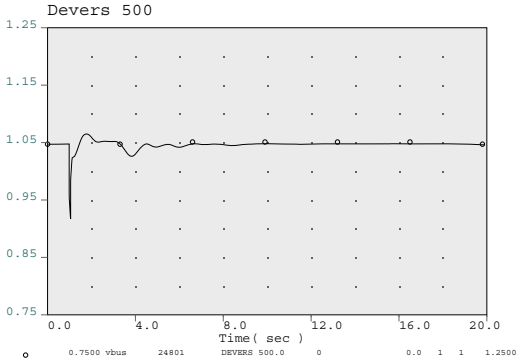
N Gila 500kV



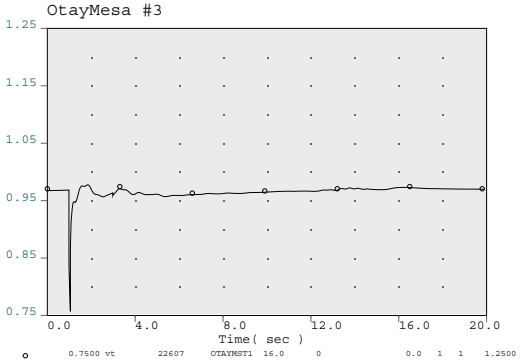
SONGS #3



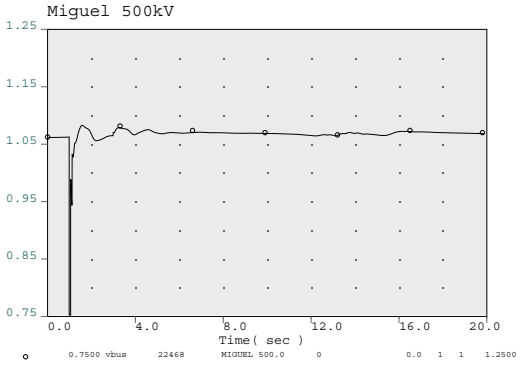
Devers 500



OtayMesa #3



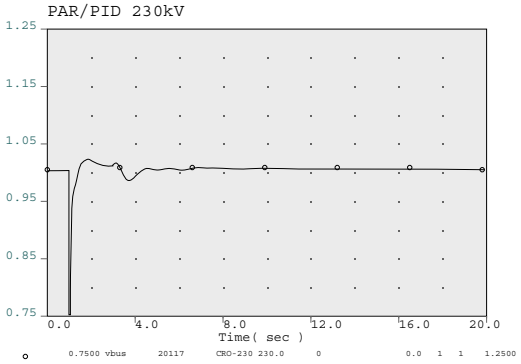
Miguel 500kV



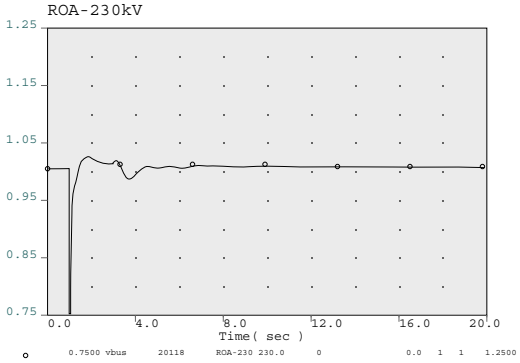
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

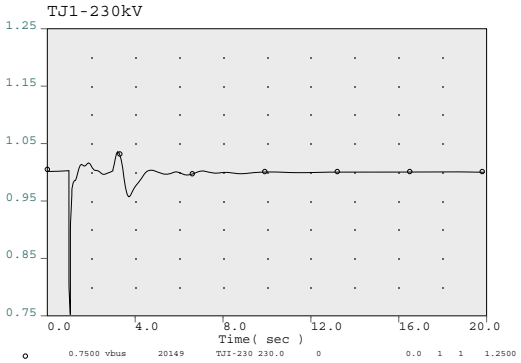
PAR/PID 230kV



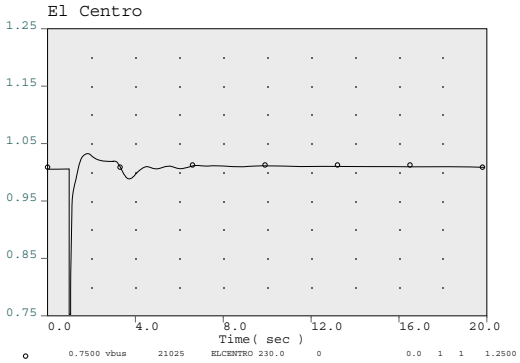
ROA-230kV



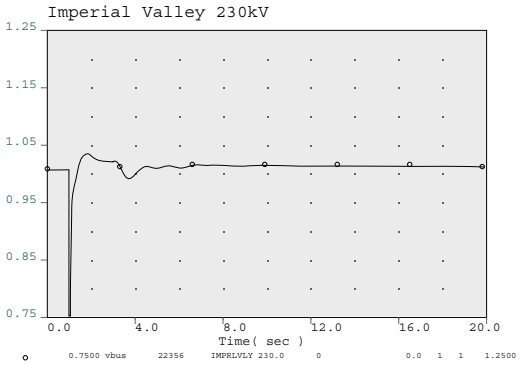
TJ1-230kV



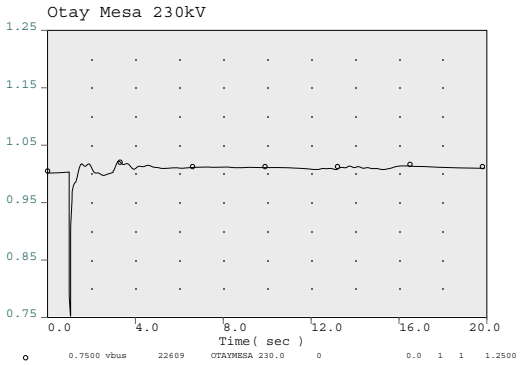
El Centro



Imperial Valley 230kV



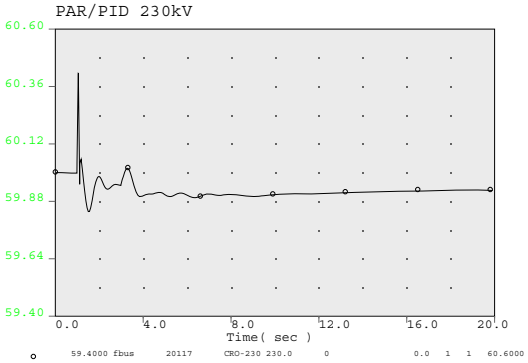
Otay Mesa 230kV



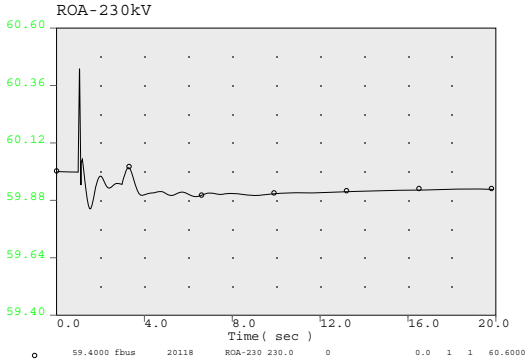
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison

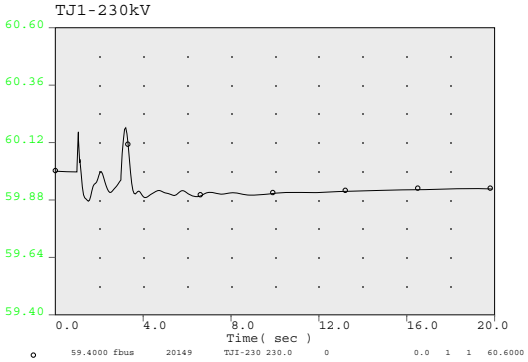
PAR/PID 230kV



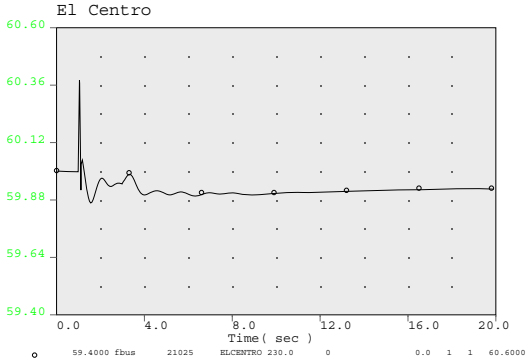
ROA-230kV



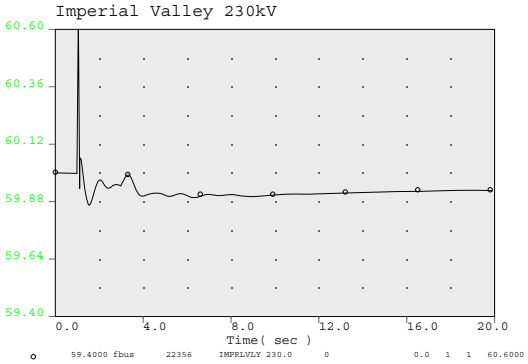
TJ1-230kV



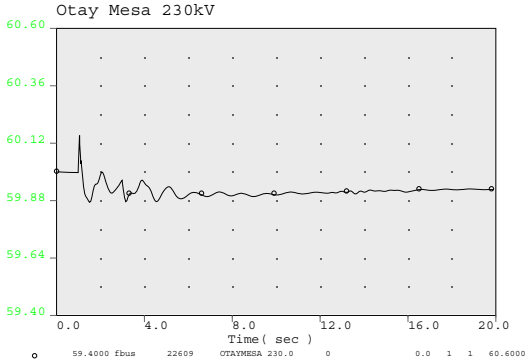
El Centro



Imperial Valley 230kV



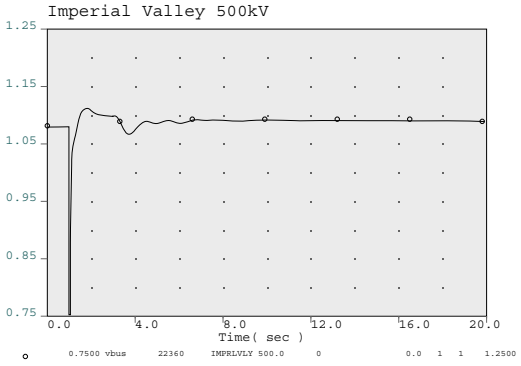
Otay Mesa 230kV



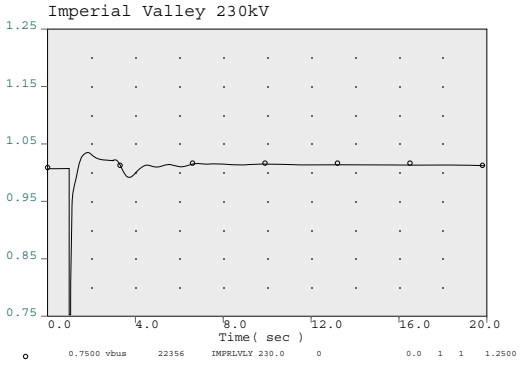
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Imperial Valley Area - VOLTAGE

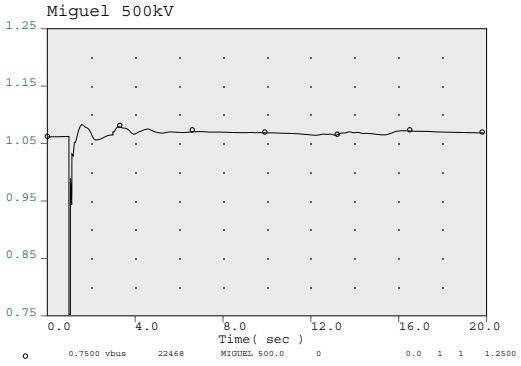
Imperial Valley 500kV



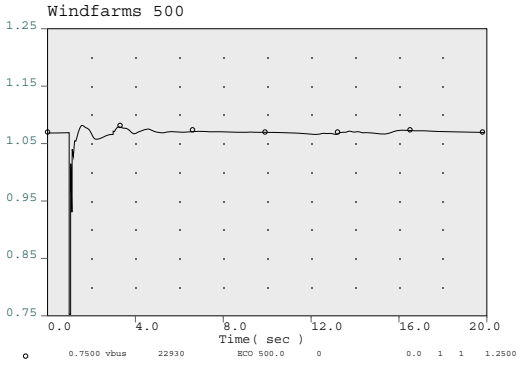
Imperial Valley 230kV



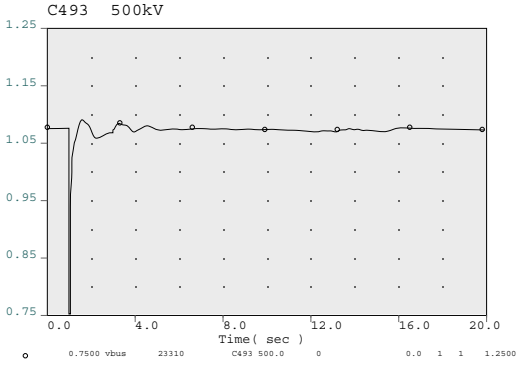
Miguel 500kV



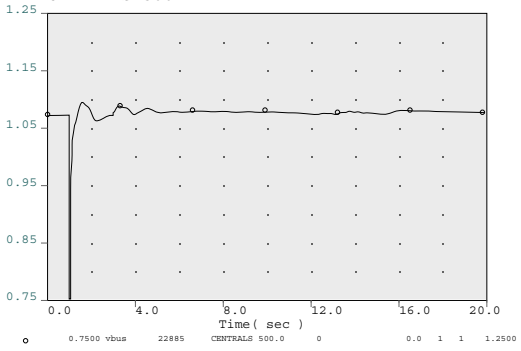
Windfarms 500



C493 500kV

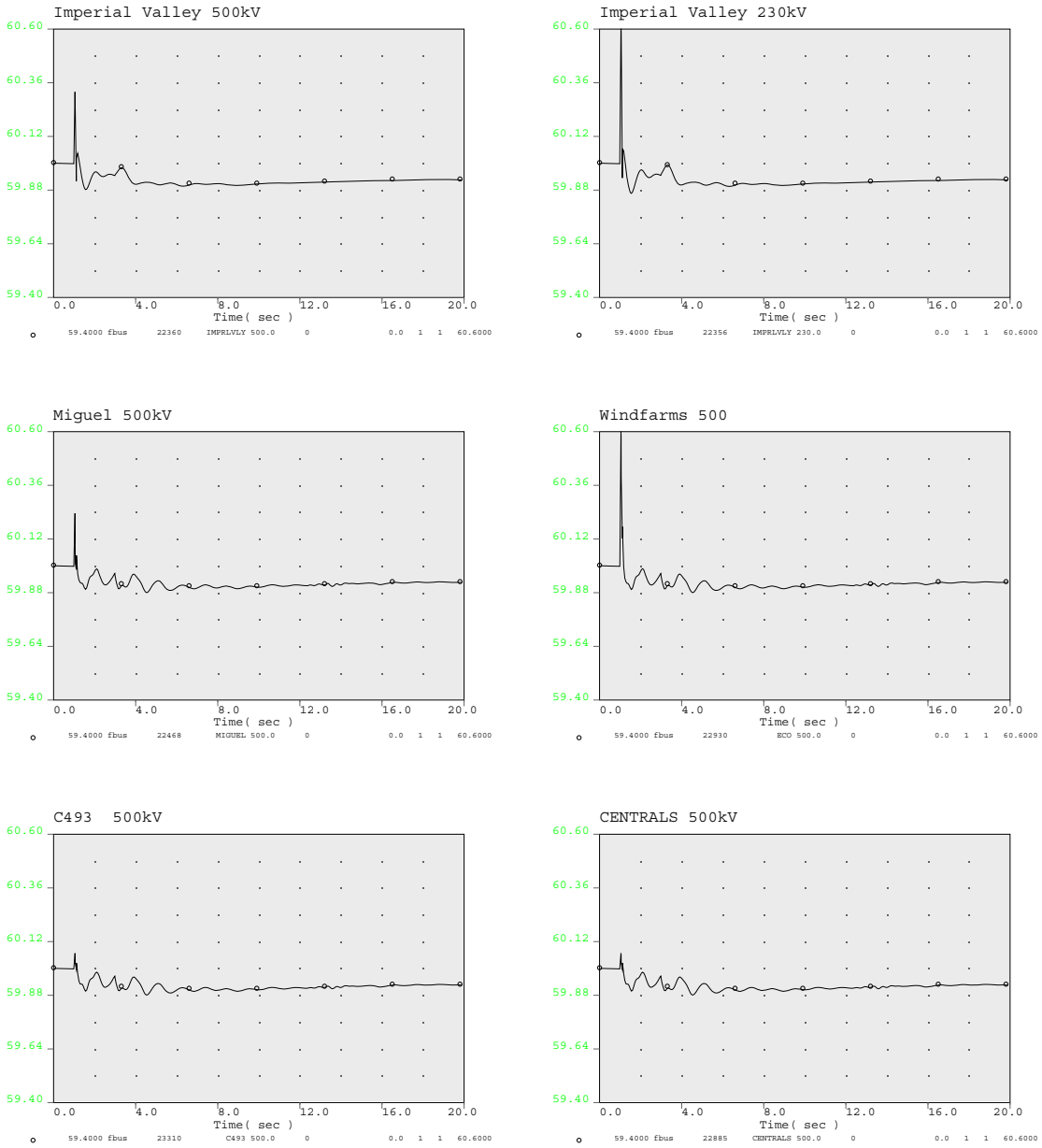


CENTRALS 500kV



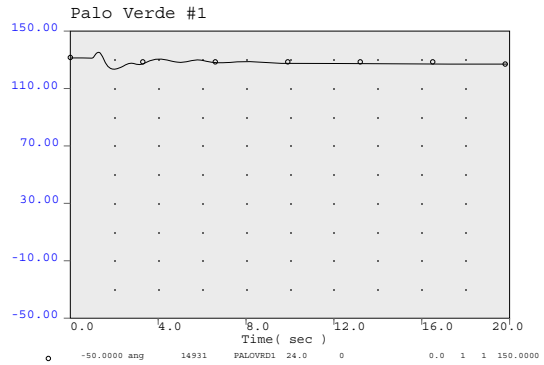
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

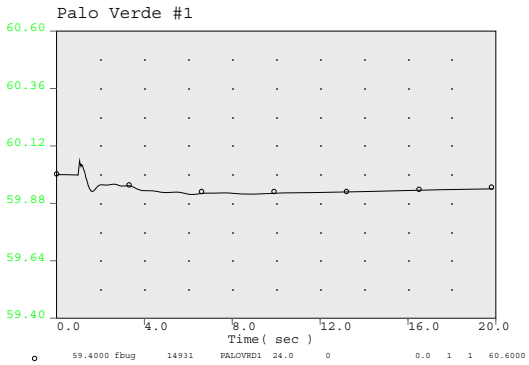
Imperial Valley Area - Frequency

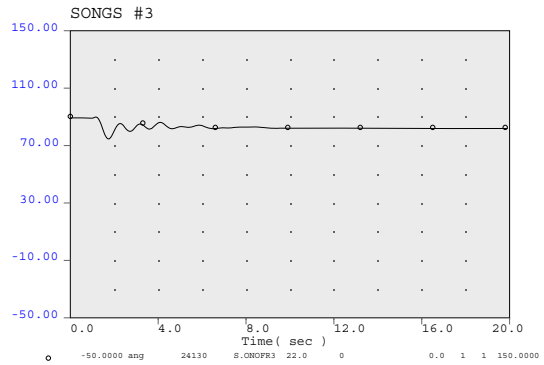


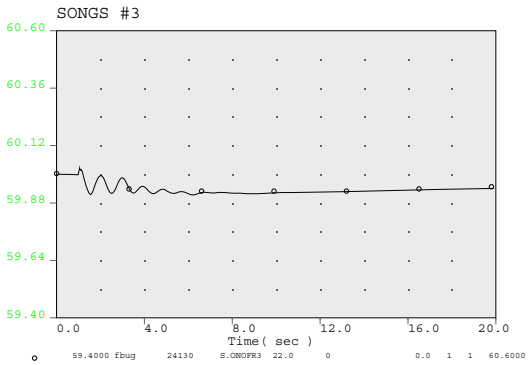
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

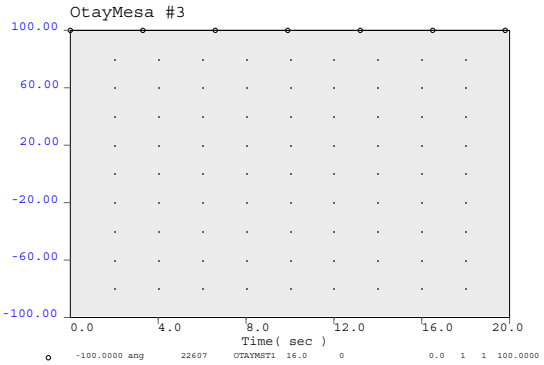
RELATIVE ROTOR ANGLE & FREQUENCY

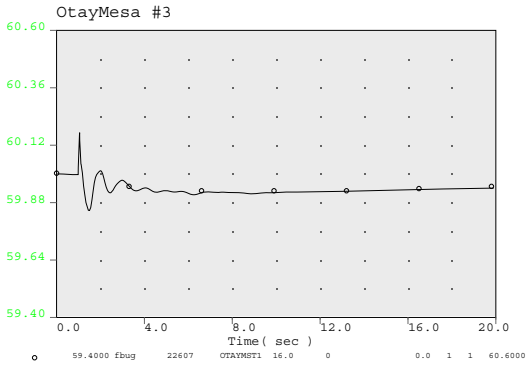












SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

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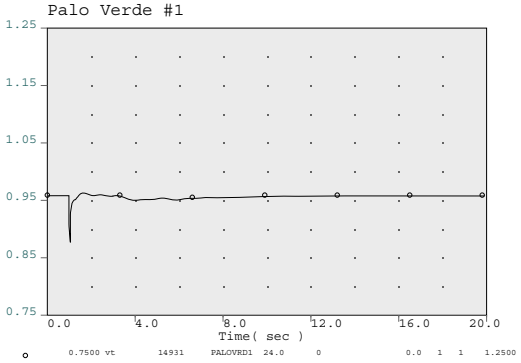
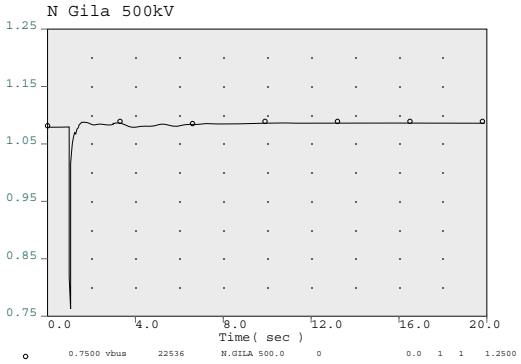
SDGE	ML_Wnd_RAS_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:30:29 2010

RELATIVE VOLTAGE

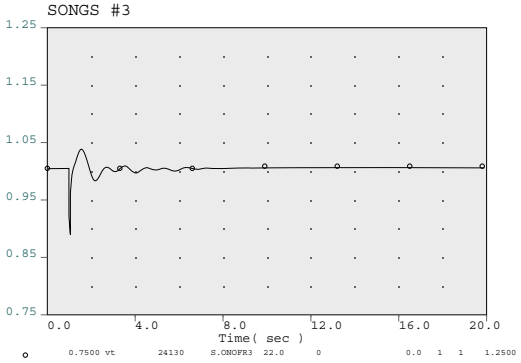
Palo Verde #1



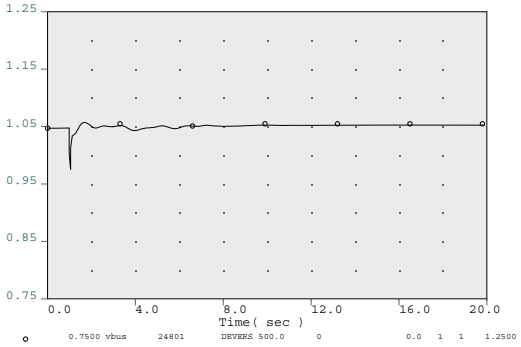
N Gila 500kV



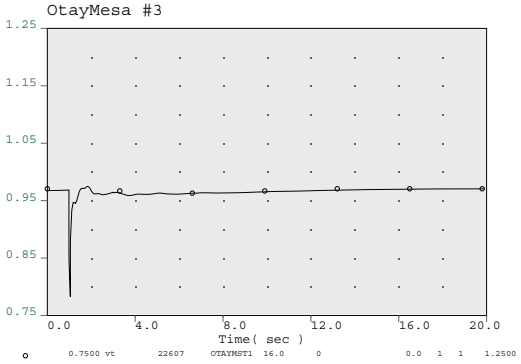
SONGS #3



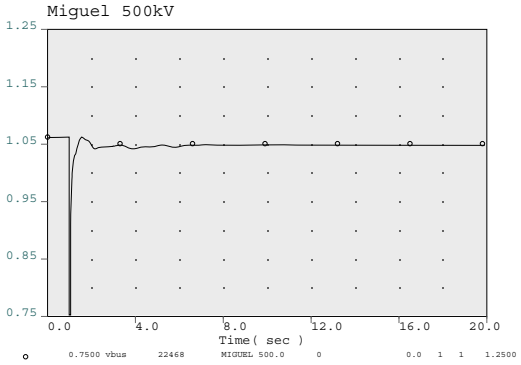
Devers 500



OtayMesa #3



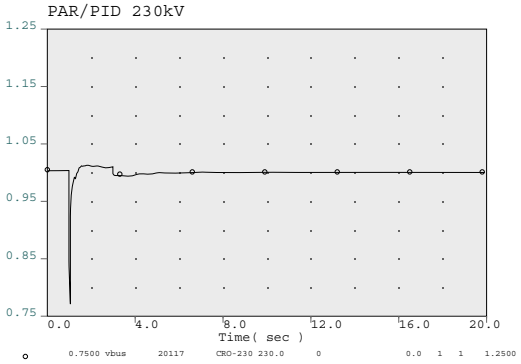
Miguel 500kV



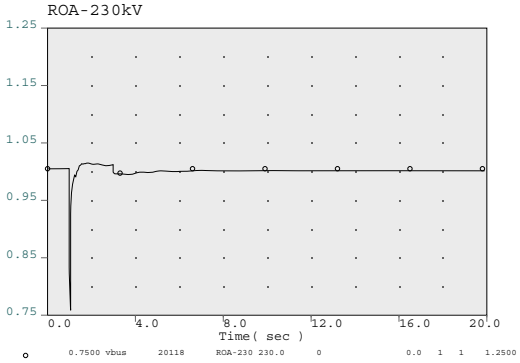
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

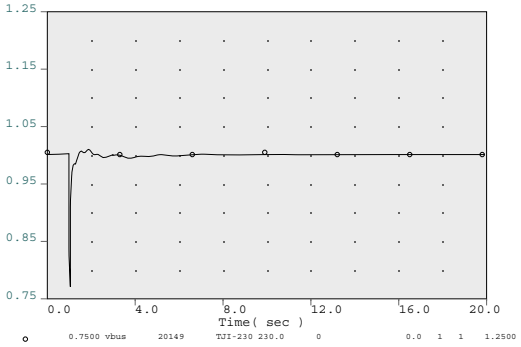
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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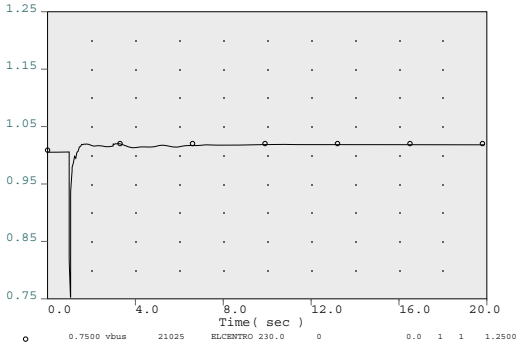
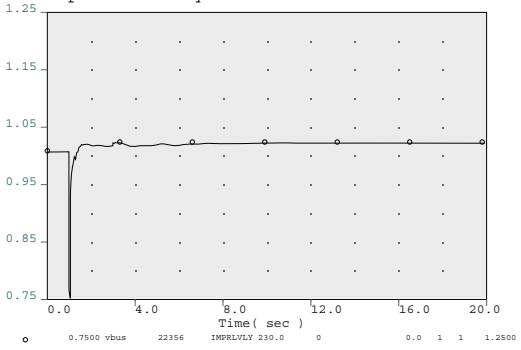
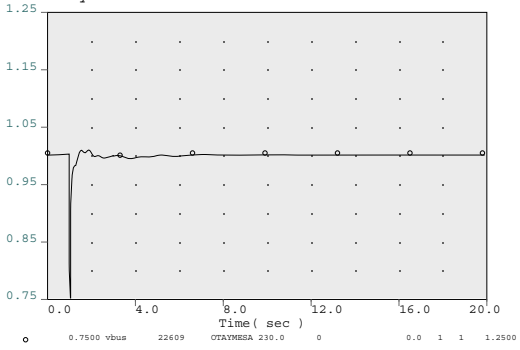


Imperial Valley 230kV



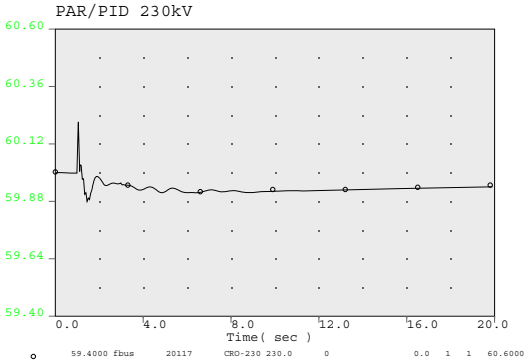
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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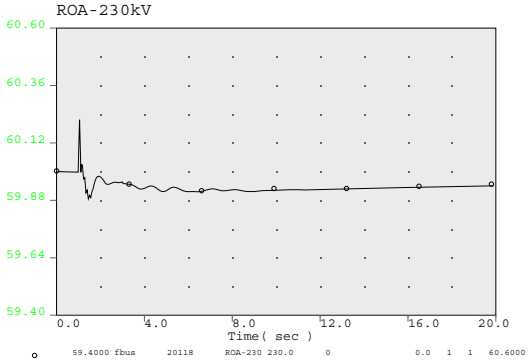

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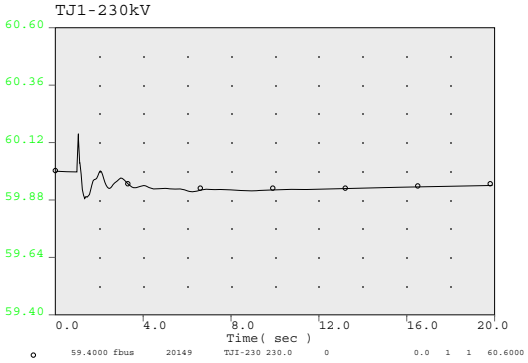

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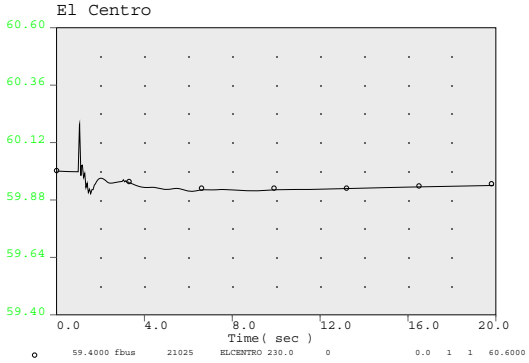
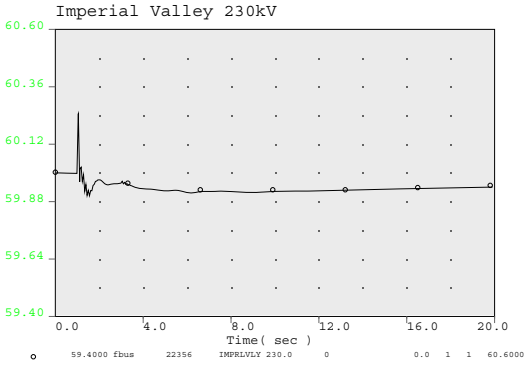


Imperial Valley 230kV



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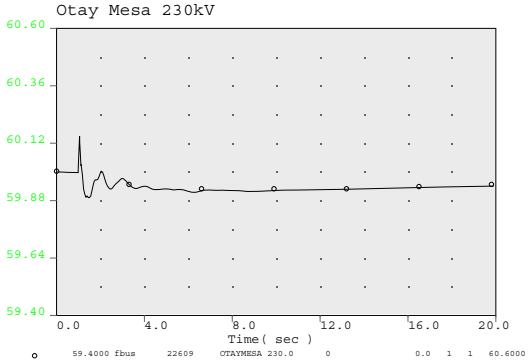
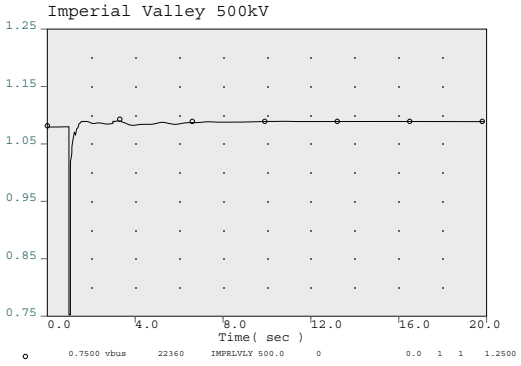


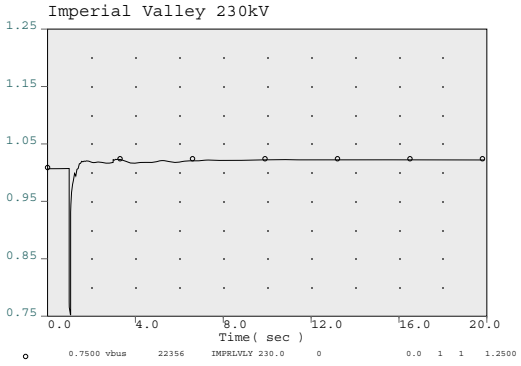
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

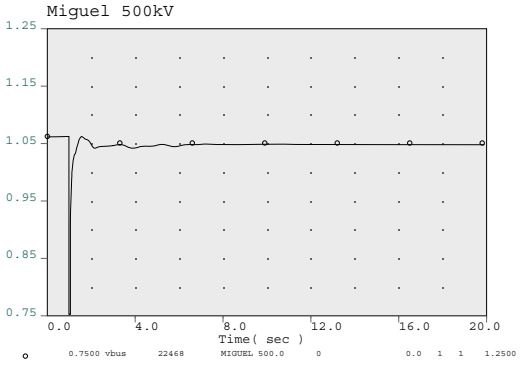
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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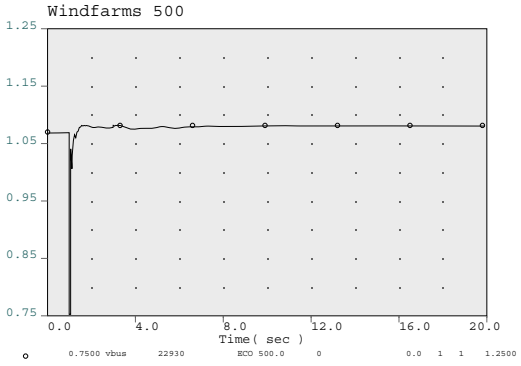

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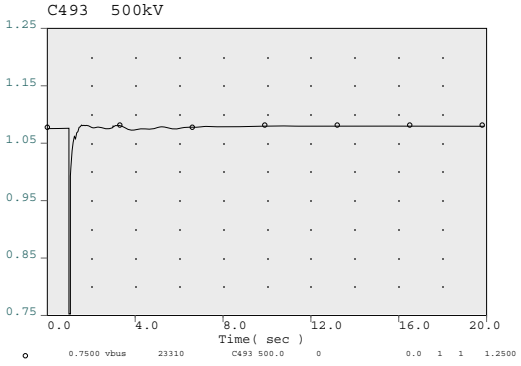
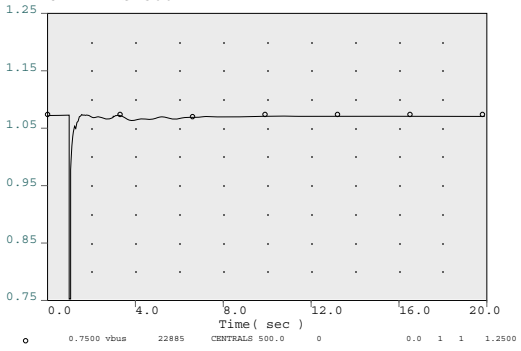
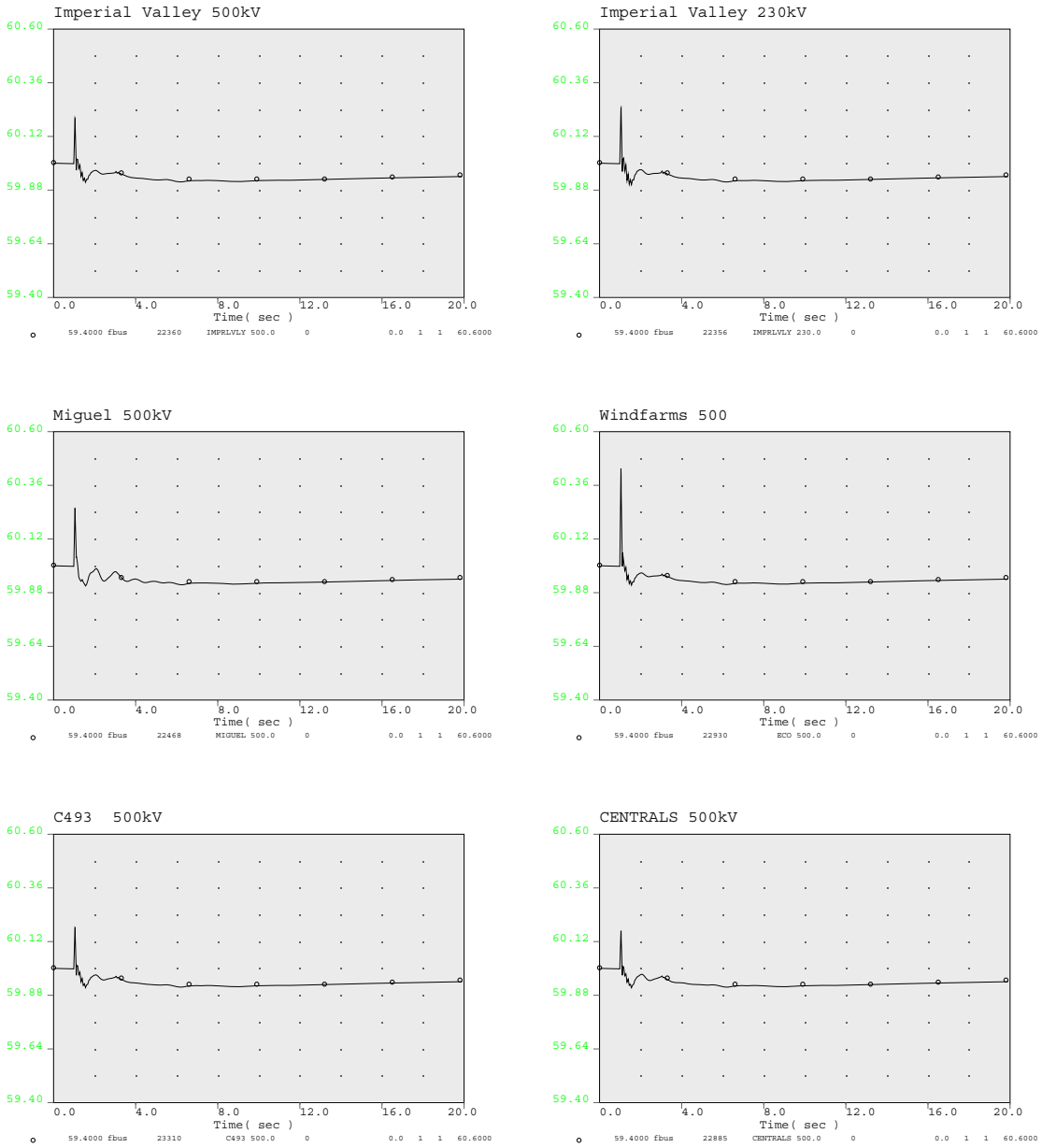


CENTRALS 500kV



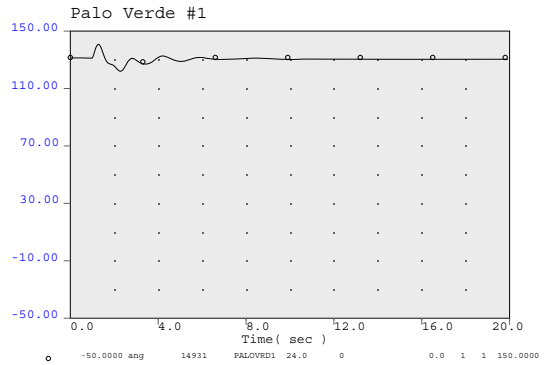
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

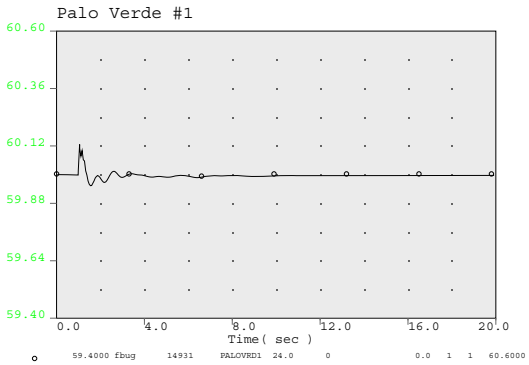
Imperial Valley Area - Frequency

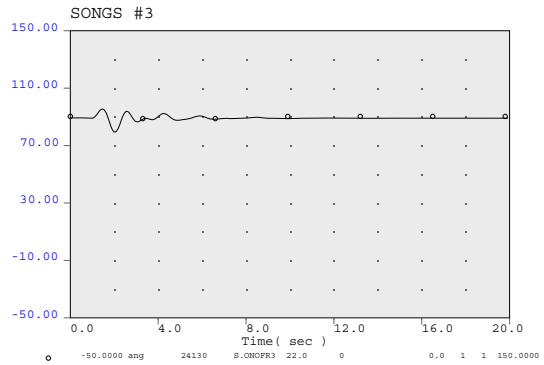


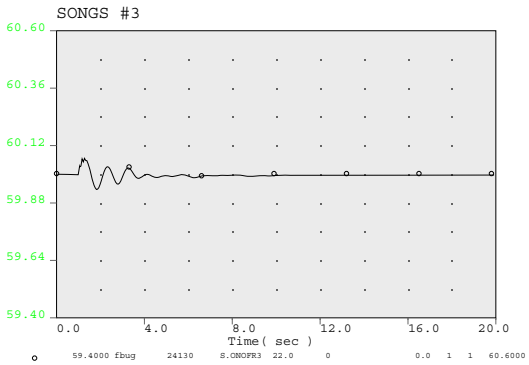
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

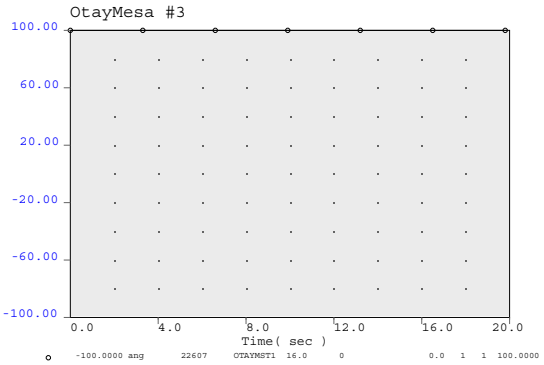
RELATIVE ROTOR ANGLE & FREQUENCY

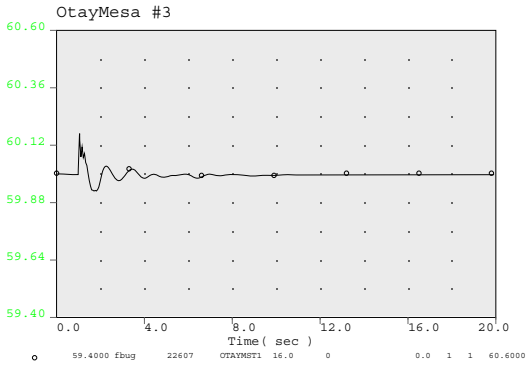












SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

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SDGE	NGila_IV_slo_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:30:49 2010

RELATIVE VOLTAGE

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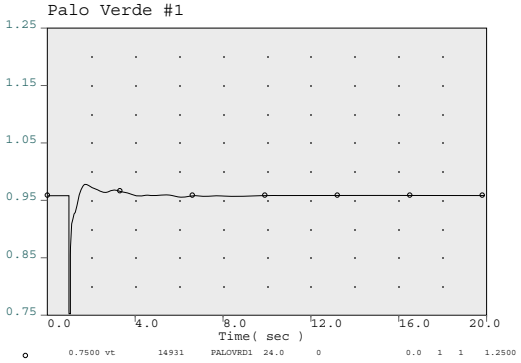
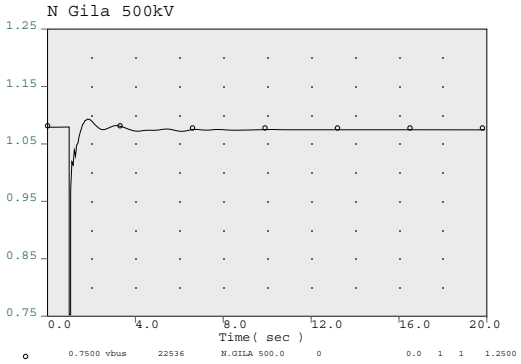


N Gila 500kV



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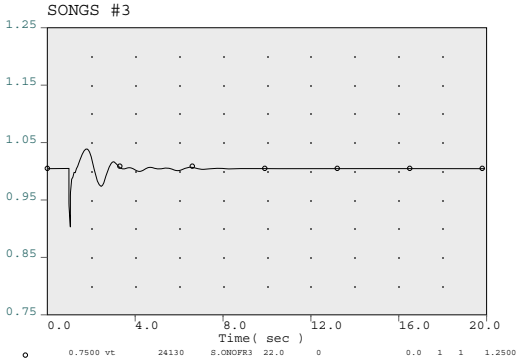
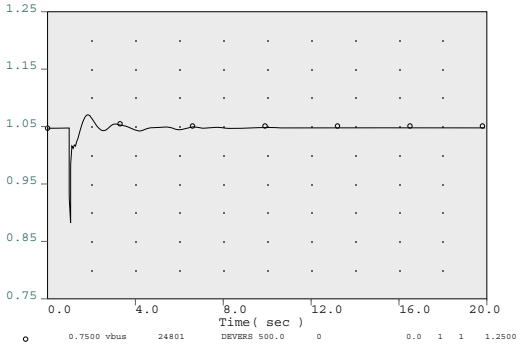


Devers 500



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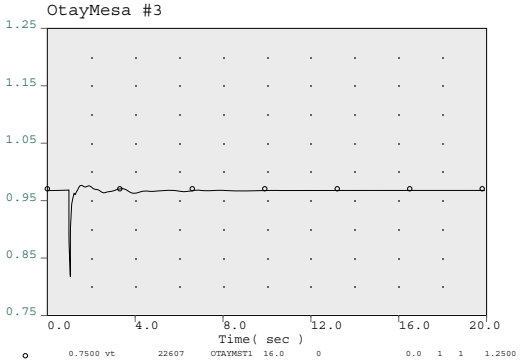
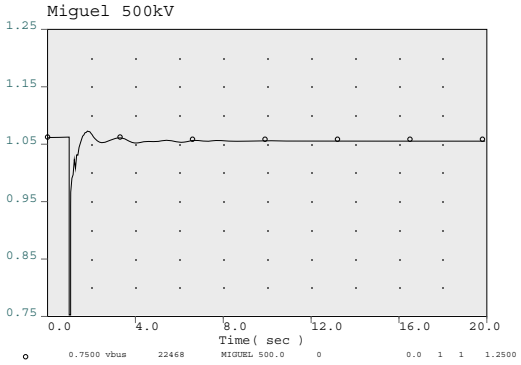


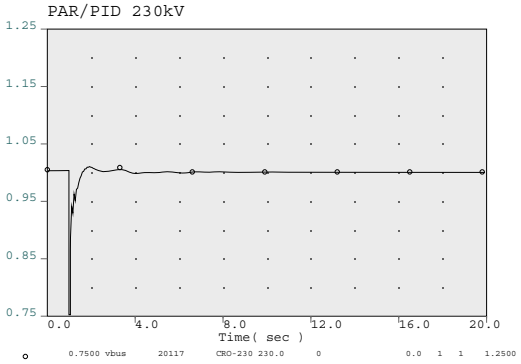
Miguel 500kV



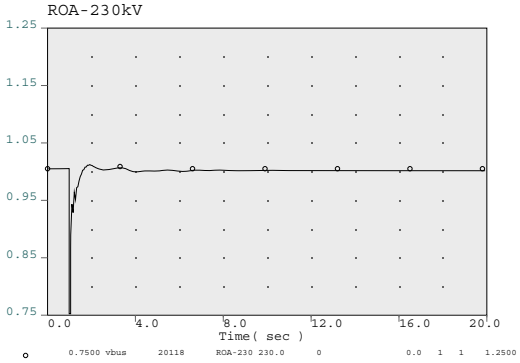
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

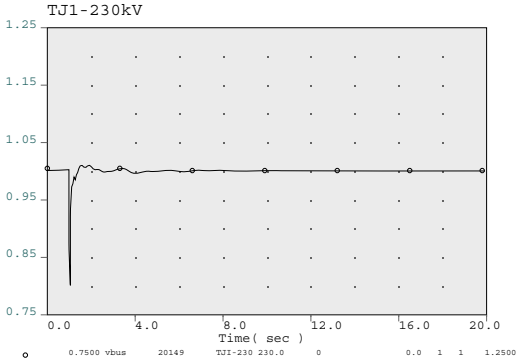
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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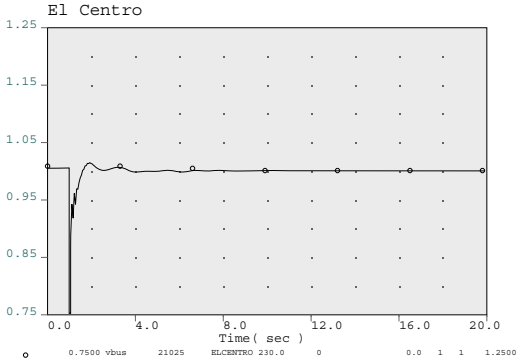
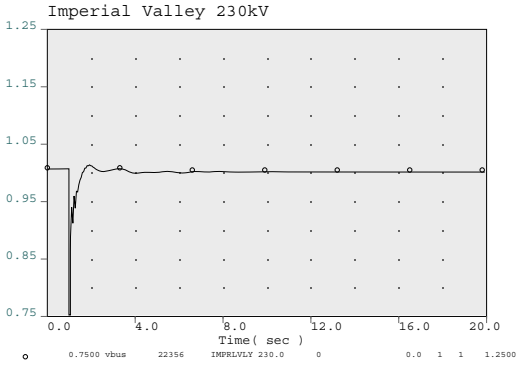
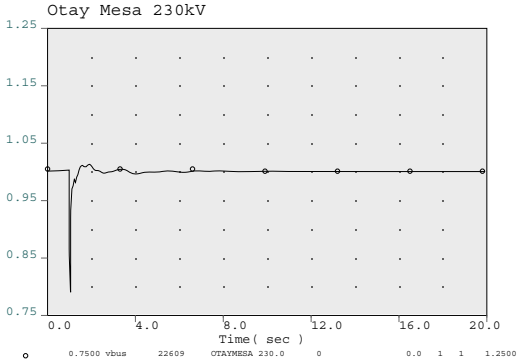


Imperial Valley 230kV



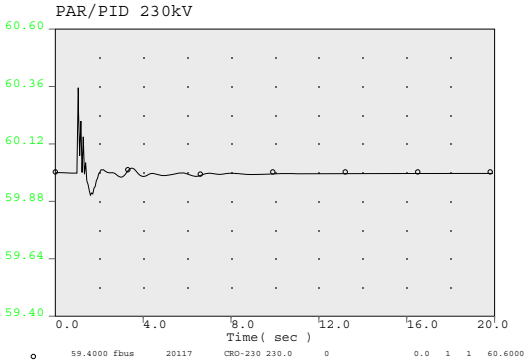
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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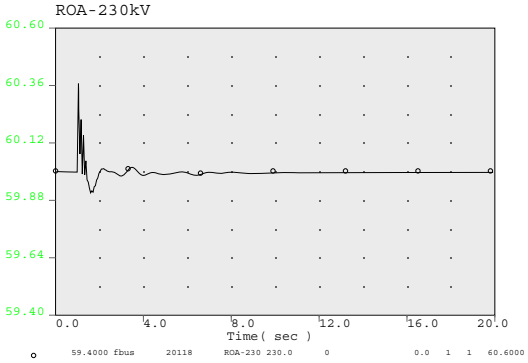
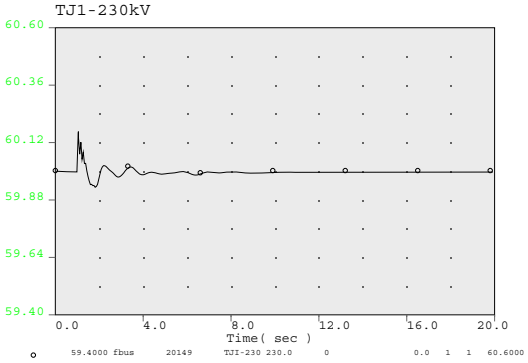


TJ1-230kV



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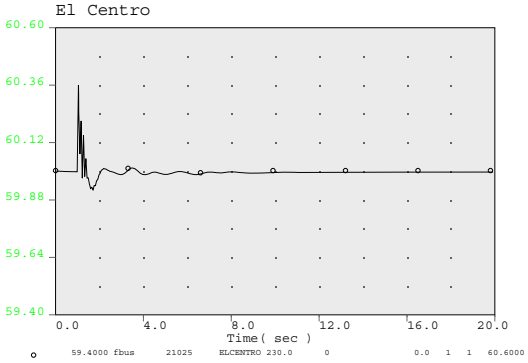
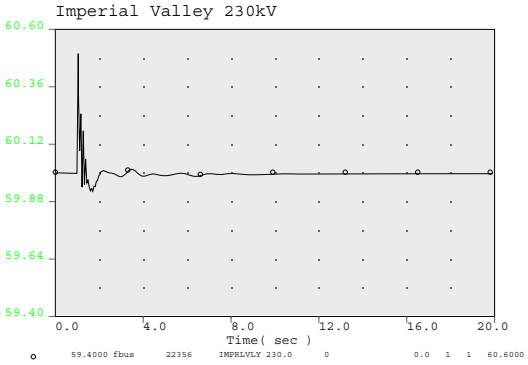
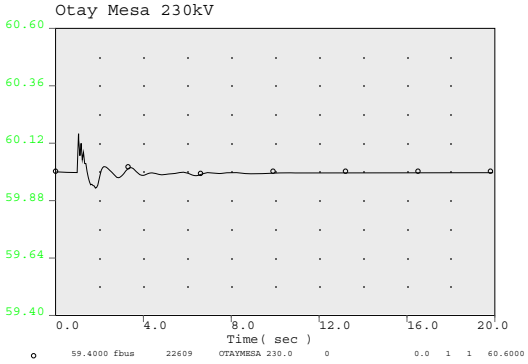


Imperial Valley 230kV



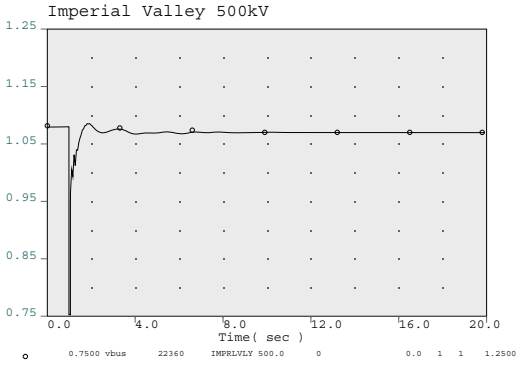
Otay Mesa 230kV



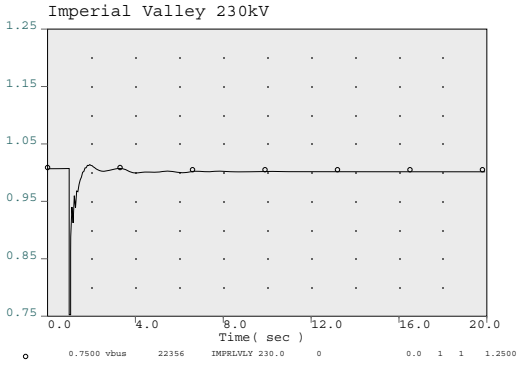
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

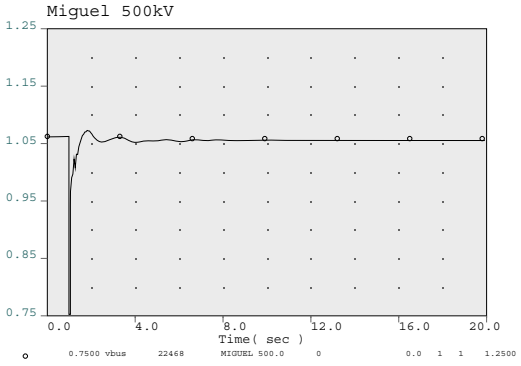
Imperial Valley 500kV



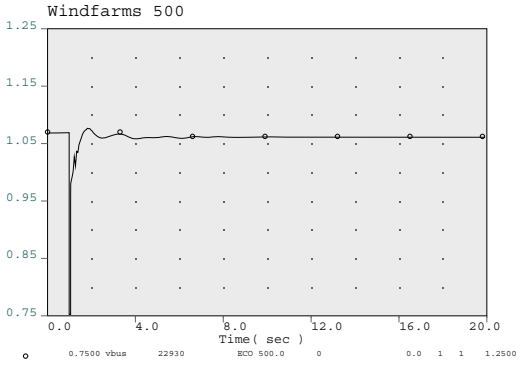
Imperial Valley 230kV



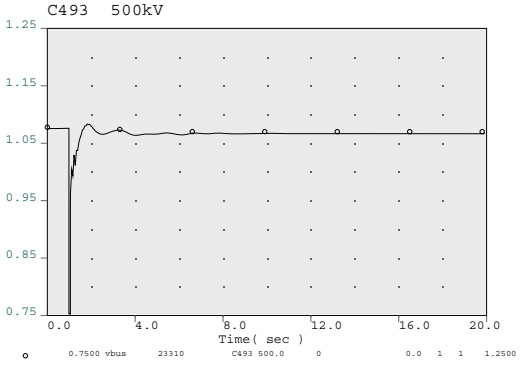
Miguel 500kV



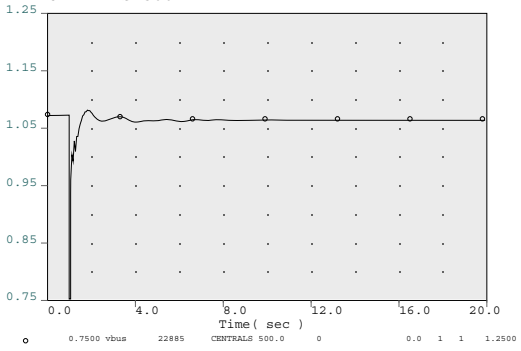
Windfarms 500



C493 500kV



CENTRALS 500kV

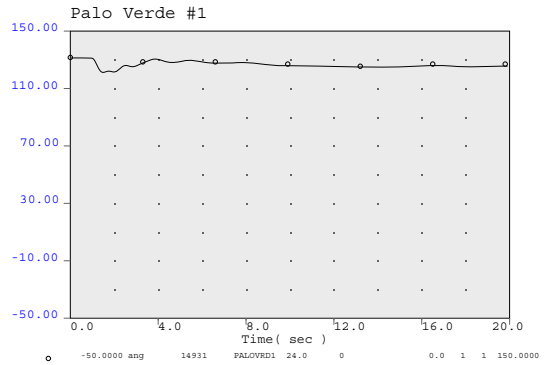


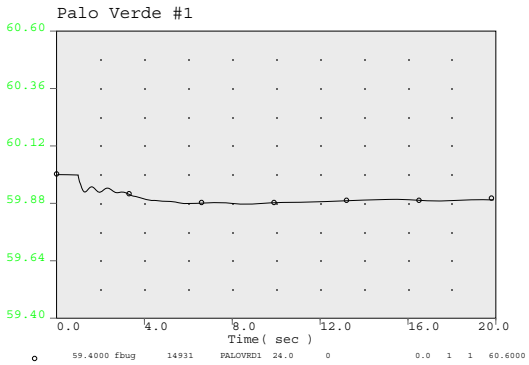
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

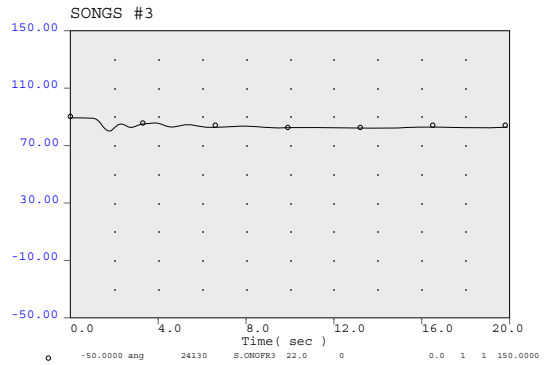
Imperial Valley Area - Frequency

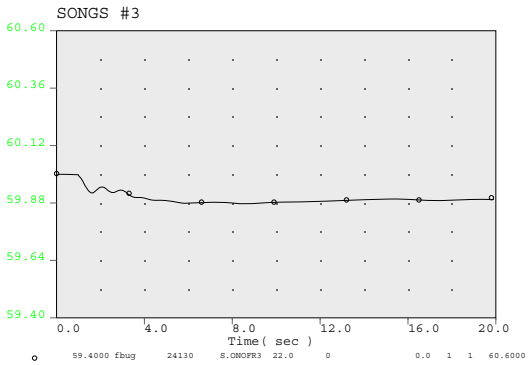
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

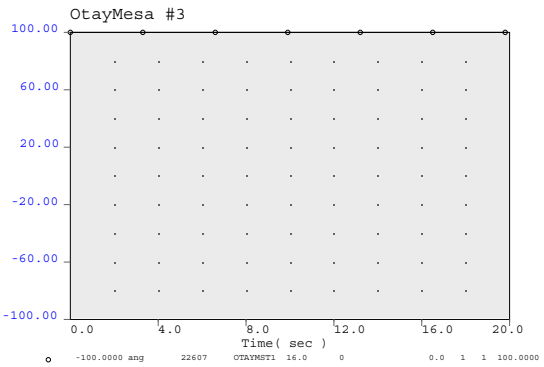
RELATIVE ROTOR ANGLE & FREQUENCY

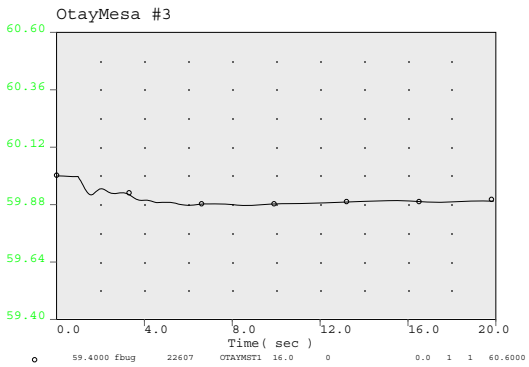












SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

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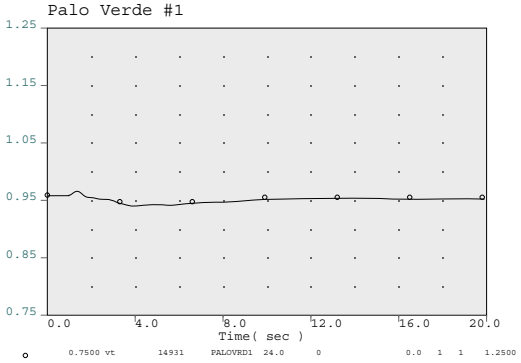
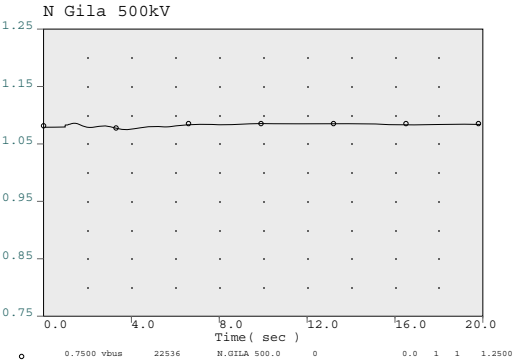
SDGE	PaloVerde-g1_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:31:15 2010

RELATIVE VOLTAGE

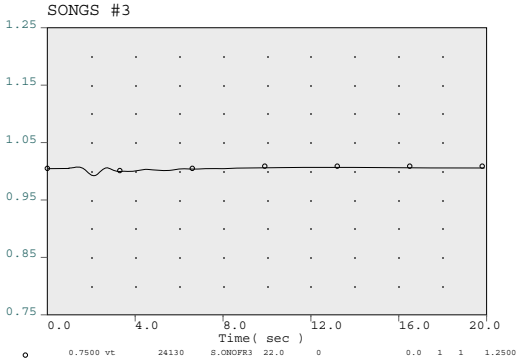
Palo Verde #1



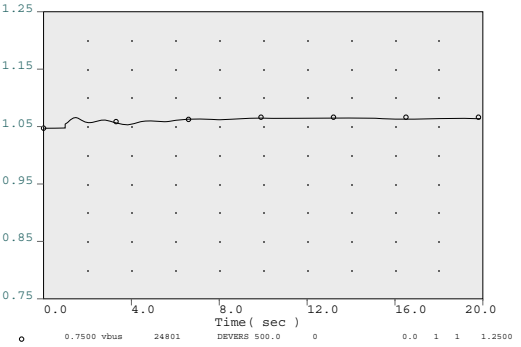
N Gila 500kV



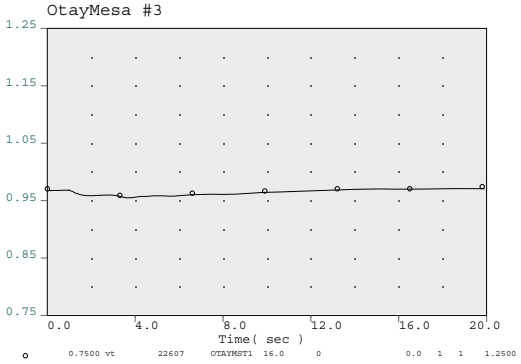
SONGS #3



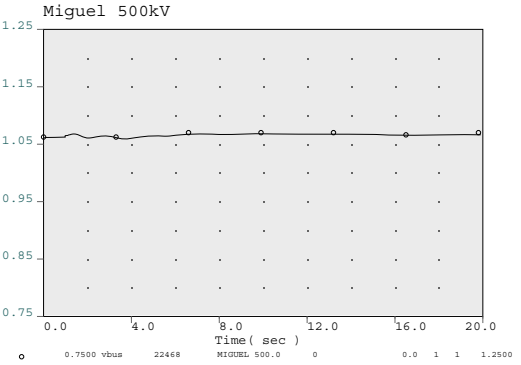
Devers 500



OtayMesa #3



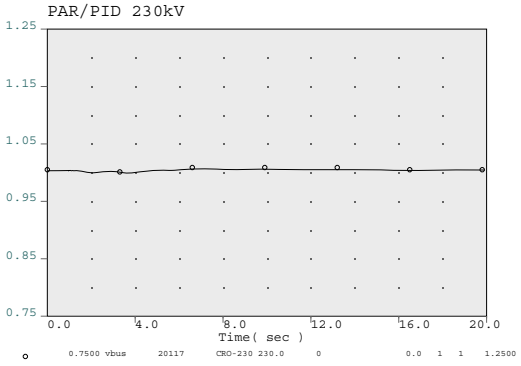
Miguel 500kV



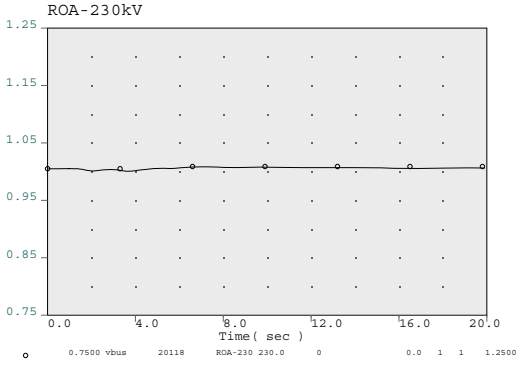
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

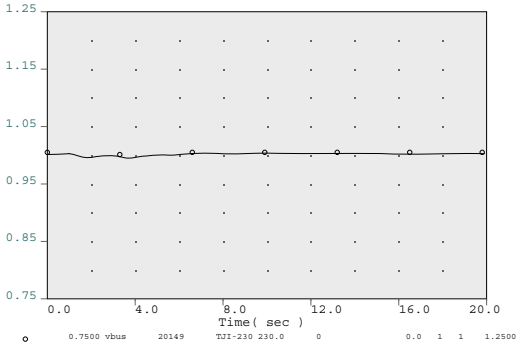
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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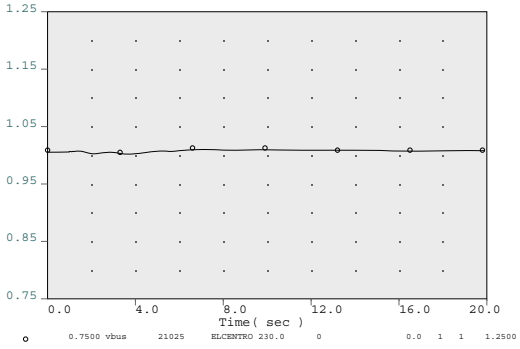
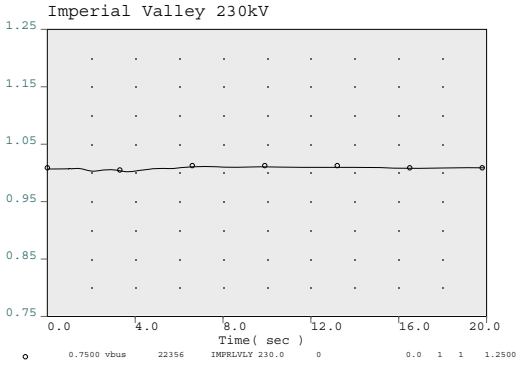
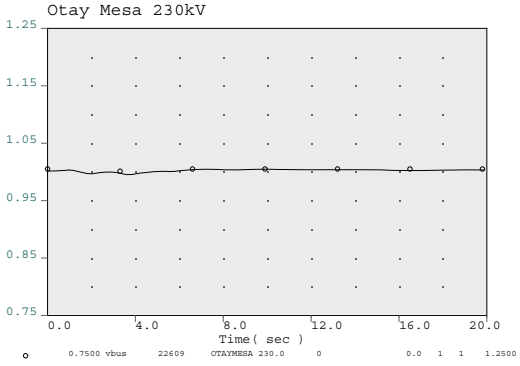


Imperial Valley 230kV



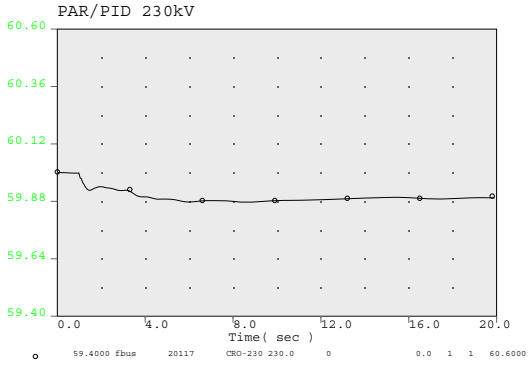
Otay Mesa 230kV



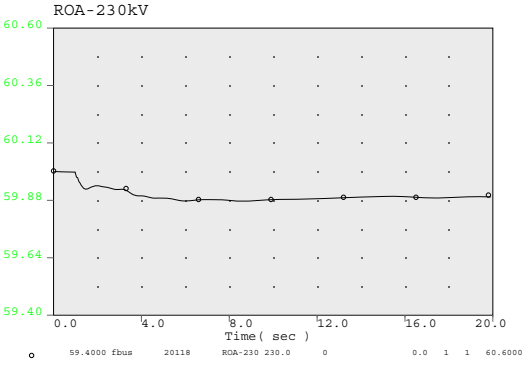
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

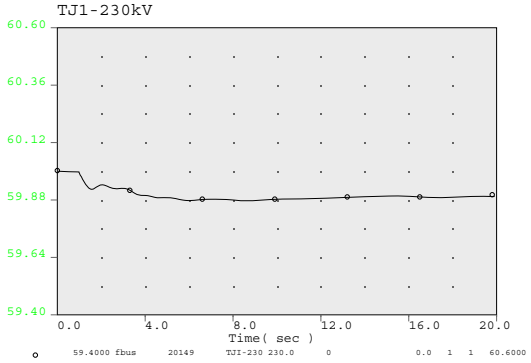
PAR/PID 230kV



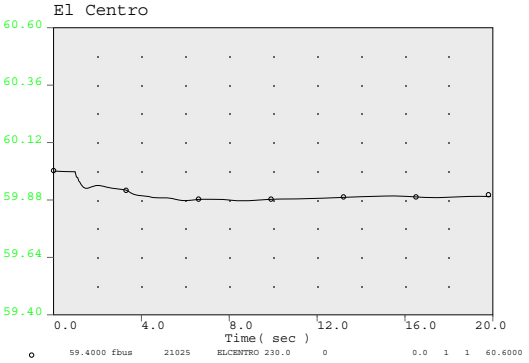
ROA-230kV



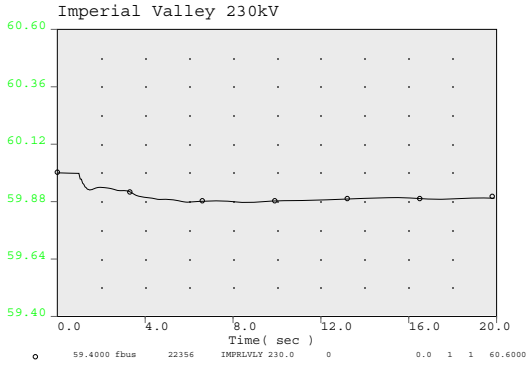
TJ1-230kV



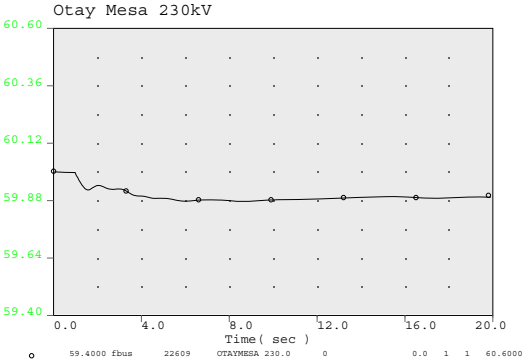
El Centro



Imperial Valley 230kV



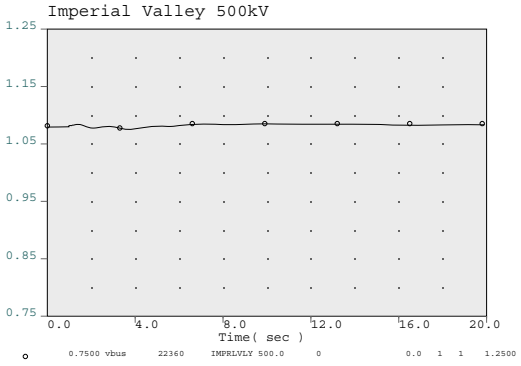
Otay Mesa 230kV



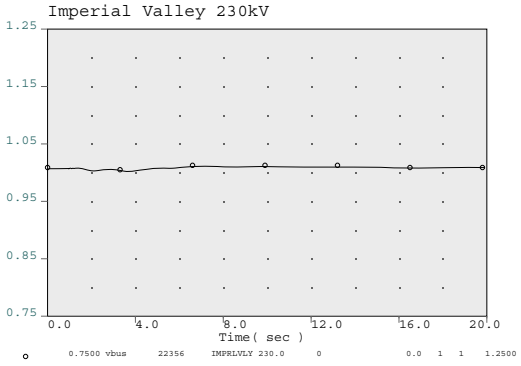
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Imperial Valley Area - VOLTAGE

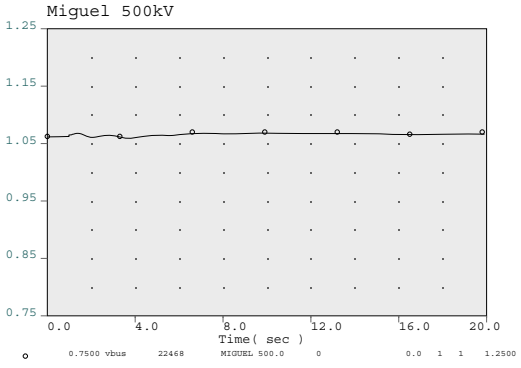
Imperial Valley 500kV



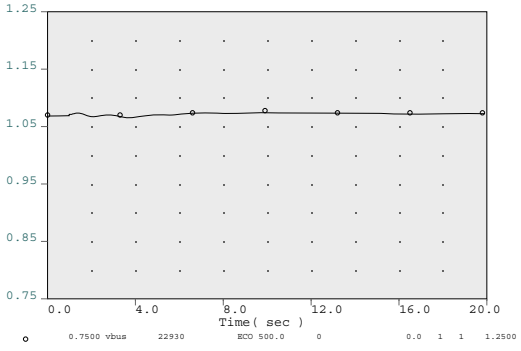
Imperial Valley 230kV



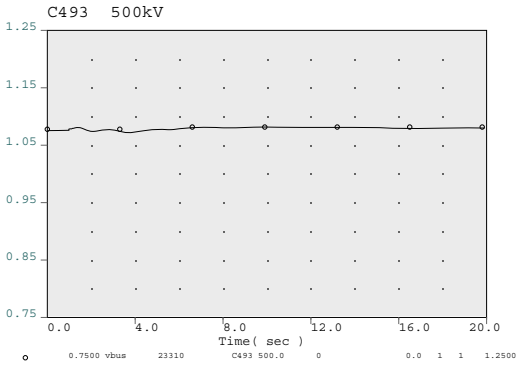
Miguel 500kV



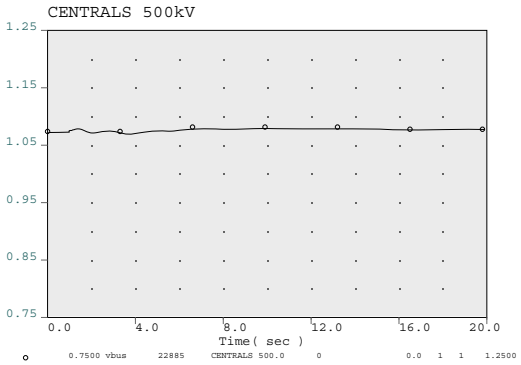
Windfarms 500



C493 500kV

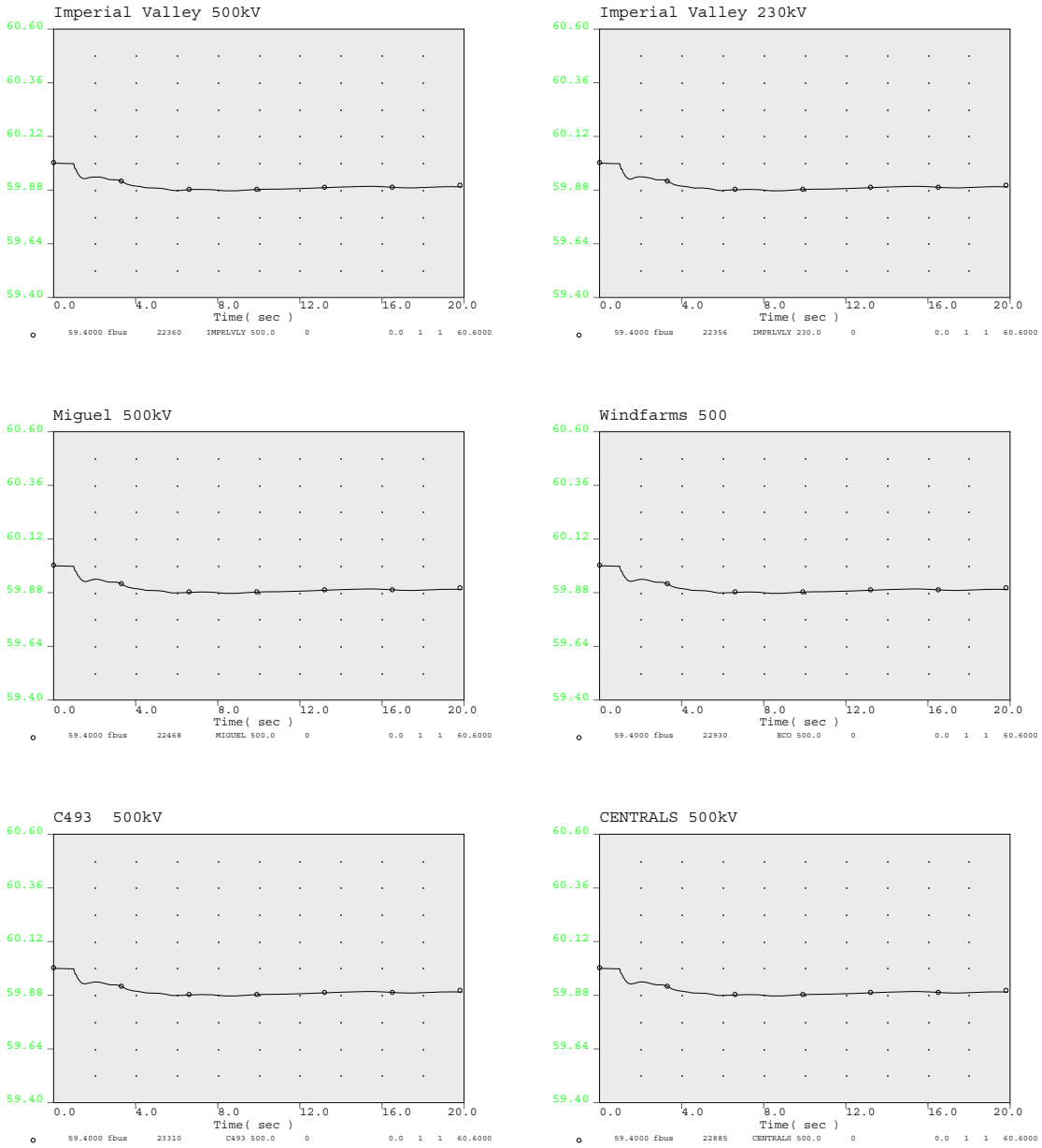


CENTRALS 500kV



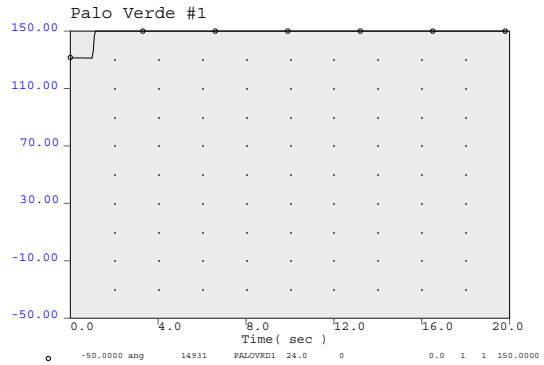
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

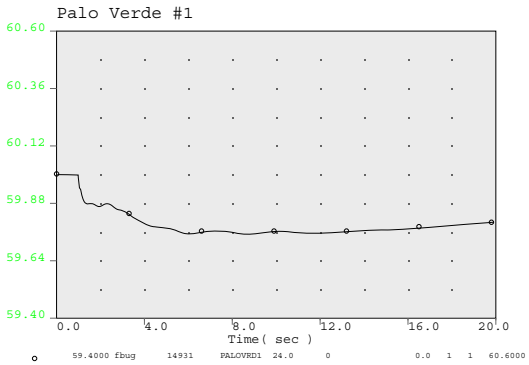
Imperial Valley Area - Frequency

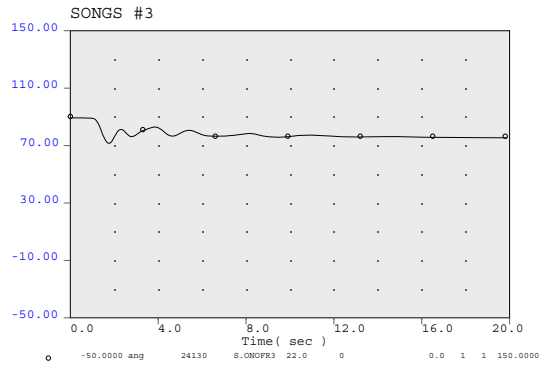


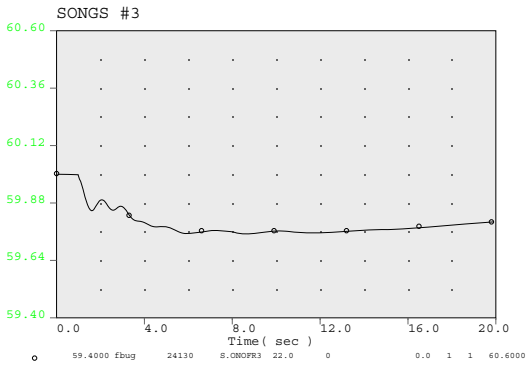
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

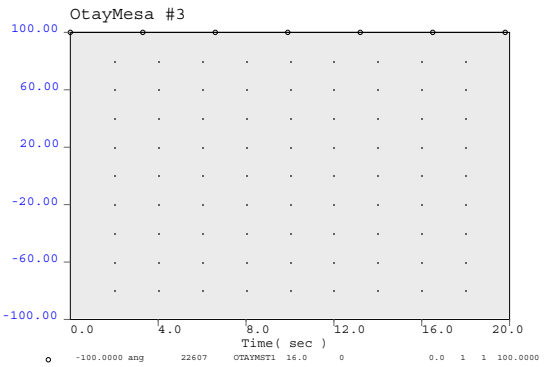
RELATIVE ROTOR ANGLE & FREQUENCY

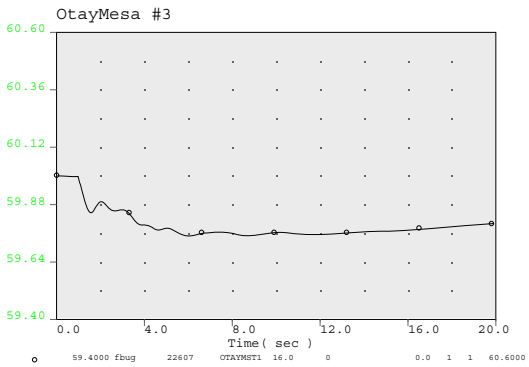












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2014 Light Autumn
Trip PaloVerde Generators 1 & 2

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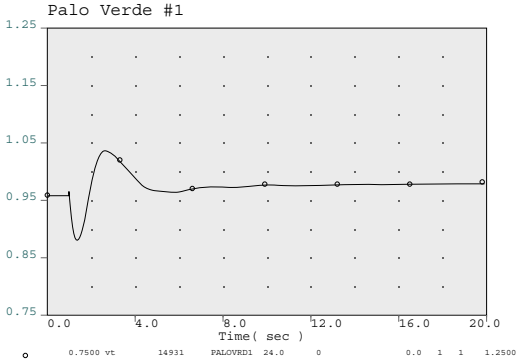
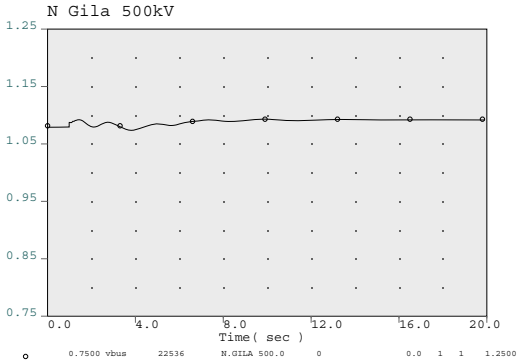
PaloVerde-g2_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:31:39 2010

RELATIVE VOLTAGE

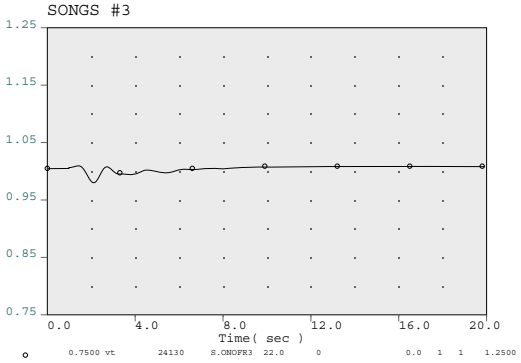
Palo Verde #1



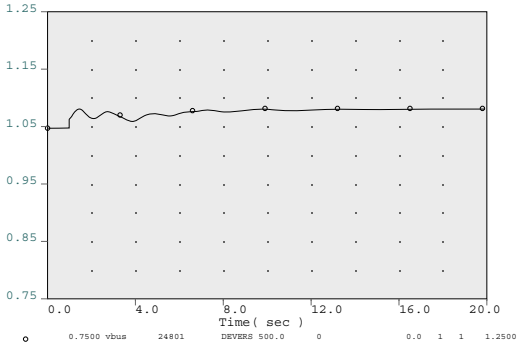
N Gila 500kV



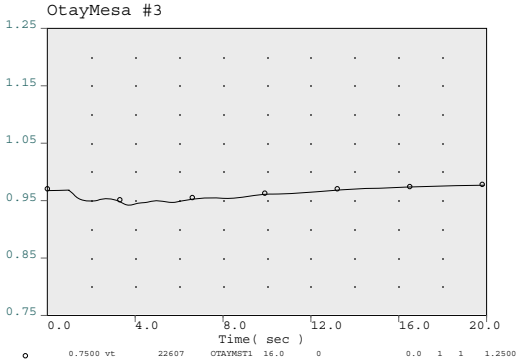
SONGS #3



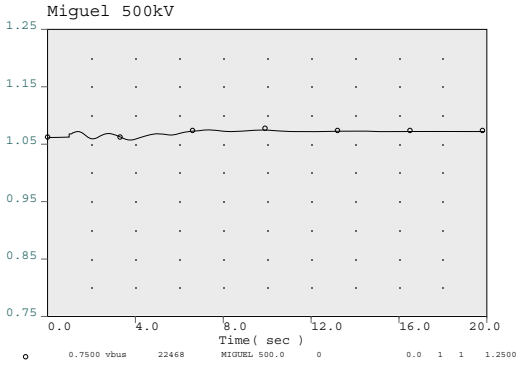
Devers 500



OtayMesa #3



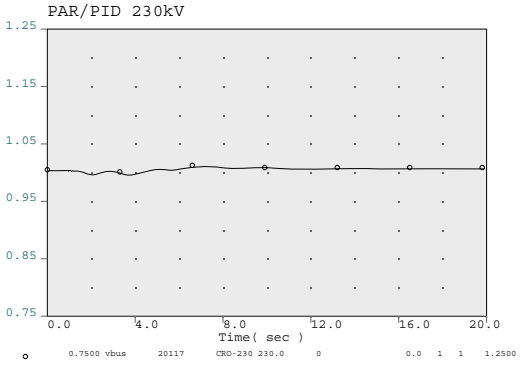
Miguel 500kV



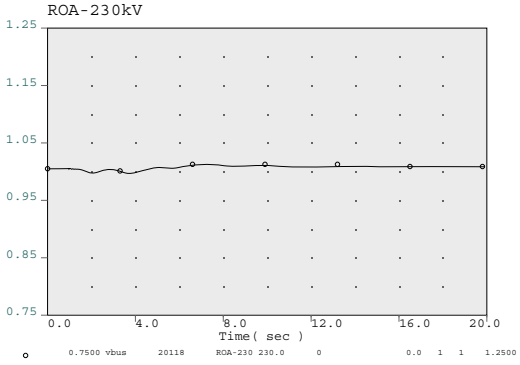
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

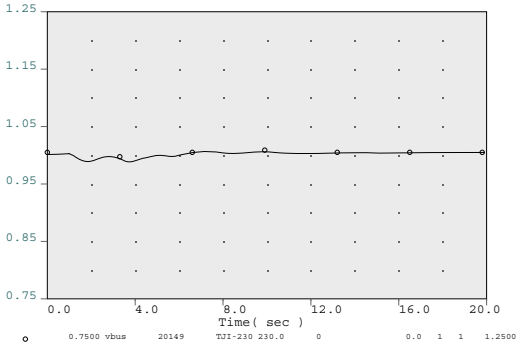
PAR/PID 230kV



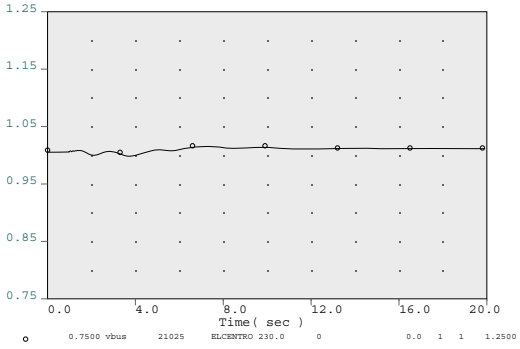
ROA-230kV



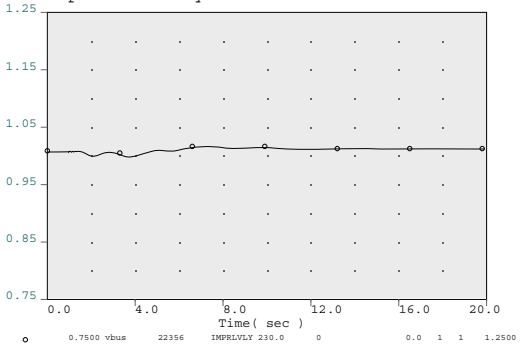
TJ1-230kV



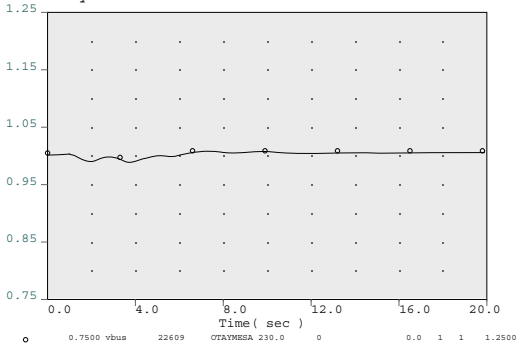
El Centro



Imperial Valley 230kV



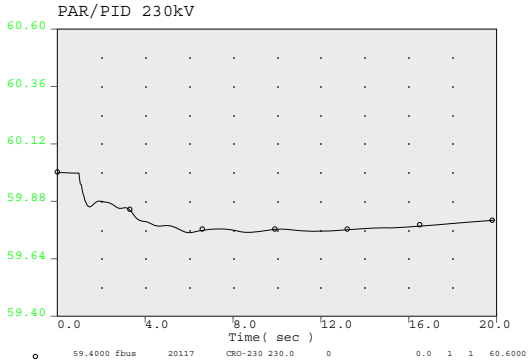
Otay Mesa 230kV



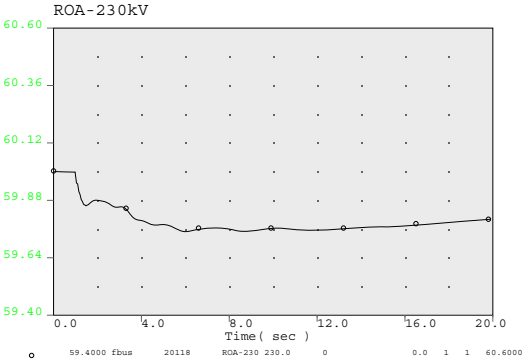
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

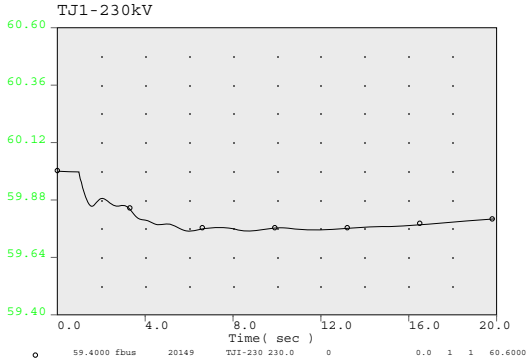
PAR/PID 230kV



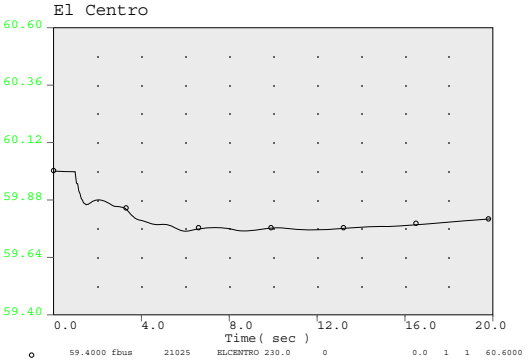
ROA-230kV



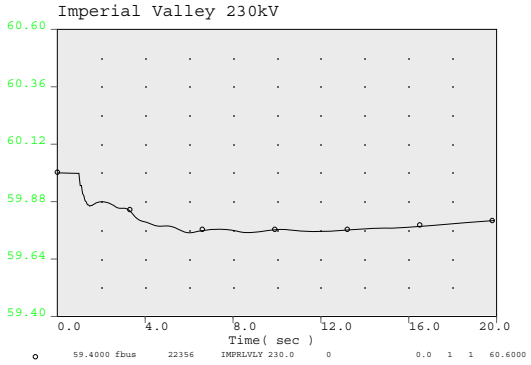
TJ1-230kV



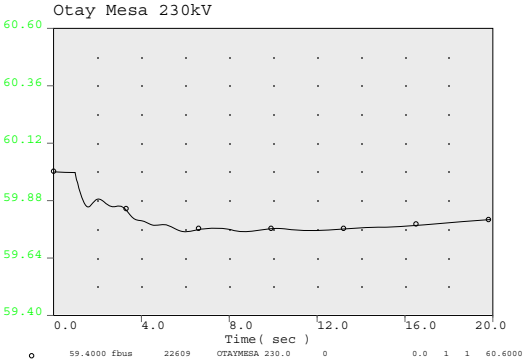
El Centro



Imperial Valley 230kV



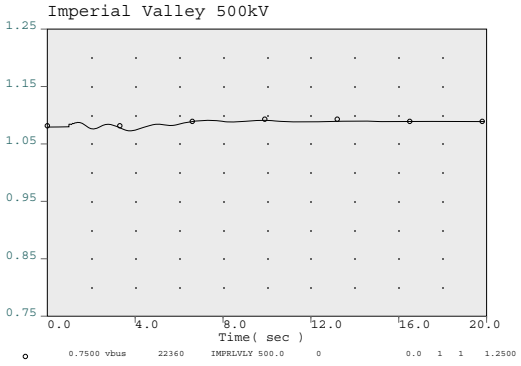
Otay Mesa 230kV



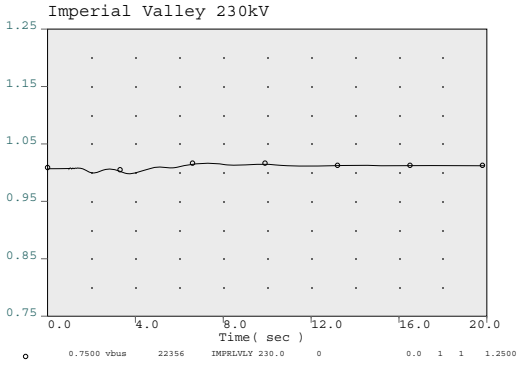
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE

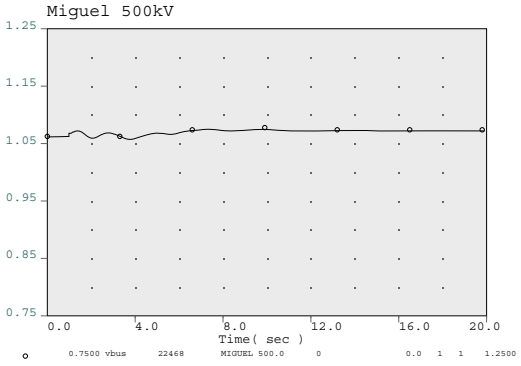
Imperial Valley 500kV



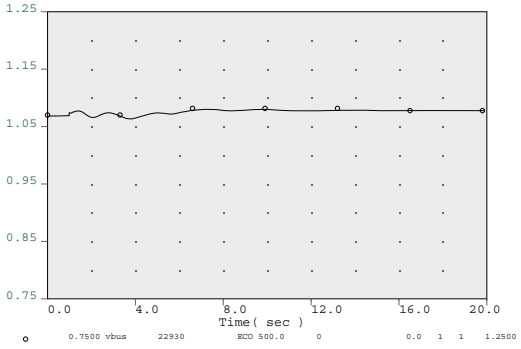
Imperial Valley 230kV



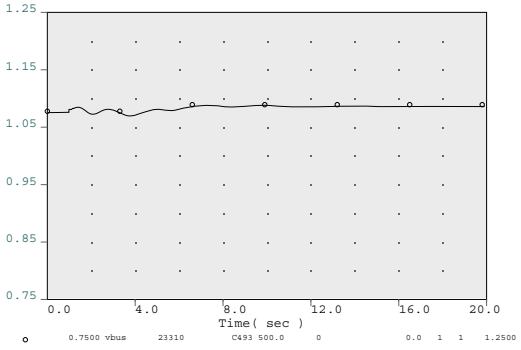
Miguel 500kV



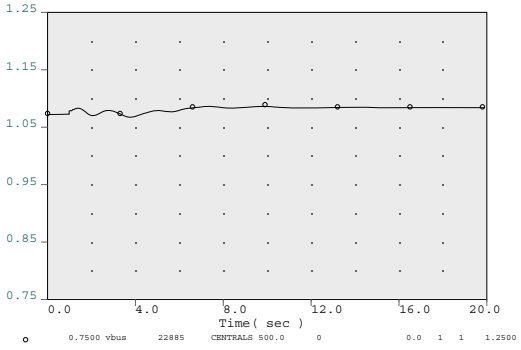
Windfarms 500



C493 500kV

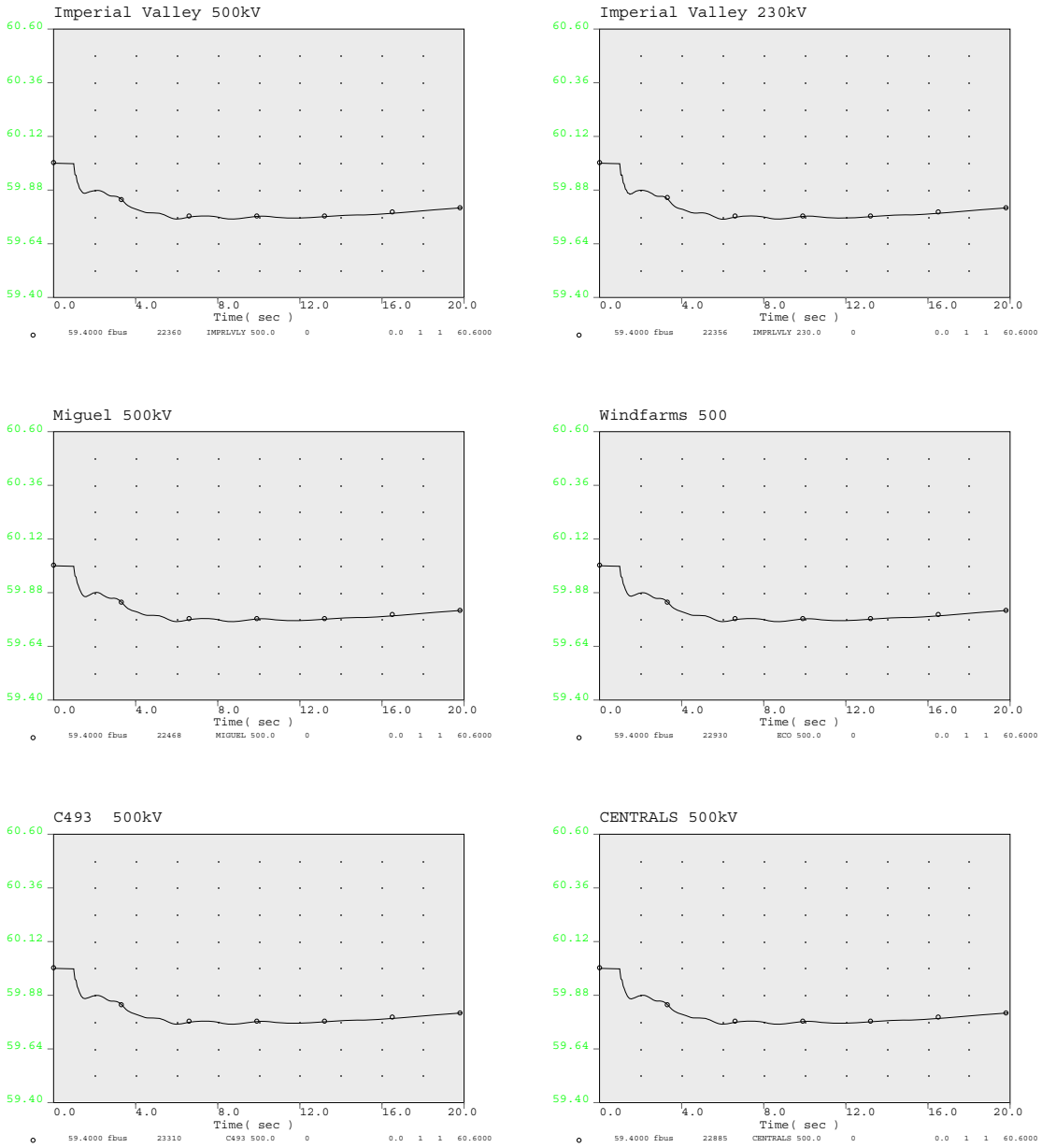


CENTRALS 500kV



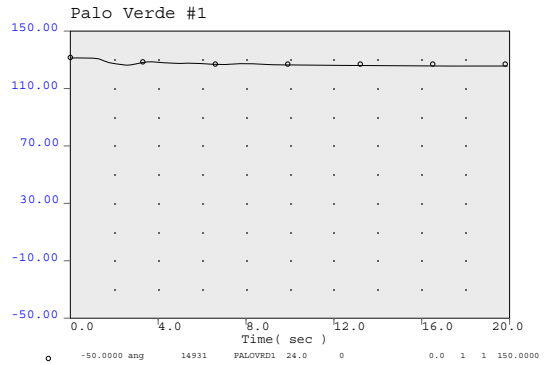
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

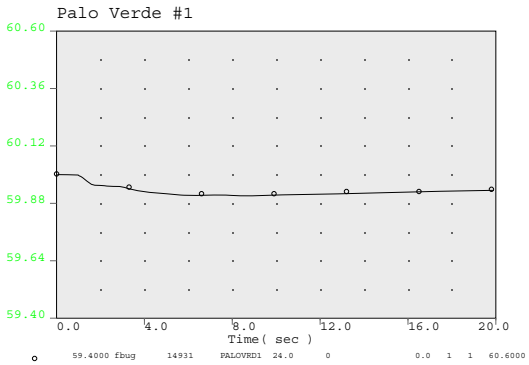
Imperial Valley Area - Frequency

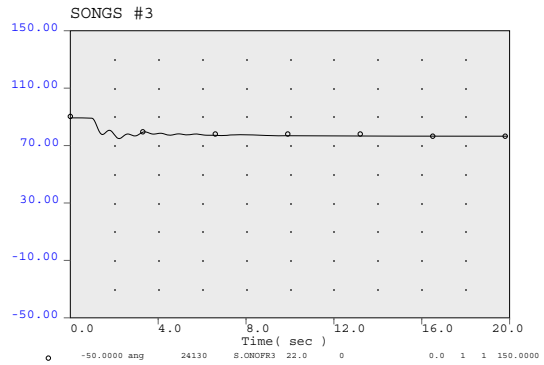


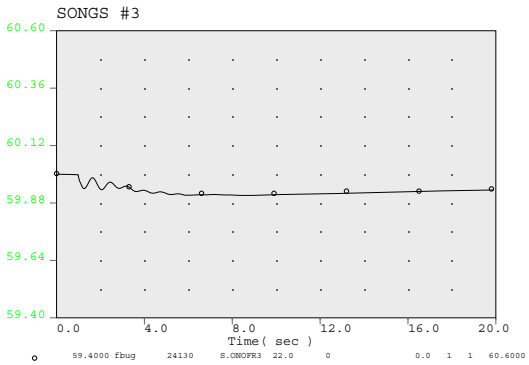
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

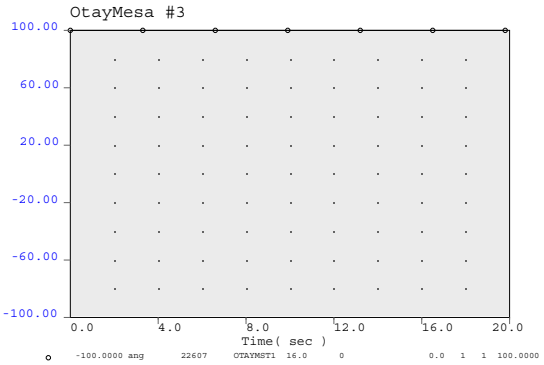
RELATIVE ROTOR ANGLE & FREQUENCY

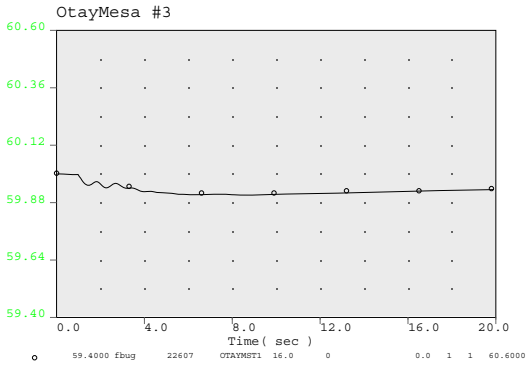












SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Page 1

SONGS-g1_pst_int_ll.chf

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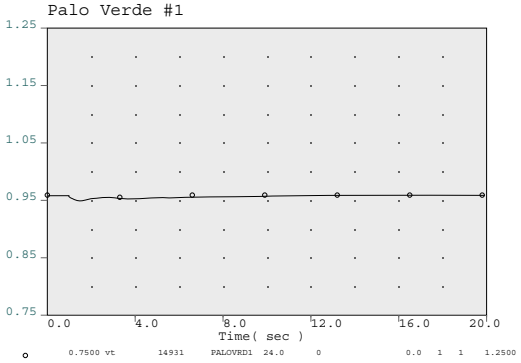
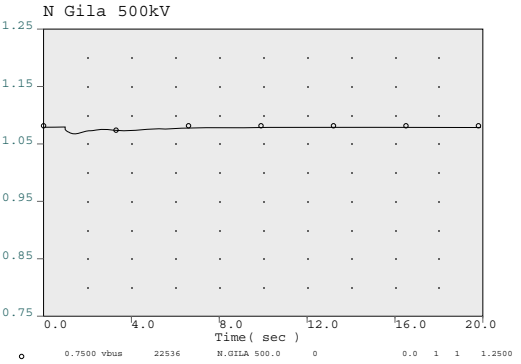
RELATIVE VOLTAGE

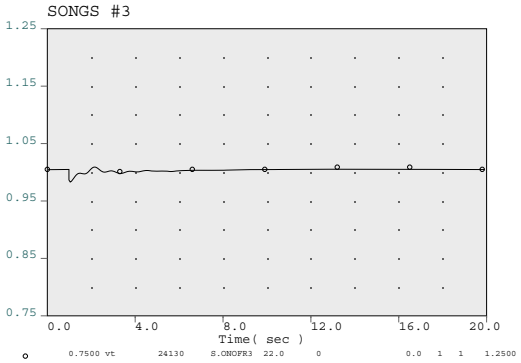
Palo Verde #1



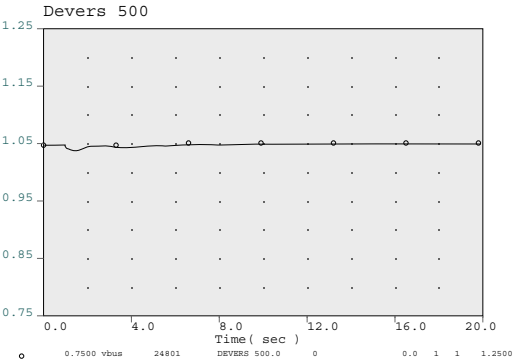
N Gila 500kV



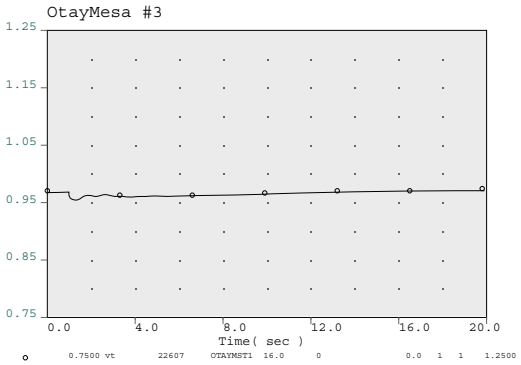
SONGS #3



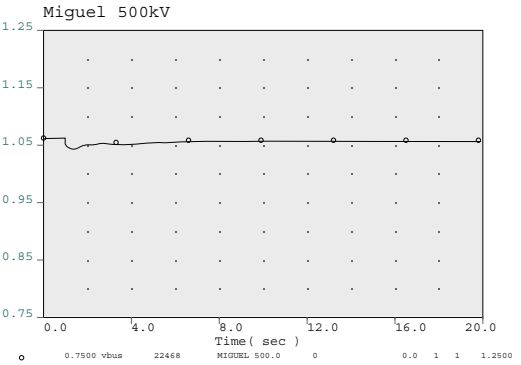
Devers 500



OtayMesa #3



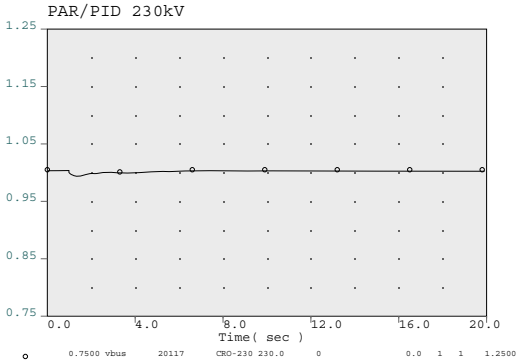
Miguel 500kV



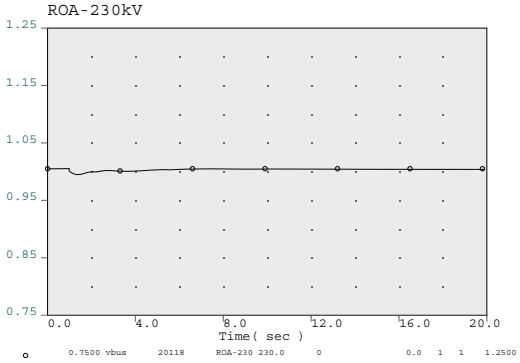
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

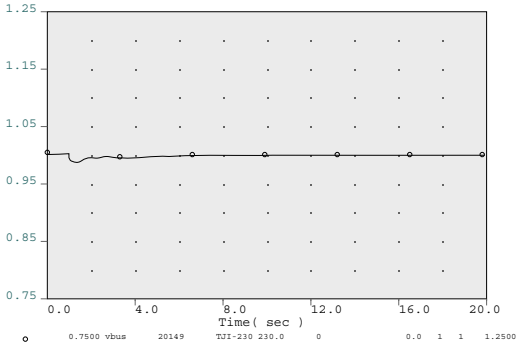
PAR/PID 230kV



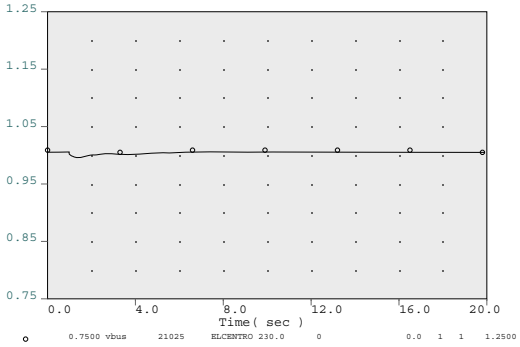
ROA-230kV



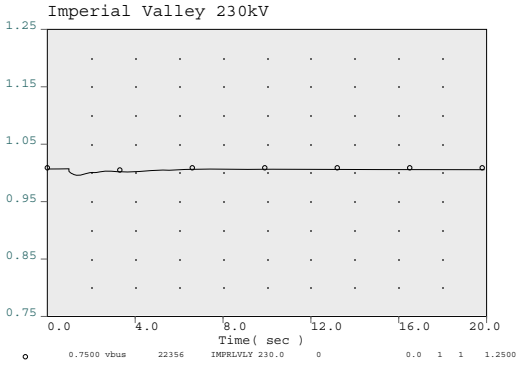
TJ1-230kV



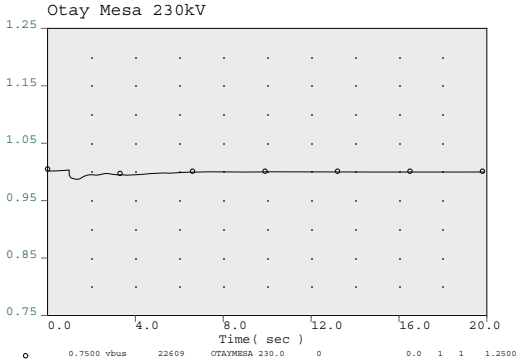
El Centro



Imperial Valley 230kV

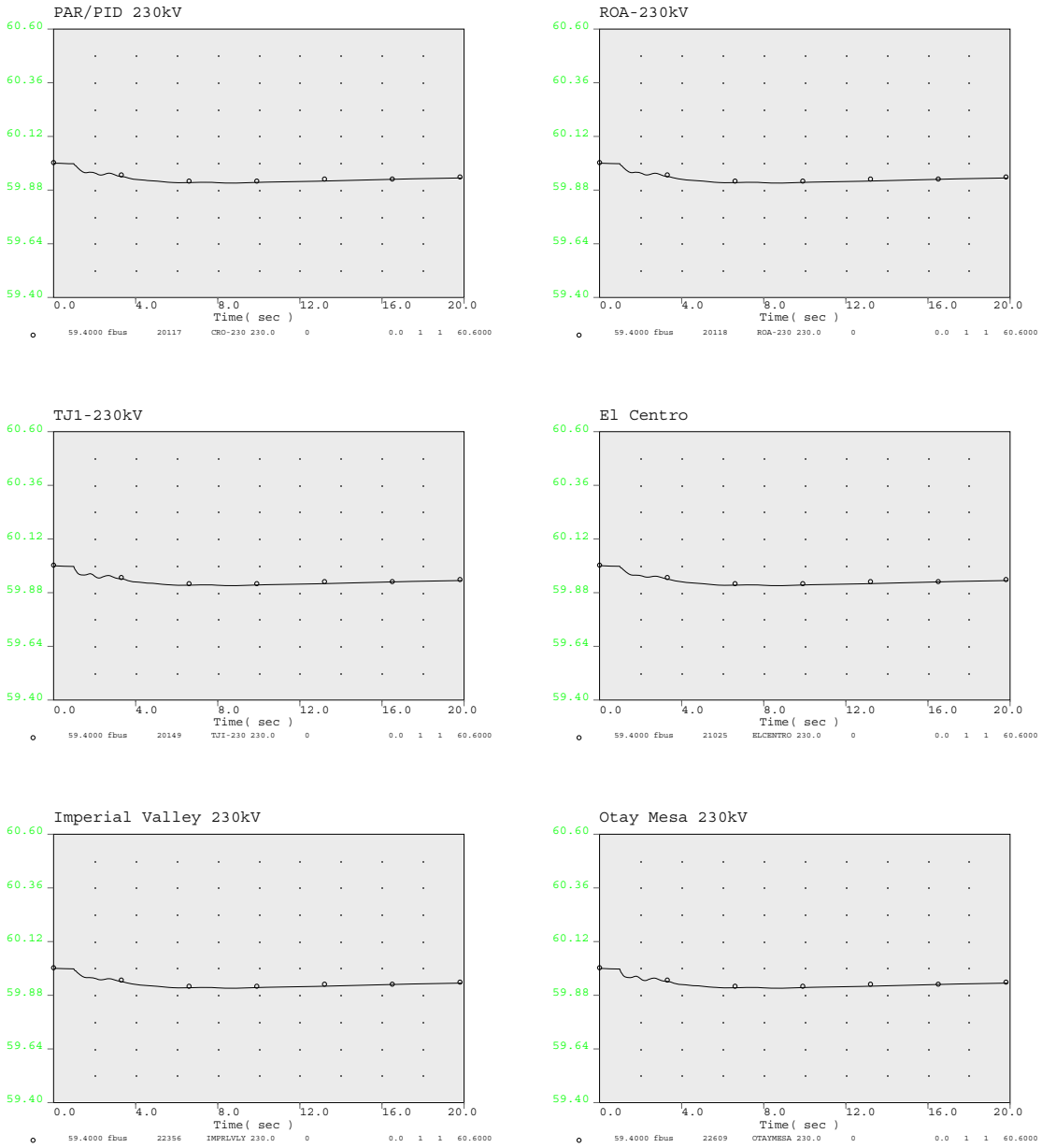


Otay Mesa 230kV



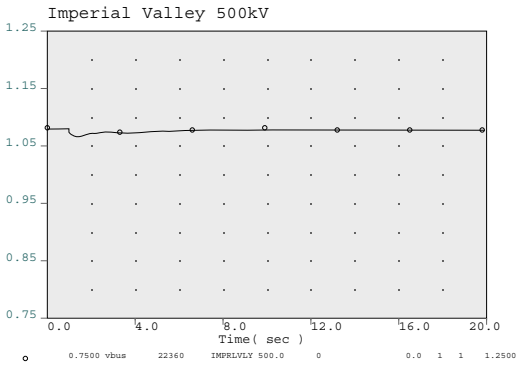
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

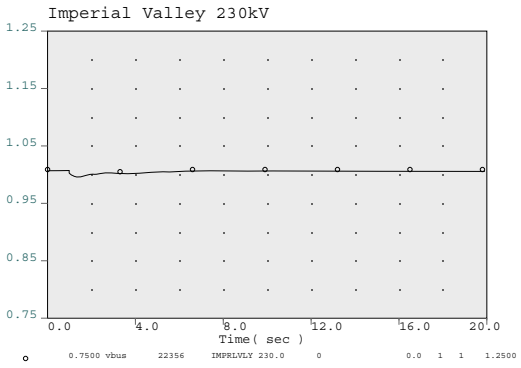
Affected System Frequency Check and Comparison

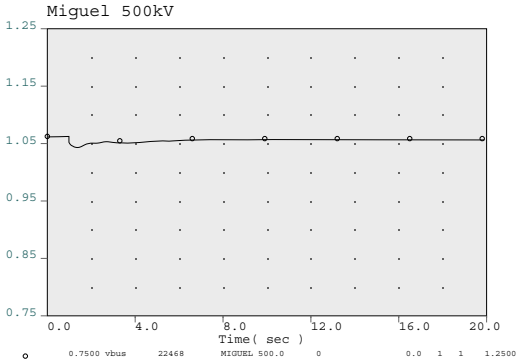


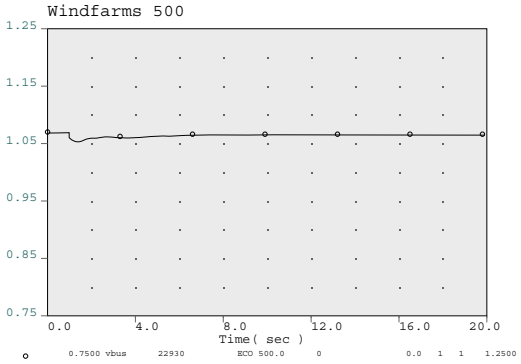
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

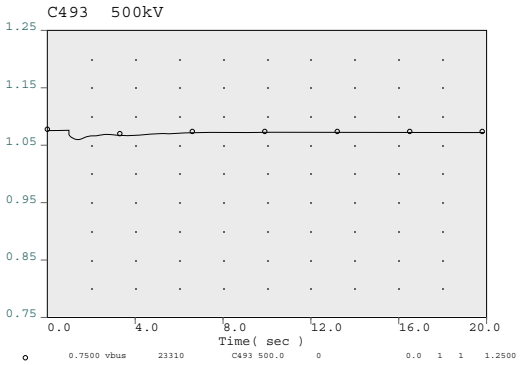
Imperial Valley Area - VOLTAGE

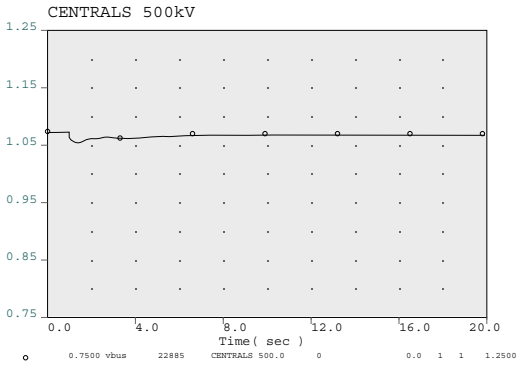






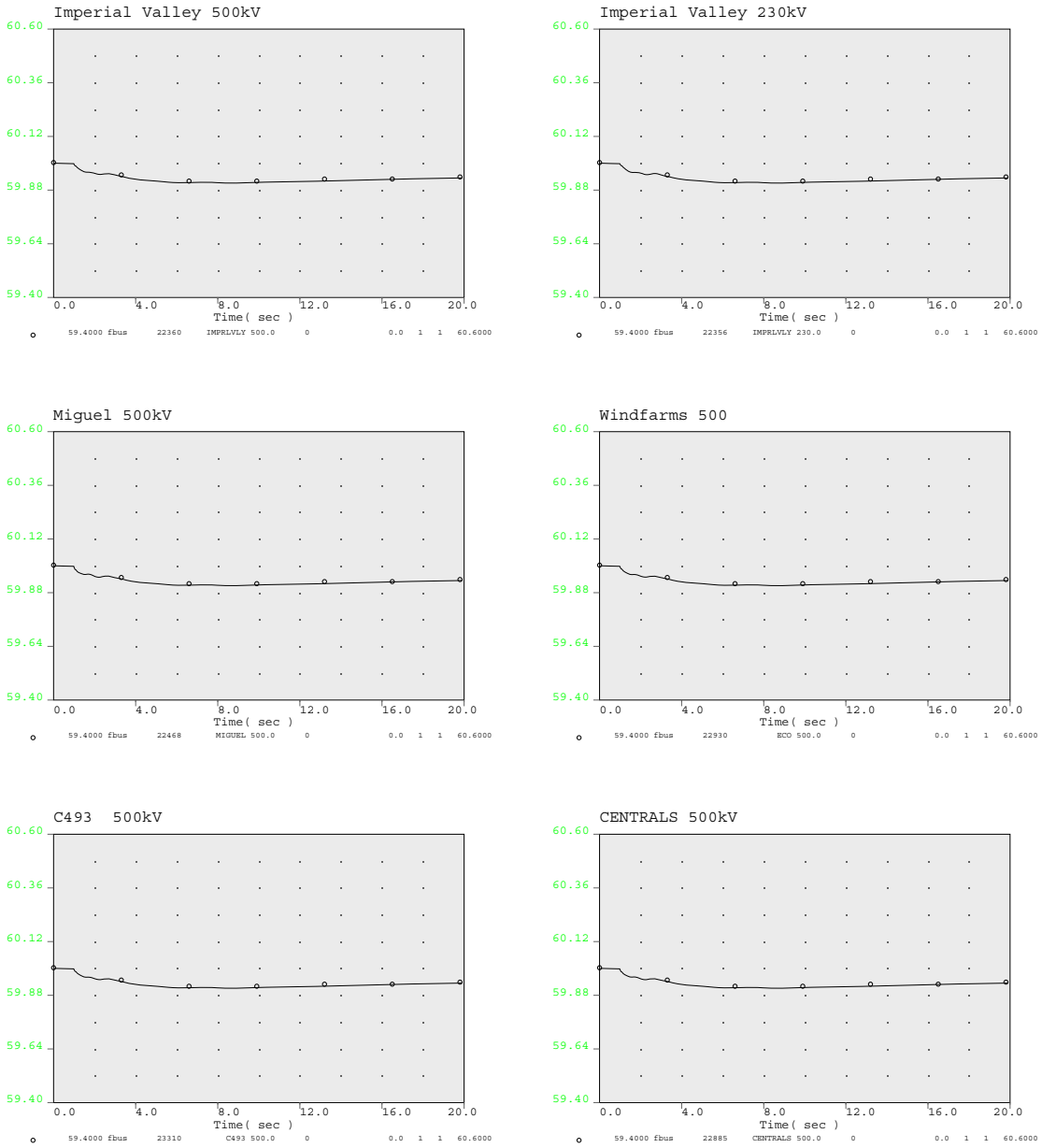






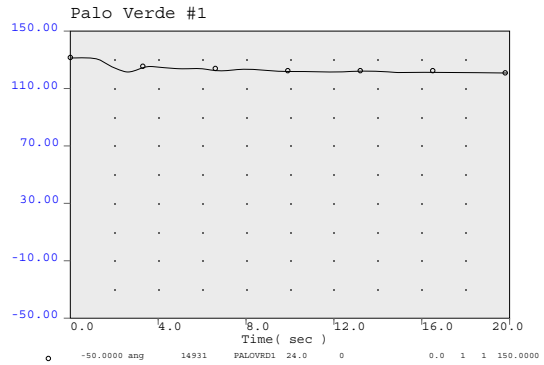
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

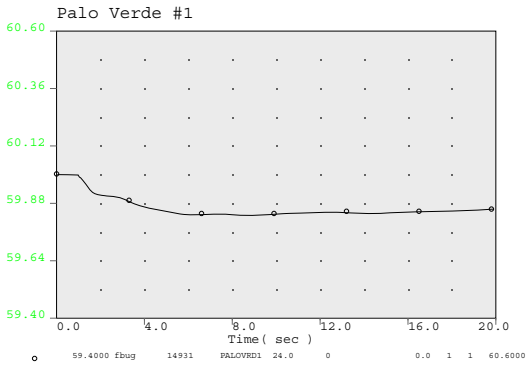
Imperial Valley Area - Frequency

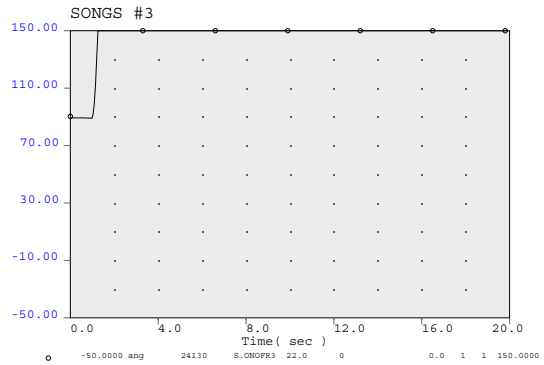


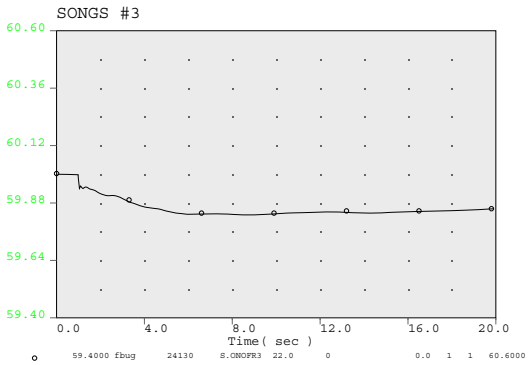
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

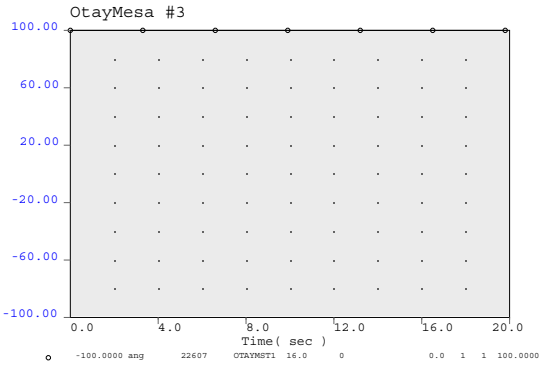
RELATIVE ROTOR ANGLE & FREQUENCY

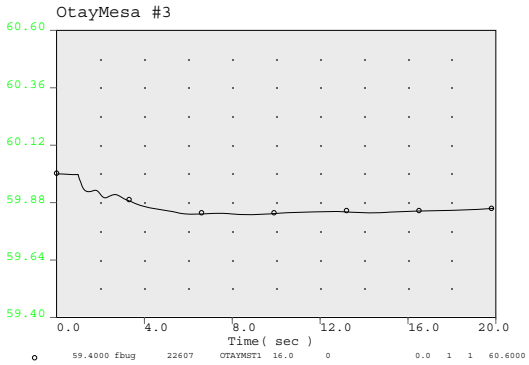












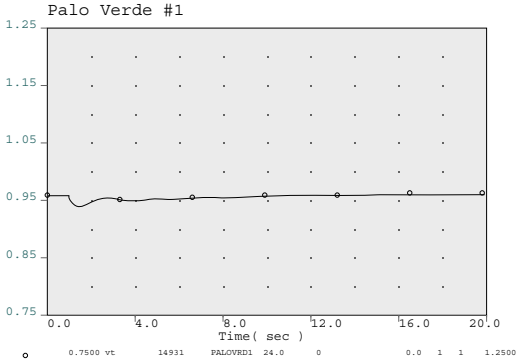
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Page 1

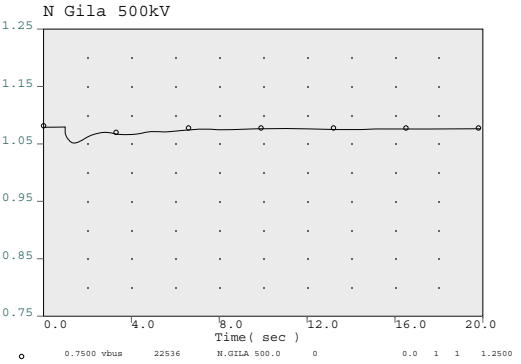
SDGE	SONGS-g2_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:32:24 2010

RELATIVE VOLTAGE

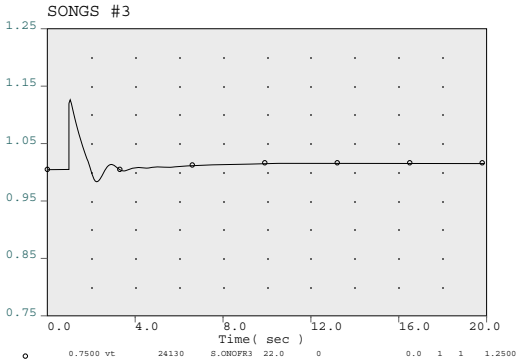
Palo Verde #1



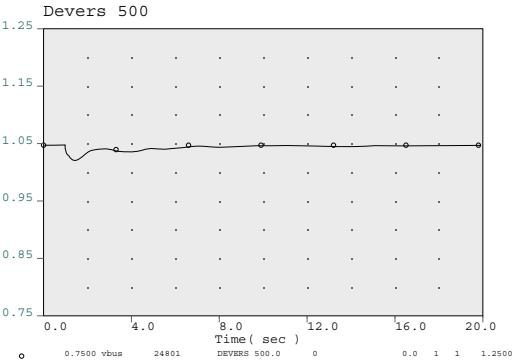
N Gila 500kV



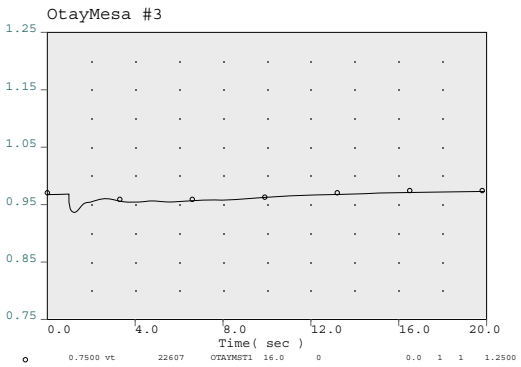
SONGS #3



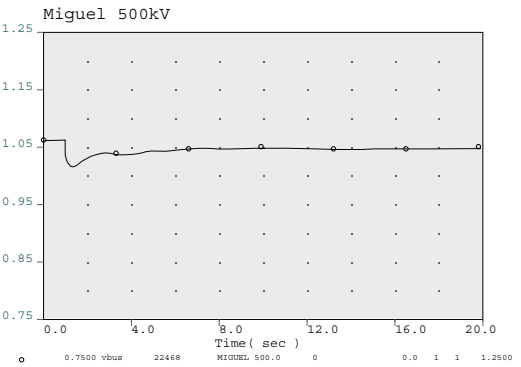
Devers 500



OtayMesa #3



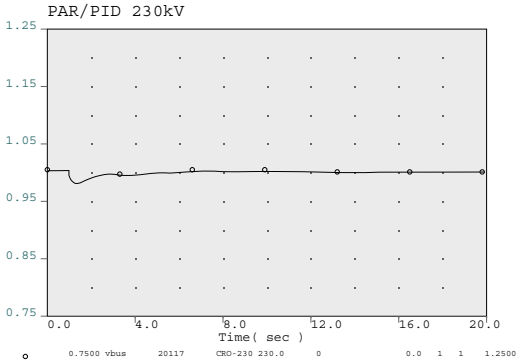
Miguel 500kV



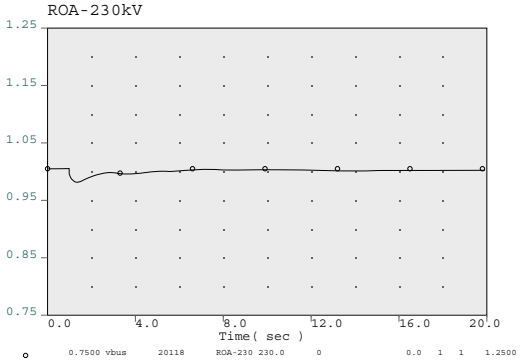
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

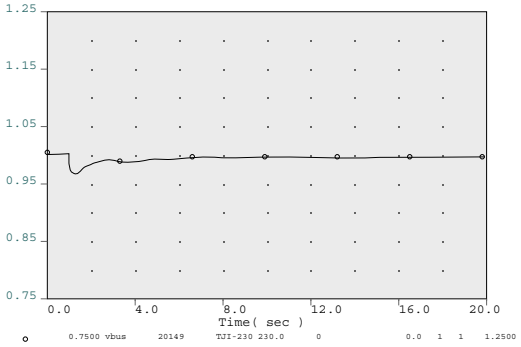
PAR/PID 230kV



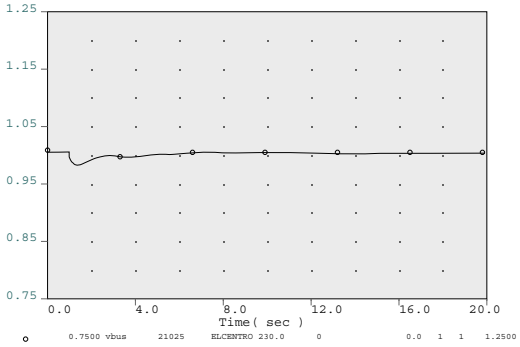
ROA-230kV



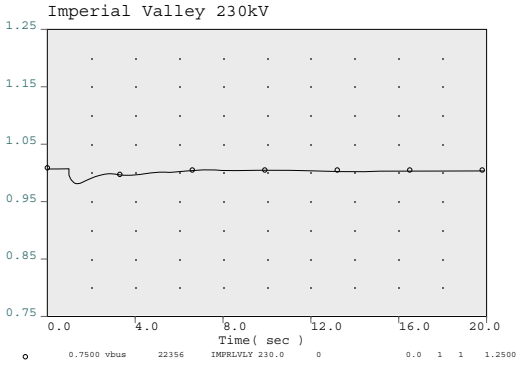
TJ1-230kV



El Centro



Imperial Valley 230kV



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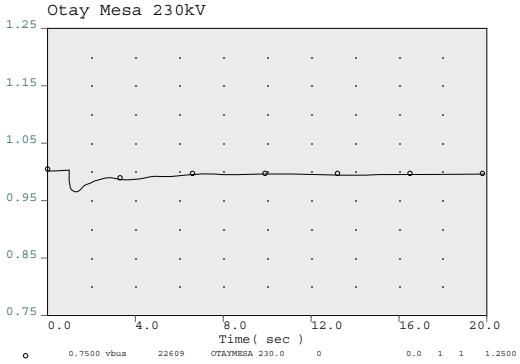
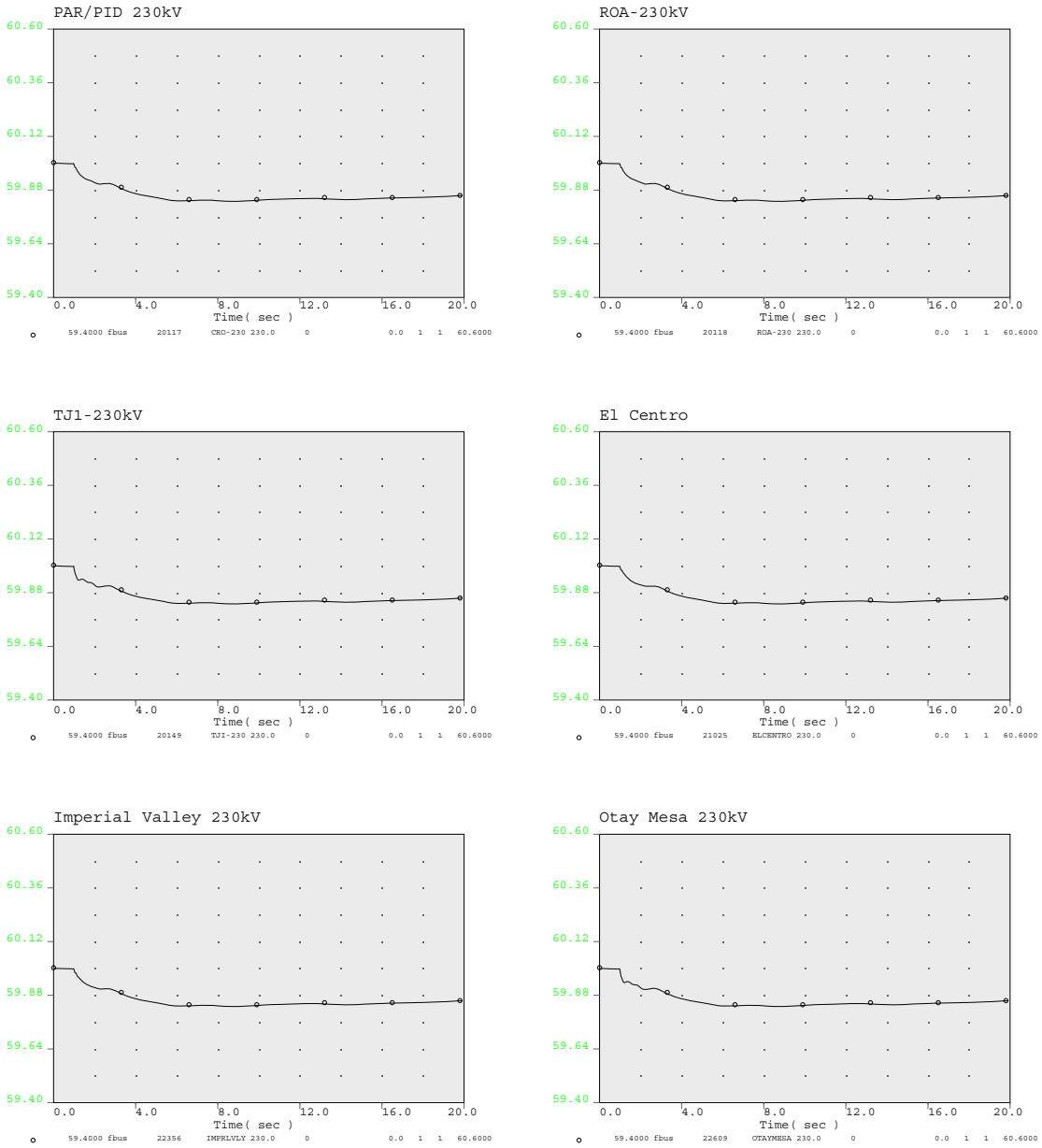


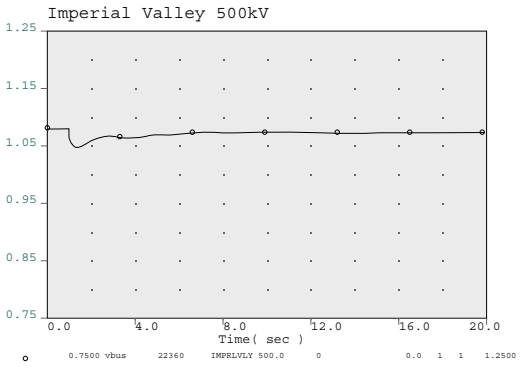
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

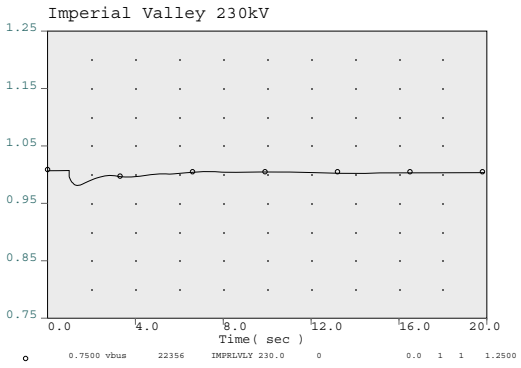
Affected System Frequency Check and Comparison

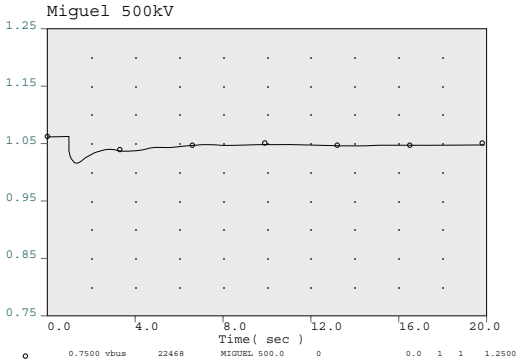


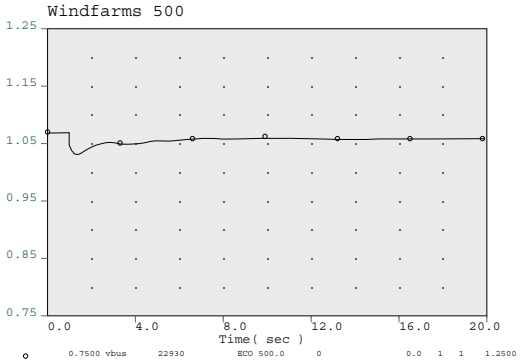
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

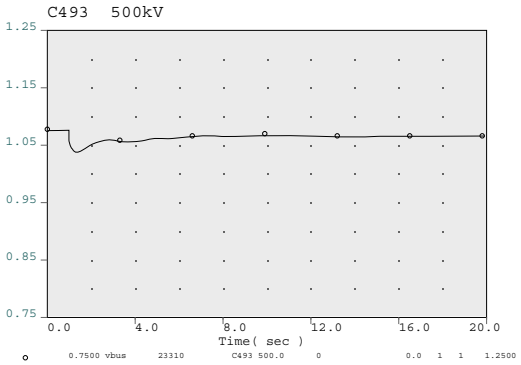
Imperial Valley Area - VOLTAGE

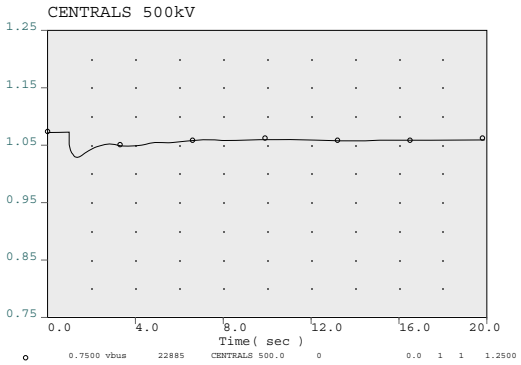






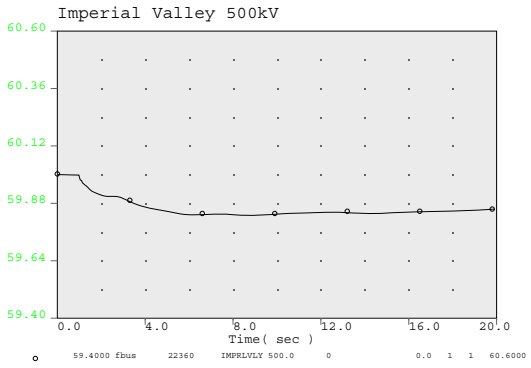


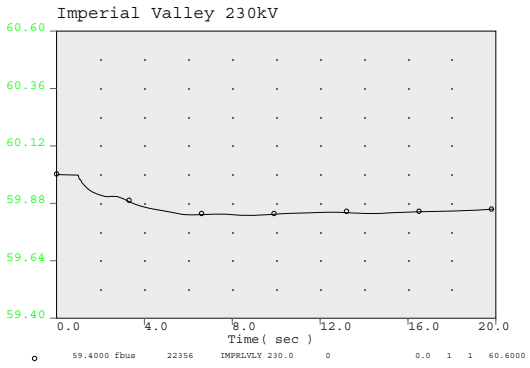


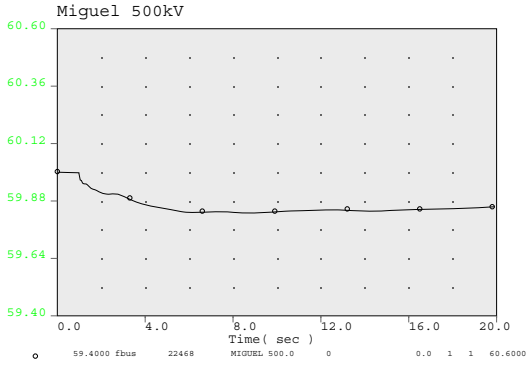


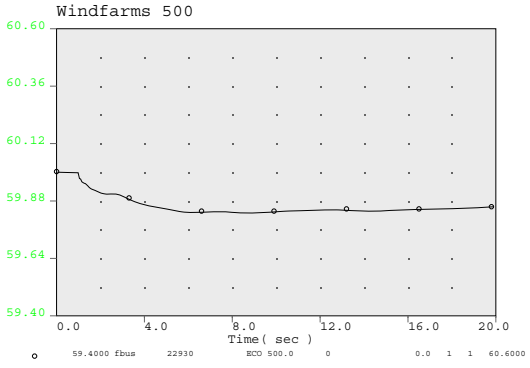
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

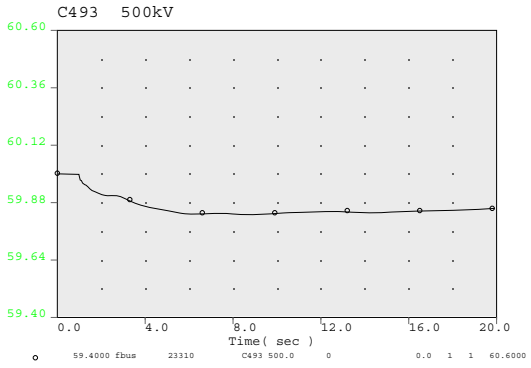
Imperial Valley Area - Frequency

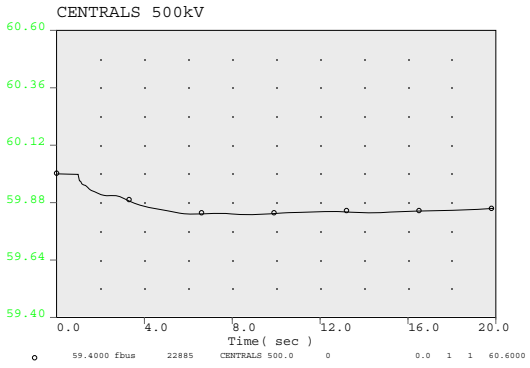






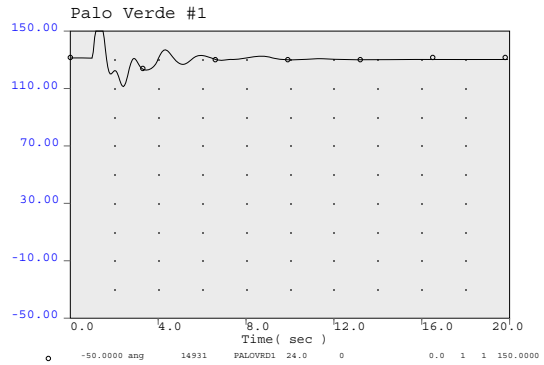


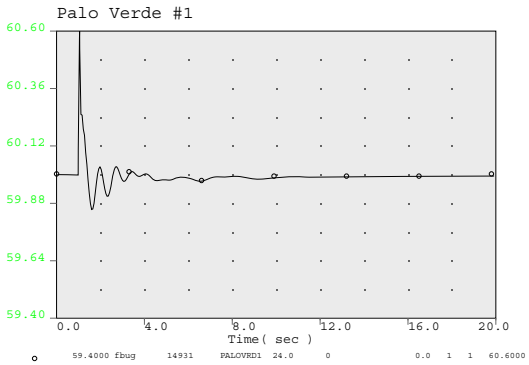


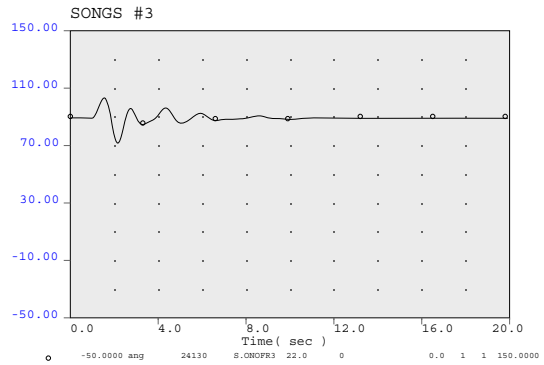


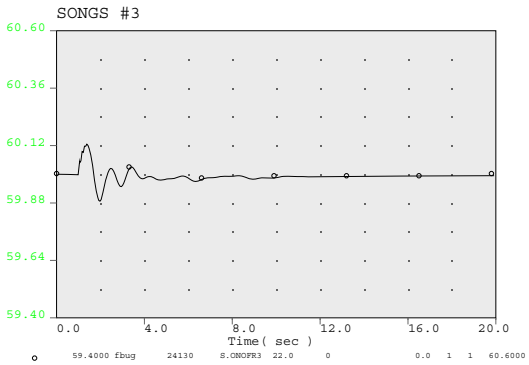
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

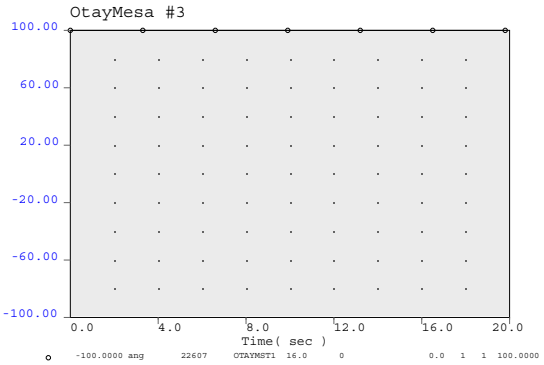
RELATIVE ROTOR ANGLE & FREQUENCY

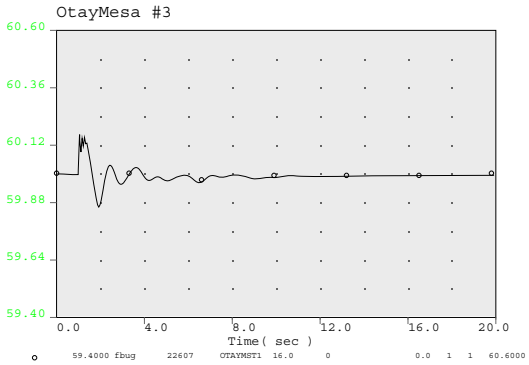












SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Page 1

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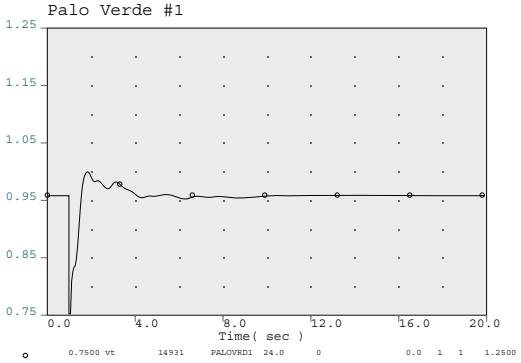
RELATIVE VOLTAGE

Palo Verde #1



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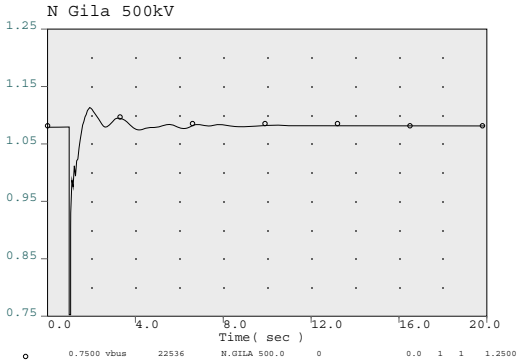

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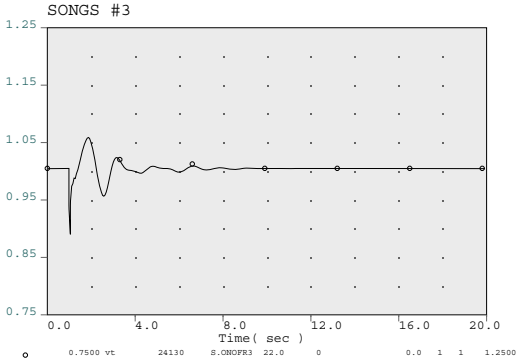
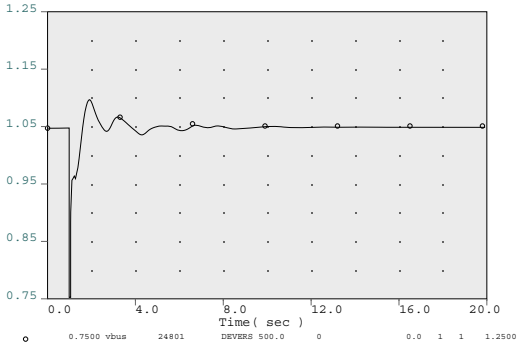
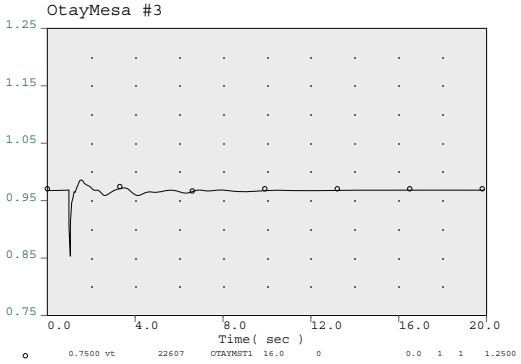


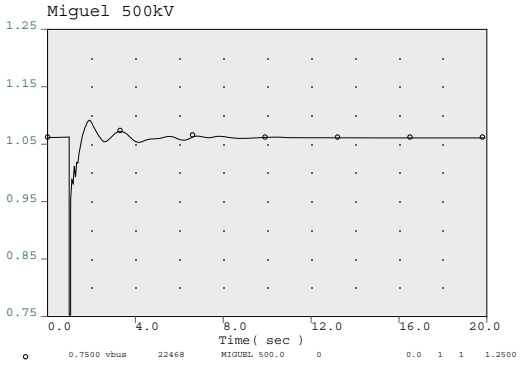
Devers 500



OtayMesa #3



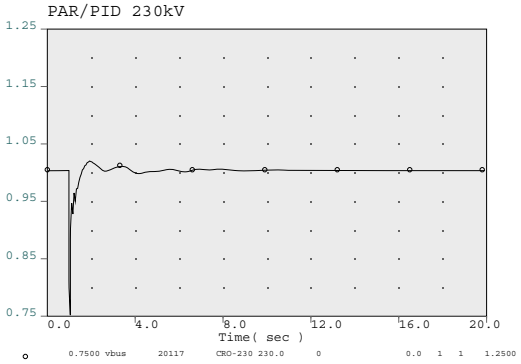
Miguel 500kV



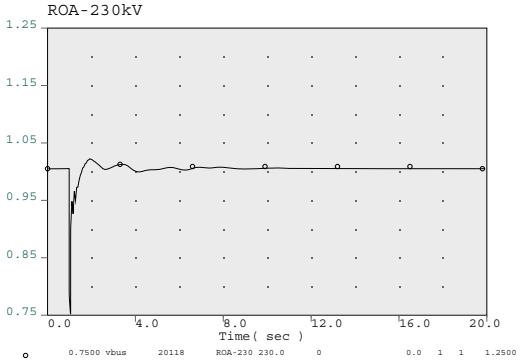
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

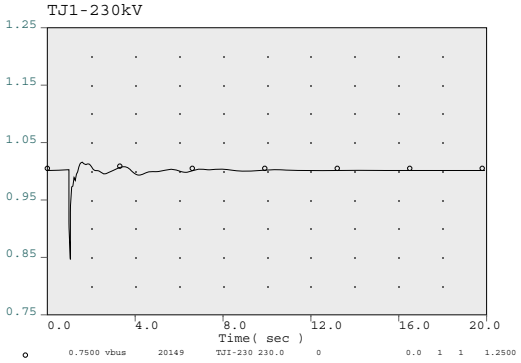
PAR/PID 230kV



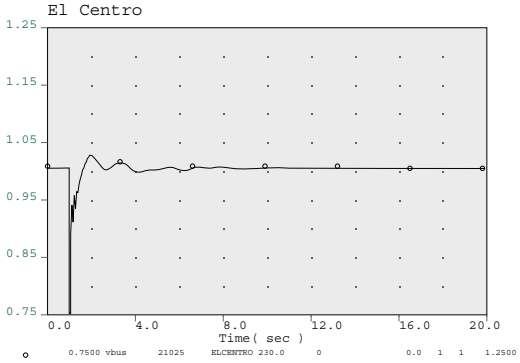
ROA-230kV



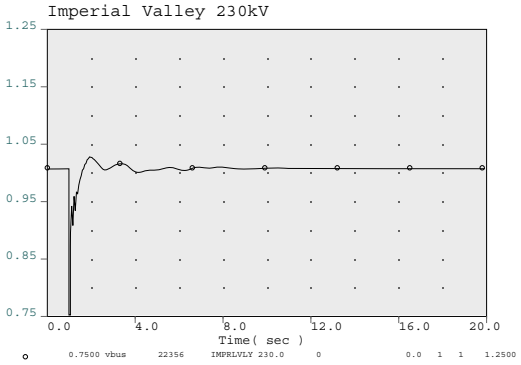
TJ1-230kV



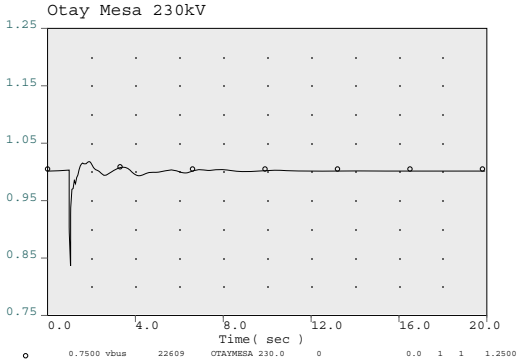
El Centro



Imperial Valley 230kV

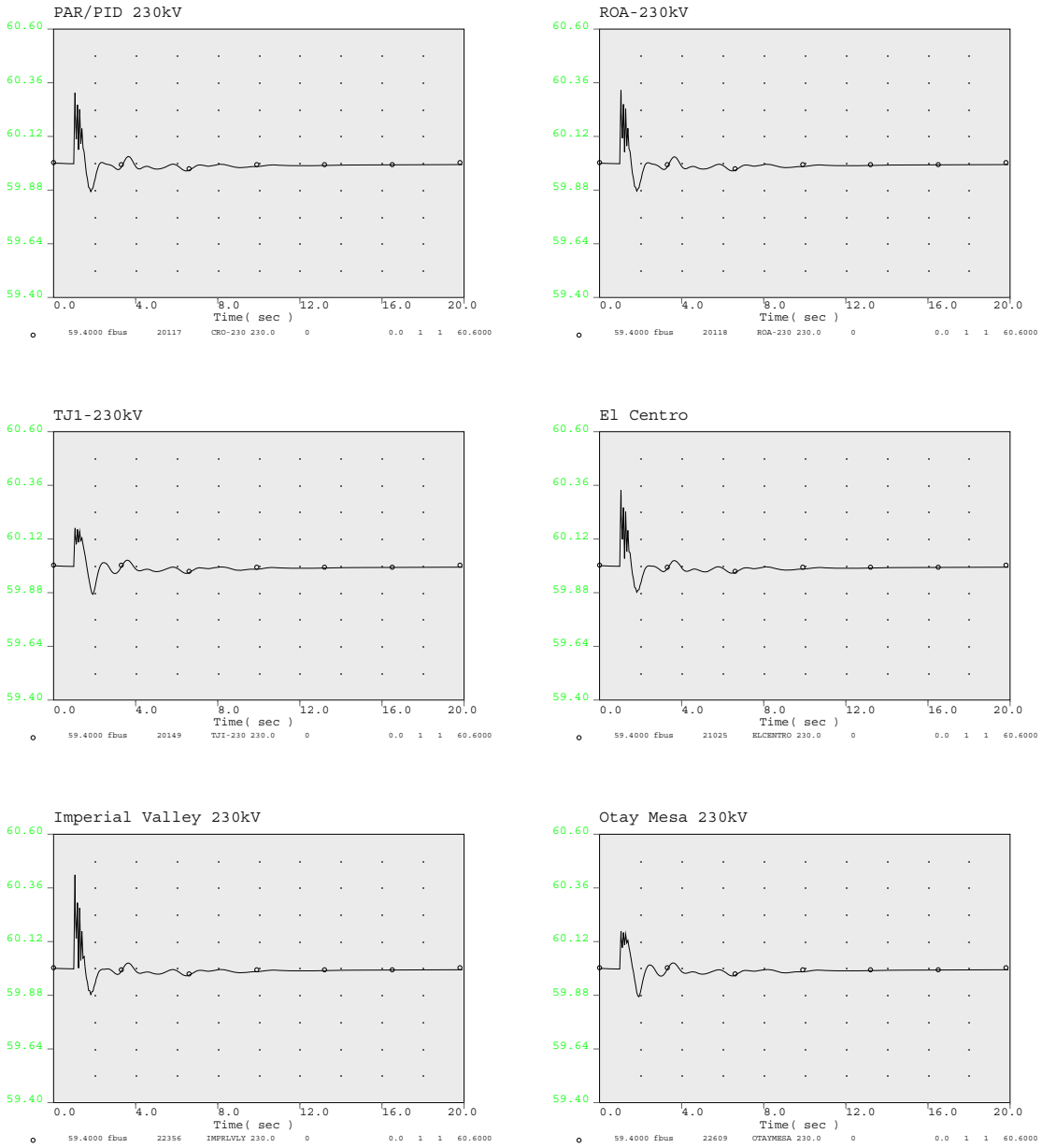


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

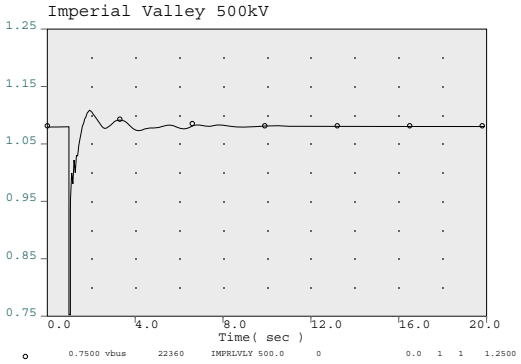
Affected System Frequency Check and Comparison



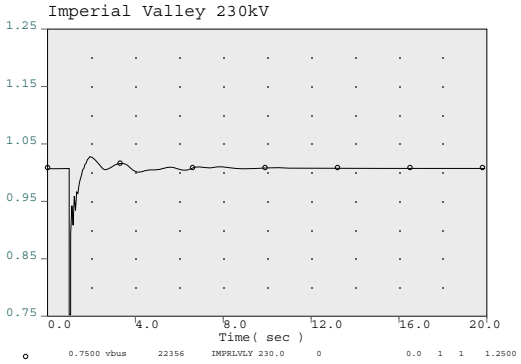
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

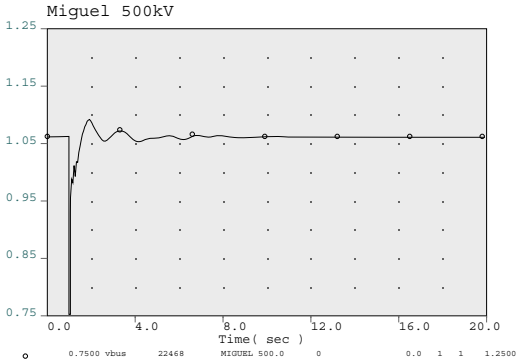
Imperial Valley 500kV



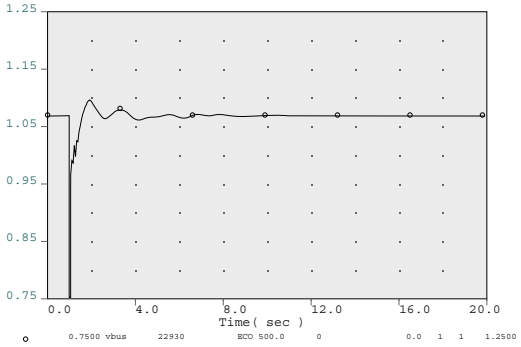
Imperial Valley 230kV



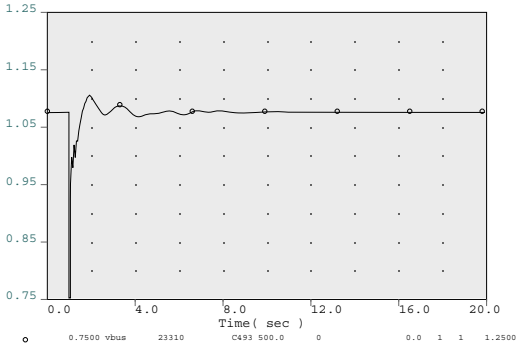
Miguel 500kV



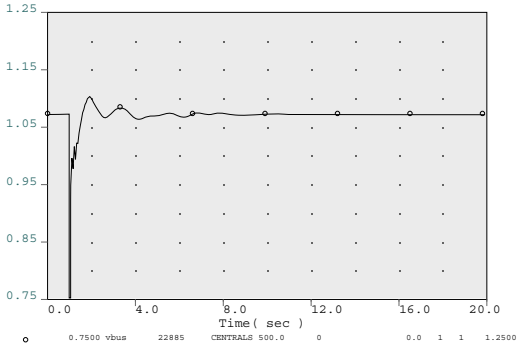
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

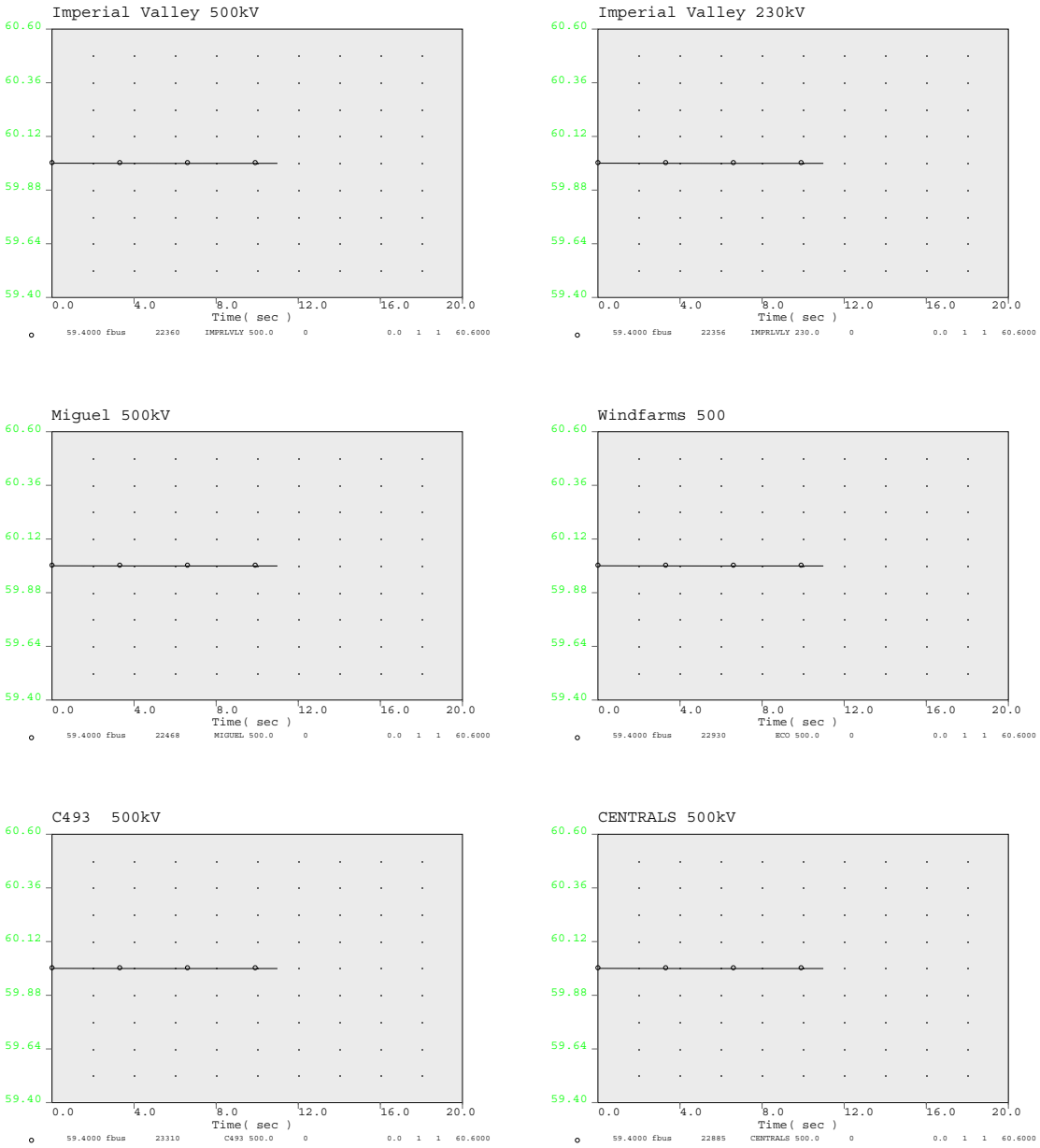
Appendix J-2

Transient Stability Analysis Plots

Imperial Valley Area Cluster &
Boulevard Cluster

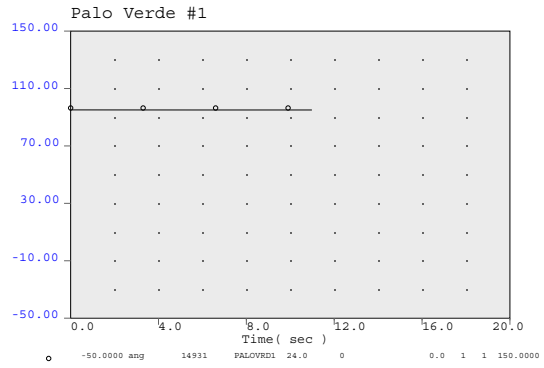
Light Load (Spring or Light Autumn) Pre

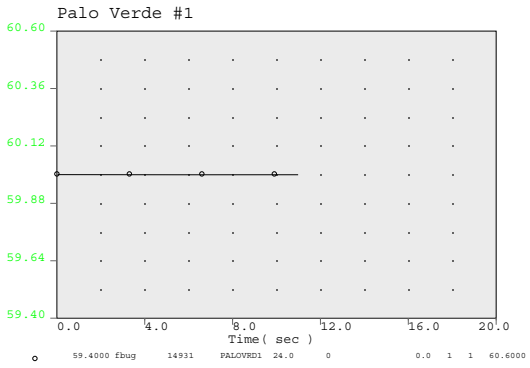
Imperial Valley Area - Frequency

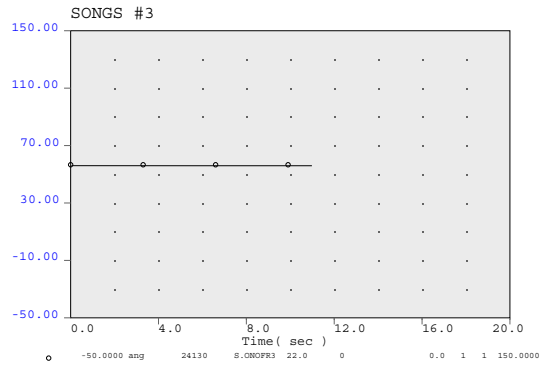


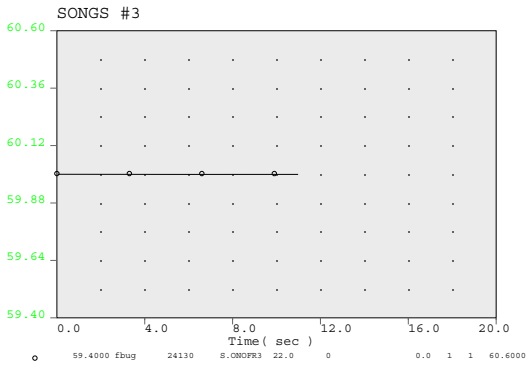
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

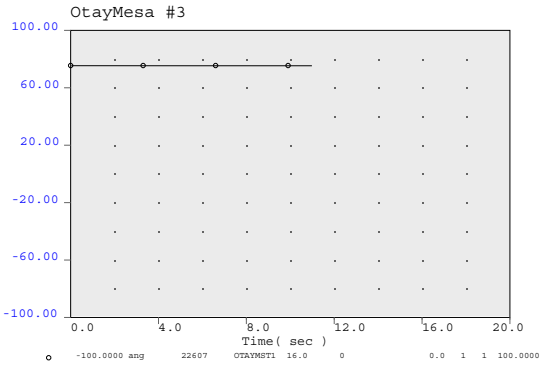
RELATIVE ROTOR ANGLE & FREQUENCY

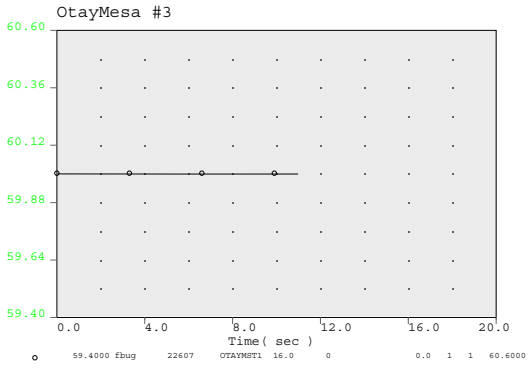












SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

Page 1

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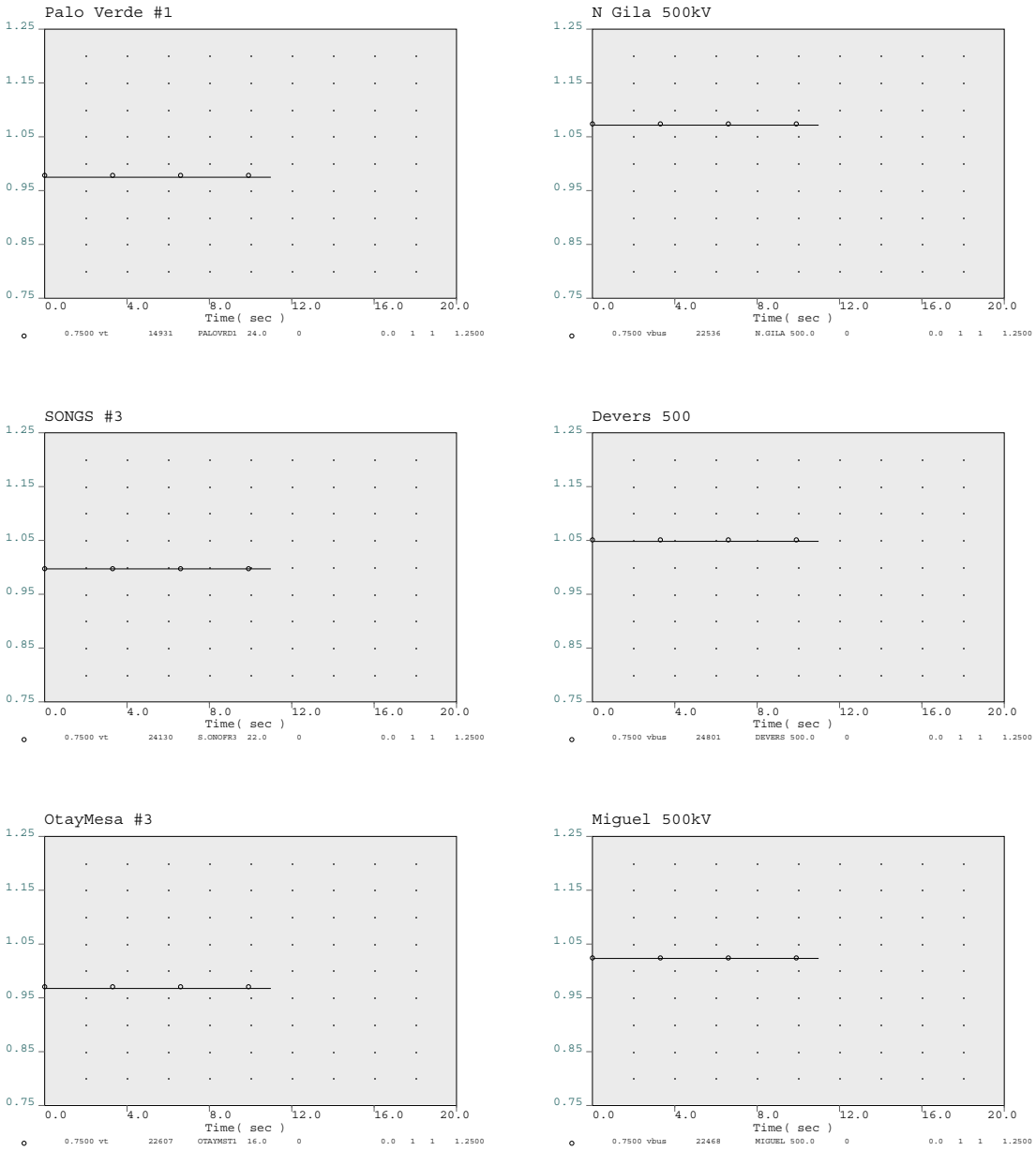
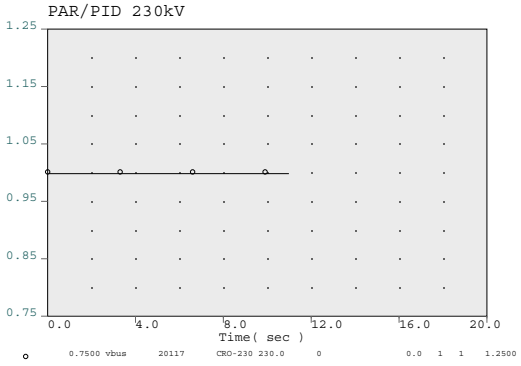
RELATIVE VOLTAGE



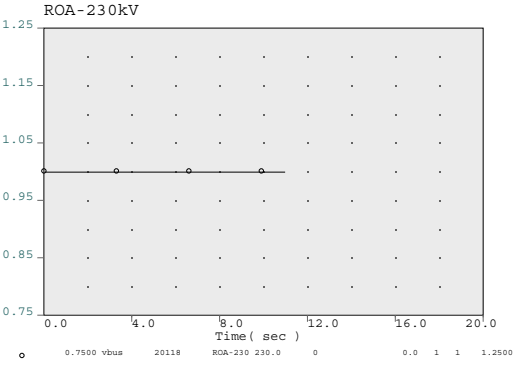
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

Affected System Voltage Check and Comparison

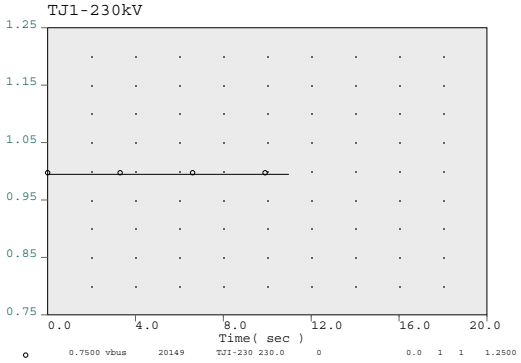
PAR/PID 230kV



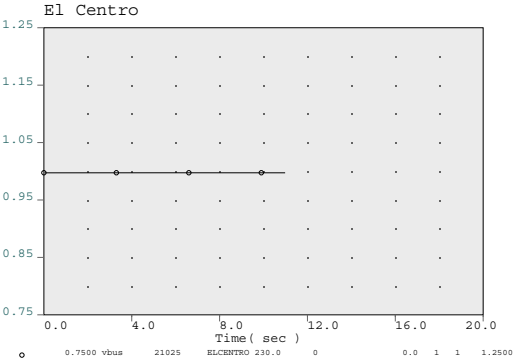
ROA-230kV



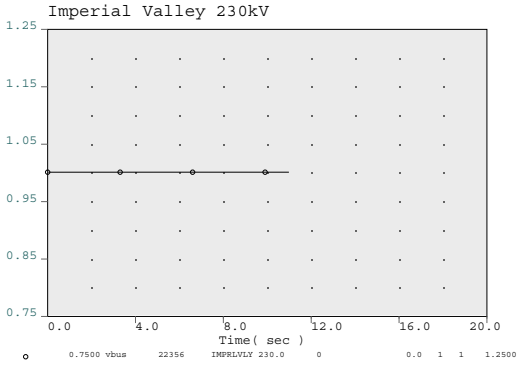
TJ1-230kV



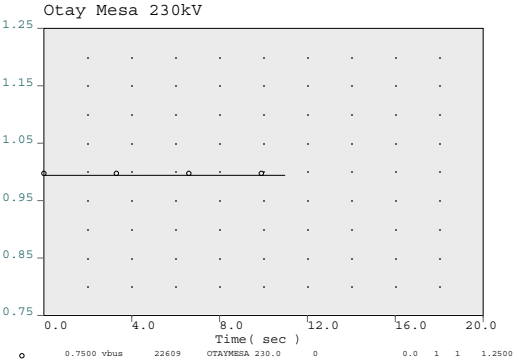
El Centro



Imperial Valley 230kV

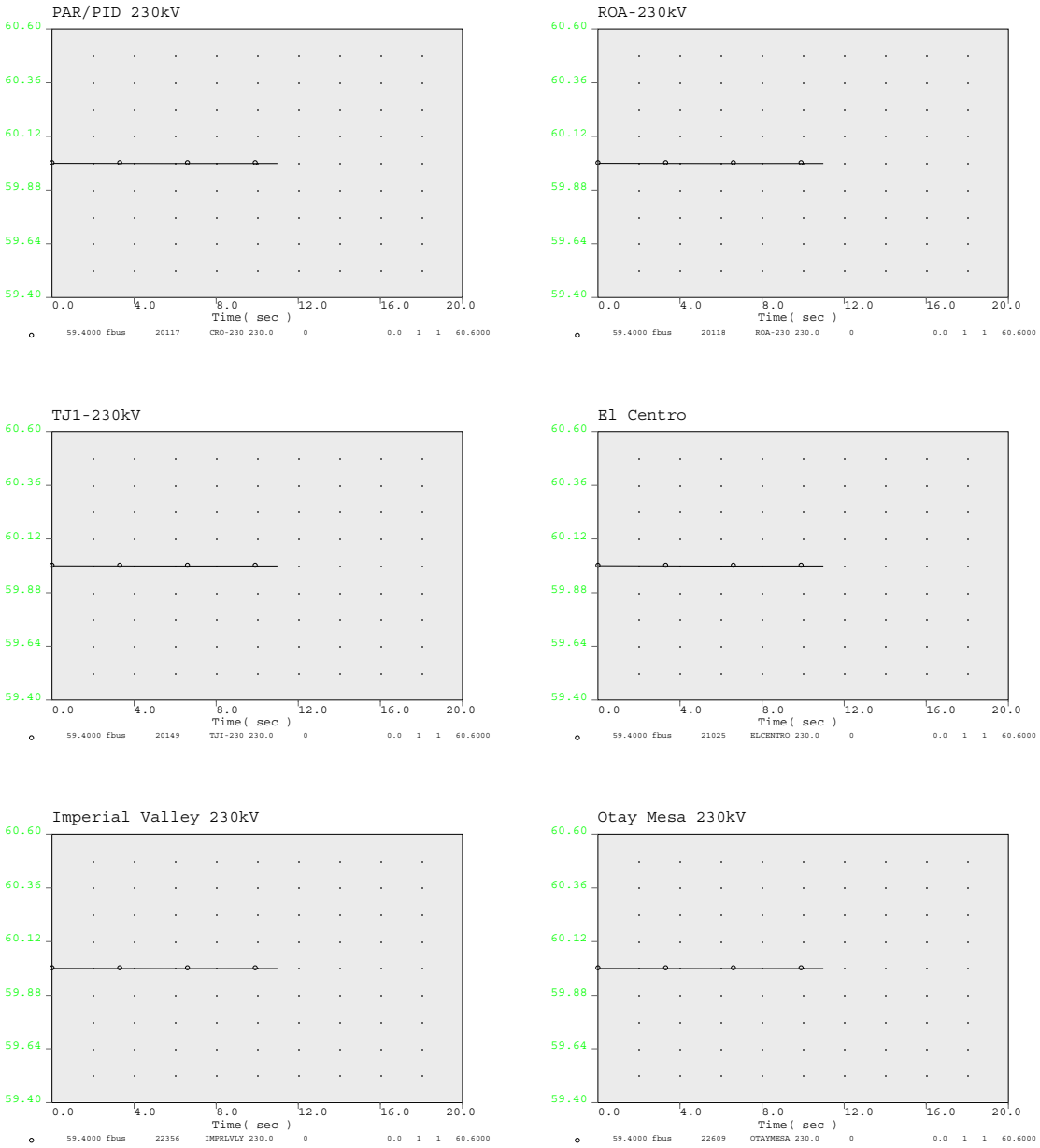


Otay Mesa 230kV



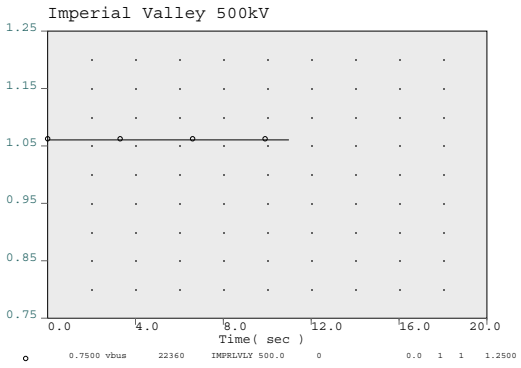
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

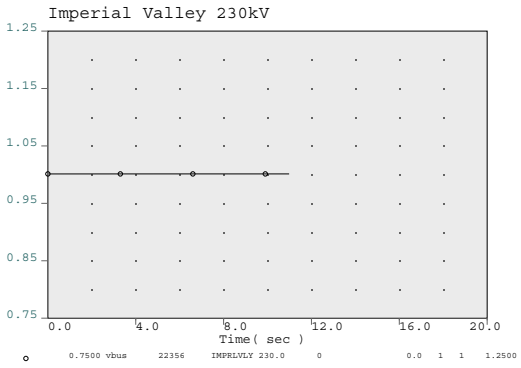
Affected System Frequency Check and Comparison

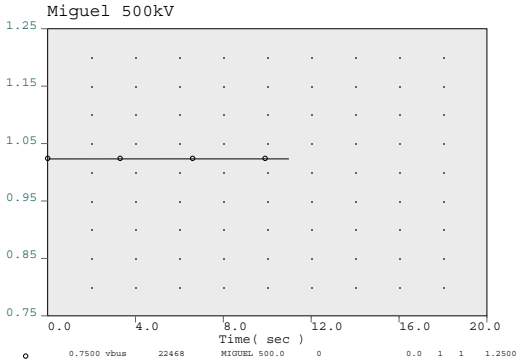


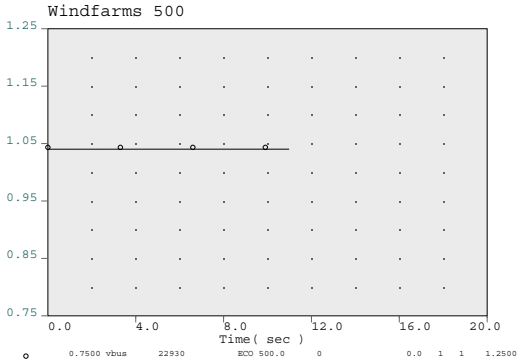
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

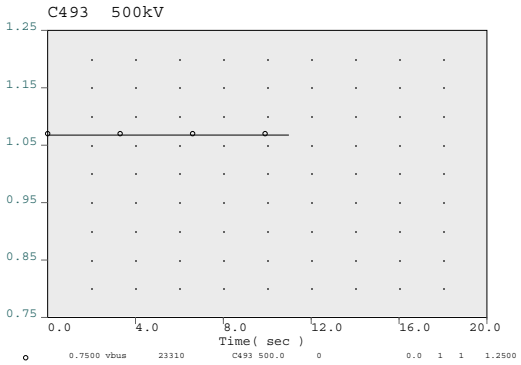
Imperial Valley Area - VOLTAGE

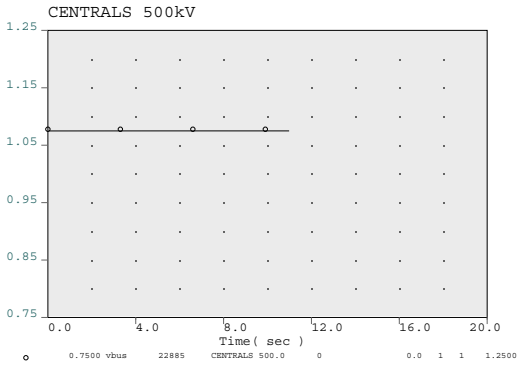










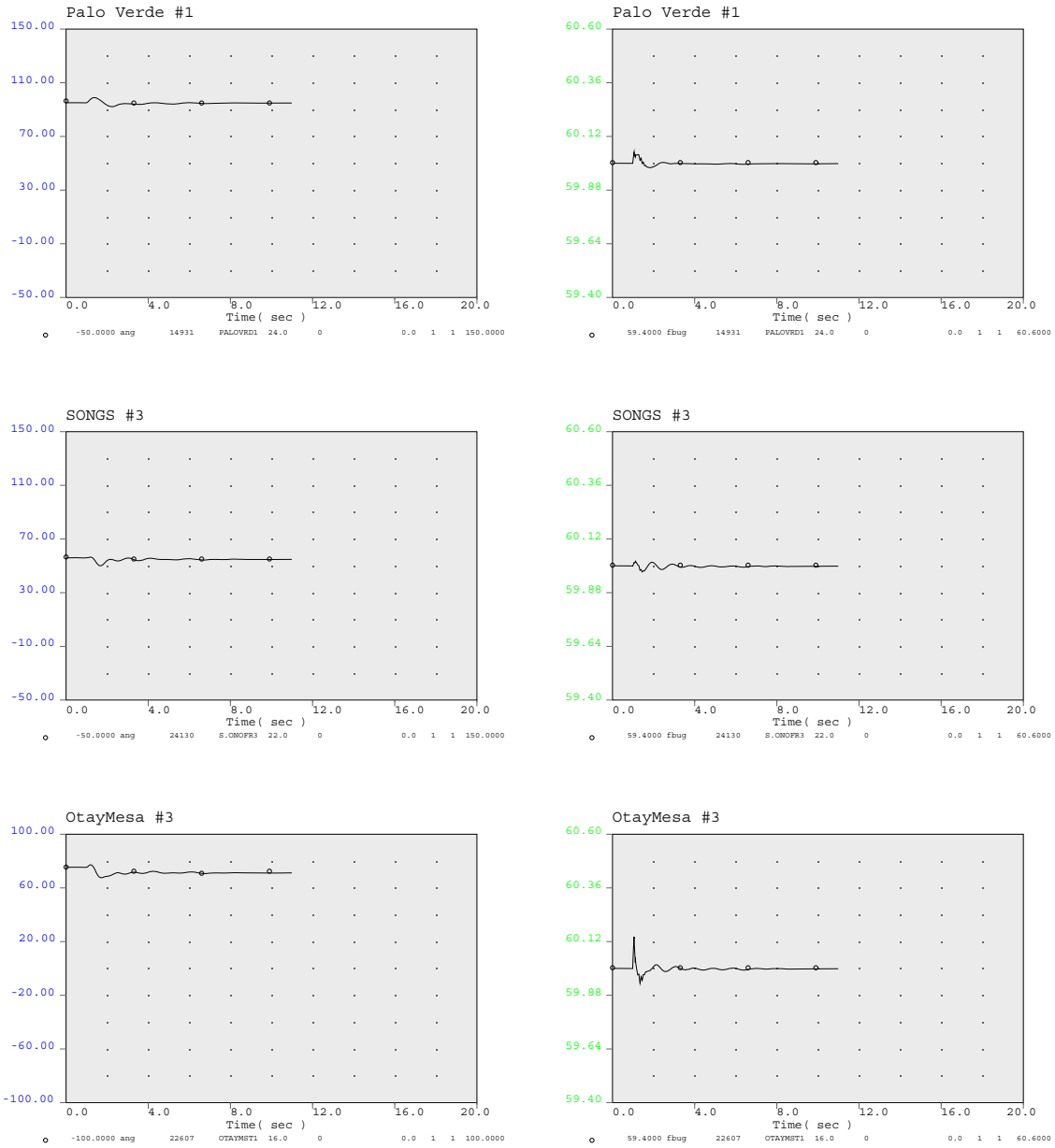


SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

Imperial Valley Area - Frequency

SDG&E Cluster 2 - pre
2014 Light Autumn
Valley - Devers 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY

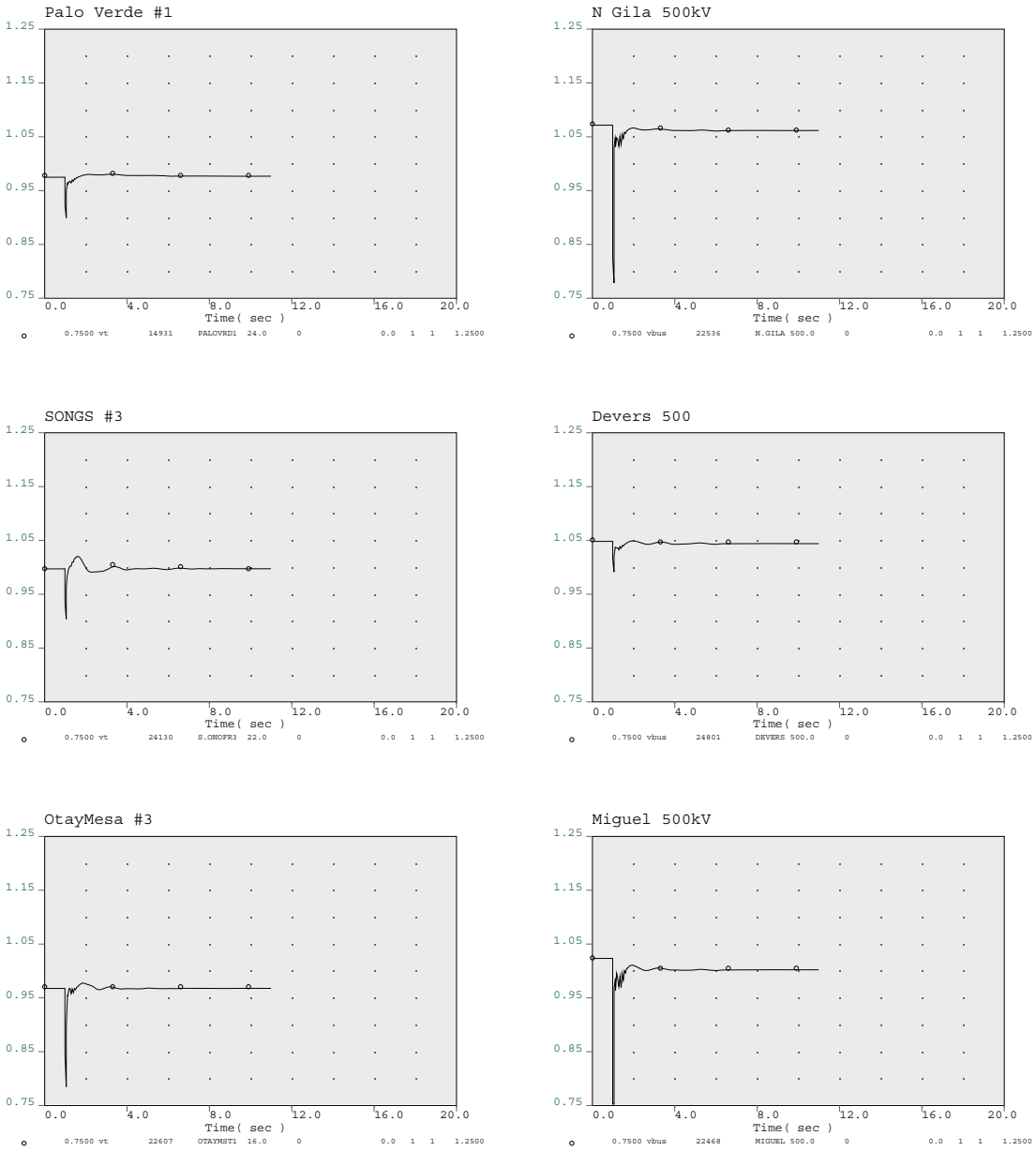


SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

Page 1

SDGE	C493_Cen_slo_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:28:30 2010

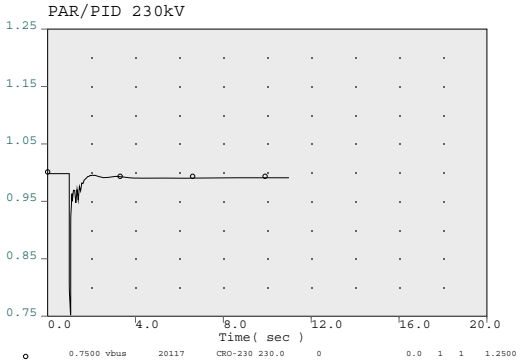
RELATIVE VOLTAGE



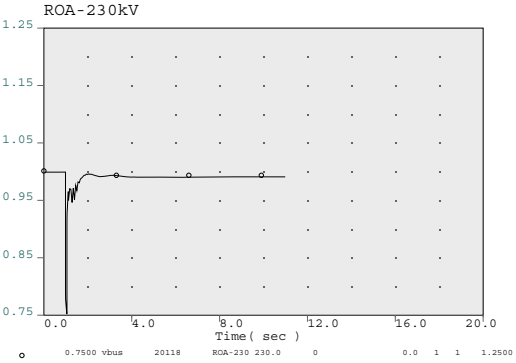
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

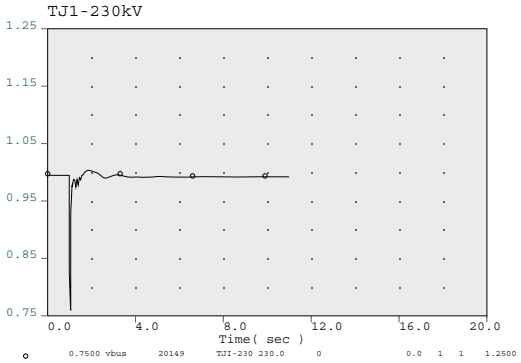
PAR/PID 230kV



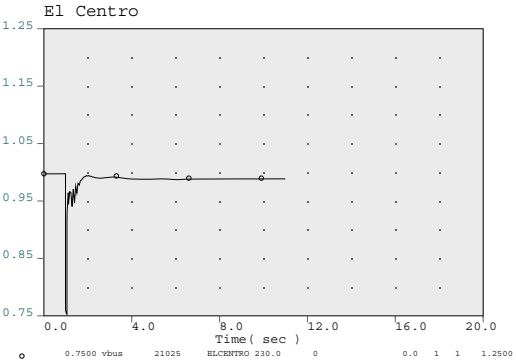
ROA-230kV



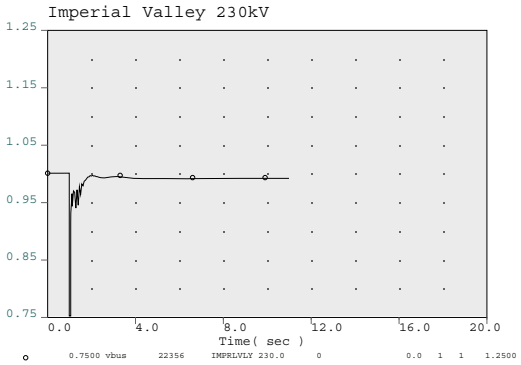
TJ1-230kV



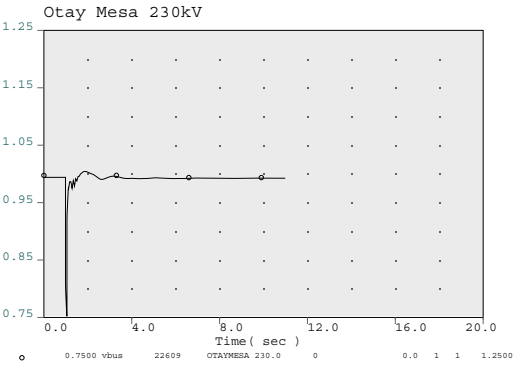
El Centro



Imperial Valley 230kV



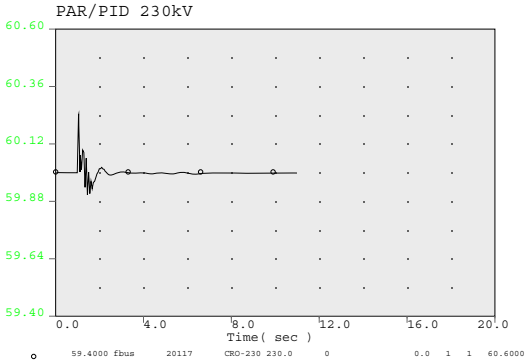
Otay Mesa 230kV



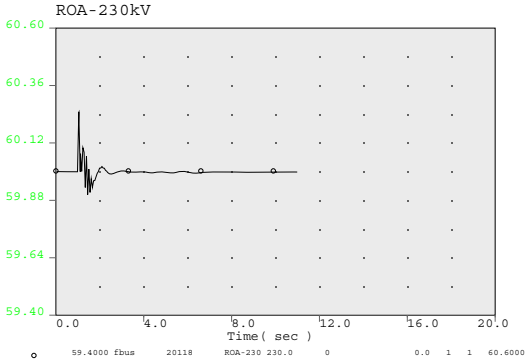
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

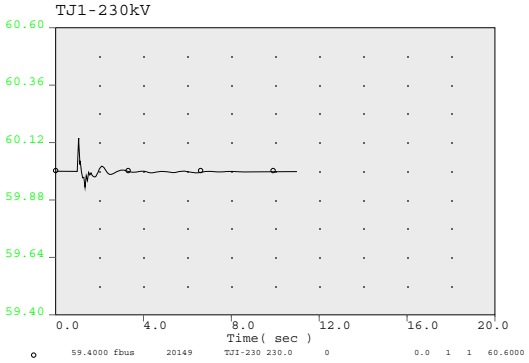
PAR/PID 230kV



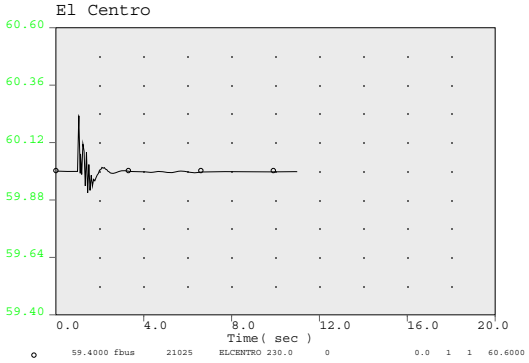
ROA-230kV



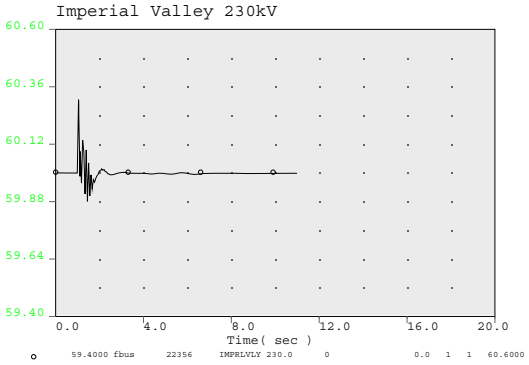
TJ1-230kV



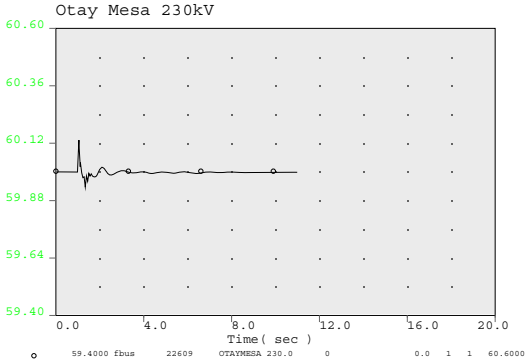
El Centro



Imperial Valley 230kV

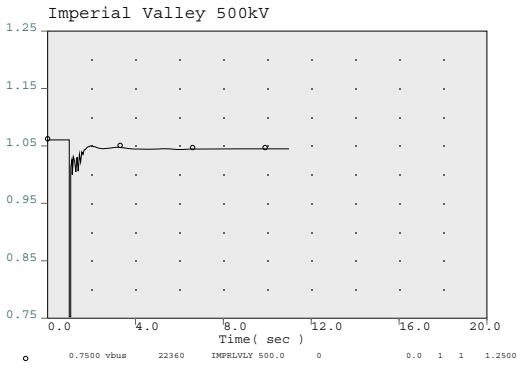


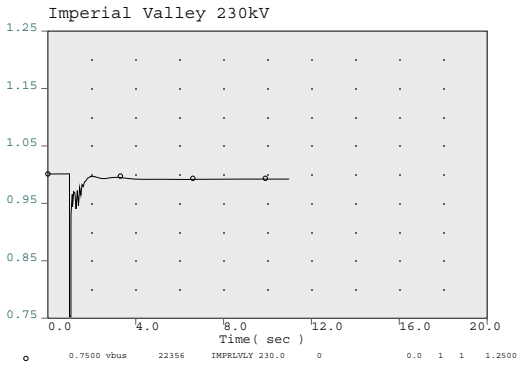
Otay Mesa 230kV

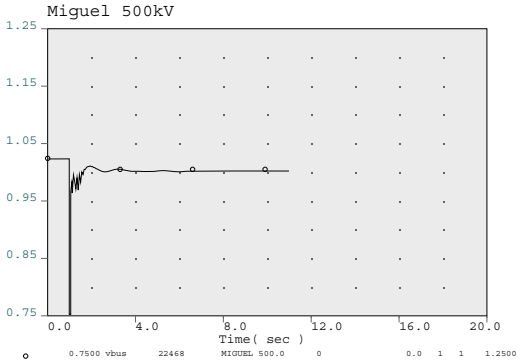


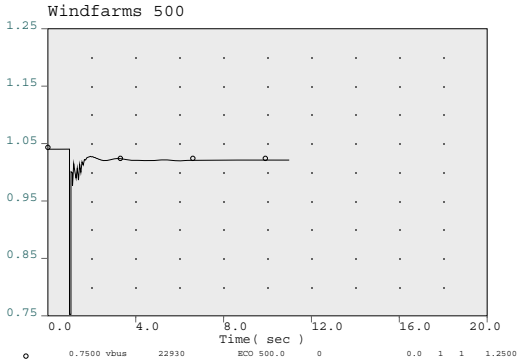
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

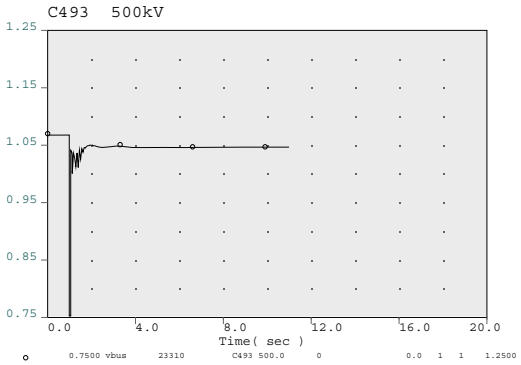
Imperial Valley Area - VOLTAGE

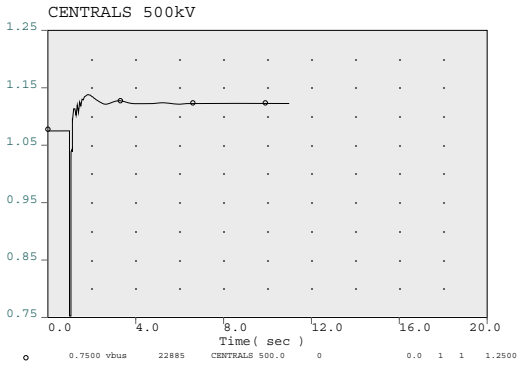






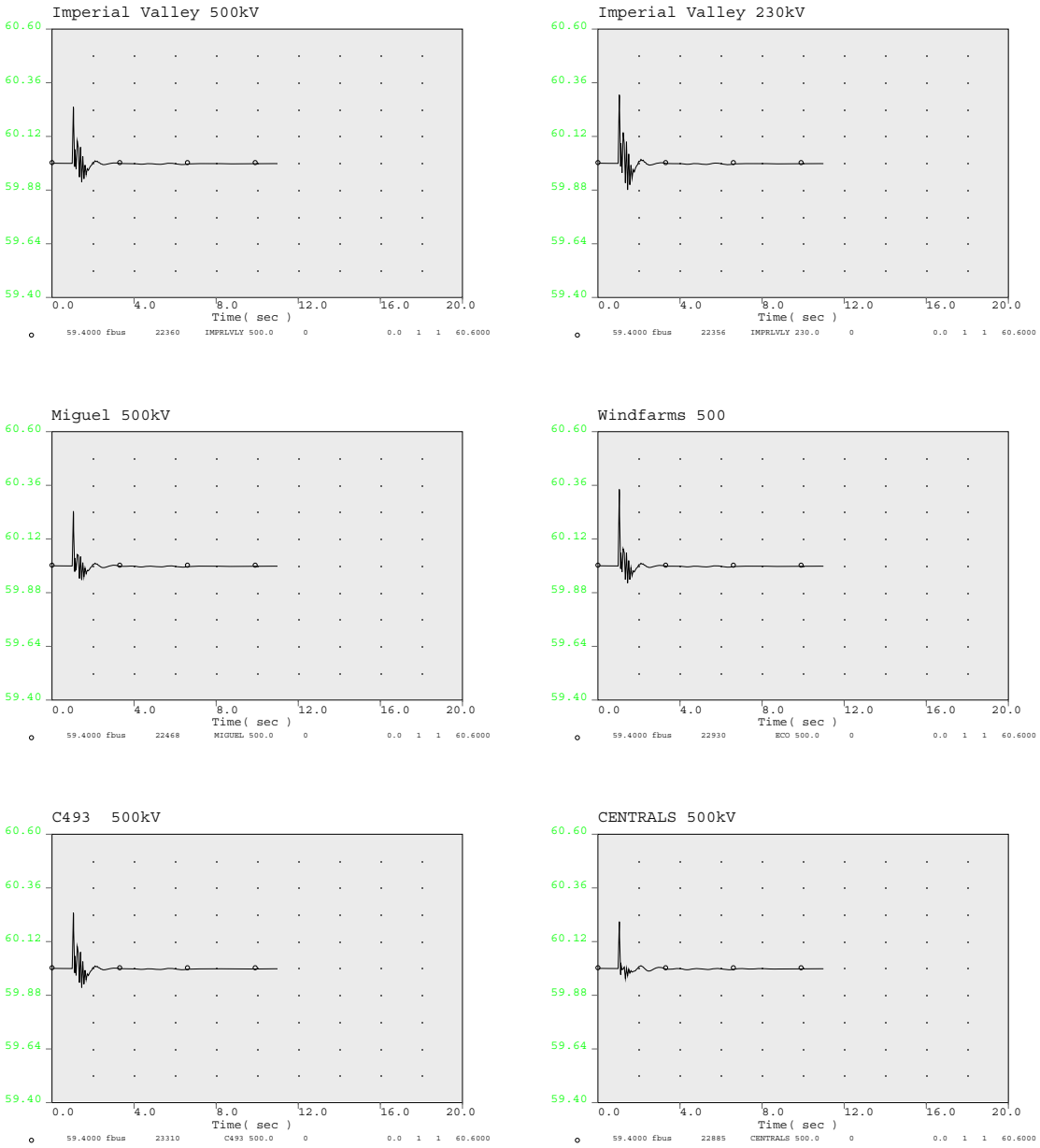






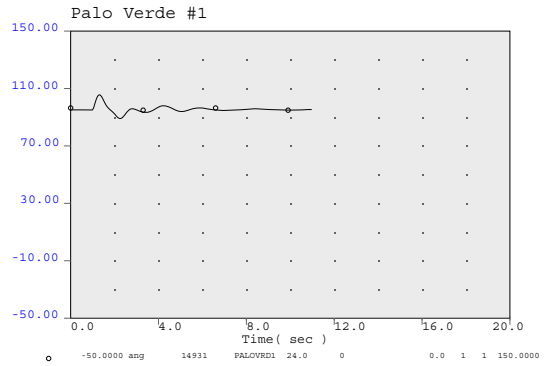
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

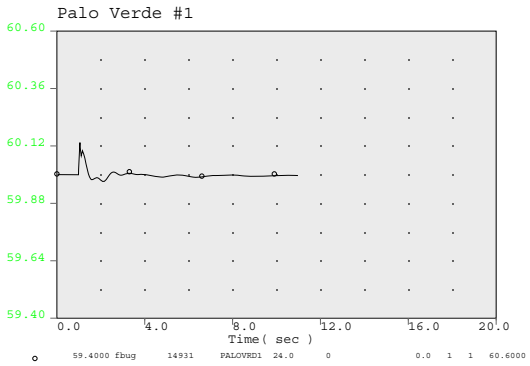
Imperial Valley Area - Frequency

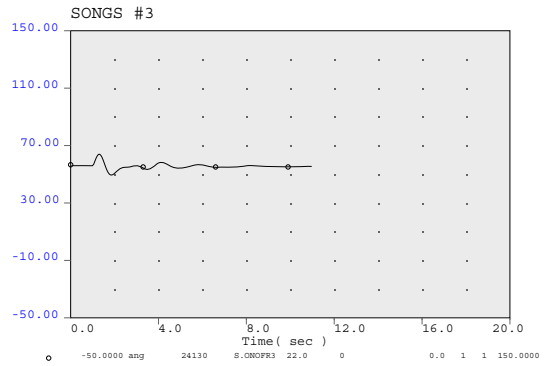


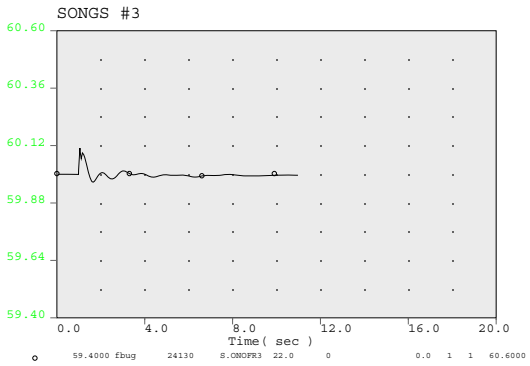
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

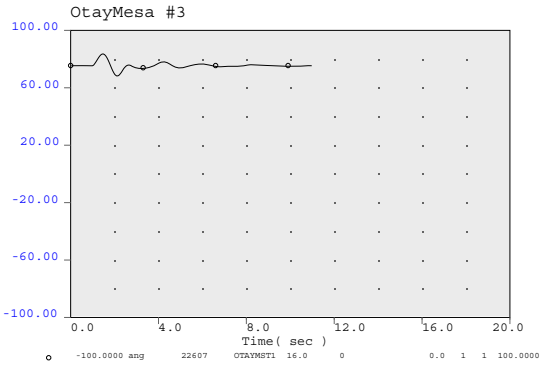
RELATIVE ROTOR ANGLE & FREQUENCY

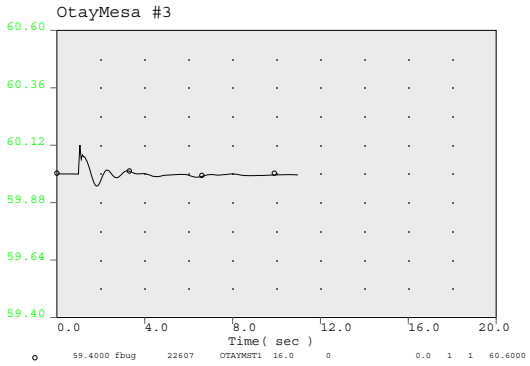






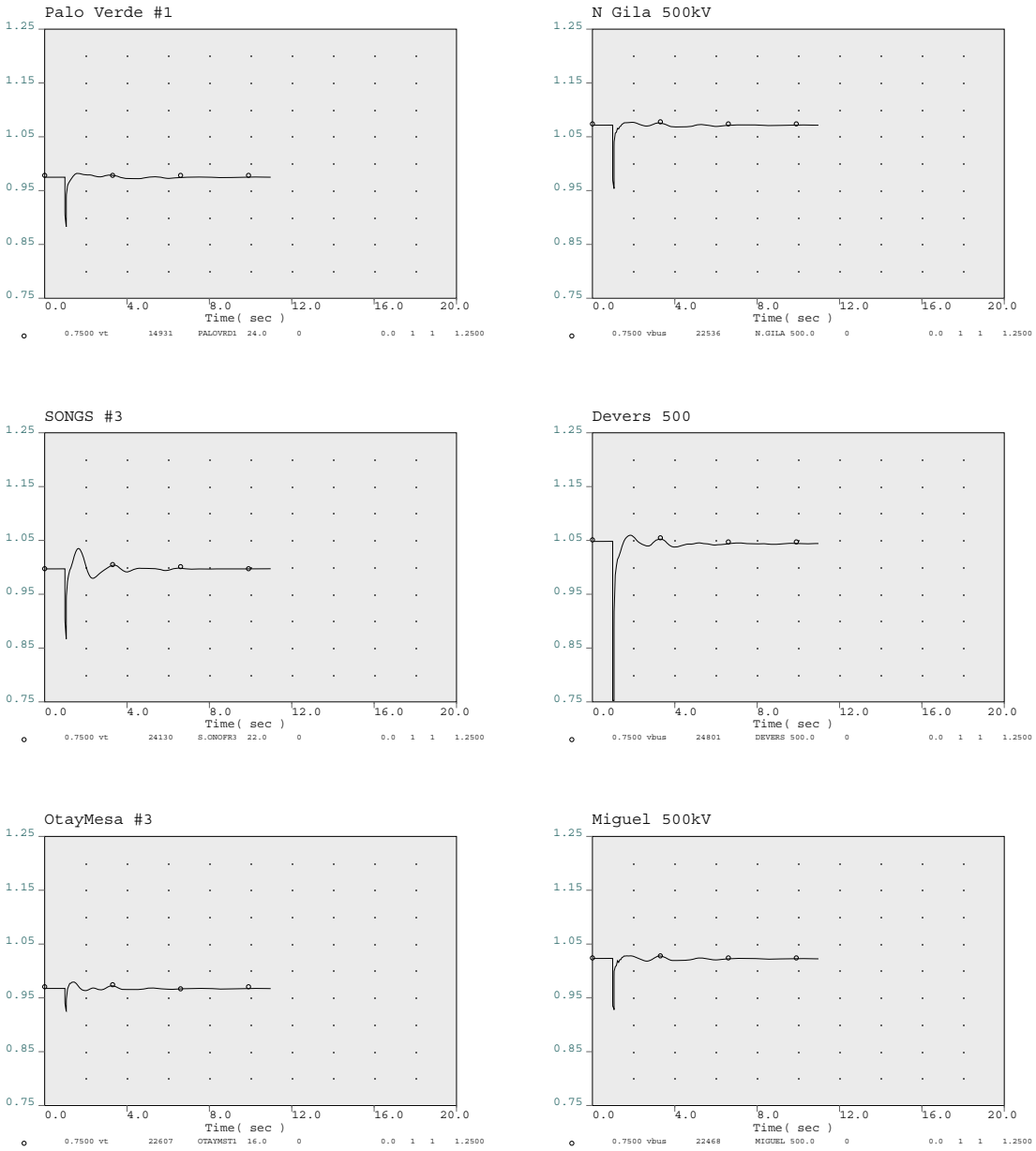






SDG&E Cluster 2 - pre
2014 Light Autumn
Valley - Devers 500 kV line

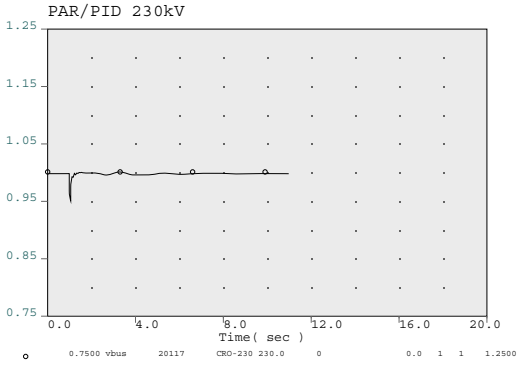
RELATIVE VOLTAGE



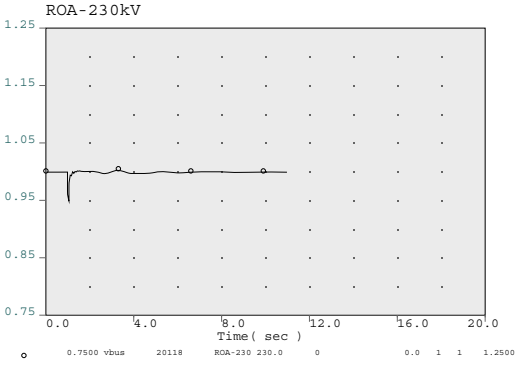
SDG&E Cluster 2 - pre
2014 Light Autumn
Valley - Devers 500 kV line

Affected System Voltage Check and Comparison

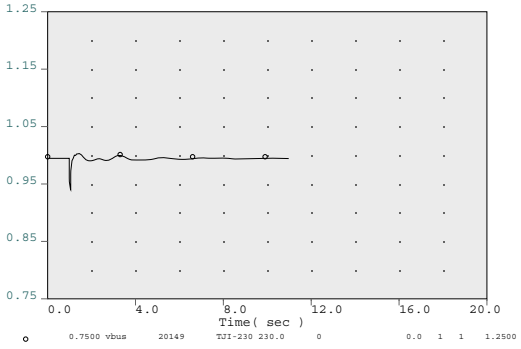
PAR/PID 230kV



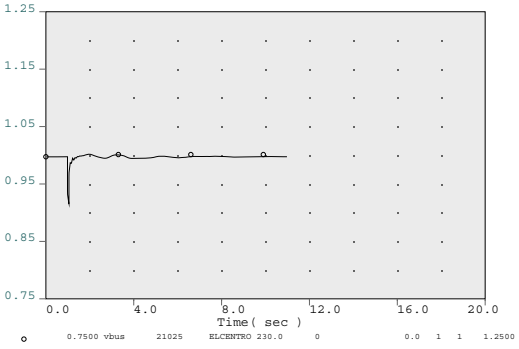
ROA-230kV



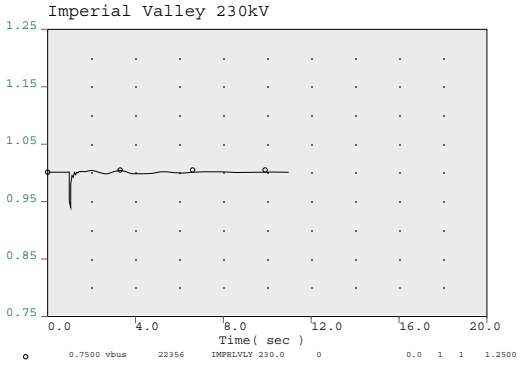
TJ1-230kV



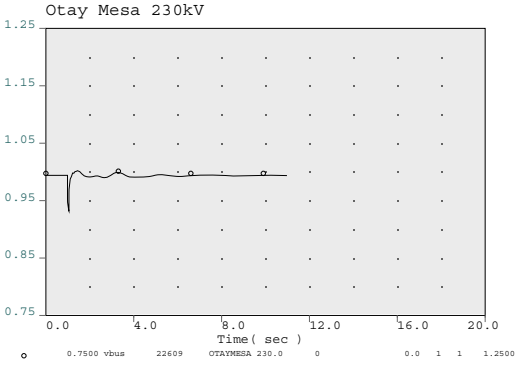
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



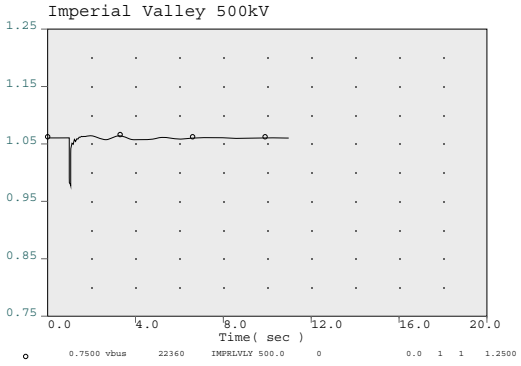
SDG&E Cluster 2 - pre
2014 Light Autumn
Valley - Devers 500 kV line

Affected System Frequency Check and Comparison

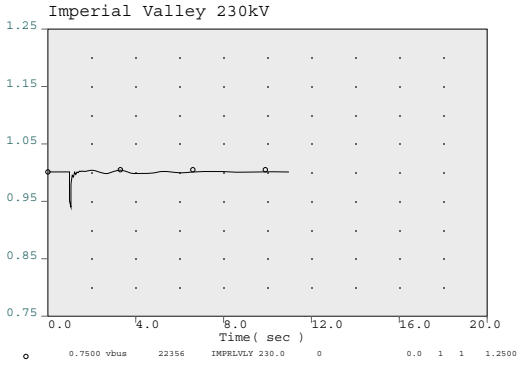
SDG&E Cluster 2 - pre
2014 Light Autumn
Valley - Devers 500 kV line

Imperial Valley Area - VOLTAGE

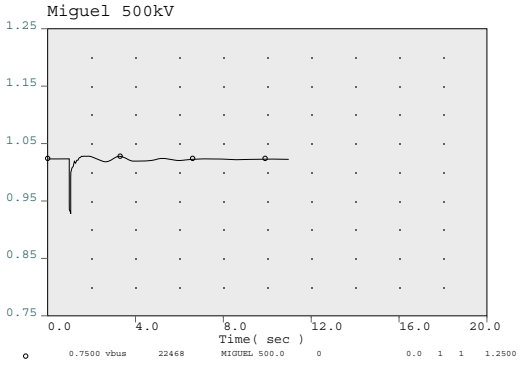
Imperial Valley 500kV



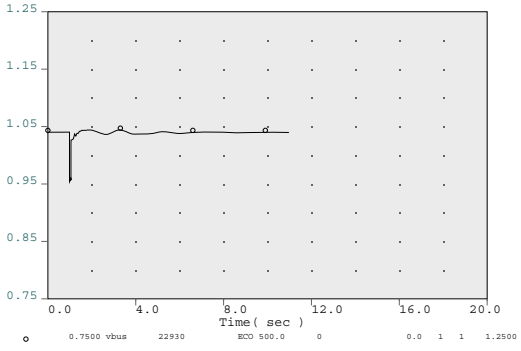
Imperial Valley 230kV



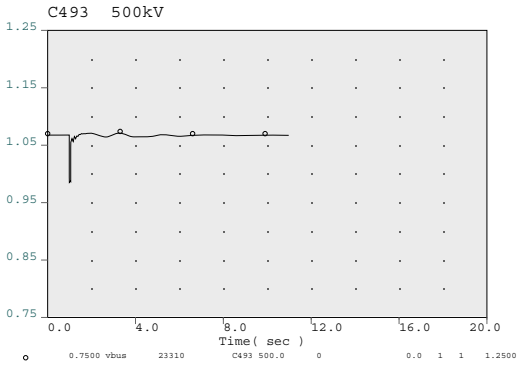
Miguel 500kV



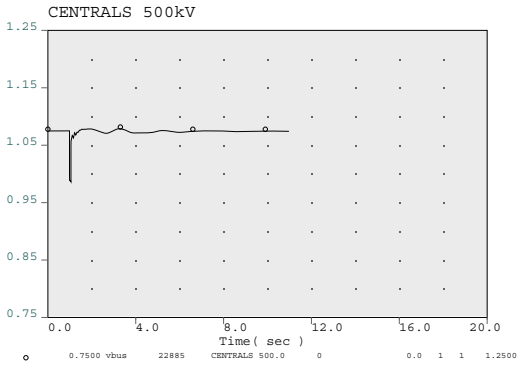
Windfarms 500



C493 500kV

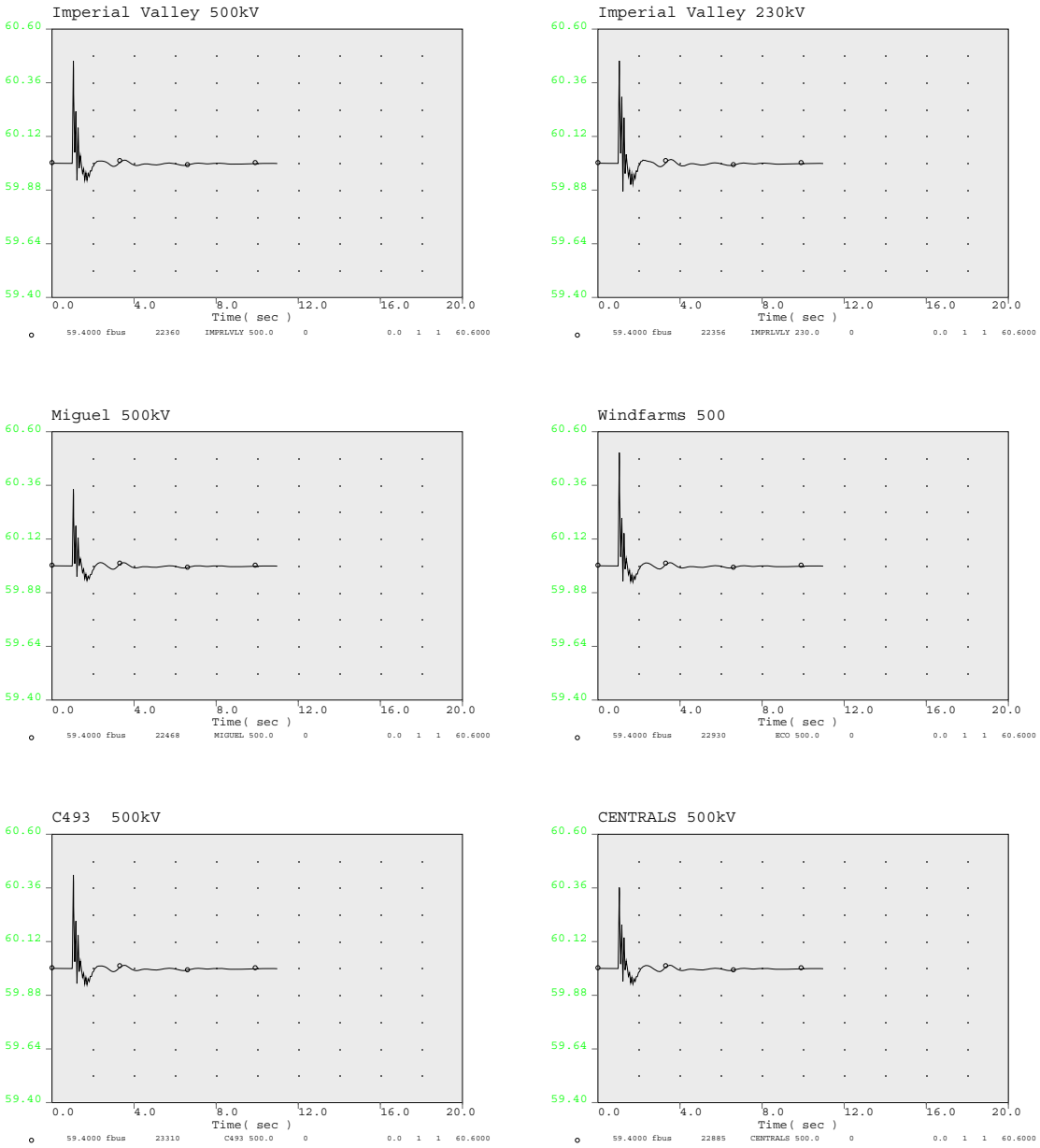


CENTRALS 500kV



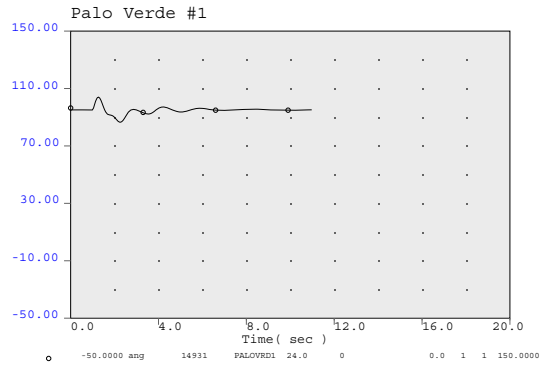
SDG&E Cluster 2 - pre
2014 Light Autumn
Valley - Devers 500 kV line

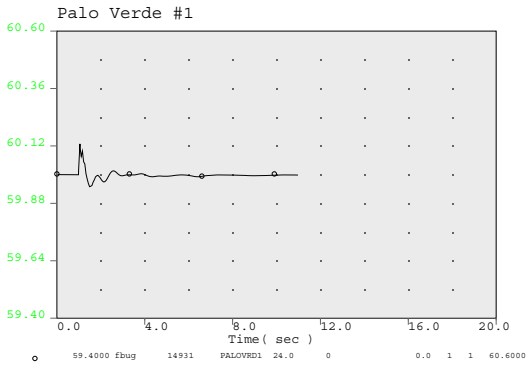
Imperial Valley Area - Frequency

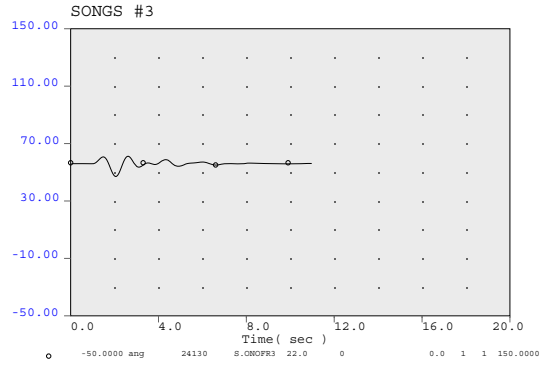


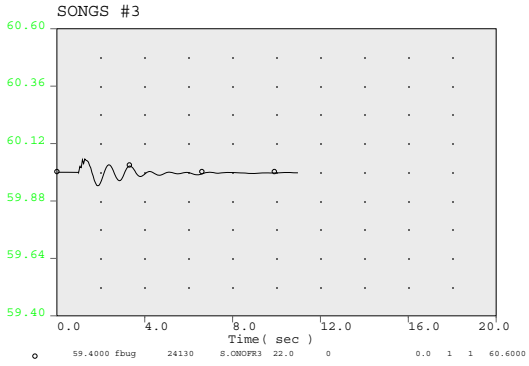
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

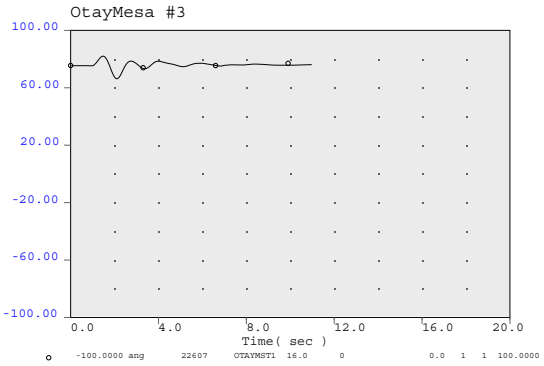
RELATIVE ROTOR ANGLE & FREQUENCY

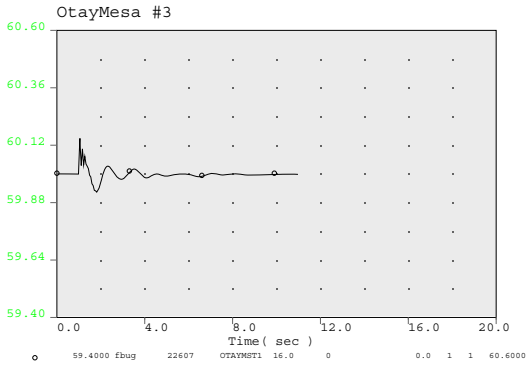










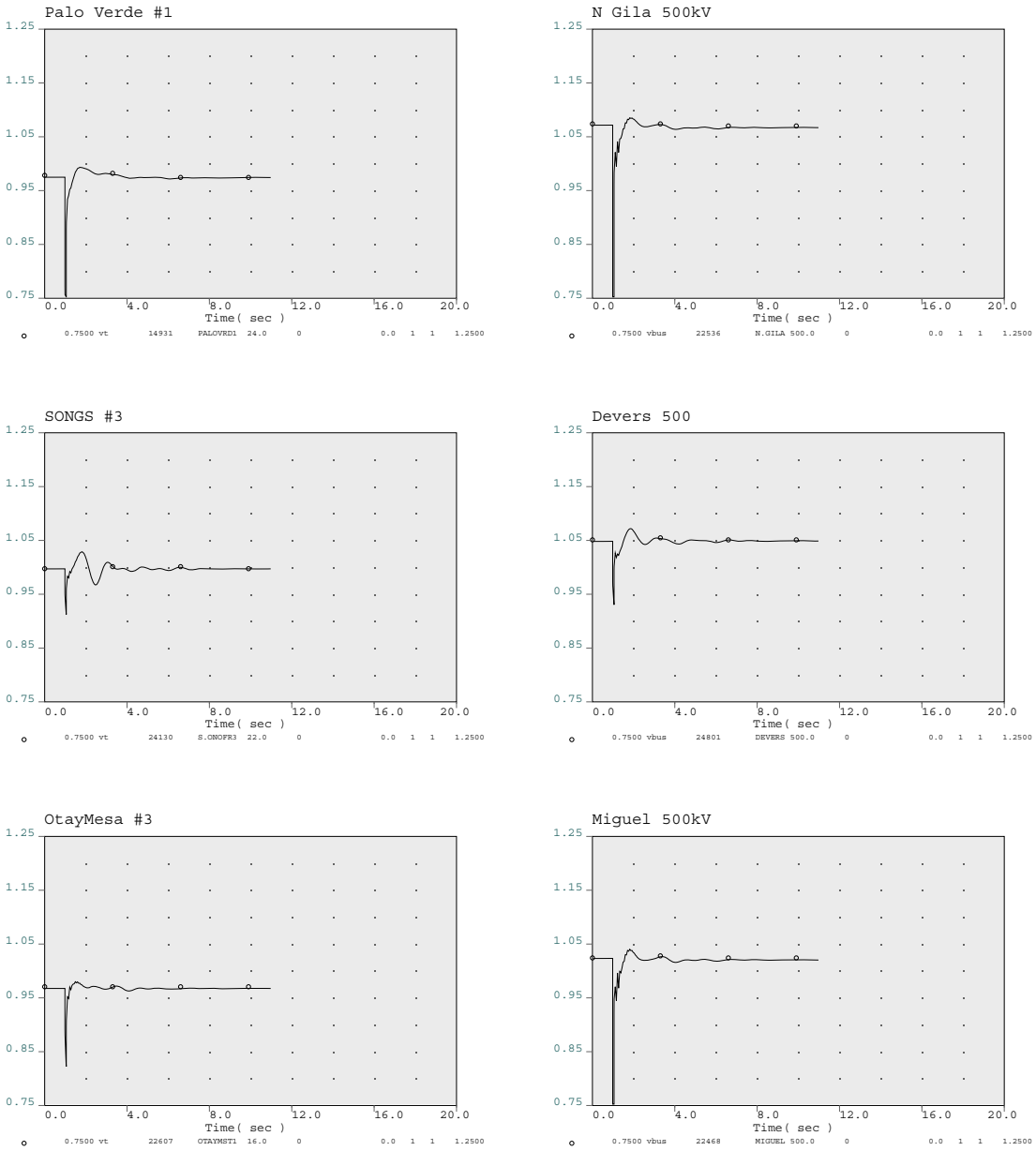


SDG&E Cluster 2 - pre
Light Autumn
Haasyampa-N.Gila 500 kV line

Page 1

SDGE	HAA_NGila_slo_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:27:42 2010

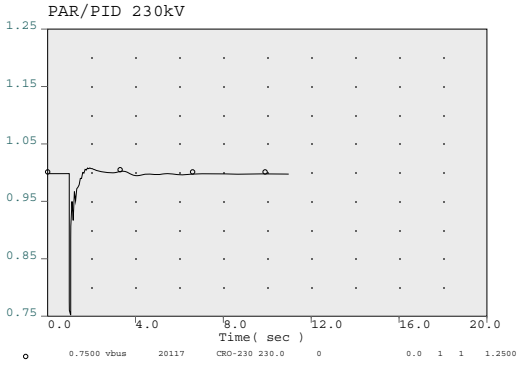
RELATIVE VOLTAGE



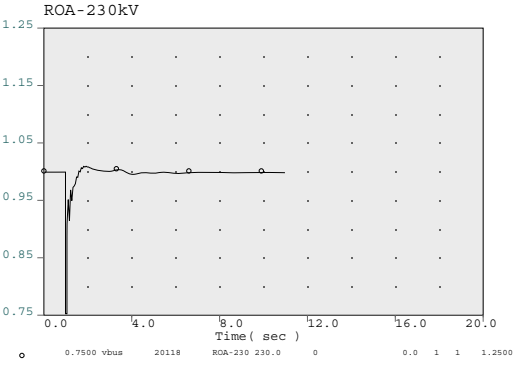
SDG&E Cluster 2 - pre
Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

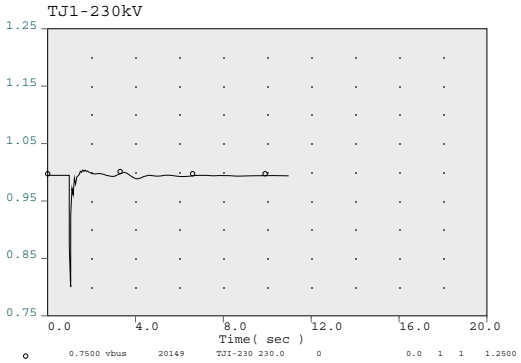
PAR/PID 230kV



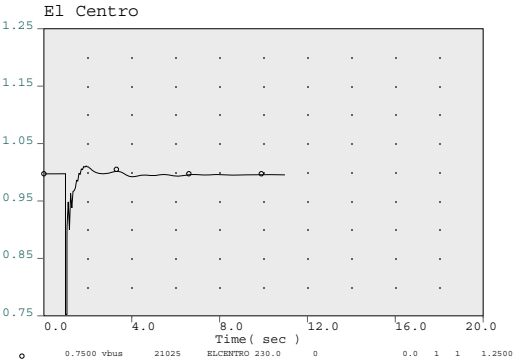
ROA-230kV



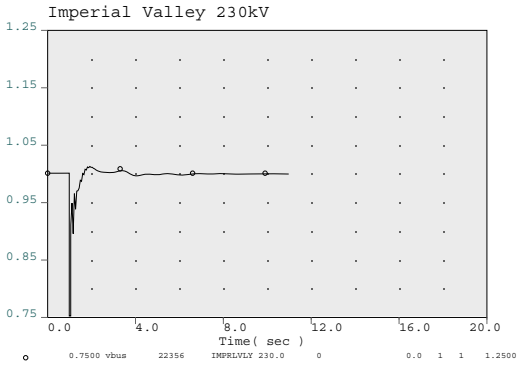
TJ1-230kV



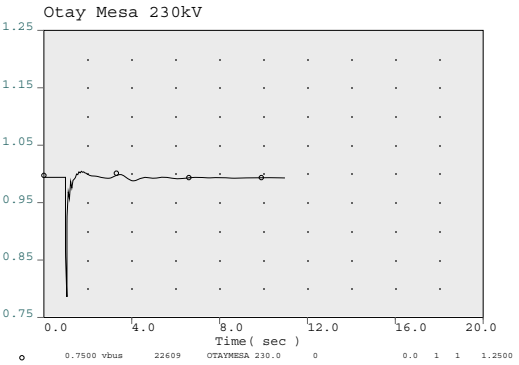
El Centro



Imperial Valley 230kV



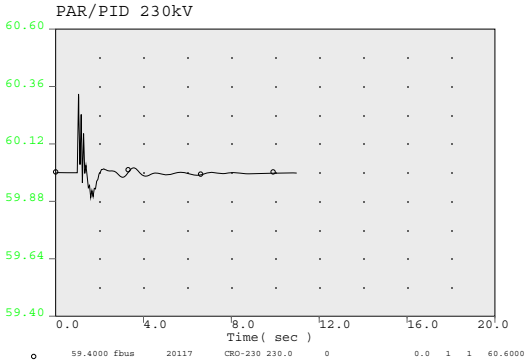
Otay Mesa 230kV



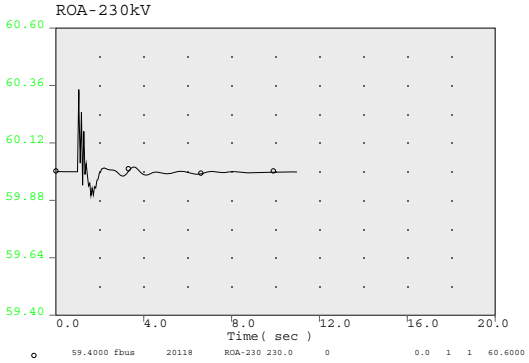
SDG&E Cluster 2 - pre
Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Frequency Check and Comparison

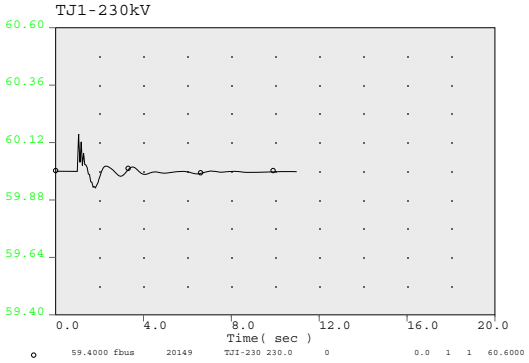
PAR/PID 230kV



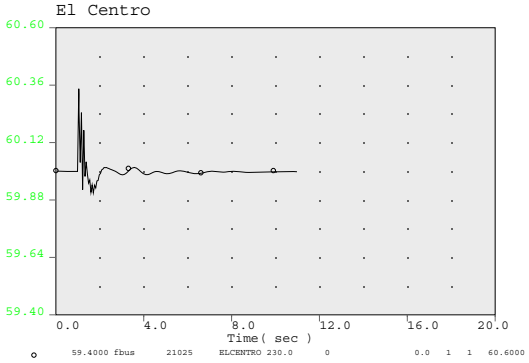
ROA-230kV



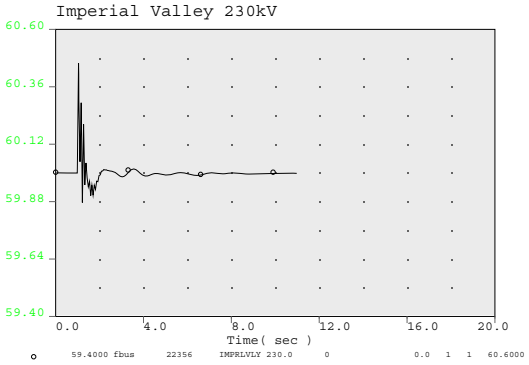
TJ1-230kV



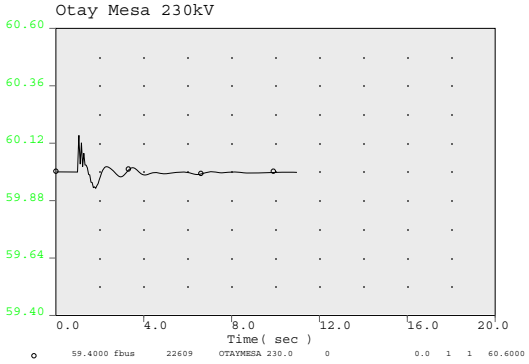
El Centro



Imperial Valley 230kV



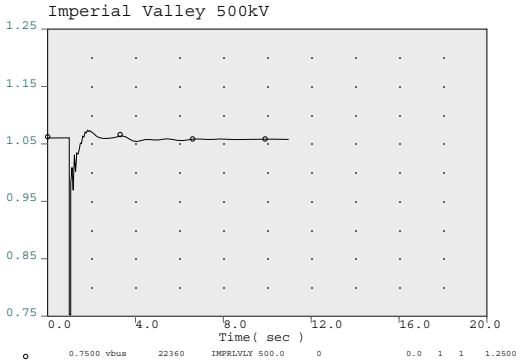
Otay Mesa 230kV



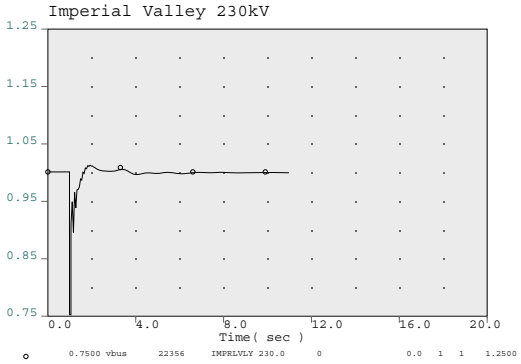
SDG&E Cluster 2 - pre
Light Autumn
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

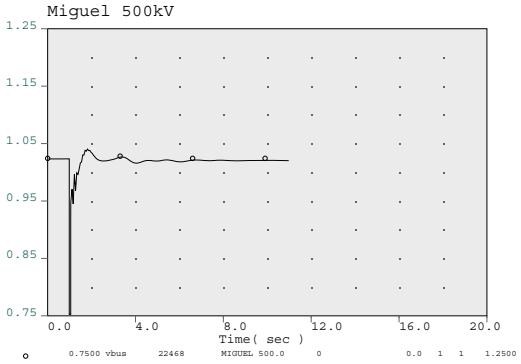
Imperial Valley 500kV



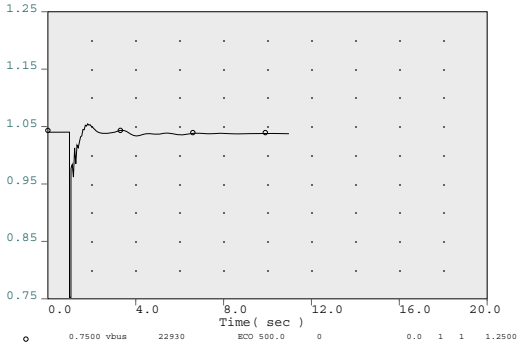
Imperial Valley 230kV



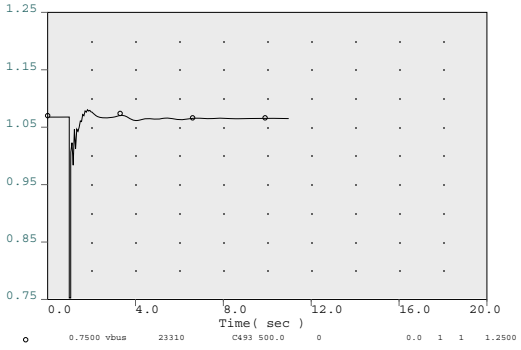
Miguel 500kV



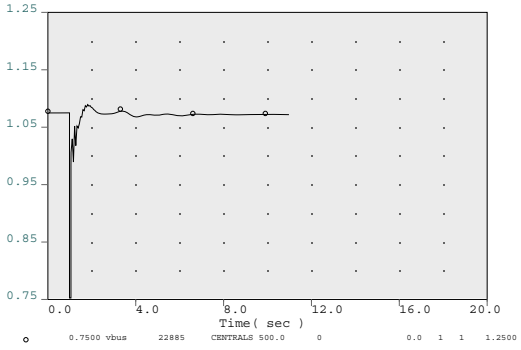
Windfarms 500



C493 500kV

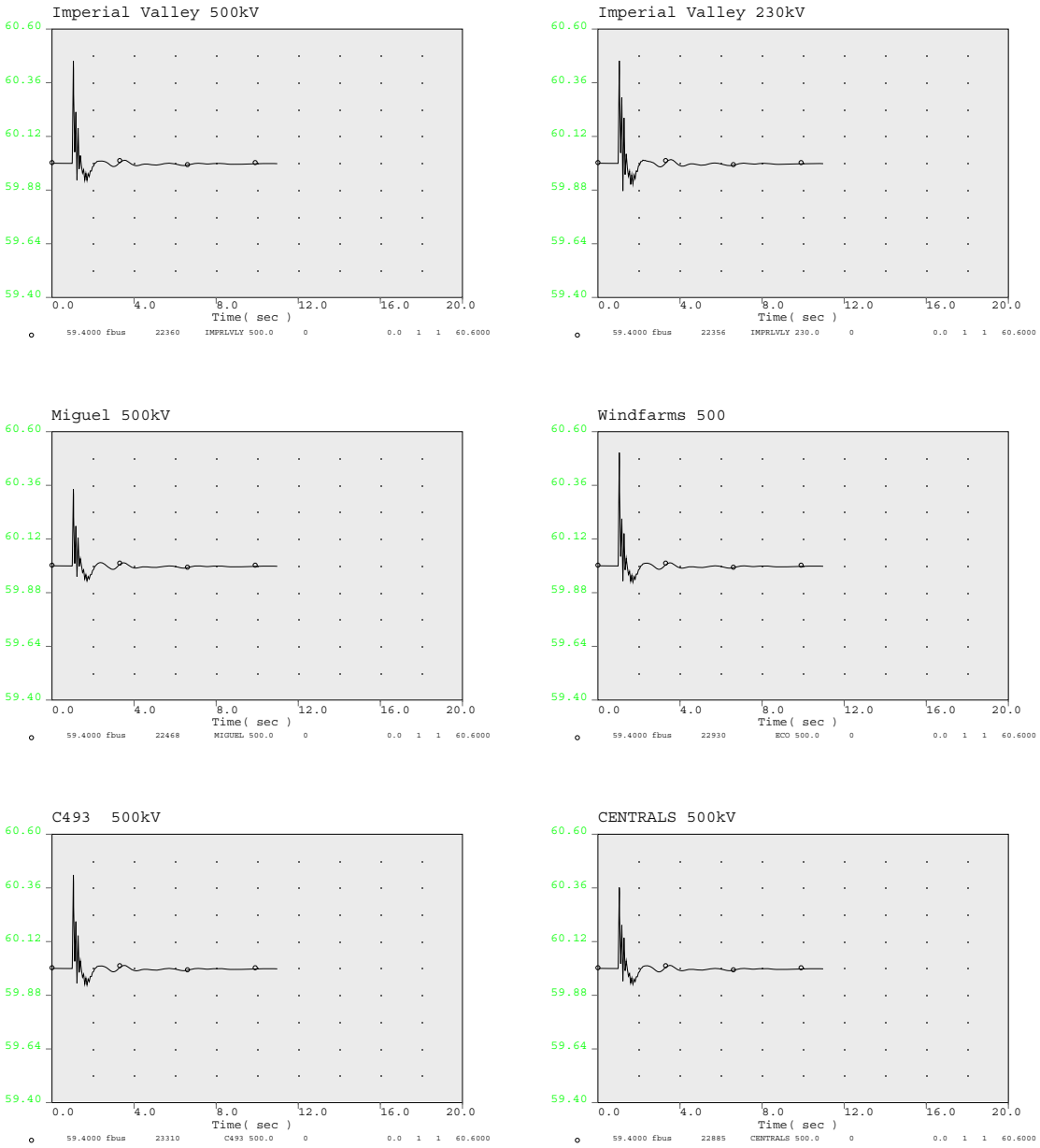


CENTRALS 500kV



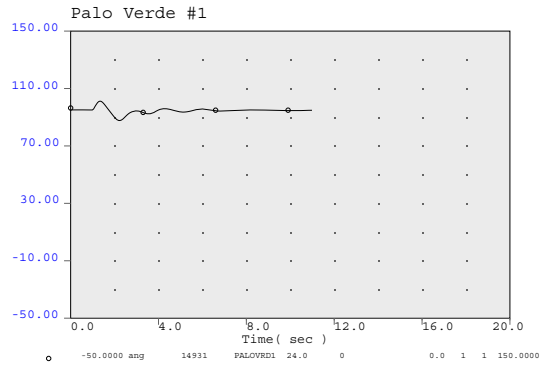
SDG&E Cluster 2 - pre
Light Autumn
Haasyampa-N.Gila 500 kV line

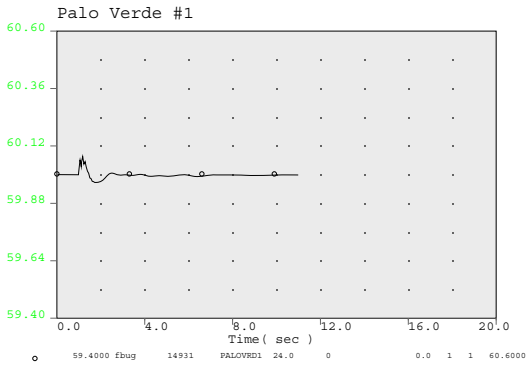
Imperial Valley Area - Frequency

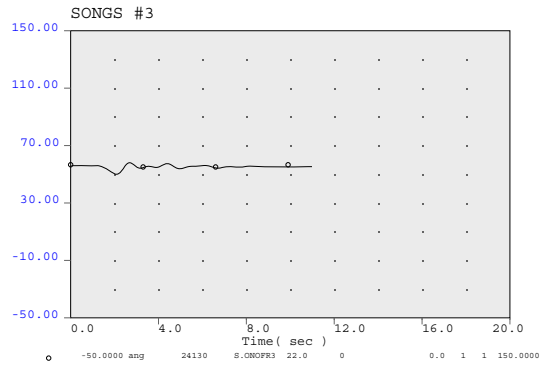


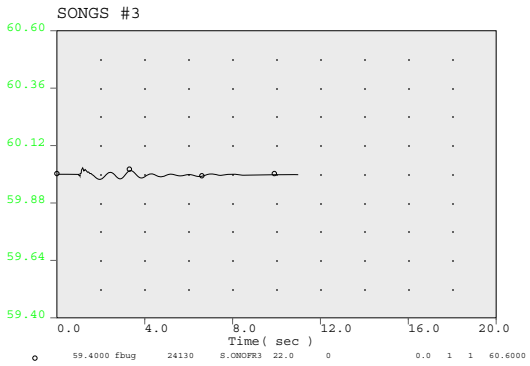
SDG&E Cluster 2 - pre
Light Autumn
Haasyampa-N.Gila 500 kV line

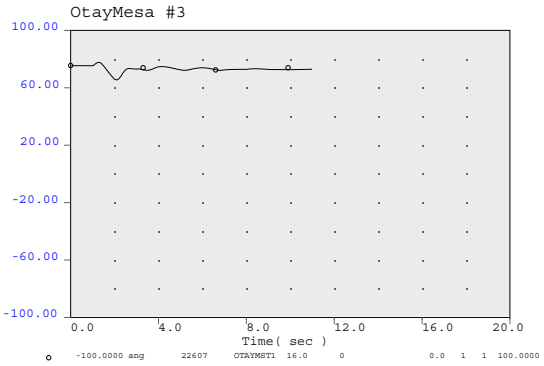
RELATIVE ROTOR ANGLE & FREQUENCY

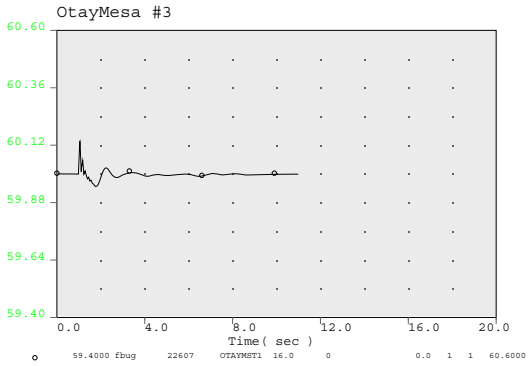










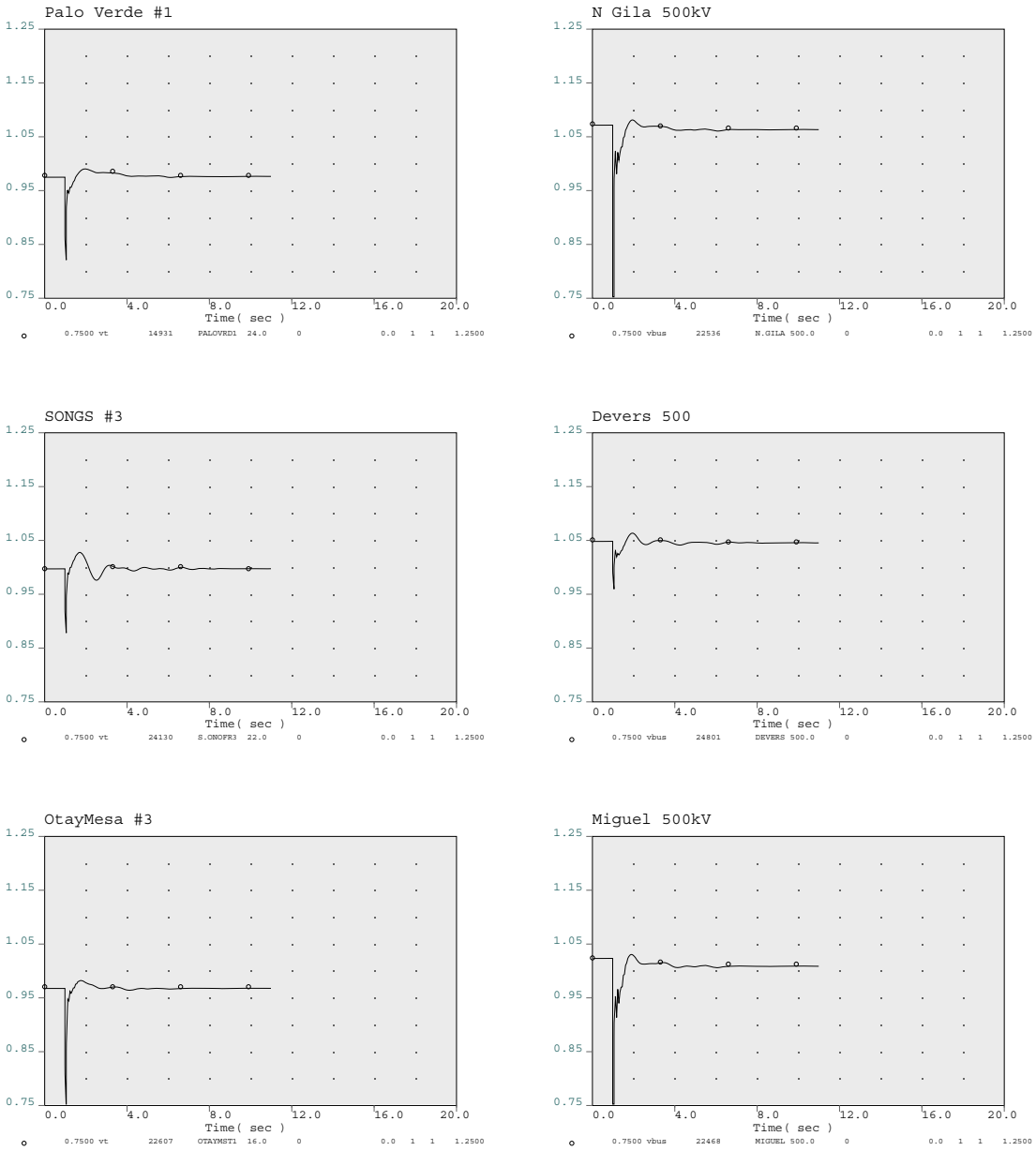


SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Page 1

SDGE	IV_C493_slo_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:28:44 2010

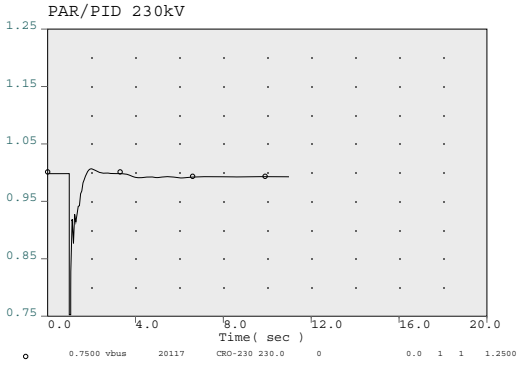
RELATIVE VOLTAGE



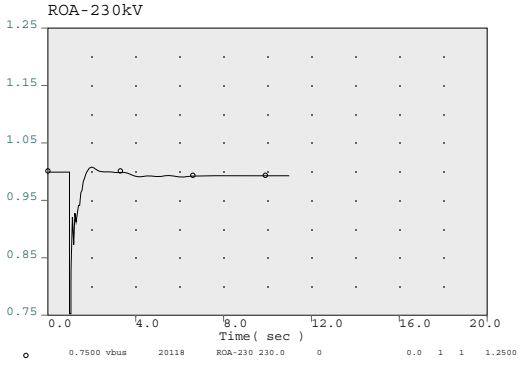
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

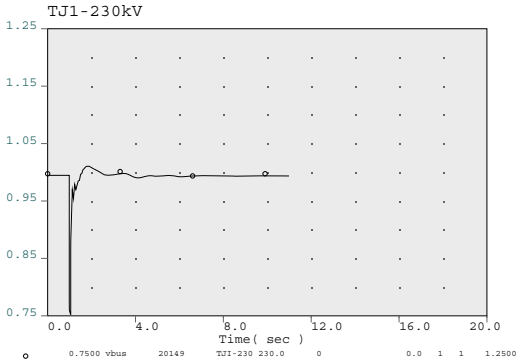
PAR/PID 230kV



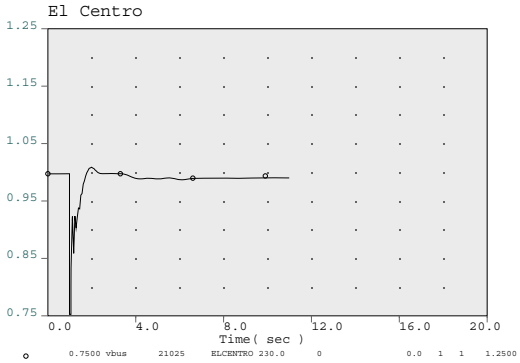
ROA-230kV



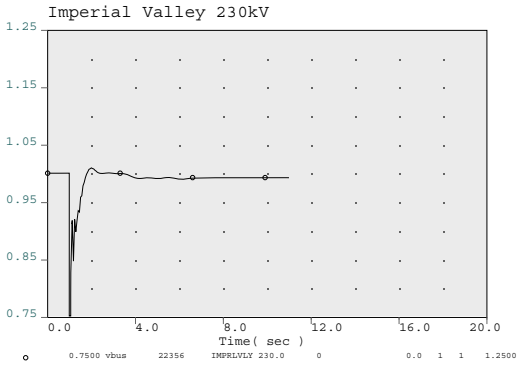
TJ1-230kV



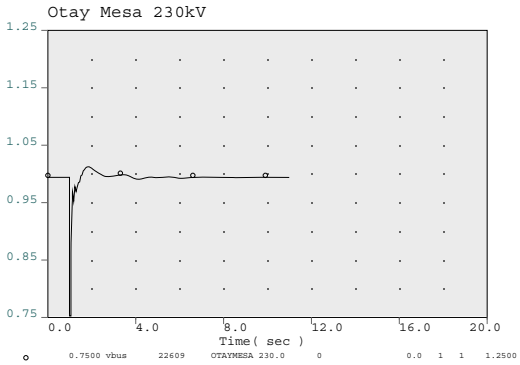
El Centro



Imperial Valley 230kV



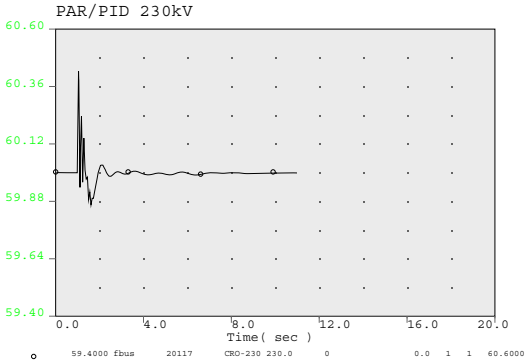
Otay Mesa 230kV



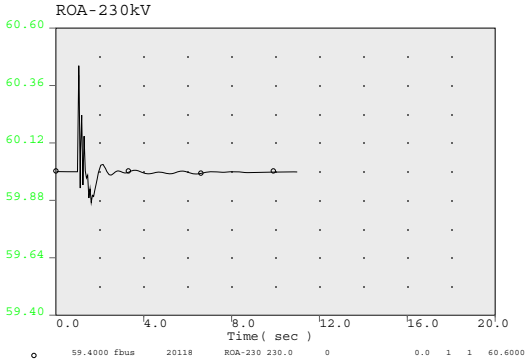
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

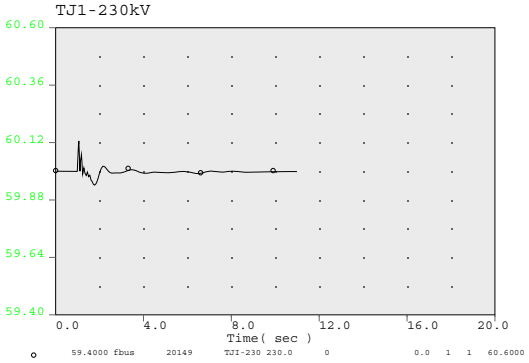
PAR/PID 230kV



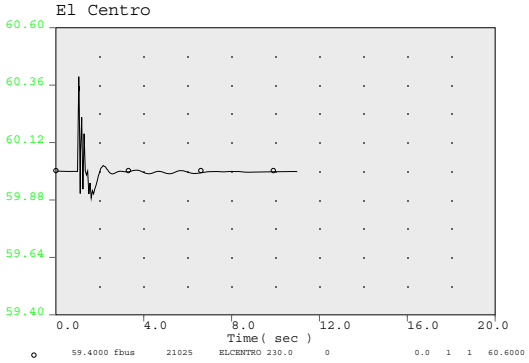
ROA-230kV



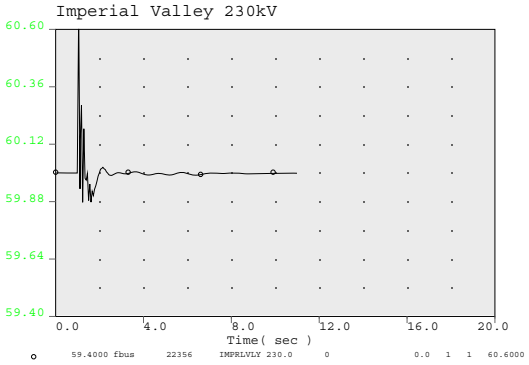
TJ1-230kV



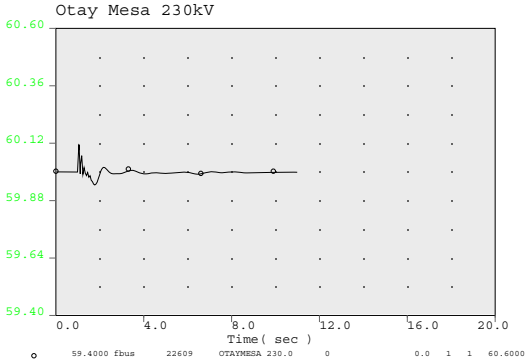
El Centro



Imperial Valley 230kV



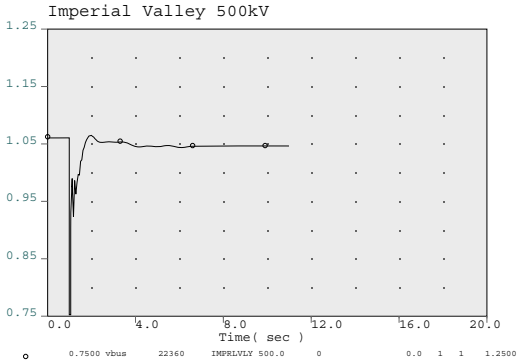
Otay Mesa 230kV



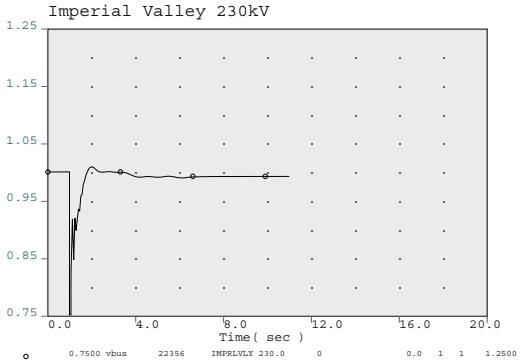
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Imperial Valley Area - VOLTAGE

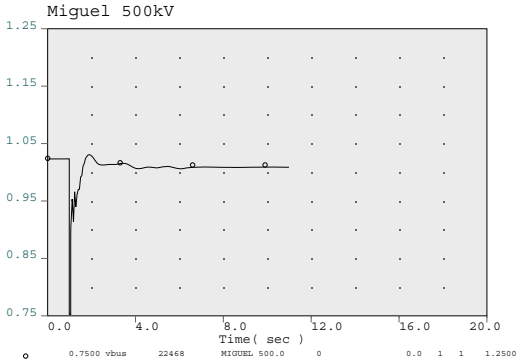
Imperial Valley 500kV



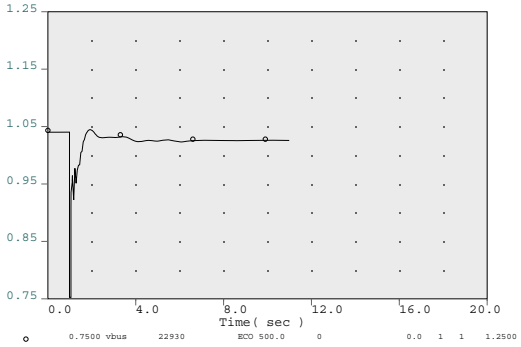
Imperial Valley 230kV



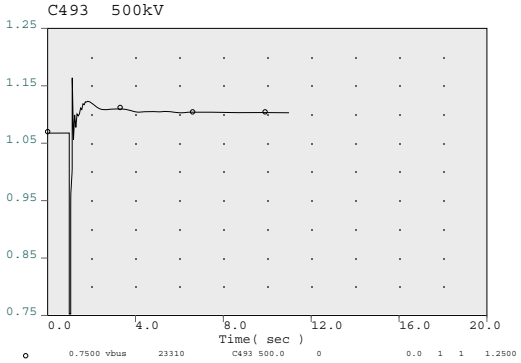
Miguel 500kV



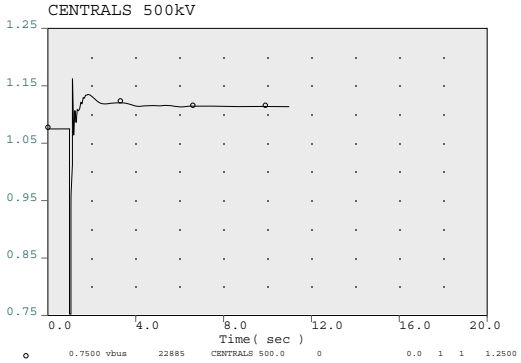
Windfarms 500



C493 500kV

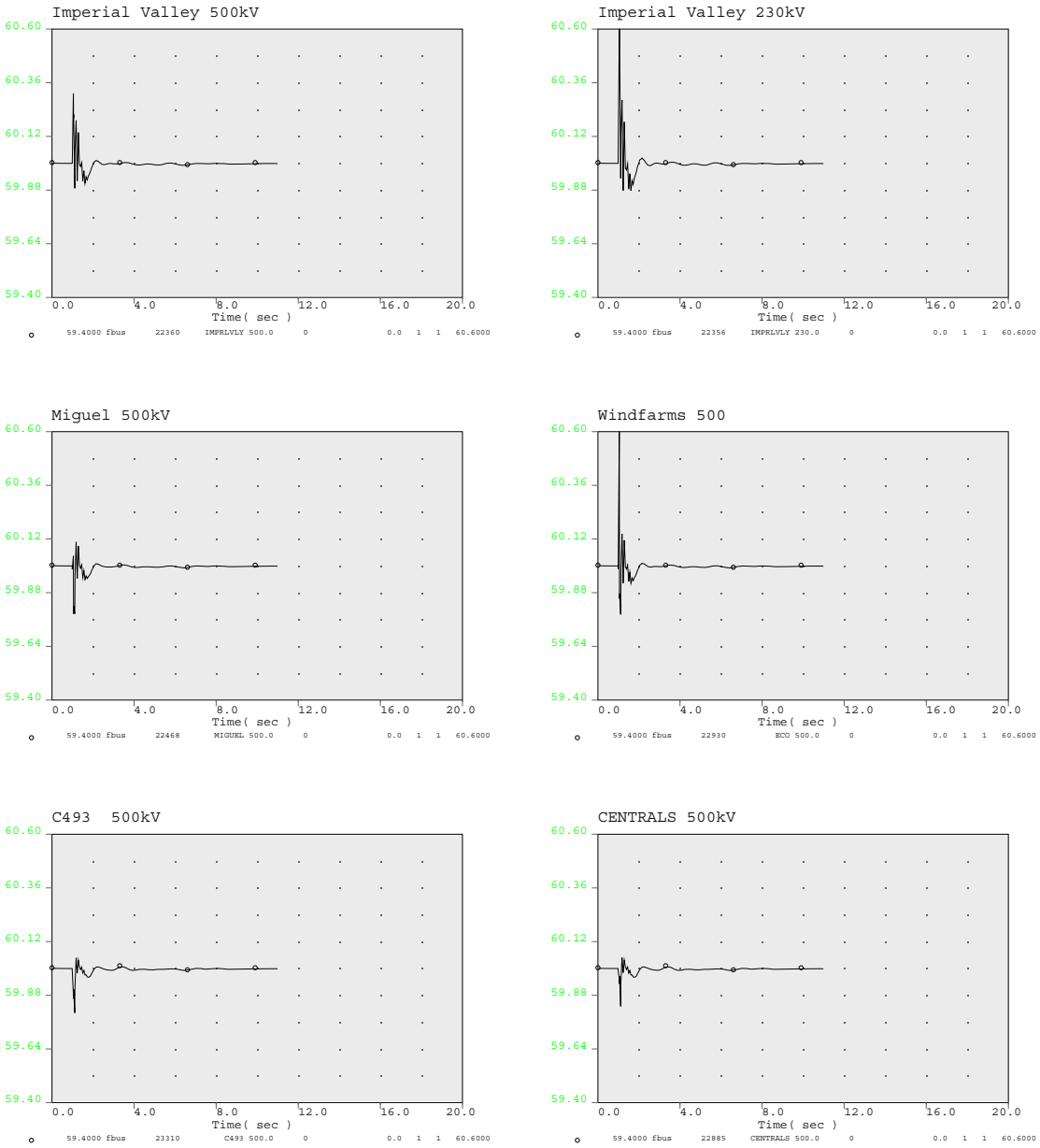


CENTRALS 500kV



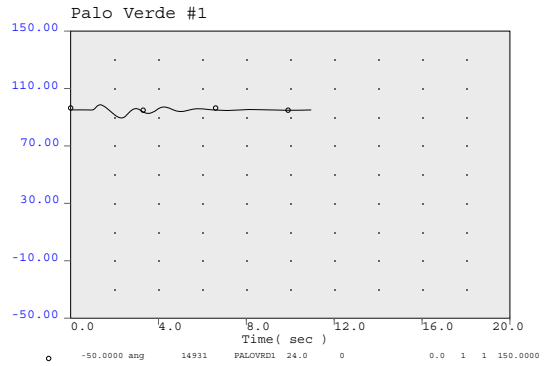
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

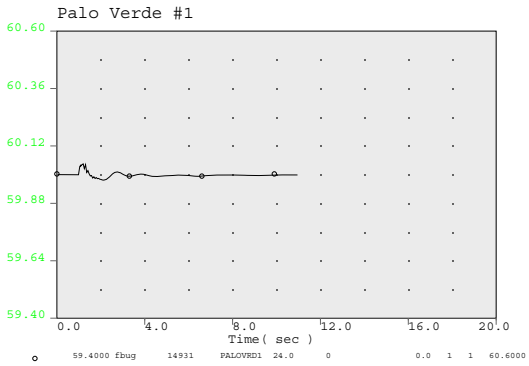
Imperial Valley Area - Frequency

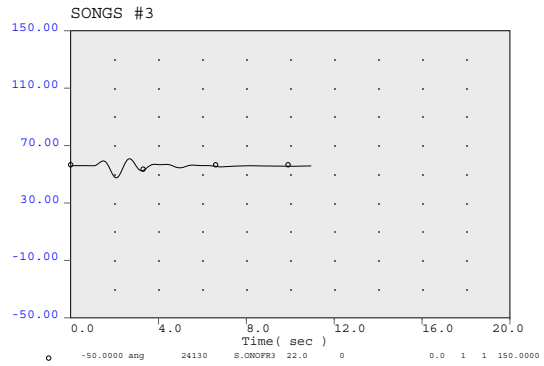


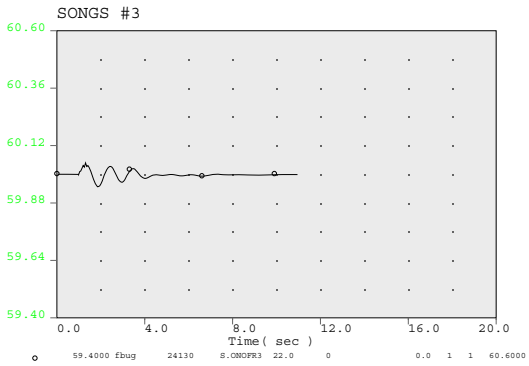
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

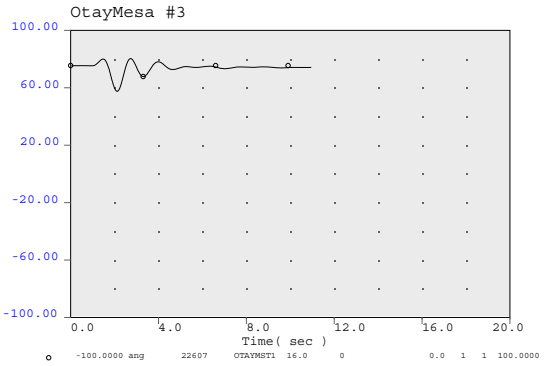
RELATIVE ROTOR ANGLE & FREQUENCY

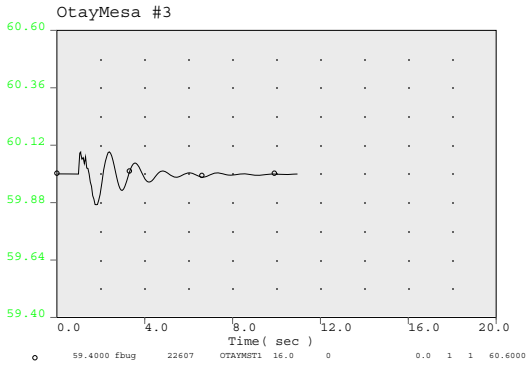










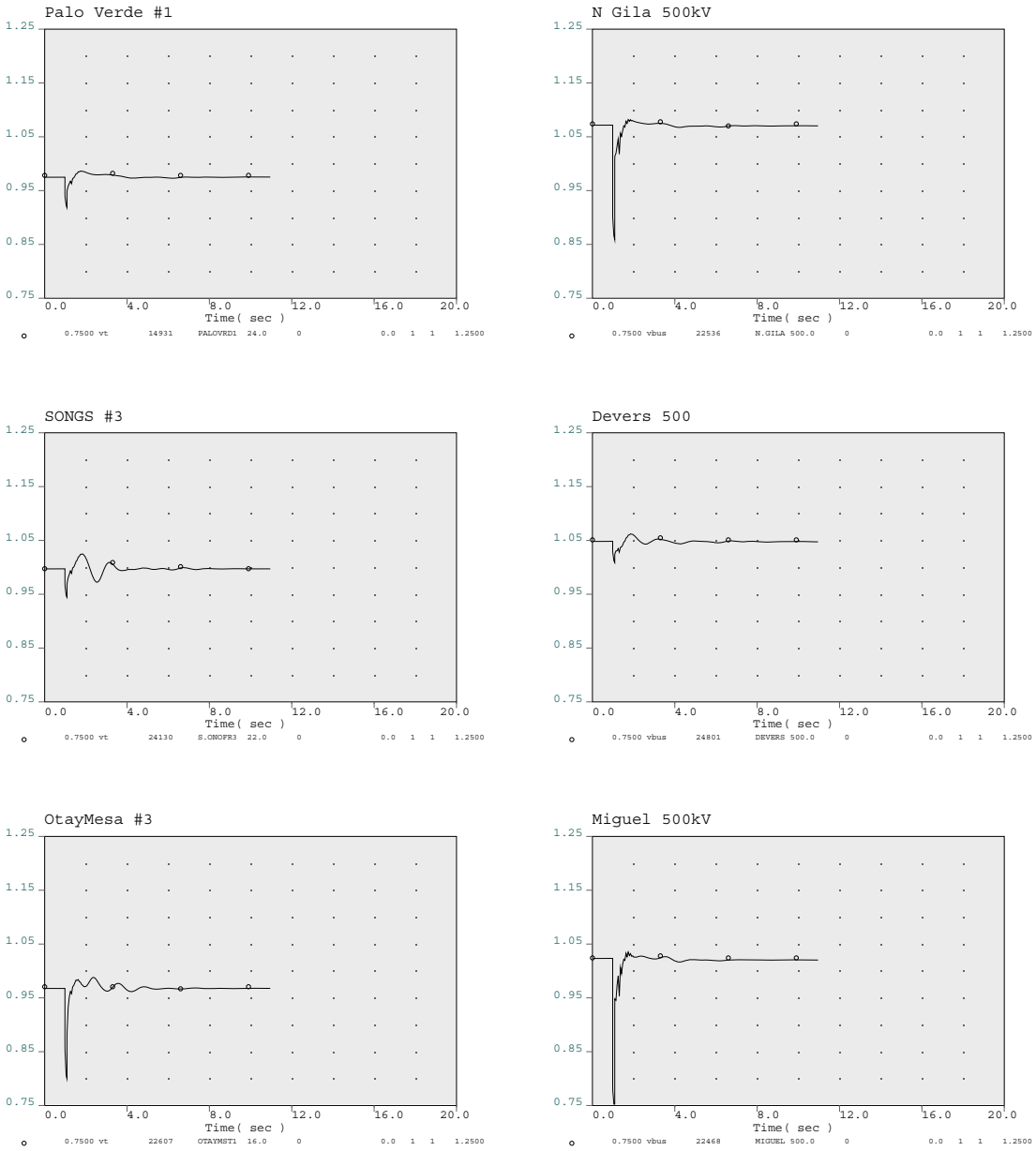


SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Page 1

SDGE	iv_roa_6_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:24:04 2010

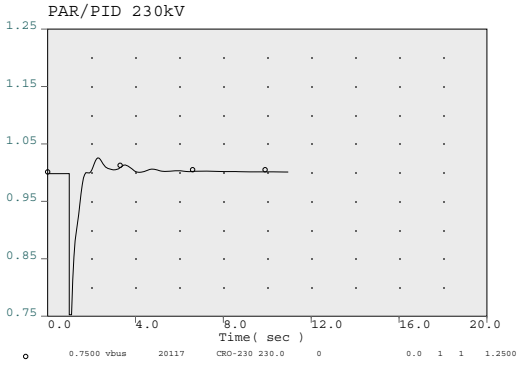
RELATIVE VOLTAGE



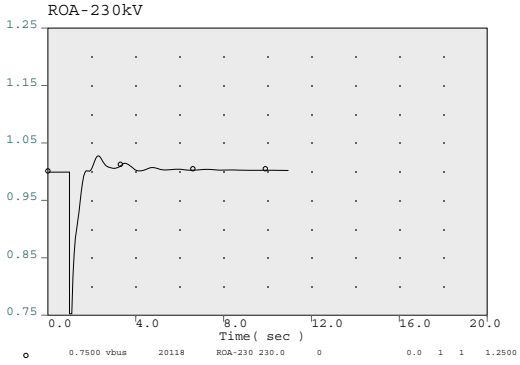
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

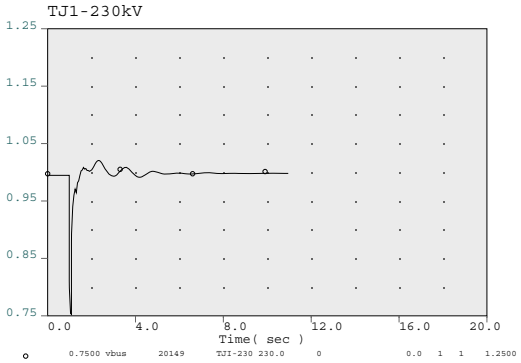
PAR/PID 230kV



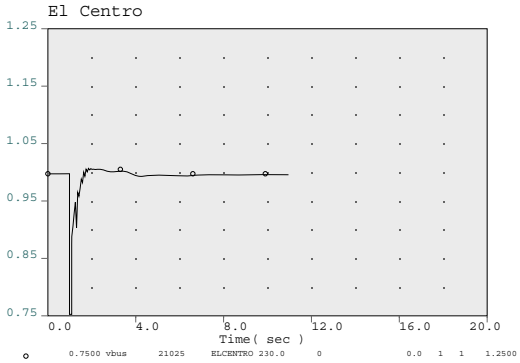
ROA-230kV



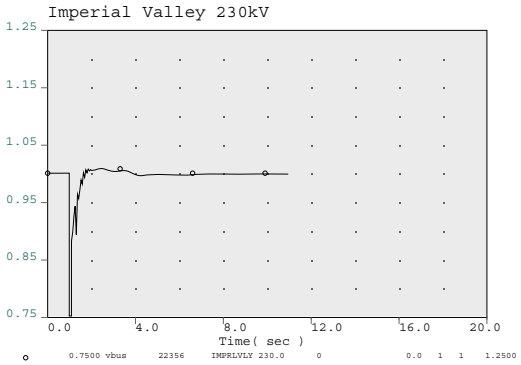
TJ1-230kV



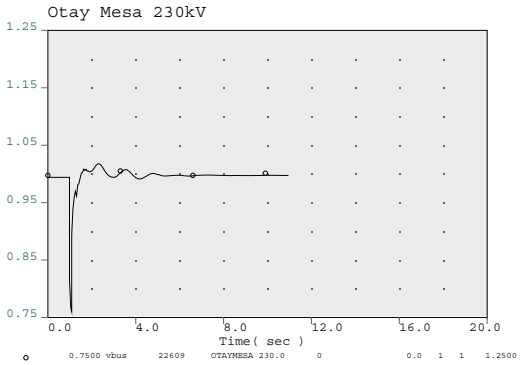
El Centro



Imperial Valley 230kV



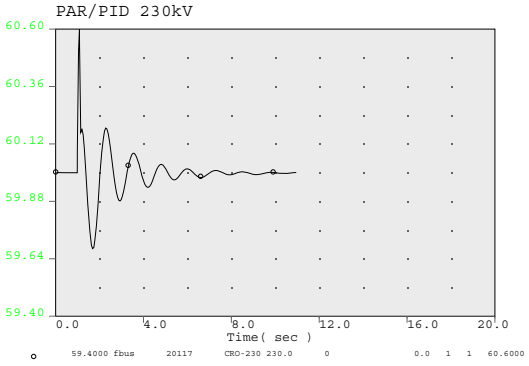
Otay Mesa 230kV



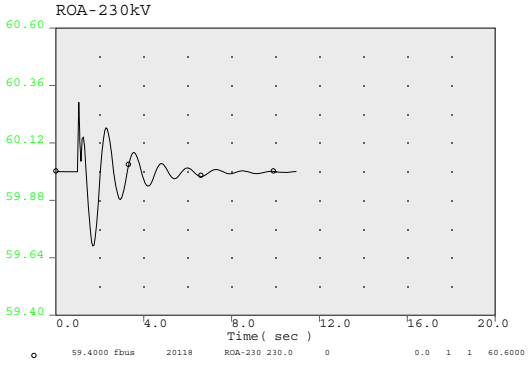
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Affected System Frequency Check and Comparison

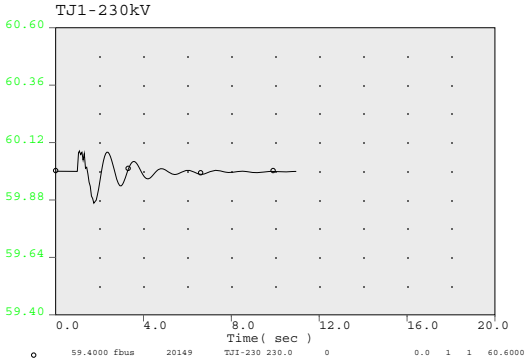
PAR/PID 230kV



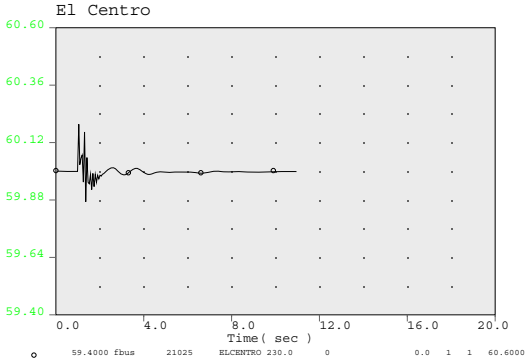
ROA-230kV



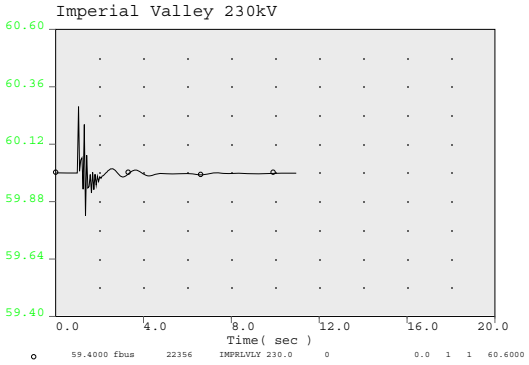
TJ1-230kV



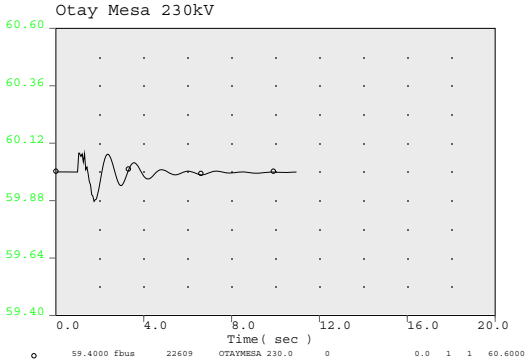
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



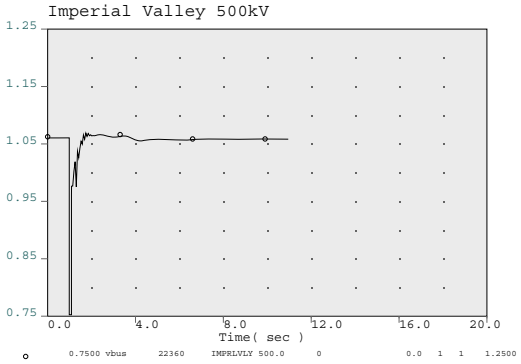
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Page 4

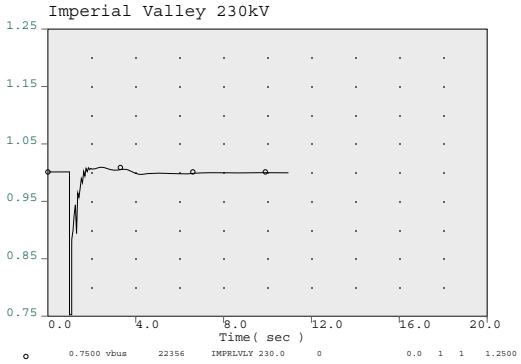
SDGE	iv_roa_6_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:24:04 2010

Imperial Valley Area - VOLTAGE

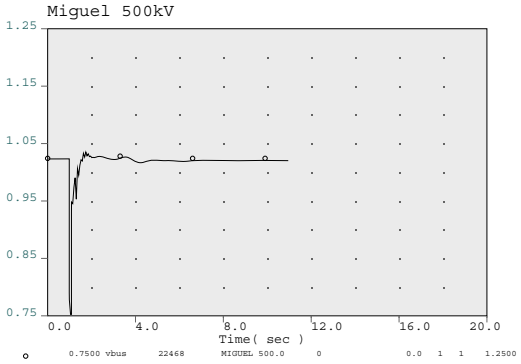
Imperial Valley 500kV



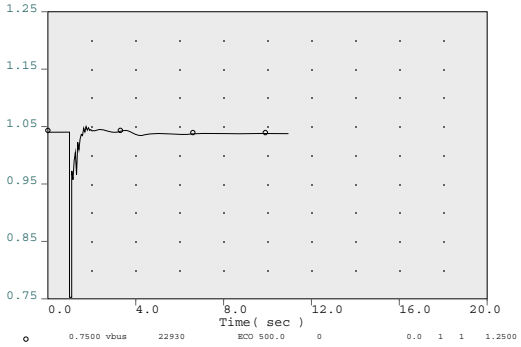
Imperial Valley 230kV



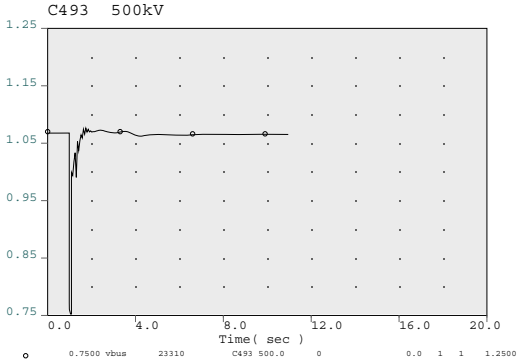
Miguel 500kV



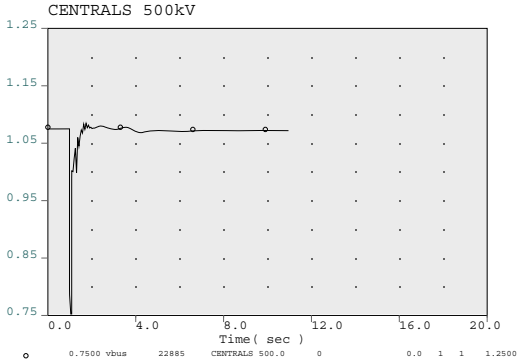
Windfarms 500



C493 500kV

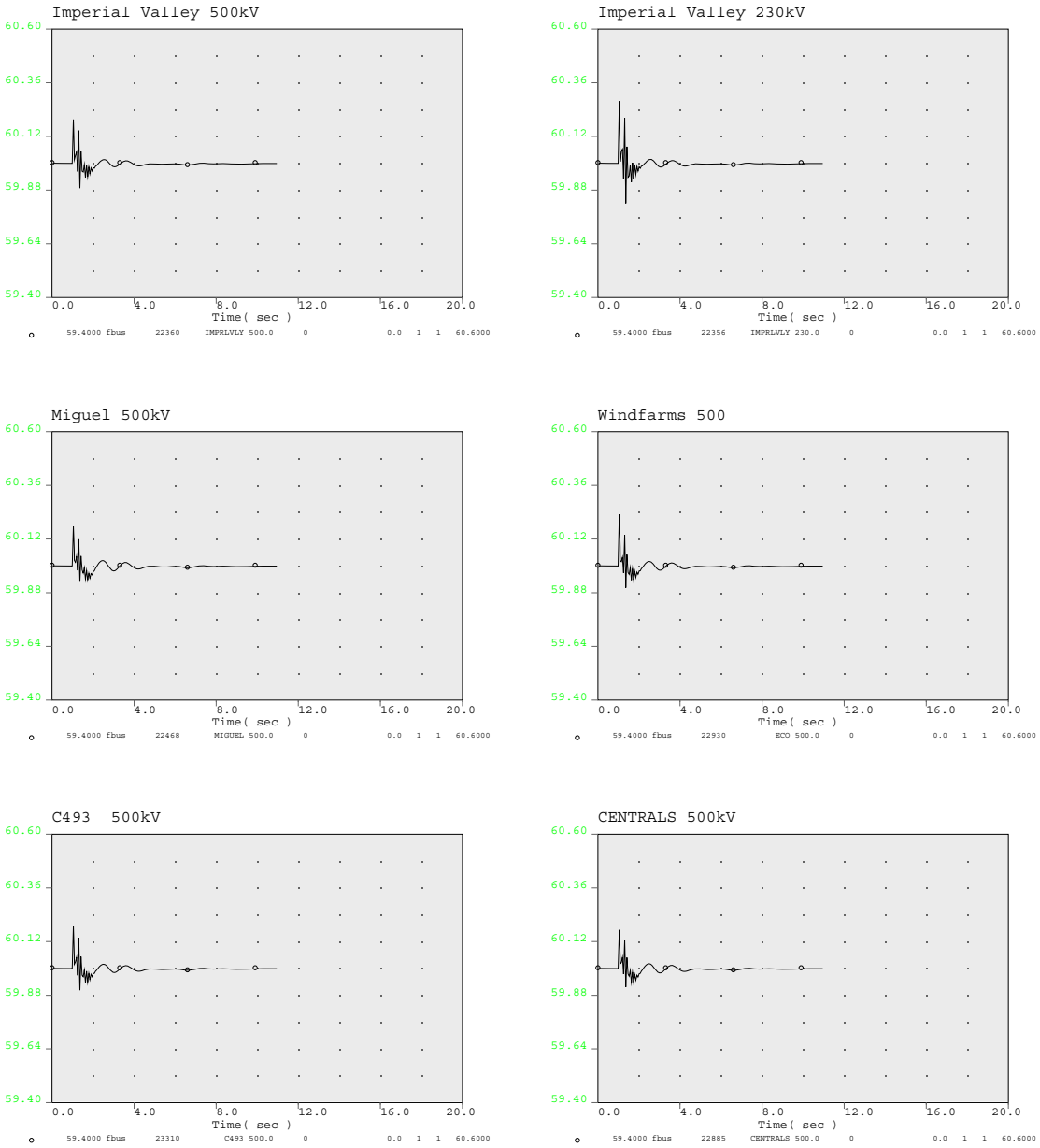


CENTRALS 500kV



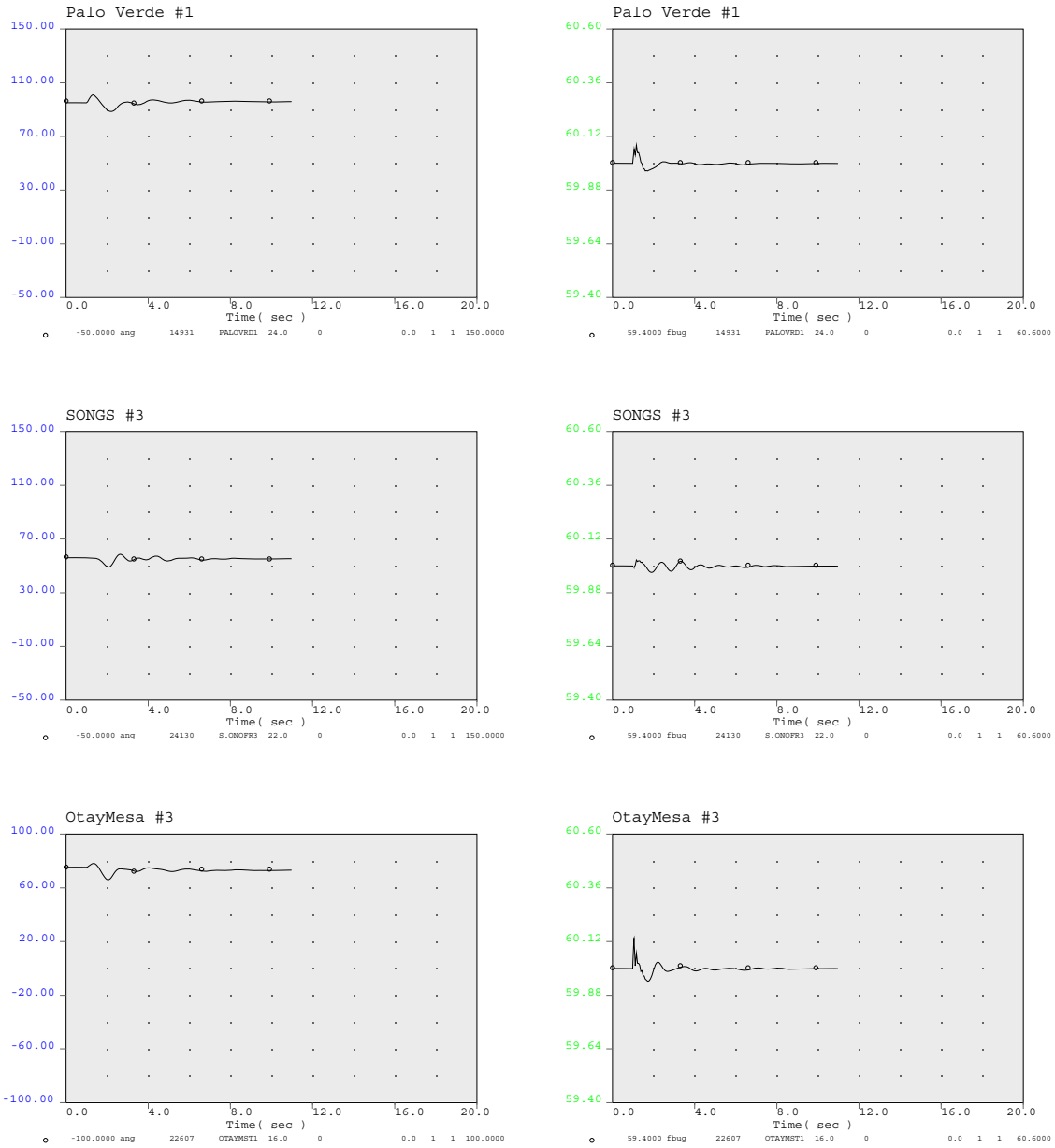
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

RELATIVE ROTOR ANGLE & FREQUENCY

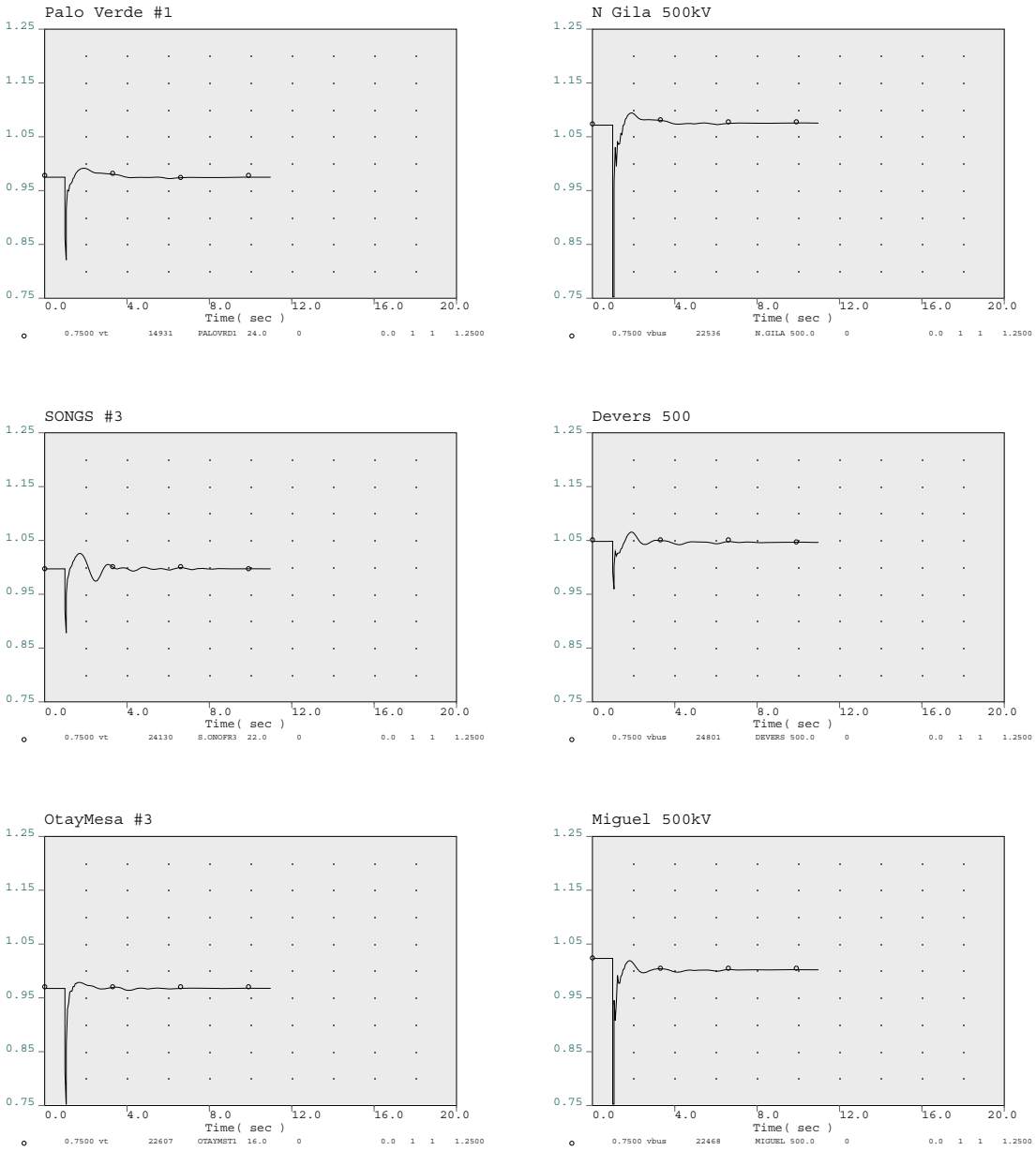


SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Page 1

SDGE	IV_Wnd1_noRAS_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:24:11 2010

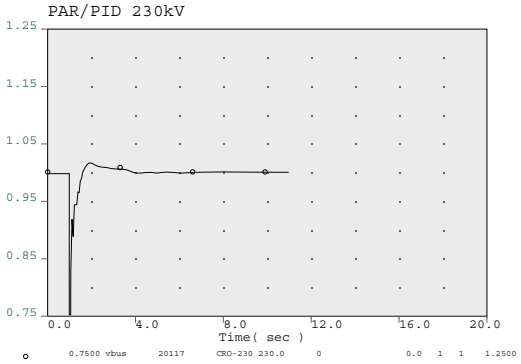
RELATIVE VOLTAGE



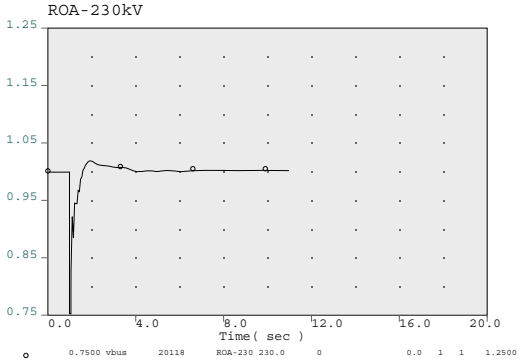
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

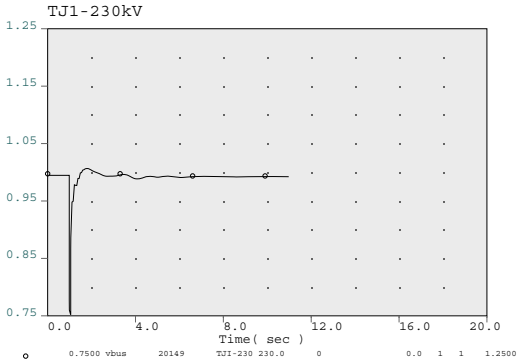
PAR/PID 230kV



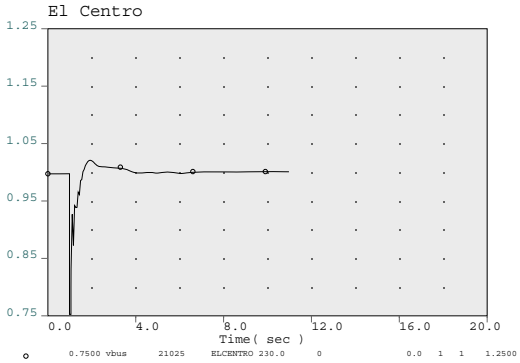
ROA-230kV



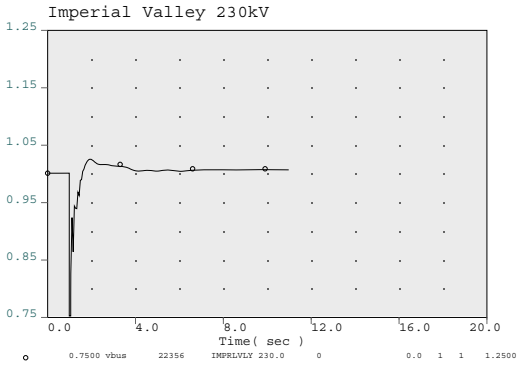
TJ1-230kV



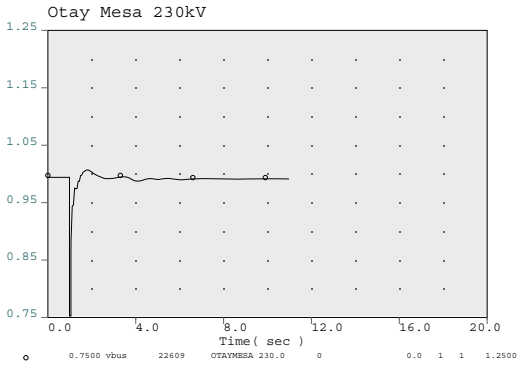
El Centro



Imperial Valley 230kV



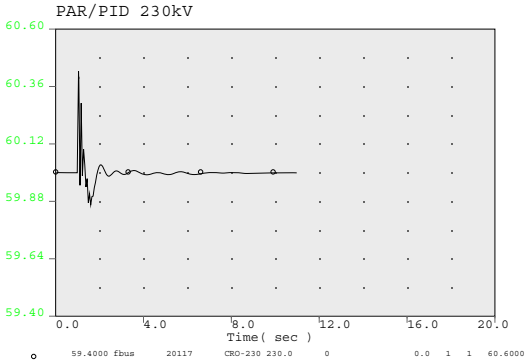
Otay Mesa 230kV



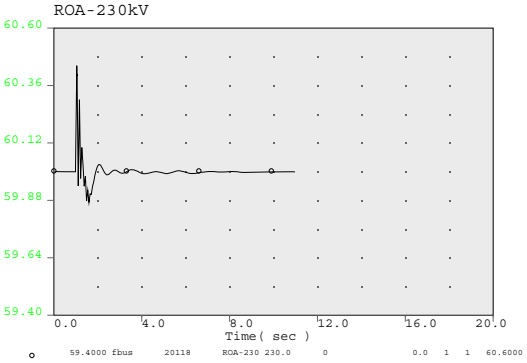
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

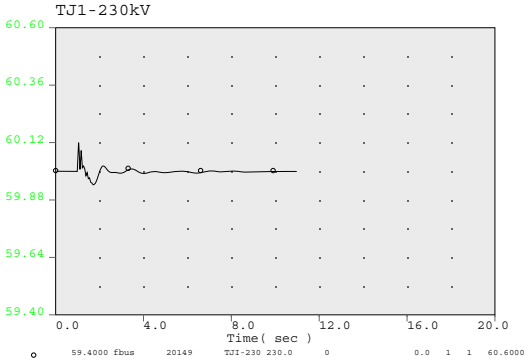
PAR/PID 230kV



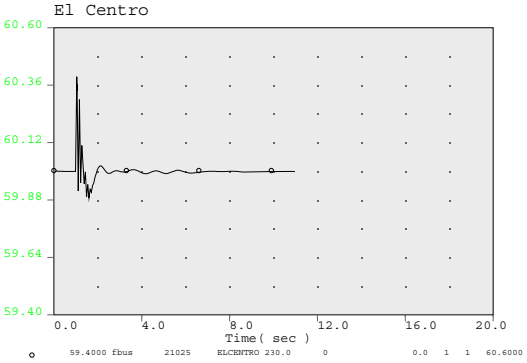
ROA-230kV



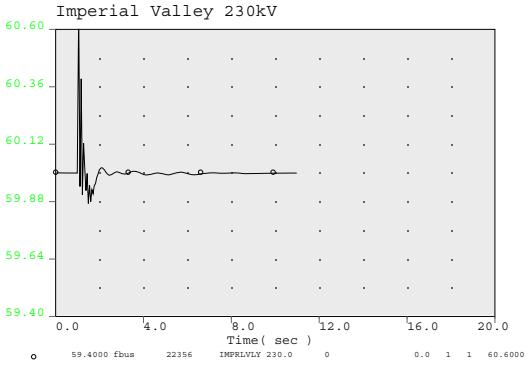
TJ1-230kV



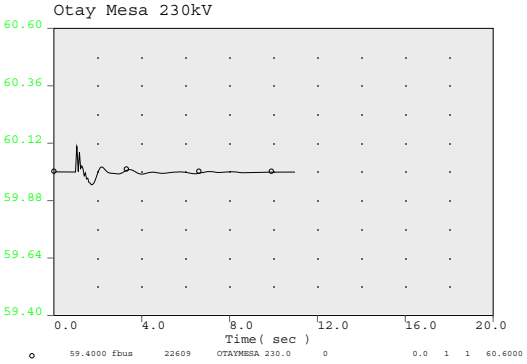
El Centro



Imperial Valley 230kV



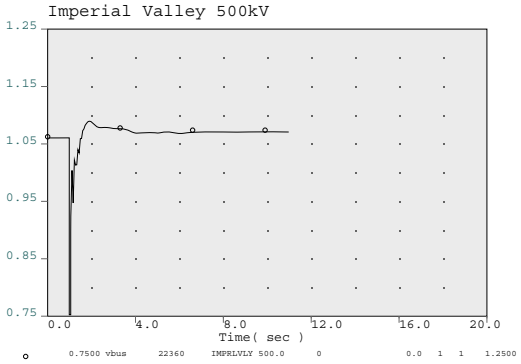
Otay Mesa 230kV



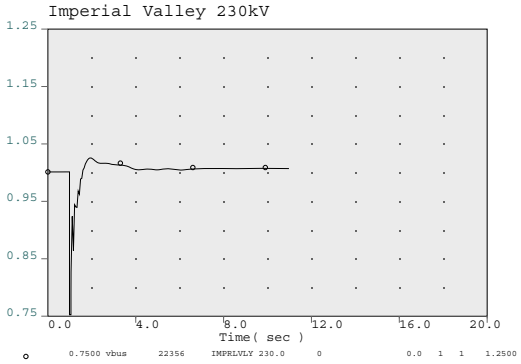
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

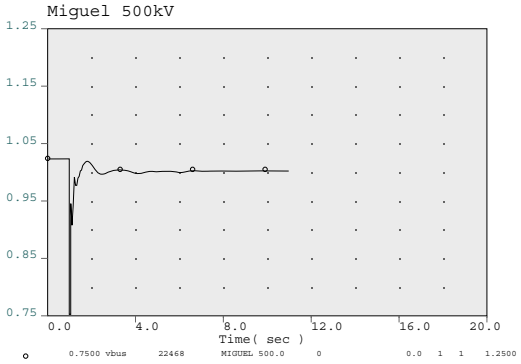
Imperial Valley 500kV



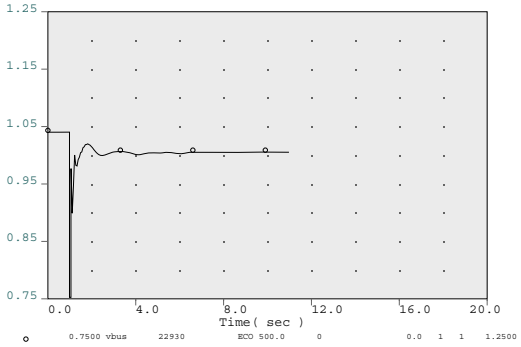
Imperial Valley 230kV



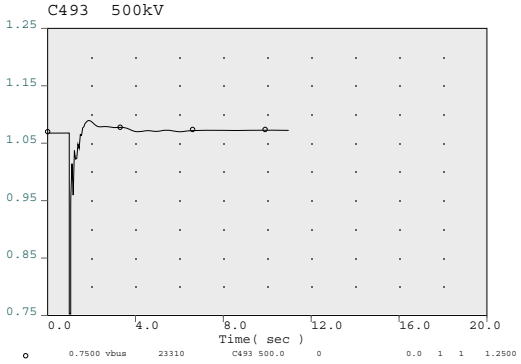
Miguel 500kV



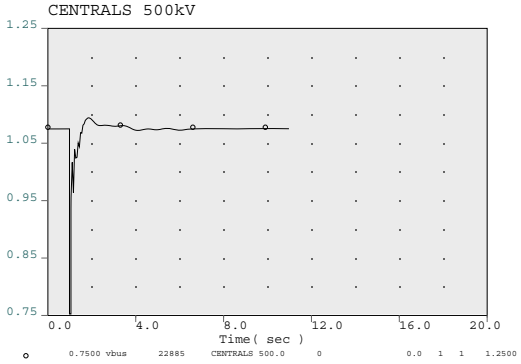
Windfarms 500



C493 500kV

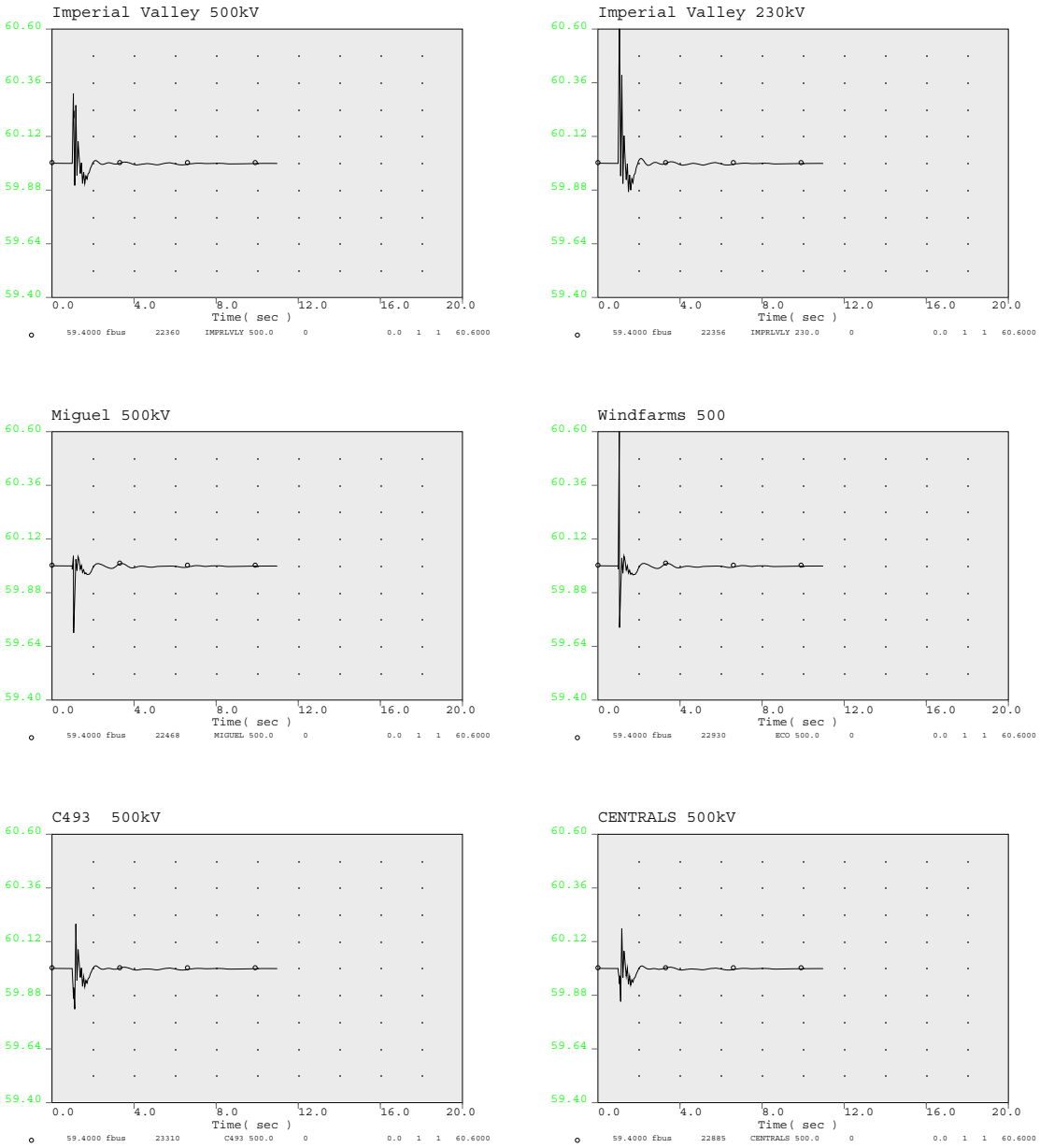


CENTRALS 500kV



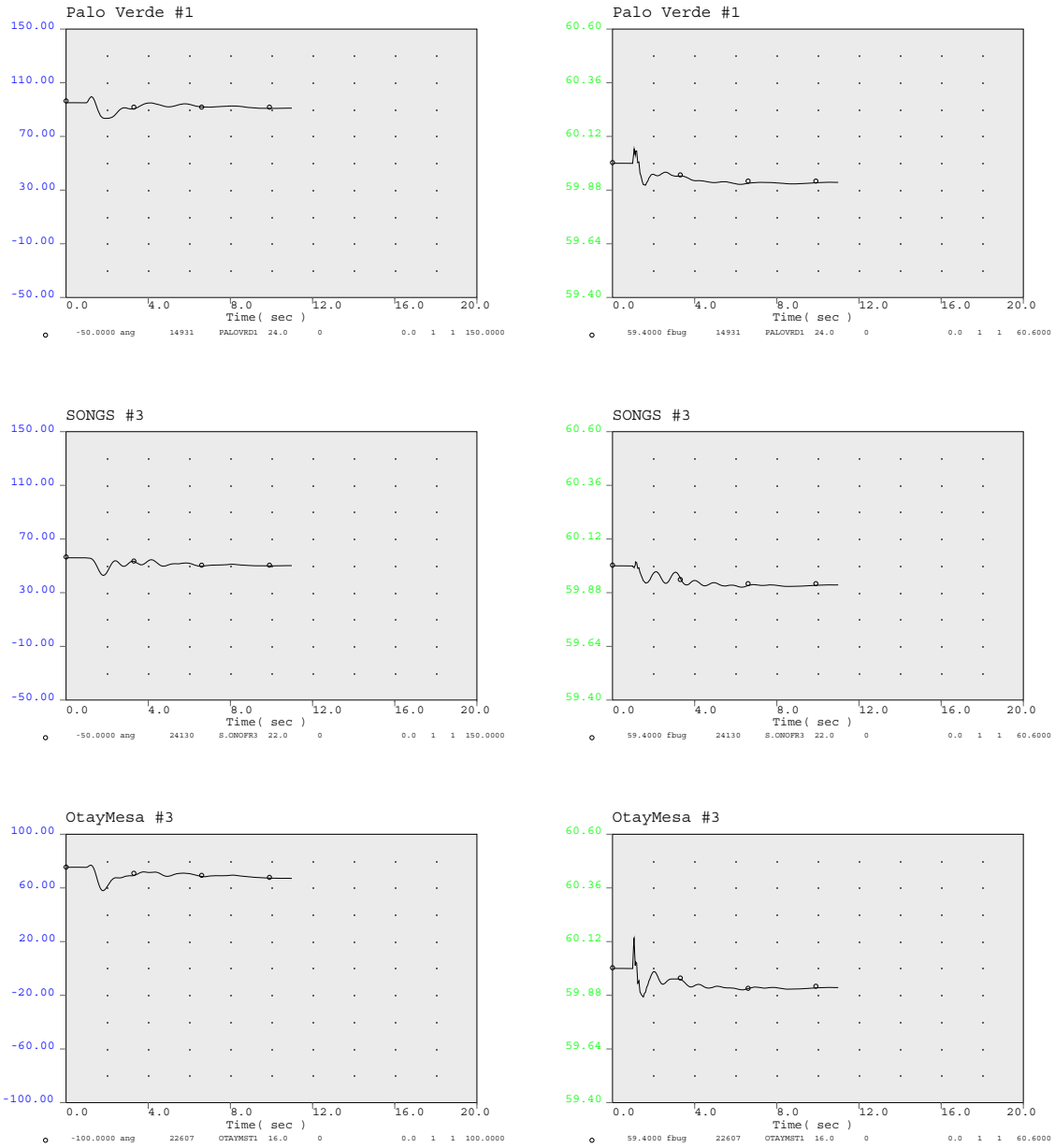
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

RELATIVE ROTOR ANGLE & FREQUENCY



SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

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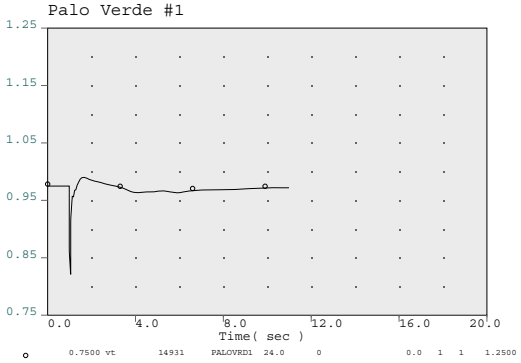
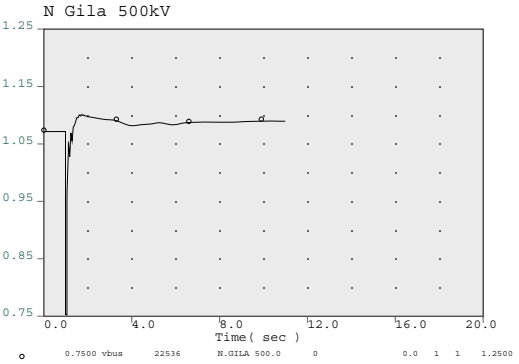
SDGE	IV_Wnd1_noXTrp_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:24:19 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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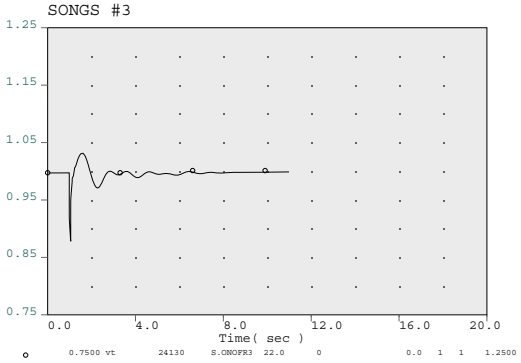
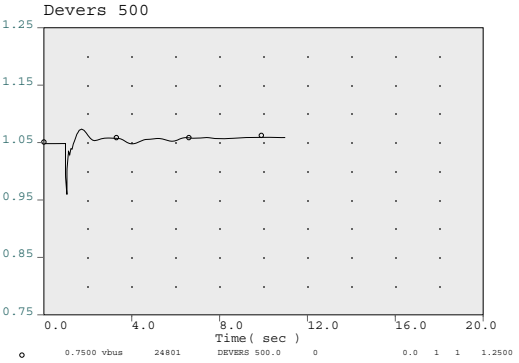


Devers 500



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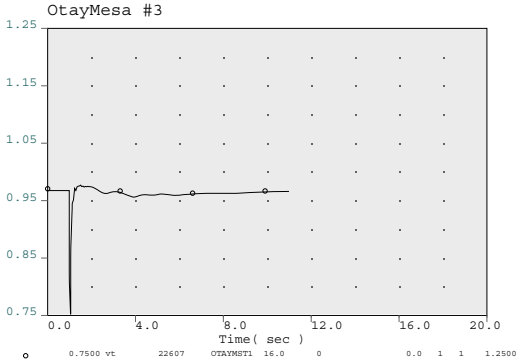
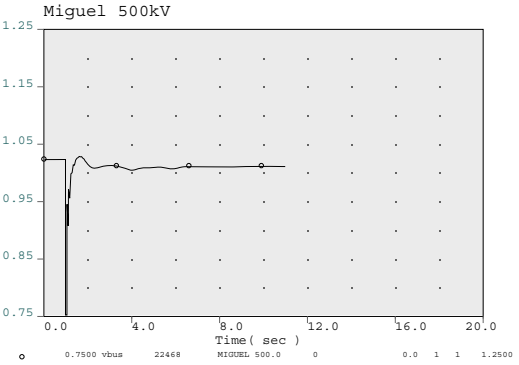


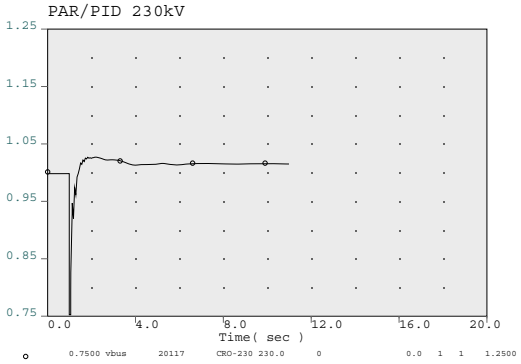
Miguel 500kV



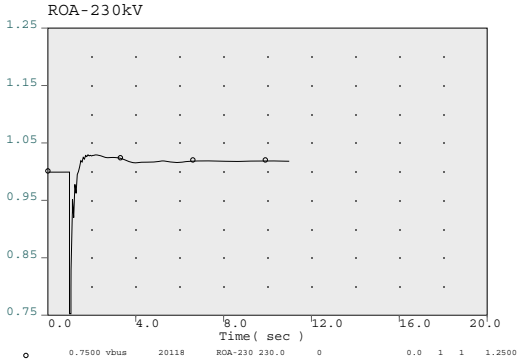
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

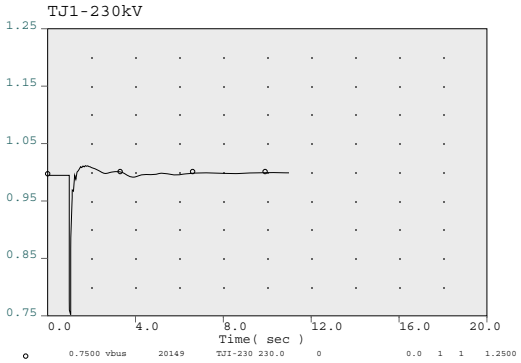
PAR/PID 230kV



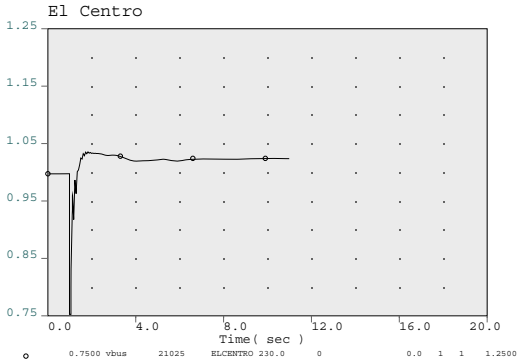
ROA-230kV



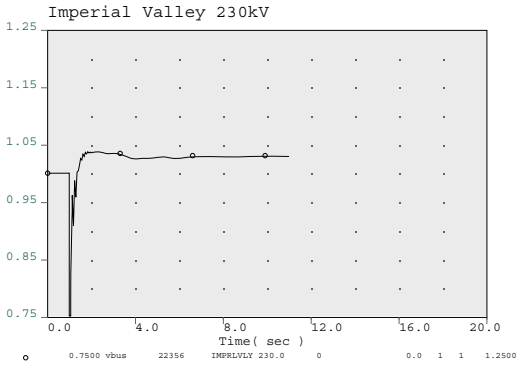
TJ1-230kV



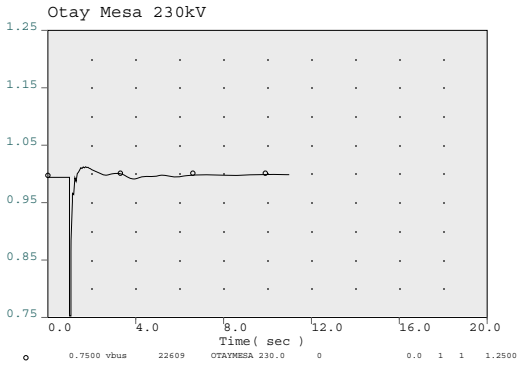
El Centro



Imperial Valley 230kV



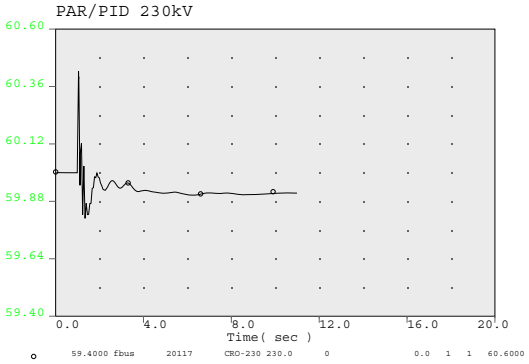
Otay Mesa 230kV



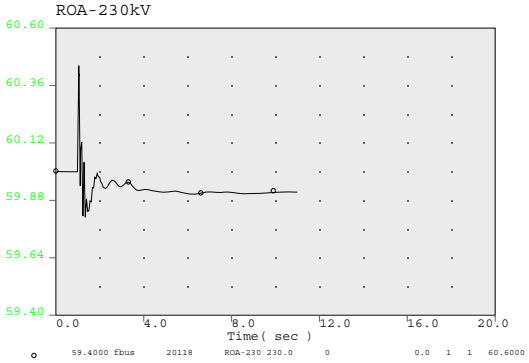
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

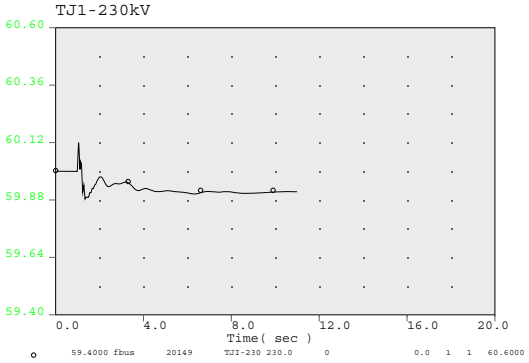
PAR/PID 230kV



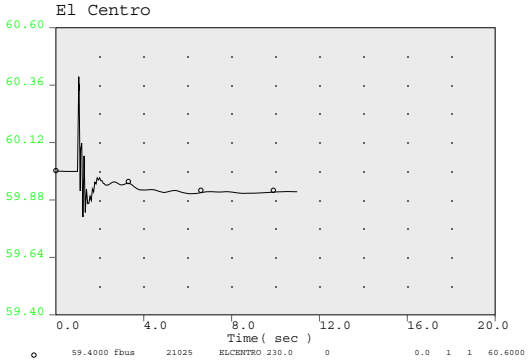
ROA-230kV



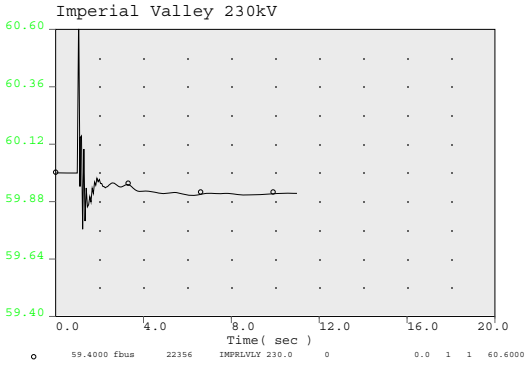
TJ1-230kV



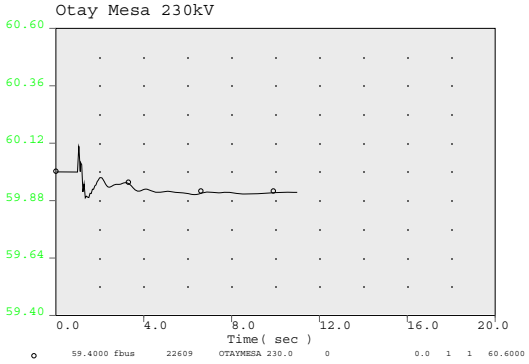
El Centro



Imperial Valley 230kV



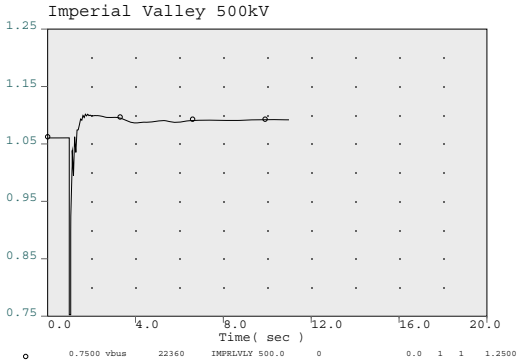
Otay Mesa 230kV



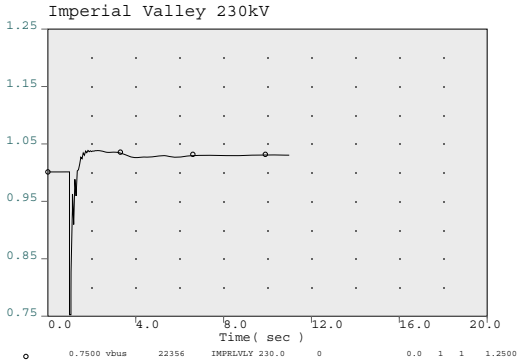
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

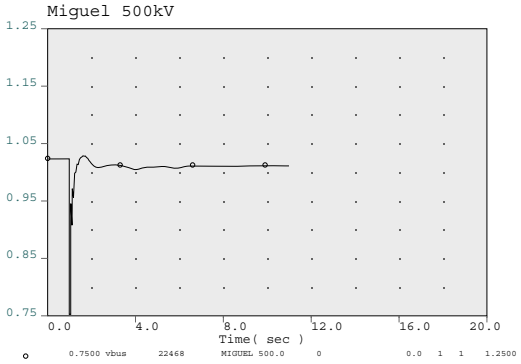
Imperial Valley 500kV



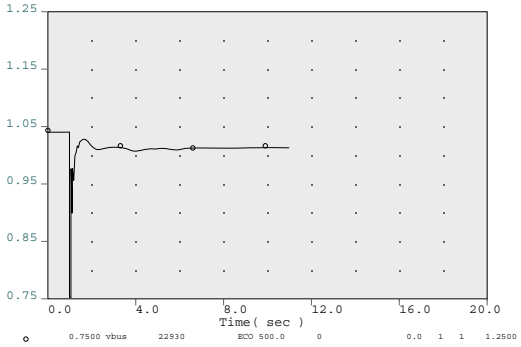
Imperial Valley 230kV



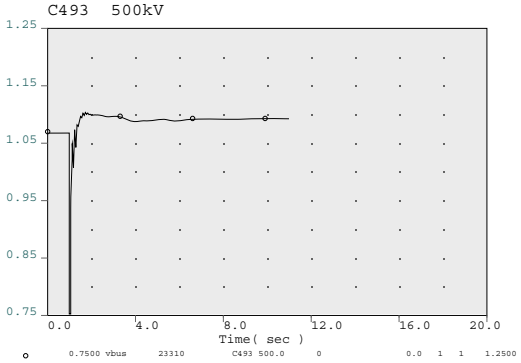
Miguel 500kV



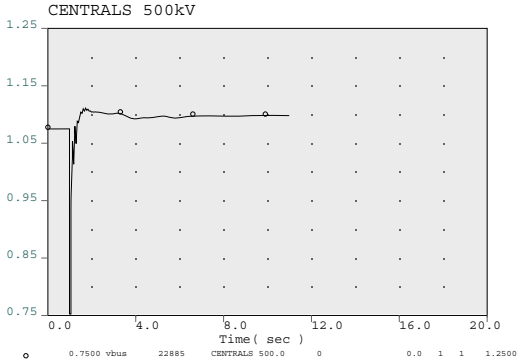
Windfarms 500



C493 500kV

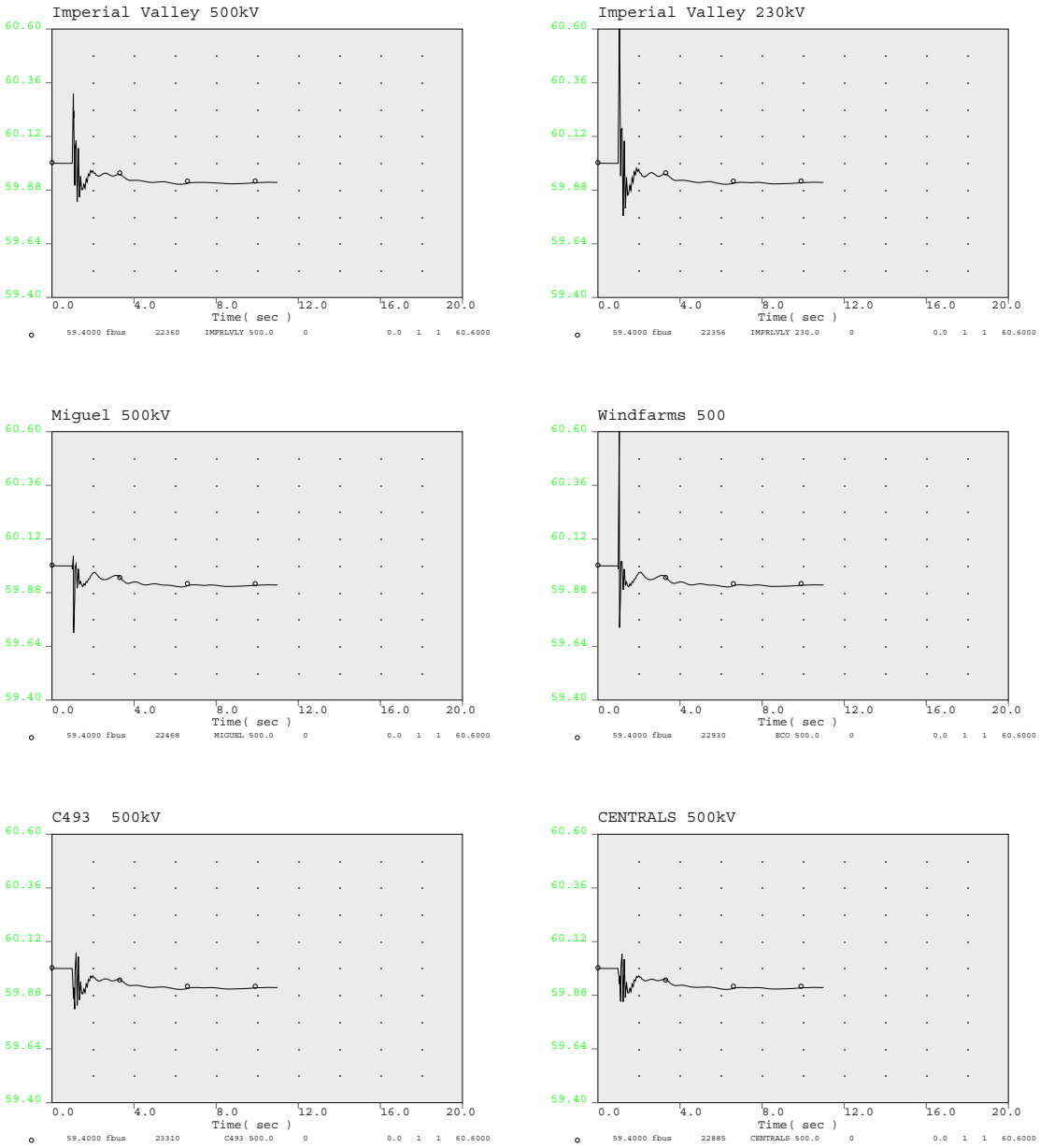


CENTRALS 500kV



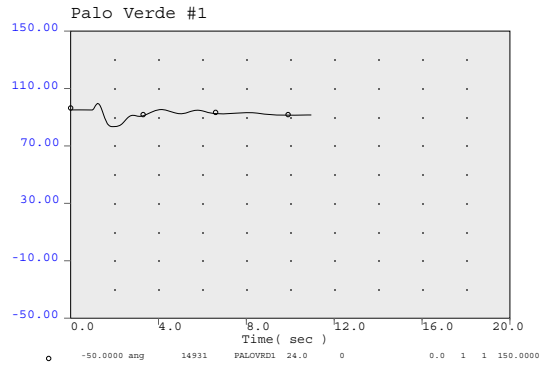
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

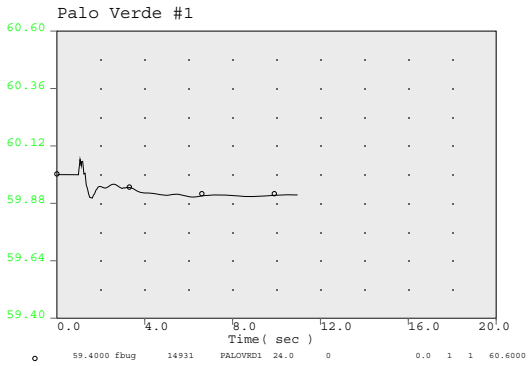
Imperial Valley Area - Frequency

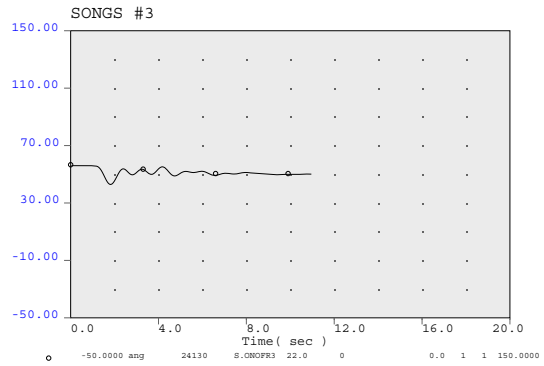


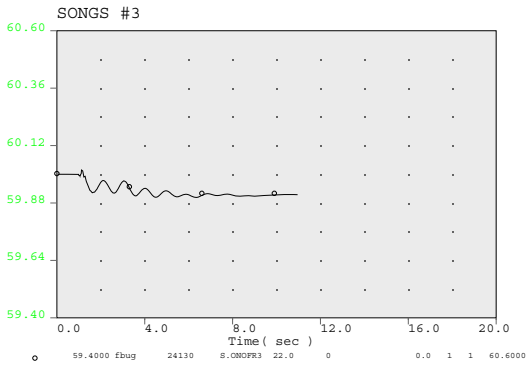
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

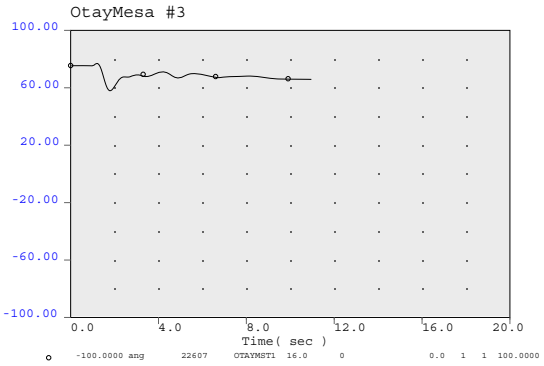
RELATIVE ROTOR ANGLE & FREQUENCY

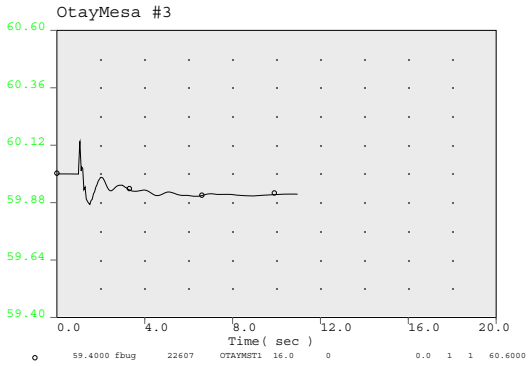










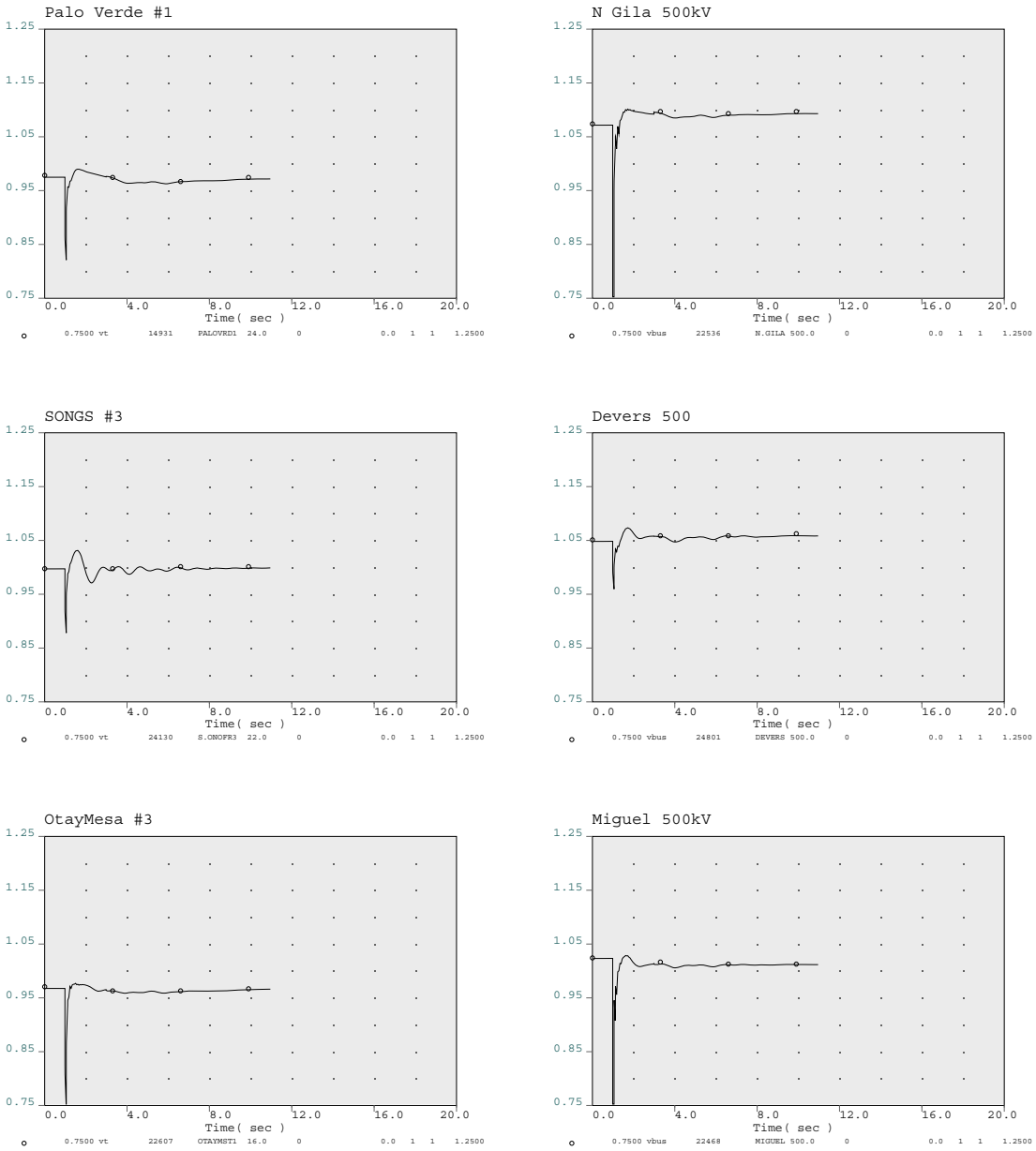


SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Page 1

SDGE	IV_Wnd1_RAS_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:24:31 2010

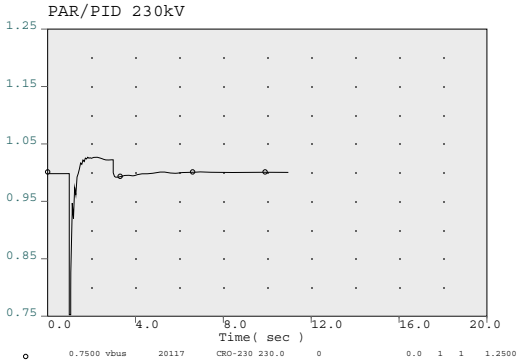
RELATIVE VOLTAGE



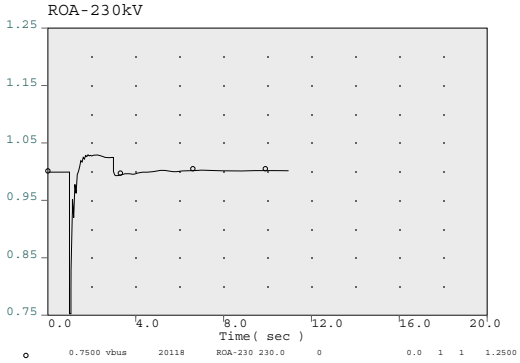
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

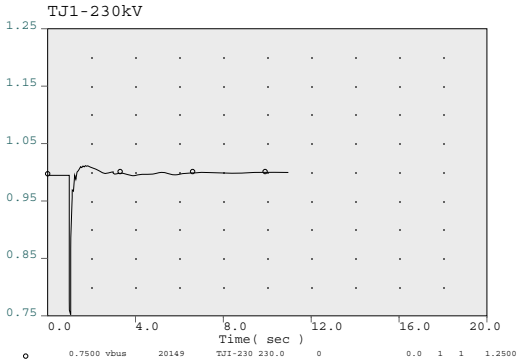
PAR/PID 230kV



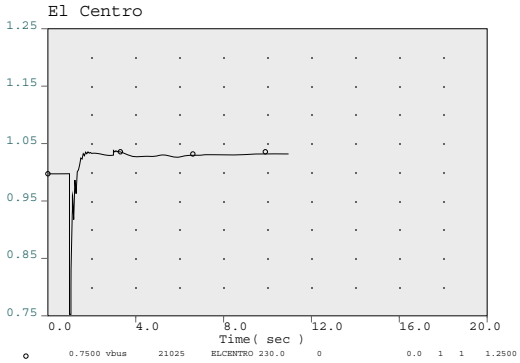
ROA-230kV



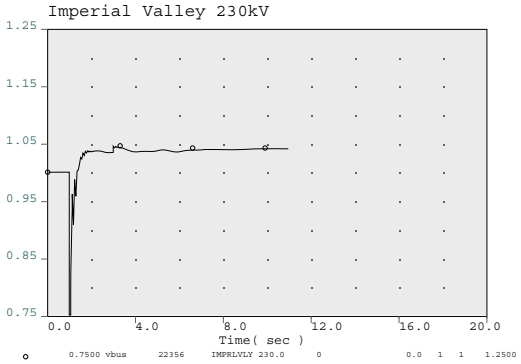
TJ1-230kV



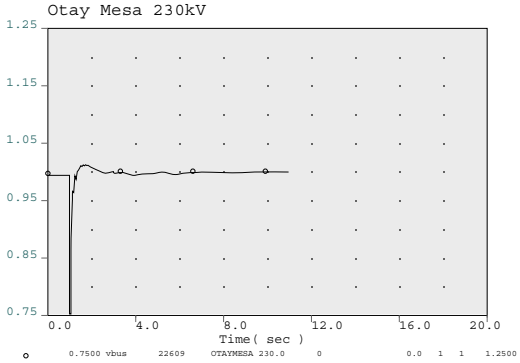
El Centro



Imperial Valley 230kV



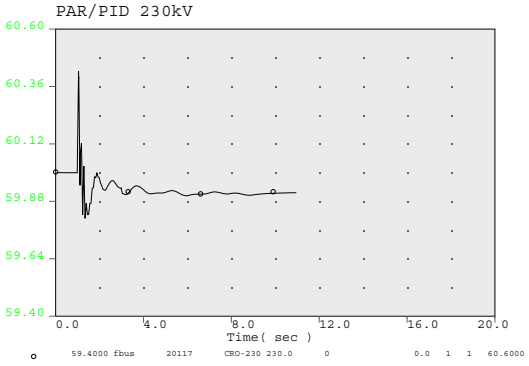
Otay Mesa 230kV



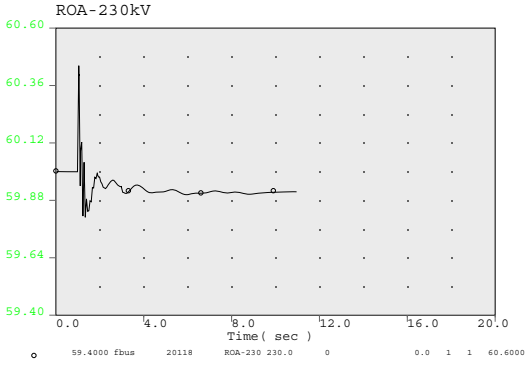
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

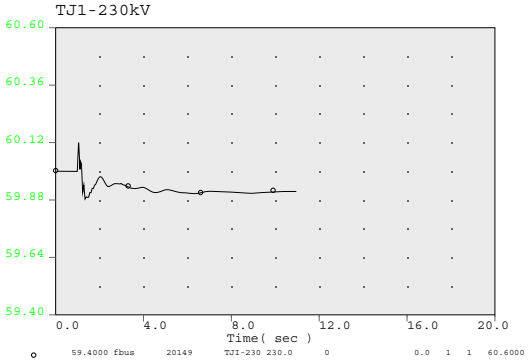
PAR/PID 230kV



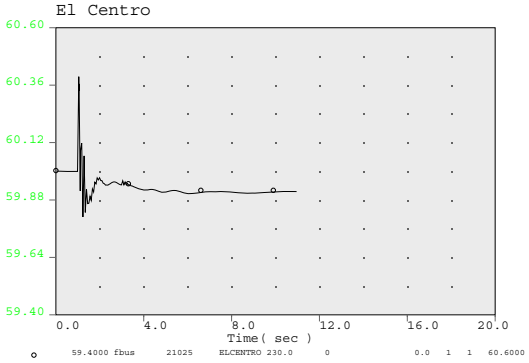
ROA-230kV



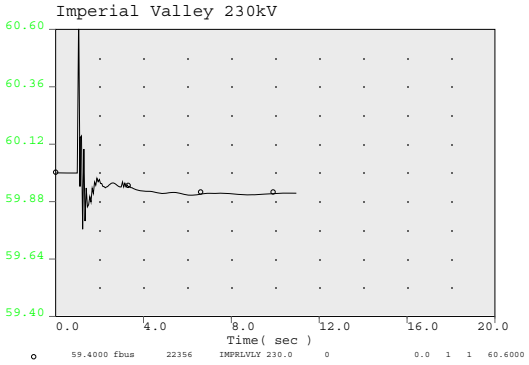
TJ1-230kV



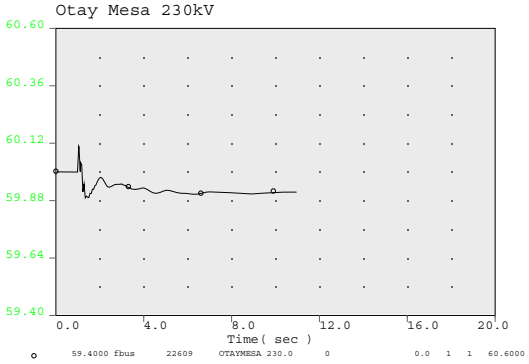
El Centro



Imperial Valley 230kV



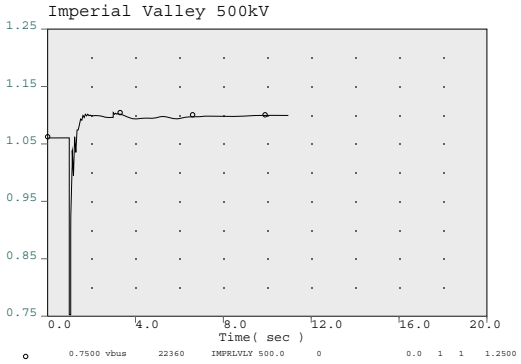
Otay Mesa 230kV



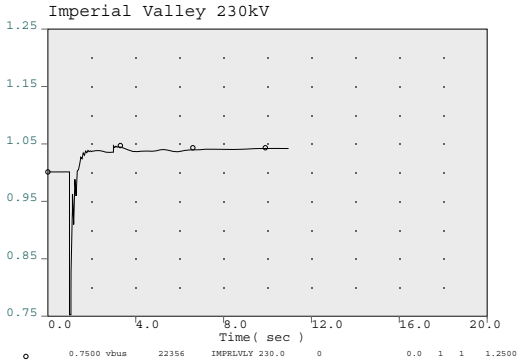
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

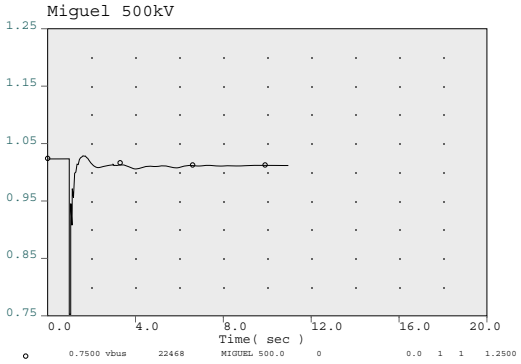
Imperial Valley 500kV



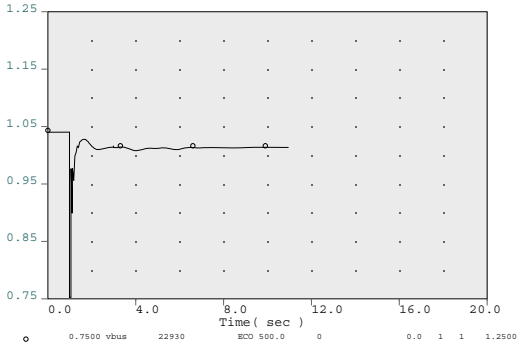
Imperial Valley 230kV



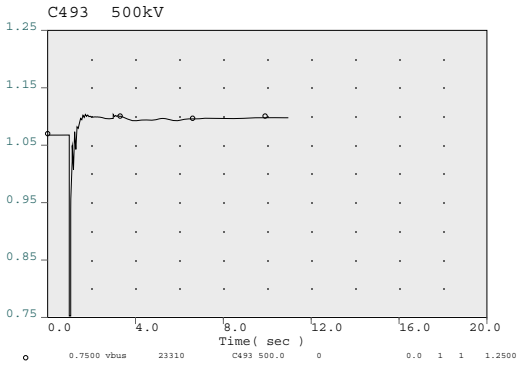
Miguel 500kV



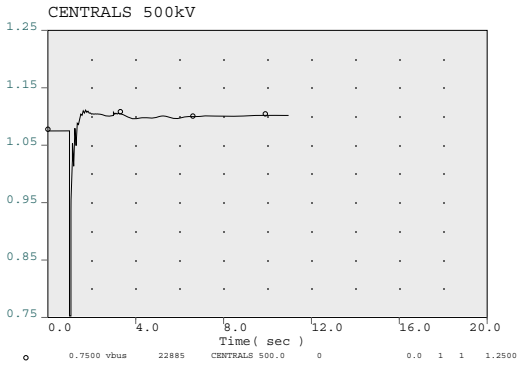
Windfarms 500



C493 500kV

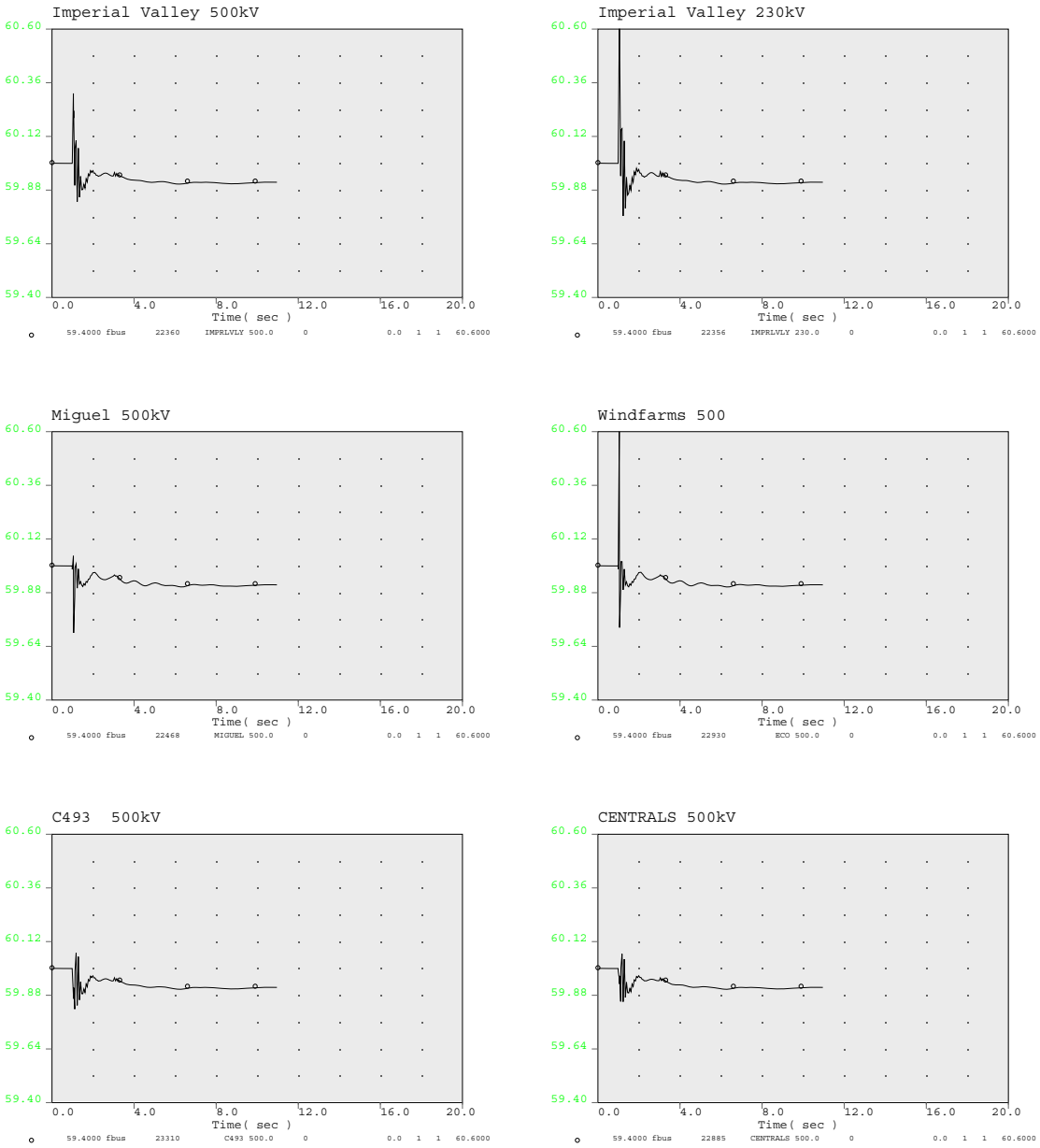


CENTRALS 500kV



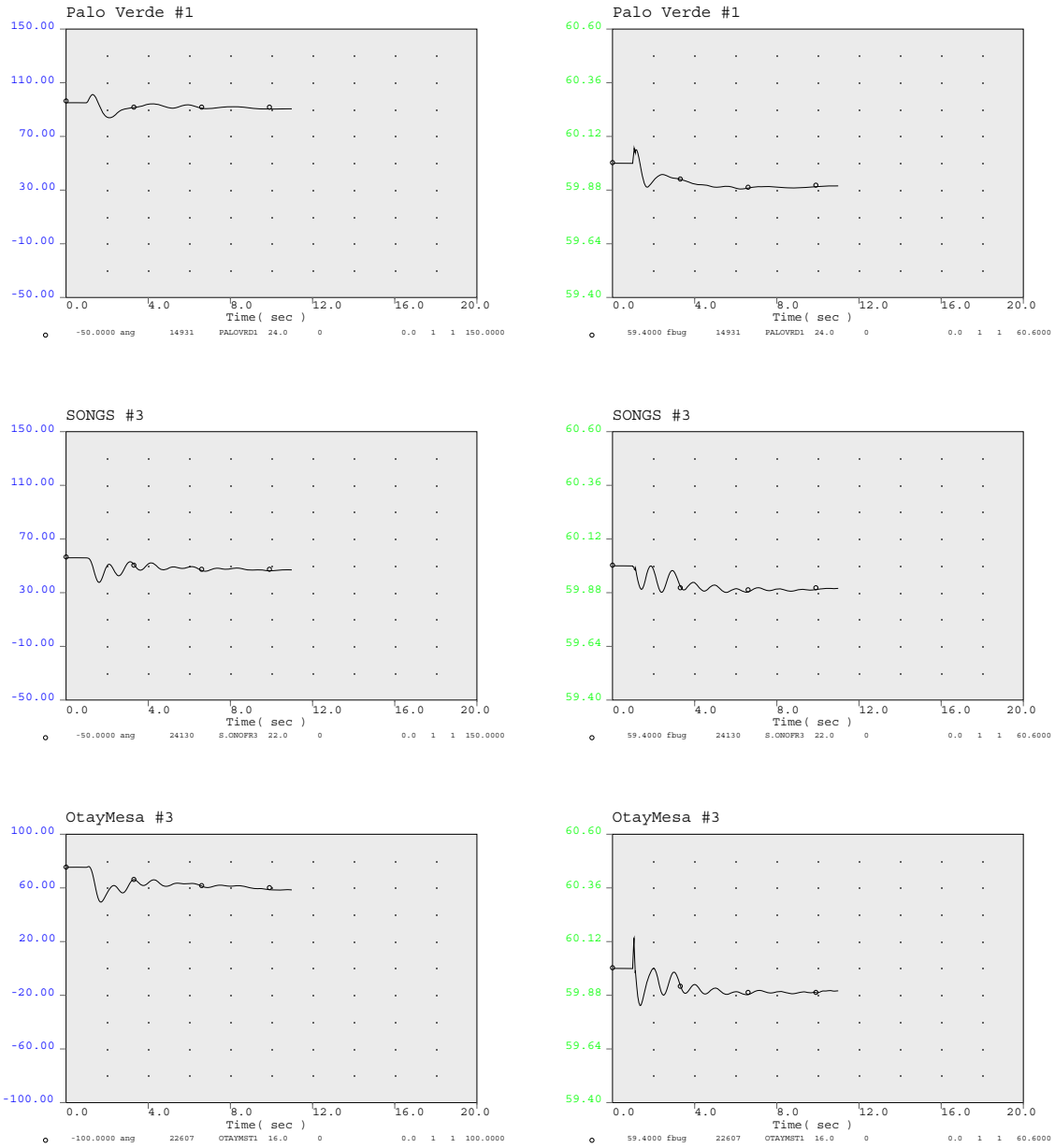
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - Frequency



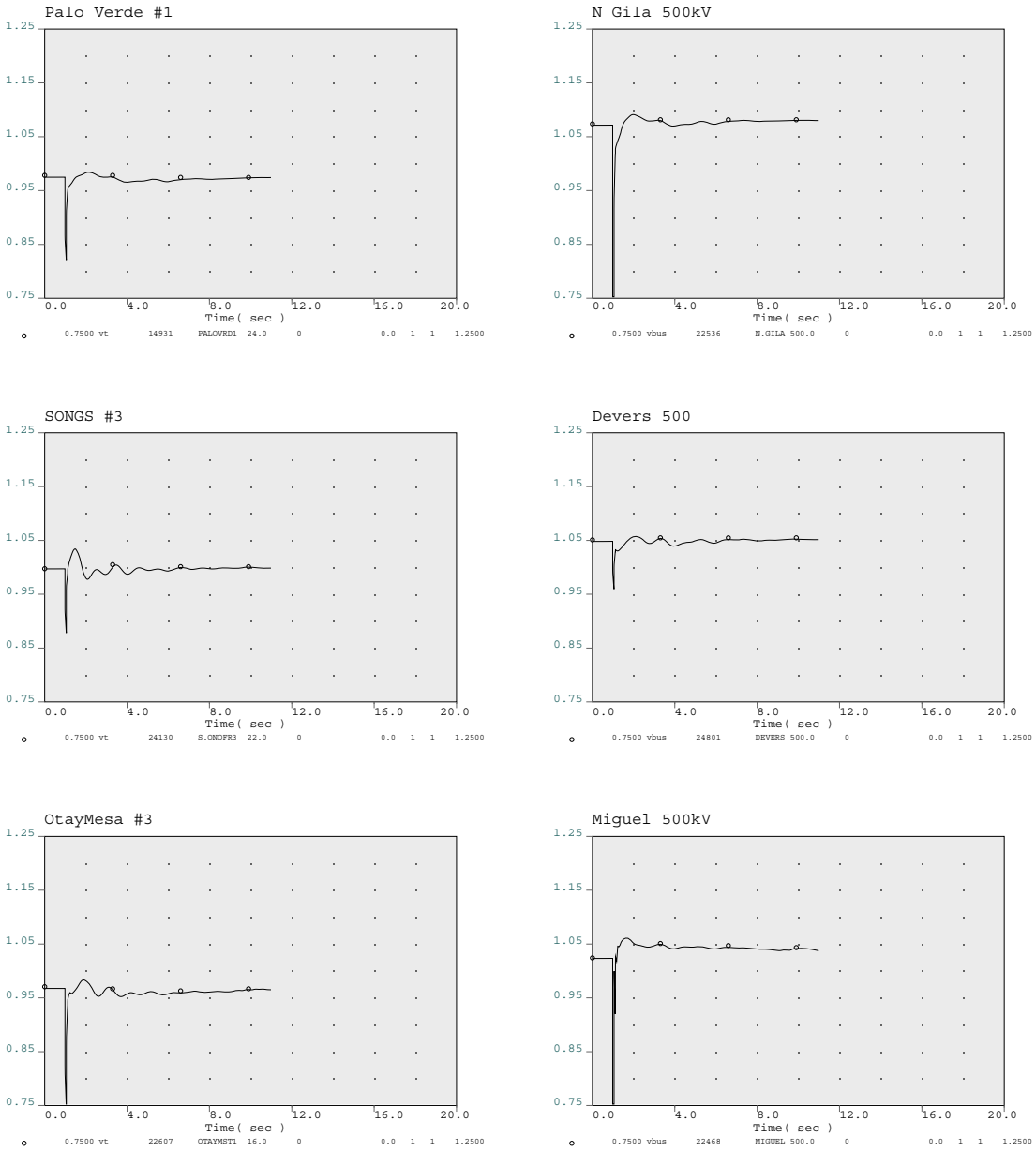
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

RELATIVE ROTOR ANGLE & FREQUENCY



SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

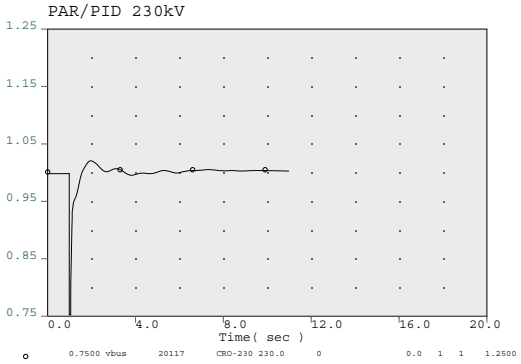
RELATIVE VOLTAGE



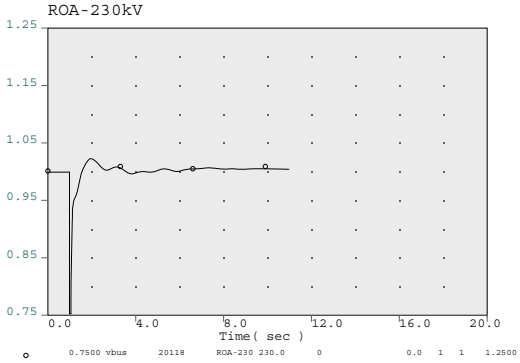
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

Affected System Voltage Check and Comparison

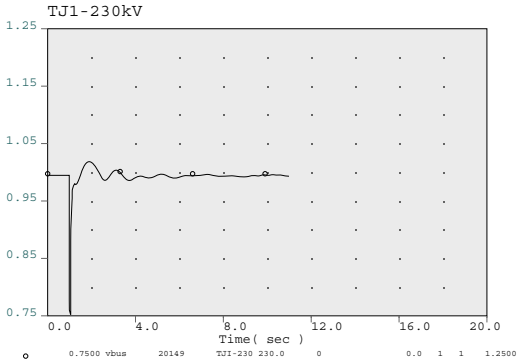
PAR/PID 230kV



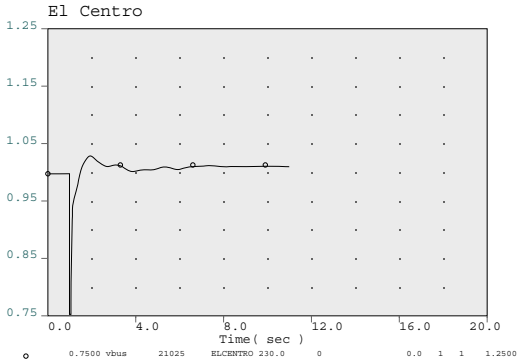
ROA-230kV



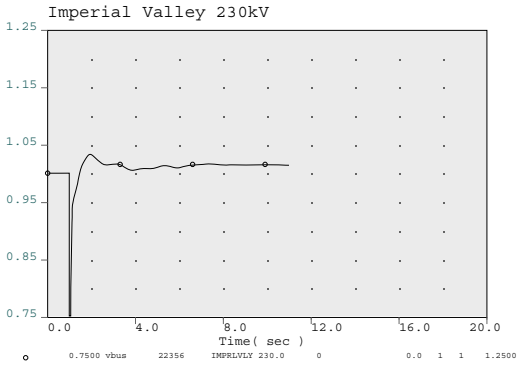
TJ1-230kV



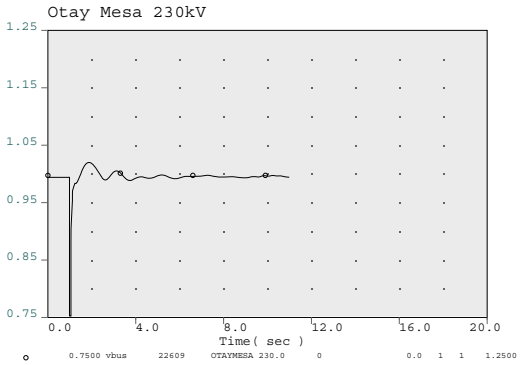
El Centro



Imperial Valley 230kV



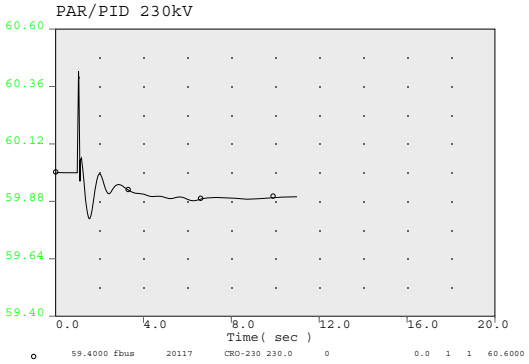
Otay Mesa 230kV



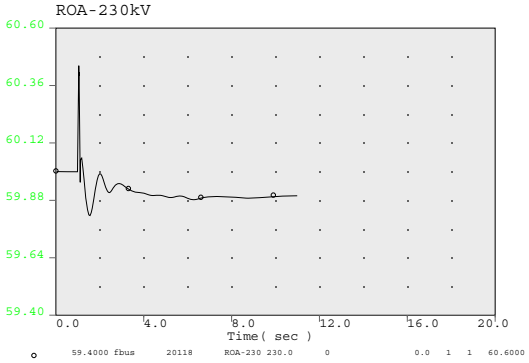
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

Affected System Frequency Check and Comparison

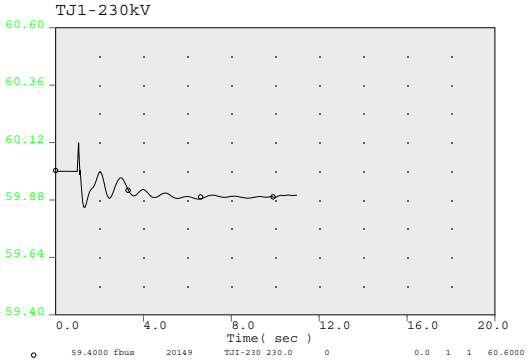
PAR/PID 230kV



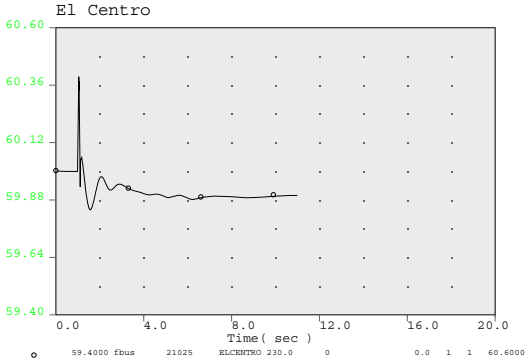
ROA-230kV



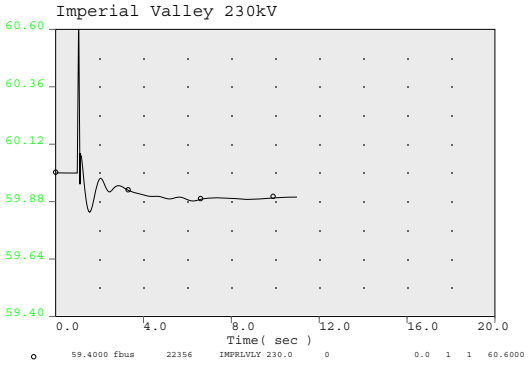
TJ1-230kV



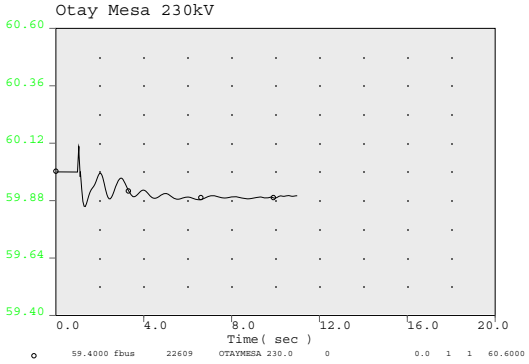
El Centro



Imperial Valley 230kV



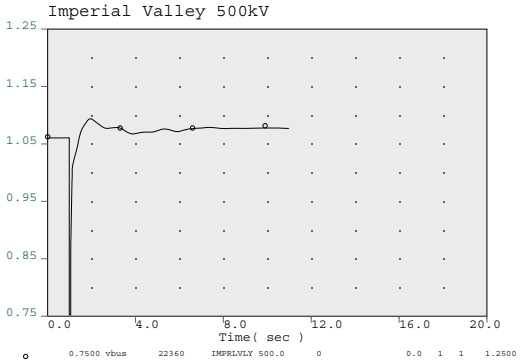
Otay Mesa 230kV



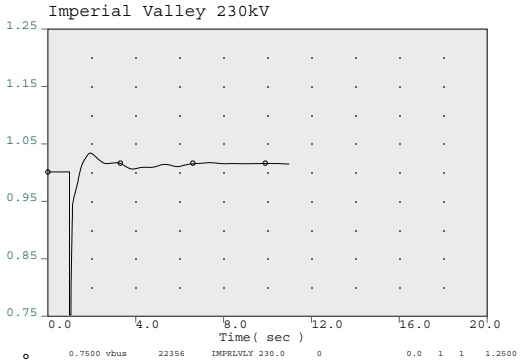
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

Imperial Valley Area - VOLTAGE

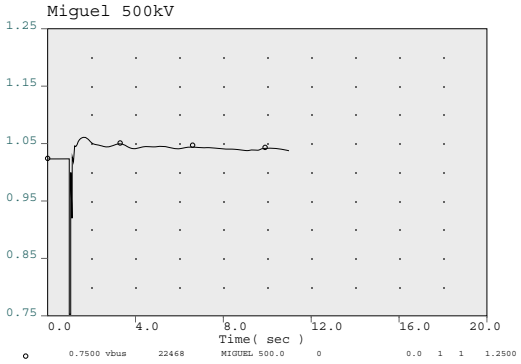
Imperial Valley 500kV



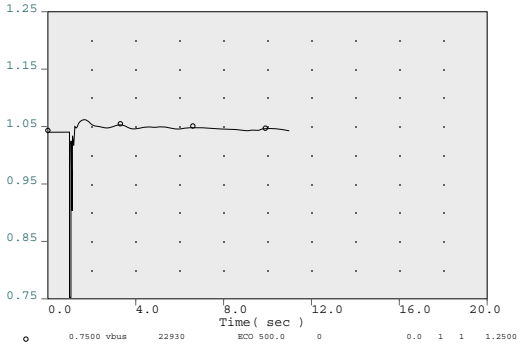
Imperial Valley 230kV



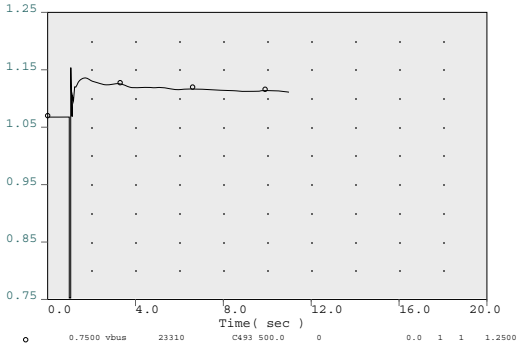
Miguel 500kV



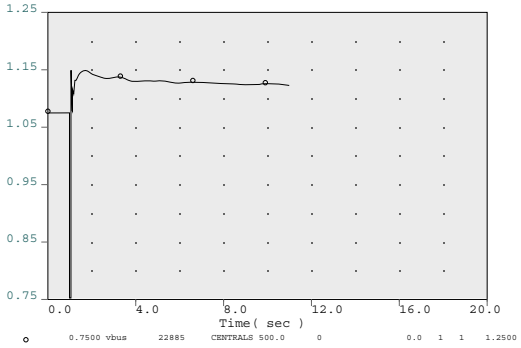
Windfarms 500



C493 500kV

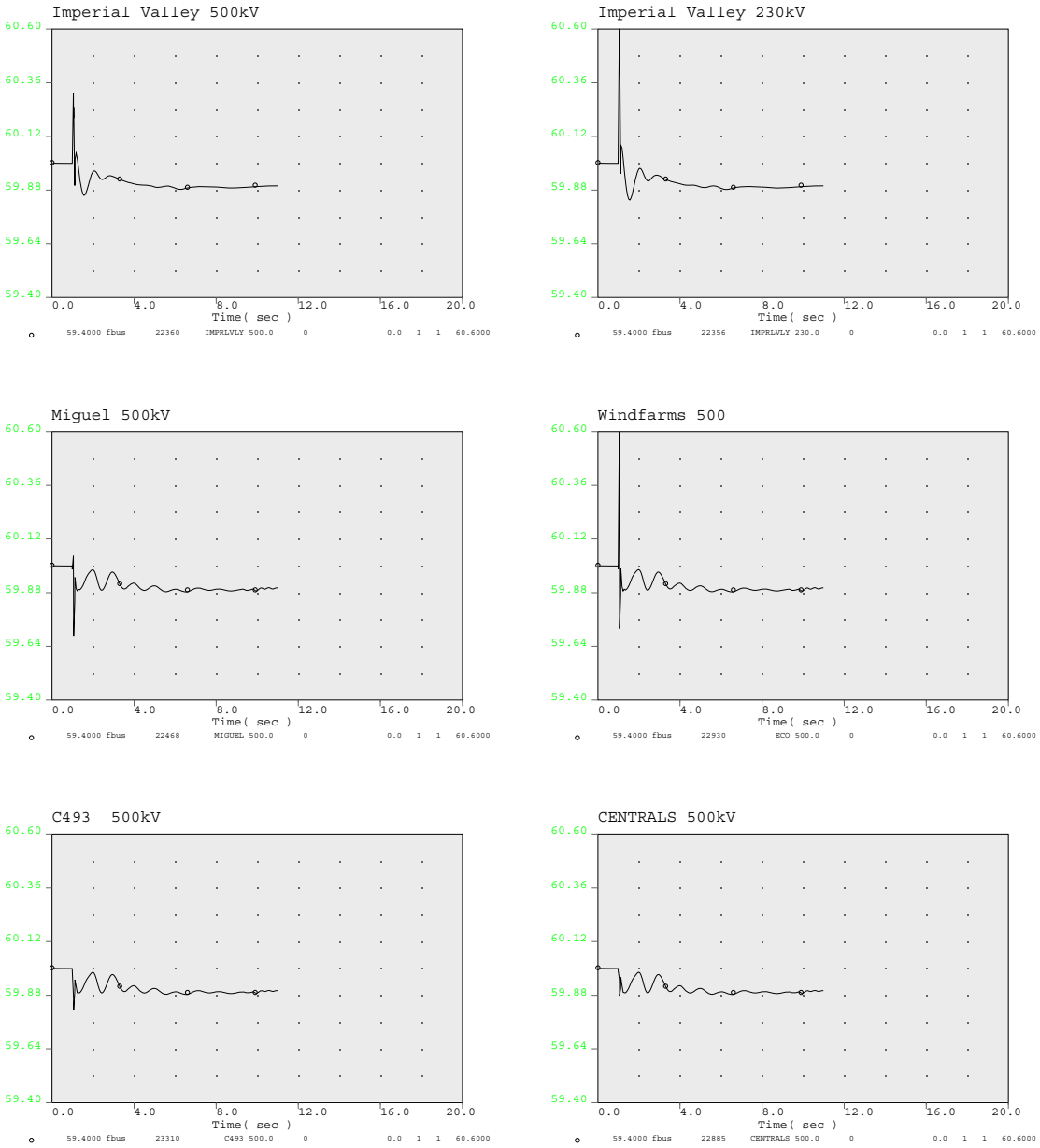


CENTRALS 500kV



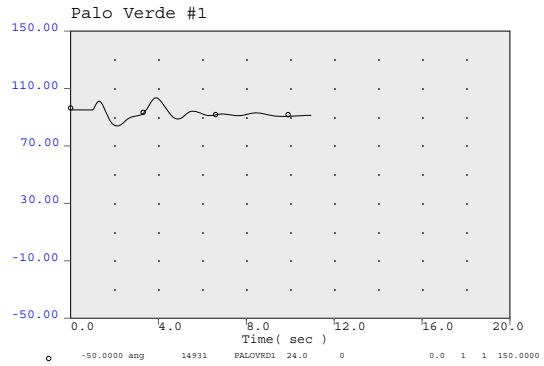
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

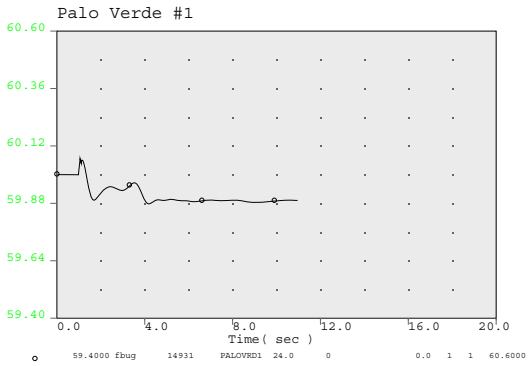
Imperial Valley Area - Frequency

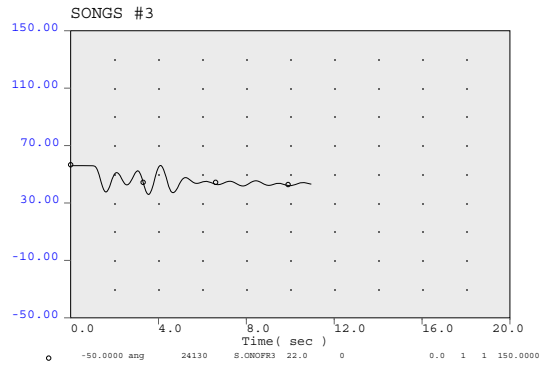


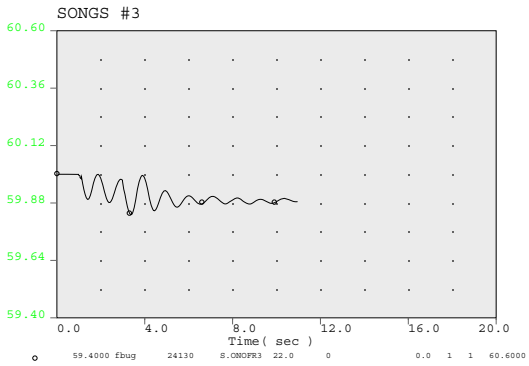
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

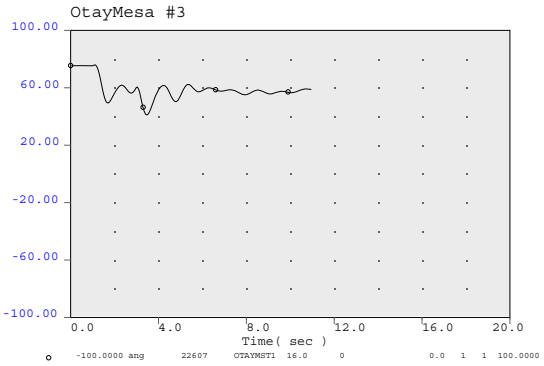
RELATIVE ROTOR ANGLE & FREQUENCY

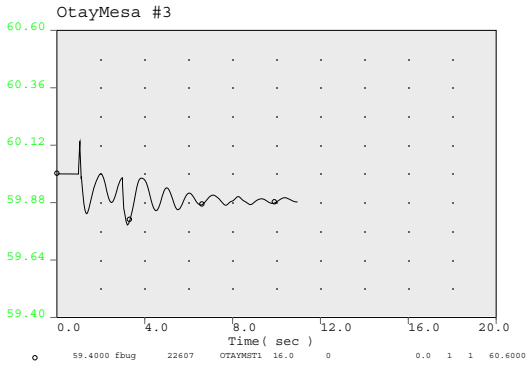










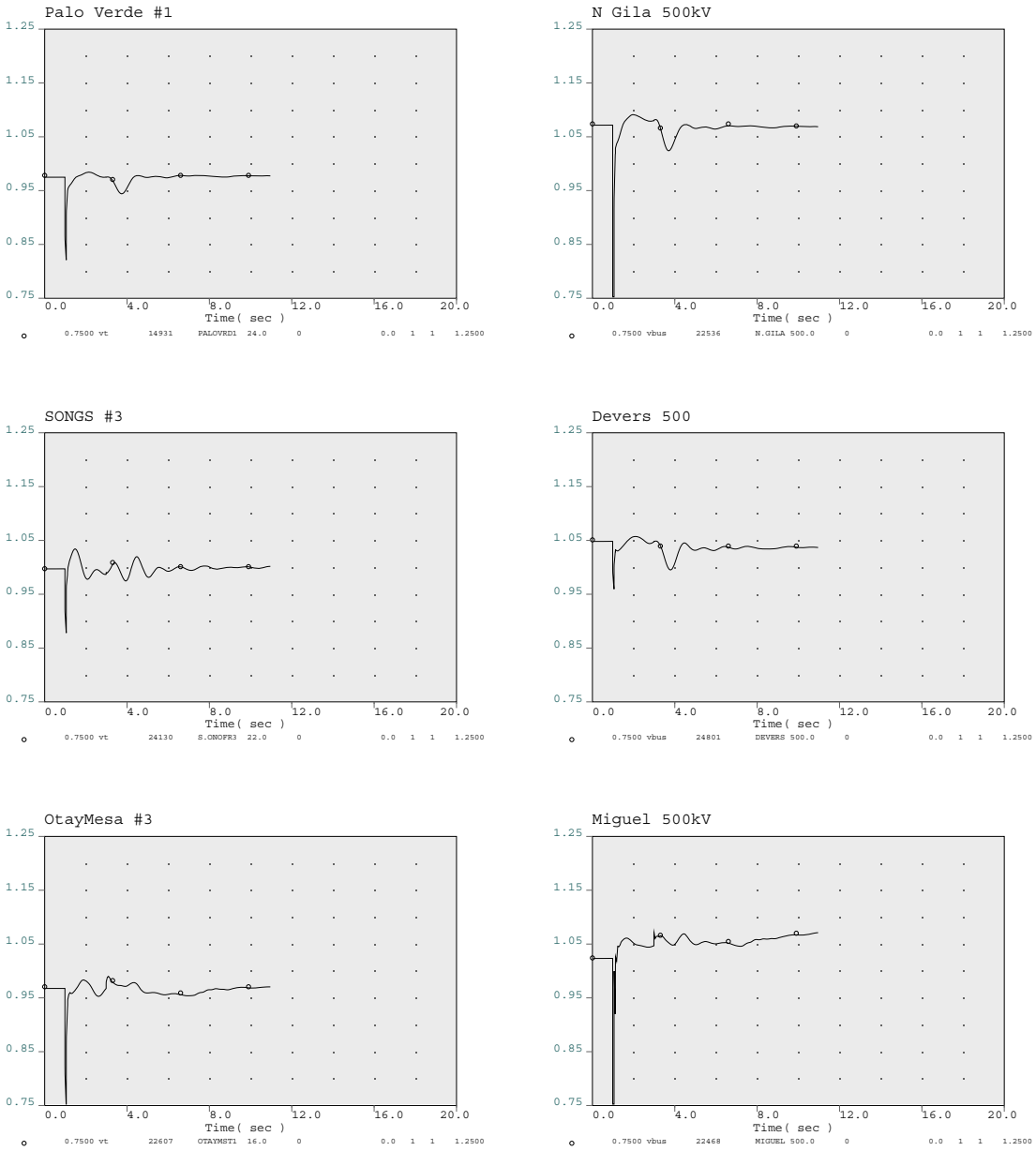


SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

Page 1

SDGE	IV_Wnd_dlo_RxR_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:25:05 2010

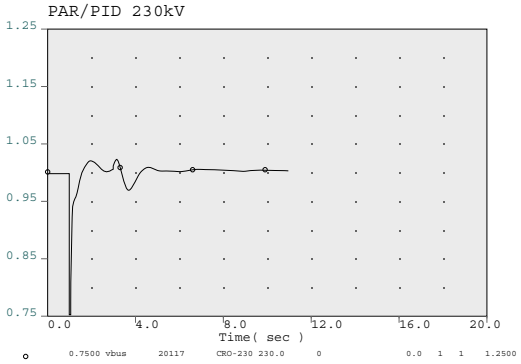
RELATIVE VOLTAGE



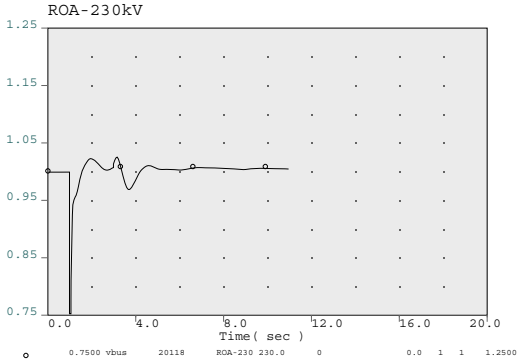
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

Affected System Voltage Check and Comparison

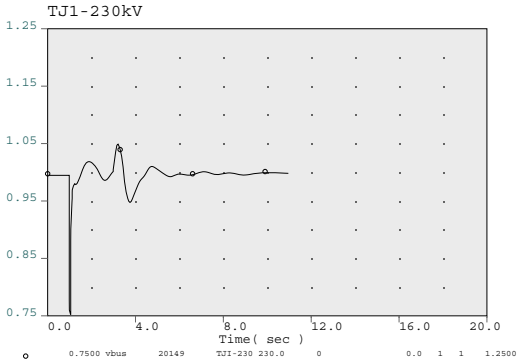
PAR/PID 230kV



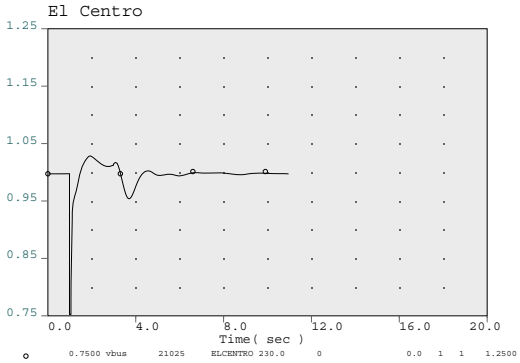
ROA-230kV



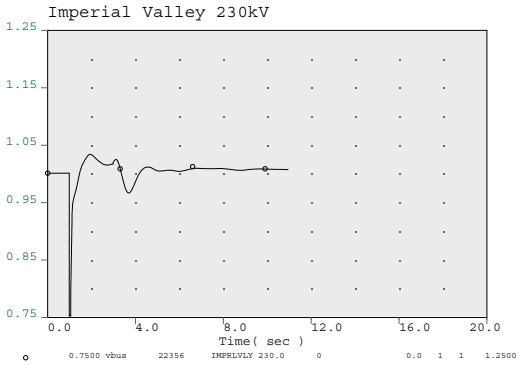
TJ1-230kV



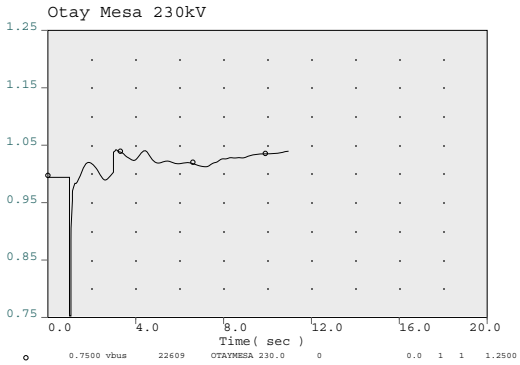
El Centro



Imperial Valley 230kV

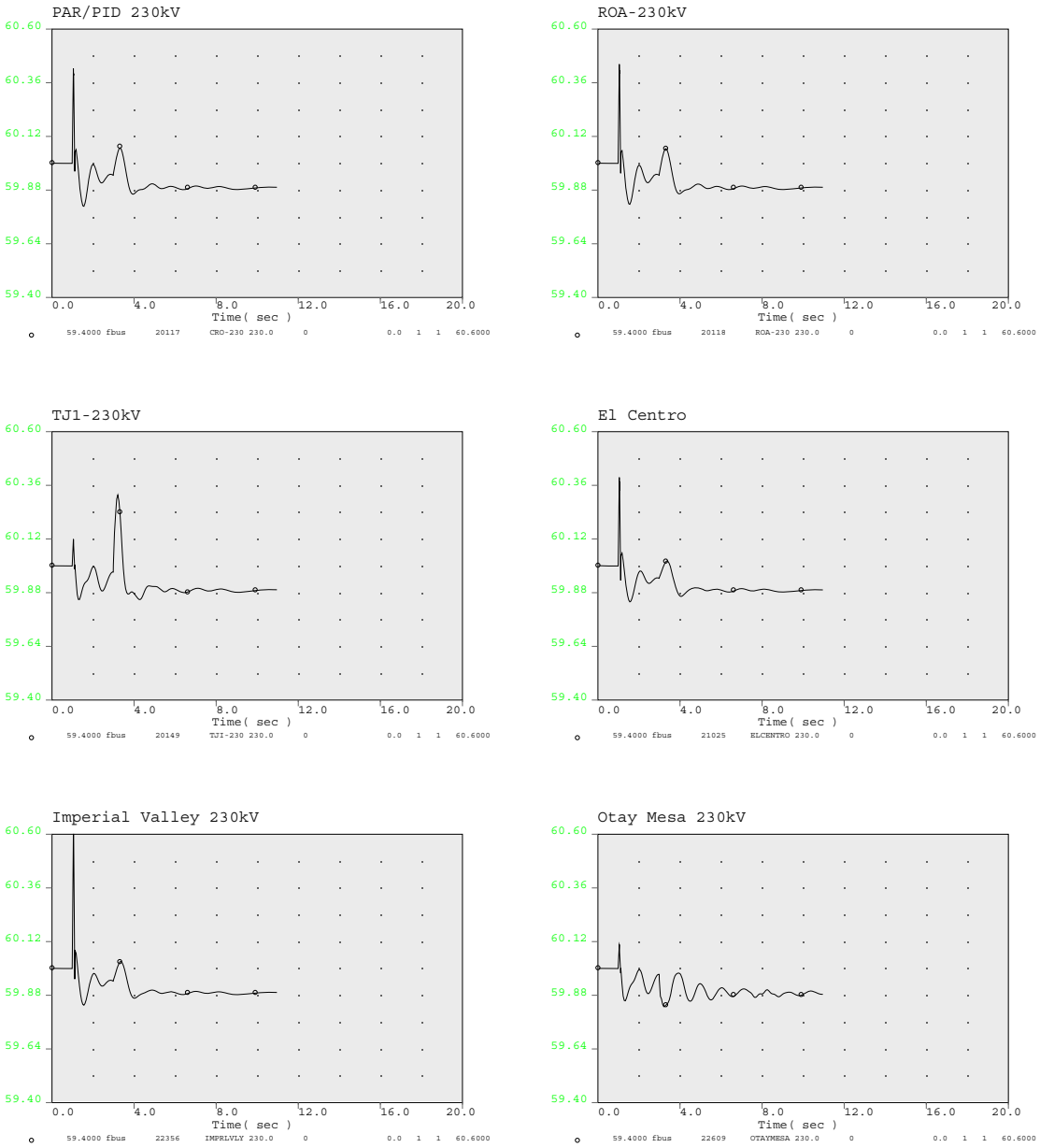


Otay Mesa 230kV



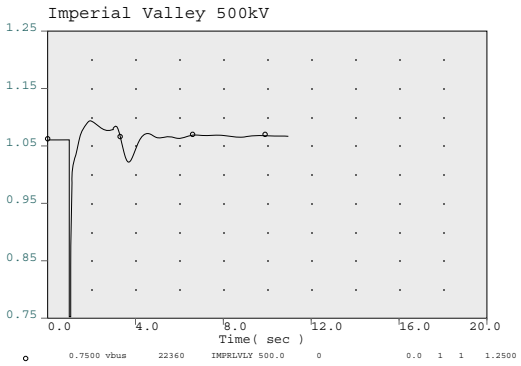
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

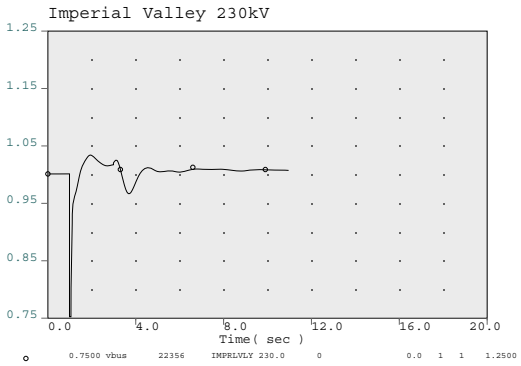
Affected System Frequency Check and Comparison

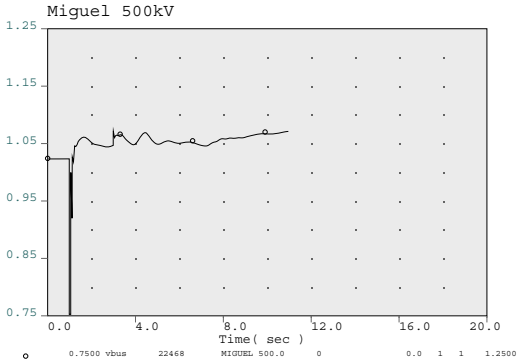


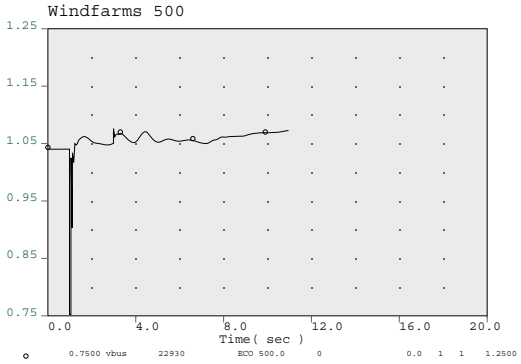
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

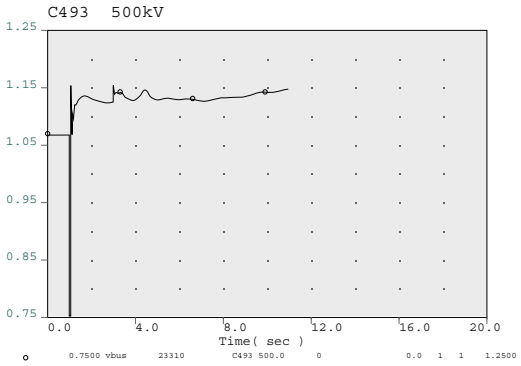
Imperial Valley Area - VOLTAGE

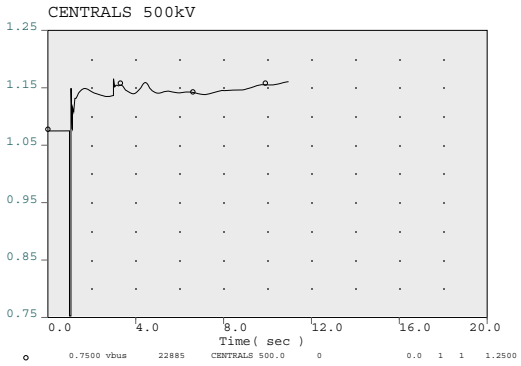






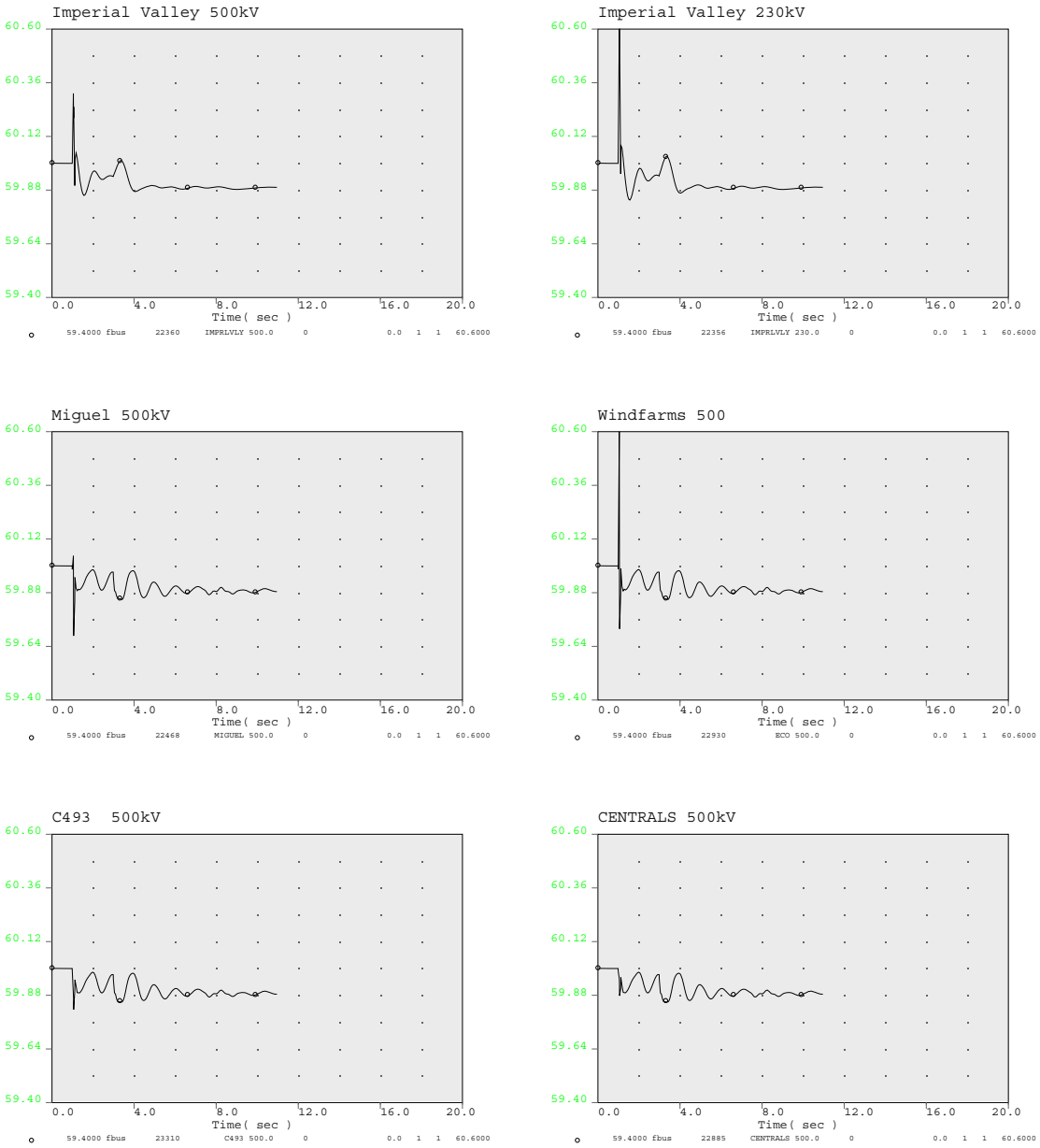






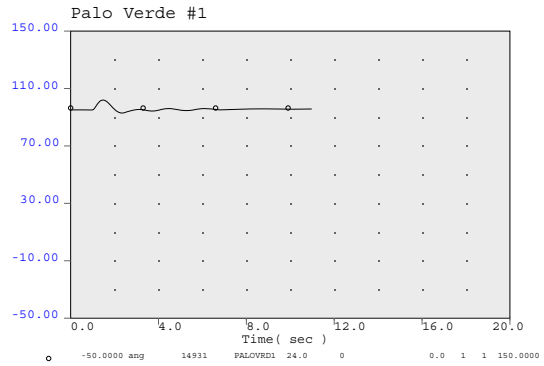
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

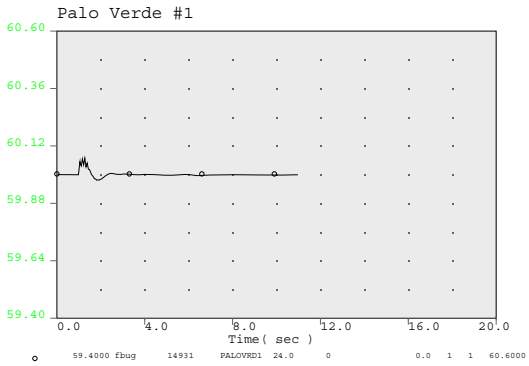
Imperial Valley Area - Frequency

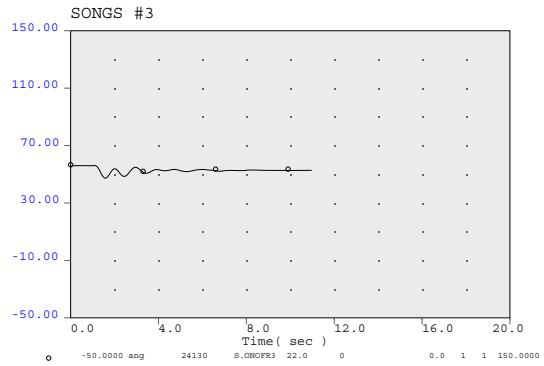


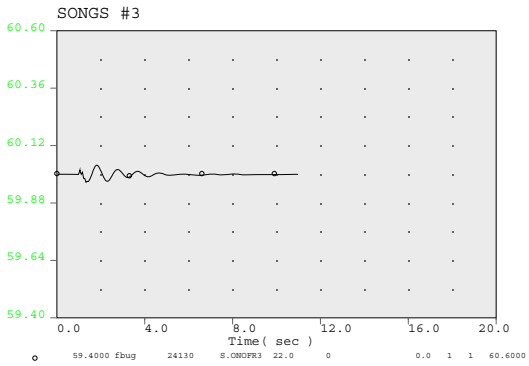
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-ECO & IV-C493 500 kV Double line outage

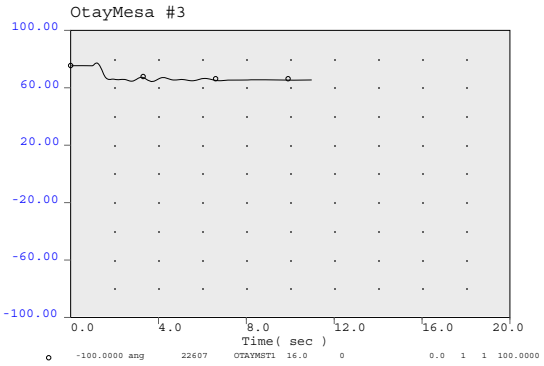
RELATIVE ROTOR ANGLE & FREQUENCY

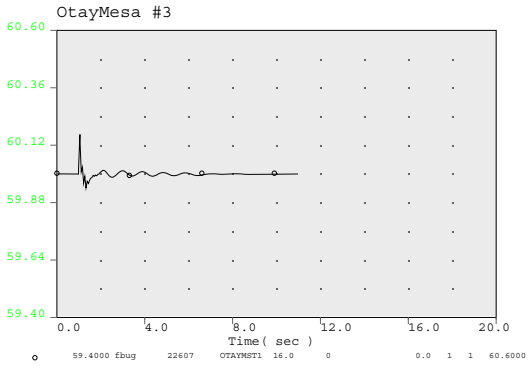










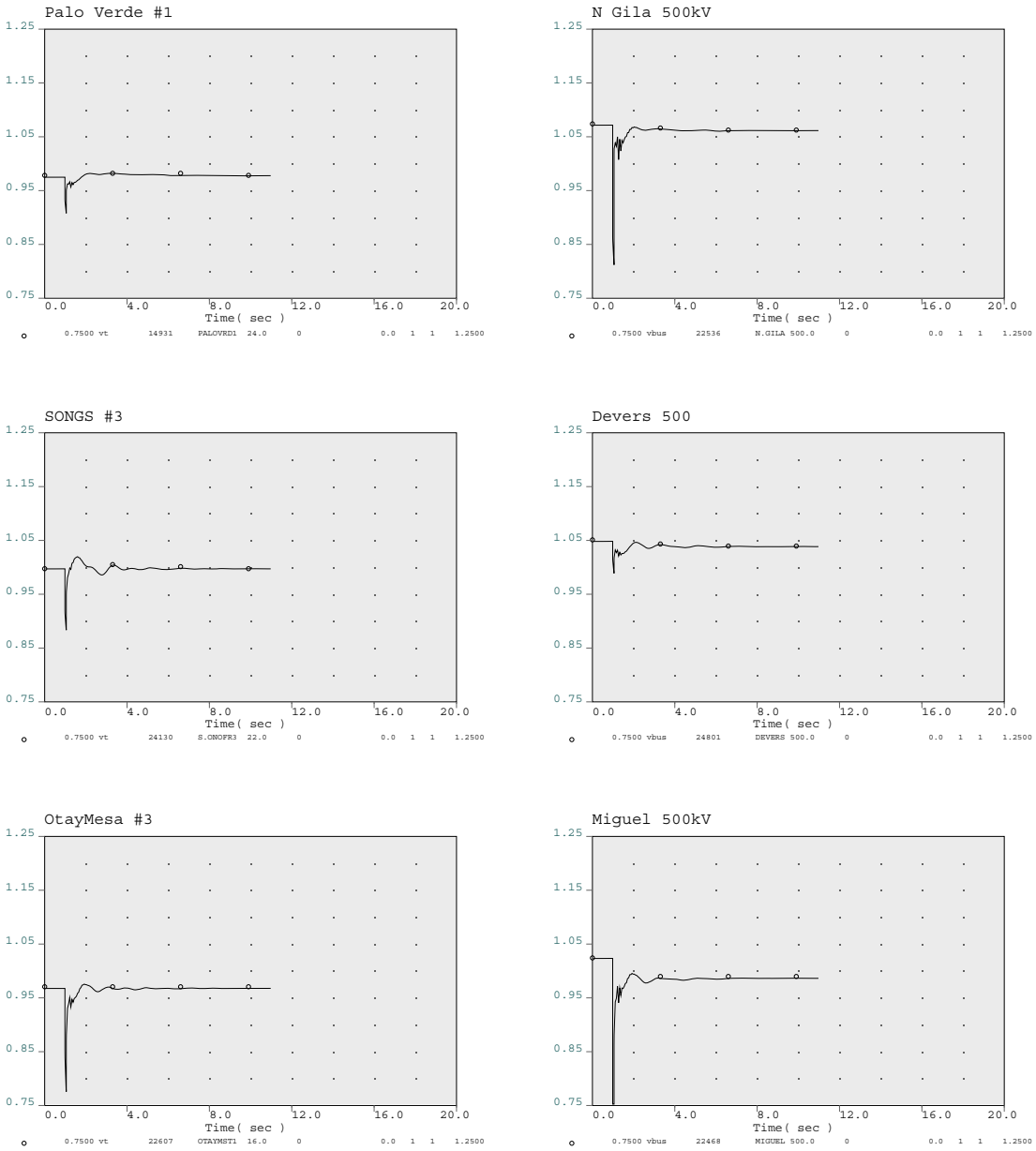


SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Page 1

SDGE	ML_Wnd_noRAS_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:25:21 2010

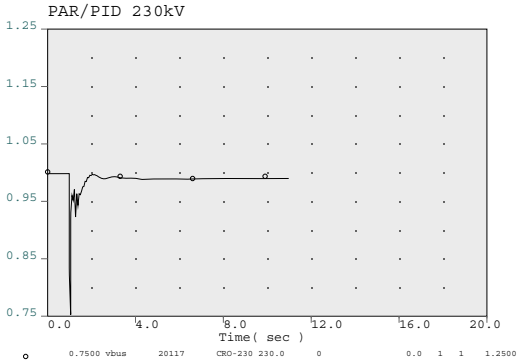
RELATIVE VOLTAGE



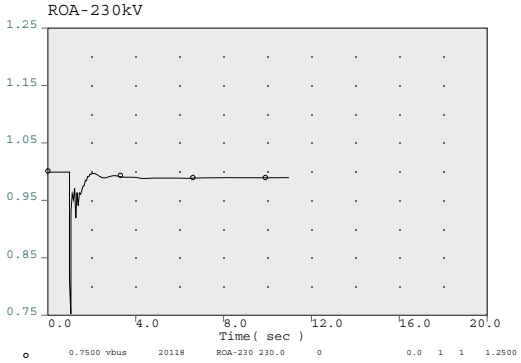
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

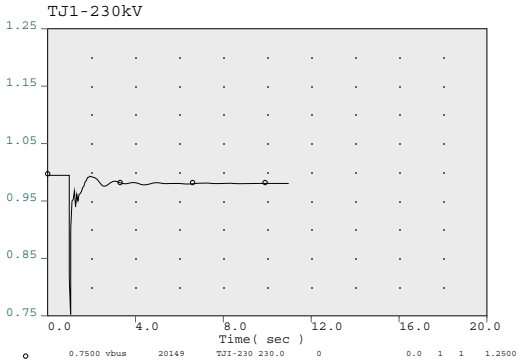
PAR/PID 230kV



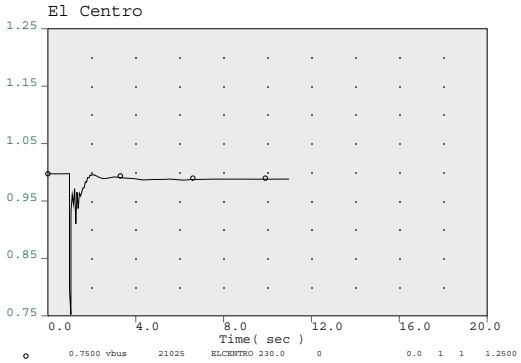
ROA-230kV



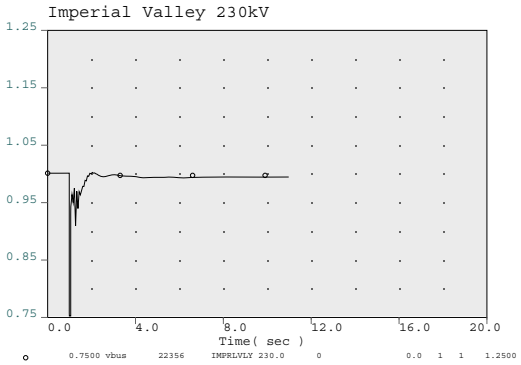
TJ1-230kV



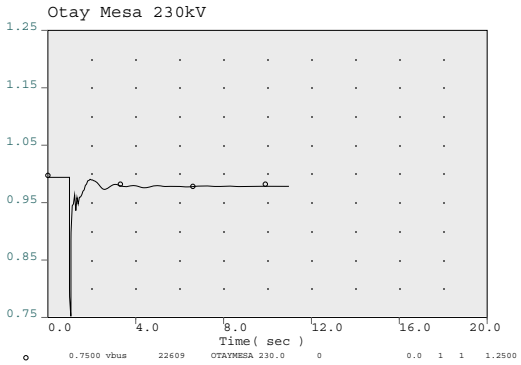
El Centro



Imperial Valley 230kV

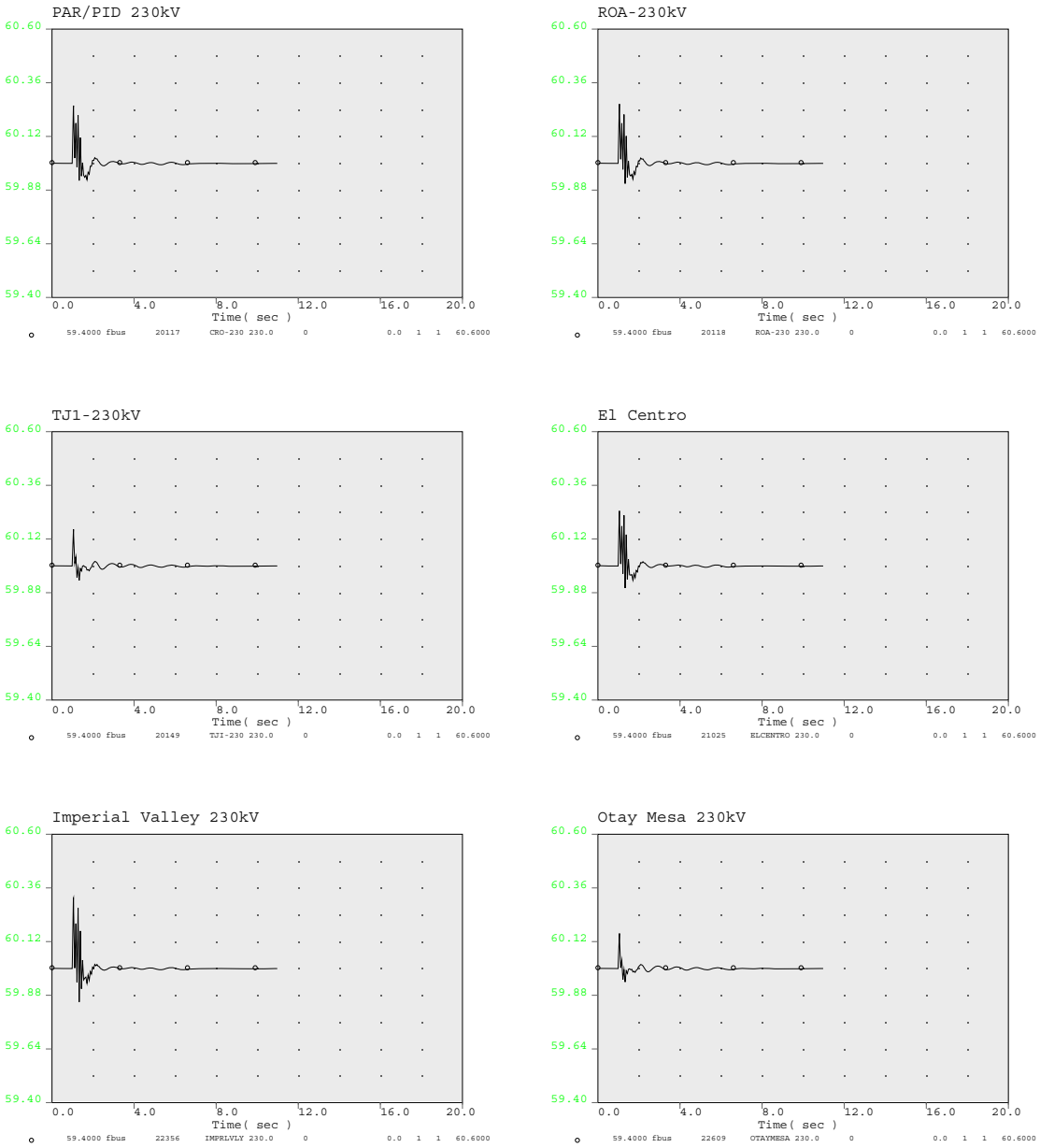


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

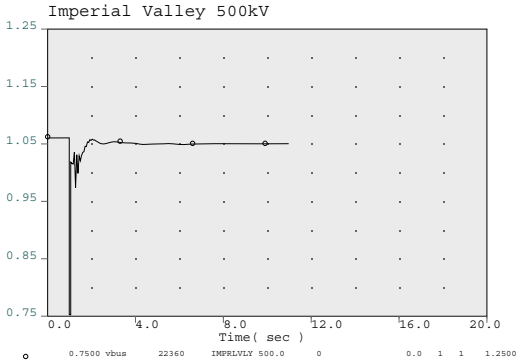
Affected System Frequency Check and Comparison



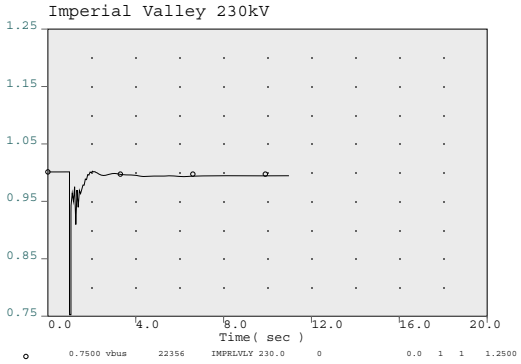
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

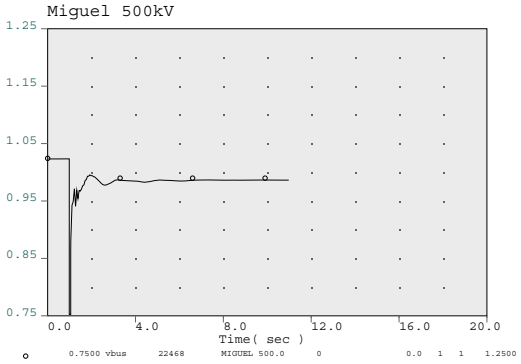
Imperial Valley 500kV



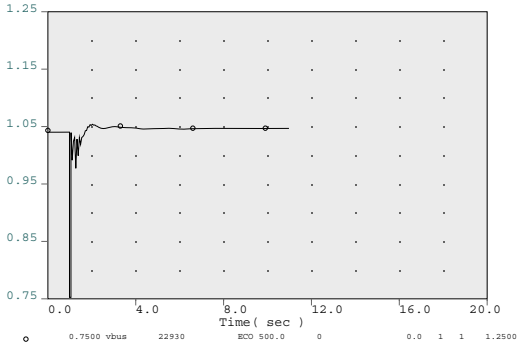
Imperial Valley 230kV



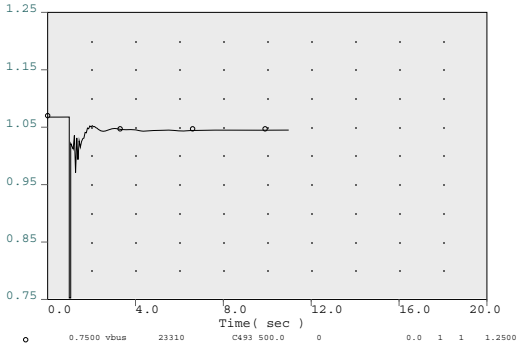
Miguel 500kV



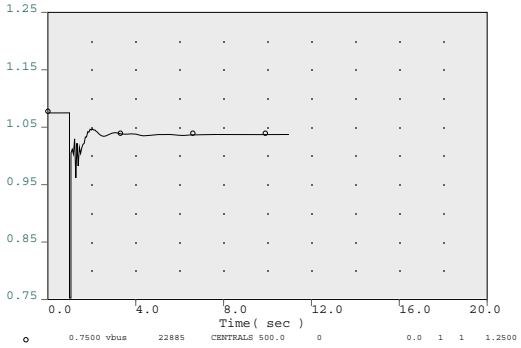
Windfarms 500



C493 500kV

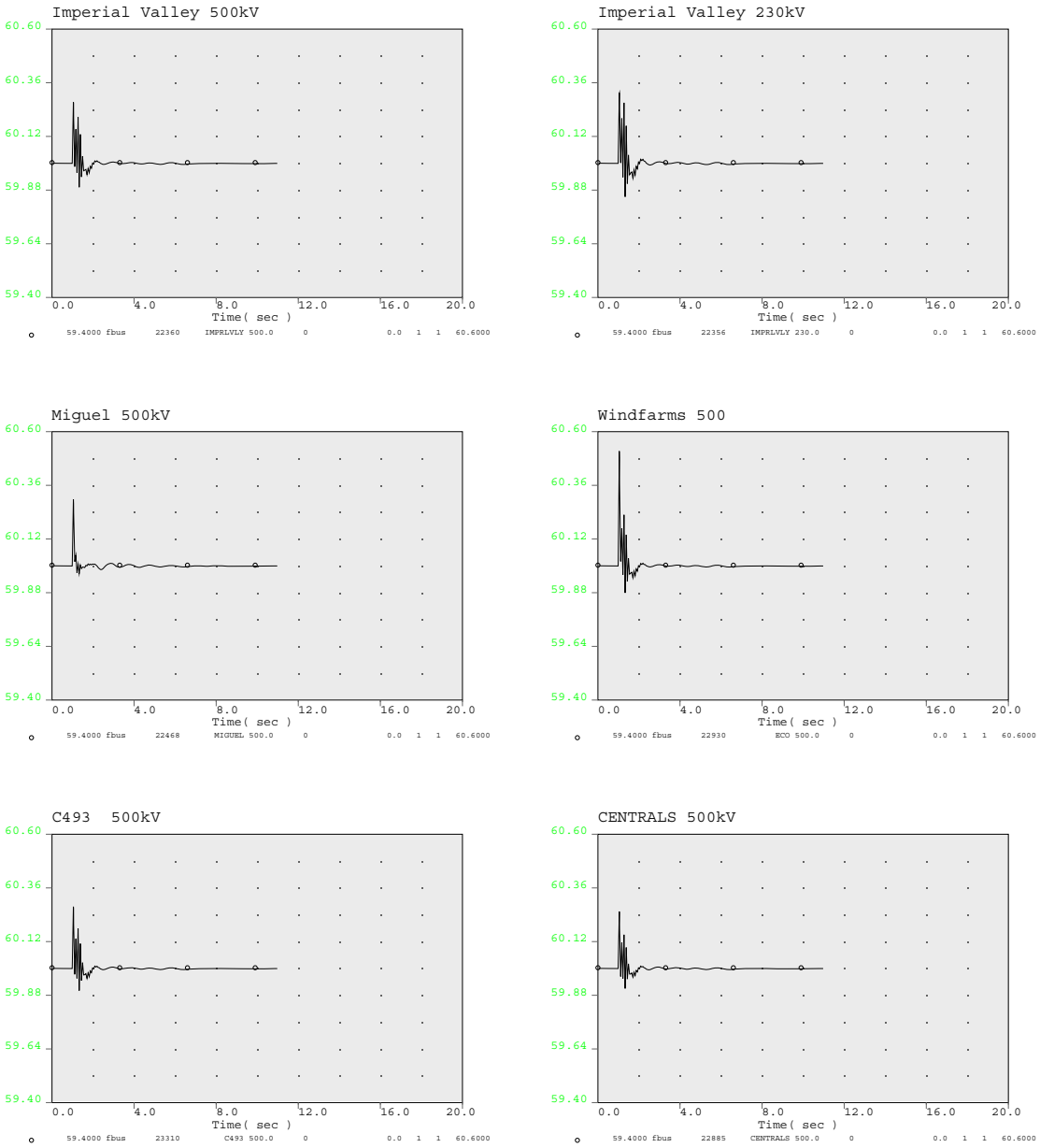


CENTRALS 500kV



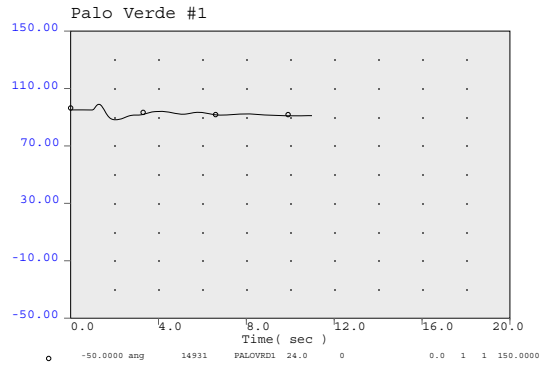
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

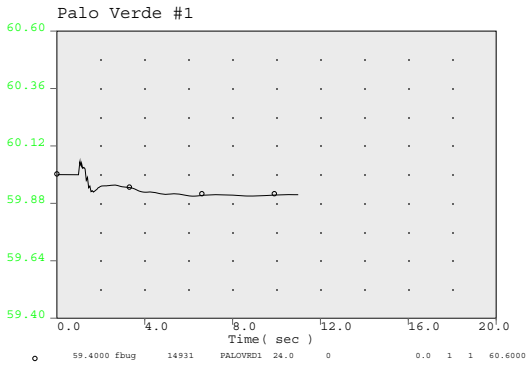
Imperial Valley Area - Frequency

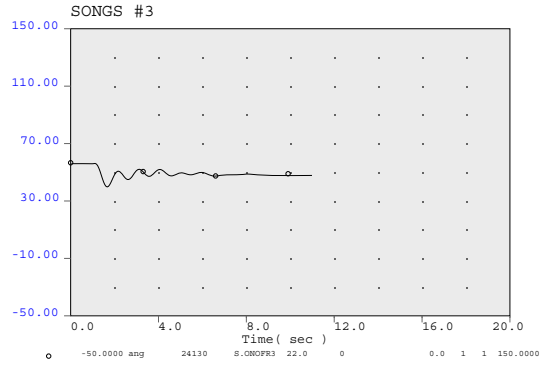


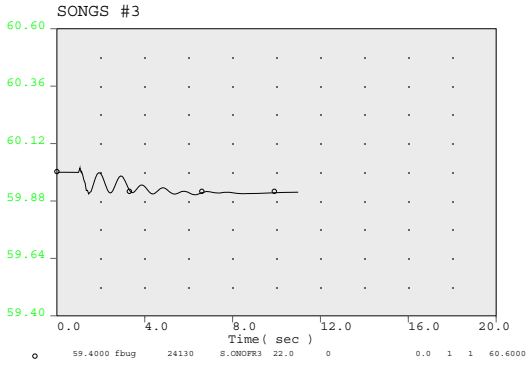
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

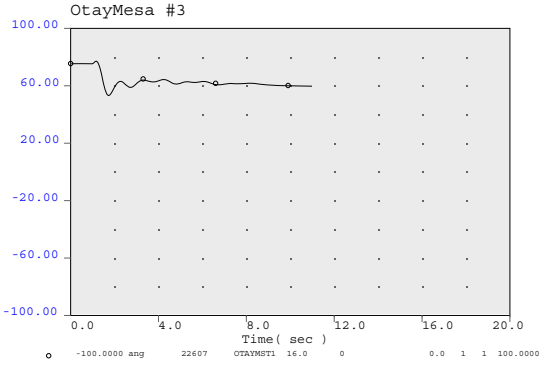
RELATIVE ROTOR ANGLE & FREQUENCY

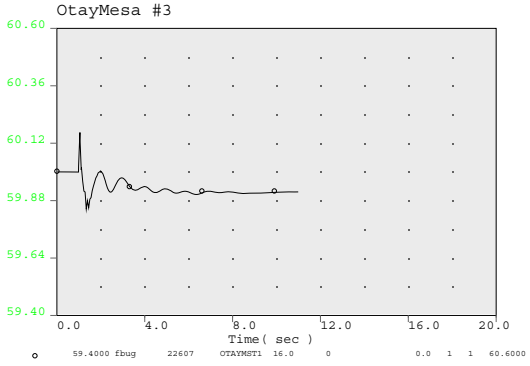






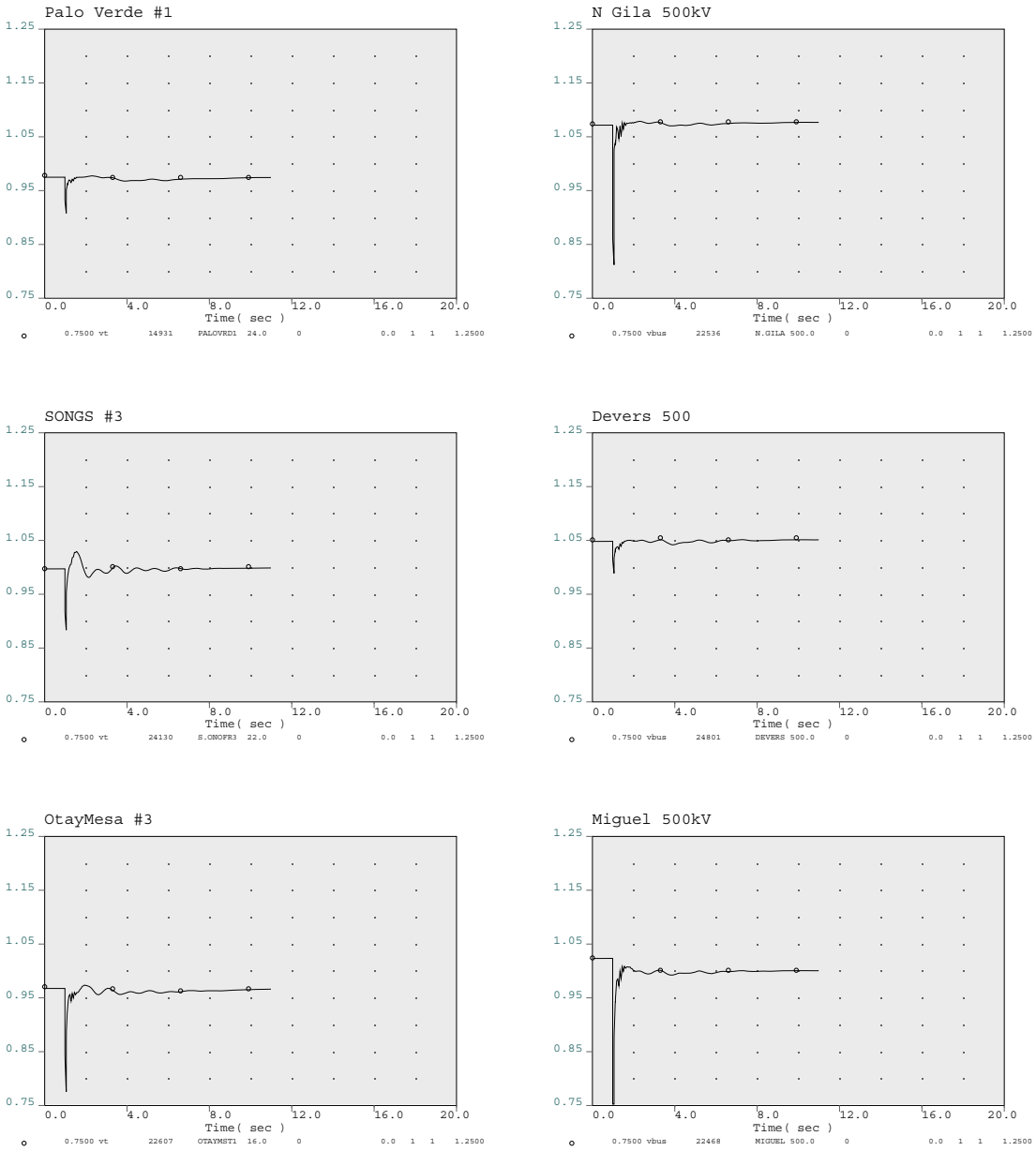






SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

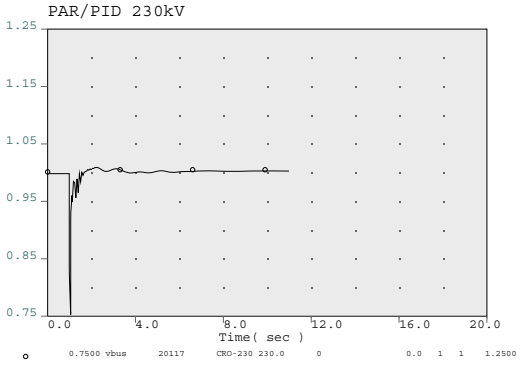
RELATIVE VOLTAGE



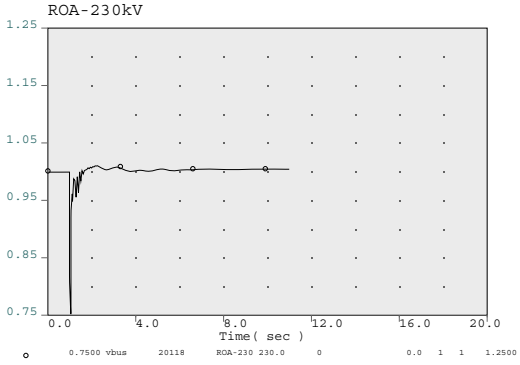
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

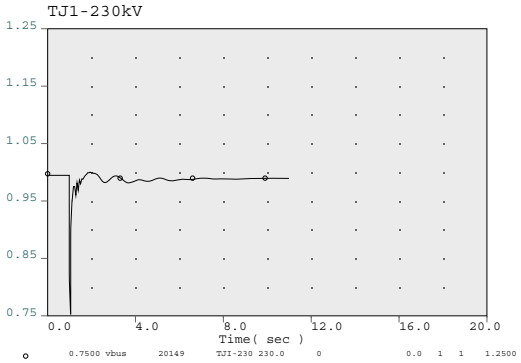
PAR/PID 230kV



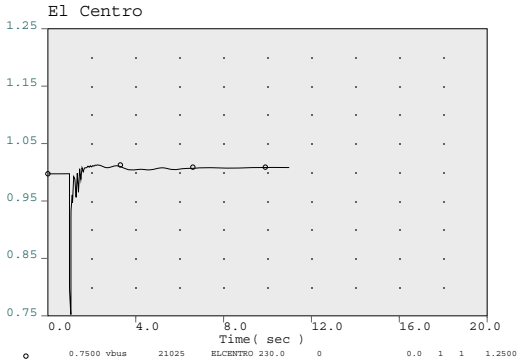
ROA-230kV



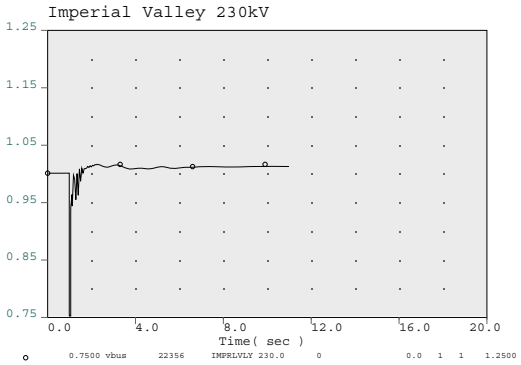
TJ1-230kV



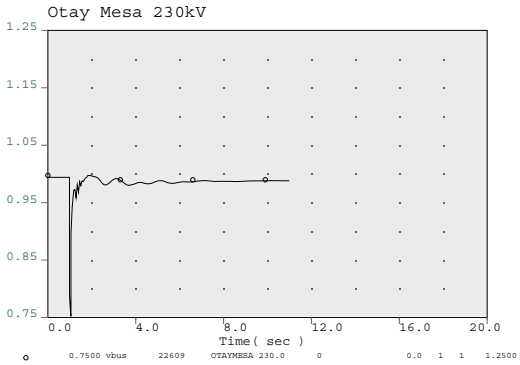
El Centro



Imperial Valley 230kV

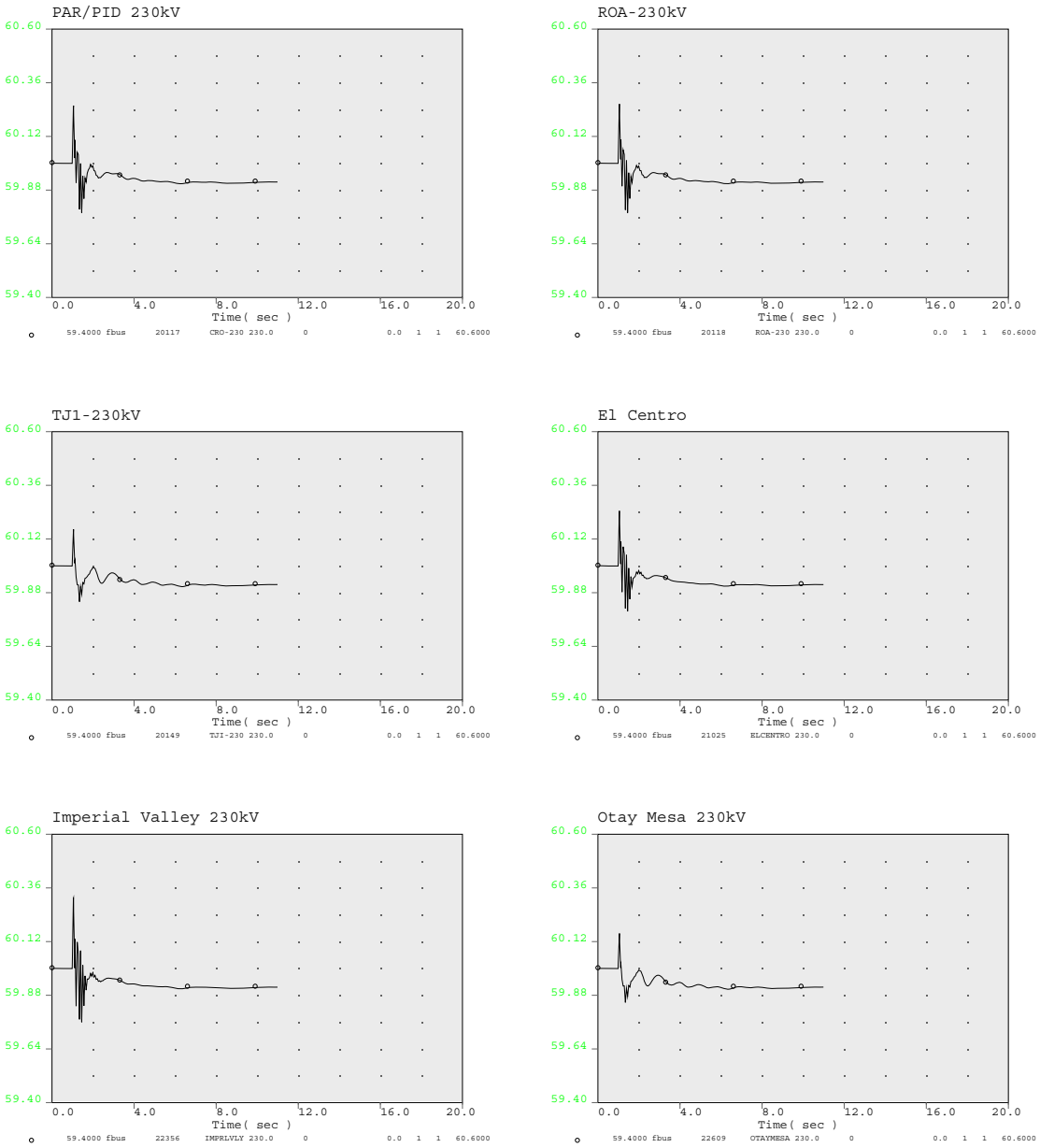


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

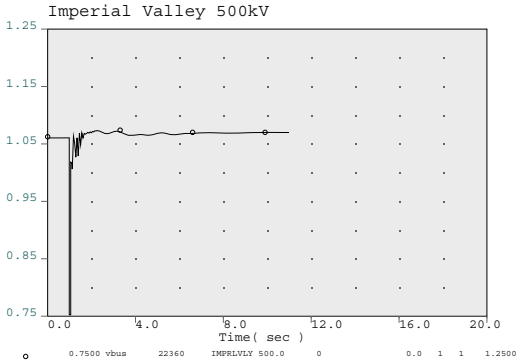
Affected System Frequency Check and Comparison



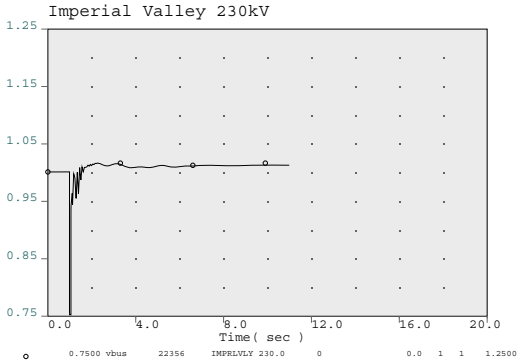
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

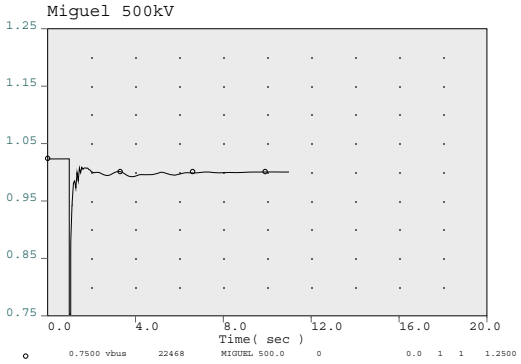
Imperial Valley 500kV



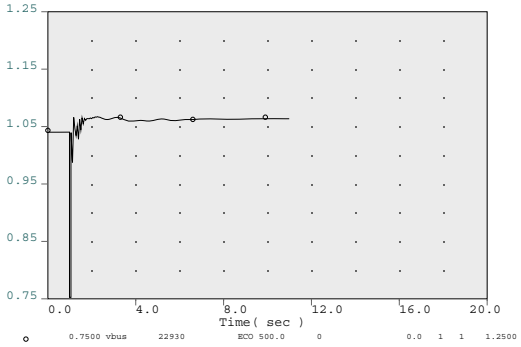
Imperial Valley 230kV



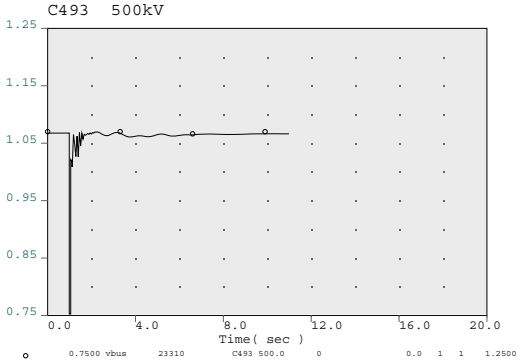
Miguel 500kV



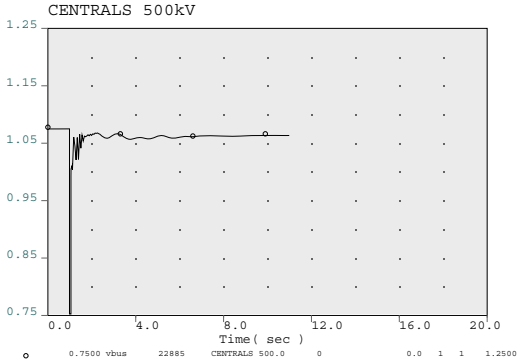
Windfarms 500



C493 500kV

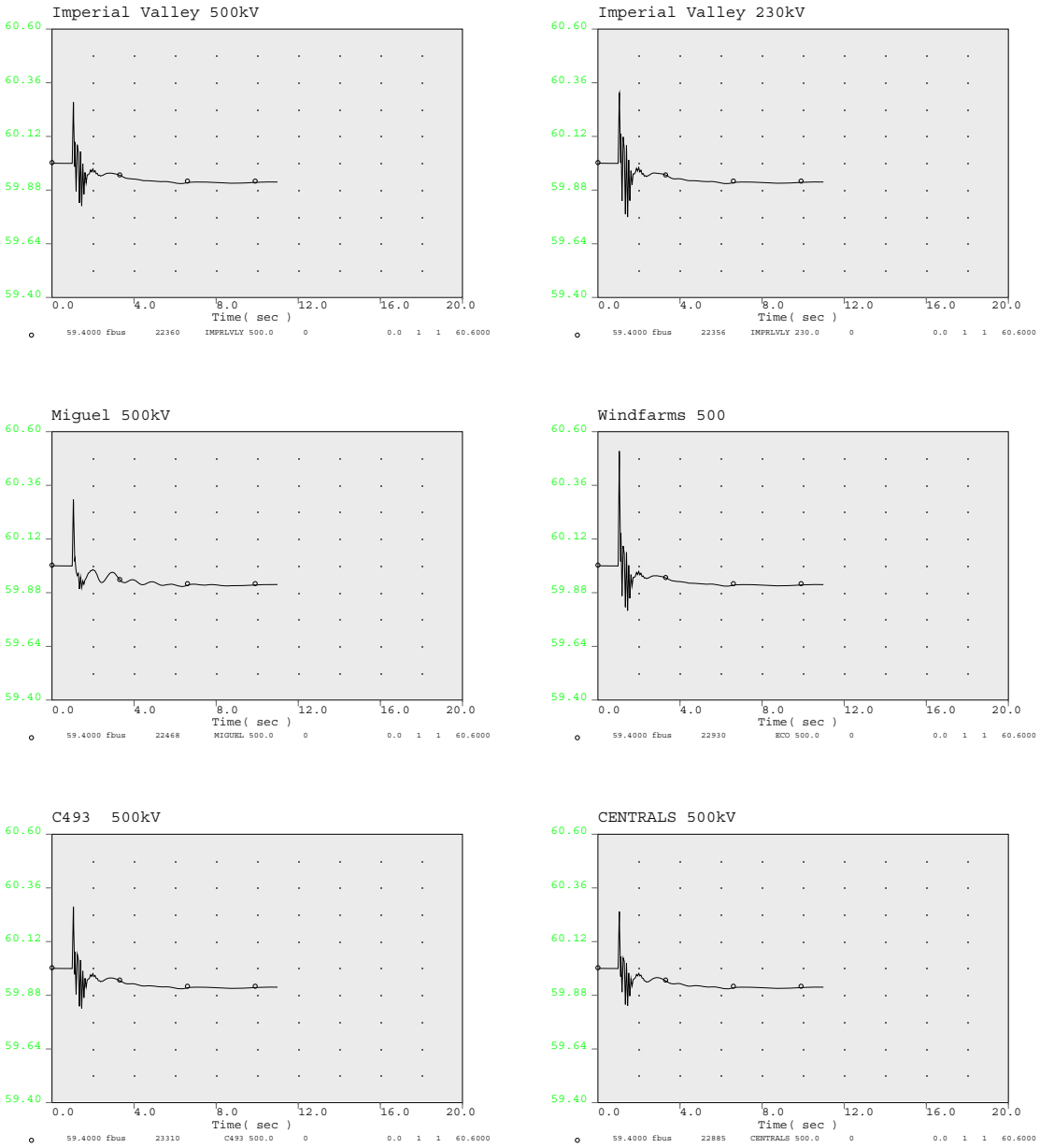


CENTRALS 500kV



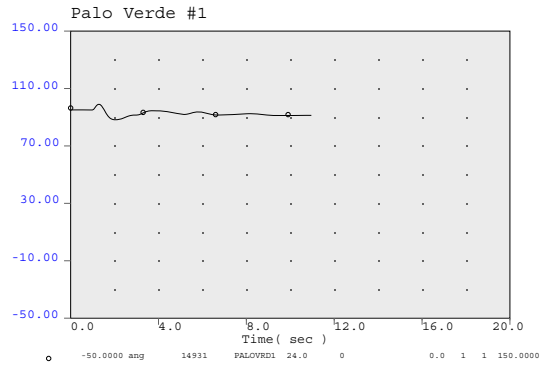
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

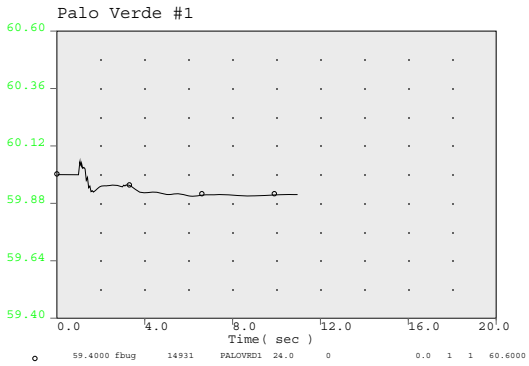
Imperial Valley Area - Frequency

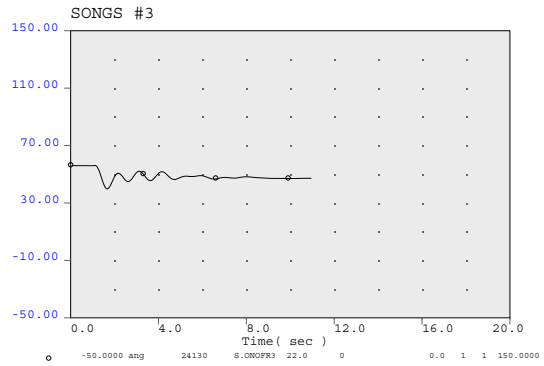


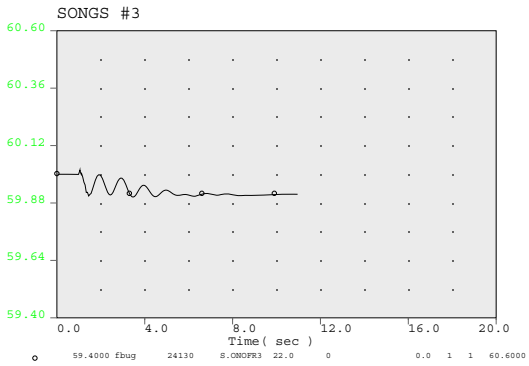
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

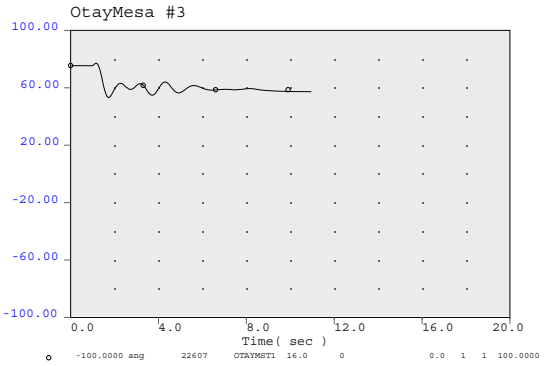
RELATIVE ROTOR ANGLE & FREQUENCY

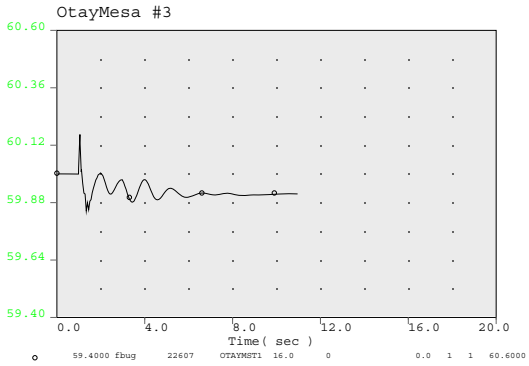






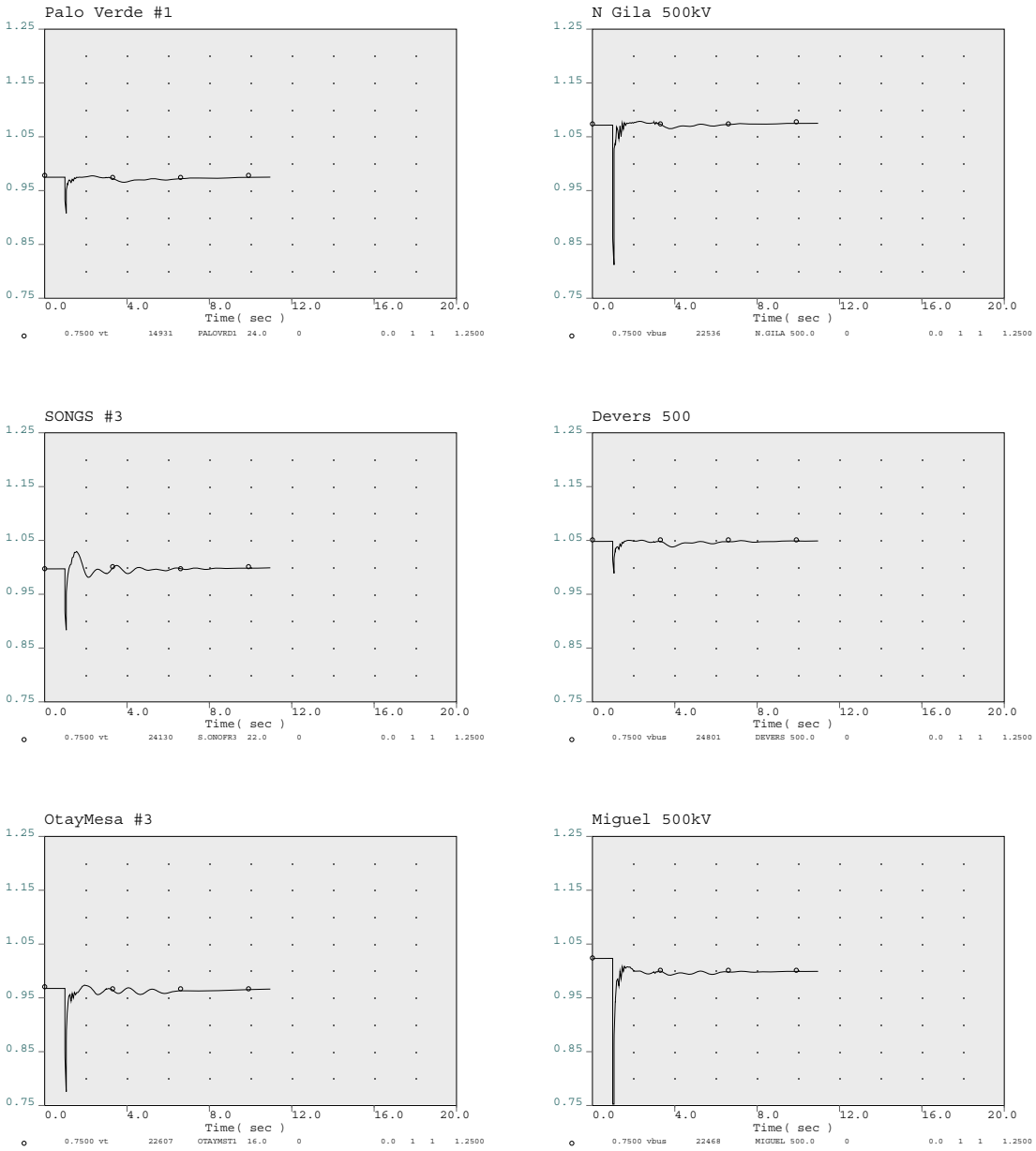






SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

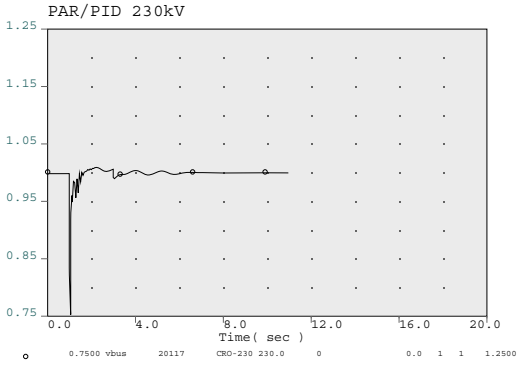
RELATIVE VOLTAGE



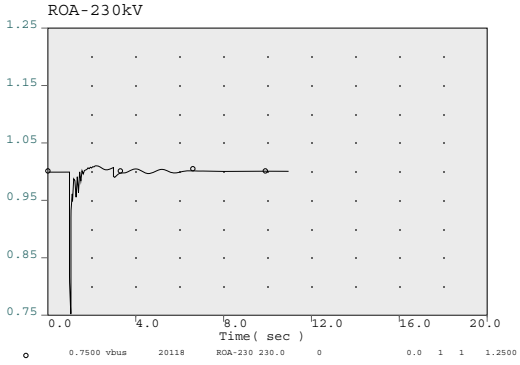
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

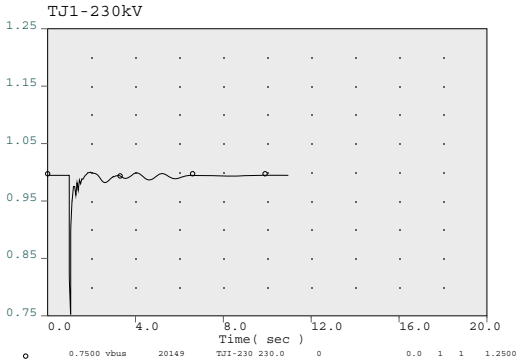
PAR/PID 230kV



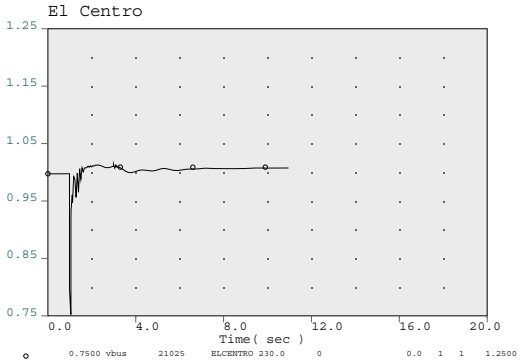
ROA-230kV



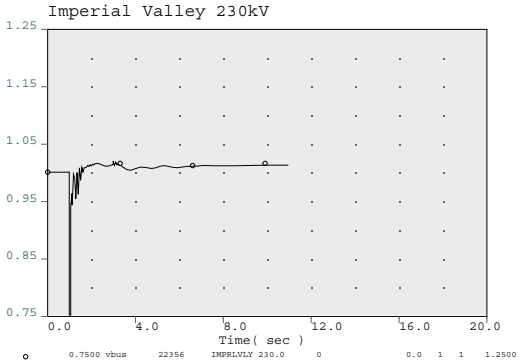
TJ1-230kV



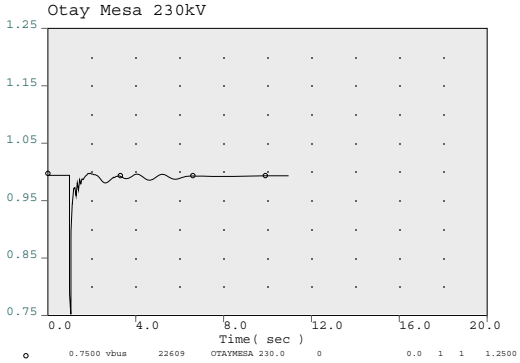
El Centro



Imperial Valley 230kV



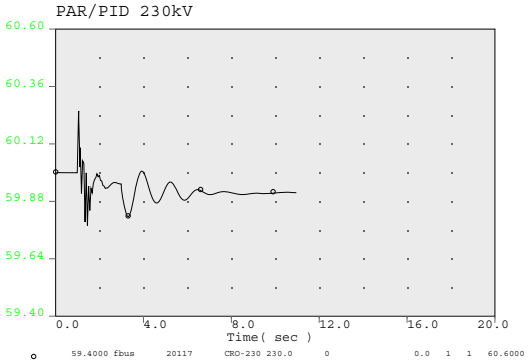
Otay Mesa 230kV



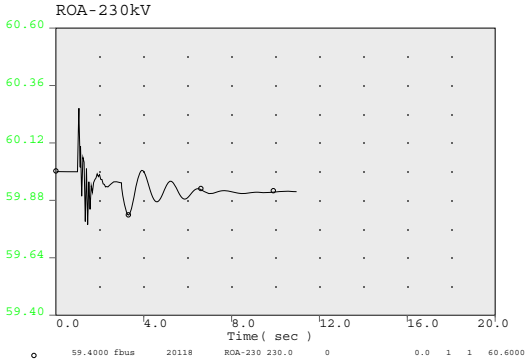
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

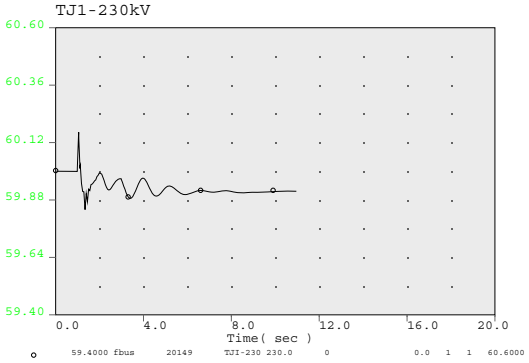
PAR/PID 230kV



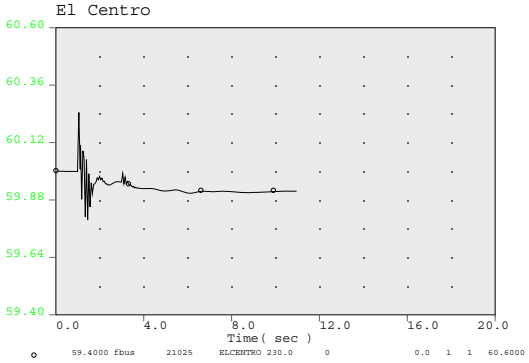
ROA-230kV



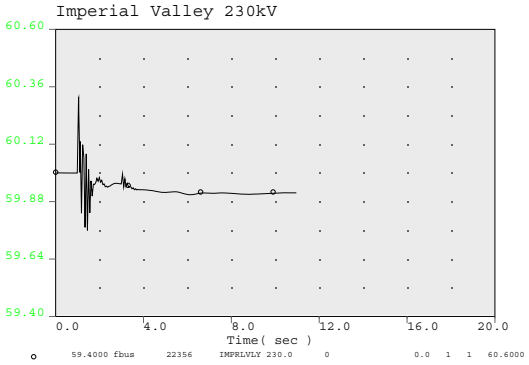
TJ1-230kV



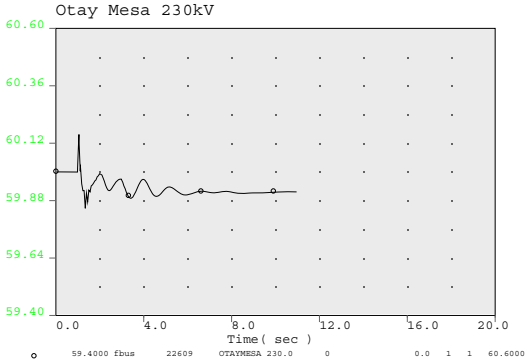
El Centro



Imperial Valley 230kV



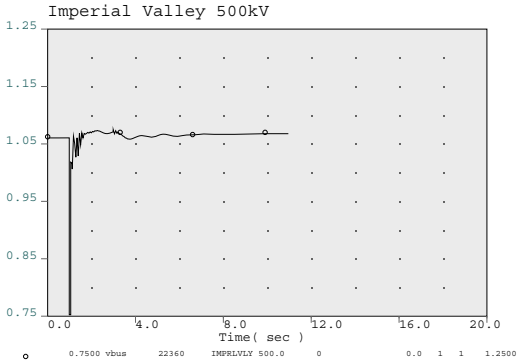
Otay Mesa 230kV



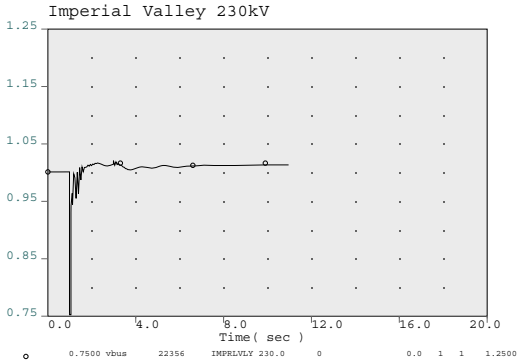
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

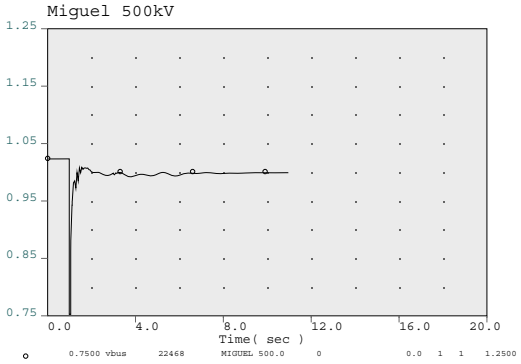
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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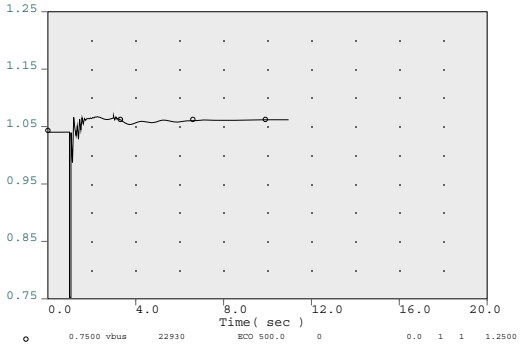
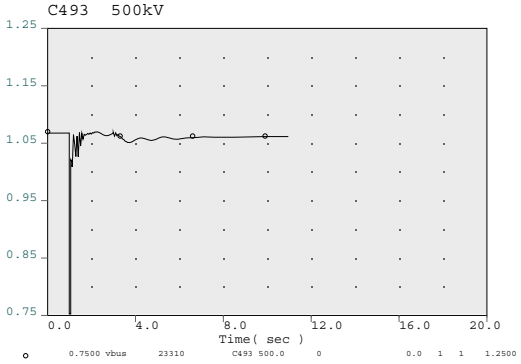
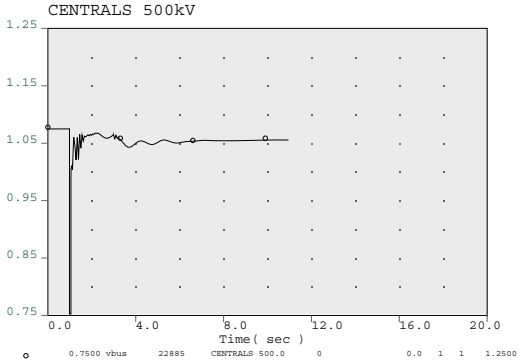


C493 500kV

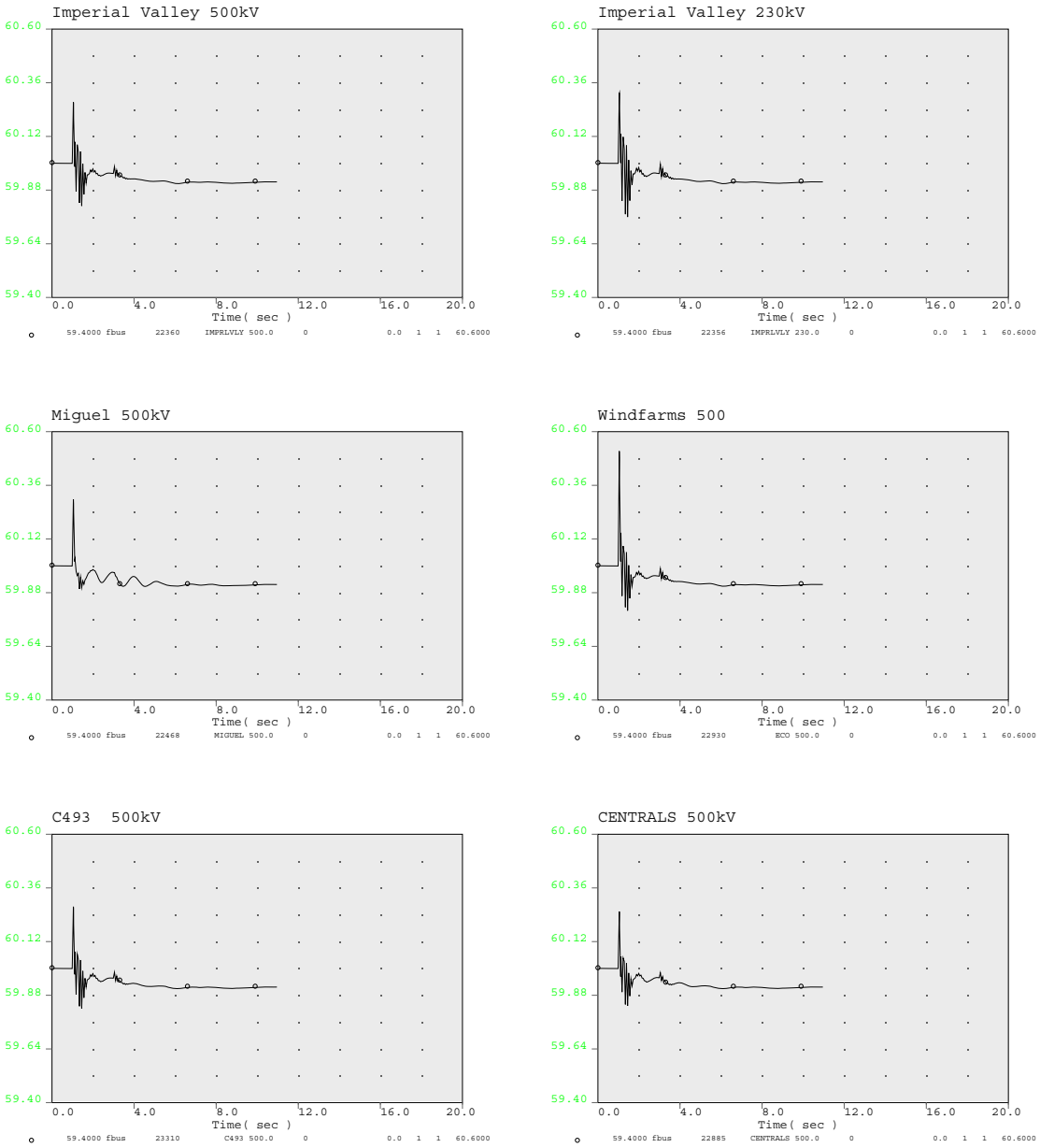


CENTRALS 500kV



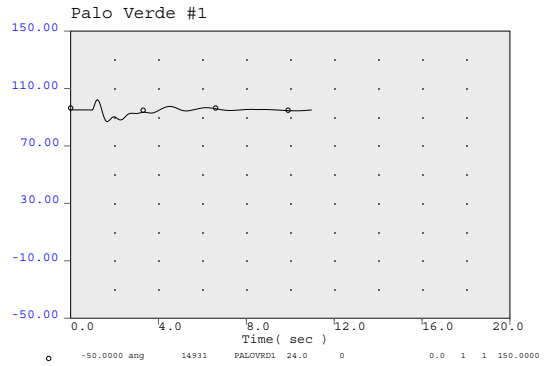
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

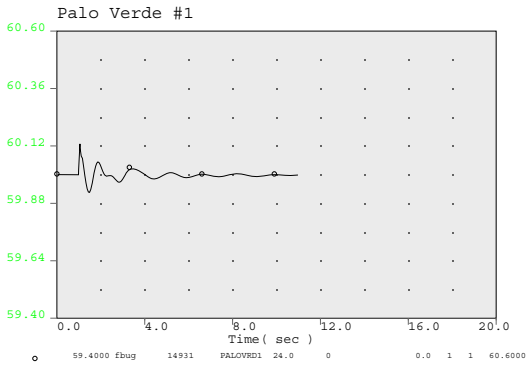
Imperial Valley Area - Frequency

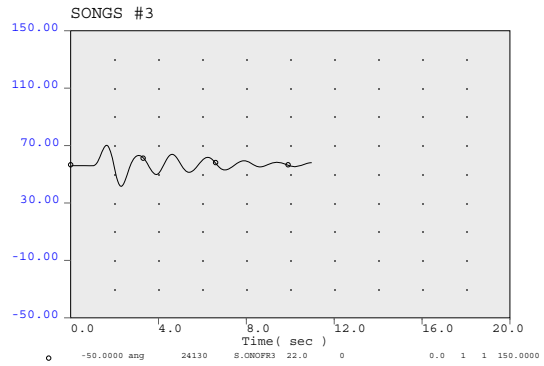


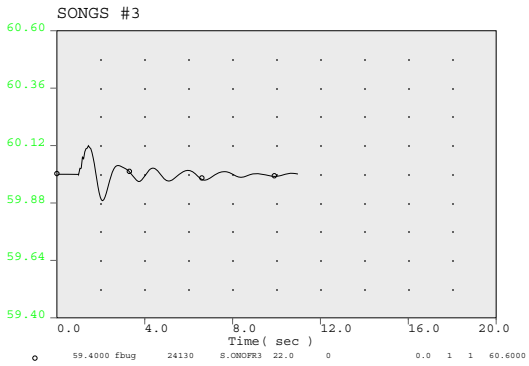
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-ECO 500 kV line

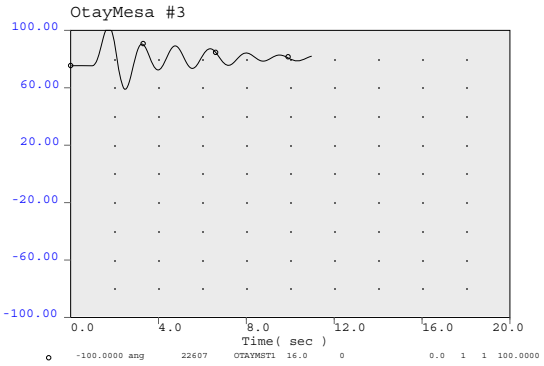
RELATIVE ROTOR ANGLE & FREQUENCY

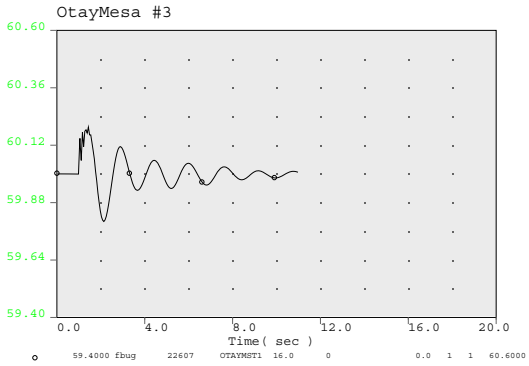










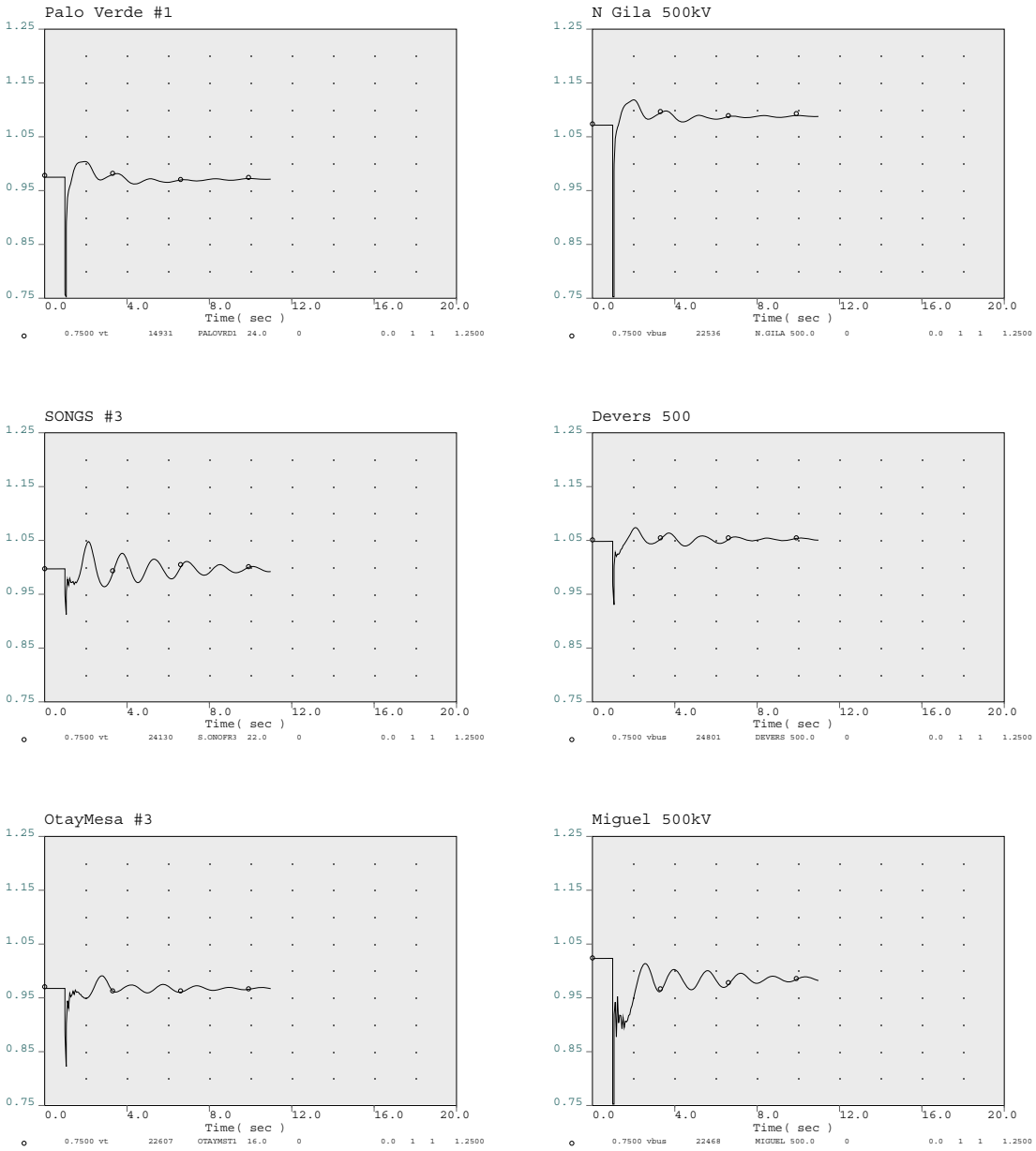


SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Page 1

SDGE	NGila_IV_slo_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:29:02 2010

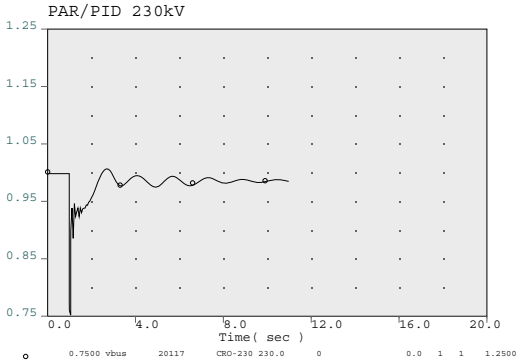
RELATIVE VOLTAGE



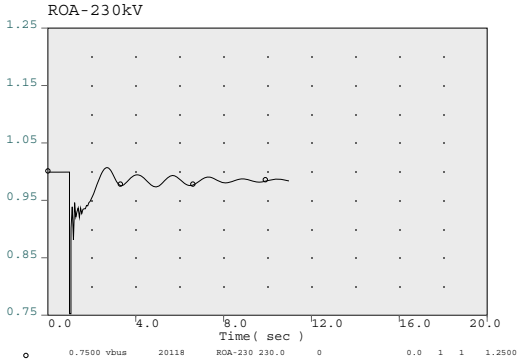
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

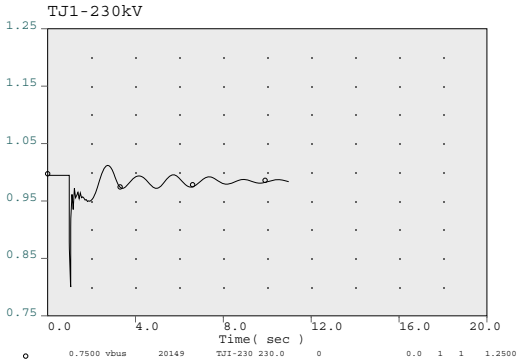
PAR/PID 230kV



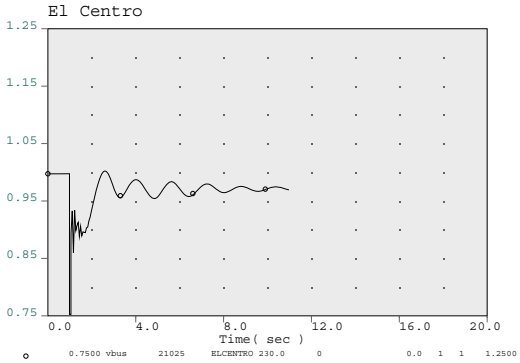
ROA-230kV



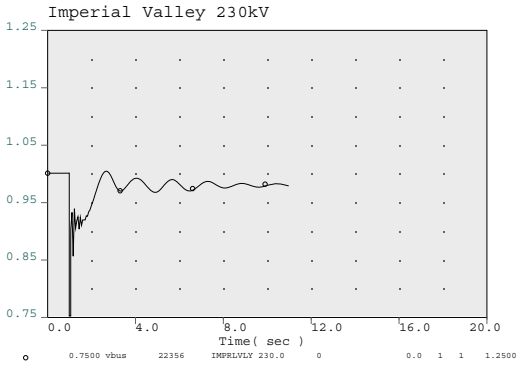
TJ1-230kV



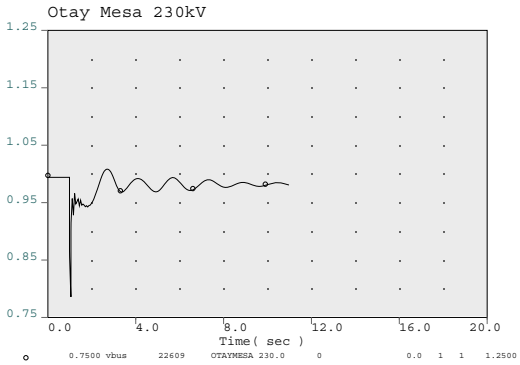
El Centro



Imperial Valley 230kV



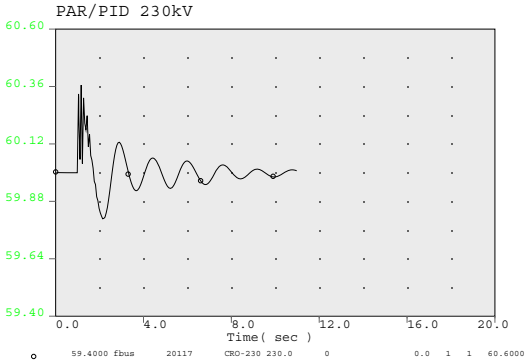
Otay Mesa 230kV



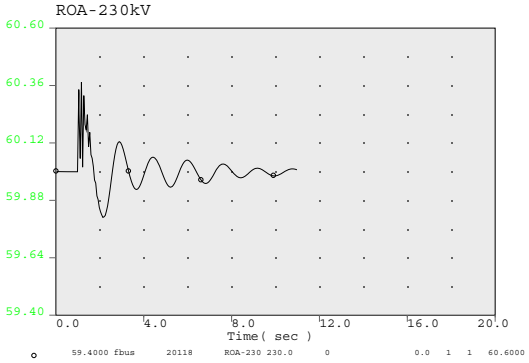
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

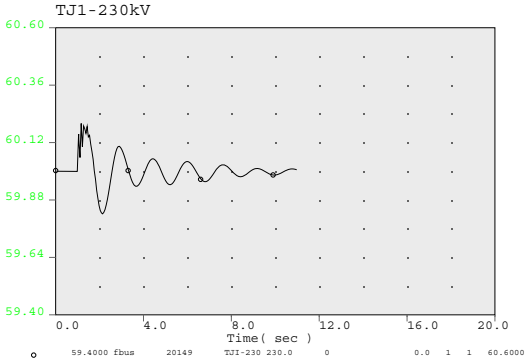
PAR/PID 230kV



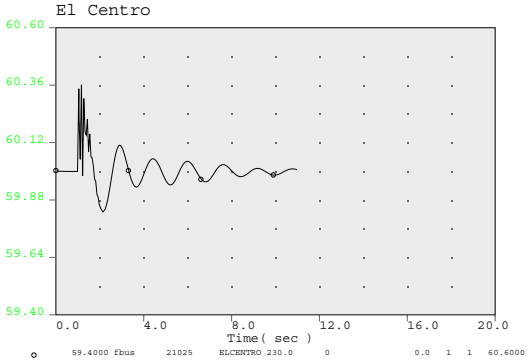
ROA-230kV



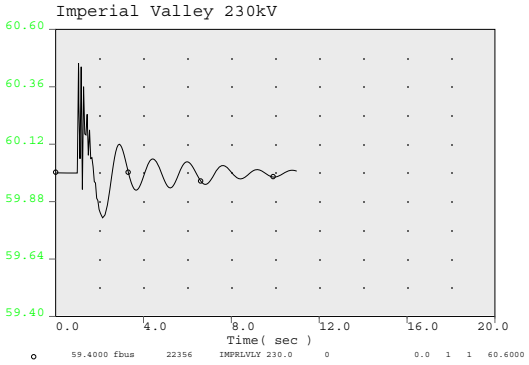
TJ1-230kV



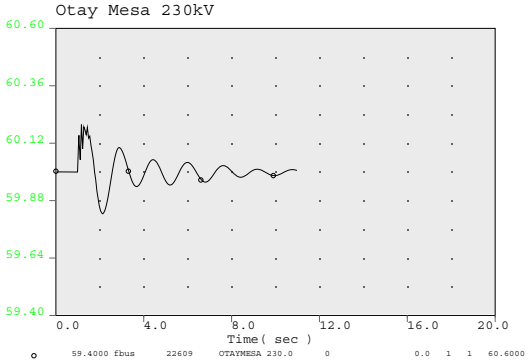
El Centro



Imperial Valley 230kV

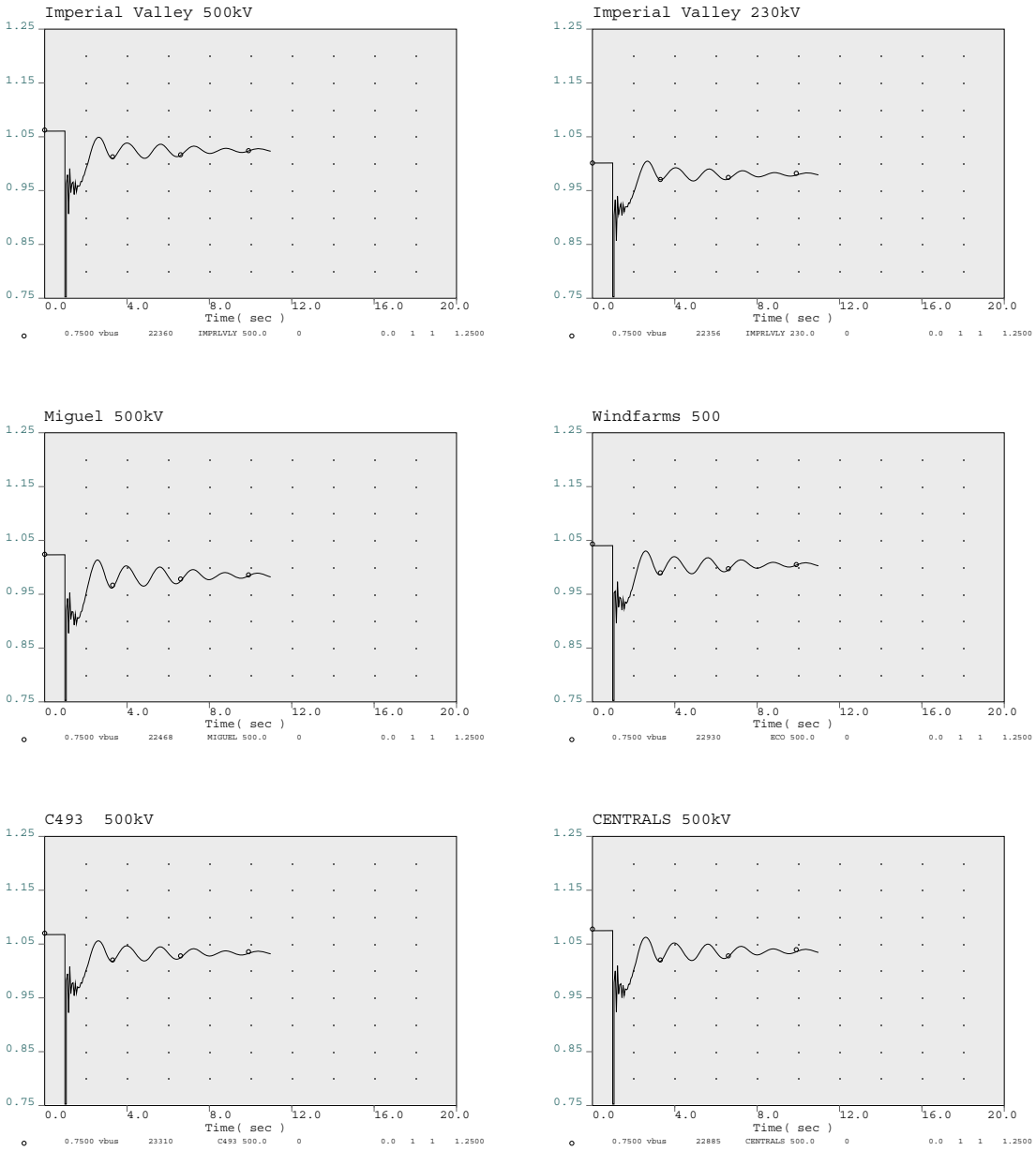


Otay Mesa 230kV



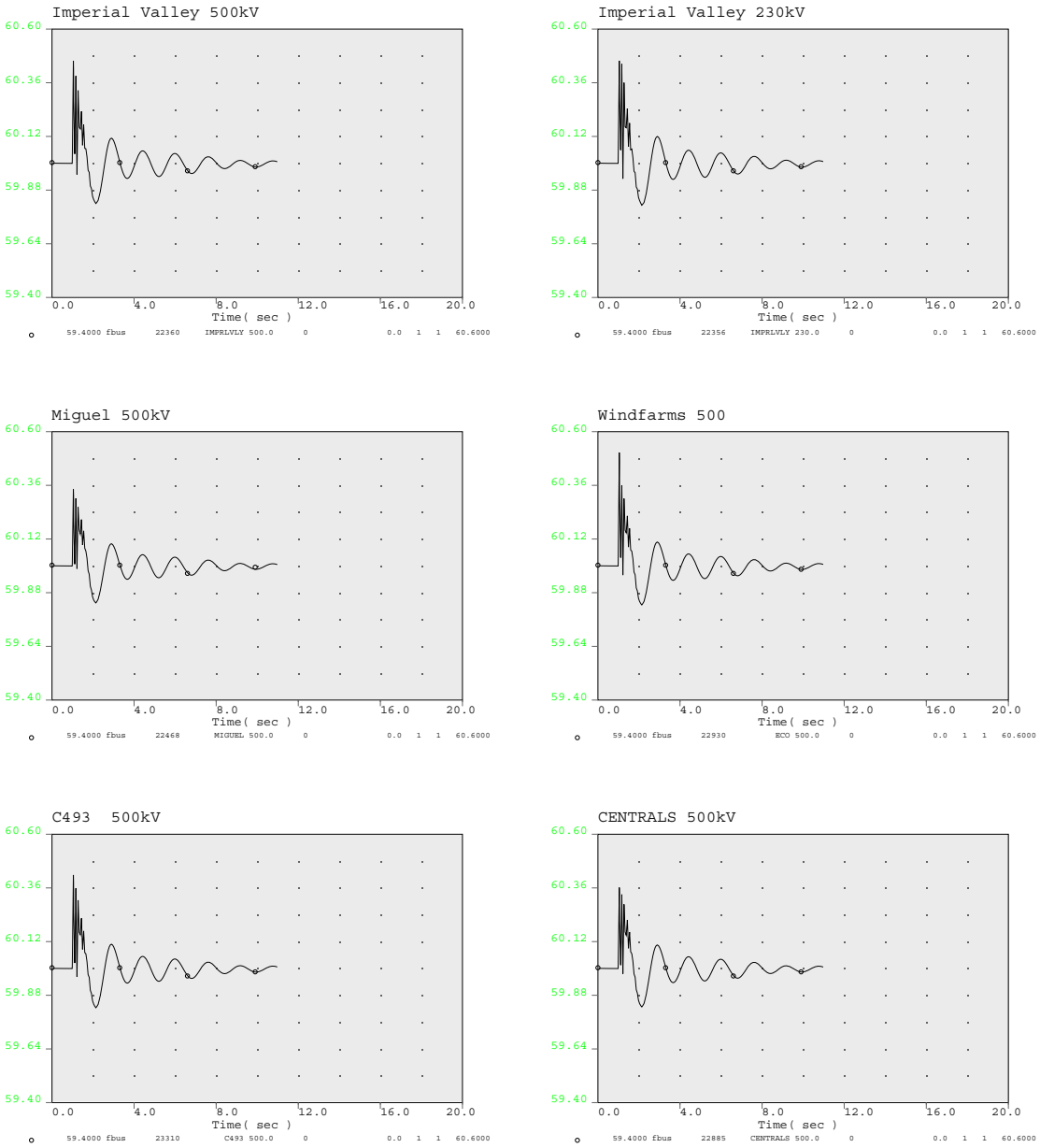
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE



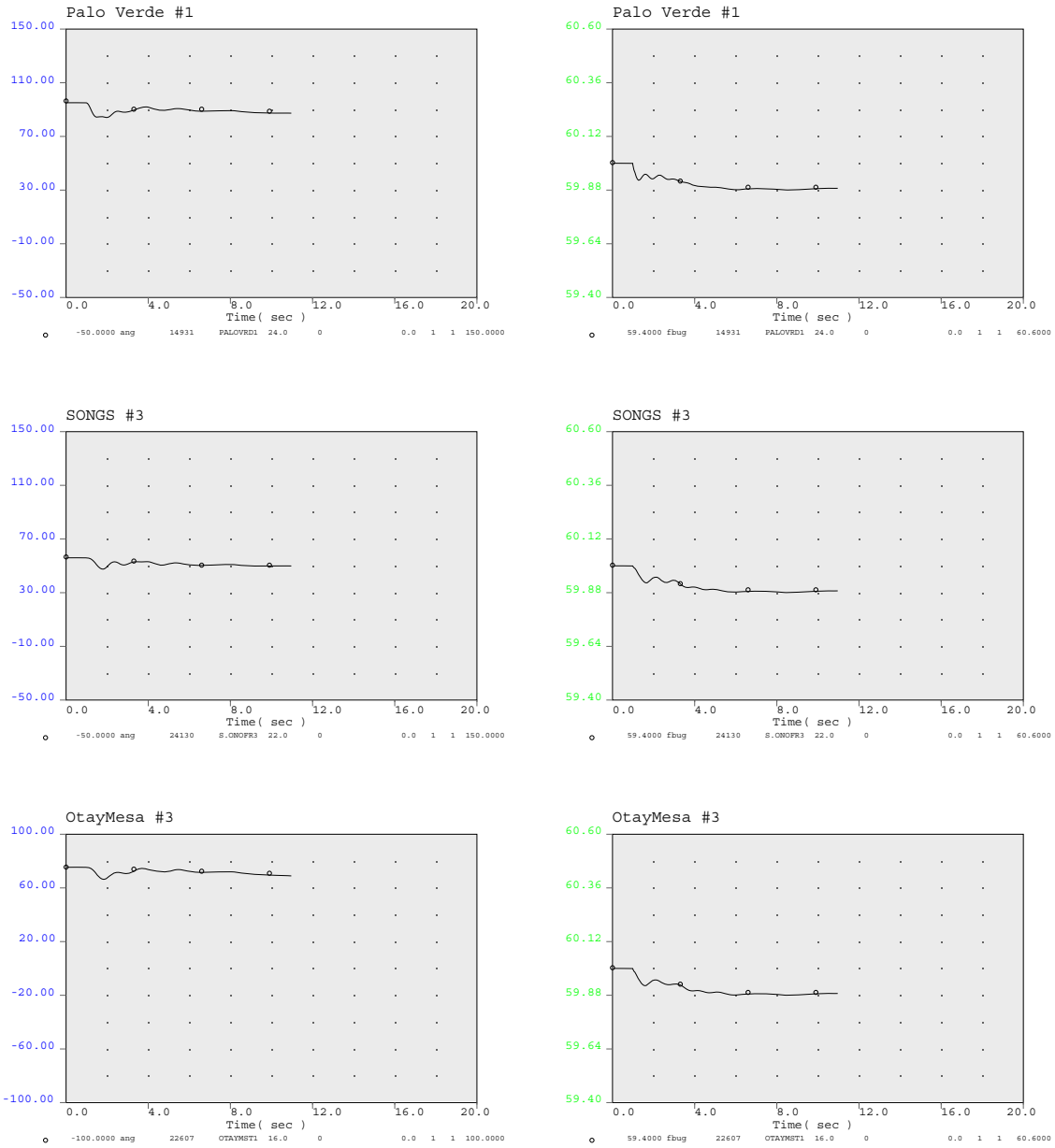
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY

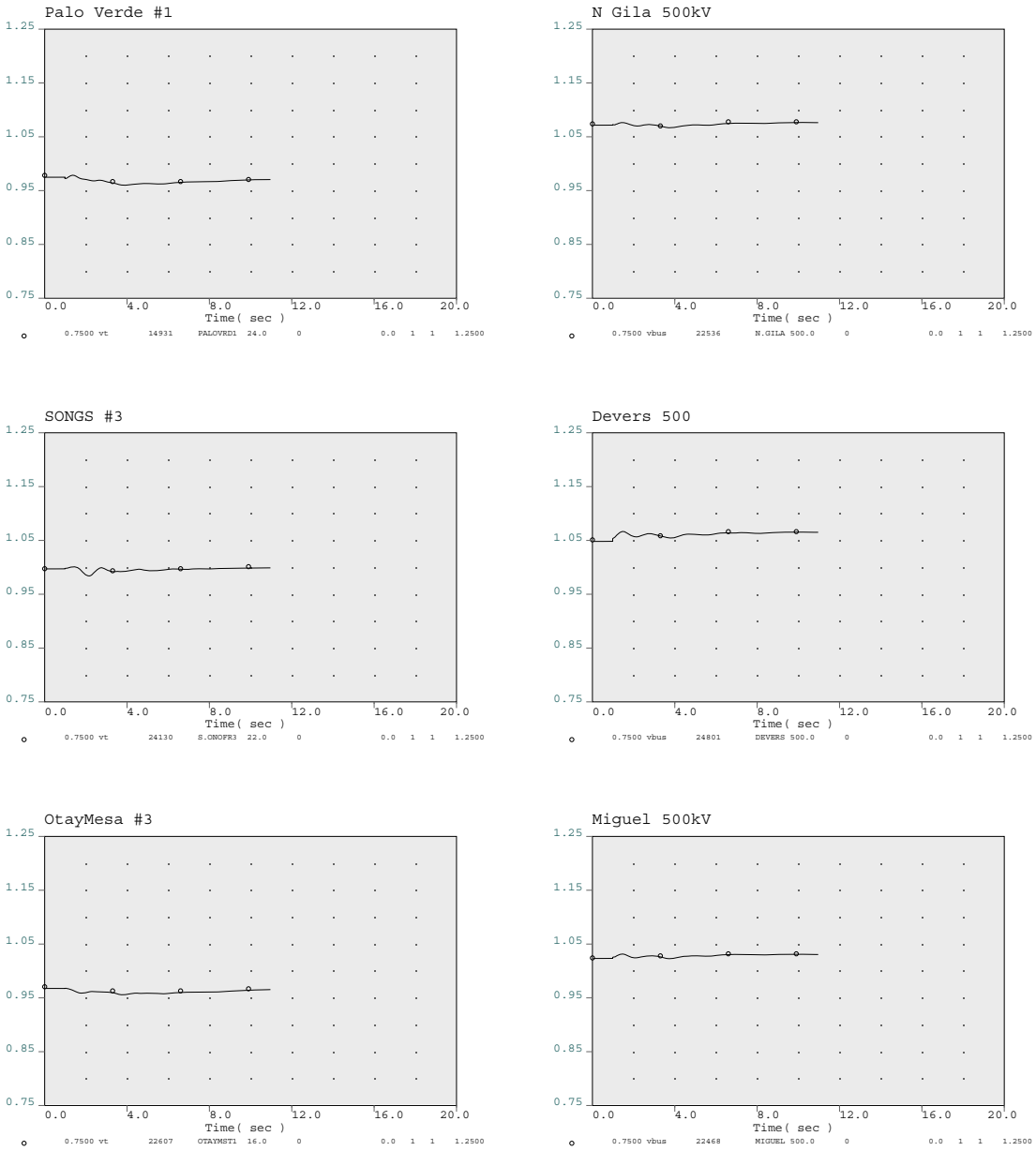


SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

Page 1

SDGE	PaloVerde-g1_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:26:30 2010

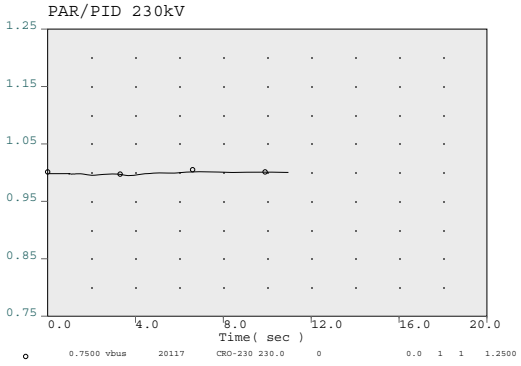
RELATIVE VOLTAGE



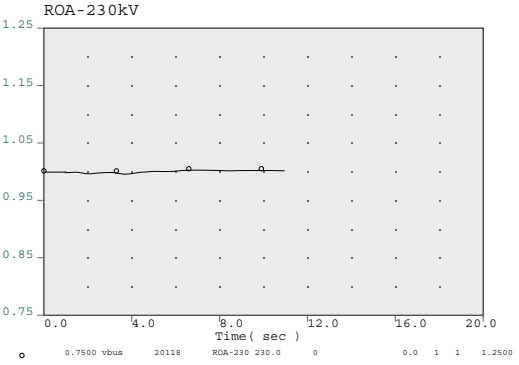
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

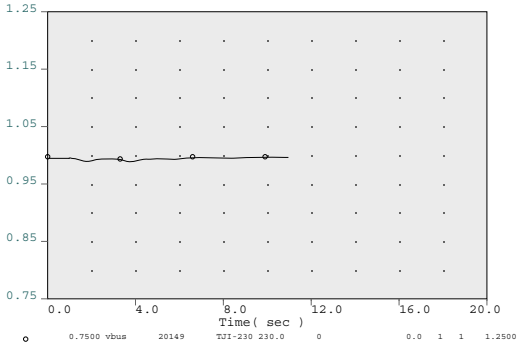
PAR/PID 230kV



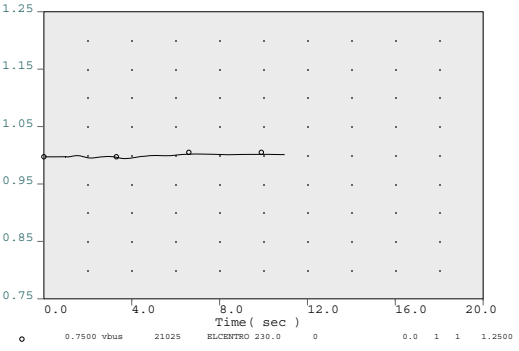
ROA-230kV



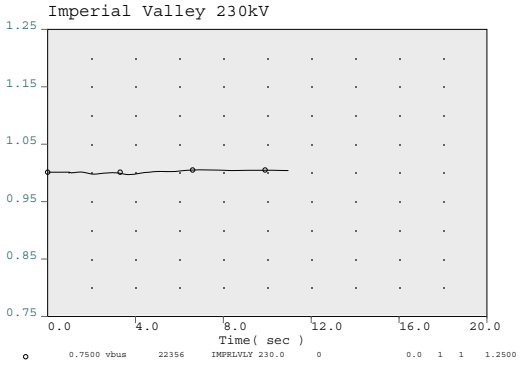
TJ1-230kV



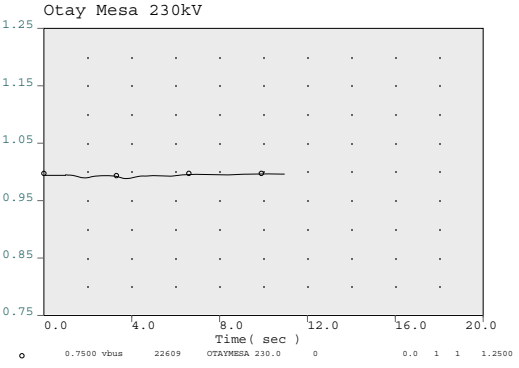
El Centro



Imperial Valley 230kV

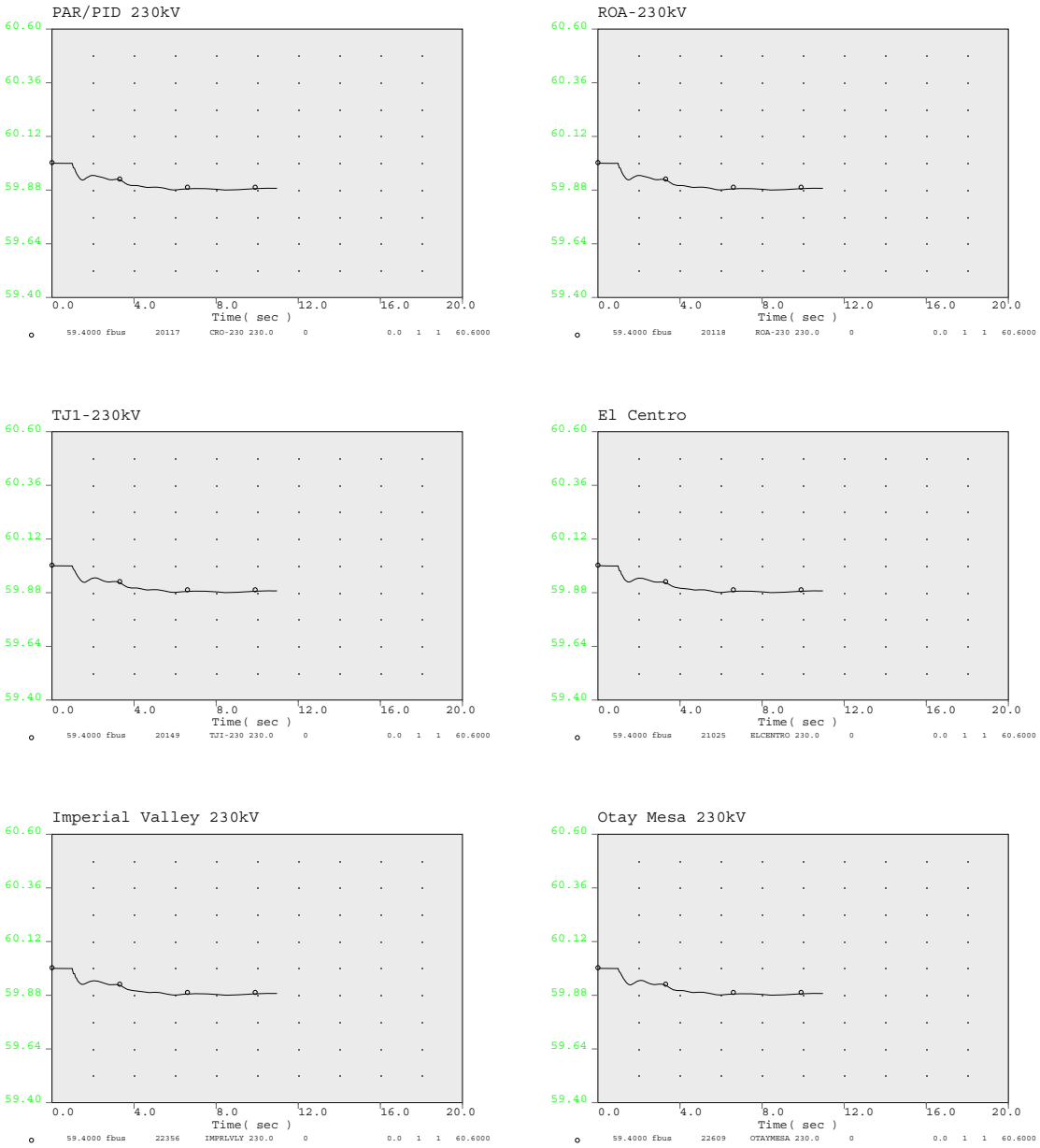


Otay Mesa 230kV



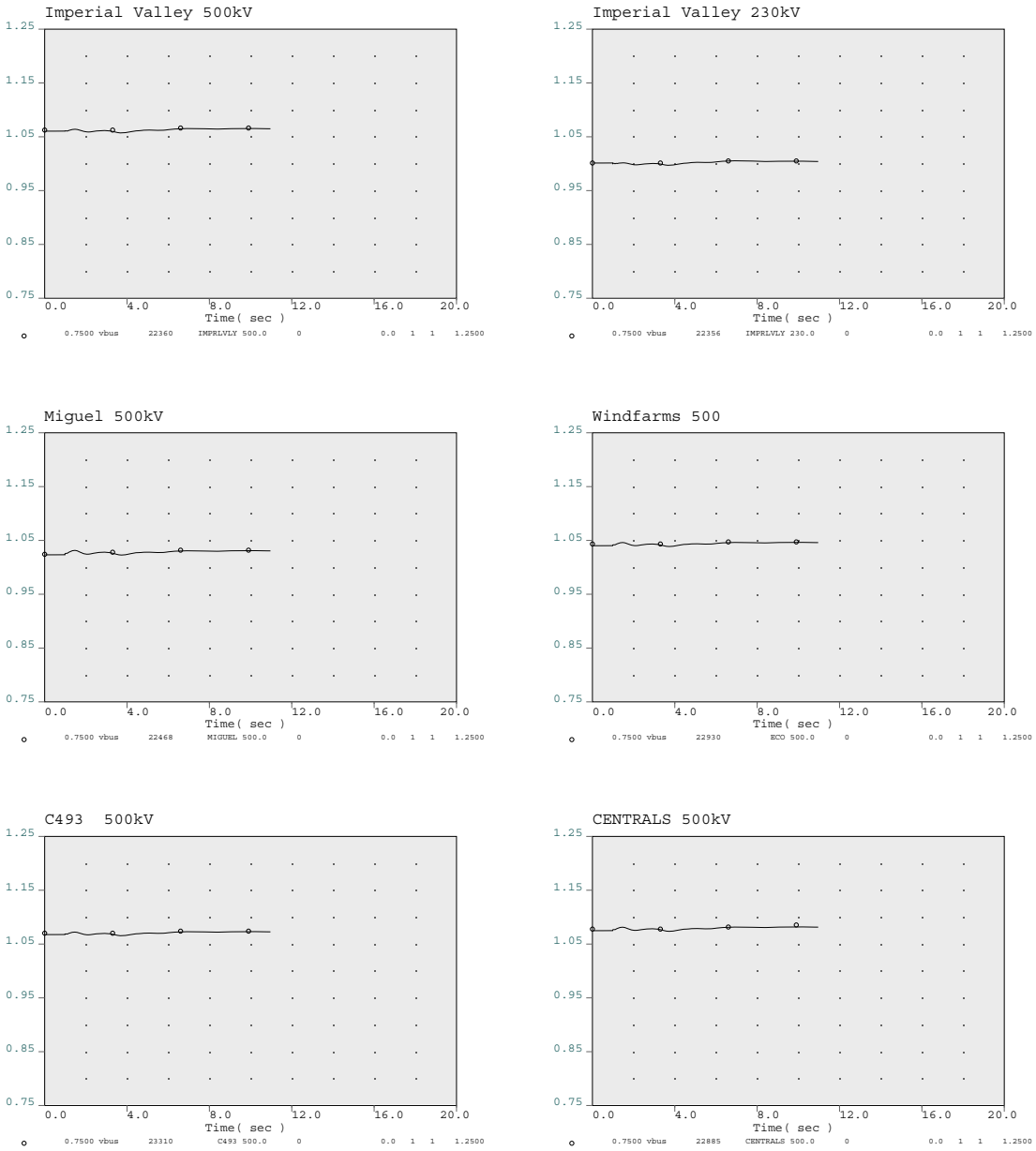
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison



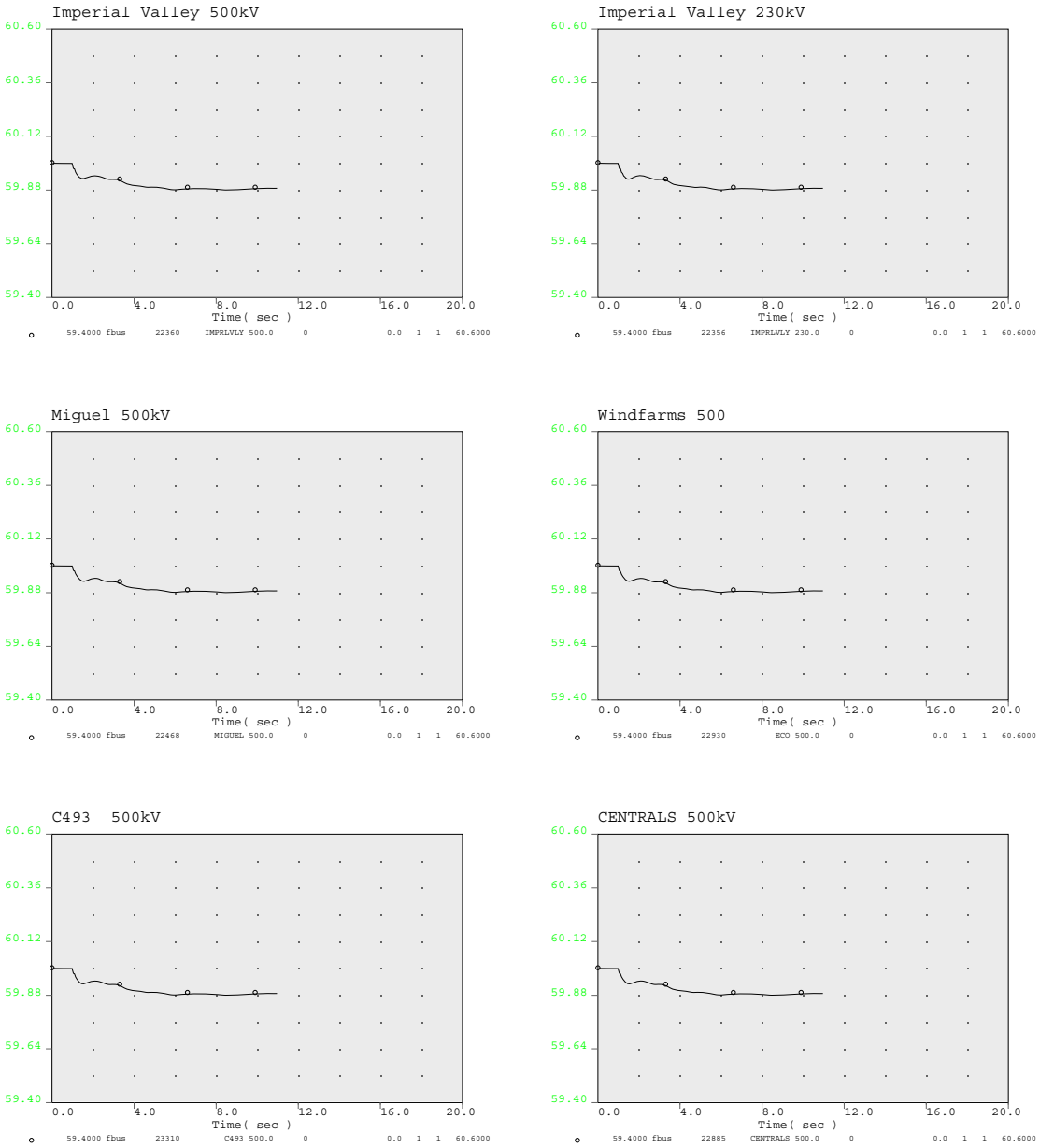
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

Imperial Valley Area - VOLTAGE



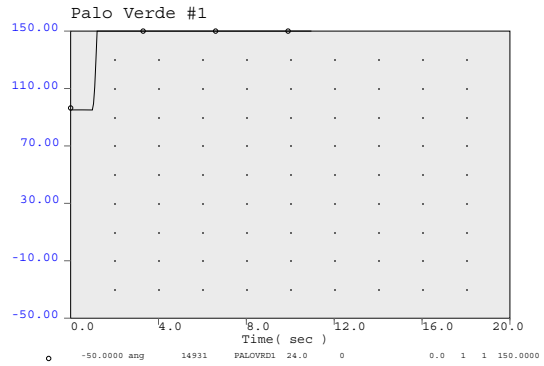
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

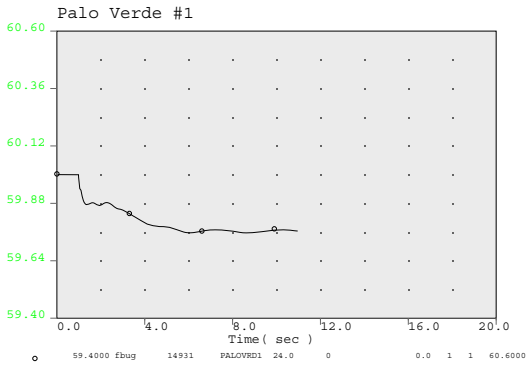
Imperial Valley Area - Frequency

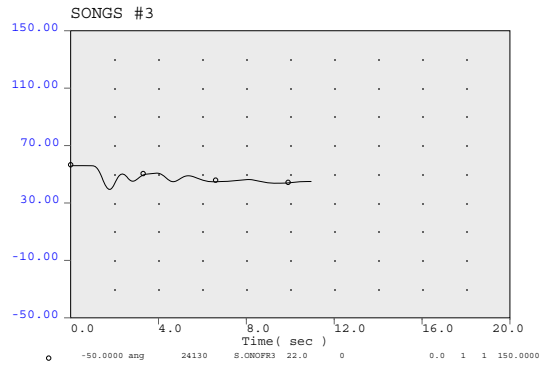


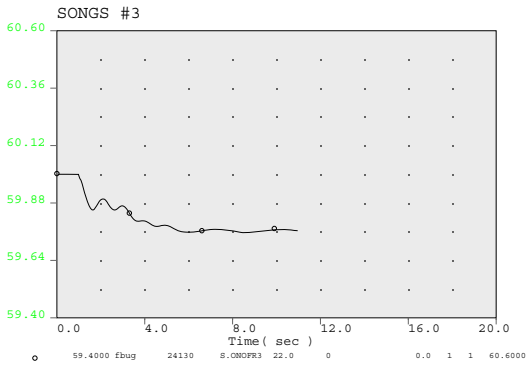
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

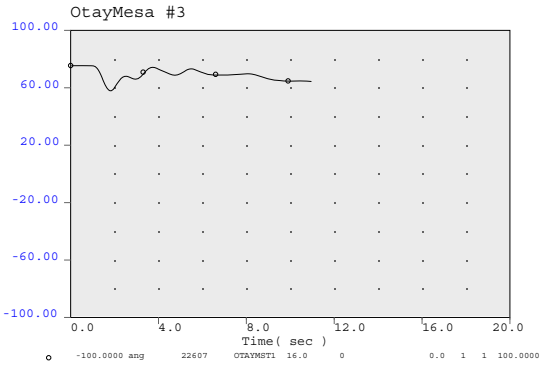
RELATIVE ROTOR ANGLE & FREQUENCY

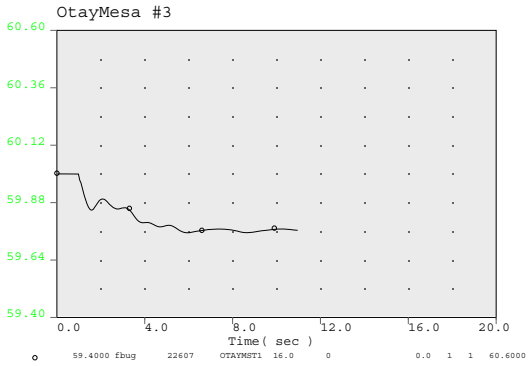










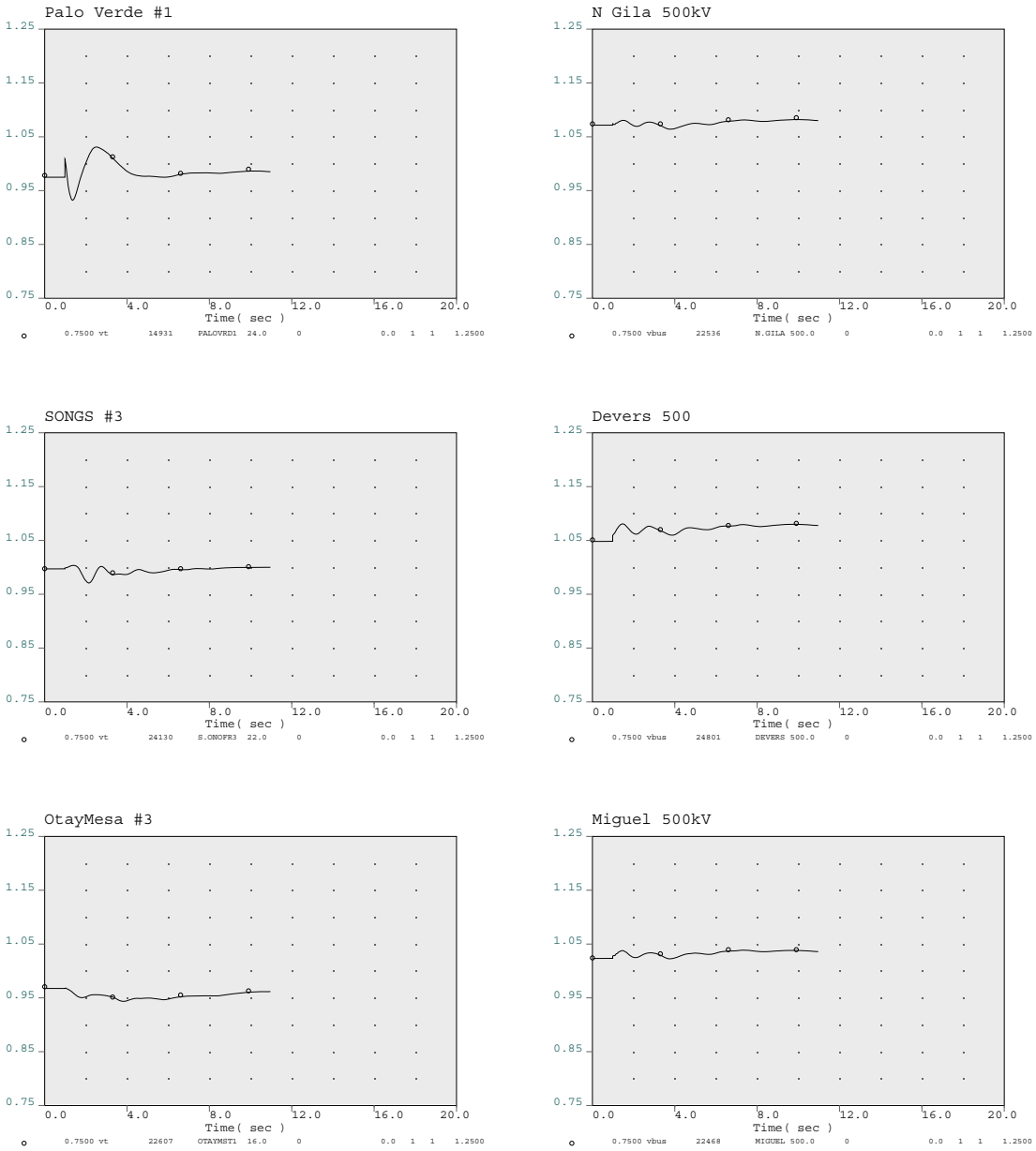


SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Page 1

SDGE	PaloVerde-g2_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:26:48 2010

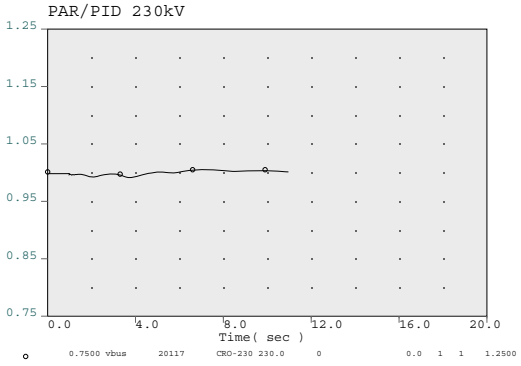
RELATIVE VOLTAGE



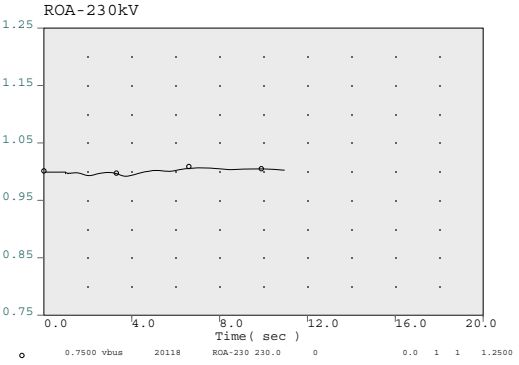
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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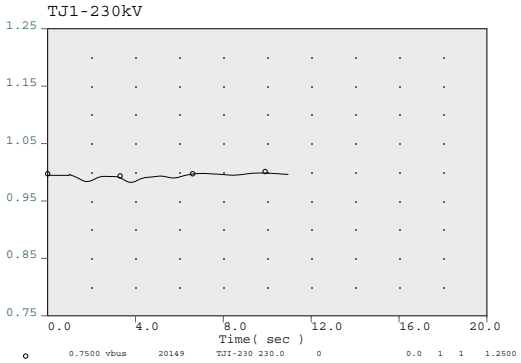

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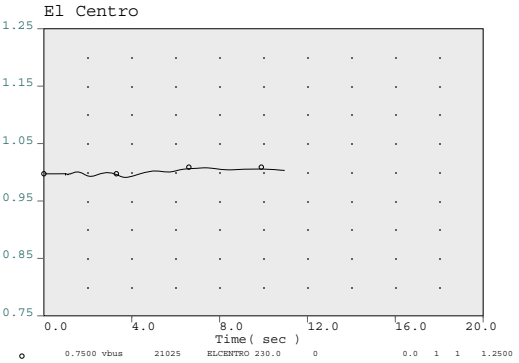
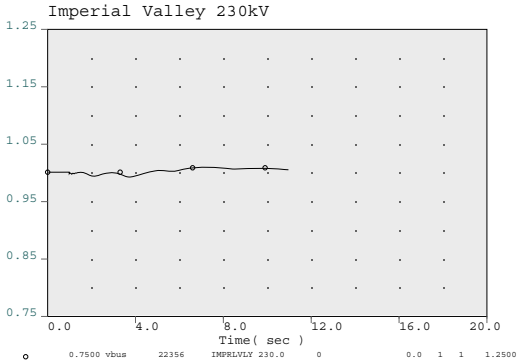
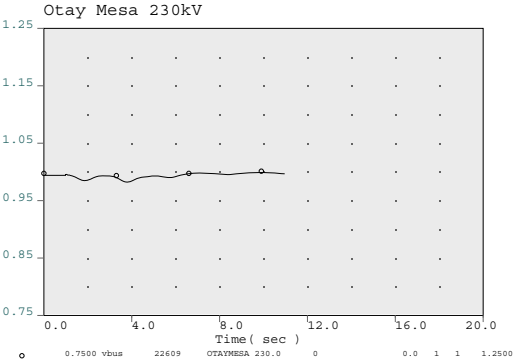


Imperial Valley 230kV



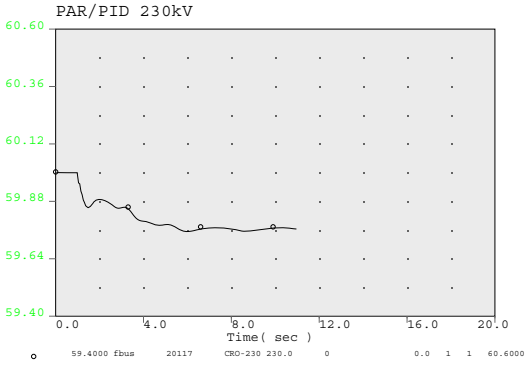
Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

PAR/PID 230kV



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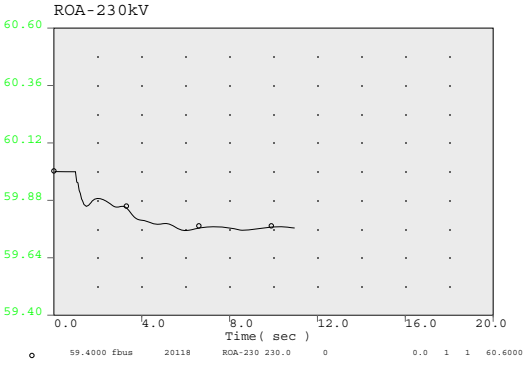

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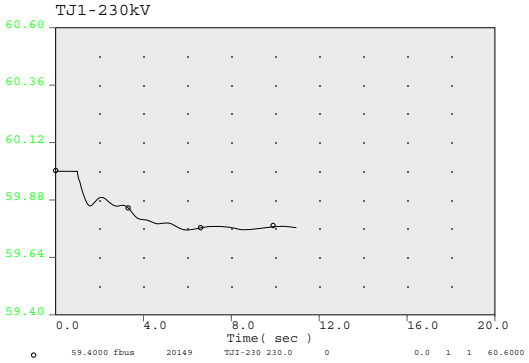

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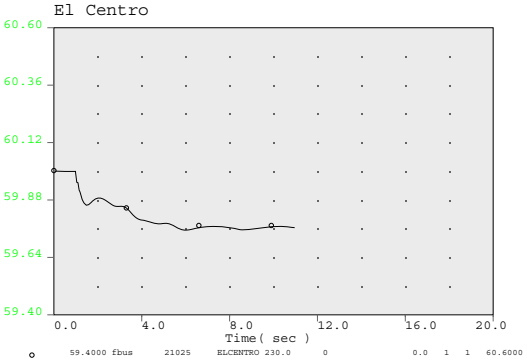
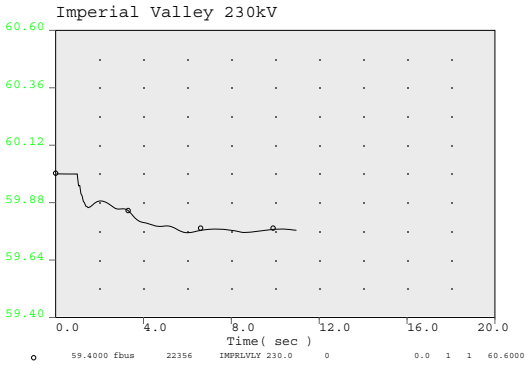
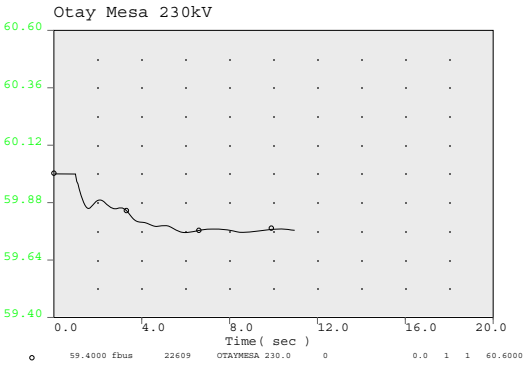


Imperial Valley 230kV

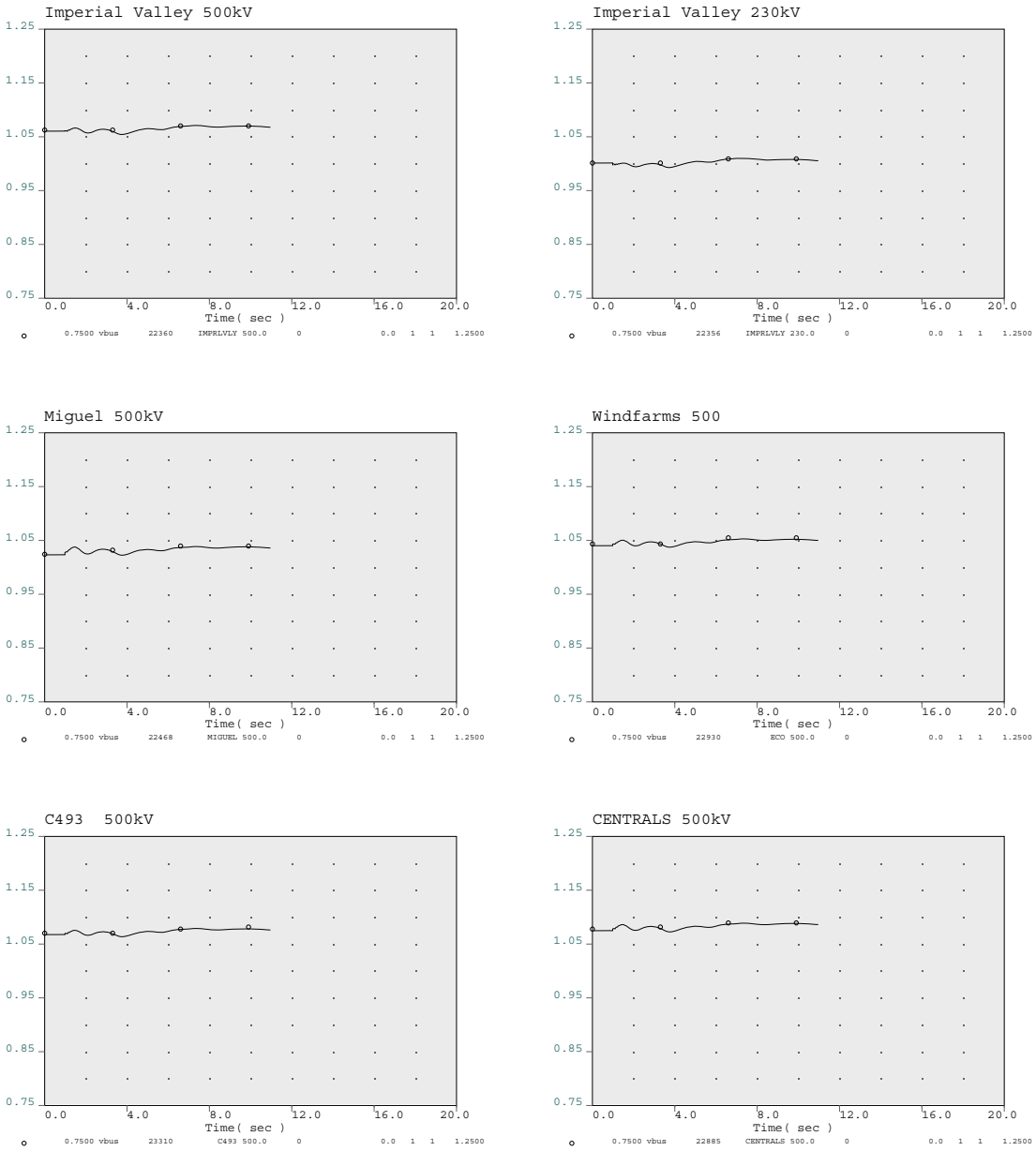


Otay Mesa 230kV



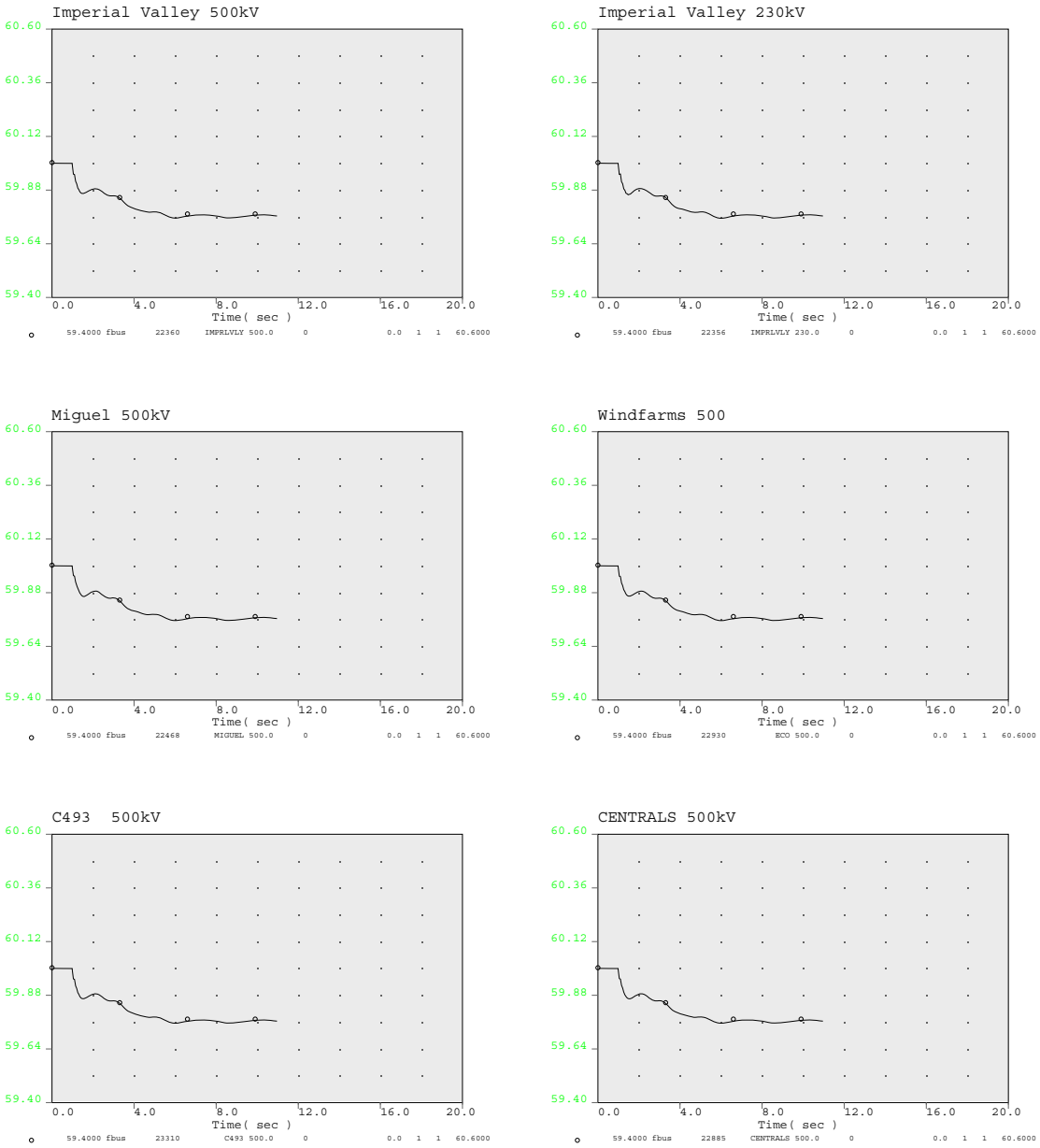
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE



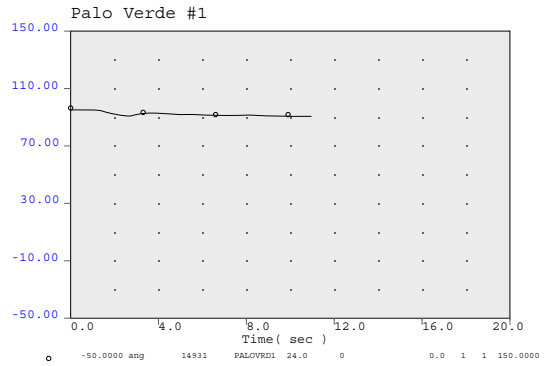
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

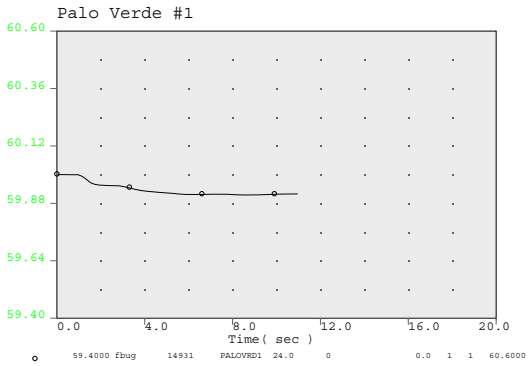
Imperial Valley Area - Frequency

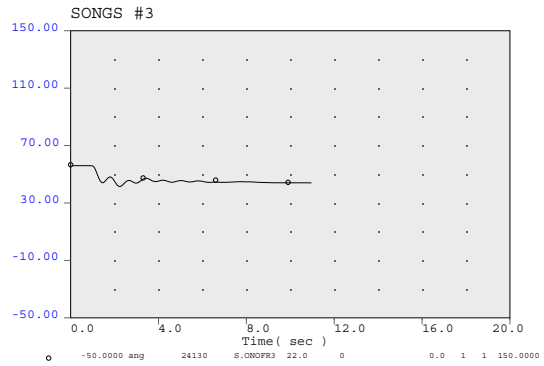


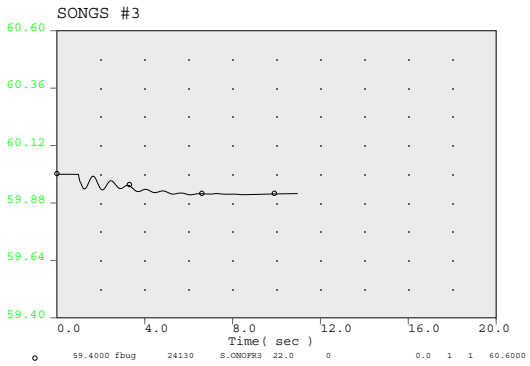
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

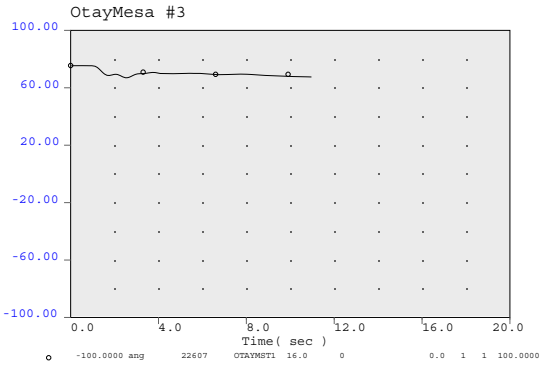
RELATIVE ROTOR ANGLE & FREQUENCY

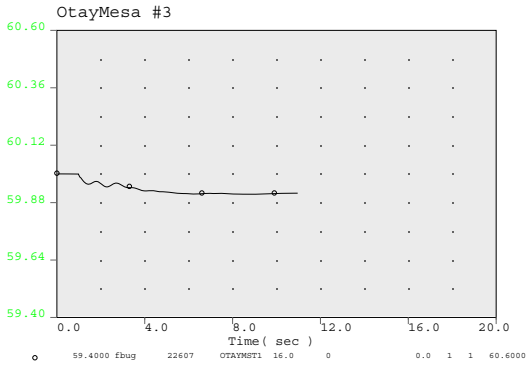










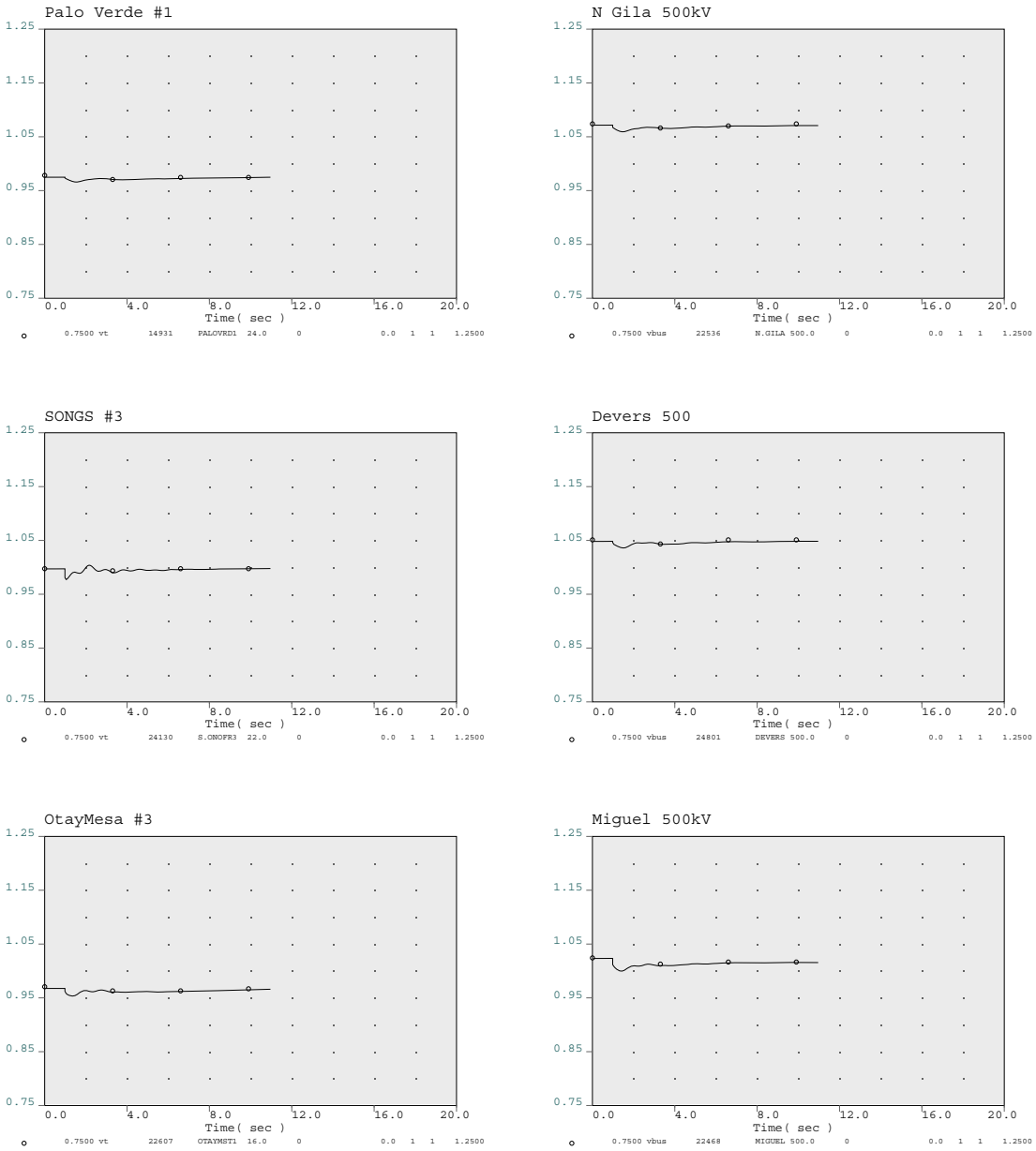


SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Page 1

SDGE	SONGS-g1_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:27:10 2010

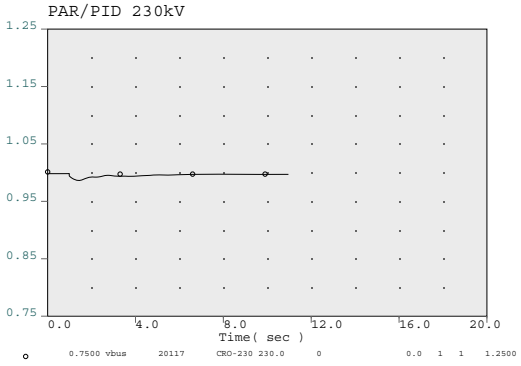
RELATIVE VOLTAGE



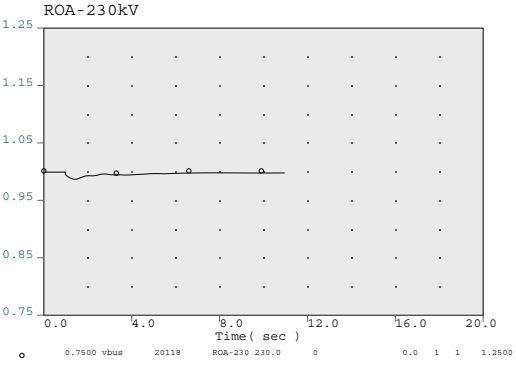
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

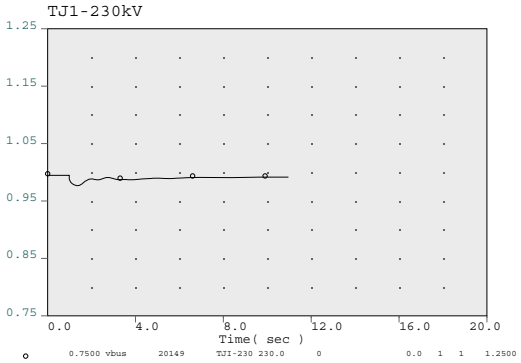
PAR/PID 230kV



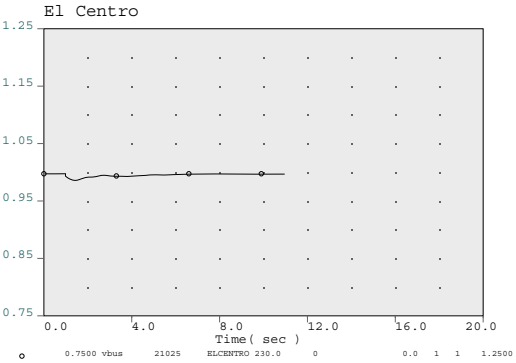
ROA-230kV



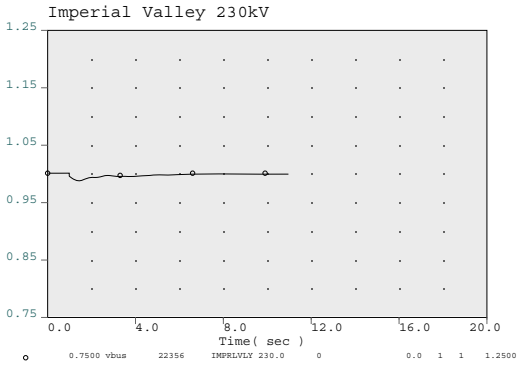
TJ1-230kV



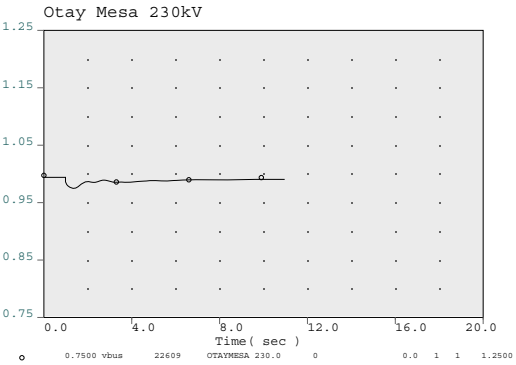
El Centro



Imperial Valley 230kV

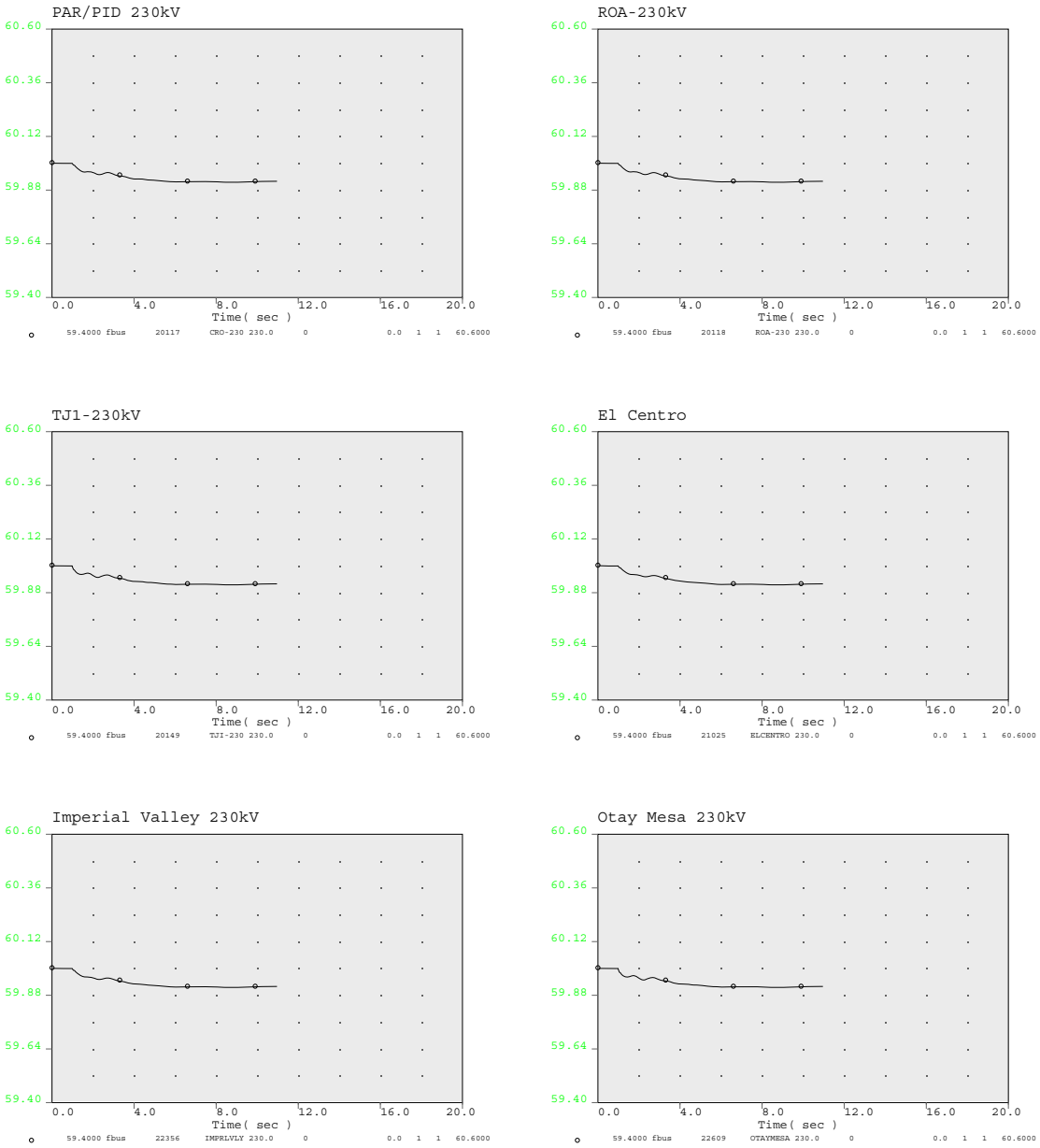


Otay Mesa 230kV



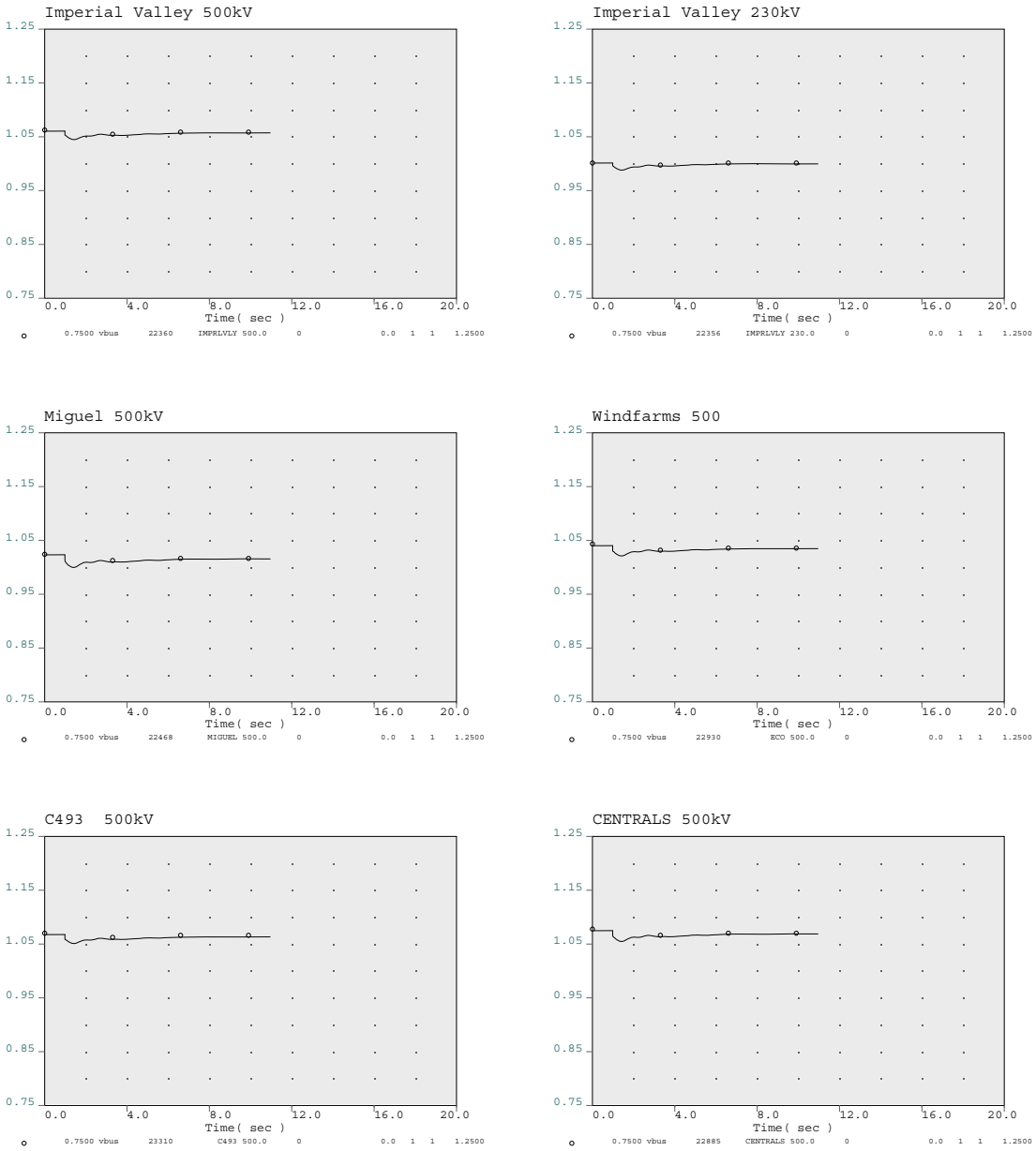
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison



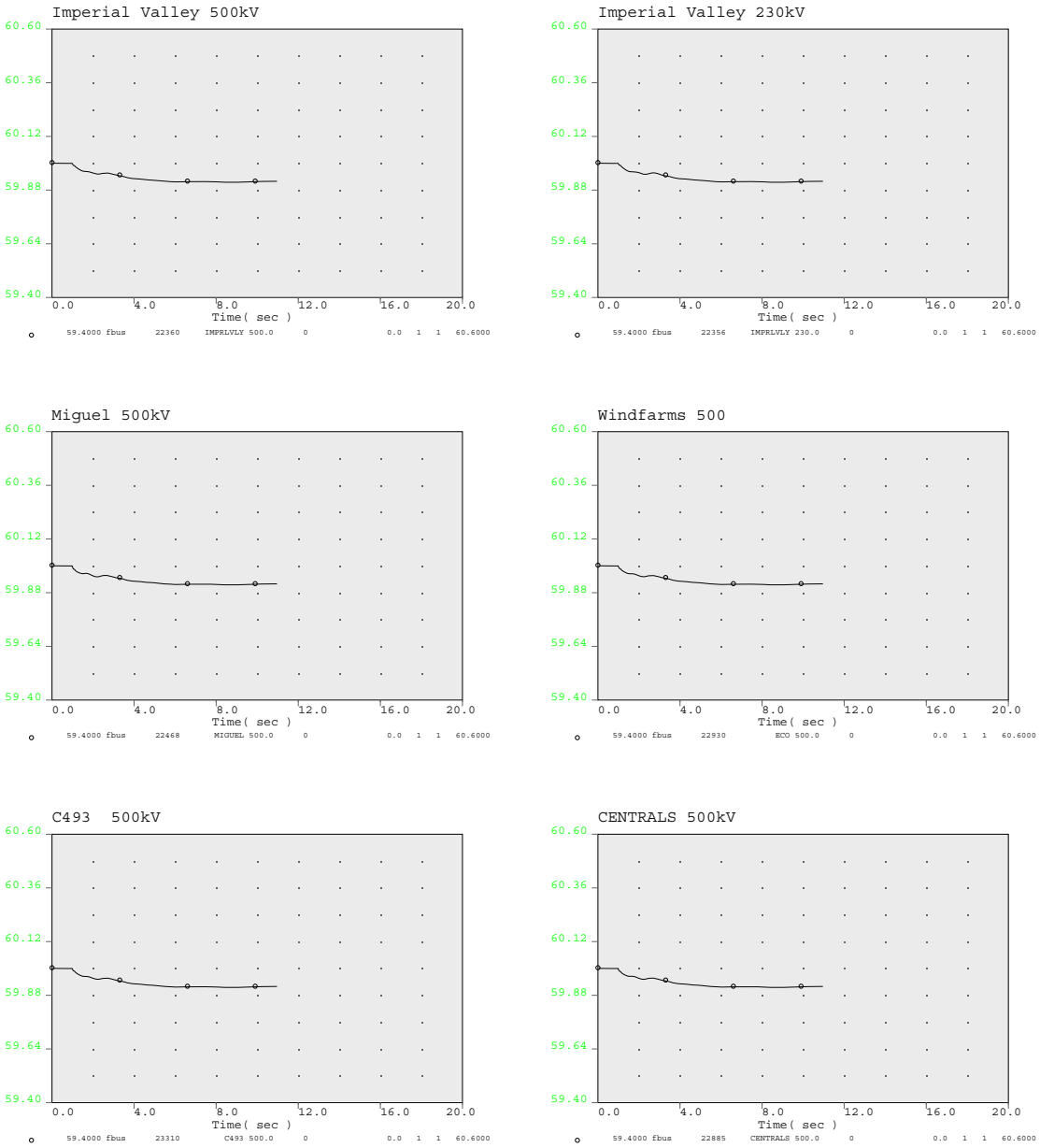
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Imperial Valley Area - VOLTAGE



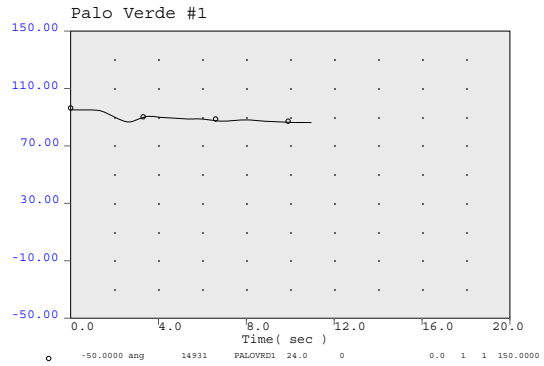
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

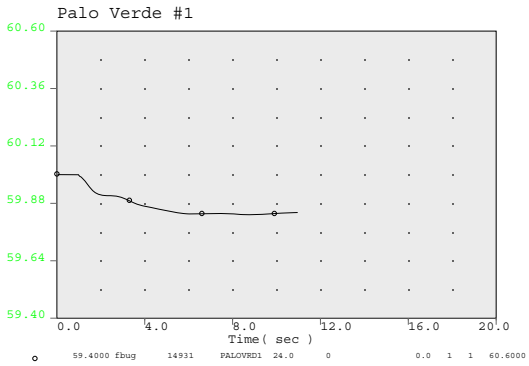
Imperial Valley Area - Frequency

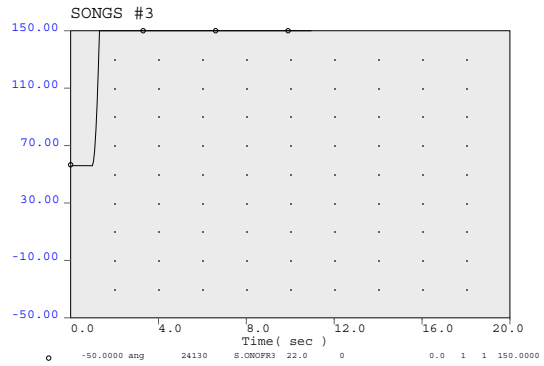


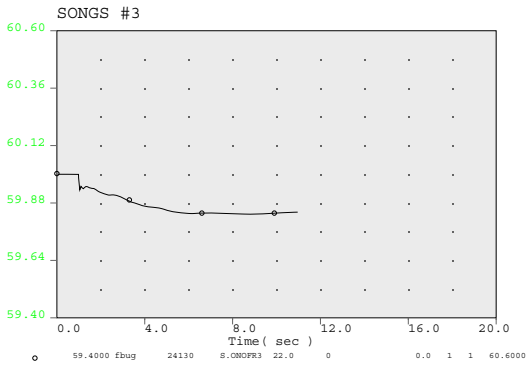
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

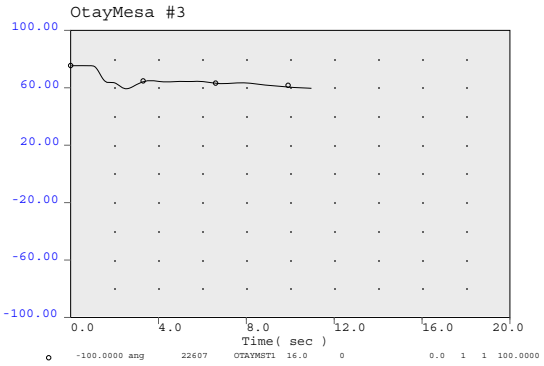
RELATIVE ROTOR ANGLE & FREQUENCY

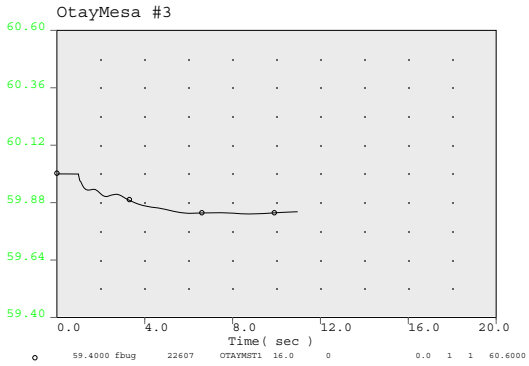






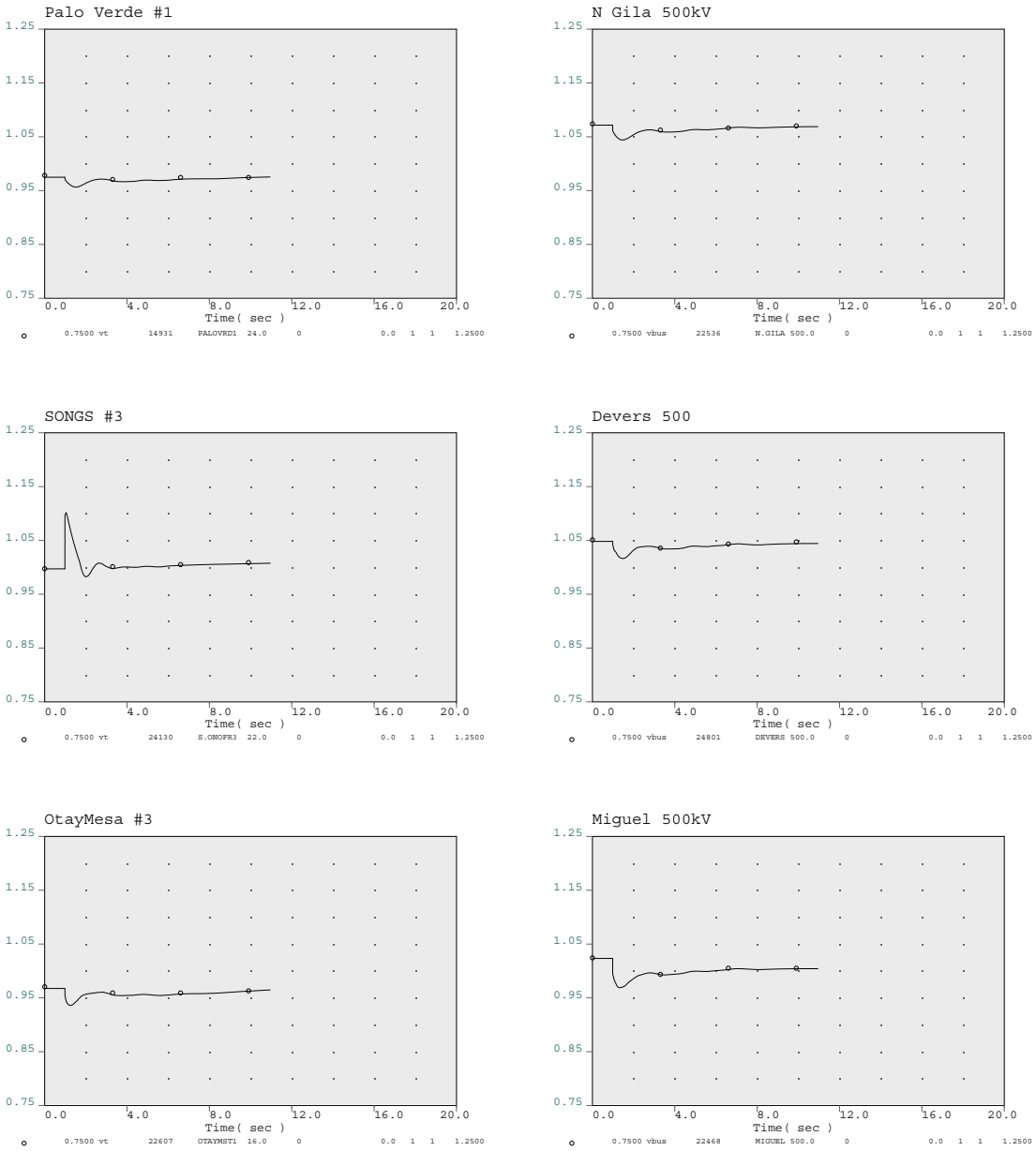






SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

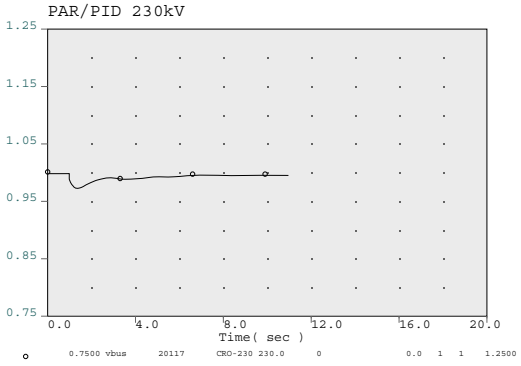
RELATIVE VOLTAGE



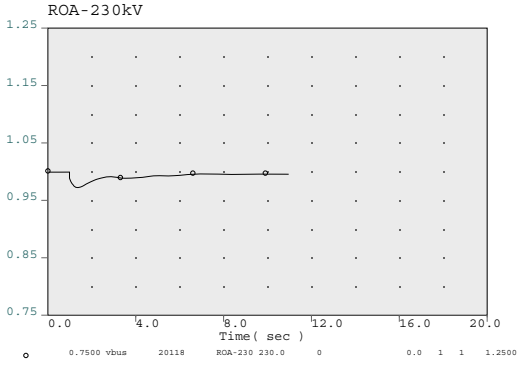
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

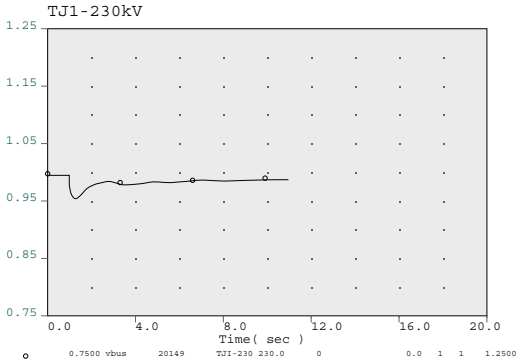
PAR/PID 230kV



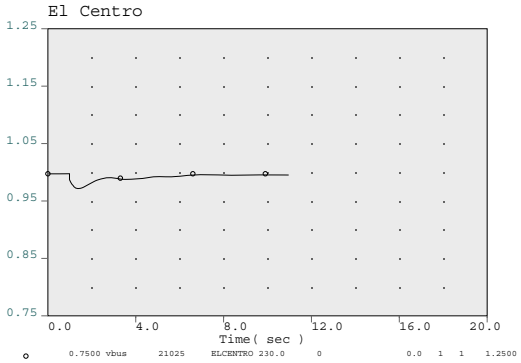
ROA-230kV



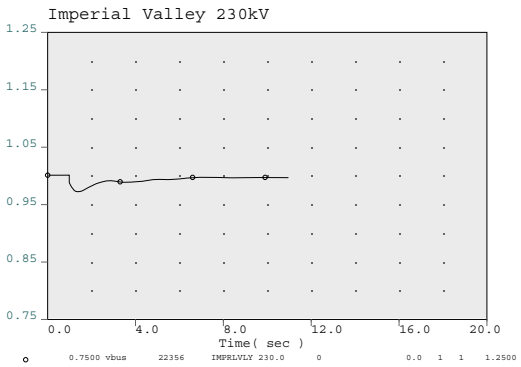
TJ1-230kV



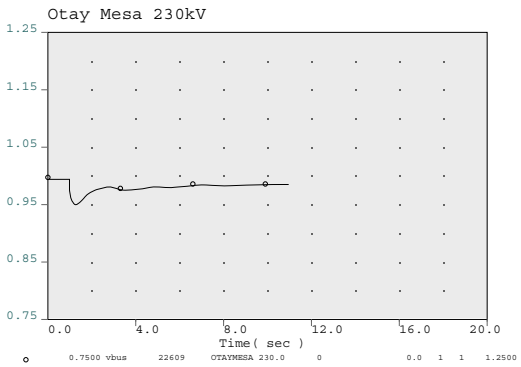
El Centro



Imperial Valley 230kV



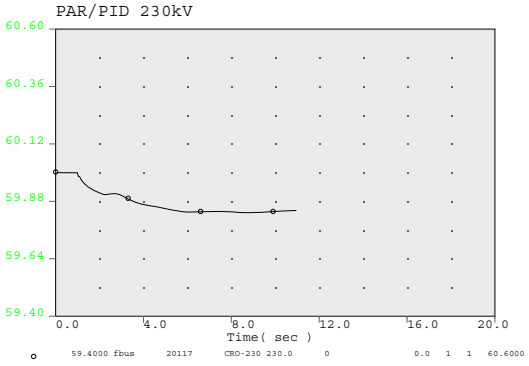
Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Frequency Check and Comparison

PAR/PID 230kV



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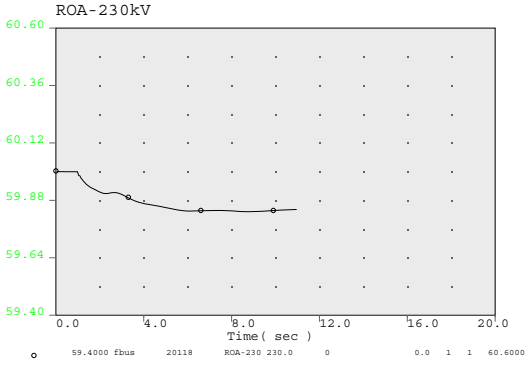
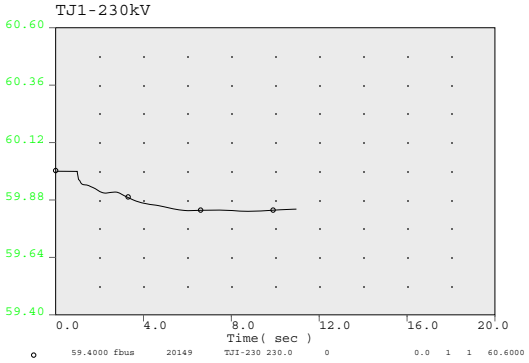
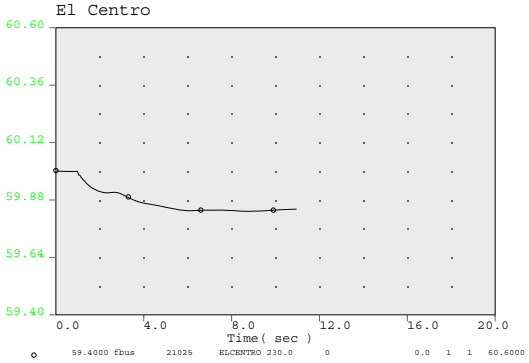


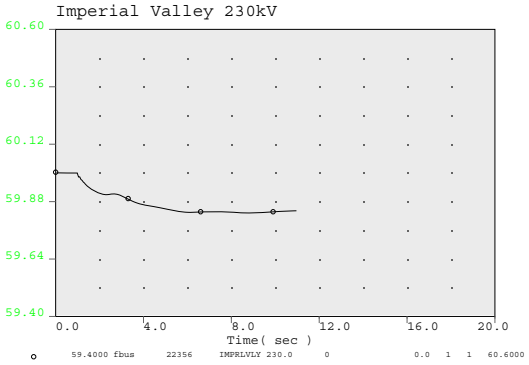
TJ1-230kV



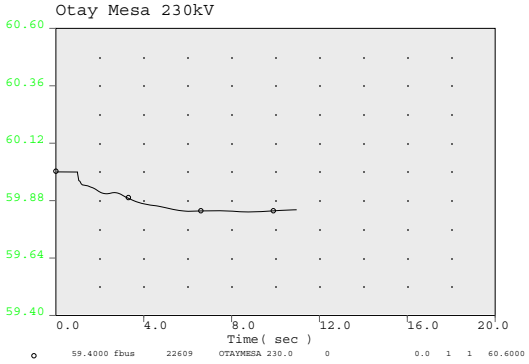
El Centro



Imperial Valley 230kV



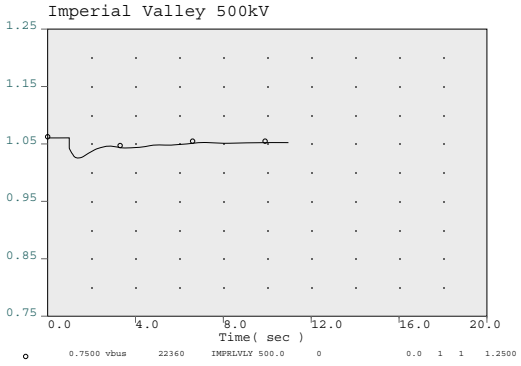
Otay Mesa 230kV



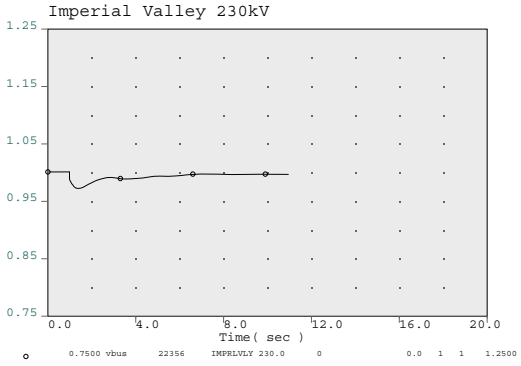
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Imperial Valley Area - VOLTAGE

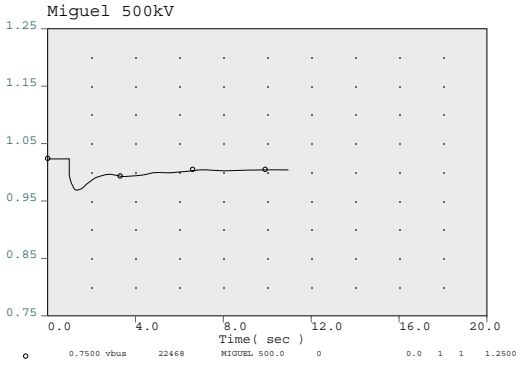
Imperial Valley 500kV



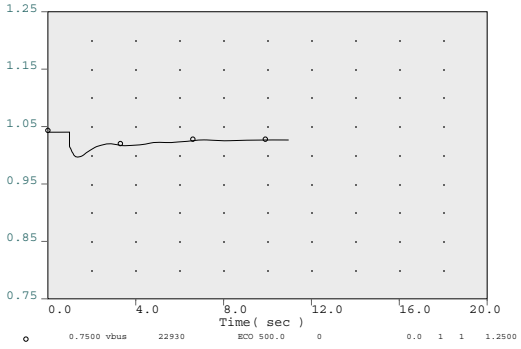
Imperial Valley 230kV



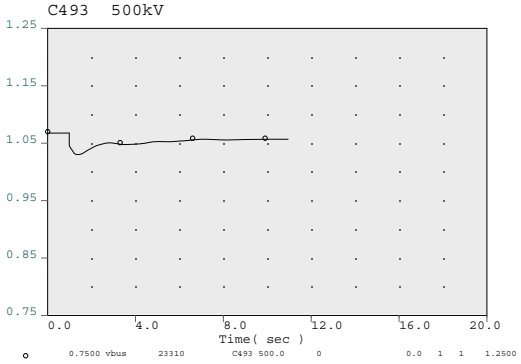
Miguel 500kV



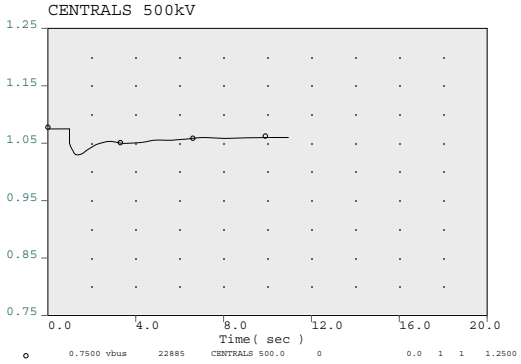
Windfarms 500



C493 500kV

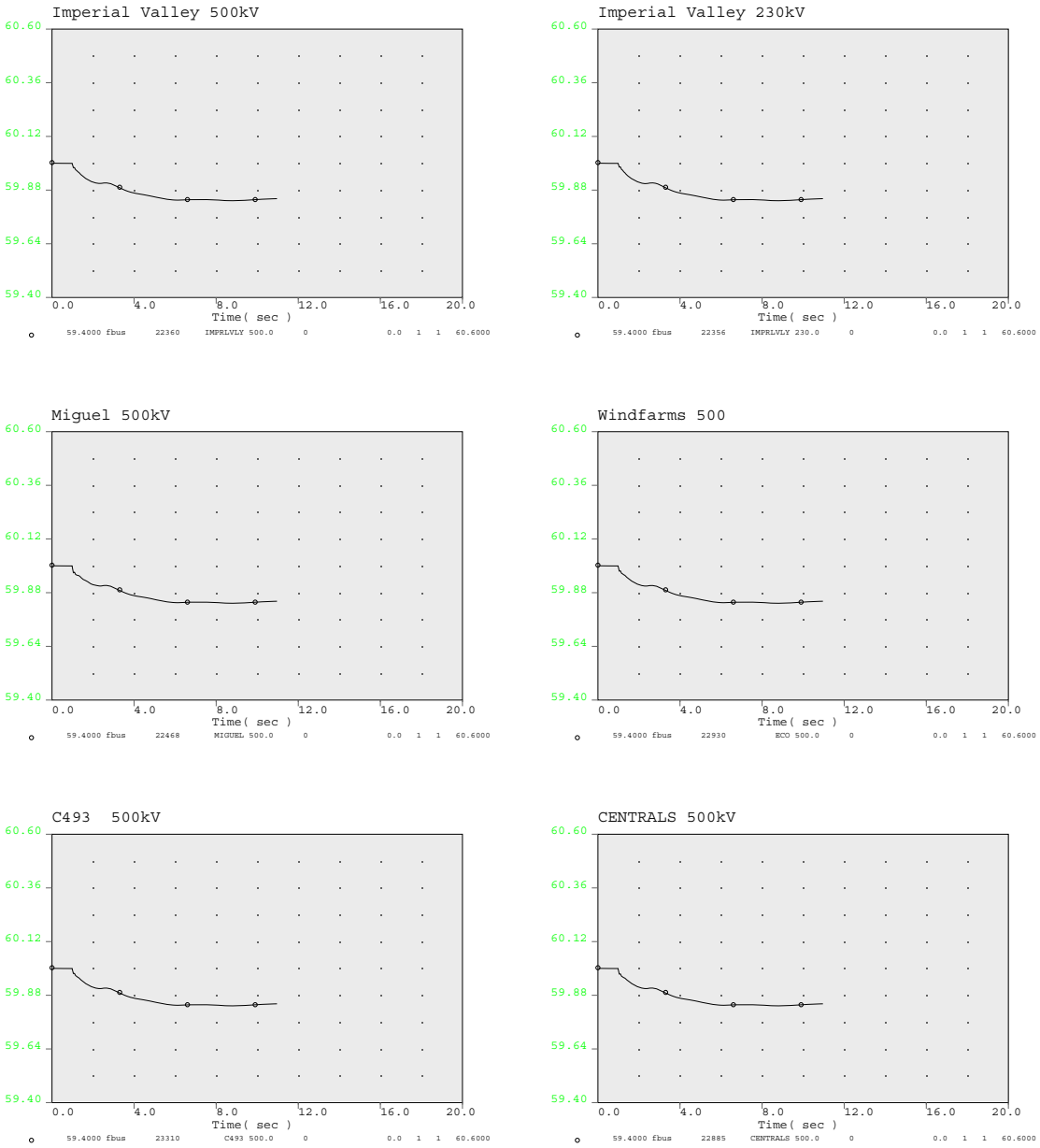


CENTRALS 500kV



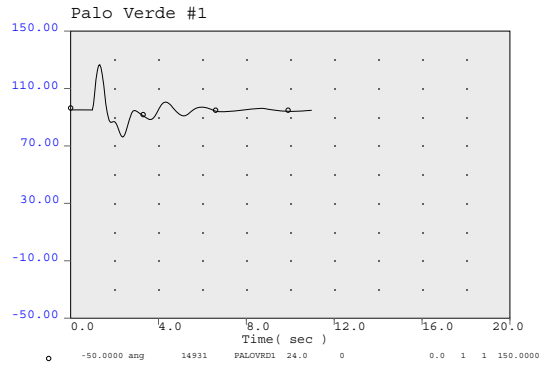
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

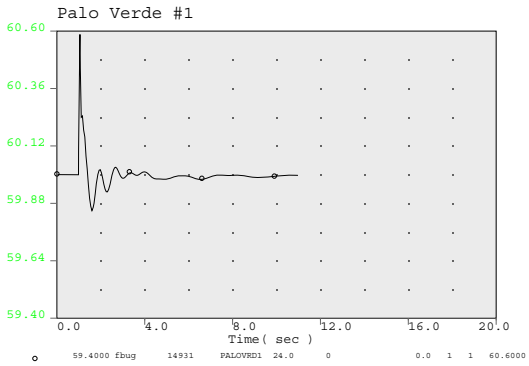
Imperial Valley Area - Frequency

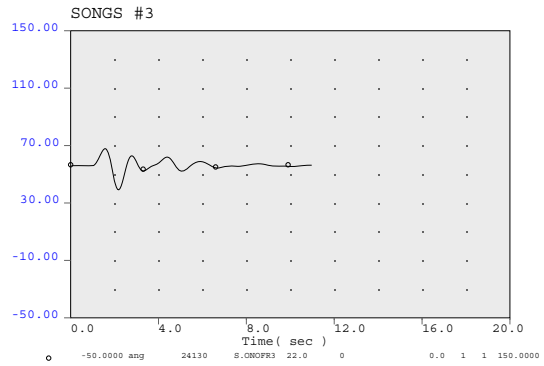


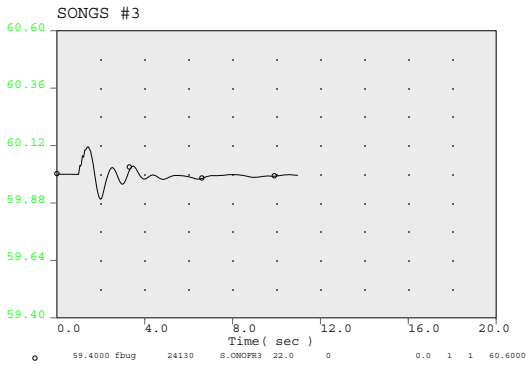
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

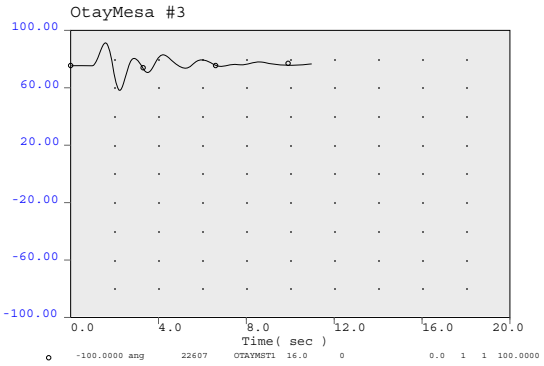
RELATIVE ROTOR ANGLE & FREQUENCY

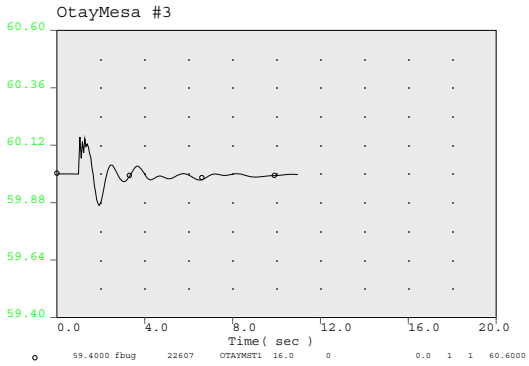










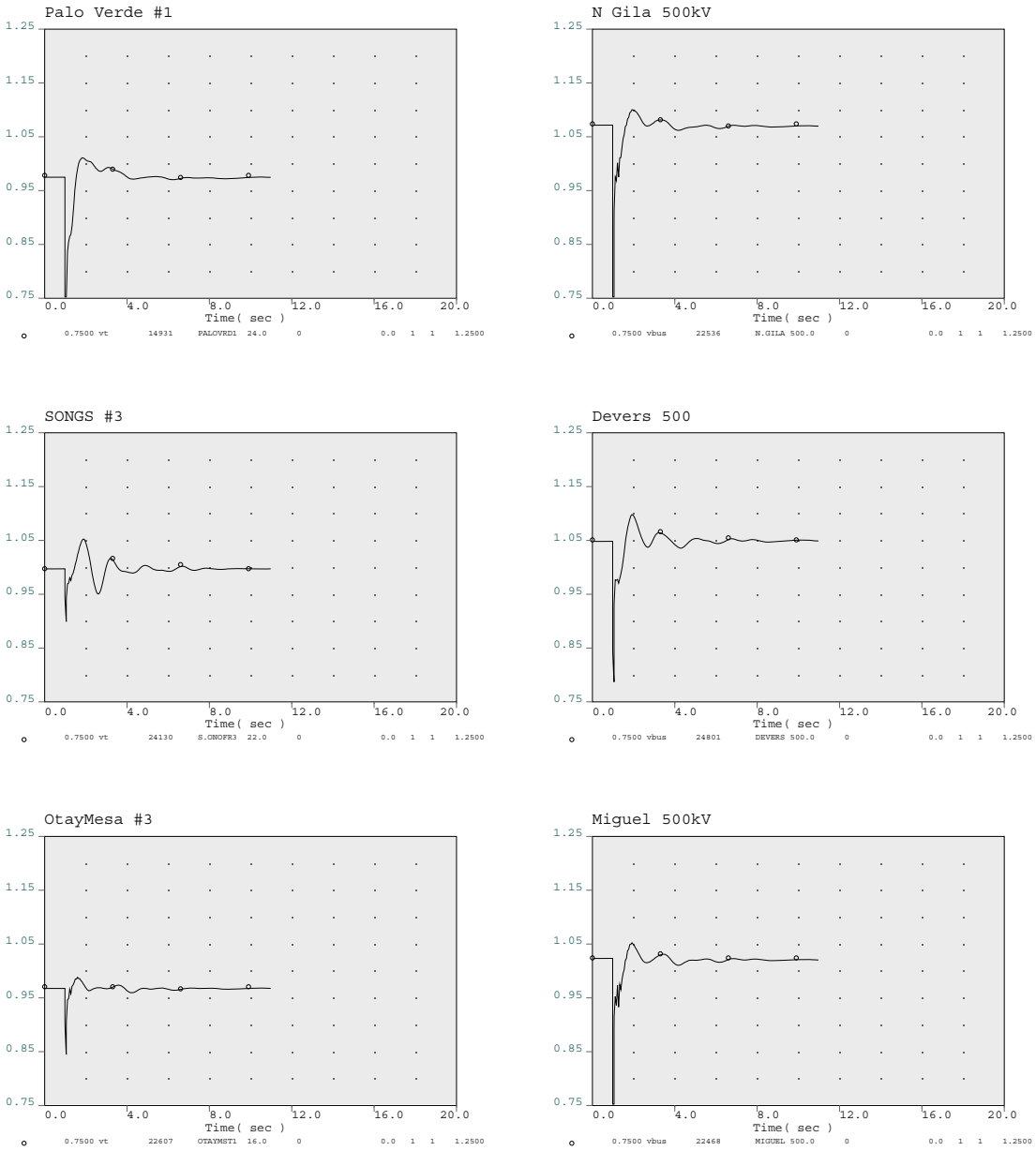


SDG&E Cluster 2 - pre
2014 Light Autumn
T468-Hassyampa 500 kV line

Page 1

SDGE	T468_HAA_slo_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:27:57 2010

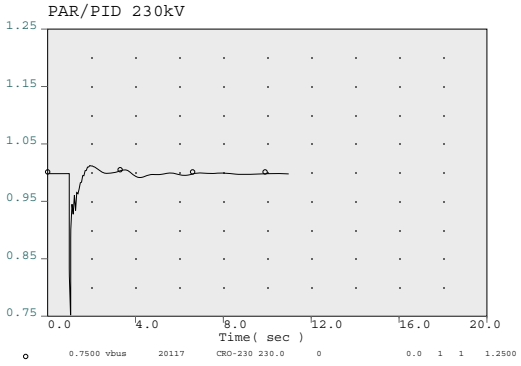
RELATIVE VOLTAGE



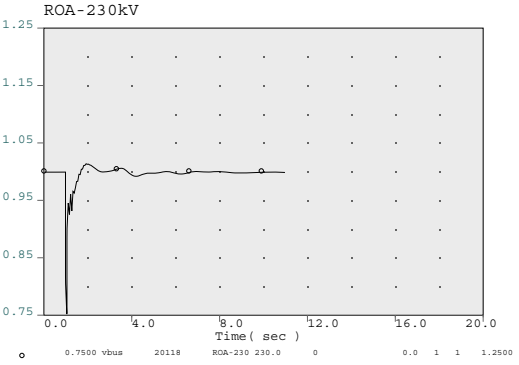
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

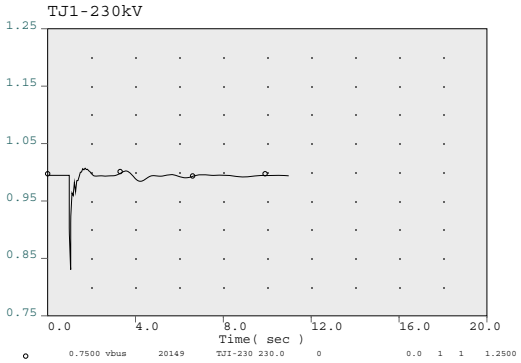
PAR/PID 230kV



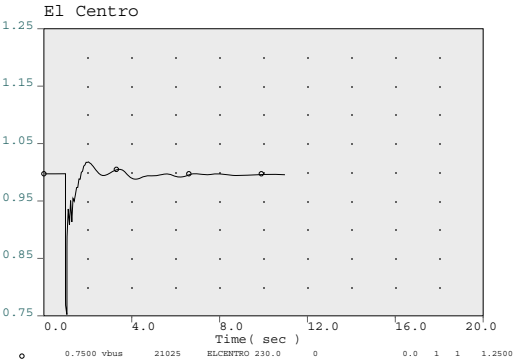
ROA-230kV



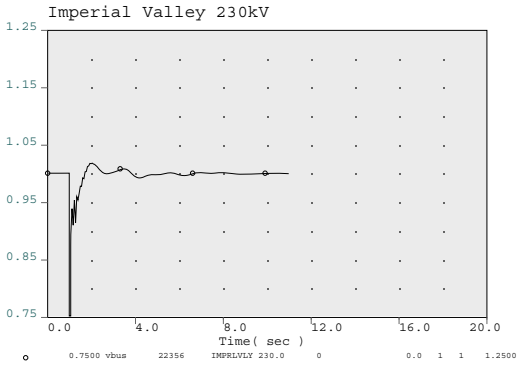
TJ1-230kV



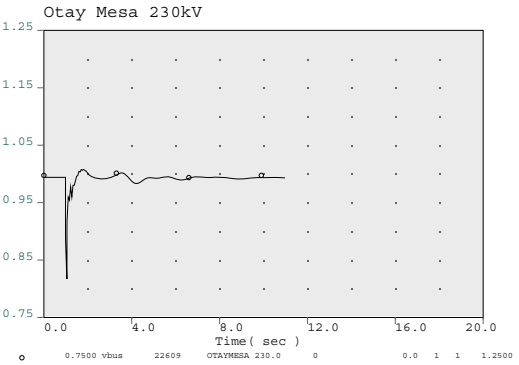
El Centro



Imperial Valley 230kV



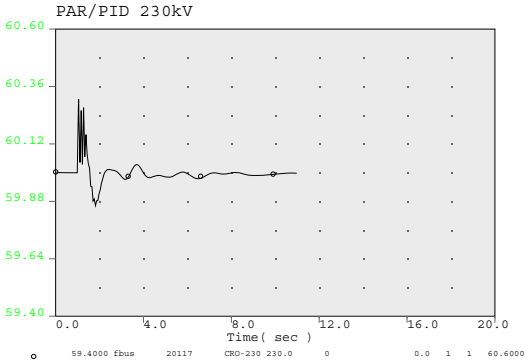
Otay Mesa 230kV



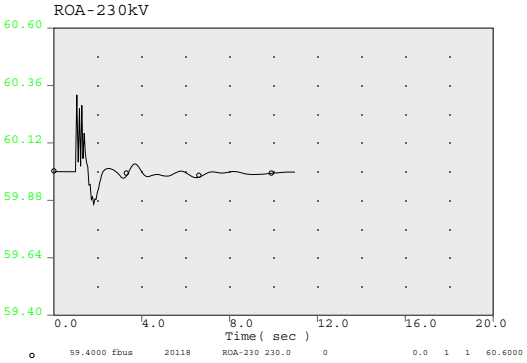
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Frequency Check and Comparison

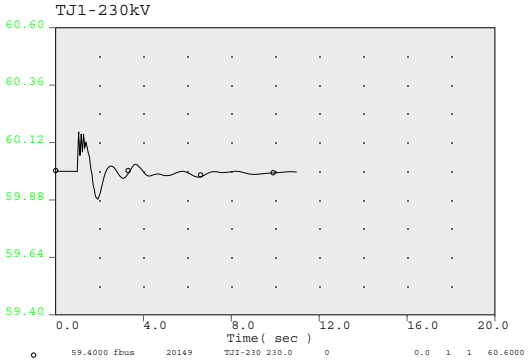
PAR/PID 230kV



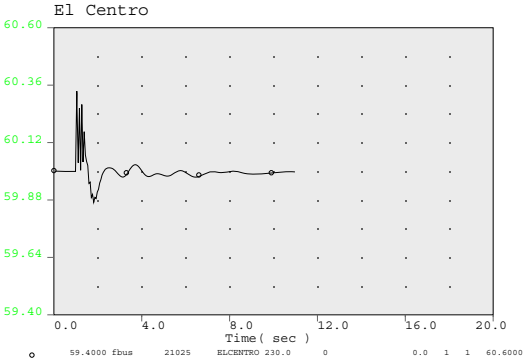
ROA-230kV



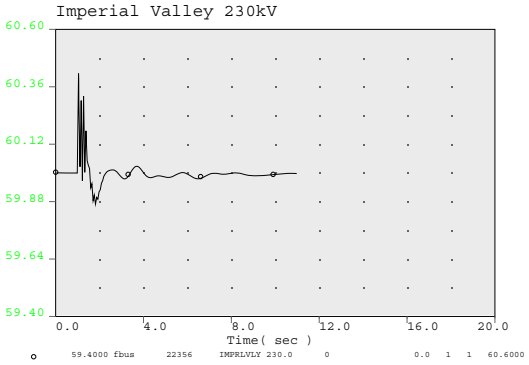
TJ1-230kV



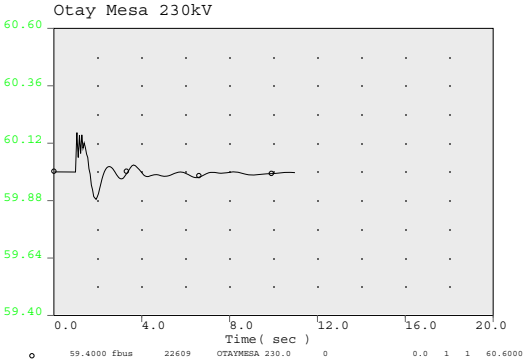
El Centro



Imperial Valley 230kV



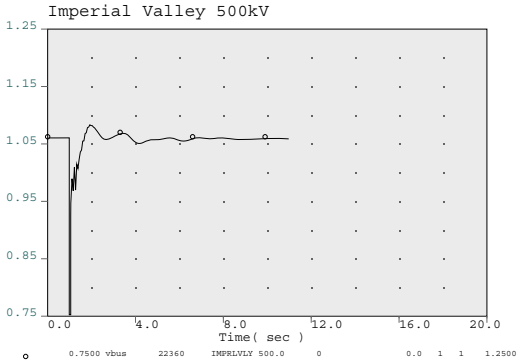
Otay Mesa 230kV



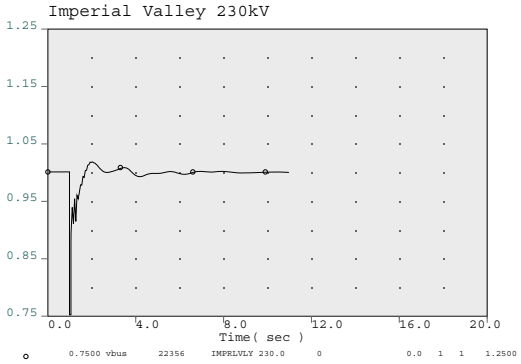
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

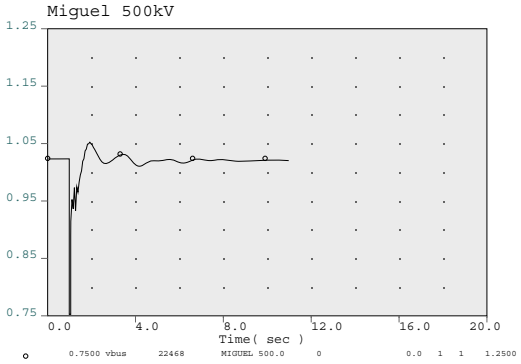
Imperial Valley 500kV



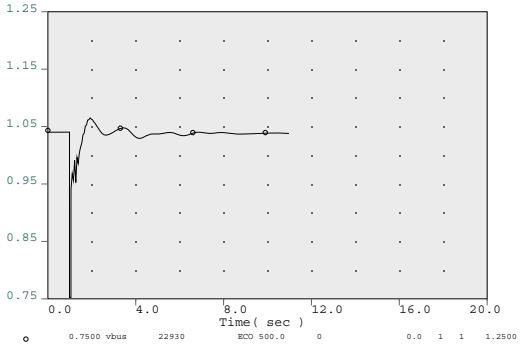
Imperial Valley 230kV



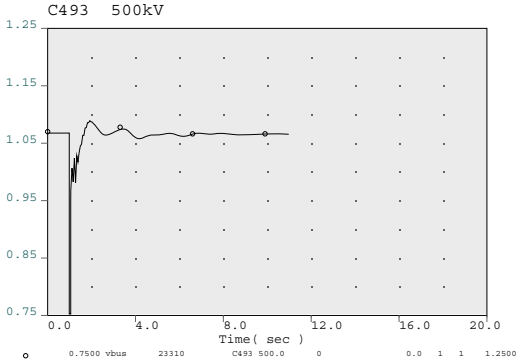
Miguel 500kV



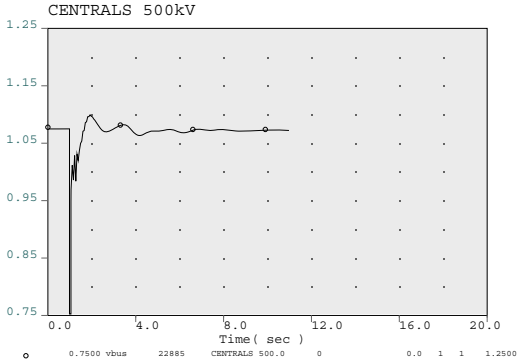
Windfarms 500



C493 500kV

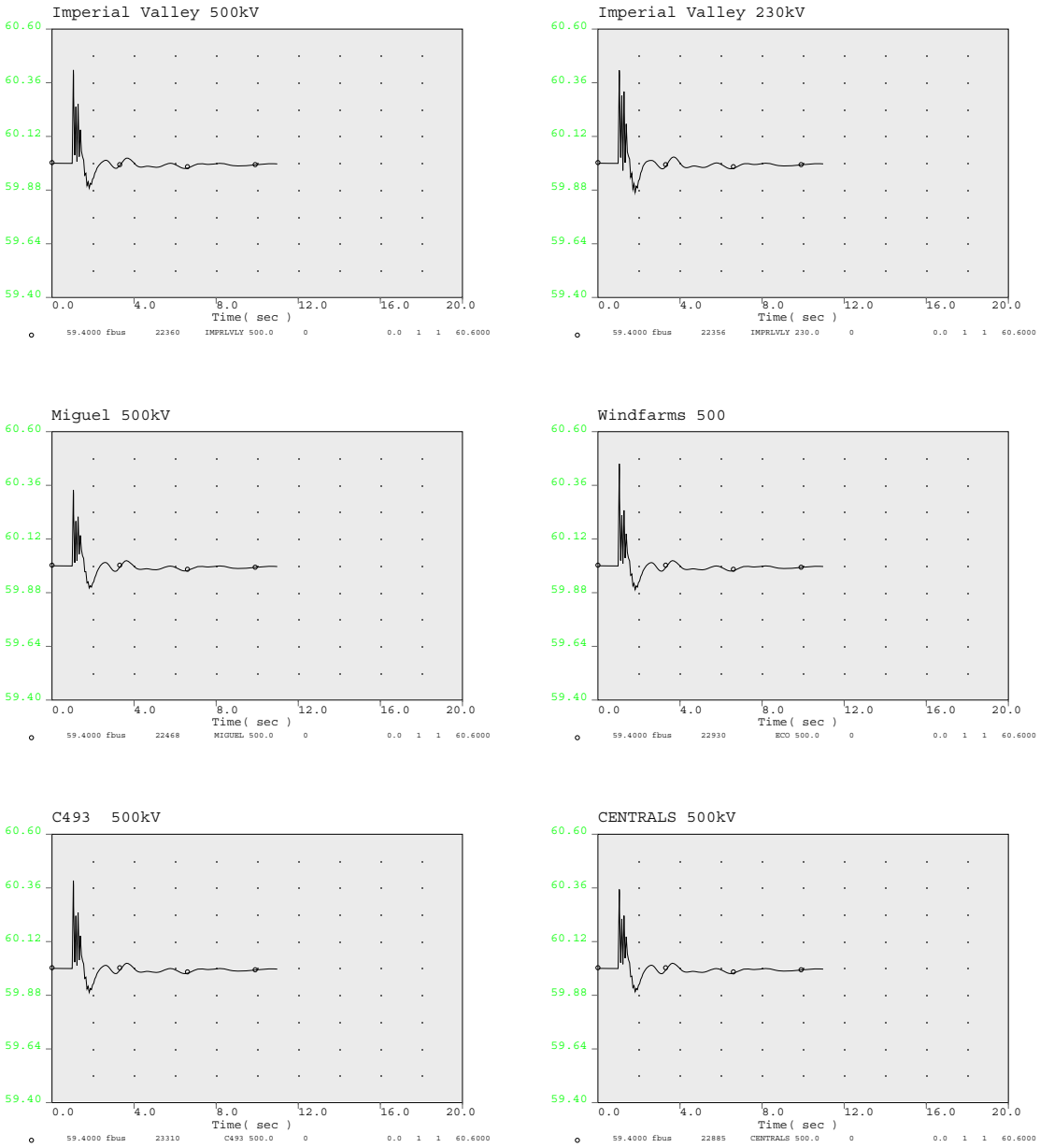


CENTRALS 500kV



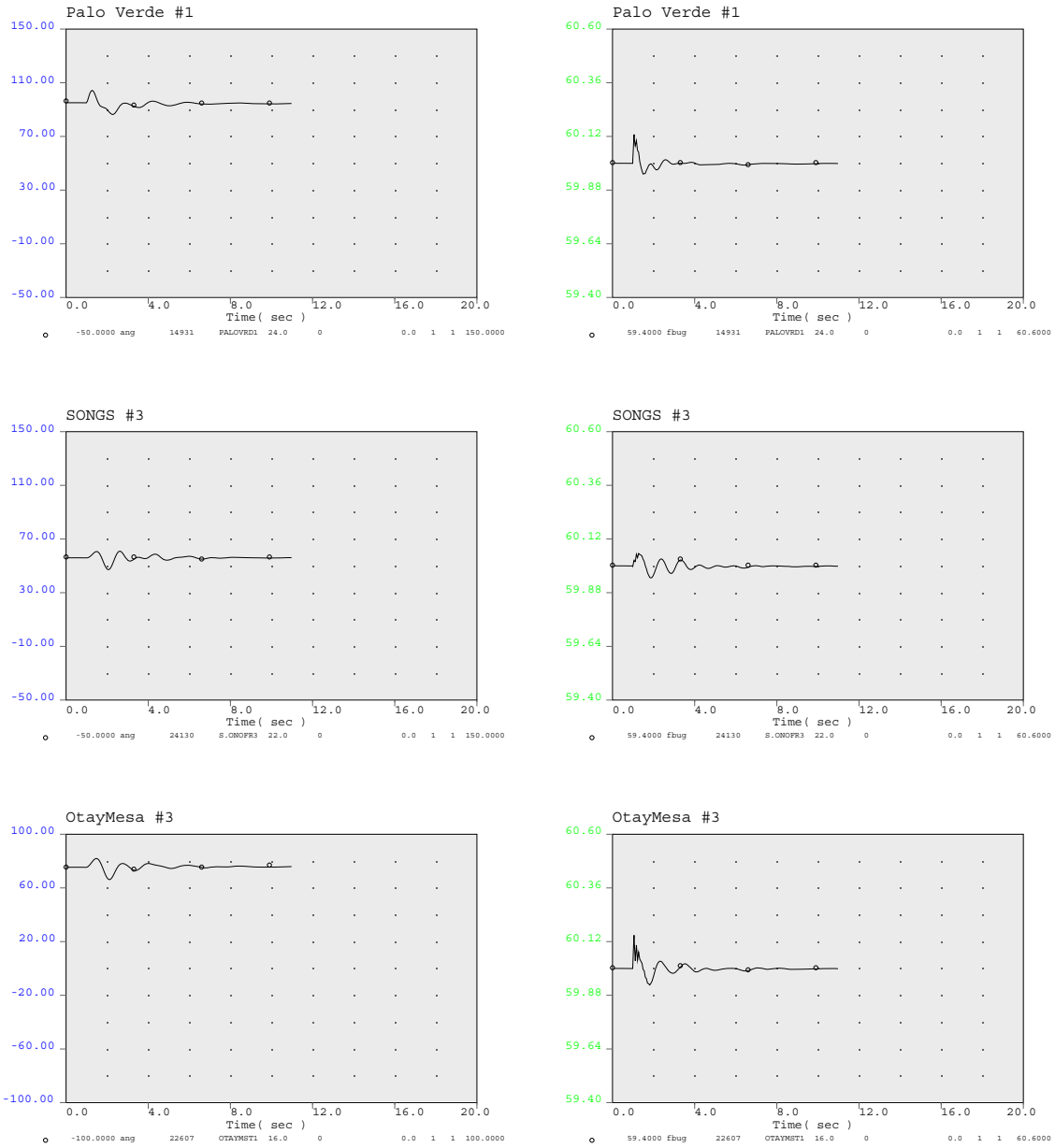
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-Hassyampa 500 kV line

Imperial Valley Area - Frequency



SDG&E Cluster 2 - pre
2014 Light Autumn
T468-Hassyampa 500 kV line

RELATIVE ROTOR ANGLE & FREQUENCY

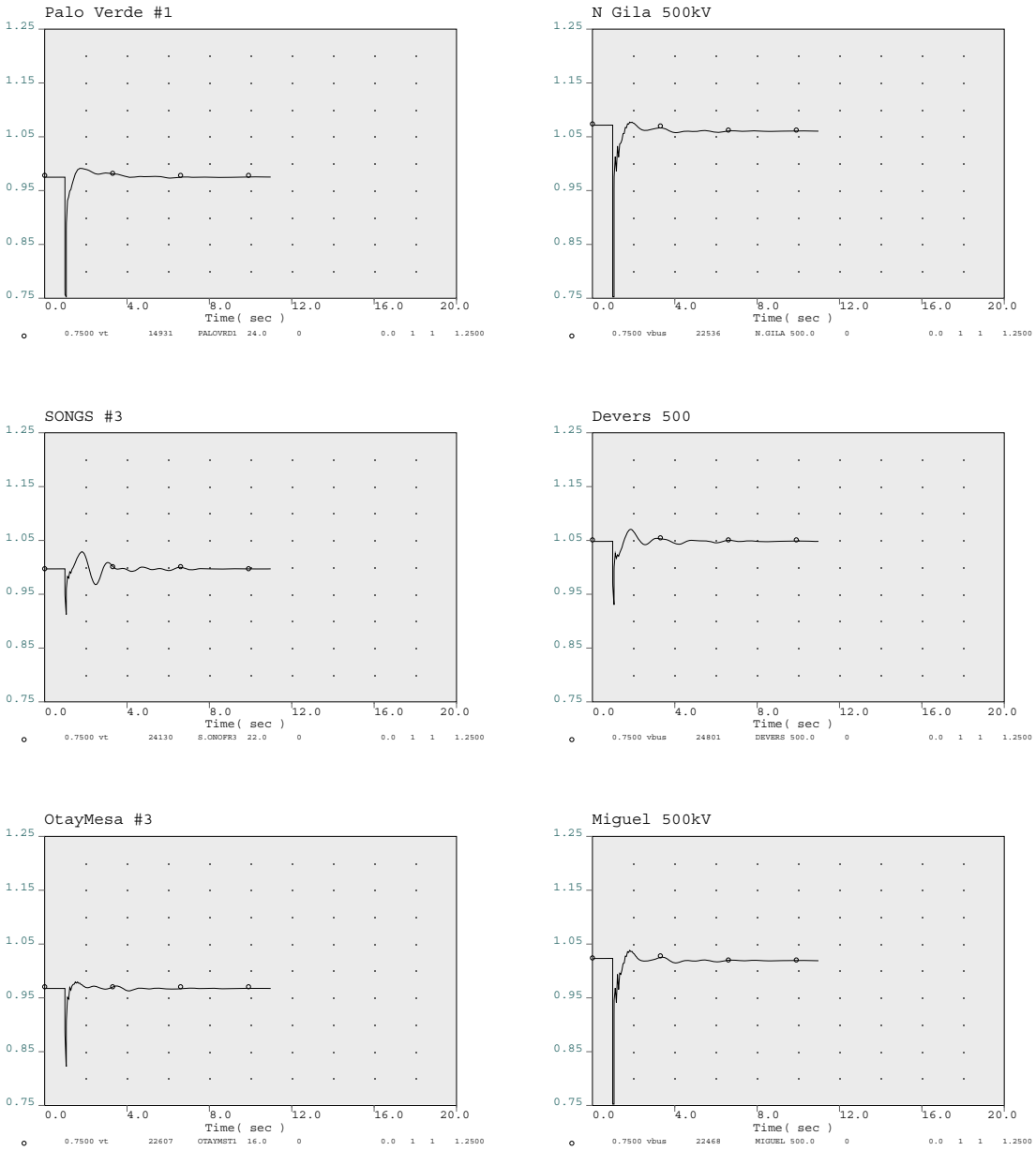


SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Page 1

SDGE	T468_NGila_slo_pre_iva_ll.chf	p_i\ll\pre_iva\ws_pre_iva Tue Nov 02 07:28:13 2010

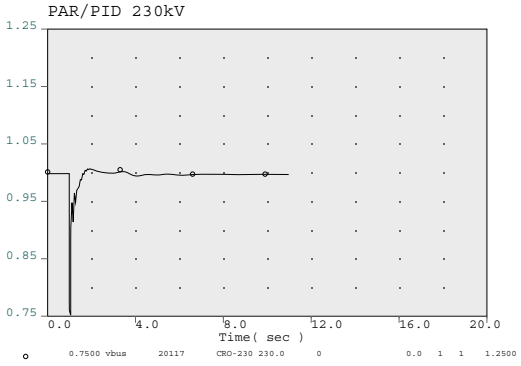
RELATIVE VOLTAGE



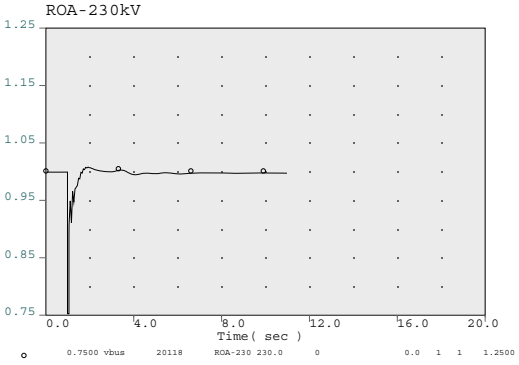
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

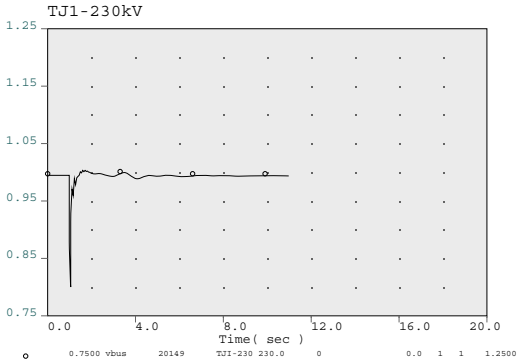
PAR/PID 230kV



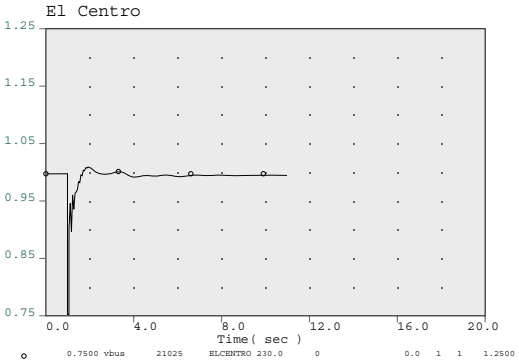
ROA-230kV



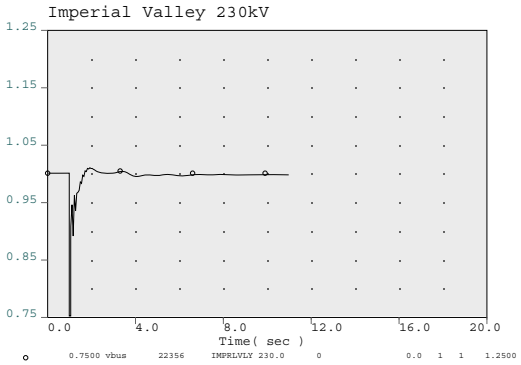
TJ1-230kV



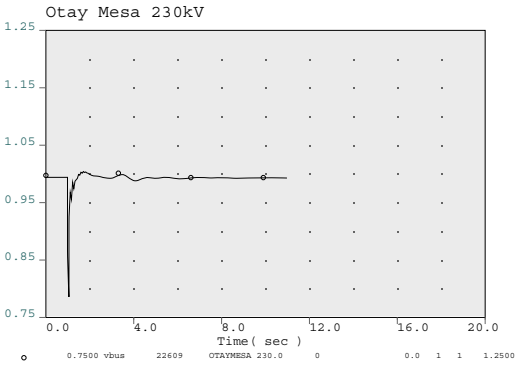
El Centro



Imperial Valley 230kV



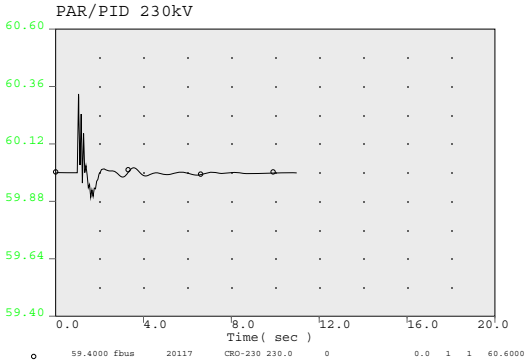
Otay Mesa 230kV



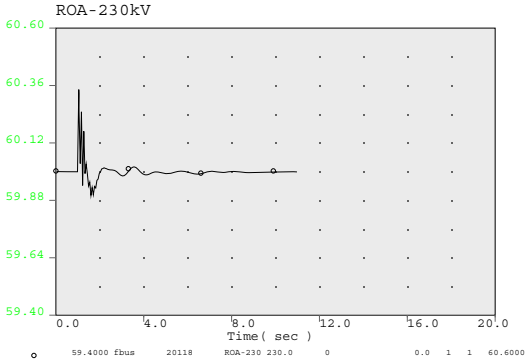
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

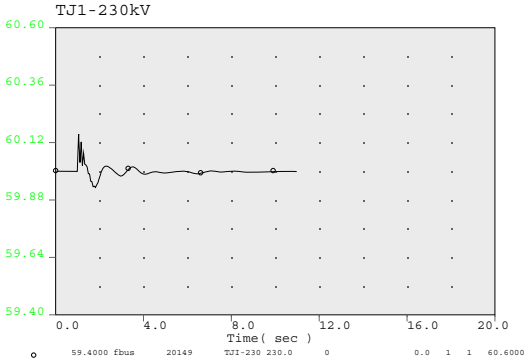
PAR/PID 230kV



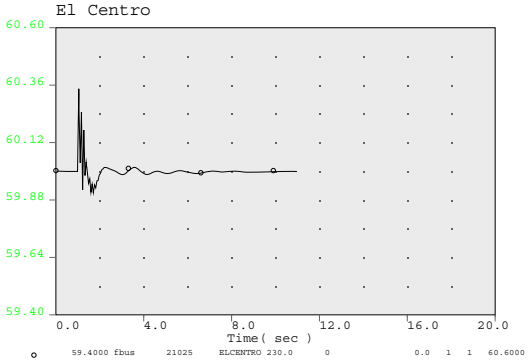
ROA-230kV



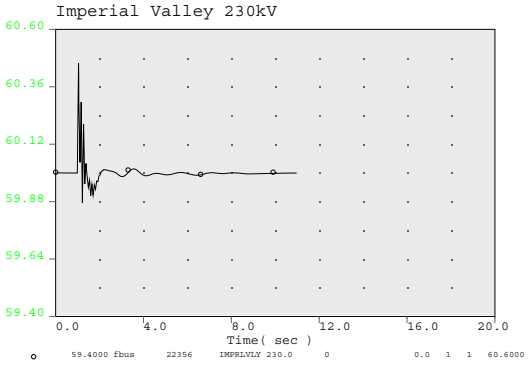
TJ1-230kV



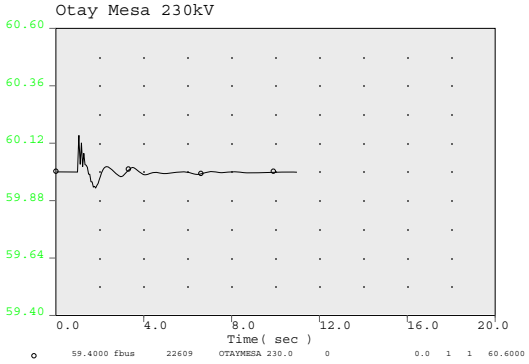
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

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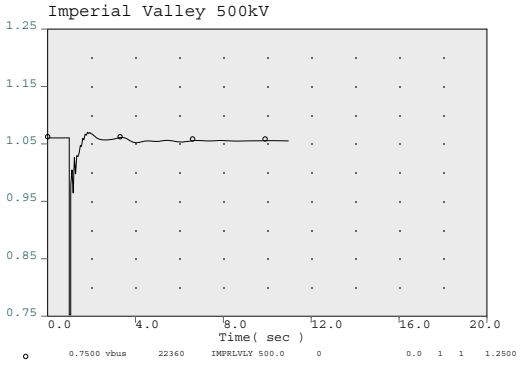
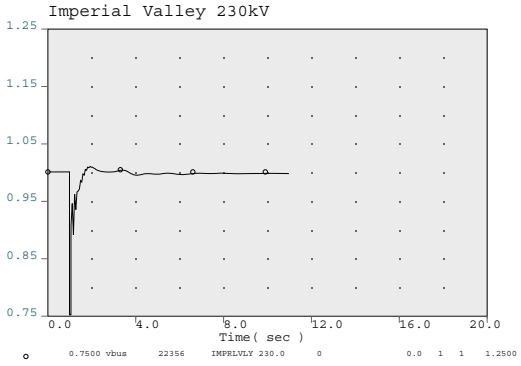
Imperial Valley Area - VOLTAGE

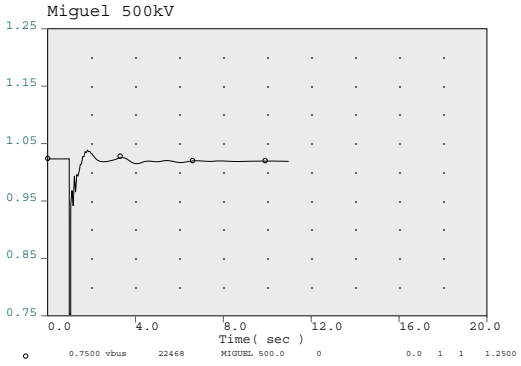
Imperial Valley 500kV



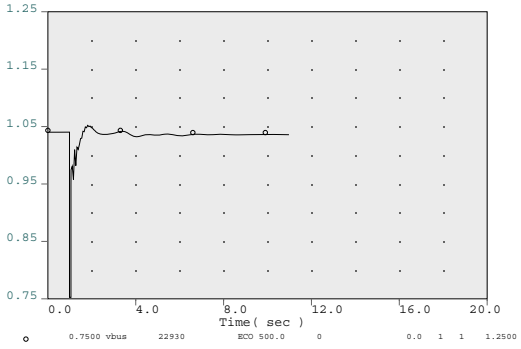
Imperial Valley 230kV



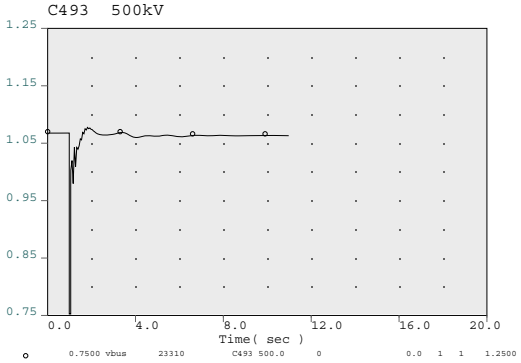
Miguel 500kV



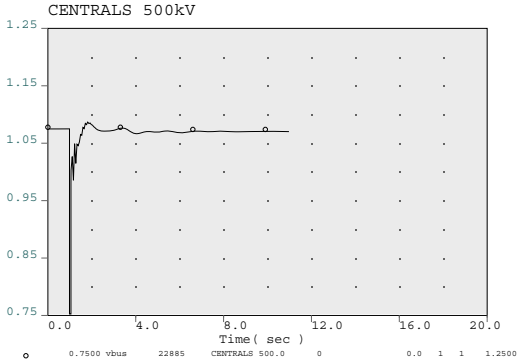
Windfarms 500



C493 500kV



CENTRALS 500kV



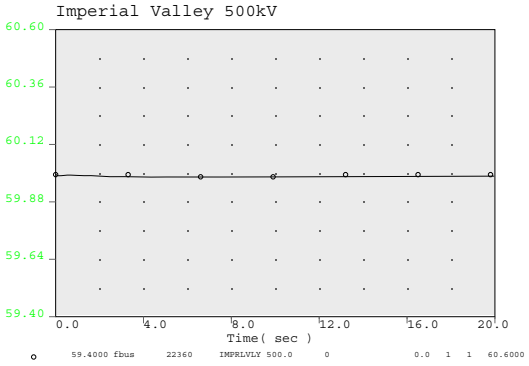
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

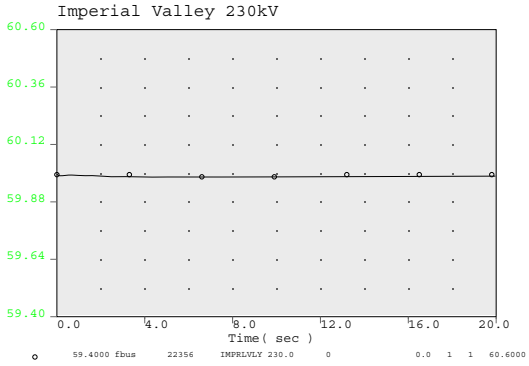
Appendix J-2

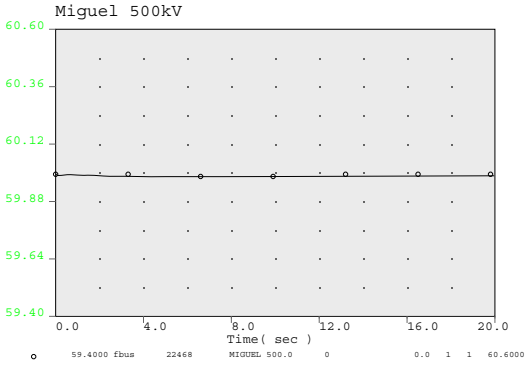
Transient Stability Plots

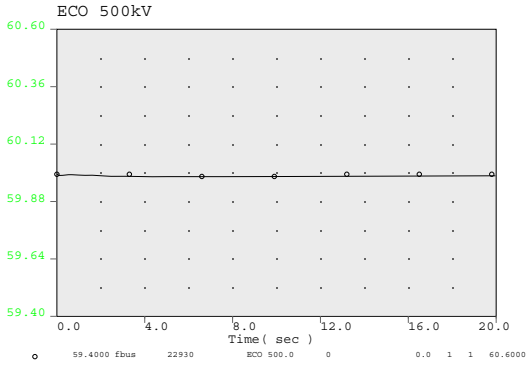
Light Load Post

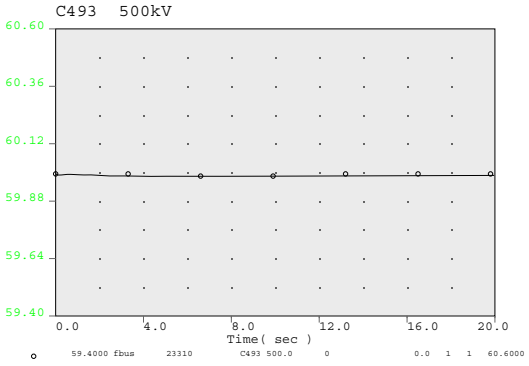
FREQUENCY

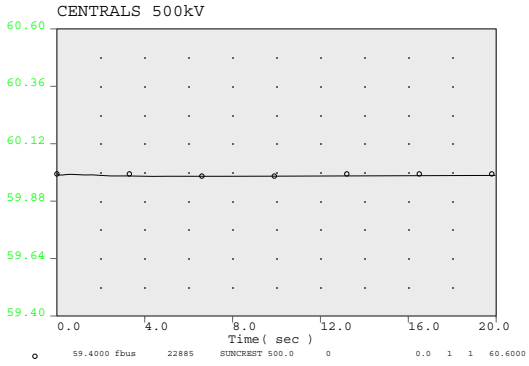






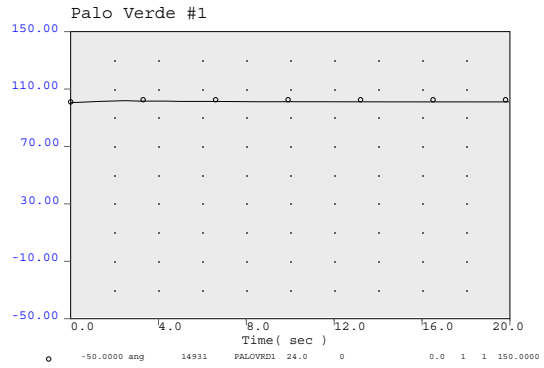


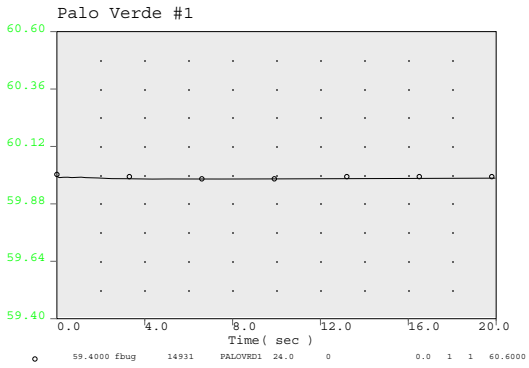


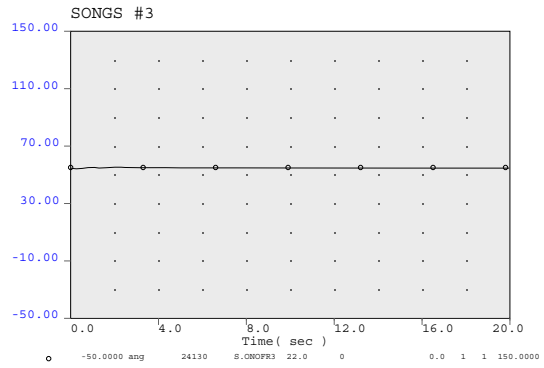


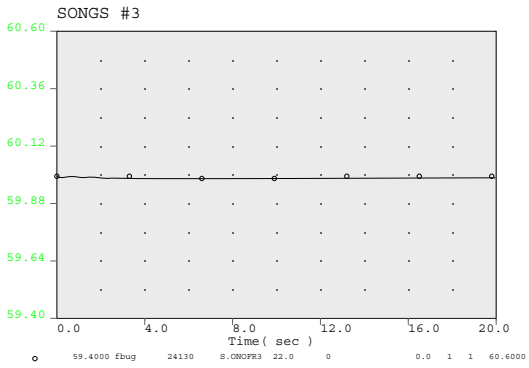
C1 C2 Light Load Post With Upgrades

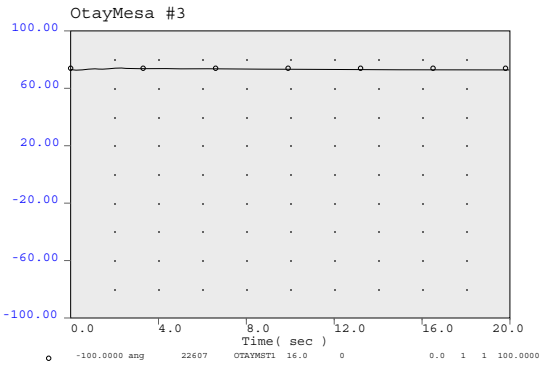
RELATIVE ROTOR ANGLE & FREQUENCY

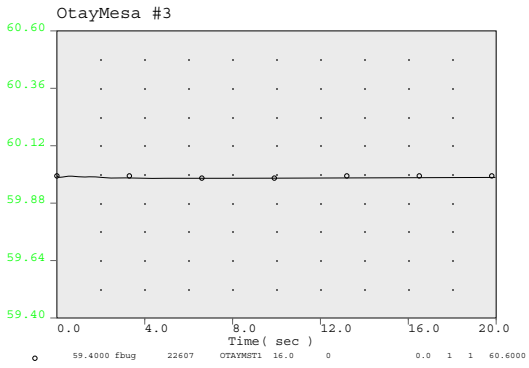












C1 C2 Light Load Post With Upgrades

Page 1

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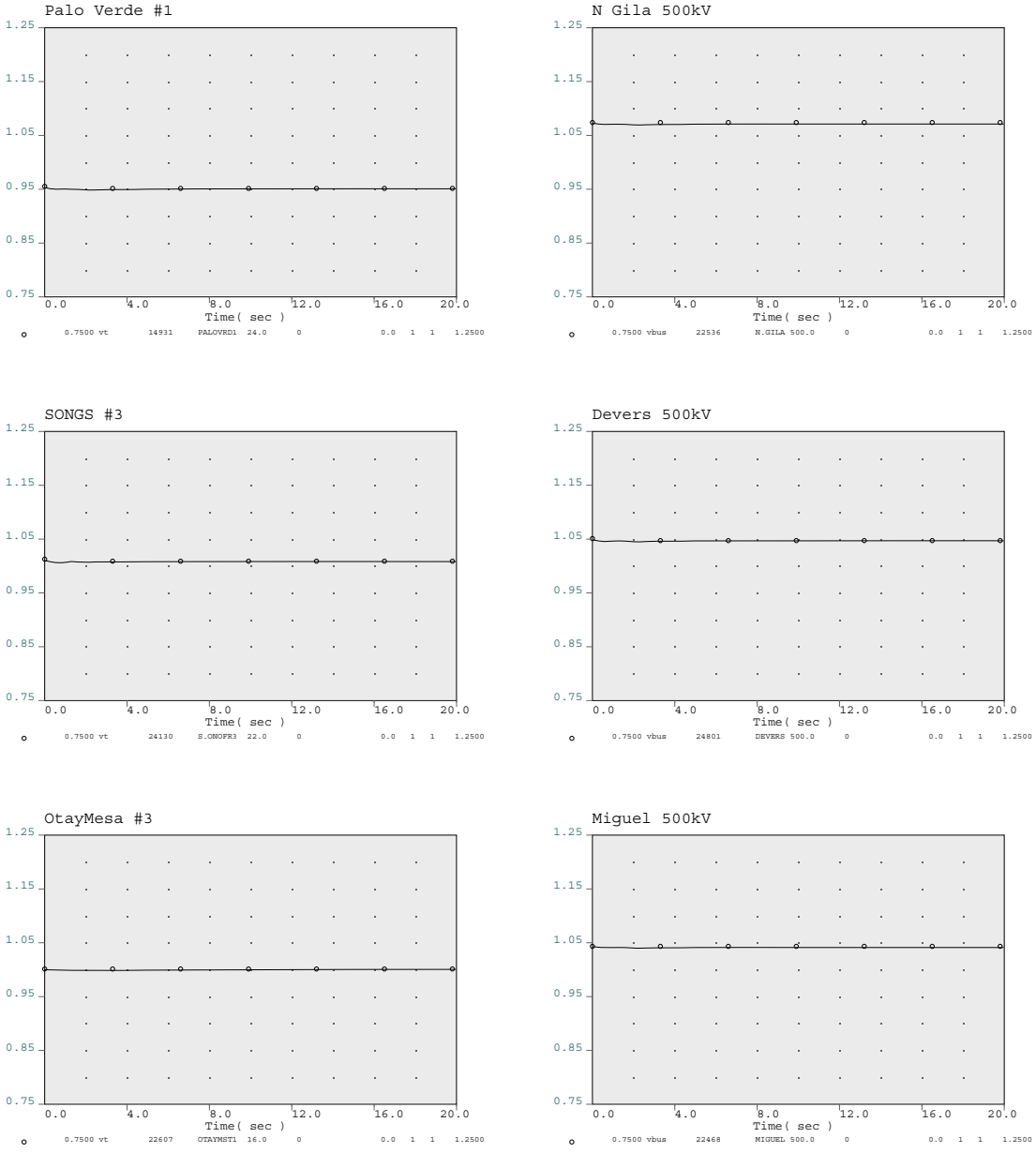
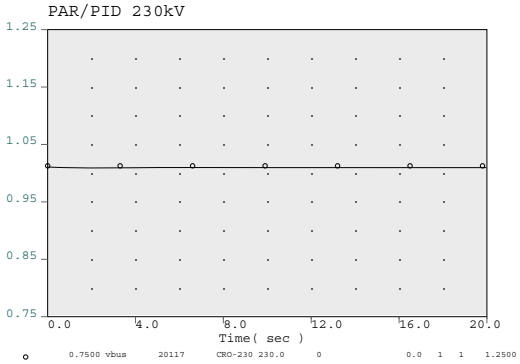
RELATIVE VOLTAGE



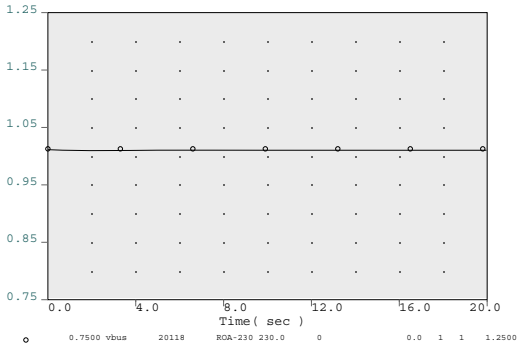
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

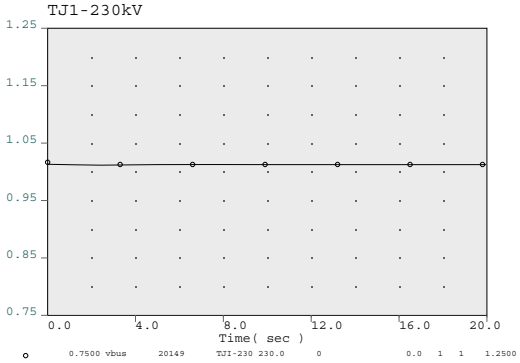
PAR/PID 230kV



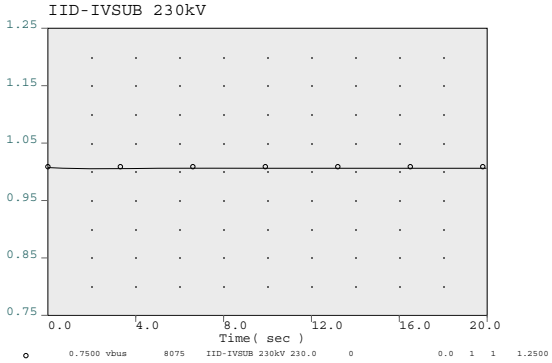
ROA-230kV



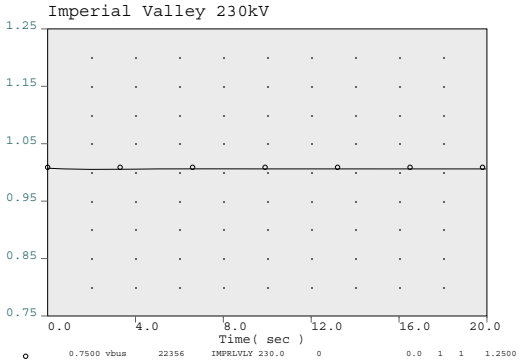
TJ1-230kV



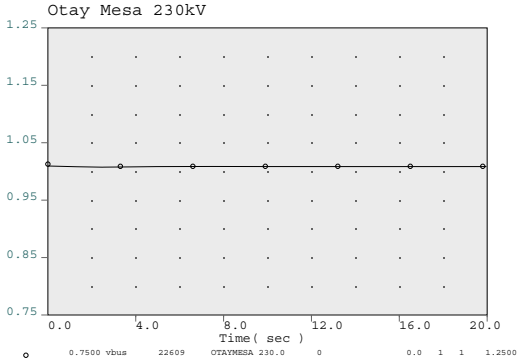
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV

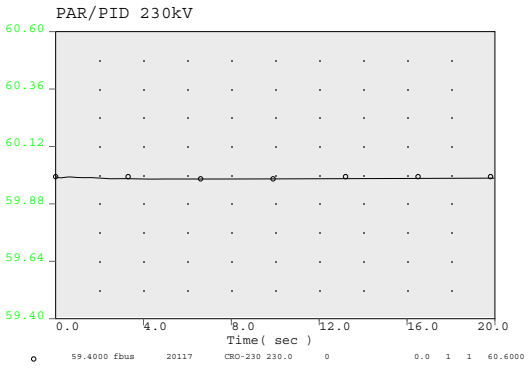


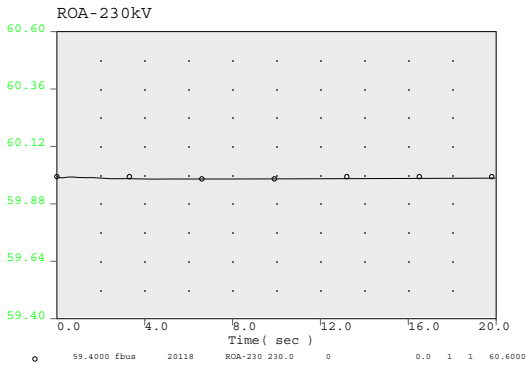
C1 C2 Light Load Post With Upgrades

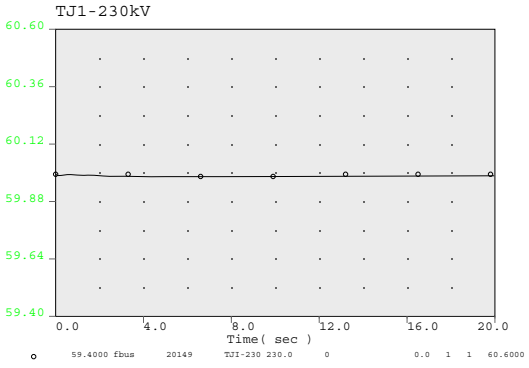
Page 3

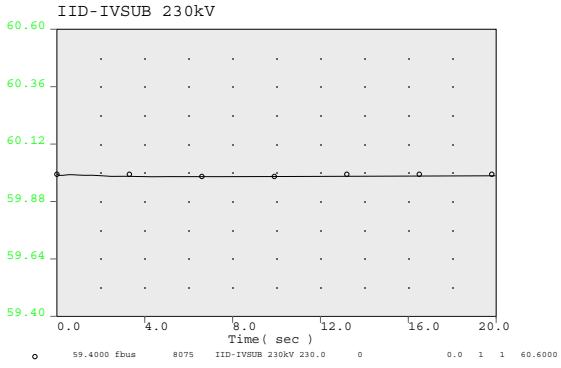
SDGE	tran-c1c2-ll-pstup-r15_FLAT.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:49:39 2011

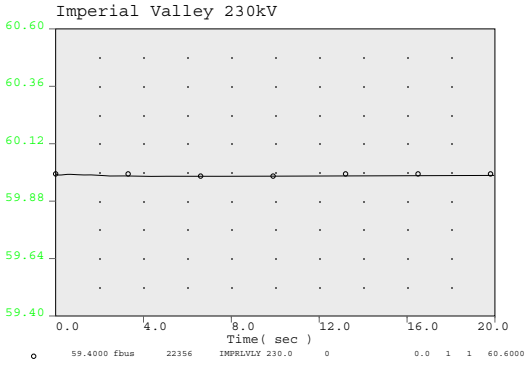
Affected System Frequency Check and Comparison

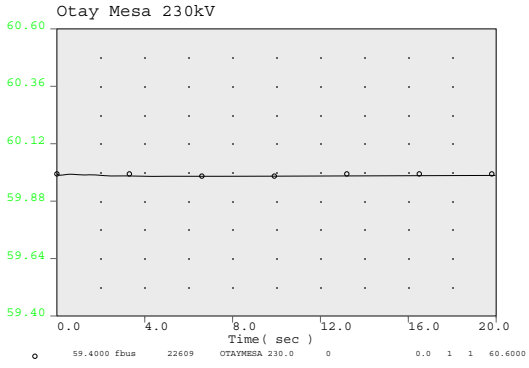












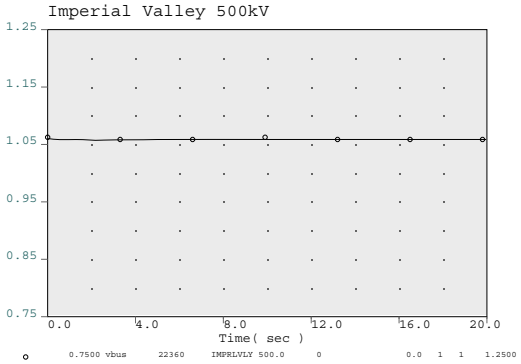
C1 C2 Light Load Post With Upgrades

Page 4

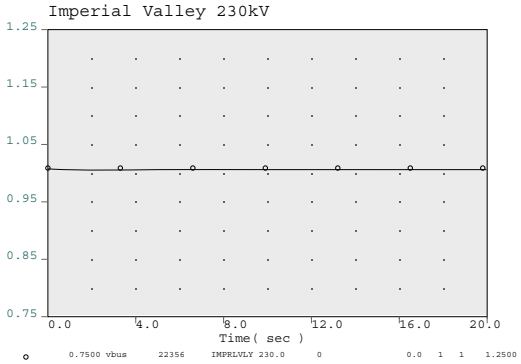
SDGE	tran-c1c2-ll-pstup-r15_FLAT.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:49:40 2011

VOLTAGE

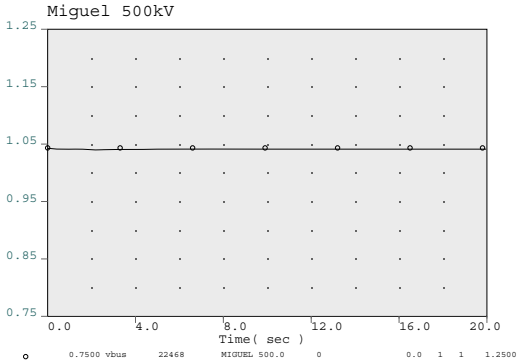
Imperial Valley 500kV



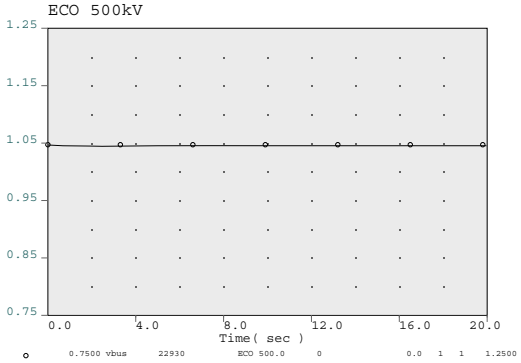
Imperial Valley 230kV



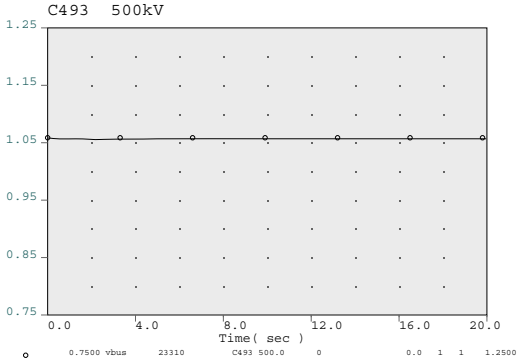
Miguel 500kV



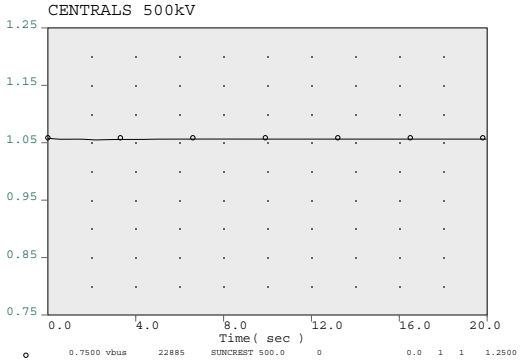
ECO 500kV



C493 500kV

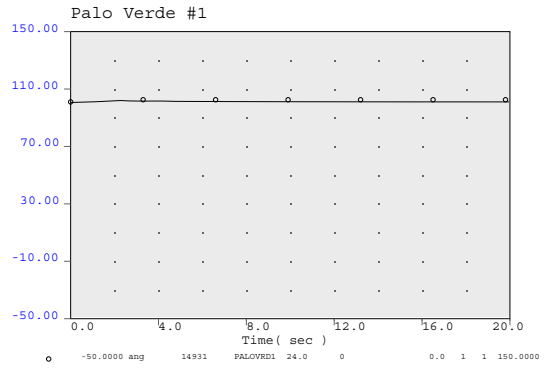


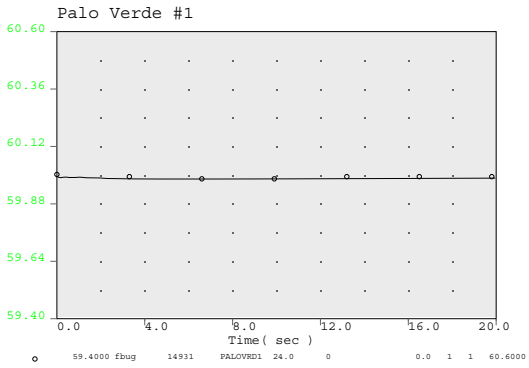
CENTRALS 500kV

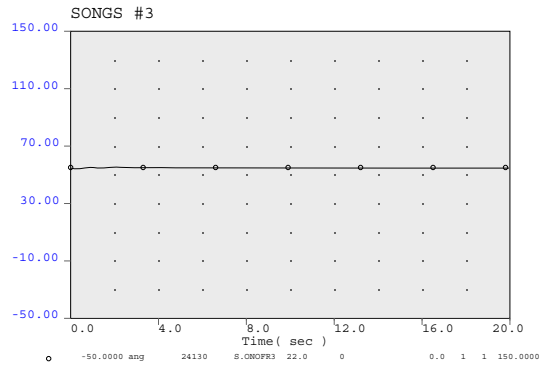


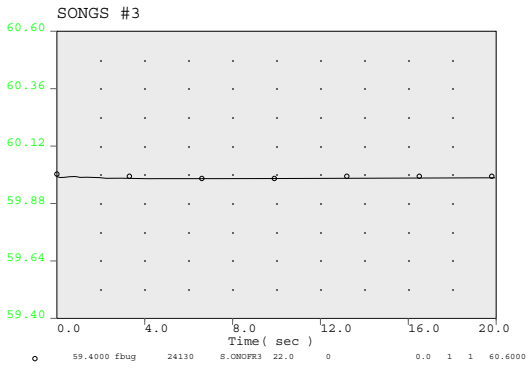
C1 C2 Light Load Post With Upgrades

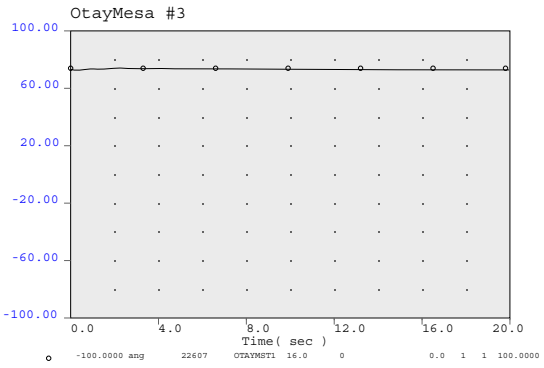
RELATIVE ROTOR ANGLE & FREQUENCY

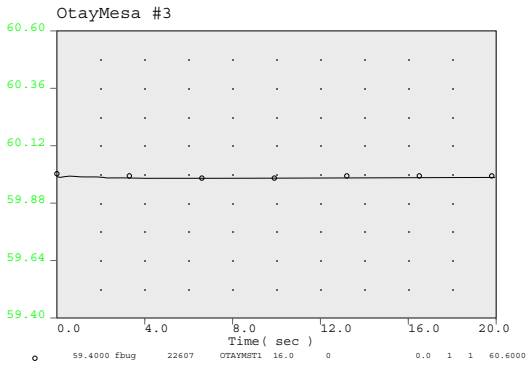










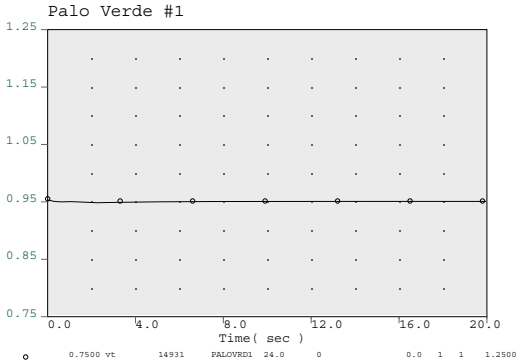


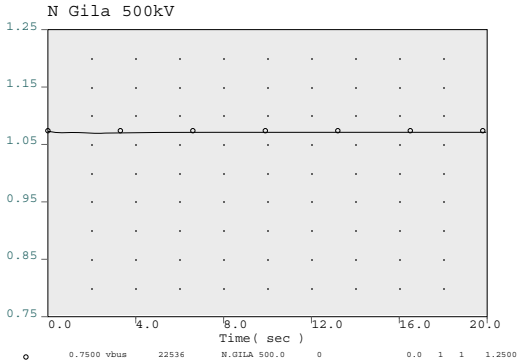
C1 C2 Light Load Post With Upgrades

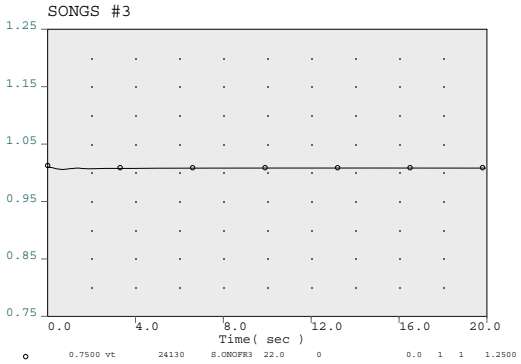
Page 1

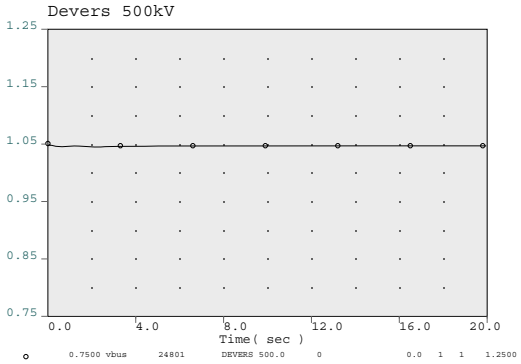
SDGE	tran-c1c2-ll-pstup-r15_C493-CE-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:46:02 2011

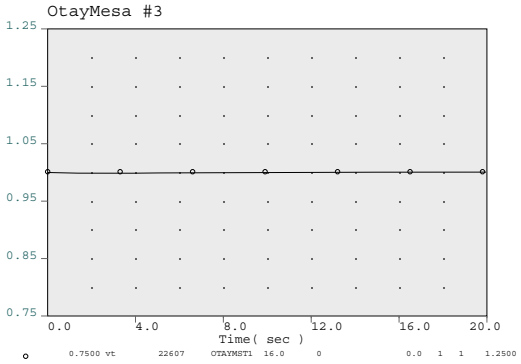
RELATIVE VOLTAGE

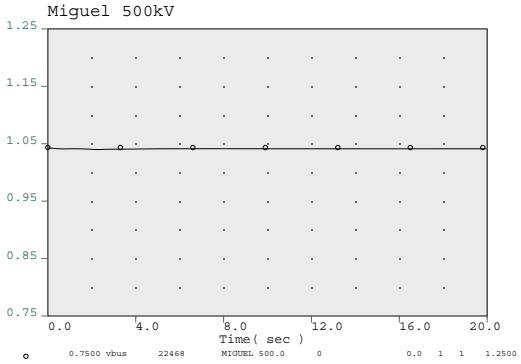












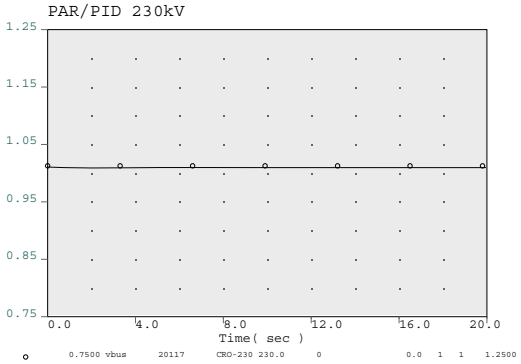
C1 C2 Light Load Post With Upgrades

Page 2

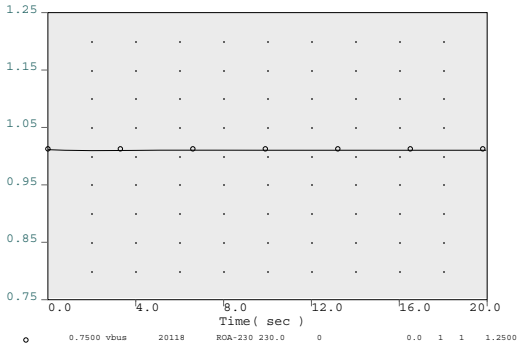
SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_C493-CE-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:46:02 2011

Affected System Voltage Check and Comparison

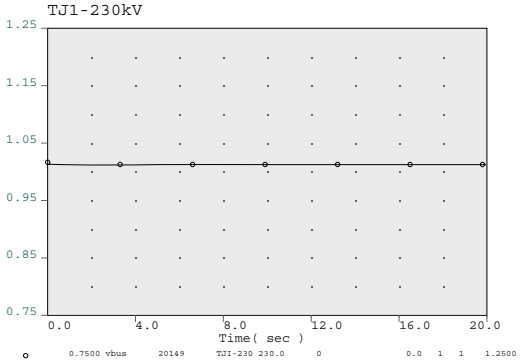
PAR/PID 230kV



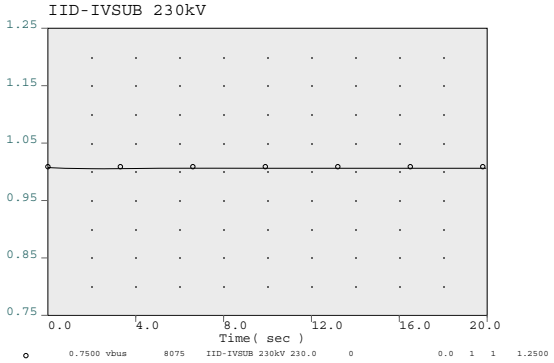
ROA-230kV



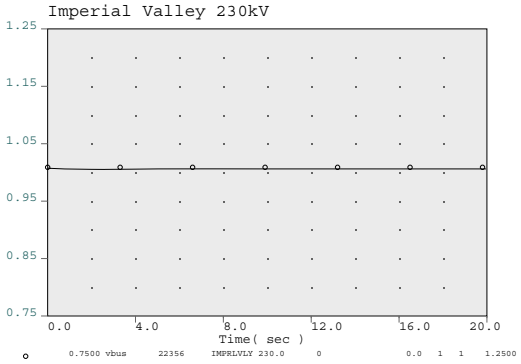
TJ1-230kV



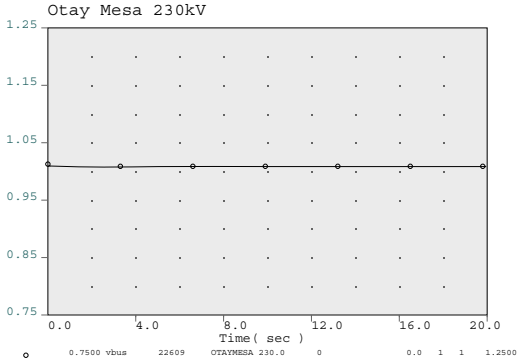
IID-IVSUB 230kV



Imperial Valley 230kV

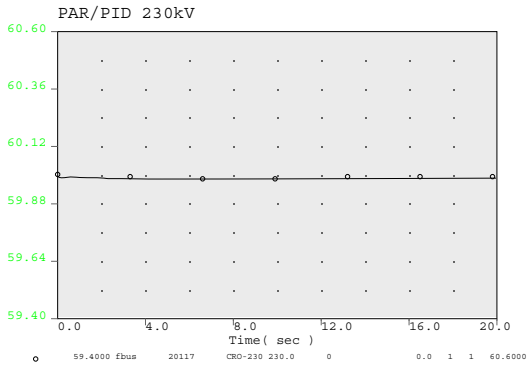


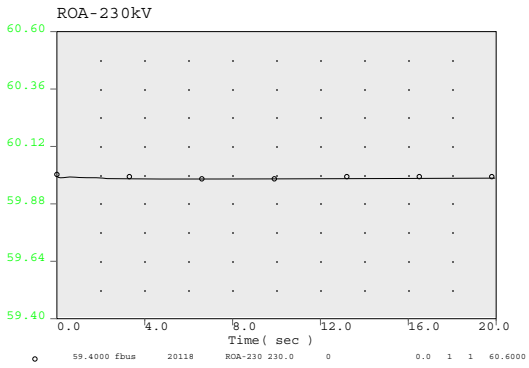
Otay Mesa 230kV

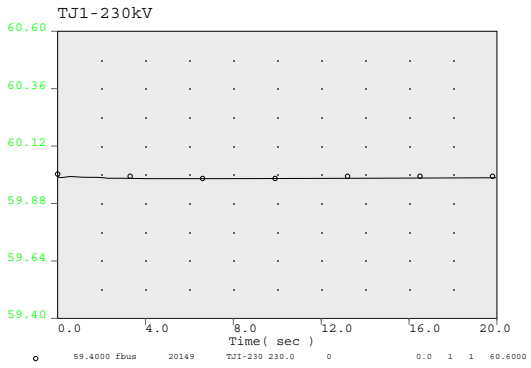


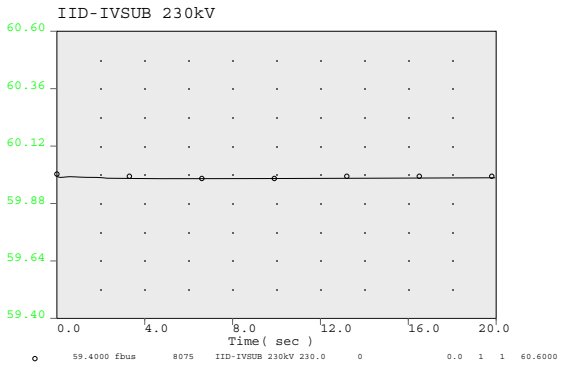
C1 C2 Light Load Post With Upgrades

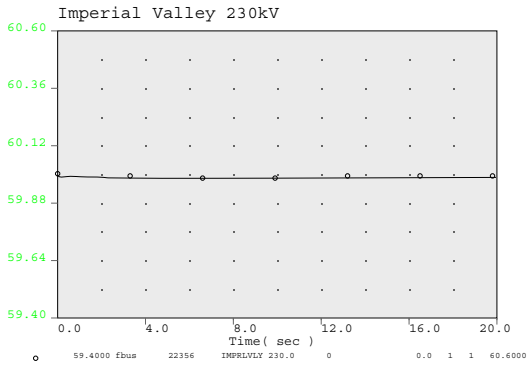
Affected System Frequency Check and Comparison

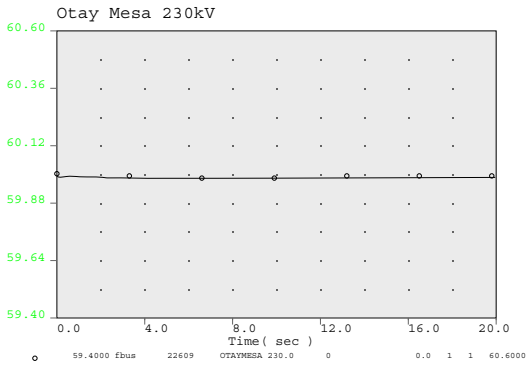












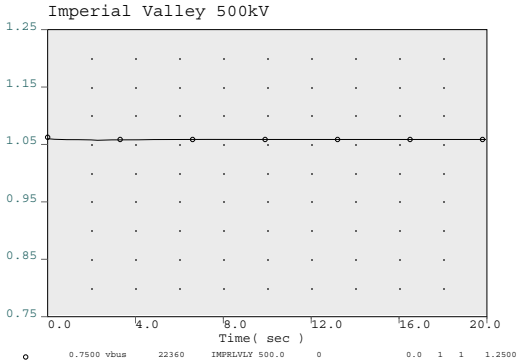
C1 C2 Light Load Post With Upgrades

Page 4

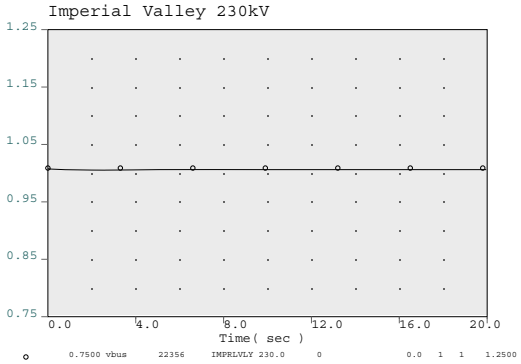
SDGE	tran-c1c2-ll-pstup-r15_C493-CE-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:46:04 2011

VOLTAGE

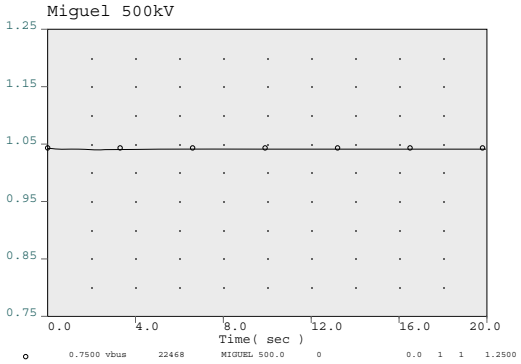
Imperial Valley 500kV



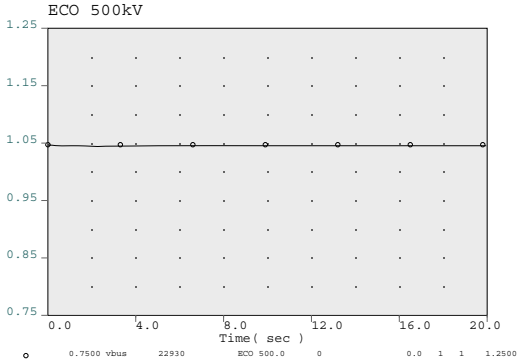
Imperial Valley 230kV



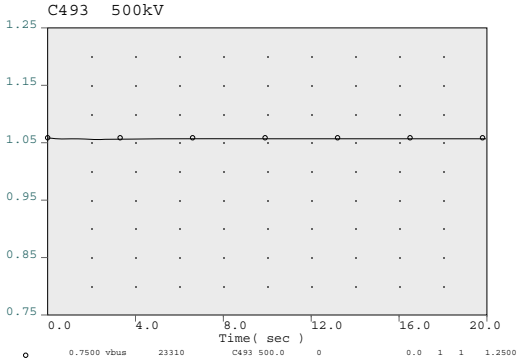
Miguel 500kV



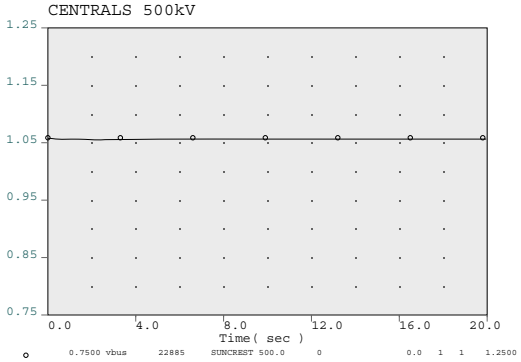
ECO 500kV



C493 500kV

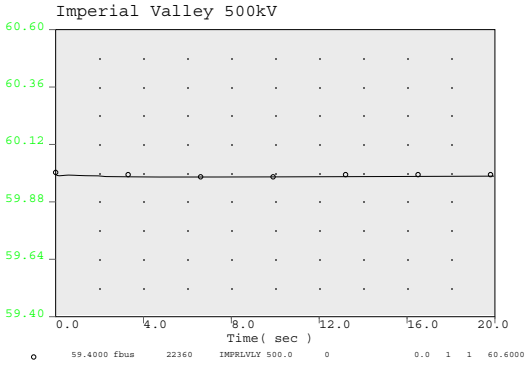


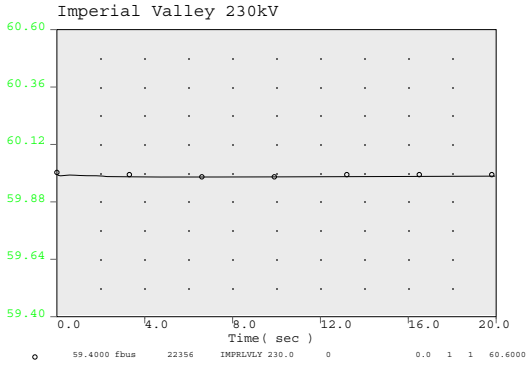
CENTRALS 500kV

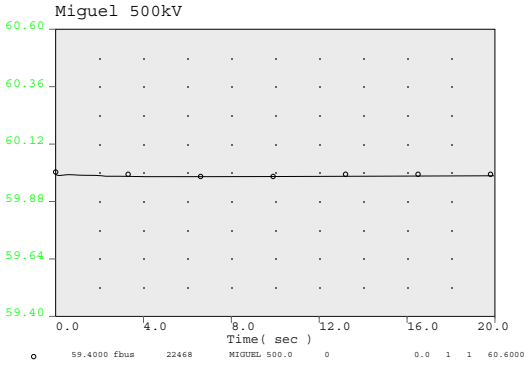


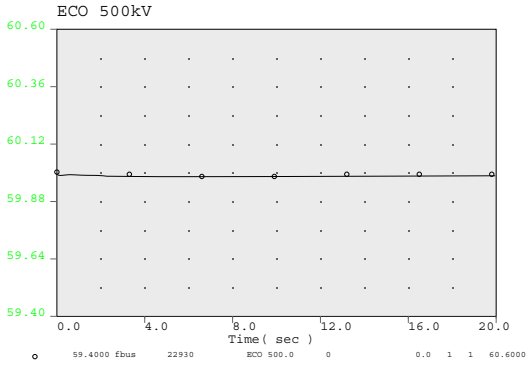
C1 C2 Light Load Post With Upgrades

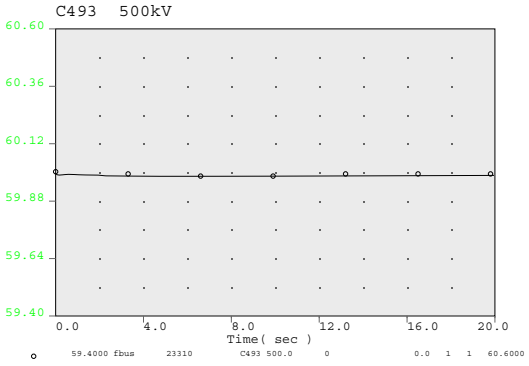
FREQUENCY

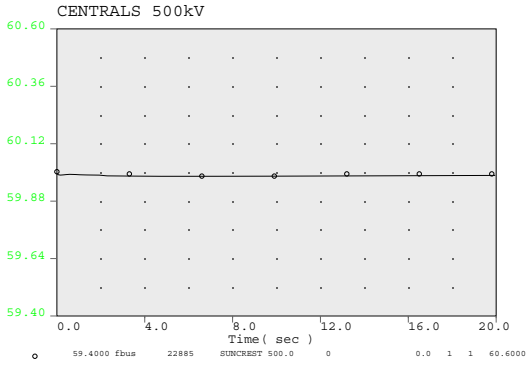






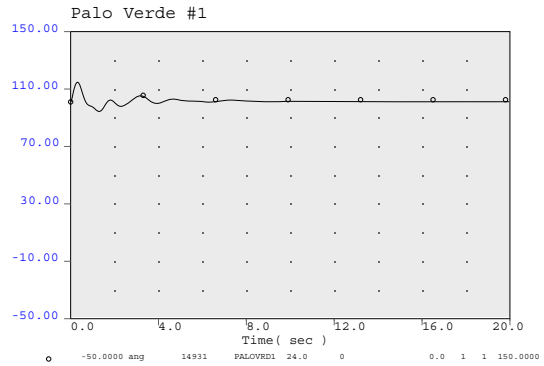


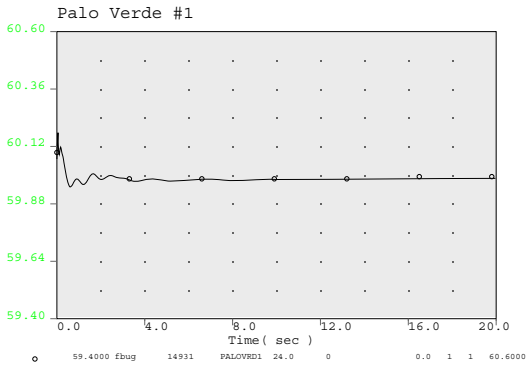


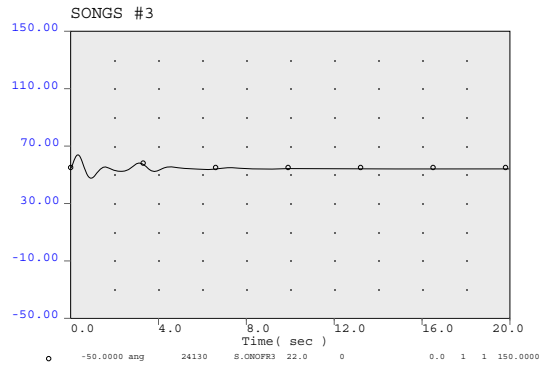


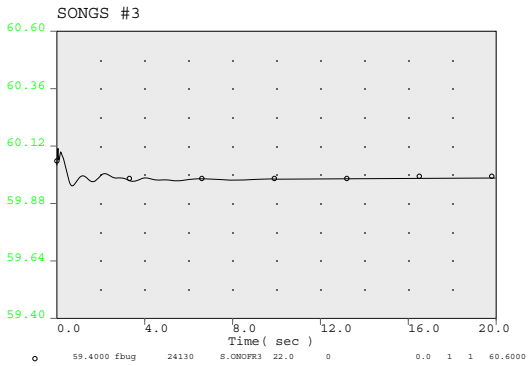
C1 C2 Light Load Post With Upgrades

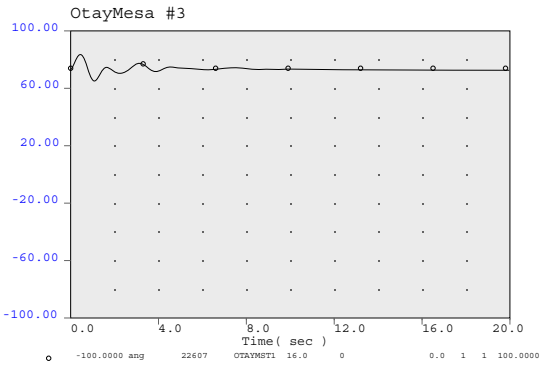
RELATIVE ROTOR ANGLE & FREQUENCY

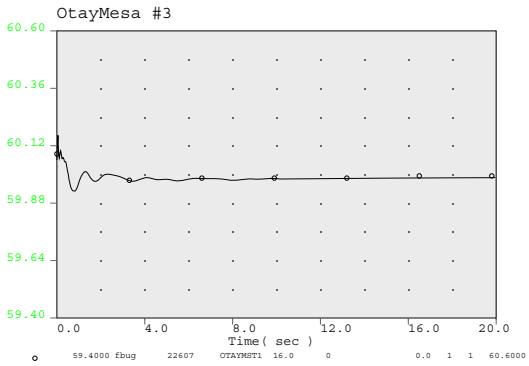












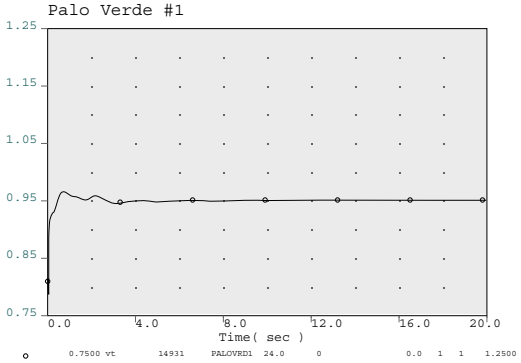
C1 C2 Light Load Post With Upgrades

Page 1

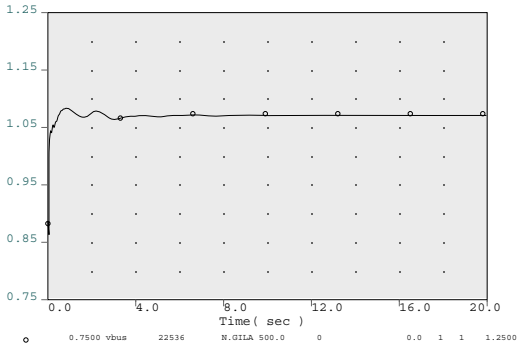
SDGE	tran-c1c2-ll-pstup-r15_Dev-Val-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:47:52 2011

RELATIVE VOLTAGE

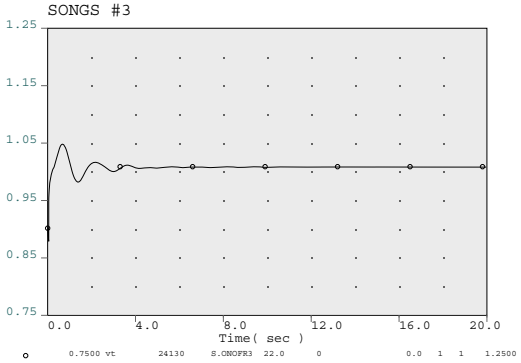
Palo Verde #1



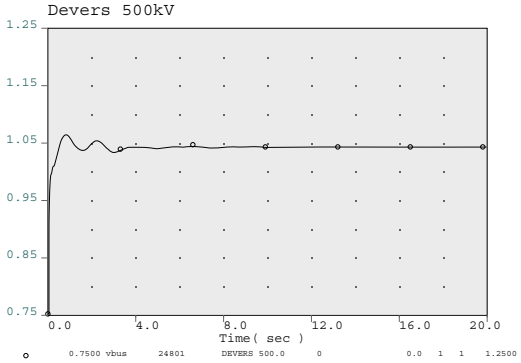
N Gila 500kV



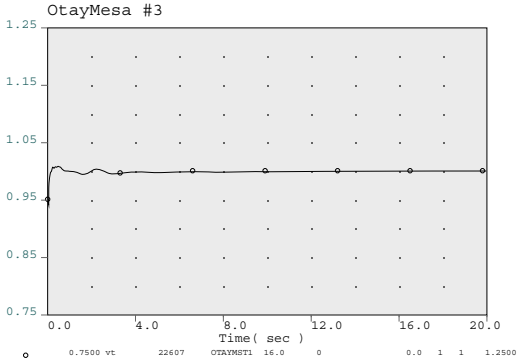
SONGS #3



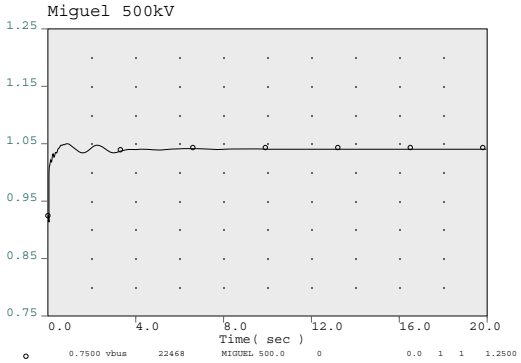
Devers 500kV



OtayMesa #3



Miguel 500kV



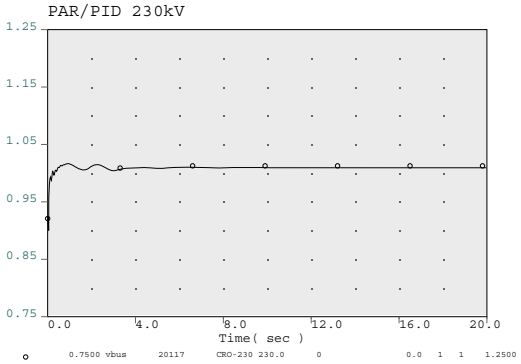
C1 C2 Light Load Post With Upgrades

Page 2

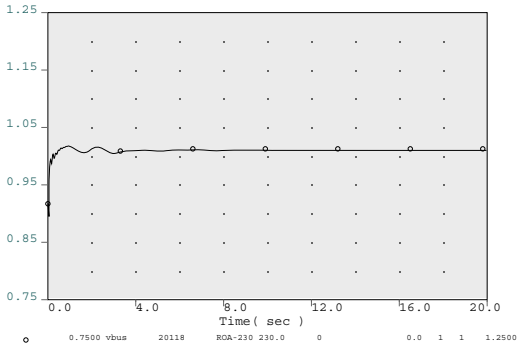
SDGE	tran-c1c2-ll-pstup-r15_Dev-Val-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:47:53 2011

Affected System Voltage Check and Comparison

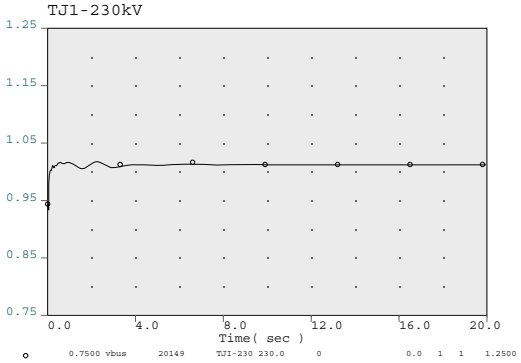
PAR/PID 230kV



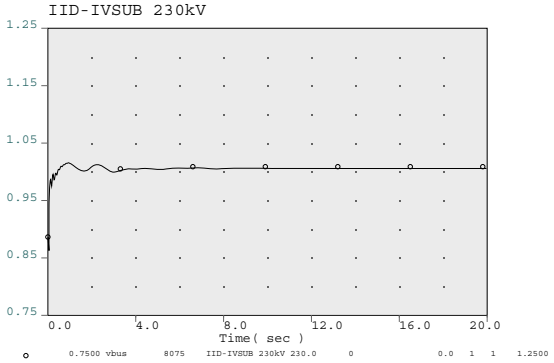
ROA-230kV



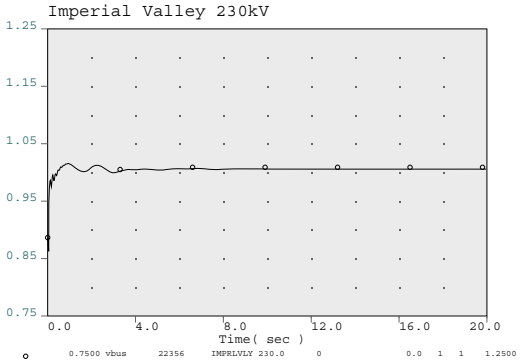
TJ1-230kV



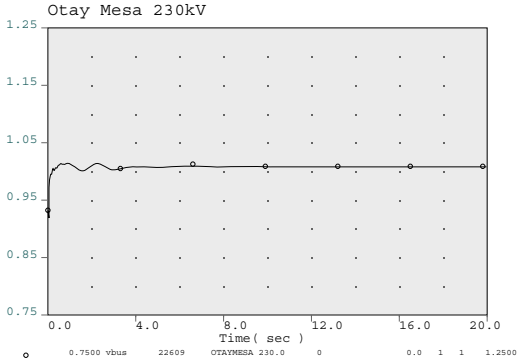
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



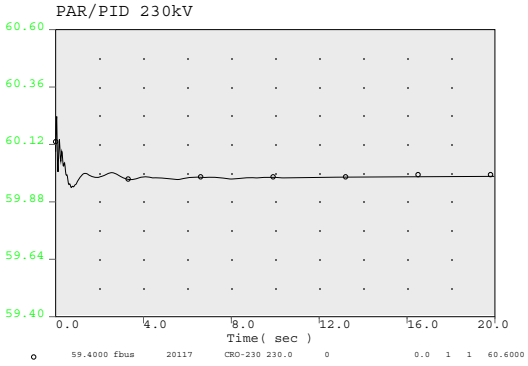
C1 C2 Light Load Post With Upgrades

Page 3

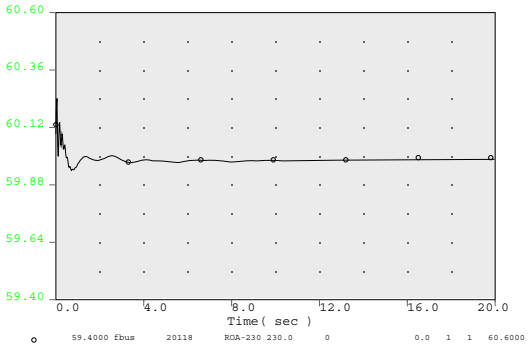
SDGE	tran-c1c2-ll-pstup-r15_Dev-Val-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:47:53 2011

Affected System Frequency Check and Comparison

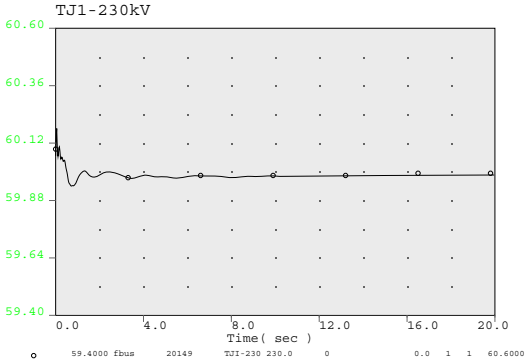
PAR/PID 230kV



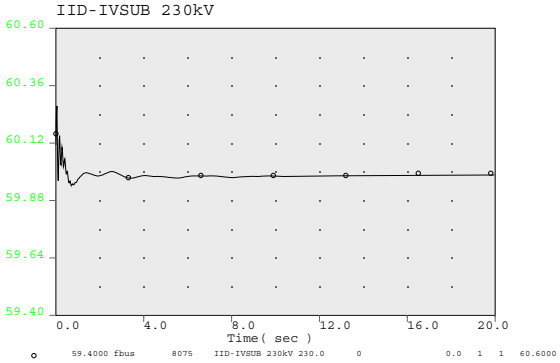
ROA-230kV



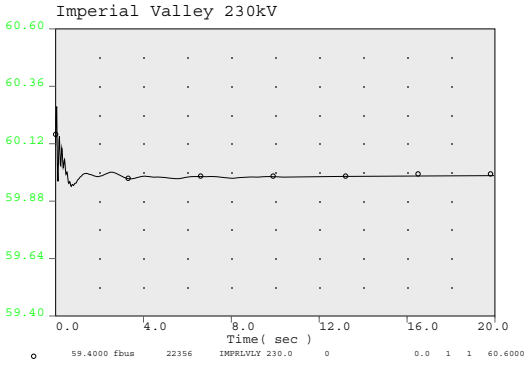
TJ1-230kV



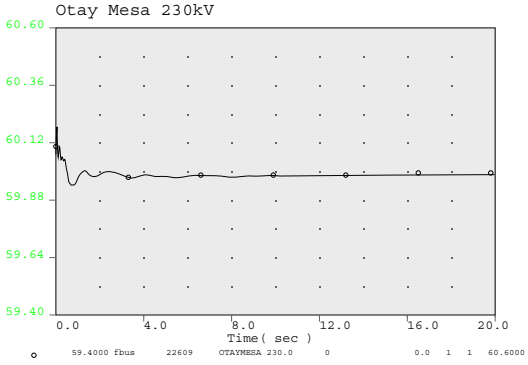
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



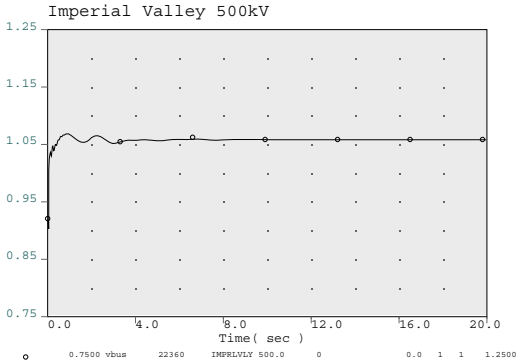
C1 C2 Light Load Post With Upgrades

Page 4

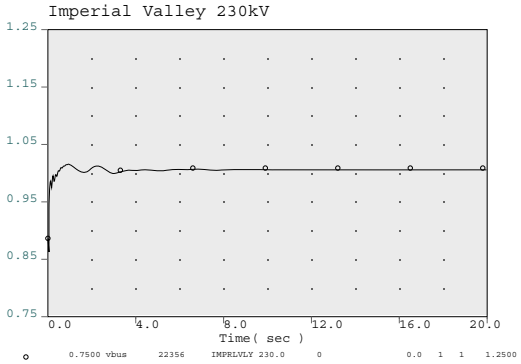
SDGE	tran-c1c2-ll-pstup-r15_Dev-Val-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:47:54 2011

VOLTAGE

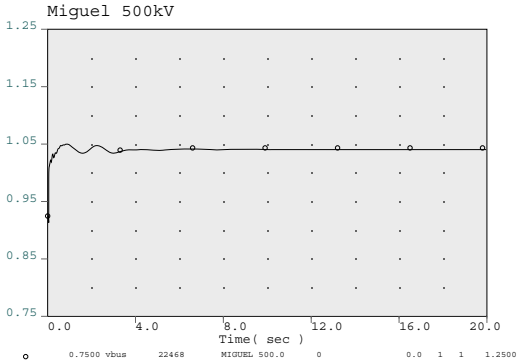
Imperial Valley 500kV



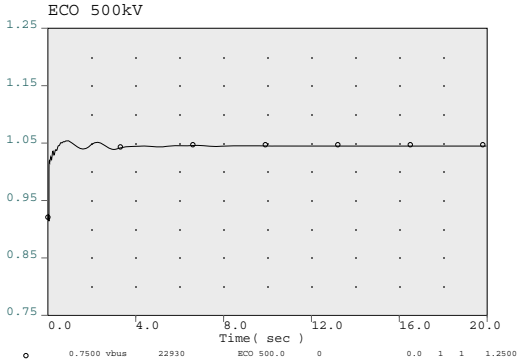
Imperial Valley 230kV



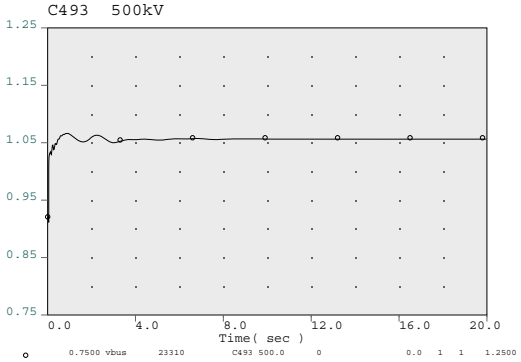
Miguel 500kV



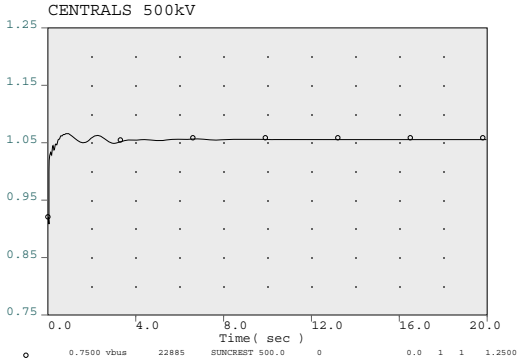
ECO 500kV



C493 500kV



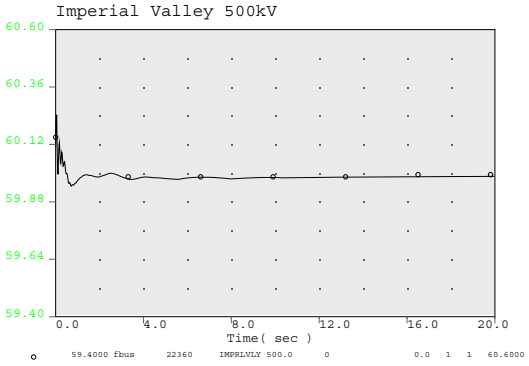
CENTRALS 500kV



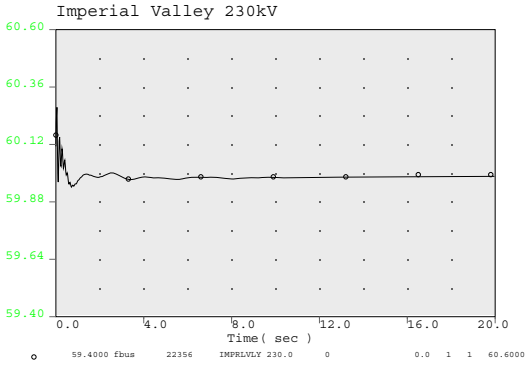
C1 C2 Light Load Post With Upgrades

FREQUENCY

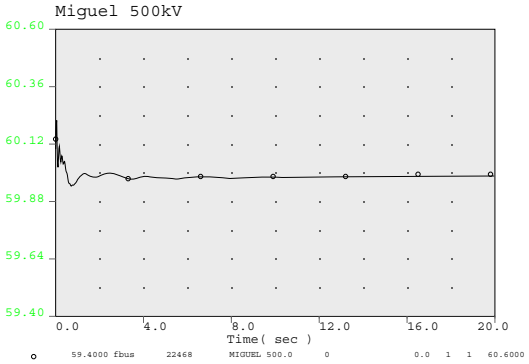
Imperial Valley 500kV



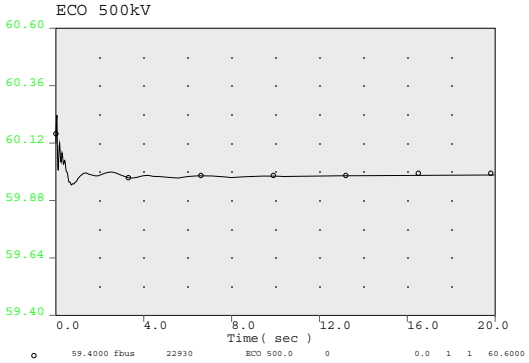
Imperial Valley 230kV



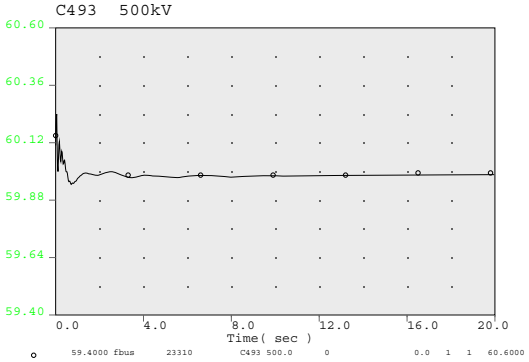
Miguel 500kV



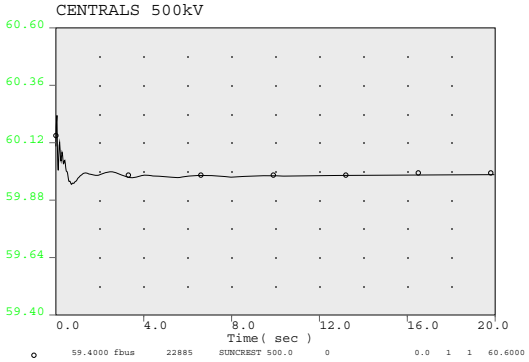
ECO 500kV



C493 500kV

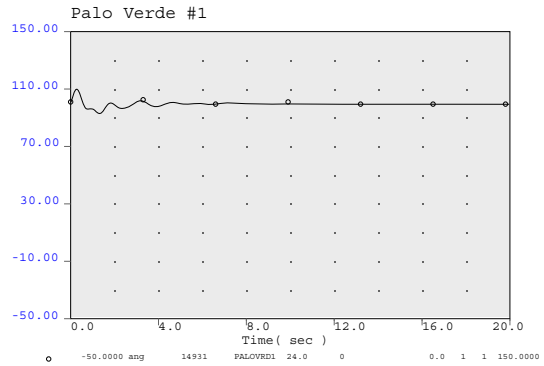


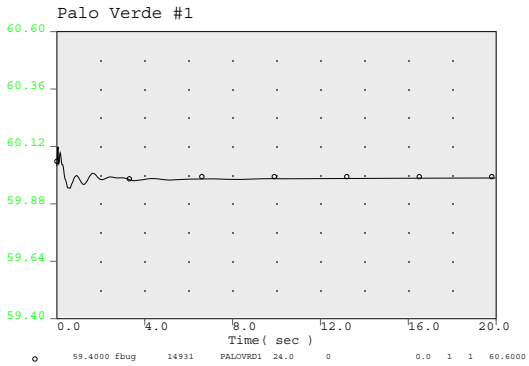
CENTRALS 500kV

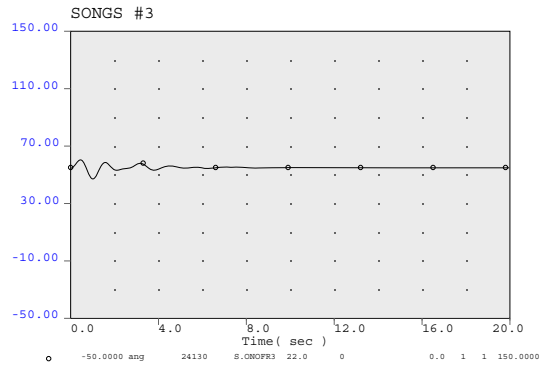


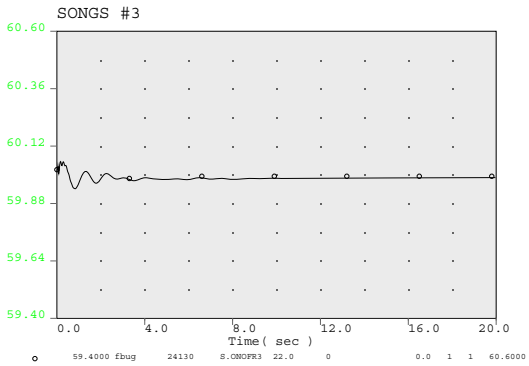
C1 C2 Light Load Post With Upgrades

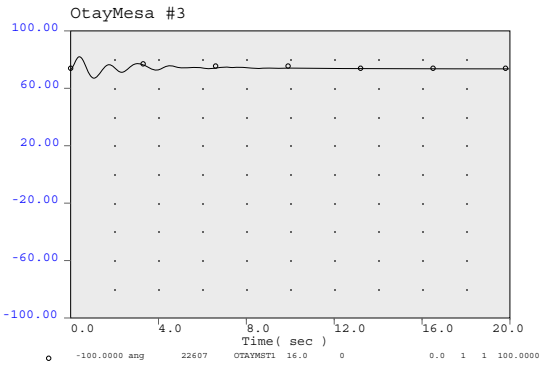
RELATIVE ROTOR ANGLE & FREQUENCY

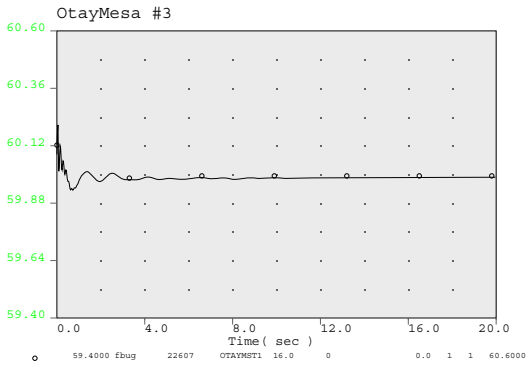












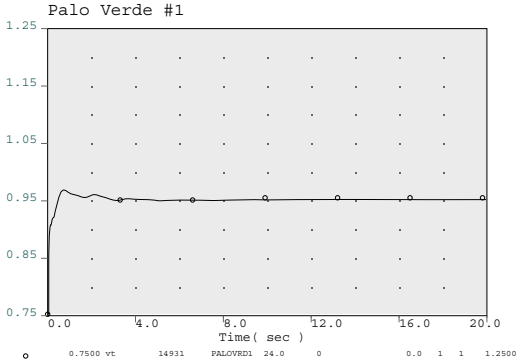
C1 C2 Light Load Post With Upgrades

Page 1

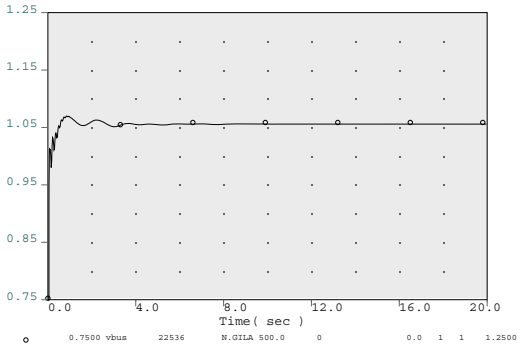
SDGE	tran-c1c2-ll-pstup-r15_HAA-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:51:25 2011

RELATIVE VOLTAGE

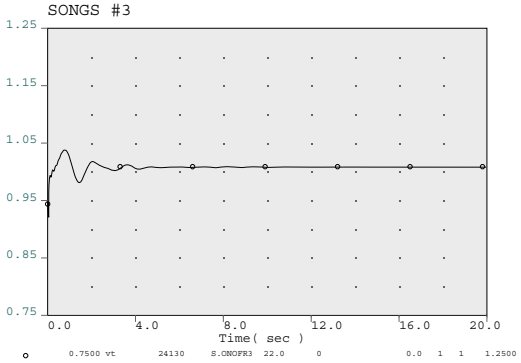
Palo Verde #1



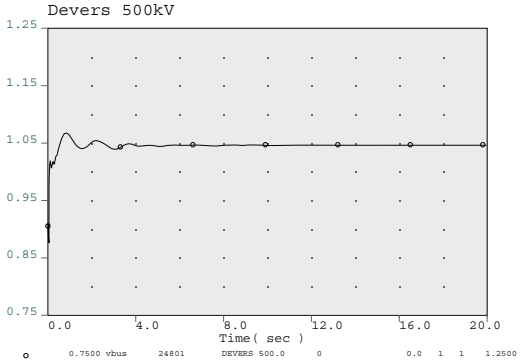
N Gila 500kV



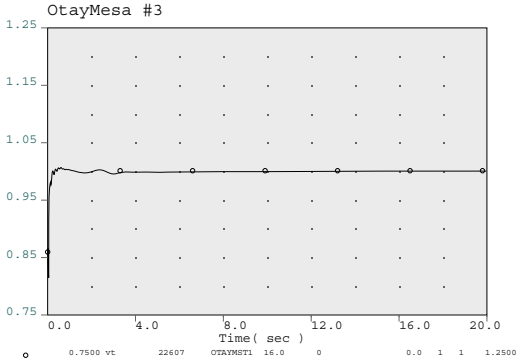
SONGS #3



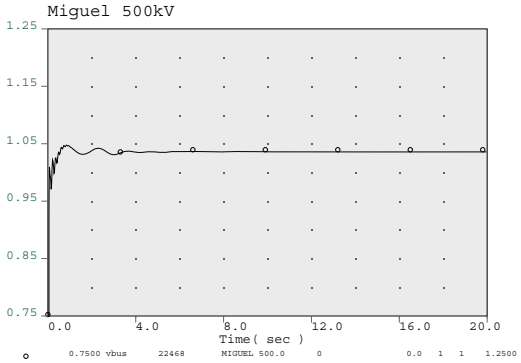
Devers 500kV



OtayMesa #3



Miguel 500kV



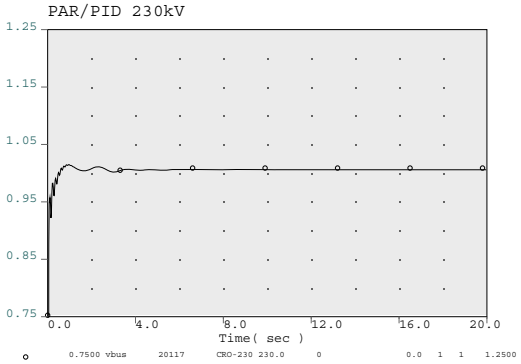
C1 C2 Light Load Post With Upgrades

Page 2

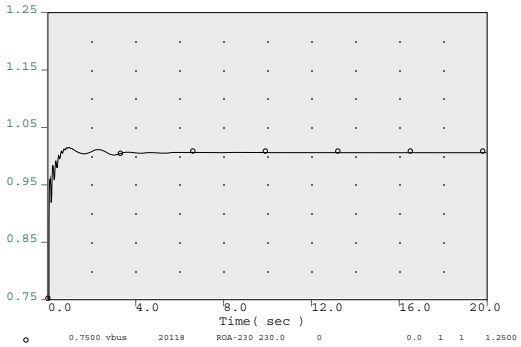
SDGE	tran-c1c2-ll-pstup-r15_HAA-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:51:26 2011

Affected System Voltage Check and Comparison

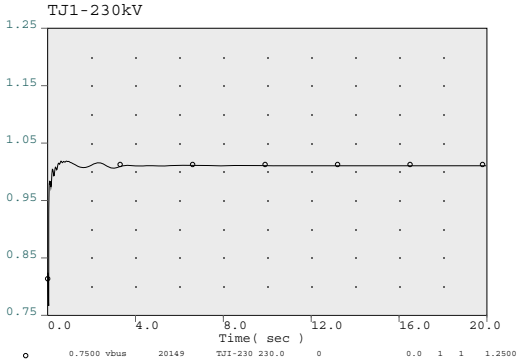
PAR/PID 230kV



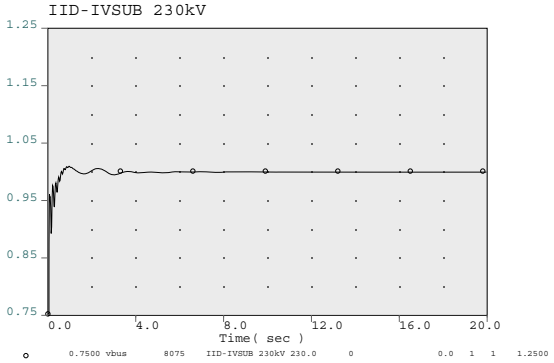
ROA-230kV



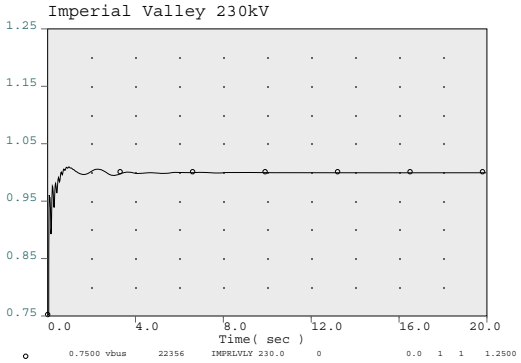
TJ1-230kV



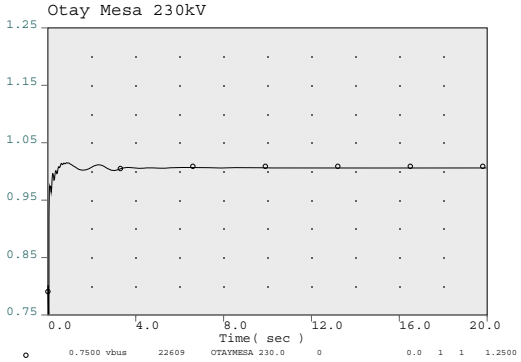
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



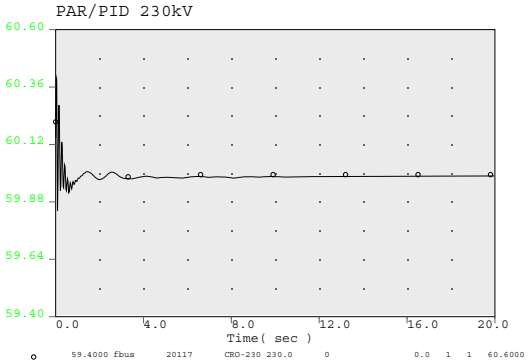
C1 C2 Light Load Post With Upgrades

Page 3

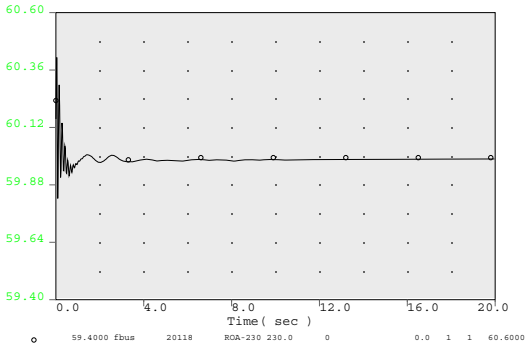
SDGE	tran-c1c2-ll-pstup-r15_HAA-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:51:26 2011

Affected System Frequency Check and Comparison

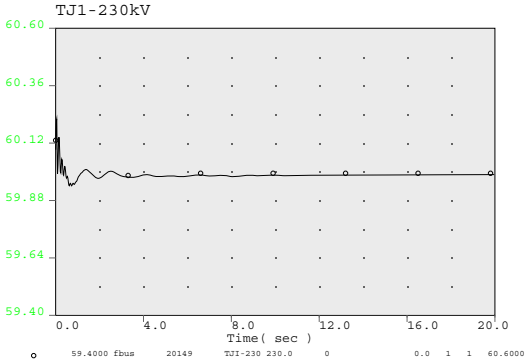
PAR/PID 230kV



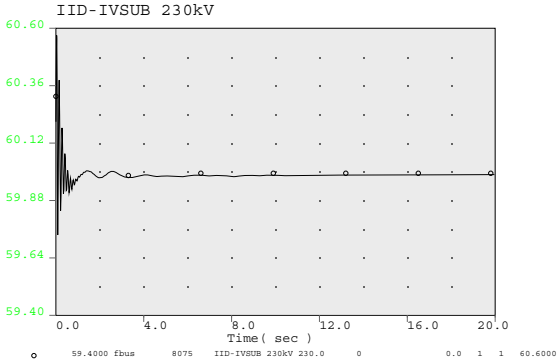
ROA-230kV



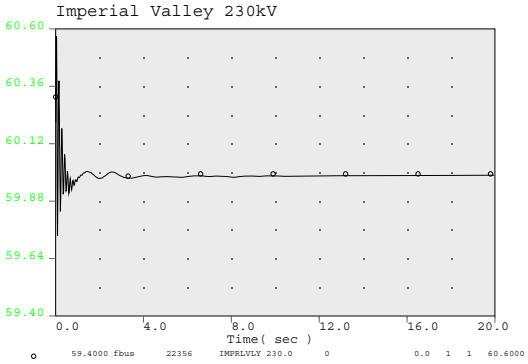
TJ1-230kV



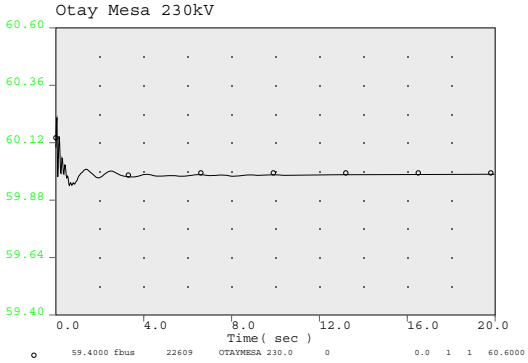
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



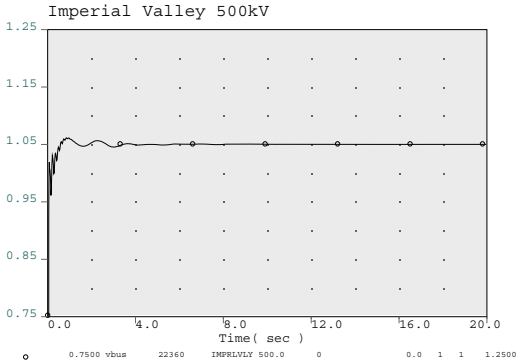
C1 C2 Light Load Post With Upgrades

Page 4

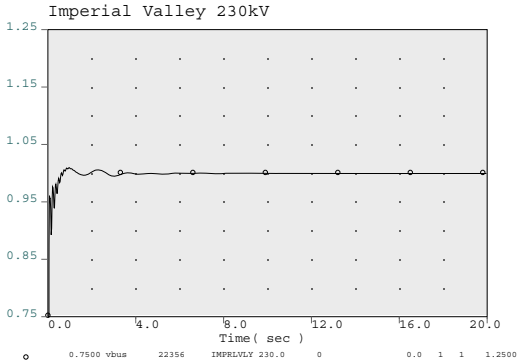
SDGE	tran-c1c2-ll-pstup-r15_HAA-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:51:27 2011

VOLTAGE

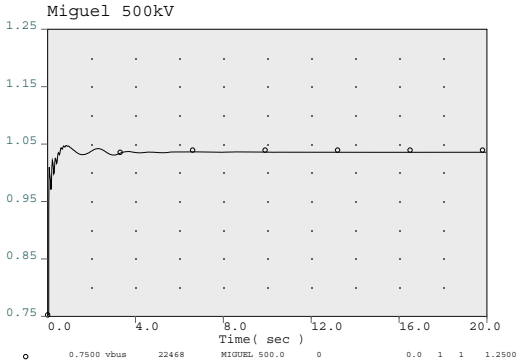
Imperial Valley 500kV



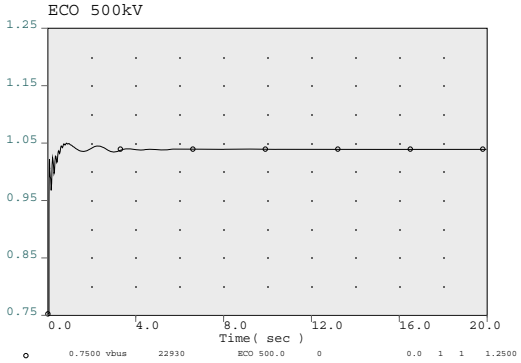
Imperial Valley 230kV



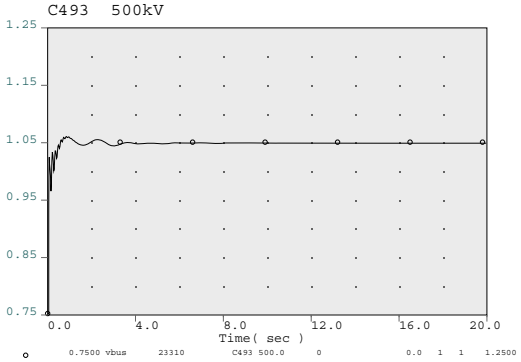
Miguel 500kV



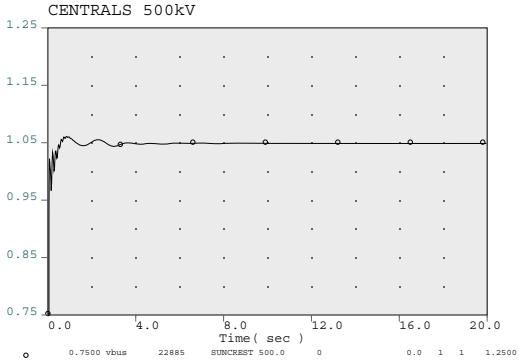
ECO 500kV



C493 500kV



CENTRALS 500kV



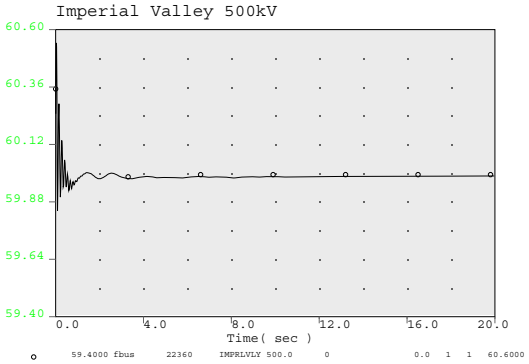
C1 C2 Light Load Post With Upgrades

Page 5

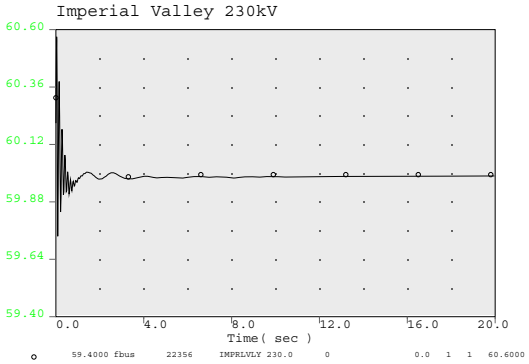
SDGE	tran-c1c2-ll-pstup-r15_HAA-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:51:27 2011

FREQUENCY

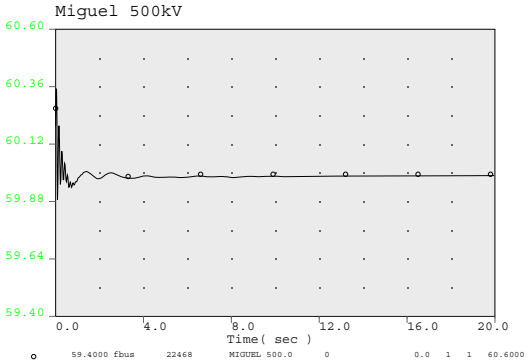
Imperial Valley 500kV



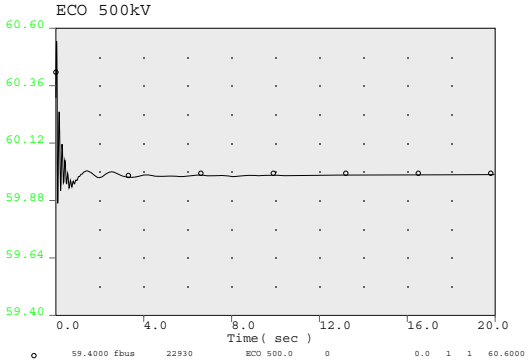
Imperial Valley 230kV



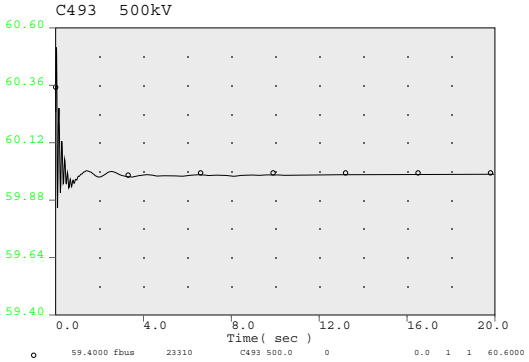
Miguel 500kV



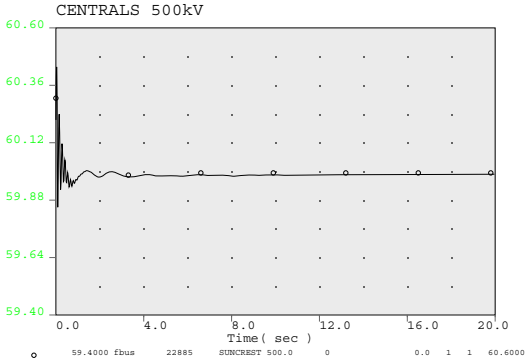
ECO 500kV



C493 500kV



CENTRALS 500kV

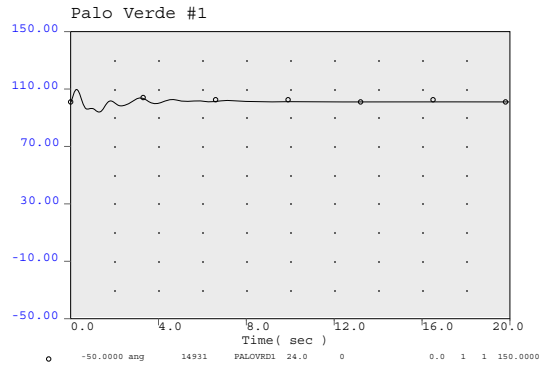


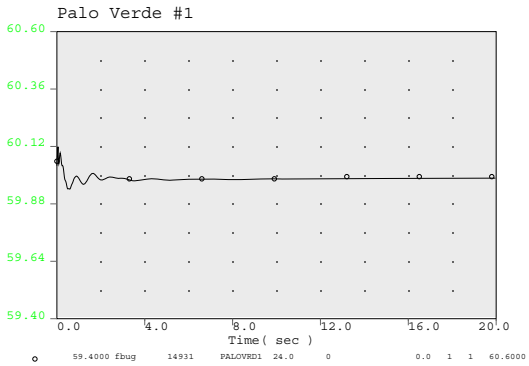
C1 C2 Light Load Post With Upgrades

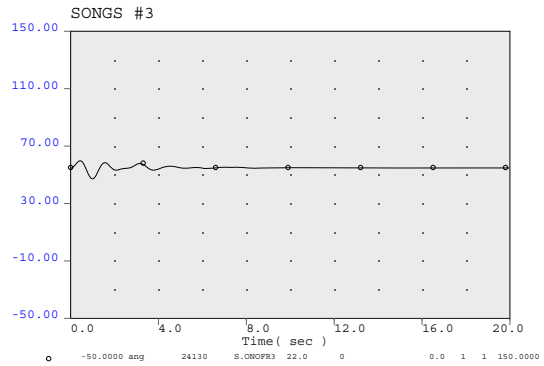
Page 6

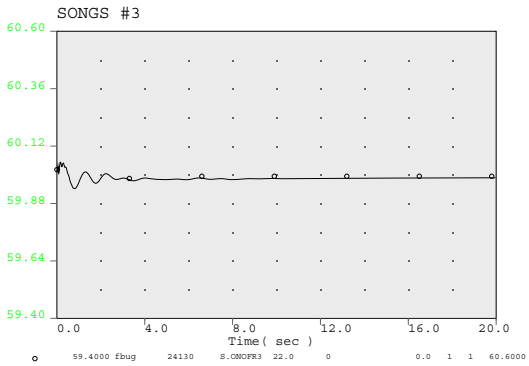
SDGE	tran-c1c2-ll-pstup-r15_HAA-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:51:28 2011

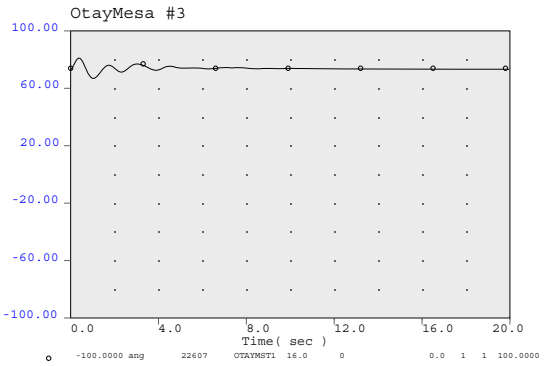
RELATIVE ROTOR ANGLE & FREQUENCY

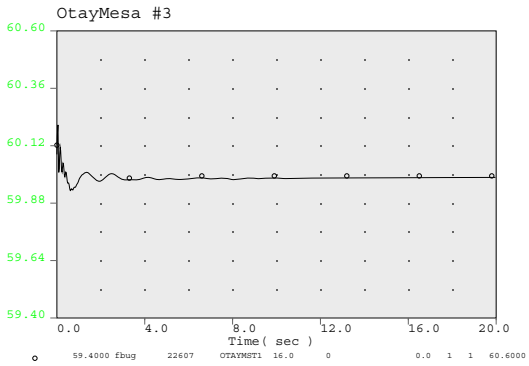












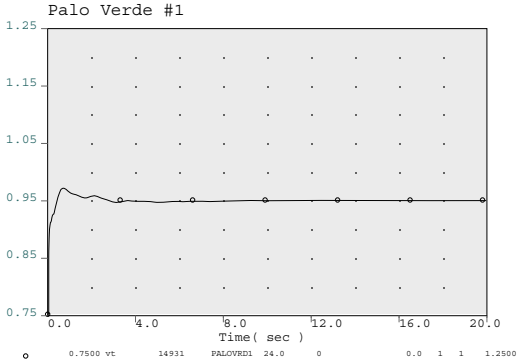
C1 C2 Light Load Post With Upgrades

Page 1

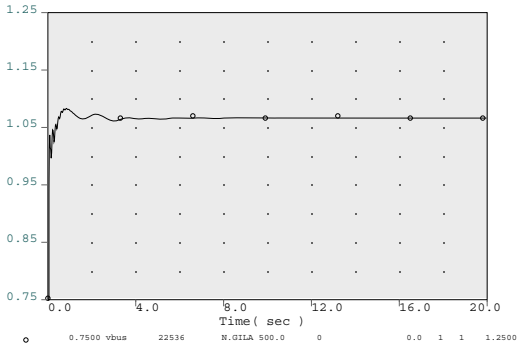
SDGE	tran-c1c2-ll-pstup-r15_HDWSH-NGila-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:53:07 2011

RELATIVE VOLTAGE

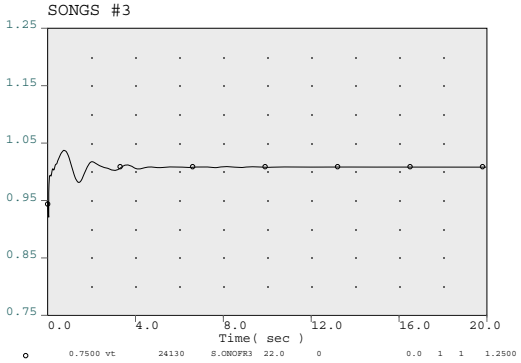
Palo Verde #1



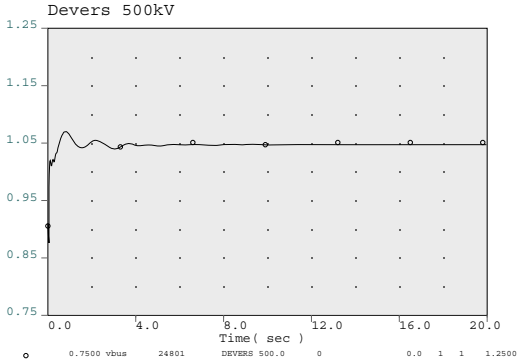
N Gila 500kV



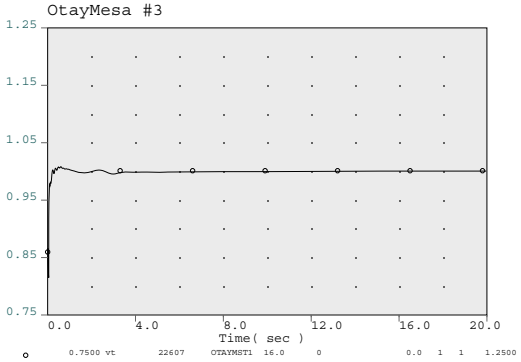
SONGS #3



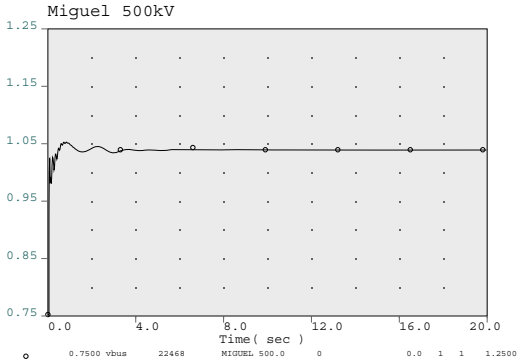
Devers 500kV



OtayMesa #3



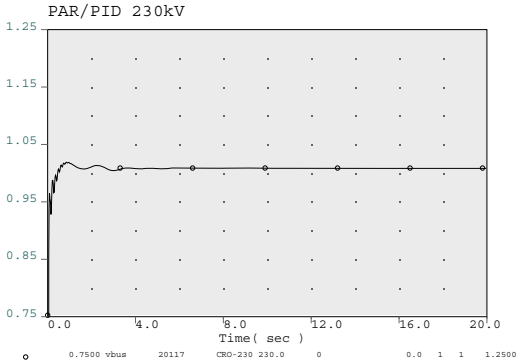
Miguel 500kV



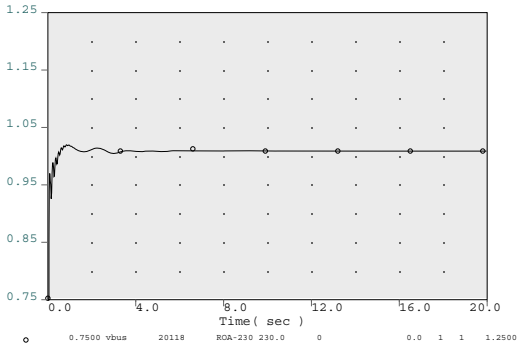
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

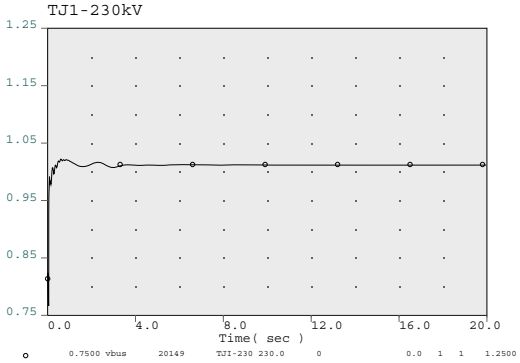
PAR/PID 230kV



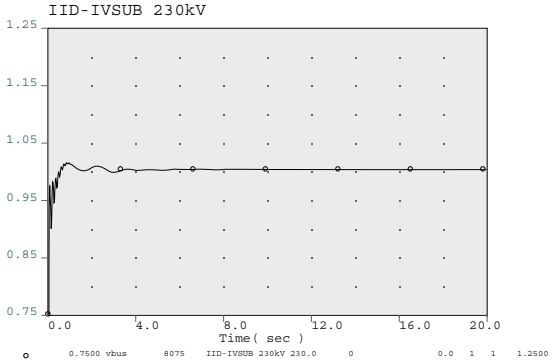
ROA-230kV



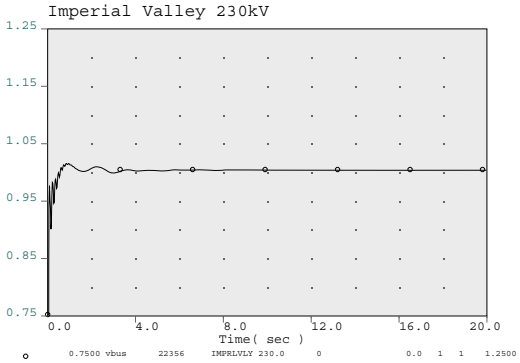
TJ1-230kV



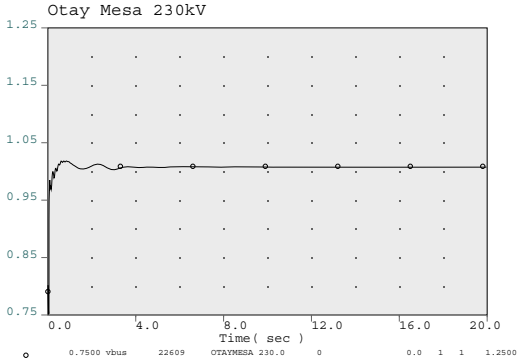
IID-IVSUB 230kV



Imperial Valley 230kV



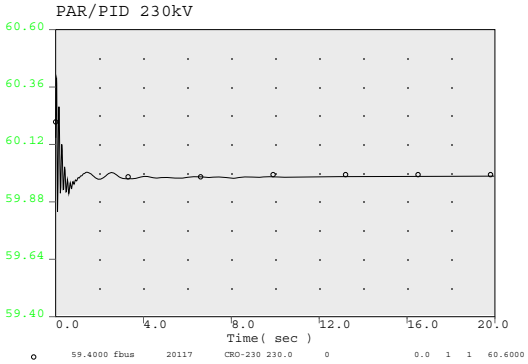
Otay Mesa 230kV



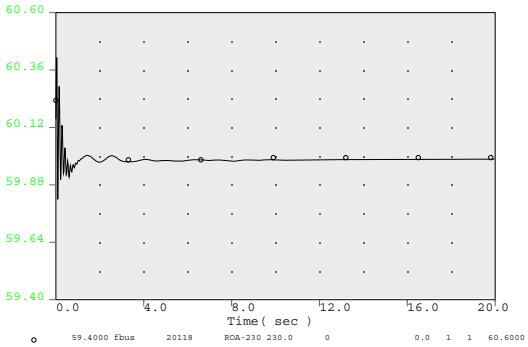
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

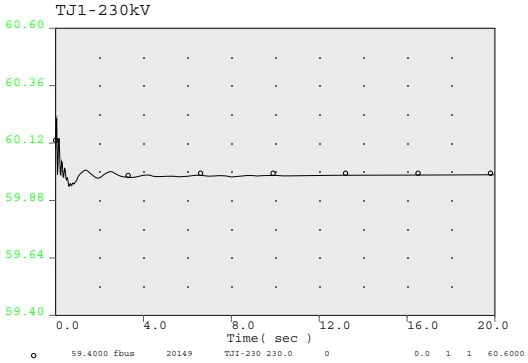
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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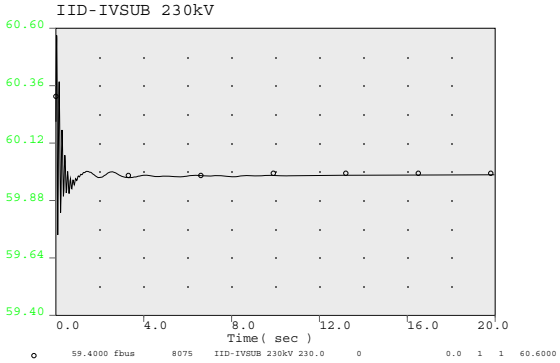
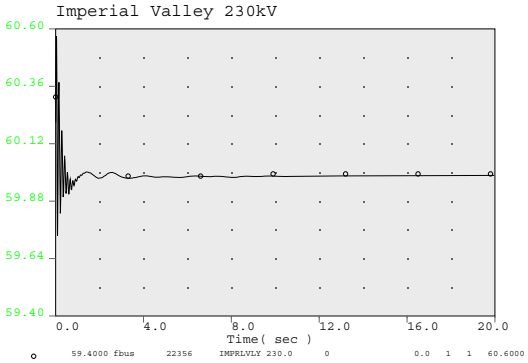
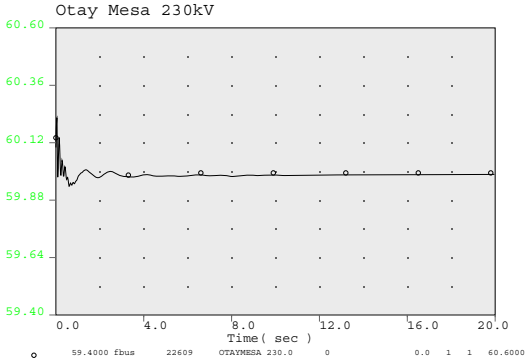


Imperial Valley 230kV



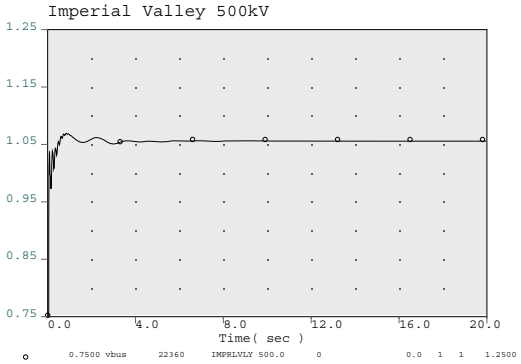
Otay Mesa 230kV



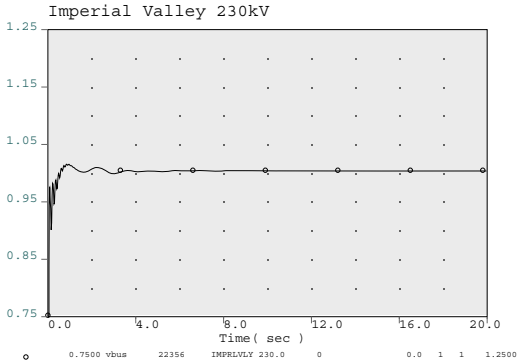
C1 C2 Light Load Post With Upgrades

VOLTAGE

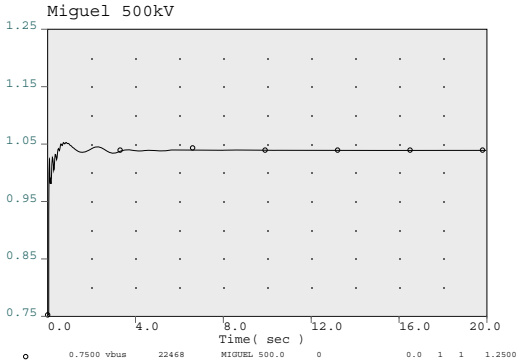
Imperial Valley 500kV



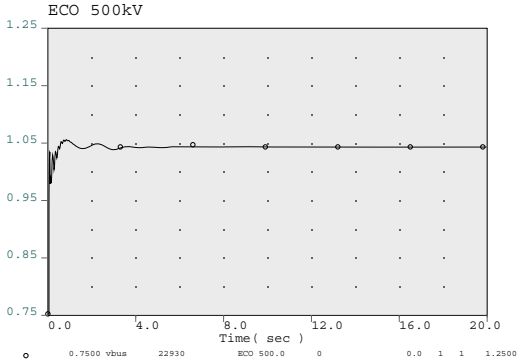
Imperial Valley 230kV



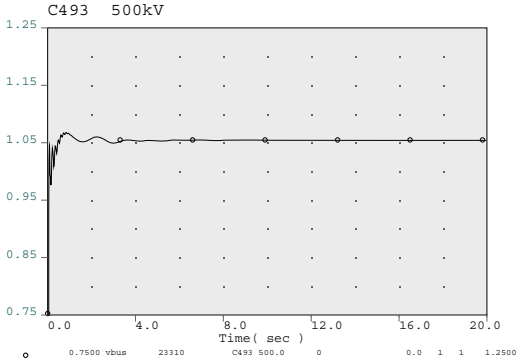
Miguel 500kV



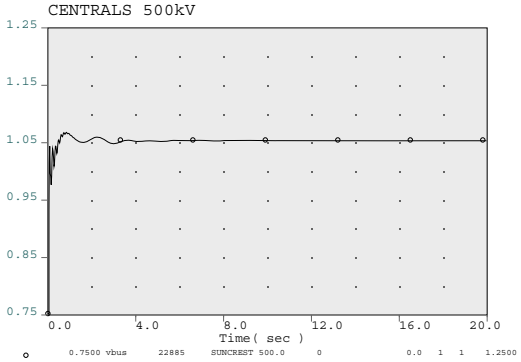
ECO 500kV



C493 500kV



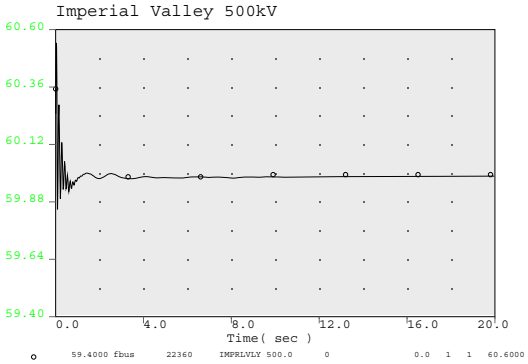
CENTRALS 500kV



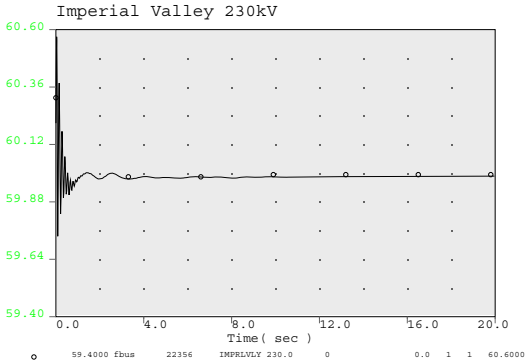
C1 C2 Light Load Post With Upgrades

FREQUENCY

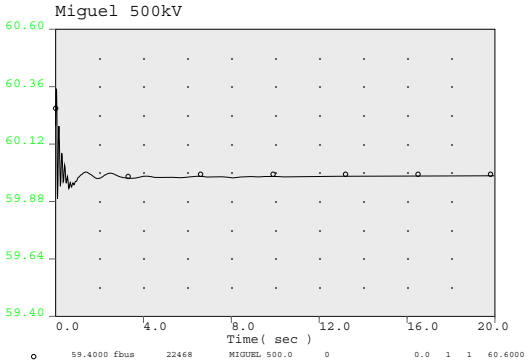
Imperial Valley 500kV



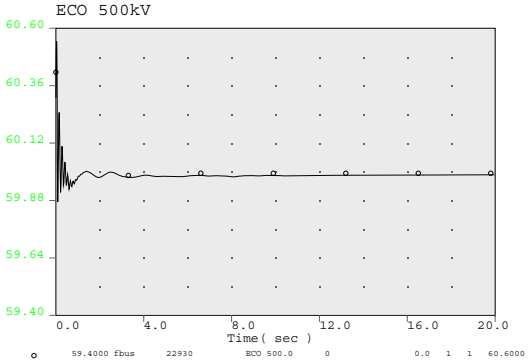
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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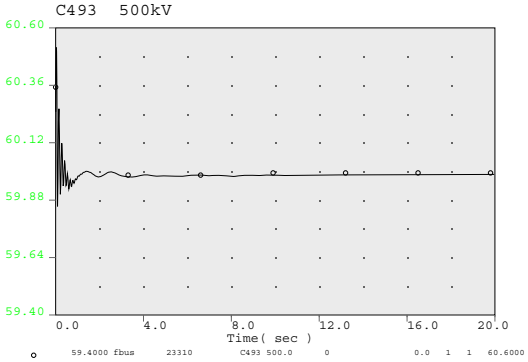
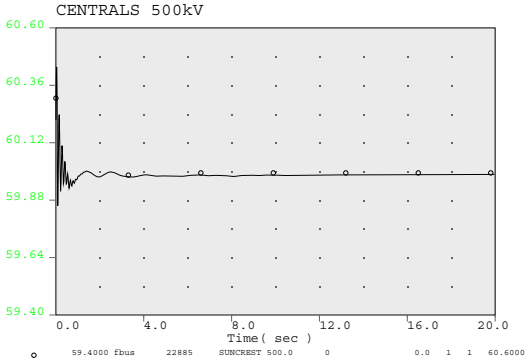


CENTRALS 500kV



C1 C2 Light Load Post With Upgrades

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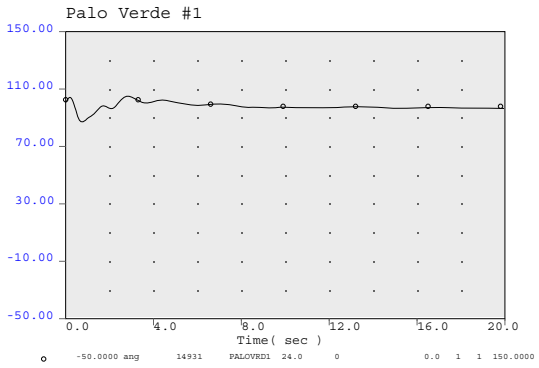
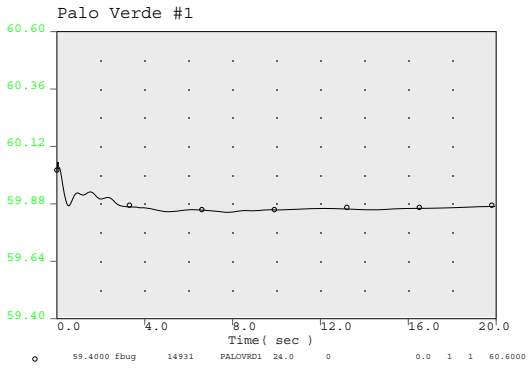
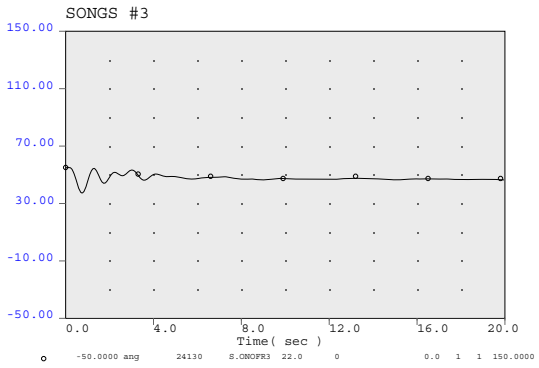
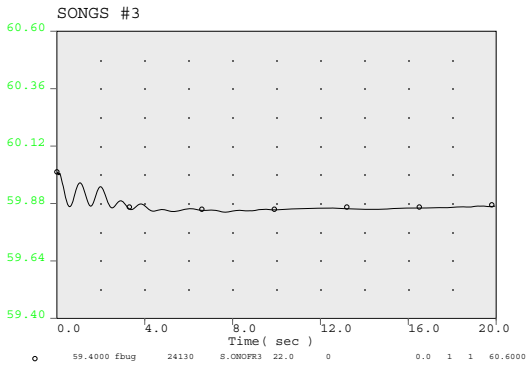
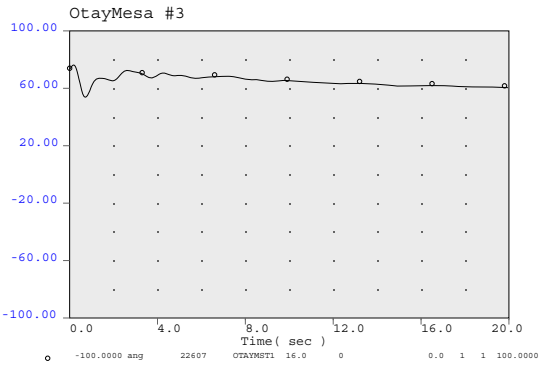
RELATIVE ROTOR ANGLE & FREQUENCY

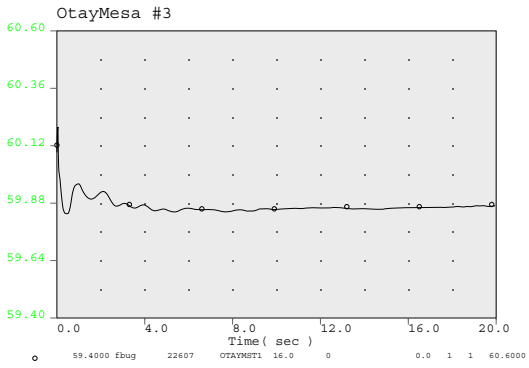












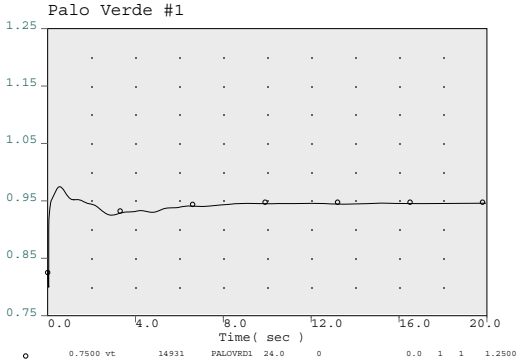
C1 C2 Light Load Post With Upgrades

Page 1

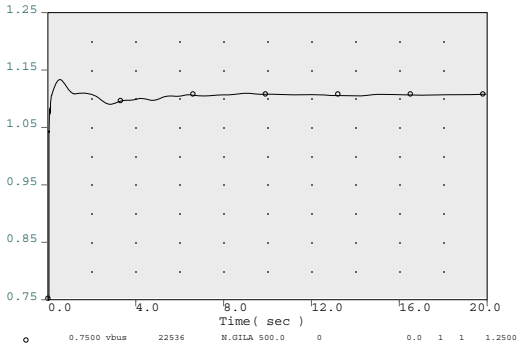
SDGE	tran-c1c2-ll-pstup-r15_IV-C493-slo.chf	perl-projects\c1c2\ll\pst Thu Aug 11 11:34:52 2011

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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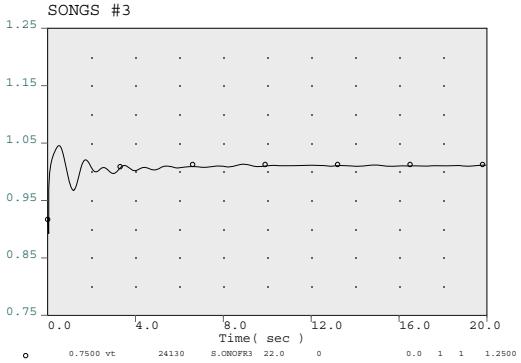
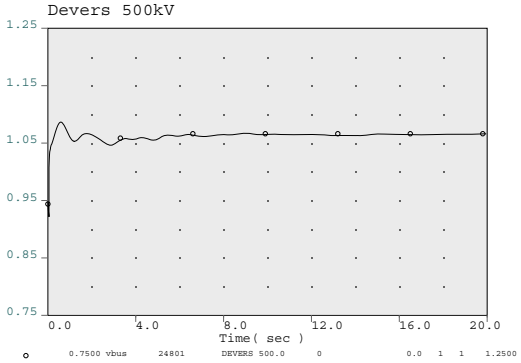
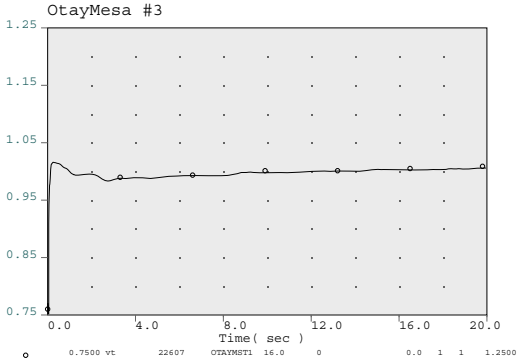


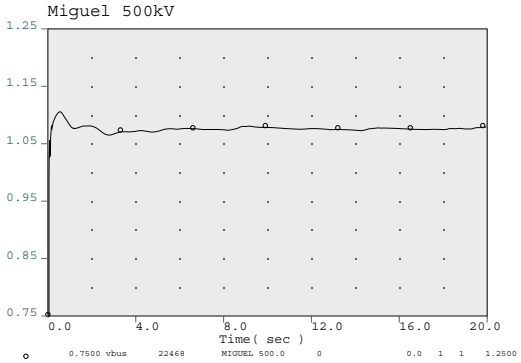
Devers 500kV



OtayMesa #3



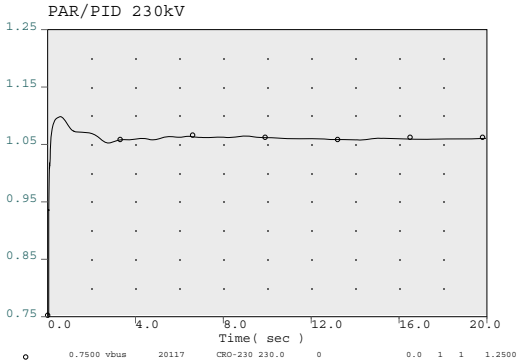
Miguel 500kV



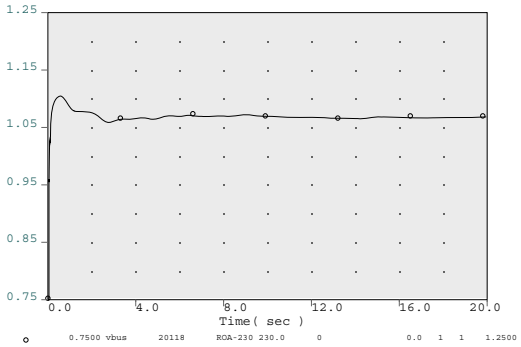
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

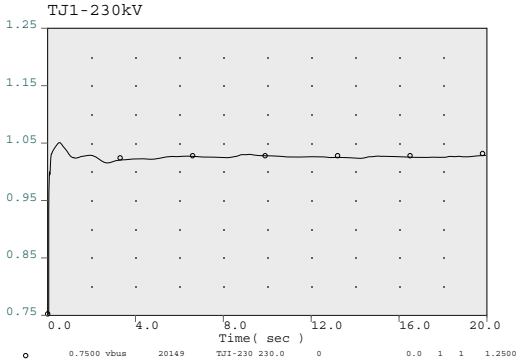
PAR/PID 230kV



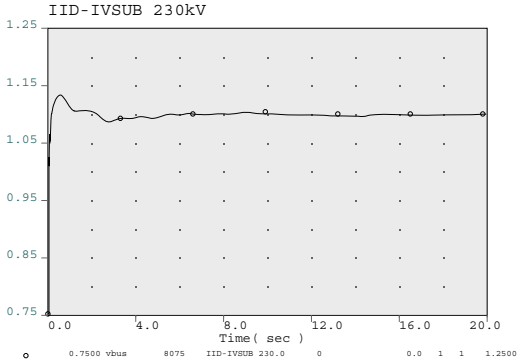
ROA-230kV



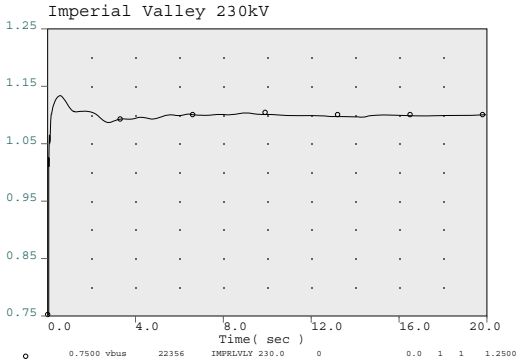
TJ1-230kV



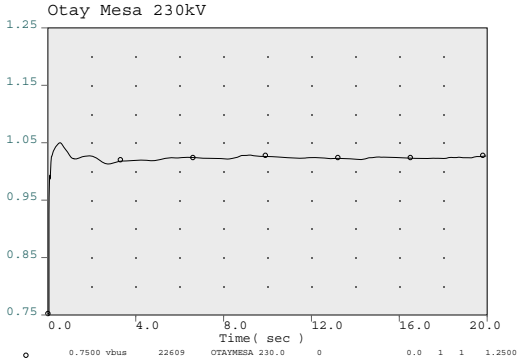
IID-IVSUB 230kV



Imperial Valley 230kV



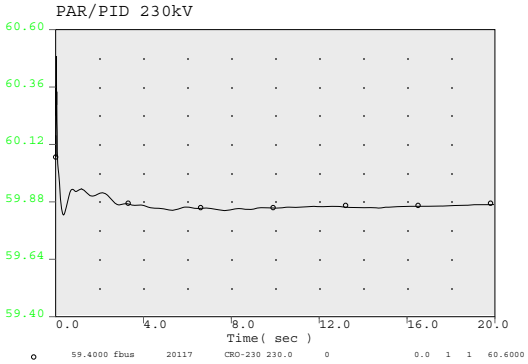
Otay Mesa 230kV



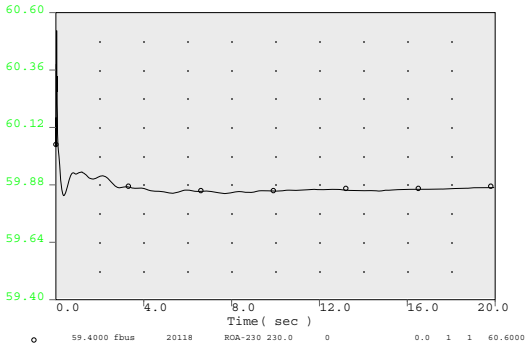
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

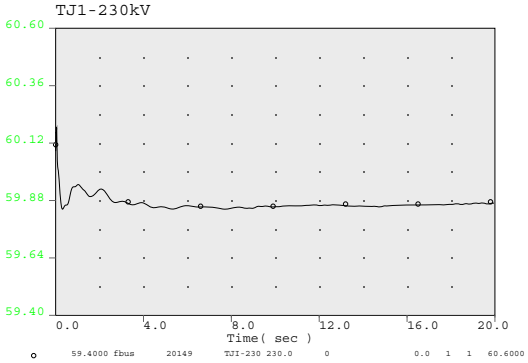
PAR/PID 230kV



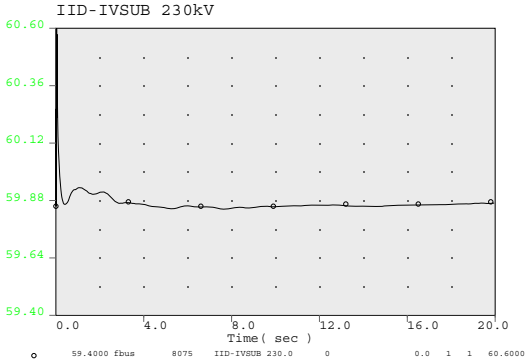
ROA-230kV



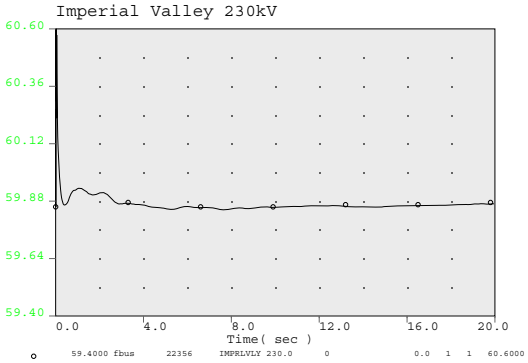
TJ1-230kV



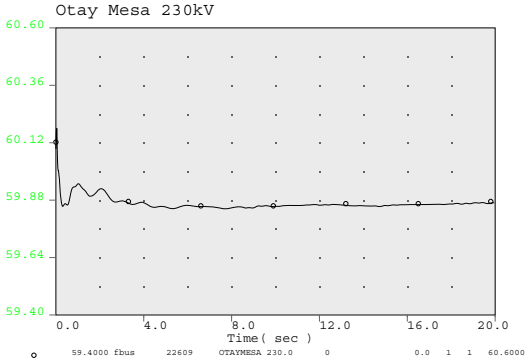
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Post With Upgrades

Page 4

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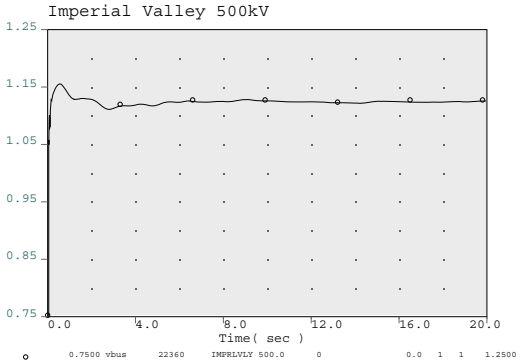
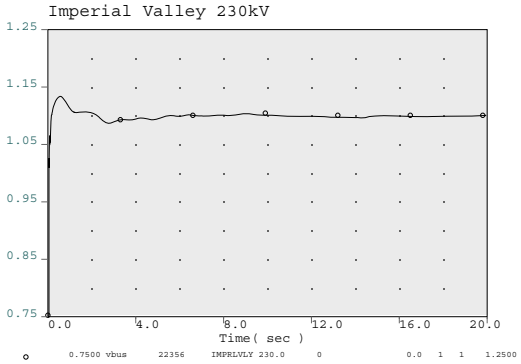
VOLTAGE

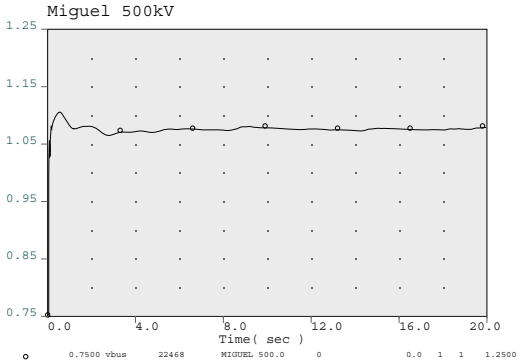
Imperial Valley 500kV



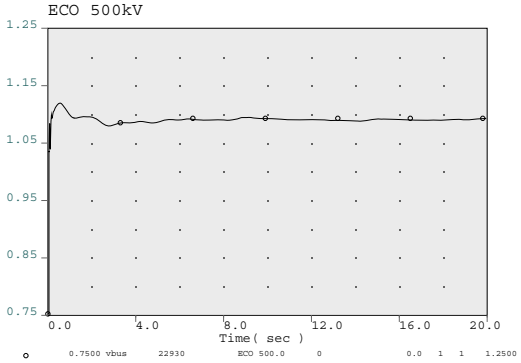
Imperial Valley 230kV



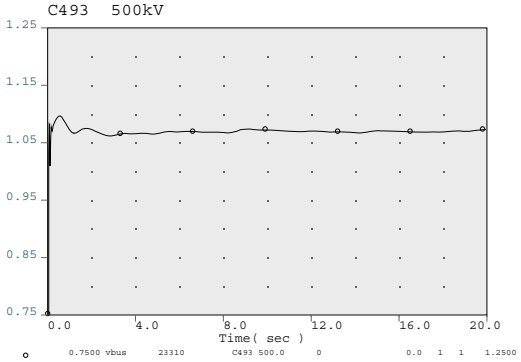
Miguel 500kV



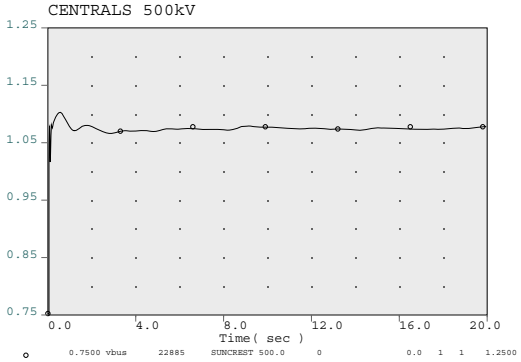
ECO 500kV



C493 500kV

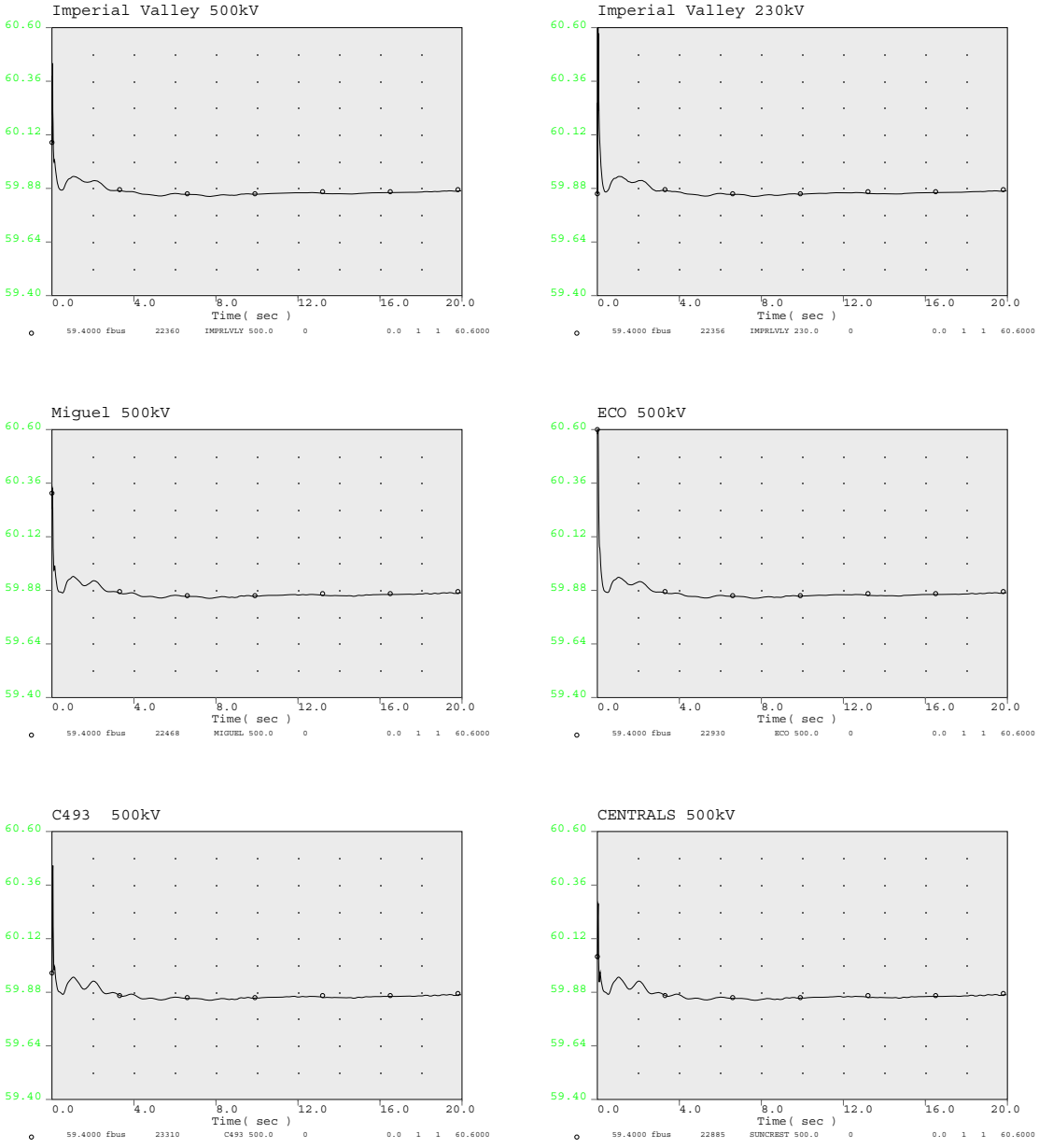


CENTRALS 500kV



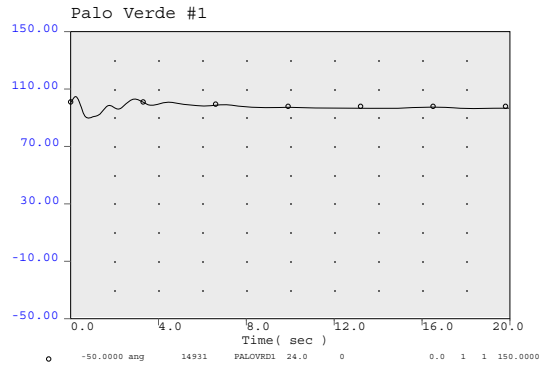
C1 C2 Light Load Post With Upgrades

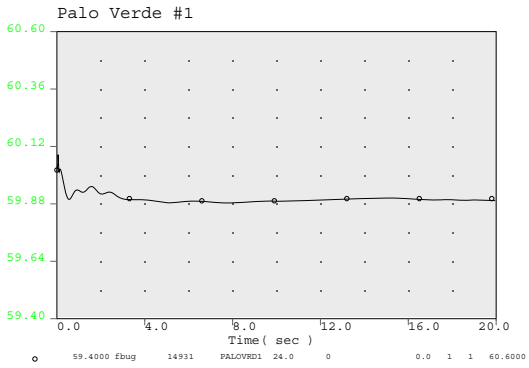
Frequency

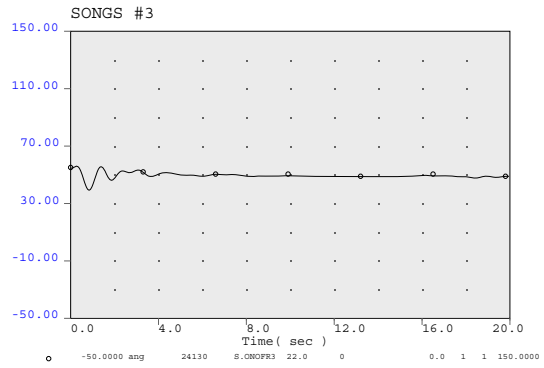


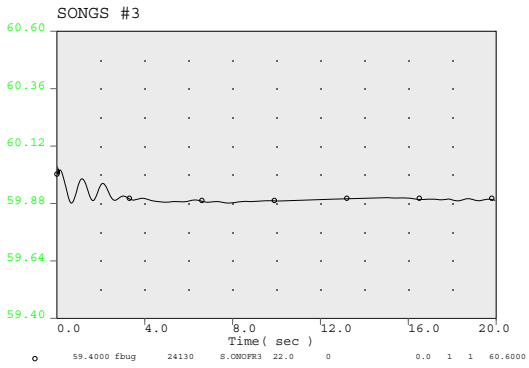
C1 C2 Light Load Post With Upgrades

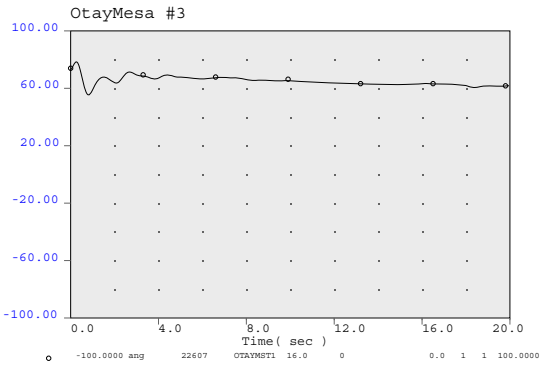
RELATIVE ROTOR ANGLE & FREQUENCY

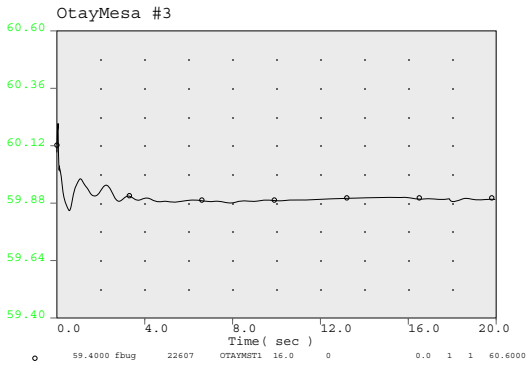










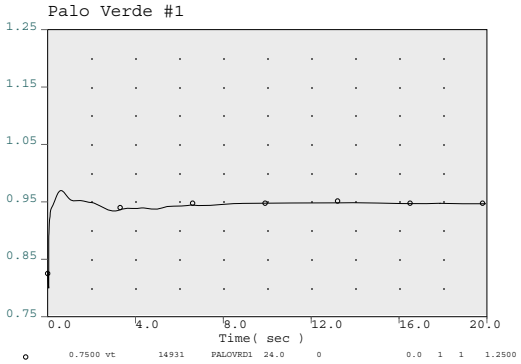


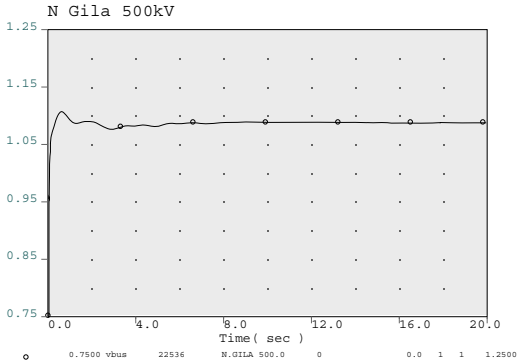
C1 C2 Light Load Post With Upgrades

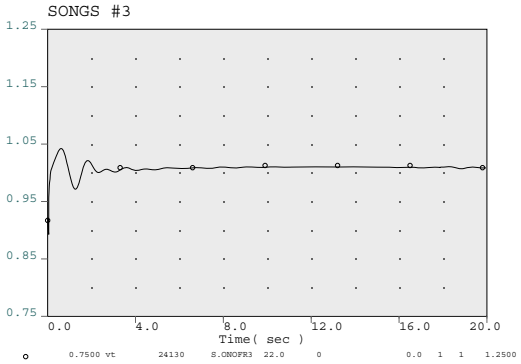
Page 1

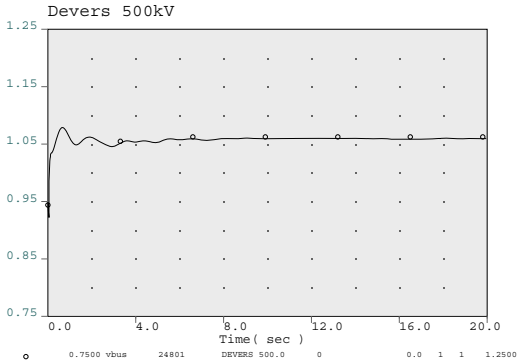
SDGE	tran-c1c2-ll-pstup-r15_IV-ECO-RAS-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:55:16 2011

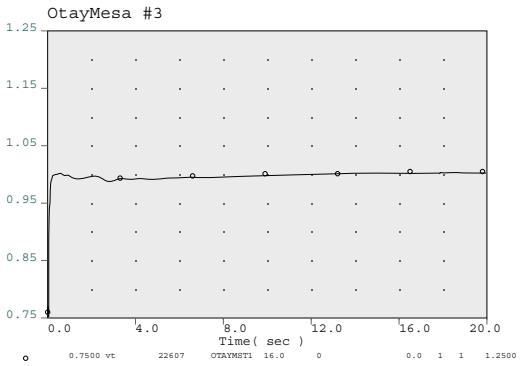
RELATIVE VOLTAGE

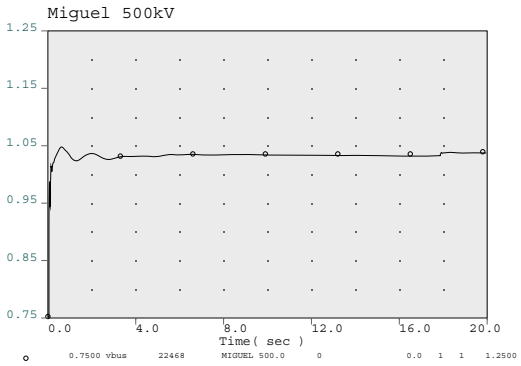








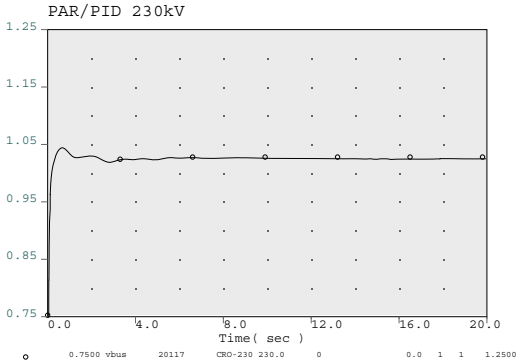




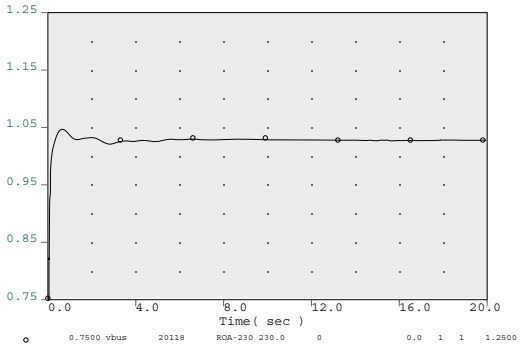
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

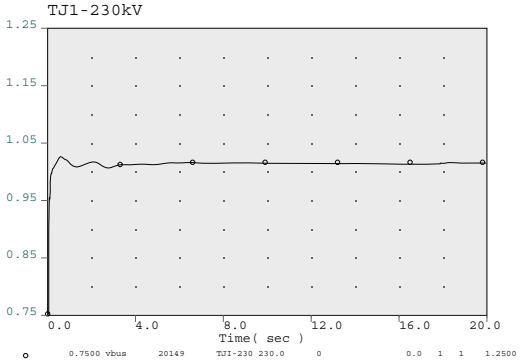
PAR/PID 230kV



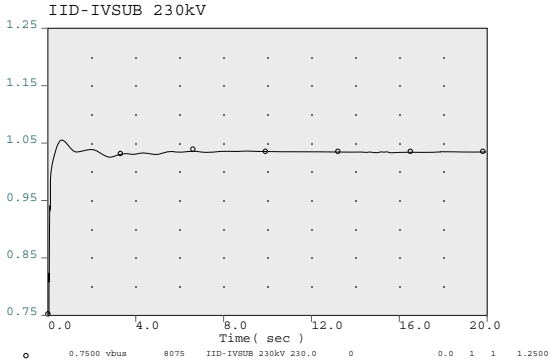
ROA-230kV



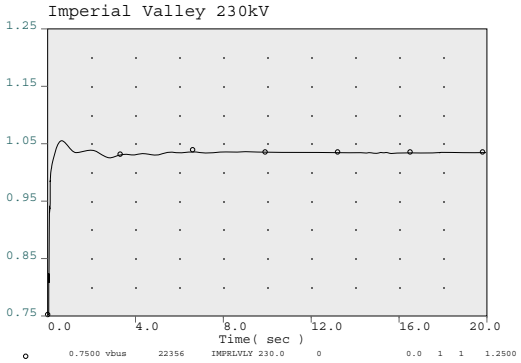
TJ1-230kV



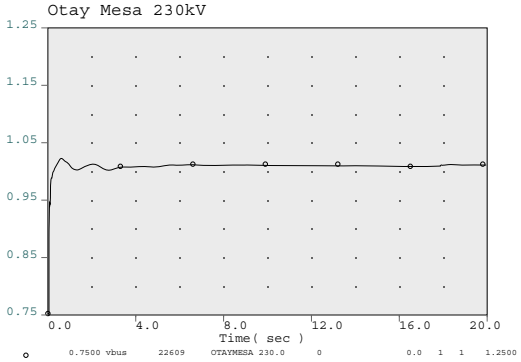
IID-IVSUB 230kV



Imperial Valley 230kV



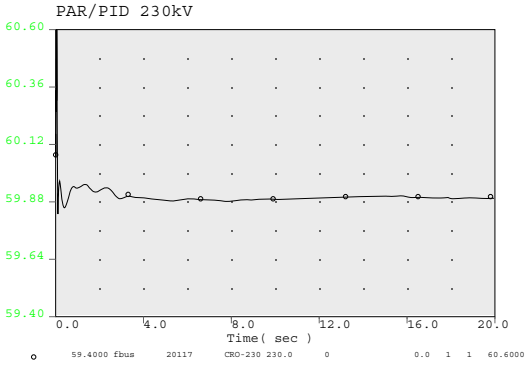
Otay Mesa 230kV



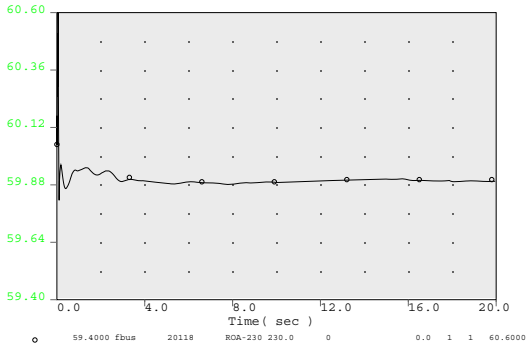
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

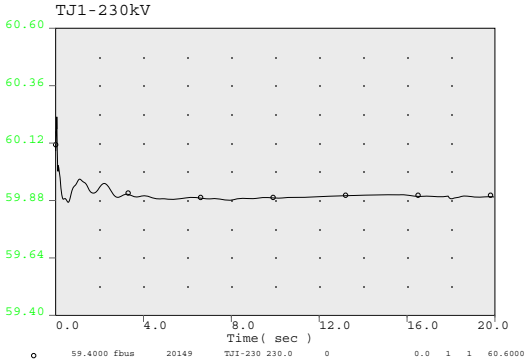
PAR/PID 230kV



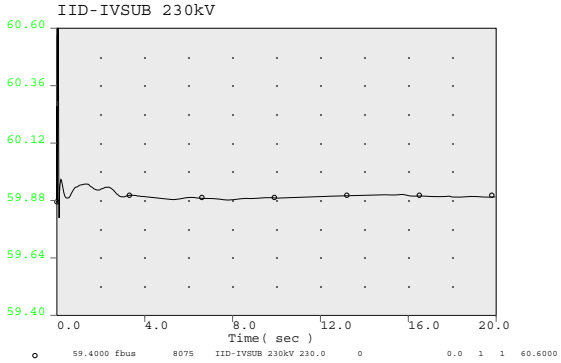
ROA-230kV



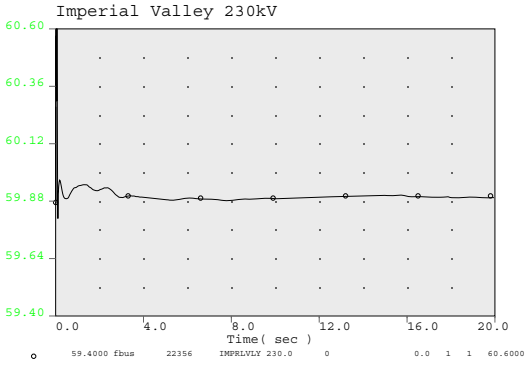
TJ1-230kV



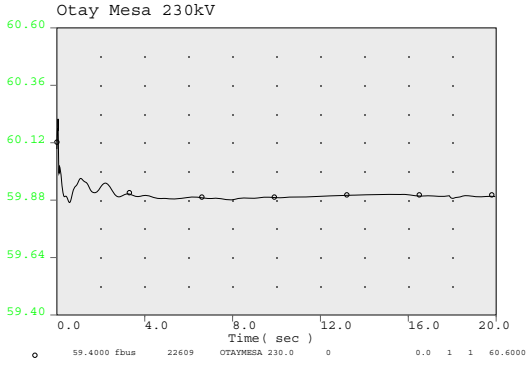
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Post With Upgrades

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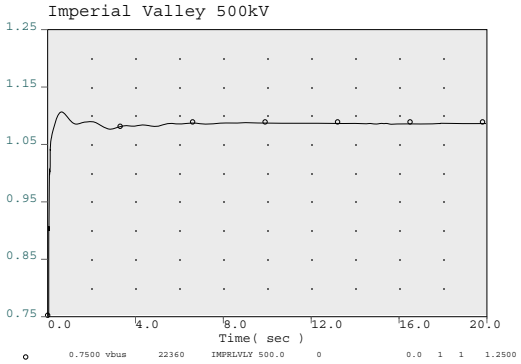
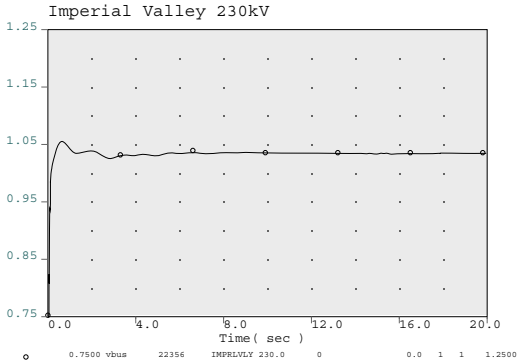
SDGE	tran-c1c2-ll-pstup-r15_IV-ECO-RAS-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:55:18 2011

VOLTAGE

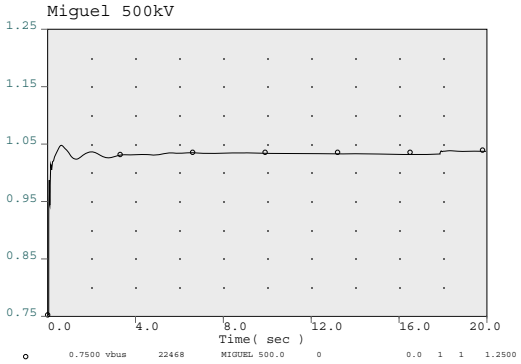
Imperial Valley 500kV



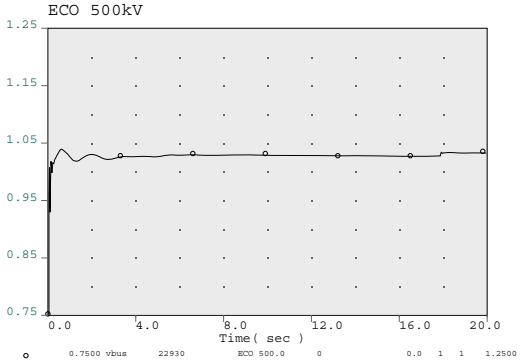
Imperial Valley 230kV



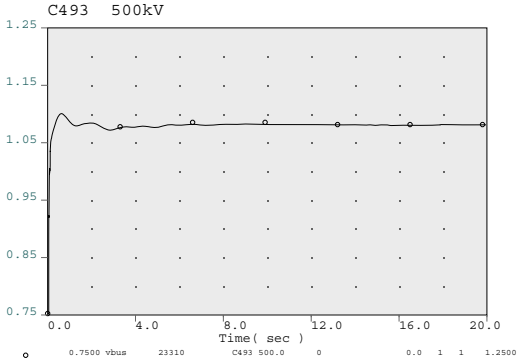
Miguel 500kV



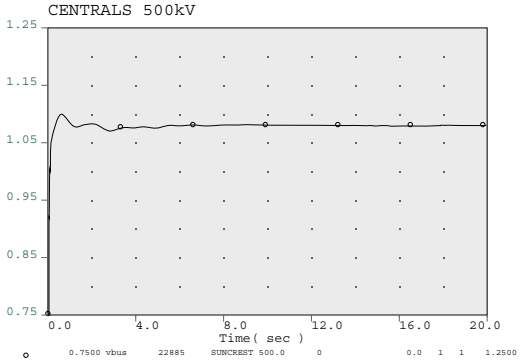
ECO 500kV



C493 500kV



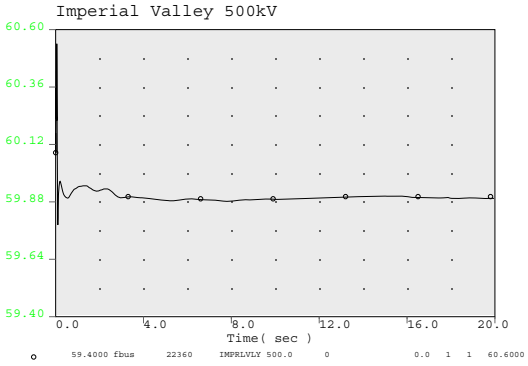
CENTRALS 500kV



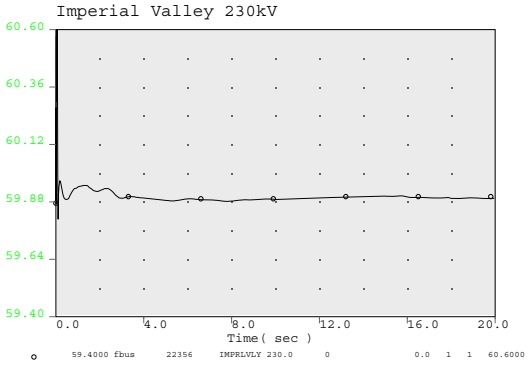
C1 C2 Light Load Post With Upgrades

FREQUENCY

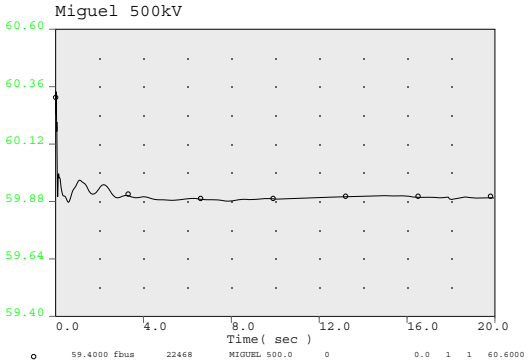
Imperial Valley 500kV



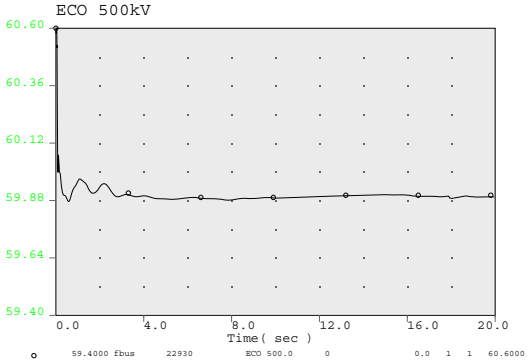
Imperial Valley 230kV



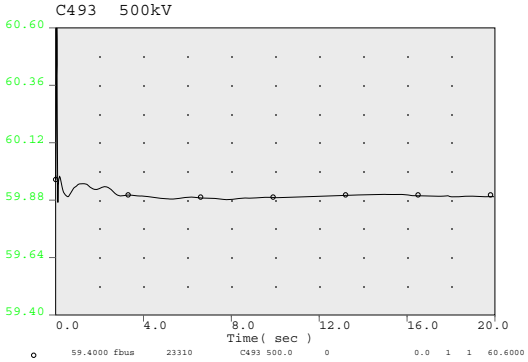
Miguel 500kV



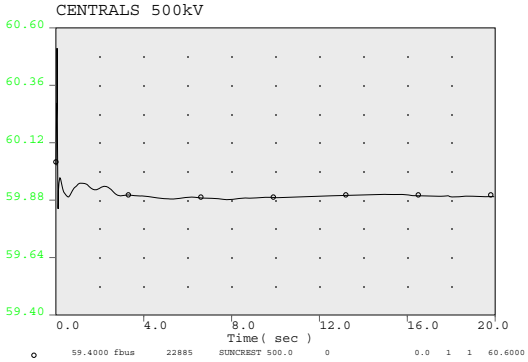
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Light Load Post With Upgrades

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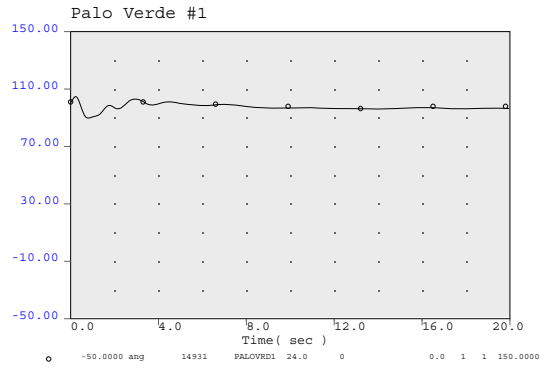
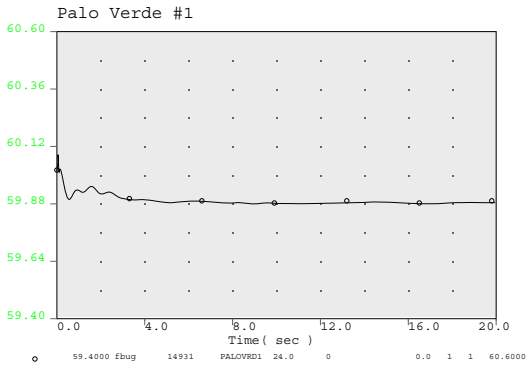
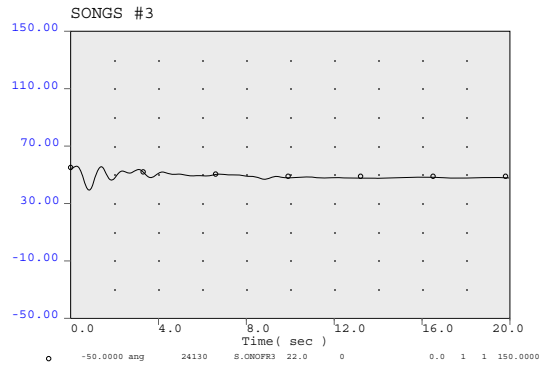
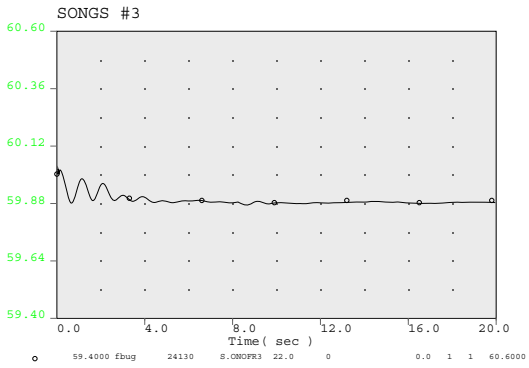
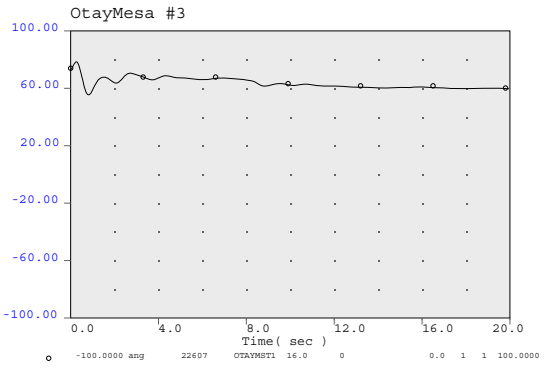
RELATIVE ROTOR ANGLE & FREQUENCY

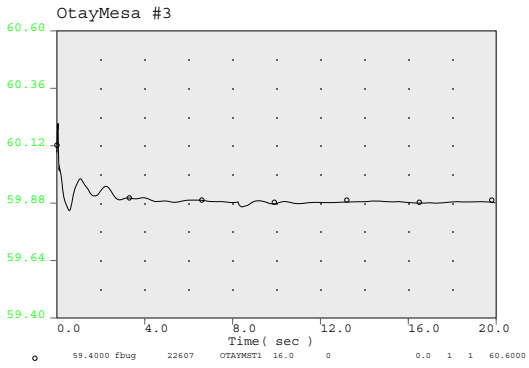












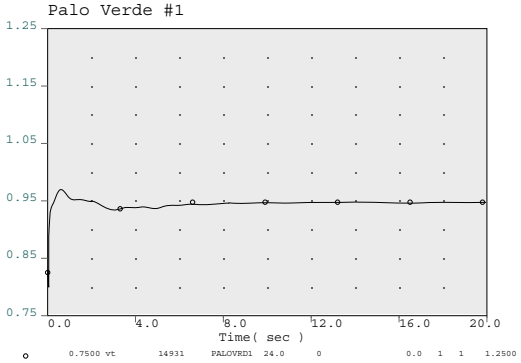
C1 C2 Light Load Post With Upgrades

Page 1

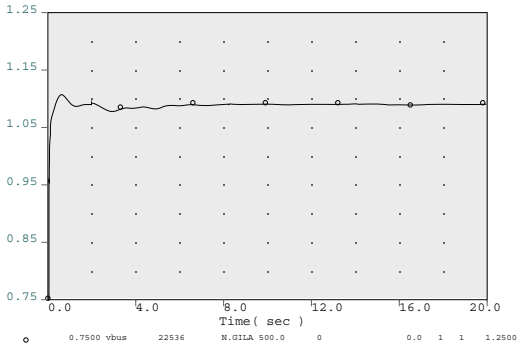
SDGE	tran-c1c2-ll-pstup-r15_IVECO-RASX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:05:00 2011

RELATIVE VOLTAGE

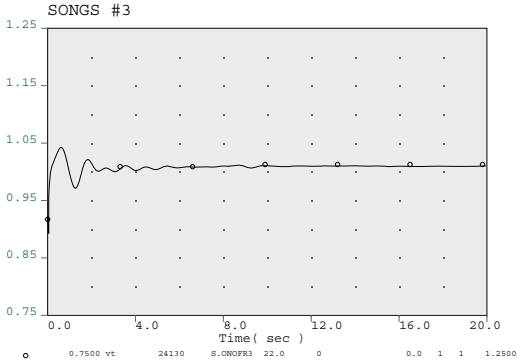
Palo Verde #1



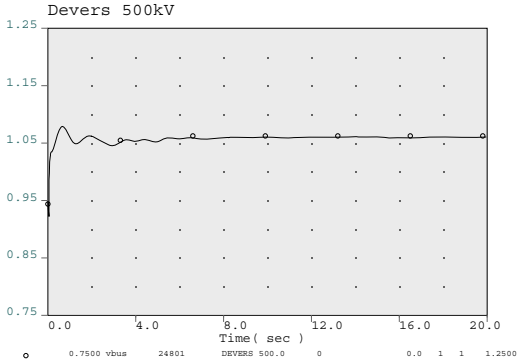
N Gila 500kV



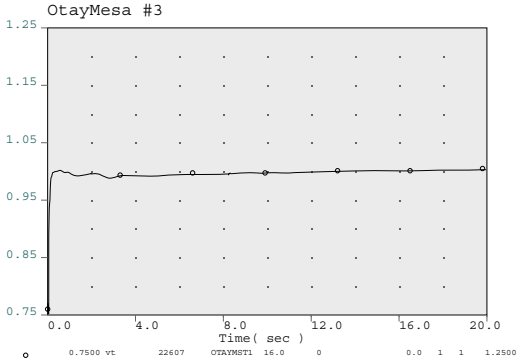
SONGS #3



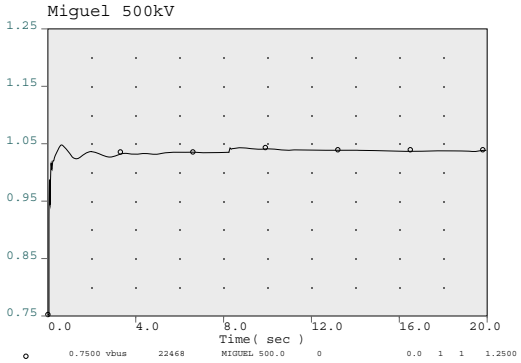
Devers 500kV



OtayMesa #3



Miguel 500kV



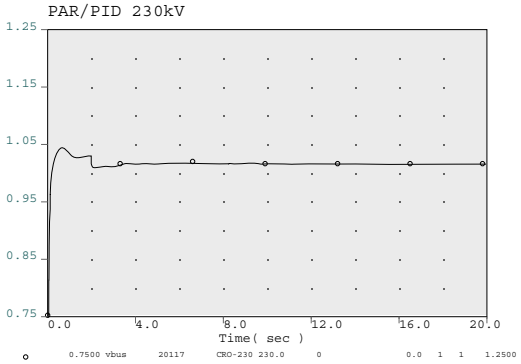
C1 C2 Light Load Post With Upgrades

Page 2

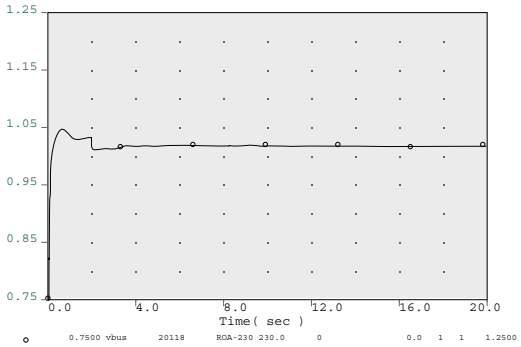
SDGE	tran-c1c2-ll-pstup-r15_IVECO-RASX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:05:01 2011

Affected System Voltage Check and Comparison

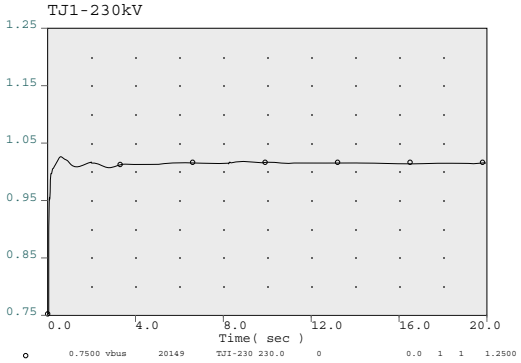
PAR/PID 230kV



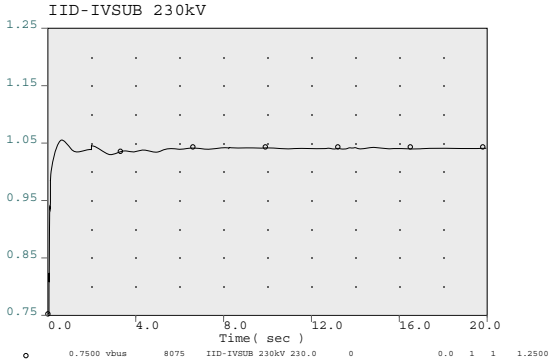
ROA-230kV



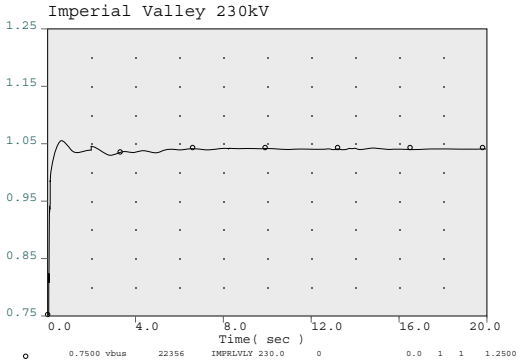
TJ1-230kV



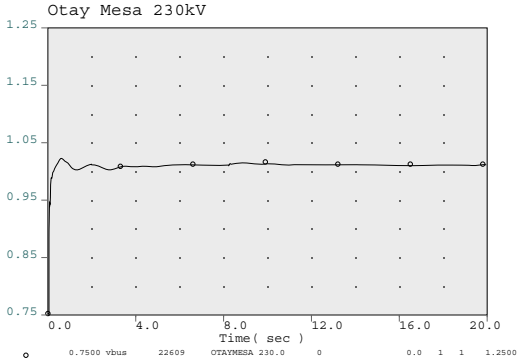
IID-IVSUB 230kV



Imperial Valley 230kV



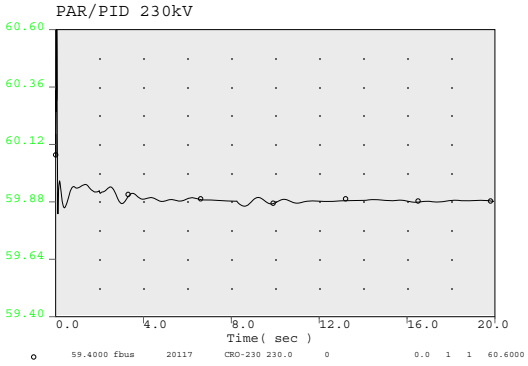
Otay Mesa 230kV



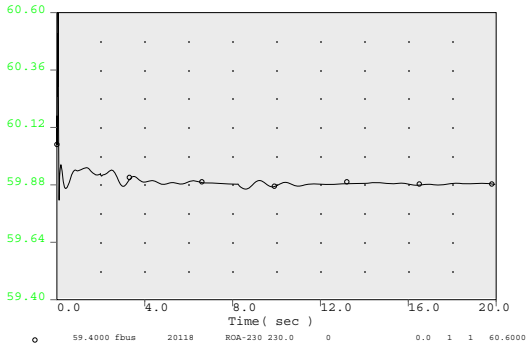
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

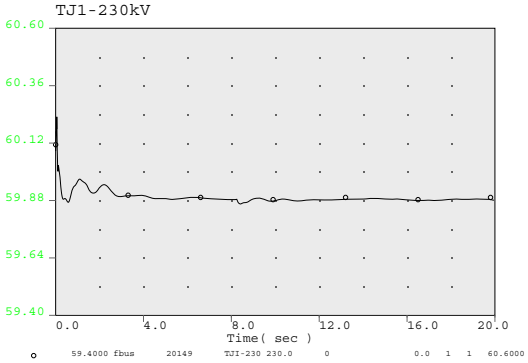
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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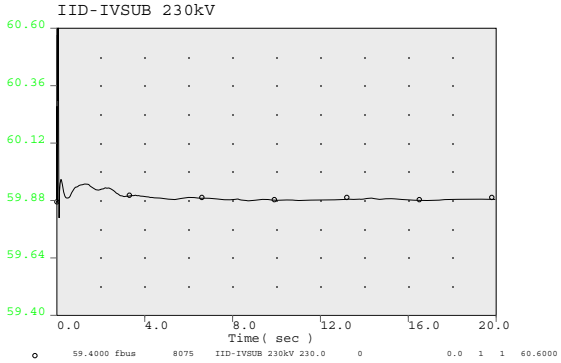
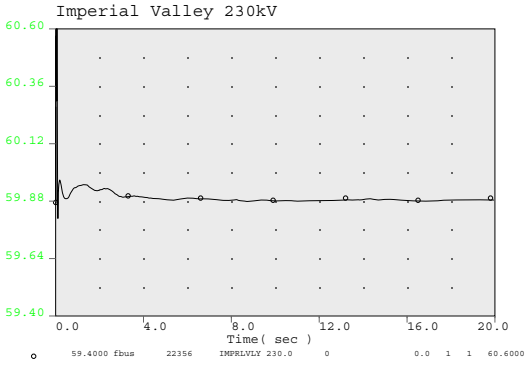
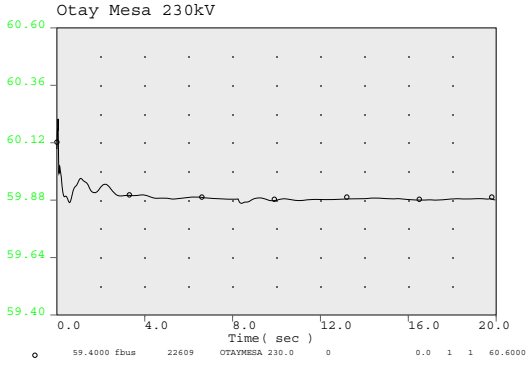


Imperial Valley 230kV



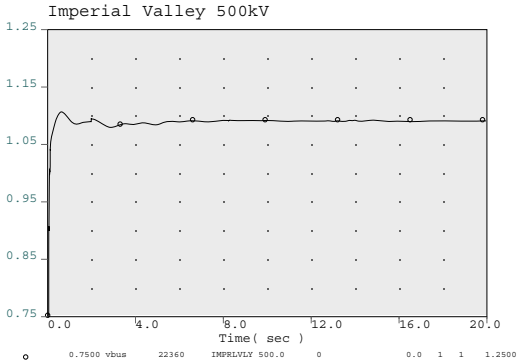
Otay Mesa 230kV



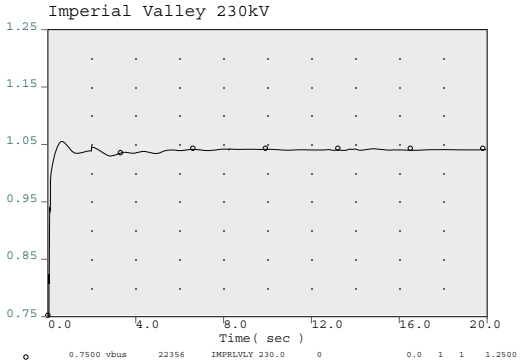
C1 C2 Light Load Post With Upgrades

VOLTAGE

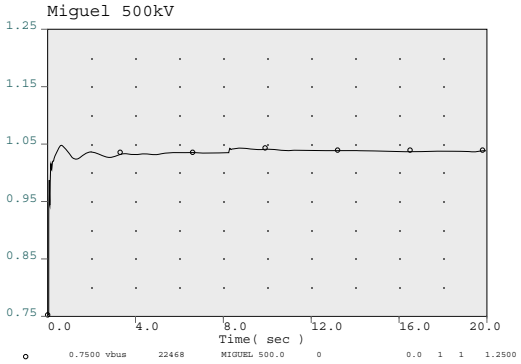
Imperial Valley 500kV



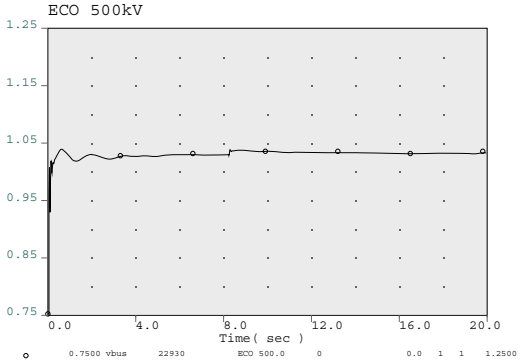
Imperial Valley 230kV



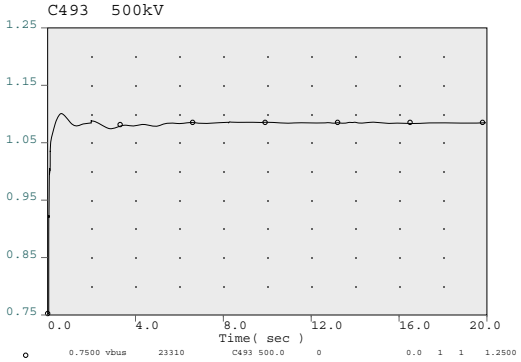
Miguel 500kV



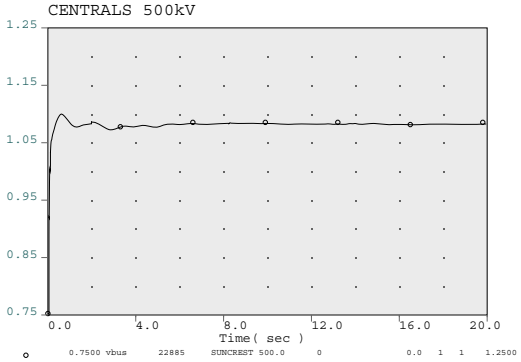
ECO 500kV



C493 500kV



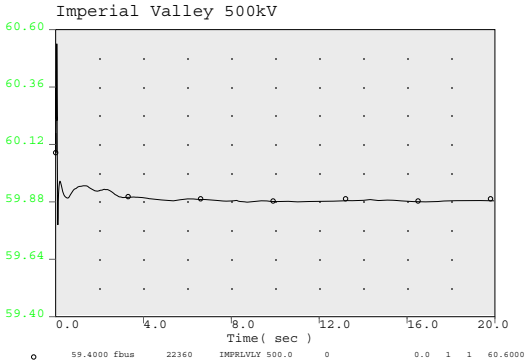
CENTRALS 500kV



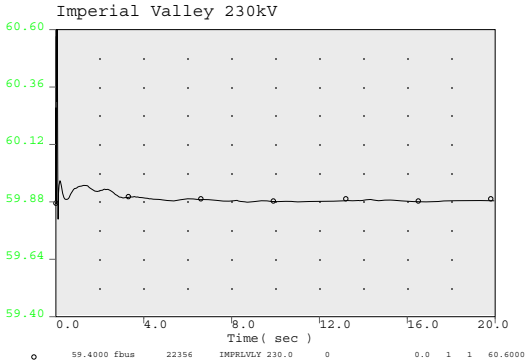
C1 C2 Light Load Post With Upgrades

FREQUENCY

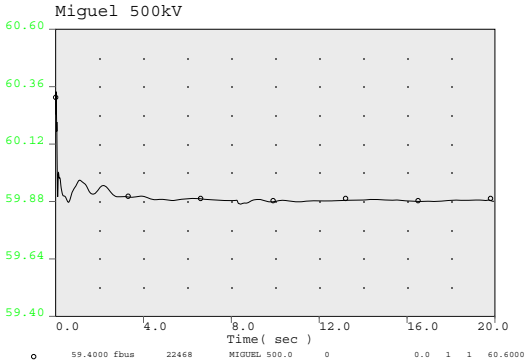
Imperial Valley 500kV



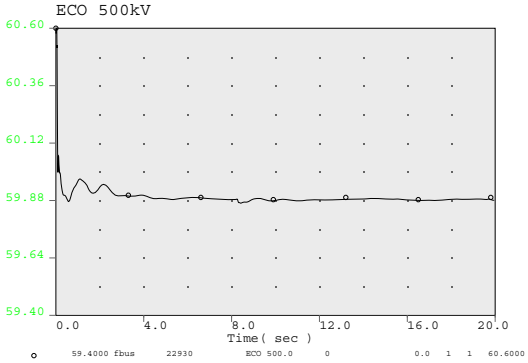
Imperial Valley 230kV



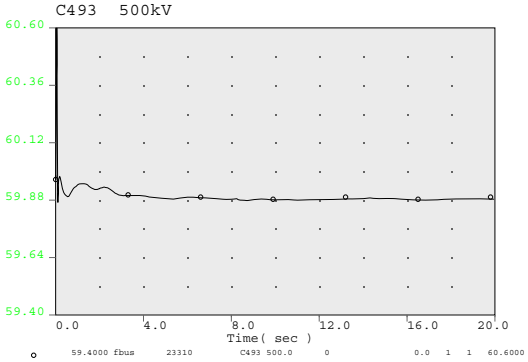
Miguel 500kV



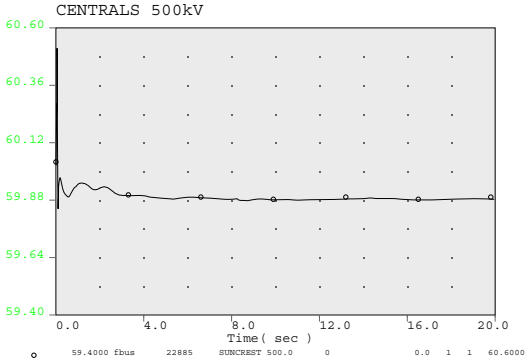
ECO 500kV



C493 500kV

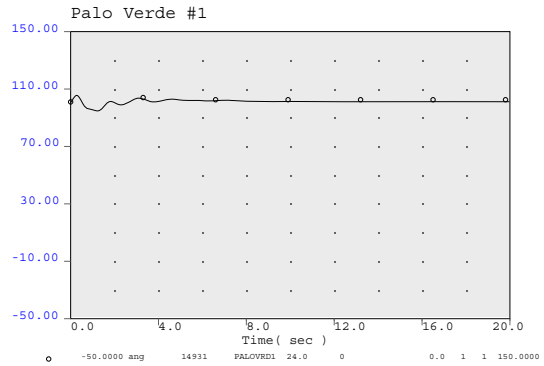


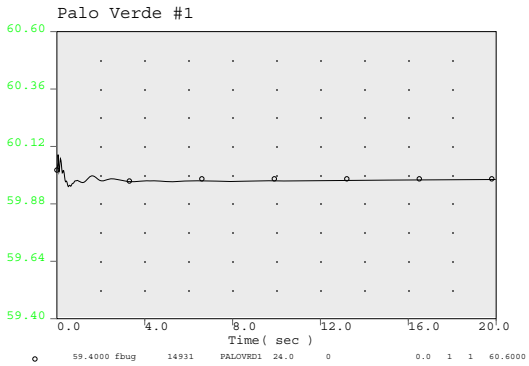
CENTRALS 500kV

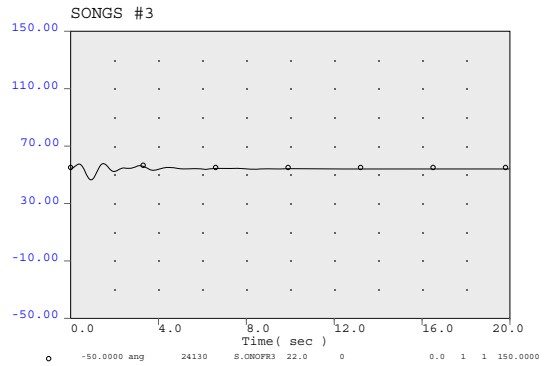


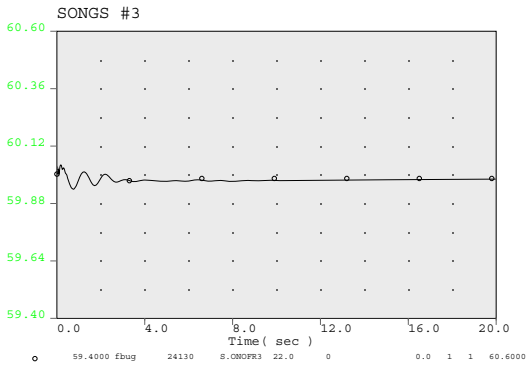
C1 C2 Light Load Post With Upgrades

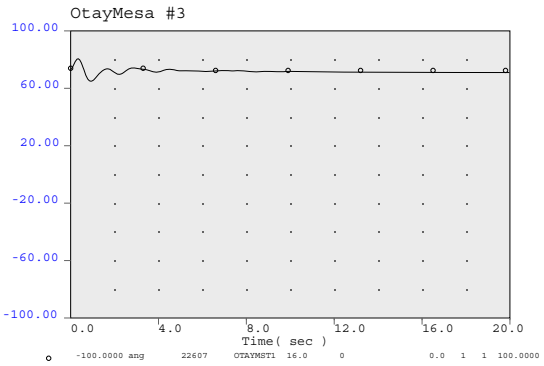
RELATIVE ROTOR ANGLE & FREQUENCY

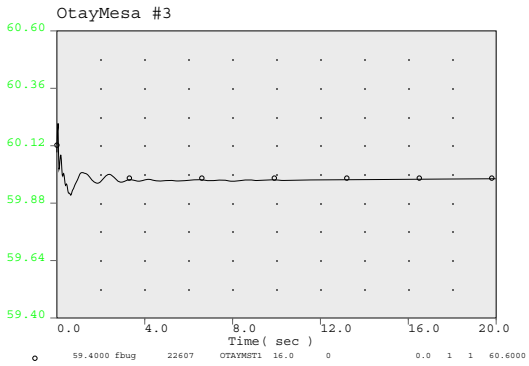












C1 C2 Light Load Post With Upgrades

Page 1

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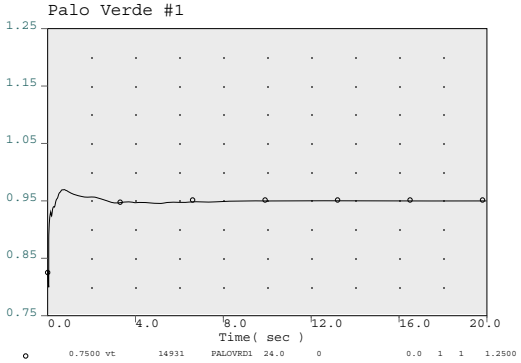
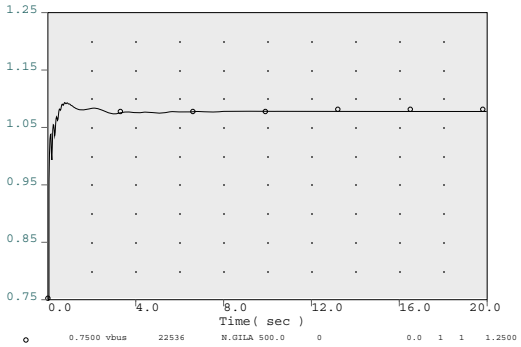
RELATIVE VOLTAGE

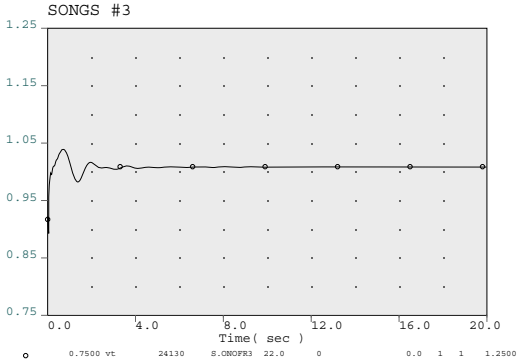
Palo Verde #1



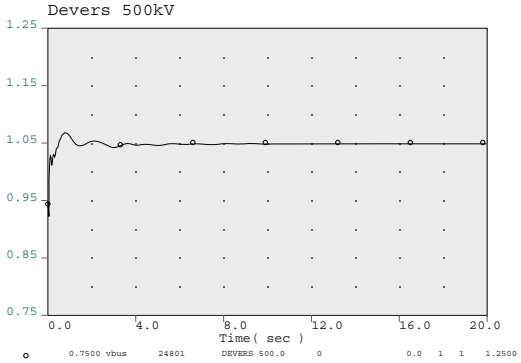
N Gila 500kV



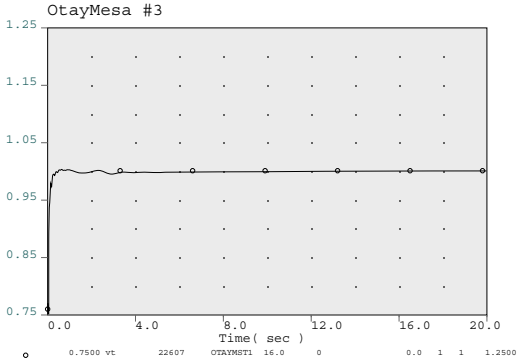
SONGS #3



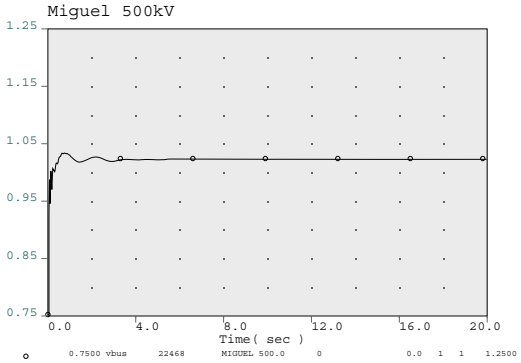
Devers 500kV



OtayMesa #3



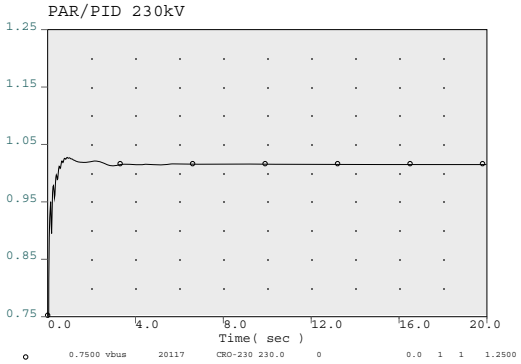
Miguel 500kV



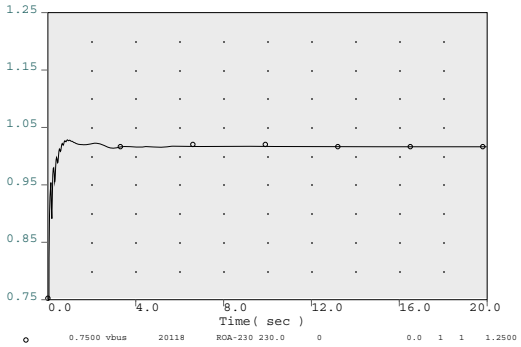
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

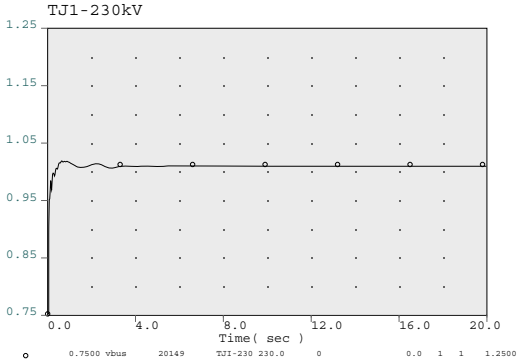
PAR/PID 230kV



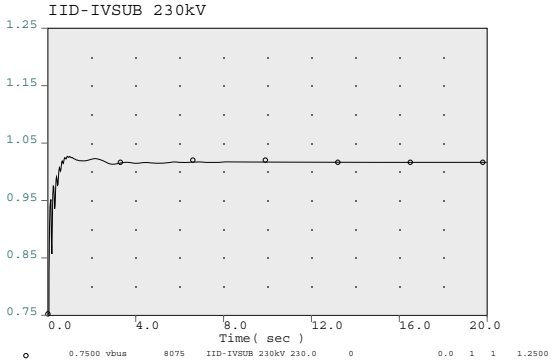
ROA-230kV



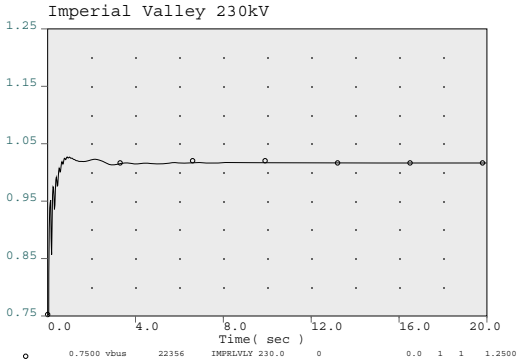
TJ1-230kV



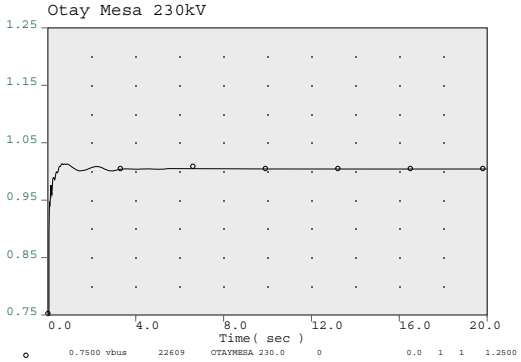
IID-IVSUB 230kV



Imperial Valley 230kV



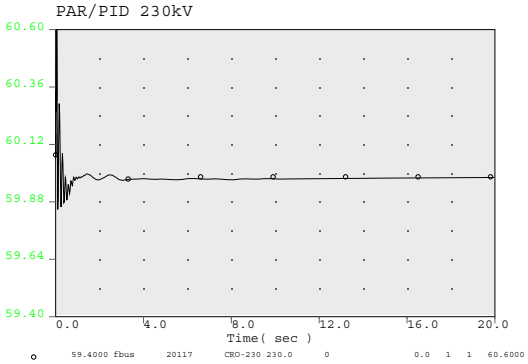
Otay Mesa 230kV



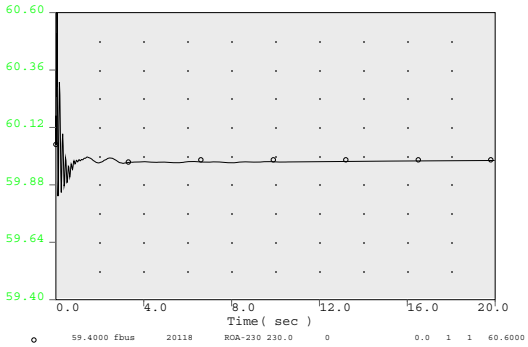
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

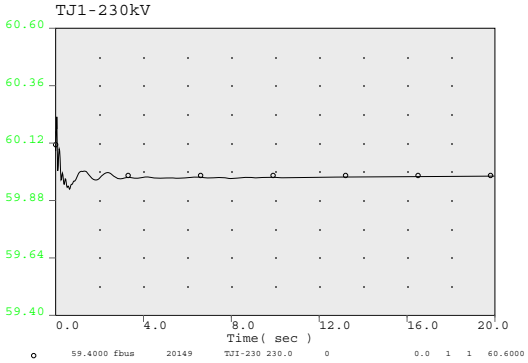
PAR/PID 230kV



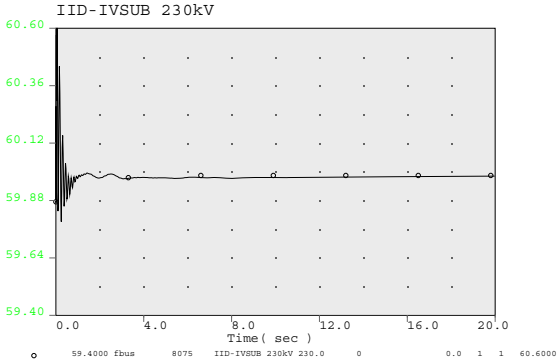
ROA-230kV



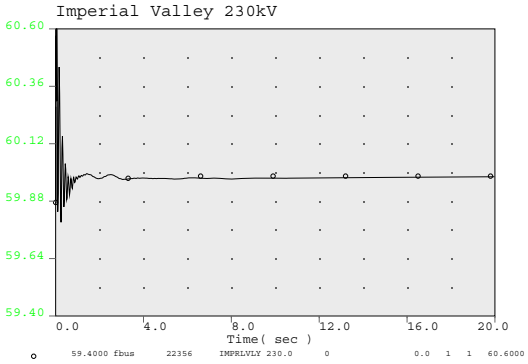
TJ1-230kV



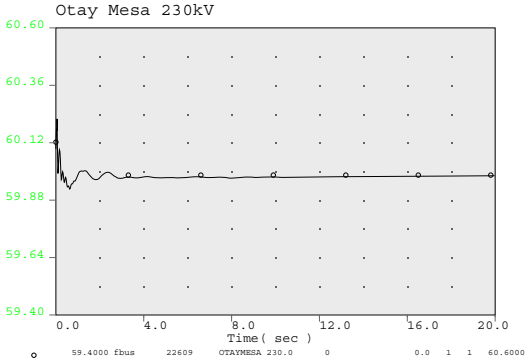
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



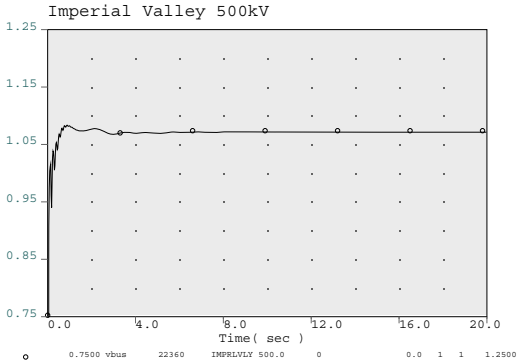
C1 C2 Light Load Post With Upgrades

Page 4

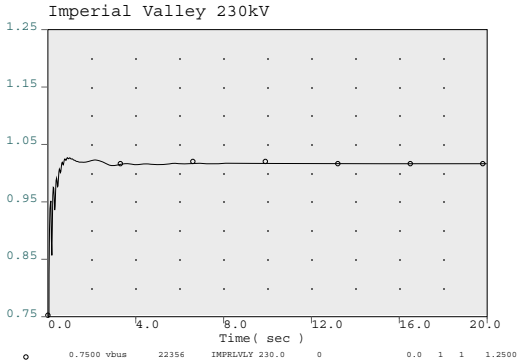
SDGE	tran-c1c2-ll-pstup-r15_IV-ECO-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:57:09 2011

VOLTAGE

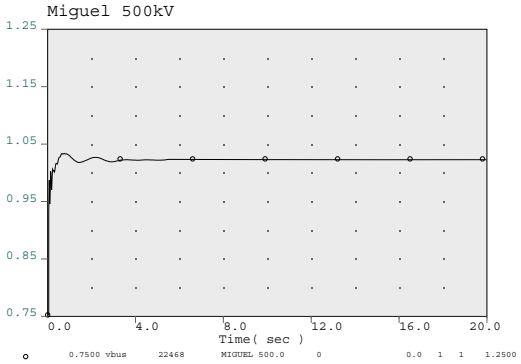
Imperial Valley 500kV



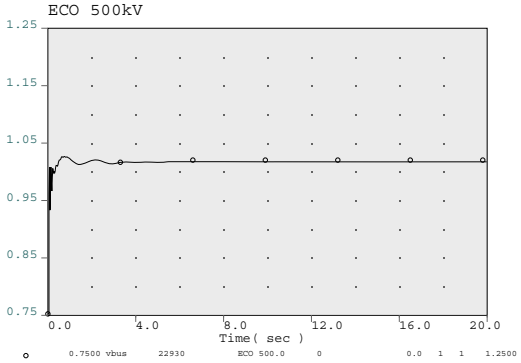
Imperial Valley 230kV



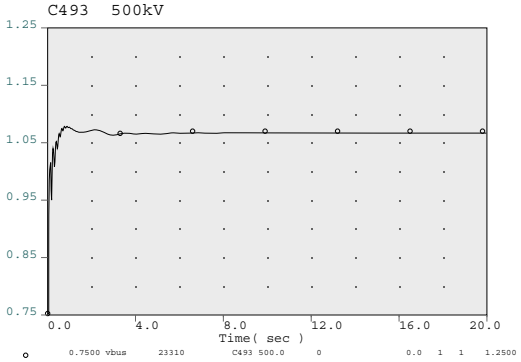
Miguel 500kV



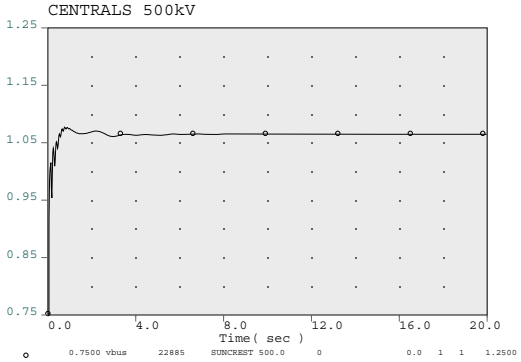
ECO 500kV



C493 500kV



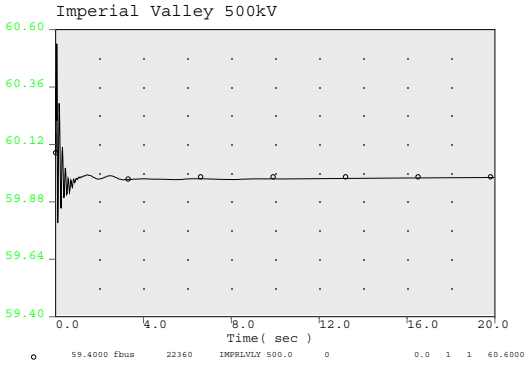
CENTRALS 500kV



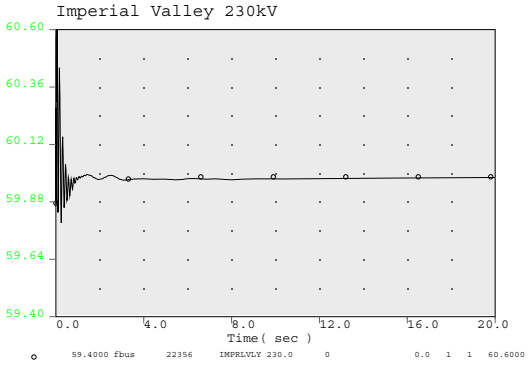
C1 C2 Light Load Post With Upgrades

FREQUENCY

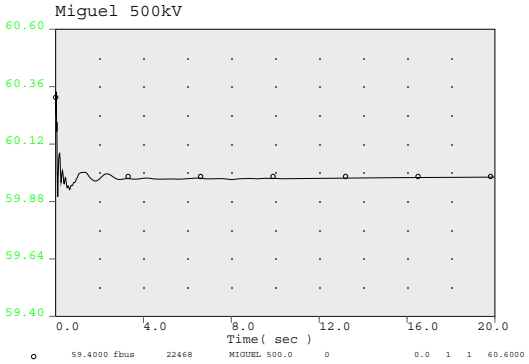
Imperial Valley 500kV



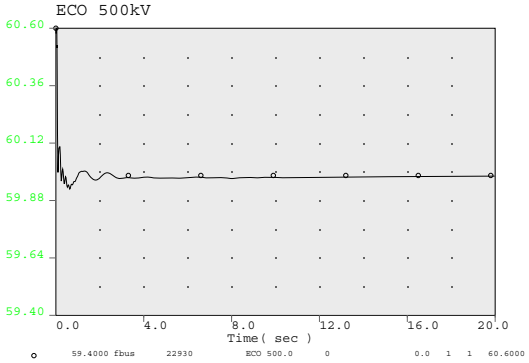
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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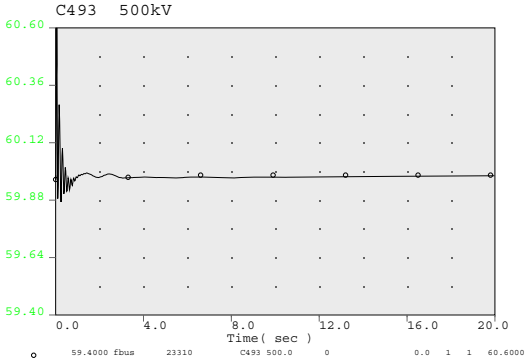
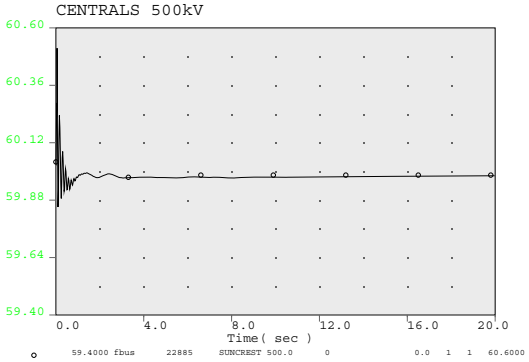


CENTRALS 500kV

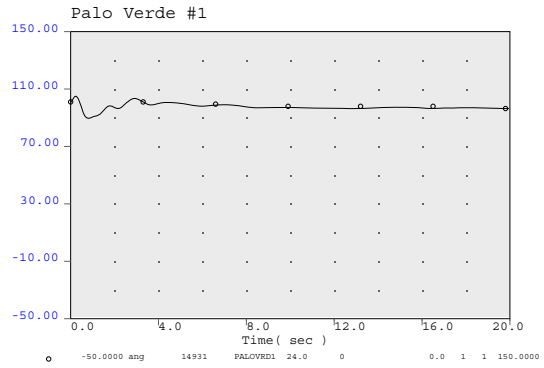


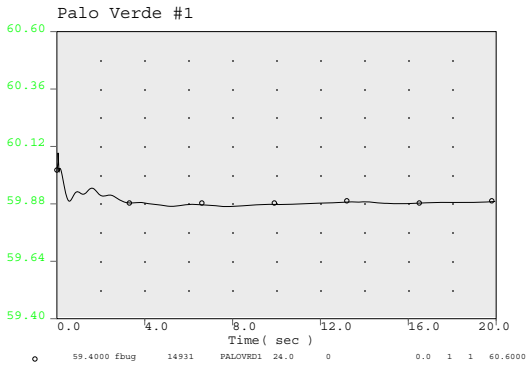
C1 C2 Light Load Post With Upgrades

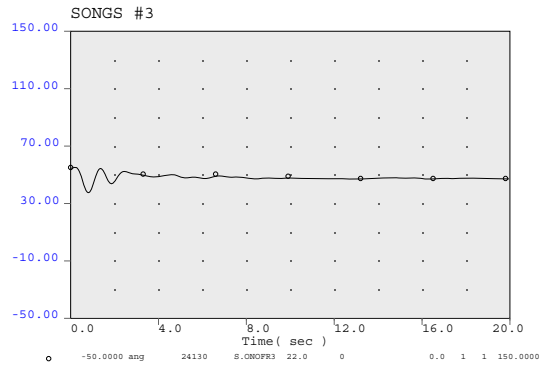
Page 6

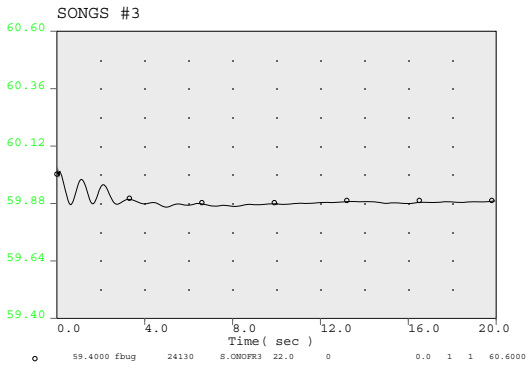
SDGE	tran-c1c2-ll-pstup-r15_IV-ECO-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:57:10 2011

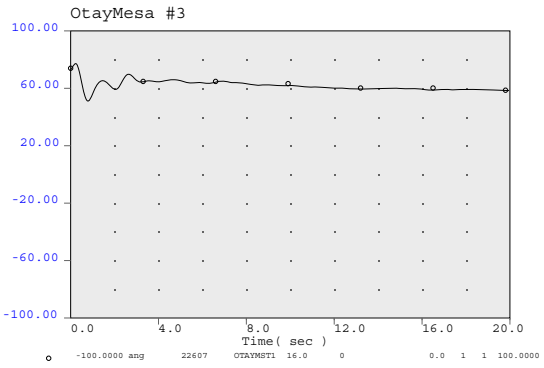
RELATIVE ROTOR ANGLE & FREQUENCY

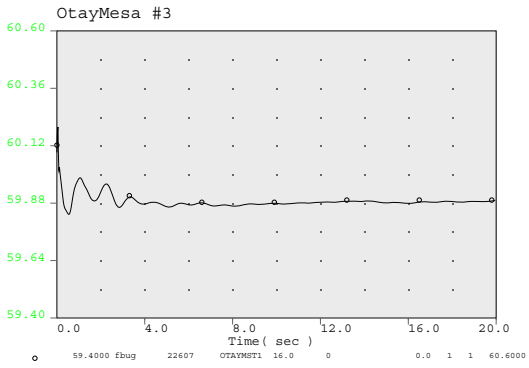












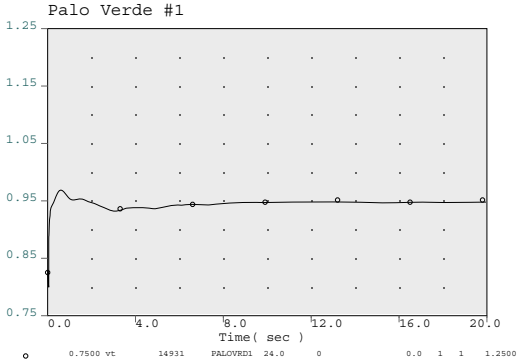
C1 C2 Light Load Post With Upgrades

Page 1

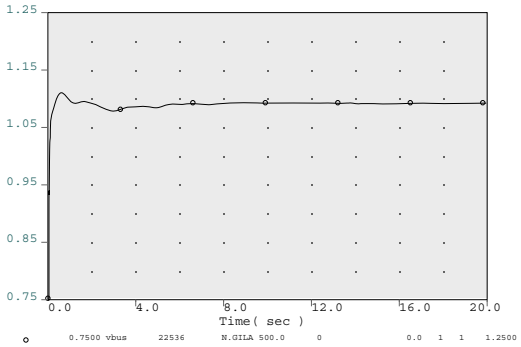
SDGE	tran-c1c2-ll-pstup-r15_IV-RAS-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:58:55 2011

RELATIVE VOLTAGE

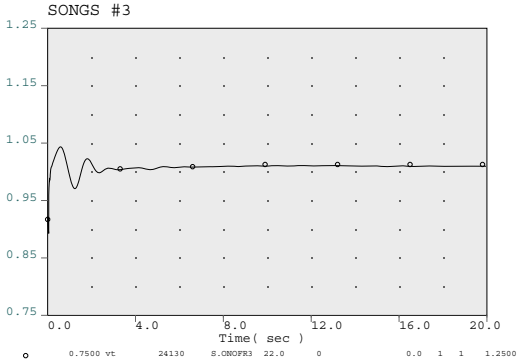
Palo Verde #1



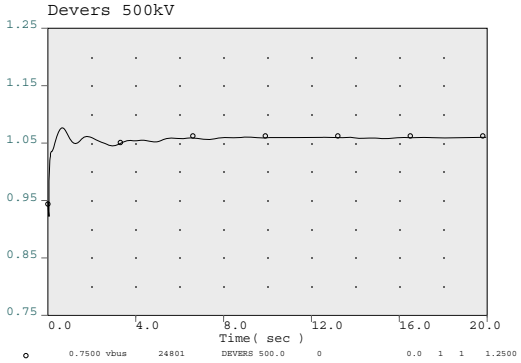
N Gila 500kV



SONGS #3



Devers 500kV



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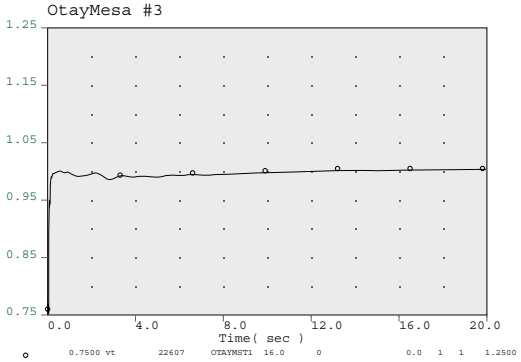
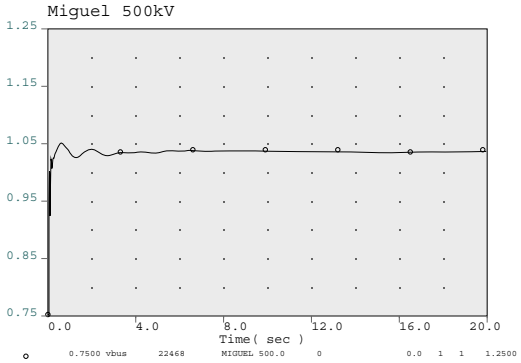


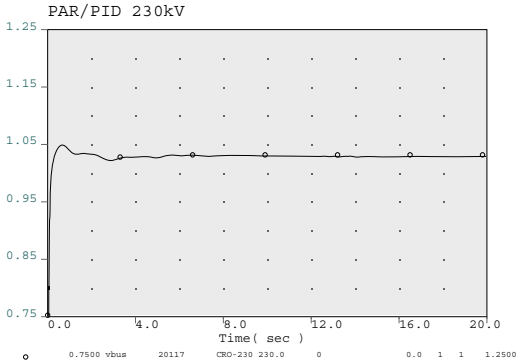
Miguel 500kV



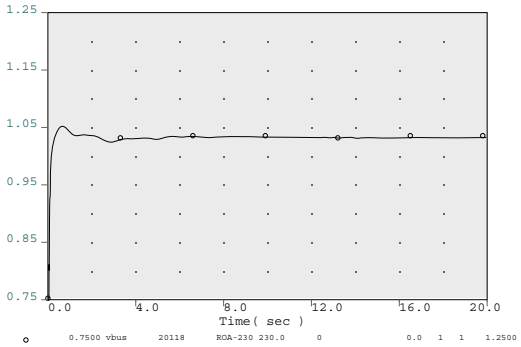
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

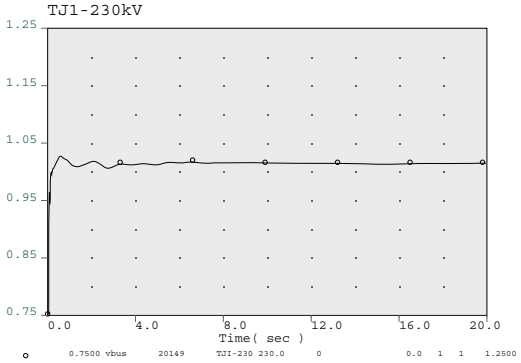
PAR/PID 230kV



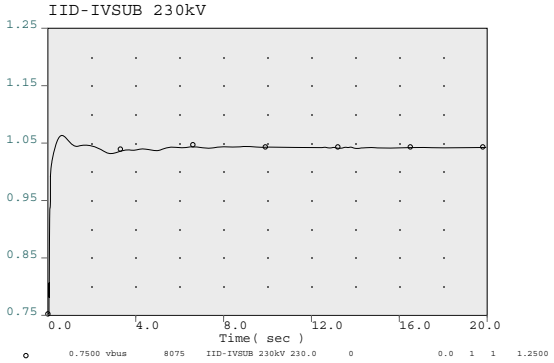
ROA-230kV



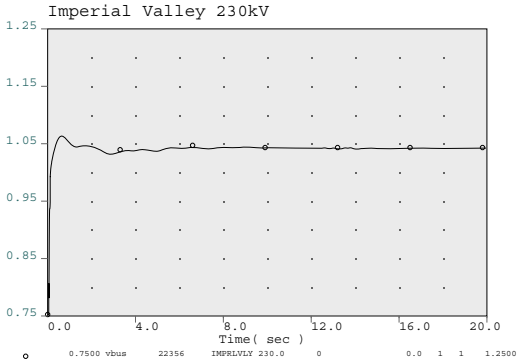
TJ1-230kV



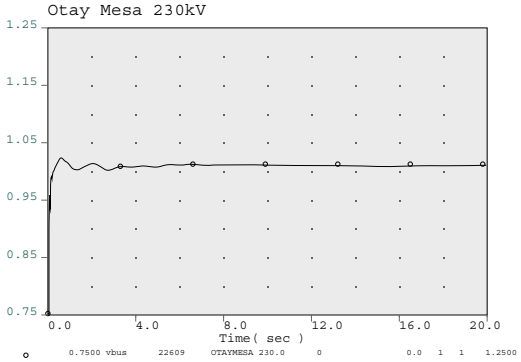
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



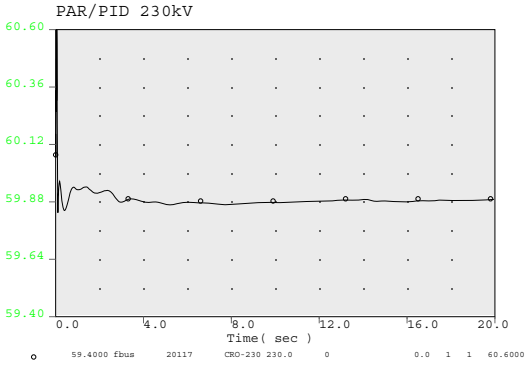
C1 C2 Light Load Post With Upgrades

Page 3

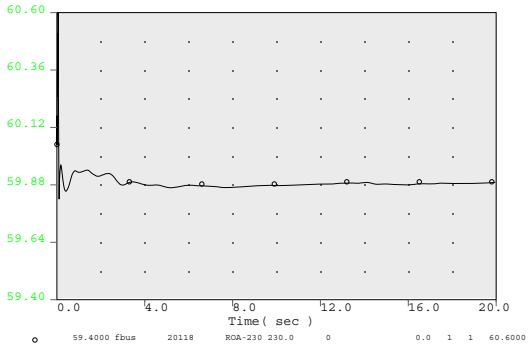
SDGE	tran-c1c2-ll-pstup-r15_IV-RAS-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 14:58:56 2011

Affected System Frequency Check and Comparison

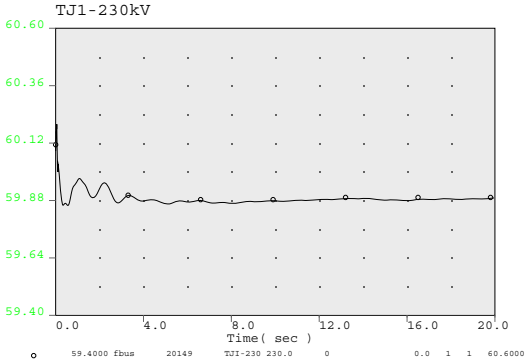
PAR/PID 230kV



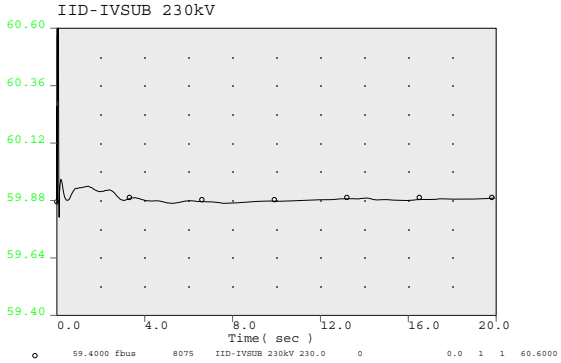
ROA-230kV



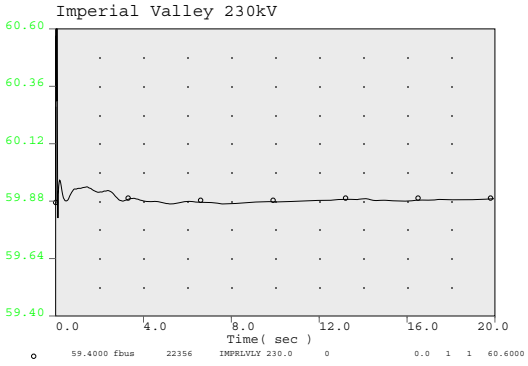
TJ1-230kV



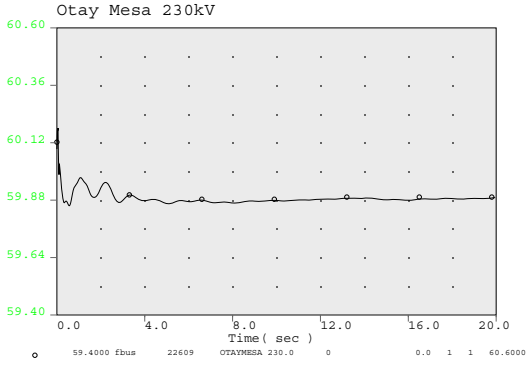
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Post With Upgrades

Page 4

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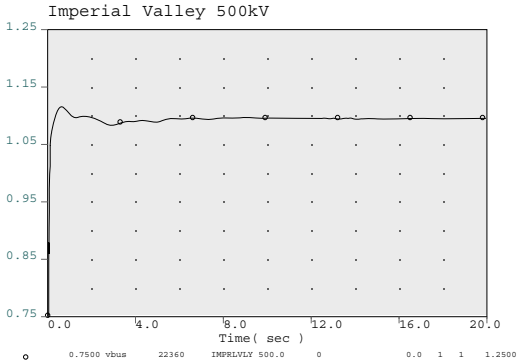
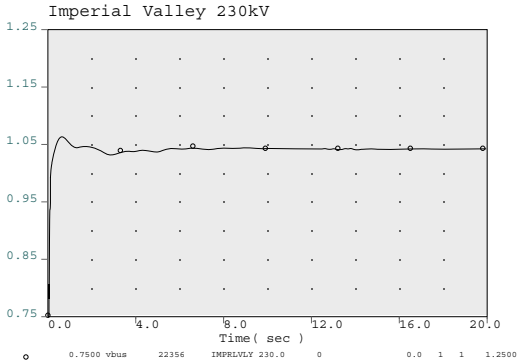
VOLTAGE

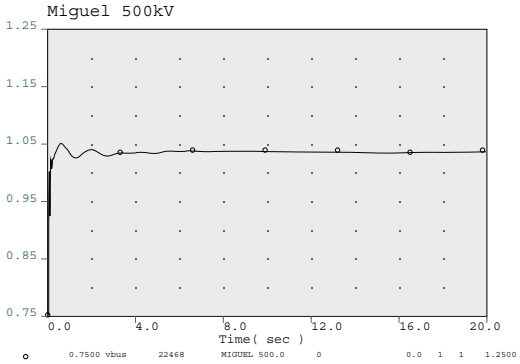
Imperial Valley 500kV



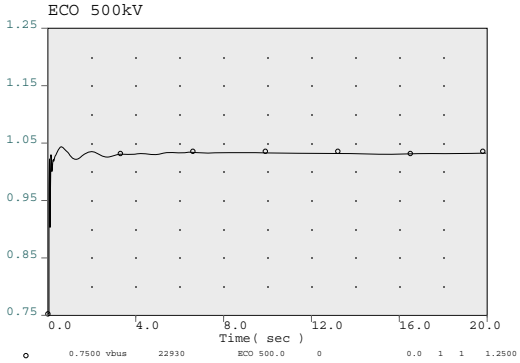
Imperial Valley 230kV



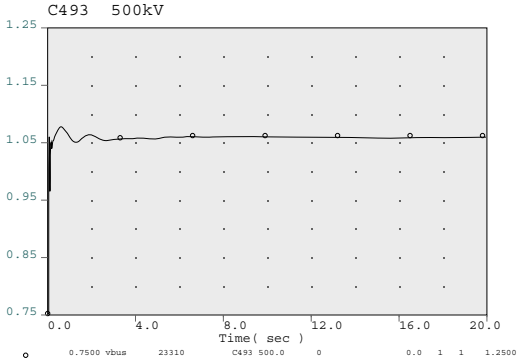
Miguel 500kV



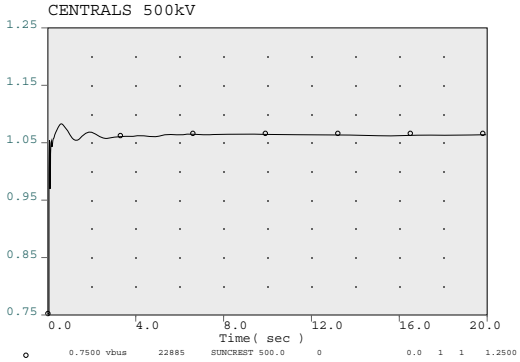
ECO 500kV



C493 500kV

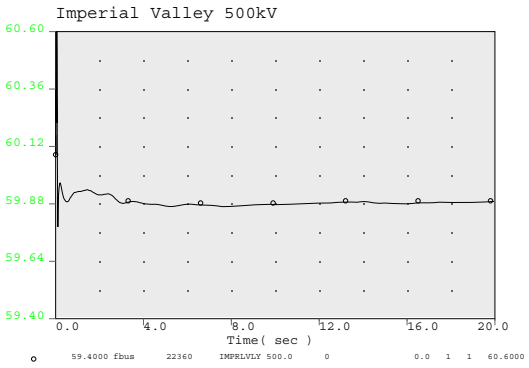


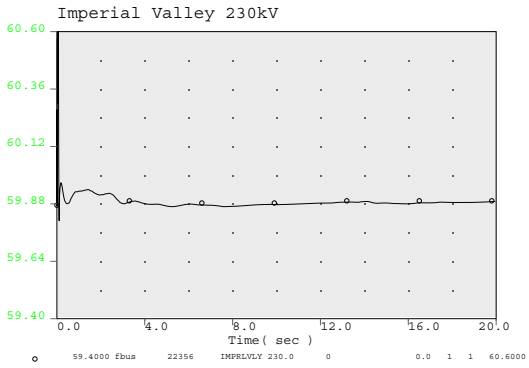
CENTRALS 500kV

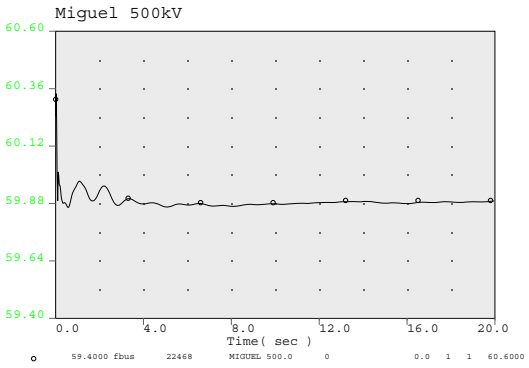


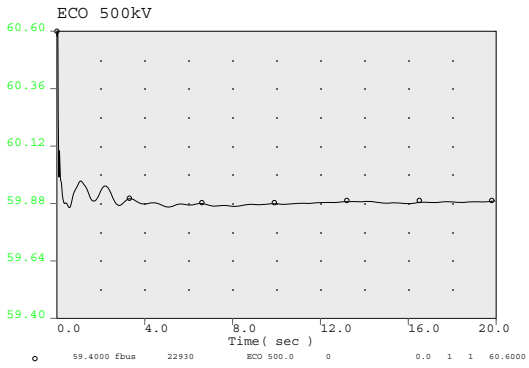
C1 C2 Light Load Post With Upgrades

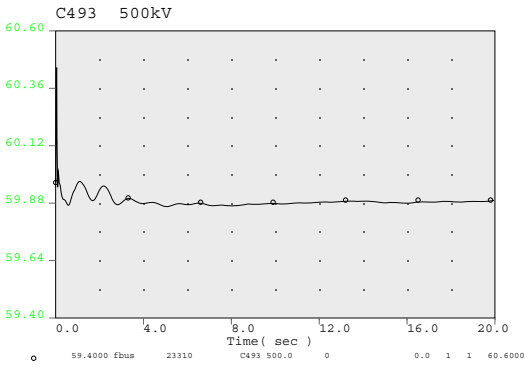
FREQUENCY

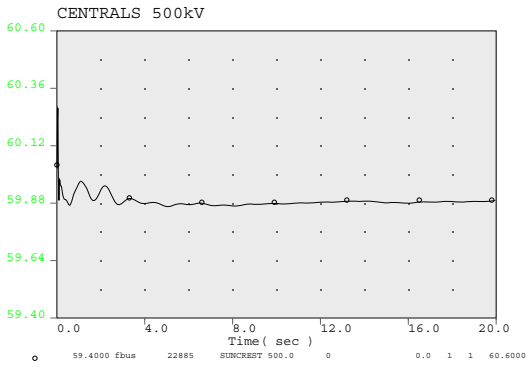






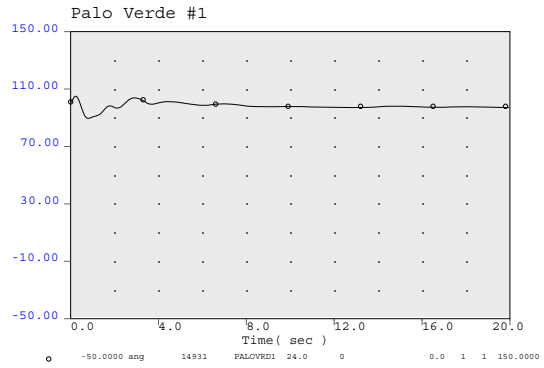


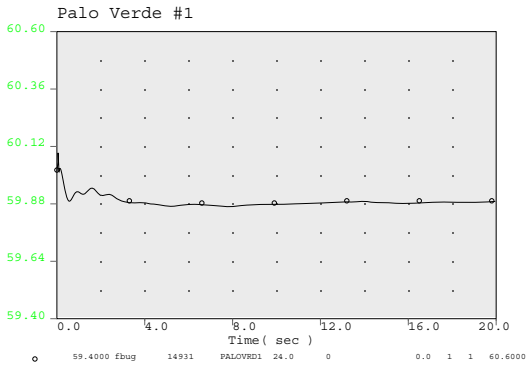


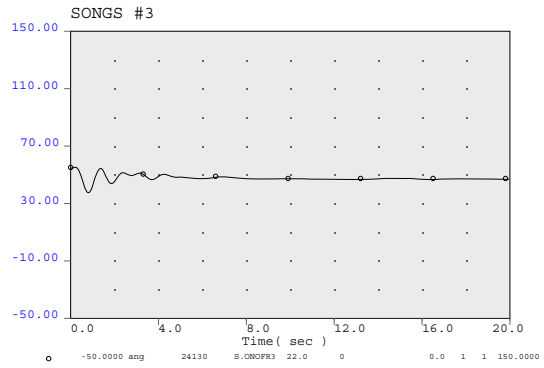


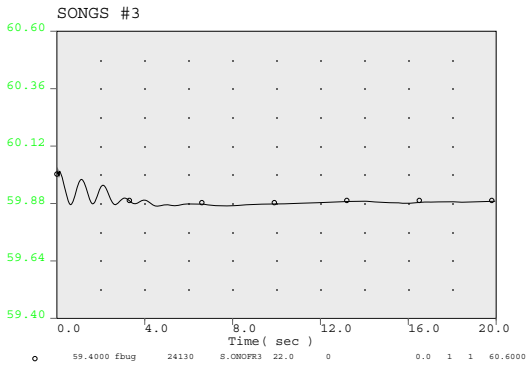
C1 C2 Light Load Post With Upgrades

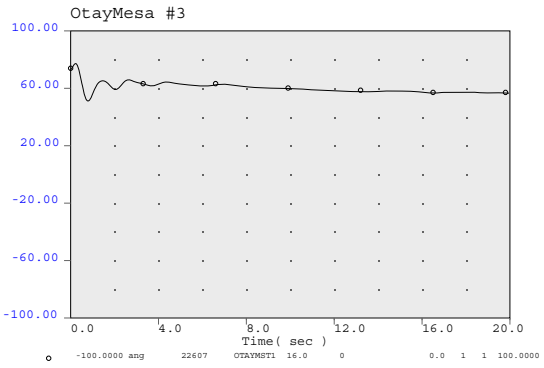
RELATIVE ROTOR ANGLE & FREQUENCY

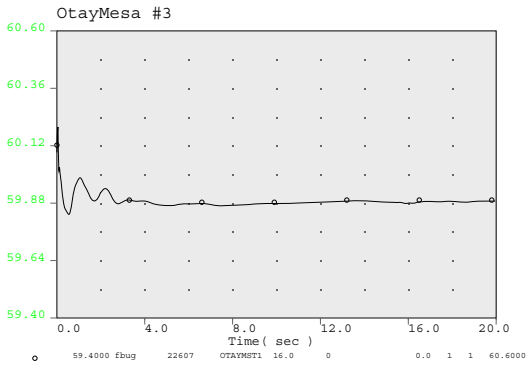










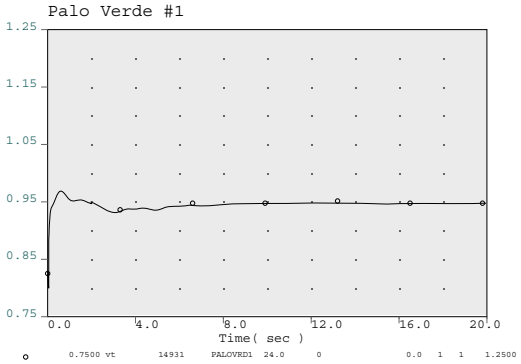


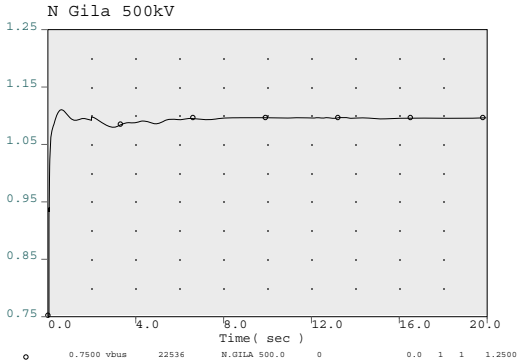
C1 C2 Light Load Post With Upgrades

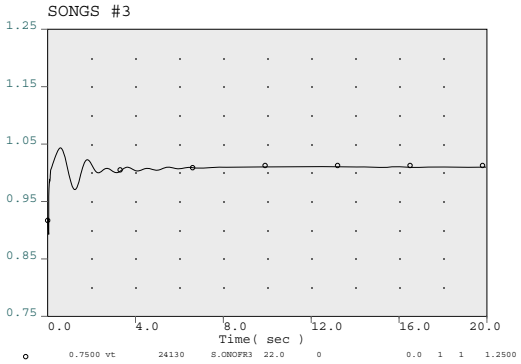
Page 1

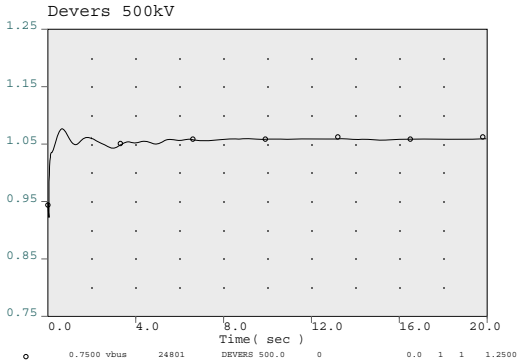
SDGE	tran-c1c2-ll-pstup-r15_IV-RASX-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:01:01 2011

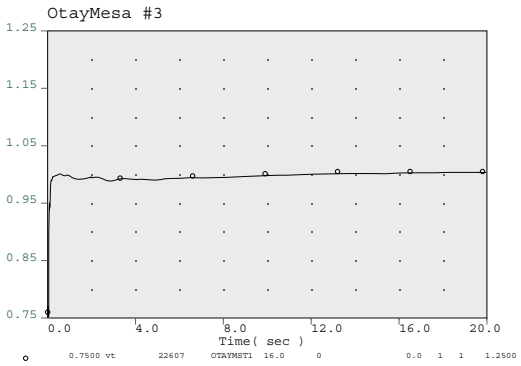
RELATIVE VOLTAGE

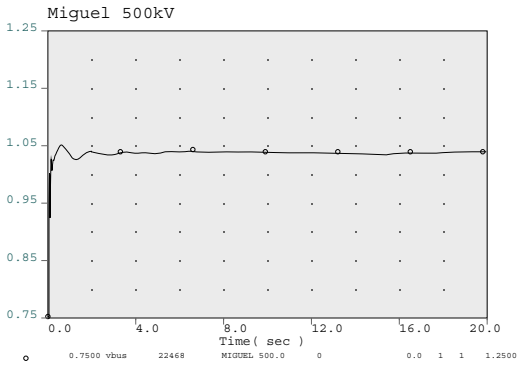












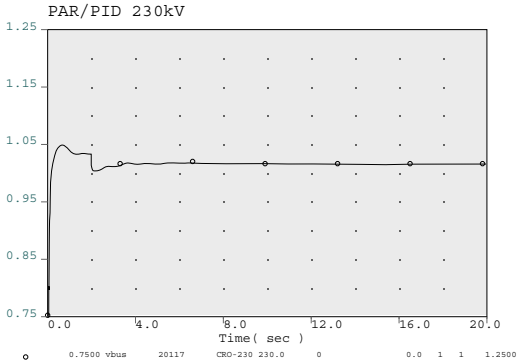
C1 C2 Light Load Post With Upgrades

Page 2

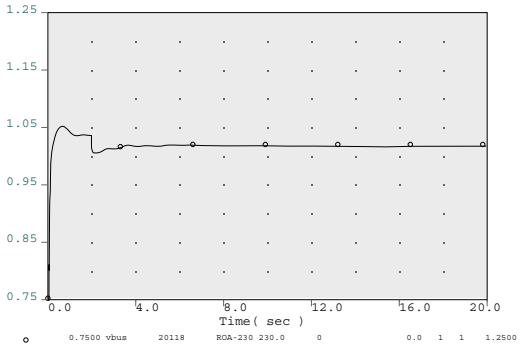
SDGE	tran-c1c2-ll-pstup-r15_IV-RASX-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:01:01 2011

Affected System Voltage Check and Comparison

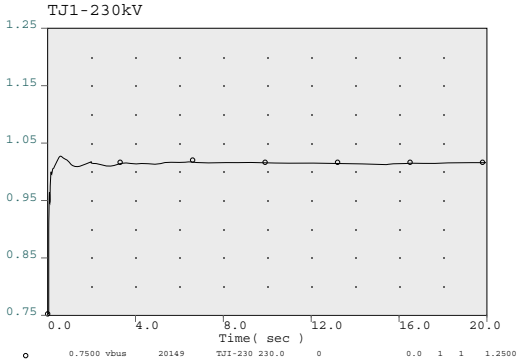
PAR/PID 230kV



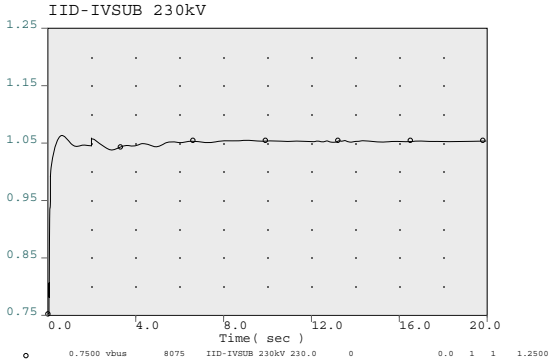
ROA-230kV



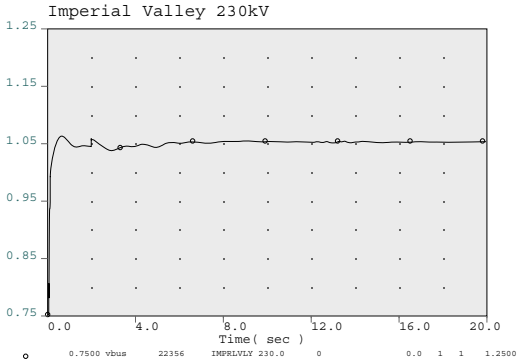
TJ1-230kV



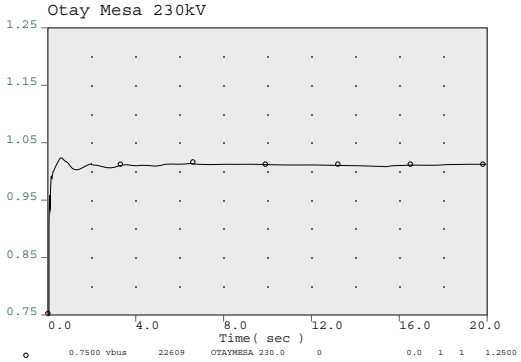
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



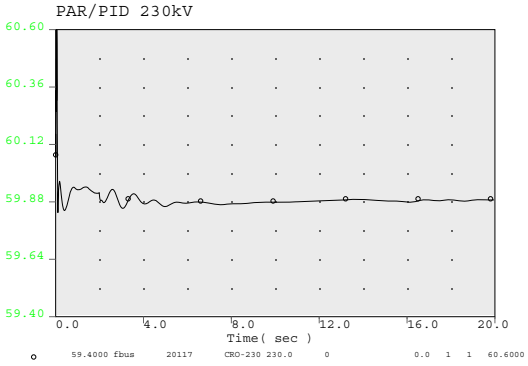
C1 C2 Light Load Post With Upgrades

Page 3

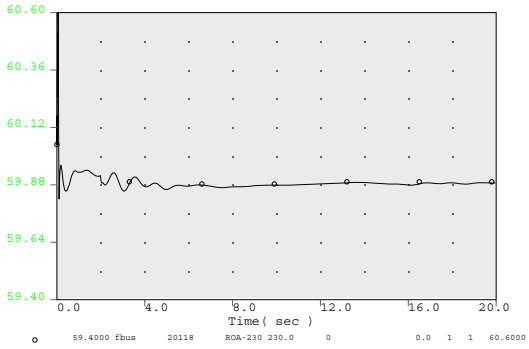
SDGE	tran-c1c2-ll-pstup-r15_IV-RASX-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:01:02 2011

Affected System Frequency Check and Comparison

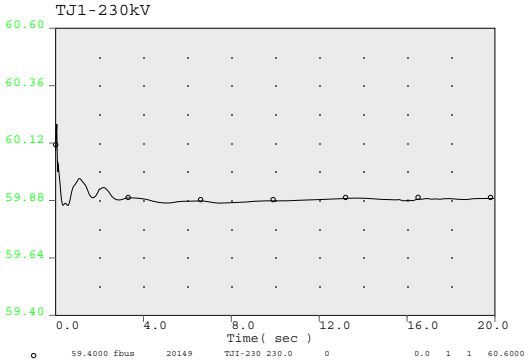
PAR/PID 230kV



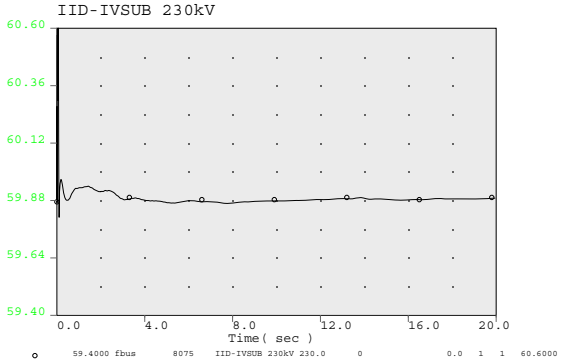
ROA-230kV



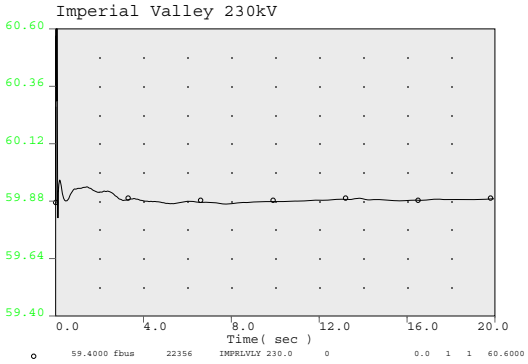
TJ1-230kV



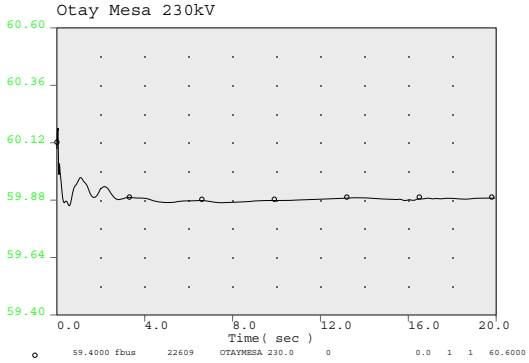
IID-IVSUB 230kV



Imperial Valley 230kV



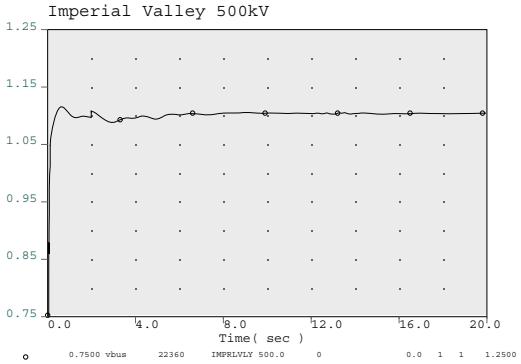
Otay Mesa 230kV



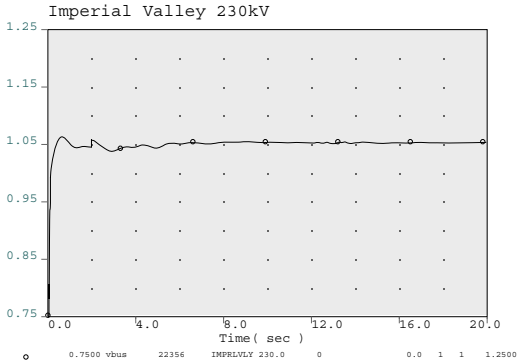
C1 C2 Light Load Post With Upgrades

VOLTAGE

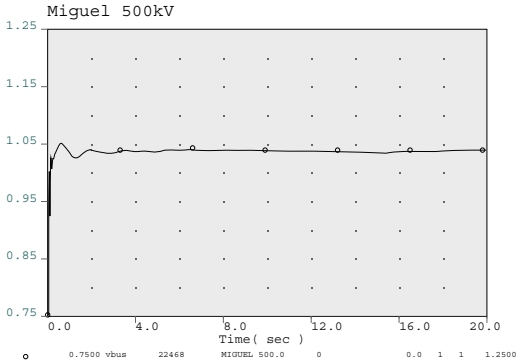
Imperial Valley 500kV



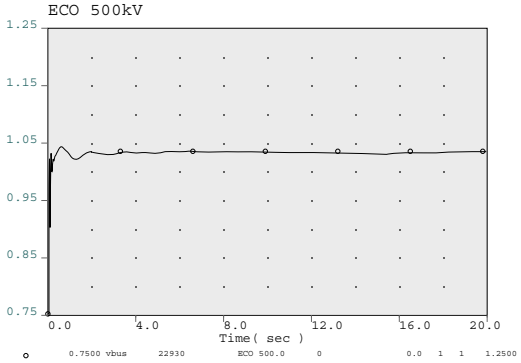
Imperial Valley 230kV



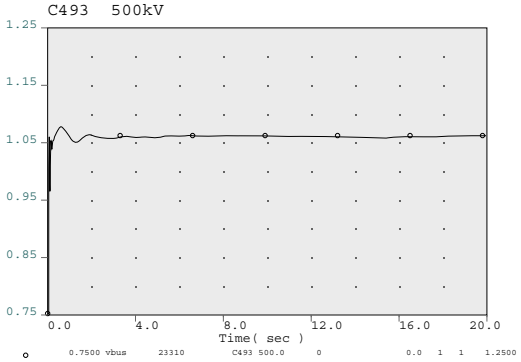
Miguel 500kV



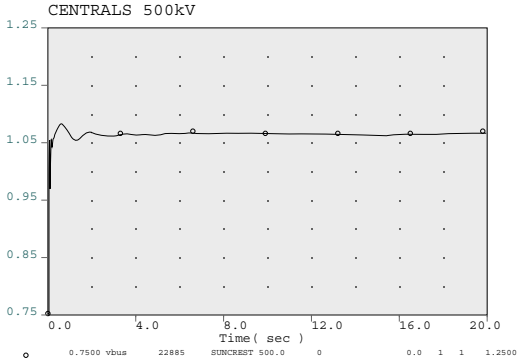
ECO 500kV



C493 500kV



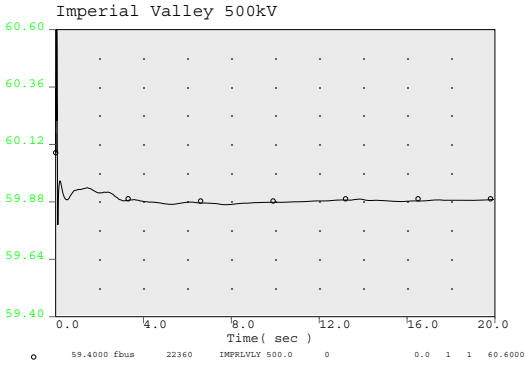
CENTRALS 500kV



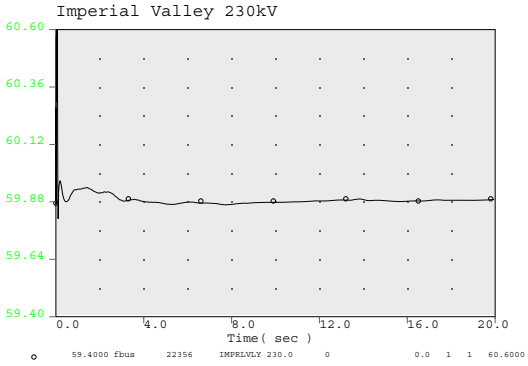
C1 C2 Light Load Post With Upgrades

FREQUENCY

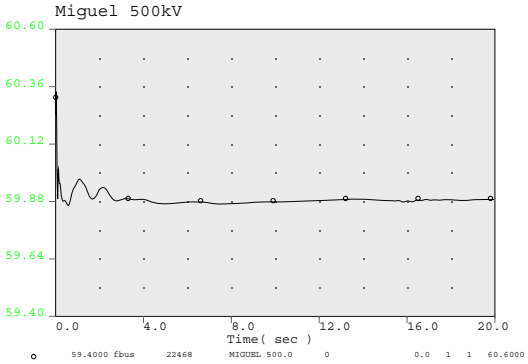
Imperial Valley 500kV



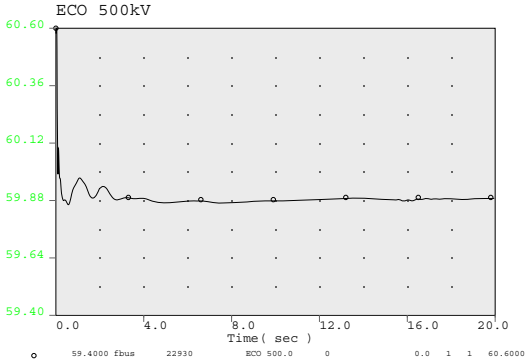
Imperial Valley 230kV



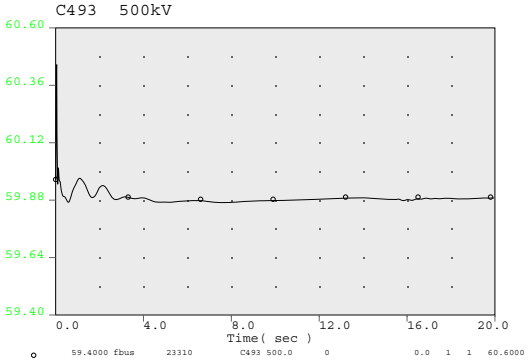
Miguel 500kV



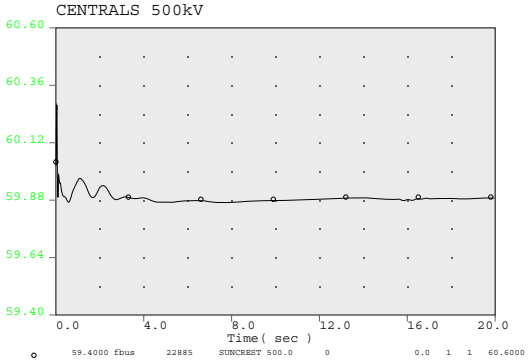
ECO 500kV



C493 500kV



CENTRALS 500kV

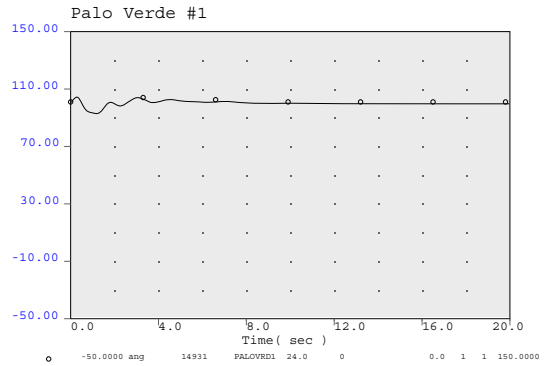


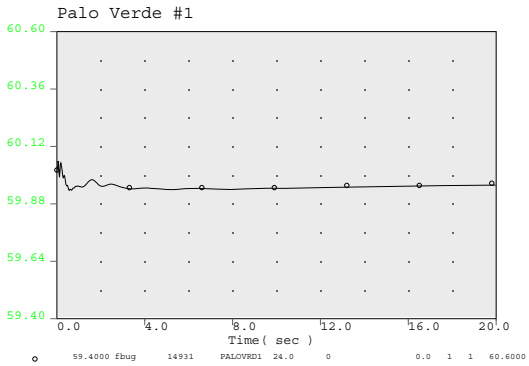
C1 C2 Light Load Post With Upgrades

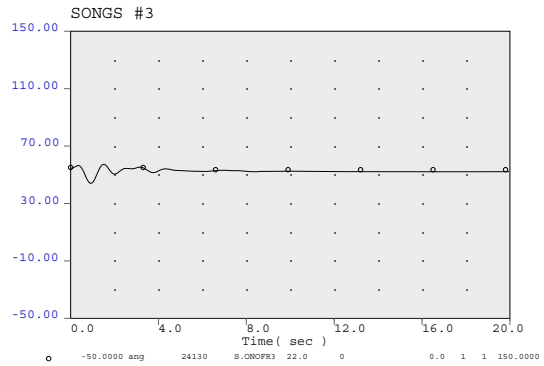
Page 6

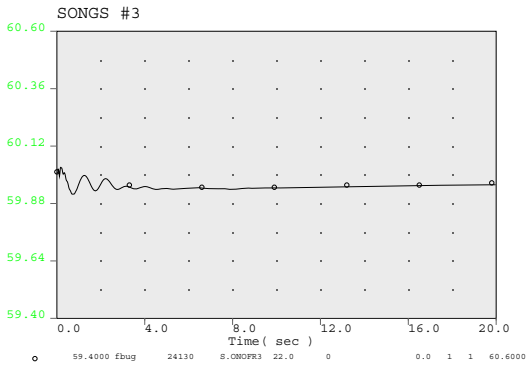
SDGE	tran-c1c2-ll-pstup-r15_IV-RASX-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:01:04 2011

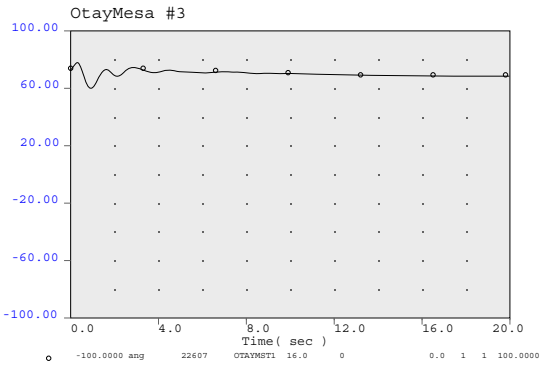
RELATIVE ROTOR ANGLE & FREQUENCY

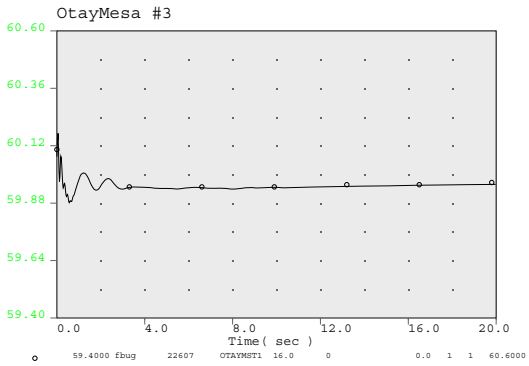












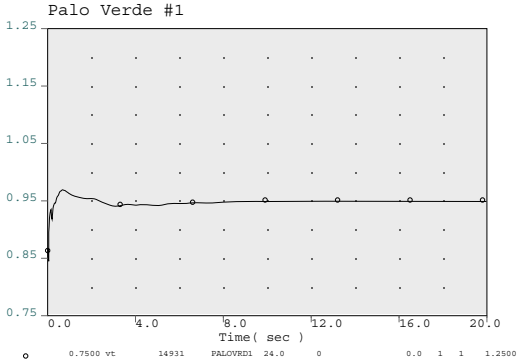
WESTERN ELECTRICITY COORDINATING COUNCIL

Page 1

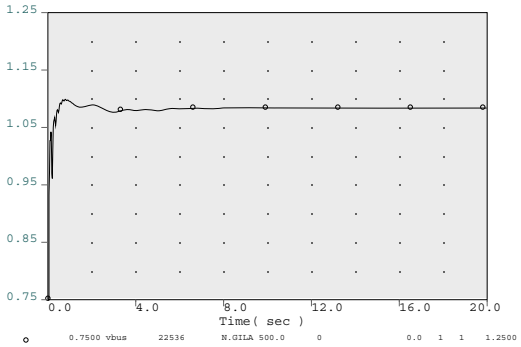
SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_IVROA(IV)-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:06:50 2011

RELATIVE VOLTAGE

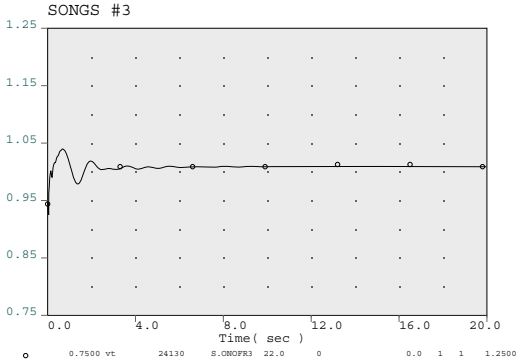
Palo Verde #1



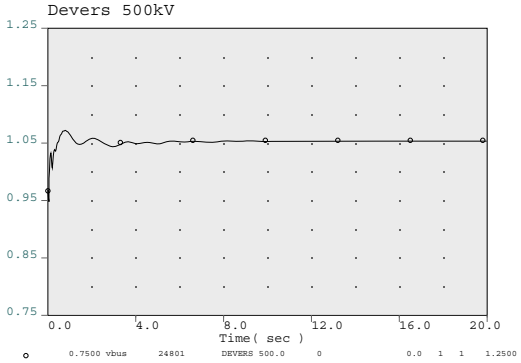
N Gila 500kV



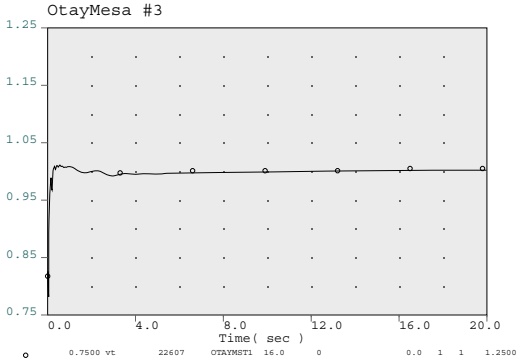
SONGS #3



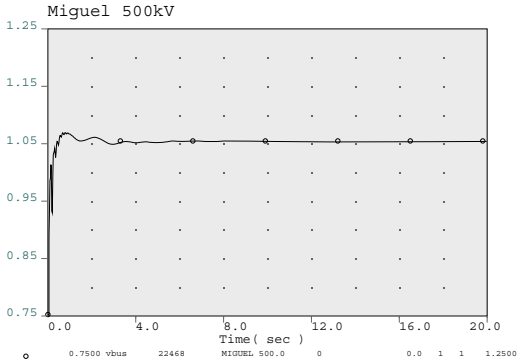
Devers 500kV



OtayMesa #3



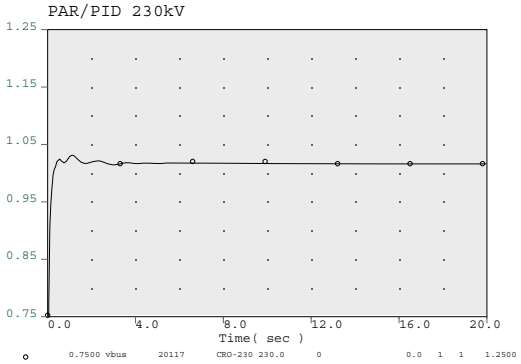
Miguel 500kV



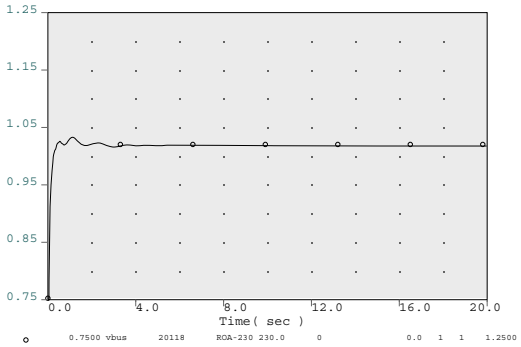
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

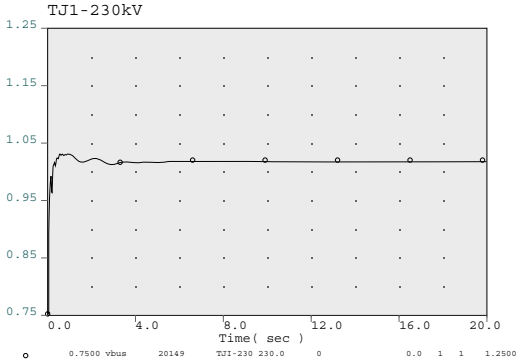
PAR/PID 230kV



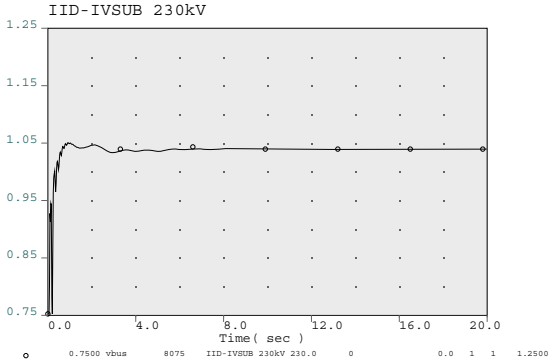
ROA-230kV



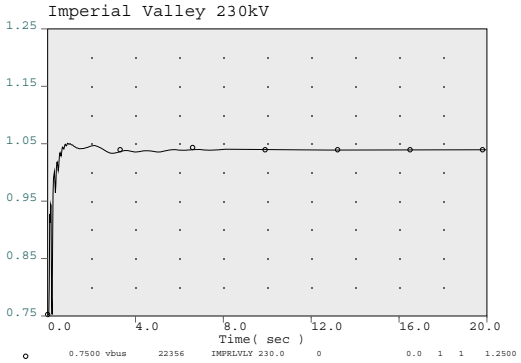
TJ1-230kV



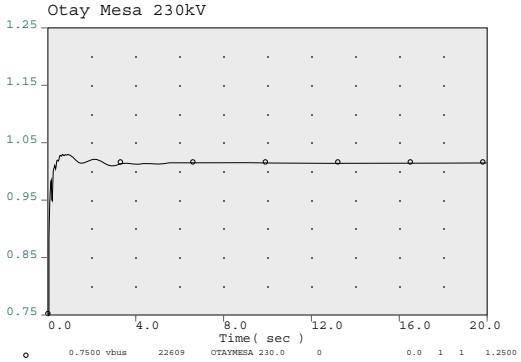
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



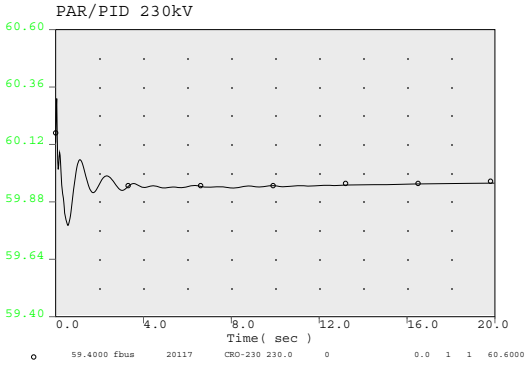
C1 C2 Light Load Post With Upgrades

Page 3

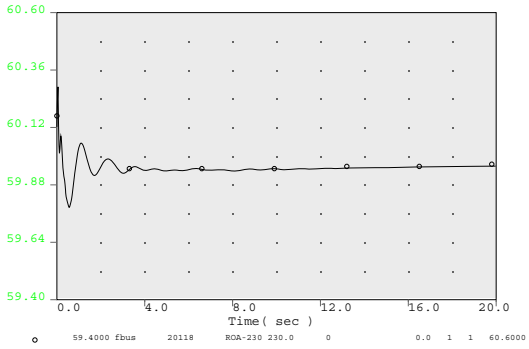
SDGE	tran-c1c2-ll-pstup-r15_IVROA(IV)-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:06:51 2011

Affected System Frequency Check and Comparison

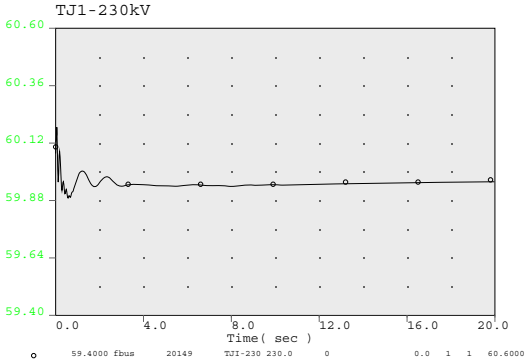
PAR/PID 230kV



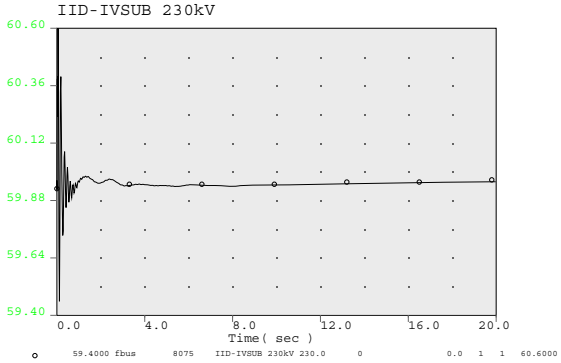
ROA-230kV



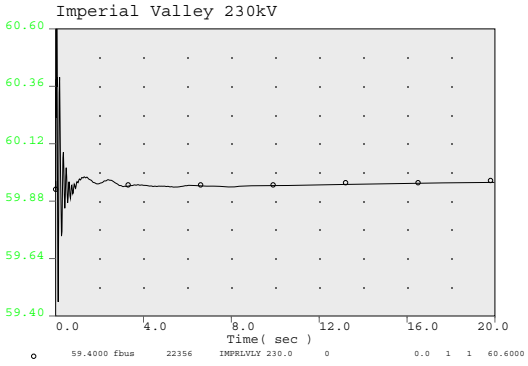
TJ1-230kV



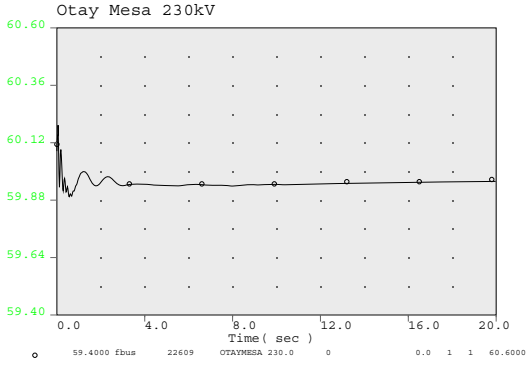
IID-IVSUB 230kV



Imperial Valley 230kV



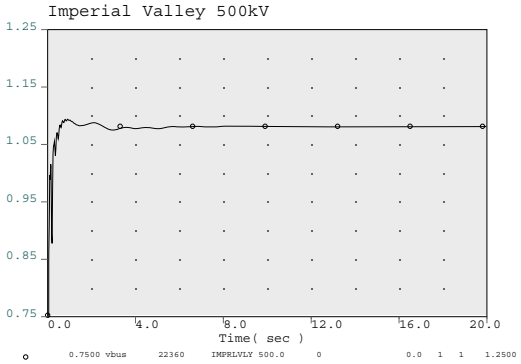
Otay Mesa 230kV



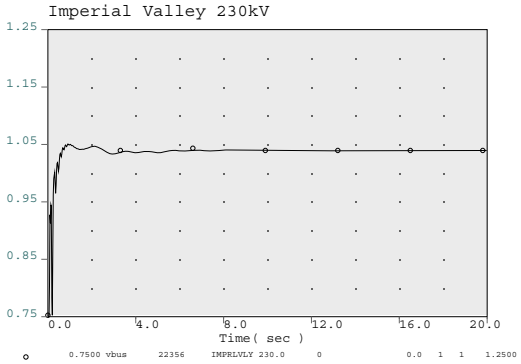
C1 C2 Light Load Post With Upgrades

VOLTAGE

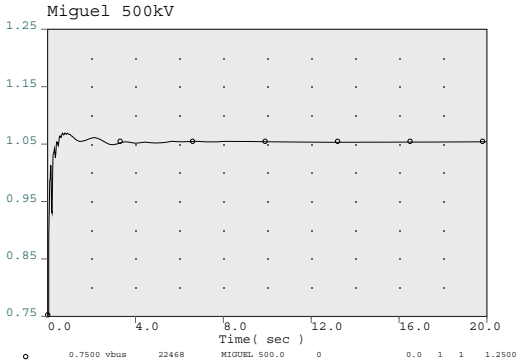
Imperial Valley 500kV



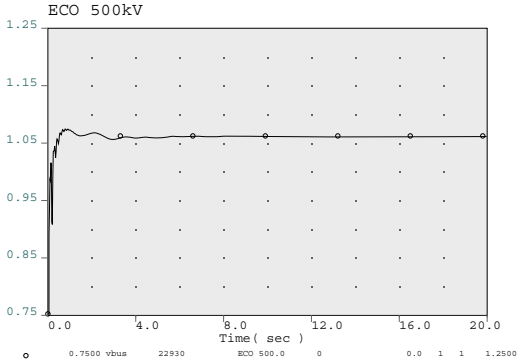
Imperial Valley 230kV



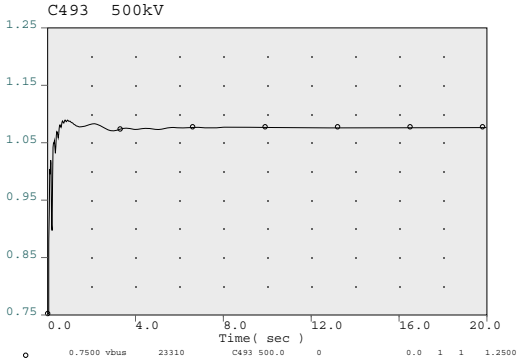
Miguel 500kV



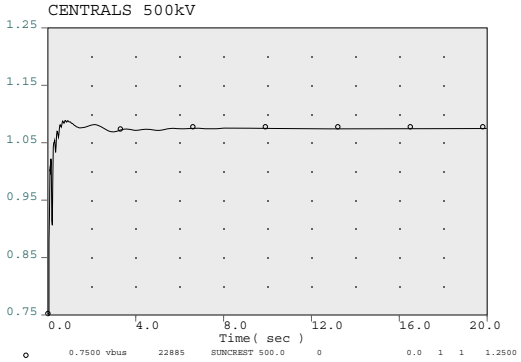
ECO 500kV



C493 500kV



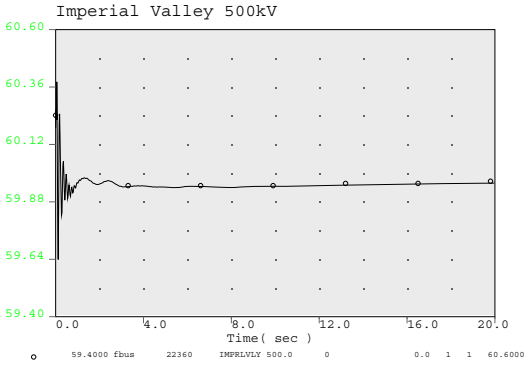
CENTRALS 500kV



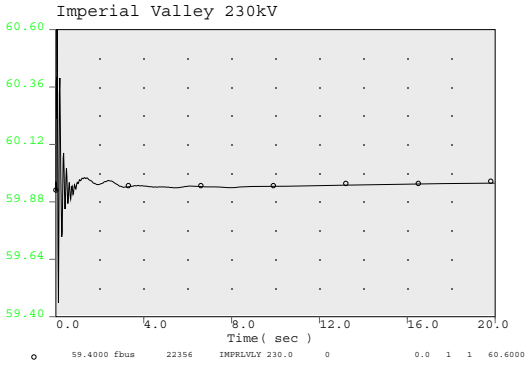
C1 C2 Light Load Post With Upgrades

FREQUENCY

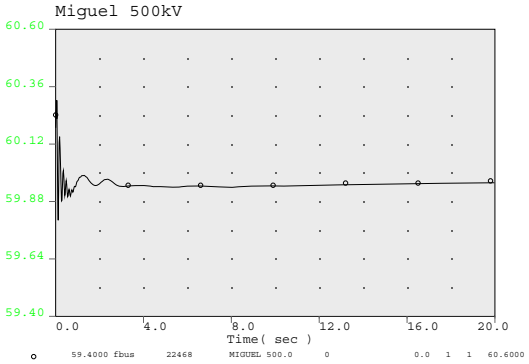
Imperial Valley 500kV



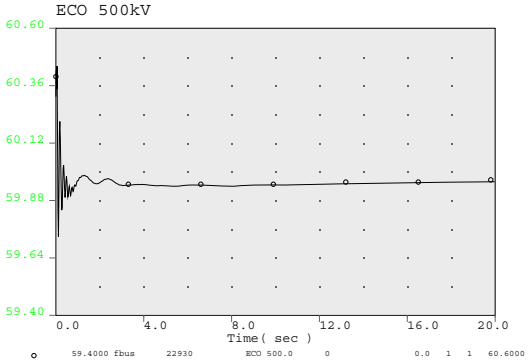
Imperial Valley 230kV



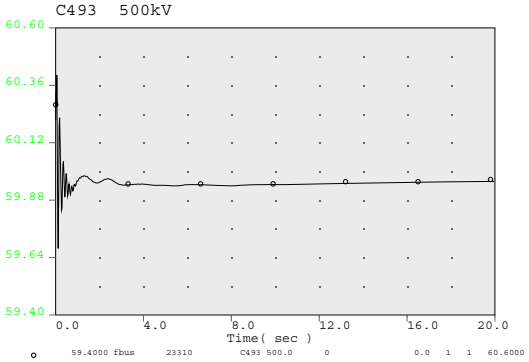
Miguel 500kV



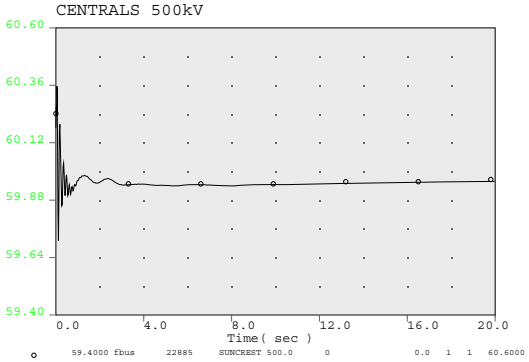
ECO 500kV



C493 500kV

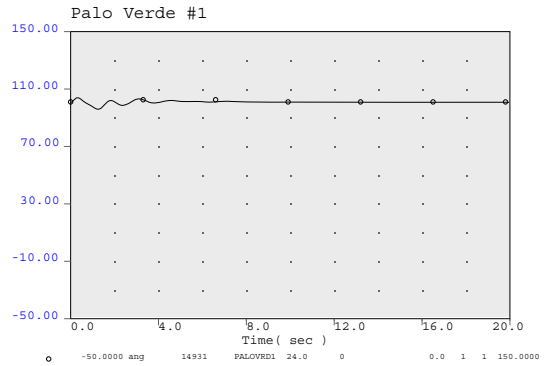


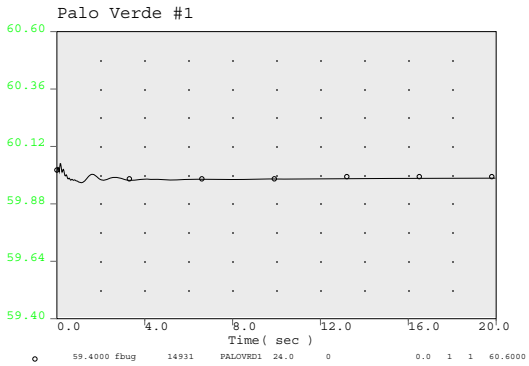
CENTRALS 500kV

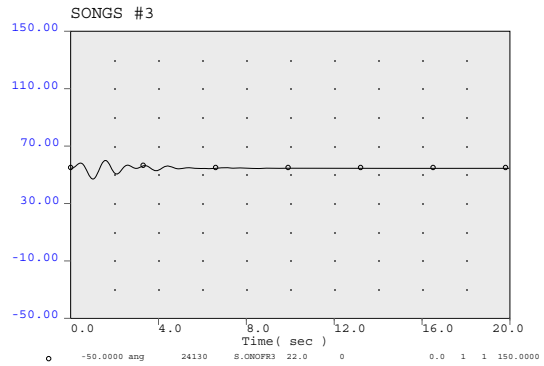


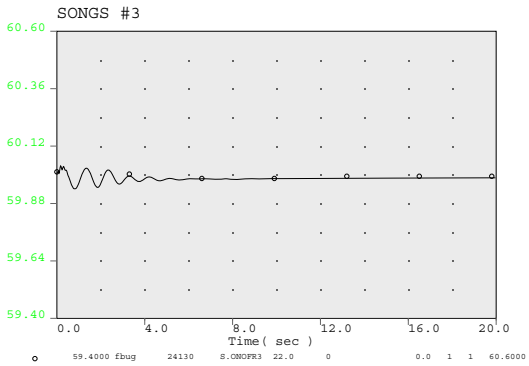
C1 C2 Light Load Post With Upgrades

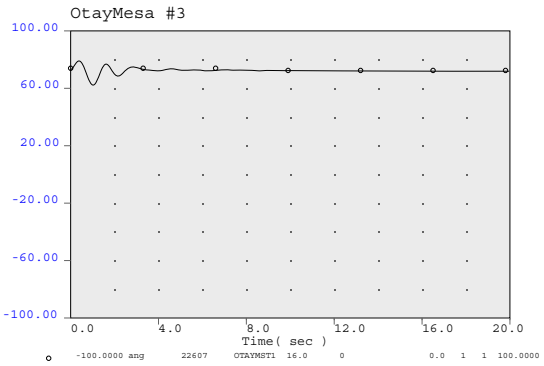
RELATIVE ROTOR ANGLE & FREQUENCY

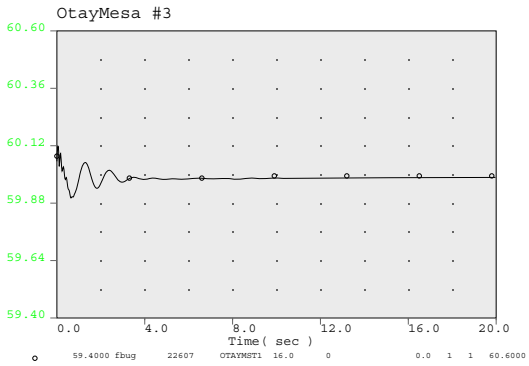












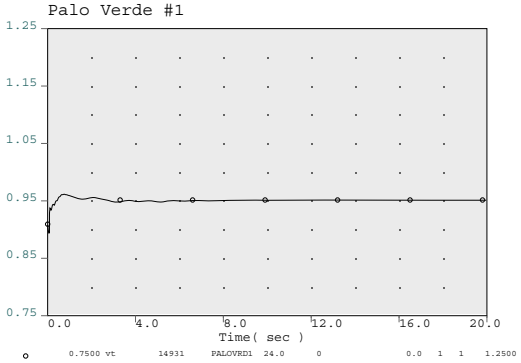
C1 C2 Light Load Post With Upgrades

Page 1

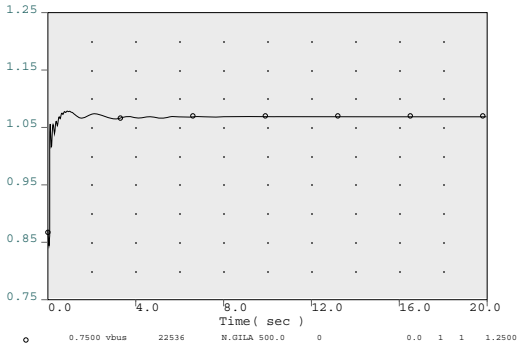
SDGE	tran-c1c2-ll-pstup-r15_IVROA(ROA)-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:08:41 2011

RELATIVE VOLTAGE

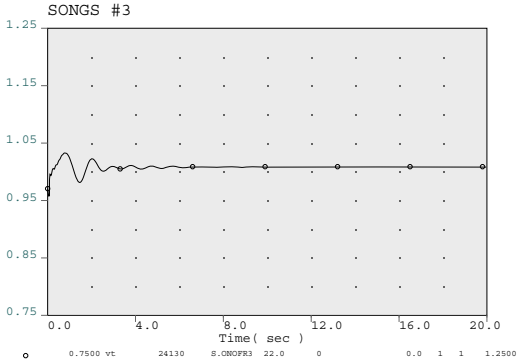
Palo Verde #1



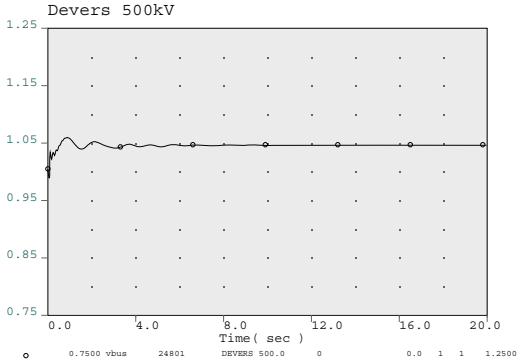
N Gila 500kV



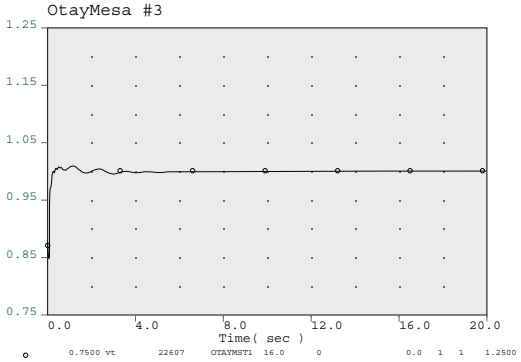
SONGS #3



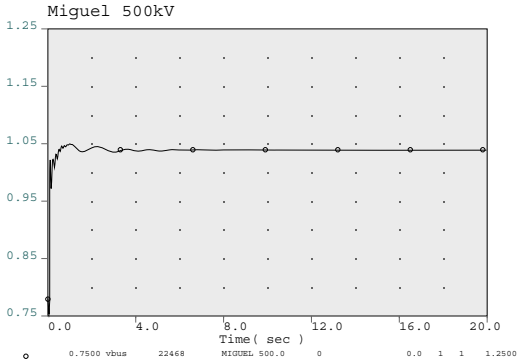
Devers 500kV



OtayMesa #3



Miguel 500kV



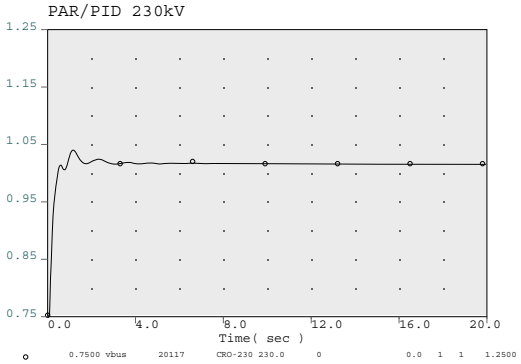
C1 C2 Light Load Post With Upgrades

Page 2

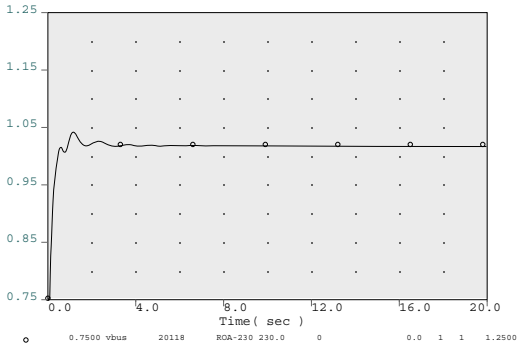
SDGE	tran-c1c2-ll-pstup-r15_IVROA(ROA)-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:08:42 2011

Affected System Voltage Check and Comparison

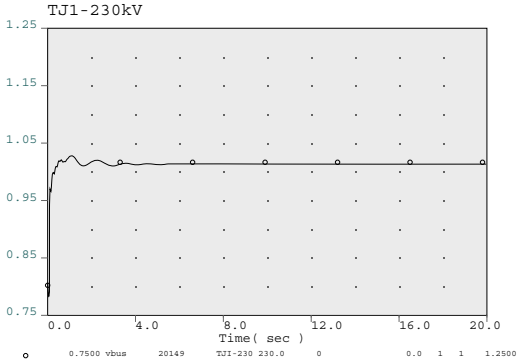
PAR/PID 230kV



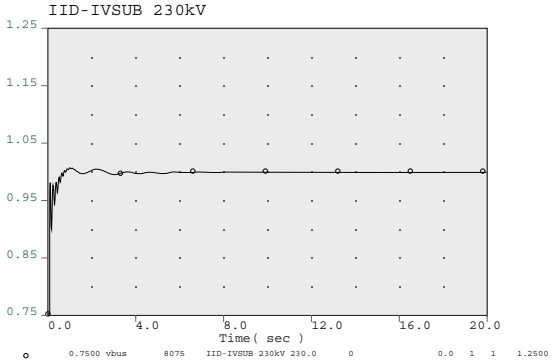
ROA-230kV



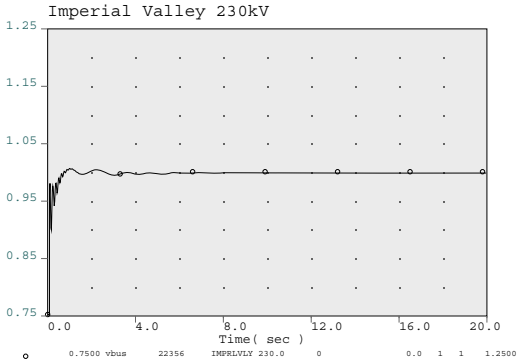
TJ1-230kV



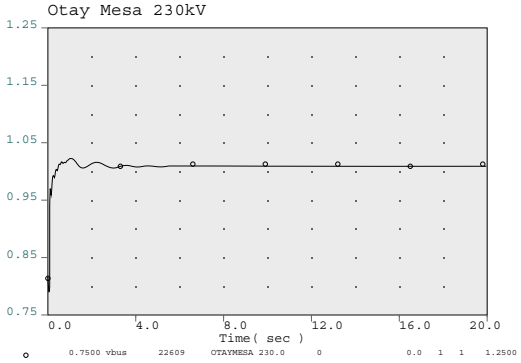
IID-IVSUB 230kV



Imperial Valley 230kV



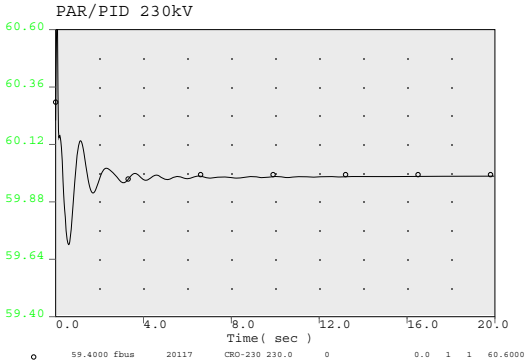
Otay Mesa 230kV



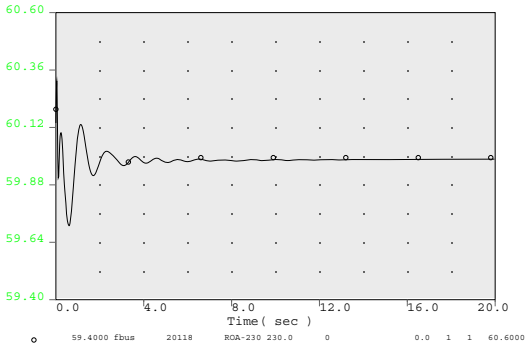
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

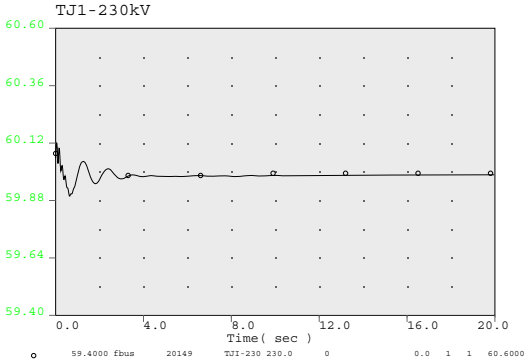
PAR/PID 230kV



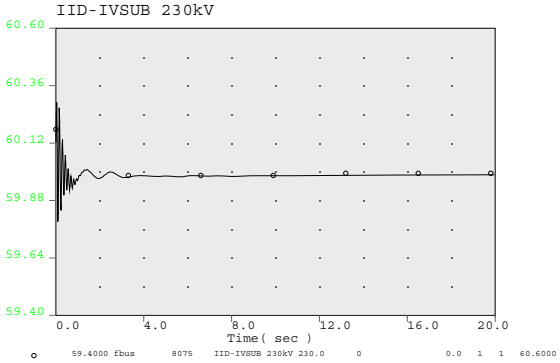
ROA-230kV



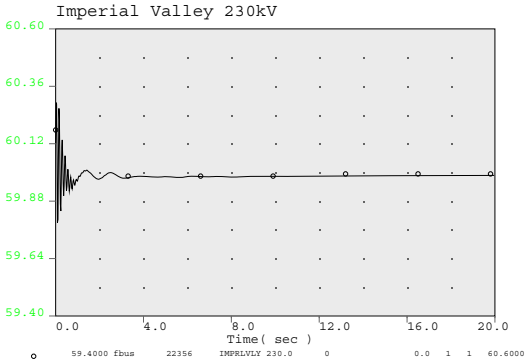
TJ1-230kV



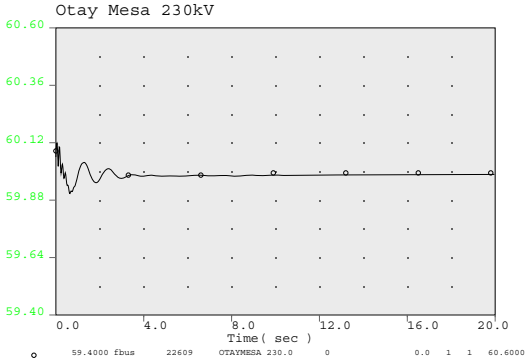
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Post With Upgrades

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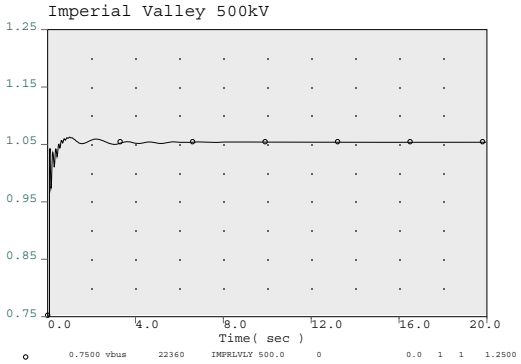
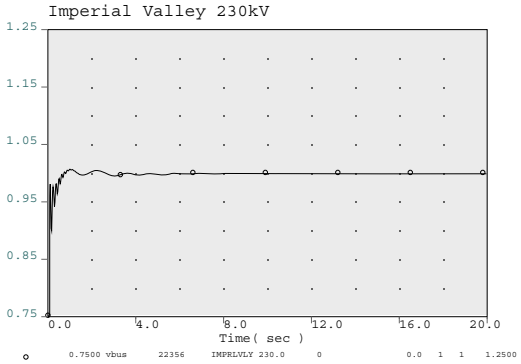
SDGE	tran-c1c2-ll-pstup-r15_IVROA(ROA)-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:08:43 2011

VOLTAGE

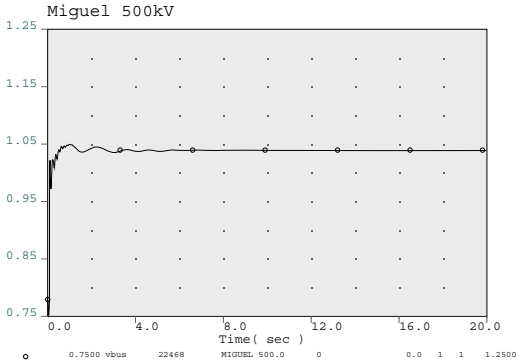
Imperial Valley 500kV



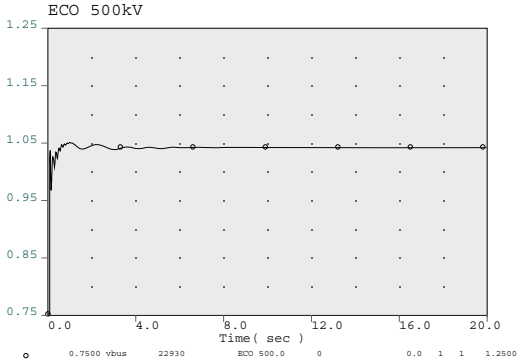
Imperial Valley 230kV



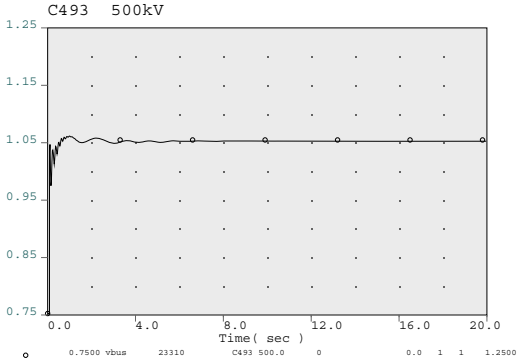
Miguel 500kV



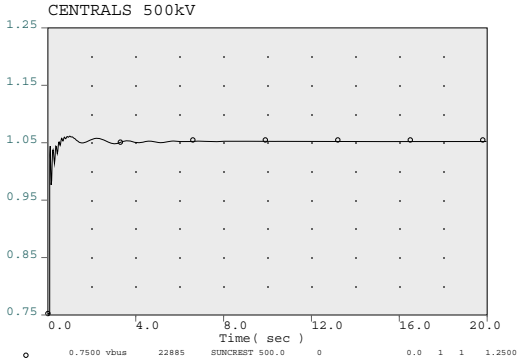
ECO 500kV



C493 500kV



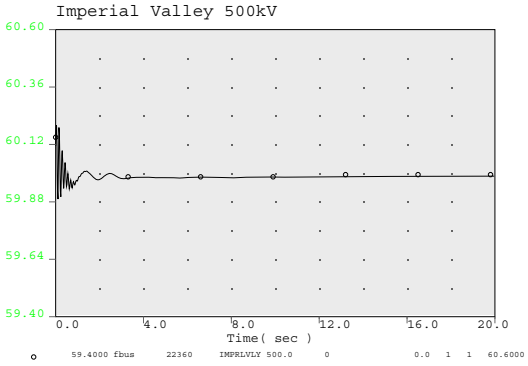
CENTRALS 500kV



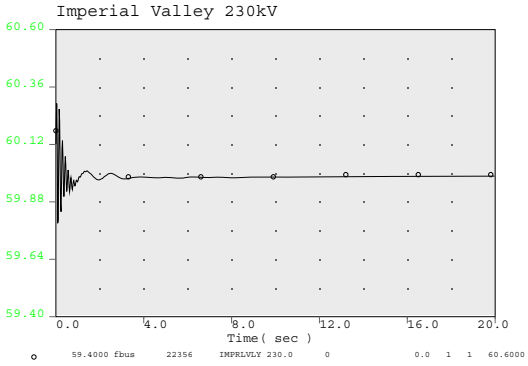
C1 C2 Light Load Post With Upgrades

FREQUENCY

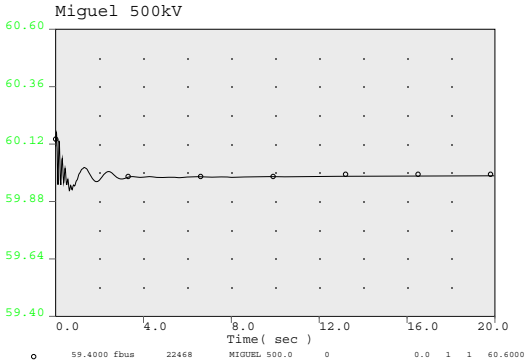
Imperial Valley 500kV



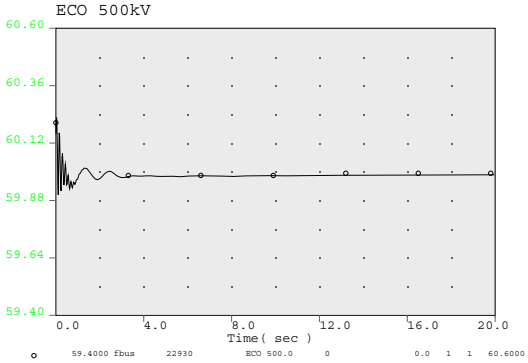
Imperial Valley 230kV



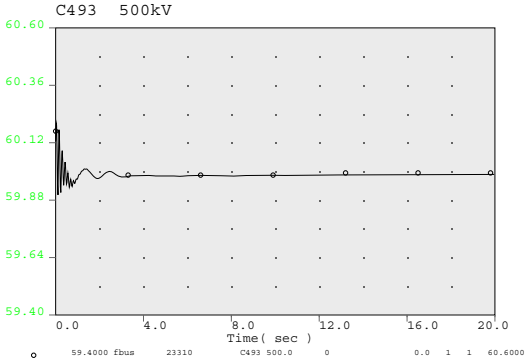
Miguel 500kV



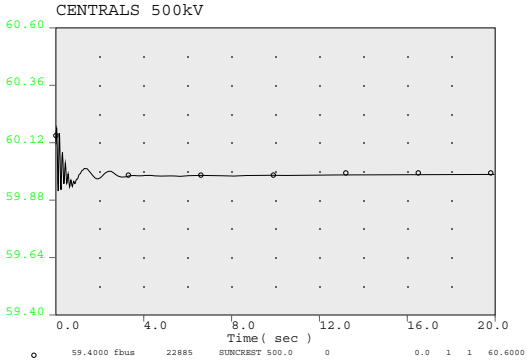
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Light Load Post With Upgrades

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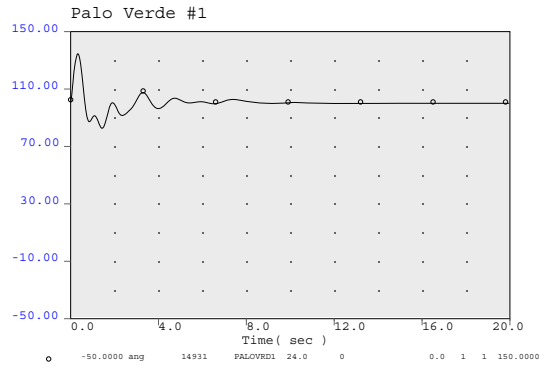
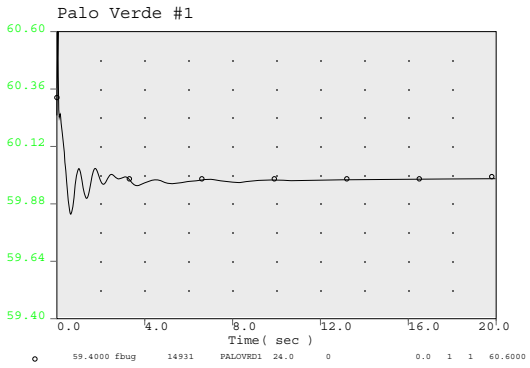
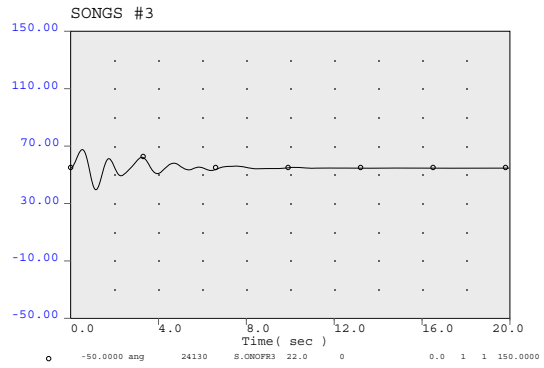
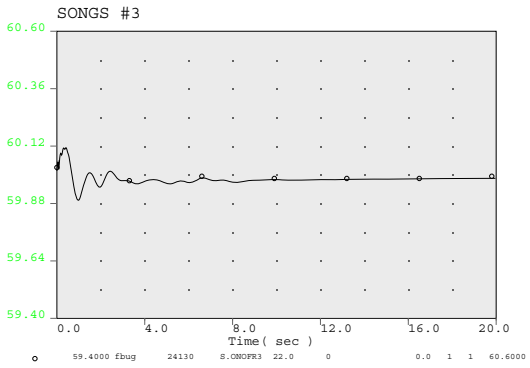
SDGE	tran-c1c2-ll-pstup-r15_IVROA(ROA)-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:08:44 2011

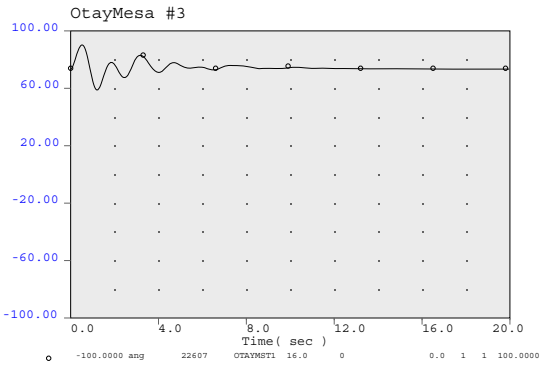
RELATIVE ROTOR ANGLE & FREQUENCY

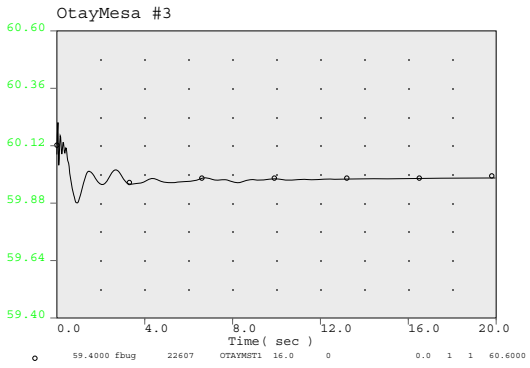












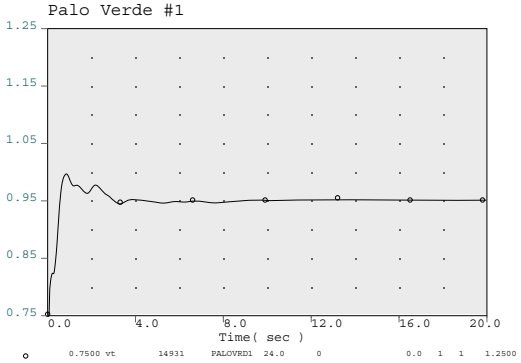
C1 C2 Light Load Post With Upgrades

Page 1

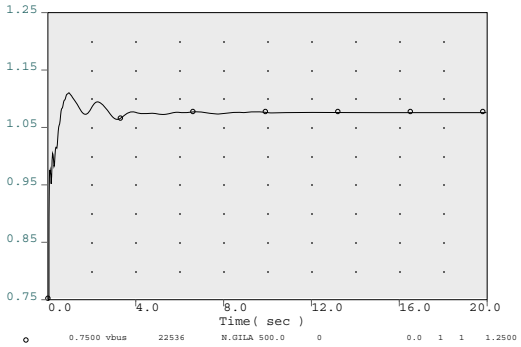
SDGE	tran-c1c2-ll-pstup-r15_MES-HAA-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:10:33 2011

RELATIVE VOLTAGE

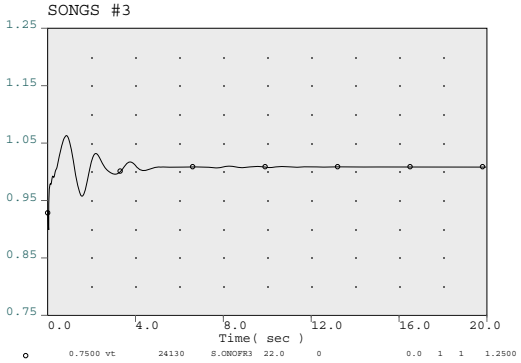
Palo Verde #1



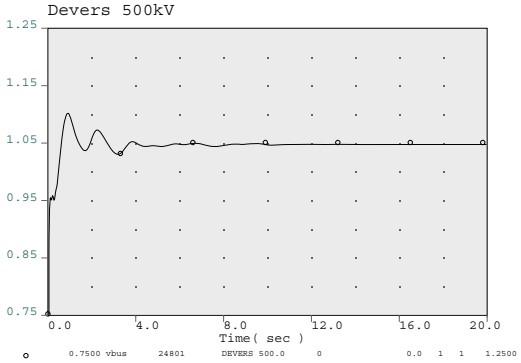
N Gila 500kV



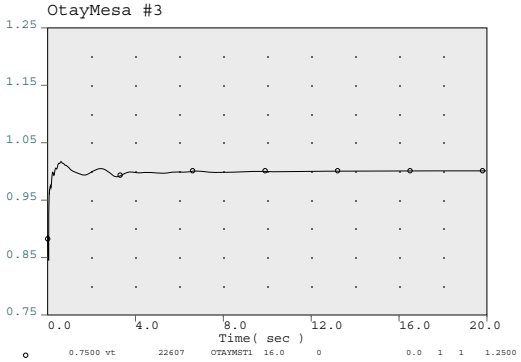
SONGS #3



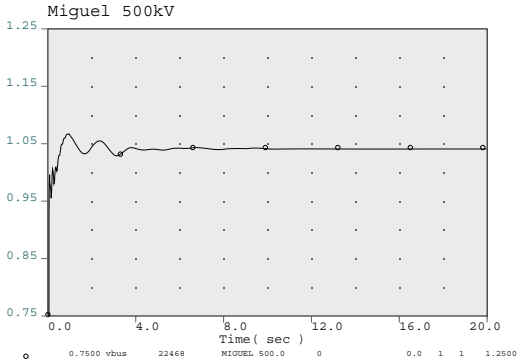
Devers 500kV



OtayMesa #3



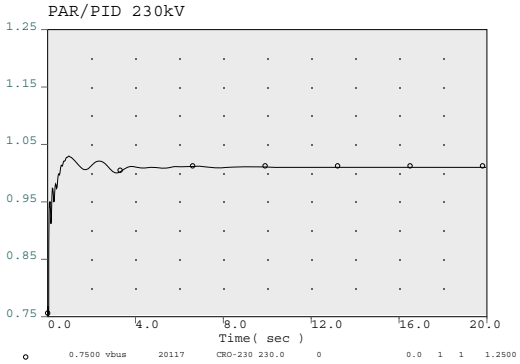
Miguel 500kV



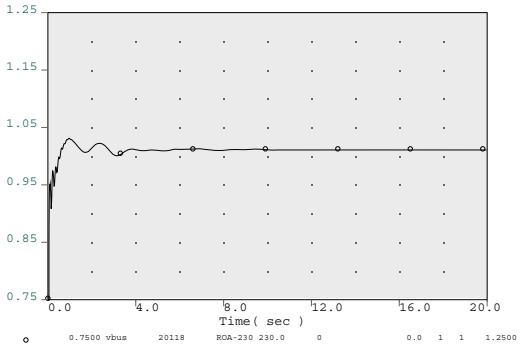
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

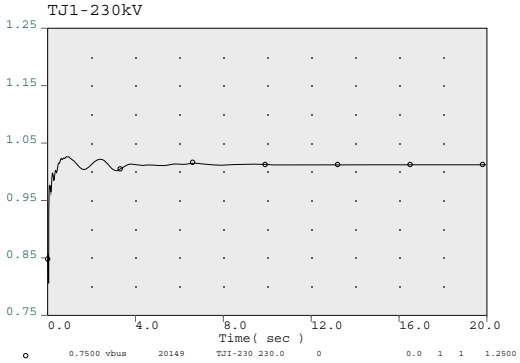
PAR/PID 230kV



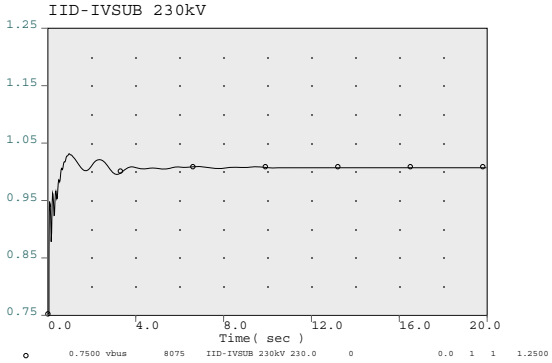
ROA-230kV



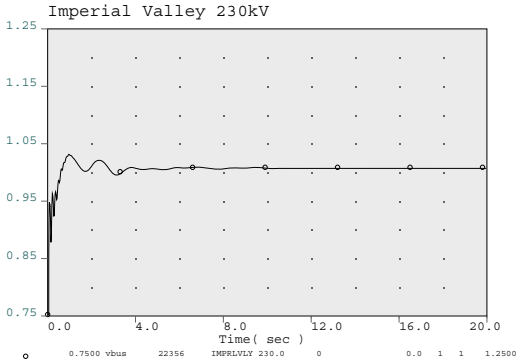
TJ1-230kV



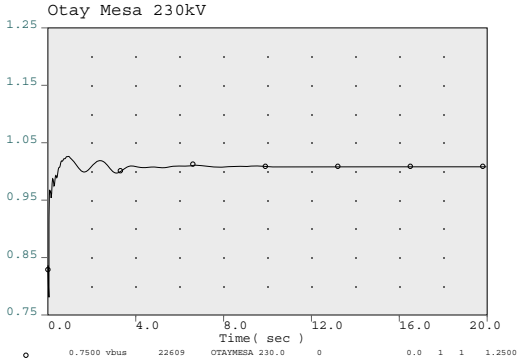
IID-IVSUB 230kV



Imperial Valley 230kV



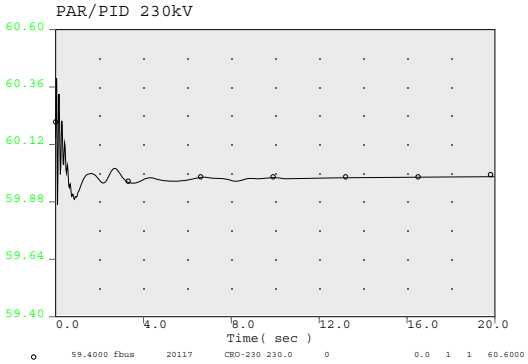
Otay Mesa 230kV



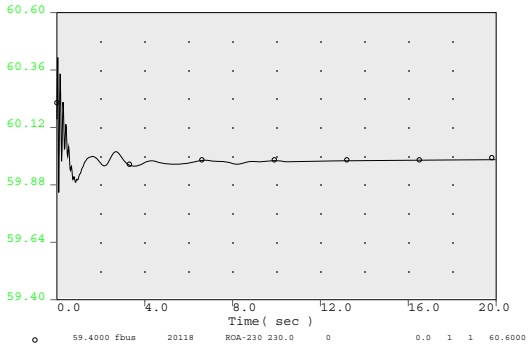
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

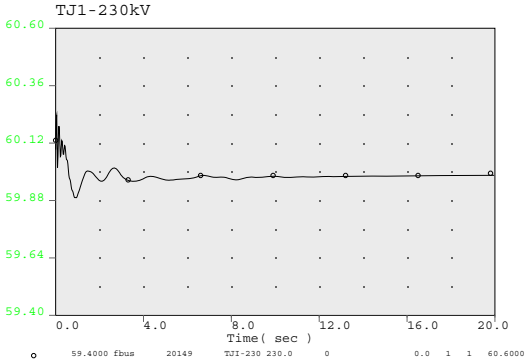
PAR/PID 230kV



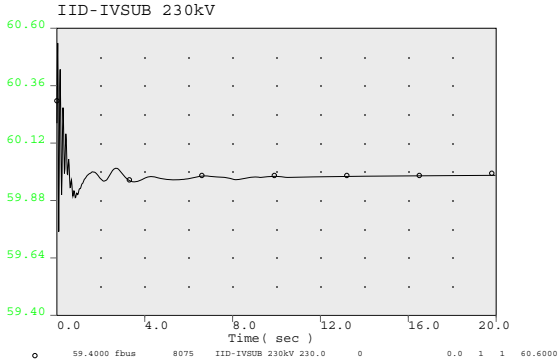
ROA-230kV



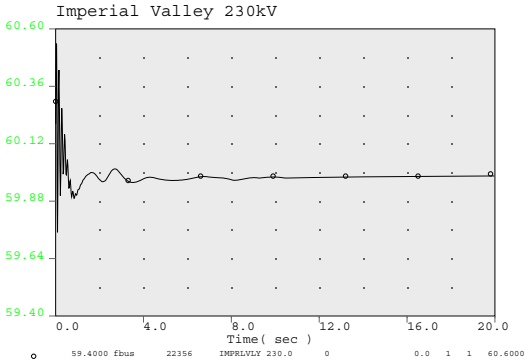
TJ1-230kV



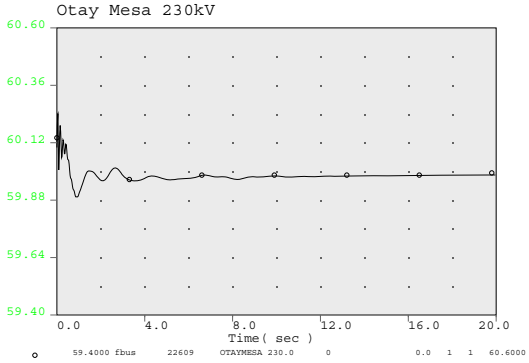
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



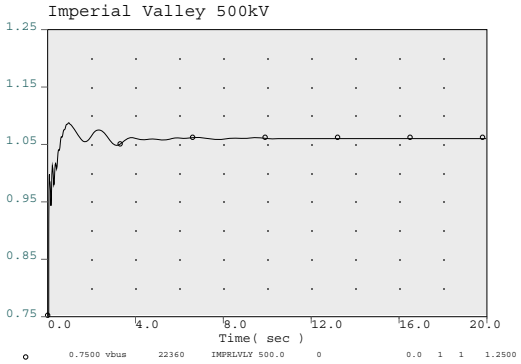
C1 C2 Light Load Post With Upgrades

Page 4

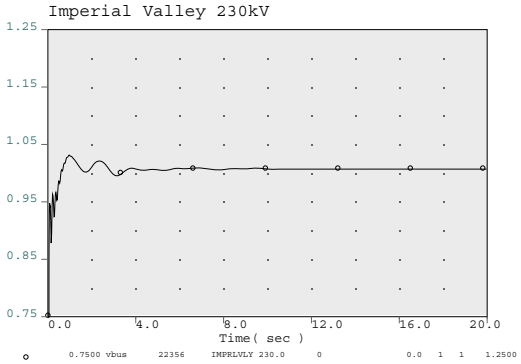
SDGE	tran-c1c2-ll-pstup-r15_MES-HAA-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:10:35 2011

VOLTAGE

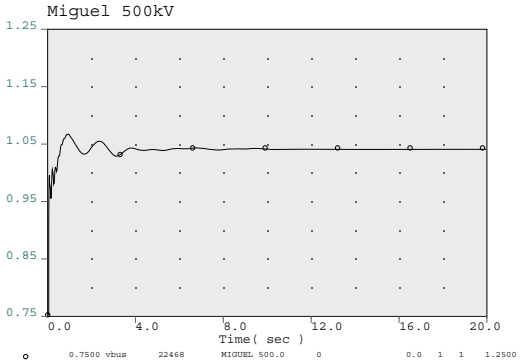
Imperial Valley 500kV



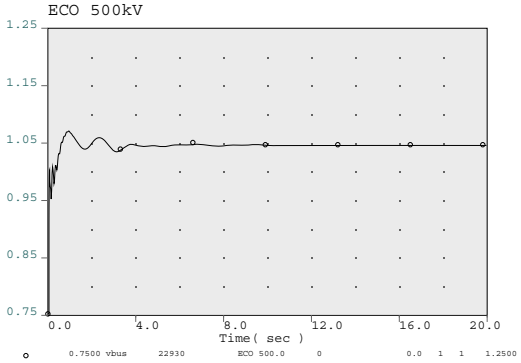
Imperial Valley 230kV



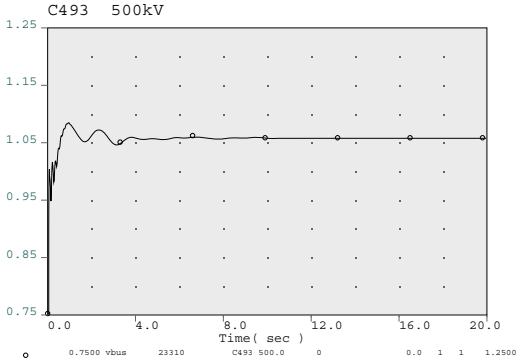
Miguel 500kV



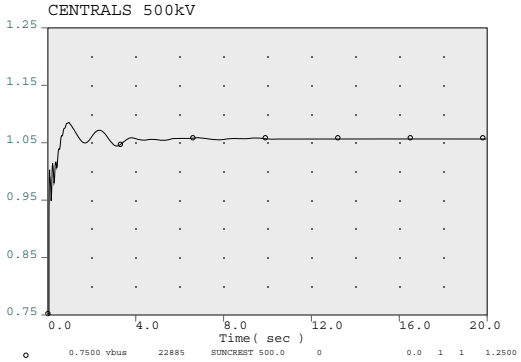
ECO 500kV



C493 500kV



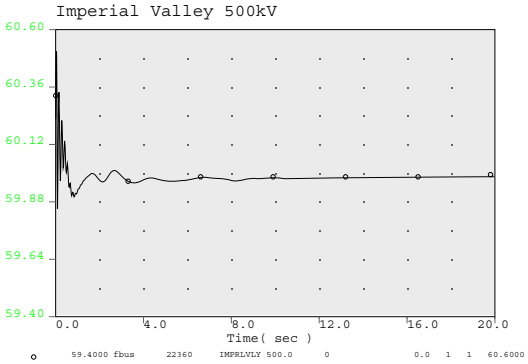
CENTRALS 500kV



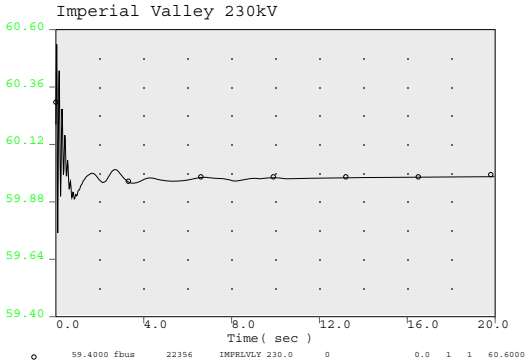
C1 C2 Light Load Post With Upgrades

FREQUENCY

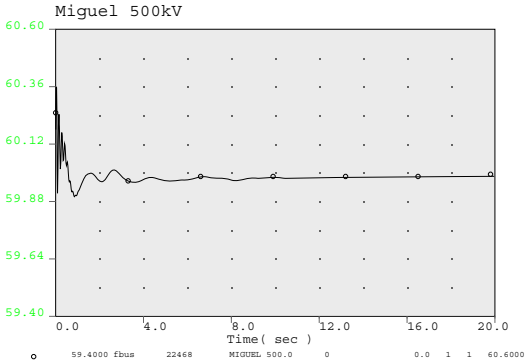
Imperial Valley 500kV



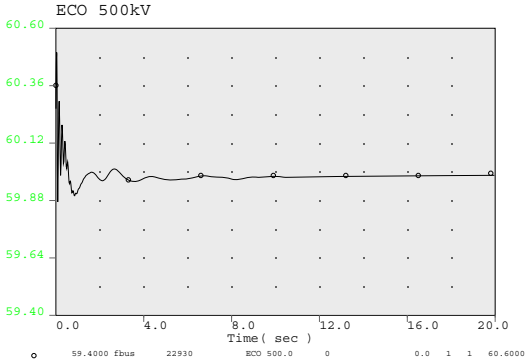
Imperial Valley 230kV



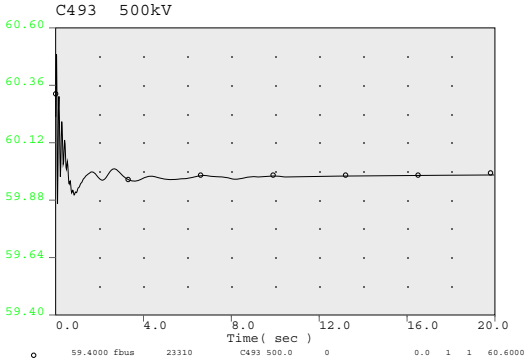
Miguel 500kV



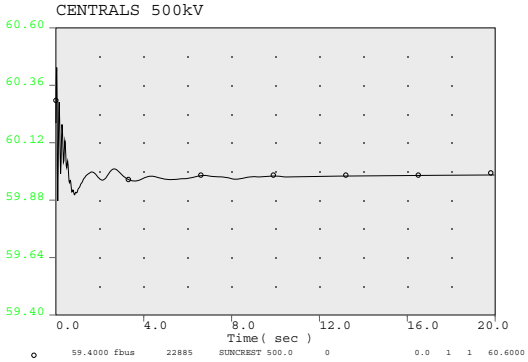
ECO 500kV



C493 500kV

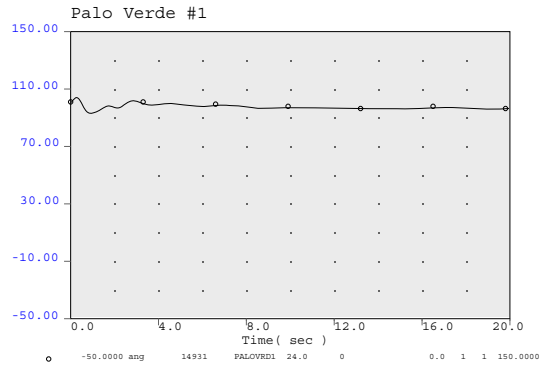


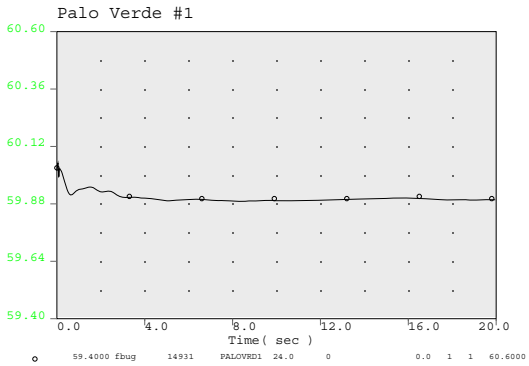
CENTRALS 500kV

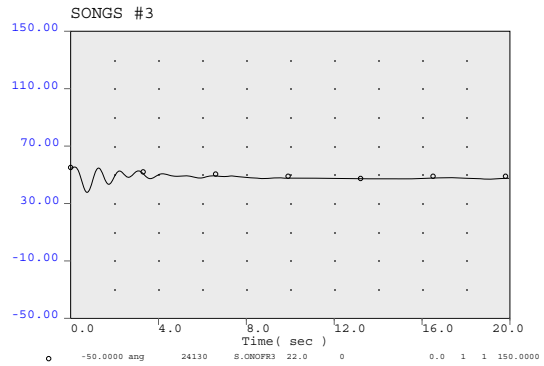


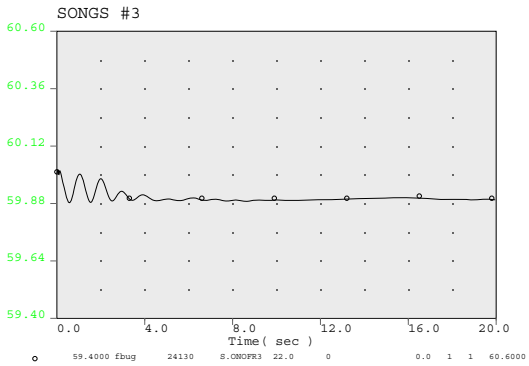
C1 C2 Light Load Post With Upgrades

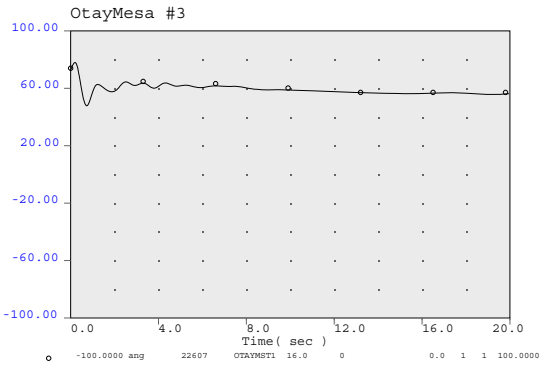
RELATIVE ROTOR ANGLE & FREQUENCY

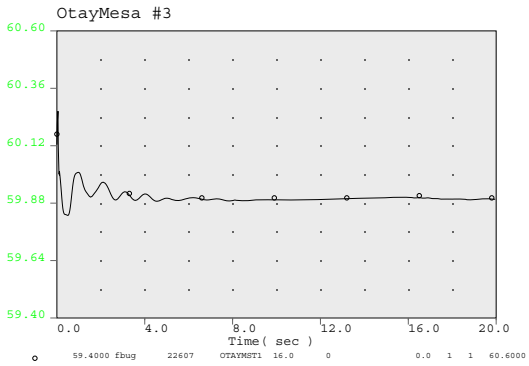












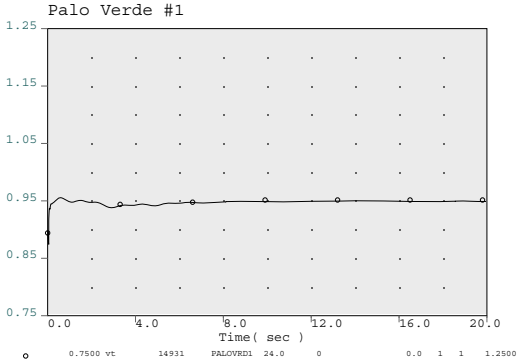
C1 C2 Light Load Post With Upgrades

Page 1

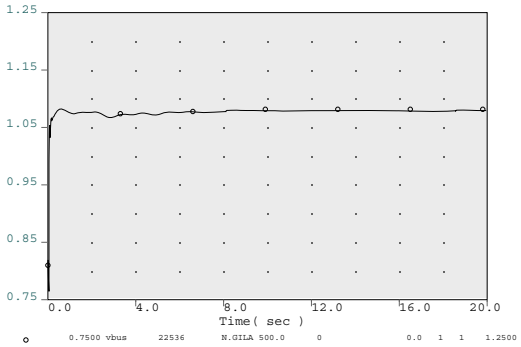
SDGE	tran-c1c2-ll-pstup-r15_ML-ECO-RAS_slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:12:28 2011

RELATIVE VOLTAGE

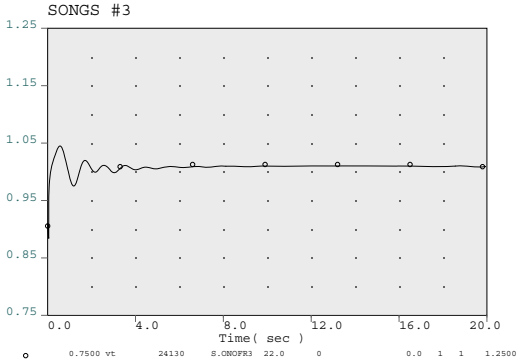
Palo Verde #1



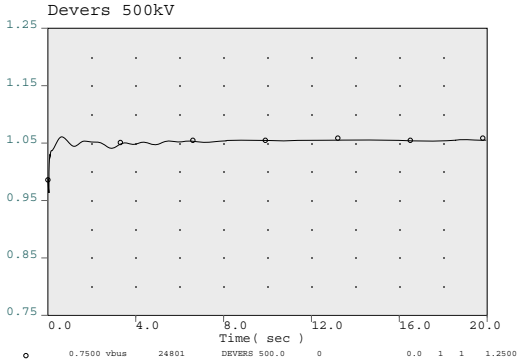
N Gila 500kV



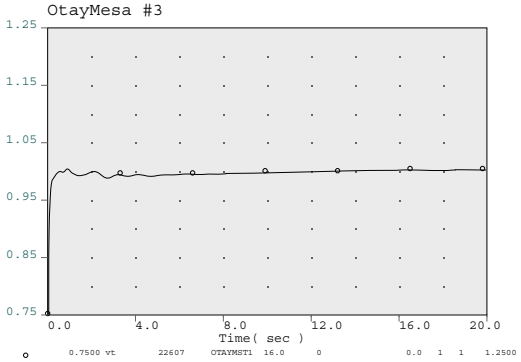
SONGS #3



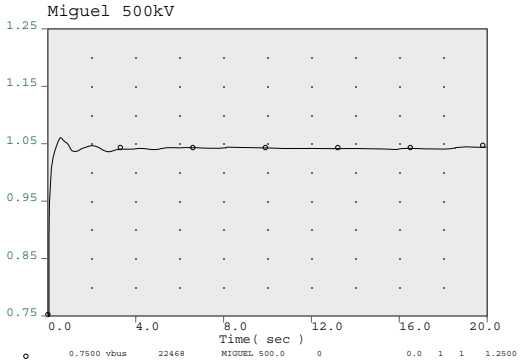
Devers 500kV



OtayMesa #3



Miguel 500kV



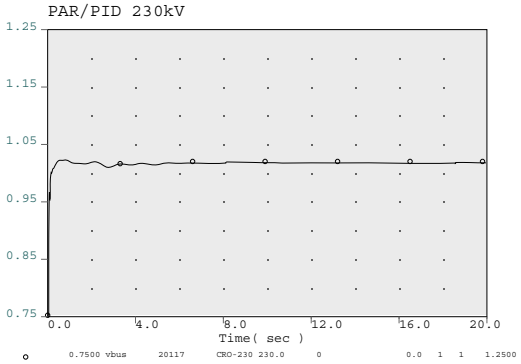
C1 C2 Light Load Post With Upgrades

Page 2

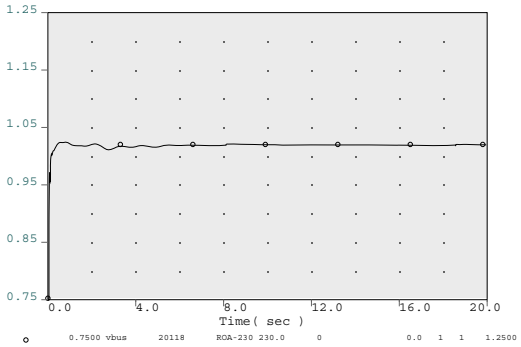
SDGE	tran-c1c2-ll-pstup-r15_ML-ECO-RAS_slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:12:29 2011

Affected System Voltage Check and Comparison

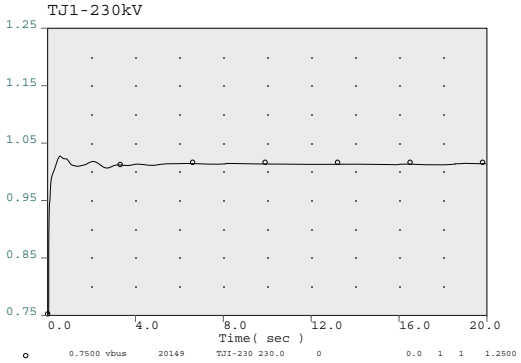
PAR/PID 230kV



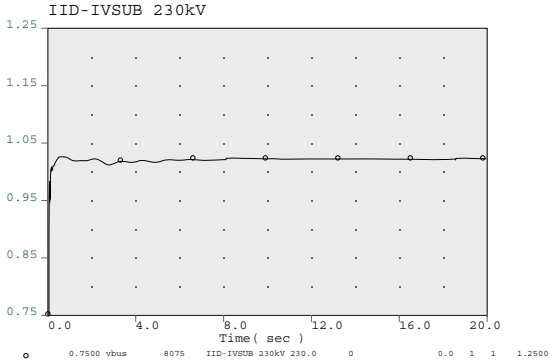
ROA-230kV



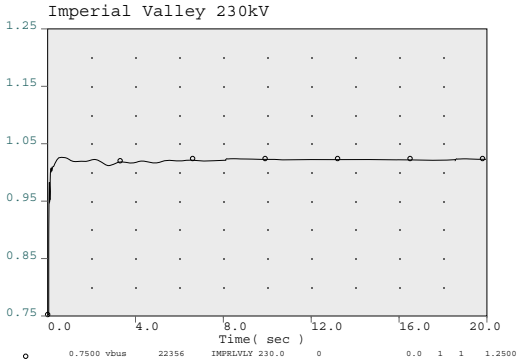
TJ1-230kV



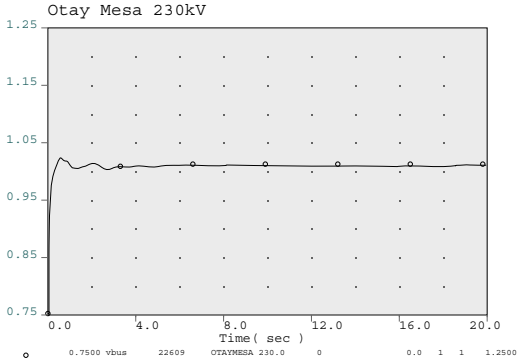
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV

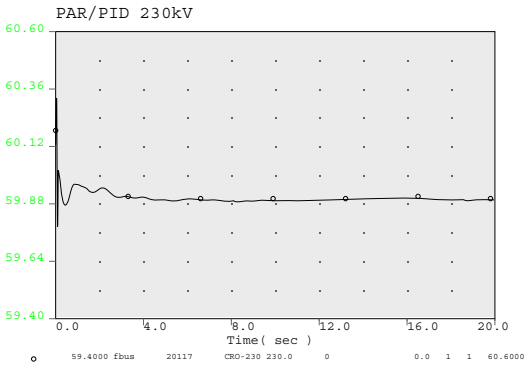


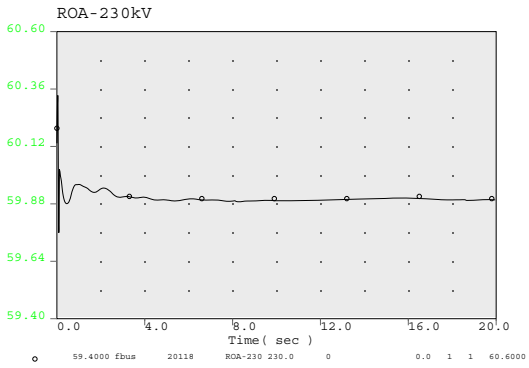
C1 C2 Light Load Post With Upgrades

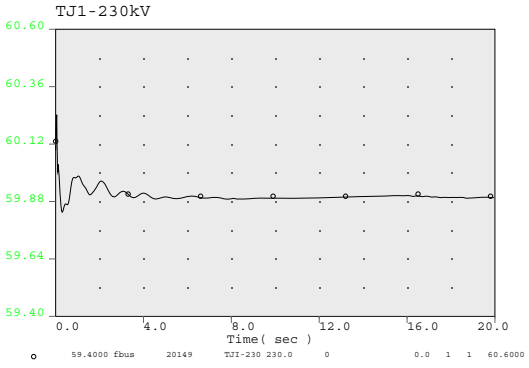
Page 3

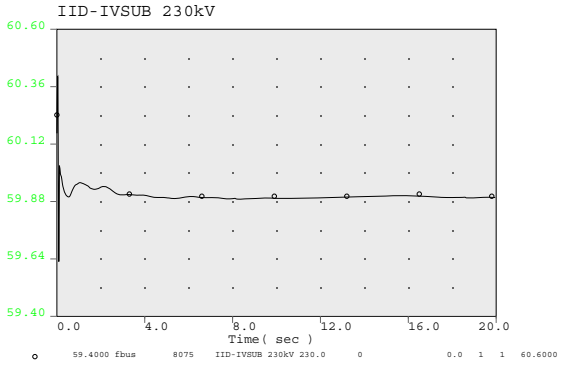
SDGE	tran-c1c2-ll-pstup-r15_ML-ECO-RAS_slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:12:29 2011

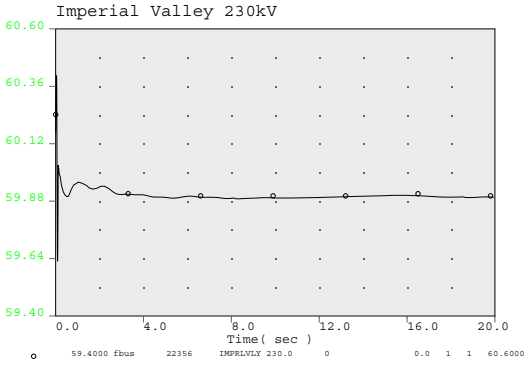
Affected System Frequency Check and Comparison

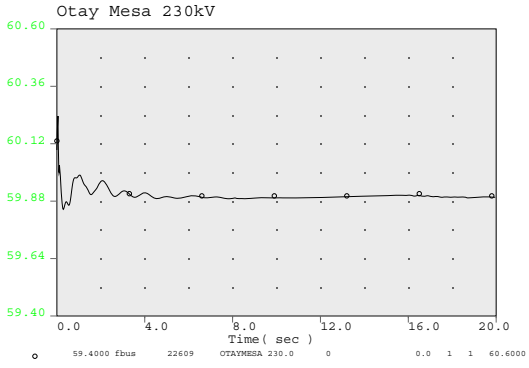












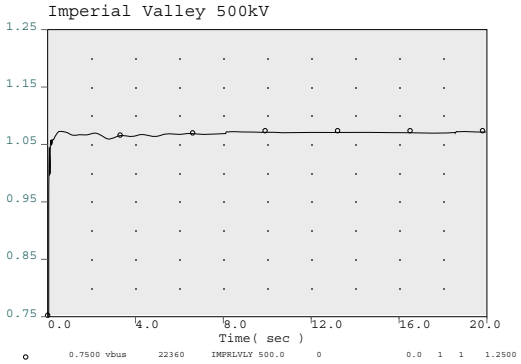
C1 C2 Light Load Post With Upgrades

Page 4

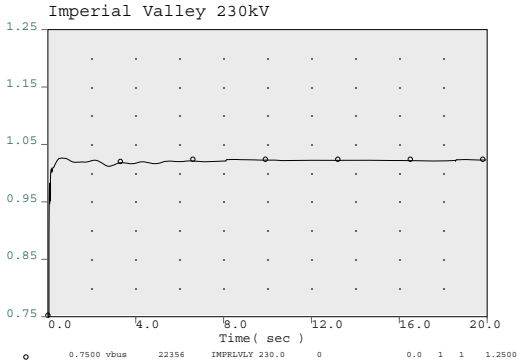
SDGE	tran-c1c2-ll-pstup-r15_ML-ECO-RAS_slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:12:30 2011

VOLTAGE

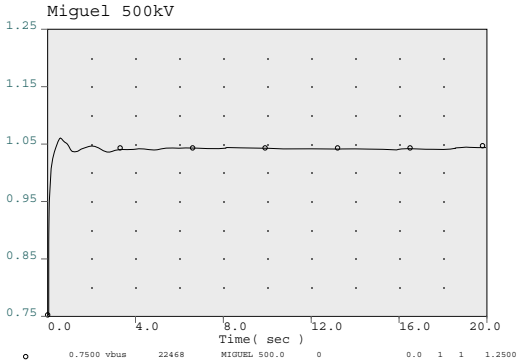
Imperial Valley 500kV



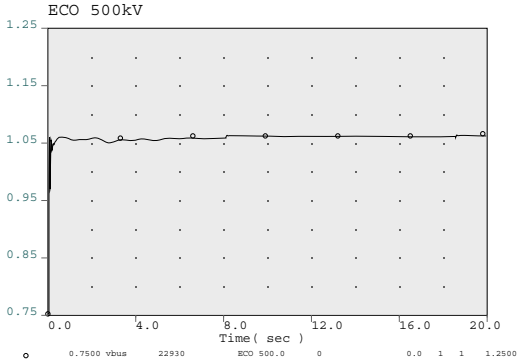
Imperial Valley 230kV



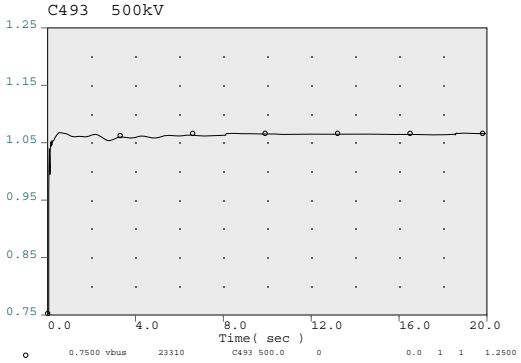
Miguel 500kV



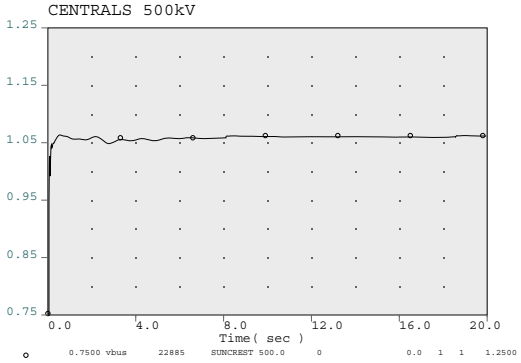
ECO 500kV



C493 500kV

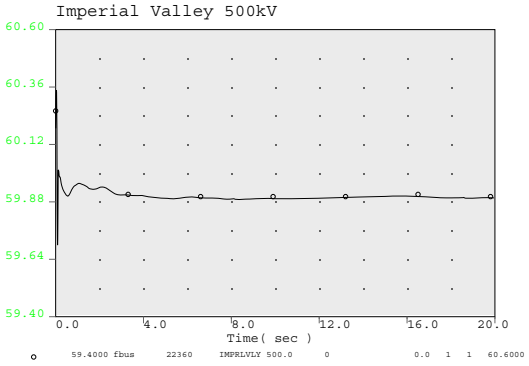


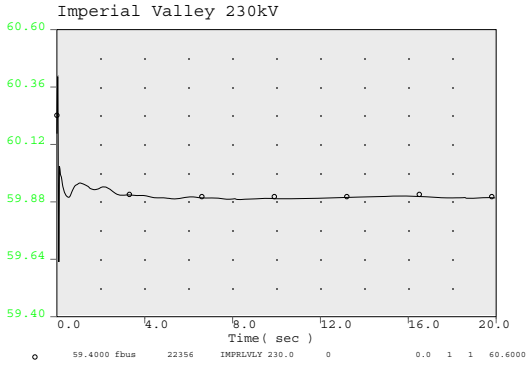
CENTRALS 500kV

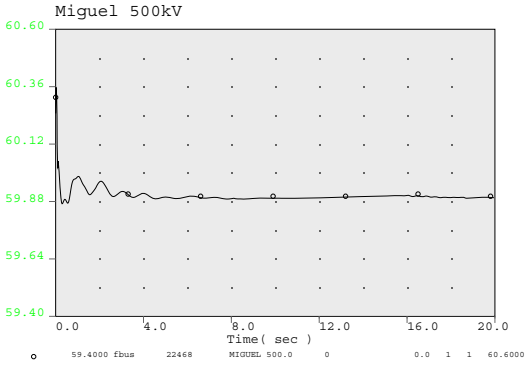


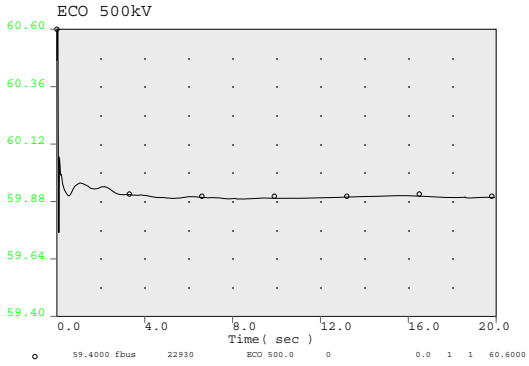
C1 C2 Light Load Post With Upgrades

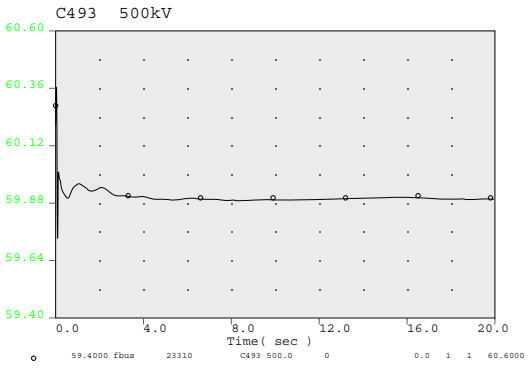
FREQUENCY

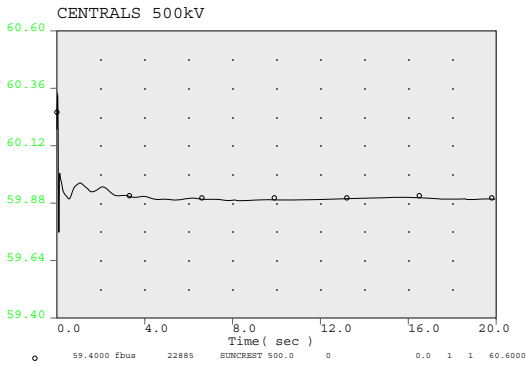






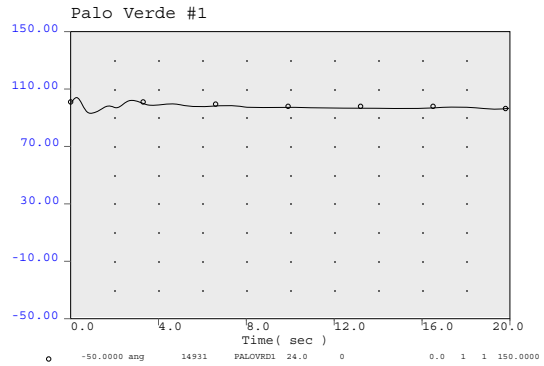


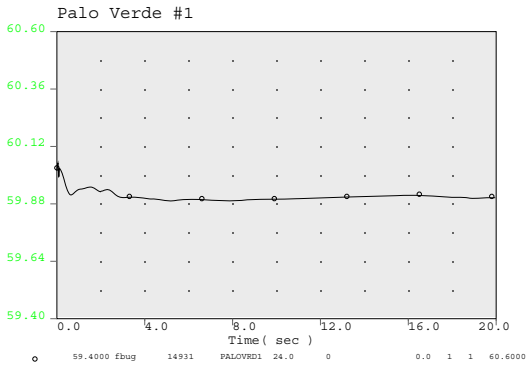


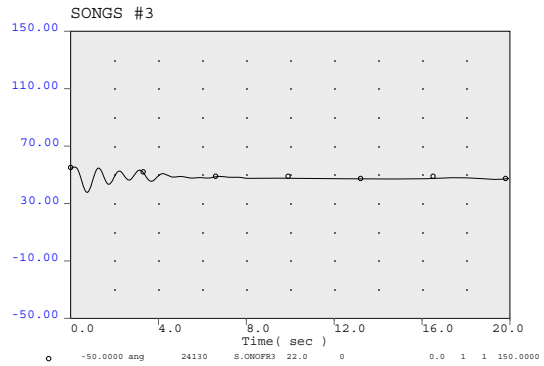


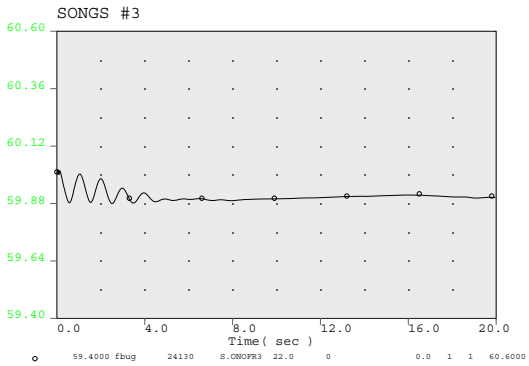
C1 C2 Light Load Post With Upgrades

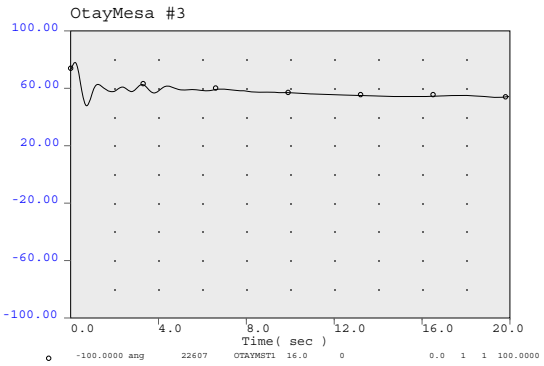
RELATIVE ROTOR ANGLE & FREQUENCY

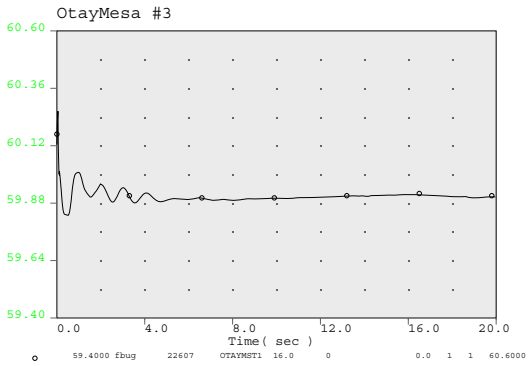












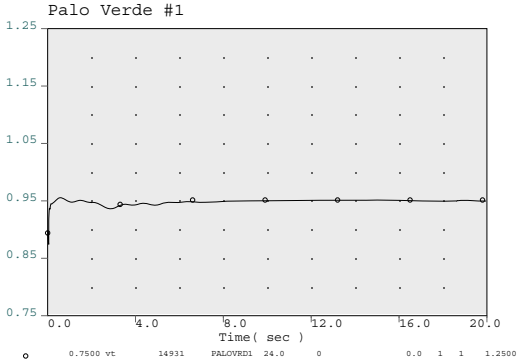
C1 C2 Light Load Post With Upgrades

Page 1

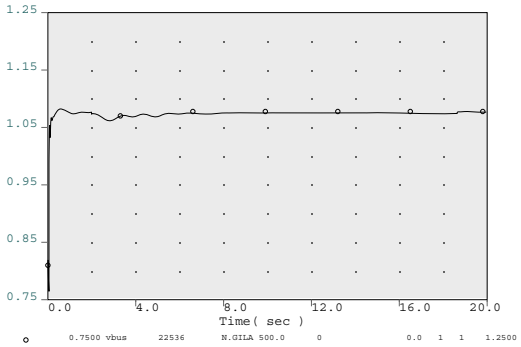
SDGE	tran-c1c2-ll-pstup-r15_MLECO-RASX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:16:25 2011

RELATIVE VOLTAGE

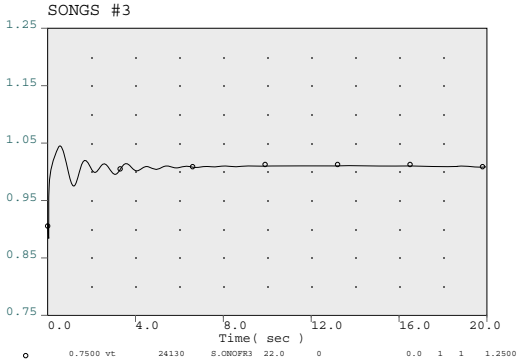
Palo Verde #1



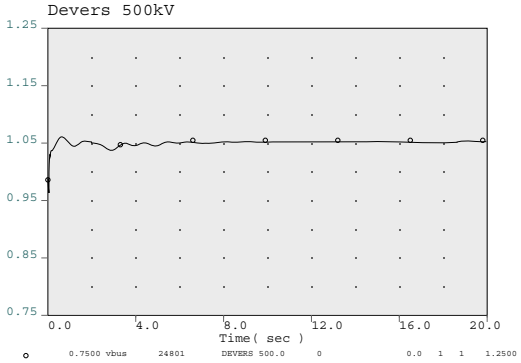
N Gila 500kV



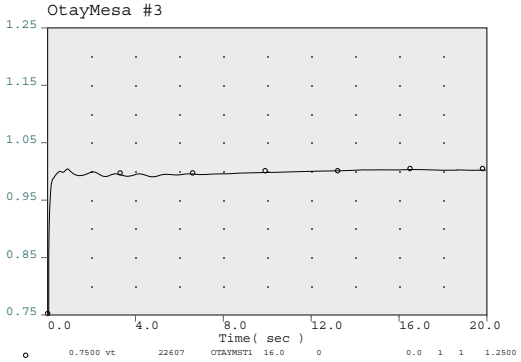
SONGS #3



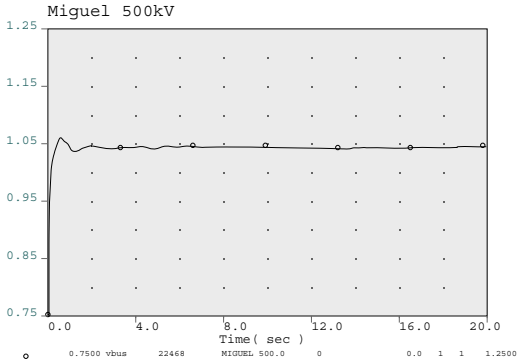
Devers 500kV



OtayMesa #3



Miguel 500kV



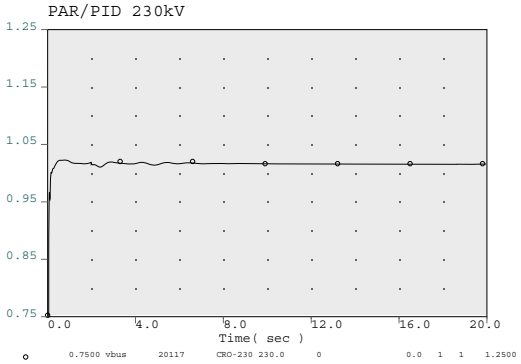
C1 C2 Light Load Post With Upgrades

Page 2

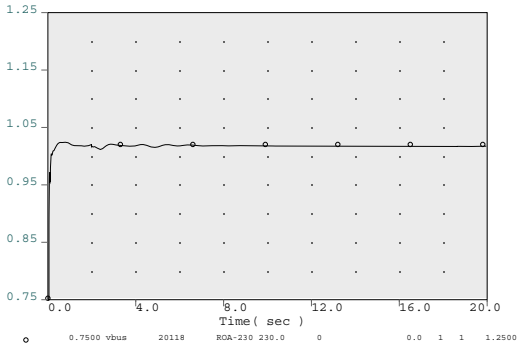
SDGE	tran-c1c2-ll-pstup-r15_MLECO-RASX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:16:26 2011

Affected System Voltage Check and Comparison

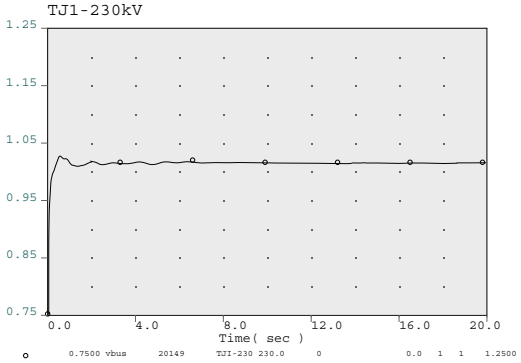
PAR/PID 230kV



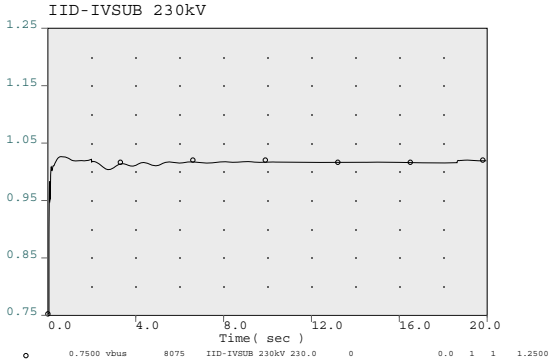
ROA-230kV



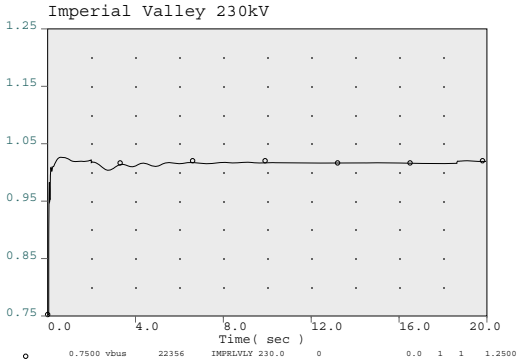
TJ1-230kV



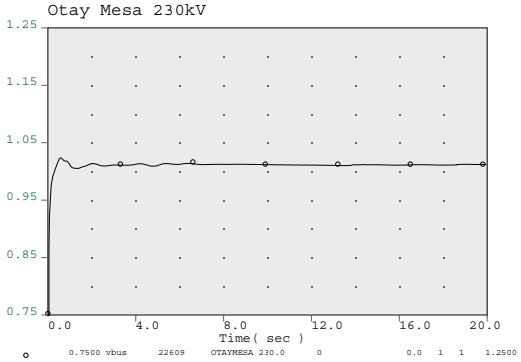
IID-IVSUB 230kV



Imperial Valley 230kV



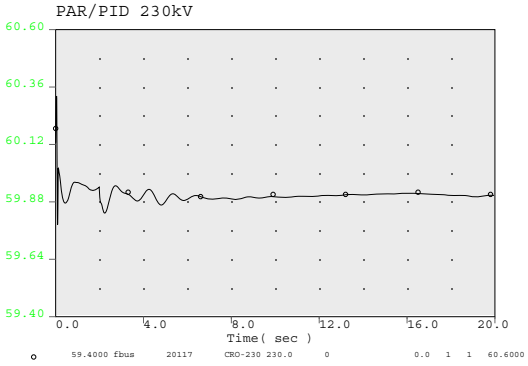
Otay Mesa 230kV



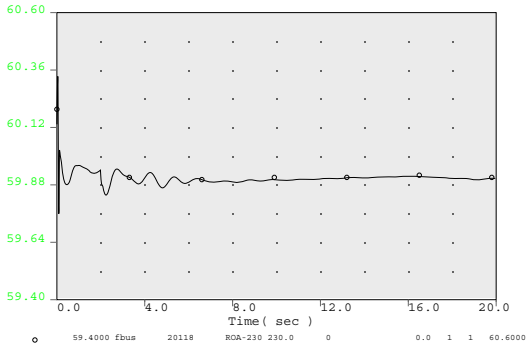
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

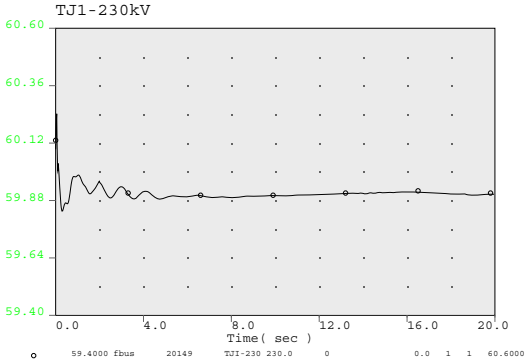
PAR/PID 230kV



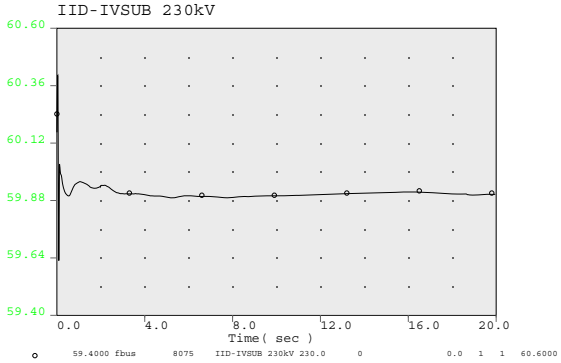
ROA-230kV



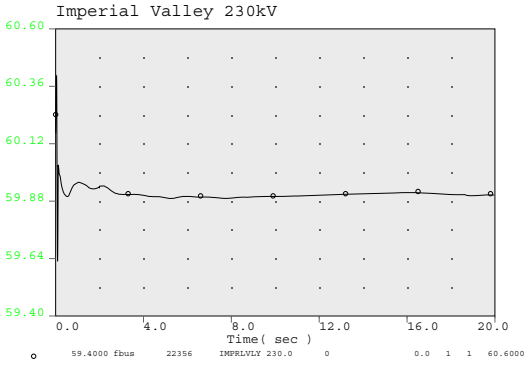
TJ1-230kV



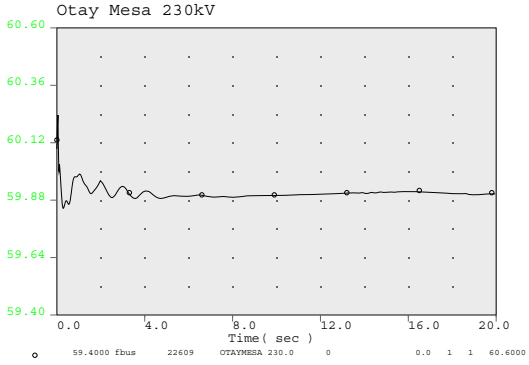
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



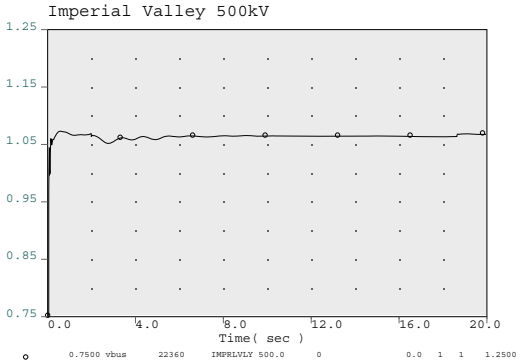
C1 C2 Light Load Post With Upgrades

Page 4

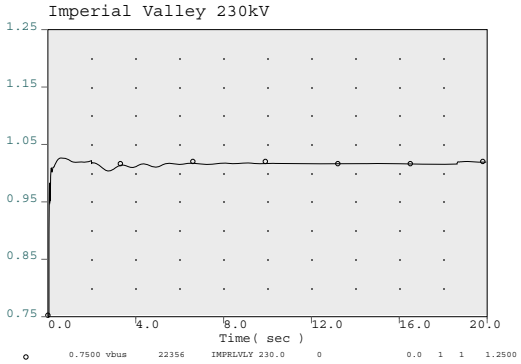
SDGE	tran-c1c2-ll-pstup-r15_MLECO-RASX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:16:27 2011

VOLTAGE

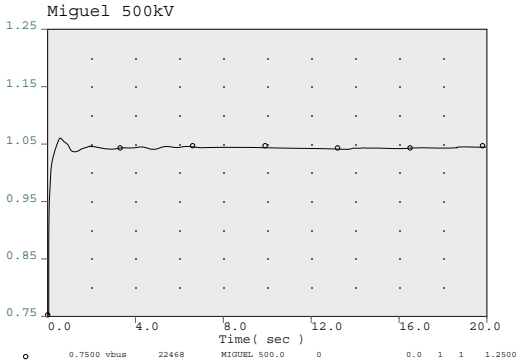
Imperial Valley 500kV



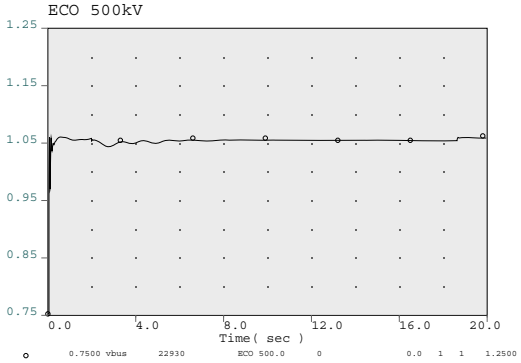
Imperial Valley 230kV



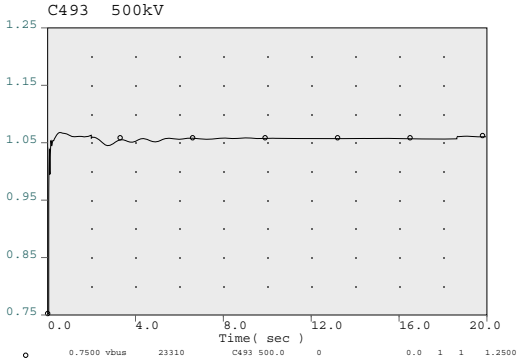
Miguel 500kV



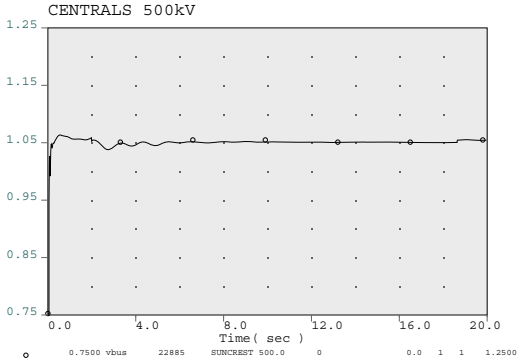
ECO 500kV



C493 500kV



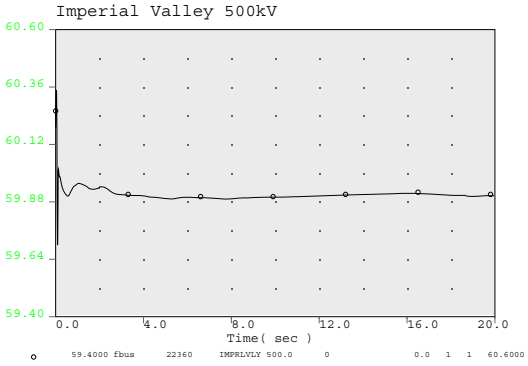
CENTRALS 500kV



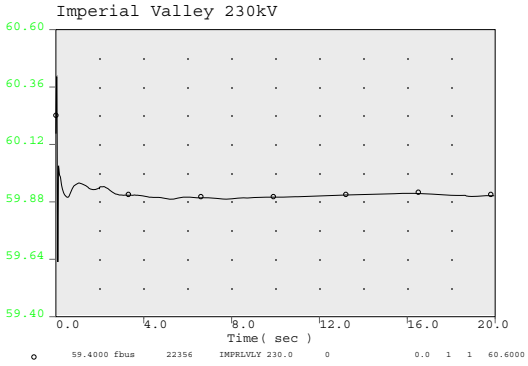
C1 C2 Light Load Post With Upgrades

FREQUENCY

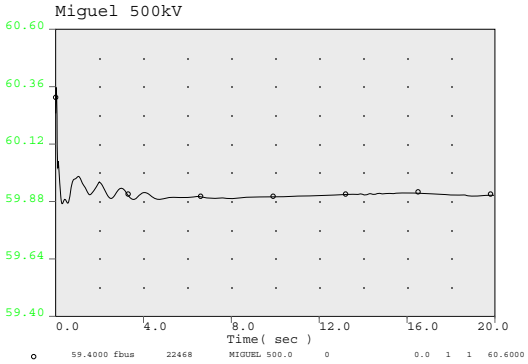
Imperial Valley 500kV



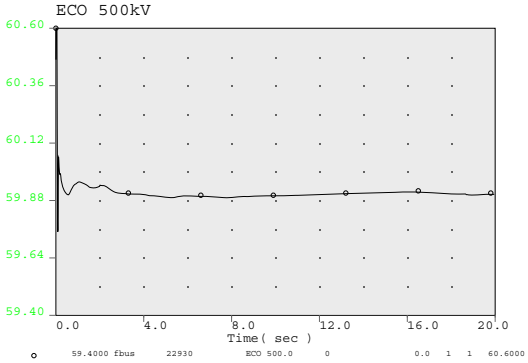
Imperial Valley 230kV



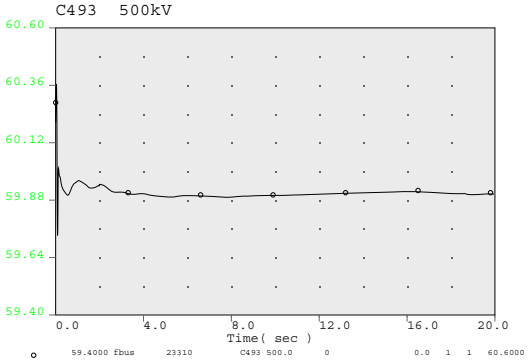
Miguel 500kV



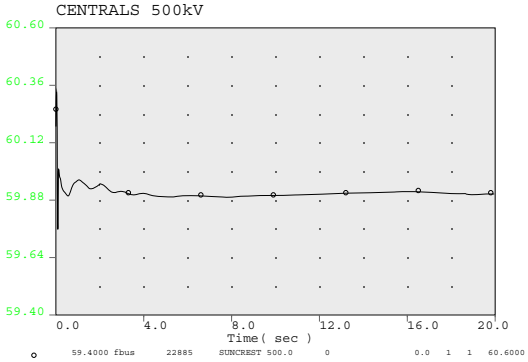
ECO 500kV



C493 500kV

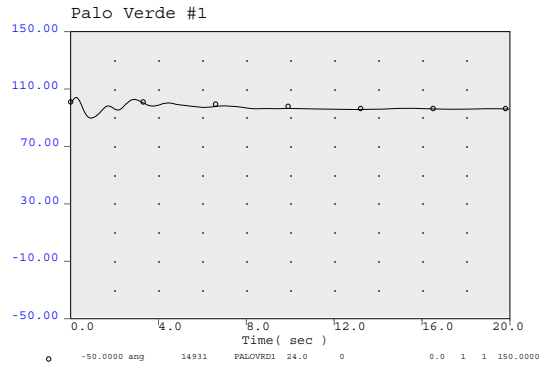


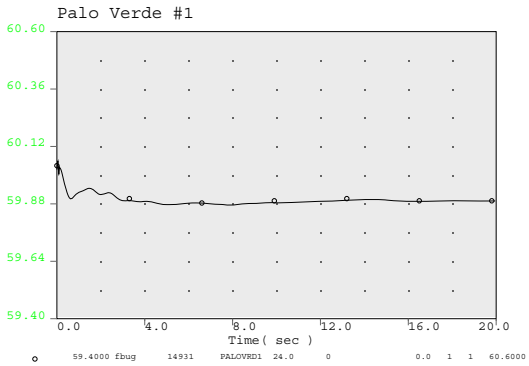
CENTRALS 500kV

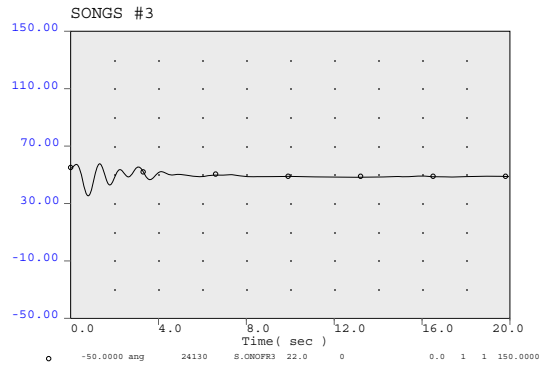


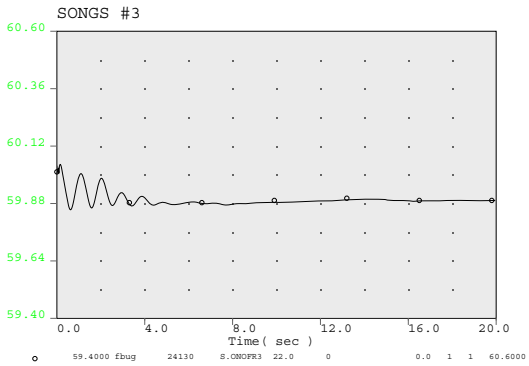
C1 C2 Light Load Post With Upgrades

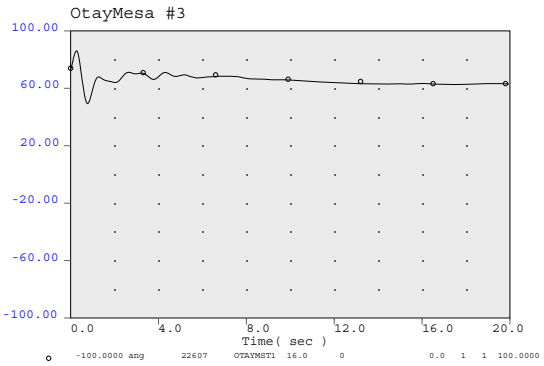
RELATIVE ROTOR ANGLE & FREQUENCY

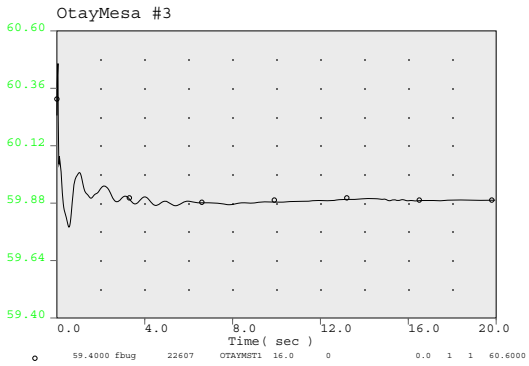












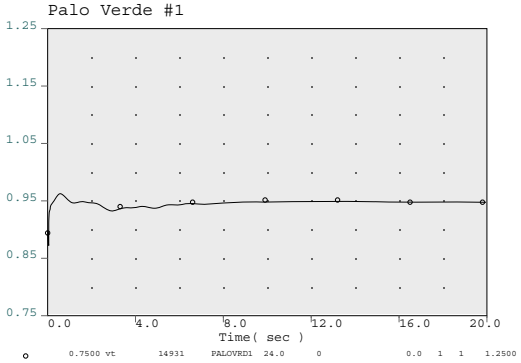
C1 C2 Light Load Post With Upgrades

Page 1

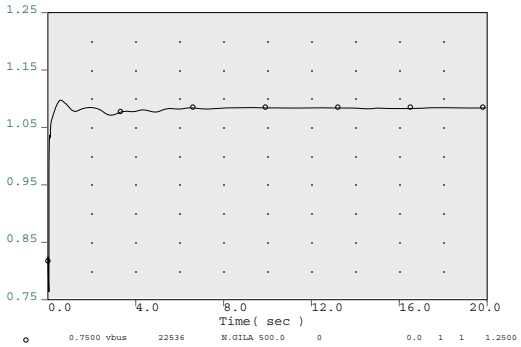
SDGE	tran-c1c2-ll-pstup-r15_ML-MS-RAS-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:14:19 2011

RELATIVE VOLTAGE

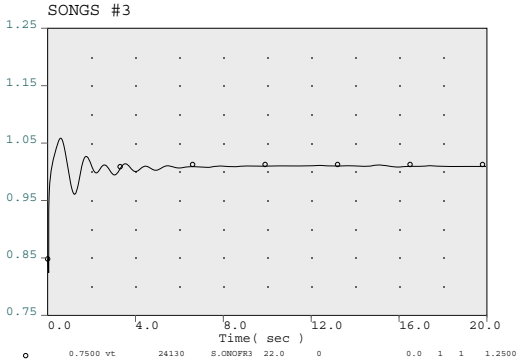
Palo Verde #1



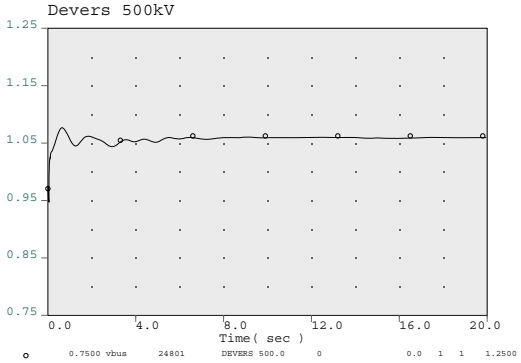
N Gila 500kV



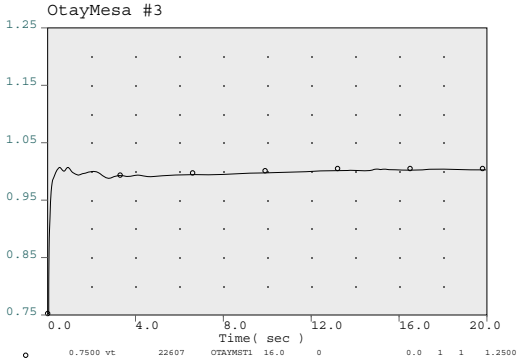
SONGS #3



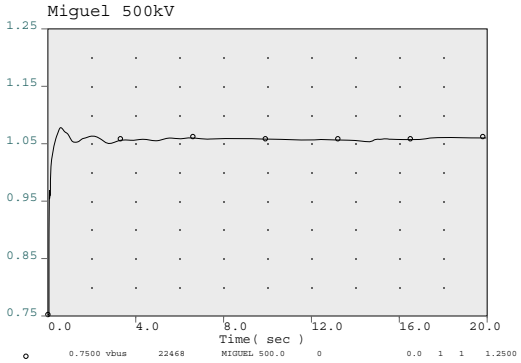
Devers 500kV



OtayMesa #3



Miguel 500kV



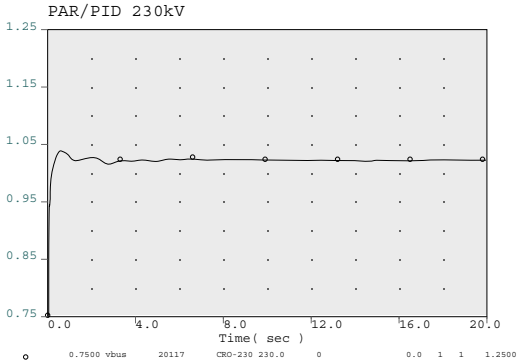
C1 C2 Light Load Post With Upgrades

Page 2

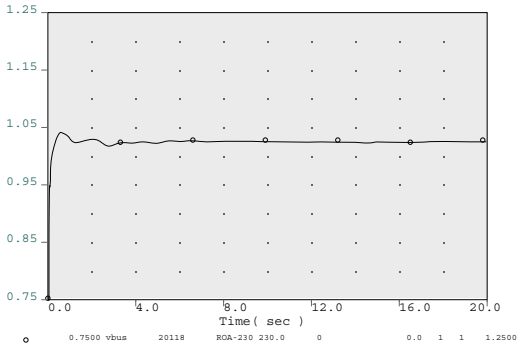
SDGE	tran-c1c2-ll-pstup-r15_ML-MS-RAS-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:14:19 2011

Affected System Voltage Check and Comparison

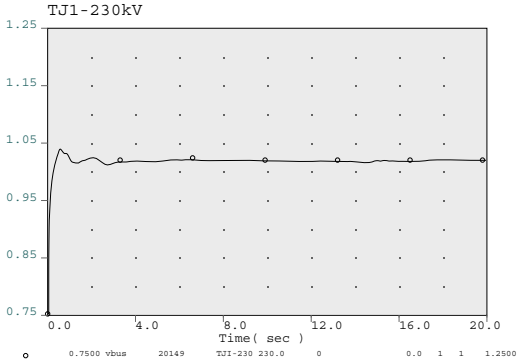
PAR/PID 230kV



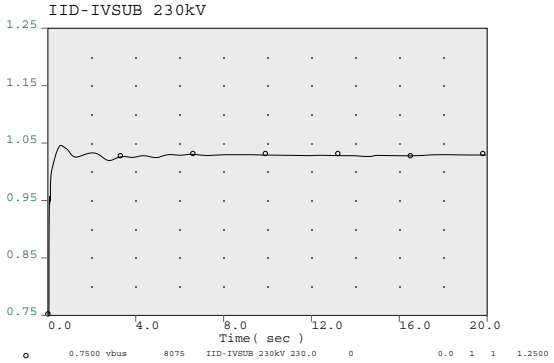
ROA-230kV



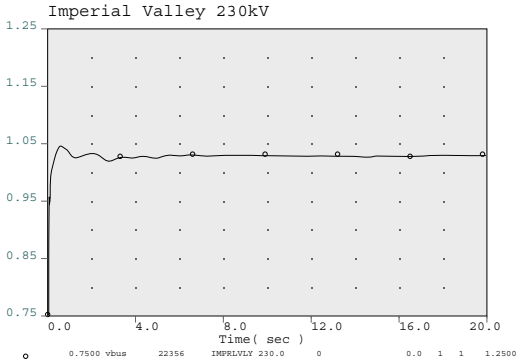
TJ1-230kV



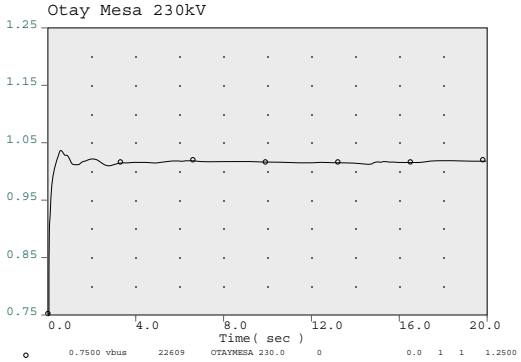
IID-IVSUB 230kV



Imperial Valley 230kV

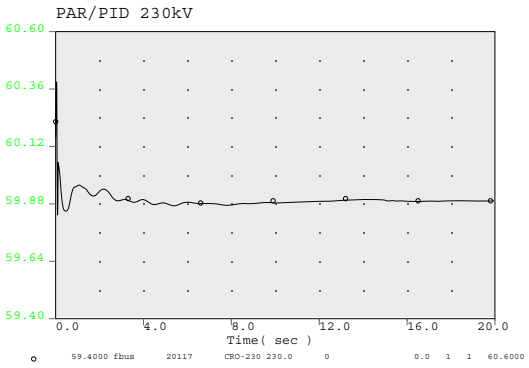


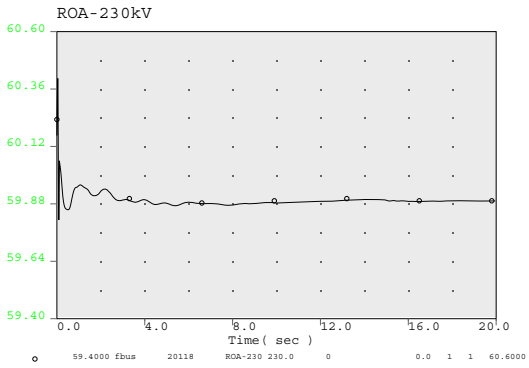
Otay Mesa 230kV

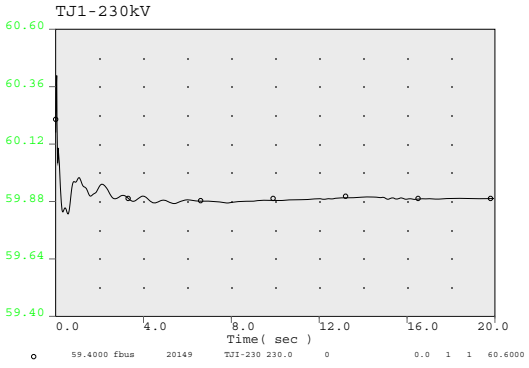


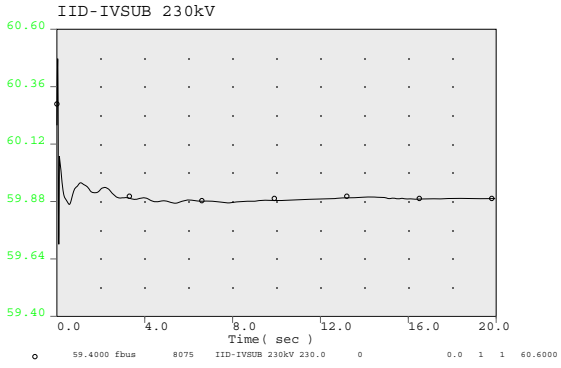
C1 C2 Light Load Post With Upgrades

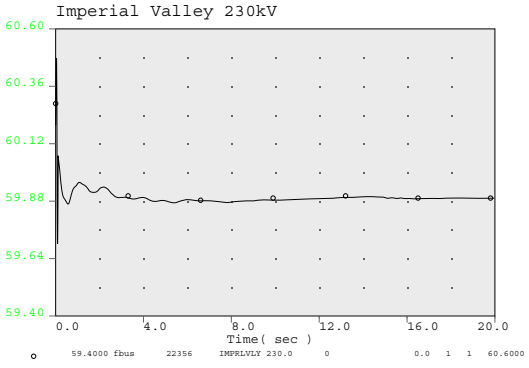
Affected System Frequency Check and Comparison

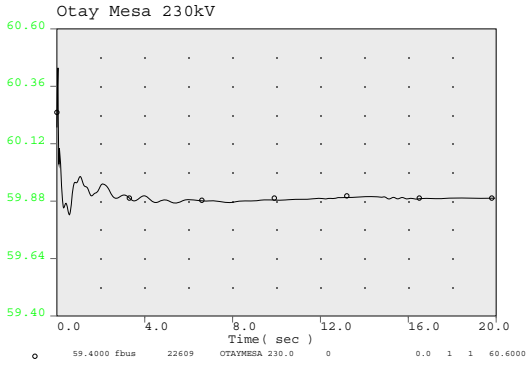












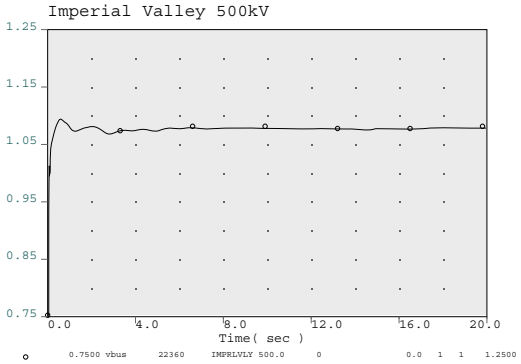
C1 C2 Light Load Post With Upgrades

Page 4

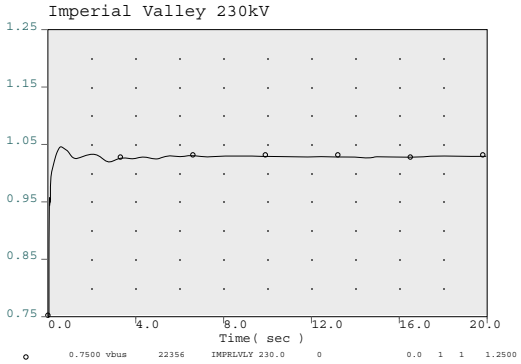
SDGE	tran-c1c2-ll-pstup-r15_ML-MS-RAS-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:14:20 2011

VOLTAGE

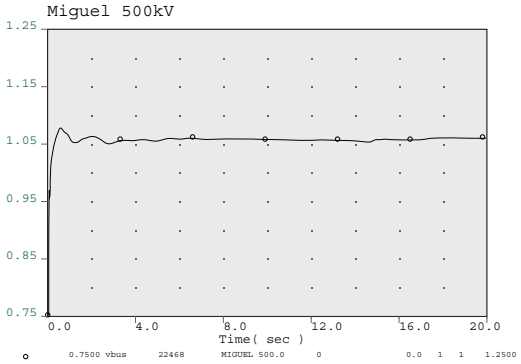
Imperial Valley 500kV



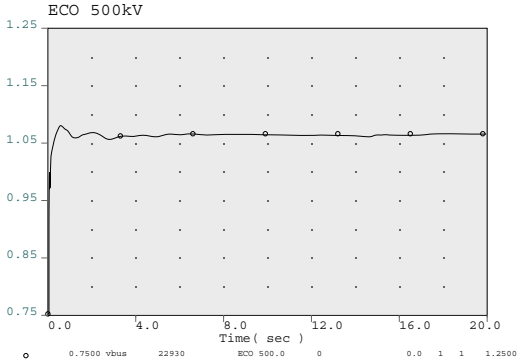
Imperial Valley 230kV



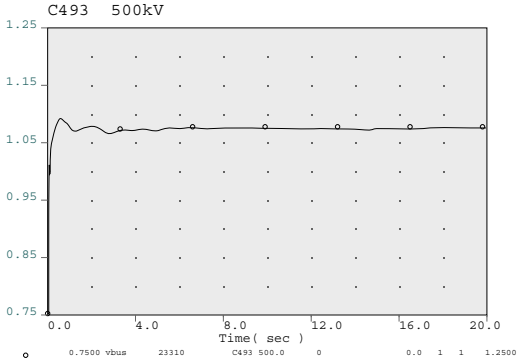
Miguel 500kV



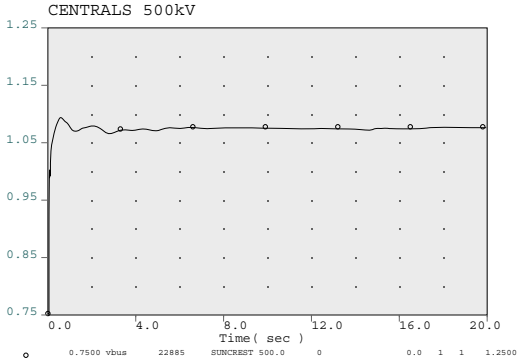
ECO 500kV



C493 500kV



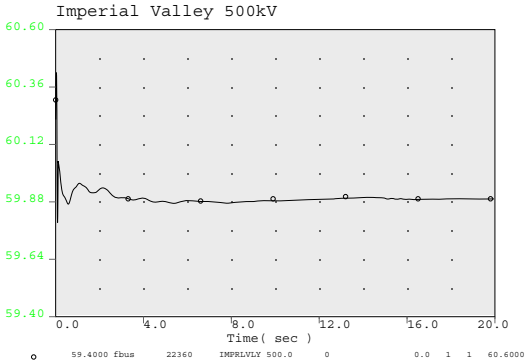
CENTRALS 500kV



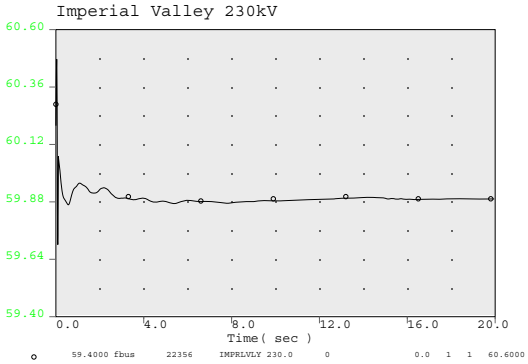
C1 C2 Light Load Post With Upgrades

FREQUENCY

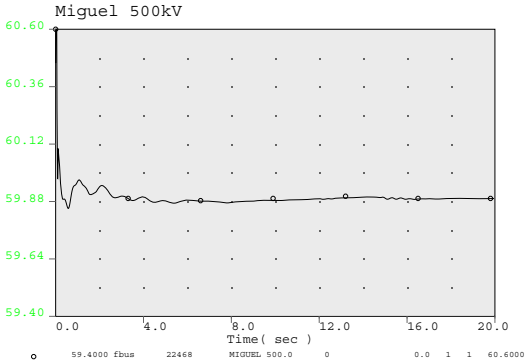
Imperial Valley 500kV



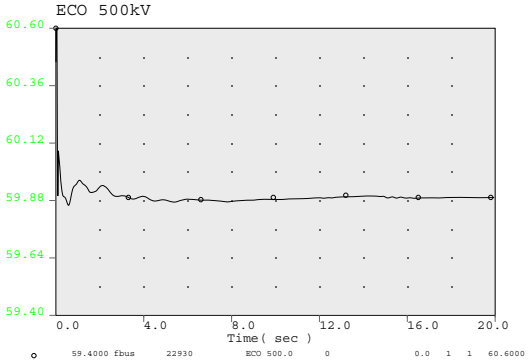
Imperial Valley 230kV



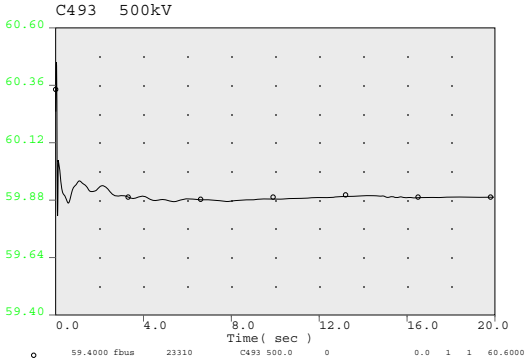
Miguel 500kV



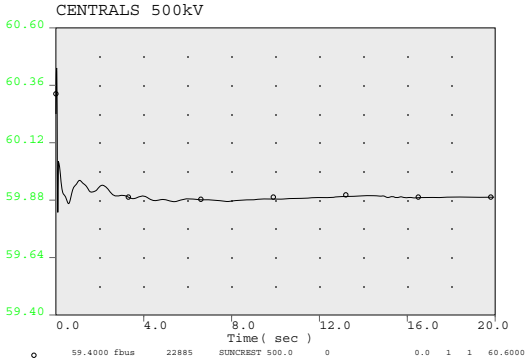
ECO 500kV



C493 500kV

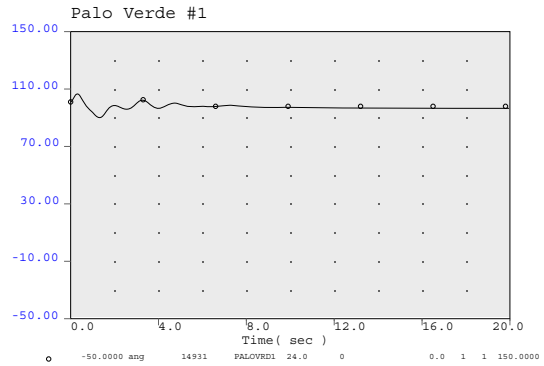


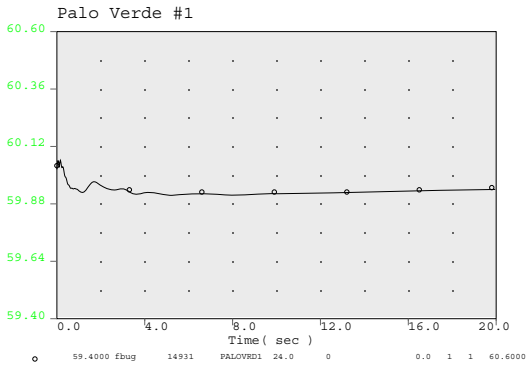
CENTRALS 500kV

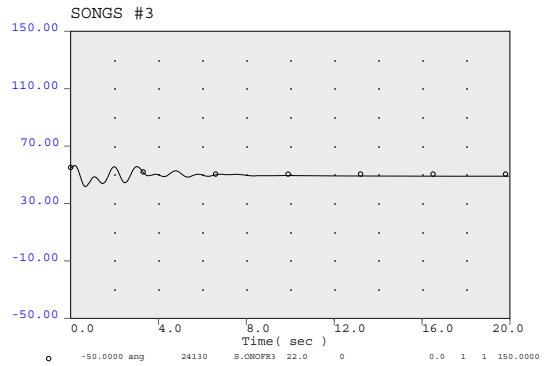


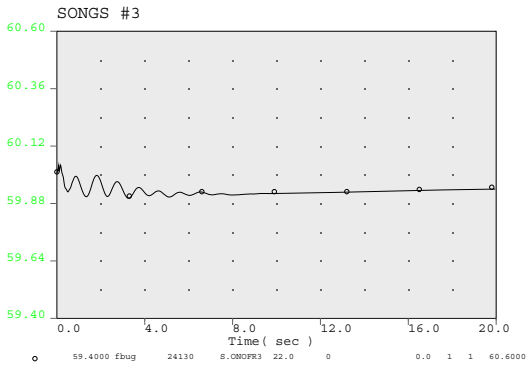
C1 C2 Light Load Post With Upgrades

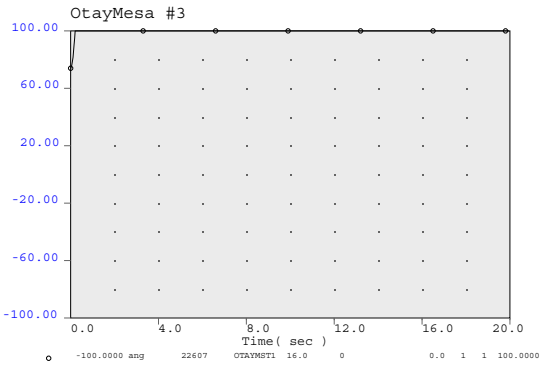
RELATIVE ROTOR ANGLE & FREQUENCY

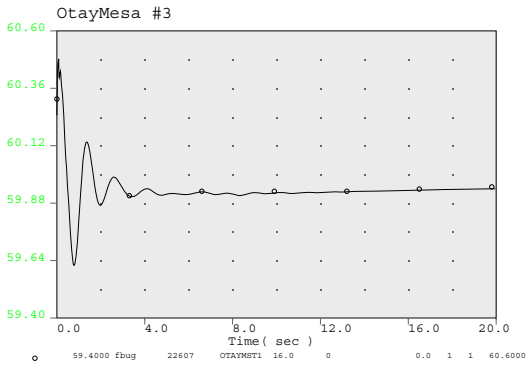












C1 C2 Light Load Post With Upgrades

Page 1

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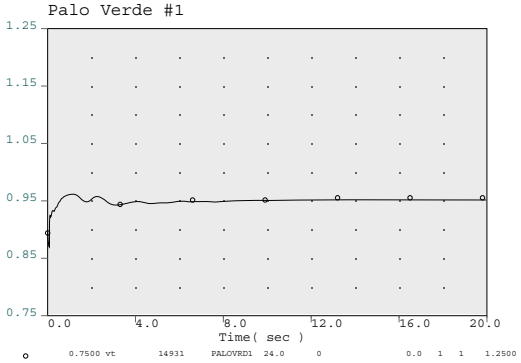
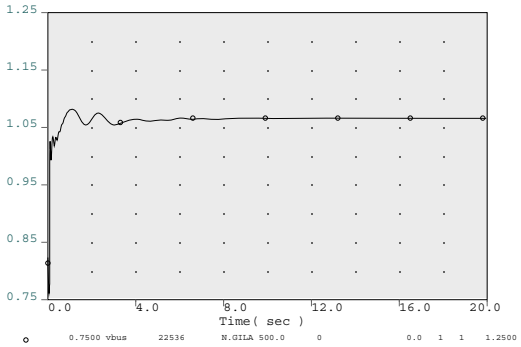
RELATIVE VOLTAGE

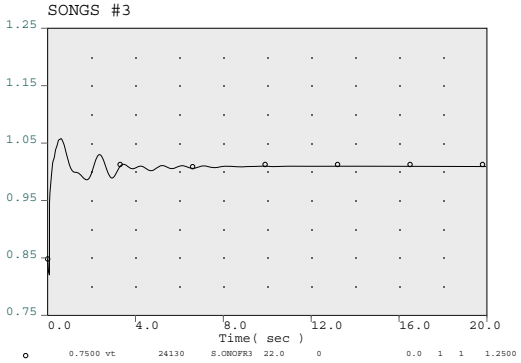
Palo Verde #1



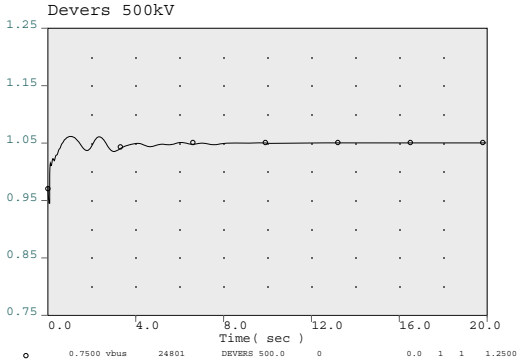
N Gila 500kV



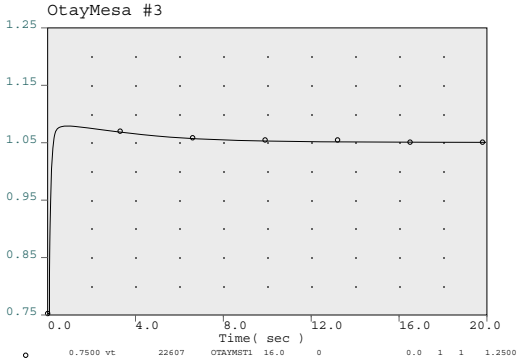
SONGS #3



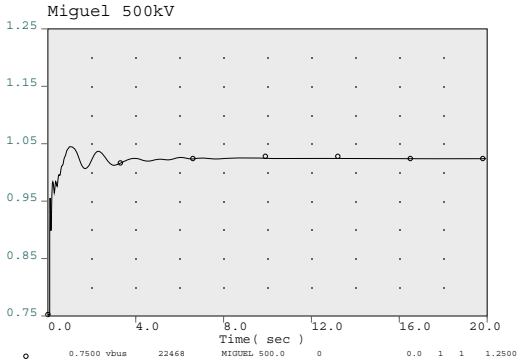
Devers 500kV



OtayMesa #3



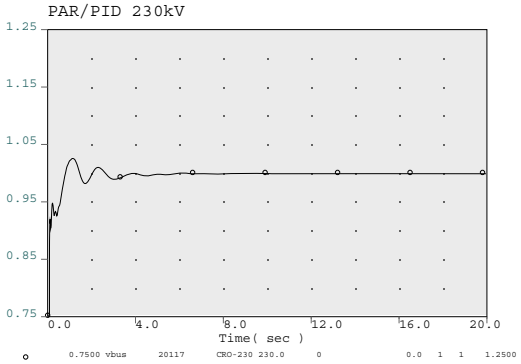
Miguel 500kV



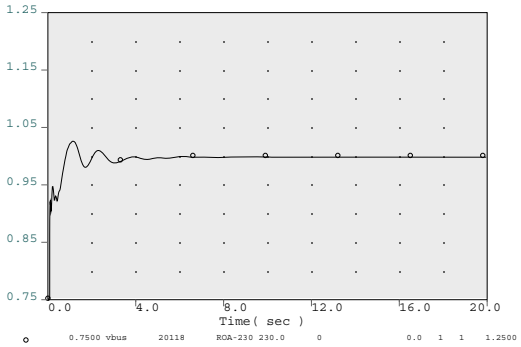
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

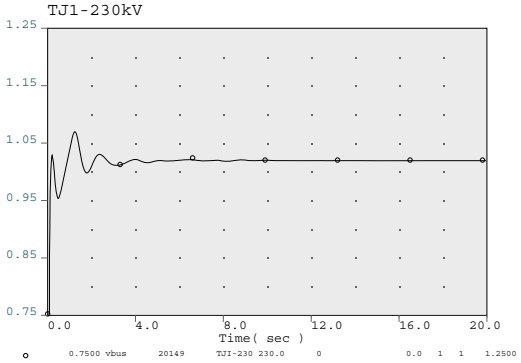
PAR/PID 230kV



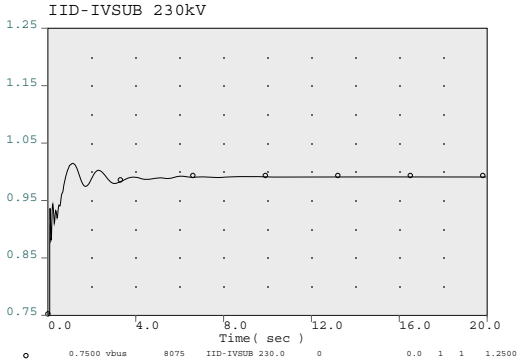
ROA-230kV



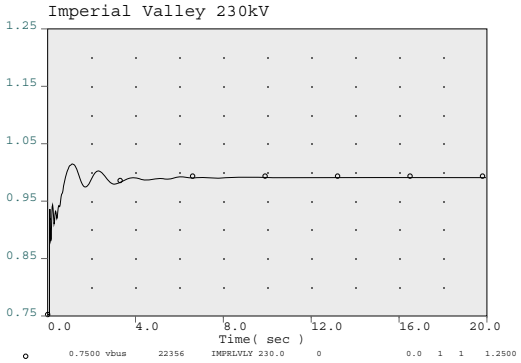
TJ1-230kV



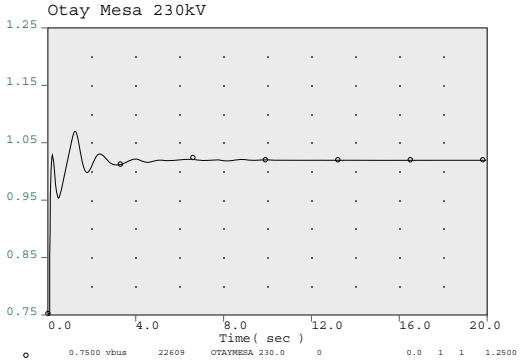
IID-IVSUB 230kV



Imperial Valley 230kV



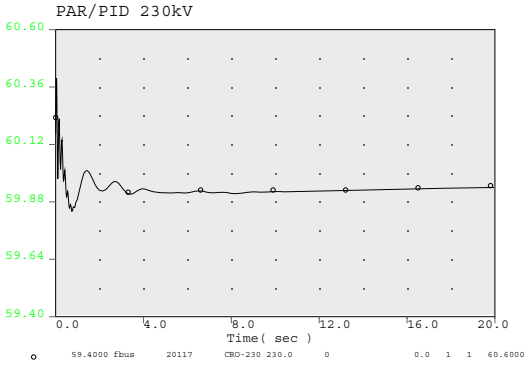
Otay Mesa 230kV



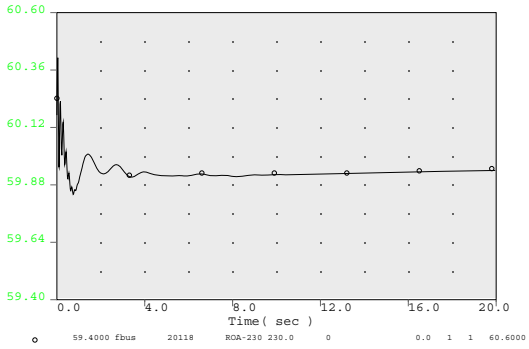
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

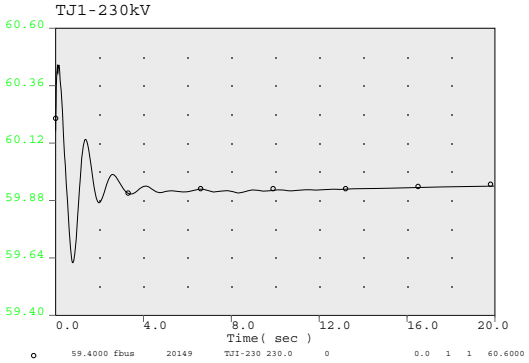
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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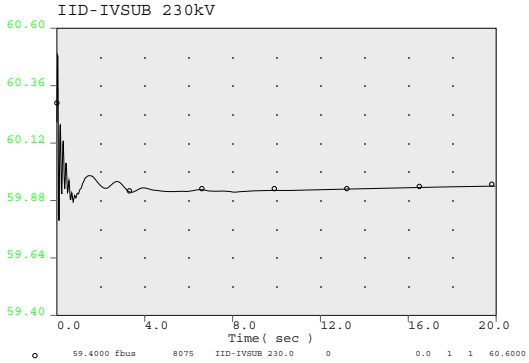
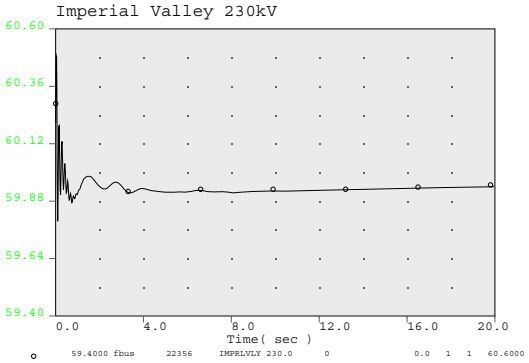
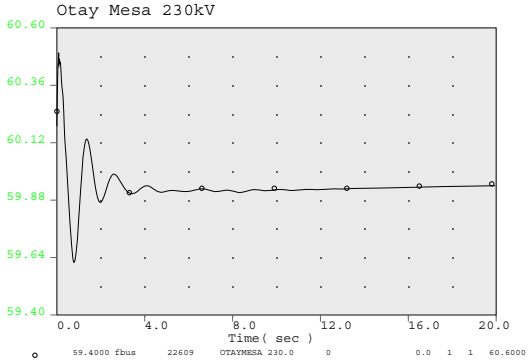


Imperial Valley 230kV



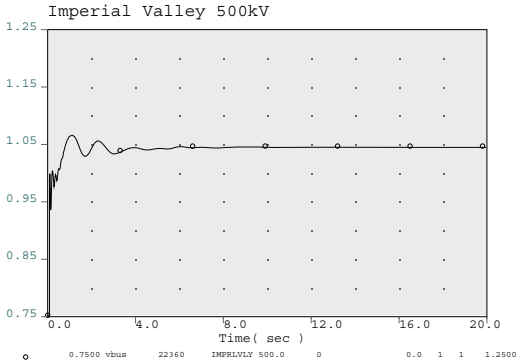
Otay Mesa 230kV



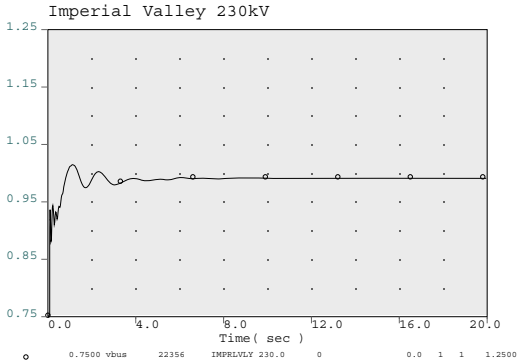
C1 C2 Light Load Post With Upgrades

VOLTAGE

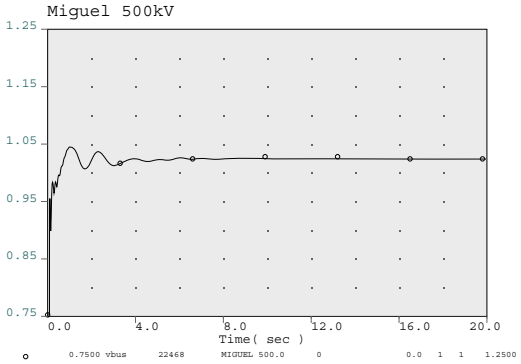
Imperial Valley 500kV



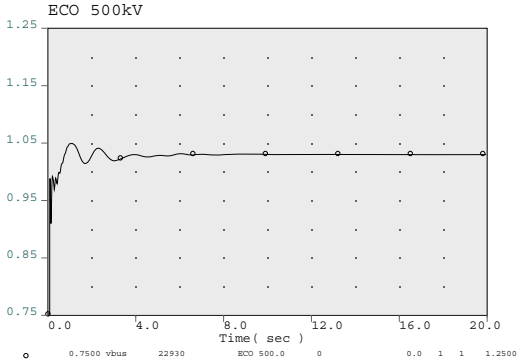
Imperial Valley 230kV



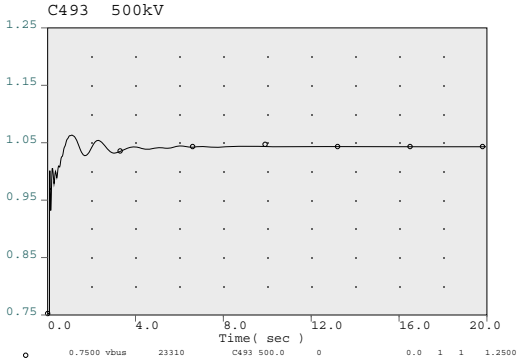
Miguel 500kV



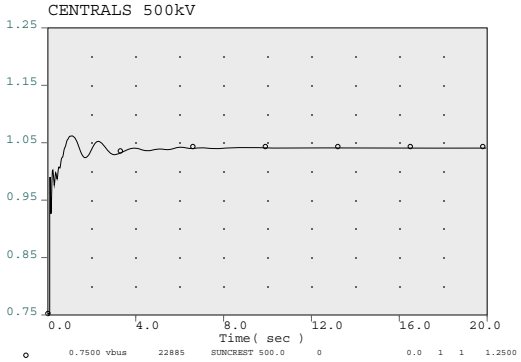
ECO 500kV



C493 500kV



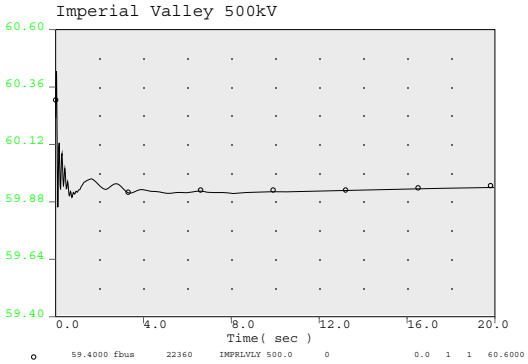
CENTRALS 500kV



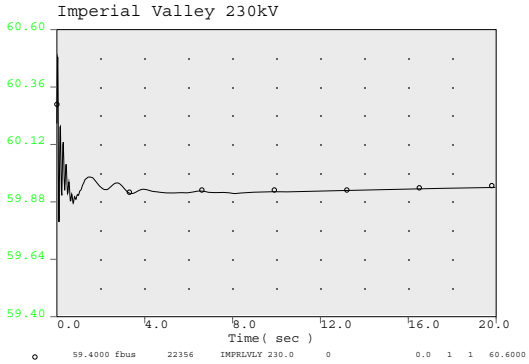
C1 C2 Light Load Post With Upgrades

Frequency

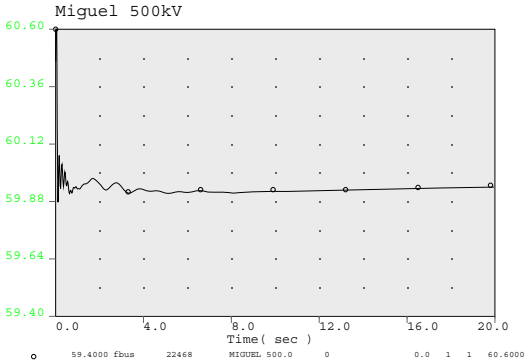
Imperial Valley 500kV



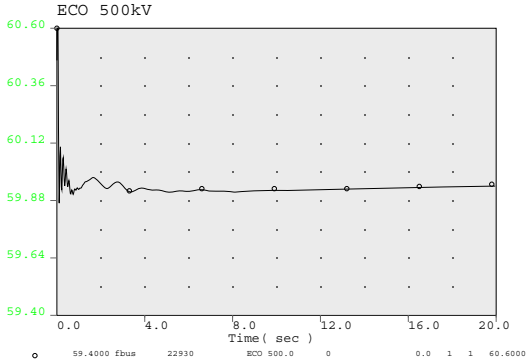
Imperial Valley 230kV



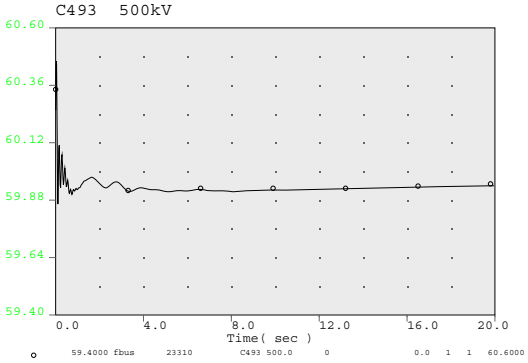
Miguel 500kV



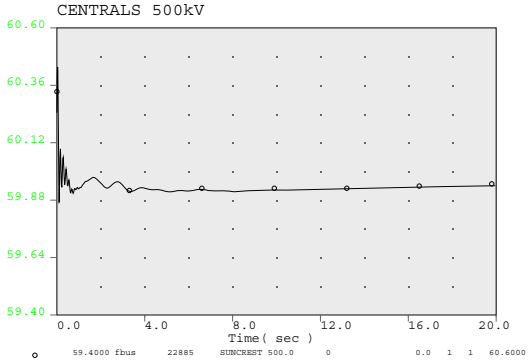
ECO 500kV



C493 500kV

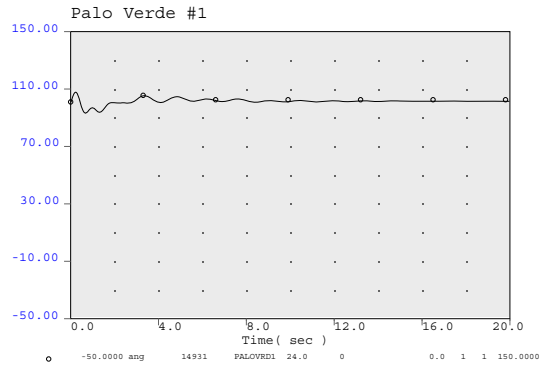


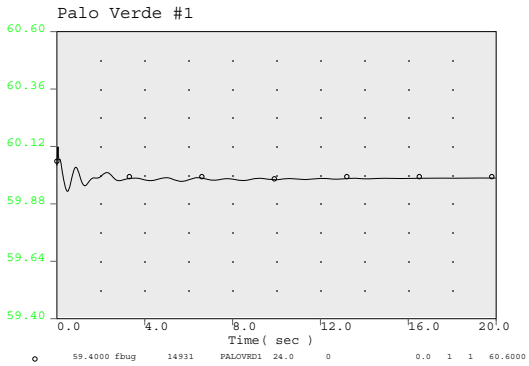
CENTRALS 500kV

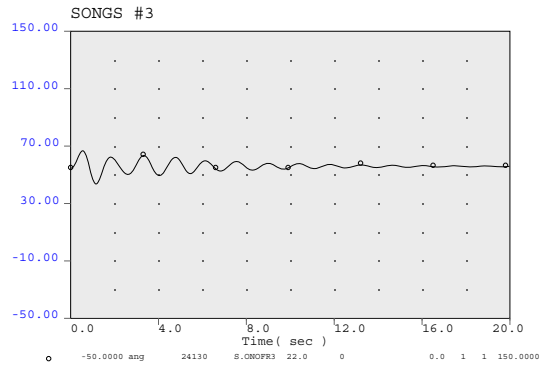


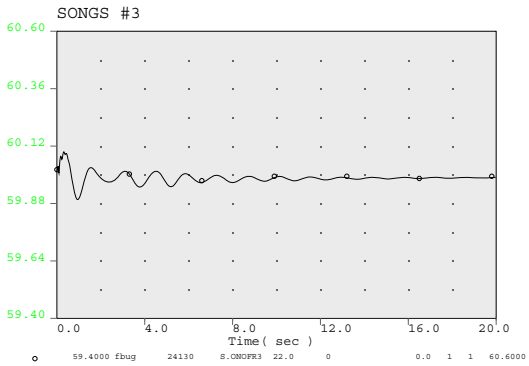
C1 C2 Light Load Post With Upgrades

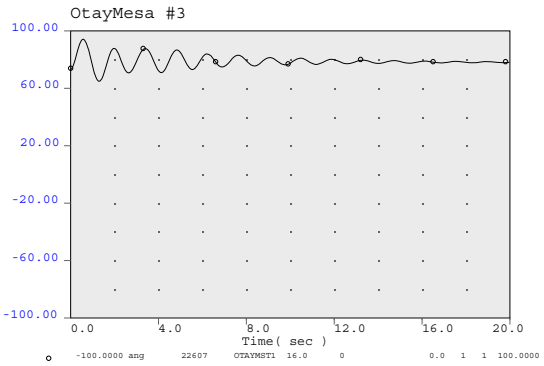
RELATIVE ROTOR ANGLE & FREQUENCY

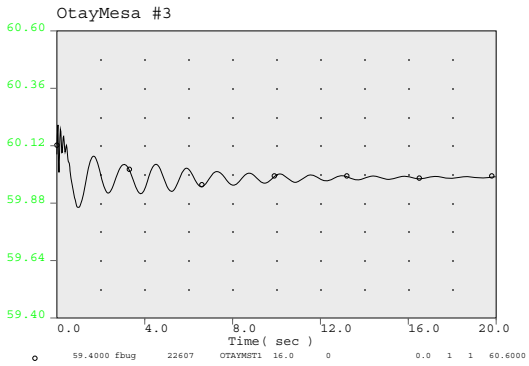










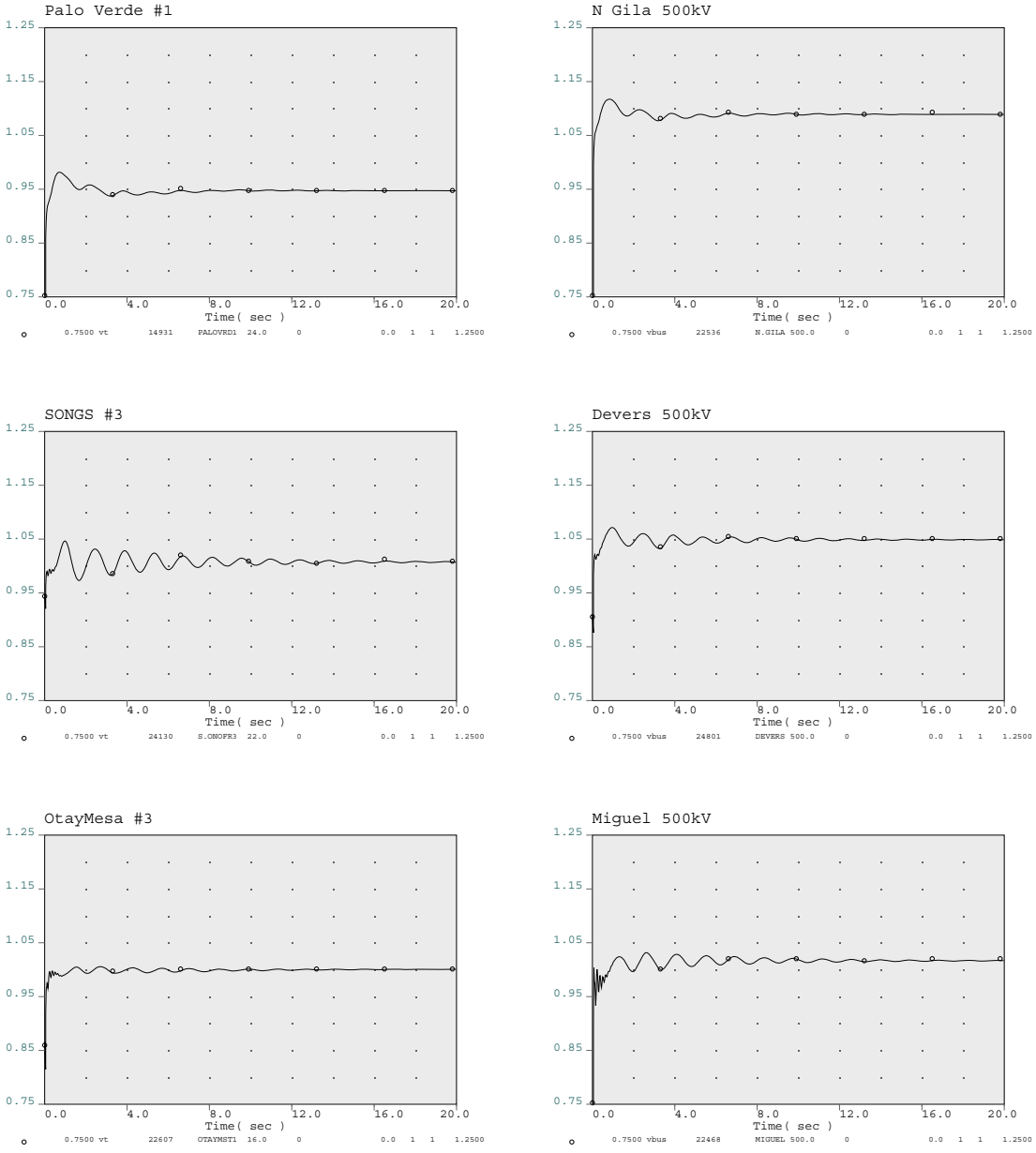


C1 C2 Light Load Post With Upgrades

Page 1

SDGE	tran-c1c2-ll-pstup-r15_NGila-IV-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:20:01 2011

RELATIVE VOLTAGE



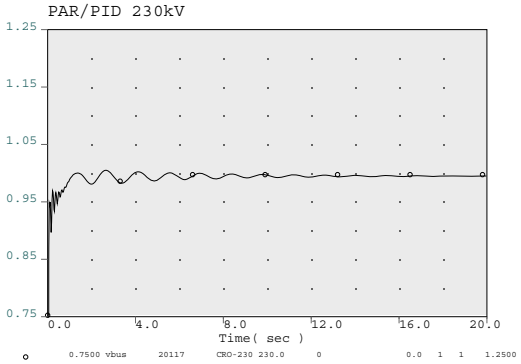
C1 C2 Light Load Post With Upgrades

Page 2

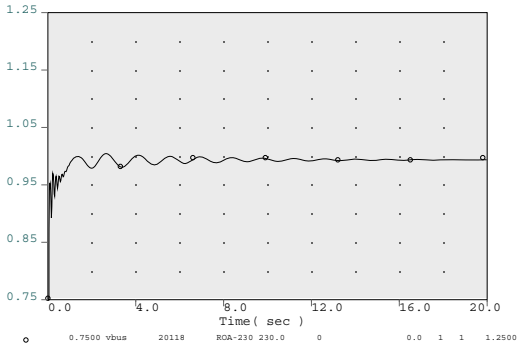
SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_NGila-IV-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:20:02 2011

Affected System Voltage Check and Comparison

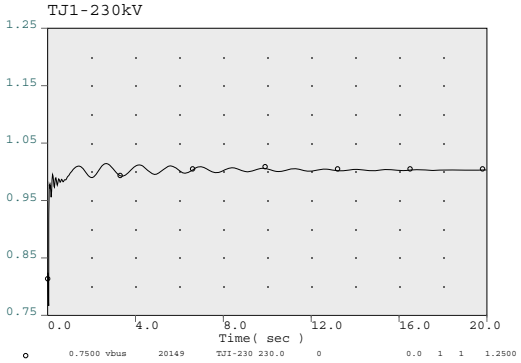
PAR/PID 230kV



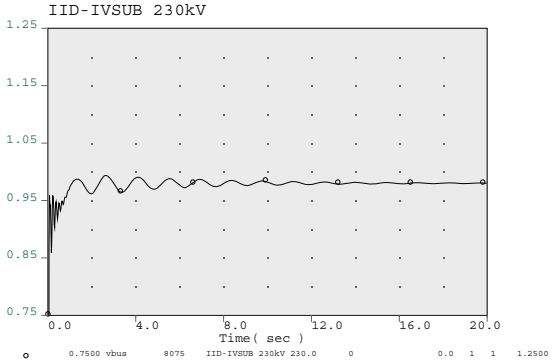
ROA-230kV



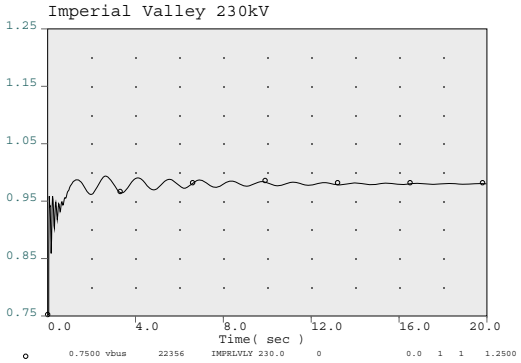
TJ1-230kV



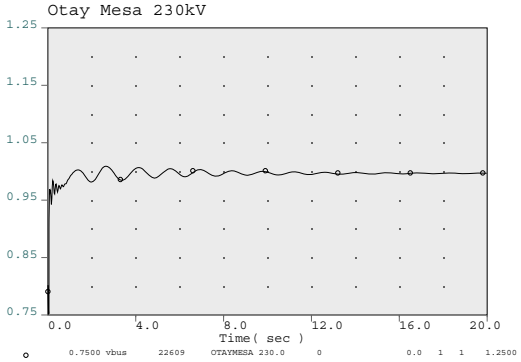
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



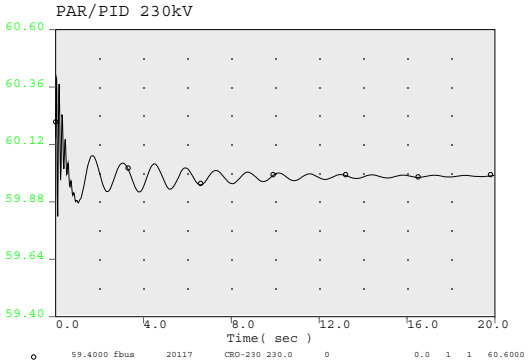
C1 C2 Light Load Post With Upgrades

Page 3

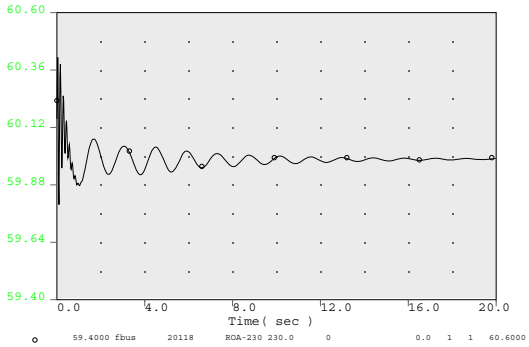
SDGE	tran-c1c2-ll-pstup-r15_NGila-IV-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:20:02 2011

Affected System Frequency Check and Comparison

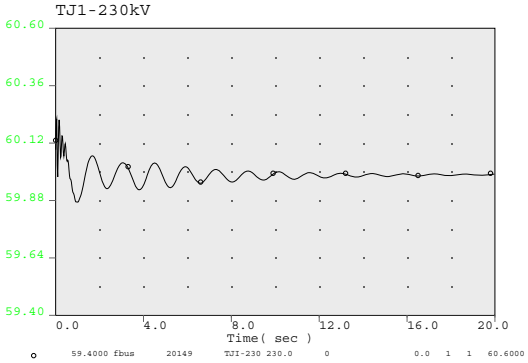
PAR/PID 230kV



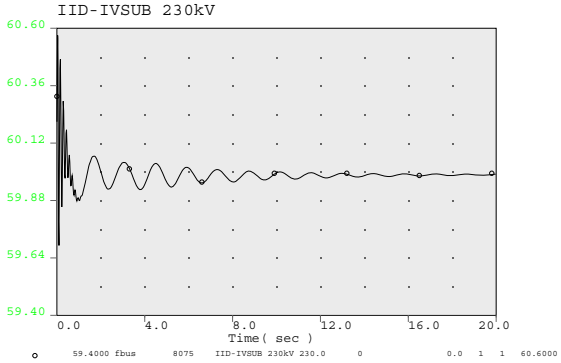
ROA-230kV



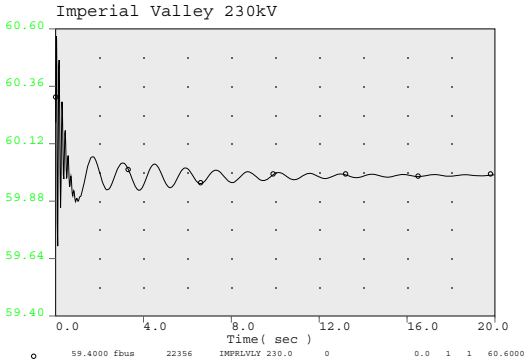
TJ1-230kV



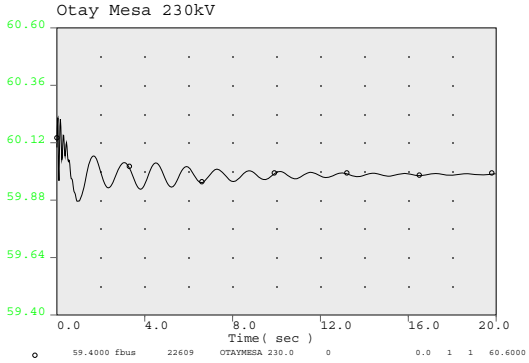
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



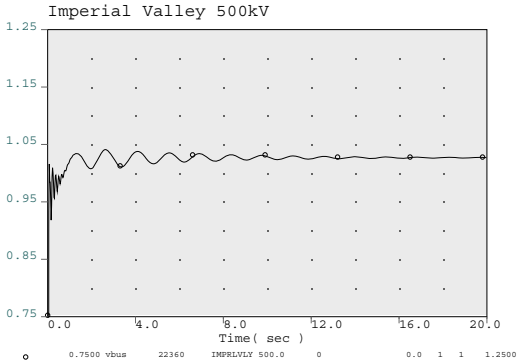
C1 C2 Light Load Post With Upgrades

Page 4

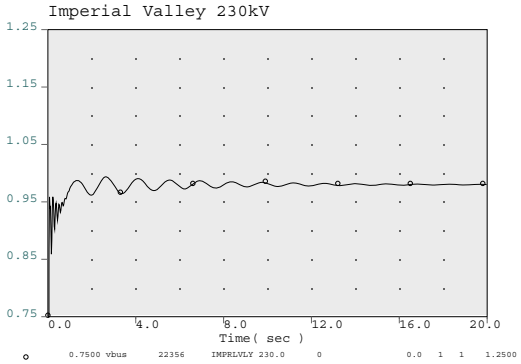
SDGE	tran-c1c2-ll-pstup-r15_NGila-IV-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:20:03 2011

VOLTAGE

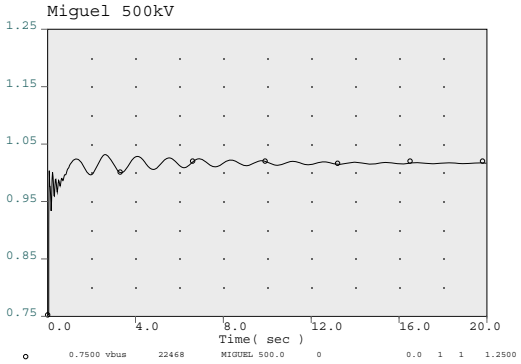
Imperial Valley 500kV



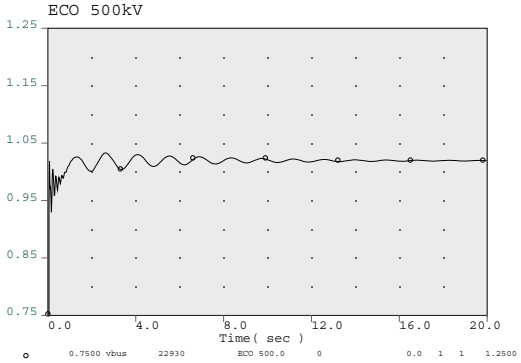
Imperial Valley 230kV



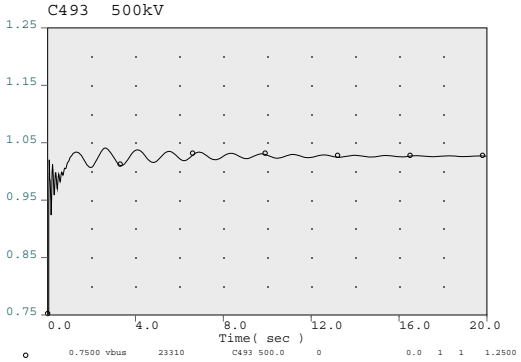
Miguel 500kV



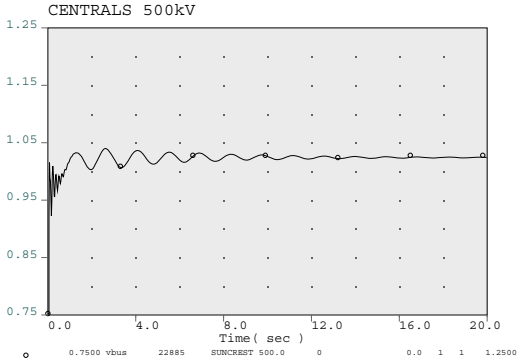
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Light Load Post With Upgrades

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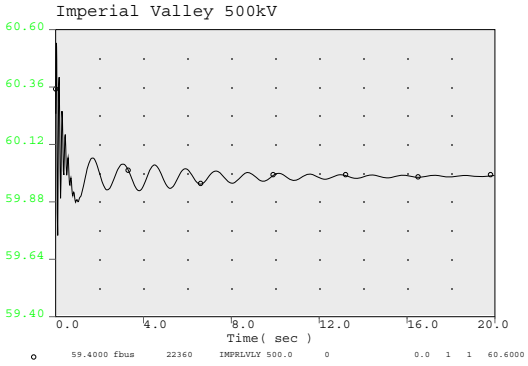
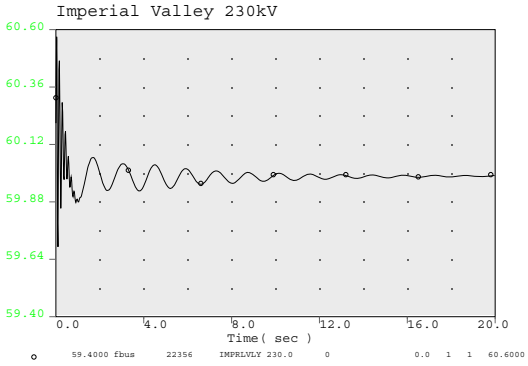
SDGE	tran-c1c2-ll-pstup-r15_NGila-IV-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:20:03 2011

FREQUENCY

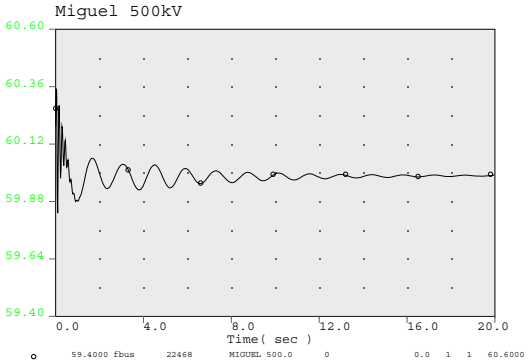
Imperial Valley 500kV



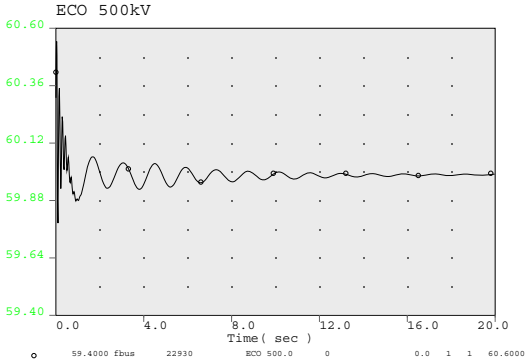
Imperial Valley 230kV



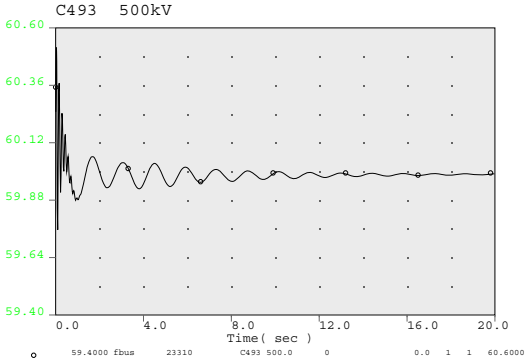
Miguel 500kV



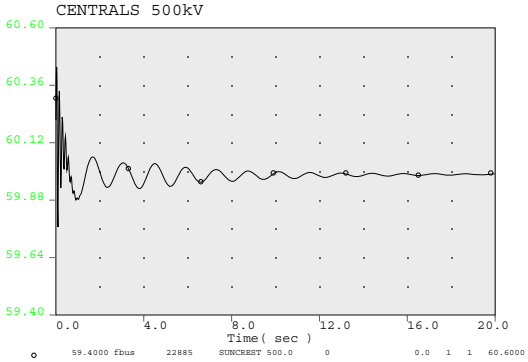
ECO 500kV



C493 500kV

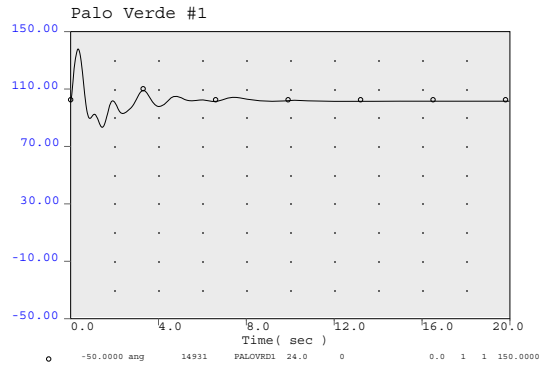


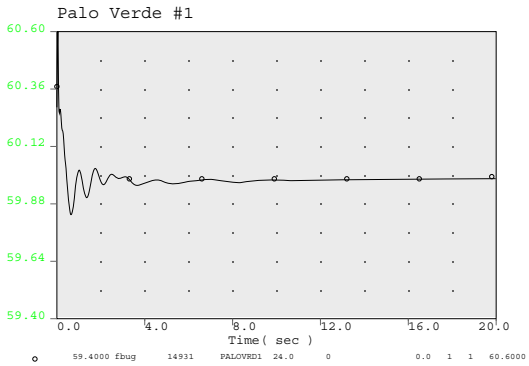
CENTRALS 500kV

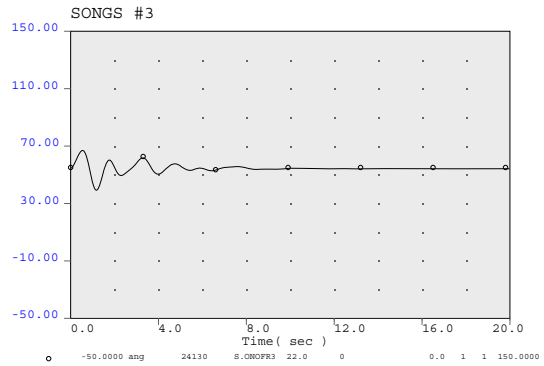


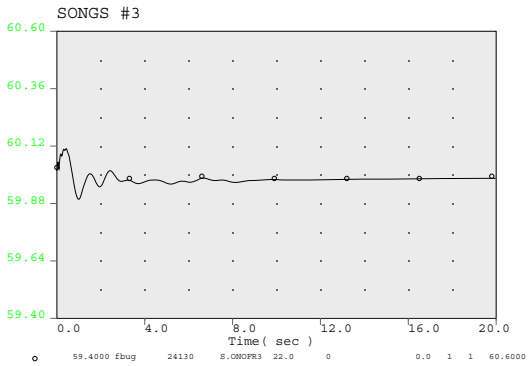
C1 C2 Light Load Post With Upgrades

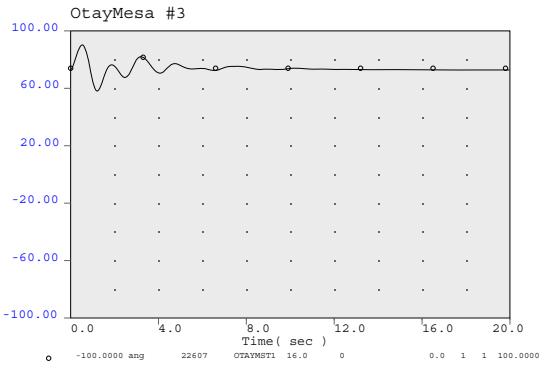
RELATIVE ROTOR ANGLE & FREQUENCY

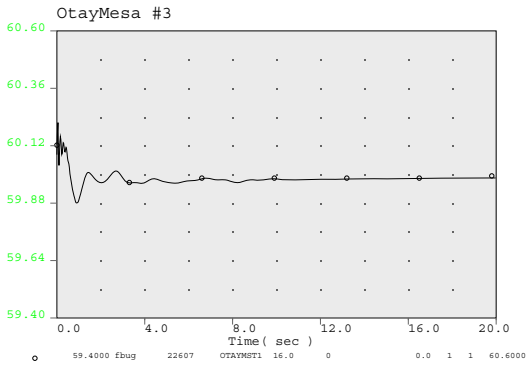












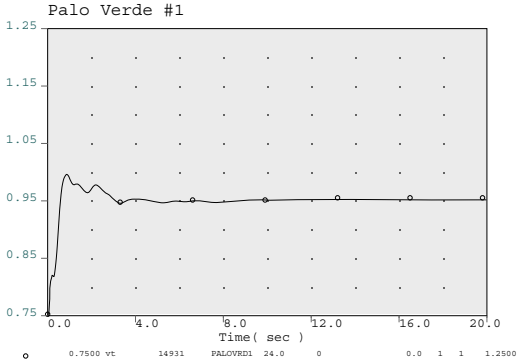
C1 C2 Light Load Post With Upgrades

Page 1

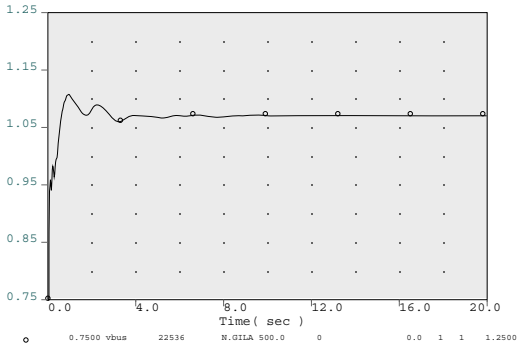
SDGE	tran-c1c2-ll-pstup-r15_pal-col-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:21:53 2011

RELATIVE VOLTAGE

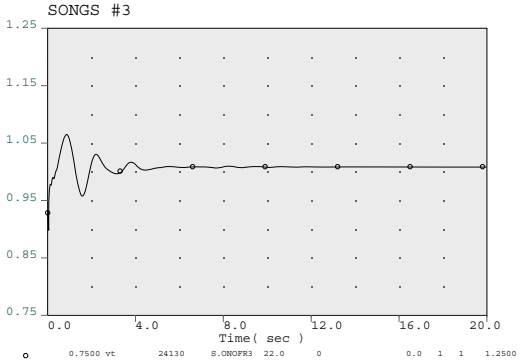
Palo Verde #1



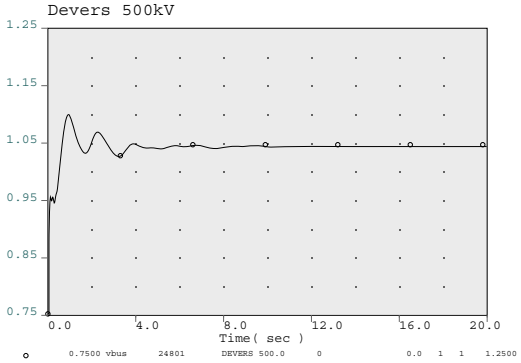
N Gila 500kV



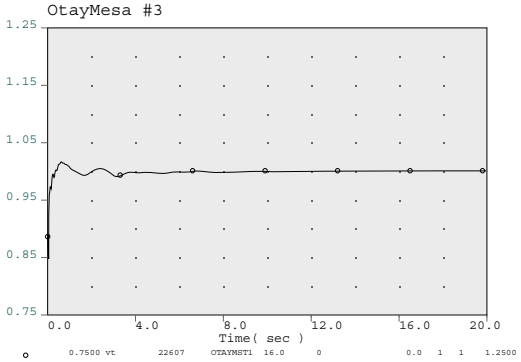
SONGS #3



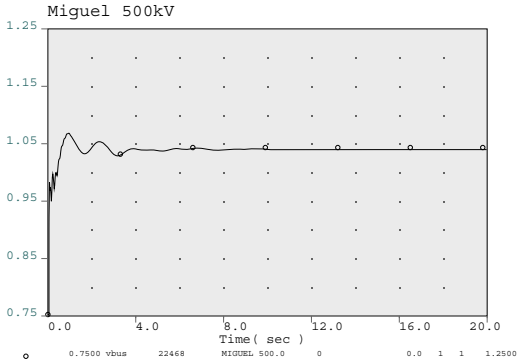
Devers 500kV



OtayMesa #3



Miguel 500kV



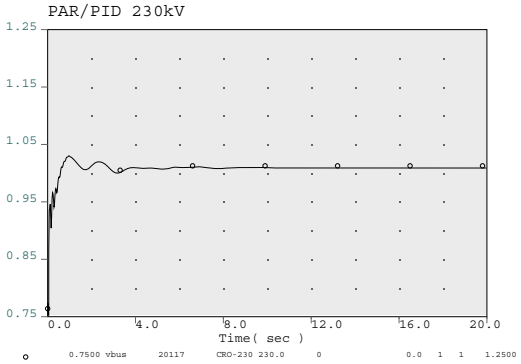
C1 C2 Light Load Post With Upgrades

Page 2

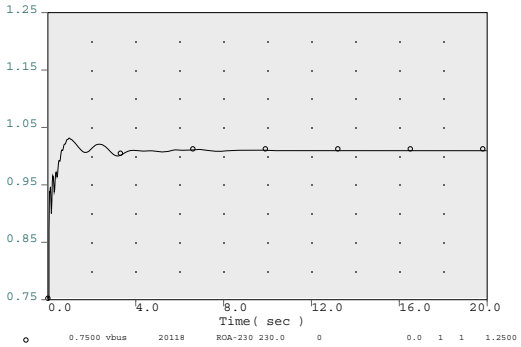
SDGE	tran-c1c2-ll-pstup-r15_pal-col-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:21:54 2011

Affected System Voltage Check and Comparison

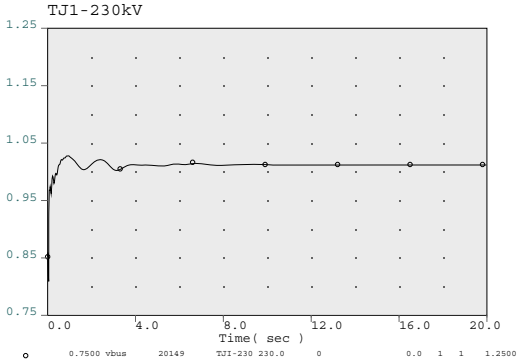
PAR/PID 230kV



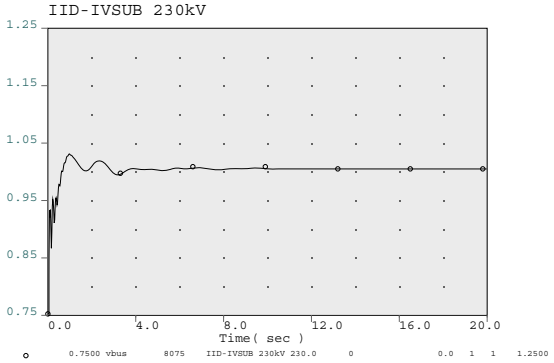
ROA-230kV



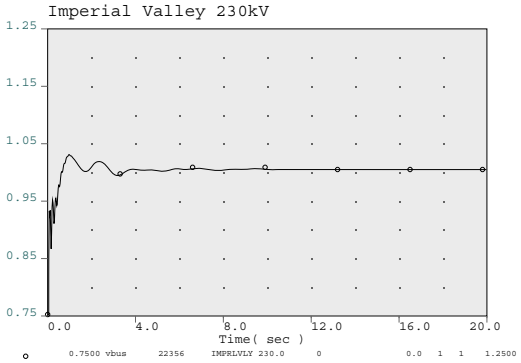
TJ1-230kV



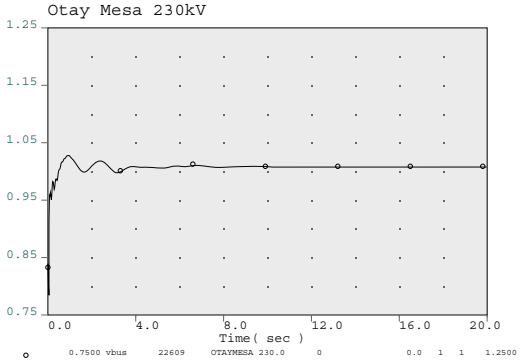
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



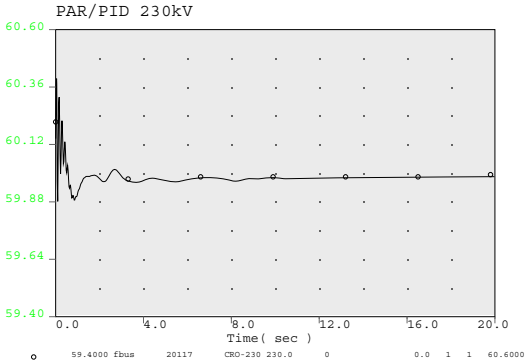
C1 C2 Light Load Post With Upgrades

Page 3

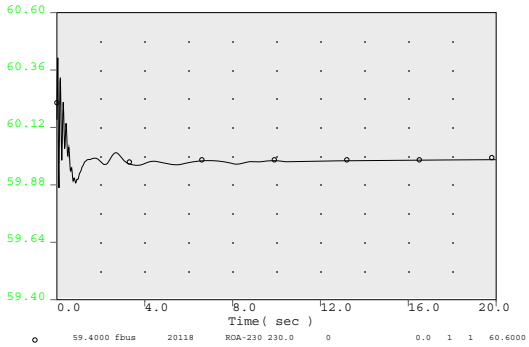
tran-c1c2-ll-pstup-r15_pal-col-slo.chf | anstab\ll\pst\ws_pst_c1c2 | Sun Jul 17 15:21:54 2011

Affected System Frequency Check and Comparison

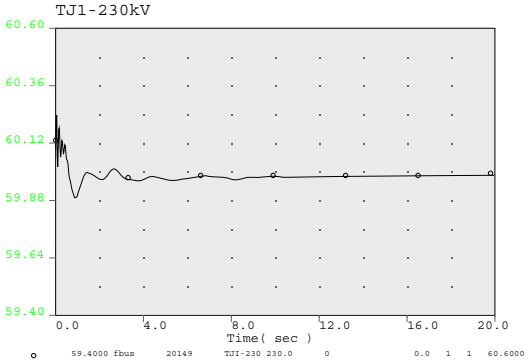
PAR/PID 230kV



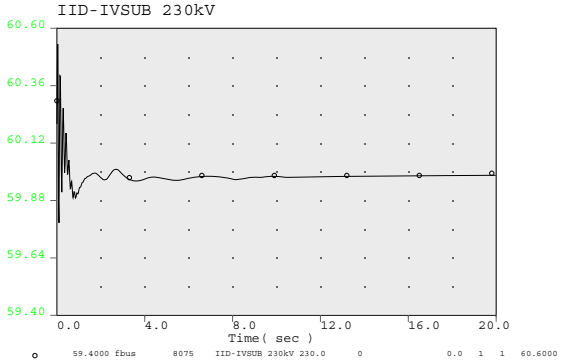
ROA-230kV



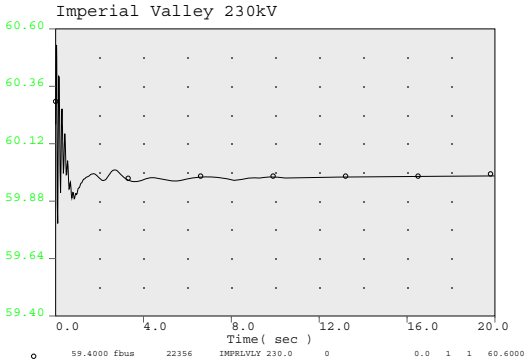
TJ1-230kV



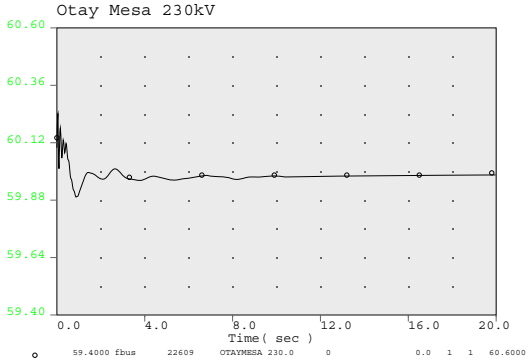
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



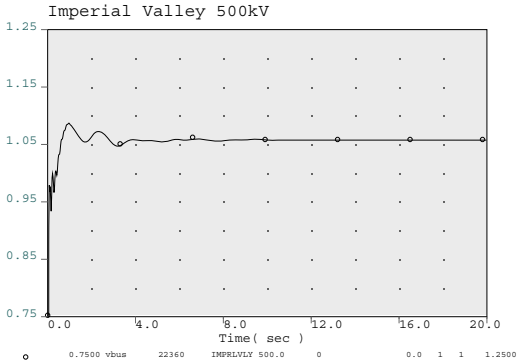
C1 C2 Light Load Post With Upgrades

Page 4

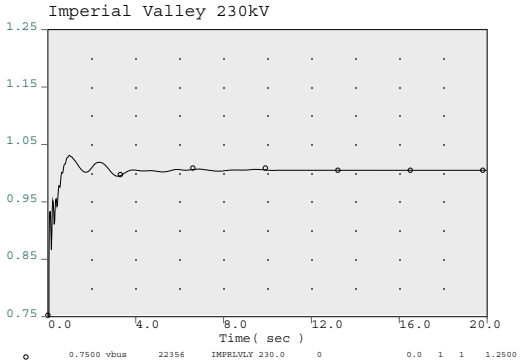
SDGE	tran-c1c2-ll-pstup-r15_pal-col-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:21:55 2011

VOLTAGE

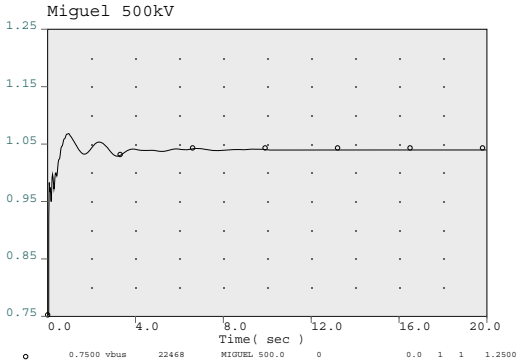
Imperial Valley 500kV



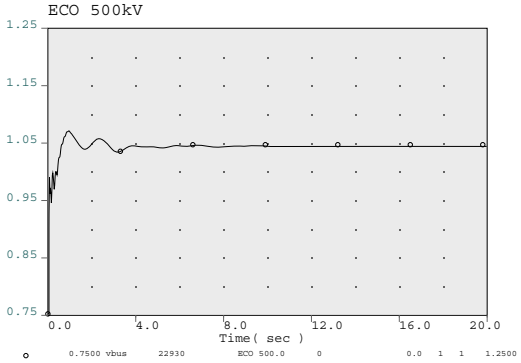
Imperial Valley 230kV



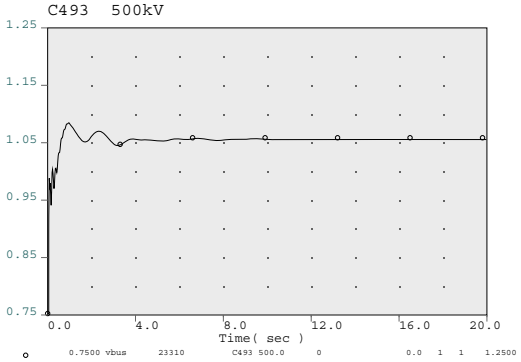
Miguel 500kV



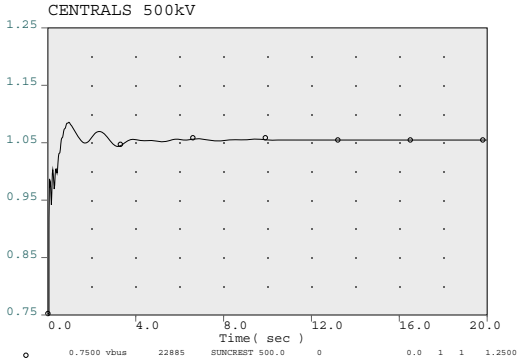
ECO 500kV



C493 500kV



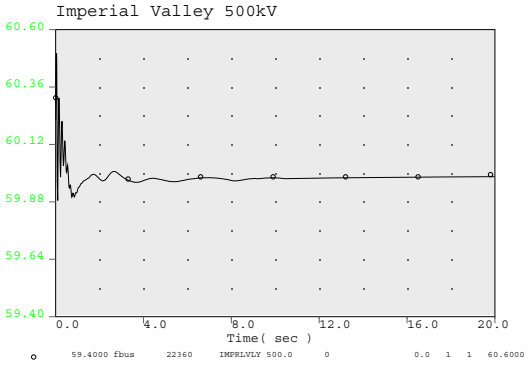
CENTRALS 500kV



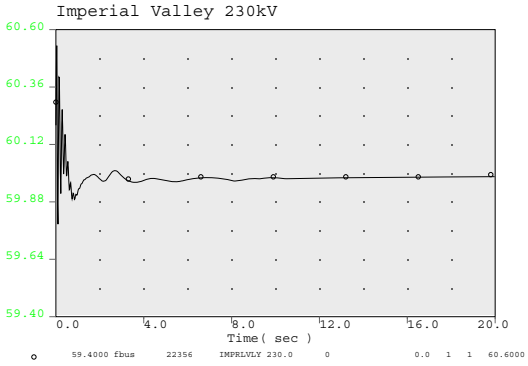
C1 C2 Light Load Post With Upgrades

FREQUENCY

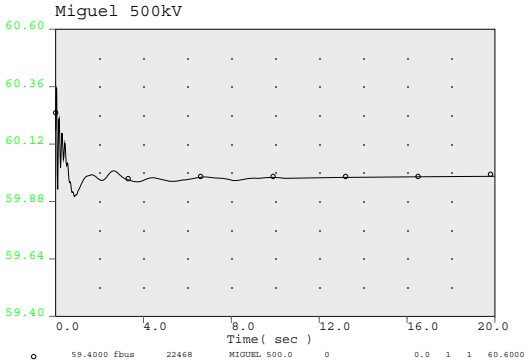
Imperial Valley 500kV



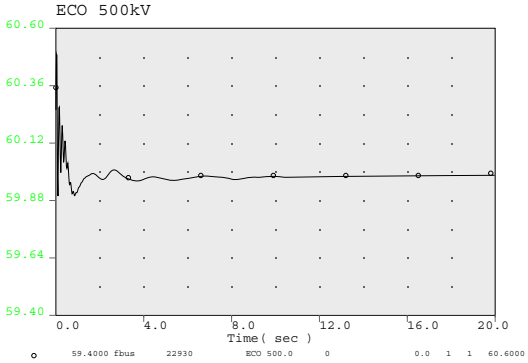
Imperial Valley 230kV



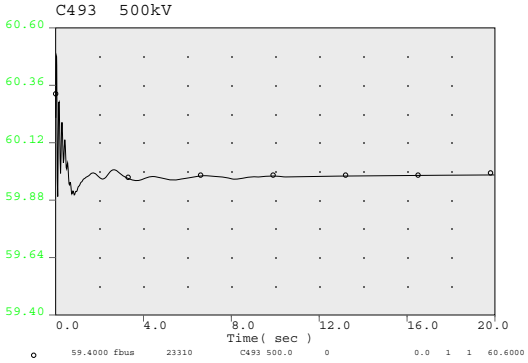
Miguel 500kV



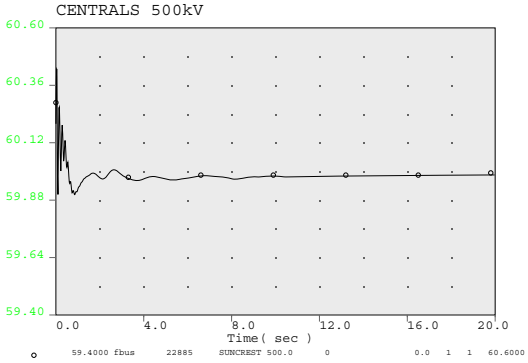
ECO 500kV



C493 500kV

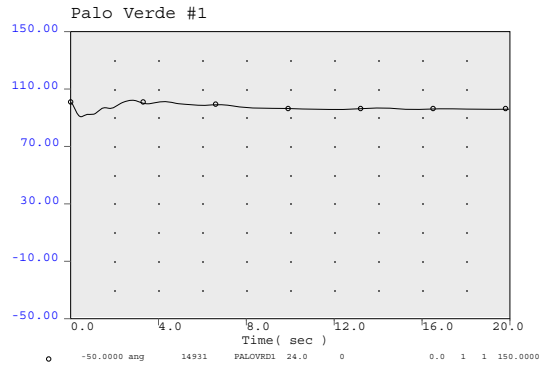


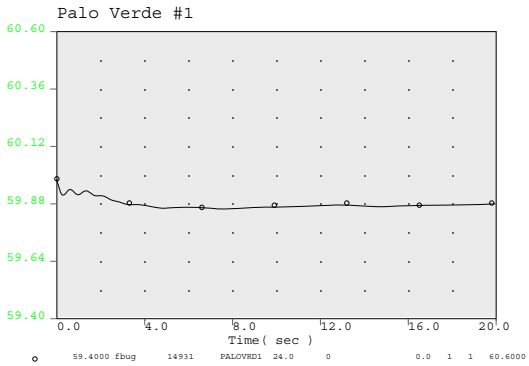
CENTRALS 500kV

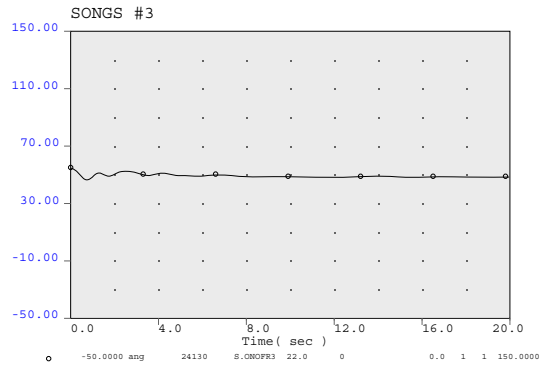


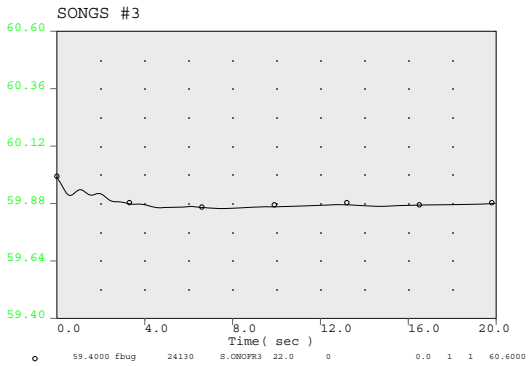
C1 C2 Light Load Post With Upgrades

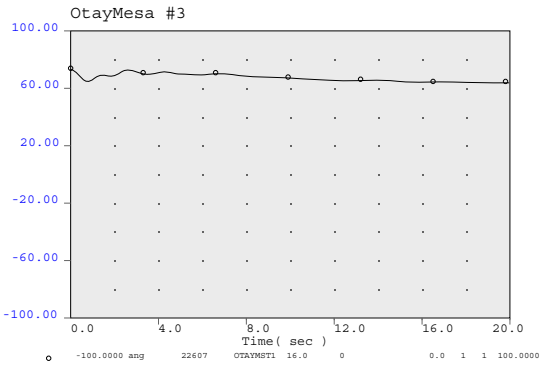
RELATIVE ROTOR ANGLE & FREQUENCY

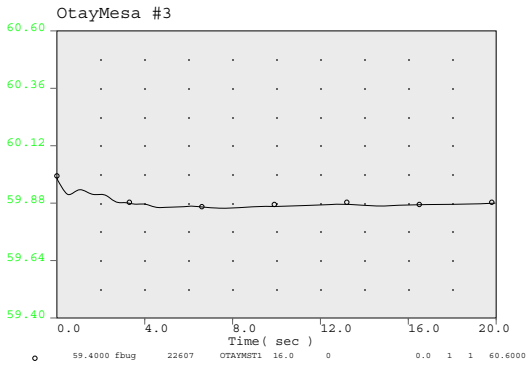










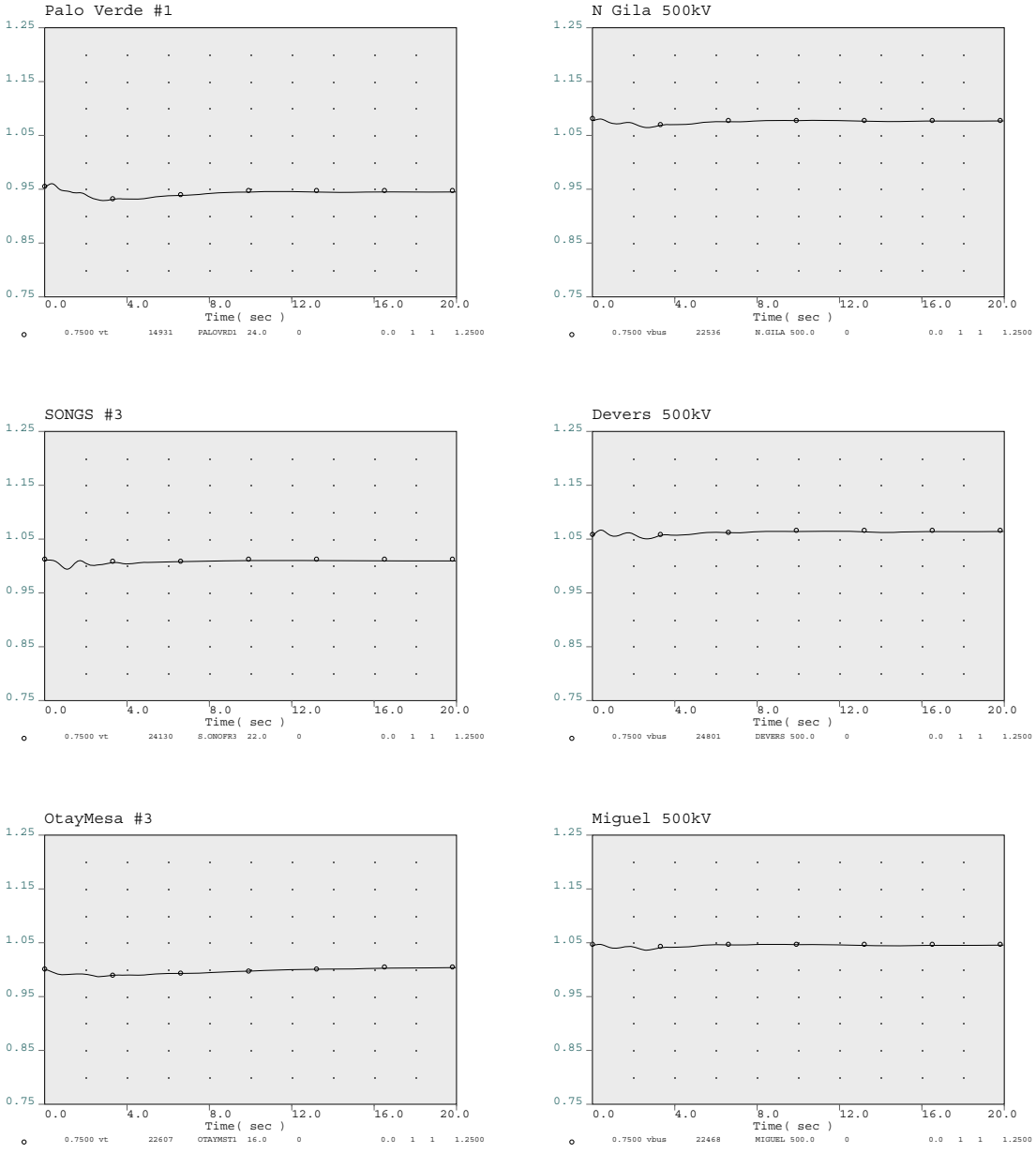


C1 C2 Light Load Post With Upgrades

Page 1

SDGE	tran-c1c2-ll-pstup-r15_PaloVerde-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:23:41 2011

RELATIVE VOLTAGE

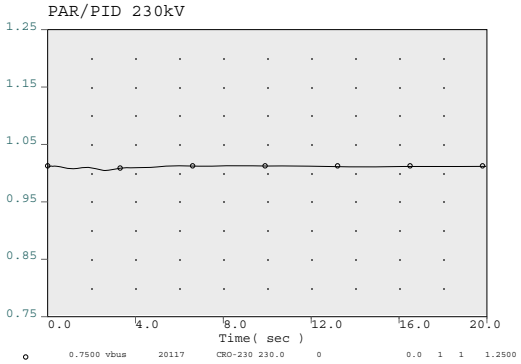


C1 C2 Light Load Post With Upgrades

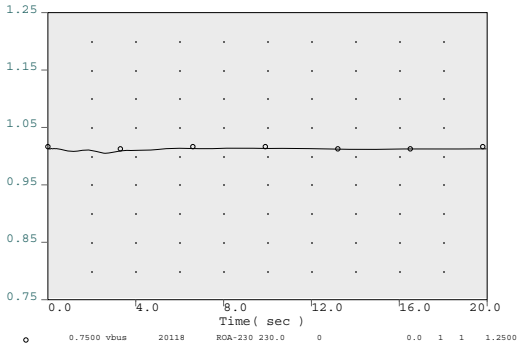
SDGE	tran-c1c2-ll-pstup-r15_PaloVerde-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:23:42 2011

Affected System Voltage Check and Comparison

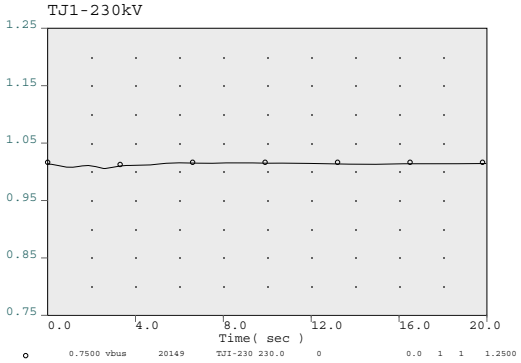
PAR/PID 230kV



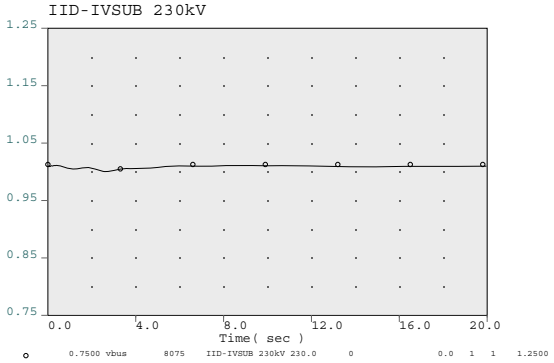
ROA-230kV



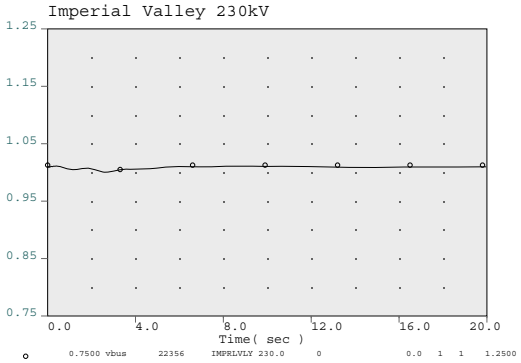
TJ1-230kV



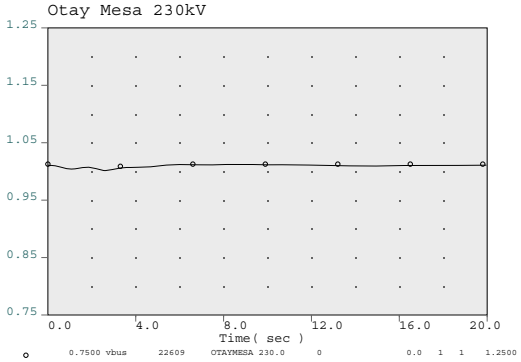
IID-IVSUB 230kV



Imperial Valley 230kV

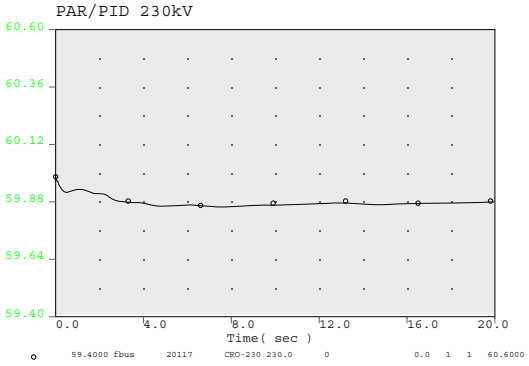


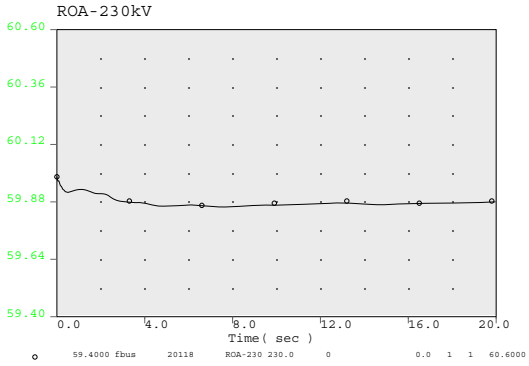
Otay Mesa 230kV

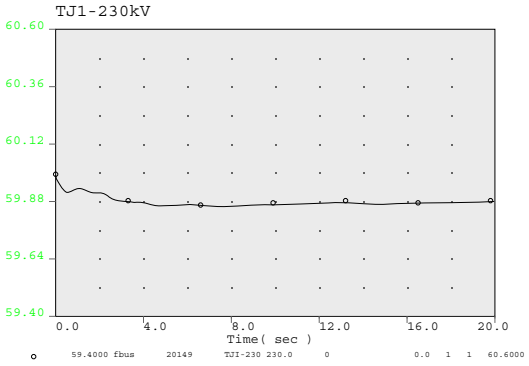


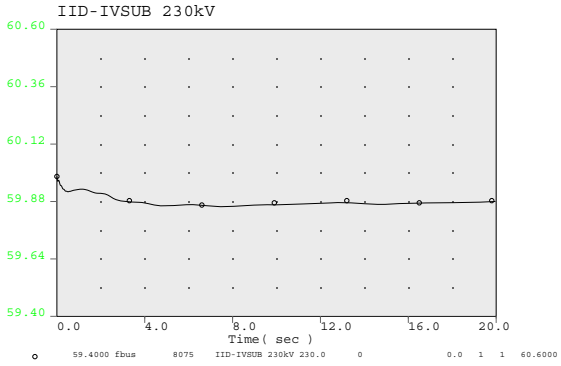
C1 C2 Light Load Post With Upgrades

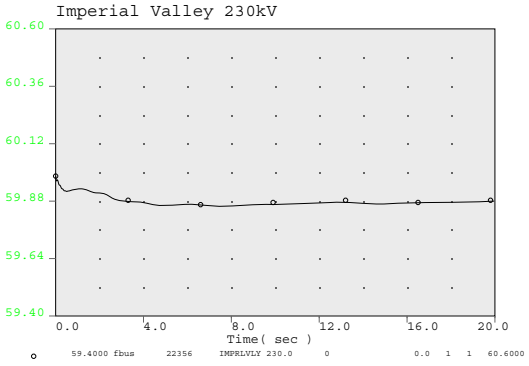
Affected System Frequency Check and Comparison

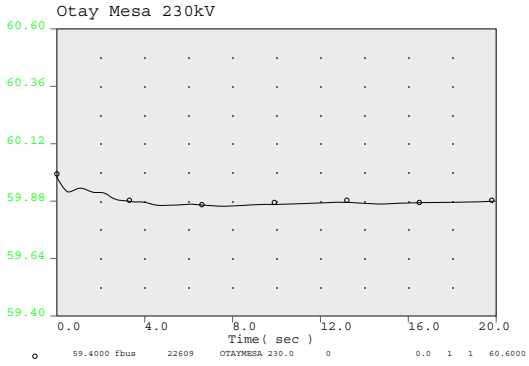












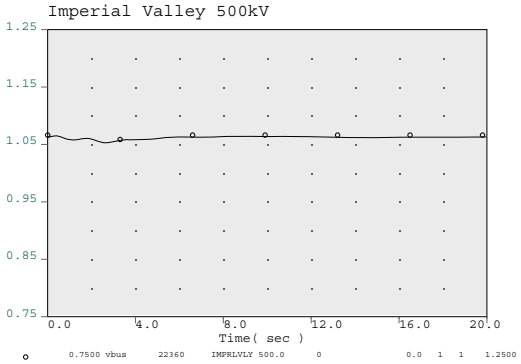
C1 C2 Light Load Post With Upgrades

Page 4

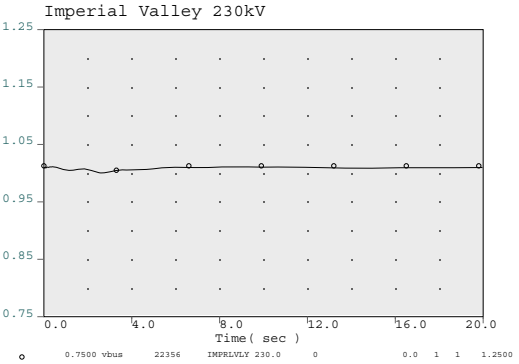
SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_PaloVerde-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:23:43 2011

VOLTAGE

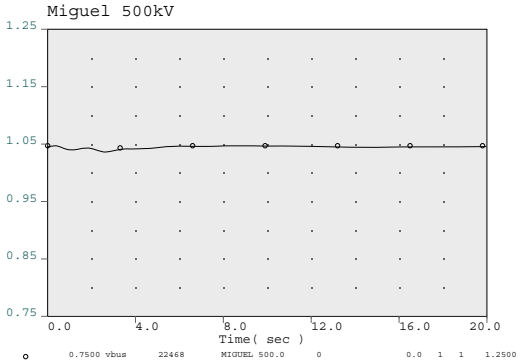
Imperial Valley 500kV



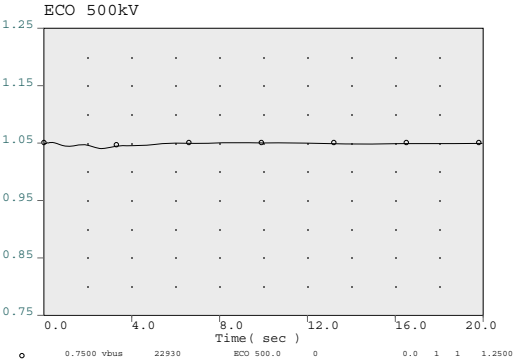
Imperial Valley 230kV



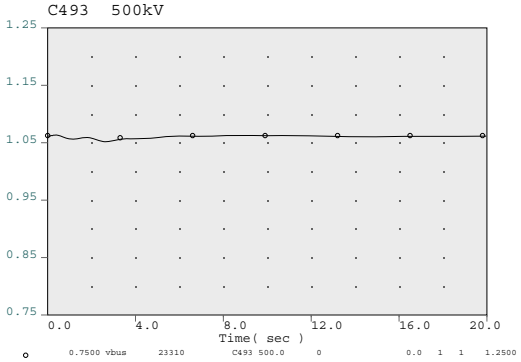
Miguel 500kV



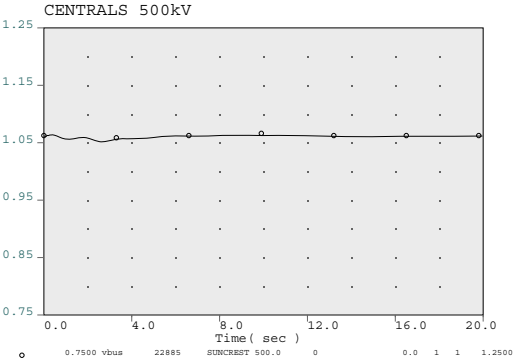
ECO 500kV



C493 500kV



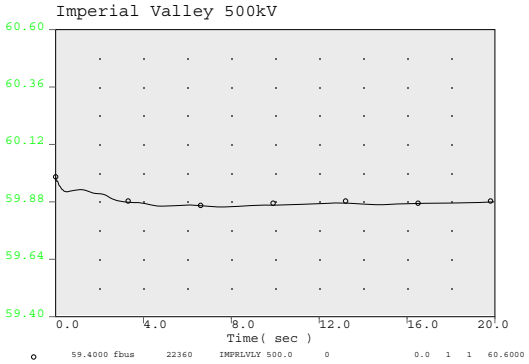
CENTRALS 500kV



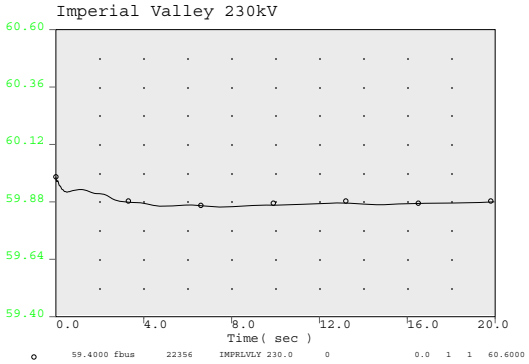
C1 C2 Light Load Post With Upgrades

FREQUENCY

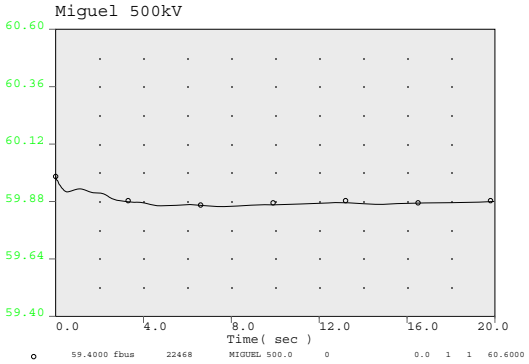
Imperial Valley 500kV



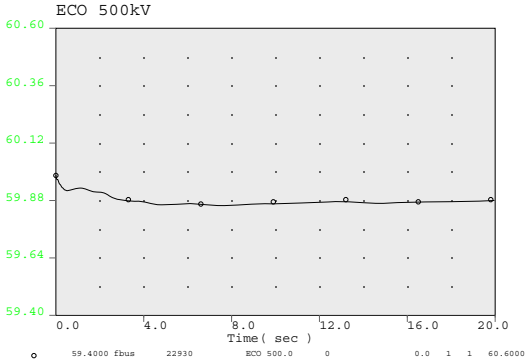
Imperial Valley 230kV



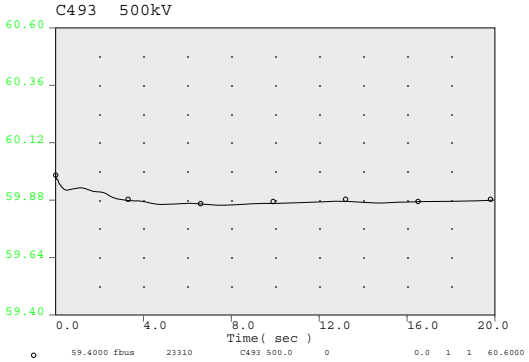
Miguel 500kV



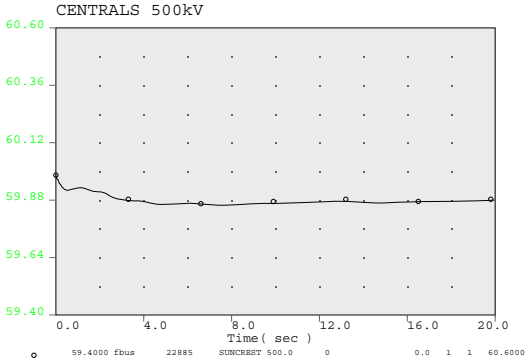
ECO 500kV



C493 500kV

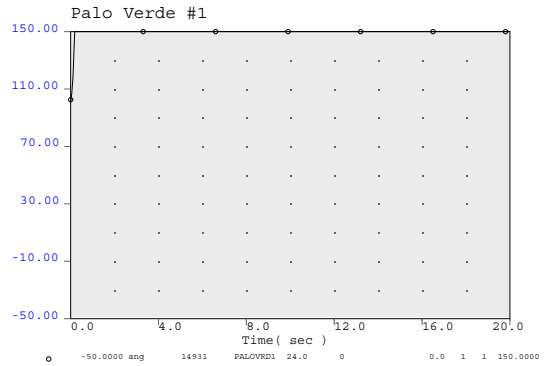


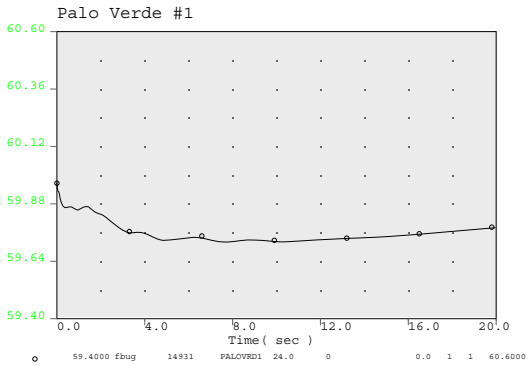
CENTRALS 500kV

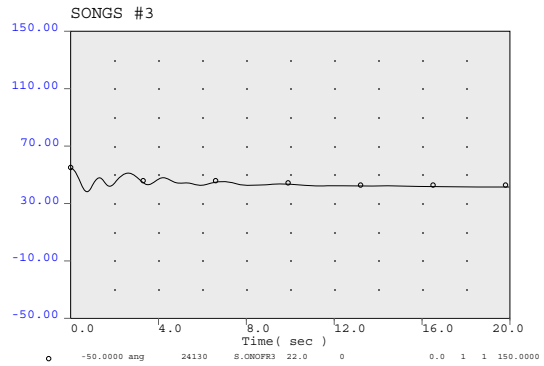


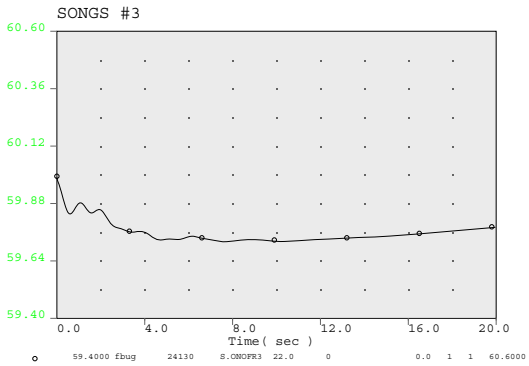
C1 C2 Light Load Post With Upgrades

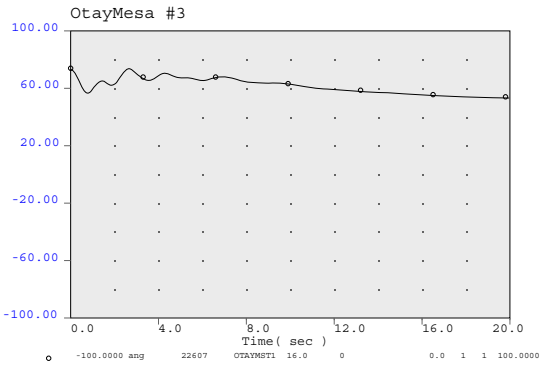
RELATIVE ROTOR ANGLE & FREQUENCY

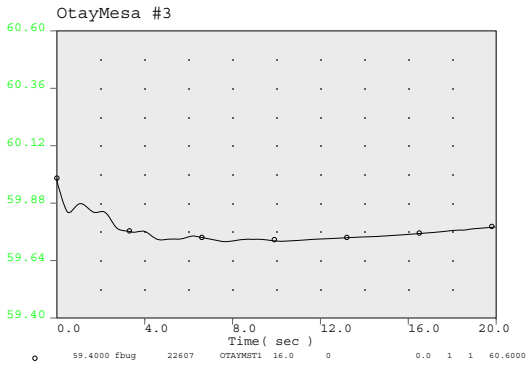










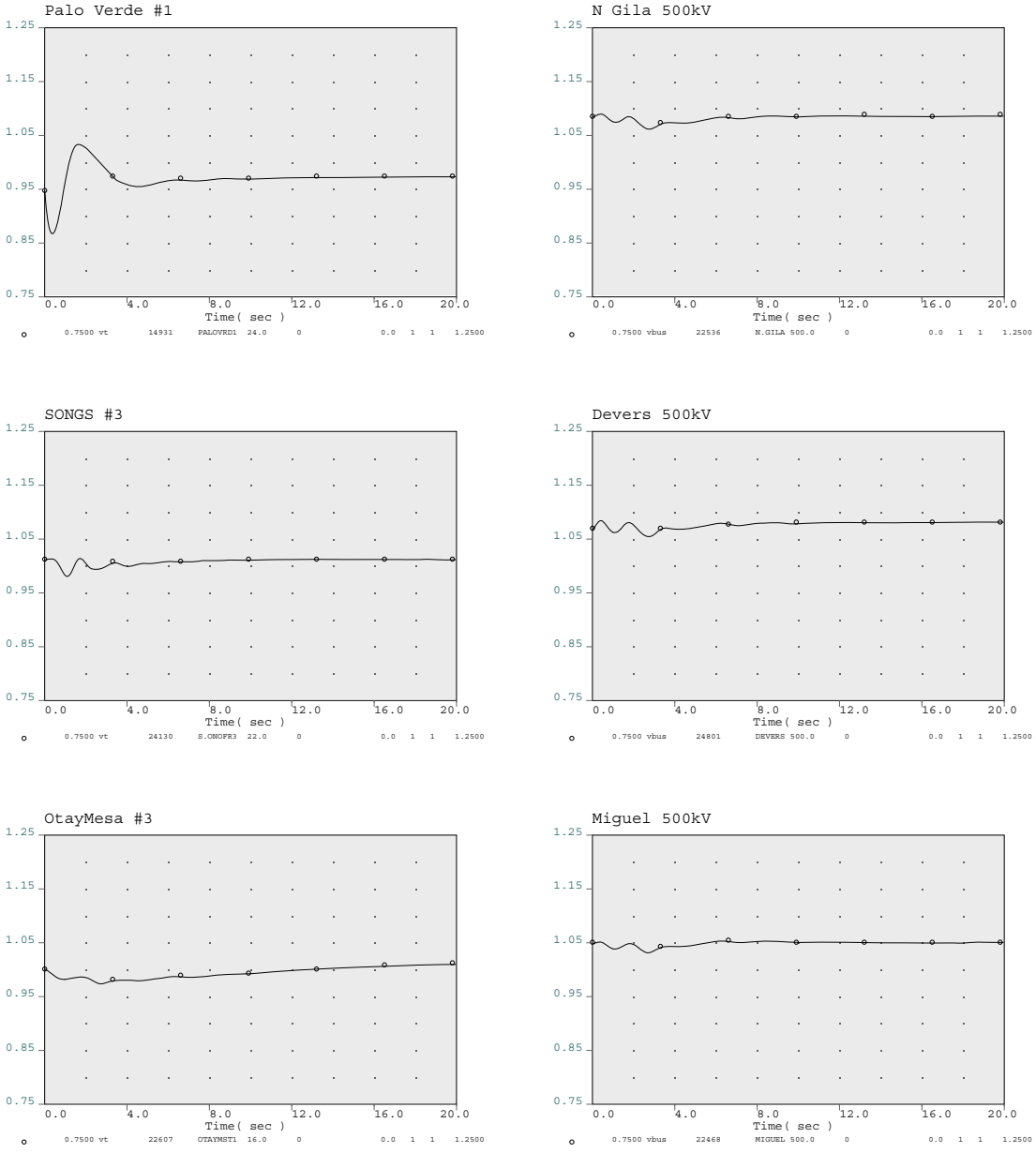


C1 C2 Light Load Post With Upgrades

Page 1

SDGE	tran-c1c2-ll-pstup-r15_PaloVerde-g2.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:25:38 2011

RELATIVE VOLTAGE



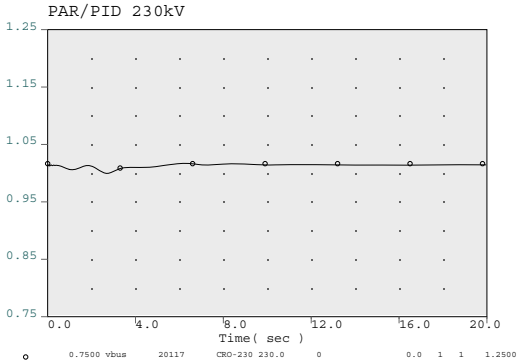
C1 C2 Light Load Post With Upgrades

Page 2

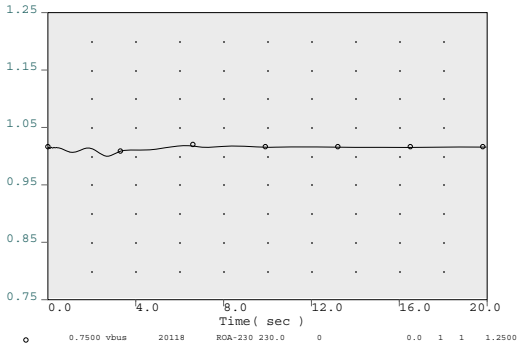
SDGE	tran-c1c2-ll-pstup-r15_PaloVerde-g2.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:25:39 2011

Affected System Voltage Check and Comparison

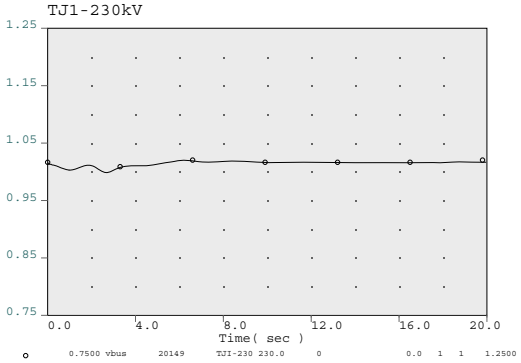
PAR/PID 230kV



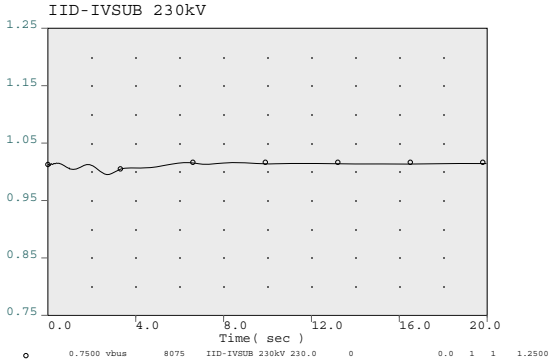
ROA-230kV



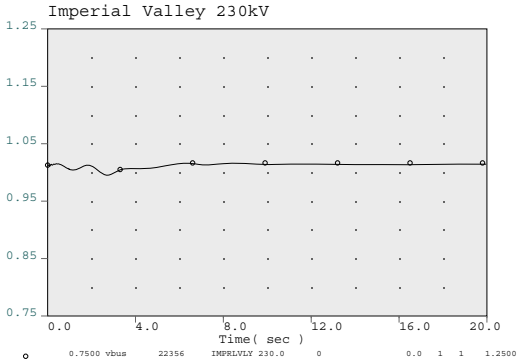
TJ1-230kV



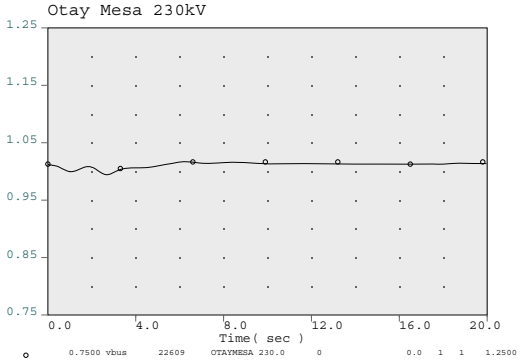
IID-IVSUB 230kV



Imperial Valley 230kV



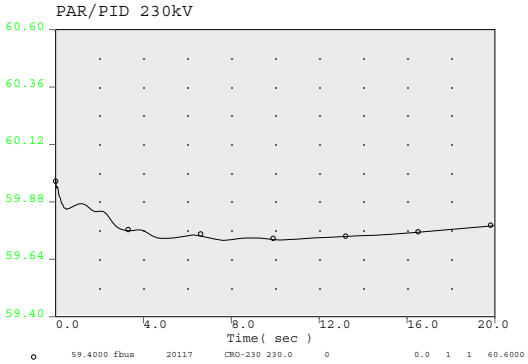
Otay Mesa 230kV



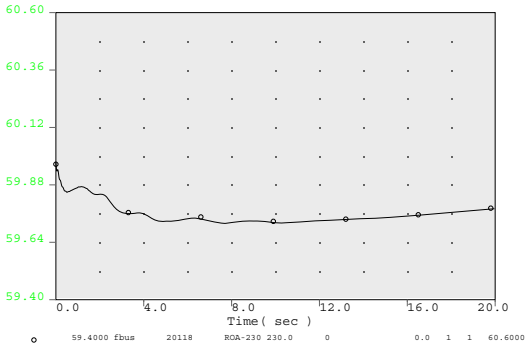
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

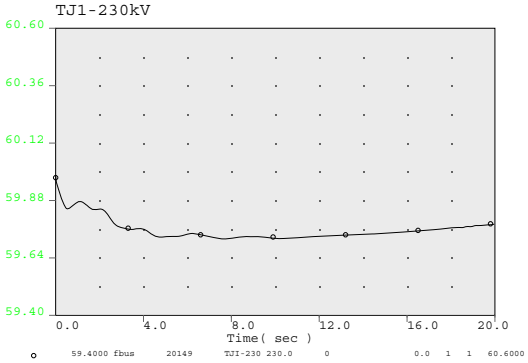
PAR/PID 230kV



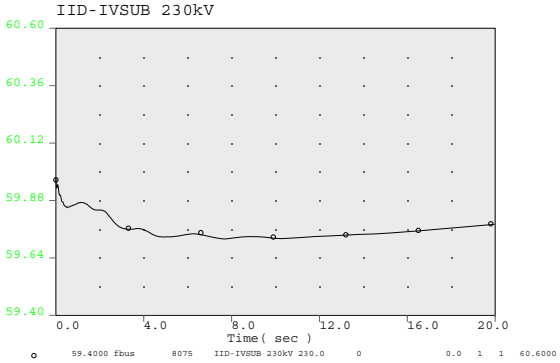
ROA-230kV



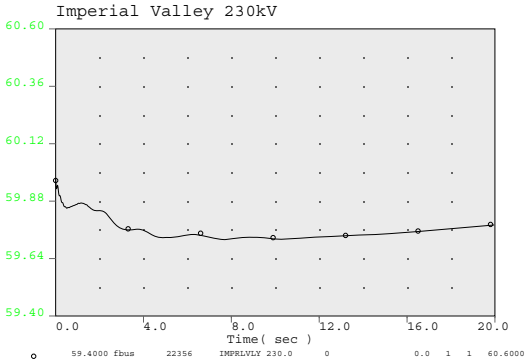
TJ1-230kV



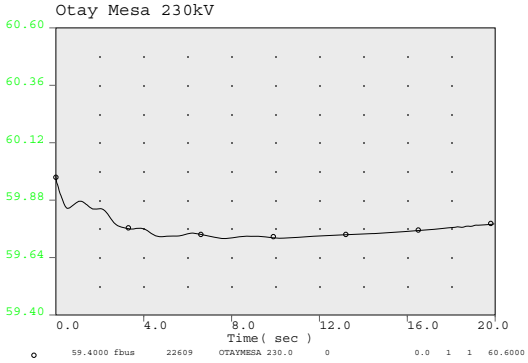
IID-IVSUB 230kV



Imperial Valley 230kV



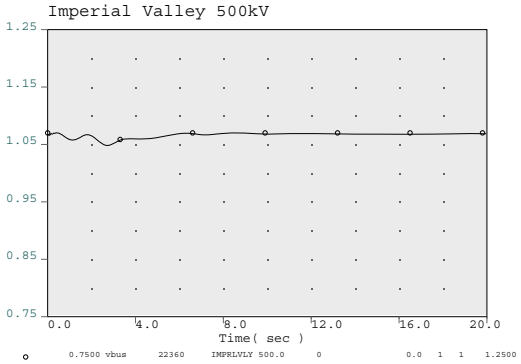
Otay Mesa 230kV



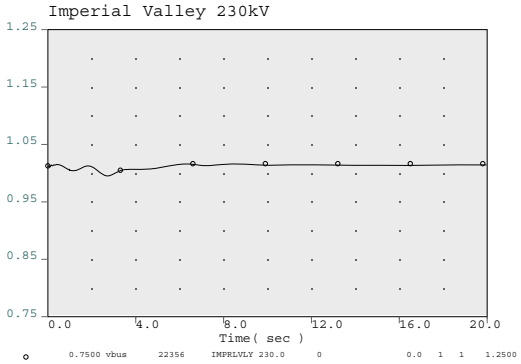
C1 C2 Light Load Post With Upgrades

VOLTAGE

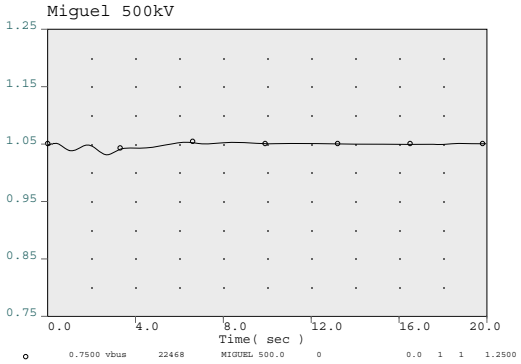
Imperial Valley 500kV



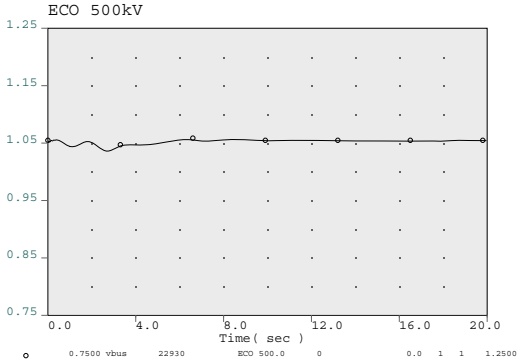
Imperial Valley 230kV



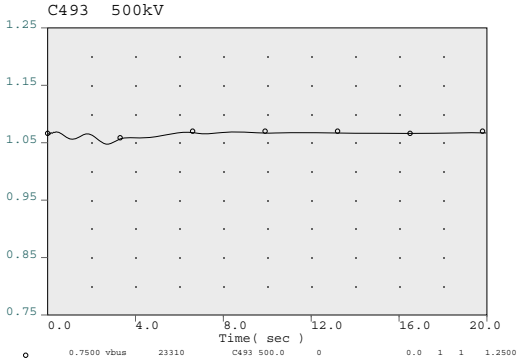
Miguel 500kV



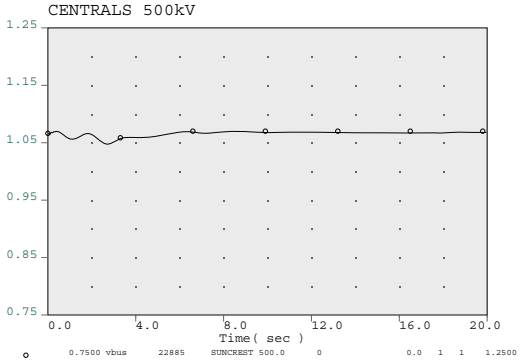
ECO 500kV



C493 500kV



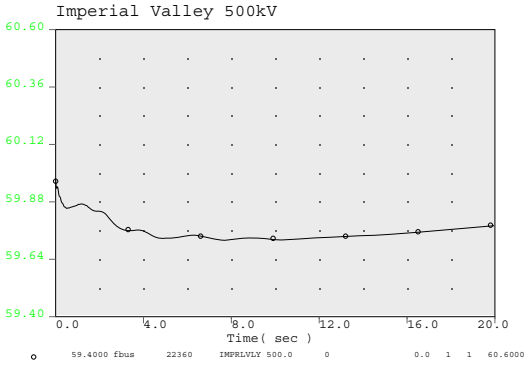
CENTRALS 500kV



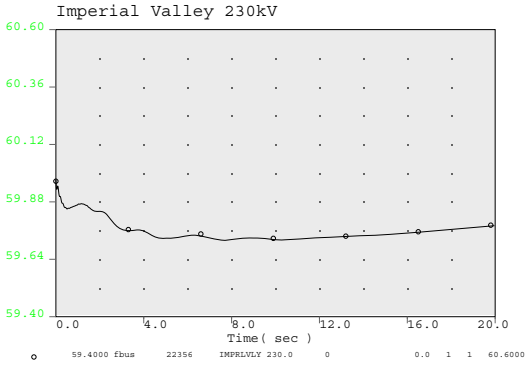
C1 C2 Light Load Post With Upgrades

FREQUENCY

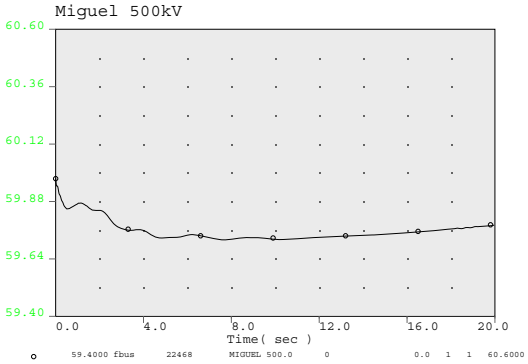
Imperial Valley 500kV



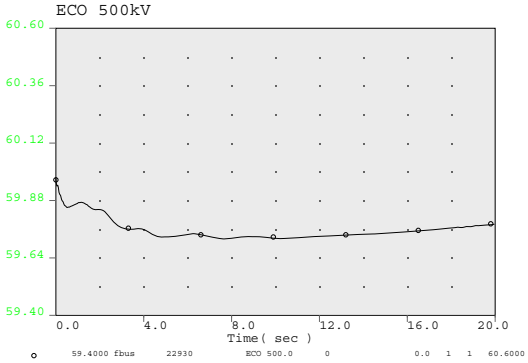
Imperial Valley 230kV



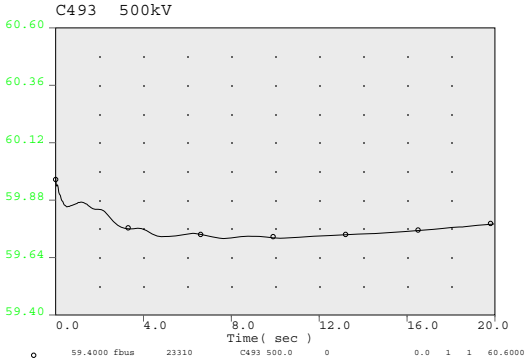
Miguel 500kV



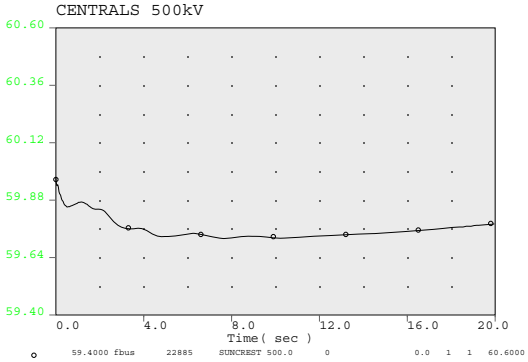
ECO 500kV



C493 500kV

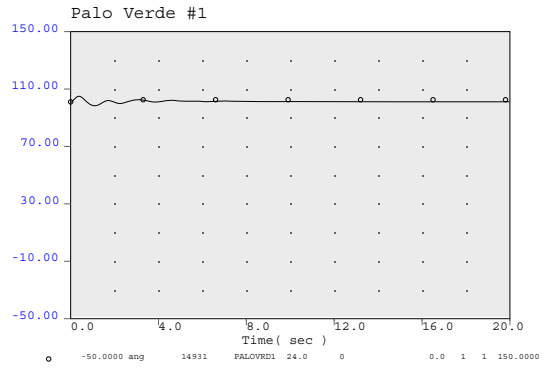


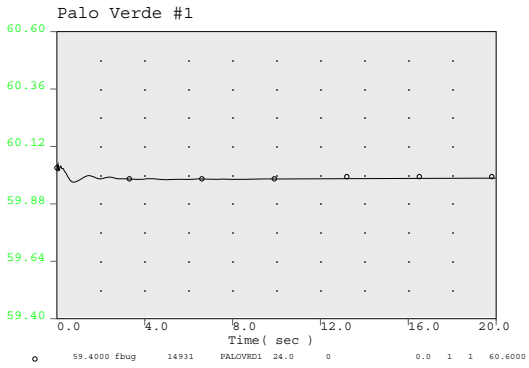
CENTRALS 500kV

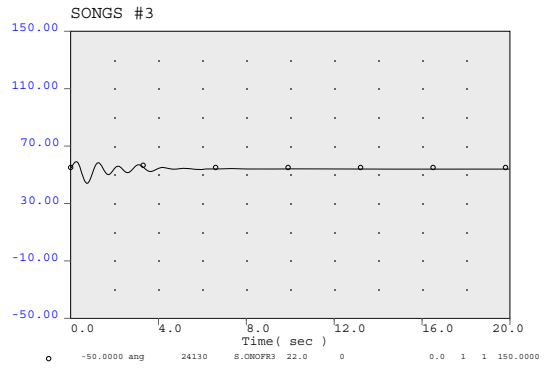


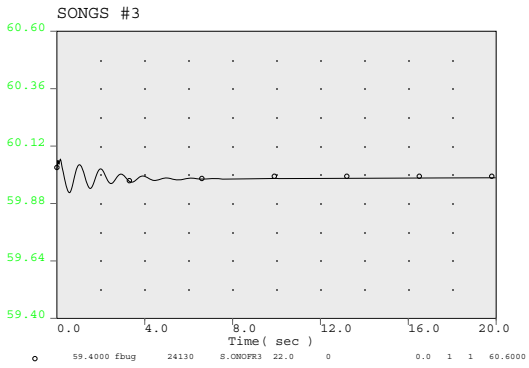
C1 C2 Light Load Post With Upgrades

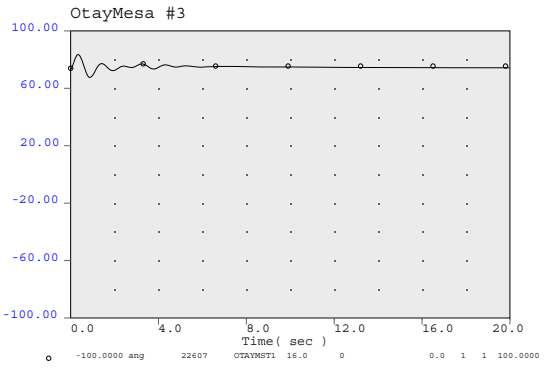
RELATIVE ROTOR ANGLE & FREQUENCY

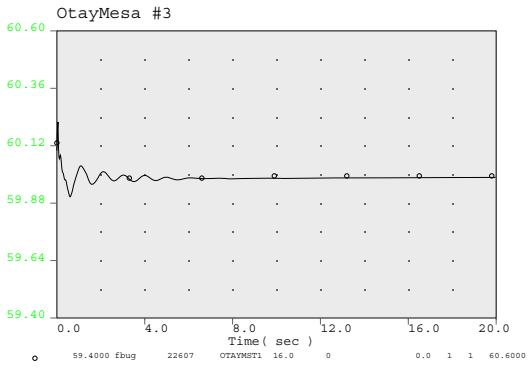












C1 C2 Light Load Post With Upgrades

Page 1

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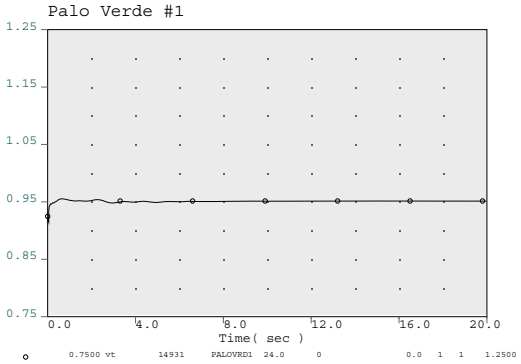
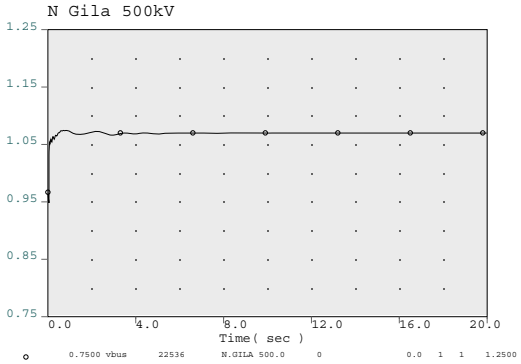
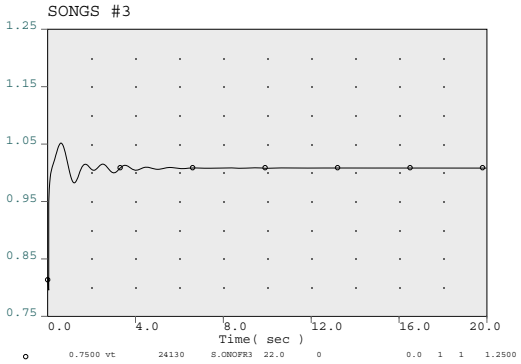
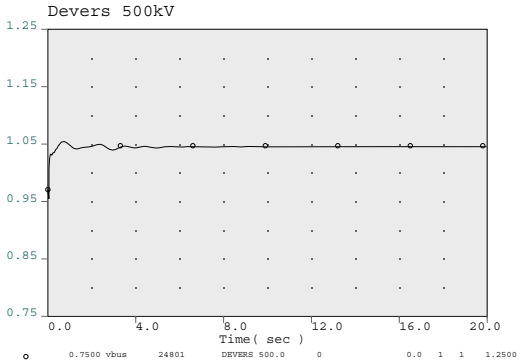
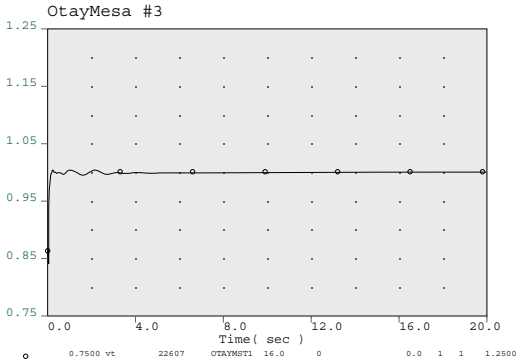
RELATIVE VOLTAGE

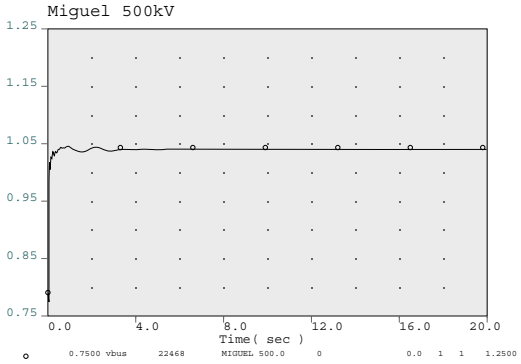








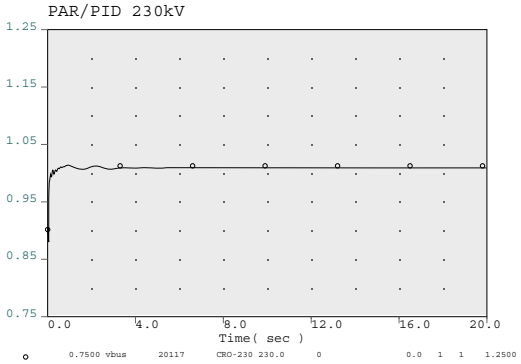




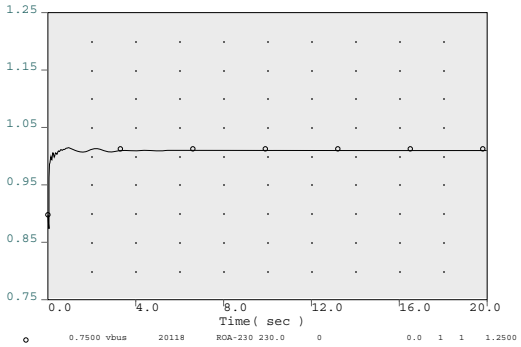
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

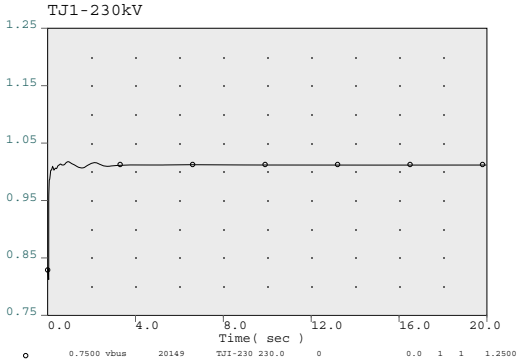
PAR/PID 230kV



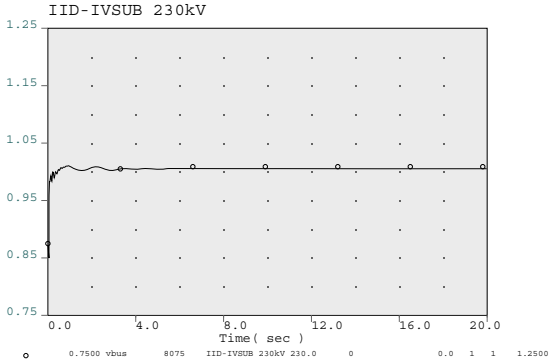
ROA-230kV



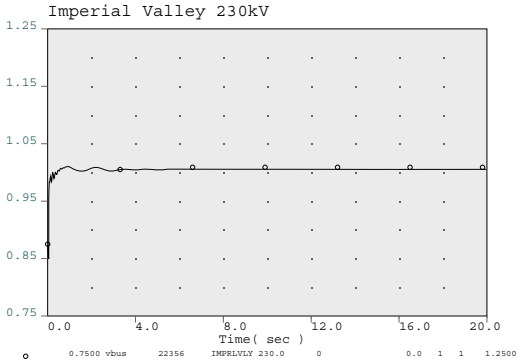
TJ1-230kV



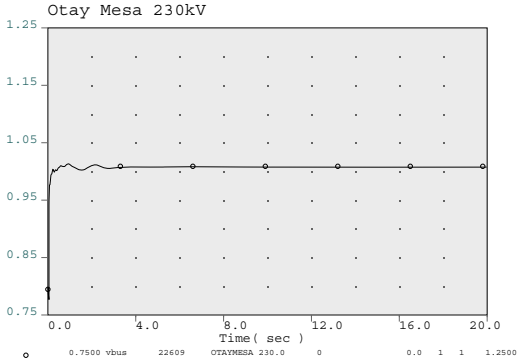
IID-IVSUB 230kV



Imperial Valley 230kV



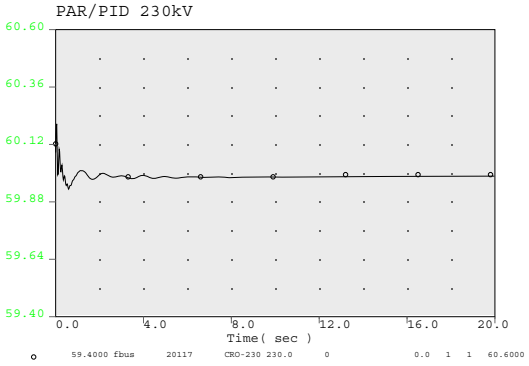
Otay Mesa 230kV



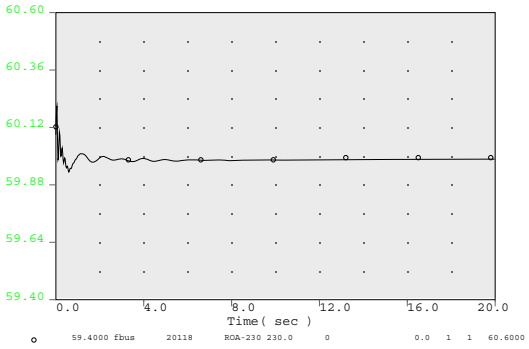
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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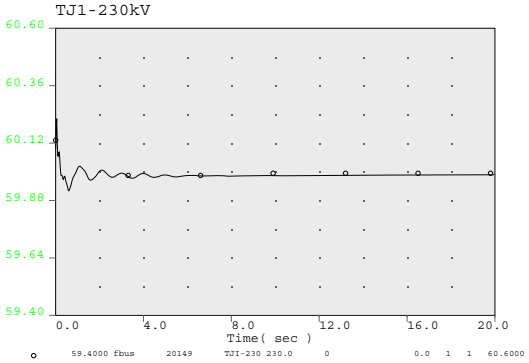
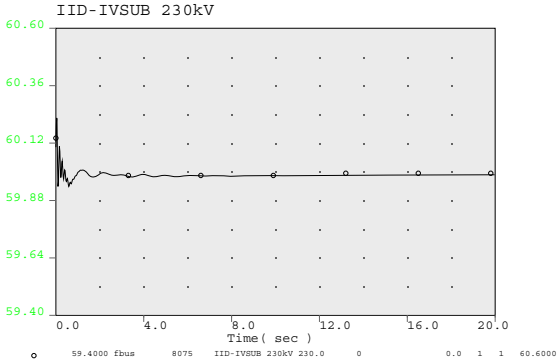
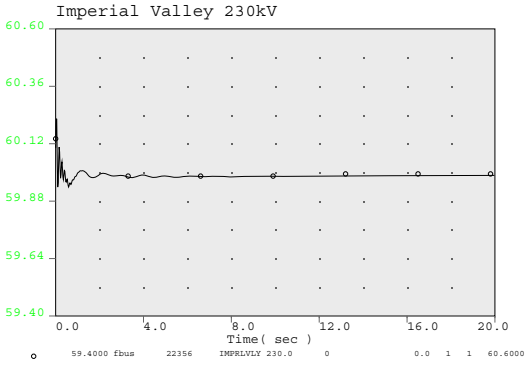


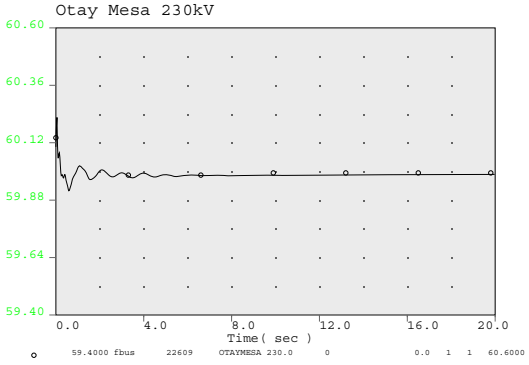
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Light Load Post With Upgrades

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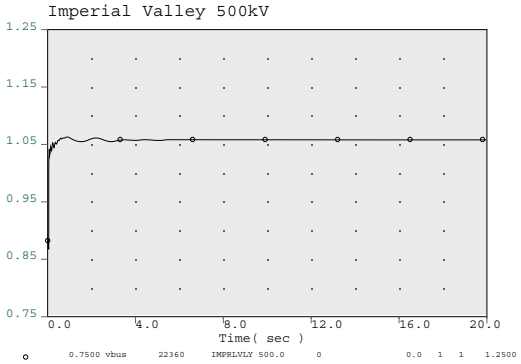
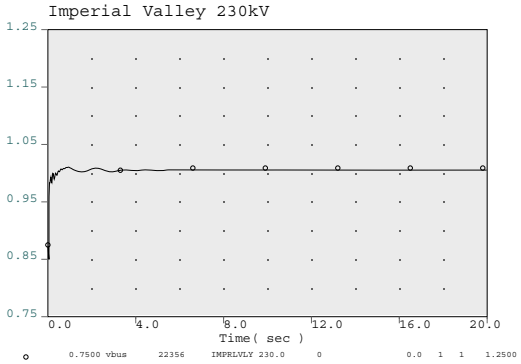
SDGE	tran-c1c2-ll-pstup-r15_PEN230kv-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:31:14 2011

VOLTAGE

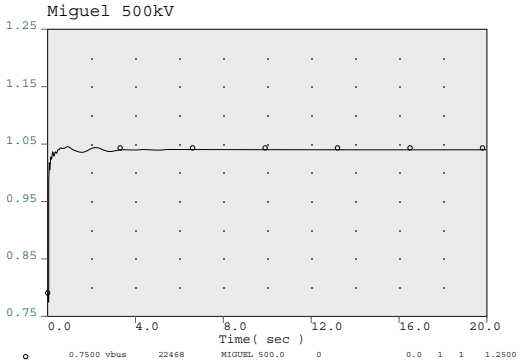
Imperial Valley 500kV



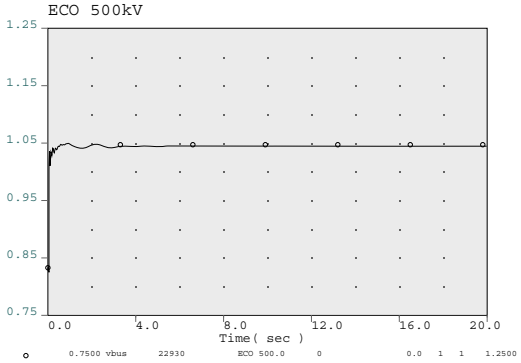
Imperial Valley 230kV



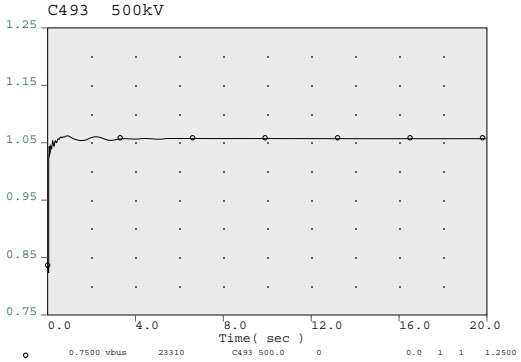
Miguel 500kV



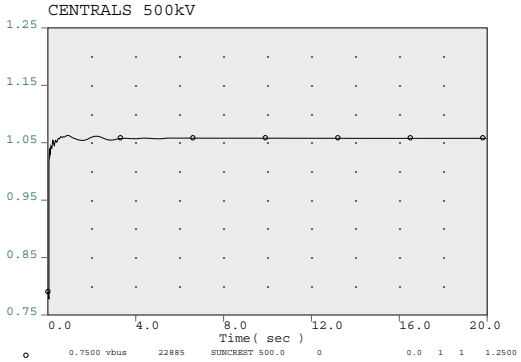
ECO 500kV



C493 500kV



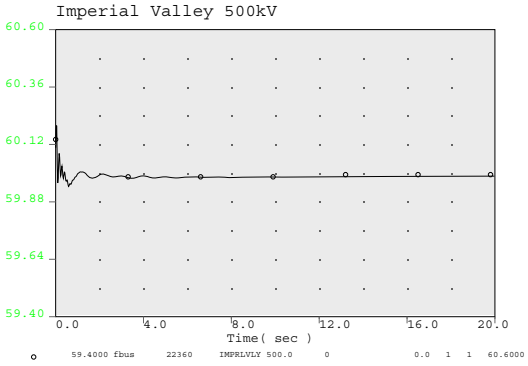
CENTRALS 500kV



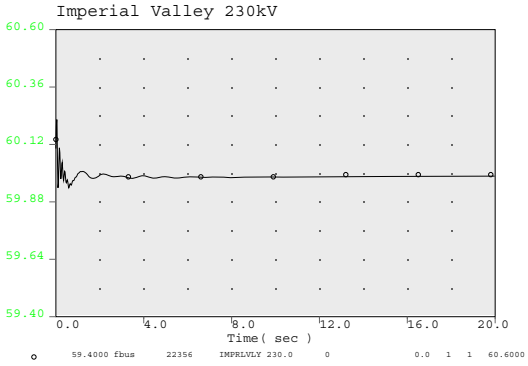
C1 C2 Light Load Post With Upgrades

FREQUENCY

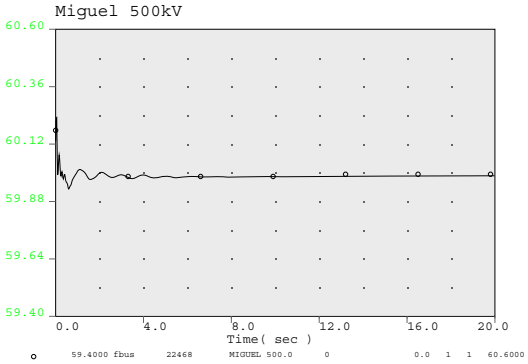
Imperial Valley 500kV



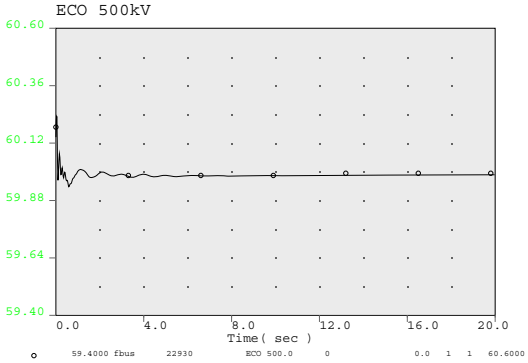
Imperial Valley 230kV



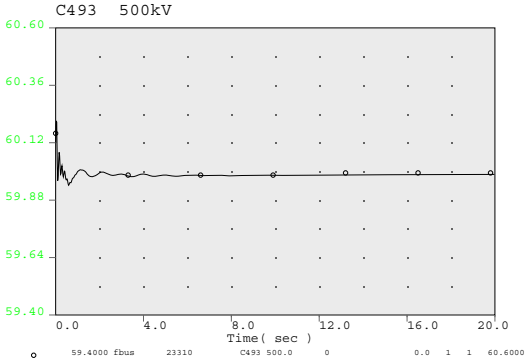
Miguel 500kV



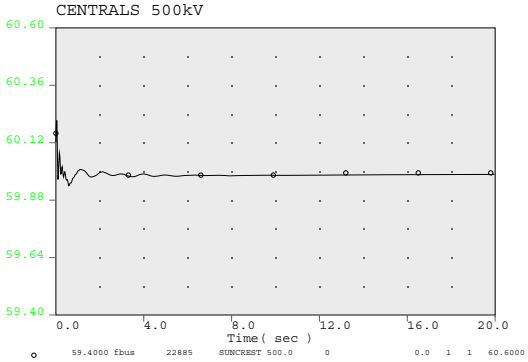
ECO 500kV



C493 500kV

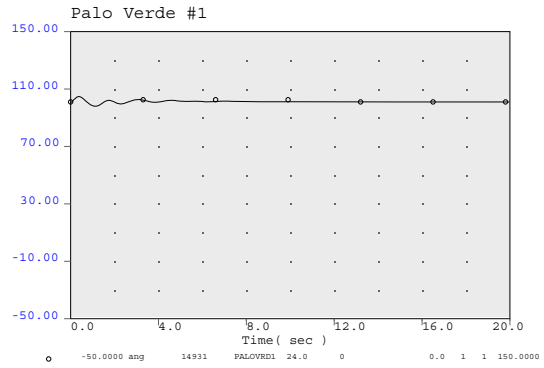


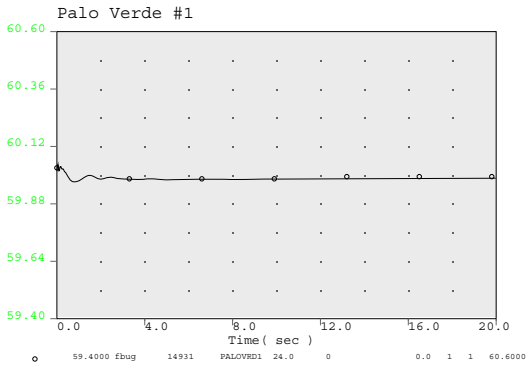
CENTRALS 500kV

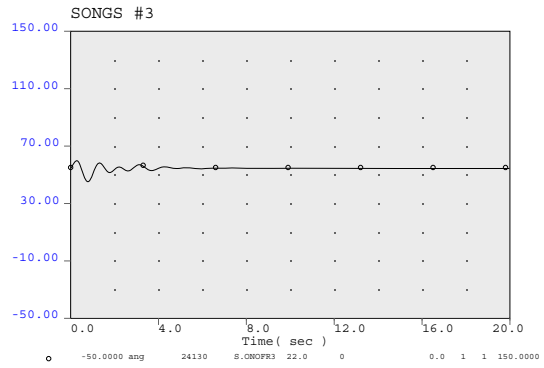


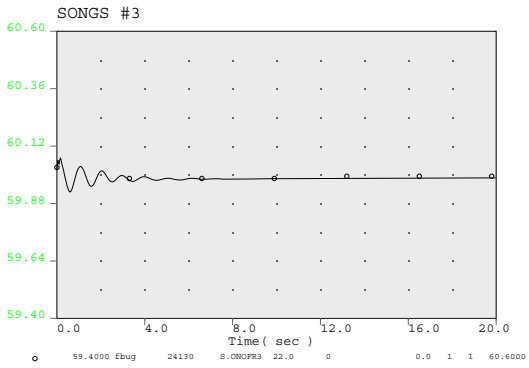
C1 C2 Light Load Post With Upgrades

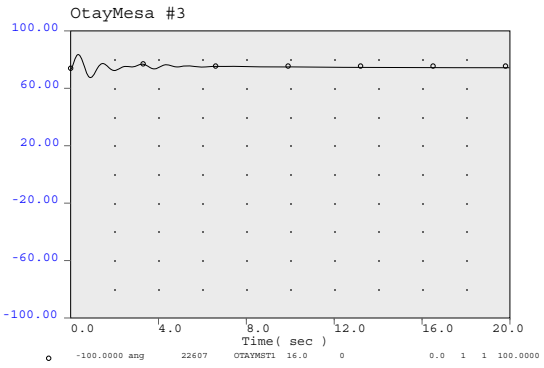
RELATIVE ROTOR ANGLE & FREQUENCY

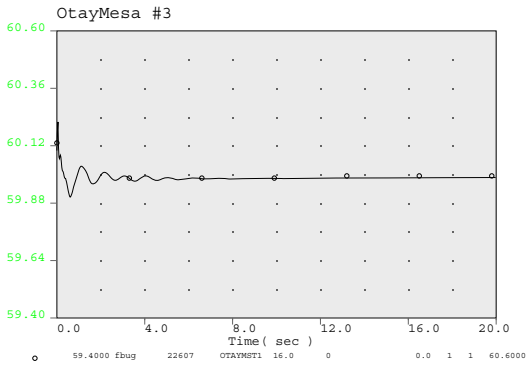












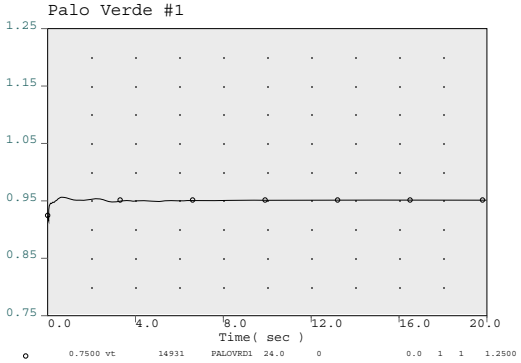
C1 C2 Light Load Post With Upgrades

Page 1

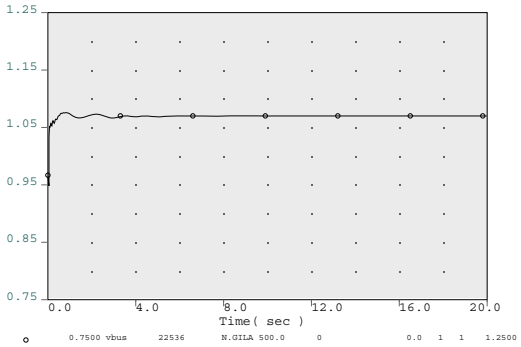
SDGE	tran-c1c2-ll-pstup-r15_PEN-ES-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:27:29 2011

RELATIVE VOLTAGE

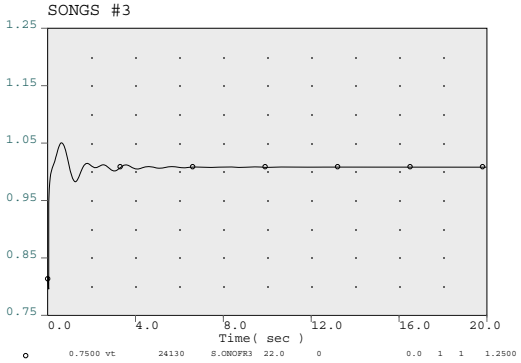
Palo Verde #1



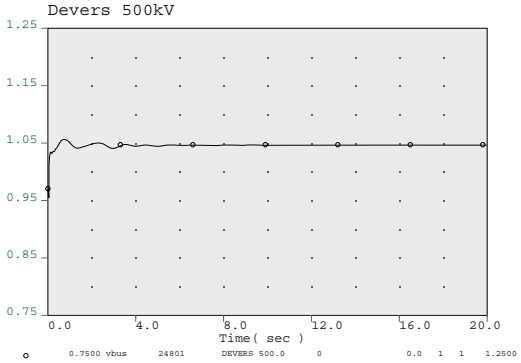
N Gila 500kV



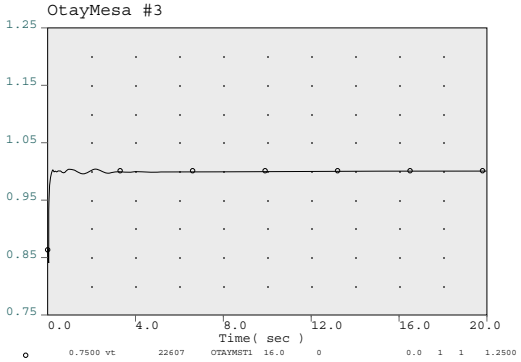
SONGS #3



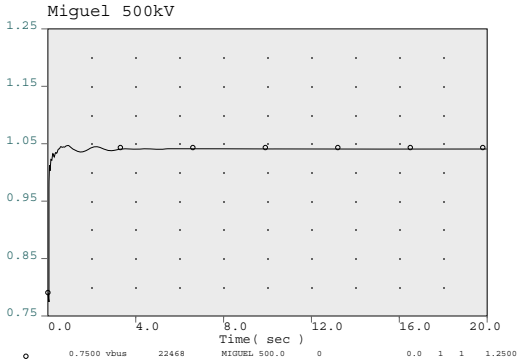
Devers 500kV



OtayMesa #3



Miguel 500kV



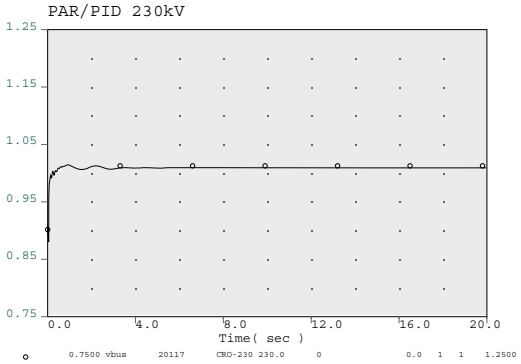
C1 C2 Light Load Post With Upgrades

Page 2

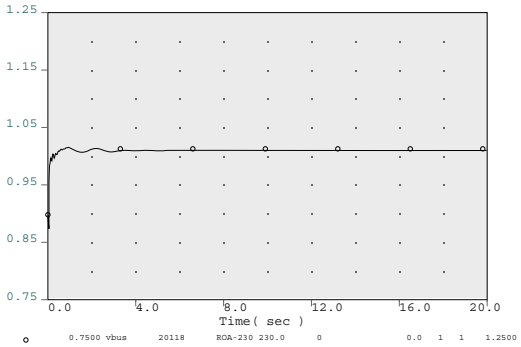
SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_PEN-ES-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:27:30 2011

Affected System Voltage Check and Comparison

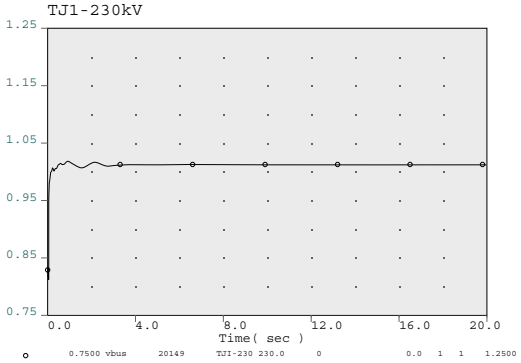
PAR/PID 230kV



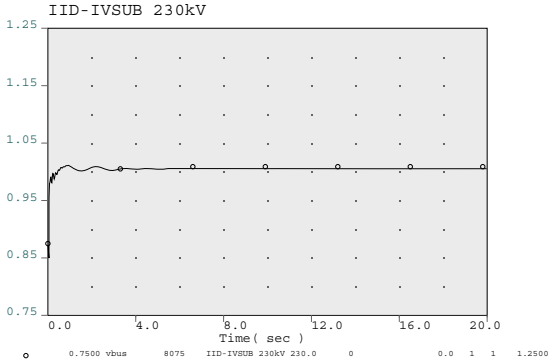
ROA-230kV



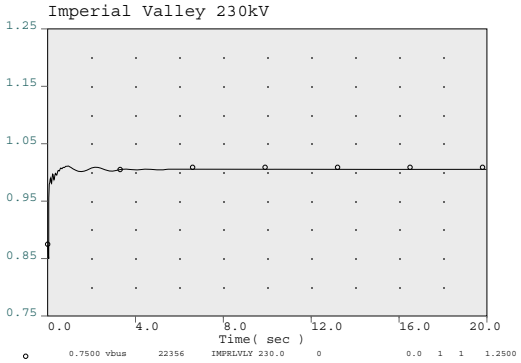
TJ1-230kV



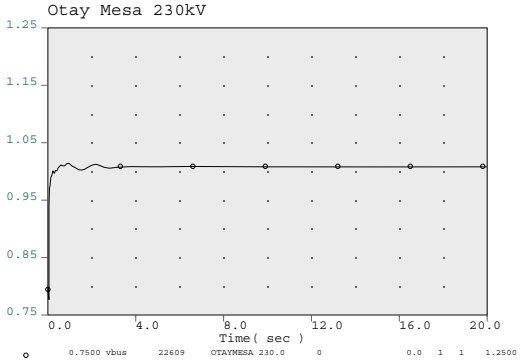
IID-IVSUB 230kV



Imperial Valley 230kV



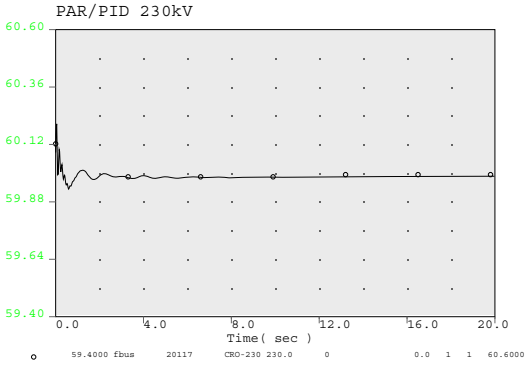
Otay Mesa 230kV



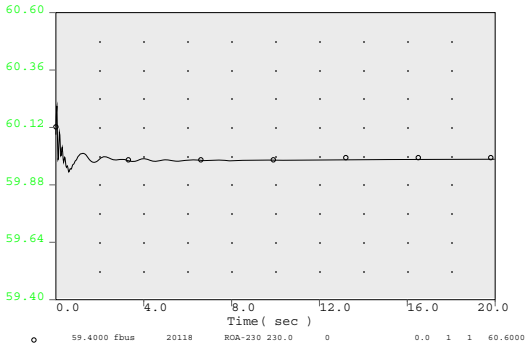
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

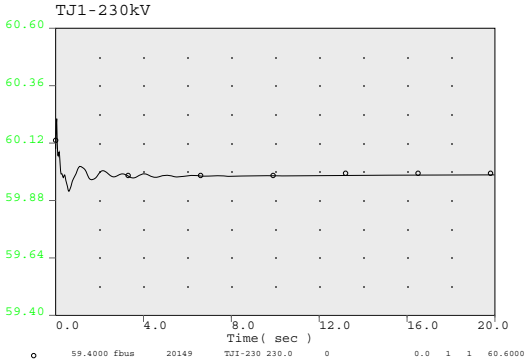
PAR/PID 230kV



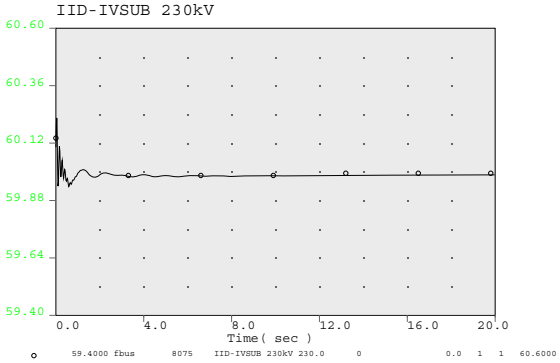
ROA-230kV



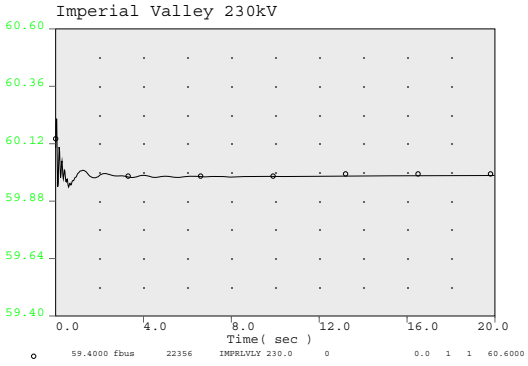
TJ1-230kV



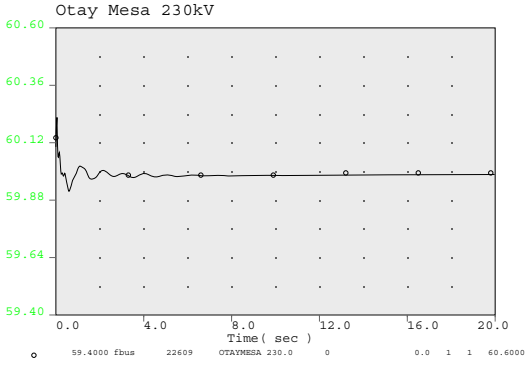
IID-IVSUB 230kV



Imperial Valley 230kV



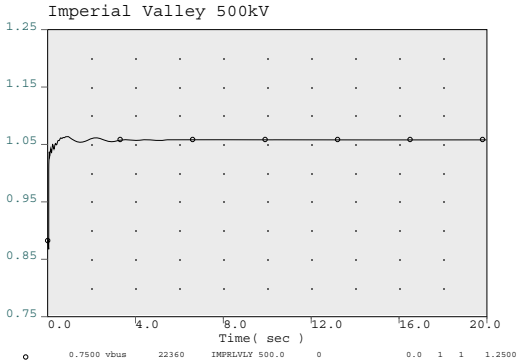
Otay Mesa 230kV



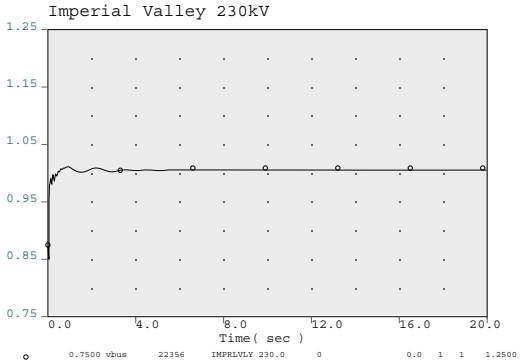
C1 C2 Light Load Post With Upgrades

VOLTAGE

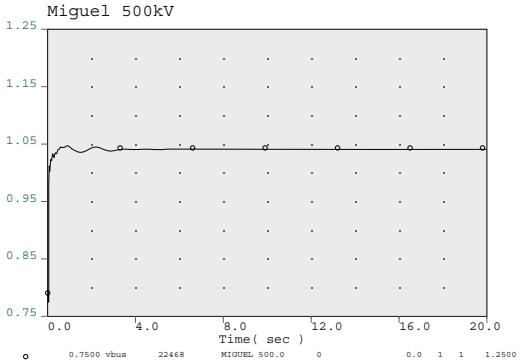
Imperial Valley 500kV



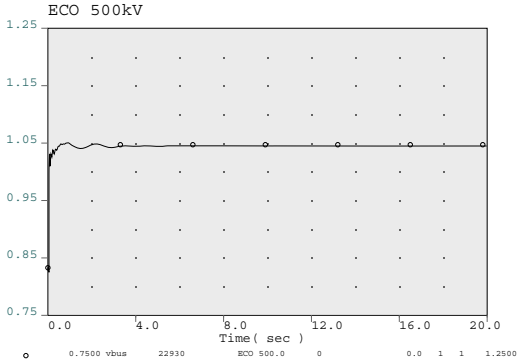
Imperial Valley 230kV



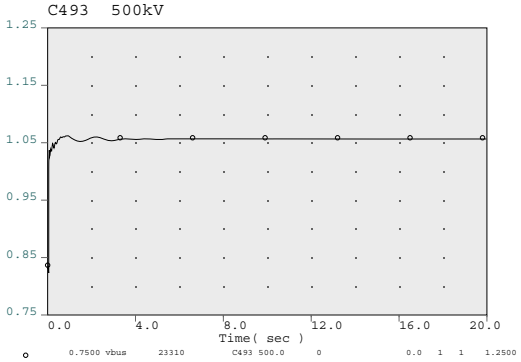
Miguel 500kV



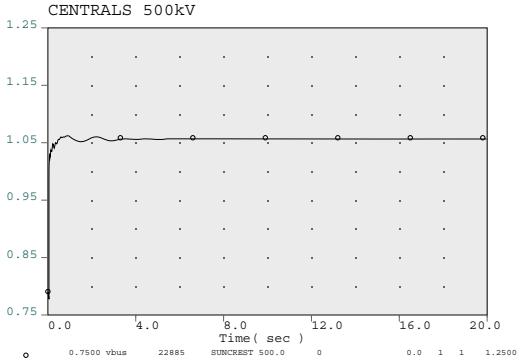
ECO 500kV



C493 500kV



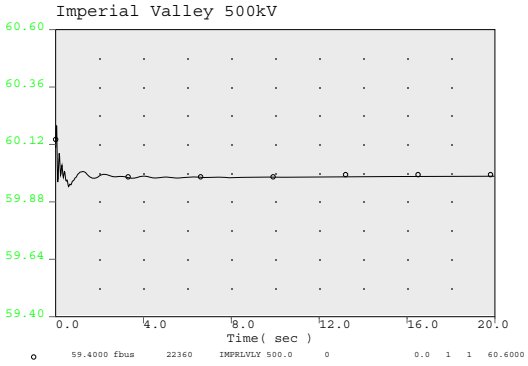
CENTRALS 500kV



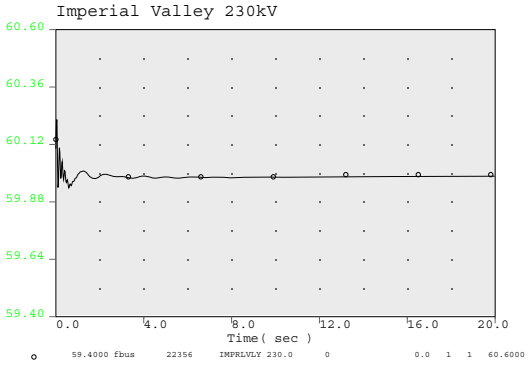
C1 C2 Light Load Post With Upgrades

FREQUENCY

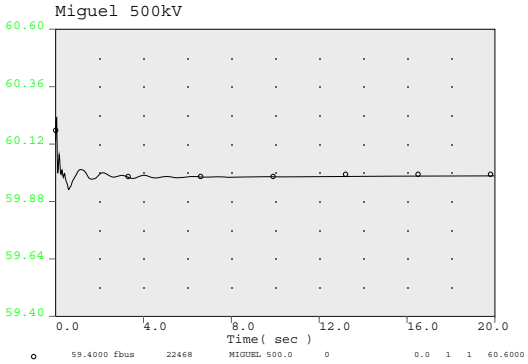
Imperial Valley 500kV



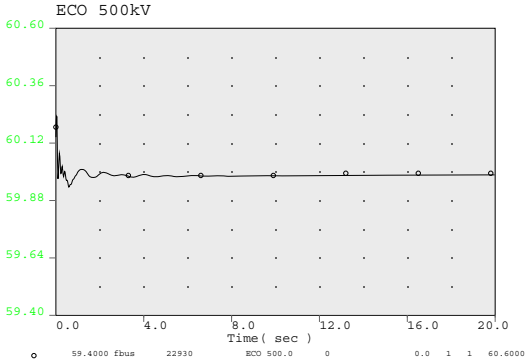
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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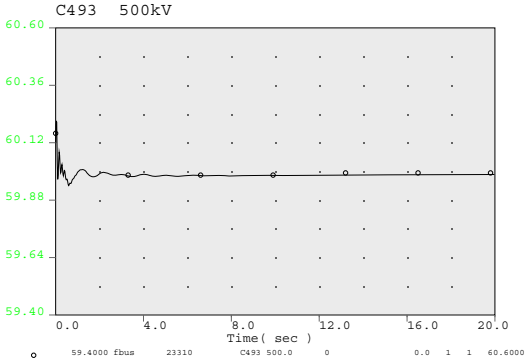
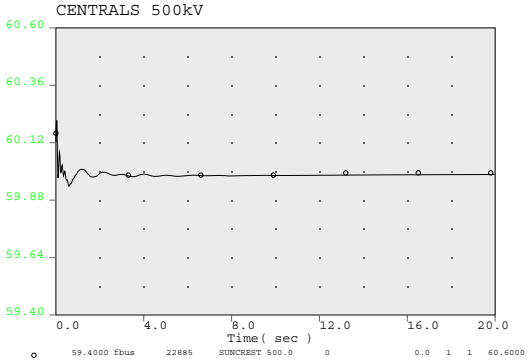
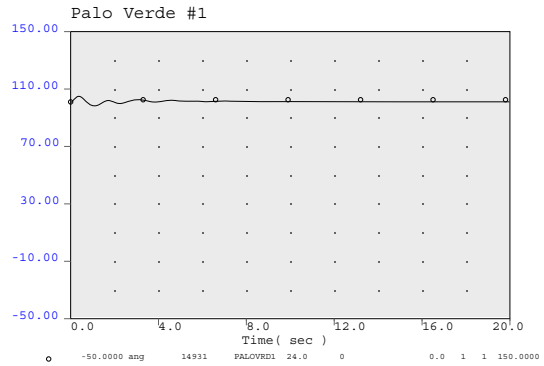


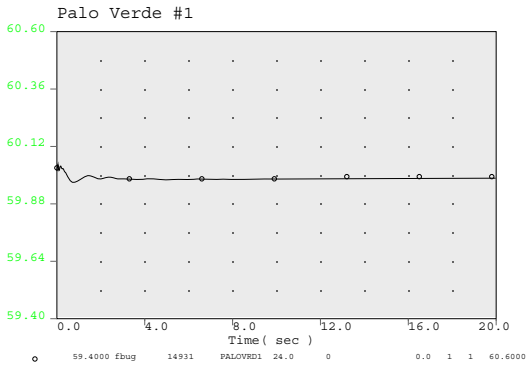
CENTRALS 500kV

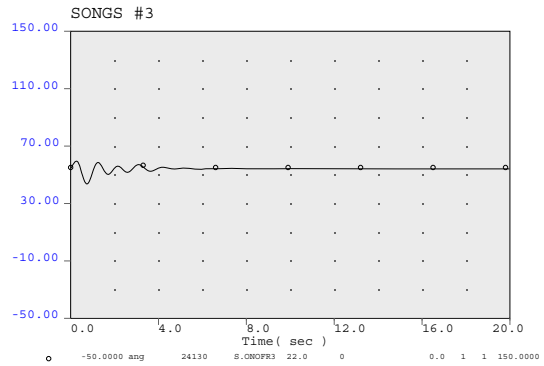


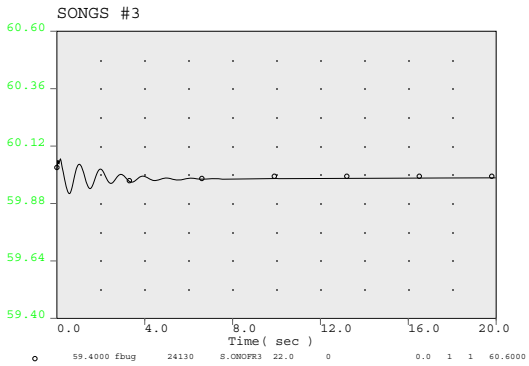
C1 C2 Light Load Post With Upgrades

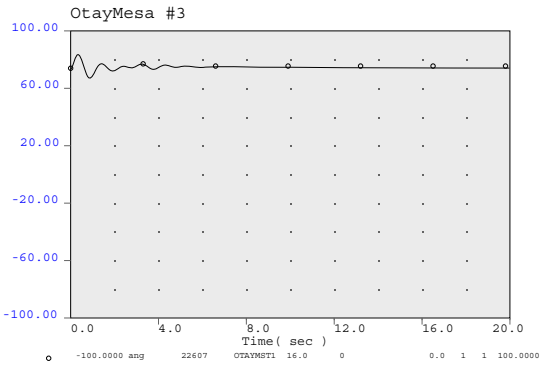
RELATIVE ROTOR ANGLE & FREQUENCY

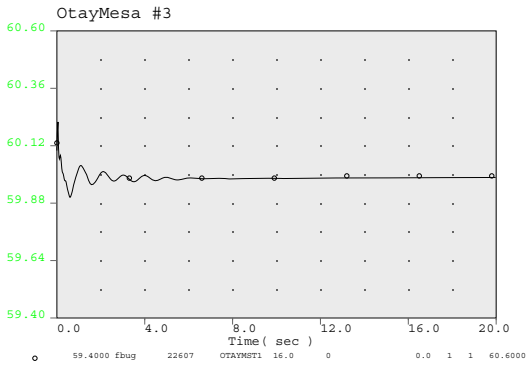










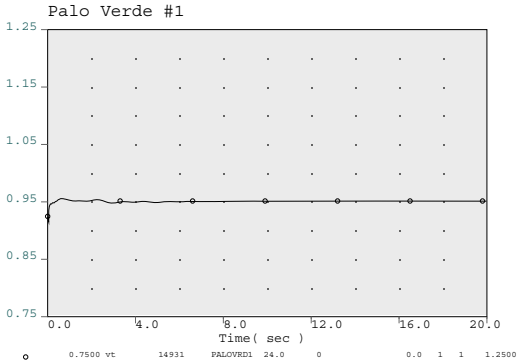


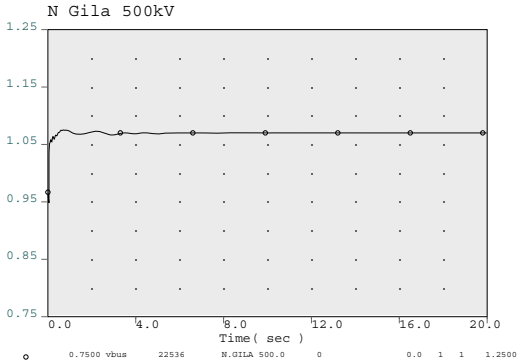
C1 C2 Light Load Post With Upgrades

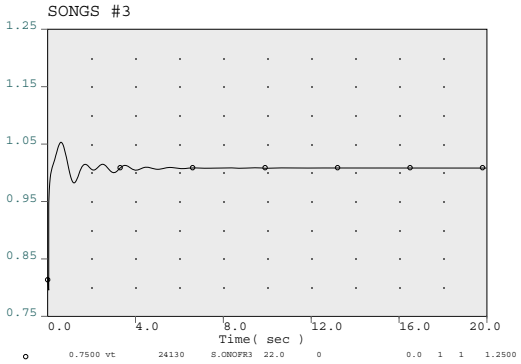
Page 1

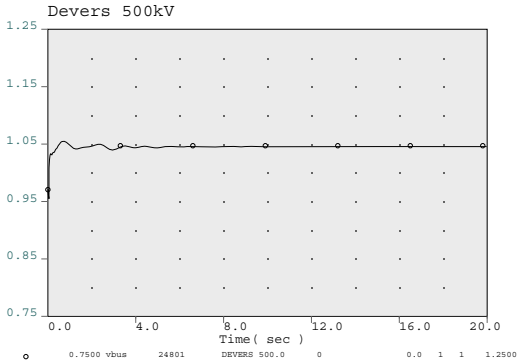
SDGE	tran-c1c2-ll-pstup-r15_PEN-SX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:29:23 2011

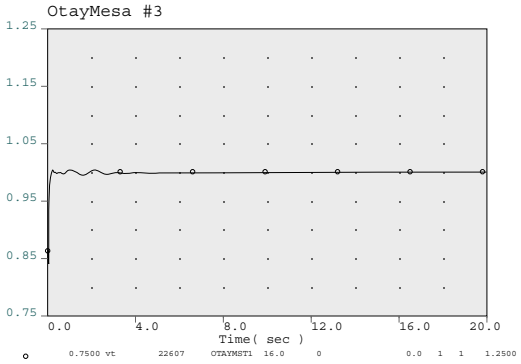
RELATIVE VOLTAGE

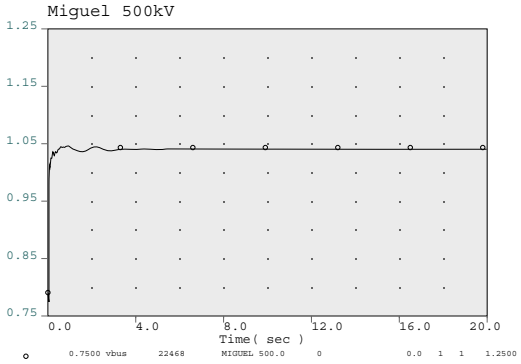








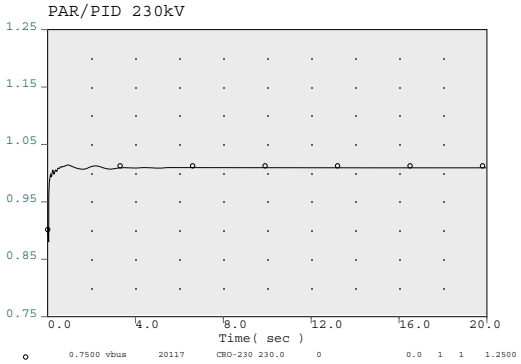




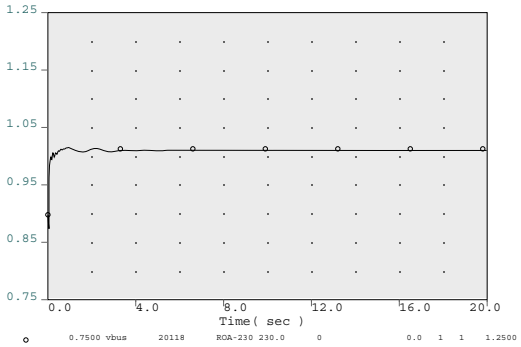
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

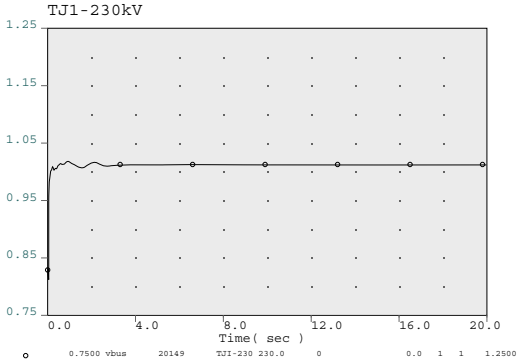
PAR/PID 230kV



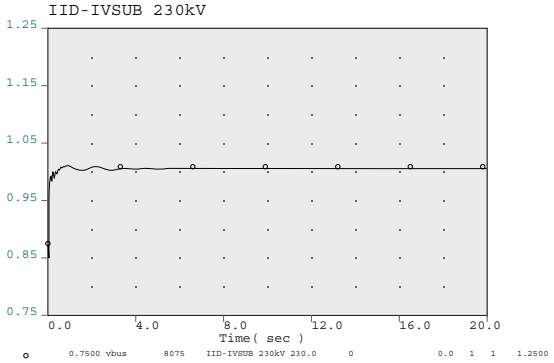
ROA-230kV



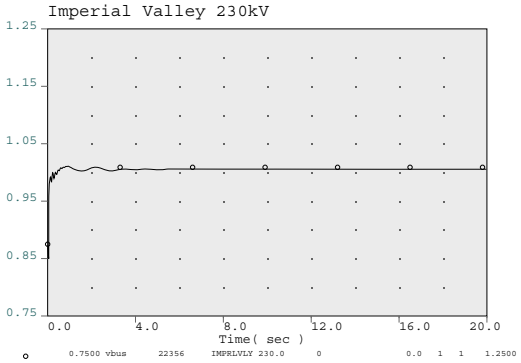
TJ1-230kV



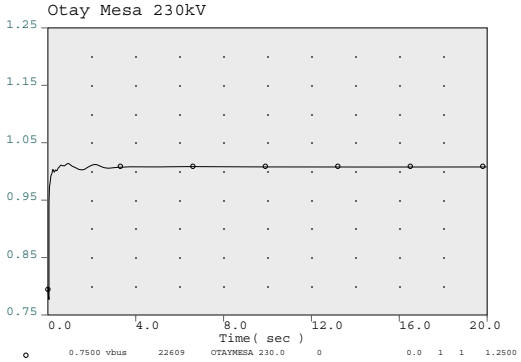
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



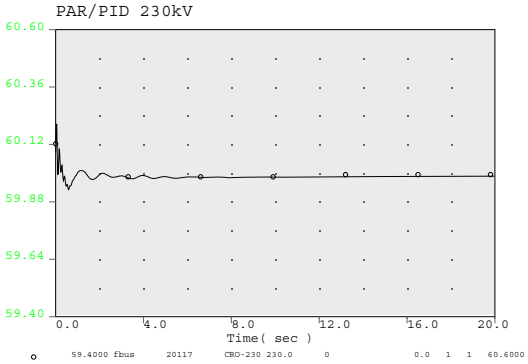
C1 C2 Light Load Post With Upgrades

Page 3

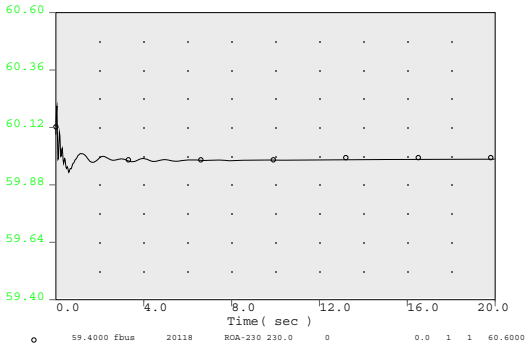
SDGE	tran-c1c2-ll-pstup-r15_PEN-SX-slo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:29:24 2011

Affected System Frequency Check and Comparison

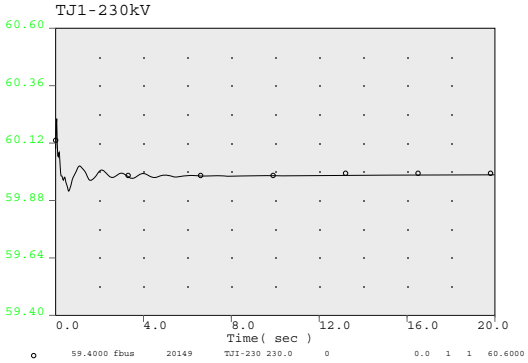
PAR/PID 230kV



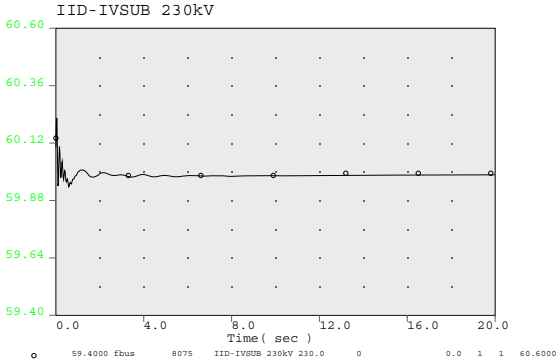
ROA-230kV



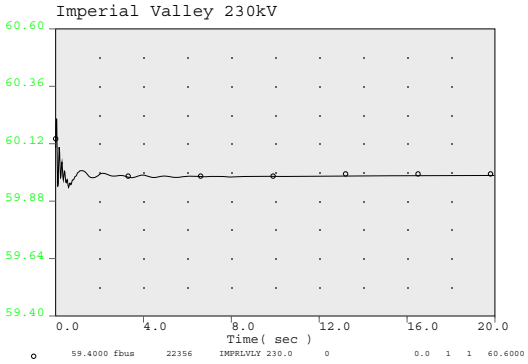
TJ1-230kV



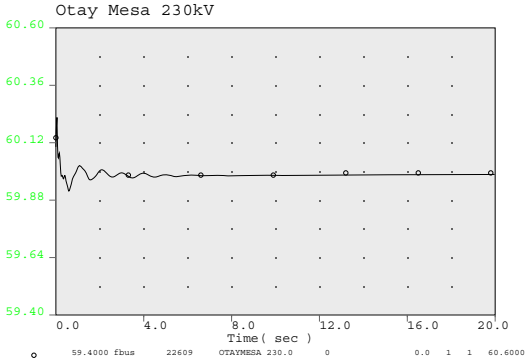
IID-IVSUB 230kV



Imperial Valley 230kV



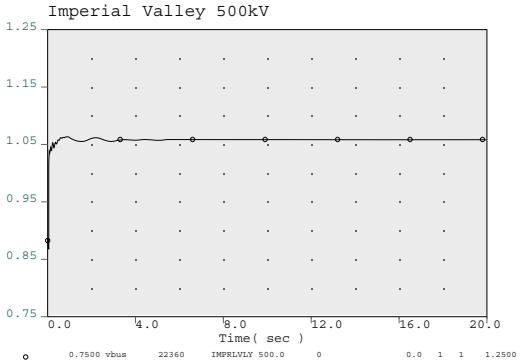
Otay Mesa 230kV



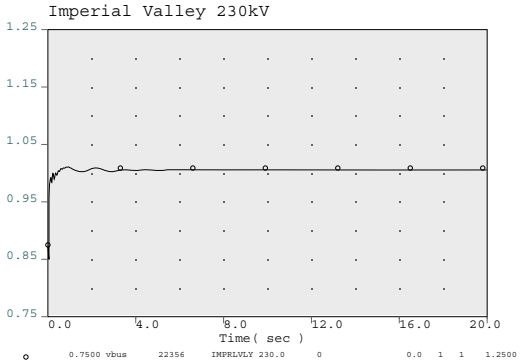
C1 C2 Light Load Post With Upgrades

VOLTAGE

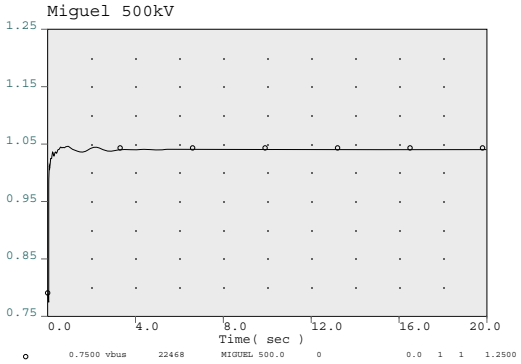
Imperial Valley 500kV



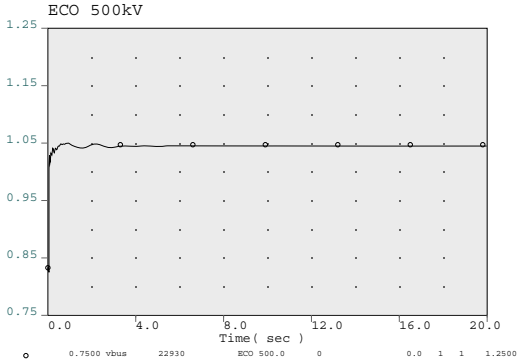
Imperial Valley 230kV



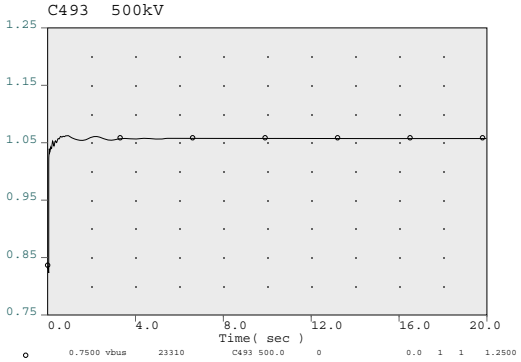
Miguel 500kV



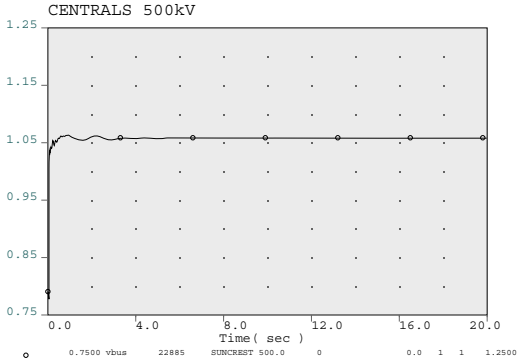
ECO 500kV



C493 500kV



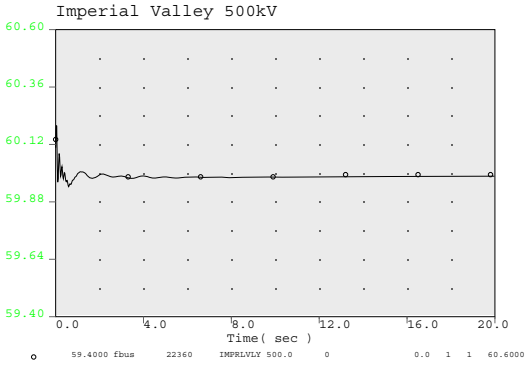
CENTRALS 500kV



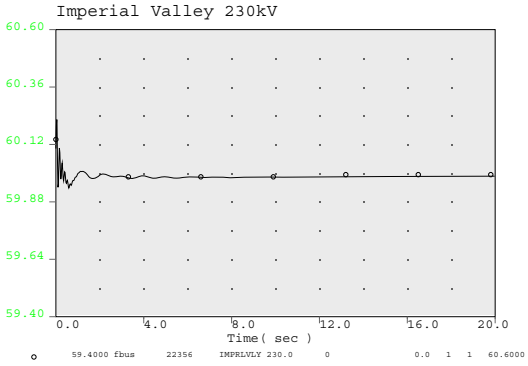
C1 C2 Light Load Post With Upgrades

FREQUENCY

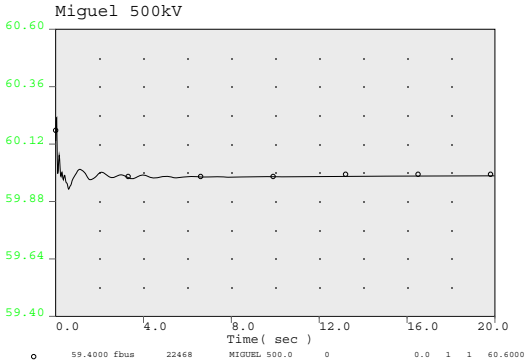
Imperial Valley 500kV



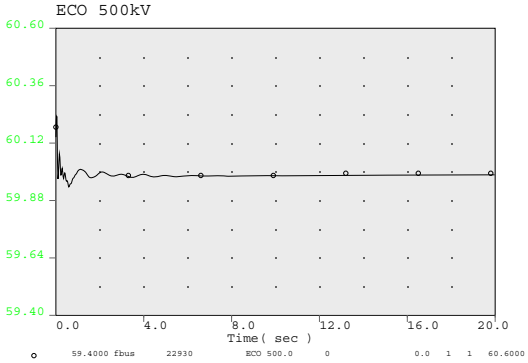
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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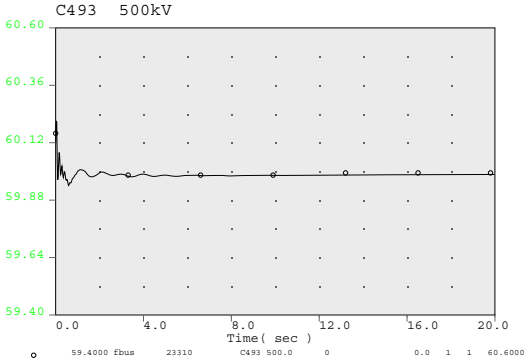
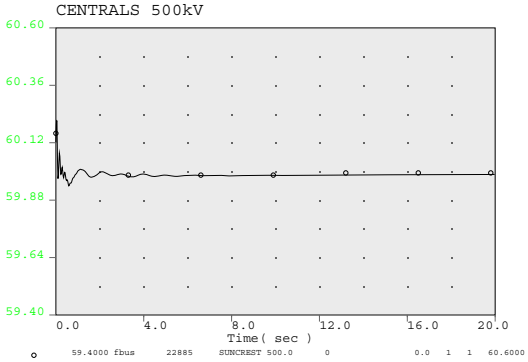
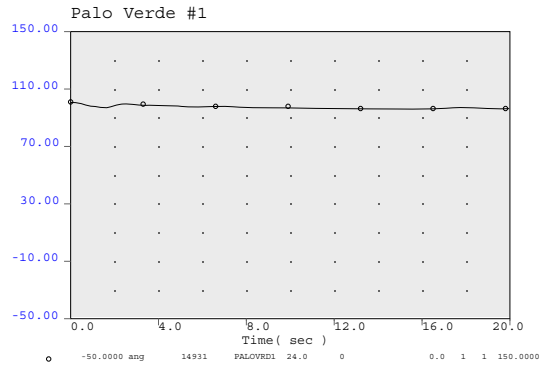


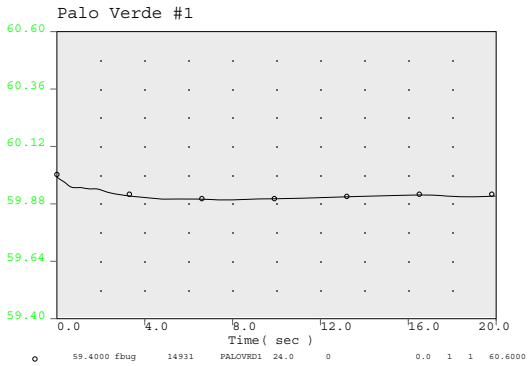
CENTRALS 500kV

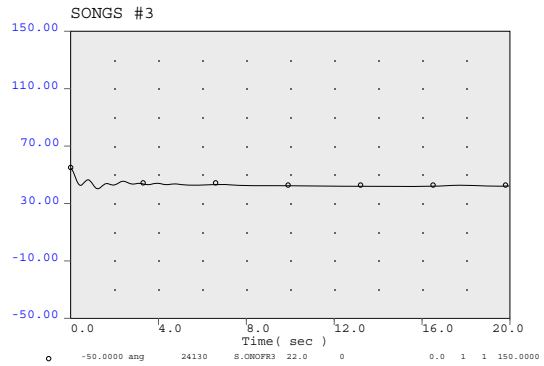


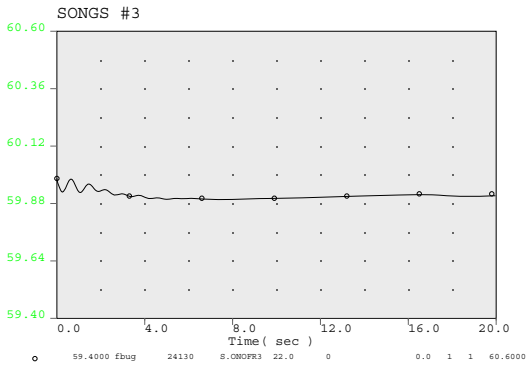
C1 C2 Light Load Post With Upgrades

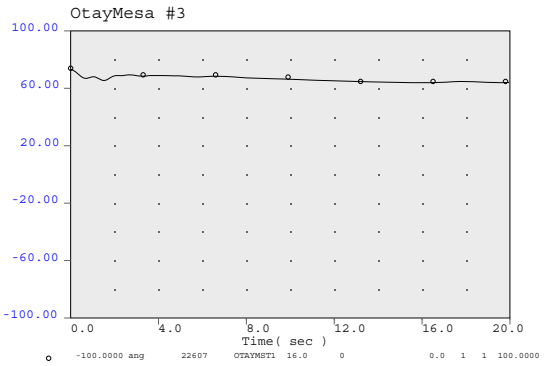
RELATIVE ROTOR ANGLE & FREQUENCY

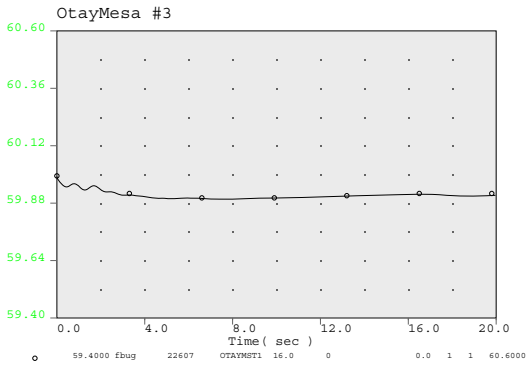










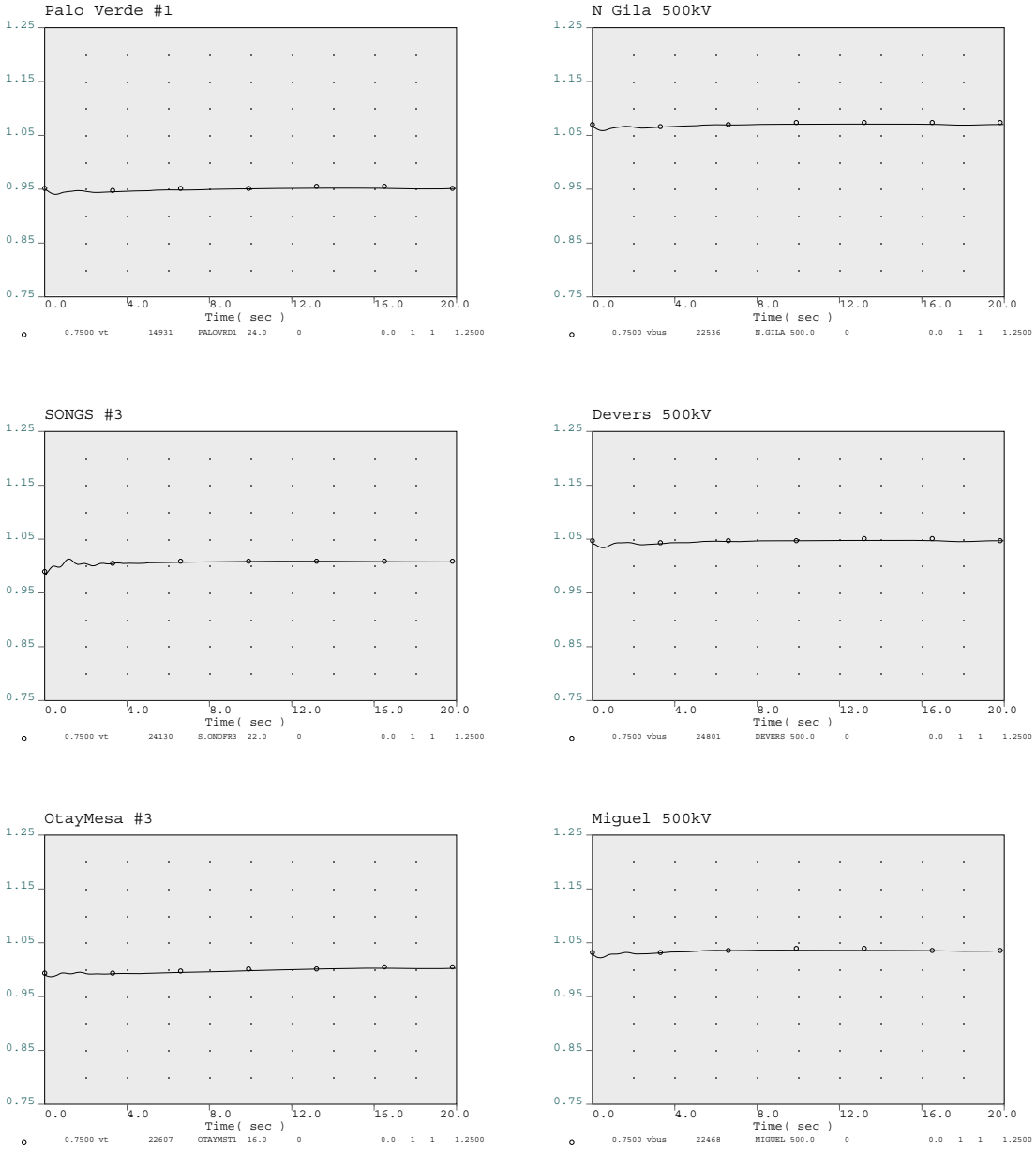


C1 C2 Light Load Post With Upgrades

Page 1

SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_SONG-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:38:29 2011

RELATIVE VOLTAGE



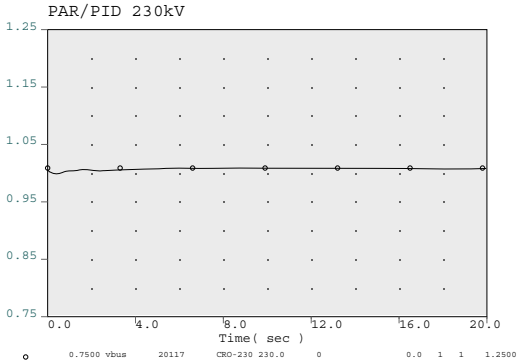
C1 C2 Light Load Post With Upgrades

Page 2

SDGE A Sempra Energy utility	tran-c1c2-ll-pstup-r15_SONG-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:38:29 2011

Affected System Voltage Check and Comparison

PAR/PID 230kV



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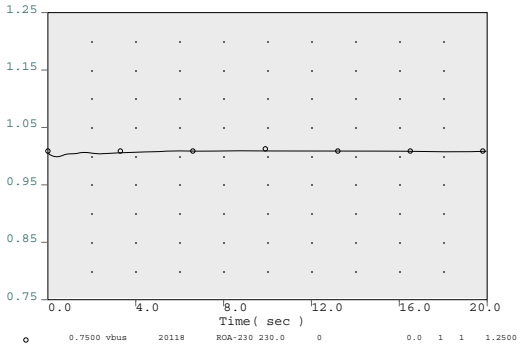
ROA-230kV



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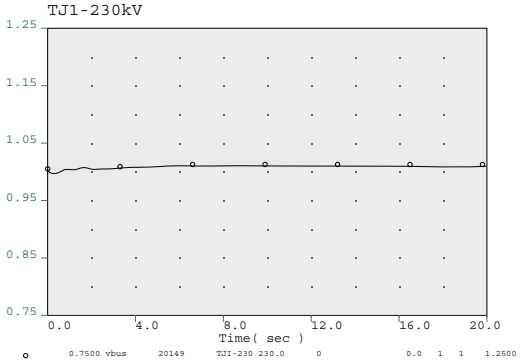
TJ1-230kV



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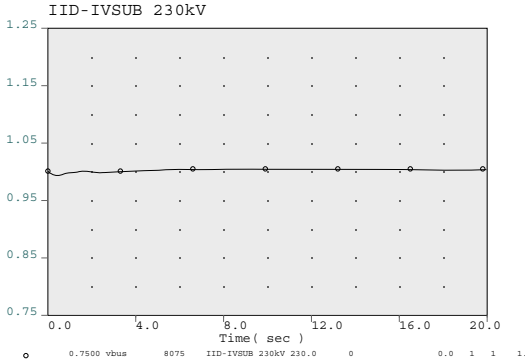
IID-IVSUB 230kV



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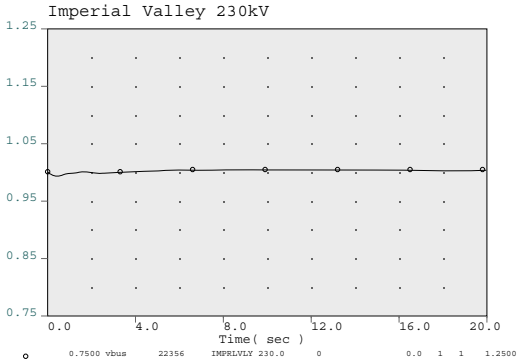
Imperial Valley 230kV



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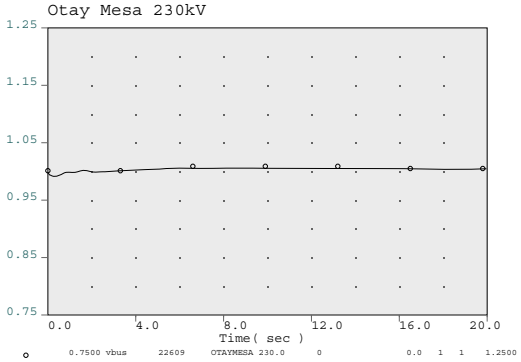
Otay Mesa 230kV



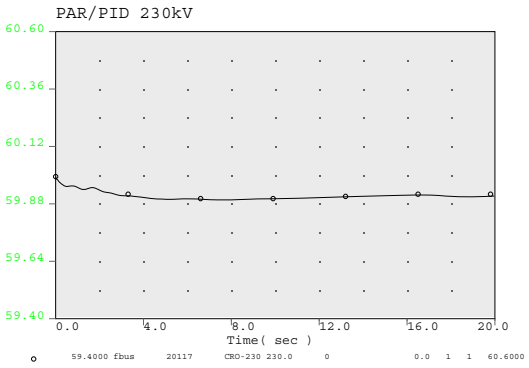
0.7500 vbus 22609 OTAYMESA 230.0 0 0.0 1 1 1.2500

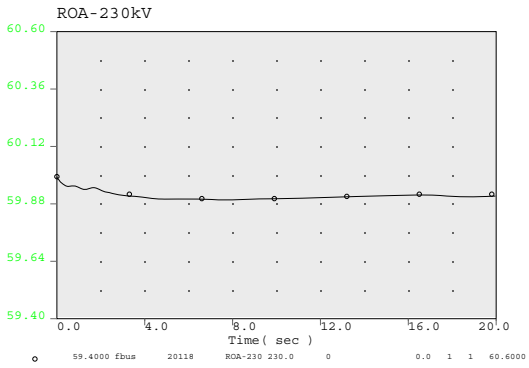
C1 C2 Light Load Post With Upgrades

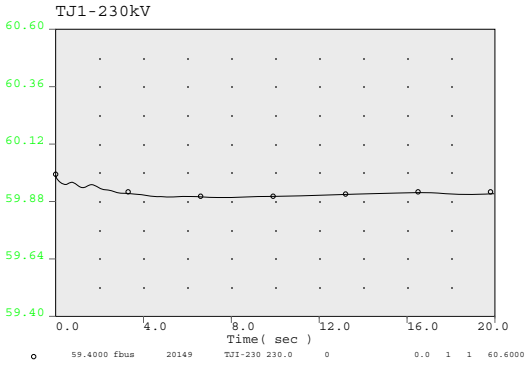
Page 3

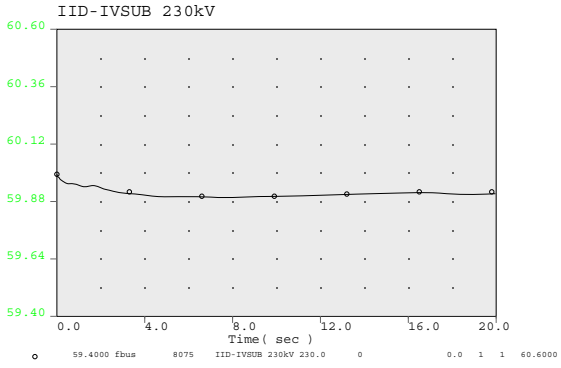
SDGE	tran-c1c2-ll-pstup-r15_SONG-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:38:30 2011

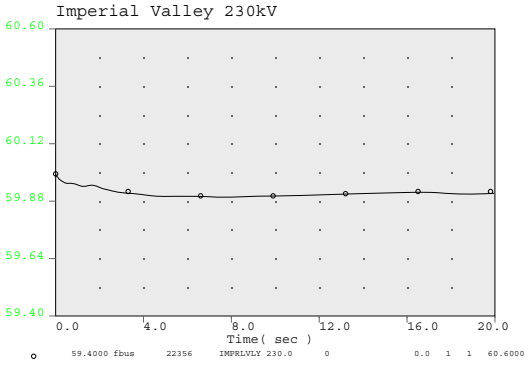
Affected System Frequency Check and Comparison

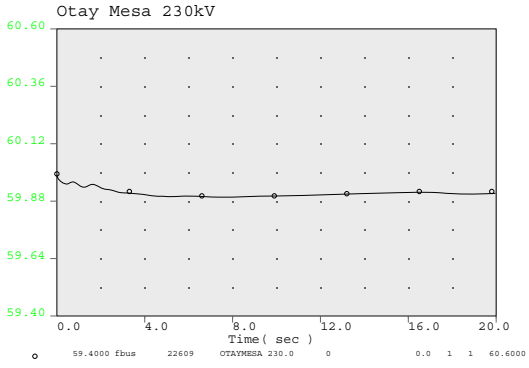












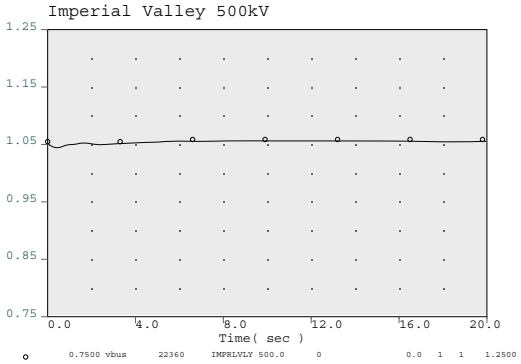
C1 C2 Light Load Post With Upgrades

Page 4

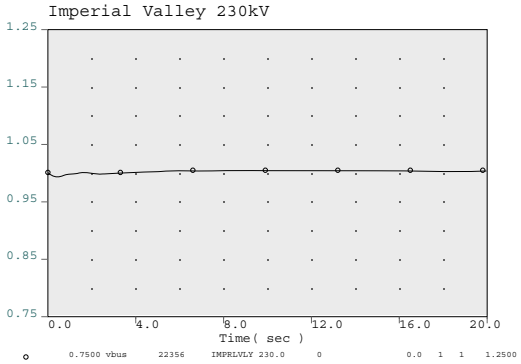
SDGE	tran-c1c2-ll-pstup-r15_SONG-g1.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:38:30 2011

VOLTAGE

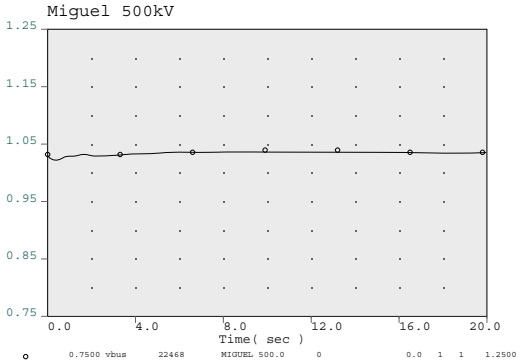
Imperial Valley 500kV



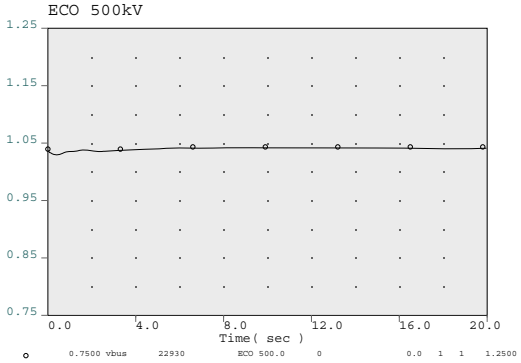
Imperial Valley 230kV



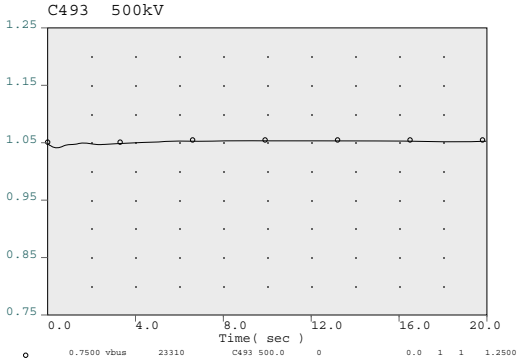
Miguel 500kV



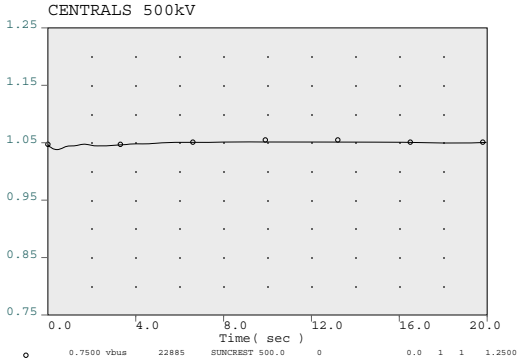
ECO 500kV



C493 500kV



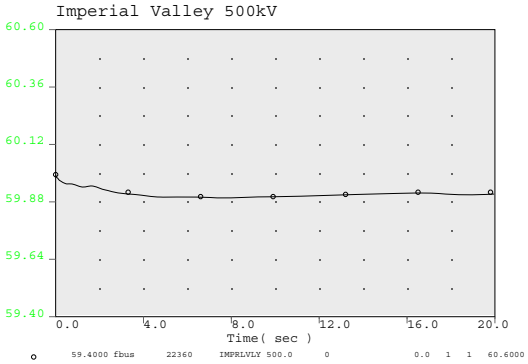
CENTRALS 500kV



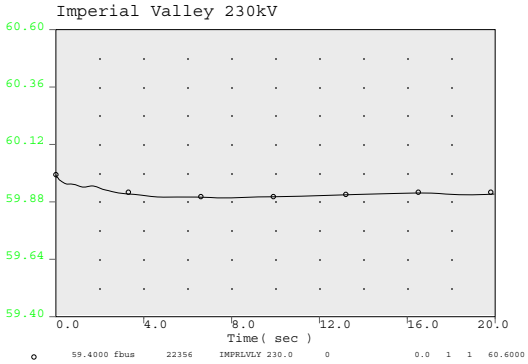
C1 C2 Light Load Post With Upgrades

FREQUENCY

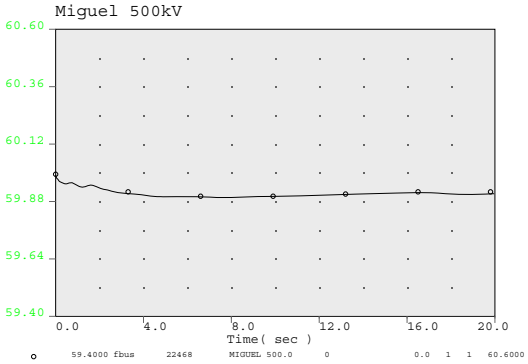
Imperial Valley 500kV



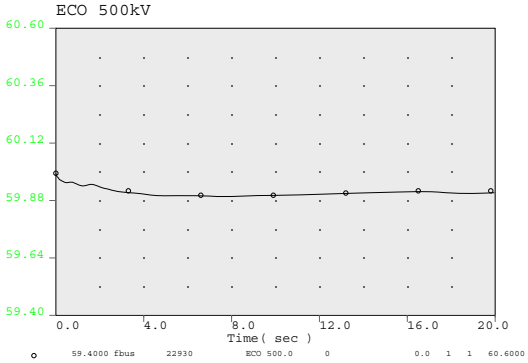
Imperial Valley 230kV



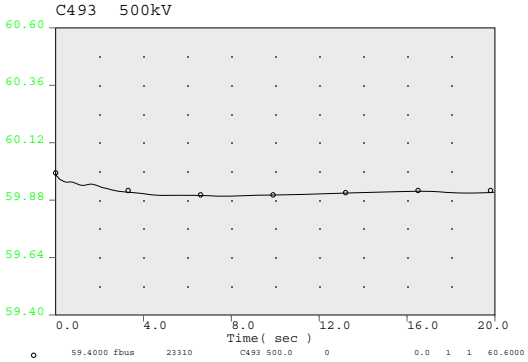
Miguel 500kV



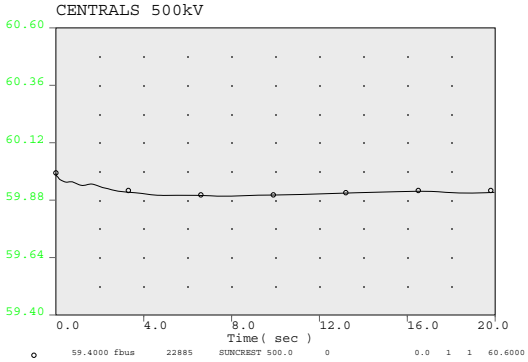
ECO 500kV



C493 500kV

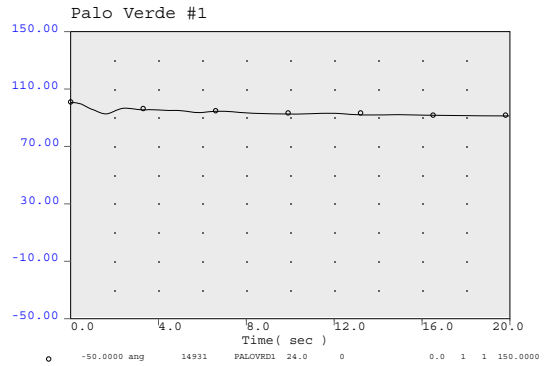


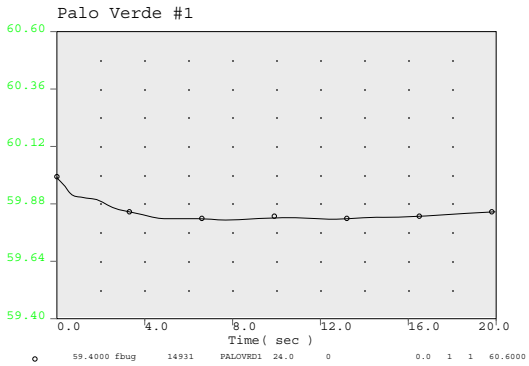
CENTRALS 500kV

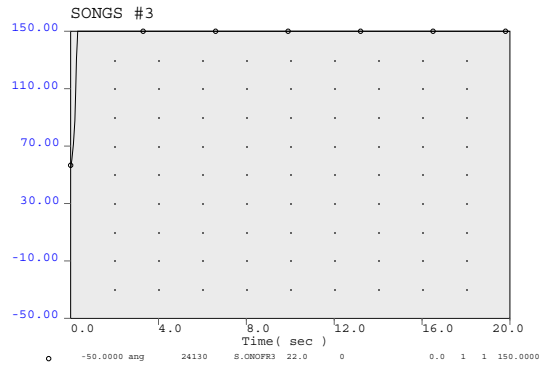


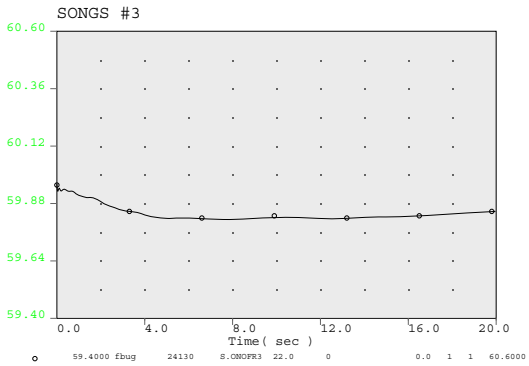
C1 C2 Light Load Post With Upgrades

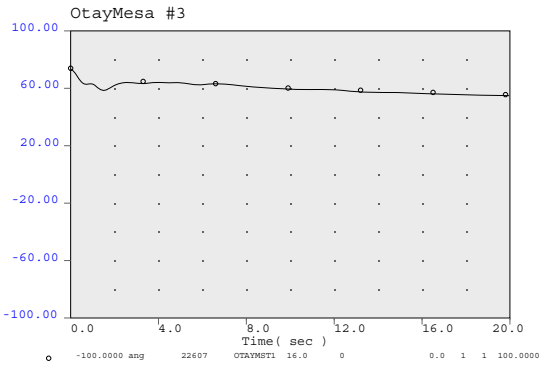
RELATIVE ROTOR ANGLE & FREQUENCY

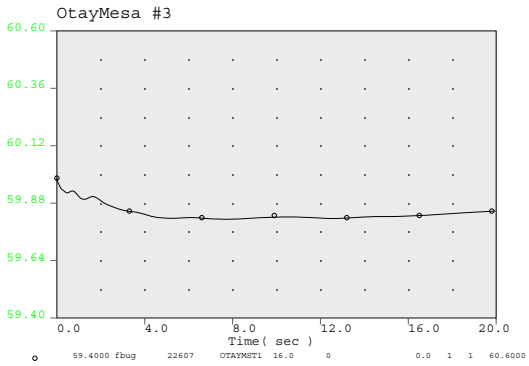










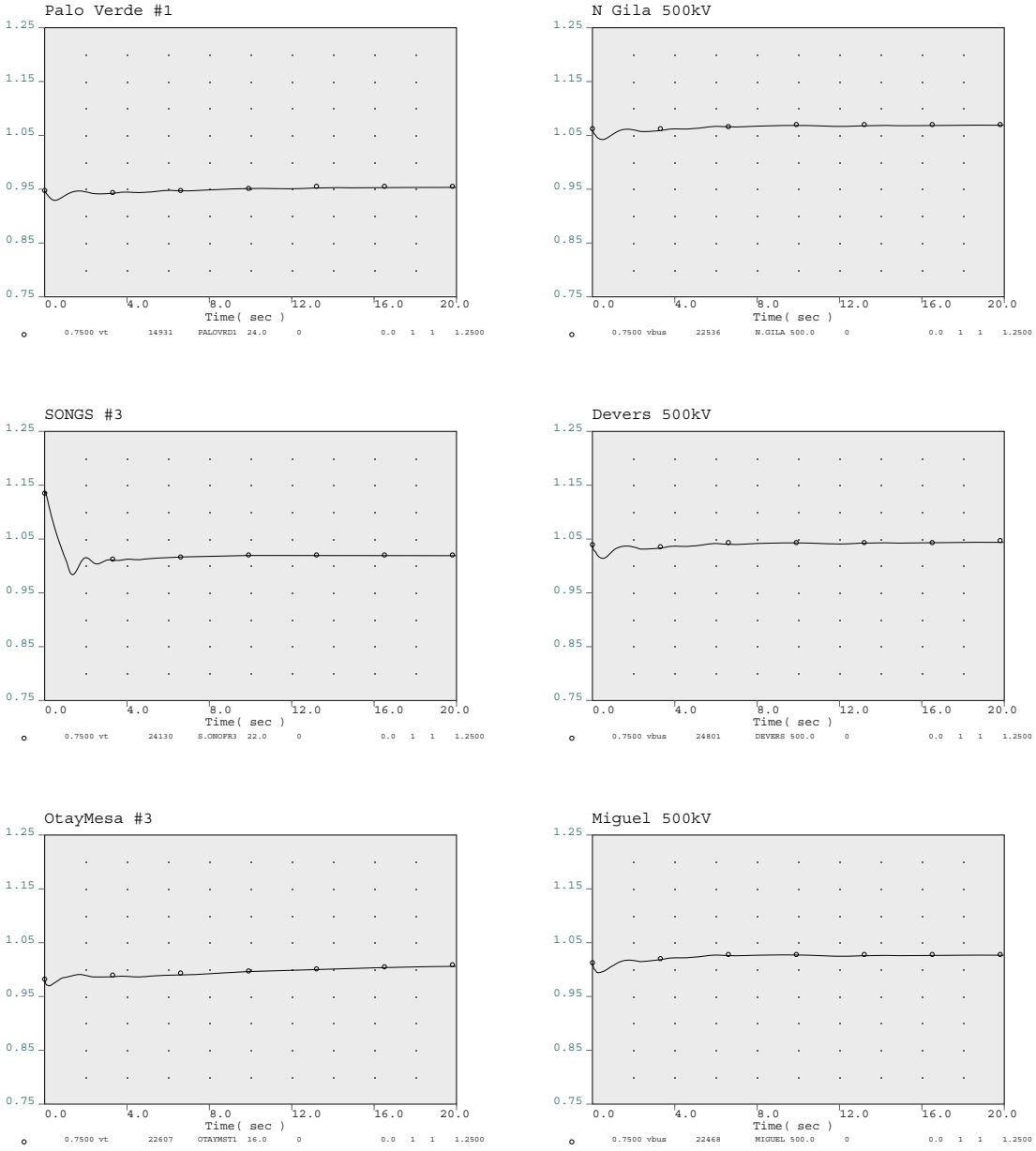


C1 C2 Light Load Post With Upgrades

Page 1

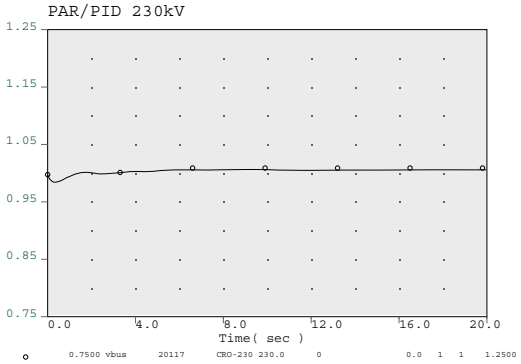
SDGE	tran-c1c2-ll-pstup-r15_SONGS-g2.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:40:16 2011

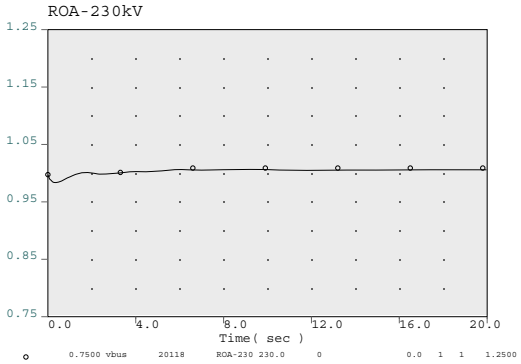
RELATIVE VOLTAGE

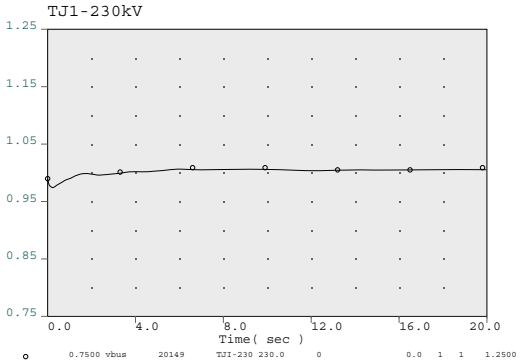


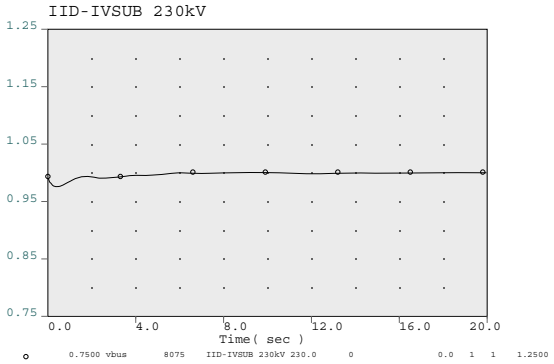
C1 C2 Light Load Post With Upgrades

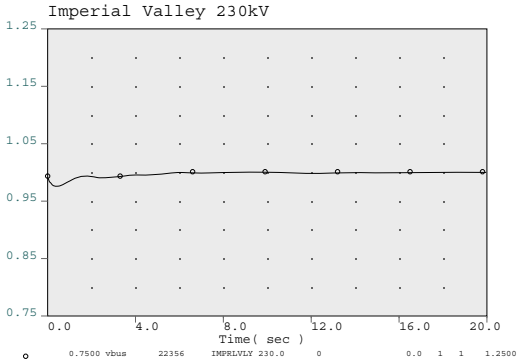
Affected System Voltage Check and Comparison

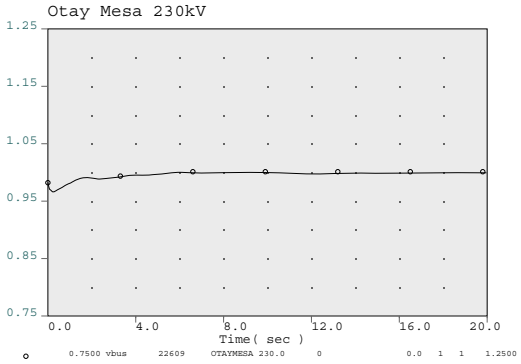








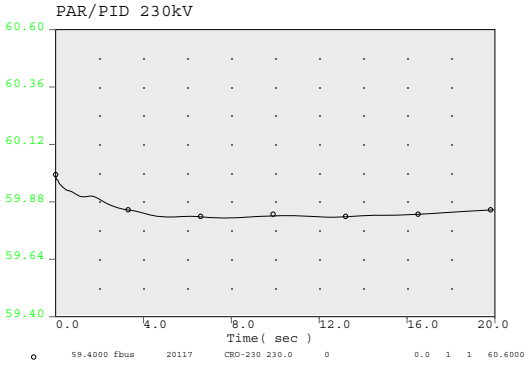




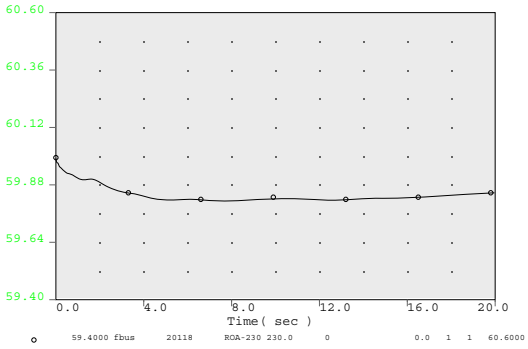
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

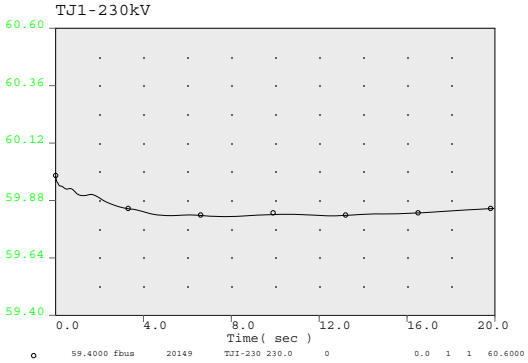
PAR/PID 230kV



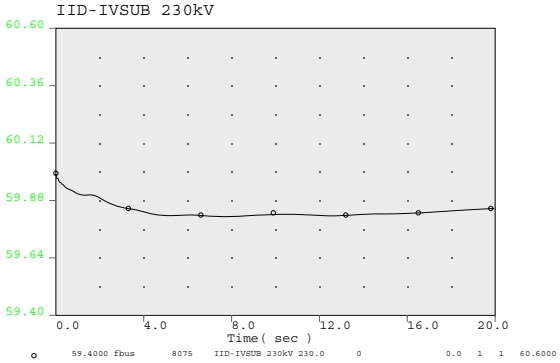
ROA-230kV



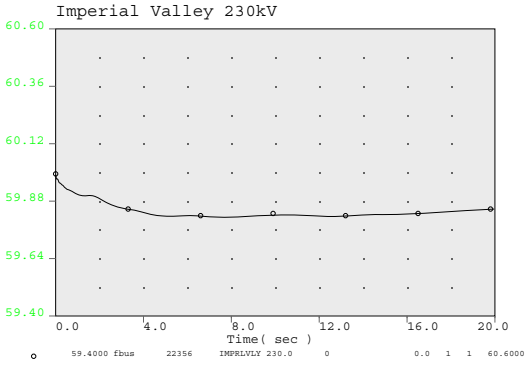
TJ1-230kV



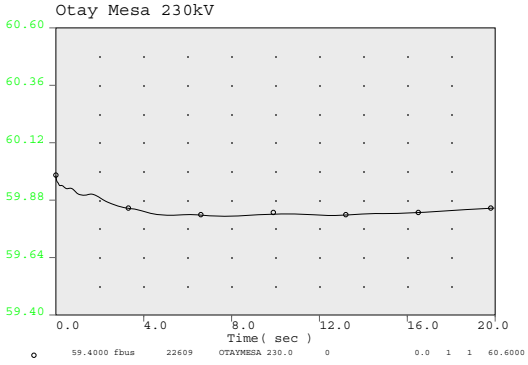
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



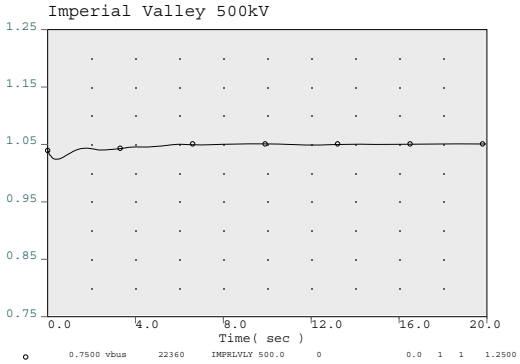
C1 C2 Light Load Post With Upgrades

Page 4

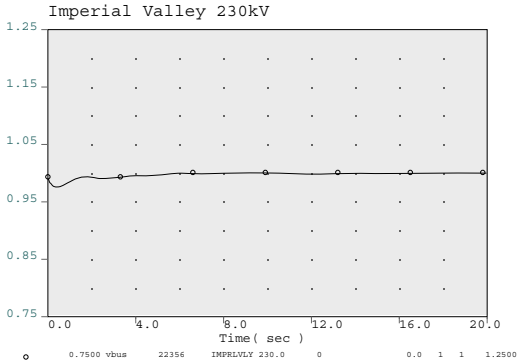
SDGE	tran-c1c2-ll-pstup-r15_SONGS-g2.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:40:18 2011

VOLTAGE

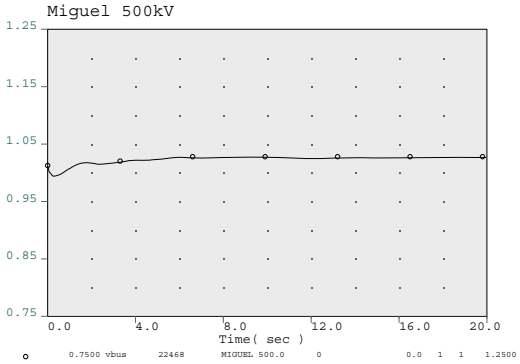
Imperial Valley 500kV



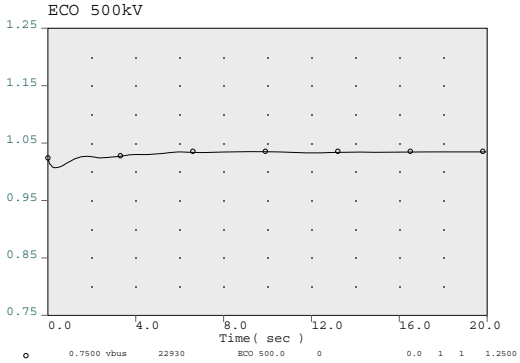
Imperial Valley 230kV



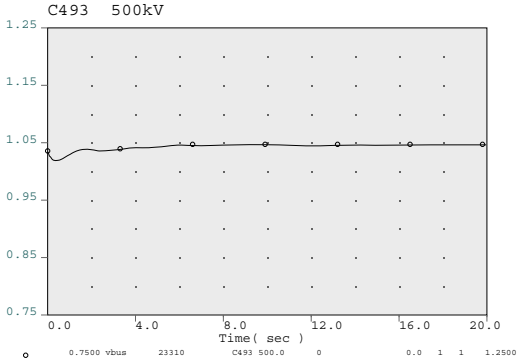
Miguel 500kV



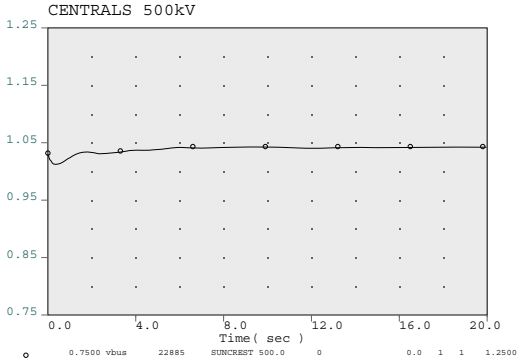
ECO 500kV



C493 500kV



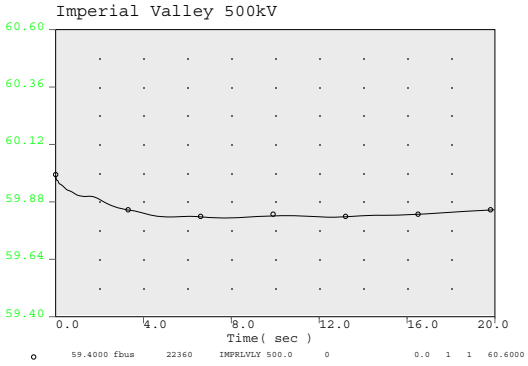
CENTRALS 500kV



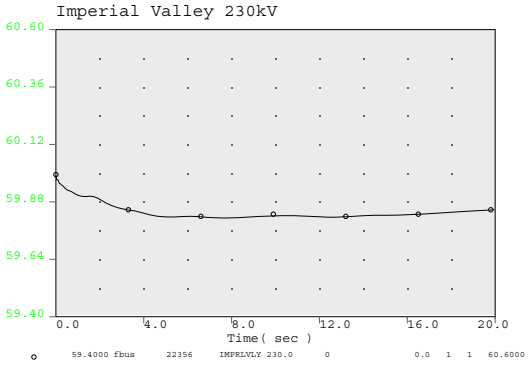
C1 C2 Light Load Post With Upgrades

FREQUENCY

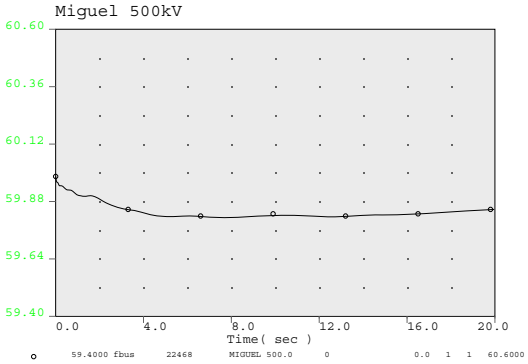
Imperial Valley 500kV



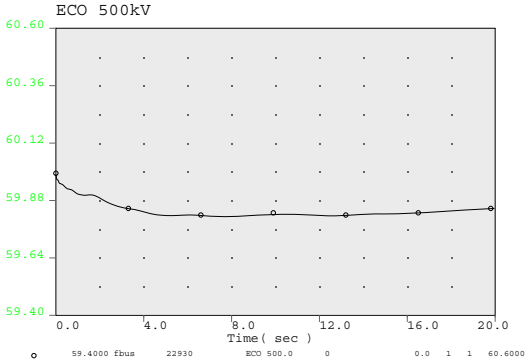
Imperial Valley 230kV



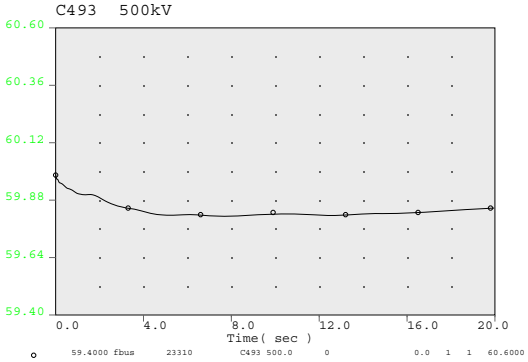
Miguel 500kV



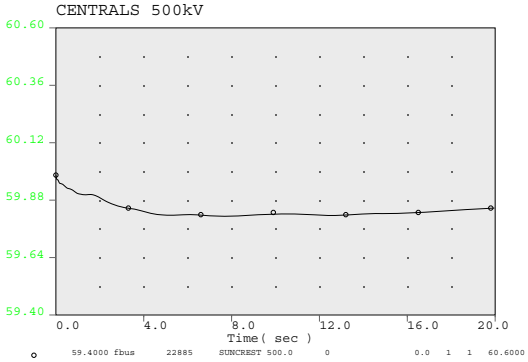
ECO 500kV



C493 500kV

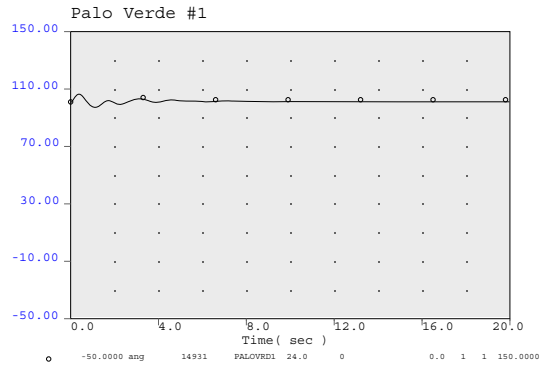


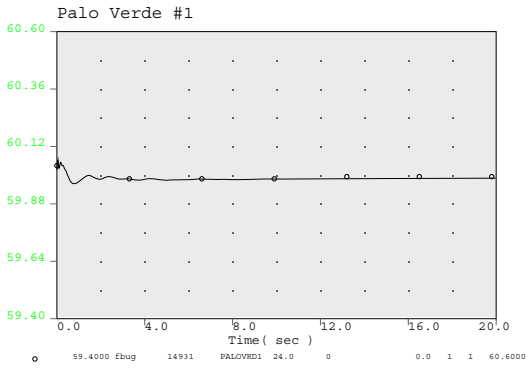
CENTRALS 500kV

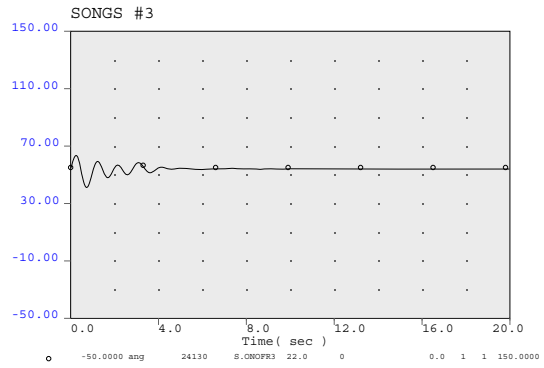


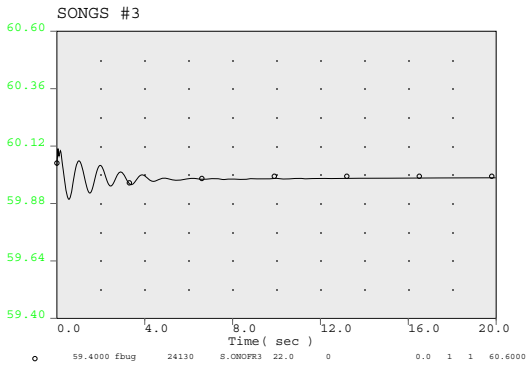
C1 C2 Light Load Post With Upgrades

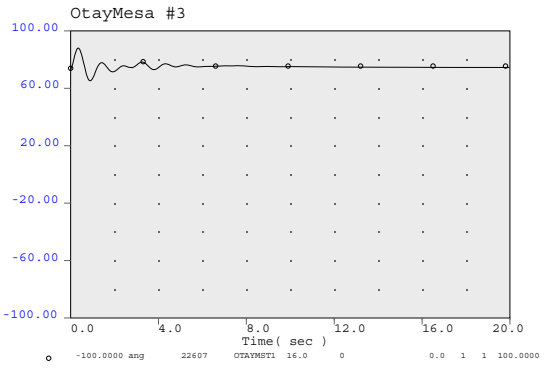
RELATIVE ROTOR ANGLE & FREQUENCY

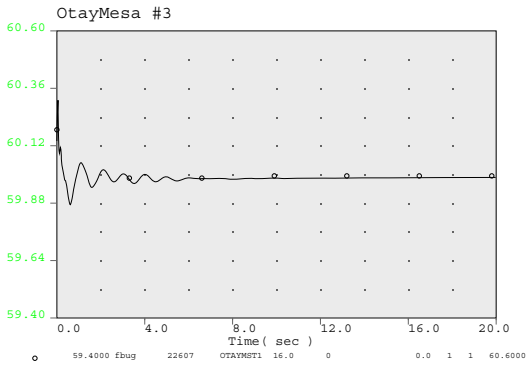












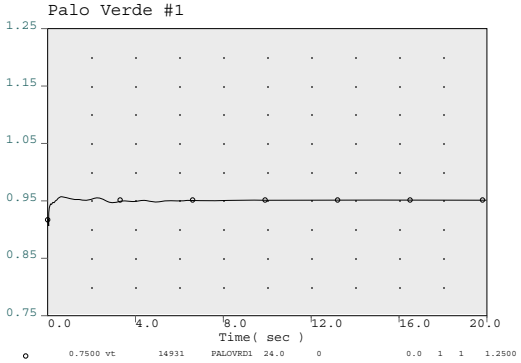
C1 C2 Light Load Post With Upgrades

Page 1

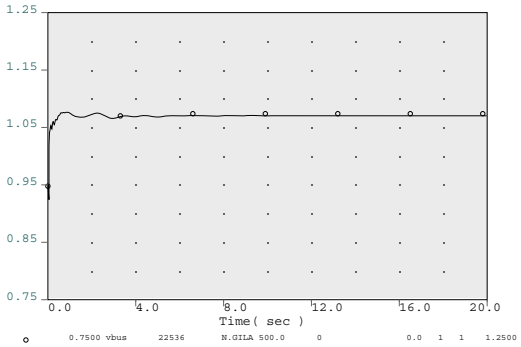
SDGE	tran-c1c2-ll-pstup-r15_SO-SA-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:33:00 2011

RELATIVE VOLTAGE

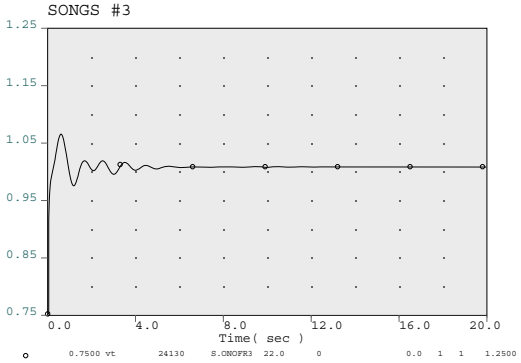
Palo Verde #1



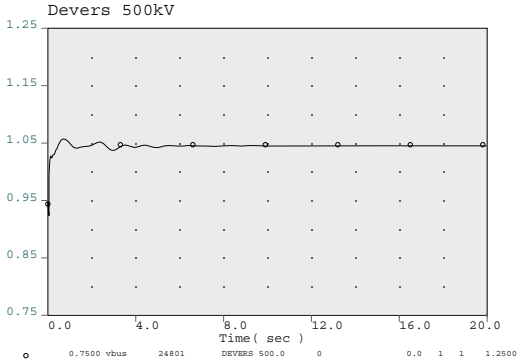
N Gila 500kV



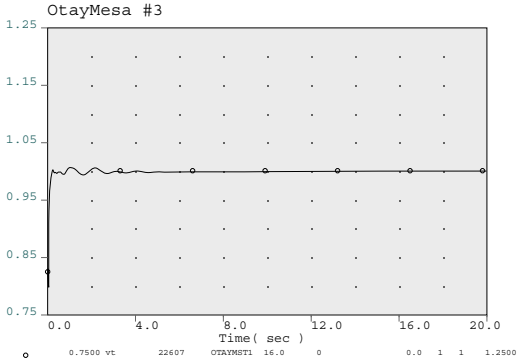
SONGS #3



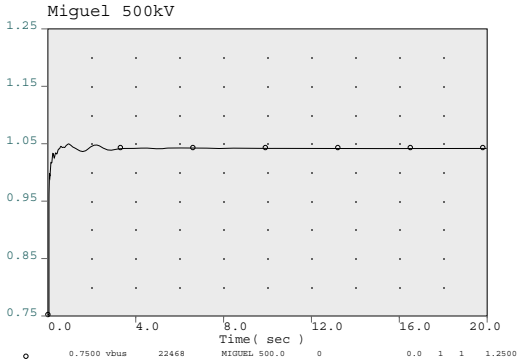
Devers 500kV



OtayMesa #3



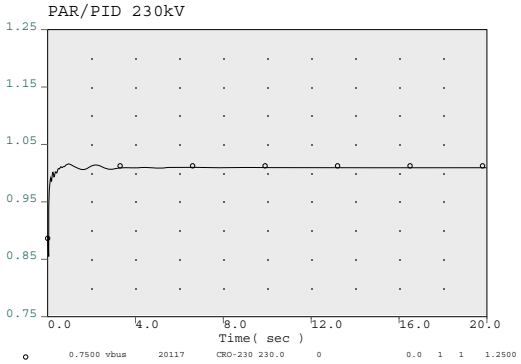
Miguel 500kV



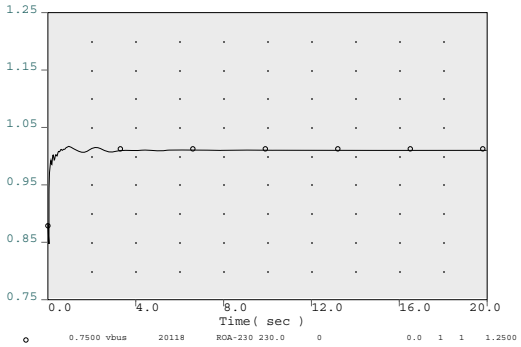
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

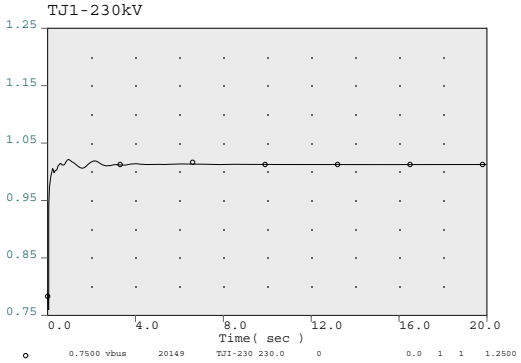
PAR/PID 230kV



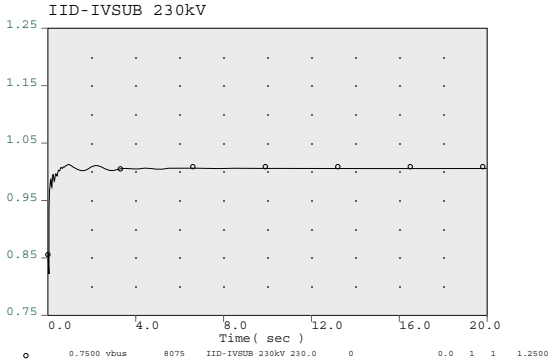
ROA-230kV



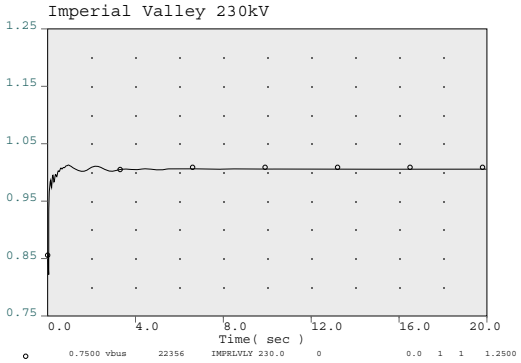
TJ1-230kV



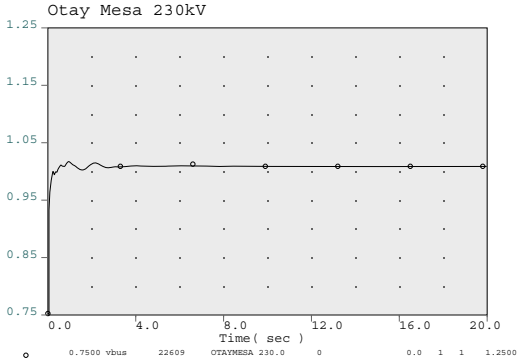
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



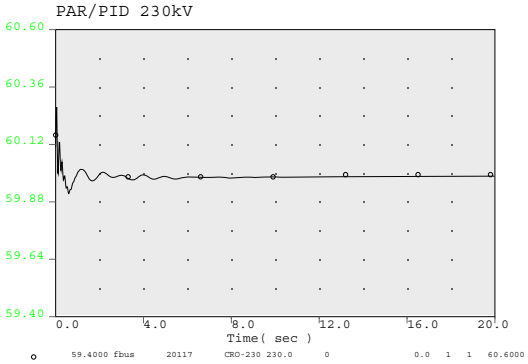
C1 C2 Light Load Post With Upgrades

Page 3

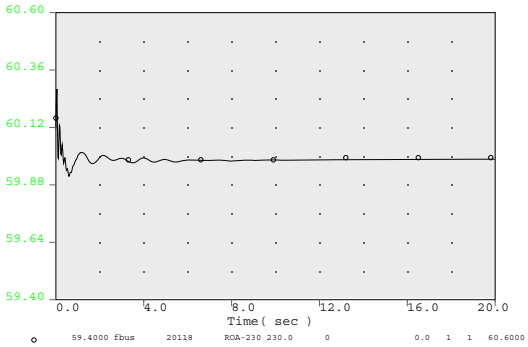
SDGE	tran-c1c2-ll-pstup-r15_SO-SA-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:33:01 2011

Affected System Frequency Check and Comparison

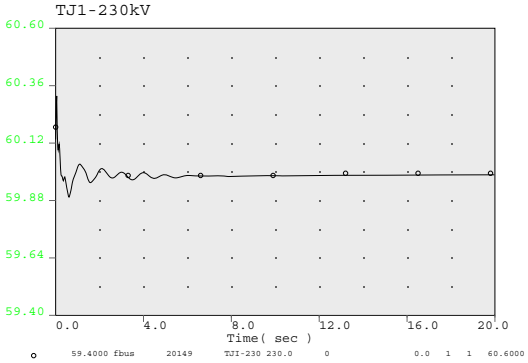
PAR/PID 230kV



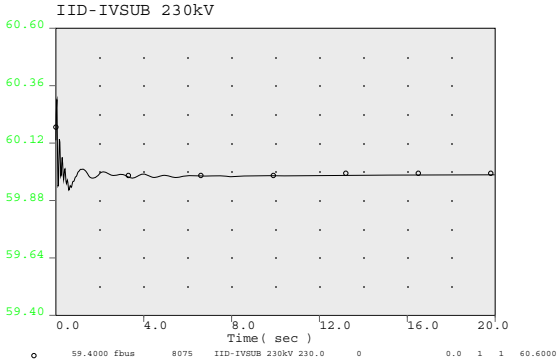
ROA-230kV



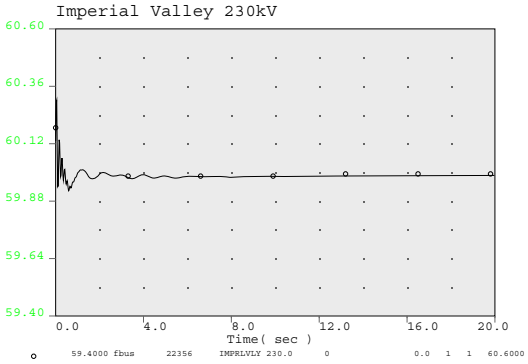
TJ1-230kV



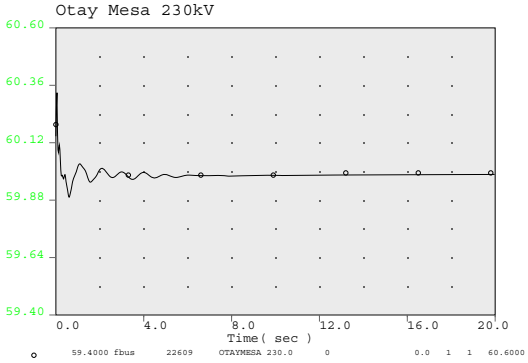
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



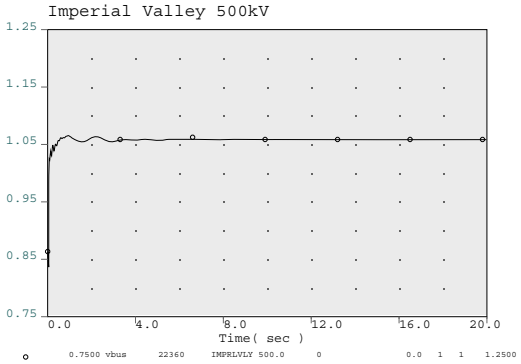
C1 C2 Light Load Post With Upgrades

Page 4

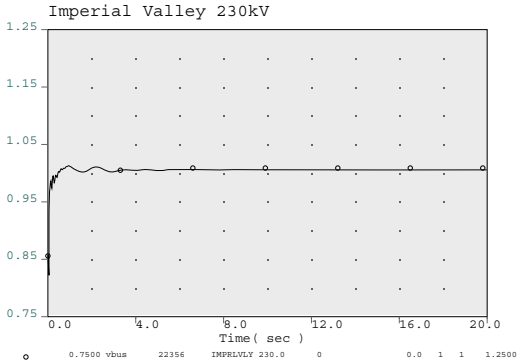
SDGE	tran-c1c2-ll-pstup-r15_SO-SA-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:33:01 2011

VOLTAGE

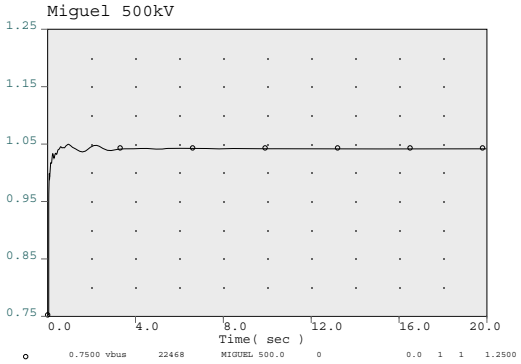
Imperial Valley 500kV



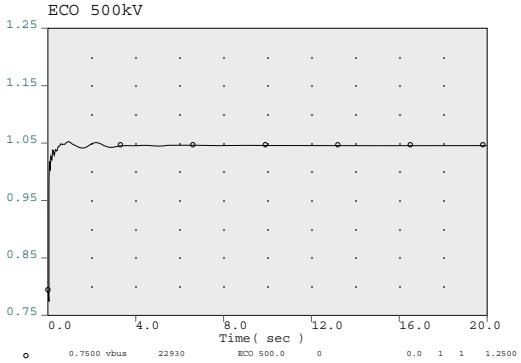
Imperial Valley 230kV



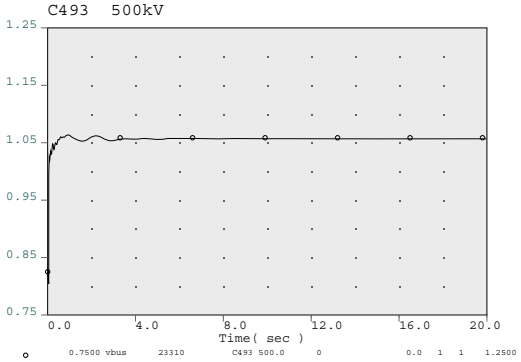
Miguel 500kV



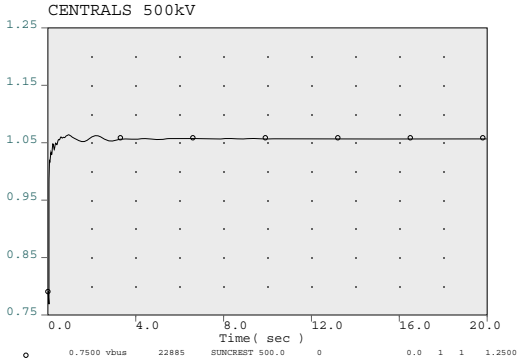
ECO 500kV



C493 500kV

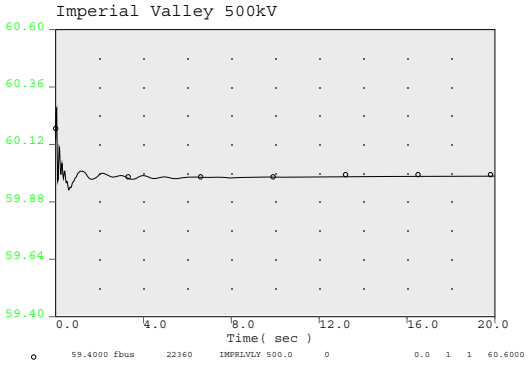


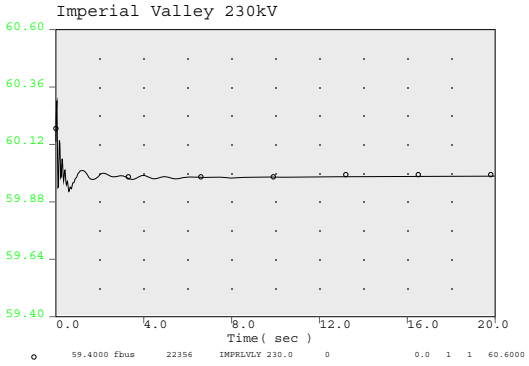
CENTRALS 500kV

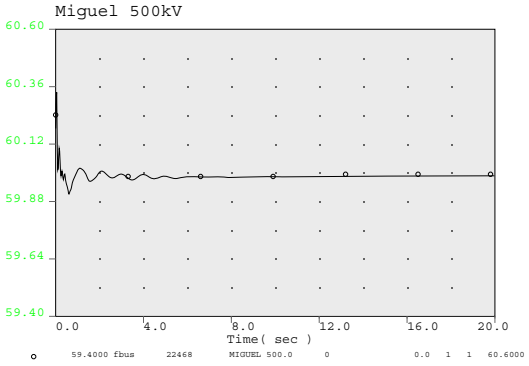


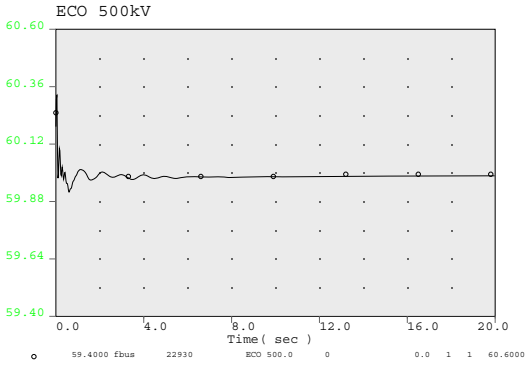
C1 C2 Light Load Post With Upgrades

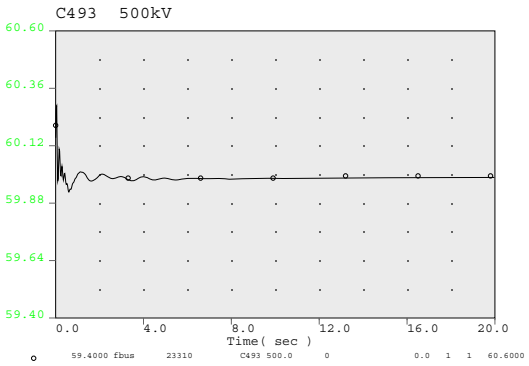
FREQUENCY

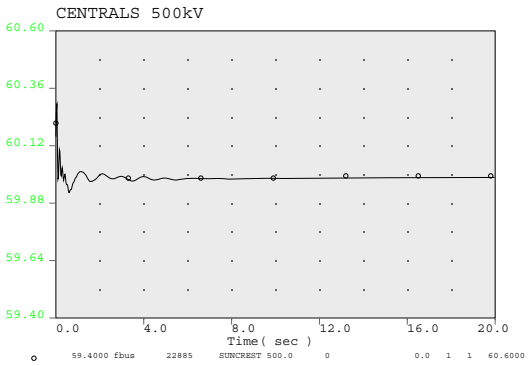






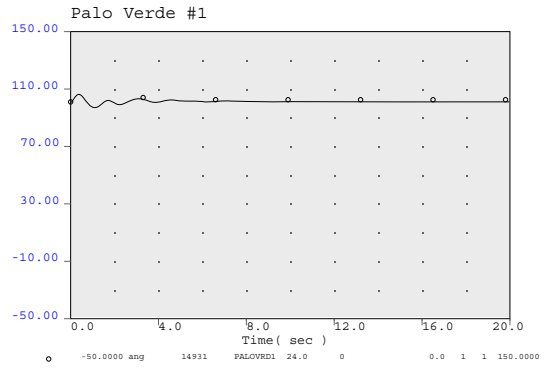


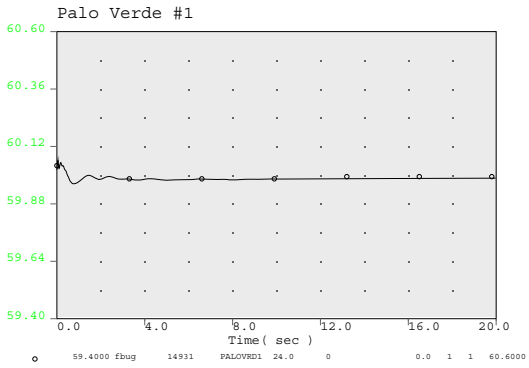


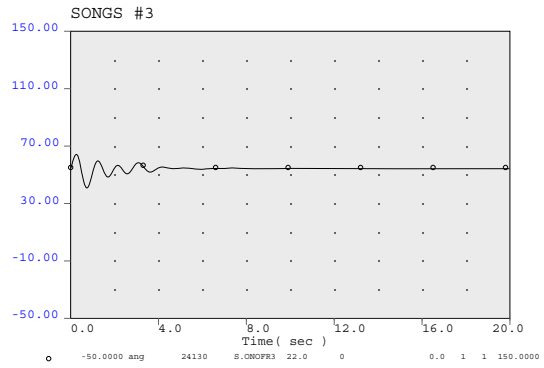


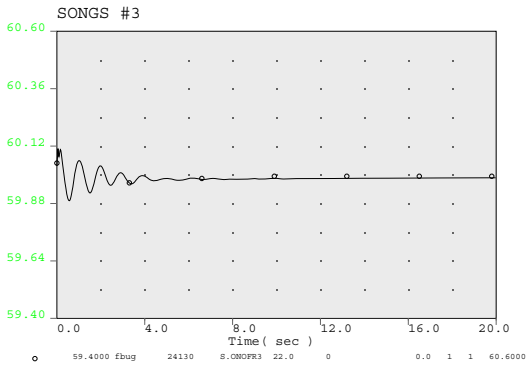
C1 C2 Light Load Post With Upgrades

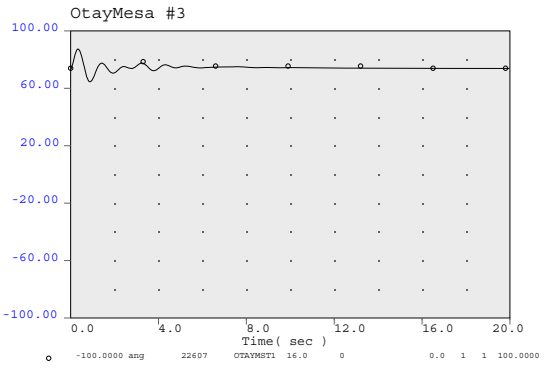
RELATIVE ROTOR ANGLE & FREQUENCY

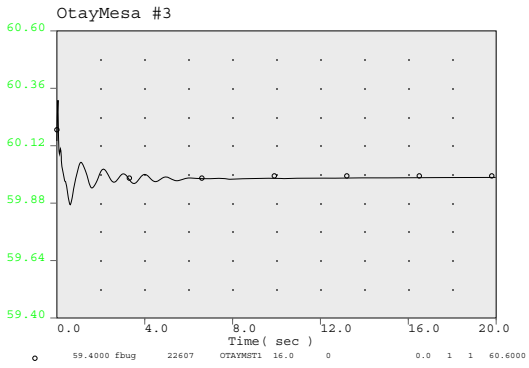












C1 C2 Light Load Post With Upgrades

Page 1

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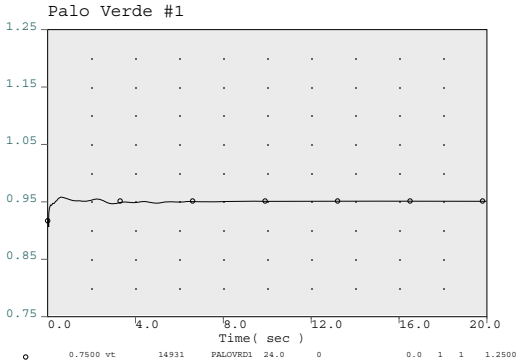
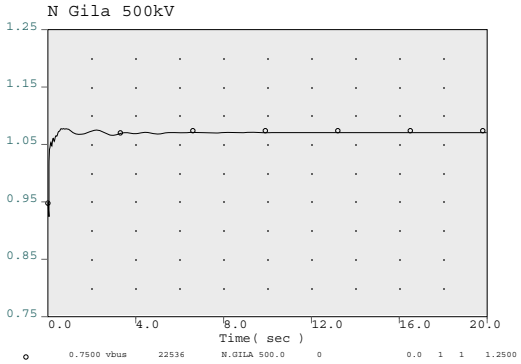
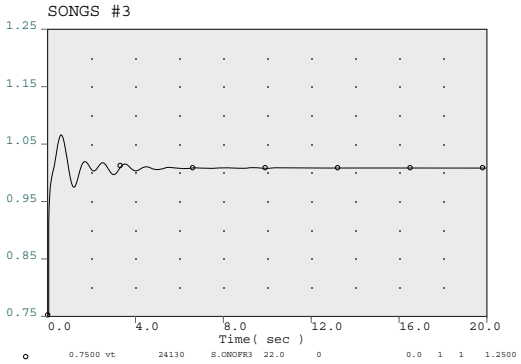
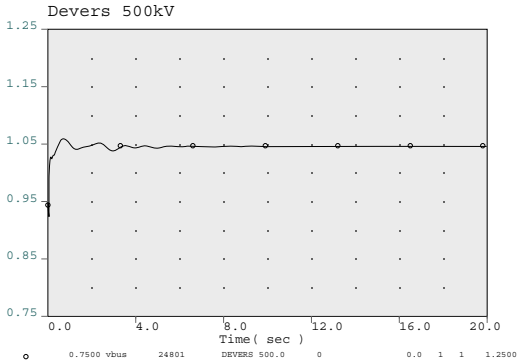
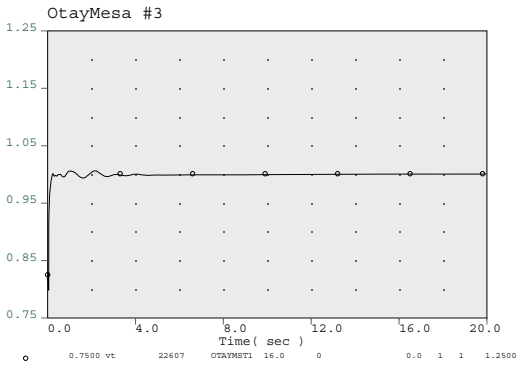
RELATIVE VOLTAGE

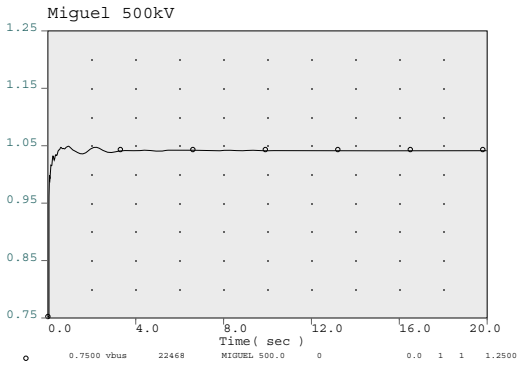








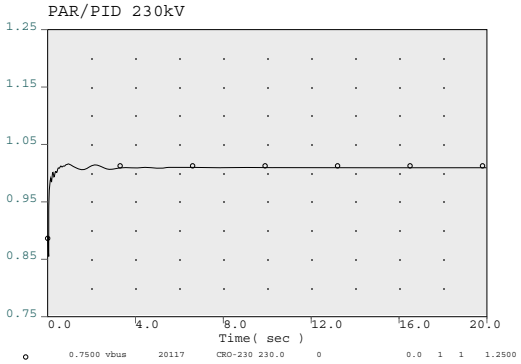




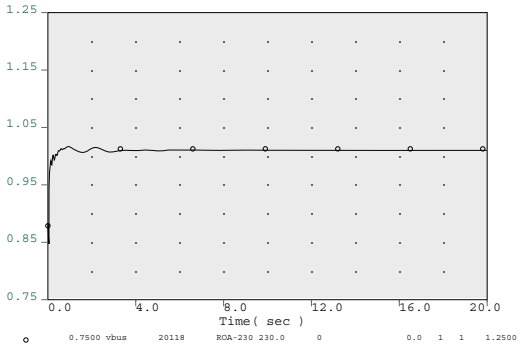
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

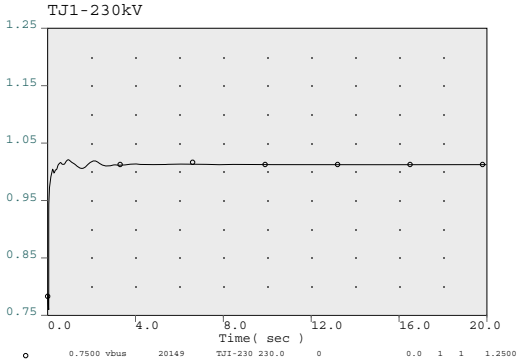
PAR/PID 230kV



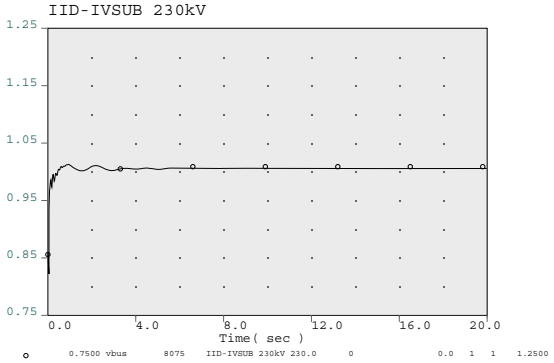
ROA-230kV



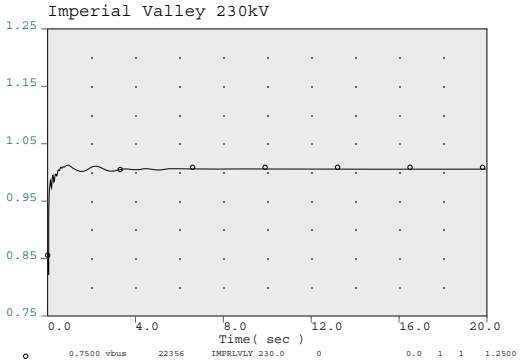
TJ1-230kV



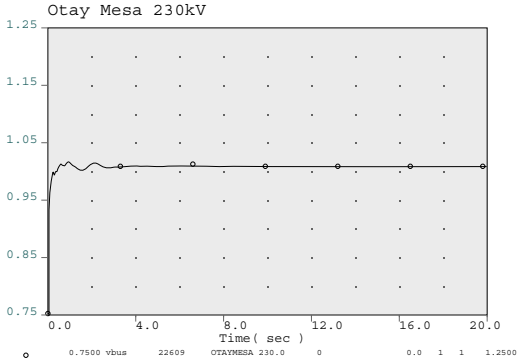
IID-IVSUB 230kV



Imperial Valley 230kV



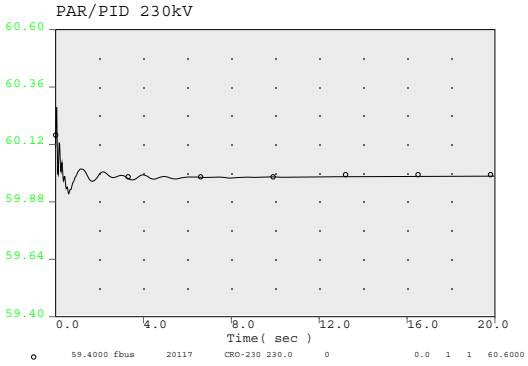
Otay Mesa 230kV



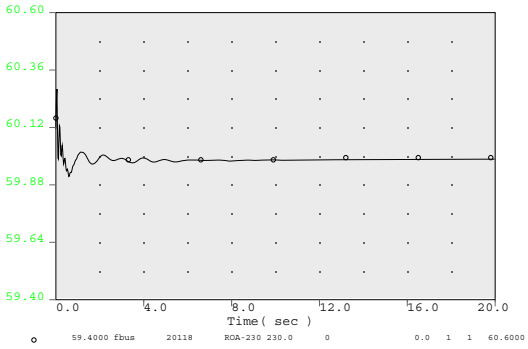
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

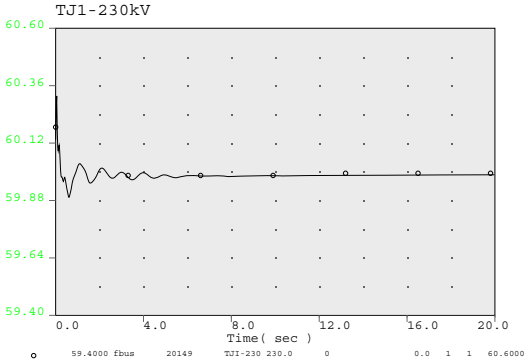
PAR/PID 230kV



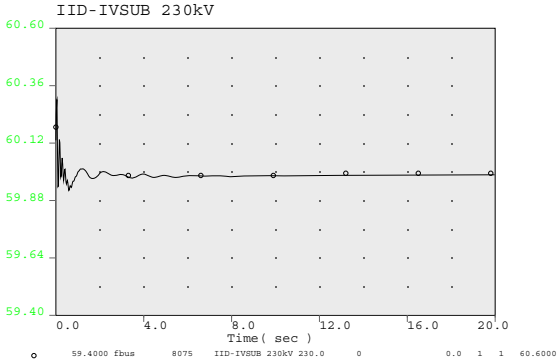
ROA-230kV



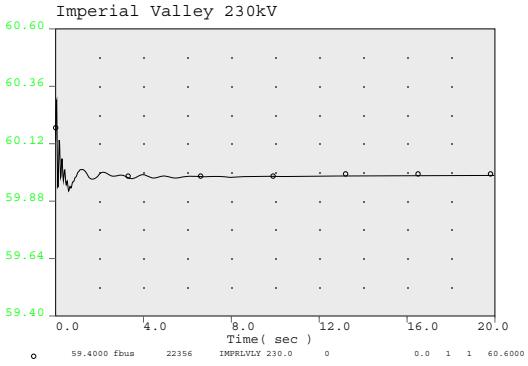
TJ1-230kV



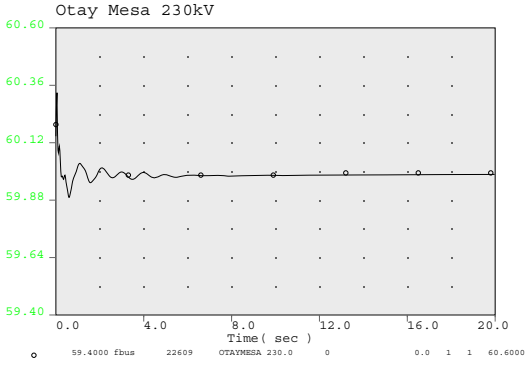
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



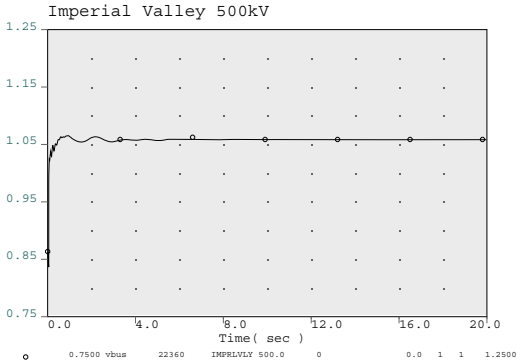
C1 C2 Light Load Post With Upgrades

Page 4

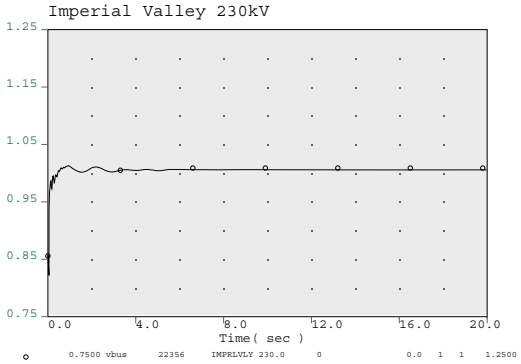
SDGE	tran-c1c2-ll-pstup-r15_SO-SA-MS-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:34:49 2011

VOLTAGE

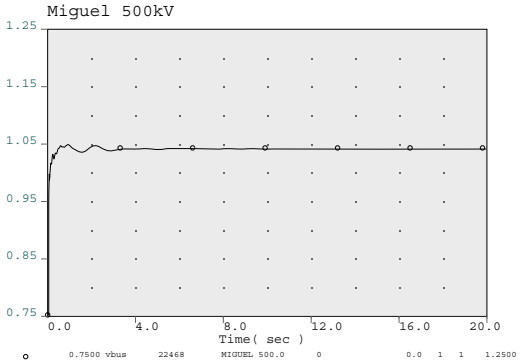
Imperial Valley 500kV



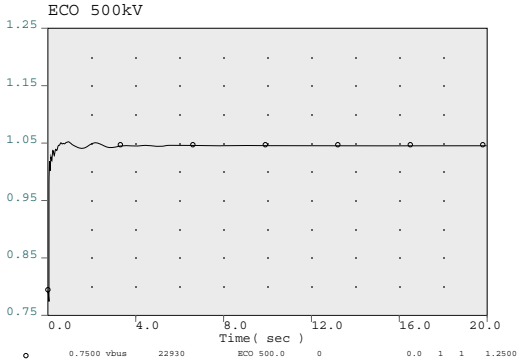
Imperial Valley 230kV



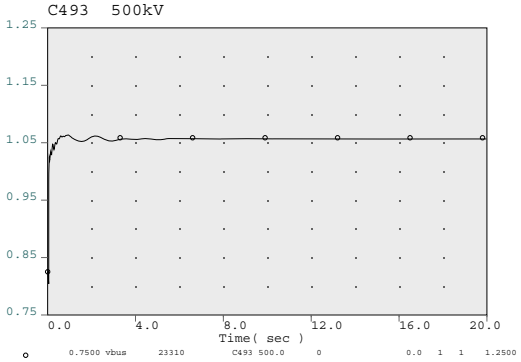
Miguel 500kV



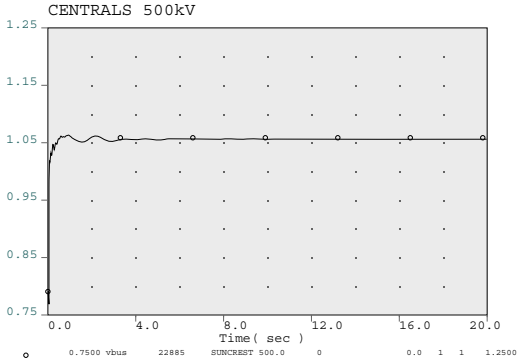
ECO 500kV



C493 500kV



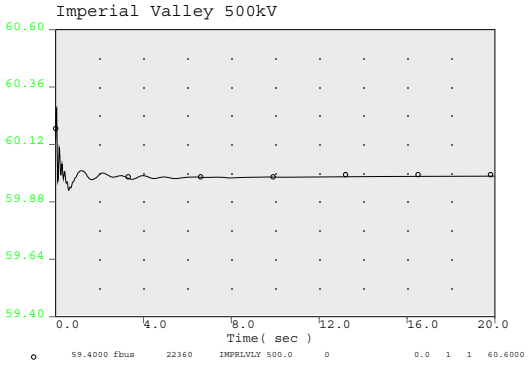
CENTRALS 500kV



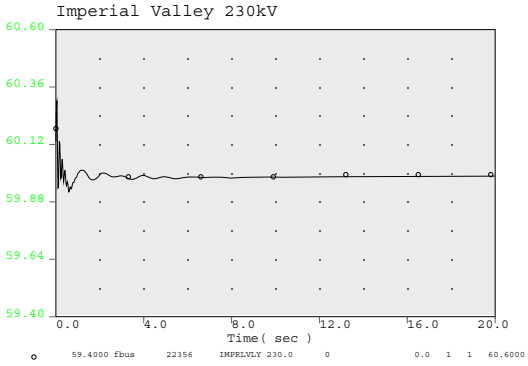
C1 C2 Light Load Post With Upgrades

FREQUENCY

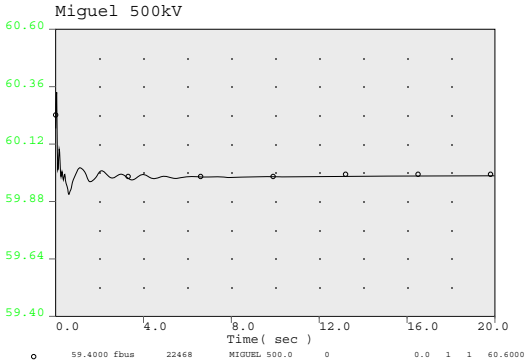
Imperial Valley 500kV



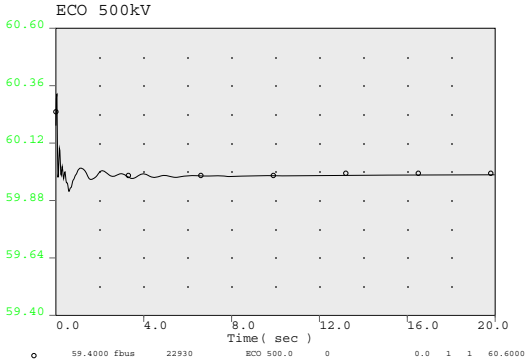
Imperial Valley 230kV



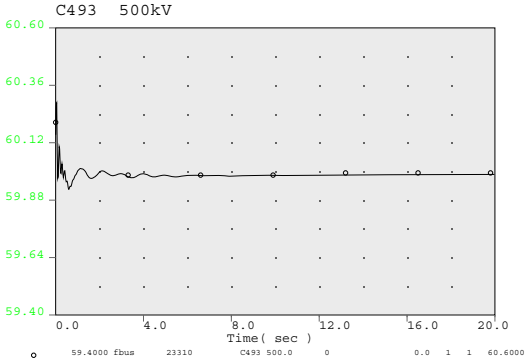
Miguel 500kV



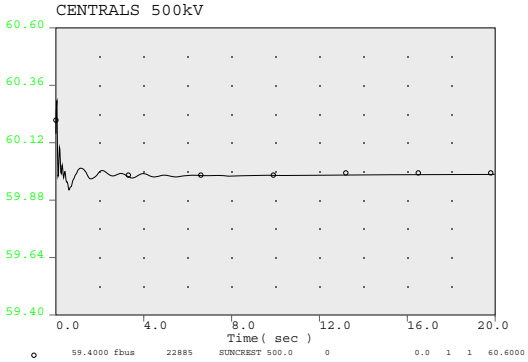
ECO 500kV



C493 500kV

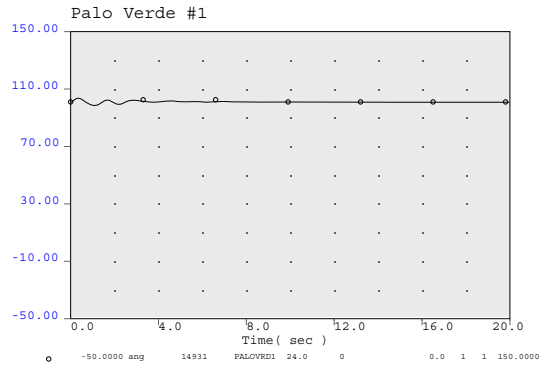


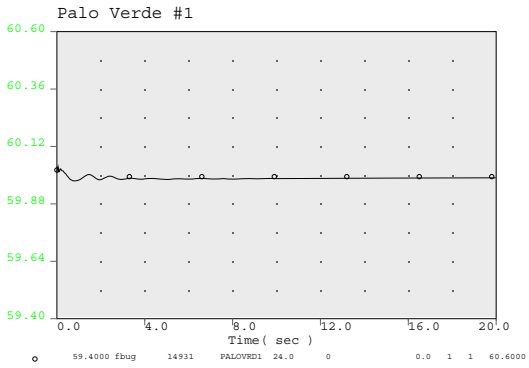
CENTRALS 500kV

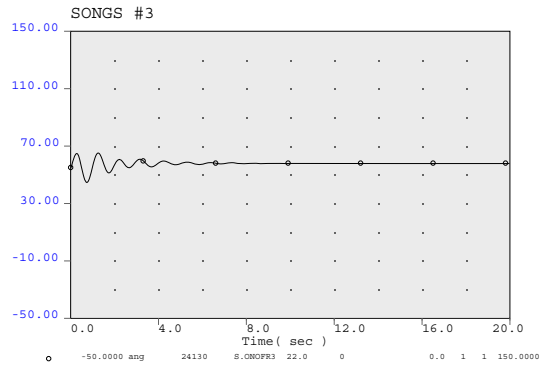


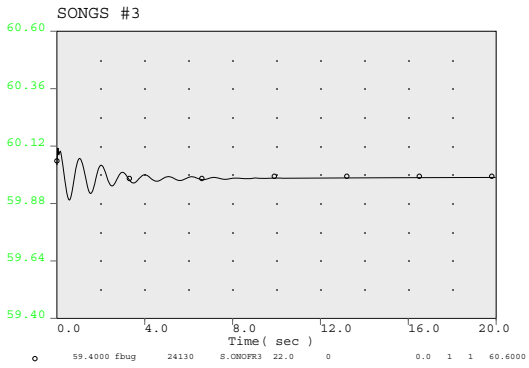
C1 C2 Light Load Post With Upgrades

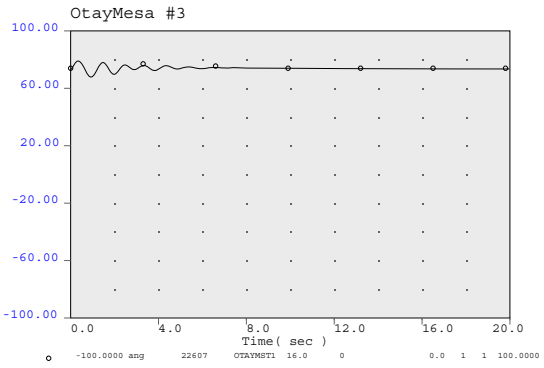
RELATIVE ROTOR ANGLE & FREQUENCY

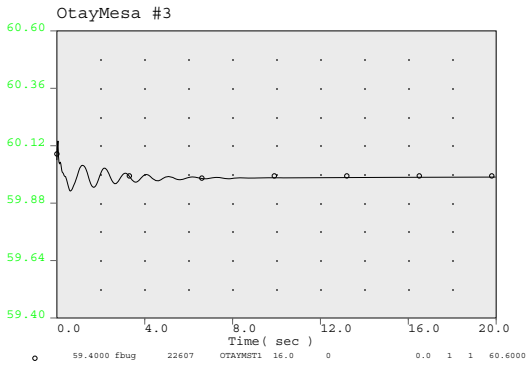










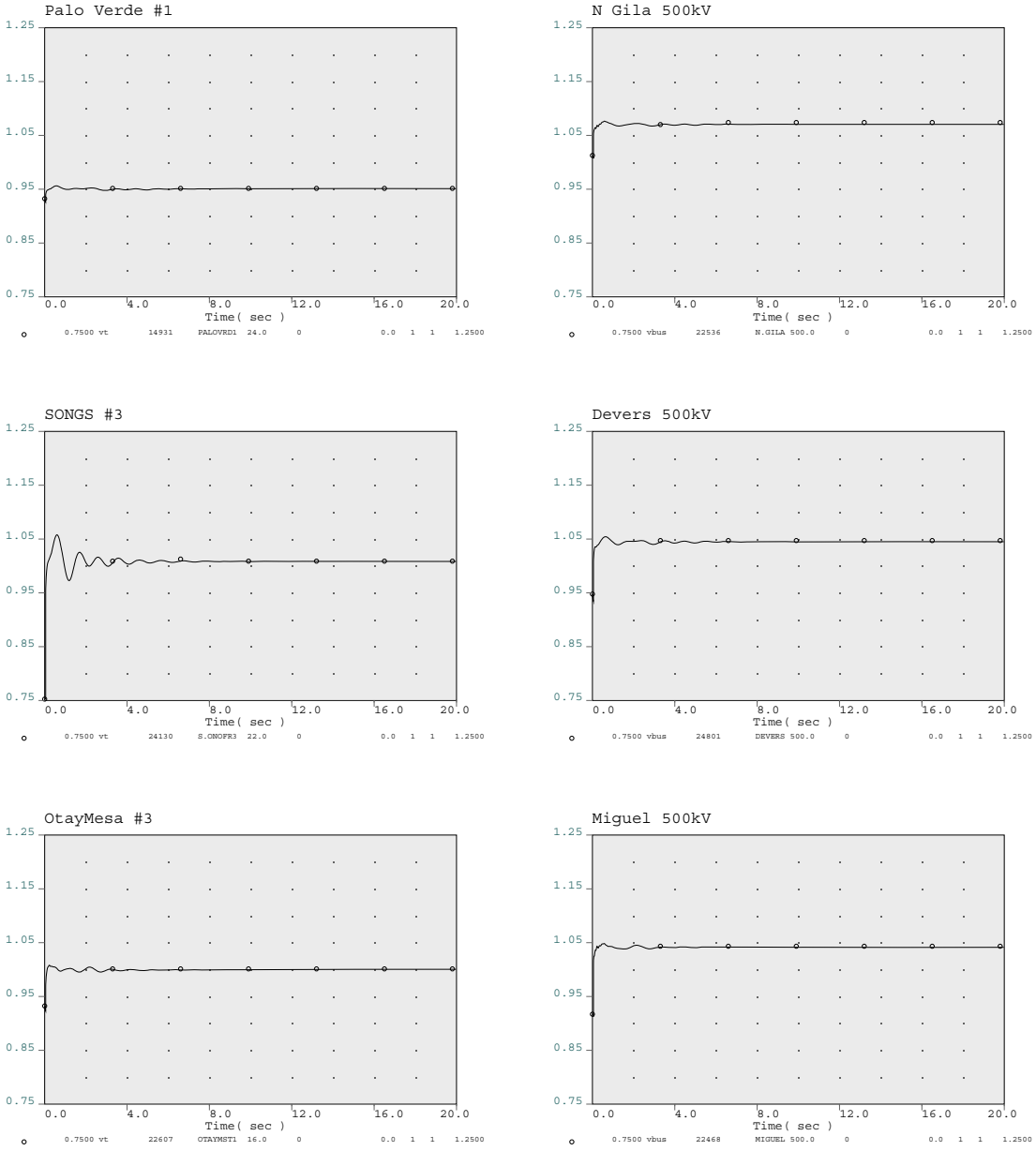


C1 C2 Light Load Post With Upgrades

Page 1

SDGE	tran-c1c2-ll-pstup-r15_SO-TA-dlo.chf	anstab\ll\pst\ws_pst_c1c2 Sun Jul 17 15:36:38 2011

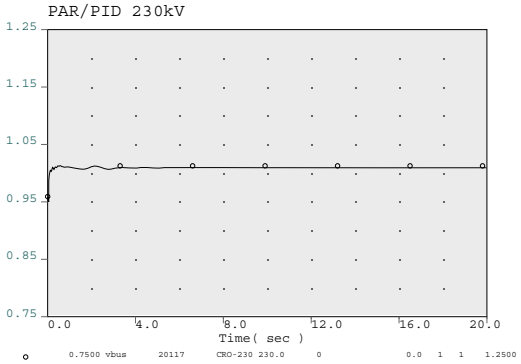
RELATIVE VOLTAGE



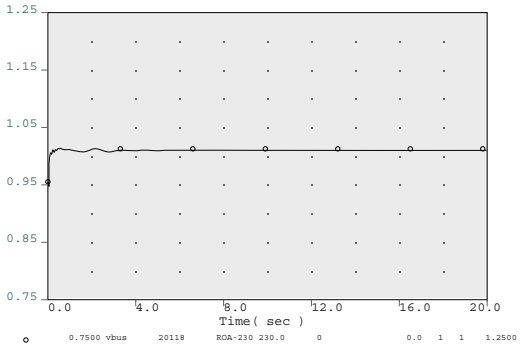
C1 C2 Light Load Post With Upgrades

Affected System Voltage Check and Comparison

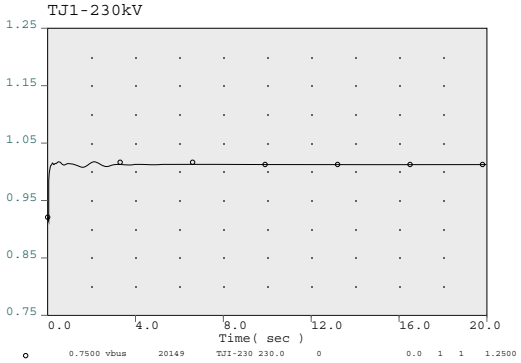
PAR/PID 230kV



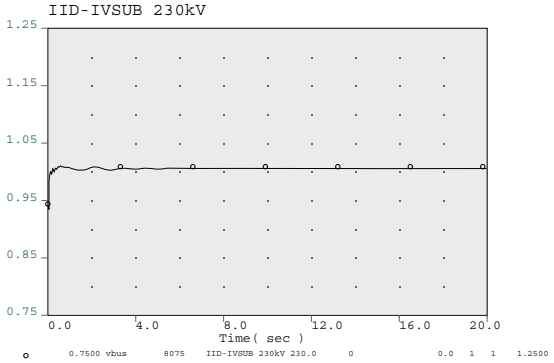
ROA-230kV



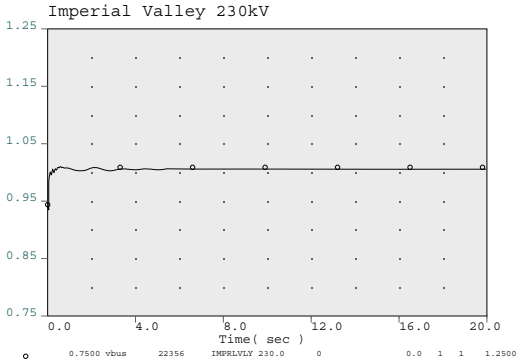
TJ1-230kV



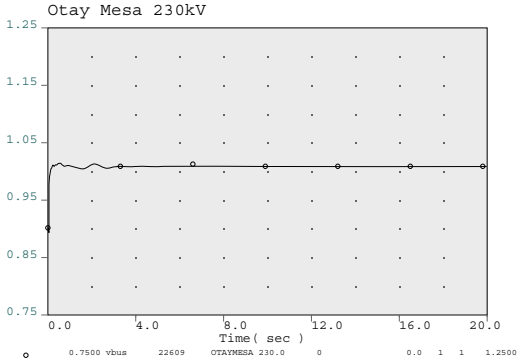
IID-IVSUB 230kV



Imperial Valley 230kV



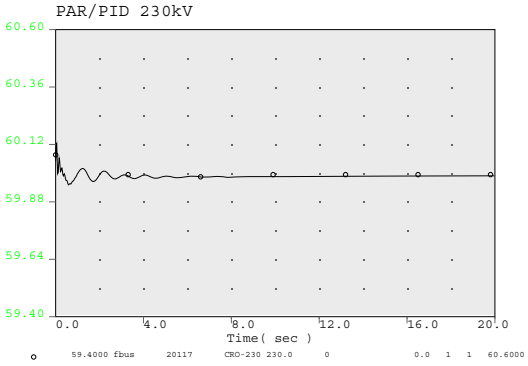
Otay Mesa 230kV



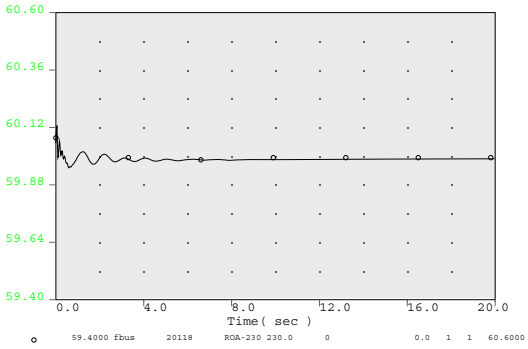
C1 C2 Light Load Post With Upgrades

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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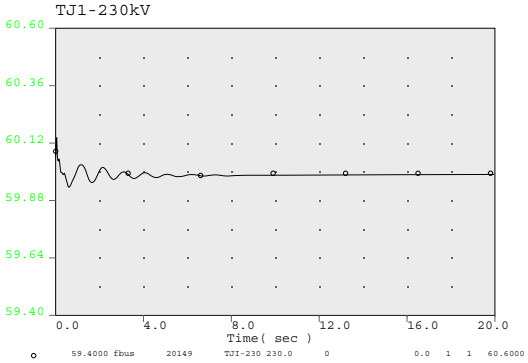

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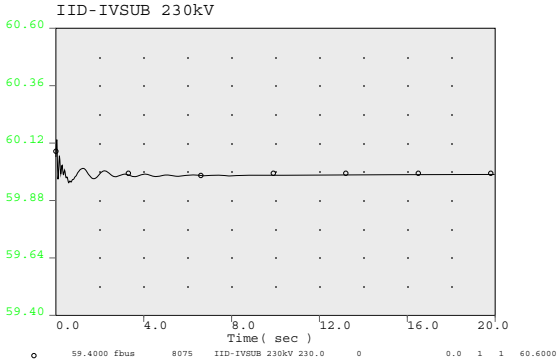

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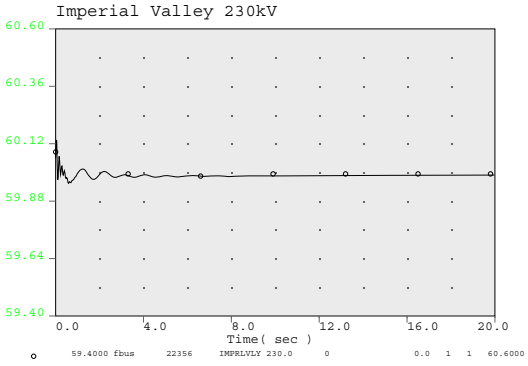

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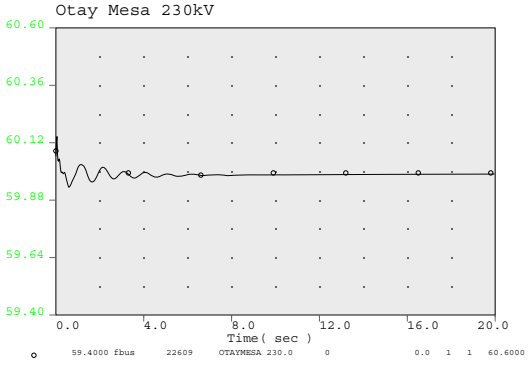
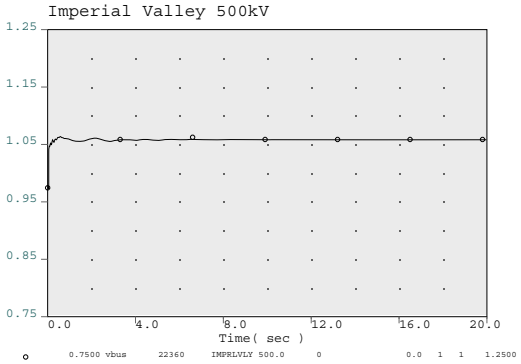


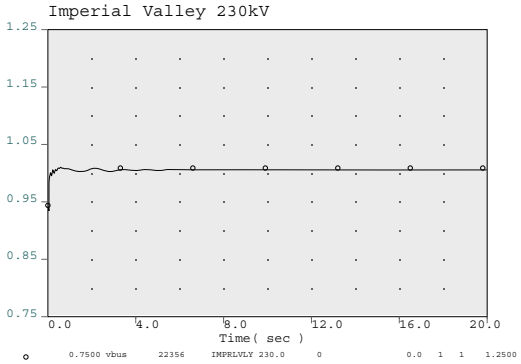
C1 C2 Light Load Post With Upgrades

VOLTAGE

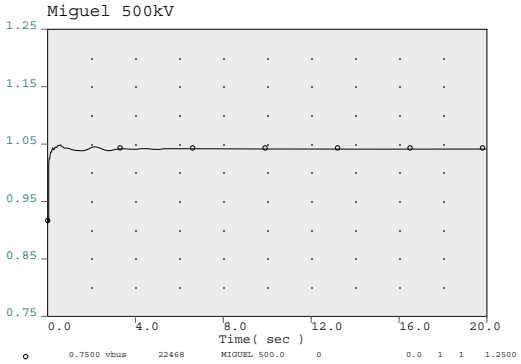
Imperial Valley 500kV



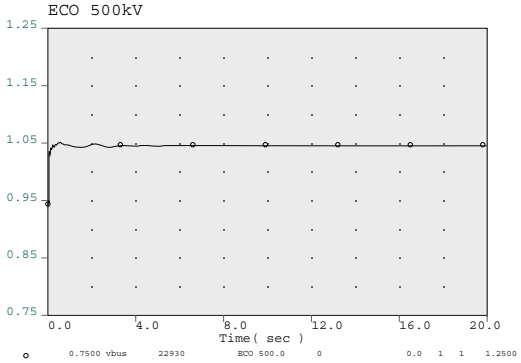
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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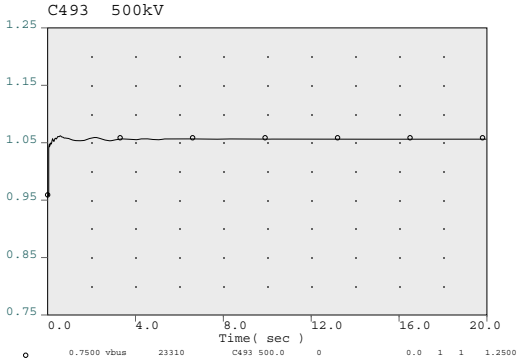
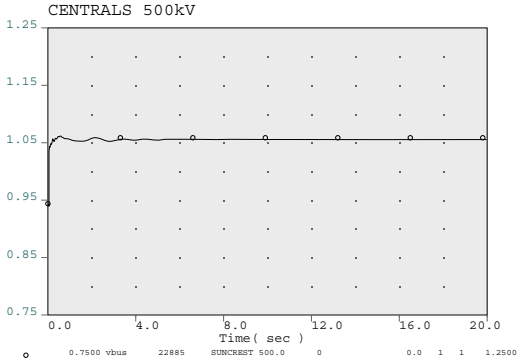


CENTRALS 500kV



C1 C2 Light Load Post With Upgrades

Page 5

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FREQUENCY

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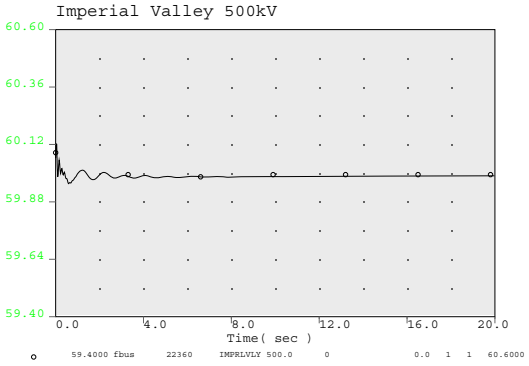

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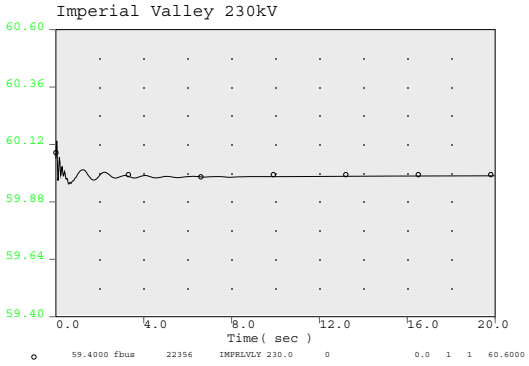

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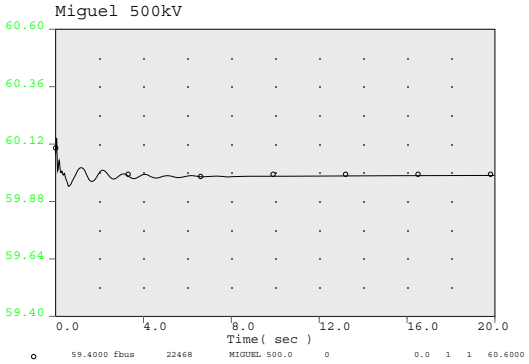

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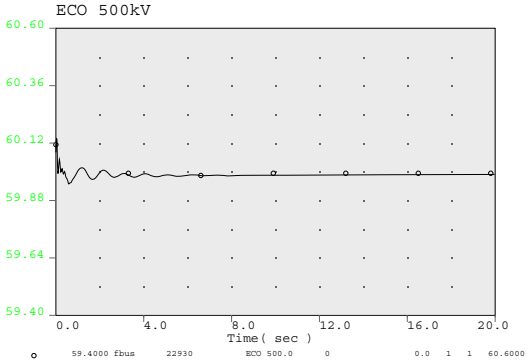

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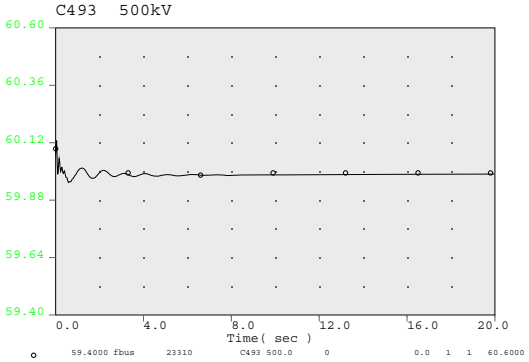

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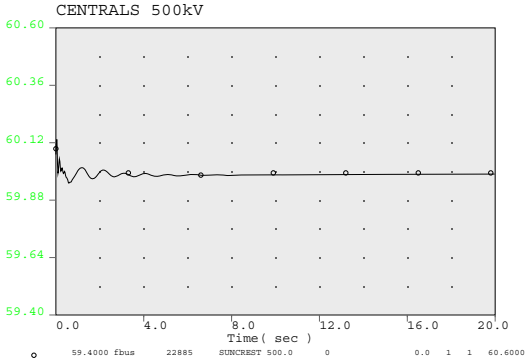


C1 C2 Light Load Post With Upgrades

Appendix J-3

Transient Stability Analysis Plots

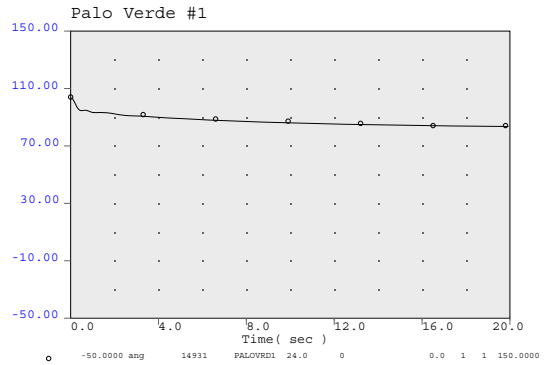
Imperial Valley Area Cluster

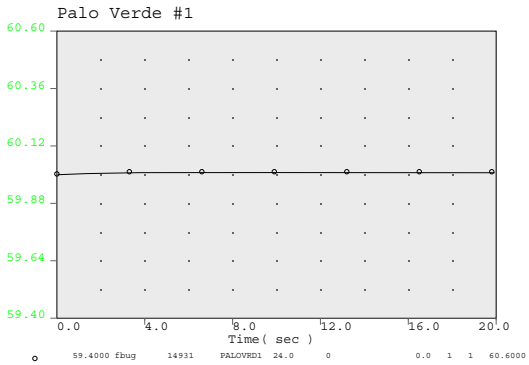
Heavy Summer Post

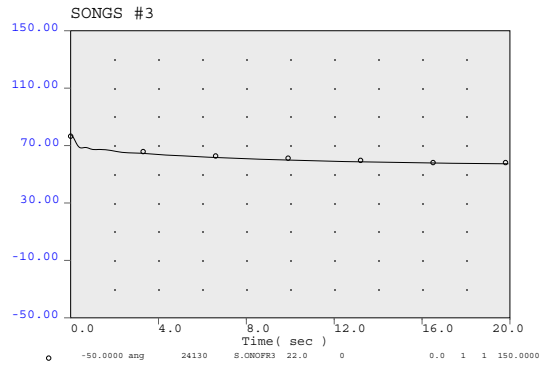
Imperial Valley Area - Frequency

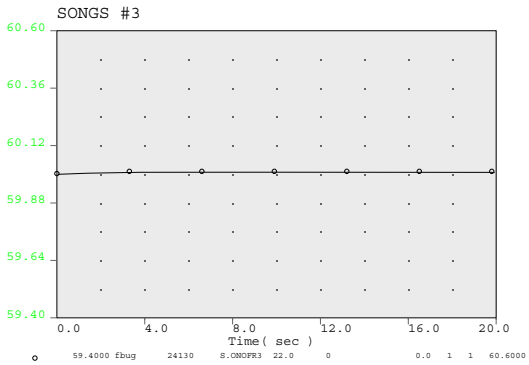
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

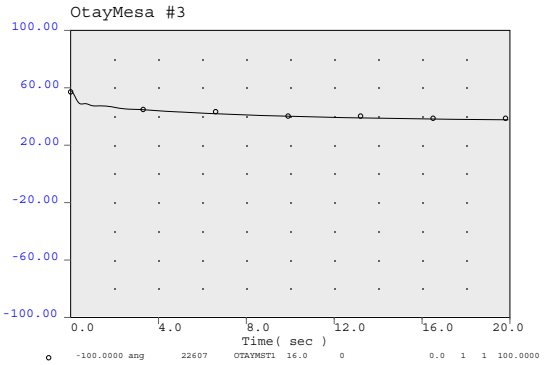
RELATIVE ROTOR ANGLE & FREQUENCY

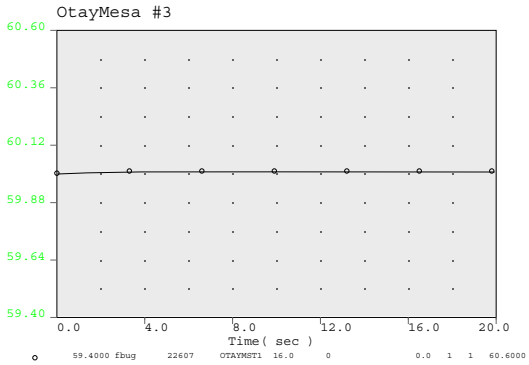












SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Page 1

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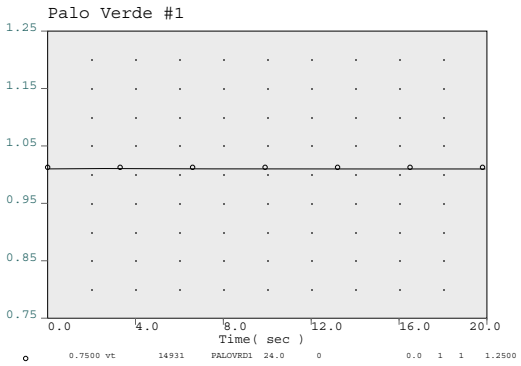
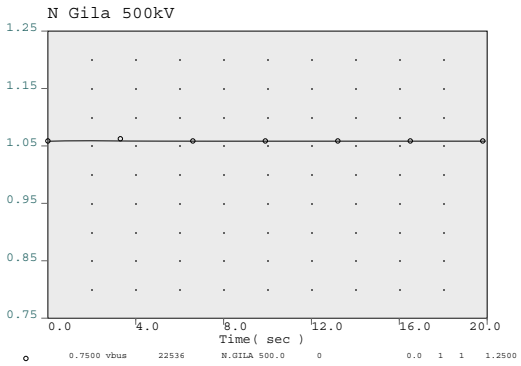
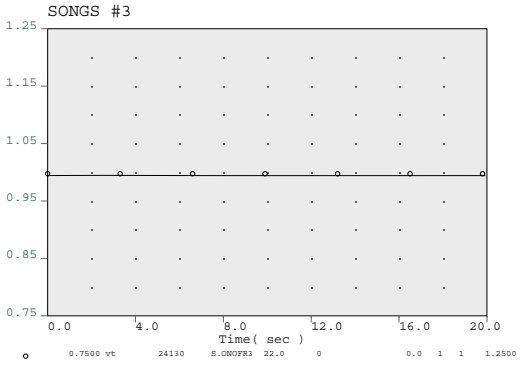
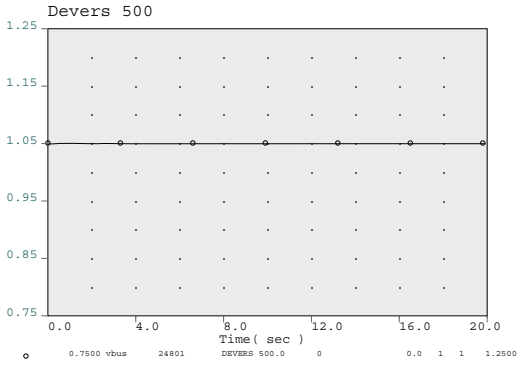
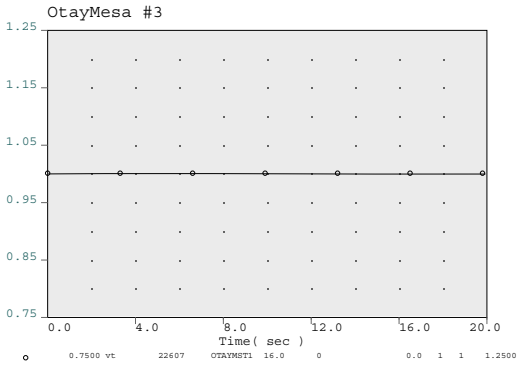
RELATIVE VOLTAGE

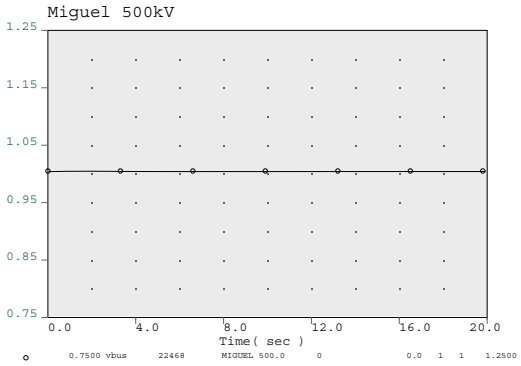








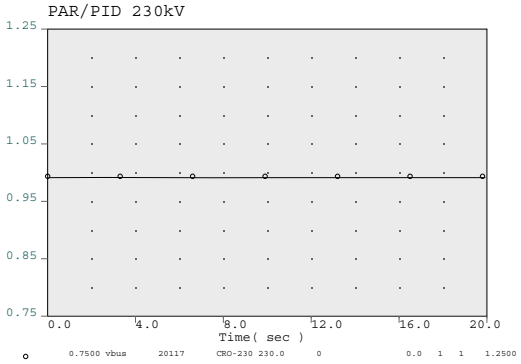




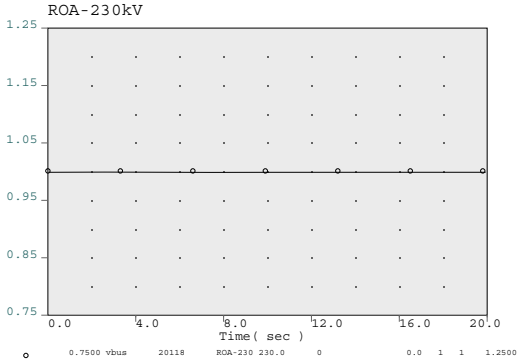
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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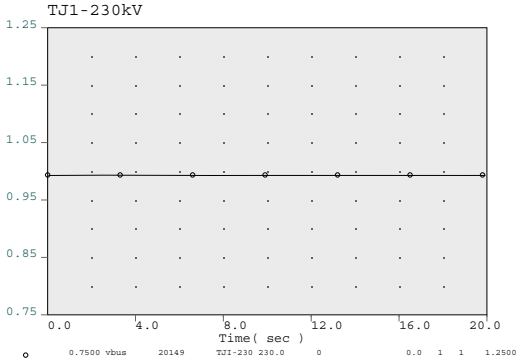

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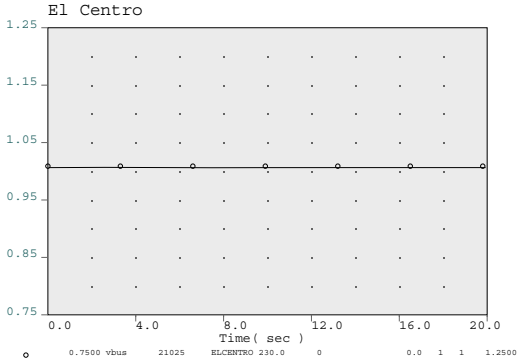
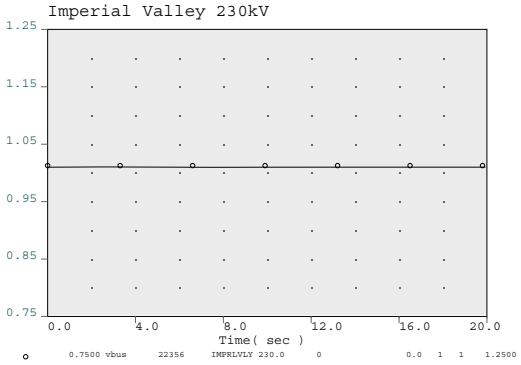


Imperial Valley 230kV



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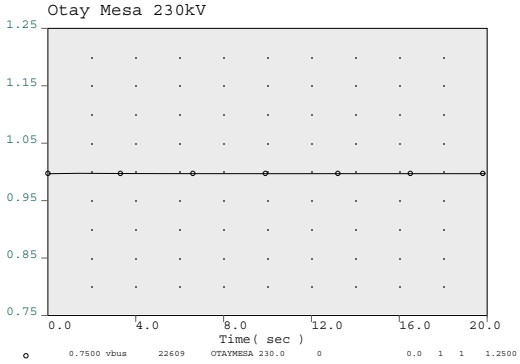
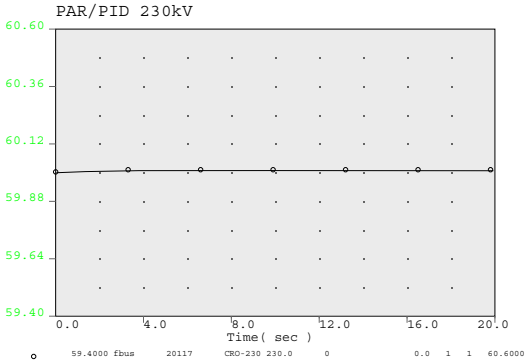


SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Affected System Frequency Check and Comparison

PAR/PID 230kV



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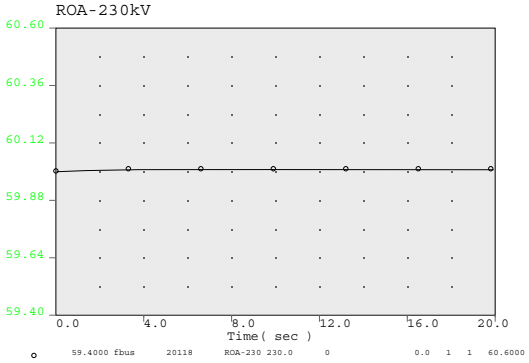
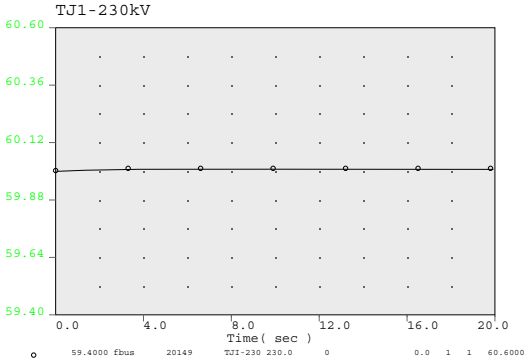
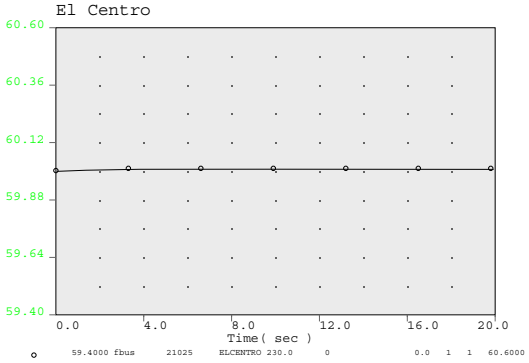


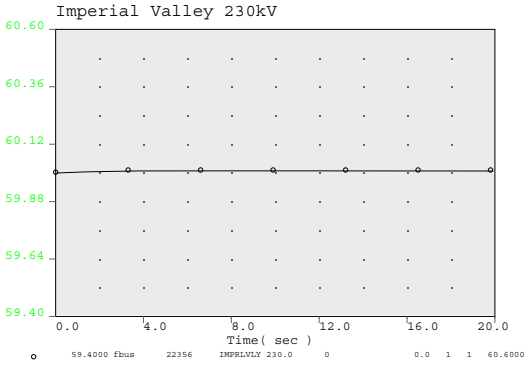
TJ1-230kV



El Centro



Imperial Valley 230kV



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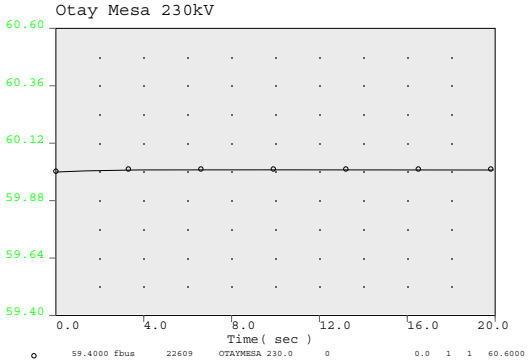
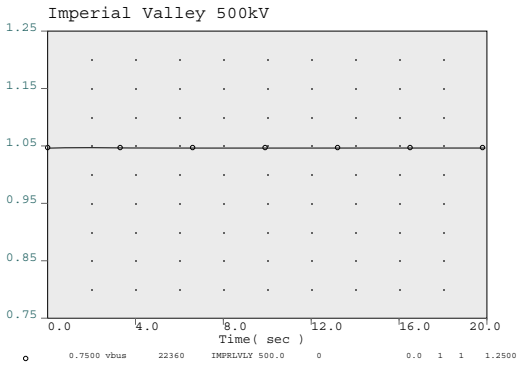
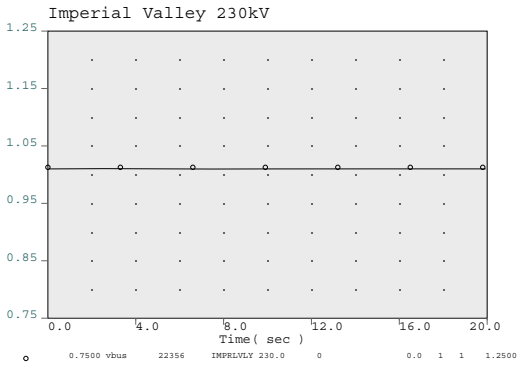
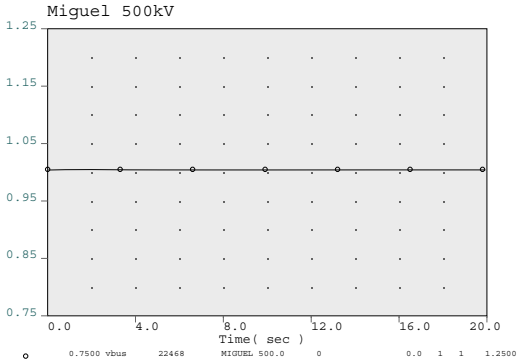


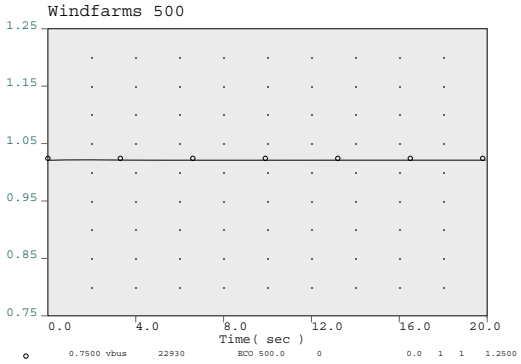
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

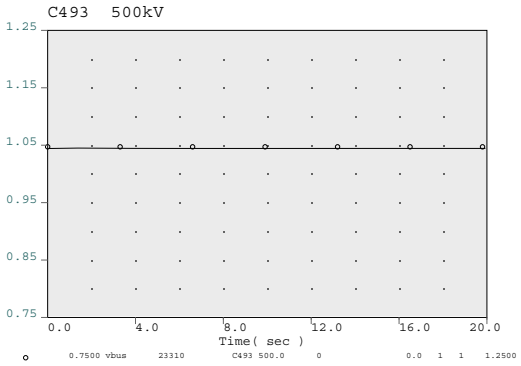
Imperial Valley Area - VOLTAGE

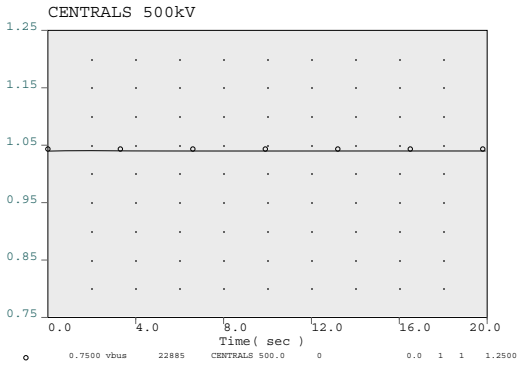










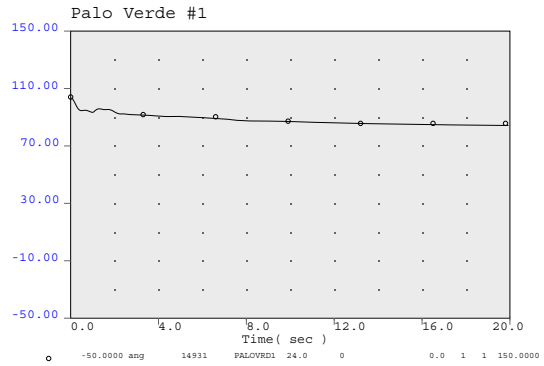


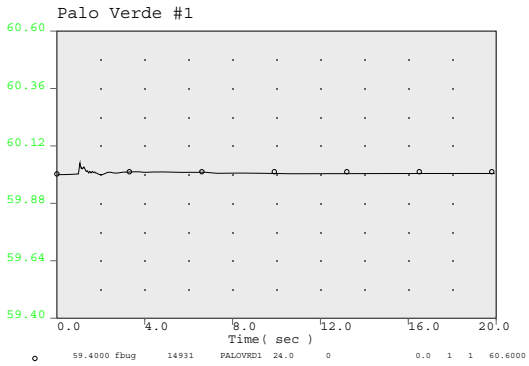
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

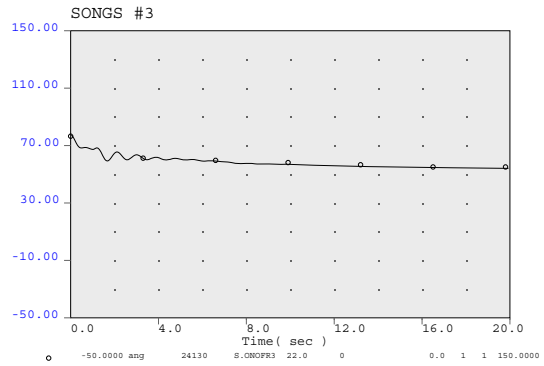
Imperial Valley Area - Frequency

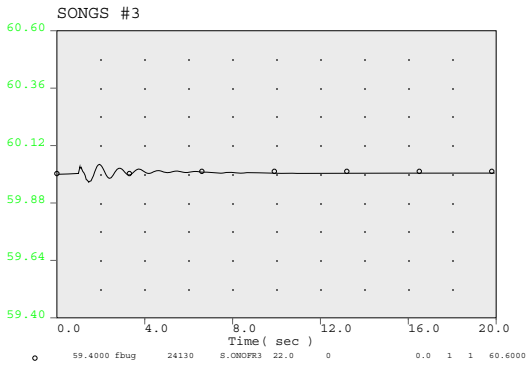
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

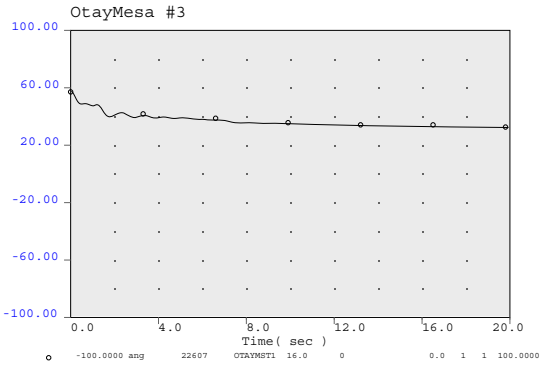
RELATIVE ROTOR ANGLE & FREQUENCY

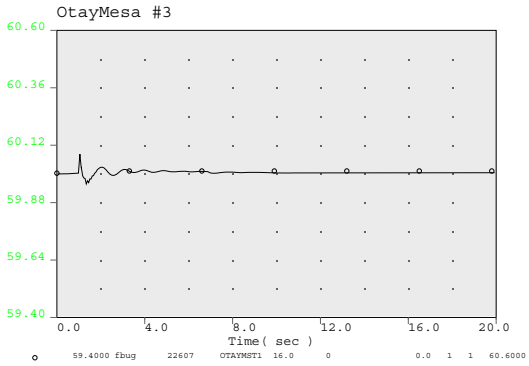












SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

RELATIVE VOLTAGE

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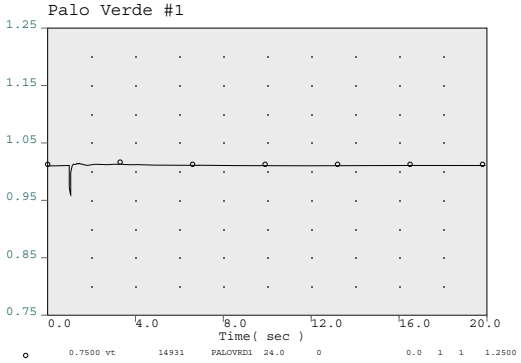
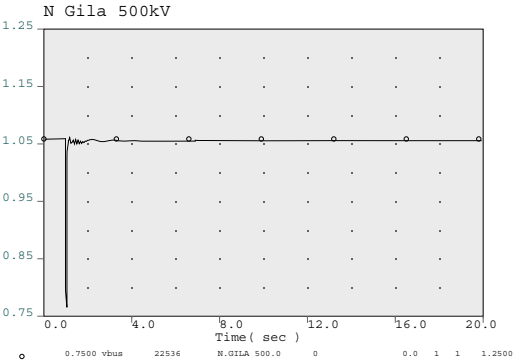


N Gila 500kV



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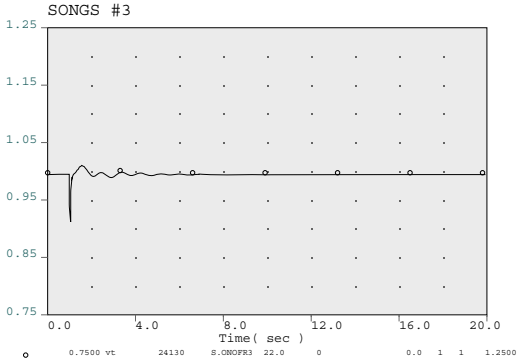
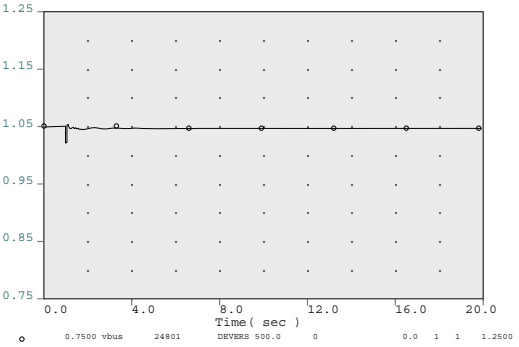


Devers 500



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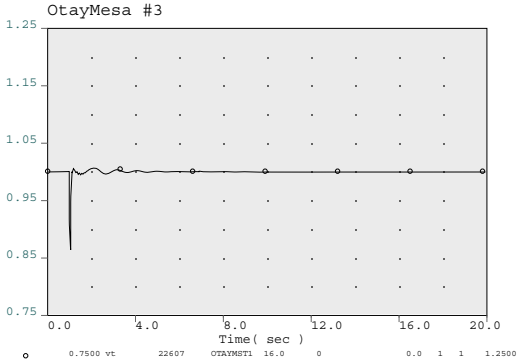
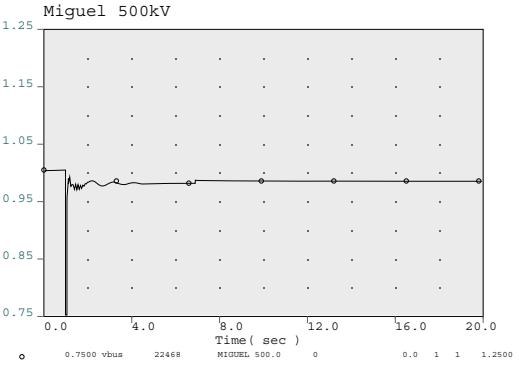


Miguel 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
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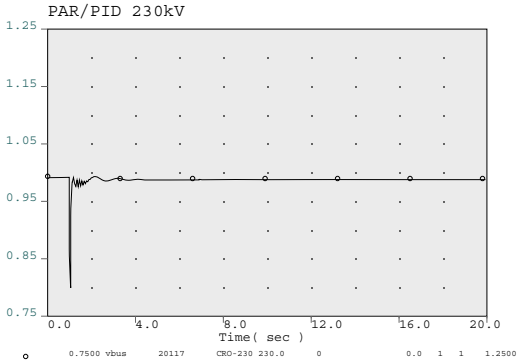
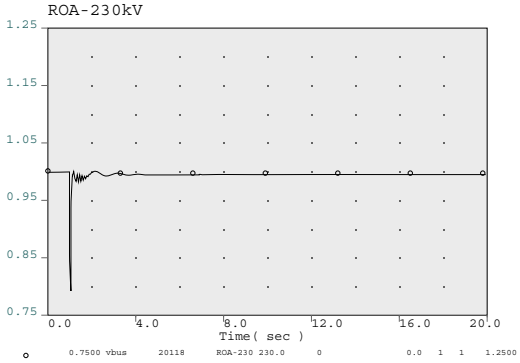
Affected System Voltage Check and Comparison

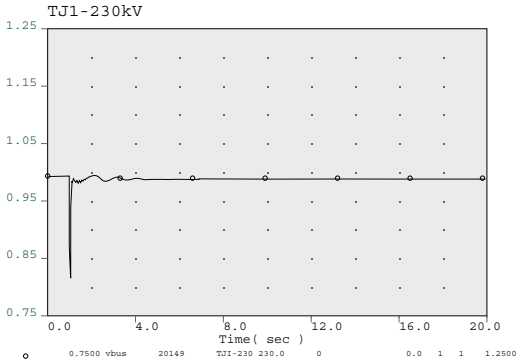
PAR/PID 230kV



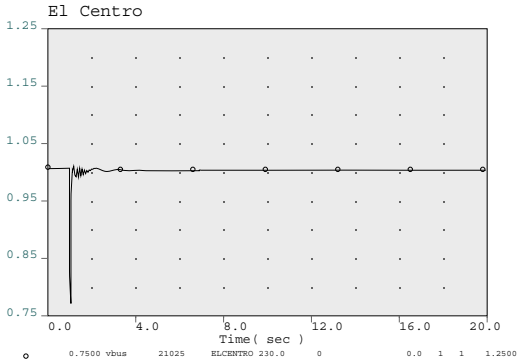
ROA-230kV



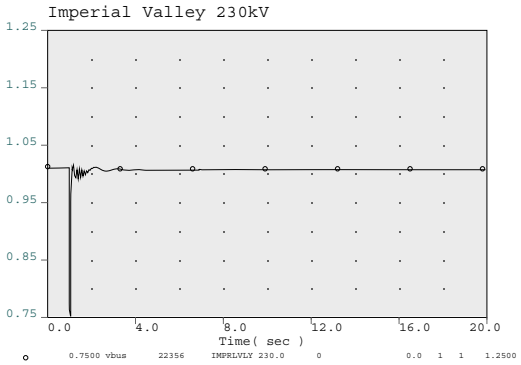
TJ1-230kV



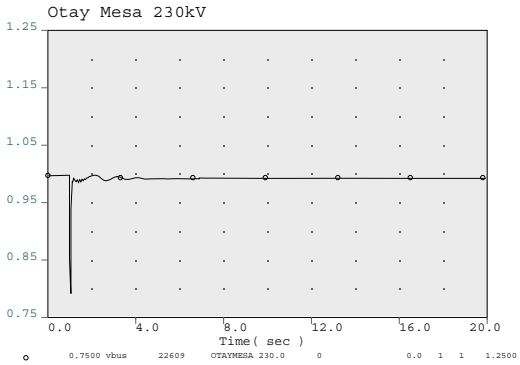
El Centro



Imperial Valley 230kV



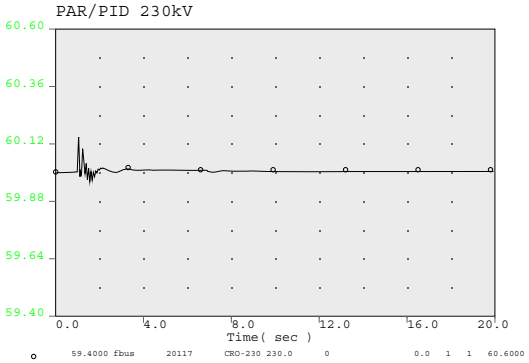
Otay Mesa 230kV



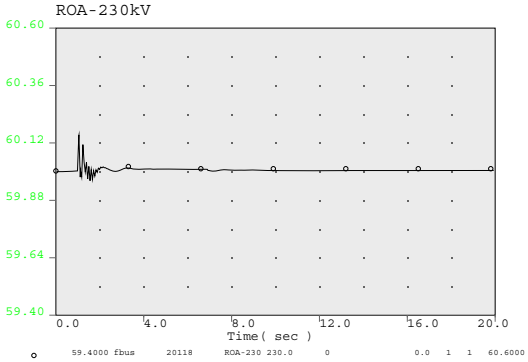
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

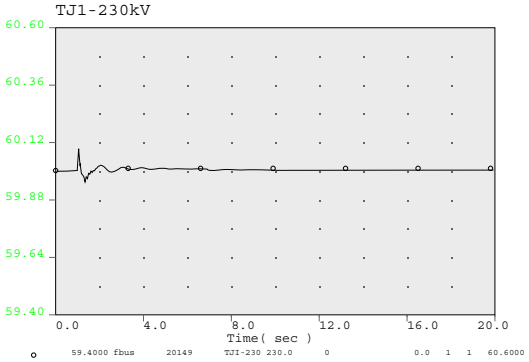
PAR/PID 230kV



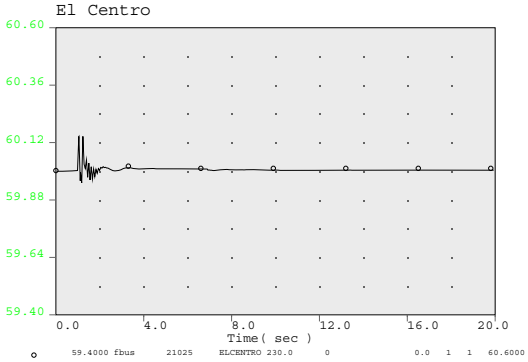
ROA-230kV



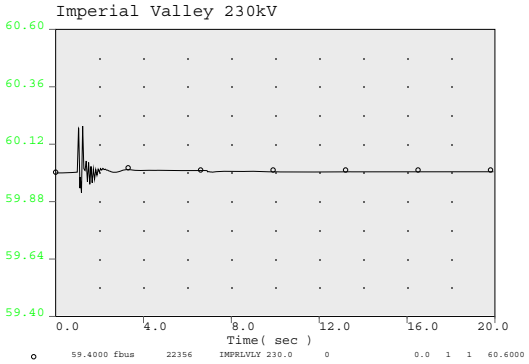
TJ1-230kV



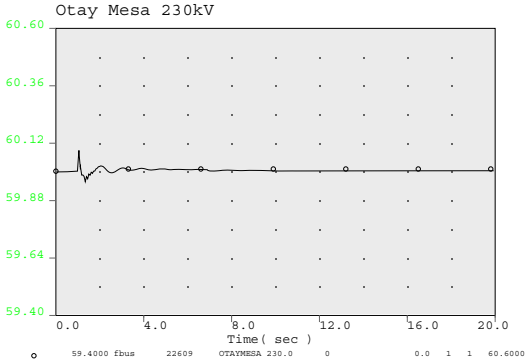
El Centro



Imperial Valley 230kV

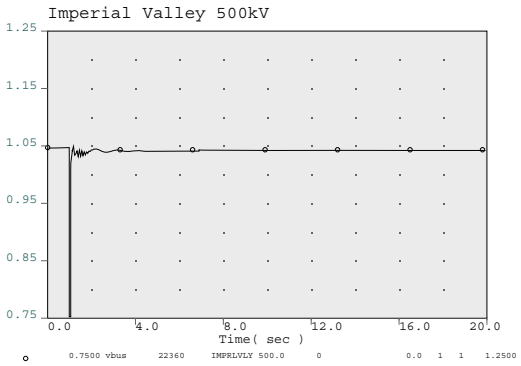


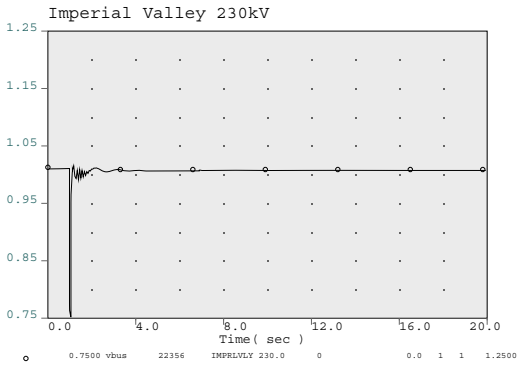
Otay Mesa 230kV

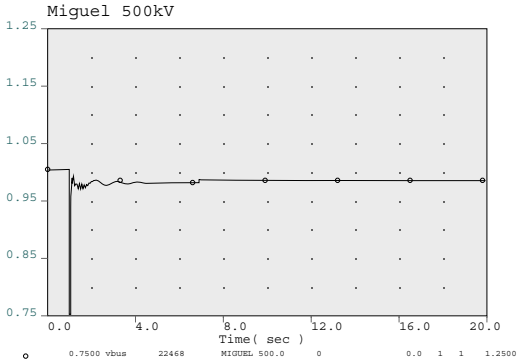


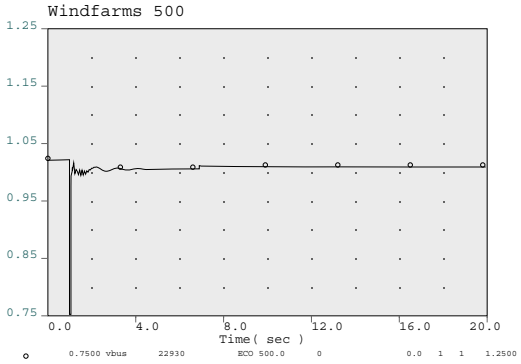
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

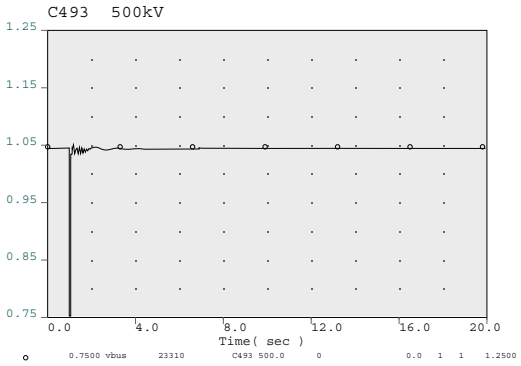
Imperial Valley Area - VOLTAGE

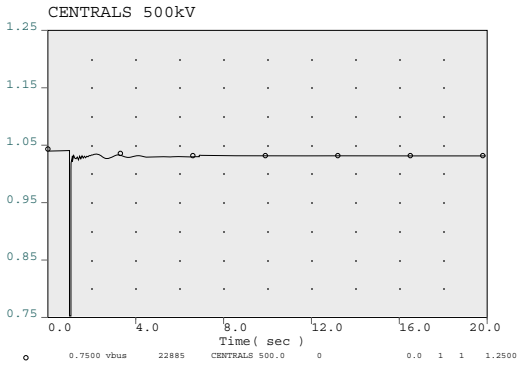






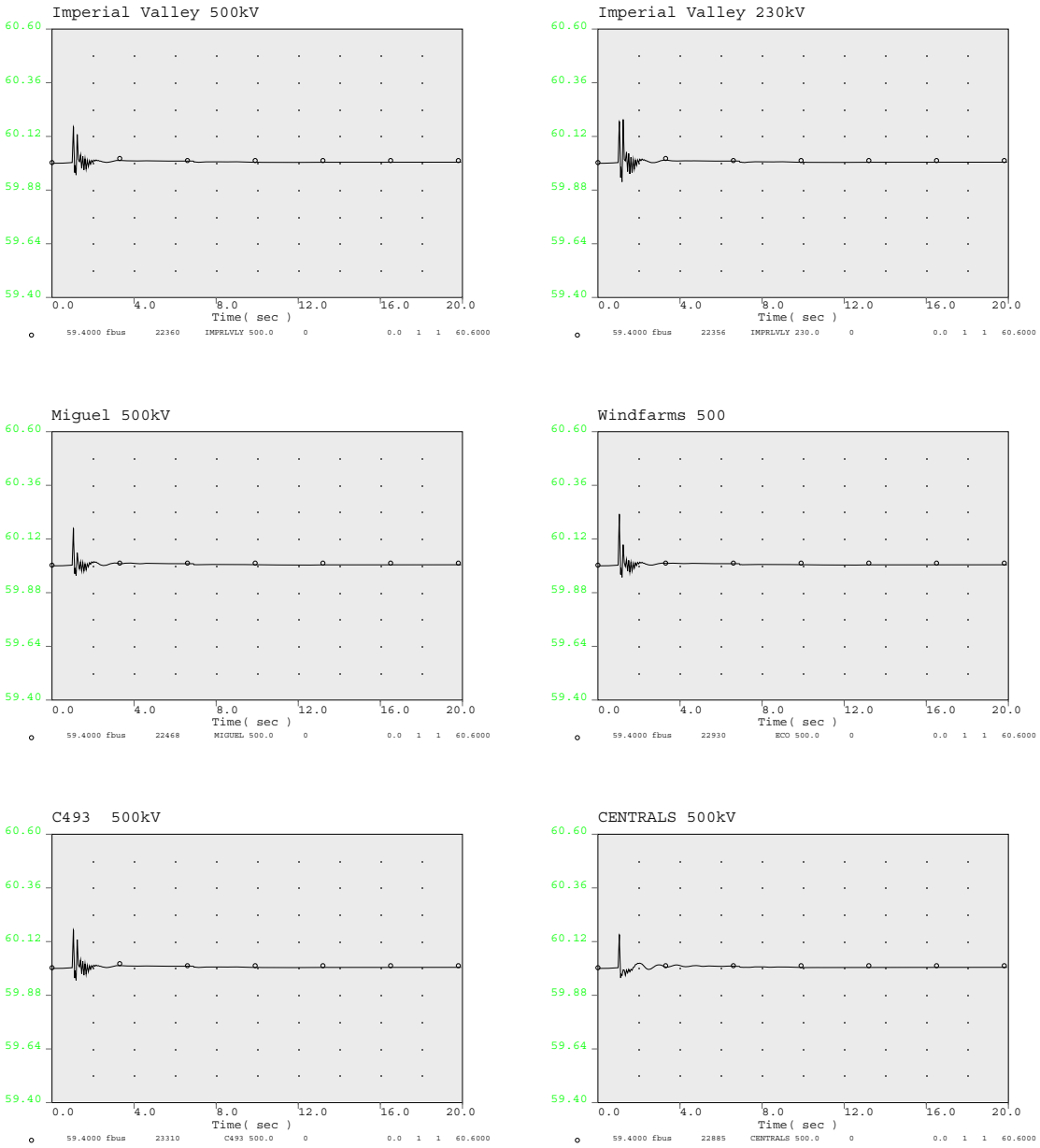






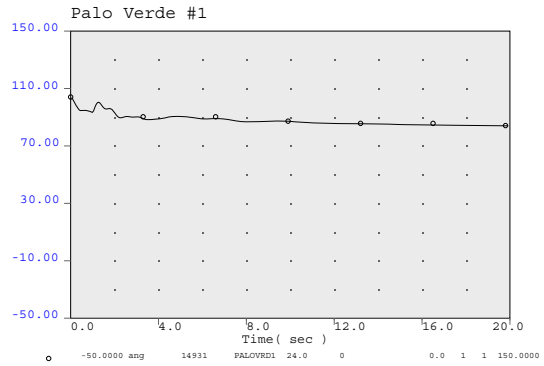
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

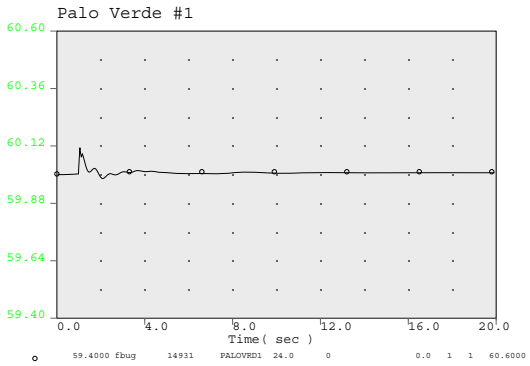
Imperial Valley Area - Frequency

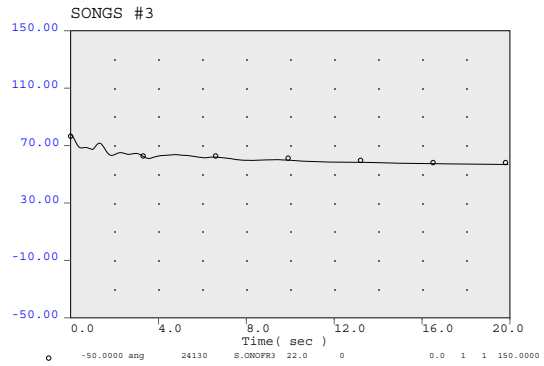


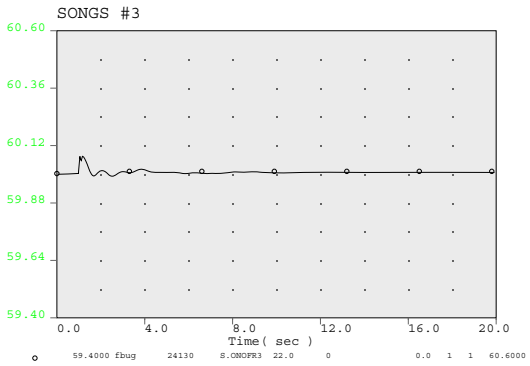
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

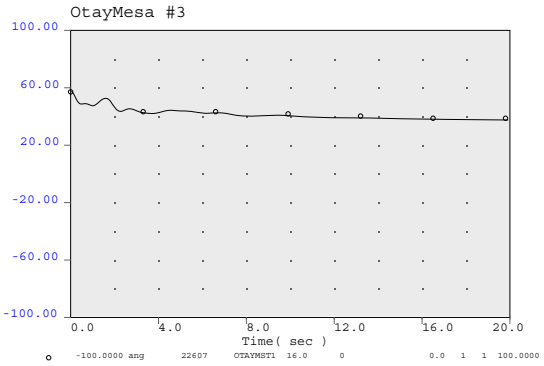
RELATIVE ROTOR ANGLE & FREQUENCY

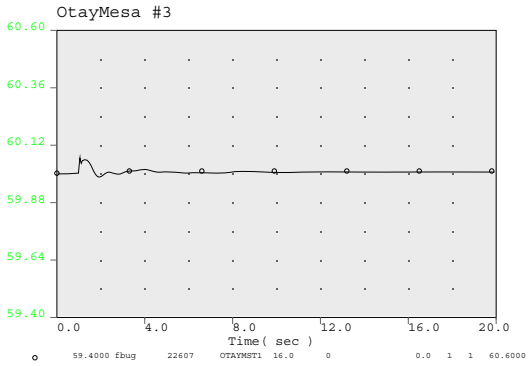










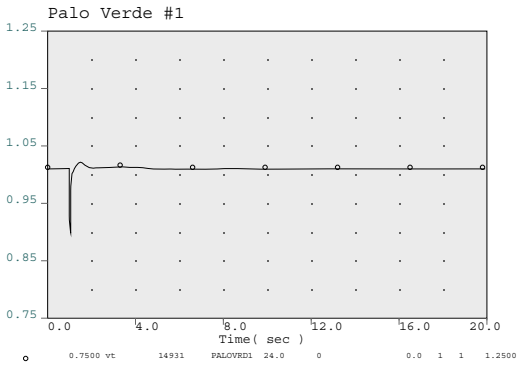


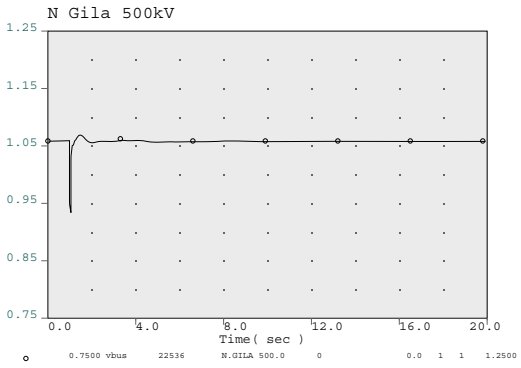
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

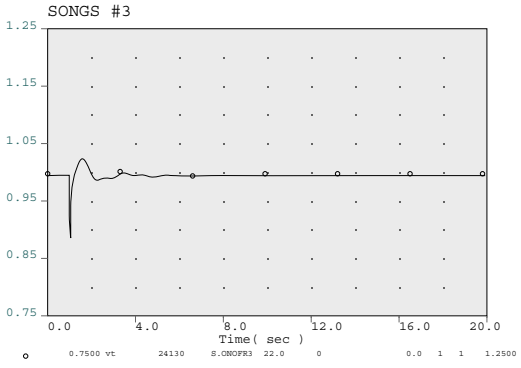
Page 1

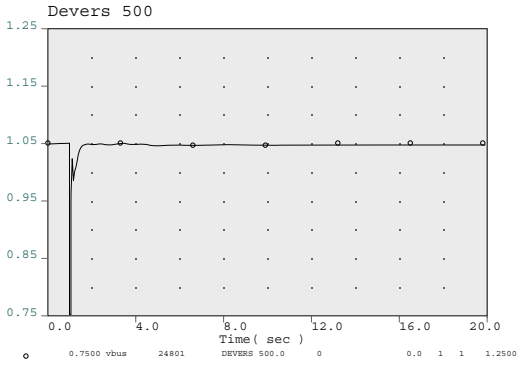
SDGE	Dev_Val_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:34:20 2010

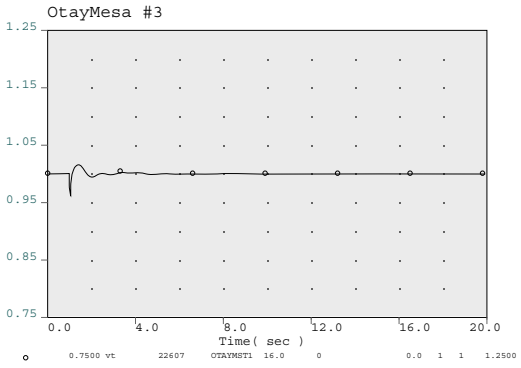
RELATIVE VOLTAGE

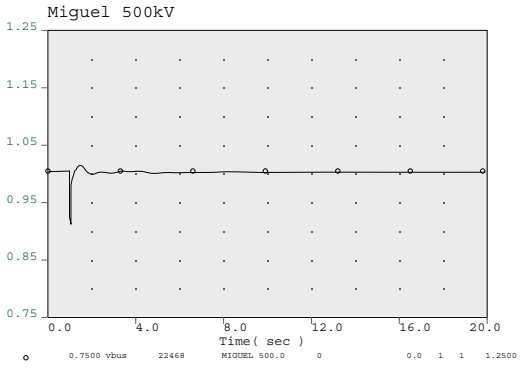








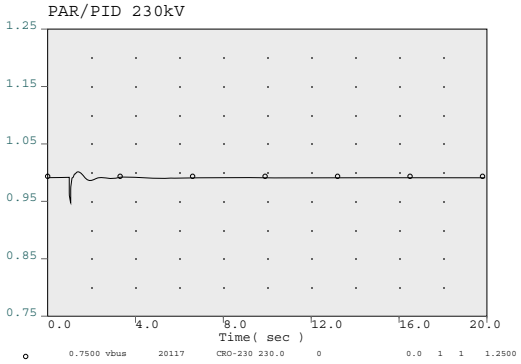




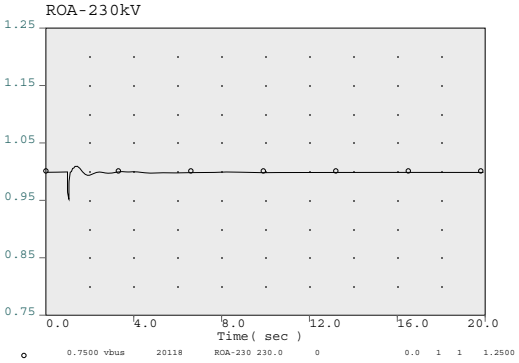
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Affected System Voltage Check and Comparison

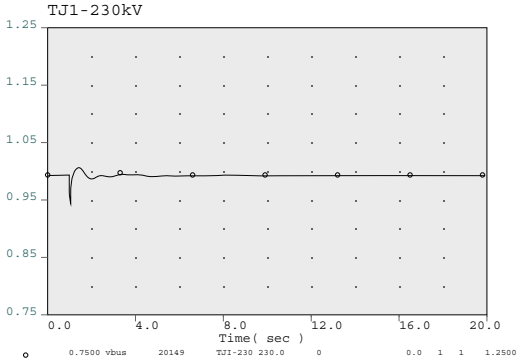
PAR/PID 230kV



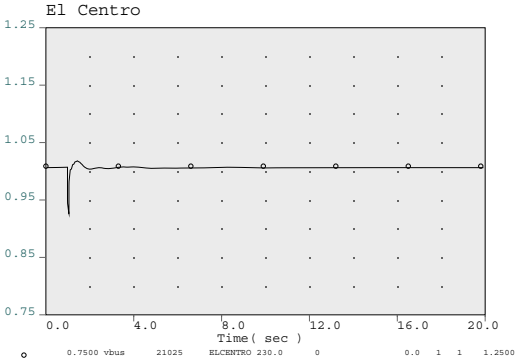
ROA-230kV



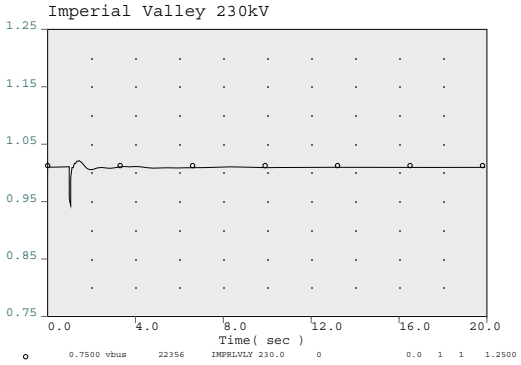
TJ1-230kV



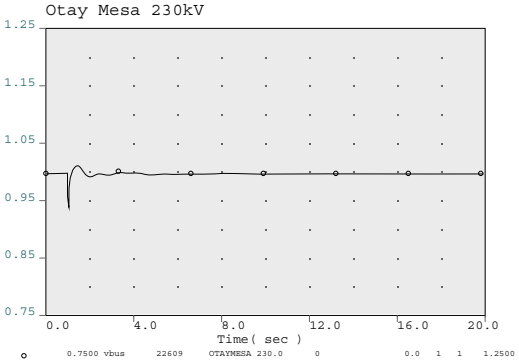
El Centro



Imperial Valley 230kV



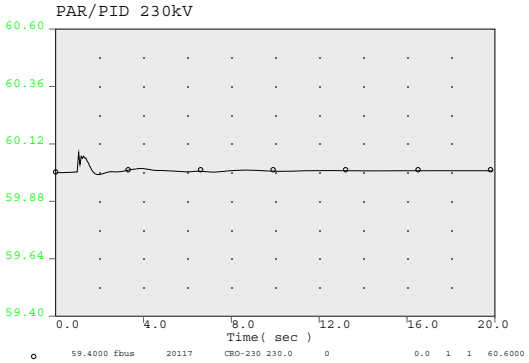
Otay Mesa 230kV



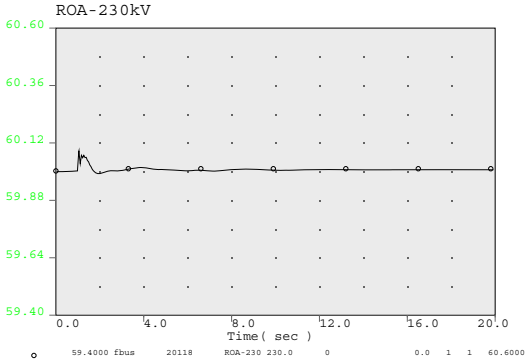
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Affected System Frequency Check and Comparison

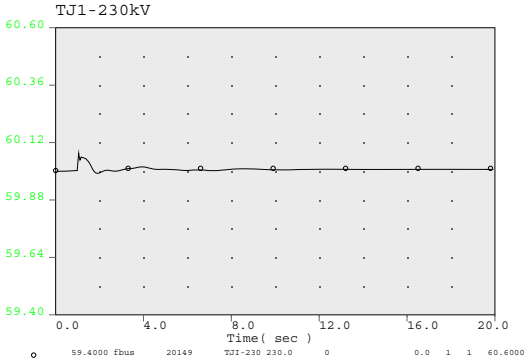
PAR/PID 230kV



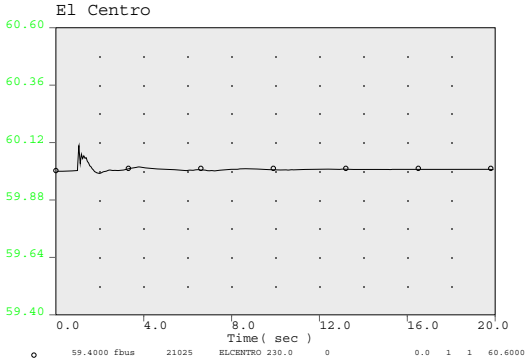
ROA-230kV



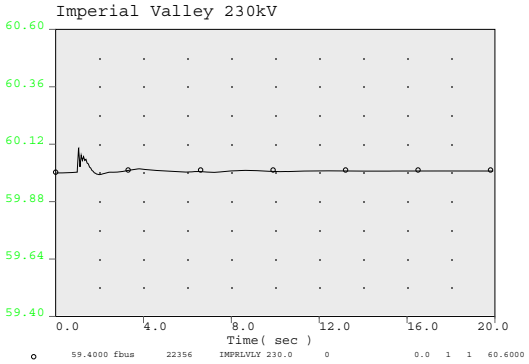
TJ1-230kV



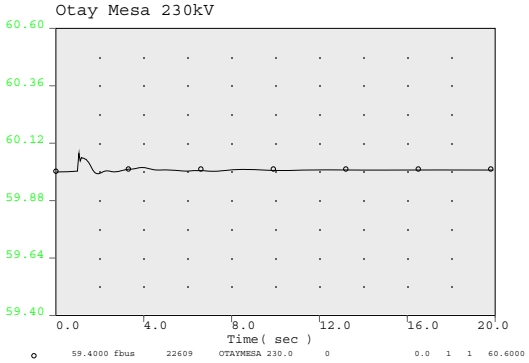
El Centro



Imperial Valley 230kV



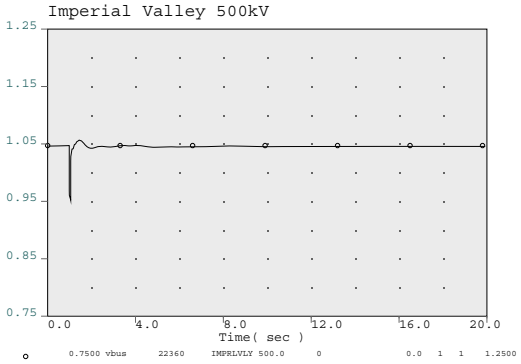
Otay Mesa 230kV



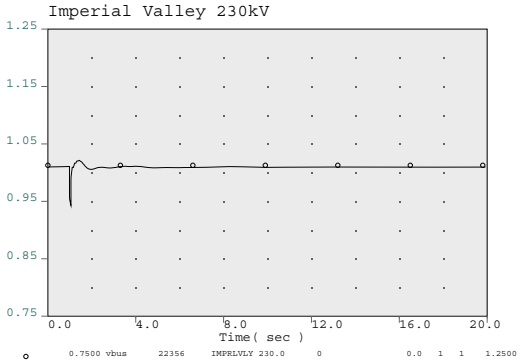
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Imperial Valley Area - VOLTAGE

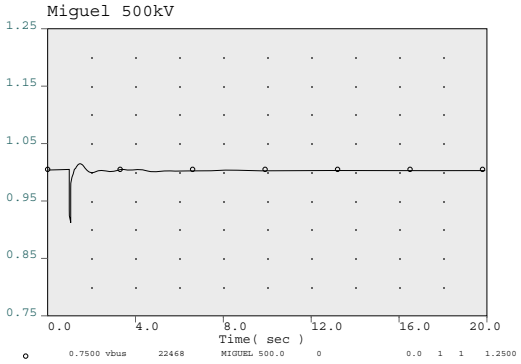
Imperial Valley 500kV



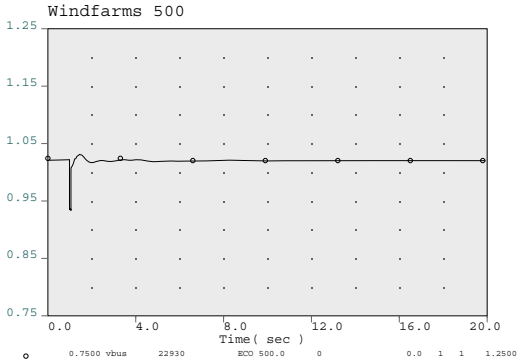
Imperial Valley 230kV



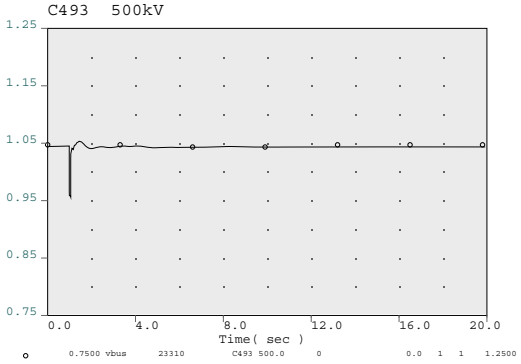
Miguel 500kV



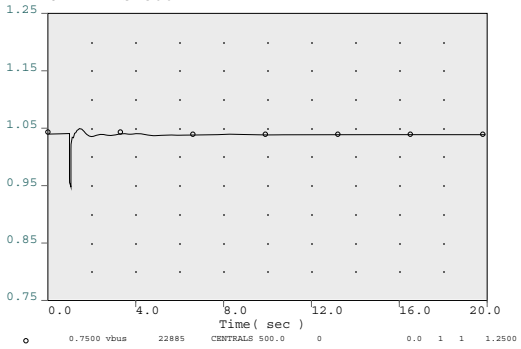
Windfarms 500



C493 500kV

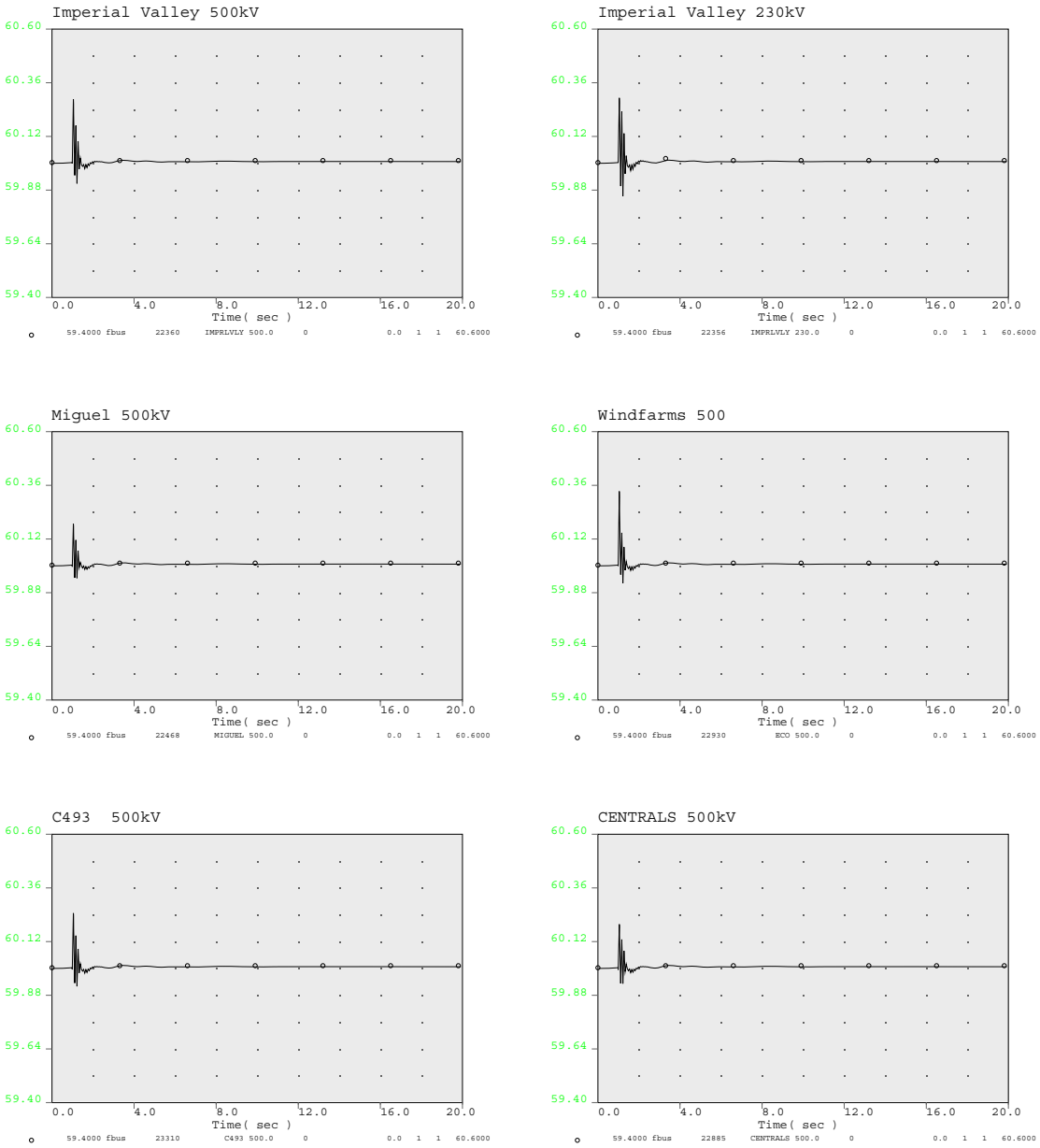


CENTRALS 500kV



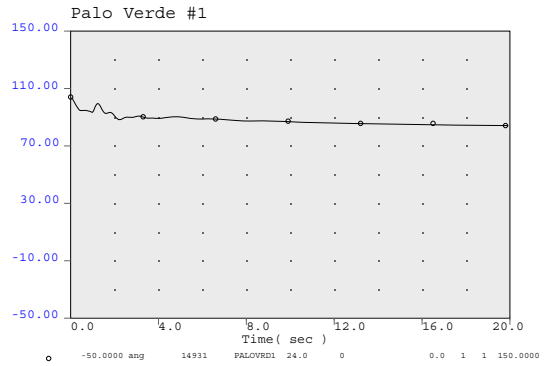
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

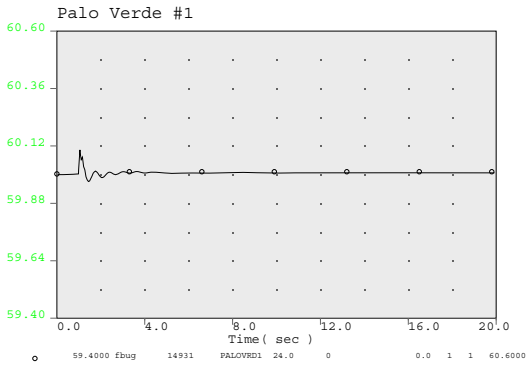
Imperial Valley Area - Frequency

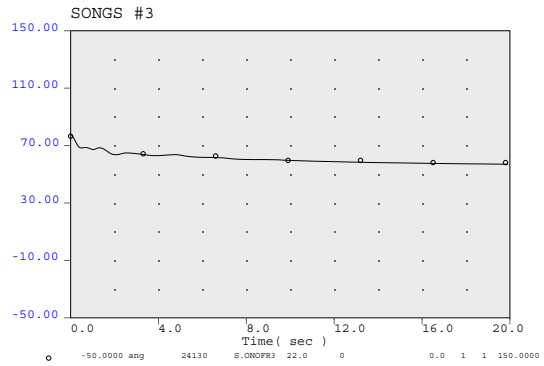


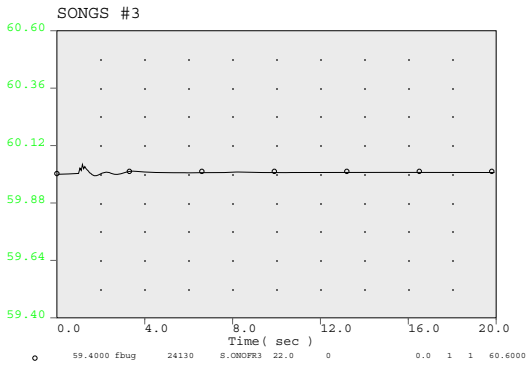
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

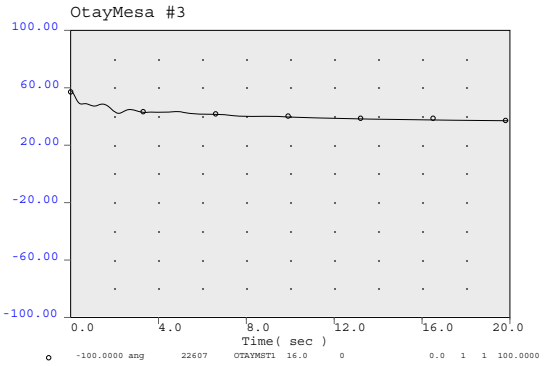
RELATIVE ROTOR ANGLE & FREQUENCY

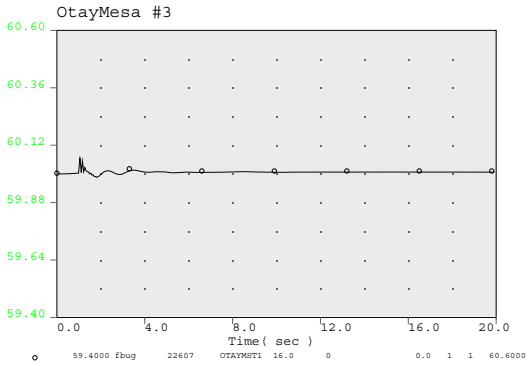












SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

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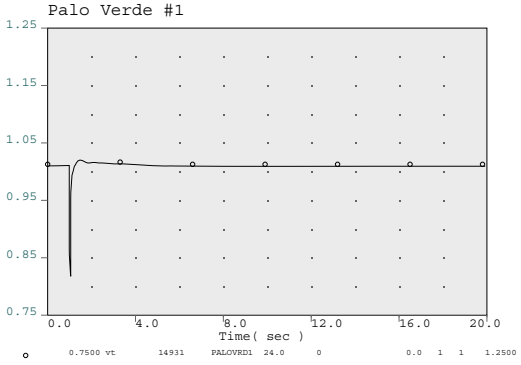
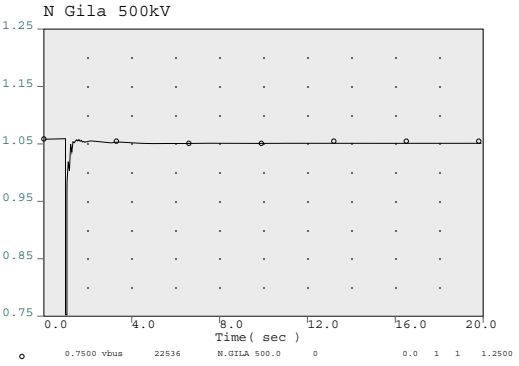
RELATIVE VOLTAGE

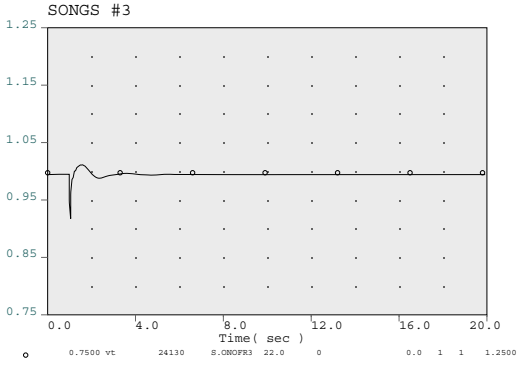
Palo Verde #1



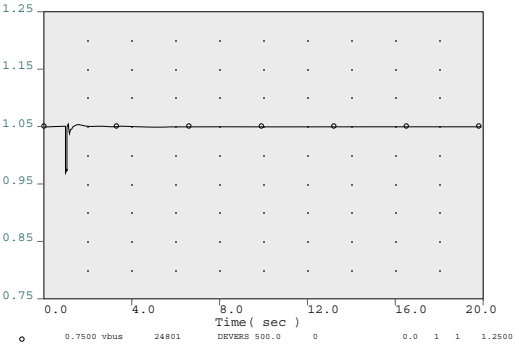
N Gila 500kV



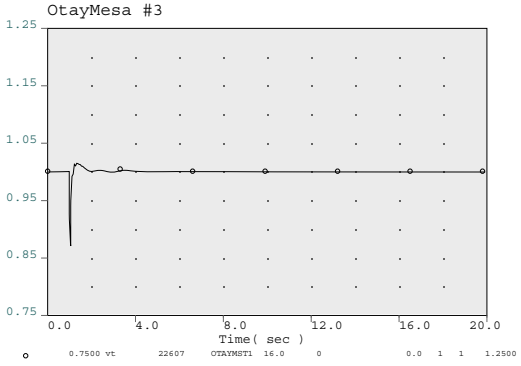
SONGS #3



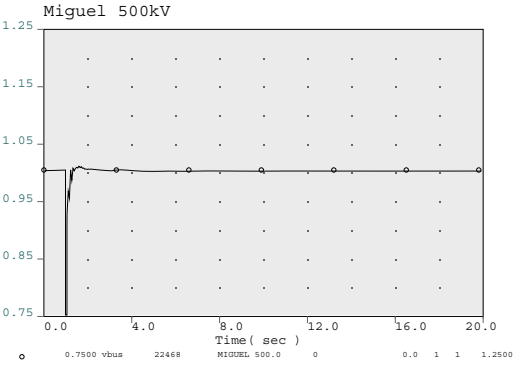
Devers 500



OtayMesa #3



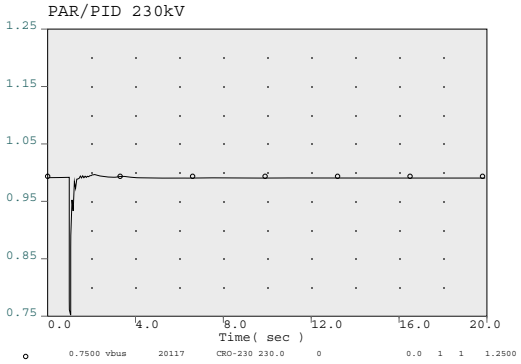
Miguel 500kV



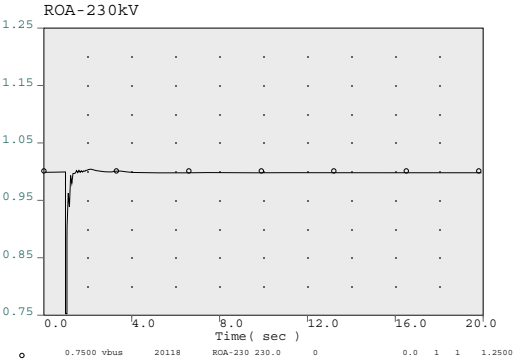
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

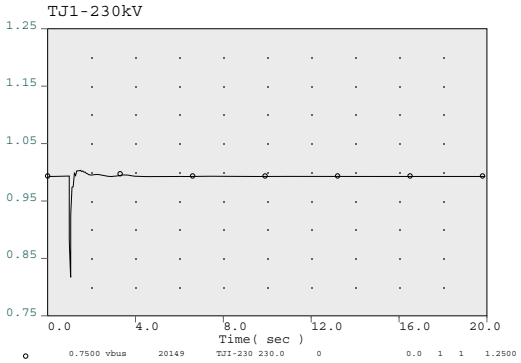
PAR/PID 230kV



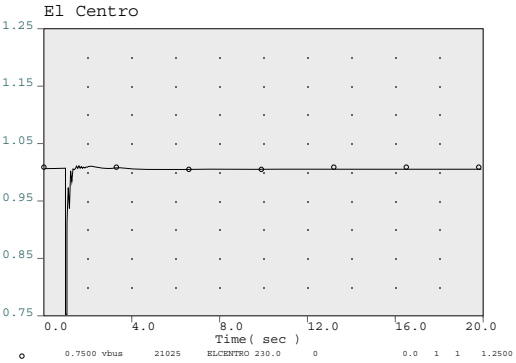
ROA-230kV



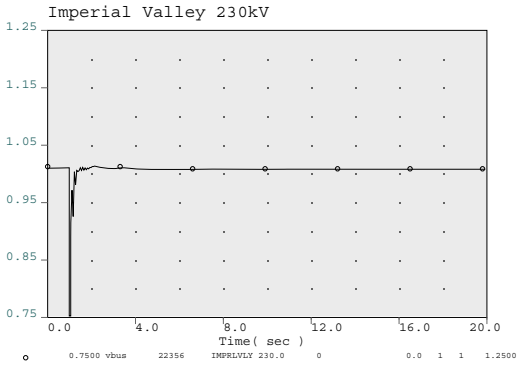
TJ1-230kV



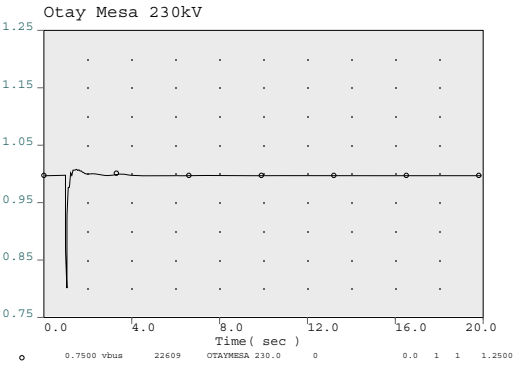
El Centro



Imperial Valley 230kV



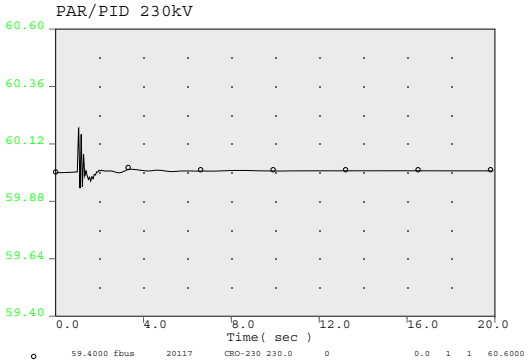
Otay Mesa 230kV



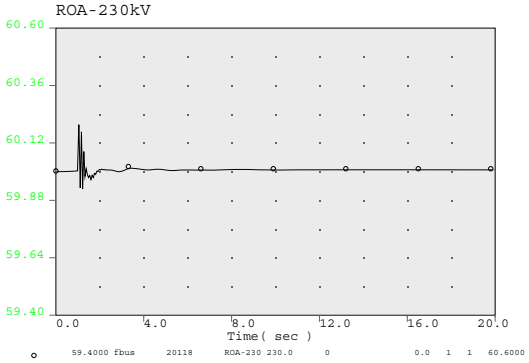
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Affected System Frequency Check and Comparison

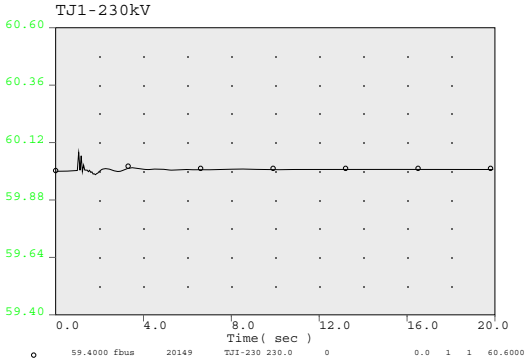
PAR/PID 230kV



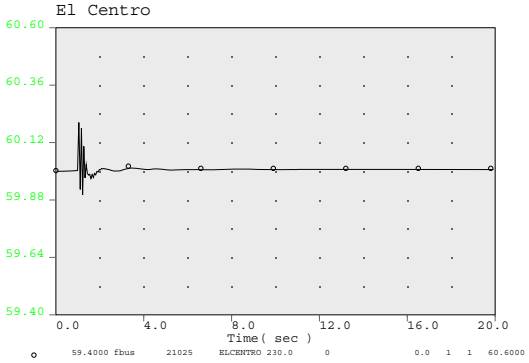
ROA-230kV



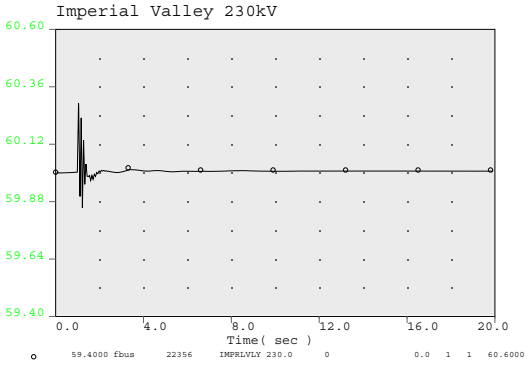
TJ1-230kV



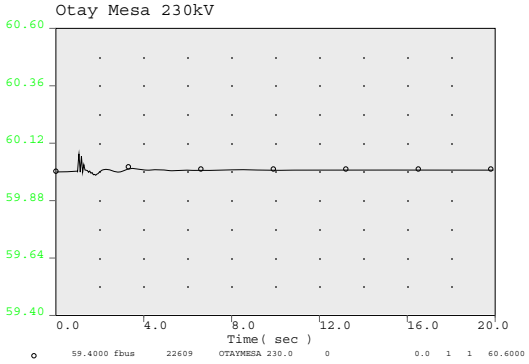
El Centro



Imperial Valley 230kV



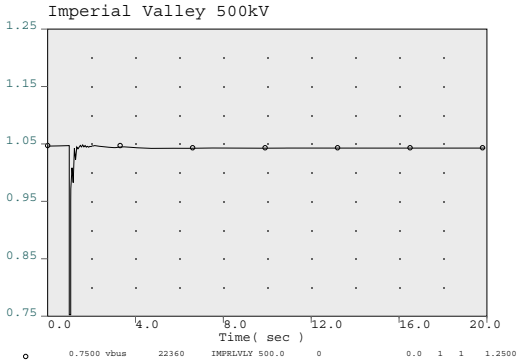
Otay Mesa 230kV



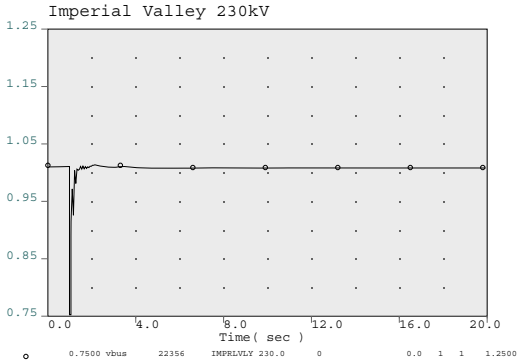
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

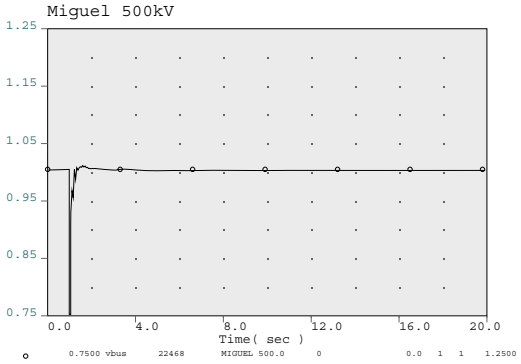
Imperial Valley 500kV



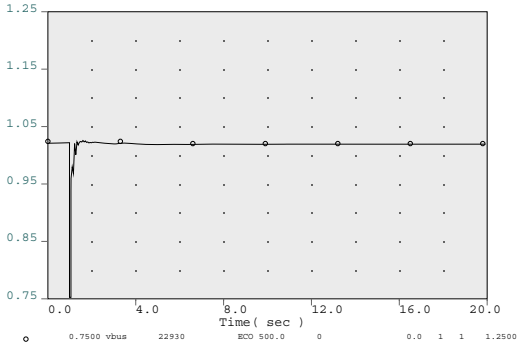
Imperial Valley 230kV



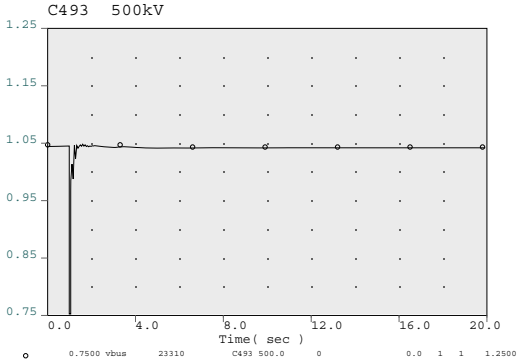
Miguel 500kV



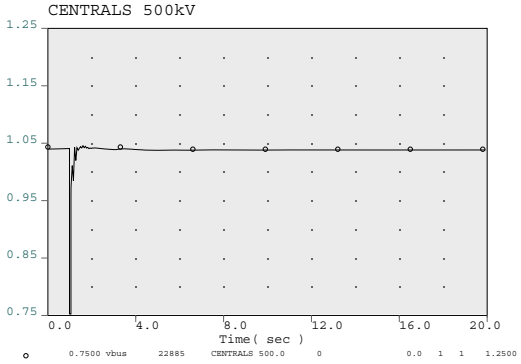
Windfarms 500



C493 500kV

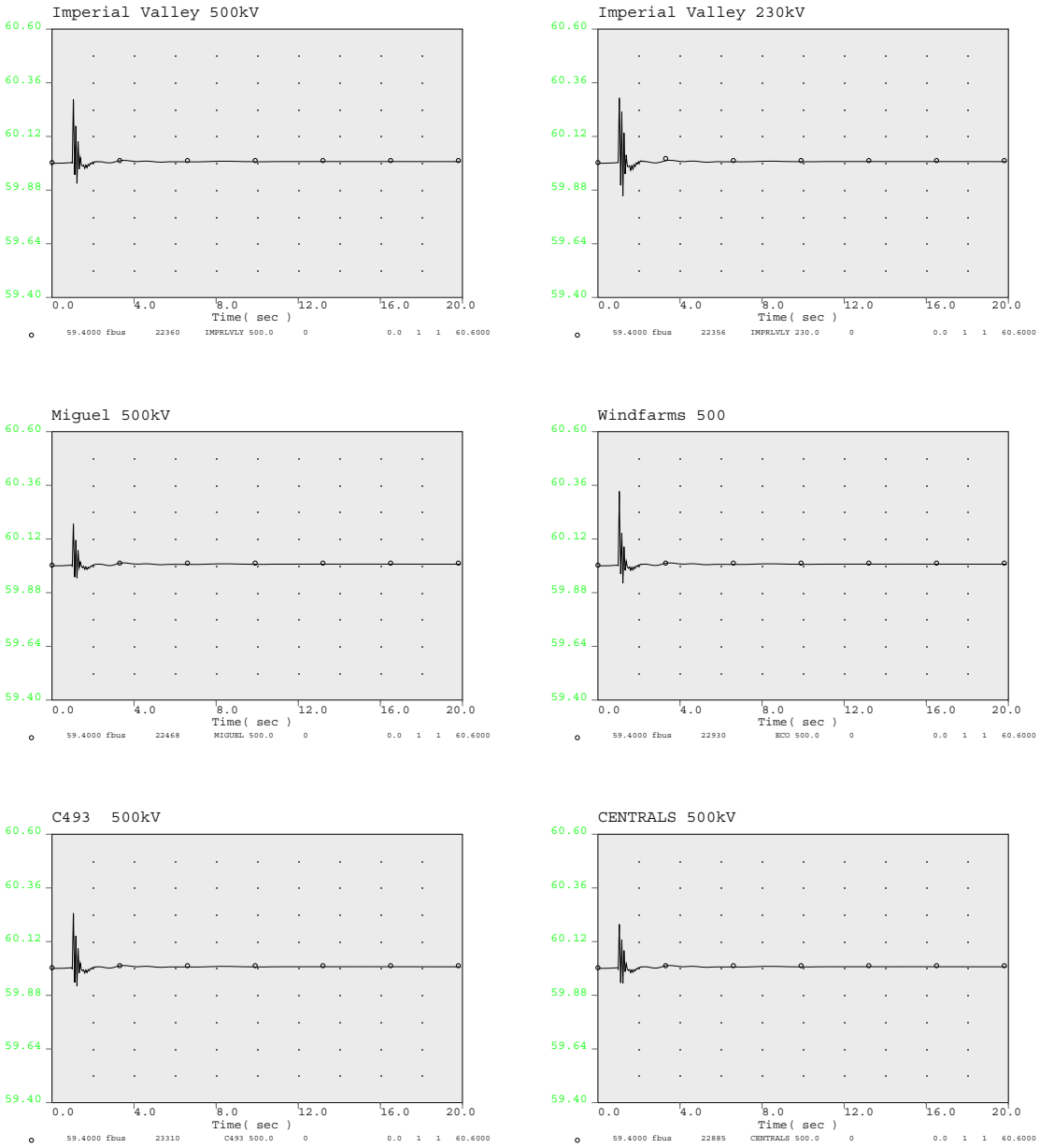


CENTRALS 500kV



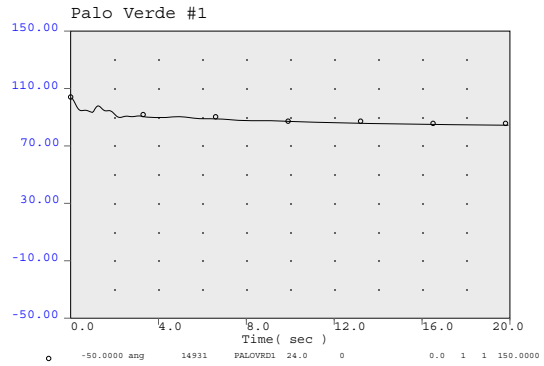
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

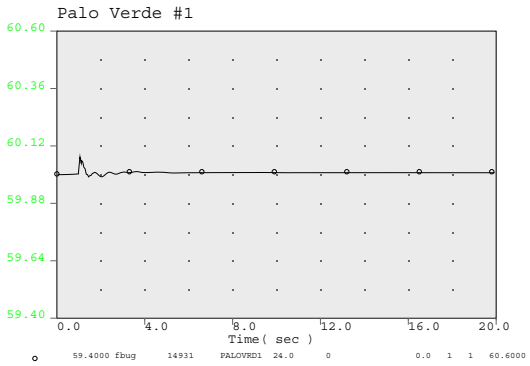
Imperial Valley Area - Frequency

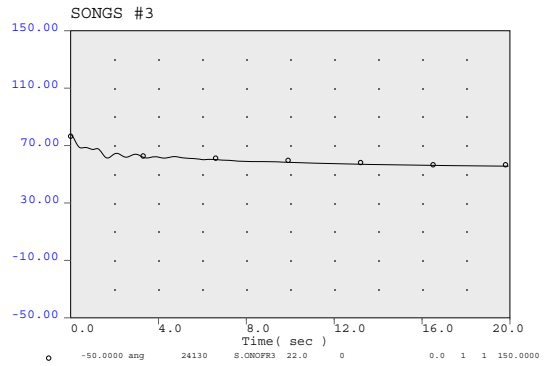


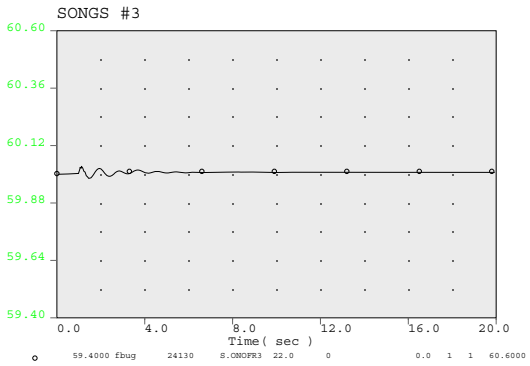
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

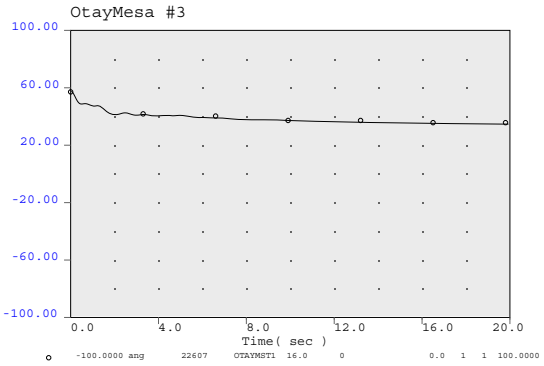
RELATIVE ROTOR ANGLE & FREQUENCY

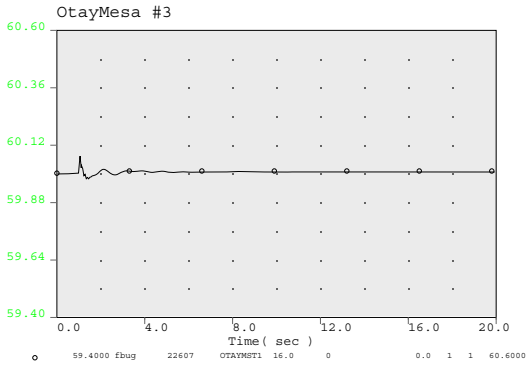












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

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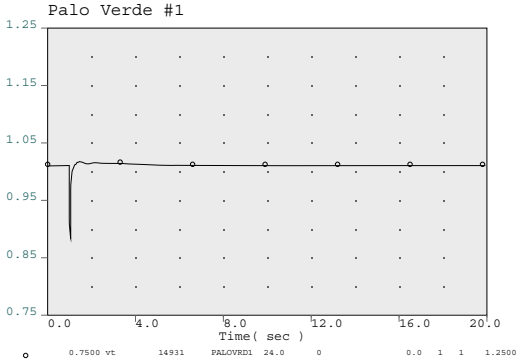
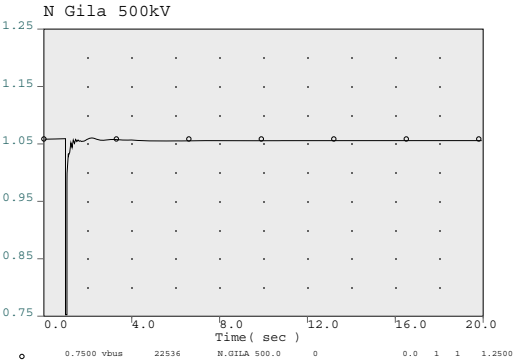
RELATIVE VOLTAGE

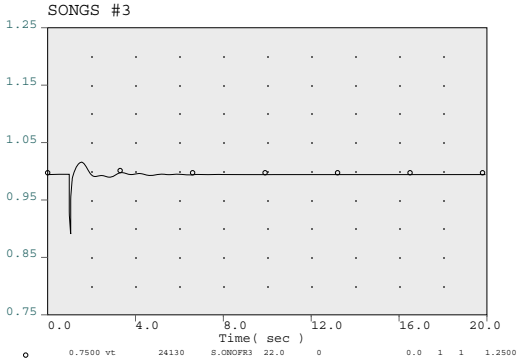
Palo Verde #1



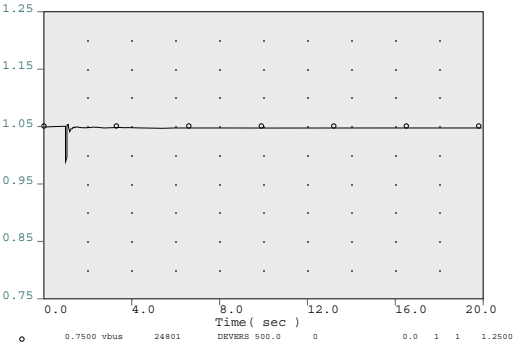
N Gila 500kV



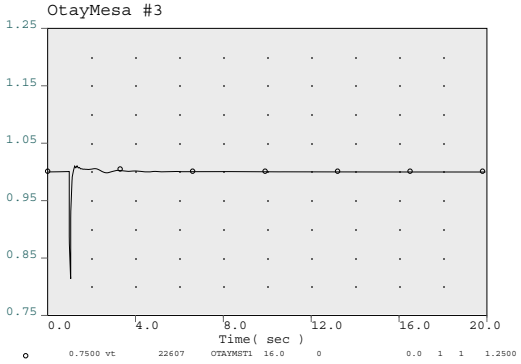
SONGS #3



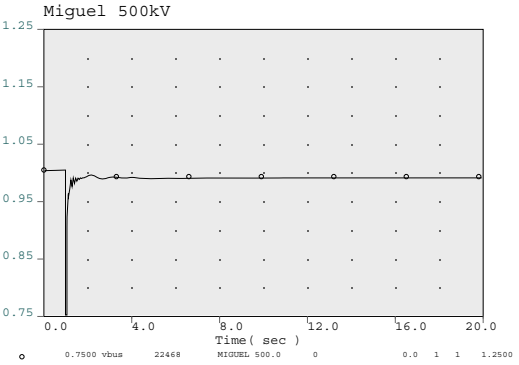
Devers 500



OtayMesa #3



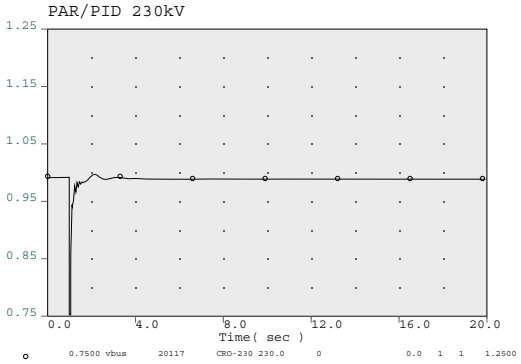
Miguel 500kV



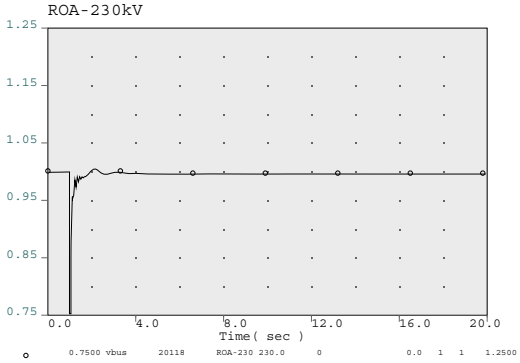
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

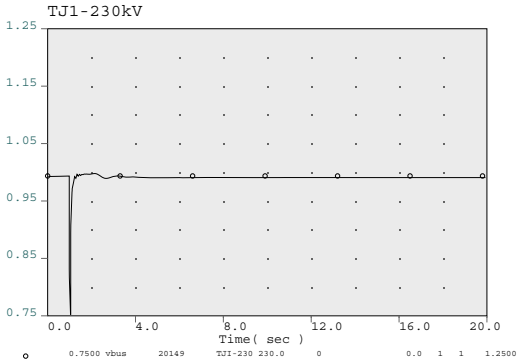
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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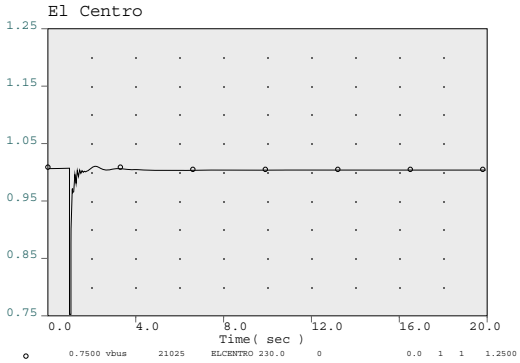
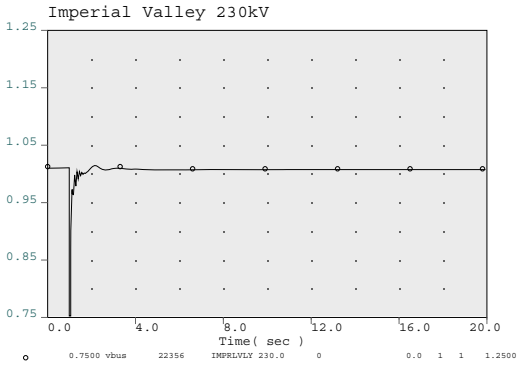
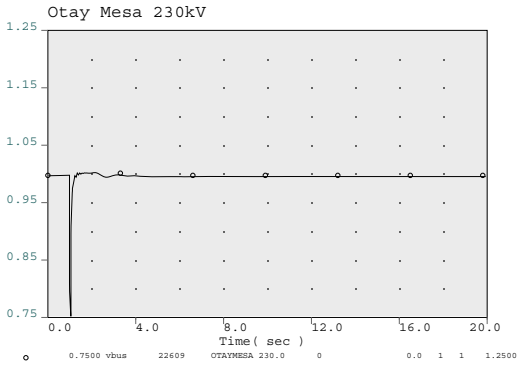


Imperial Valley 230kV



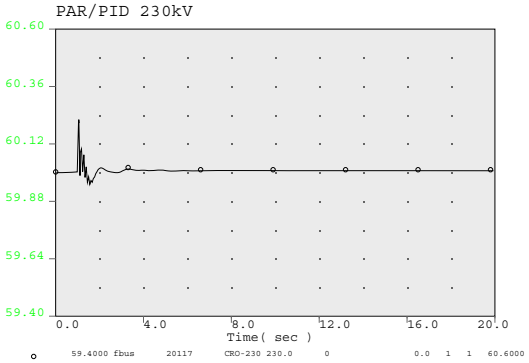
Otay Mesa 230kV



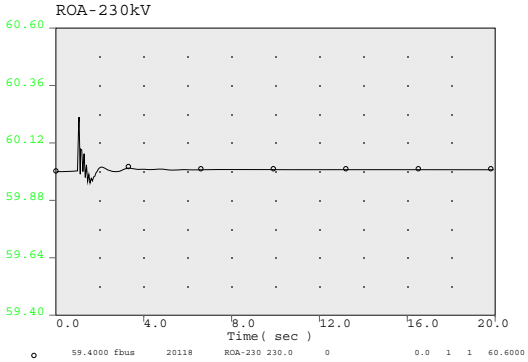
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

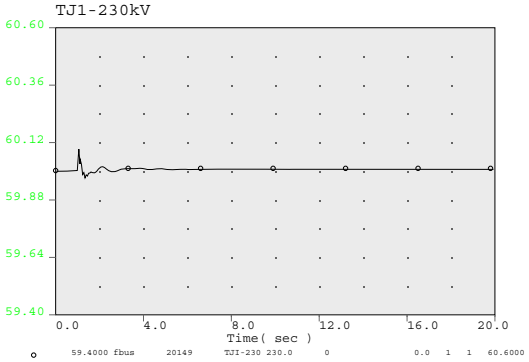
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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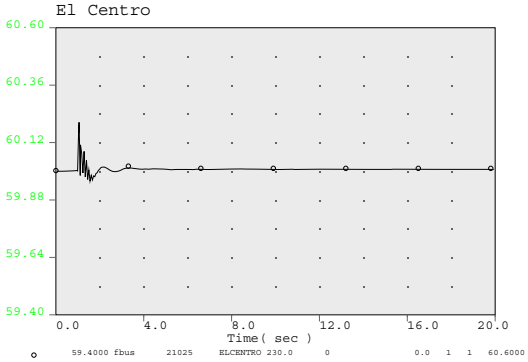
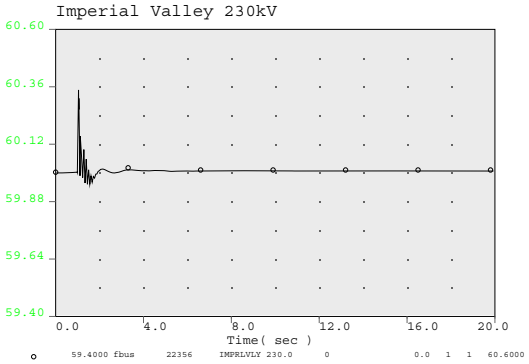
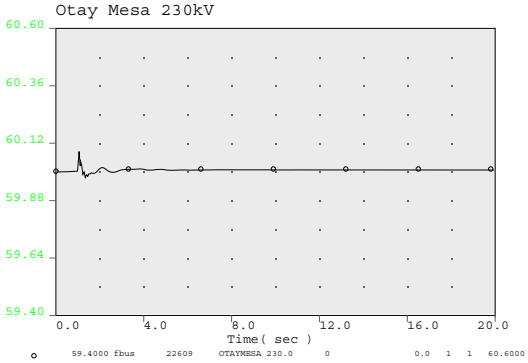


Imperial Valley 230kV



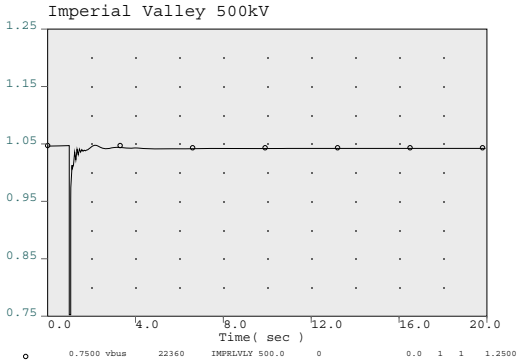
Otay Mesa 230kV



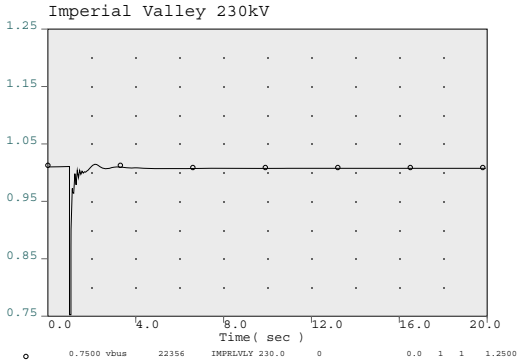
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Imperial Valley Area - VOLTAGE

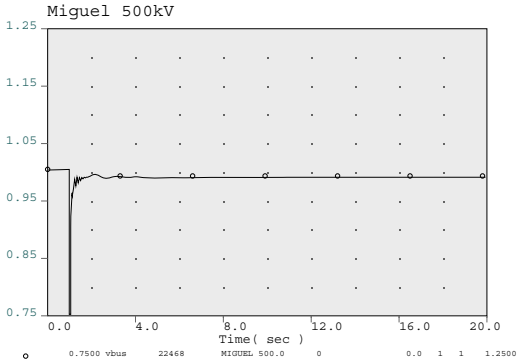
Imperial Valley 500kV



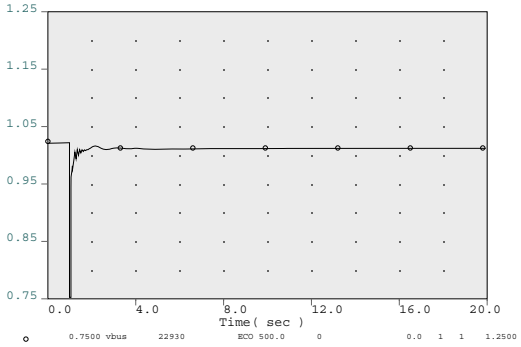
Imperial Valley 230kV



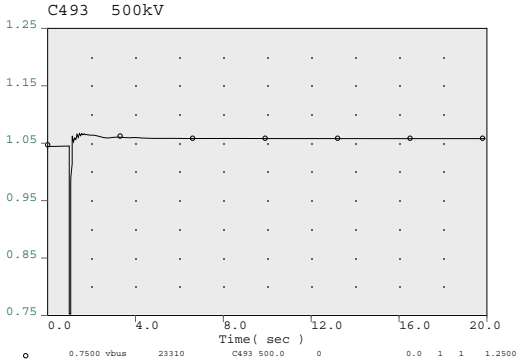
Miguel 500kV



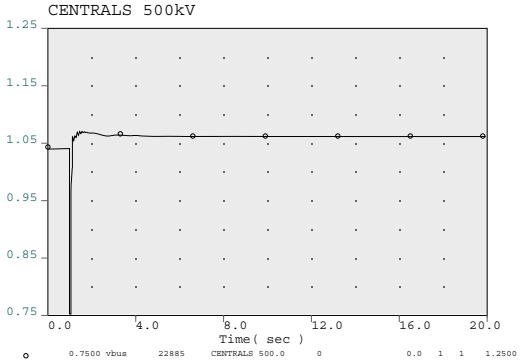
Windfarms 500



C493 500kV

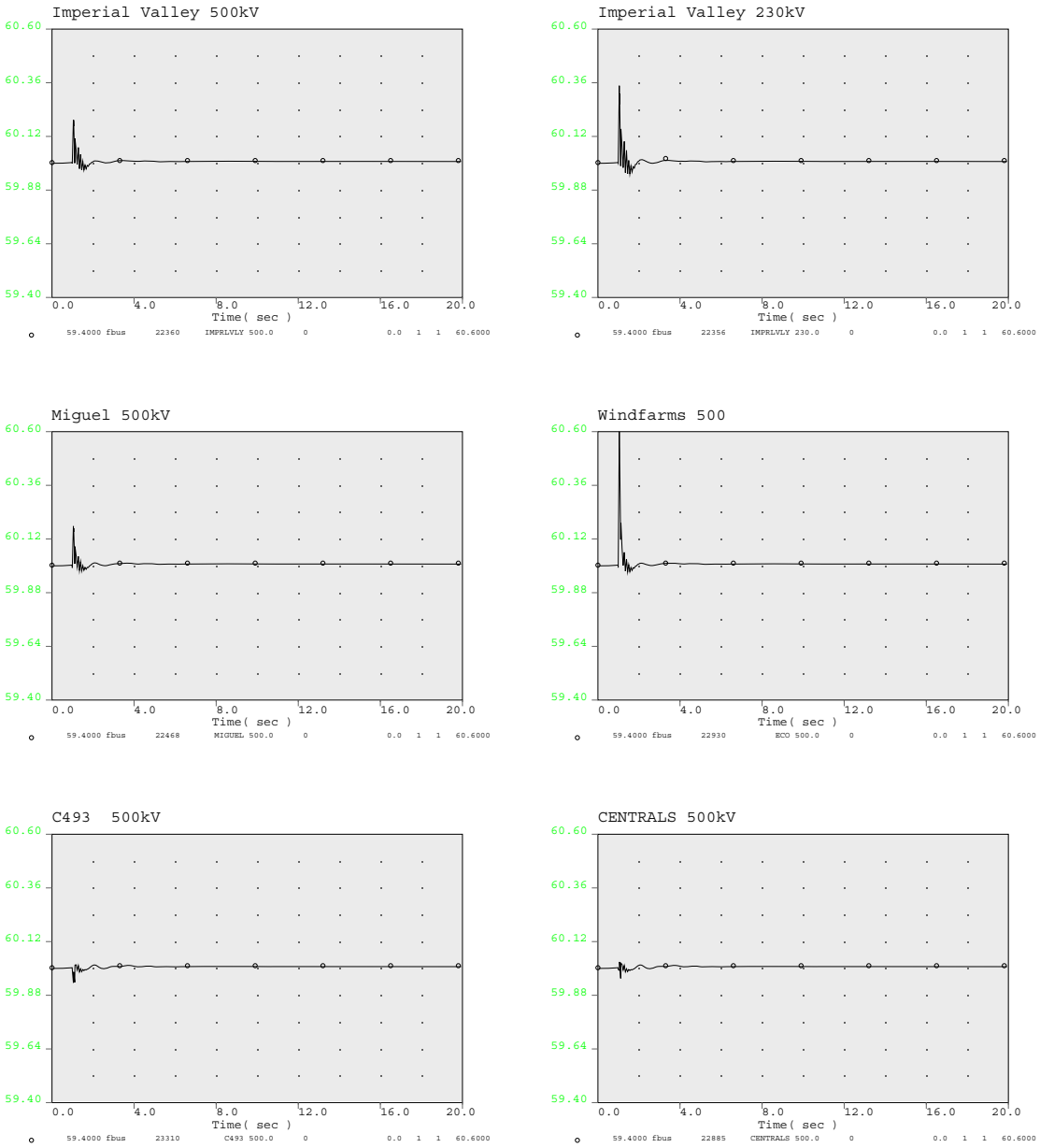


CENTRALS 500kV



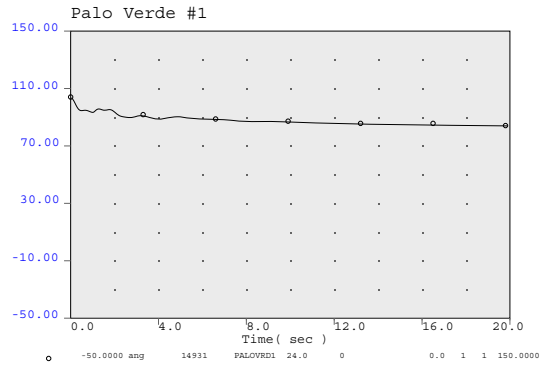
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

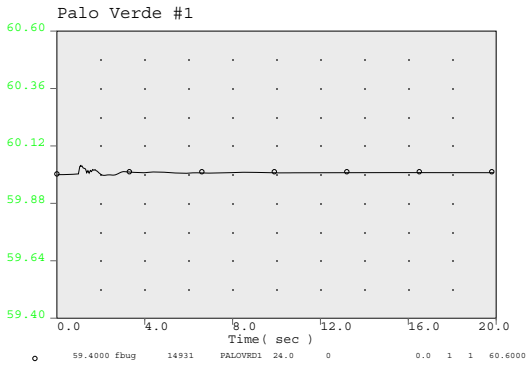
Imperial Valley Area - Frequency

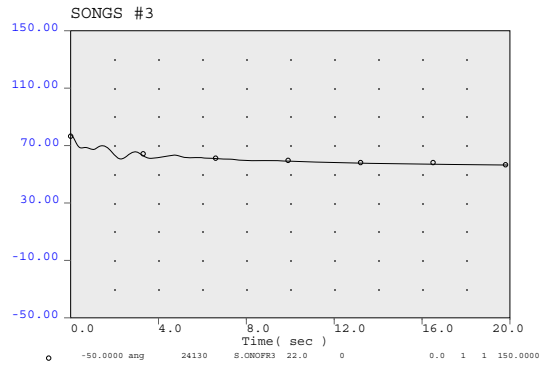


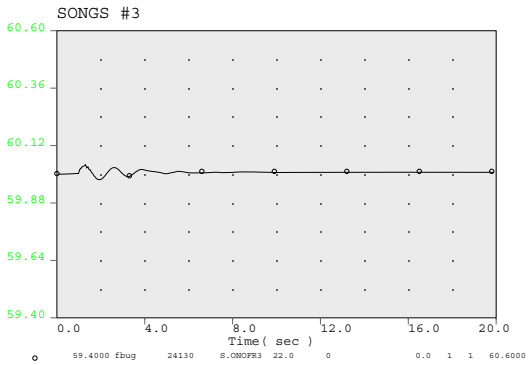
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

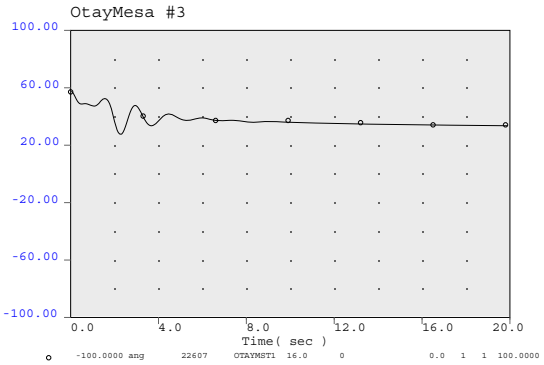
RELATIVE ROTOR ANGLE & FREQUENCY

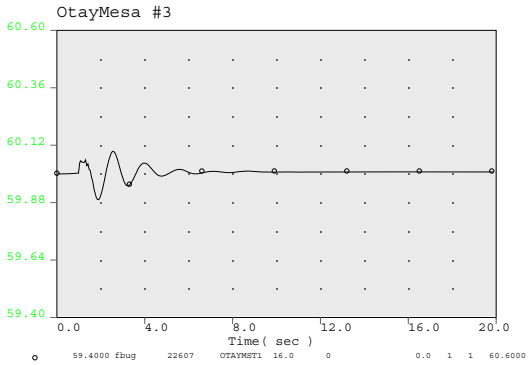












SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Page 1

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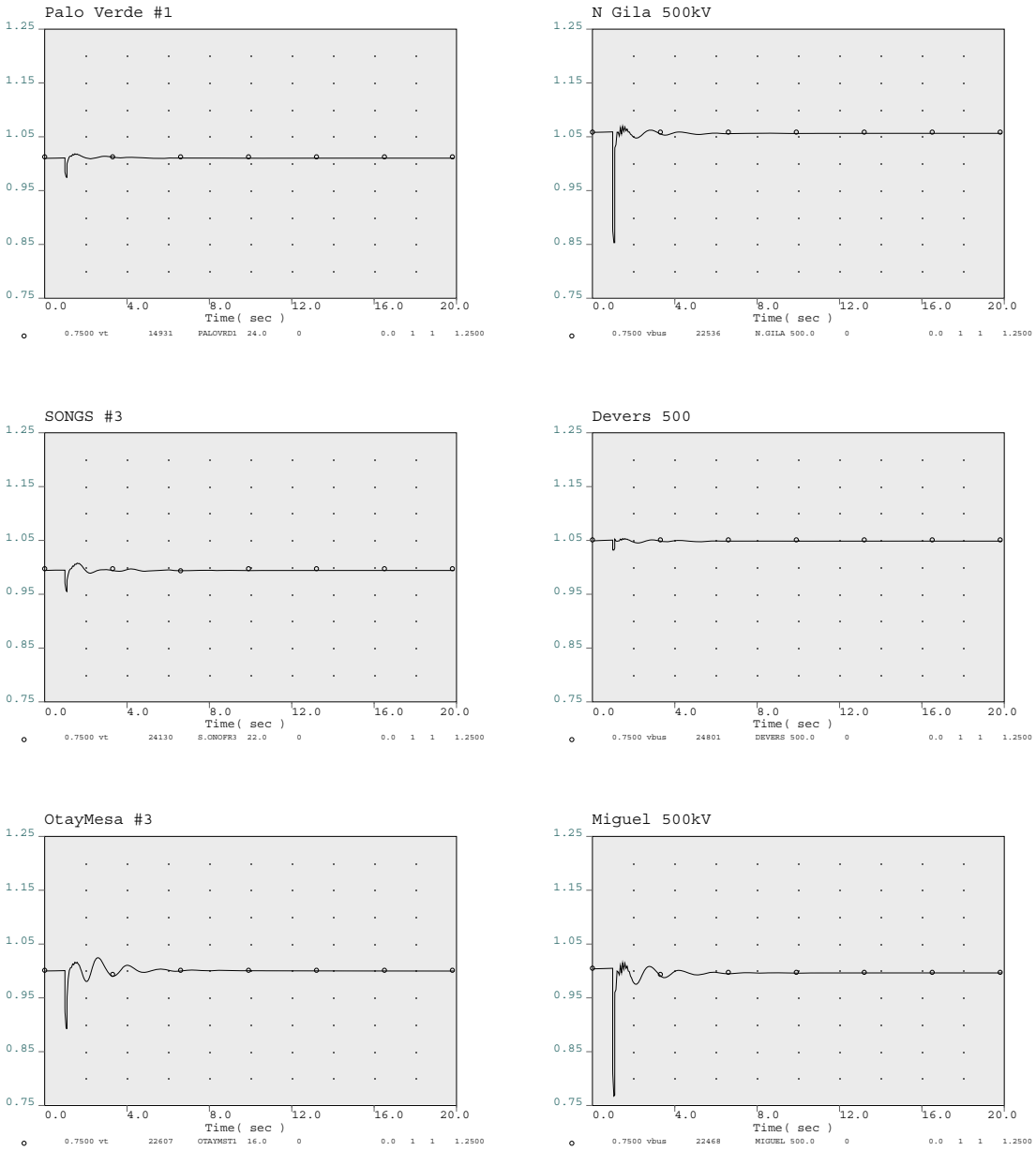
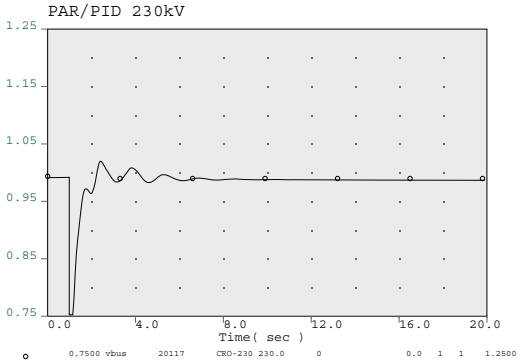
RELATIVE VOLTAGE



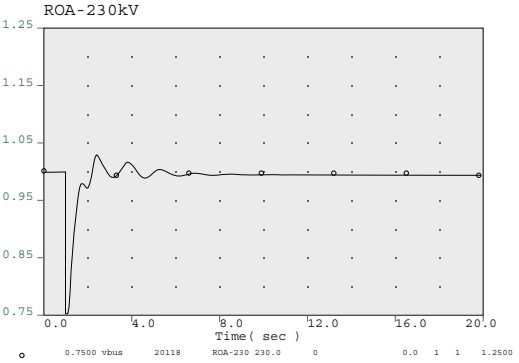
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

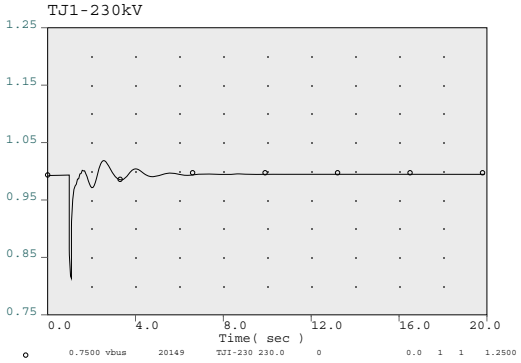
PAR/PID 230kV



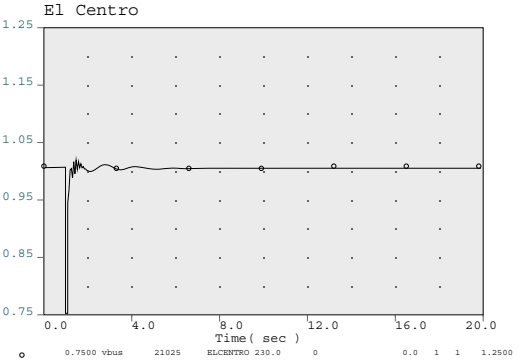
ROA-230kV



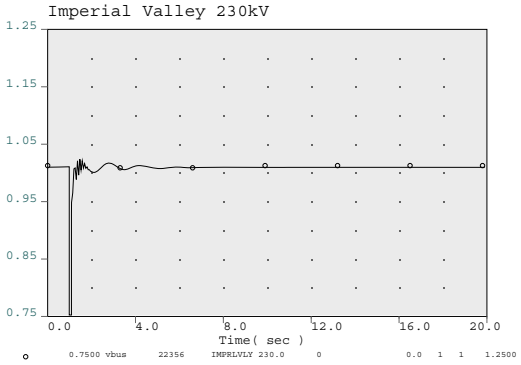
TJ1-230kV



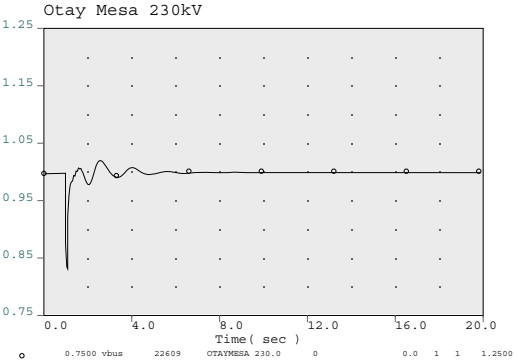
El Centro



Imperial Valley 230kV



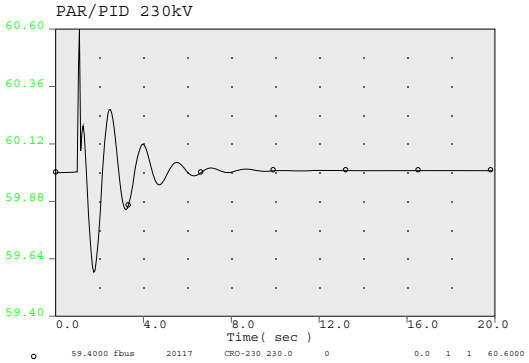
Otay Mesa 230kV



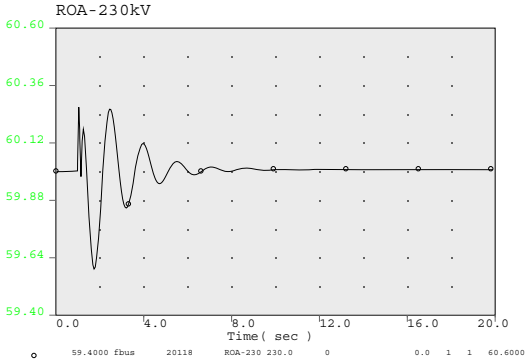
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Frequency Check and Comparison

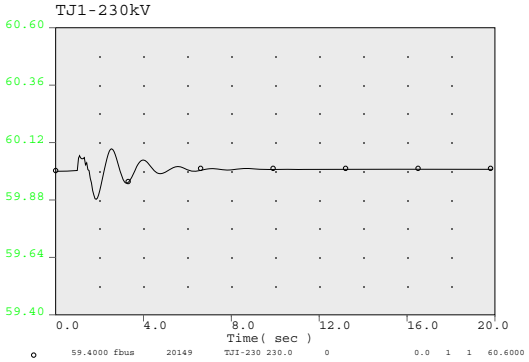
PAR/PID 230kV



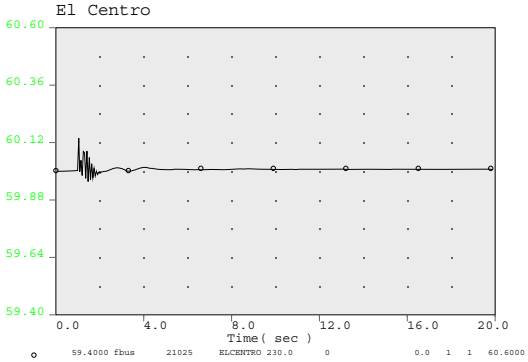
ROA-230kV



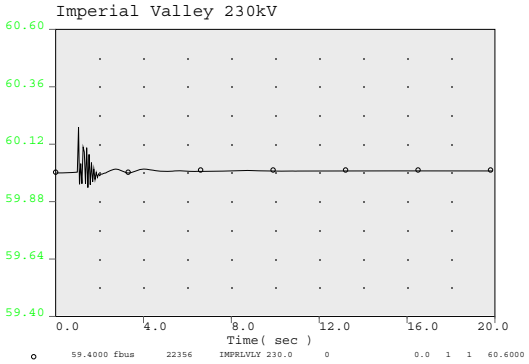
TJ1-230kV



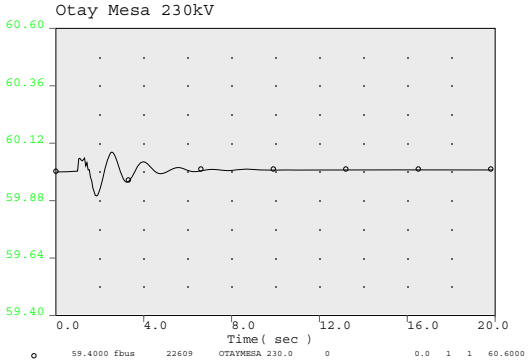
El Centro



Imperial Valley 230kV



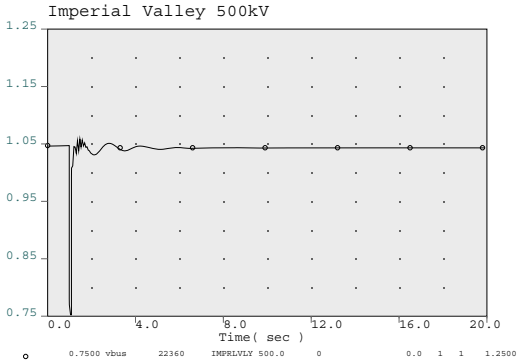
Otay Mesa 230kV



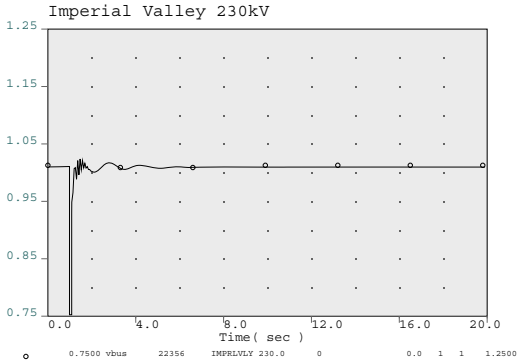
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

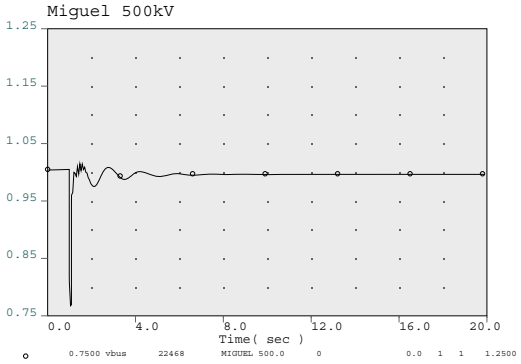
Imperial Valley 500kV



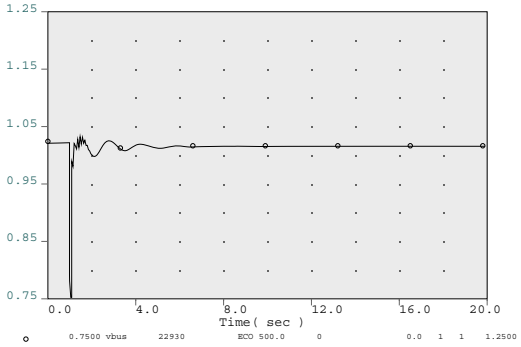
Imperial Valley 230kV



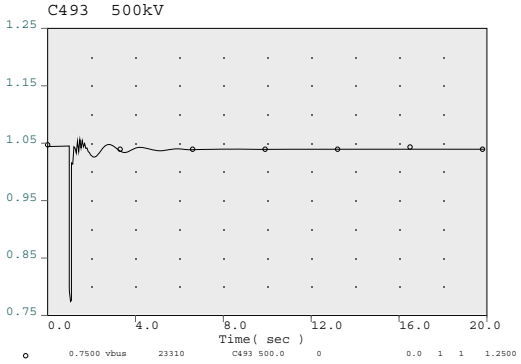
Miguel 500kV



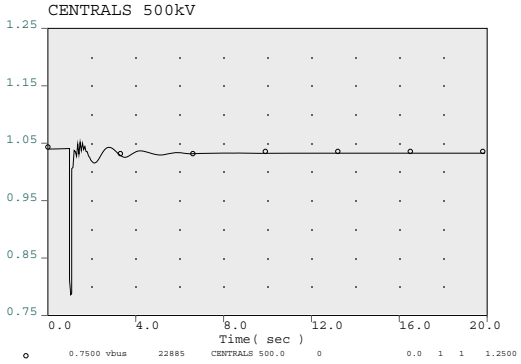
Windfarms 500



C493 500kV

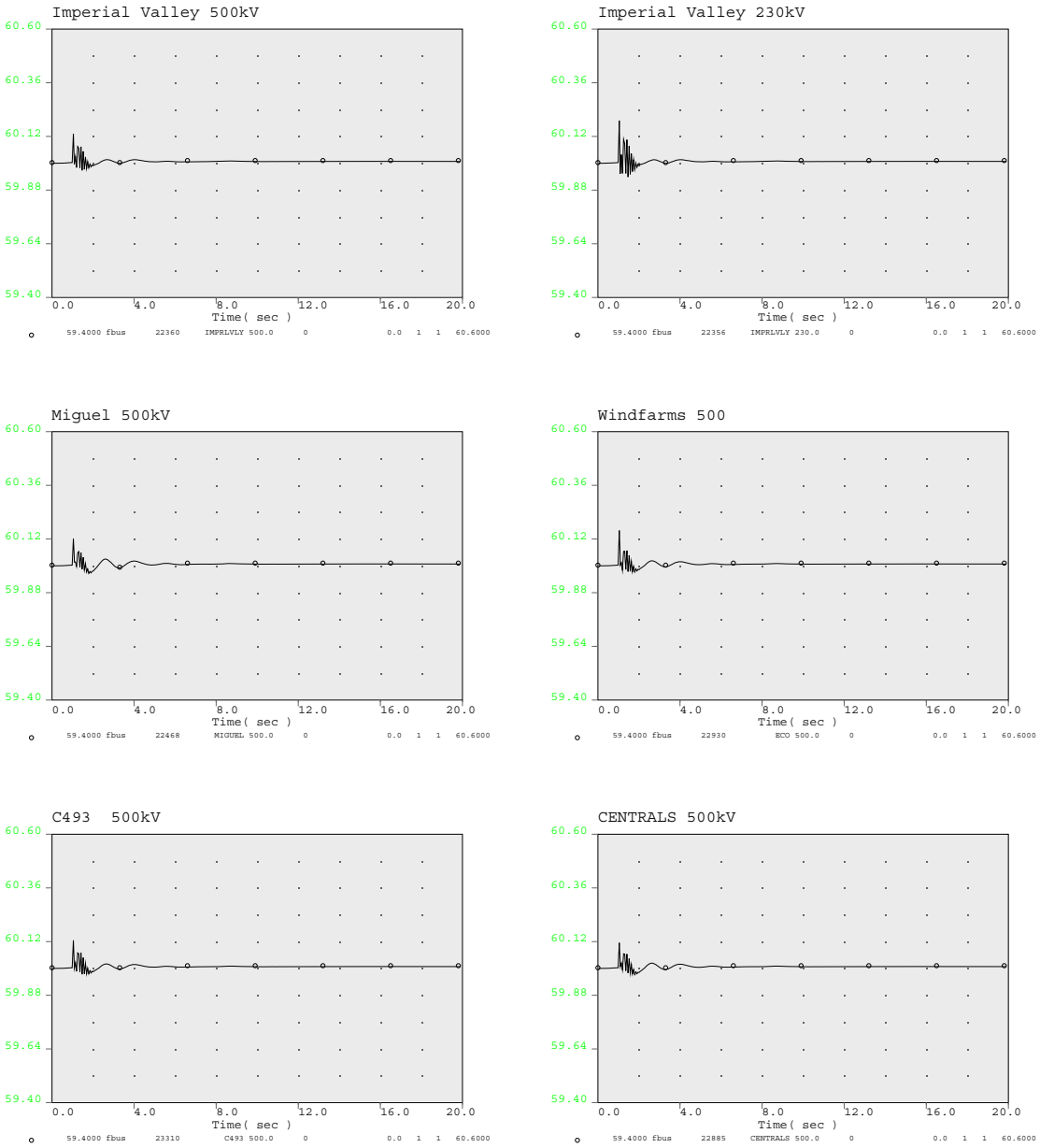


CENTRALS 500kV



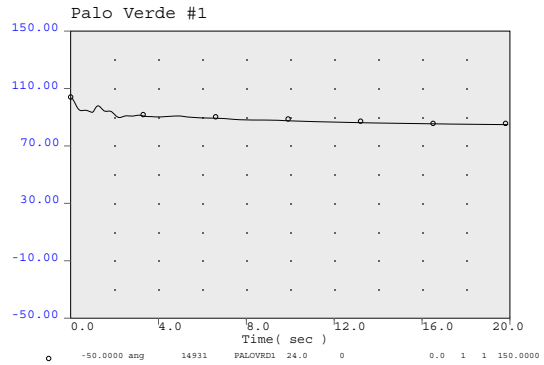
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

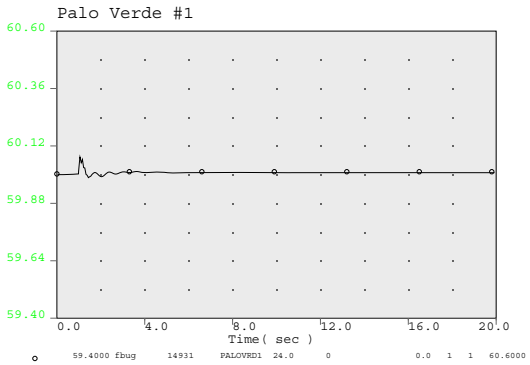
Imperial Valley Area - Frequency

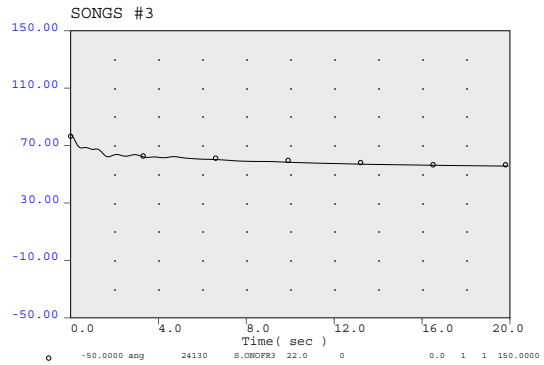


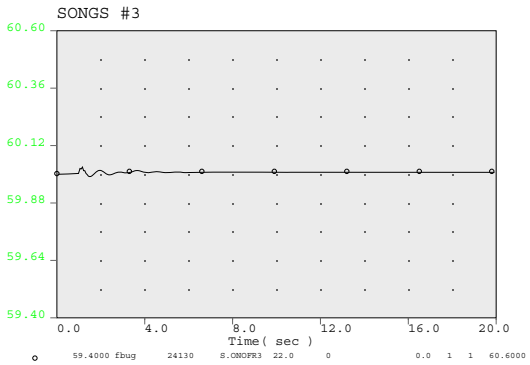
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

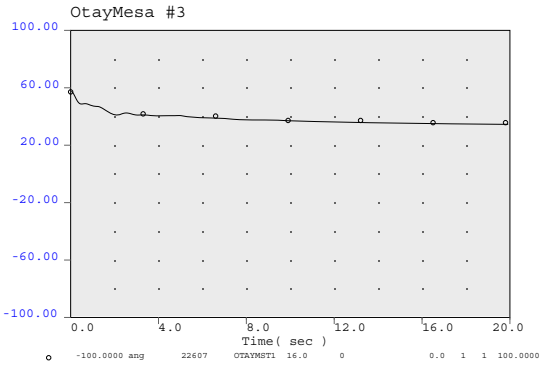
RELATIVE ROTOR ANGLE & FREQUENCY

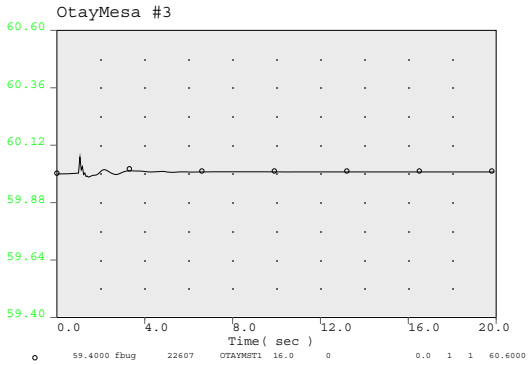












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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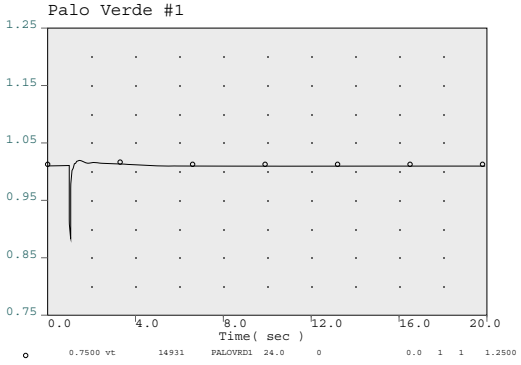
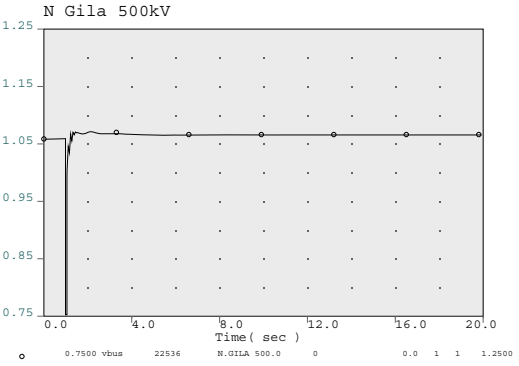
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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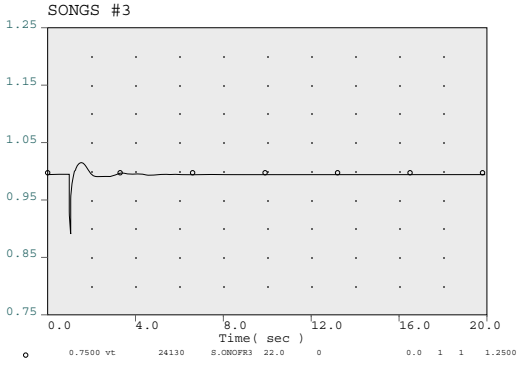

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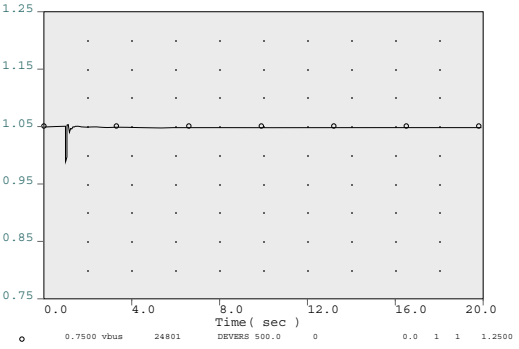
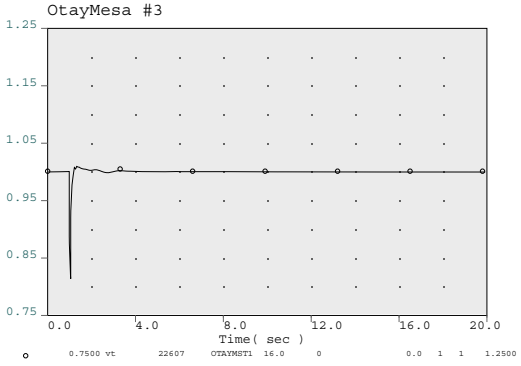
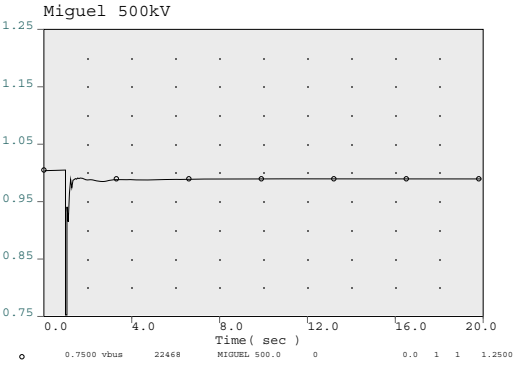


OtayMesa #3



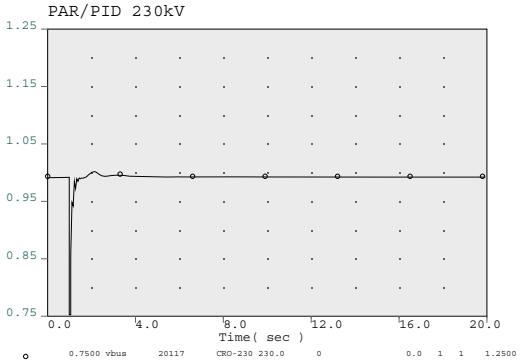
Miguel 500kV



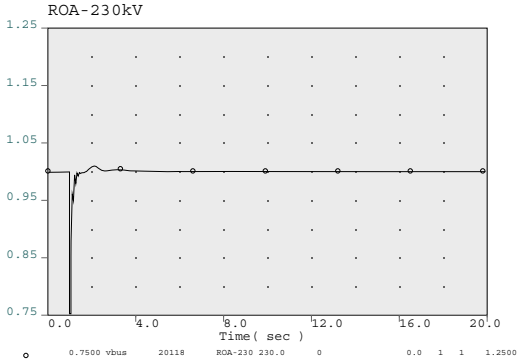
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

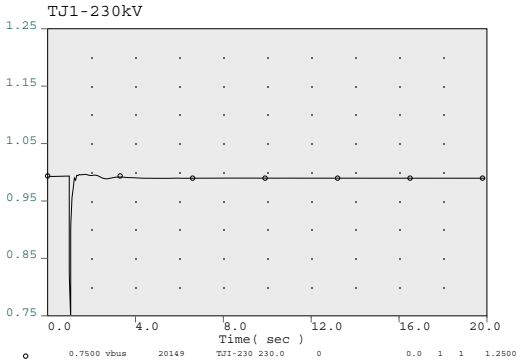
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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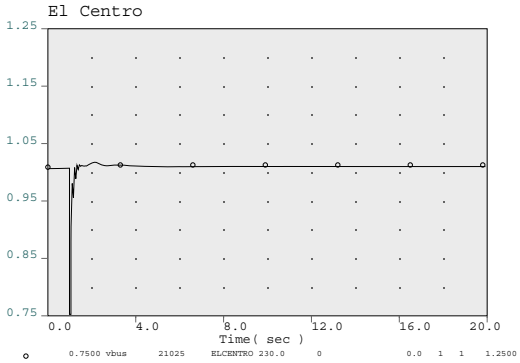
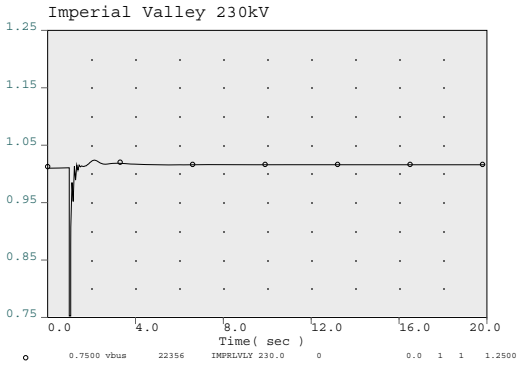
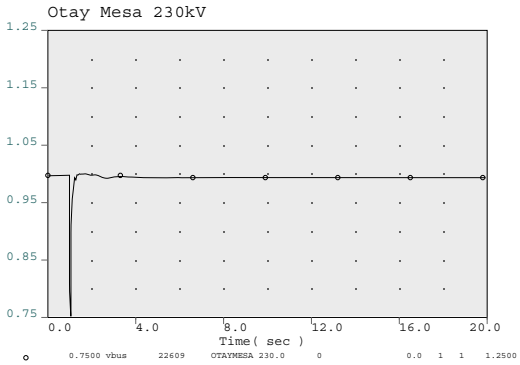


Imperial Valley 230kV



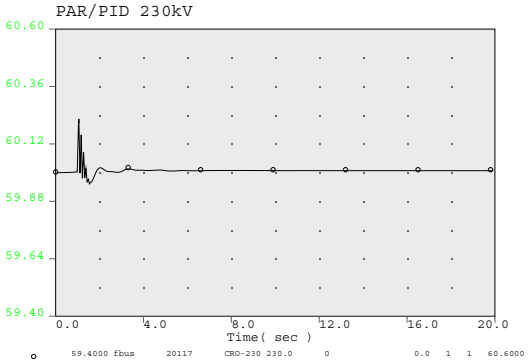
Otay Mesa 230kV



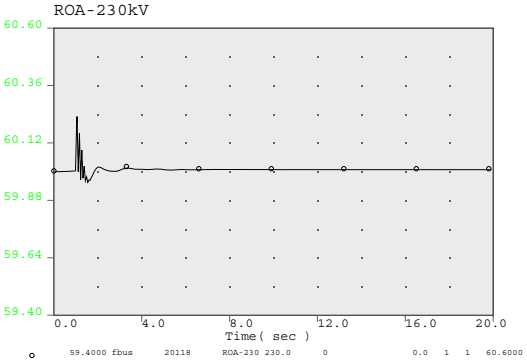
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

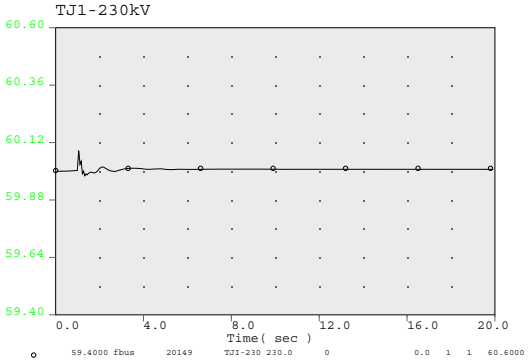
PAR/PID 230kV



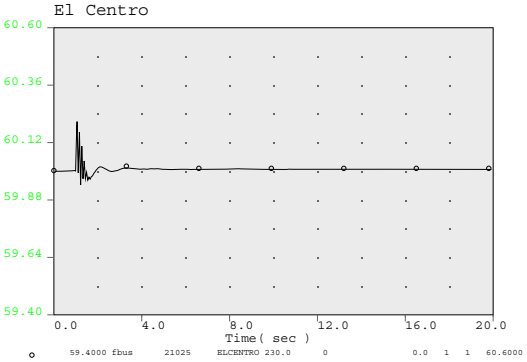
ROA-230kV



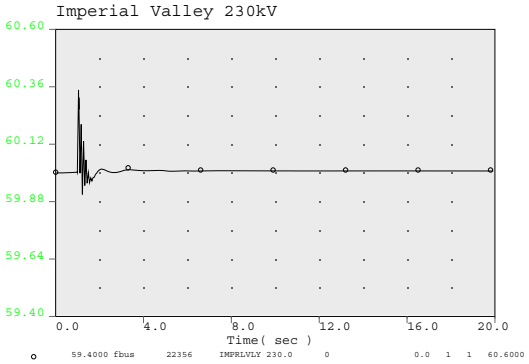
TJ1-230kV



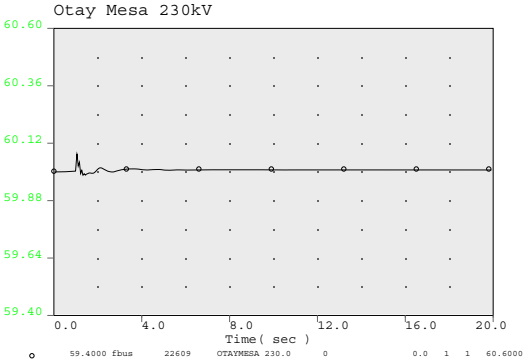
El Centro



Imperial Valley 230kV



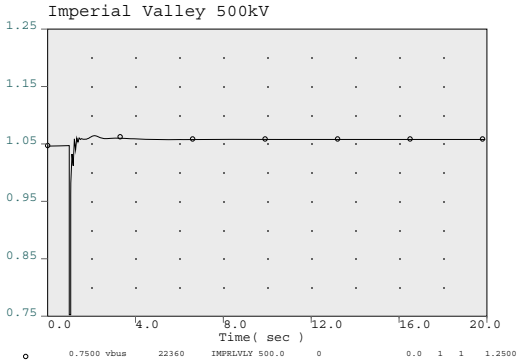
Otay Mesa 230kV



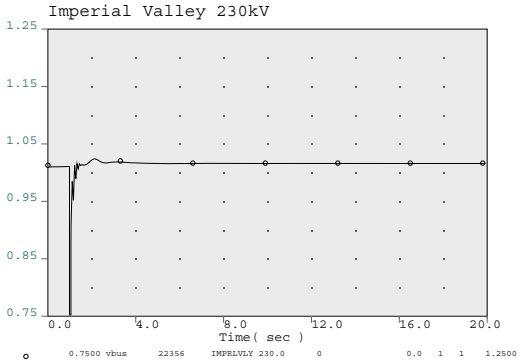
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

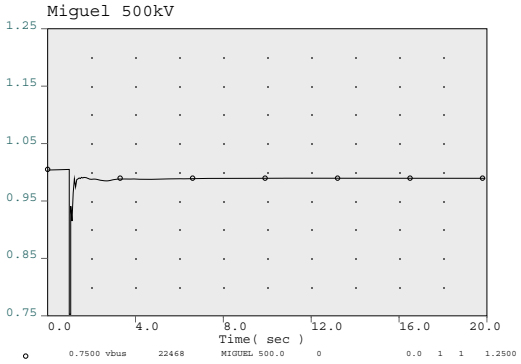
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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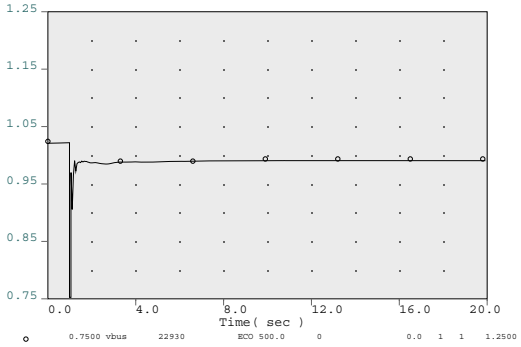
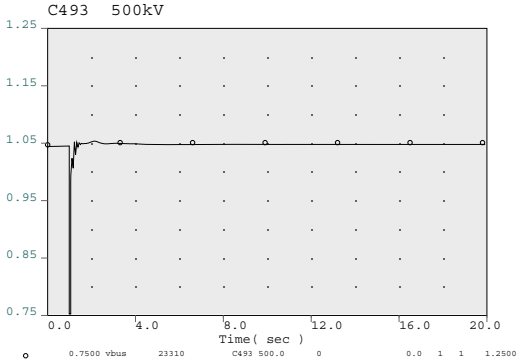
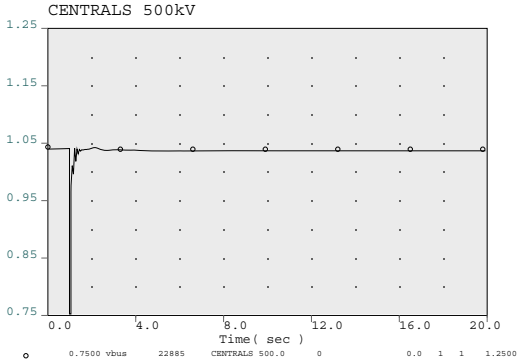


C493 500kV

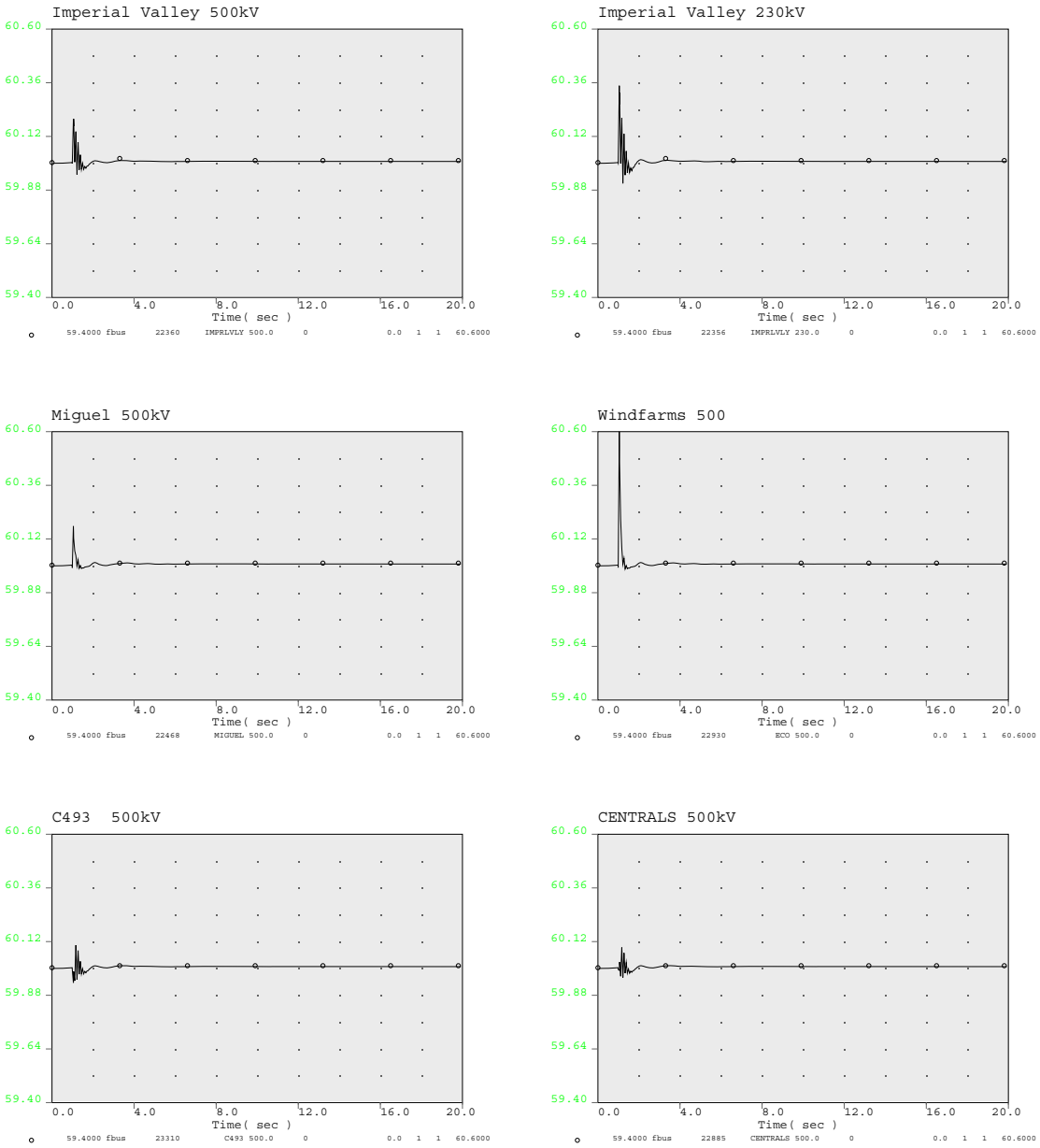


CENTRALS 500kV



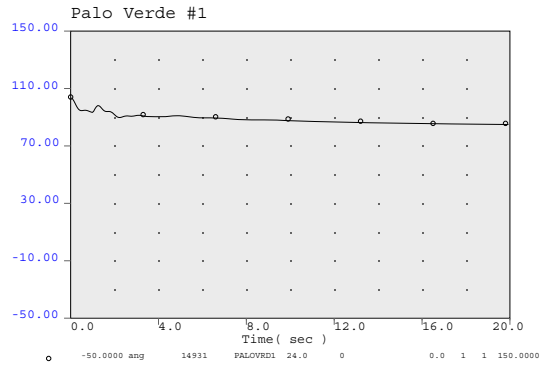
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

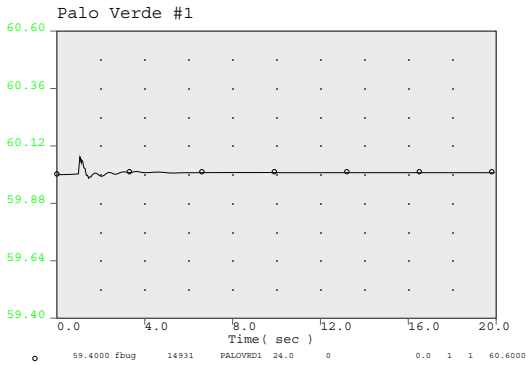
Imperial Valley Area - Frequency

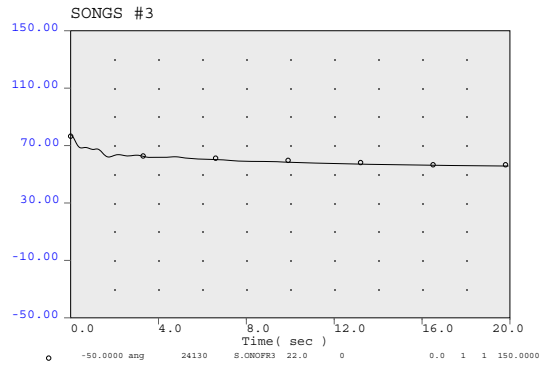


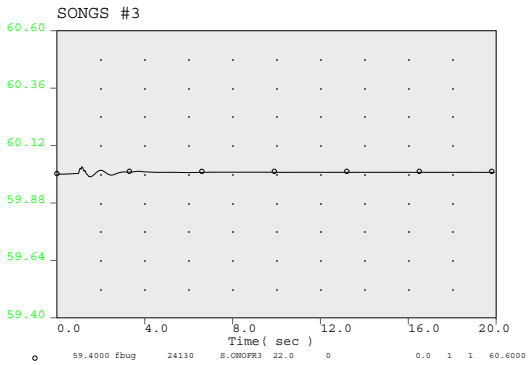
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

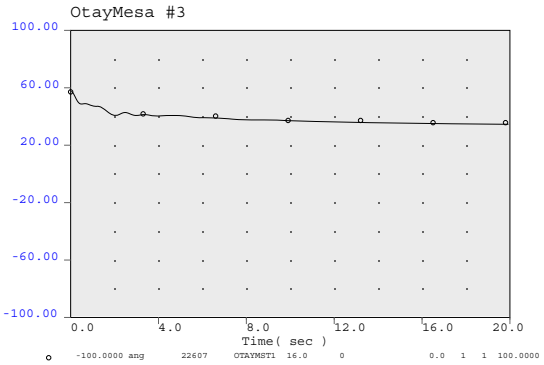
RELATIVE ROTOR ANGLE & FREQUENCY

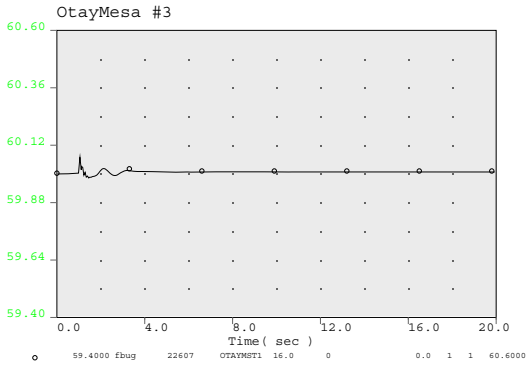












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2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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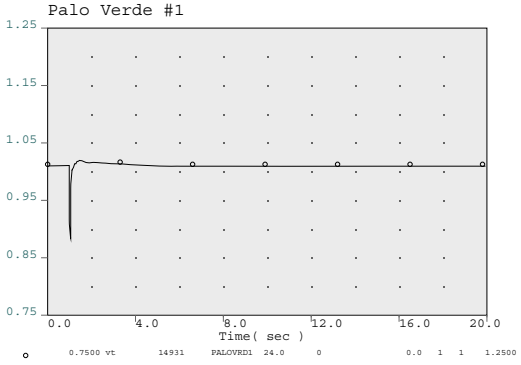
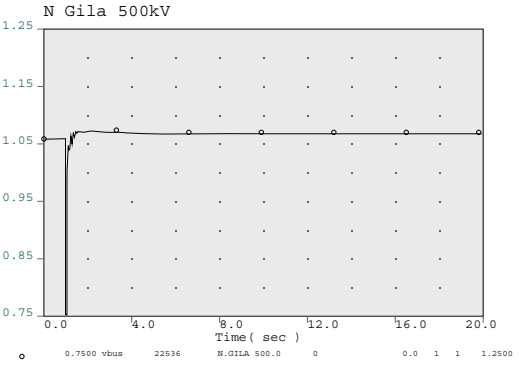
RELATIVE VOLTAGE

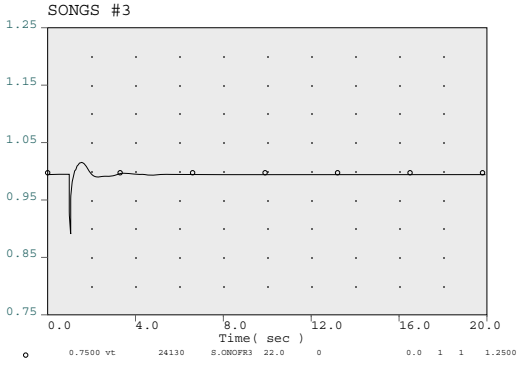
Palo Verde #1



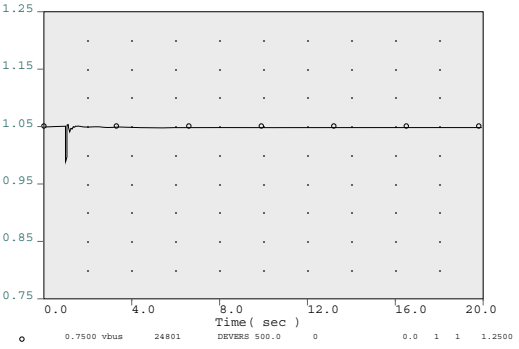
N Gila 500kV



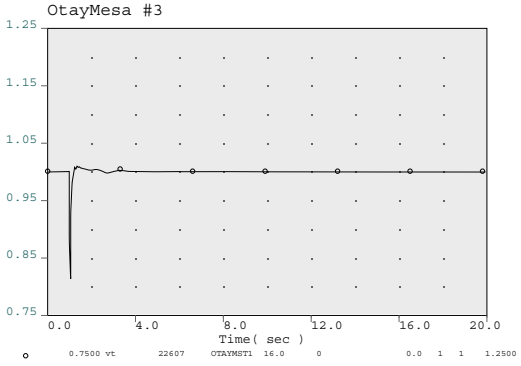
SONGS #3



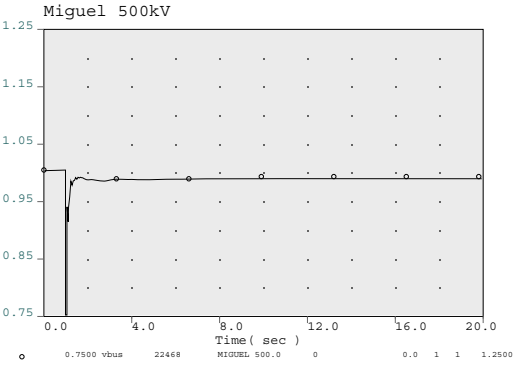
Devers 500



OtayMesa #3



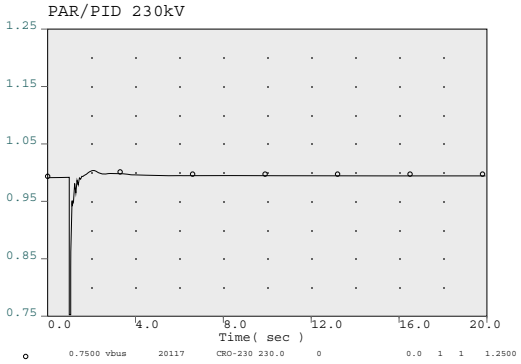
Miguel 500kV



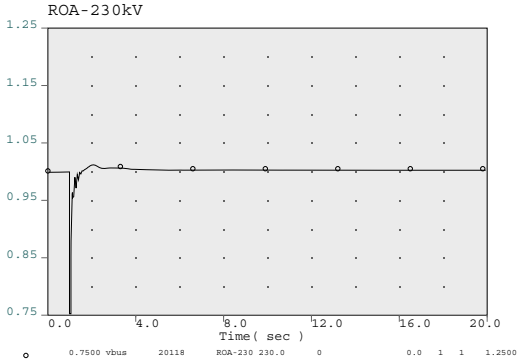
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

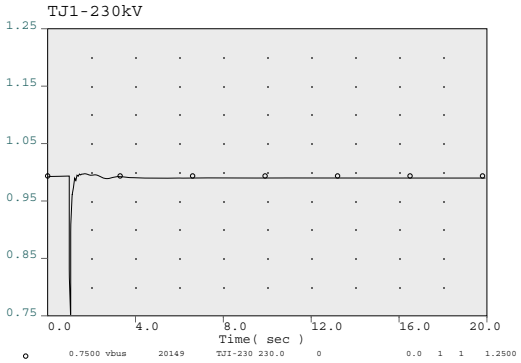
PAR/PID 230kV



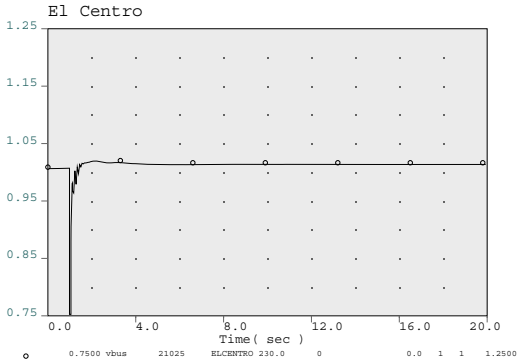
ROA-230kV



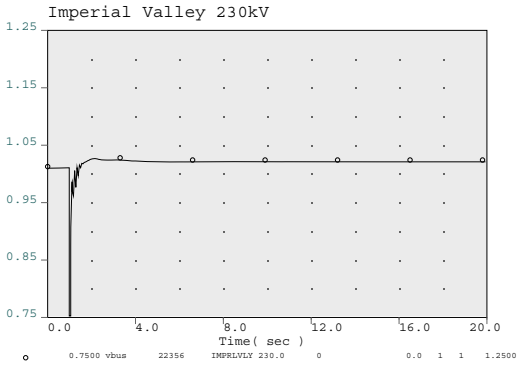
TJ1-230kV



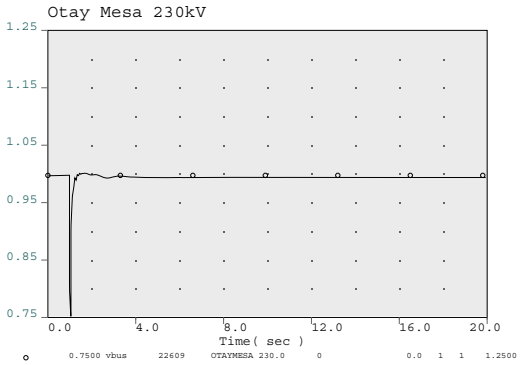
El Centro



Imperial Valley 230kV



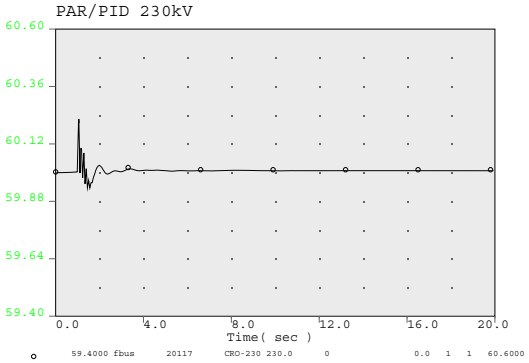
Otay Mesa 230kV



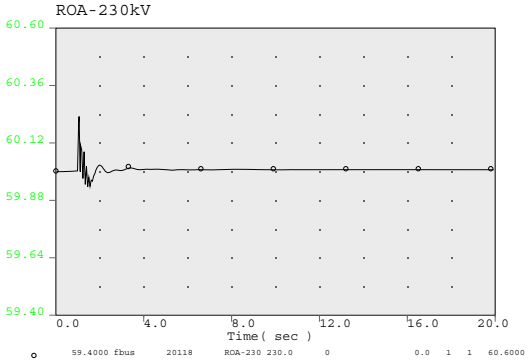
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

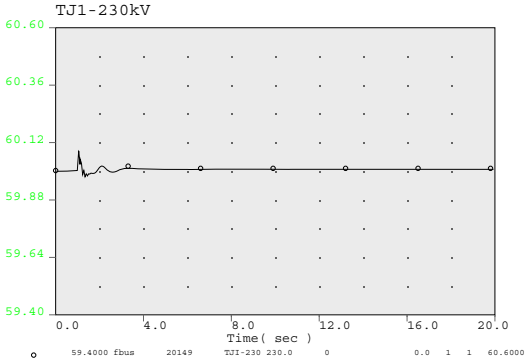
PAR/PID 230kV



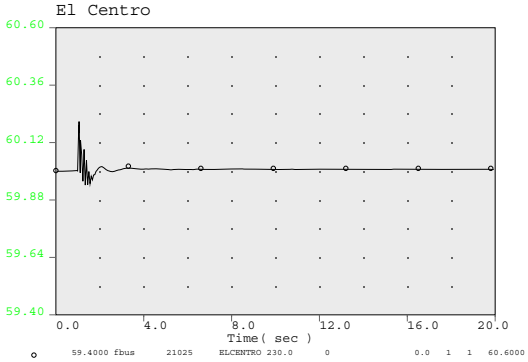
ROA-230kV



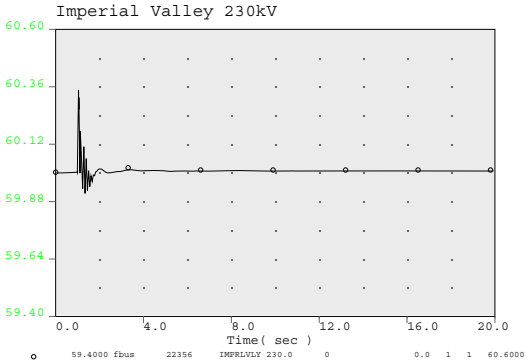
TJ1-230kV



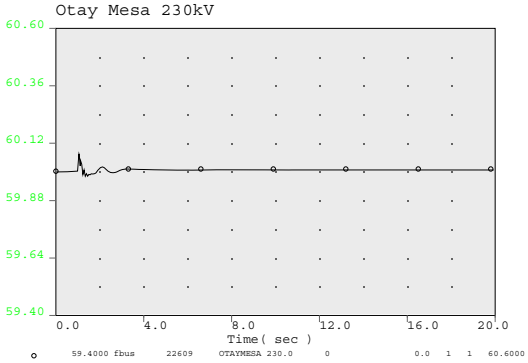
El Centro



Imperial Valley 230kV



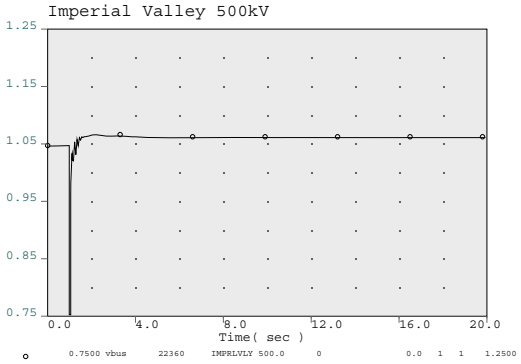
Otay Mesa 230kV



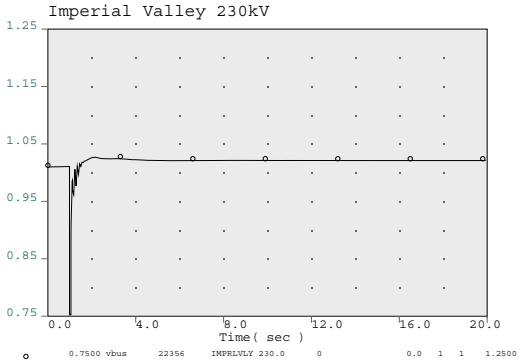
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

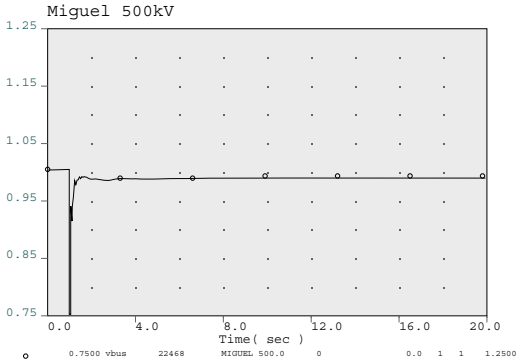
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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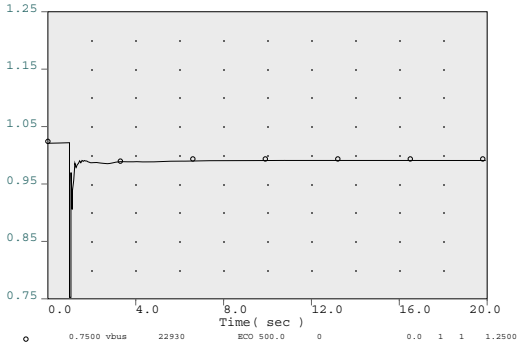
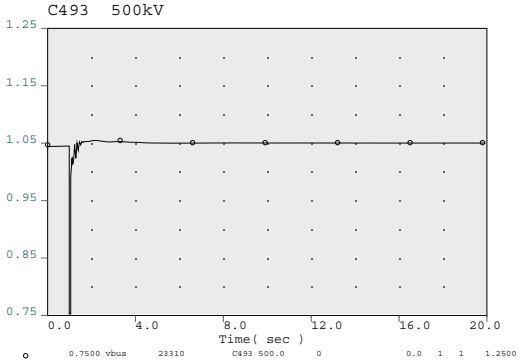
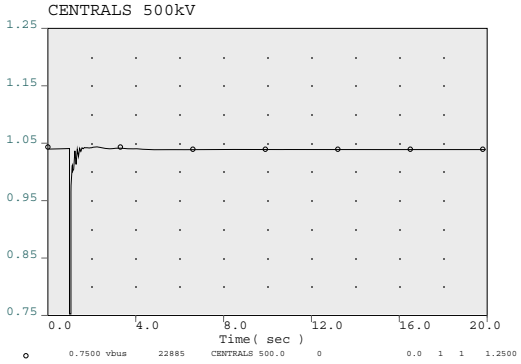


C493 500kV

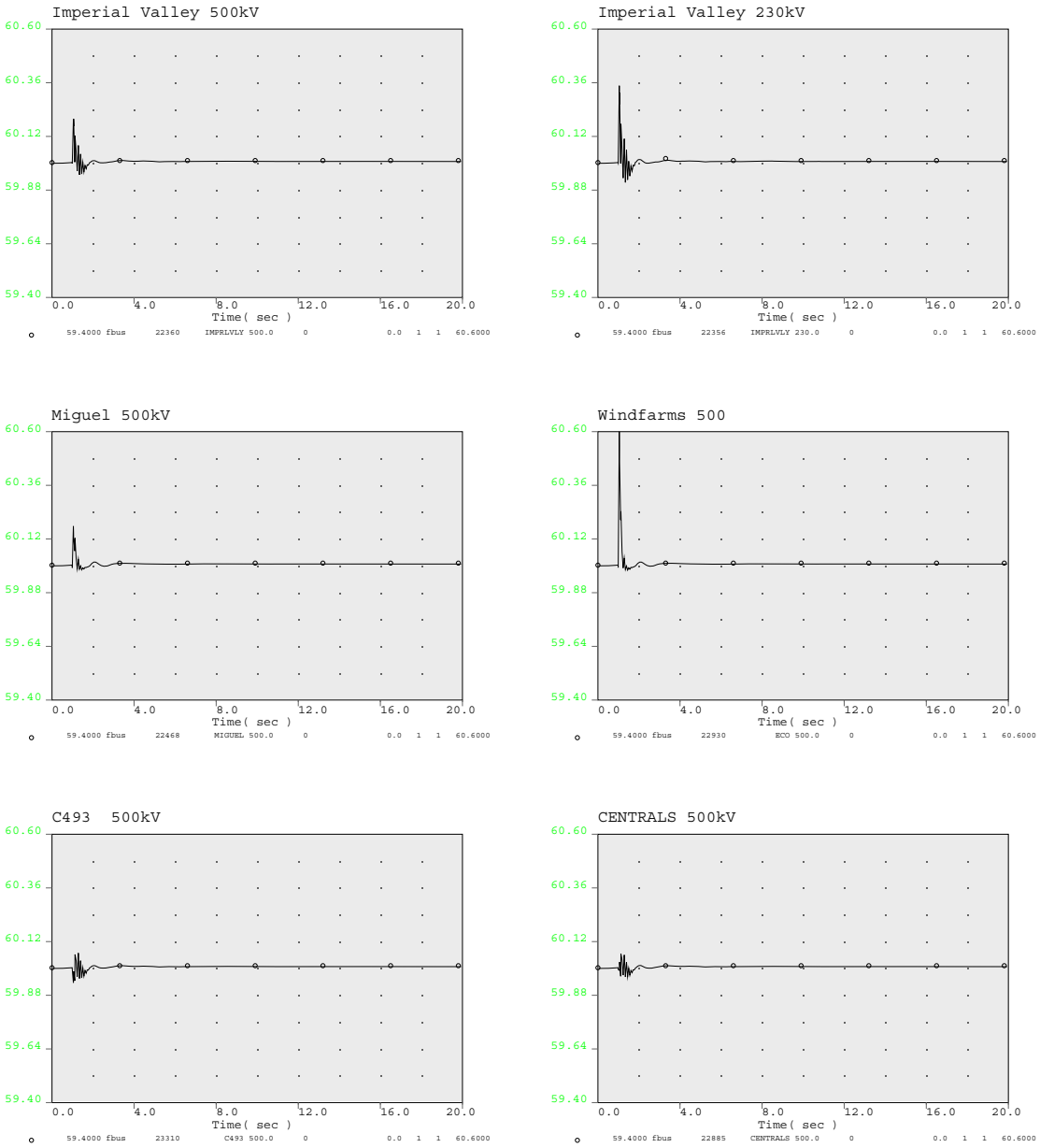


CENTRALS 500kV



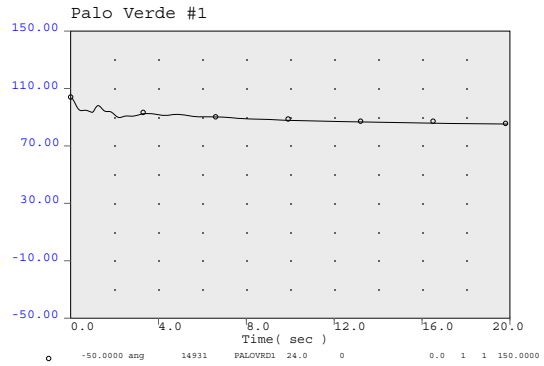
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

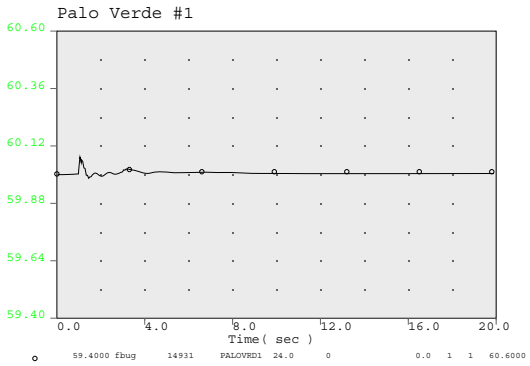
Imperial Valley Area - Frequency

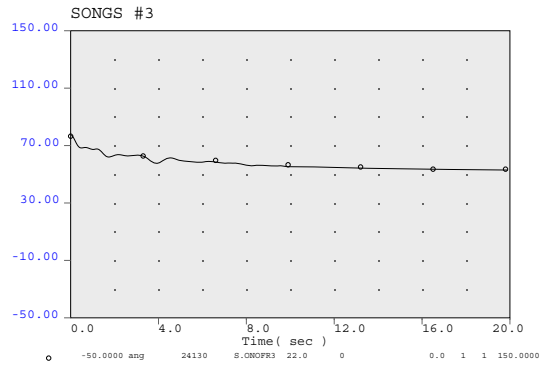


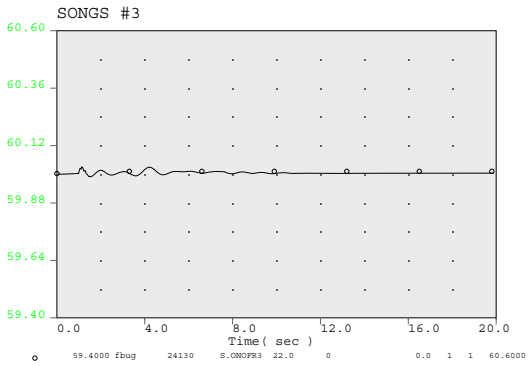
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

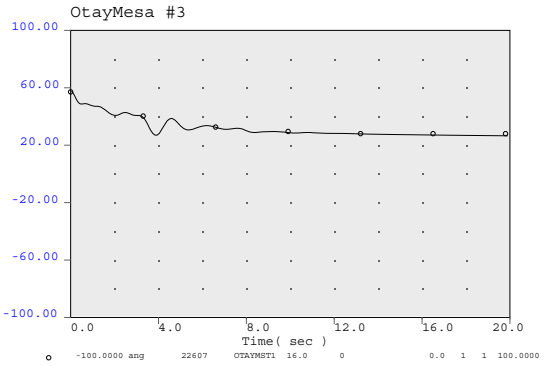
RELATIVE ROTOR ANGLE & FREQUENCY

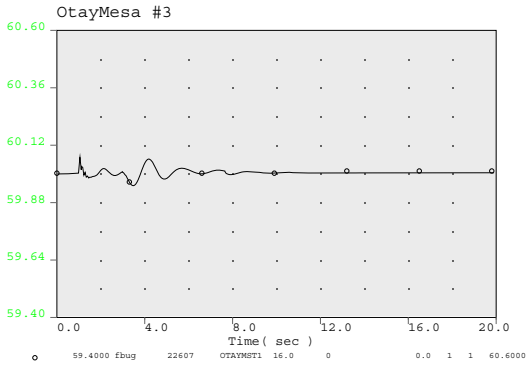












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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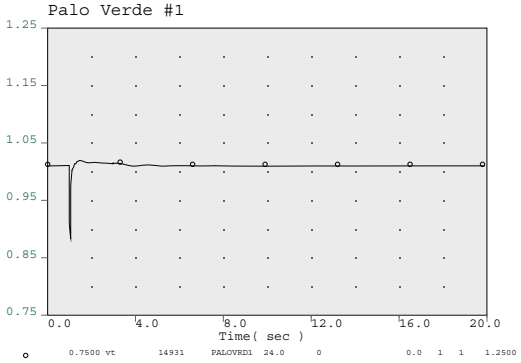
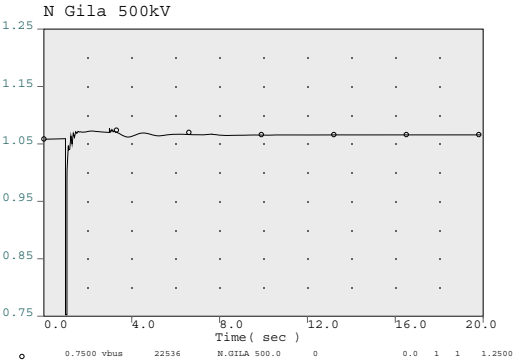
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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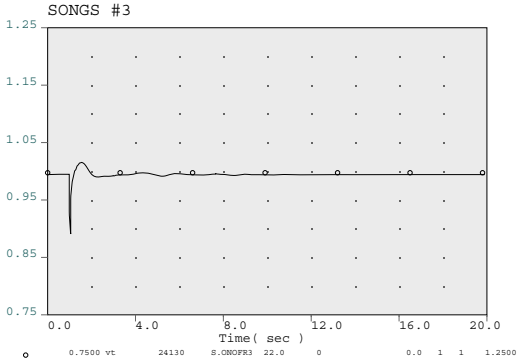
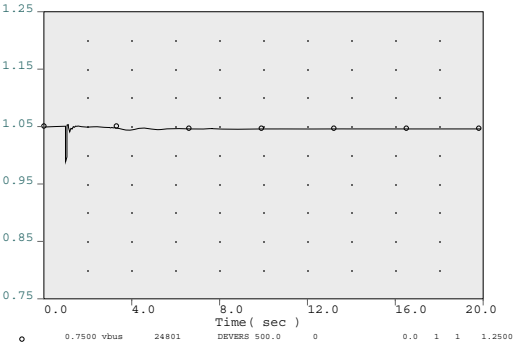


Devers 500



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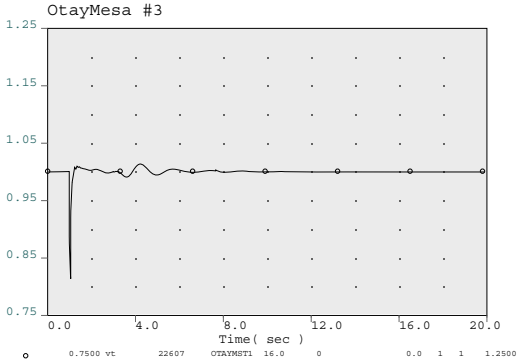
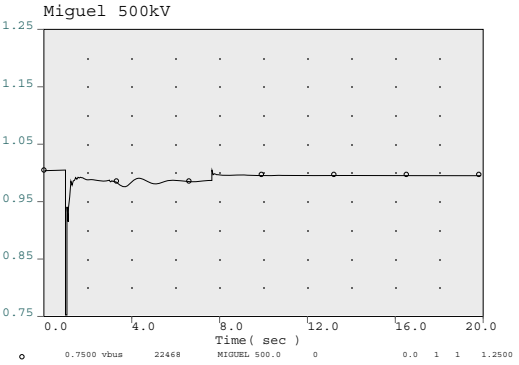


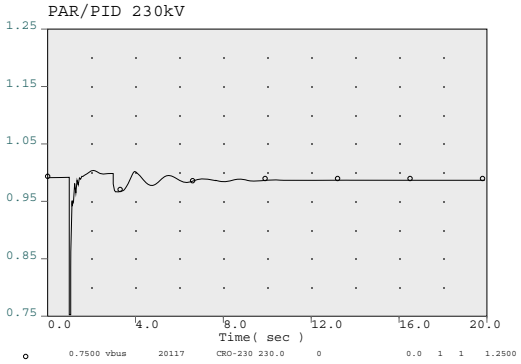
Miguel 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

PAR/PID 230kV



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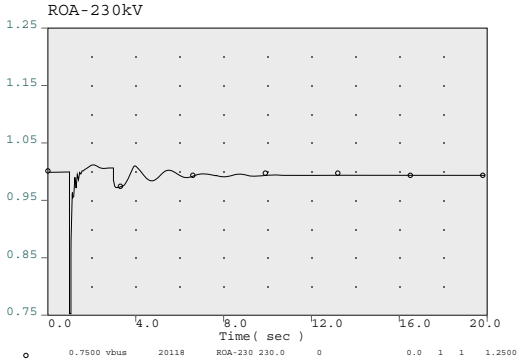
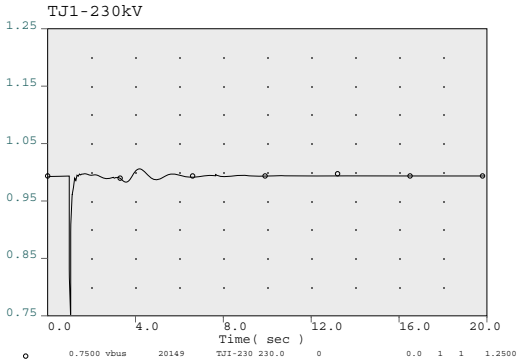


TJ1-230kV



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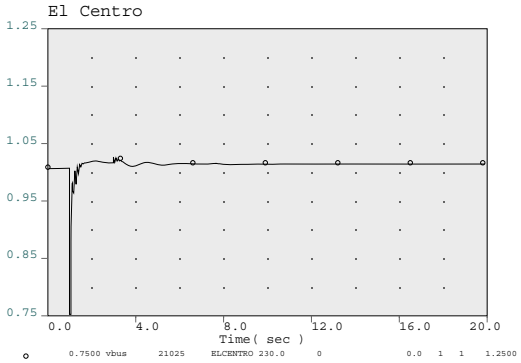
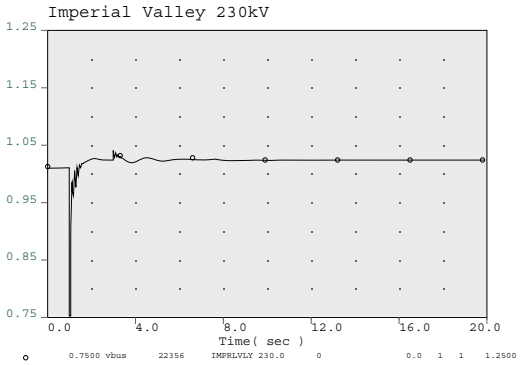
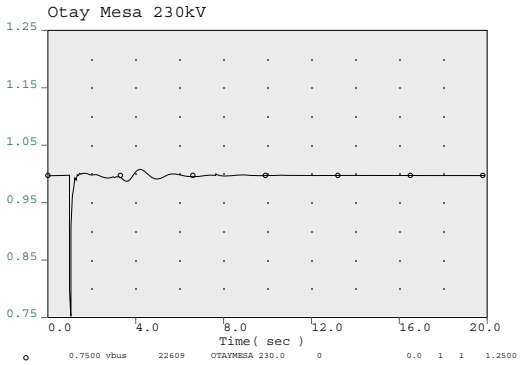


Imperial Valley 230kV



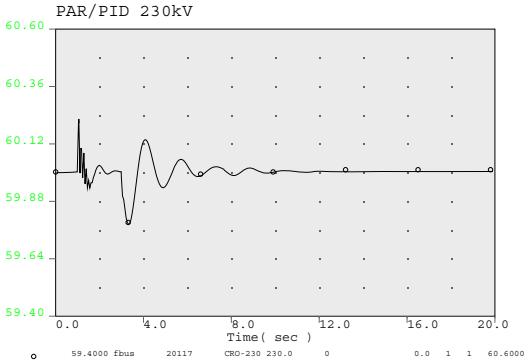
Otay Mesa 230kV



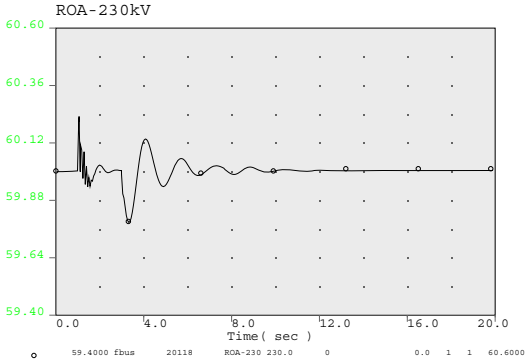
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

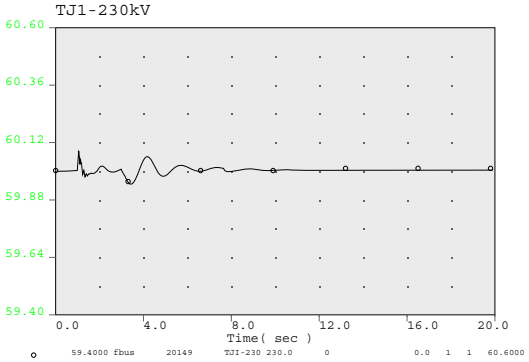
PAR/PID 230kV



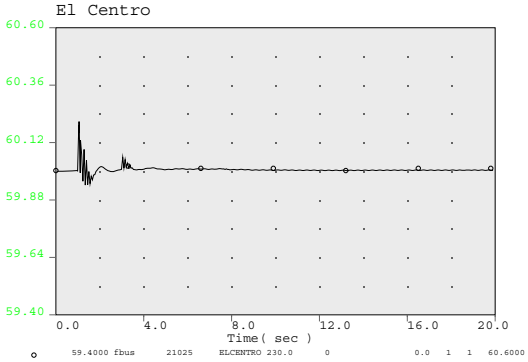
ROA-230kV



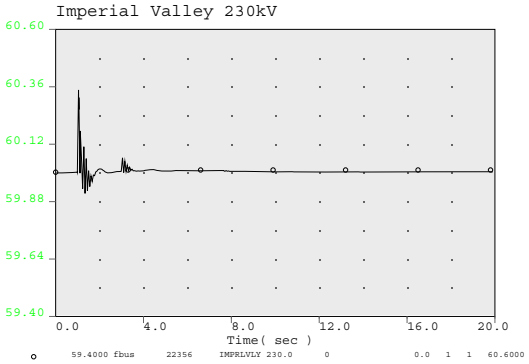
TJ1-230kV



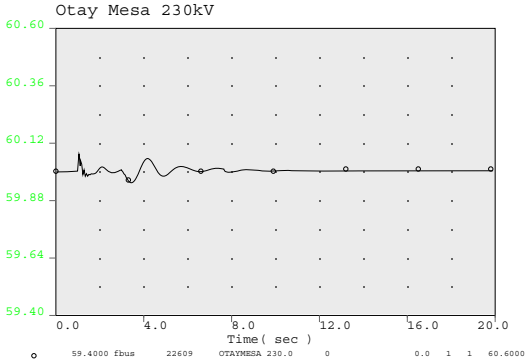
El Centro



Imperial Valley 230kV

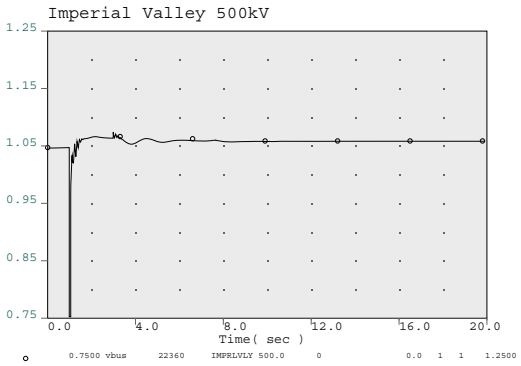


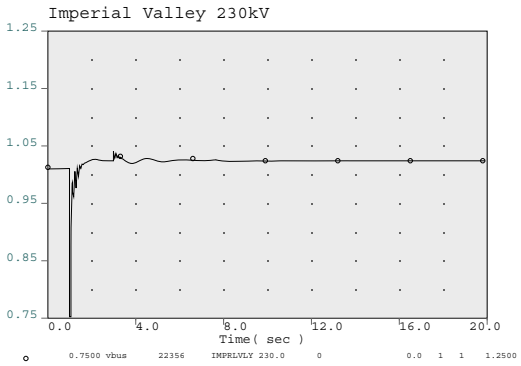
Otay Mesa 230kV

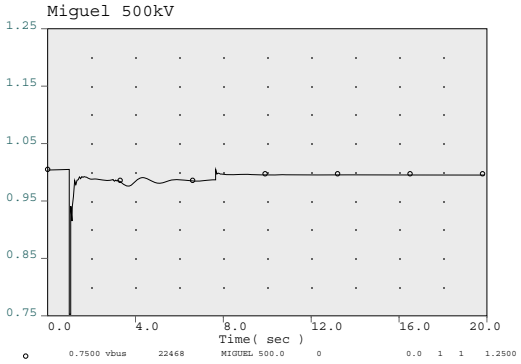


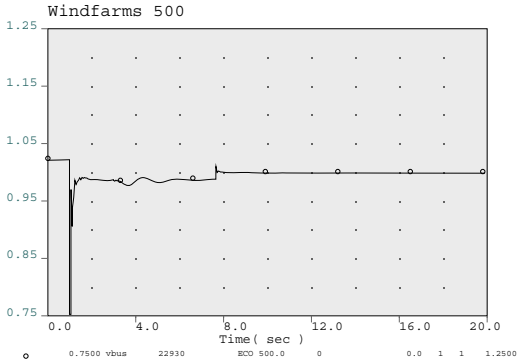
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

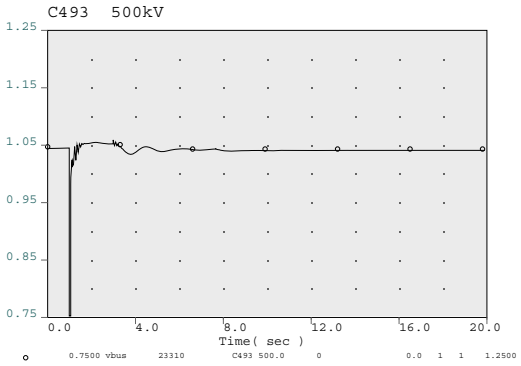
Imperial Valley Area - VOLTAGE

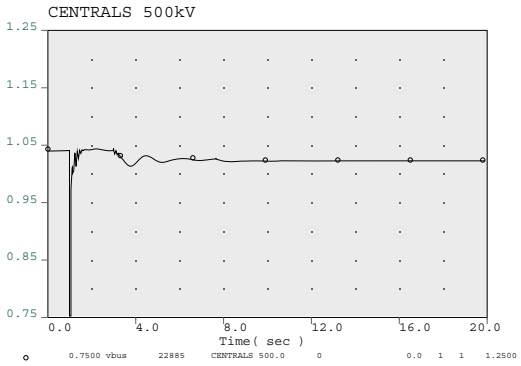






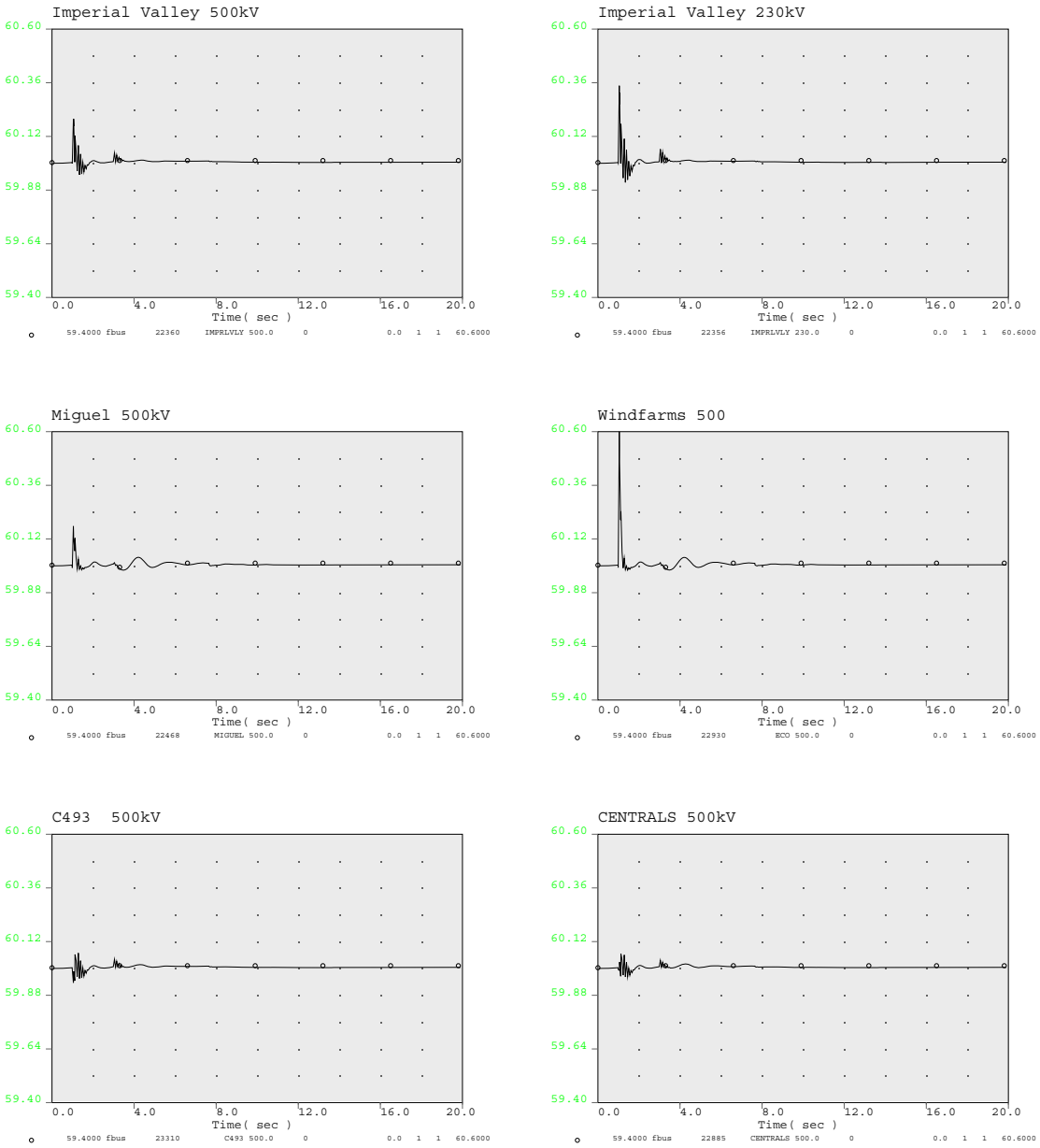






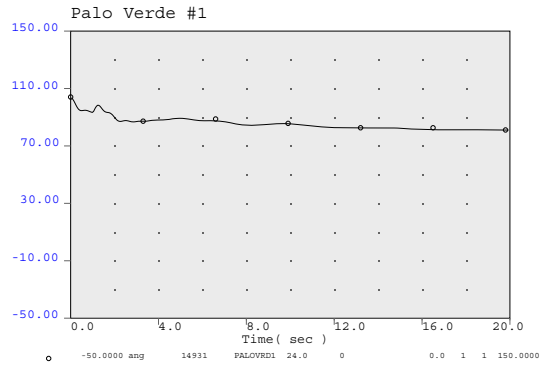
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

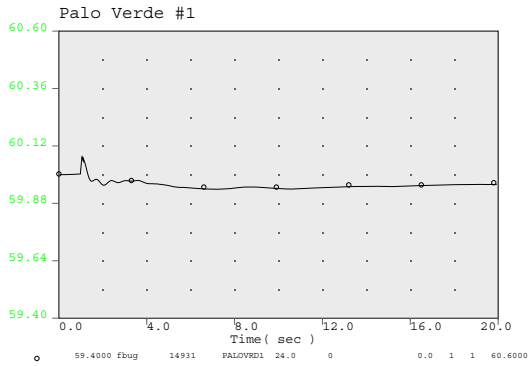
Imperial Valley Area - Frequency

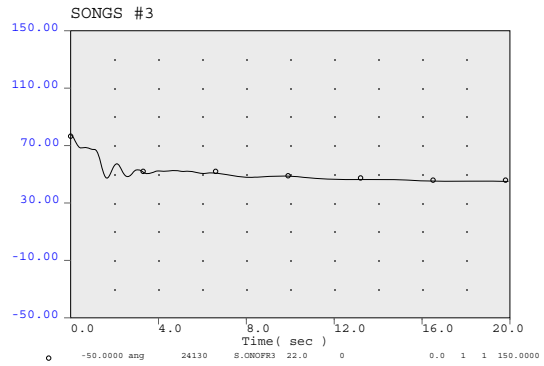


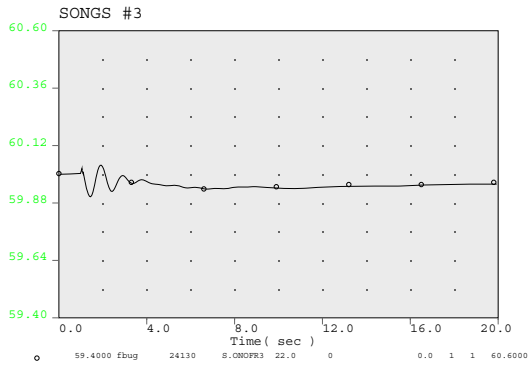
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

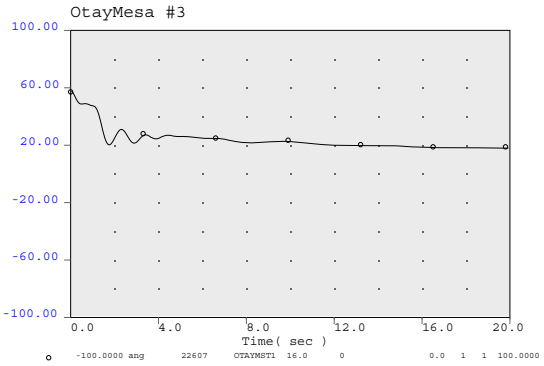
RELATIVE ROTOR ANGLE & FREQUENCY

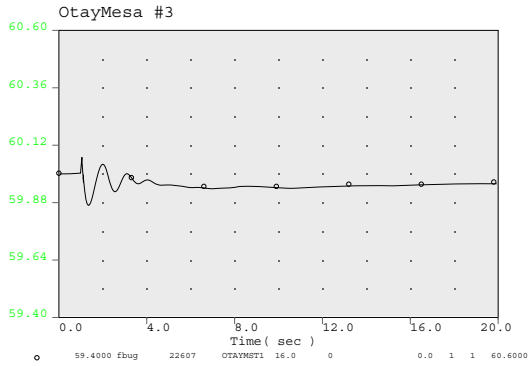












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

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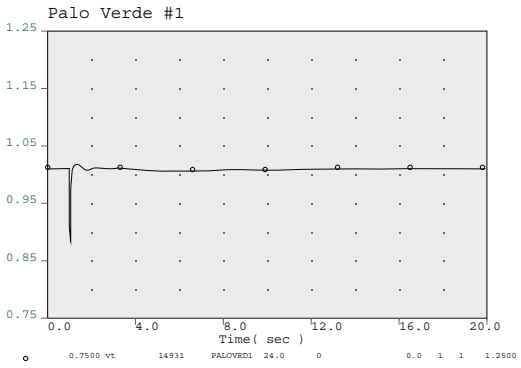
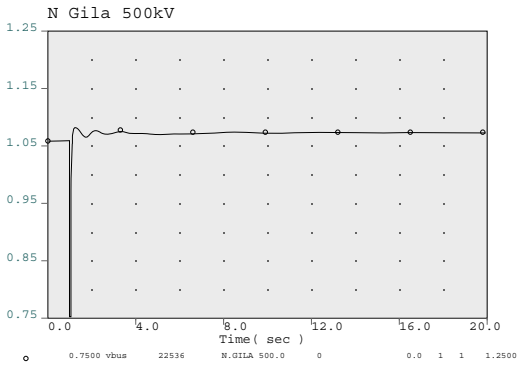
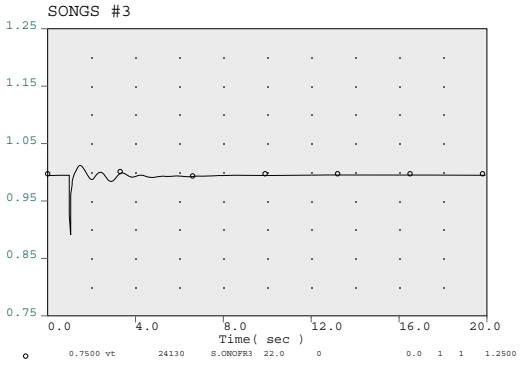
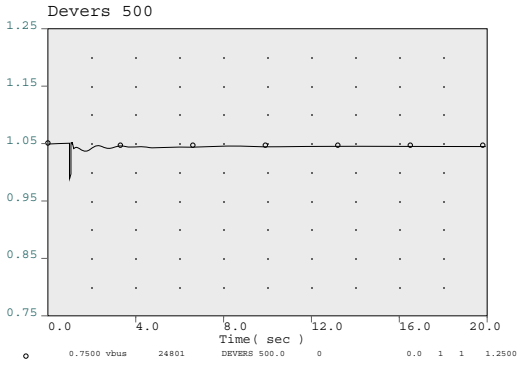
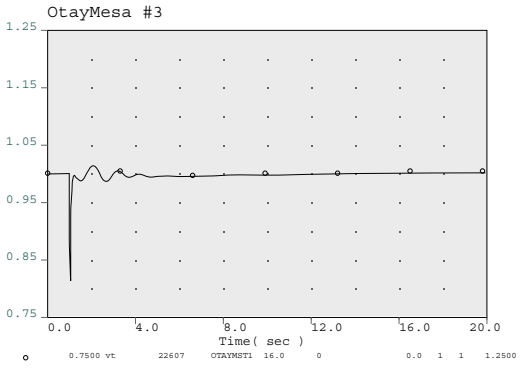
RELATIVE VOLTAGE

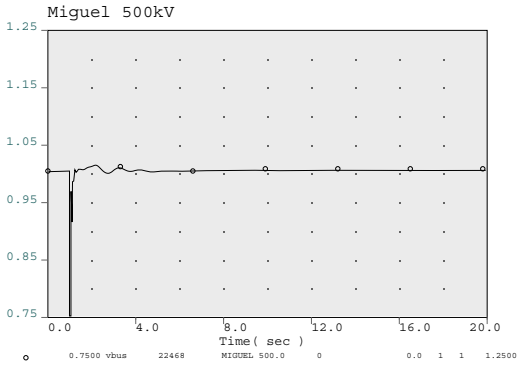








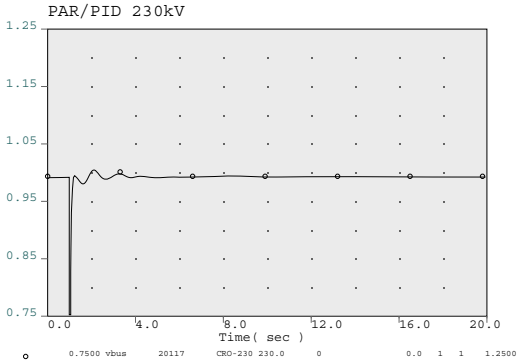




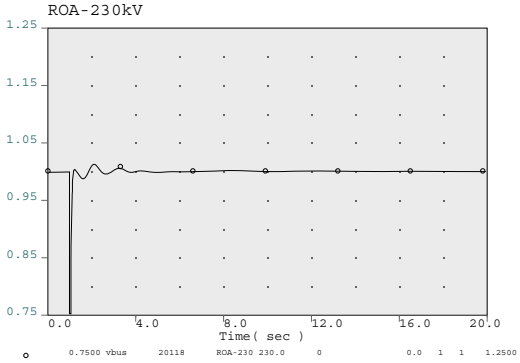
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

Affected System Voltage Check and Comparison

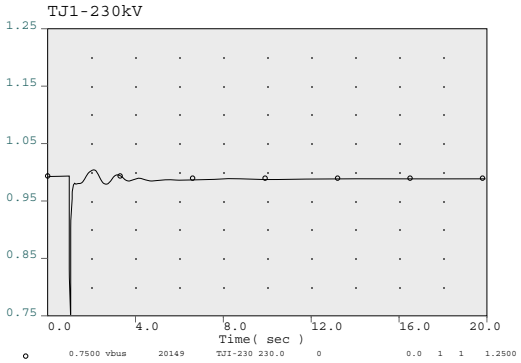
PAR/PID 230kV



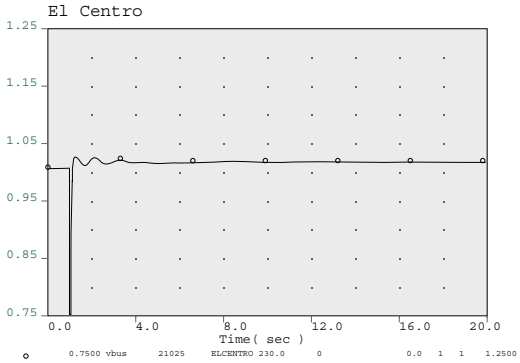
ROA-230kV



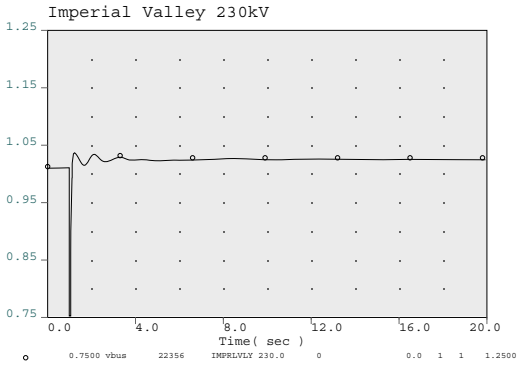
TJ1-230kV



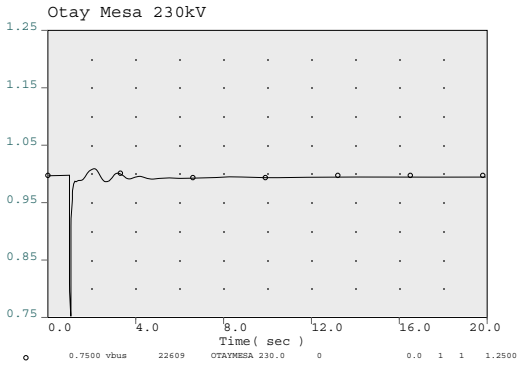
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

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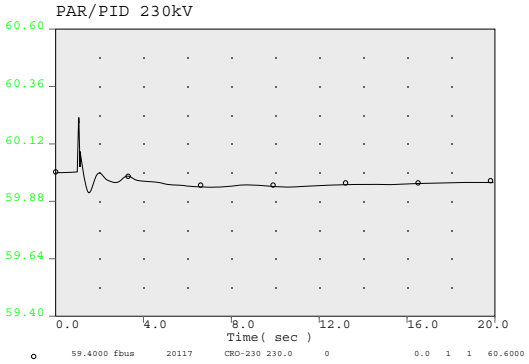
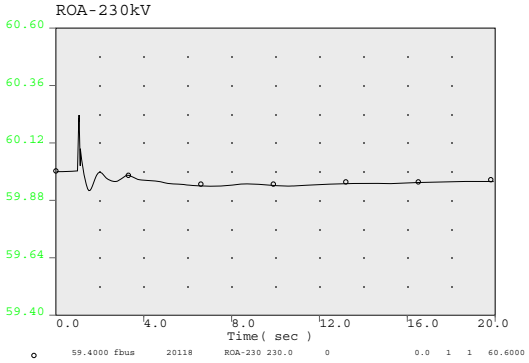
SDGE	IV_Wnd_dlo_noX_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:36:27 2010

Affected System Frequency Check and Comparison

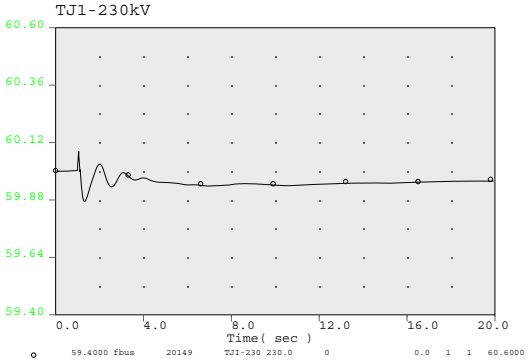
PAR/PID 230kV



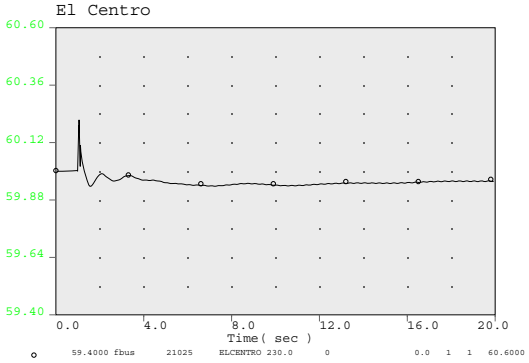
ROA-230kV



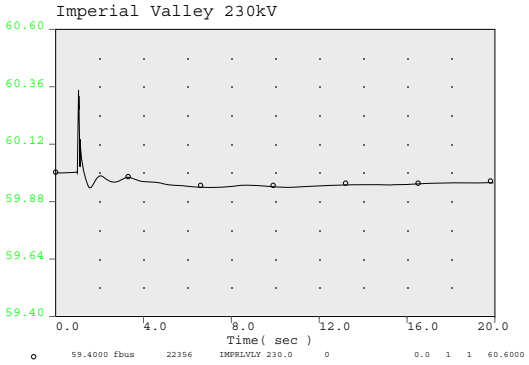
TJ1-230kV



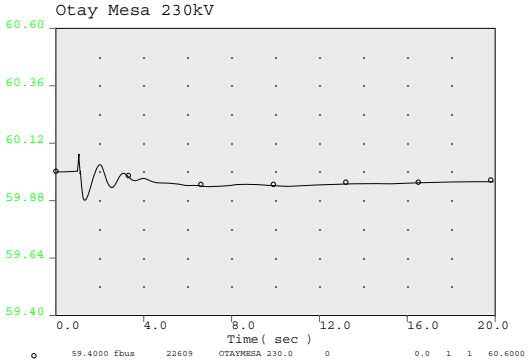
El Centro



Imperial Valley 230kV



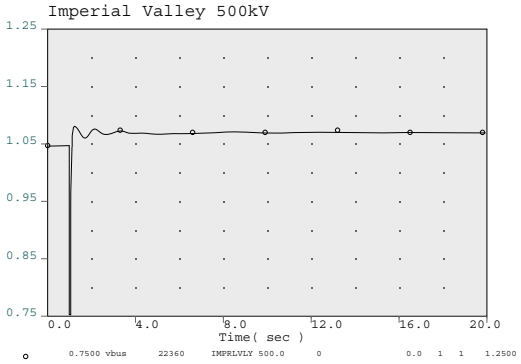
Otay Mesa 230kV



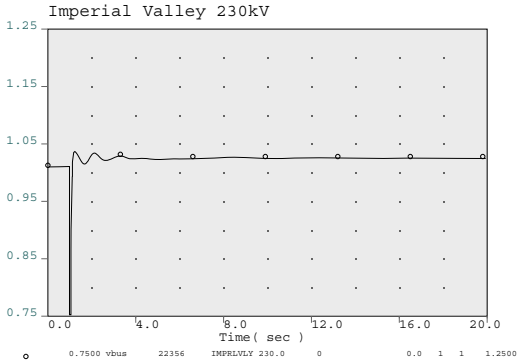
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

Imperial Valley Area - VOLTAGE

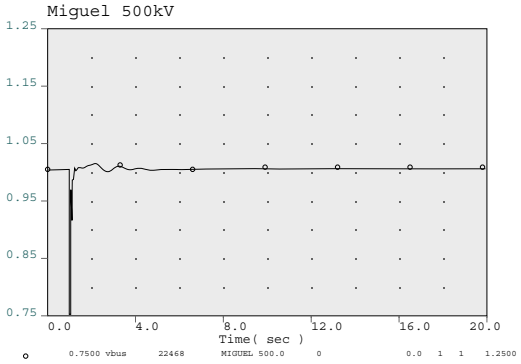
Imperial Valley 500kV



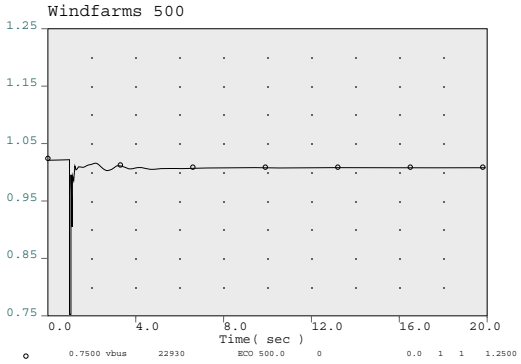
Imperial Valley 230kV



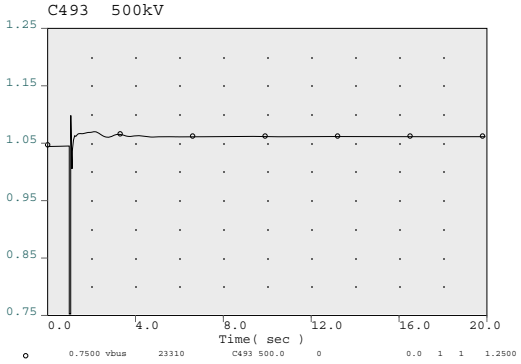
Miguel 500kV



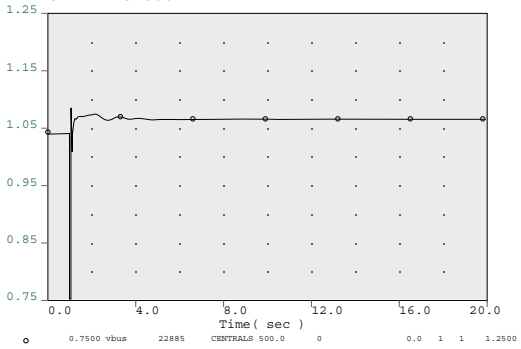
Windfarms 500



C493 500kV

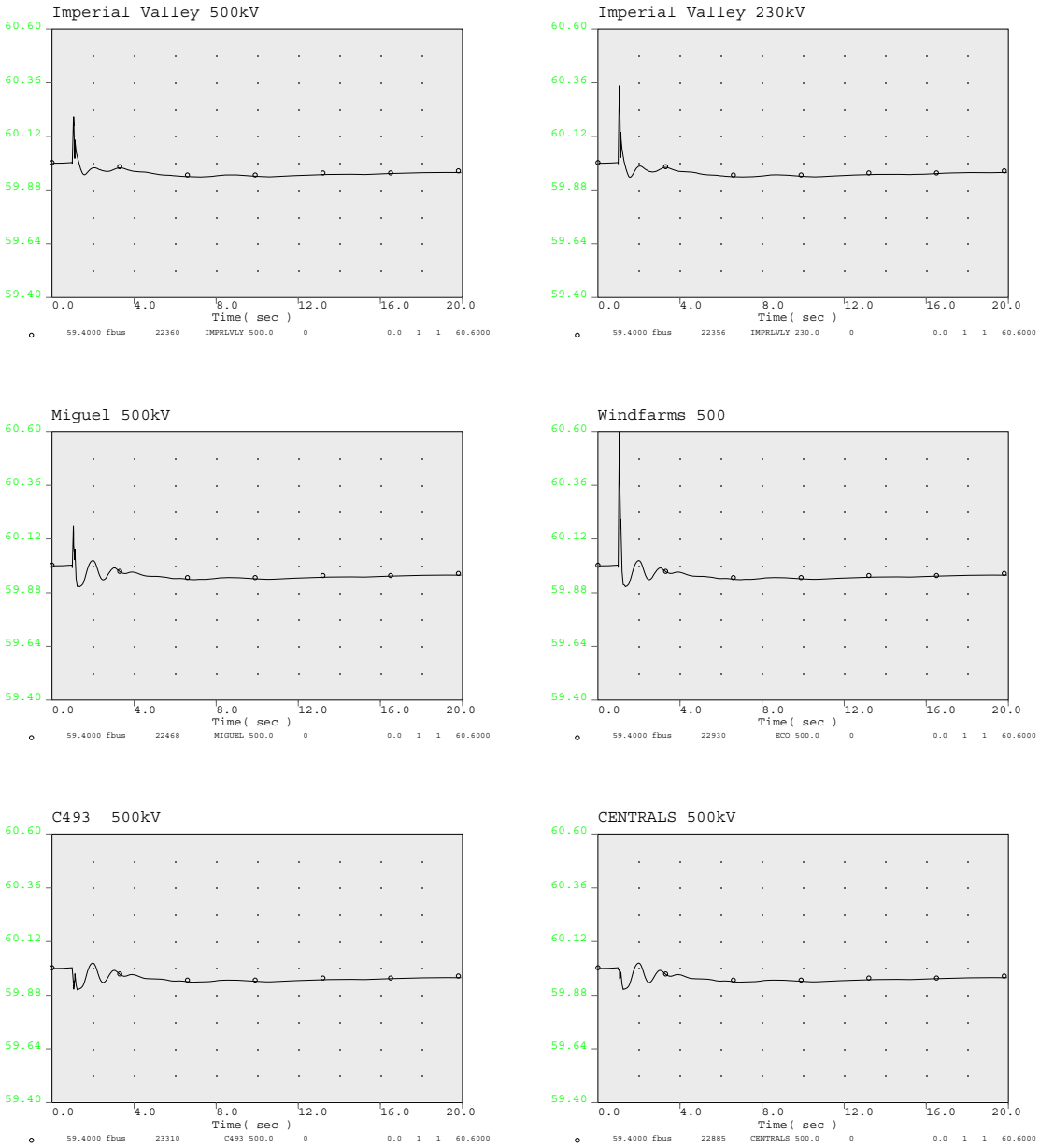


CENTRALS 500kV



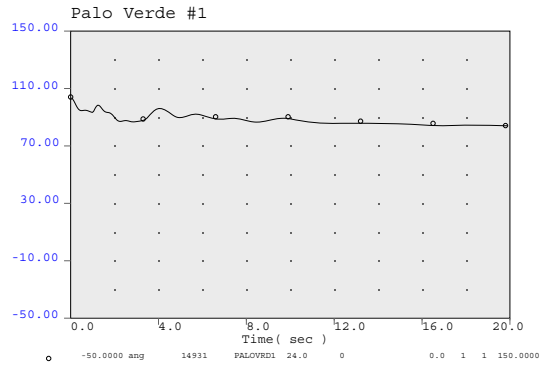
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

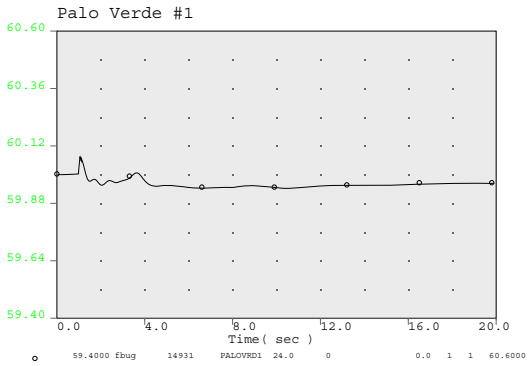
Imperial Valley Area - Frequency

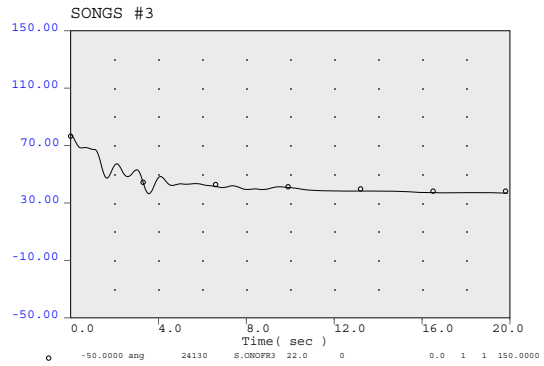


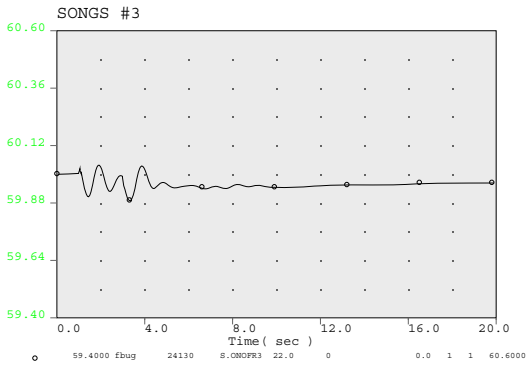
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

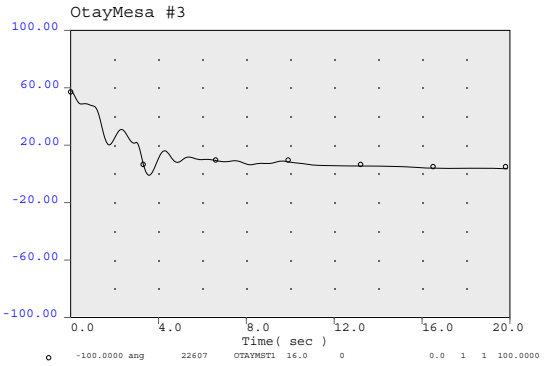
RELATIVE ROTOR ANGLE & FREQUENCY

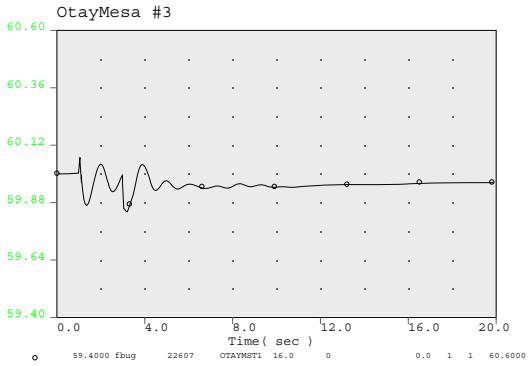










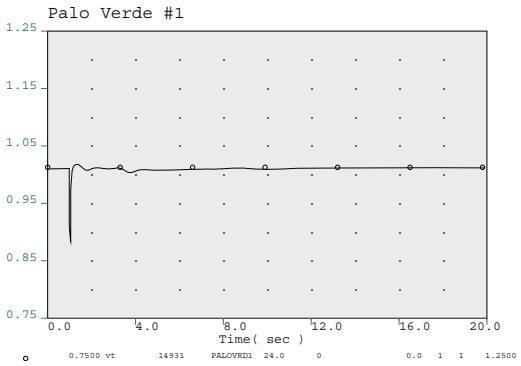


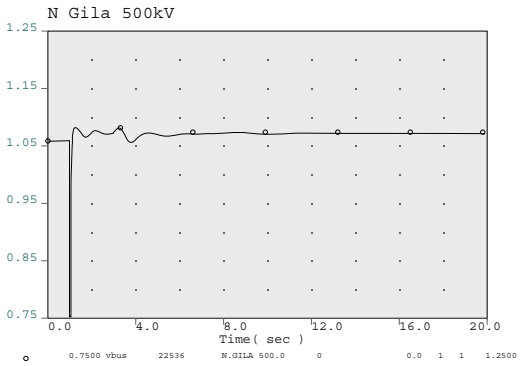
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

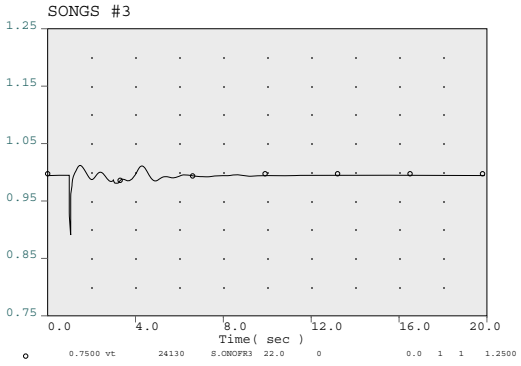
Page 1

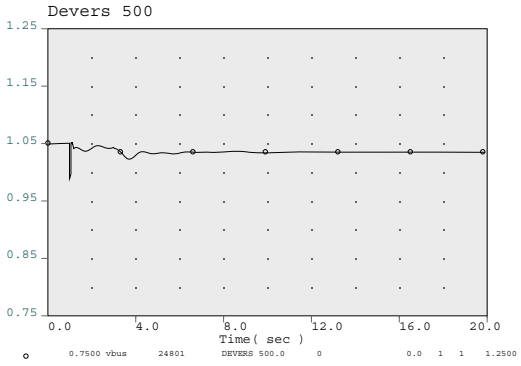
SDGE	IV_Wnd_dlo_RxR_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:36:53 2010

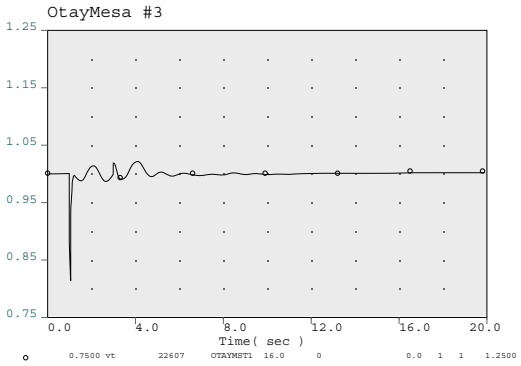
RELATIVE VOLTAGE

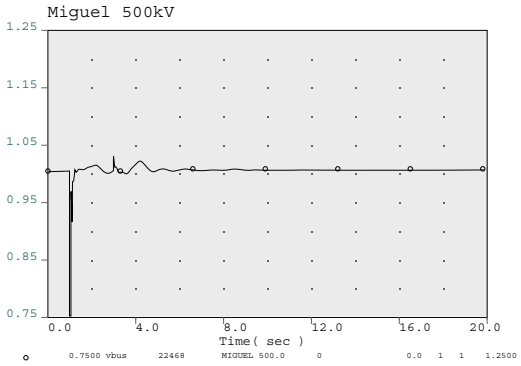








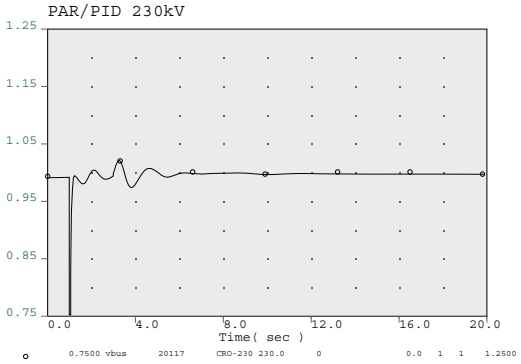




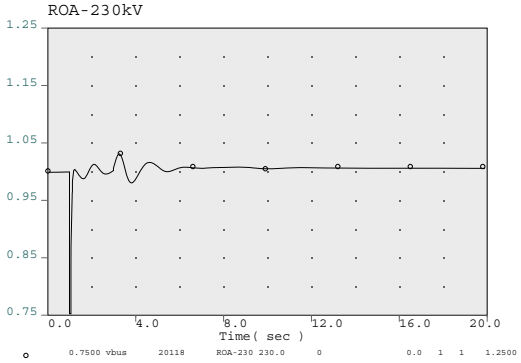
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

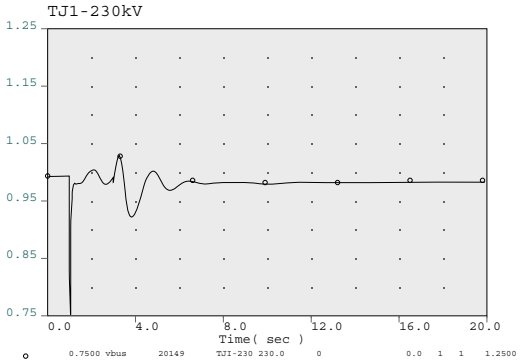
PAR/PID 230kV



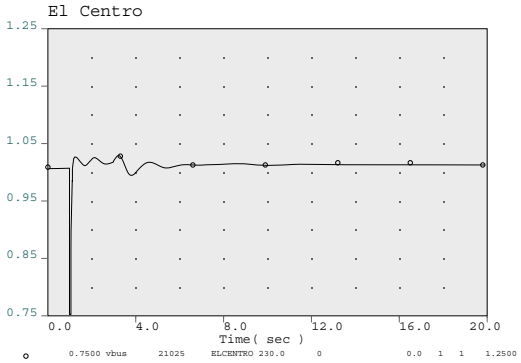
ROA-230kV



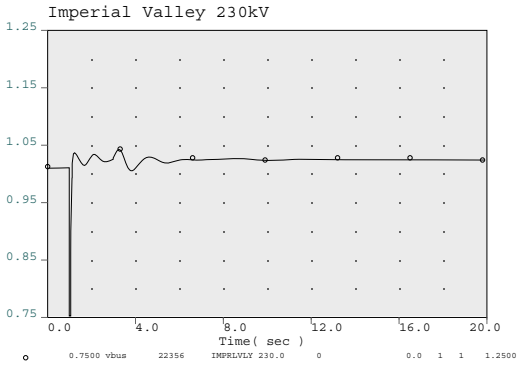
TJ1-230kV



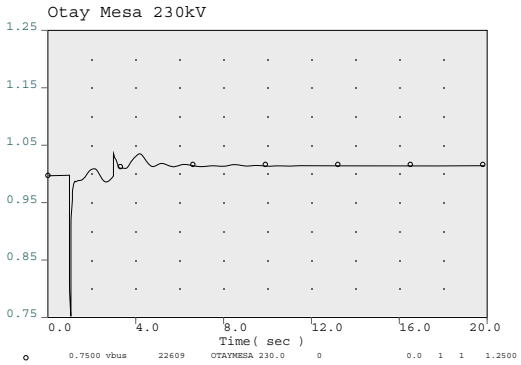
El Centro



Imperial Valley 230kV



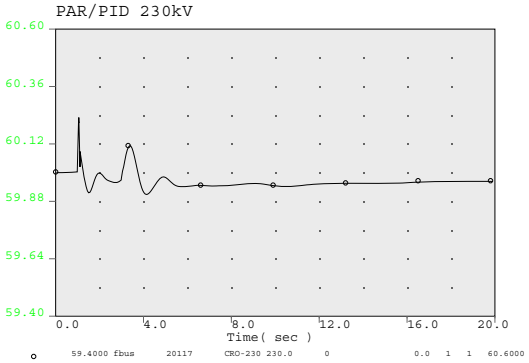
Otay Mesa 230kV



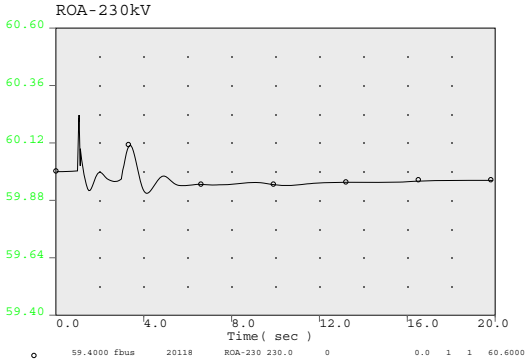
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison

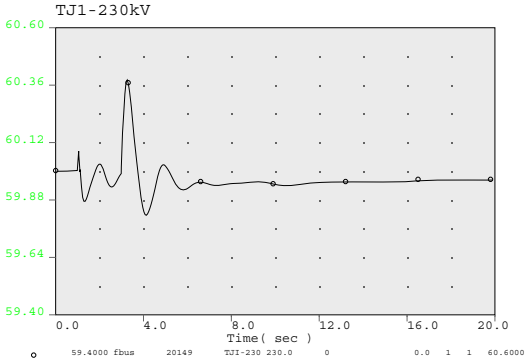
PAR/PID 230kV



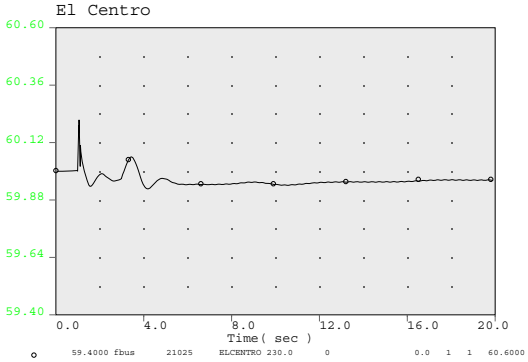
ROA-230kV



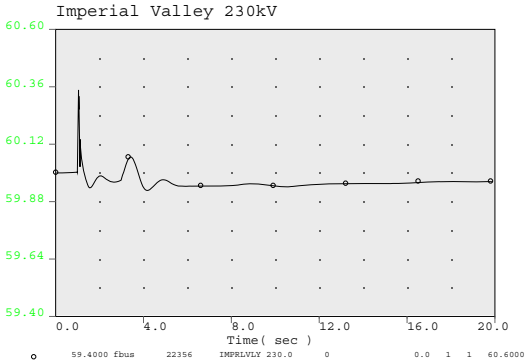
TJ1-230kV



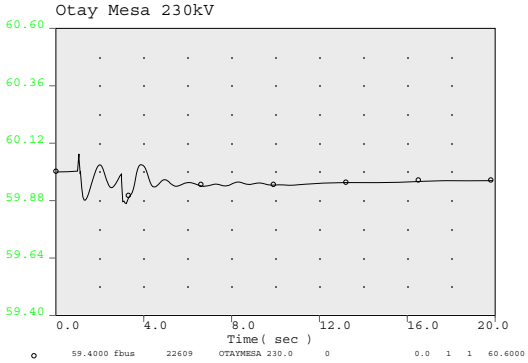
El Centro



Imperial Valley 230kV



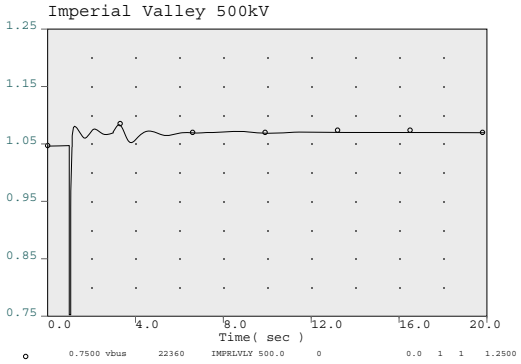
Otay Mesa 230kV



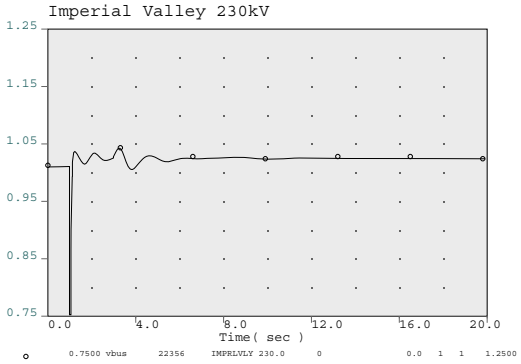
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Imperial Valley Area - VOLTAGE

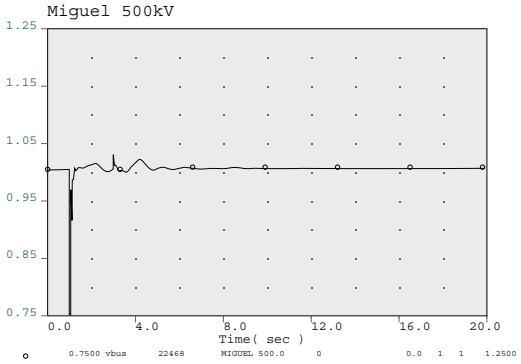
Imperial Valley 500kV



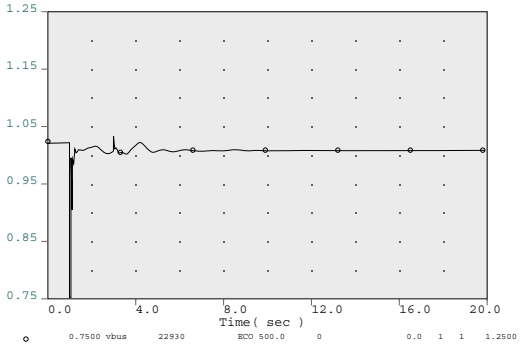
Imperial Valley 230kV



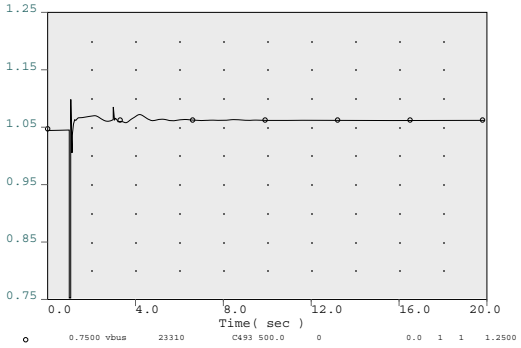
Miguel 500kV



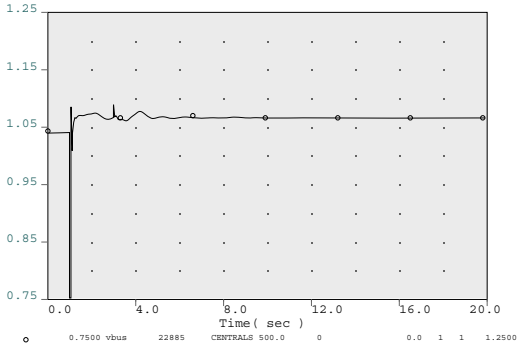
Windfarms 500



C493 500kV

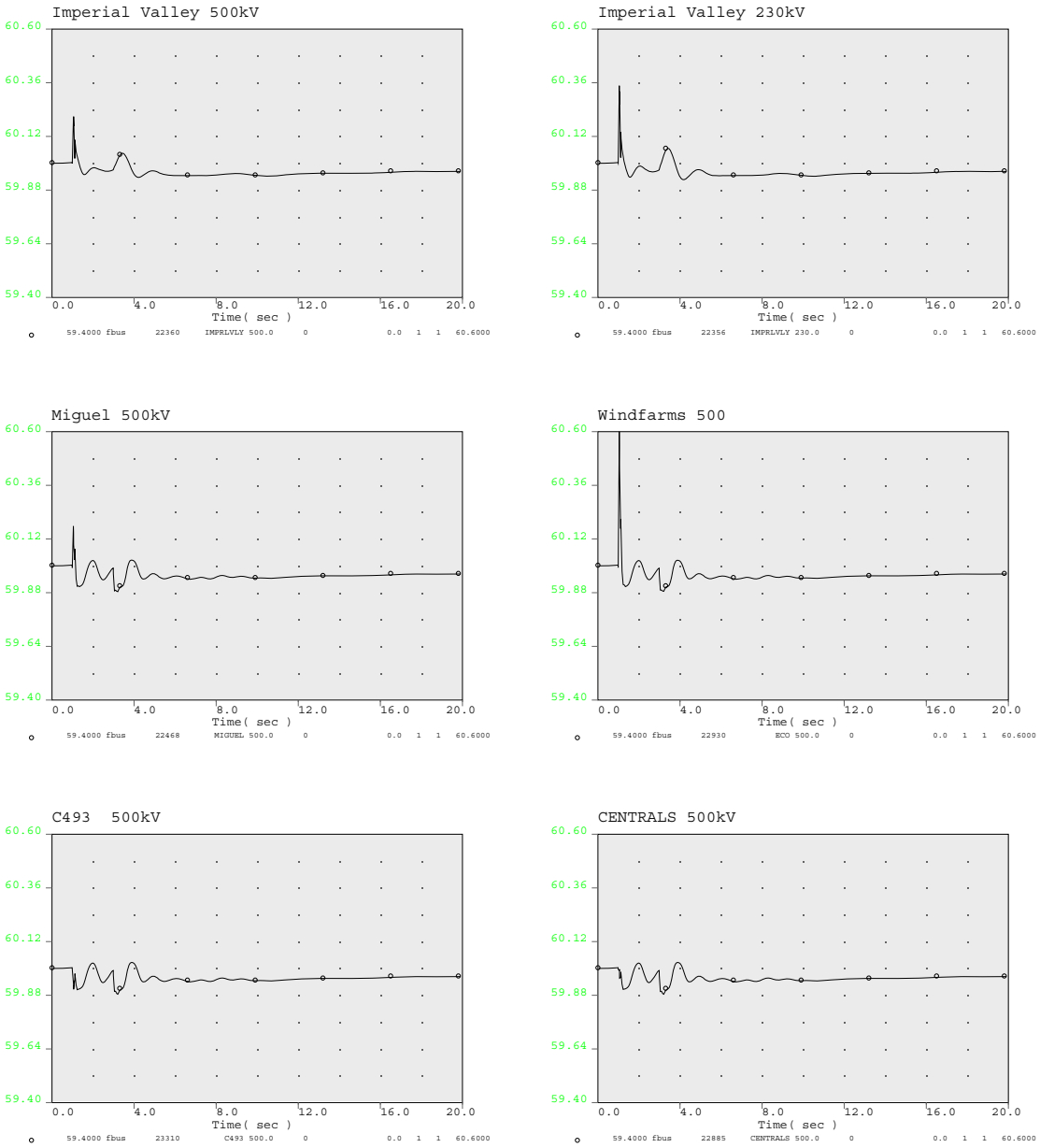


CENTRALS 500kV



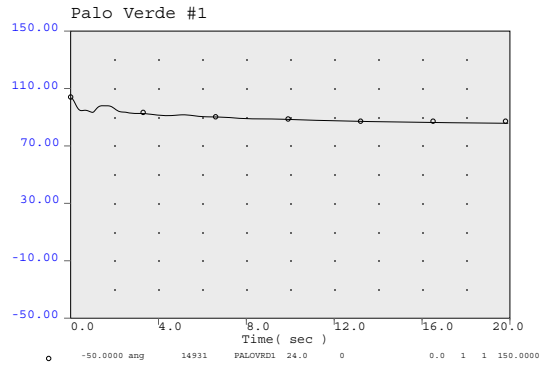
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

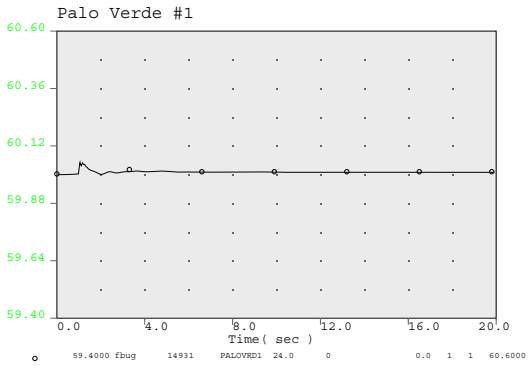
Imperial Valley Area - Frequency

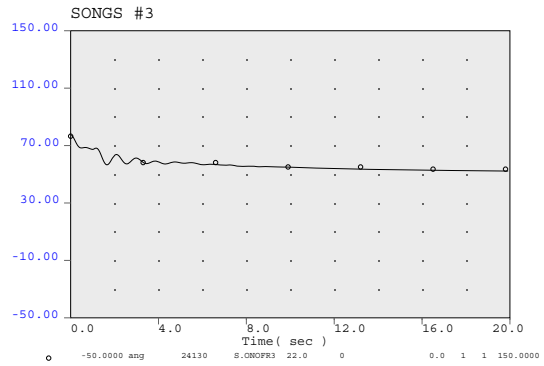


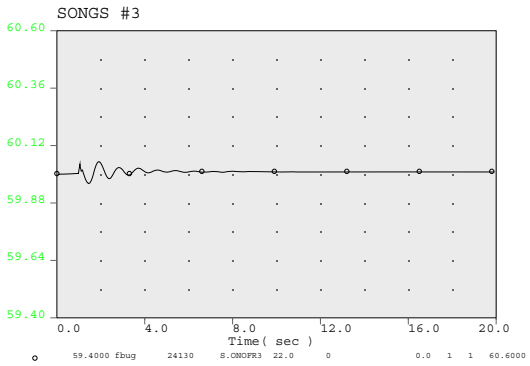
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

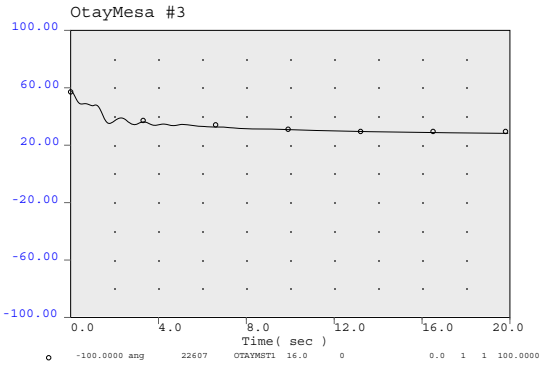
RELATIVE ROTOR ANGLE & FREQUENCY

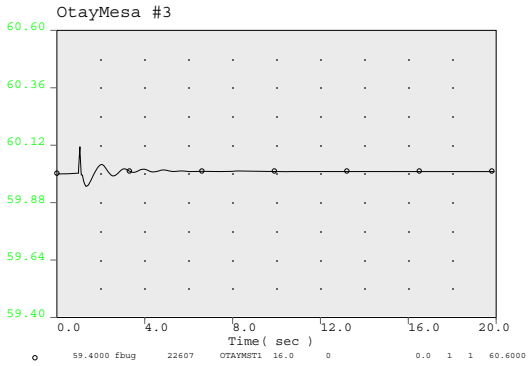












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Miguel-ECO 500 kV line

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SDGE	ML_Wnd_noRAS_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:37:20 2010

RELATIVE VOLTAGE

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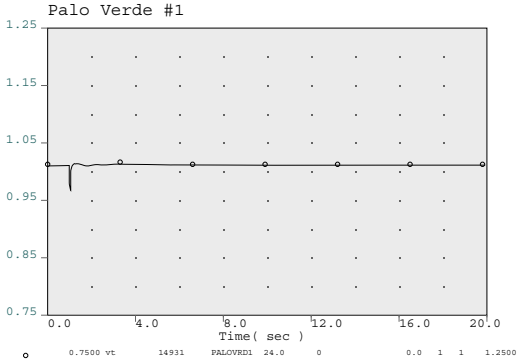
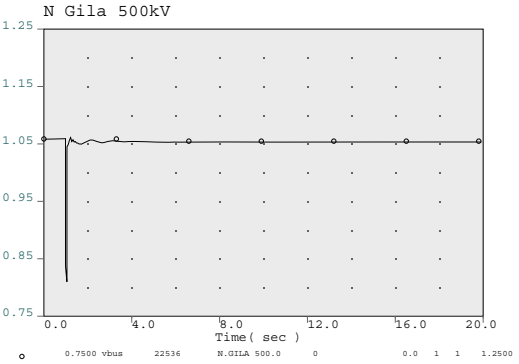


N Gila 500kV



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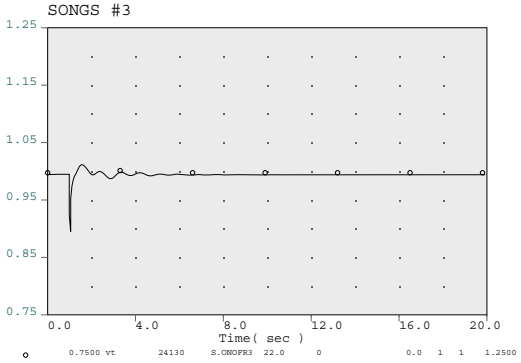

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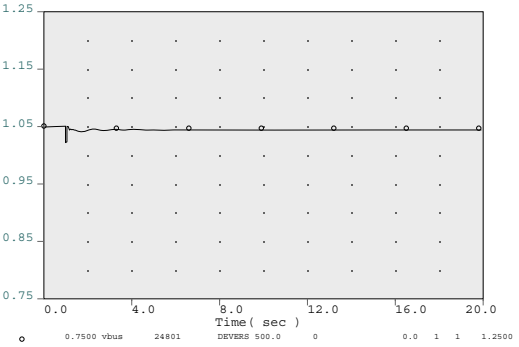

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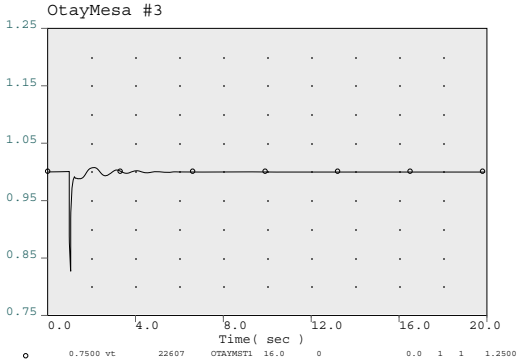
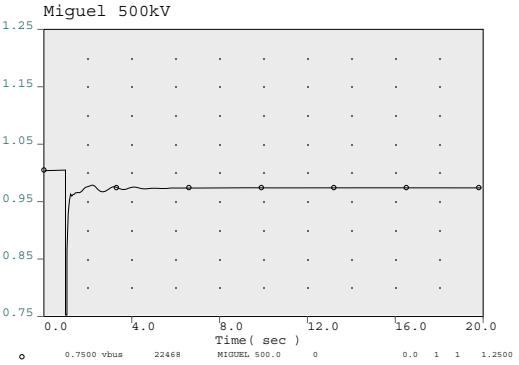


Miguel 500kV



SDG&E Cluster 2 - post
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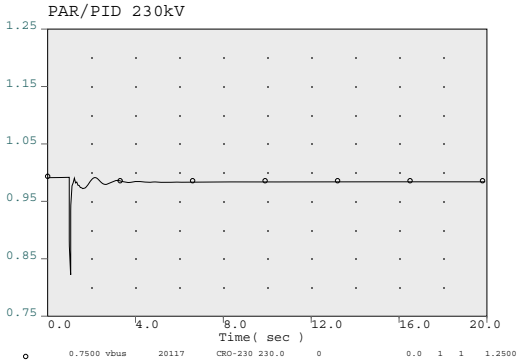
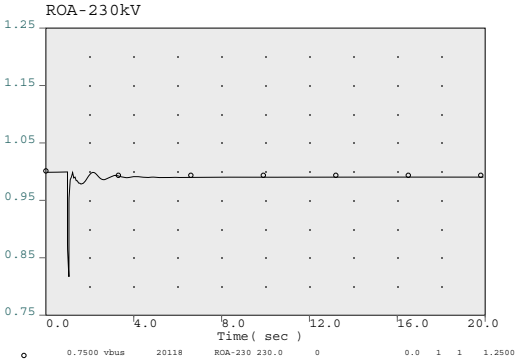
Affected System Voltage Check and Comparison

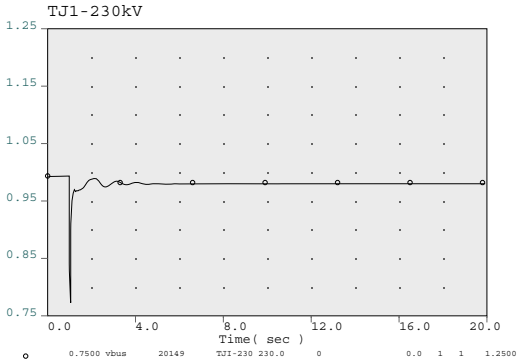
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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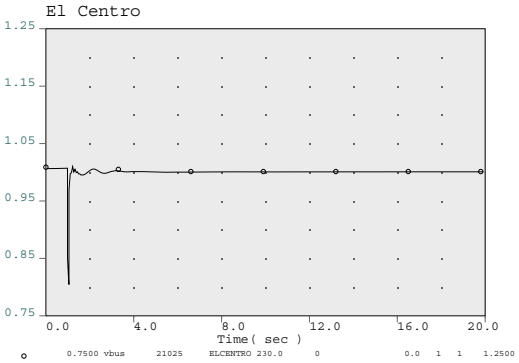
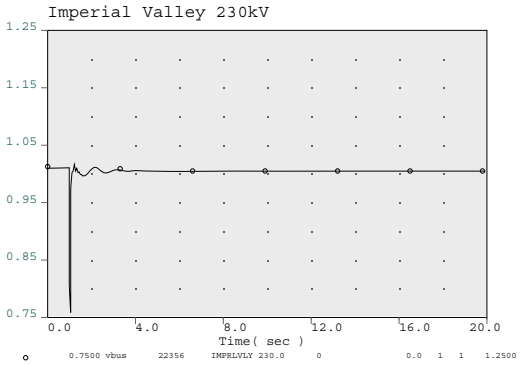
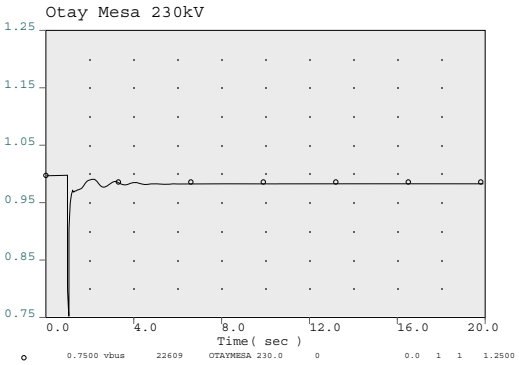


Imperial Valley 230kV



Otay Mesa 230kV



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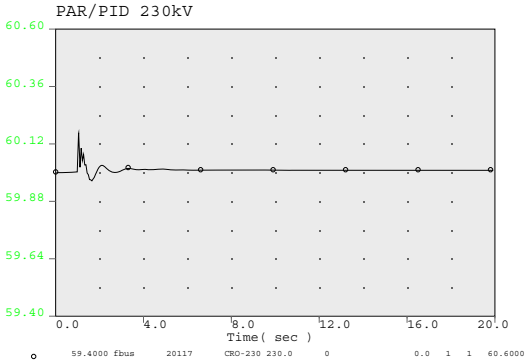
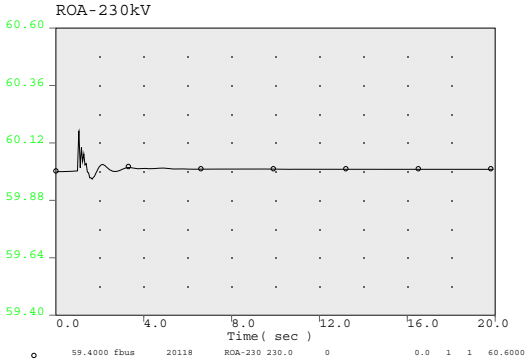
Affected System Frequency Check and Comparison

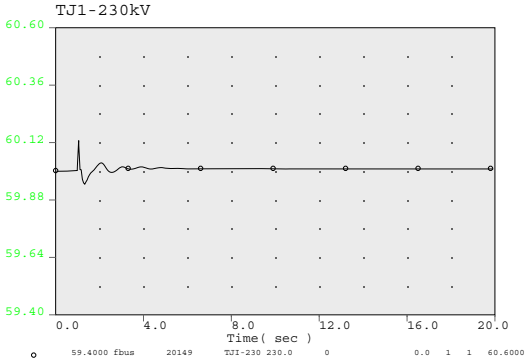
PAR/PID 230kV



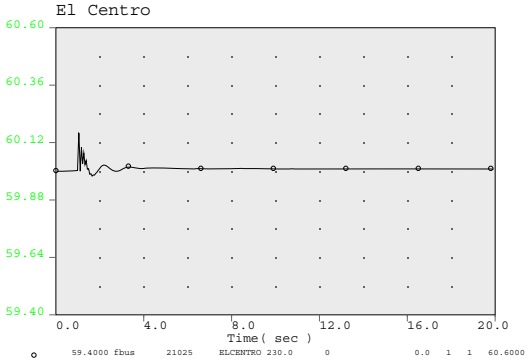
ROA-230kV



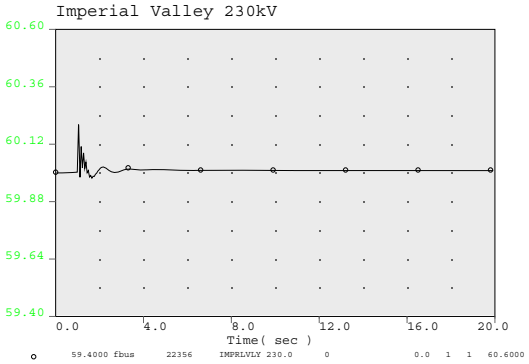
TJ1-230kV



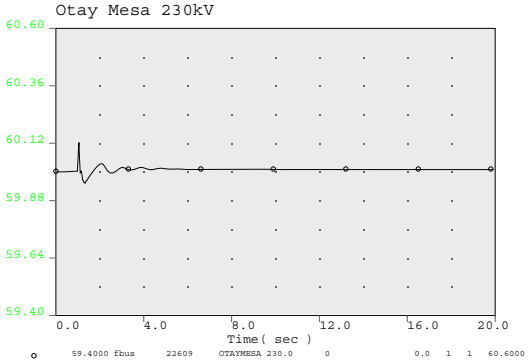
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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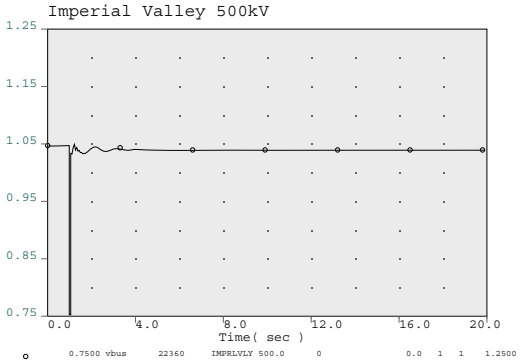
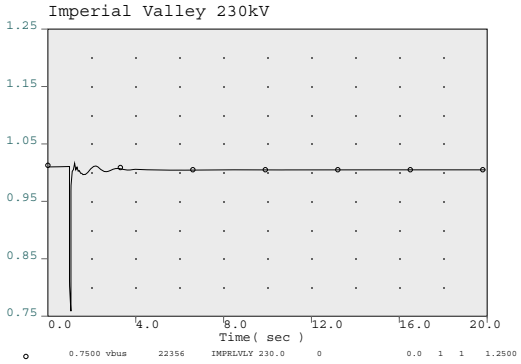
Imperial Valley Area - VOLTAGE

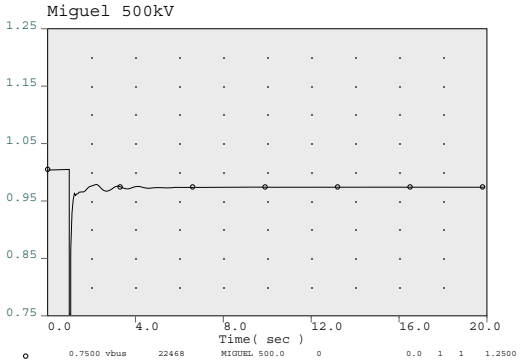
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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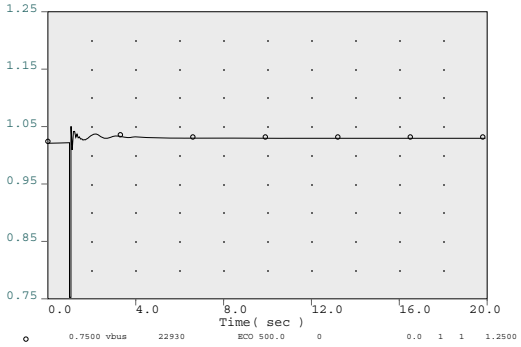
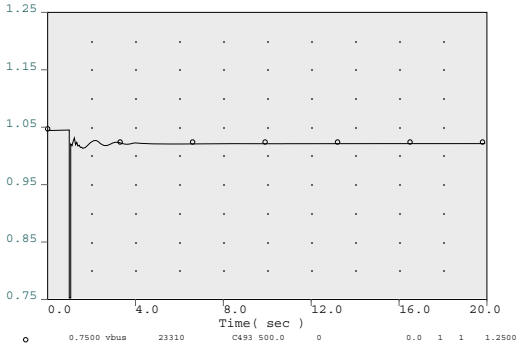


C493 500kV



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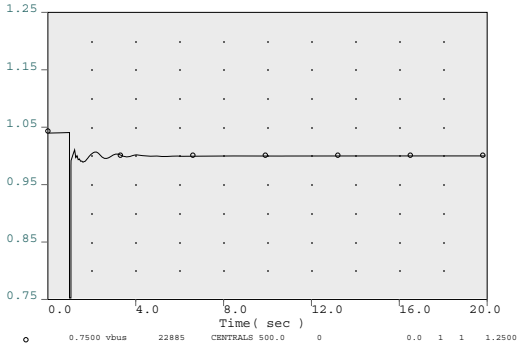

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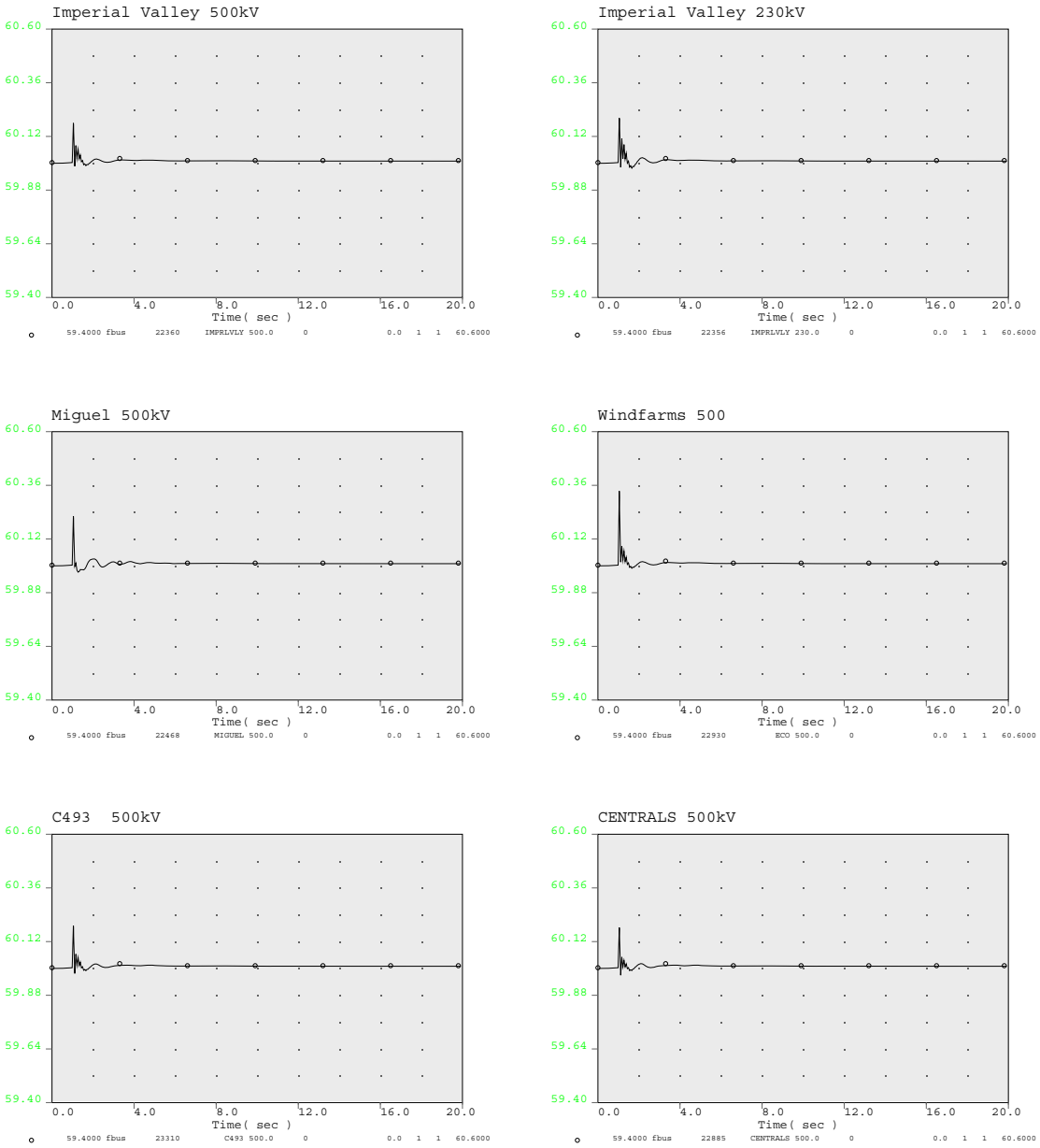
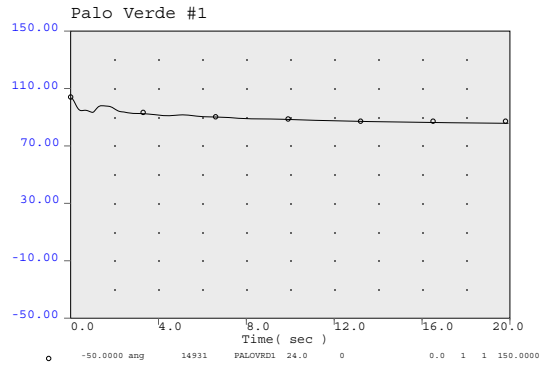
2014 Heavy Summer
Miguel-ECO 500 kV line

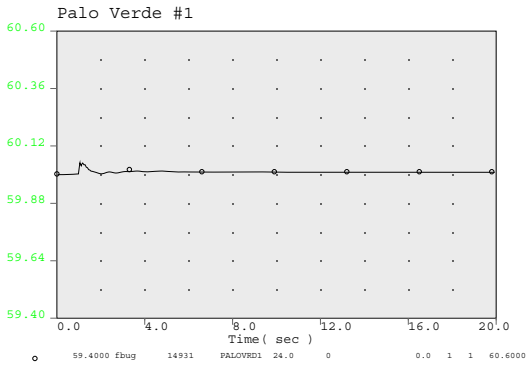
Imperial Valley Area - Frequency

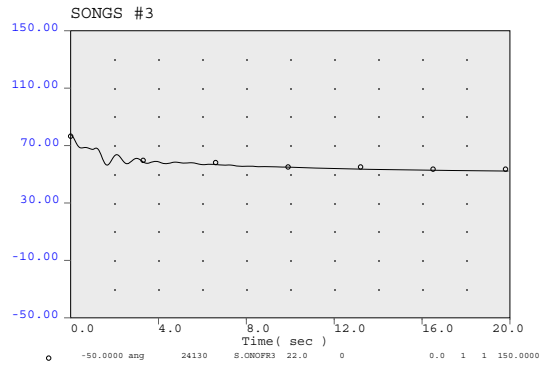


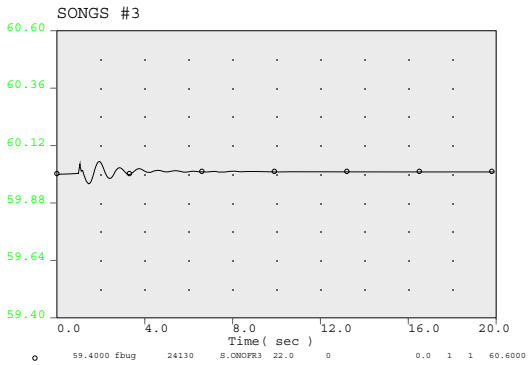
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

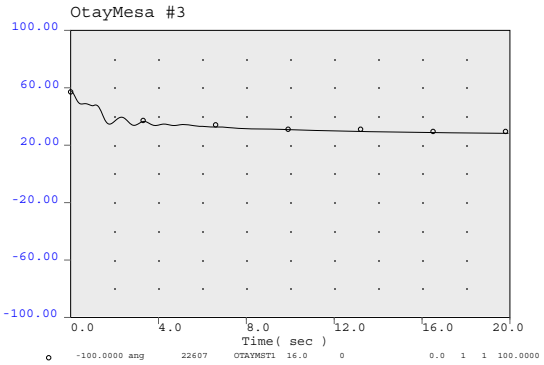
RELATIVE ROTOR ANGLE & FREQUENCY

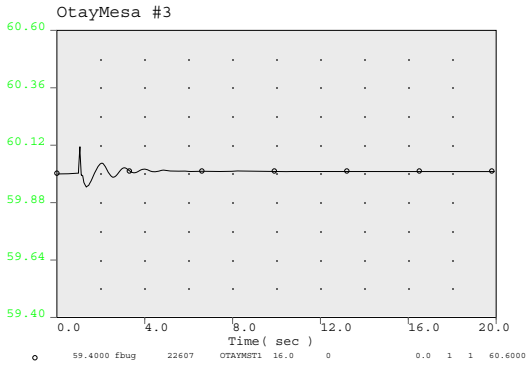












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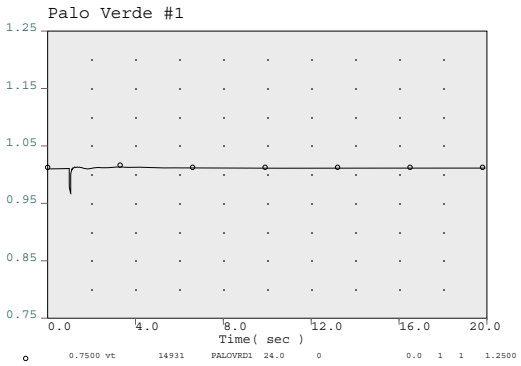
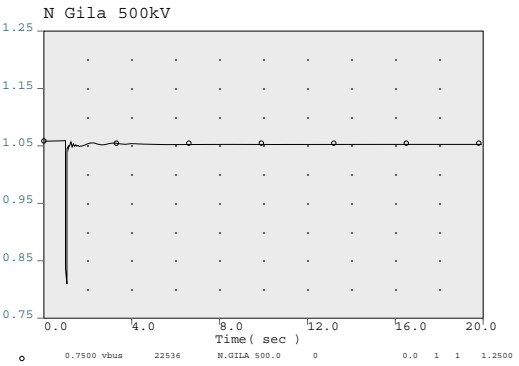
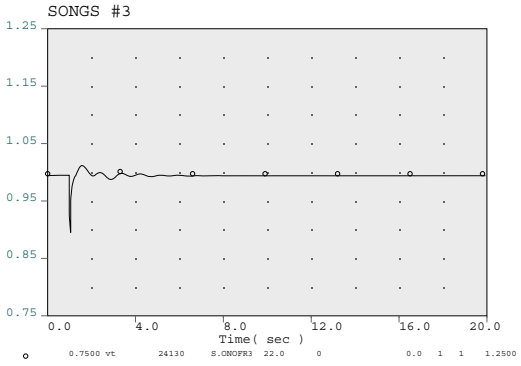
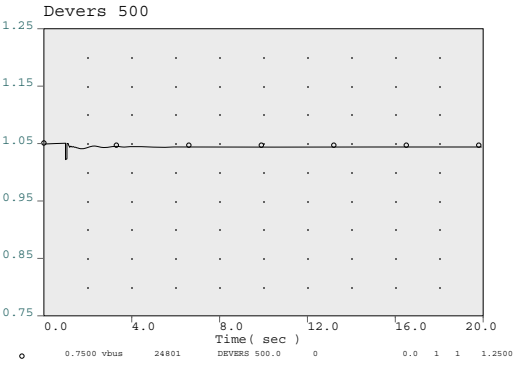
2014 Heavy Summer
Miguel-ECO 500 kV line

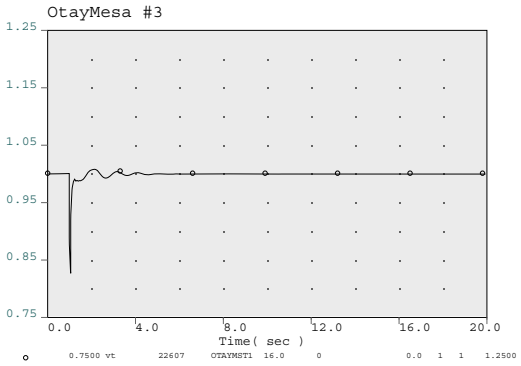
RELATIVE VOLTAGE

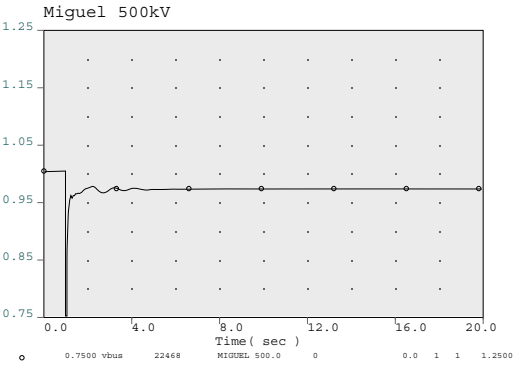








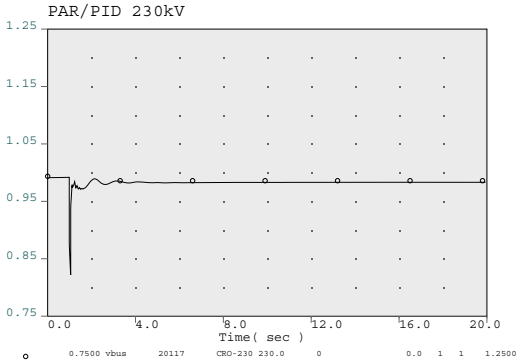




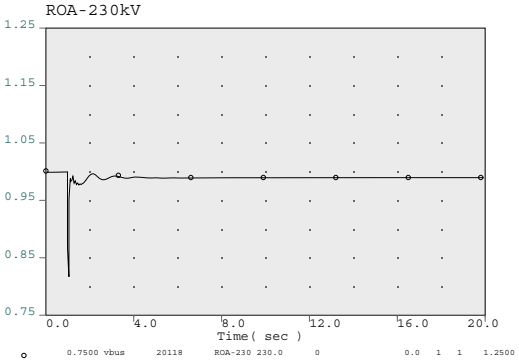
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

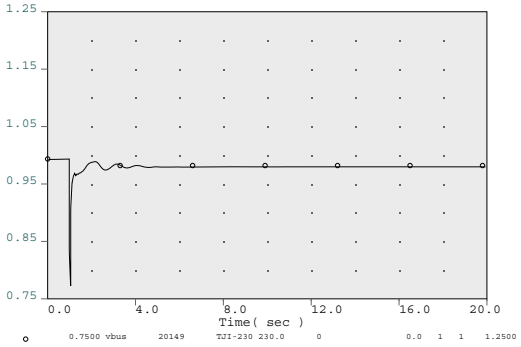
PAR/PID 230kV



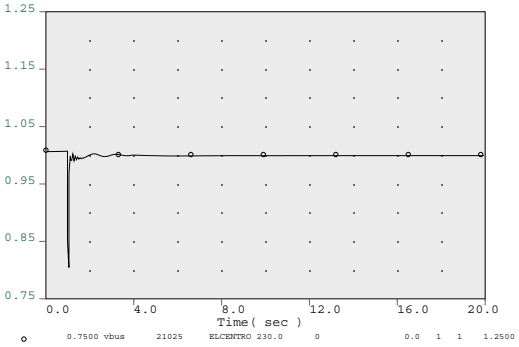
ROA-230kV



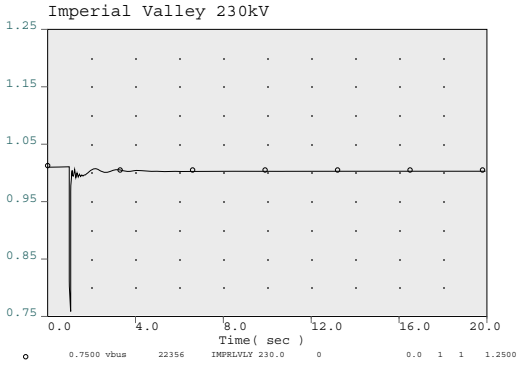
TJ1-230kV



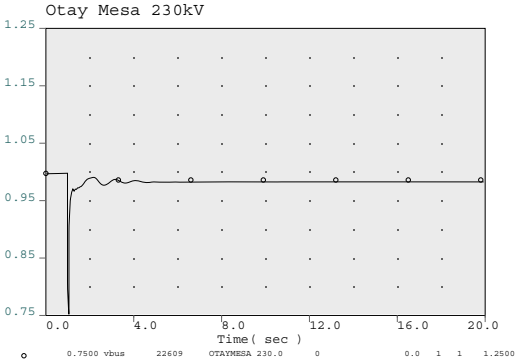
El Centro



Imperial Valley 230kV



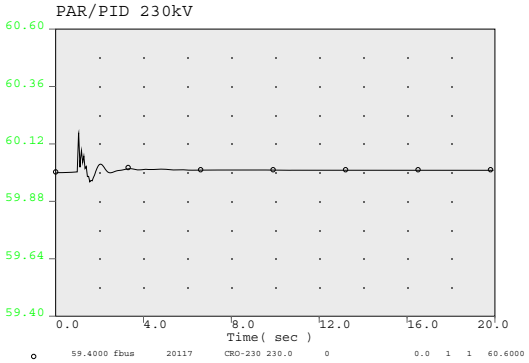
Otay Mesa 230kV



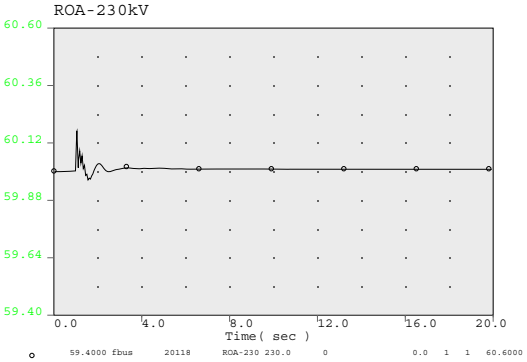
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

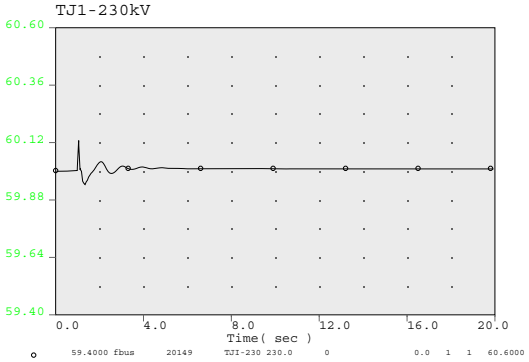
PAR/PID 230kV



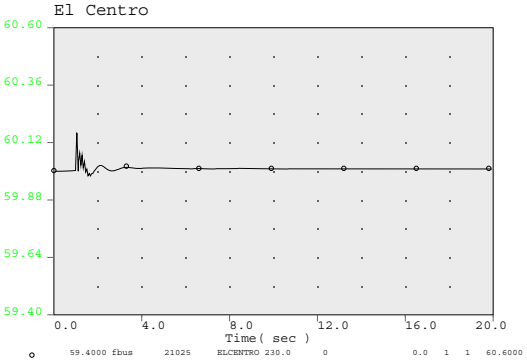
ROA-230kV



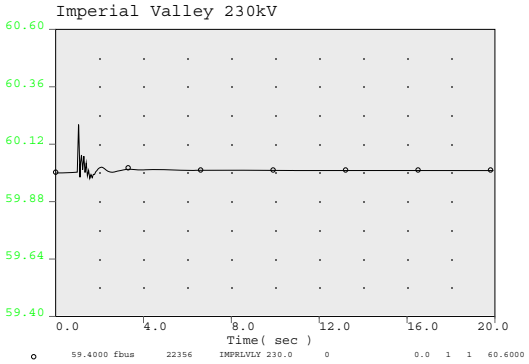
TJ1-230kV



El Centro



Imperial Valley 230kV



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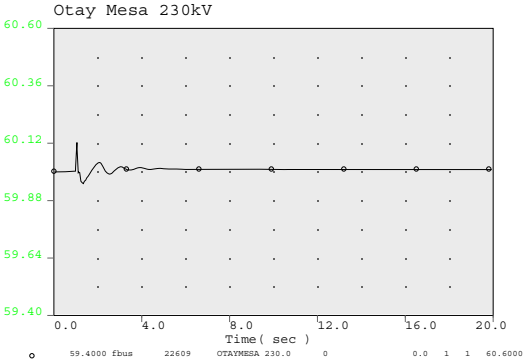
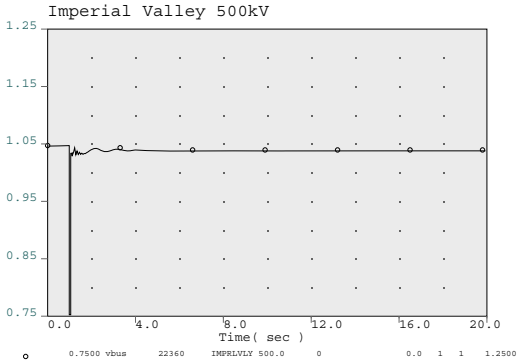


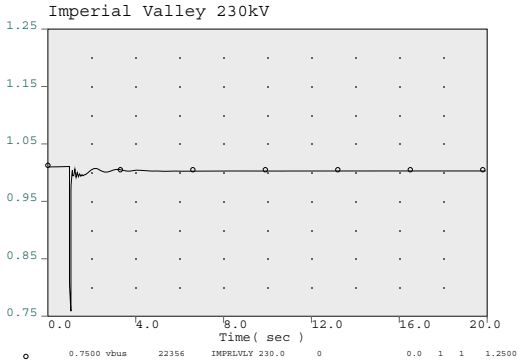
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

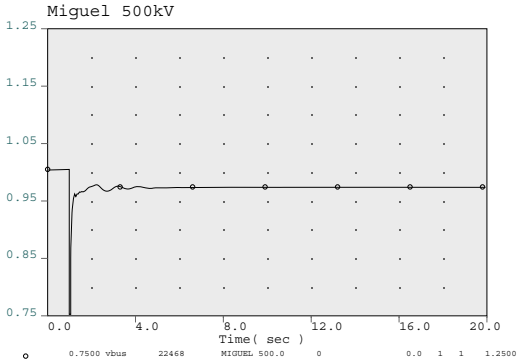
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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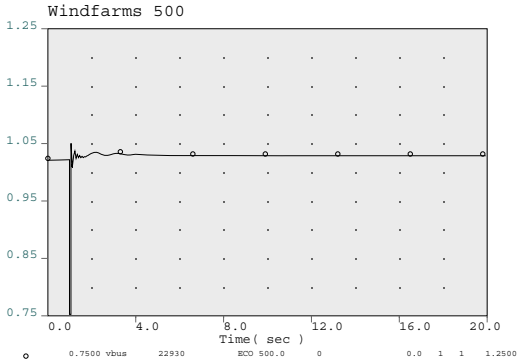

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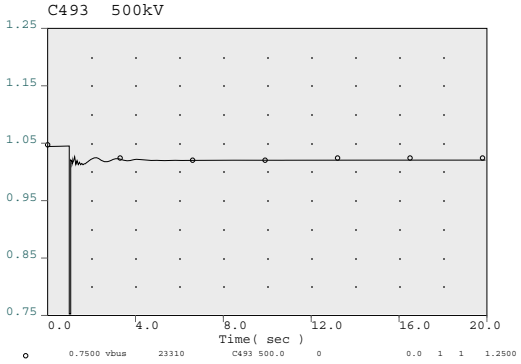
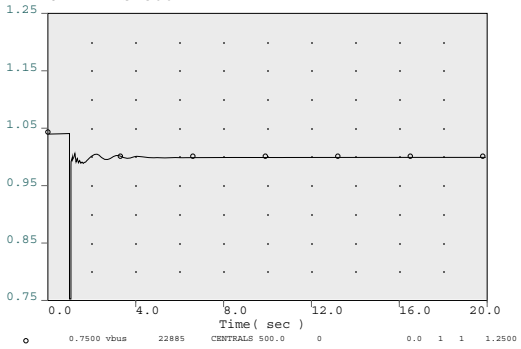
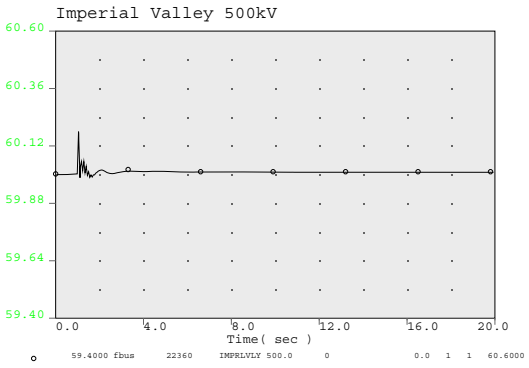


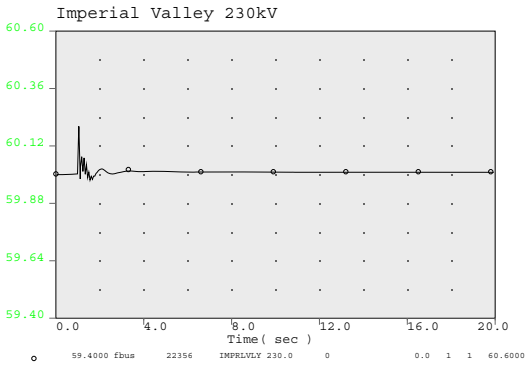
CENTRALS 500kV

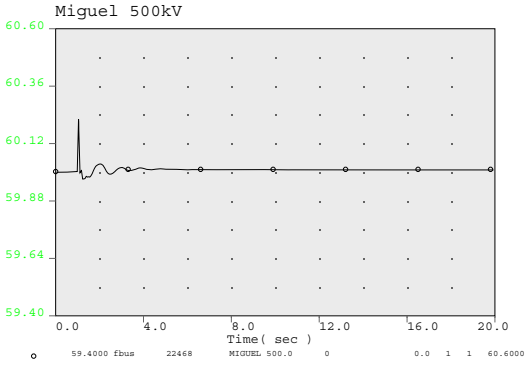


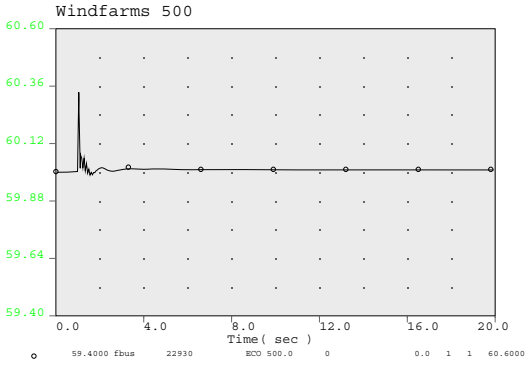
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

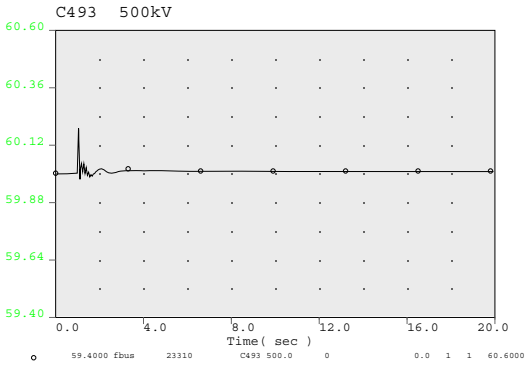
Imperial Valley Area - Frequency

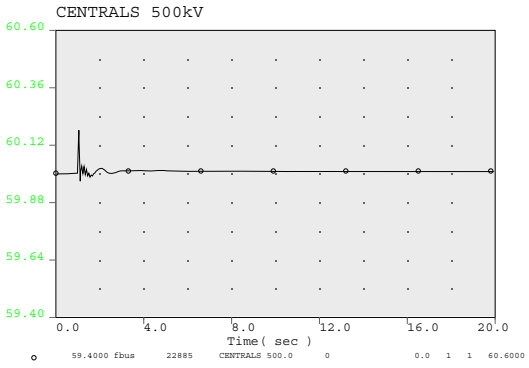






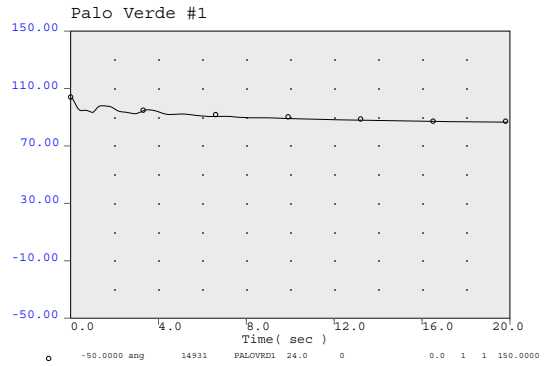


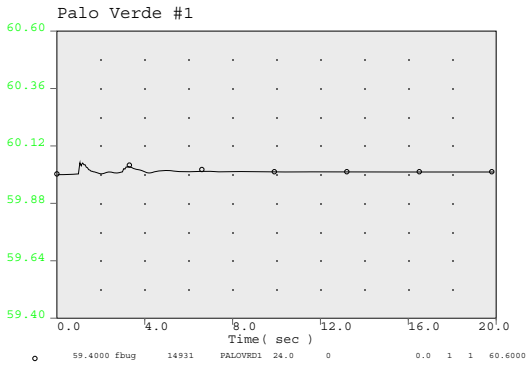


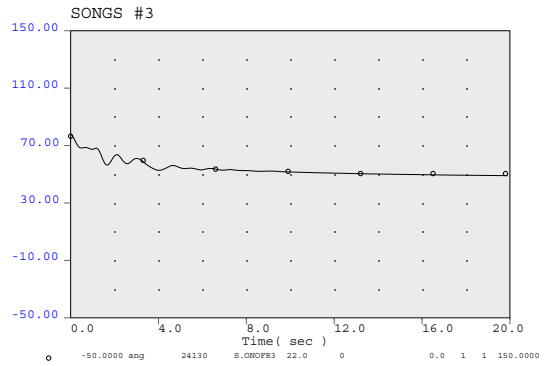


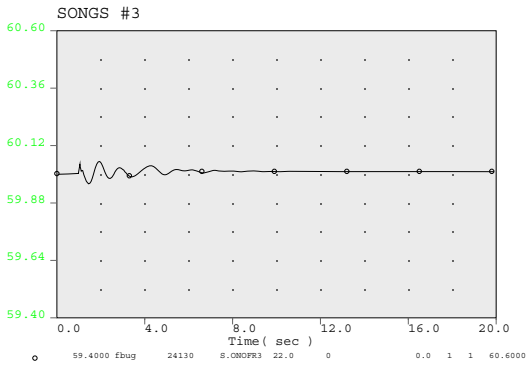
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

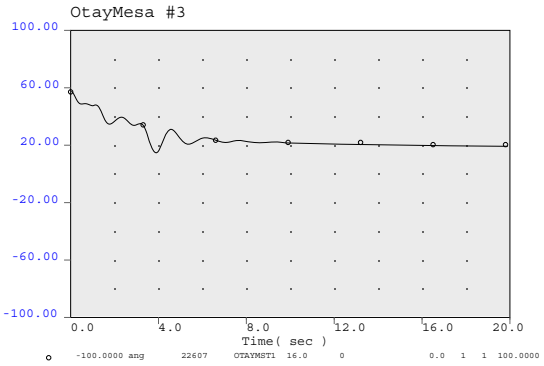
RELATIVE ROTOR ANGLE & FREQUENCY

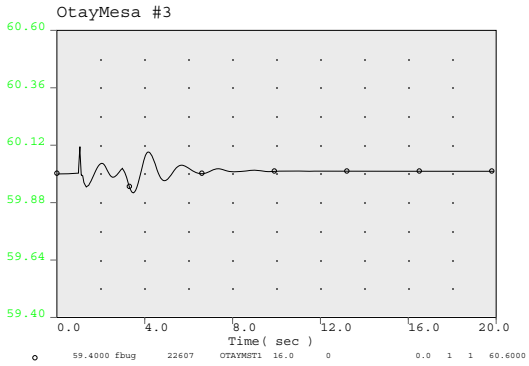












SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

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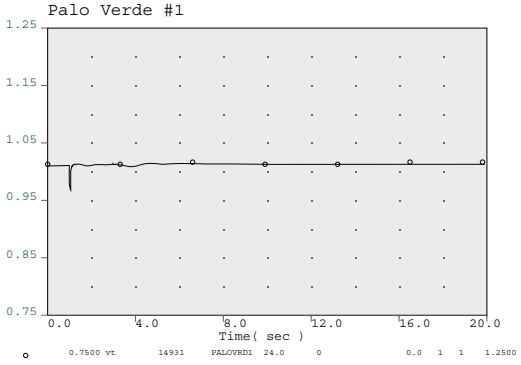
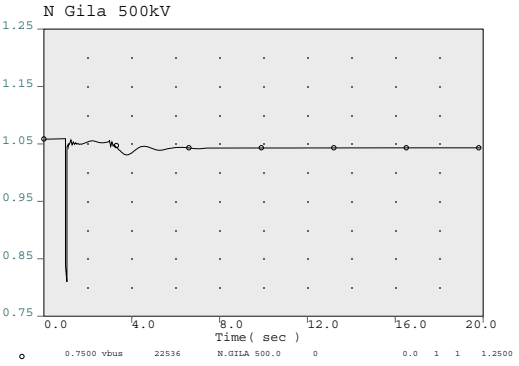
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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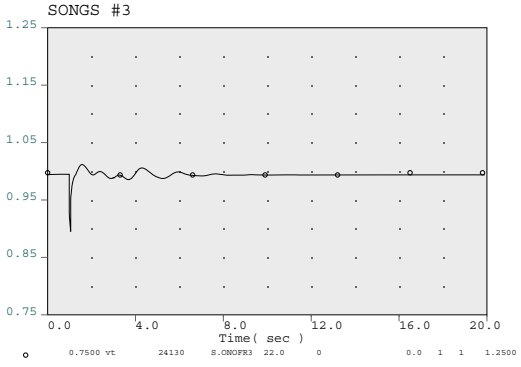

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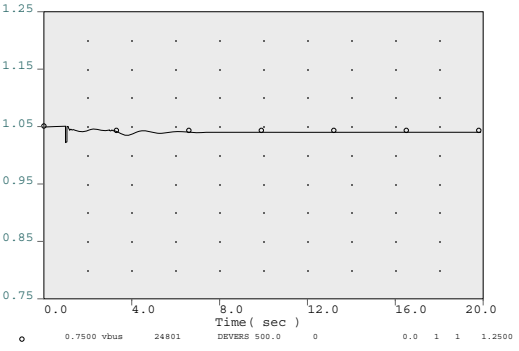

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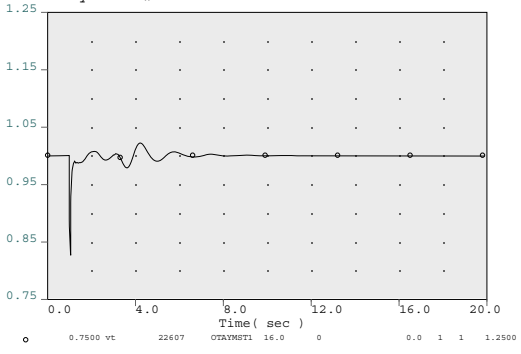
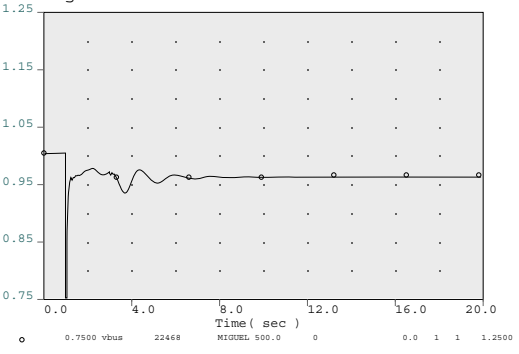


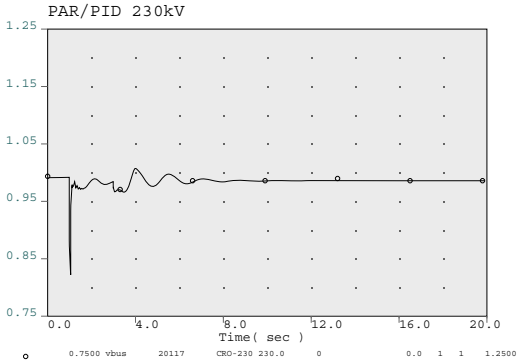
Miguel 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

PAR/PID 230kV



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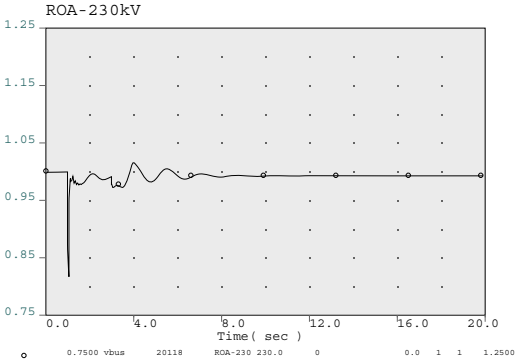
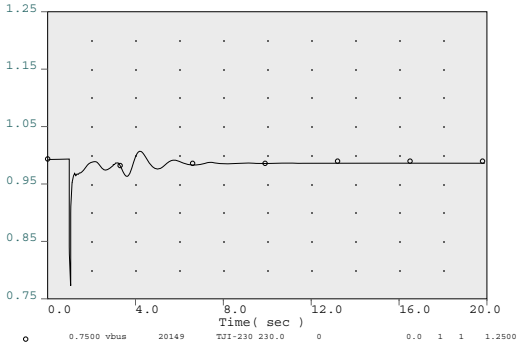


TJ1-230kV



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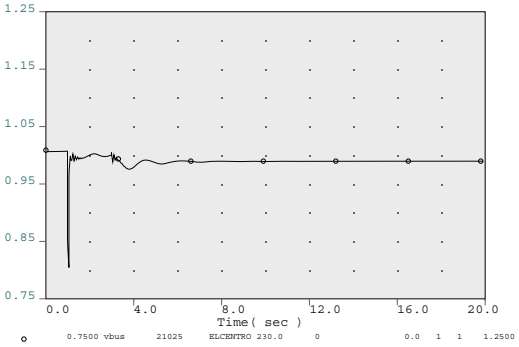
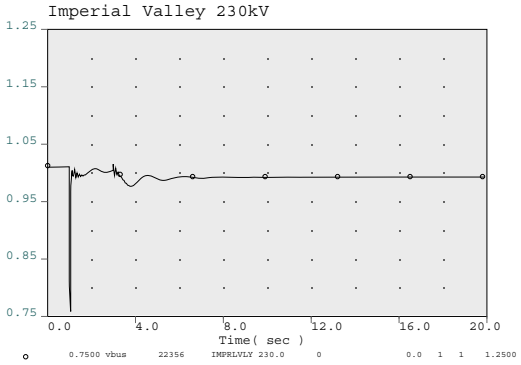
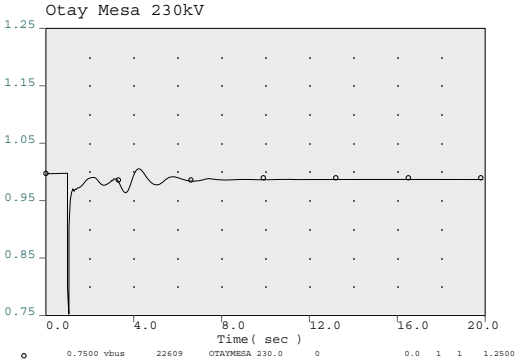


Imperial Valley 230kV



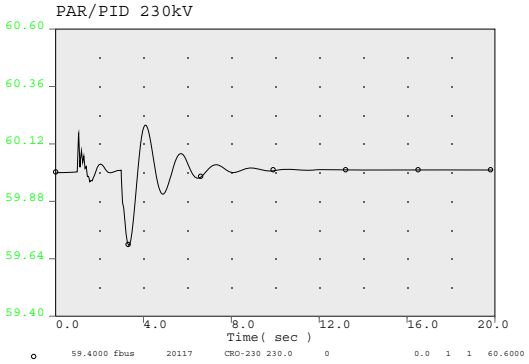
Otay Mesa 230kV



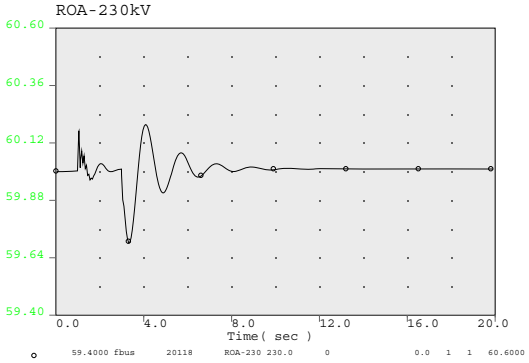
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

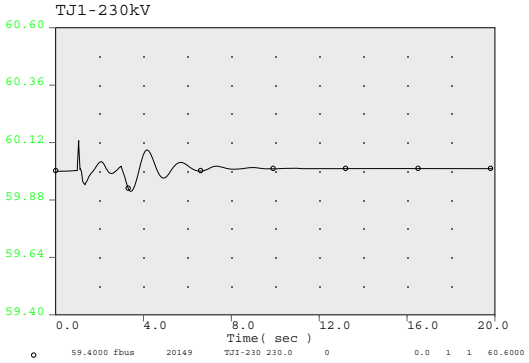
PAR/PID 230kV



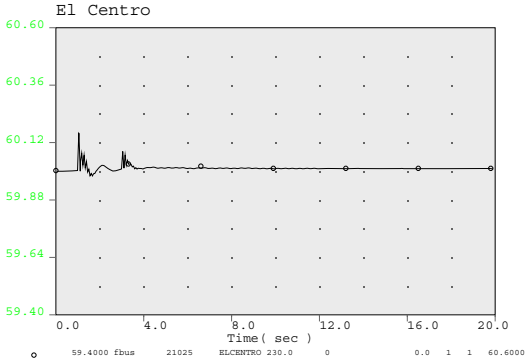
ROA-230kV



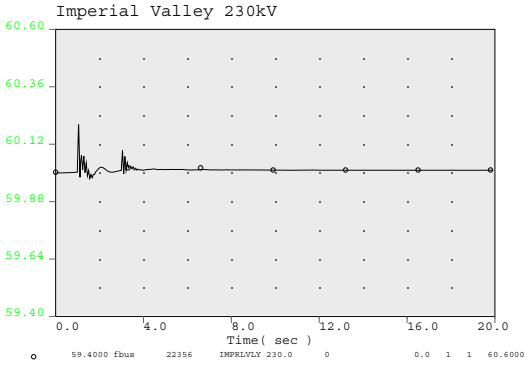
TJ1-230kV



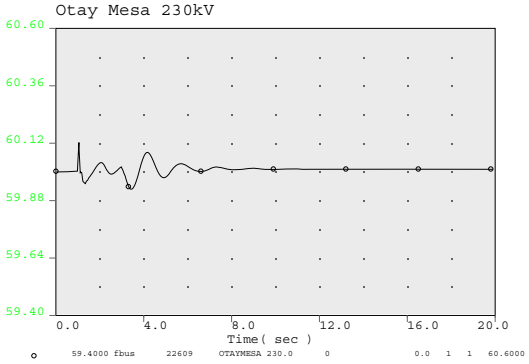
El Centro



Imperial Valley 230kV



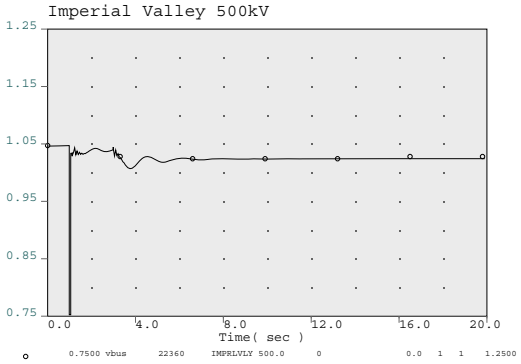
Otay Mesa 230kV



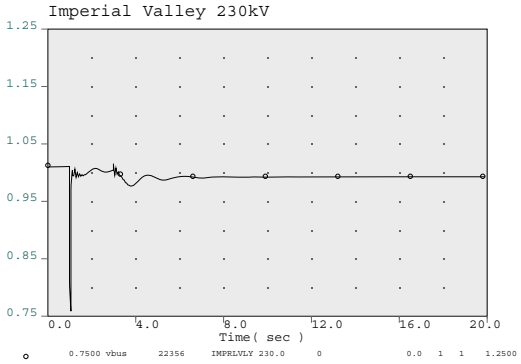
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

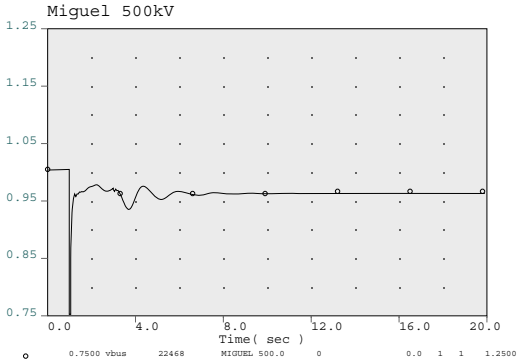
Imperial Valley 500kV



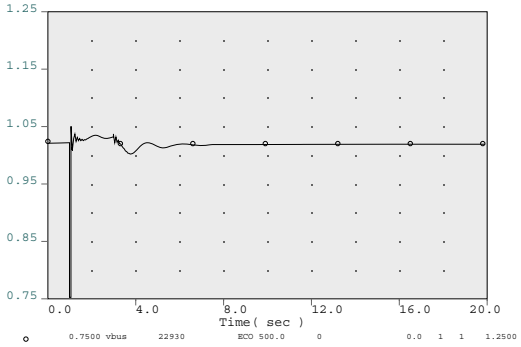
Imperial Valley 230kV



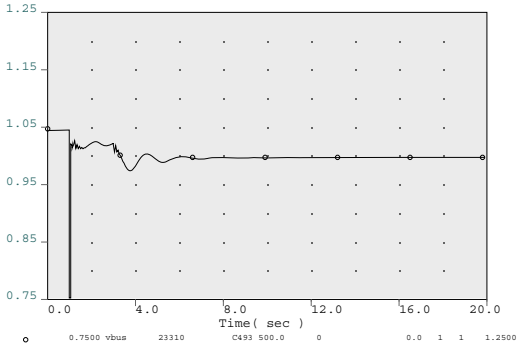
Miguel 500kV



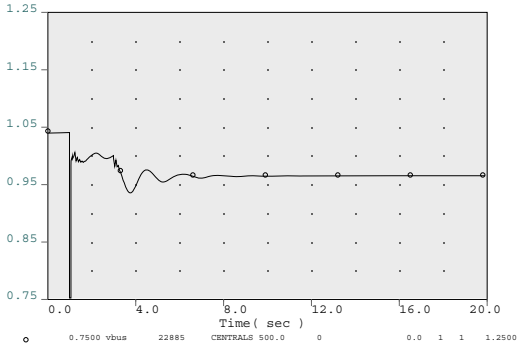
Windfarms 500



C493 500kV

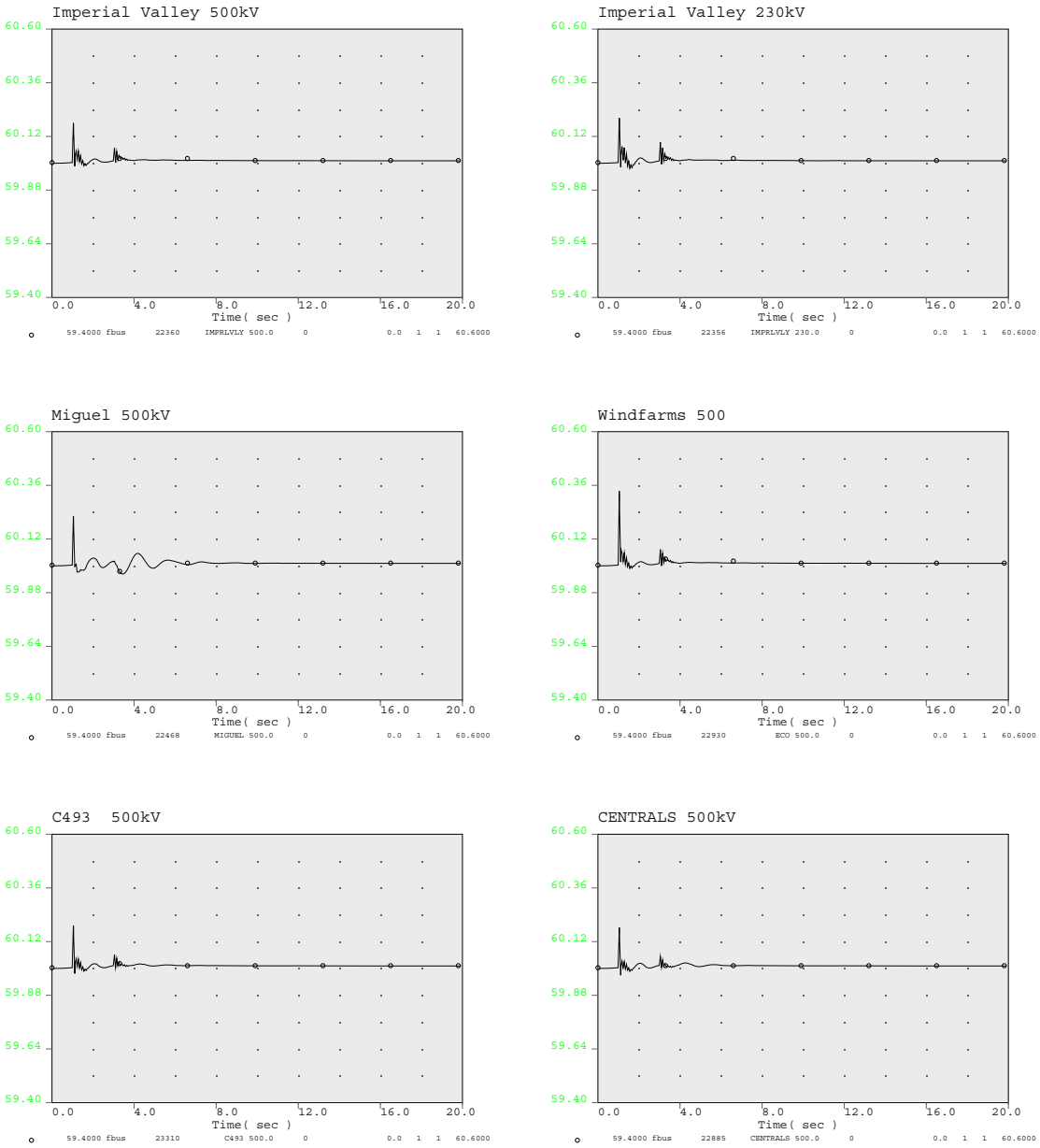


CENTRALS 500kV



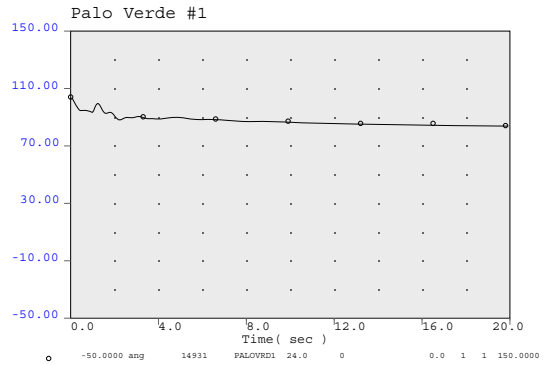
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

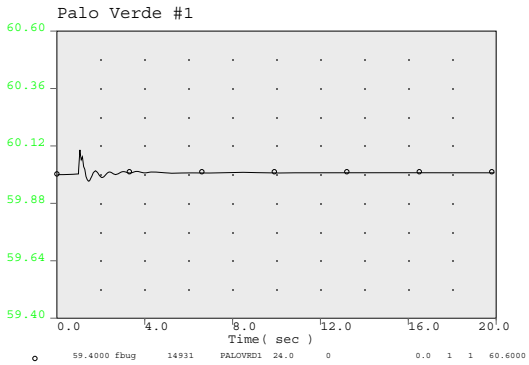
Imperial Valley Area - Frequency

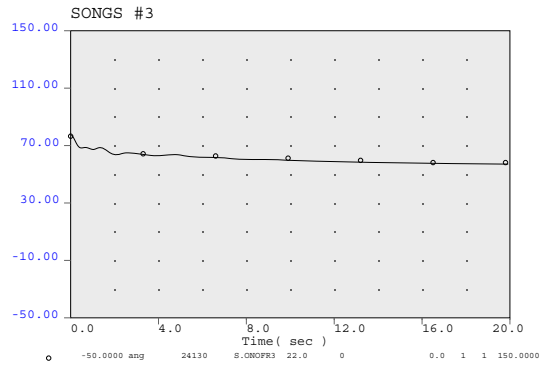


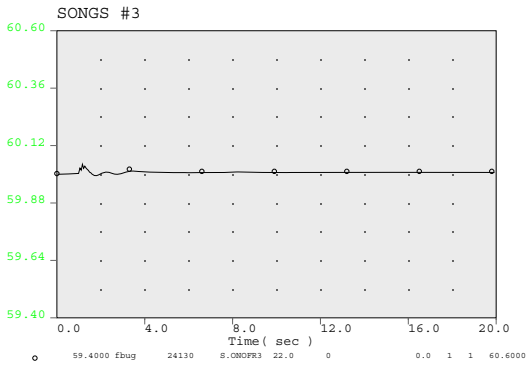
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

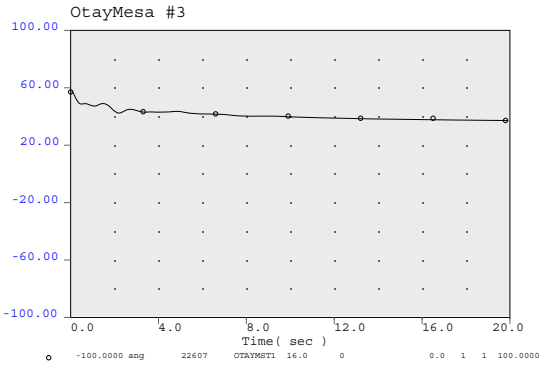
RELATIVE ROTOR ANGLE & FREQUENCY

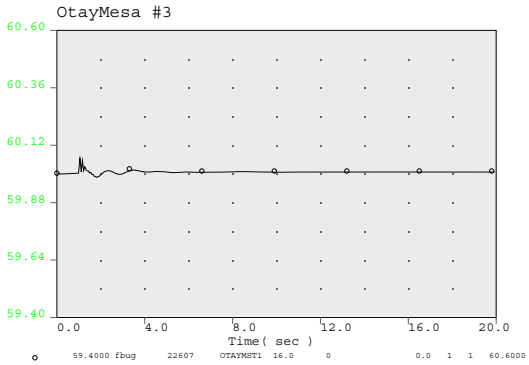












SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

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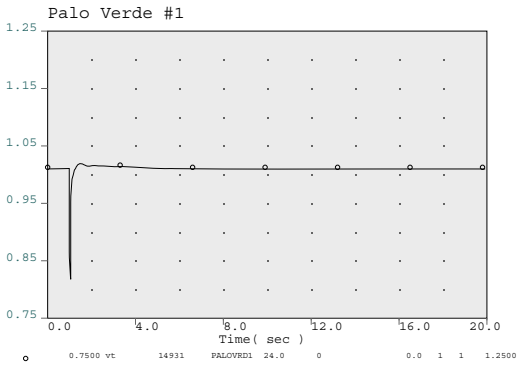
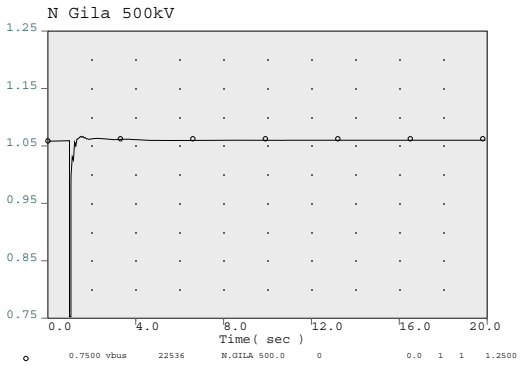
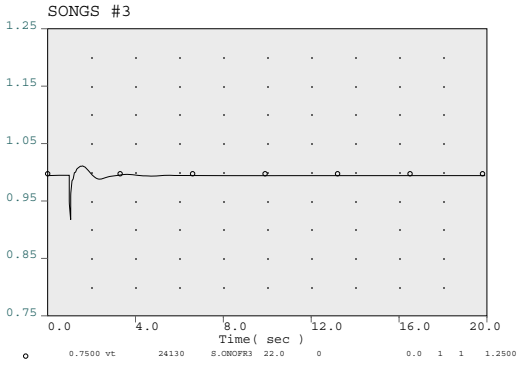
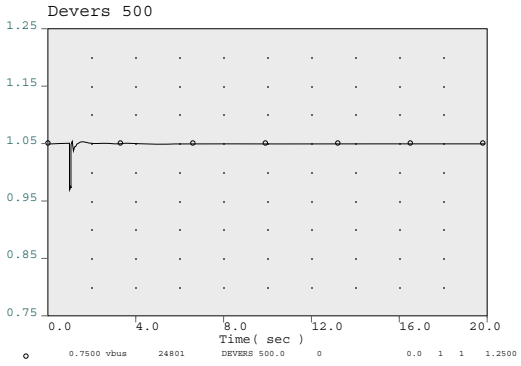
SDGE	NGila_IV_slo_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:43:42 2010

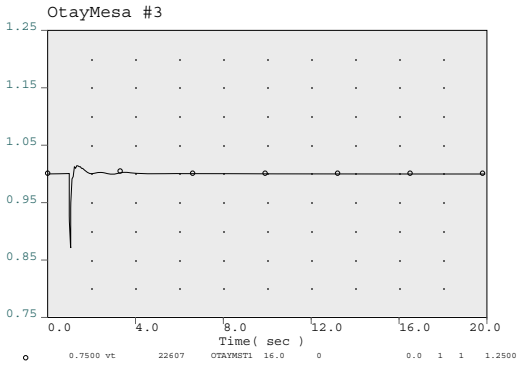
RELATIVE VOLTAGE

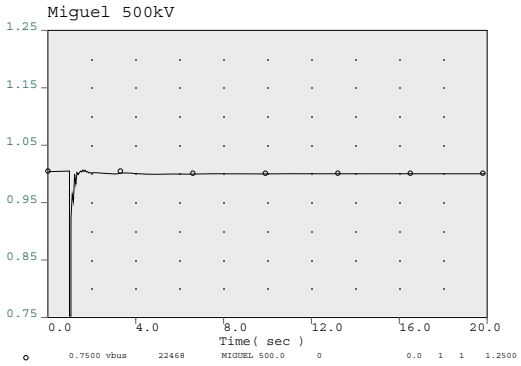








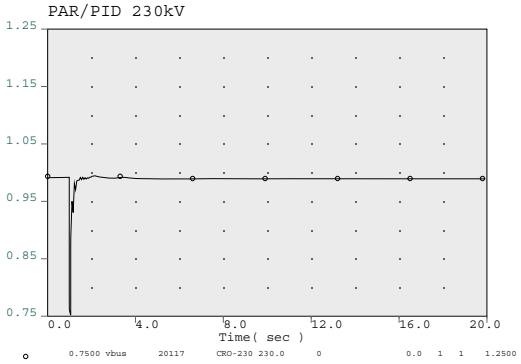




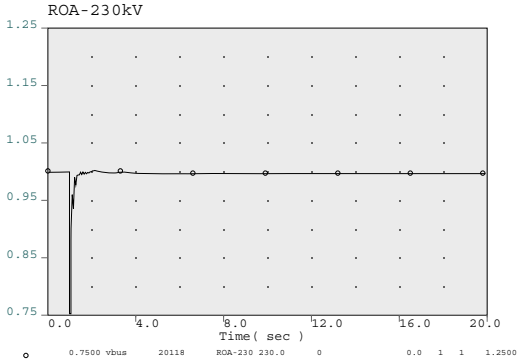
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

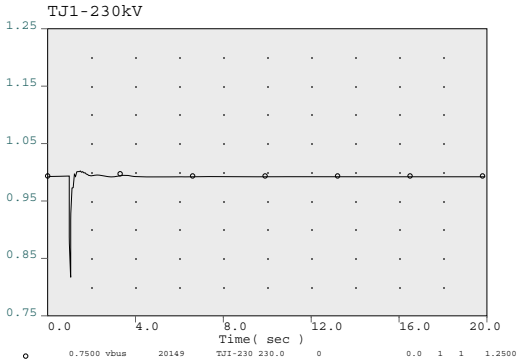
PAR/PID 230kV



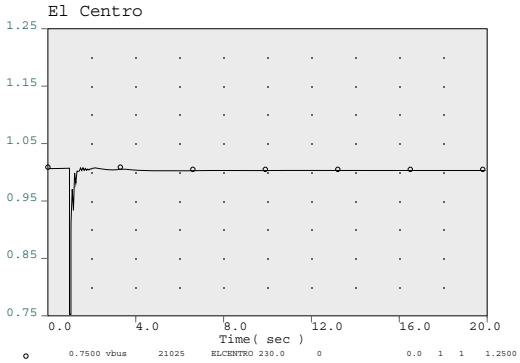
ROA-230kV



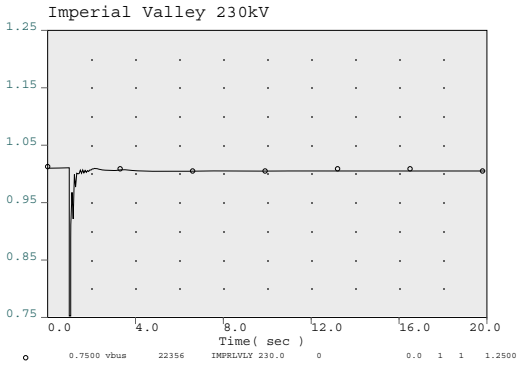
TJ1-230kV



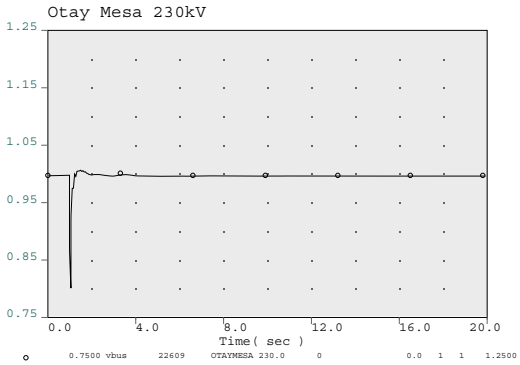
El Centro



Imperial Valley 230kV



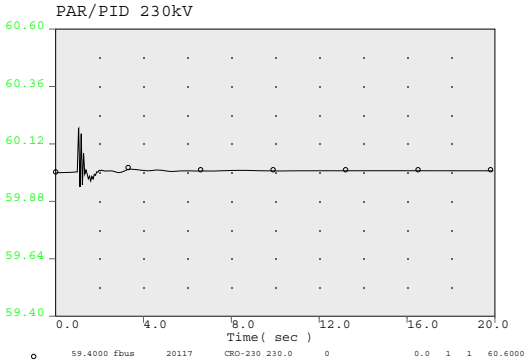
Otay Mesa 230kV



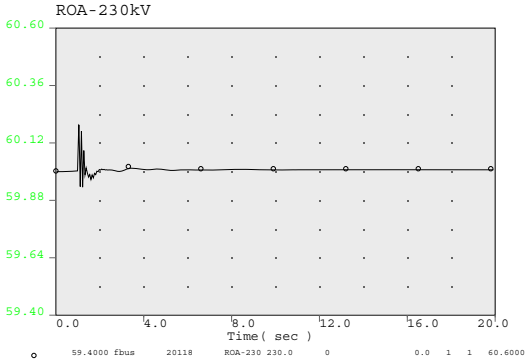
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

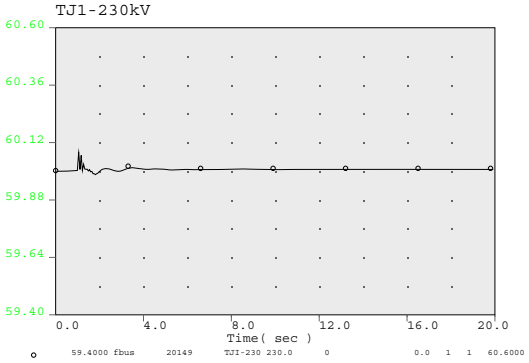
PAR/PID 230kV



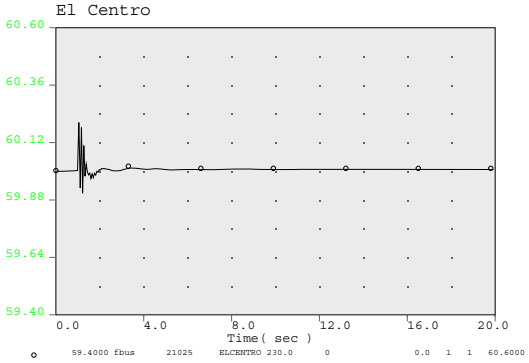
ROA-230kV



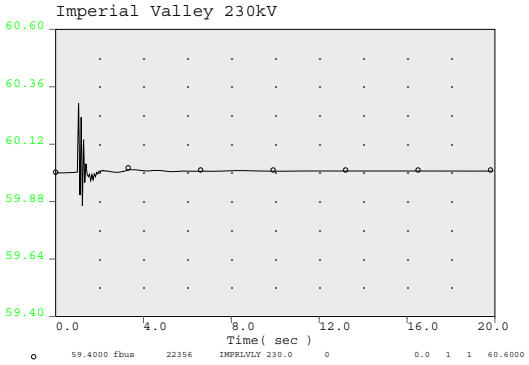
TJ1-230kV



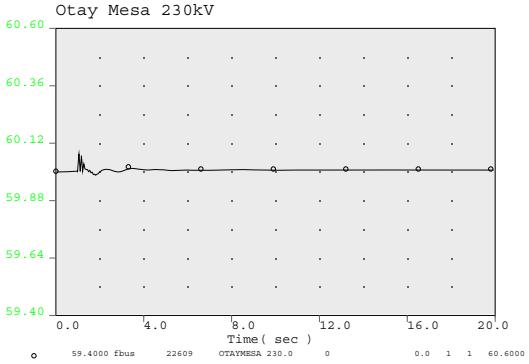
El Centro



Imperial Valley 230kV



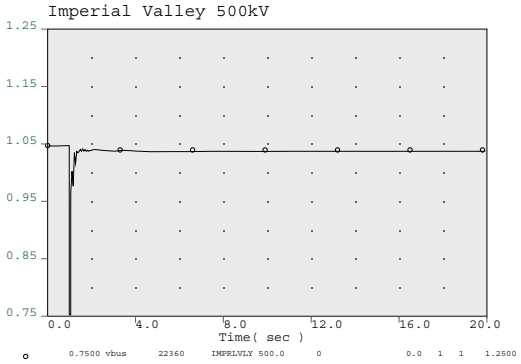
Otay Mesa 230kV



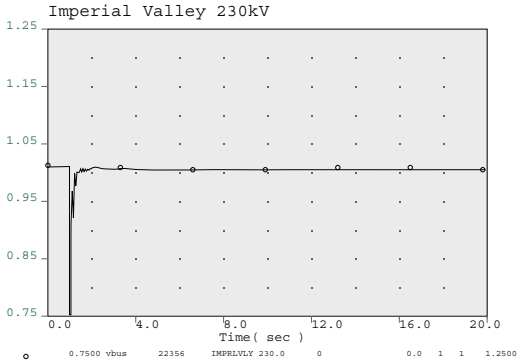
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

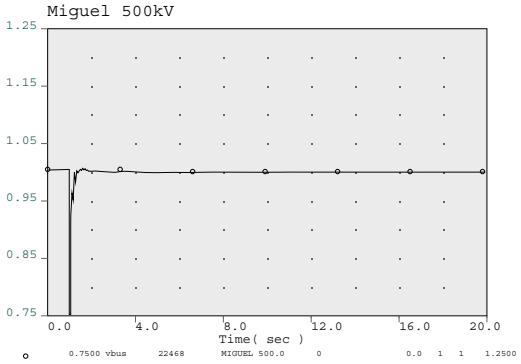
Imperial Valley 500kV



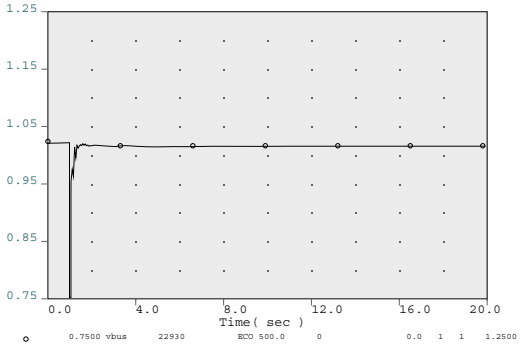
Imperial Valley 230kV



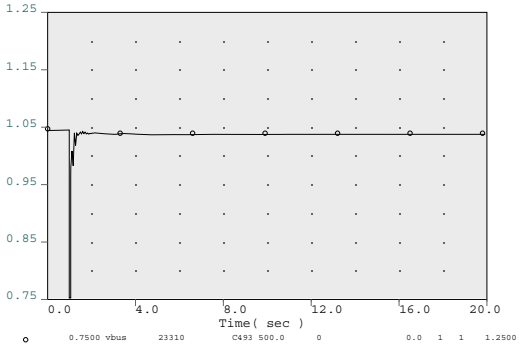
Miguel 500kV



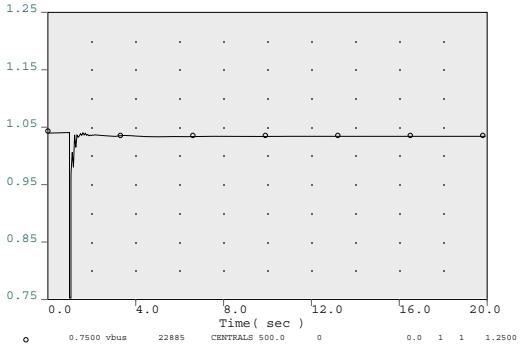
Windfarms 500



C493 500kV

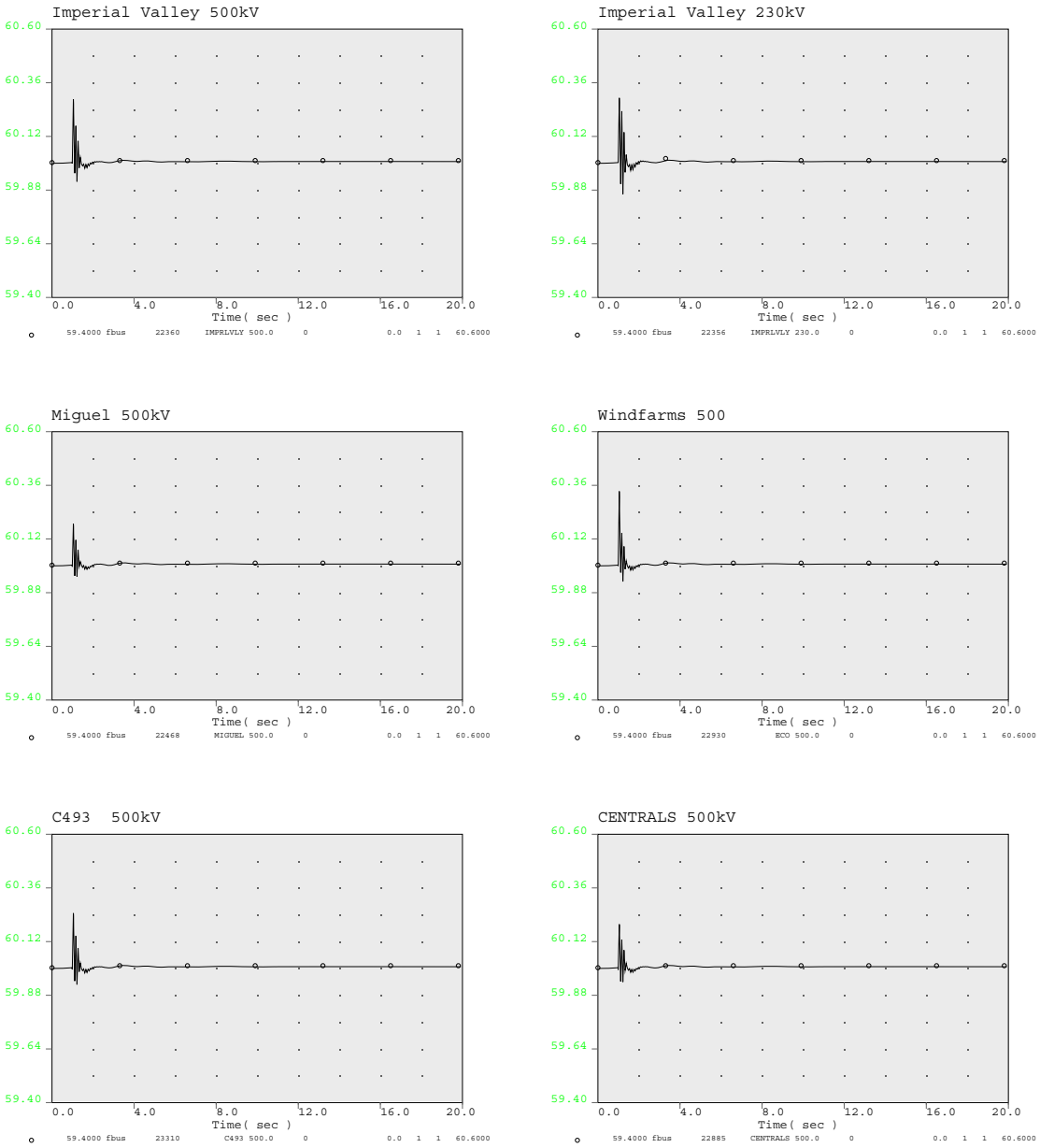


CENTRALS 500kV



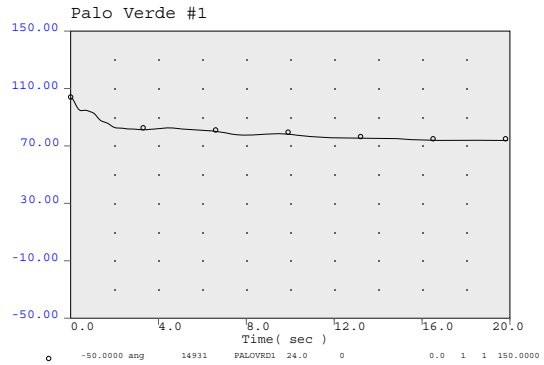
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

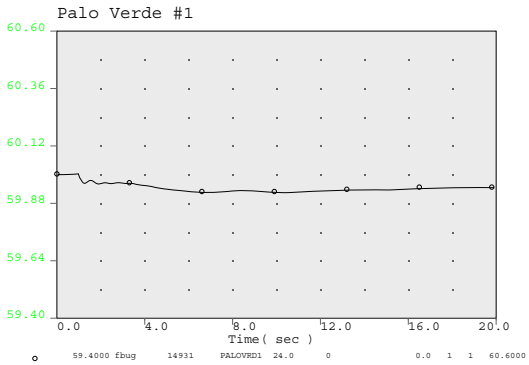
Imperial Valley Area - Frequency

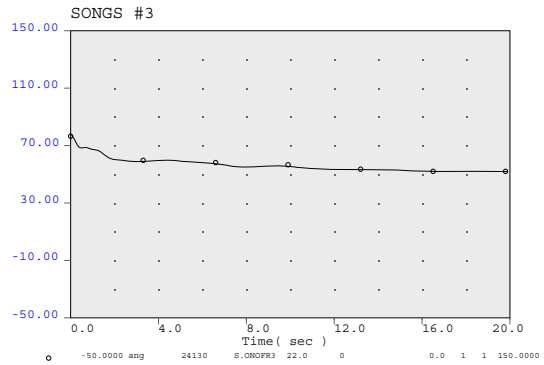


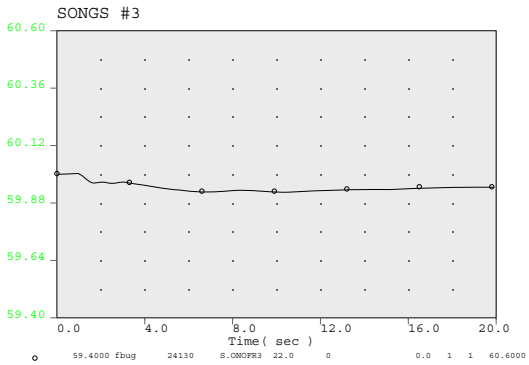
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

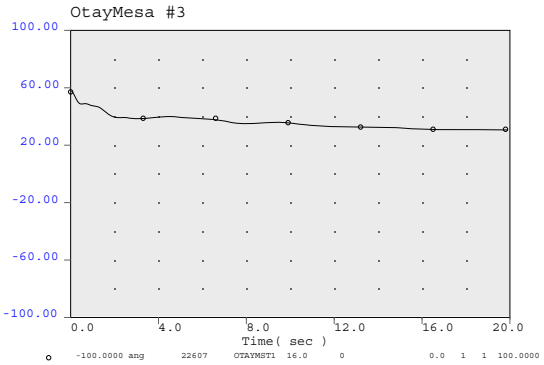
RELATIVE ROTOR ANGLE & FREQUENCY

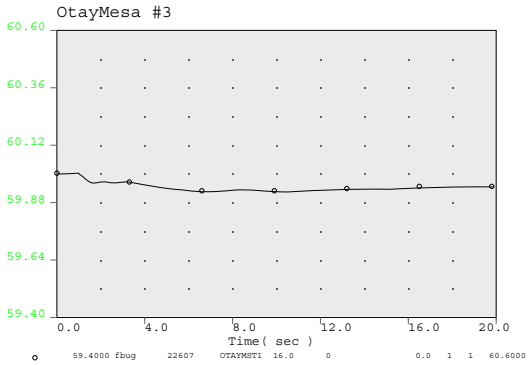






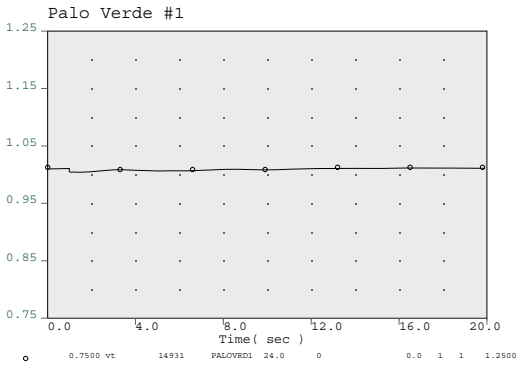


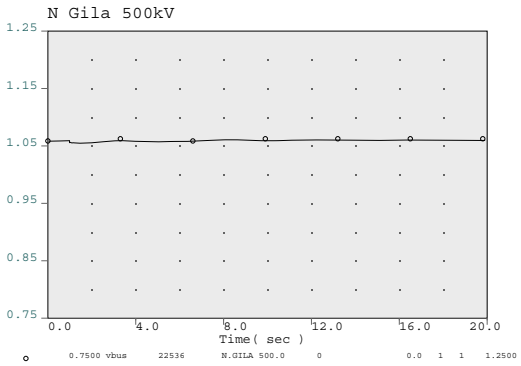


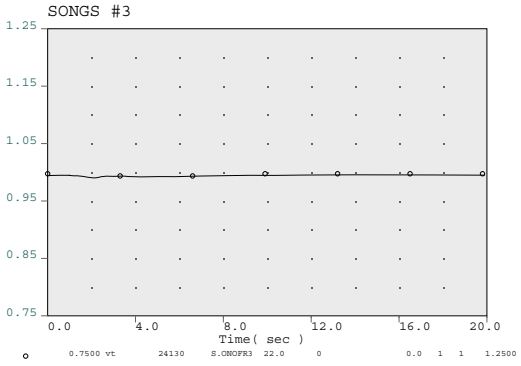


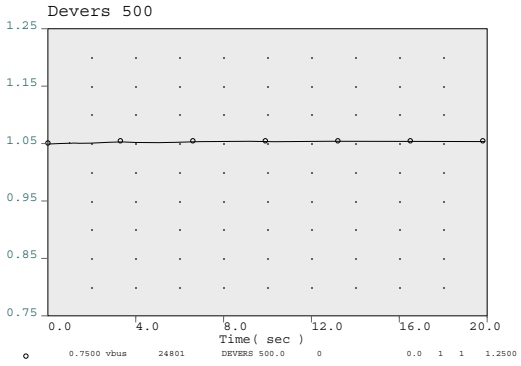
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

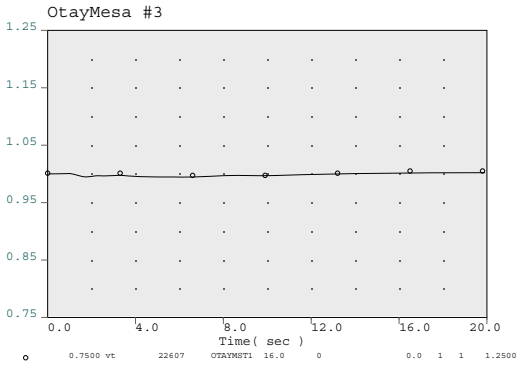
RELATIVE VOLTAGE

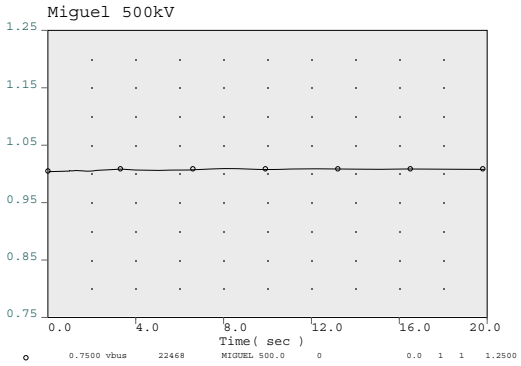








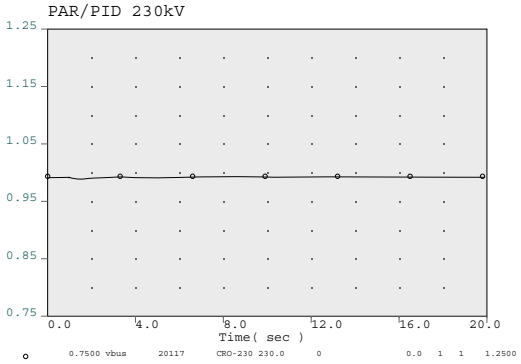




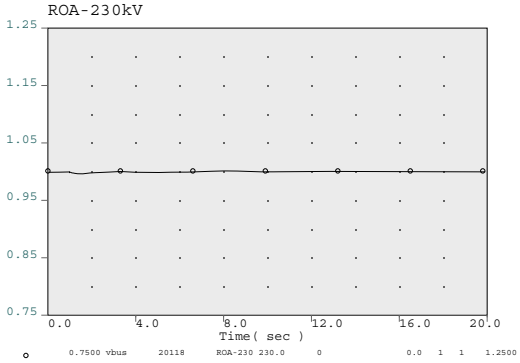
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

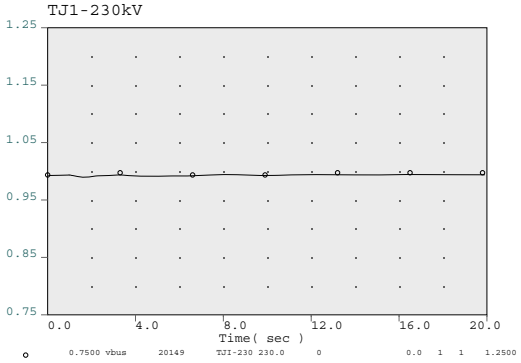
PAR/PID 230kV



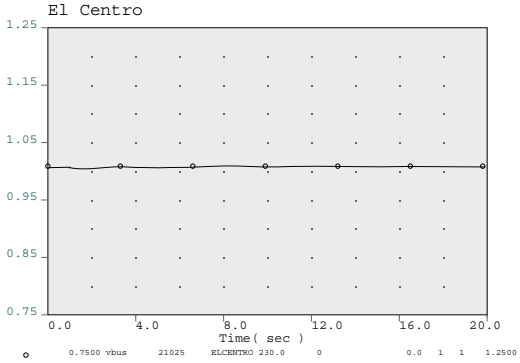
ROA-230kV



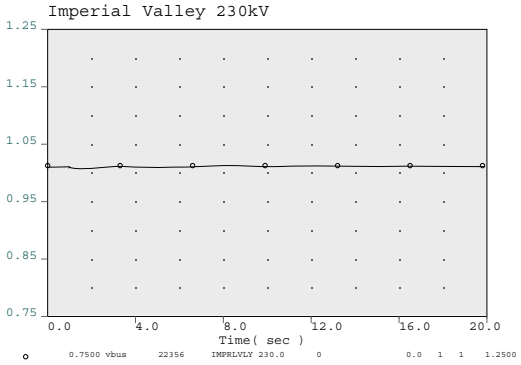
TJ1-230kV



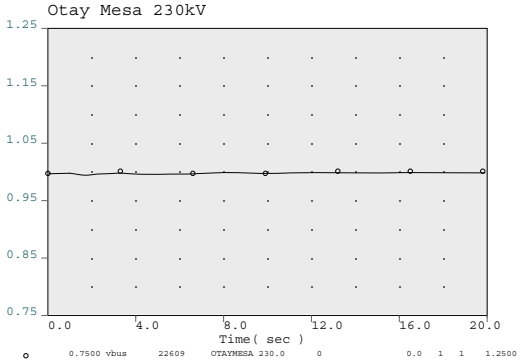
El Centro



Imperial Valley 230kV



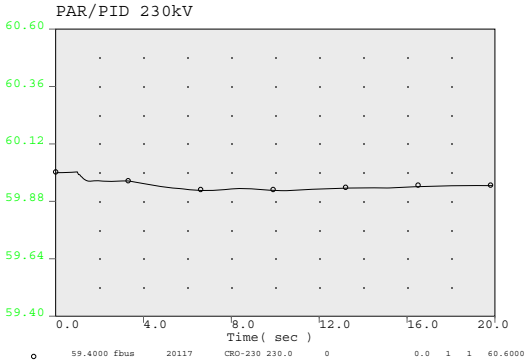
Otay Mesa 230kV



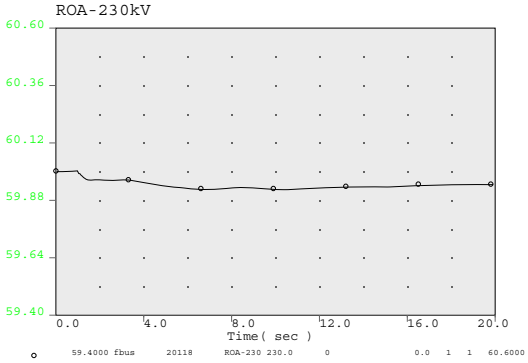
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

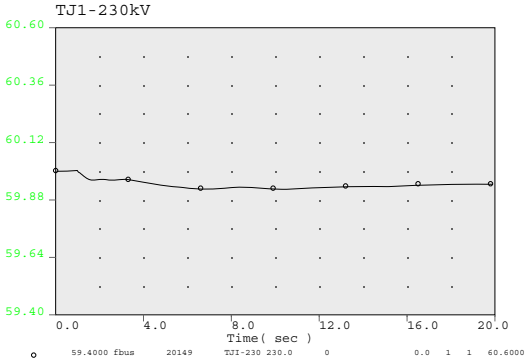
PAR/PID 230kV



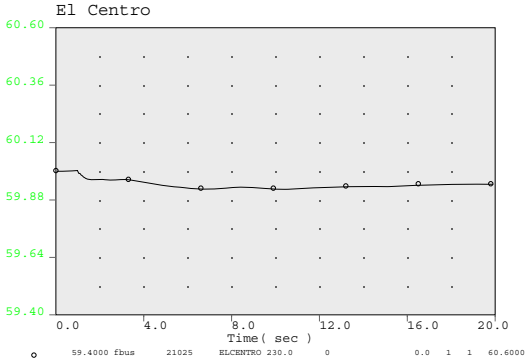
ROA-230kV



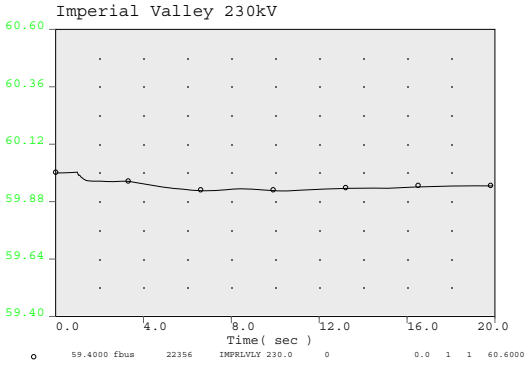
TJ1-230kV



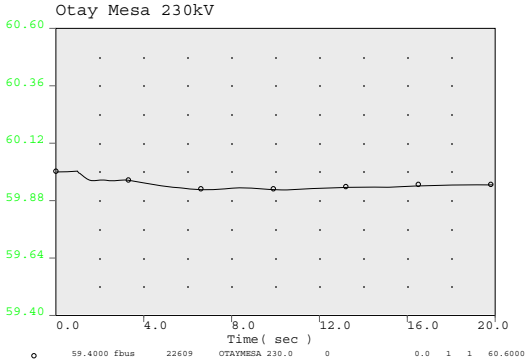
El Centro



Imperial Valley 230kV

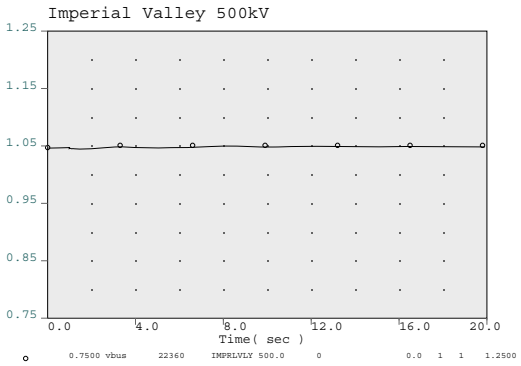


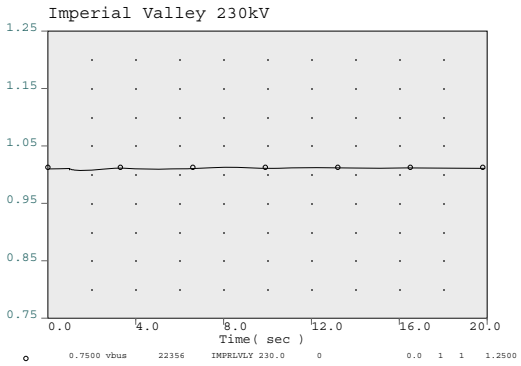
Otay Mesa 230kV

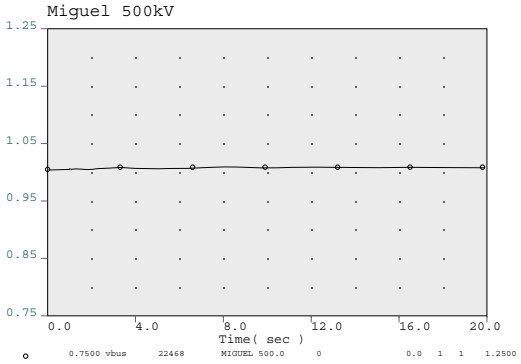


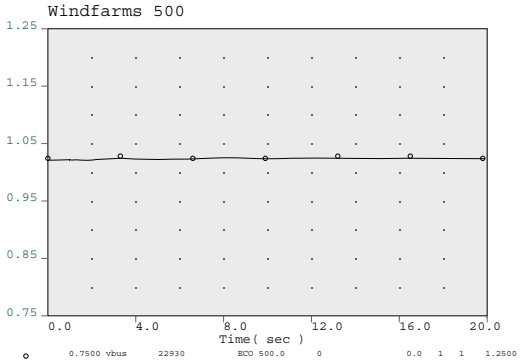
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

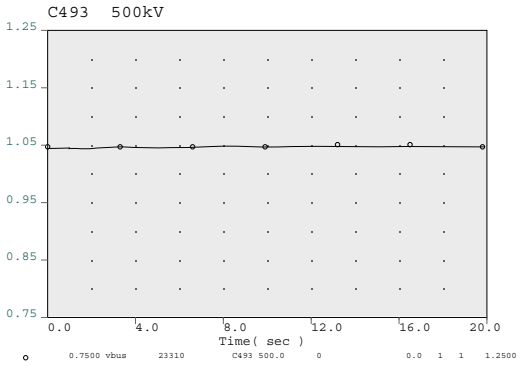
Imperial Valley Area - VOLTAGE

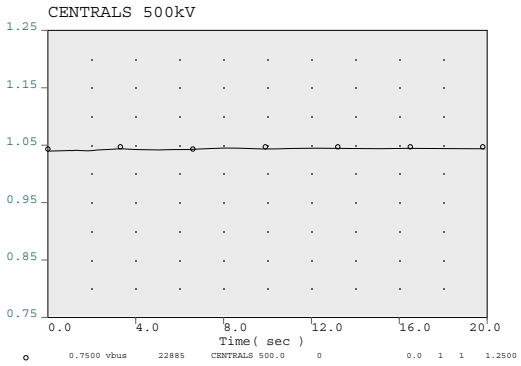






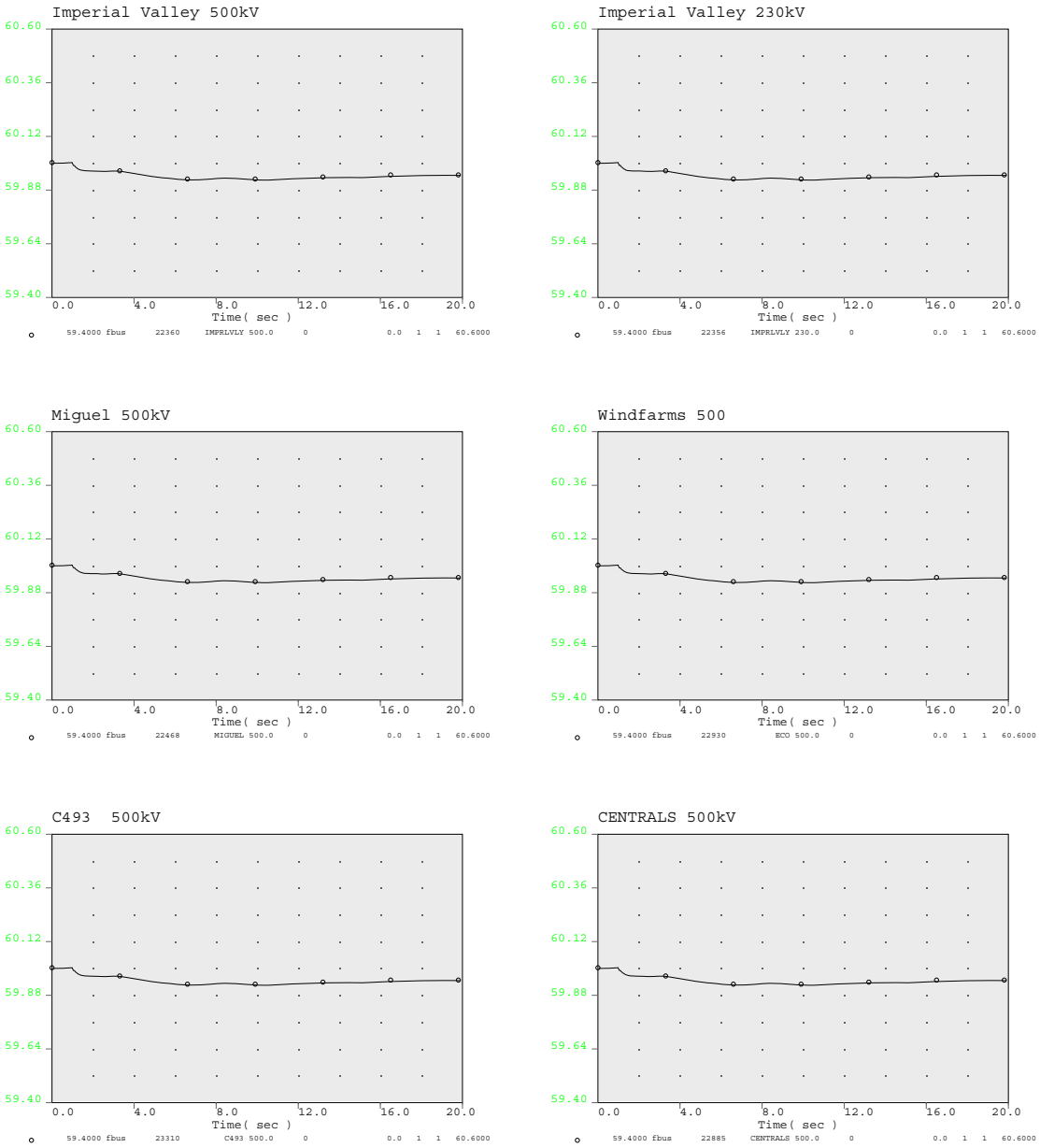






SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Imperial Valley Area - Frequency



SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

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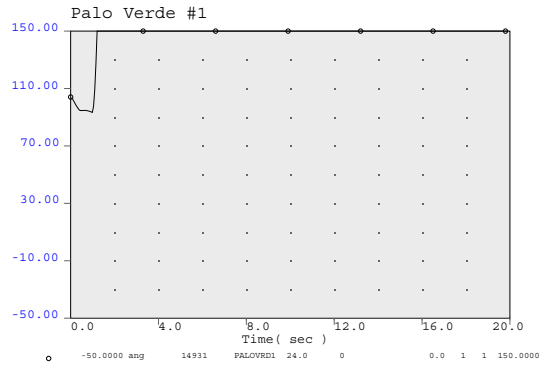
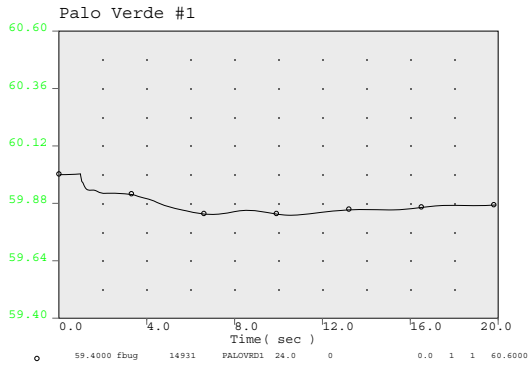
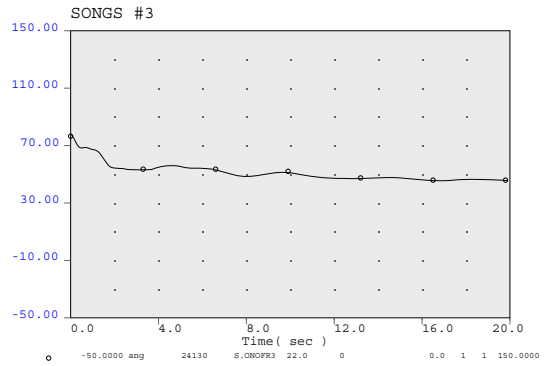
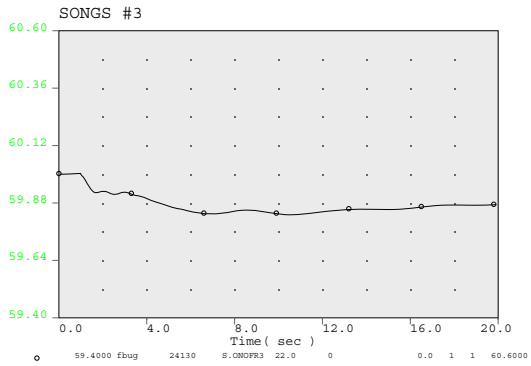
SDGE	PaloVerde-g1_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:38:53 2010

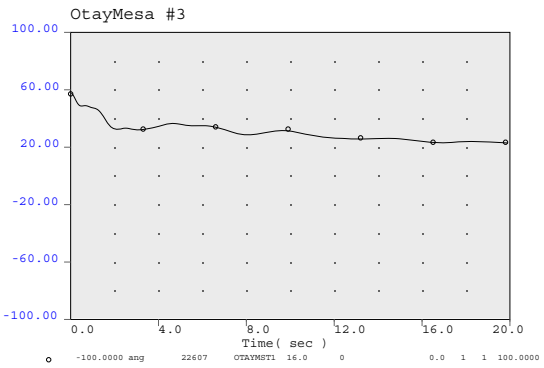
RELATIVE ROTOR ANGLE & FREQUENCY

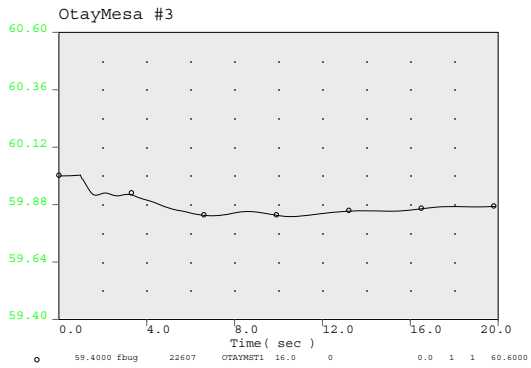












SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

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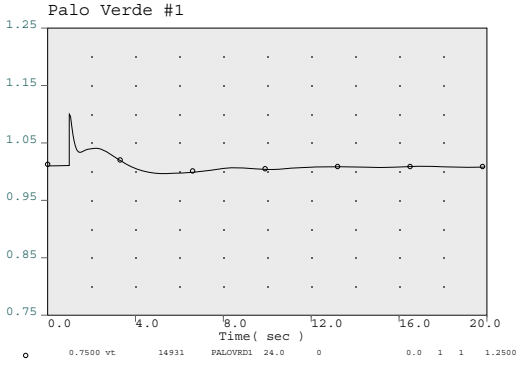
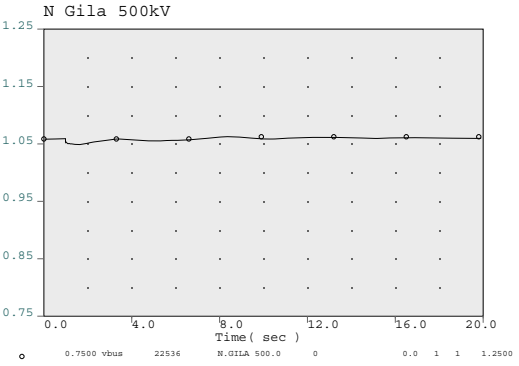
SDGE	PaloVerde-g2_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:39:24 2010

RELATIVE VOLTAGE

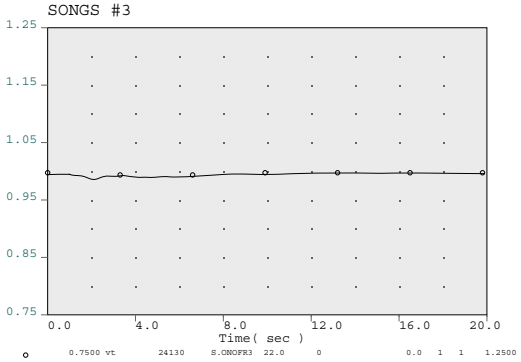
Palo Verde #1



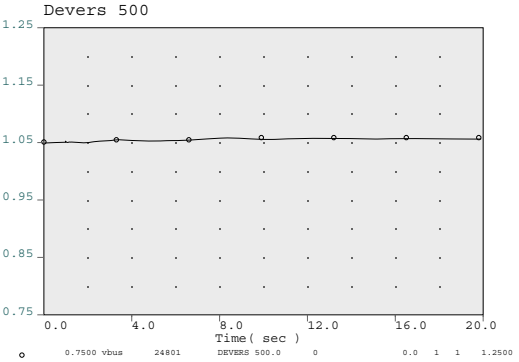
N Gila 500kV



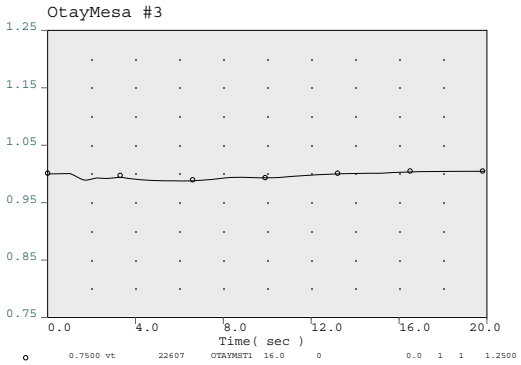
SONGS #3



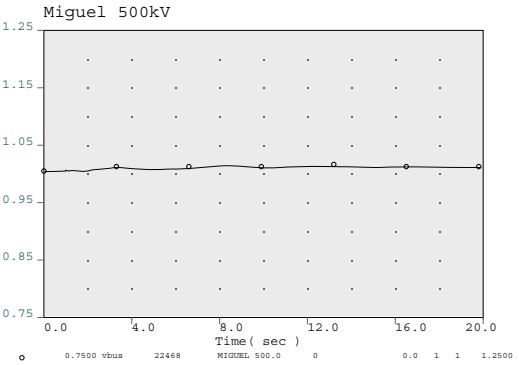
Devers 500



OtayMesa #3



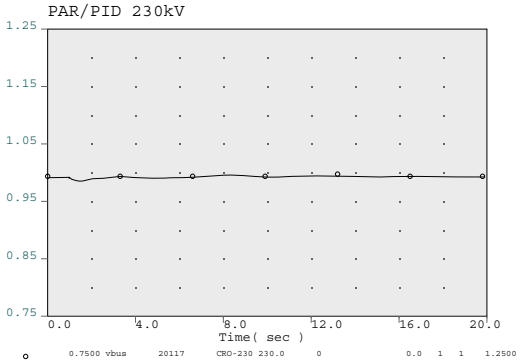
Miguel 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

PAR/PID 230kV



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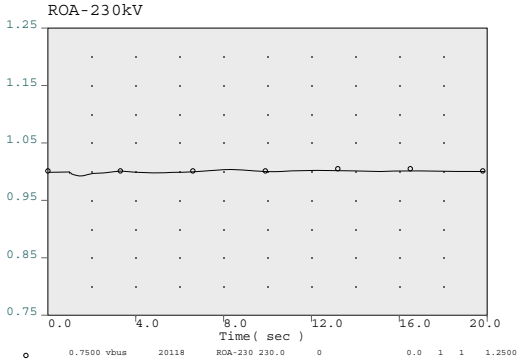
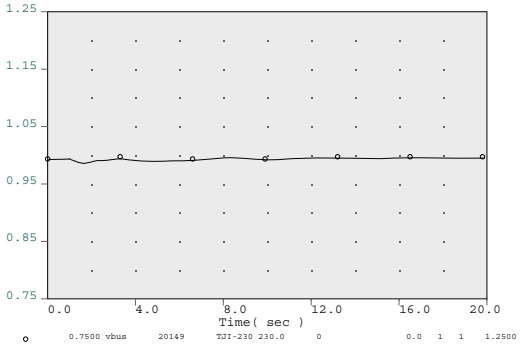
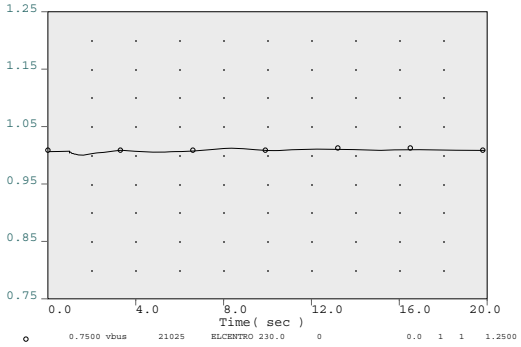


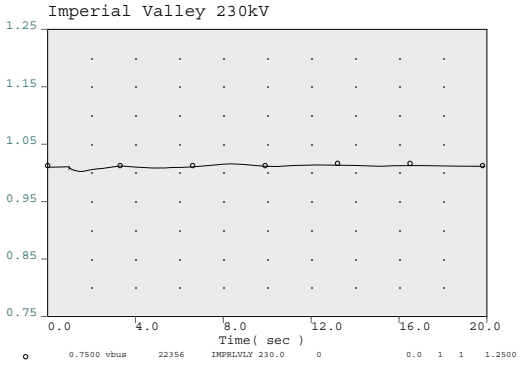
TJ1-230kV



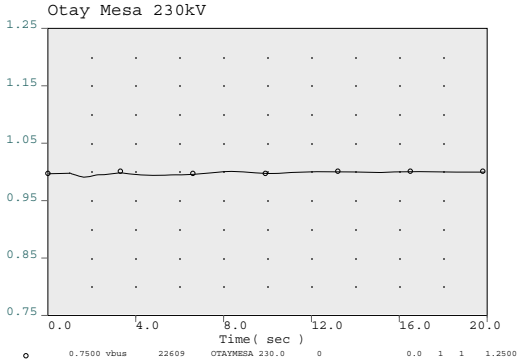
El Centro



Imperial Valley 230kV



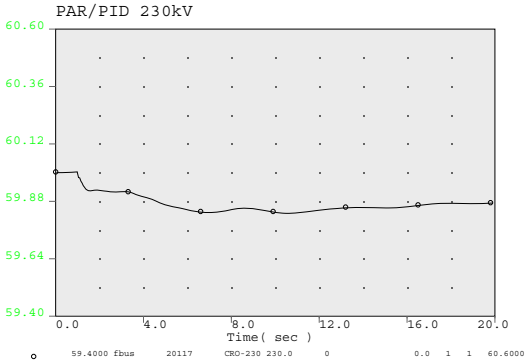
Otay Mesa 230kV



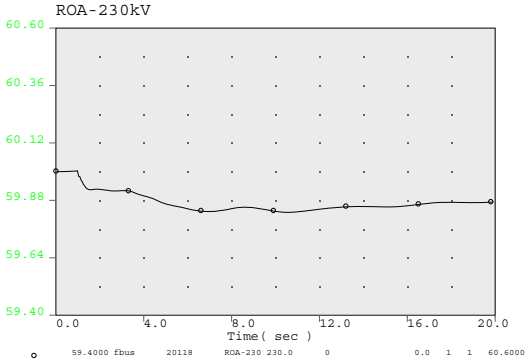
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

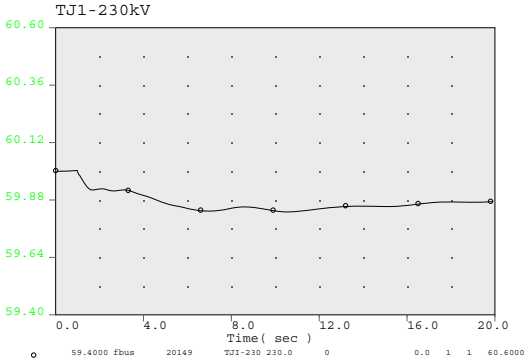
PAR/PID 230kV



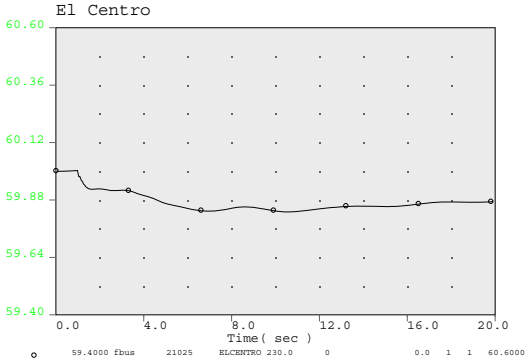
ROA-230kV



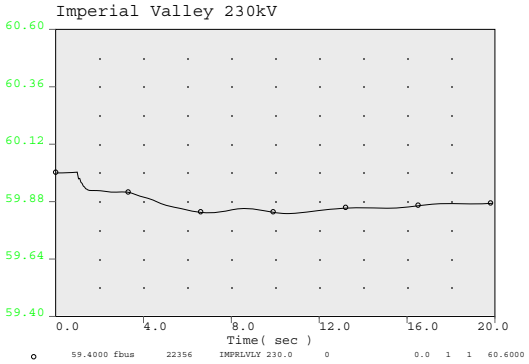
TJ1-230kV



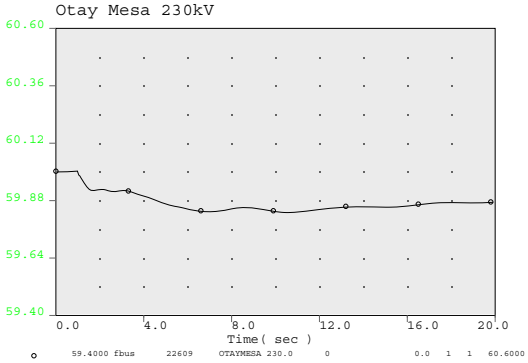
El Centro



Imperial Valley 230kV



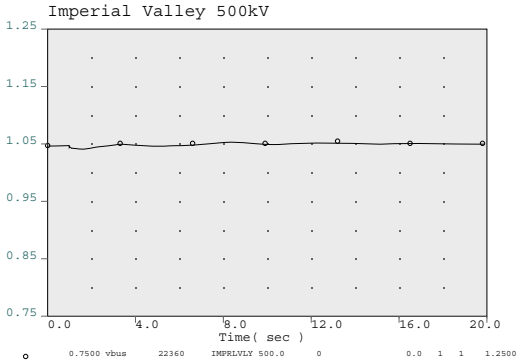
Otay Mesa 230kV



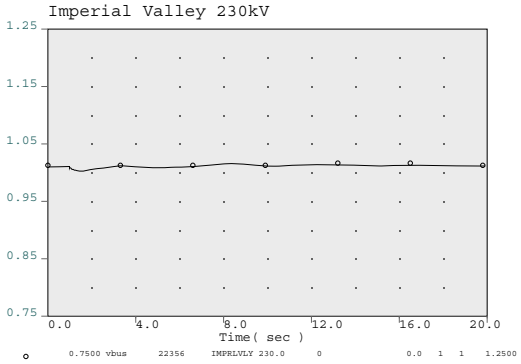
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE

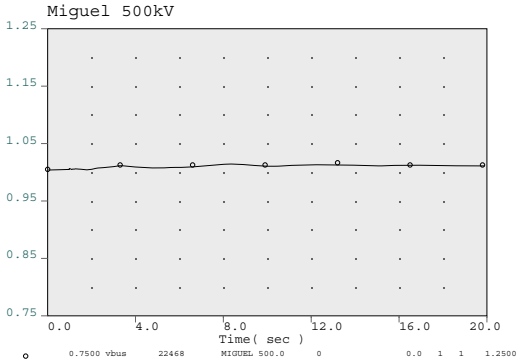
Imperial Valley 500kV



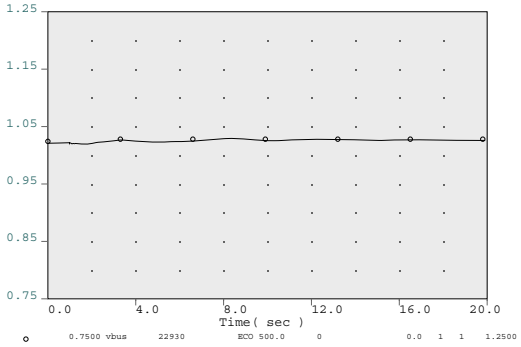
Imperial Valley 230kV



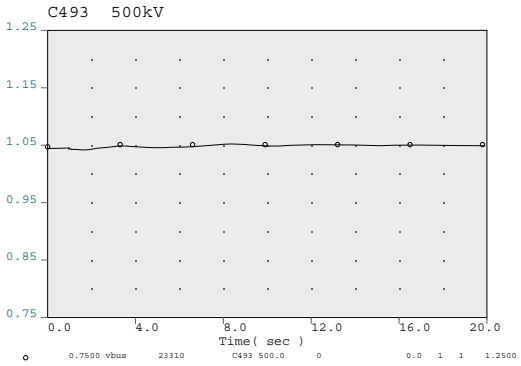
Miguel 500kV



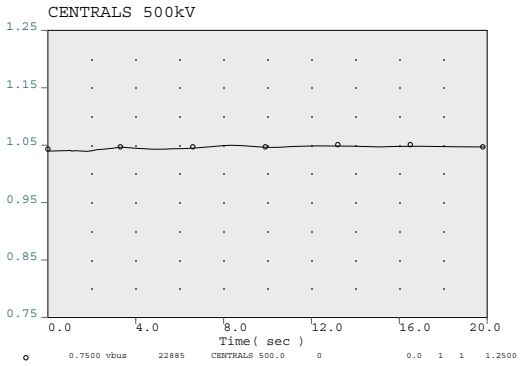
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
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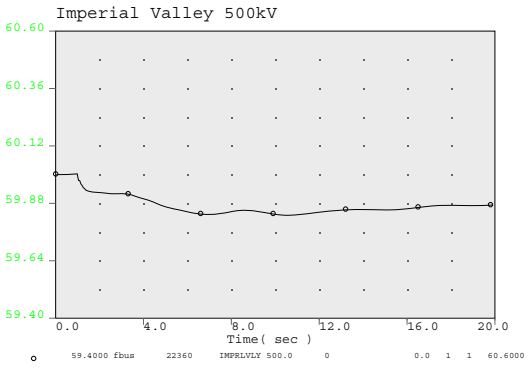
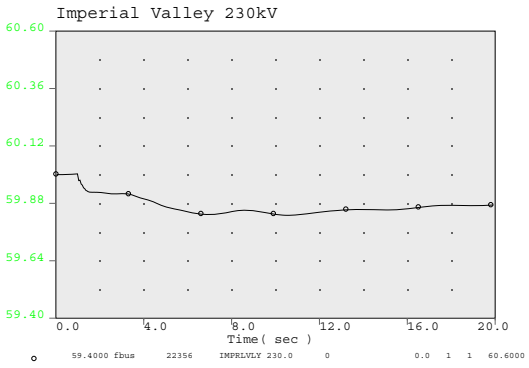
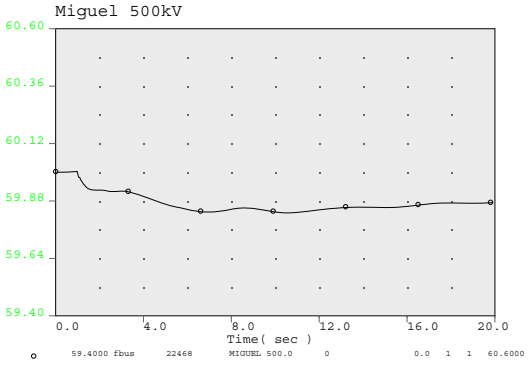
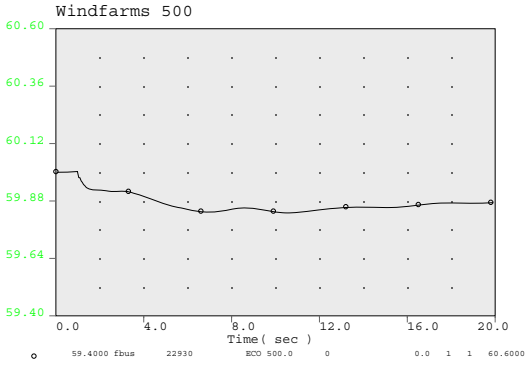
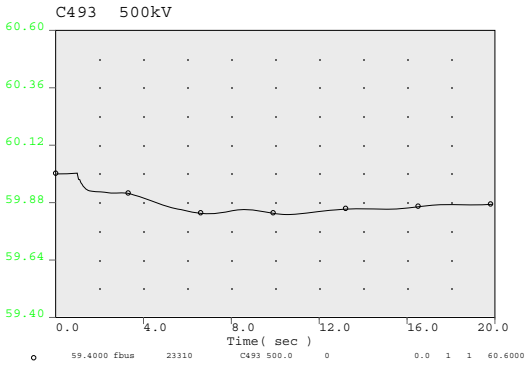
Imperial Valley Area - Frequency

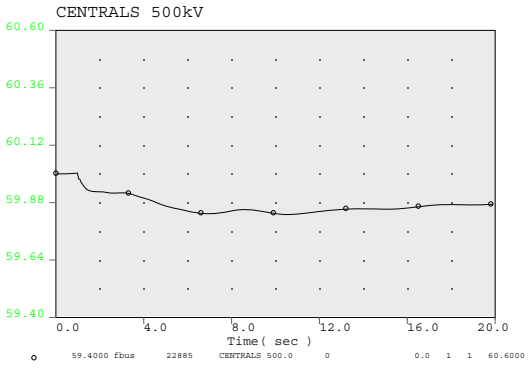






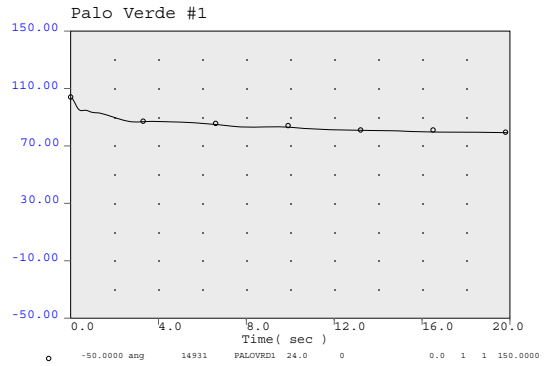


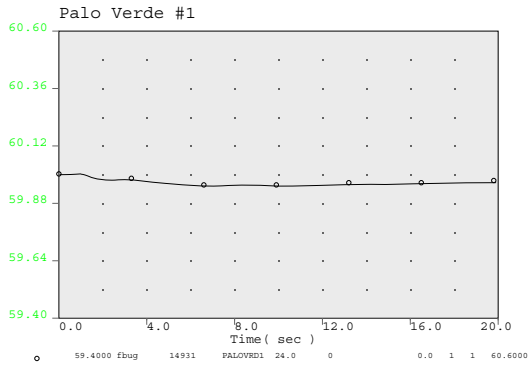


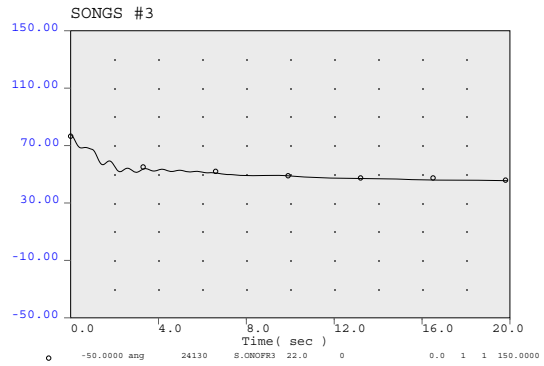


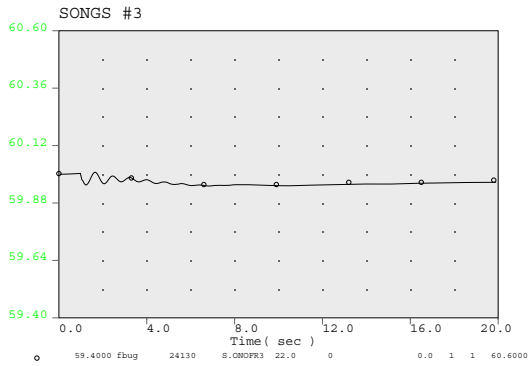
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

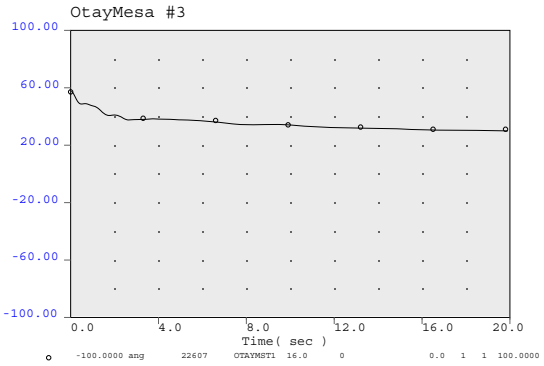
RELATIVE ROTOR ANGLE & FREQUENCY

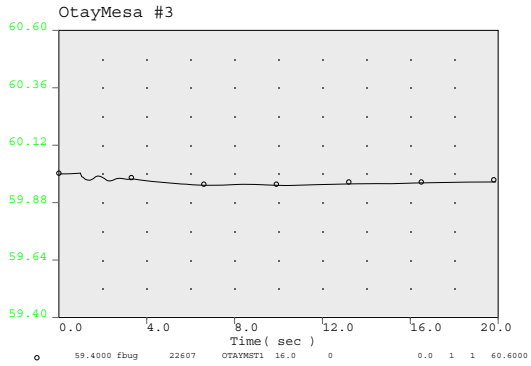












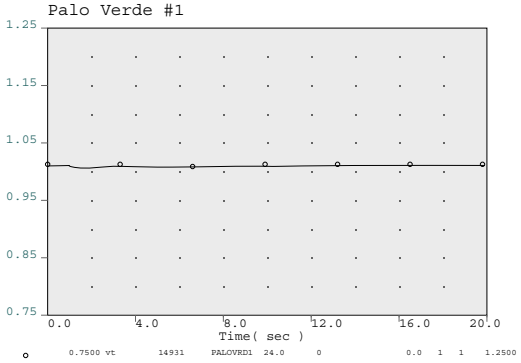
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

Page 1

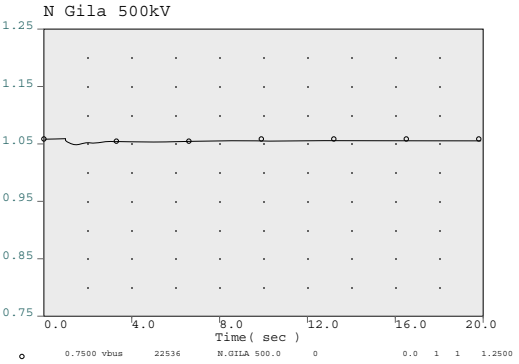
SDGE	SONGS-g1_pst_iv4_hs.chf	tab\hs\pst_iv4\ws_pst_iv4 Wed Oct 13 16:39:56 2010

RELATIVE VOLTAGE

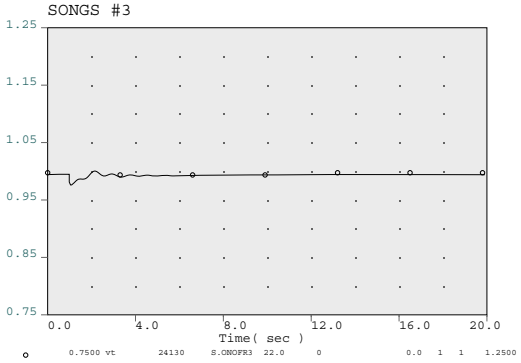
Palo Verde #1



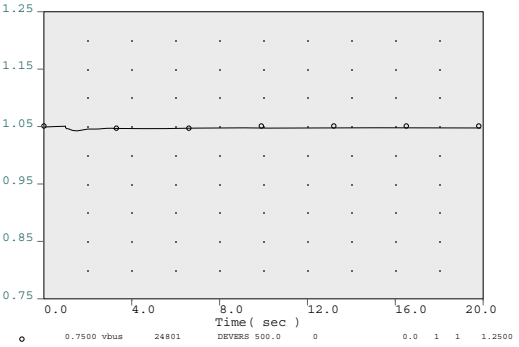
N Gila 500kV



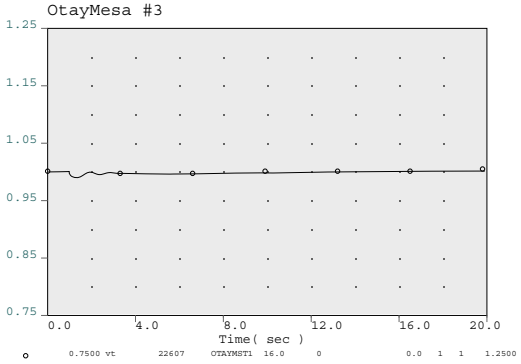
SONGS #3



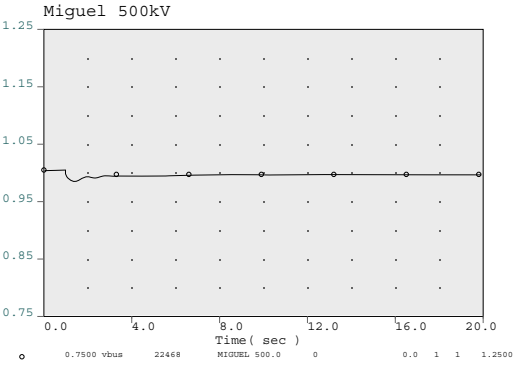
Devers 500



OtayMesa #3



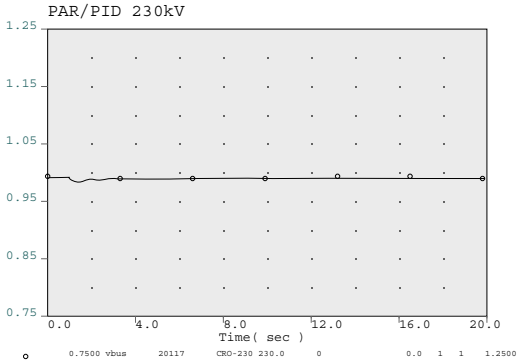
Miguel 500kV



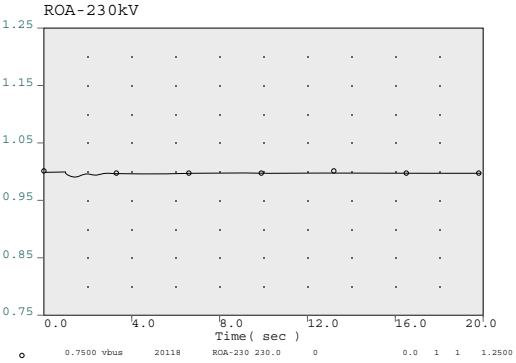
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

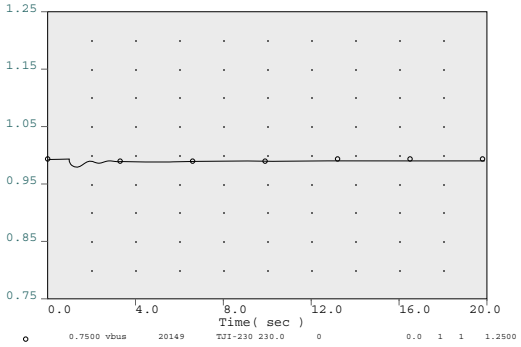
PAR/PID 230kV



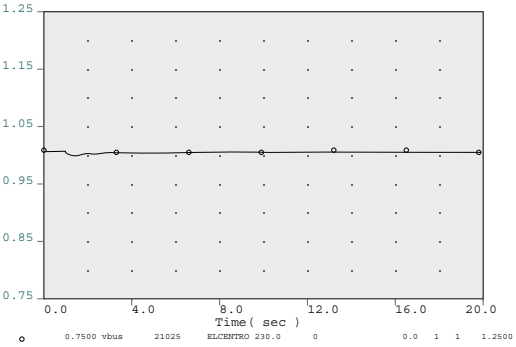
ROA-230kV



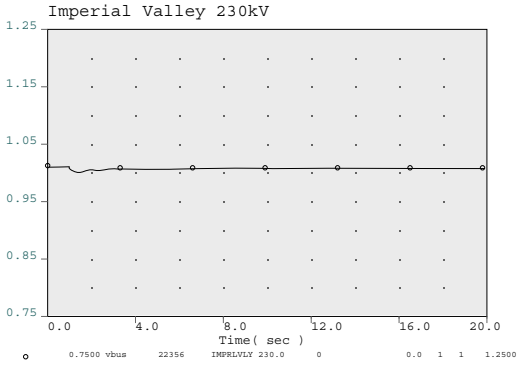
TJ1-230kV



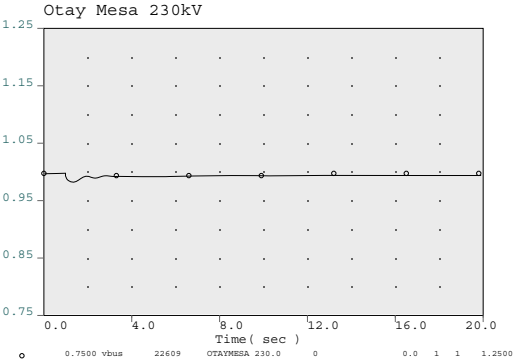
El Centro



Imperial Valley 230kV



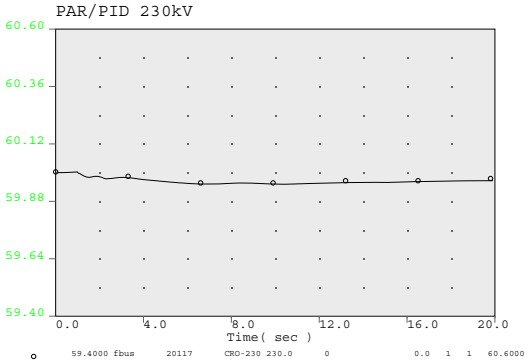
Otay Mesa 230kV



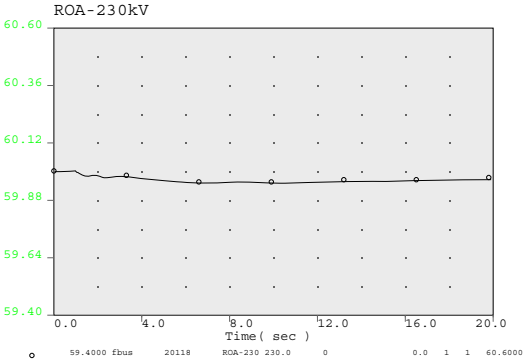
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison

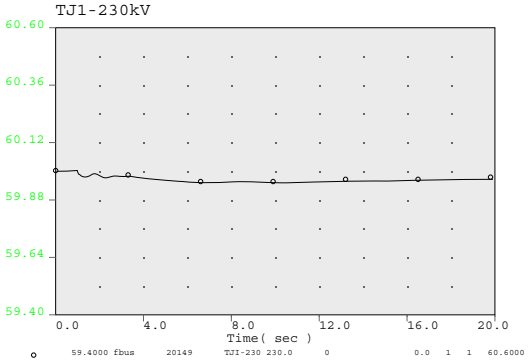
PAR/PID 230kV



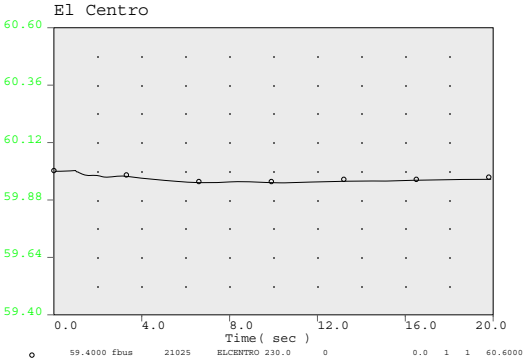
ROA-230kV



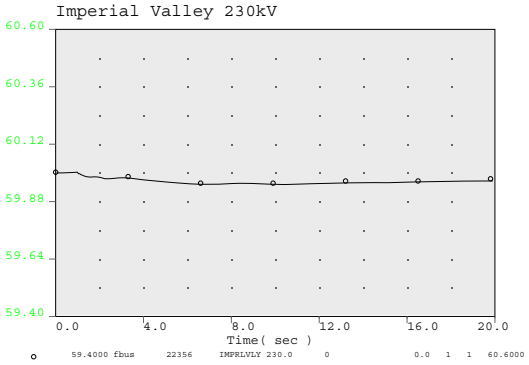
TJ1-230kV



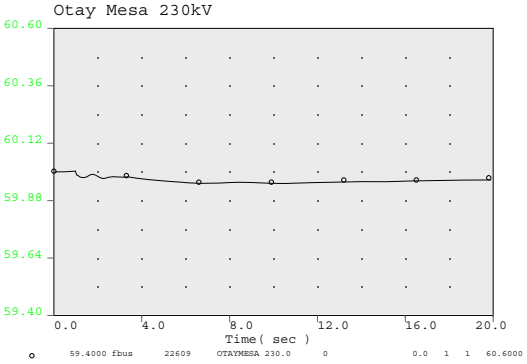
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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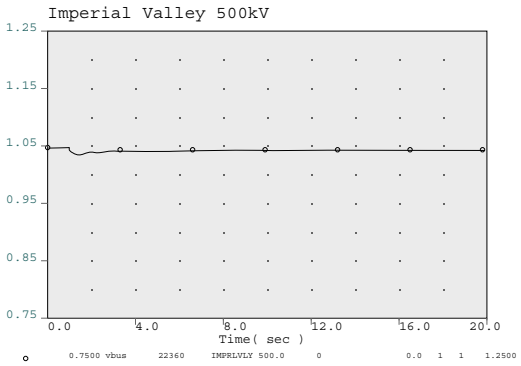
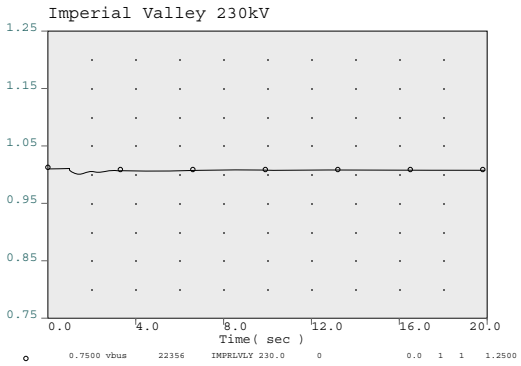
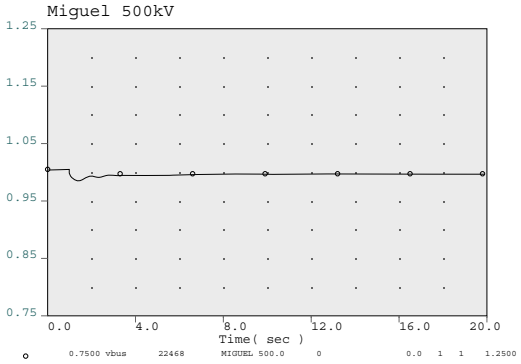
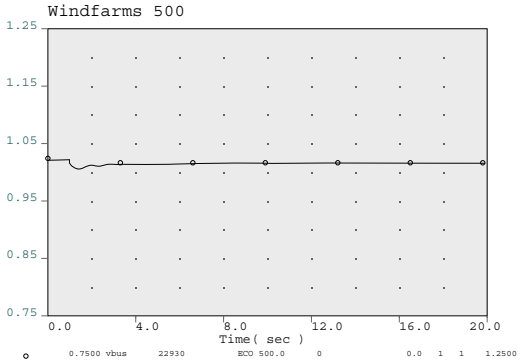
2014 Heavy Summer
Trip San Onofre Generator #2

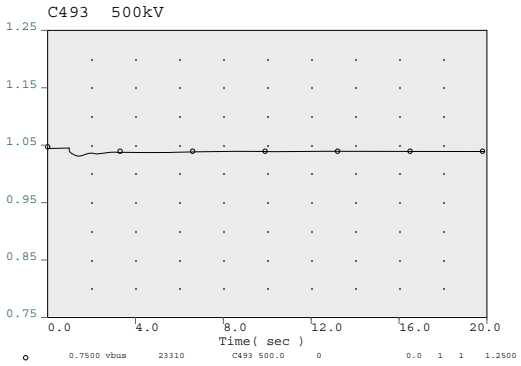
Imperial Valley Area - VOLTAGE

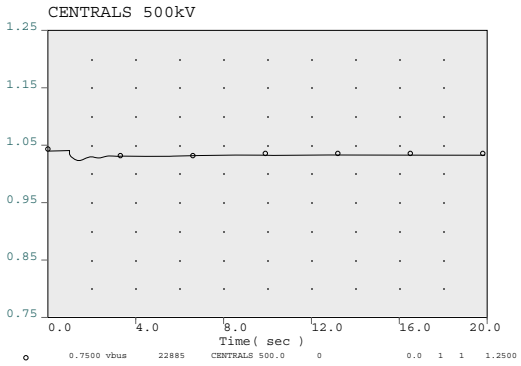






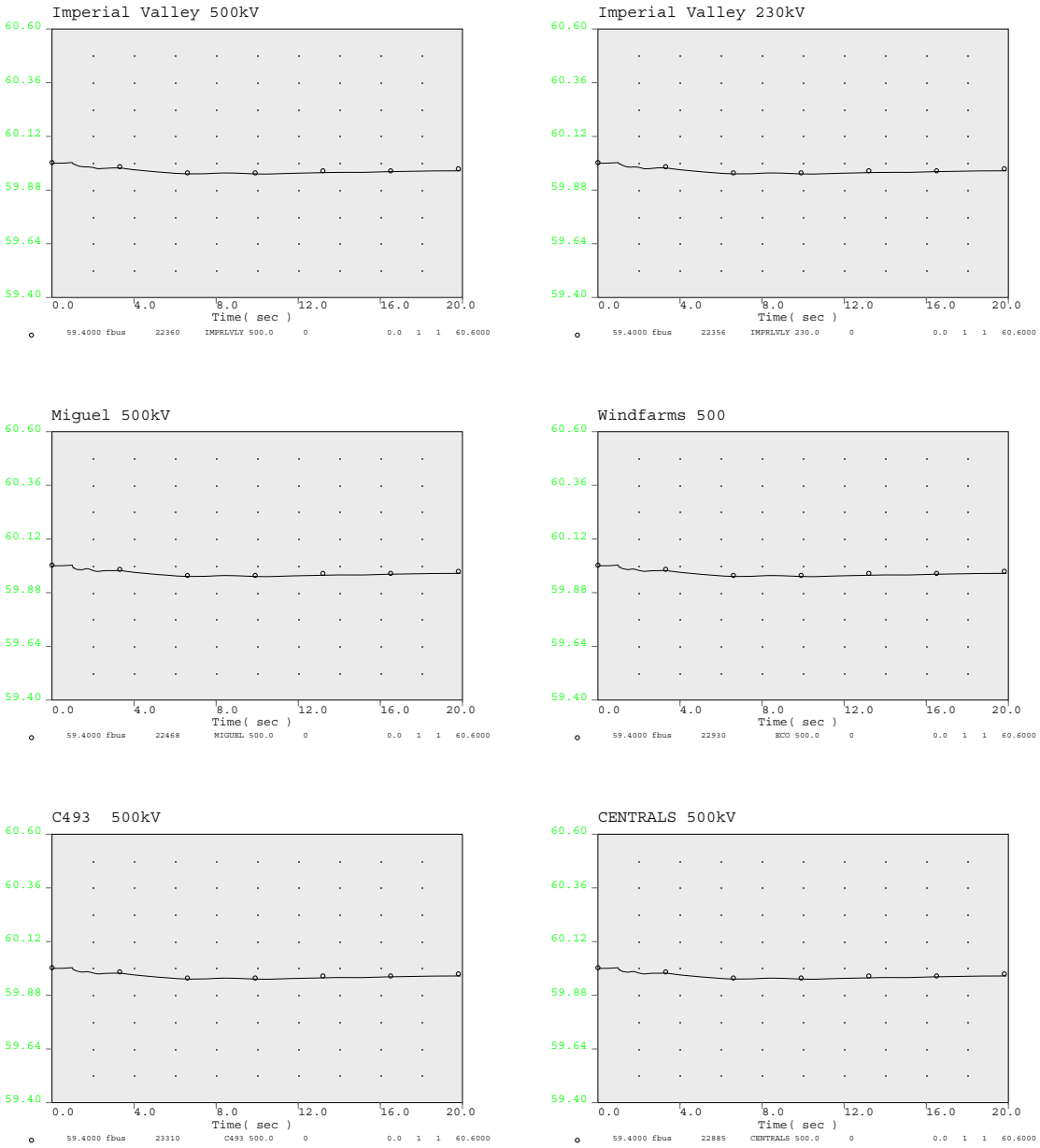






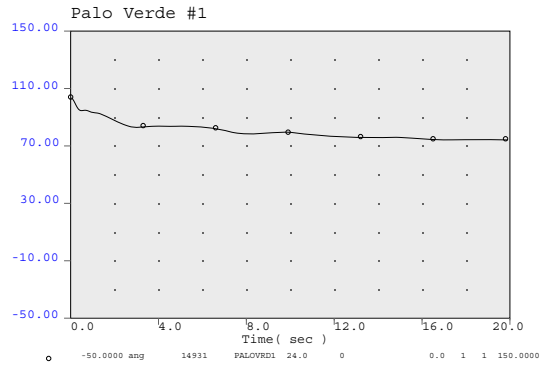
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

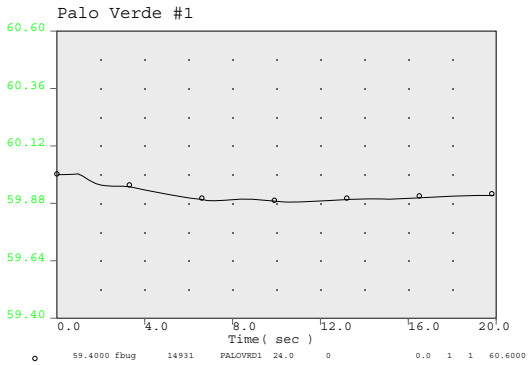
Imperial Valley Area - Frequency

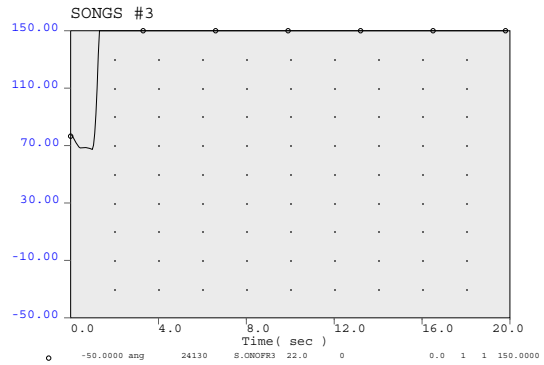


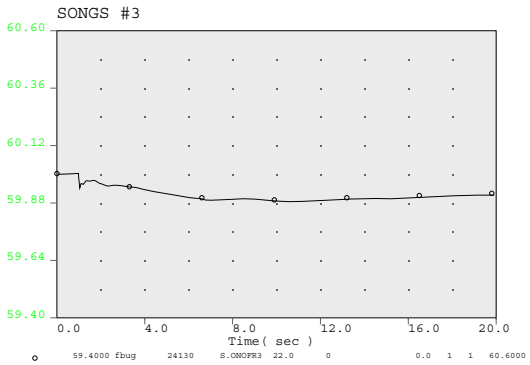
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

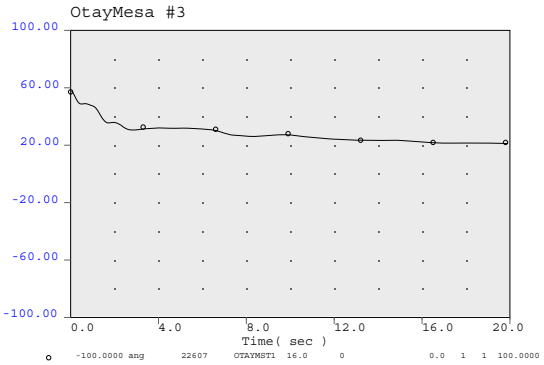
RELATIVE ROTOR ANGLE & FREQUENCY

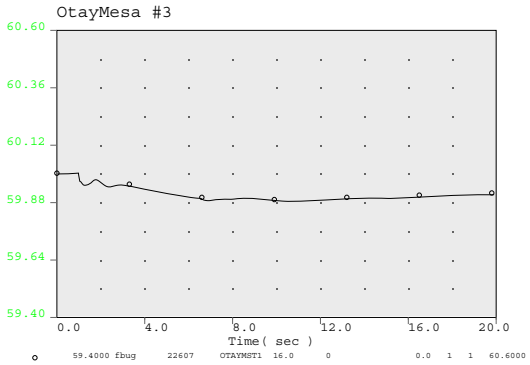












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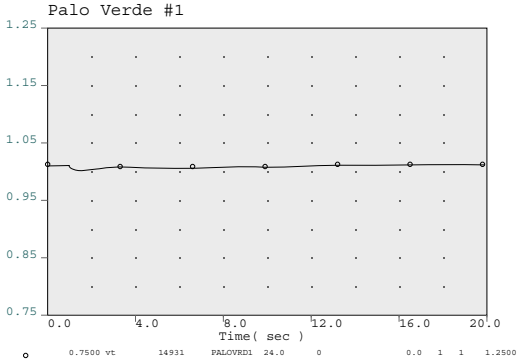
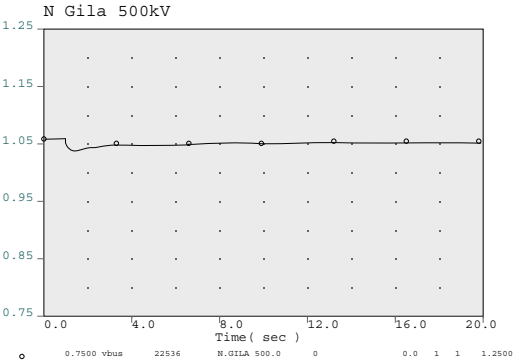
RELATIVE VOLTAGE

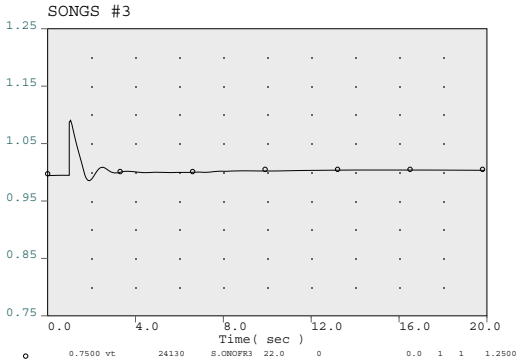
Palo Verde #1



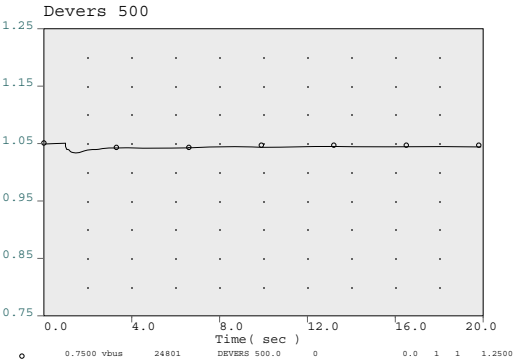
N Gila 500kV



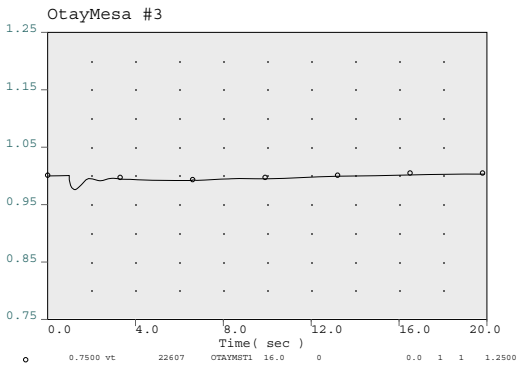
SONGS #3



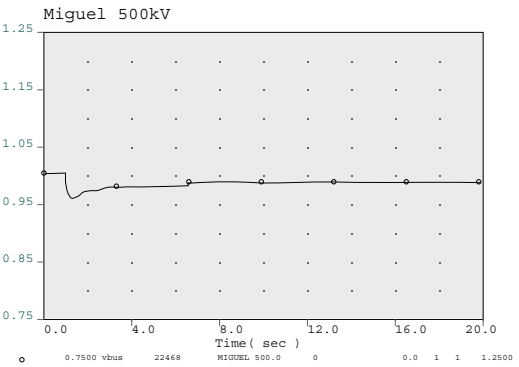
Devers 500



OtayMesa #3



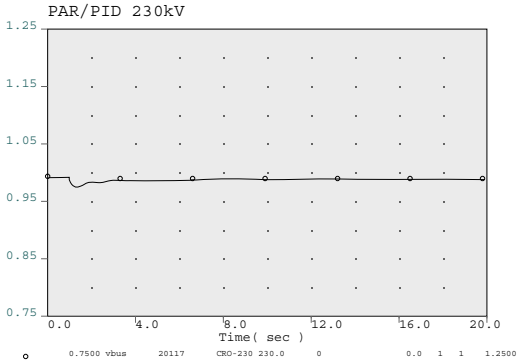
Miguel 500kV



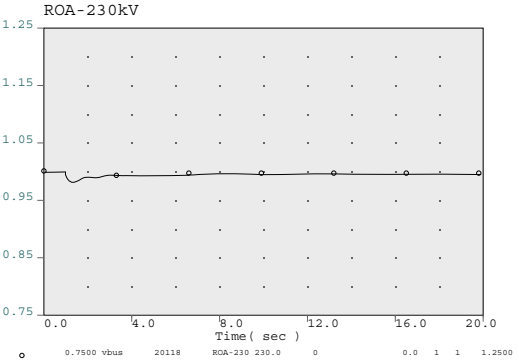
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

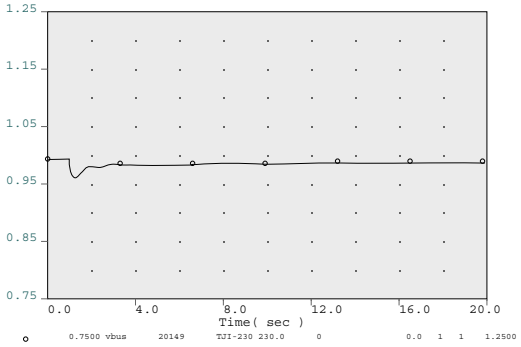
PAR/PID 230kV



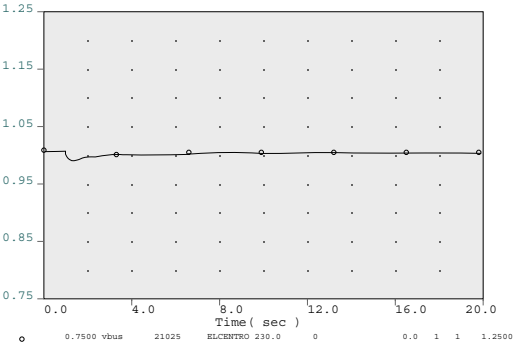
ROA-230kV



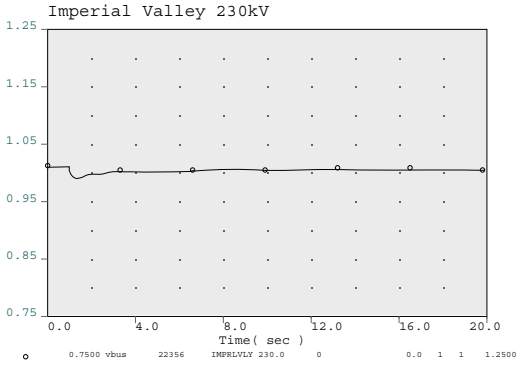
TJ1-230kV



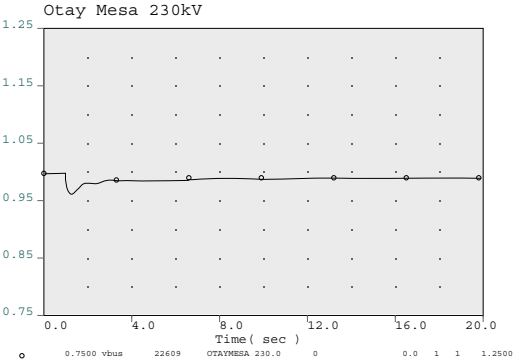
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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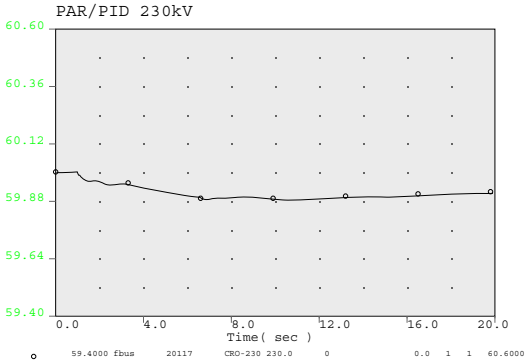
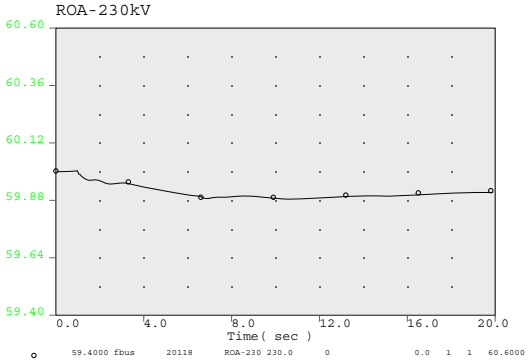
Affected System Frequency Check and Comparison

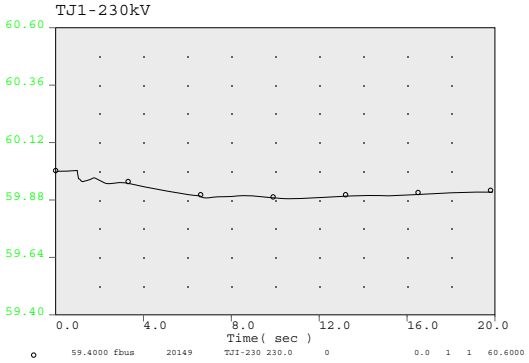
PAR/PID 230kV



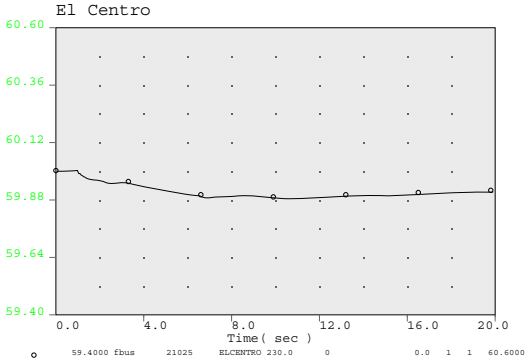
ROA-230kV



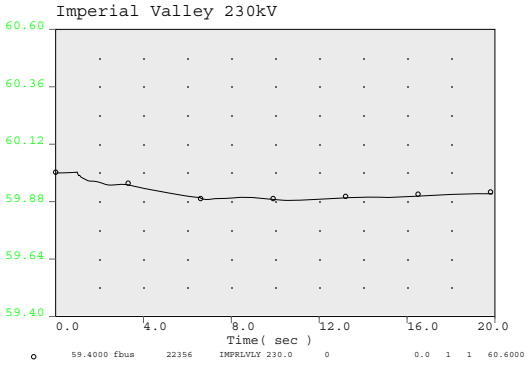
TJ1-230kV



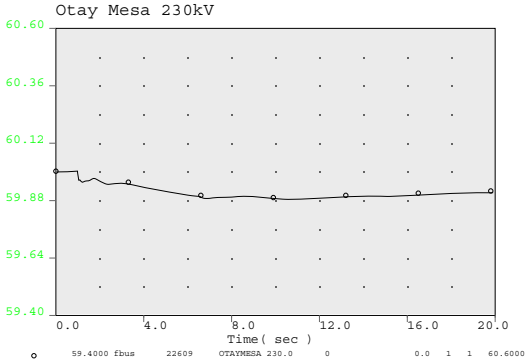
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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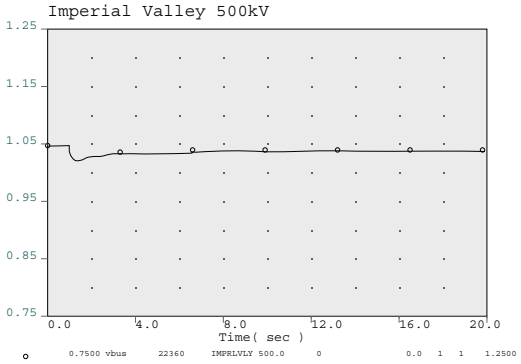
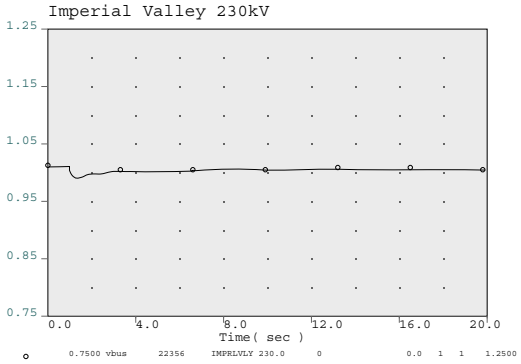
Imperial Valley Area - VOLTAGE

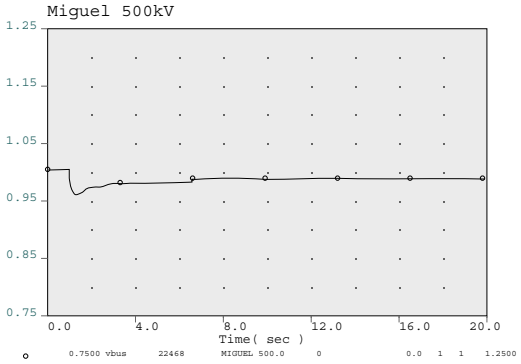
Imperial Valley 500kV



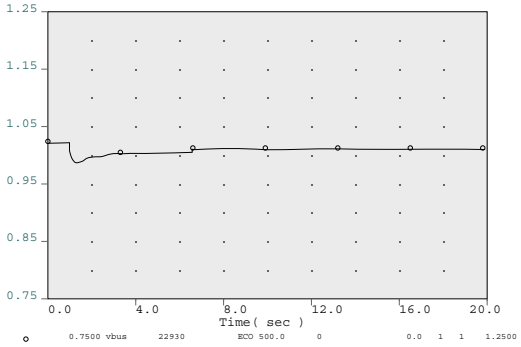
Imperial Valley 230kV



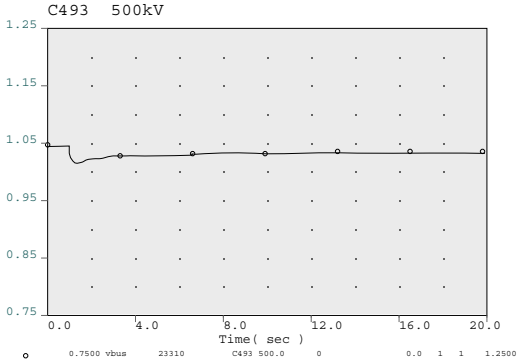
Miguel 500kV



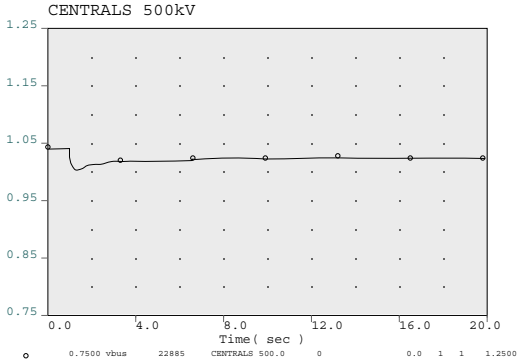
Windfarms 500



C493 500kV



CENTRALS 500kV



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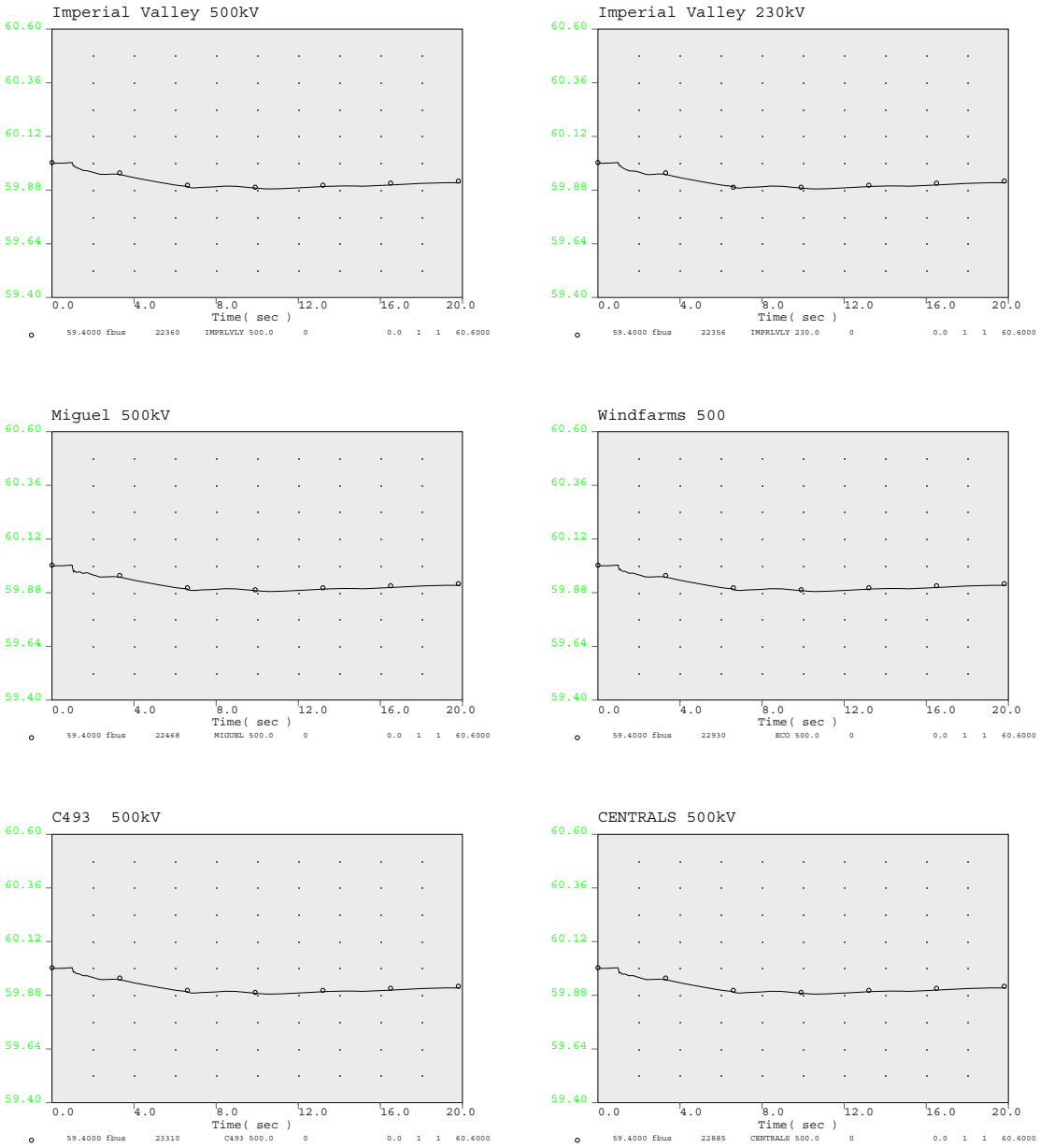
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Imperial Valley Area - Frequency



SDG&E Cluster 2 - post
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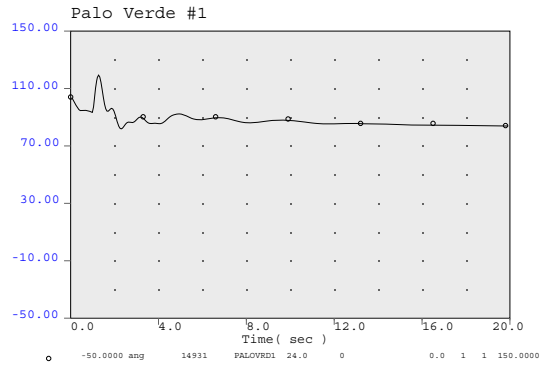
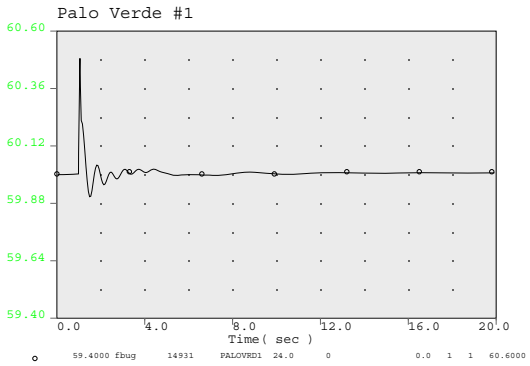
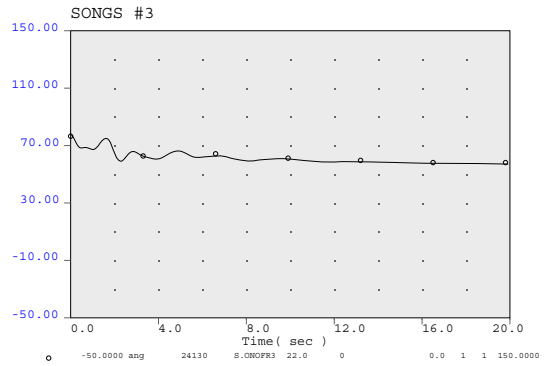
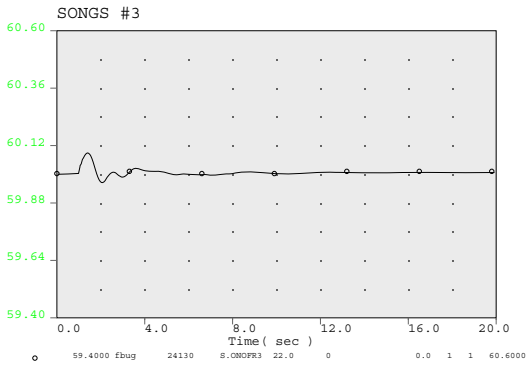
Trip San Onofre Generators 2 & 3

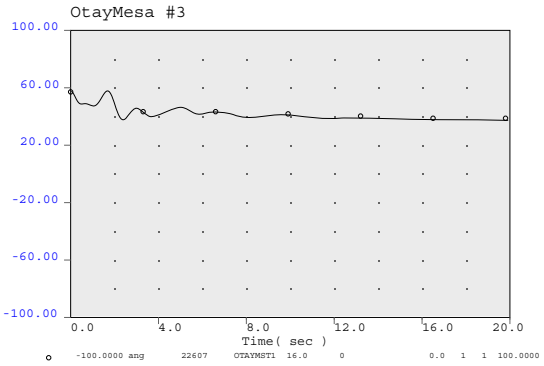
RELATIVE ROTOR ANGLE & FREQUENCY

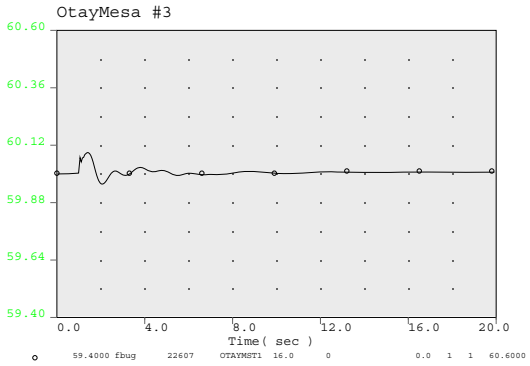












SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

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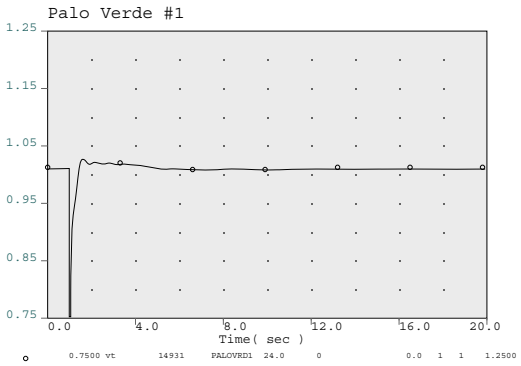
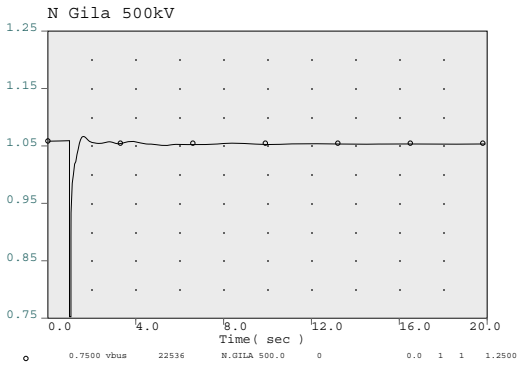
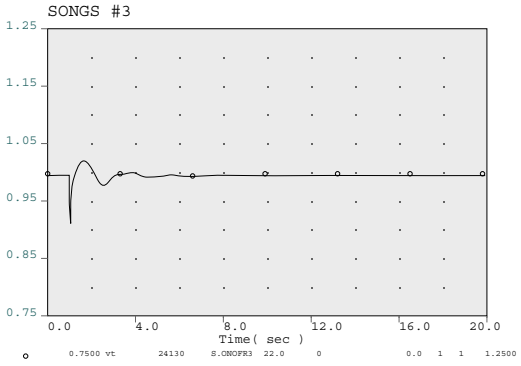
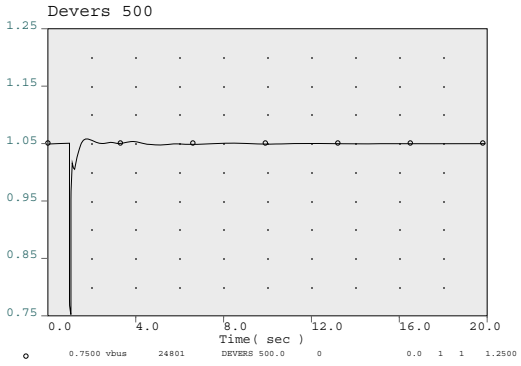
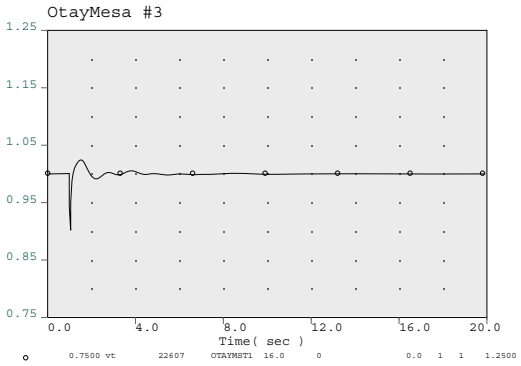
RELATIVE VOLTAGE

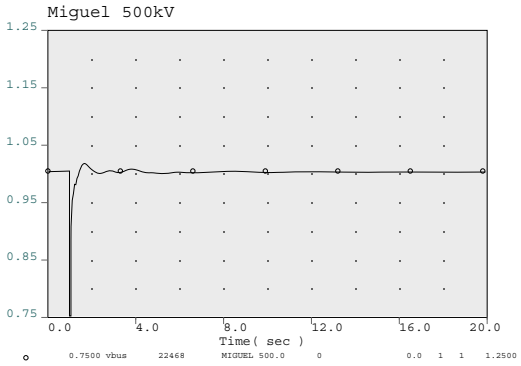








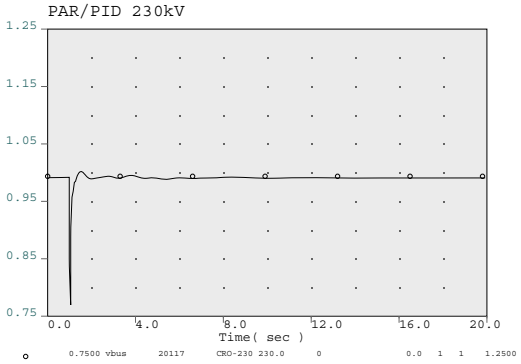




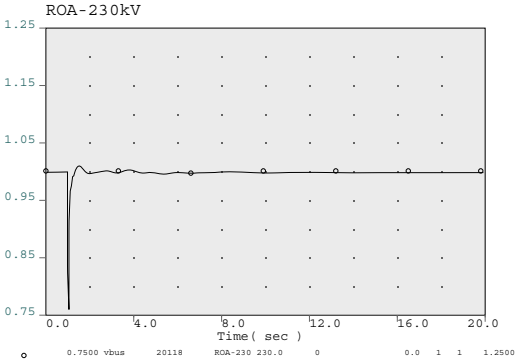
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

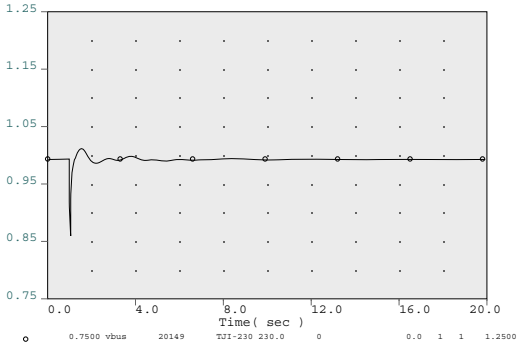
PAR/PID 230kV



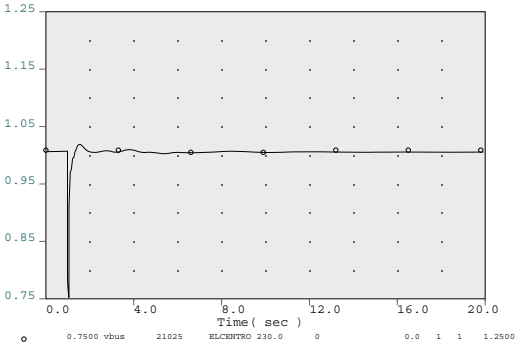
ROA-230kV



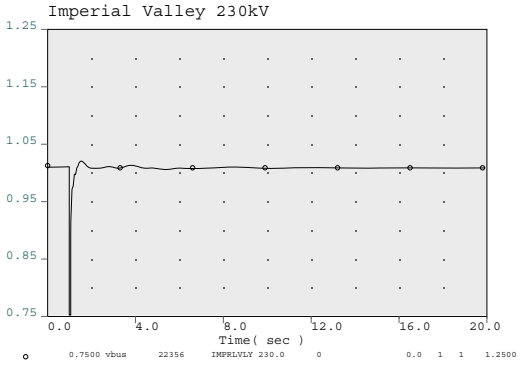
TJ1-230kV



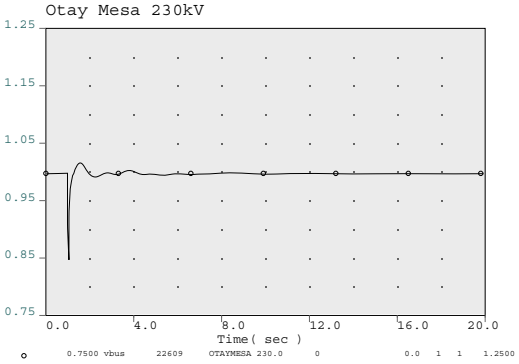
El Centro



Imperial Valley 230kV



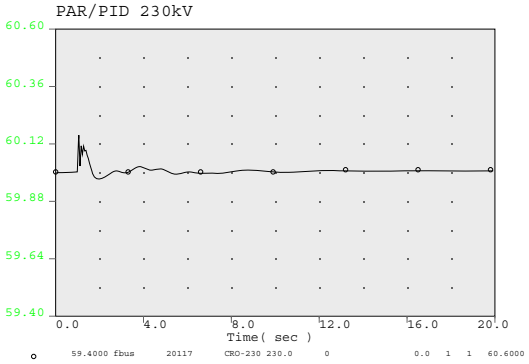
Otay Mesa 230kV



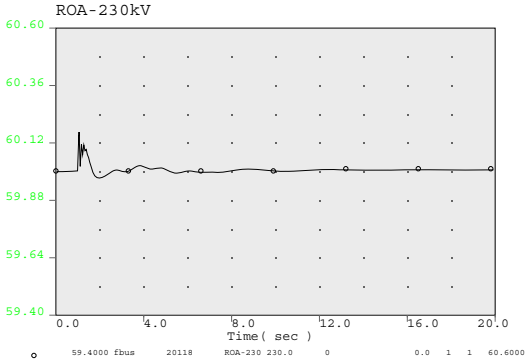
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Frequency Check and Comparison

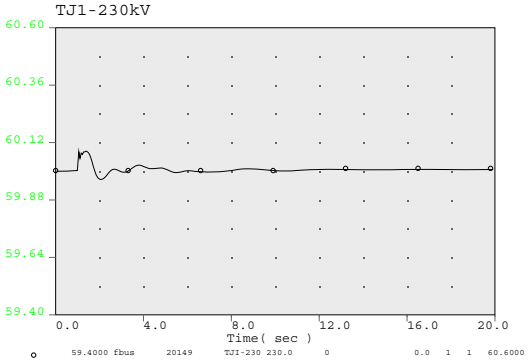
PAR/PID 230kV



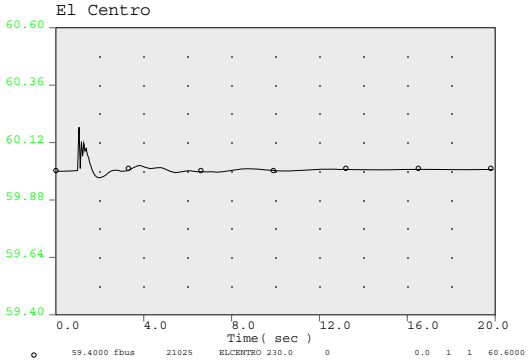
ROA-230kV



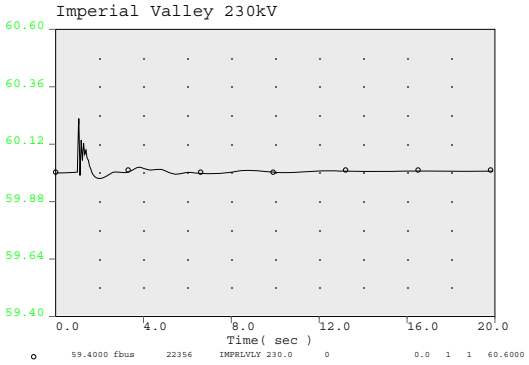
TJ1-230kV



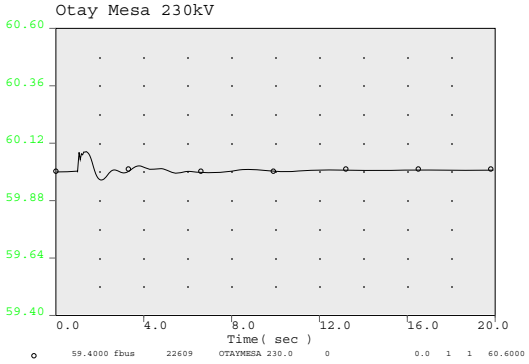
El Centro



Imperial Valley 230kV

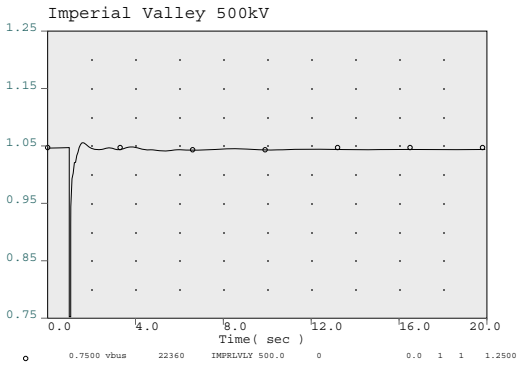


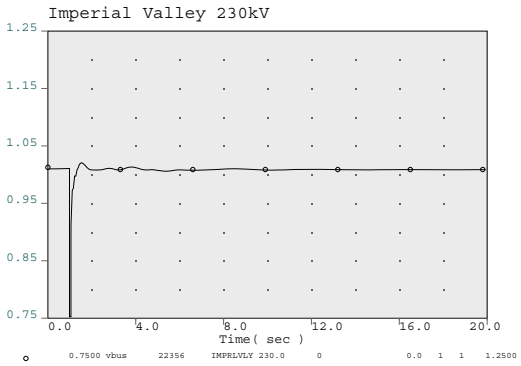
Otay Mesa 230kV

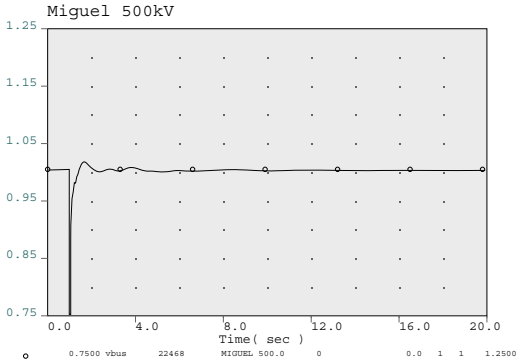


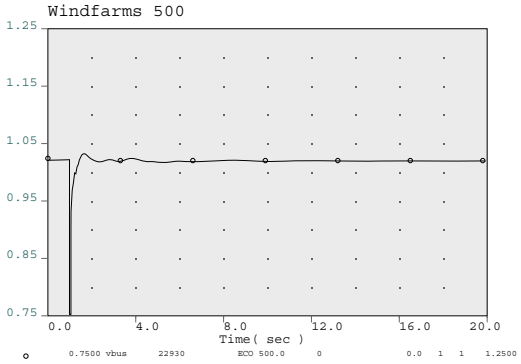
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

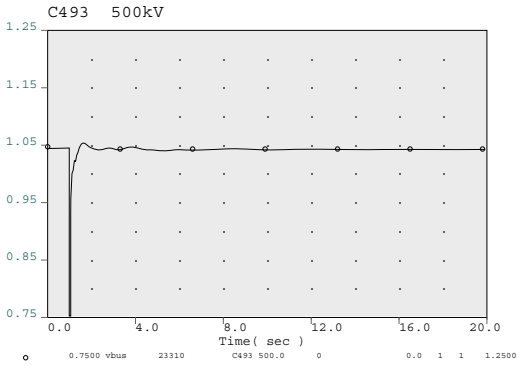
Imperial Valley Area - VOLTAGE

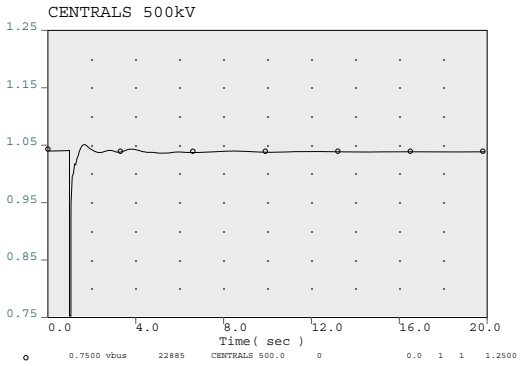






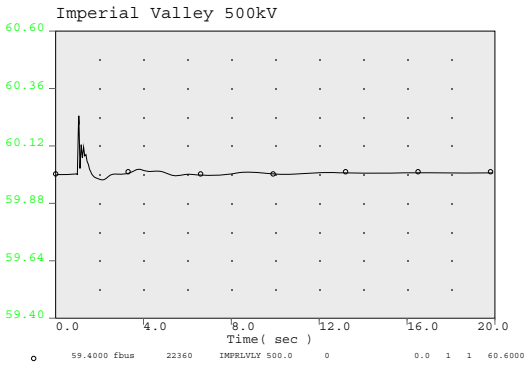


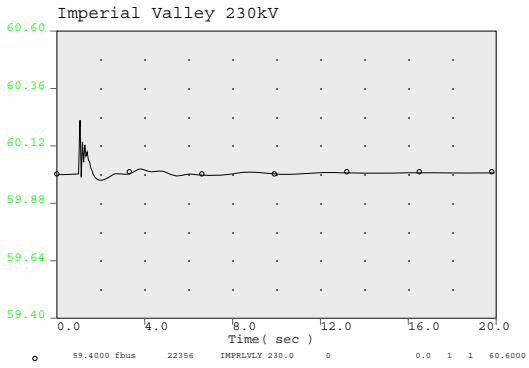


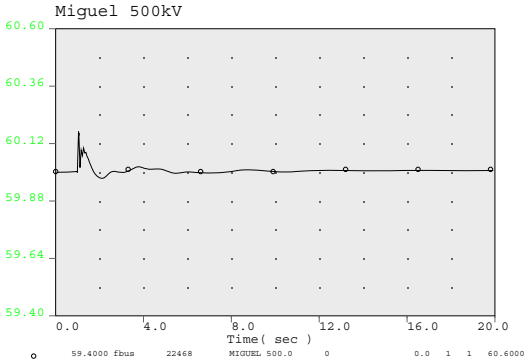


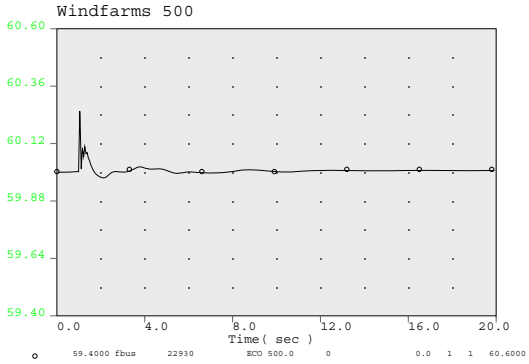
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

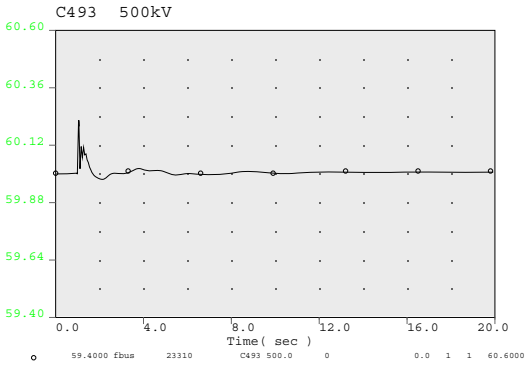
Imperial Valley Area - Frequency

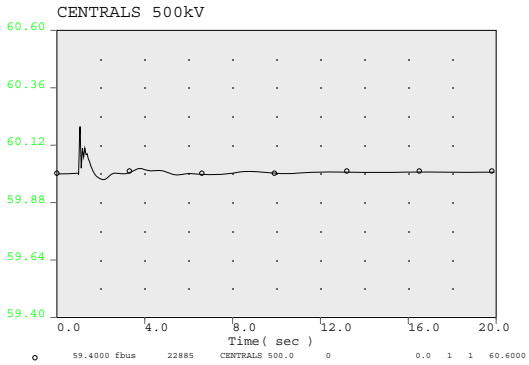






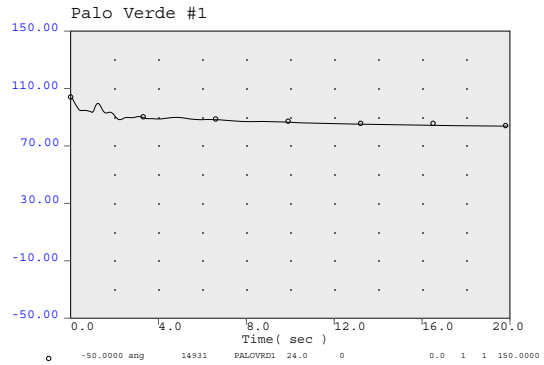


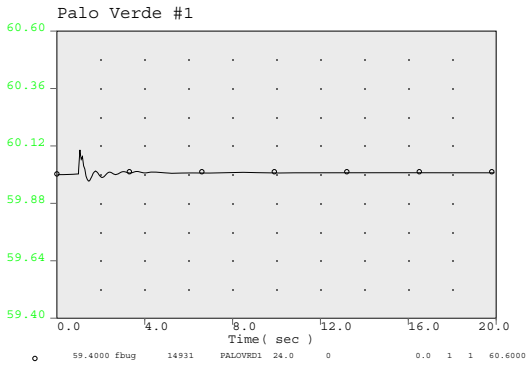


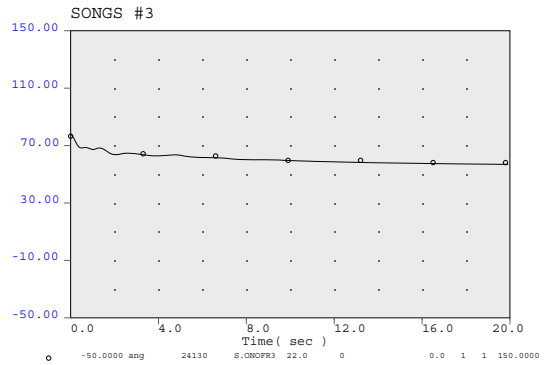


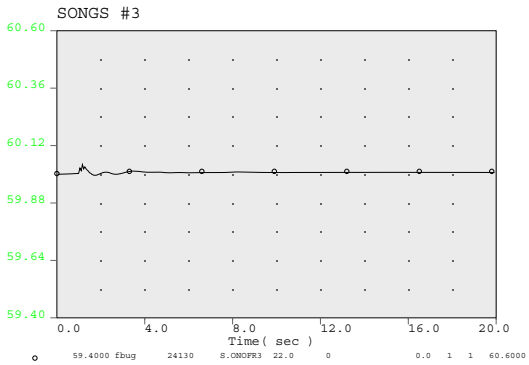
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

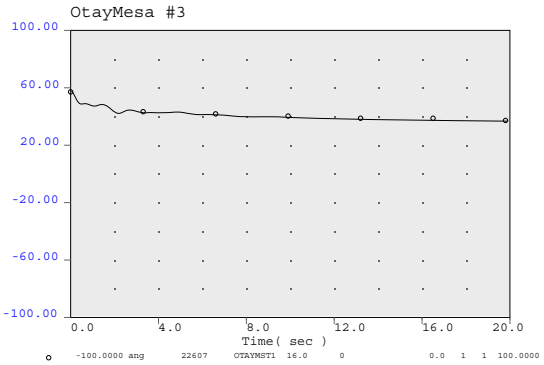
RELATIVE ROTOR ANGLE & FREQUENCY

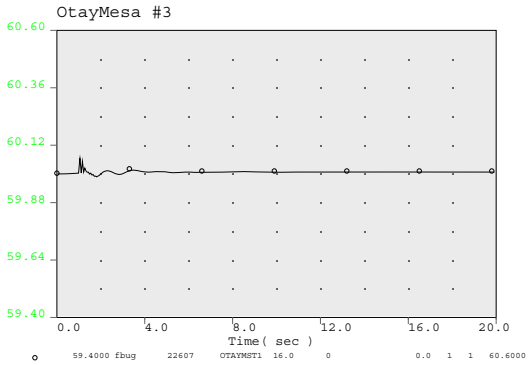












SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

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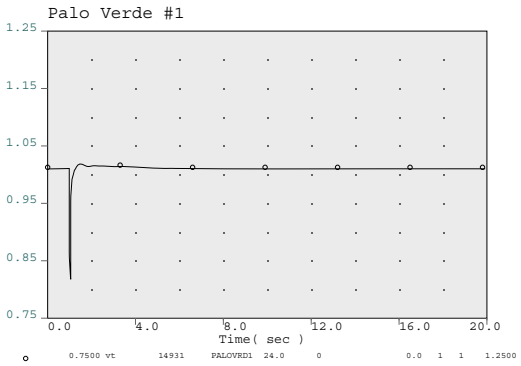
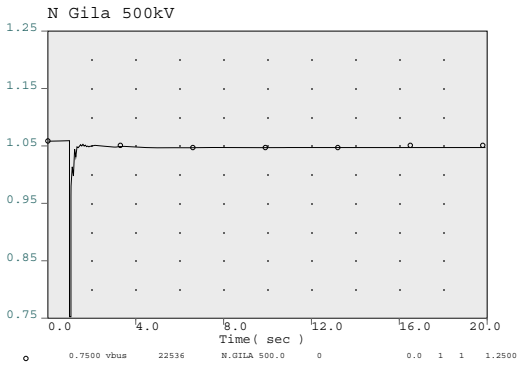
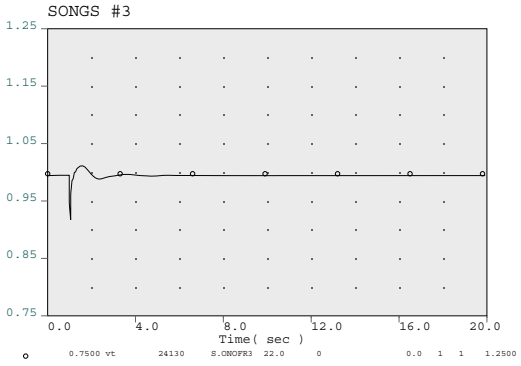
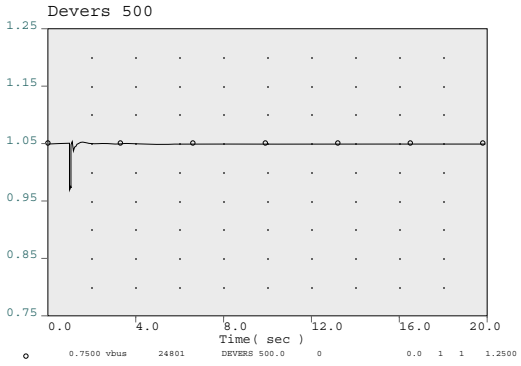
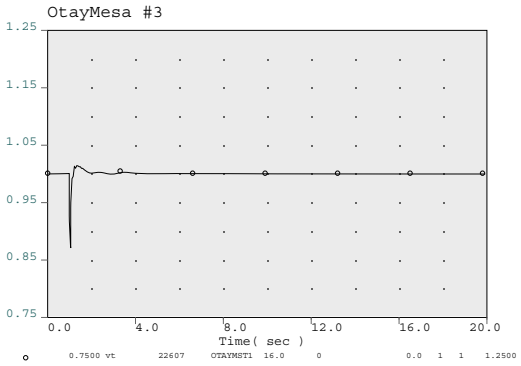
RELATIVE VOLTAGE

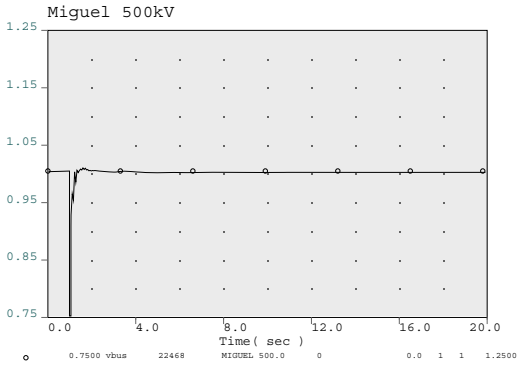








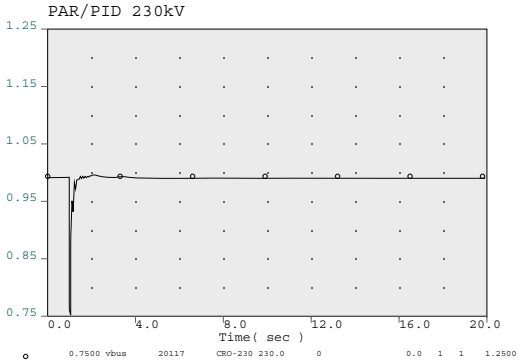




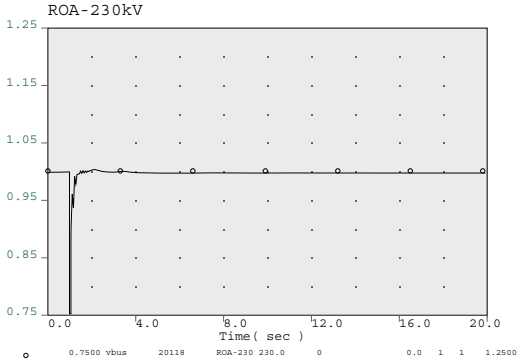
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

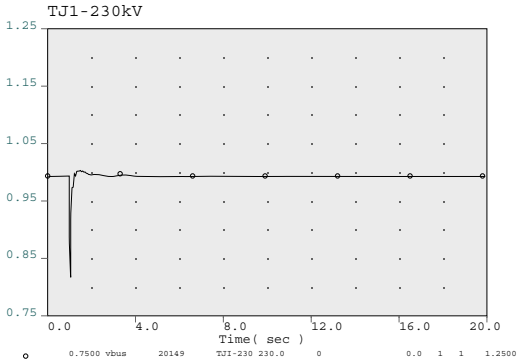
PAR/PID 230kV



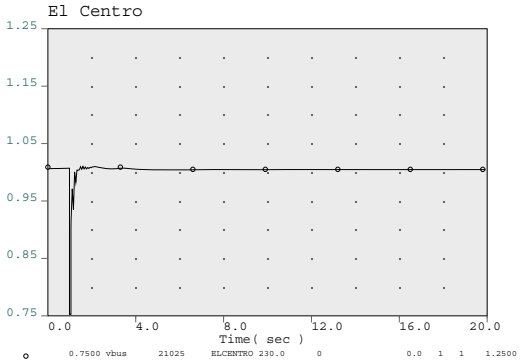
ROA-230kV



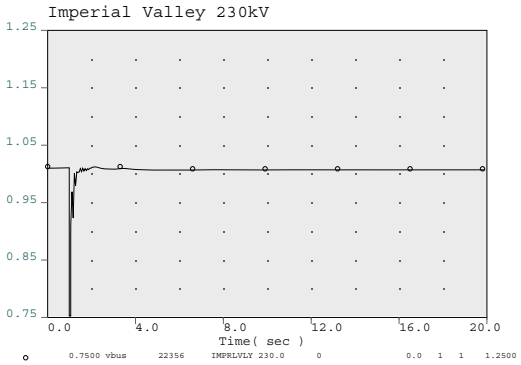
TJ1-230kV



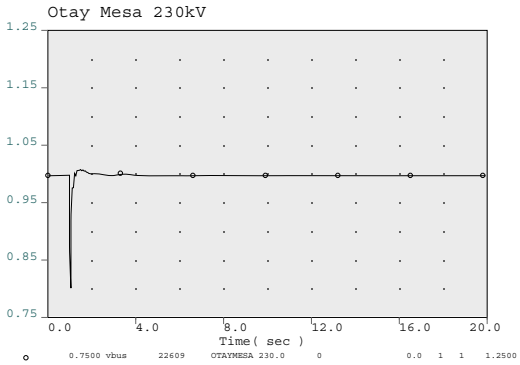
El Centro



Imperial Valley 230kV



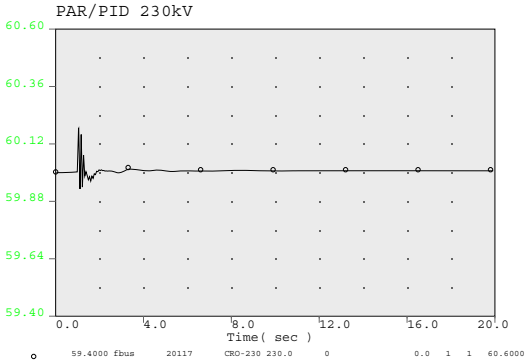
Otay Mesa 230kV



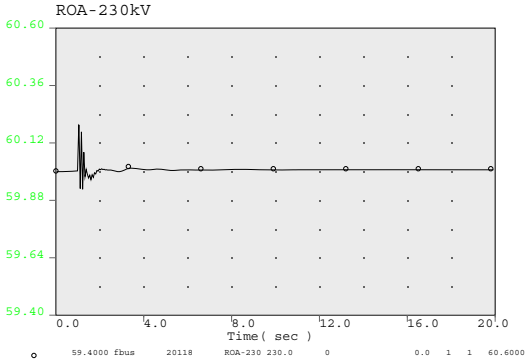
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

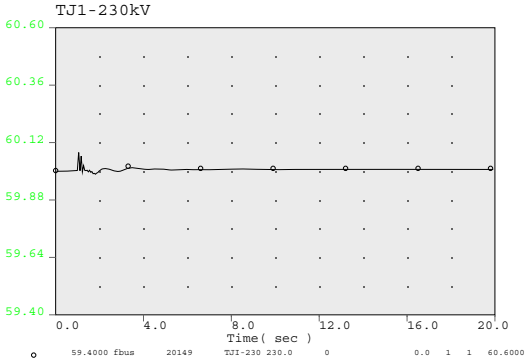
PAR/PID 230kV



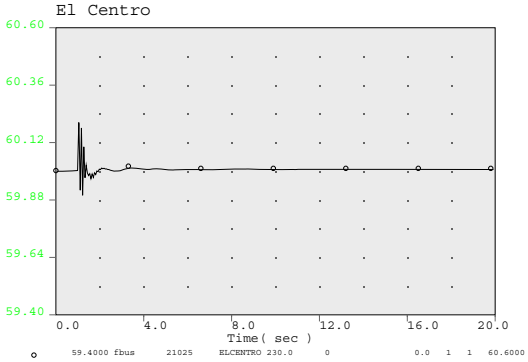
ROA-230kV



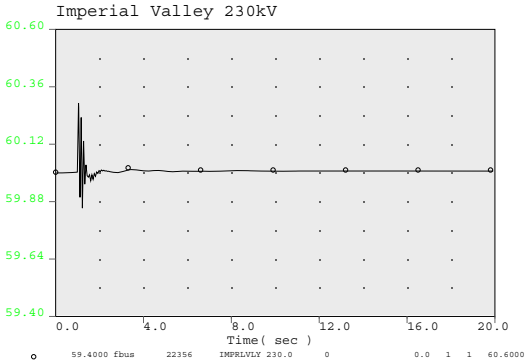
TJ1-230kV



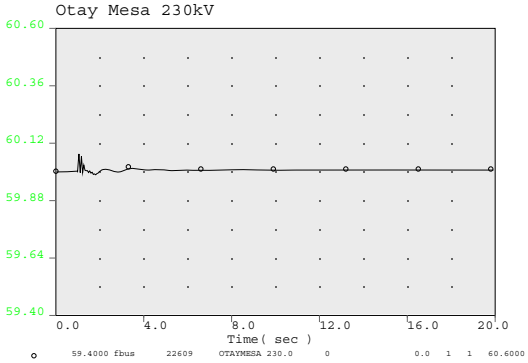
El Centro



Imperial Valley 230kV

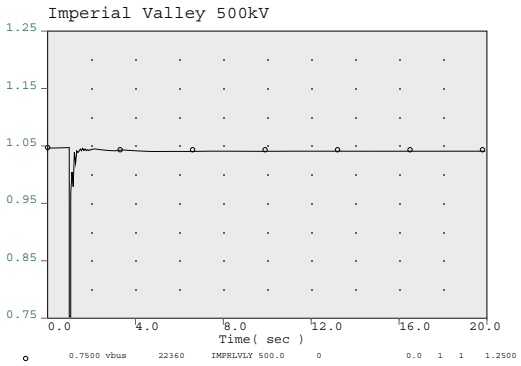


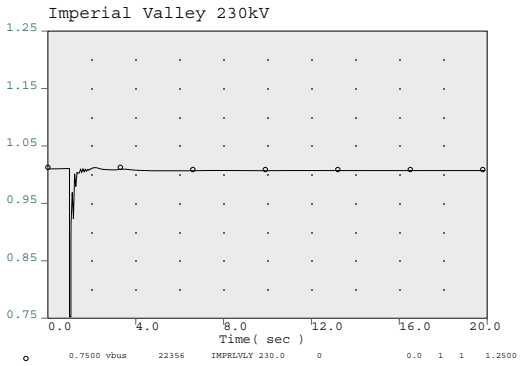
Otay Mesa 230kV

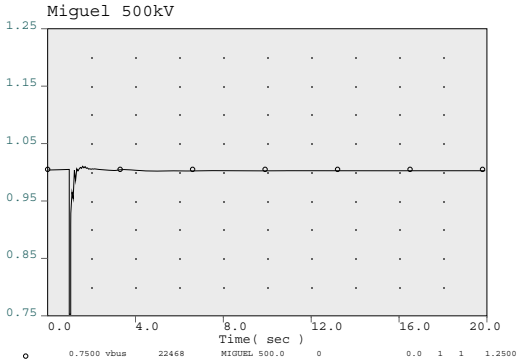


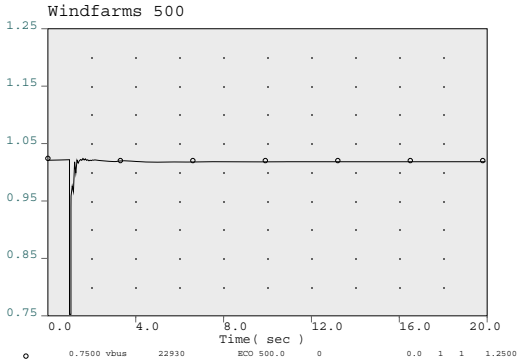
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

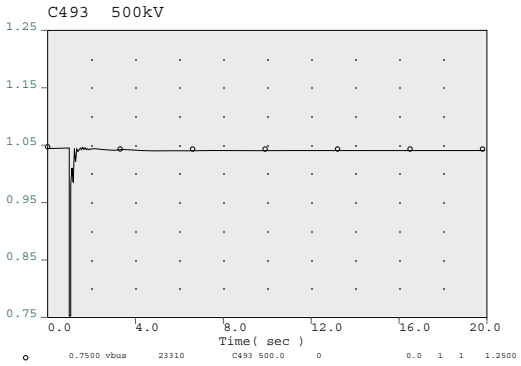
Imperial Valley Area - VOLTAGE

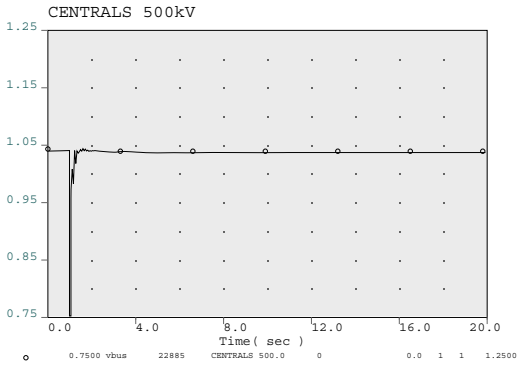












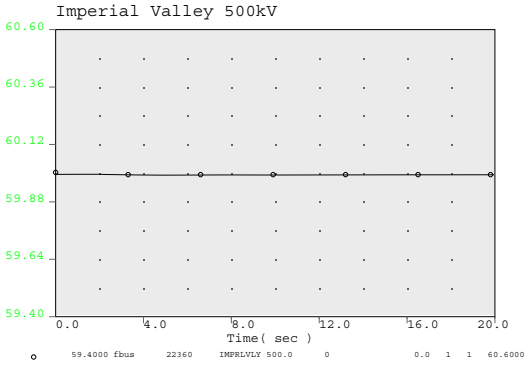
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

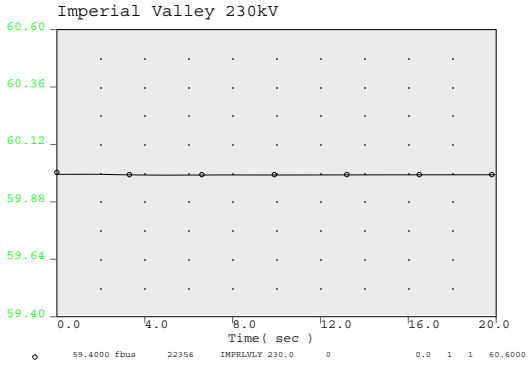
Appendix J-3

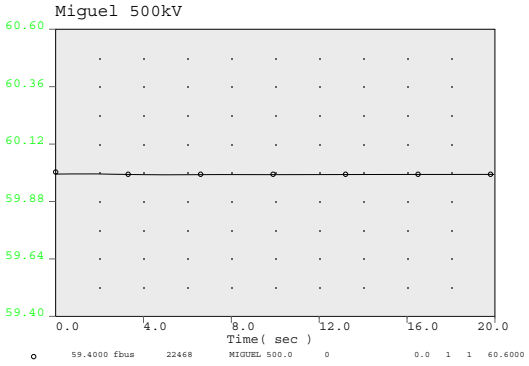
Transient Stability Plots

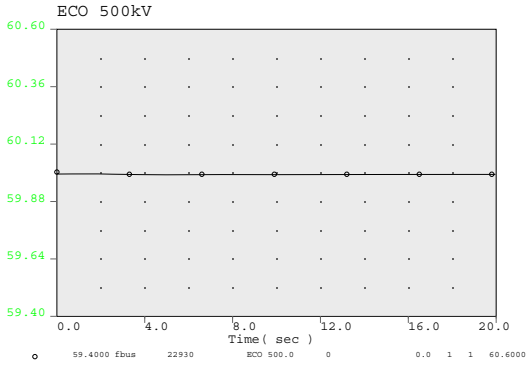
Heavy Summer Pre

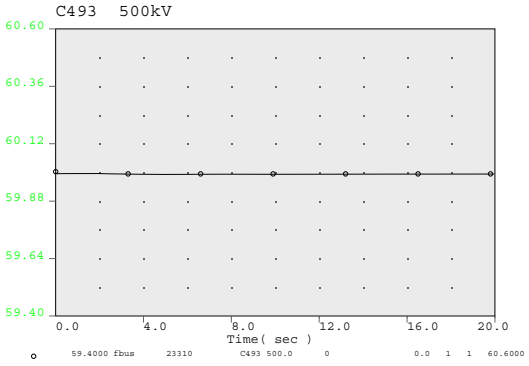
FREQUENCY

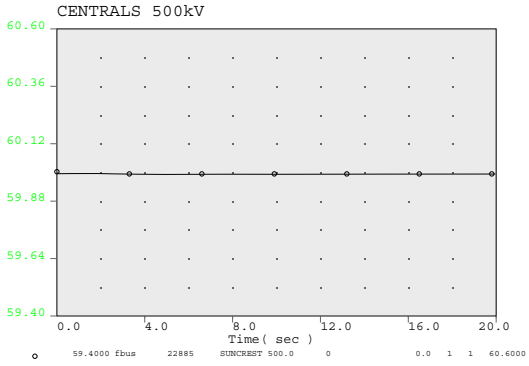






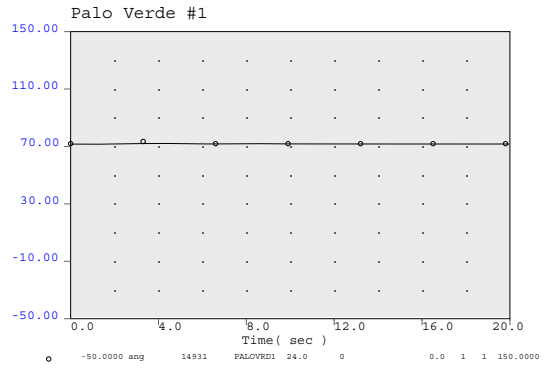


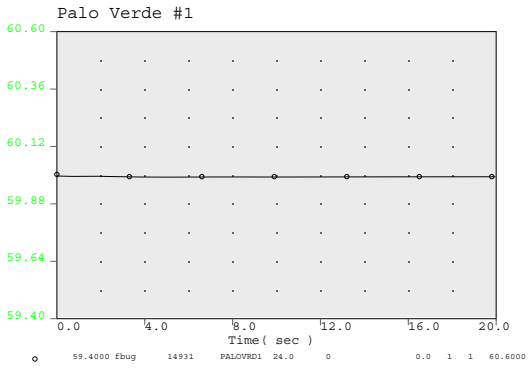


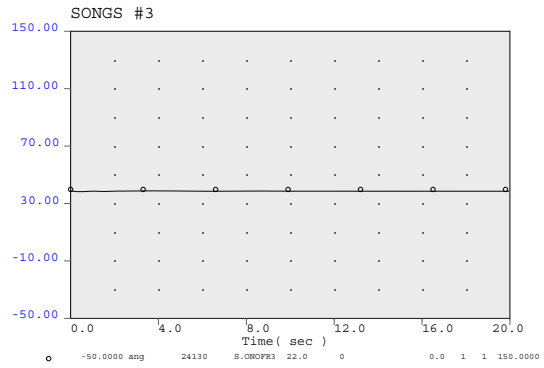


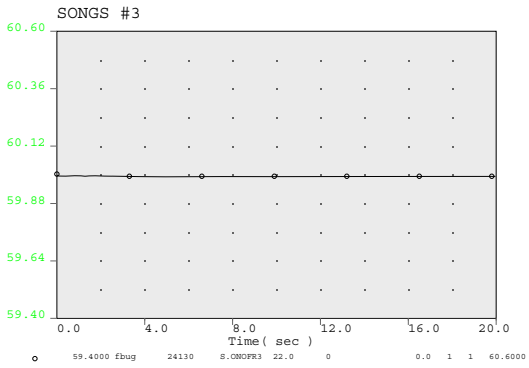
C1 C2 Heavy Summer Pre Without Upgrades

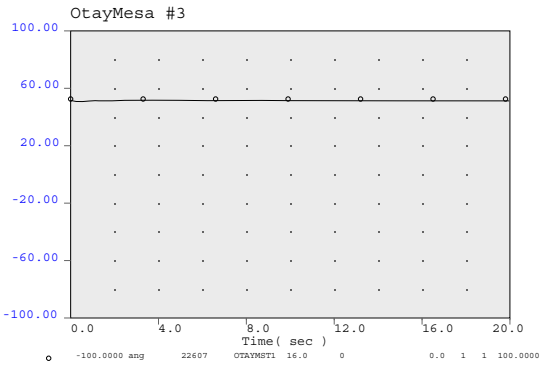
RELATIVE ROTOR ANGLE & FREQUENCY

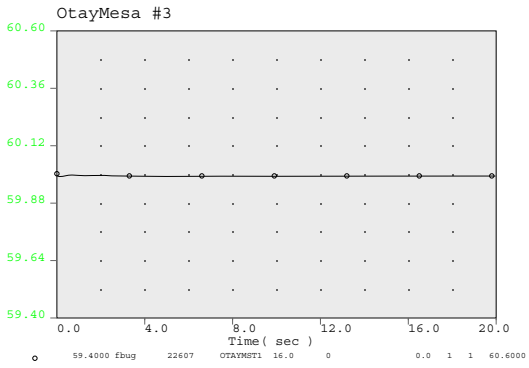












C1 C2 Heavy Summer Pre Without Upgrades

Page 1

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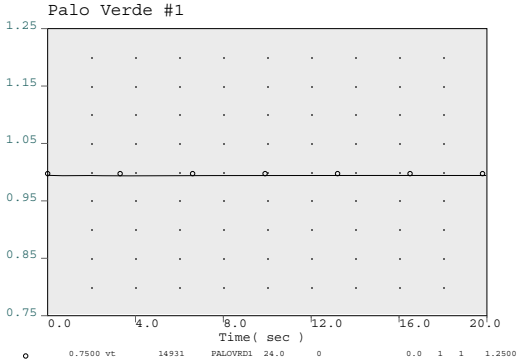
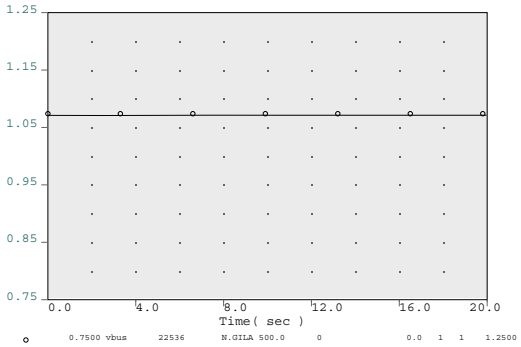
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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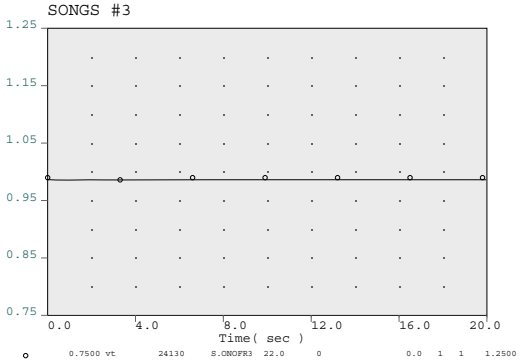
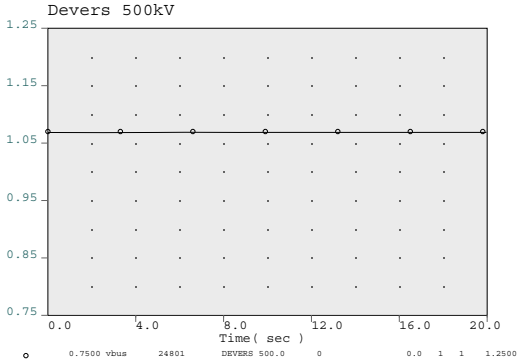


Devers 500kV



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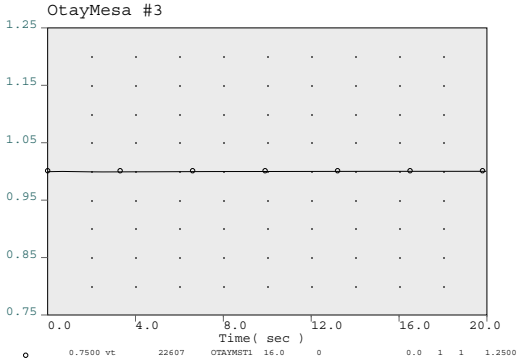
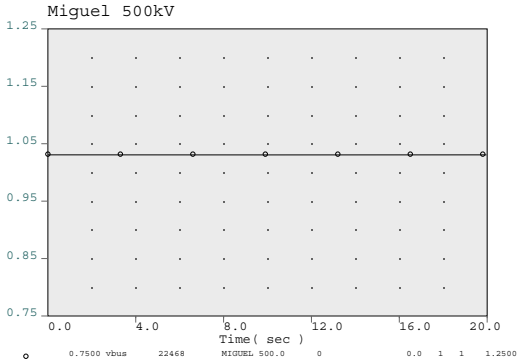


Miguel 500kV



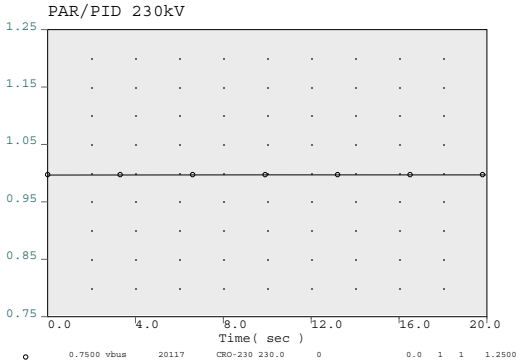
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

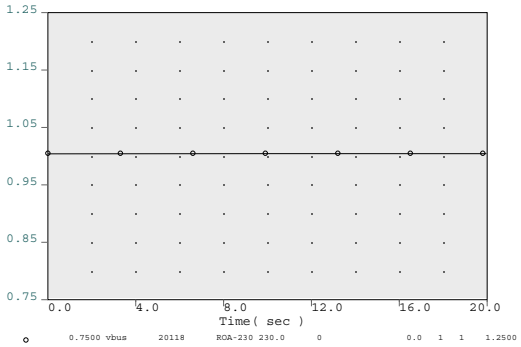
tran-c1c2-hs-pre-r12_FLAT.chf | anstab\hs\pre\ws_pre_c1c2 | Sun Jul 17 14:47:44 2011

Affected System Voltage Check and Comparison

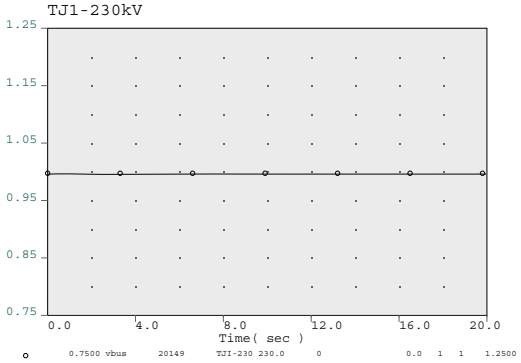
PAR/PID 230kV



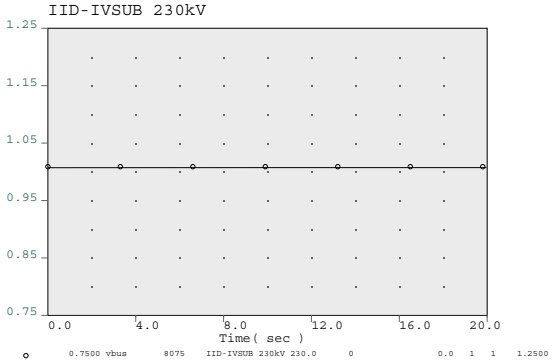
ROA-230kV



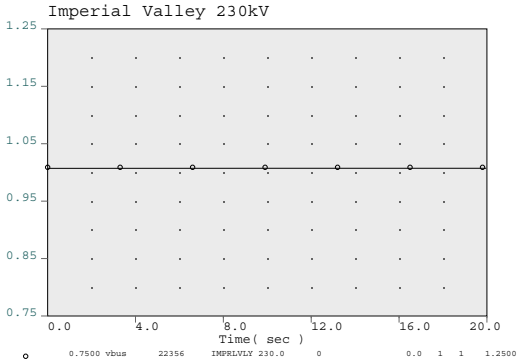
TJ1-230kV



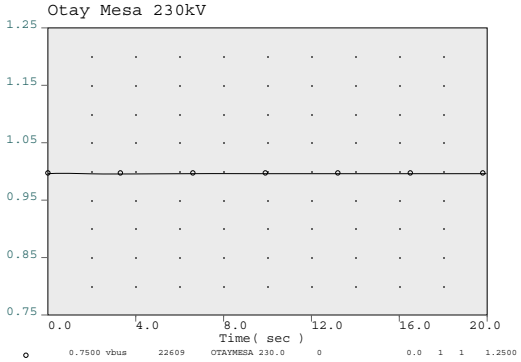
IID-IVSUB 230kV



Imperial Valley 230kV



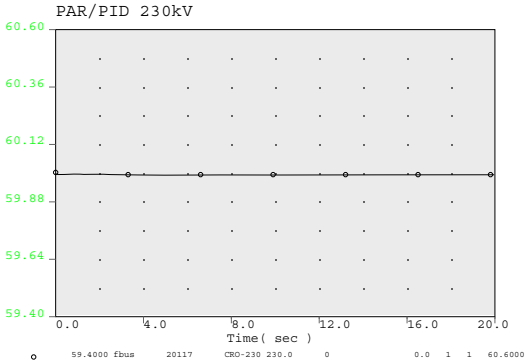
Otay Mesa 230kV



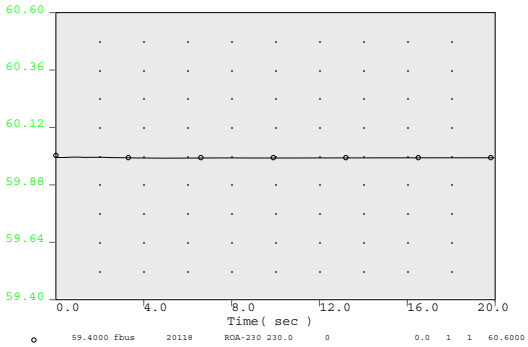
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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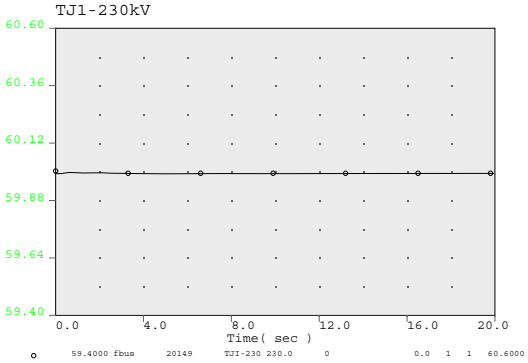
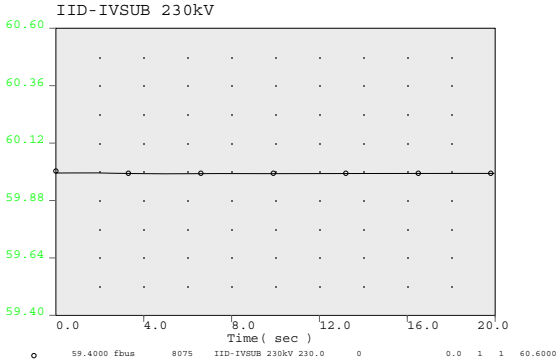
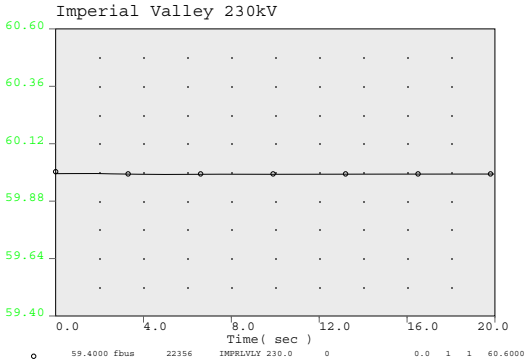


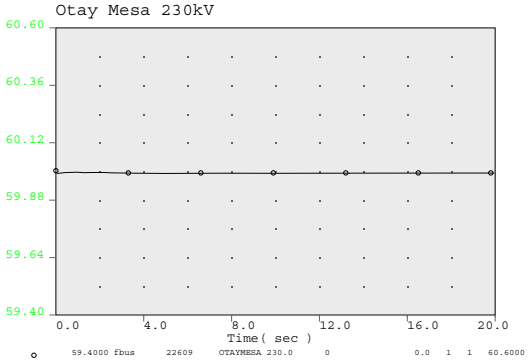
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



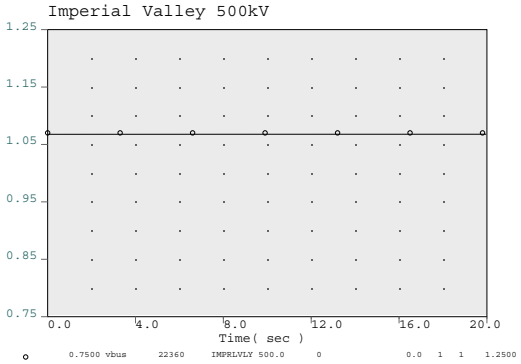
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

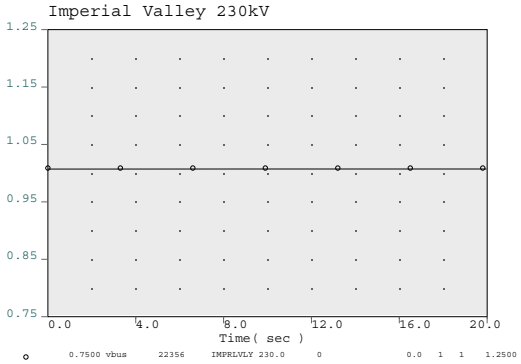
SDGE	tran-c1c2-hs-pre-r12_FLAT.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:47:45 2011

VOLTAGE

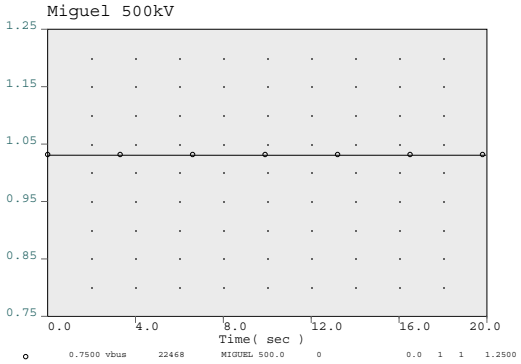
Imperial Valley 500kV



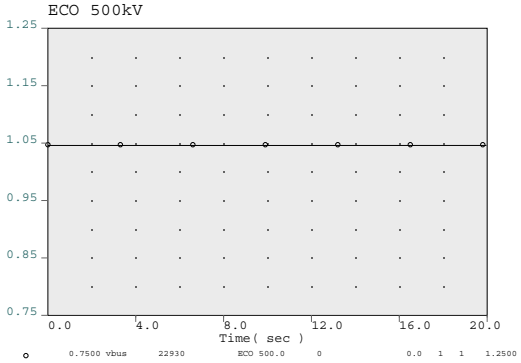
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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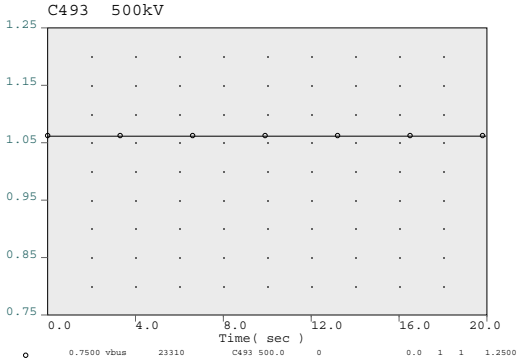
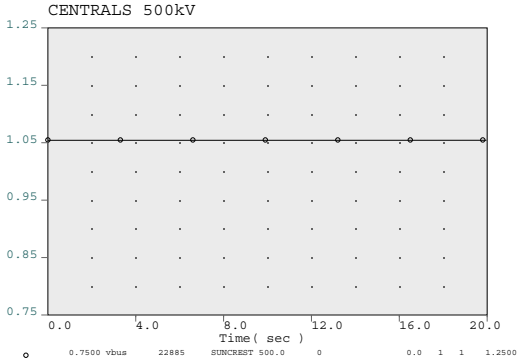
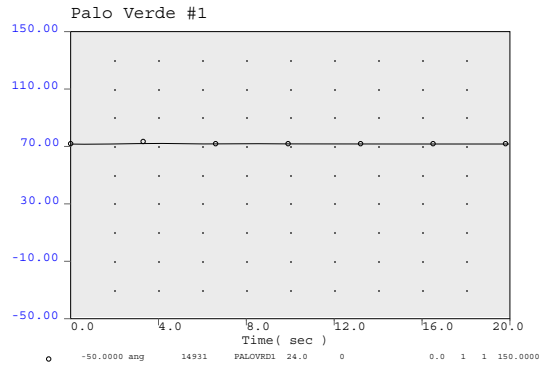


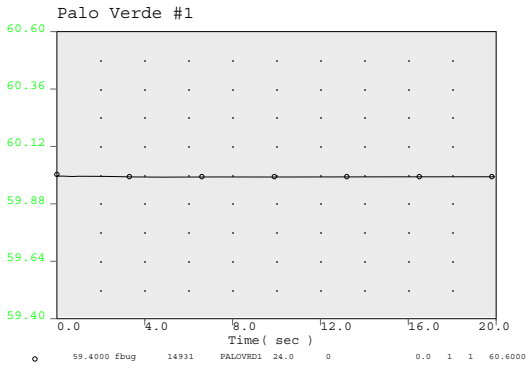
CENTRALS 500kV

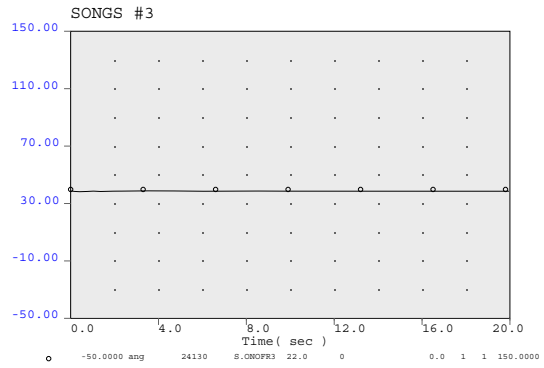


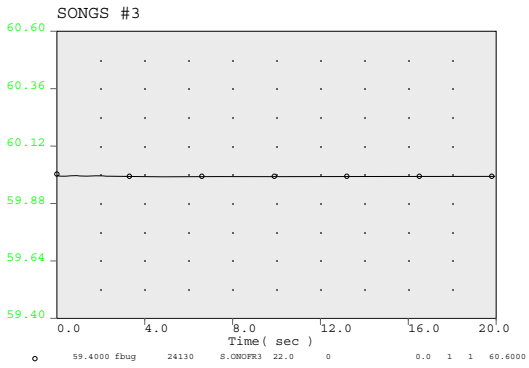
C1 C2 Heavy Summer Pre Without Upgrades

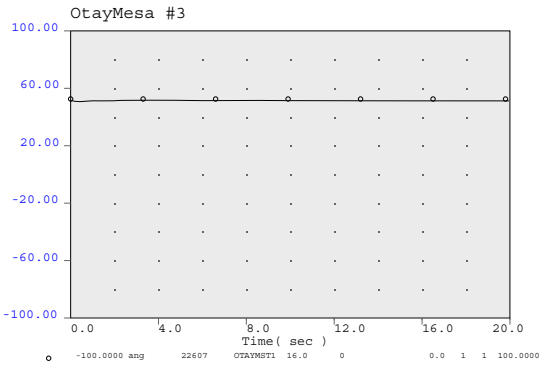
RELATIVE ROTOR ANGLE & FREQUENCY

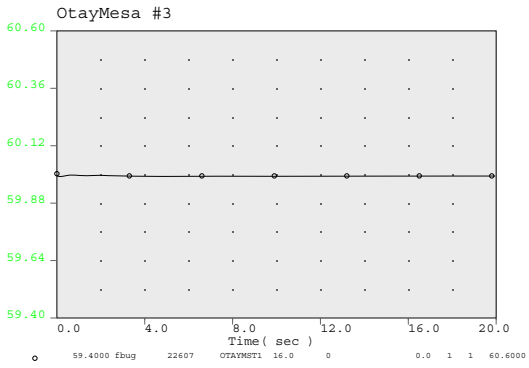










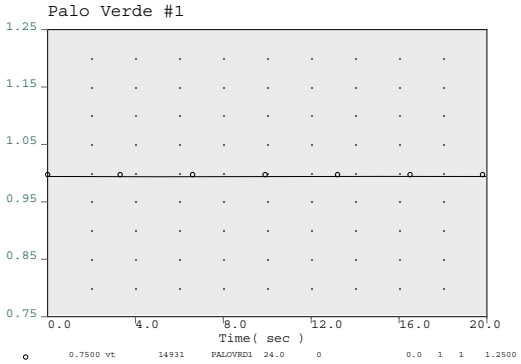


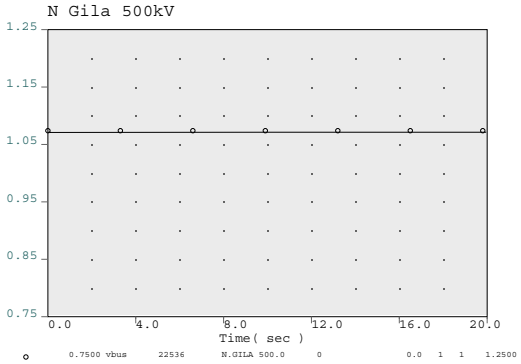
C1 C2 Heavy Summer Pre Without Upgrades

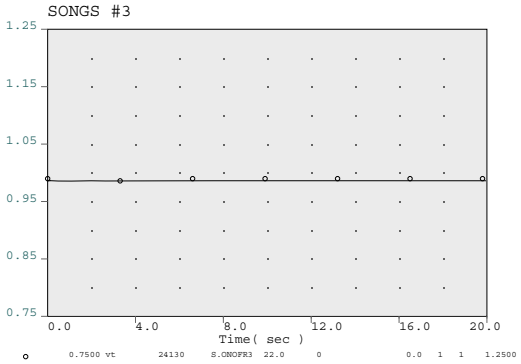
Page 1

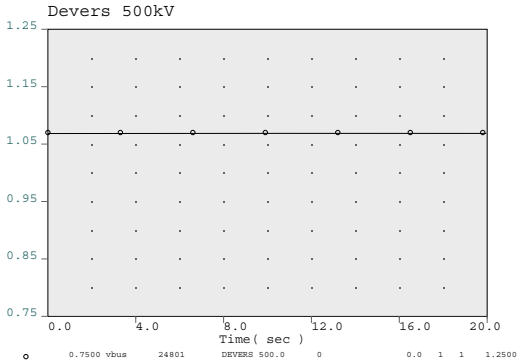
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_C493-CE-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:43:51 2011

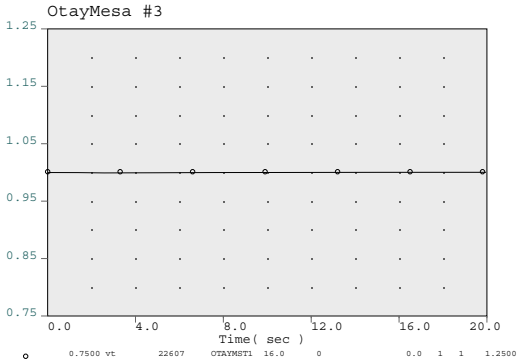
RELATIVE VOLTAGE

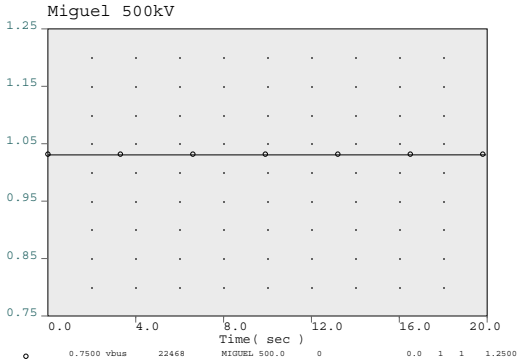












C1 C2 Heavy Summer Pre Without Upgrades

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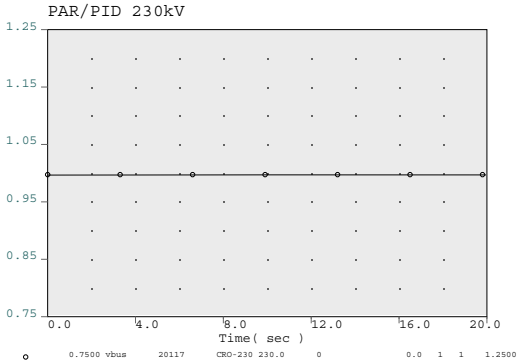
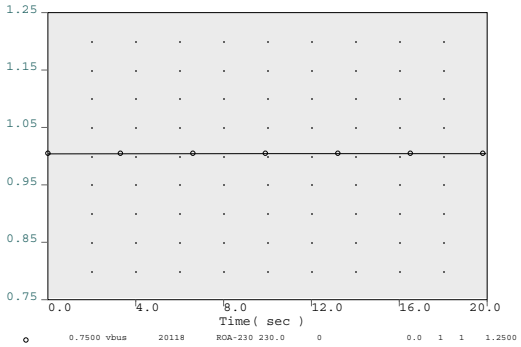
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_C493-CE-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:43:51 2011

Affected System Voltage Check and Comparison

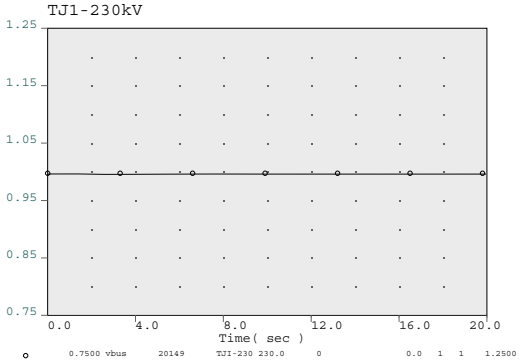
PAR/PID 230kV



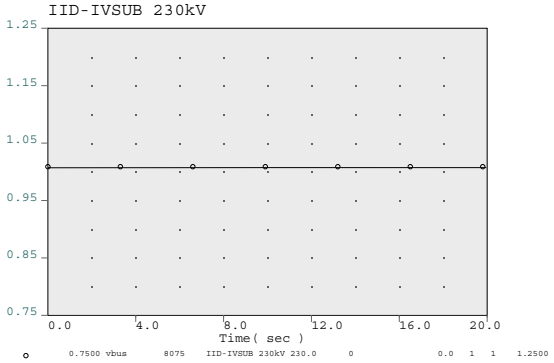
ROA-230kV



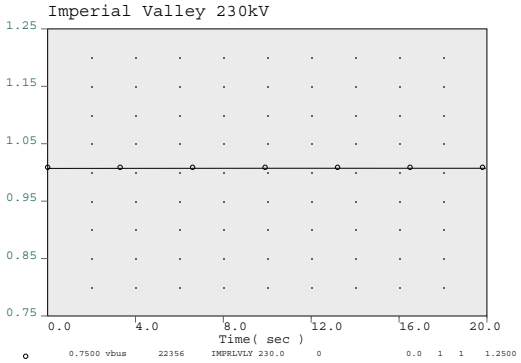
TJ1-230kV



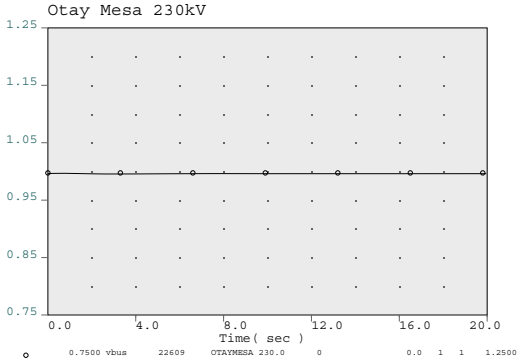
IID-IVSUB 230kV



Imperial Valley 230kV



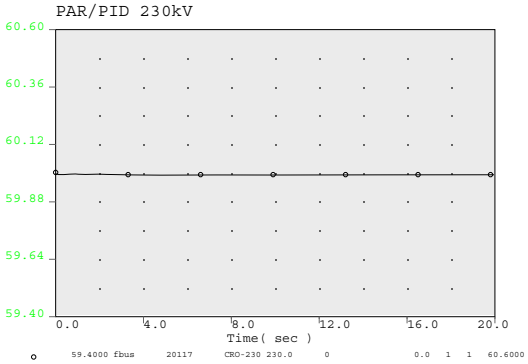
Otay Mesa 230kV



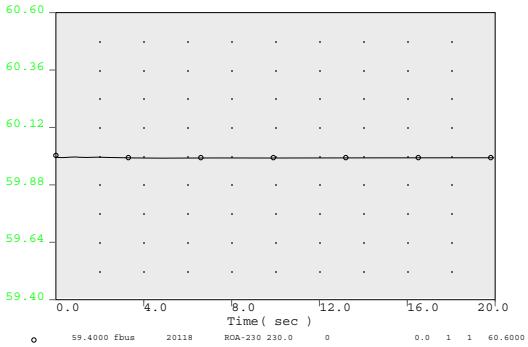
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

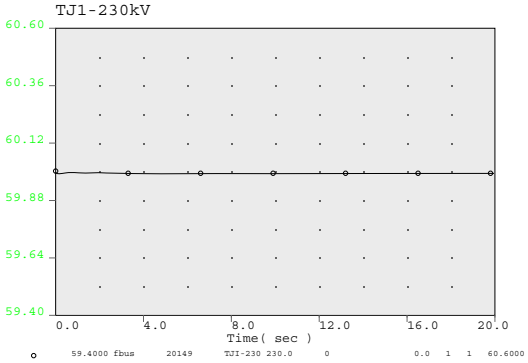
PAR/PID 230kV



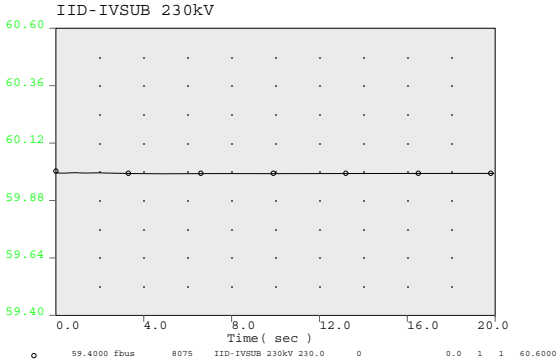
ROA-230kV



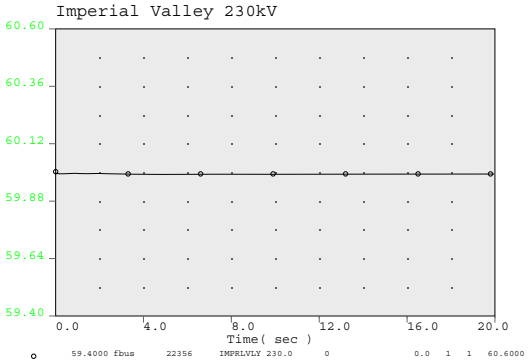
TJ1-230kV



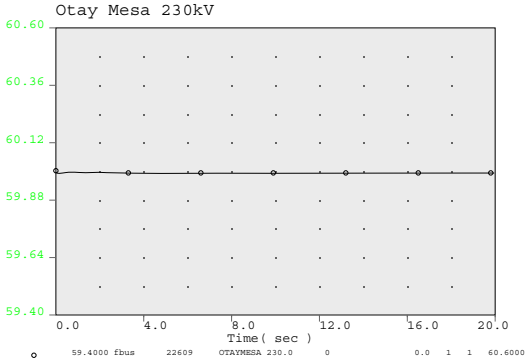
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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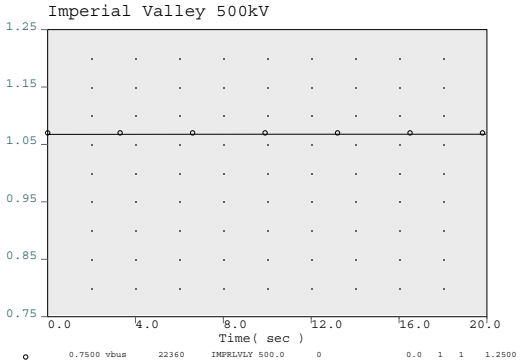
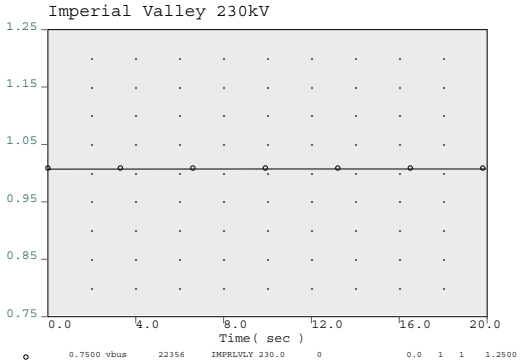
VOLTAGE

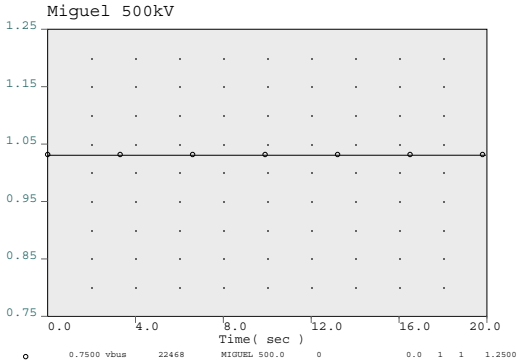
Imperial Valley 500kV



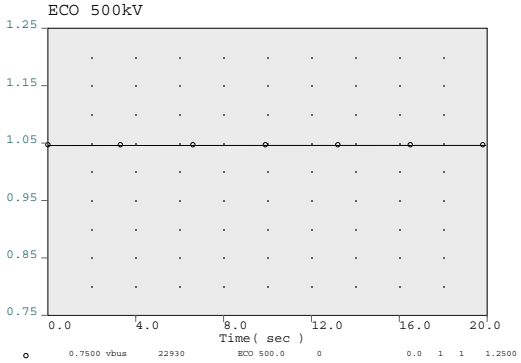
Imperial Valley 230kV



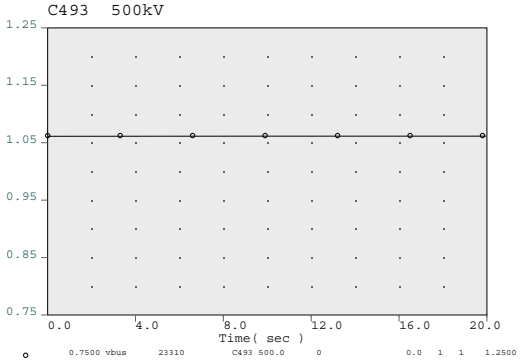
Miguel 500kV



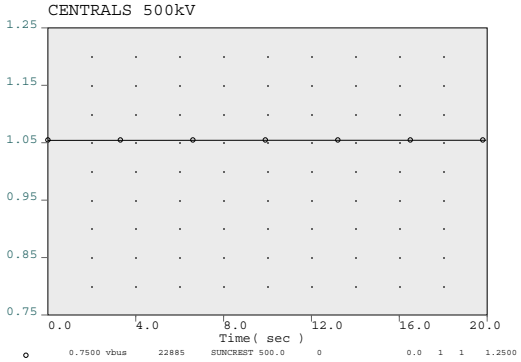
ECO 500kV



C493 500kV

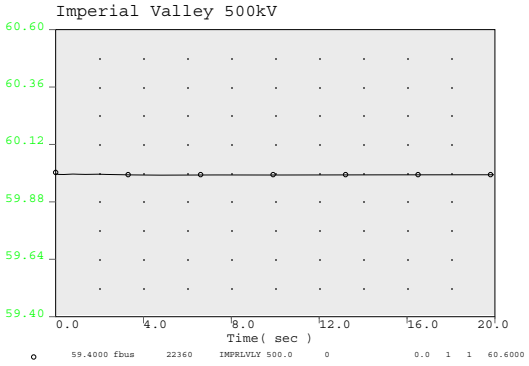


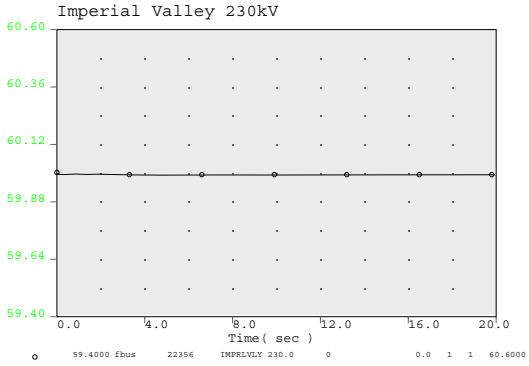
CENTRALS 500kV

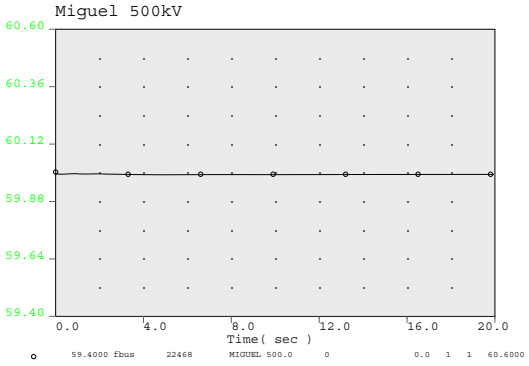


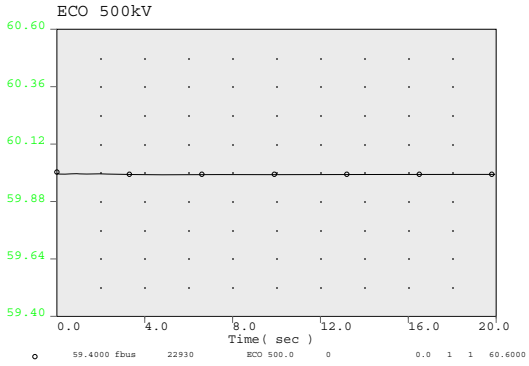
C1 C2 Heavy Summer Pre Without Upgrades

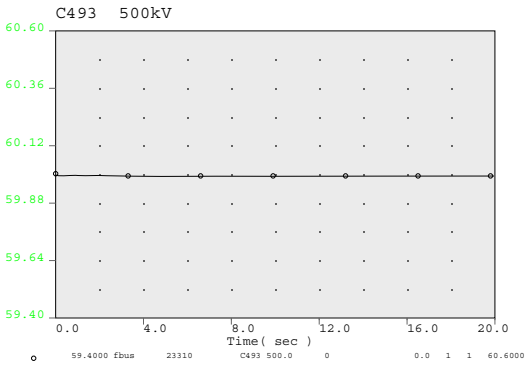
FREQUENCY

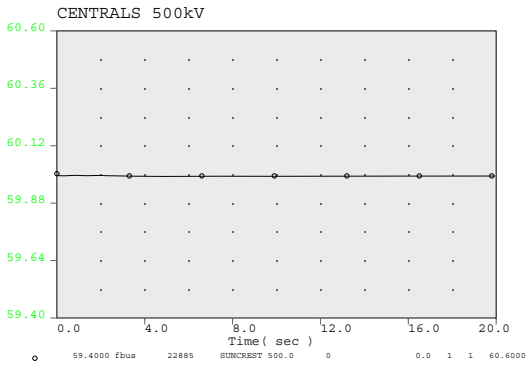












C1 C2 Heavy Summer Pre Without Upgrades

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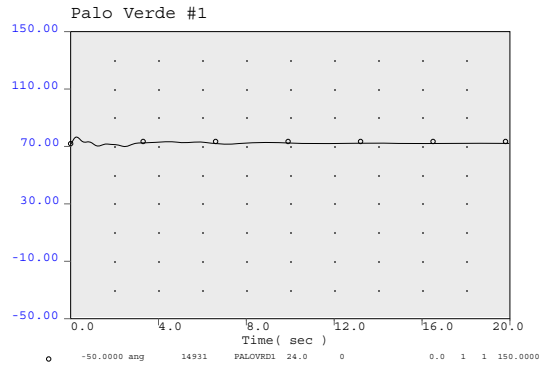
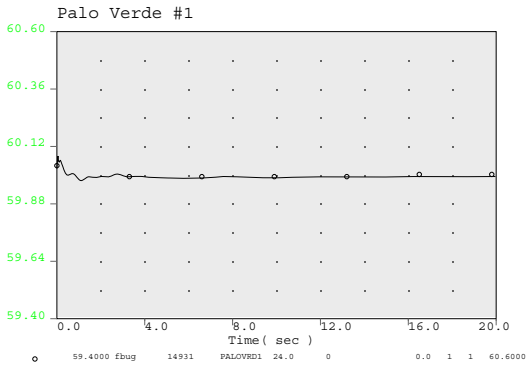
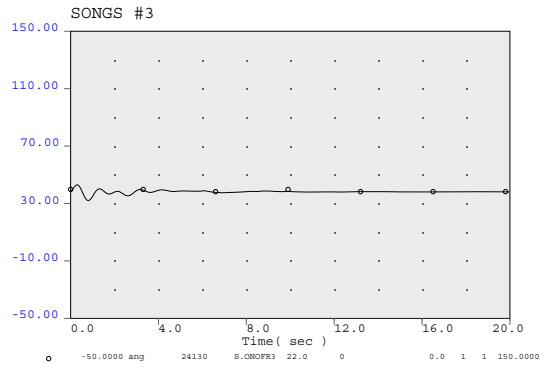
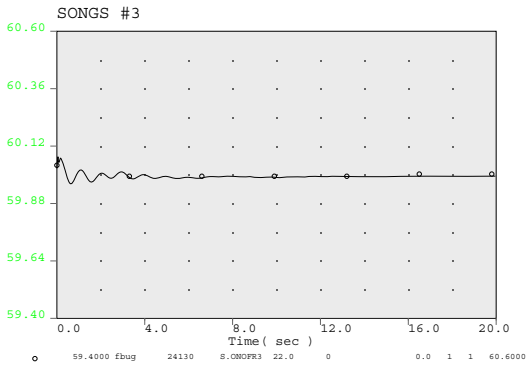
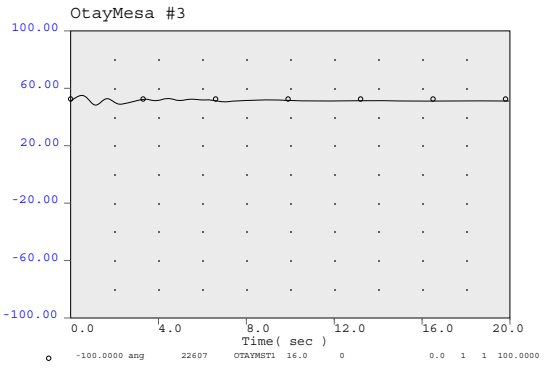
RELATIVE ROTOR ANGLE & FREQUENCY

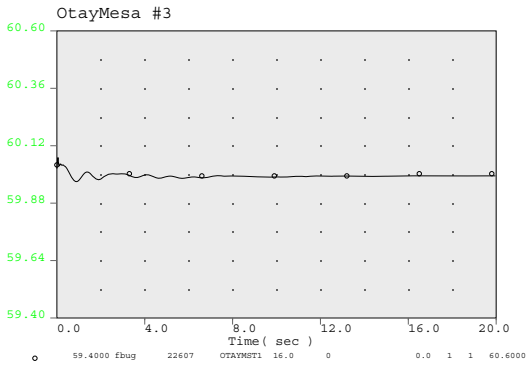












C1 C2 Heavy Summer Pre Without Upgrades

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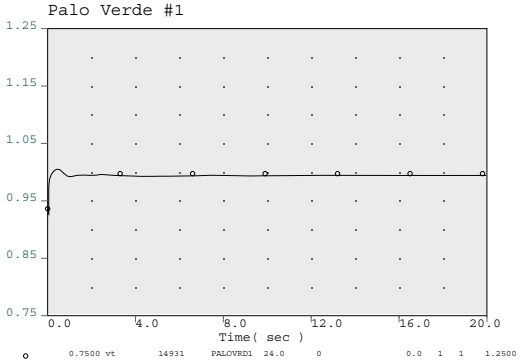
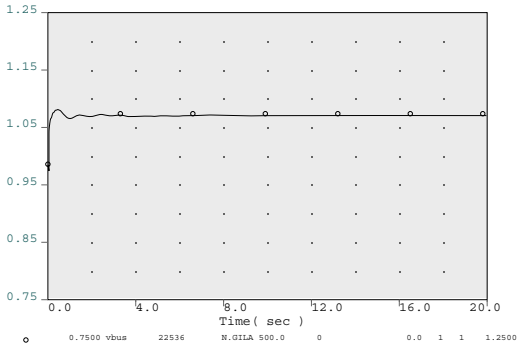
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_Dev-Val-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:45:48 2011

RELATIVE VOLTAGE

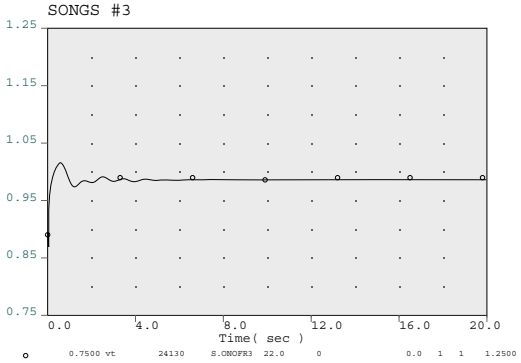
Palo Verde #1



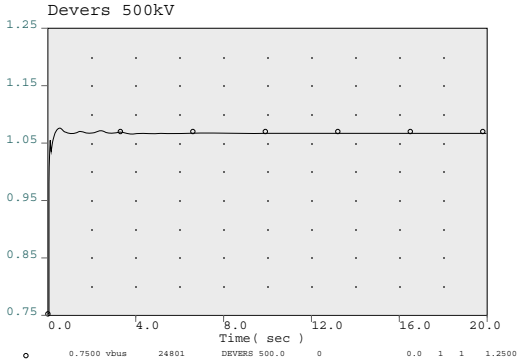
N Gila 500kV



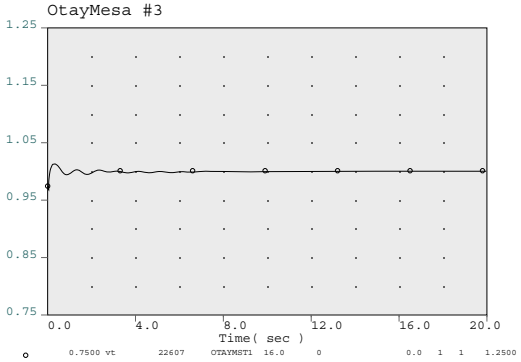
SONGS #3



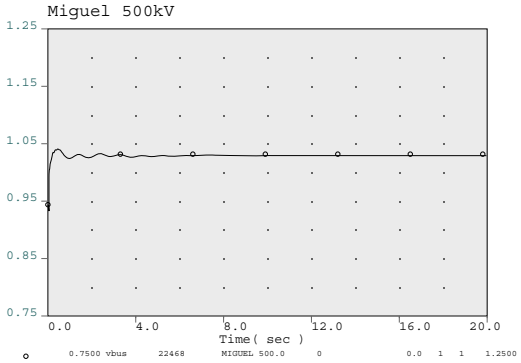
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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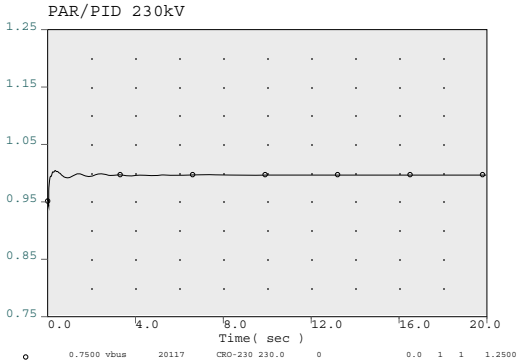
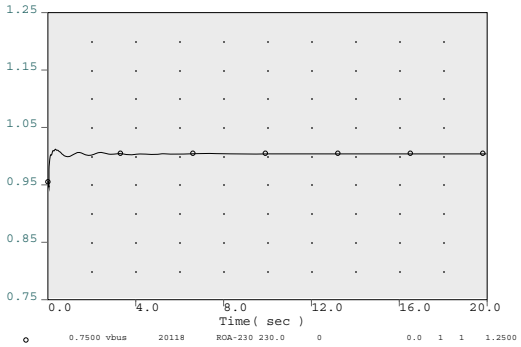
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_Dev-Val-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:45:48 2011

Affected System Voltage Check and Comparison

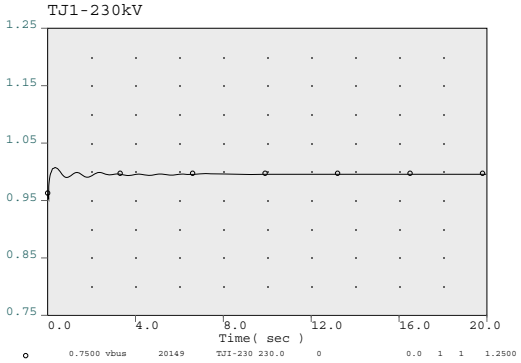
PAR/PID 230kV



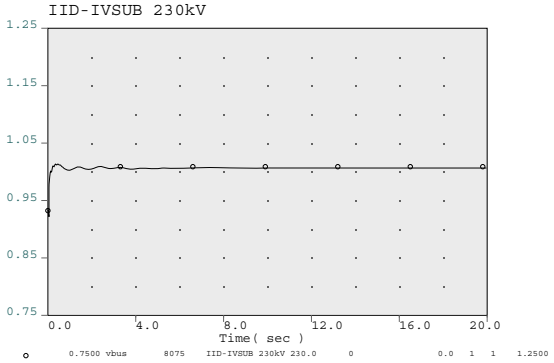
ROA-230kV



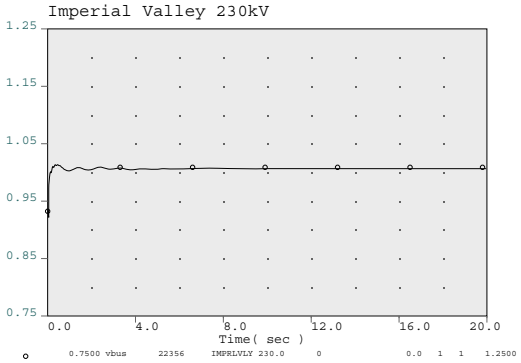
TJ1-230kV



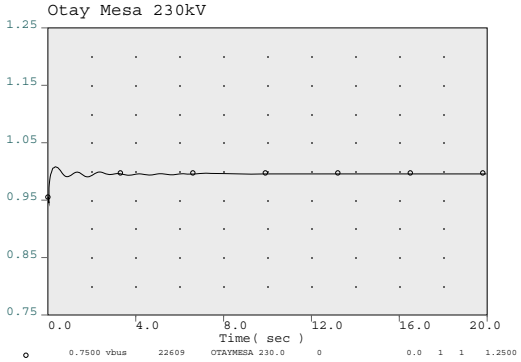
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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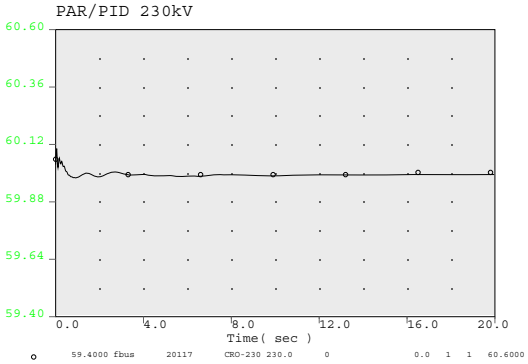
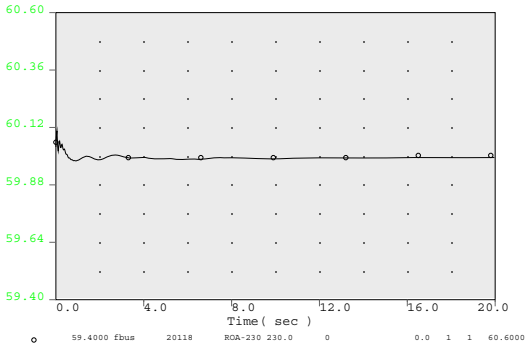
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_Dev-Val-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:45:49 2011

Affected System Frequency Check and Comparison

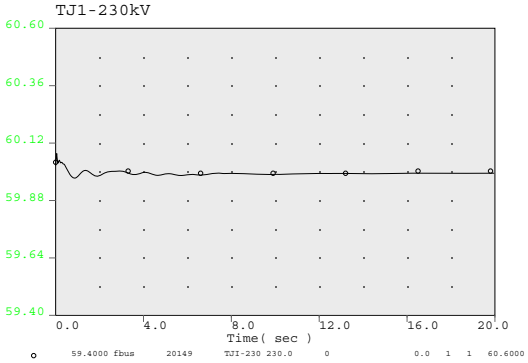
PAR/PID 230kV



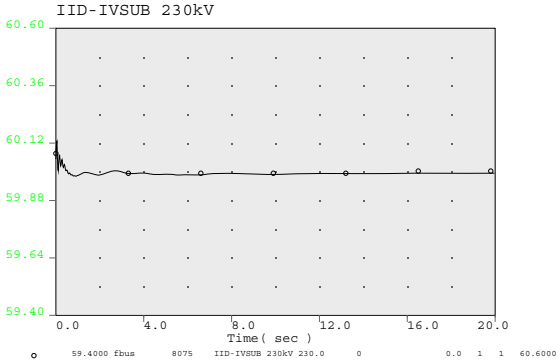
ROA-230kV



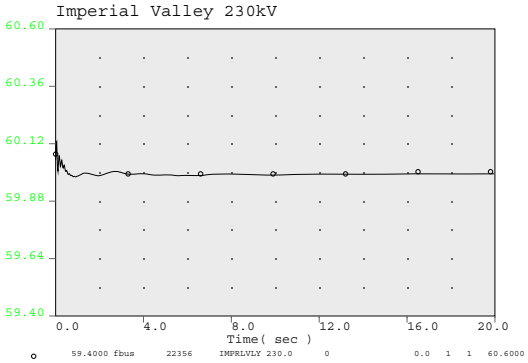
TJ1-230kV



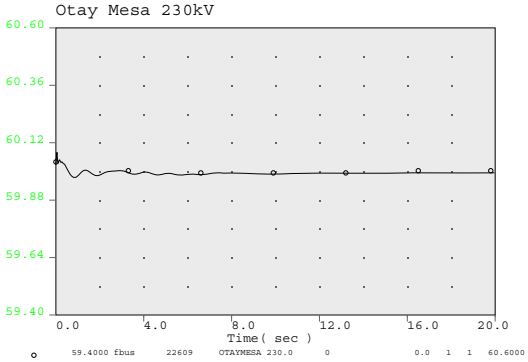
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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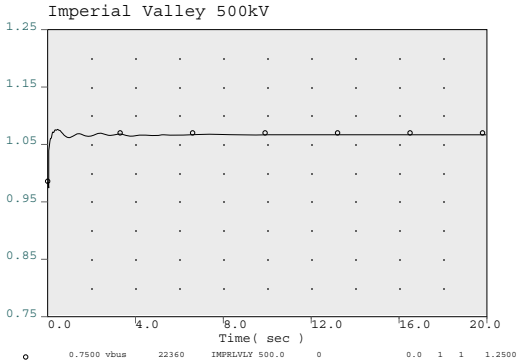
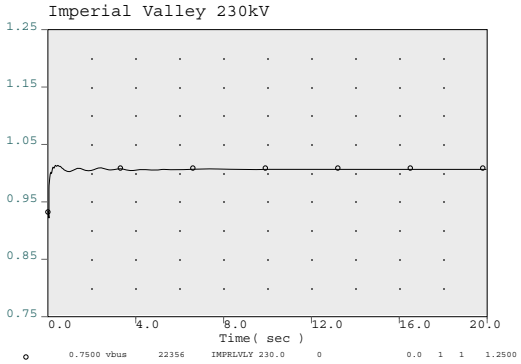
SDGE	tran-c1c2-hs-pre-r12_Dev-Val-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:45:49 2011

VOLTAGE

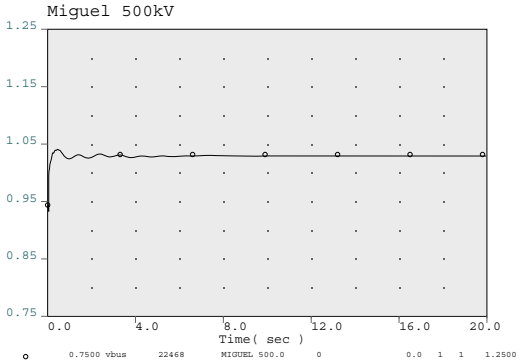
Imperial Valley 500kV



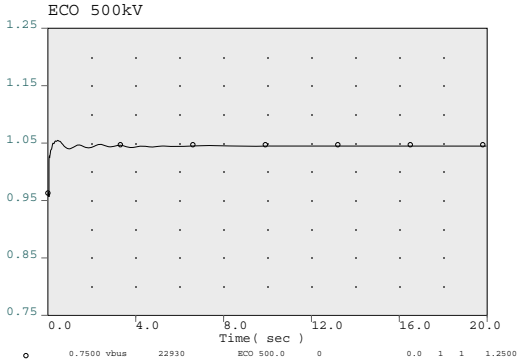
Imperial Valley 230kV



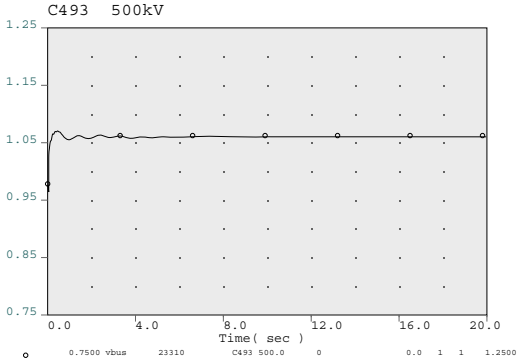
Miguel 500kV



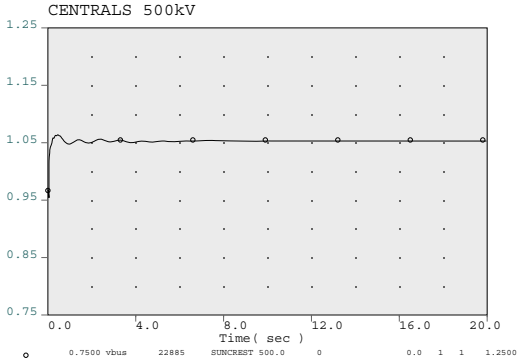
ECO 500kV



C493 500kV



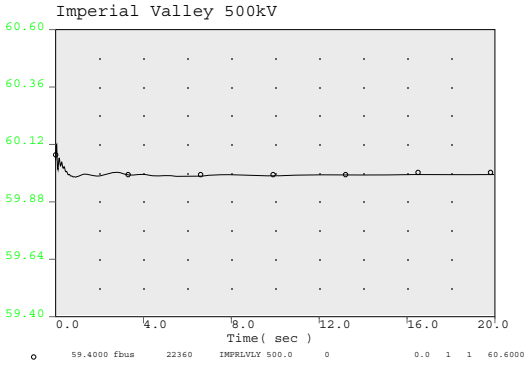
CENTRALS 500kV



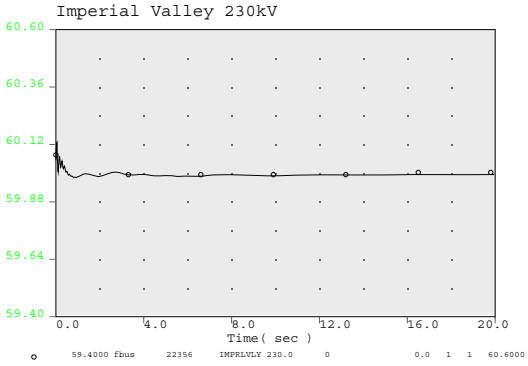
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

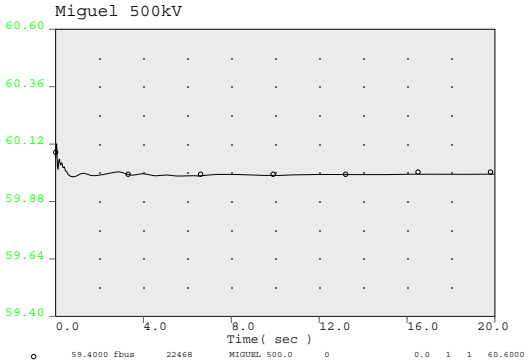
Imperial Valley 500kV



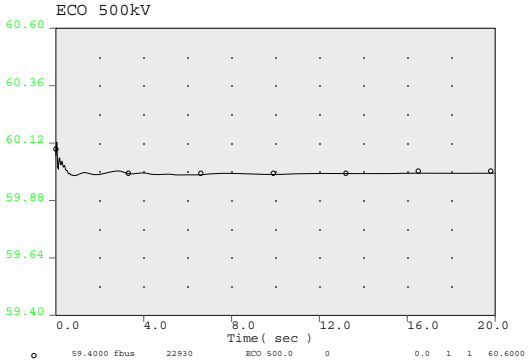
Imperial Valley 230kV



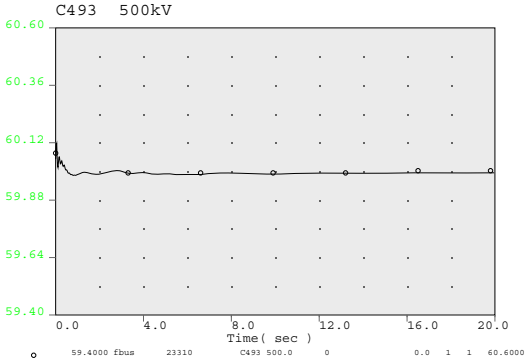
Miguel 500kV



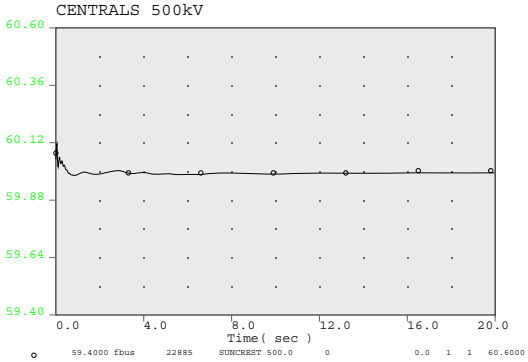
ECO 500kV



C493 500kV

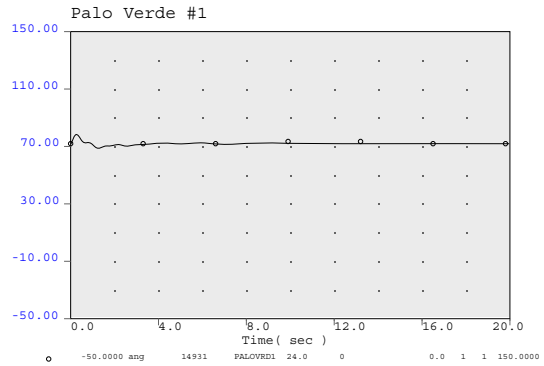


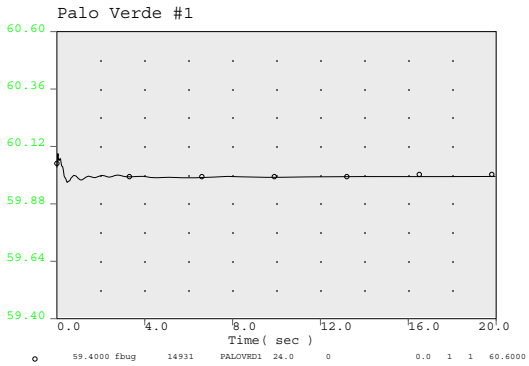
CENTRALS 500kV

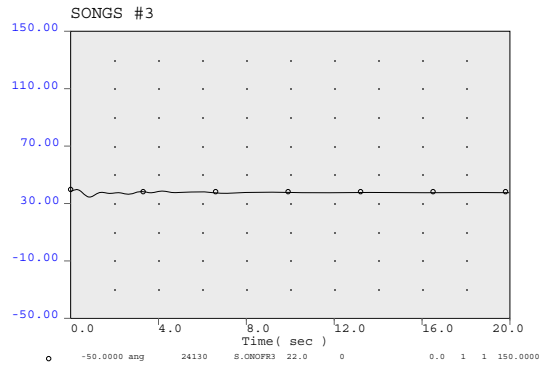


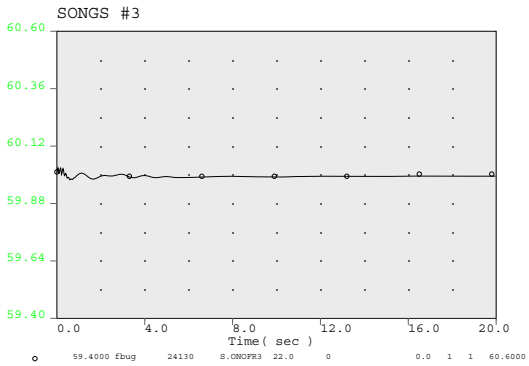
C1 C2 Heavy Summer Pre Without Upgrades

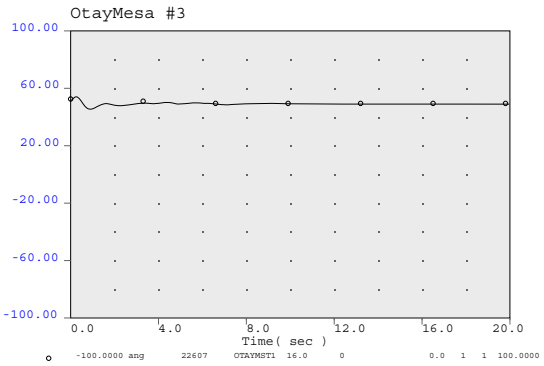
RELATIVE ROTOR ANGLE & FREQUENCY

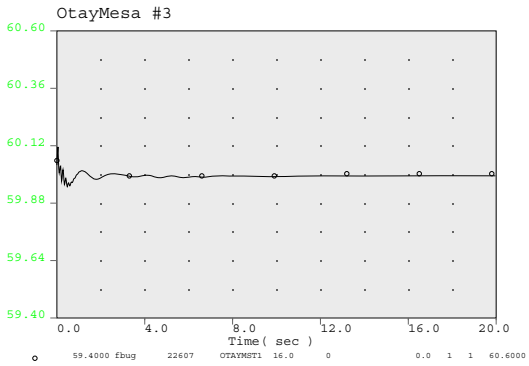












C1 C2 Heavy Summer Pre Without Upgrades

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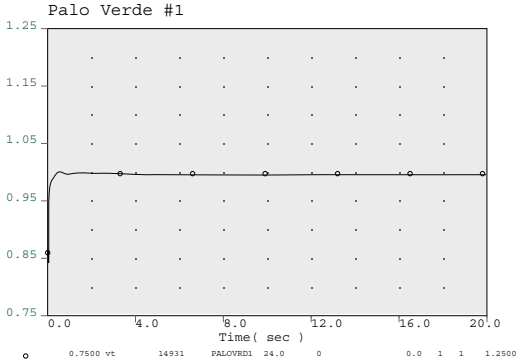
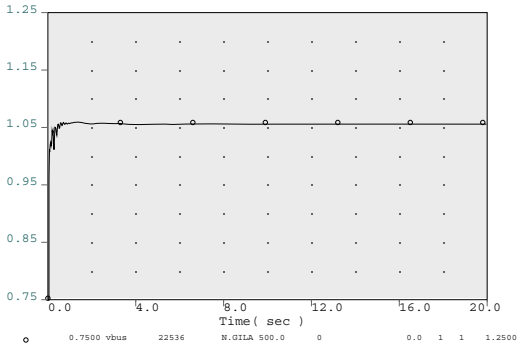
RELATIVE VOLTAGE

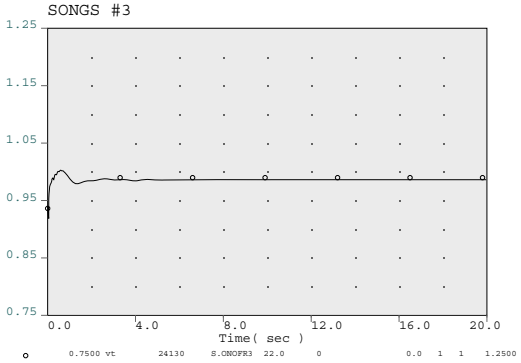
Palo Verde #1



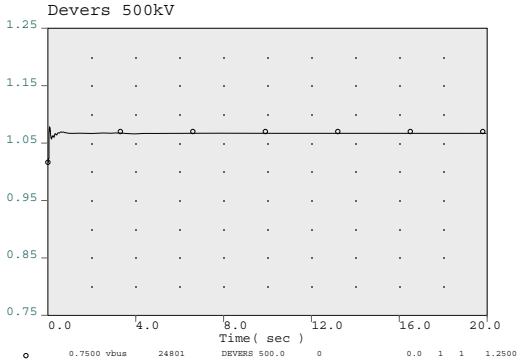
N Gila 500kV



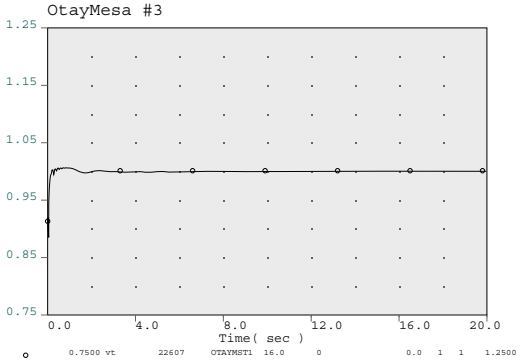
SONGS #3



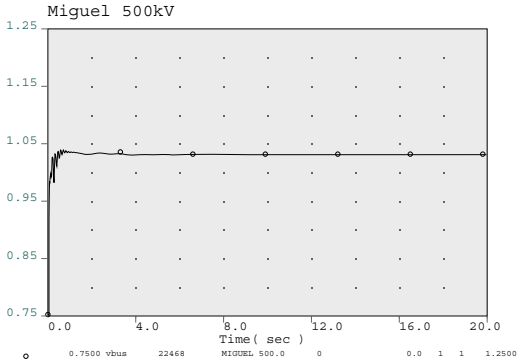
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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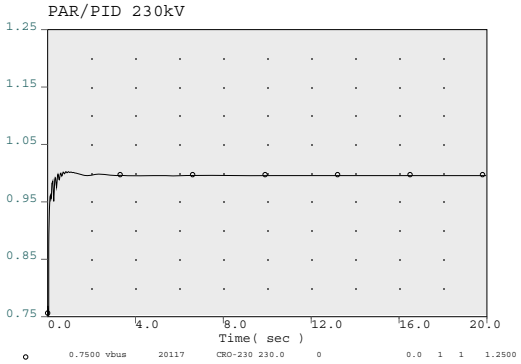
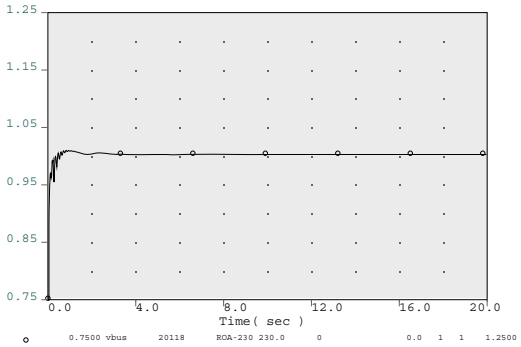
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_HAA-NGila-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:49:45 2011

Affected System Voltage Check and Comparison

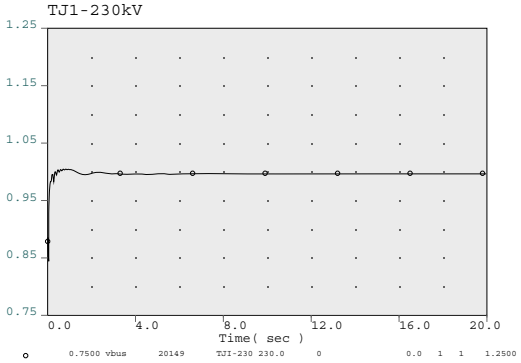
PAR/PID 230kV



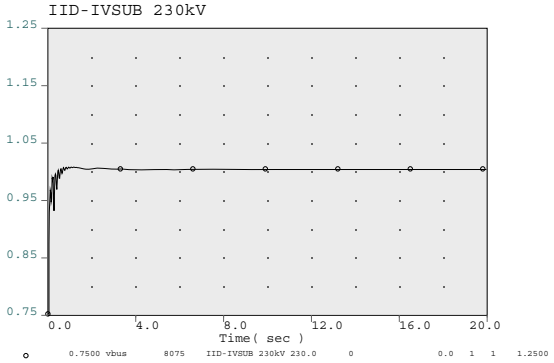
ROA-230kV



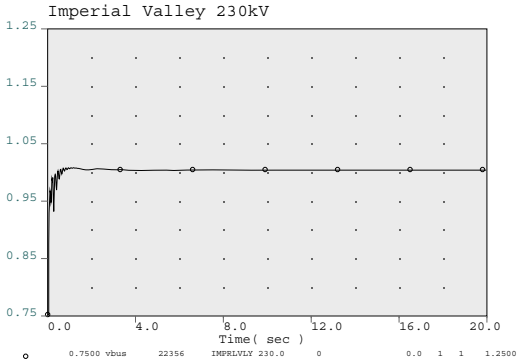
TJ1-230kV



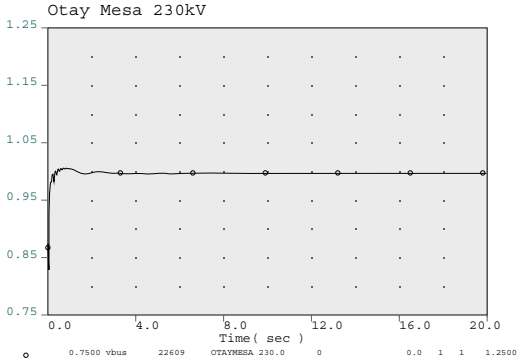
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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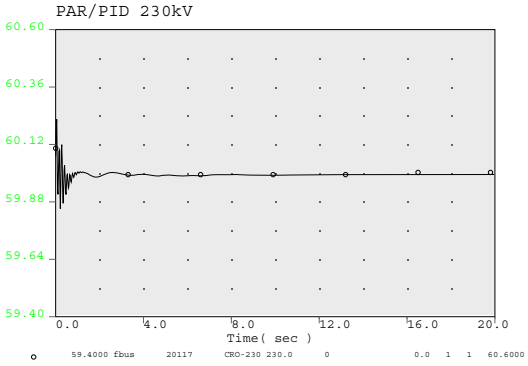
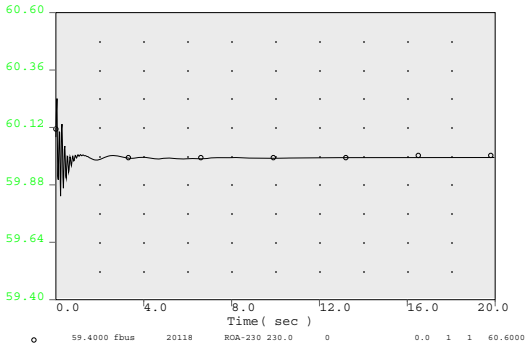
SDGE	tran-c1c2-hs-pre-r12_HAA-NGila-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:49:45 2011

Affected System Frequency Check and Comparison

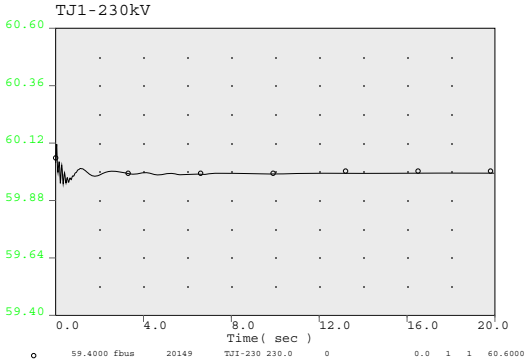
PAR/PID 230kV



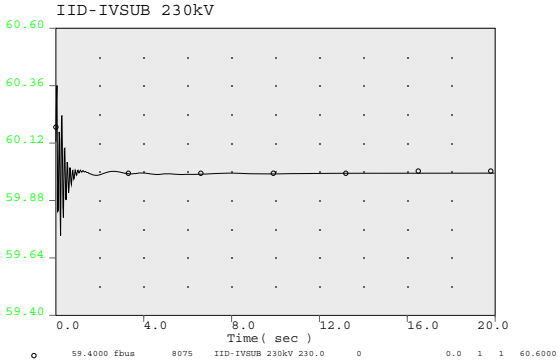
ROA-230kV



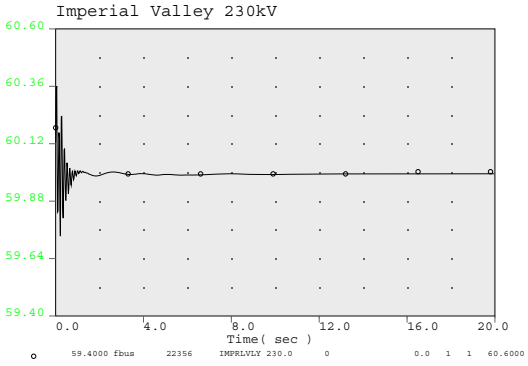
TJ1-230kV



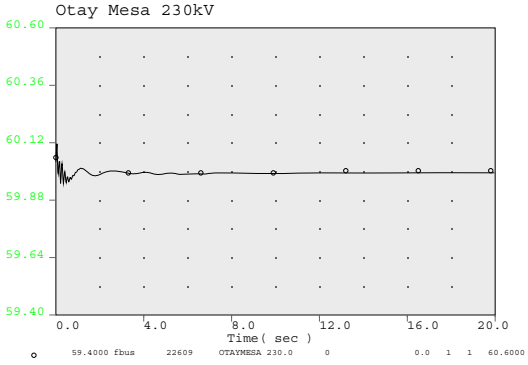
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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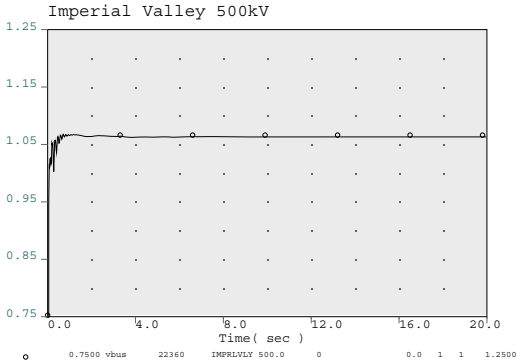
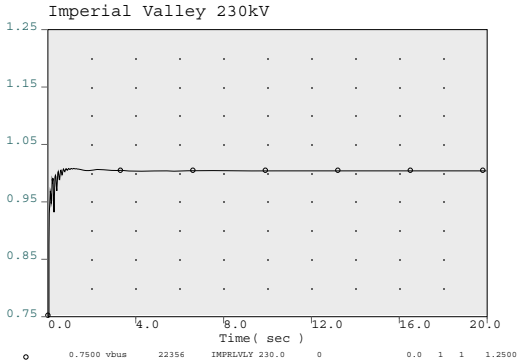
SDGE	tran-c1c2-hs-pre-r12_HAA-NGila-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:49:46 2011

VOLTAGE

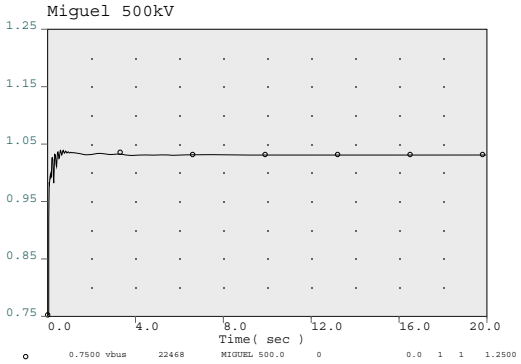
Imperial Valley 500kV



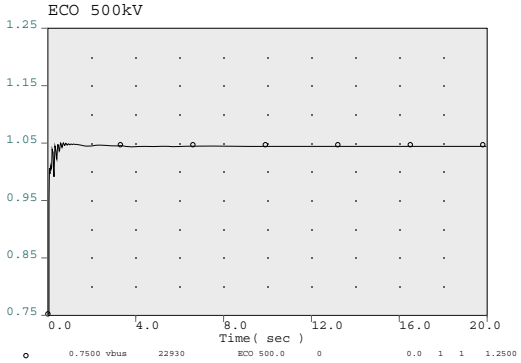
Imperial Valley 230kV



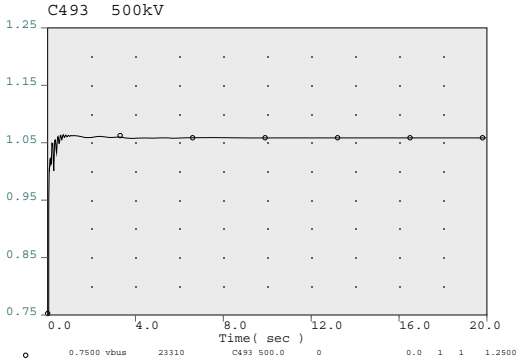
Miguel 500kV



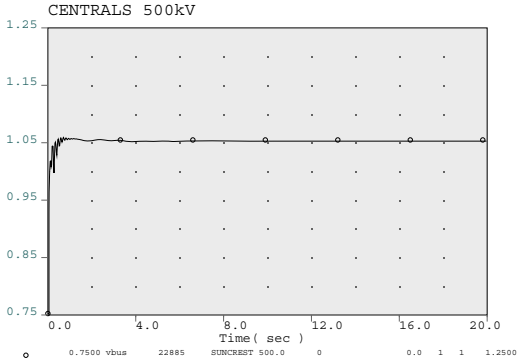
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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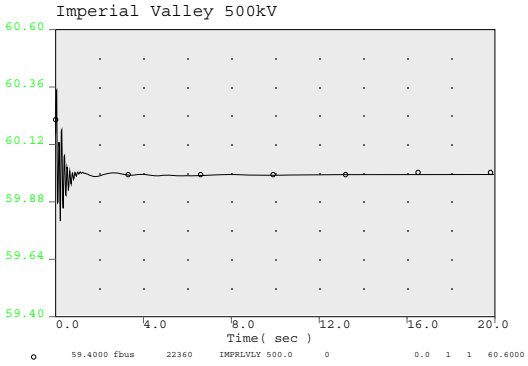
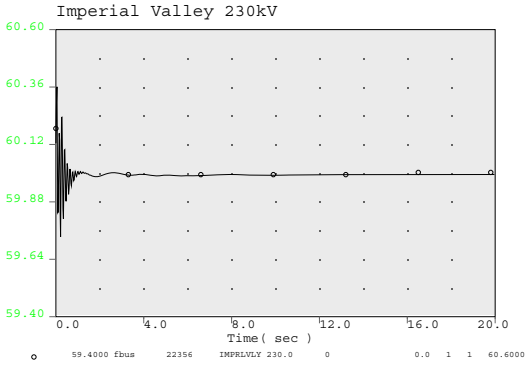
SDGE	tran-c1c2-hs-pre-r12_HAA-NGila-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:49:46 2011

FREQUENCY

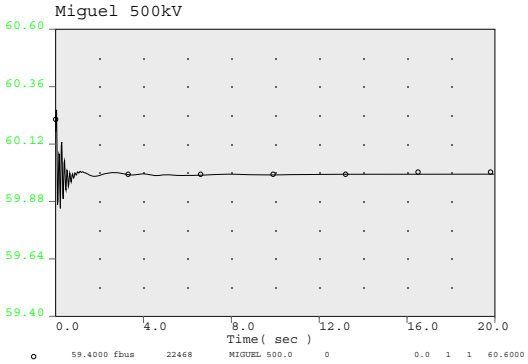
Imperial Valley 500kV



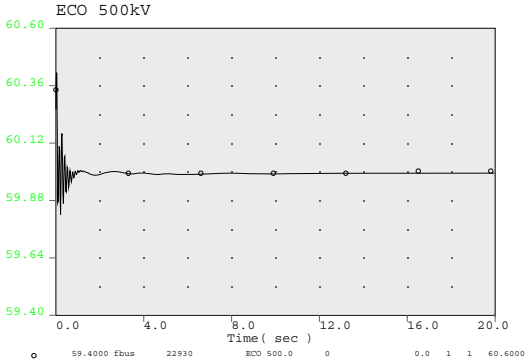
Imperial Valley 230kV



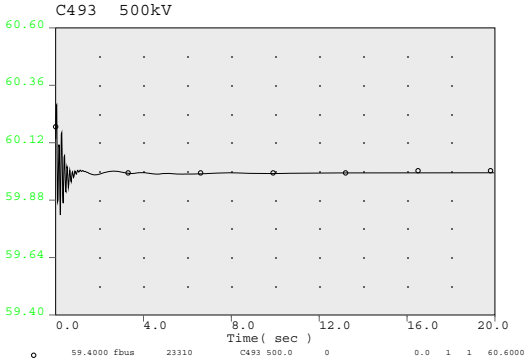
Miguel 500kV



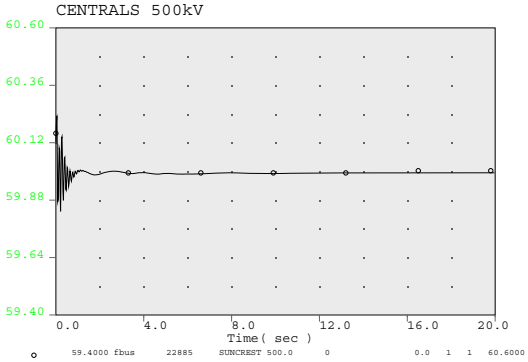
ECO 500kV



C493 500kV

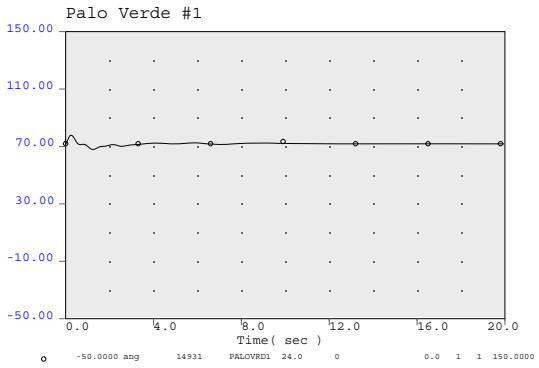


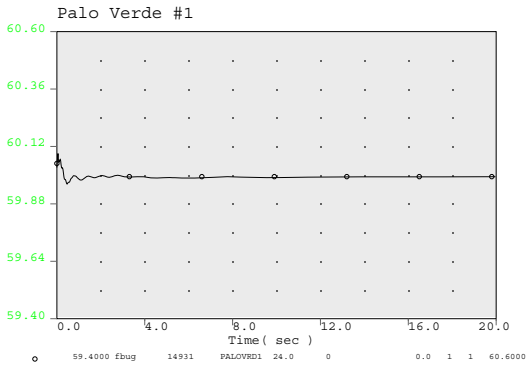
CENTRALS 500kV

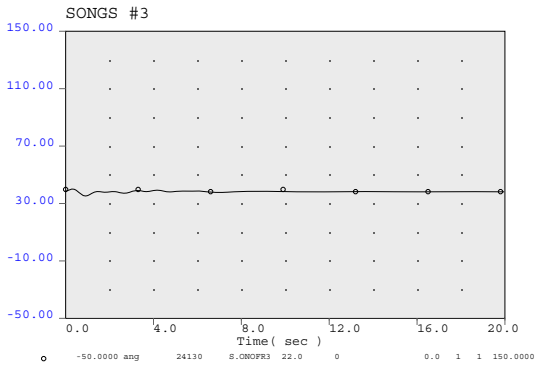


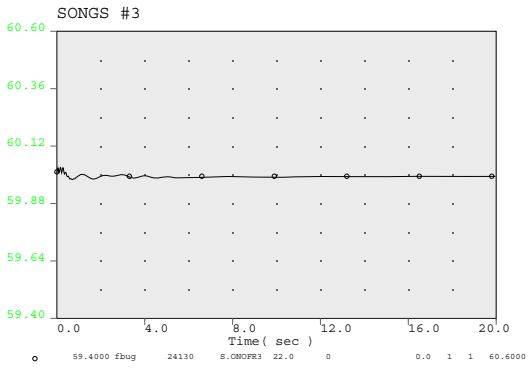
C1 C2 Heavy Summer Pre Without Upgrades

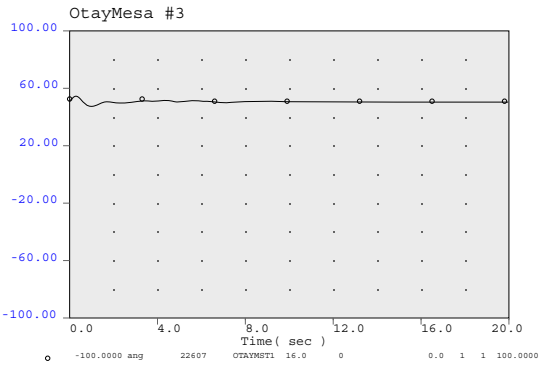
RELATIVE ROTOR ANGLE & FREQUENCY

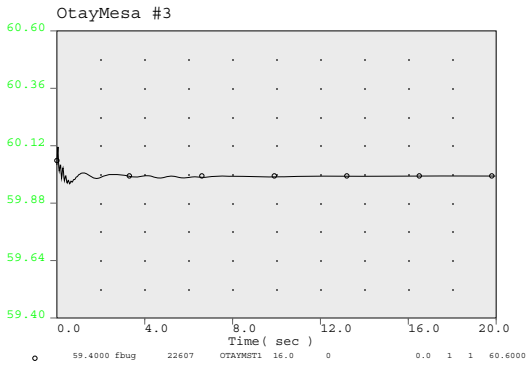












C1 C2 Heavy Summer Pre Without Upgrades

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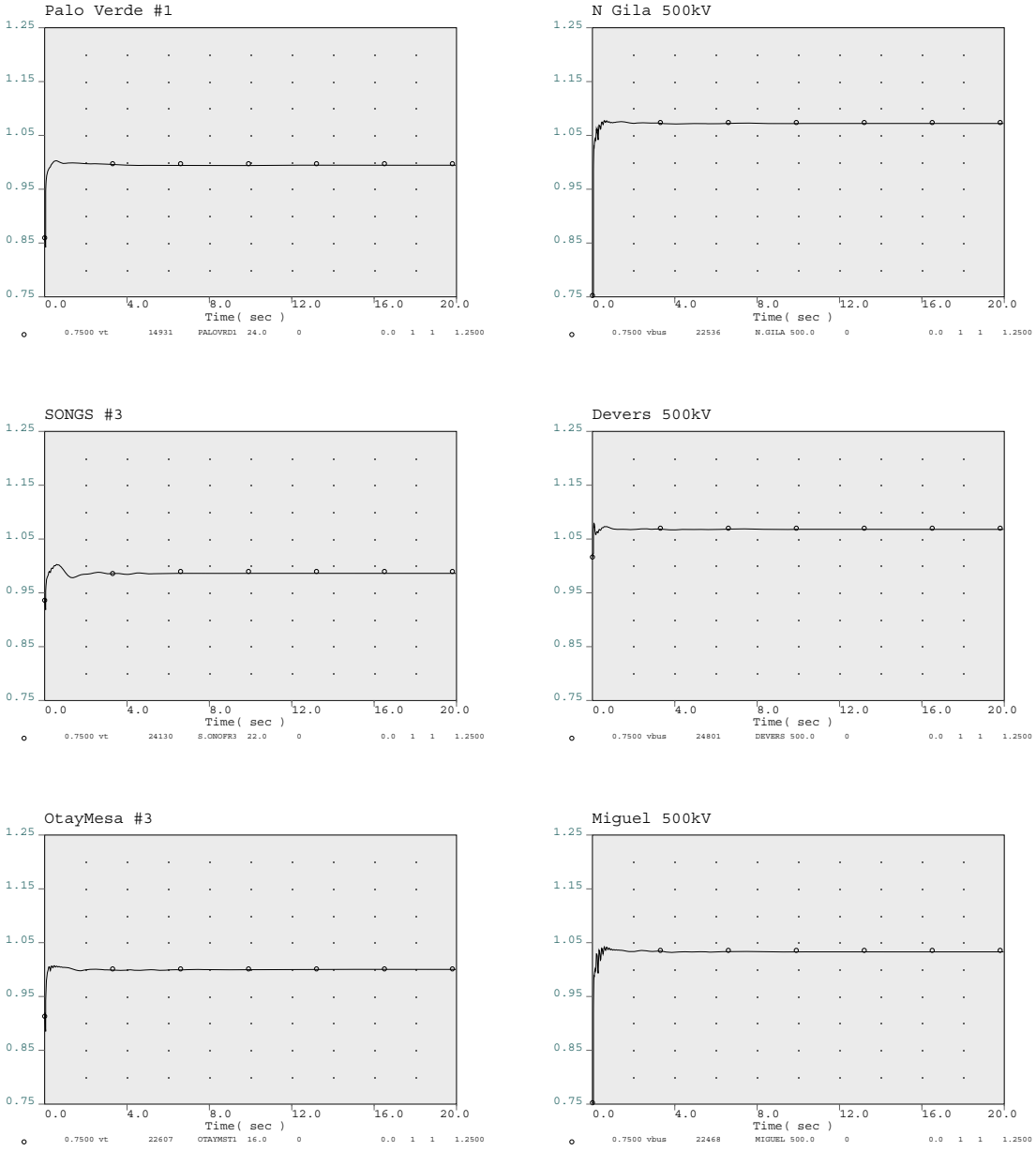
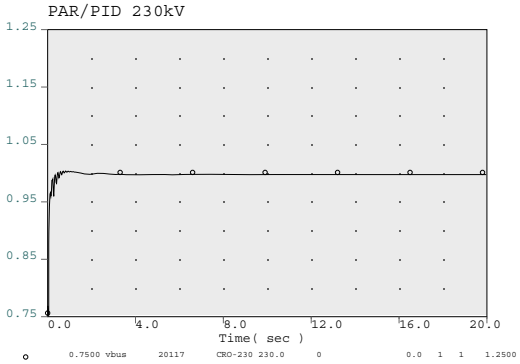
RELATIVE VOLTAGE



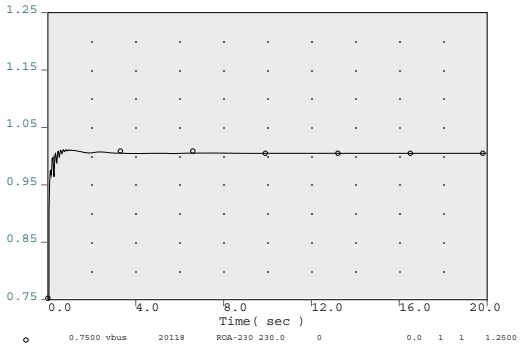
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Voltage Check and Comparison

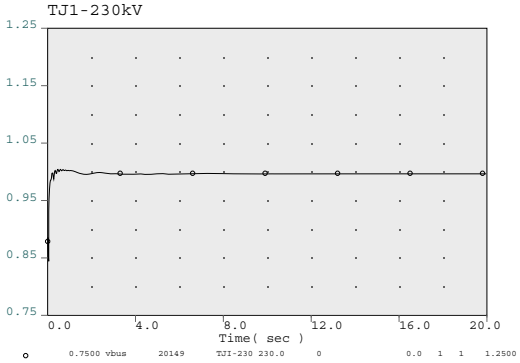
PAR/PID 230kV



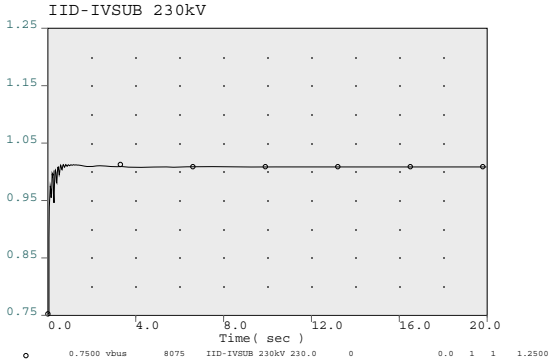
ROA-230kV



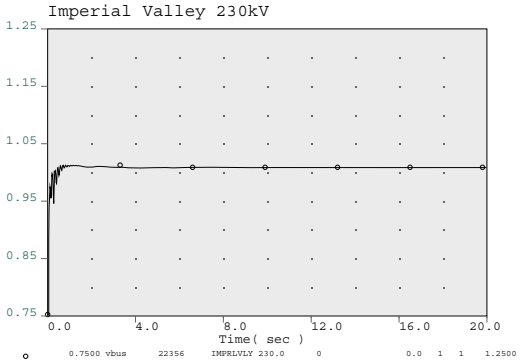
TJ1-230kV



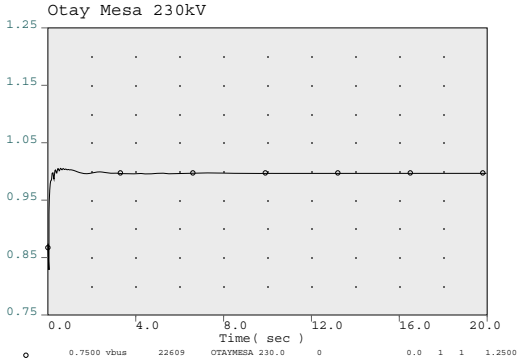
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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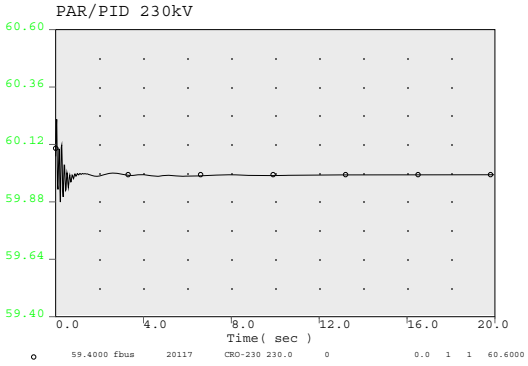
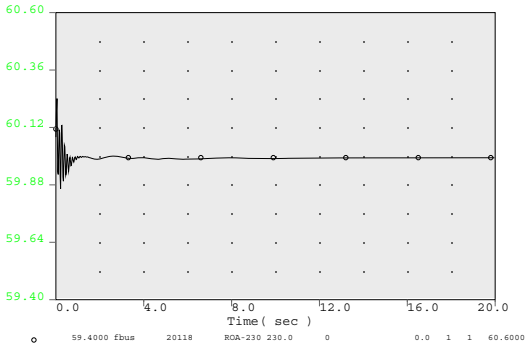
Affected System Frequency Check and Comparison

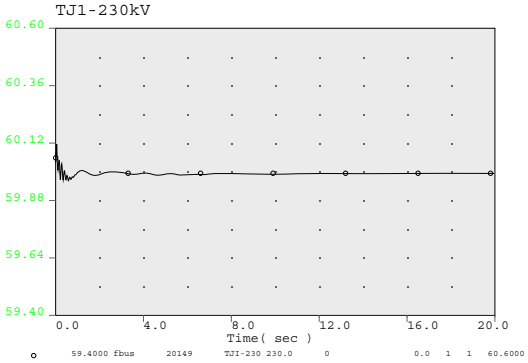
PAR/PID 230kV



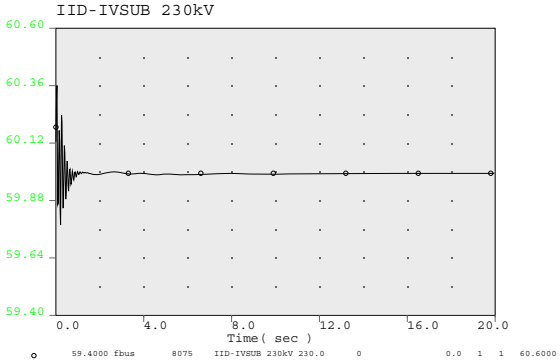
ROA-230kV



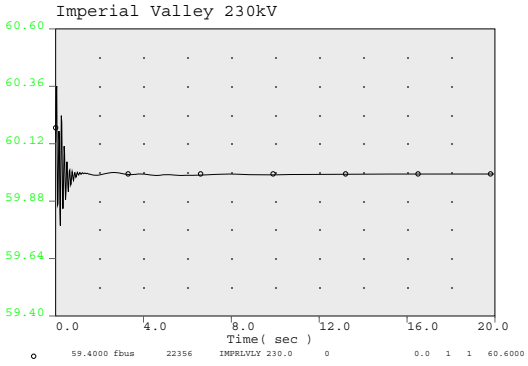
TJ1-230kV



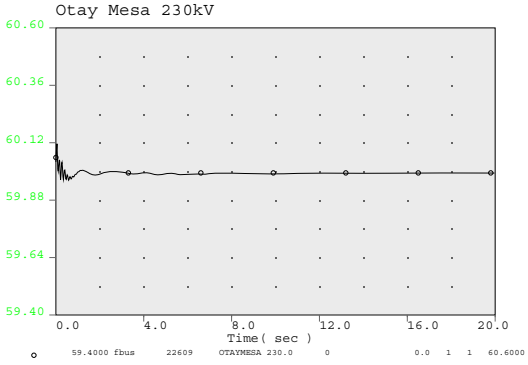
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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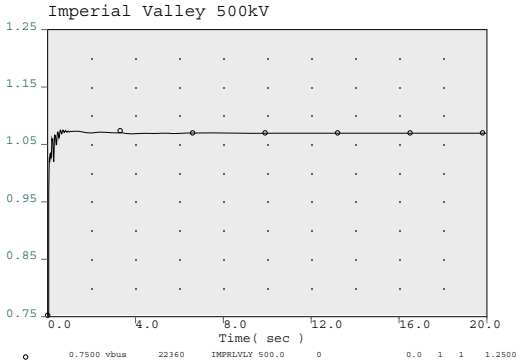
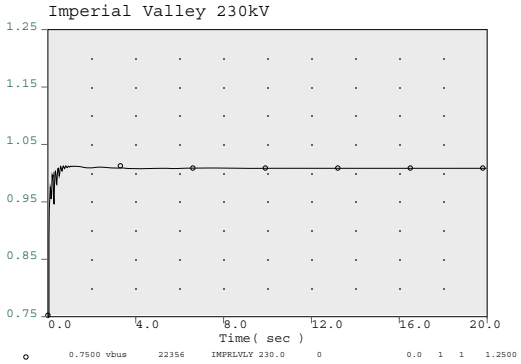
VOLTAGE

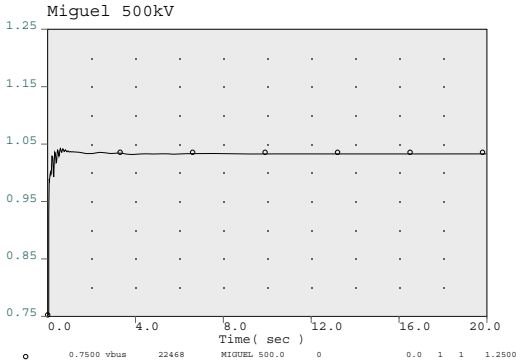
Imperial Valley 500kV



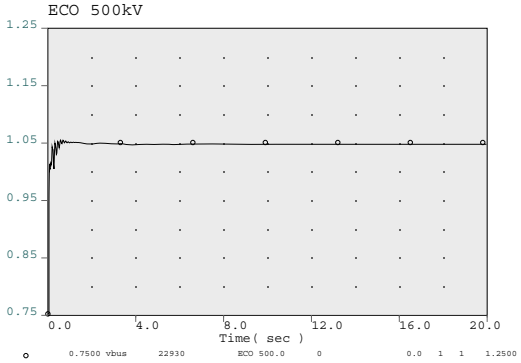
Imperial Valley 230kV



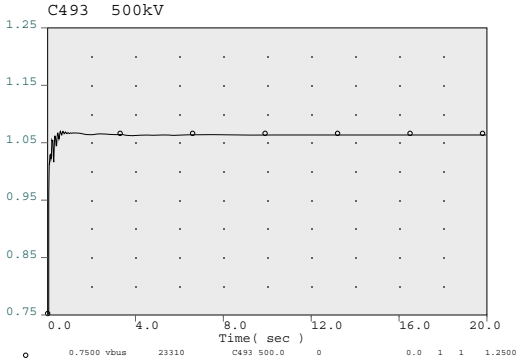
Miguel 500kV



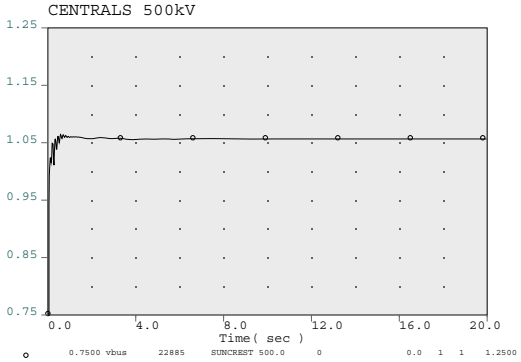
ECO 500kV



C493 500kV



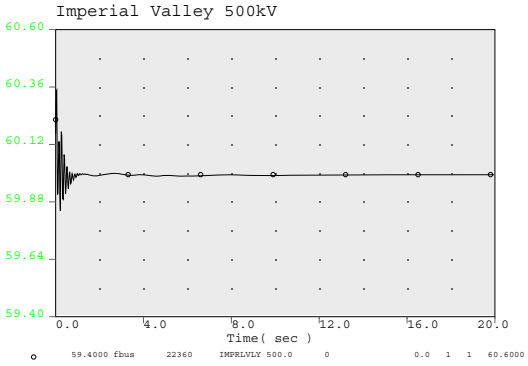
CENTRALS 500kV



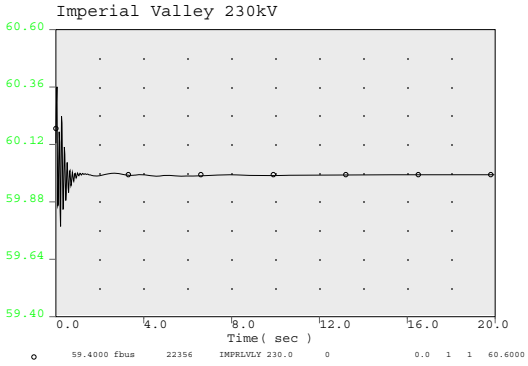
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

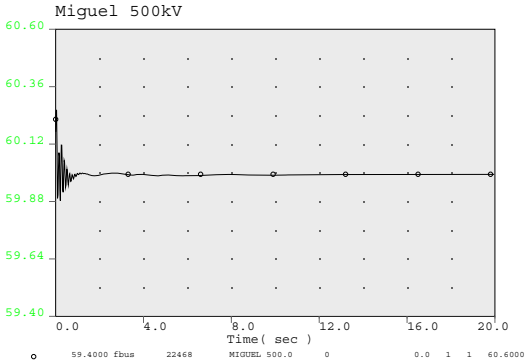
Imperial Valley 500kV



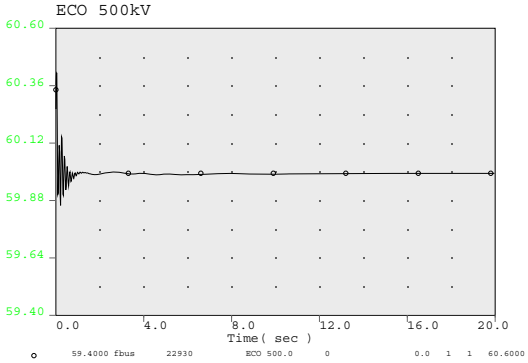
Imperial Valley 230kV



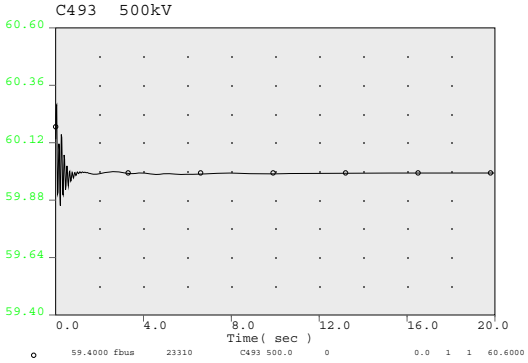
Miguel 500kV



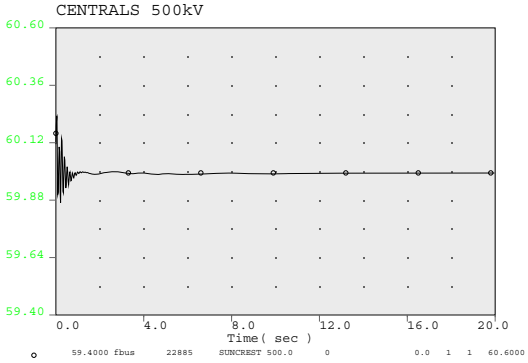
ECO 500kV



C493 500kV

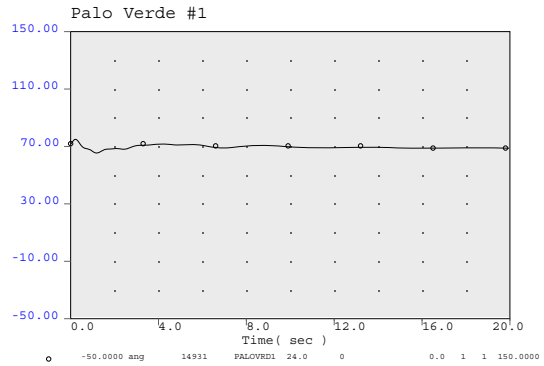


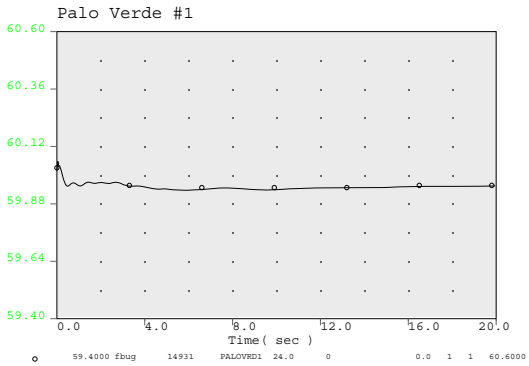
CENTRALS 500kV

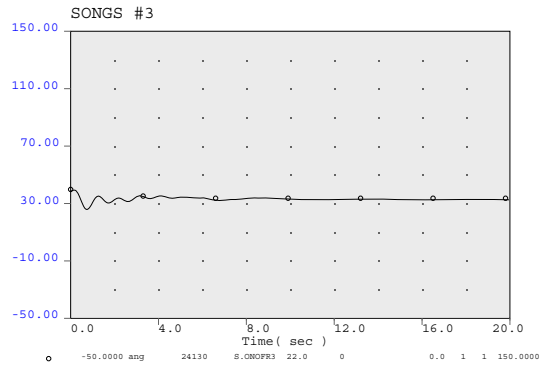


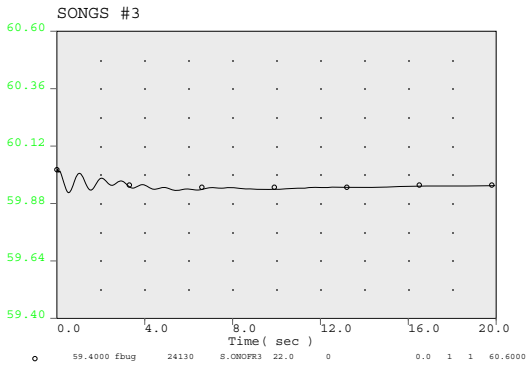
C1 C2 Heavy Summer Pre Without Upgrades

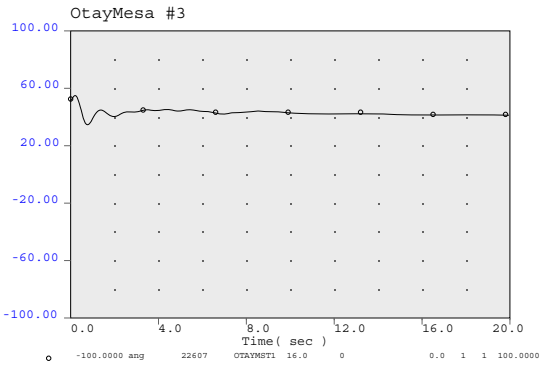
RELATIVE ROTOR ANGLE & FREQUENCY

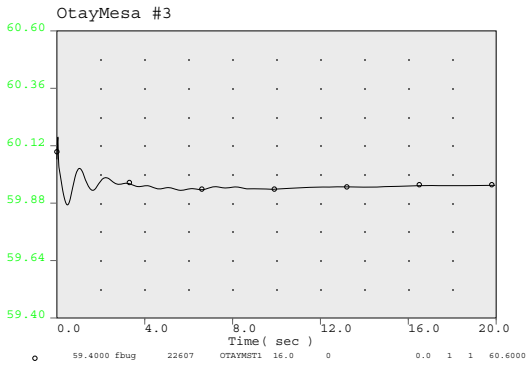












C1 C2 Heavy Summer Pre Without Upgrades

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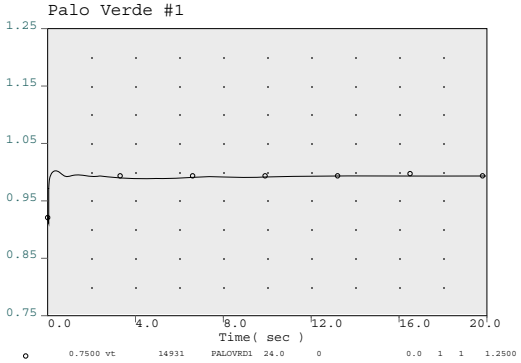
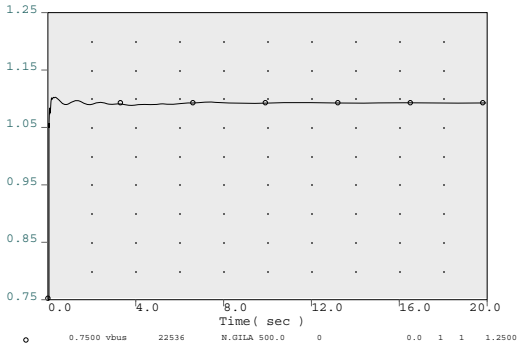
RELATIVE VOLTAGE

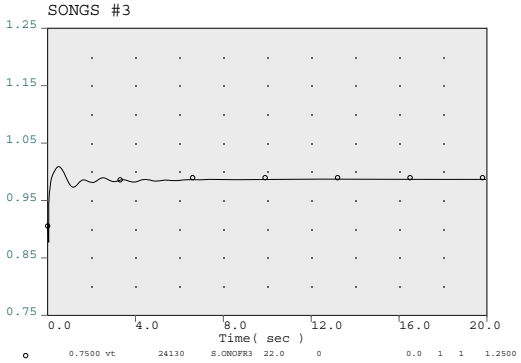
Palo Verde #1



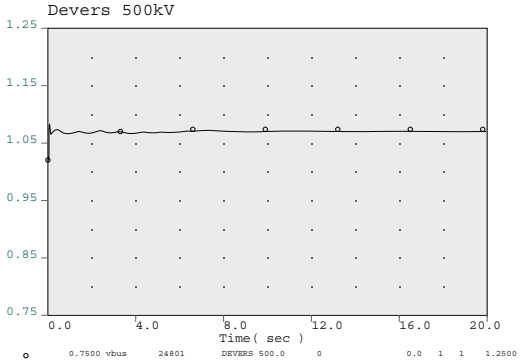
N Gila 500kV



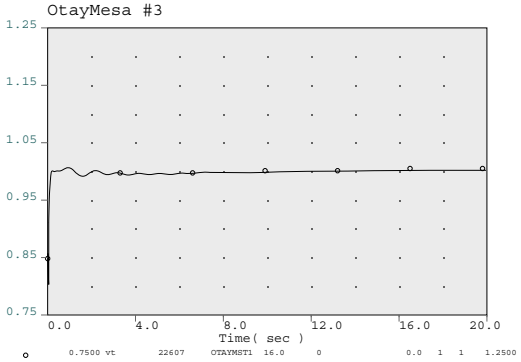
SONGS #3



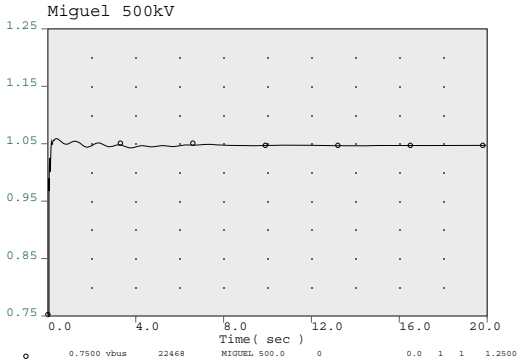
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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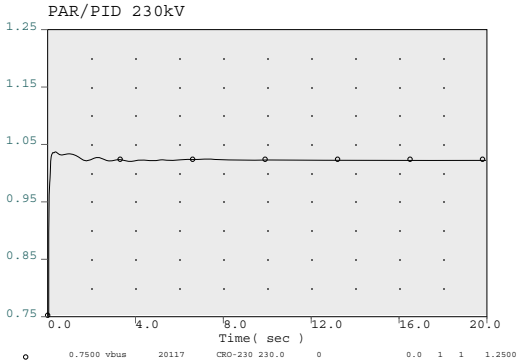
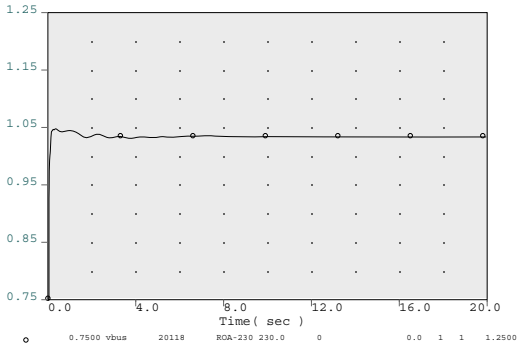
Affected System Voltage Check and Comparison

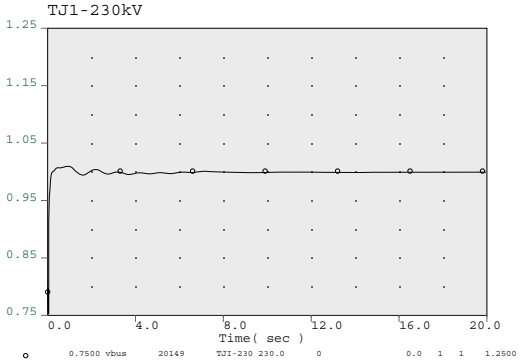
PAR/PID 230kV



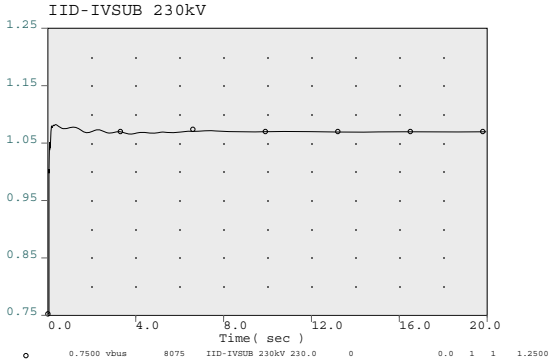
ROA-230kV



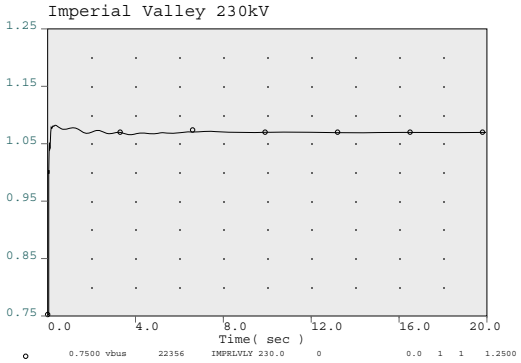
TJ1-230kV



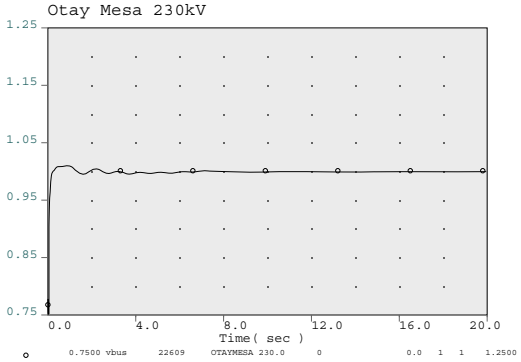
IID-IVSUB 230kV



Imperial Valley 230kV



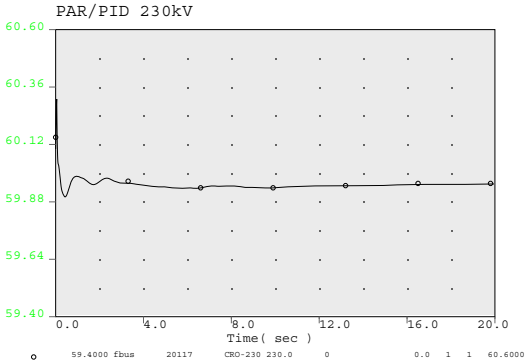
Otay Mesa 230kV



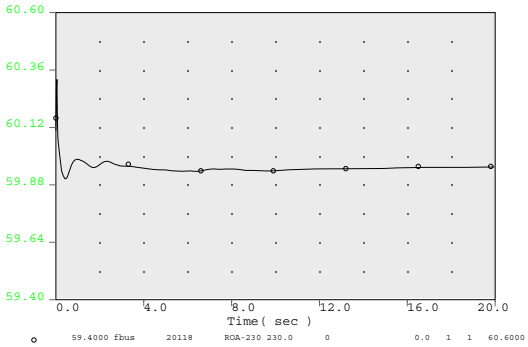
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

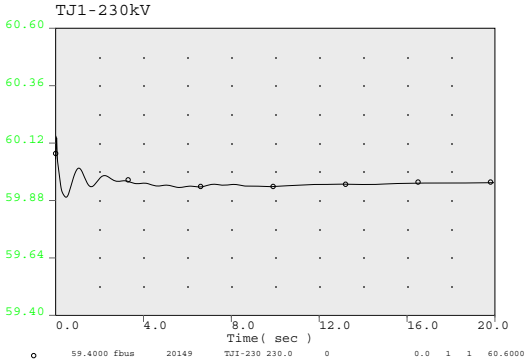
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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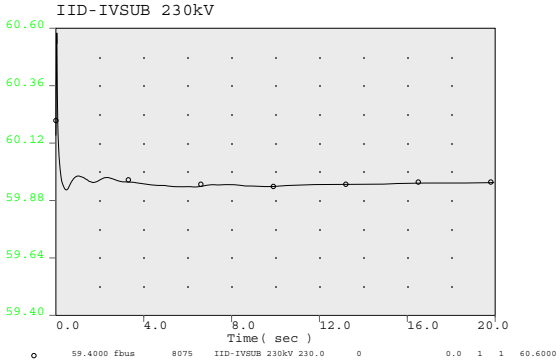
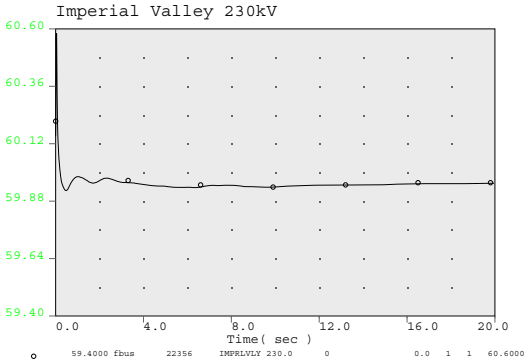
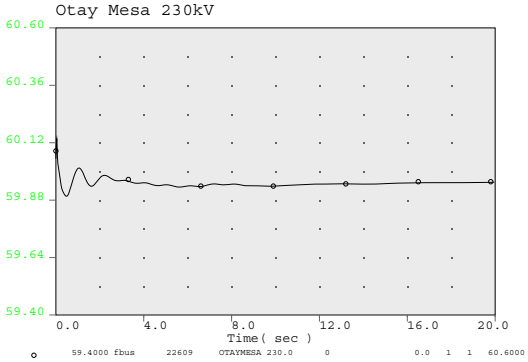


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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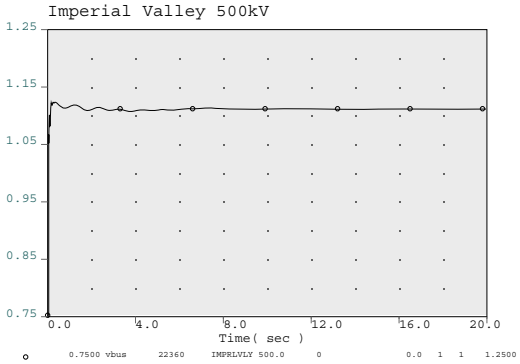
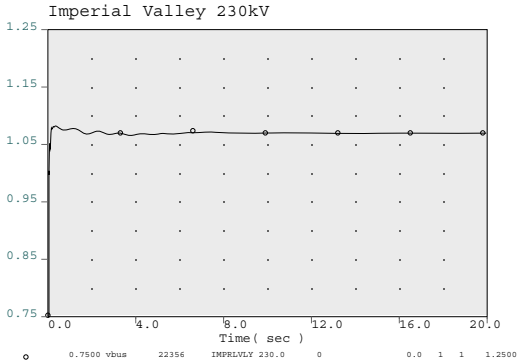
VOLTAGE

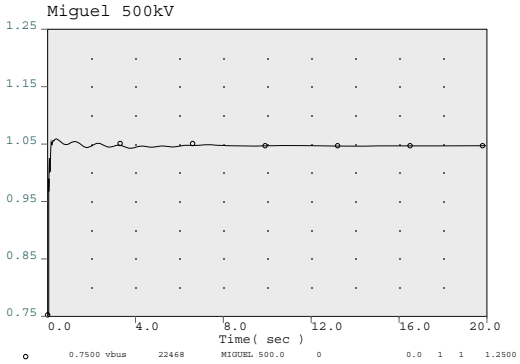
Imperial Valley 500kV



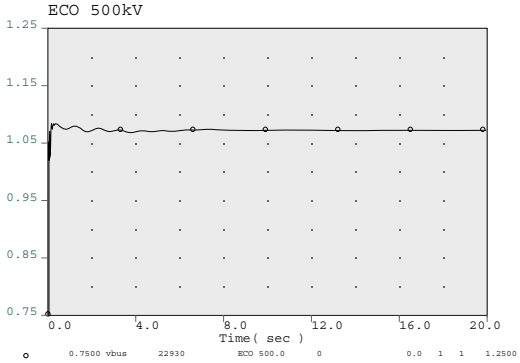
Imperial Valley 230kV



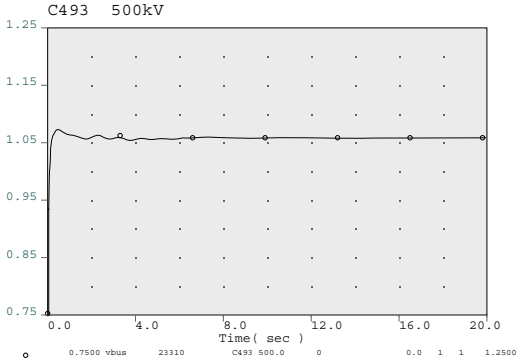
Miguel 500kV



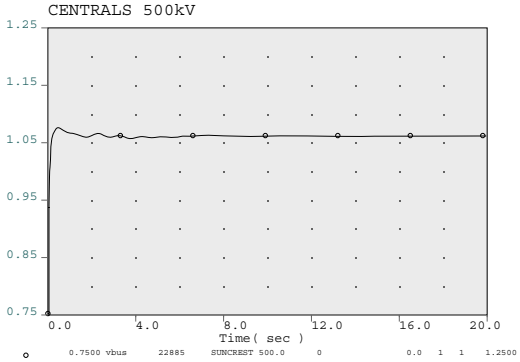
ECO 500kV



C493 500kV



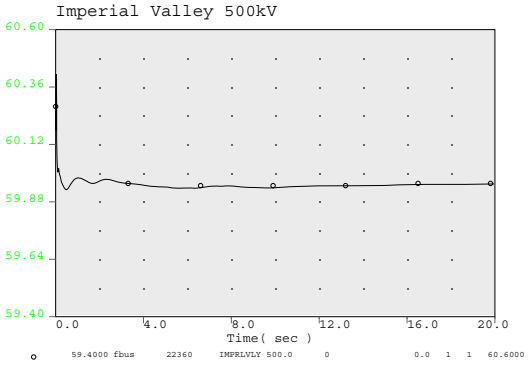
CENTRALS 500kV



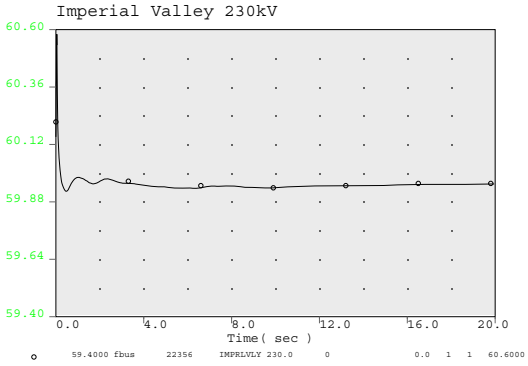
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

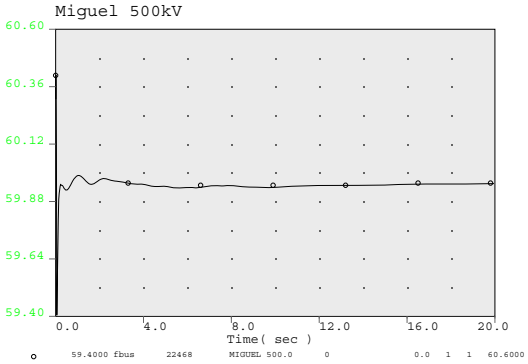
Imperial Valley 500kV



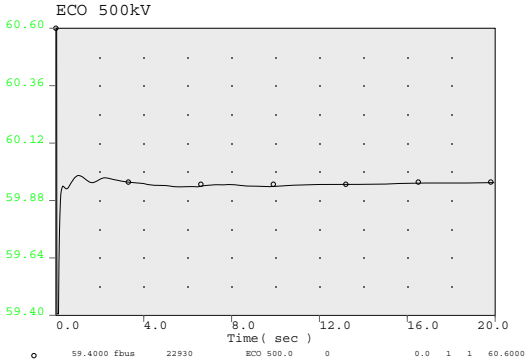
Imperial Valley 230kV



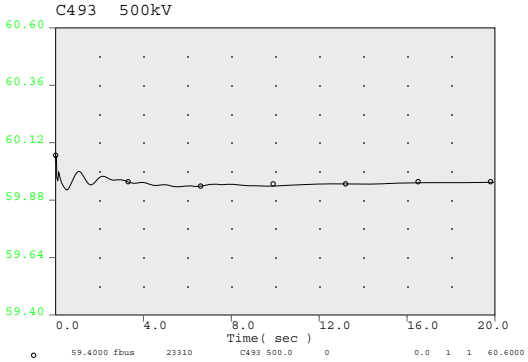
Miguel 500kV



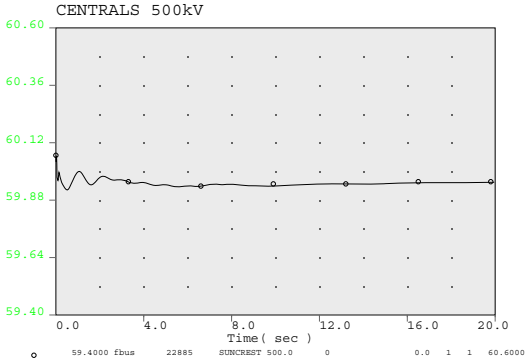
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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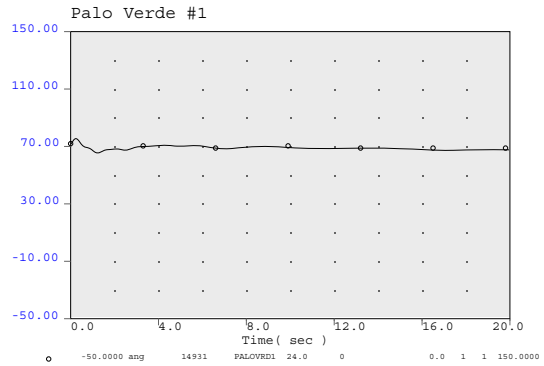
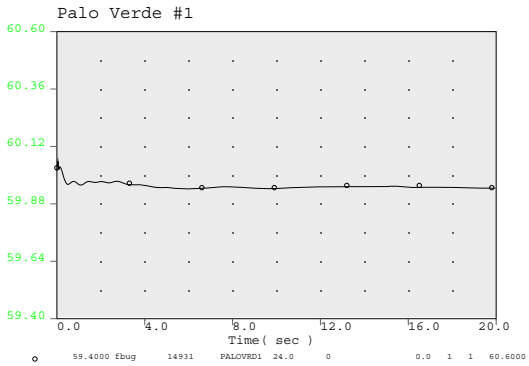
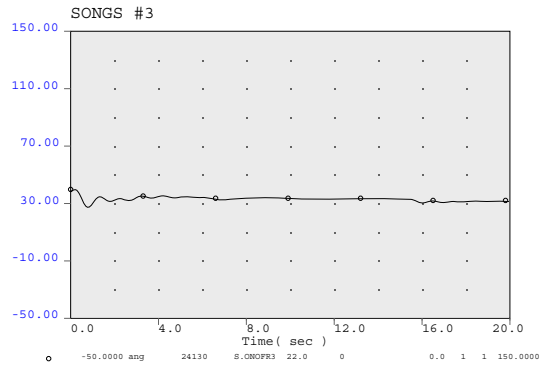
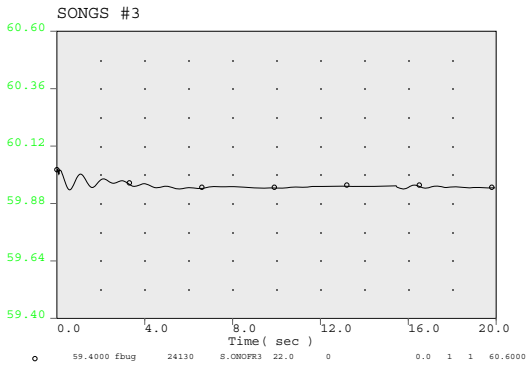
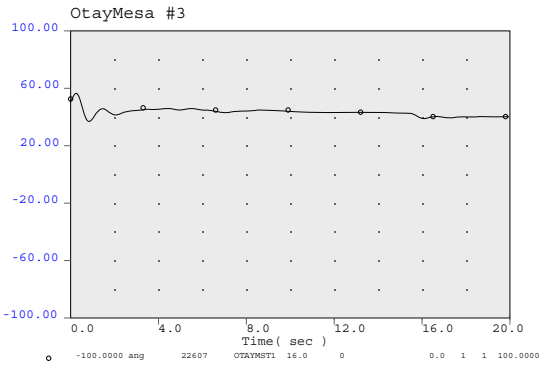
RELATIVE ROTOR ANGLE & FREQUENCY

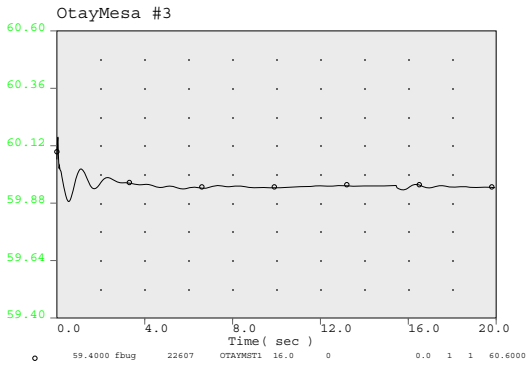












C1 C2 Heavy Summer Pre Without Upgrades

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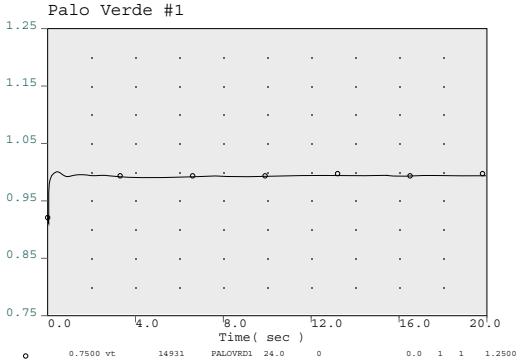
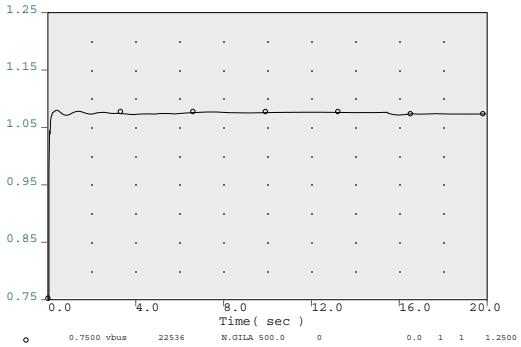
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_IV-ECO-RAS-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:54:06 2011

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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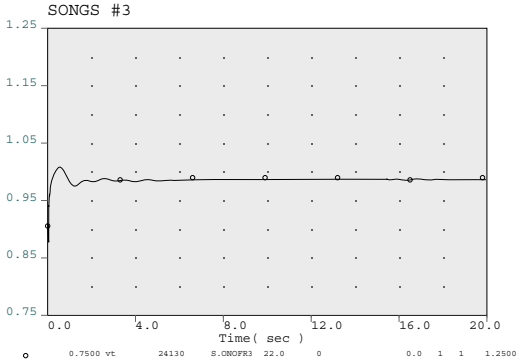
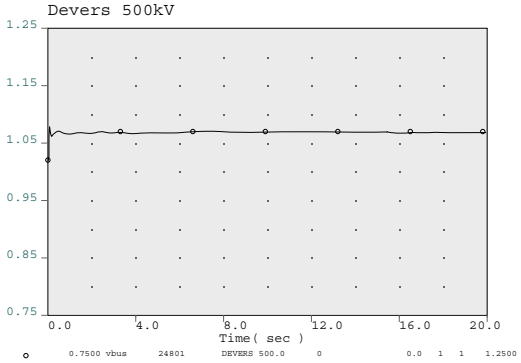
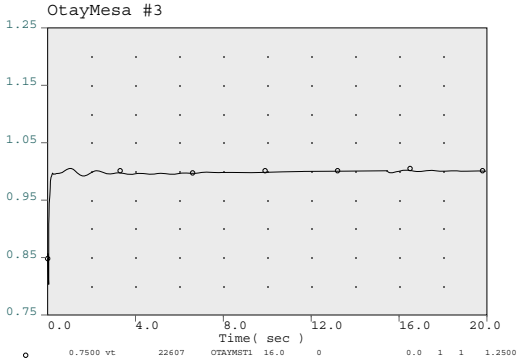


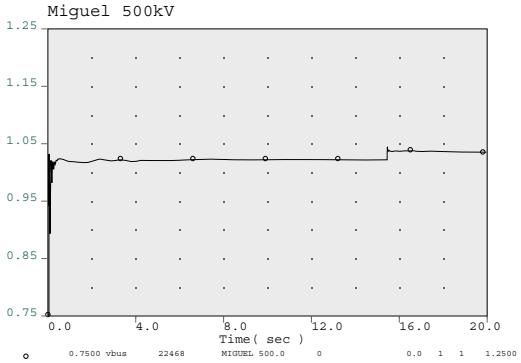
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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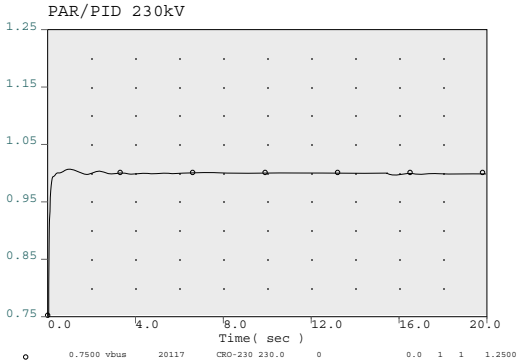
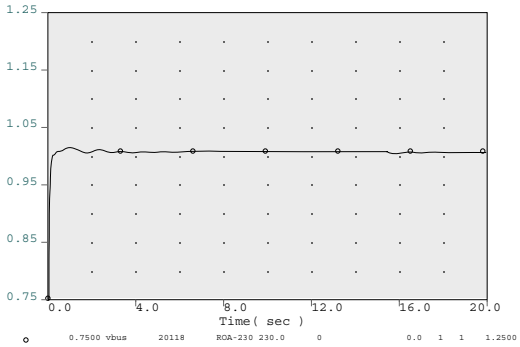
Sun Jul 17 14:54:07 2011

Affected System Voltage Check and Comparison

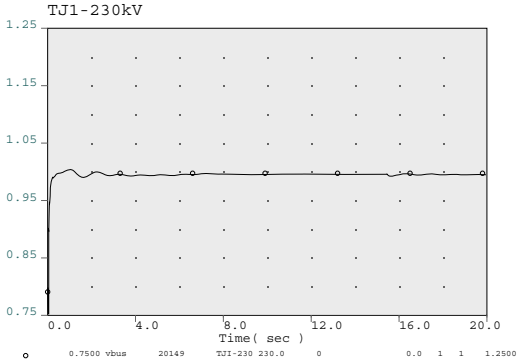
PAR/PID 230kV



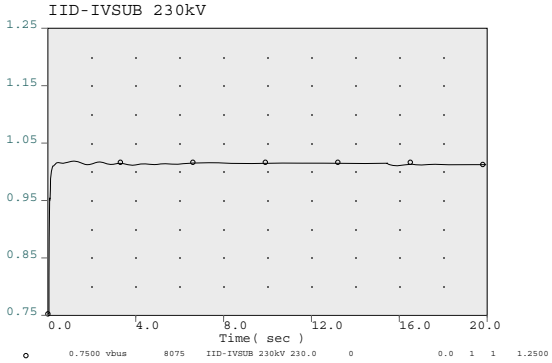
ROA-230kV



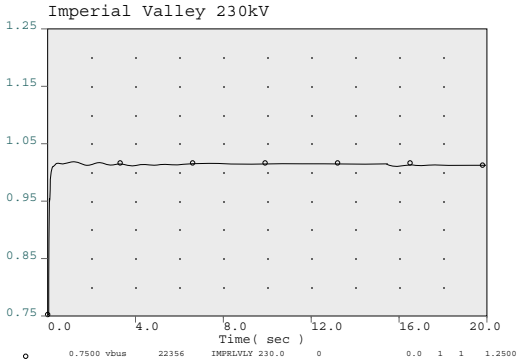
TJ1-230kV



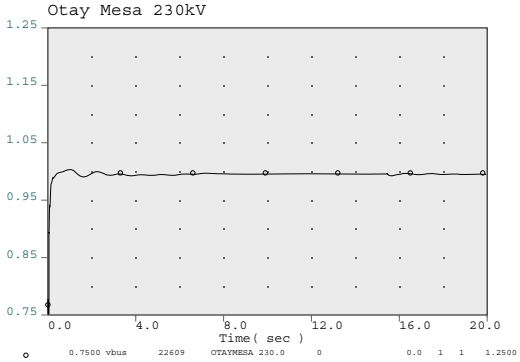
IID-IVSUB 230kV



Imperial Valley 230kV



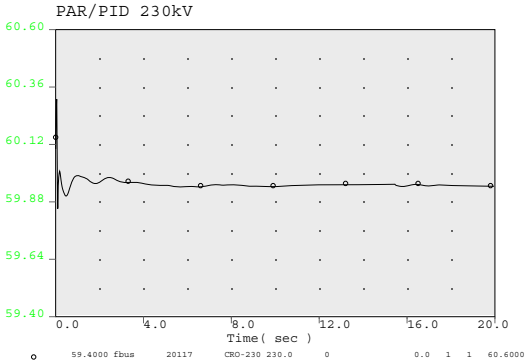
Otay Mesa 230kV



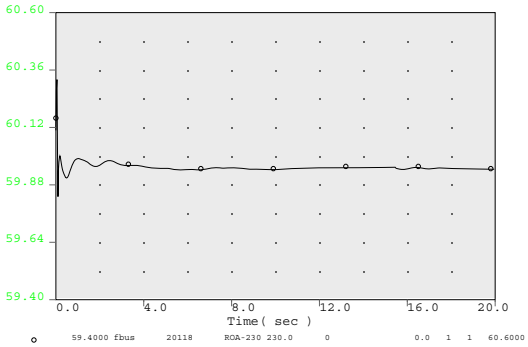
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

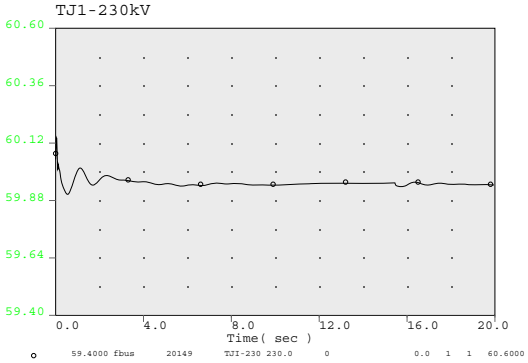
PAR/PID 230kV



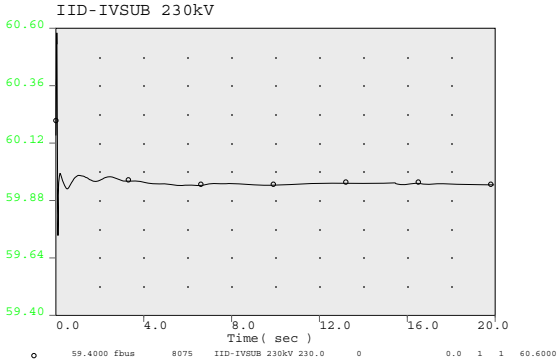
ROA-230kV



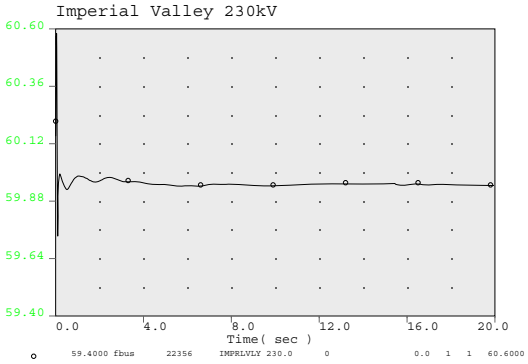
TJ1-230kV



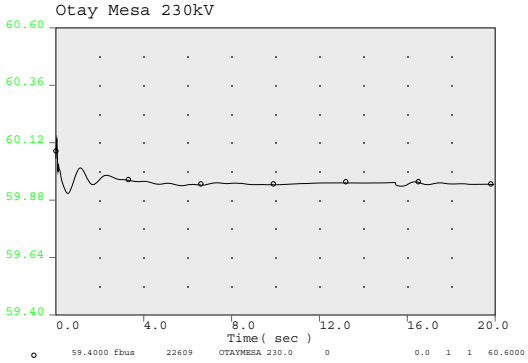
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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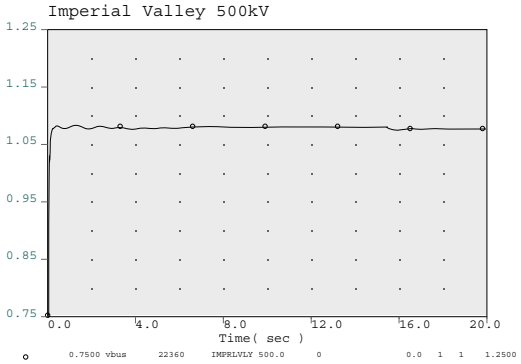
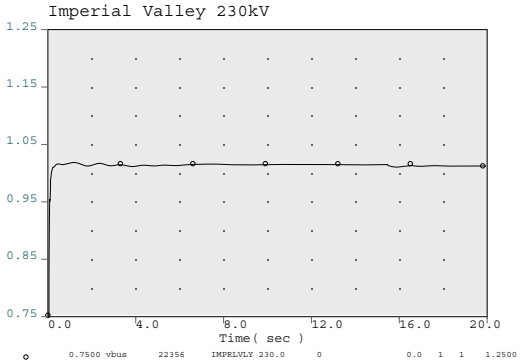
SDGE	tran-c1c2-hs-pre-r12_IV-ECO-RAS-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:54:08 2011

VOLTAGE

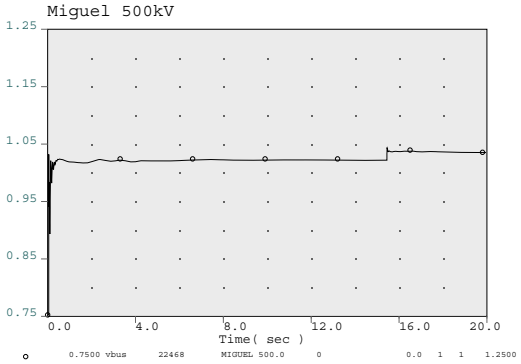
Imperial Valley 500kV



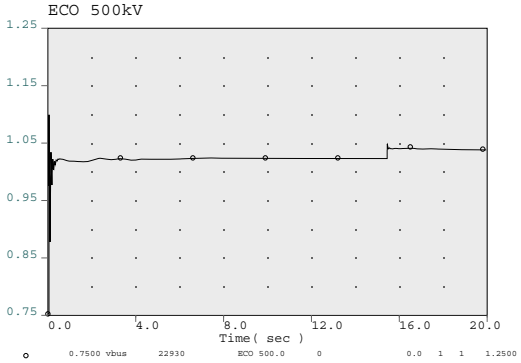
Imperial Valley 230kV



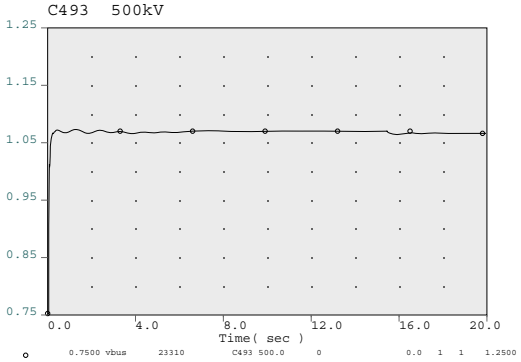
Miguel 500kV



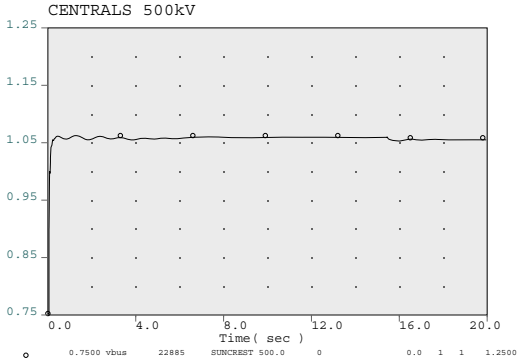
ECO 500kV



C493 500kV



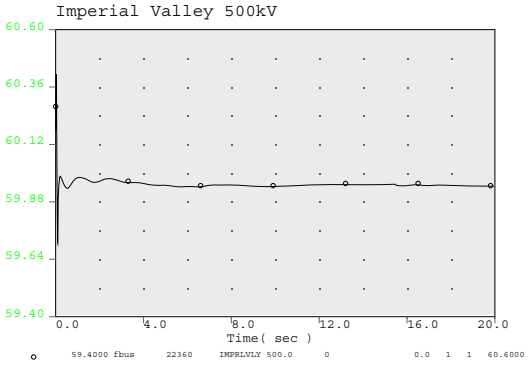
CENTRALS 500kV



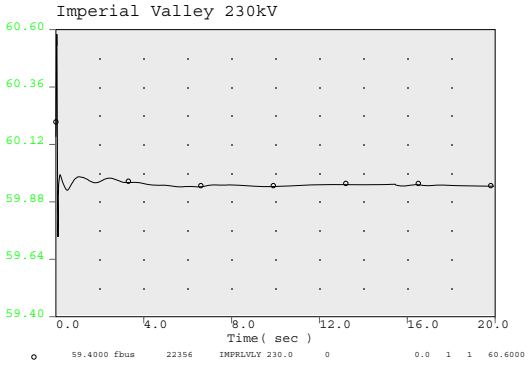
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

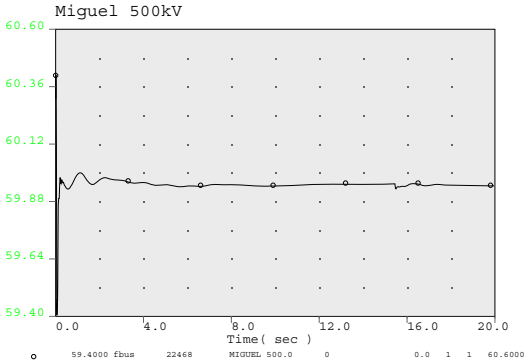
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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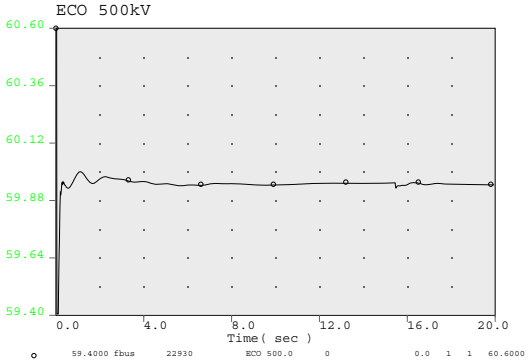

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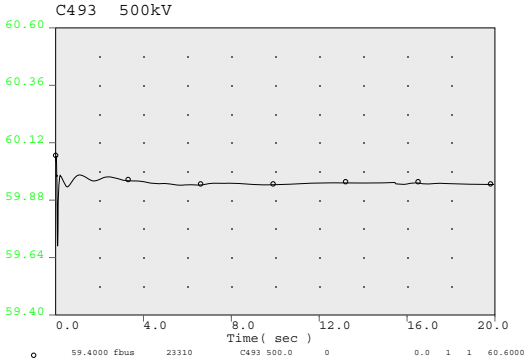

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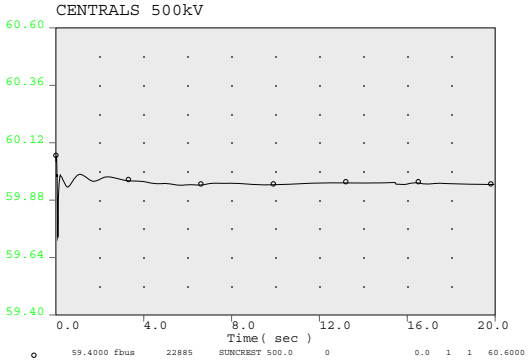
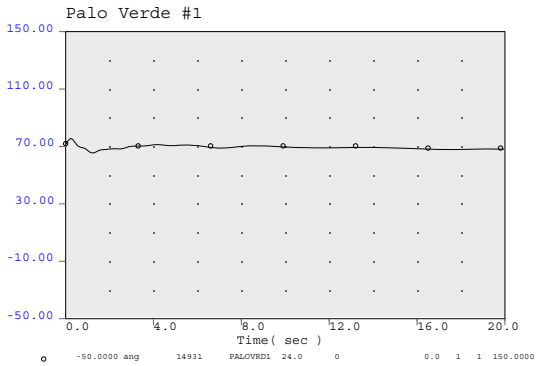
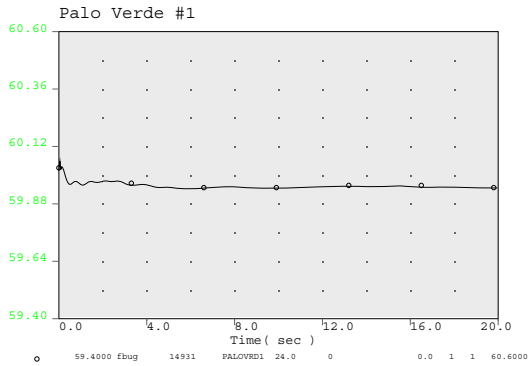
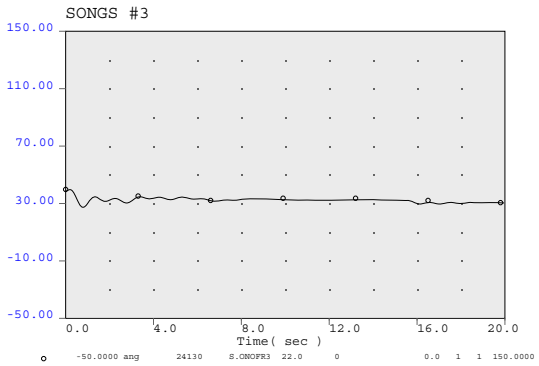


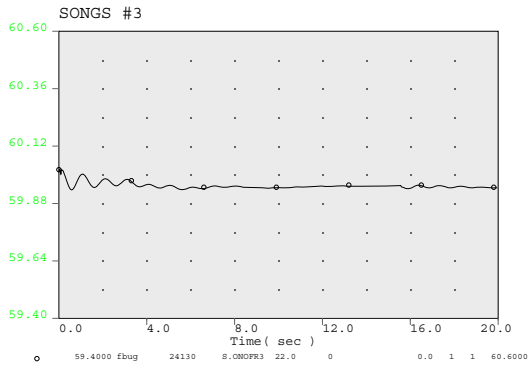
C1 C2 Heavy Summer Pre Without Upgrades

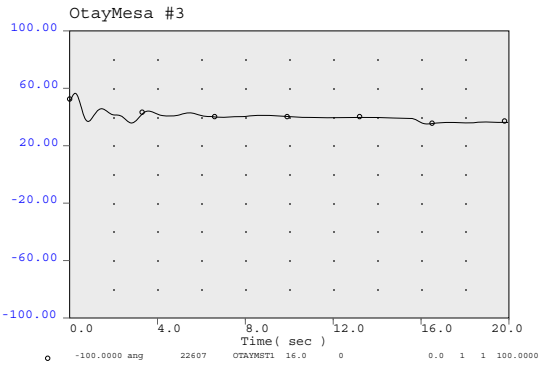
RELATIVE ROTOR ANGLE & FREQUENCY

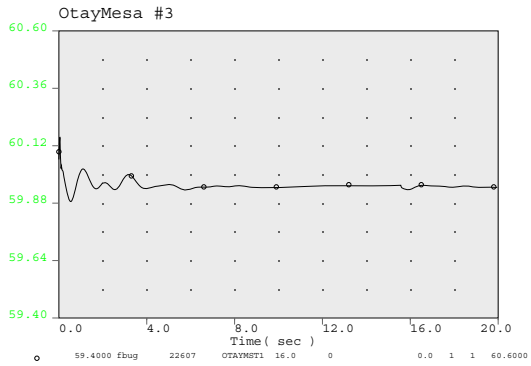












C1 C2 Heavy Summer Pre Without Upgrades

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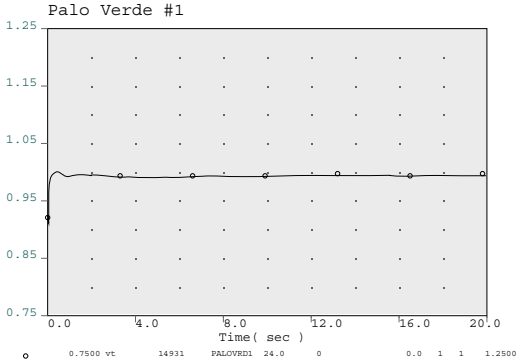
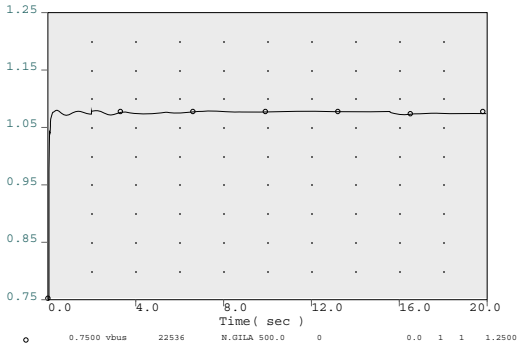
RELATIVE VOLTAGE

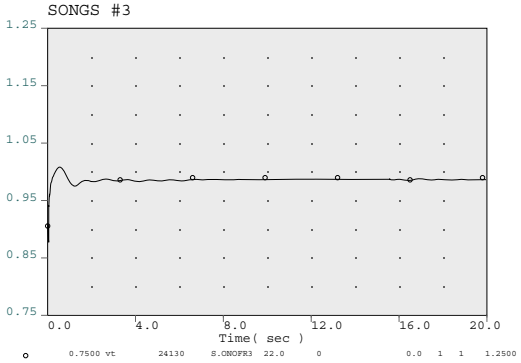
Palo Verde #1



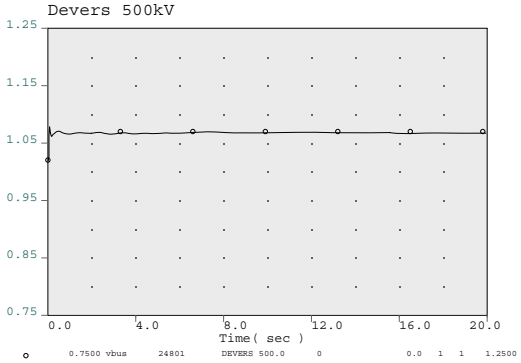
N Gila 500kV



SONGS #3



Devers 500kV



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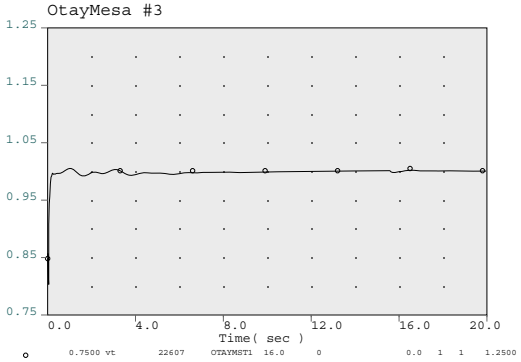
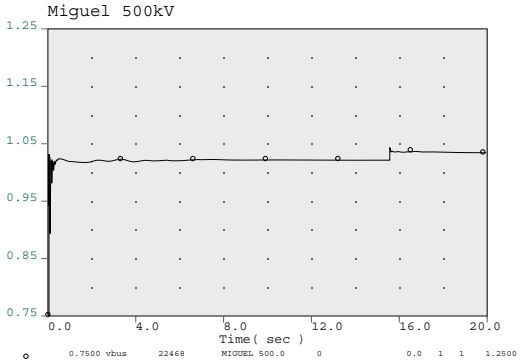


Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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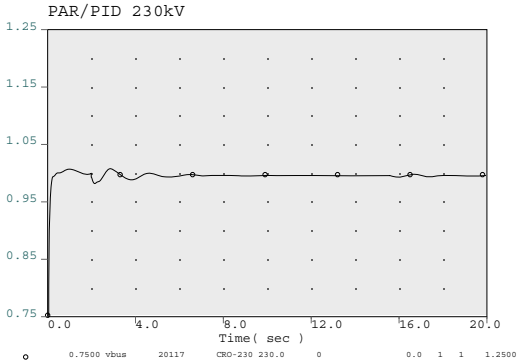
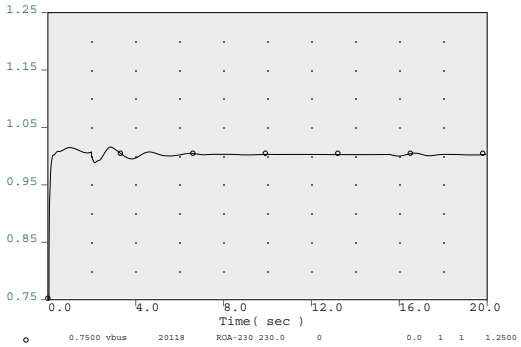
Affected System Voltage Check and Comparison

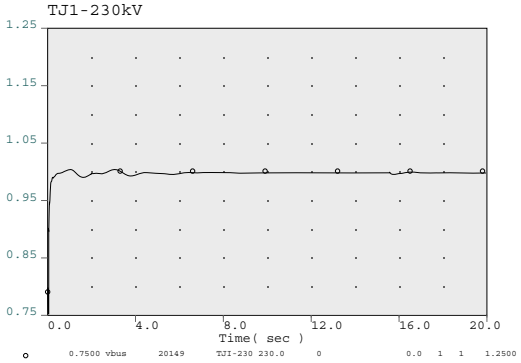
PAR/PID 230kV



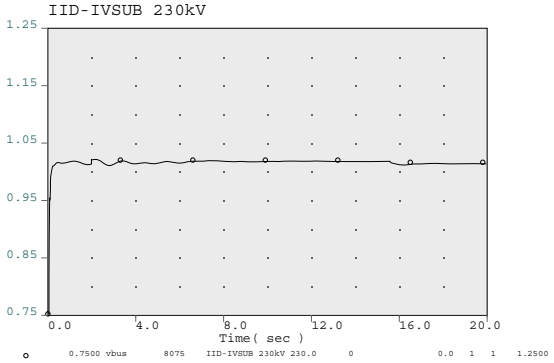
ROA-230kV



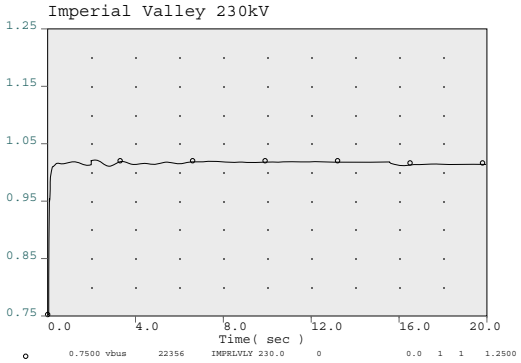
TJ1-230kV



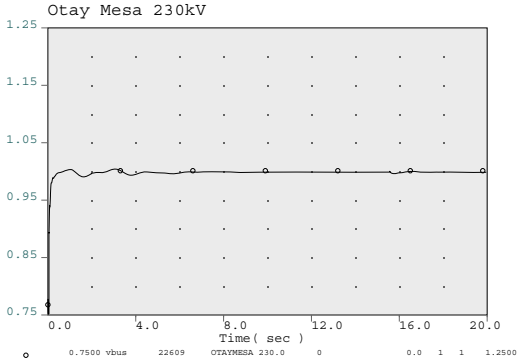
IID-IVSUB 230kV



Imperial Valley 230kV



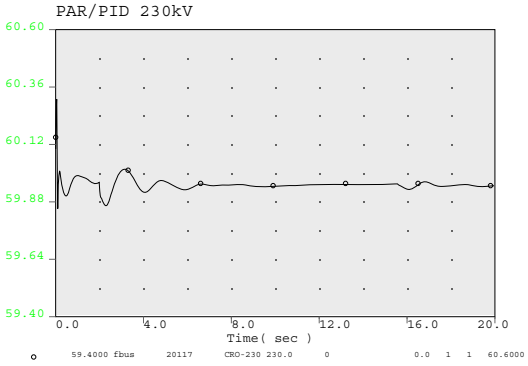
Otay Mesa 230kV



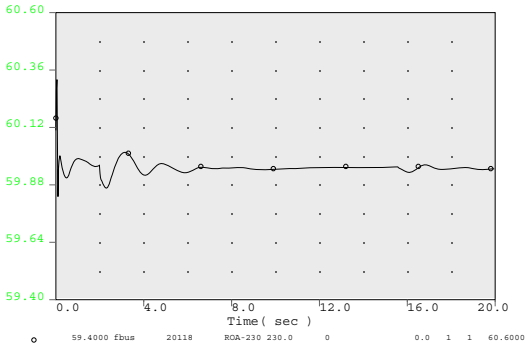
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

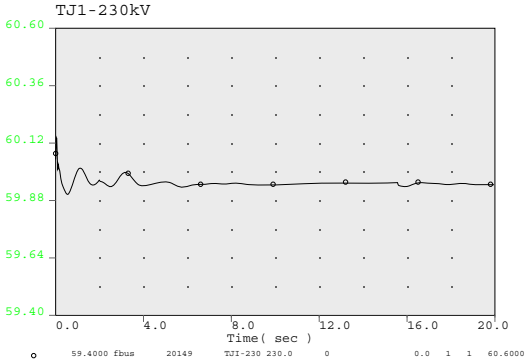
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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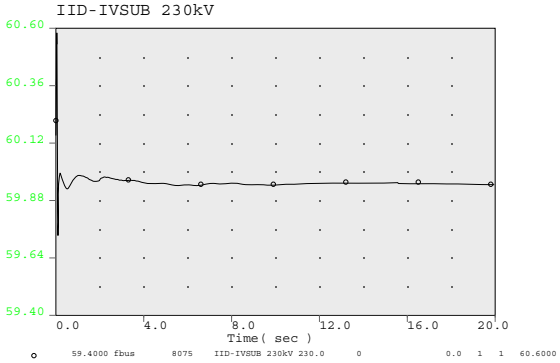
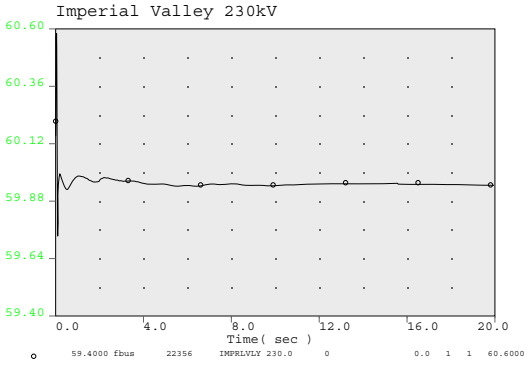
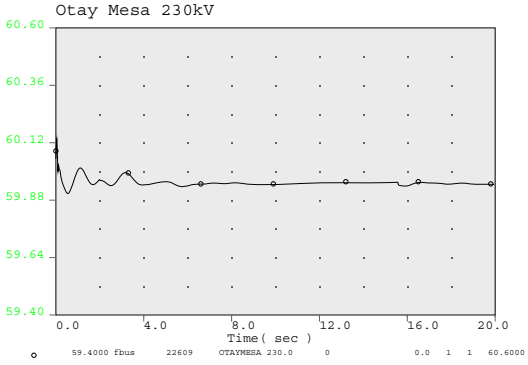


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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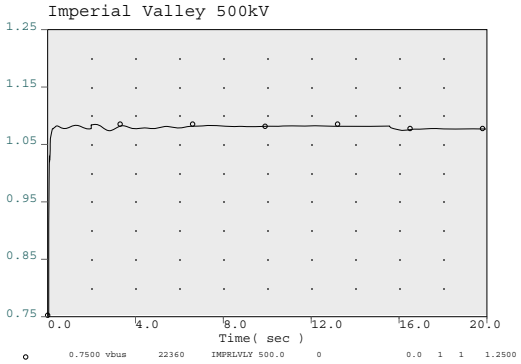
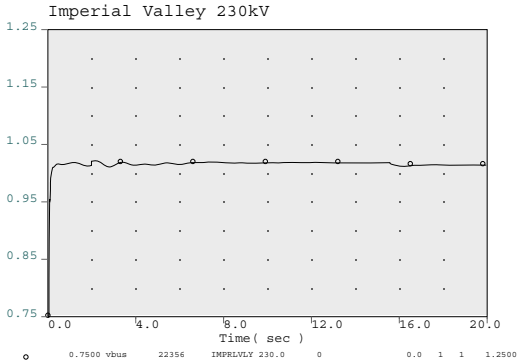
VOLTAGE

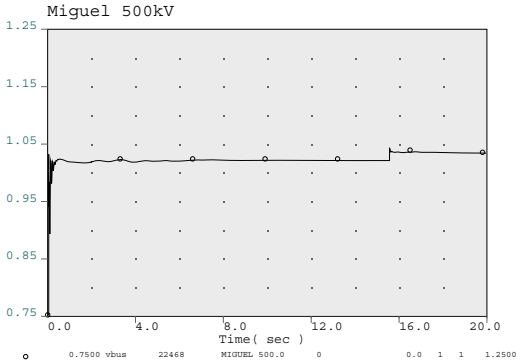
Imperial Valley 500kV



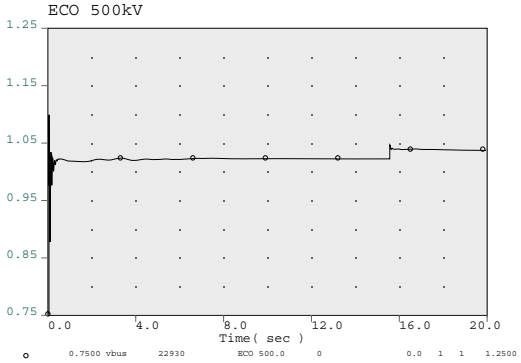
Imperial Valley 230kV



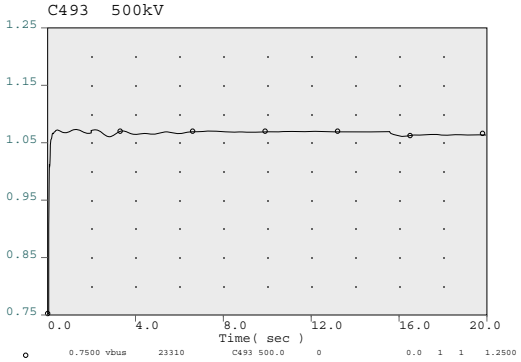
Miguel 500kV



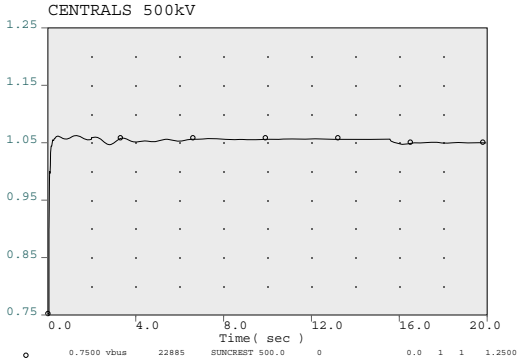
ECO 500kV



C493 500kV



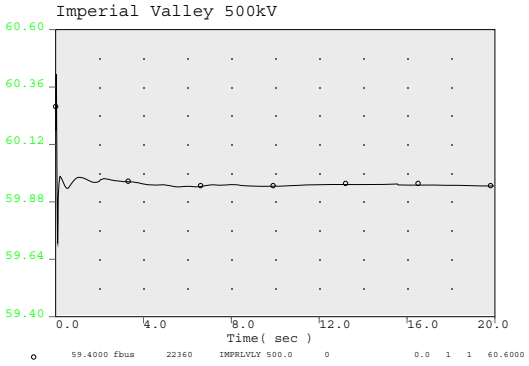
CENTRALS 500kV



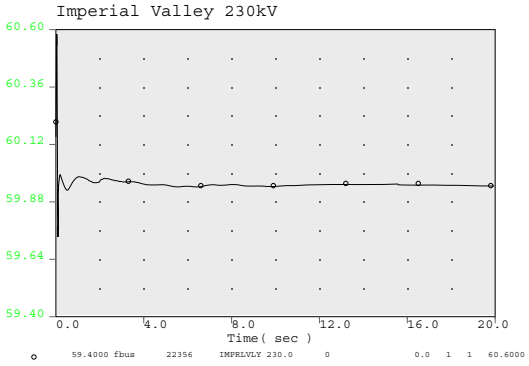
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

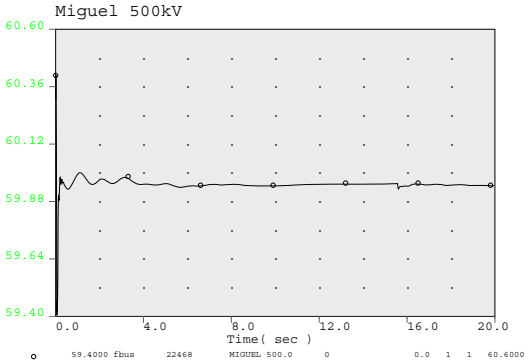
Imperial Valley 500kV



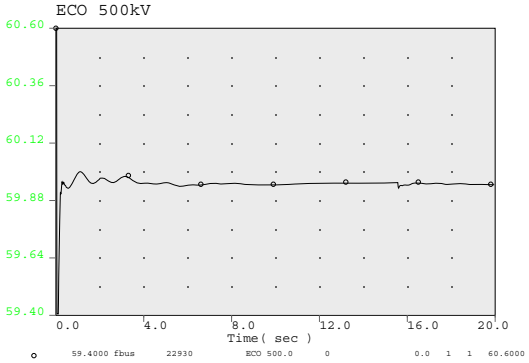
Imperial Valley 230kV



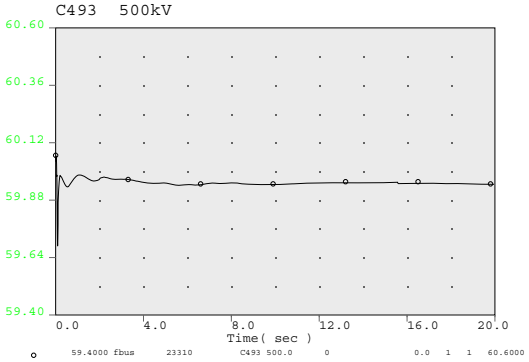
Miguel 500kV



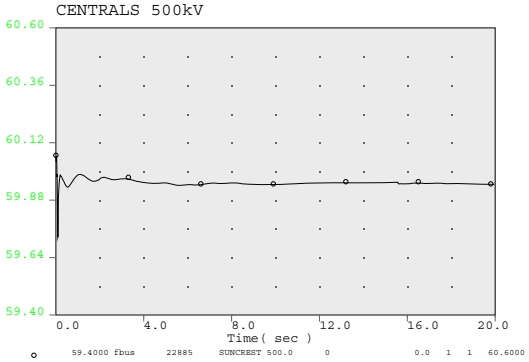
ECO 500kV



C493 500kV

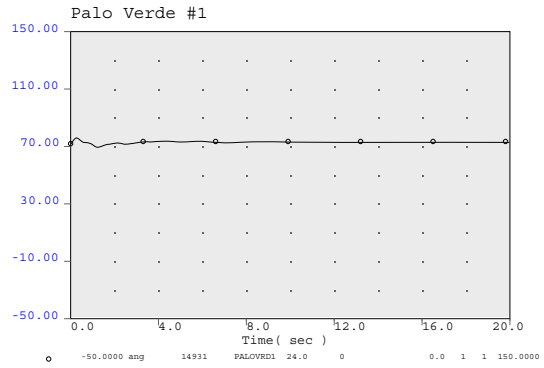


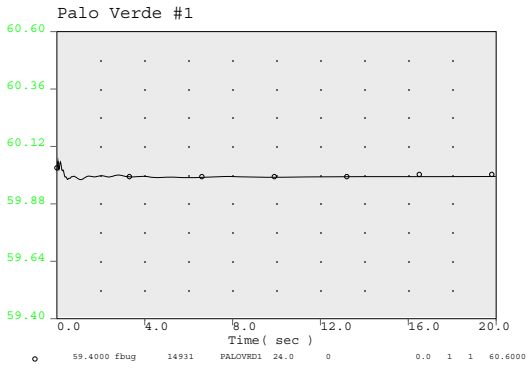
CENTRALS 500kV

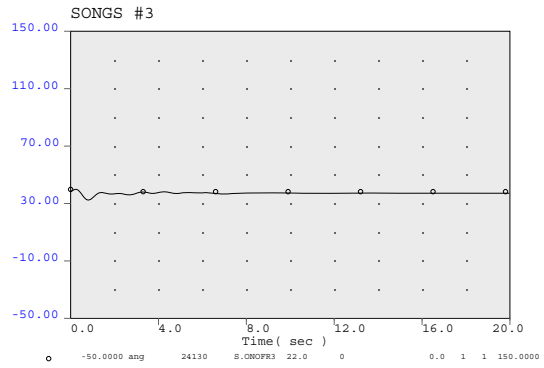


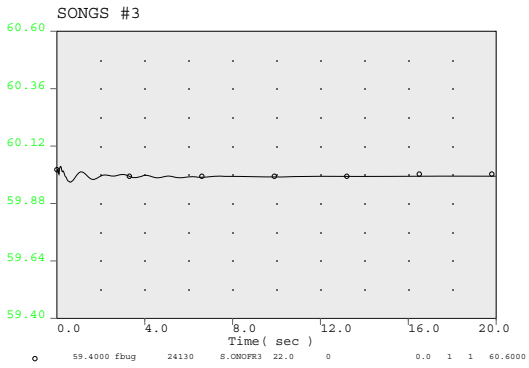
C1 C2 Heavy Summer Pre Without Upgrades

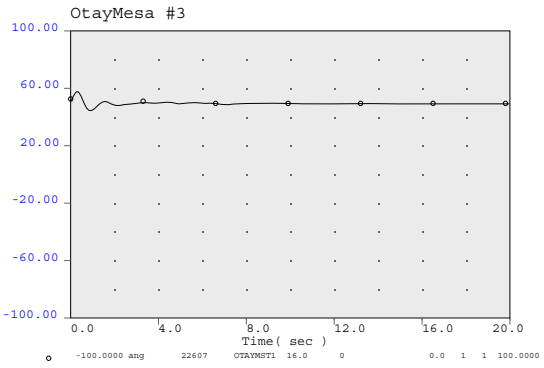
RELATIVE ROTOR ANGLE & FREQUENCY

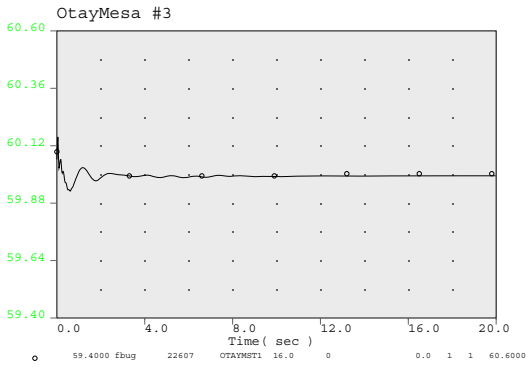












C1 C2 Heavy Summer Pre Without Upgrades

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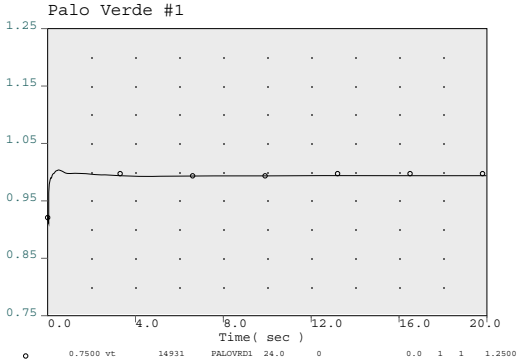
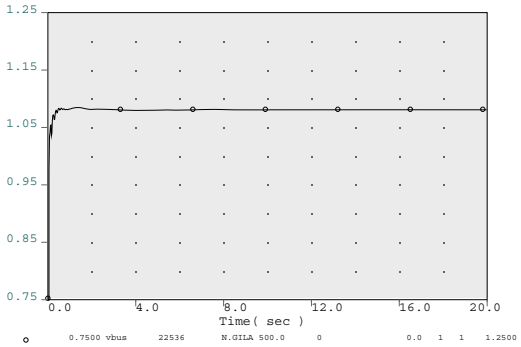
RELATIVE VOLTAGE

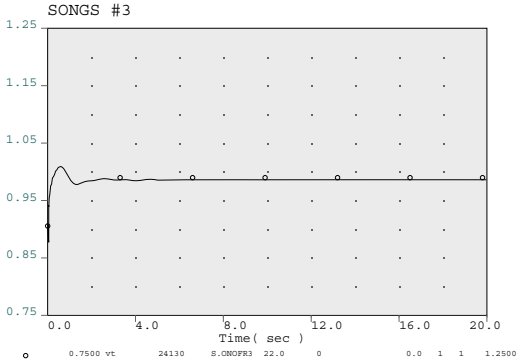
Palo Verde #1



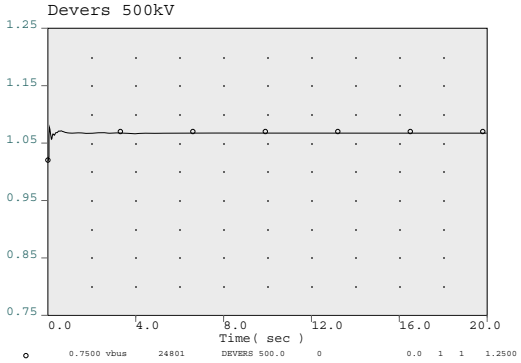
N Gila 500kV



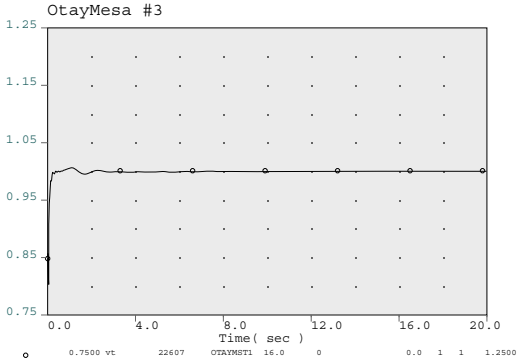
SONGS #3



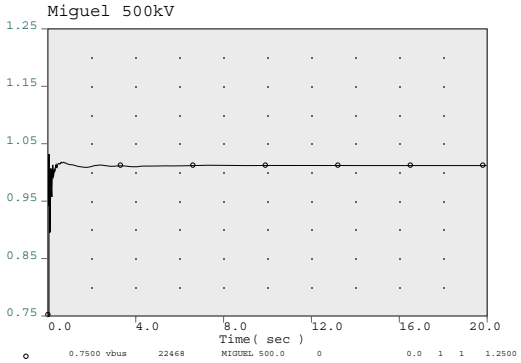
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

Page 2

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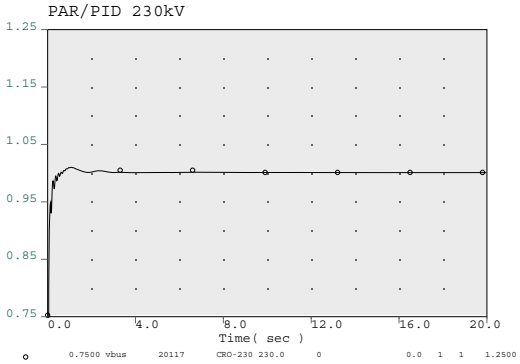
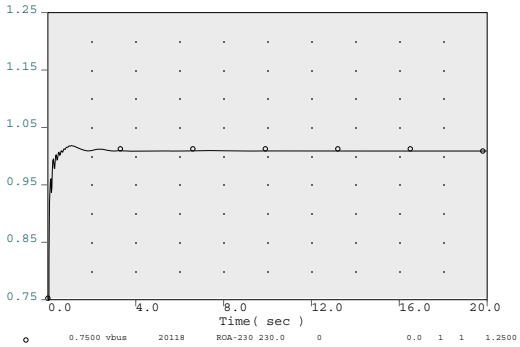
Affected System Voltage Check and Comparison

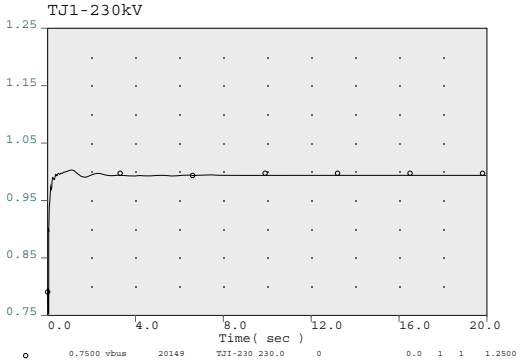
PAR/PID 230kV



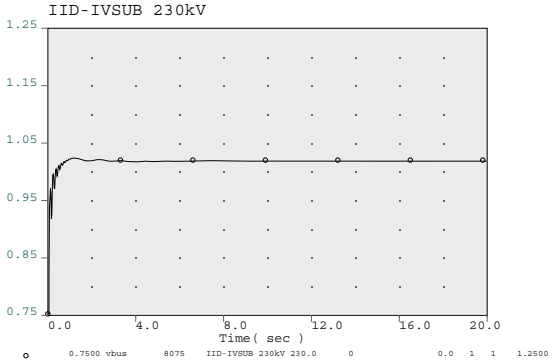
ROA-230kV



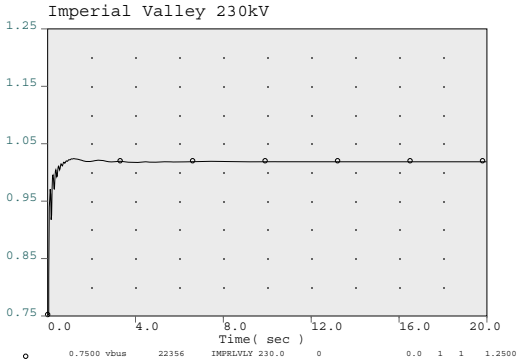
TJ1-230kV



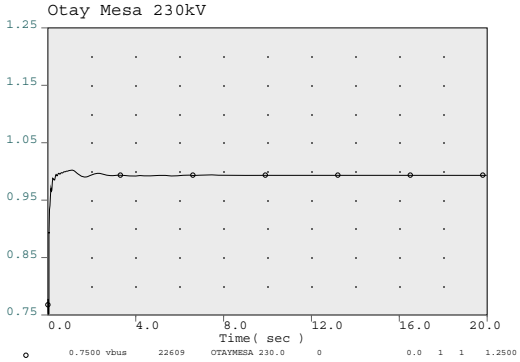
IID-IVSUB 230kV



Imperial Valley 230kV



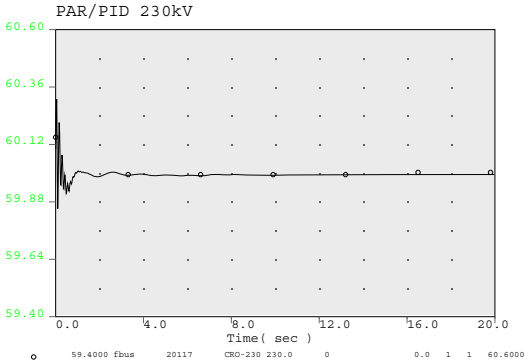
Otay Mesa 230kV



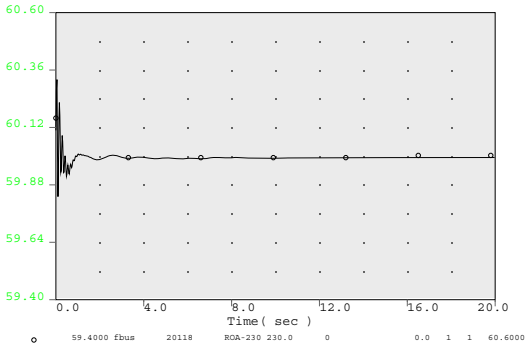
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

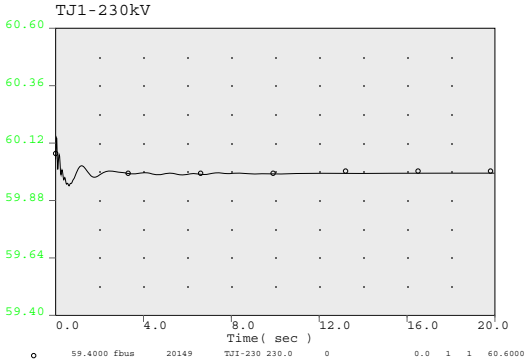
PAR/PID 230kV



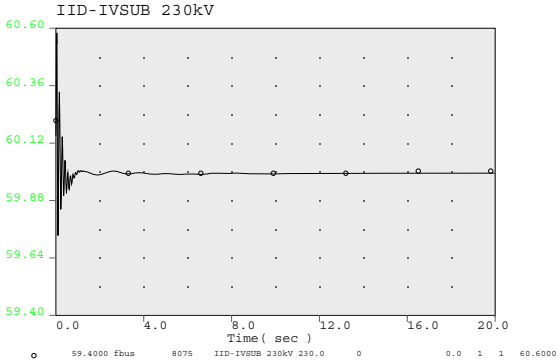
ROA-230kV



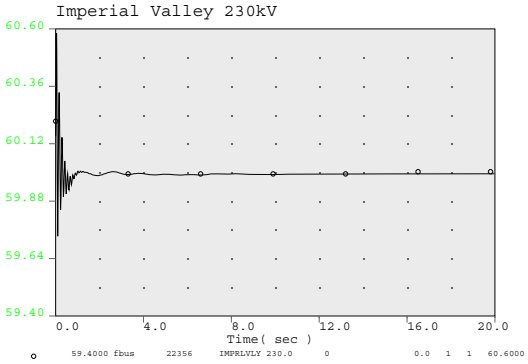
TJ1-230kV



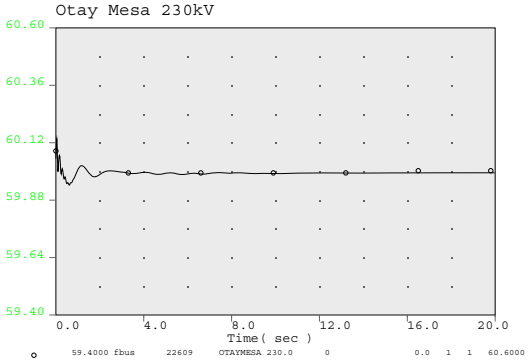
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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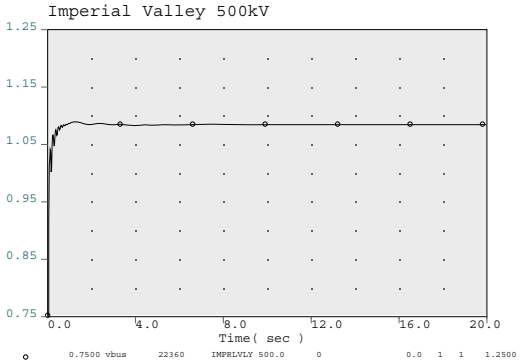
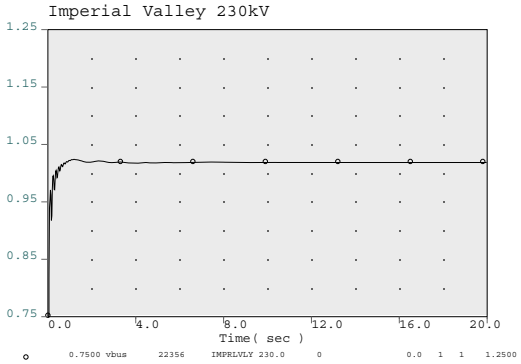
VOLTAGE

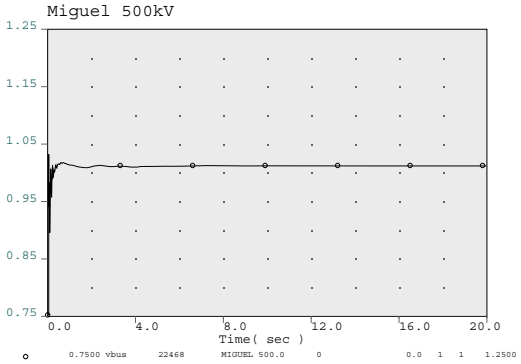
Imperial Valley 500kV



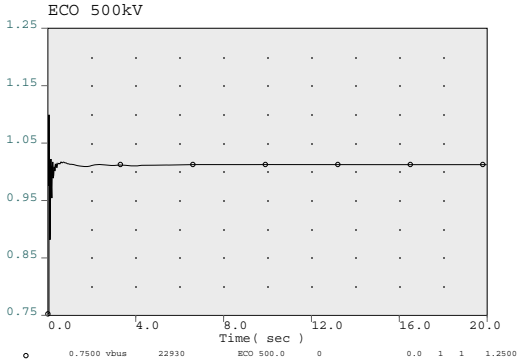
Imperial Valley 230kV



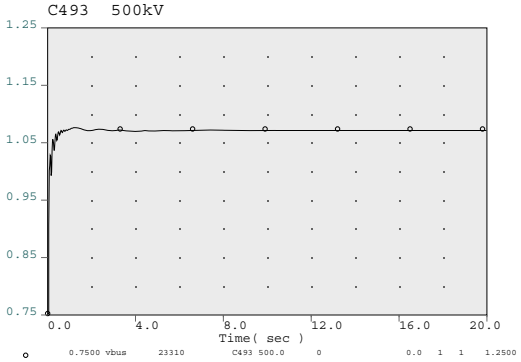
Miguel 500kV



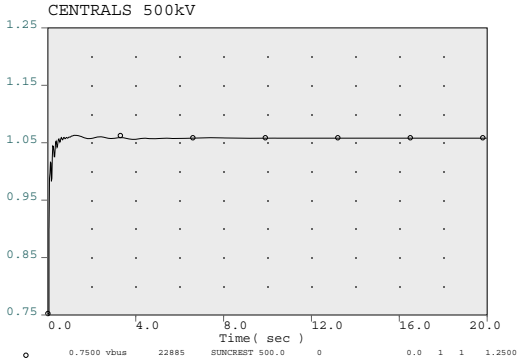
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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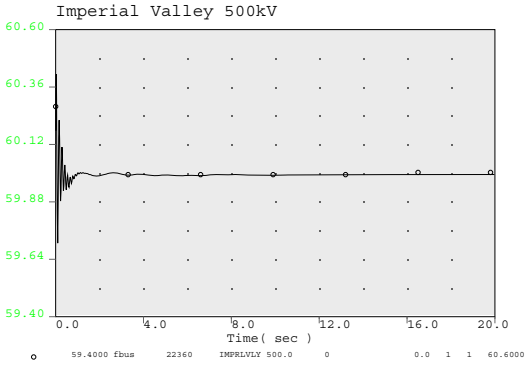
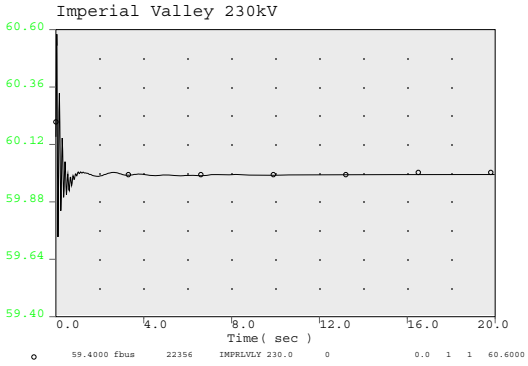
SDGE	tran-c1c2-hs-pre-r12_IV-ECO-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:56:11 2011

FREQUENCY

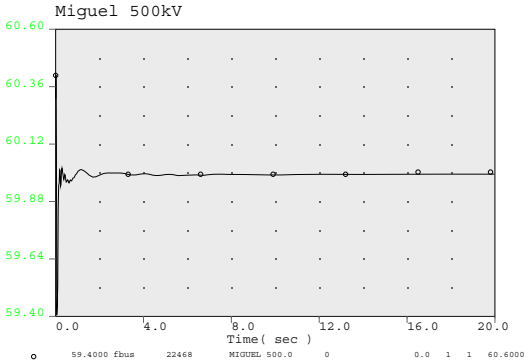
Imperial Valley 500kV



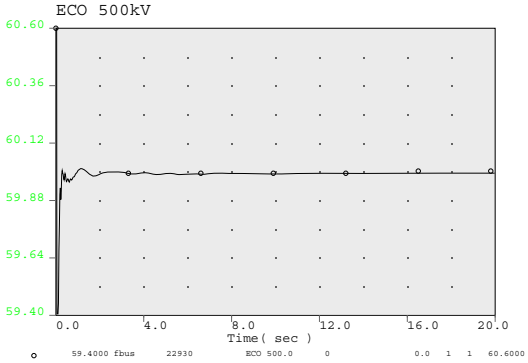
Imperial Valley 230kV



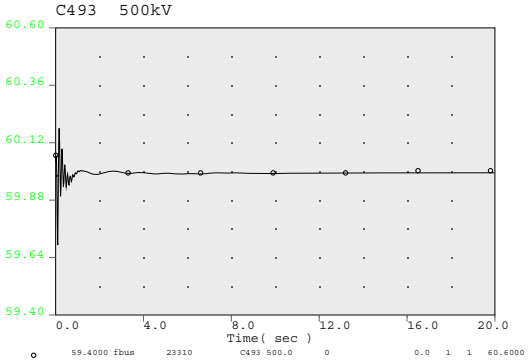
Miguel 500kV



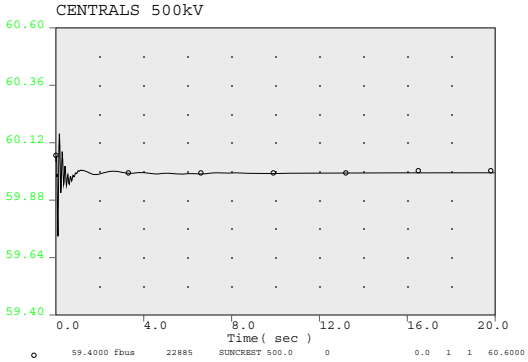
ECO 500kV



C493 500kV

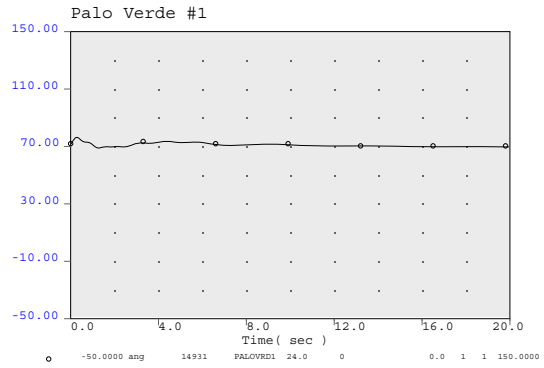


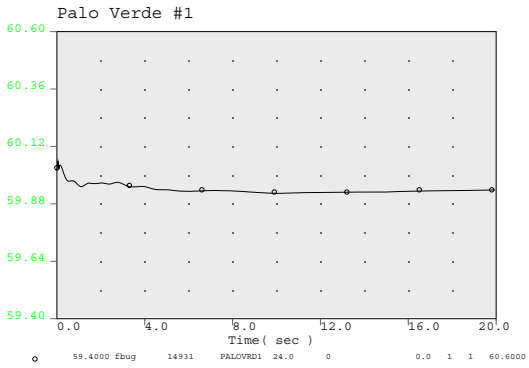
CENTRALS 500kV

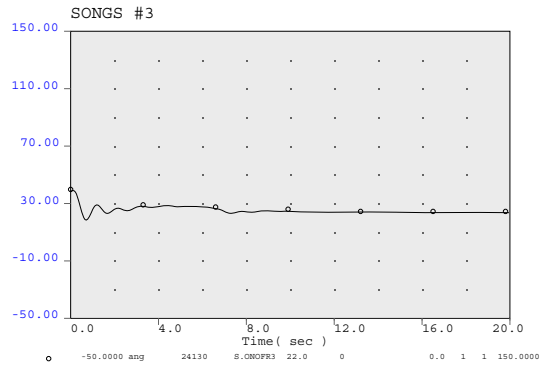


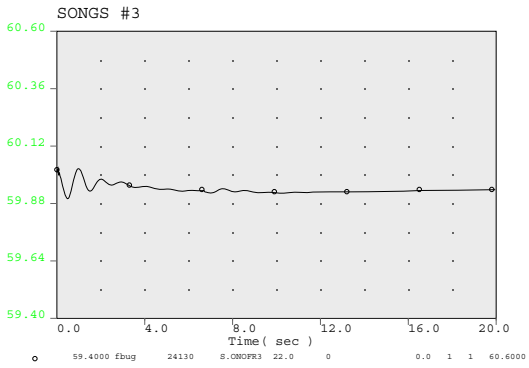
C1 C2 Heavy Summer Pre Without Upgrades

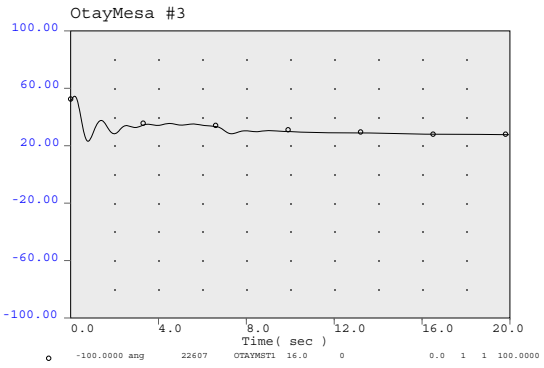
RELATIVE ROTOR ANGLE & FREQUENCY

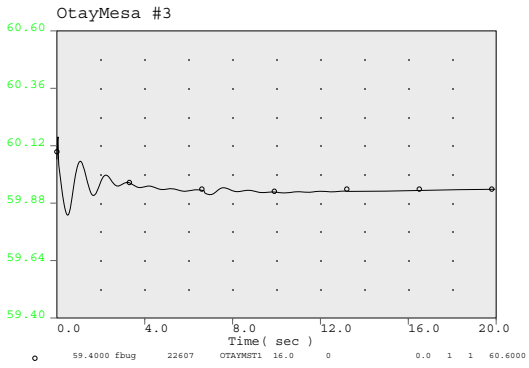












C1 C2 Heavy Summer Pre Without Upgrades

Page 1

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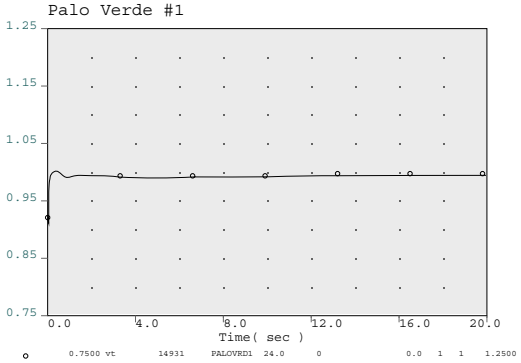
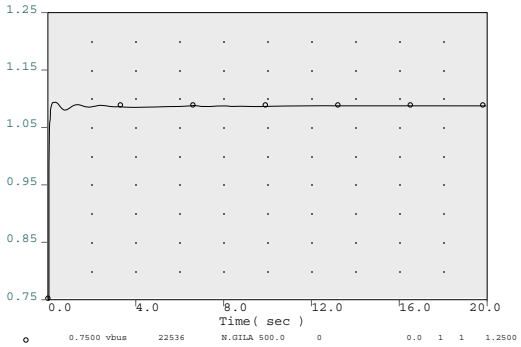
RELATIVE VOLTAGE

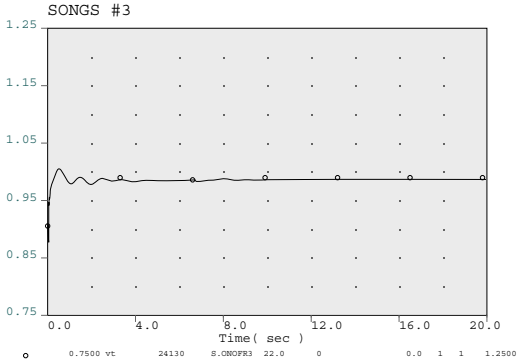
Palo Verde #1



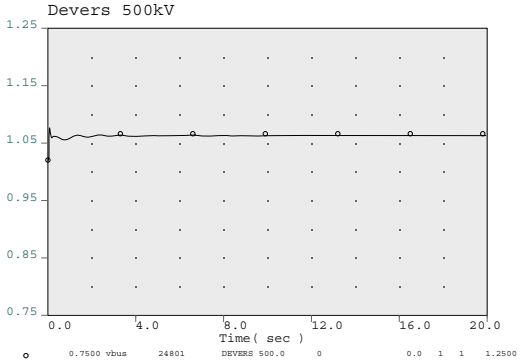
N Gila 500kV



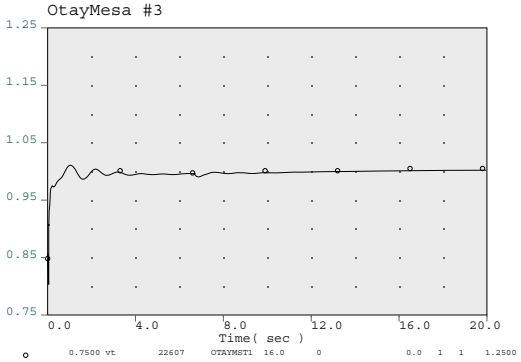
SONGS #3



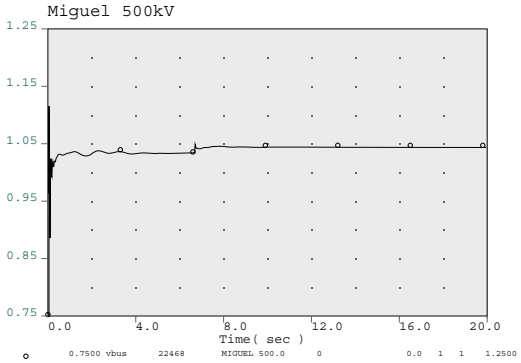
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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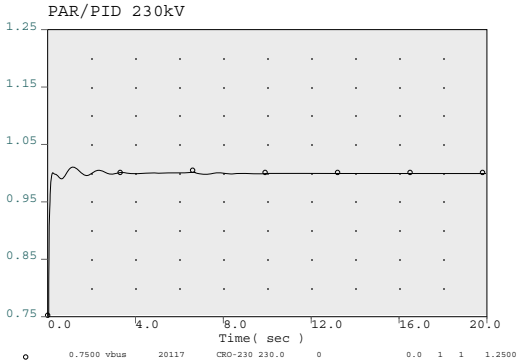
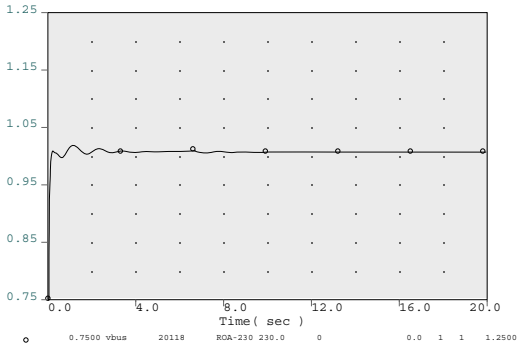
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_IV-RAS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:58:13 2011

Affected System Voltage Check and Comparison

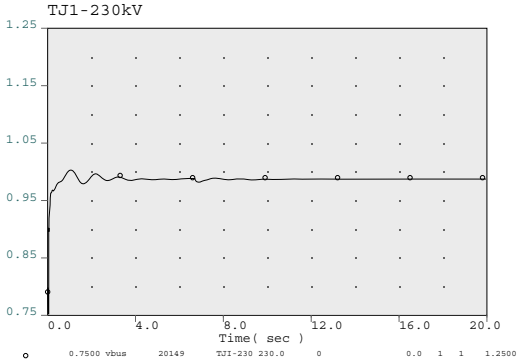
PAR/PID 230kV



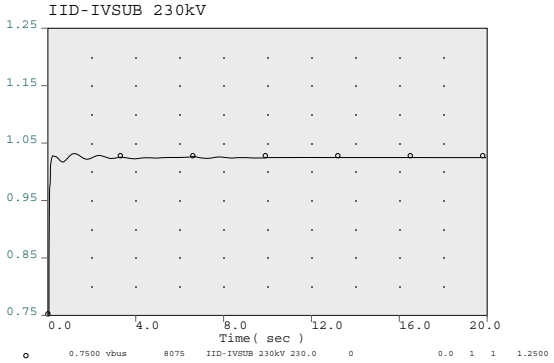
ROA-230kV



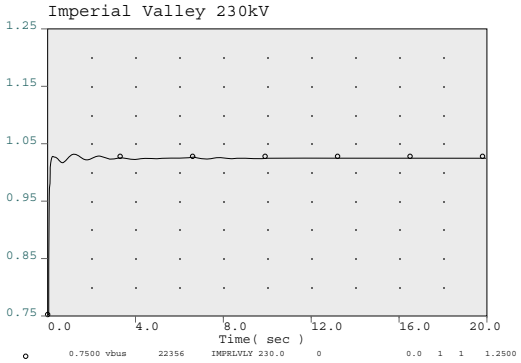
TJ1-230kV



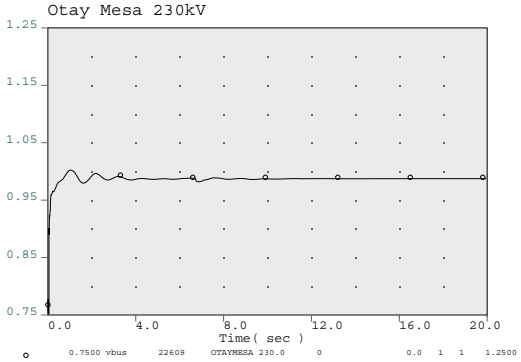
IID-IVSUB 230kV



Imperial Valley 230kV



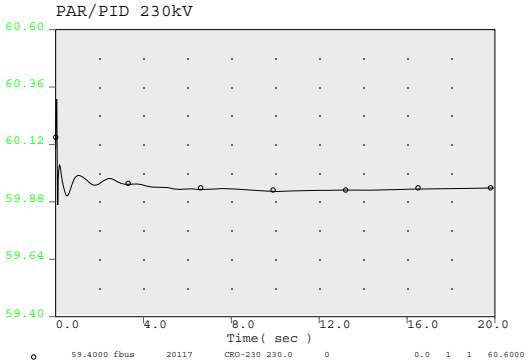
Otay Mesa 230kV



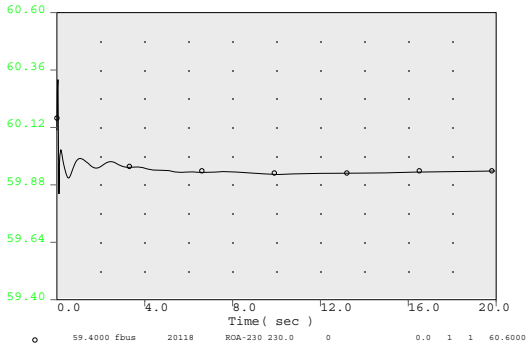
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

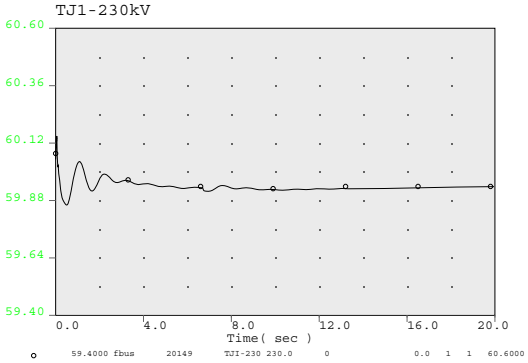
PAR/PID 230kV



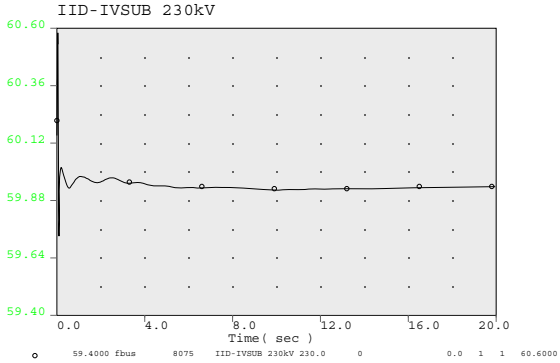
ROA-230kV



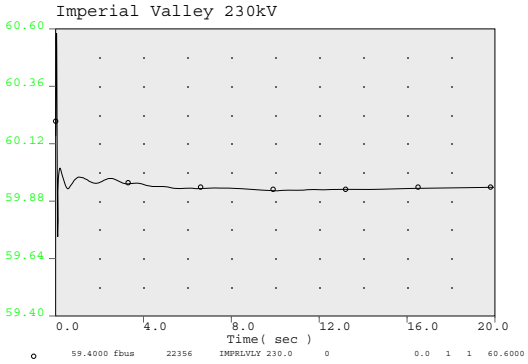
TJ1-230kV



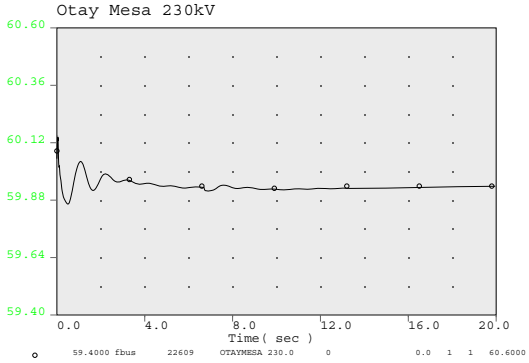
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



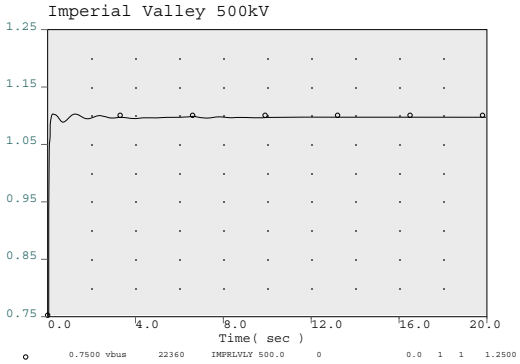
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

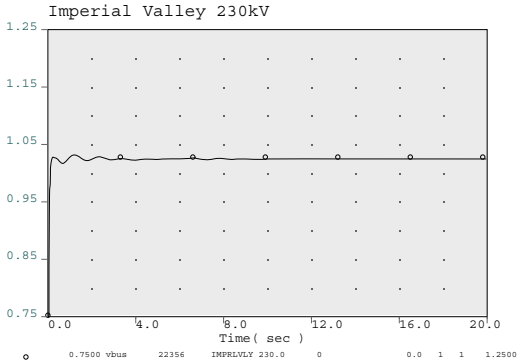
SDGE	tran-c1c2-hs-pre-r12_IV-RAS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 14:58:14 2011

VOLTAGE

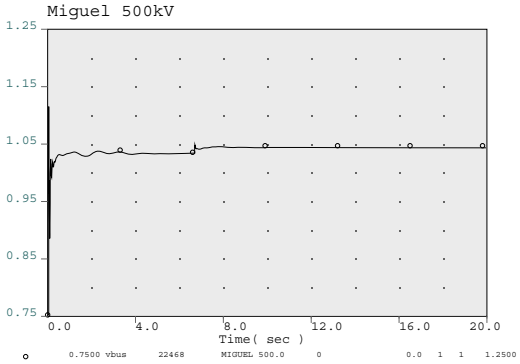
Imperial Valley 500kV



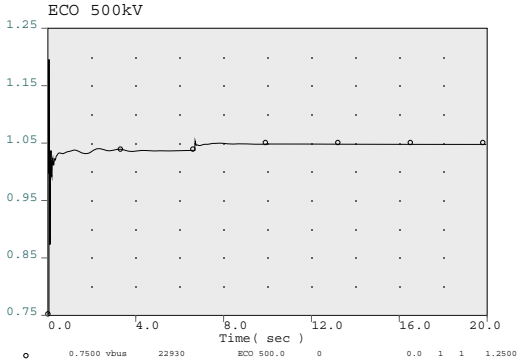
Imperial Valley 230kV



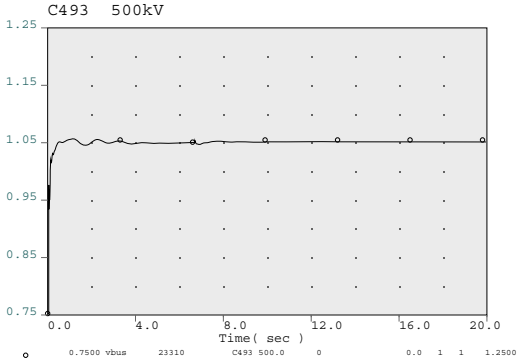
Miguel 500kV



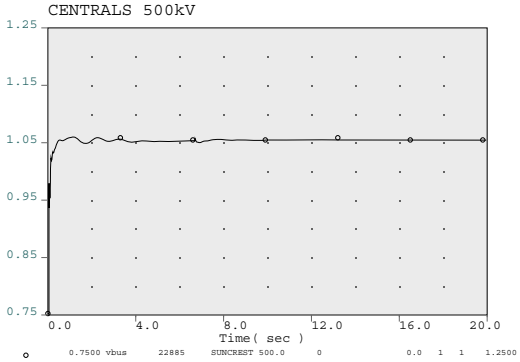
ECO 500kV



C493 500kV



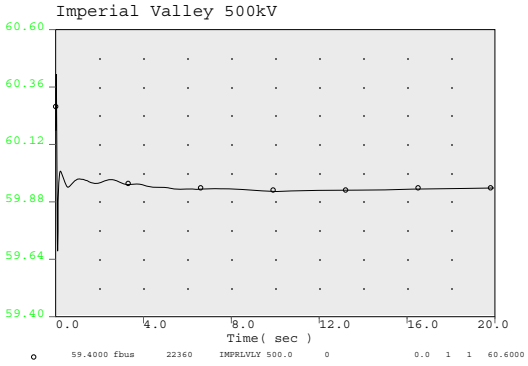
CENTRALS 500kV



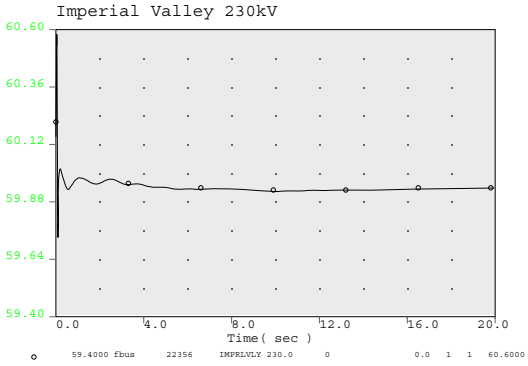
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

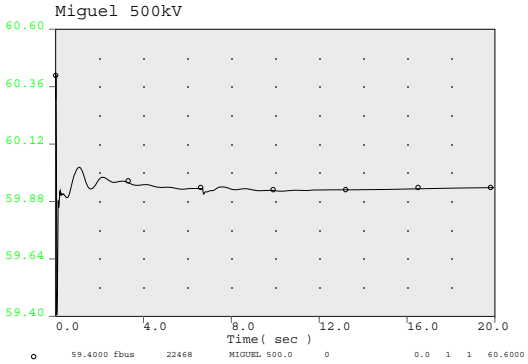
Imperial Valley 500kV



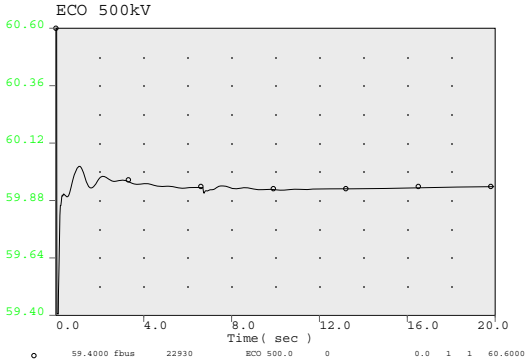
Imperial Valley 230kV



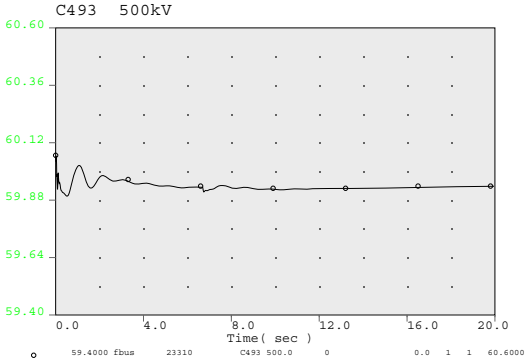
Miguel 500kV



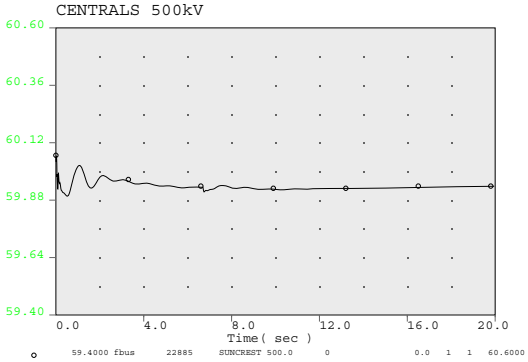
ECO 500kV



C493 500kV

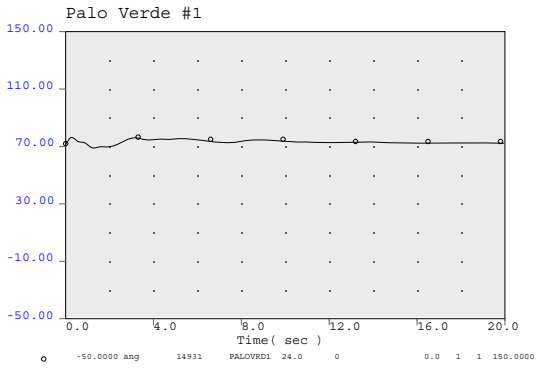


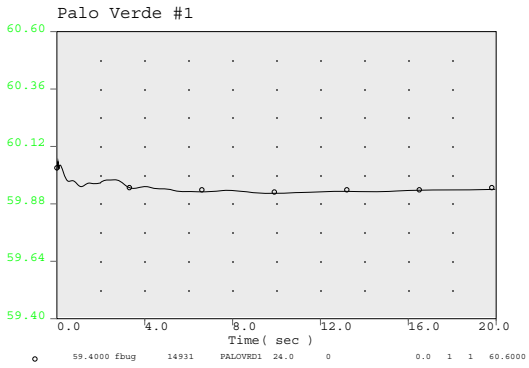
CENTRALS 500kV

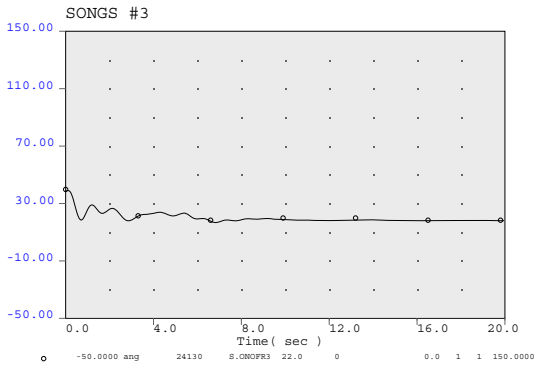


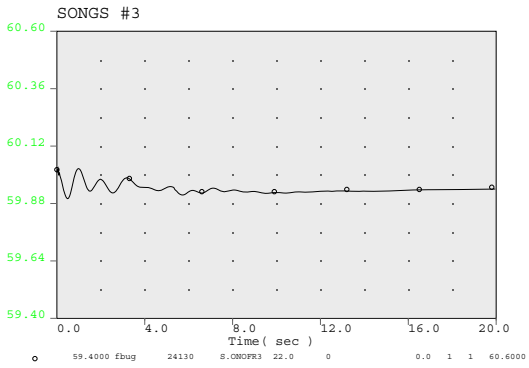
C1 C2 Heavy Summer Pre Without Upgrades

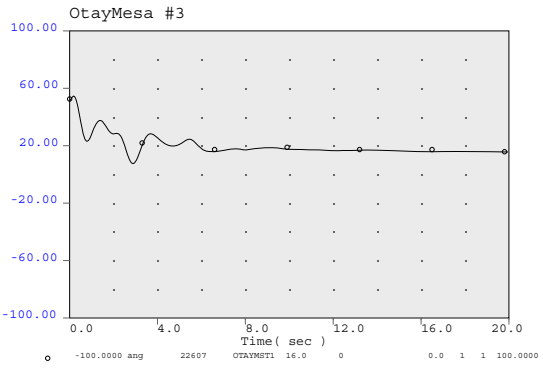
RELATIVE ROTOR ANGLE & FREQUENCY

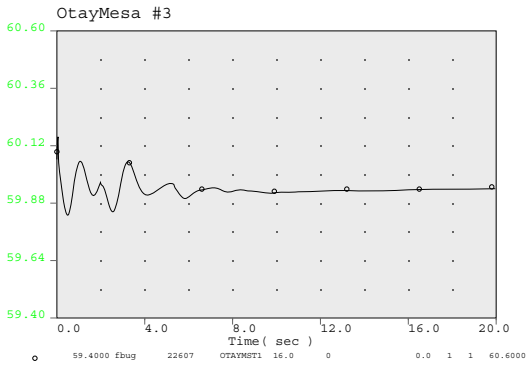












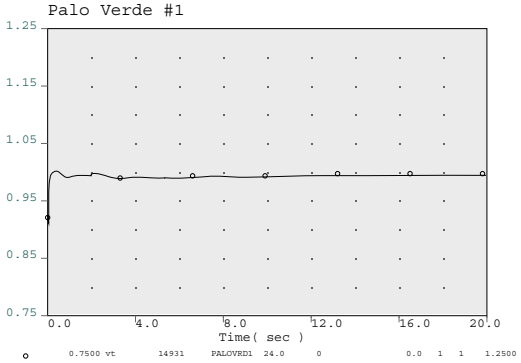
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

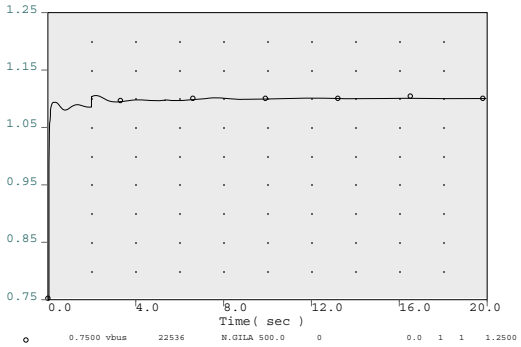
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_IV-RASX-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:00:35 2011

RELATIVE VOLTAGE

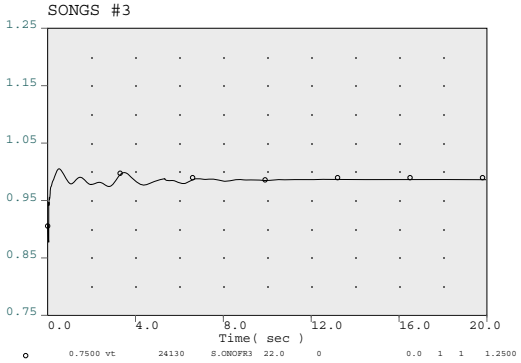
Palo Verde #1



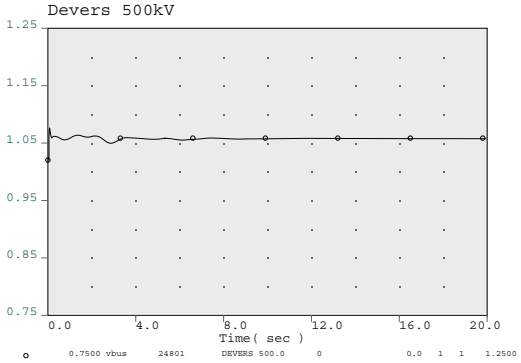
N Gila 500kV



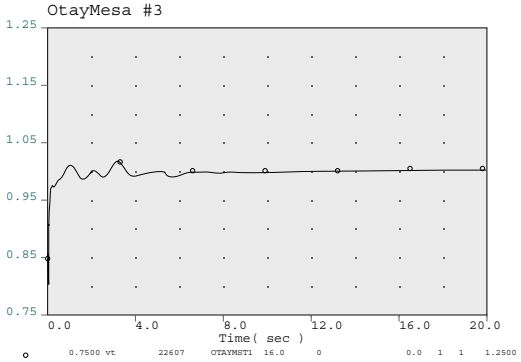
SONGS #3



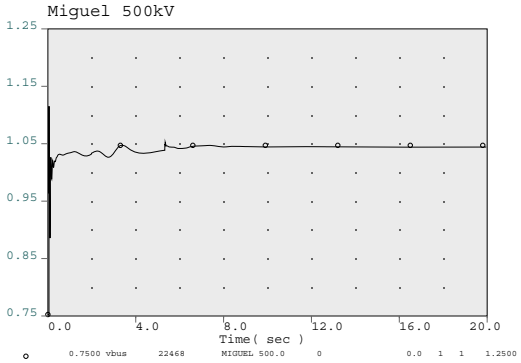
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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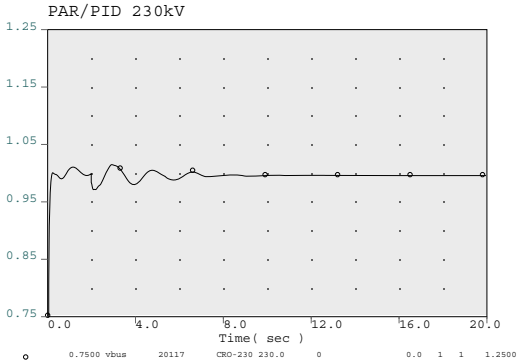
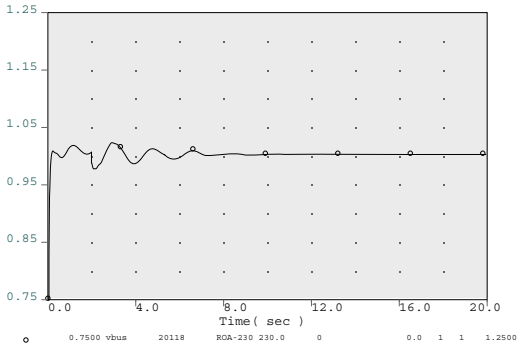
SDGE	tran-c1c2-hs-pre-r12_IV-RASX-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:00:35 2011

Affected System Voltage Check and Comparison

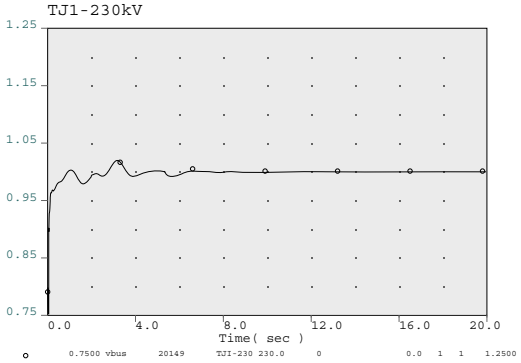
PAR/PID 230kV



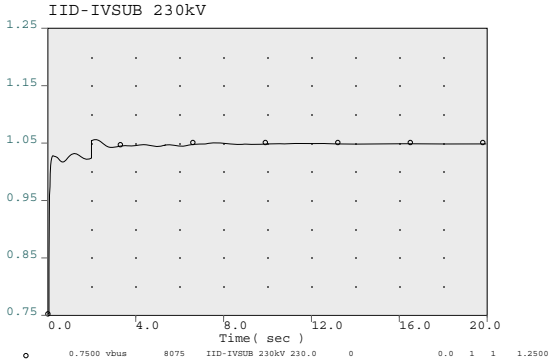
ROA-230kV



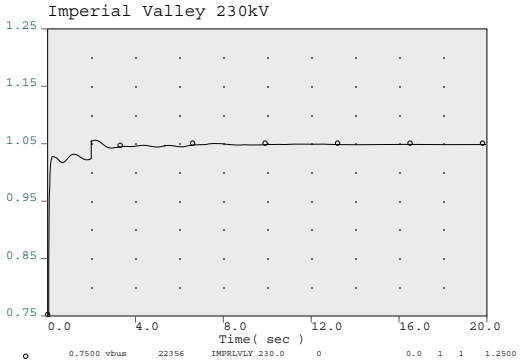
TJ1-230kV



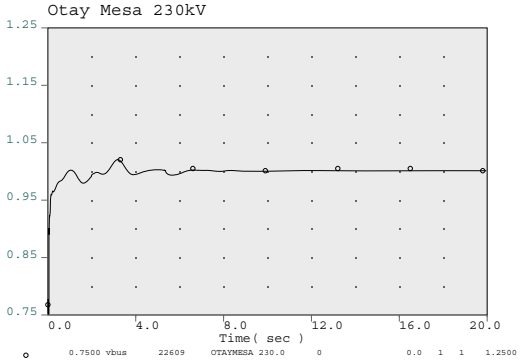
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



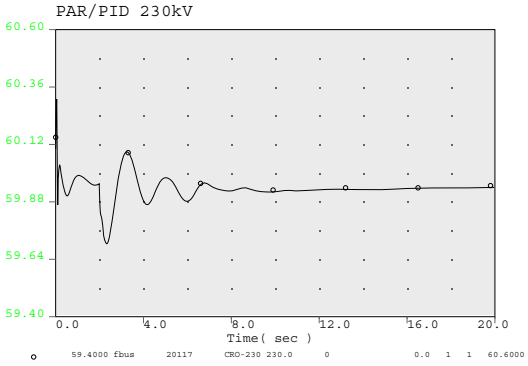
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

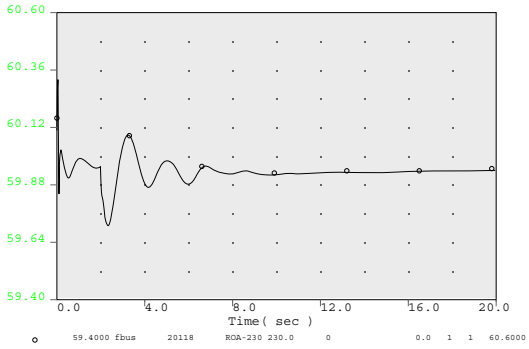
SDGE	tran-c1c2-hs-pre-r12_IV-RASX-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:00:36 2011

Affected System Frequency Check and Comparison

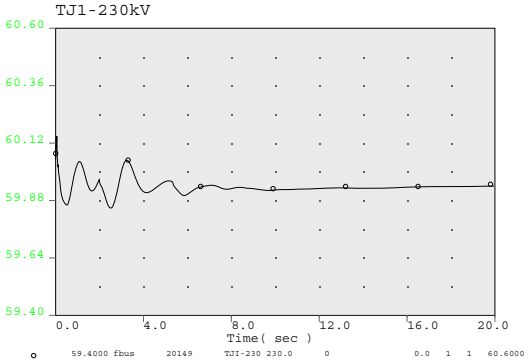
PAR/PID 230kV



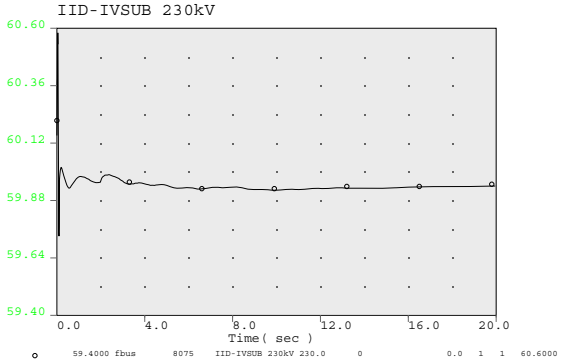
ROA-230kV



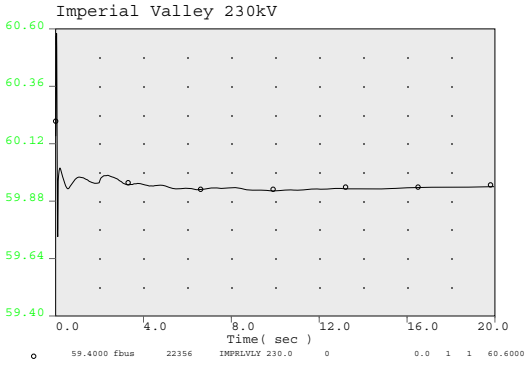
TJ1-230kV



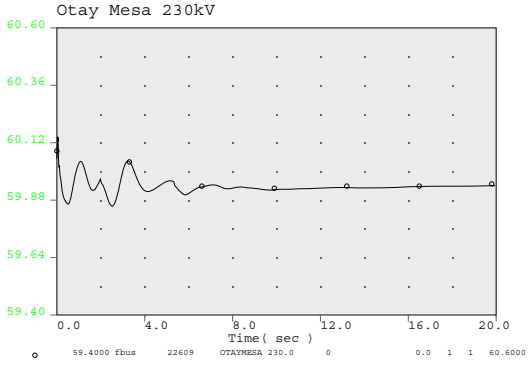
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



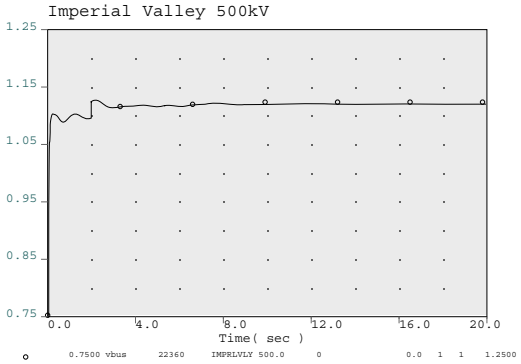
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

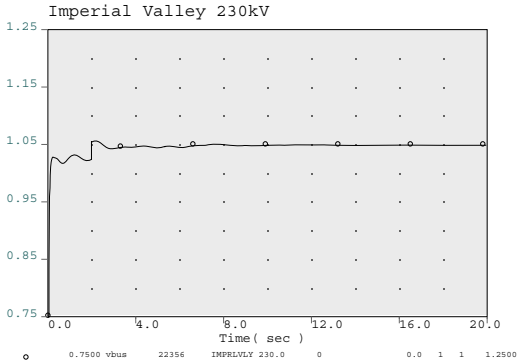
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_IV-RASX-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:00:37 2011

VOLTAGE

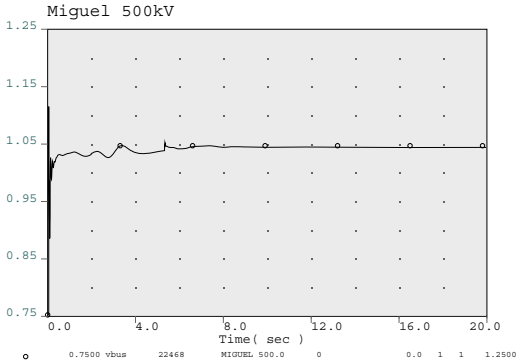
Imperial Valley 500kV



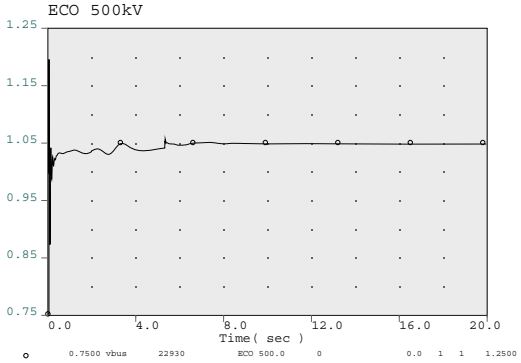
Imperial Valley 230kV



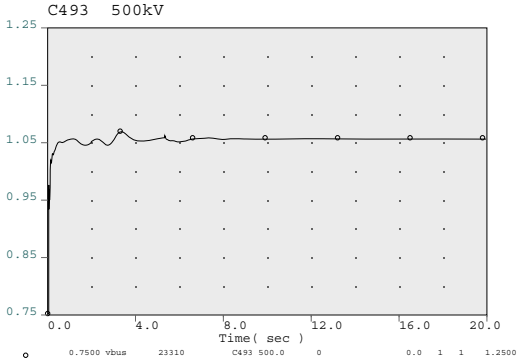
Miguel 500kV



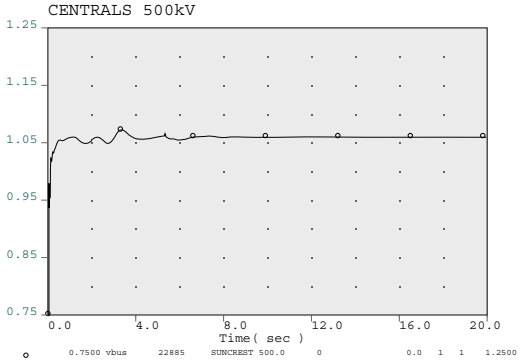
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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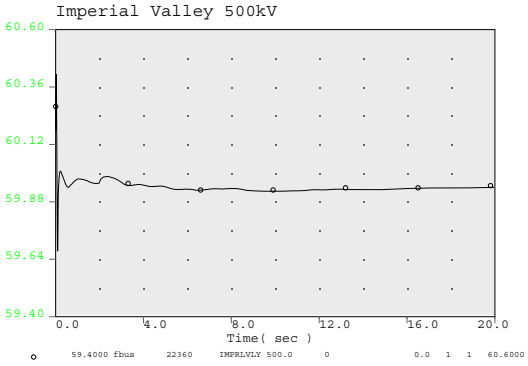
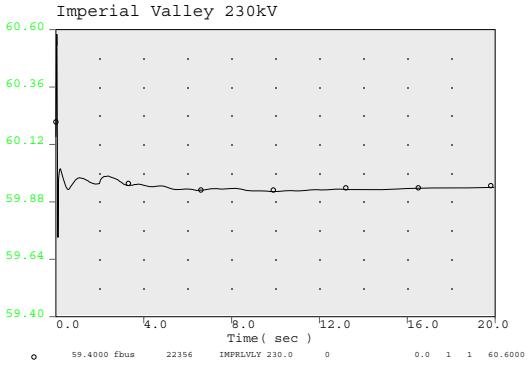
SDGE	tran-c1c2-hs-pre-r12_IV-RASX-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:00:37 2011

FREQUENCY

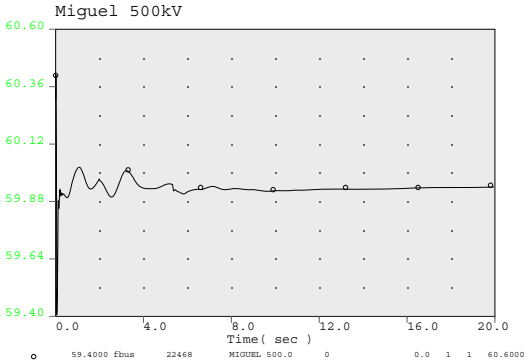
Imperial Valley 500kV



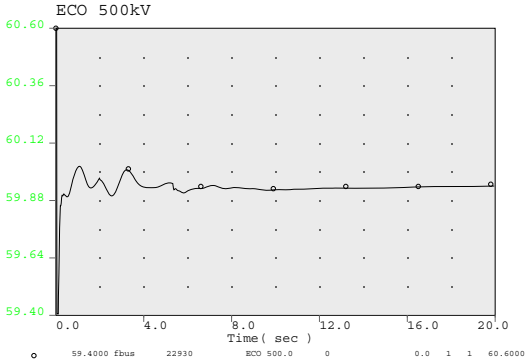
Imperial Valley 230kV



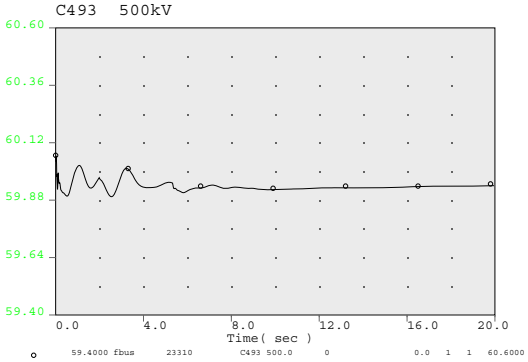
Miguel 500kV



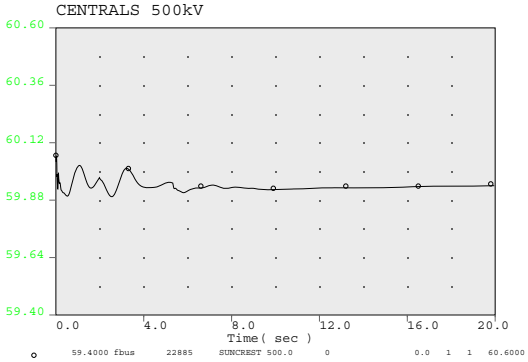
ECO 500kV



C493 500kV

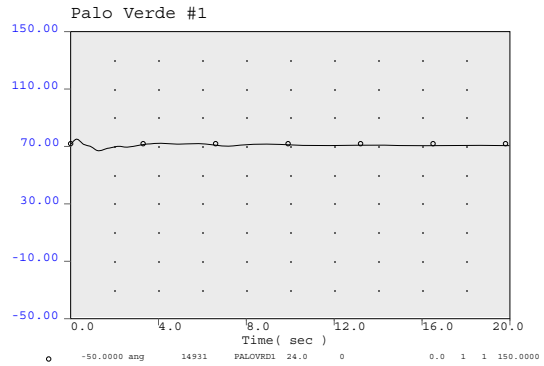


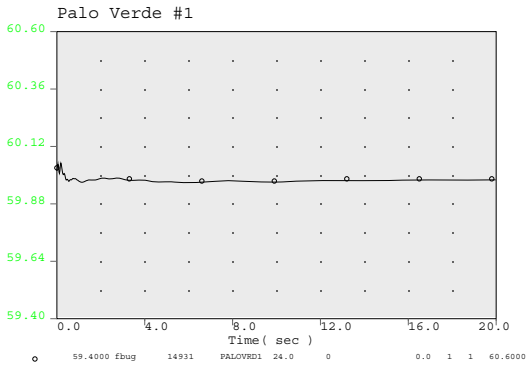
CENTRALS 500kV

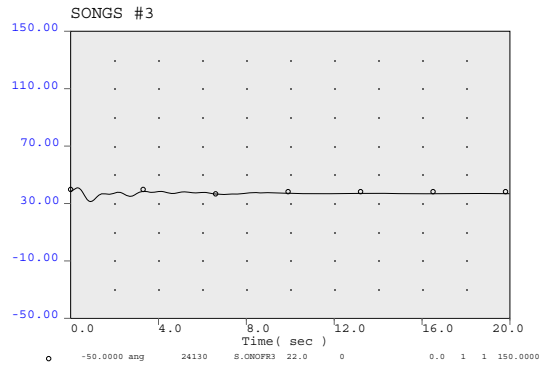


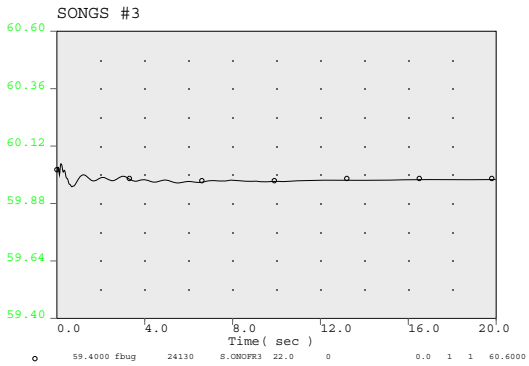
C1 C2 Heavy Summer Pre Without Upgrades

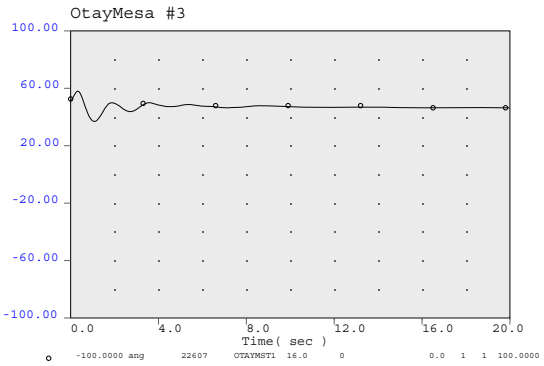
RELATIVE ROTOR ANGLE & FREQUENCY

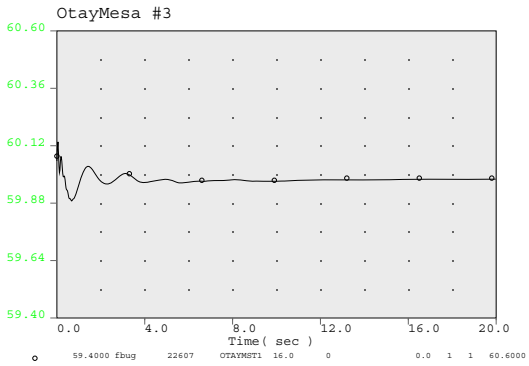












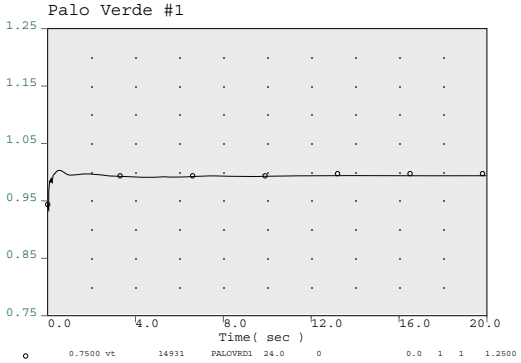
WESTERN ELECTRICITY COORDINATING COUNCIL

Page 1

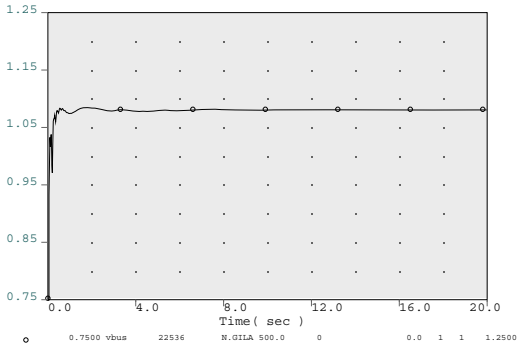
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_IVROA(IV)-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:07:04 2011

RELATIVE VOLTAGE

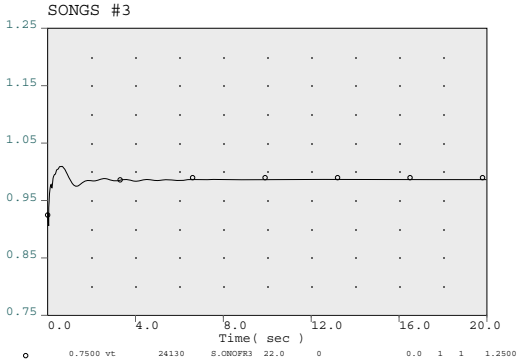
Palo Verde #1



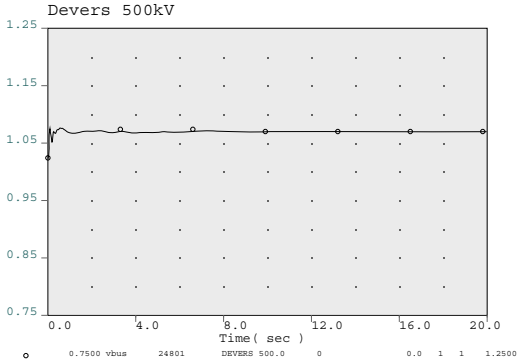
N Gila 500kV



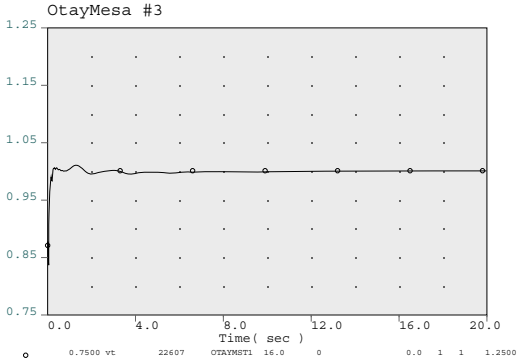
SONGS #3



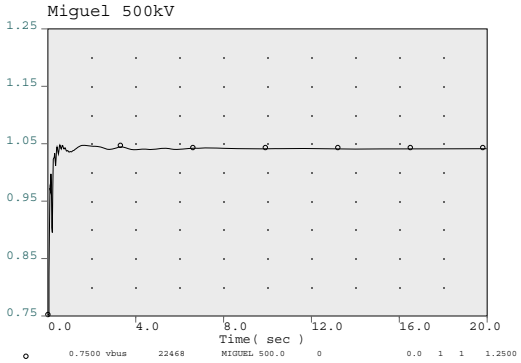
Devers 500kV



OtayMesa #3



Miguel 500kV



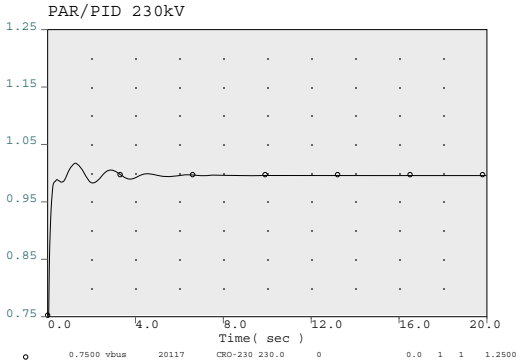
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

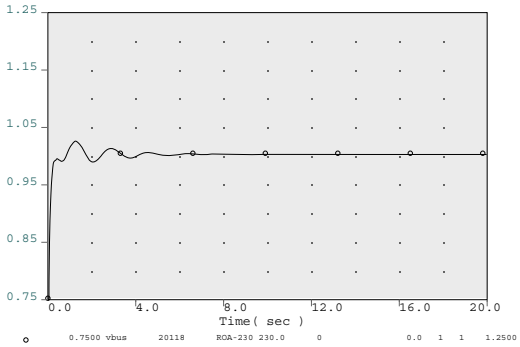
SDGE	tran-c1c2-hs-pre-r12_IVROA(IV)-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:07:04 2011

Affected System Voltage Check and Comparison

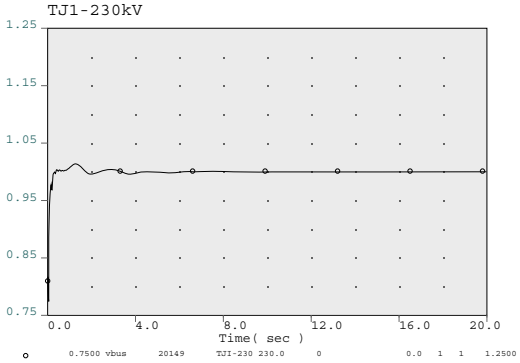
PAR/PID 230kV



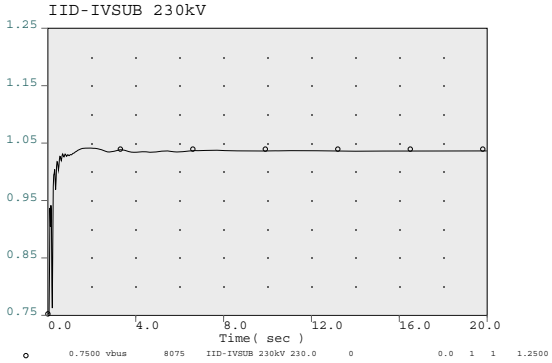
ROA-230kV



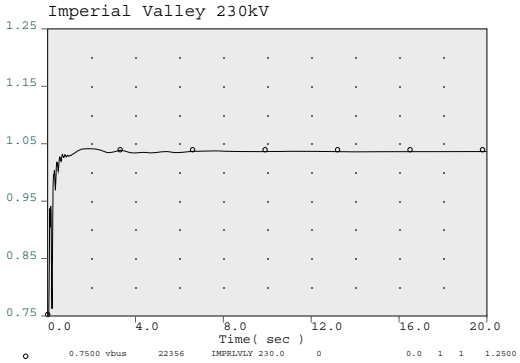
TJ1-230kV



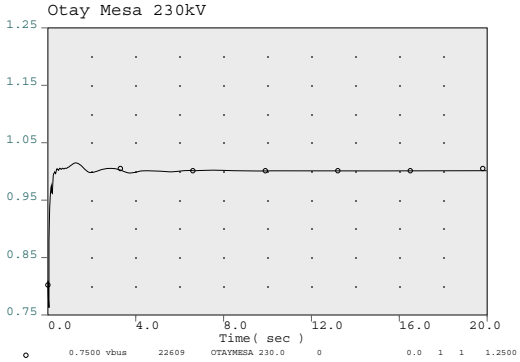
IID-IVSUB 230kV



Imperial Valley 230kV



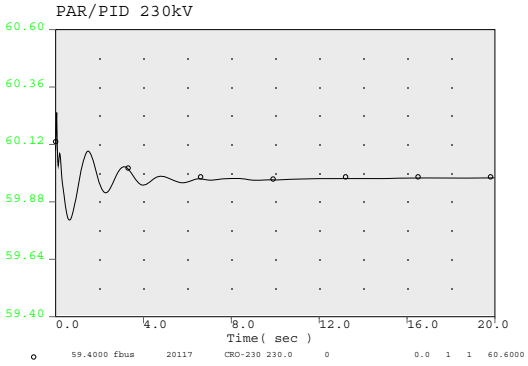
Otay Mesa 230kV



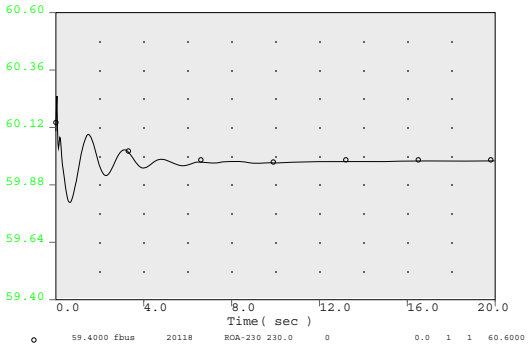
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

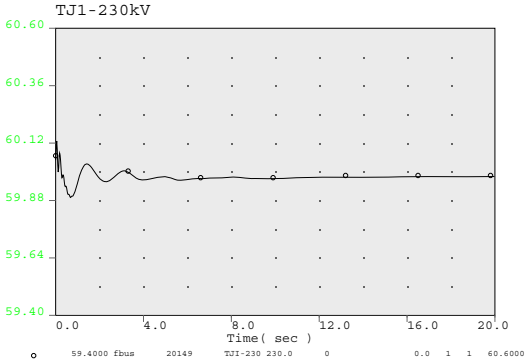
PAR/PID 230kV



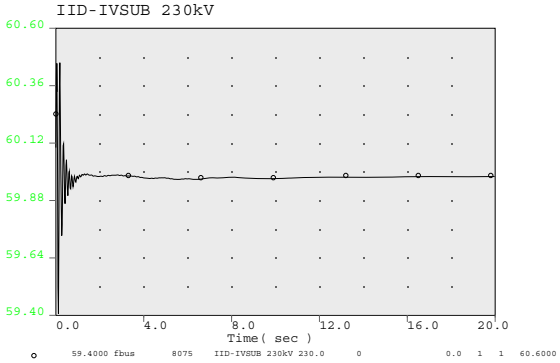
ROA-230kV



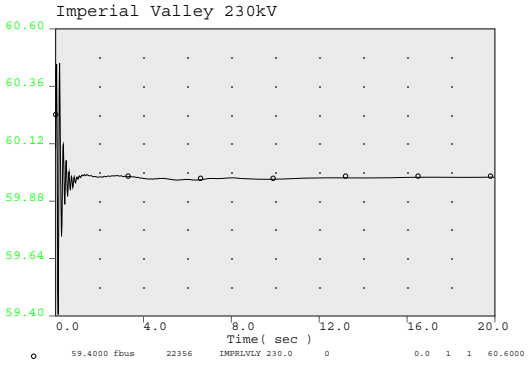
TJ1-230kV



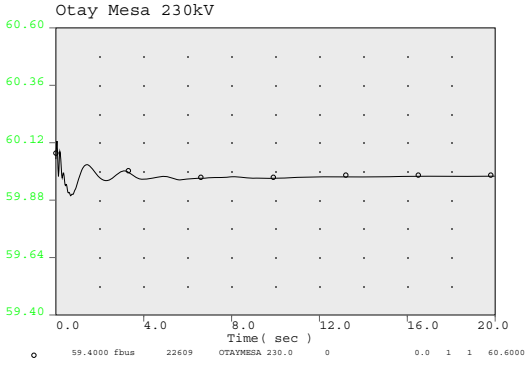
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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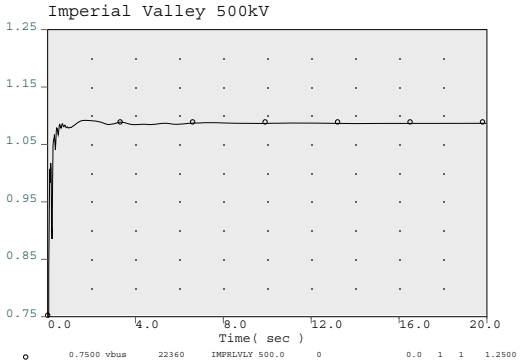
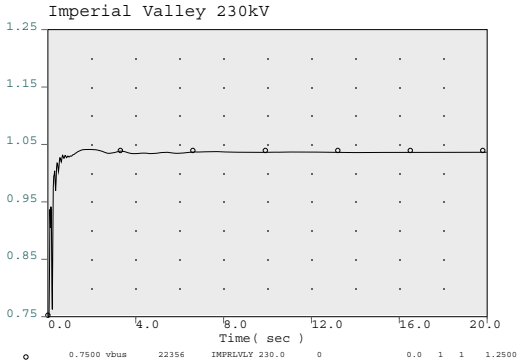
SDGE	tran-c1c2-hs-pre-r12_IVROA(IV)-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:07:06 2011

VOLTAGE

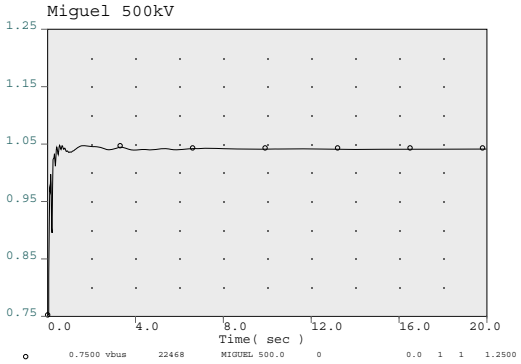
Imperial Valley 500kV



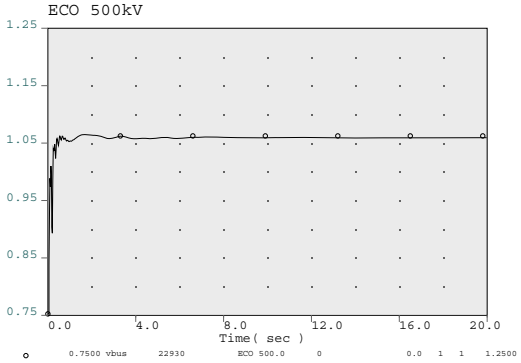
Imperial Valley 230kV



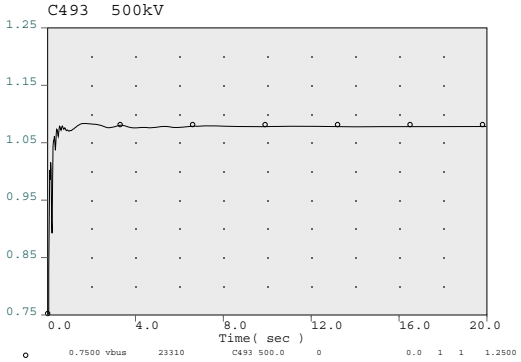
Miguel 500kV



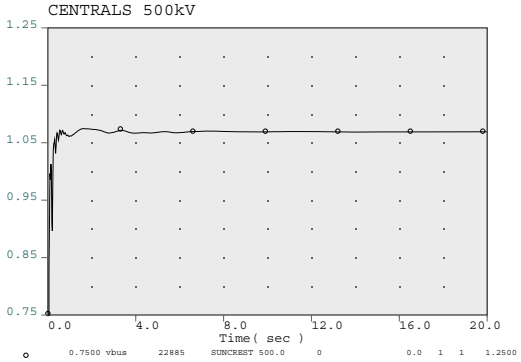
ECO 500kV



C493 500kV



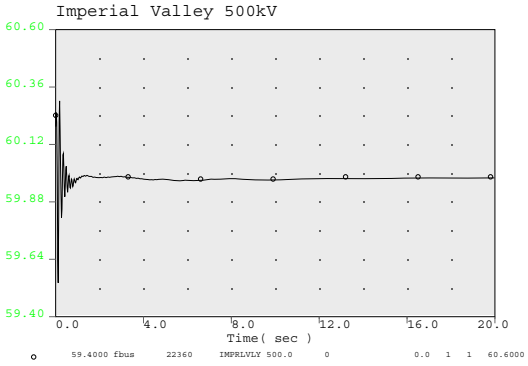
CENTRALS 500kV



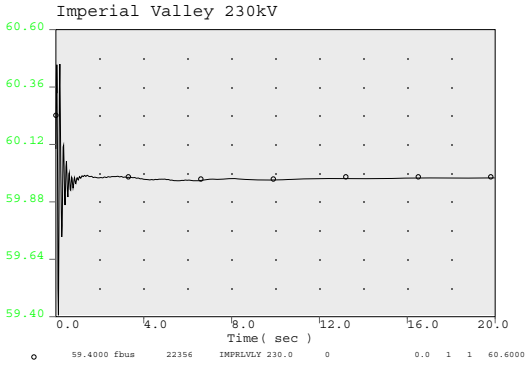
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

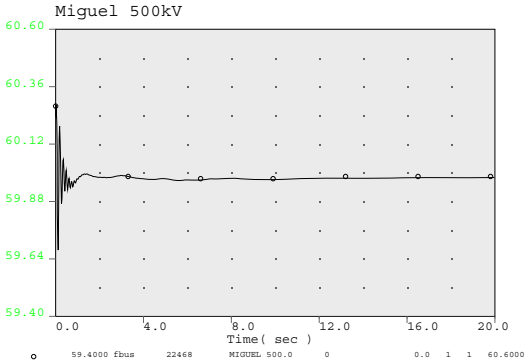
Imperial Valley 500kV



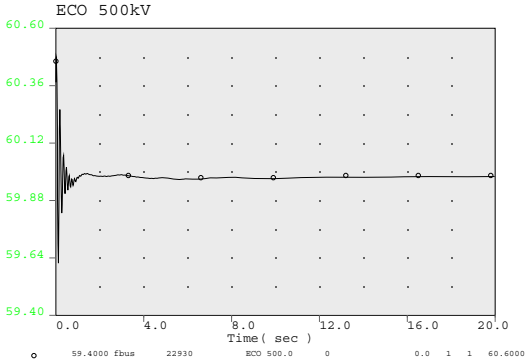
Imperial Valley 230kV



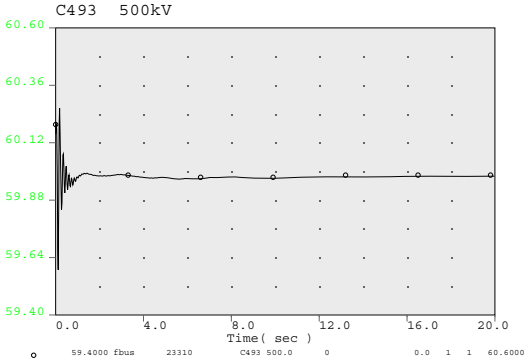
Miguel 500kV



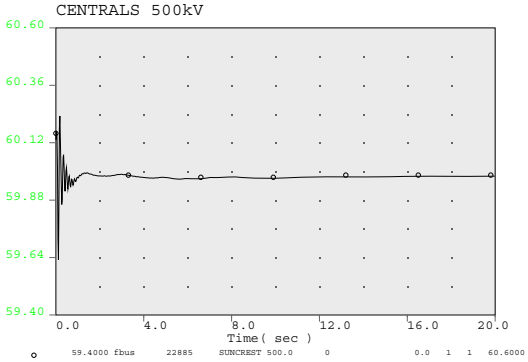
ECO 500kV



C493 500kV

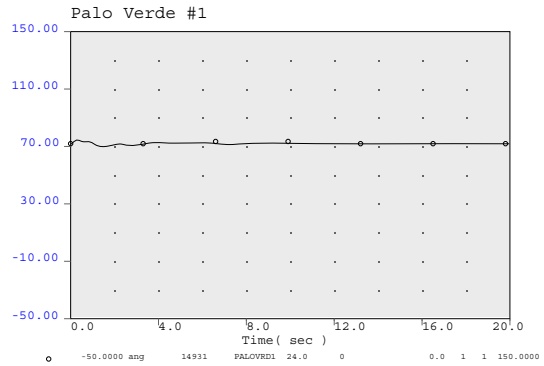


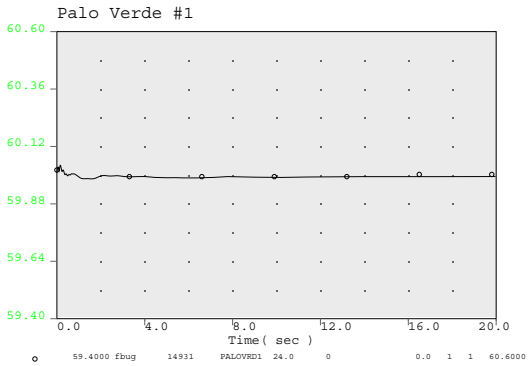
CENTRALS 500kV

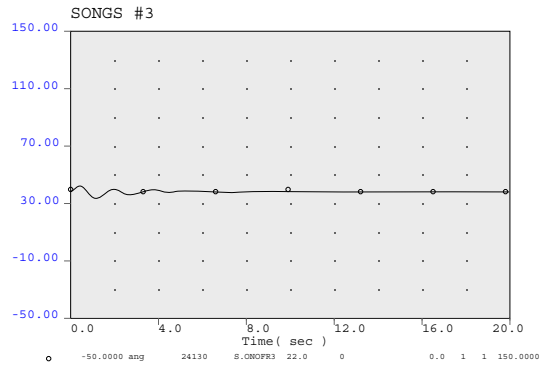


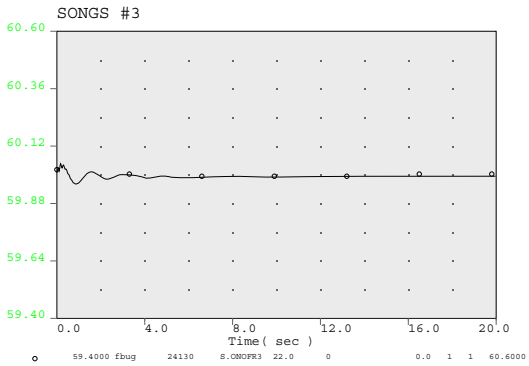
C1 C2 Heavy Summer Pre Without Upgrades

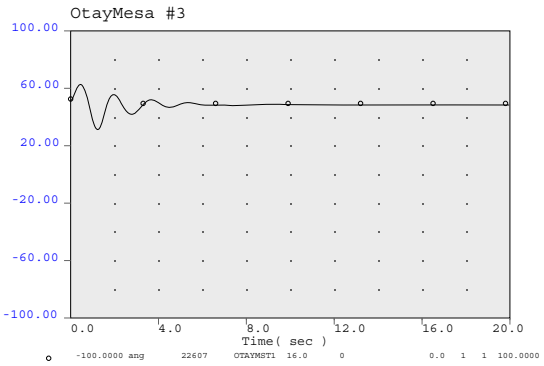
RELATIVE ROTOR ANGLE & FREQUENCY

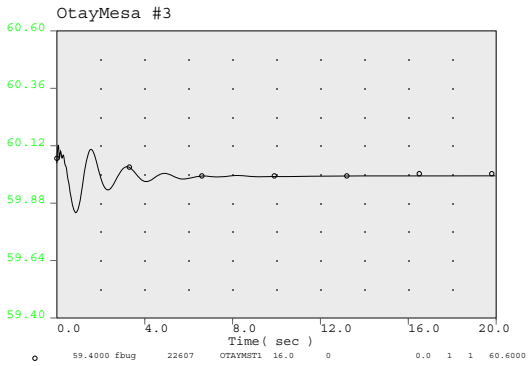












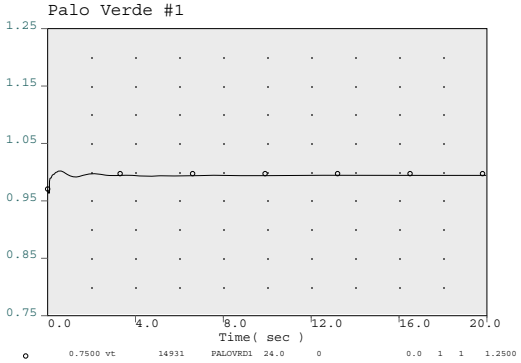
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

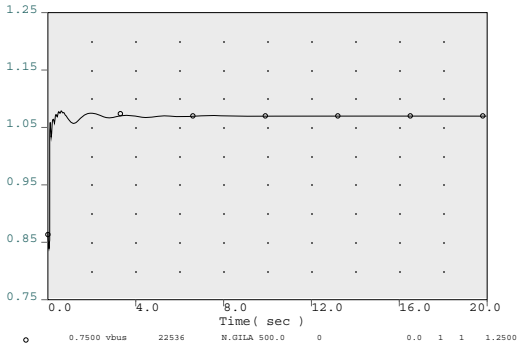
SDGE	tran-c1c2-hs-pre-r12_IVROA(ROA)-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:09:11 2011

RELATIVE VOLTAGE

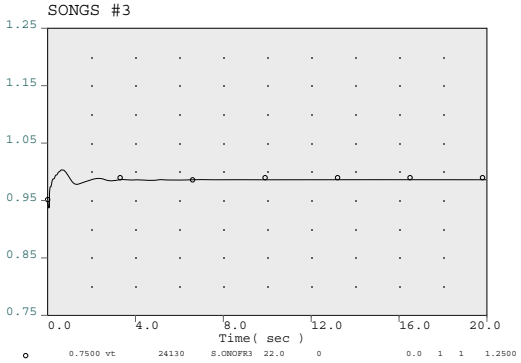
Palo Verde #1



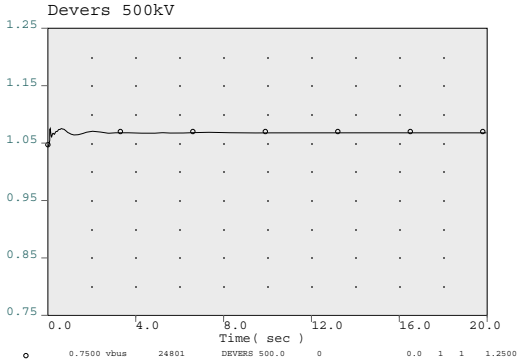
N Gila 500kV



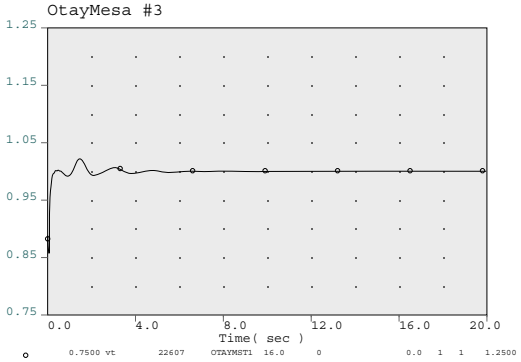
SONGS #3



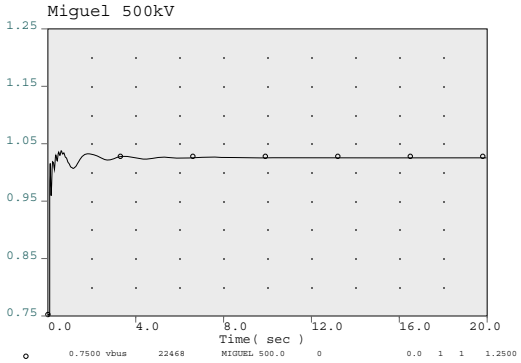
Devers 500kV



OtayMesa #3



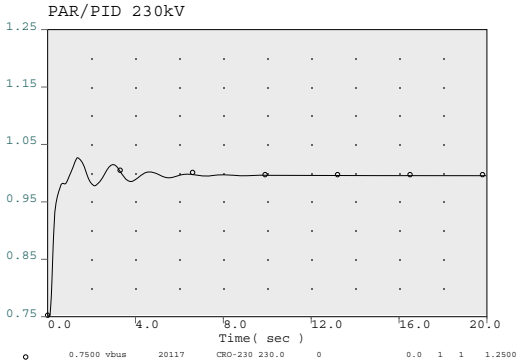
Miguel 500kV



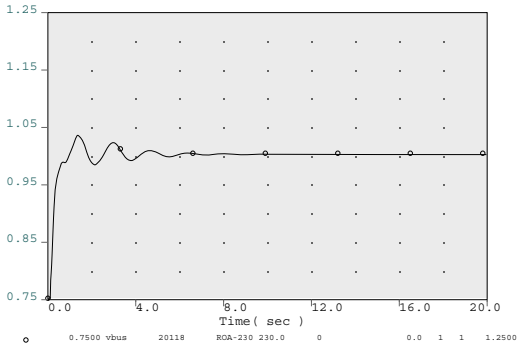
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Voltage Check and Comparison

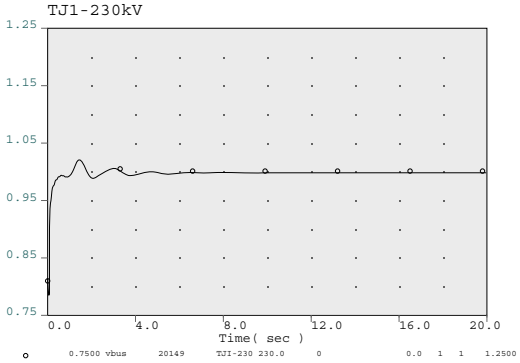
PAR/PID 230kV



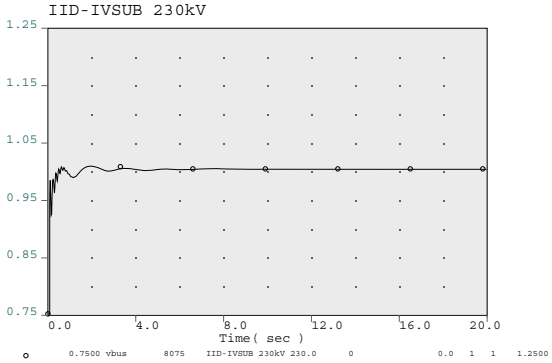
ROA-230kV



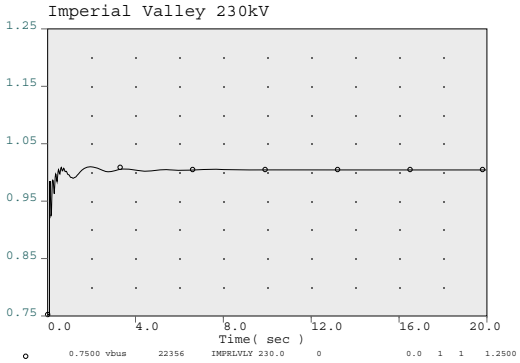
TJ1-230kV



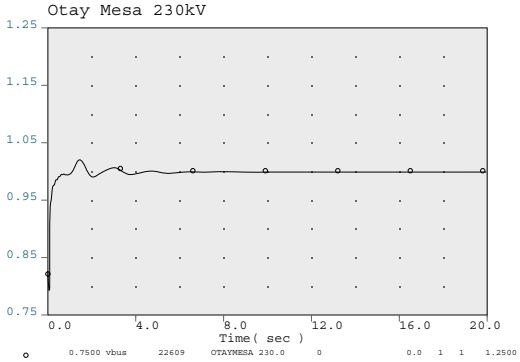
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



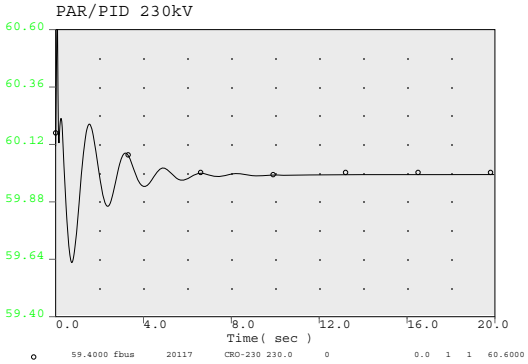
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

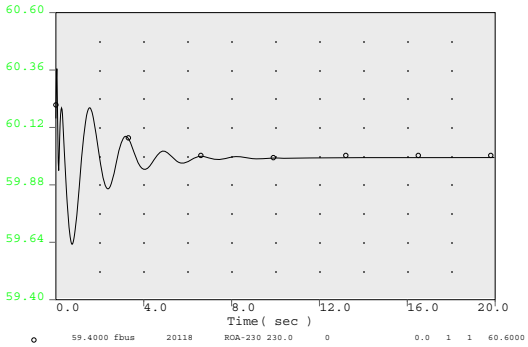
SDGE	tran-c1c2-hs-pre-r12_IVROA(ROA)-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:09:12 2011

Affected System Frequency Check and Comparison

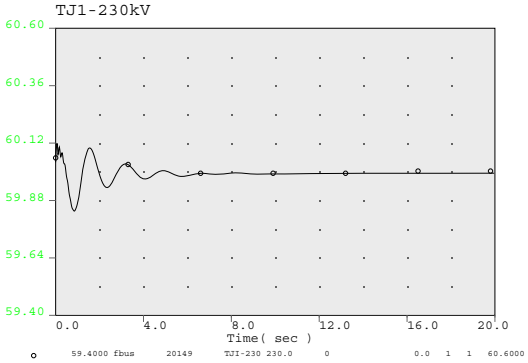
PAR/PID 230kV



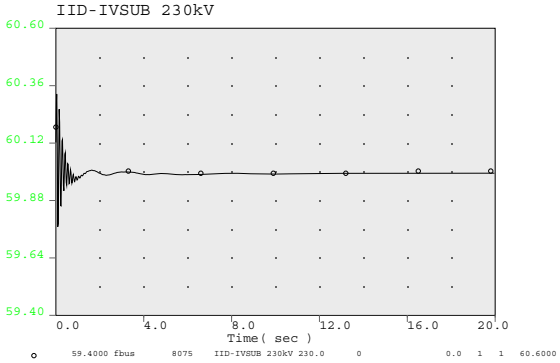
ROA-230kV



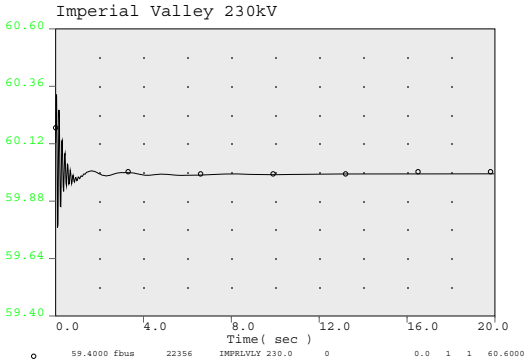
TJ1-230kV



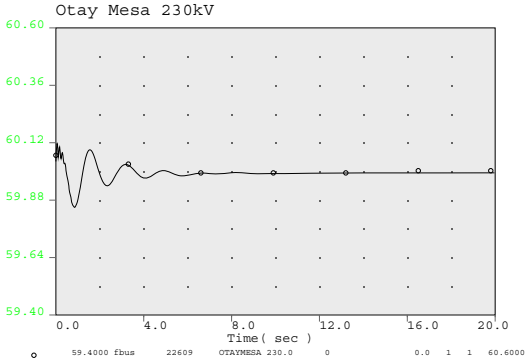
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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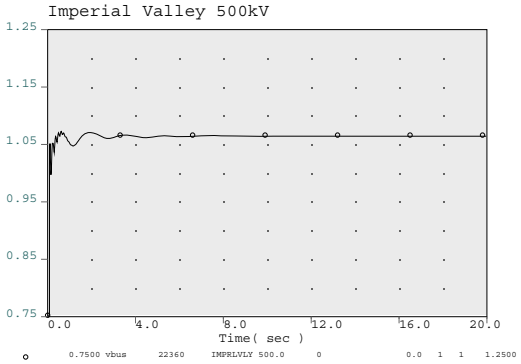
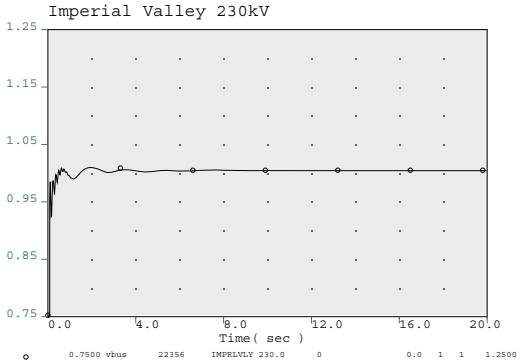
SDGE	tran-c1c2-hs-pre-r12_IVROA(ROA)-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:09:13 2011

VOLTAGE

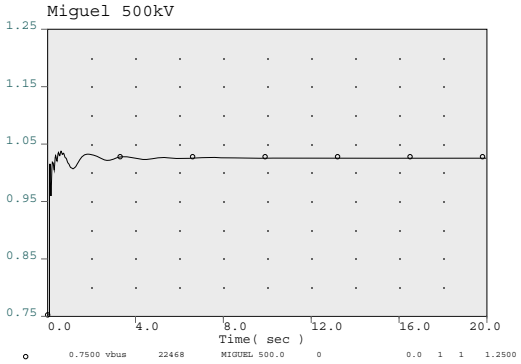
Imperial Valley 500kV



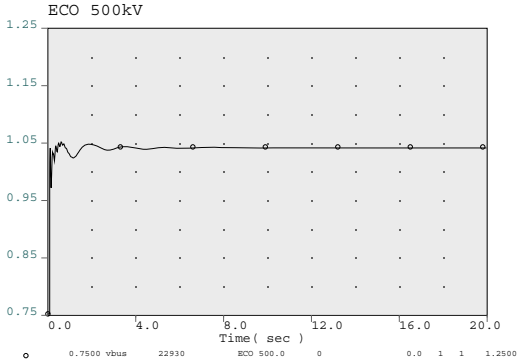
Imperial Valley 230kV



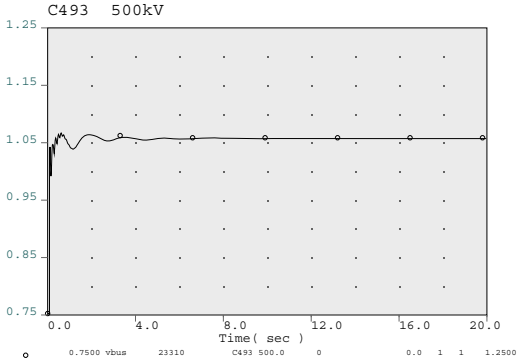
Miguel 500kV



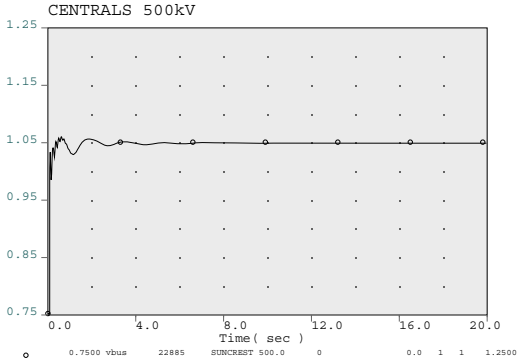
ECO 500kV



C493 500kV



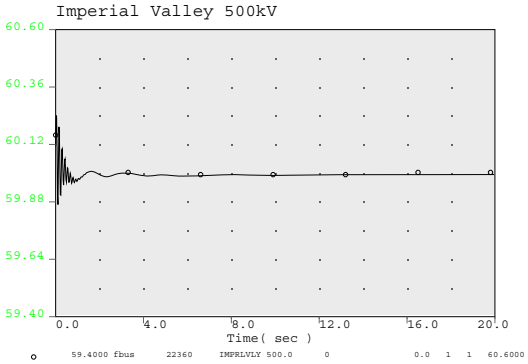
CENTRALS 500kV



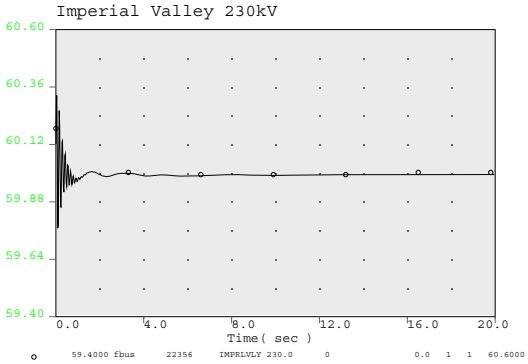
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

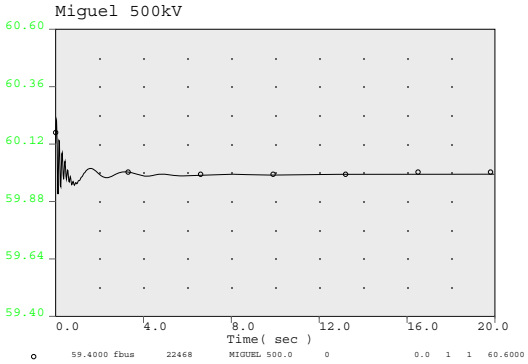
Imperial Valley 500kV



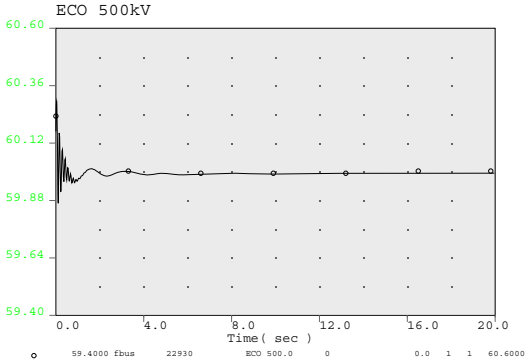
Imperial Valley 230kV



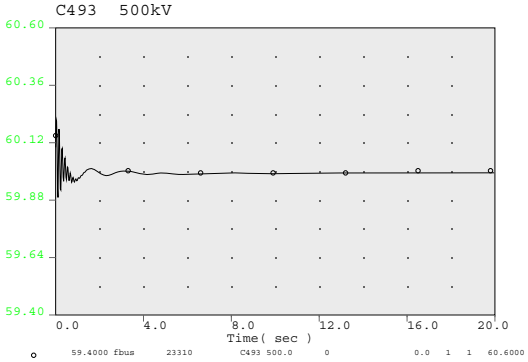
Miguel 500kV



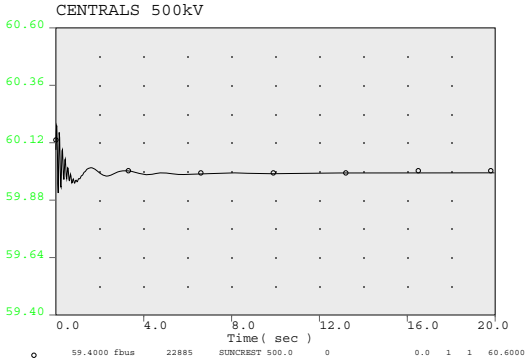
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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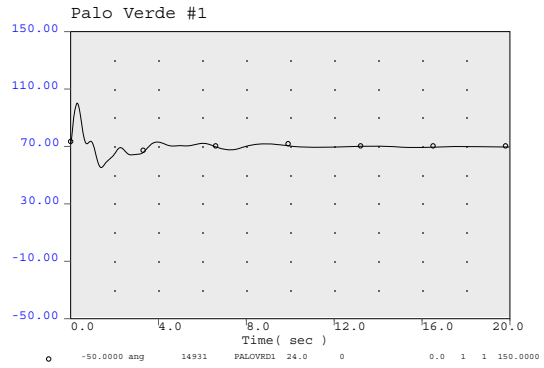
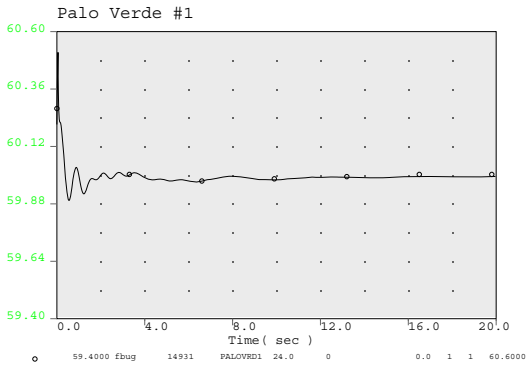
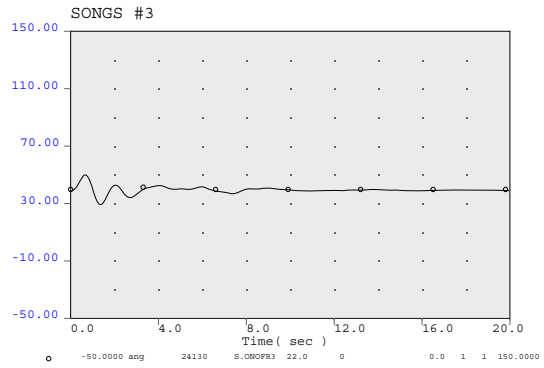
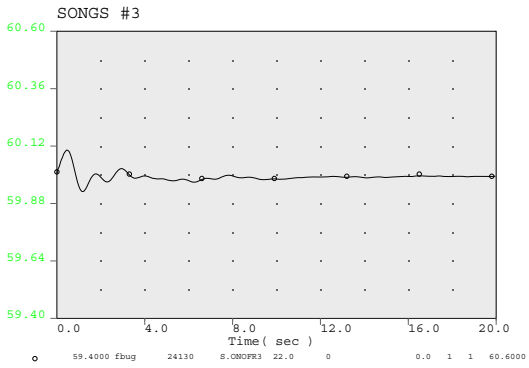
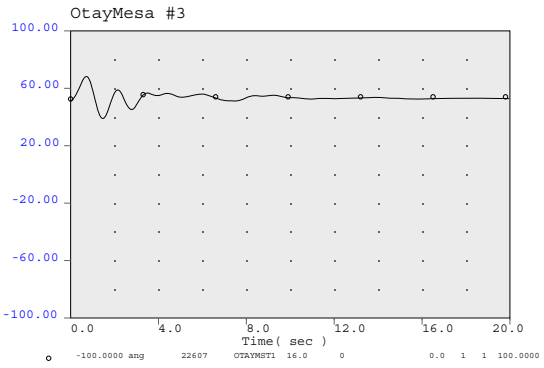
RELATIVE ROTOR ANGLE & FREQUENCY

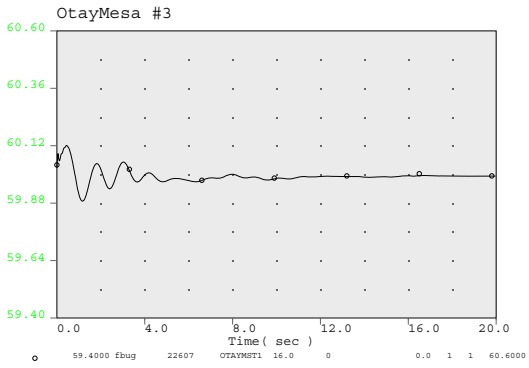












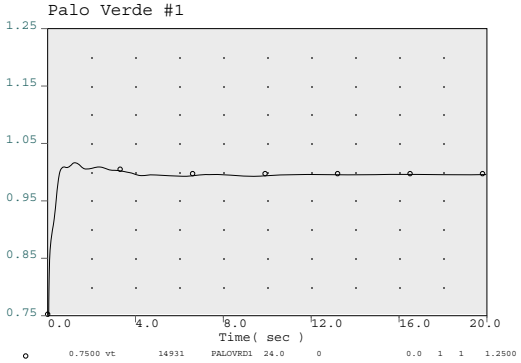
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

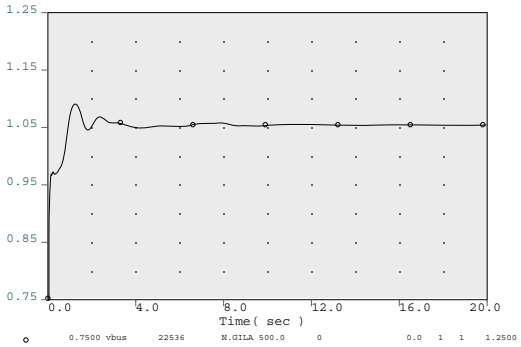
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_MES-HAA-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:11:17 2011

RELATIVE VOLTAGE

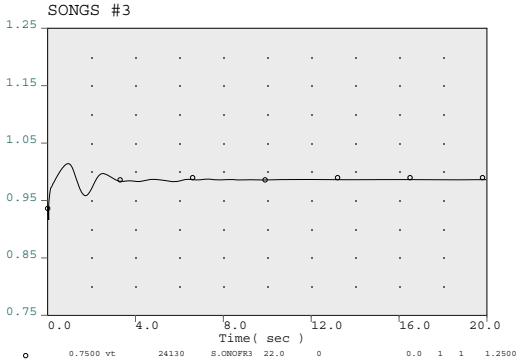
Palo Verde #1



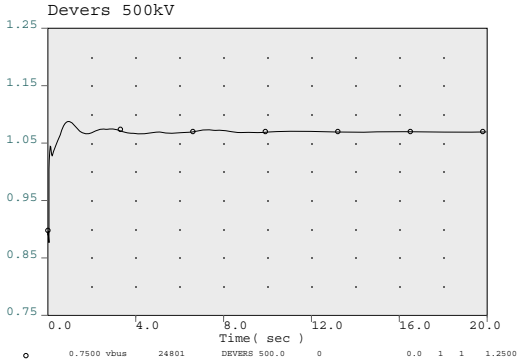
N Gila 500kV



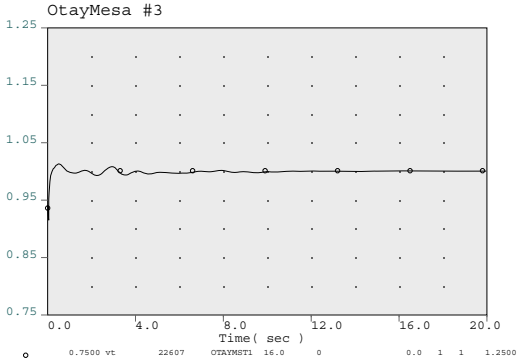
SONGS #3



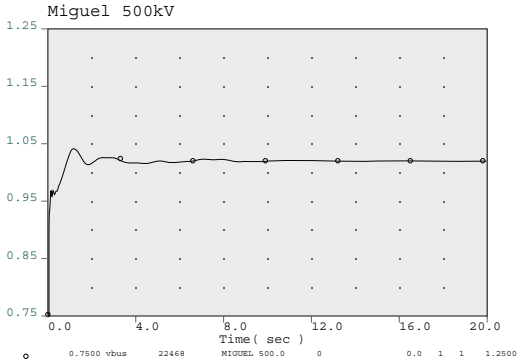
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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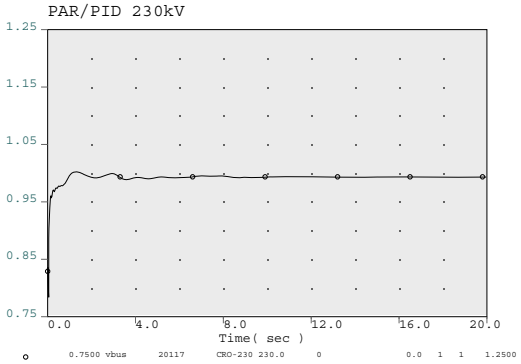
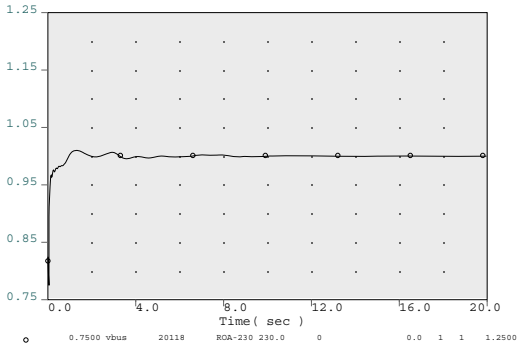
Affected System Voltage Check and Comparison

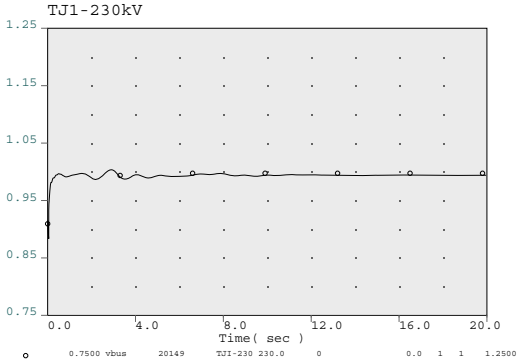
PAR/PID 230kV



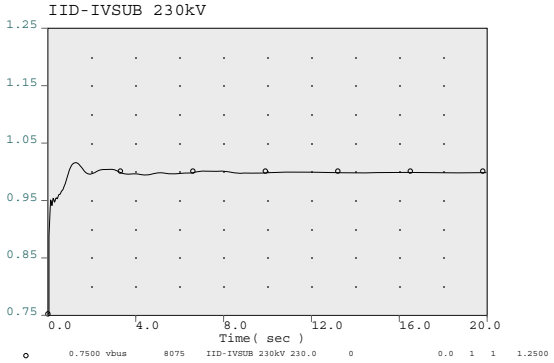
ROA-230kV



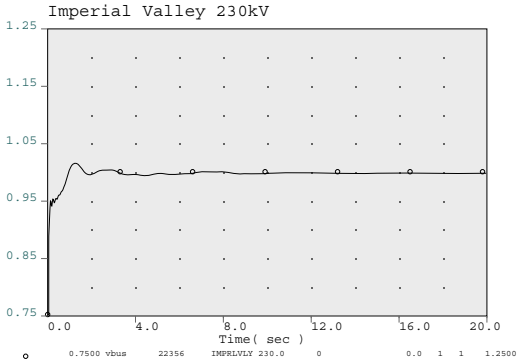
TJ1-230kV



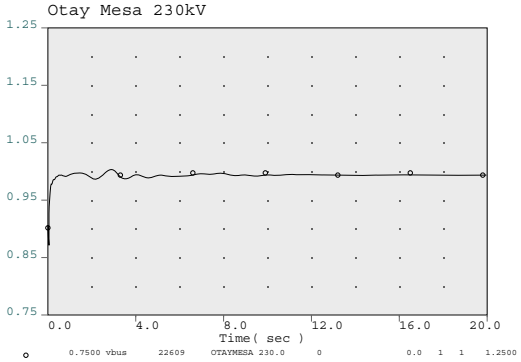
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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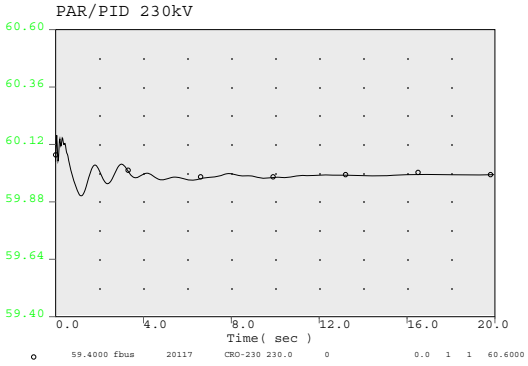
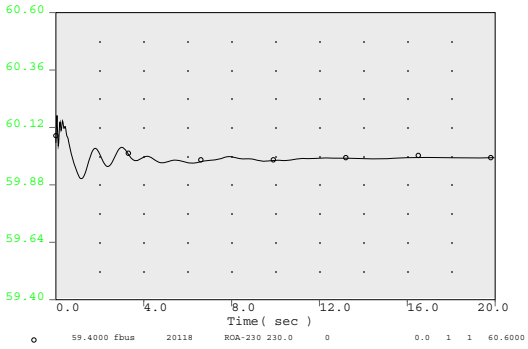
SDGE	tran-c1c2-hs-pre-r12_MES-HAA-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:11:18 2011

Affected System Frequency Check and Comparison

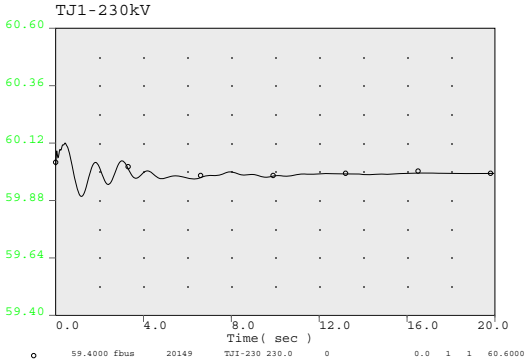
PAR/PID 230kV



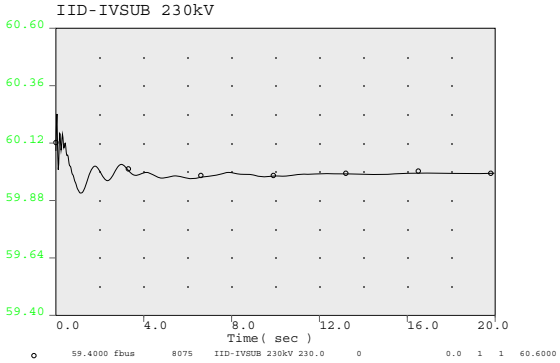
ROA-230kV



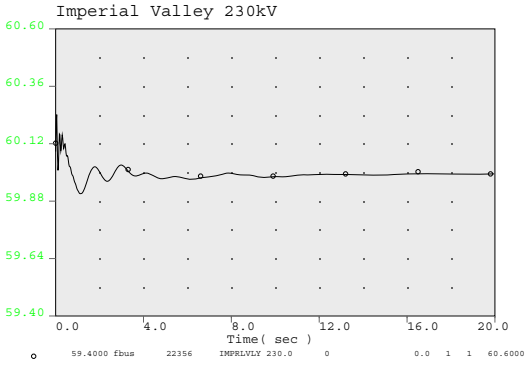
TJ1-230kV



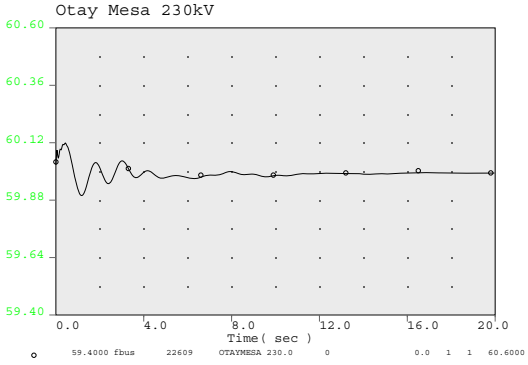
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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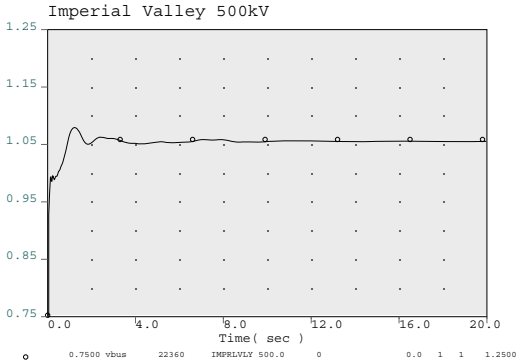
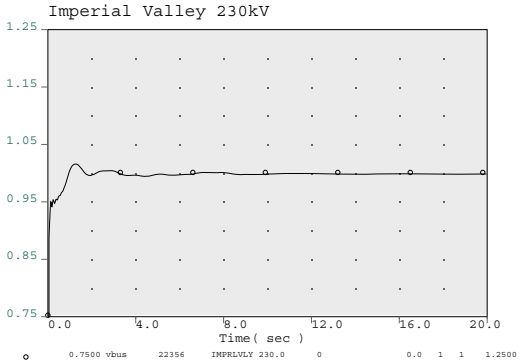
SDGE	tran-c1c2-hs-pre-r12_MES-HAA-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:11:19 2011

VOLTAGE

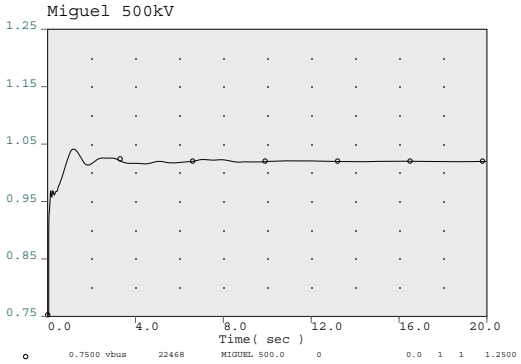
Imperial Valley 500kV



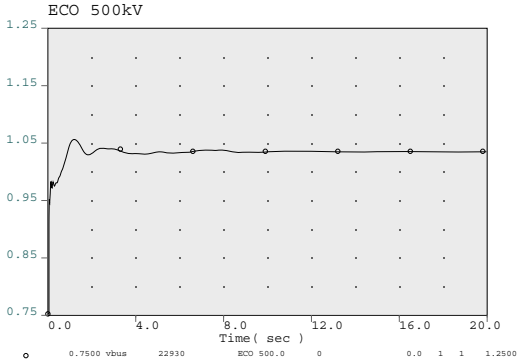
Imperial Valley 230kV



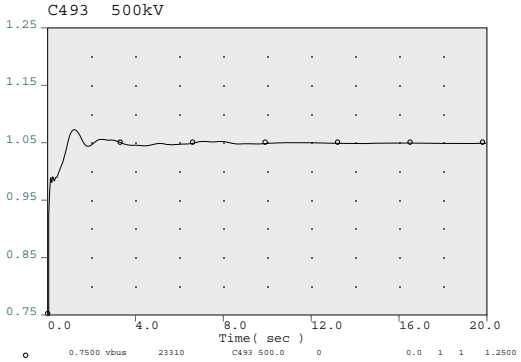
Miguel 500kV



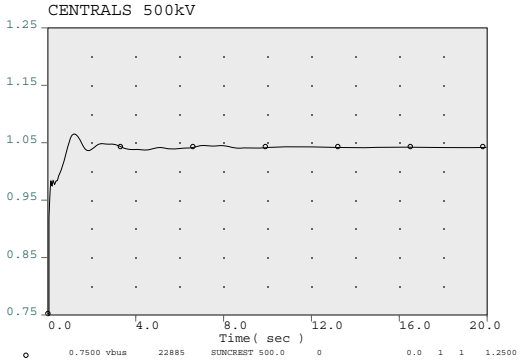
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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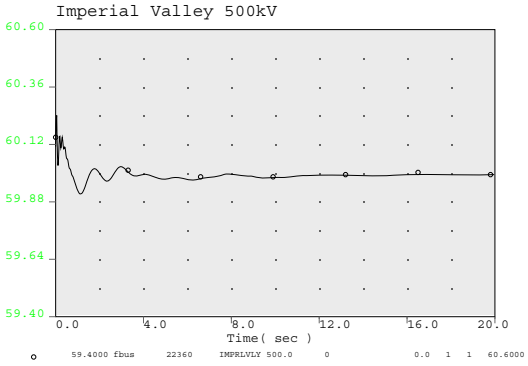
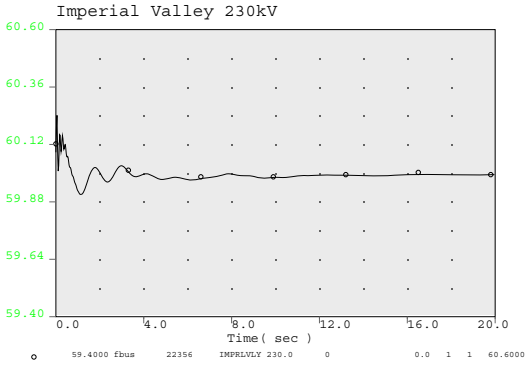
SDGE	tran-c1c2-hs-pre-r12_MES-HAA-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:11:19 2011

FREQUENCY

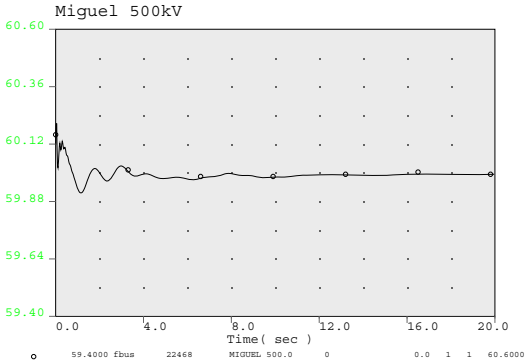
Imperial Valley 500kV



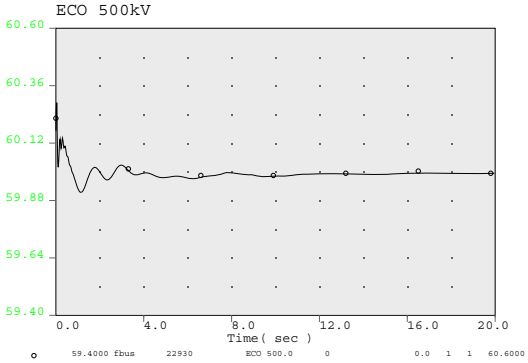
Imperial Valley 230kV



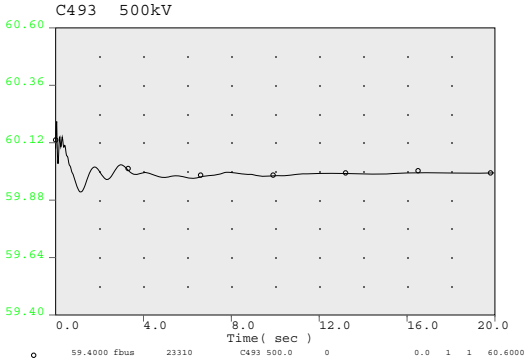
Miguel 500kV



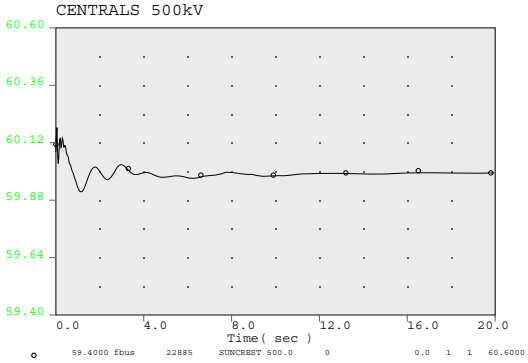
ECO 500kV



C493 500kV

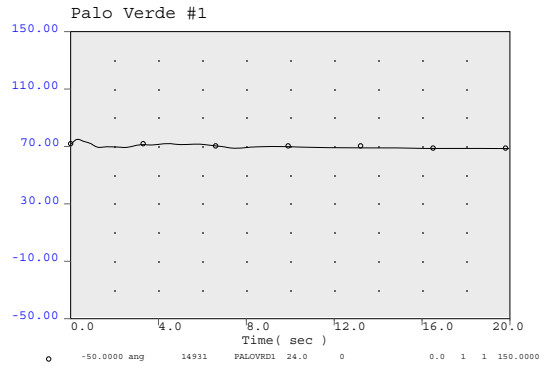


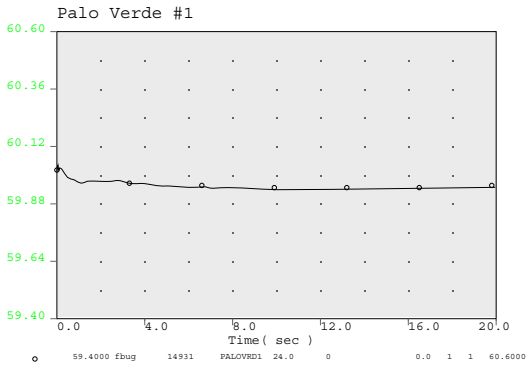
CENTRALS 500kV

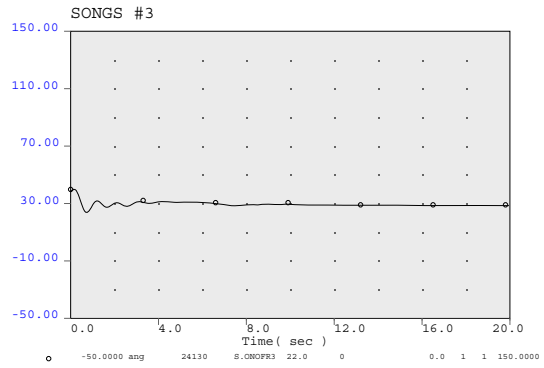


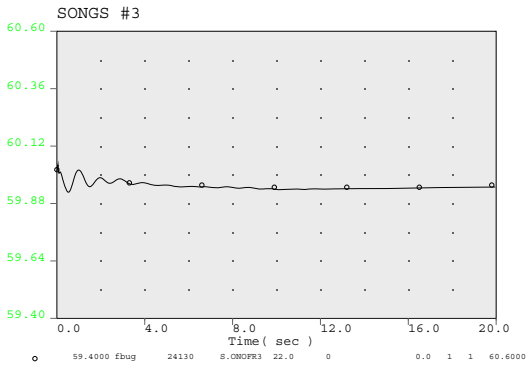
C1 C2 Heavy Summer Pre Without Upgrades

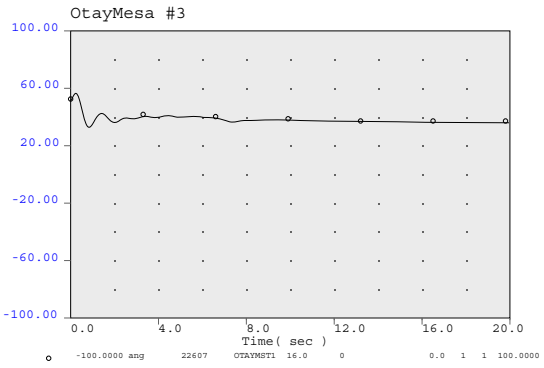
RELATIVE ROTOR ANGLE & FREQUENCY

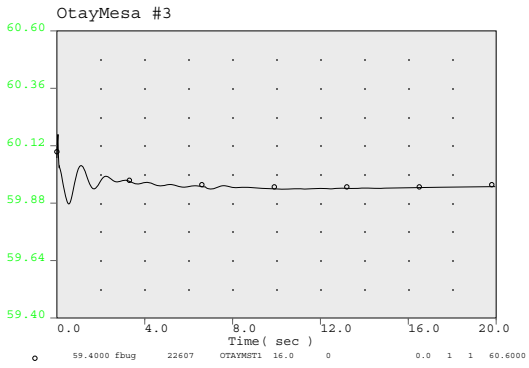












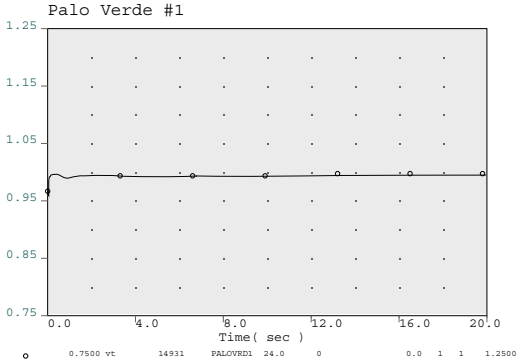
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

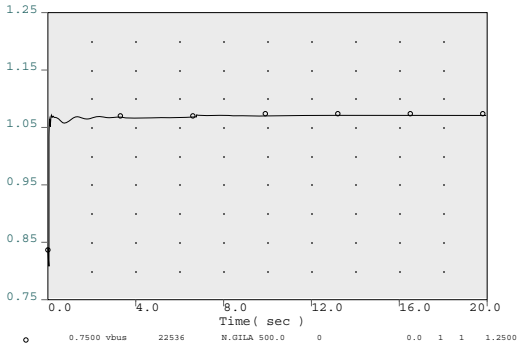
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_ML-ECO-RAS_slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:13:24 2011

RELATIVE VOLTAGE

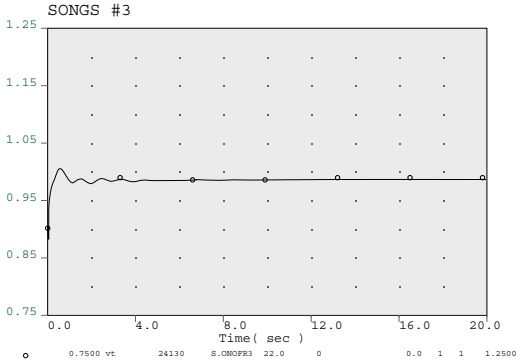
Palo Verde #1



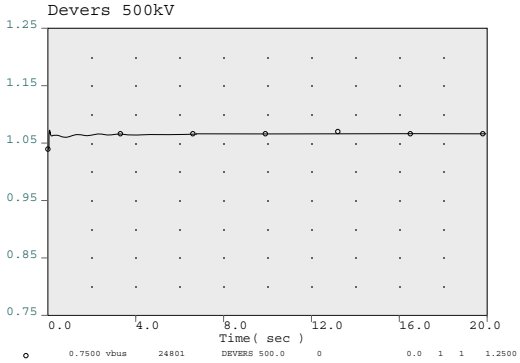
N Gila 500kV



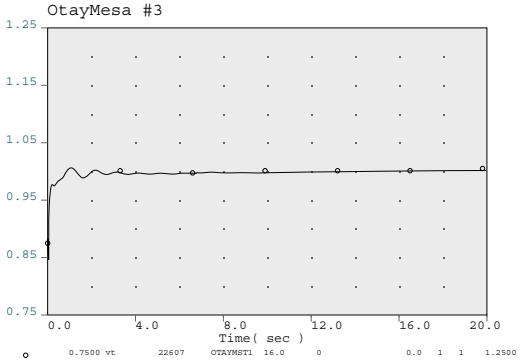
SONGS #3



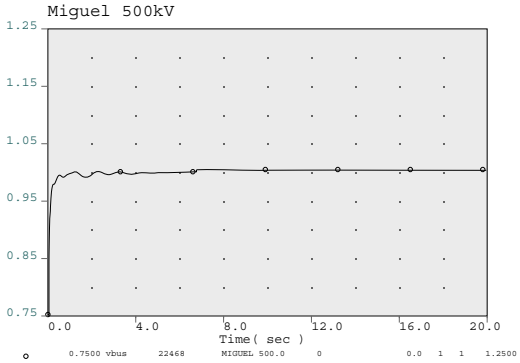
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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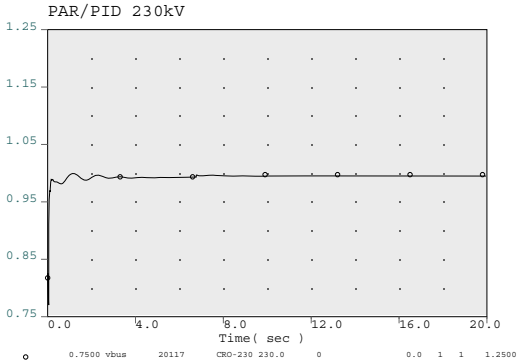
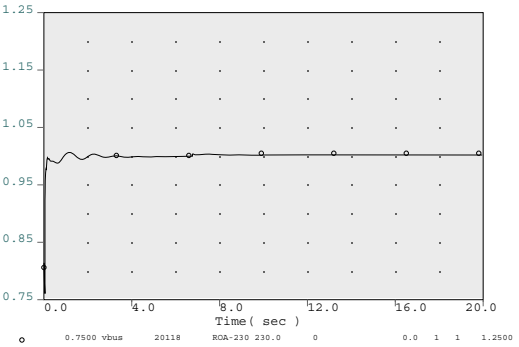
SDGE	tran-c1c2-hs-pre-r12_ML-ECO-RAS_slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:13:25 2011

Affected System Voltage Check and Comparison

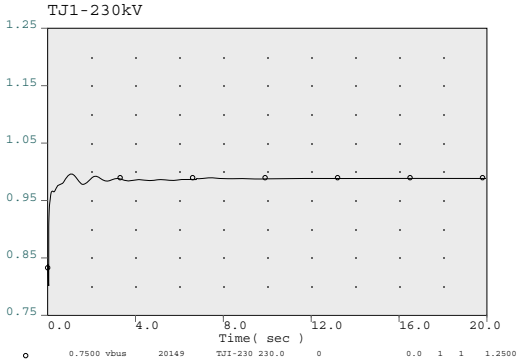
PAR/PID 230kV



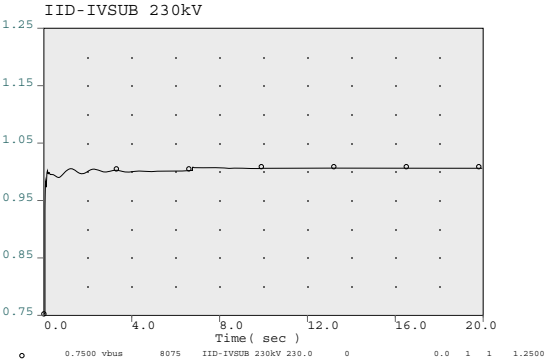
ROA-230kV



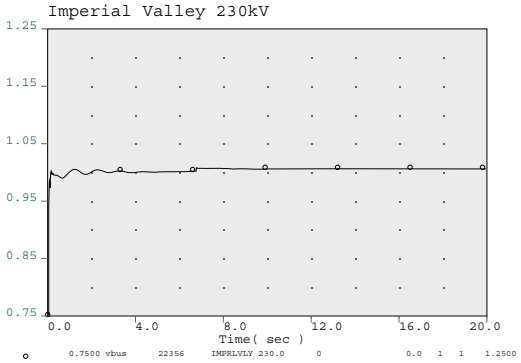
TJ1-230kV



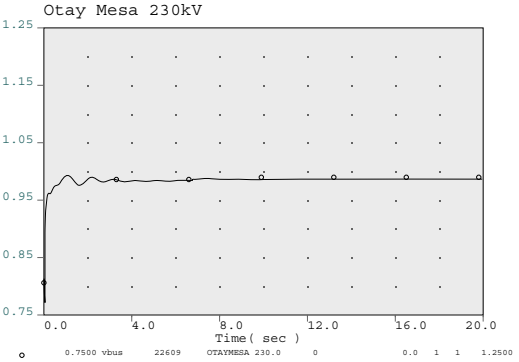
IID-IVSUB 230kV



Imperial Valley 230kV



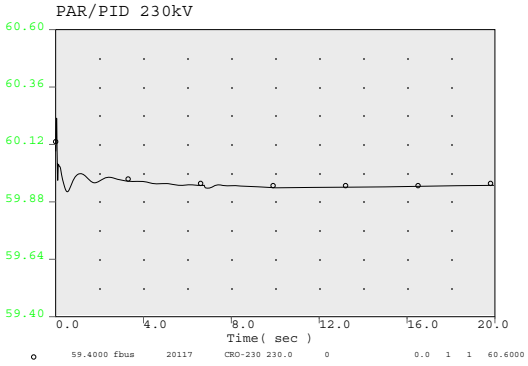
Otay Mesa 230kV



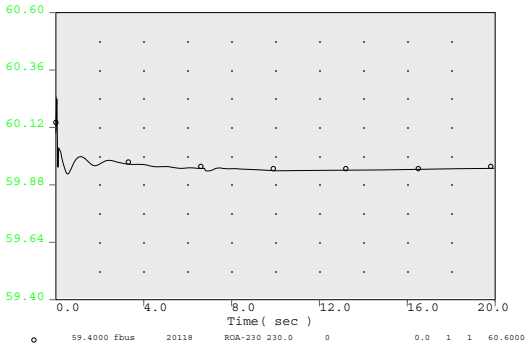
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

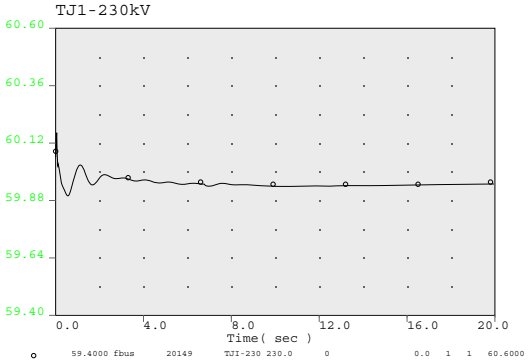
PAR/PID 230kV



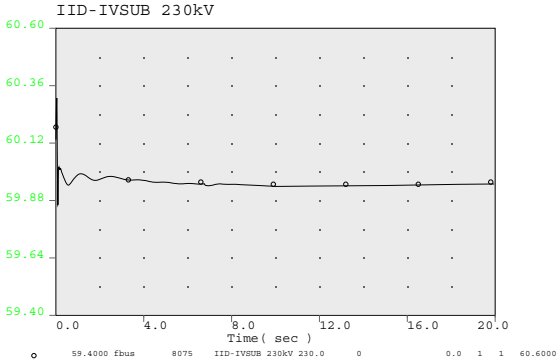
ROA-230kV



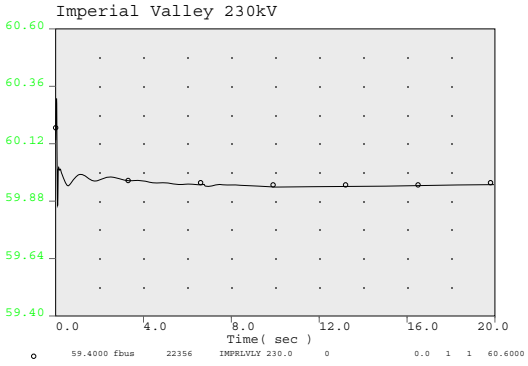
TJ1-230kV



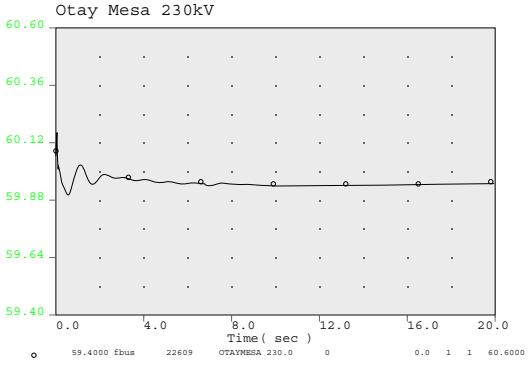
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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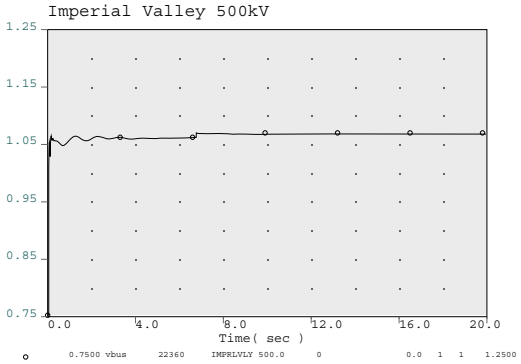
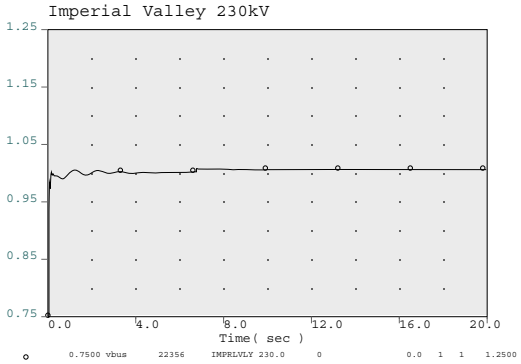
SDGE	tran-c1c2-hs-pre-r12_ML-ECO-RAS_slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:13:26 2011

VOLTAGE

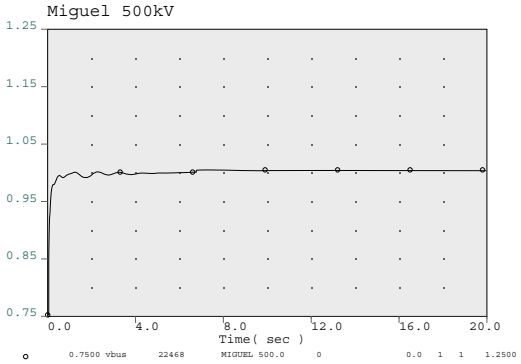
Imperial Valley 500kV



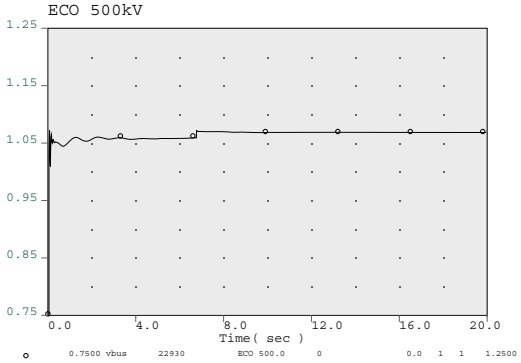
Imperial Valley 230kV



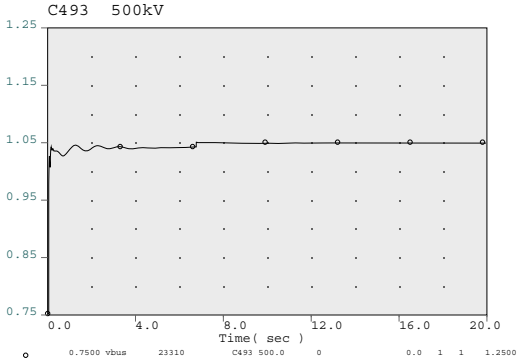
Miguel 500kV



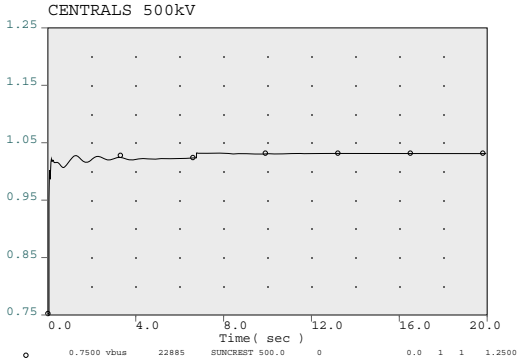
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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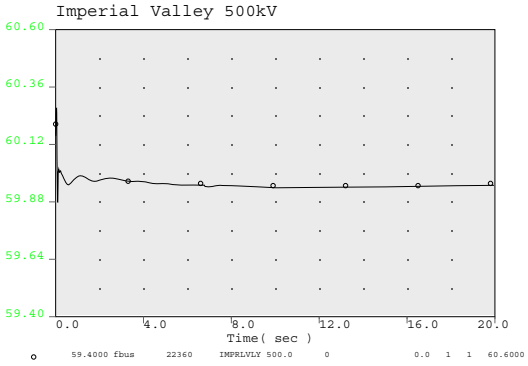
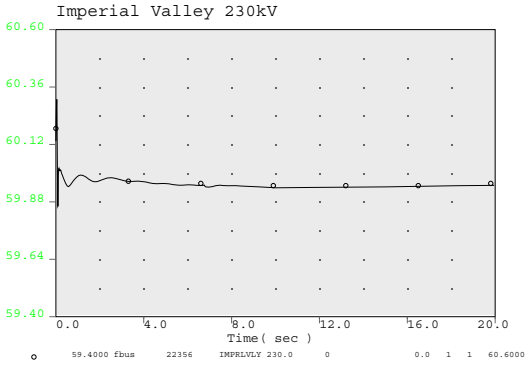
SDGE	tran-c1c2-hs-pre-r12_ML-ECO-RAS_slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:13:27 2011

FREQUENCY

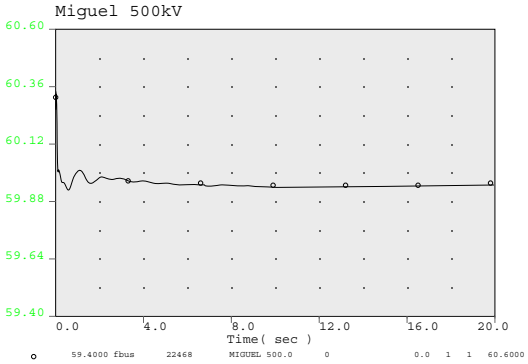
Imperial Valley 500kV



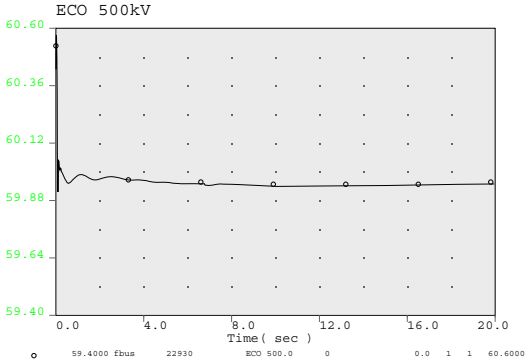
Imperial Valley 230kV



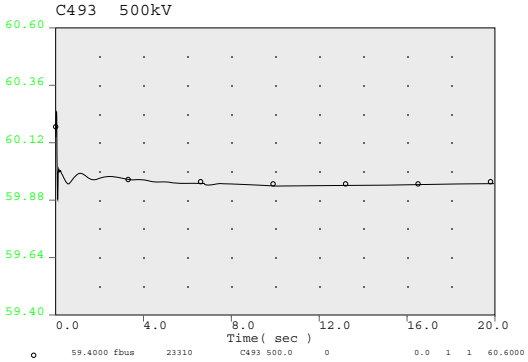
Miguel 500kV



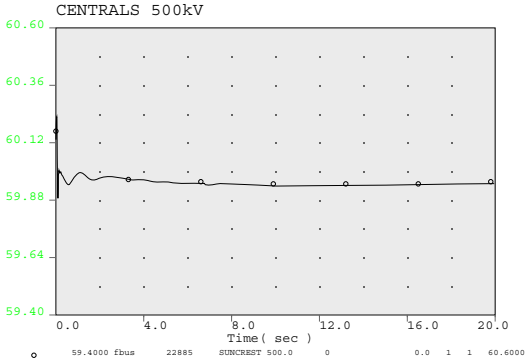
ECO 500kV



C493 500kV

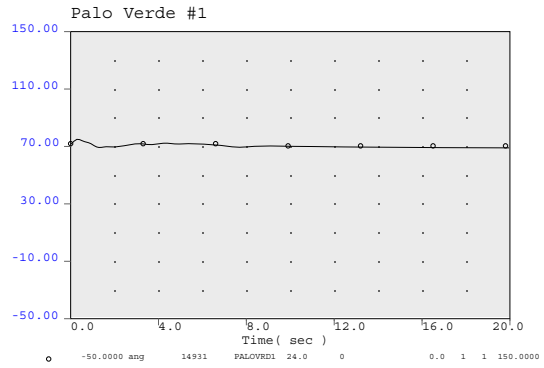


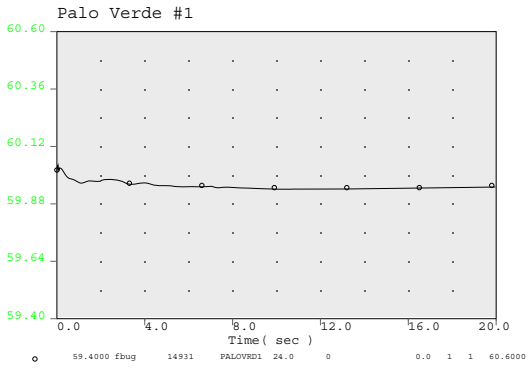
CENTRALS 500kV

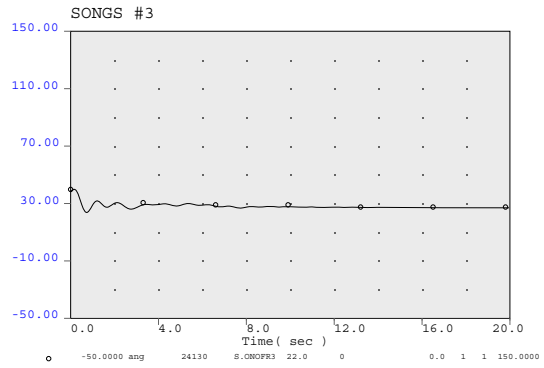


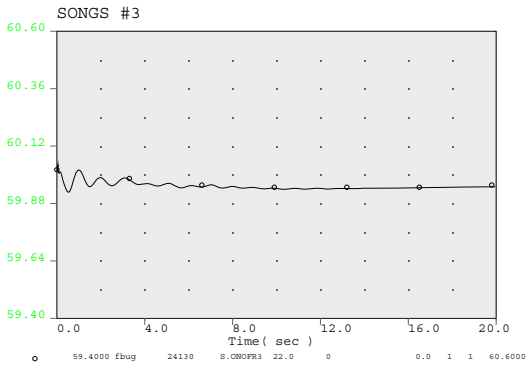
C1 C2 Heavy Summer Pre Without Upgrades

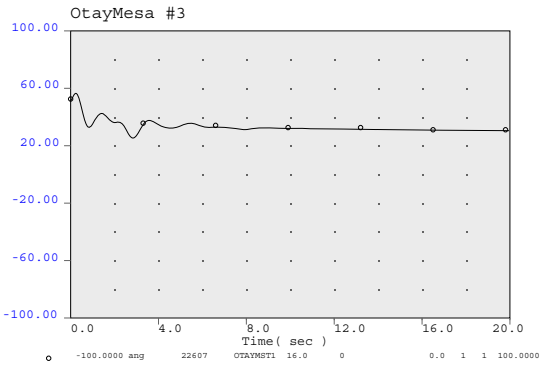
RELATIVE ROTOR ANGLE & FREQUENCY

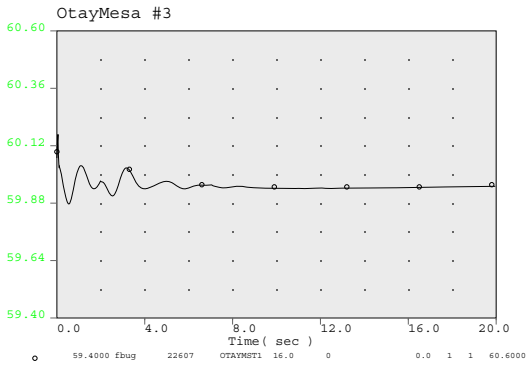












C1 C2 Heavy Summer Pre Without Upgrades

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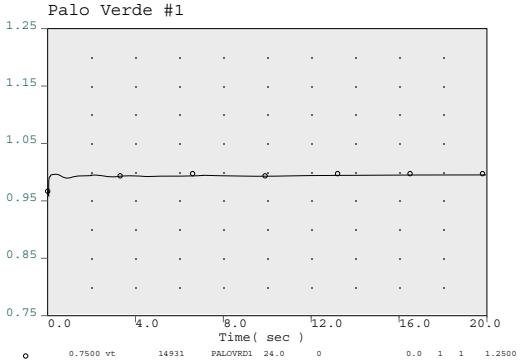
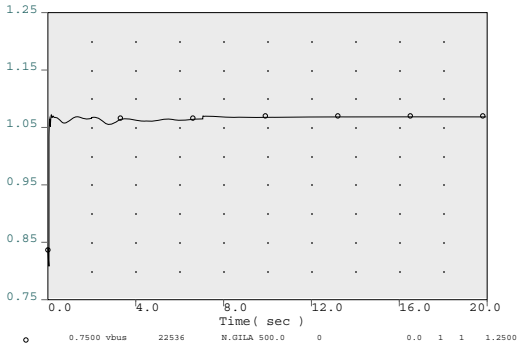
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_MLECO-RASX-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:17:49 2011

RELATIVE VOLTAGE

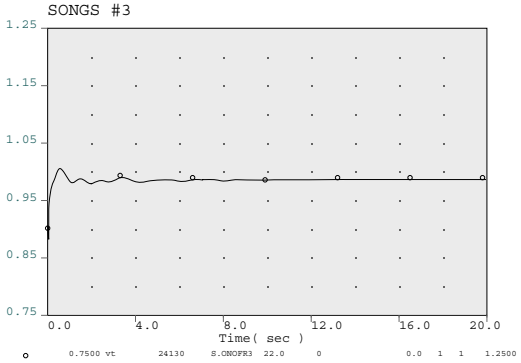
Palo Verde #1



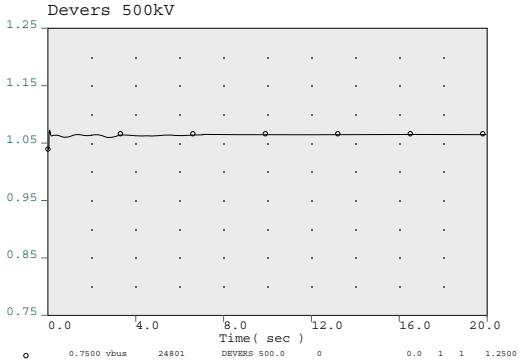
N Gila 500kV



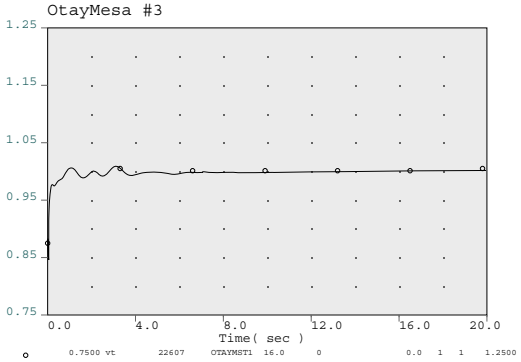
SONGS #3



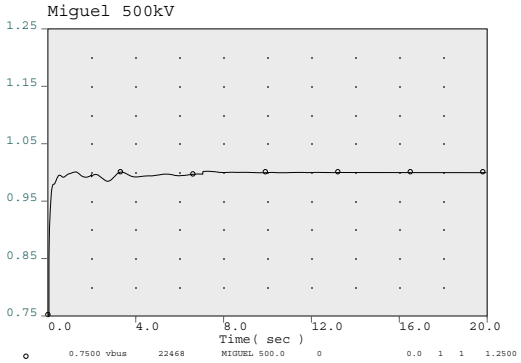
Devers 500kV



OtayMesa #3



Miguel 500kV



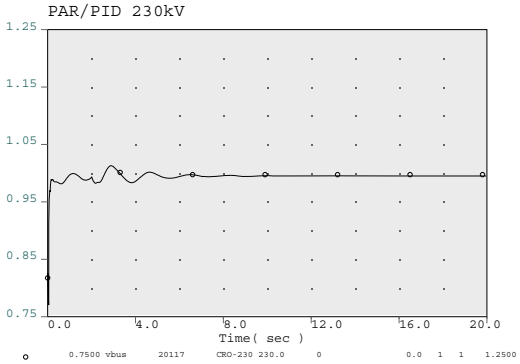
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

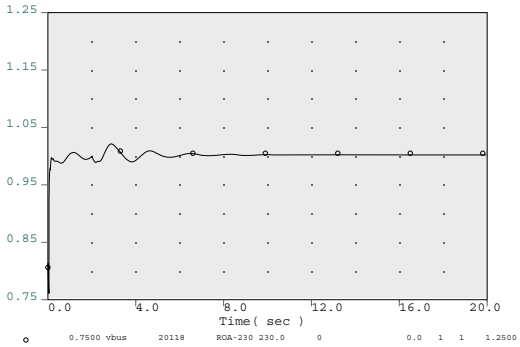
SDGE	tran-c1c2-hs-pre-r12_MLECO-RASX-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:17:50 2011

Affected System Voltage Check and Comparison

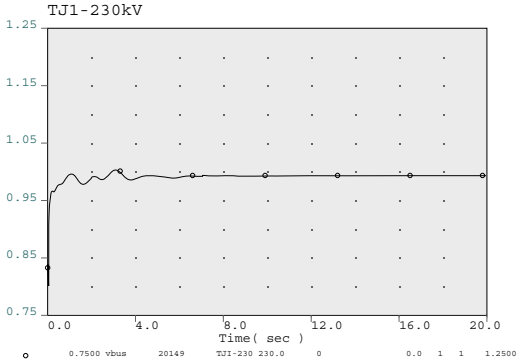
PAR/PID 230kV



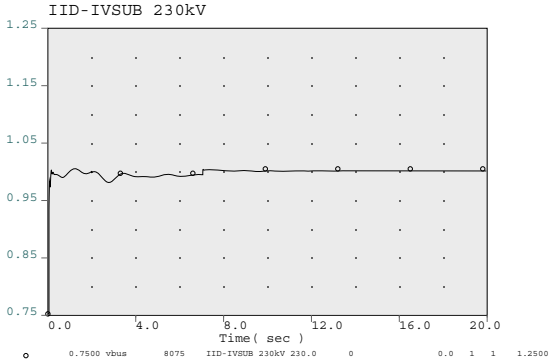
ROA-230kV



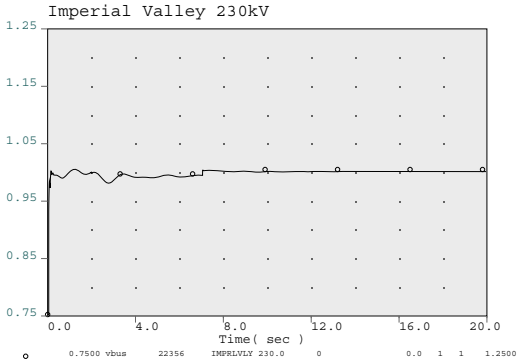
TJ1-230kV



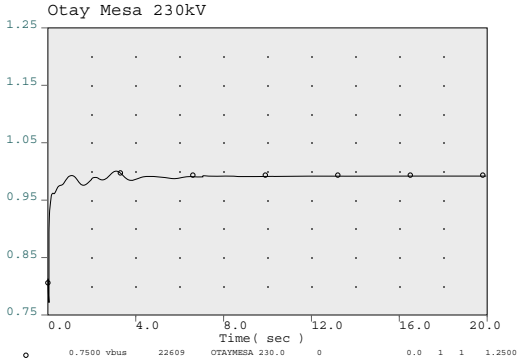
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



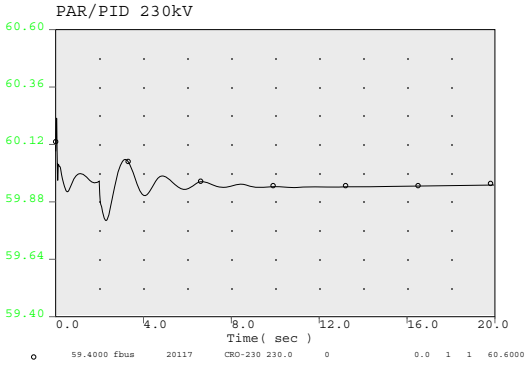
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

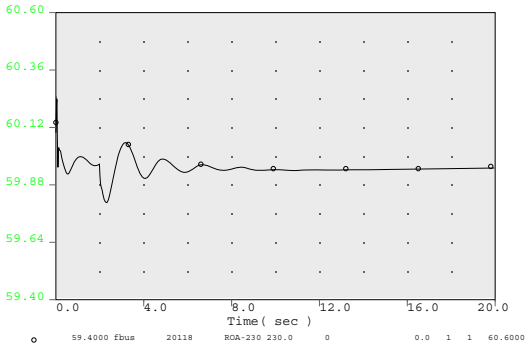
SDGE	tran-c1c2-hs-pre-r12_MLECO-RASX-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:17:50 2011

Affected System Frequency Check and Comparison

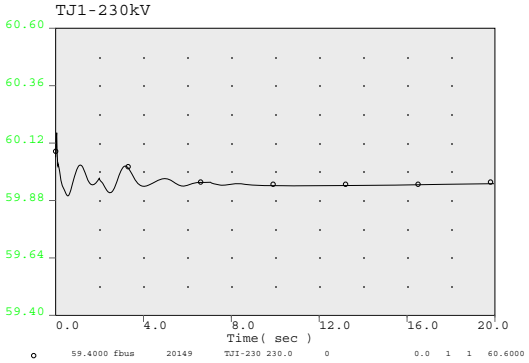
PAR/PID 230kV



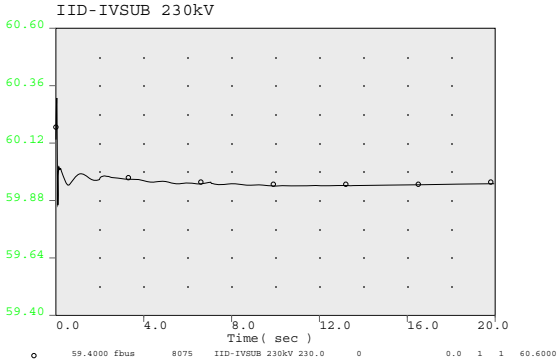
ROA-230kV



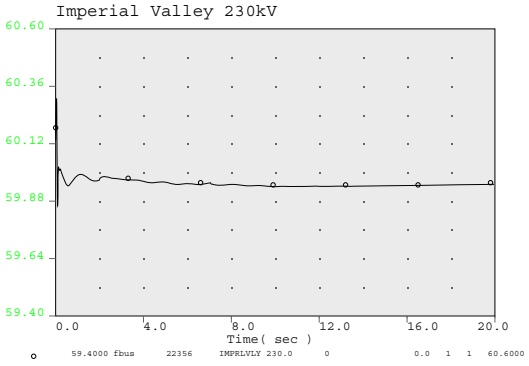
TJ1-230kV



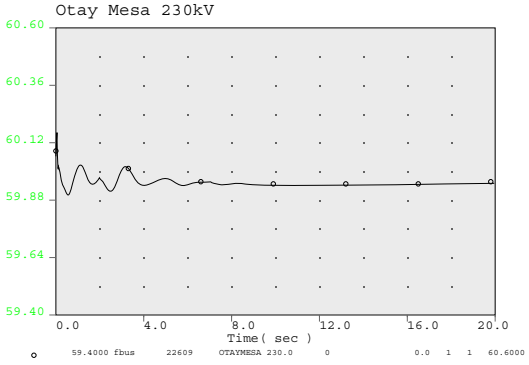
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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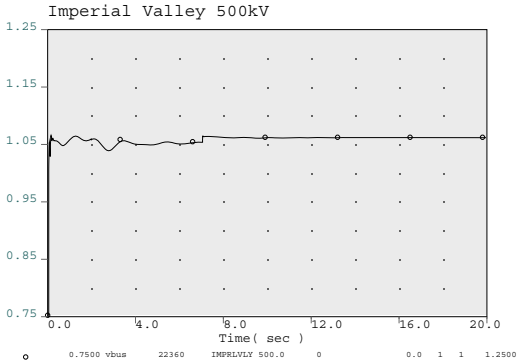
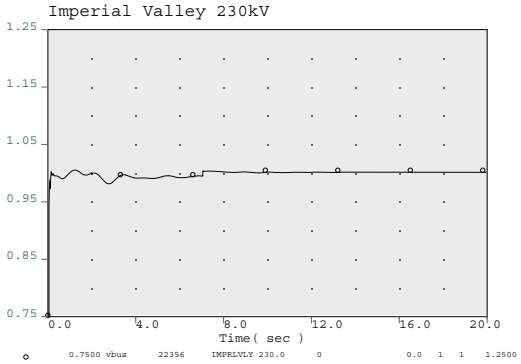
VOLTAGE

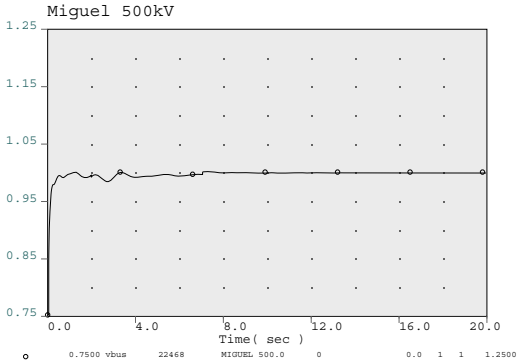
Imperial Valley 500kV



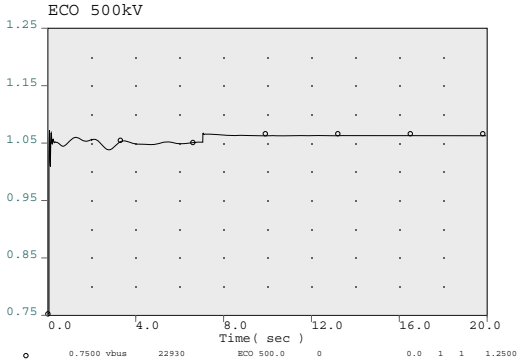
Imperial Valley 230kV



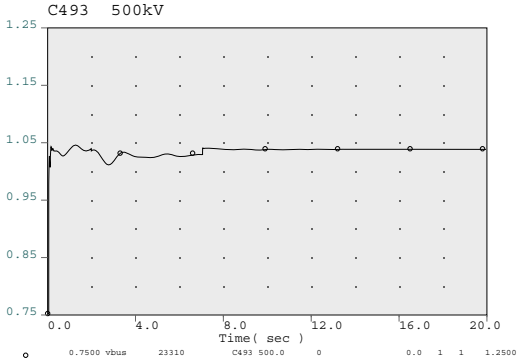
Miguel 500kV



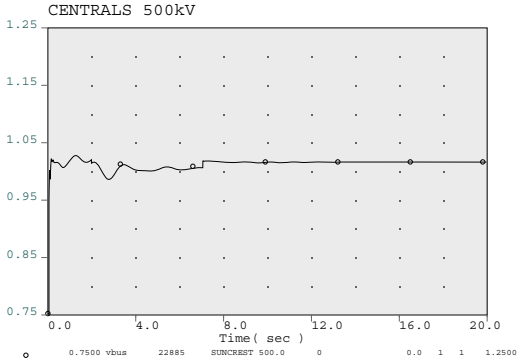
ECO 500kV



C493 500kV



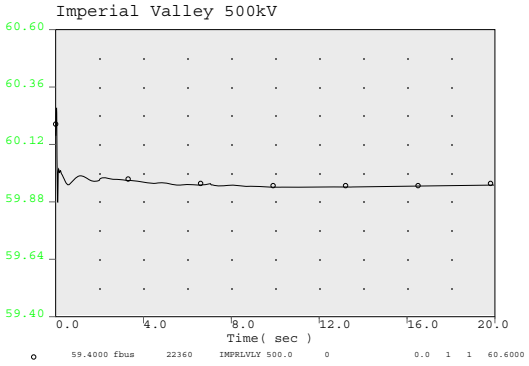
CENTRALS 500kV



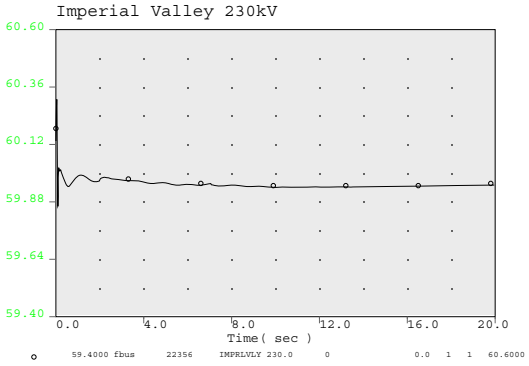
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

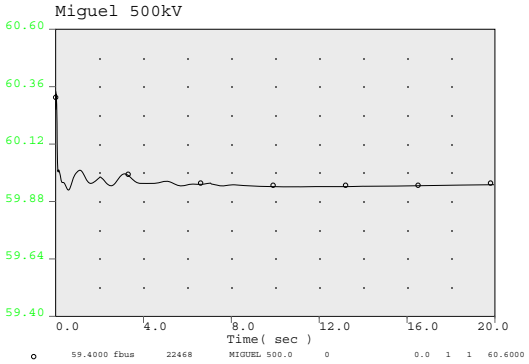
Imperial Valley 500kV



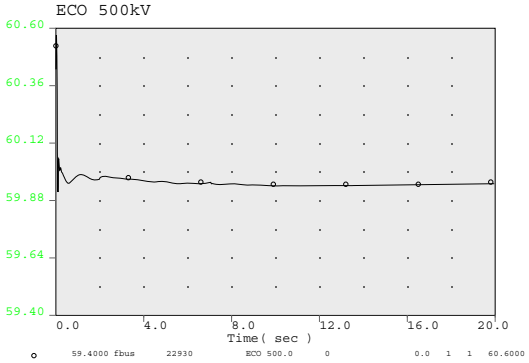
Imperial Valley 230kV



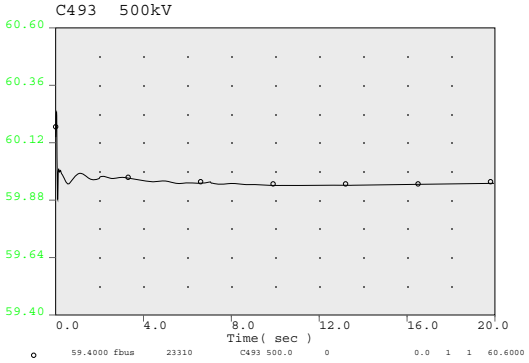
Miguel 500kV



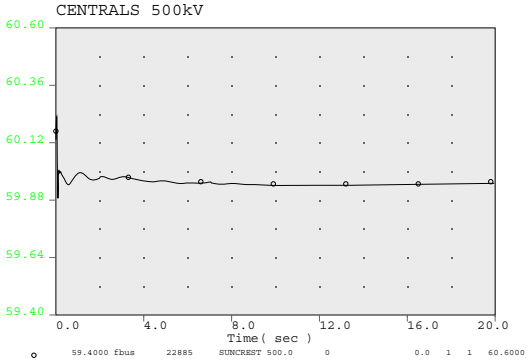
ECO 500kV



C493 500kV

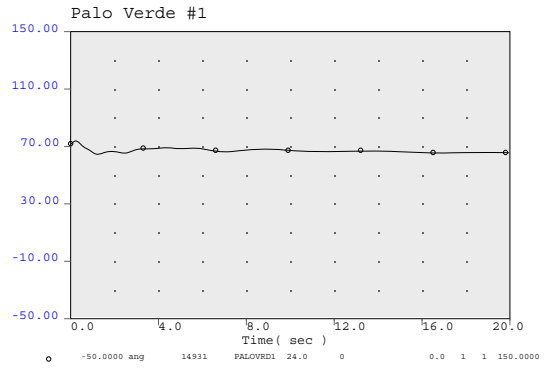


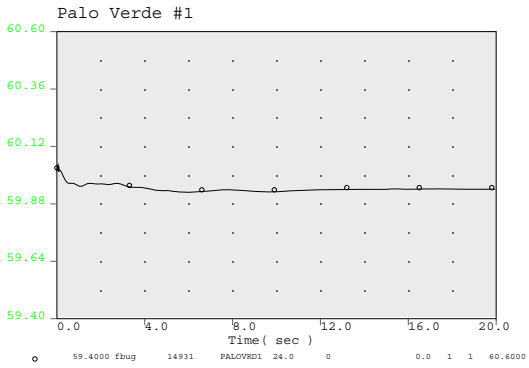
CENTRALS 500kV

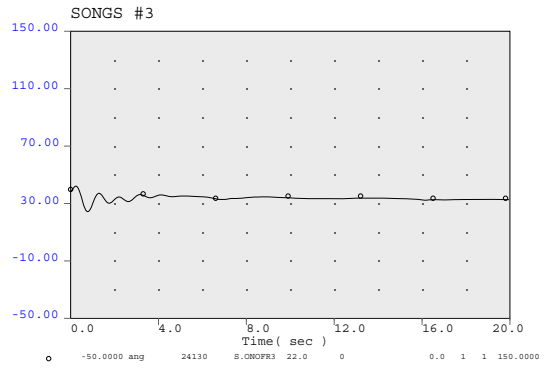


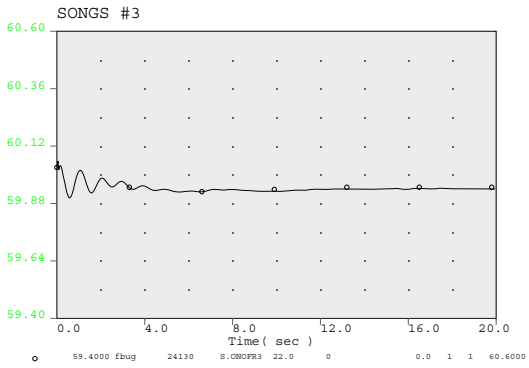
C1 C2 Heavy Summer Pre Without Upgrades

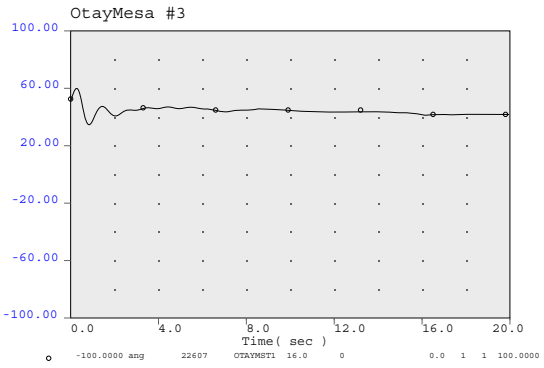
RELATIVE ROTOR ANGLE & FREQUENCY

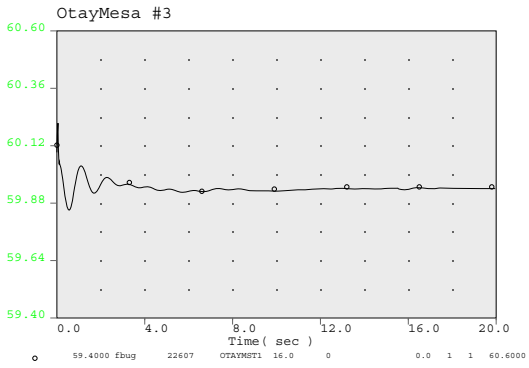












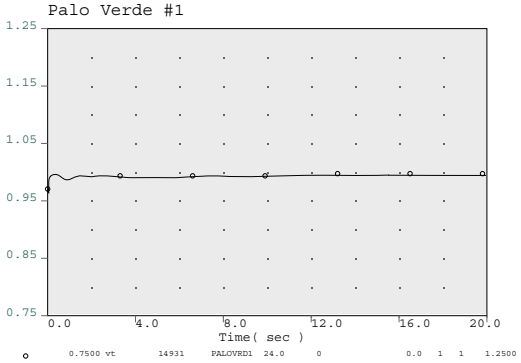
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

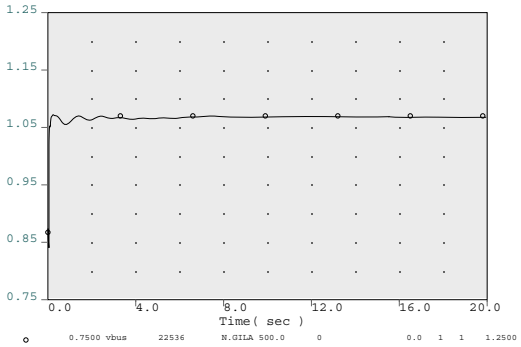
SDGE	tran-c1c2-hs-pre-r12_ML-MS-RAS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:15:30 2011

RELATIVE VOLTAGE

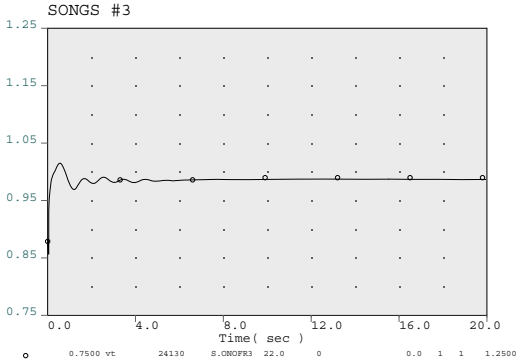
Palo Verde #1



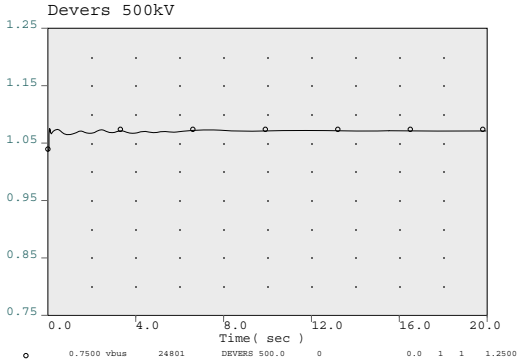
N Gila 500kV



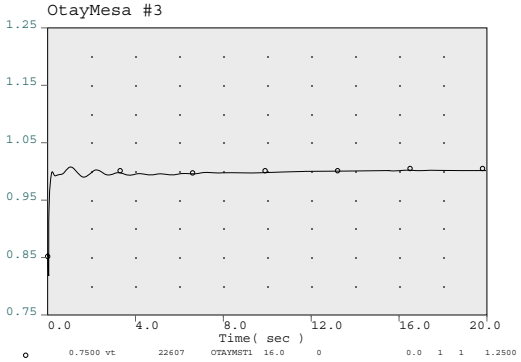
SONGS #3



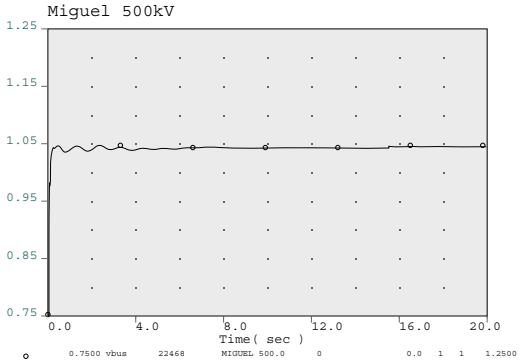
Devers 500kV



OtayMesa #3



Miguel 500kV



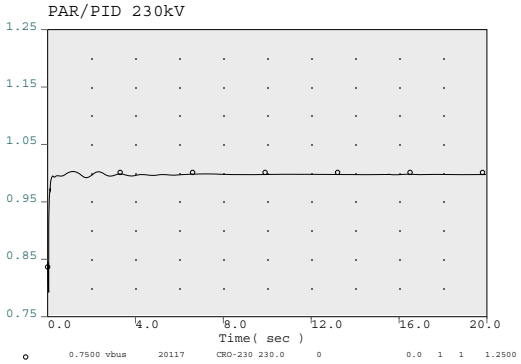
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

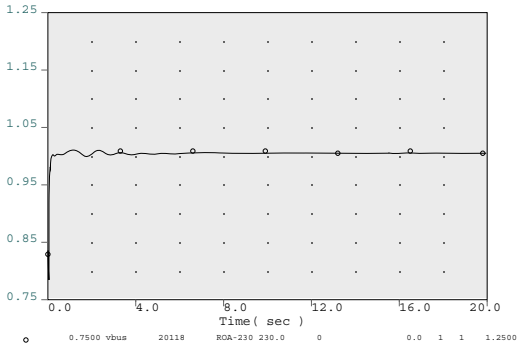
SDGE	tran-c1c2-hs-pre-r12_ML-MS-RAS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:15:30 2011

Affected System Voltage Check and Comparison

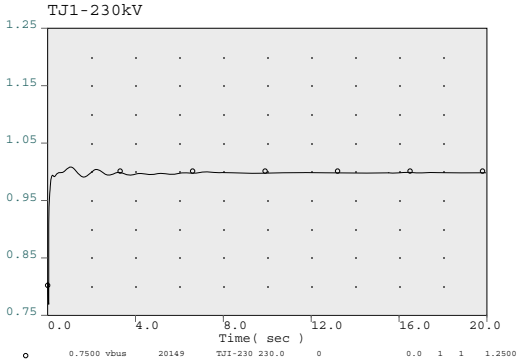
PAR/PID 230kV



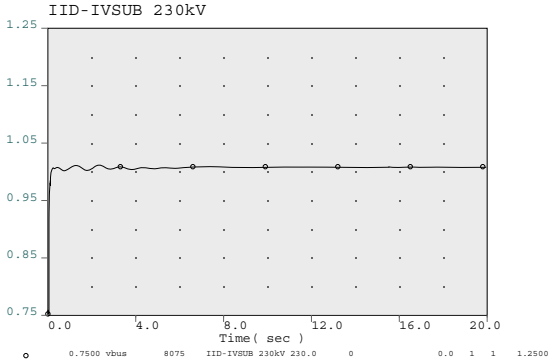
ROA-230kV



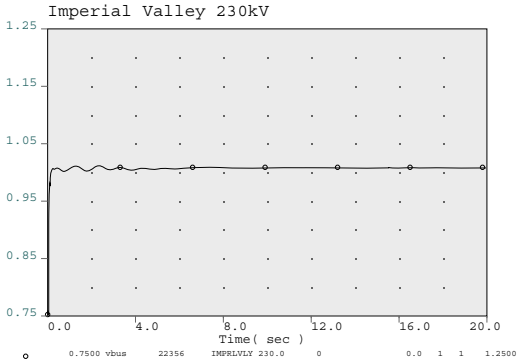
TJ1-230kV



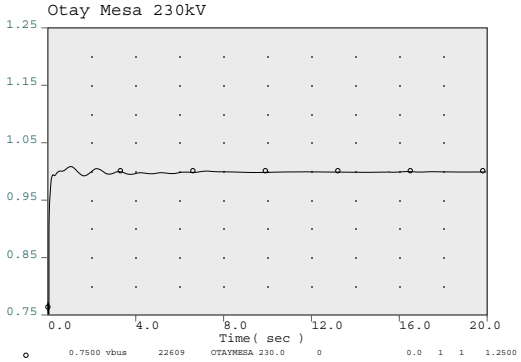
IID-IVSUB 230kV



Imperial Valley 230kV



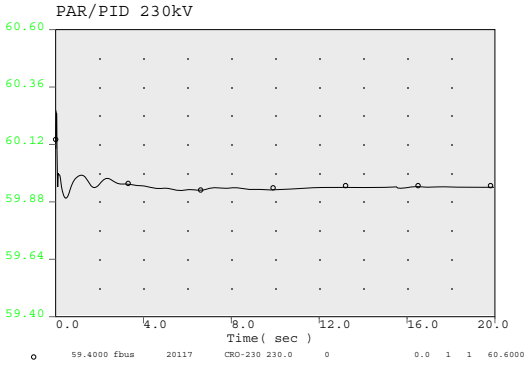
Otay Mesa 230kV



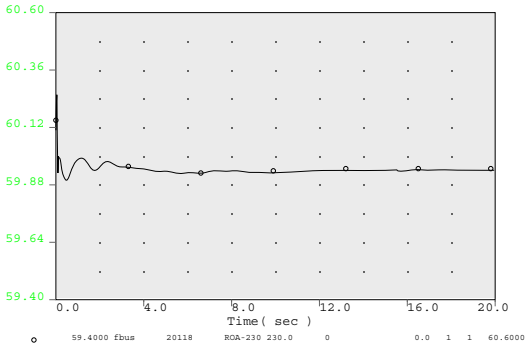
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

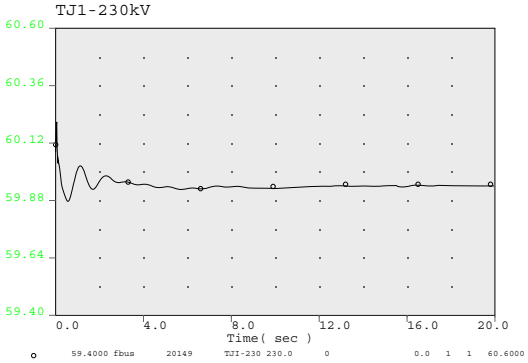
PAR/PID 230kV



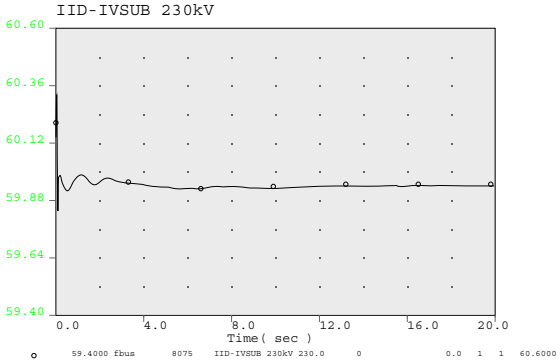
ROA-230kV



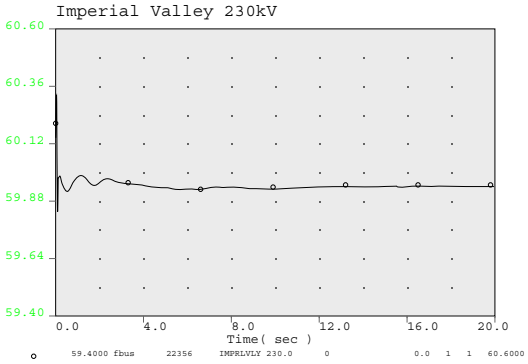
TJ1-230kV



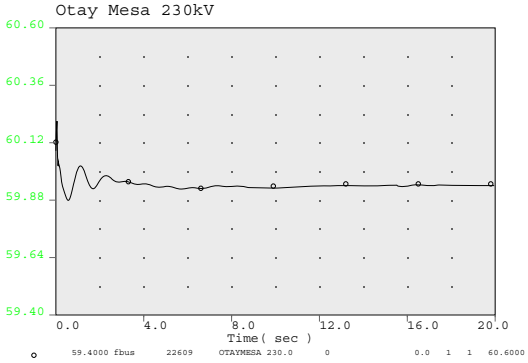
IID-IVSUB 230kV



Imperial Valley 230kV



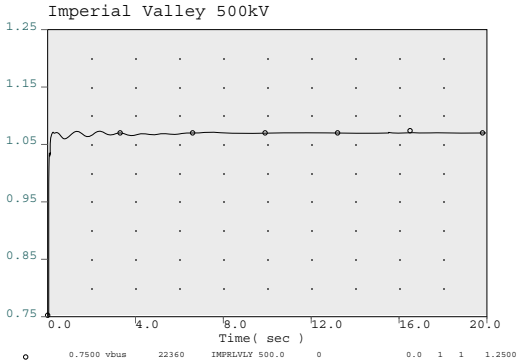
Otay Mesa 230kV



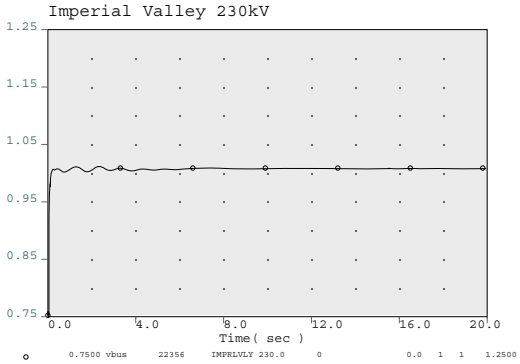
C1 C2 Heavy Summer Pre Without Upgrades

VOLTAGE

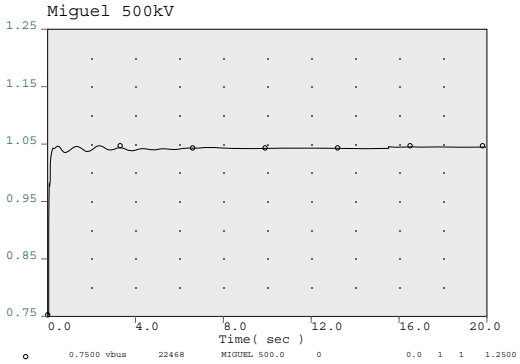
Imperial Valley 500kV



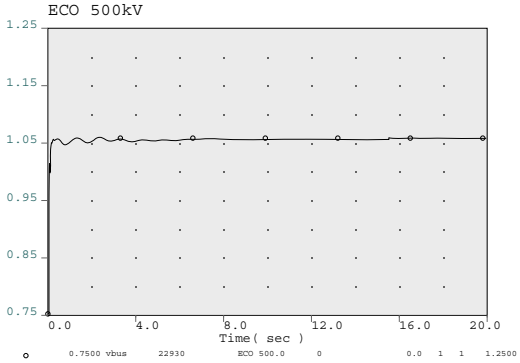
Imperial Valley 230kV



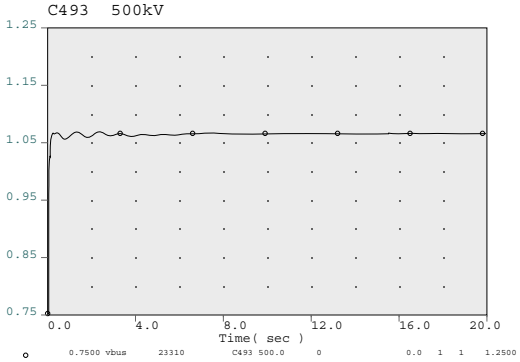
Miguel 500kV



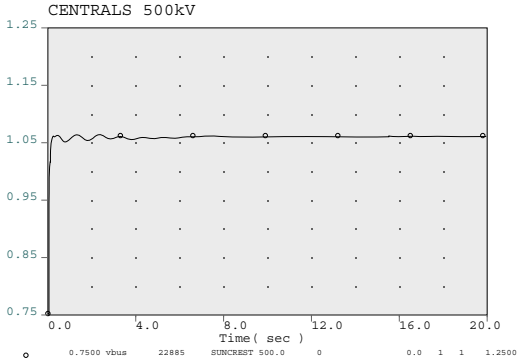
ECO 500kV



C493 500kV



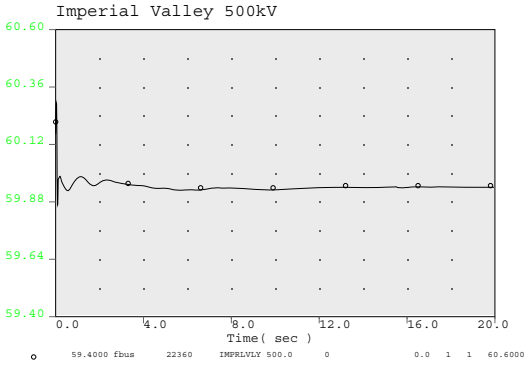
CENTRALS 500kV



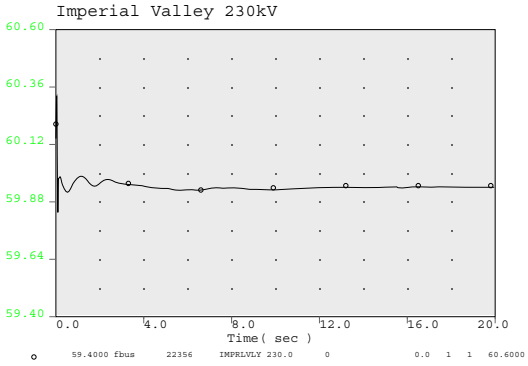
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

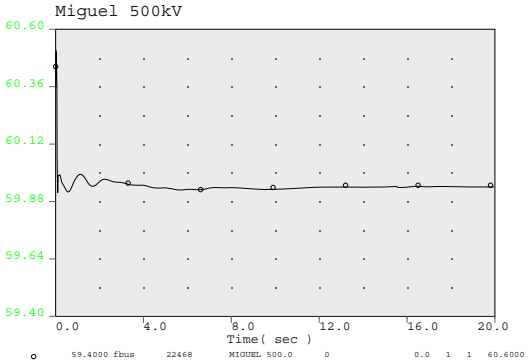
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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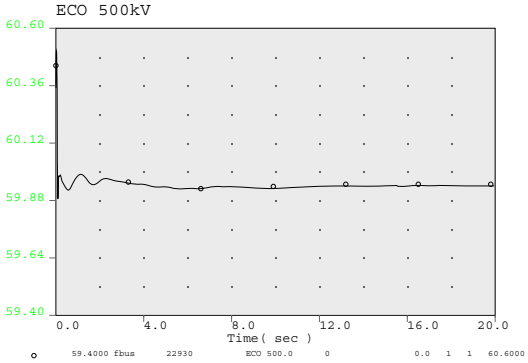

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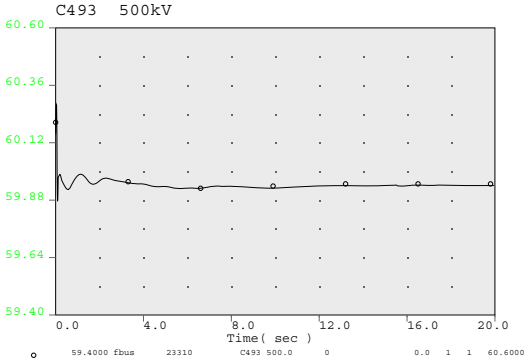
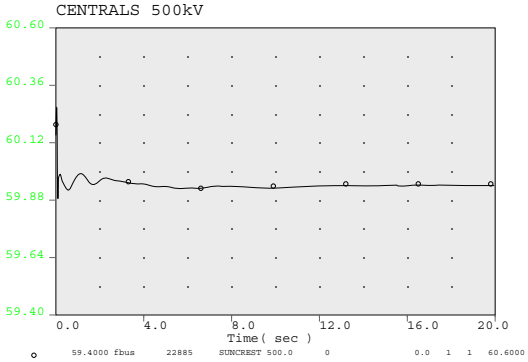
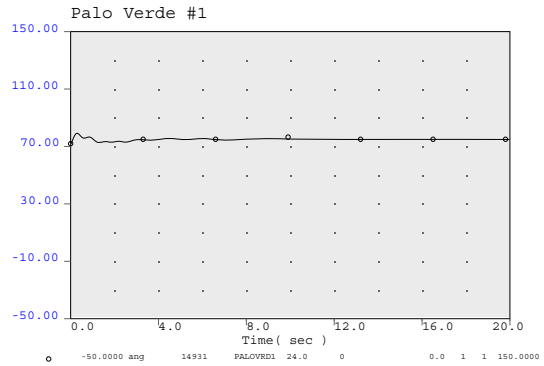


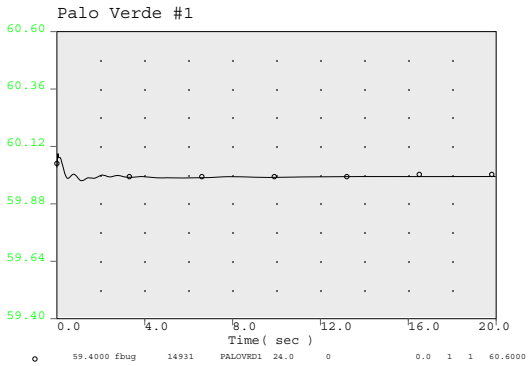
CENTRALS 500kV

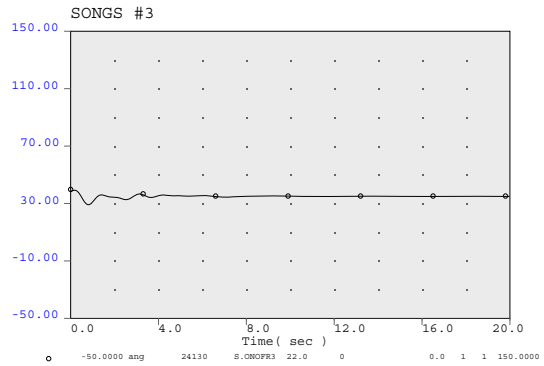


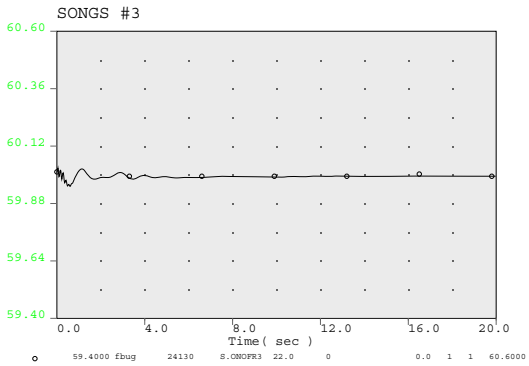
C1 C2 Heavy Summer Pre Without Upgrades

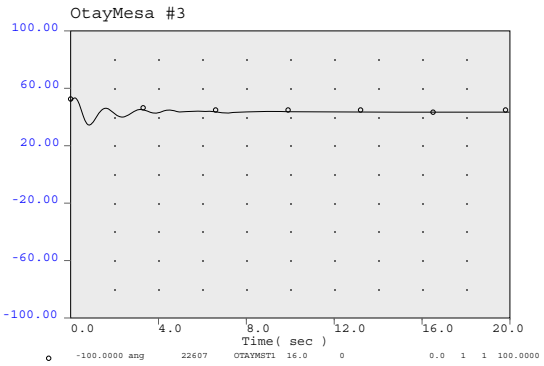
RELATIVE ROTOR ANGLE & FREQUENCY

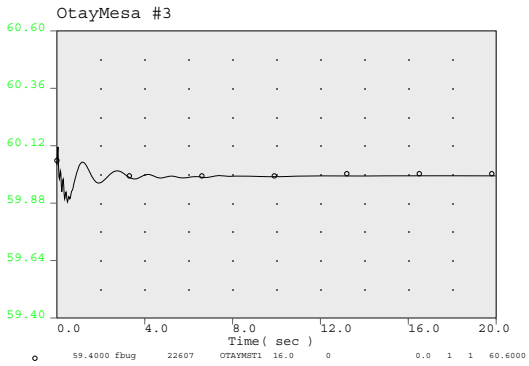










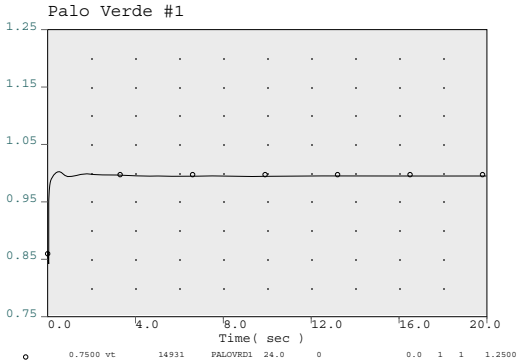


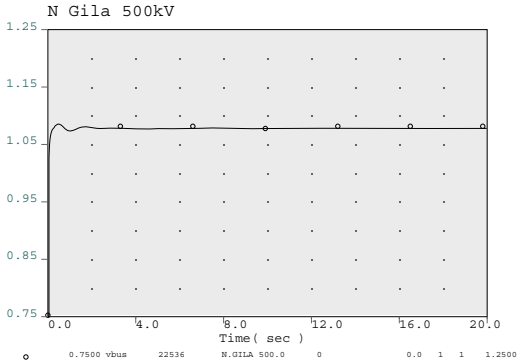
C1 C2 Heavy Summer Pre Without Upgrades

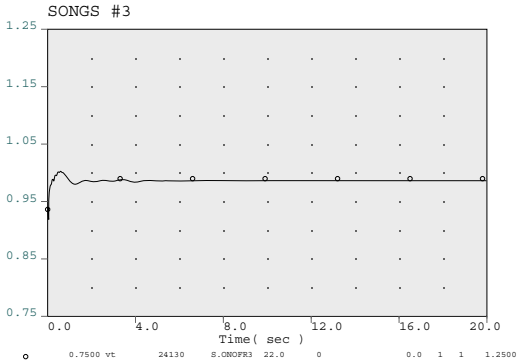
Page 1

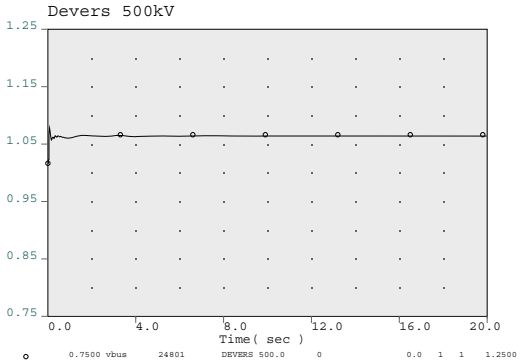
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_NGila-IV-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:21:55 2011

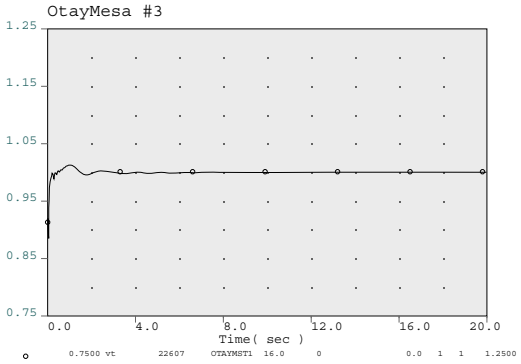
RELATIVE VOLTAGE

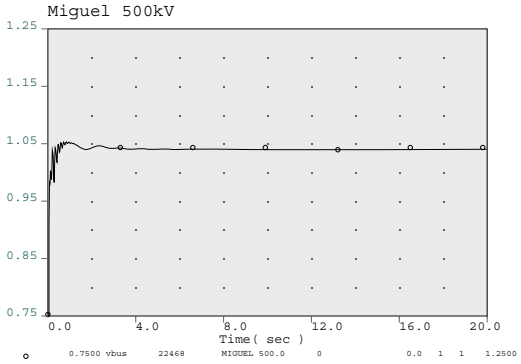












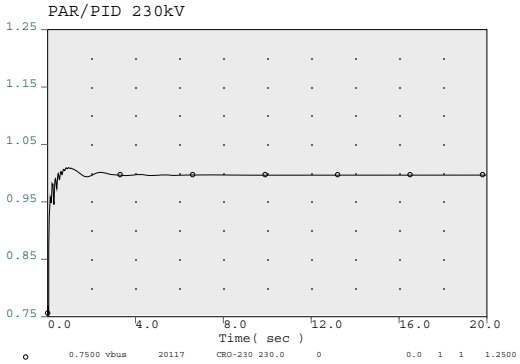
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

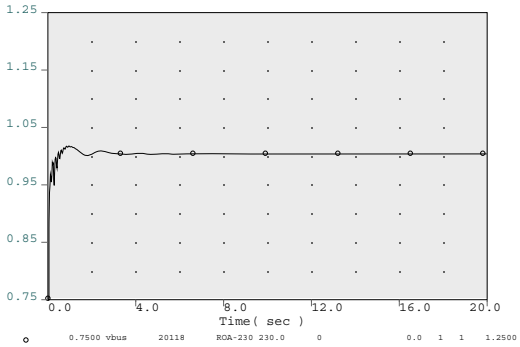
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_NGila-IV-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:21:56 2011

Affected System Voltage Check and Comparison

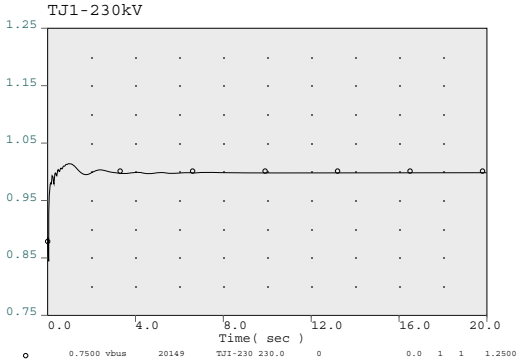
PAR/PID 230kV



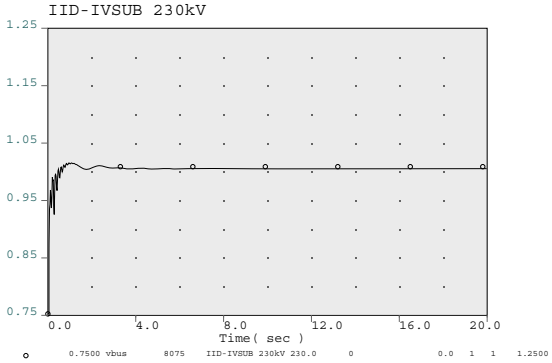
ROA-230kV



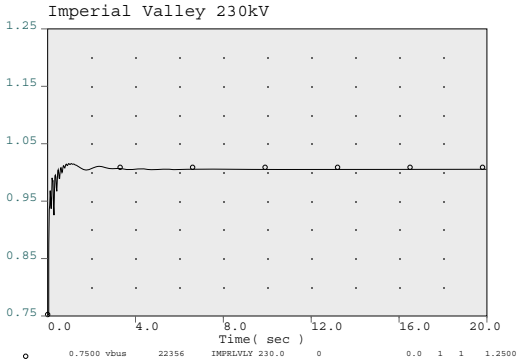
TJ1-230kV



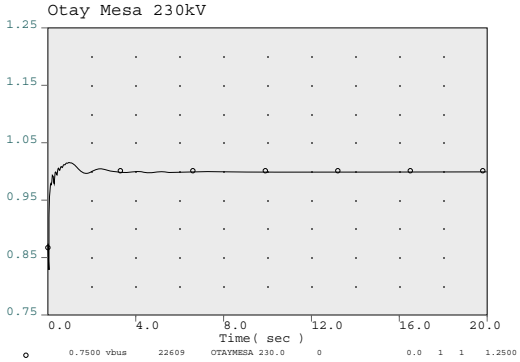
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



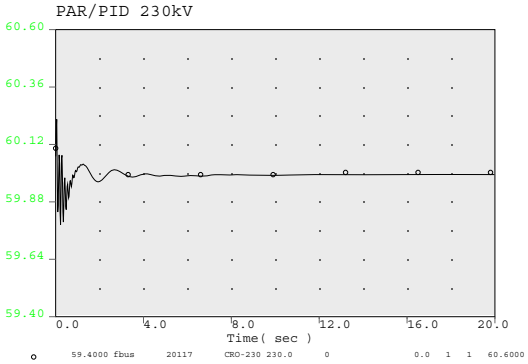
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

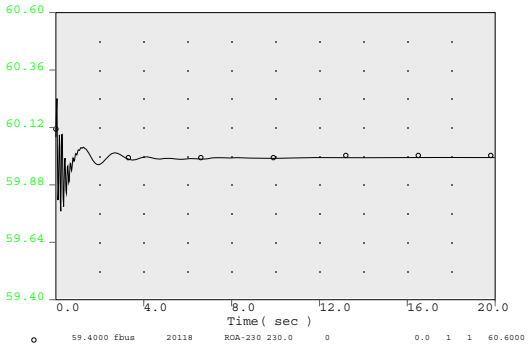
SDGE	tran-c1c2-hs-pre-r12_NGila-IV-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:21:56 2011

Affected System Frequency Check and Comparison

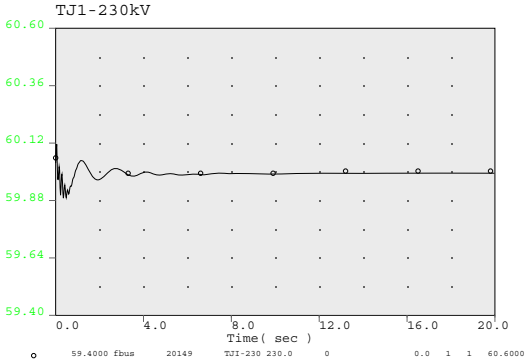
PAR/PID 230kV



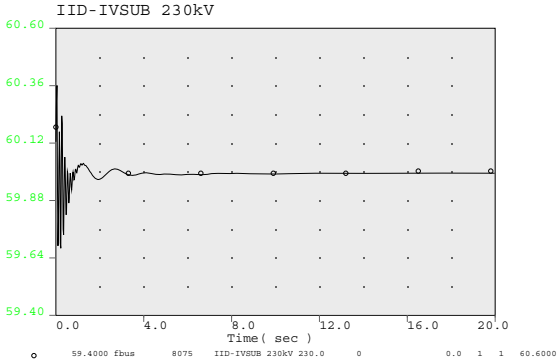
ROA-230kV



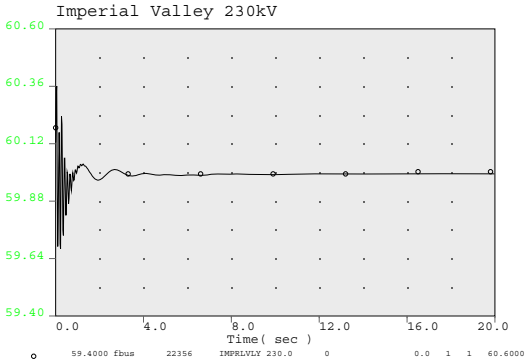
TJ1-230kV



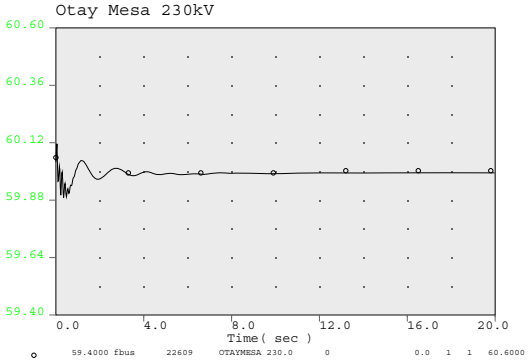
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



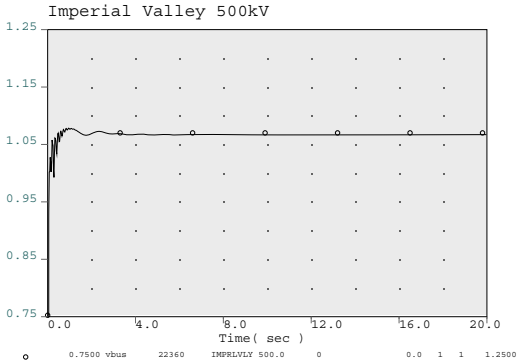
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

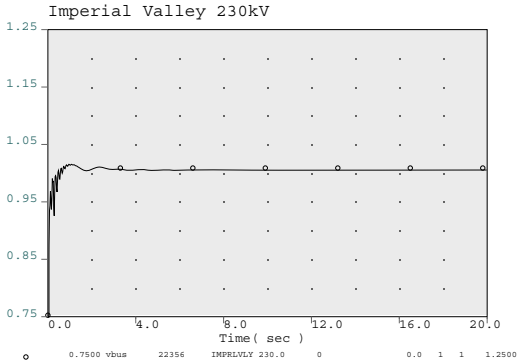
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_NGila-IV-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:21:57 2011

VOLTAGE

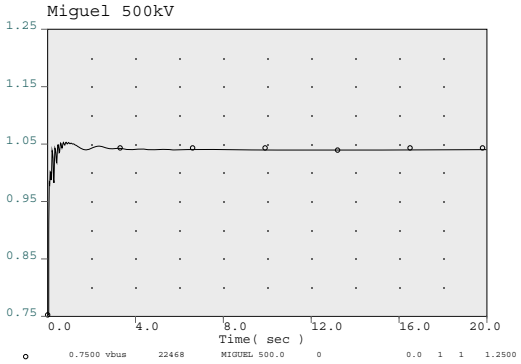
Imperial Valley 500kV



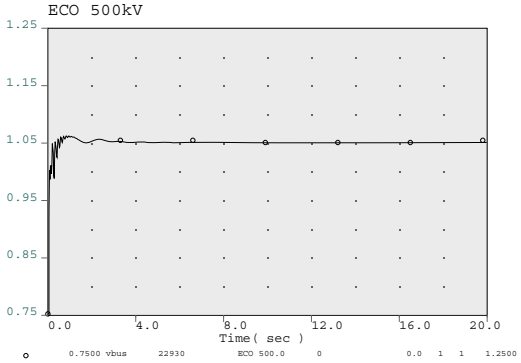
Imperial Valley 230kV



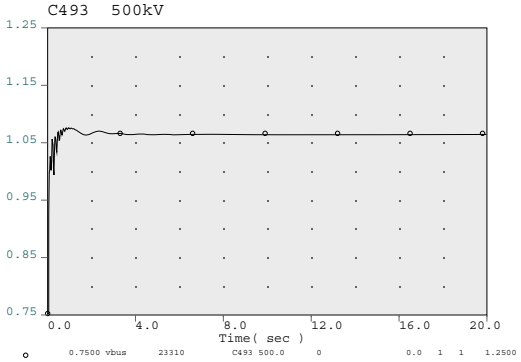
Miguel 500kV



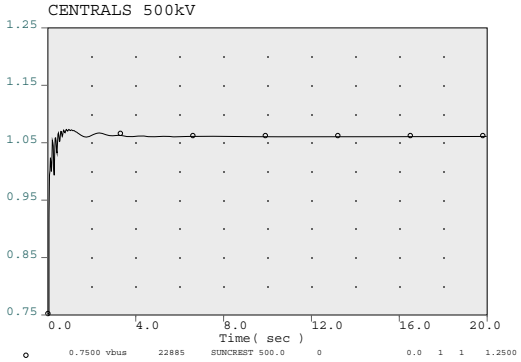
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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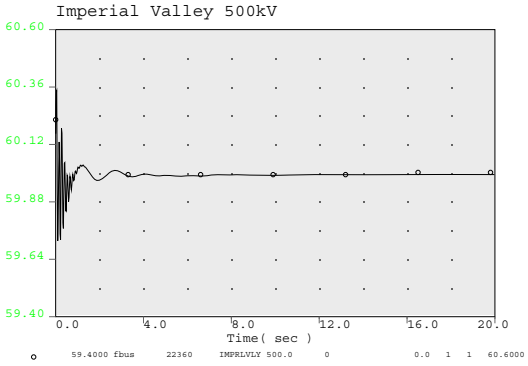
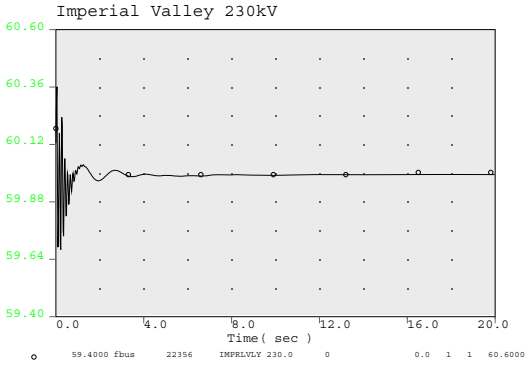
SDGE	tran-c1c2-hs-pre-r12_NGila-IV-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:21:57 2011

FREQUENCY

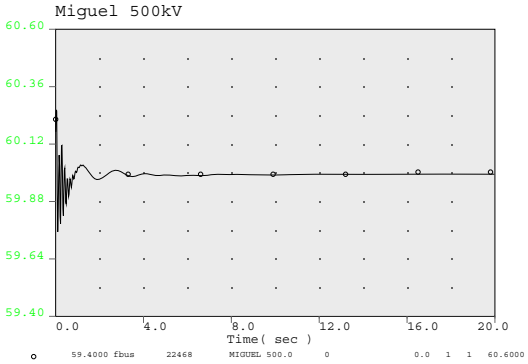
Imperial Valley 500kV



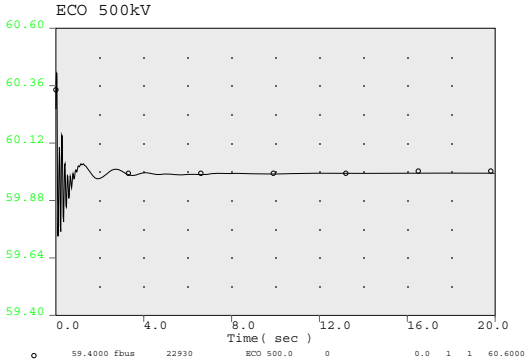
Imperial Valley 230kV



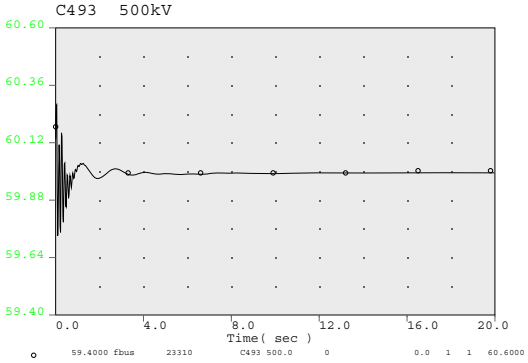
Miguel 500kV



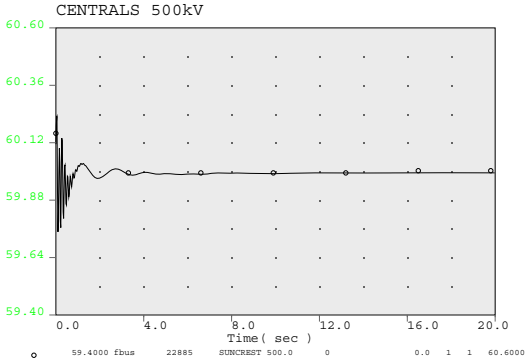
ECO 500kV



C493 500kV

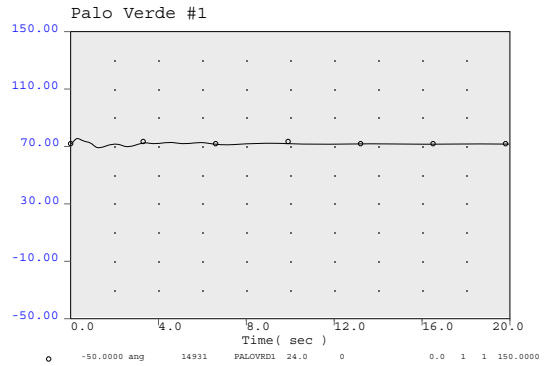


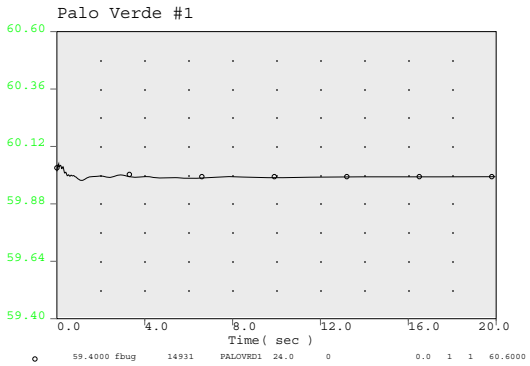
CENTRALS 500kV

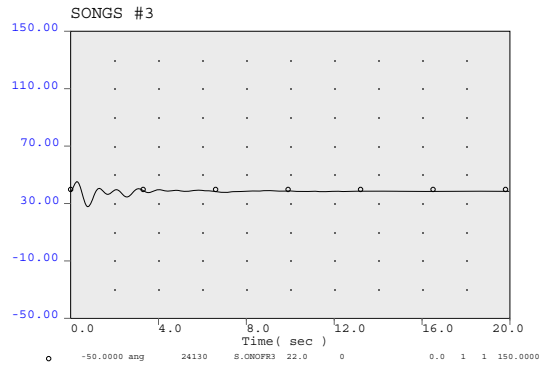


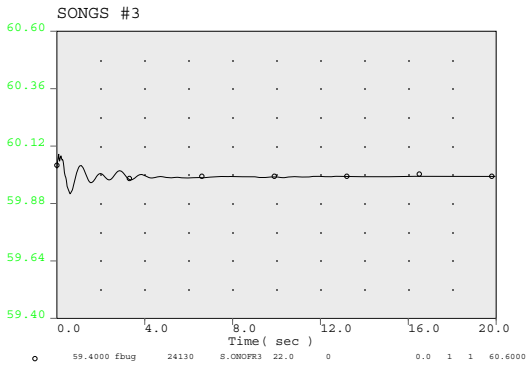
C1 C2 Heavy Summer Pre Without Upgrades

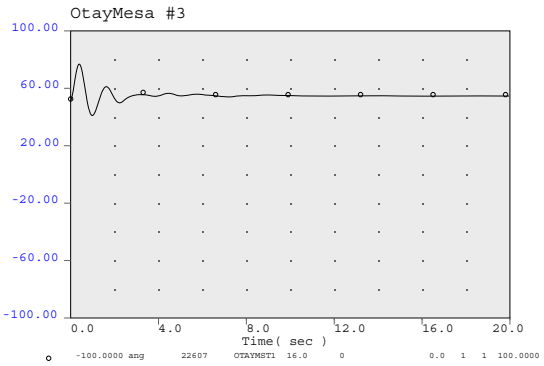
RELATIVE ROTOR ANGLE & FREQUENCY

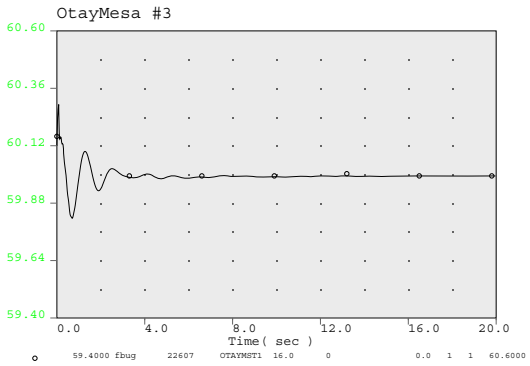












C1 C2 Heavy Summer Pre Without Upgrades

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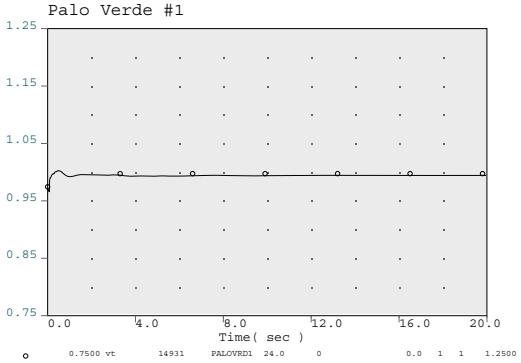
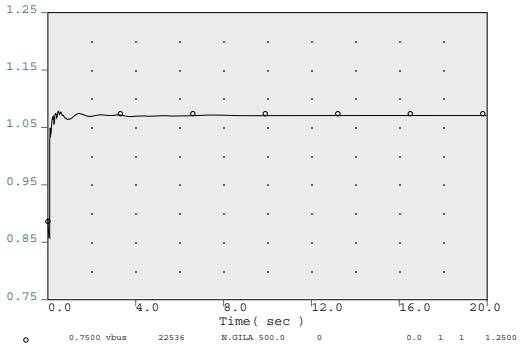
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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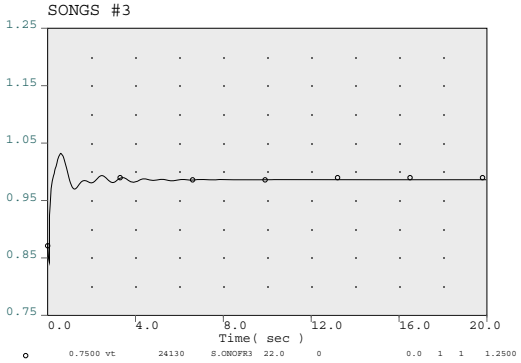
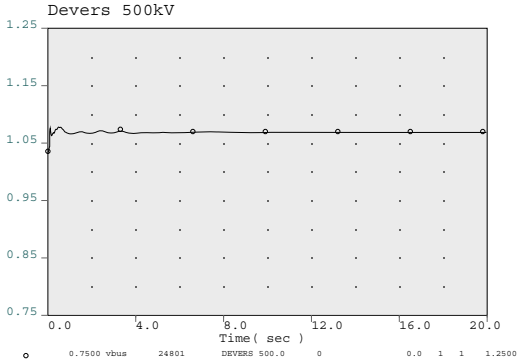
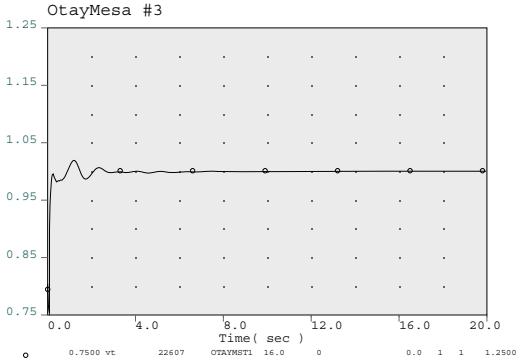


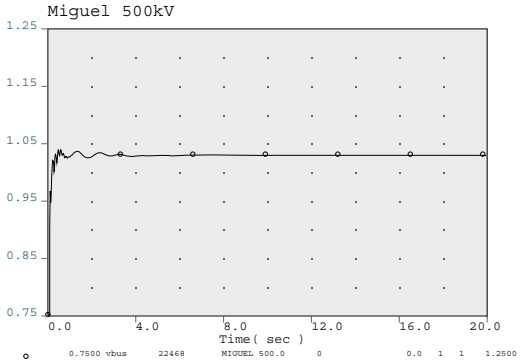
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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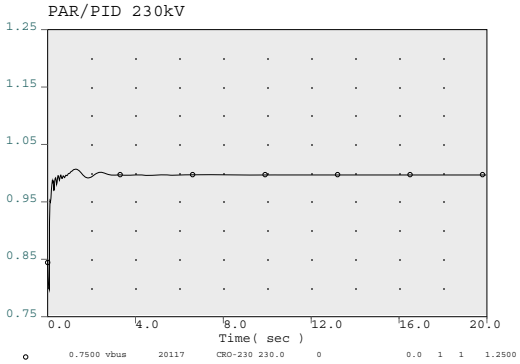
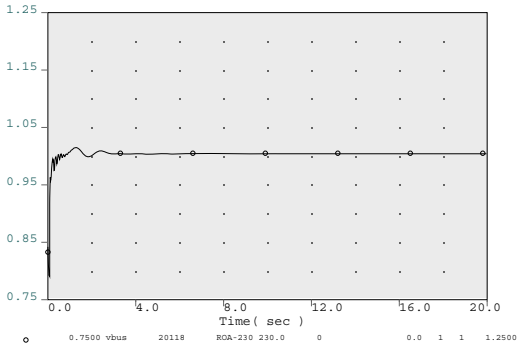
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_OM-MLX-SX-prec1c2-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:45:00 2011

Affected System Voltage Check and Comparison

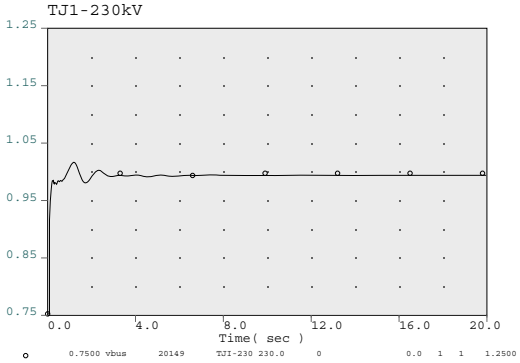
PAR/PID 230kV



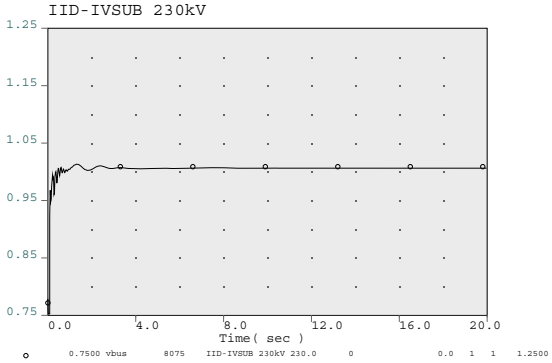
ROA-230kV



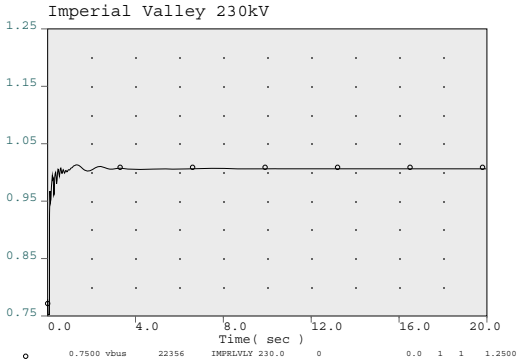
TJ1-230kV



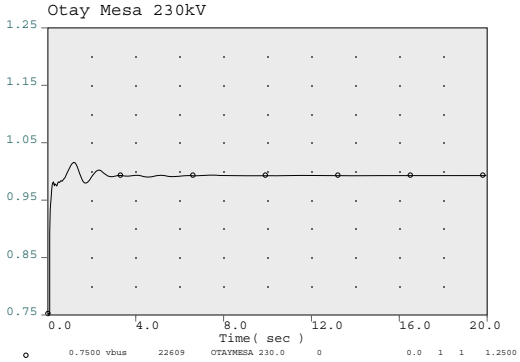
IID-IVSUB 230kV



Imperial Valley 230kV



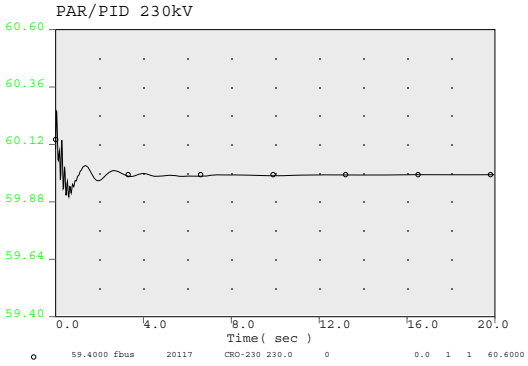
Otay Mesa 230kV



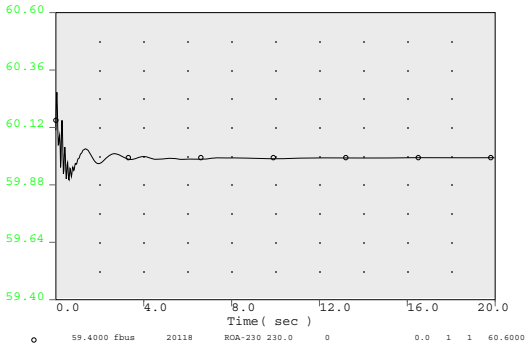
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

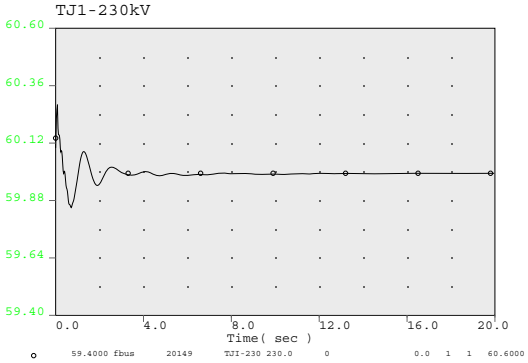
PAR/PID 230kV



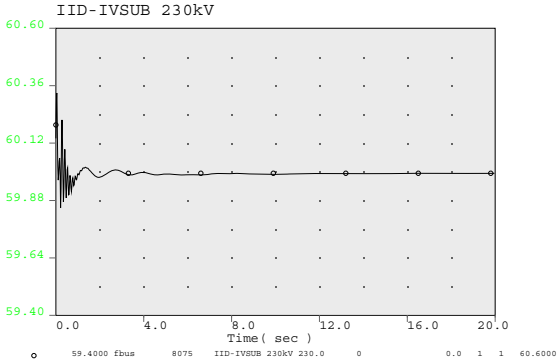
ROA-230kV



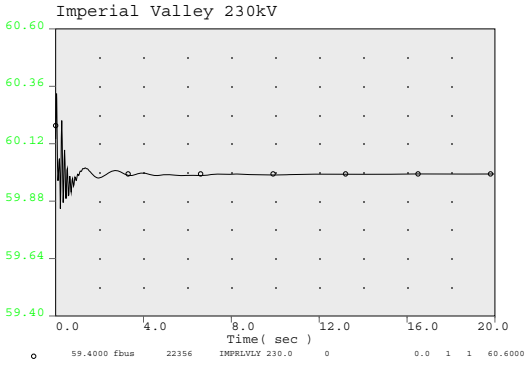
TJ1-230kV



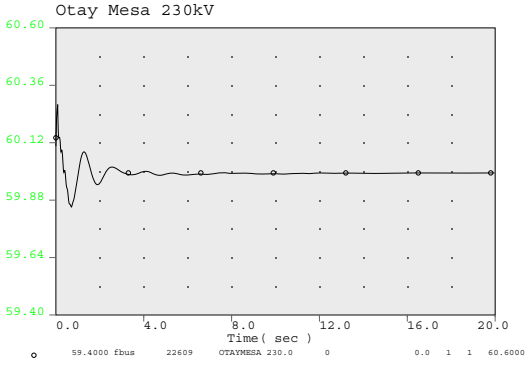
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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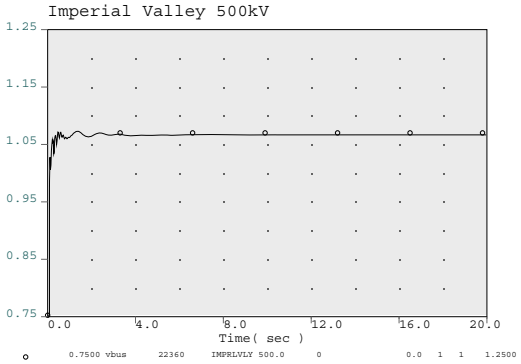
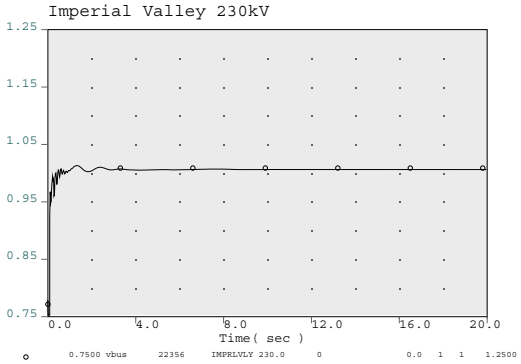
SDGE	tran-c1c2-hs-pre-r12_OM-MLX-SX-prec1c2-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:45:01 2011

VOLTAGE

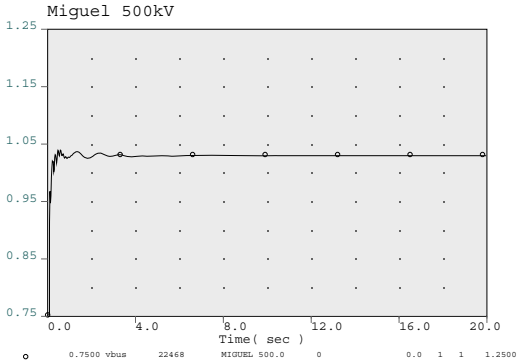
Imperial Valley 500kV



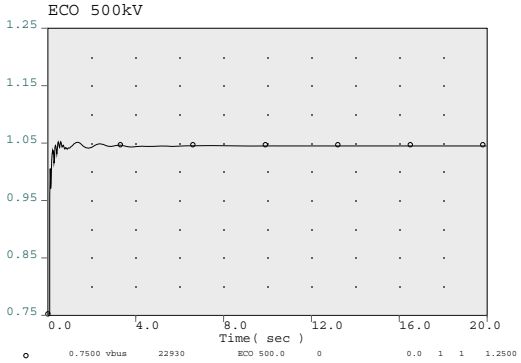
Imperial Valley 230kV



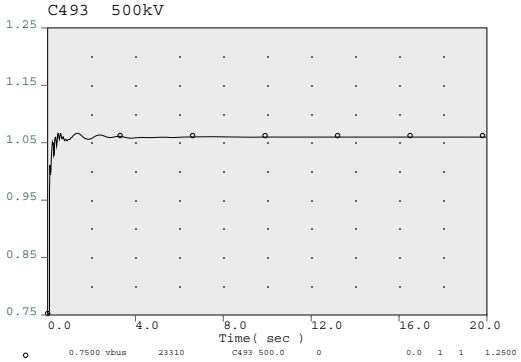
Miguel 500kV



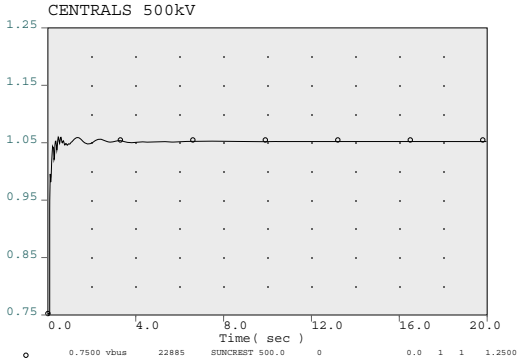
ECO 500kV



C493 500kV



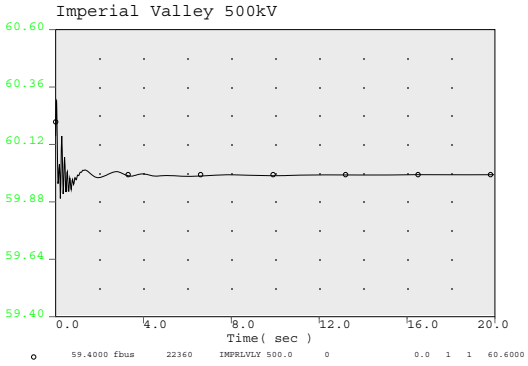
CENTRALS 500kV



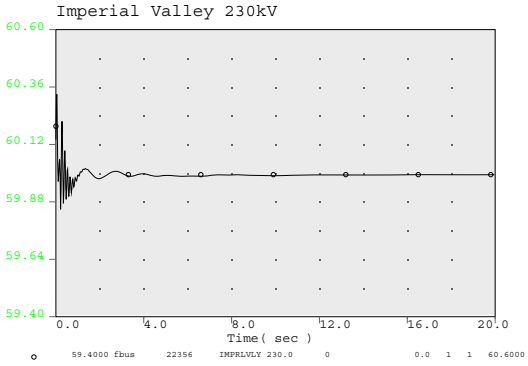
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

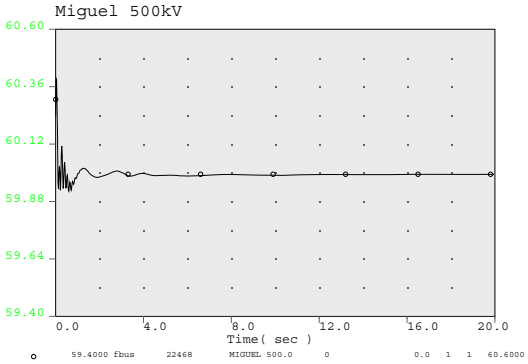
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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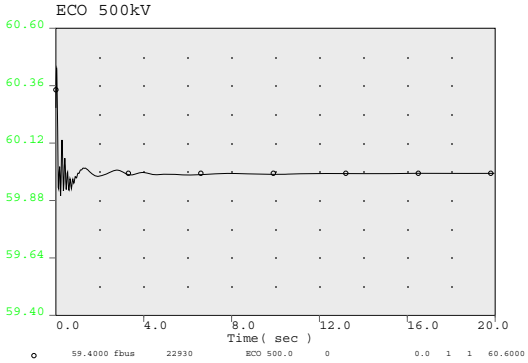
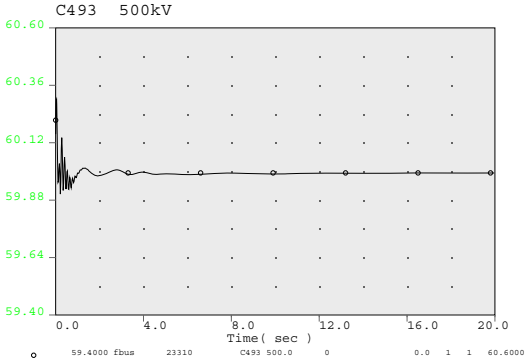
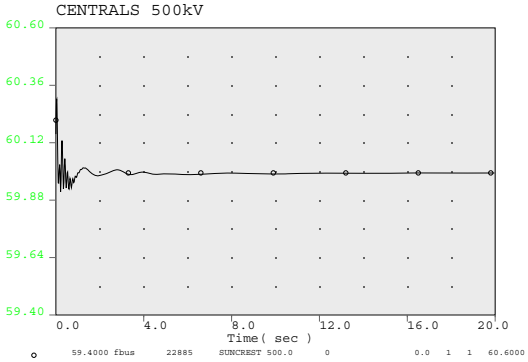


C493 500kV

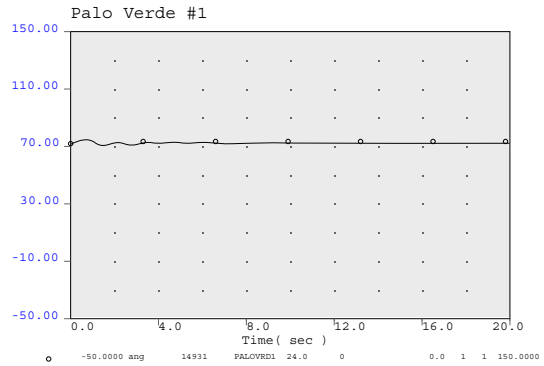


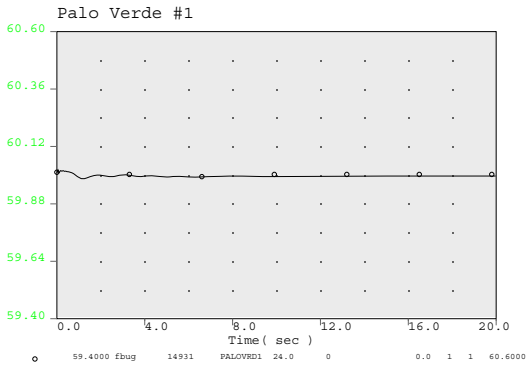
CENTRALS 500kV

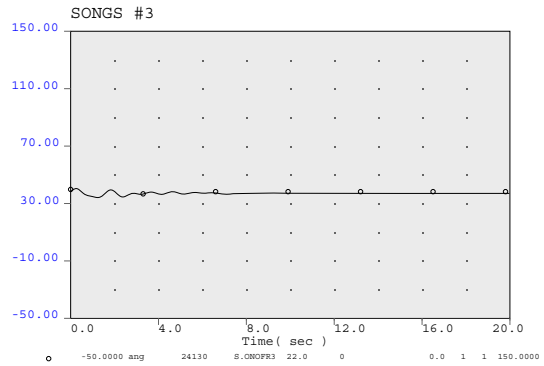


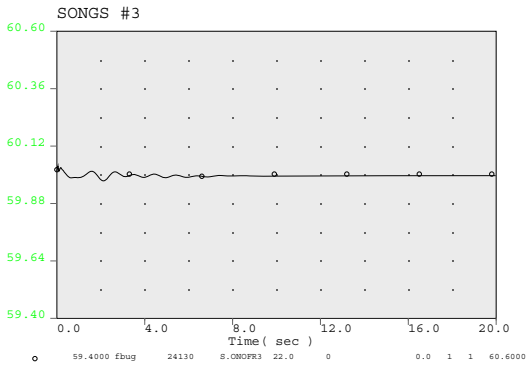
C1 C2 Heavy Summer Pre Without Upgrades

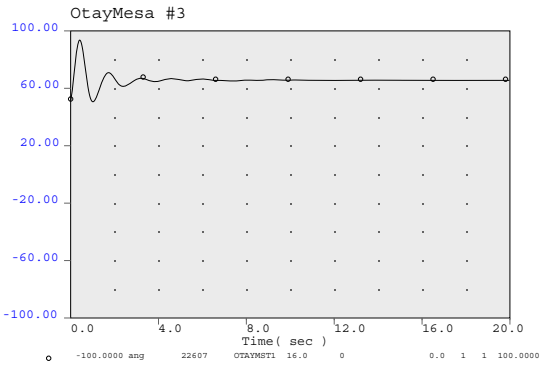
RELATIVE ROTOR ANGLE & FREQUENCY

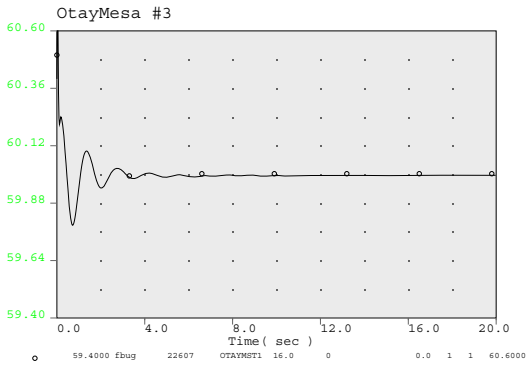












C1 C2 Heavy Summer Pre Without Upgrades

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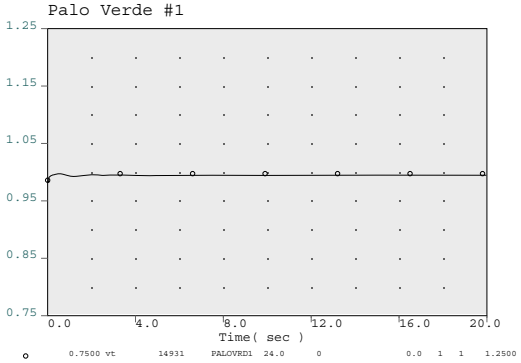
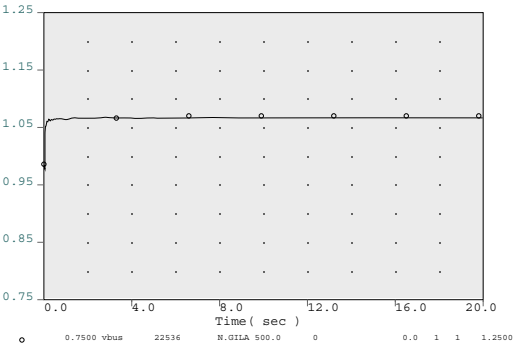
RELATIVE VOLTAGE

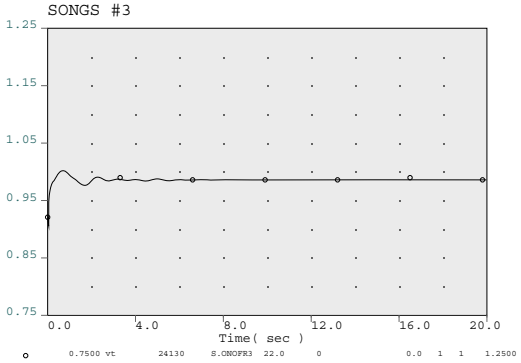
Palo Verde #1



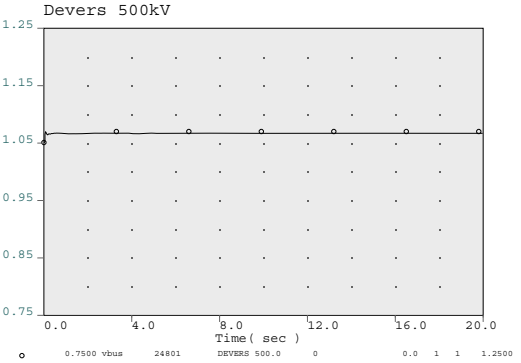
N Gila 500kV



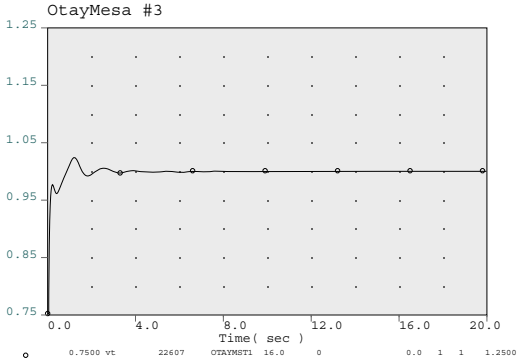
SONGS #3



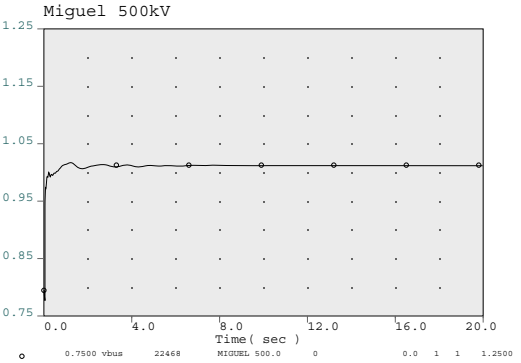
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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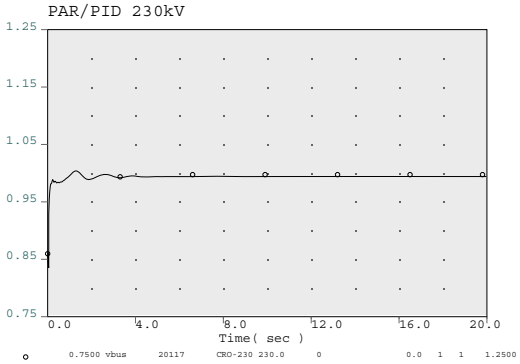
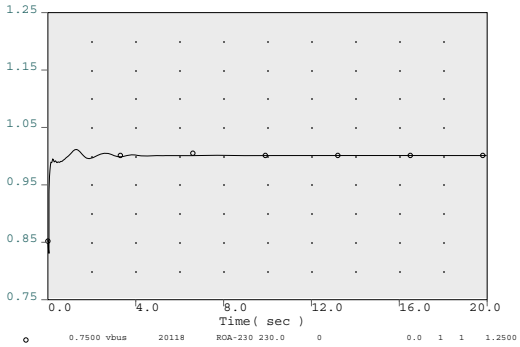
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:46:02 2011

Affected System Voltage Check and Comparison

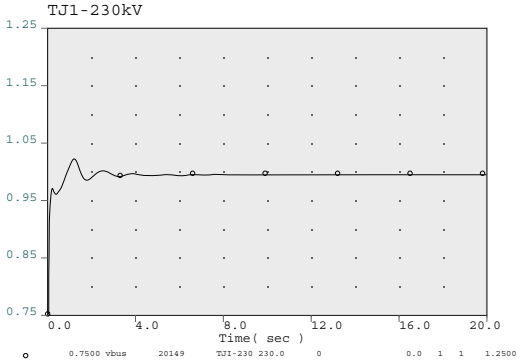
PAR/PID 230kV



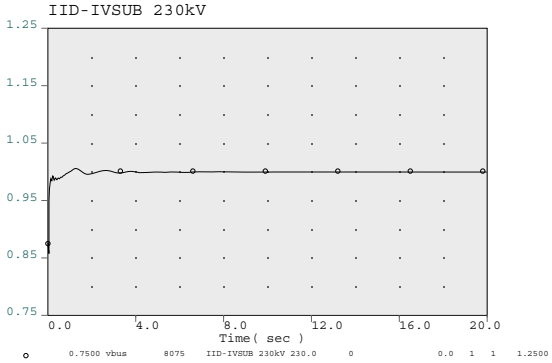
ROA-230kV



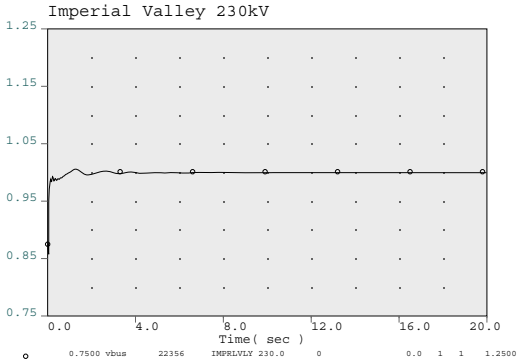
TJ1-230kV



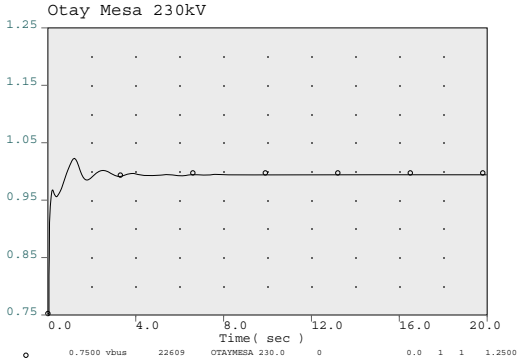
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



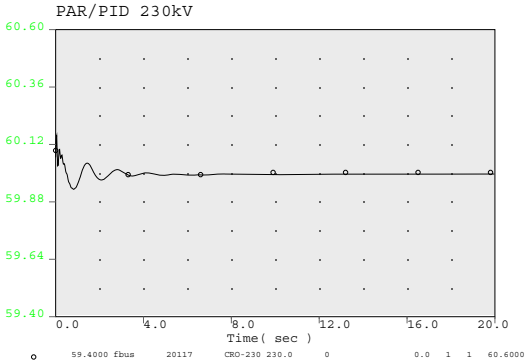
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

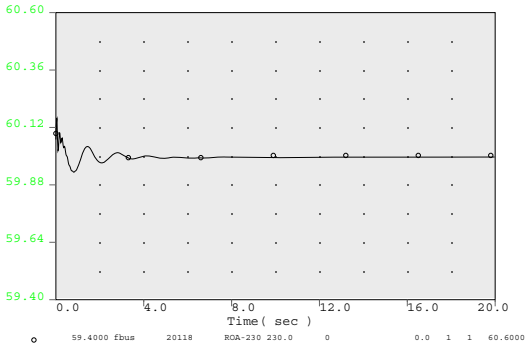
SDGE	tran-c1c2-hs-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:46:02 2011

Affected System Frequency Check and Comparison

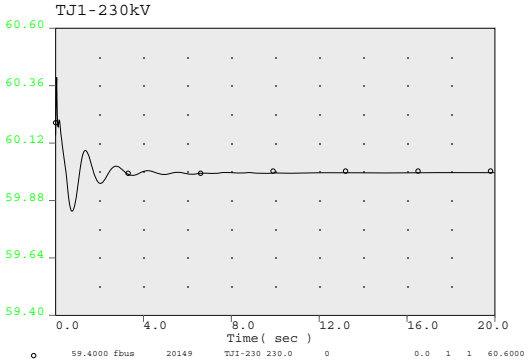
PAR/PID 230kV



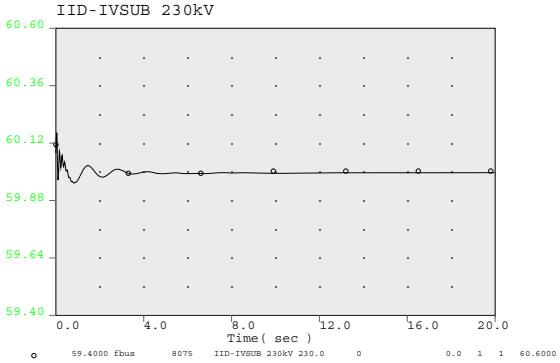
ROA-230kV



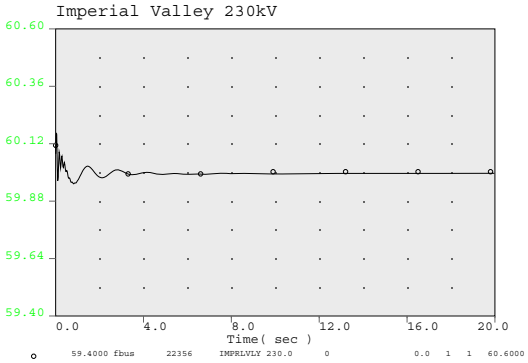
TJ1-230kV



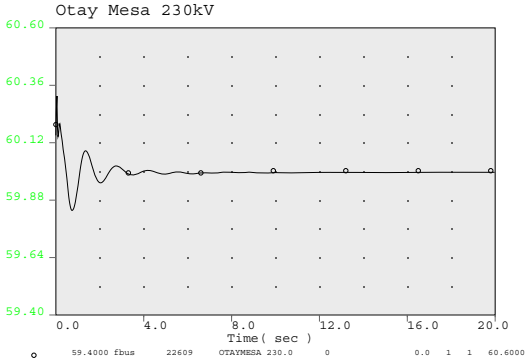
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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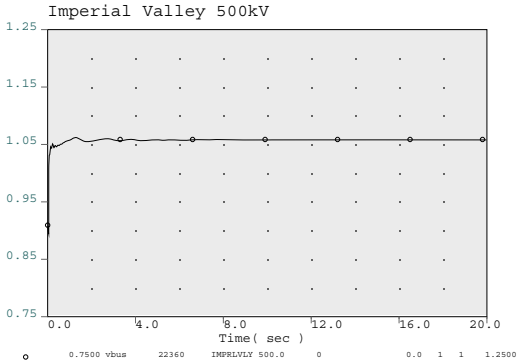
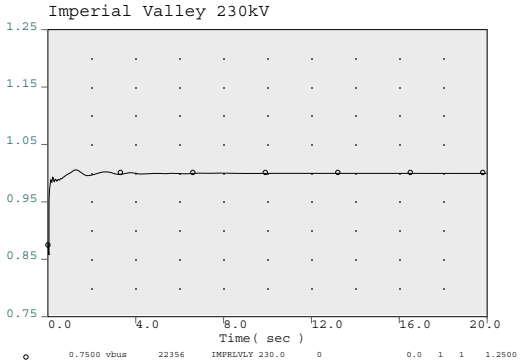
SDGE	tran-c1c2-hs-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:46:02 2011

VOLTAGE

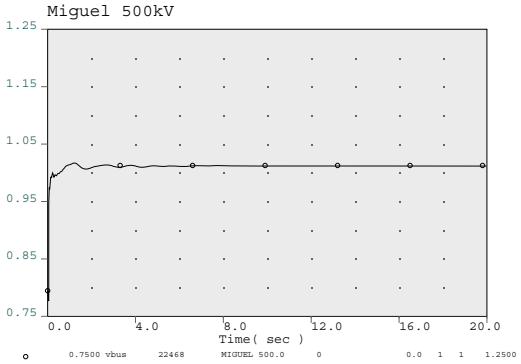
Imperial Valley 500kV



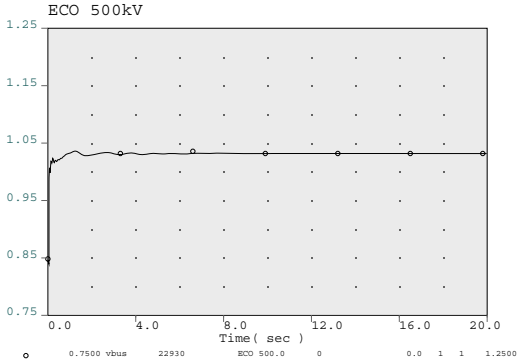
Imperial Valley 230kV



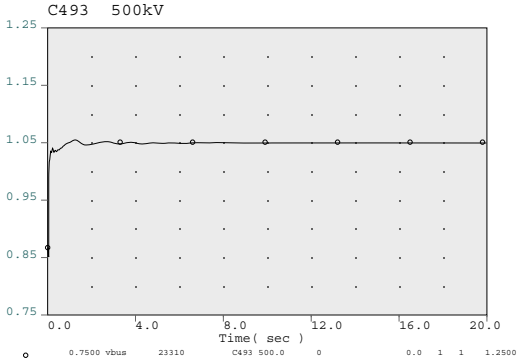
Miguel 500kV



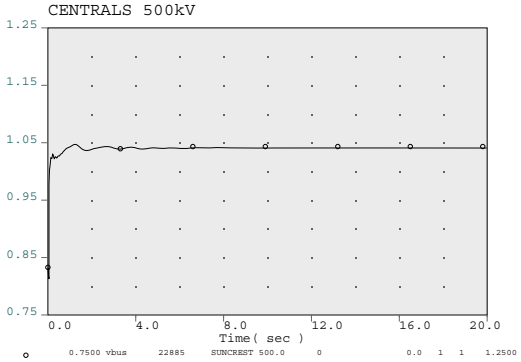
ECO 500kV



C493 500kV



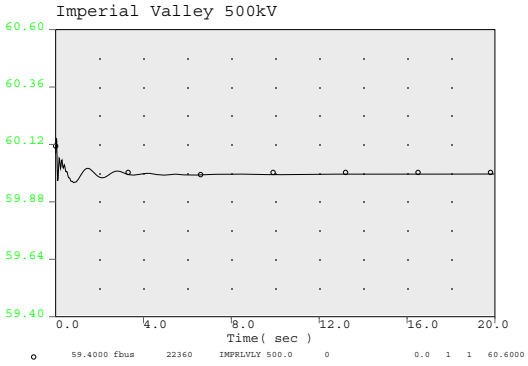
CENTRALS 500kV



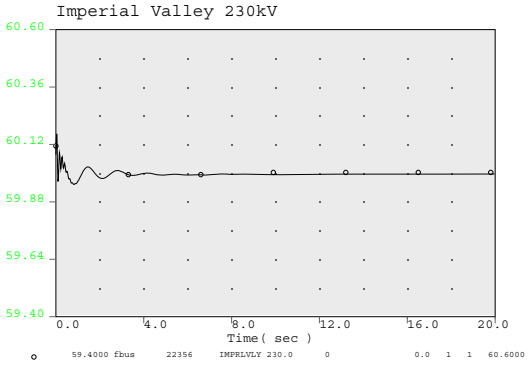
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

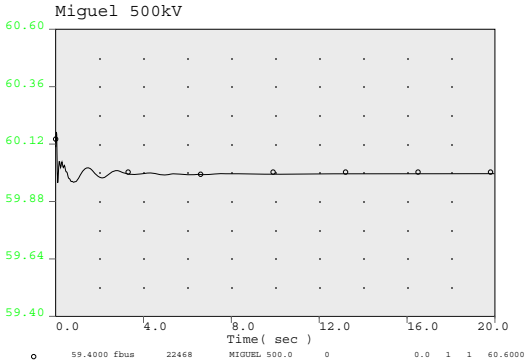
Imperial Valley 500kV



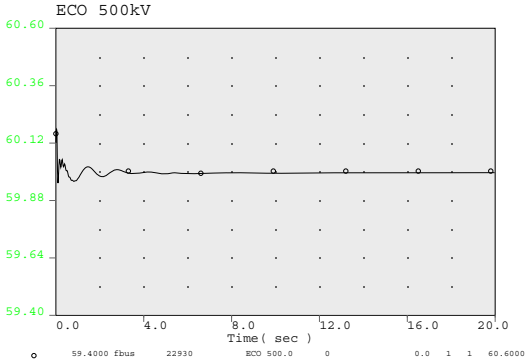
Imperial Valley 230kV



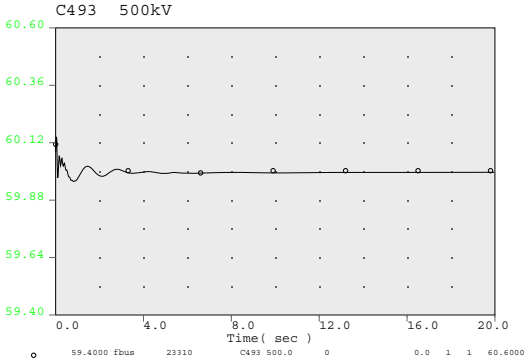
Miguel 500kV



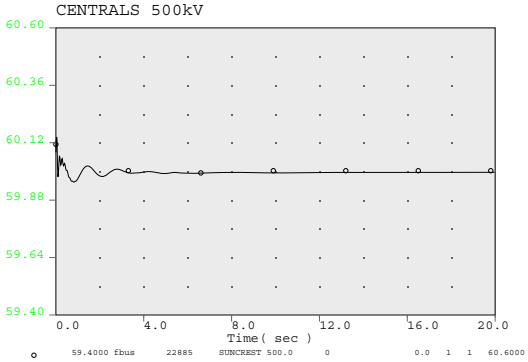
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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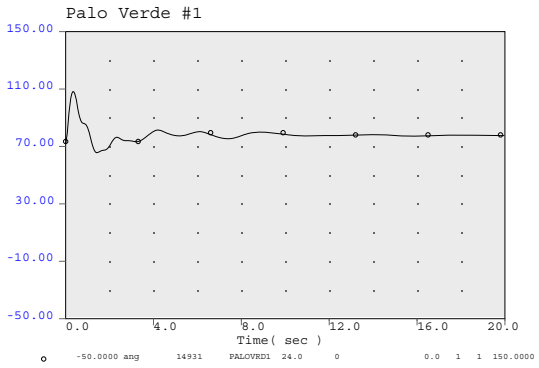
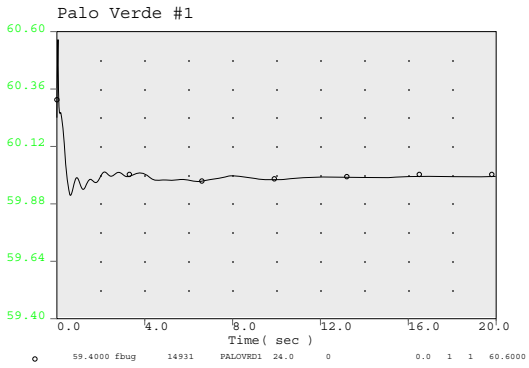
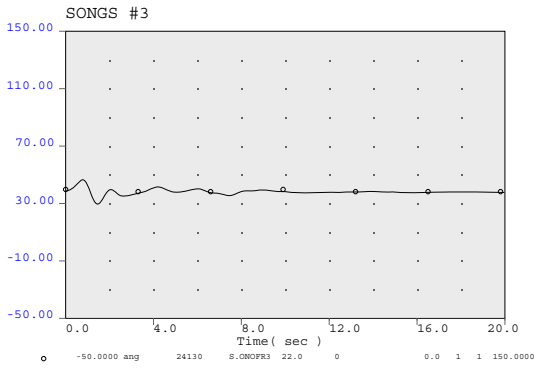
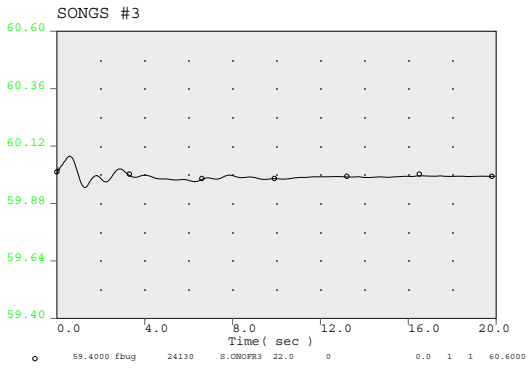
SDGE	tran-c1c2-hs-pre-r12_OM-SY-prec1c2-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:46:03 2011

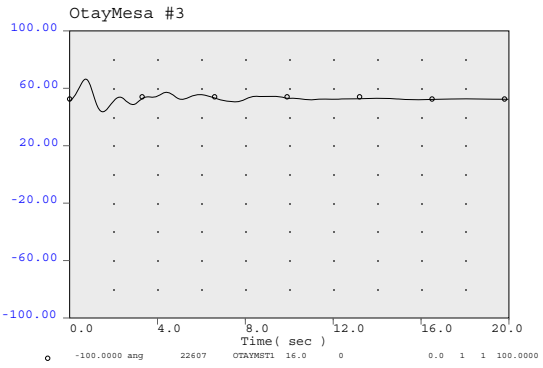
RELATIVE ROTOR ANGLE & FREQUENCY

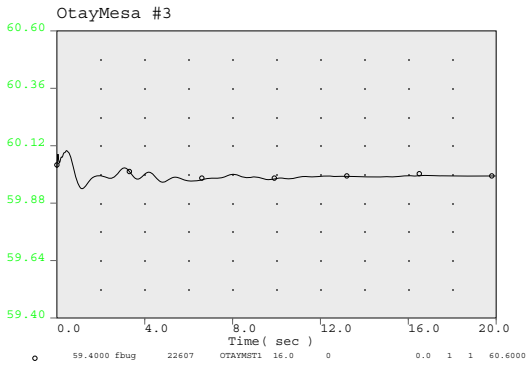












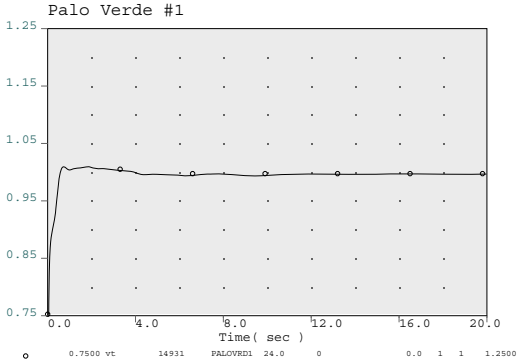
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

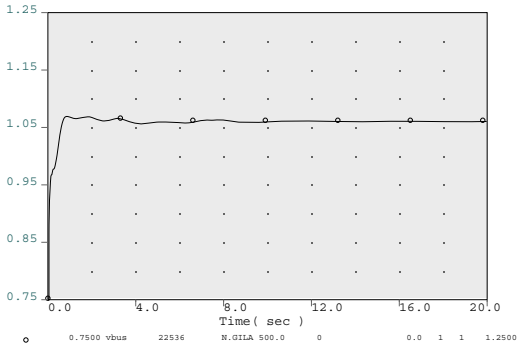
SDGE	tran-c1c2-hs-pre-r12_pal-col-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:23:57 2011

RELATIVE VOLTAGE

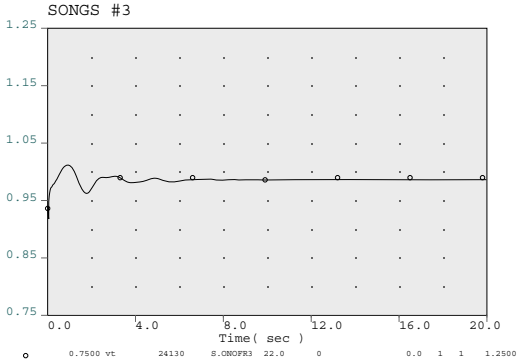
Palo Verde #1



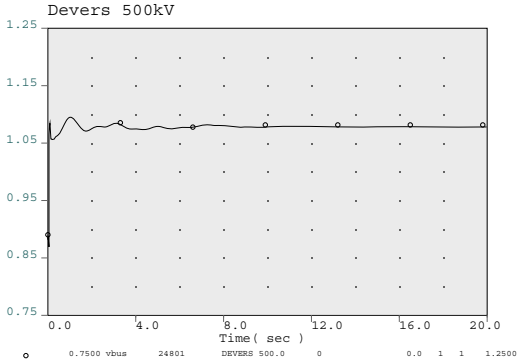
N Gila 500kV



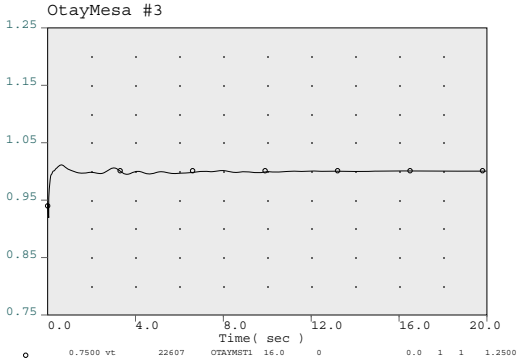
SONGS #3



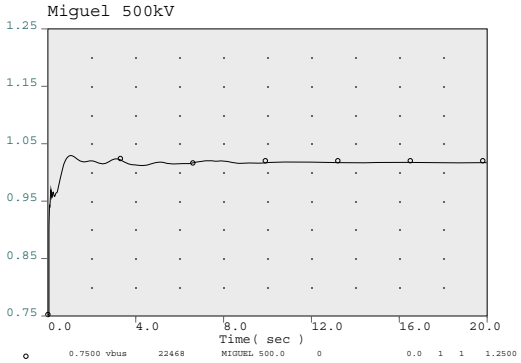
Devers 500kV



OtayMesa #3



Miguel 500kV



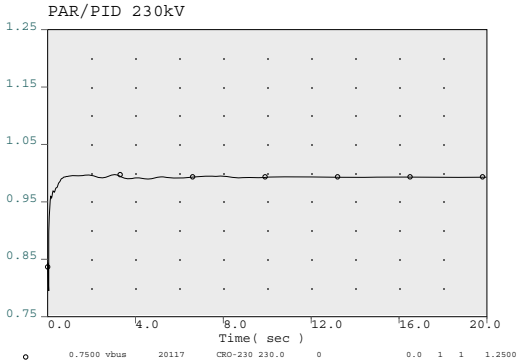
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

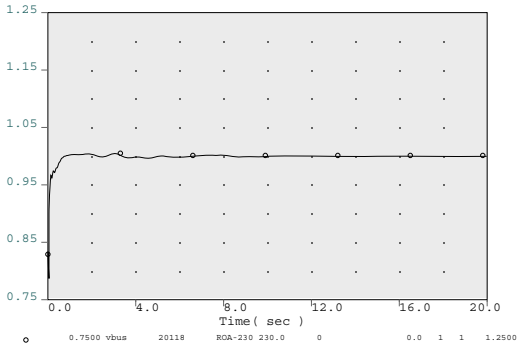
SDGE	tran-c1c2-hs-pre-r12_pal-col-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:23:57 2011

Affected System Voltage Check and Comparison

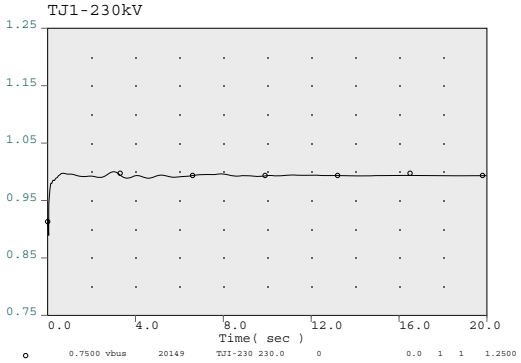
PAR/PID 230kV



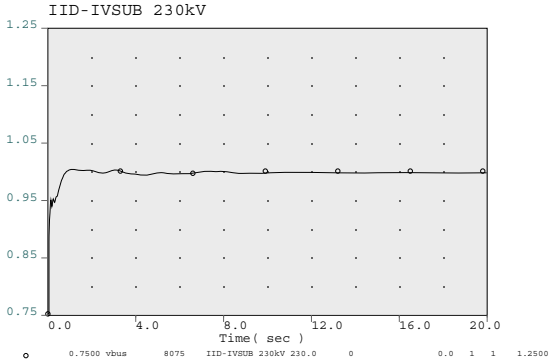
ROA-230kV



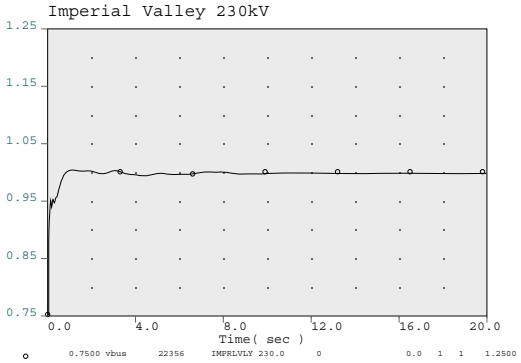
TJ1-230kV



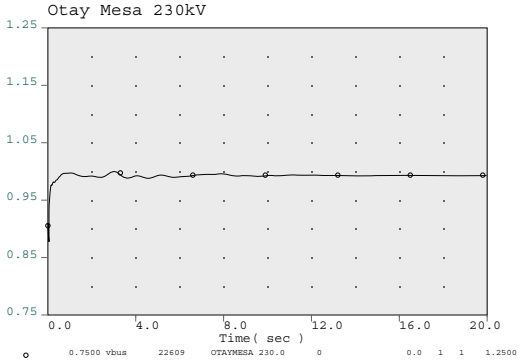
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



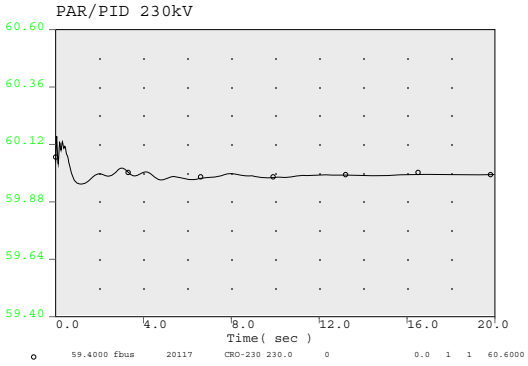
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

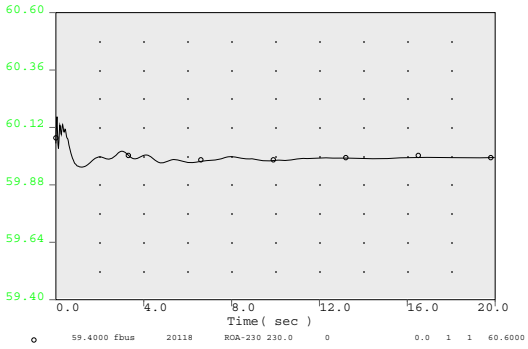
SDGE	tran-c1c2-hs-pre-r12_pal-col-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:23:58 2011

Affected System Frequency Check and Comparison

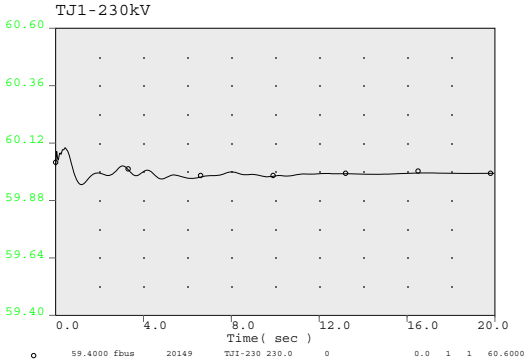
PAR/PID 230kV



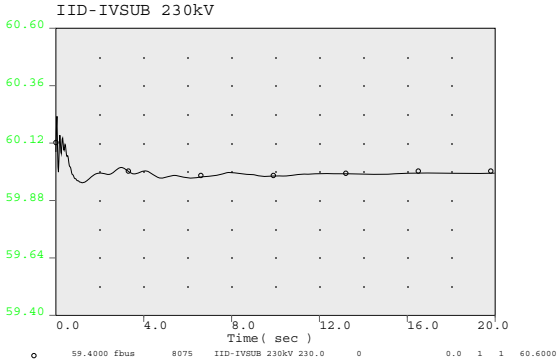
ROA-230kV



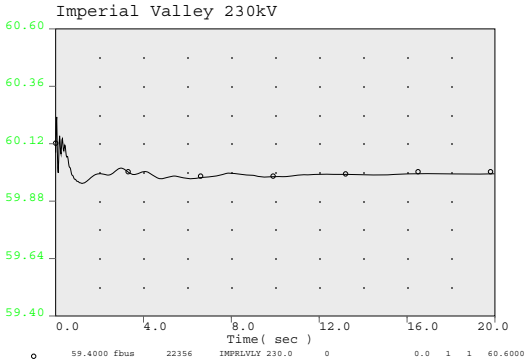
TJ1-230kV



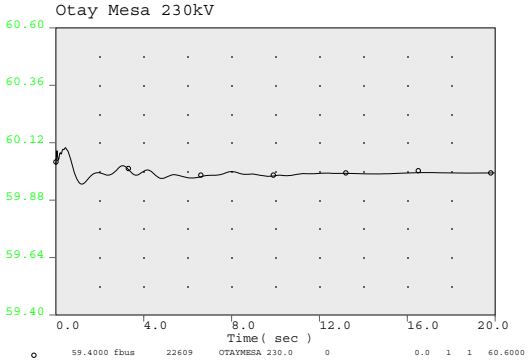
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



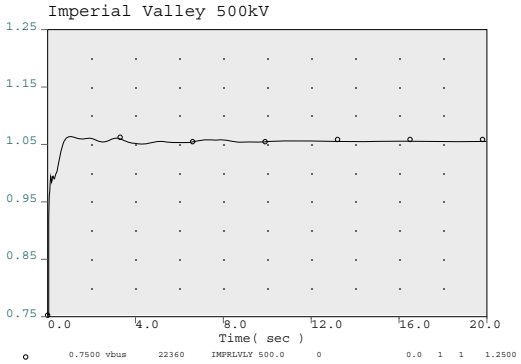
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

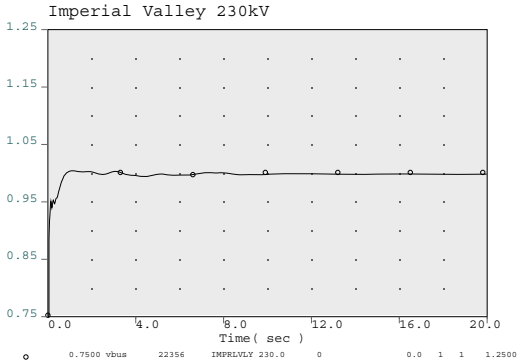
SDGE	tran-c1c2-hs-pre-r12_pal-col-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:23:58 2011

VOLTAGE

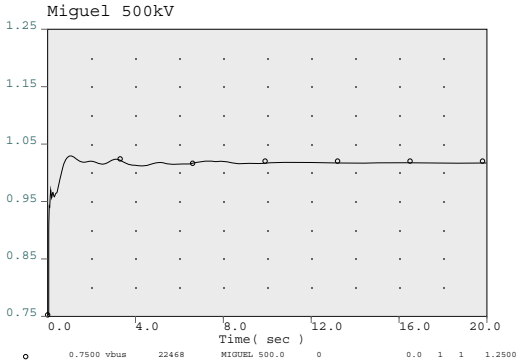
Imperial Valley 500kV



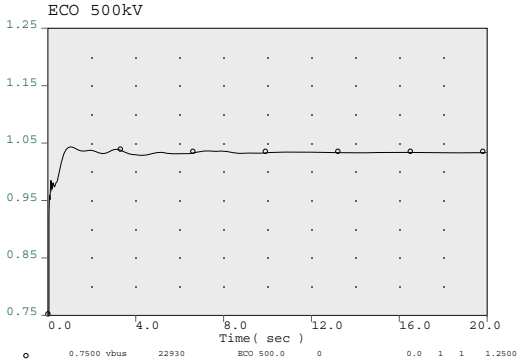
Imperial Valley 230kV



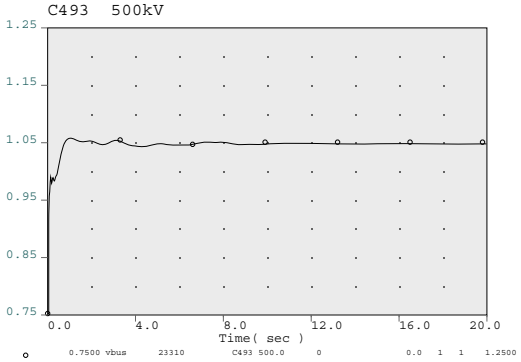
Miguel 500kV



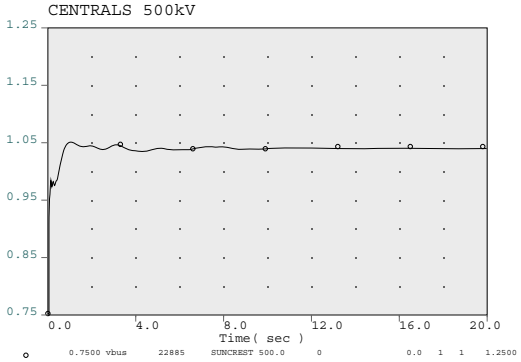
ECO 500kV



C493 500kV



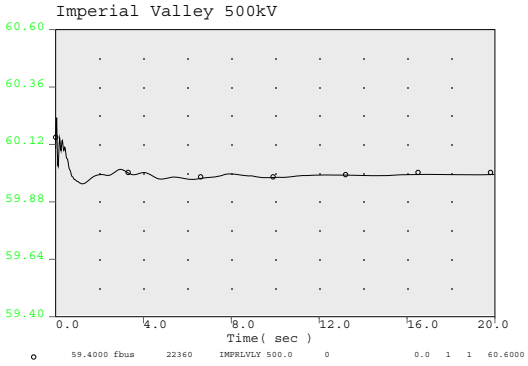
CENTRALS 500kV



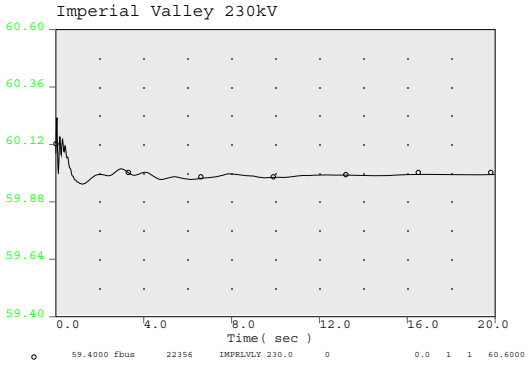
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

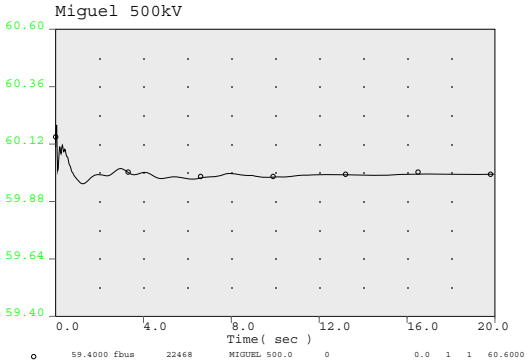
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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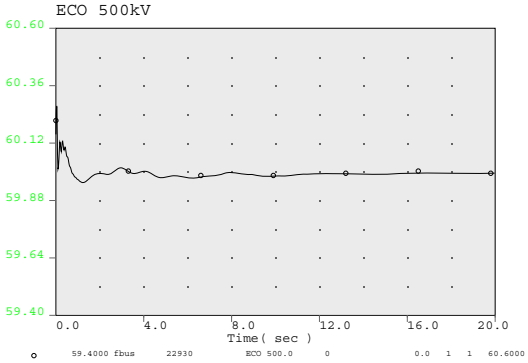

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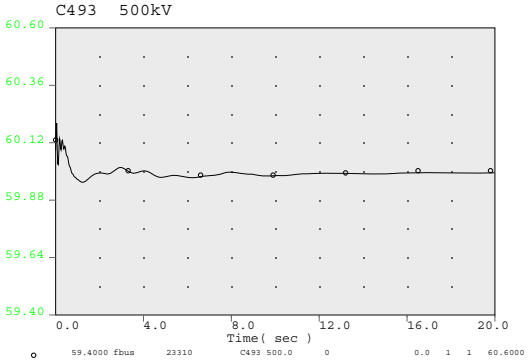
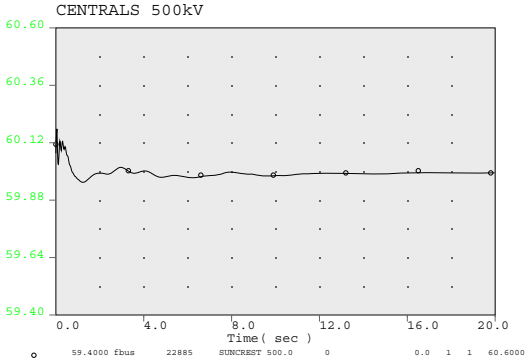


CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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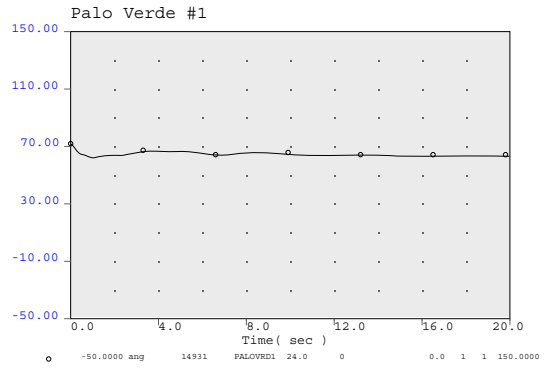
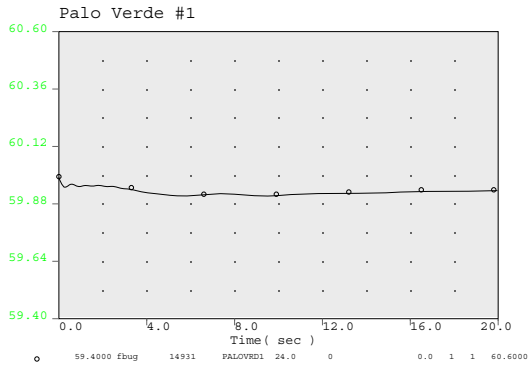
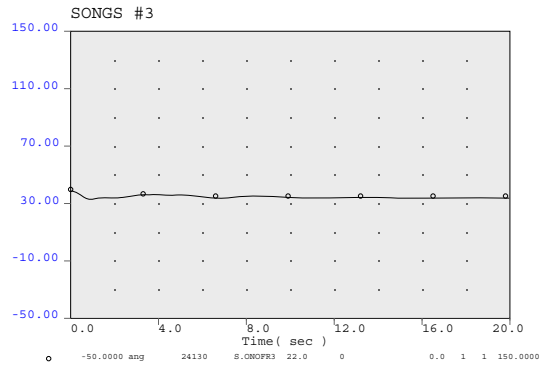
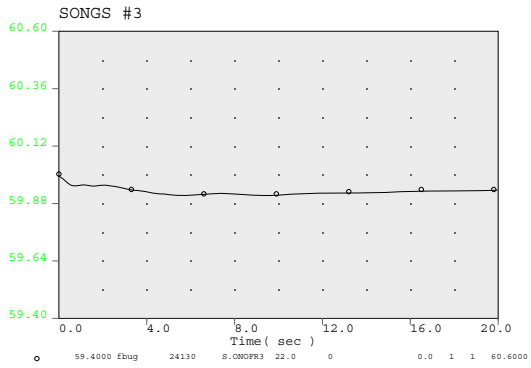
SDGE	tran-c1c2-hs-pre-r12_pal-col-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:24:00 2011

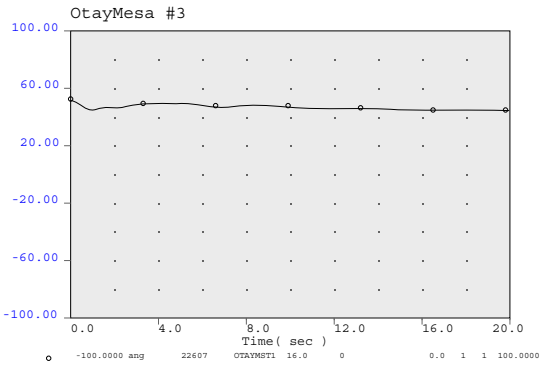
RELATIVE ROTOR ANGLE & FREQUENCY

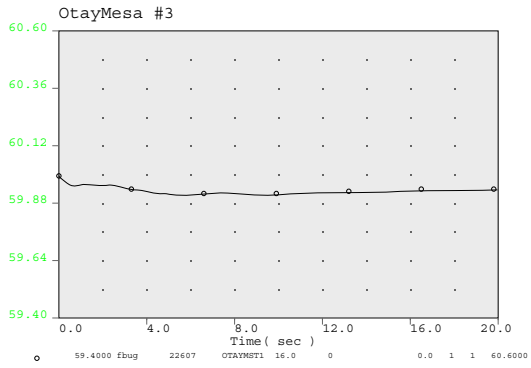










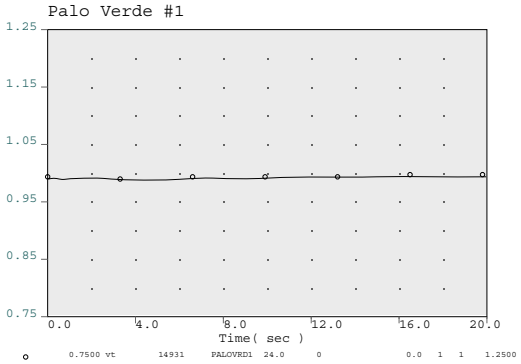


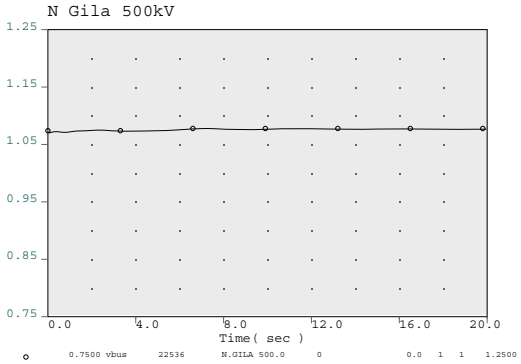
C1 C2 Heavy Summer Pre Without Upgrades

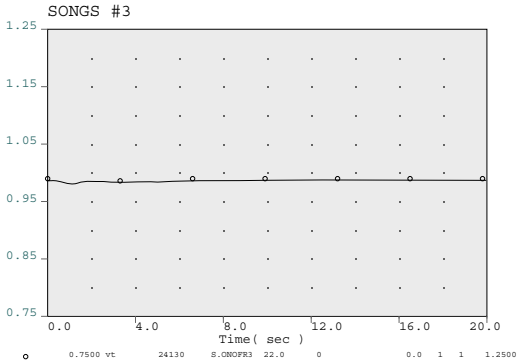
Page 1

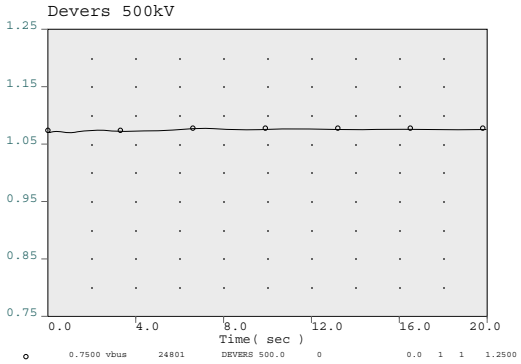
SDGE	tran-c1c2-hs-pre-r12_PaloVerde-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:26:01 2011

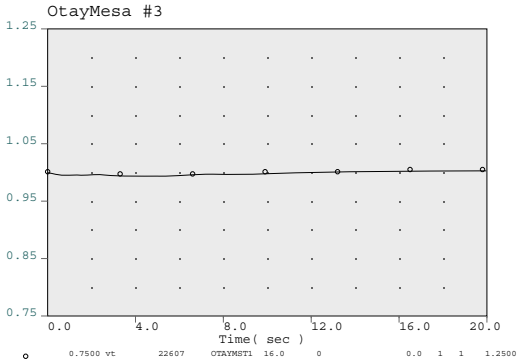
RELATIVE VOLTAGE

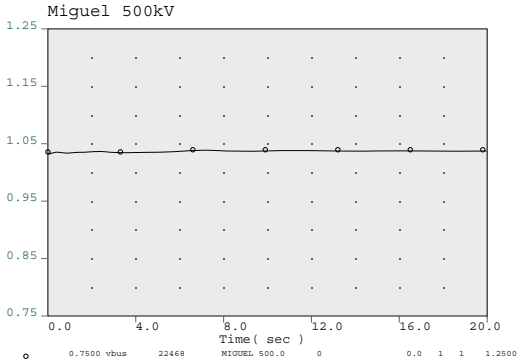












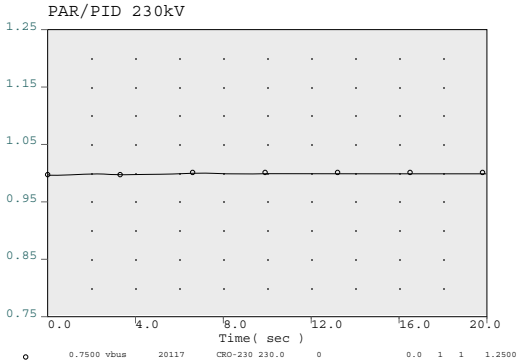
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

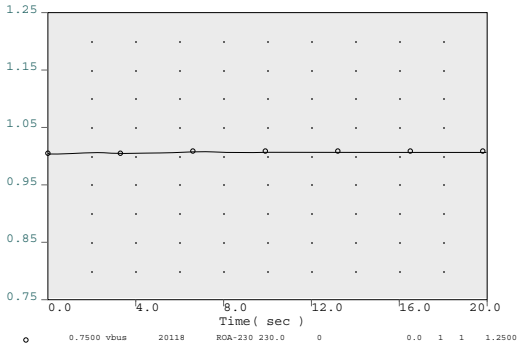
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_PaloVerde-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:26:02 2011

Affected System Voltage Check and Comparison

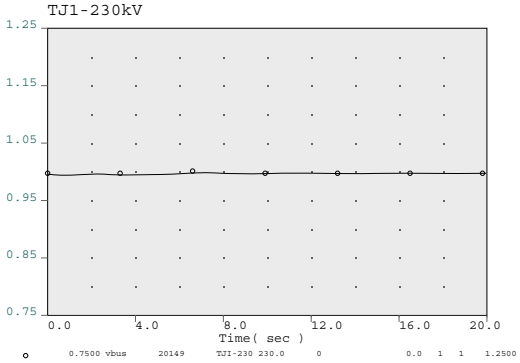
PAR/PID 230kV



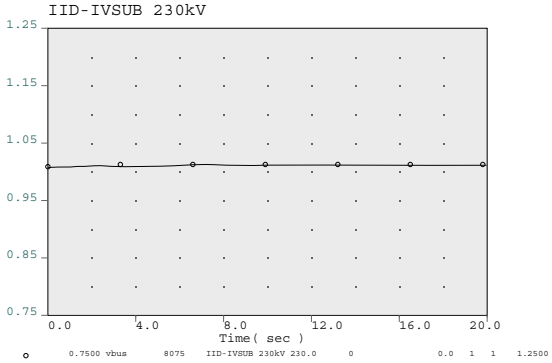
ROA-230kV



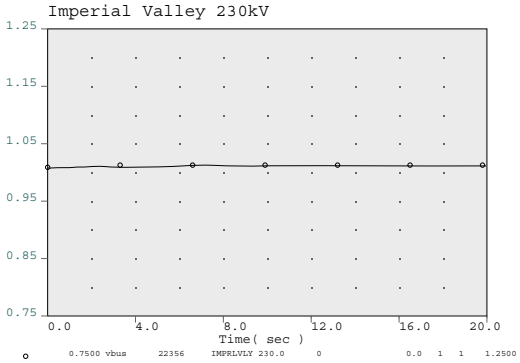
TJ1-230kV



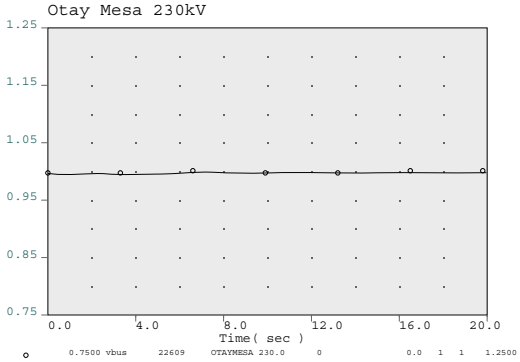
IID-IVSUB 230kV



Imperial Valley 230kV

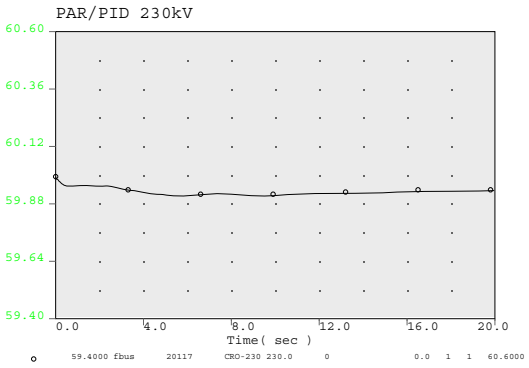


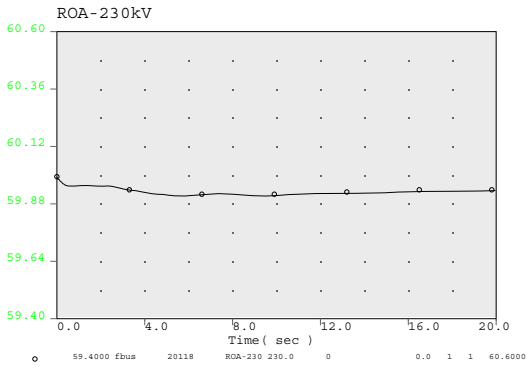
Otay Mesa 230kV

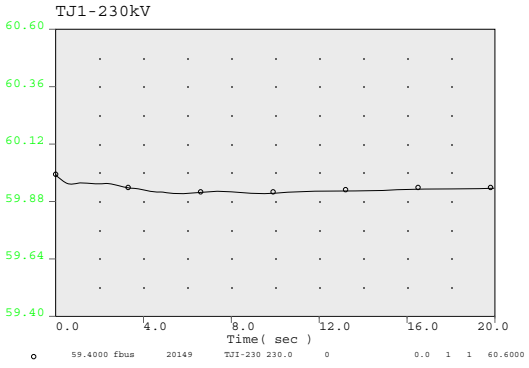


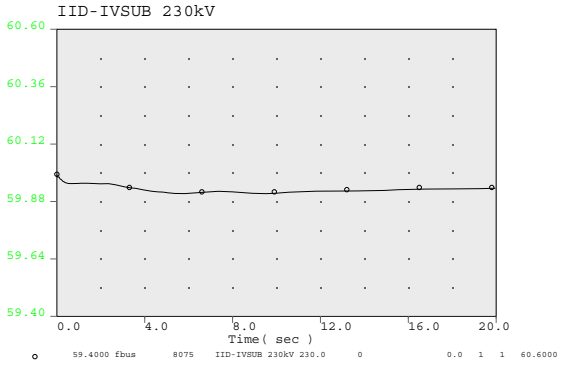
C1 C2 Heavy Summer Pre Without Upgrades

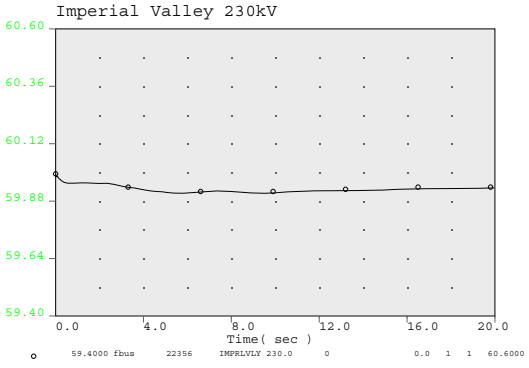
Affected System Frequency Check and Comparison

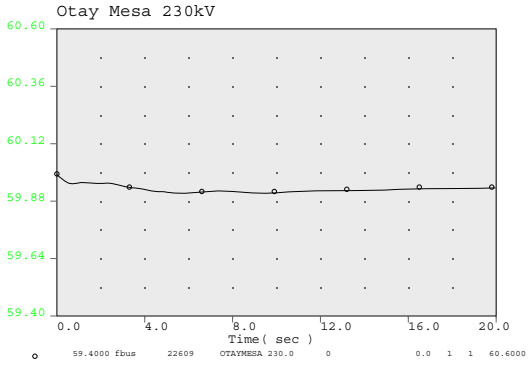












C1 C2 Heavy Summer Pre Without Upgrades

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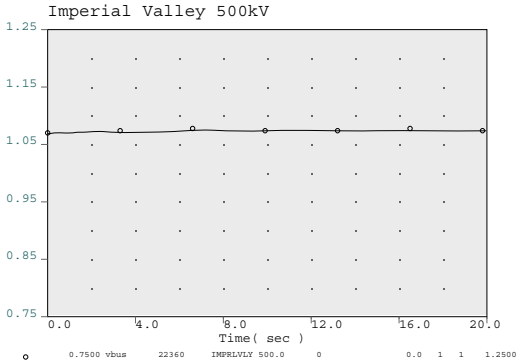
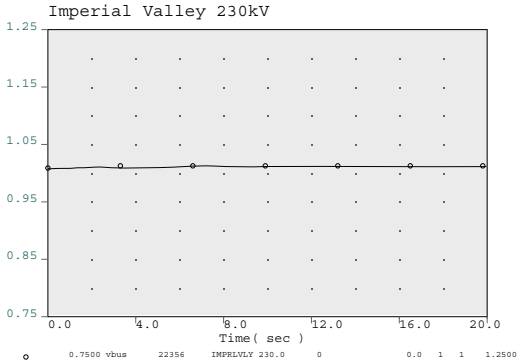
SDGE	tran-c1c2-hs-pre-r12_PaloVerde-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:26:03 2011

VOLTAGE

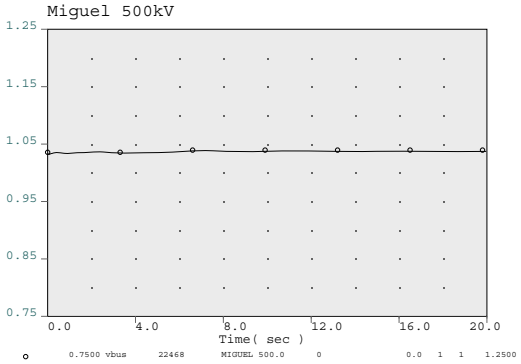
Imperial Valley 500kV



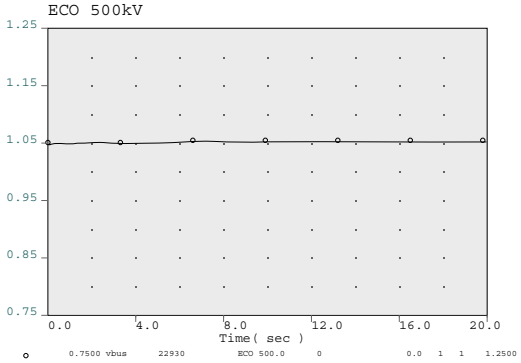
Imperial Valley 230kV



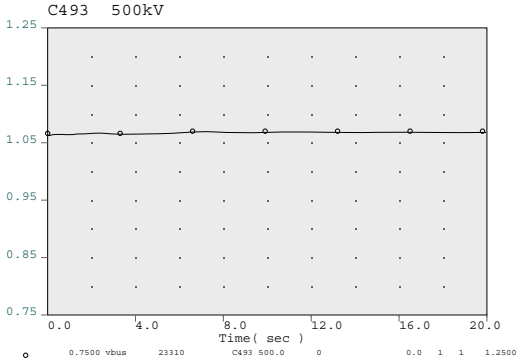
Miguel 500kV



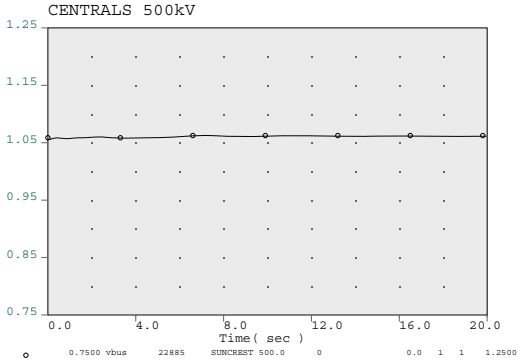
ECO 500kV



C493 500kV

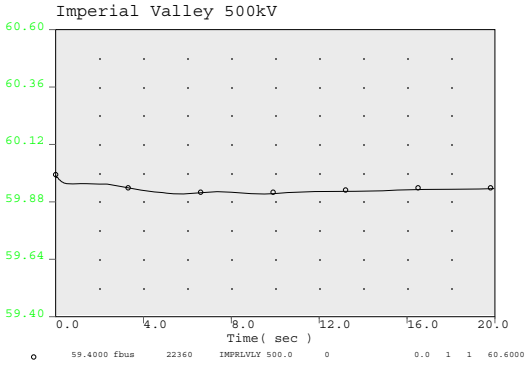


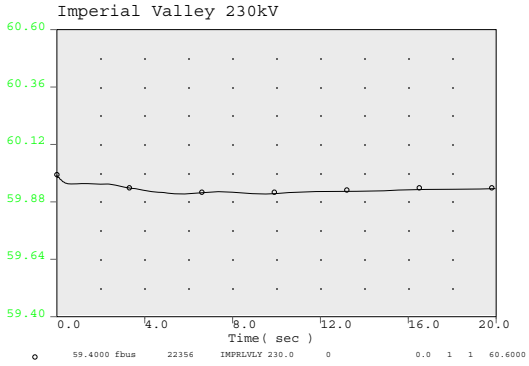
CENTRALS 500kV

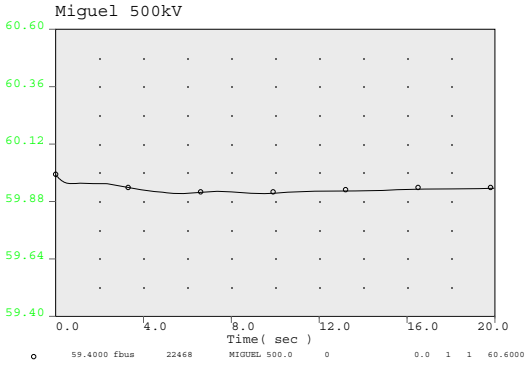


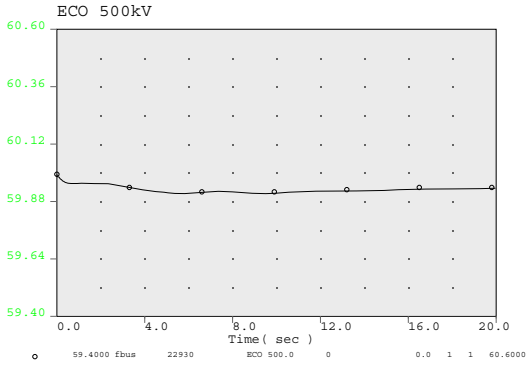
C1 C2 Heavy Summer Pre Without Upgrades

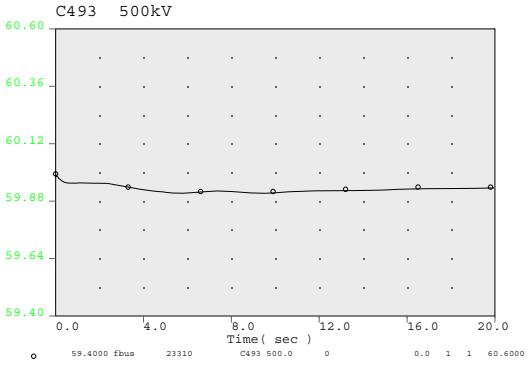
FREQUENCY

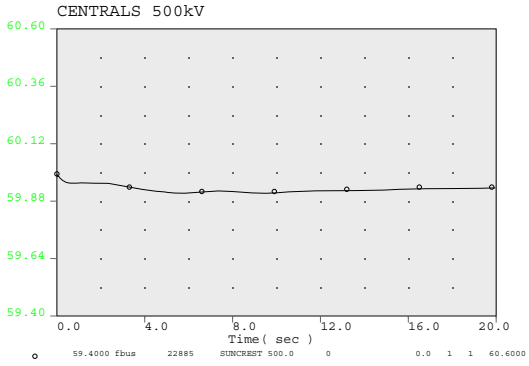










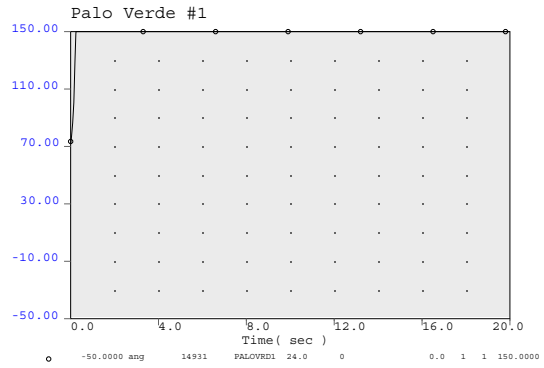


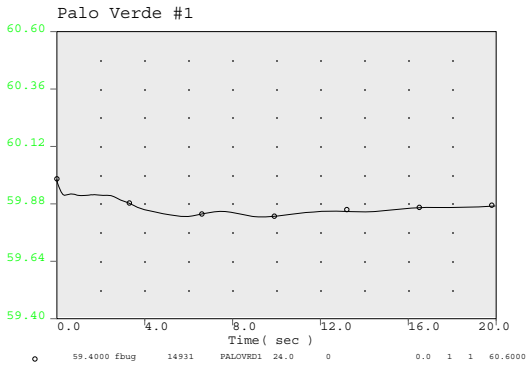
C1 C2 Heavy Summer Pre Without Upgrades

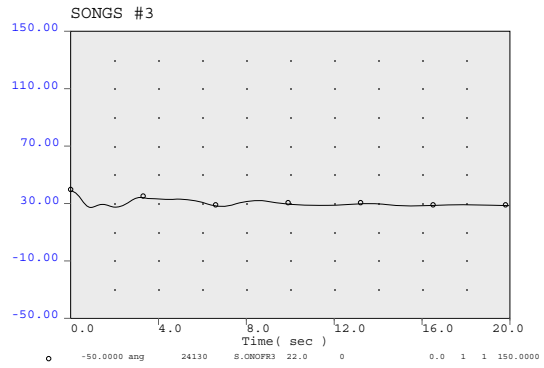
Page 6

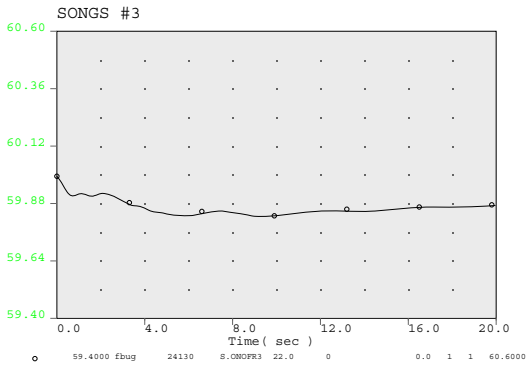
SDGE	tran-c1c2-hs-pre-r12_PaloVerde-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:26:04 2011

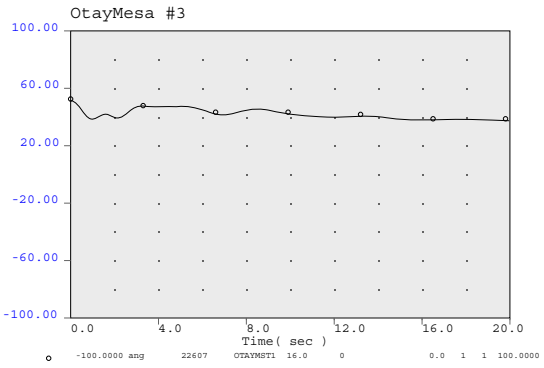
RELATIVE ROTOR ANGLE & FREQUENCY

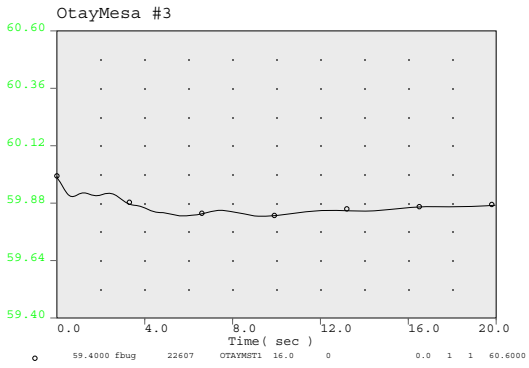












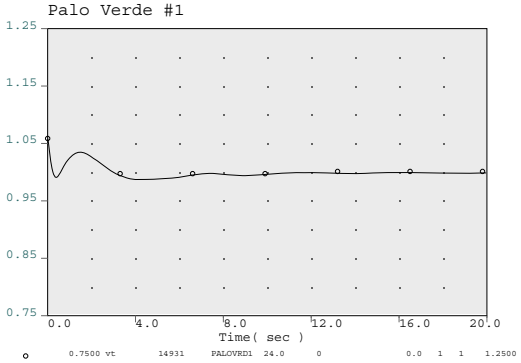
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

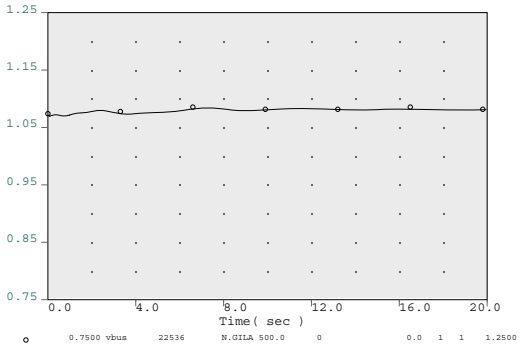
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_PaloVerde-g2.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:28:18 2011

RELATIVE VOLTAGE

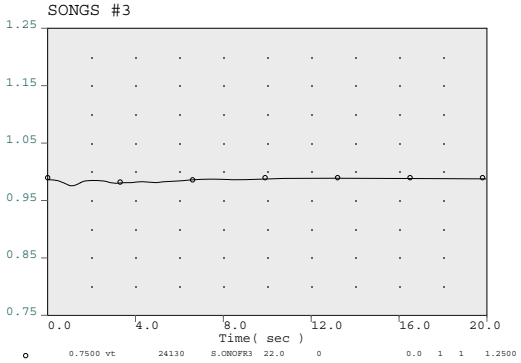
Palo Verde #1



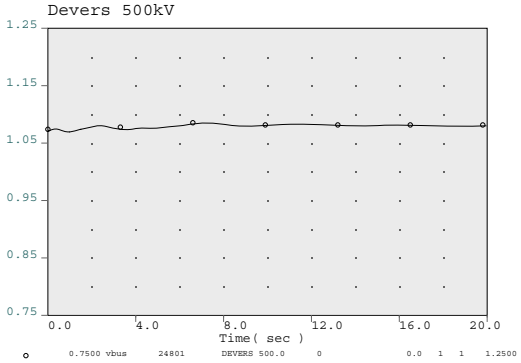
N Gila 500kV



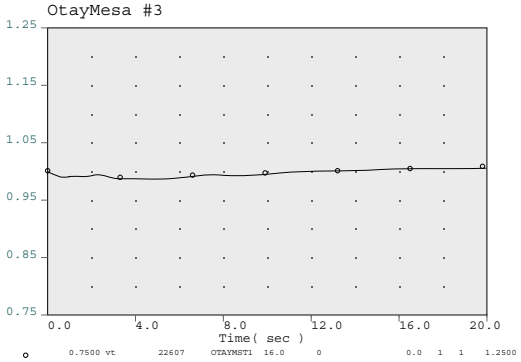
SONGS #3



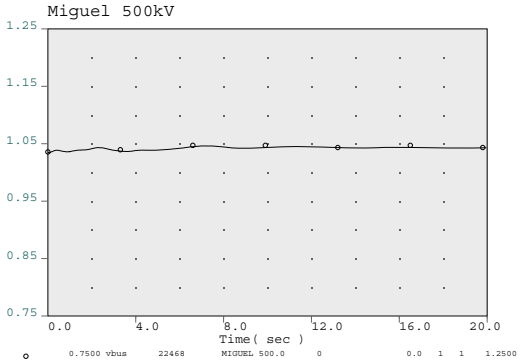
Devers 500kV



OtayMesa #3



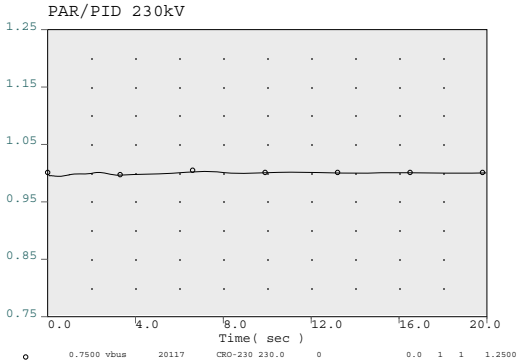
Miguel 500kV



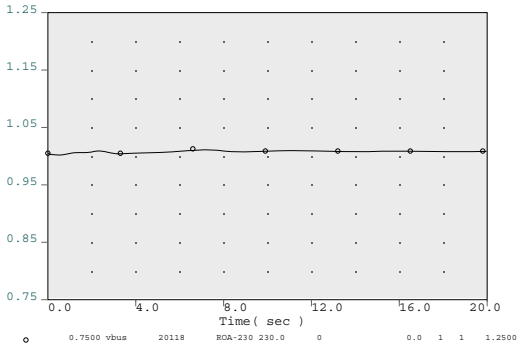
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Voltage Check and Comparison

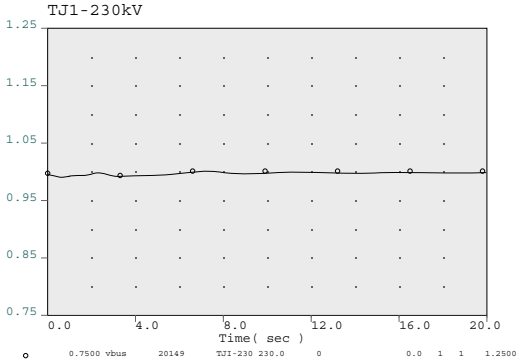
PAR/PID 230kV



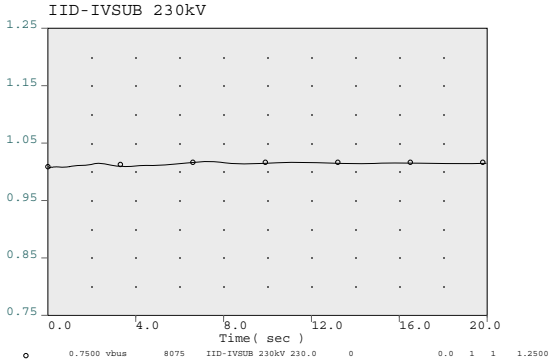
ROA-230kV



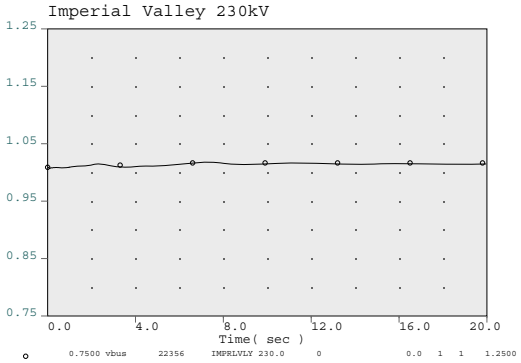
TJ1-230kV



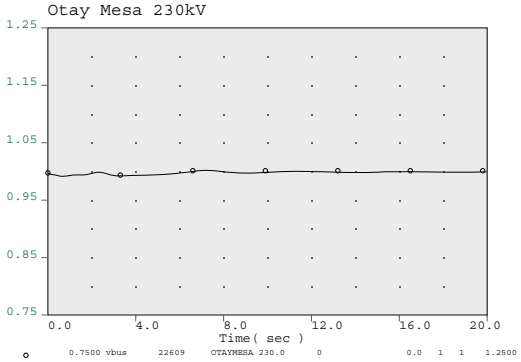
IID-IVSUB 230kV



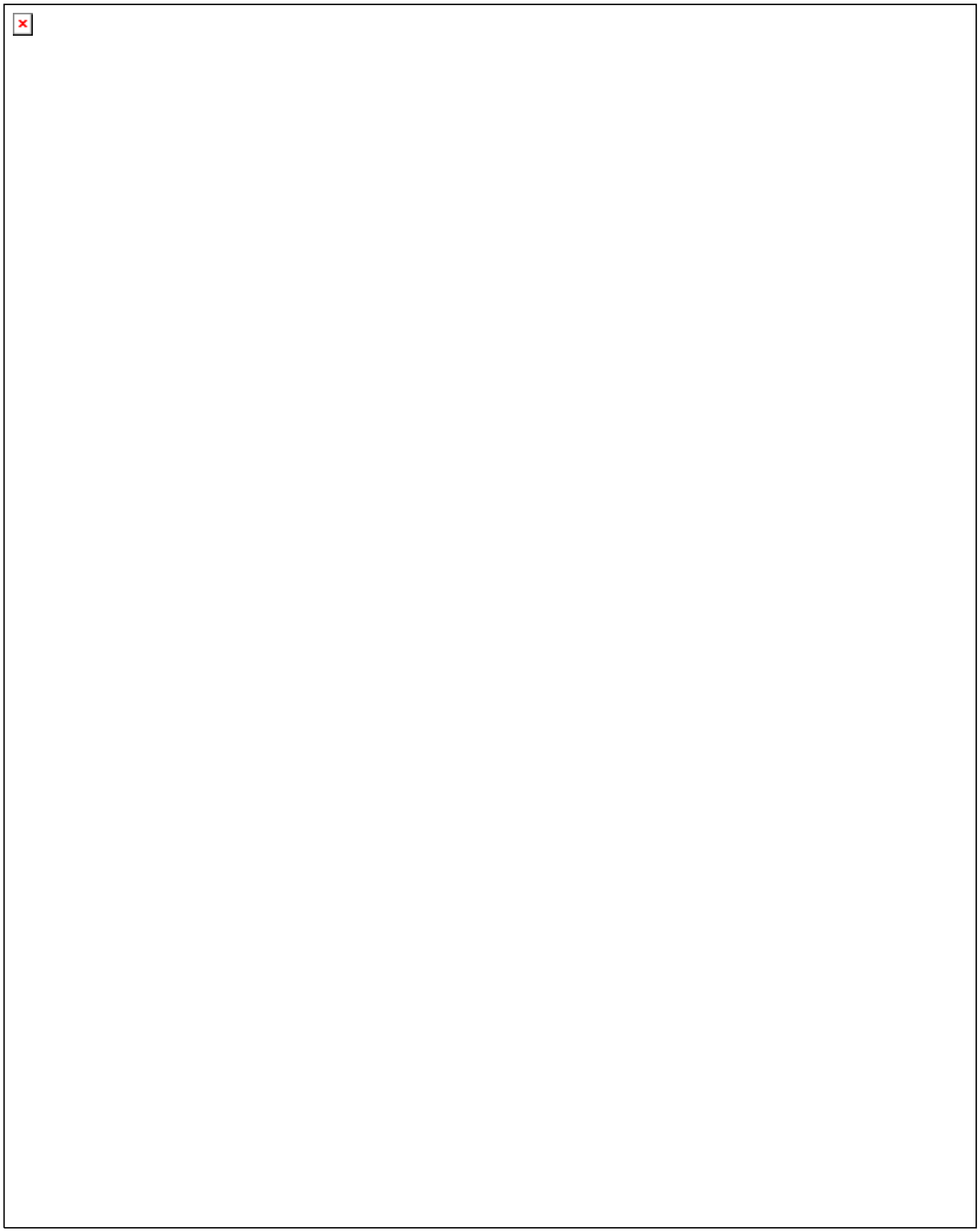
Imperial Valley 230kV



Otay Mesa 230kV

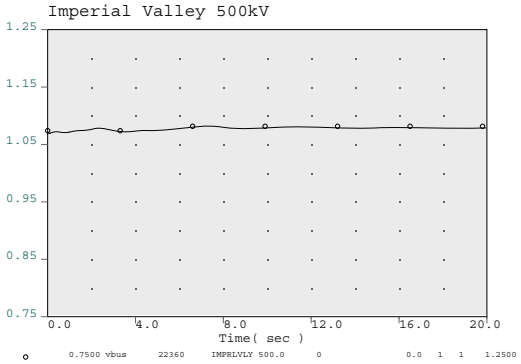


C1 C2 Heavy Summer Pre Without Upgrades

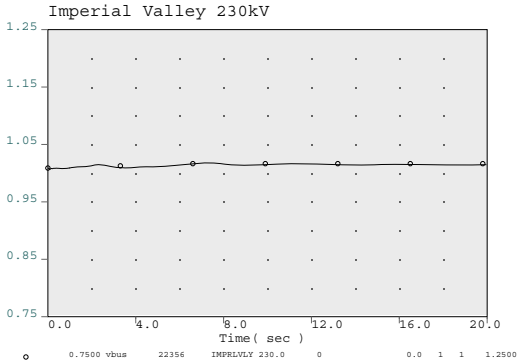


VOLTAGE

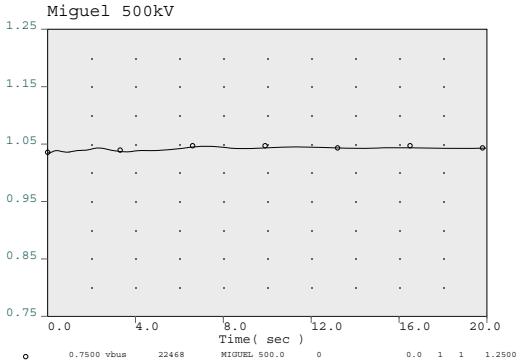
Imperial Valley 500kV



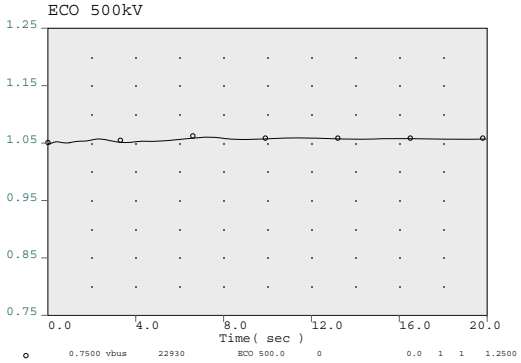
Imperial Valley 230kV



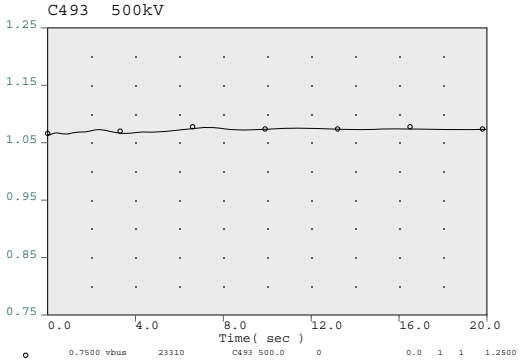
Miguel 500kV



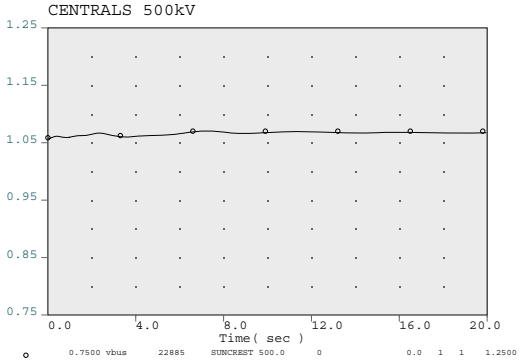
ECO 500kV



C493 500kV



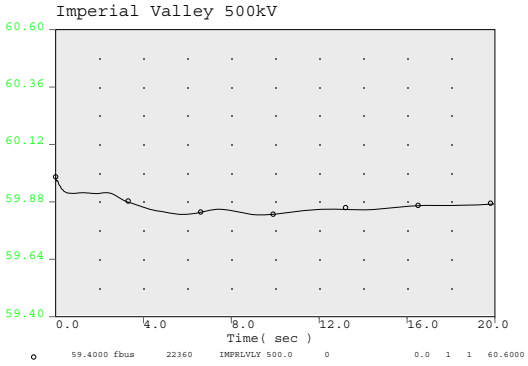
CENTRALS 500kV



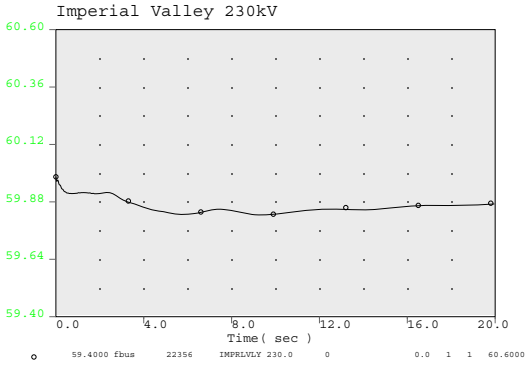
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

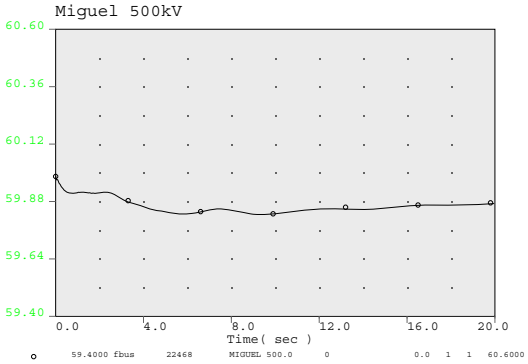
Imperial Valley 500kV



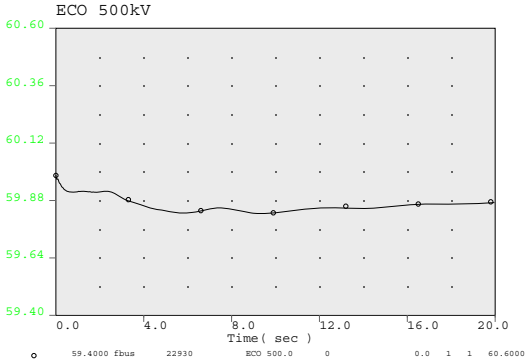
Imperial Valley 230kV



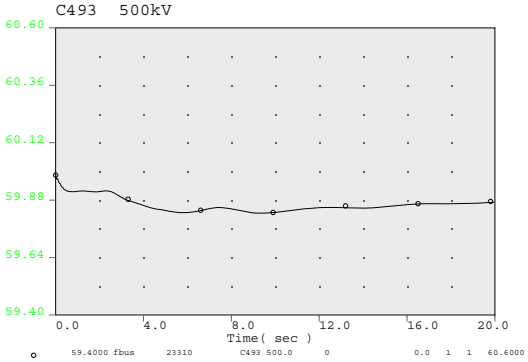
Miguel 500kV



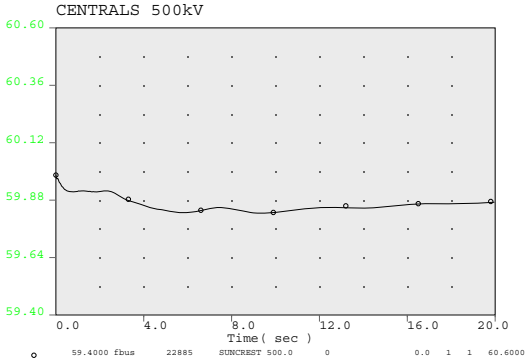
ECO 500kV



C493 500kV

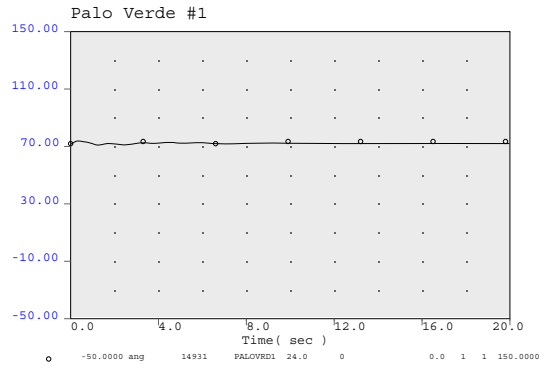


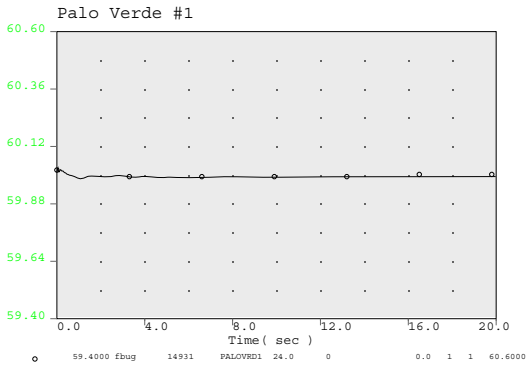
CENTRALS 500kV

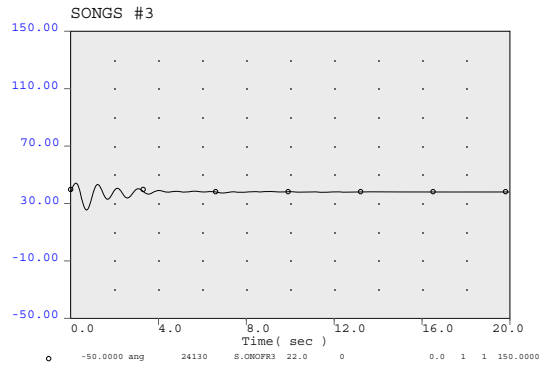


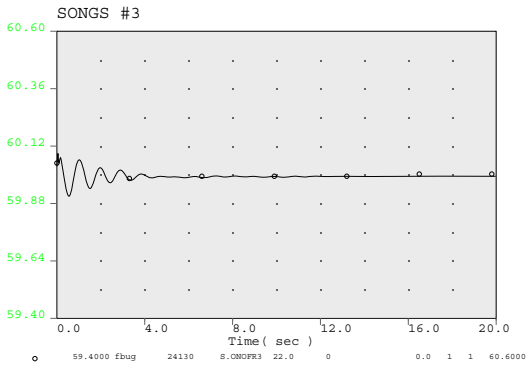
C1 C2 Heavy Summer Pre Without Upgrades

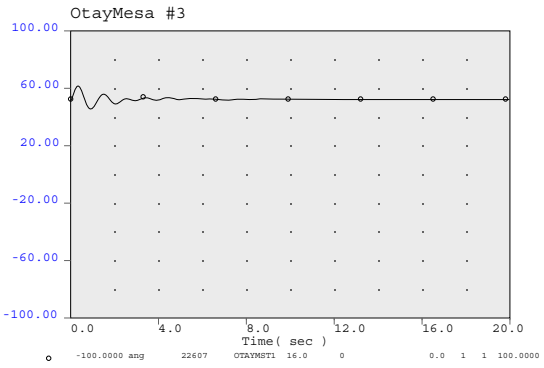
RELATIVE ROTOR ANGLE & FREQUENCY

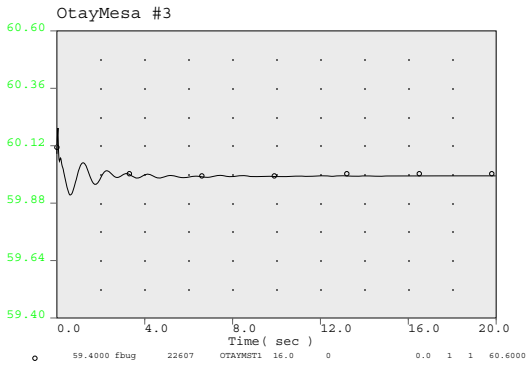












C1 C2 Heavy Summer Pre Without Upgrades

Page 1

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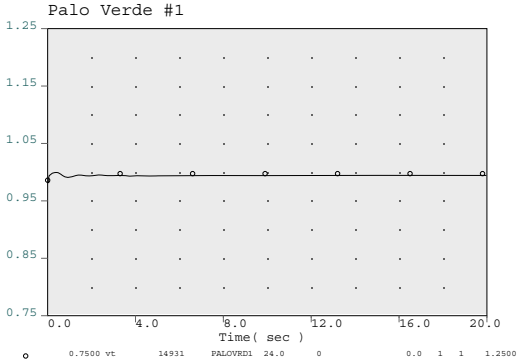
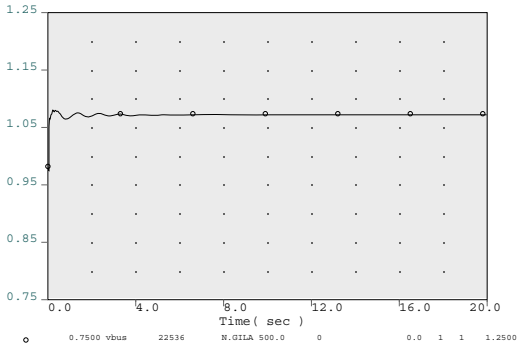
RELATIVE VOLTAGE

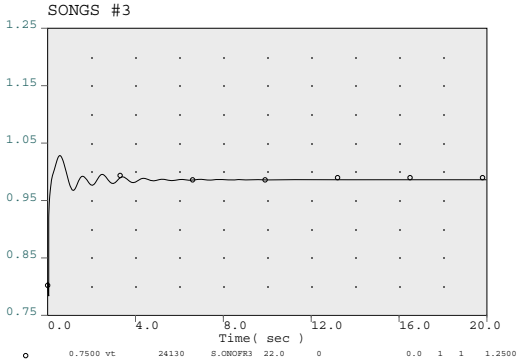
Palo Verde #1



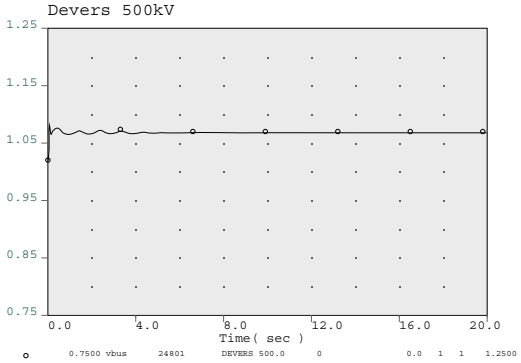
N Gila 500kV



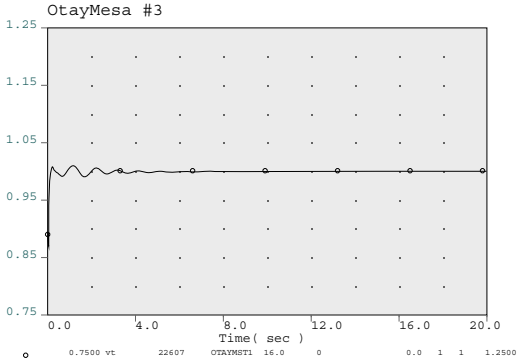
SONGS #3



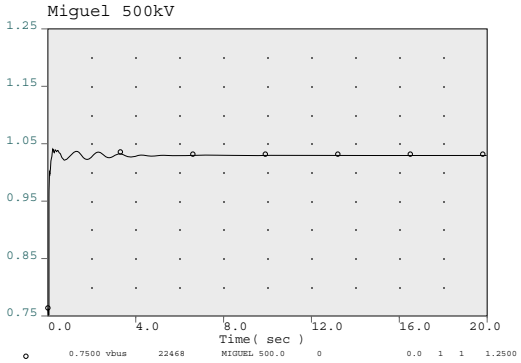
Devers 500kV



OtayMesa #3



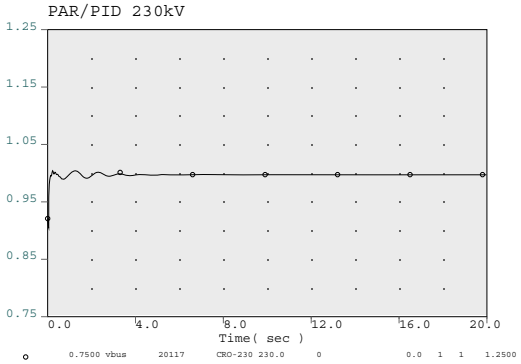
Miguel 500kV



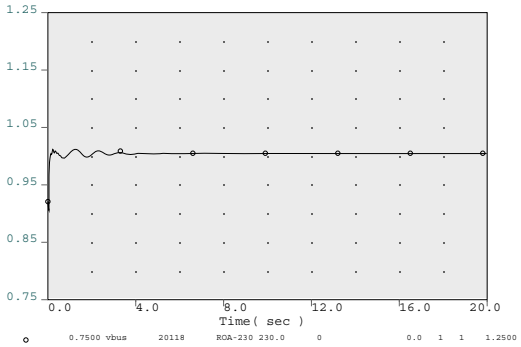
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Voltage Check and Comparison

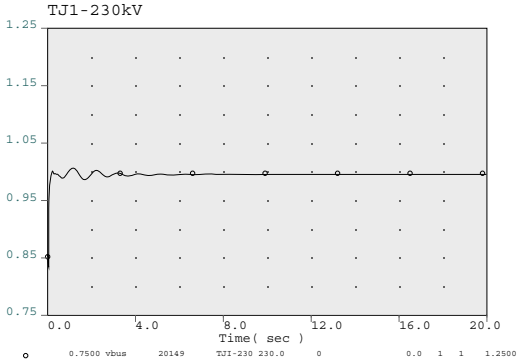
PAR/PID 230kV



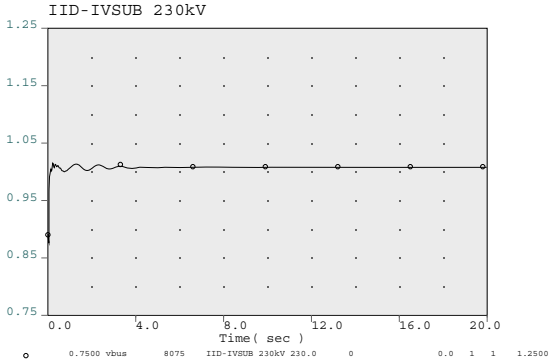
ROA-230kV



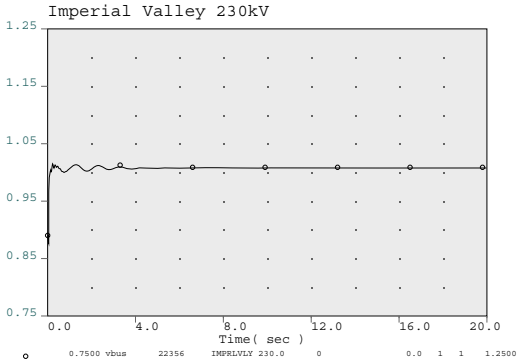
TJ1-230kV



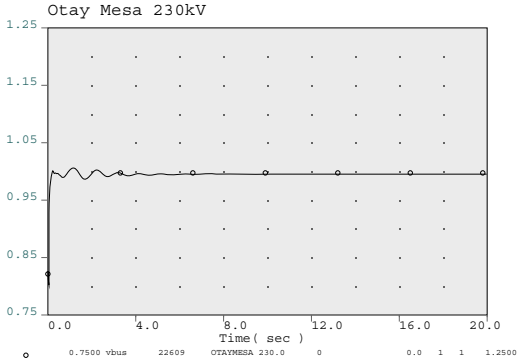
IID-IVSUB 230kV



Imperial Valley 230kV



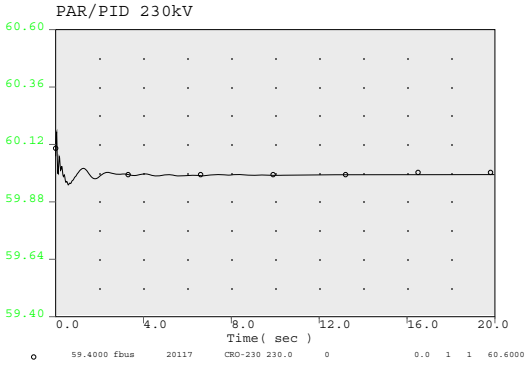
Otay Mesa 230kV



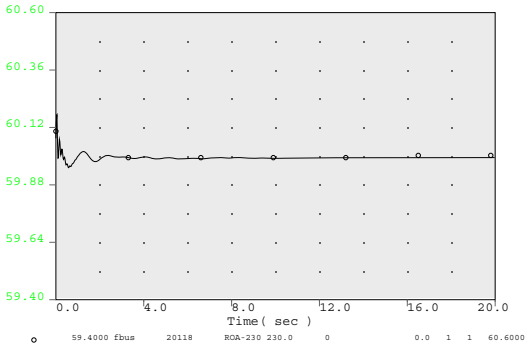
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

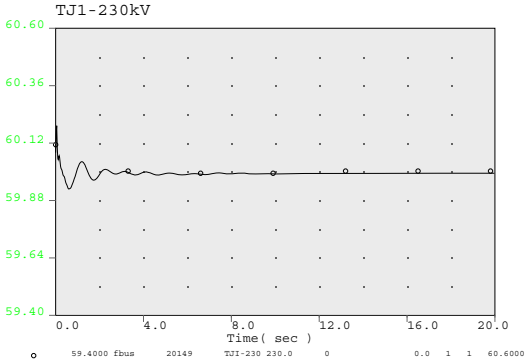
PAR/PID 230kV



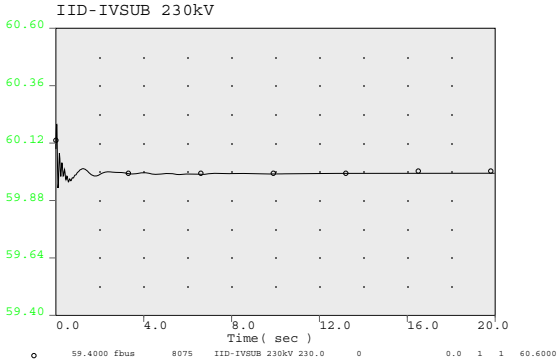
ROA-230kV



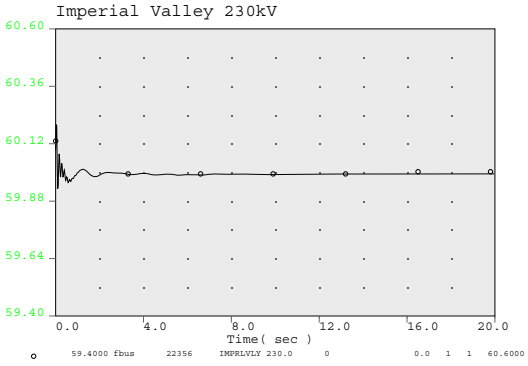
TJ1-230kV



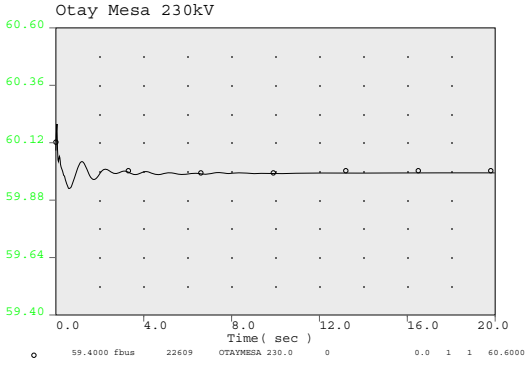
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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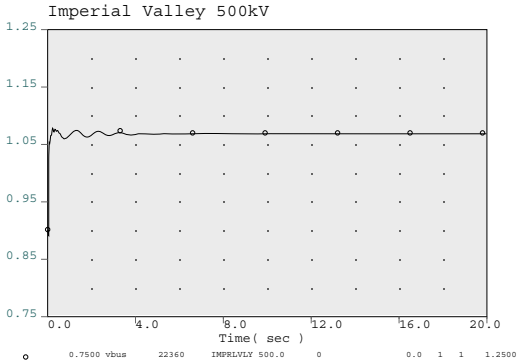
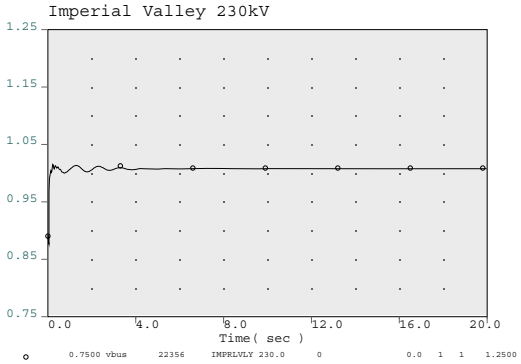
SDGE	tran-c1c2-hs-pre-r12_PEN230kv-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:34:30 2011

VOLTAGE

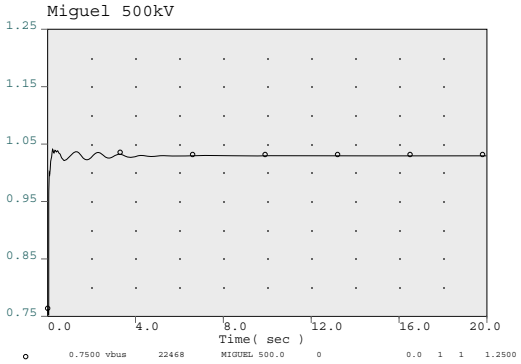
Imperial Valley 500kV



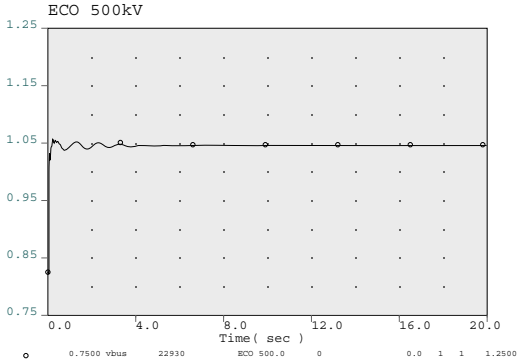
Imperial Valley 230kV



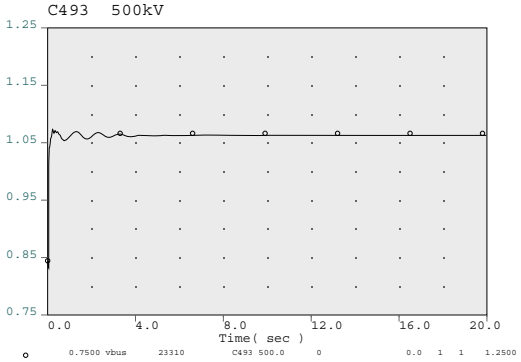
Miguel 500kV



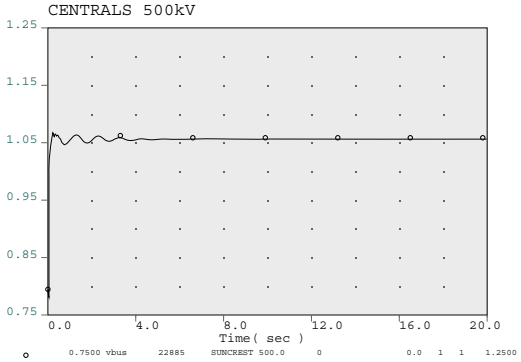
ECO 500kV



C493 500kV



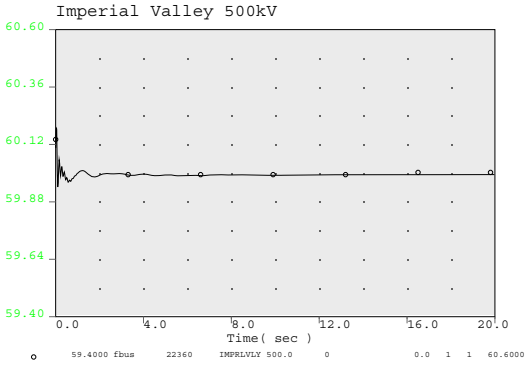
CENTRALS 500kV



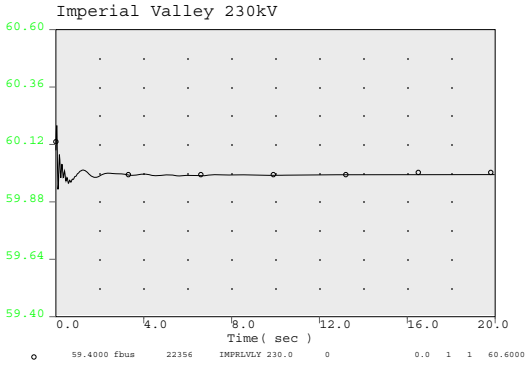
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

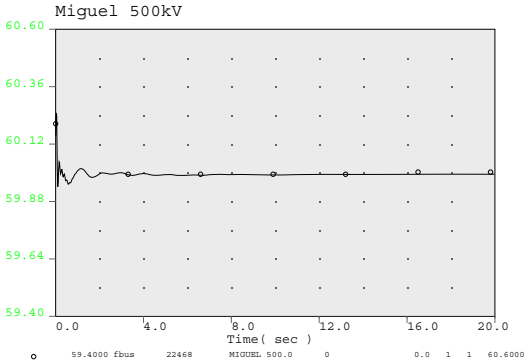
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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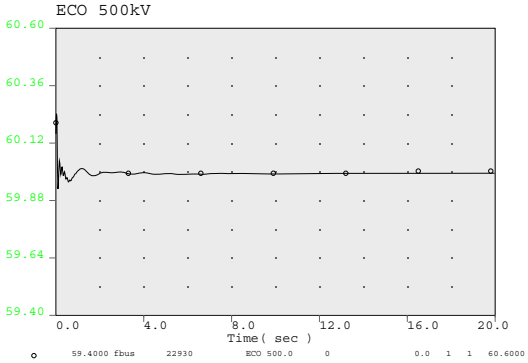

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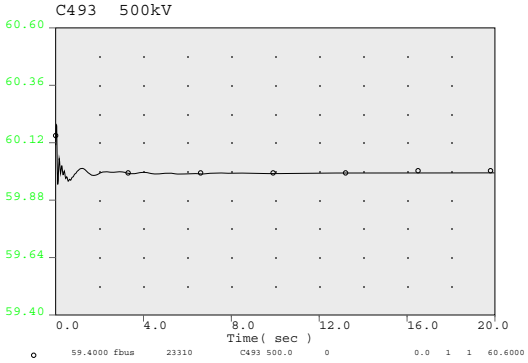

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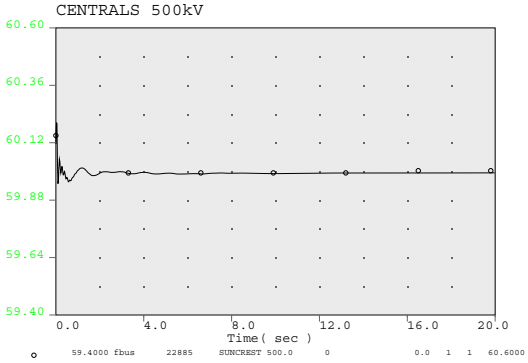
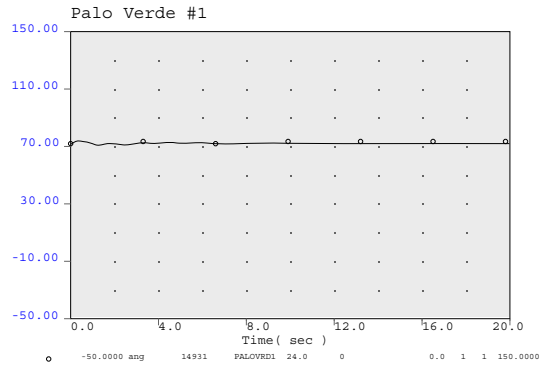
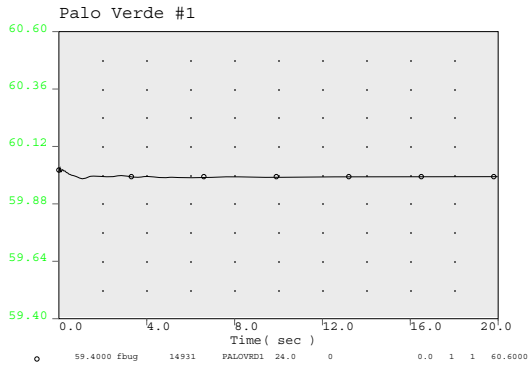
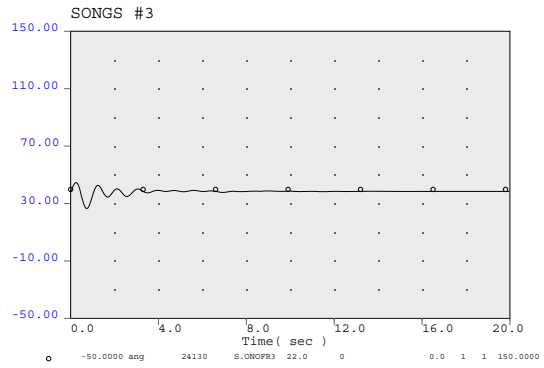


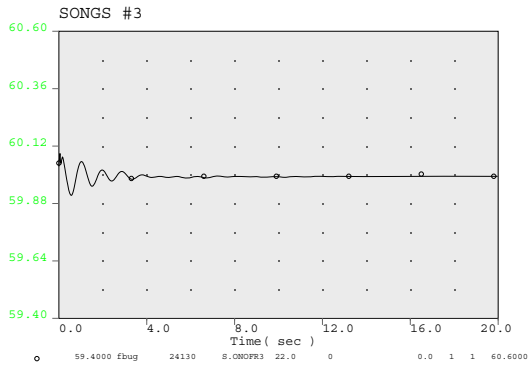
C1 C2 Heavy Summer Pre Without Upgrades

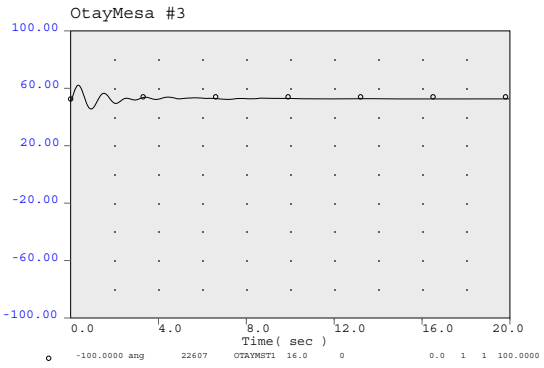
RELATIVE ROTOR ANGLE & FREQUENCY

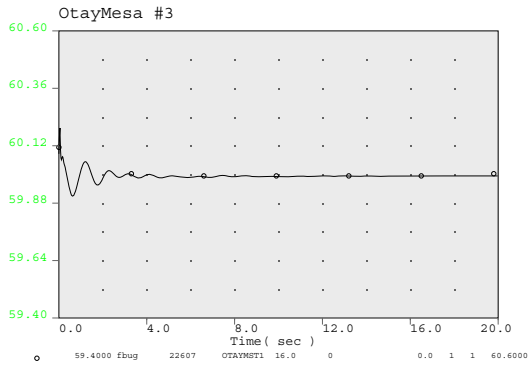












C1 C2 Heavy Summer Pre Without Upgrades

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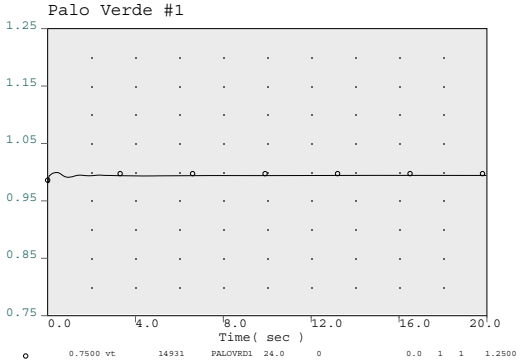
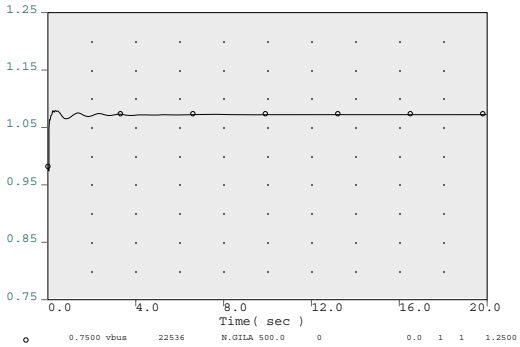
RELATIVE VOLTAGE

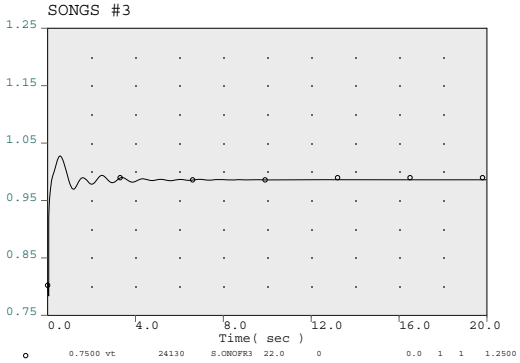
Palo Verde #1



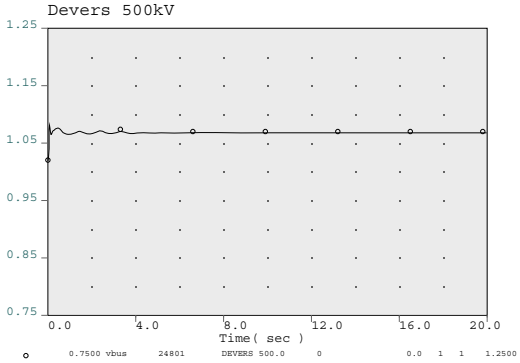
N Gila 500kV



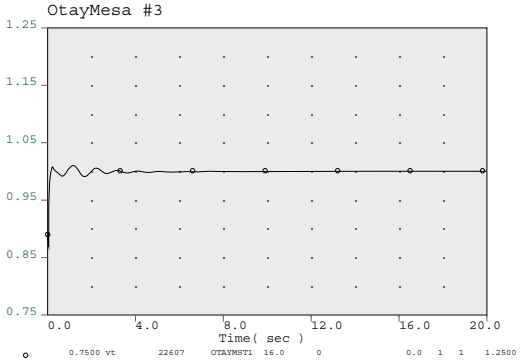
SONGS #3



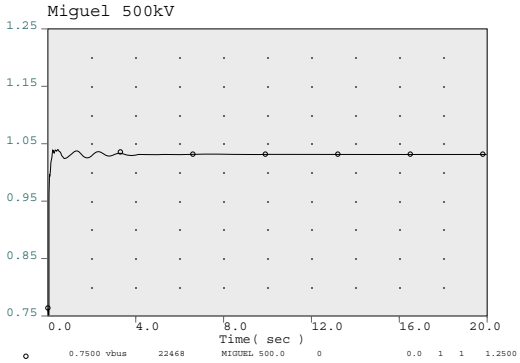
Devers 500kV



OtayMesa #3



Miguel 500kV



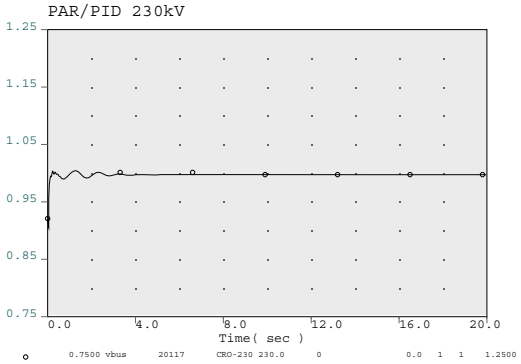
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

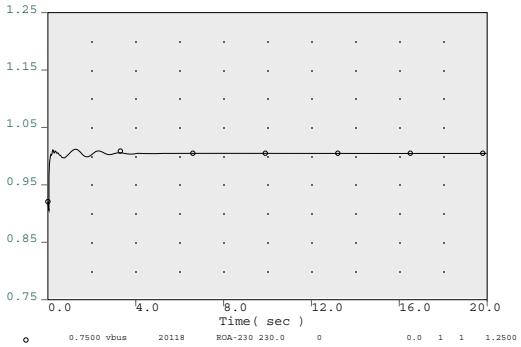
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_PEN-ES-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:30:24 2011

Affected System Voltage Check and Comparison

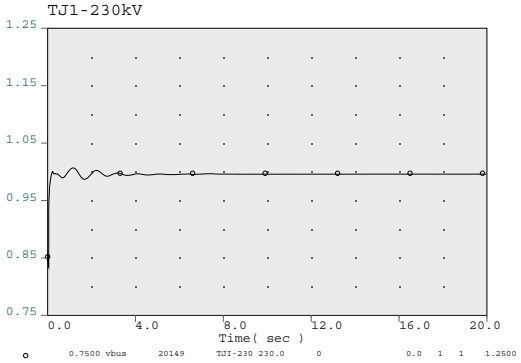
PAR/PID 230kV



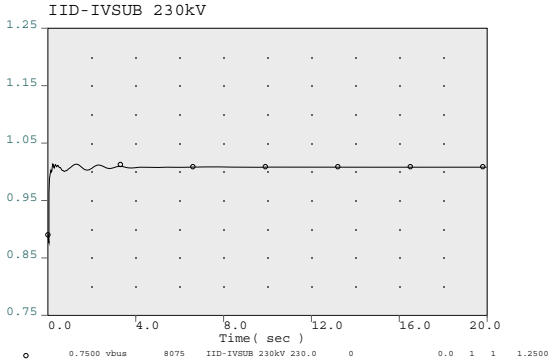
ROA-230kV



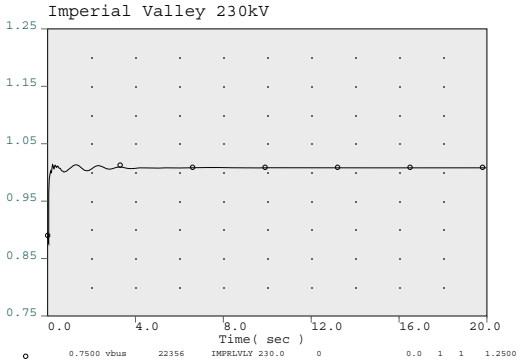
TJ1-230kV



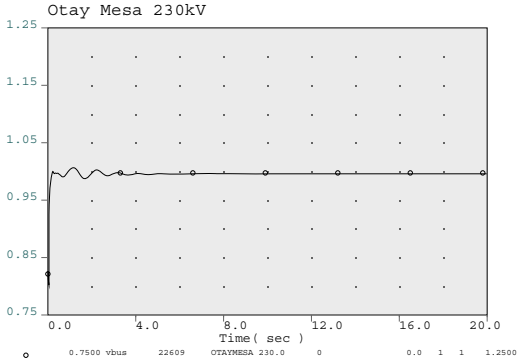
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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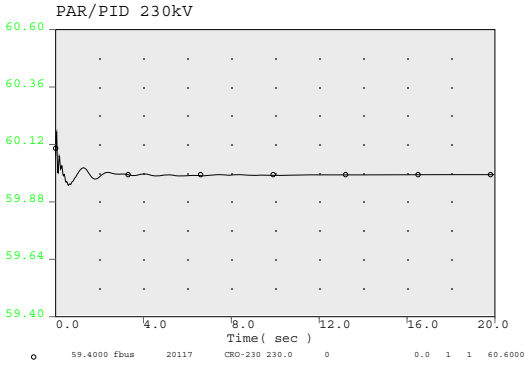
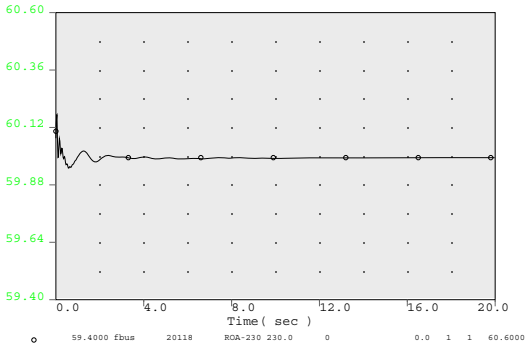
Affected System Frequency Check and Comparison

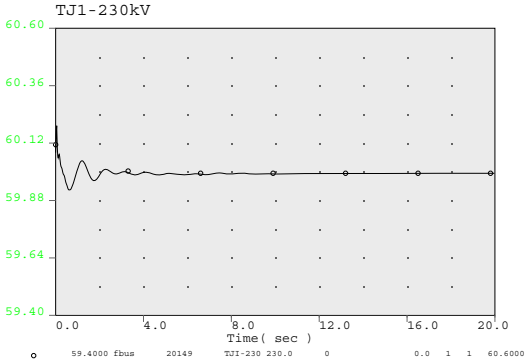
PAR/PID 230kV



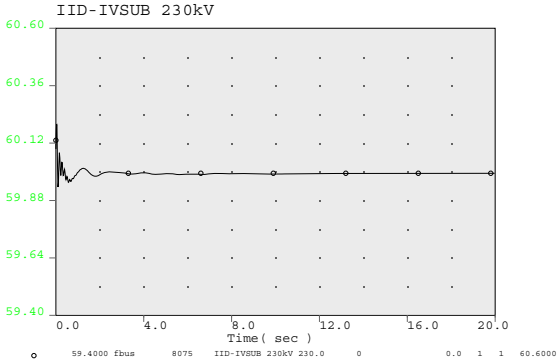
ROA-230kV



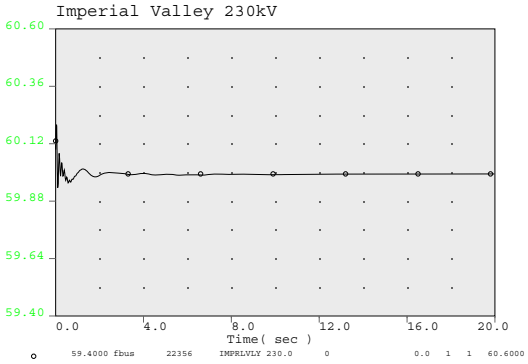
TJ1-230kV



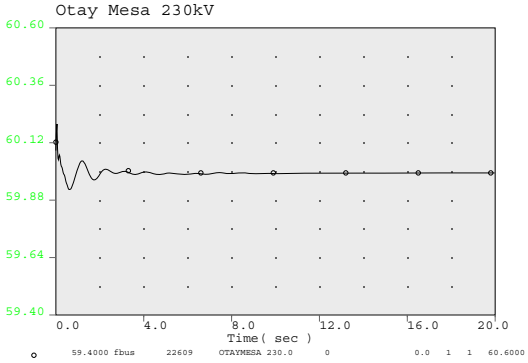
IID-IVSUB 230kV



Imperial Valley 230kV



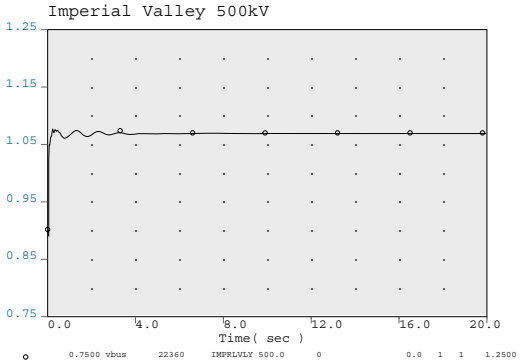
Otay Mesa 230kV



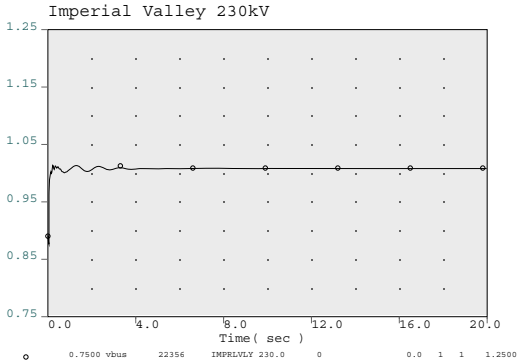
C1 C2 Heavy Summer Pre Without Upgrades

VOLTAGE

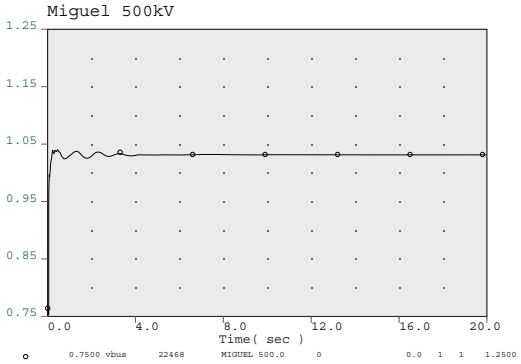
Imperial Valley 500kV



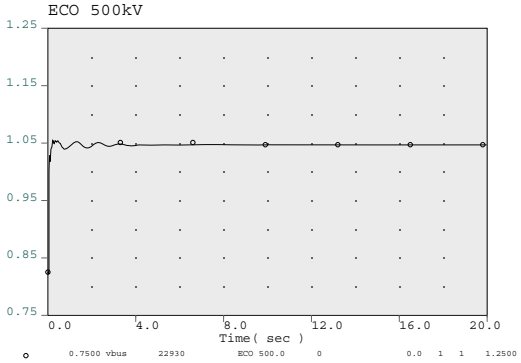
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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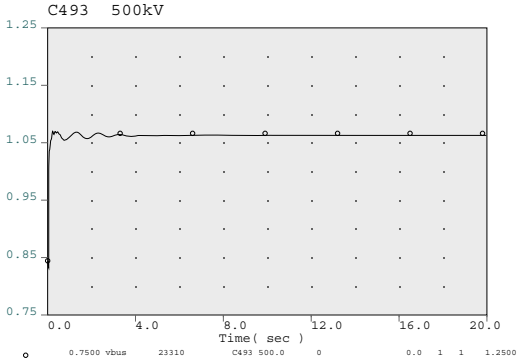
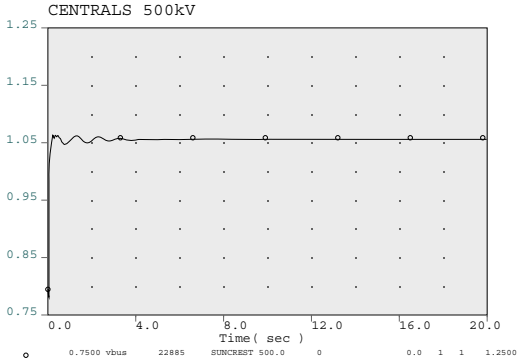


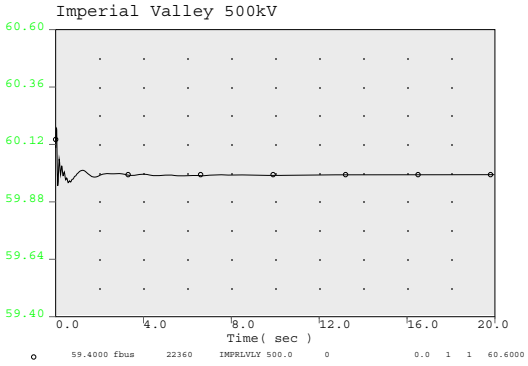
CENTRALS 500kV



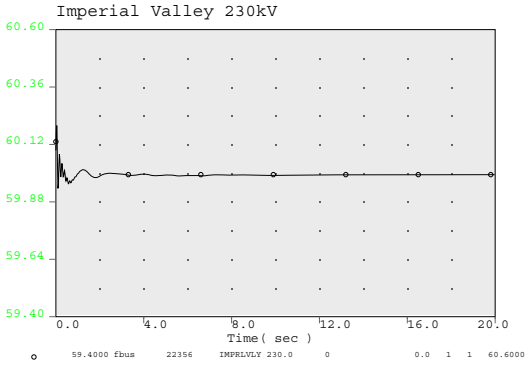
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

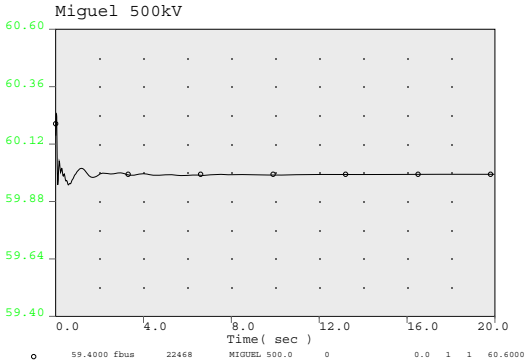
Imperial Valley 500kV



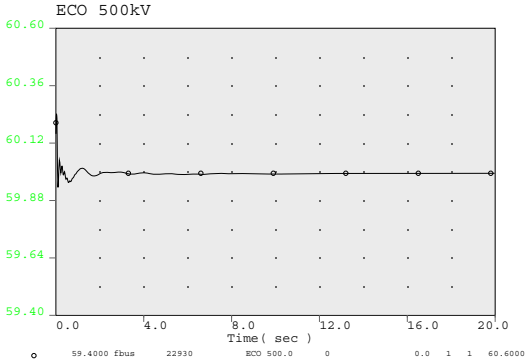
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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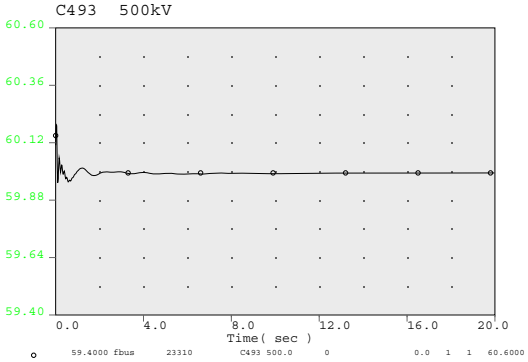
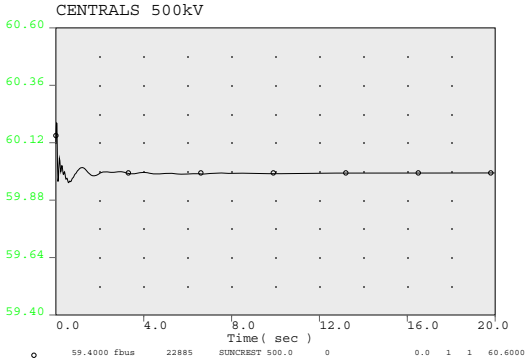


CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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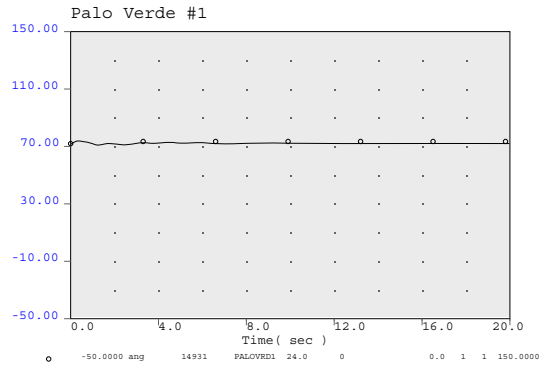
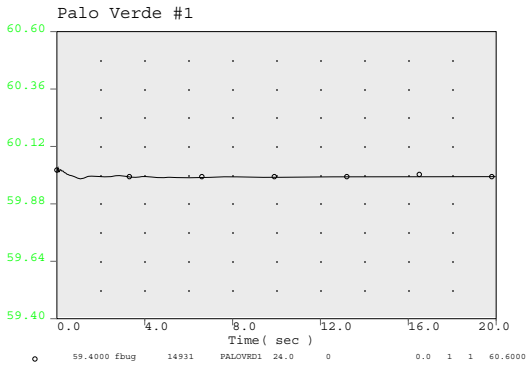
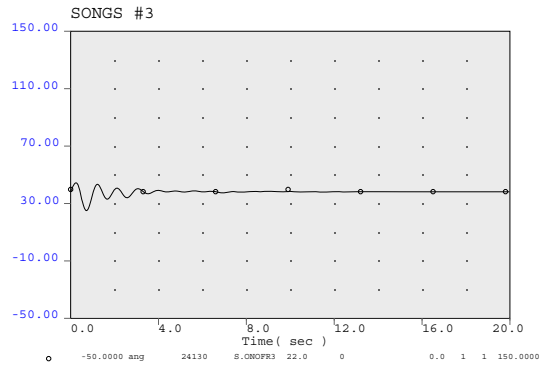
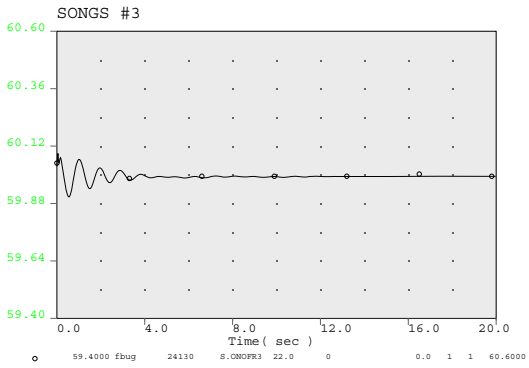
SDGE	tran-c1c2-hs-pre-r12_PEN-ES-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:30:27 2011

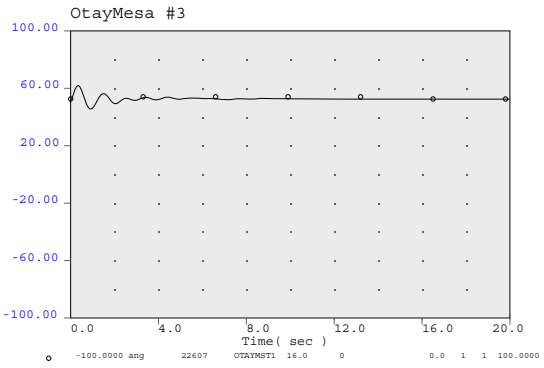
RELATIVE ROTOR ANGLE & FREQUENCY

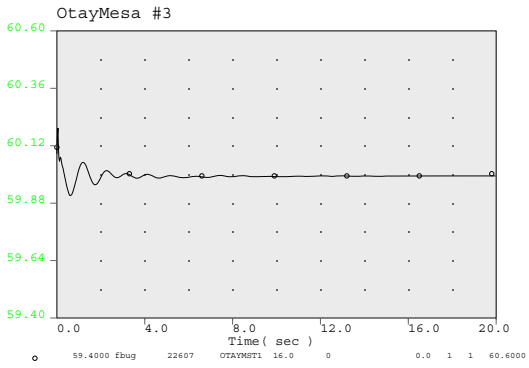












C1 C2 Heavy Summer Pre Without Upgrades

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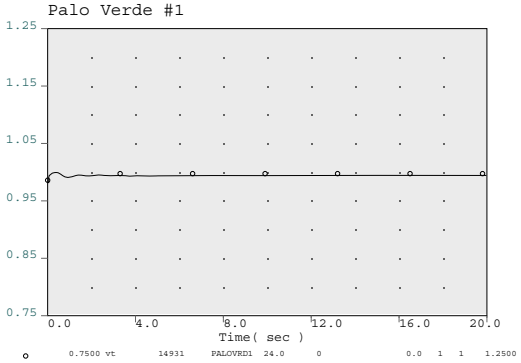
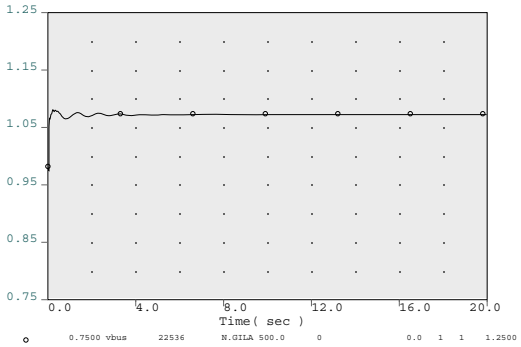
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_PEN-SX-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:32:26 2011

RELATIVE VOLTAGE

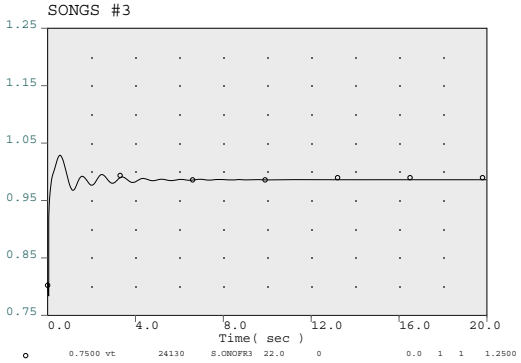
Palo Verde #1



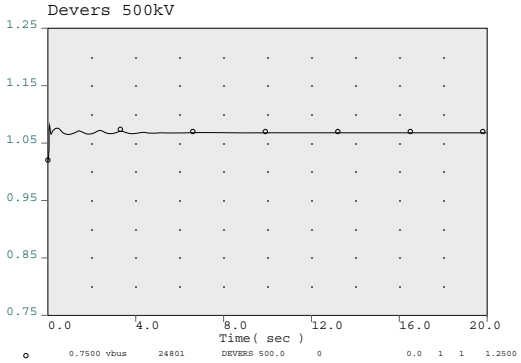
N Gila 500kV



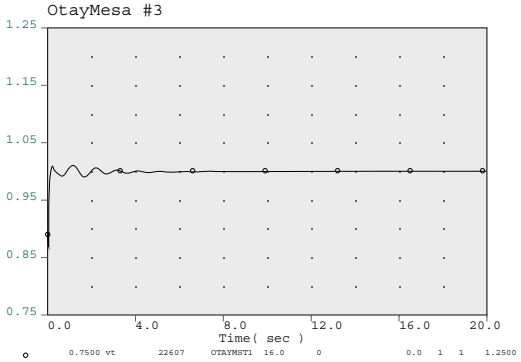
SONGS #3



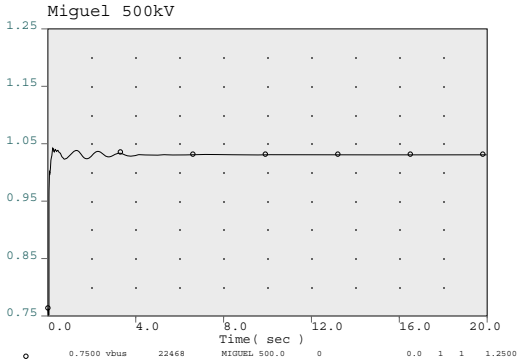
Devers 500kV



OtayMesa #3



Miguel 500kV



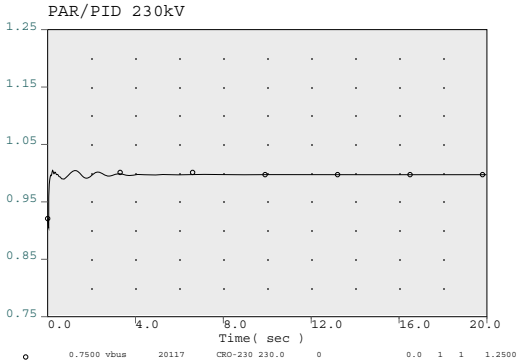
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

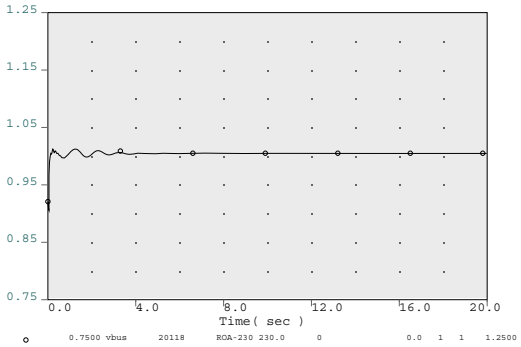
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_PEN-SX-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:32:26 2011

Affected System Voltage Check and Comparison

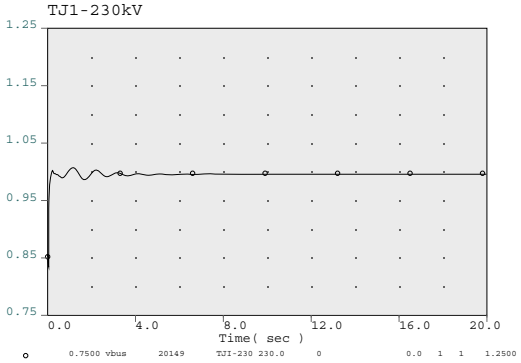
PAR/PID 230kV



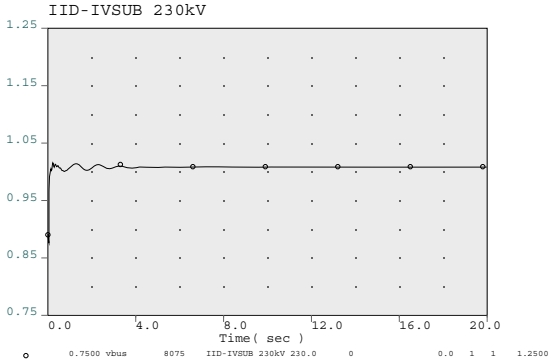
ROA-230kV



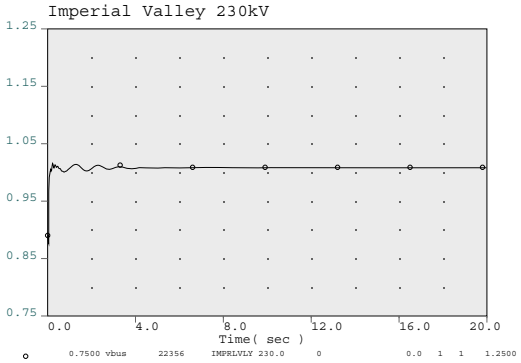
TJ1-230kV



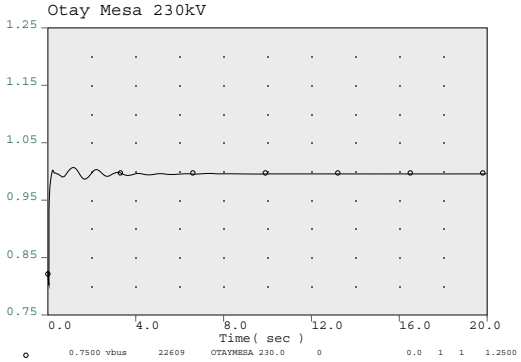
IID-IVSUB 230kV



Imperial Valley 230kV



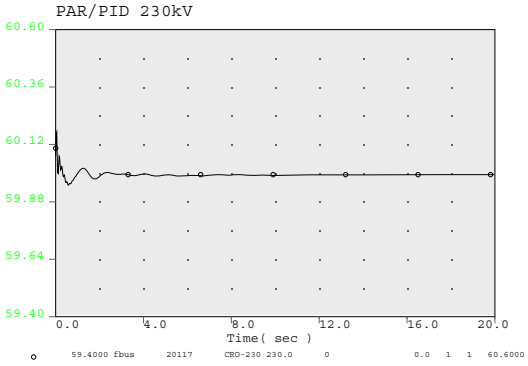
Otay Mesa 230kV



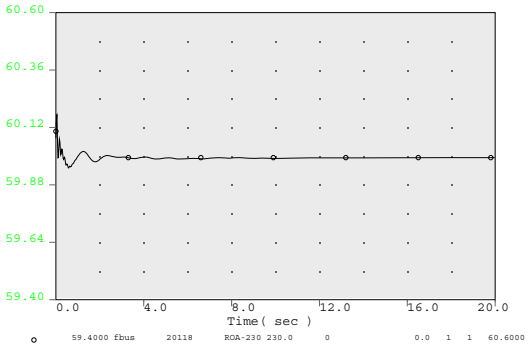
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

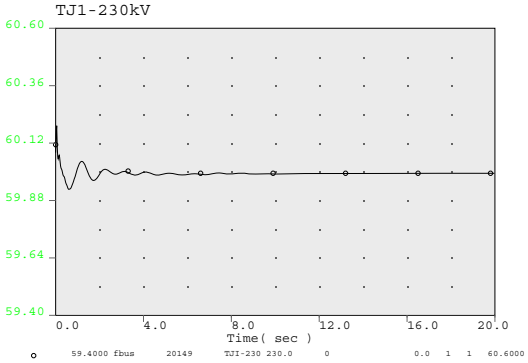
PAR/PID 230kV



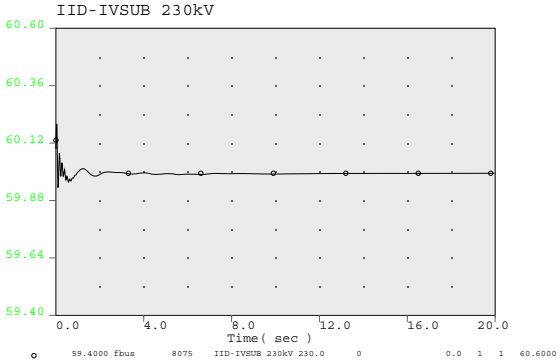
ROA-230kV



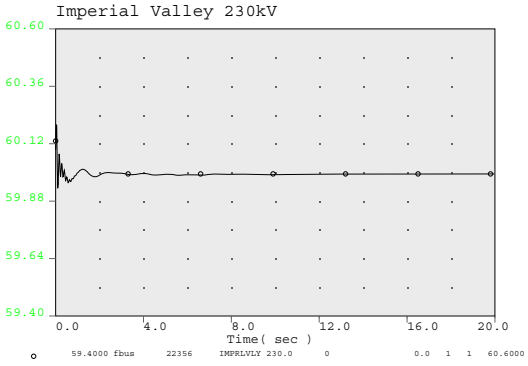
TJ1-230kV



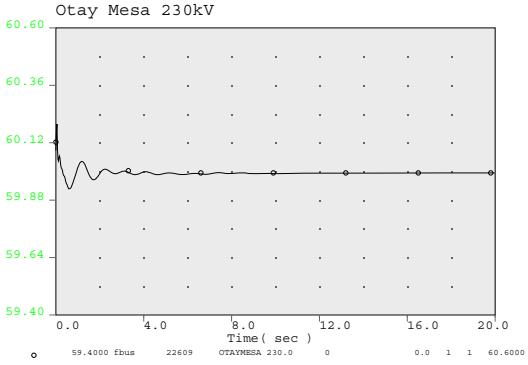
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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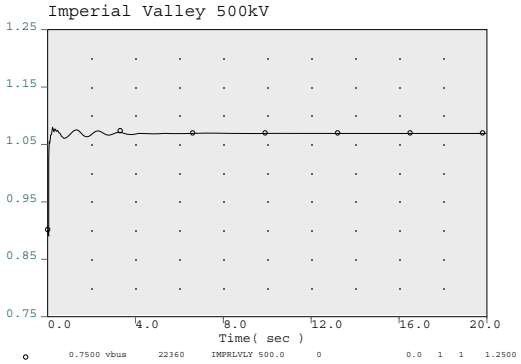
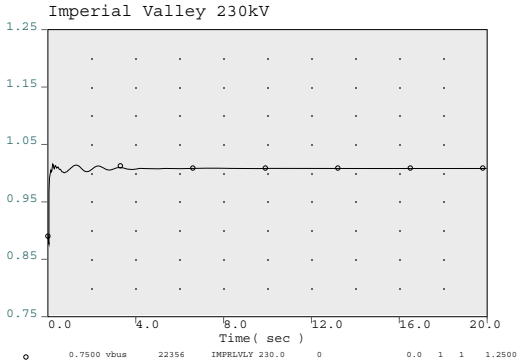
SDGE	tran-c1c2-hs-pre-r12_PEN-SX-slo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:32:27 2011

VOLTAGE

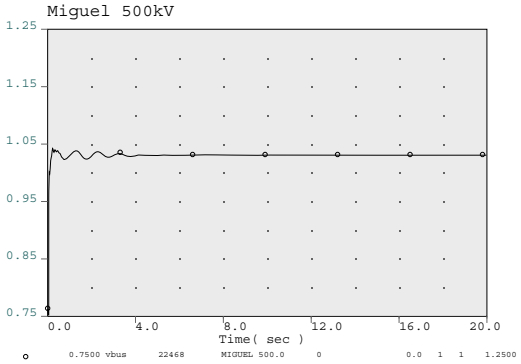
Imperial Valley 500kV



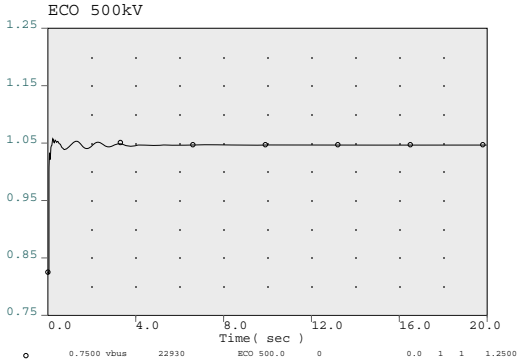
Imperial Valley 230kV



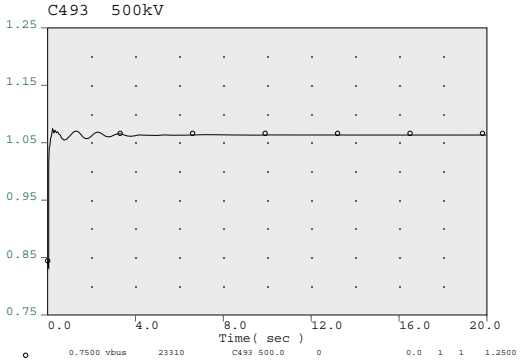
Miguel 500kV



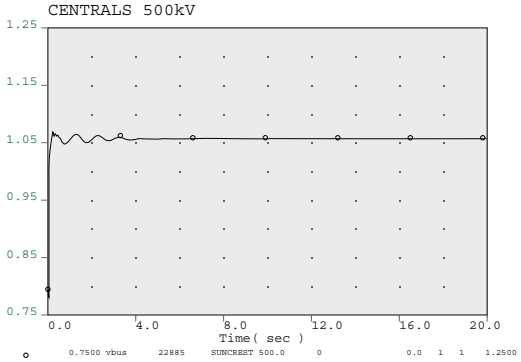
ECO 500kV



C493 500kV

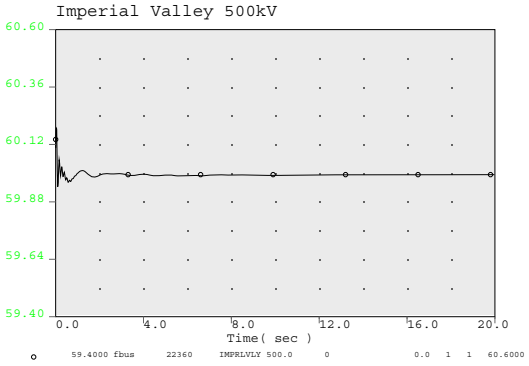


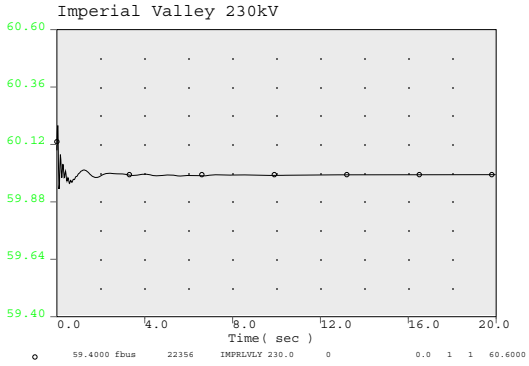
CENTRALS 500kV

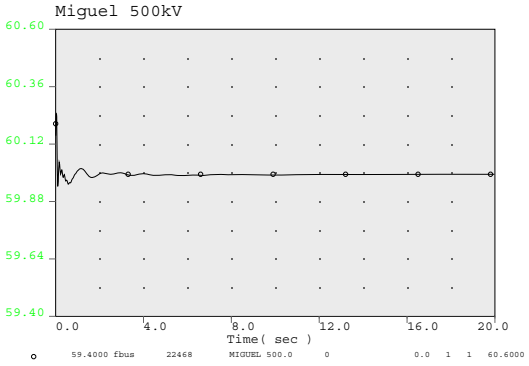


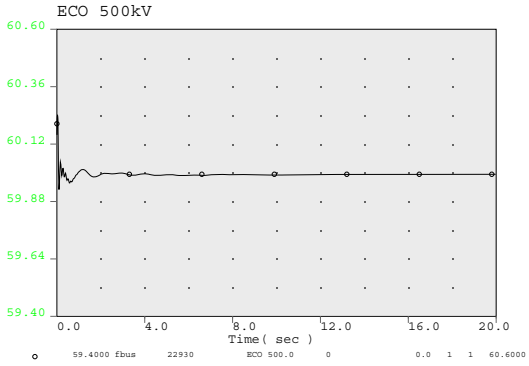
C1 C2 Heavy Summer Pre Without Upgrades

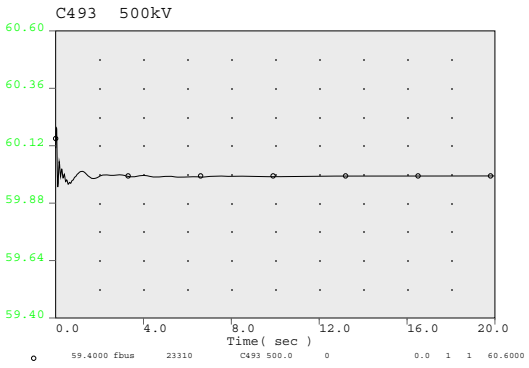
FREQUENCY

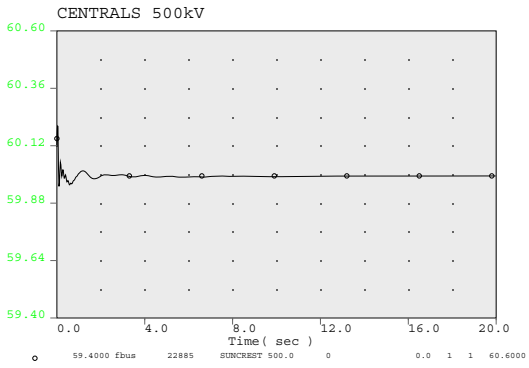












C1 C2 Heavy Summer Pre Without Upgrades

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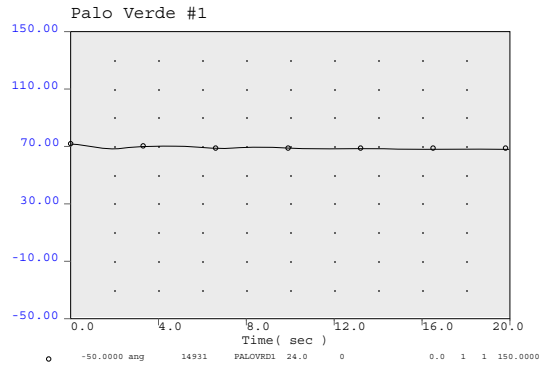
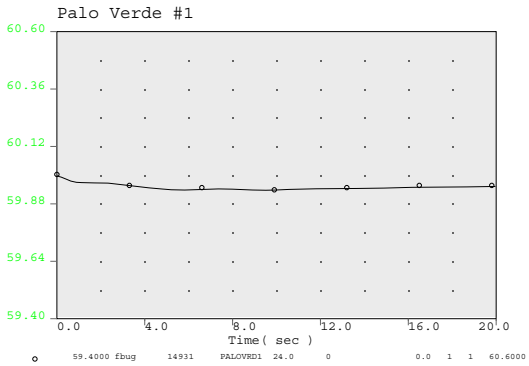
tran-c1c2-hs-pre-r12_PEN-SX-slo.chf

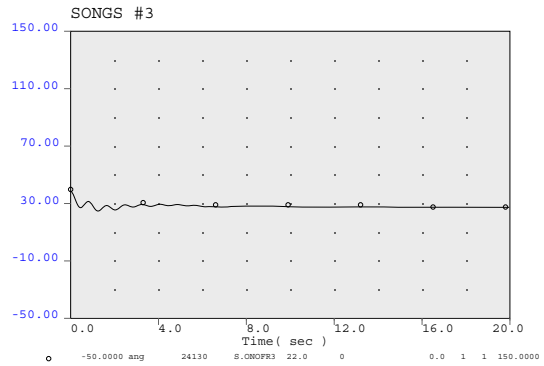
anstab\hs\pre\ws_pre_c1c2

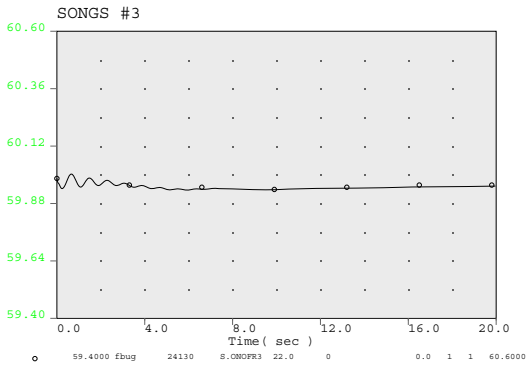
Sun Jul 17 15:32:28 2011

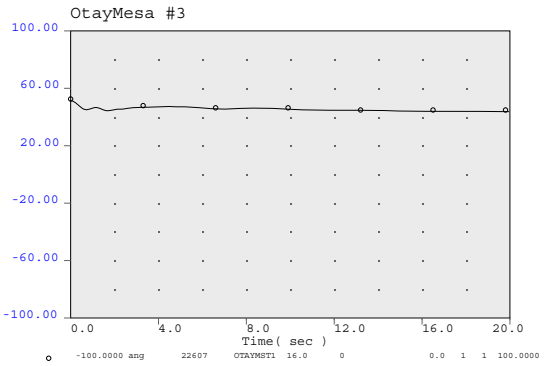
RELATIVE ROTOR ANGLE & FREQUENCY

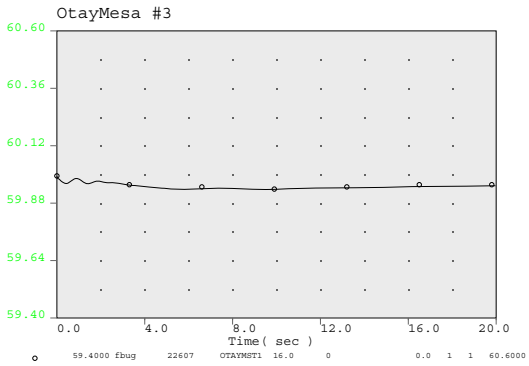












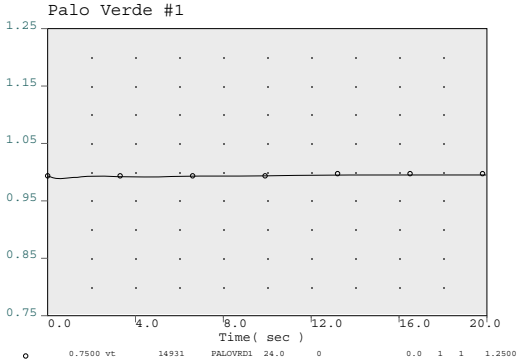
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

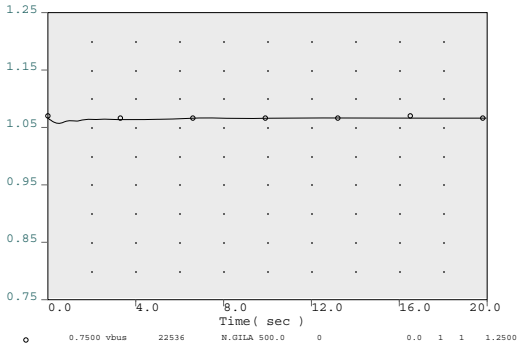
SDGE	tran-c1c2-hs-pre-r12_SONG-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:42:30 2011

RELATIVE VOLTAGE

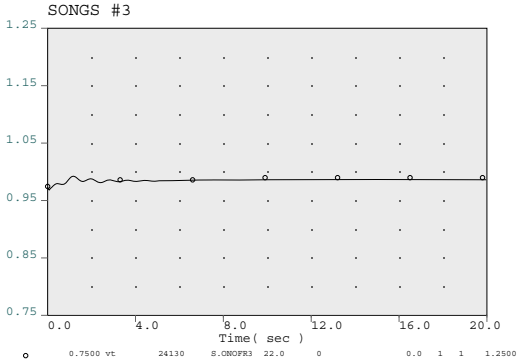
Palo Verde #1



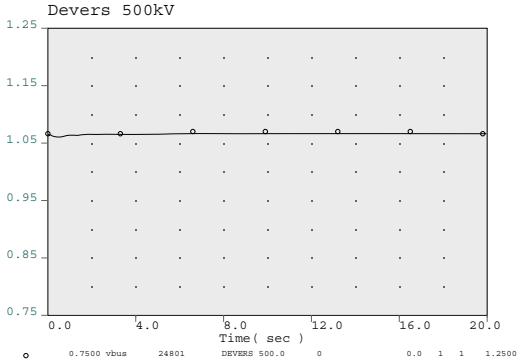
N Gila 500kV



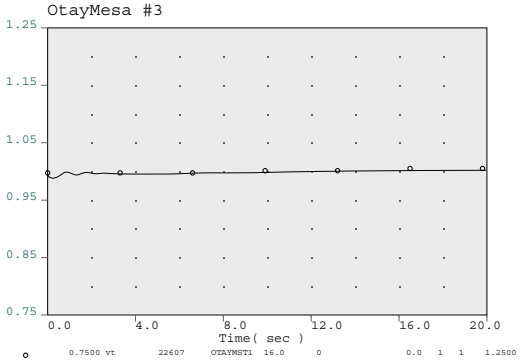
SONGS #3



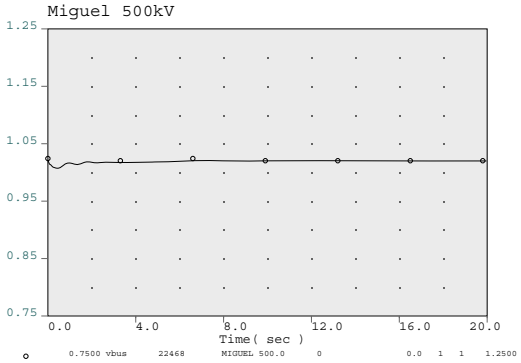
Devers 500kV



OtayMesa #3



Miguel 500kV



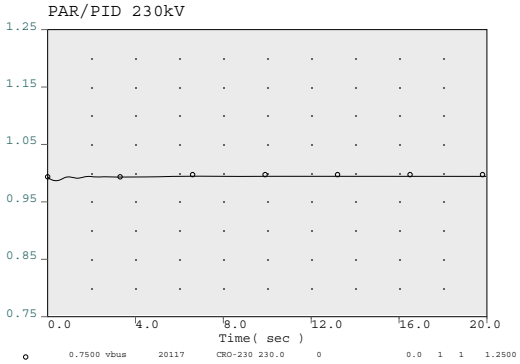
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

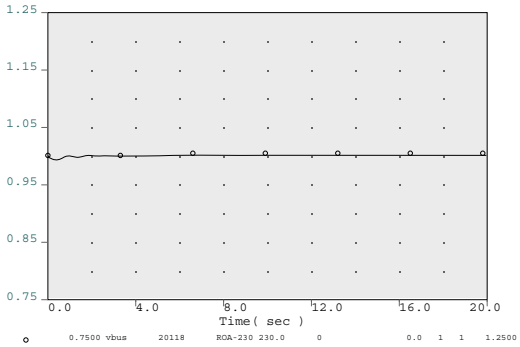
SDGE	tran-c1c2-hs-pre-r12_SONG-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:42:30 2011

Affected System Voltage Check and Comparison

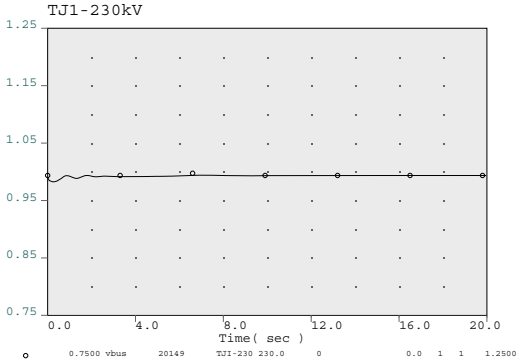
PAR/PID 230kV



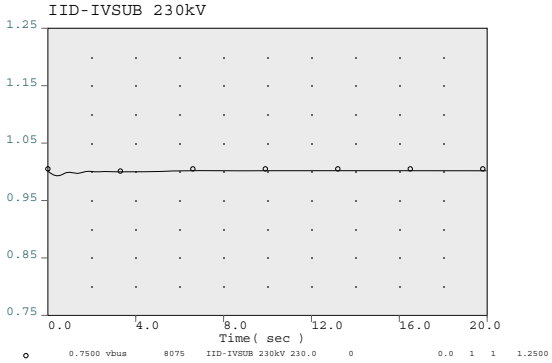
ROA-230kV



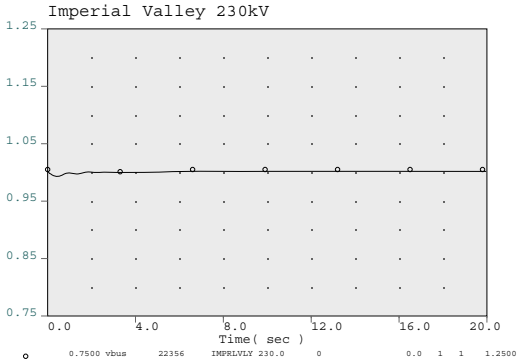
TJ1-230kV



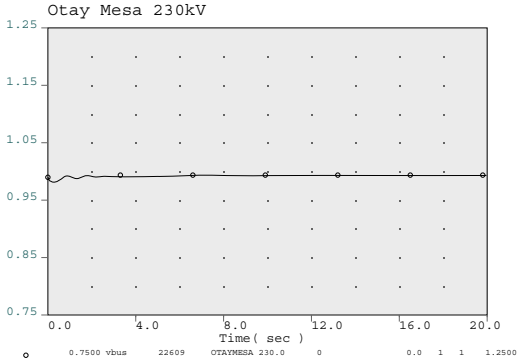
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

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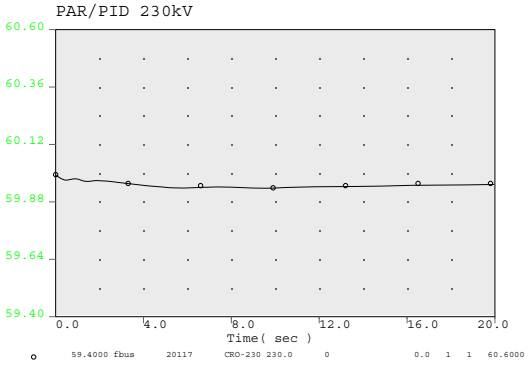
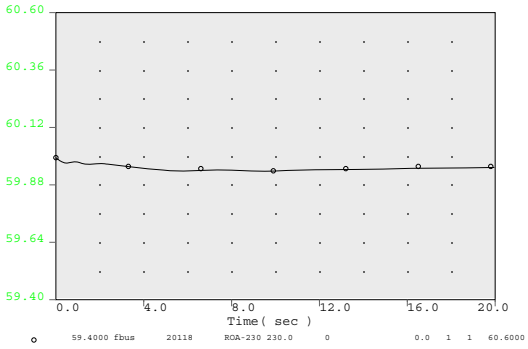
SDGE	tran-c1c2-hs-pre-r12_SONG-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:42:30 2011

Affected System Frequency Check and Comparison

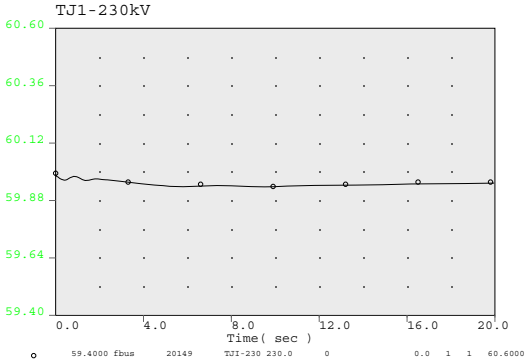
PAR/PID 230kV



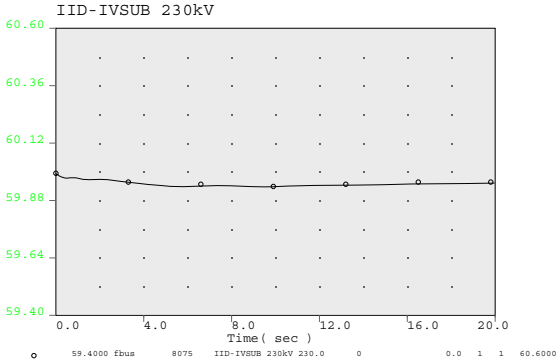
ROA-230kV



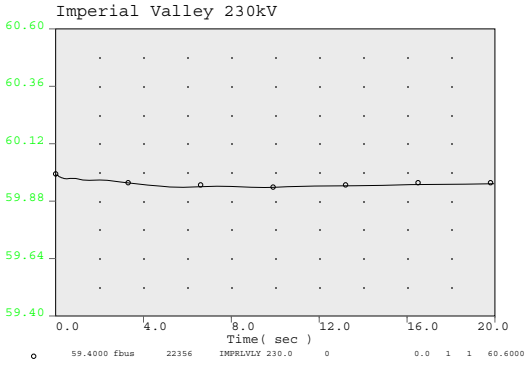
TJ1-230kV



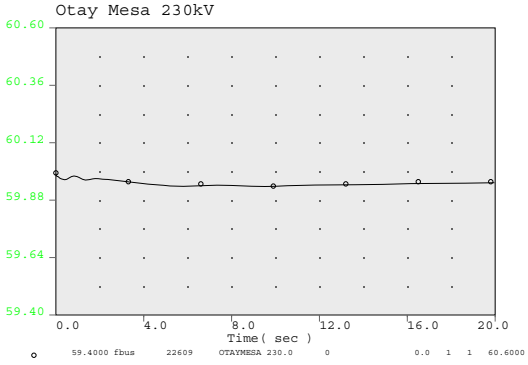
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



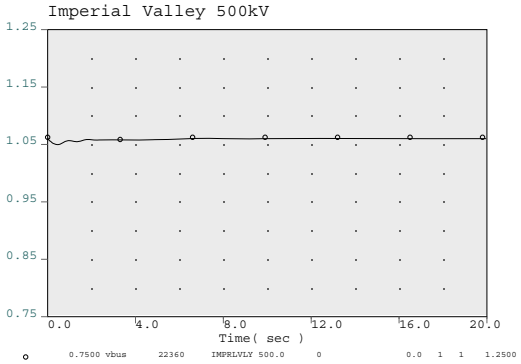
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

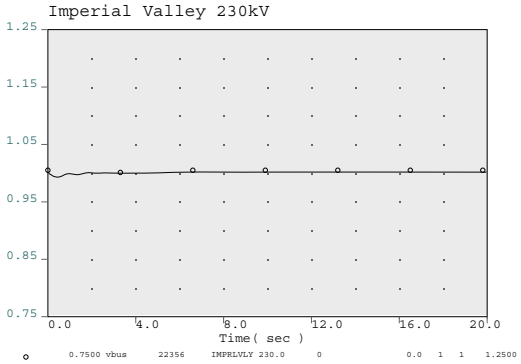
SDGE	tran-c1c2-hs-pre-r12_SONG-g1.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:42:31 2011

VOLTAGE

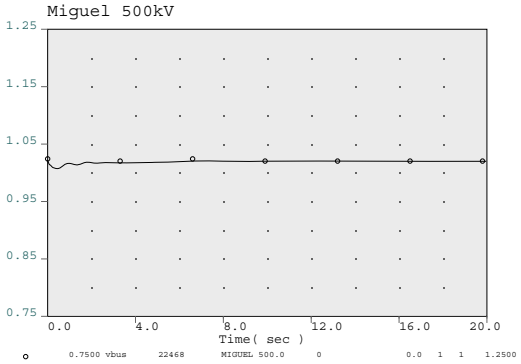
Imperial Valley 500kV



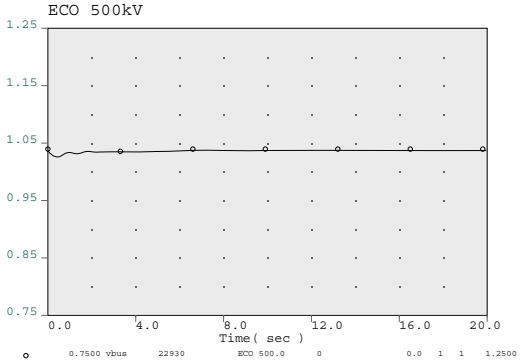
Imperial Valley 230kV



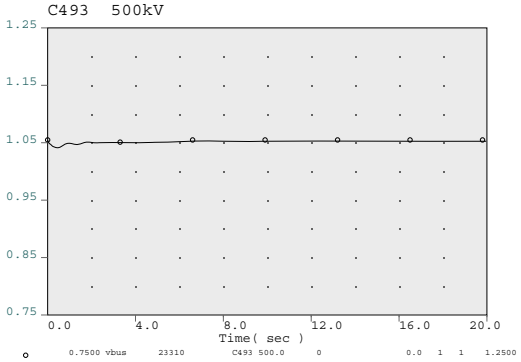
Miguel 500kV



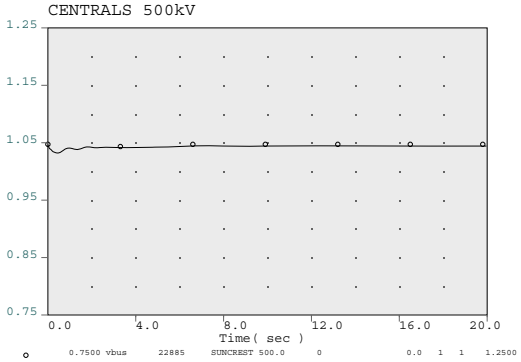
ECO 500kV



C493 500kV



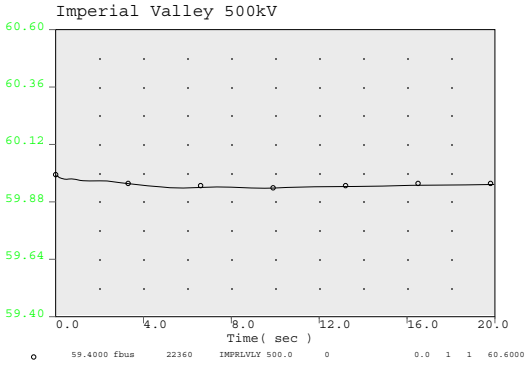
CENTRALS 500kV



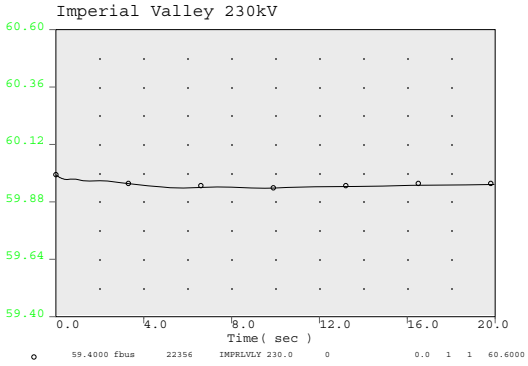
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

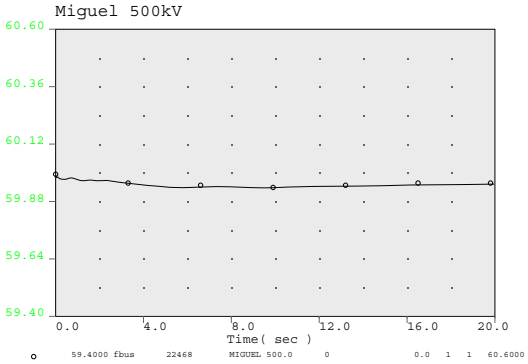
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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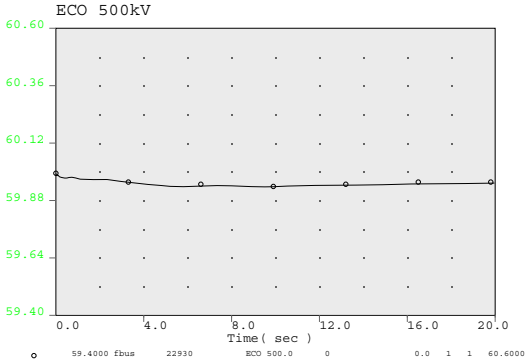

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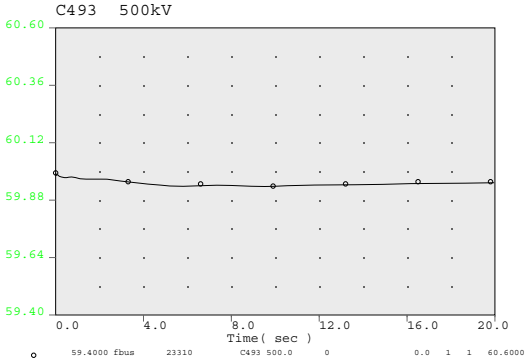
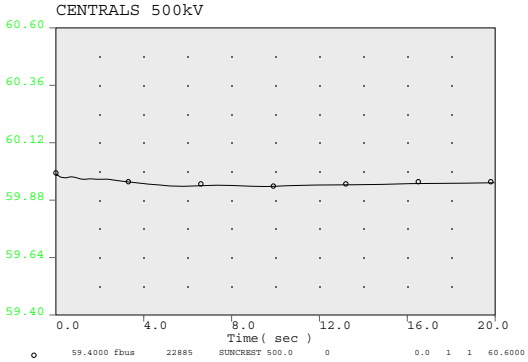
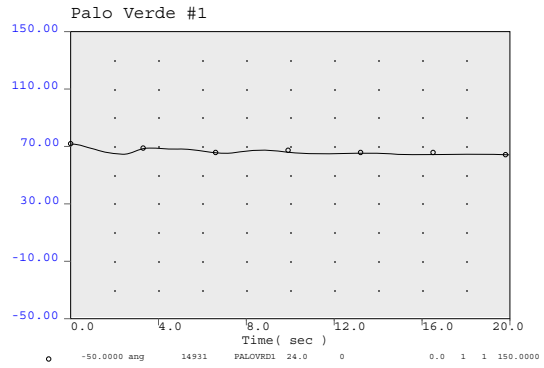


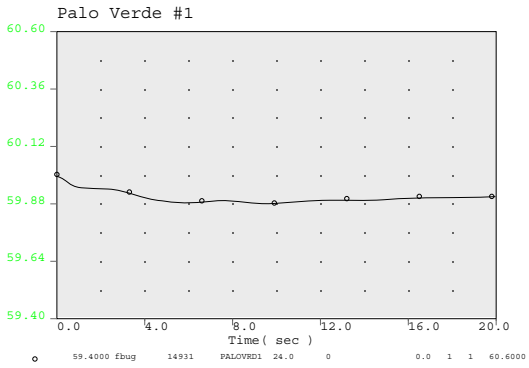
CENTRALS 500kV

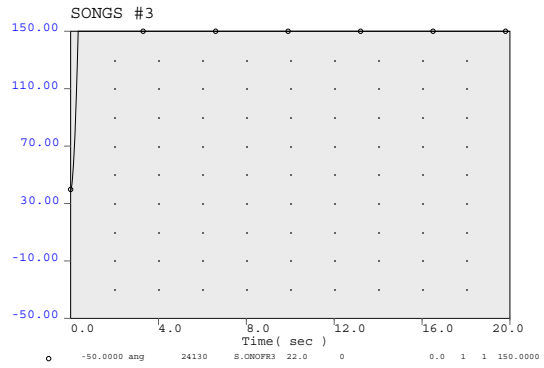


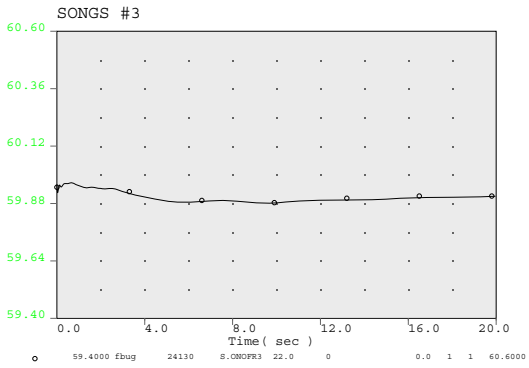
C1 C2 Heavy Summer Pre Without Upgrades

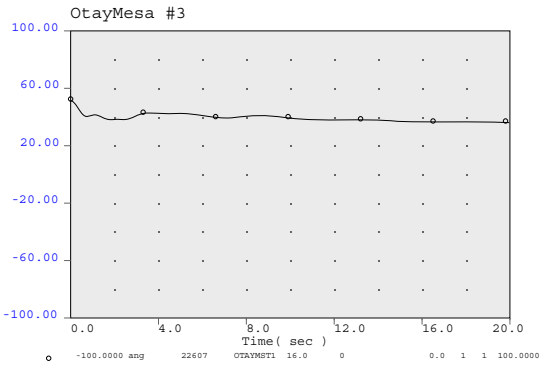
RELATIVE ROTOR ANGLE & FREQUENCY

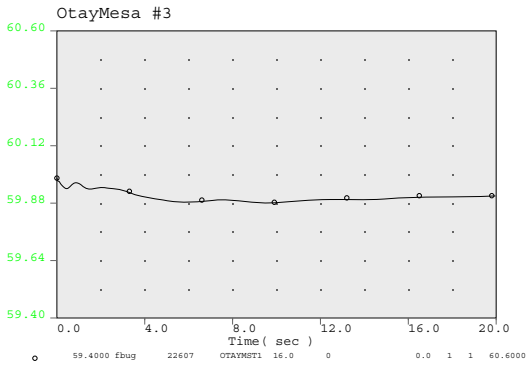












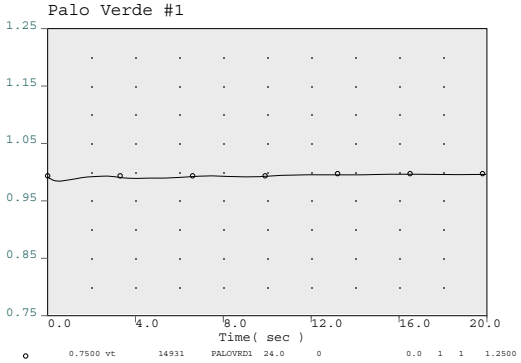
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

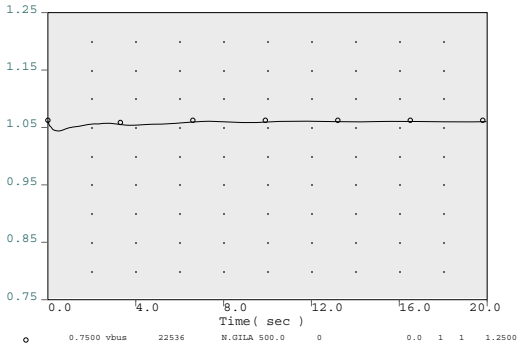
SDGE	tran-c1c2-hs-pre-r12_SONGS-g2.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:43:49 2011

RELATIVE VOLTAGE

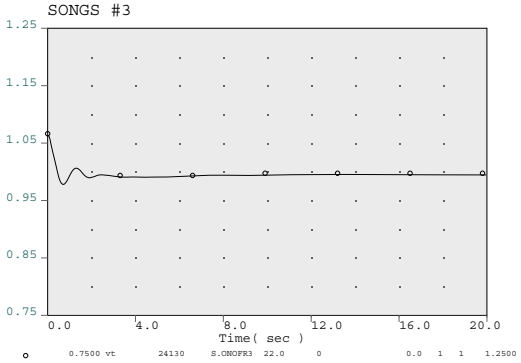
Palo Verde #1



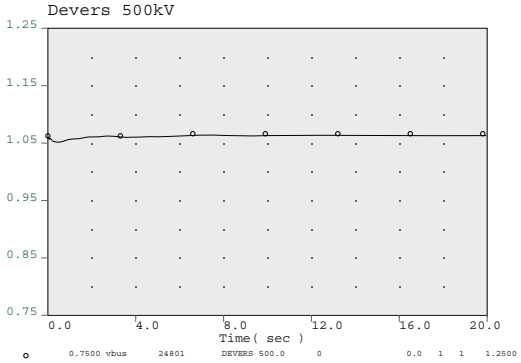
N Gila 500kV



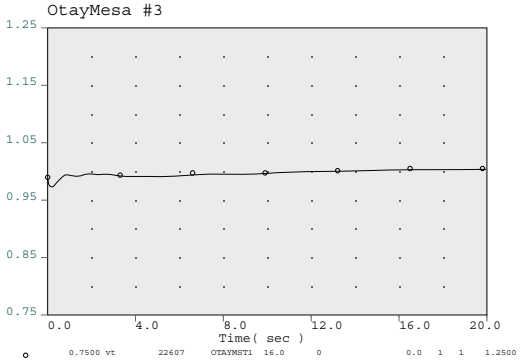
SONGS #3



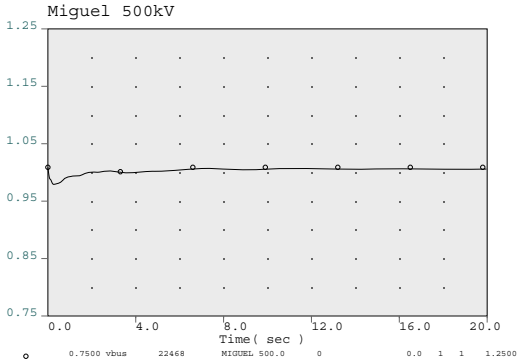
Devers 500kV



OtayMesa #3



Miguel 500kV



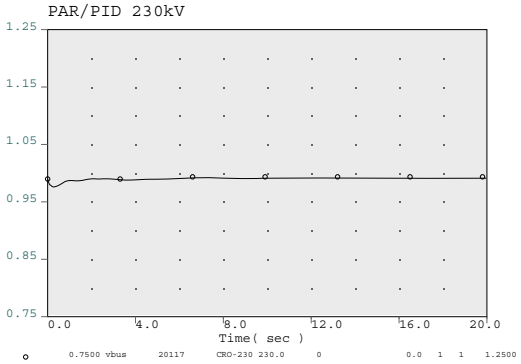
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

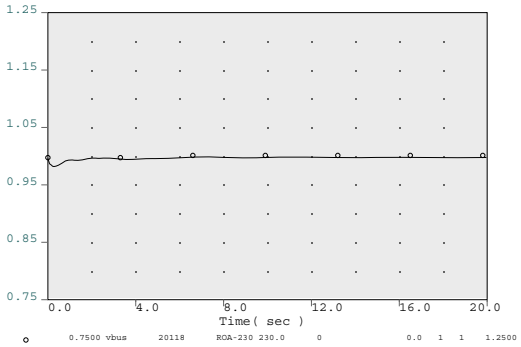
SDGE	tran-c1c2-hs-pre-r12_SONGS-g2.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:43:49 2011

Affected System Voltage Check and Comparison

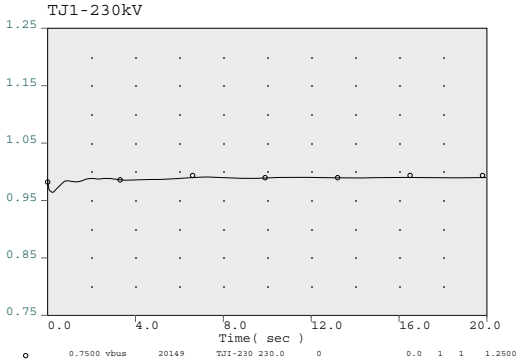
PAR/PID 230kV



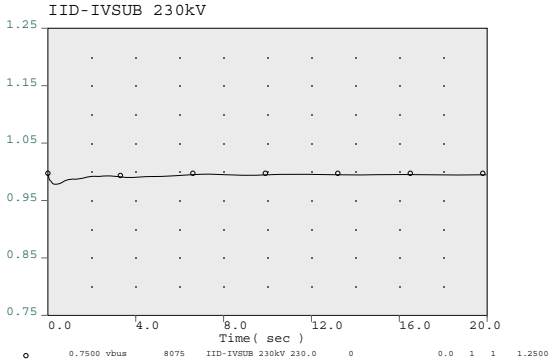
ROA-230kV



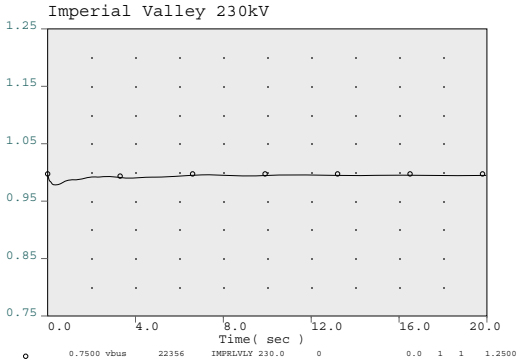
TJ1-230kV



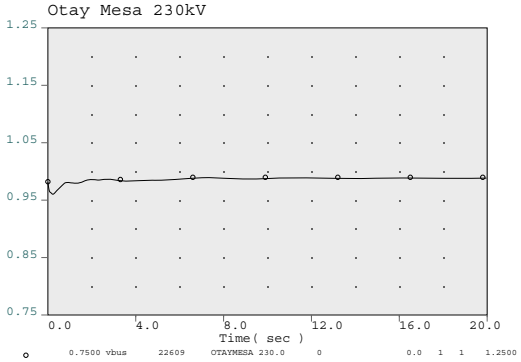
IID-IVSUB 230kV



Imperial Valley 230kV



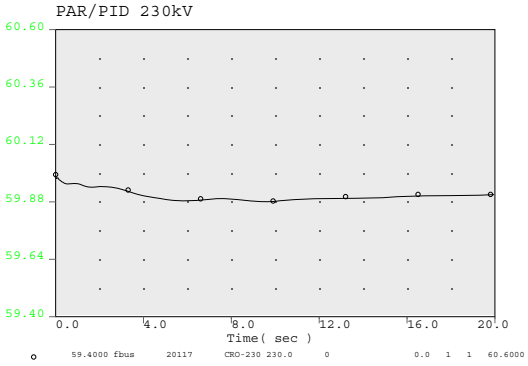
Otay Mesa 230kV



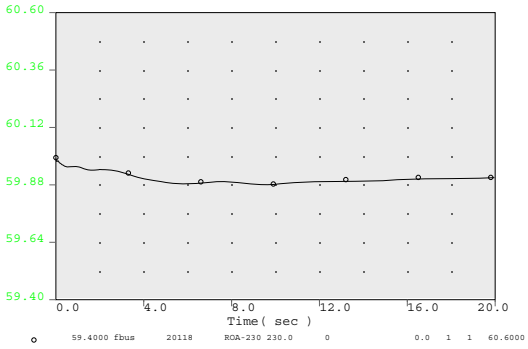
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Frequency Check and Comparison

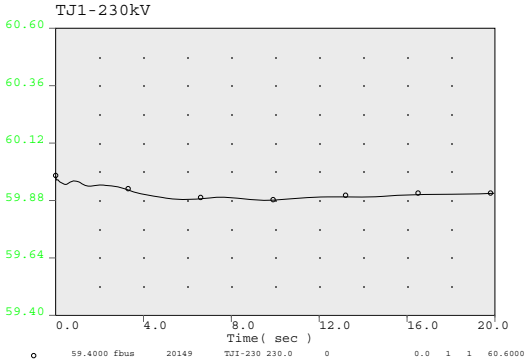
PAR/PID 230kV



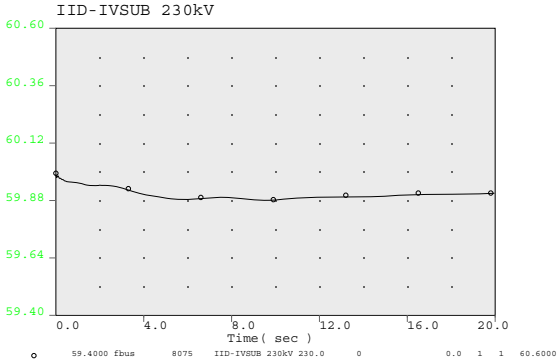
ROA-230kV



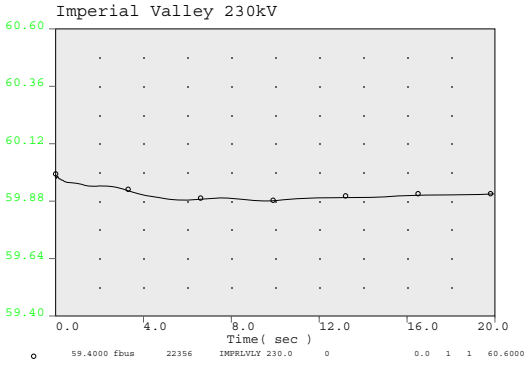
TJ1-230kV



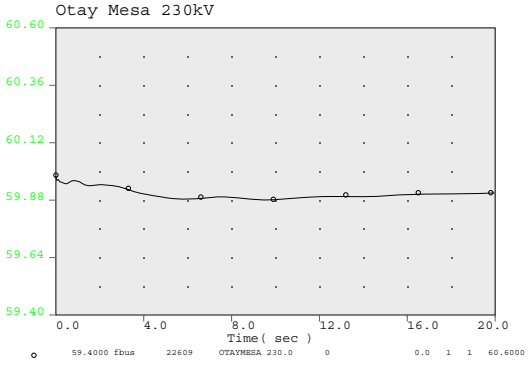
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



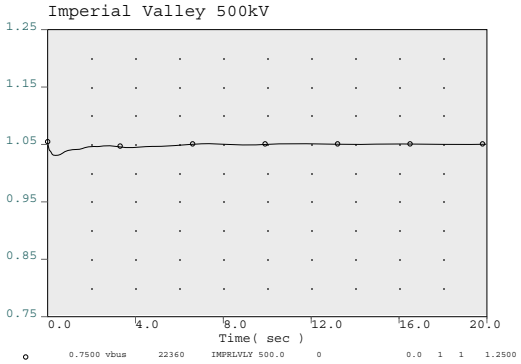
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

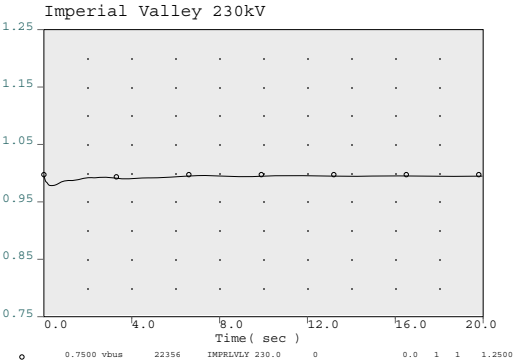
SDGE	tran-c1c2-hs-pre-r12_SONGS-g2.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:43:50 2011

VOLTAGE

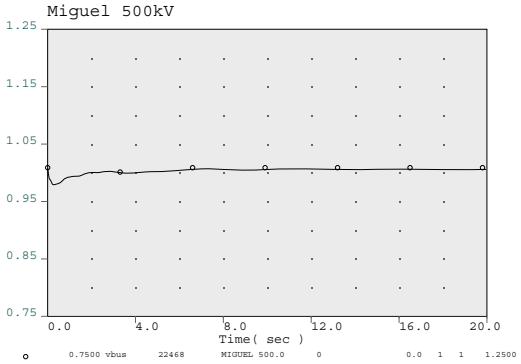
Imperial Valley 500kV



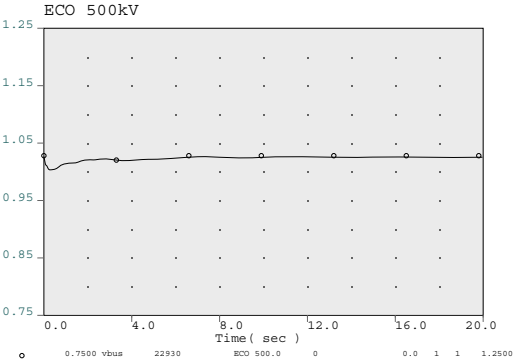
Imperial Valley 230kV



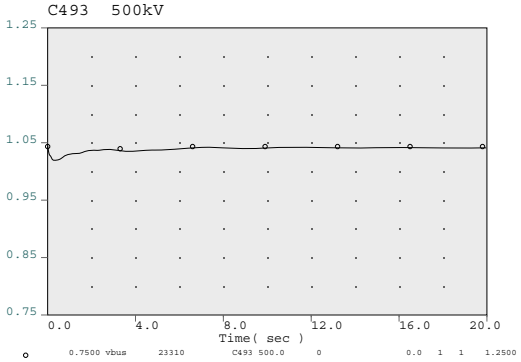
Miguel 500kV



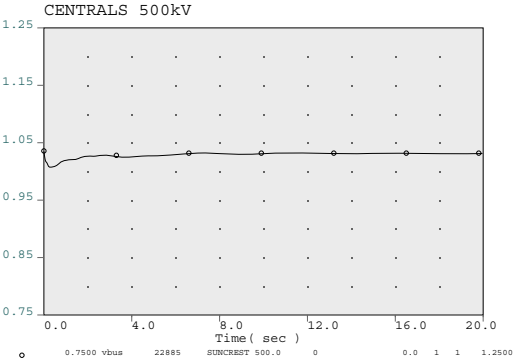
ECO 500kV



C493 500kV



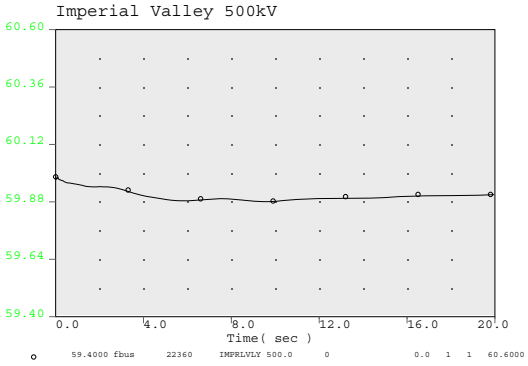
CENTRALS 500kV



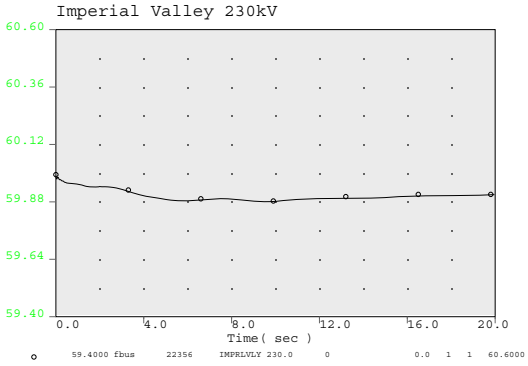
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

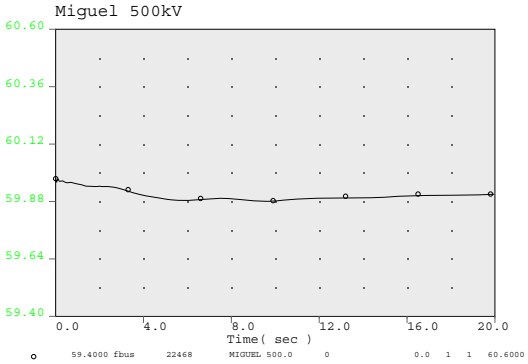
Imperial Valley 500kV



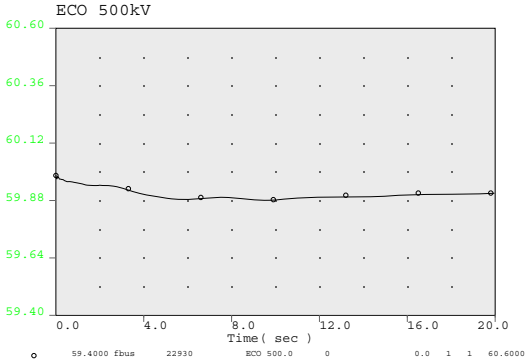
Imperial Valley 230kV



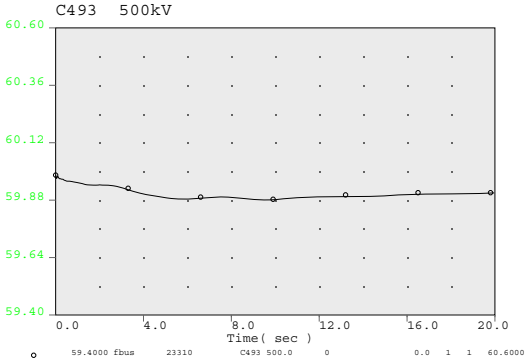
Miguel 500kV



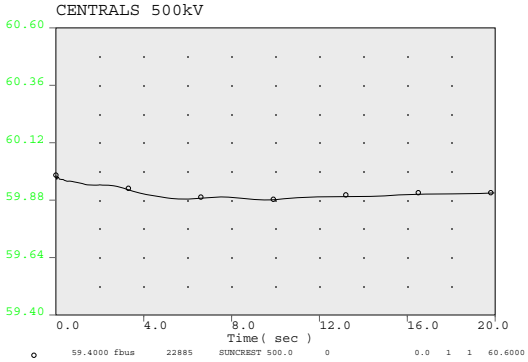
ECO 500kV



C493 500kV

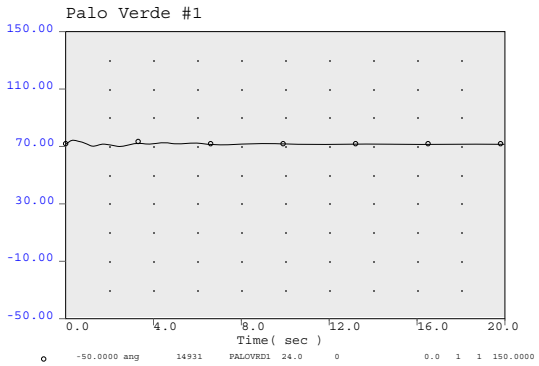


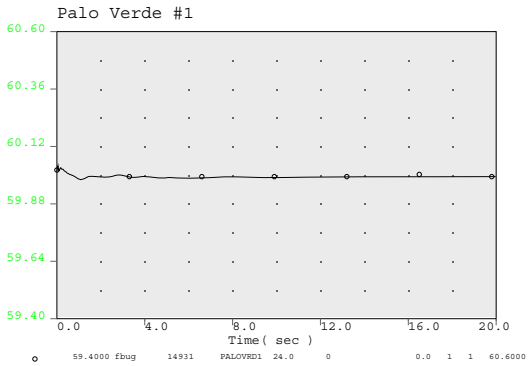
CENTRALS 500kV

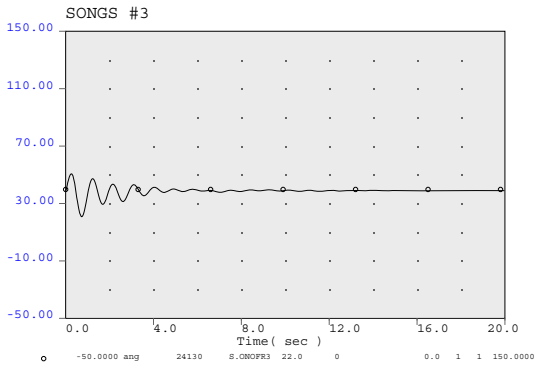


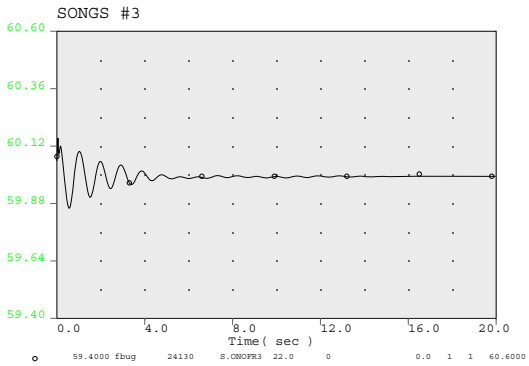
C1 C2 Heavy Summer Pre Without Upgrades

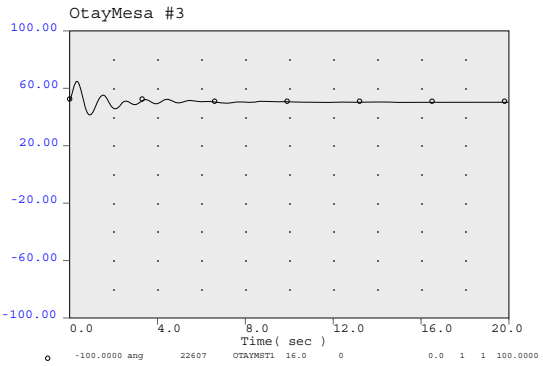
RELATIVE ROTOR ANGLE & FREQUENCY

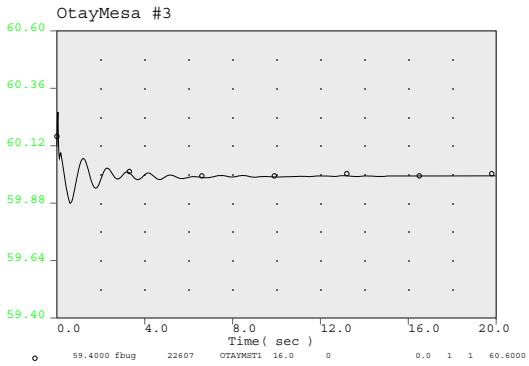










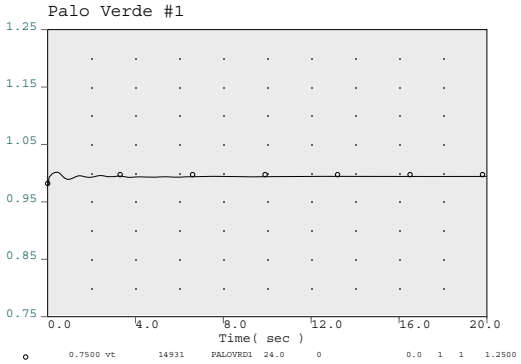


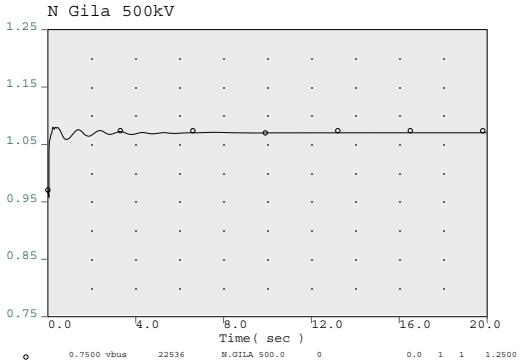
C1 C2 Heavy Summer Pre Without Upgrades

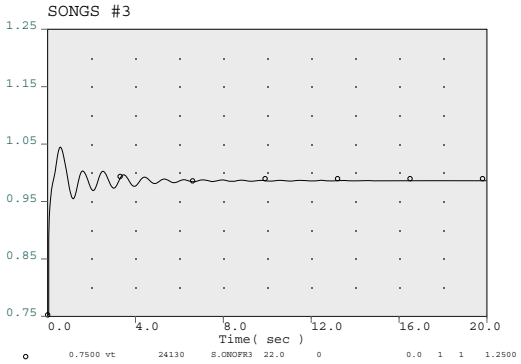
Page 1

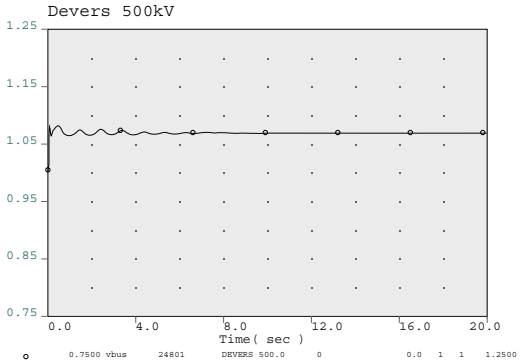
SDGE A Sempra Energy utility	tran-c1c2-hs-pre-r12_SO-SA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:36:31 2011

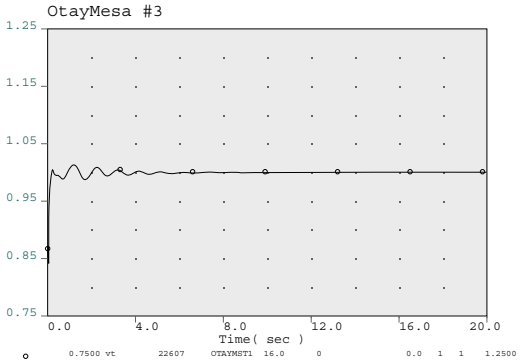
RELATIVE VOLTAGE

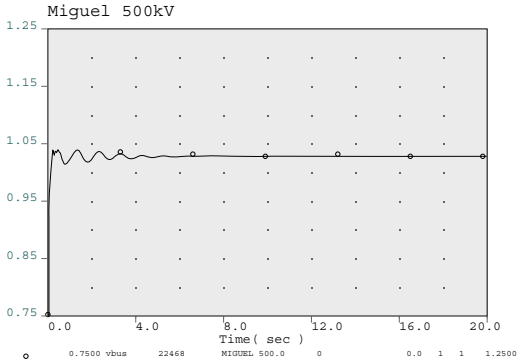












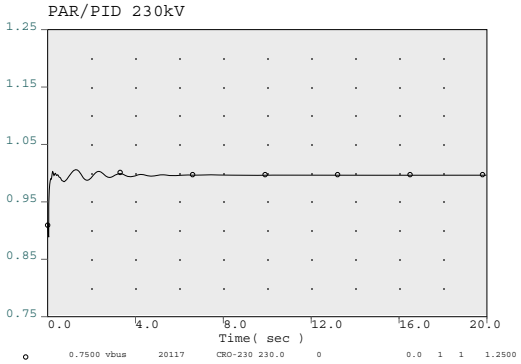
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

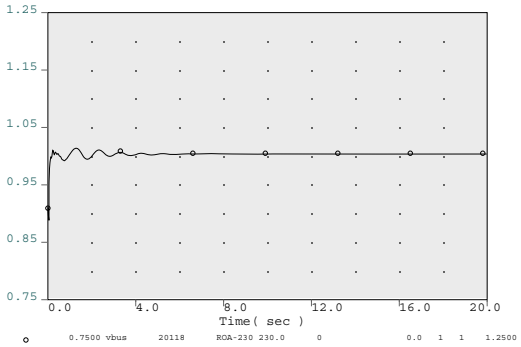
SDGE	tran-c1c2-hs-pre-r12_SO-SA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:36:32 2011

Affected System Voltage Check and Comparison

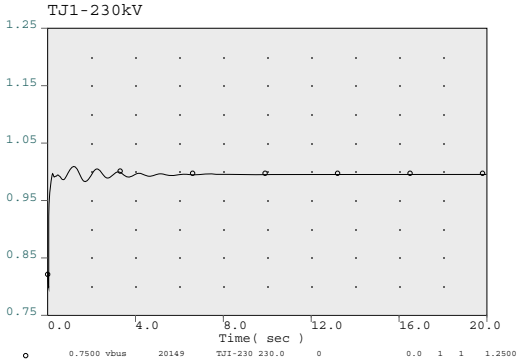
PAR/PID 230kV



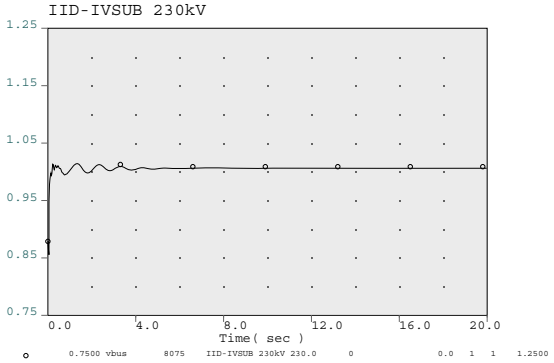
ROA-230kV



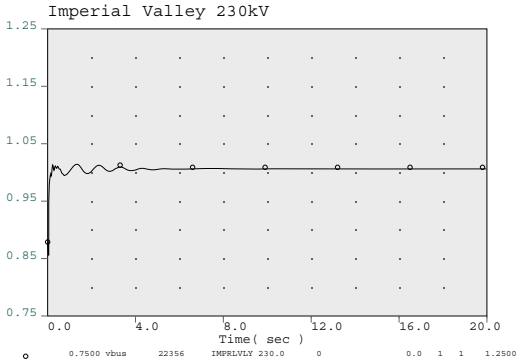
TJ1-230kV



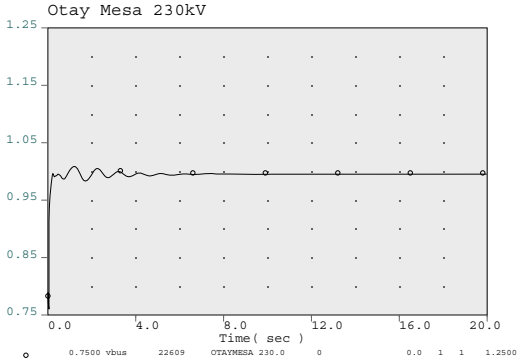
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



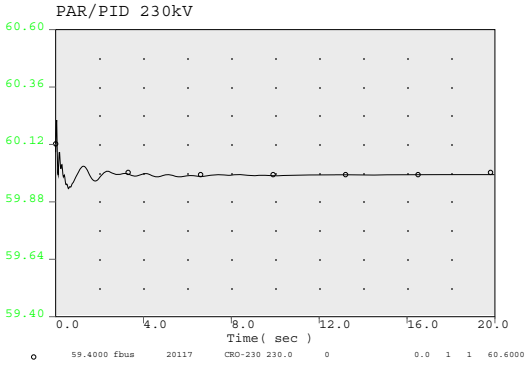
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

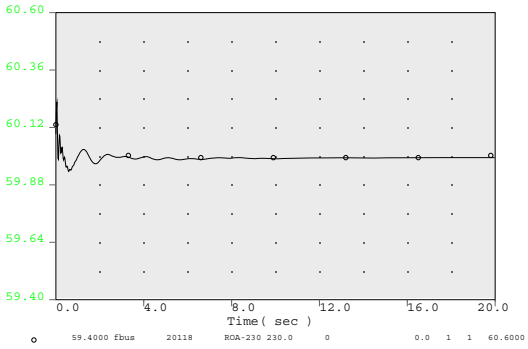
SDGE	tran-c1c2-hs-pre-r12_SO-SA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:36:32 2011

Affected System Frequency Check and Comparison

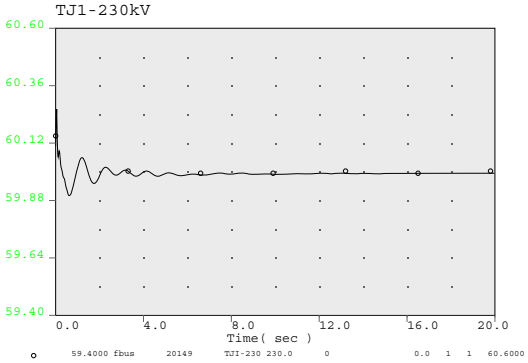
PAR/PID 230kV



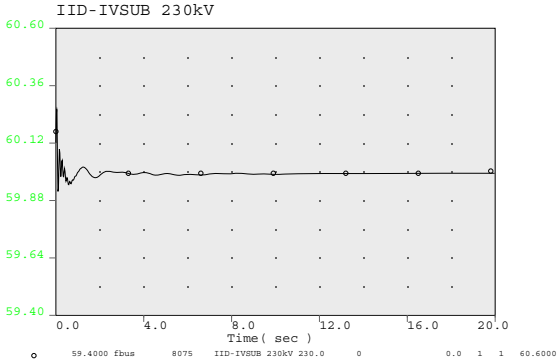
ROA-230kV



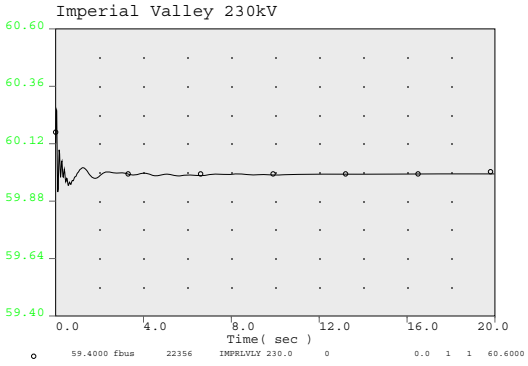
TJ1-230kV



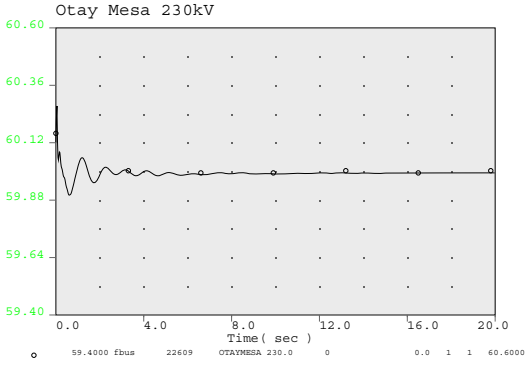
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



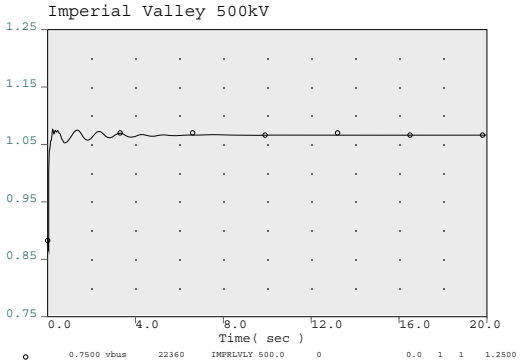
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

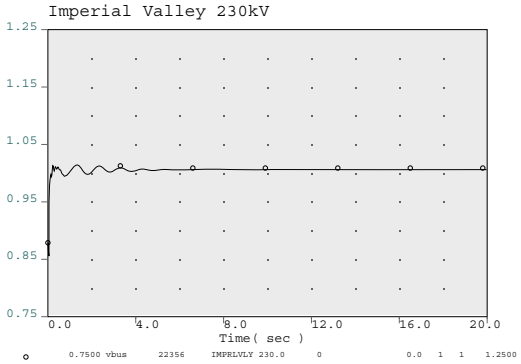
SDGE	tran-c1c2-hs-pre-r12_SO-SA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:36:33 2011

VOLTAGE

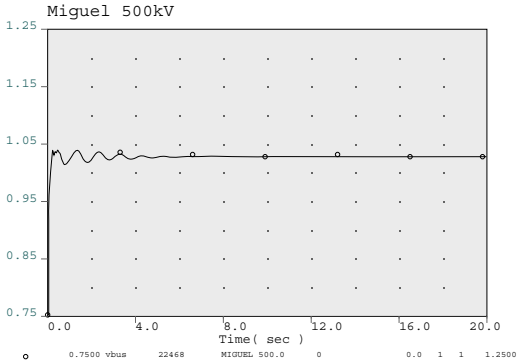
Imperial Valley 500kV



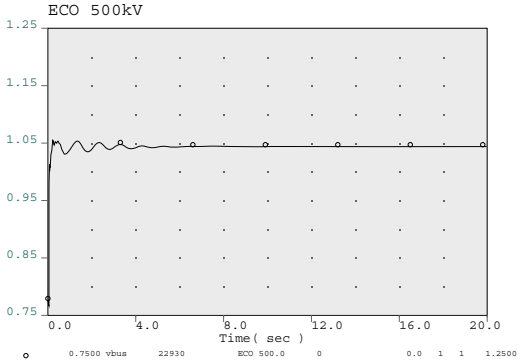
Imperial Valley 230kV



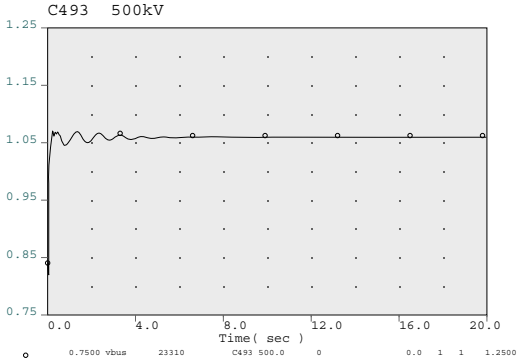
Miguel 500kV



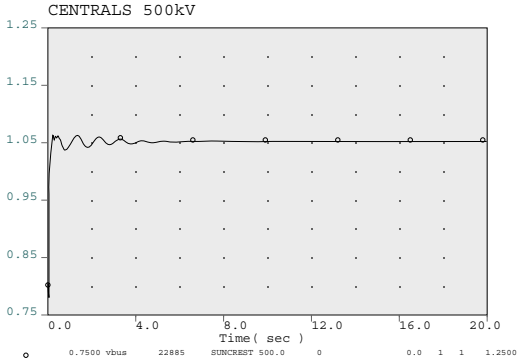
ECO 500kV



C493 500kV



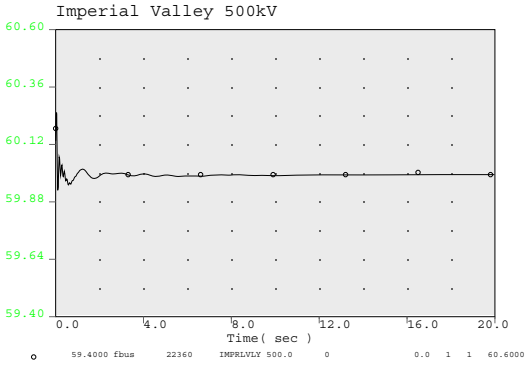
CENTRALS 500kV



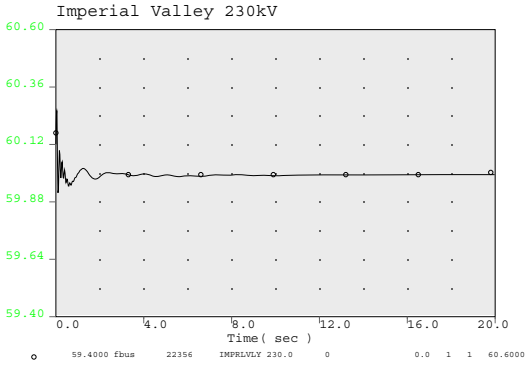
C1 C2 Heavy Summer Pre Without Upgrades

FREQUENCY

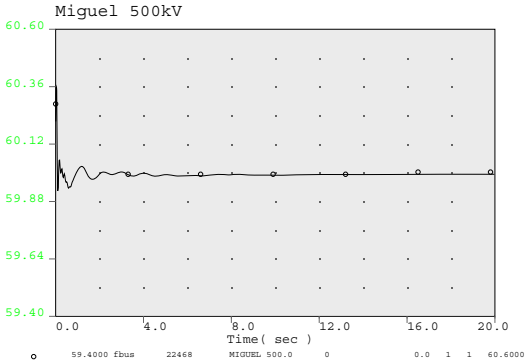
Imperial Valley 500kV



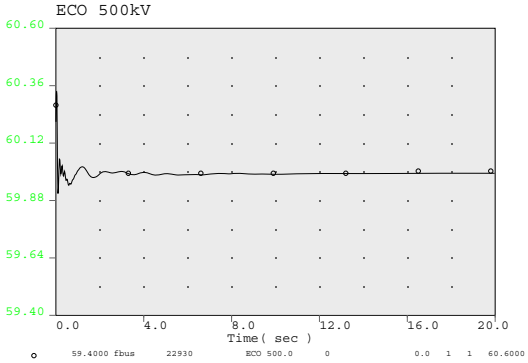
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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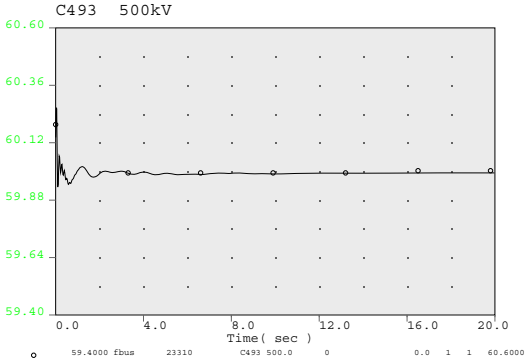
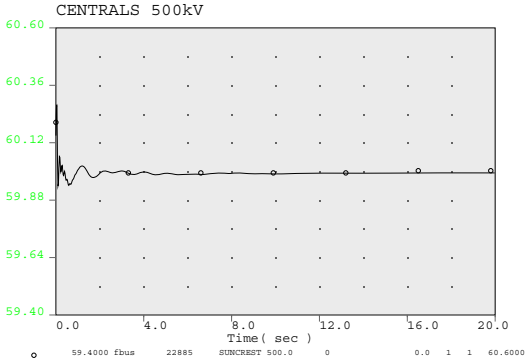


CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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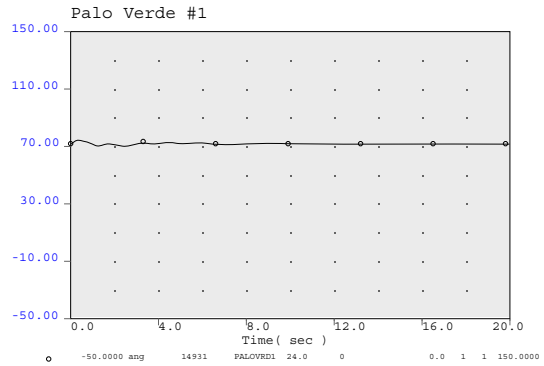
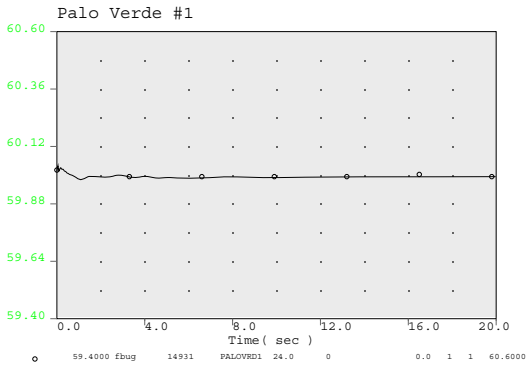
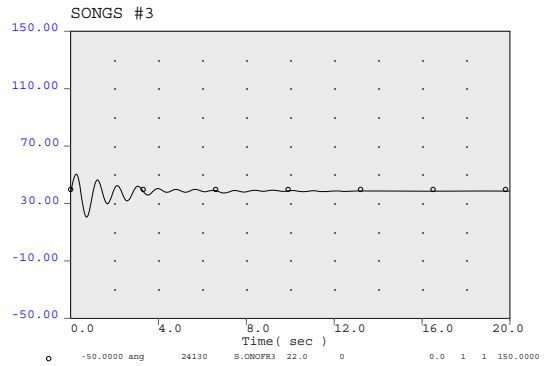
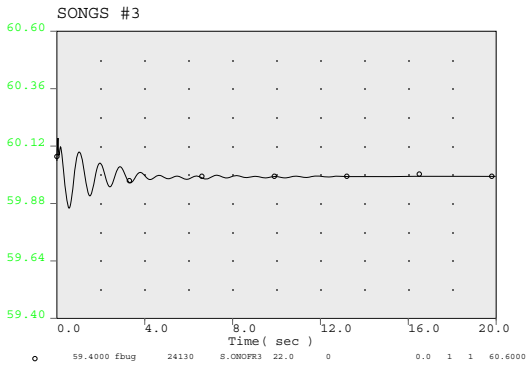
SDGE	tran-c1c2-hs-pre-r12_SO-SA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:36:34 2011

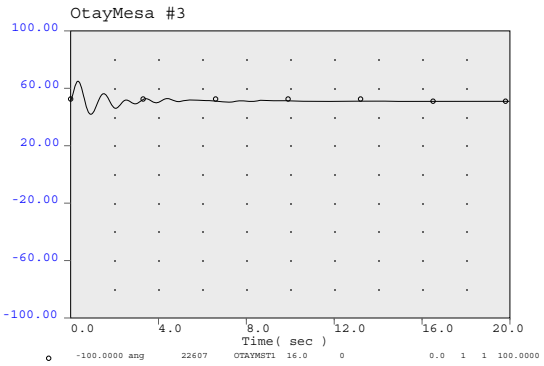
RELATIVE ROTOR ANGLE & FREQUENCY

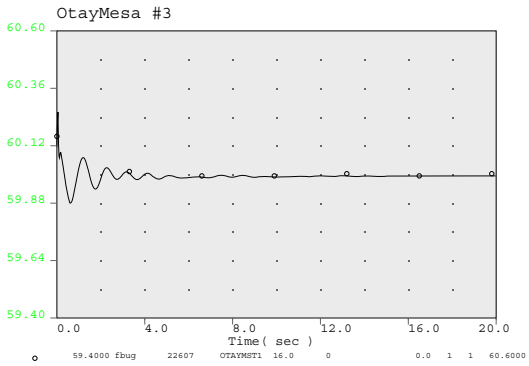










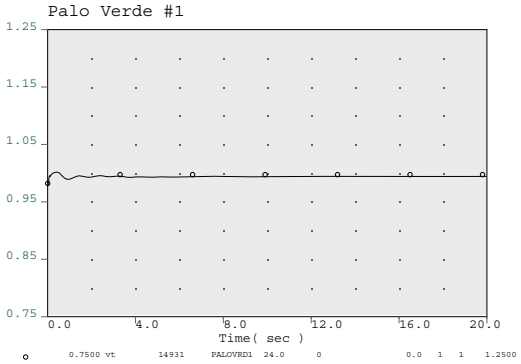


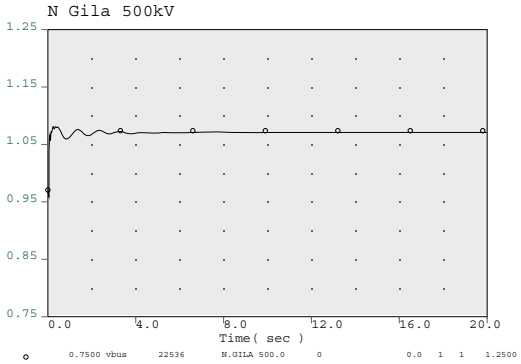
C1 C2 Heavy Summer Pre Without Upgrades

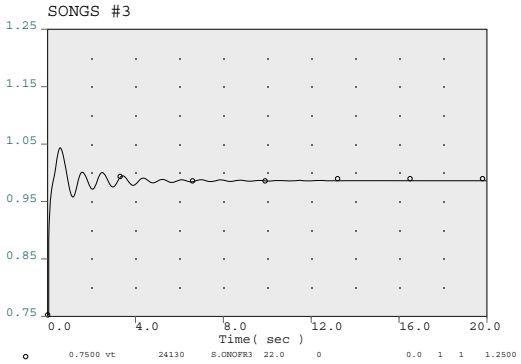
Page 1

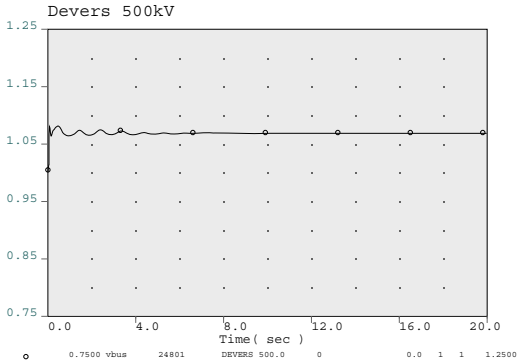
SDGE	tran-c1c2-hs-pre-r12_SO-SA-MS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:38:31 2011

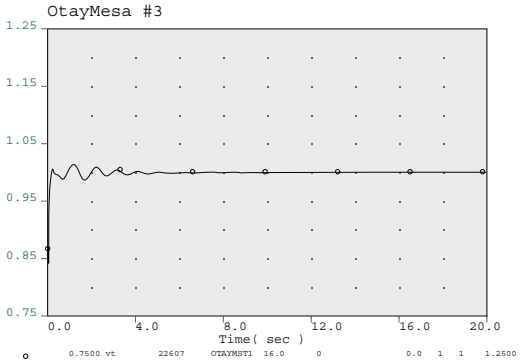
RELATIVE VOLTAGE

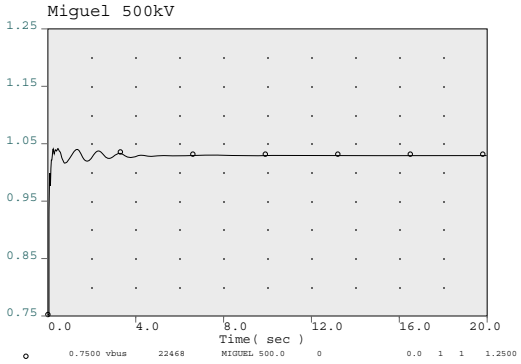








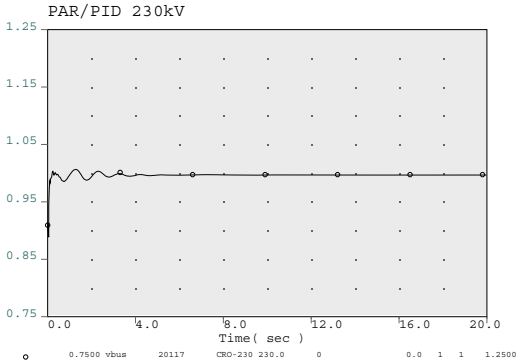




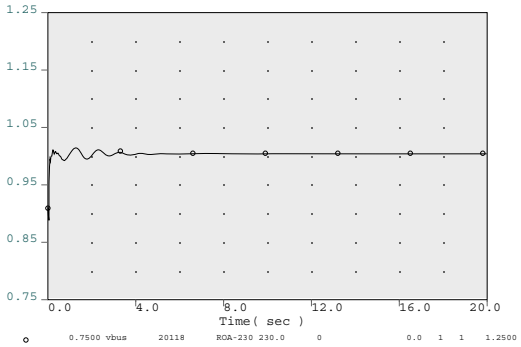
C1 C2 Heavy Summer Pre Without Upgrades

Affected System Voltage Check and Comparison

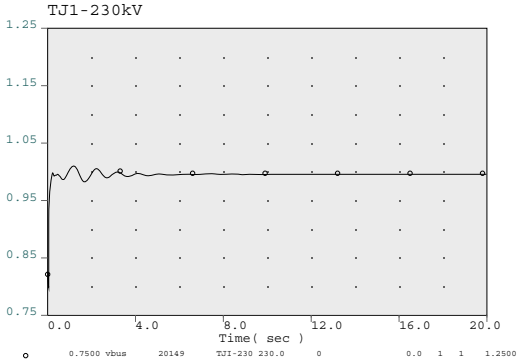
PAR/PID 230kV



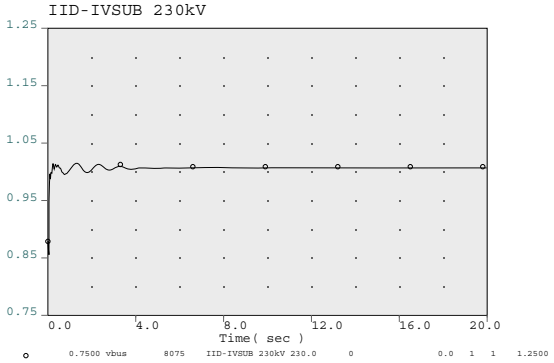
ROA-230kV



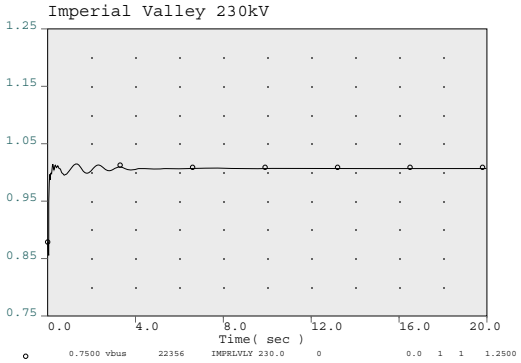
TJ1-230kV



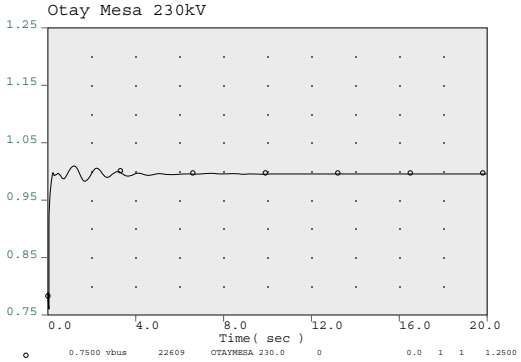
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



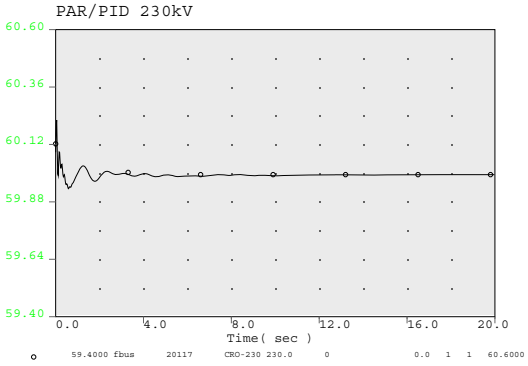
C1 C2 Heavy Summer Pre Without Upgrades

Page 3

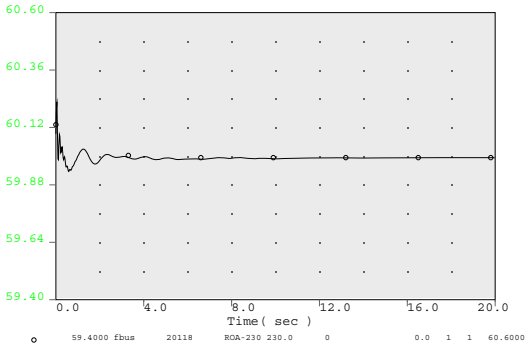
SDGE	tran-c1c2-hs-pre-r12_SO-SA-MS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:38:32 2011

Affected System Frequency Check and Comparison

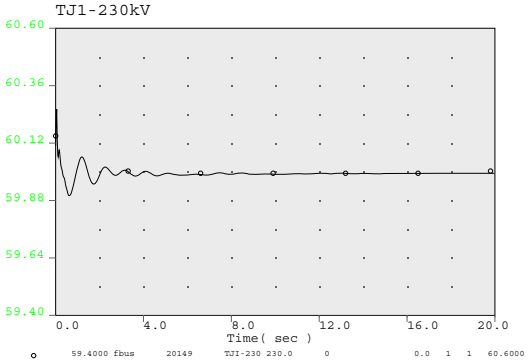
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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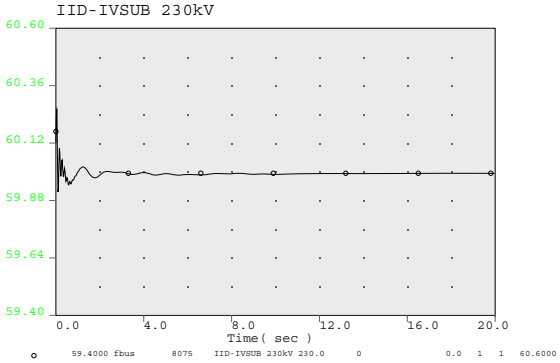
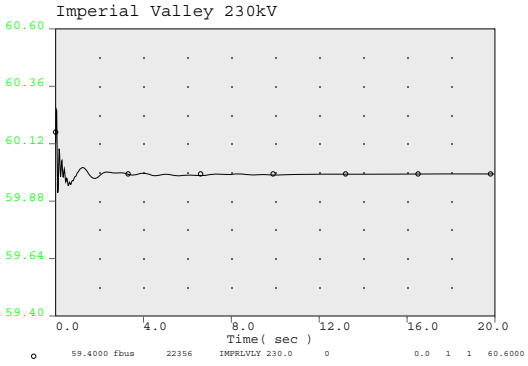
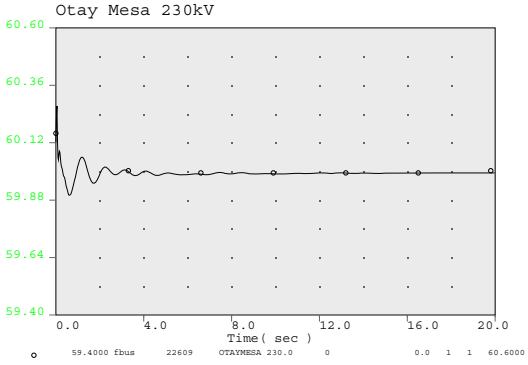


Imperial Valley 230kV



Otay Mesa 230kV



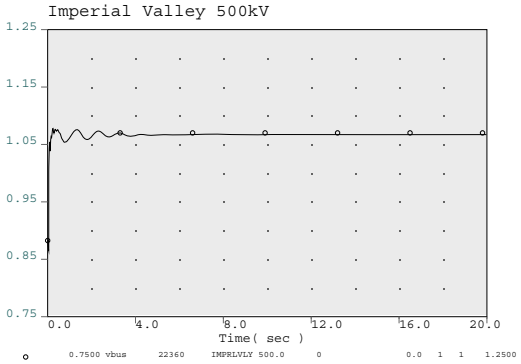
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

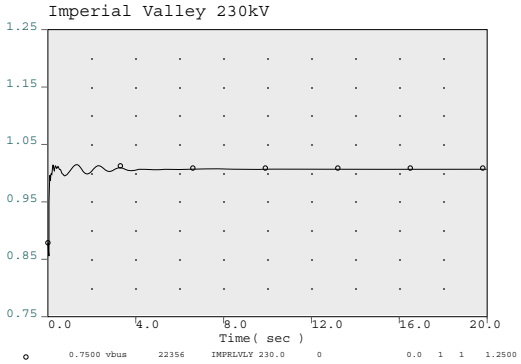
SDGE	tran-c1c2-hs-pre-r12_SO-SA-MS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:38:33 2011

VOLTAGE

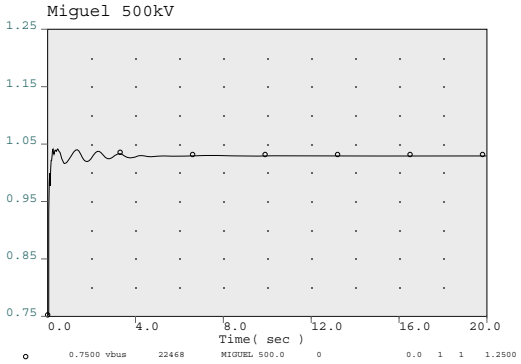
Imperial Valley 500kV



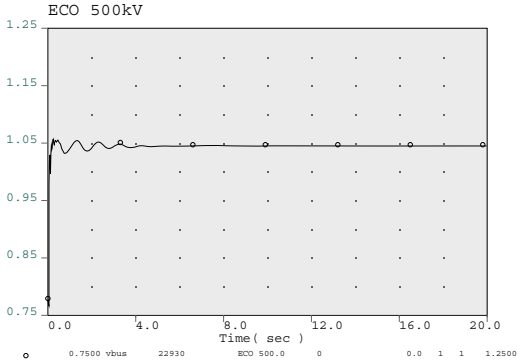
Imperial Valley 230kV



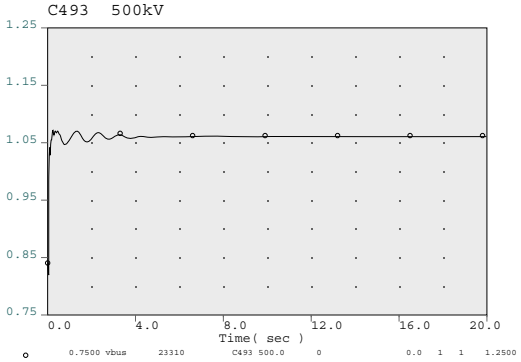
Miguel 500kV



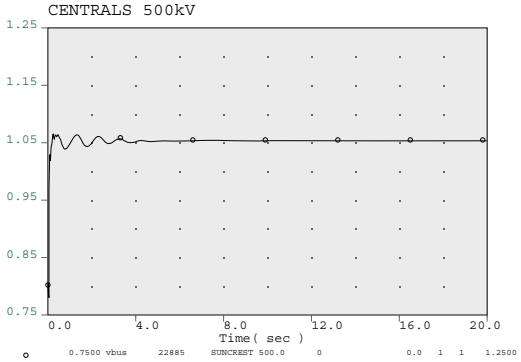
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Pre Without Upgrades

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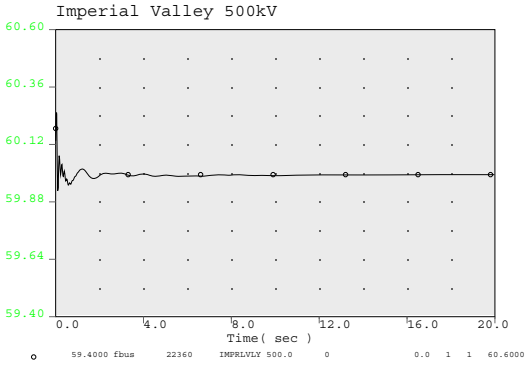
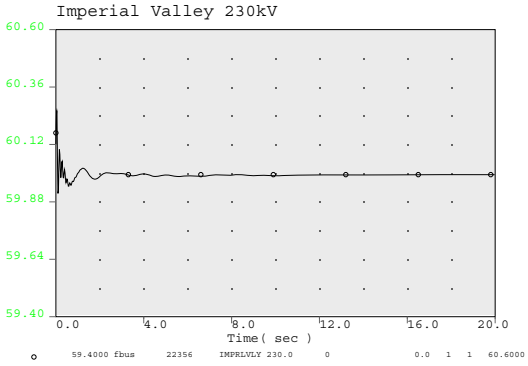
SDGE	tran-c1c2-hs-pre-r12_SO-SA-MS-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:38:33 2011

FREQUENCY

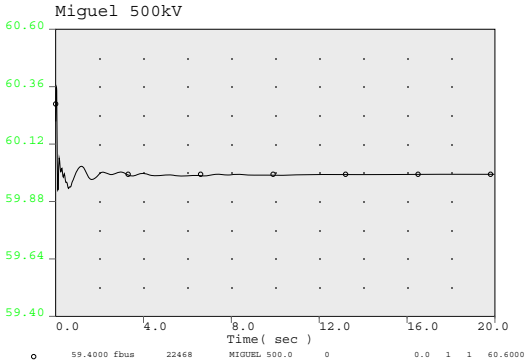
Imperial Valley 500kV



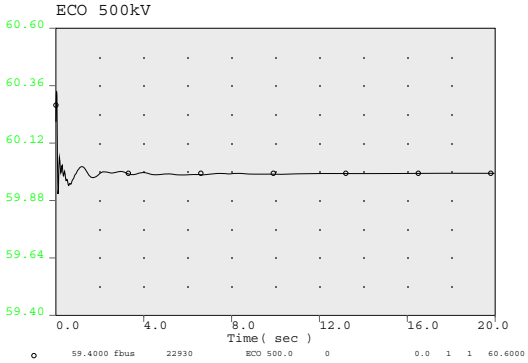
Imperial Valley 230kV



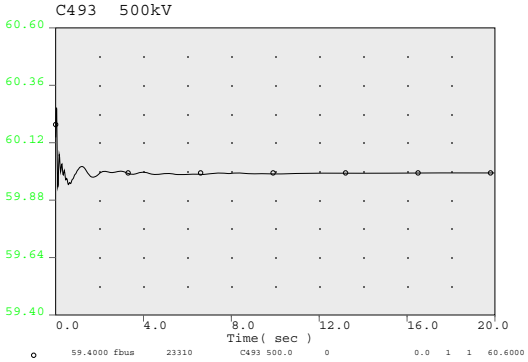
Miguel 500kV



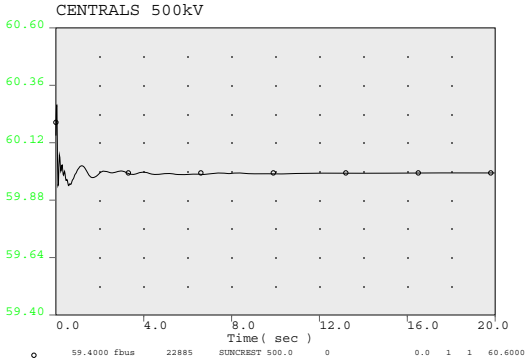
ECO 500kV



C493 500kV

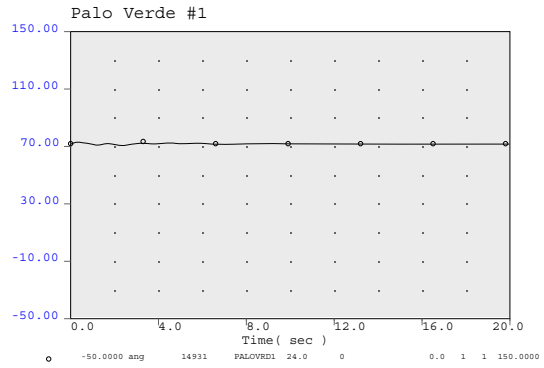


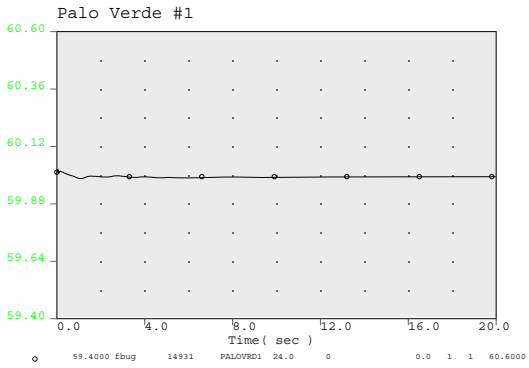
CENTRALS 500kV

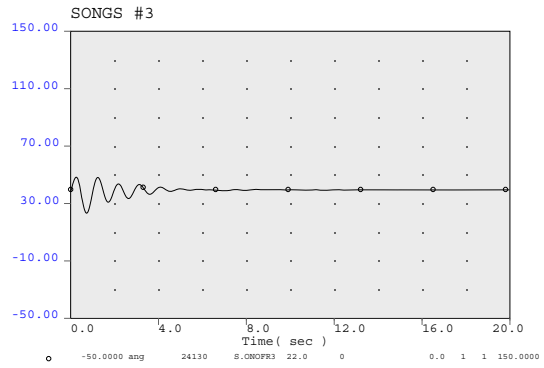


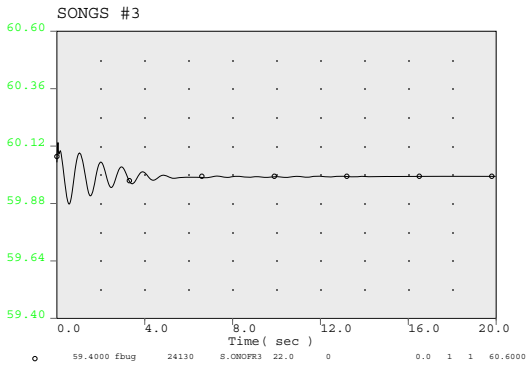
C1 C2 Heavy Summer Pre Without Upgrades

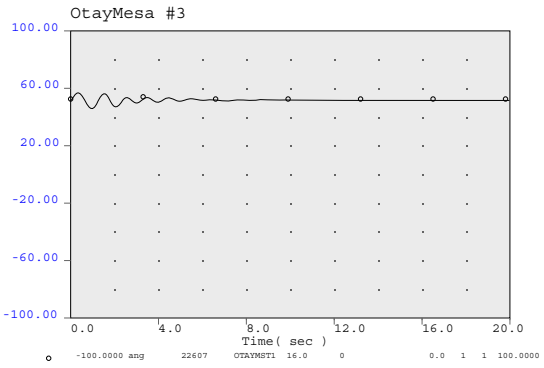
RELATIVE ROTOR ANGLE & FREQUENCY

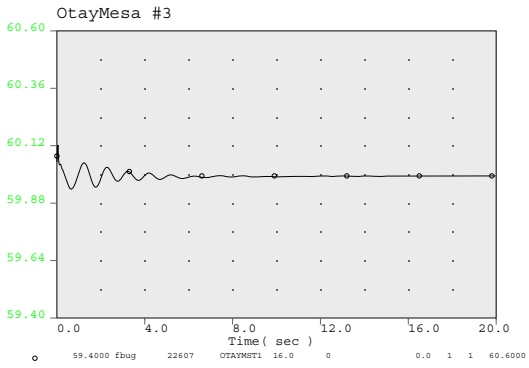












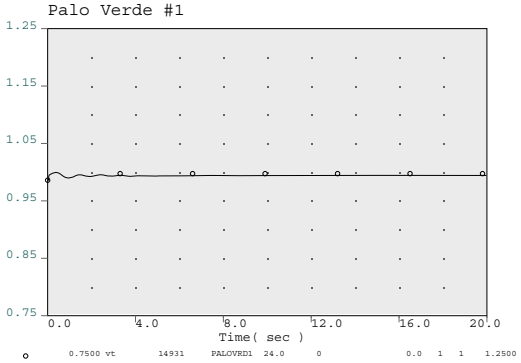
C1 C2 Heavy Summer Pre Without Upgrades

Page 1

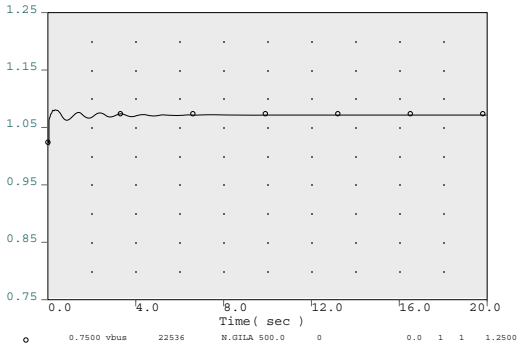
SDGE	tran-c1c2-hs-pre-r12_SO-TA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:40:31 2011

RELATIVE VOLTAGE

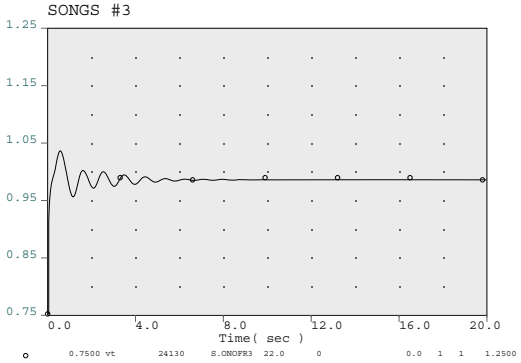
Palo Verde #1



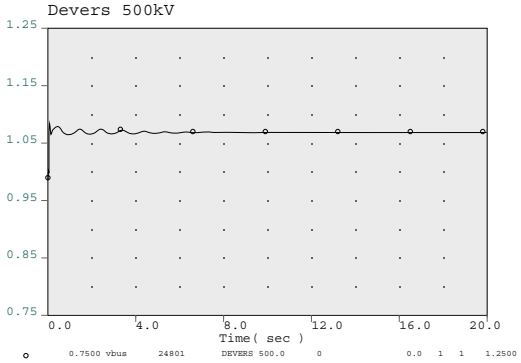
N Gila 500kV



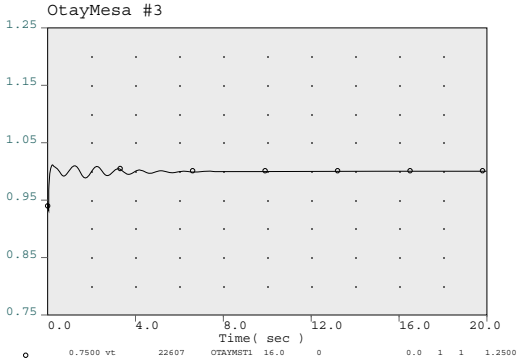
SONGS #3



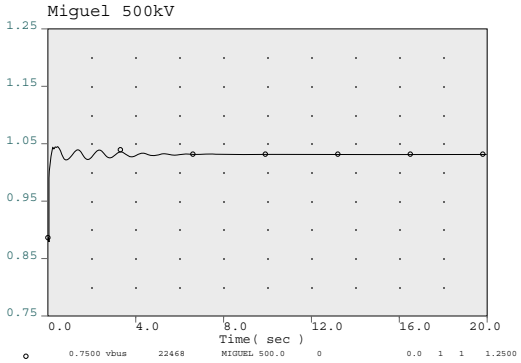
Devers 500kV



OtayMesa #3



Miguel 500kV



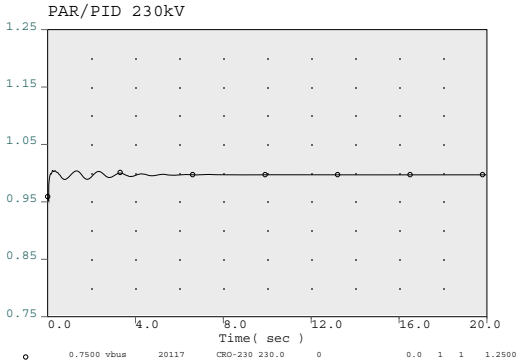
C1 C2 Heavy Summer Pre Without Upgrades

Page 2

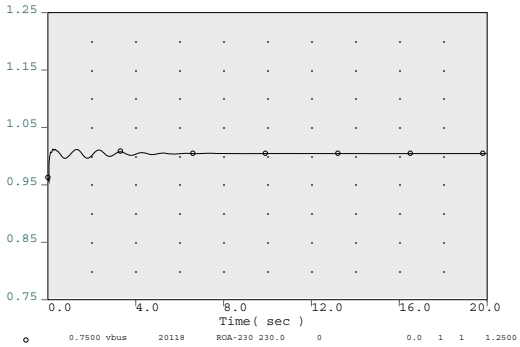
SDGE	tran-c1c2-hs-pre-r12_SO-TA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:40:31 2011

Affected System Voltage Check and Comparison

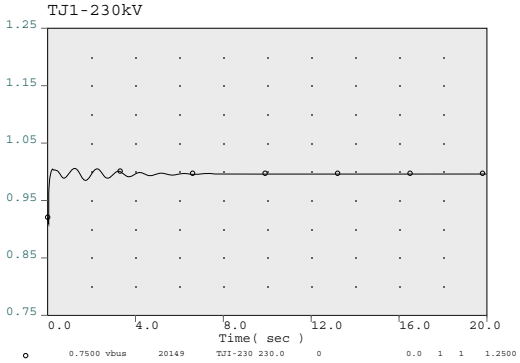
PAR/PID 230kV



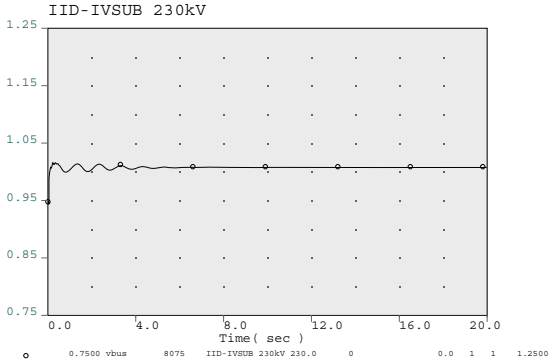
ROA-230kV



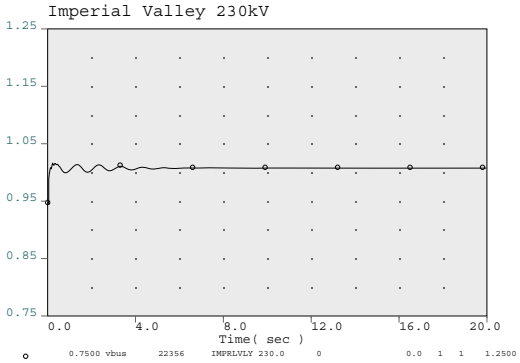
TJ1-230kV



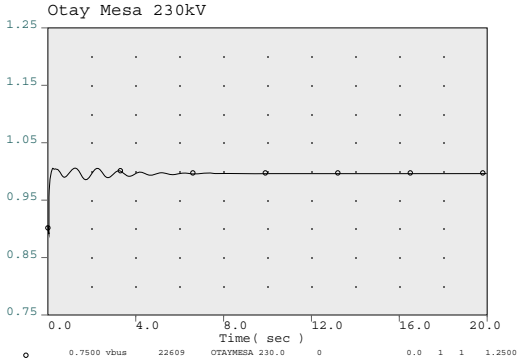
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Pre Without Upgrades

Page 3

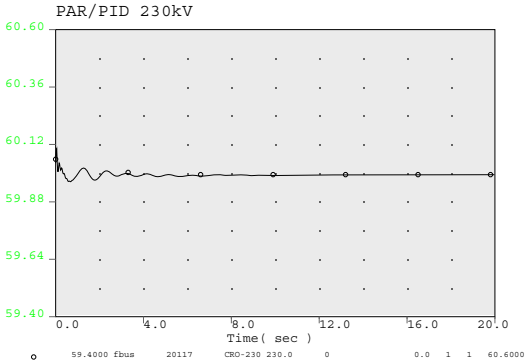
tran-c1c2-hs-pre-r12_SO-TA-dlo.chf

anstab\hs\pre\ws_pre_c1c2

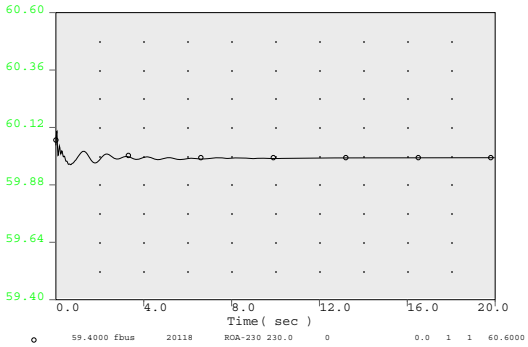
Sun Jul 17 15:40:32 2011

Affected System Frequency Check and Comparison

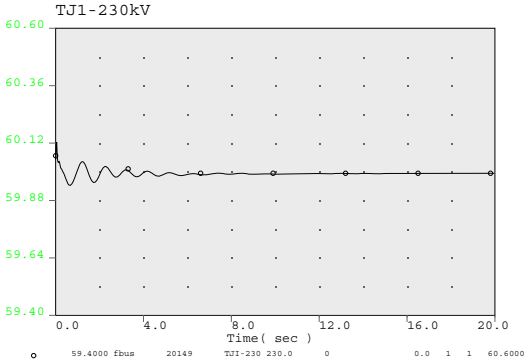
PAR/PID 230kV



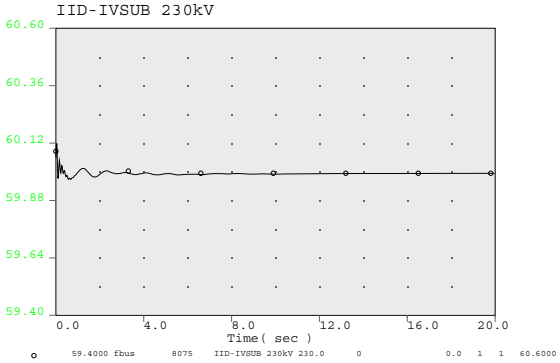
ROA-230kV



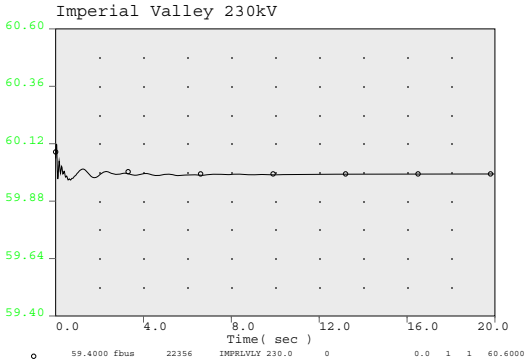
TJ1-230kV



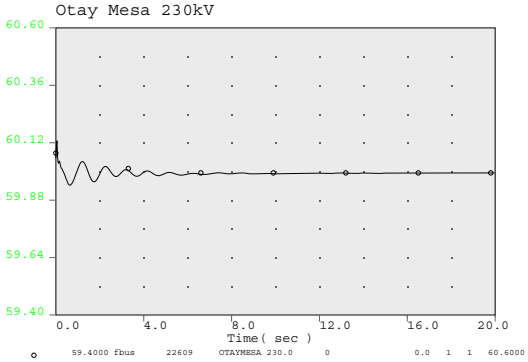
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



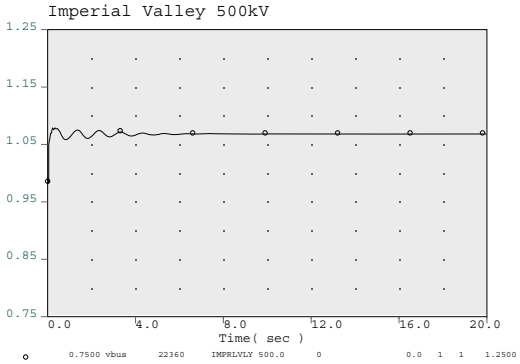
C1 C2 Heavy Summer Pre Without Upgrades

Page 4

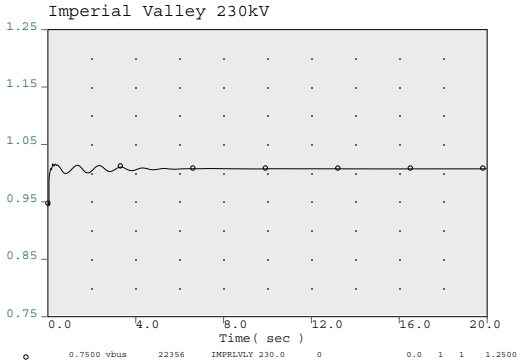
SDGE	tran-c1c2-hs-pre-r12_SO-TA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:40:32 2011

VOLTAGE

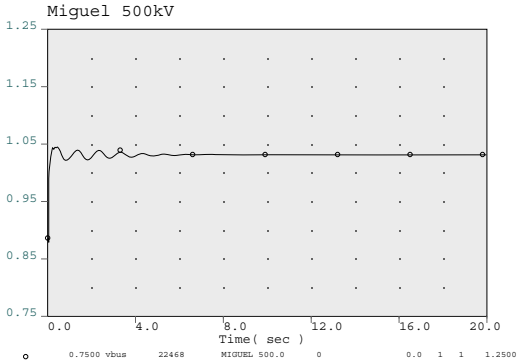
Imperial Valley 500kV



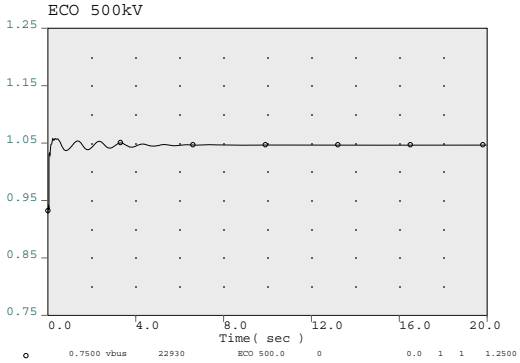
Imperial Valley 230kV



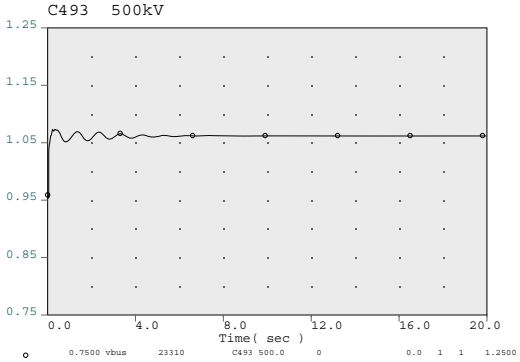
Miguel 500kV



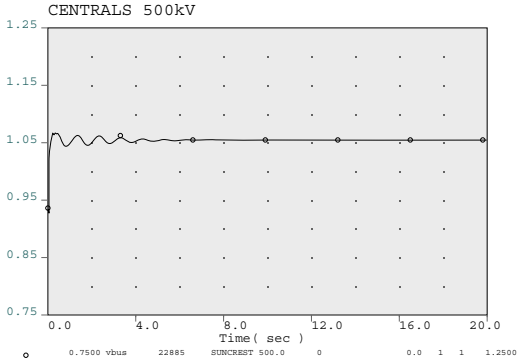
ECO 500kV



C493 500kV



CENTRALS 500kV

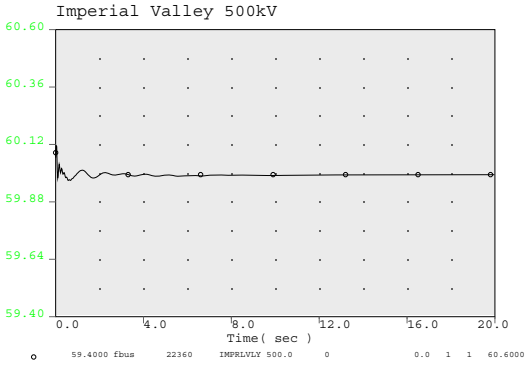


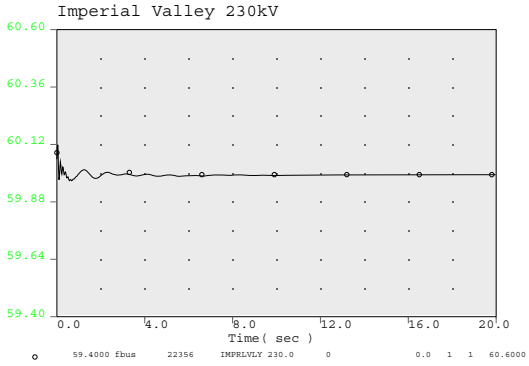
C1 C2 Heavy Summer Pre Without Upgrades

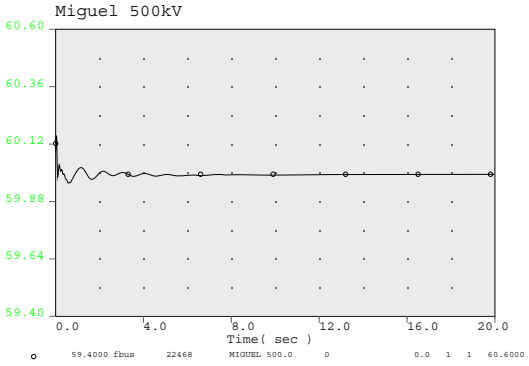
Page 5

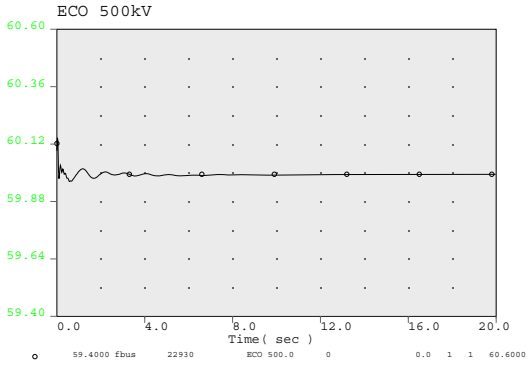
SDGE	tran-c1c2-hs-pre-r12_SO-TA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:40:33 2011

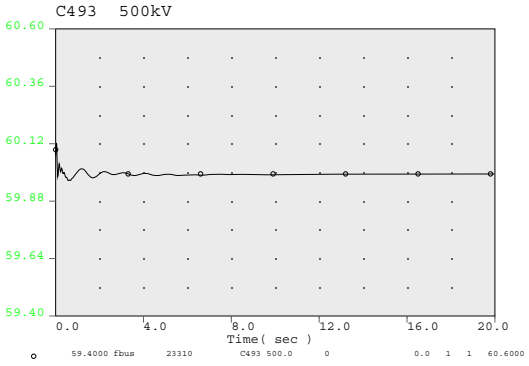
FREQUENCY

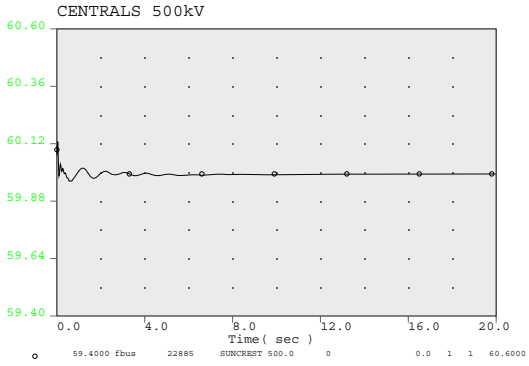












C1 C2 Heavy Summer Pre Without Upgrades

Page 6

SDGE	tran-c1c2-hs-pre-r12_SO-TA-dlo.chf	anstab\hs\pre\ws_pre_c1c2 Sun Jul 17 15:40:34 2011

Appendix J-4

Transient Stability Analysis Plots

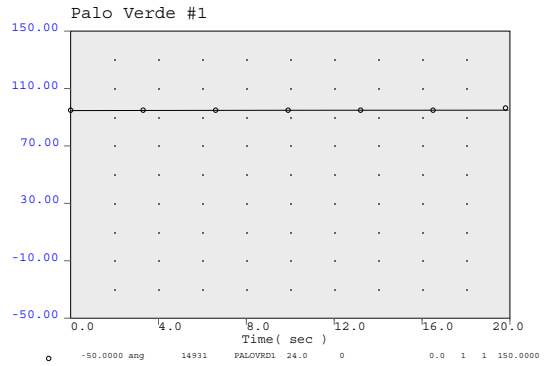
Imperial Valley Area Cluster

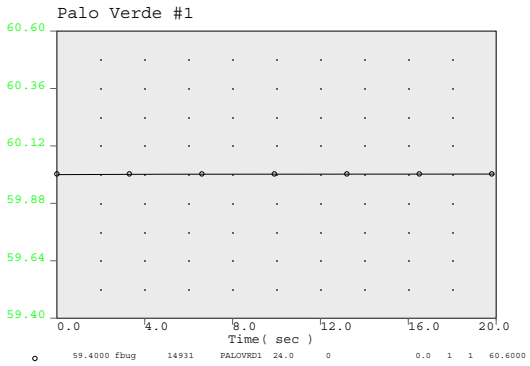
Light Load (Spring or Light Autumn) Post

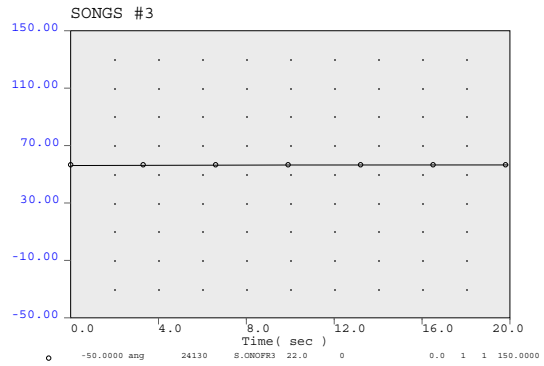
Imperial Valley Area - Frequency

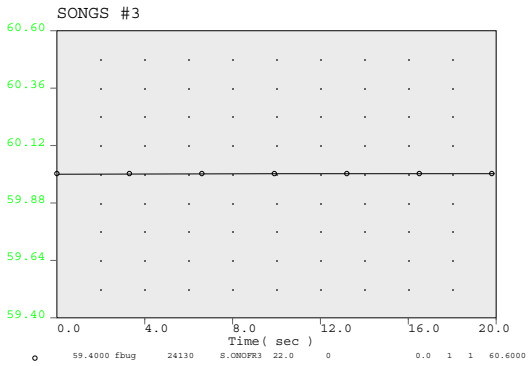
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

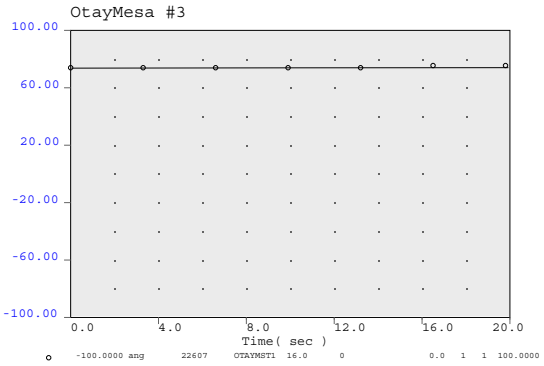
RELATIVE ROTOR ANGLE & FREQUENCY

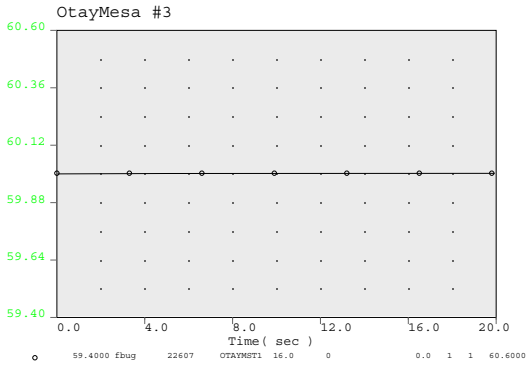












SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Page 1

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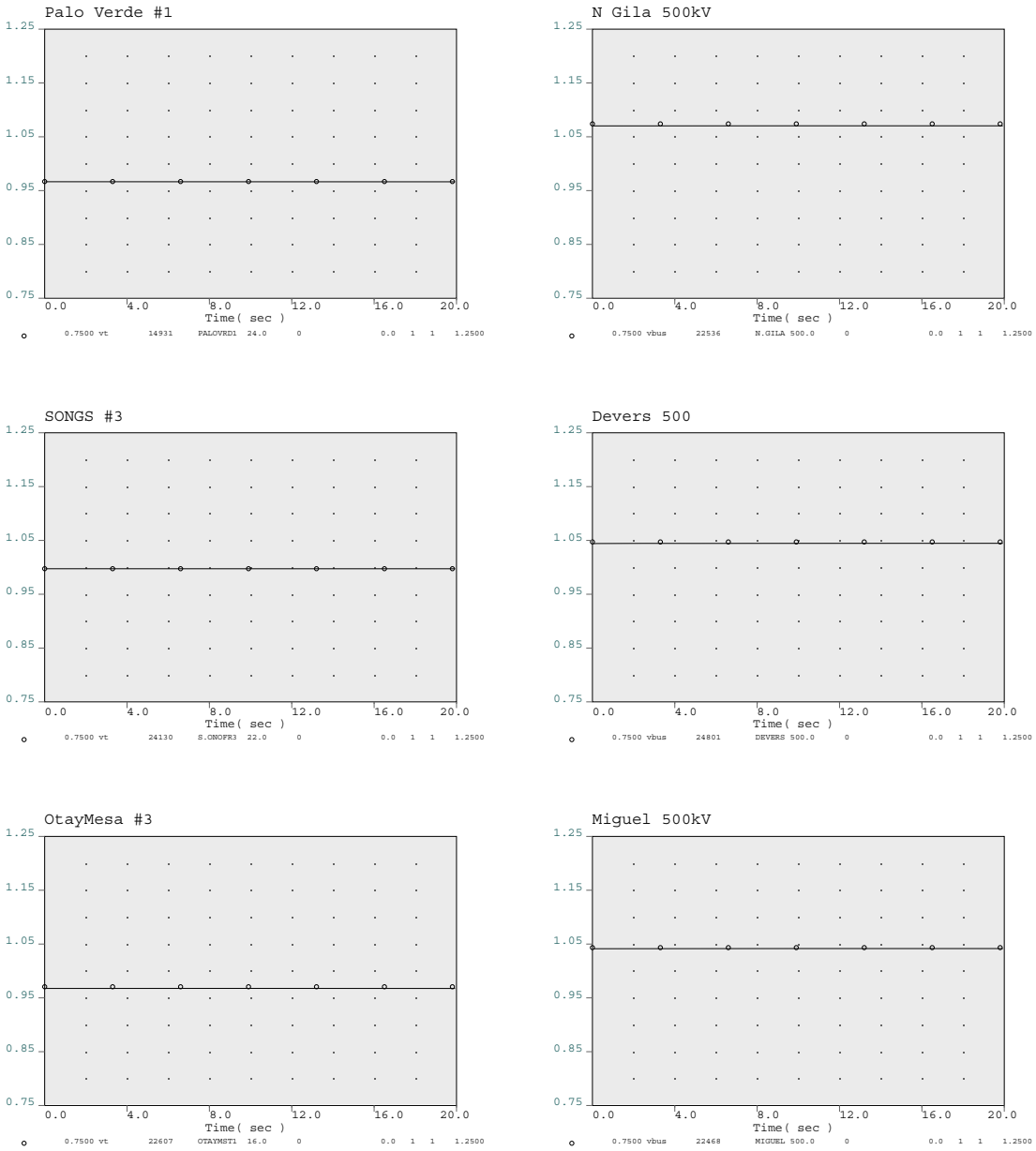
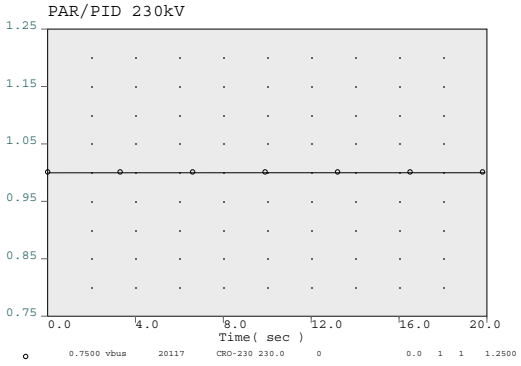
RELATIVE VOLTAGE



SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Voltage Check and Comparison

PAR/PID 230kV



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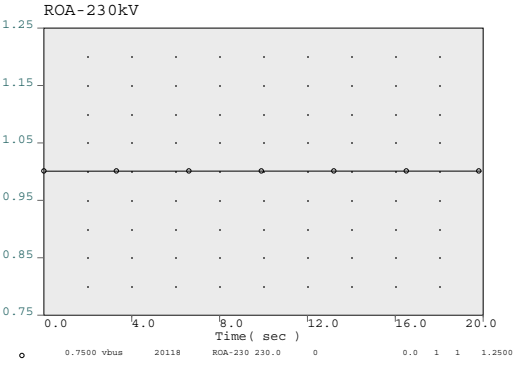
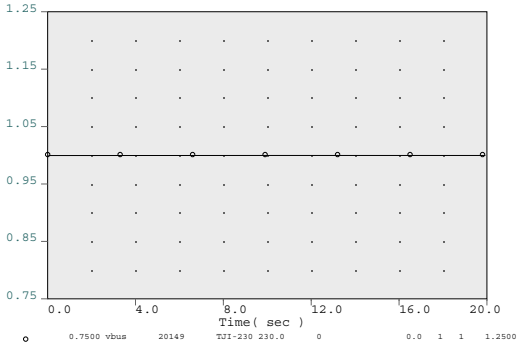
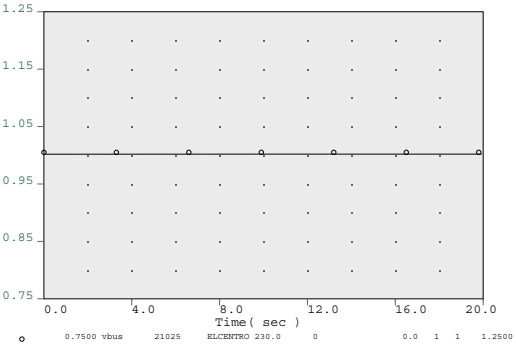


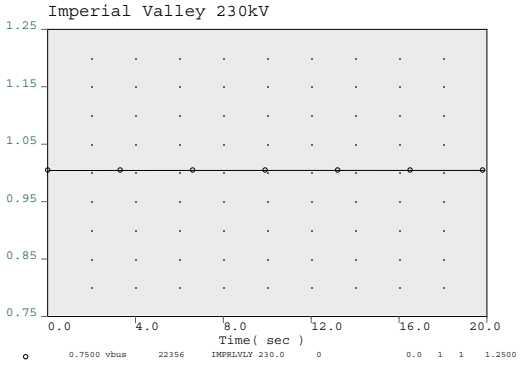
TJ1-230kV



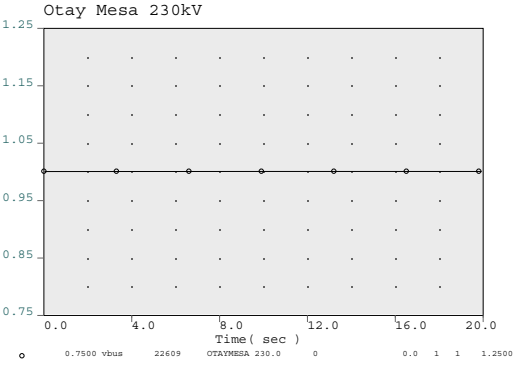
El Centro



Imperial Valley 230kV



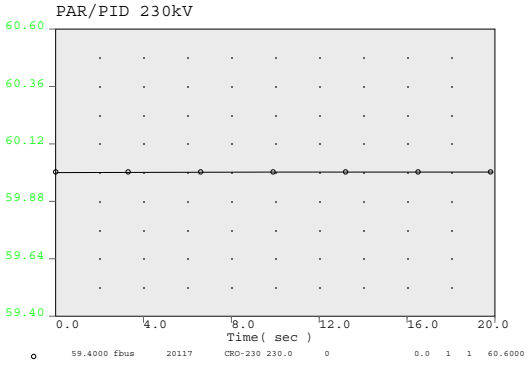
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Frequency Check and Comparison

PAR/PID 230kV



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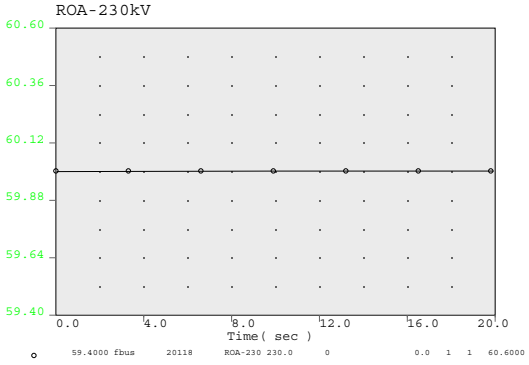

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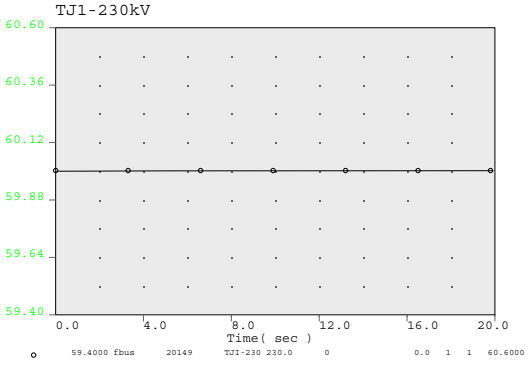
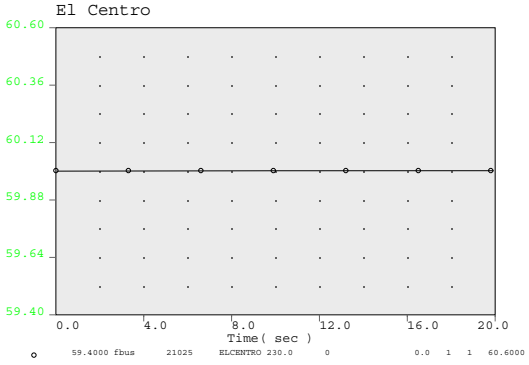
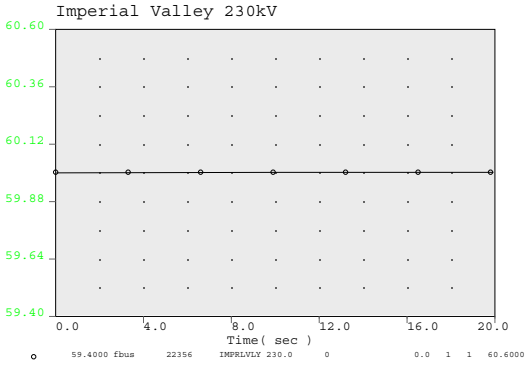


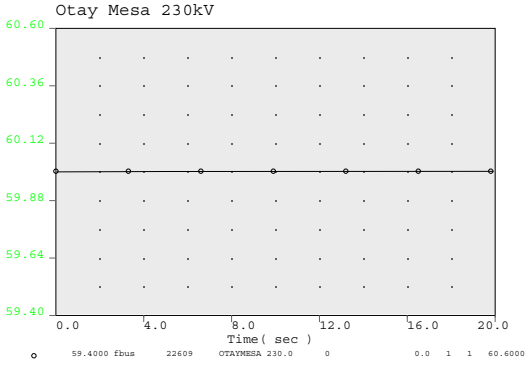
El Centro



Imperial Valley 230kV

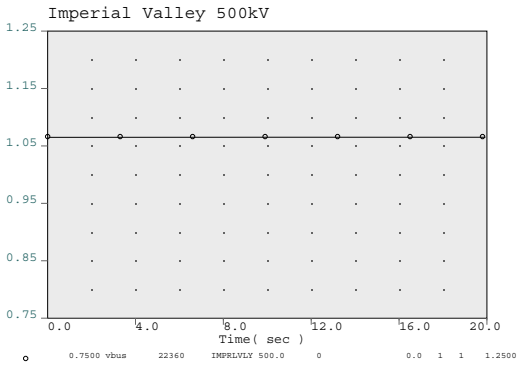


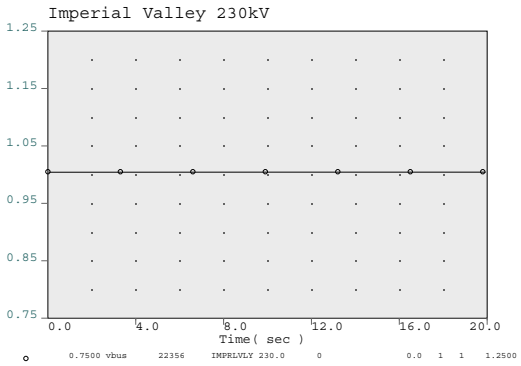
Otay Mesa 230kV

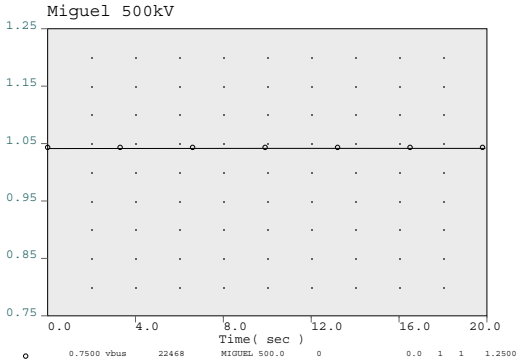


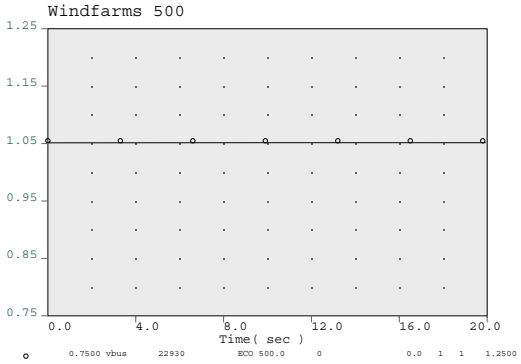
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

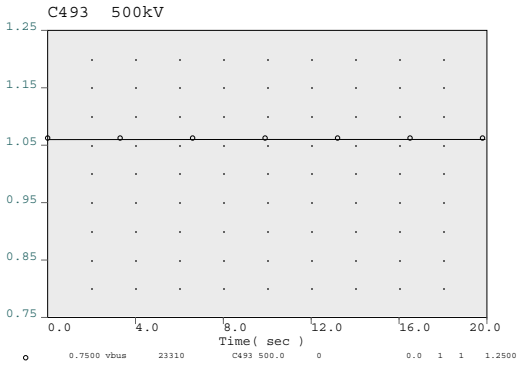
Imperial Valley Area - VOLTAGE

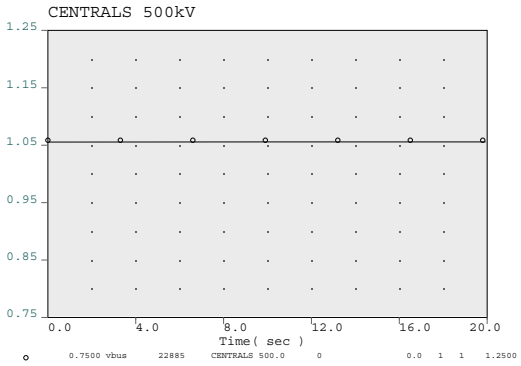












SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Page 5

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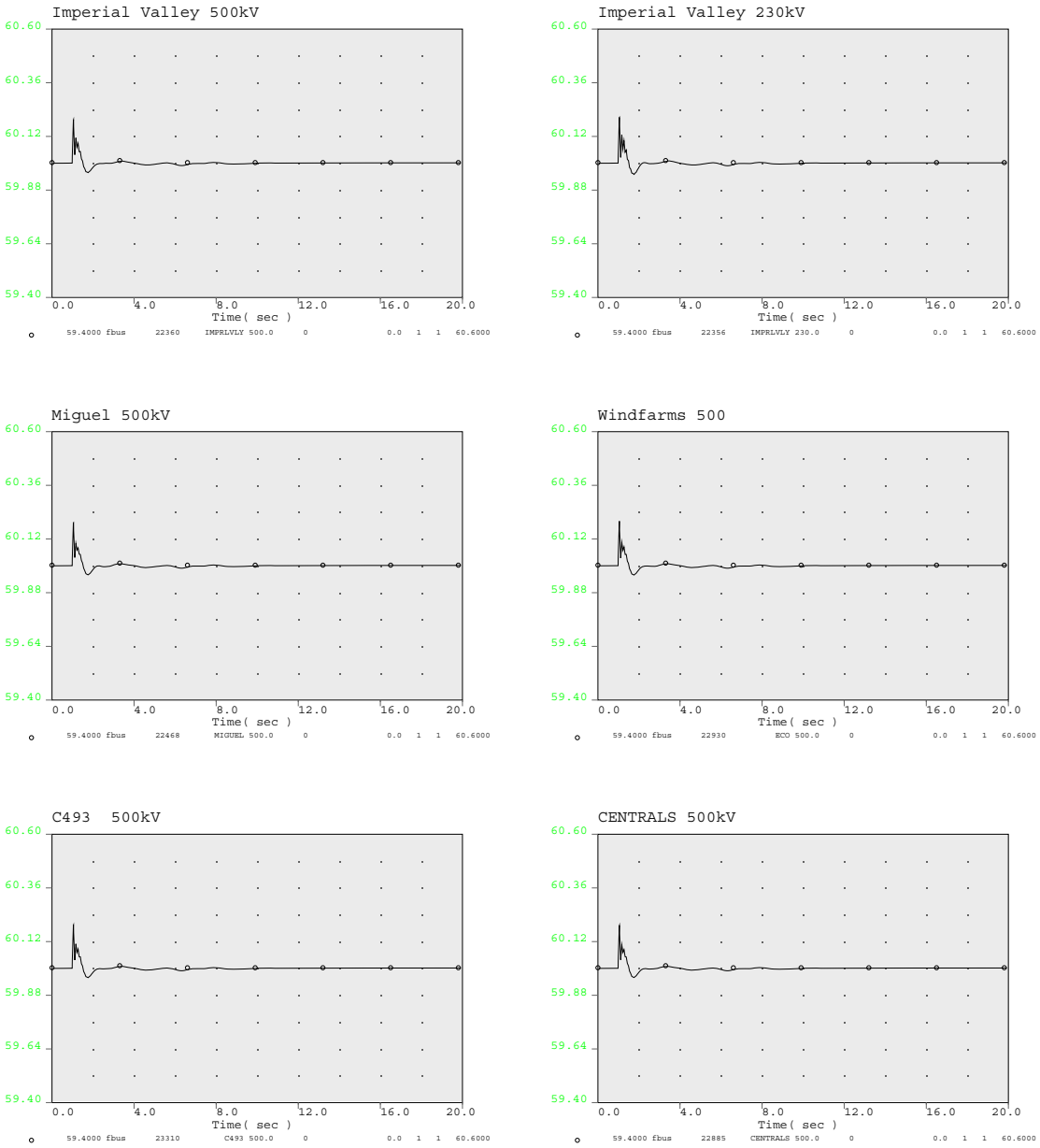
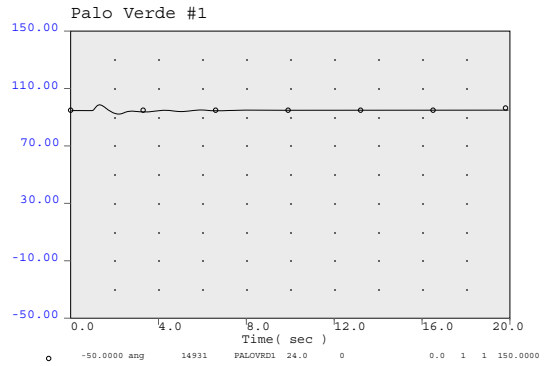
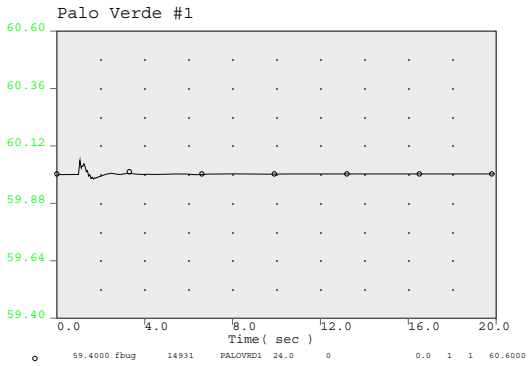
Imperial Valley Area - Frequency

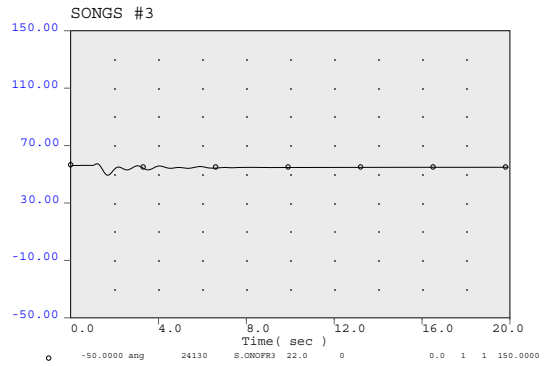


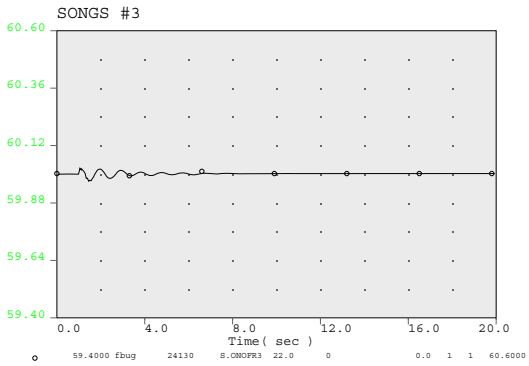
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

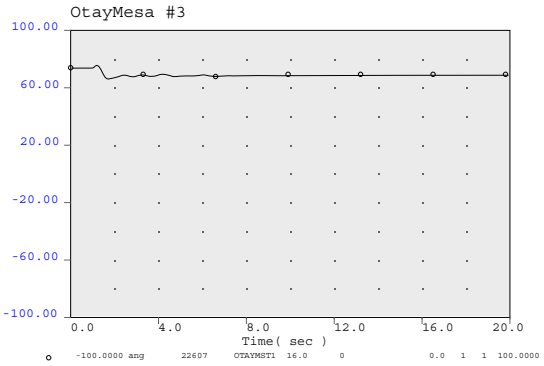
RELATIVE ROTOR ANGLE & FREQUENCY

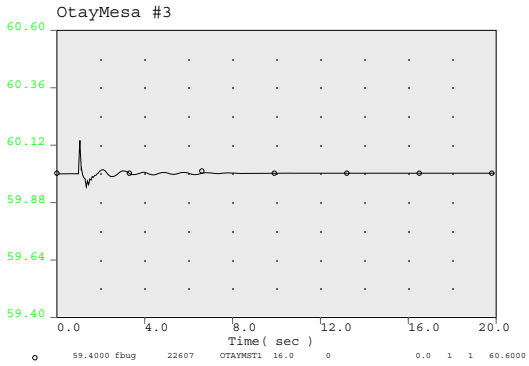












SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Page 1

SDGE	C493_Cen_slo_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:32:54 2010

RELATIVE VOLTAGE

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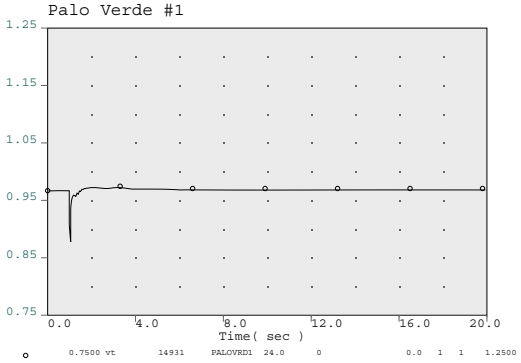
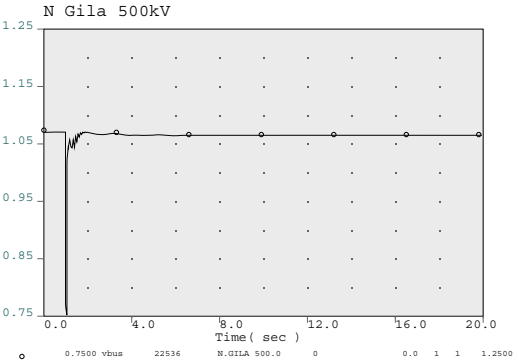


N Gila 500kV



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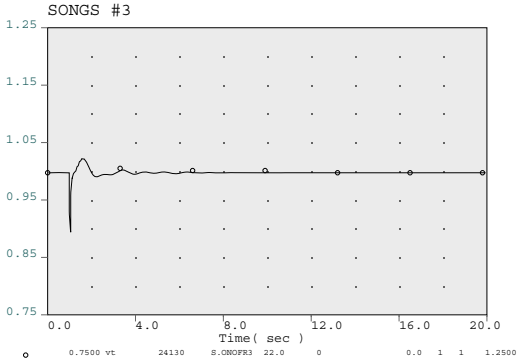
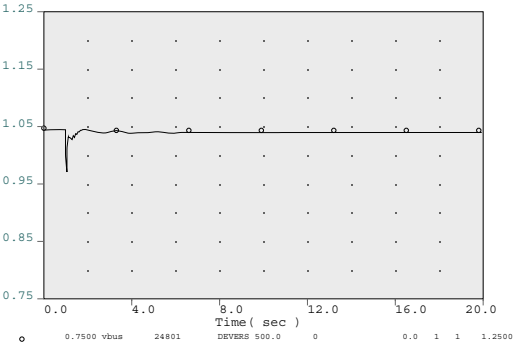
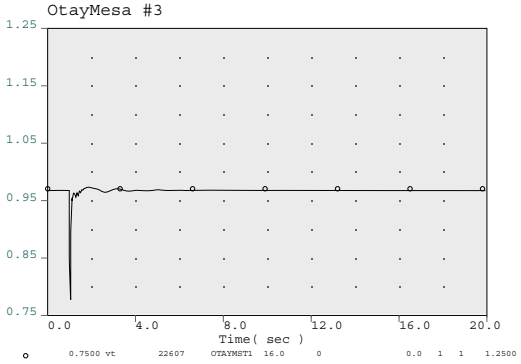


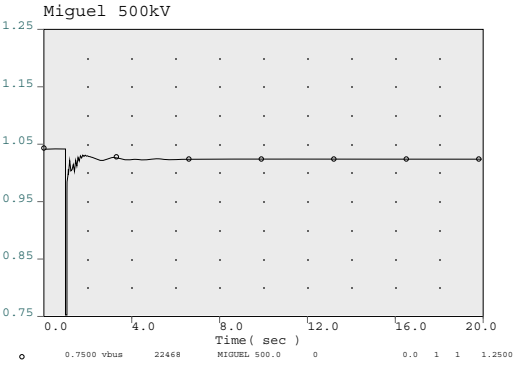
Devers 500



OtayMesa #3



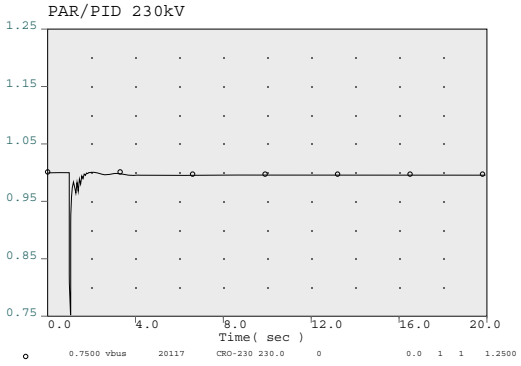
Miguel 500kV



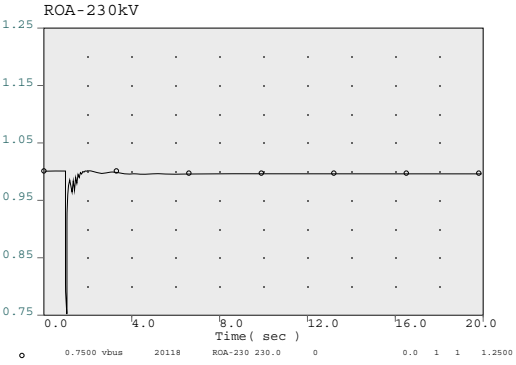
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

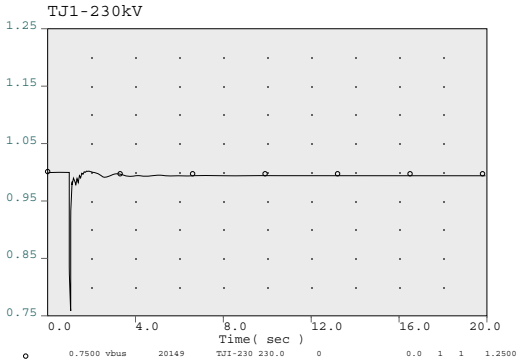
PAR/PID 230kV



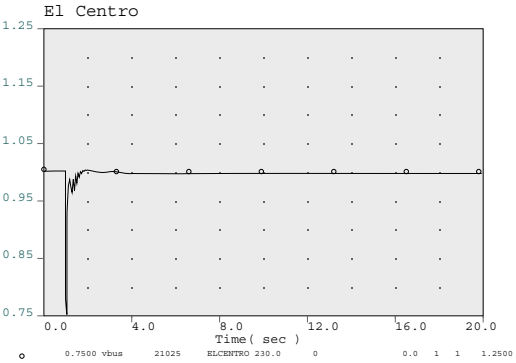
ROA-230kV



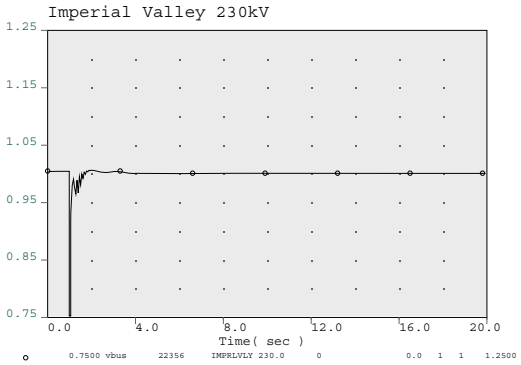
TJ1-230kV



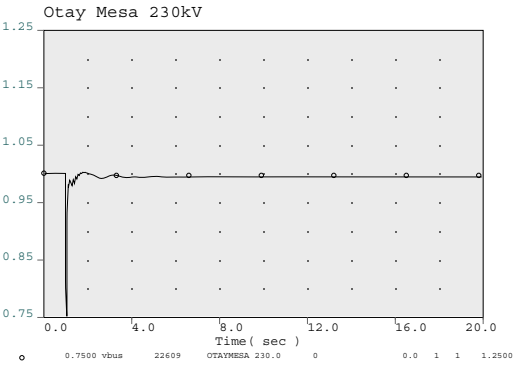
El Centro



Imperial Valley 230kV

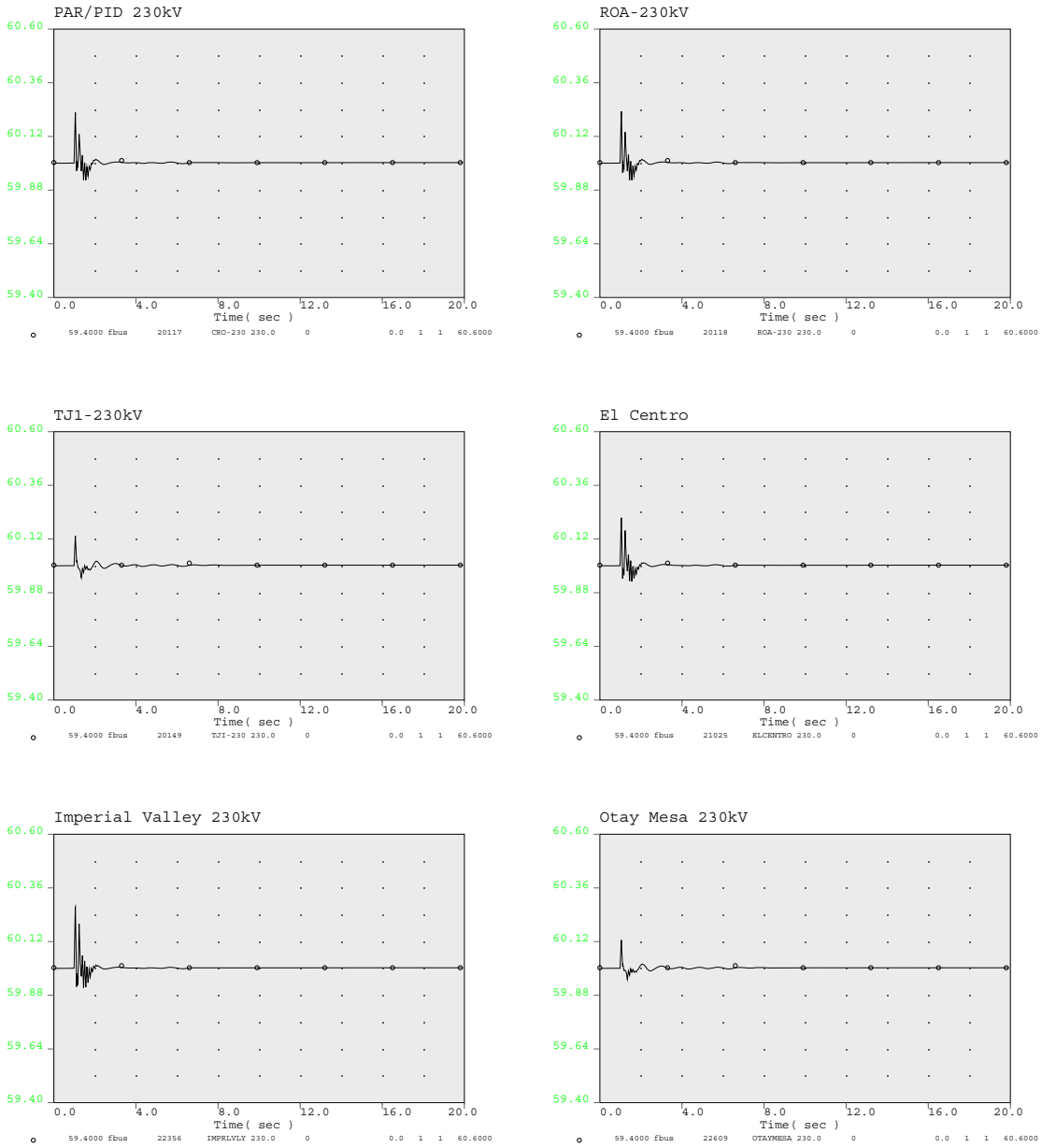


Otay Mesa 230kV



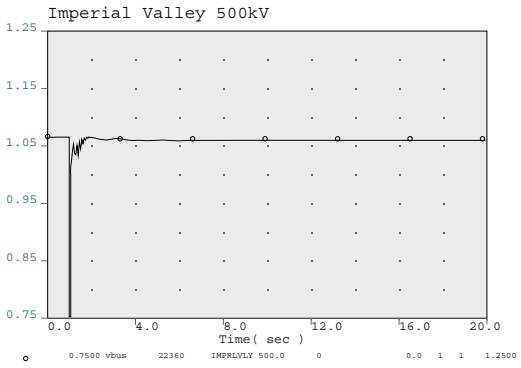
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

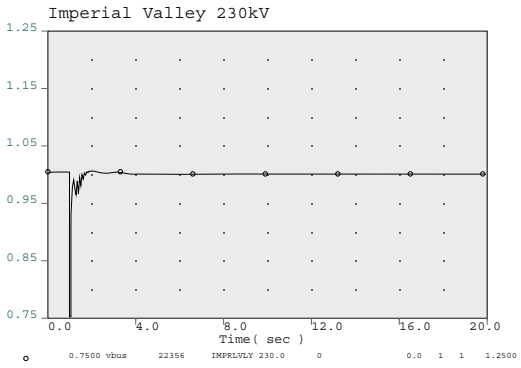
Affected System Frequency Check and Comparison

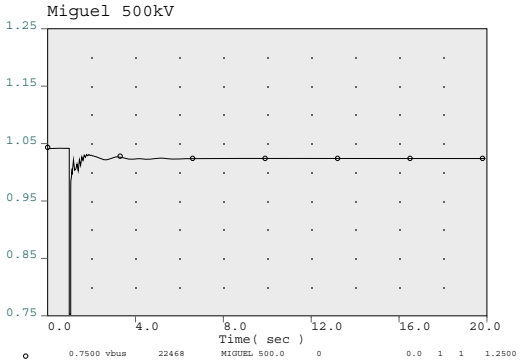


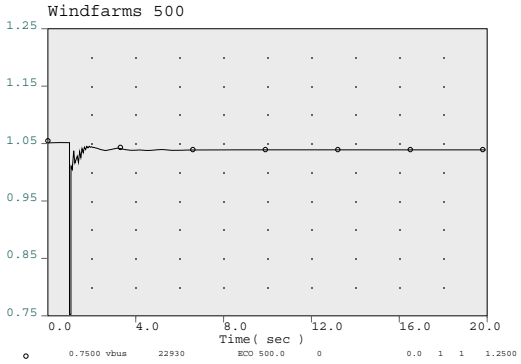
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

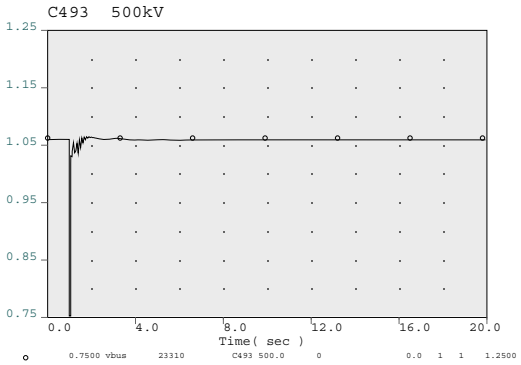
Imperial Valley Area - VOLTAGE

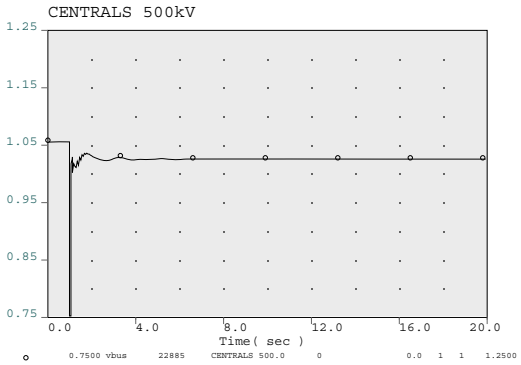






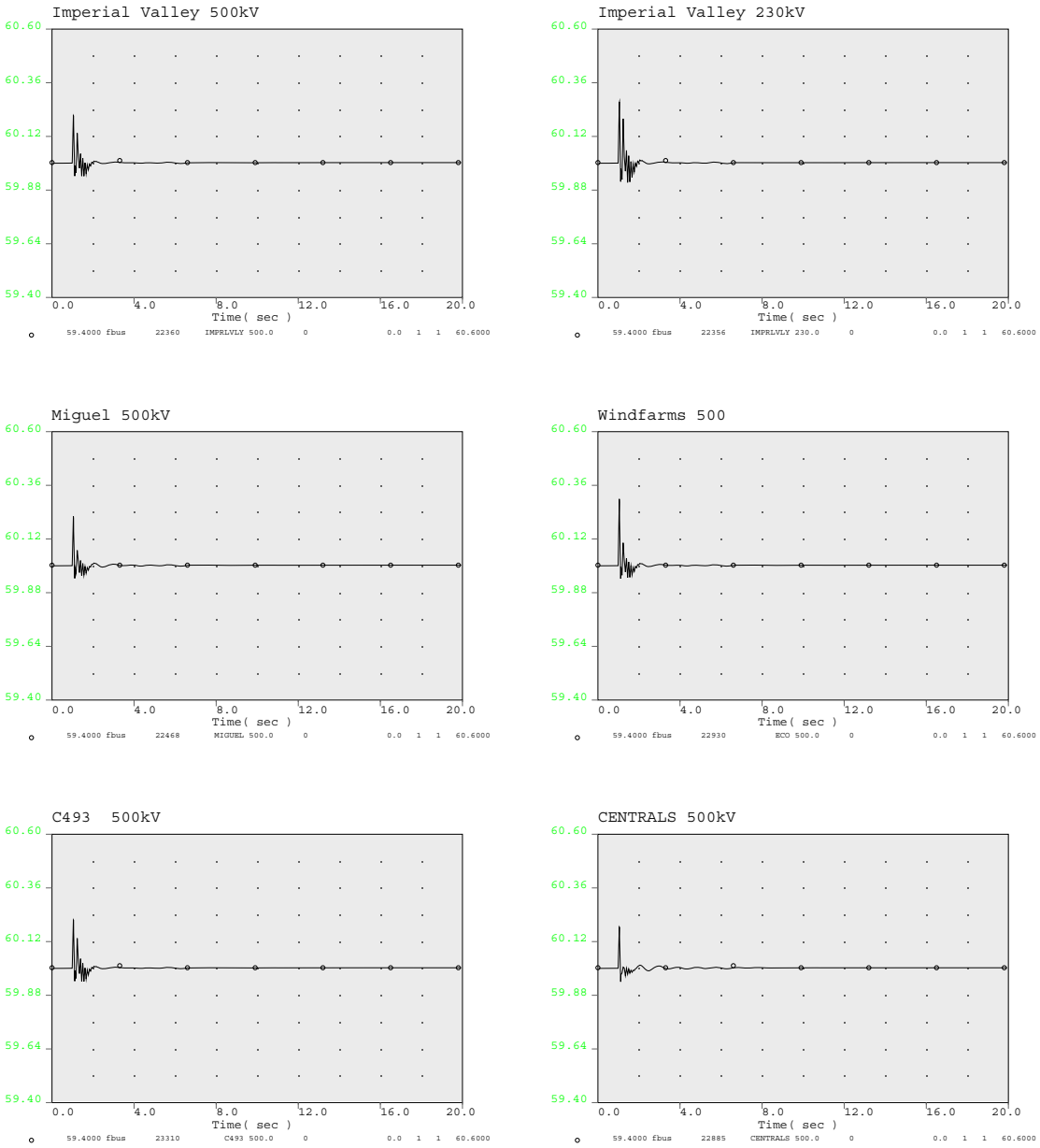






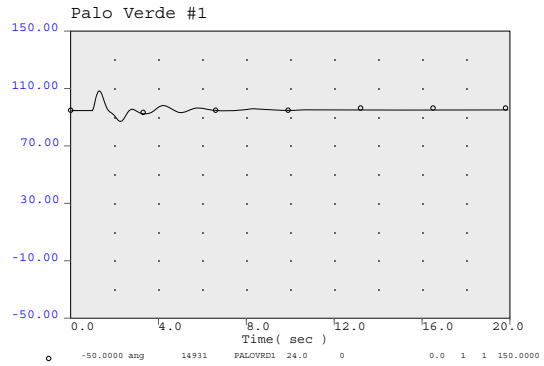
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

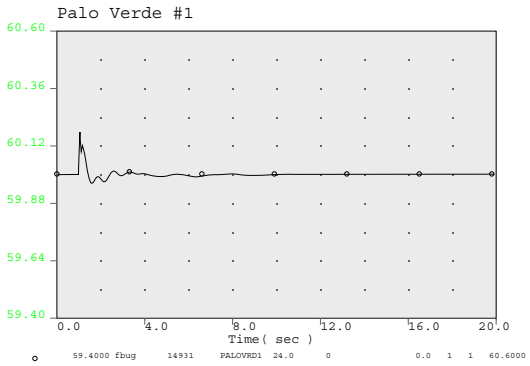
Imperial Valley Area - Frequency

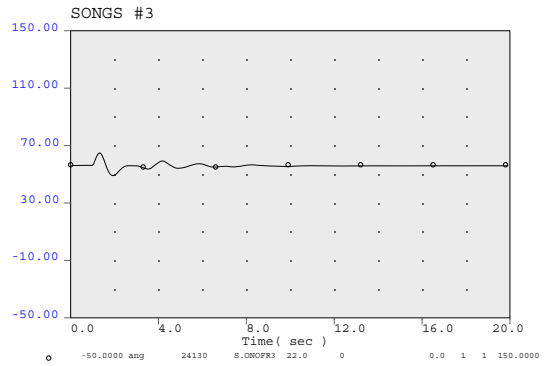


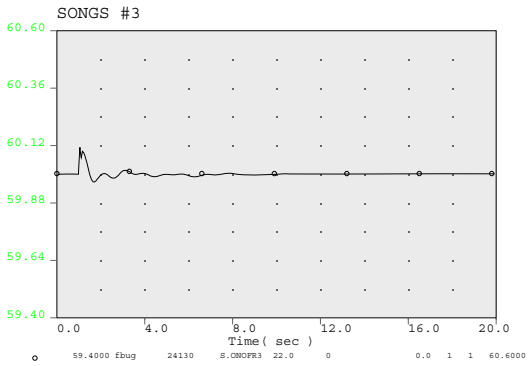
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

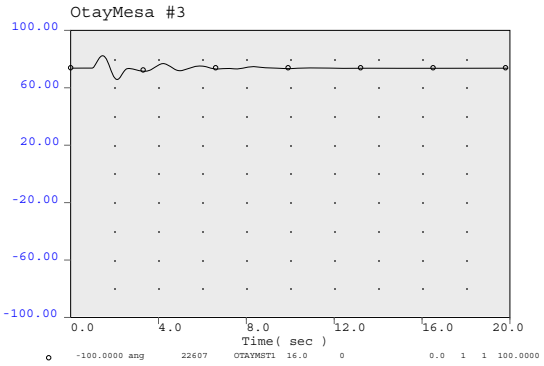
RELATIVE ROTOR ANGLE & FREQUENCY

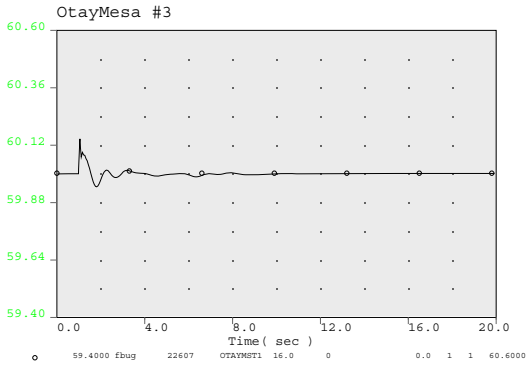












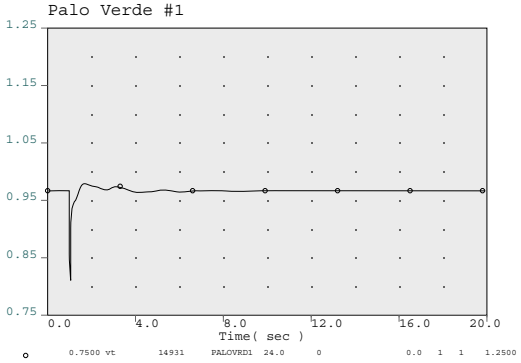
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Page 1

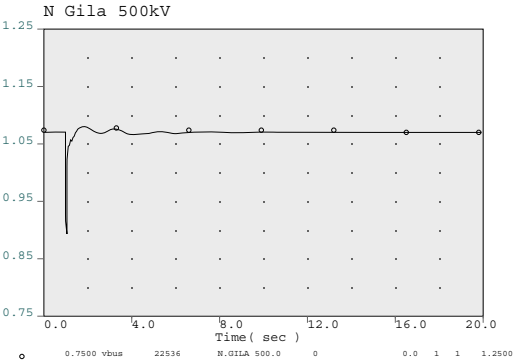
SDGE	Dev_Val_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:26:24 2010

RELATIVE VOLTAGE

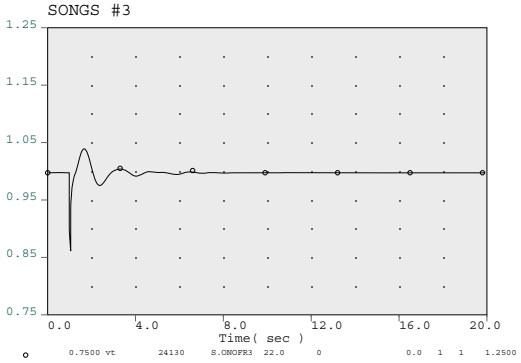
Palo Verde #1



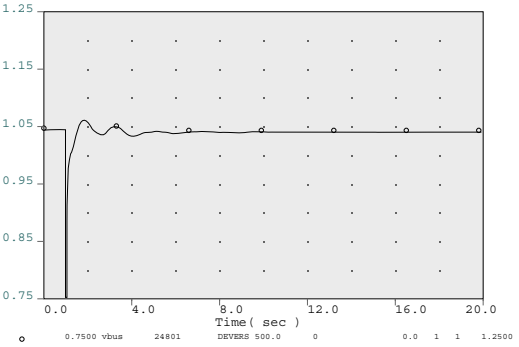
N Gila 500kV



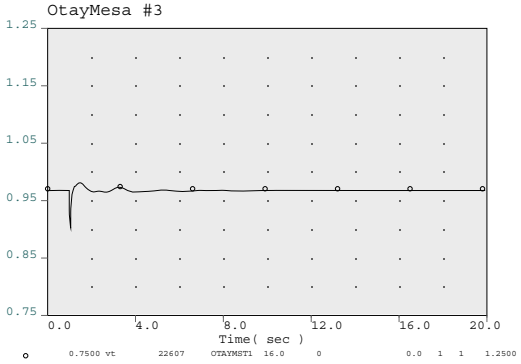
SONGS #3



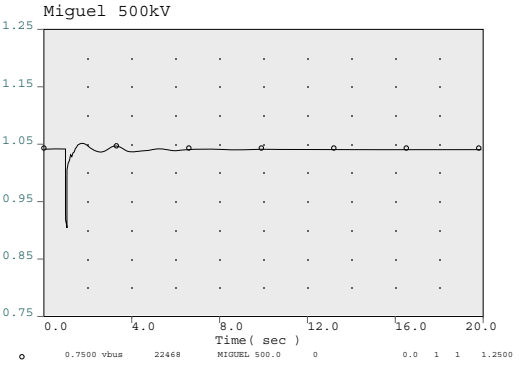
Devers 500



OtayMesa #3



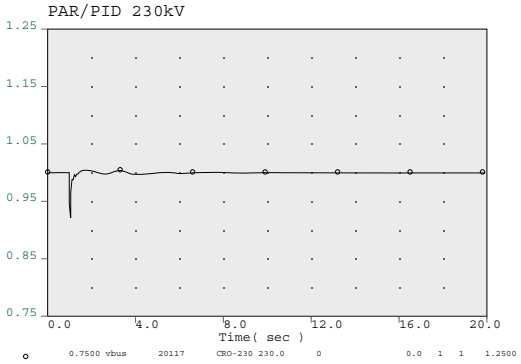
Miguel 500kV



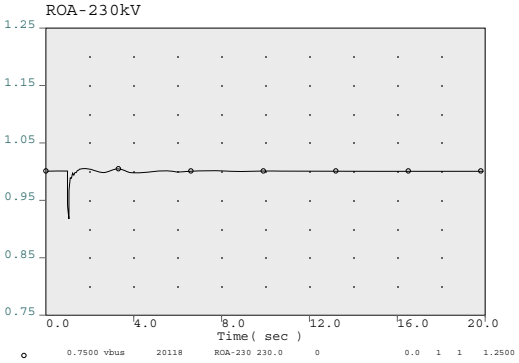
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Affected System Voltage Check and Comparison

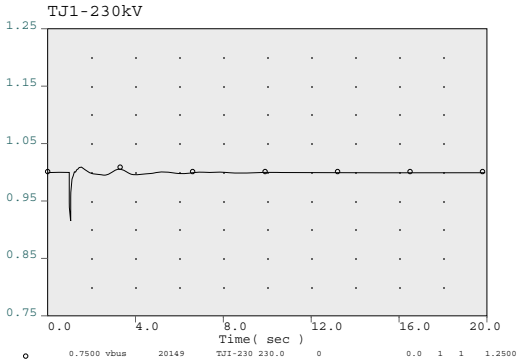
PAR/PID 230kV



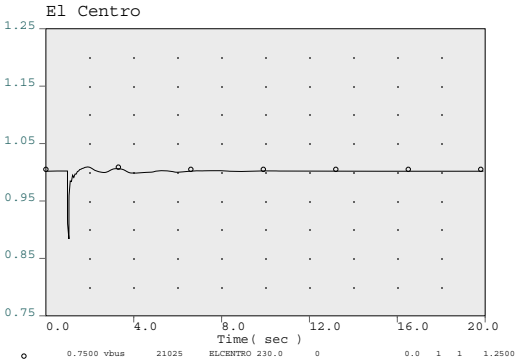
ROA-230kV



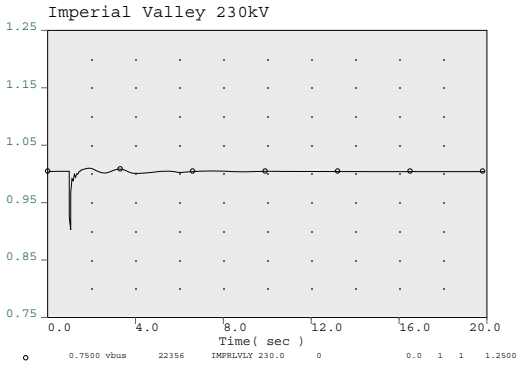
TJ1-230kV



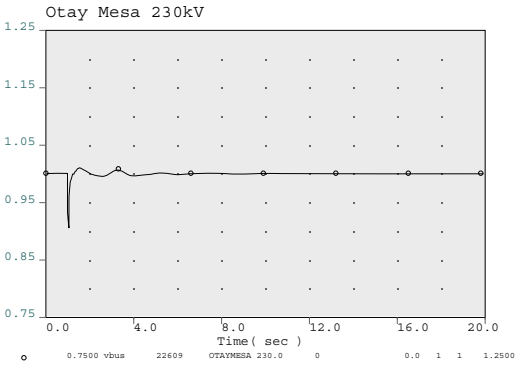
El Centro



Imperial Valley 230kV



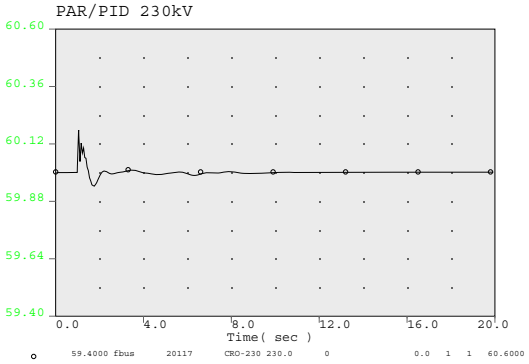
Otay Mesa 230kV



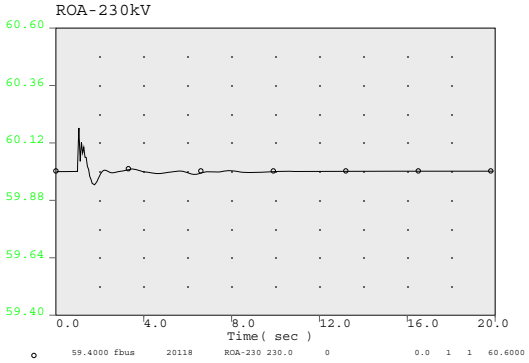
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Affected System Frequency Check and Comparison

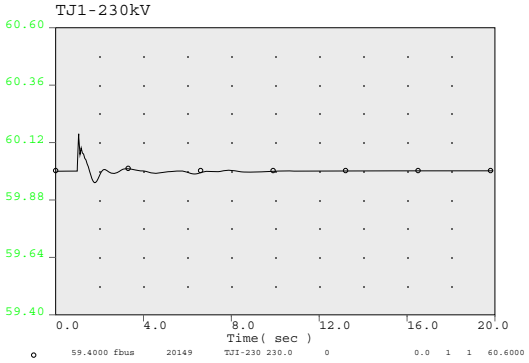
PAR/PID 230kV



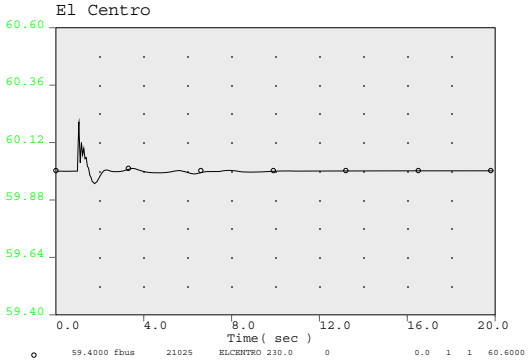
ROA-230kV



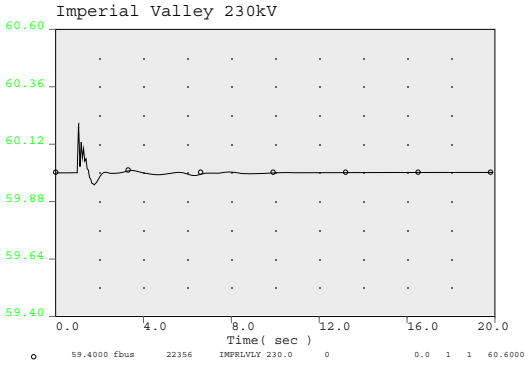
TJ1-230kV



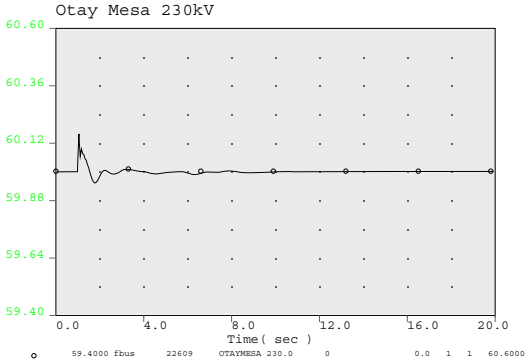
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

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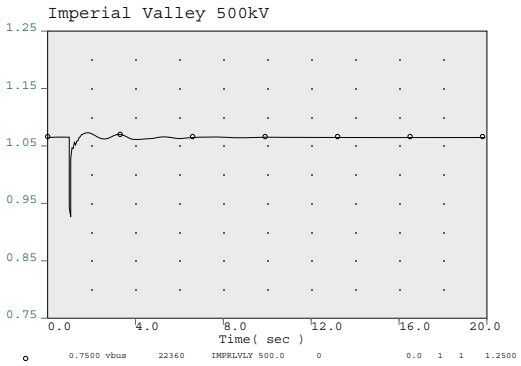
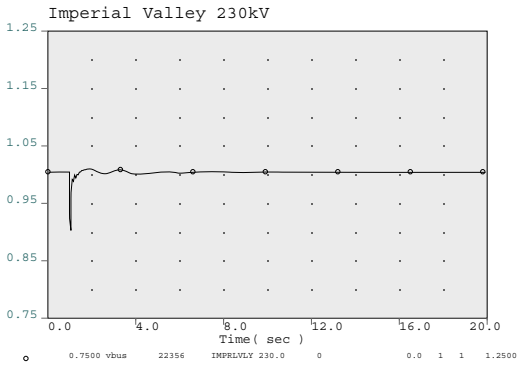
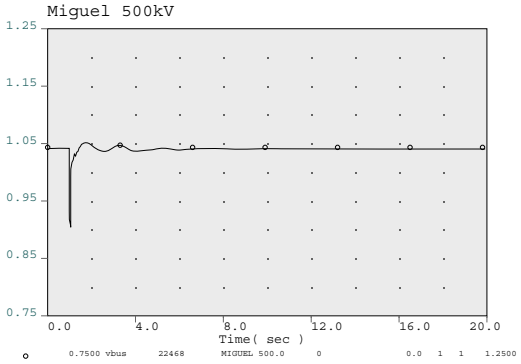
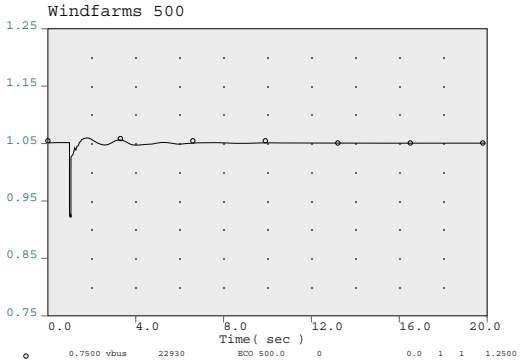
SDGE	Dev_Val_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:26:24 2010

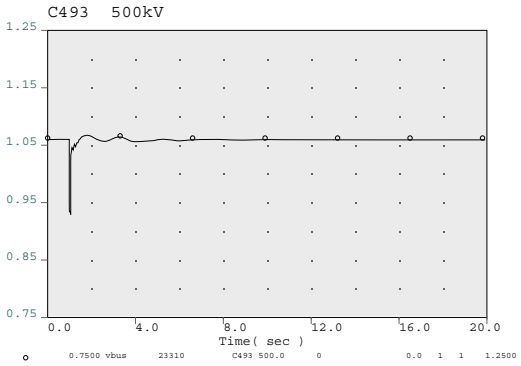
Imperial Valley Area - VOLTAGE

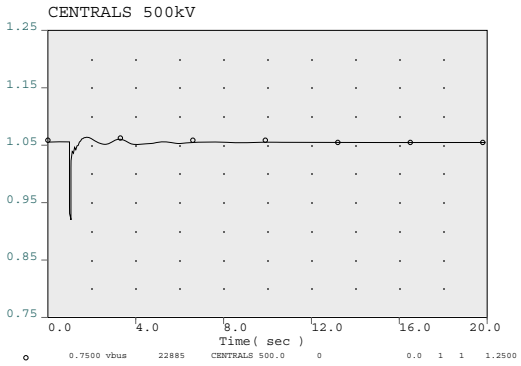






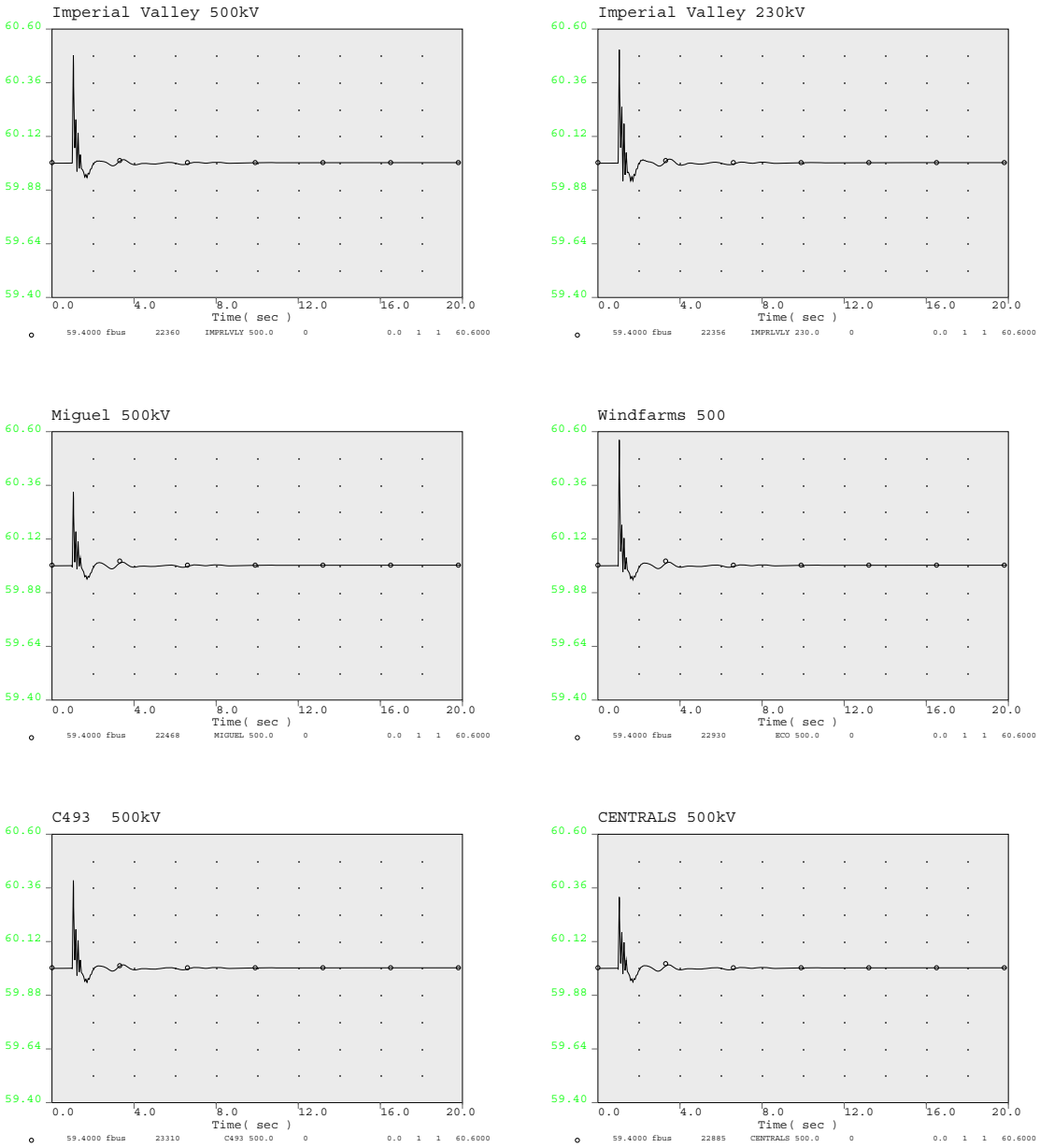






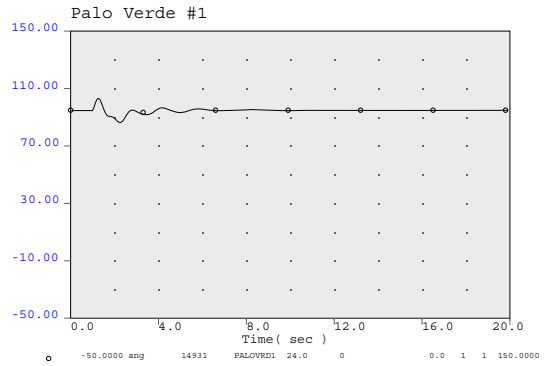
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

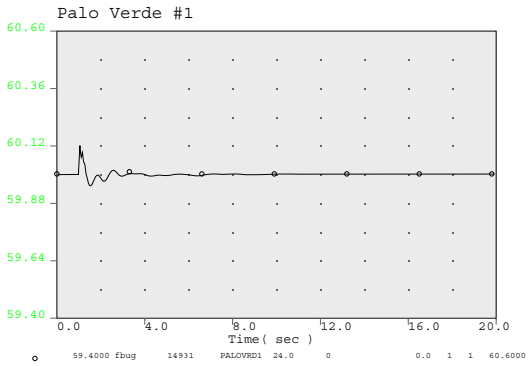
Imperial Valley Area - Frequency

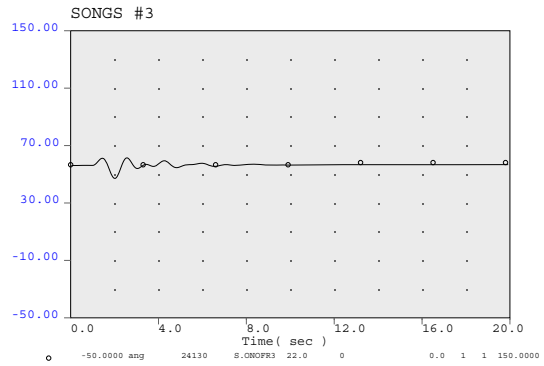


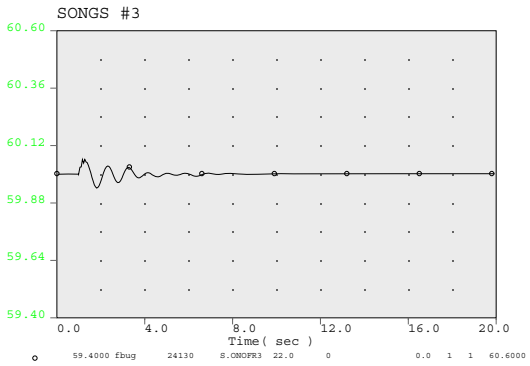
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

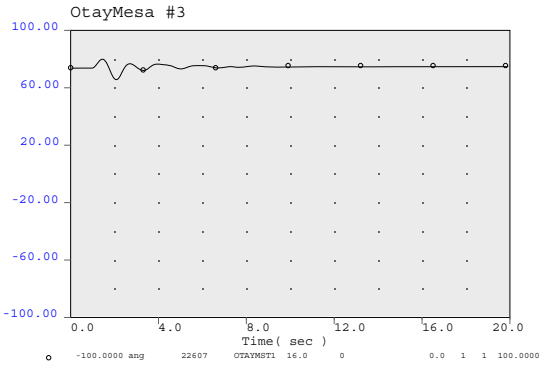
RELATIVE ROTOR ANGLE & FREQUENCY

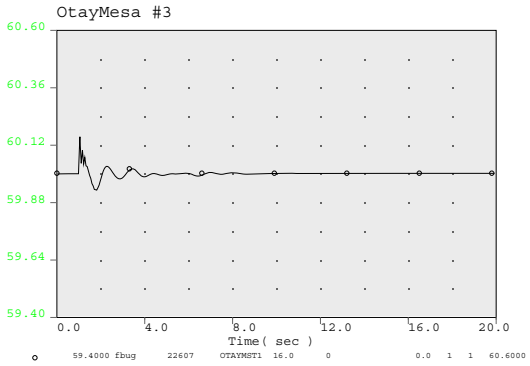










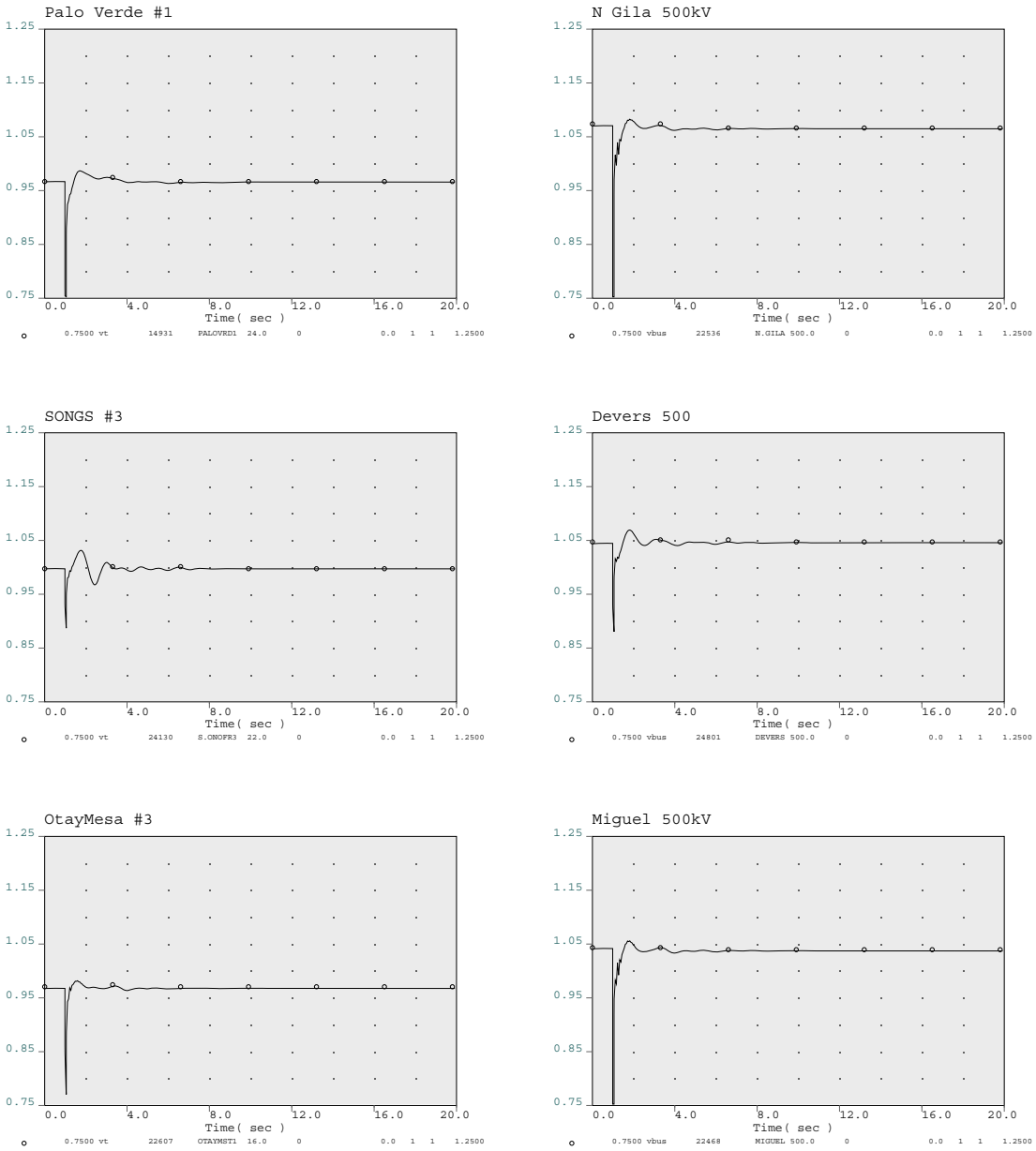


SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Page 1

SDGE	HAA_NGila_slo_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:32:06 2010

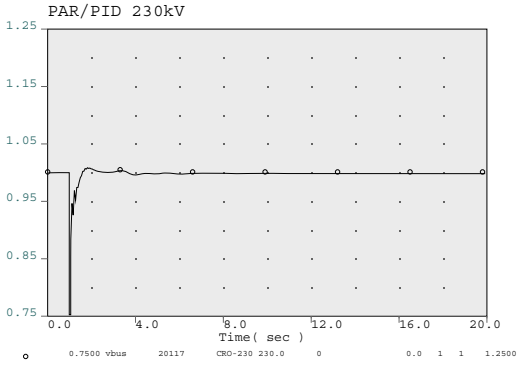
RELATIVE VOLTAGE



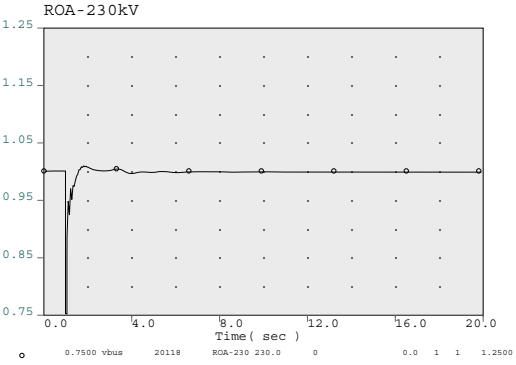
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

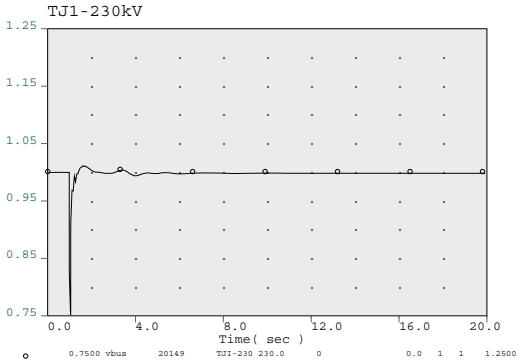
PAR/PID 230kV



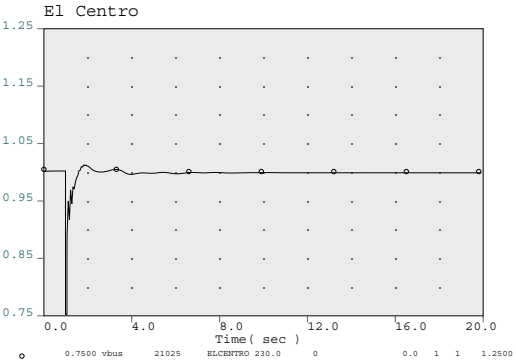
ROA-230kV



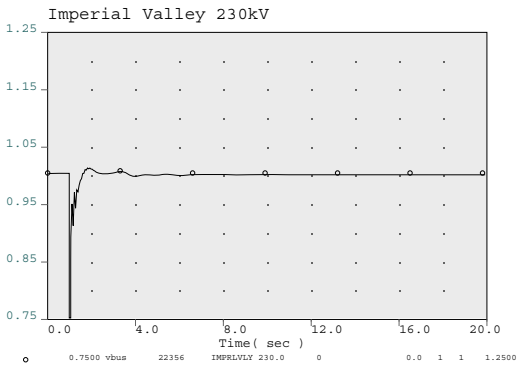
TJ1-230kV



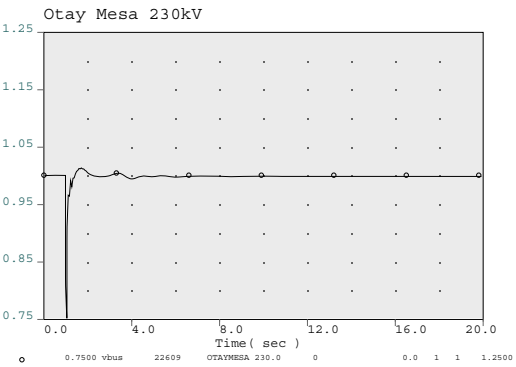
El Centro



Imperial Valley 230kV



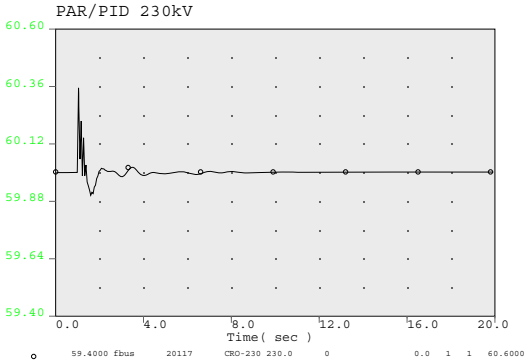
Otay Mesa 230kV



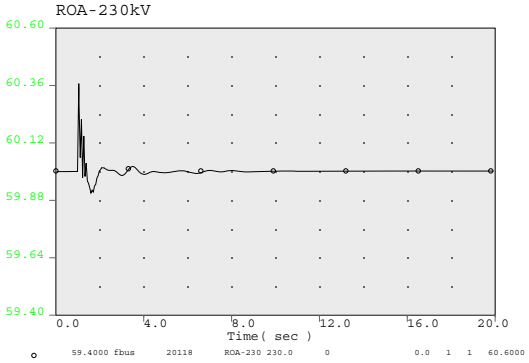
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Frequency Check and Comparison

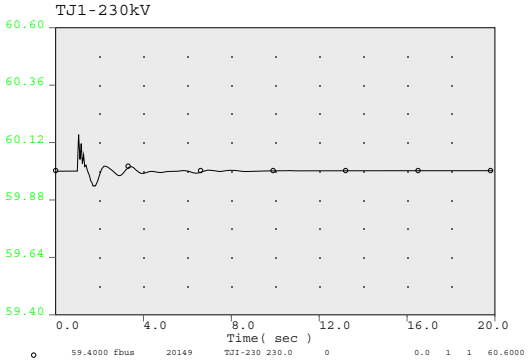
PAR/PID 230kV



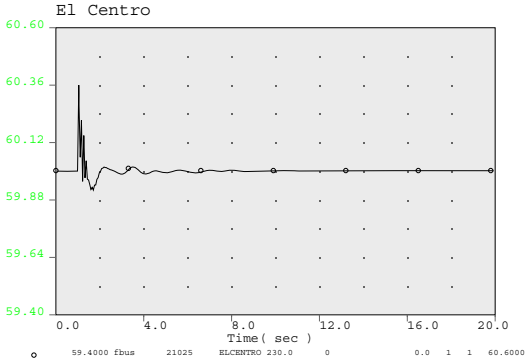
ROA-230kV



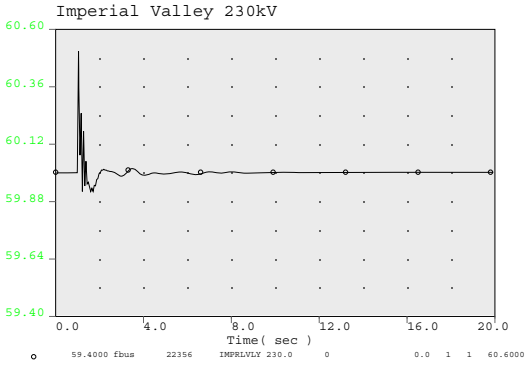
TJ1-230kV



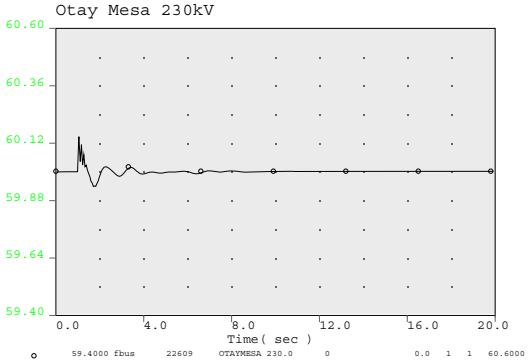
El Centro



Imperial Valley 230kV



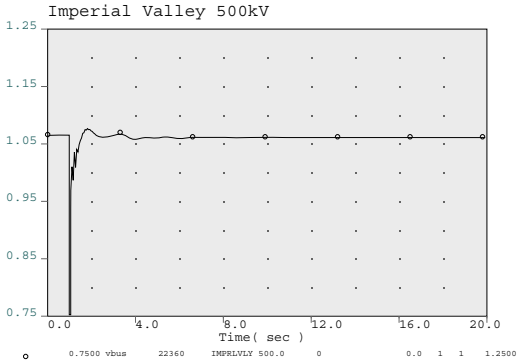
Otay Mesa 230kV



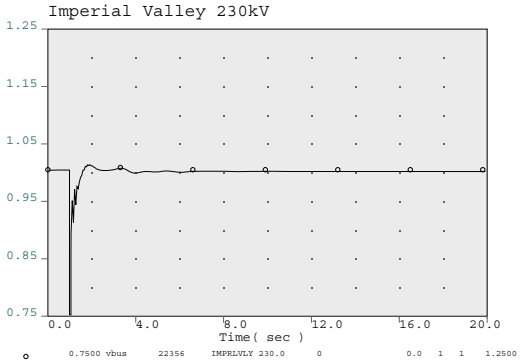
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

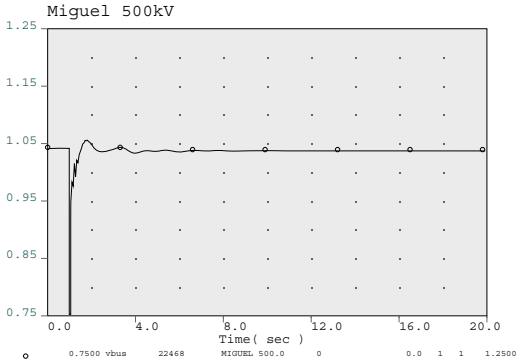
Imperial Valley 500kV



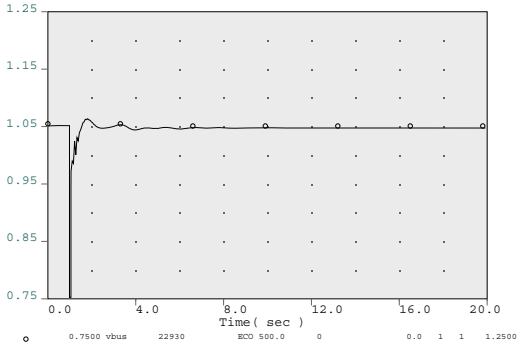
Imperial Valley 230kV



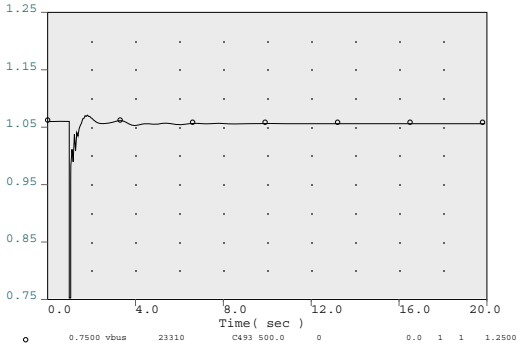
Miguel 500kV



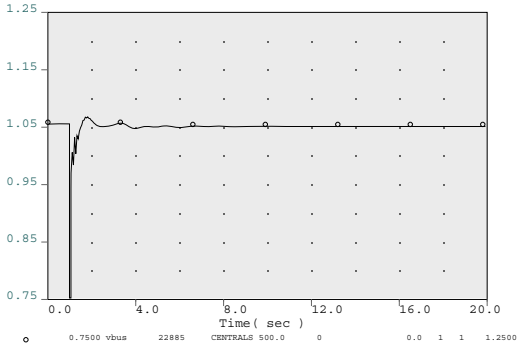
Windfarms 500



C493 500kV

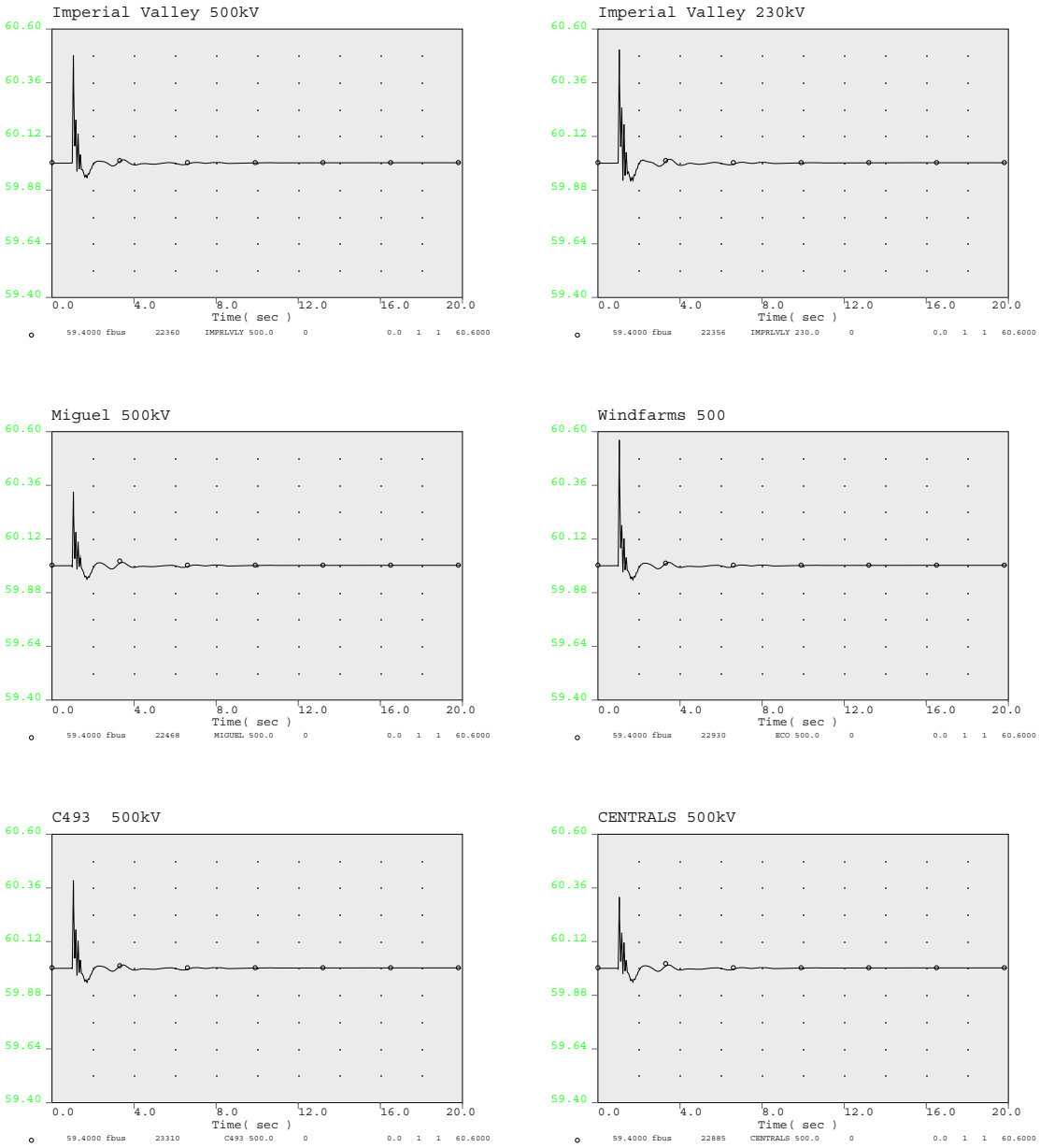


CENTRALS 500kV



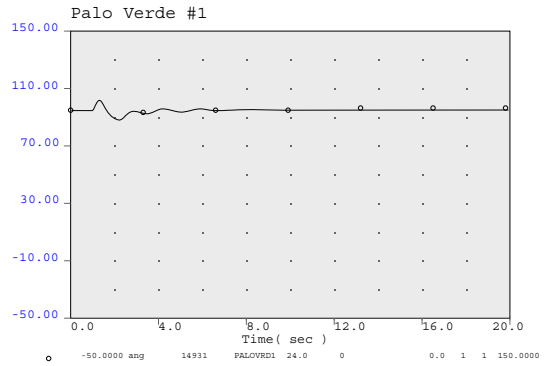
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

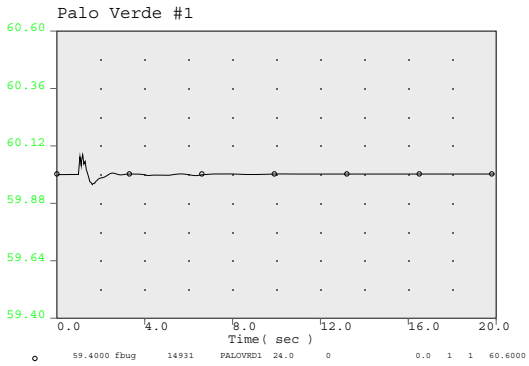
Imperial Valley Area - Frequency

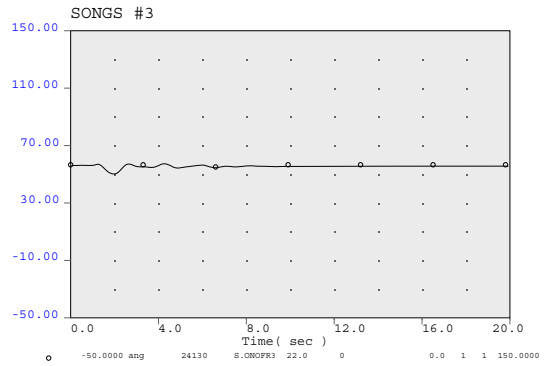


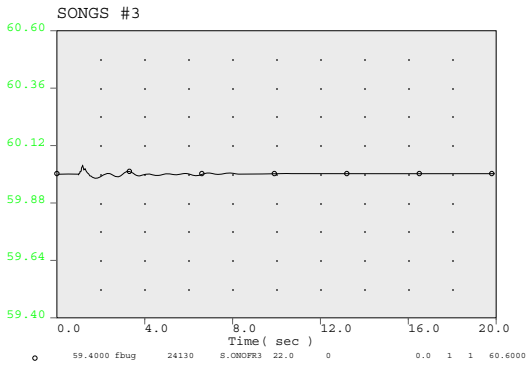
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

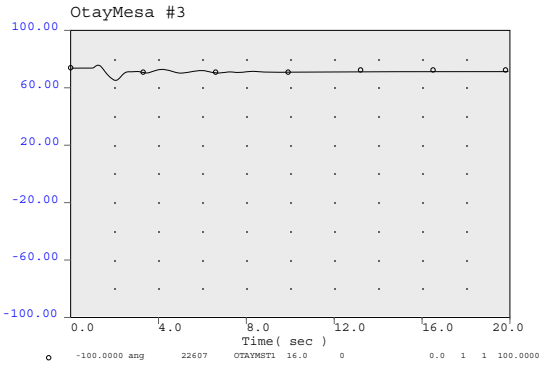
RELATIVE ROTOR ANGLE & FREQUENCY

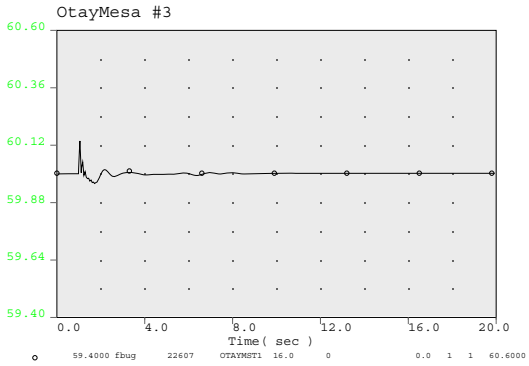












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

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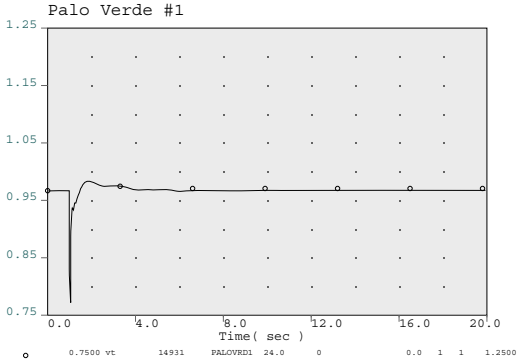
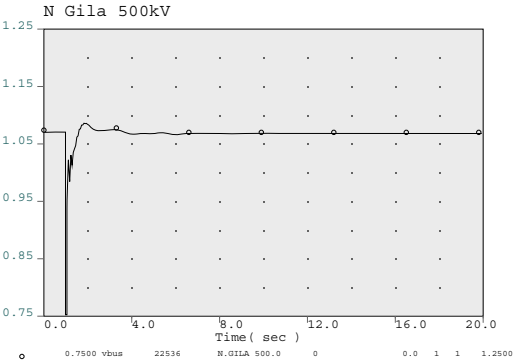
RELATIVE VOLTAGE

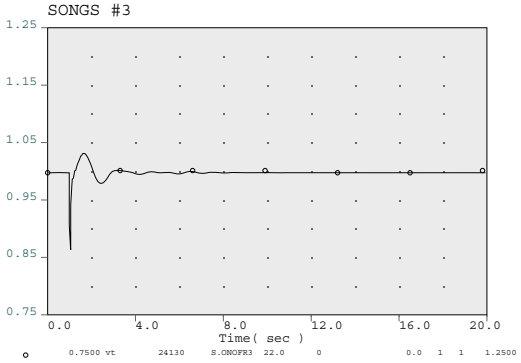
Palo Verde #1



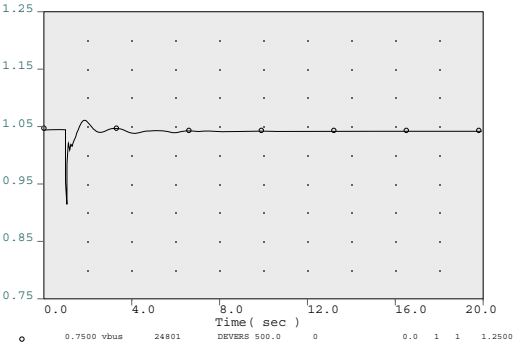
N Gila 500kV



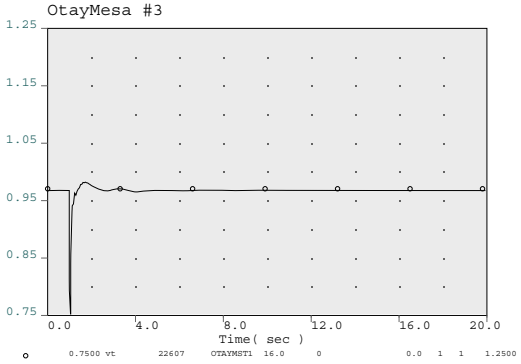
SONGS #3



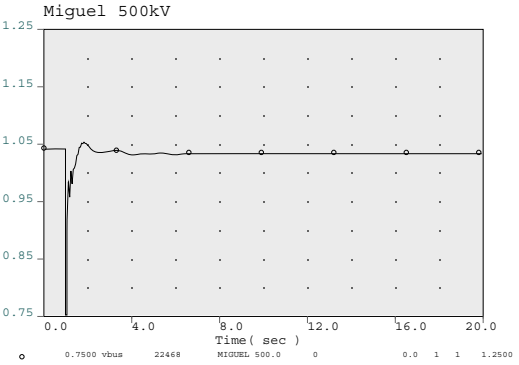
Devers 500



OtayMesa #3



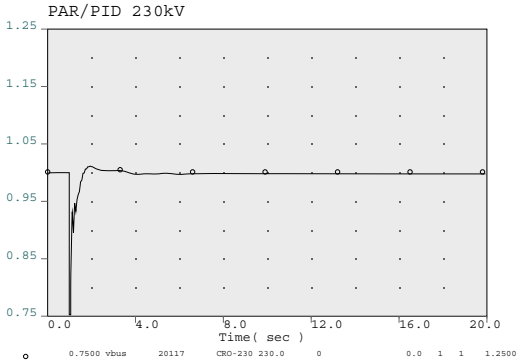
Miguel 500kV



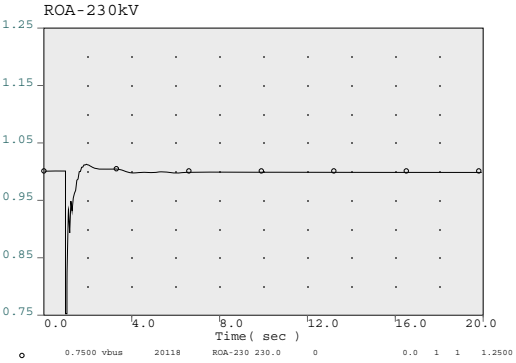
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

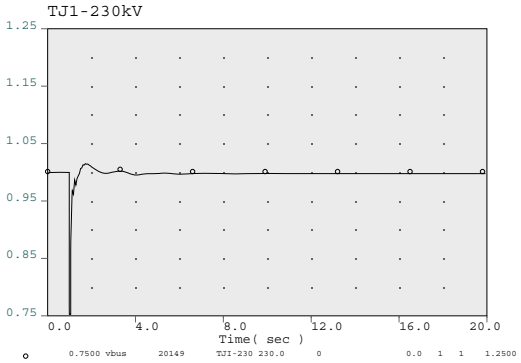
PAR/PID 230kV



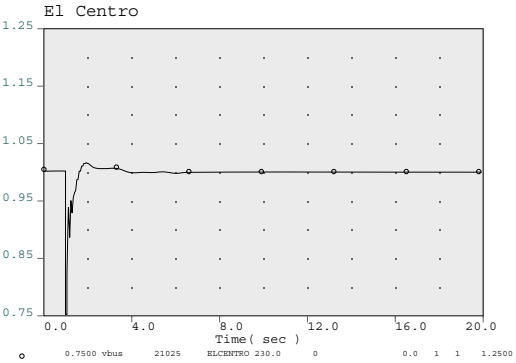
ROA-230kV



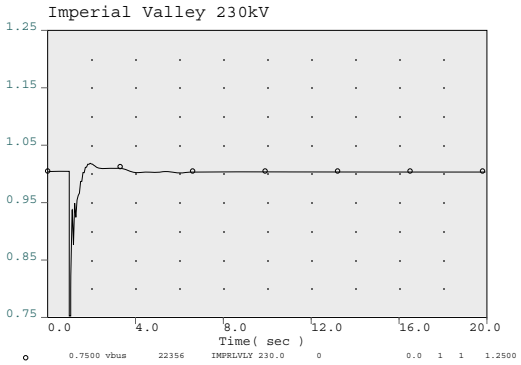
TJ1-230kV



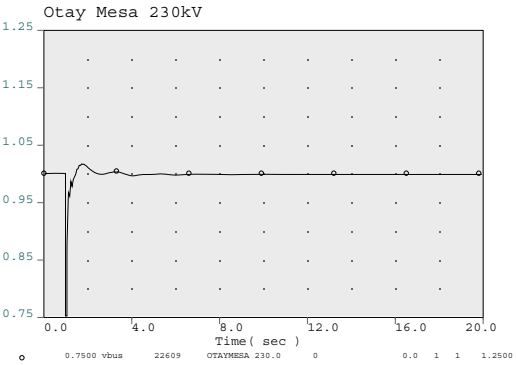
El Centro



Imperial Valley 230kV

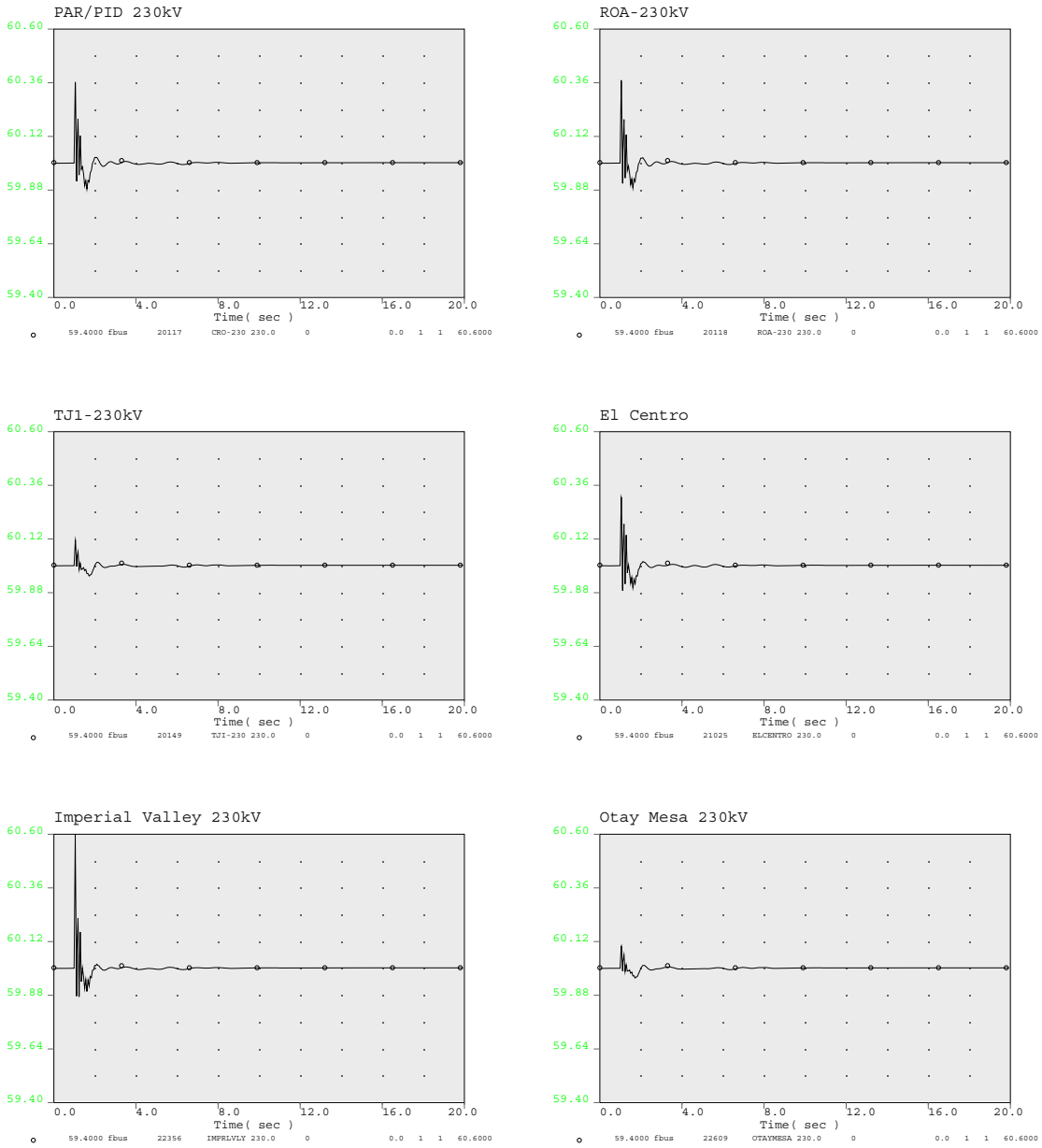


Otay Mesa 230kV



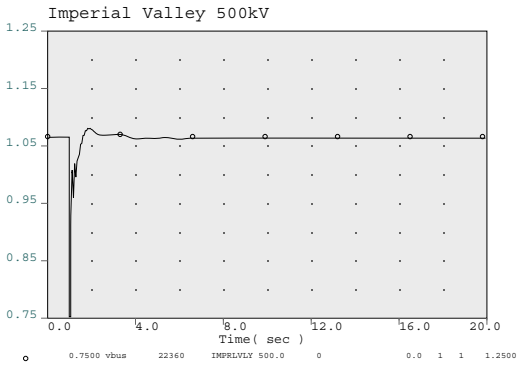
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

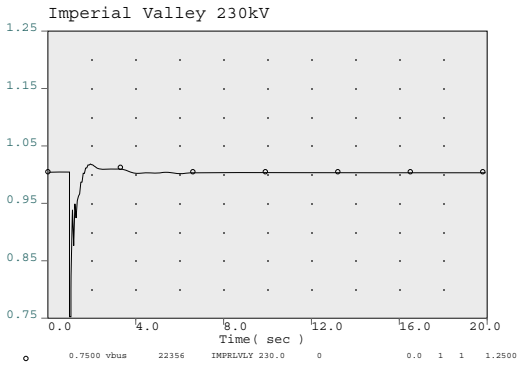
Affected System Frequency Check and Comparison

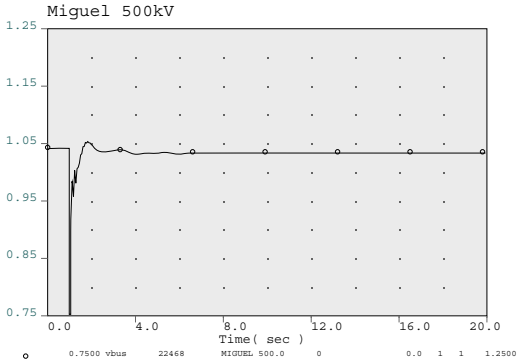


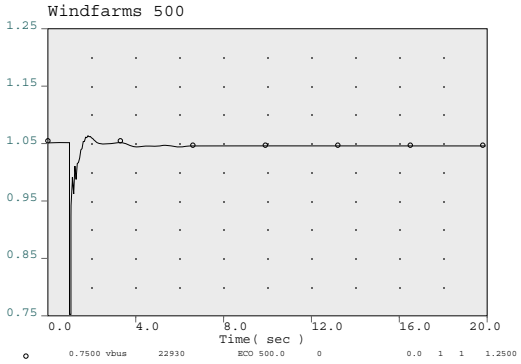
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

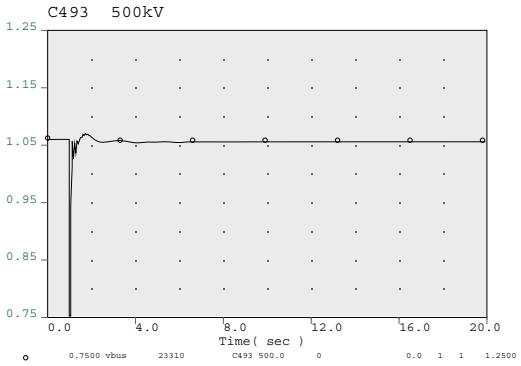
Imperial Valley Area - VOLTAGE

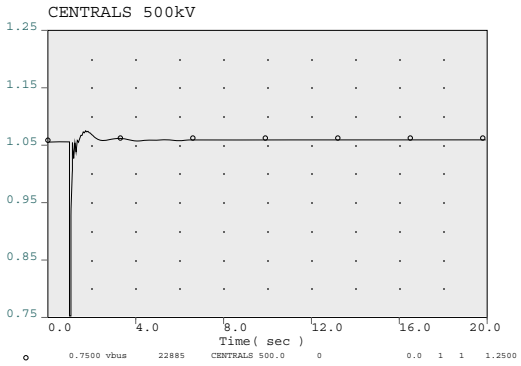






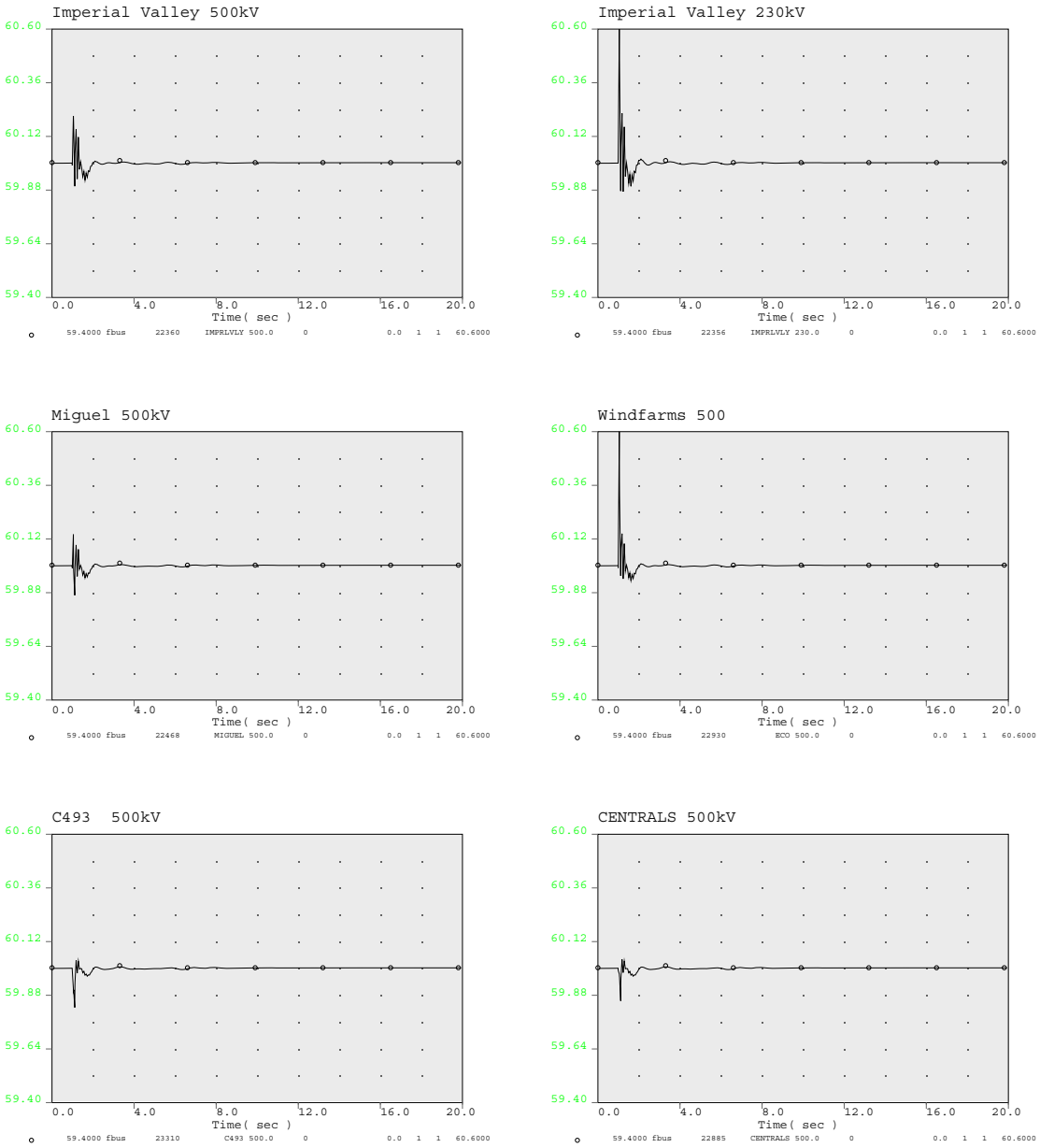






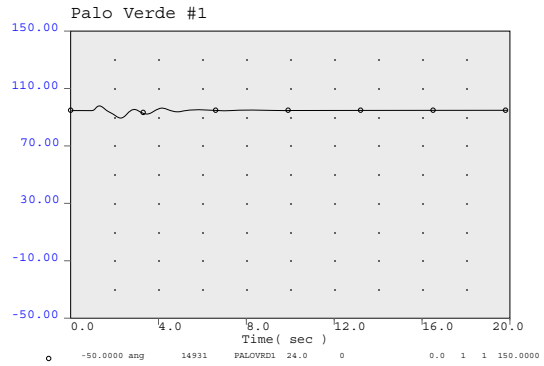
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

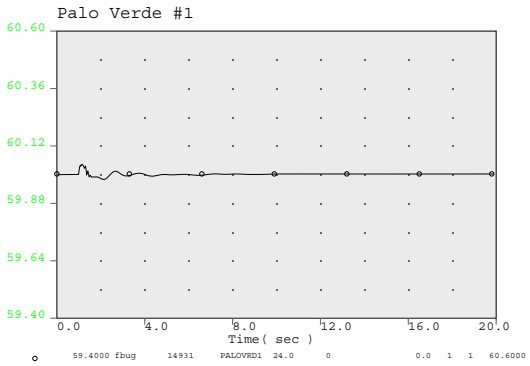
Imperial Valley Area - Frequency

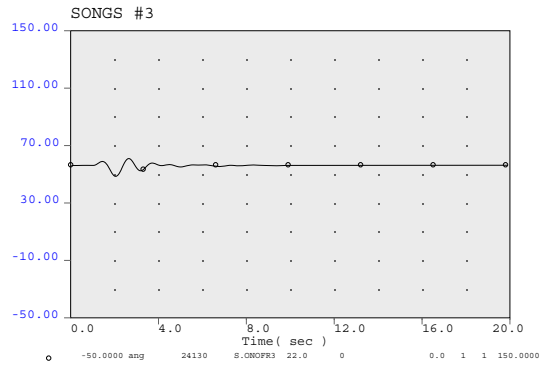


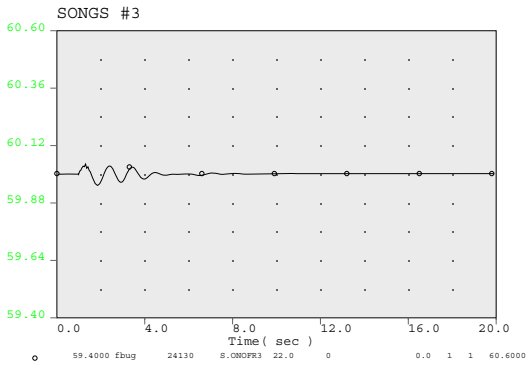
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

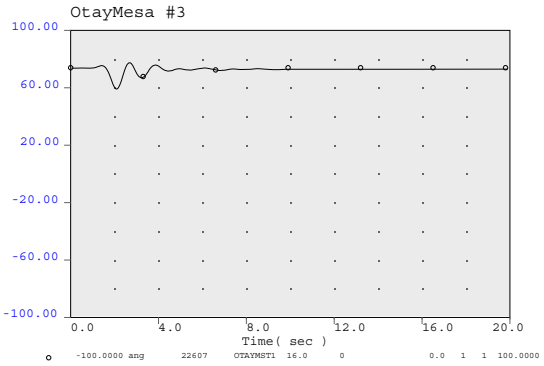
RELATIVE ROTOR ANGLE & FREQUENCY

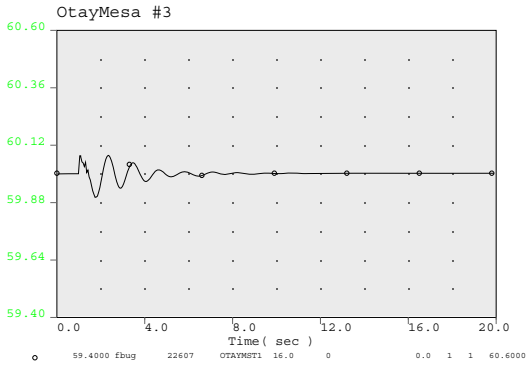












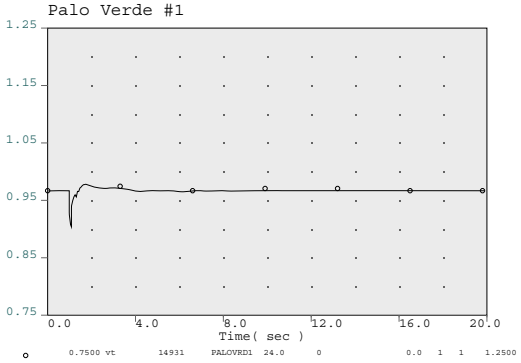
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Page 1

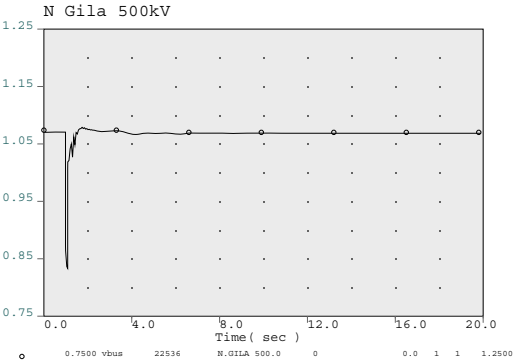
SDGE	iv_roa_6_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:26:58 2010

RELATIVE VOLTAGE

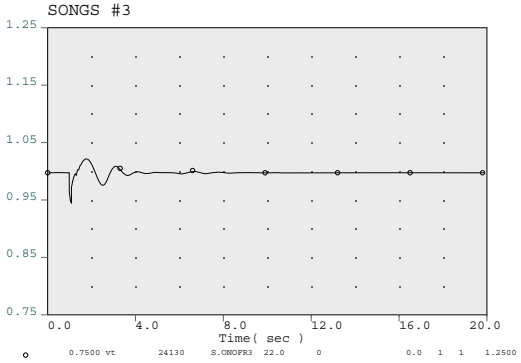
Palo Verde #1



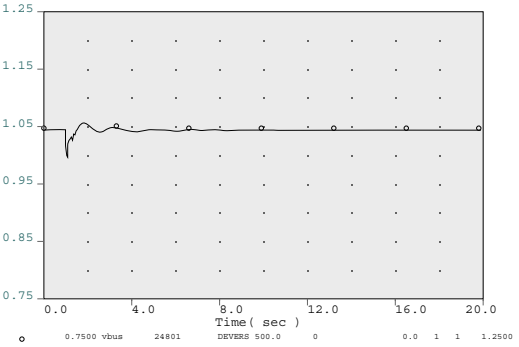
N Gila 500kV



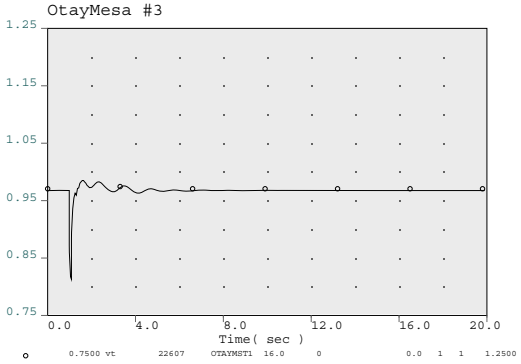
SONGS #3



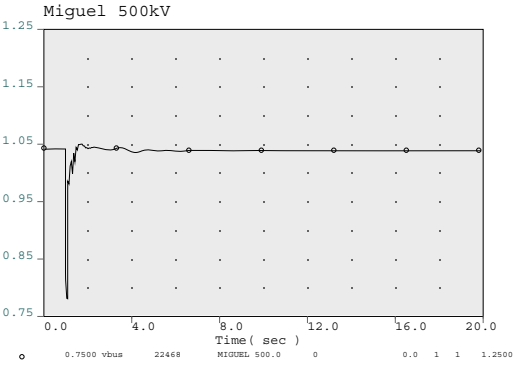
Devers 500



OtayMesa #3



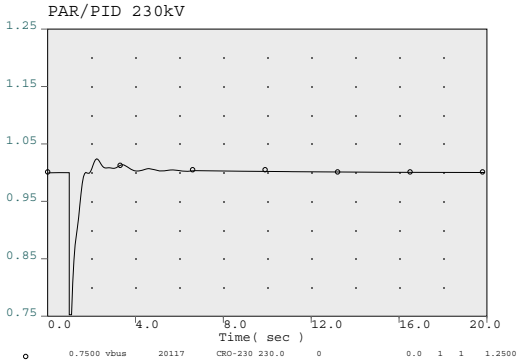
Miguel 500kV



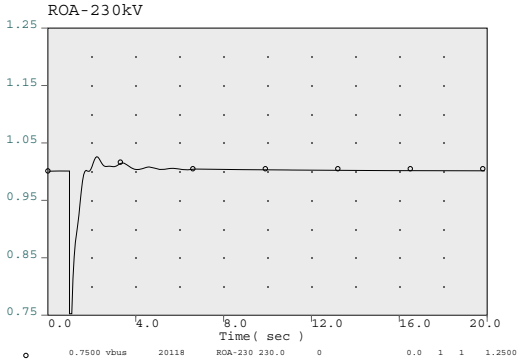
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

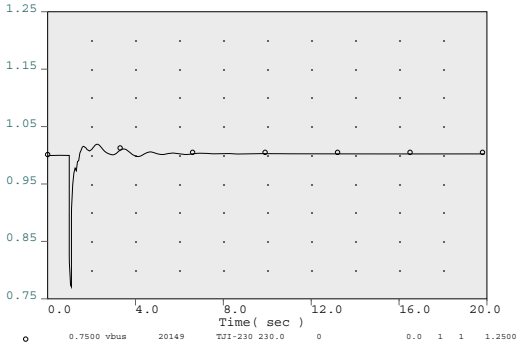
PAR/PID 230kV



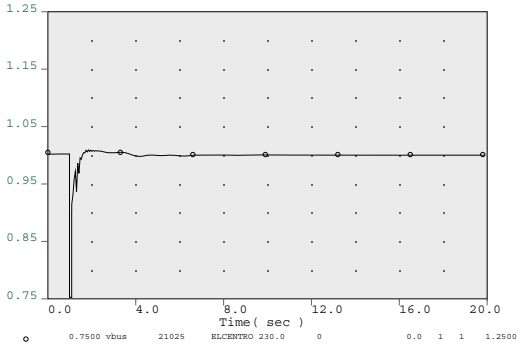
ROA-230kV



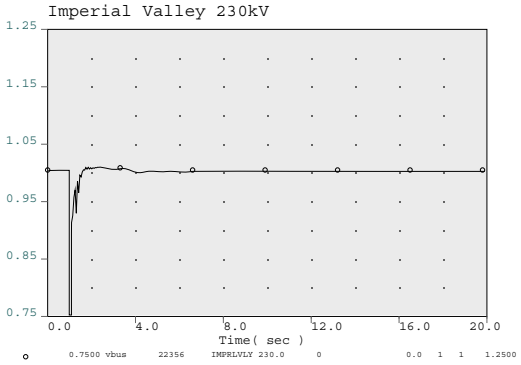
TJ1-230kV



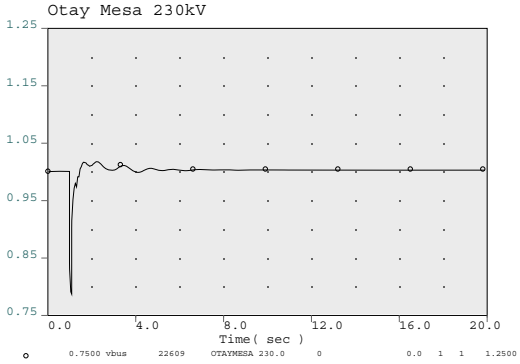
El Centro



Imperial Valley 230kV

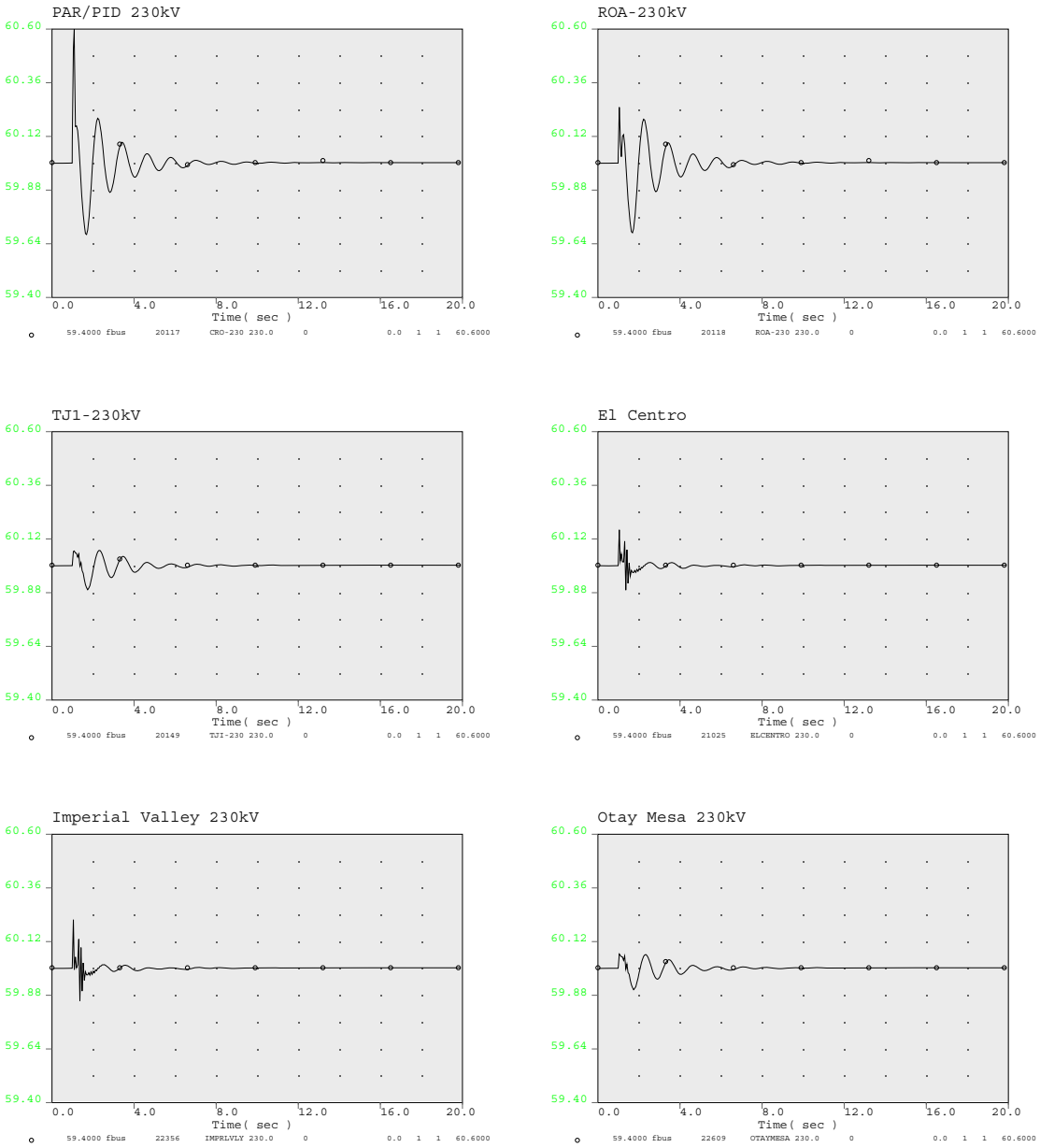


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

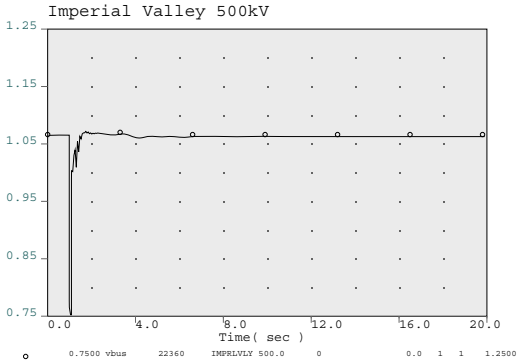
Affected System Frequency Check and Comparison



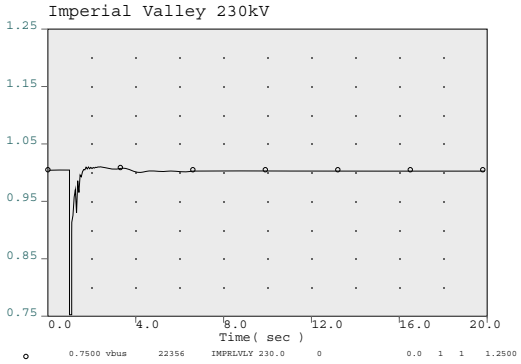
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

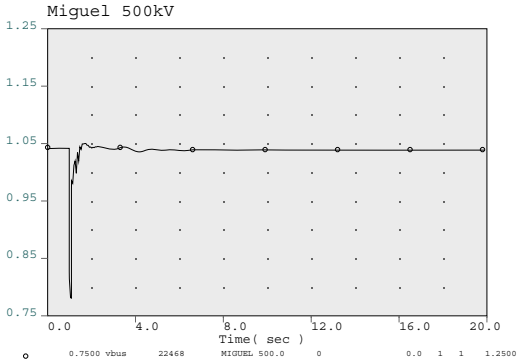
Imperial Valley 500kV



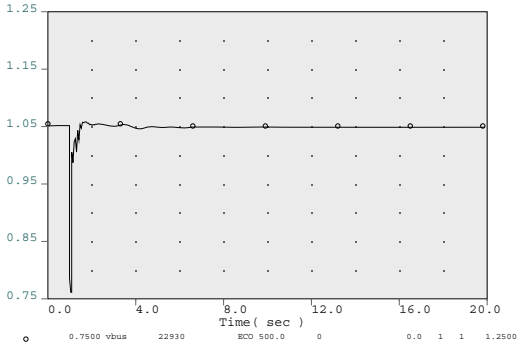
Imperial Valley 230kV



Miguel 500kV



Windfarms 500



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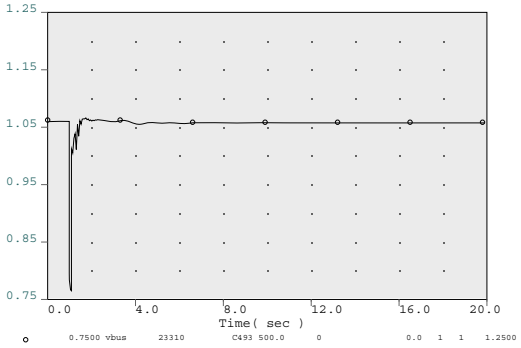
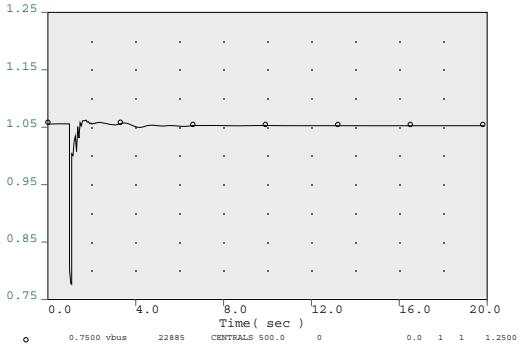
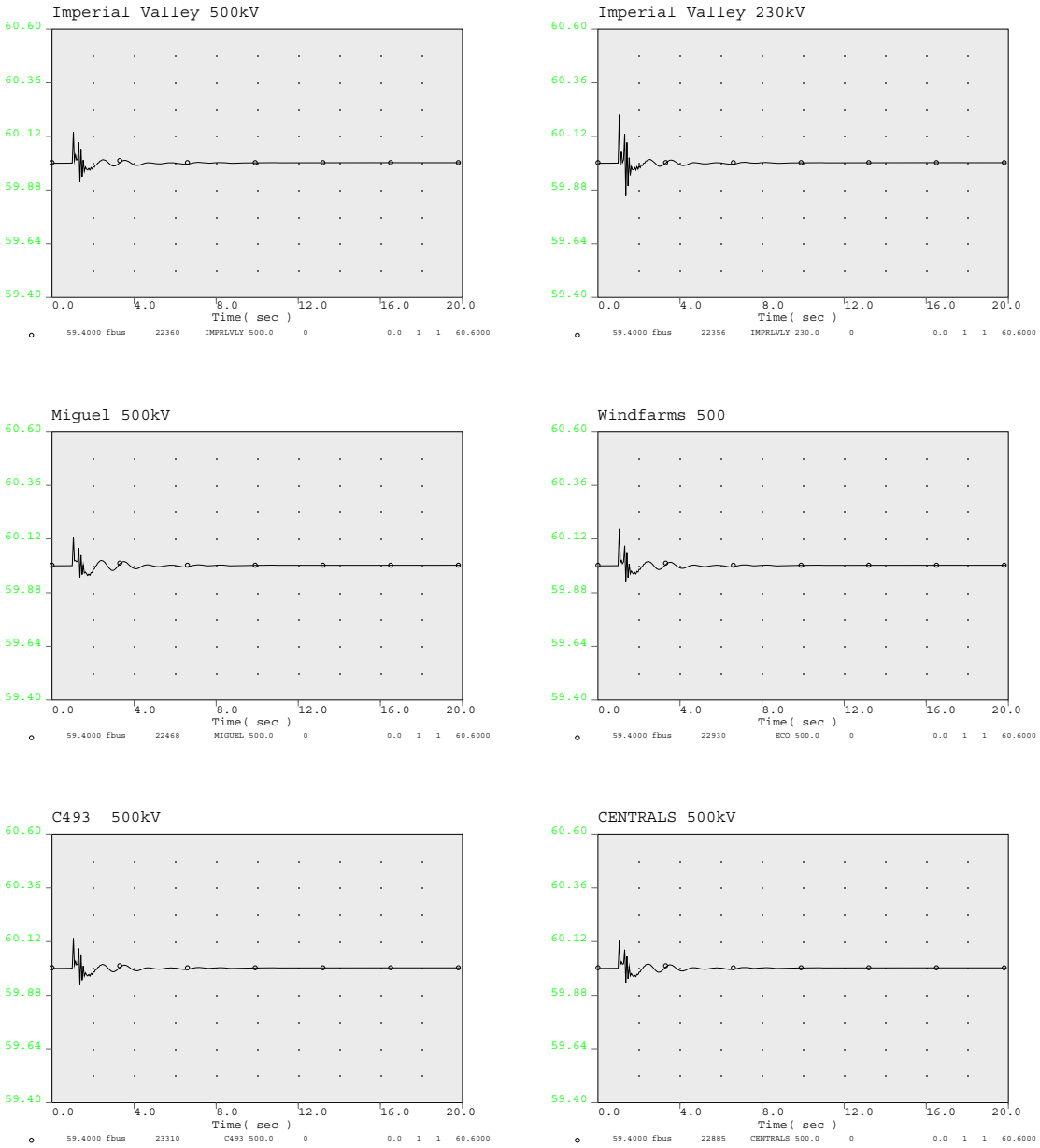


CENTRALS 500kV



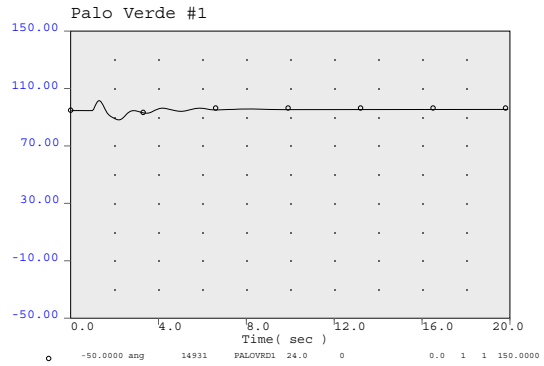
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

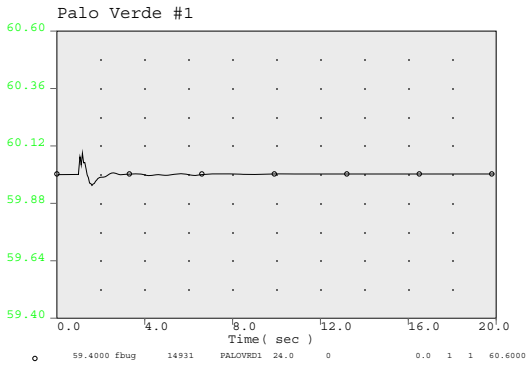
Imperial Valley Area - Frequency

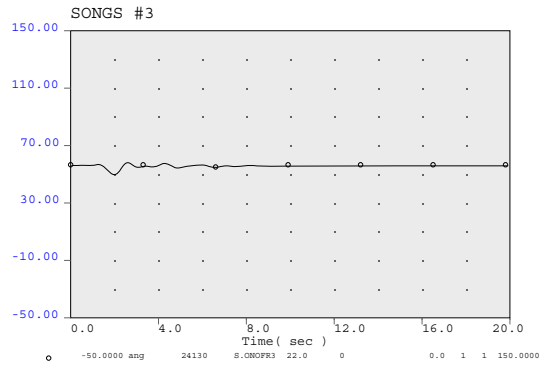


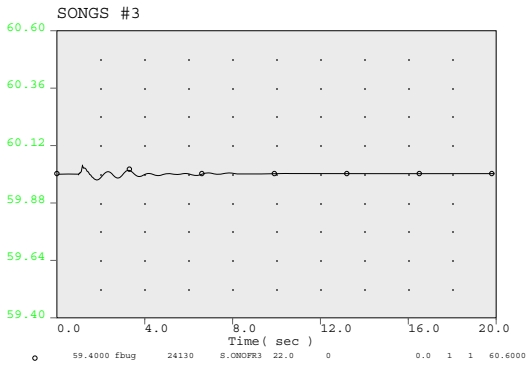
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

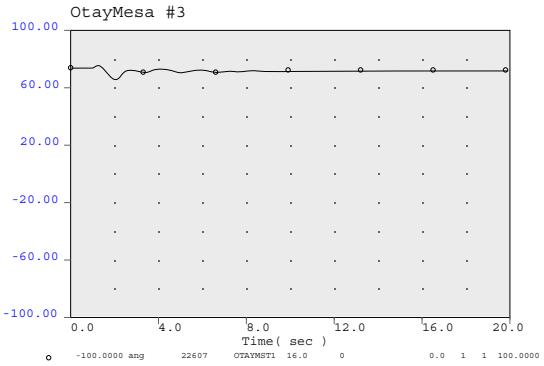
RELATIVE ROTOR ANGLE & FREQUENCY

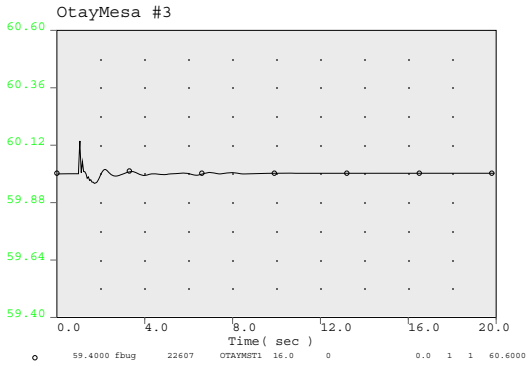












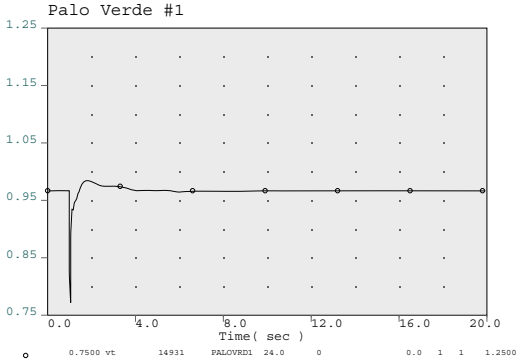
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Page 1

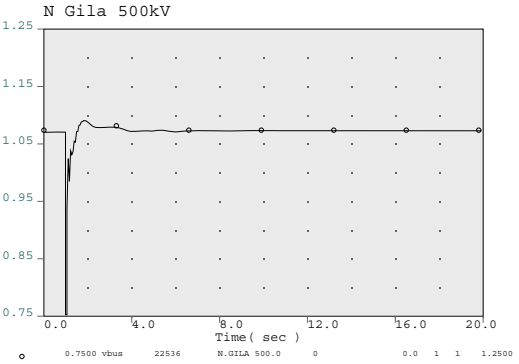
SDGE	IV_Wnd1_noRAS_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:27:29 2010

RELATIVE VOLTAGE

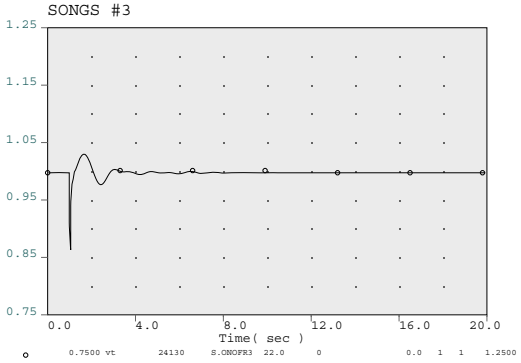
Palo Verde #1



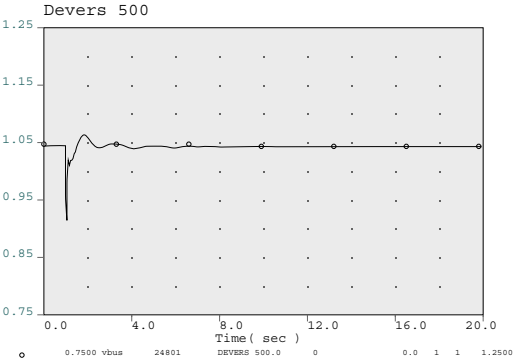
N Gila 500kV



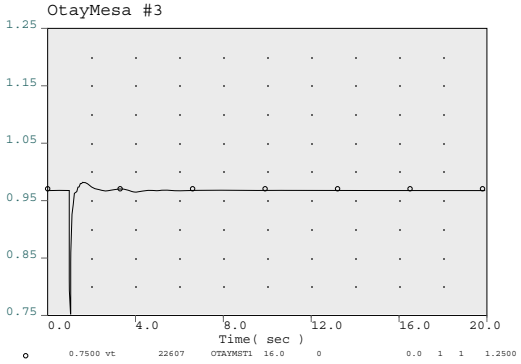
SONGS #3



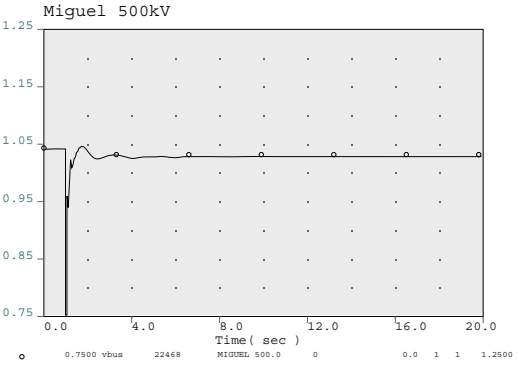
Devers 500



OtayMesa #3



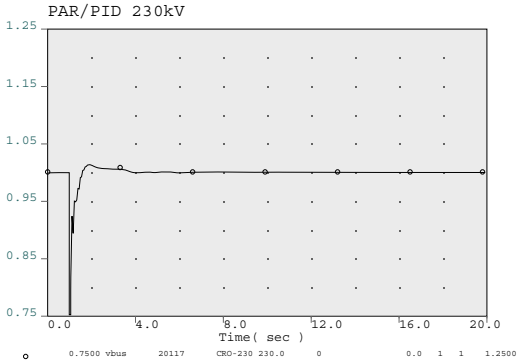
Miguel 500kV



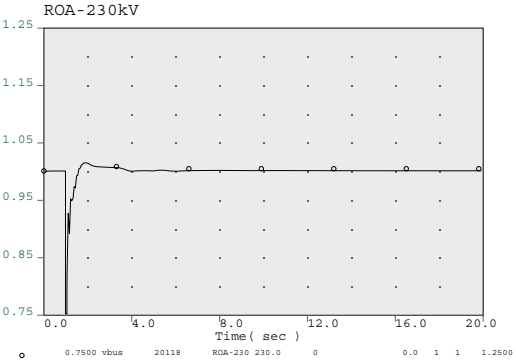
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

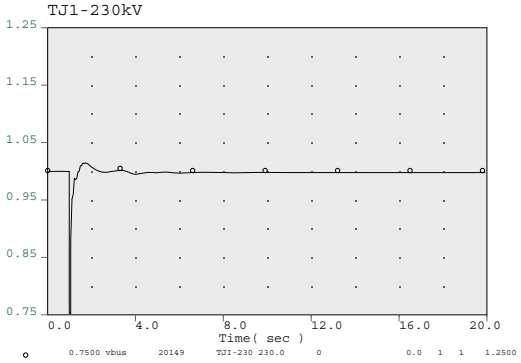
PAR/PID 230kV



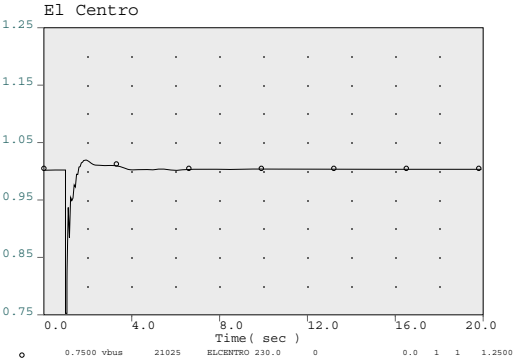
ROA-230kV



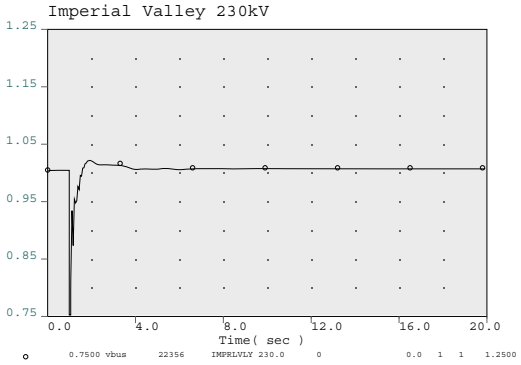
TJ1-230kV



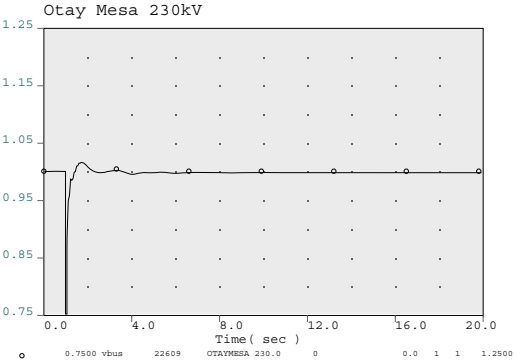
El Centro



Imperial Valley 230kV

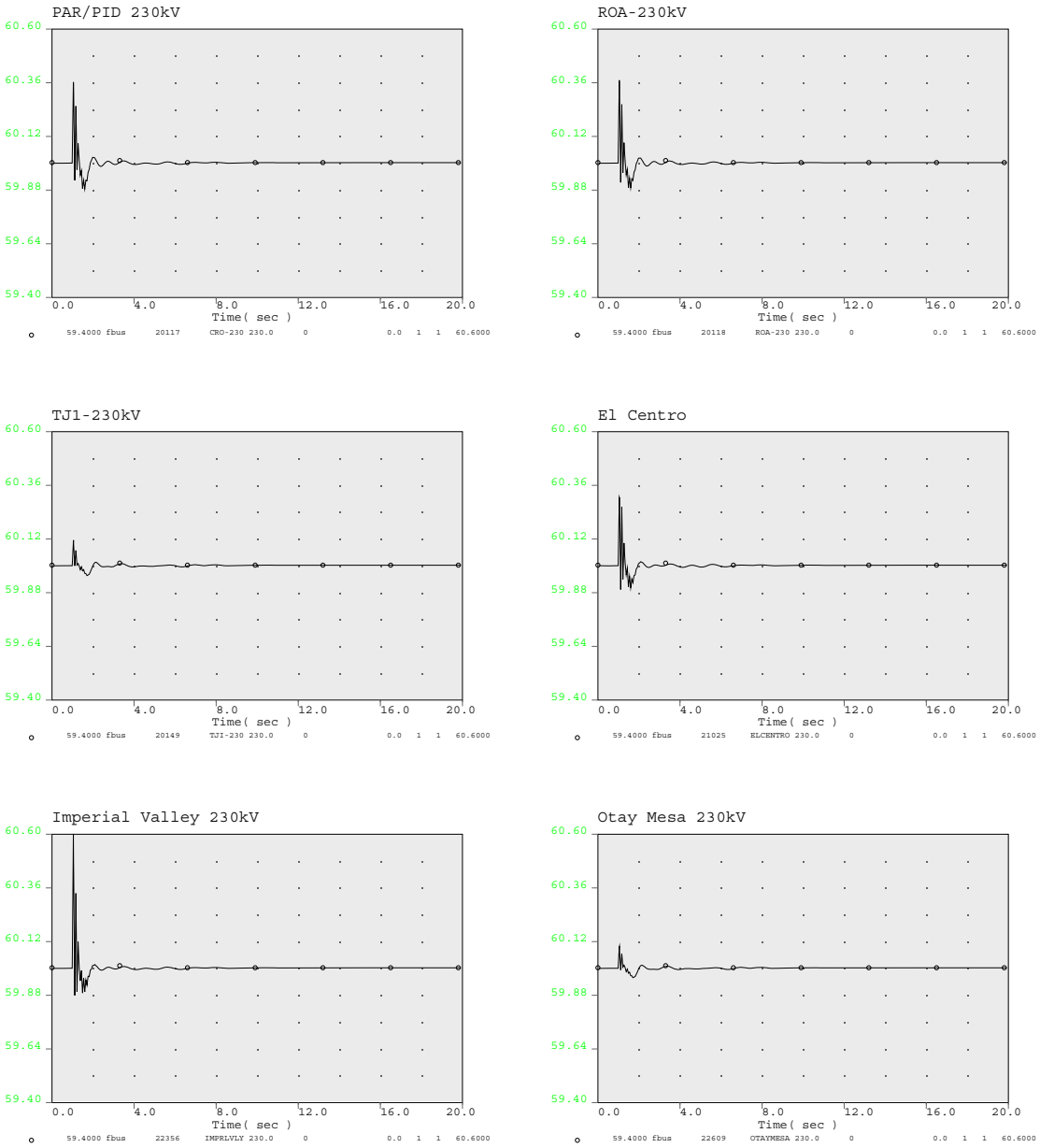


Otay Mesa 230kV



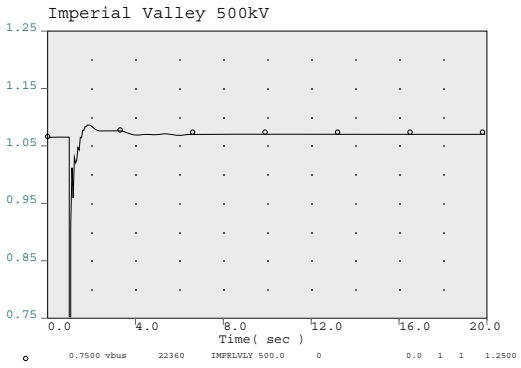
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

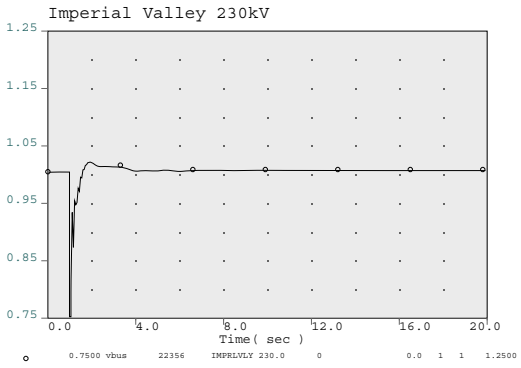
Affected System Frequency Check and Comparison

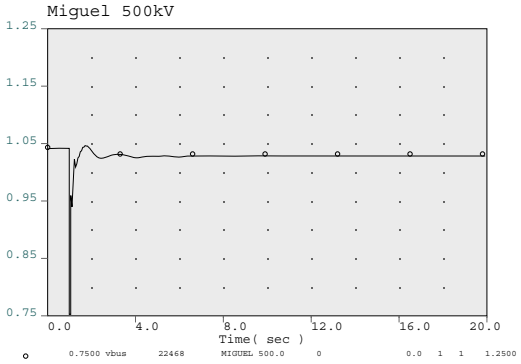


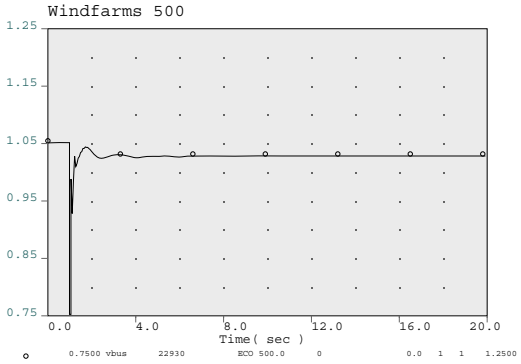
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

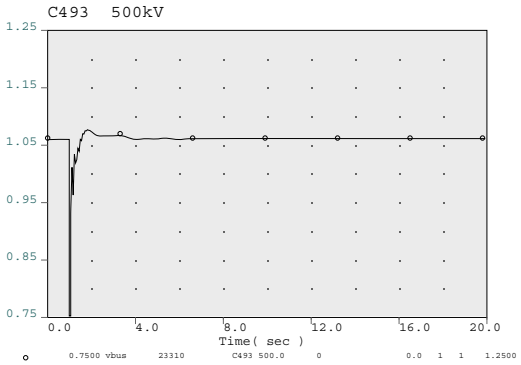
Imperial Valley Area - VOLTAGE

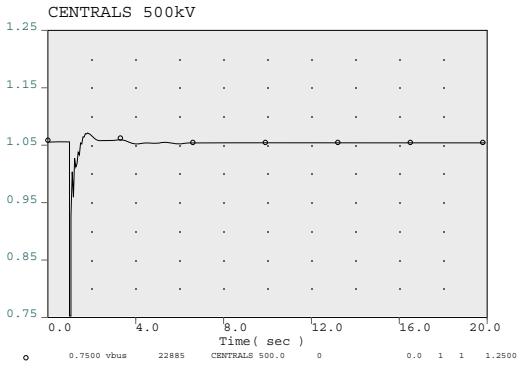






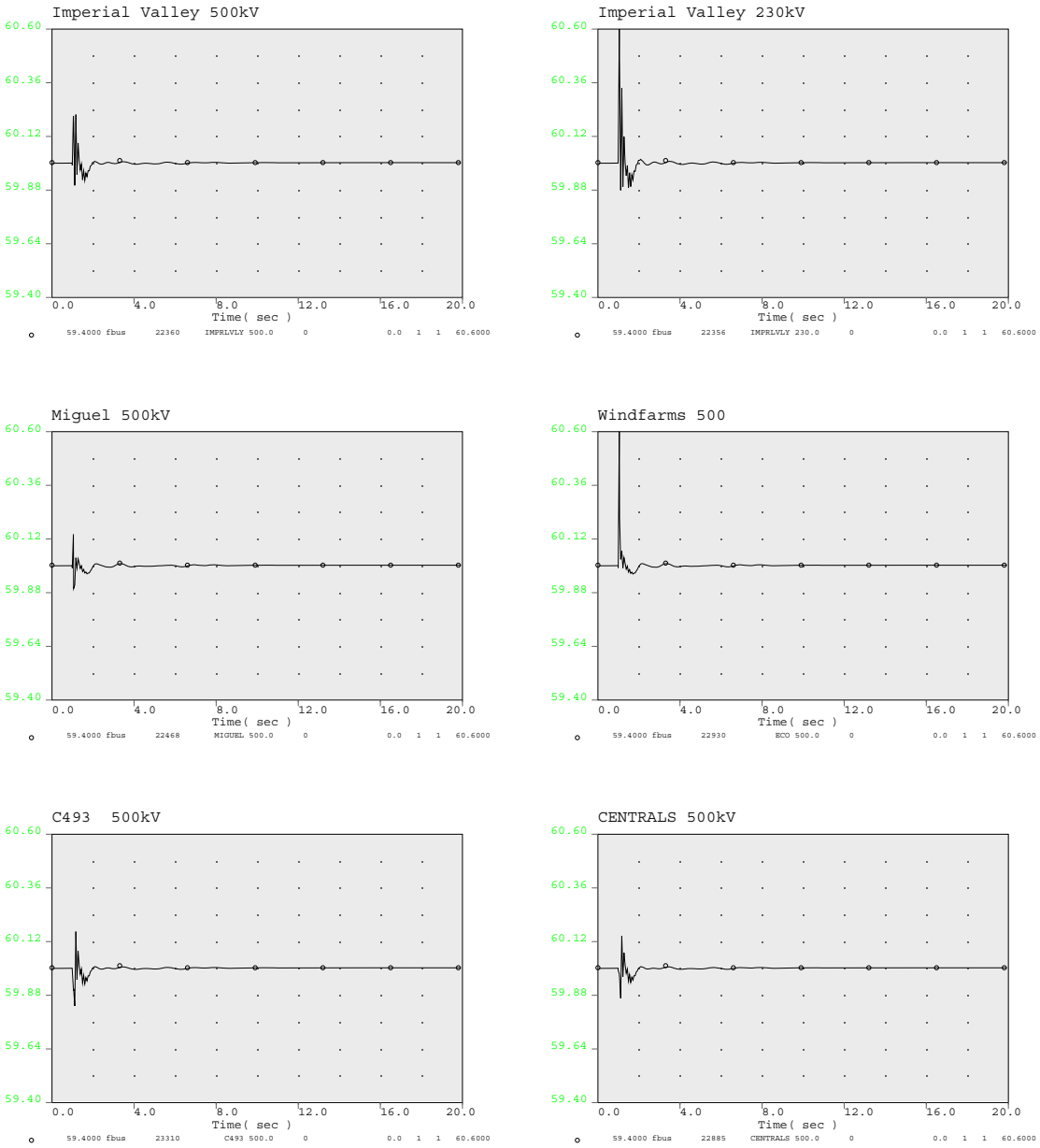






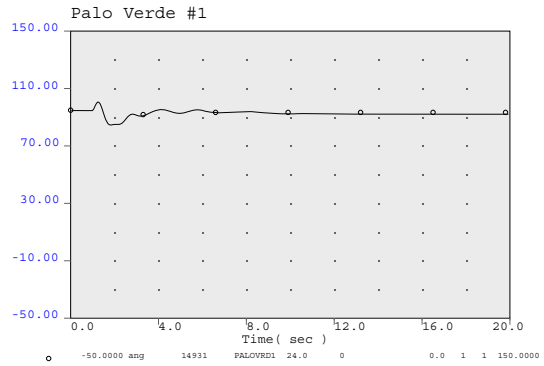
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

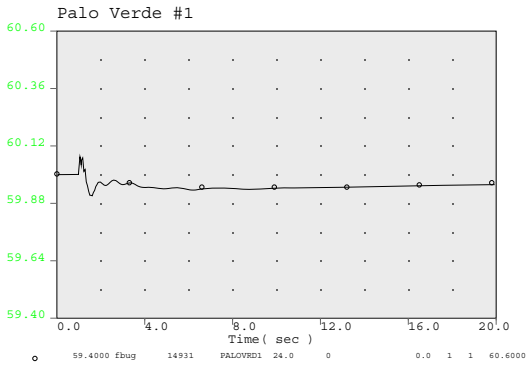
Imperial Valley Area - Frequency

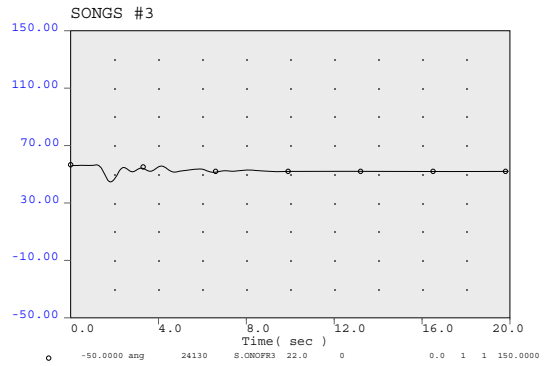


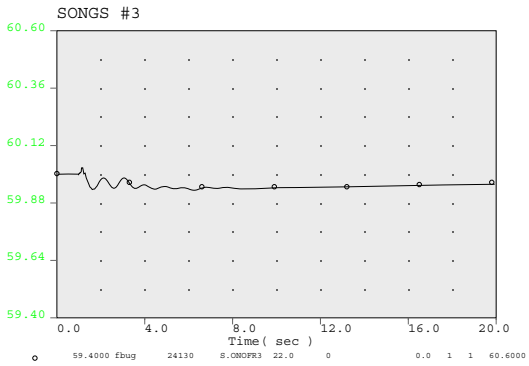
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

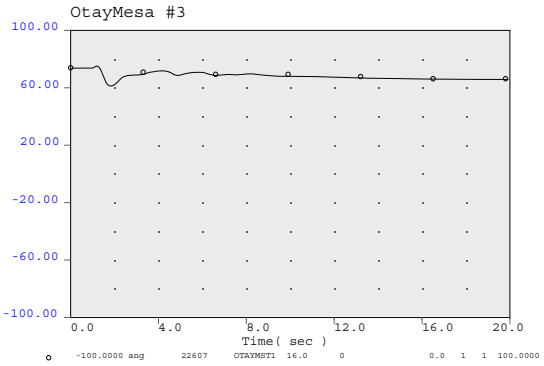
RELATIVE ROTOR ANGLE & FREQUENCY

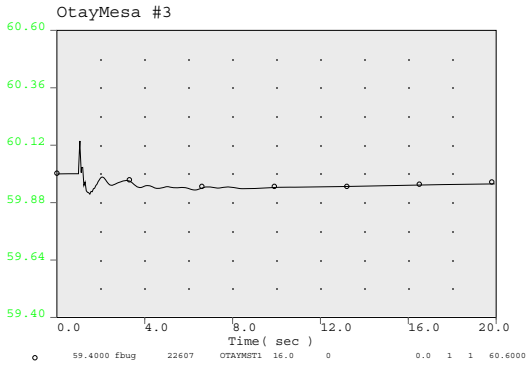












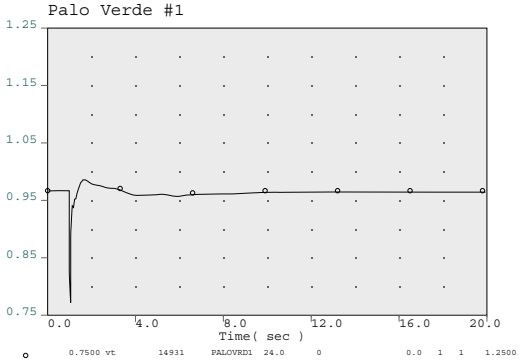
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Page 1

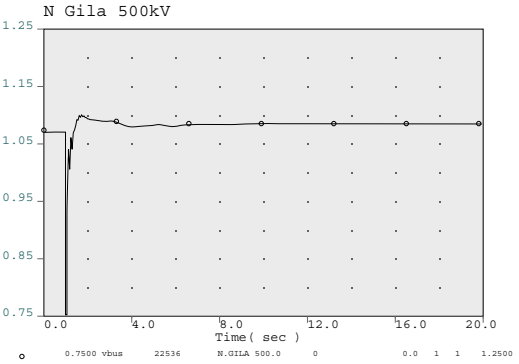
SDGE	IV_Wnd1_noXTrp_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:27:57 2010

RELATIVE VOLTAGE

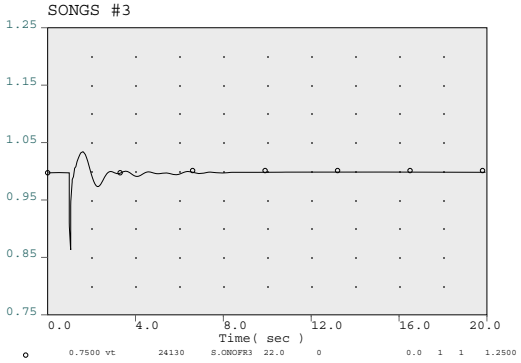
Palo Verde #1



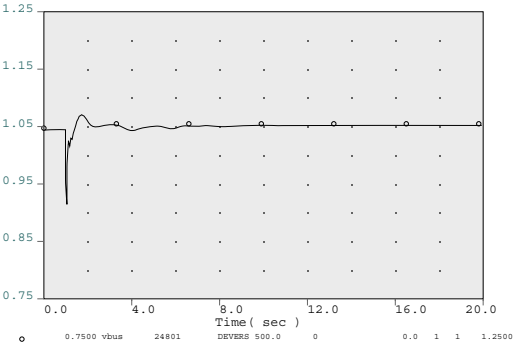
N Gila 500kV



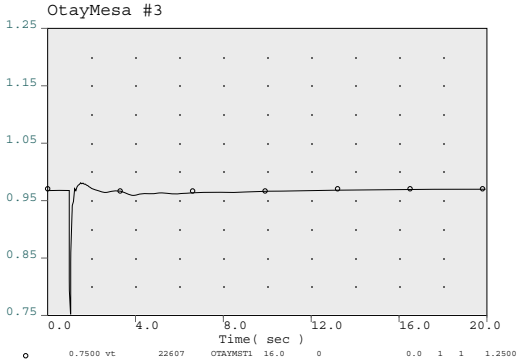
SONGS #3



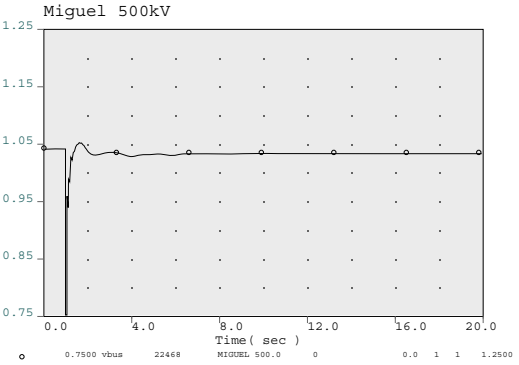
Devers 500



OtayMesa #3



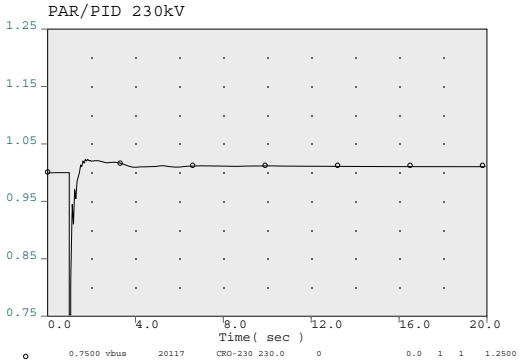
Miguel 500kV



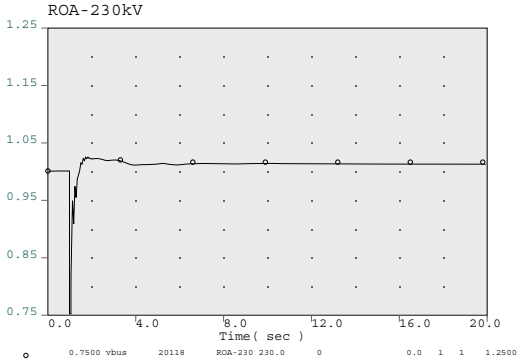
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

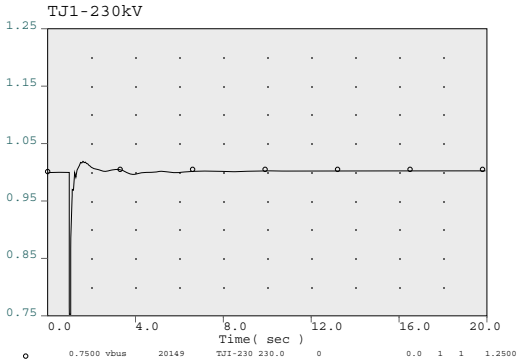
PAR/PID 230kV



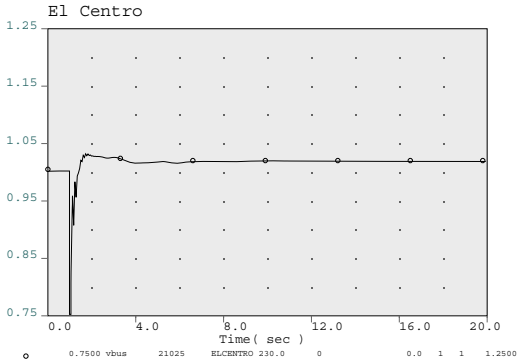
ROA-230kV



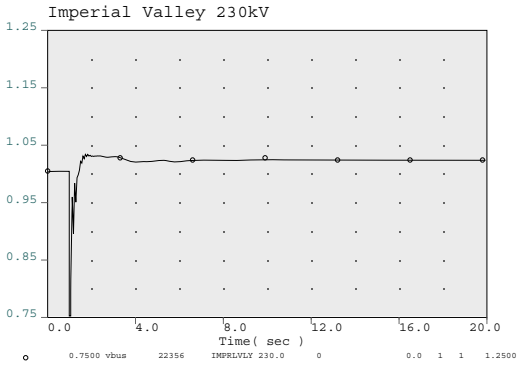
TJ1-230kV



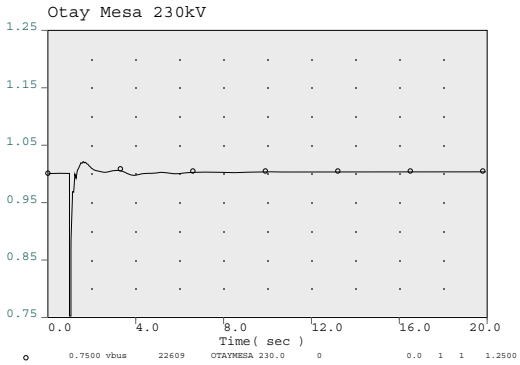
El Centro



Imperial Valley 230kV

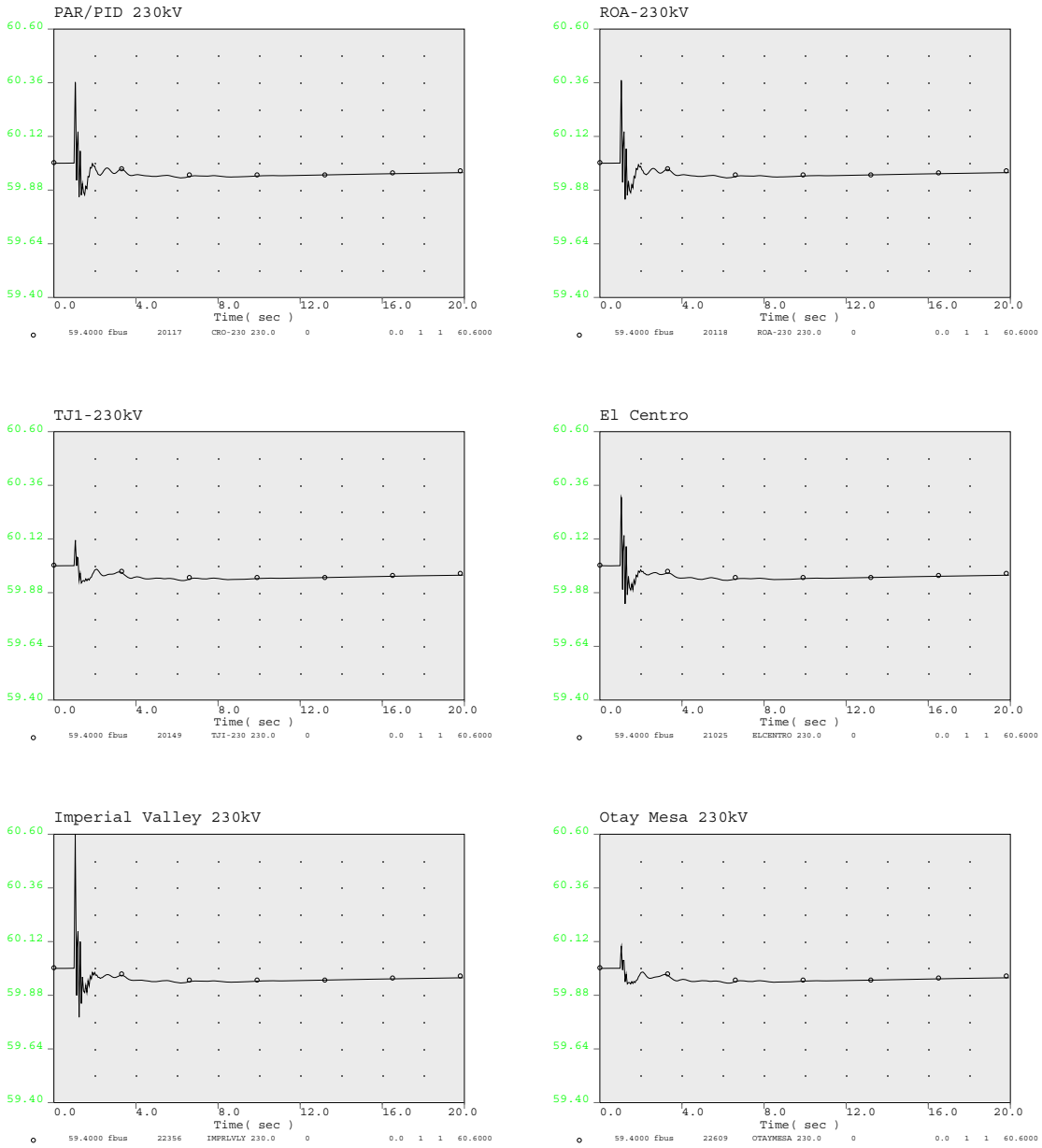


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

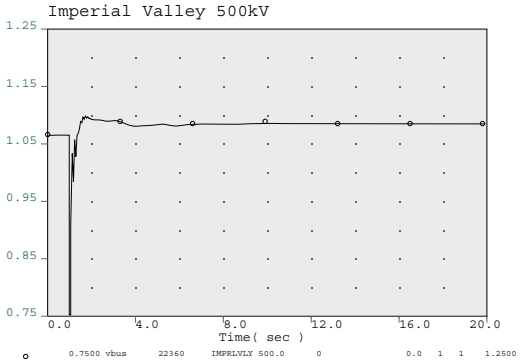
Affected System Frequency Check and Comparison



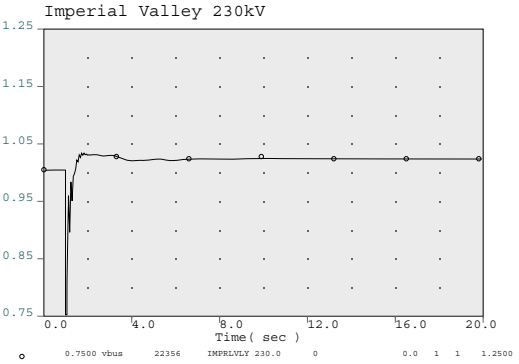
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

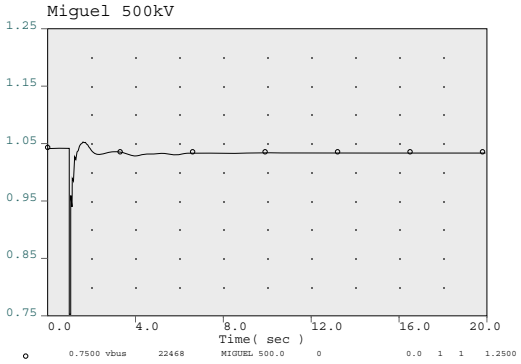
Imperial Valley 500kV



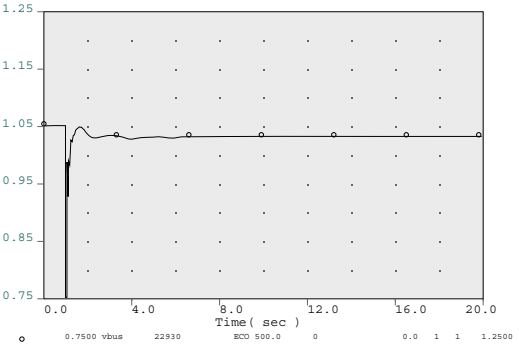
Imperial Valley 230kV



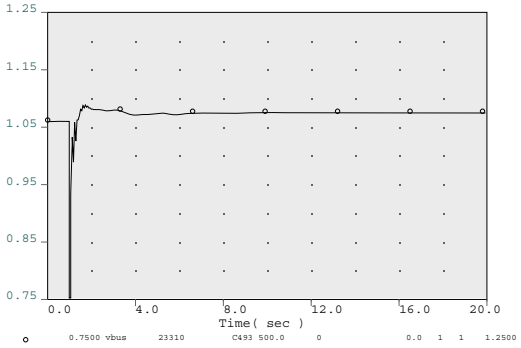
Miguel 500kV



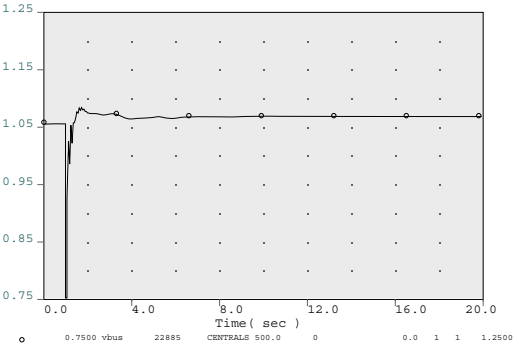
Windfarms 500



C493 500kV

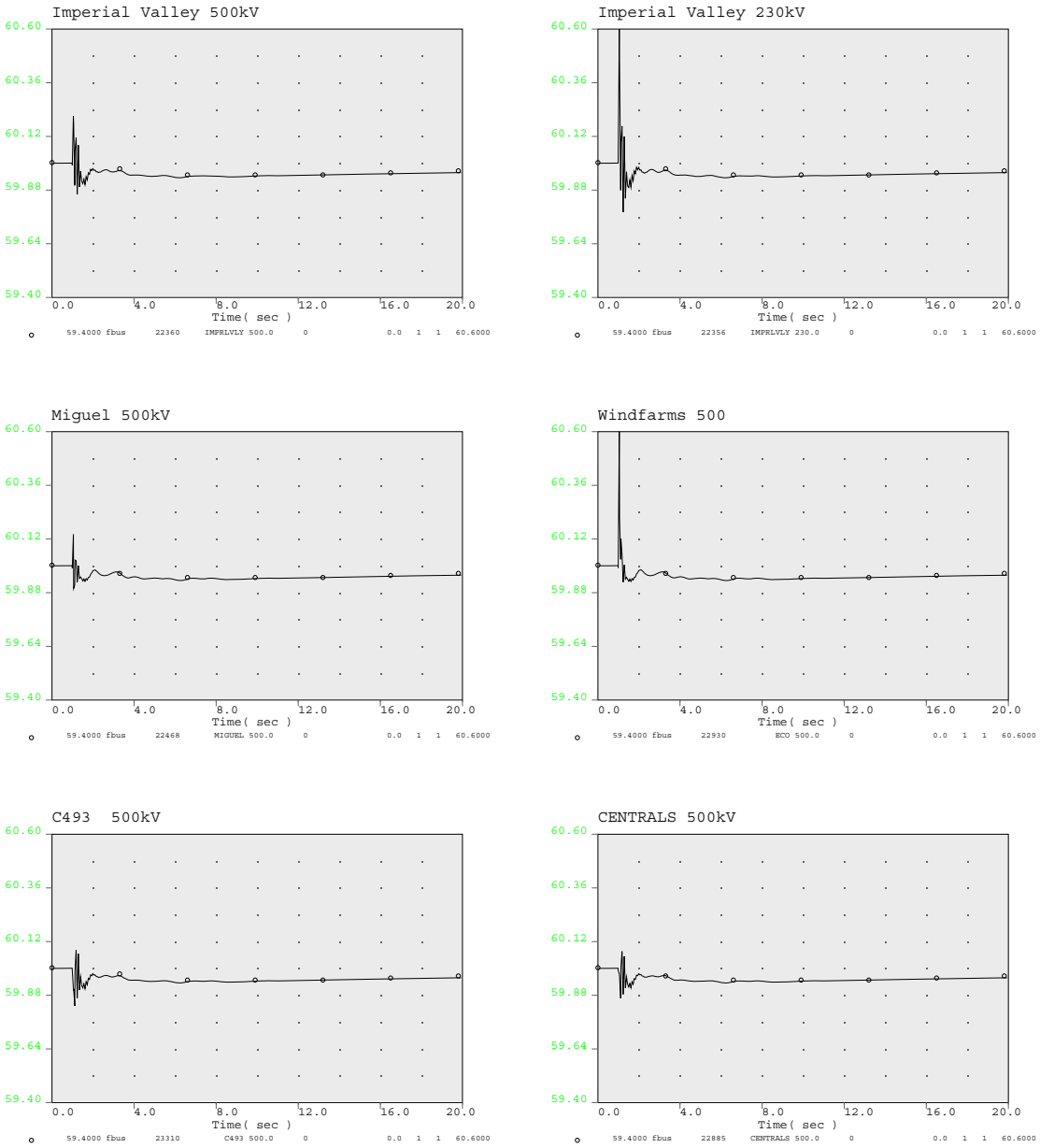


CENTRALS 500kV



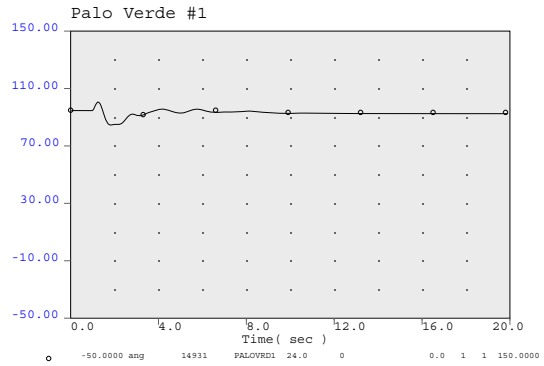
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

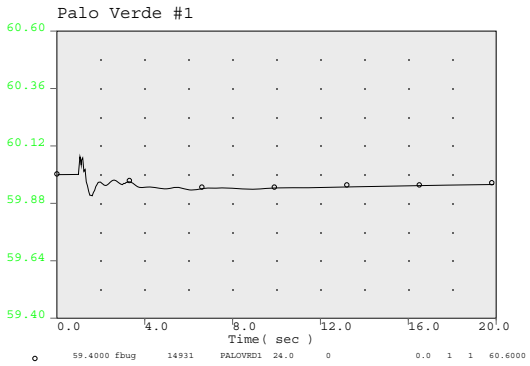
Imperial Valley Area - Frequency

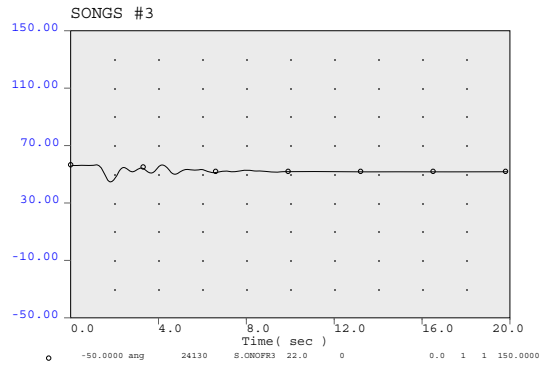


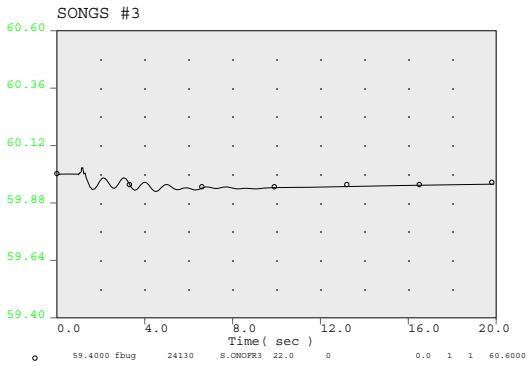
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

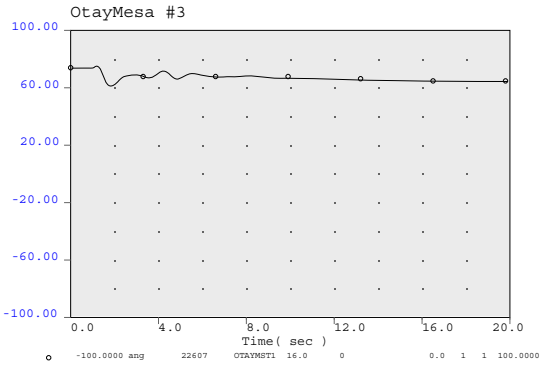
RELATIVE ROTOR ANGLE & FREQUENCY

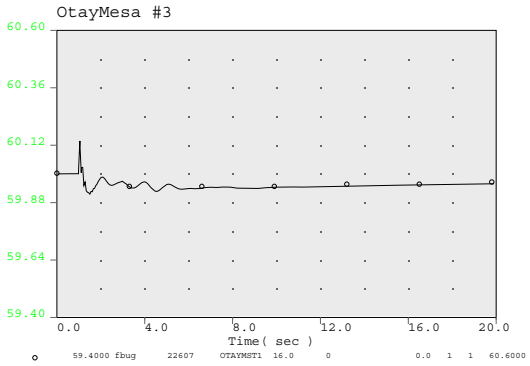












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

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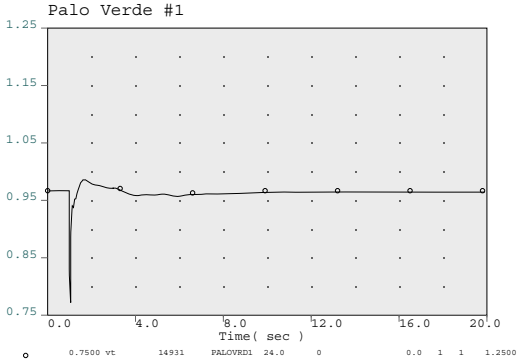
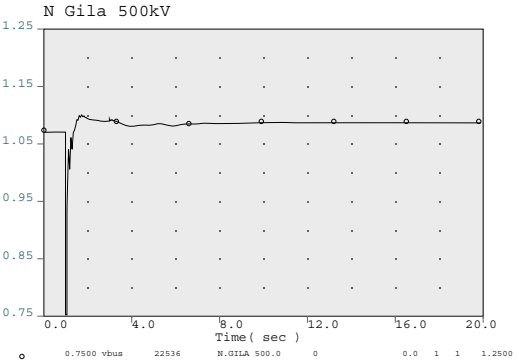
IV_Wnd1_RAS_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:28:18 2010

RELATIVE VOLTAGE

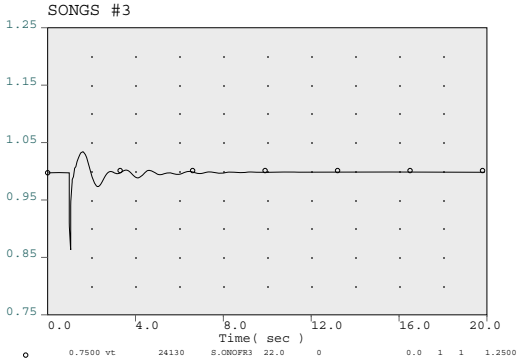
Palo Verde #1



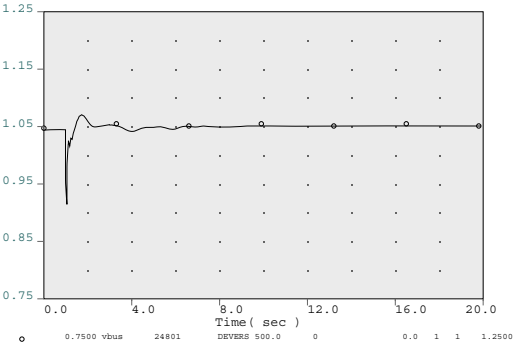
N Gila 500kV



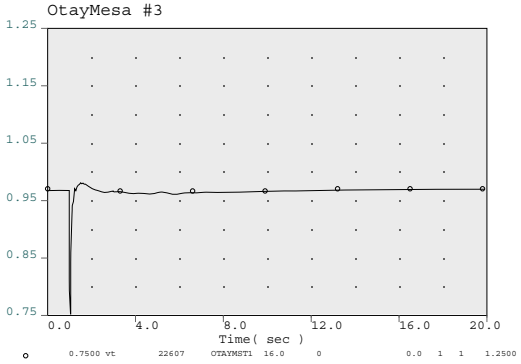
SONGS #3



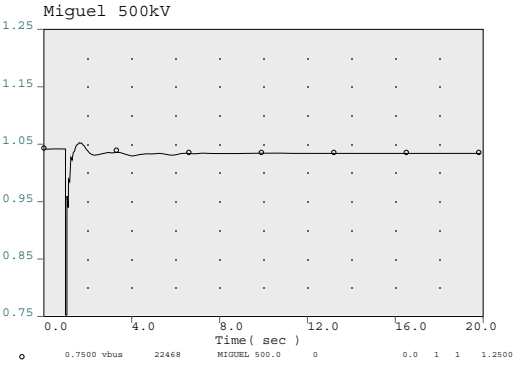
Devers 500



OtayMesa #3



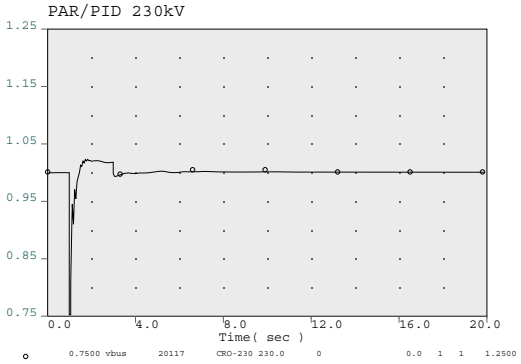
Miguel 500kV



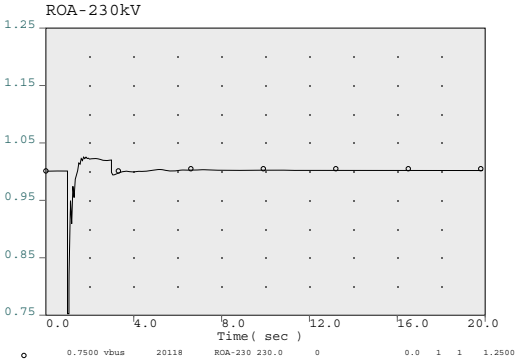
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

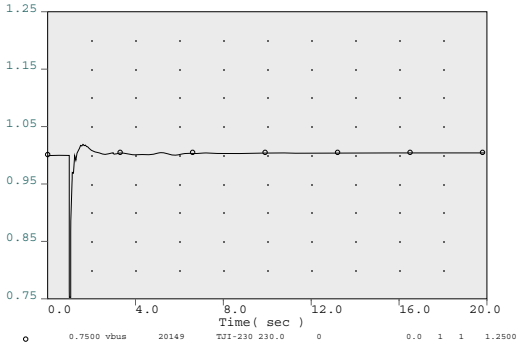
PAR/PID 230kV



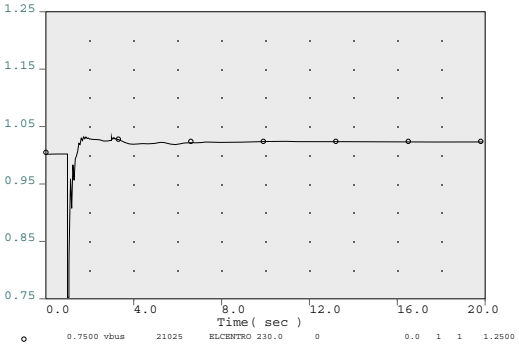
ROA-230kV



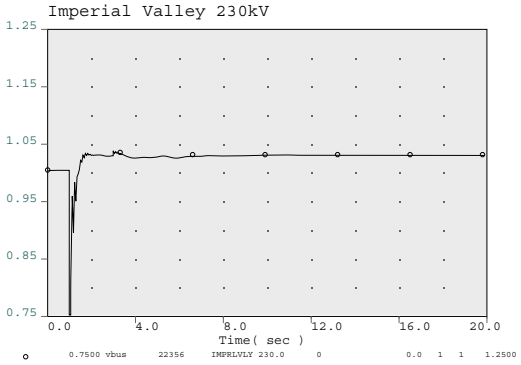
TJ1-230kV



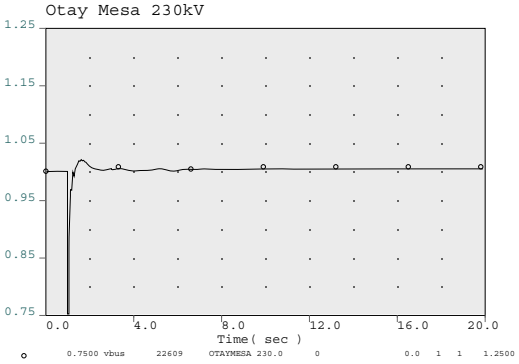
El Centro



Imperial Valley 230kV

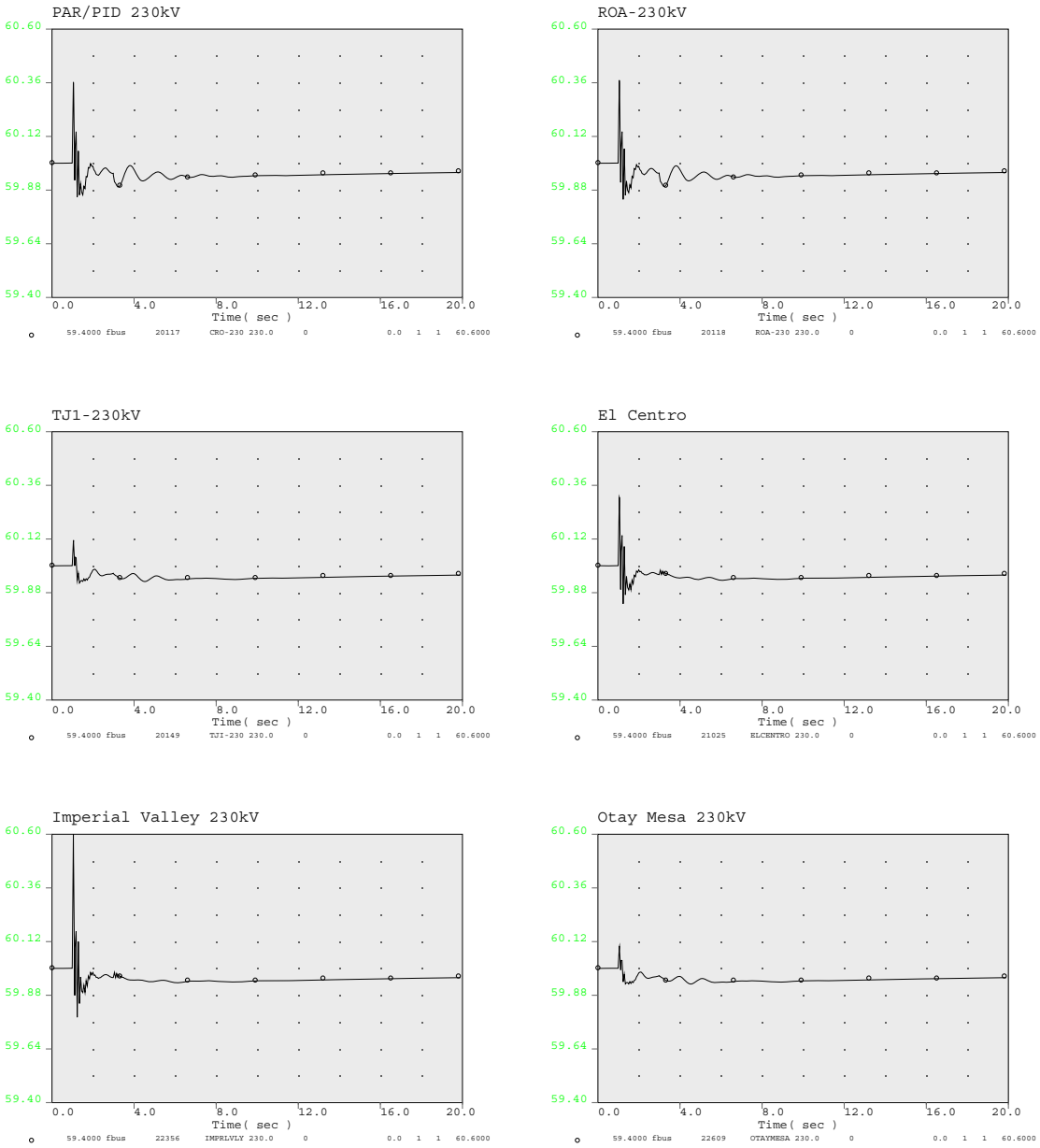


Otay Mesa 230kV



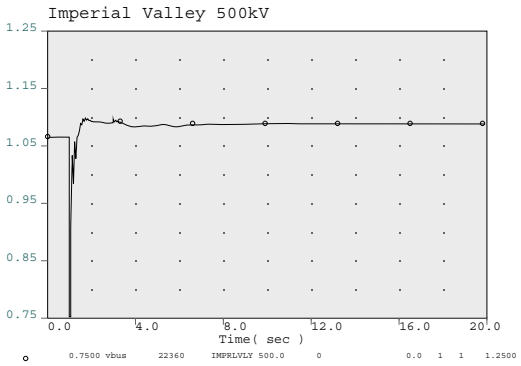
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

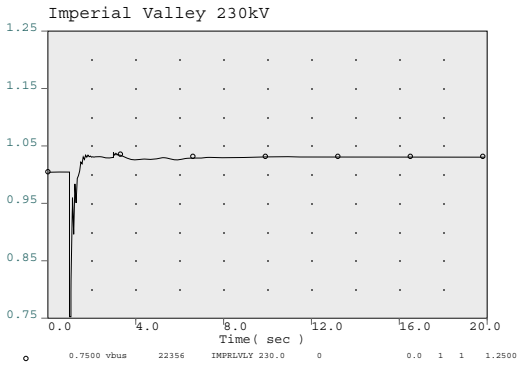
Affected System Frequency Check and Comparison

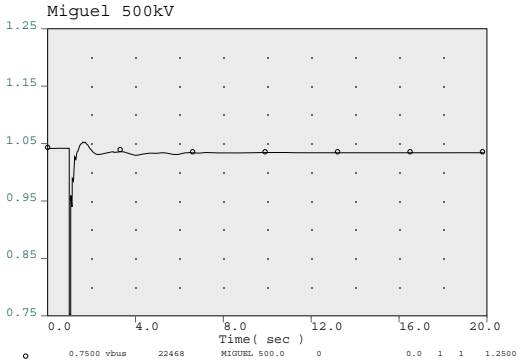


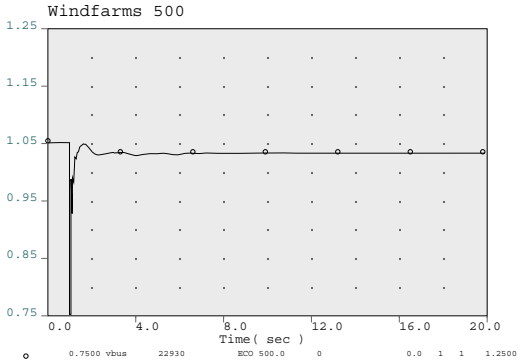
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

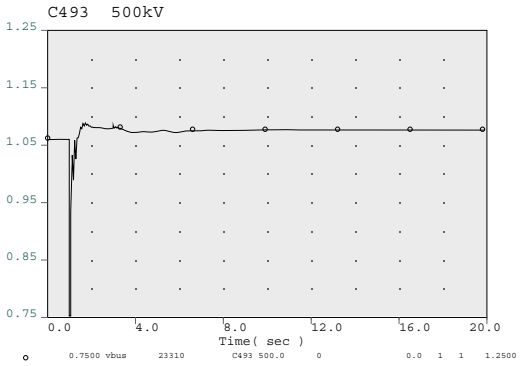
Imperial Valley Area - VOLTAGE

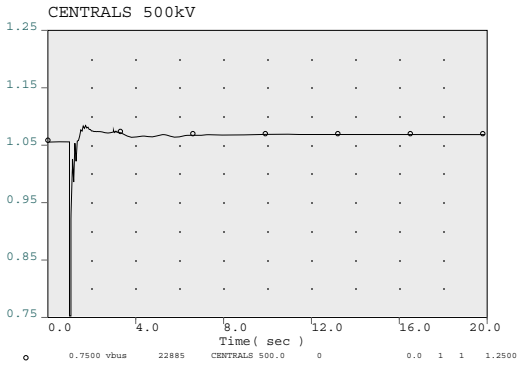












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

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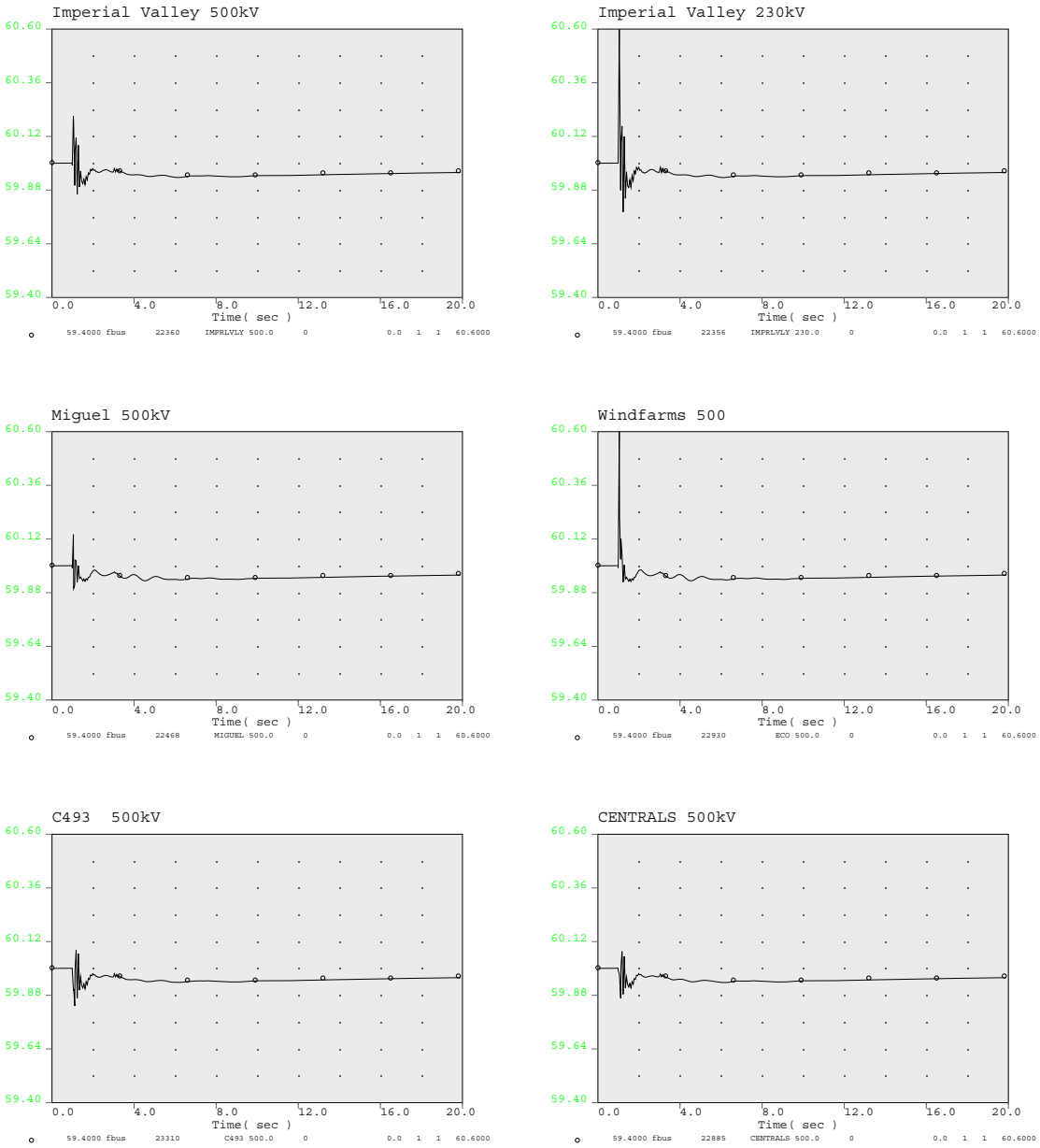
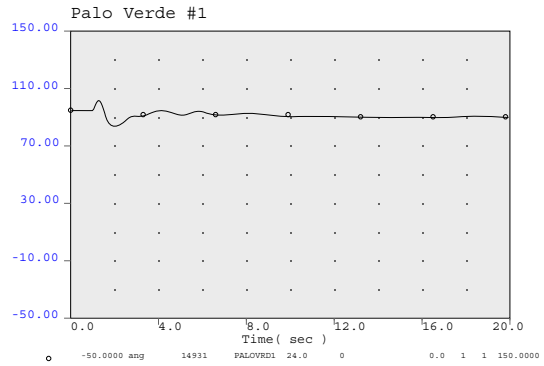
SDGE	IV_Wnd1_RAS_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:28:18 2010

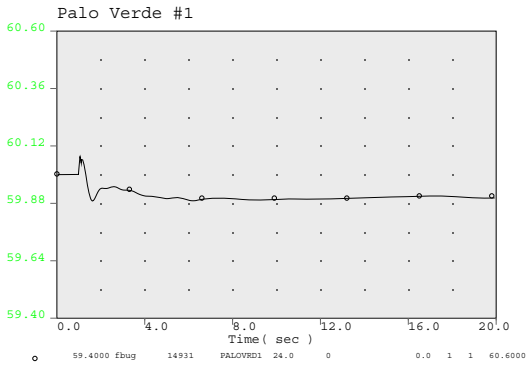
Imperial Valley Area - Frequency

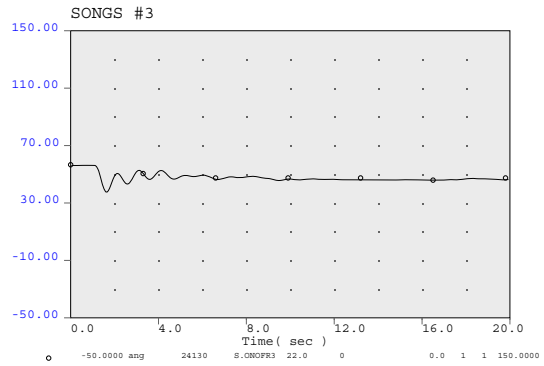


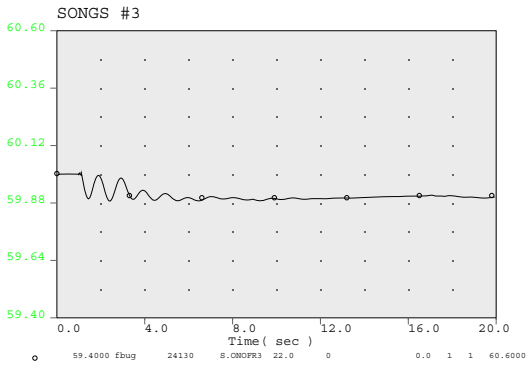
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

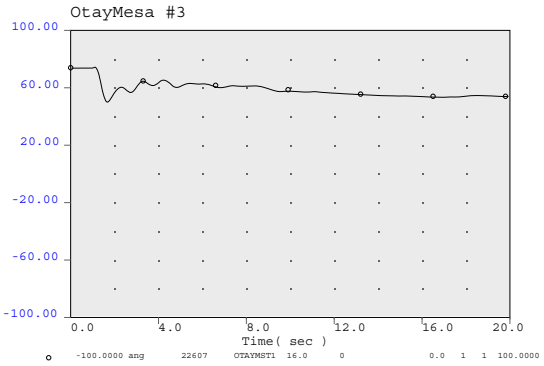
RELATIVE ROTOR ANGLE & FREQUENCY

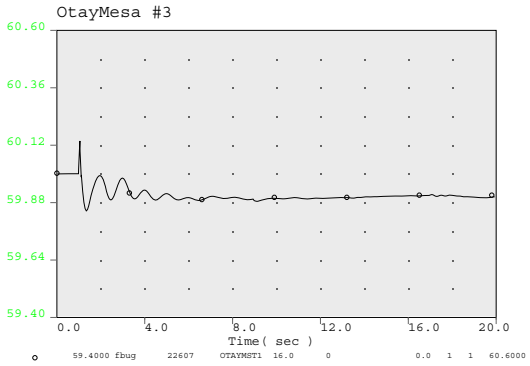












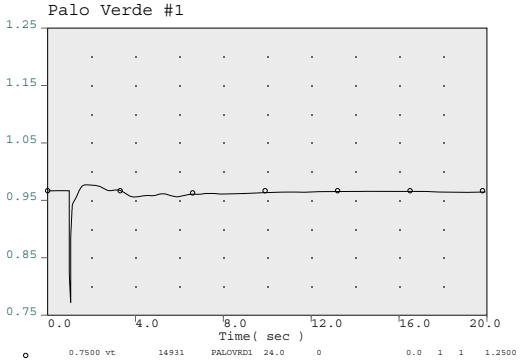
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

Page 1

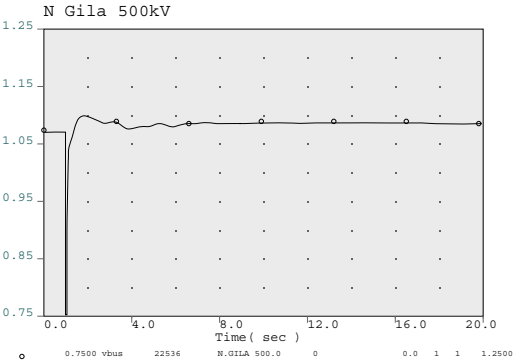
SDGE	IV_Wnd_dlo_noX_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:28:43 2010

RELATIVE VOLTAGE

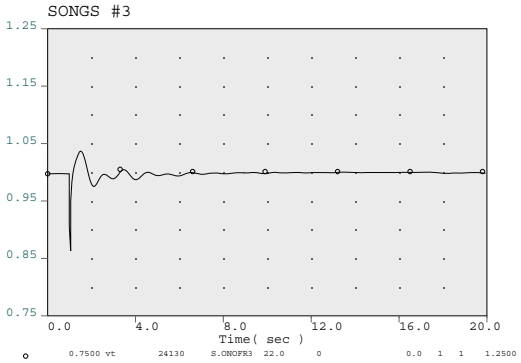
Palo Verde #1



N Gila 500kV



SONGS #3



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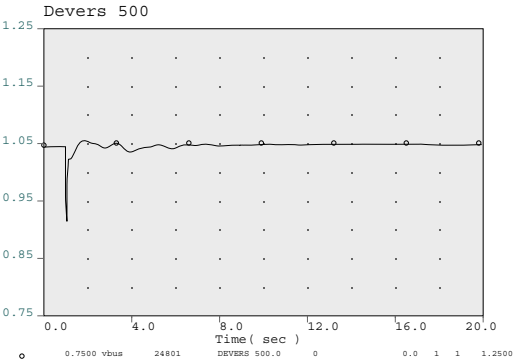
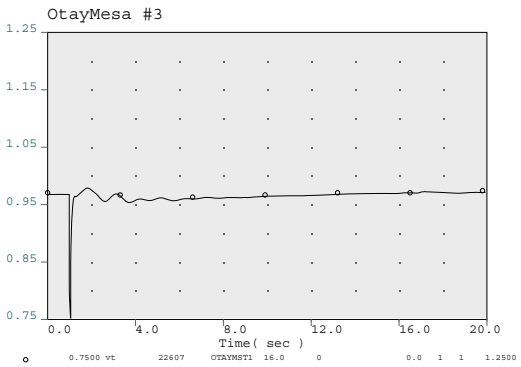
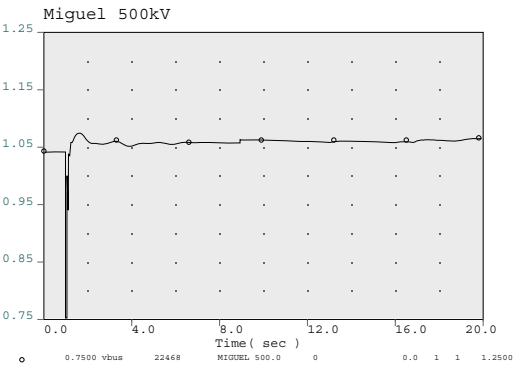


OtayMesa #3



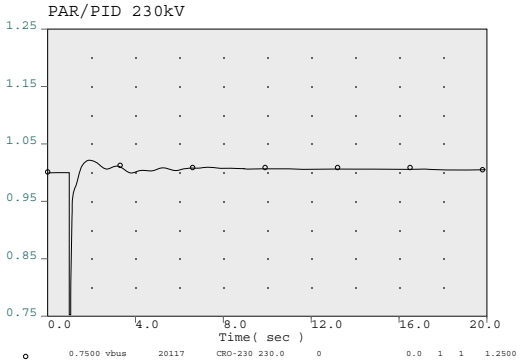
Miguel 500kV



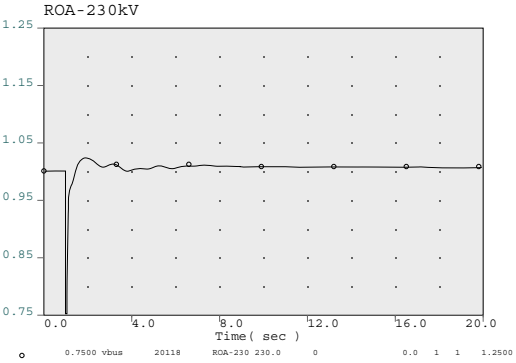
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

Affected System Voltage Check and Comparison

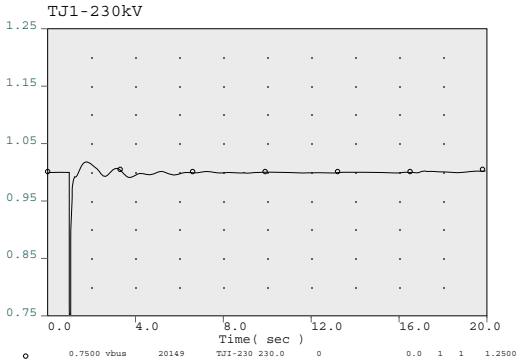
PAR/PID 230kV



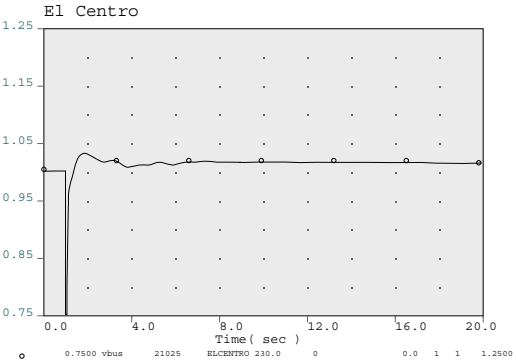
ROA-230kV



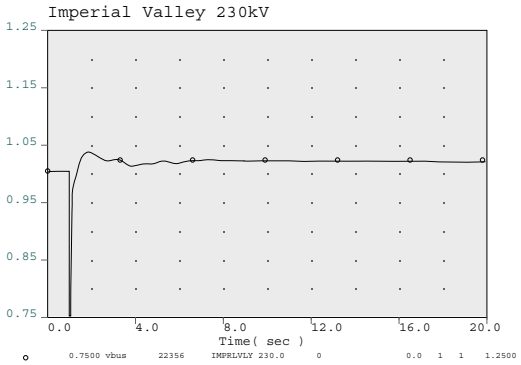
TJ1-230kV



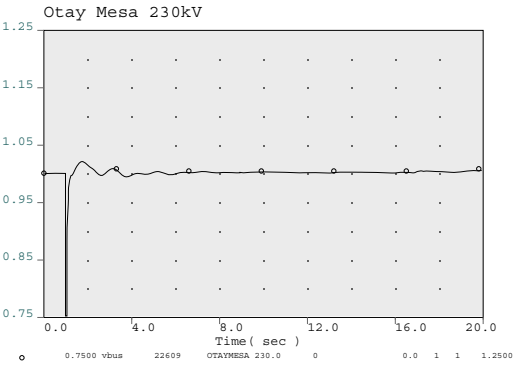
El Centro



Imperial Valley 230kV



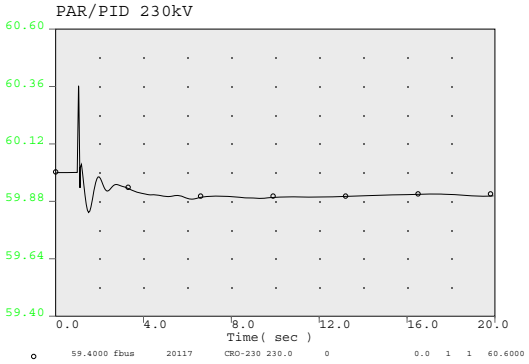
Otay Mesa 230kV



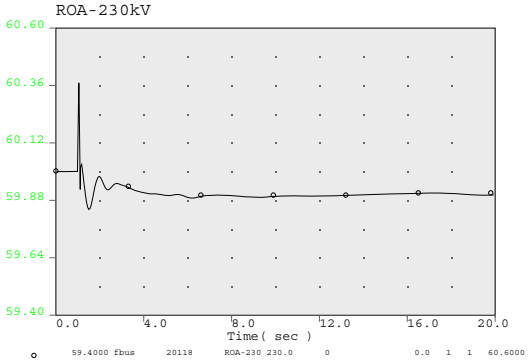
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

Affected System Frequency Check and Comparison

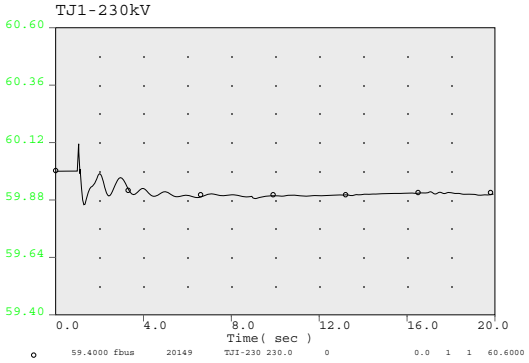
PAR/PID 230kV



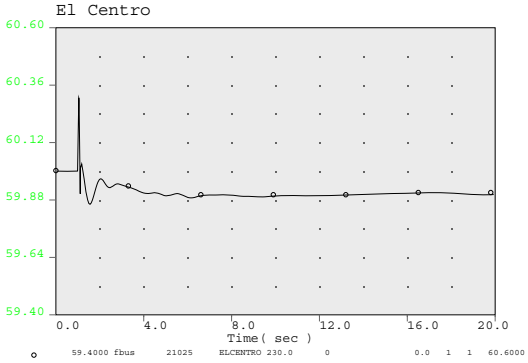
ROA-230kV



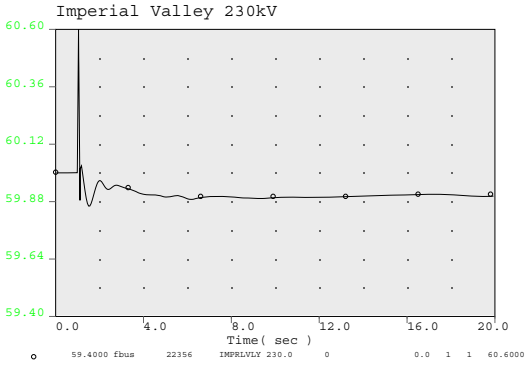
TJ1-230kV



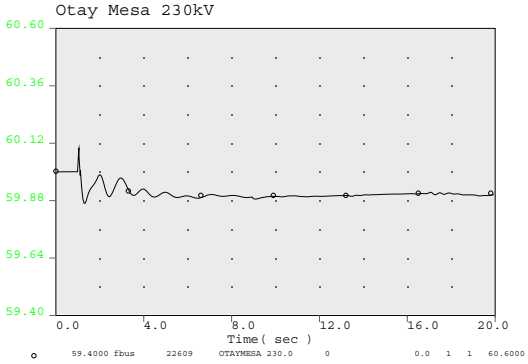
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



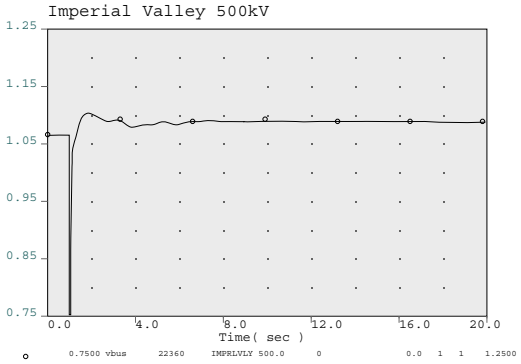
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

Page 4

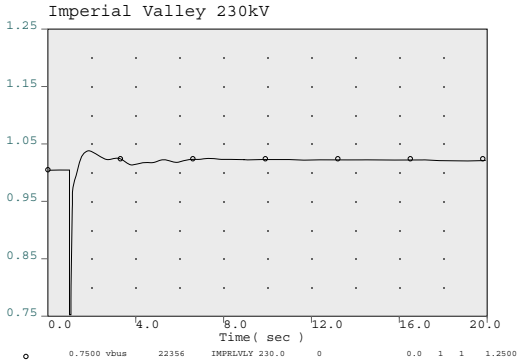
SDGE	IV_Wnd_dlo_noX_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:28:43 2010

Imperial Valley Area - VOLTAGE

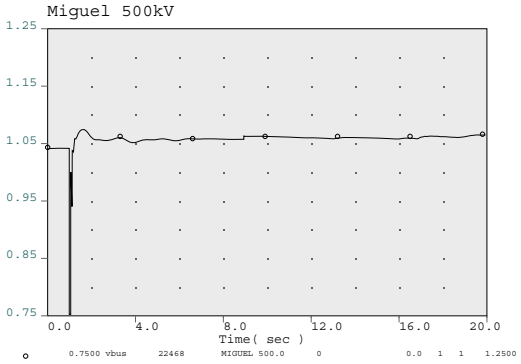
Imperial Valley 500kV



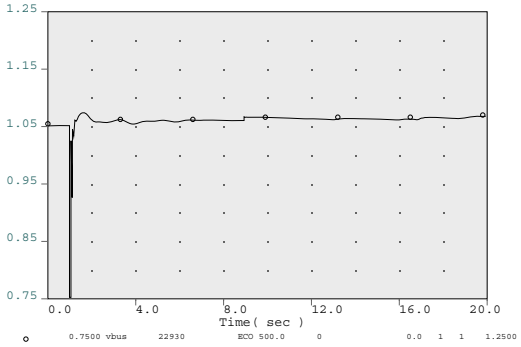
Imperial Valley 230kV



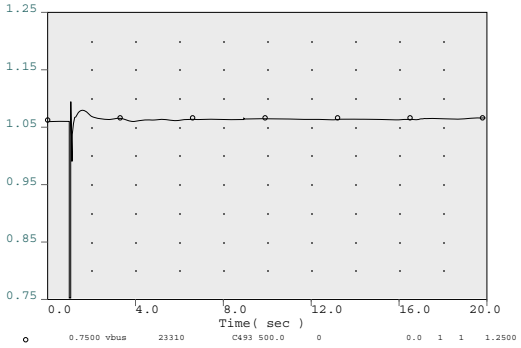
Miguel 500kV



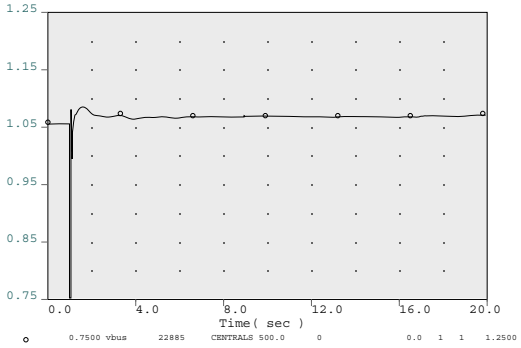
Windfarms 500



C493 500kV

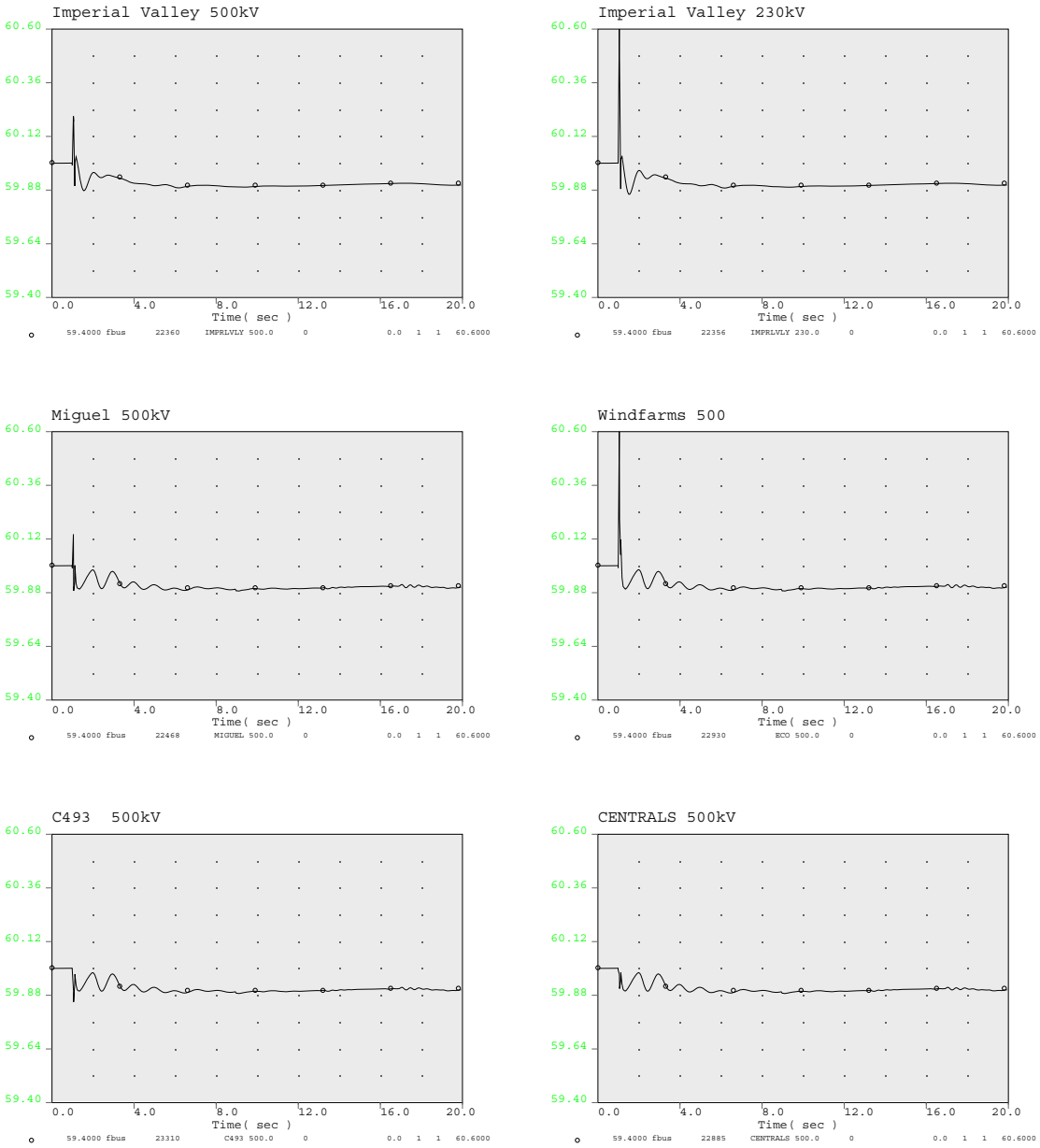


CENTRALS 500kV



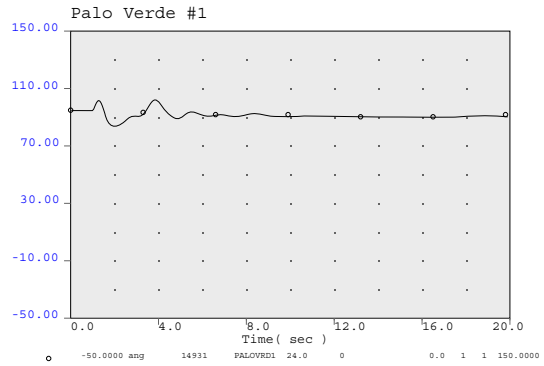
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

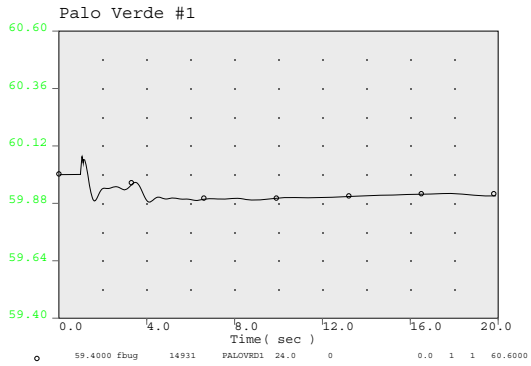
Imperial Valley Area - Frequency

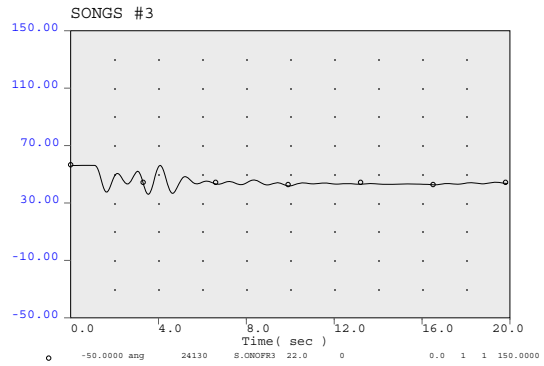


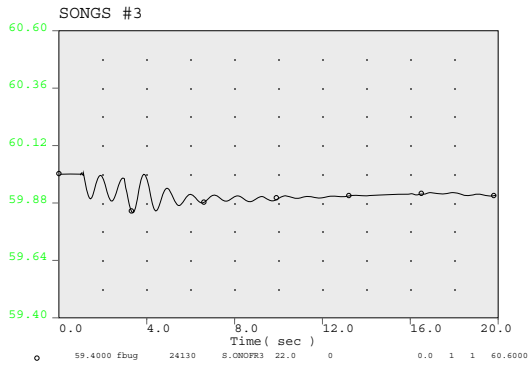
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

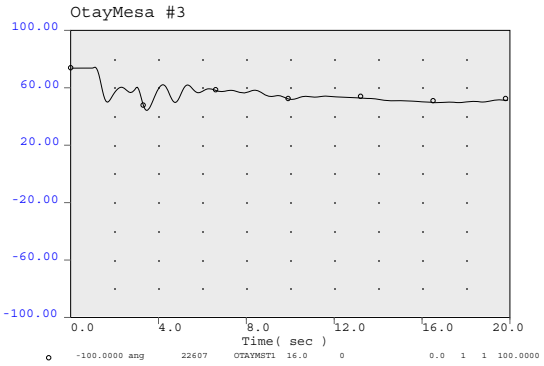
RELATIVE ROTOR ANGLE & FREQUENCY

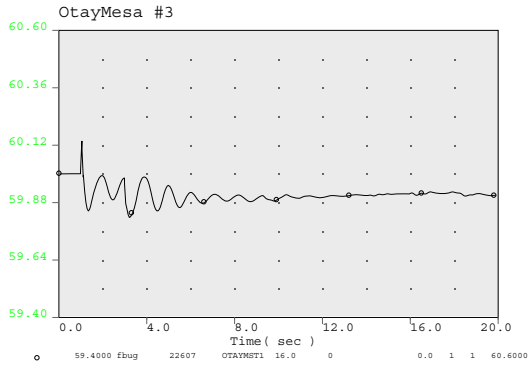












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

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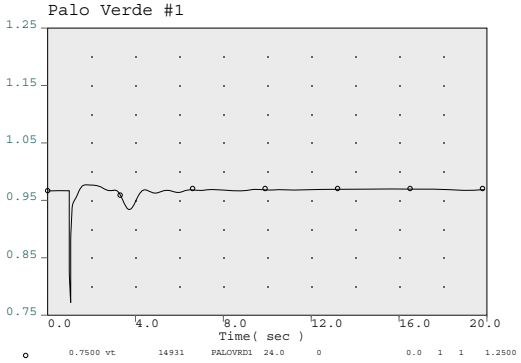
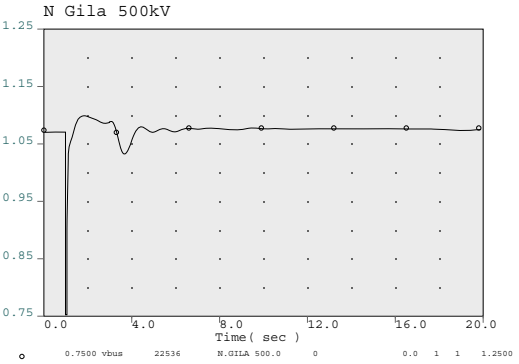
SDGE	IV_Wnd_dlo_RxR_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:29:07 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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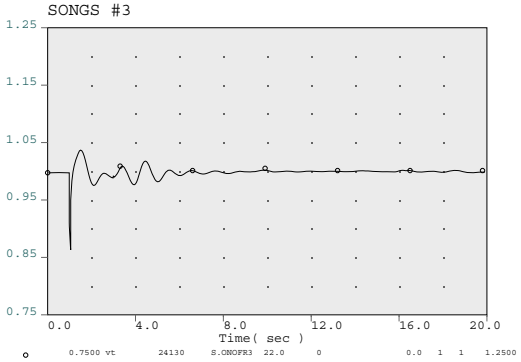
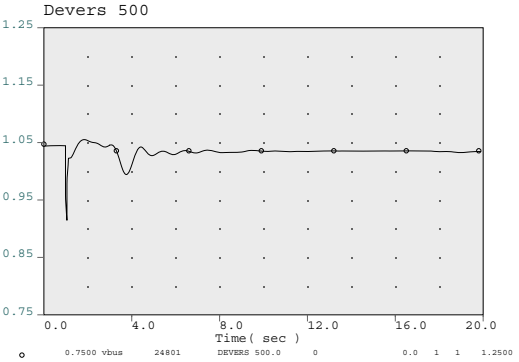
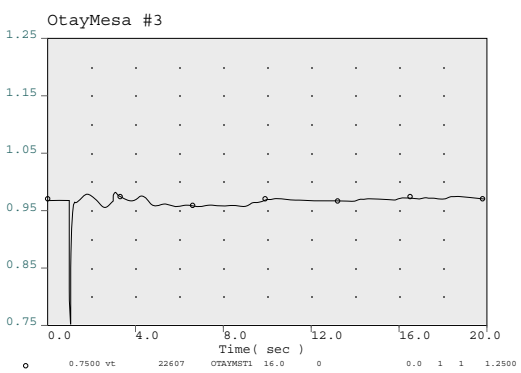


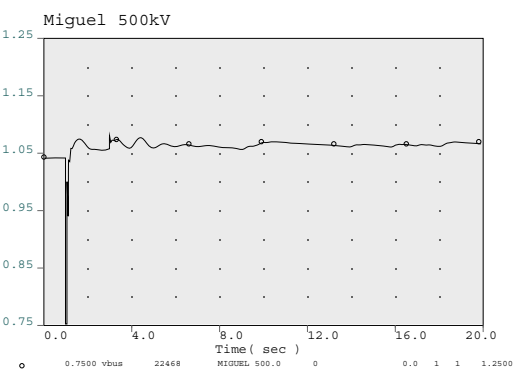
Devers 500



OtayMesa #3



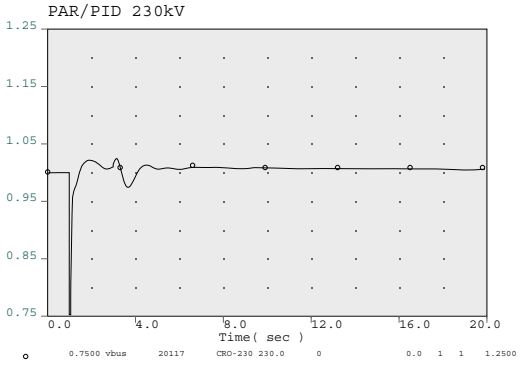
Miguel 500kV



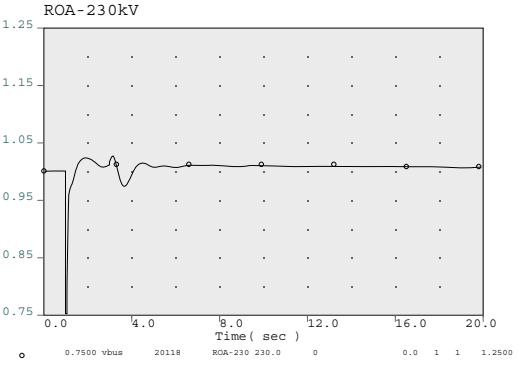
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

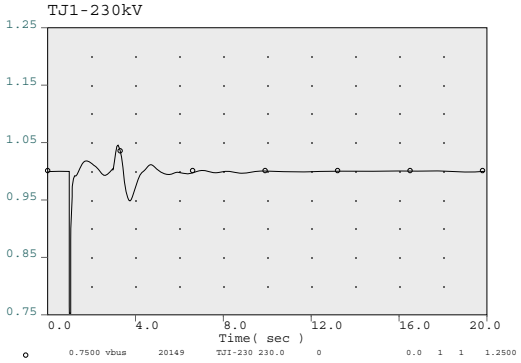
PAR/PID 230kV



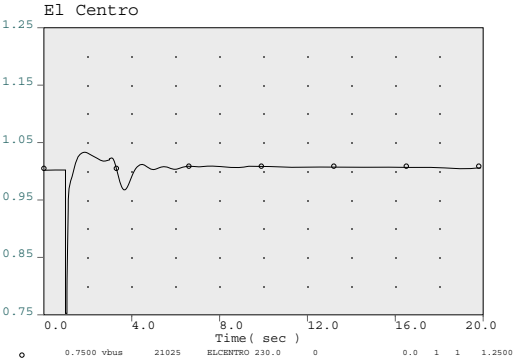
ROA-230kV



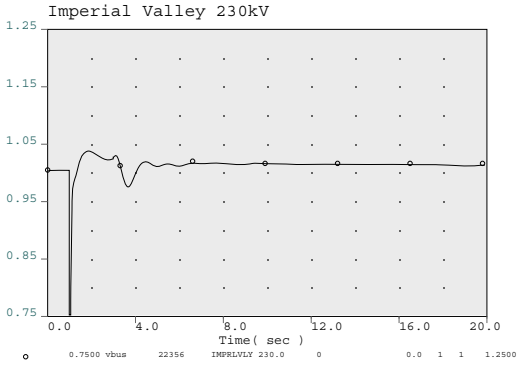
TJ1-230kV



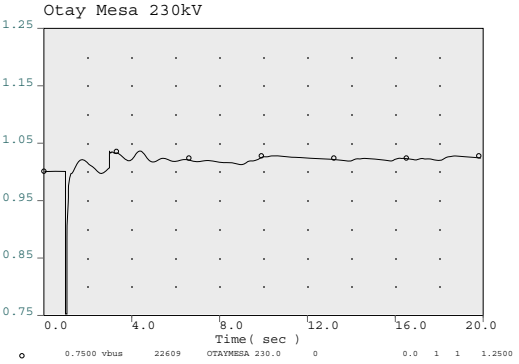
El Centro



Imperial Valley 230kV



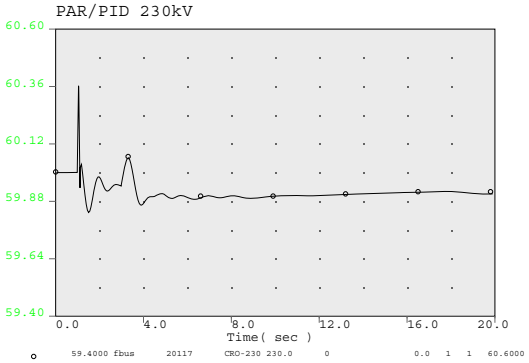
Otay Mesa 230kV



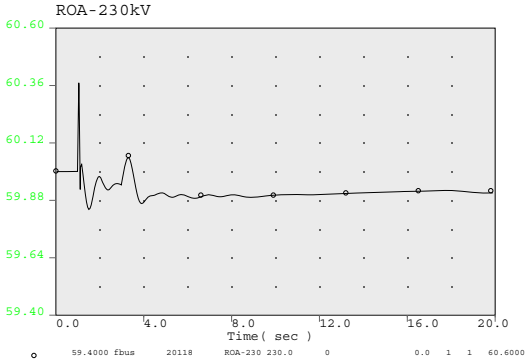
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison

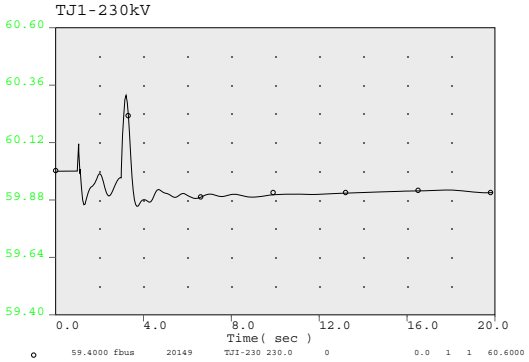
PAR/PID 230kV



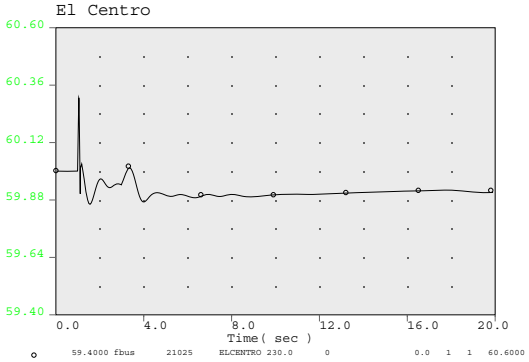
ROA-230kV



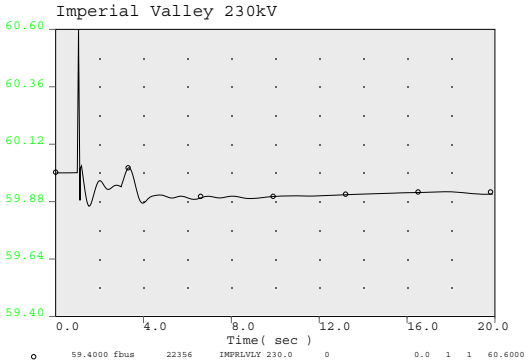
TJ1-230kV



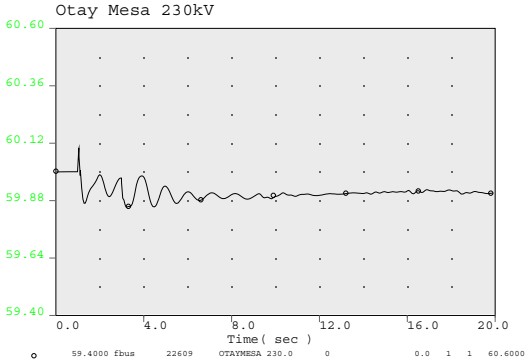
El Centro



Imperial Valley 230kV



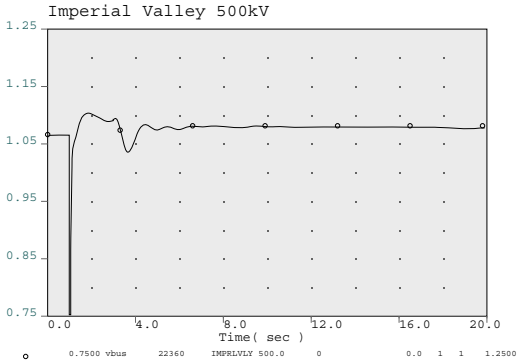
Otay Mesa 230kV



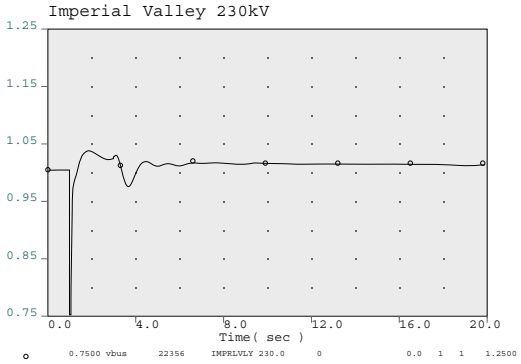
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Imperial Valley Area - VOLTAGE

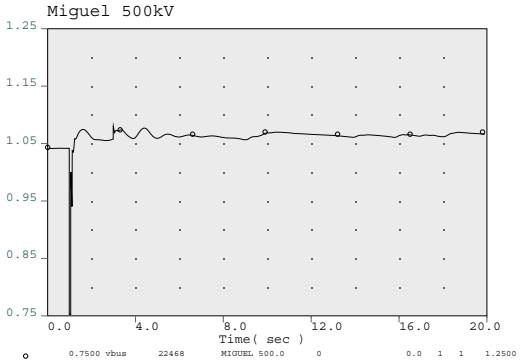
Imperial Valley 500kV



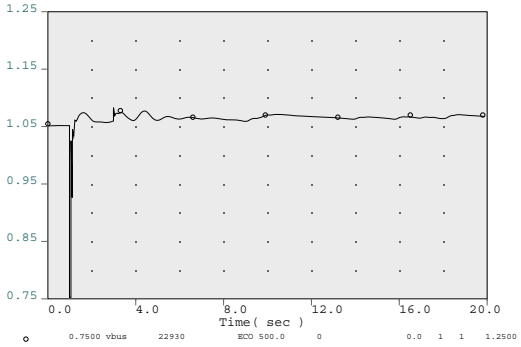
Imperial Valley 230kV



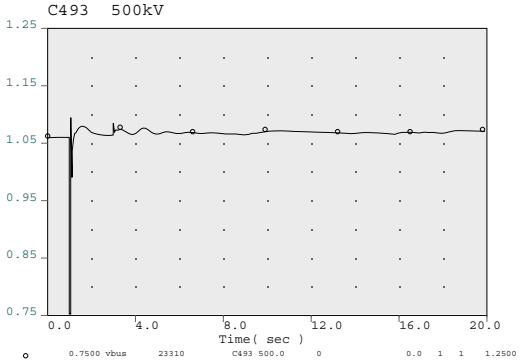
Miguel 500kV



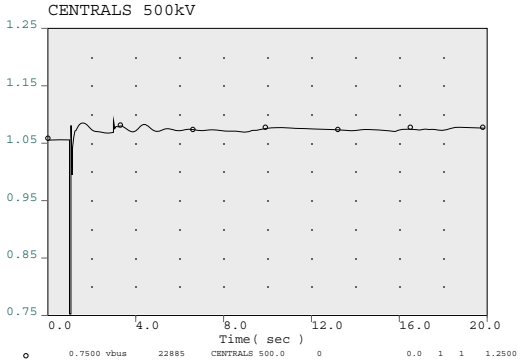
Windfarms 500



C493 500kV

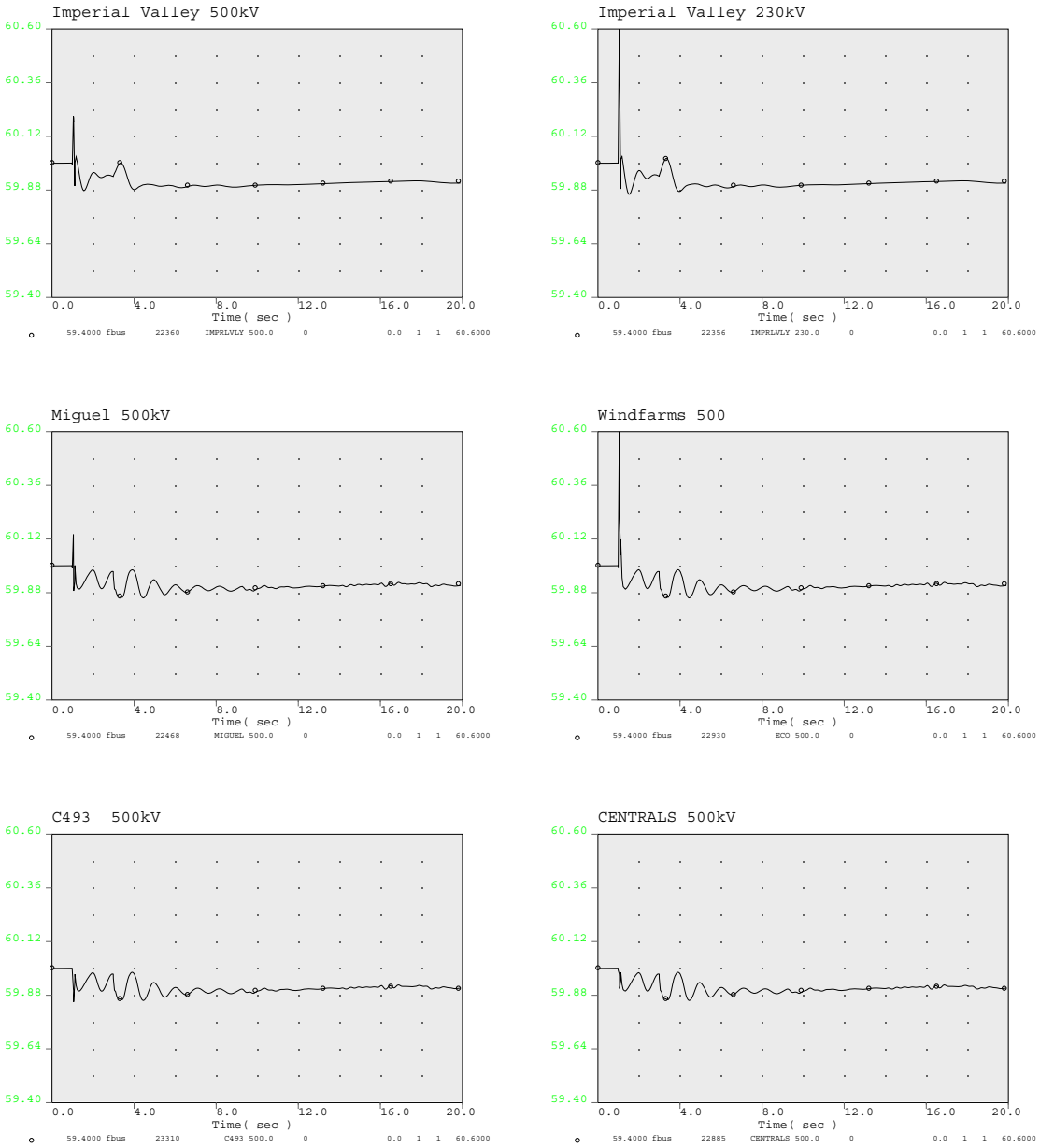


CENTRALS 500kV



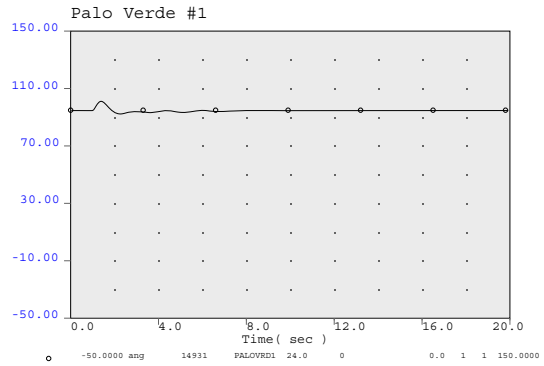
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

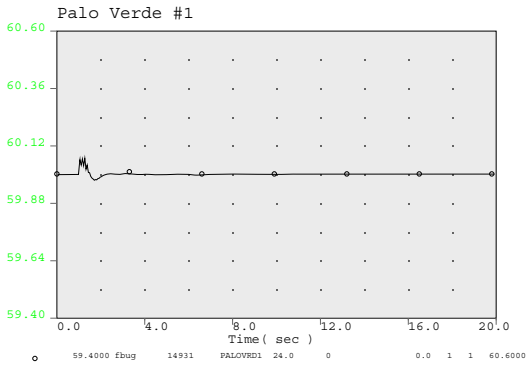
Imperial Valley Area - Frequency

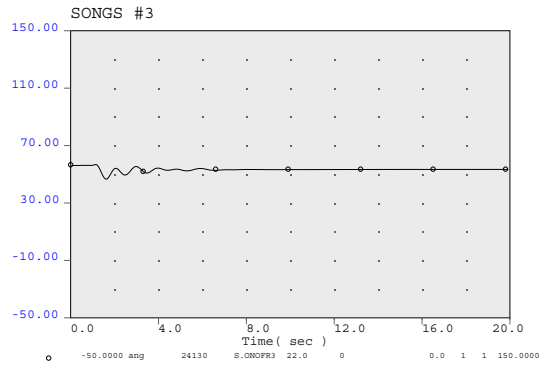


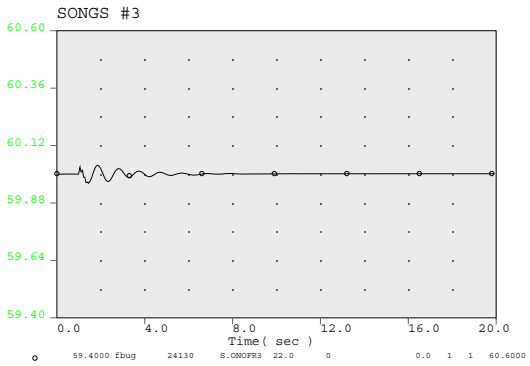
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

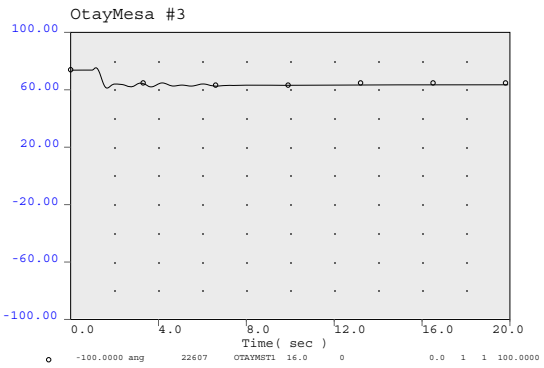
RELATIVE ROTOR ANGLE & FREQUENCY

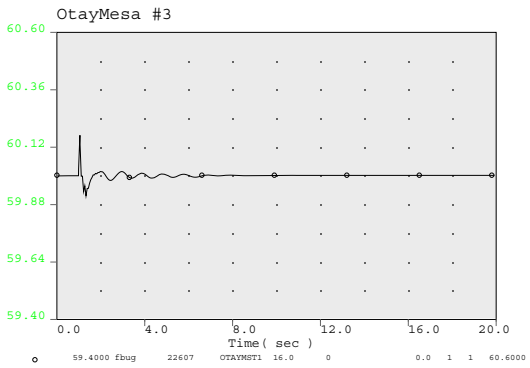












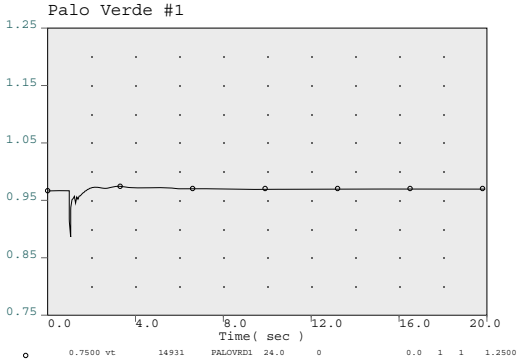
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Page 1

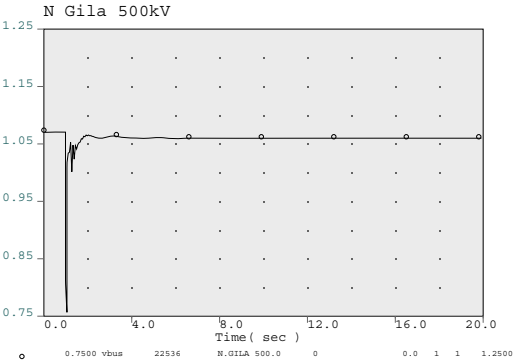
SDGE	ML_Wnd_noRAS_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:29:33 2010

RELATIVE VOLTAGE

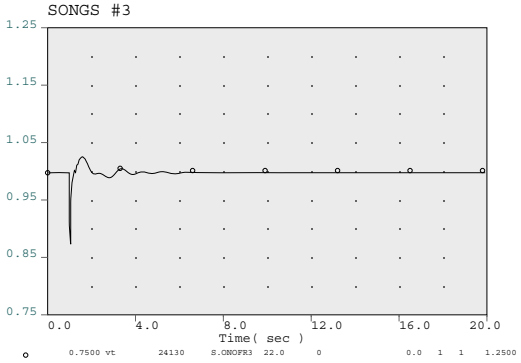
Palo Verde #1



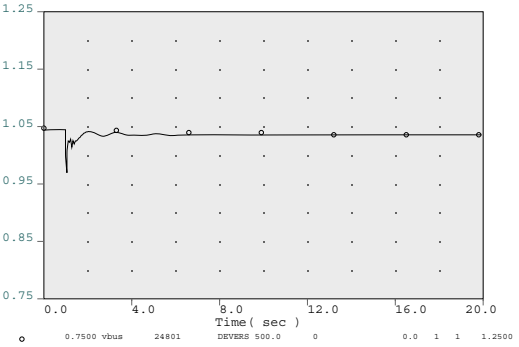
N Gila 500kV



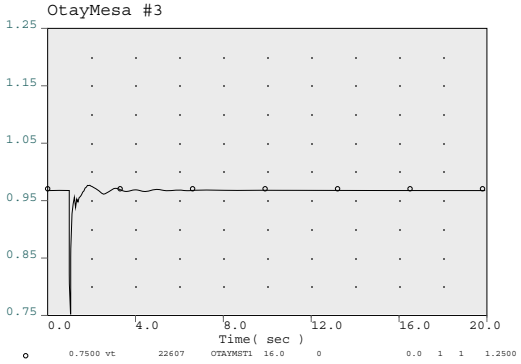
SONGS #3



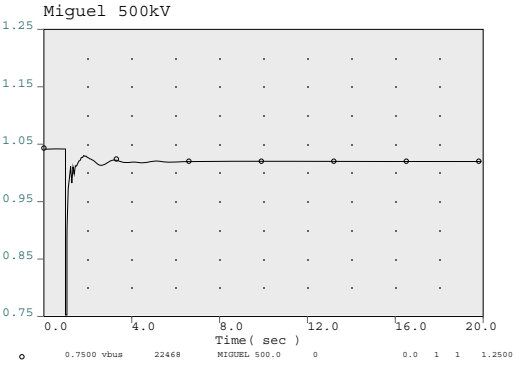
Devers 500



OtayMesa #3



Miguel 500kV



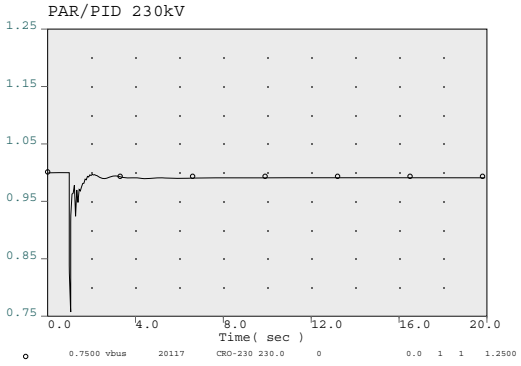
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Page 2

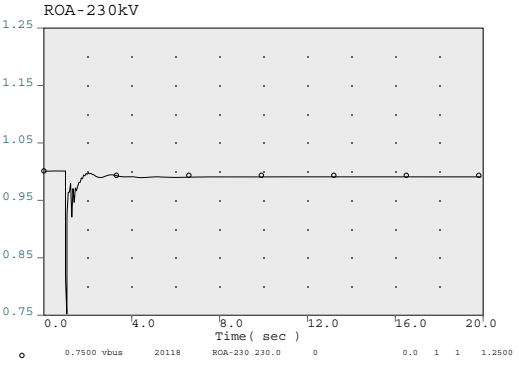
SDGE	ML_Wnd_noRAS_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:29:33 2010

Affected System Voltage Check and Comparison

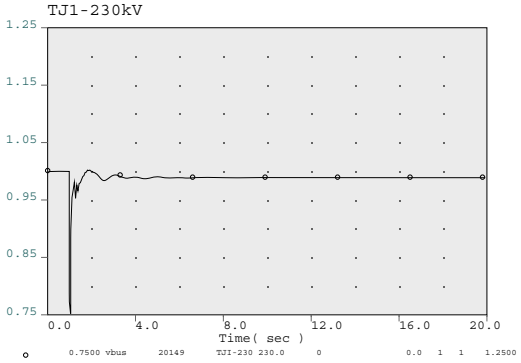
PAR/PID 230kV



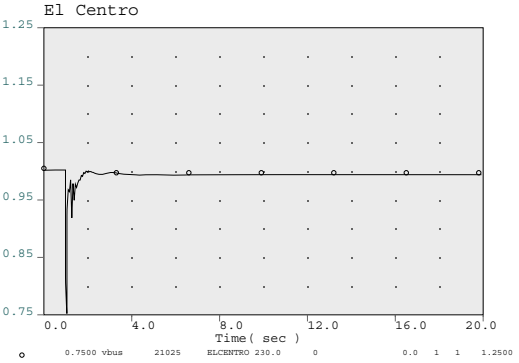
ROA-230kV



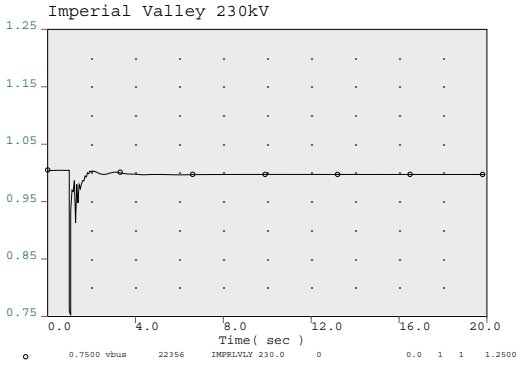
TJ1-230kV



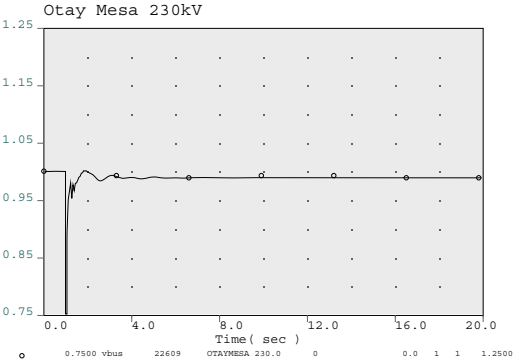
El Centro



Imperial Valley 230kV

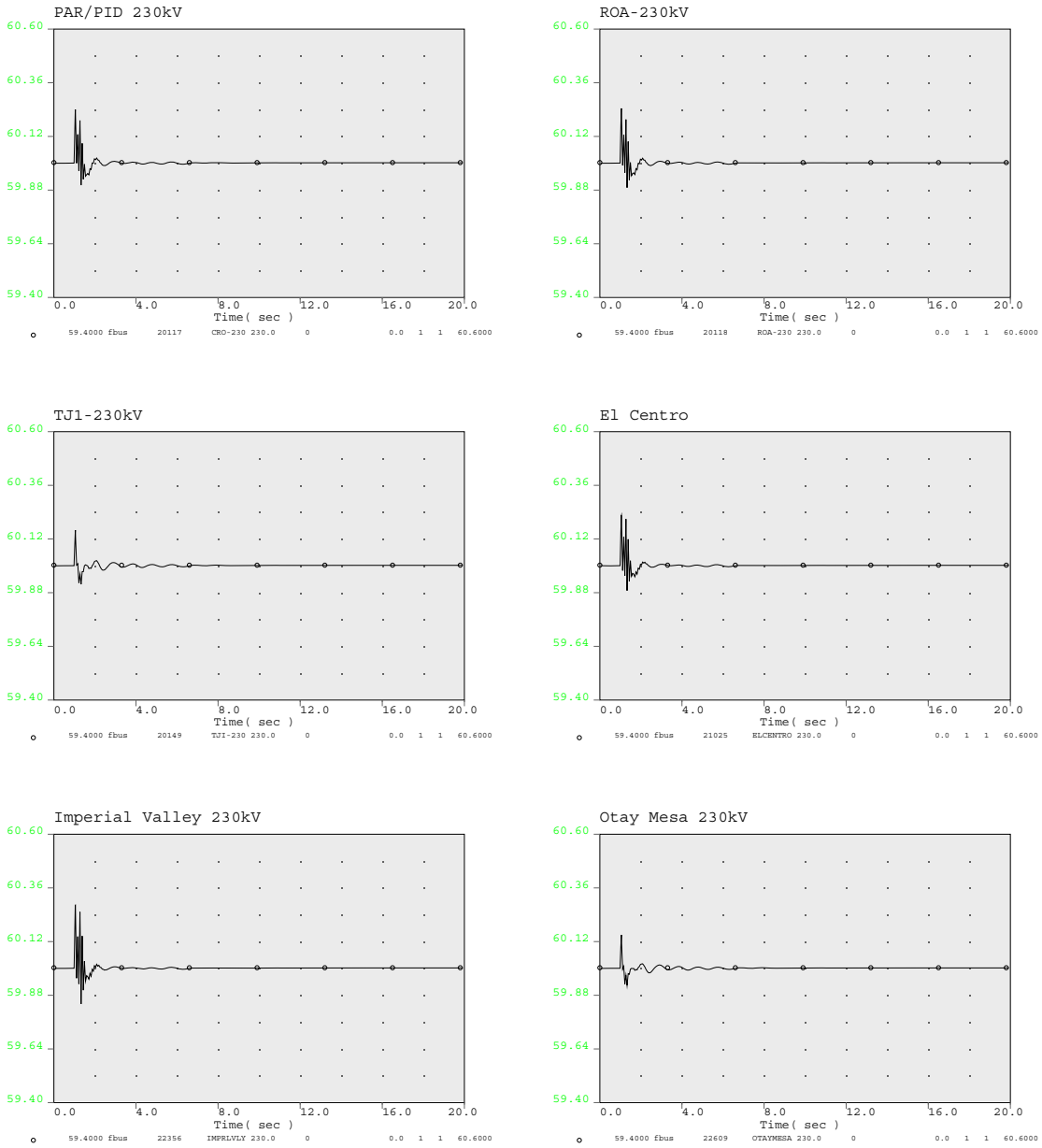


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

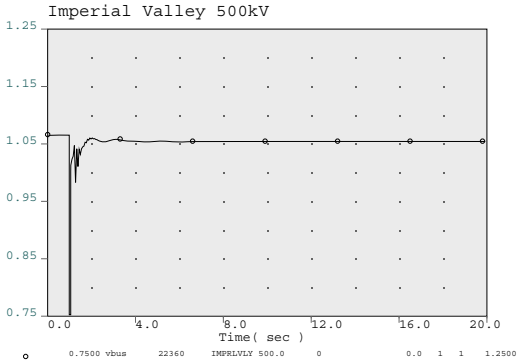
Affected System Frequency Check and Comparison



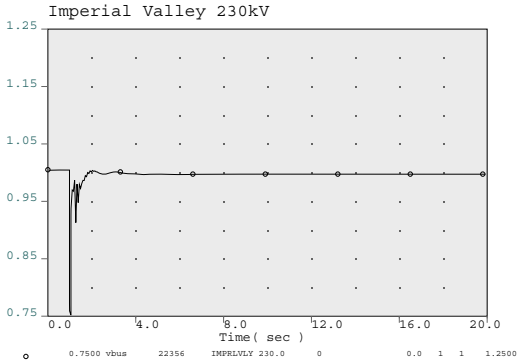
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

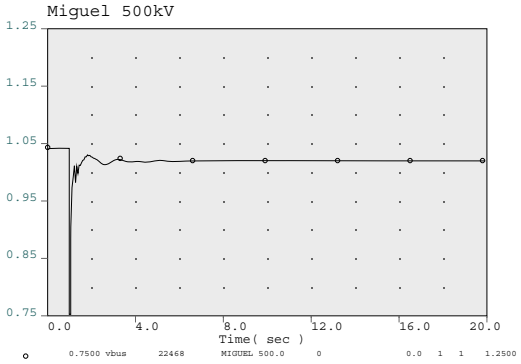
Imperial Valley 500kV



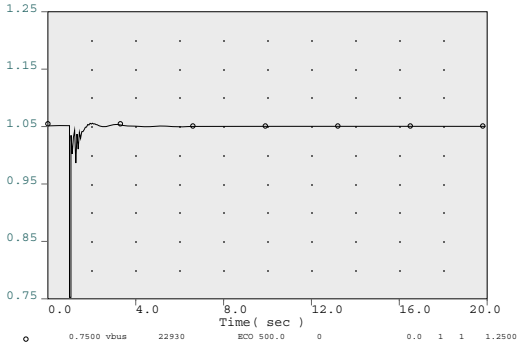
Imperial Valley 230kV



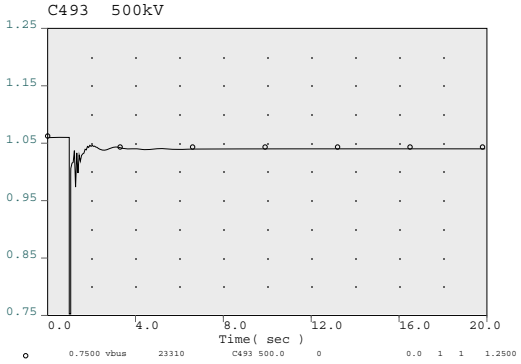
Miguel 500kV



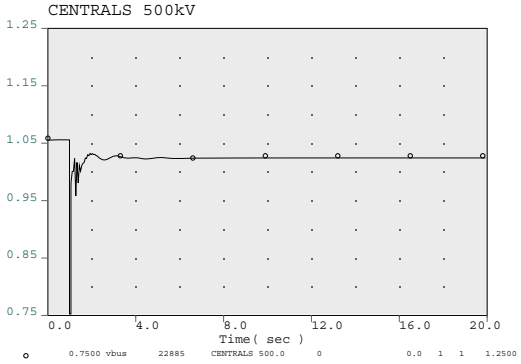
Windfarms 500



C493 500kV

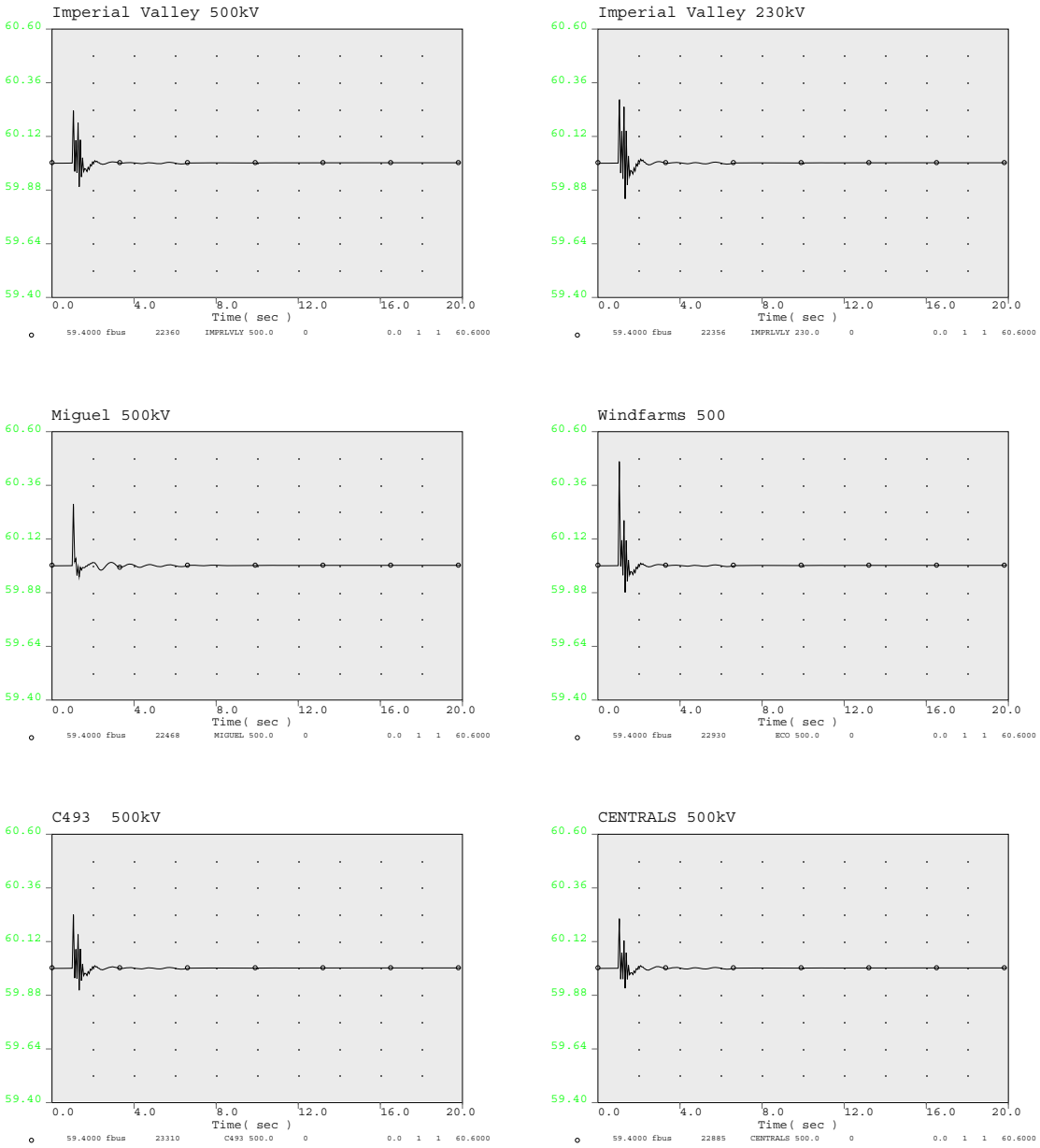


CENTRALS 500kV



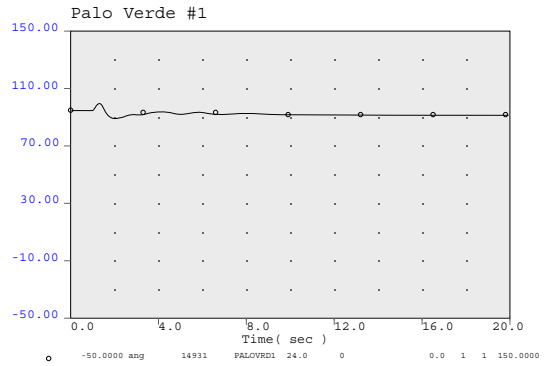
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

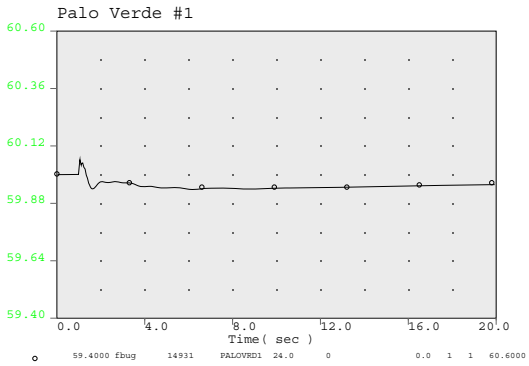
Imperial Valley Area - Frequency

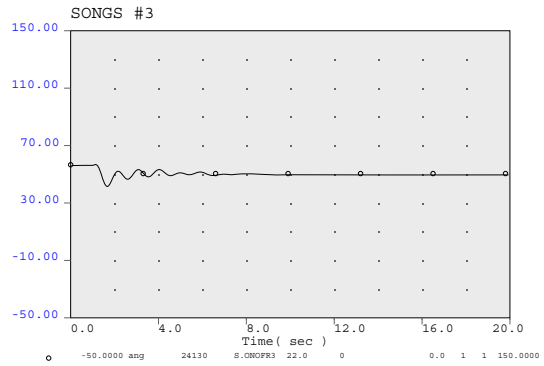


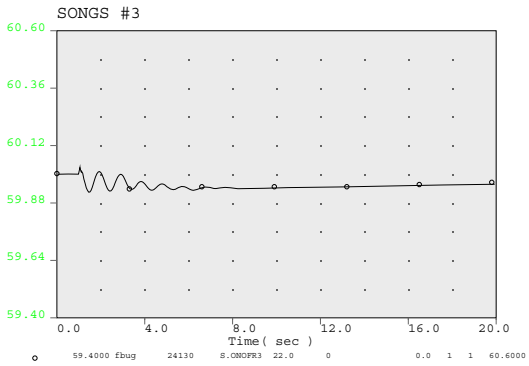
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

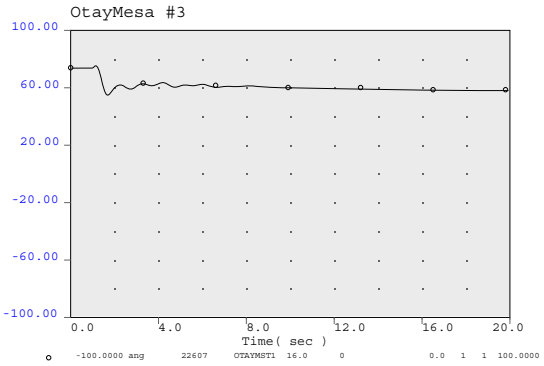
RELATIVE ROTOR ANGLE & FREQUENCY

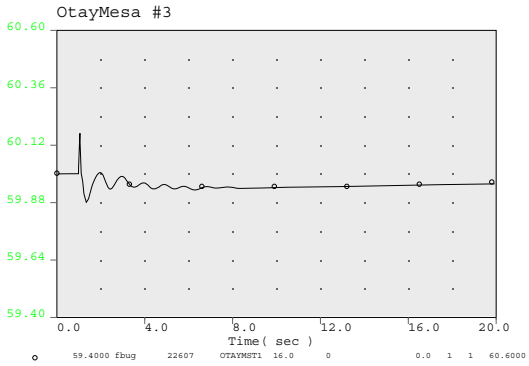










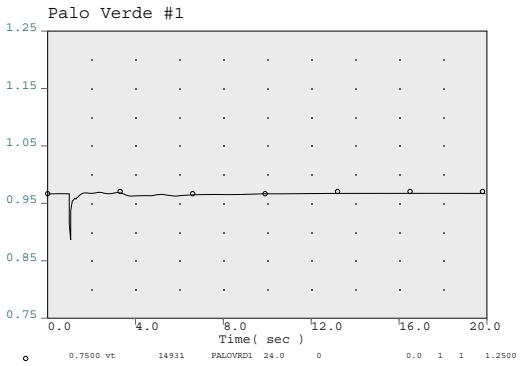


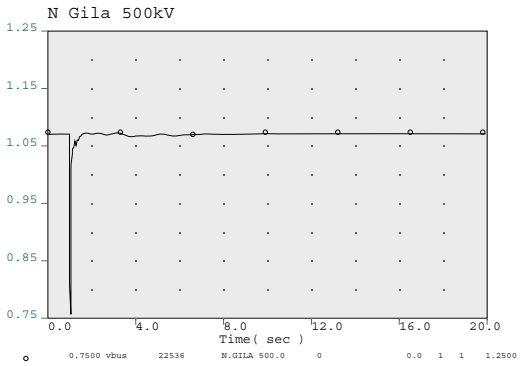
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

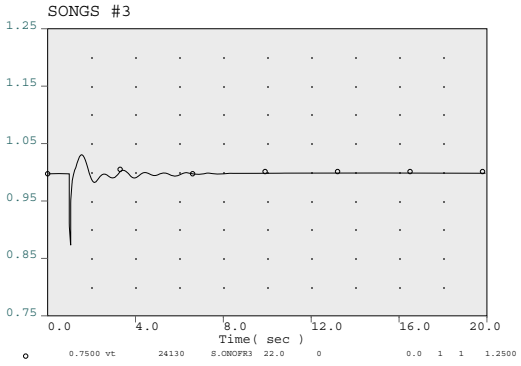
Page 1

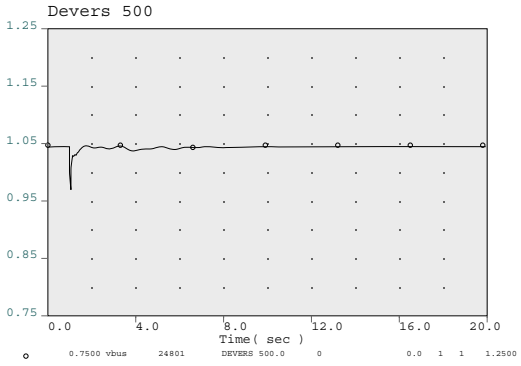
SDGE	ML_Wnd_noXTrp_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:29:54 2010

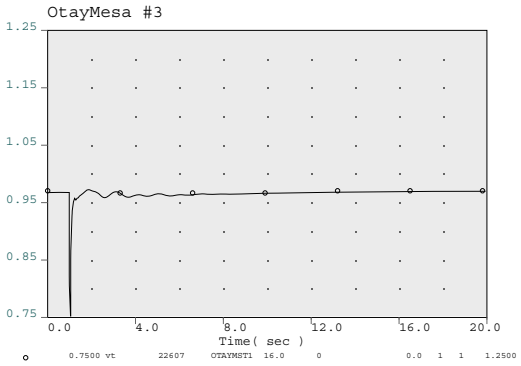
RELATIVE VOLTAGE

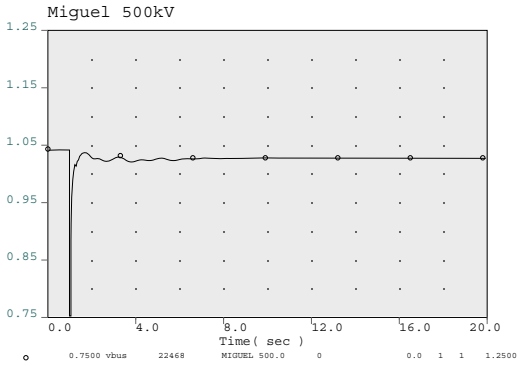








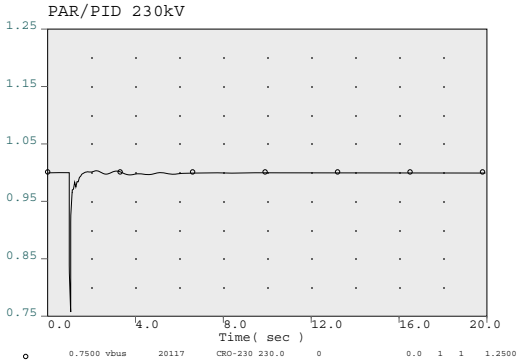




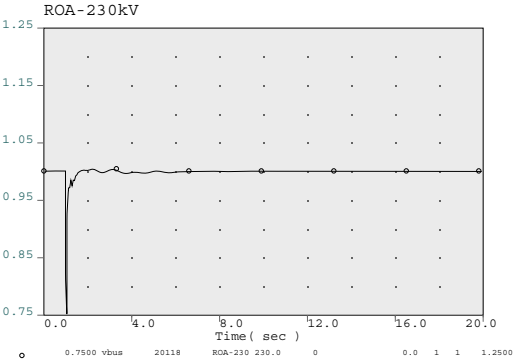
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

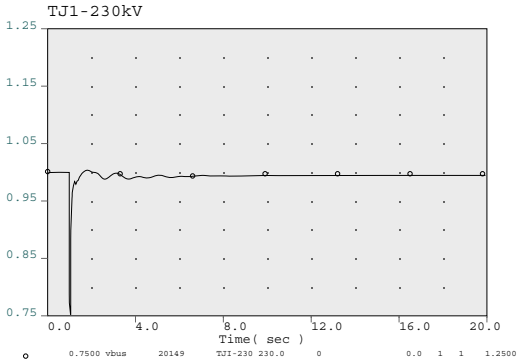
PAR/PID 230kV



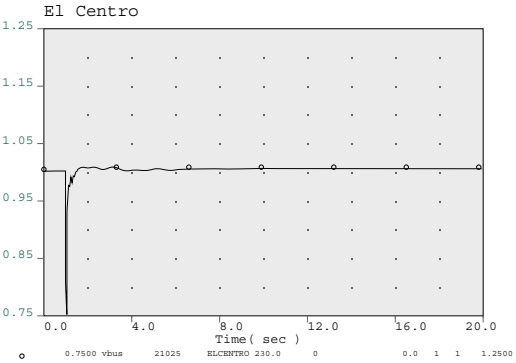
ROA-230kV



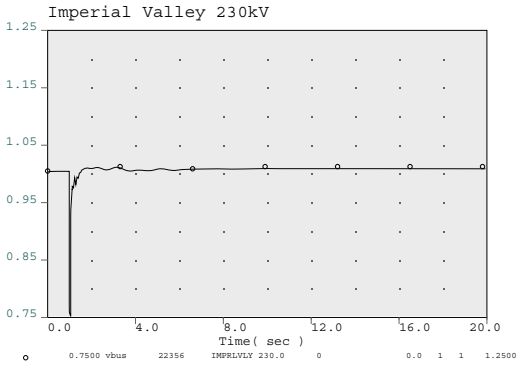
TJ1-230kV



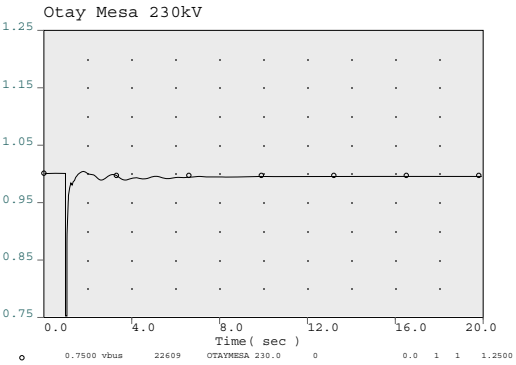
El Centro



Imperial Valley 230kV



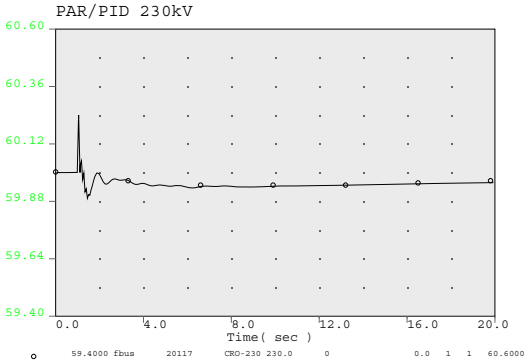
Otay Mesa 230kV



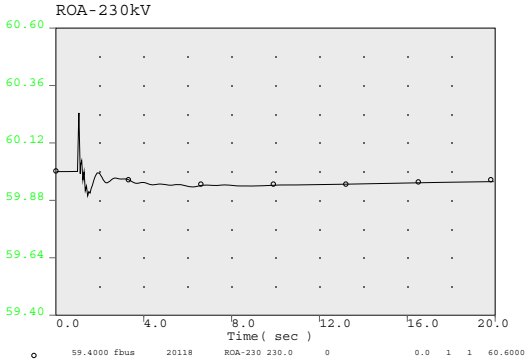
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

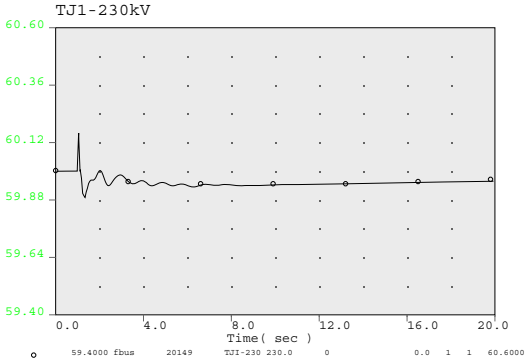
PAR/PID 230kV



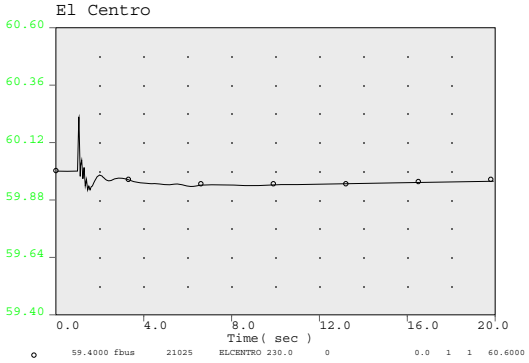
ROA-230kV



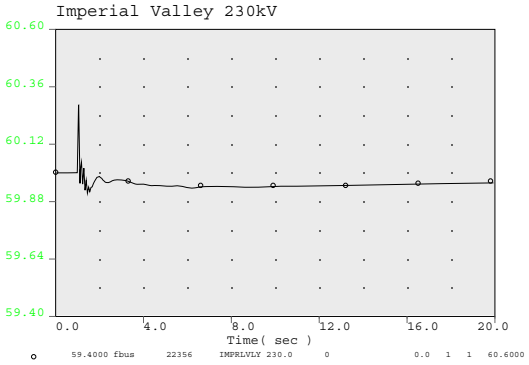
TJ1-230kV



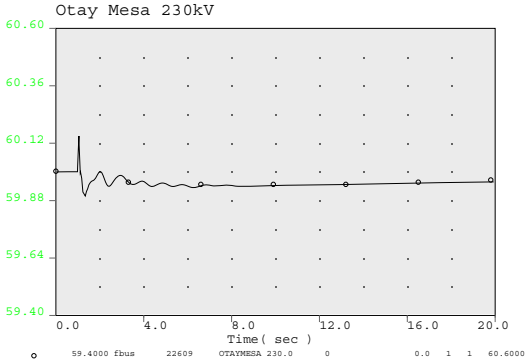
El Centro



Imperial Valley 230kV



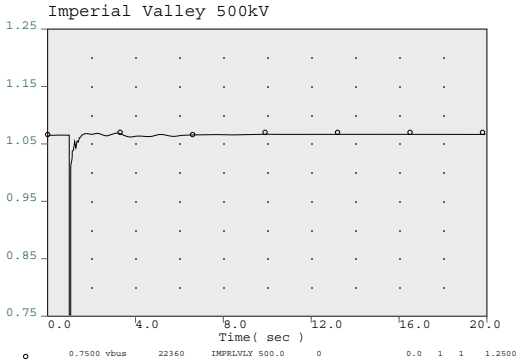
Otay Mesa 230kV



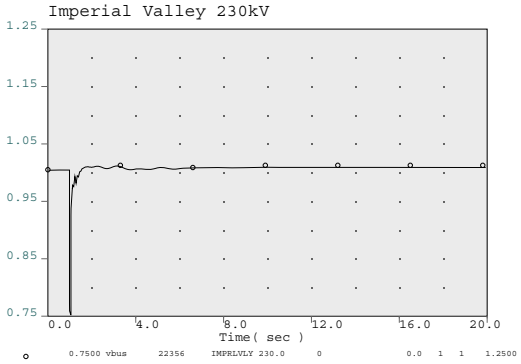
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

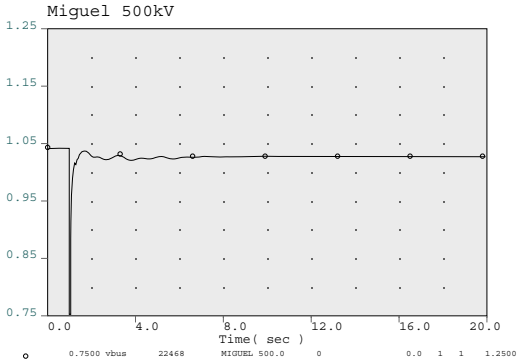
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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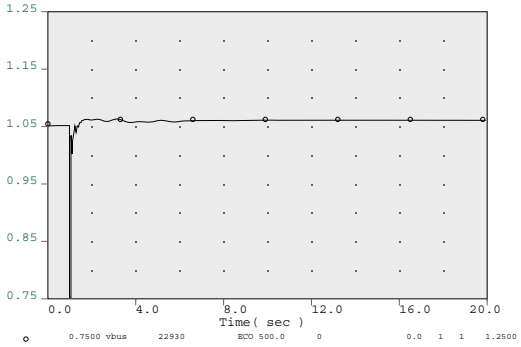
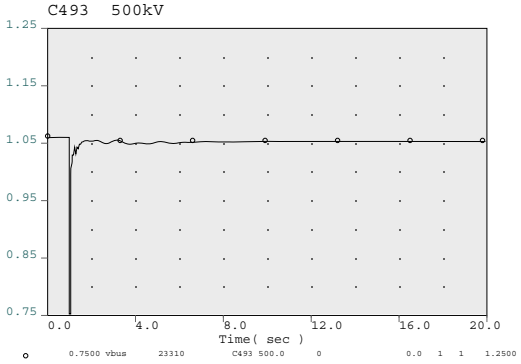
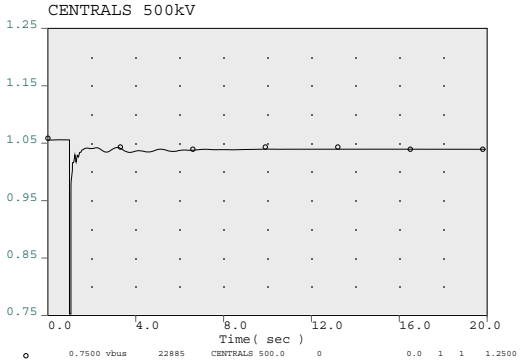


C493 500kV

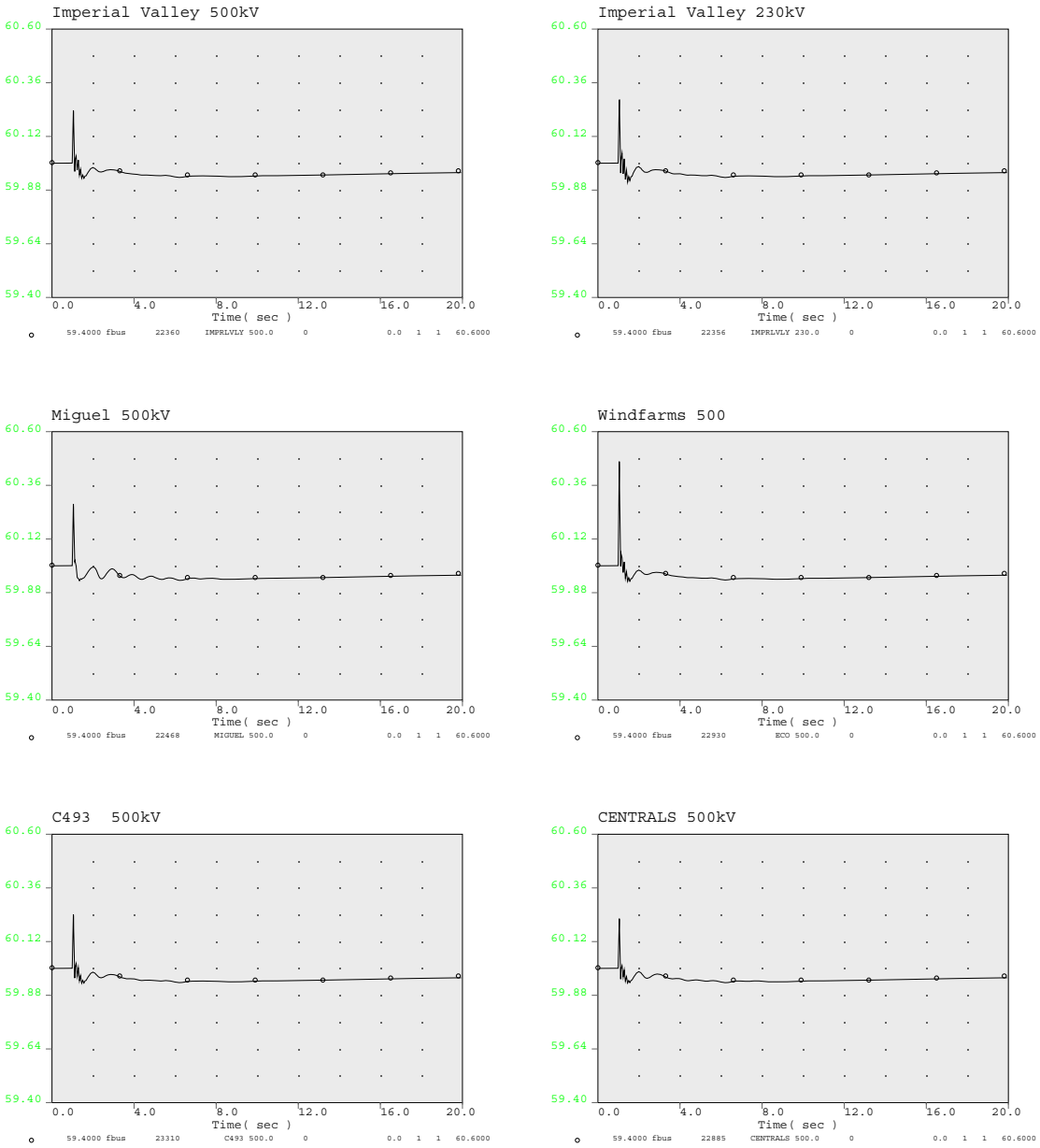


CENTRALS 500kV



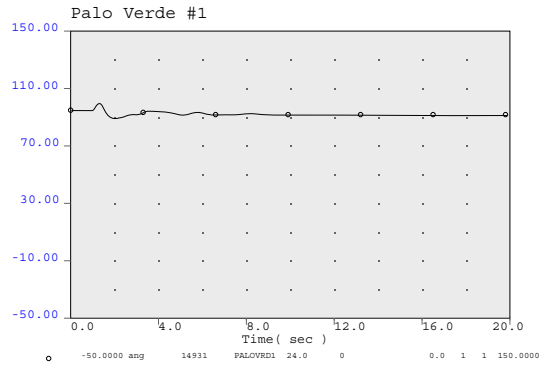
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

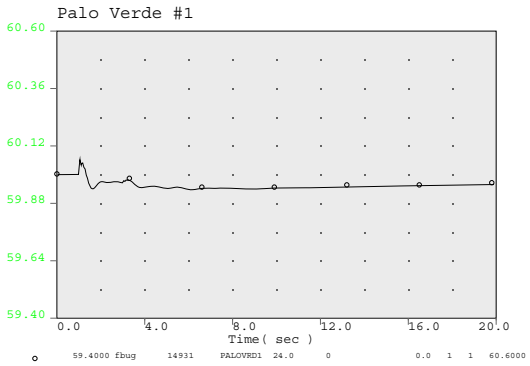
Imperial Valley Area - Frequency

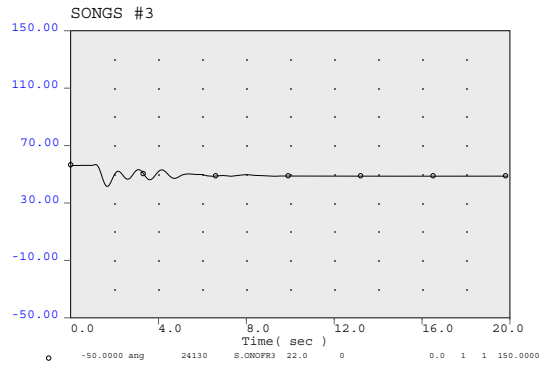


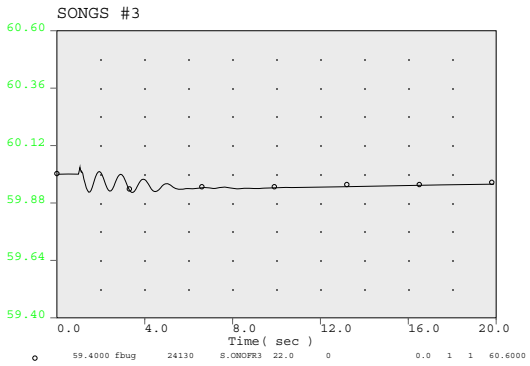
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

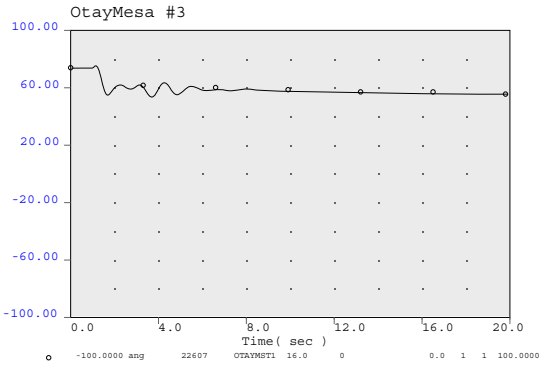
RELATIVE ROTOR ANGLE & FREQUENCY

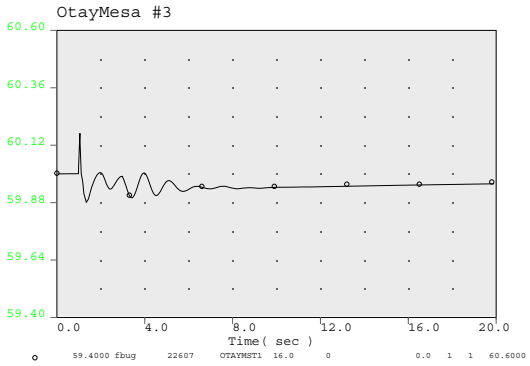












SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

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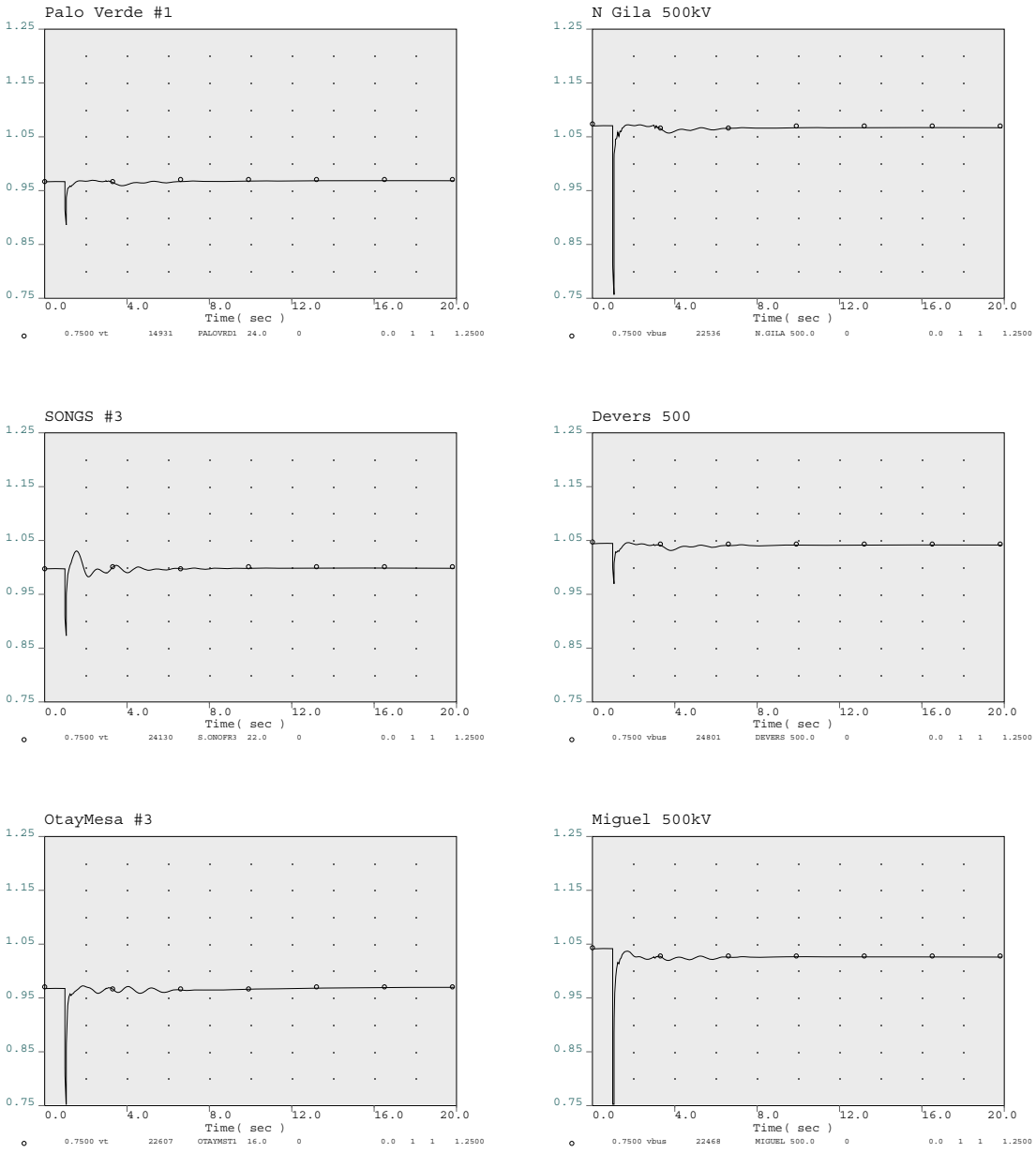
ML_Wnd_RAS_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:30:18 2010

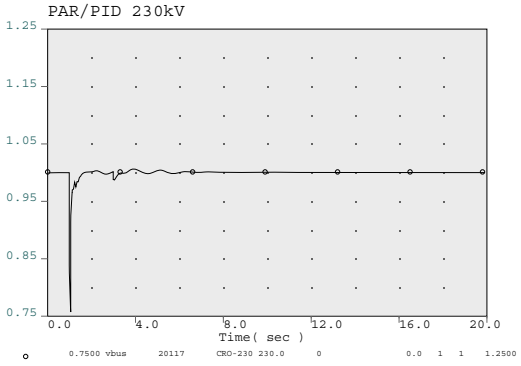
RELATIVE VOLTAGE



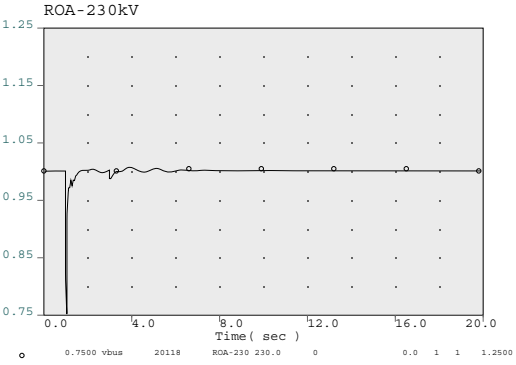
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

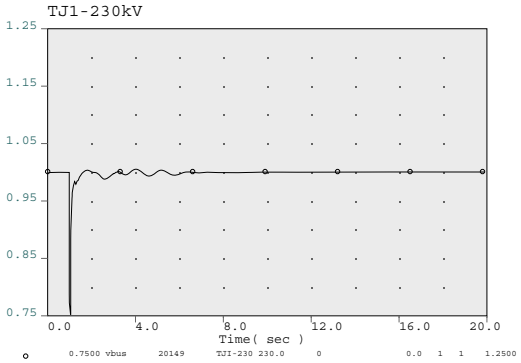
PAR/PID 230kV



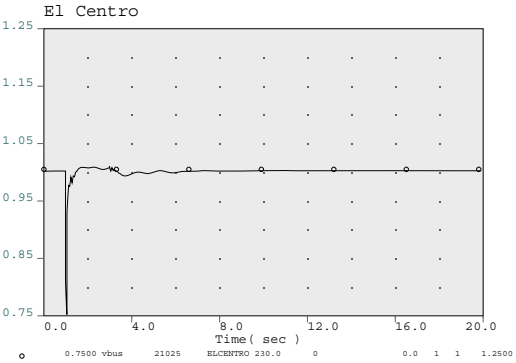
ROA-230kV



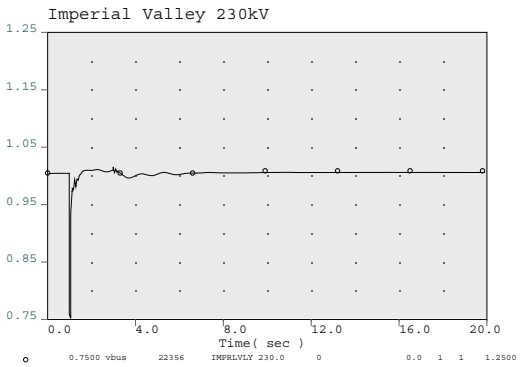
TJ1-230kV



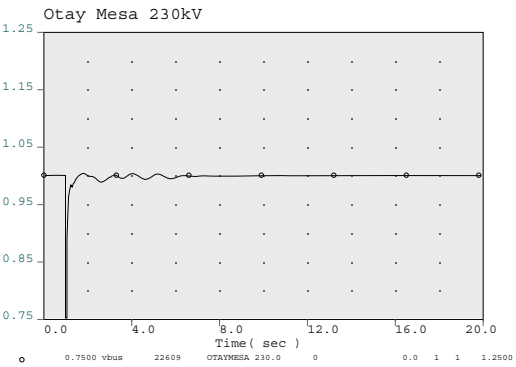
El Centro



Imperial Valley 230kV

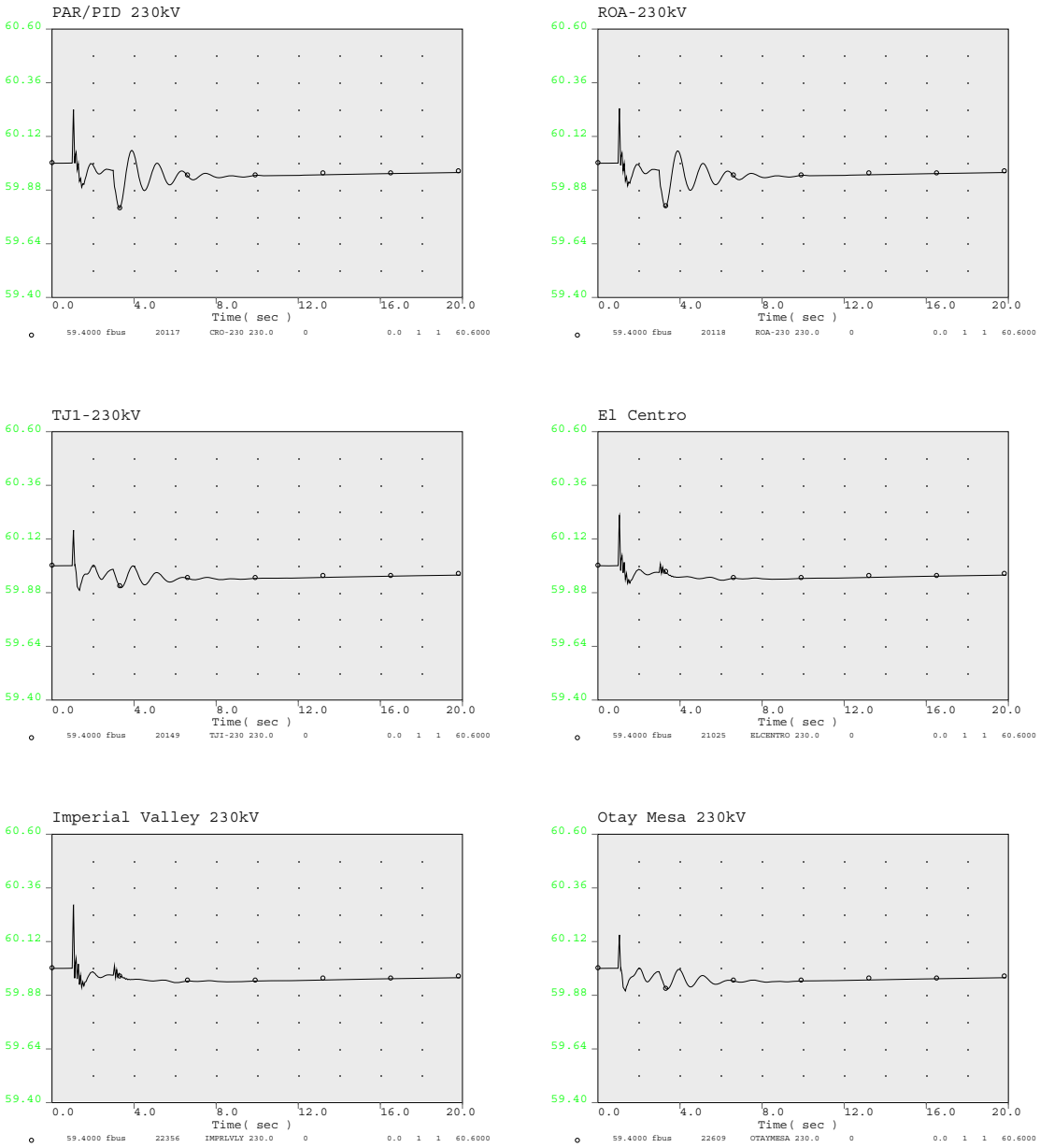


Otay Mesa 230kV



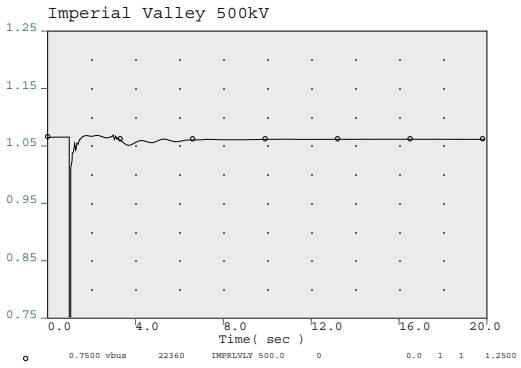
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

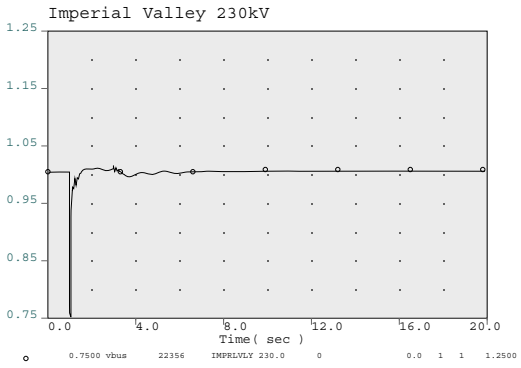
Affected System Frequency Check and Comparison

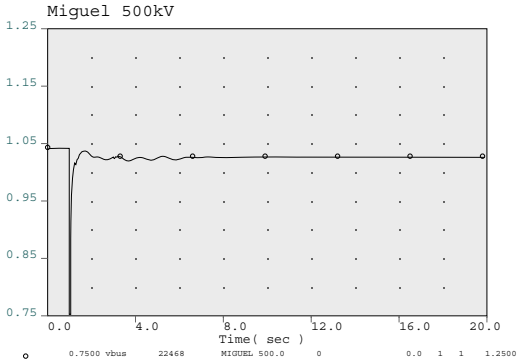


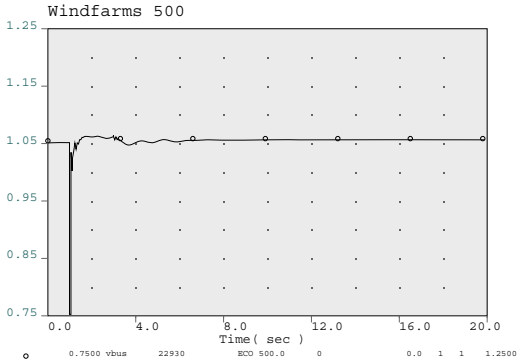
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

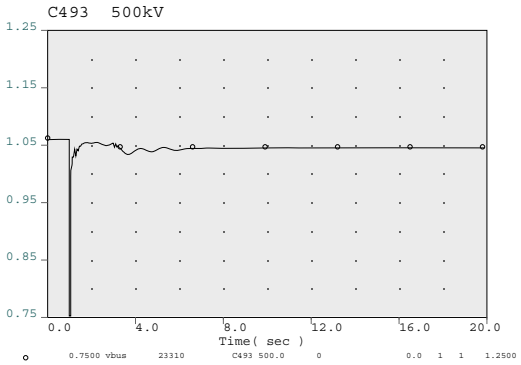
Imperial Valley Area - VOLTAGE

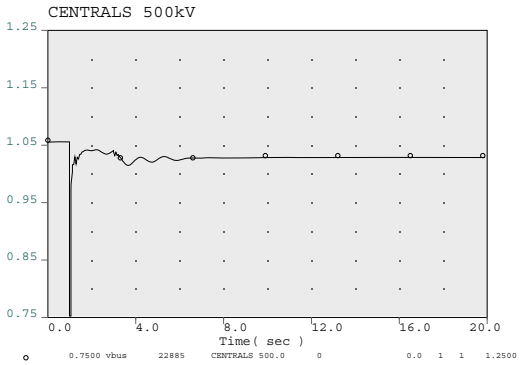












SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

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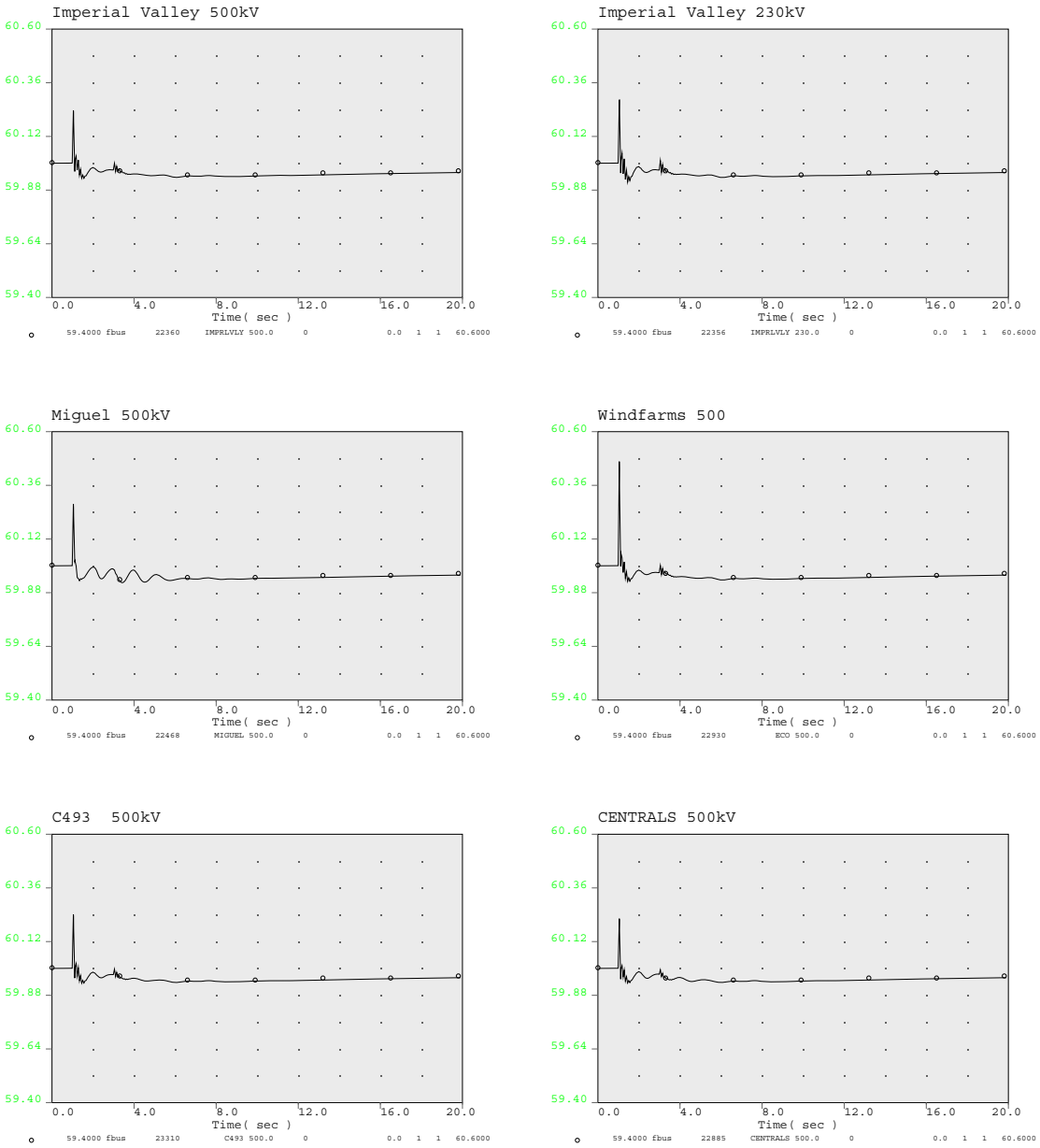
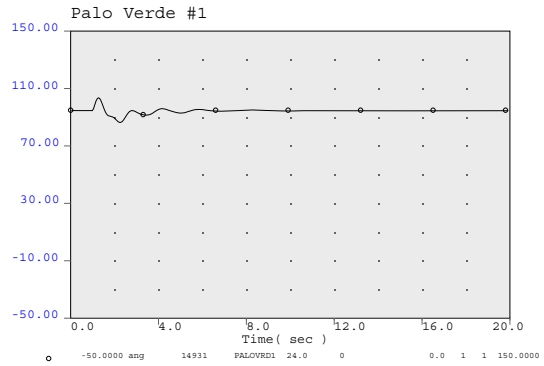
SDGE	ML_Wnd_RAS_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:30:18 2010

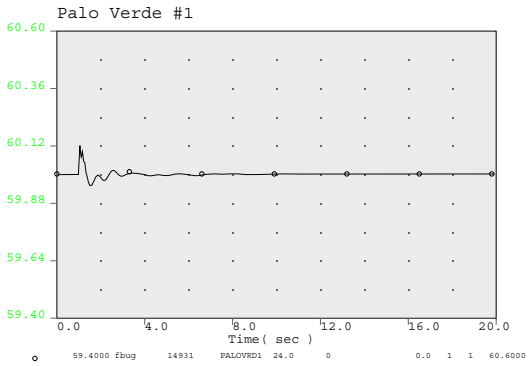
Imperial Valley Area - Frequency

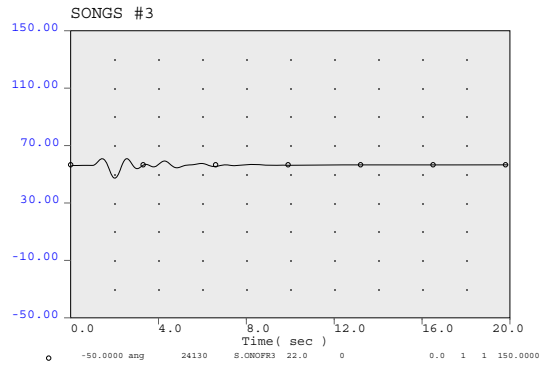


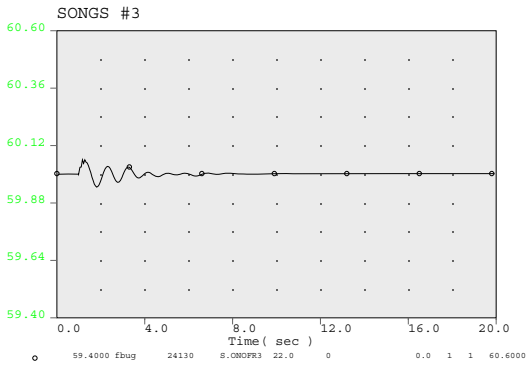
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

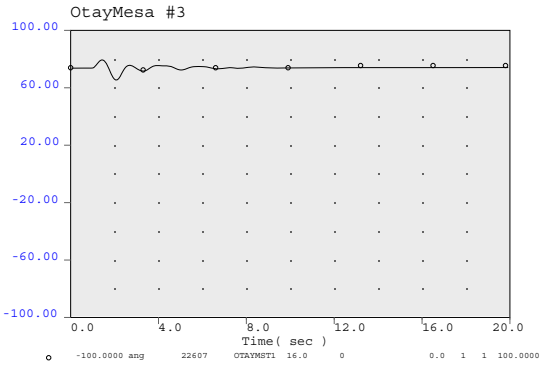
RELATIVE ROTOR ANGLE & FREQUENCY

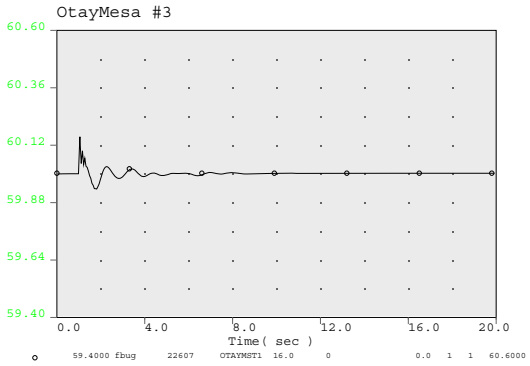












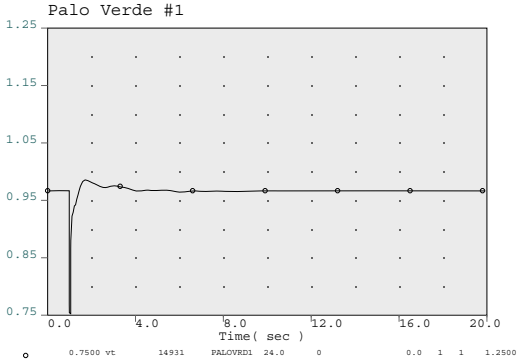
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Page 1

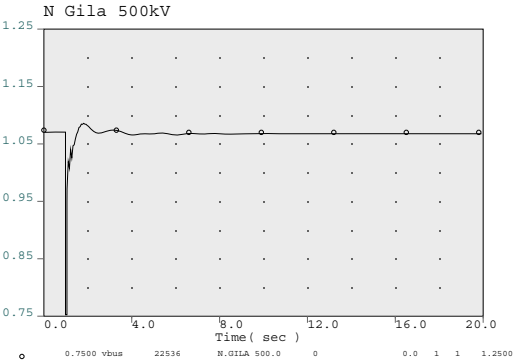
SDGE	NGila_IV_slo_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:33:11 2010

RELATIVE VOLTAGE

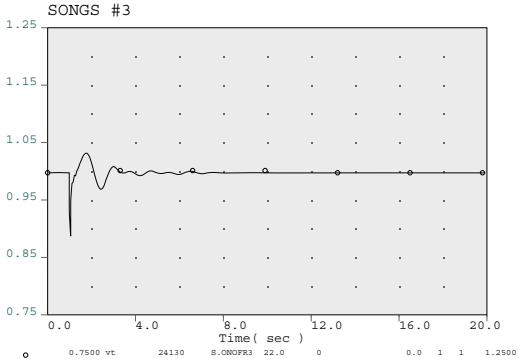
Palo Verde #1



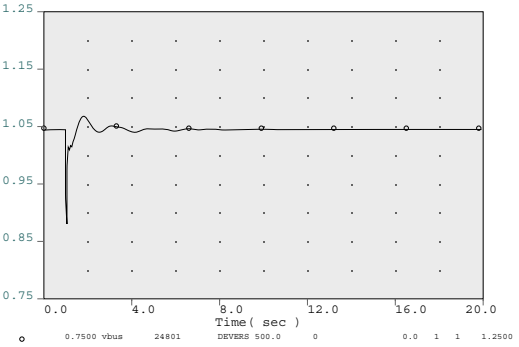
N Gila 500kV



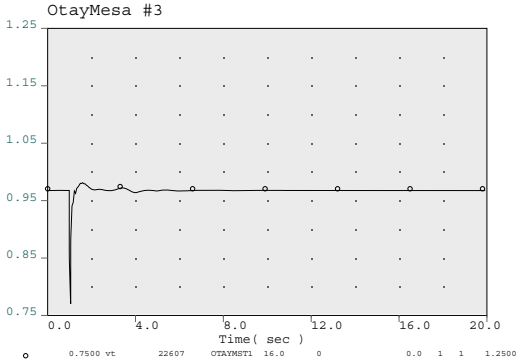
SONGS #3



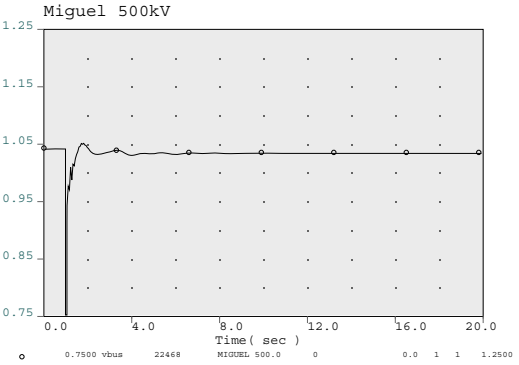
Devers 500



OtayMesa #3



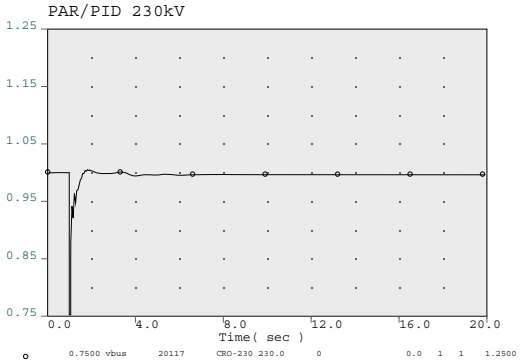
Miguel 500kV



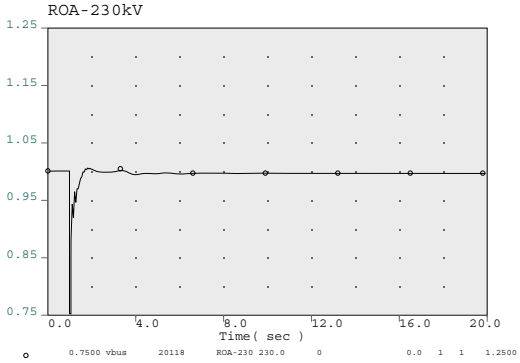
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

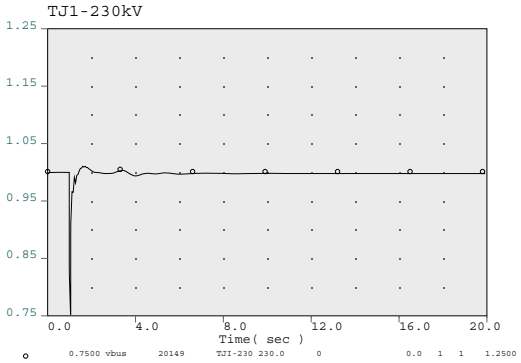
PAR/PID 230kV



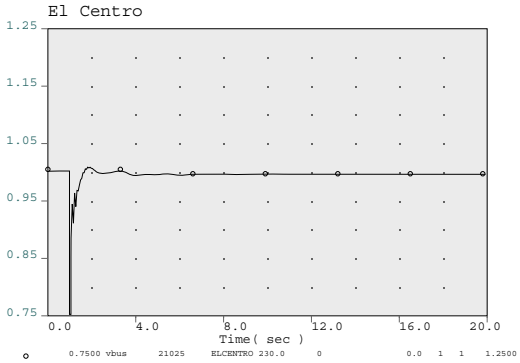
ROA-230kV



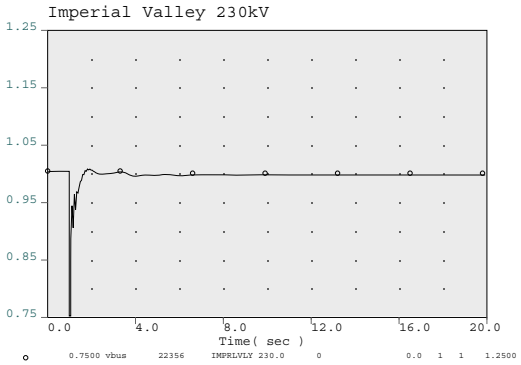
TJ1-230kV



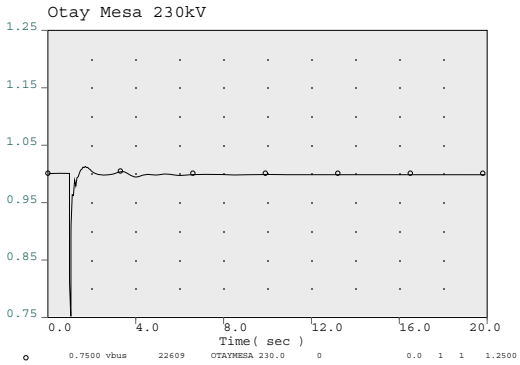
El Centro



Imperial Valley 230kV



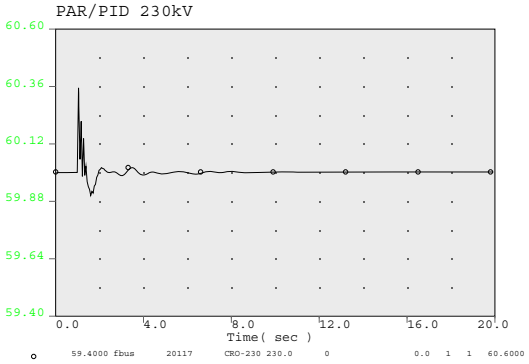
Otay Mesa 230kV



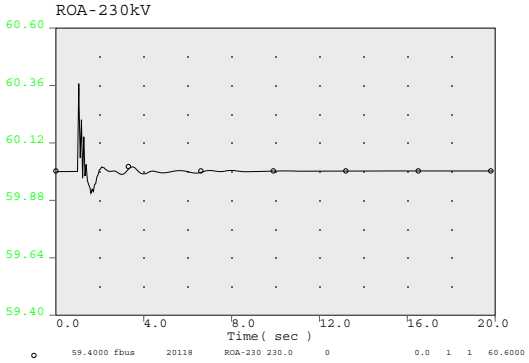
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

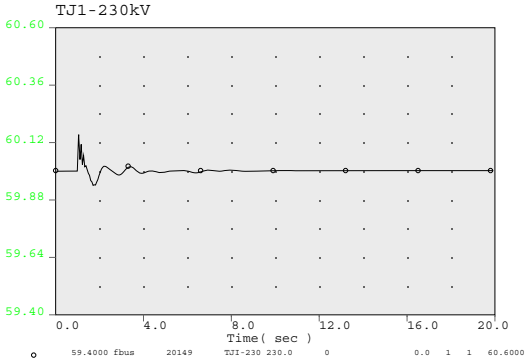
PAR/PID 230kV



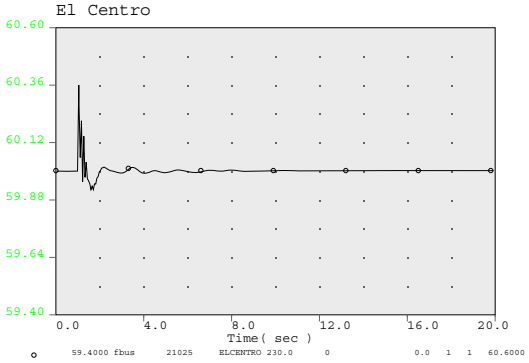
ROA-230kV



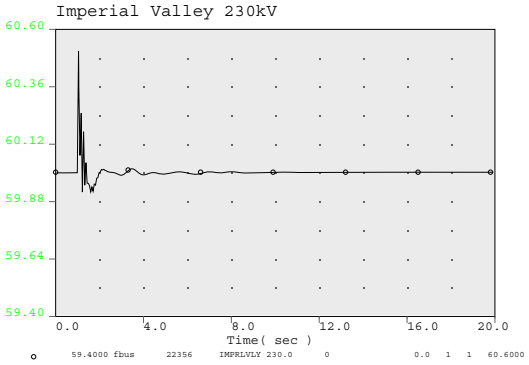
TJ1-230kV



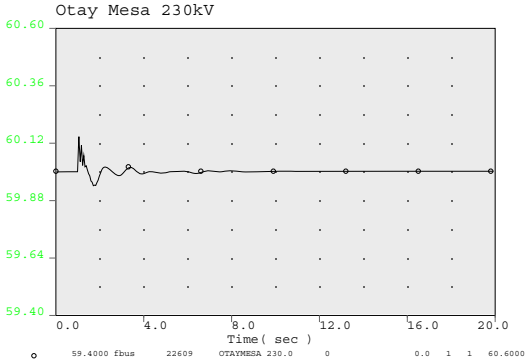
El Centro



Imperial Valley 230kV



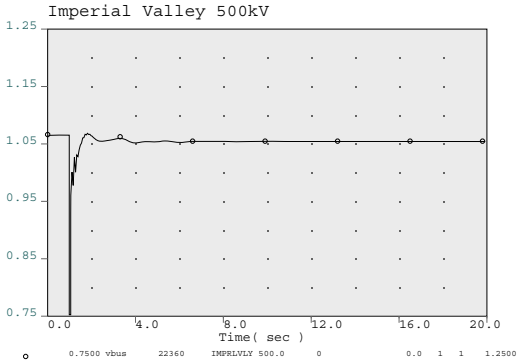
Otay Mesa 230kV



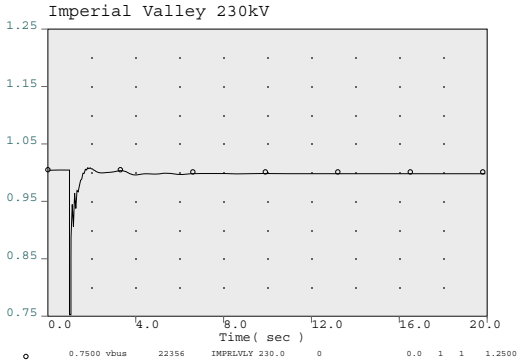
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

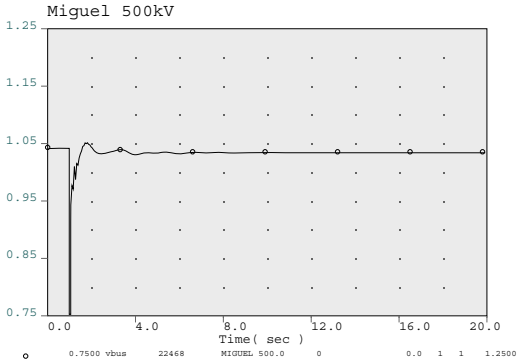
Imperial Valley 500kV



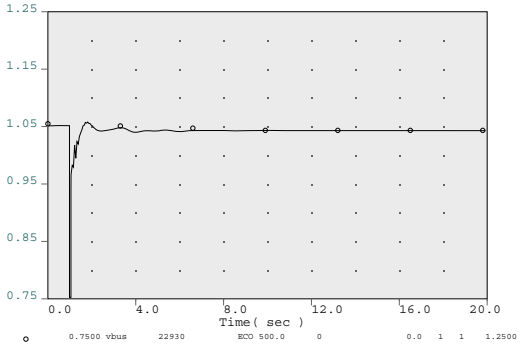
Imperial Valley 230kV



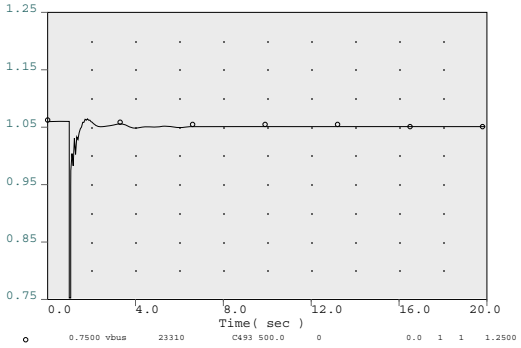
Miguel 500kV



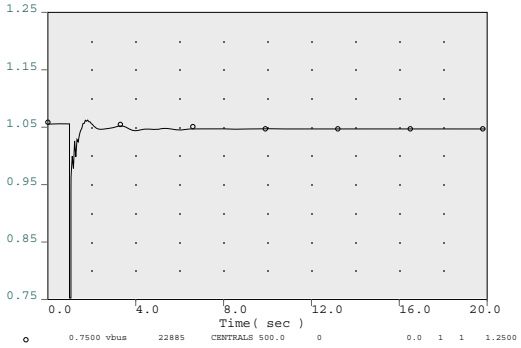
Windfarms 500



C493 500kV



CENTRALS 500kV

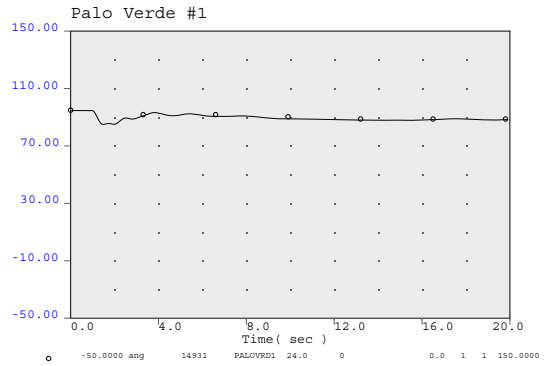


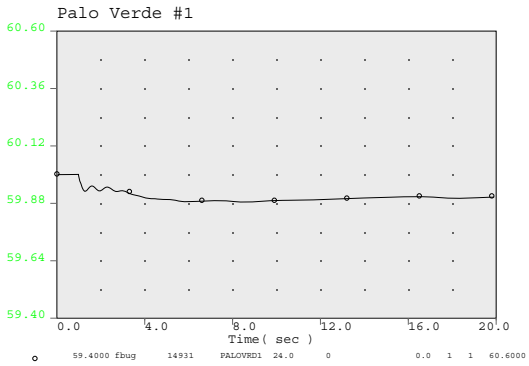
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

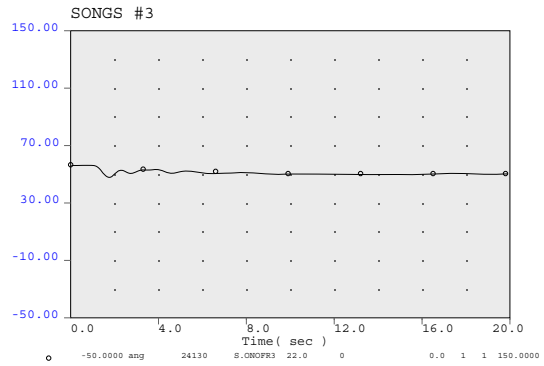
Imperial Valley Area - Frequency

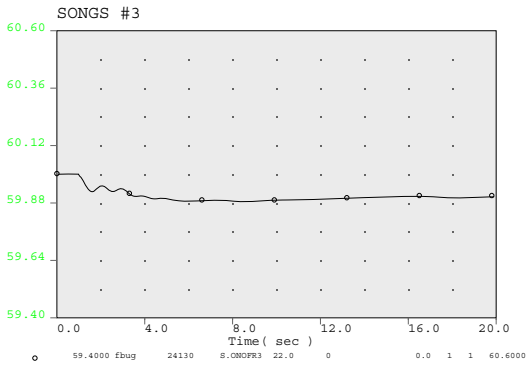
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

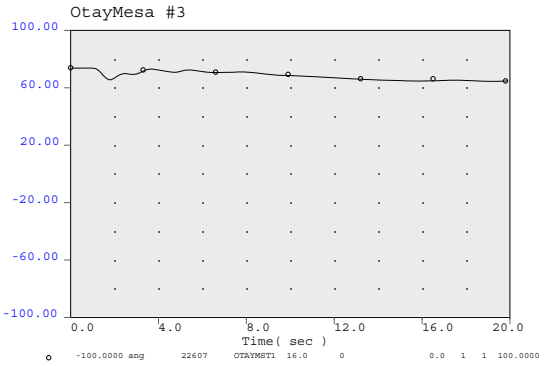
RELATIVE ROTOR ANGLE & FREQUENCY

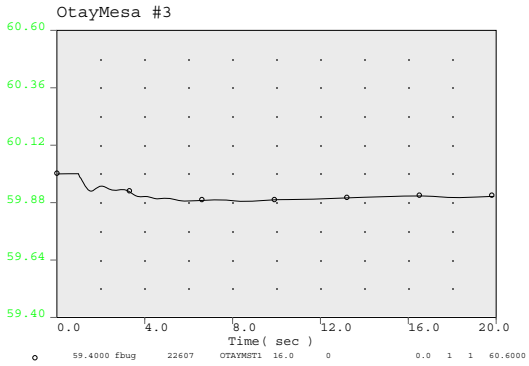










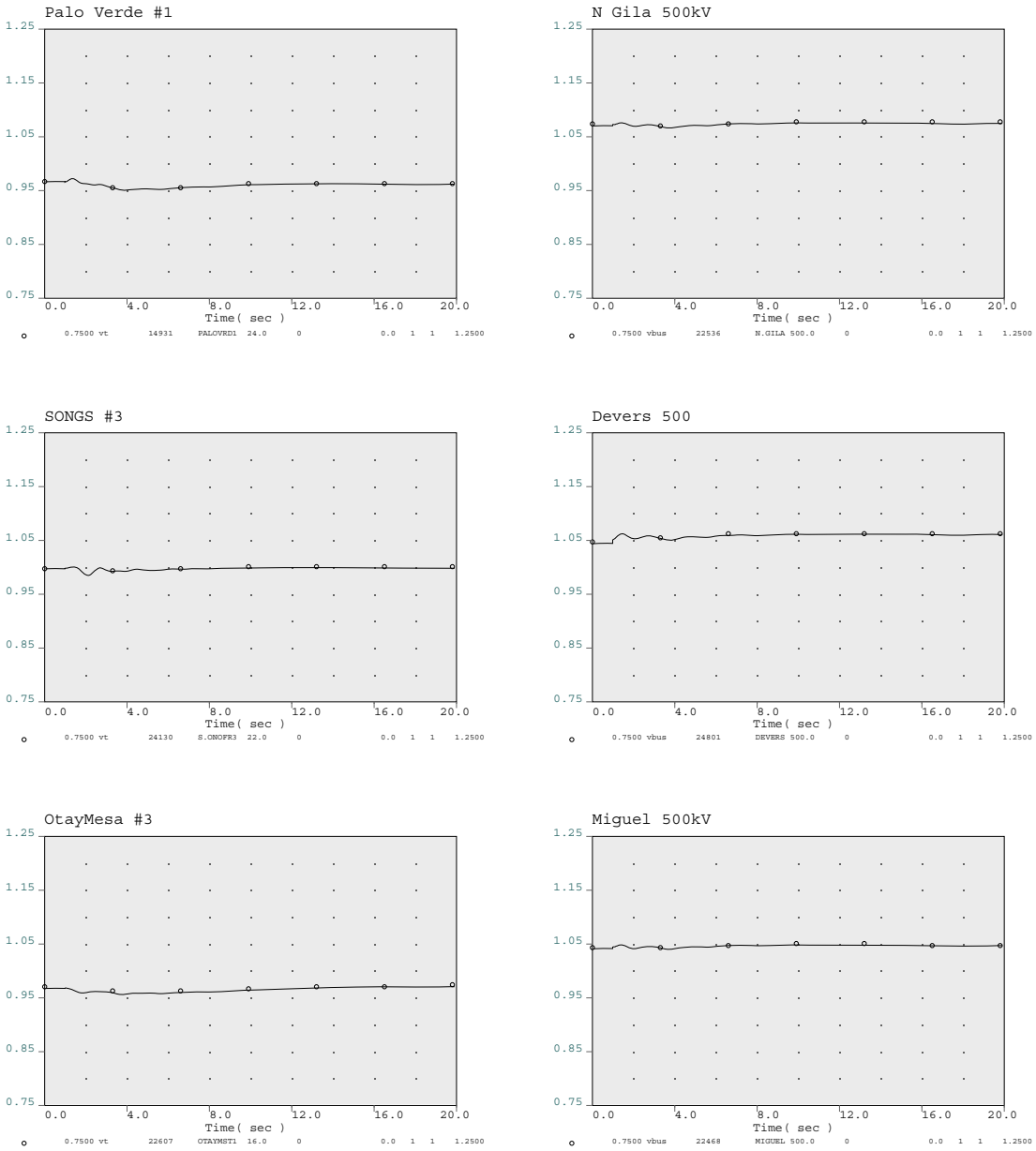


SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Page 1

PaloVerde-g1_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:30:42 2010

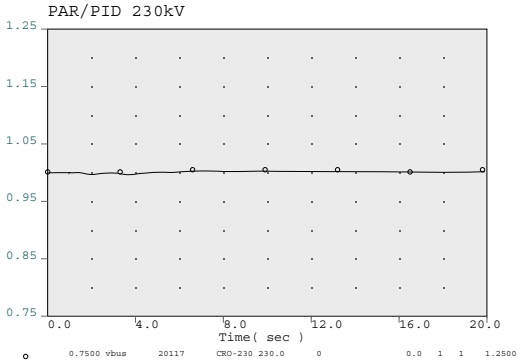
RELATIVE VOLTAGE



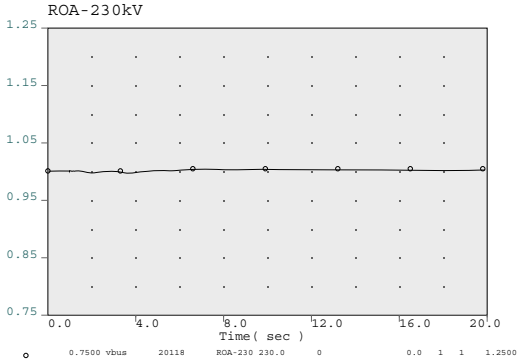
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

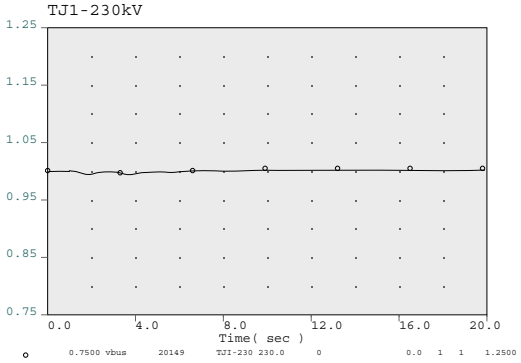
PAR/PID 230kV



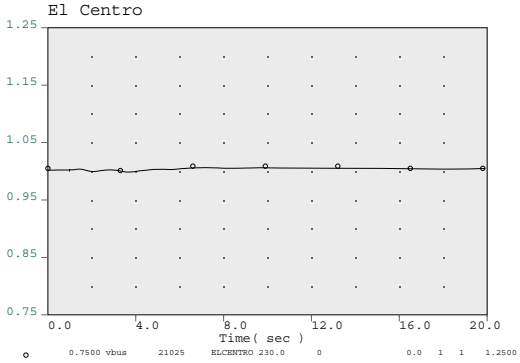
ROA-230kV



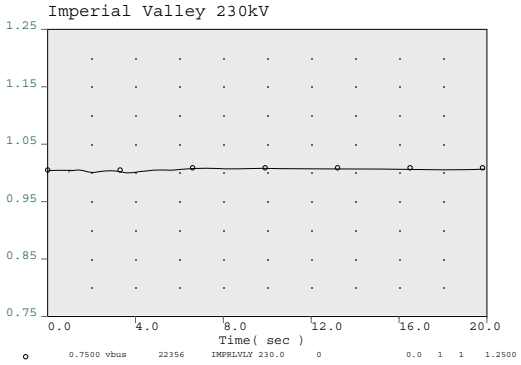
TJ1-230kV



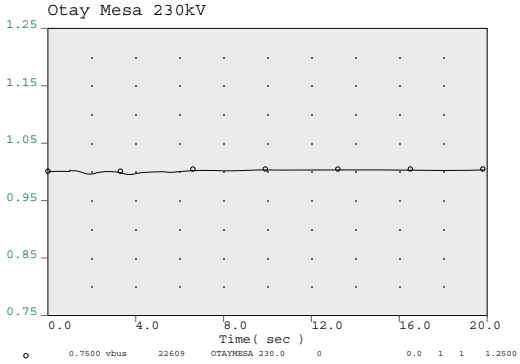
El Centro



Imperial Valley 230kV



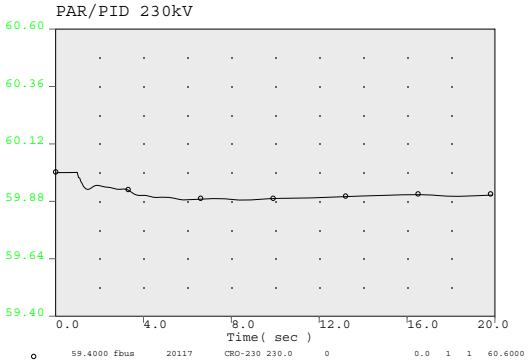
Otay Mesa 230kV



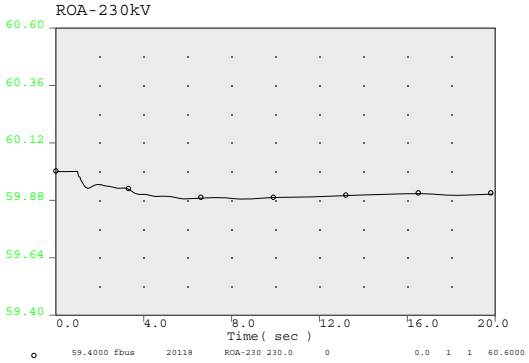
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

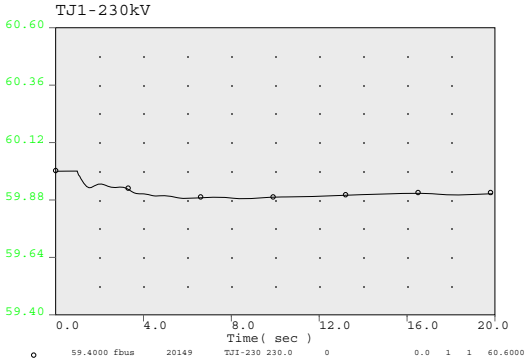
PAR/PID 230kV



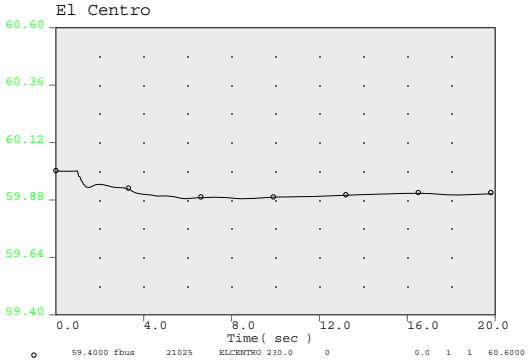
ROA-230kV



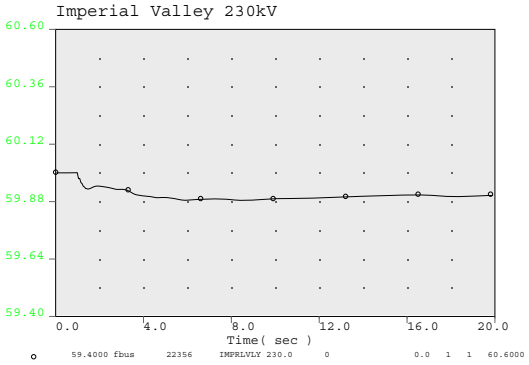
TJ1-230kV



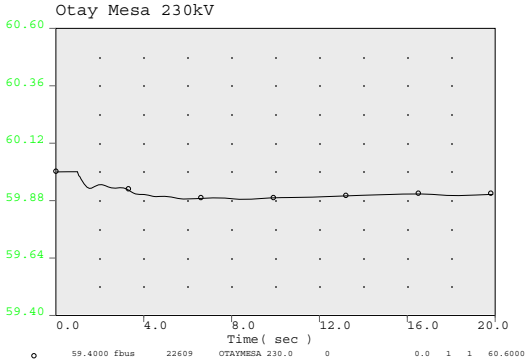
El Centro



Imperial Valley 230kV

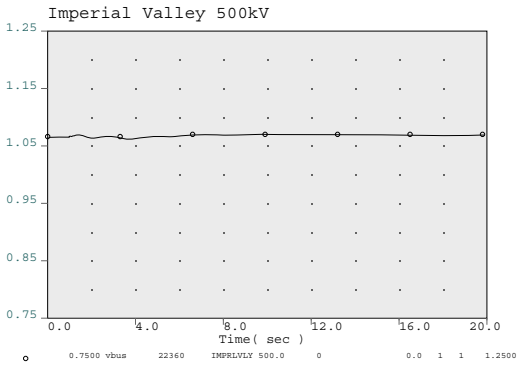


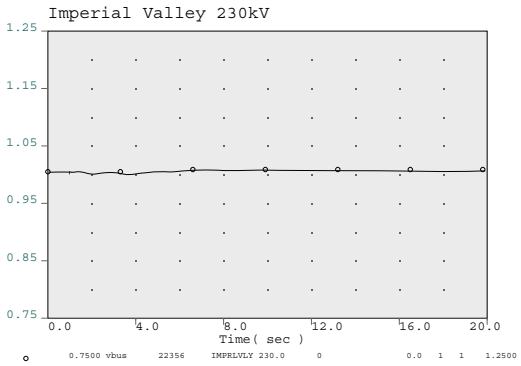
Otay Mesa 230kV

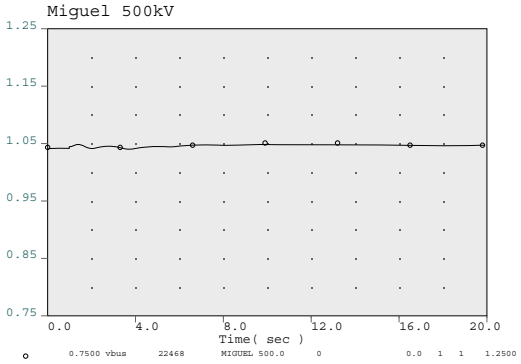


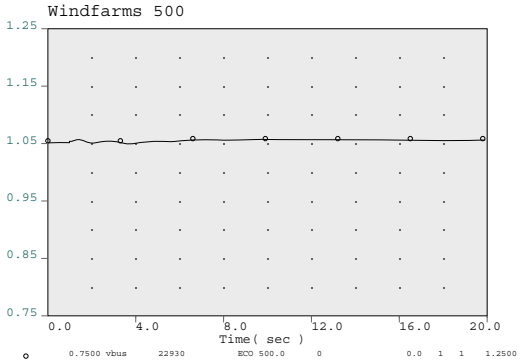
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

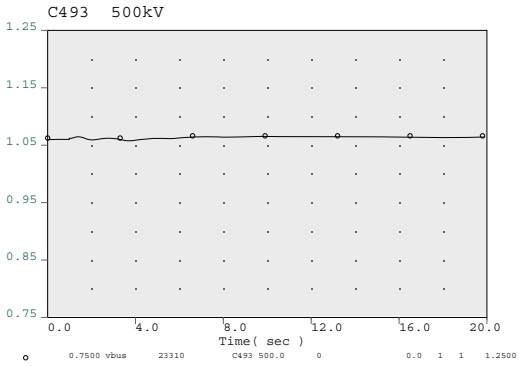
Imperial Valley Area - VOLTAGE

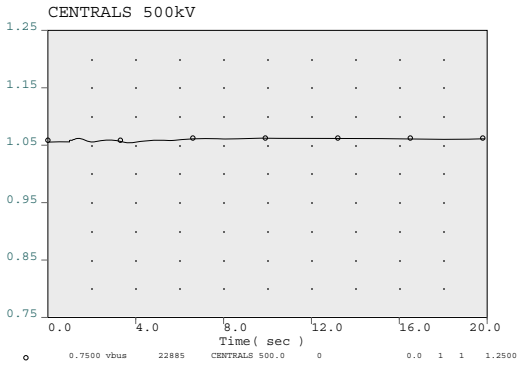






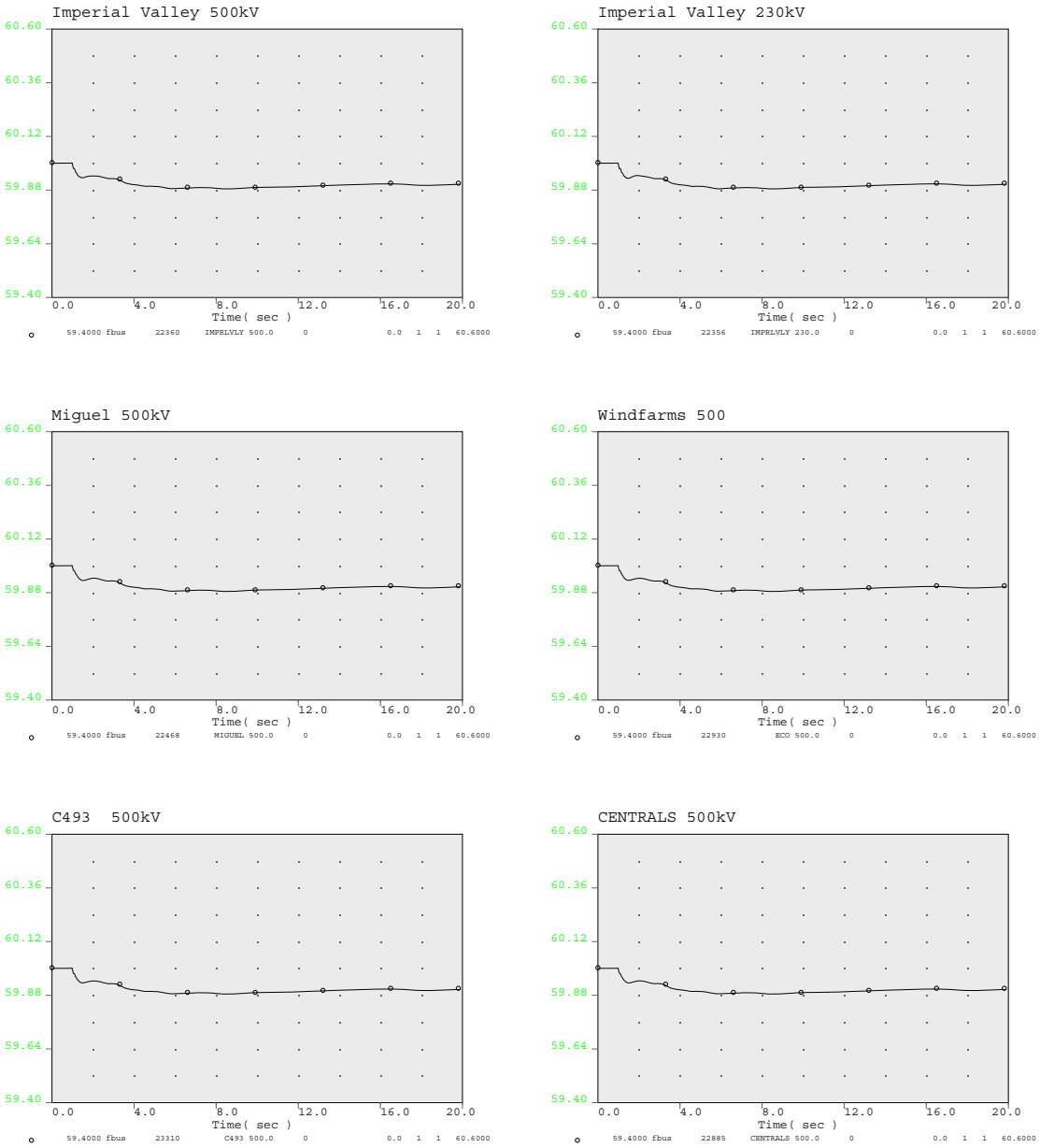






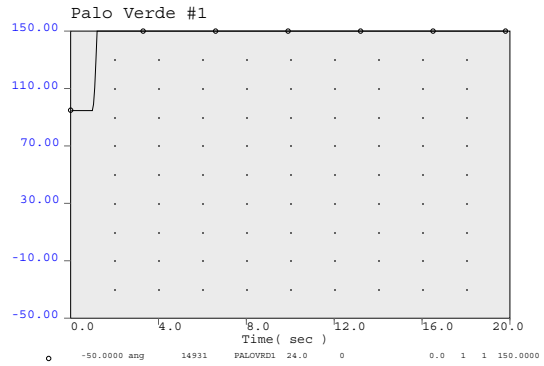
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

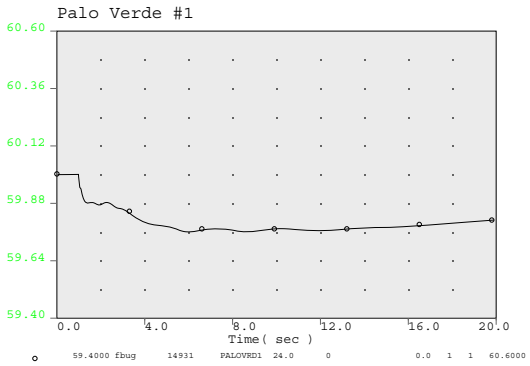
Imperial Valley Area - Frequency

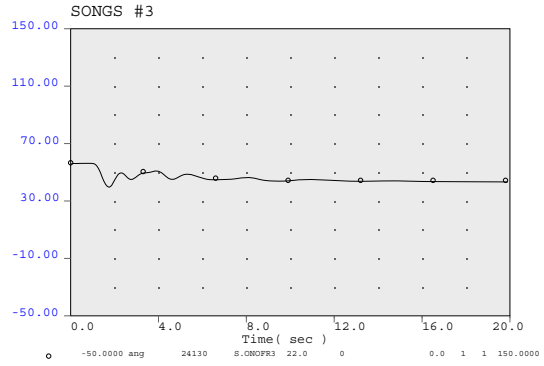


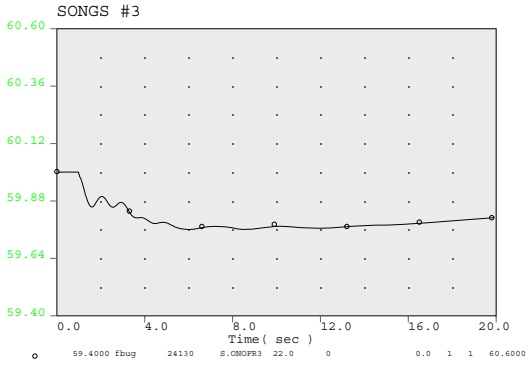
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

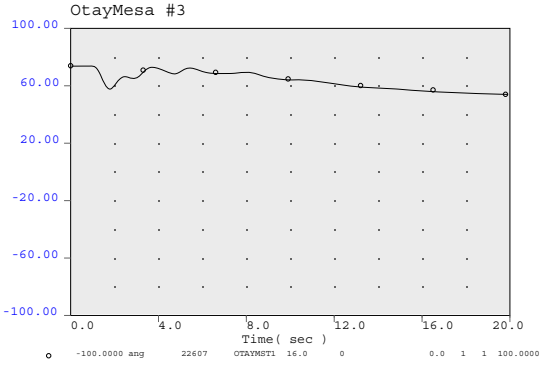
RELATIVE ROTOR ANGLE & FREQUENCY

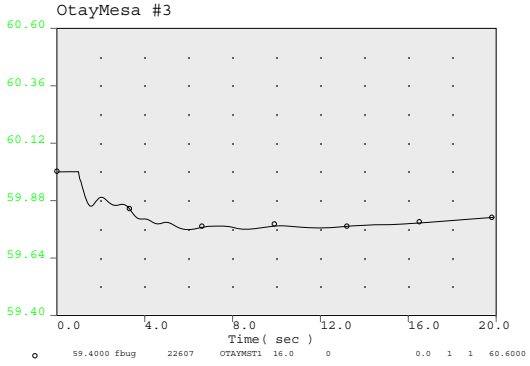












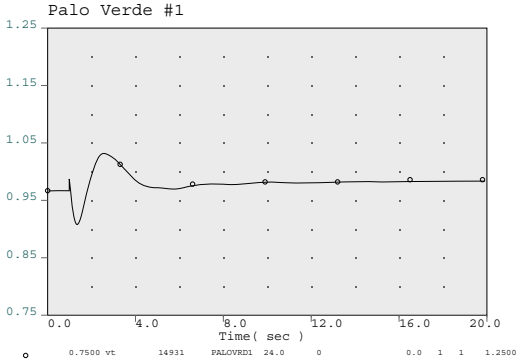
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Page 1

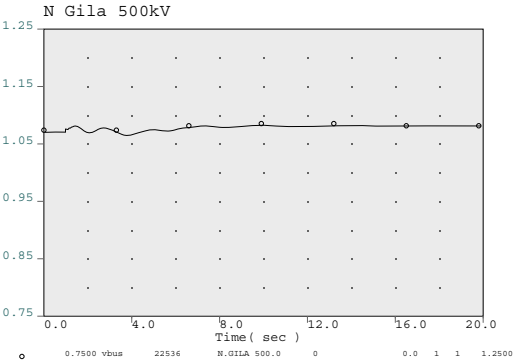
PaloVerde-g2_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:31:03 2010

RELATIVE VOLTAGE

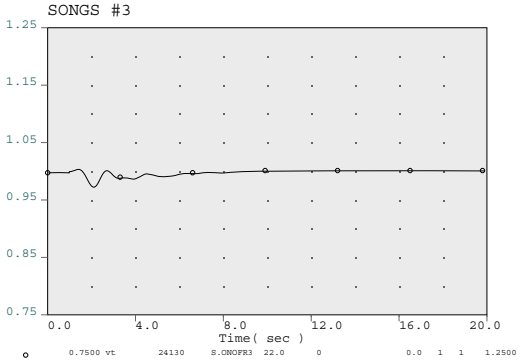
Palo Verde #1



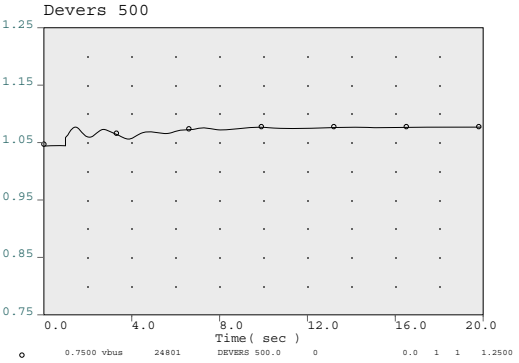
N Gila 500kV



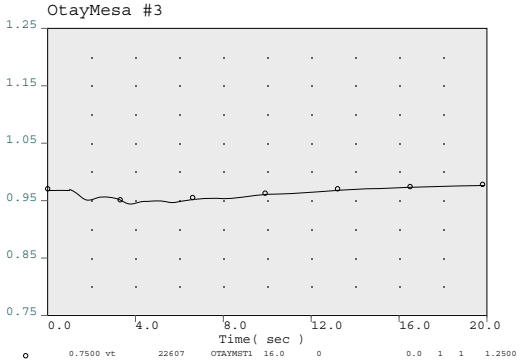
SONGS #3



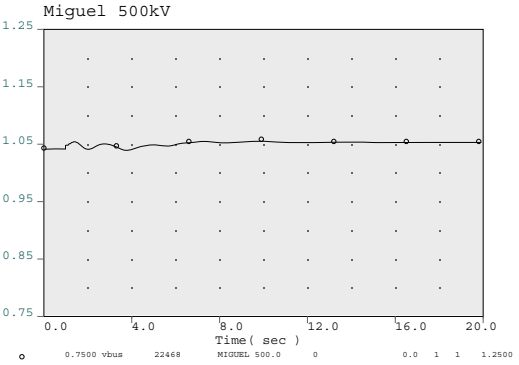
Devers 500



OtayMesa #3



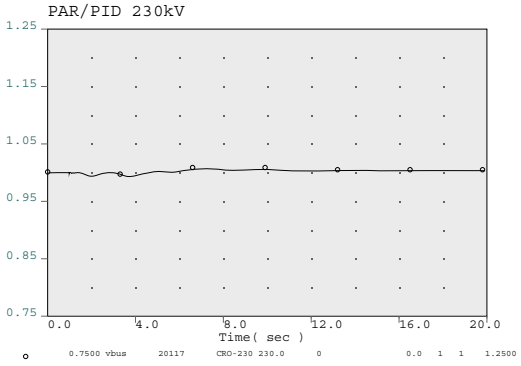
Miguel 500kV



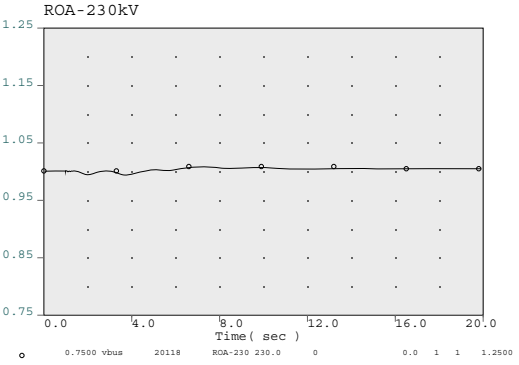
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

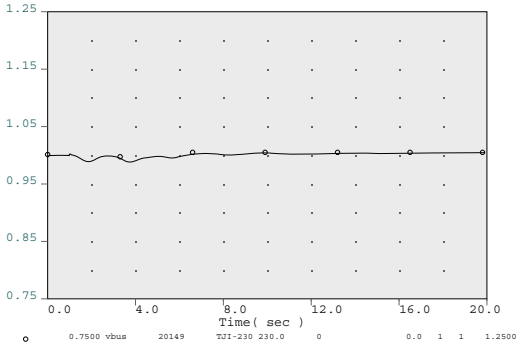
PAR/PID 230kV



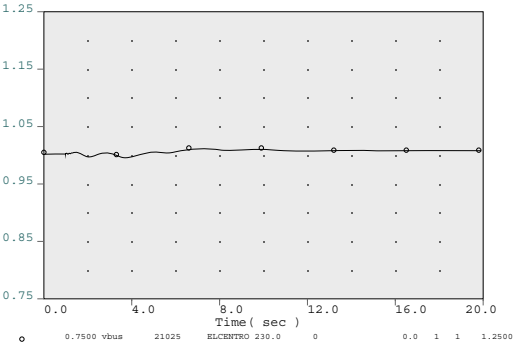
ROA-230kV



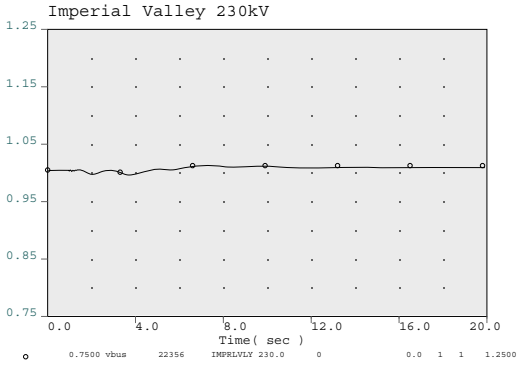
TJ1-230kV



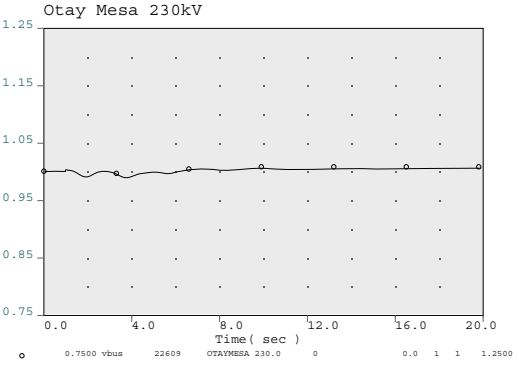
El Centro



Imperial Valley 230kV



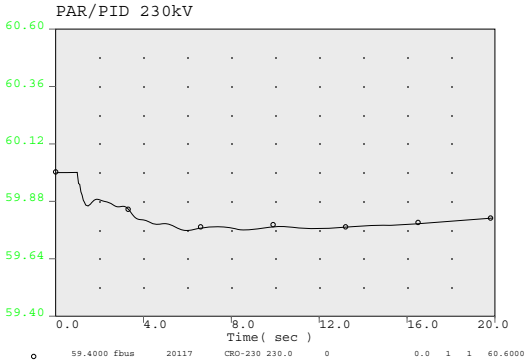
Otay Mesa 230kV



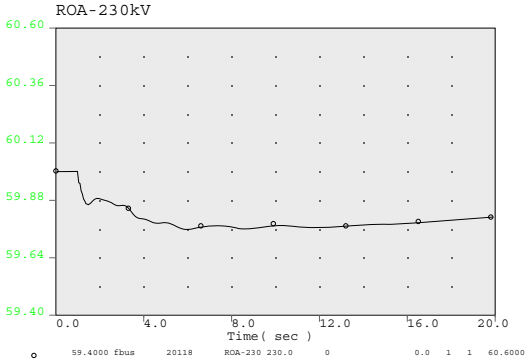
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

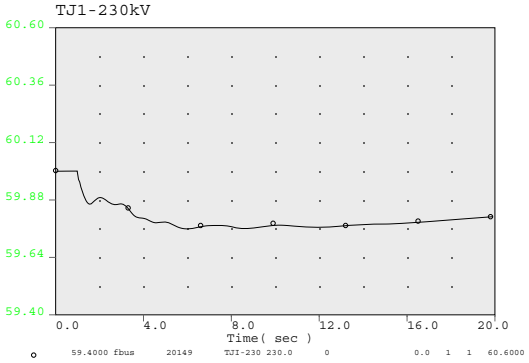
PAR/PID 230kV



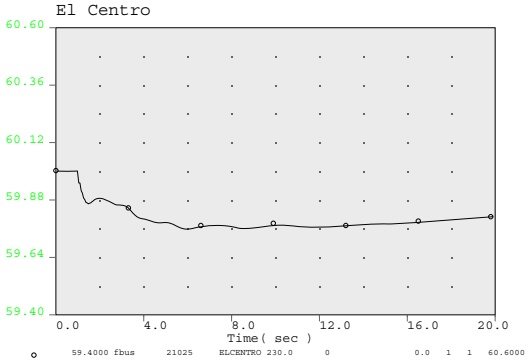
ROA-230kV



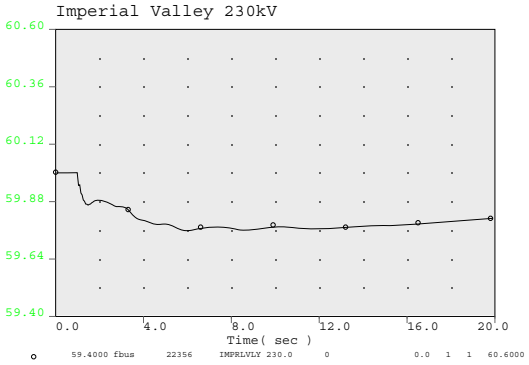
TJ1-230kV



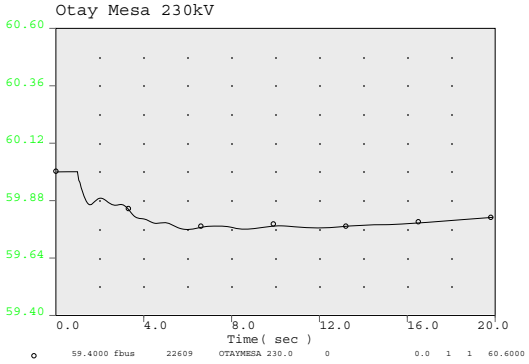
El Centro



Imperial Valley 230kV

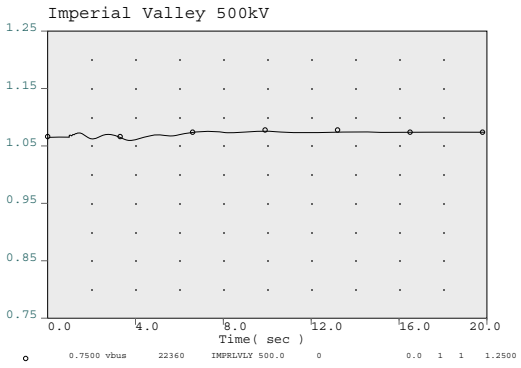


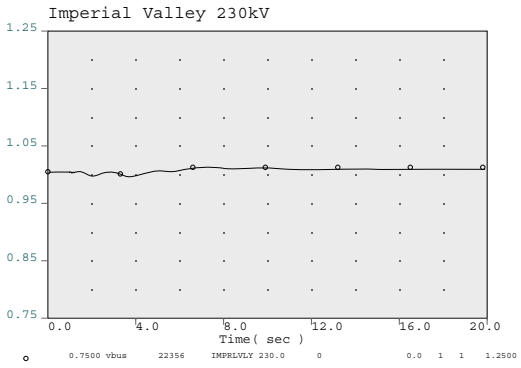
Otay Mesa 230kV

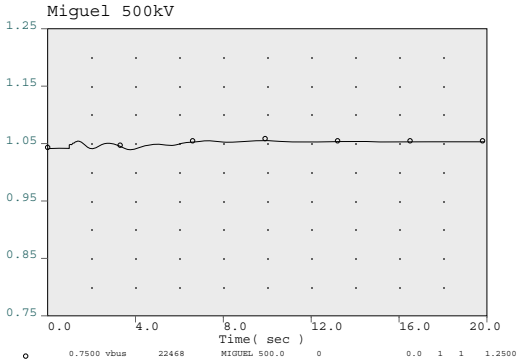


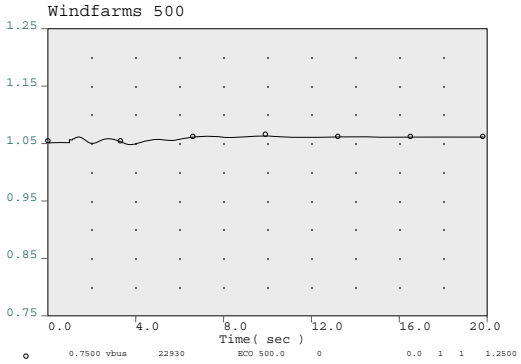
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

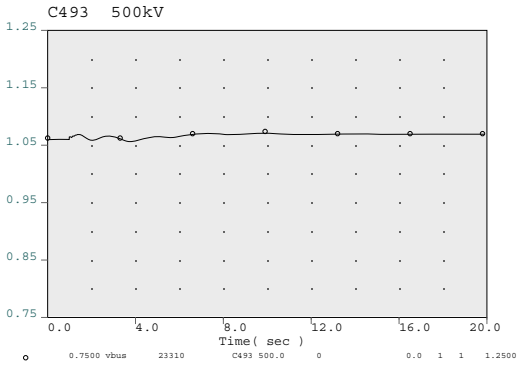
Imperial Valley Area - VOLTAGE

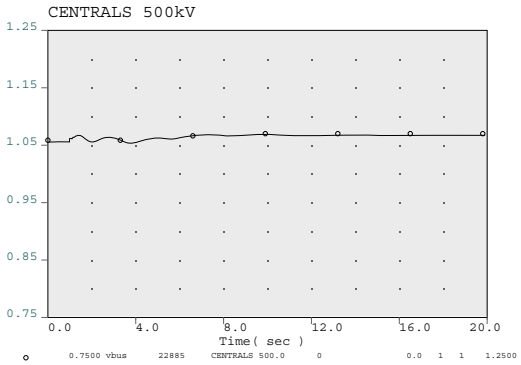












SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

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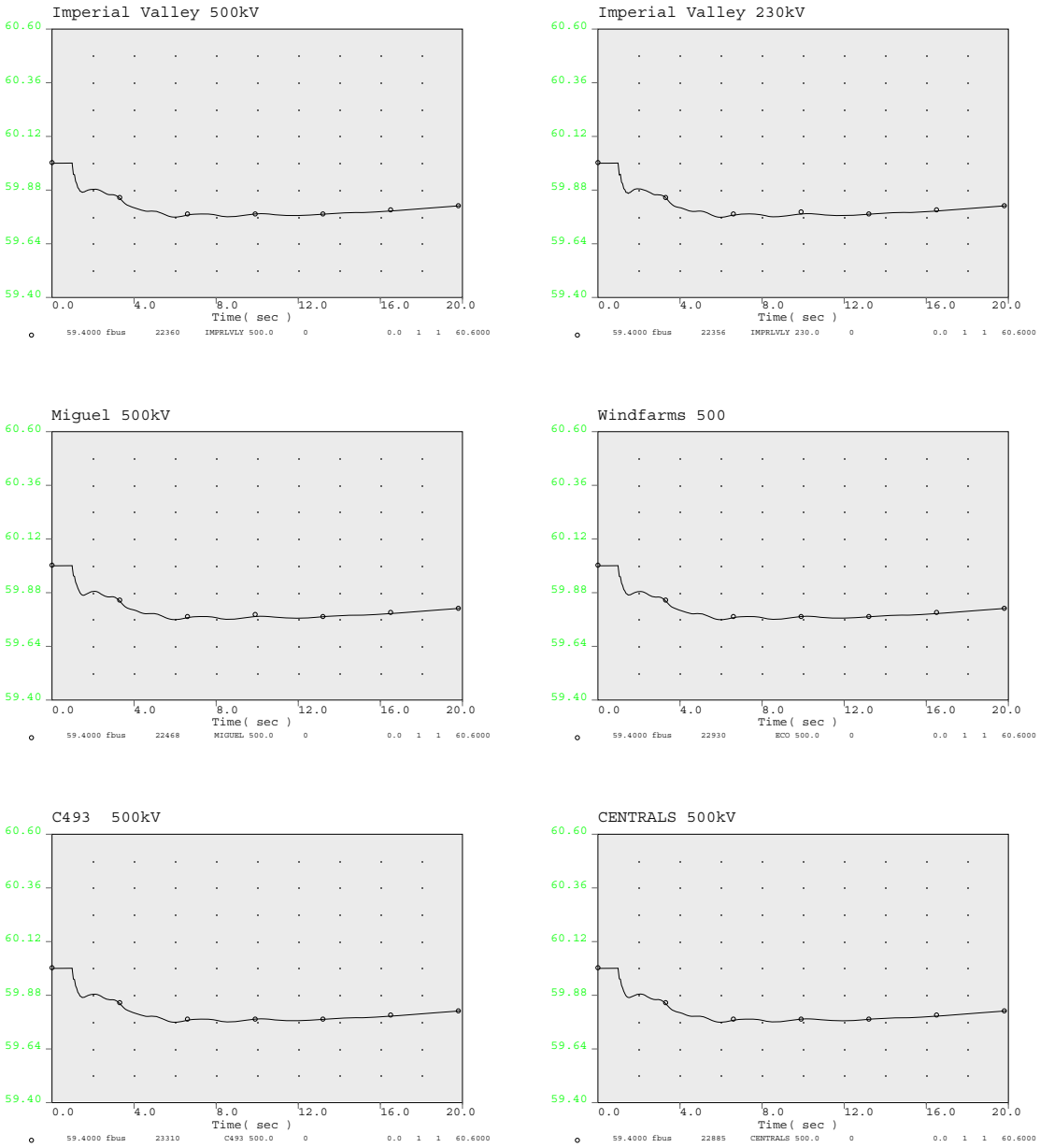
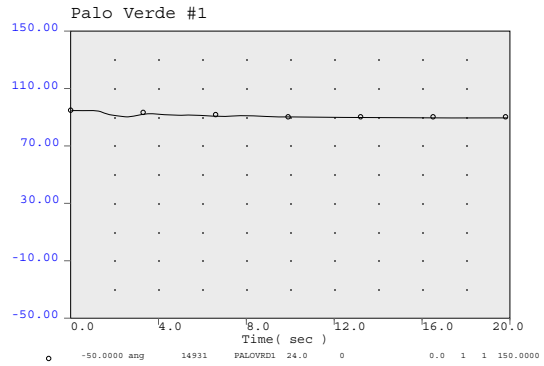
PaloVerde-g2_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:31:03 2010

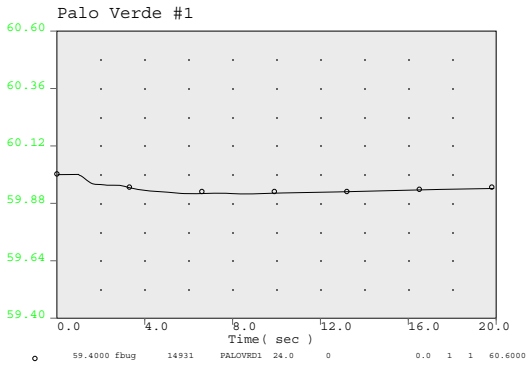
Imperial Valley Area - Frequency

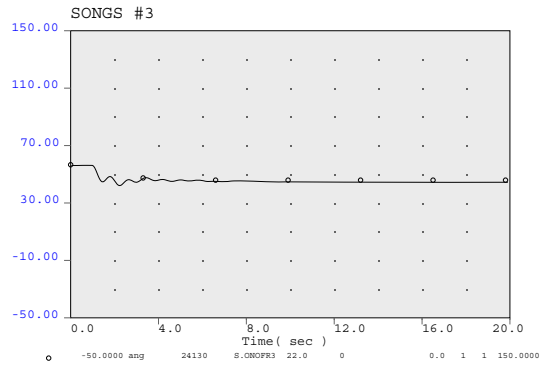


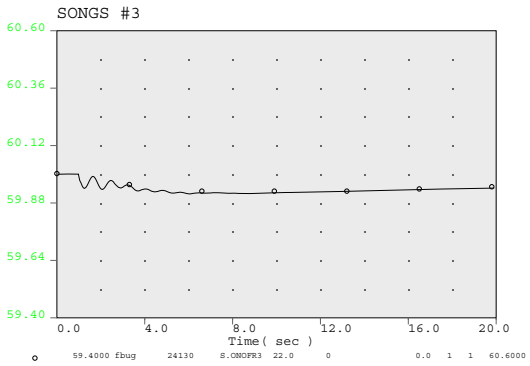
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

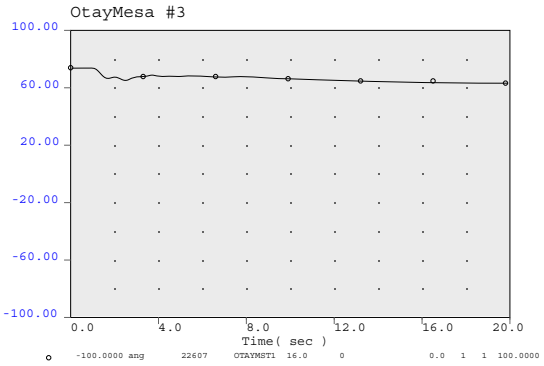
RELATIVE ROTOR ANGLE & FREQUENCY

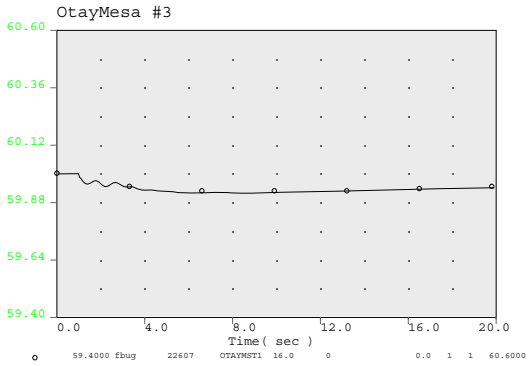












SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

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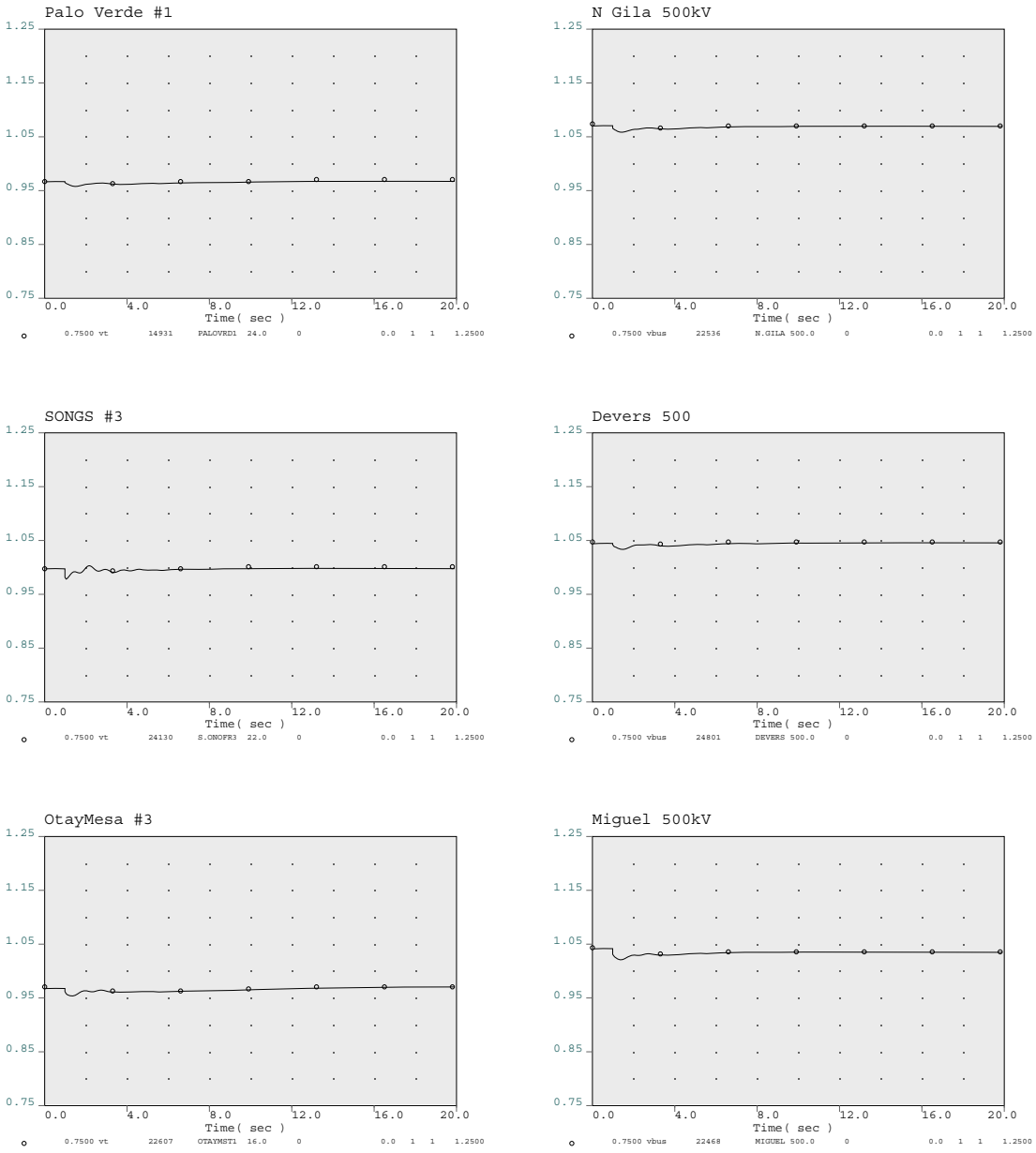
SONGS-g1_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:31:26 2010

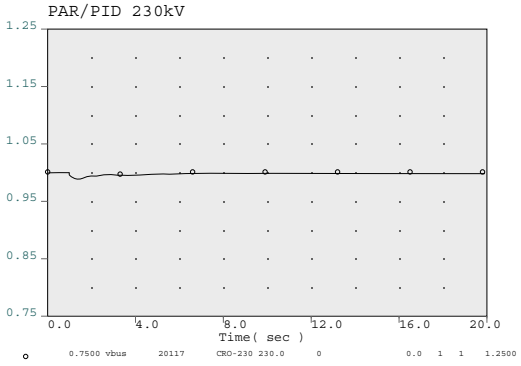
RELATIVE VOLTAGE



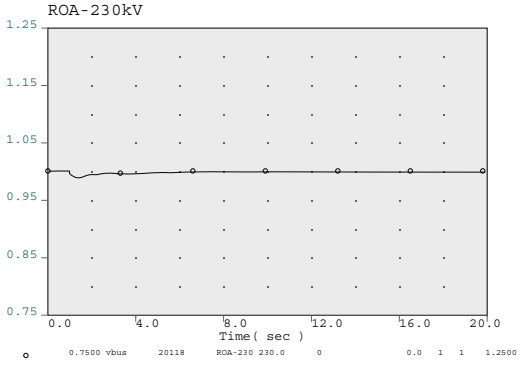
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

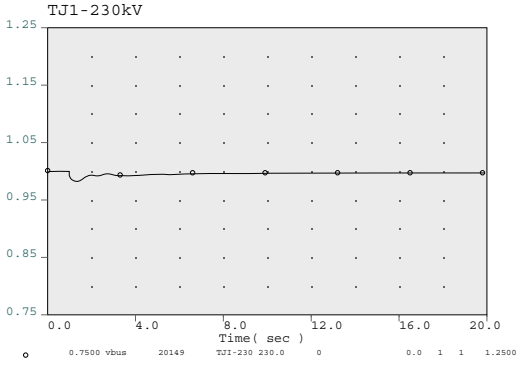
PAR/PID 230kV



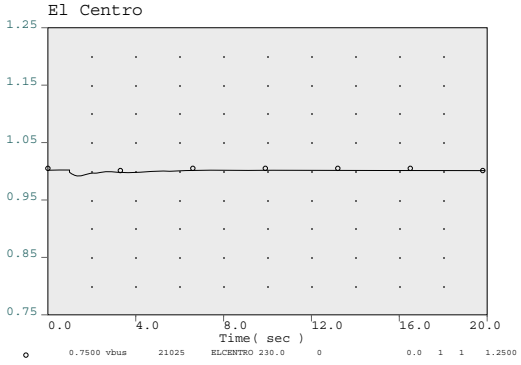
ROA-230kV



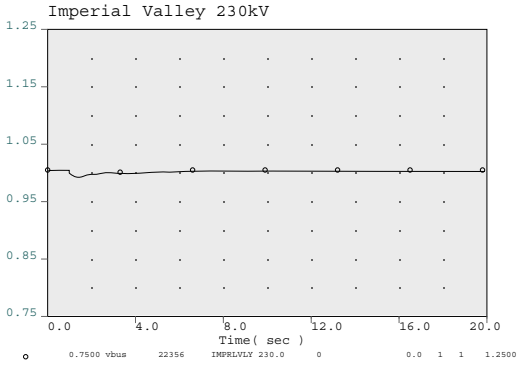
TJ1-230kV



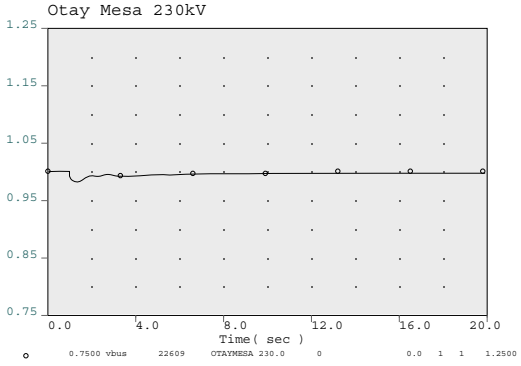
El Centro



Imperial Valley 230kV



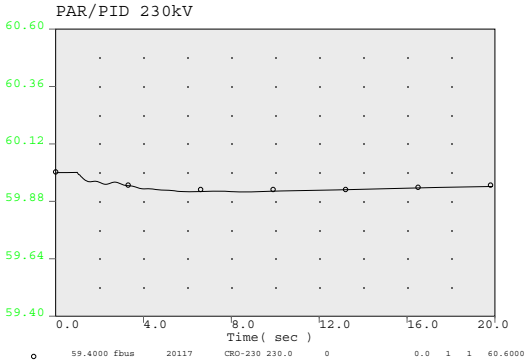
Otay Mesa 230kV



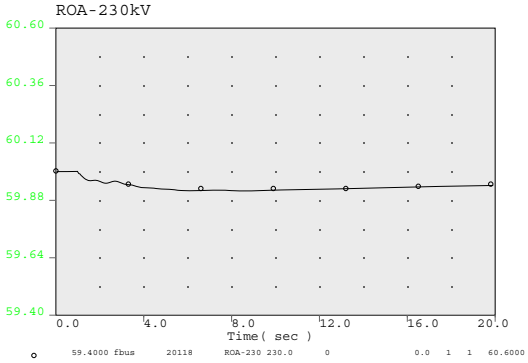
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison

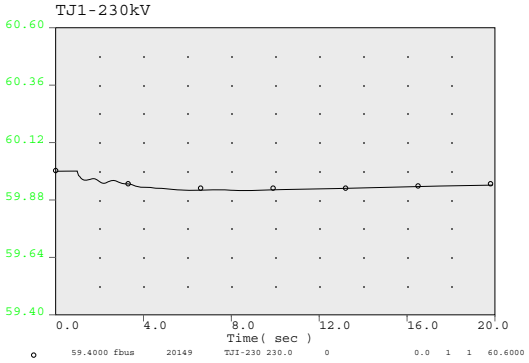
PAR/PID 230kV



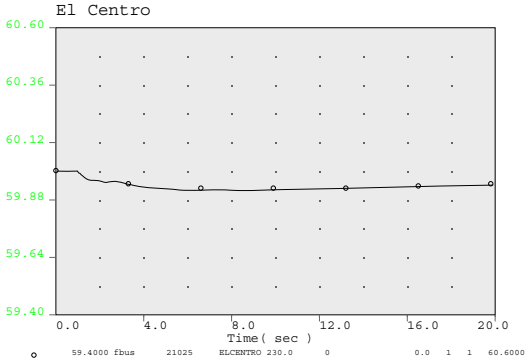
ROA-230kV



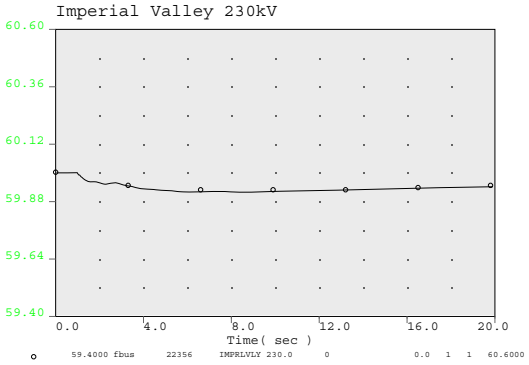
TJ1-230kV



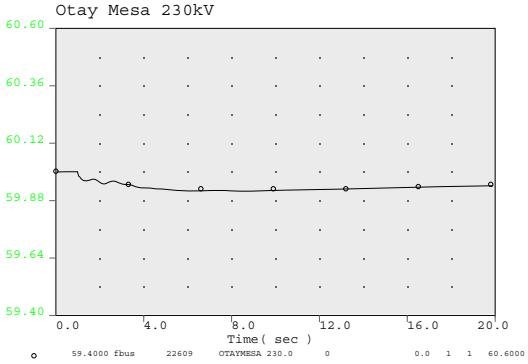
El Centro



Imperial Valley 230kV

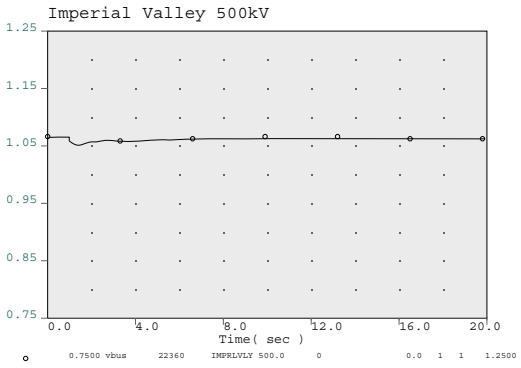


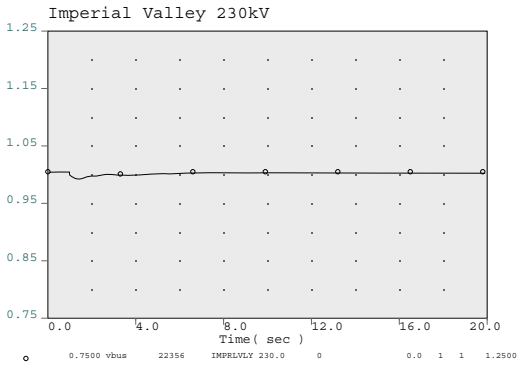
Otay Mesa 230kV

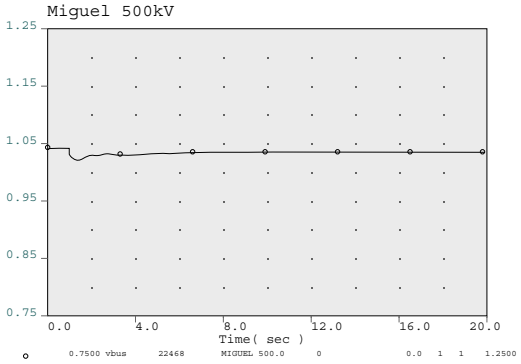


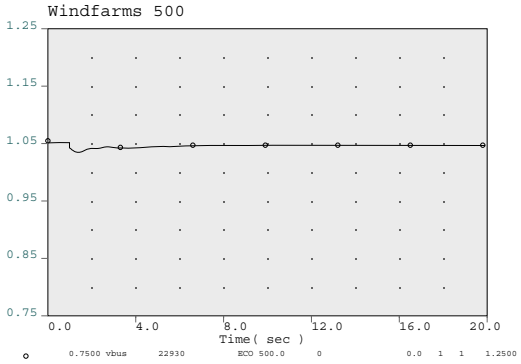
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

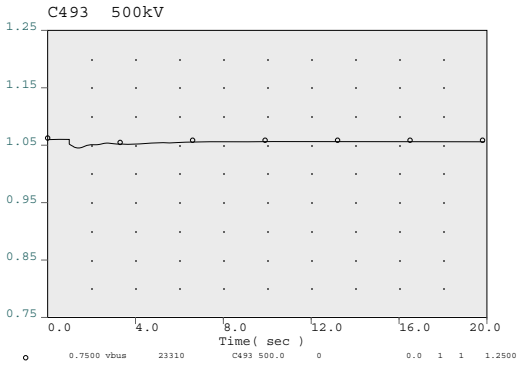
Imperial Valley Area - VOLTAGE

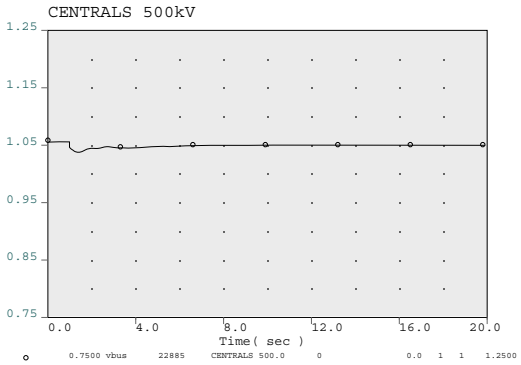












SDG&E Cluster 2 - post
2014 Light Autumn
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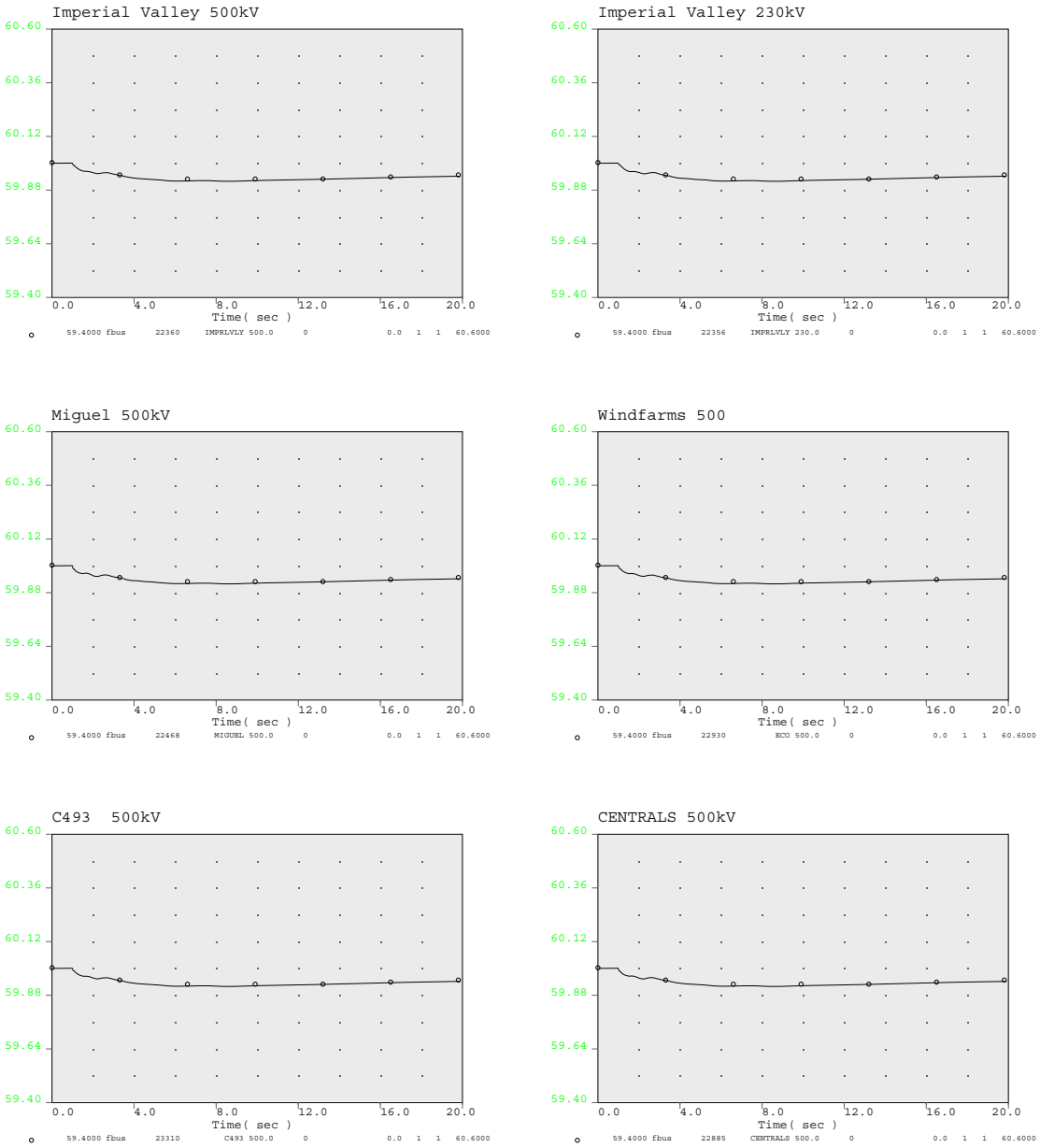
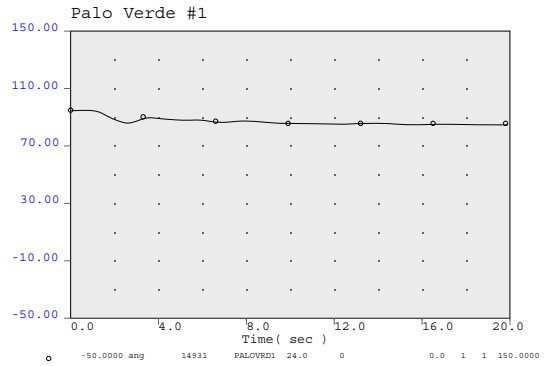
SDGE	SONGS-g1_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:31:26 2010

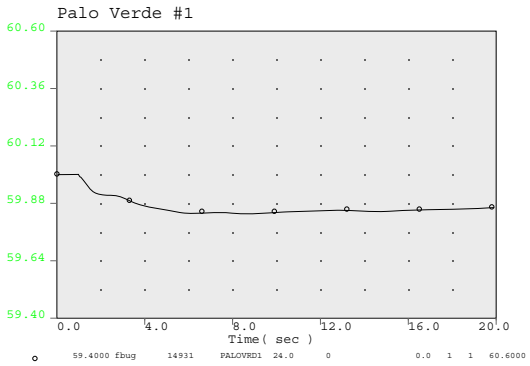
Imperial Valley Area - Frequency

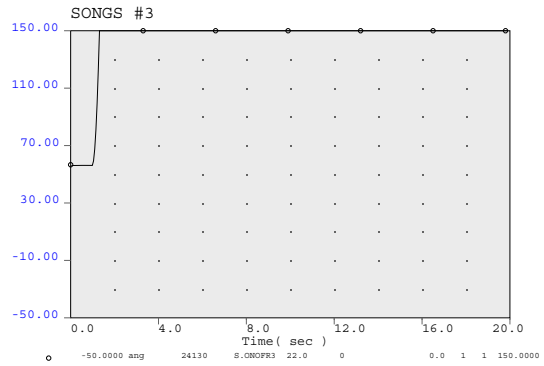


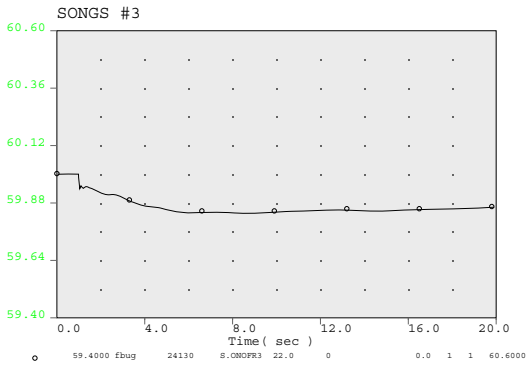
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

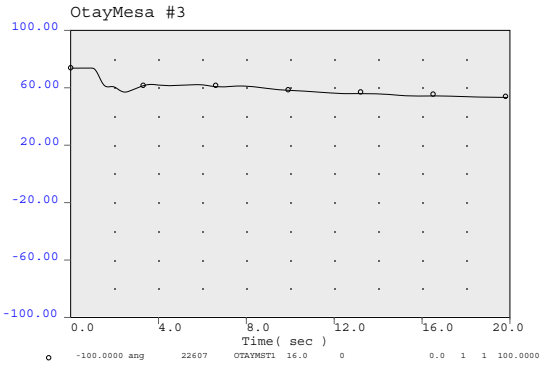
RELATIVE ROTOR ANGLE & FREQUENCY

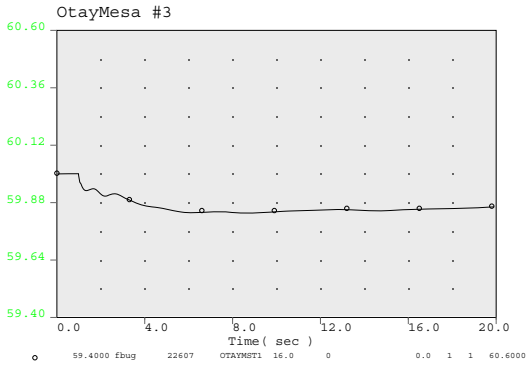












SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

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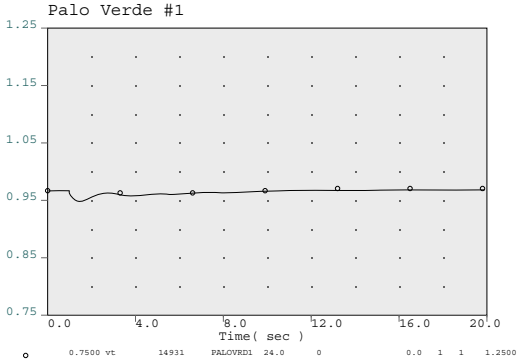
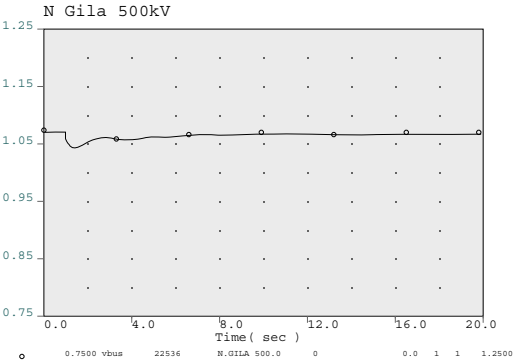
SONGS-g2_pst_iva_ll.chf | p_i\ll\pst_iva\ws_pst_iva | Tue Nov 02 07:31:44 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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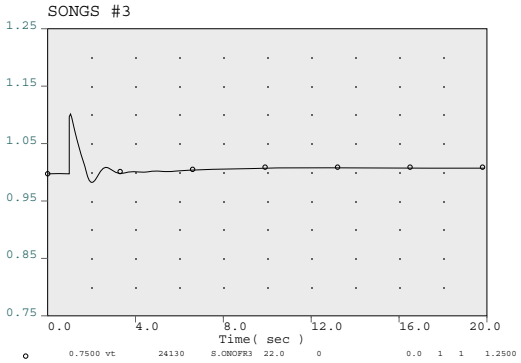

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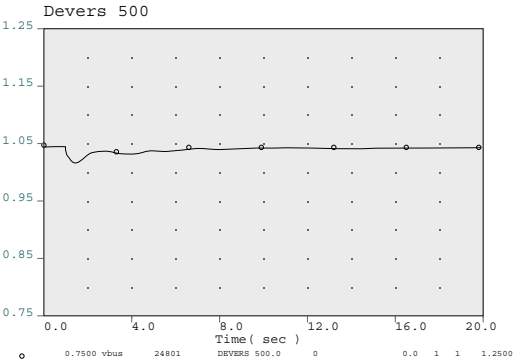

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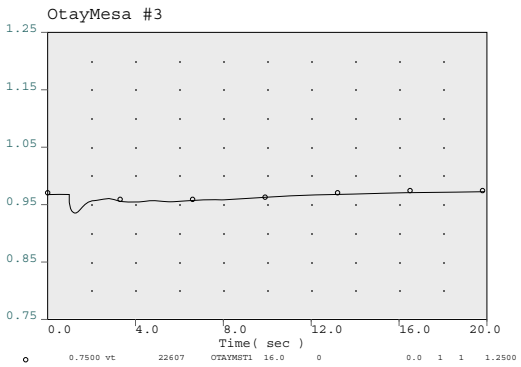
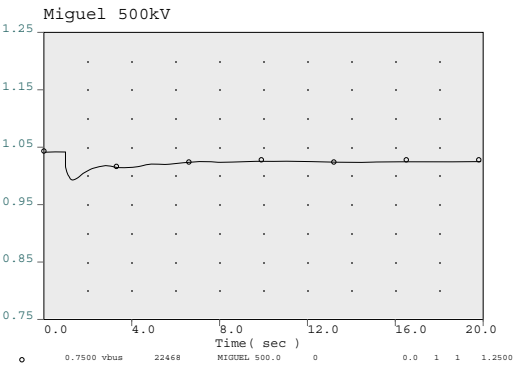


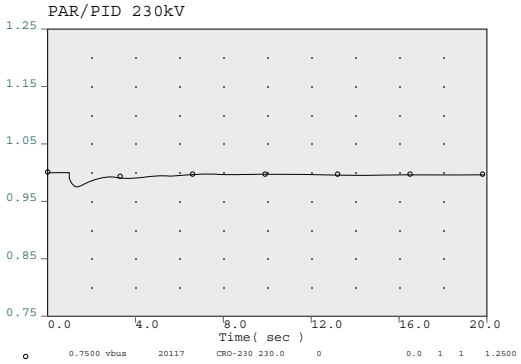
Miguel 500kV



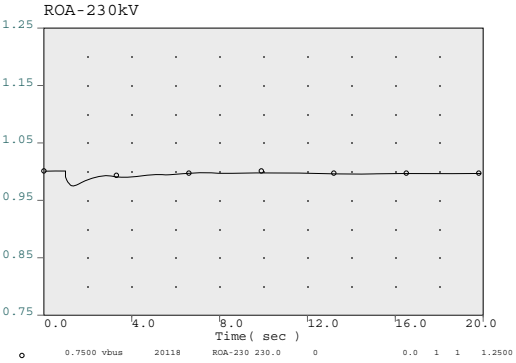
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

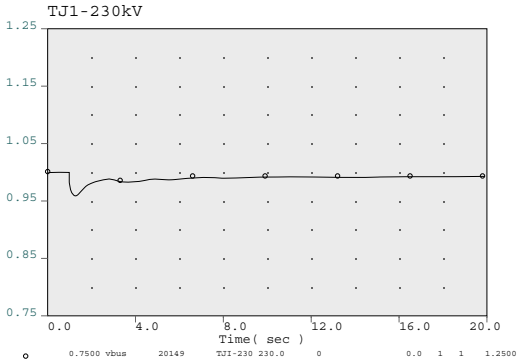
PAR/PID 230kV



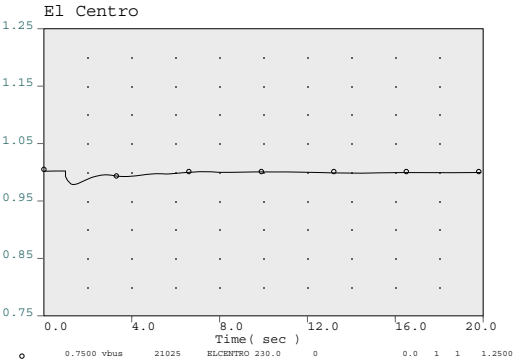
ROA-230kV



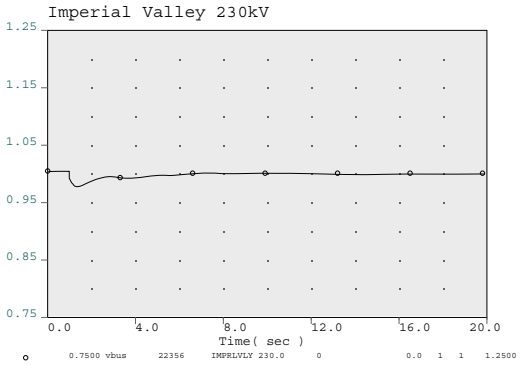
TJ1-230kV



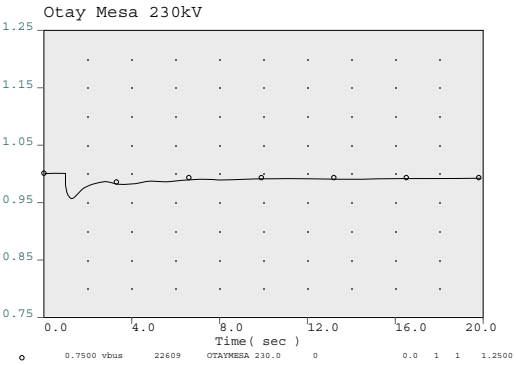
El Centro



Imperial Valley 230kV



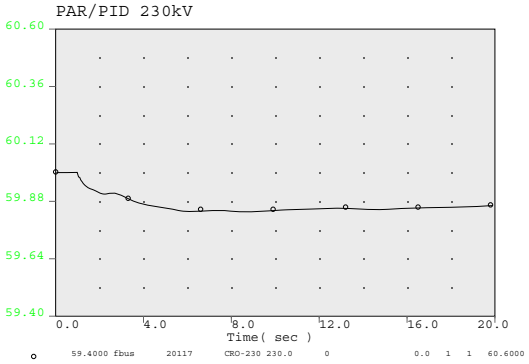
Otay Mesa 230kV



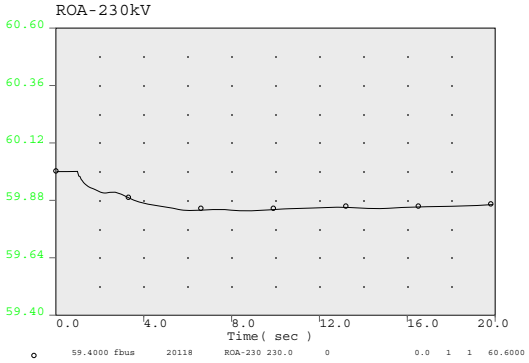
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Frequency Check and Comparison

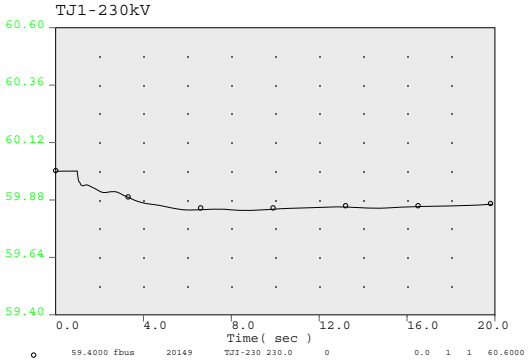
PAR/PID 230kV



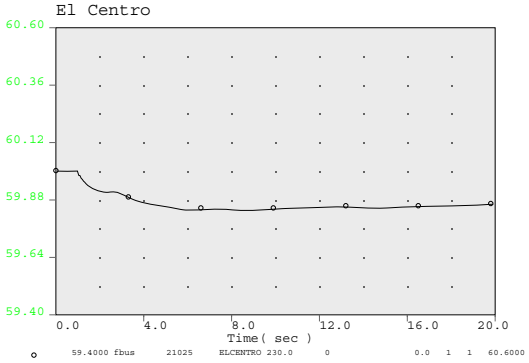
ROA-230kV



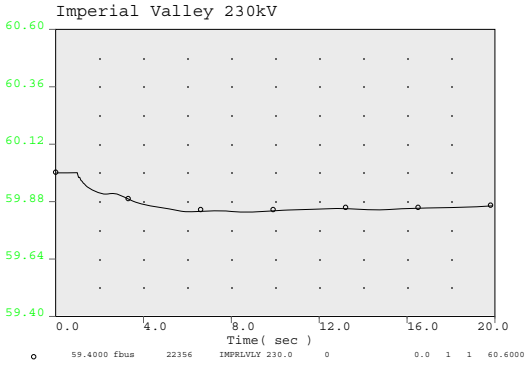
TJ1-230kV



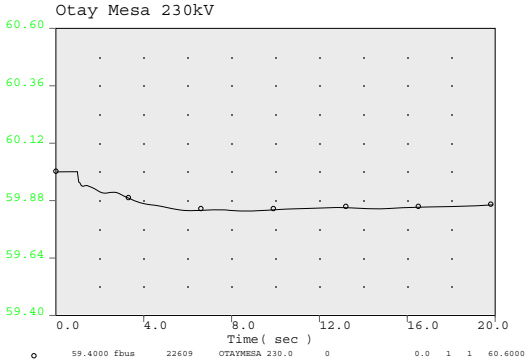
El Centro



Imperial Valley 230kV

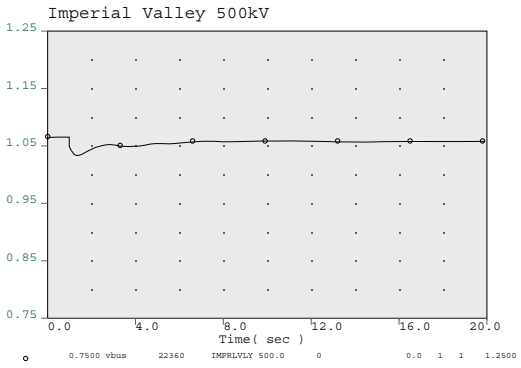


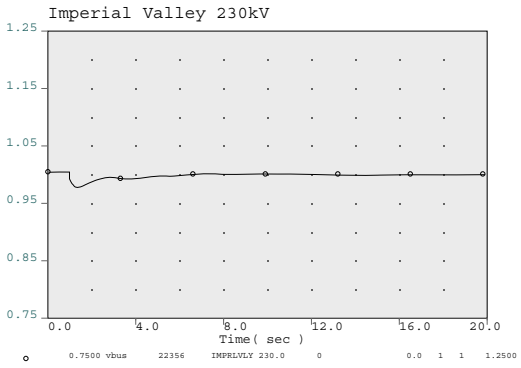
Otay Mesa 230kV

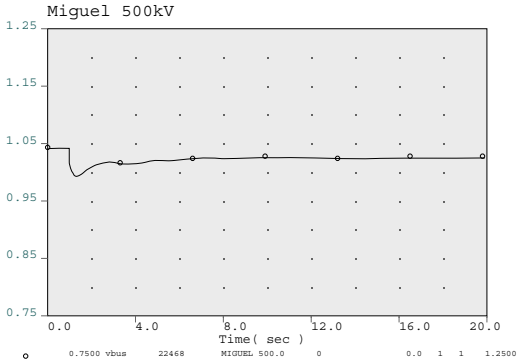


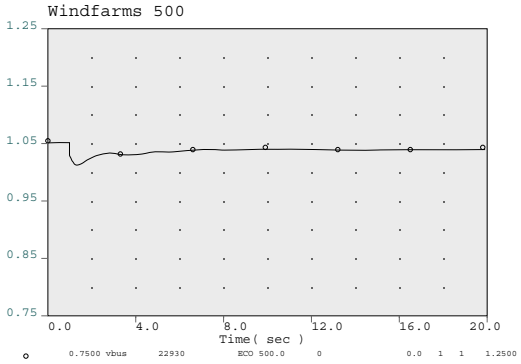
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

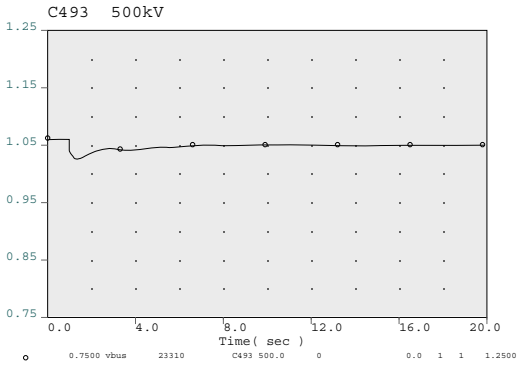
Imperial Valley Area - VOLTAGE

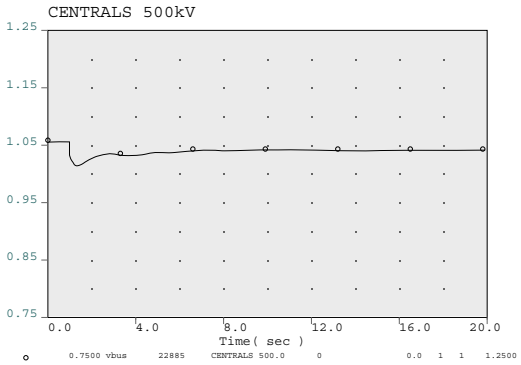






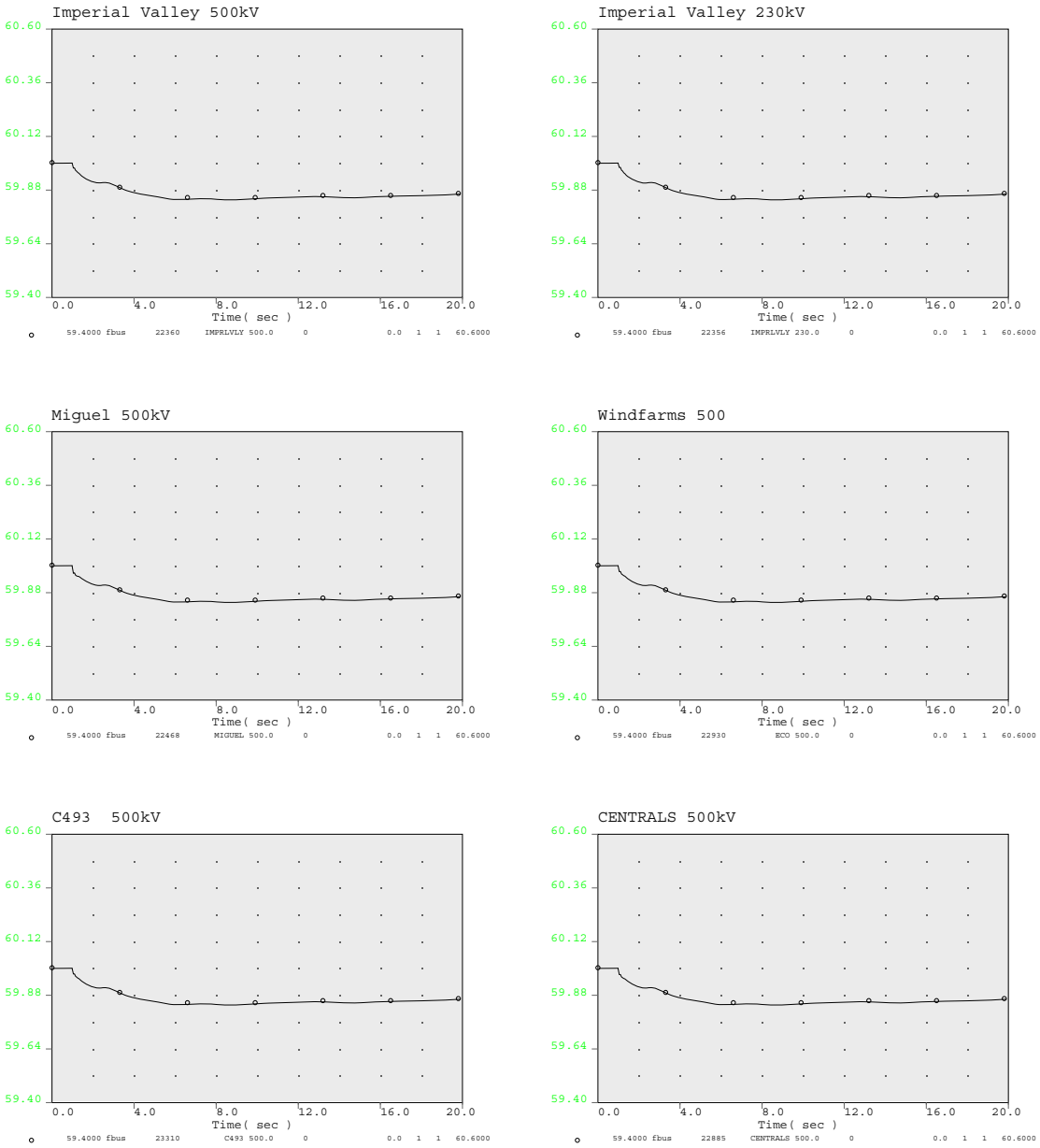






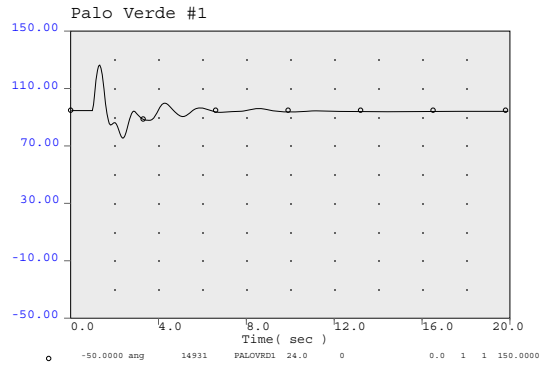
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

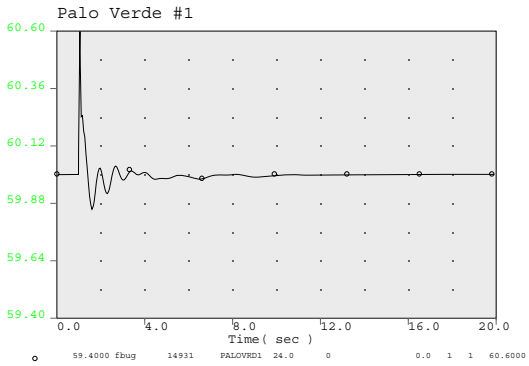
Imperial Valley Area - Frequency

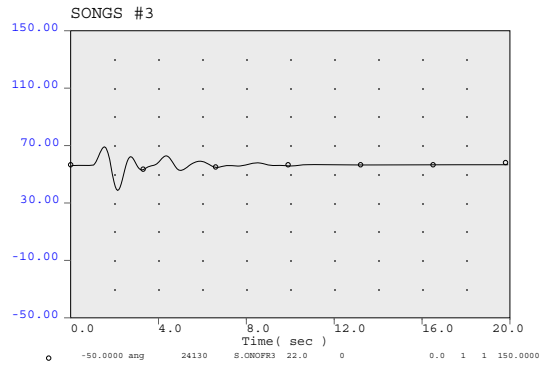


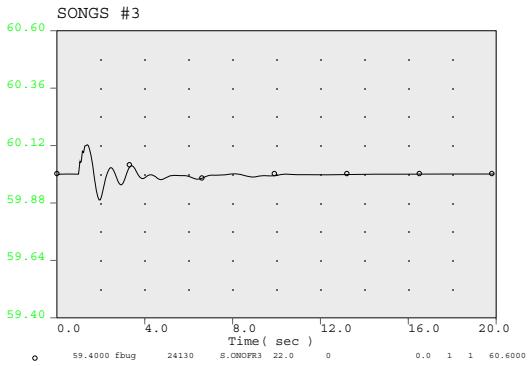
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

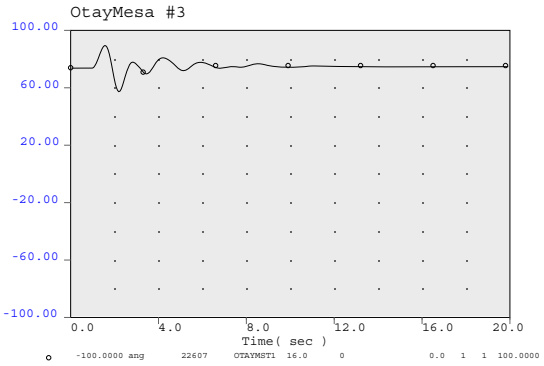
RELATIVE ROTOR ANGLE & FREQUENCY

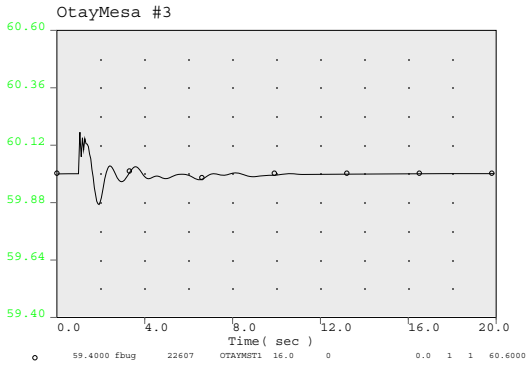












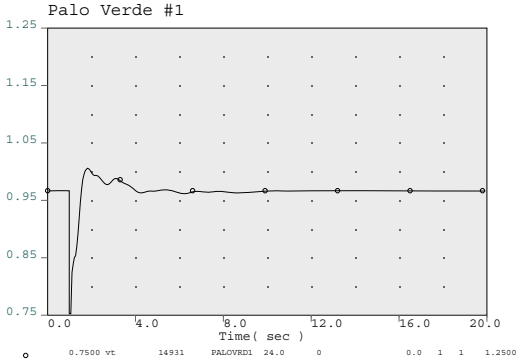
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Page 1

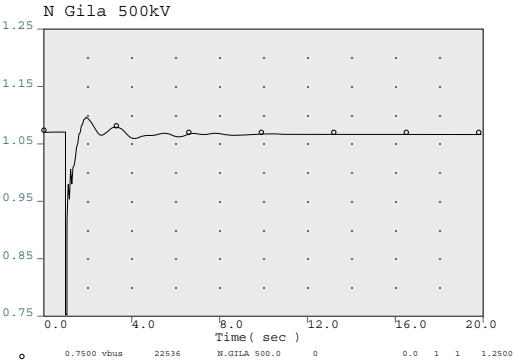
SDGE	T468_HAA_slo_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:32:26 2010

RELATIVE VOLTAGE

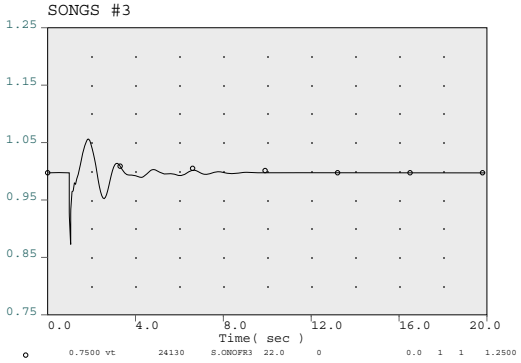
Palo Verde #1



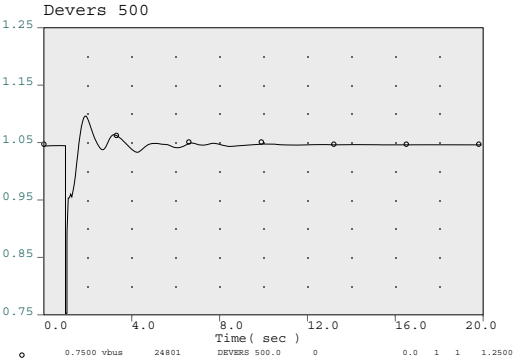
N Gila 500kV



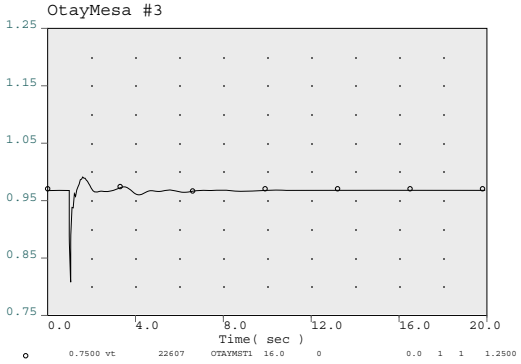
SONGS #3



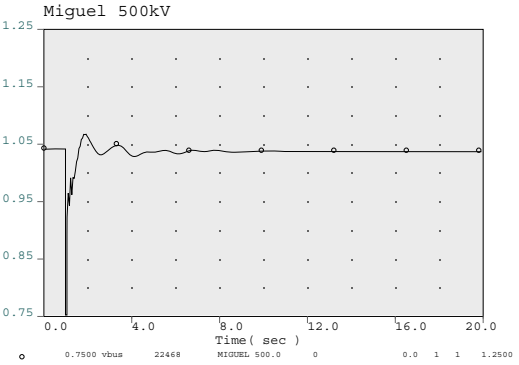
Devers 500



OtayMesa #3



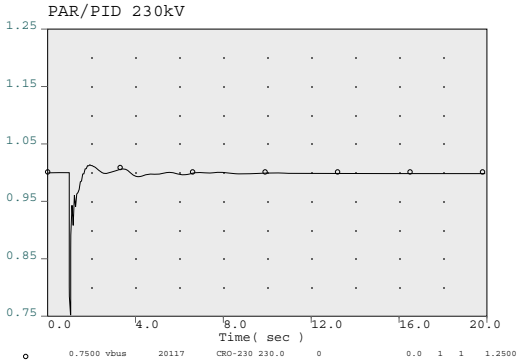
Miguel 500kV



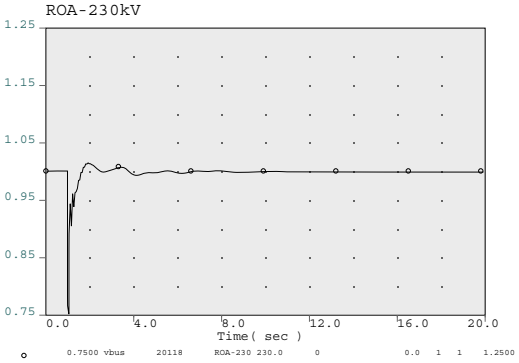
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

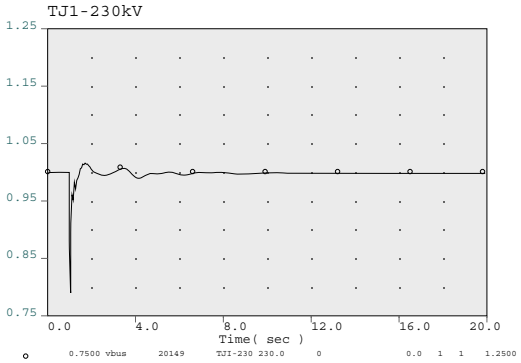
PAR/PID 230kV



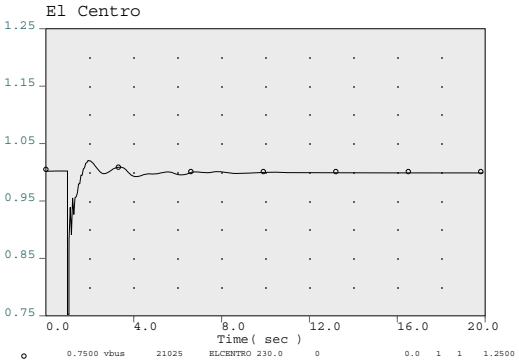
ROA-230kV



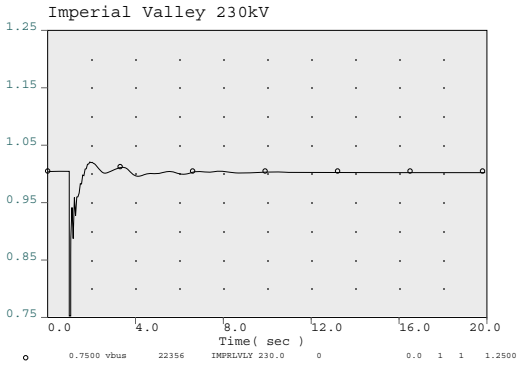
TJ1-230kV



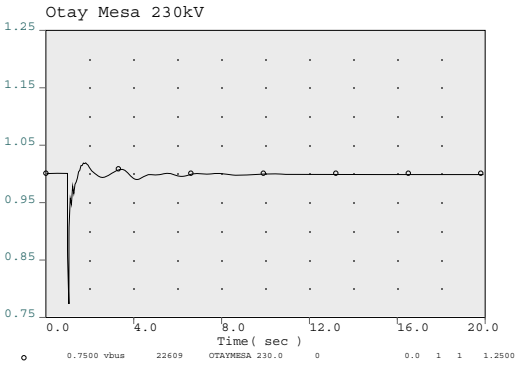
El Centro



Imperial Valley 230kV



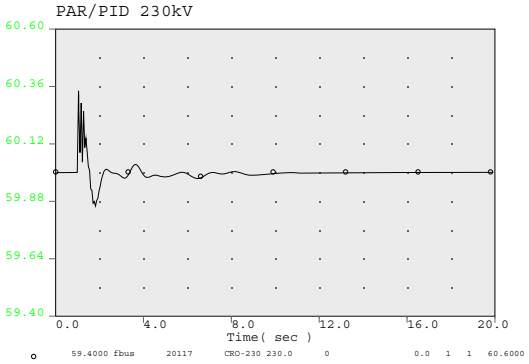
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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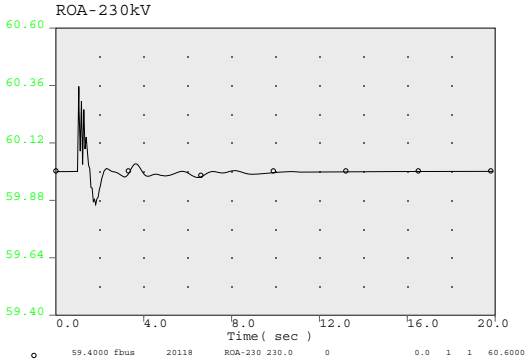
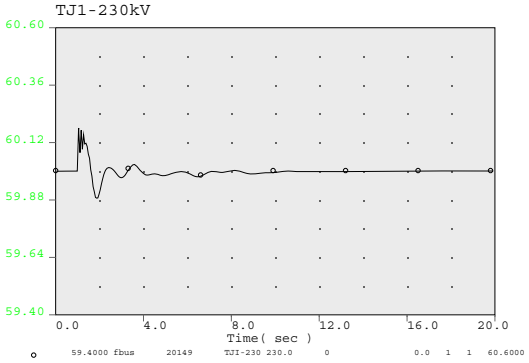
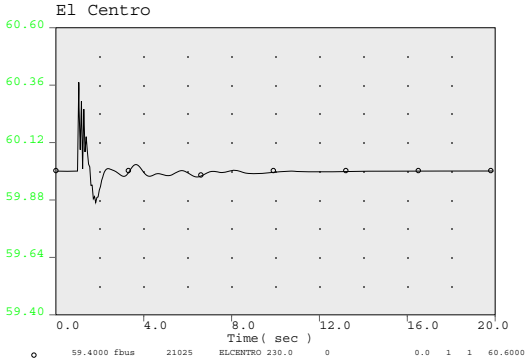


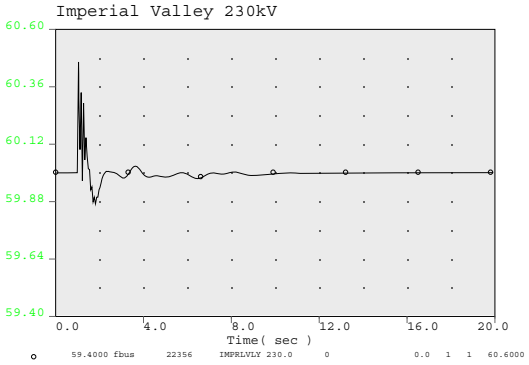
TJ1-230kV



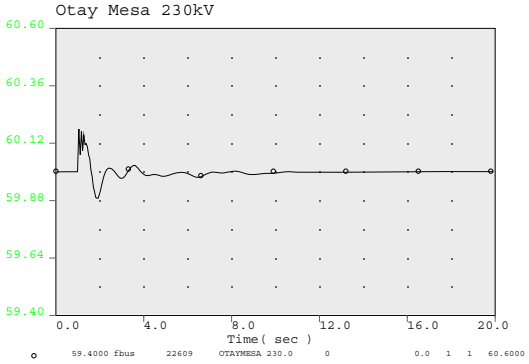
El Centro



Imperial Valley 230kV

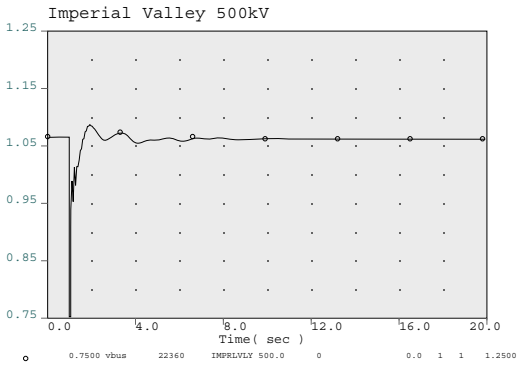


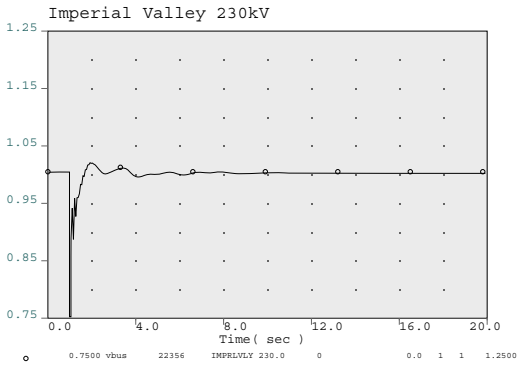
Otay Mesa 230kV

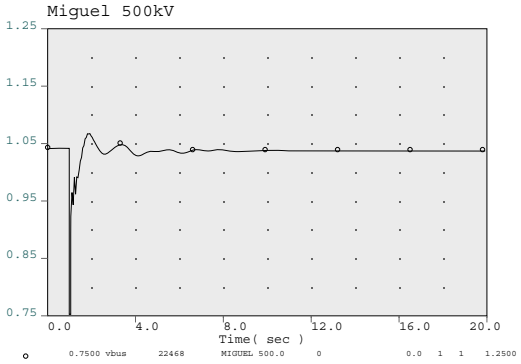


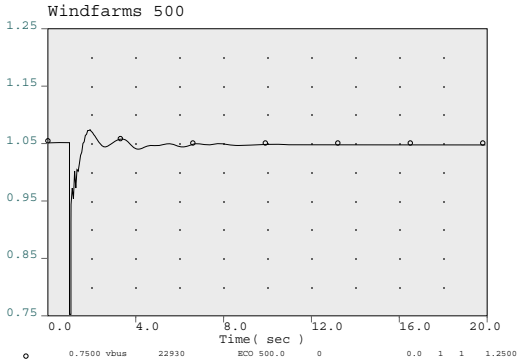
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

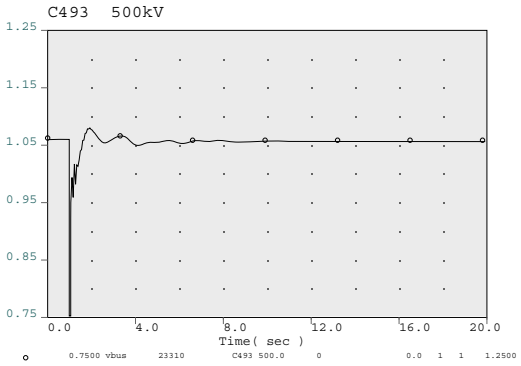
Imperial Valley Area - VOLTAGE

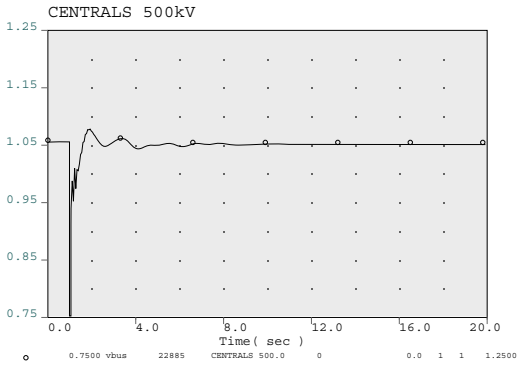






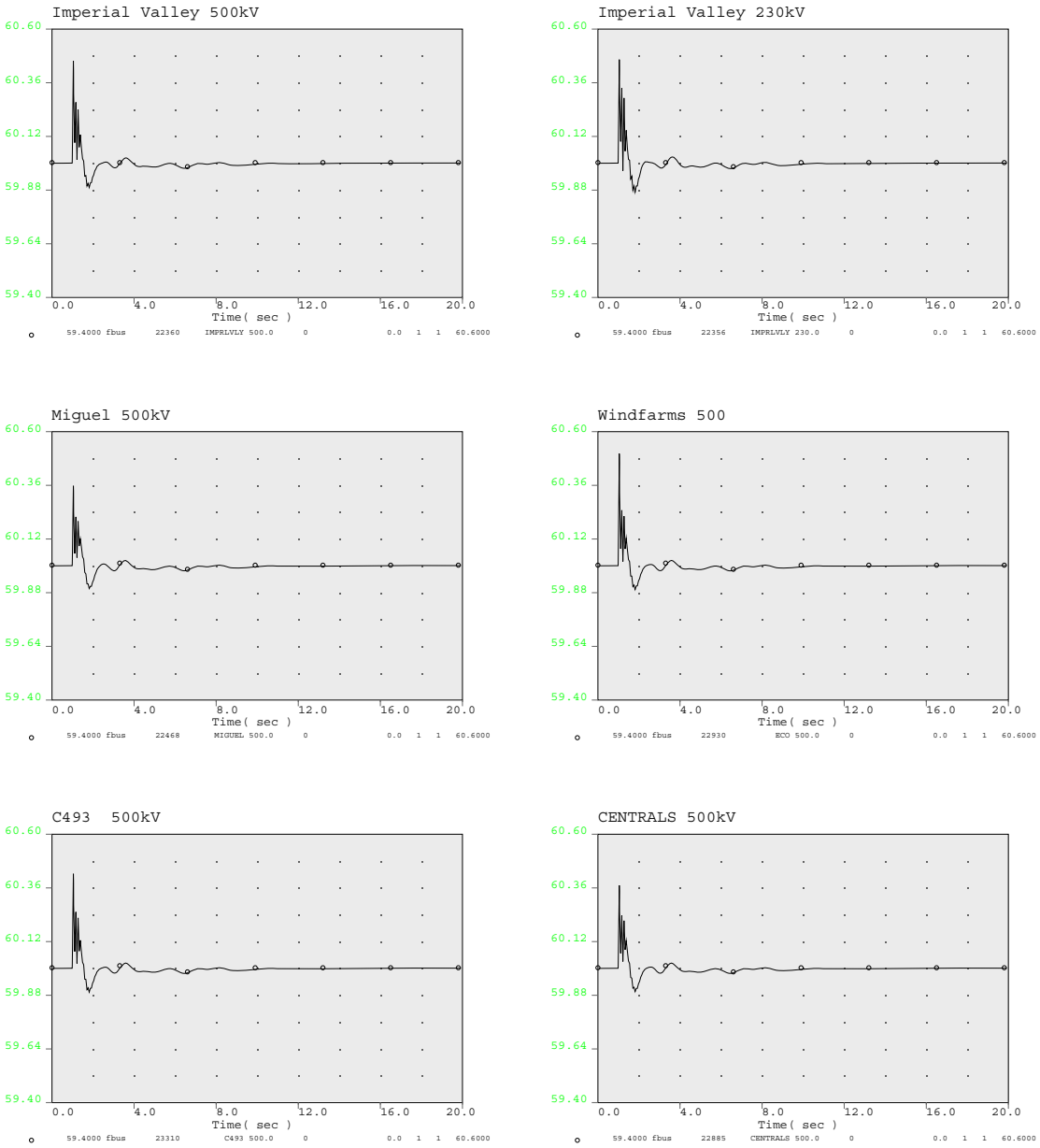






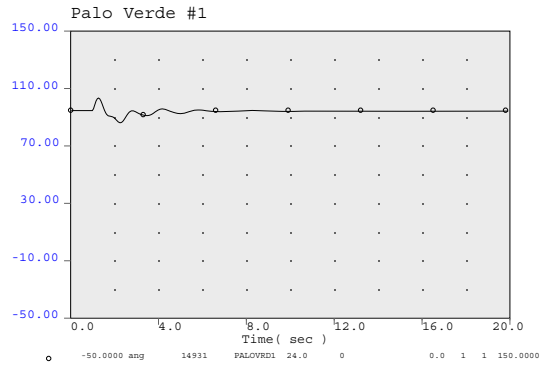
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

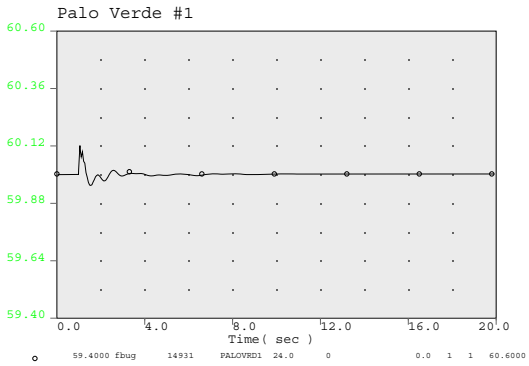
Imperial Valley Area - Frequency

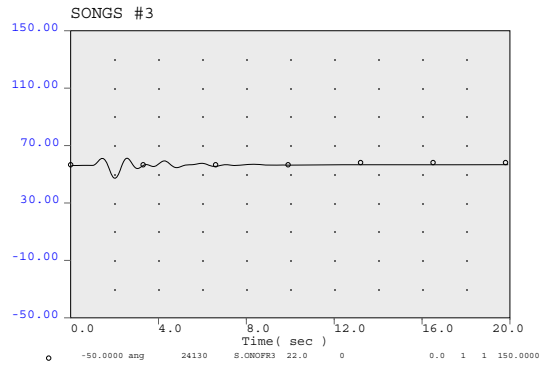


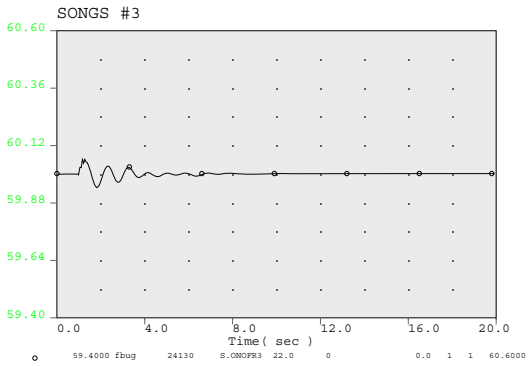
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

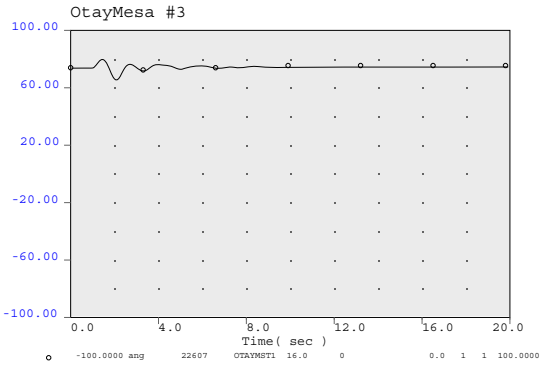
RELATIVE ROTOR ANGLE & FREQUENCY

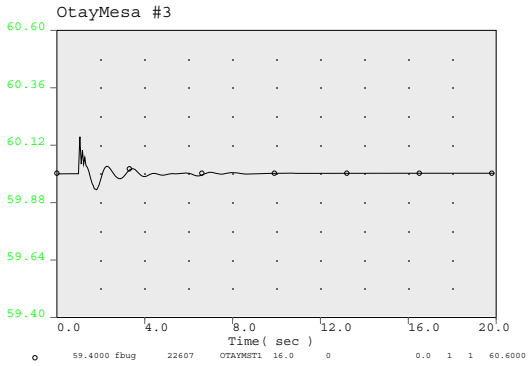












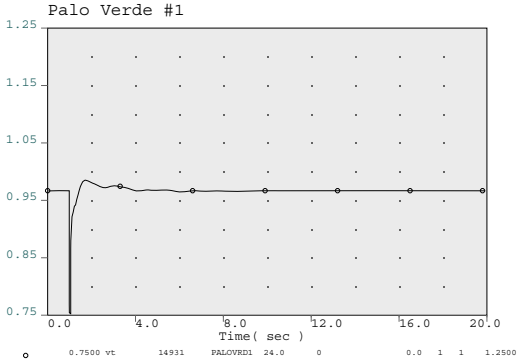
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Page 1

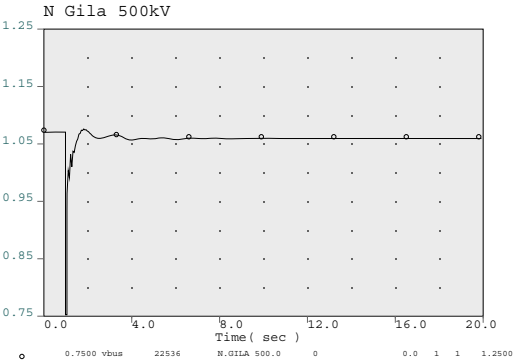
SDGE	T468_NGila_slo_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:32:44 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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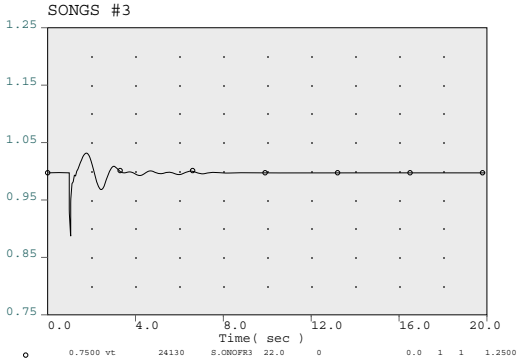
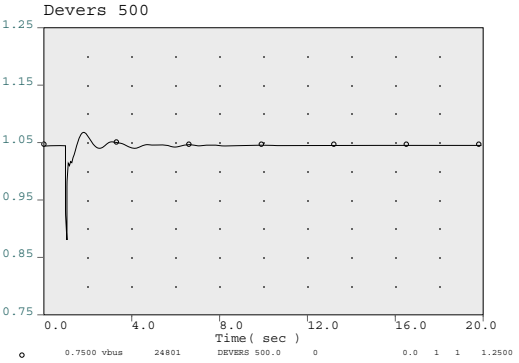


Devers 500



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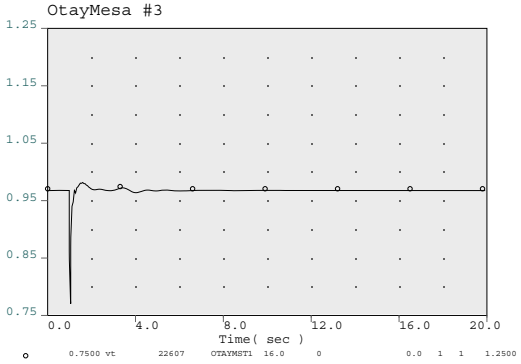
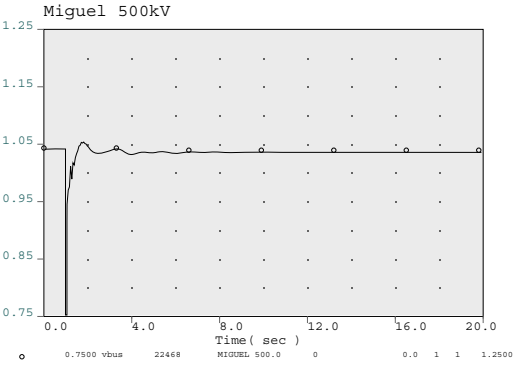


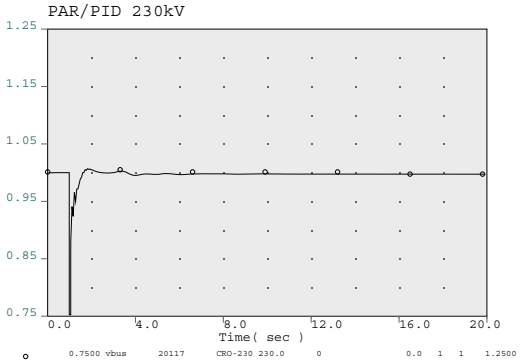
Miguel 500kV



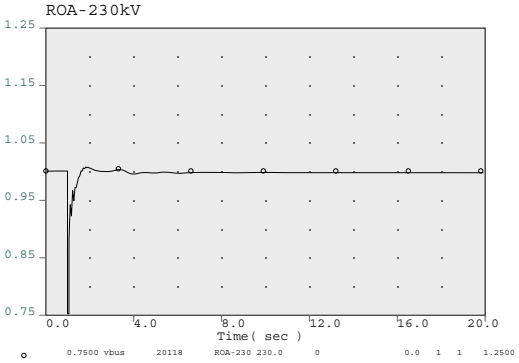
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

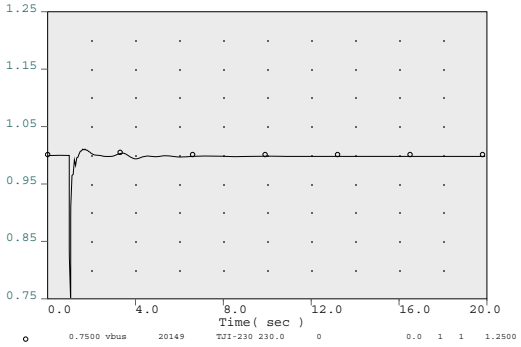
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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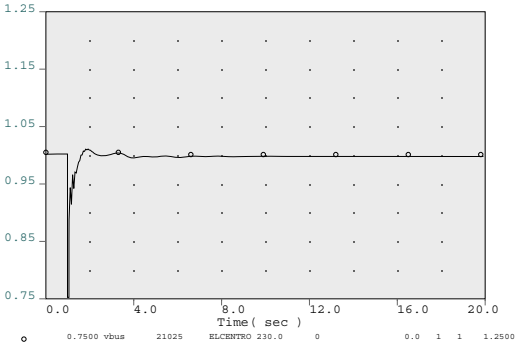
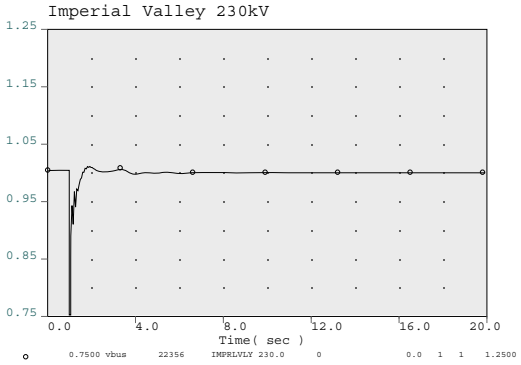
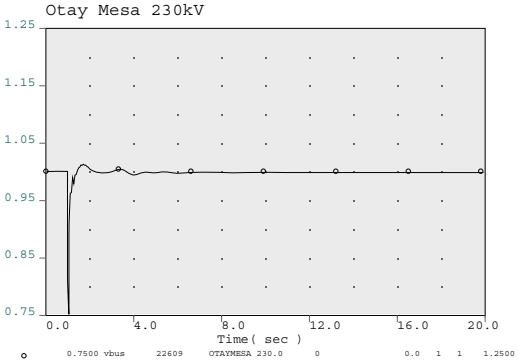


Imperial Valley 230kV



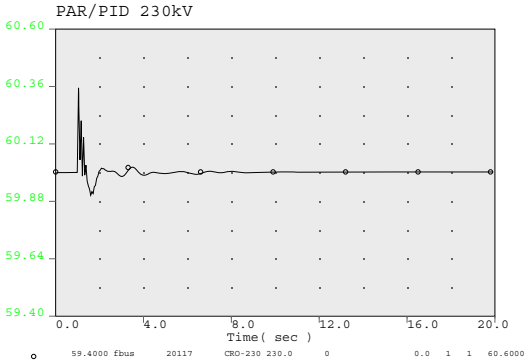
Otay Mesa 230kV



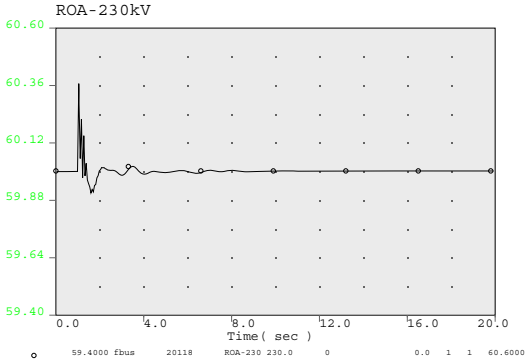
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

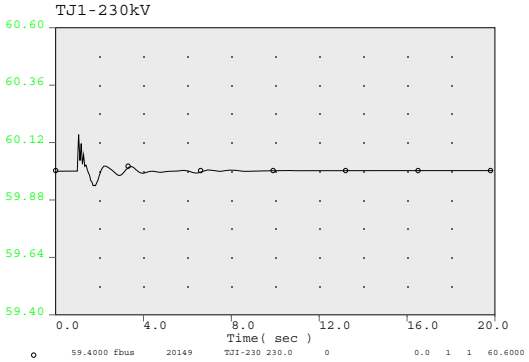
PAR/PID 230kV



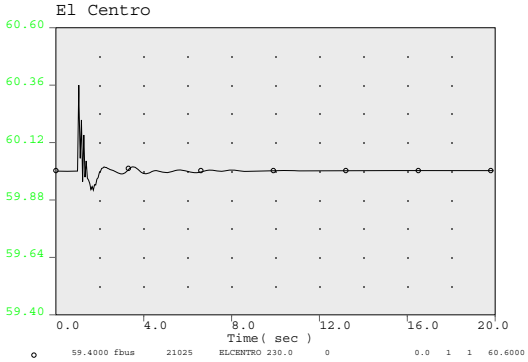
ROA-230kV



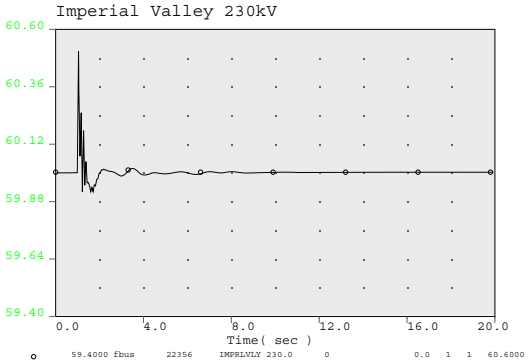
TJ1-230kV



El Centro



Imperial Valley 230kV



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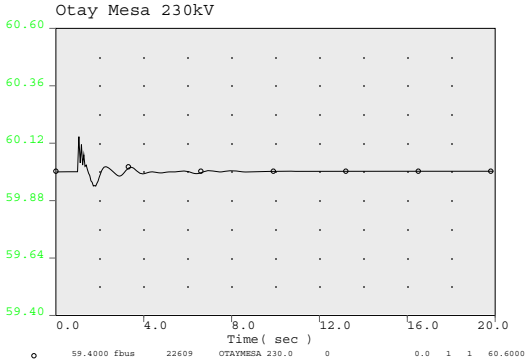
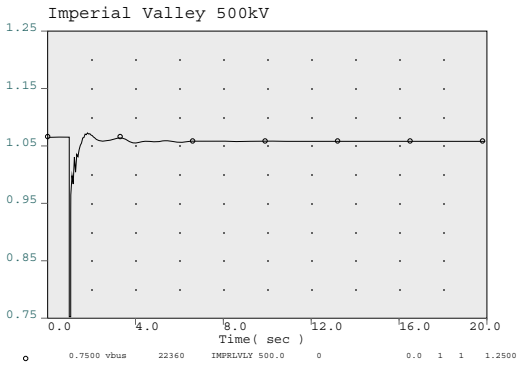


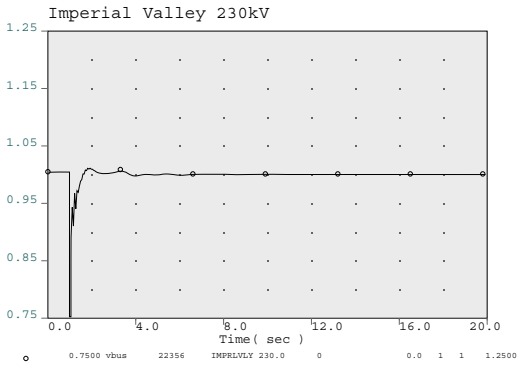
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

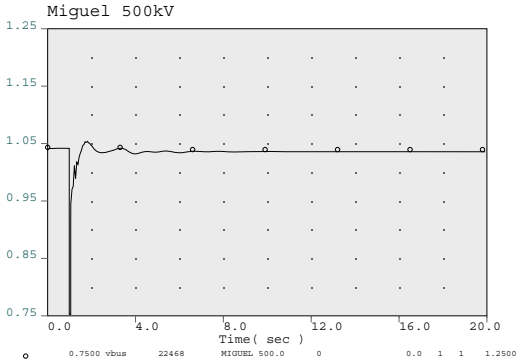
Page 4

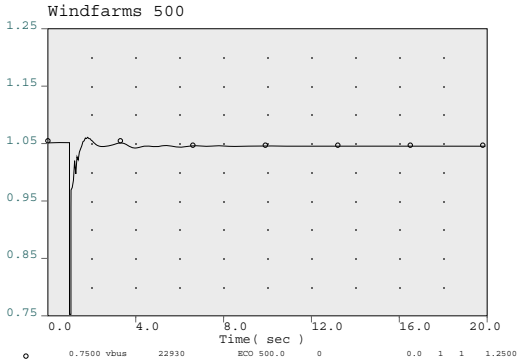
SDGE	T468_NGila_slo_pst_iva_ll.chf	p_i\ll\pst_iva\ws_pst_iva Tue Nov 02 07:32:45 2010

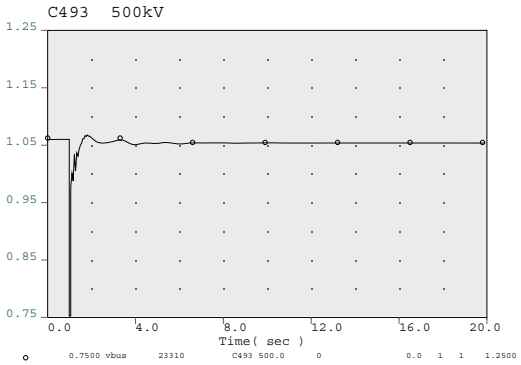
Imperial Valley Area - VOLTAGE

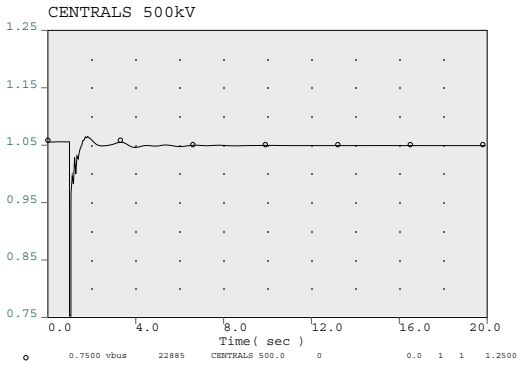












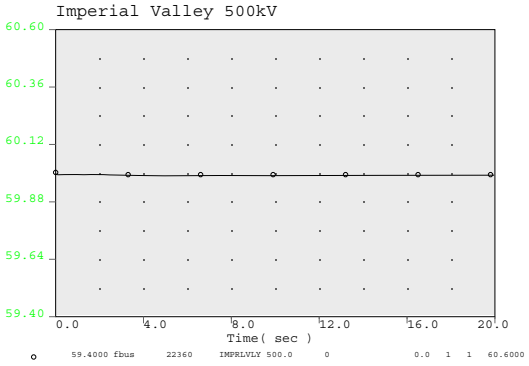
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

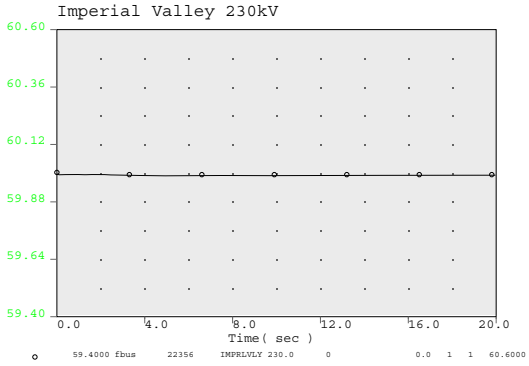
Appendix J-4

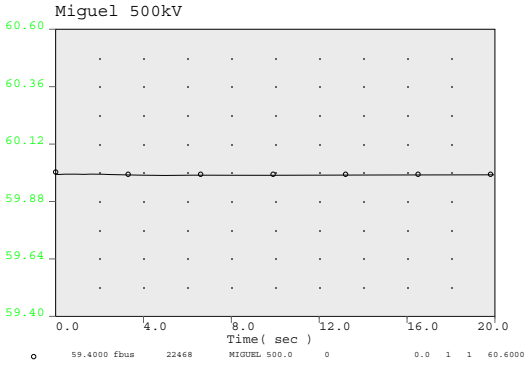
Transient Stability Plots

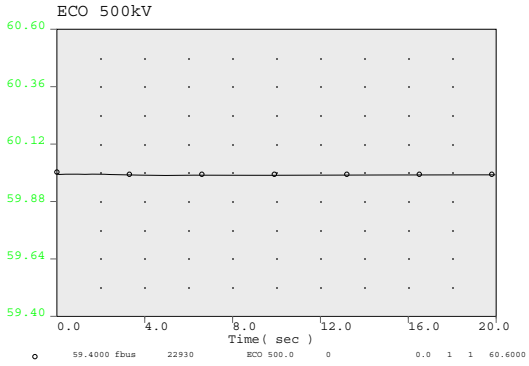
Heavy Summer Post

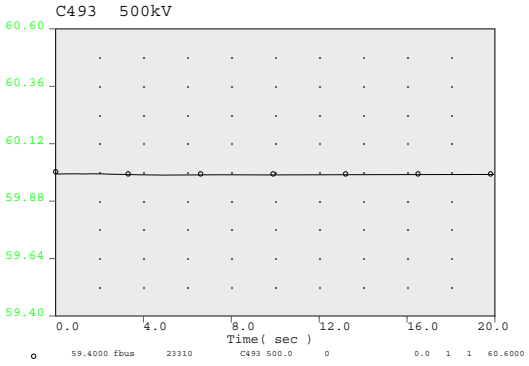
FREQUENCY

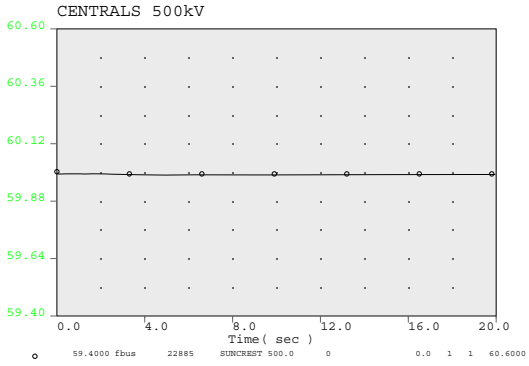












C1 C2 Heavy Summer Post With Upgrades

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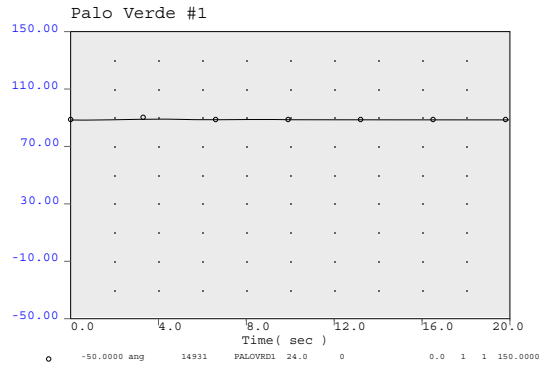
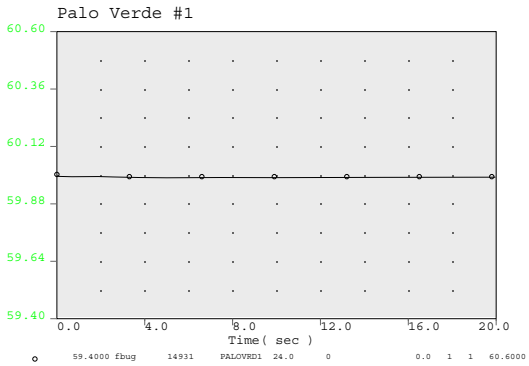
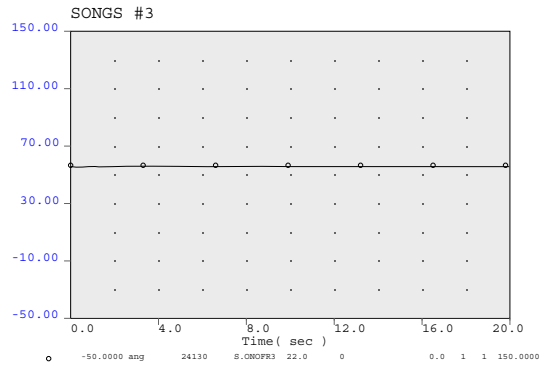
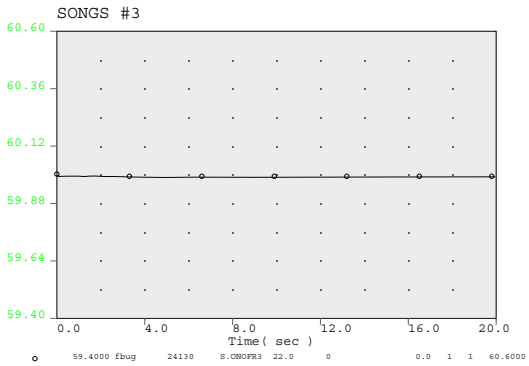
SDGE	tran-c1c2-hs-pstup-r15_FLAT.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:48:46 2011

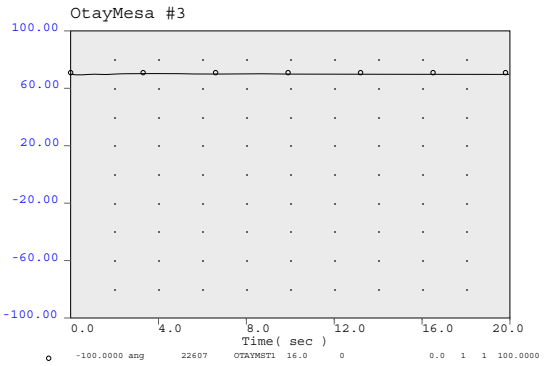
RELATIVE ROTOR ANGLE & FREQUENCY

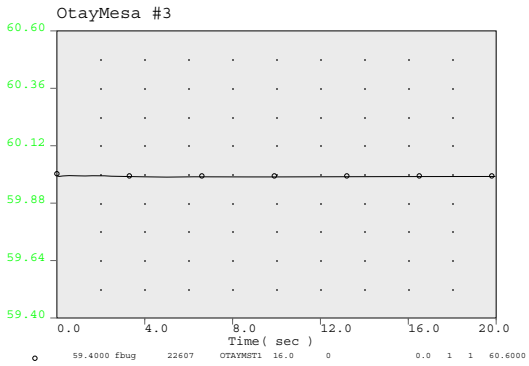










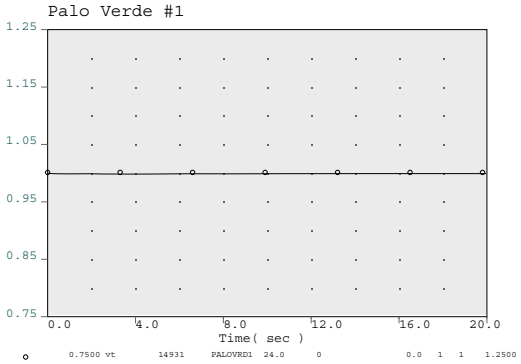


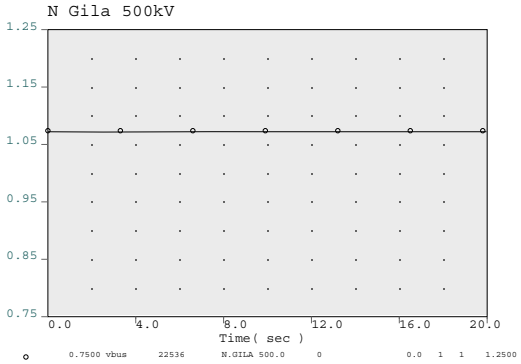
C1 C2 Heavy Summer Post With Upgrades

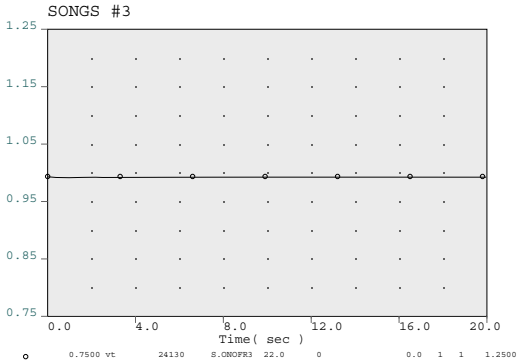
Page 1

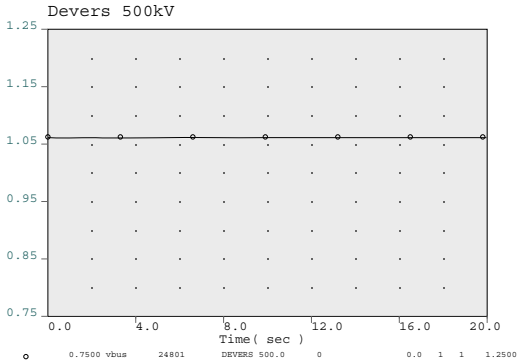
SDGE	tran-c1c2-hs-pstup-r15_FLAT.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:48:43 2011

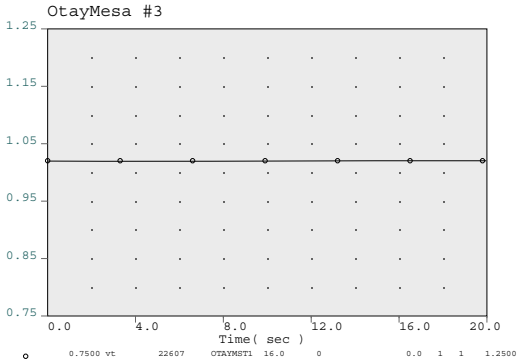
RELATIVE VOLTAGE

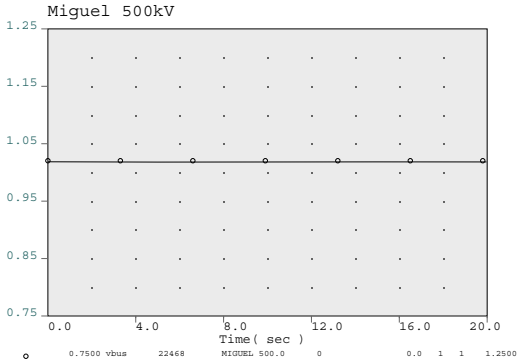












C1 C2 Heavy Summer Post With Upgrades

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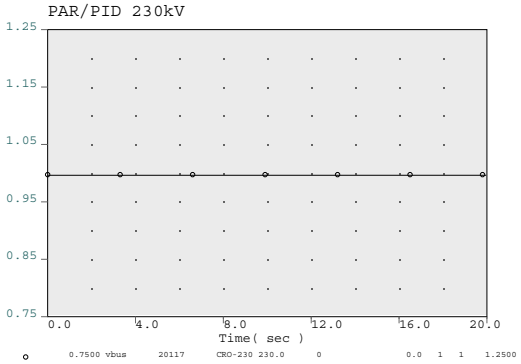
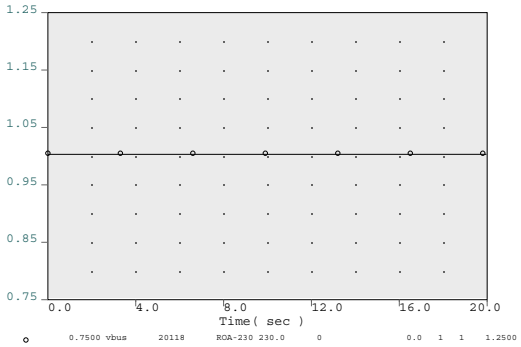
Affected System Voltage Check and Comparison

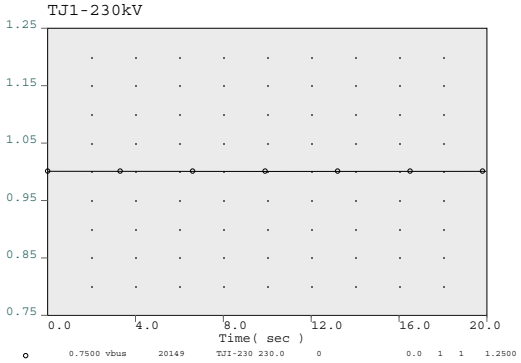
PAR/PID 230kV



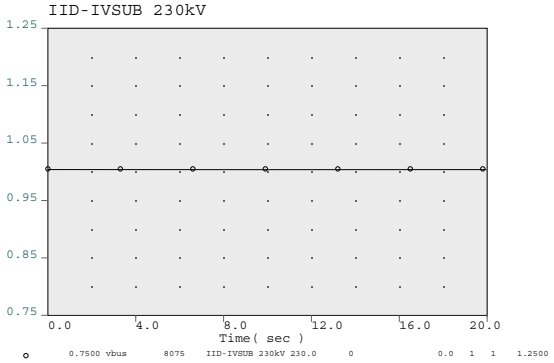
ROA-230kV



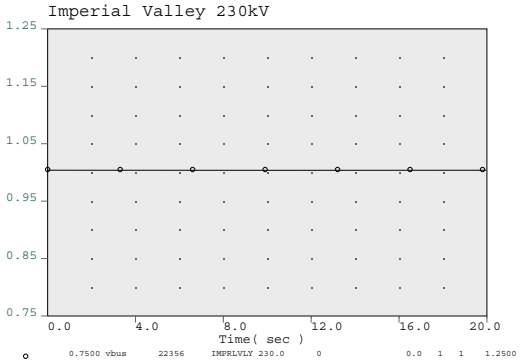
TJ1-230kV



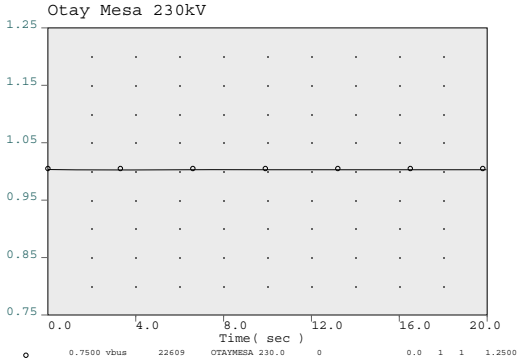
IID-IVSUB 230kV



Imperial Valley 230kV

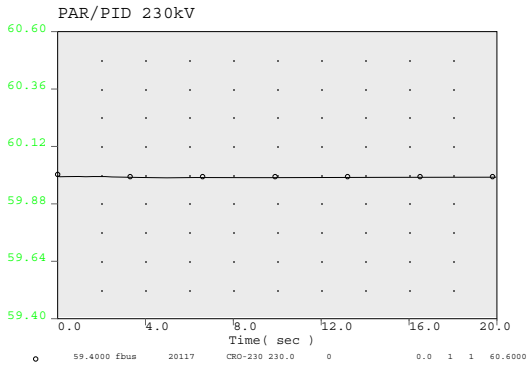


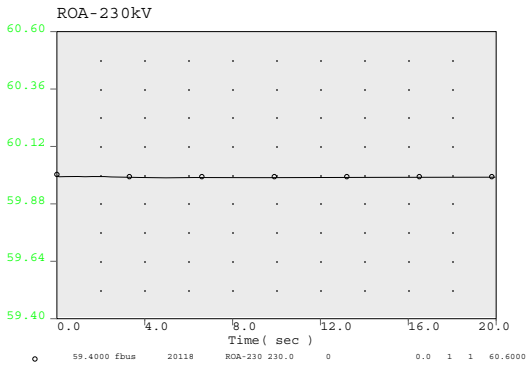
Otay Mesa 230kV

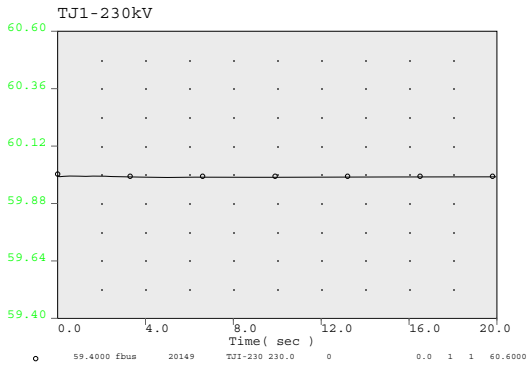


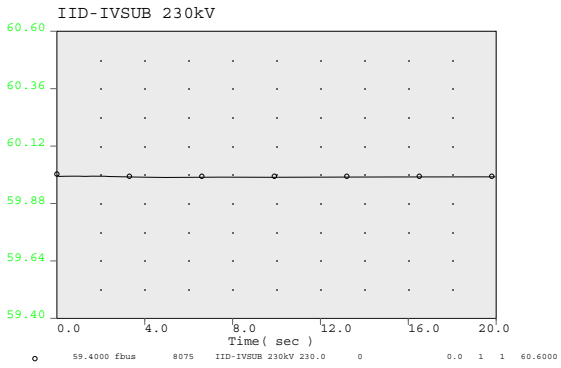
C1 C2 Heavy Summer Post With Upgrades

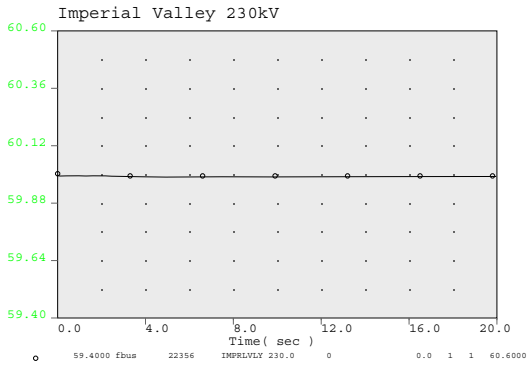
Affected System Frequency Check and Comparison

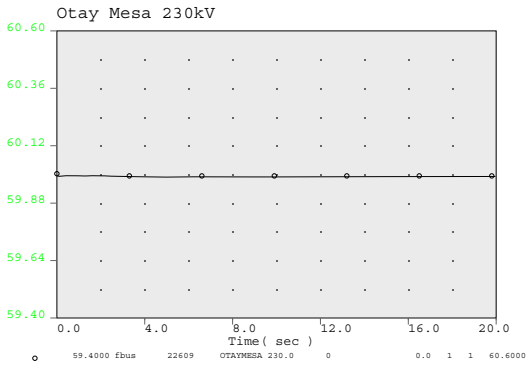












C1 C2 Heavy Summer Post With Upgrades

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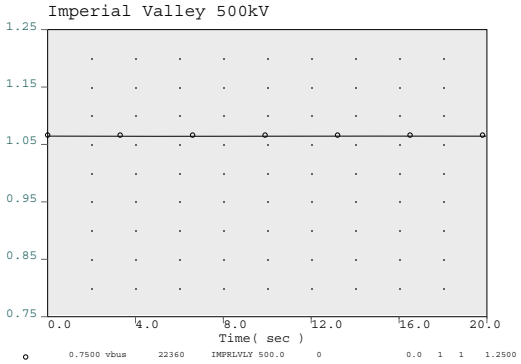
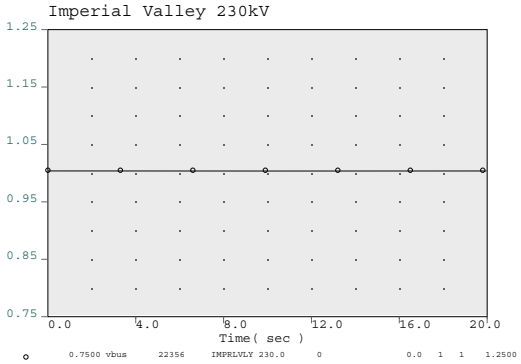
VOLTAGE

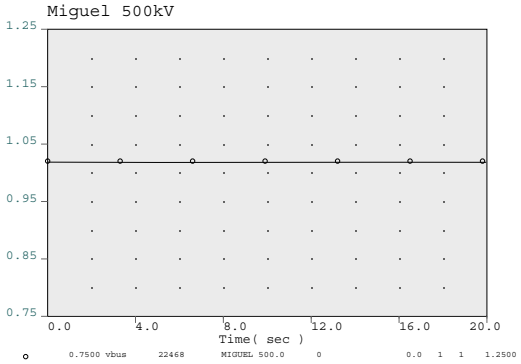
Imperial Valley 500kV



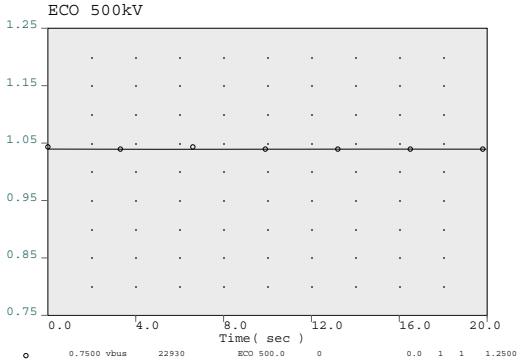
Imperial Valley 230kV



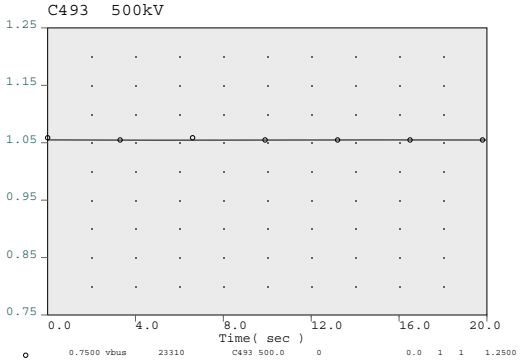
Miguel 500kV



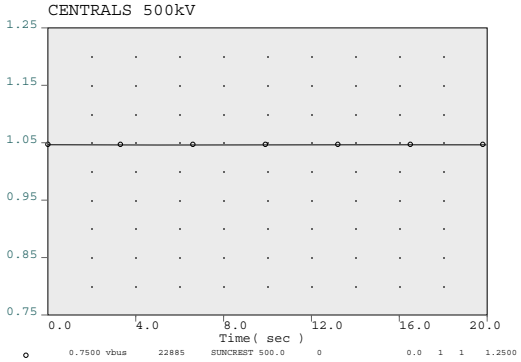
ECO 500kV



C493 500kV

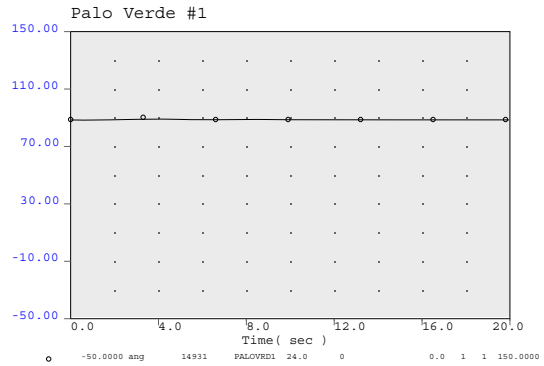


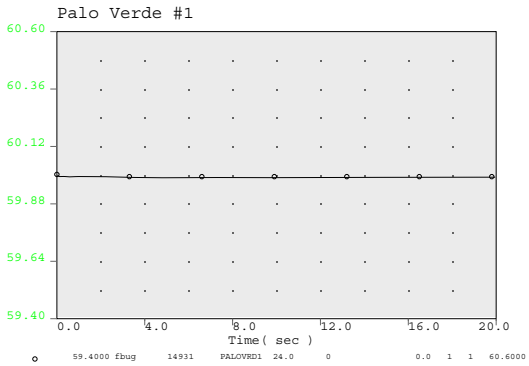
CENTRALS 500kV

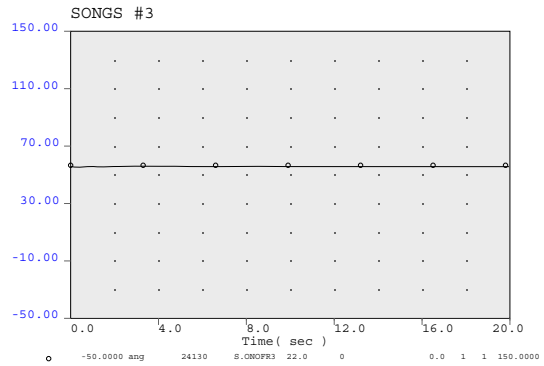


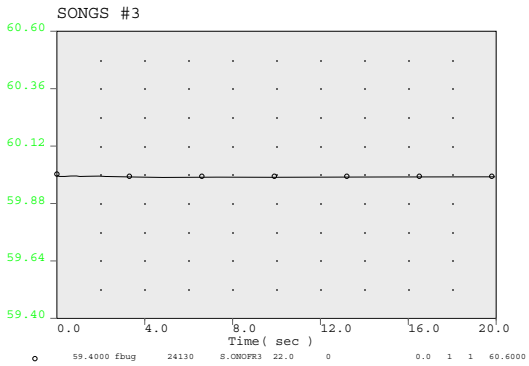
C1 C2 Heavy Summer Post With Upgrades

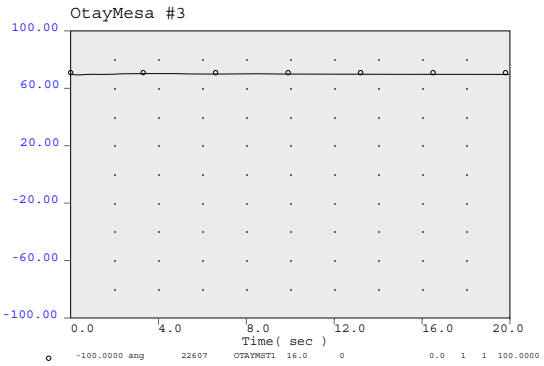
RELATIVE ROTOR ANGLE & FREQUENCY

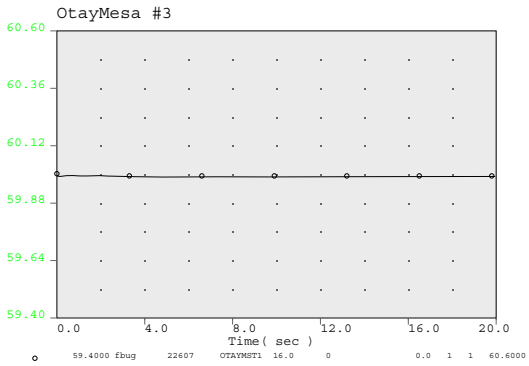












C1 C2 Heavy Summer Post With Upgrades

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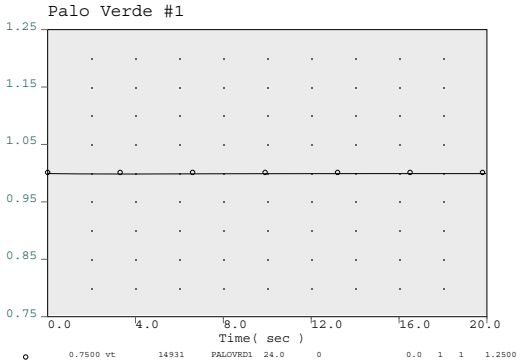
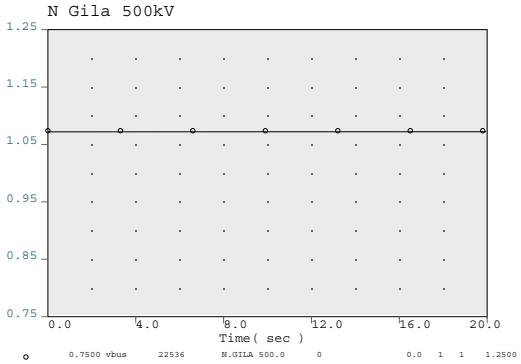
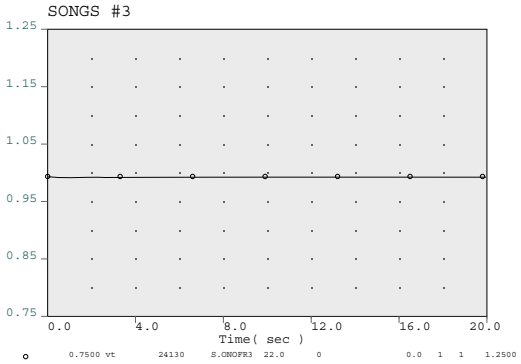
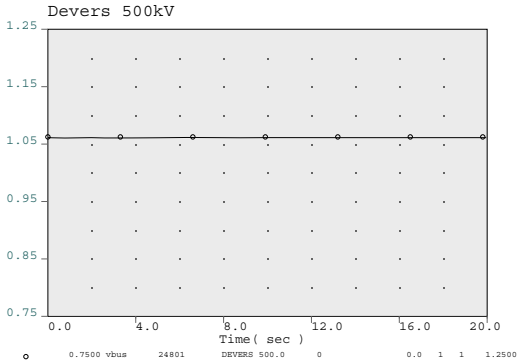
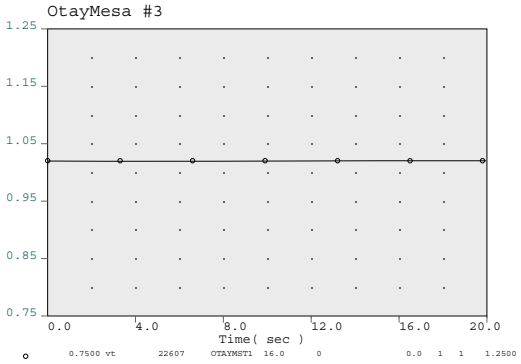
RELATIVE VOLTAGE

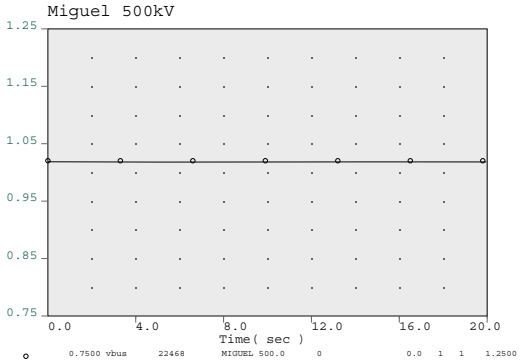












C1 C2 Heavy Summer Post With Upgrades

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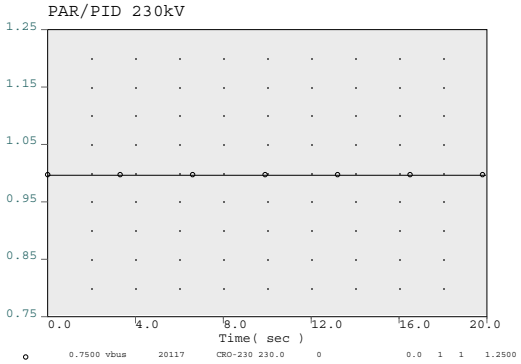
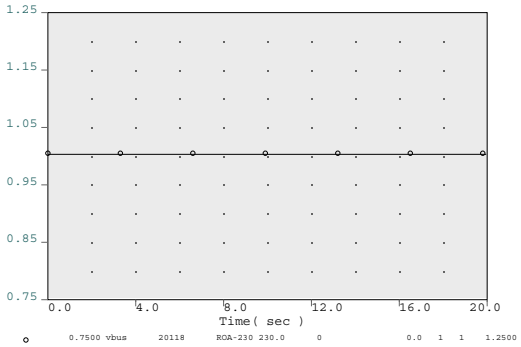
Affected System Voltage Check and Comparison

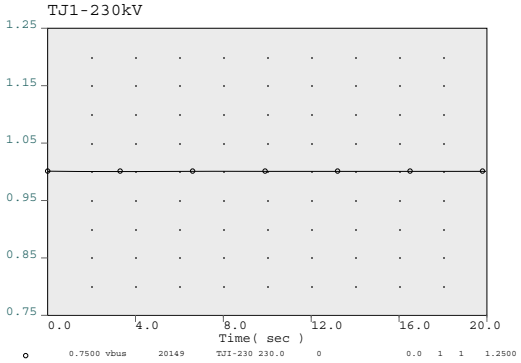
PAR/PID 230kV



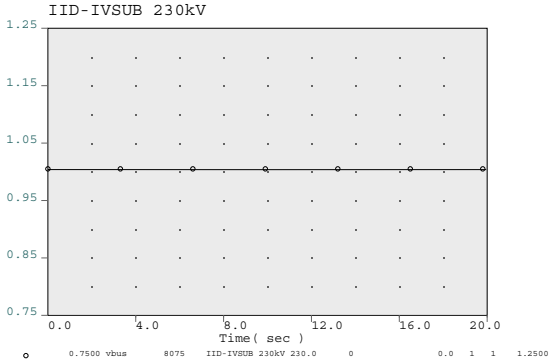
ROA-230kV



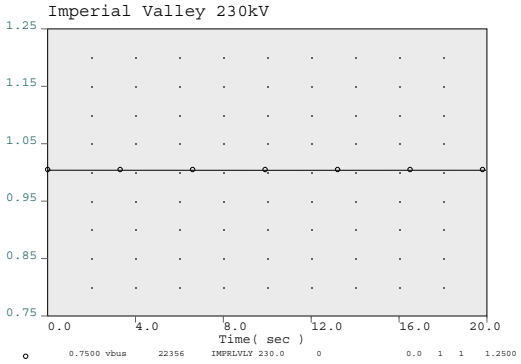
TJ1-230kV



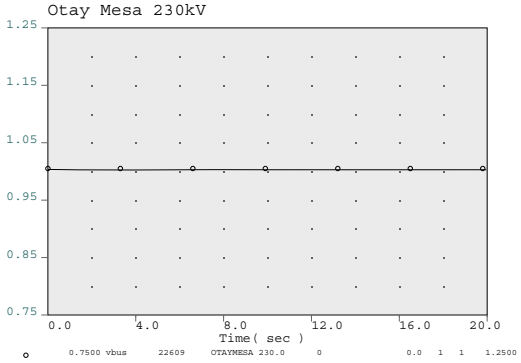
IID-IVSUB 230kV



Imperial Valley 230kV



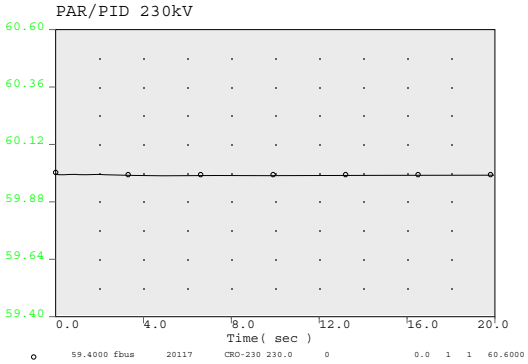
Otay Mesa 230kV



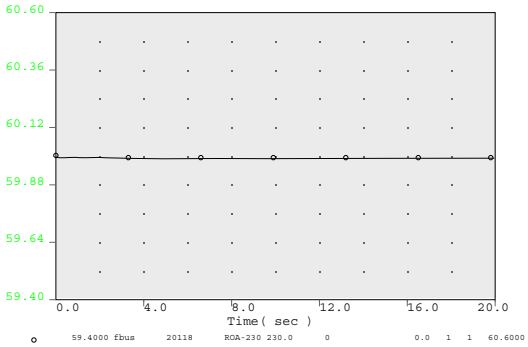
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

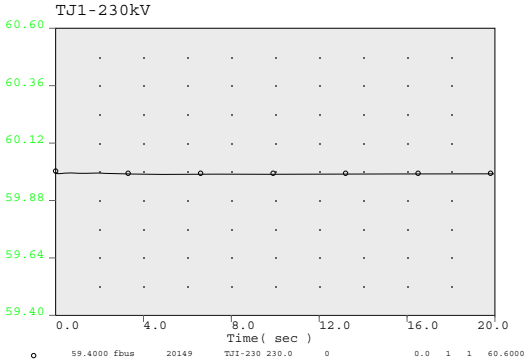
PAR/PID 230kV



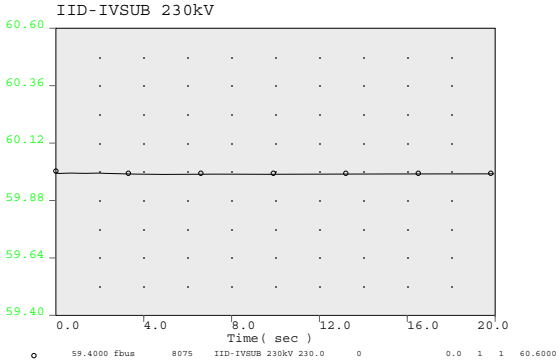
ROA-230kV



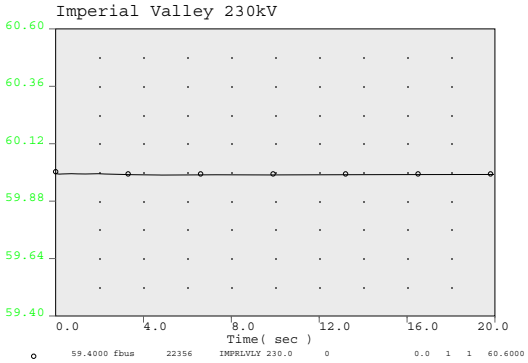
TJ1-230kV



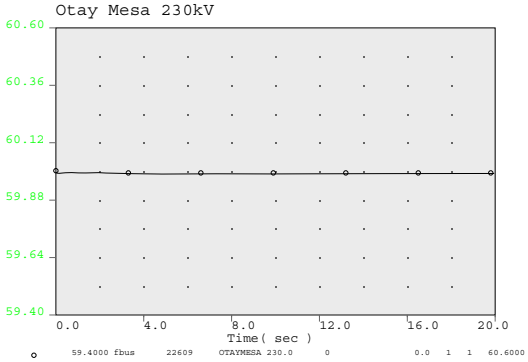
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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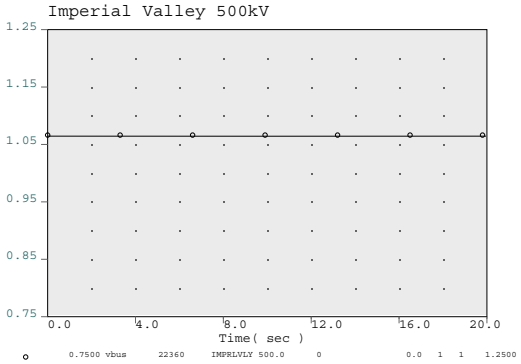
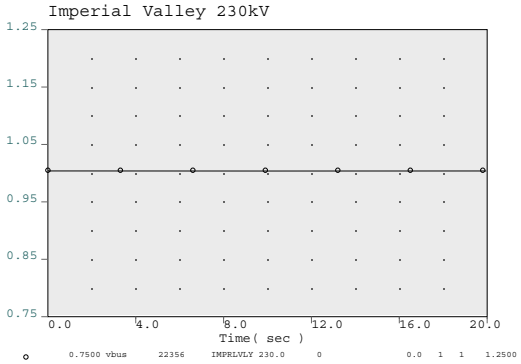
VOLTAGE

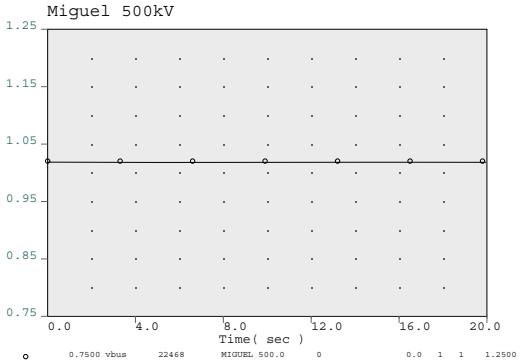
Imperial Valley 500kV



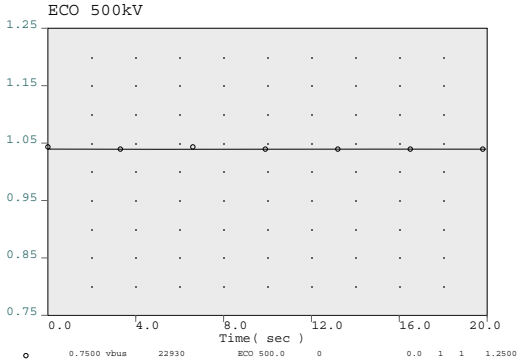
Imperial Valley 230kV



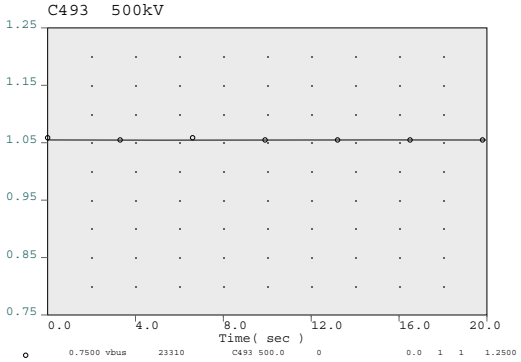
Miguel 500kV



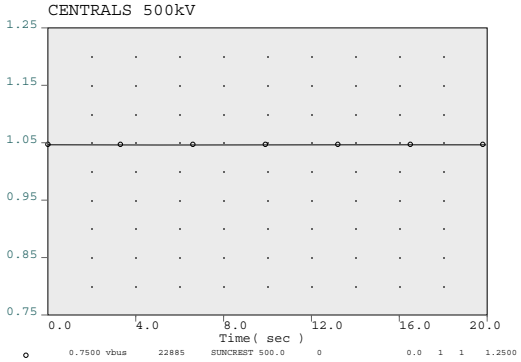
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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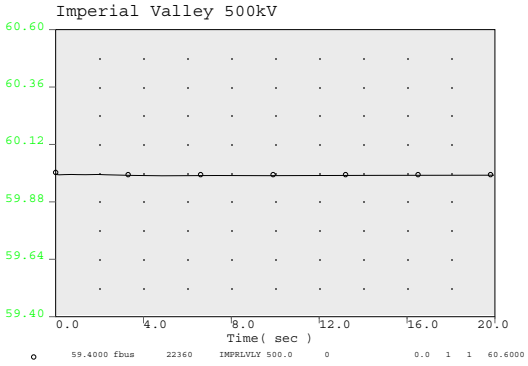
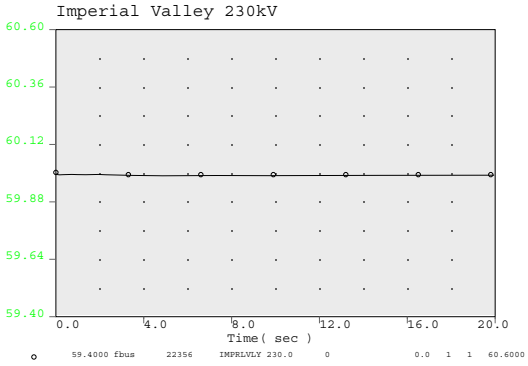
FREQUENCY

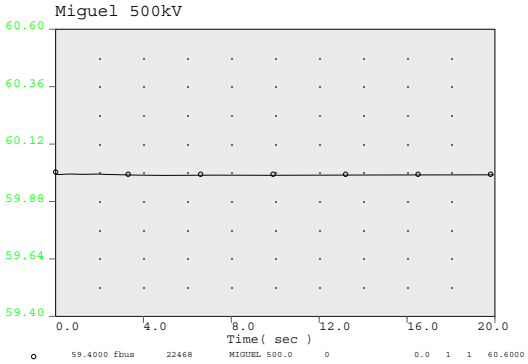
Imperial Valley 500kV



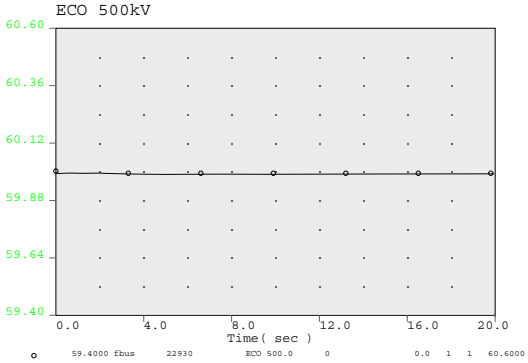
Imperial Valley 230kV



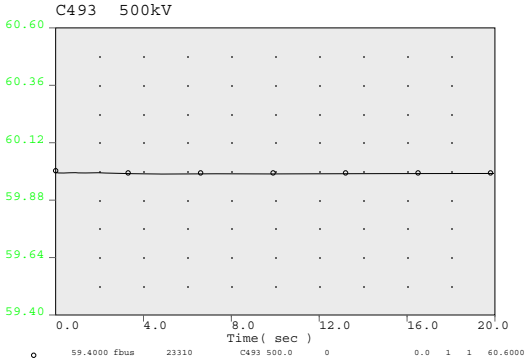
Miguel 500kV



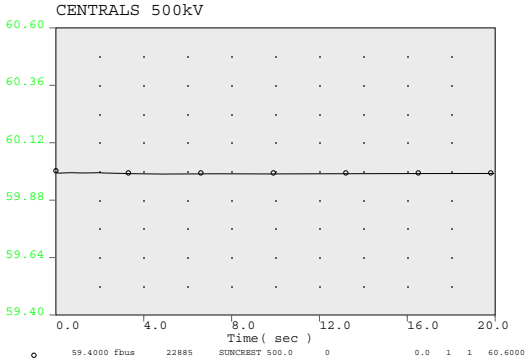
ECO 500kV



C493 500kV

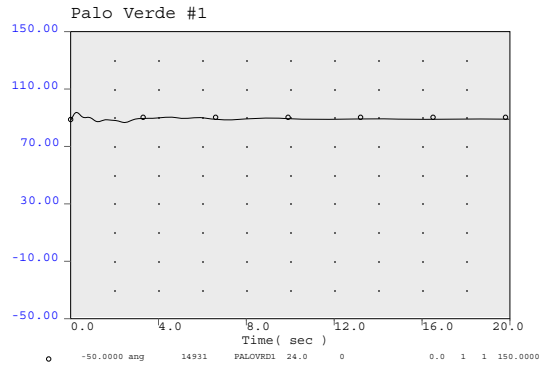


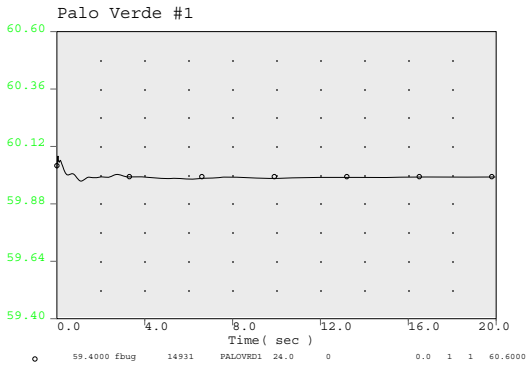
CENTRALS 500kV

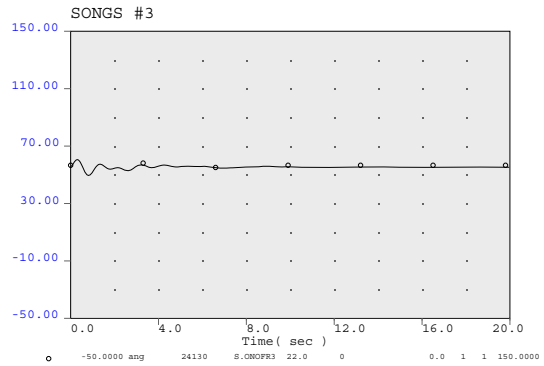


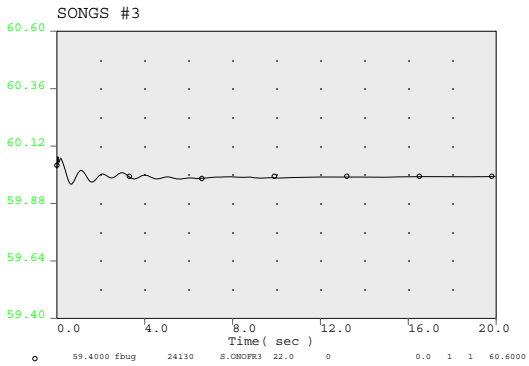
C1 C2 Heavy Summer Post With Upgrades

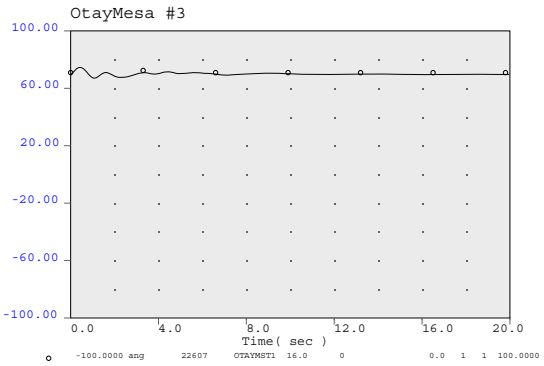
RELATIVE ROTOR ANGLE & FREQUENCY

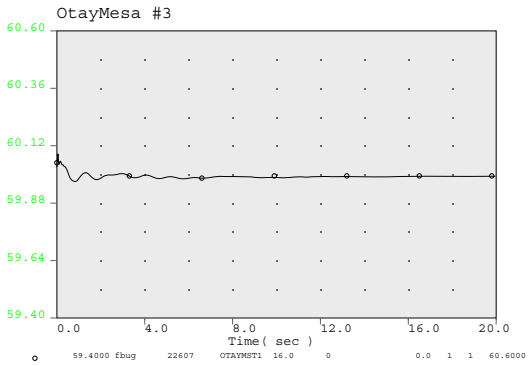












C1 C2 Heavy Summer Post With Upgrades

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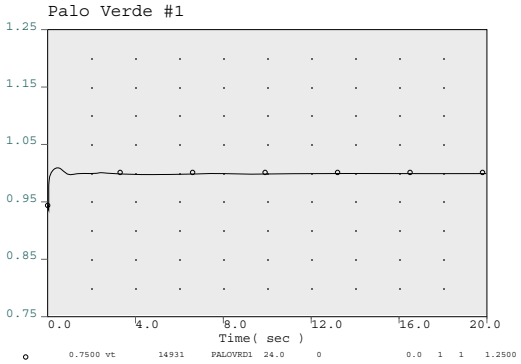
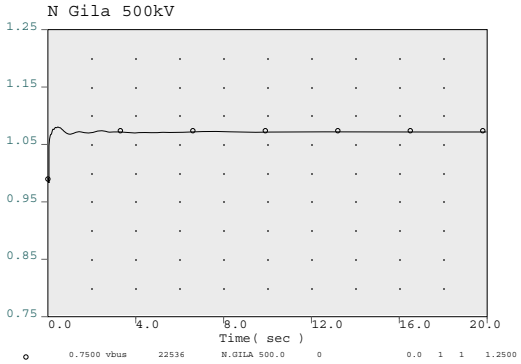
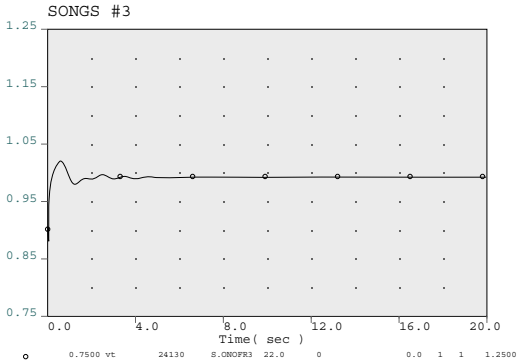
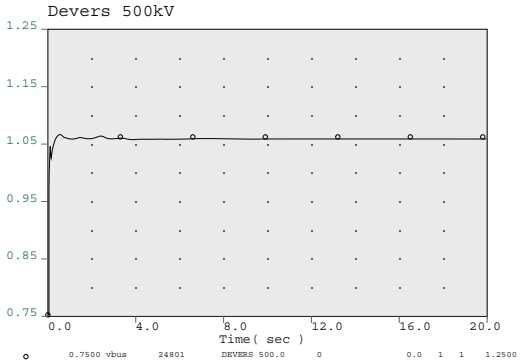
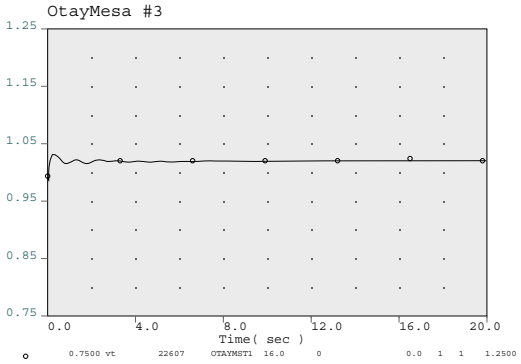
RELATIVE VOLTAGE

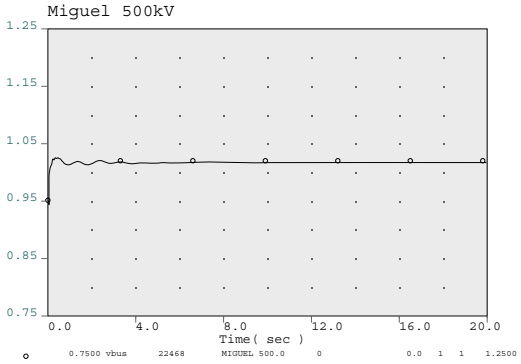








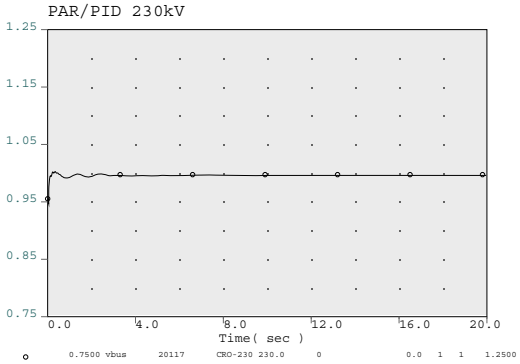




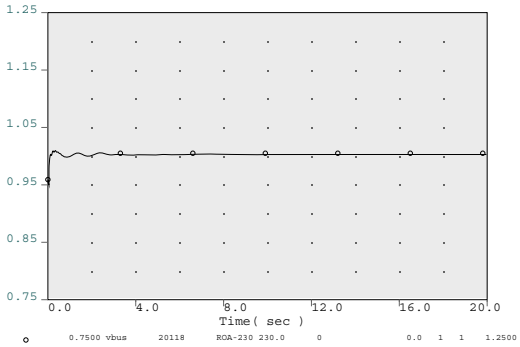
C1 C2 Heavy Summer Post With Upgrades

Affected System Voltage Check and Comparison

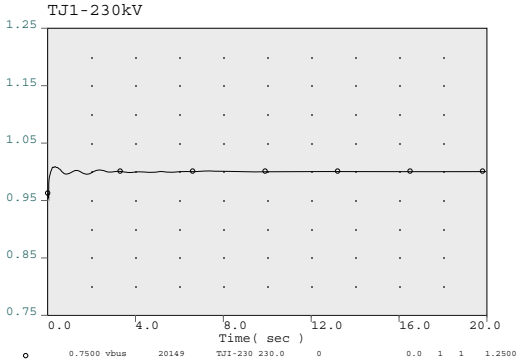
PAR/PID 230kV



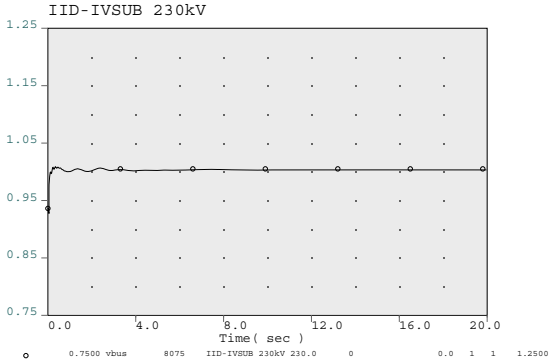
ROA-230kV



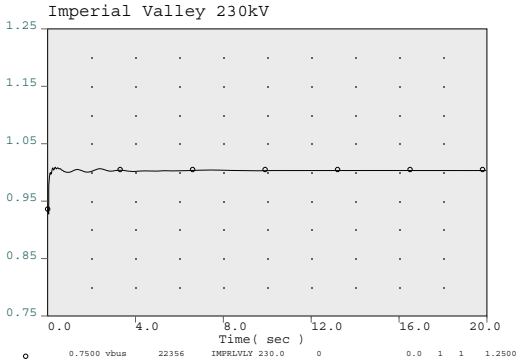
TJ1-230kV



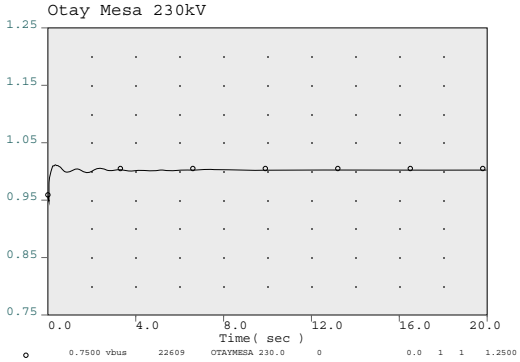
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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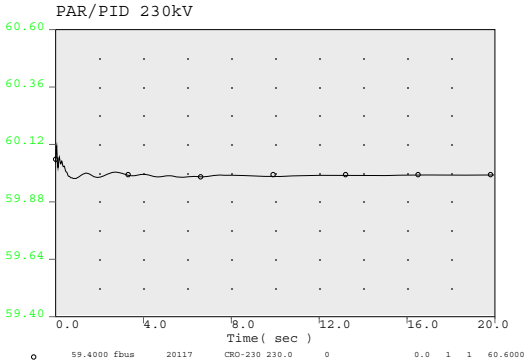
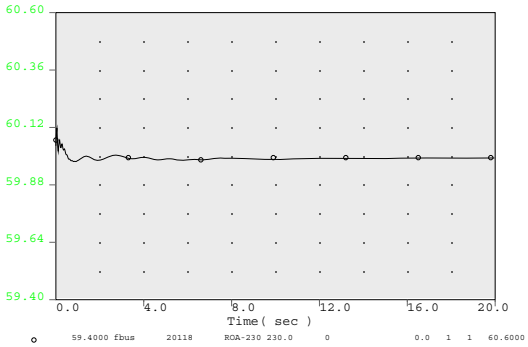
Affected System Frequency Check and Comparison

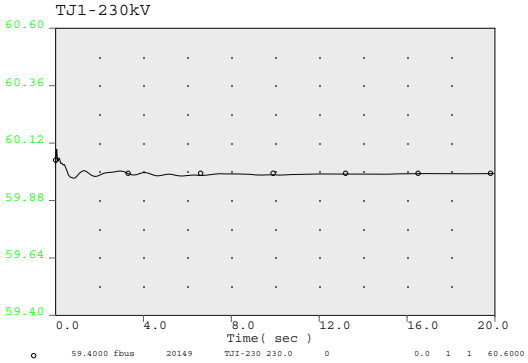
PAR/PID 230kV



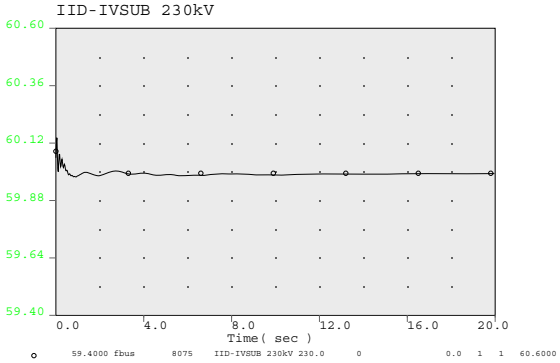
ROA-230kV



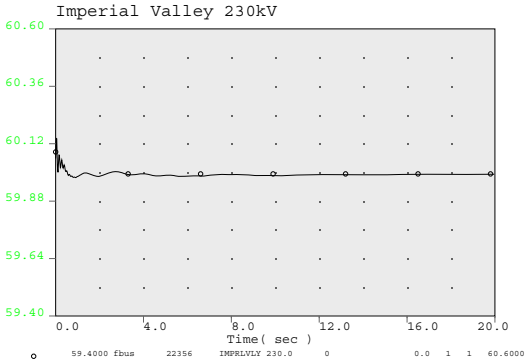
TJ1-230kV



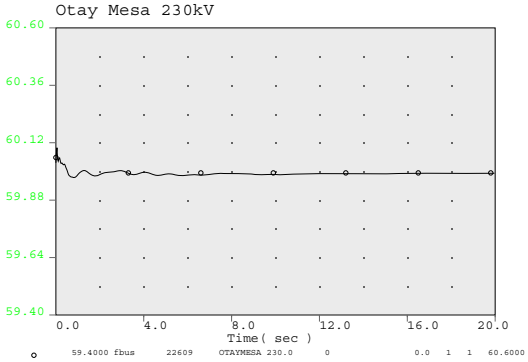
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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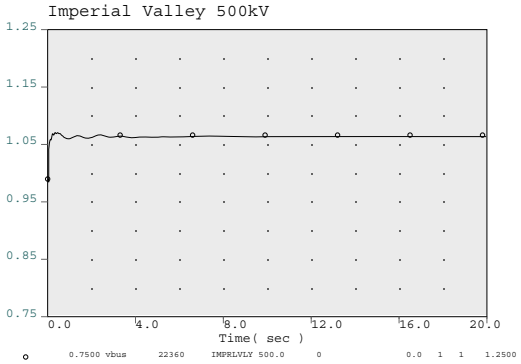
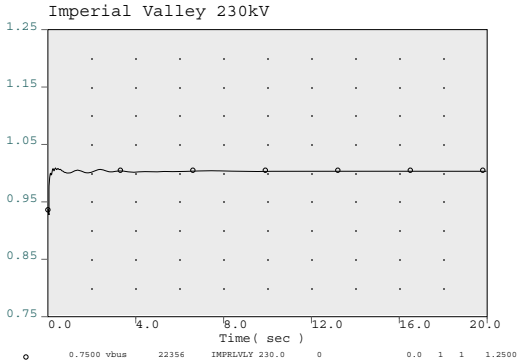
VOLTAGE

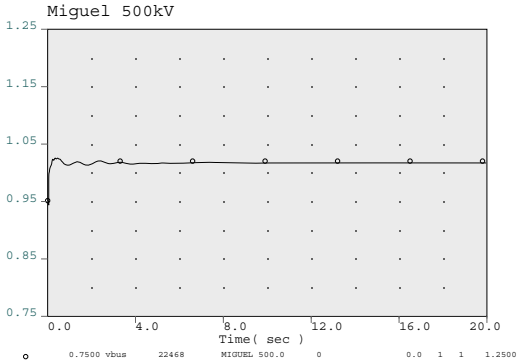
Imperial Valley 500kV



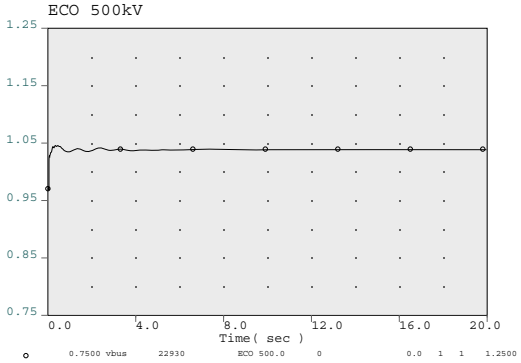
Imperial Valley 230kV



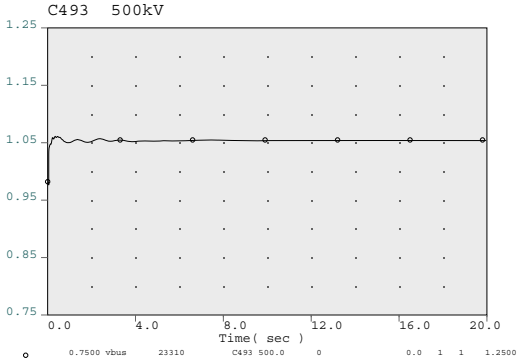
Miguel 500kV



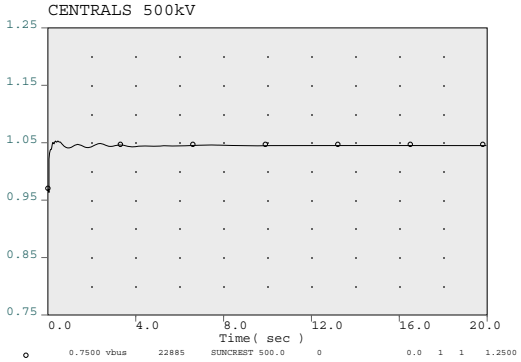
ECO 500kV



C493 500kV



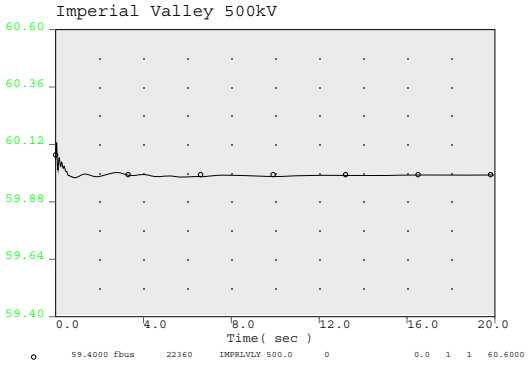
CENTRALS 500kV



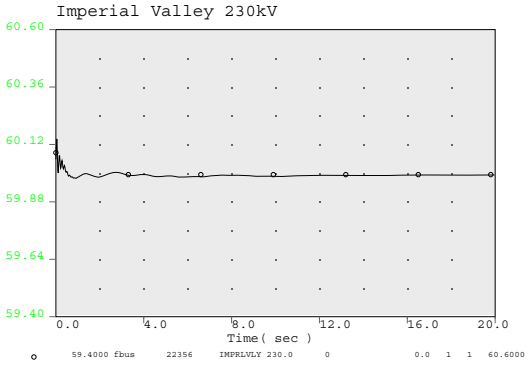
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

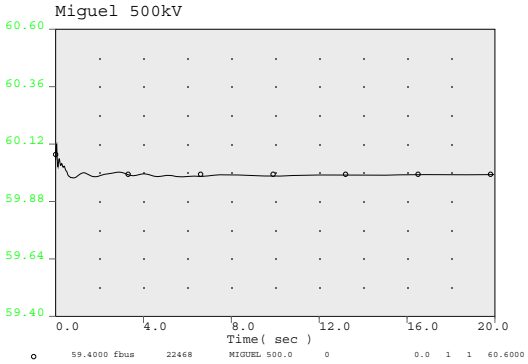
Imperial Valley 500kV



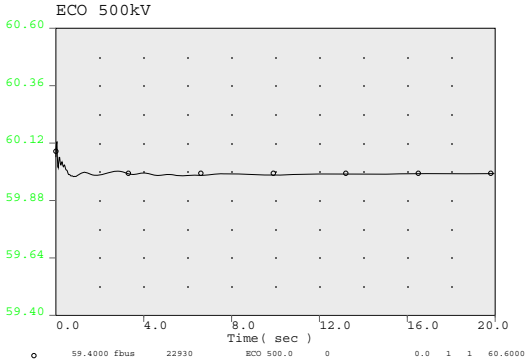
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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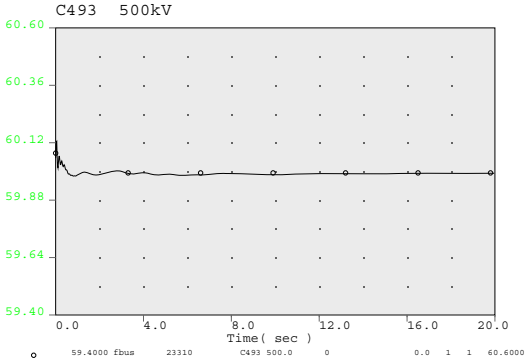
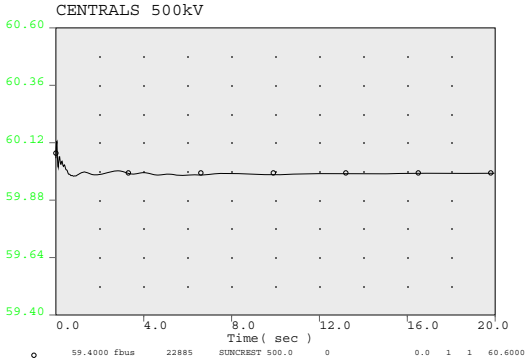


CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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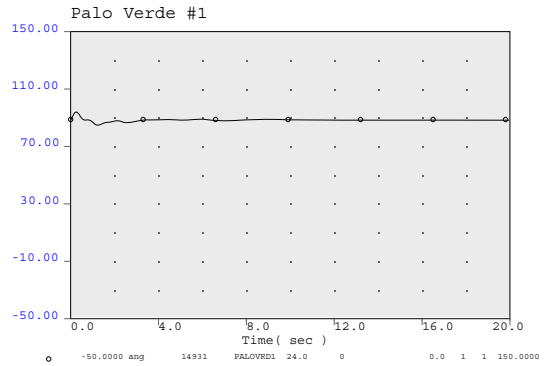
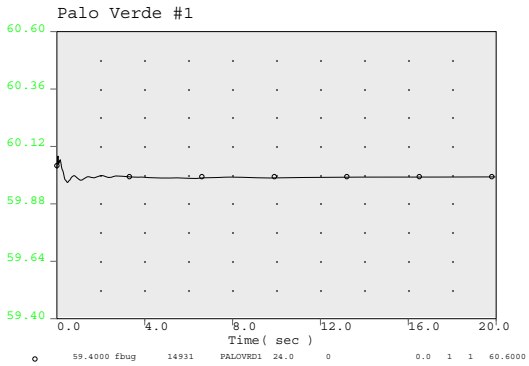
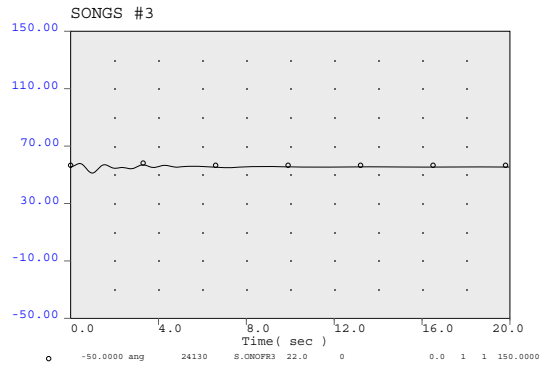
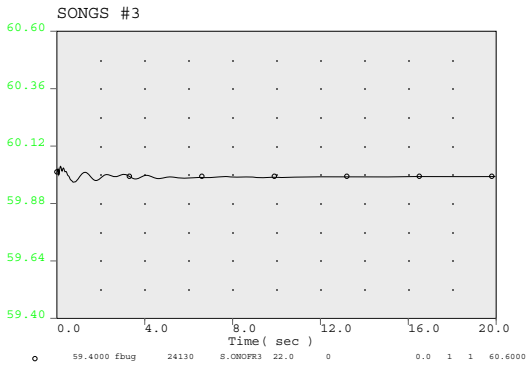
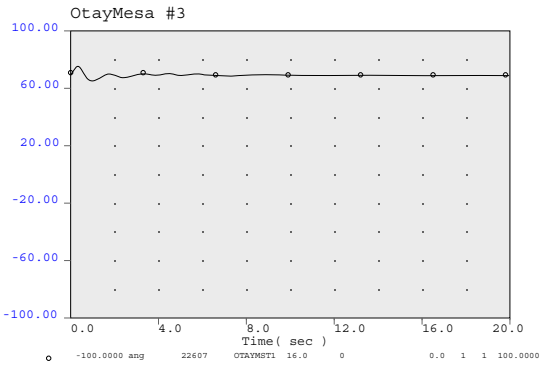
RELATIVE ROTOR ANGLE & FREQUENCY

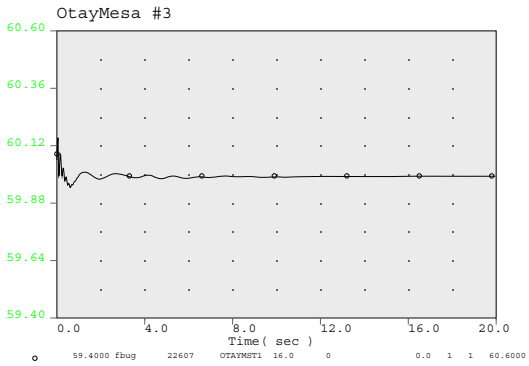












C1 C2 Heavy Summer Post With Upgrades

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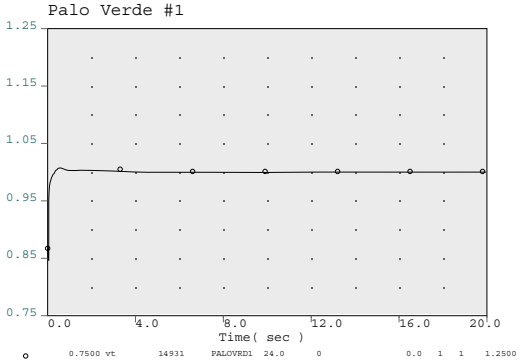
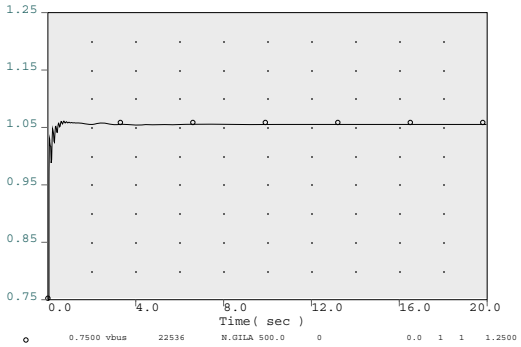
RELATIVE VOLTAGE

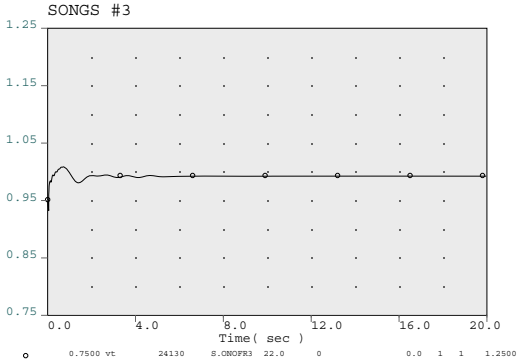
Palo Verde #1



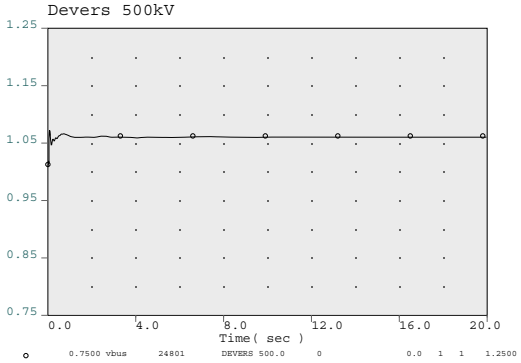
N Gila 500kV



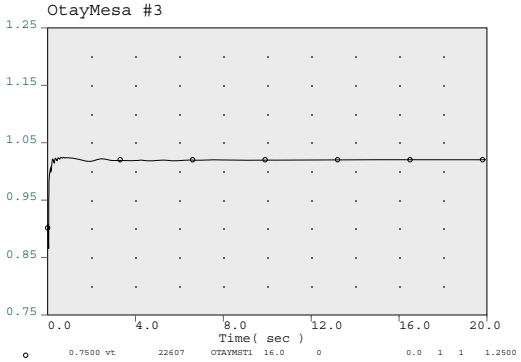
SONGS #3



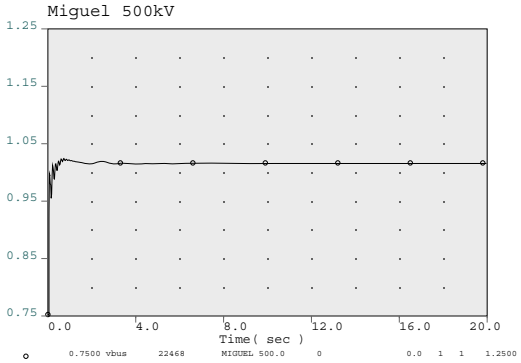
Devers 500kV



OtayMesa #3



Miguel 500kV



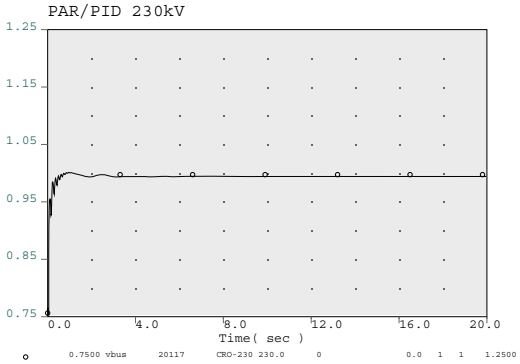
C1 C2 Heavy Summer Post With Upgrades

Page 2

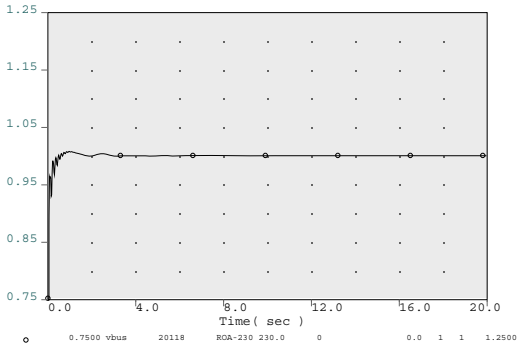
SDGE	tran-c1c2-hs-pstup-r15_HAA-NGila-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:50:47 2011

Affected System Voltage Check and Comparison

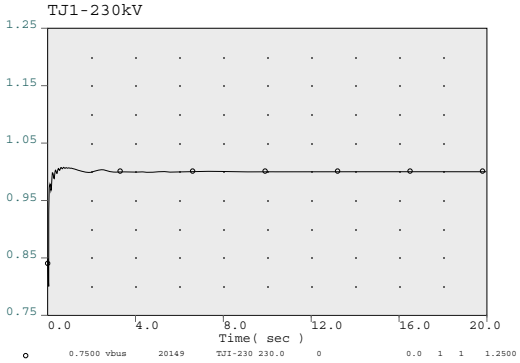
PAR/PID 230kV



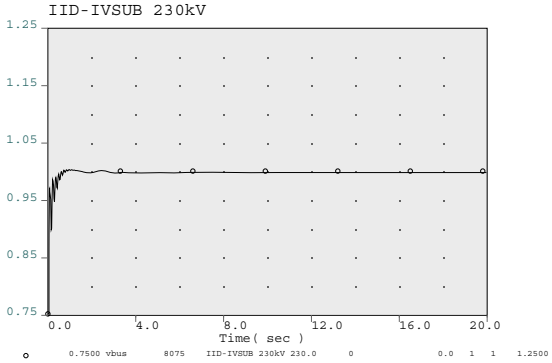
ROA-230kV



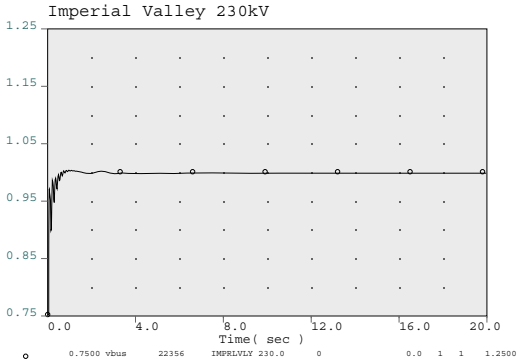
TJ1-230kV



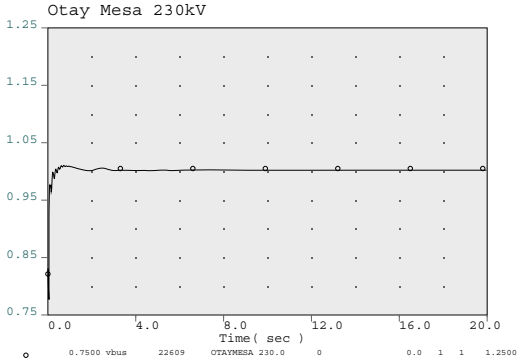
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



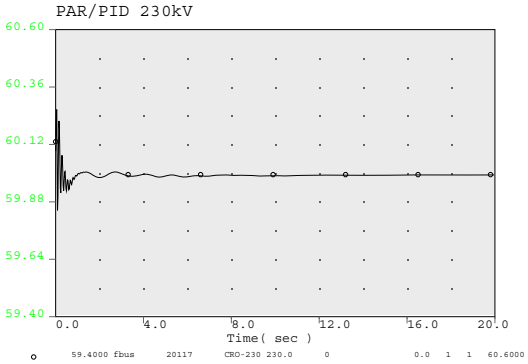
C1 C2 Heavy Summer Post With Upgrades

Page 3

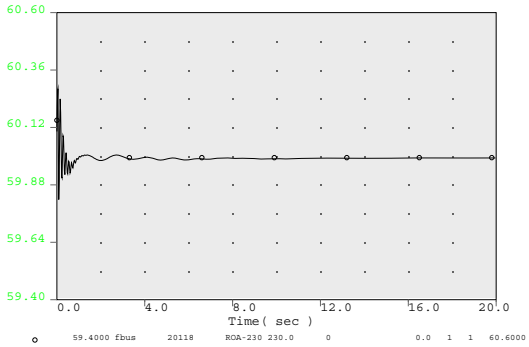
SDGE	tran-c1c2-hs-pstup-r15_HAA-NGila-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:50:48 2011

Affected System Frequency Check and Comparison

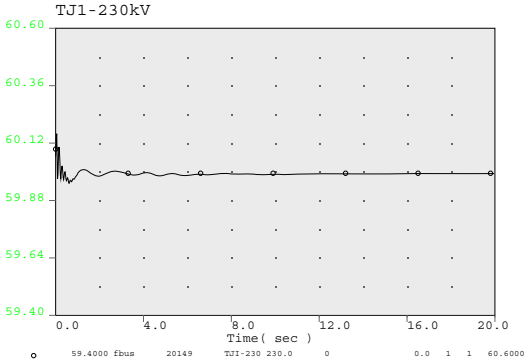
PAR/PID 230kV



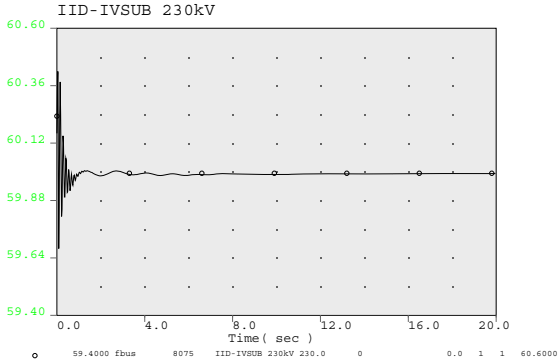
ROA-230kV



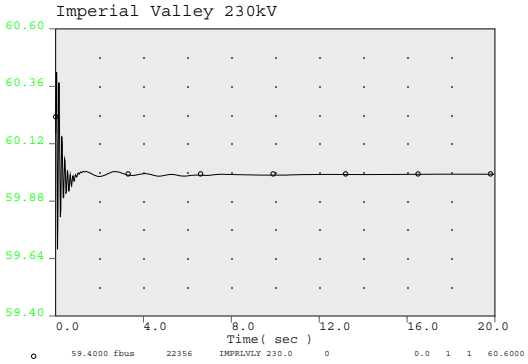
TJ1-230kV



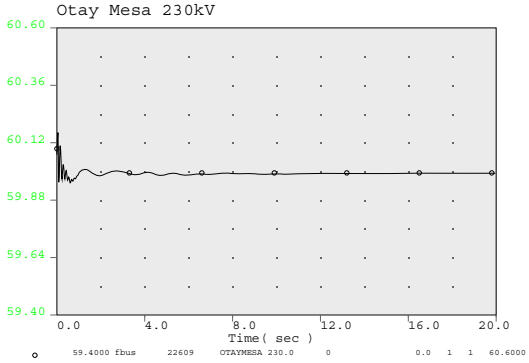
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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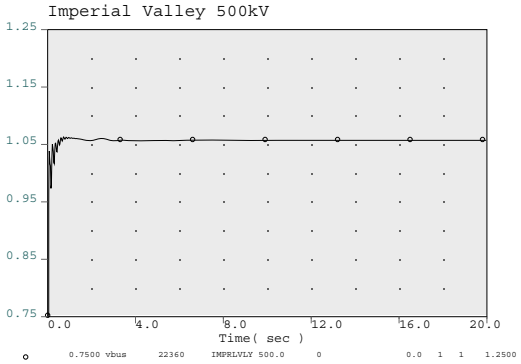
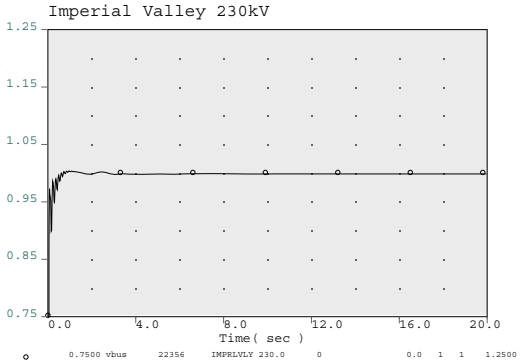
VOLTAGE

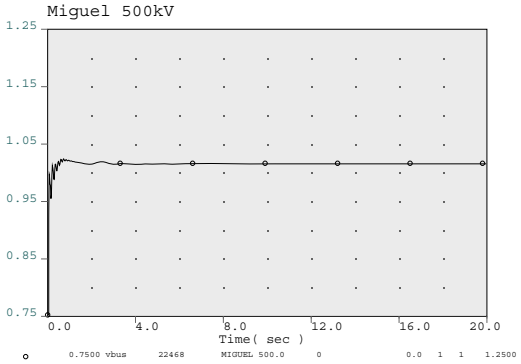
Imperial Valley 500kV



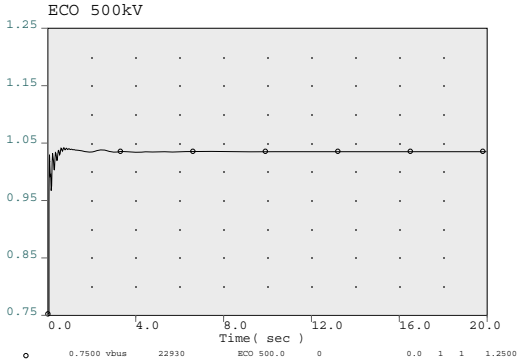
Imperial Valley 230kV



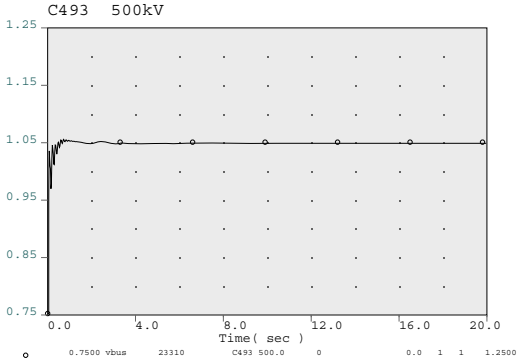
Miguel 500kV



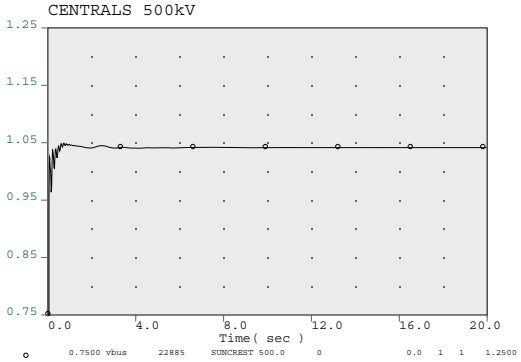
ECO 500kV



C493 500kV



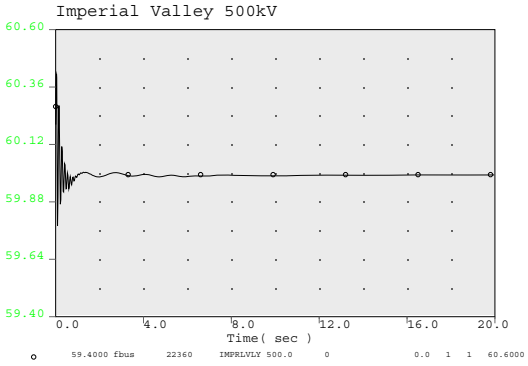
CENTRALS 500kV



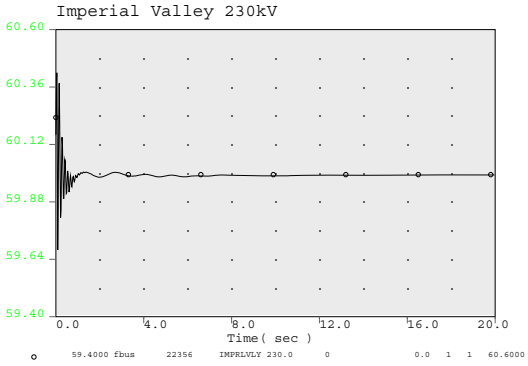
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

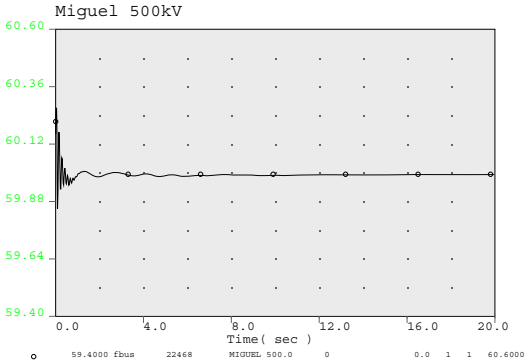
Imperial Valley 500kV



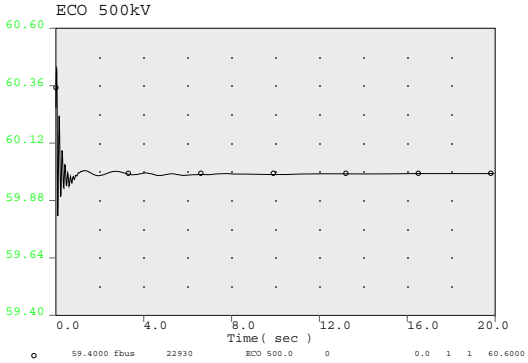
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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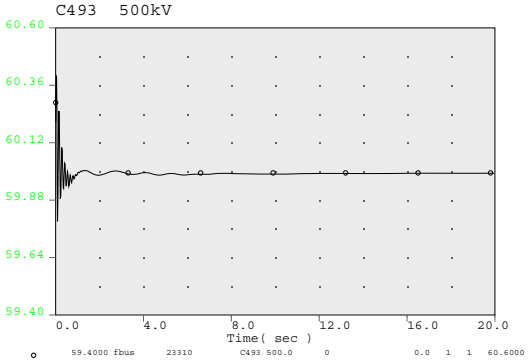
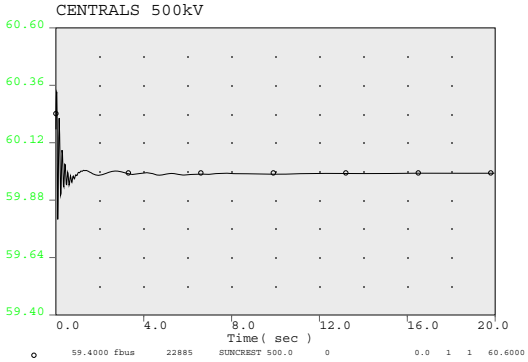
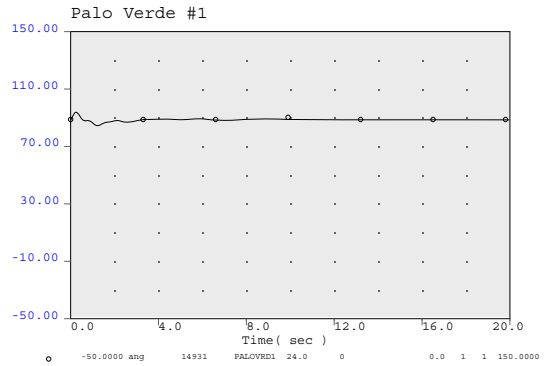


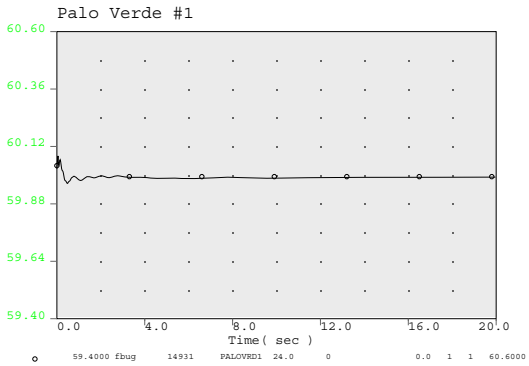
CENTRALS 500kV

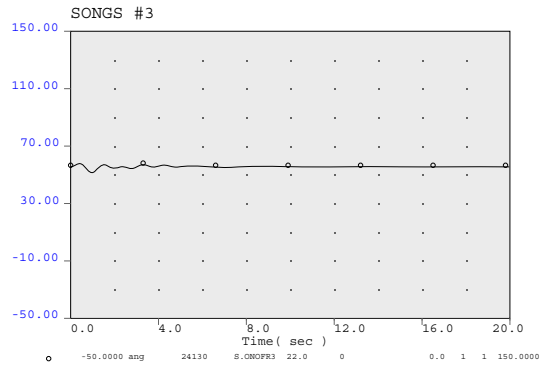


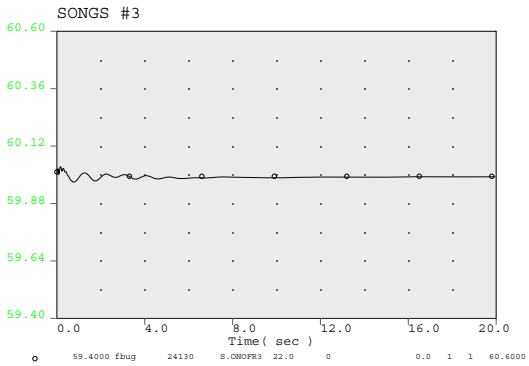
C1 C2 Heavy Summer Post With Upgrades

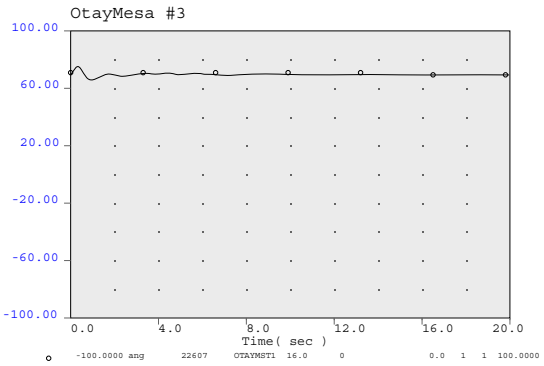
RELATIVE ROTOR ANGLE & FREQUENCY

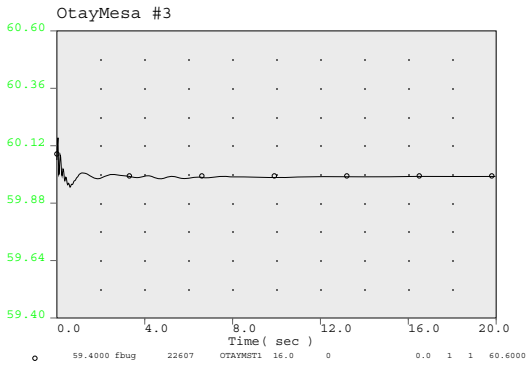










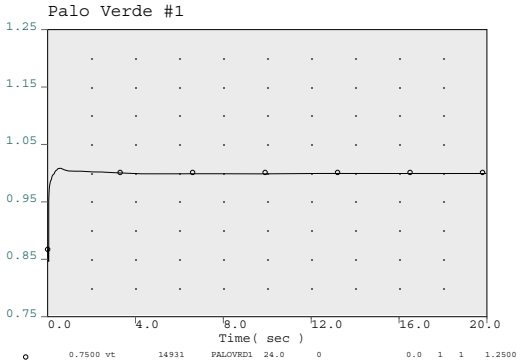


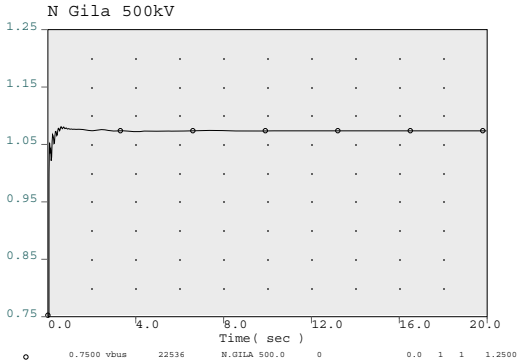
C1 C2 Heavy Summer Post With Upgrades

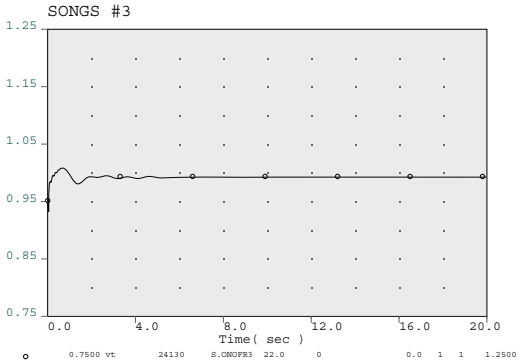
Page 1

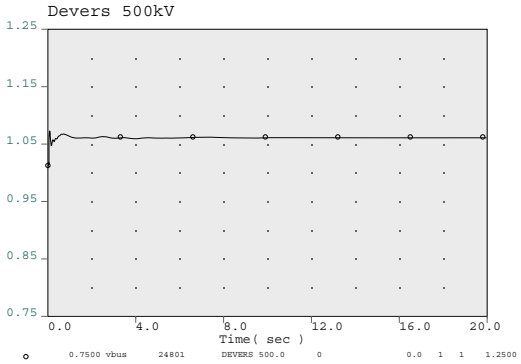
SDGE	tran-c1c2-hs-pstup-r15_HDWSH-NGila-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:52:44 2011

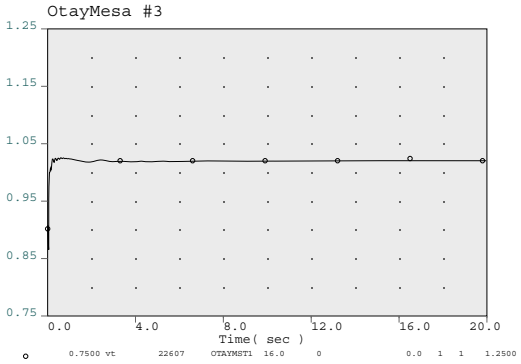
RELATIVE VOLTAGE

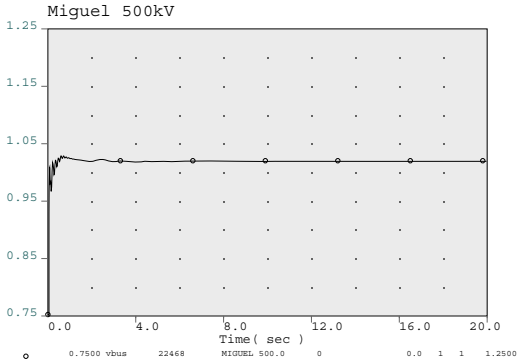








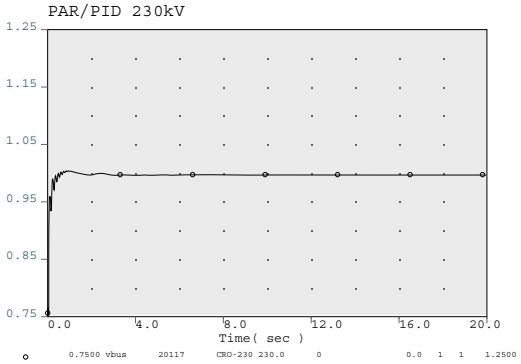




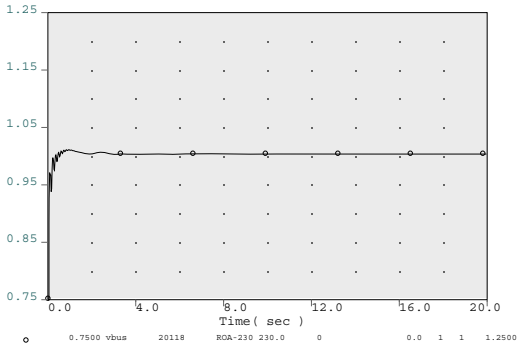
C1 C2 Heavy Summer Post With Upgrades

Affected System Voltage Check and Comparison

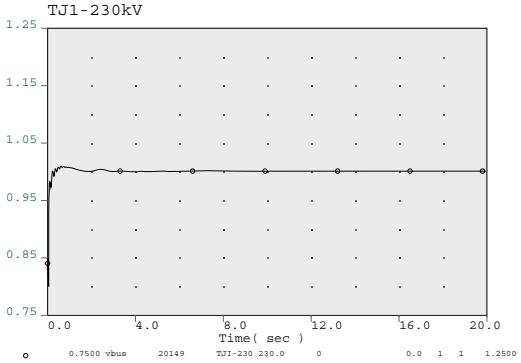
PAR/PID 230kV



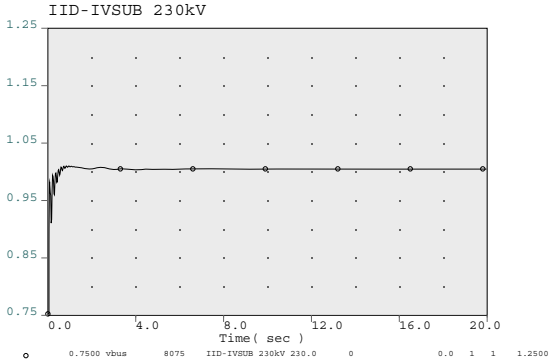
ROA-230kV



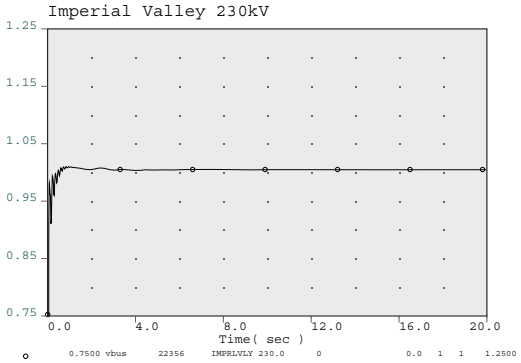
TJ1-230kV



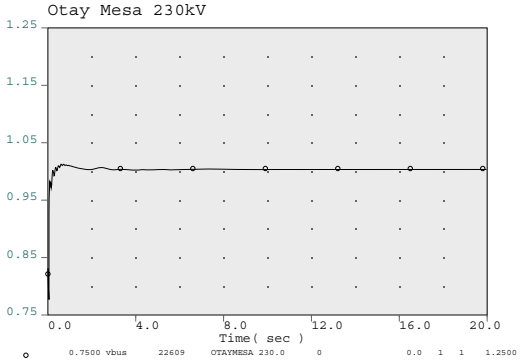
IID-IVSUB 230kV



Imperial Valley 230kV



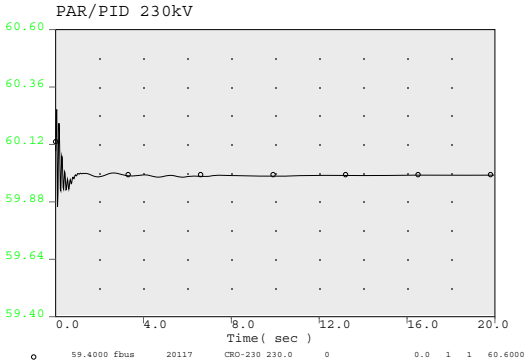
Otay Mesa 230kV



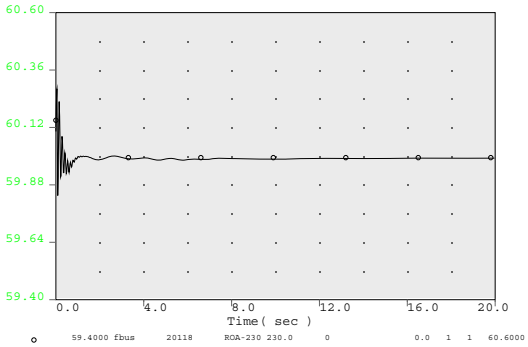
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

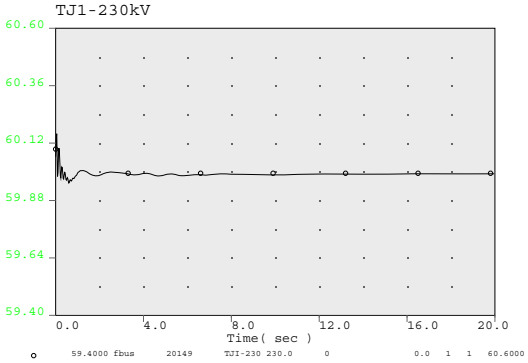
PAR/PID 230kV



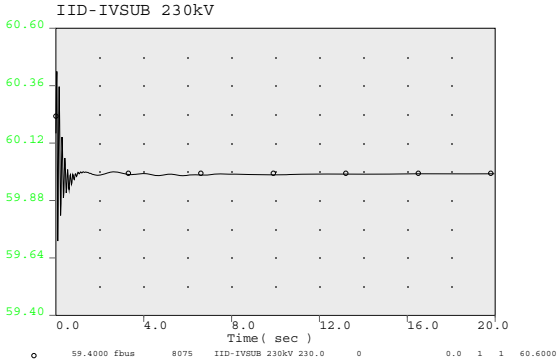
ROA-230kV



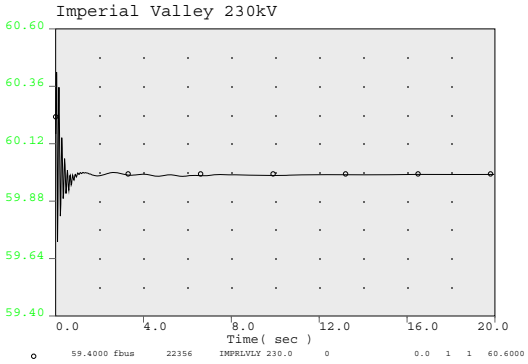
TJ1-230kV



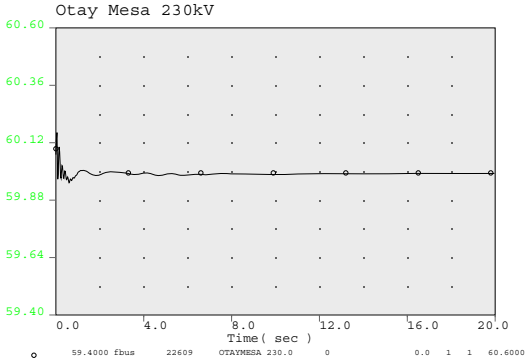
IID-IVSUB 230kV



Imperial Valley 230kV



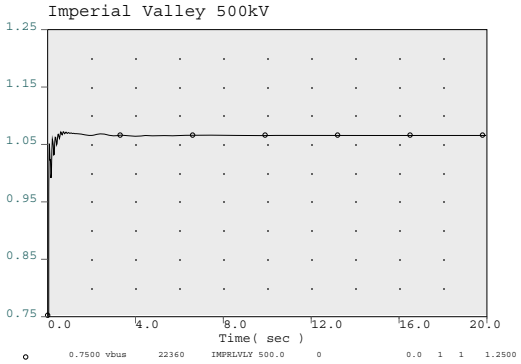
Otay Mesa 230kV



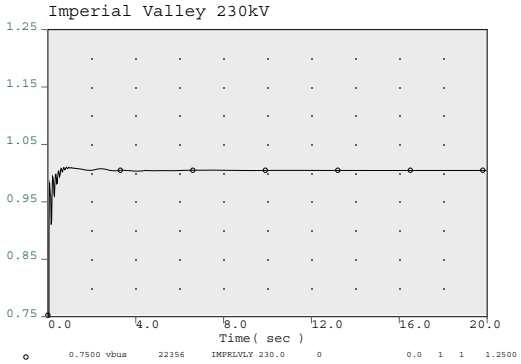
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

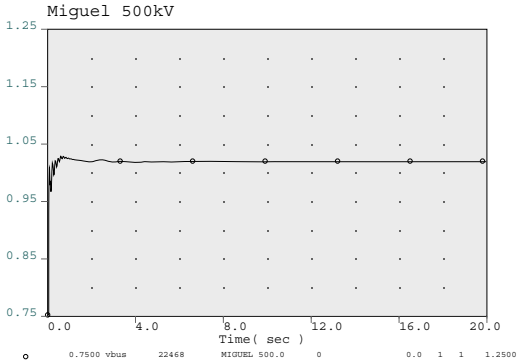
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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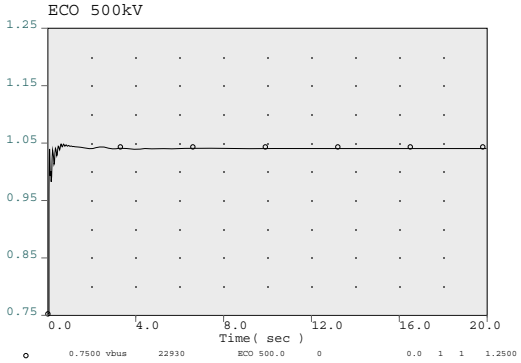
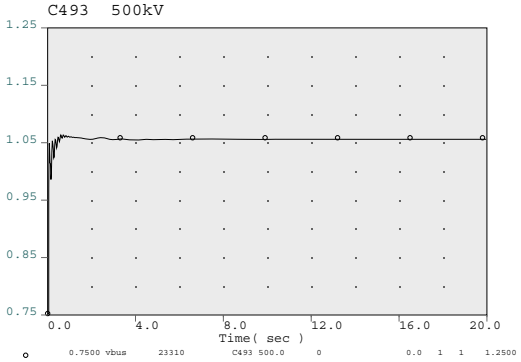
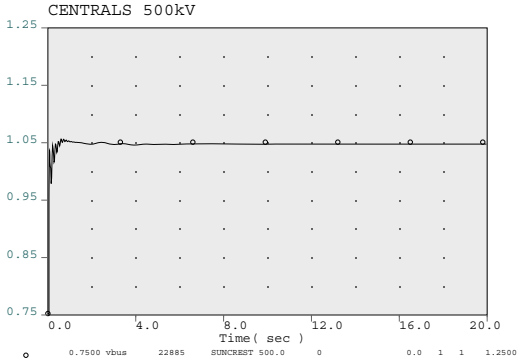


C493 500kV



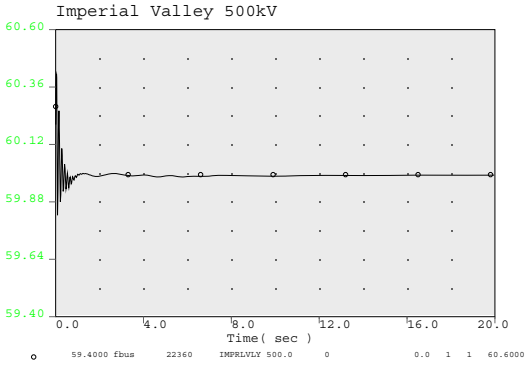
CENTRALS 500kV



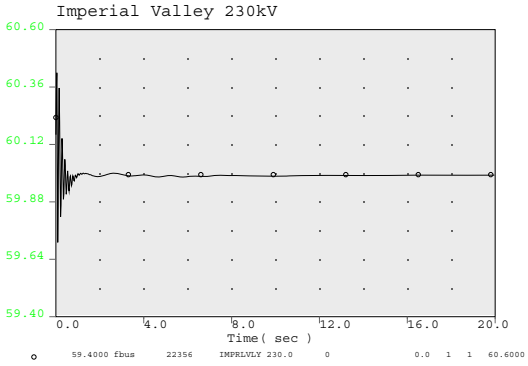
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

Imperial Valley 500kV



Imperial Valley 230kV



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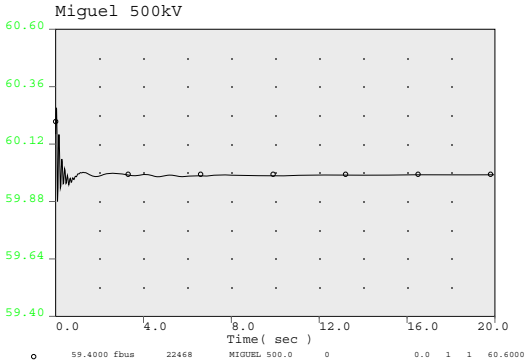

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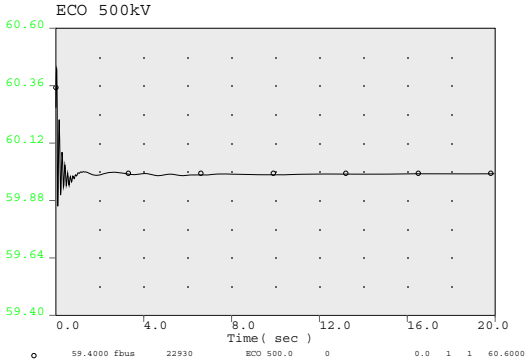

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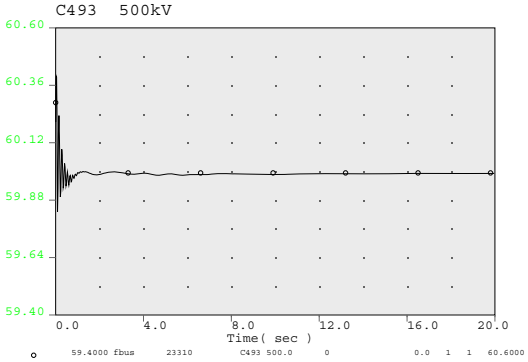
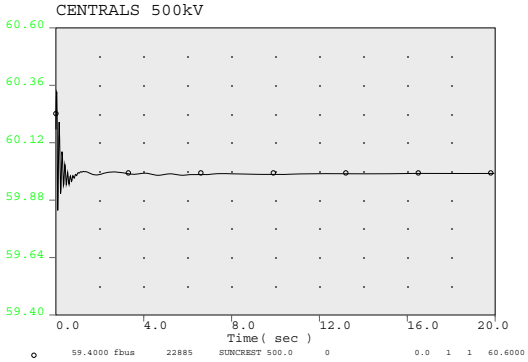
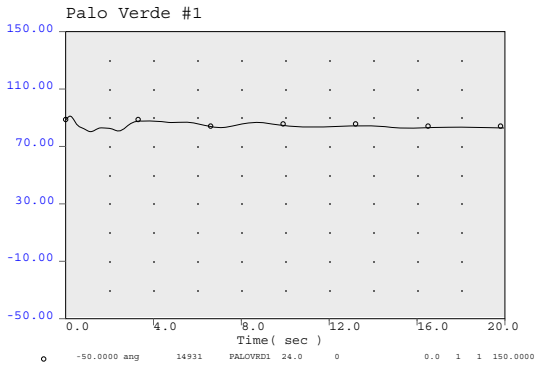


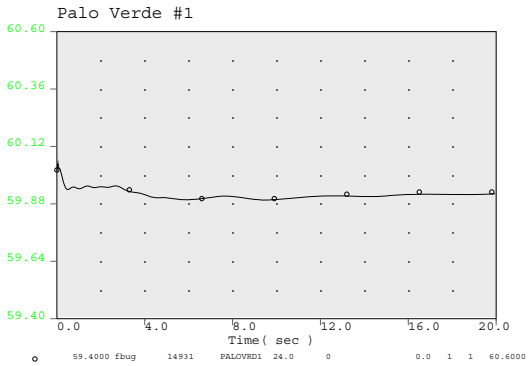
CENTRALS 500kV

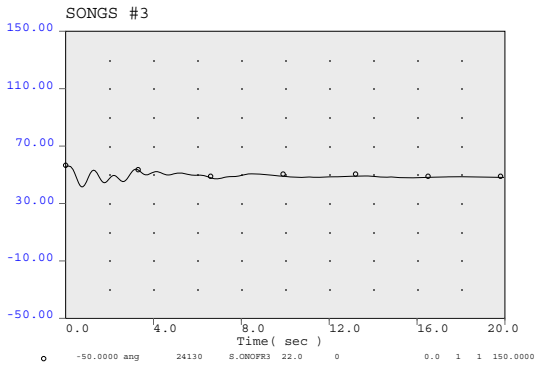


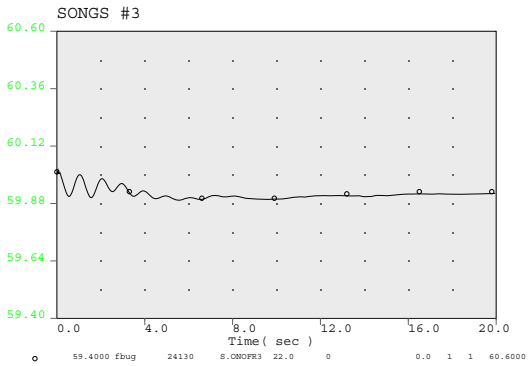
C1 C2 Heavy Summer Post With Upgrades

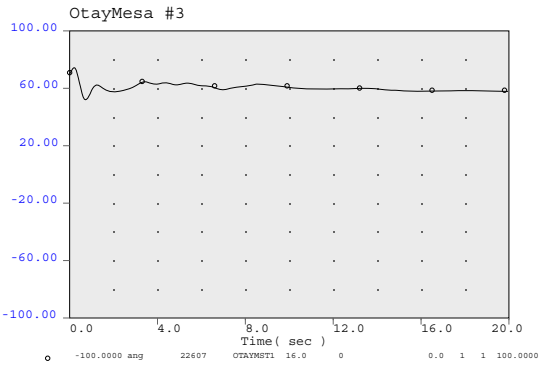
RELATIVE ROTOR ANGLE & FREQUENCY

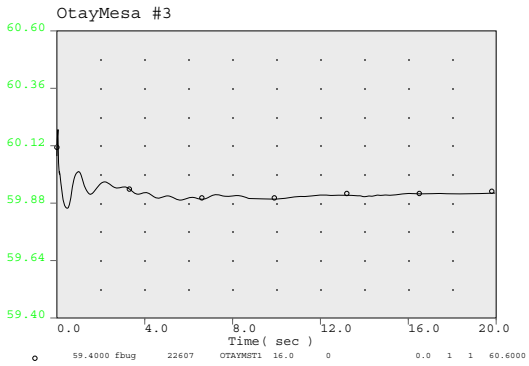












C1 C2 Heavy Summer Post With Upgrades

Page 1

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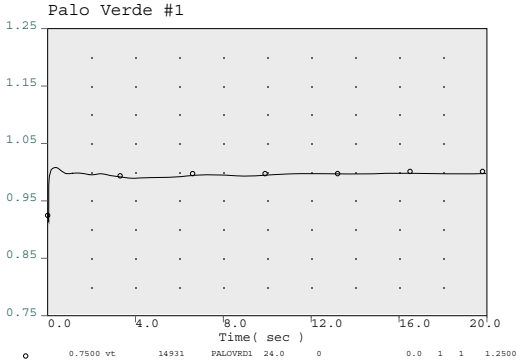
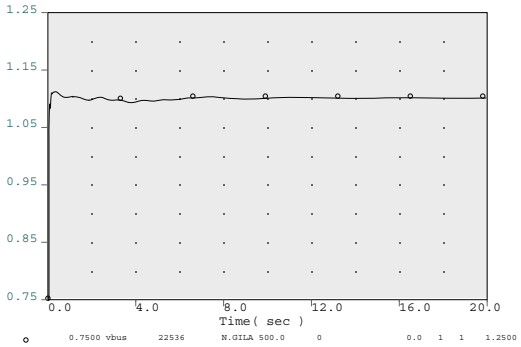
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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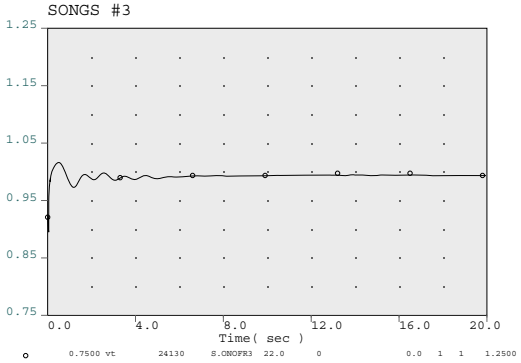
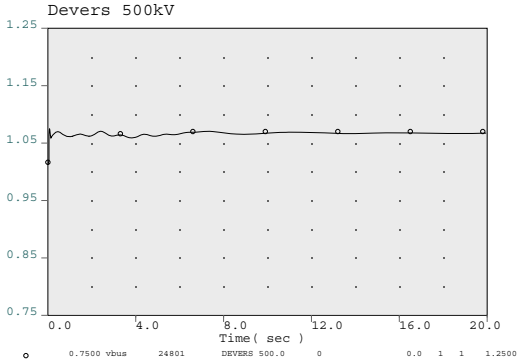
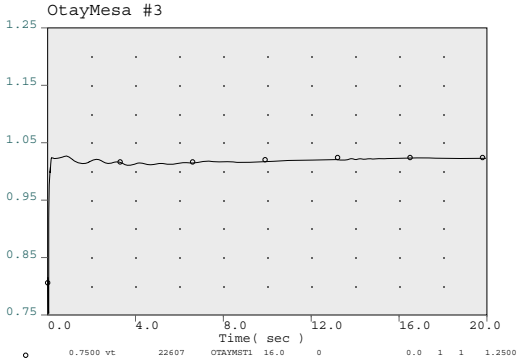


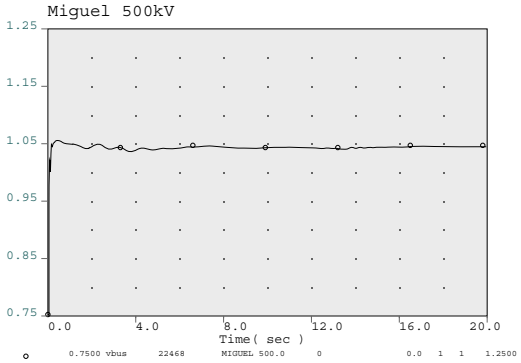
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

Page 2

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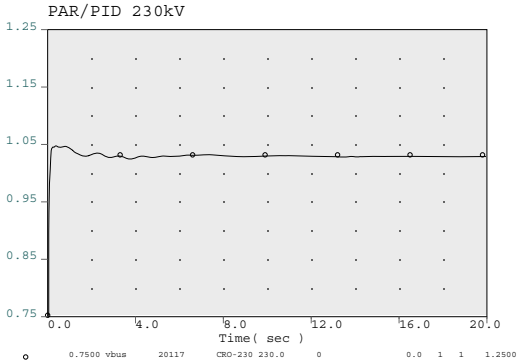
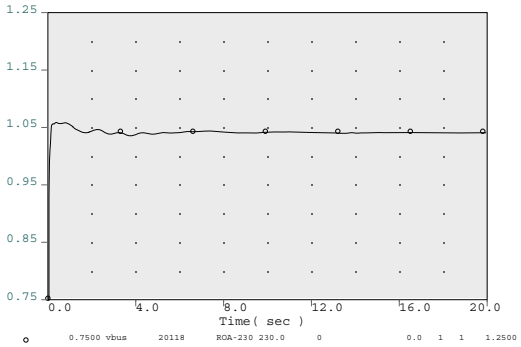
Affected System Voltage Check and Comparison

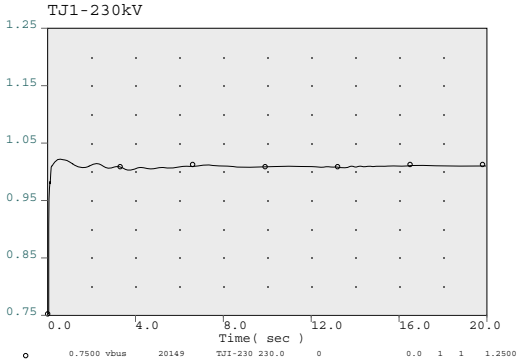
PAR/PID 230kV



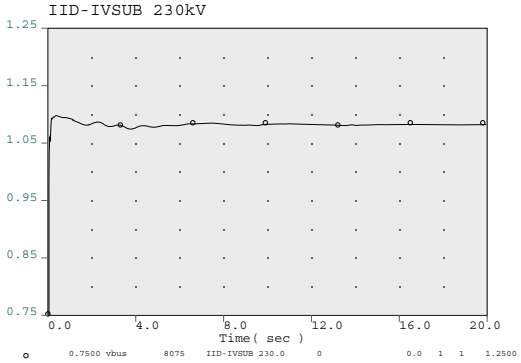
ROA-230kV



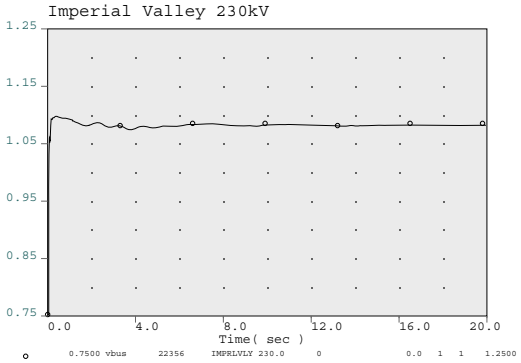
TJ1-230kV



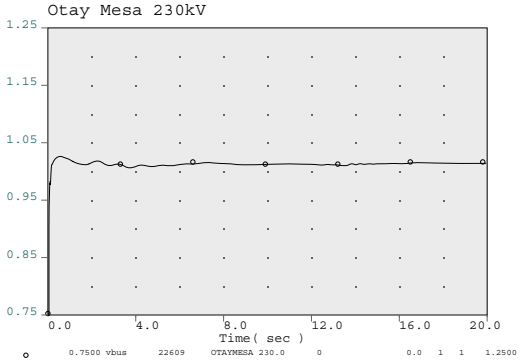
IID-IVSUB 230kV



Imperial Valley 230kV



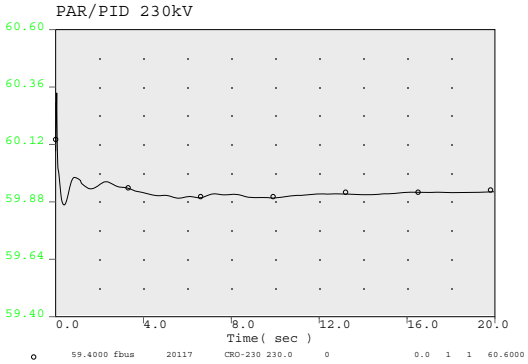
Otay Mesa 230kV



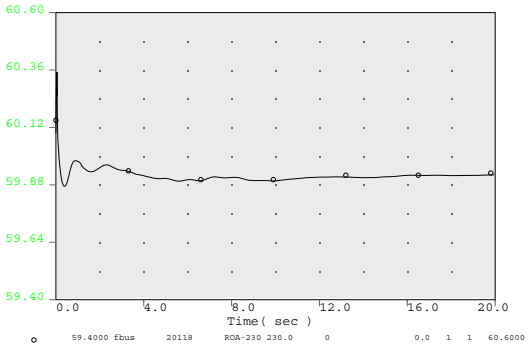
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

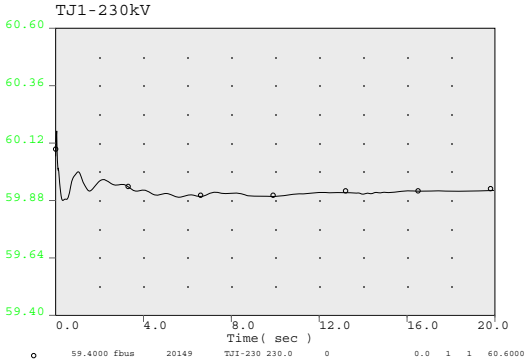
PAR/PID 230kV



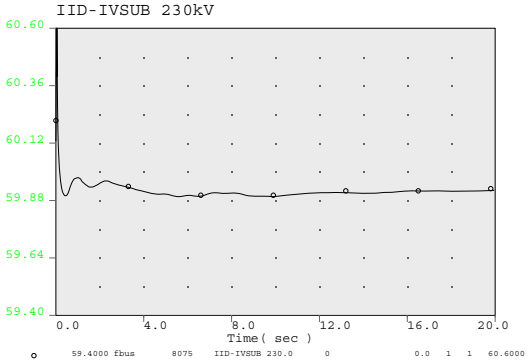
ROA-230kV



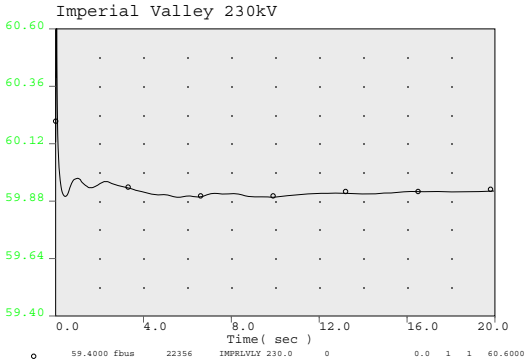
TJ1-230kV



IID-IVSUB 230kV



Imperial Valley 230kV



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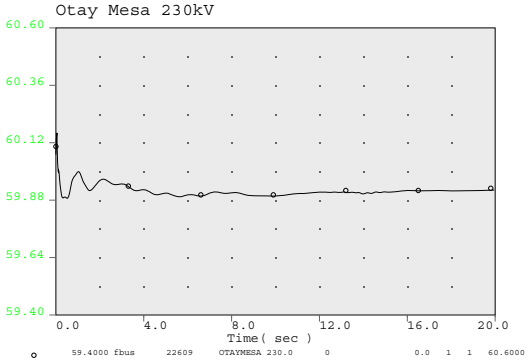
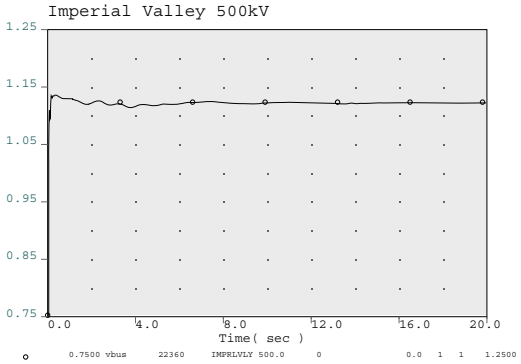


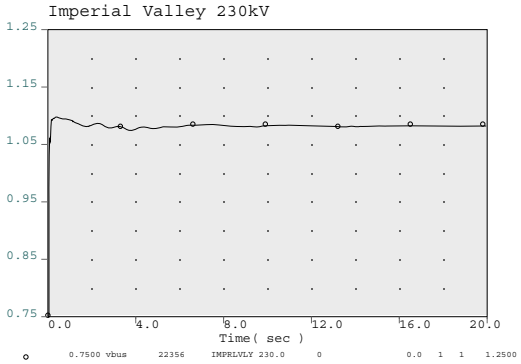
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

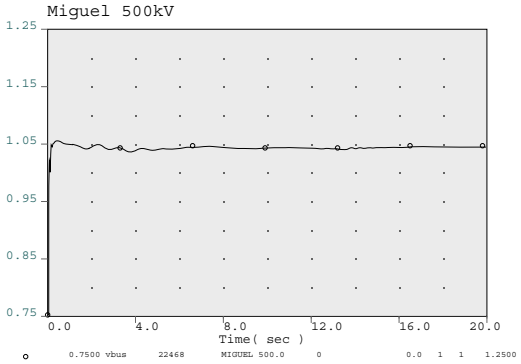
Imperial Valley 500kV



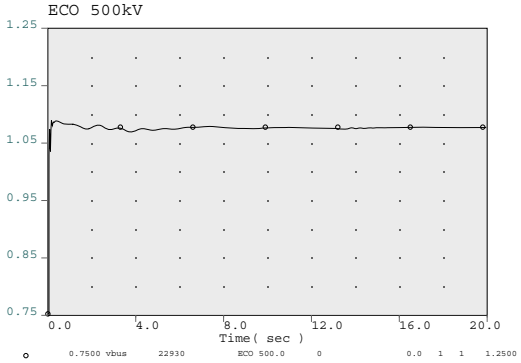
Imperial Valley 230kV



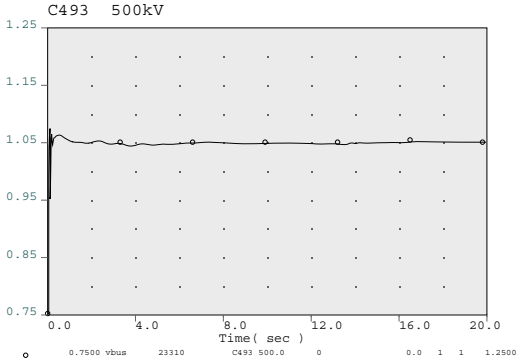
Miguel 500kV



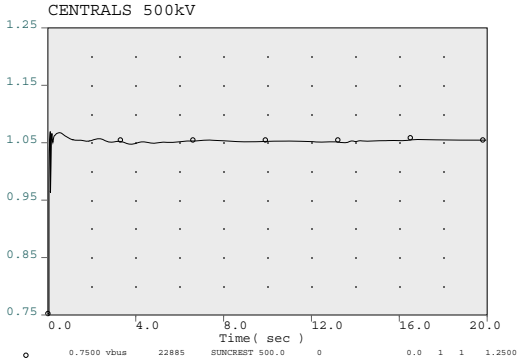
ECO 500kV



C493 500kV

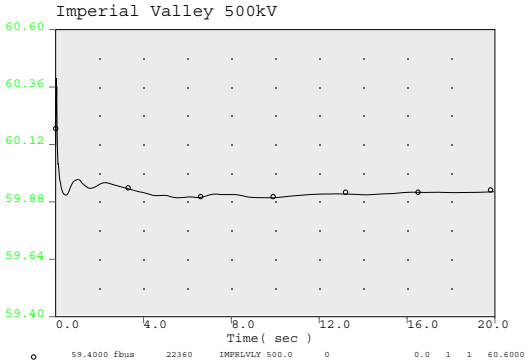


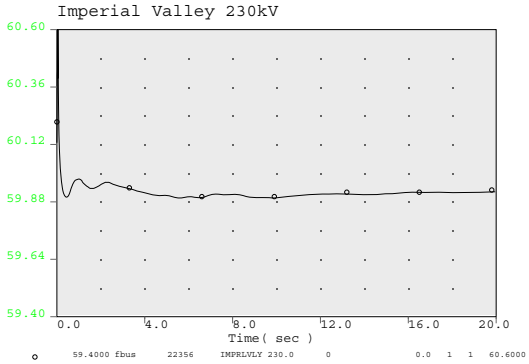
CENTRALS 500kV

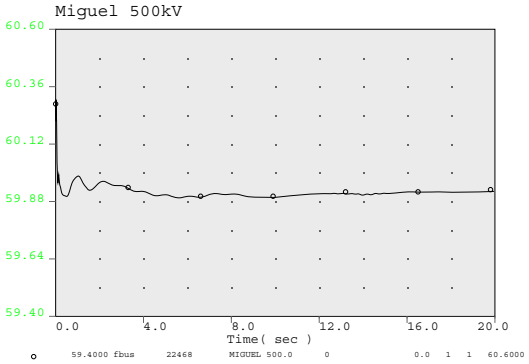


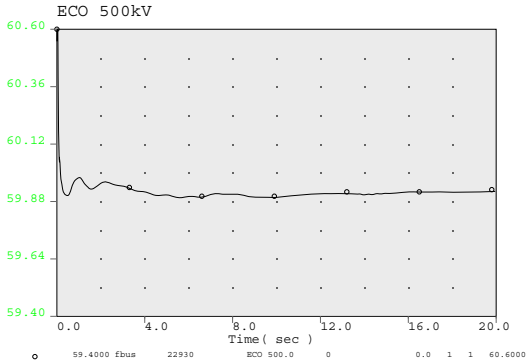
C1 C2 Heavy Summer Post With Upgrades

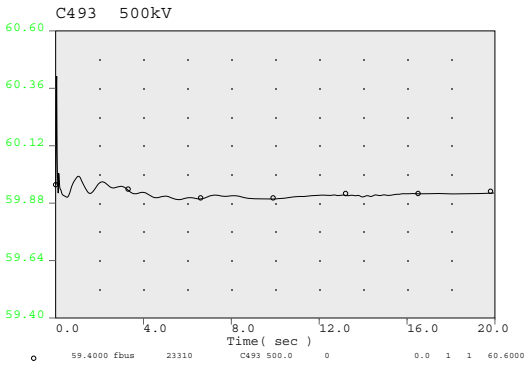
Frequency

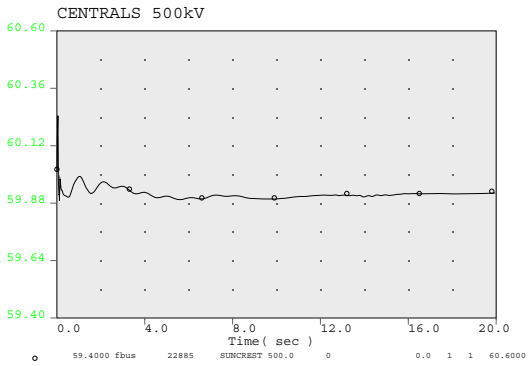






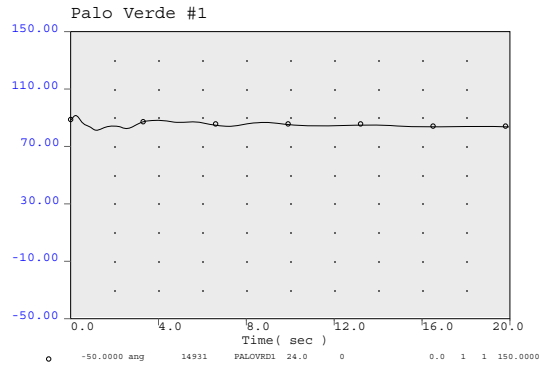


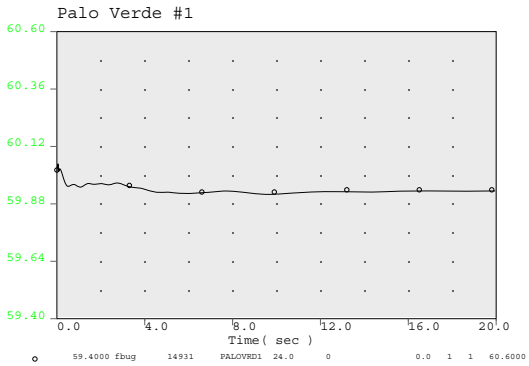


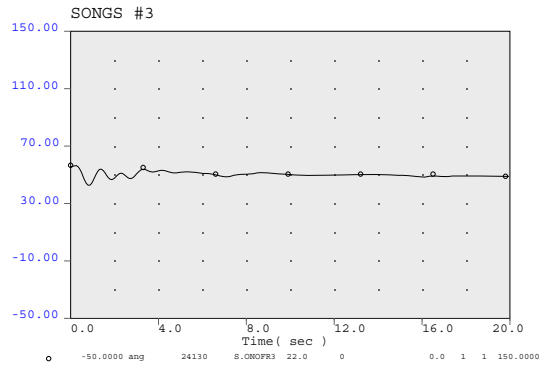


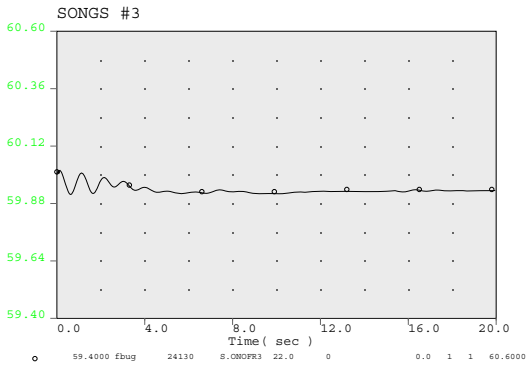
C1 C2 Heavy Summer Post With Upgrades

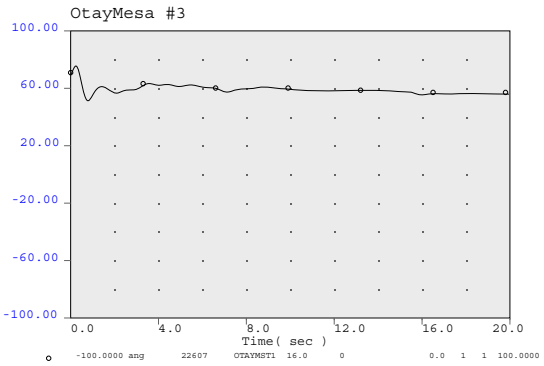
RELATIVE ROTOR ANGLE & FREQUENCY

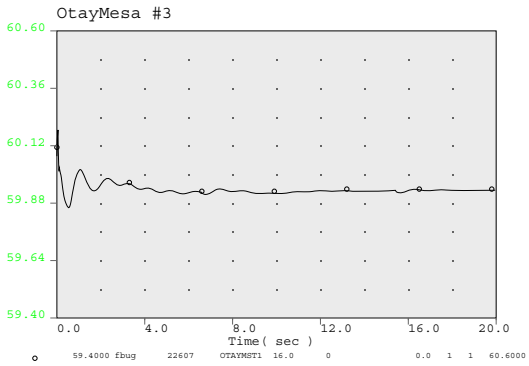












C1 C2 Heavy Summer Post With Upgrades

Page 1

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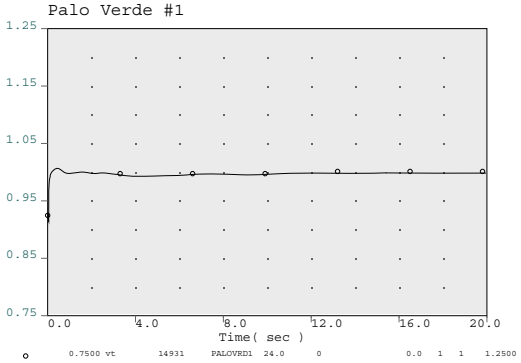
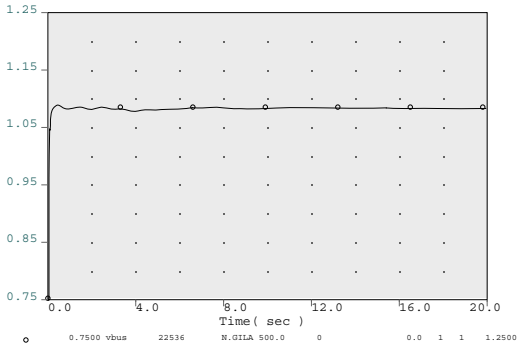
RELATIVE VOLTAGE

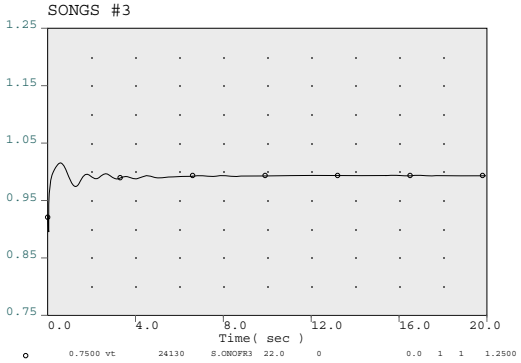
Palo Verde #1



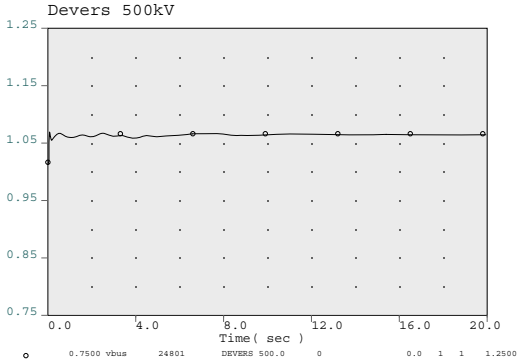
N Gila 500kV



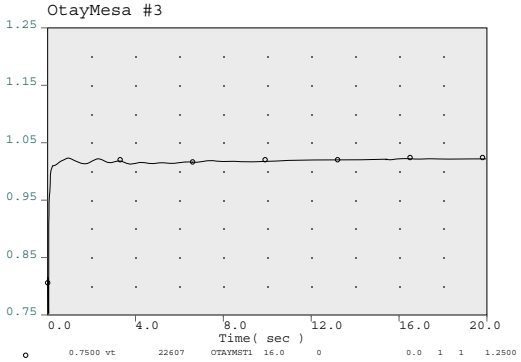
SONGS #3



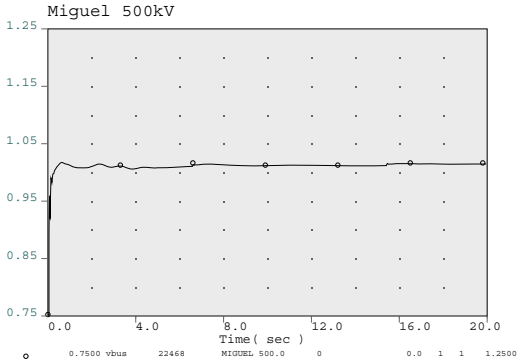
Devers 500kV



OtayMesa #3



Miguel 500kV



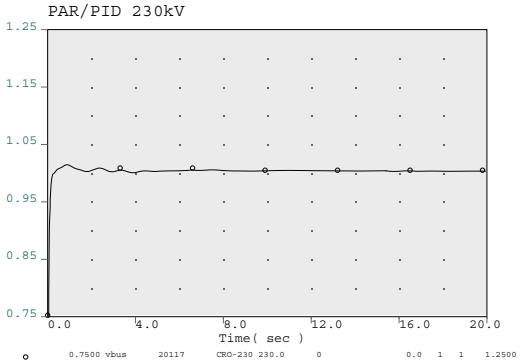
C1 C2 Heavy Summer Post With Upgrades

Page 2

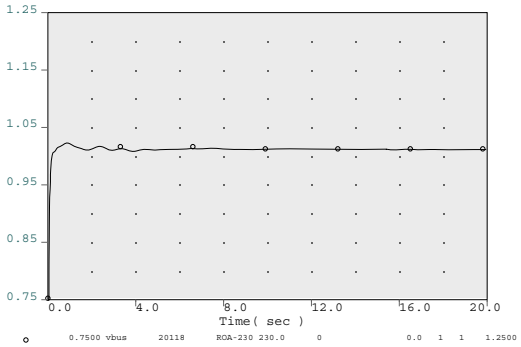
SDGE A Sempra Energy utility	tran-c1c2-hs-pstup-r15_IV-ECO-RAS-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:55:09 2011

Affected System Voltage Check and Comparison

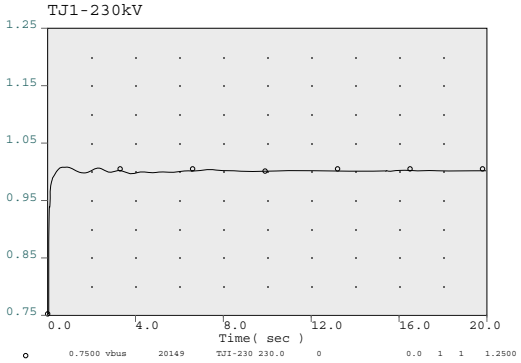
PAR/PID 230kV



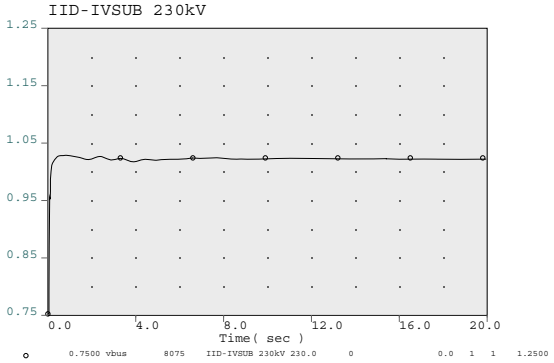
ROA-230kV



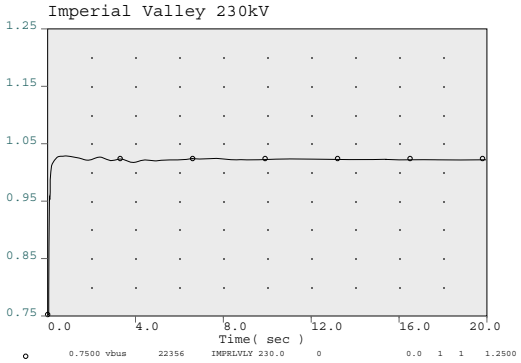
TJ1-230kV



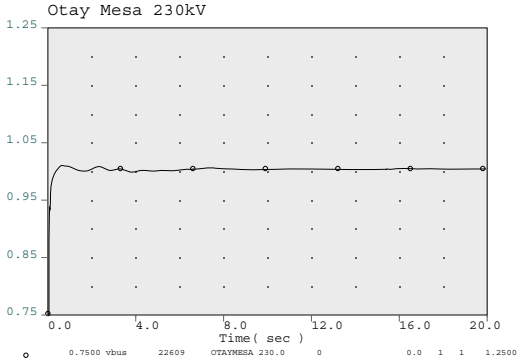
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



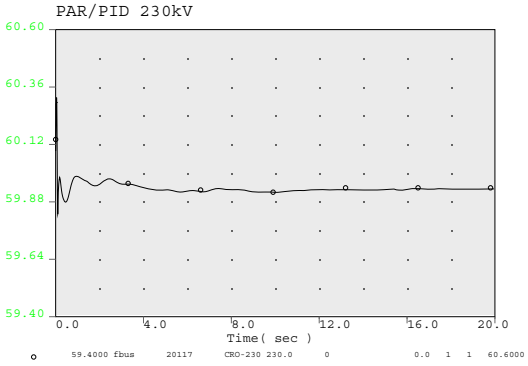
C1 C2 Heavy Summer Post With Upgrades

Page 3

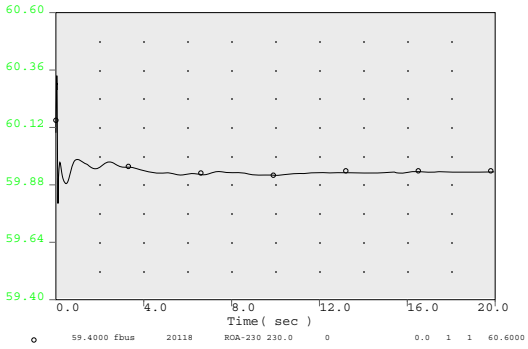
SDGE	tran-c1c2-hs-pstup-r15_IV-ECO-RAS-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:55:09 2011

Affected System Frequency Check and Comparison

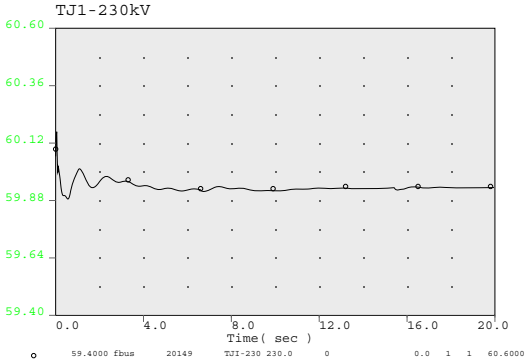
PAR/PID 230kV



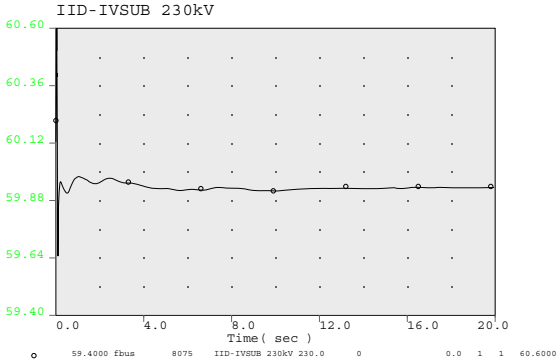
ROA-230kV



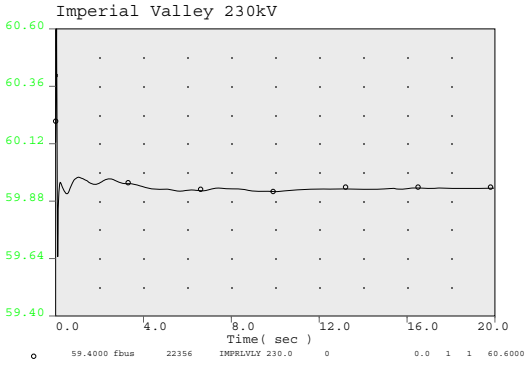
TJ1-230kV



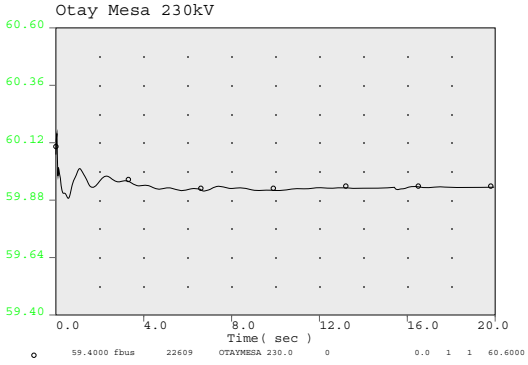
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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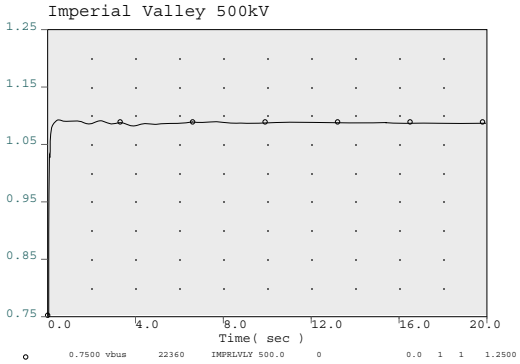
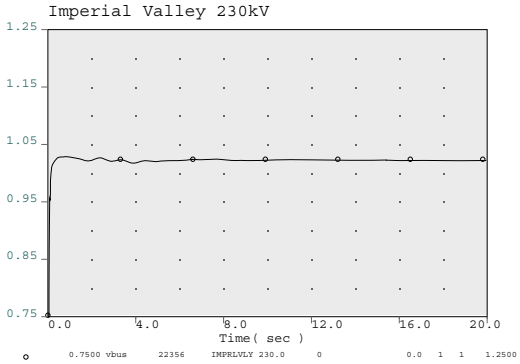
SDGE	tran-c1c2-hs-pstup-r15_IV-ECO-RAS-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:55:10 2011

VOLTAGE

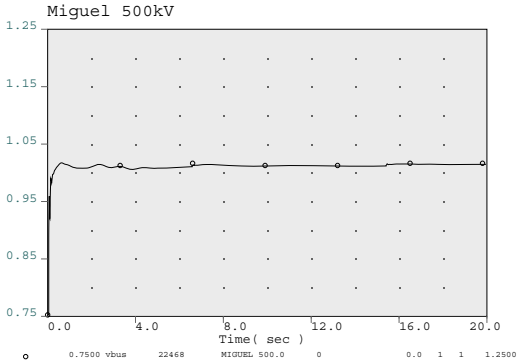
Imperial Valley 500kV



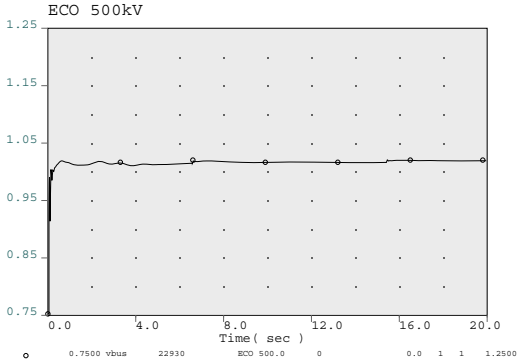
Imperial Valley 230kV



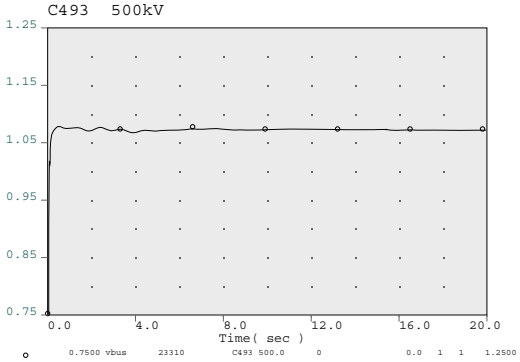
Miguel 500kV



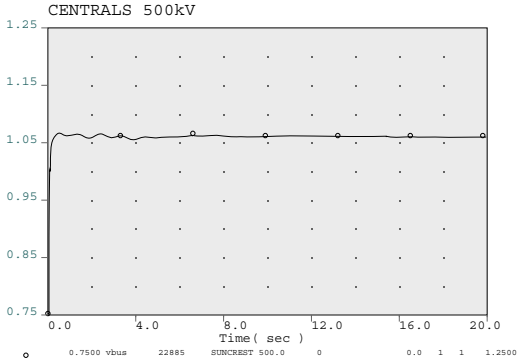
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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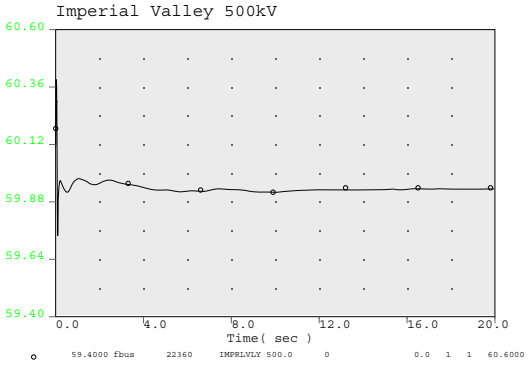
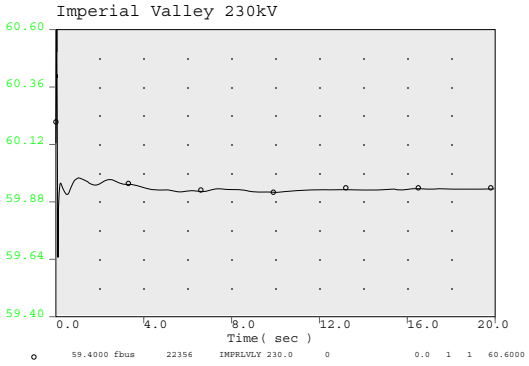
SDGE	tran-c1c2-hs-pstup-r15_IV-ECO-RAS-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:55:10 2011

FREQUENCY

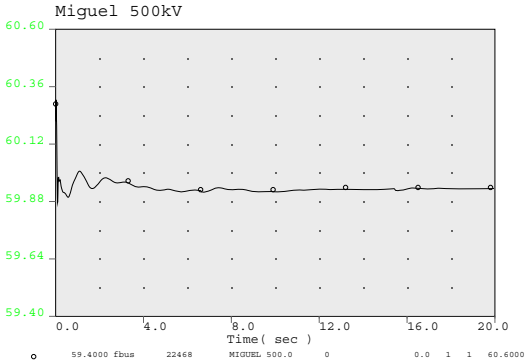
Imperial Valley 500kV



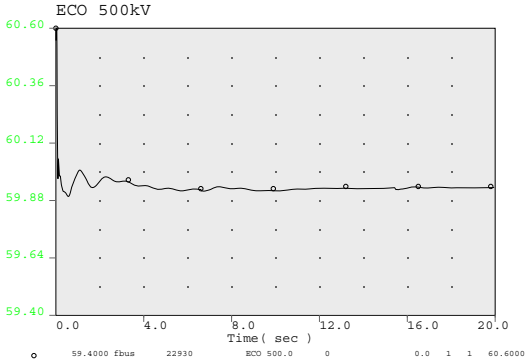
Imperial Valley 230kV



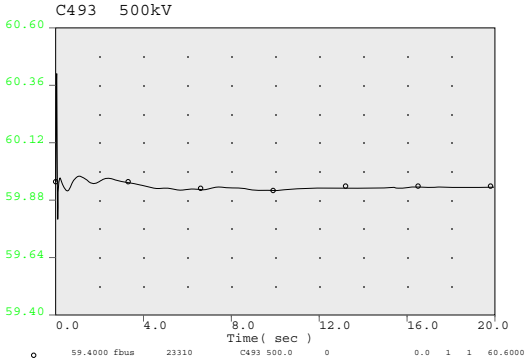
Miguel 500kV



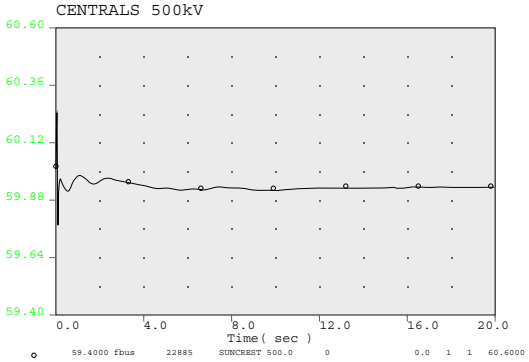
ECO 500kV



C493 500kV

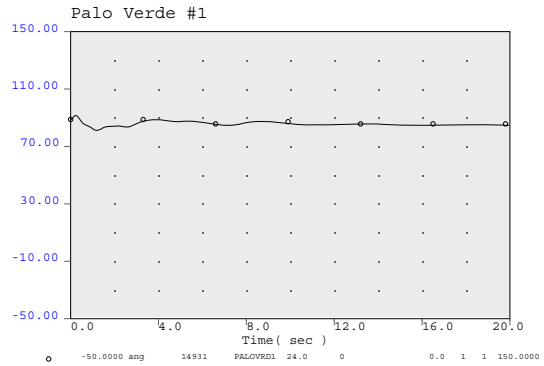


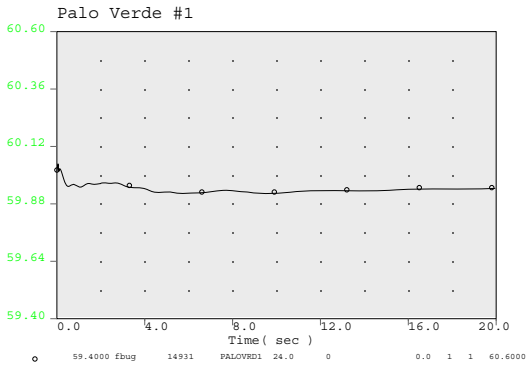
CENTRALS 500kV

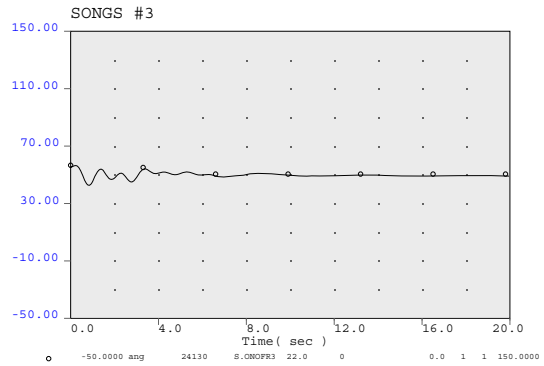


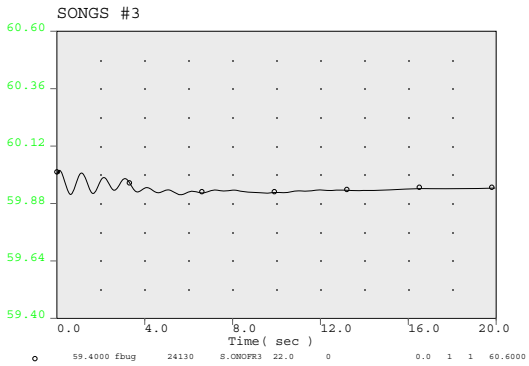
C1 C2 Heavy Summer Post With Upgrades

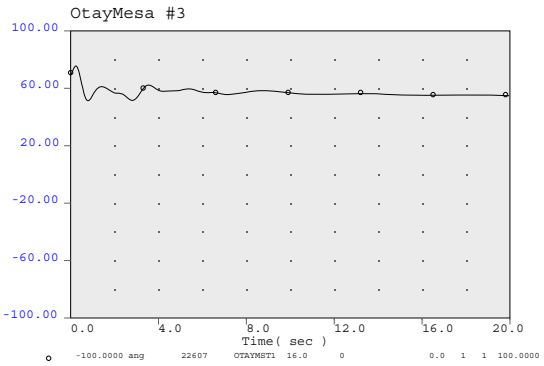
RELATIVE ROTOR ANGLE & FREQUENCY

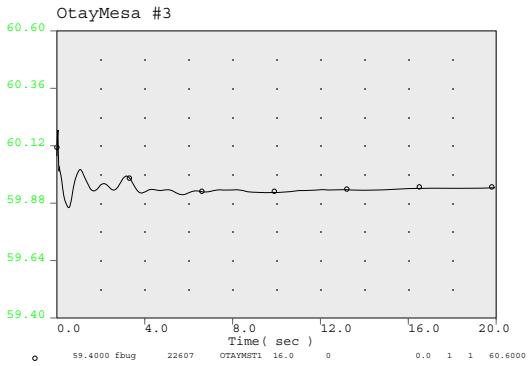












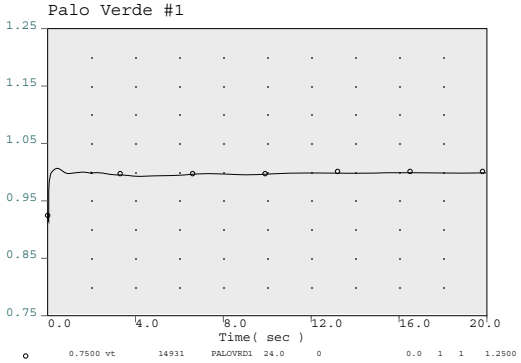
C1 C2 Heavy Summer Post With Upgrades

Page 1

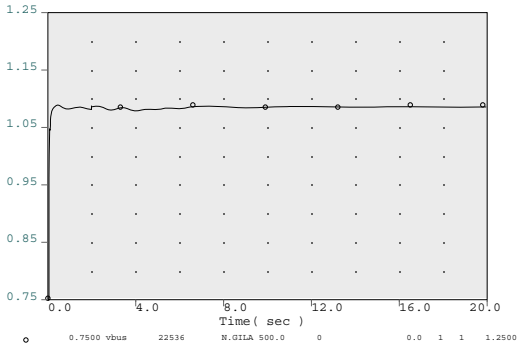
SDGE	tran-c1c2-hs-pstup-r15_IVECO-RASX-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:06:10 2011

RELATIVE VOLTAGE

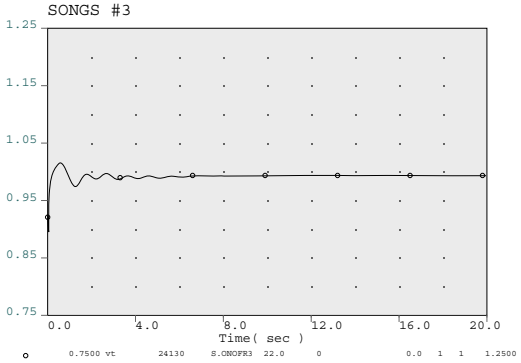
Palo Verde #1



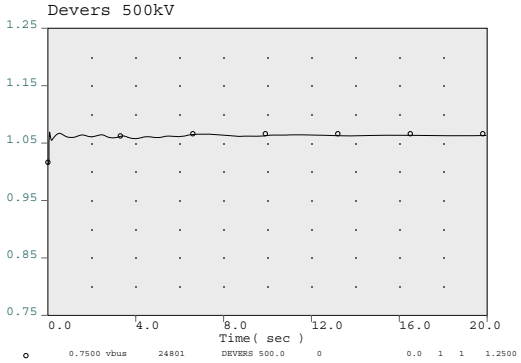
N Gila 500kV



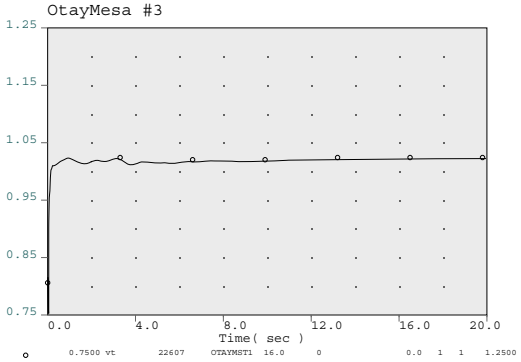
SONGS #3



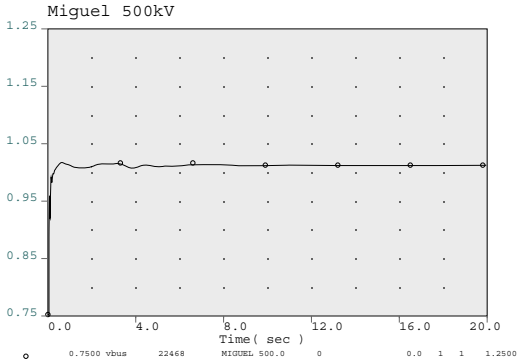
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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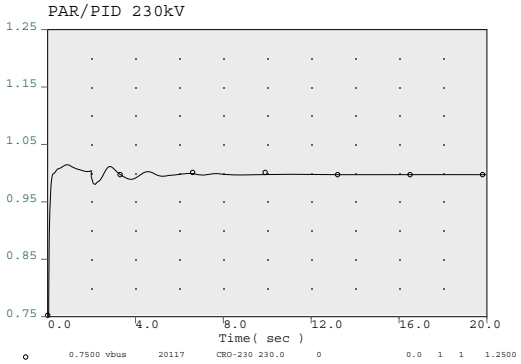
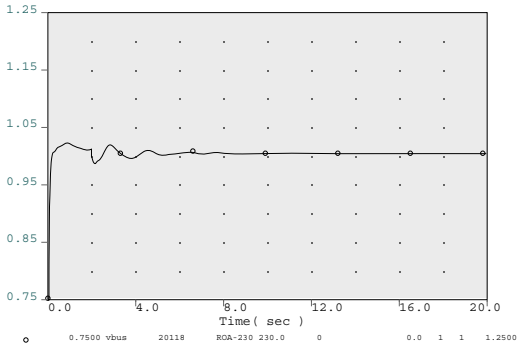
SDGE	tran-c1c2-hs-pstup-r15_IVECO-RASX-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:06:10 2011

Affected System Voltage Check and Comparison

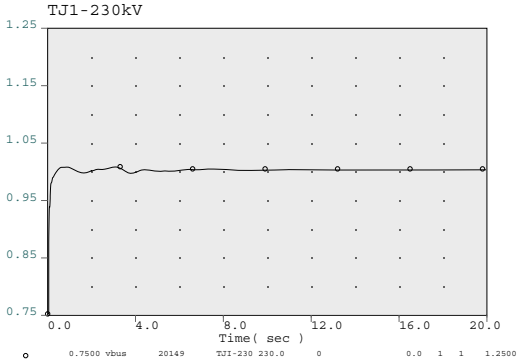
PAR/PID 230kV



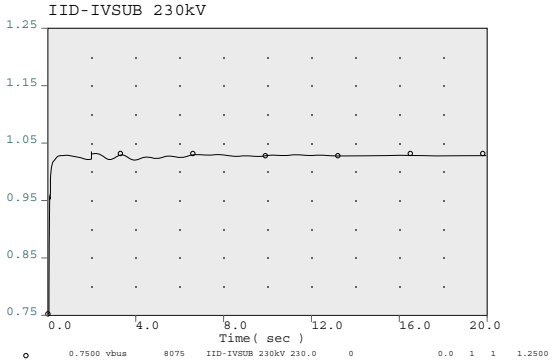
ROA-230kV



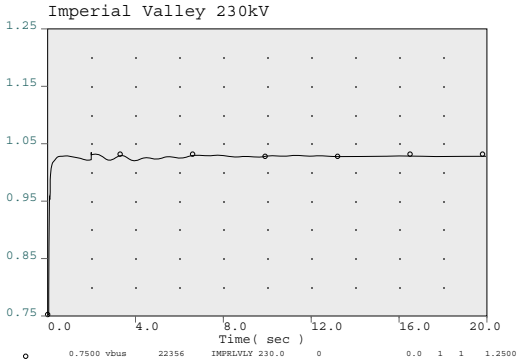
TJ1-230kV



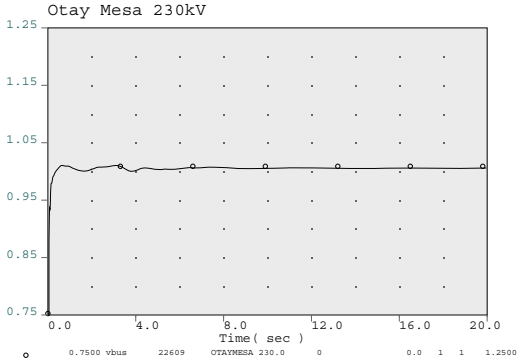
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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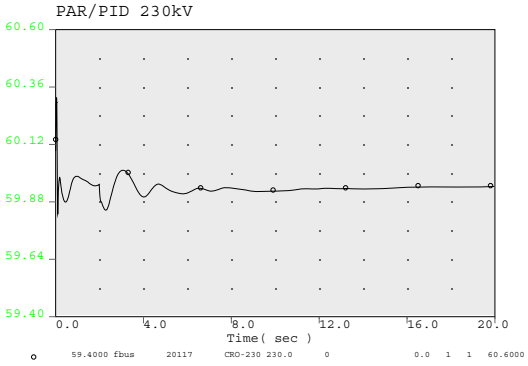
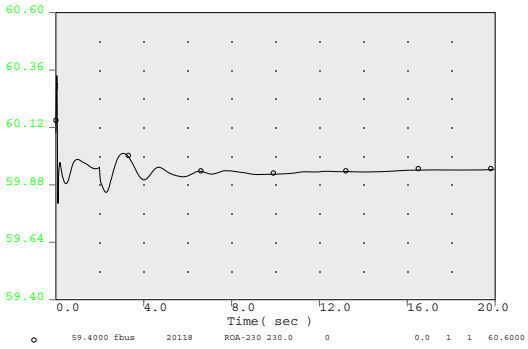
Affected System Frequency Check and Comparison

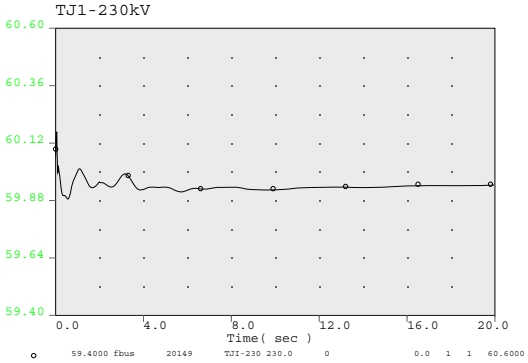
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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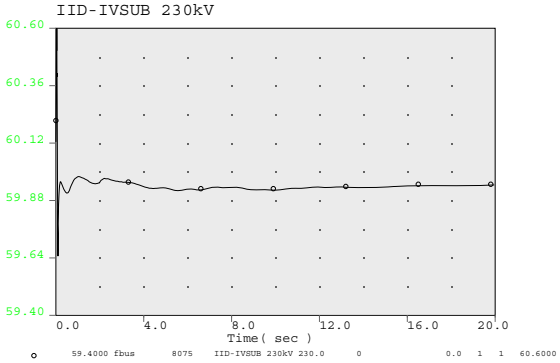
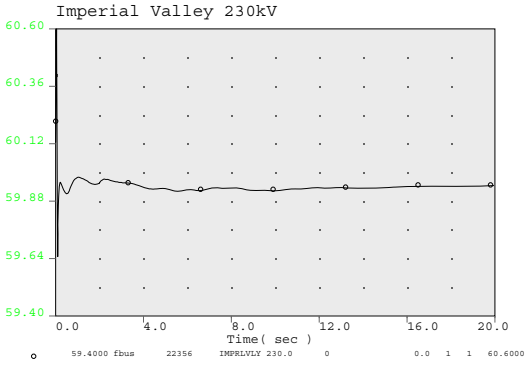
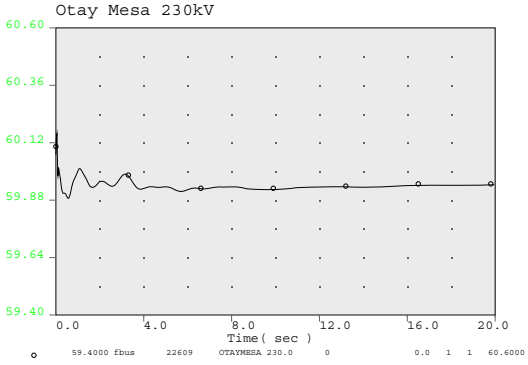


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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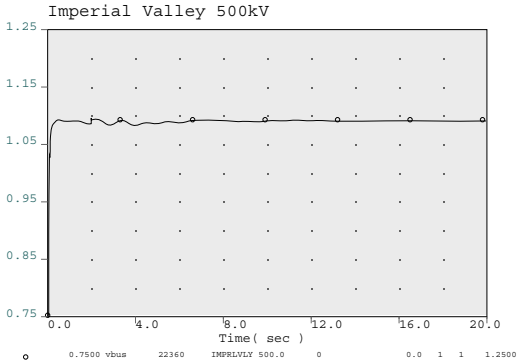
anstab\hs\pst\ws_pst_c1c2

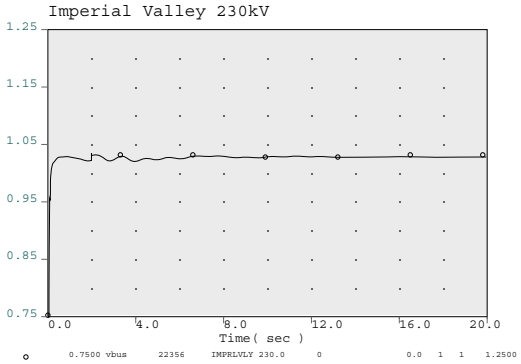
Sun Jul 17 15:06:11 2011

VOLTAGE

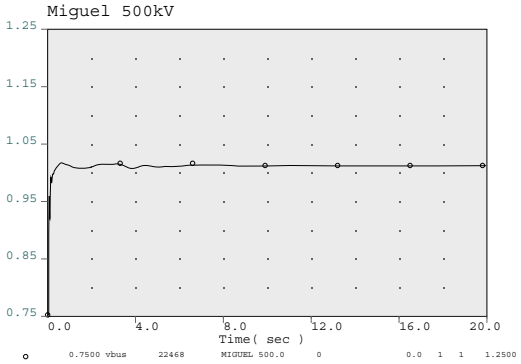
Imperial Valley 500kV



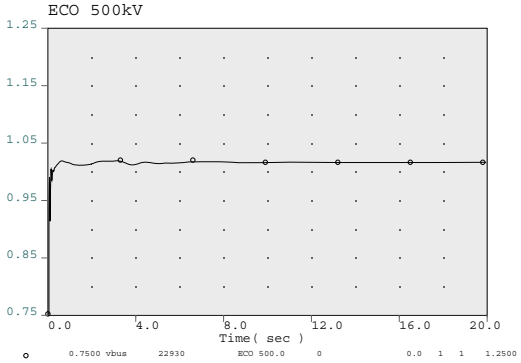
Imperial Valley 230kV



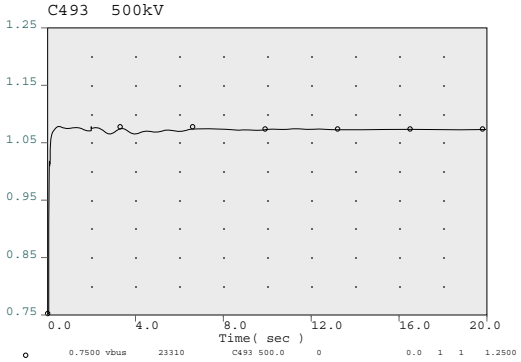
Miguel 500kV



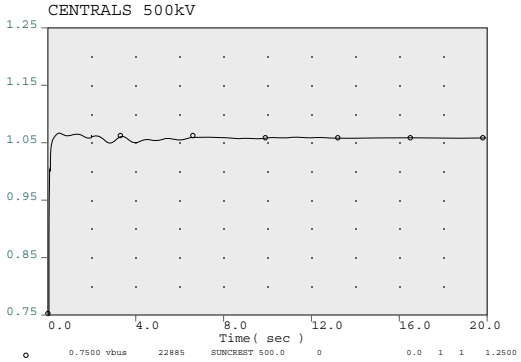
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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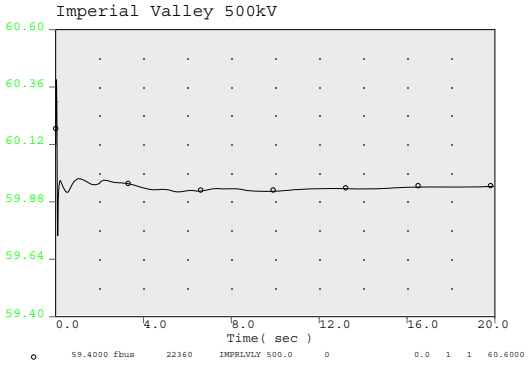
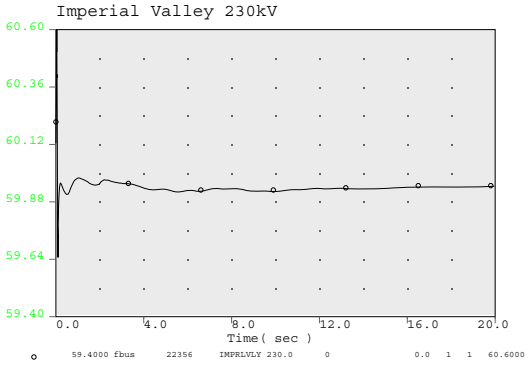
FREQUENCY

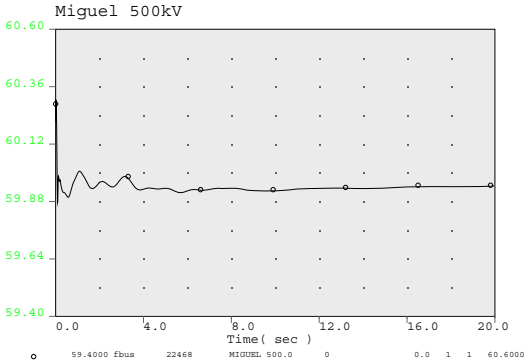
Imperial Valley 500kV



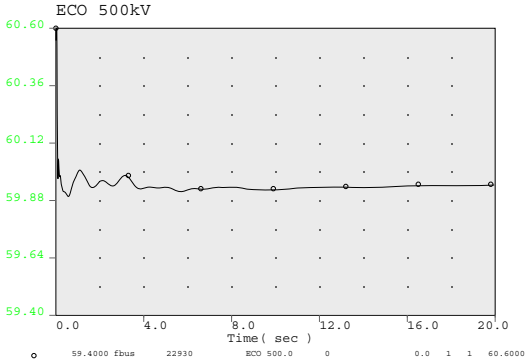
Imperial Valley 230kV



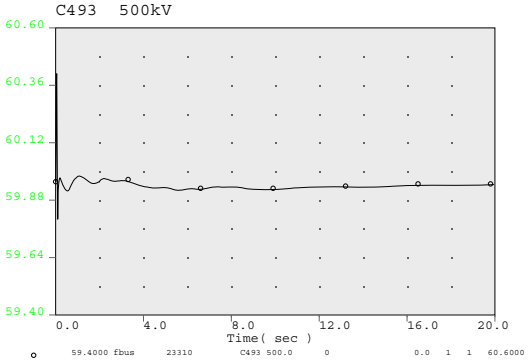
Miguel 500kV



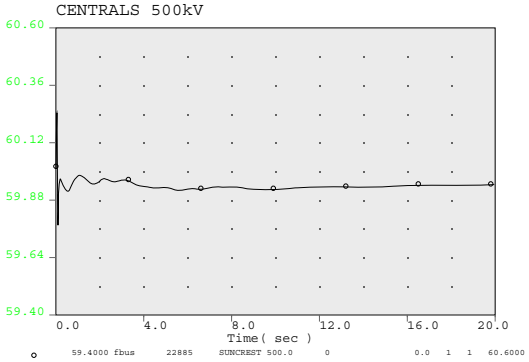
ECO 500kV



C493 500kV

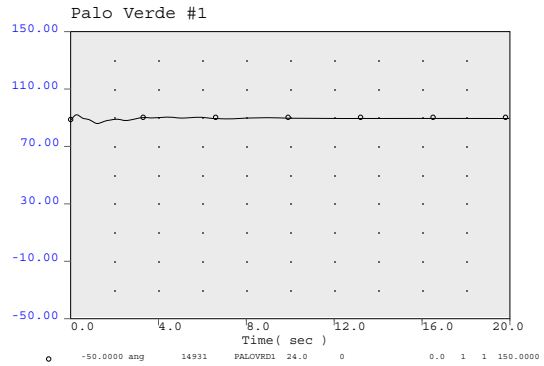


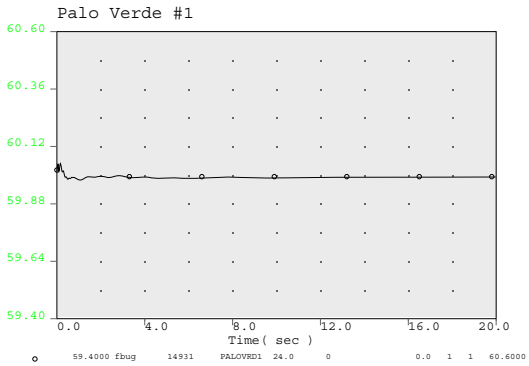
CENTRALS 500kV

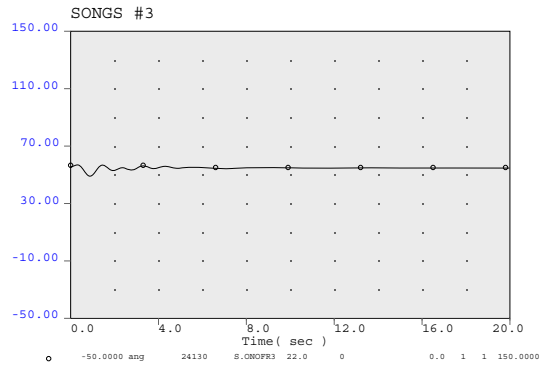


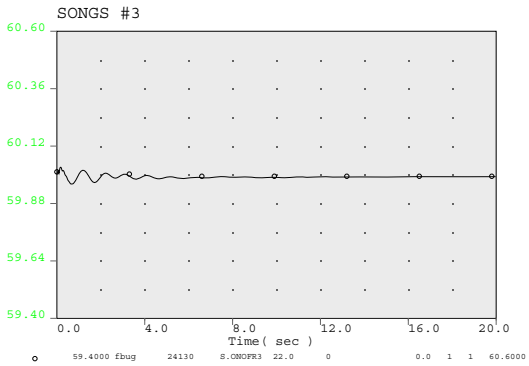
C1 C2 Heavy Summer Post With Upgrades

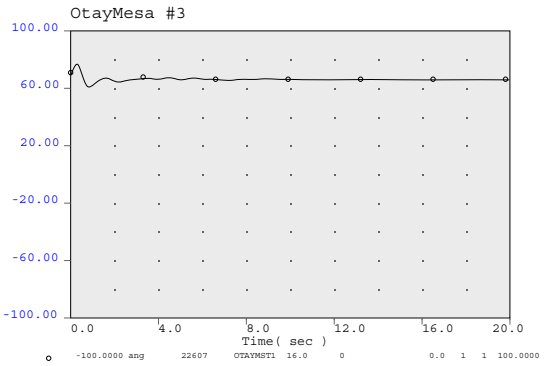
RELATIVE ROTOR ANGLE & FREQUENCY

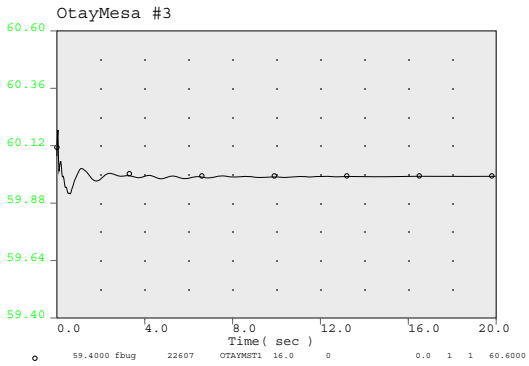












C1 C2 Heavy Summer Post With Upgrades

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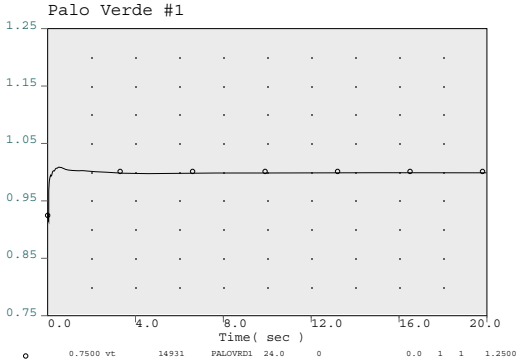
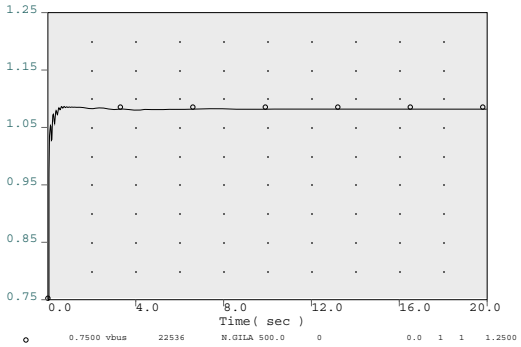
RELATIVE VOLTAGE

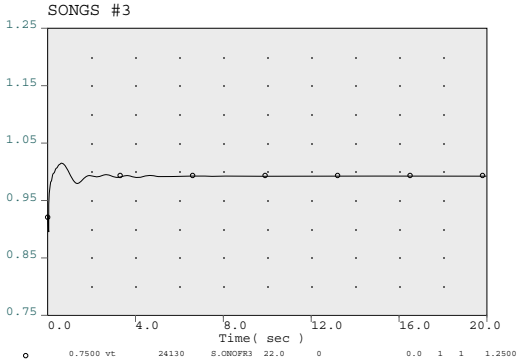
Palo Verde #1



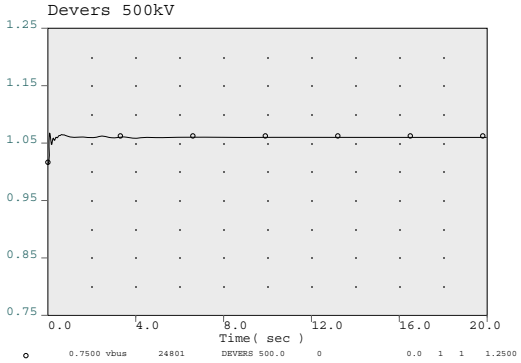
N Gila 500kV



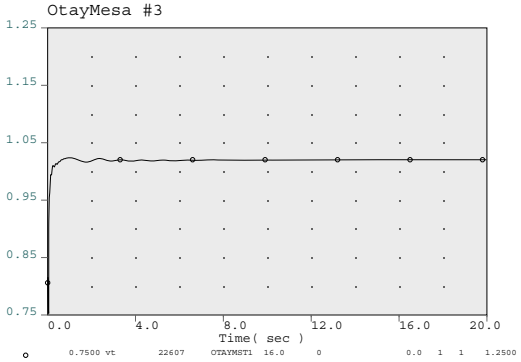
SONGS #3



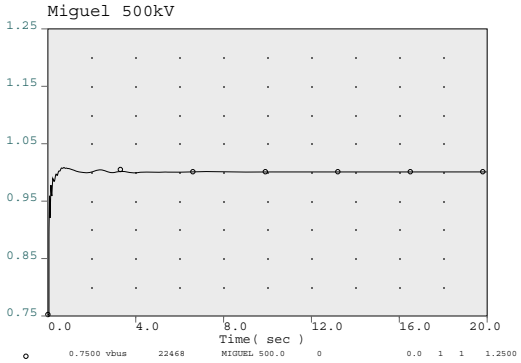
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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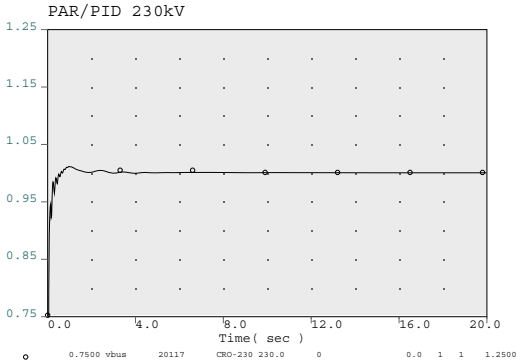
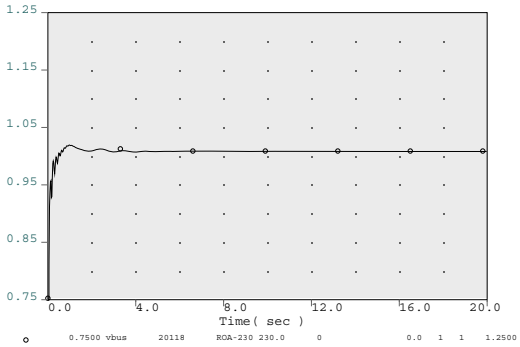
SDGE	tran-c1c2-hs-pstup-r15_IV-ECO-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:57:10 2011

Affected System Voltage Check and Comparison

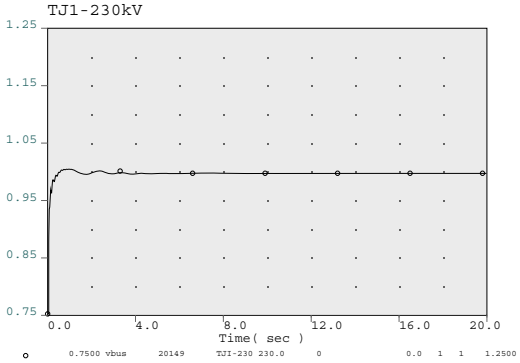
PAR/PID 230kV



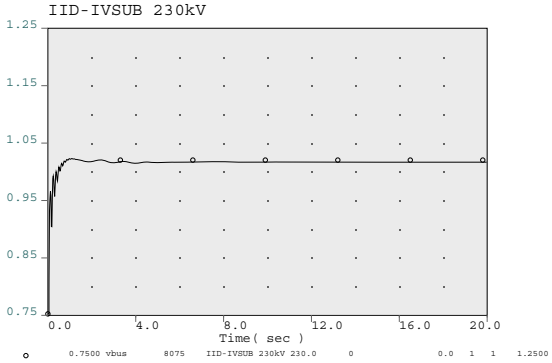
ROA-230kV



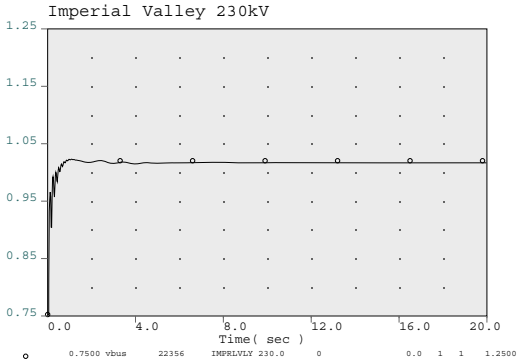
TJ1-230kV



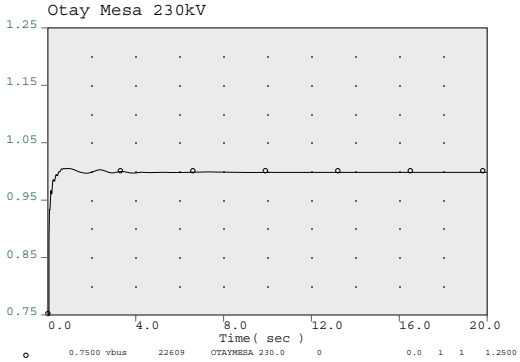
IID-IVSUB 230kV



Imperial Valley 230kV



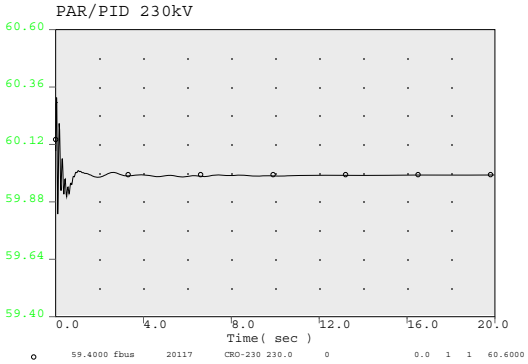
Otay Mesa 230kV



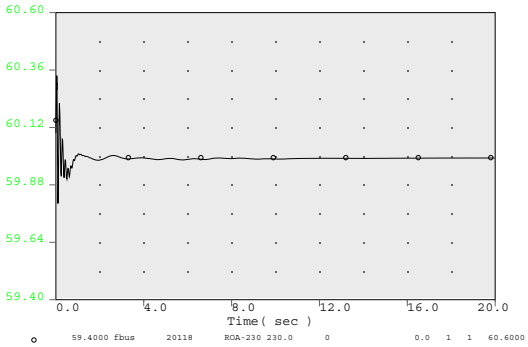
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

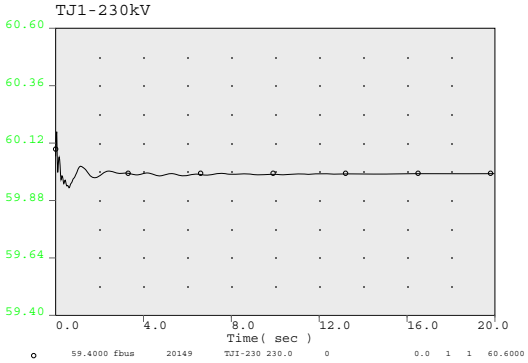
PAR/PID 230kV



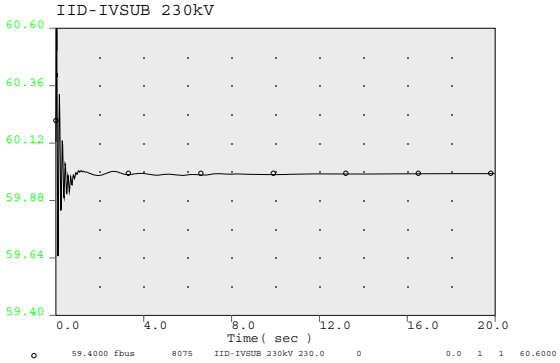
ROA-230kV



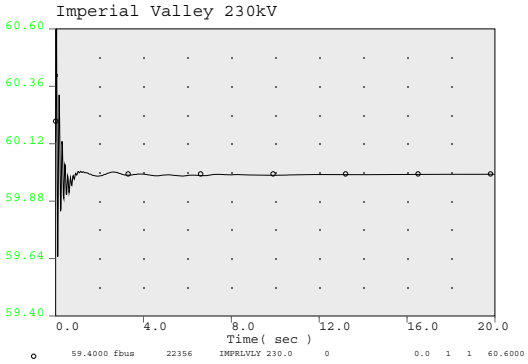
TJ1-230kV



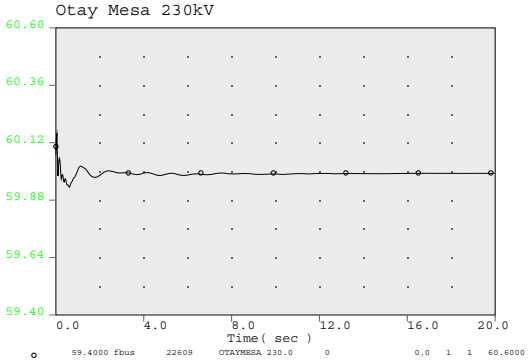
IID-IVSUB 230kV



Imperial Valley 230kV



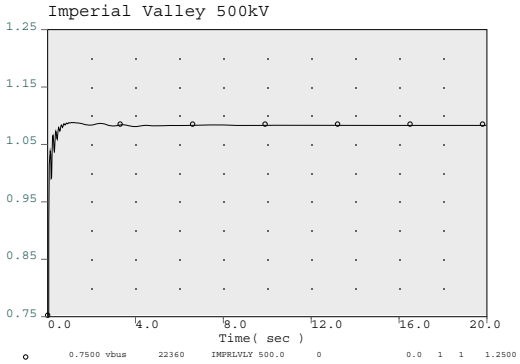
Otay Mesa 230kV



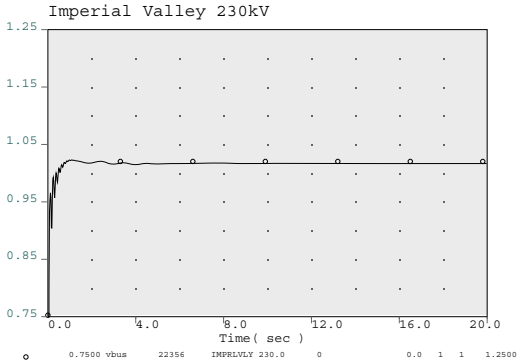
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

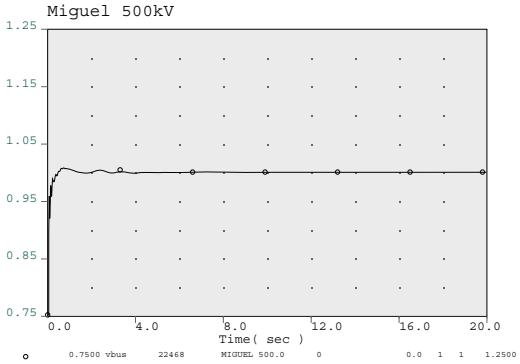
Imperial Valley 500kV



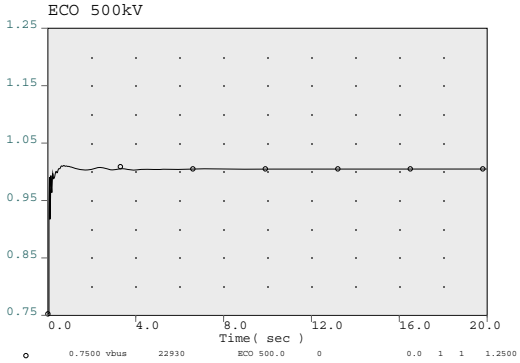
Imperial Valley 230kV



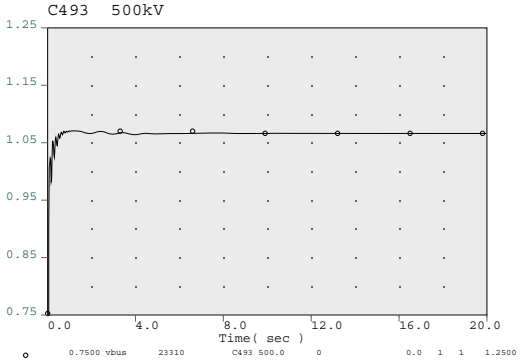
Miguel 500kV



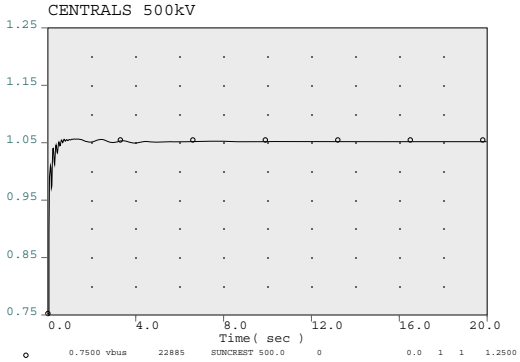
ECO 500kV



C493 500kV



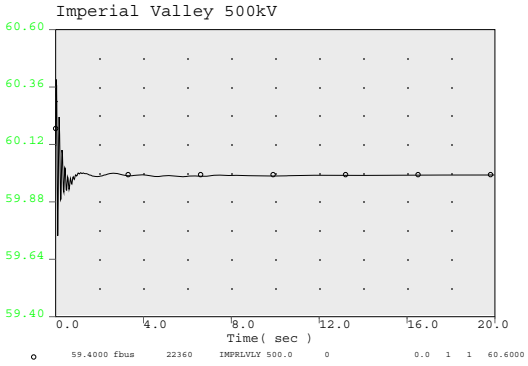
CENTRALS 500kV



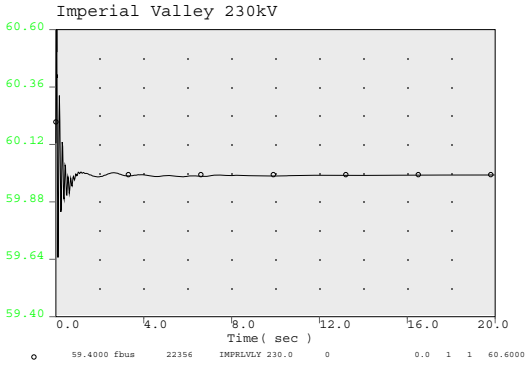
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

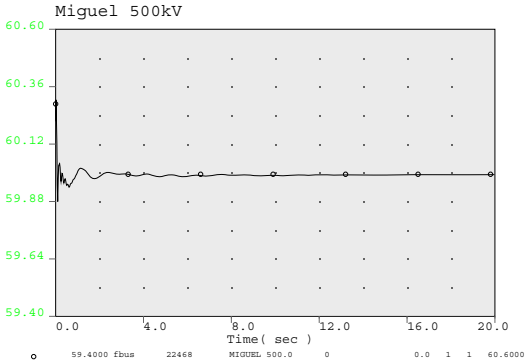
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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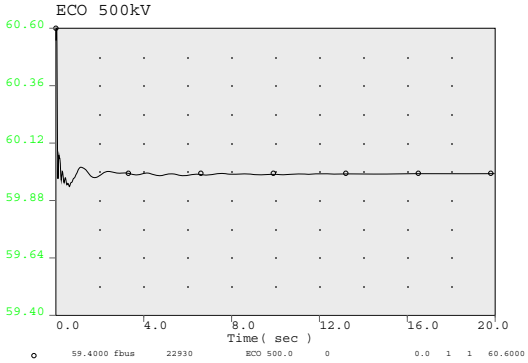
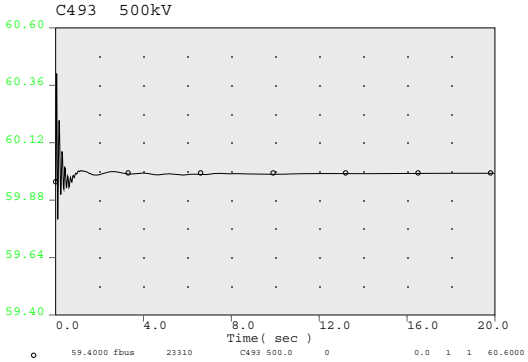
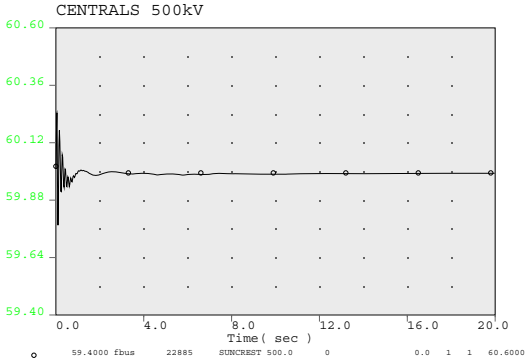


C493 500kV

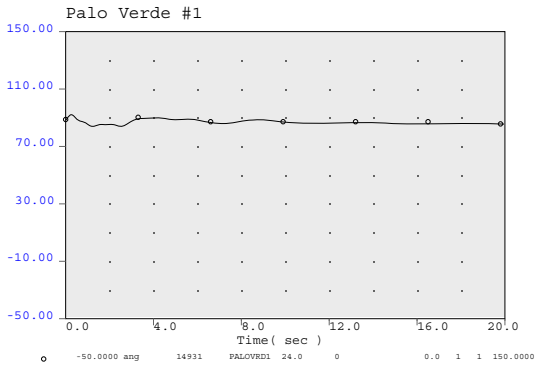


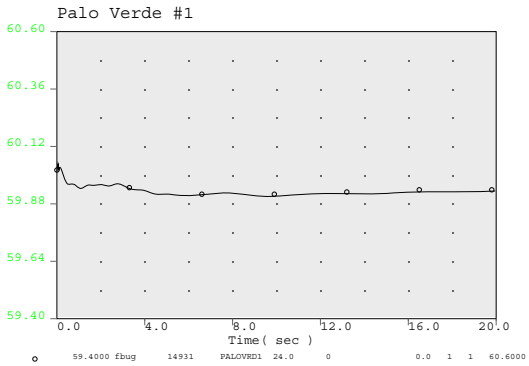
CENTRALS 500kV

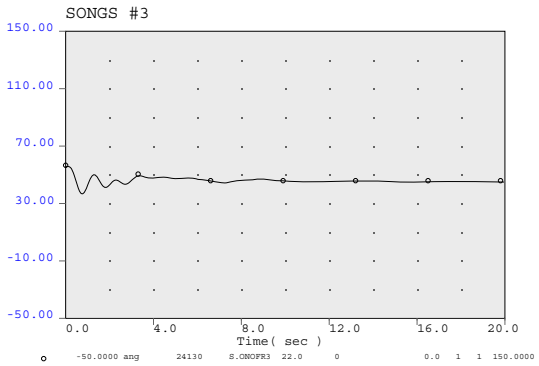


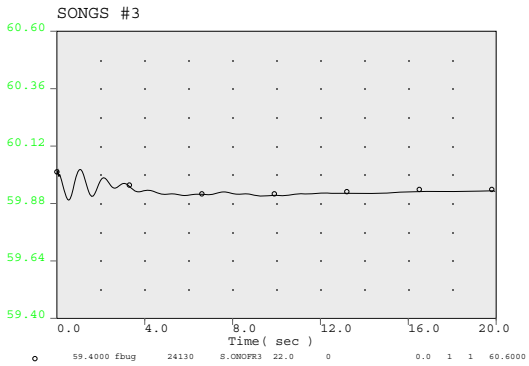
C1 C2 Heavy Summer Post With Upgrades

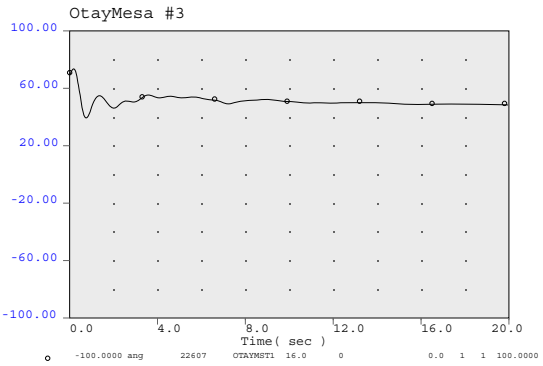
RELATIVE ROTOR ANGLE & FREQUENCY

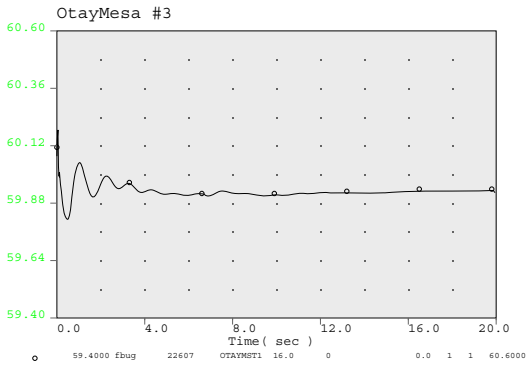












C1 C2 Heavy Summer Post With Upgrades

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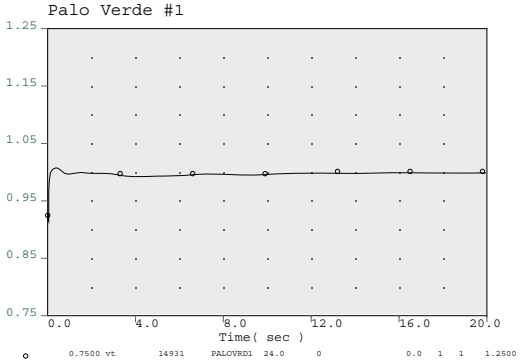
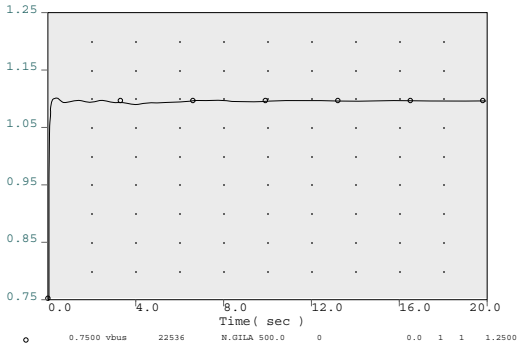
RELATIVE VOLTAGE

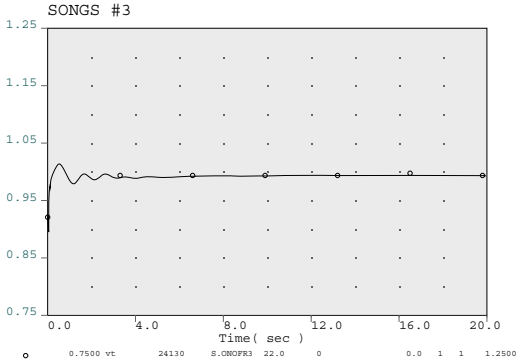
Palo Verde #1



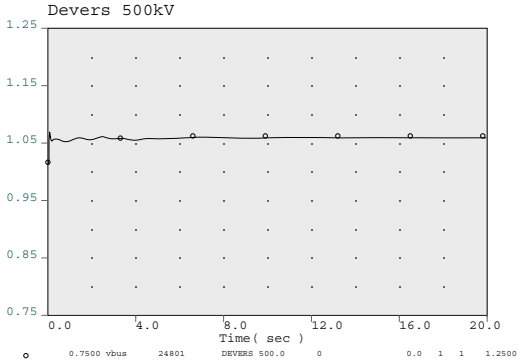
N Gila 500kV



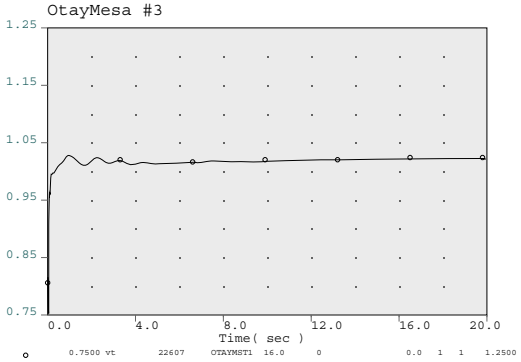
SONGS #3



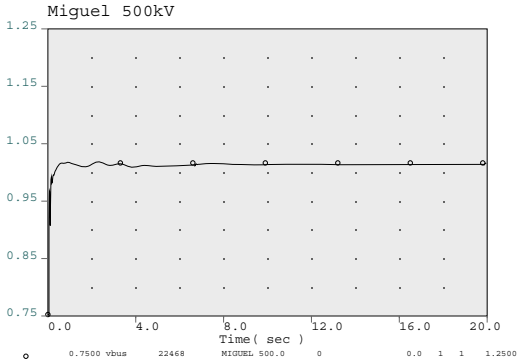
Devers 500kV



OtayMesa #3



Miguel 500kV



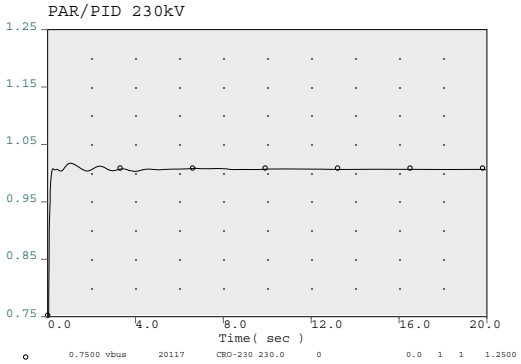
C1 C2 Heavy Summer Post With Upgrades

Page 2

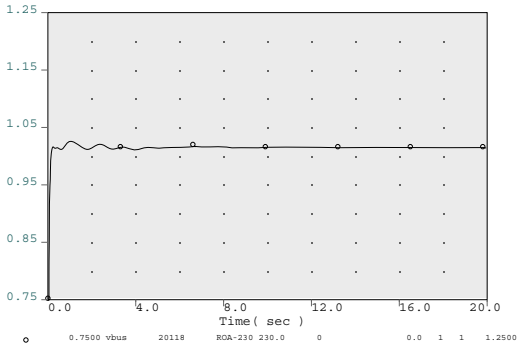
SDGE	tran-c1c2-hs-pstup-r15_IV-RAS-dlo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 14:59:15 2011

Affected System Voltage Check and Comparison

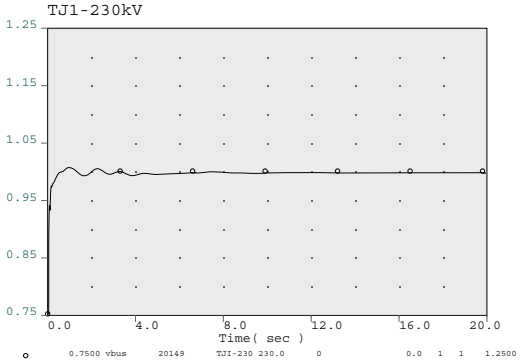
PAR/PID 230kV



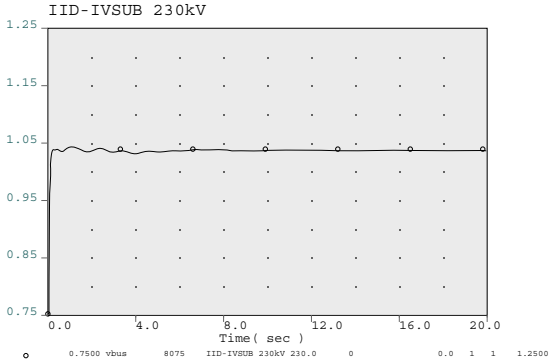
ROA-230kV



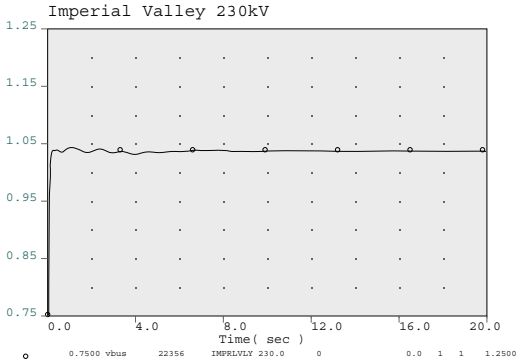
TJ1-230kV



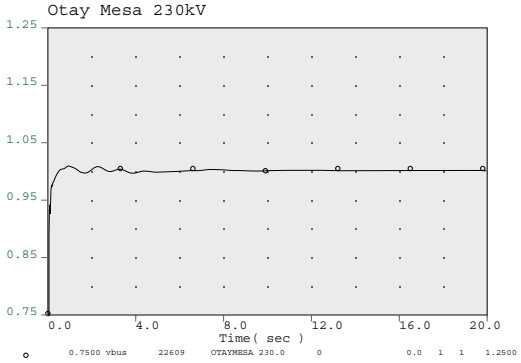
IID-IVSUB 230kV



Imperial Valley 230kV



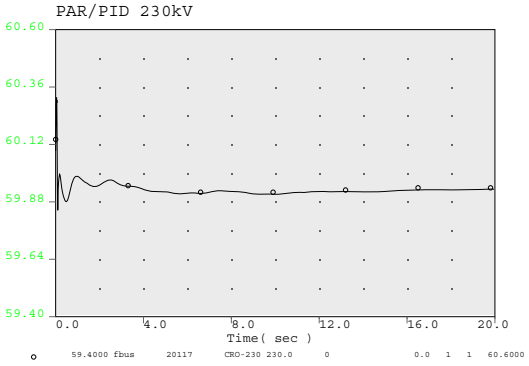
Otay Mesa 230kV



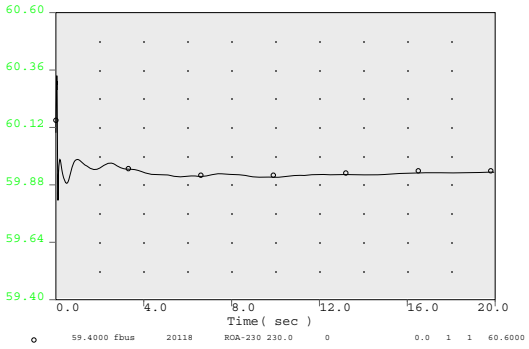
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

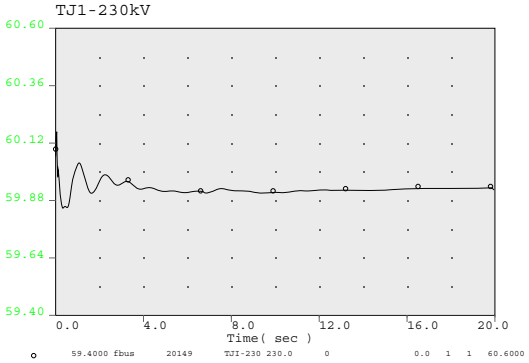
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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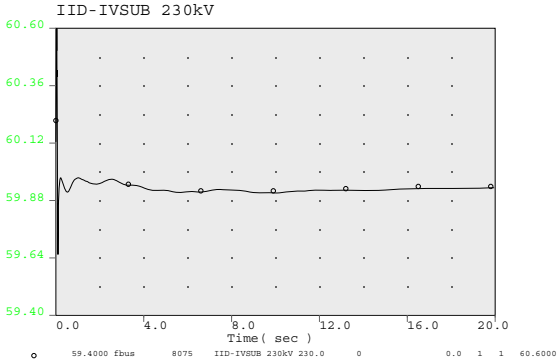
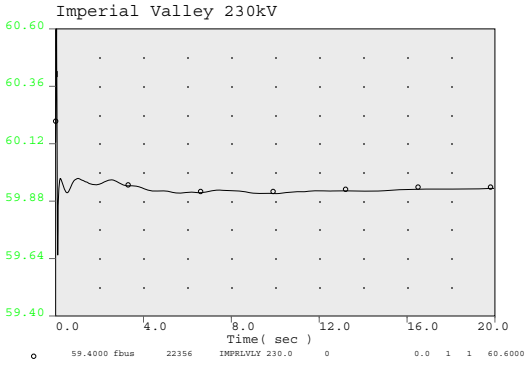


Imperial Valley 230kV



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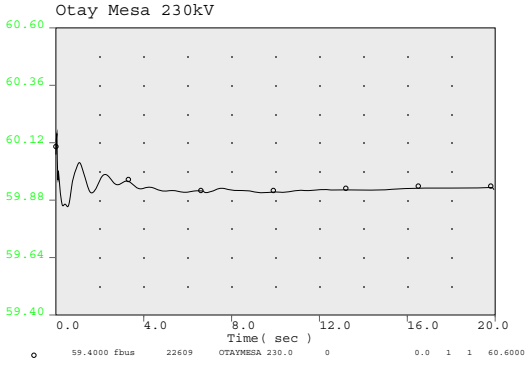

C1 C2 Heavy Summer Post With Upgrades

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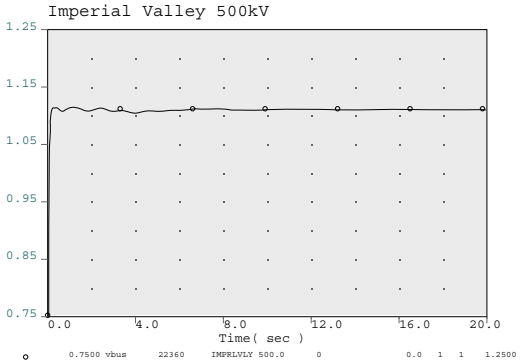
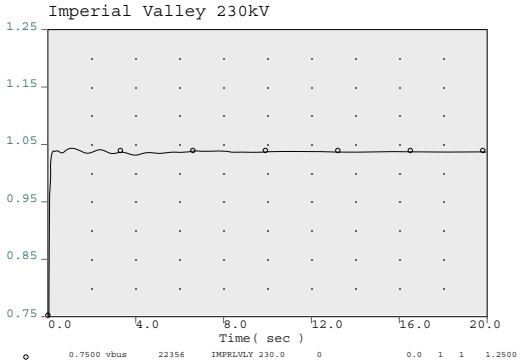
VOLTAGE

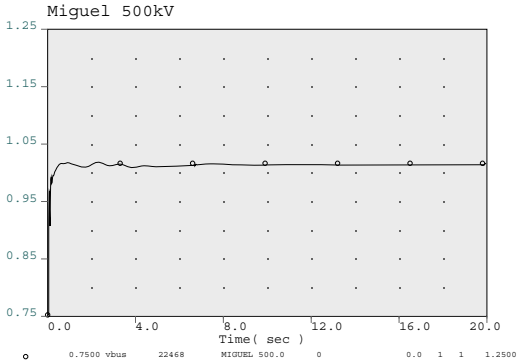
Imperial Valley 500kV



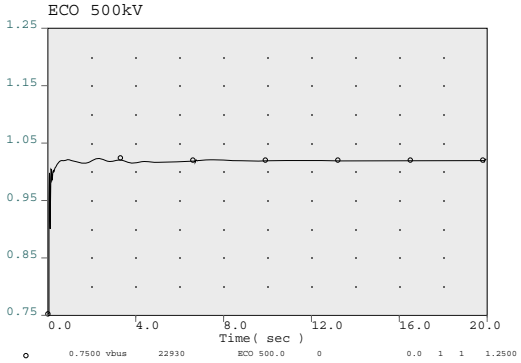
Imperial Valley 230kV



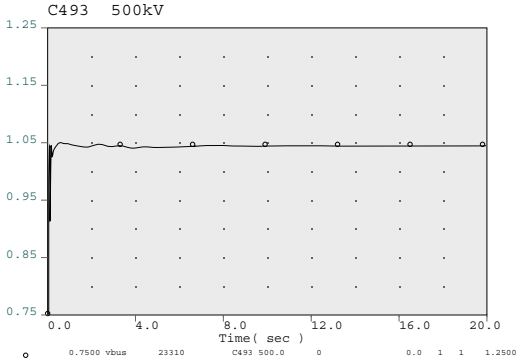
Miguel 500kV



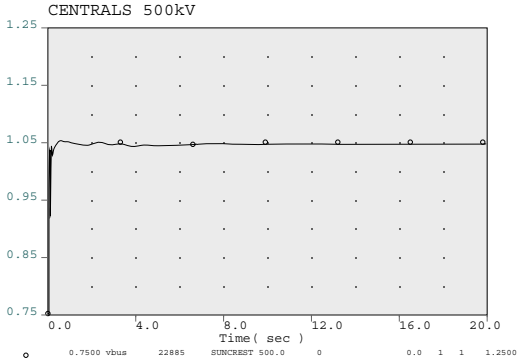
ECO 500kV



C493 500kV



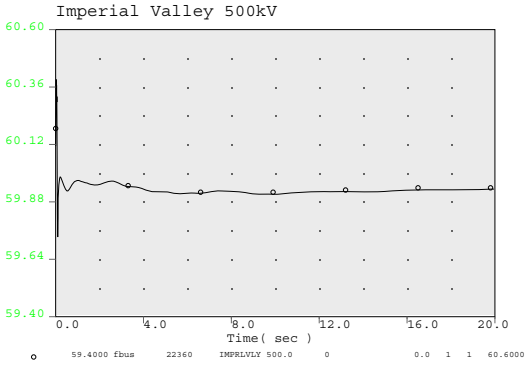
CENTRALS 500kV



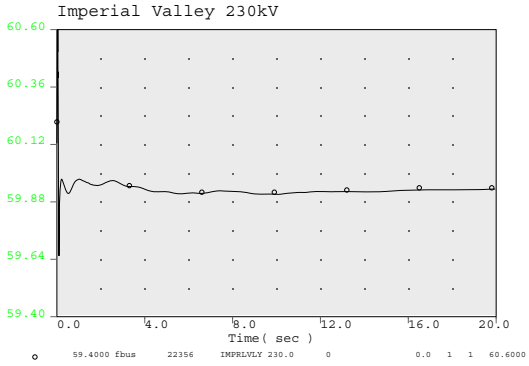
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

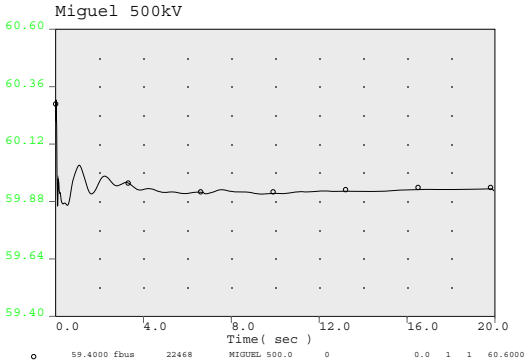
Imperial Valley 500kV



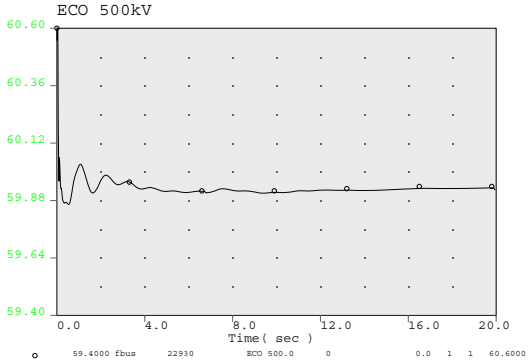
Imperial Valley 230kV



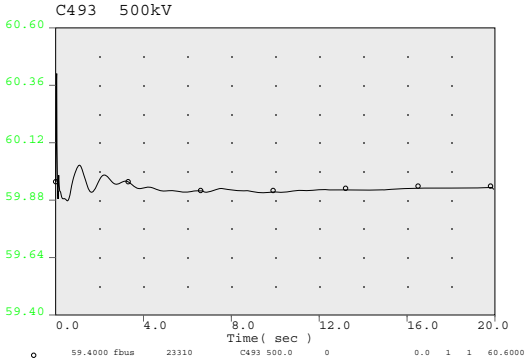
Miguel 500kV



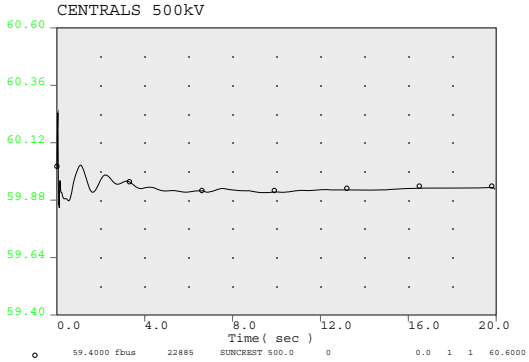
ECO 500kV



C493 500kV

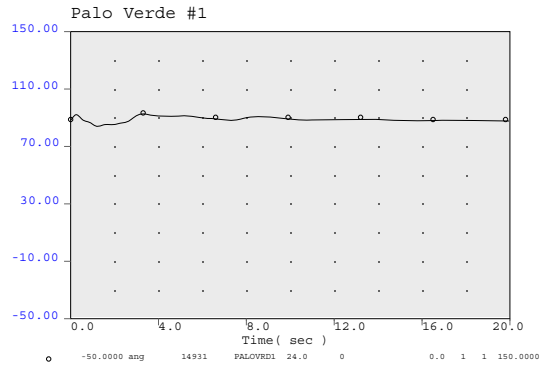


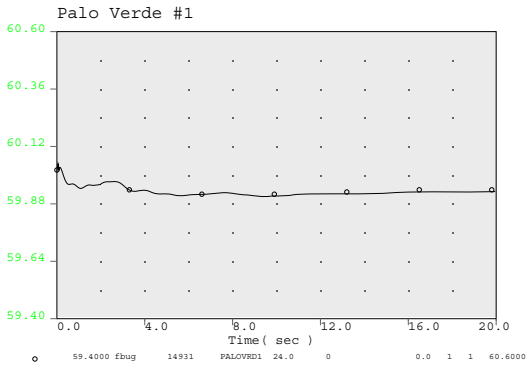
CENTRALS 500kV

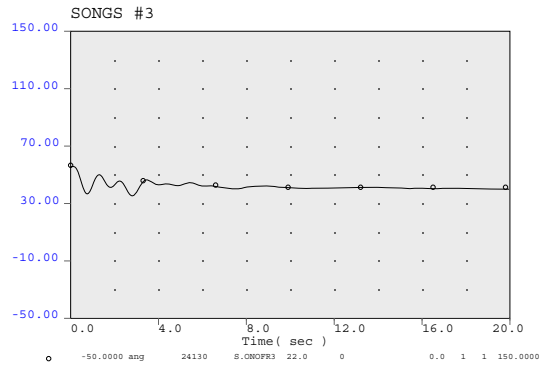


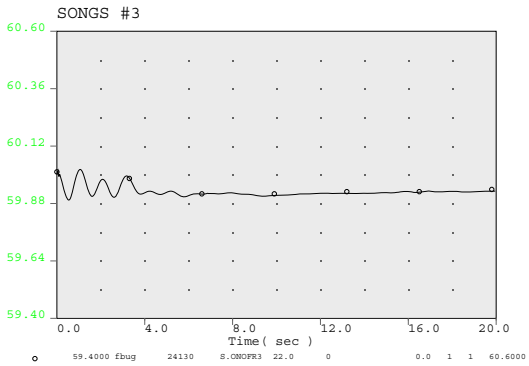
C1 C2 Heavy Summer Post With Upgrades

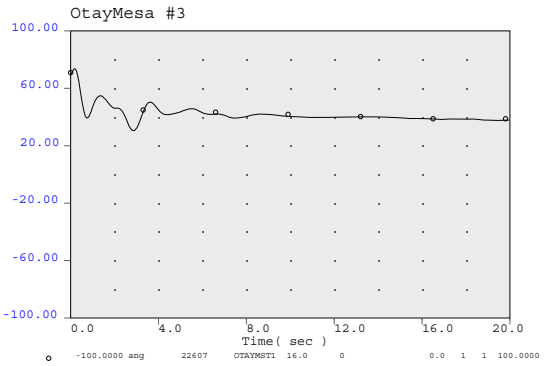
RELATIVE ROTOR ANGLE & FREQUENCY

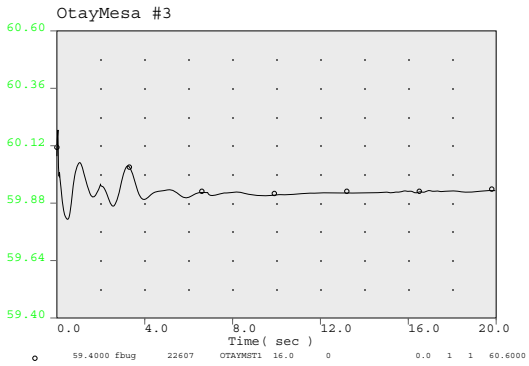












C1 C2 Heavy Summer Post With Upgrades

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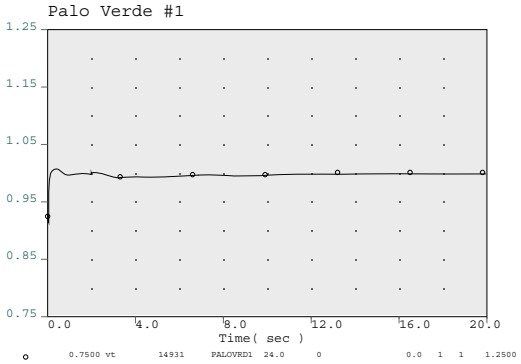
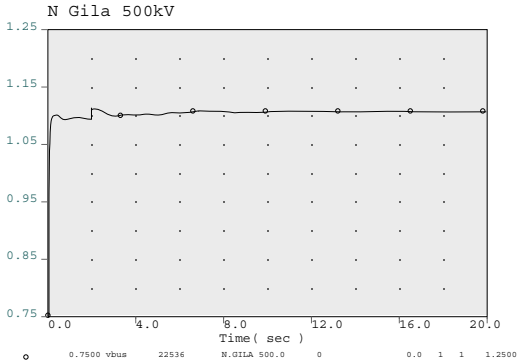
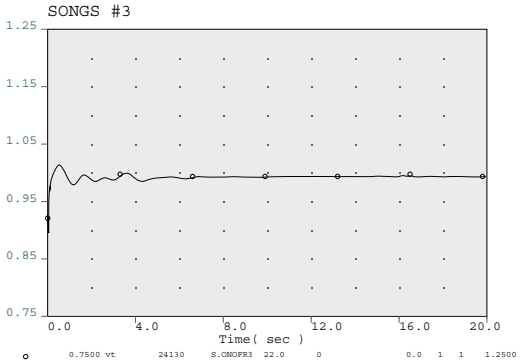
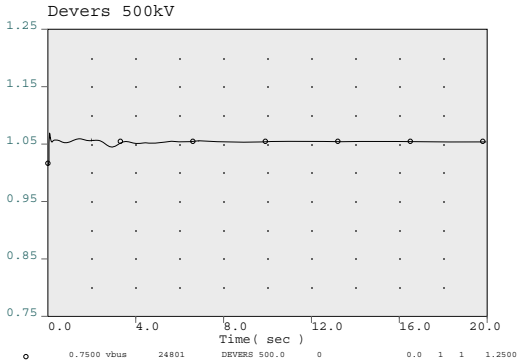
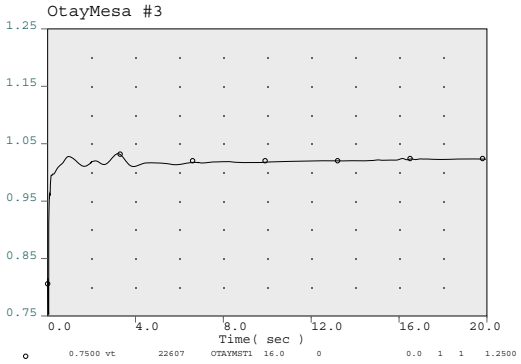
RELATIVE VOLTAGE

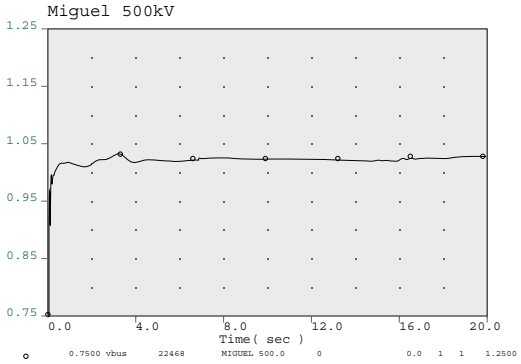












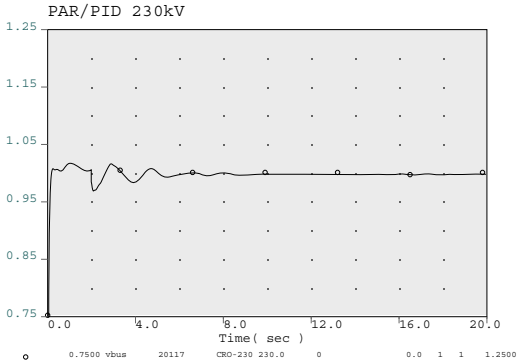
C1 C2 Heavy Summer Post With Upgrades

Page 2

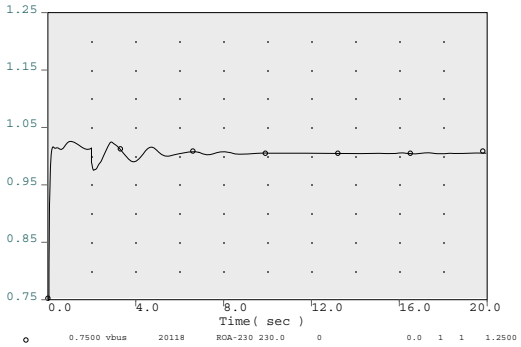
SDGE A Sempra Energy utility	tran-c1c2-hs-pstup-r15_IV-RASX-dlo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:01:41 2011

Affected System Voltage Check and Comparison

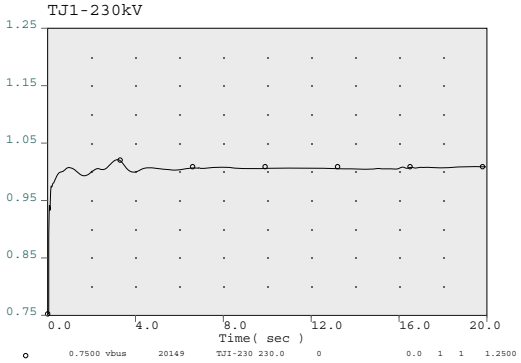
PAR/PID 230kV



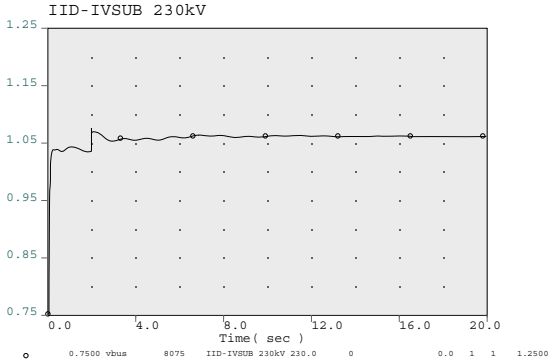
ROA-230kV



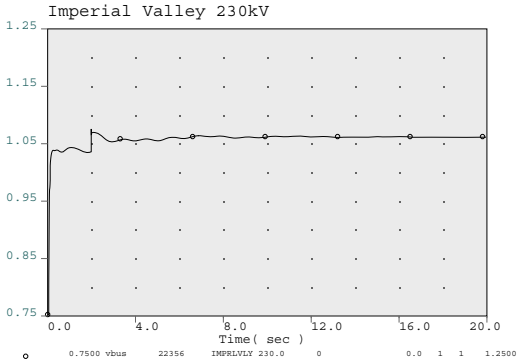
TJ1-230kV



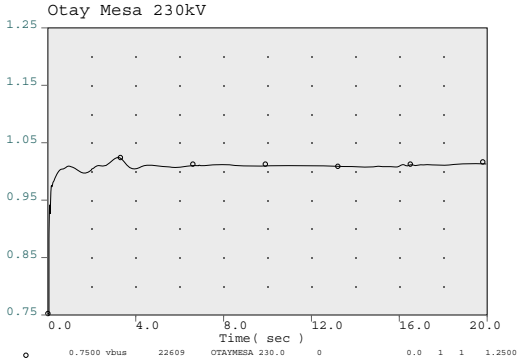
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



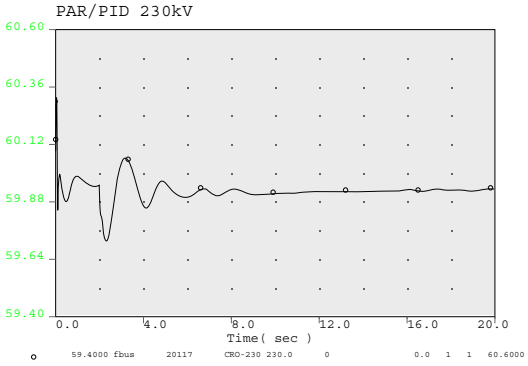
C1 C2 Heavy Summer Post With Upgrades

Page 3

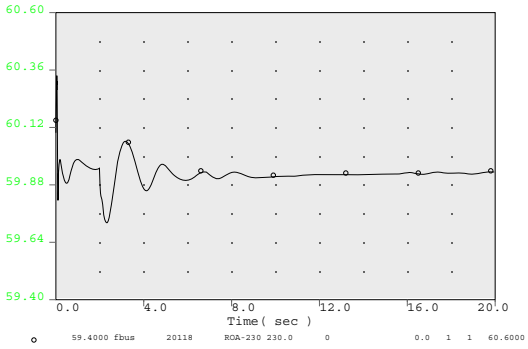
SDGE	tran-c1c2-hs-pstup-r15_IV-RASX-dlo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:01:42 2011

Affected System Frequency Check and Comparison

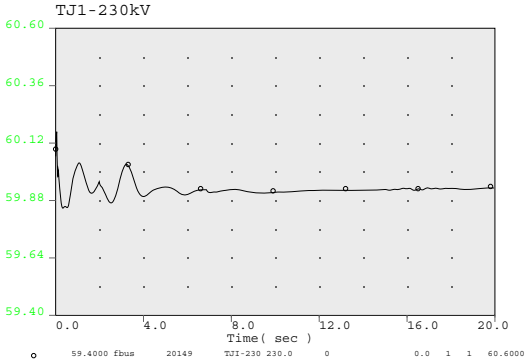
PAR/PID 230kV



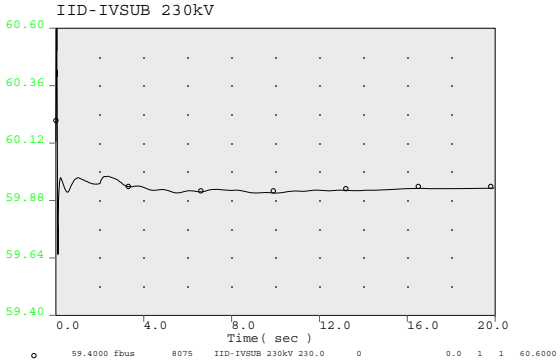
ROA-230kV



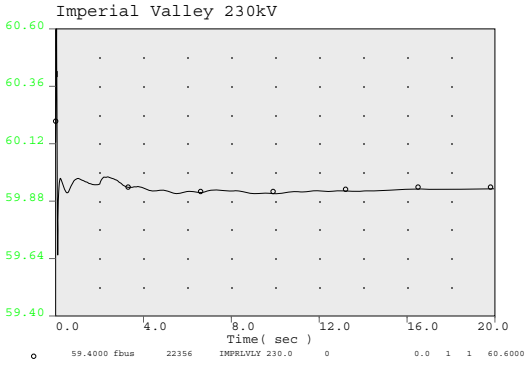
TJ1-230kV



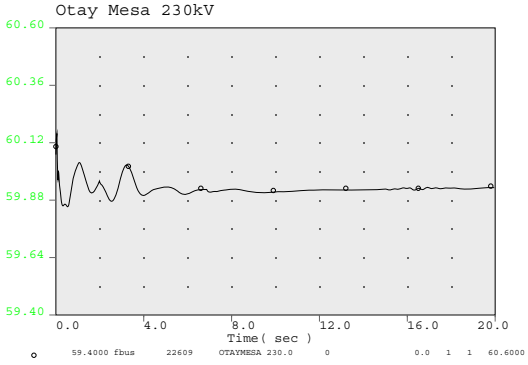
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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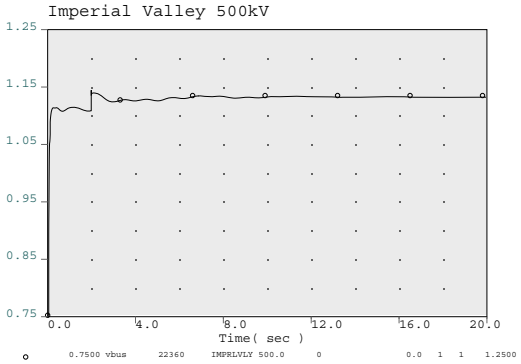
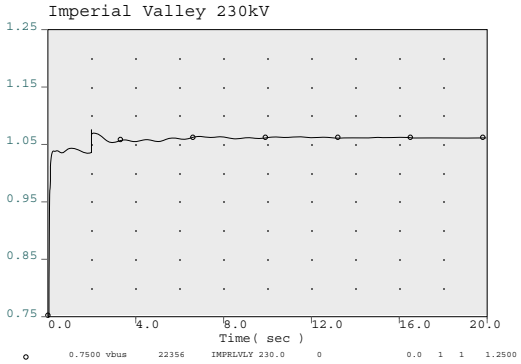
VOLTAGE

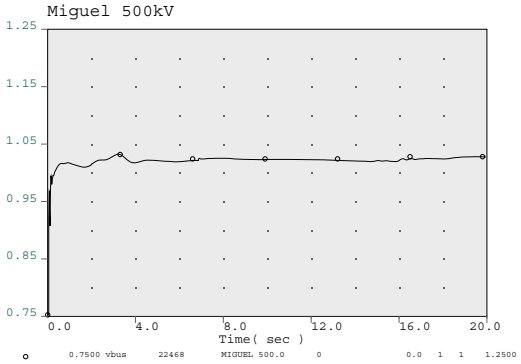
Imperial Valley 500kV



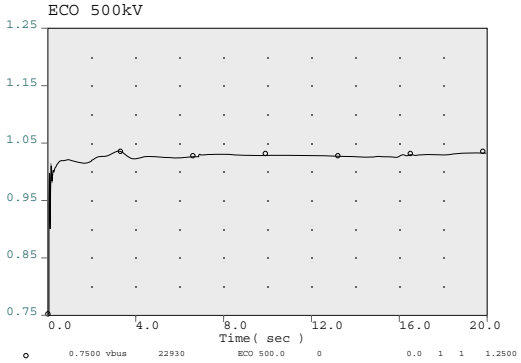
Imperial Valley 230kV



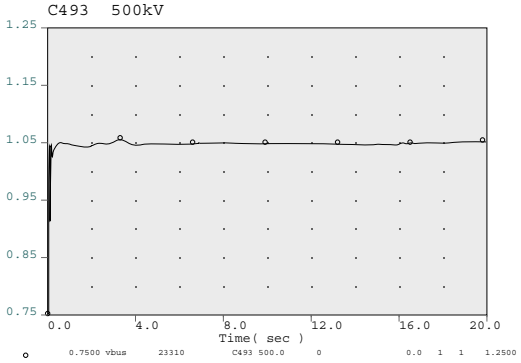
Miguel 500kV



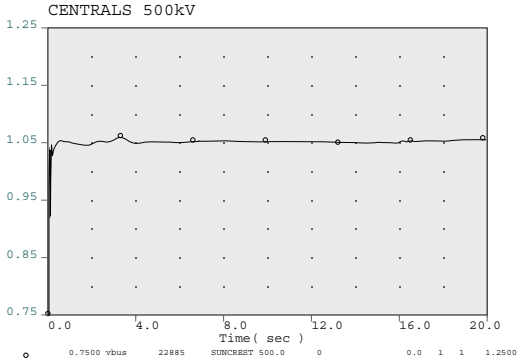
ECO 500kV



C493 500kV



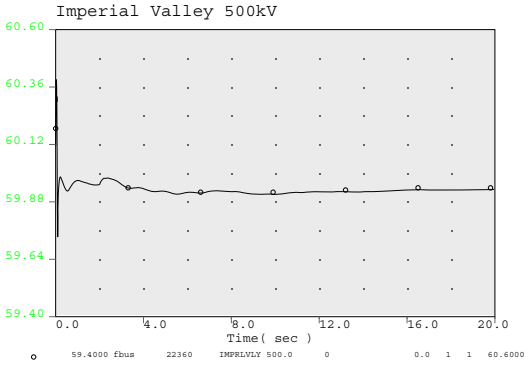
CENTRALS 500kV



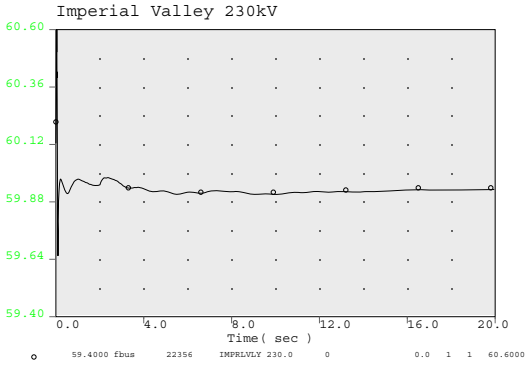
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

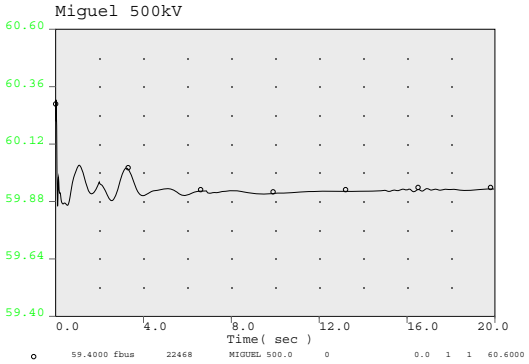
Imperial Valley 500kV



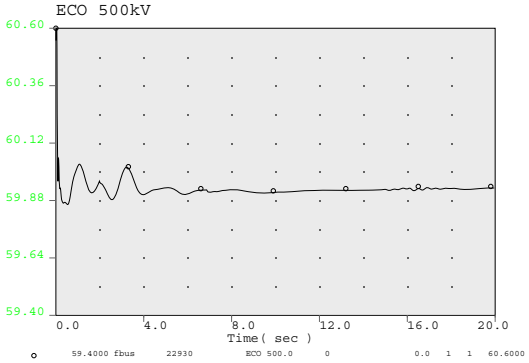
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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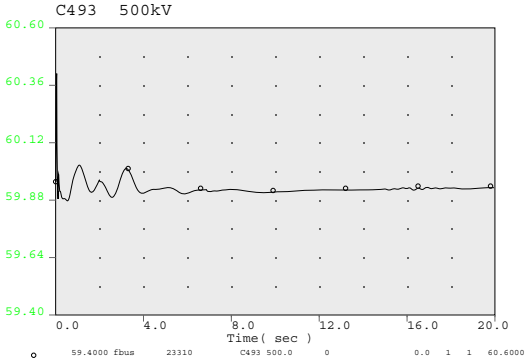
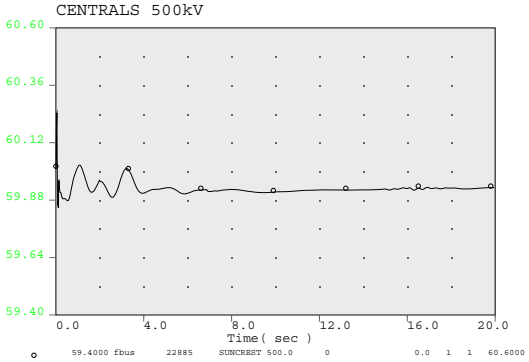
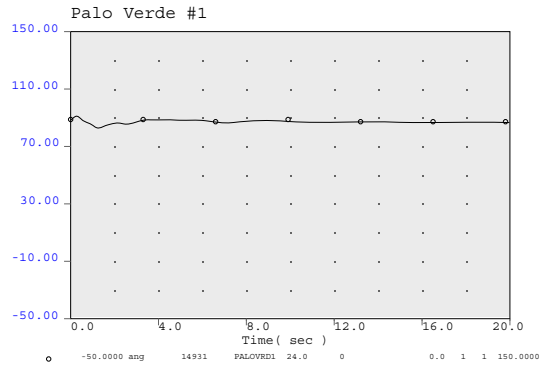


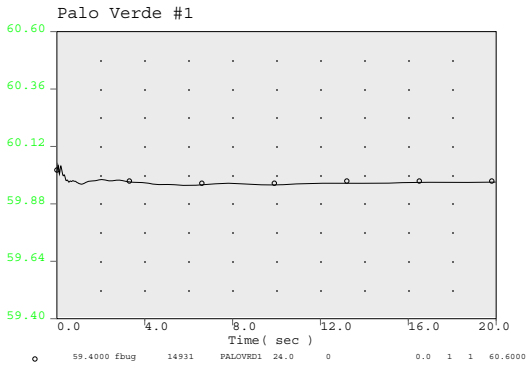
CENTRALS 500kV

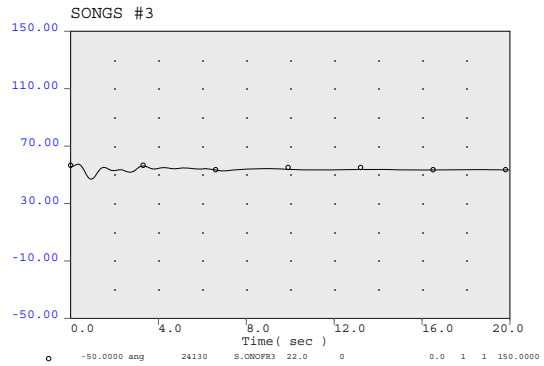


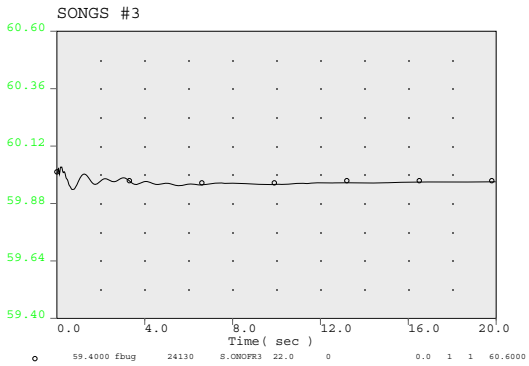
C1 C2 Heavy Summer Post With Upgrades

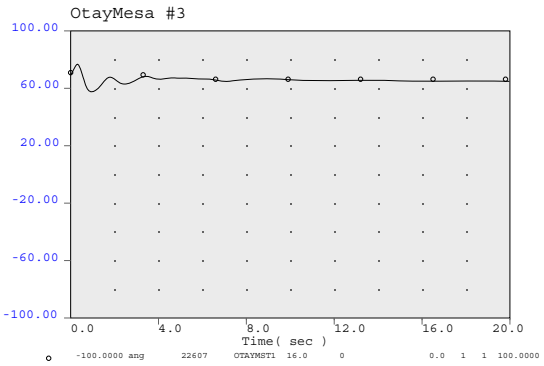
RELATIVE ROTOR ANGLE & FREQUENCY

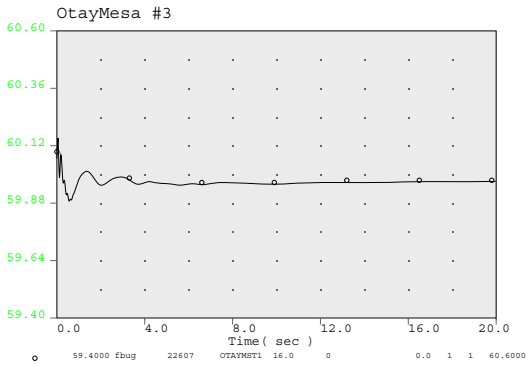








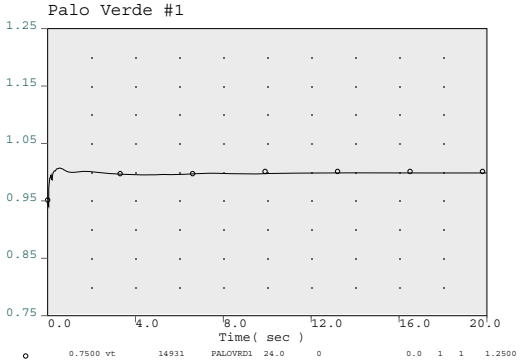




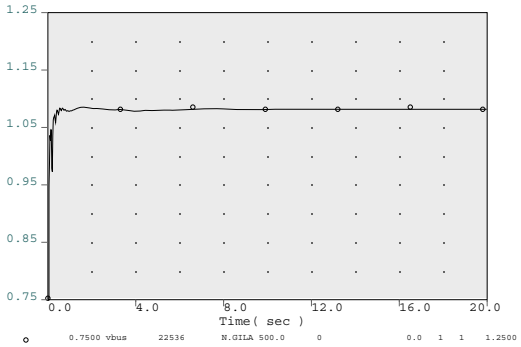
WESTERN ELECTRICITY COORDINATING COUNCIL

RELATIVE VOLTAGE

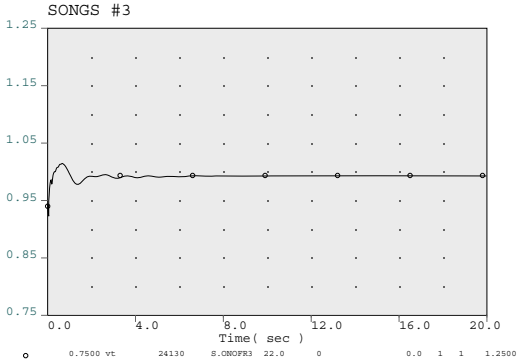
Palo Verde #1



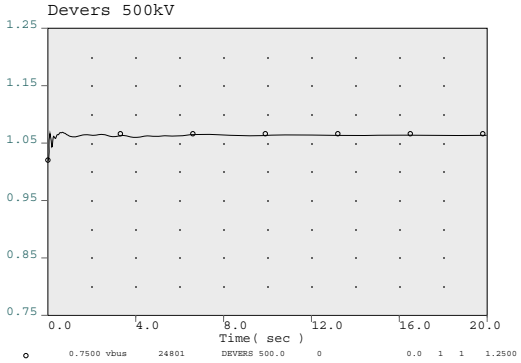
N Gila 500kV



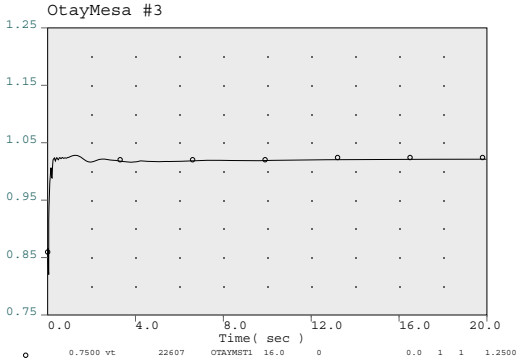
SONGS #3



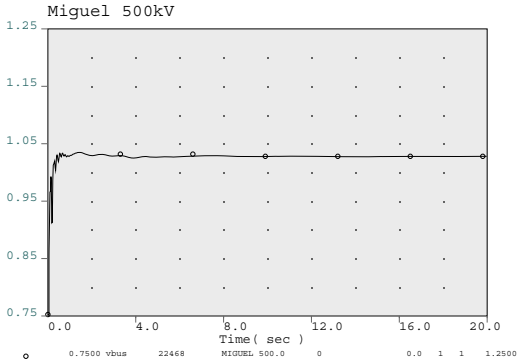
Devers 500kV



OtayMesa #3



Miguel 500kV



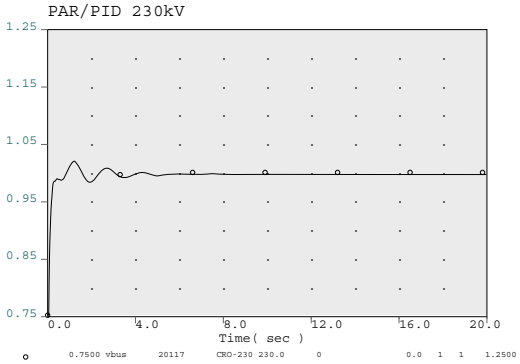
C1 C2 Heavy Summer Post With Upgrades

Page 2

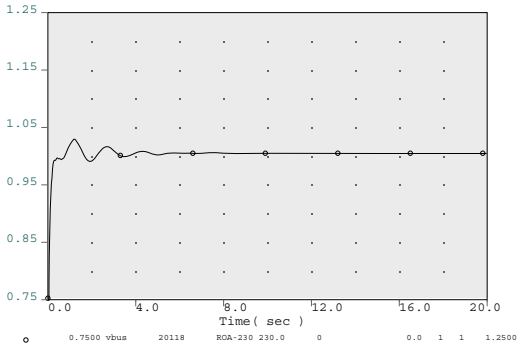
SDGE	tran-c1c2-hs-pstup-r15_IVROA(IV)-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:08:15 2011

Affected System Voltage Check and Comparison

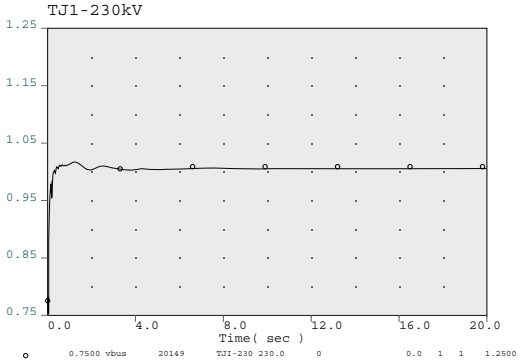
PAR/PID 230kV



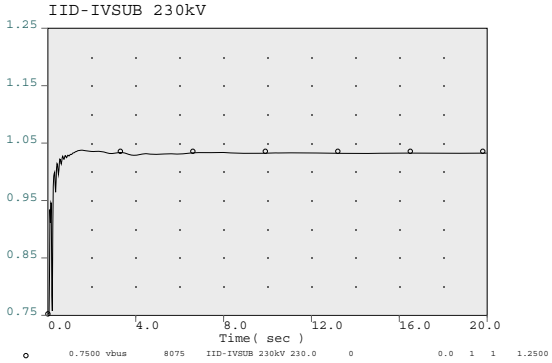
ROA-230kV



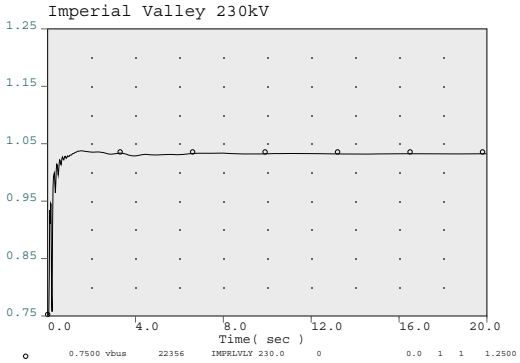
TJ1-230kV



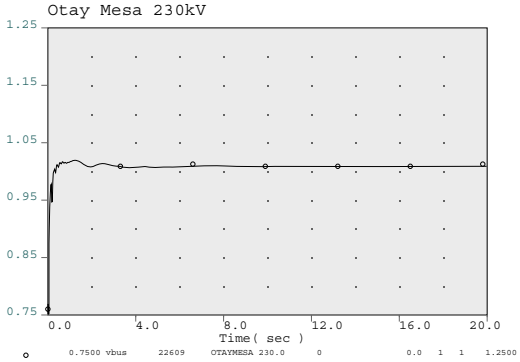
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



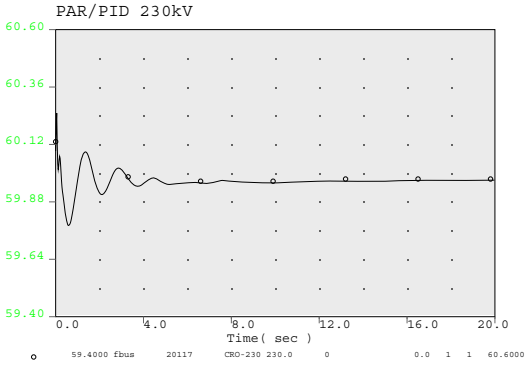
C1 C2 Heavy Summer Post With Upgrades

Page 3

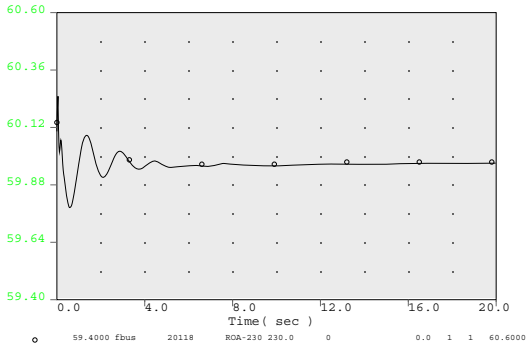
SDGE	tran-c1c2-hs-pstup-r15_IVROA(IV)-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:08:15 2011

Affected System Frequency Check and Comparison

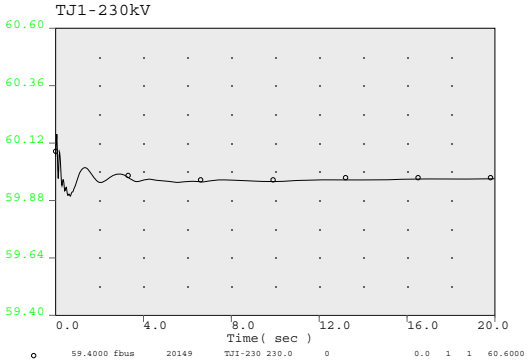
PAR/PID 230kV



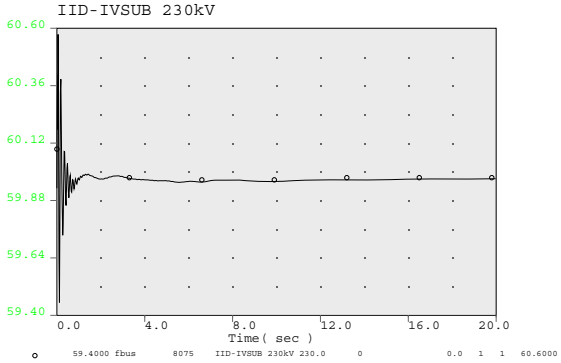
ROA-230kV



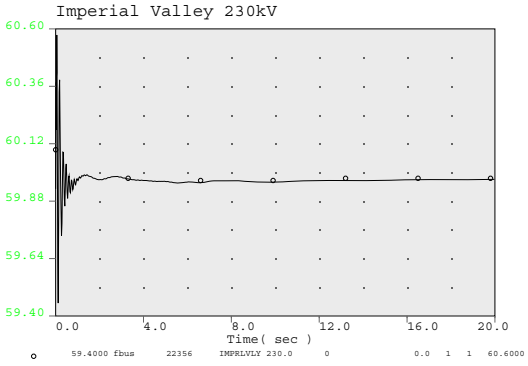
TJ1-230kV



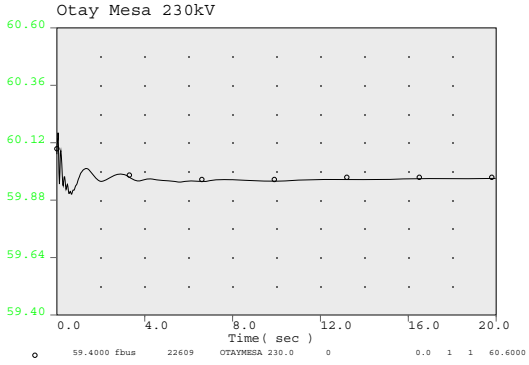
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

Page 4

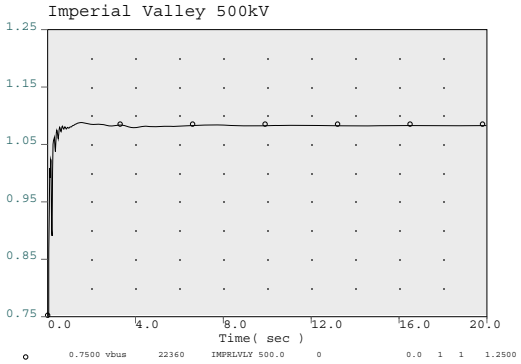
tran-c1c2-hs-pstup-r15_IVROA(IV)-slo.chf

anstab\hs\pst\ws_pst_c1c2

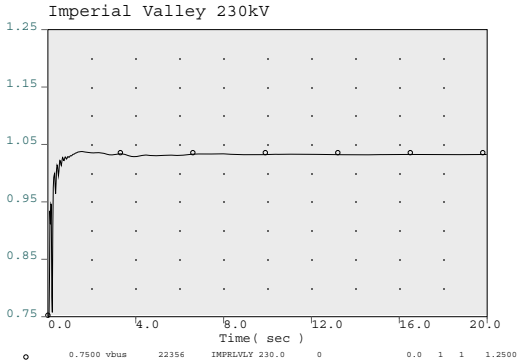
Sun Jul 17 15:08:16 2011

VOLTAGE

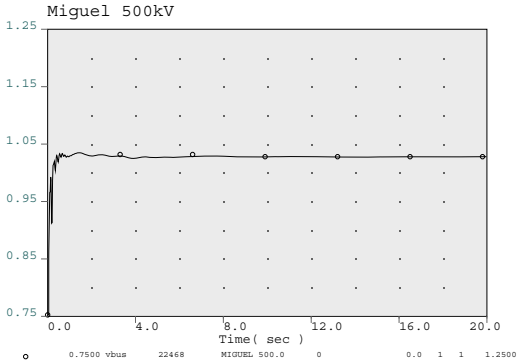
Imperial Valley 500kV



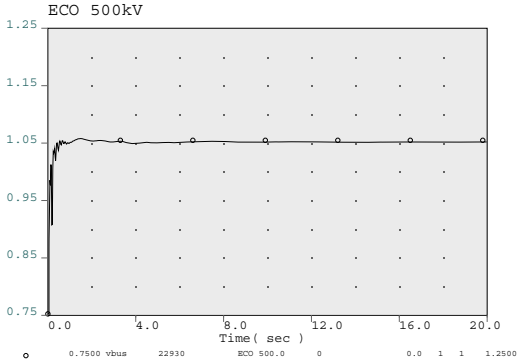
Imperial Valley 230kV



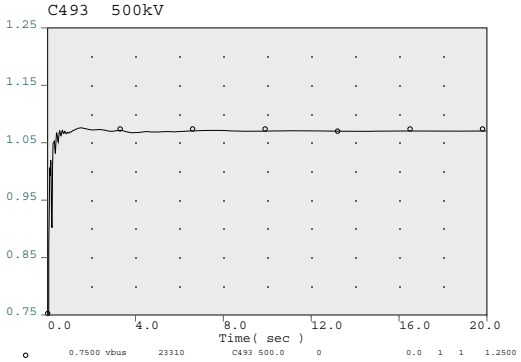
Miguel 500kV



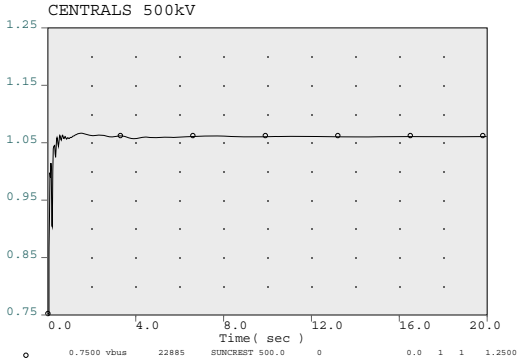
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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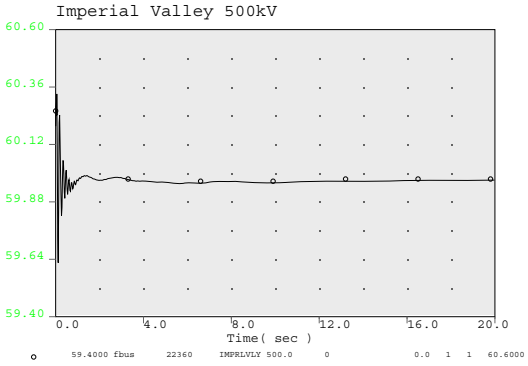
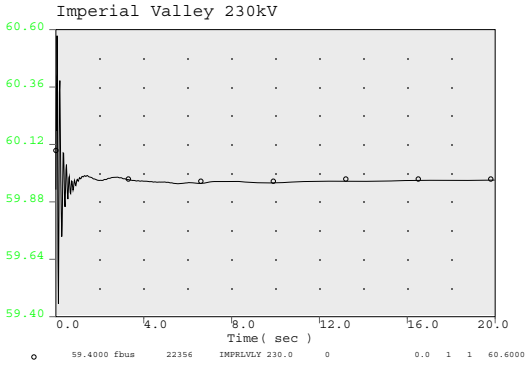
SDGE	tran-c1c2-hs-pstup-r15_IVROA(IV)-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:08:16 2011

FREQUENCY

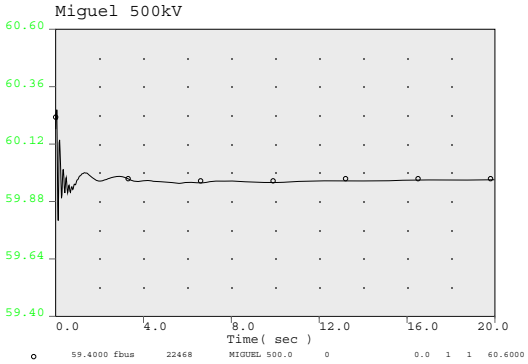
Imperial Valley 500kV



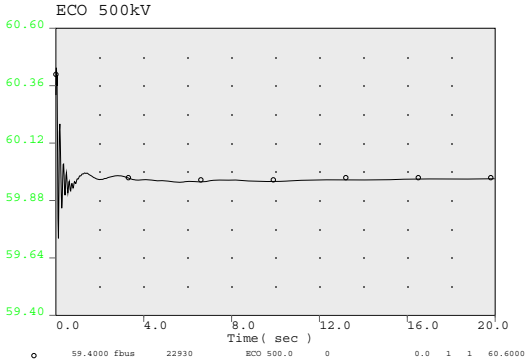
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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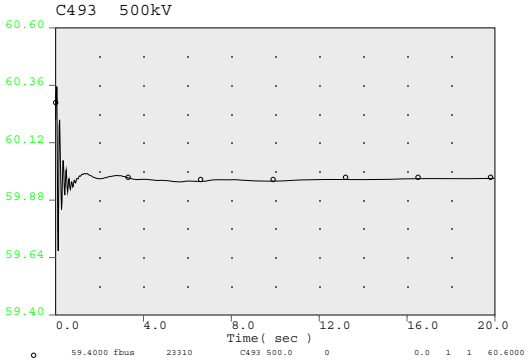
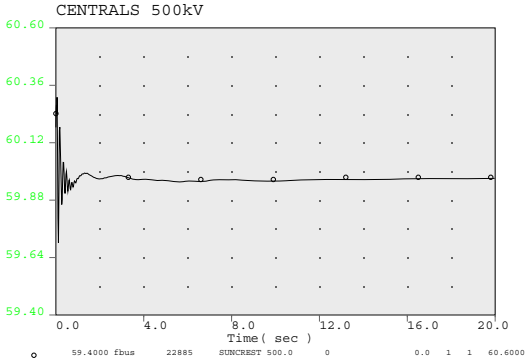
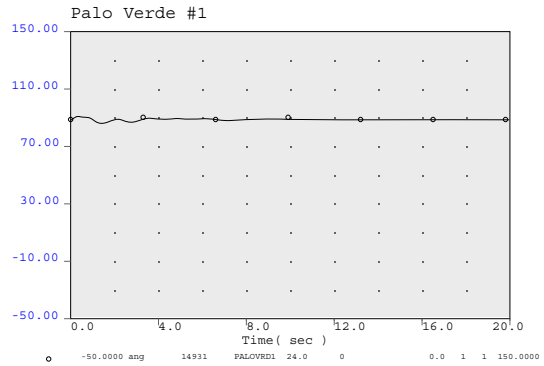


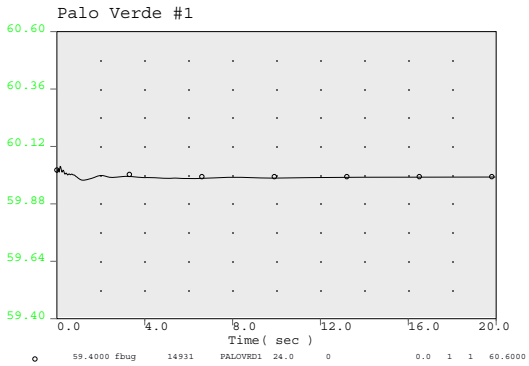
CENTRALS 500kV

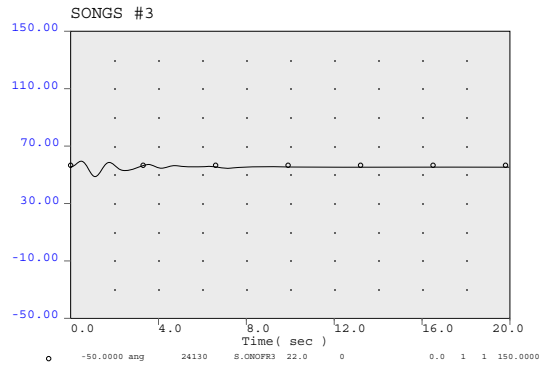


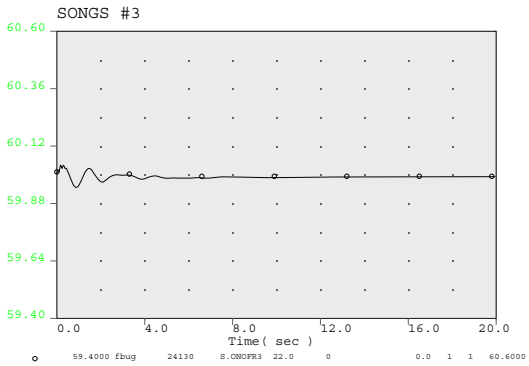
C1 C2 Heavy Summer Post With Upgrades

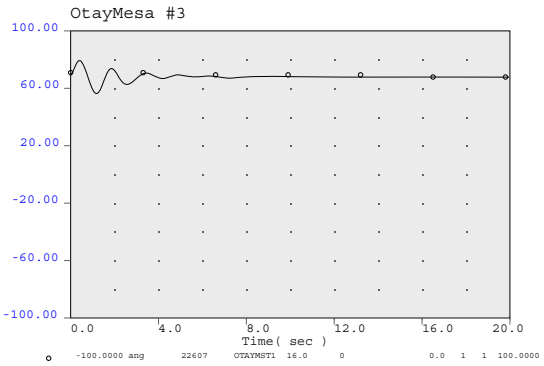
RELATIVE ROTOR ANGLE & FREQUENCY

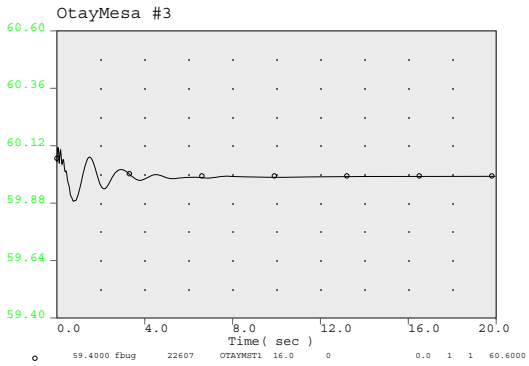












C1 C2 Heavy Summer Post With Upgrades

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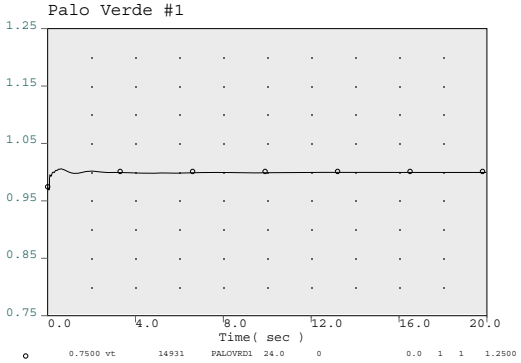
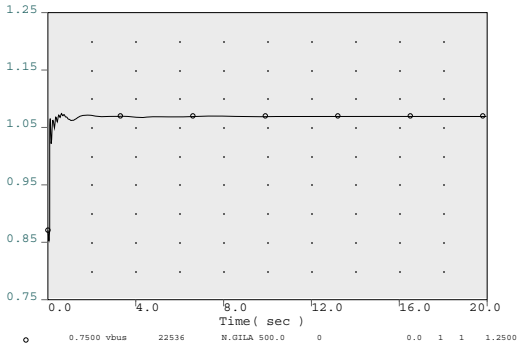
RELATIVE VOLTAGE

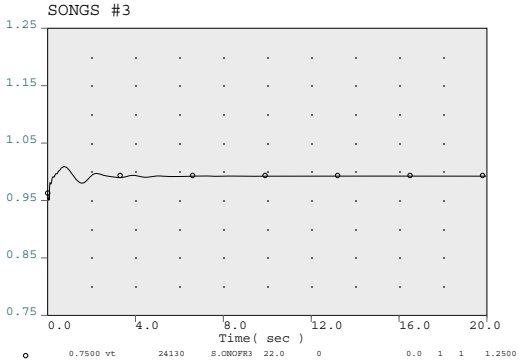
Palo Verde #1



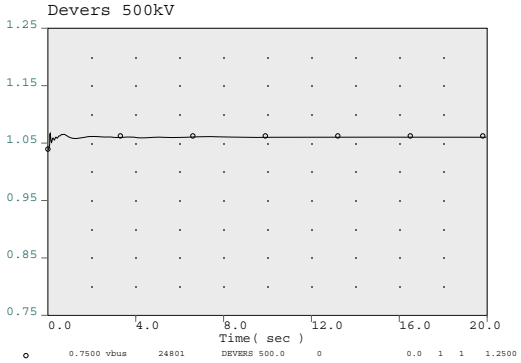
N Gila 500kV



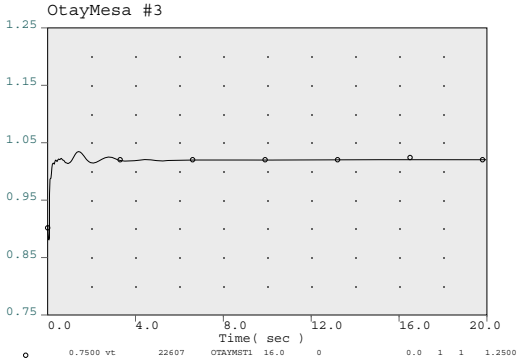
SONGS #3



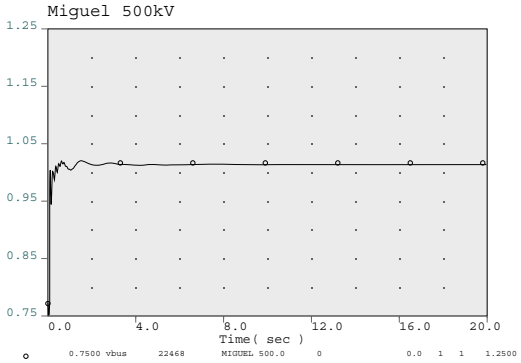
Devers 500kV



OtayMesa #3



Miguel 500kV



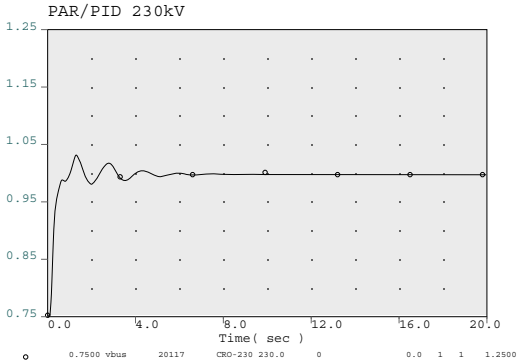
C1 C2 Heavy Summer Post With Upgrades

Page 2

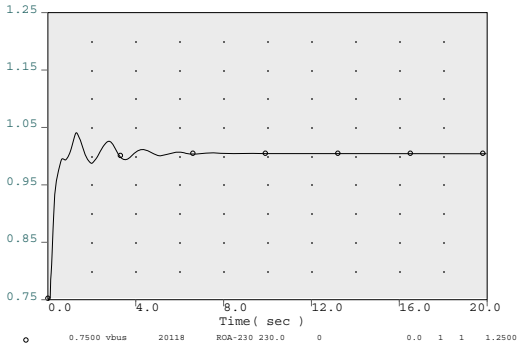
SDGE A Sempra Energy utility	tran-c1c2-hs-pstup-r15_IVROA(ROA)-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:10:22 2011

Affected System Voltage Check and Comparison

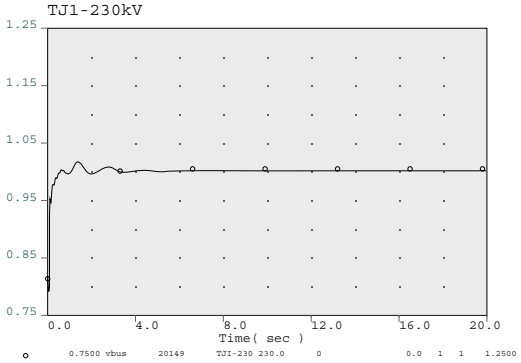
PAR/PID 230kV



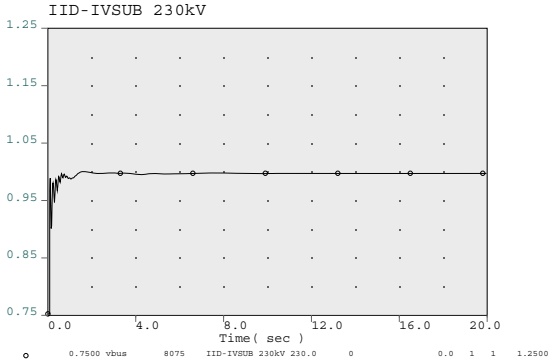
ROA-230kV



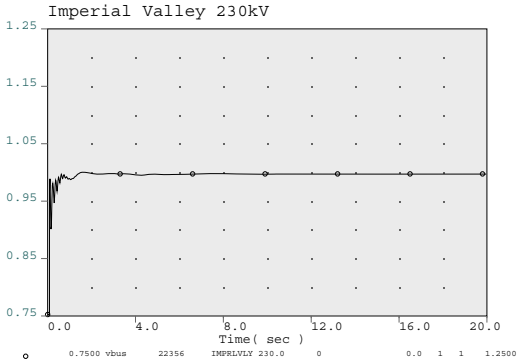
TJ1-230kV



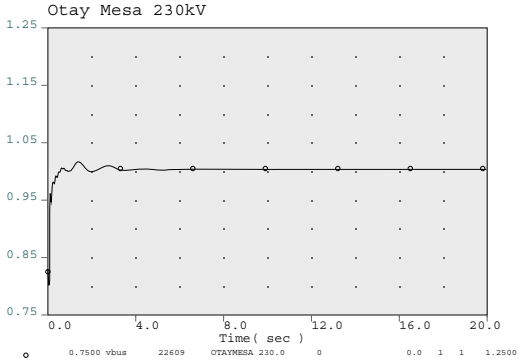
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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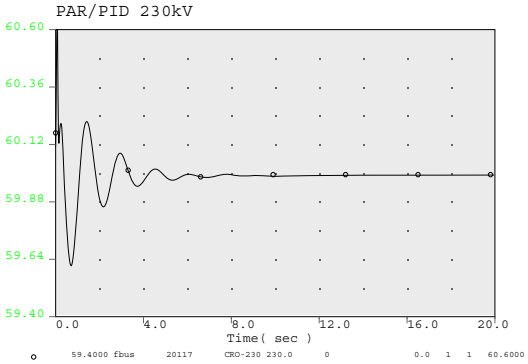
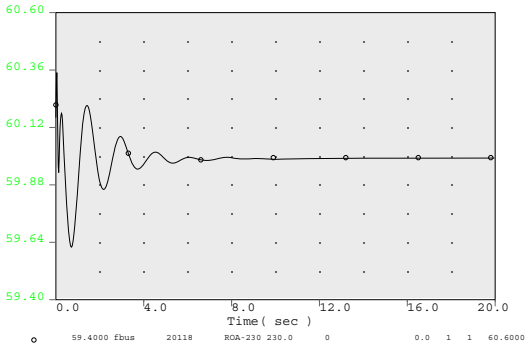
SDGE	tran-c1c2-hs-pstup-r15_IVROA(ROA)-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:10:22 2011

Affected System Frequency Check and Comparison

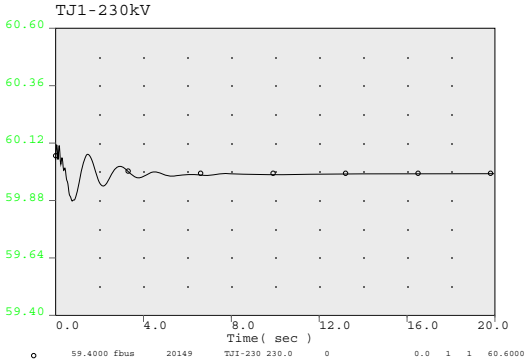
PAR/PID 230kV



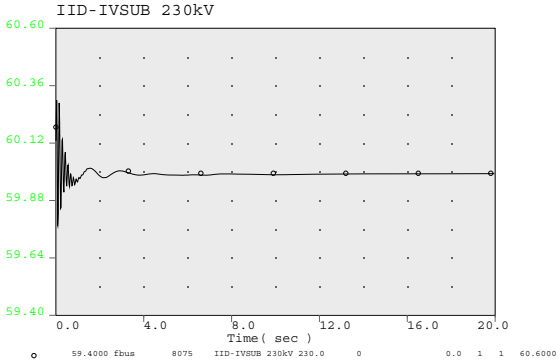
ROA-230kV



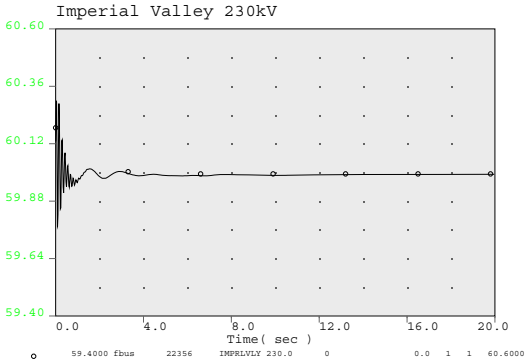
TJ1-230kV



IID-IVSUB 230kV



Imperial Valley 230kV



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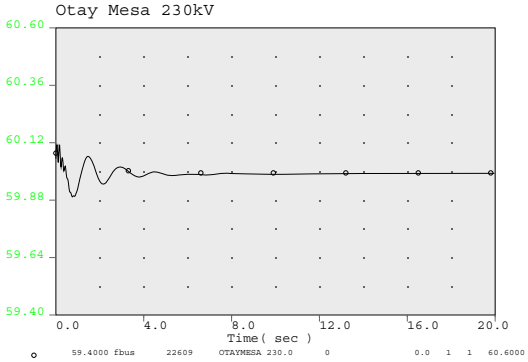

C1 C2 Heavy Summer Post With Upgrades

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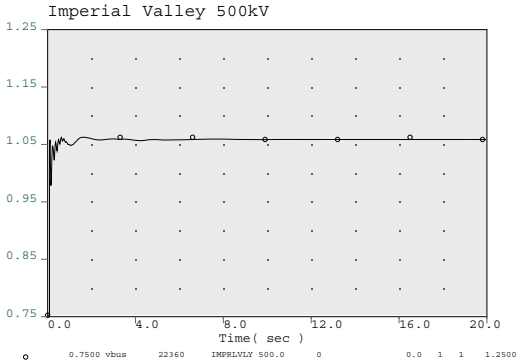
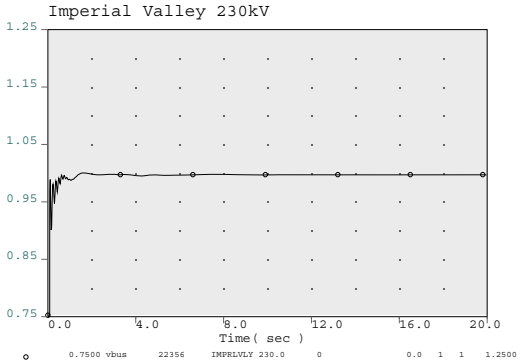
SDGE	tran-c1c2-hs-pstup-r15_IVROA(ROA)-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:10:23 2011

VOLTAGE

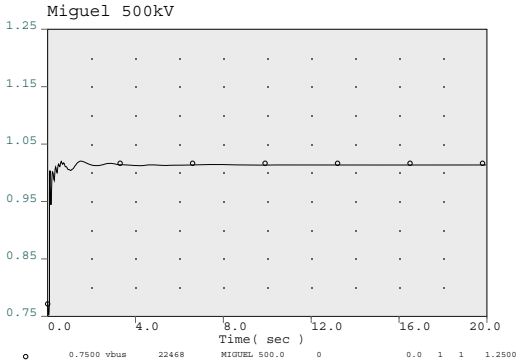
Imperial Valley 500kV



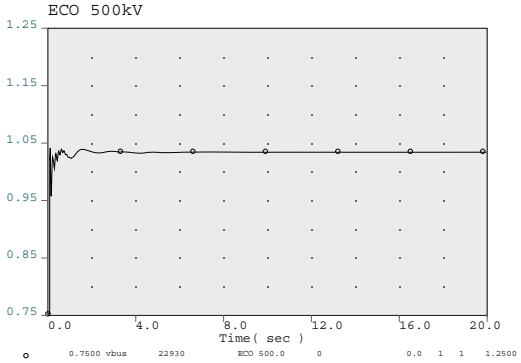
Imperial Valley 230kV



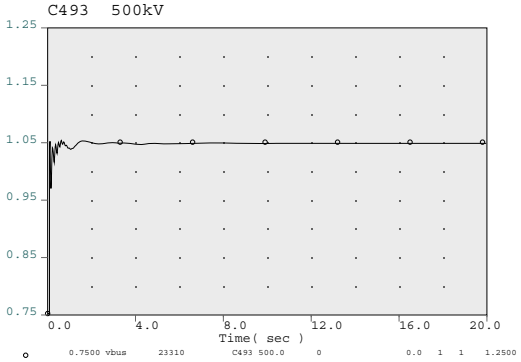
Miguel 500kV



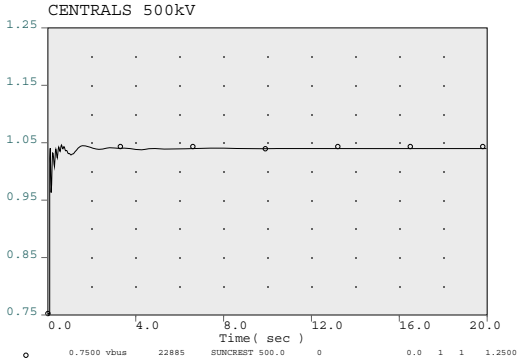
ECO 500kV



C493 500kV



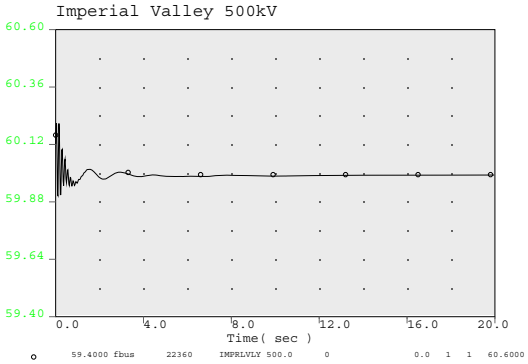
CENTRALS 500kV



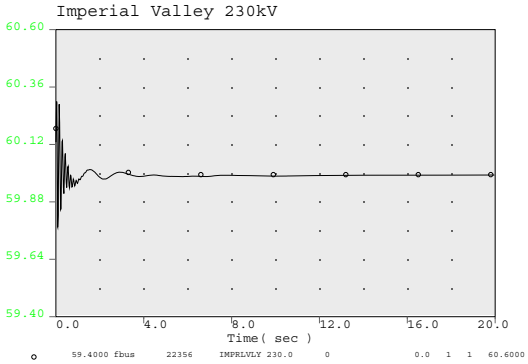
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

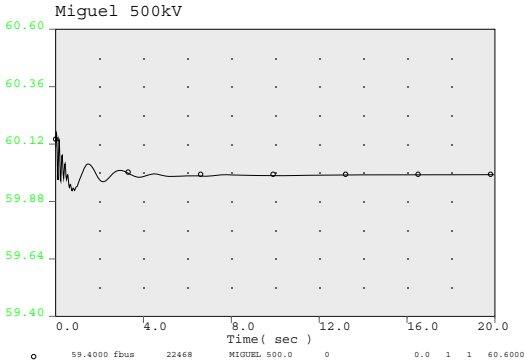
Imperial Valley 500kV



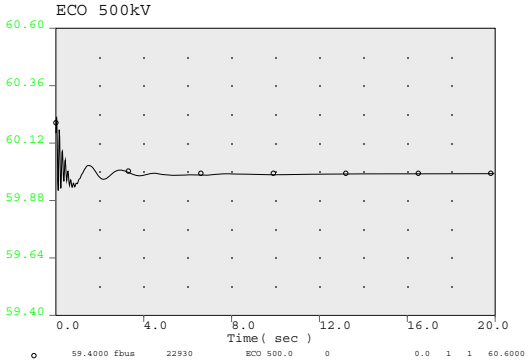
Imperial Valley 230kV



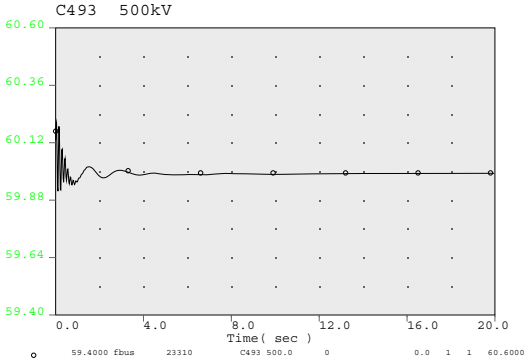
Miguel 500kV



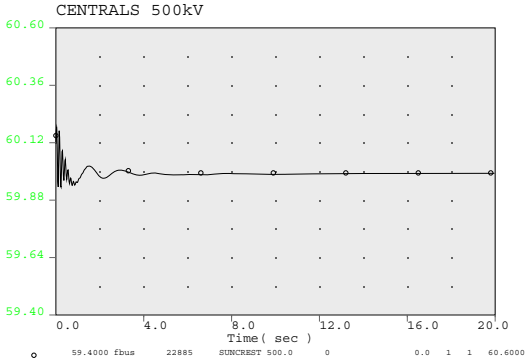
ECO 500kV



C493 500kV

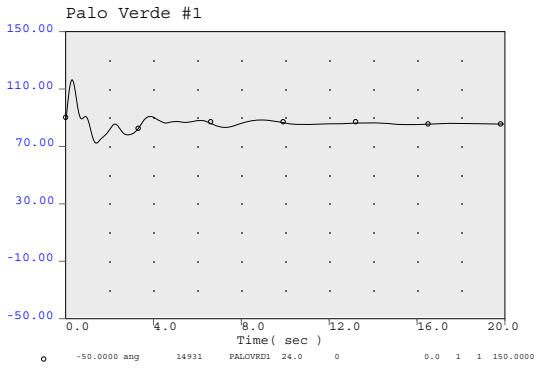


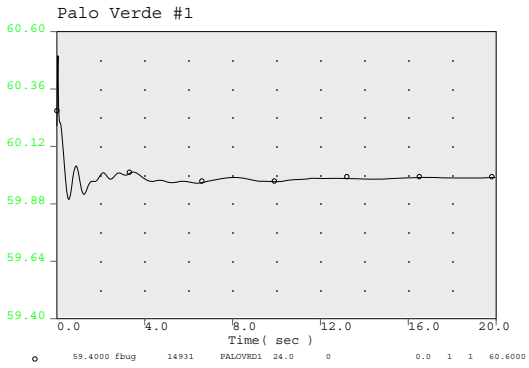
CENTRALS 500kV

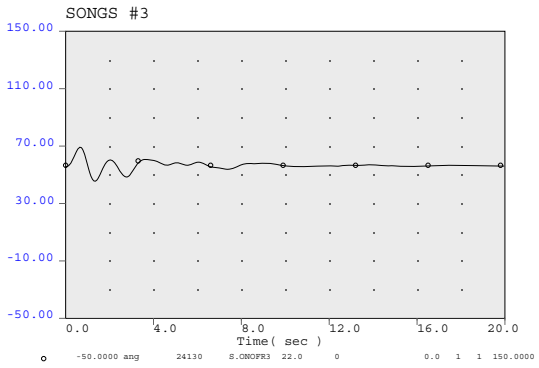


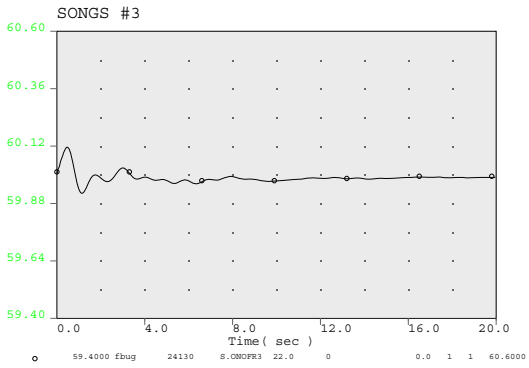
C1 C2 Heavy Summer Post With Upgrades

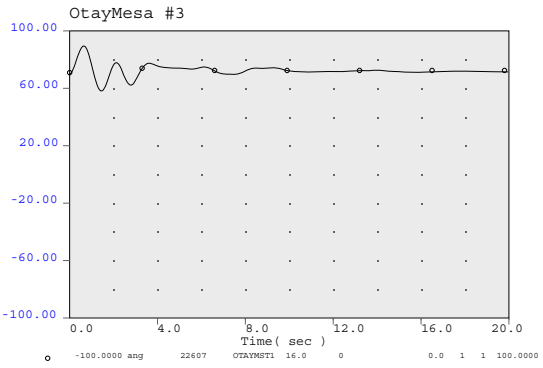
RELATIVE ROTOR ANGLE & FREQUENCY

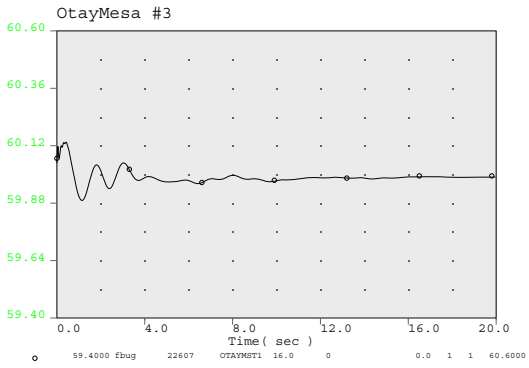












C1 C2 Heavy Summer Post With Upgrades

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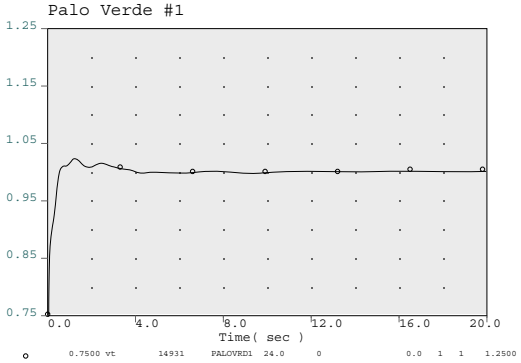
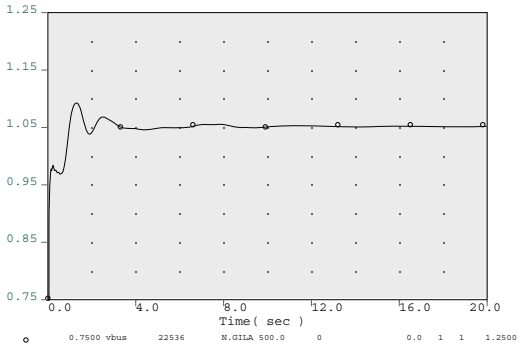
RELATIVE VOLTAGE

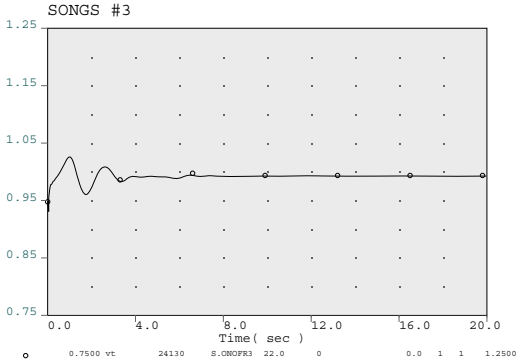
Palo Verde #1



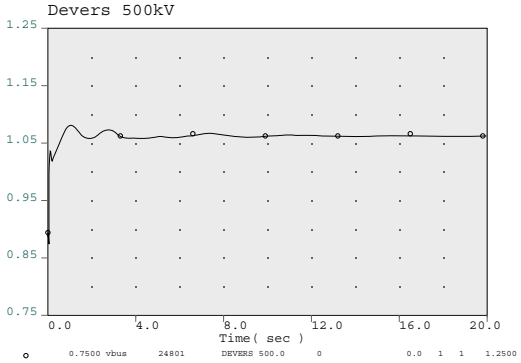
N Gila 500kV



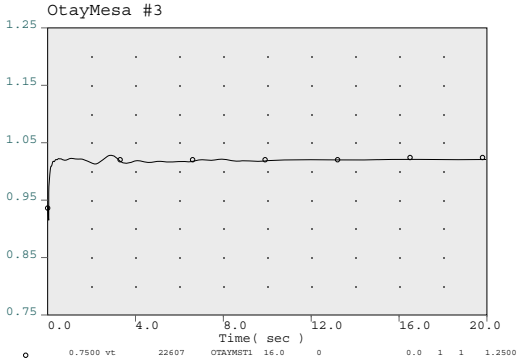
SONGS #3



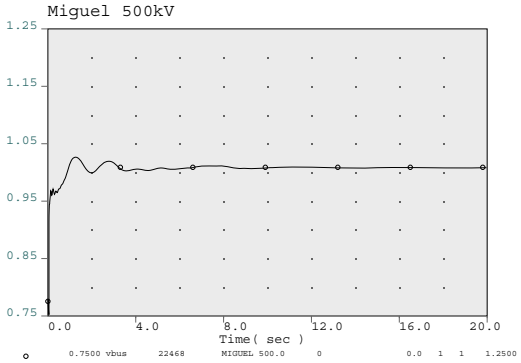
Devers 500kV



OtayMesa #3



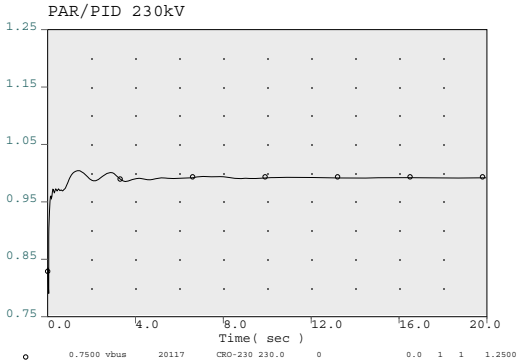
Miguel 500kV



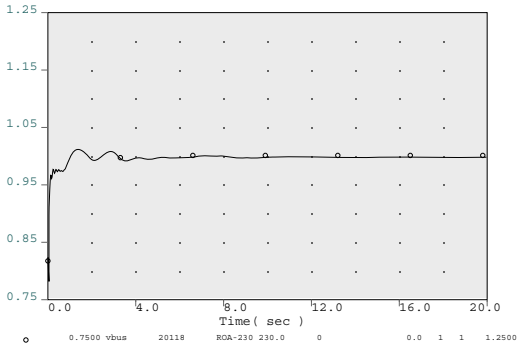
C1 C2 Heavy Summer Post With Upgrades

Affected System Voltage Check and Comparison

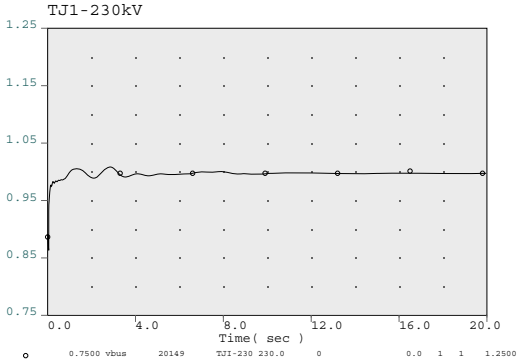
PAR/PID 230kV



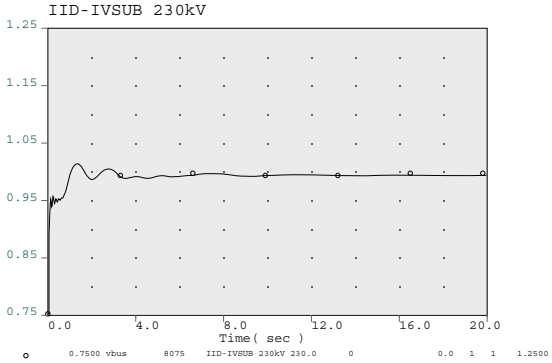
ROA-230kV



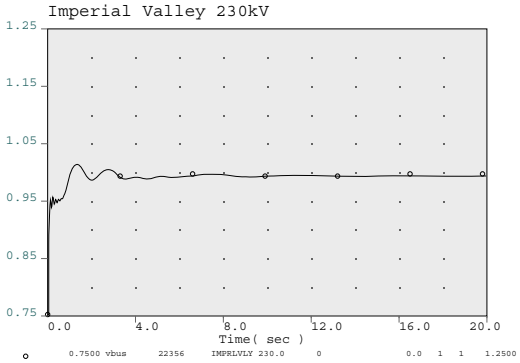
TJ1-230kV



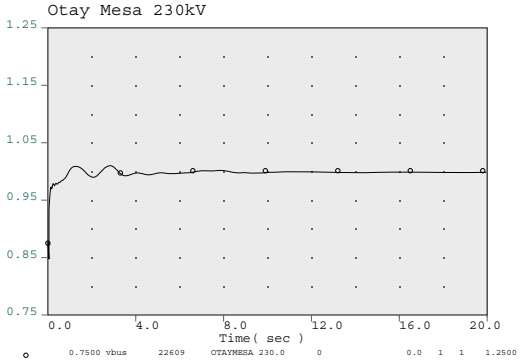
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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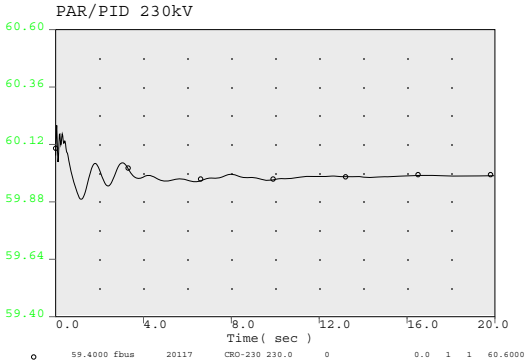
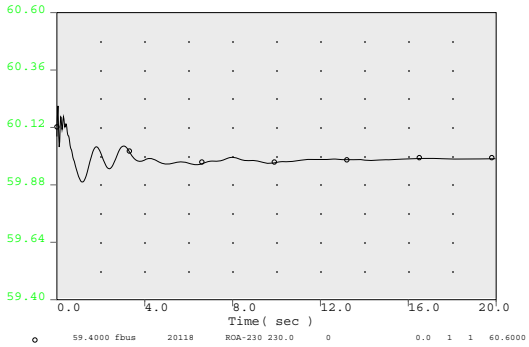
Affected System Frequency Check and Comparison

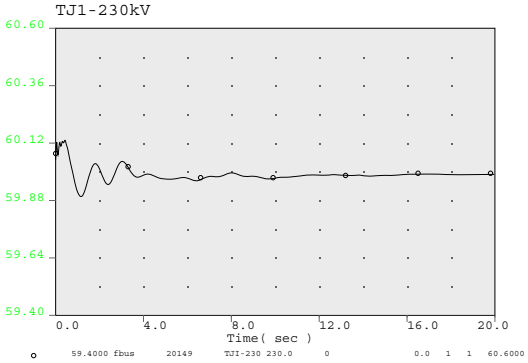
PAR/PID 230kV



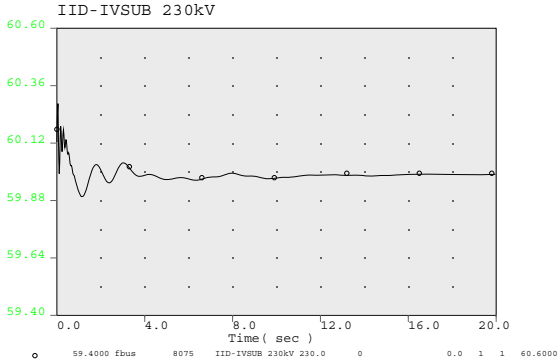
ROA-230kV



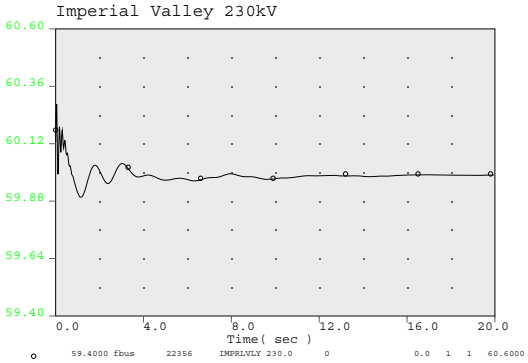
TJ1-230kV



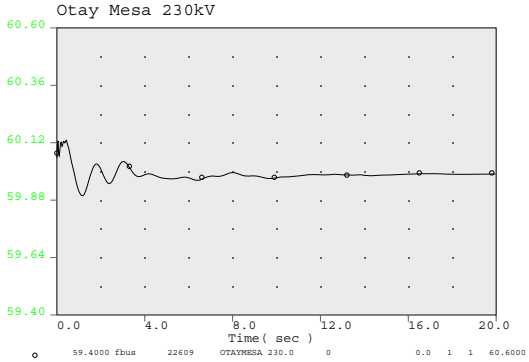
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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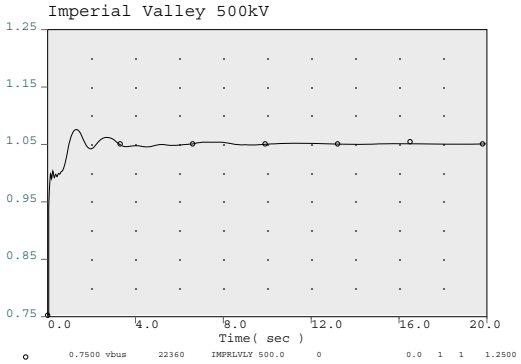
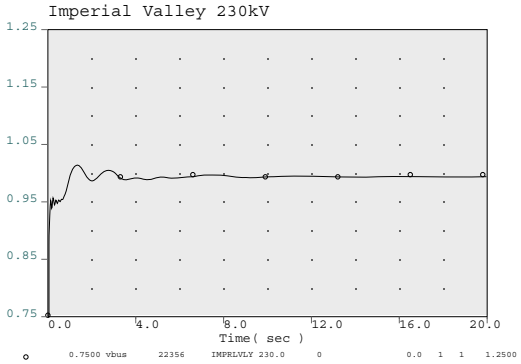
VOLTAGE

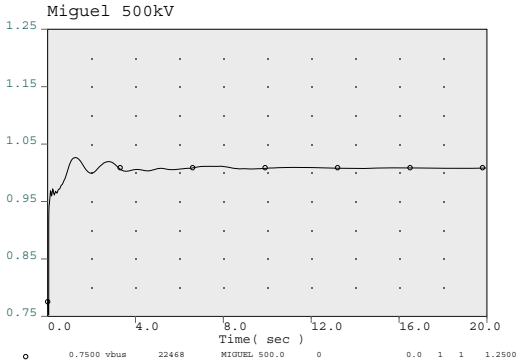
Imperial Valley 500kV



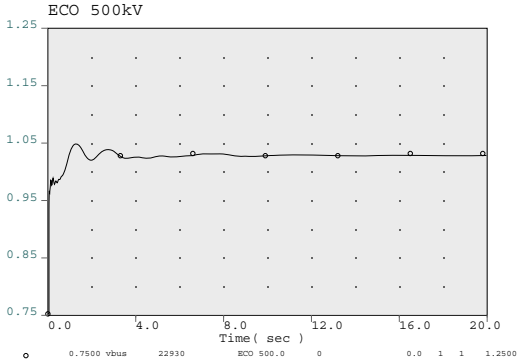
Imperial Valley 230kV



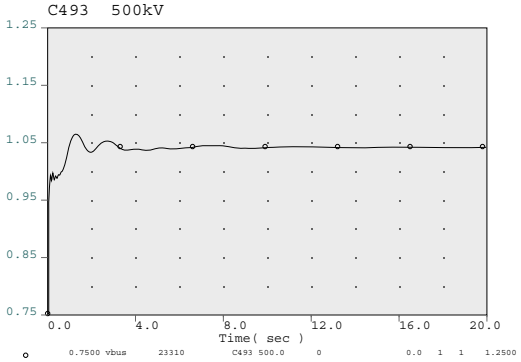
Miguel 500kV



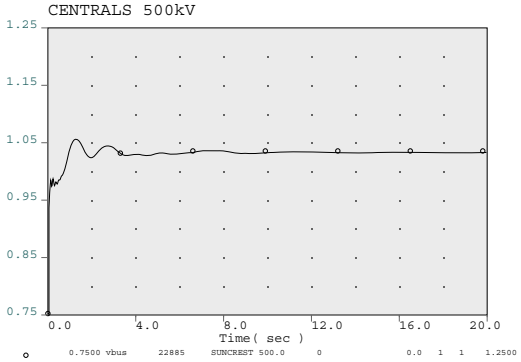
ECO 500kV



C493 500kV



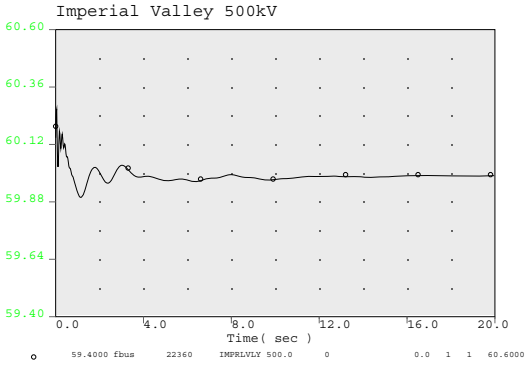
CENTRALS 500kV



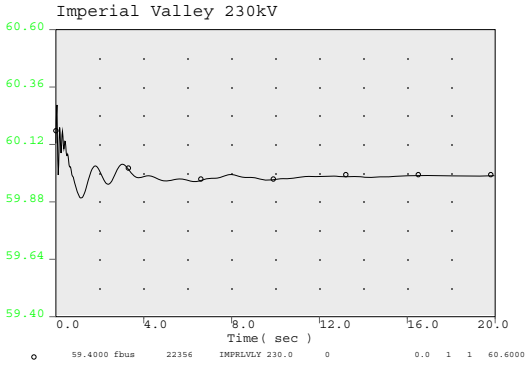
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

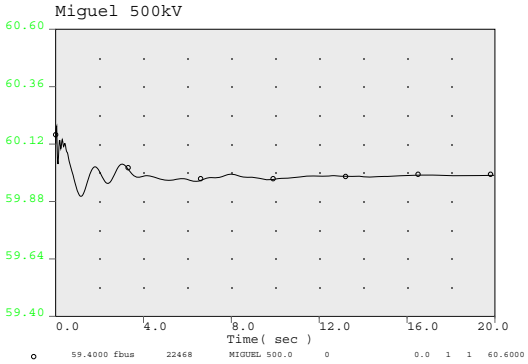
Imperial Valley 500kV



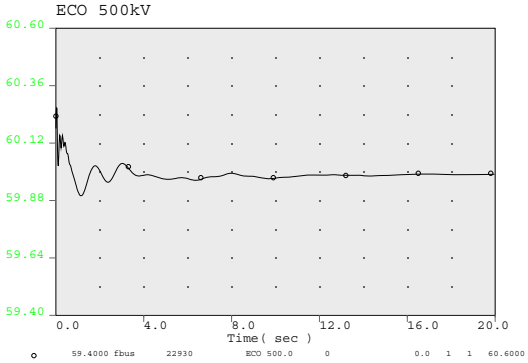
Imperial Valley 230kV



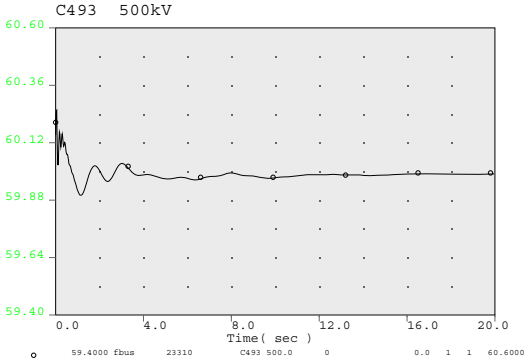
Miguel 500kV



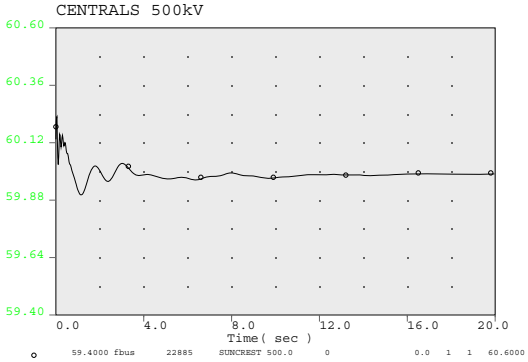
ECO 500kV



C493 500kV

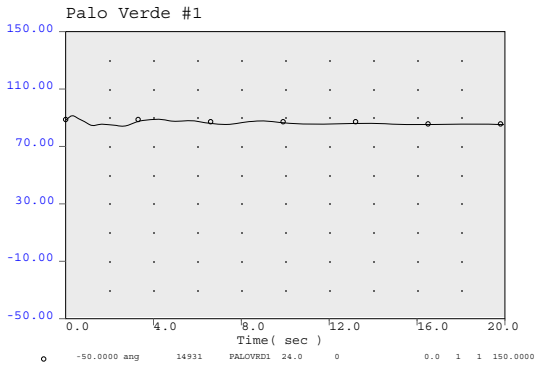


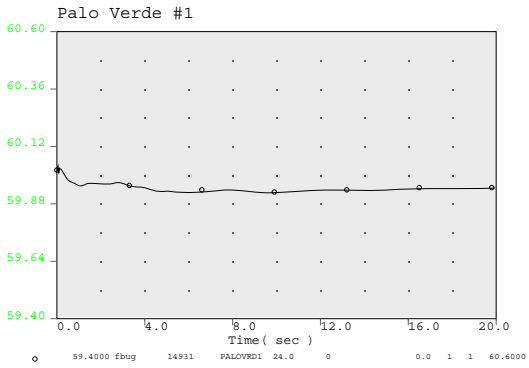
CENTRALS 500kV

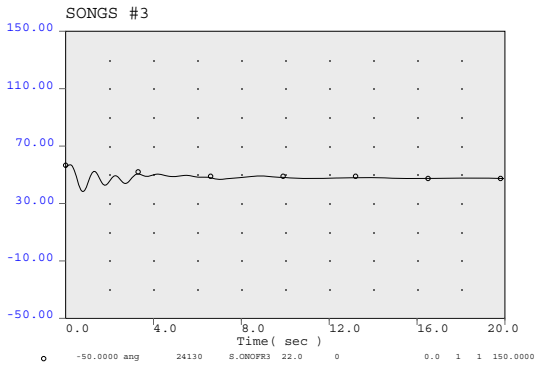


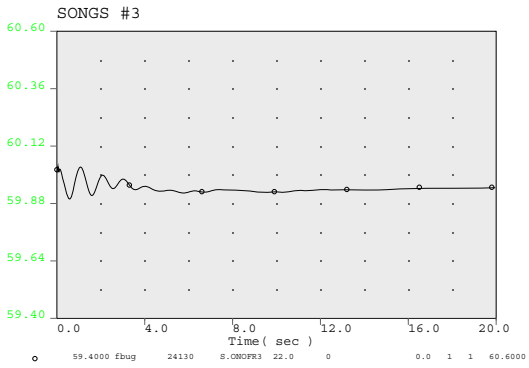
C1 C2 Heavy Summer Post With Upgrades

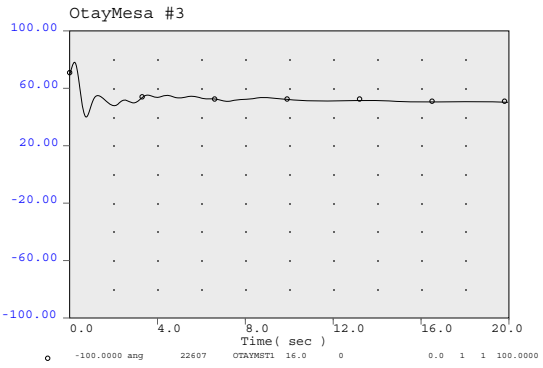
RELATIVE ROTOR ANGLE & FREQUENCY

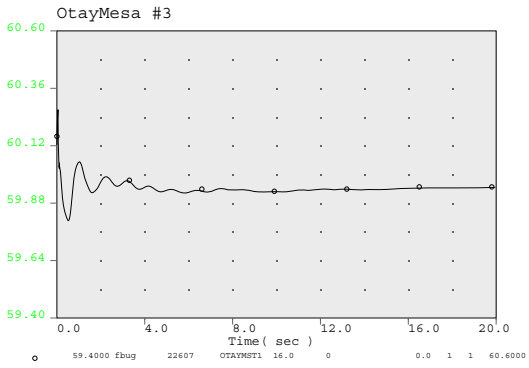












C1 C2 Heavy Summer Post With Upgrades

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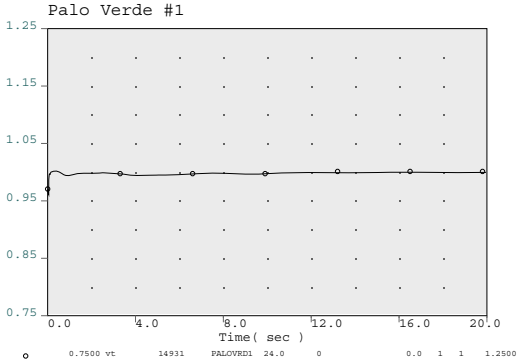
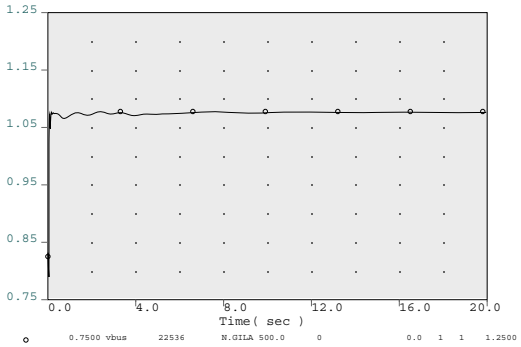
SDGE	tran-c1c2-hs-pstup-r15_ML-ECO-RAS_slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:14:28 2011

RELATIVE VOLTAGE

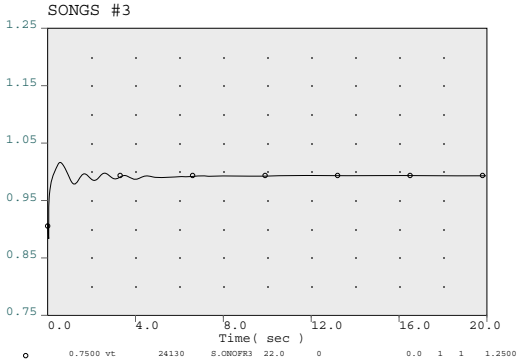
Palo Verde #1



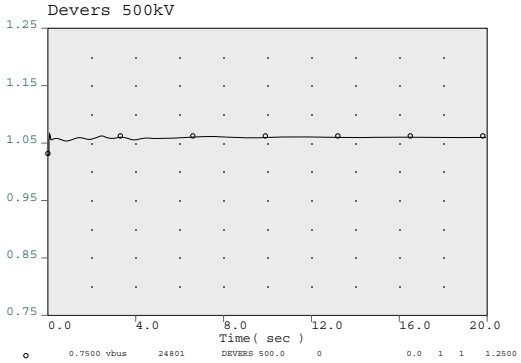
N Gila 500kV



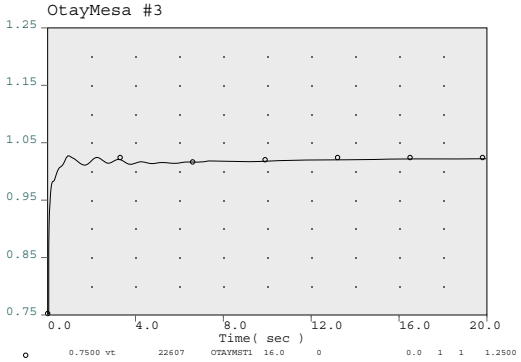
SONGS #3



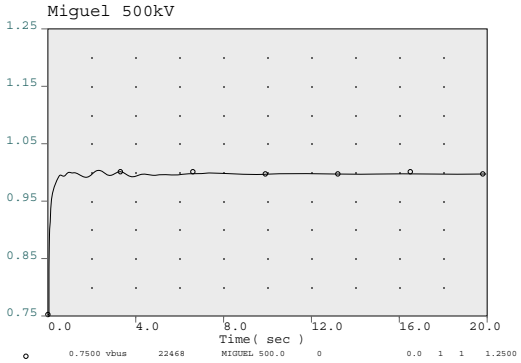
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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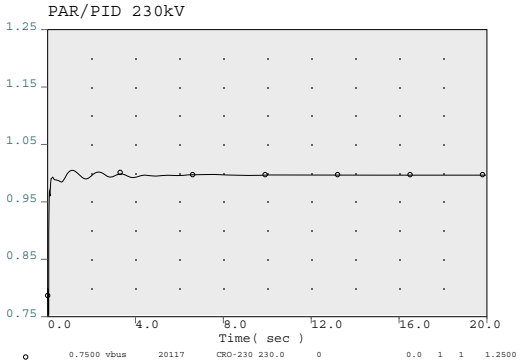
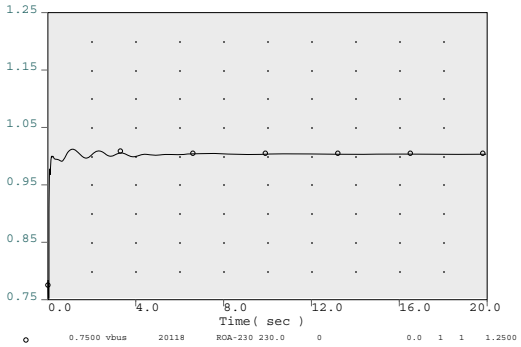
Affected System Voltage Check and Comparison

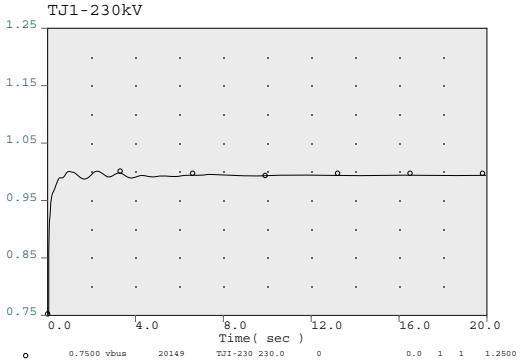
PAR/PID 230kV



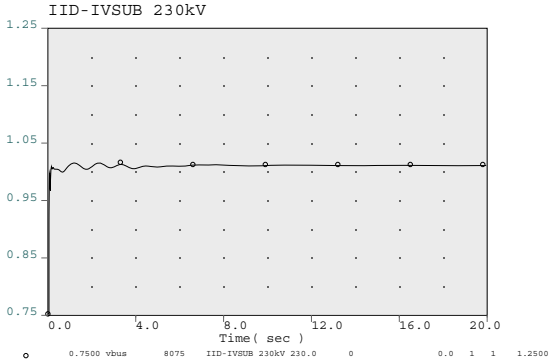
ROA-230kV



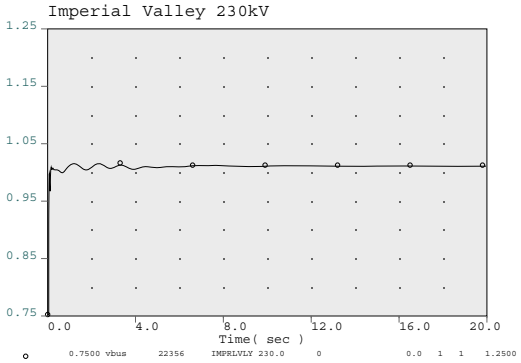
TJ1-230kV



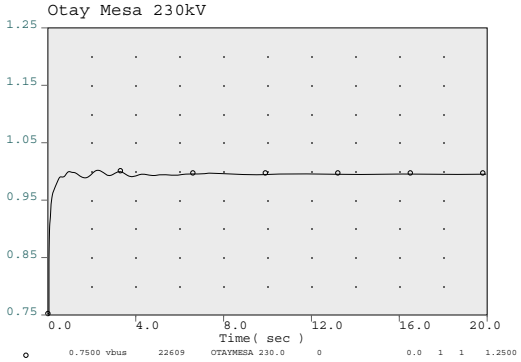
IID-IVSUB 230kV



Imperial Valley 230kV



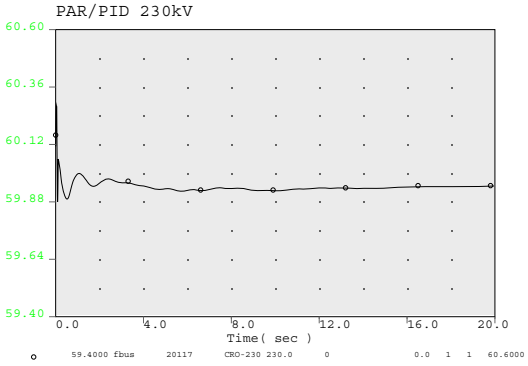
Otay Mesa 230kV



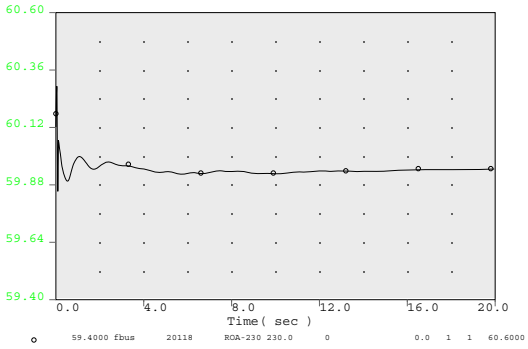
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

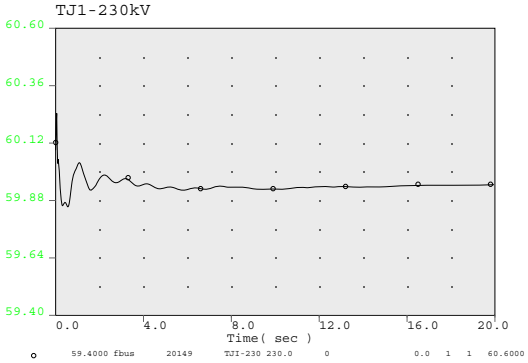
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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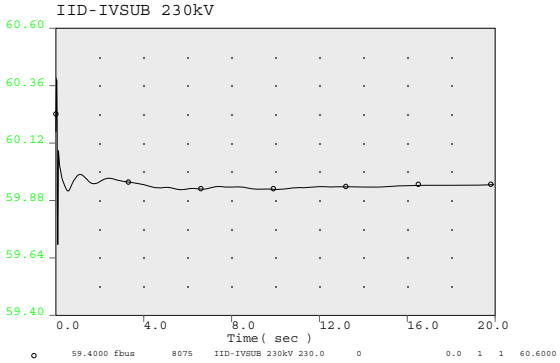
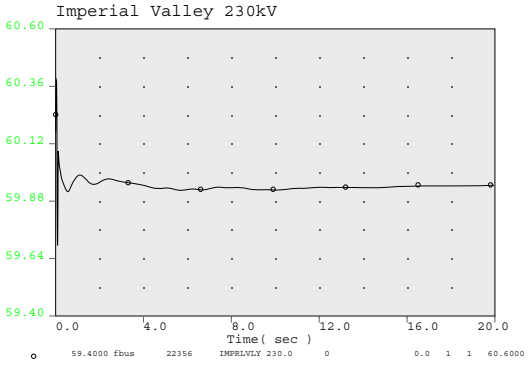
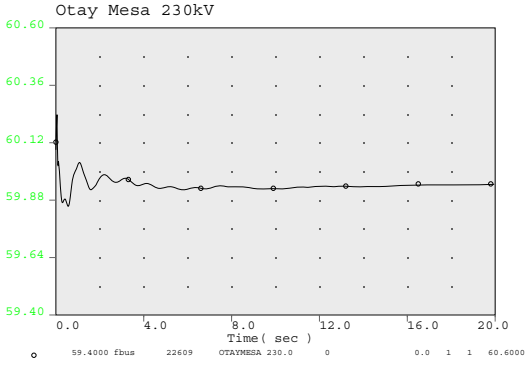


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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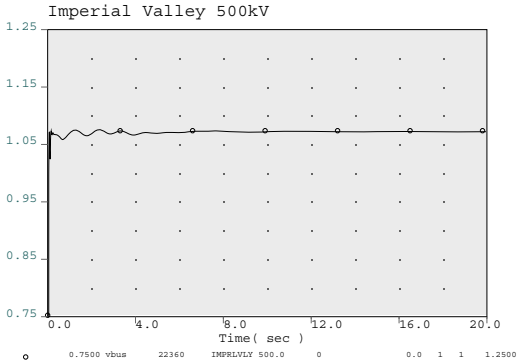
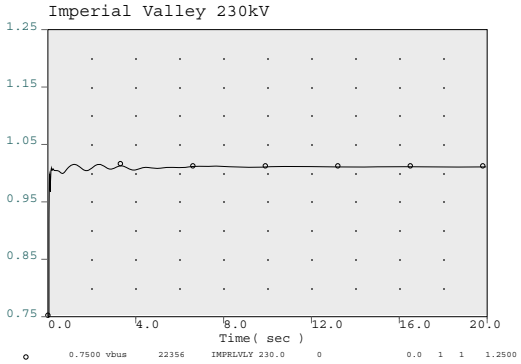
VOLTAGE

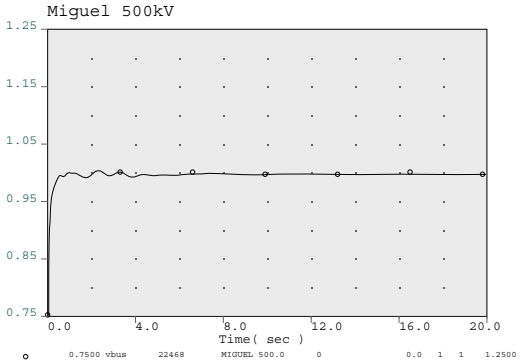
Imperial Valley 500kV



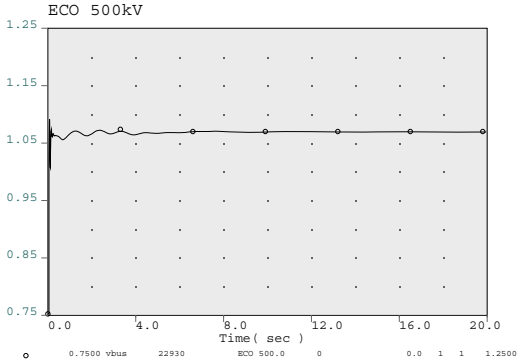
Imperial Valley 230kV



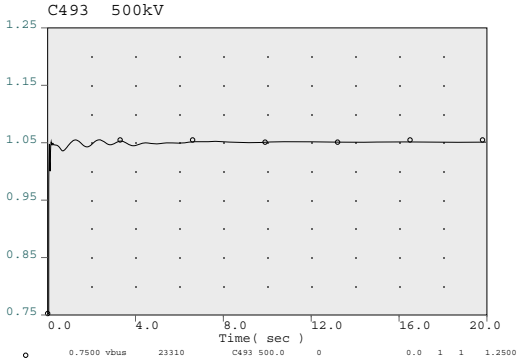
Miguel 500kV



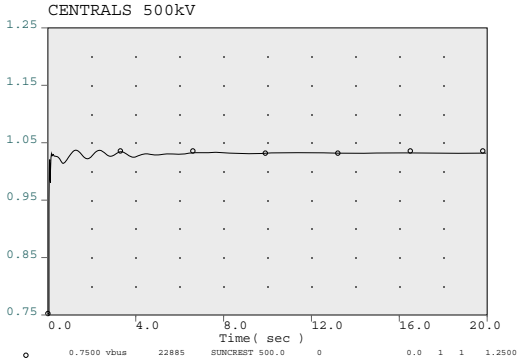
ECO 500kV



C493 500kV

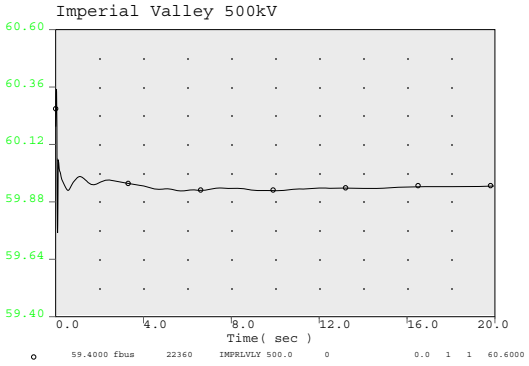


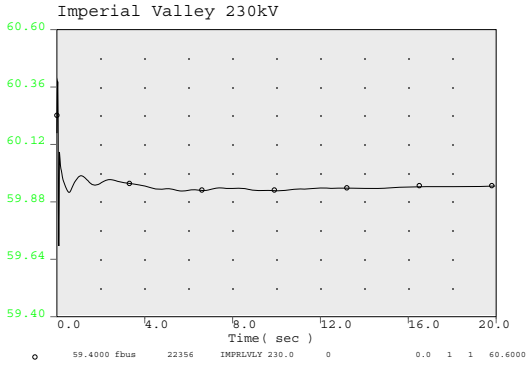
CENTRALS 500kV

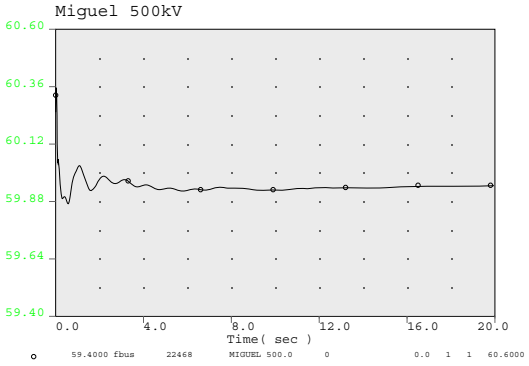


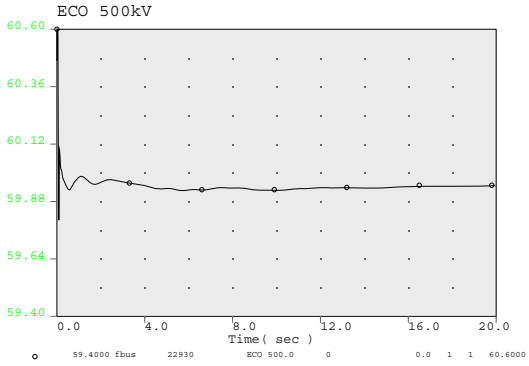
C1 C2 Heavy Summer Post With Upgrades

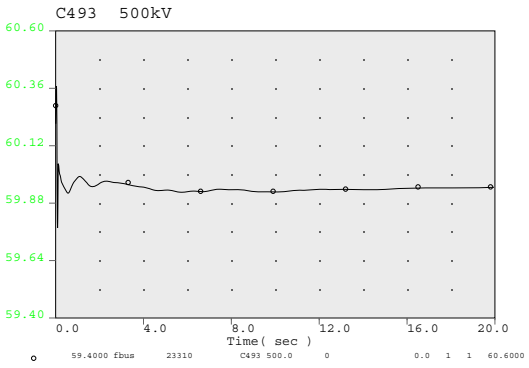
FREQUENCY

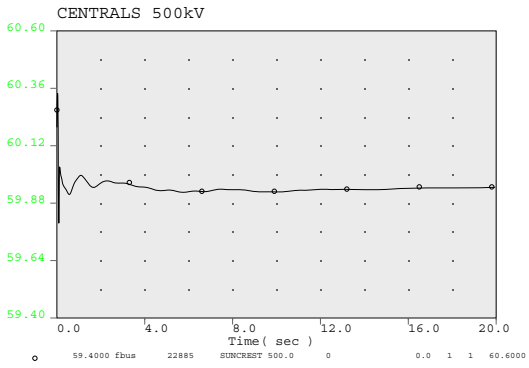












C1 C2 Heavy Summer Post With Upgrades

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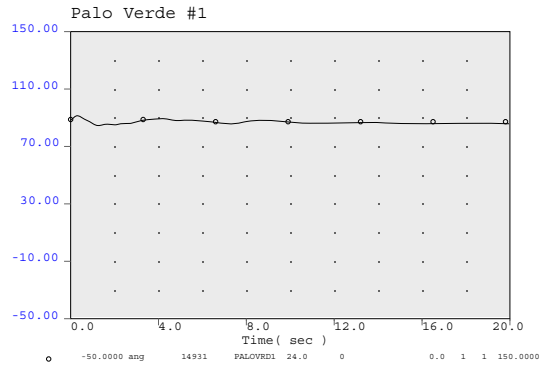
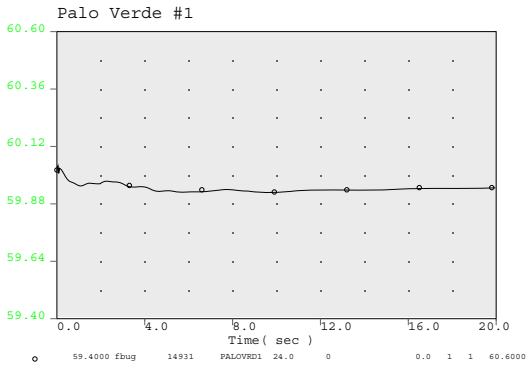
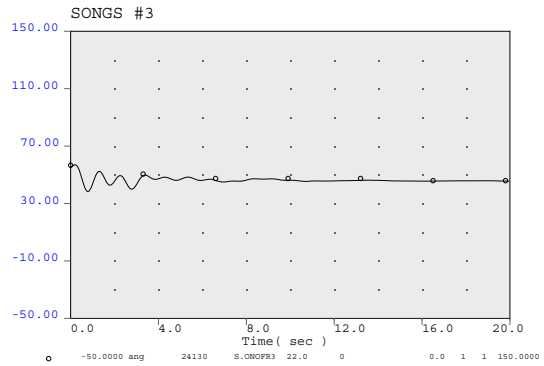
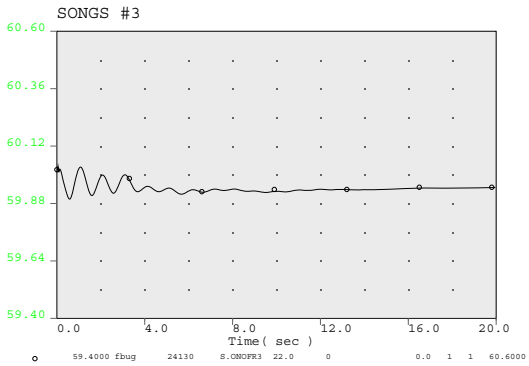
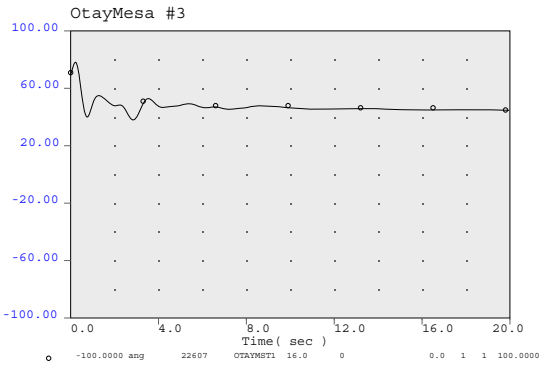
RELATIVE ROTOR ANGLE & FREQUENCY

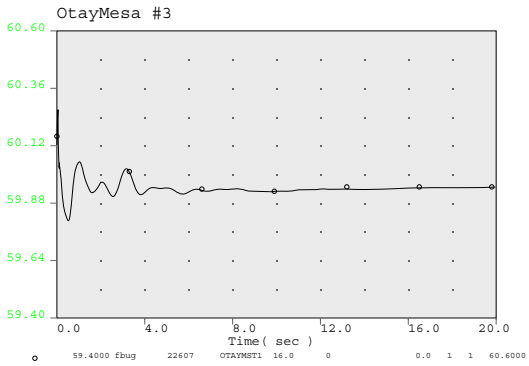












C1 C2 Heavy Summer Post With Upgrades

Page 1

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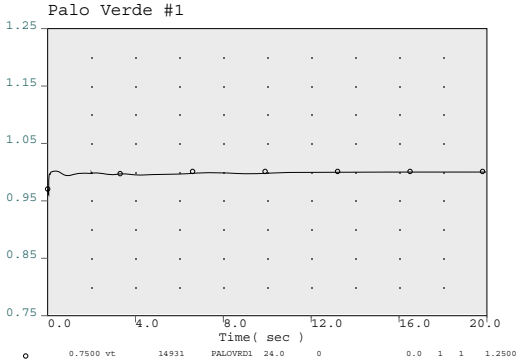
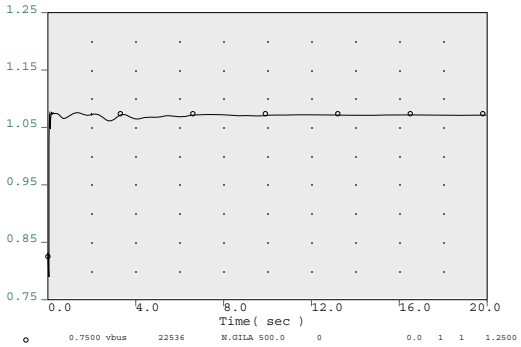
RELATIVE VOLTAGE

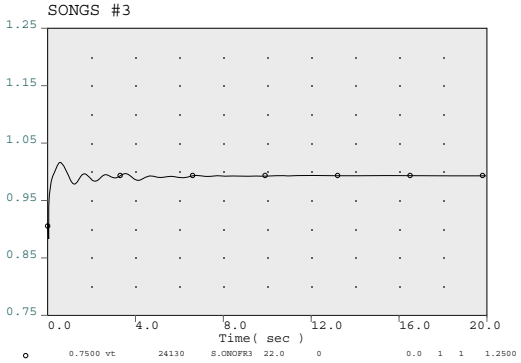
Palo Verde #1



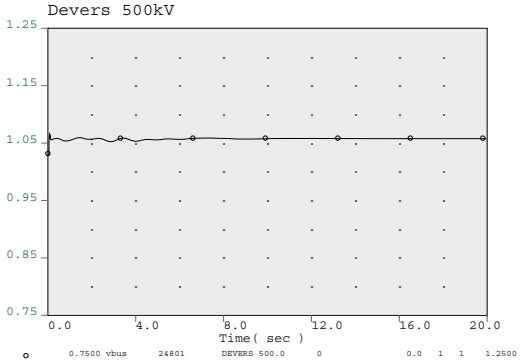
N Gila 500kV



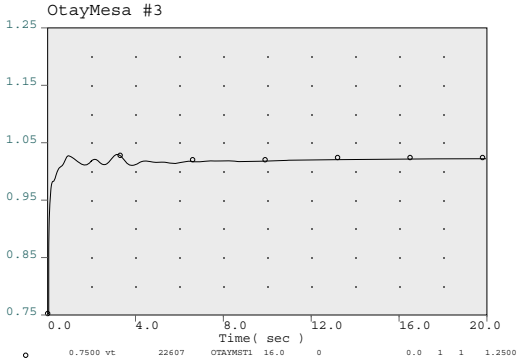
SONGS #3



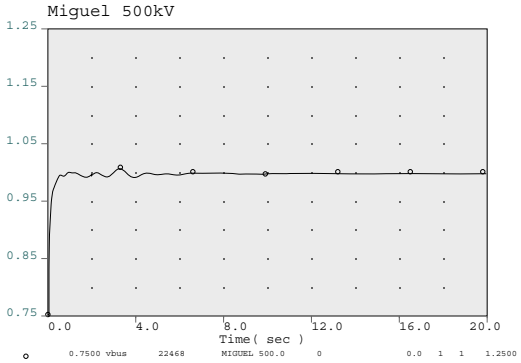
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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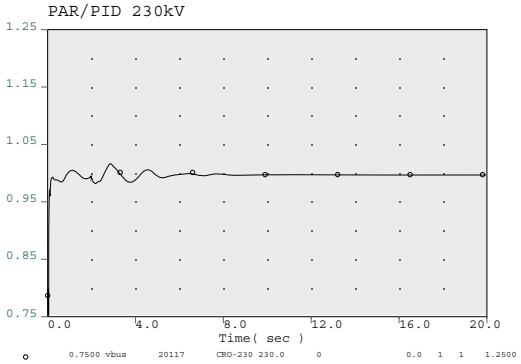
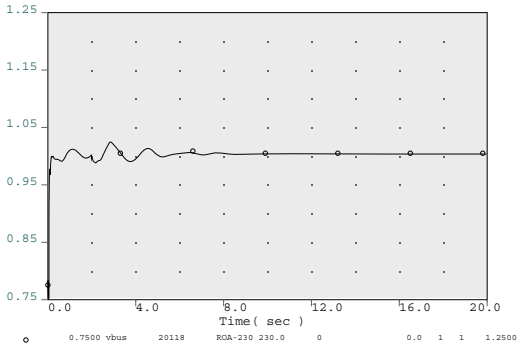
Affected System Voltage Check and Comparison

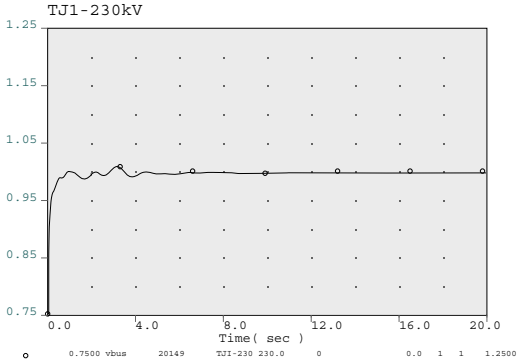
PAR/PID 230kV



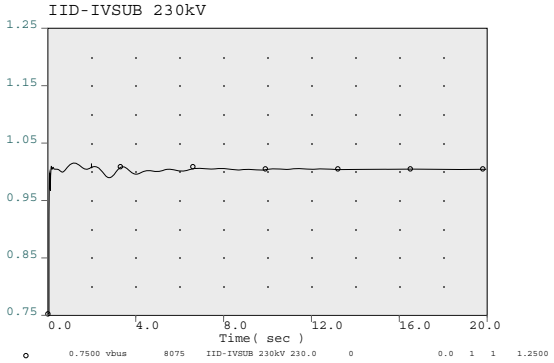
ROA-230kV



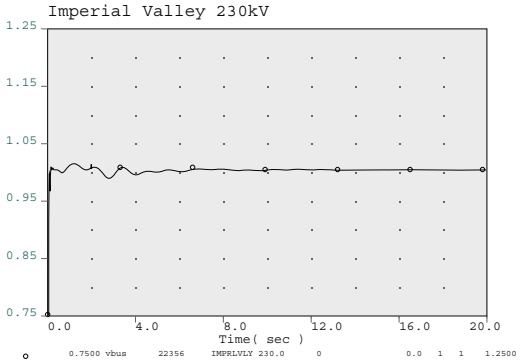
TJ1-230kV



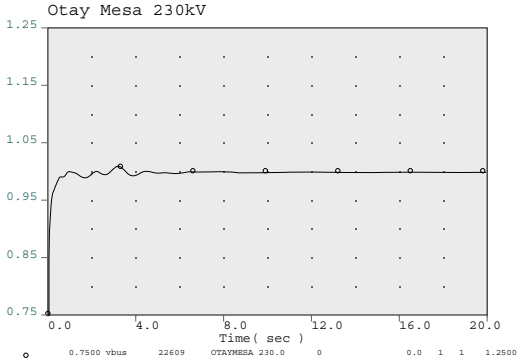
IID-IVSUB 230kV



Imperial Valley 230kV



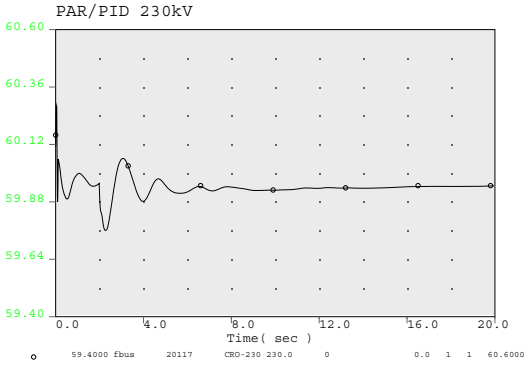
Otay Mesa 230kV



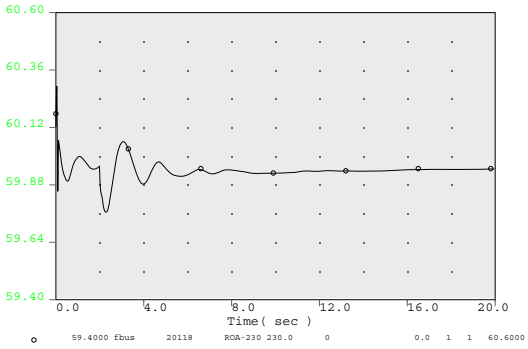
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

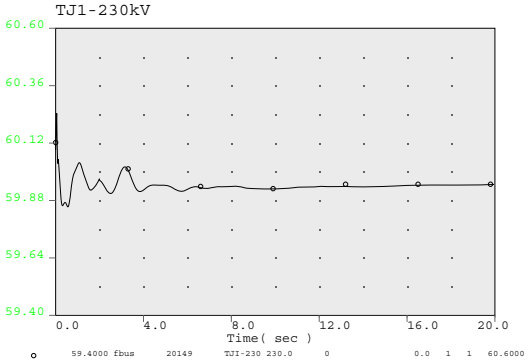
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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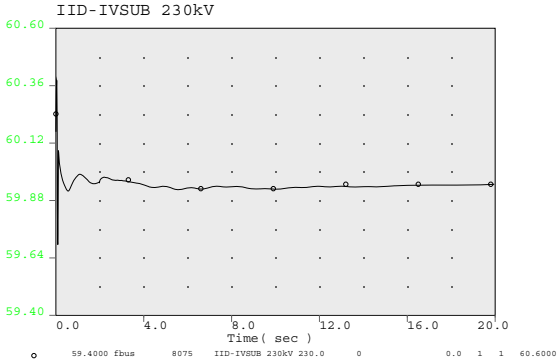
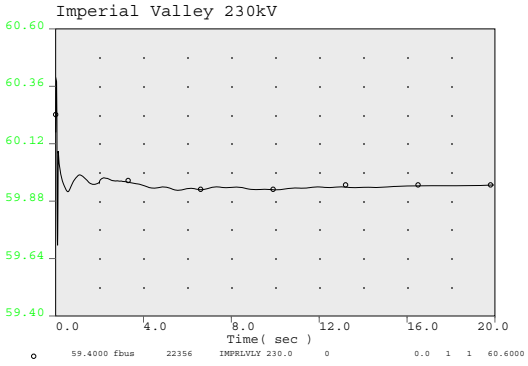
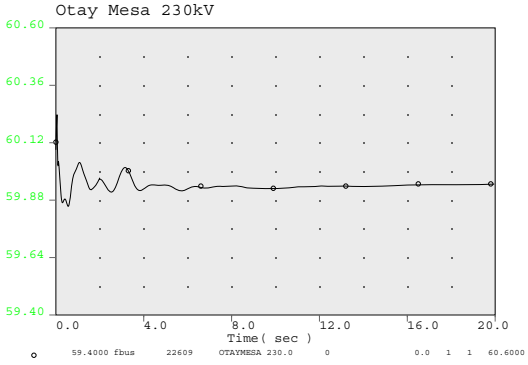


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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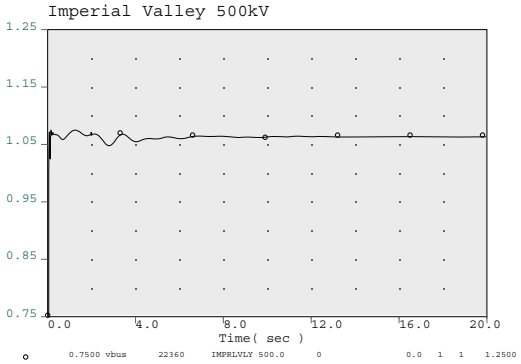
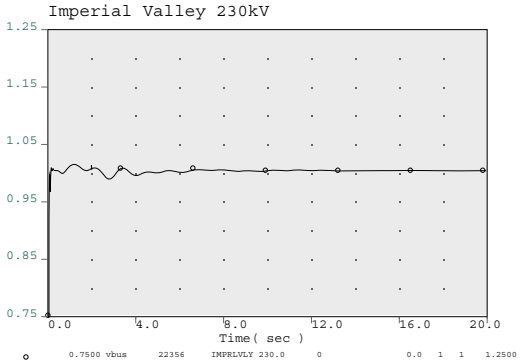
VOLTAGE

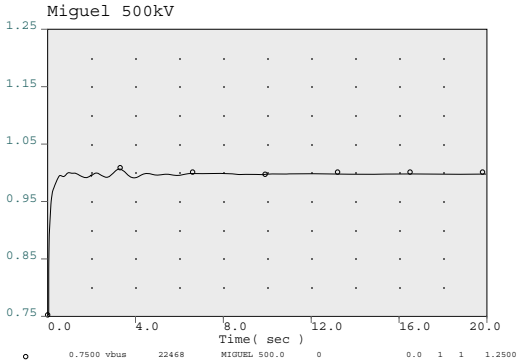
Imperial Valley 500kV



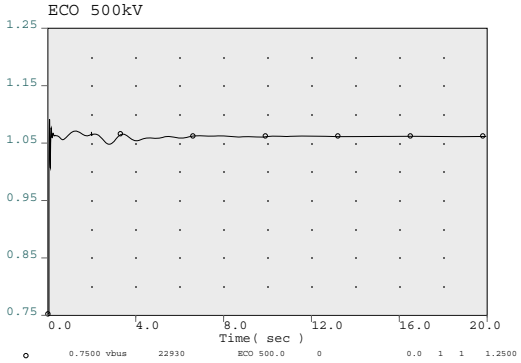
Imperial Valley 230kV



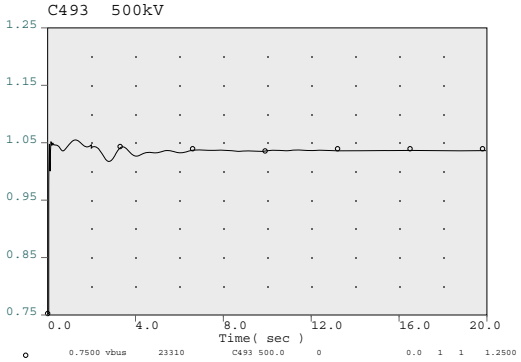
Miguel 500kV



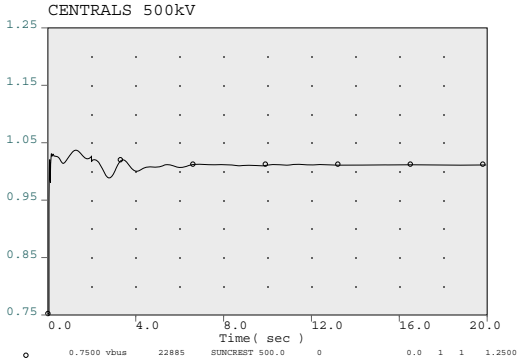
ECO 500kV



C493 500kV



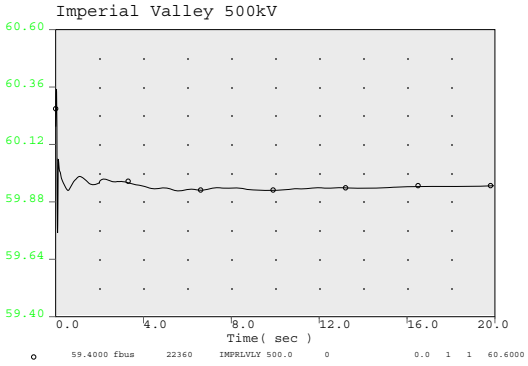
CENTRALS 500kV



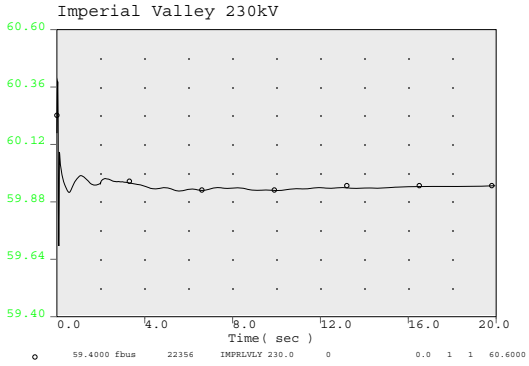
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

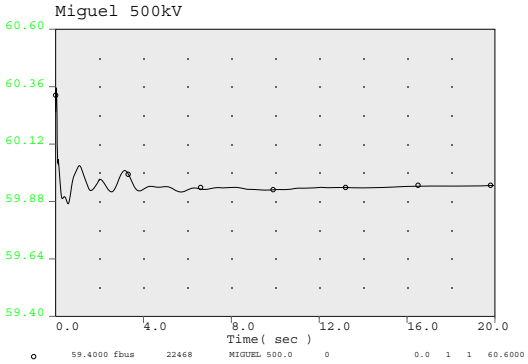
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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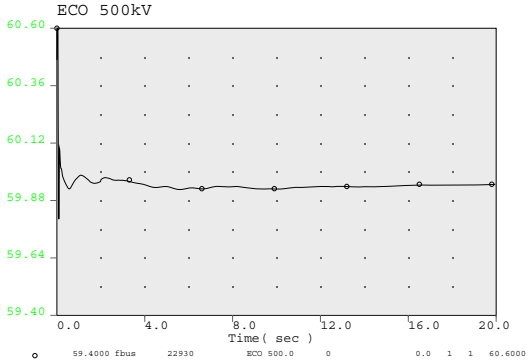

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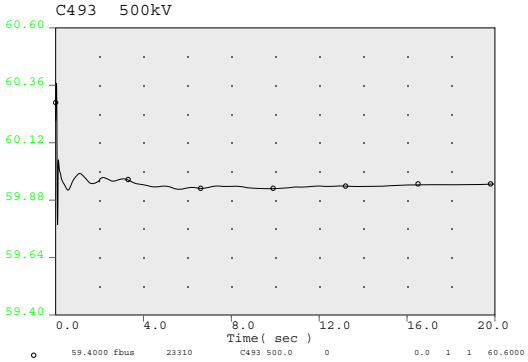
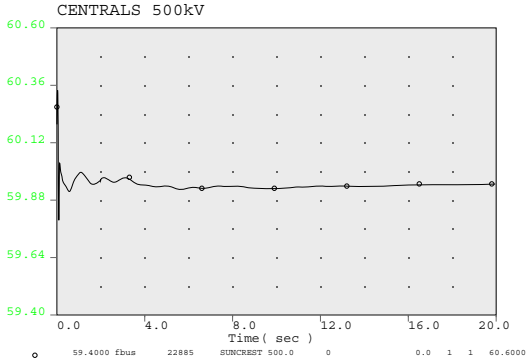
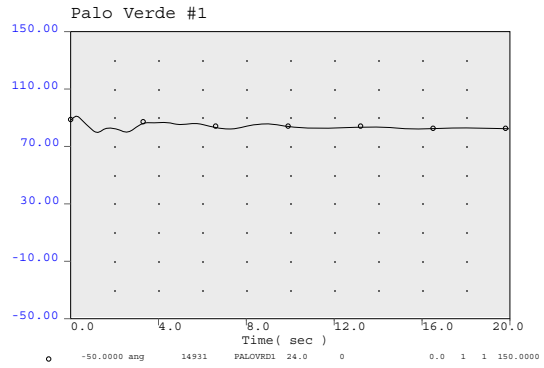


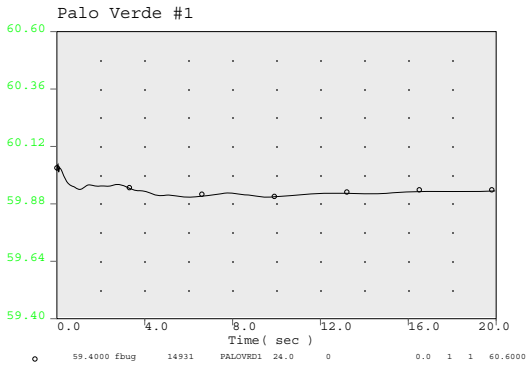
CENTRALS 500kV

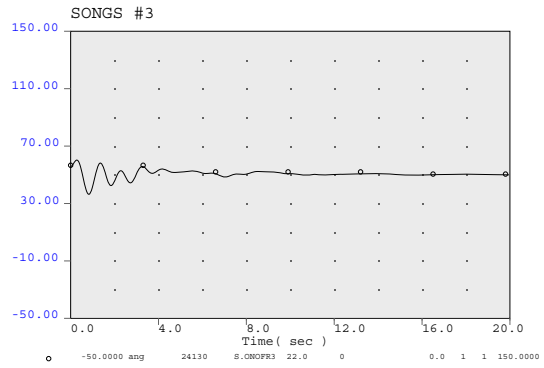


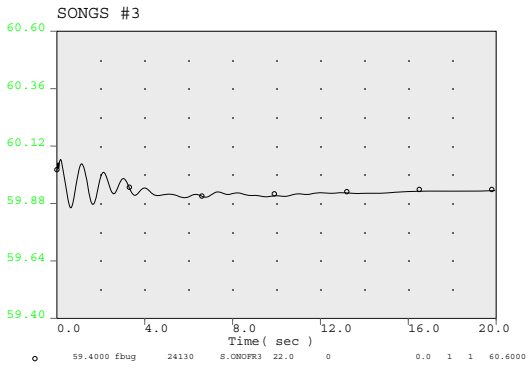
C1 C2 Heavy Summer Post With Upgrades

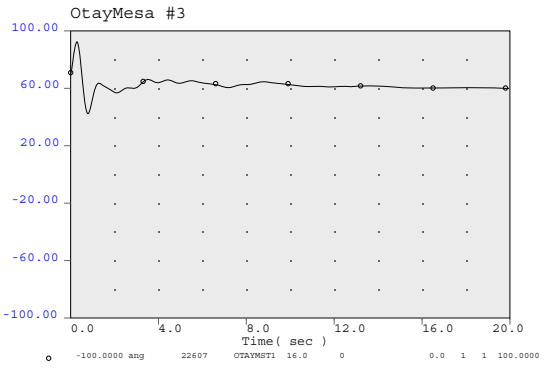
RELATIVE ROTOR ANGLE & FREQUENCY

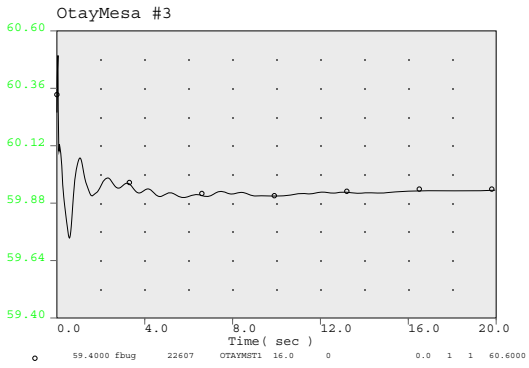












C1 C2 Heavy Summer Post With Upgrades

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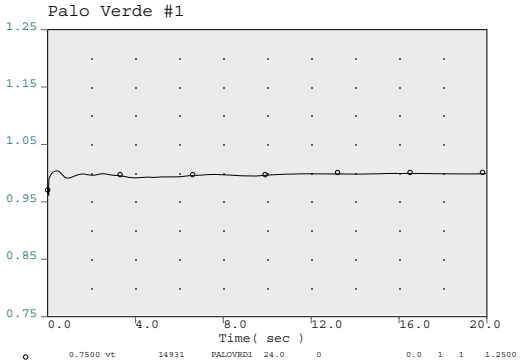
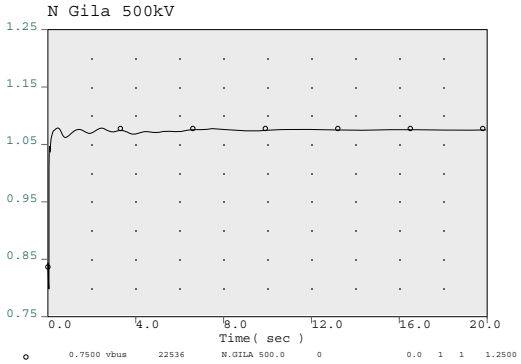
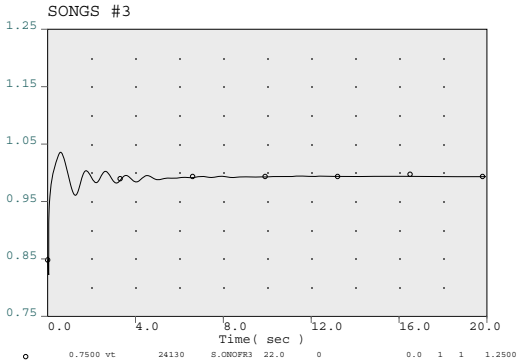
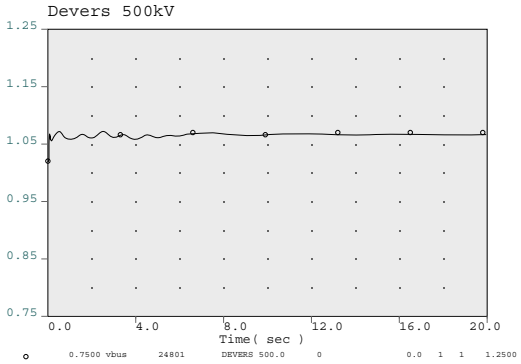
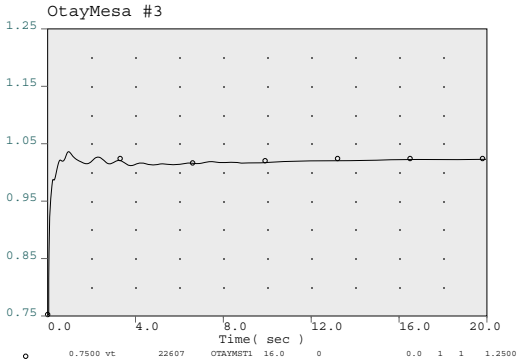
RELATIVE VOLTAGE

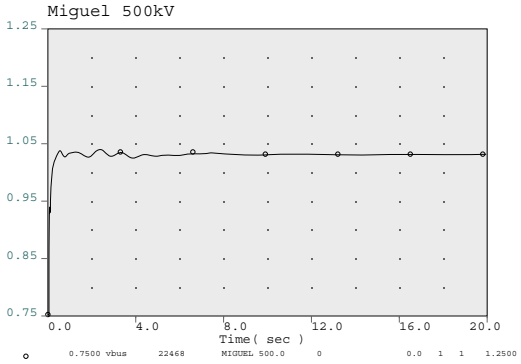








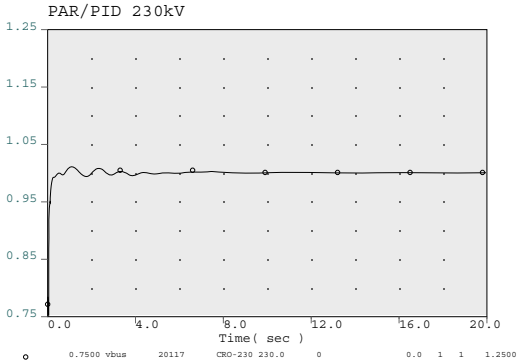




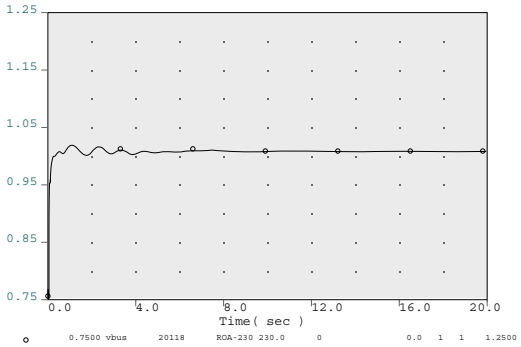
C1 C2 Heavy Summer Post With Upgrades

Affected System Voltage Check and Comparison

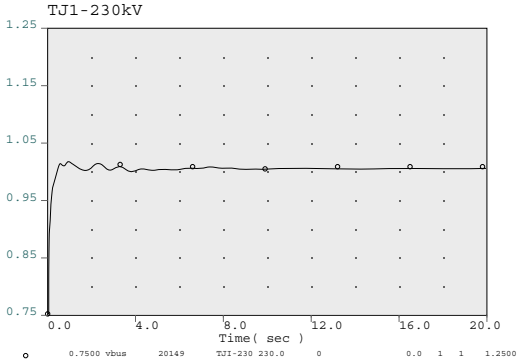
PAR/PID 230kV



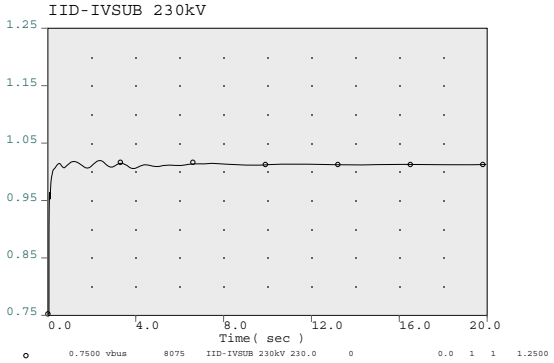
ROA-230kV



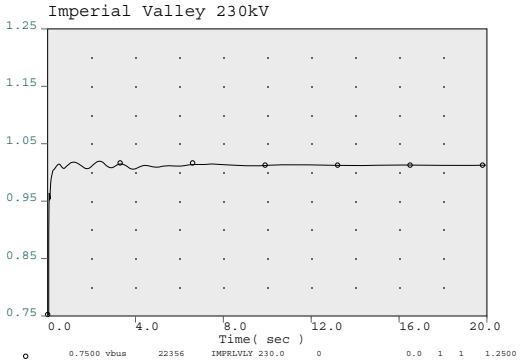
TJ1-230kV



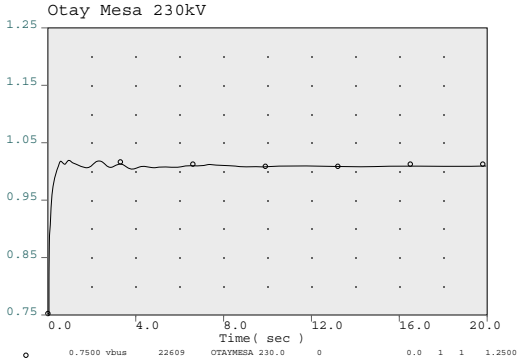
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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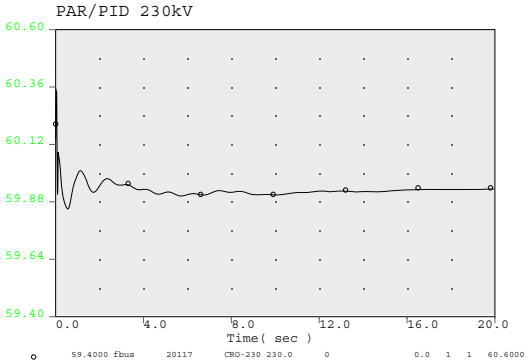
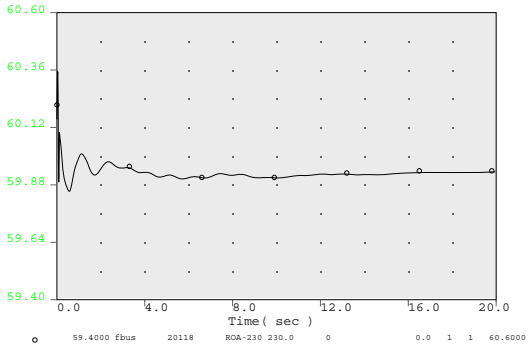
Affected System Frequency Check and Comparison

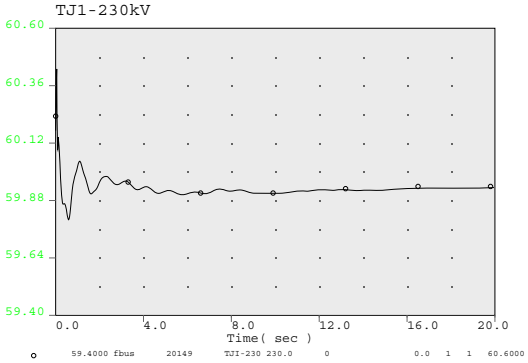
PAR/PID 230kV



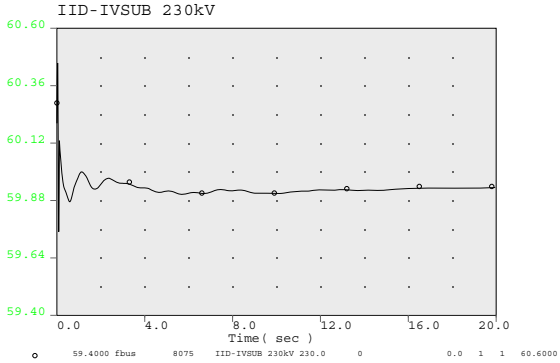
ROA-230kV



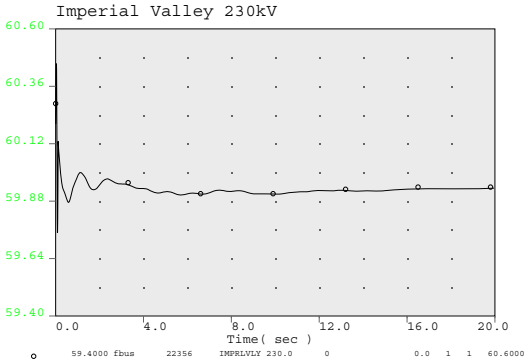
TJ1-230kV



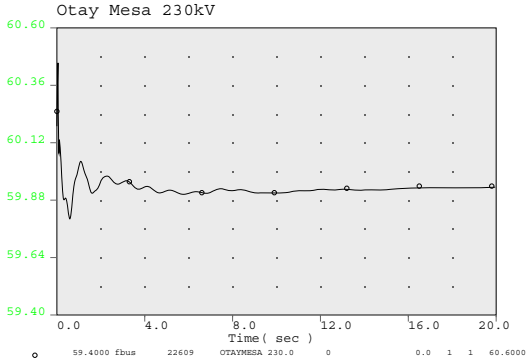
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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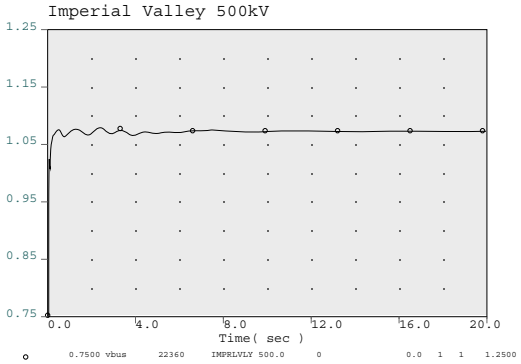
anstab\hs\pst\ws_pst_c1c2

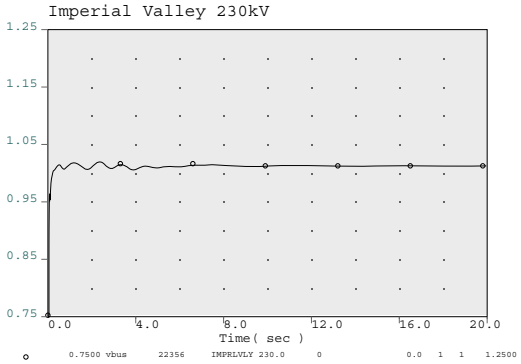
Sun Jul 17 15:16:37 2011

VOLTAGE

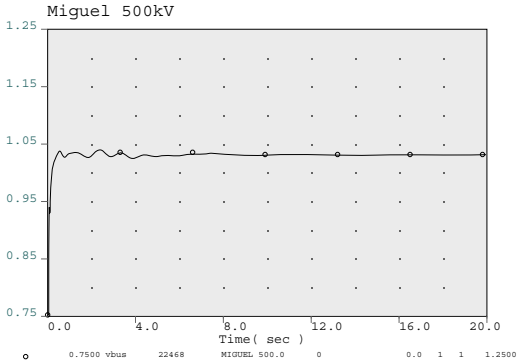
Imperial Valley 500kV



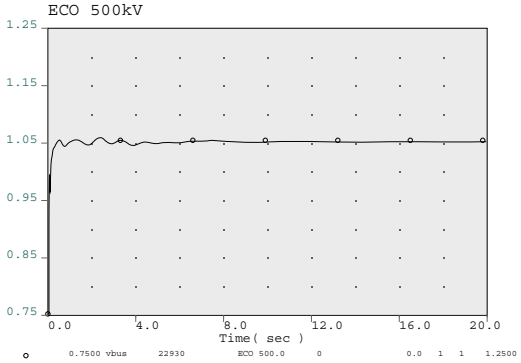
Imperial Valley 230kV



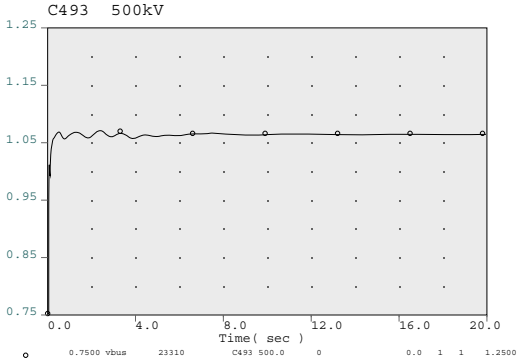
Miguel 500kV



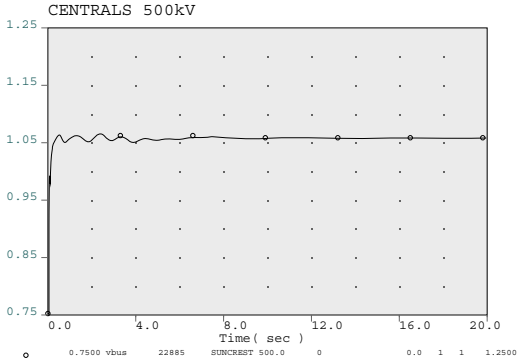
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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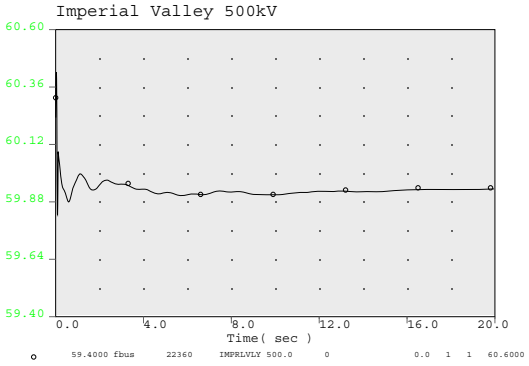
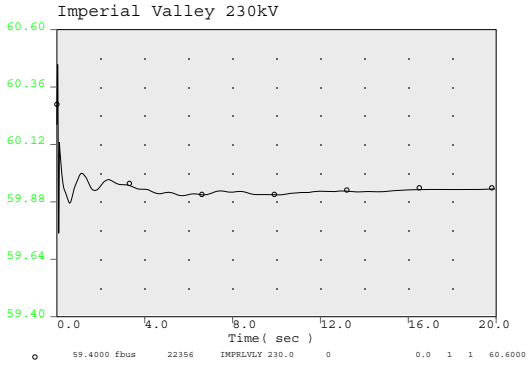
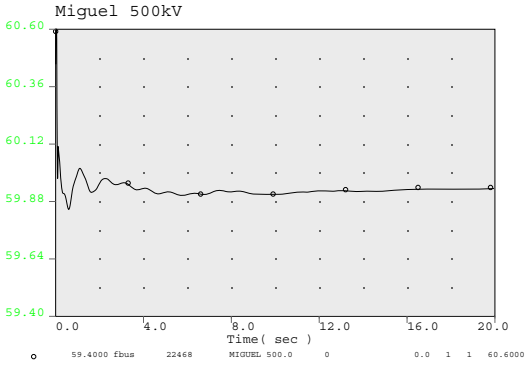
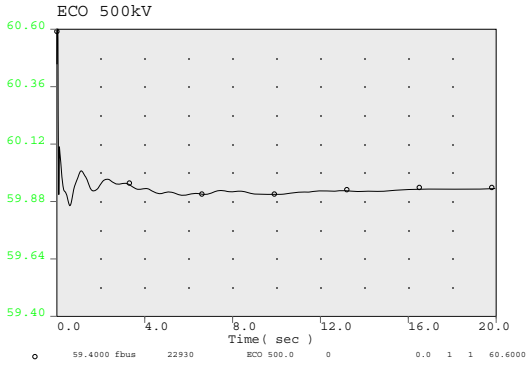
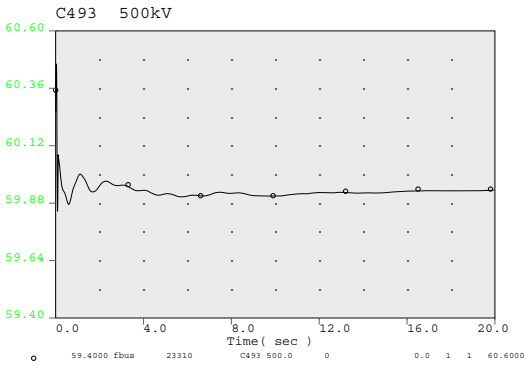
FREQUENCY

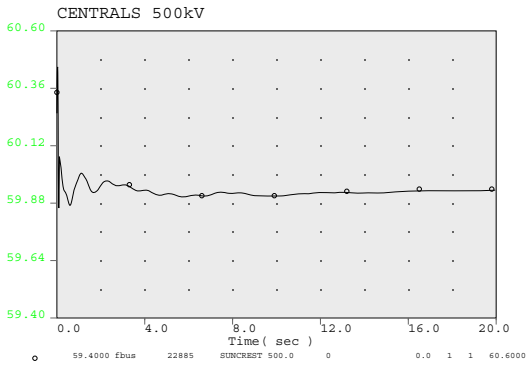






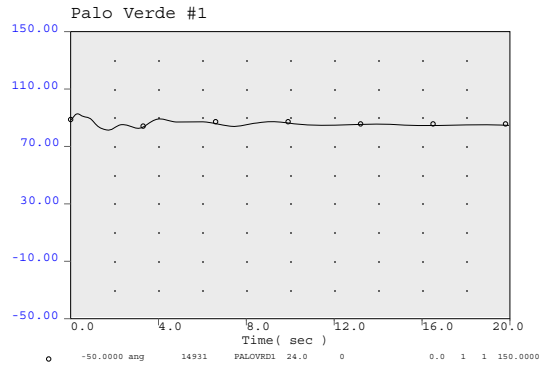


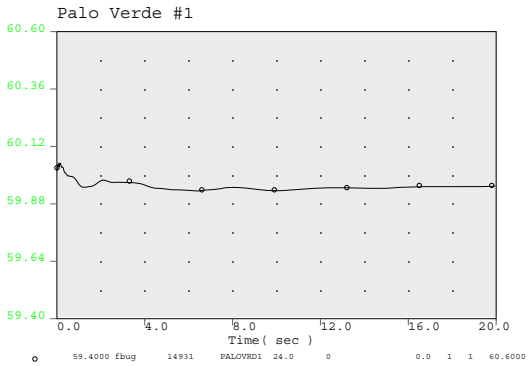


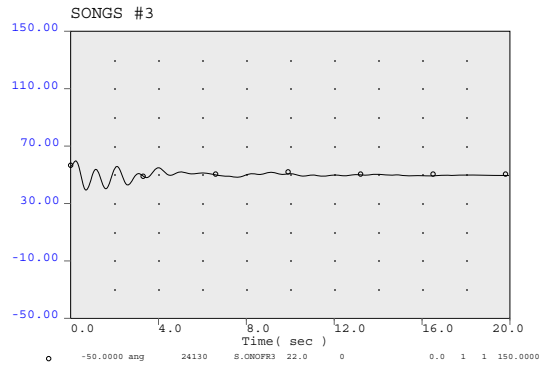


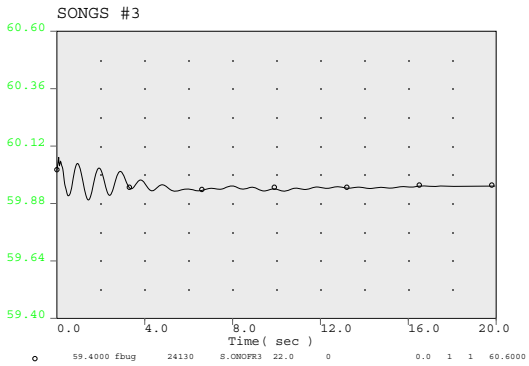
C1 C2 Heavy Summer Post With Upgrades

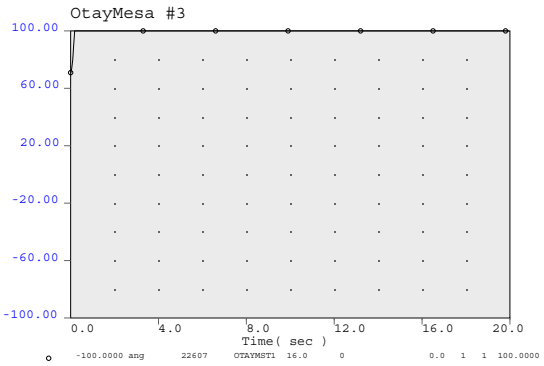
RELATIVE ROTOR ANGLE & FREQUENCY

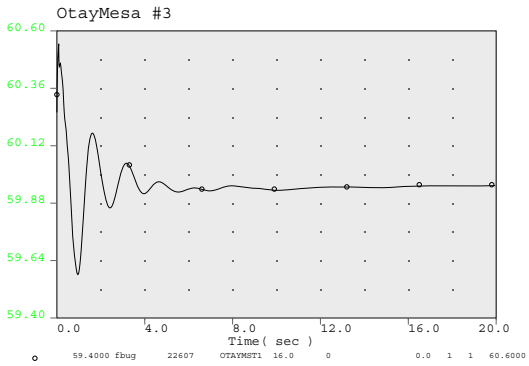












C1 C2 Heavy Summer Post With Upgrades

Page 1

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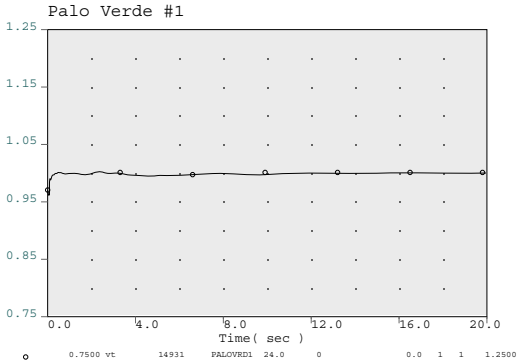
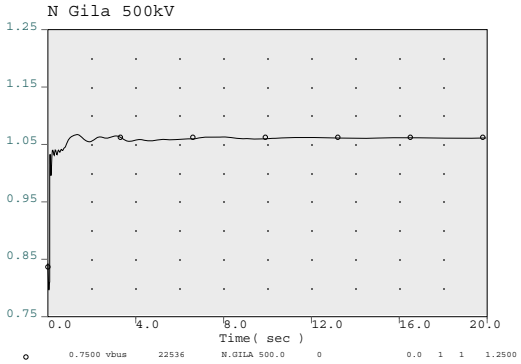
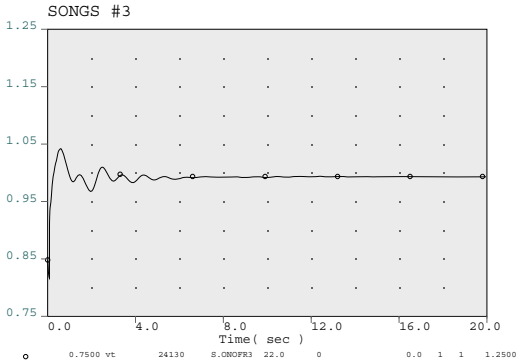
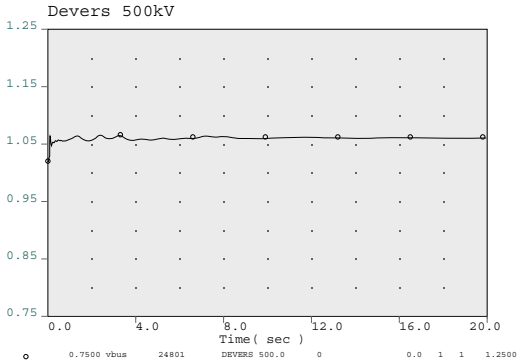
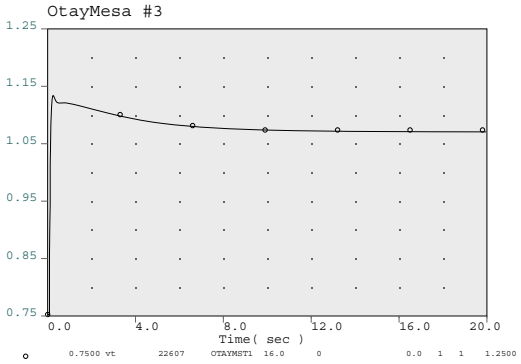
RELATIVE VOLTAGE

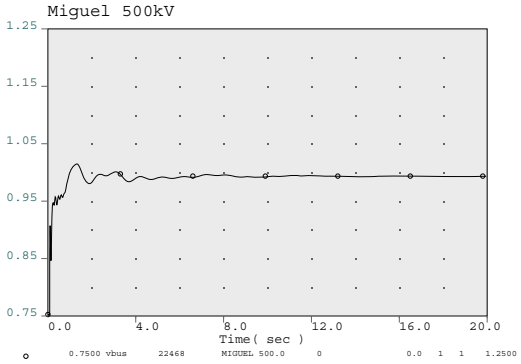












C1 C2 Heavy Summer Post With Upgrades

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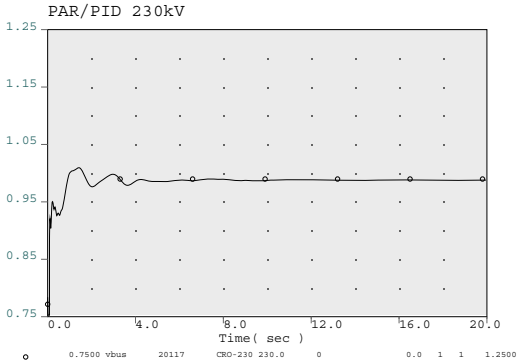
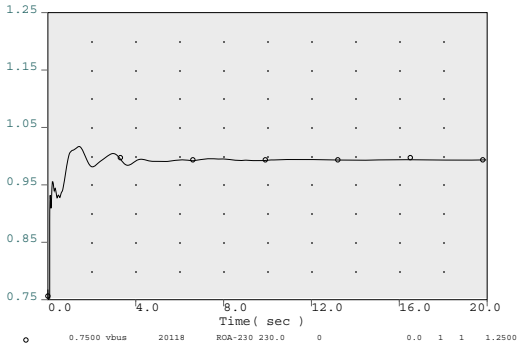
Affected System Voltage Check and Comparison

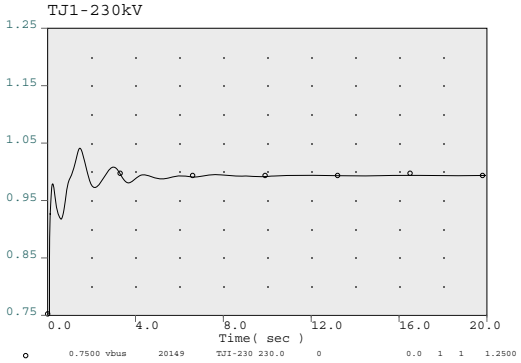
PAR/PID 230kV



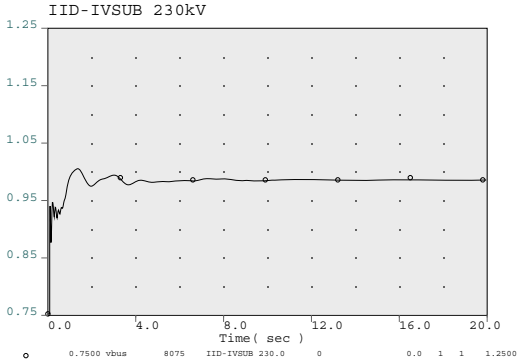
ROA-230kV



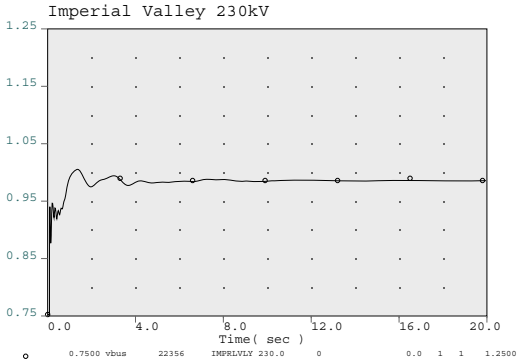
TJ1-230kV



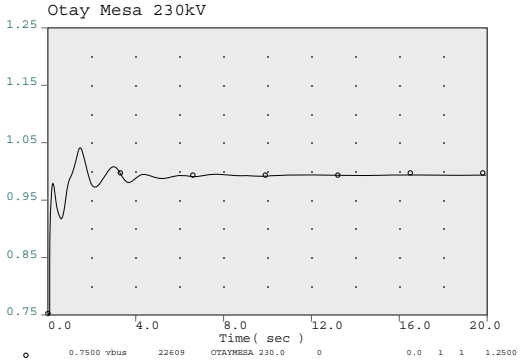
IID-IVSUB 230kV



Imperial Valley 230kV



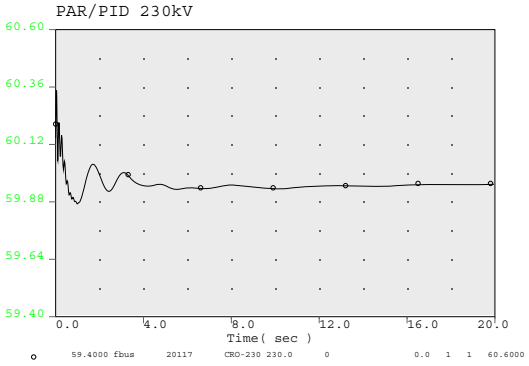
Otay Mesa 230kV



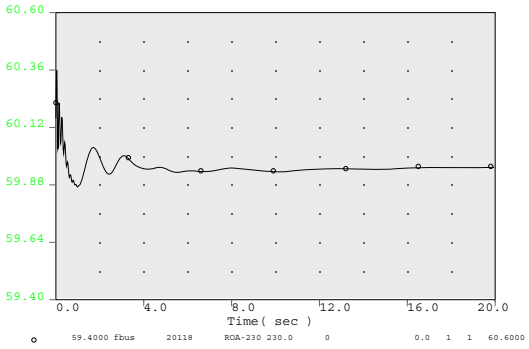
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

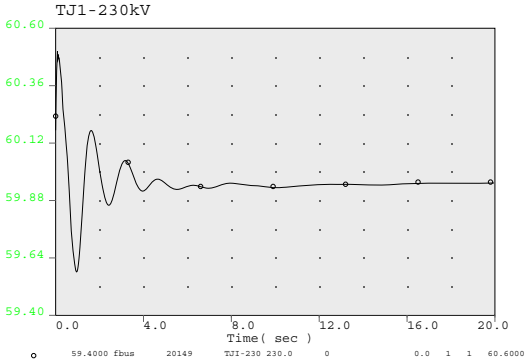
PAR/PID 230kV



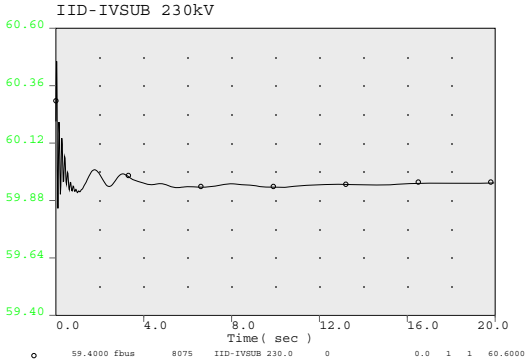
ROA-230kV



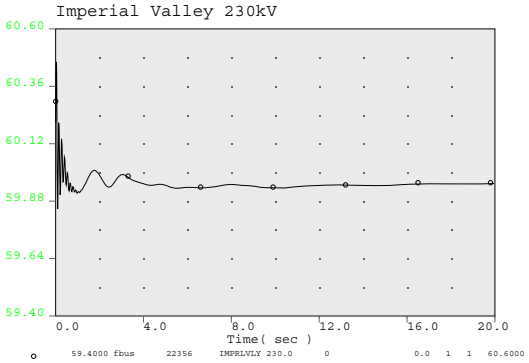
TJ1-230kV



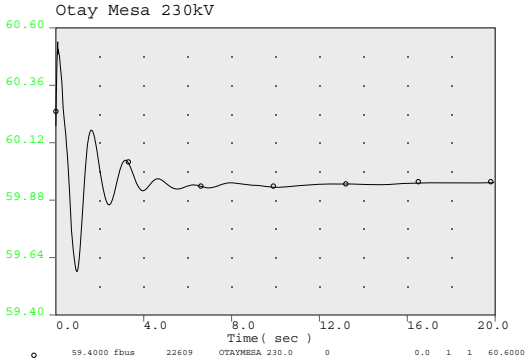
IID-IVSUB 230kV



Imperial Valley 230kV



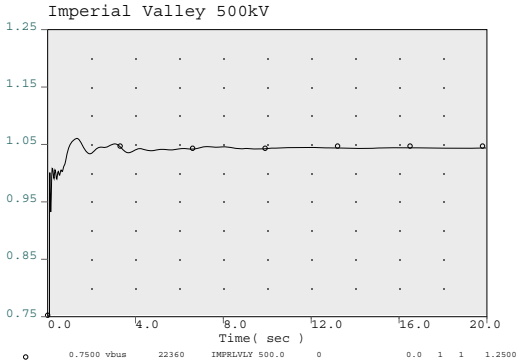
Otay Mesa 230kV



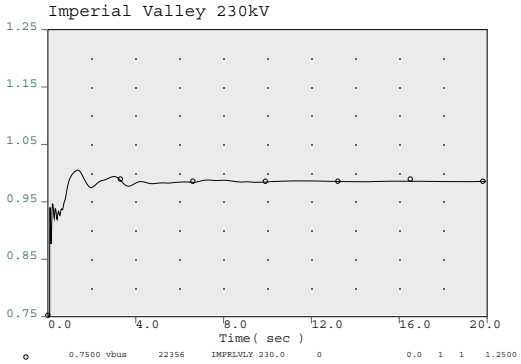
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

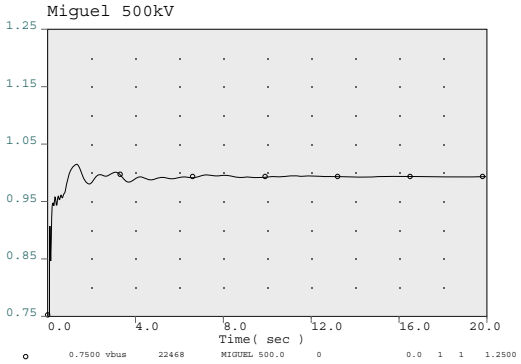
Imperial Valley 500kV



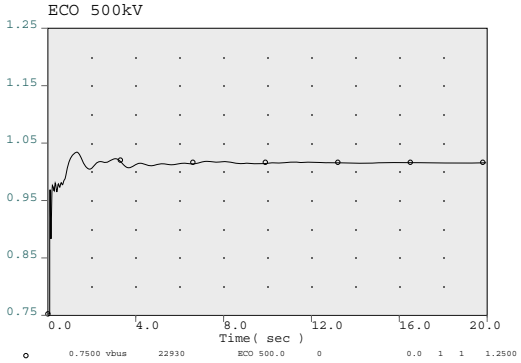
Imperial Valley 230kV



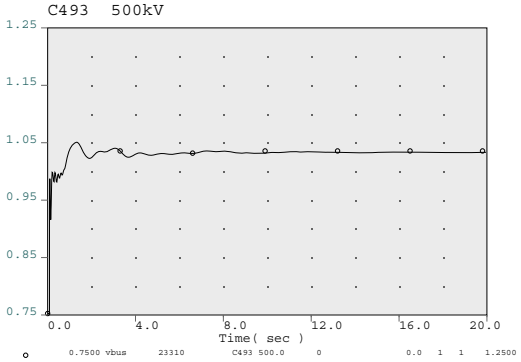
Miguel 500kV



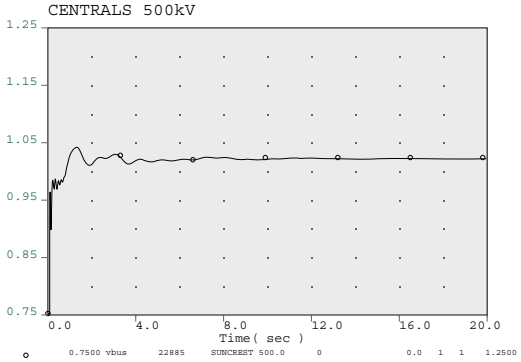
ECO 500kV



C493 500kV

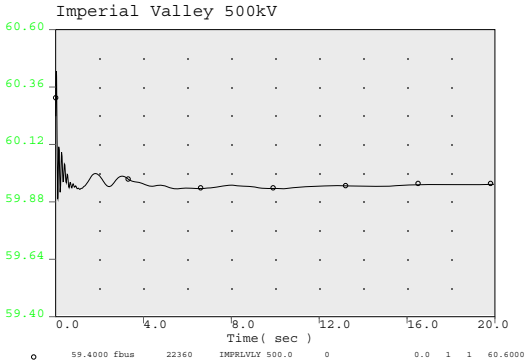


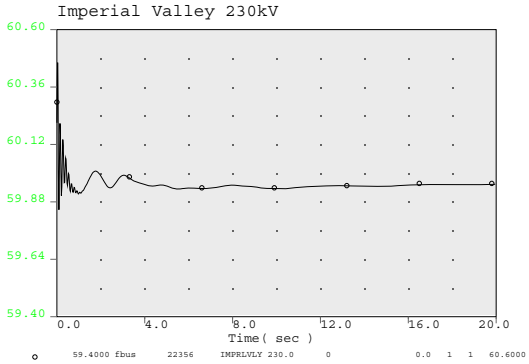
CENTRALS 500kV

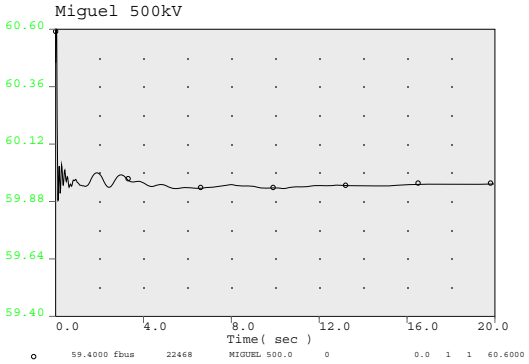


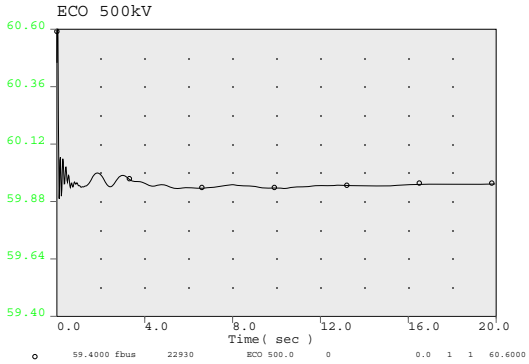
C1 C2 Heavy Summer Post With Upgrades

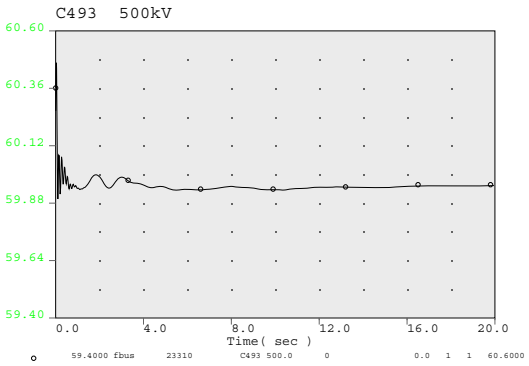
Frequency

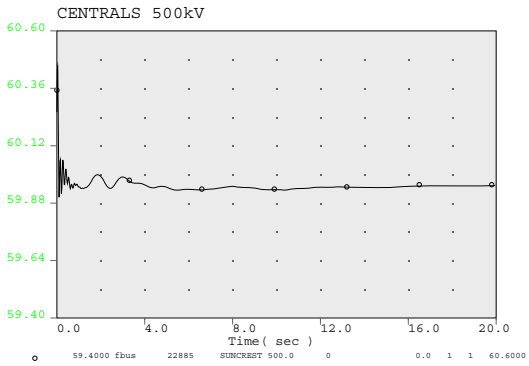






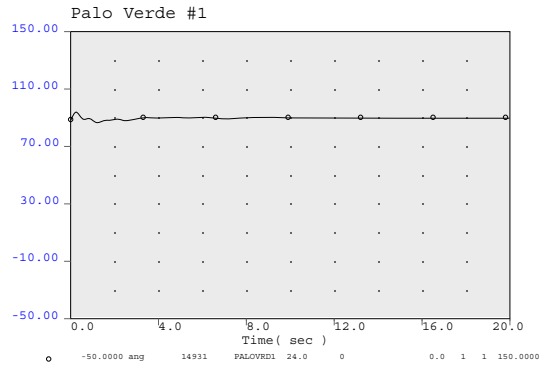


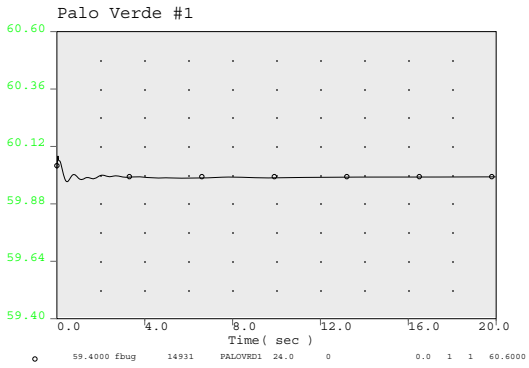


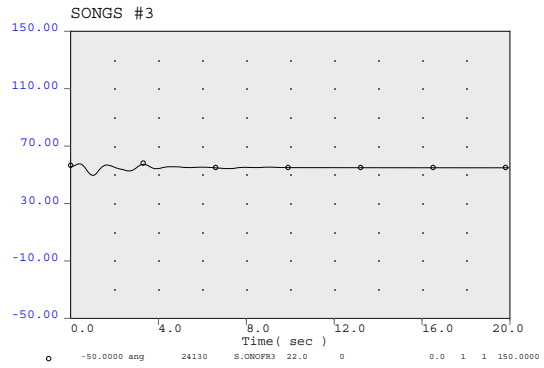


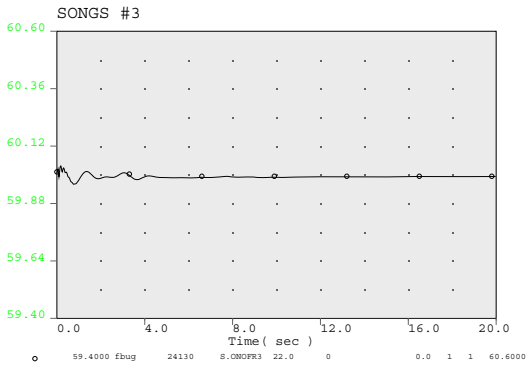
C1 C2 Heavy Summer Post With Upgrades

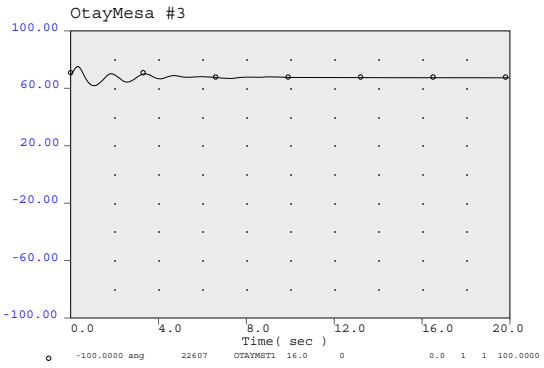
RELATIVE ROTOR ANGLE & FREQUENCY

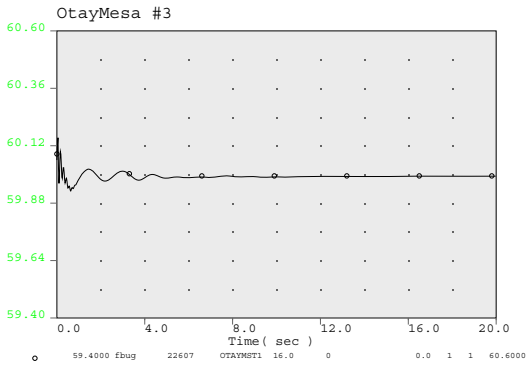












C1 C2 Heavy Summer Post With Upgrades

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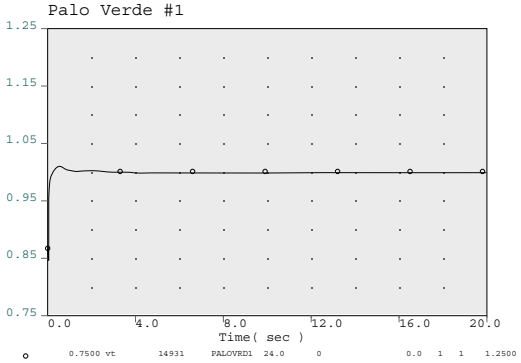
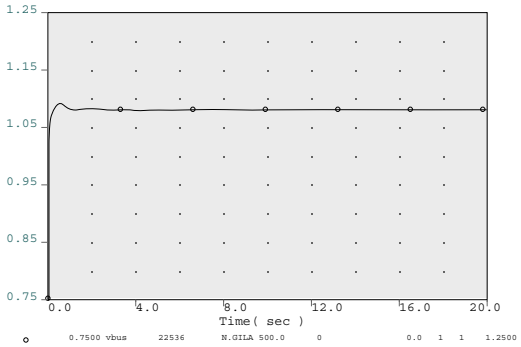
RELATIVE VOLTAGE

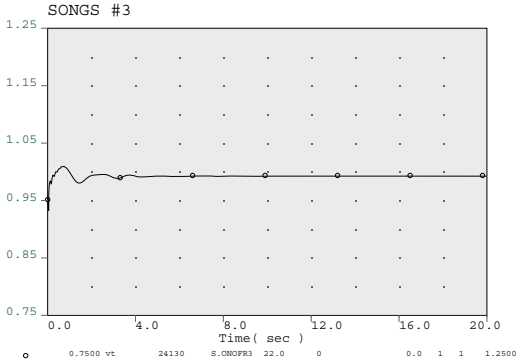
Palo Verde #1



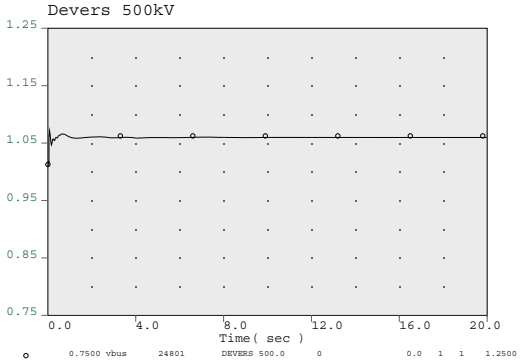
N Gila 500kV



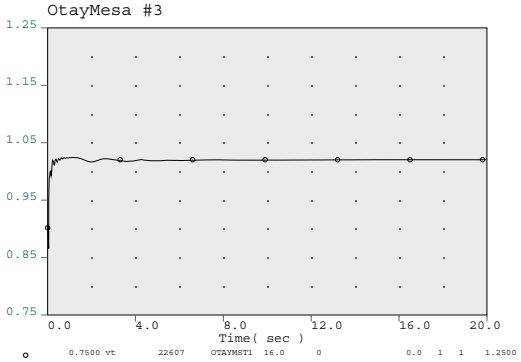
SONGS #3



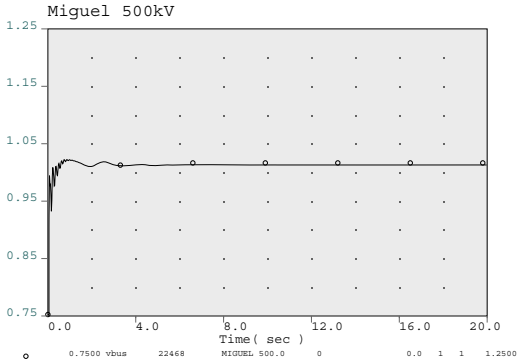
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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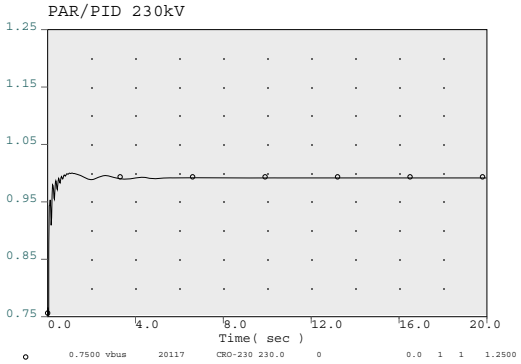
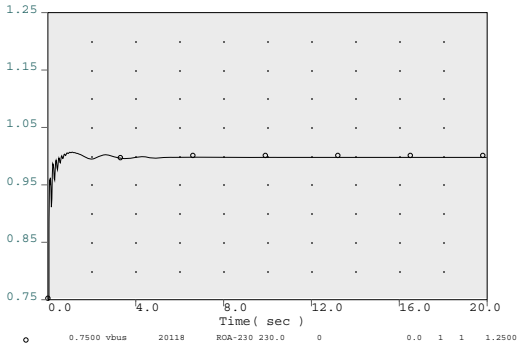
Affected System Voltage Check and Comparison

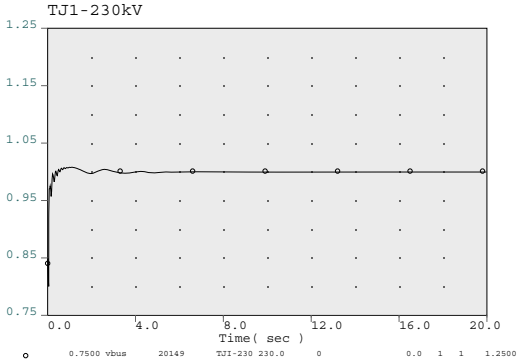
PAR/PID 230kV



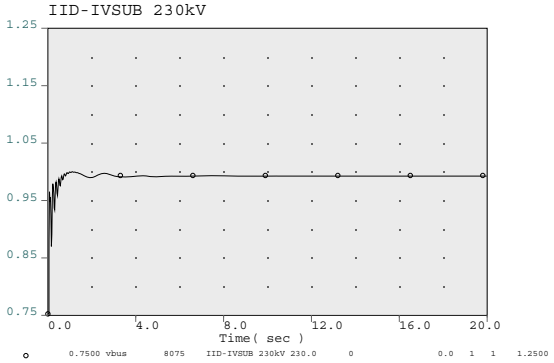
ROA-230kV



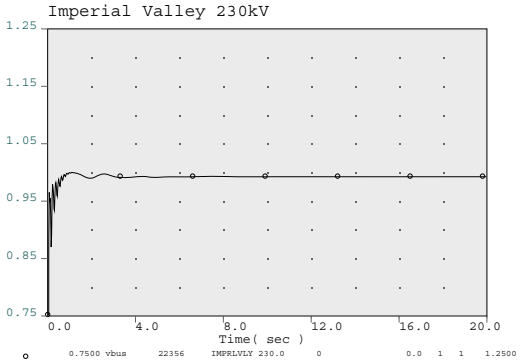
TJ1-230kV



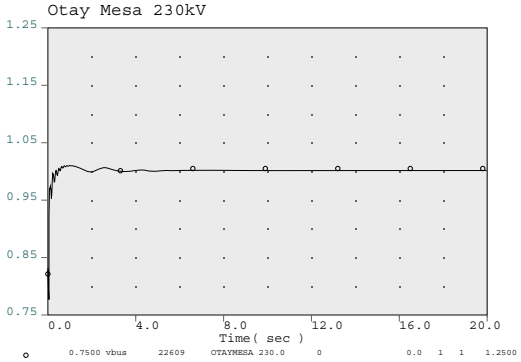
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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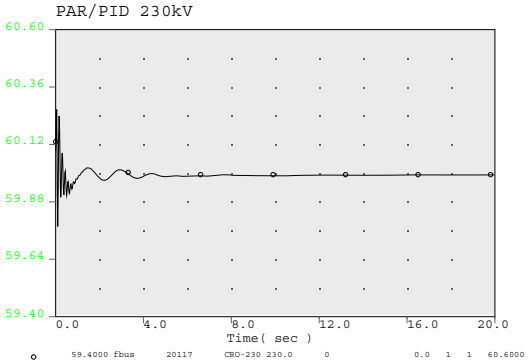
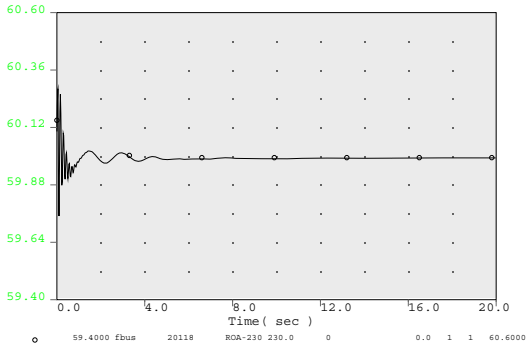
Affected System Frequency Check and Comparison

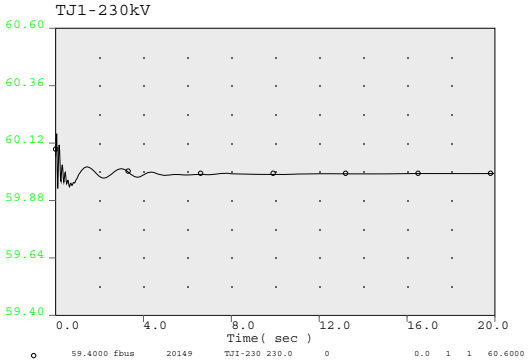
PAR/PID 230kV



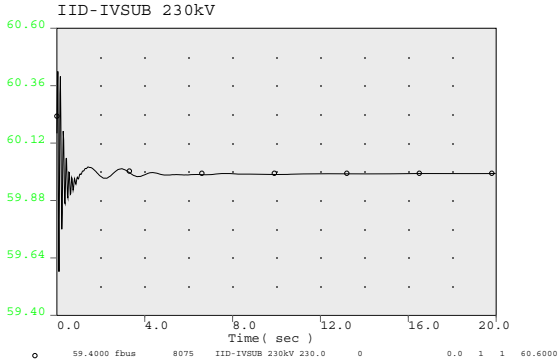
ROA-230kV



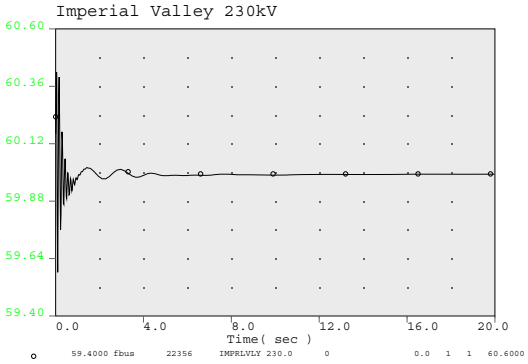
TJ1-230kV



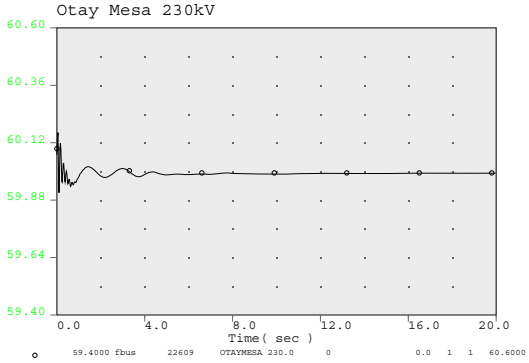
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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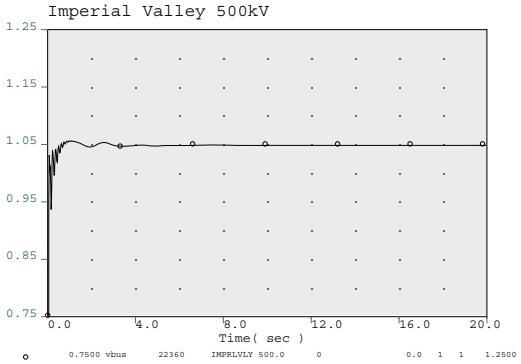
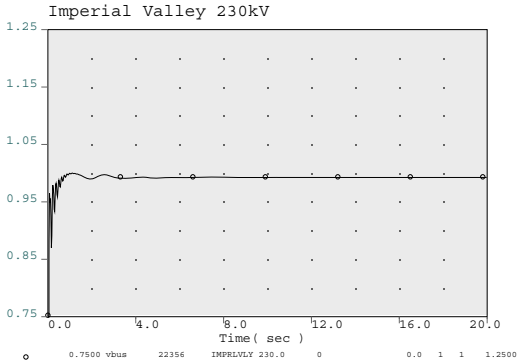
VOLTAGE

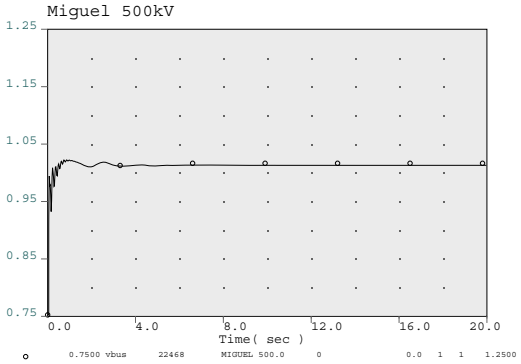
Imperial Valley 500kV



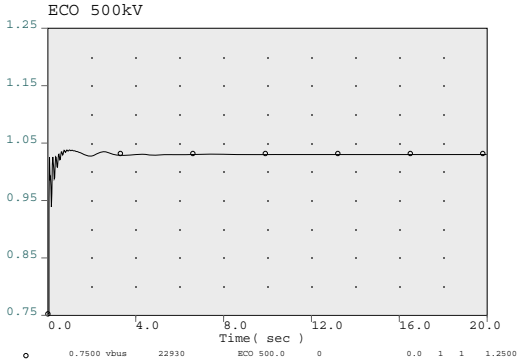
Imperial Valley 230kV



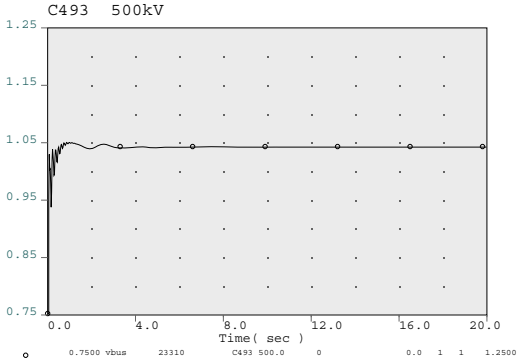
Miguel 500kV



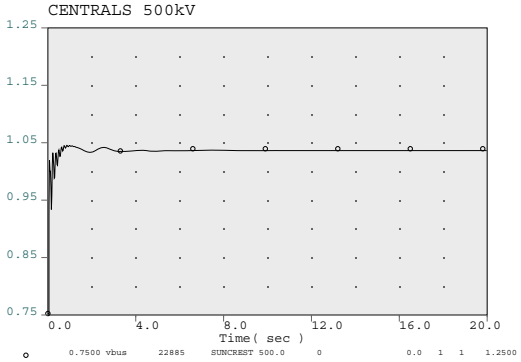
ECO 500kV



C493 500kV



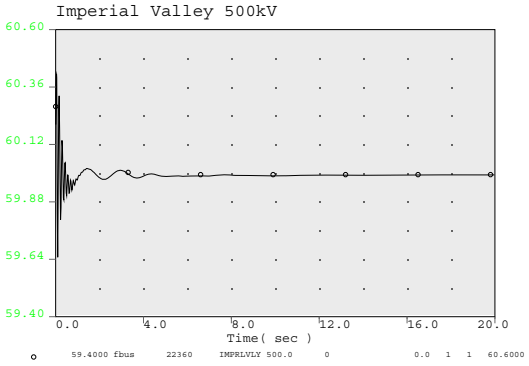
CENTRALS 500kV



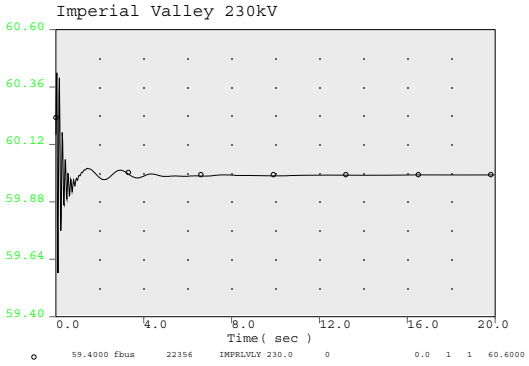
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

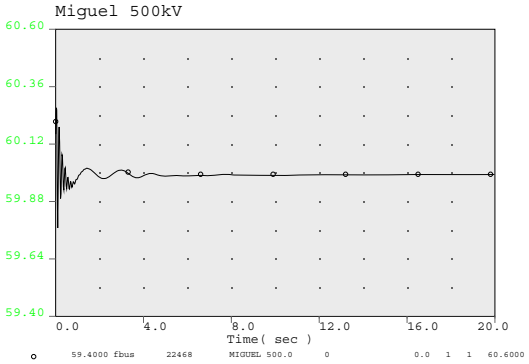
Imperial Valley 500kV



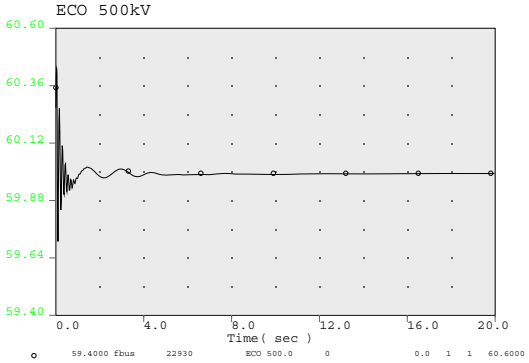
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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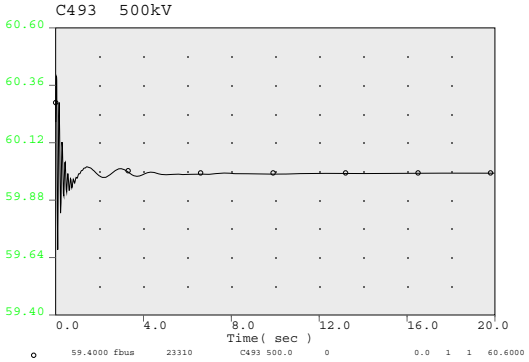
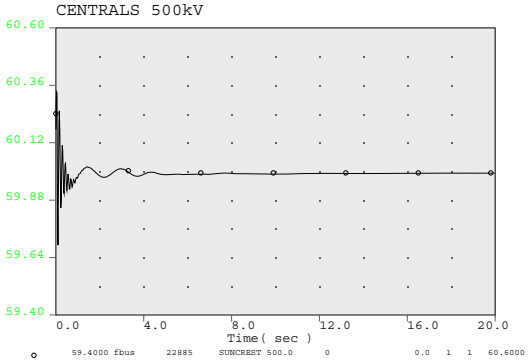
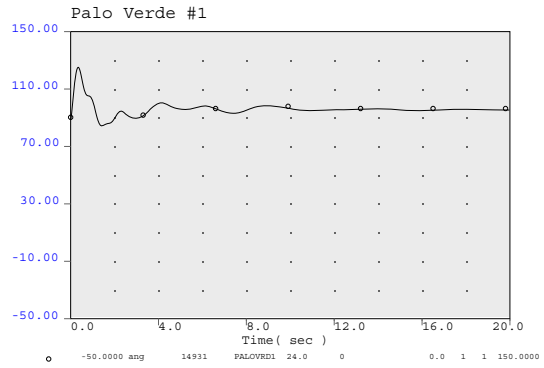


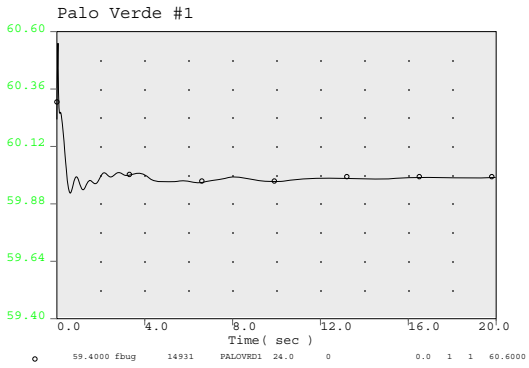
CENTRALS 500kV

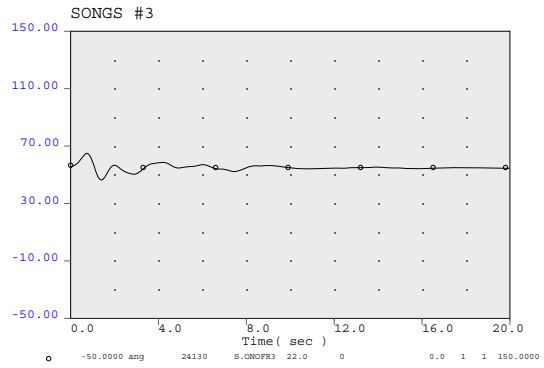


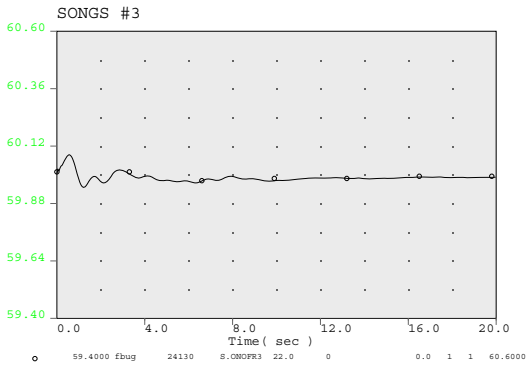
C1 C2 Heavy Summer Post With Upgrades

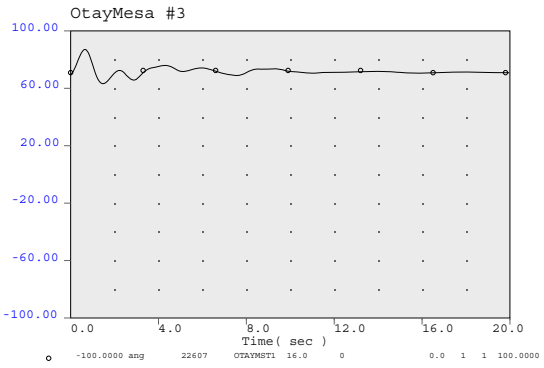
RELATIVE ROTOR ANGLE & FREQUENCY

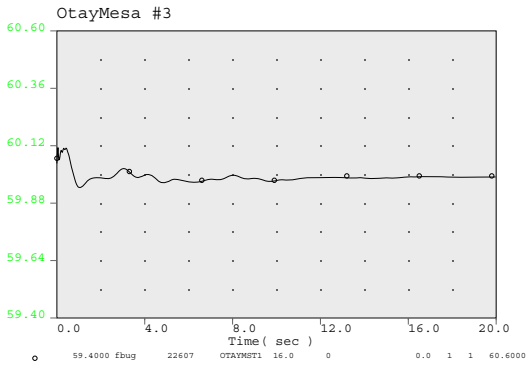












C1 C2 Heavy Summer Post With Upgrades

Page 1

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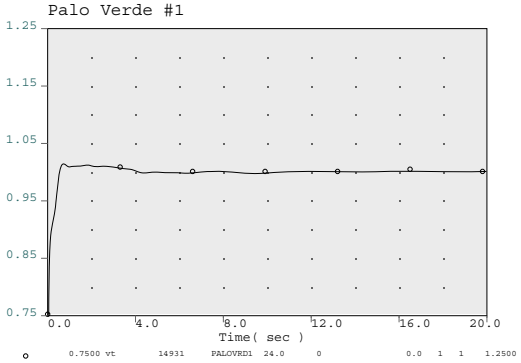
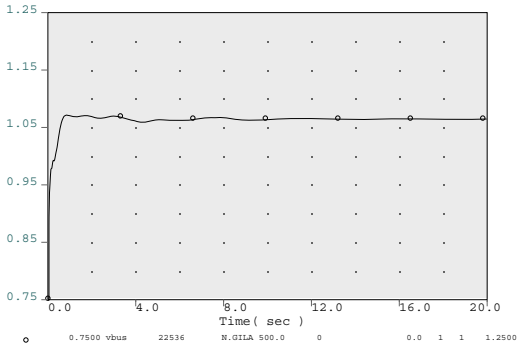
RELATIVE VOLTAGE

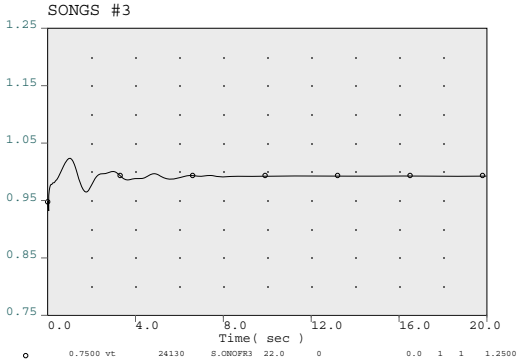
Palo Verde #1



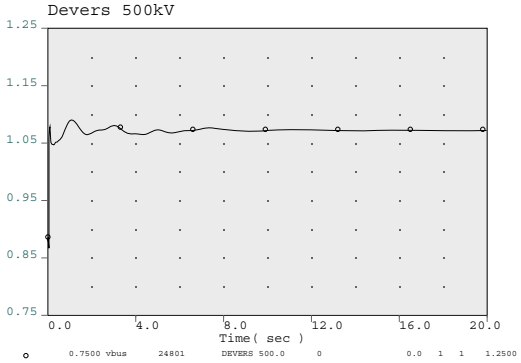
N Gila 500kV



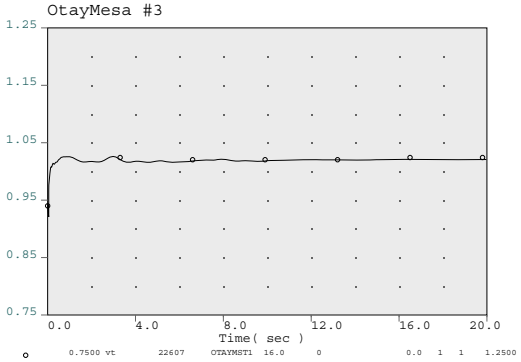
SONGS #3



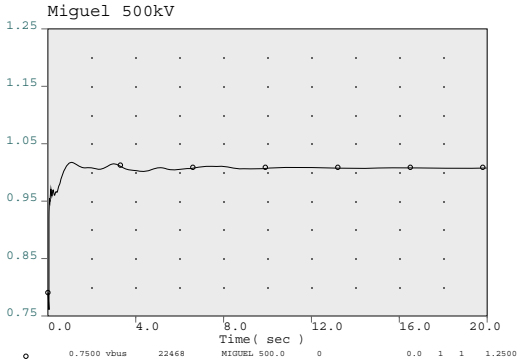
Devers 500kV



OtayMesa #3



Miguel 500kV



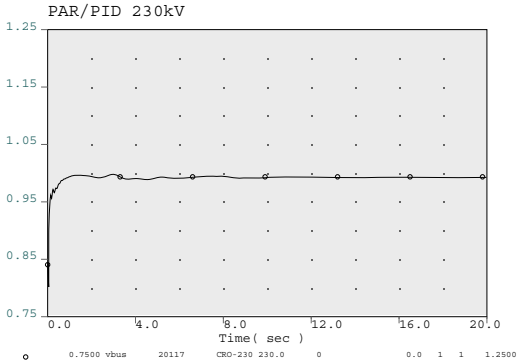
C1 C2 Heavy Summer Post With Upgrades

Page 2

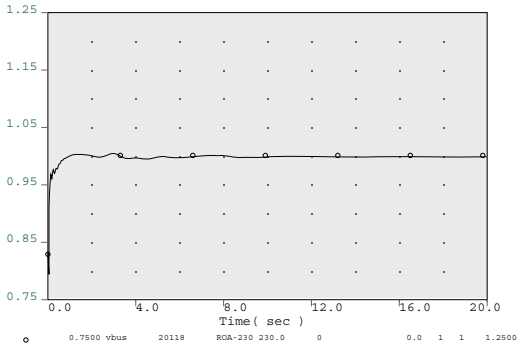
SDGE	tran-c1c2-hs-pstup-r15_pal-col-slo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:25:11 2011

Affected System Voltage Check and Comparison

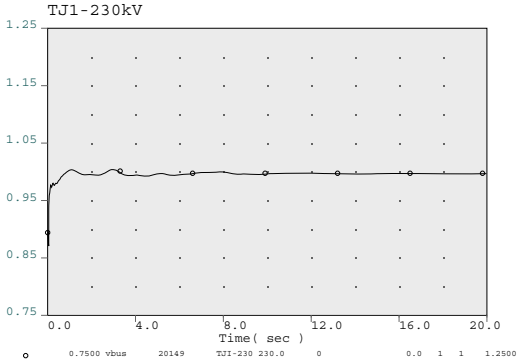
PAR/PID 230kV



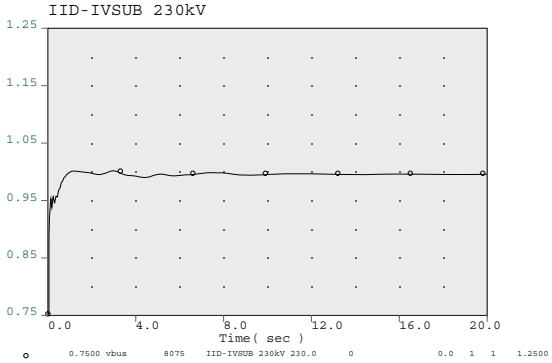
ROA-230kV



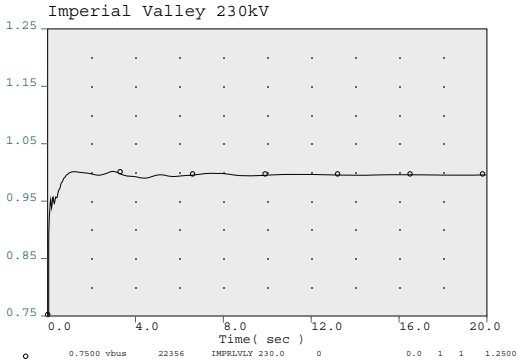
TJ1-230kV



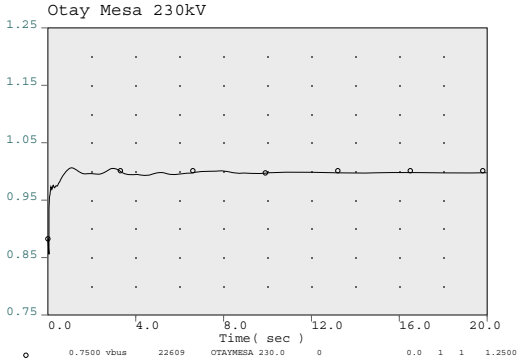
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

Page 3

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anstab\hs\pst\ws_pst_c1c2

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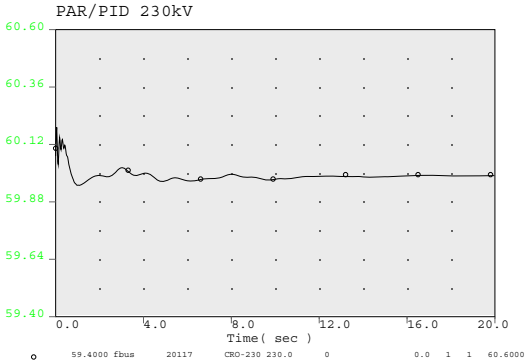
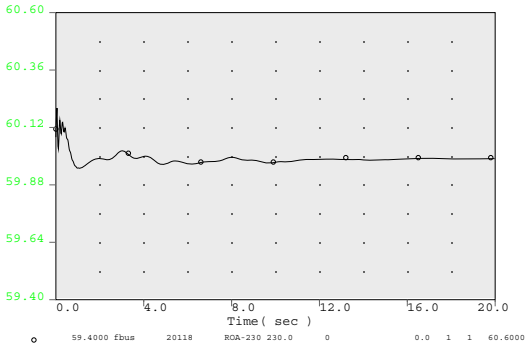
Affected System Frequency Check and Comparison

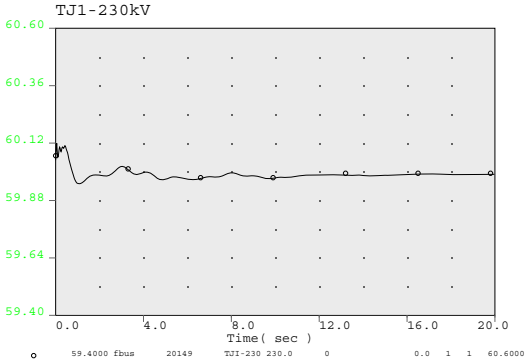
PAR/PID 230kV



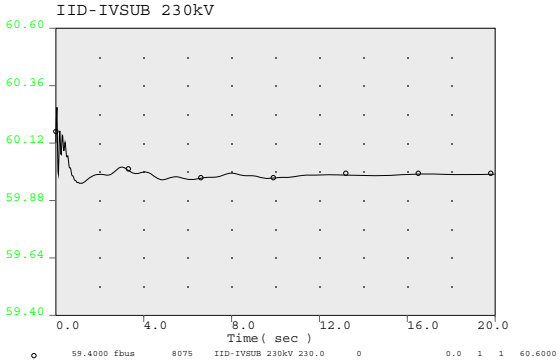
ROA-230kV



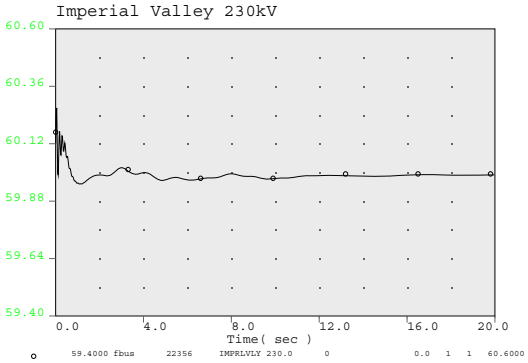
TJ1-230kV



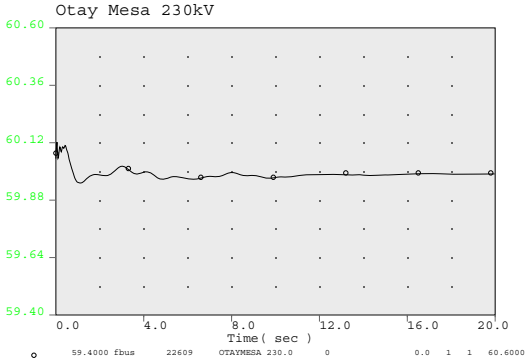
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

Page 4

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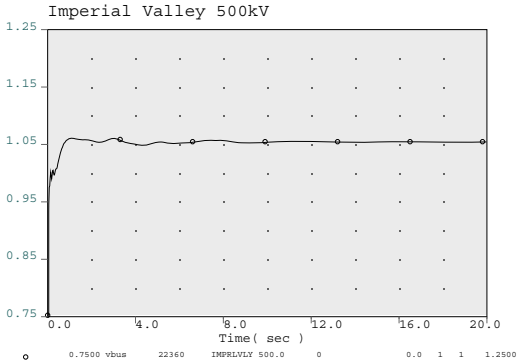
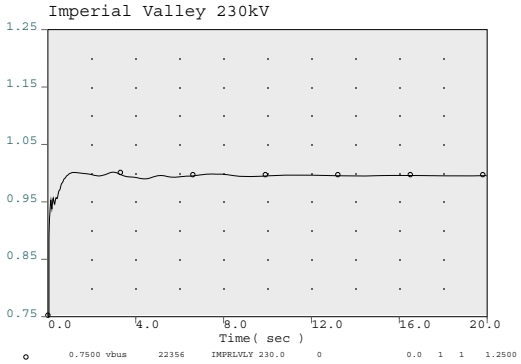
VOLTAGE

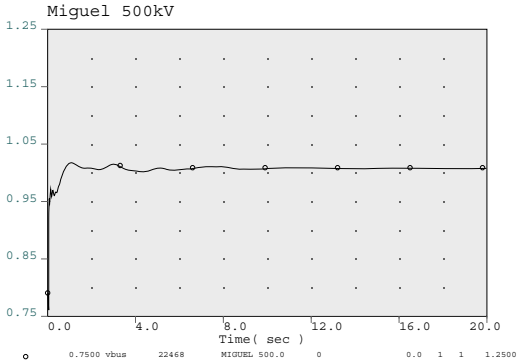
Imperial Valley 500kV



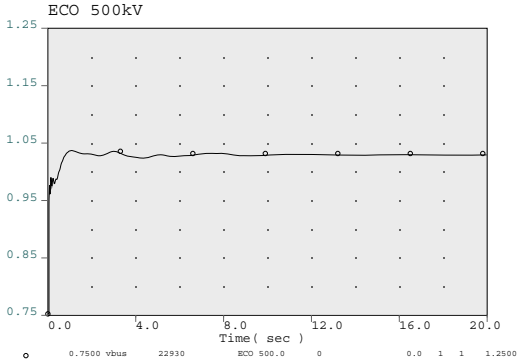
Imperial Valley 230kV



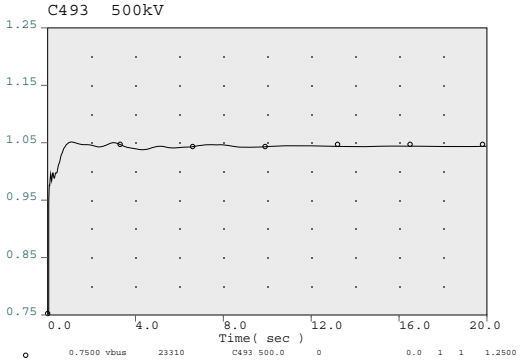
Miguel 500kV



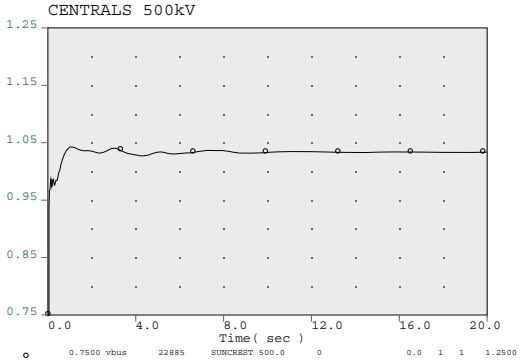
ECO 500kV



C493 500kV



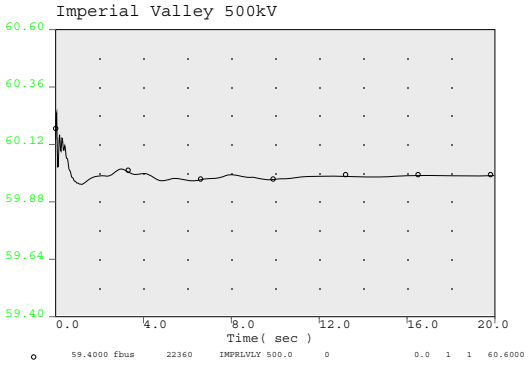
CENTRALS 500kV



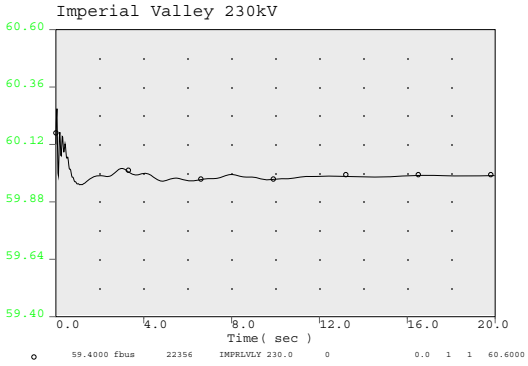
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

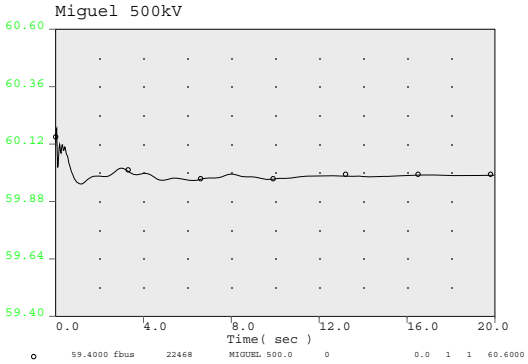
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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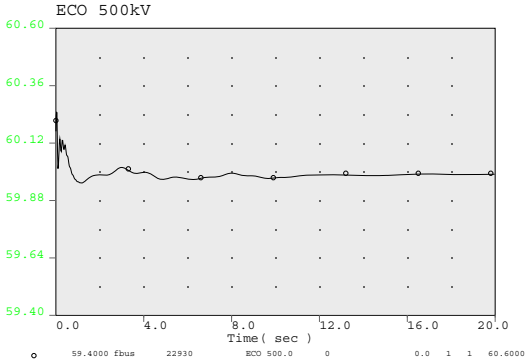
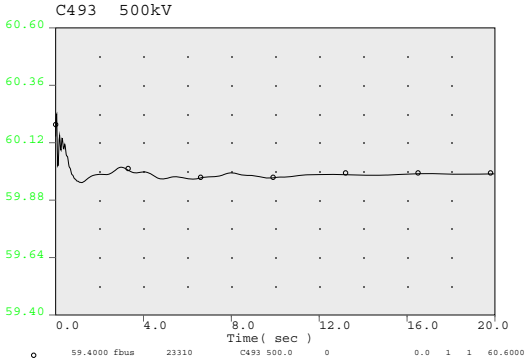
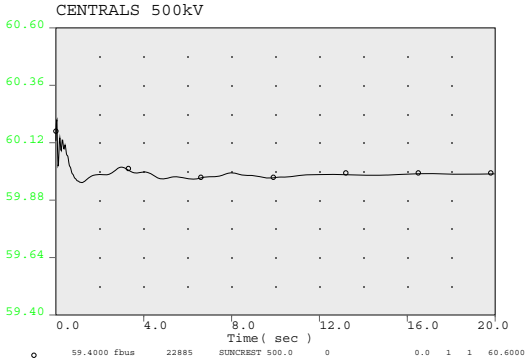


C493 500kV

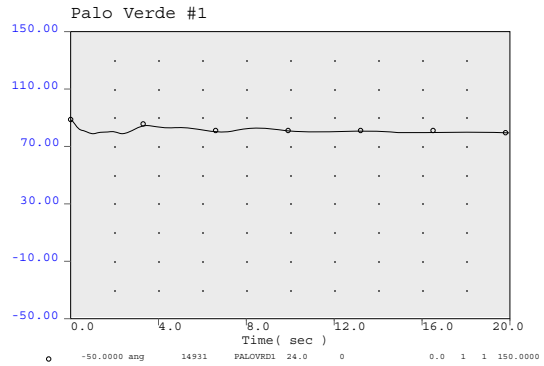


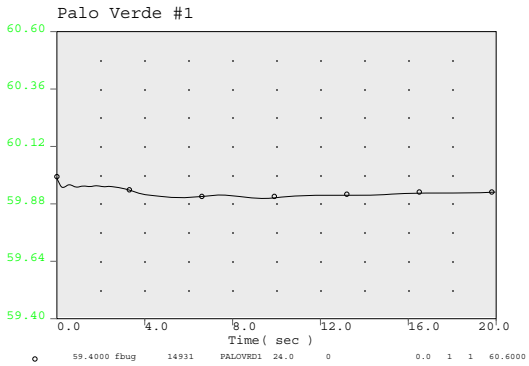
CENTRALS 500kV

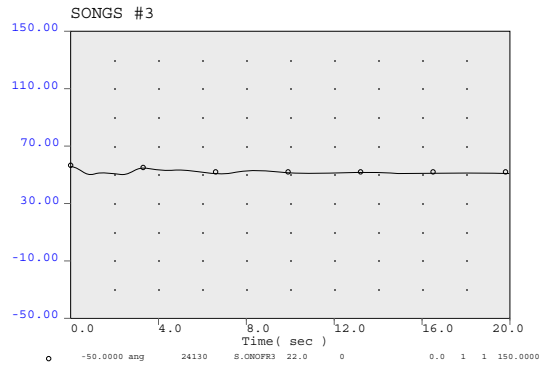


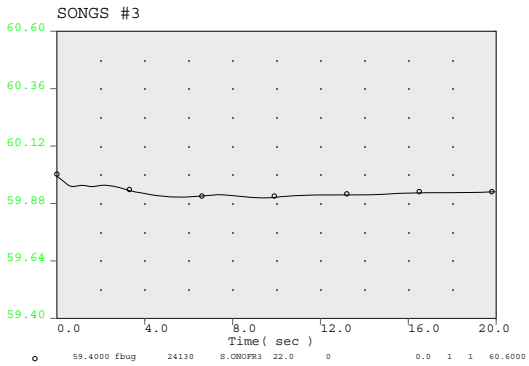
C1 C2 Heavy Summer Post With Upgrades

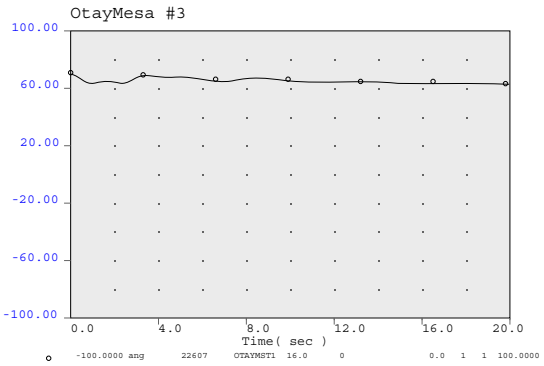
RELATIVE ROTOR ANGLE & FREQUENCY

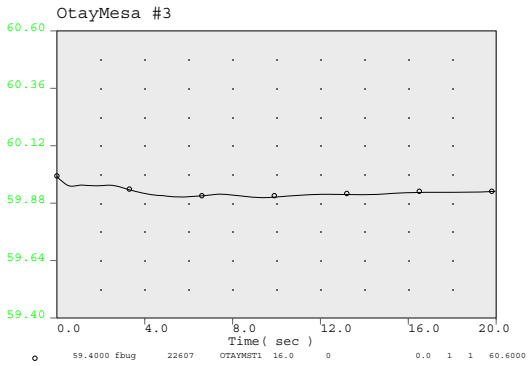












C1 C2 Heavy Summer Post With Upgrades

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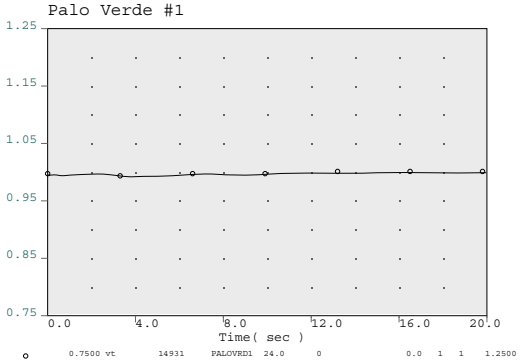
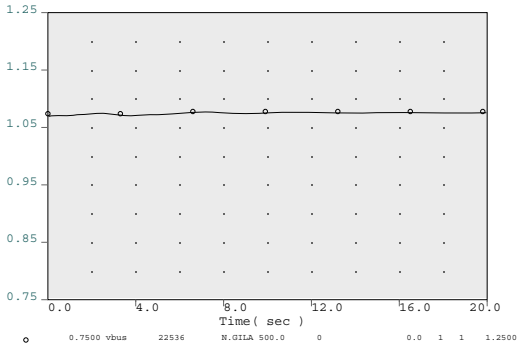
RELATIVE VOLTAGE

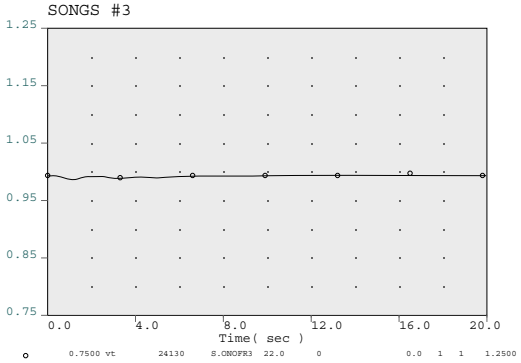
Palo Verde #1



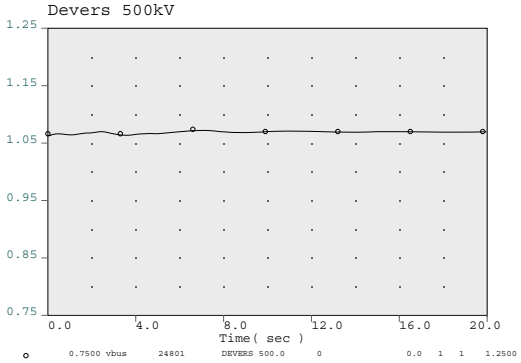
N Gila 500kV



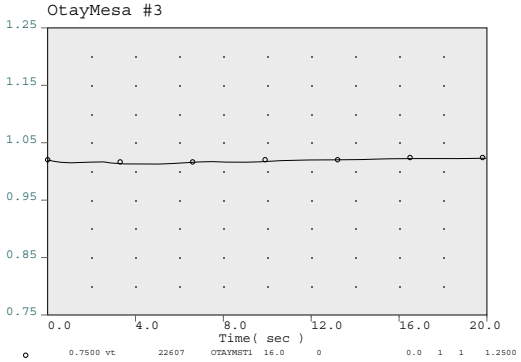
SONGS #3



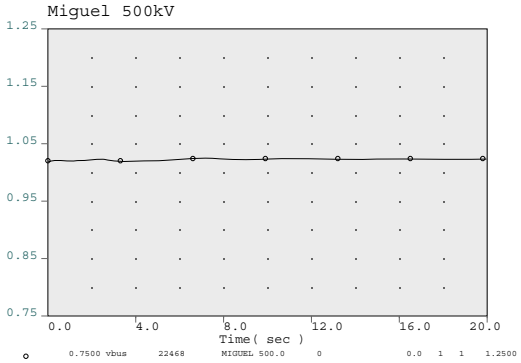
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

Page 2

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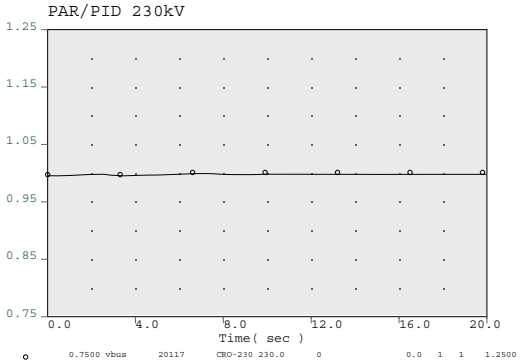
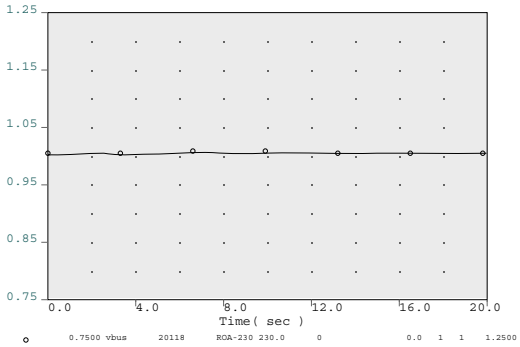
Affected System Voltage Check and Comparison

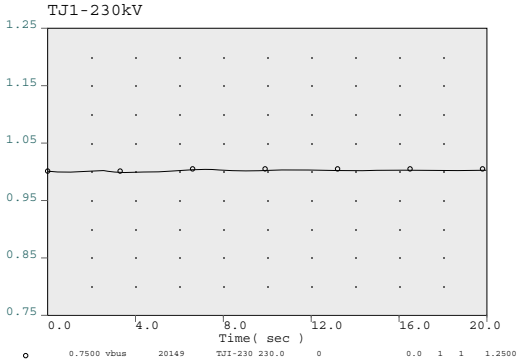
PAR/PID 230kV



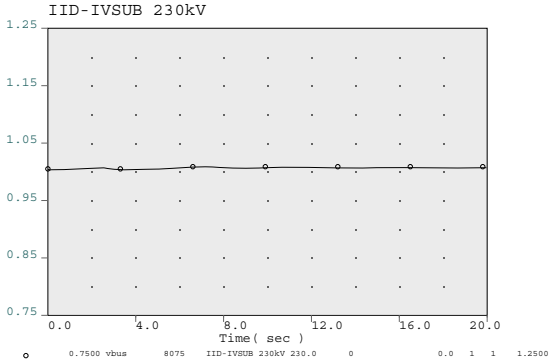
ROA-230kV



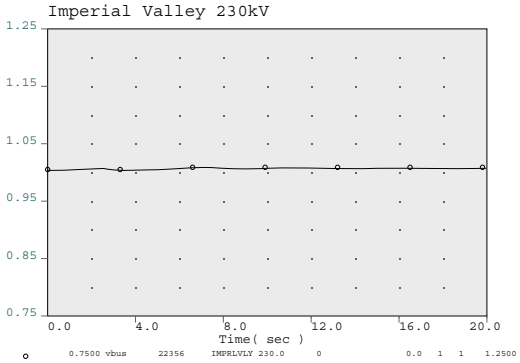
TJ1-230kV



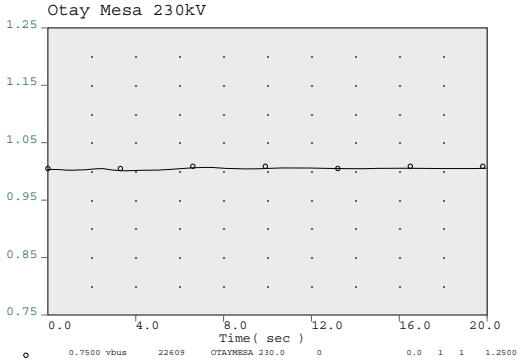
IID-IVSUB 230kV



Imperial Valley 230kV



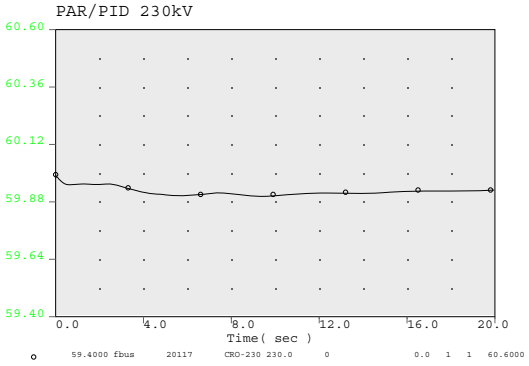
Otay Mesa 230kV



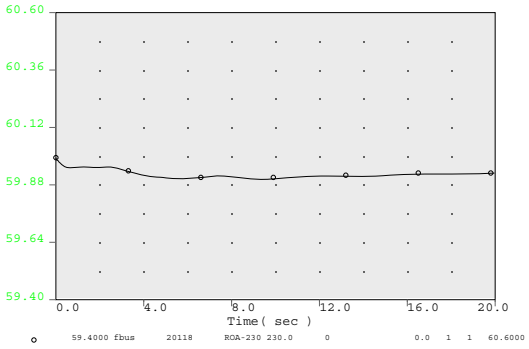
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

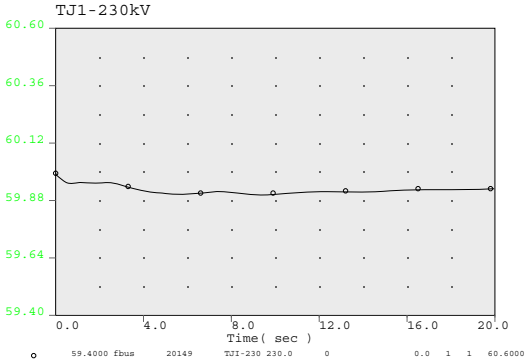
PAR/PID 230kV



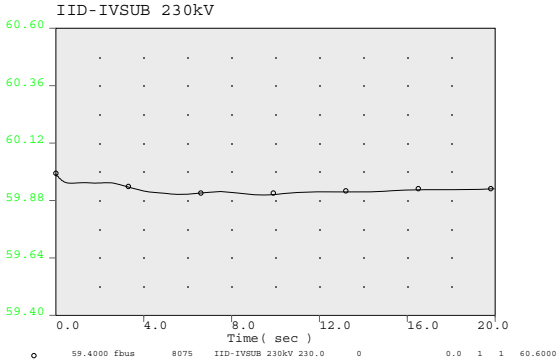
ROA-230kV



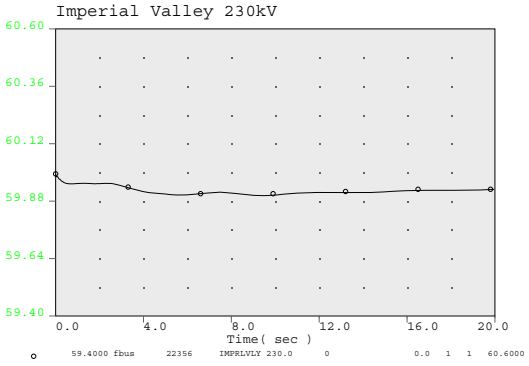
TJ1-230kV



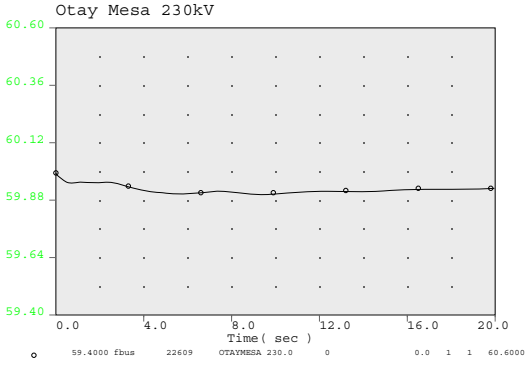
IID-IVSUB 230kV



Imperial Valley 230kV



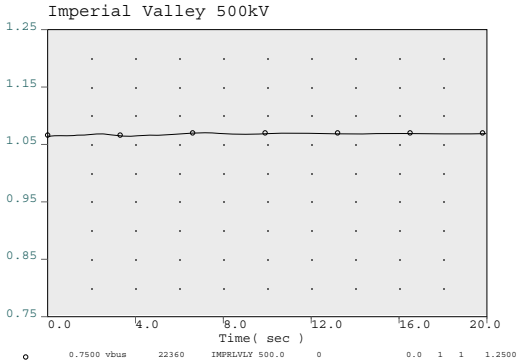
Otay Mesa 230kV



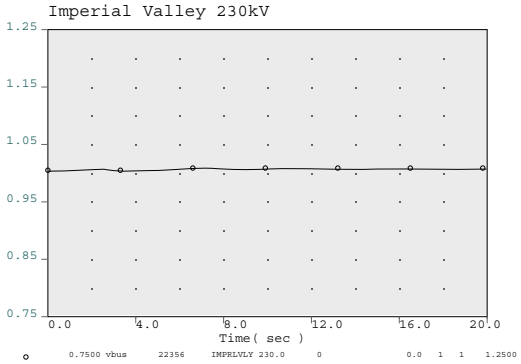
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

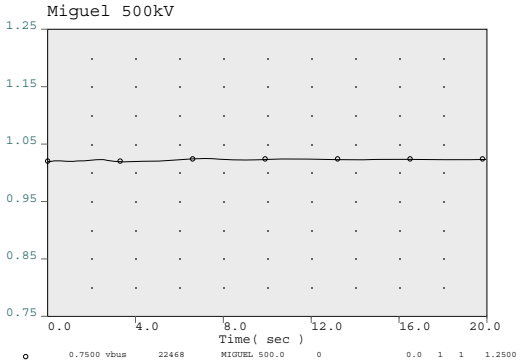
Imperial Valley 500kV



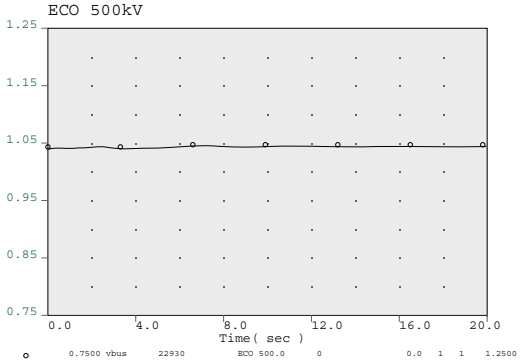
Imperial Valley 230kV



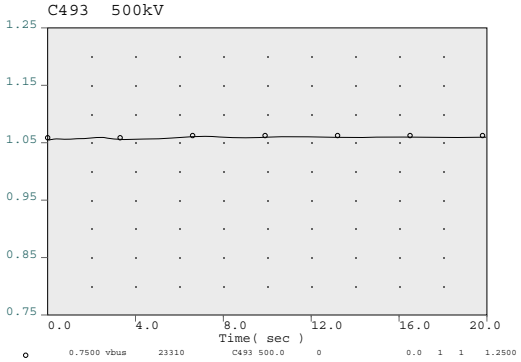
Miguel 500kV



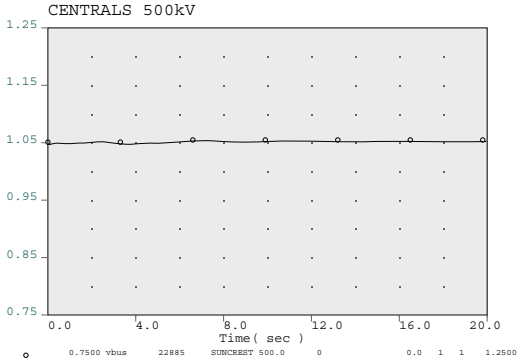
ECO 500kV



C493 500kV



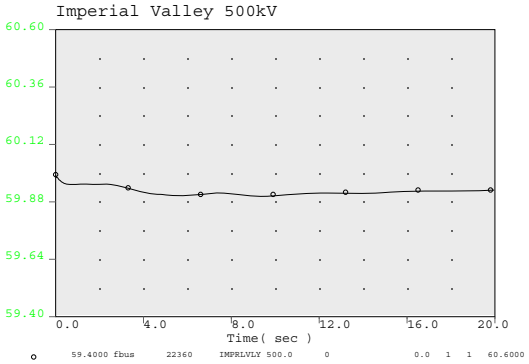
CENTRALS 500kV



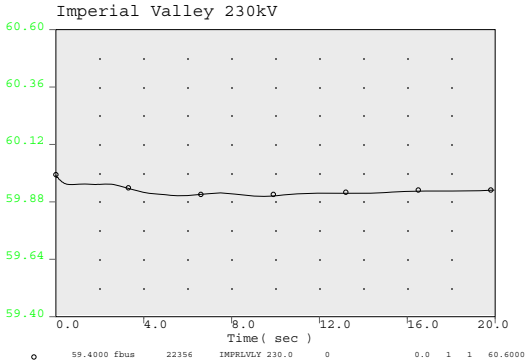
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

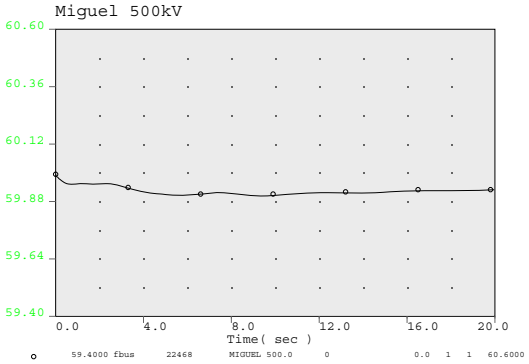
Imperial Valley 500kV



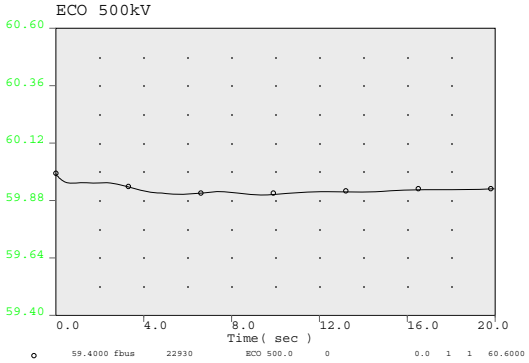
Imperial Valley 230kV



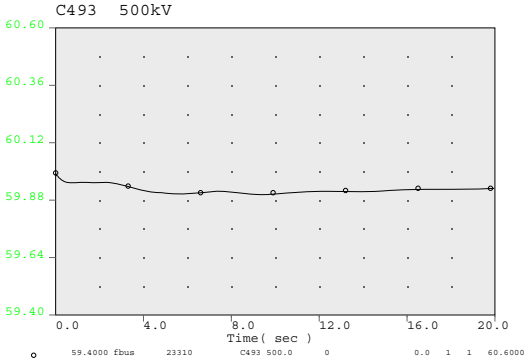
Miguel 500kV



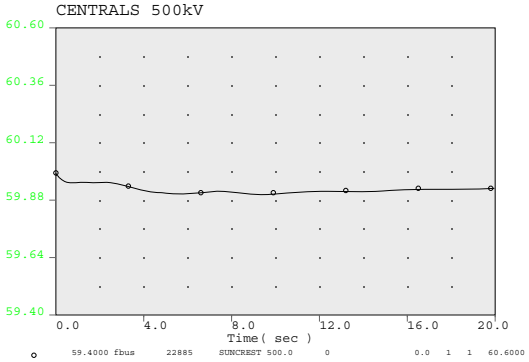
ECO 500kV



C493 500kV

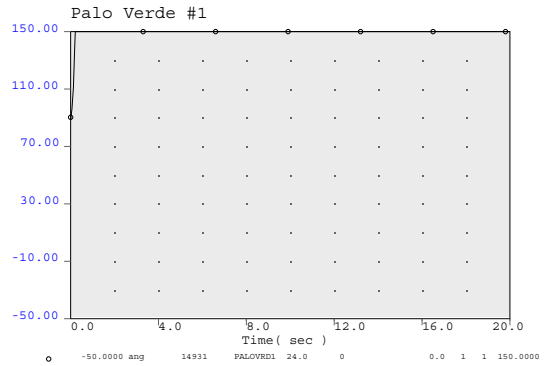


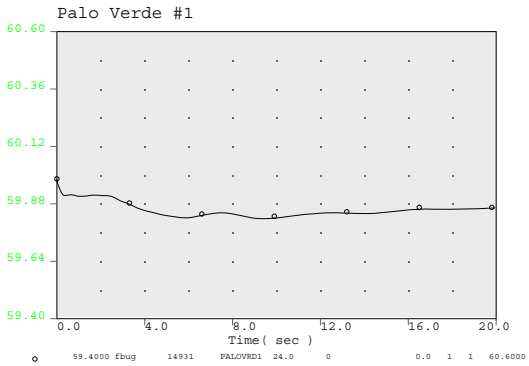
CENTRALS 500kV

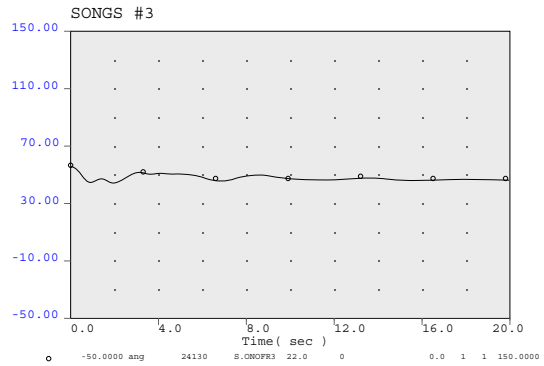


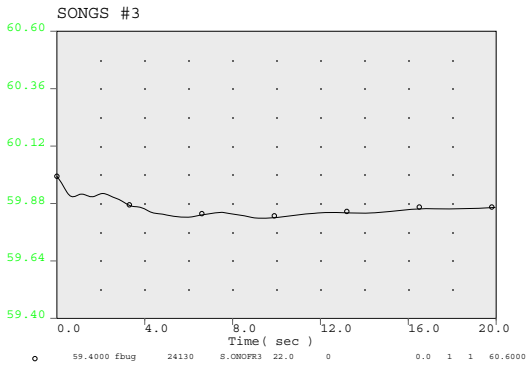
C1 C2 Heavy Summer Post With Upgrades

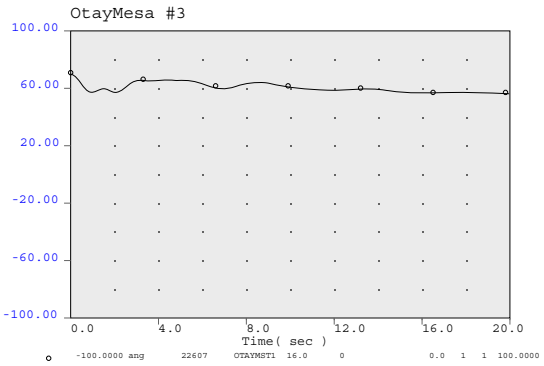
RELATIVE ROTOR ANGLE & FREQUENCY

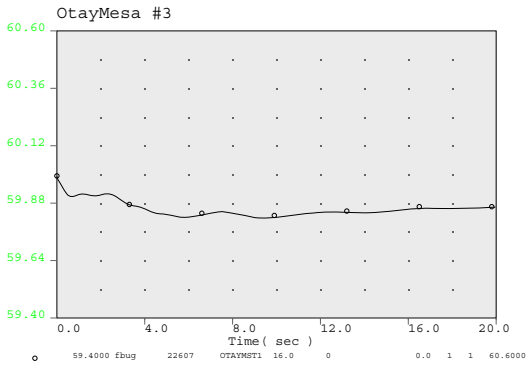












C1 C2 Heavy Summer Post With Upgrades

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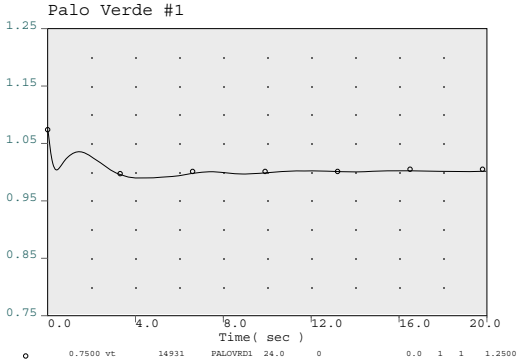
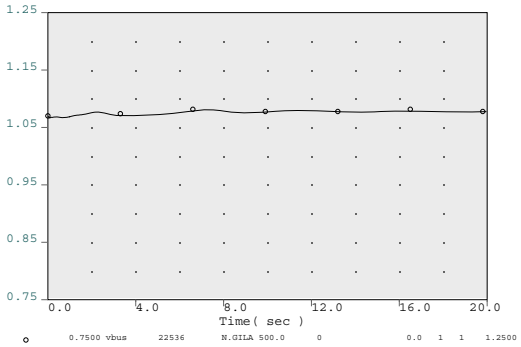
RELATIVE VOLTAGE

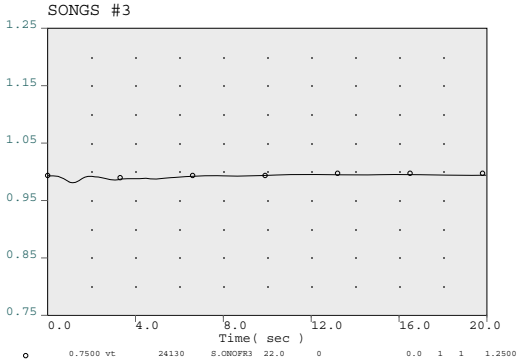
Palo Verde #1



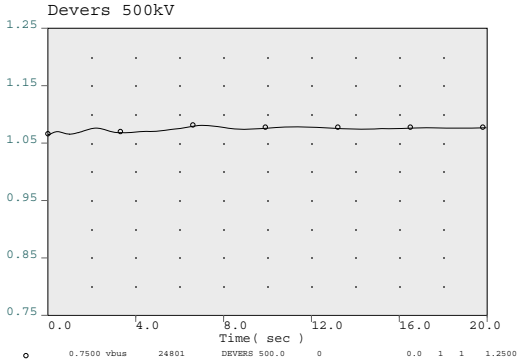
N Gila 500kV



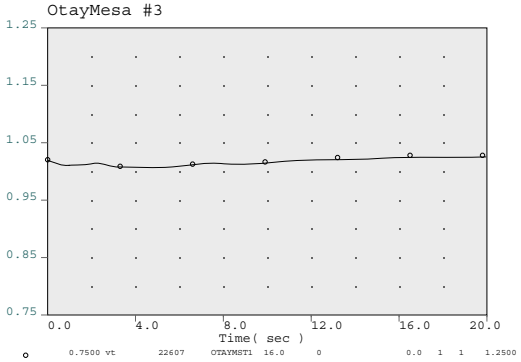
SONGS #3



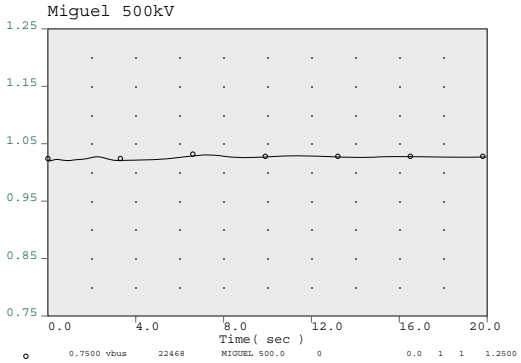
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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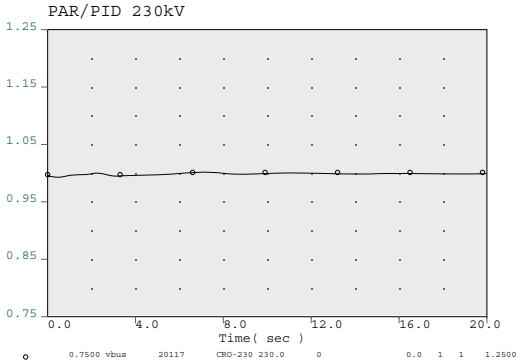
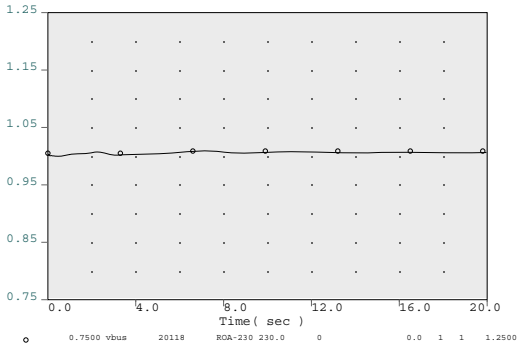
Affected System Voltage Check and Comparison

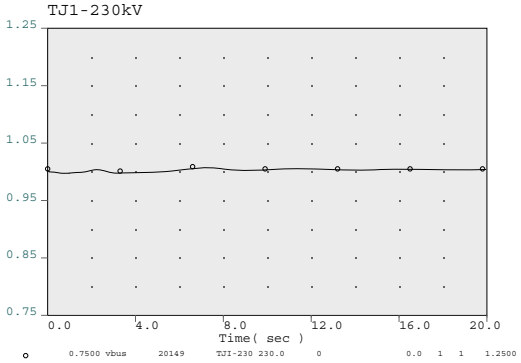
PAR/PID 230kV



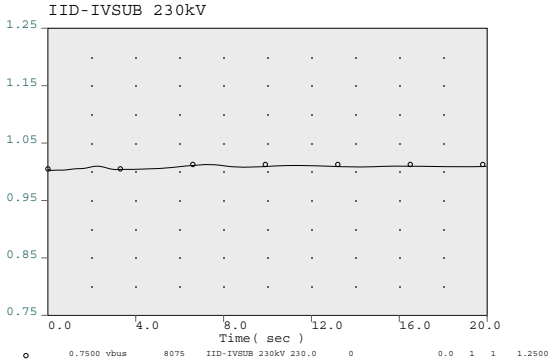
ROA-230kV



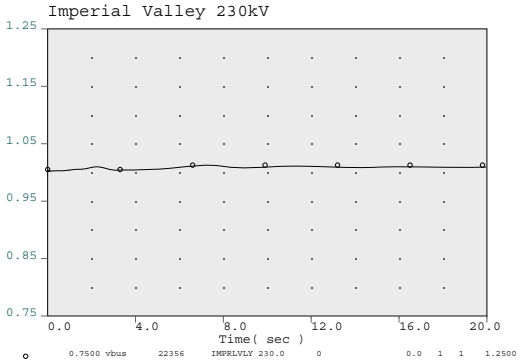
TJ1-230kV



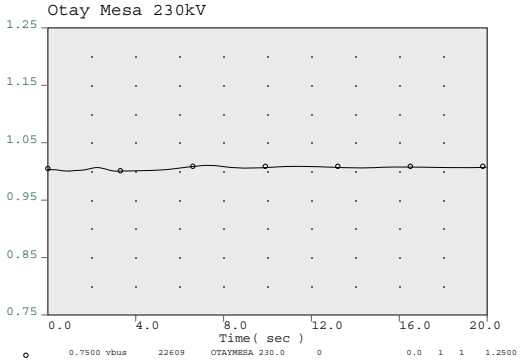
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



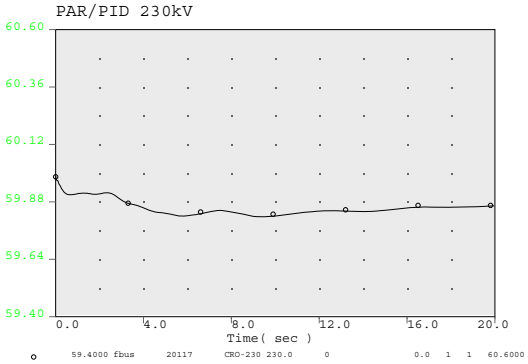
C1 C2 Heavy Summer Post With Upgrades

Page 3

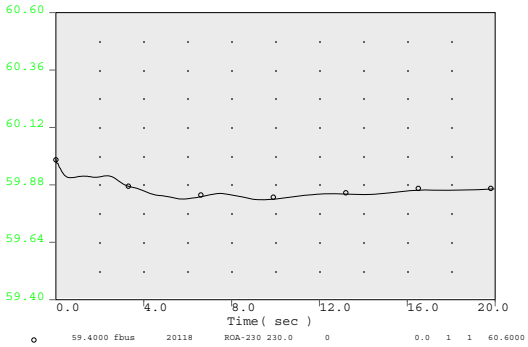
SDGE	tran-c1c2-hs-pstup-r15_PaloVerde-g2.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:29:31 2011

Affected System Frequency Check and Comparison

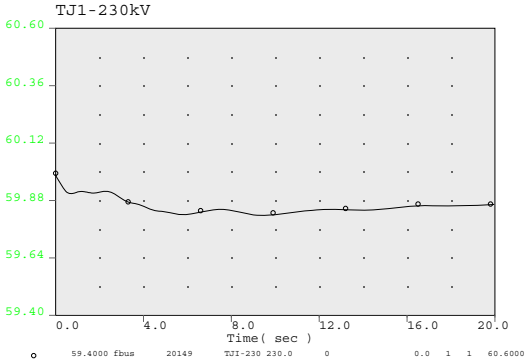
PAR/PID 230kV



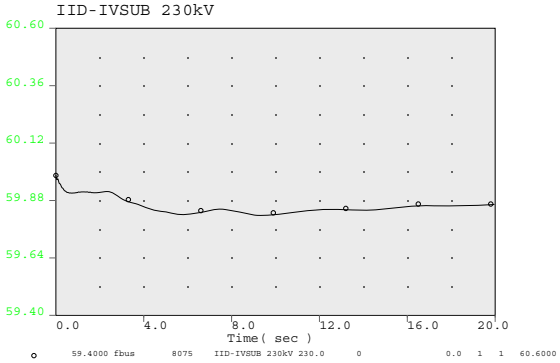
ROA-230kV



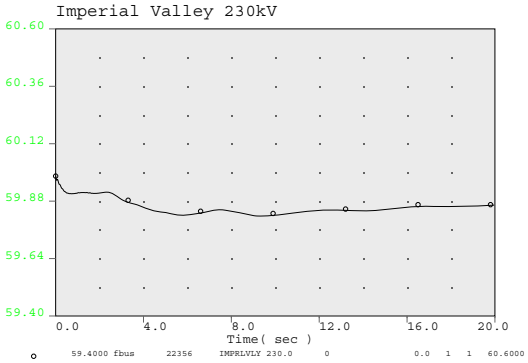
TJ1-230kV



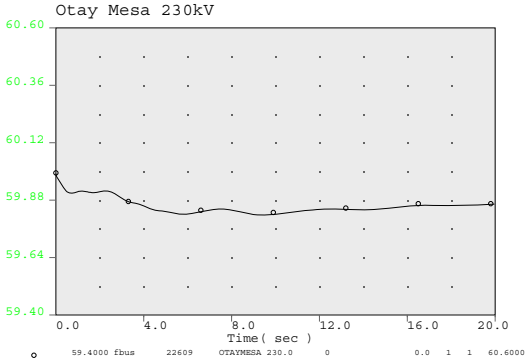
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



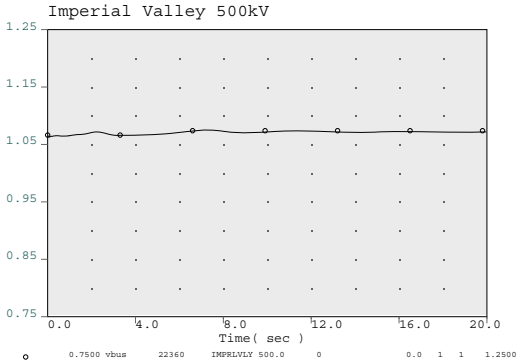
C1 C2 Heavy Summer Post With Upgrades

Page 4

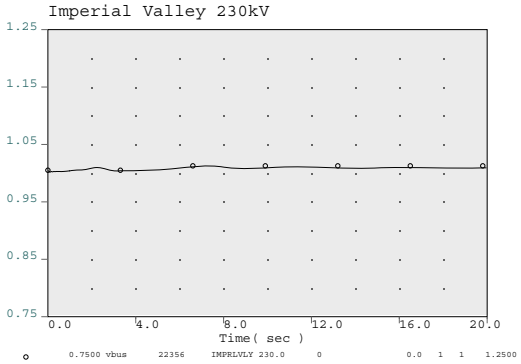
SDGE	tran-c1c2-hs-pstup-r15_PaloVerde-g2.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:29:32 2011

VOLTAGE

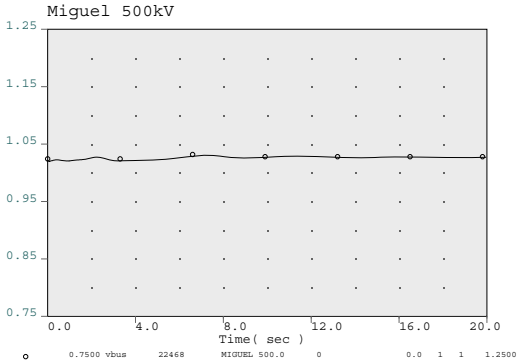
Imperial Valley 500kV



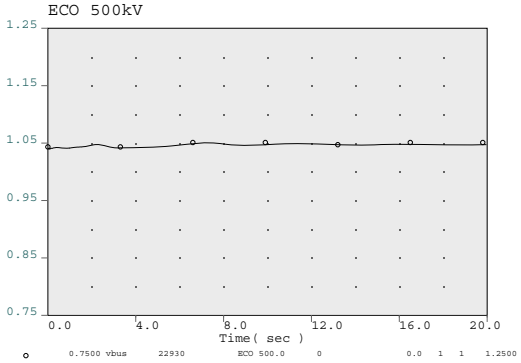
Imperial Valley 230kV



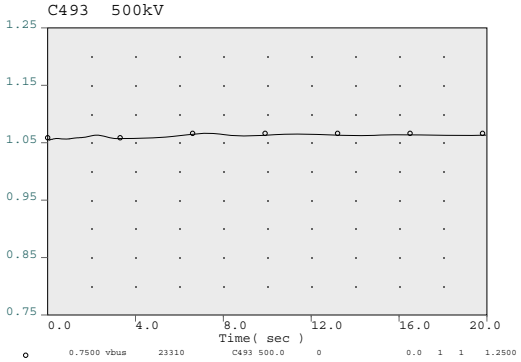
Miguel 500kV



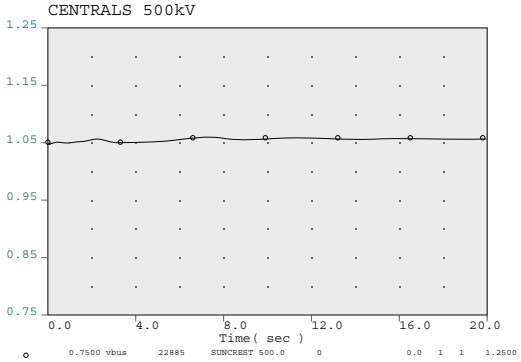
ECO 500kV



C493 500kV



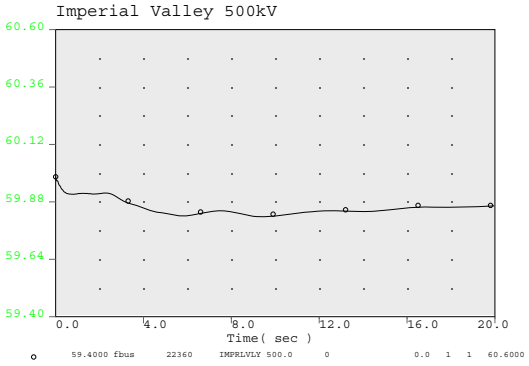
CENTRALS 500kV



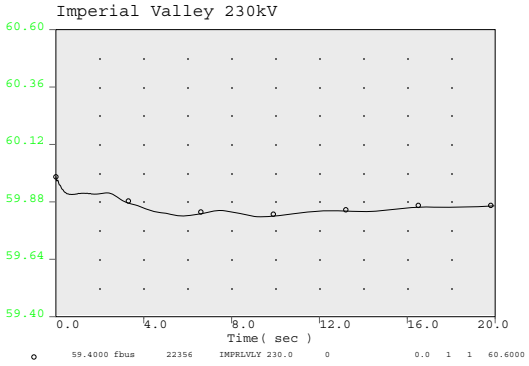
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

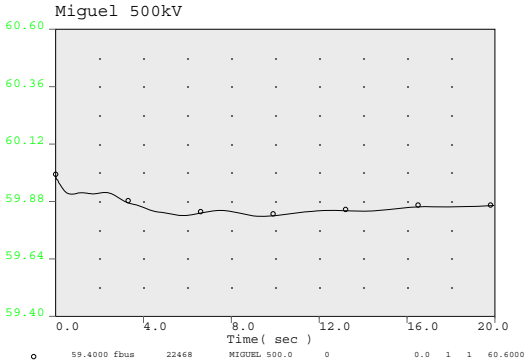
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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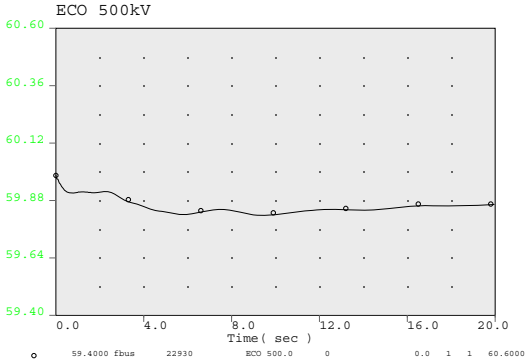

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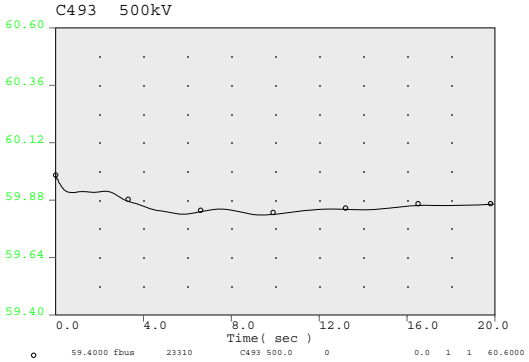
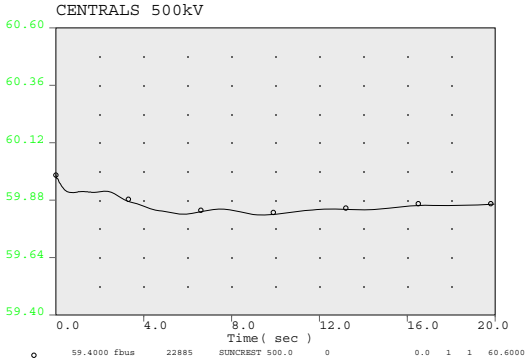
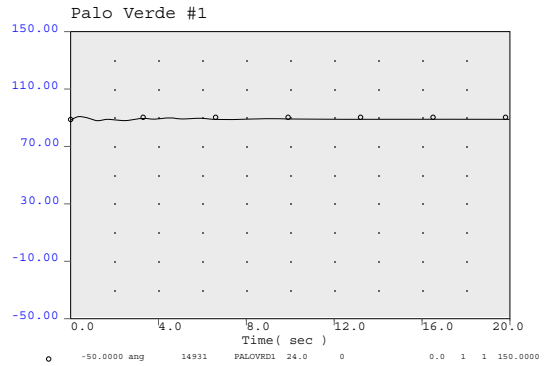


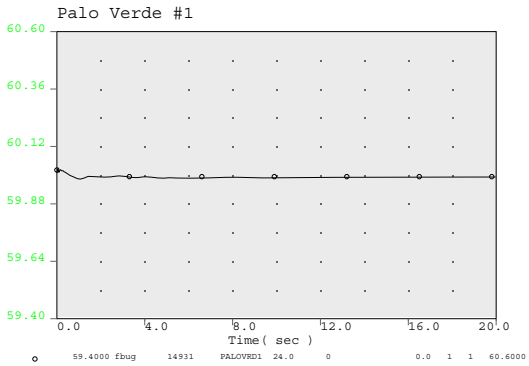
CENTRALS 500kV

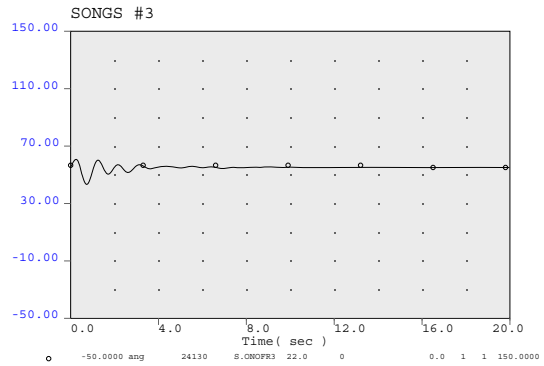


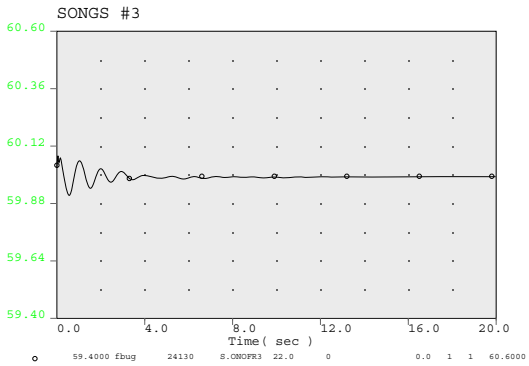
C1 C2 Heavy Summer Post With Upgrades

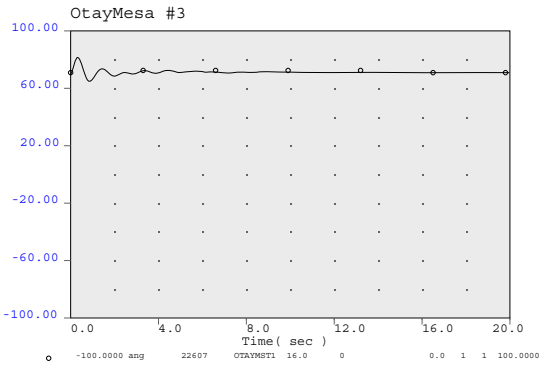
RELATIVE ROTOR ANGLE & FREQUENCY

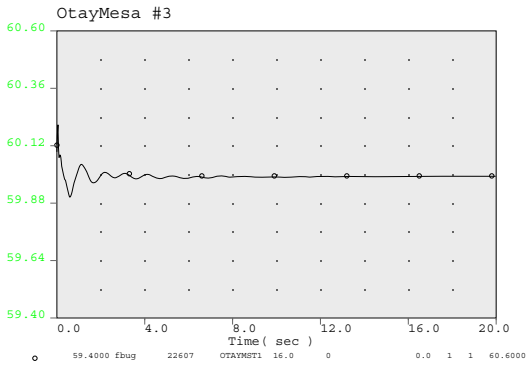












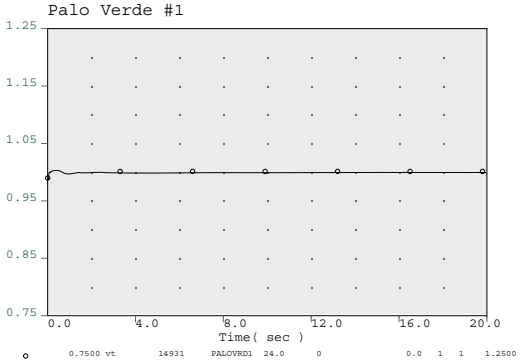
C1 C2 Heavy Summer Post With Upgrades

Page 1

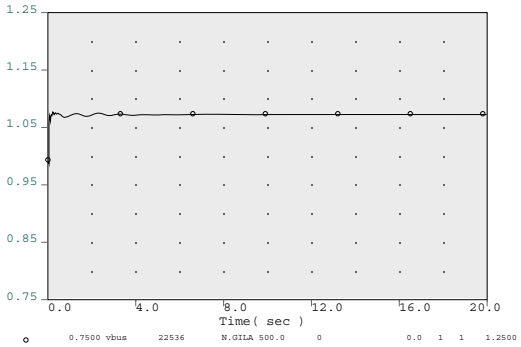
SDGE	tran-c1c2-hs-pstup-r15_PEN230kv-dlo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:35:39 2011

RELATIVE VOLTAGE

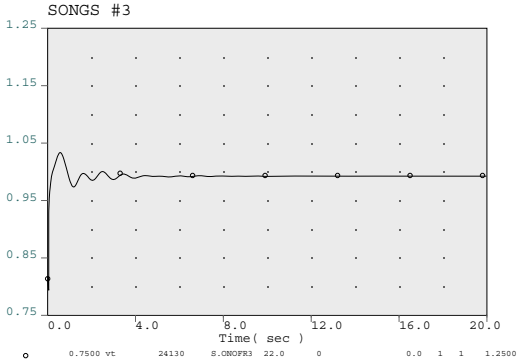
Palo Verde #1



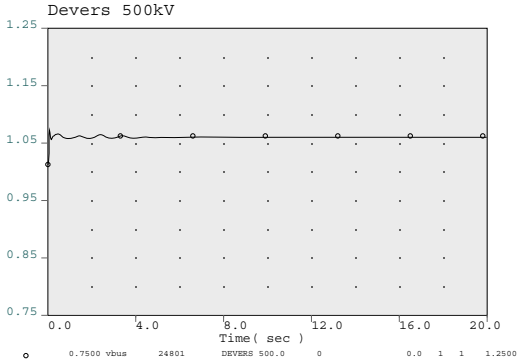
N Gila 500kV



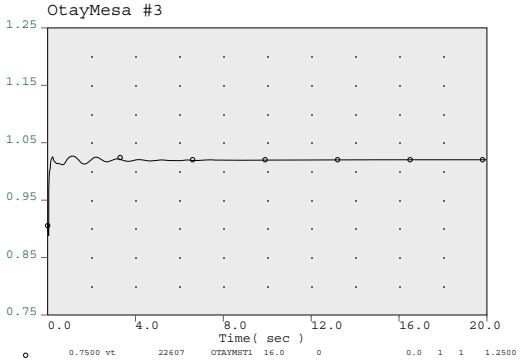
SONGS #3



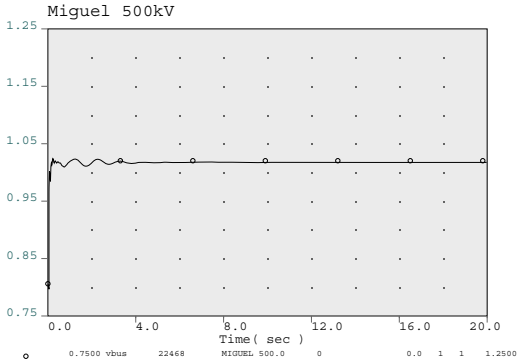
Devers 500kV



OtayMesa #3



Miguel 500kV



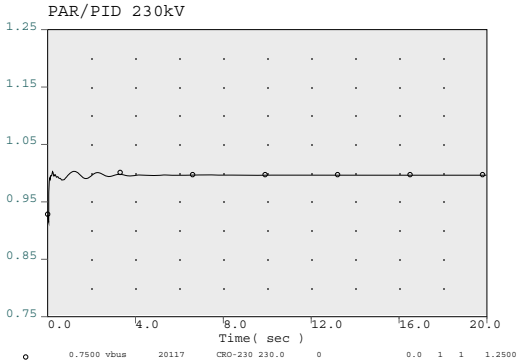
C1 C2 Heavy Summer Post With Upgrades

Page 2

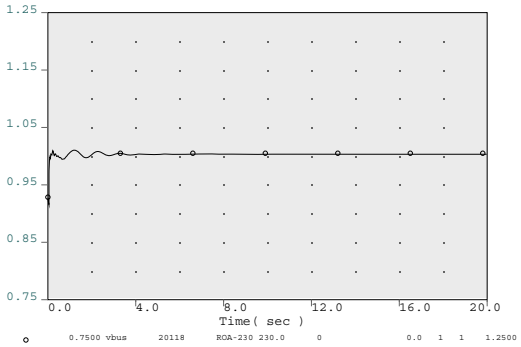
SDGE	tran-c1c2-hs-pstup-r15_PEN230kv-dlo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:35:40 2011

Affected System Voltage Check and Comparison

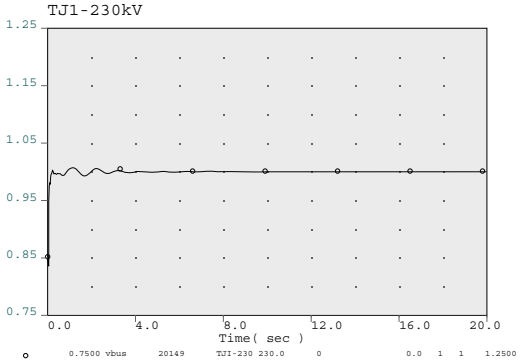
PAR/PID 230kV



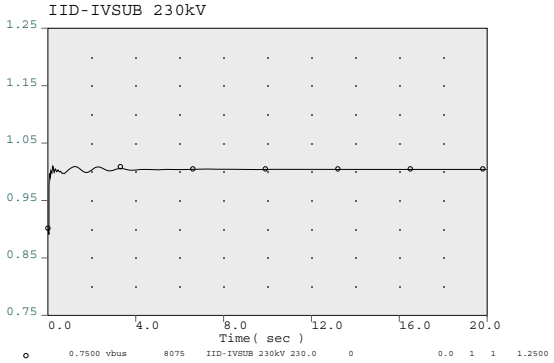
ROA-230kV



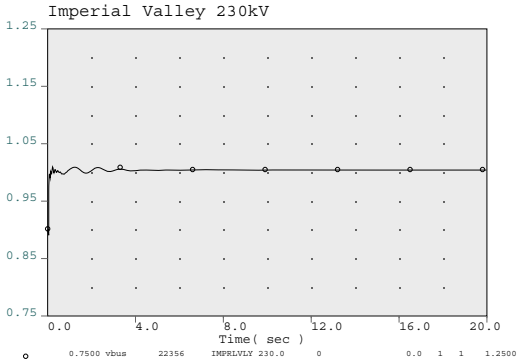
TJ1-230kV



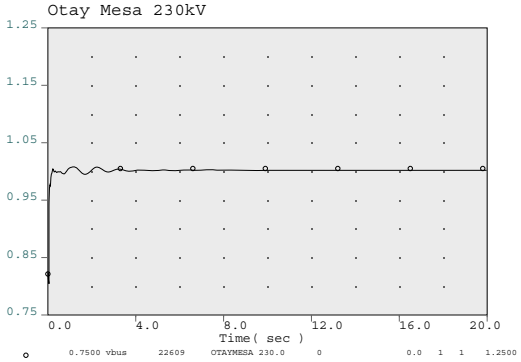
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

Page 3

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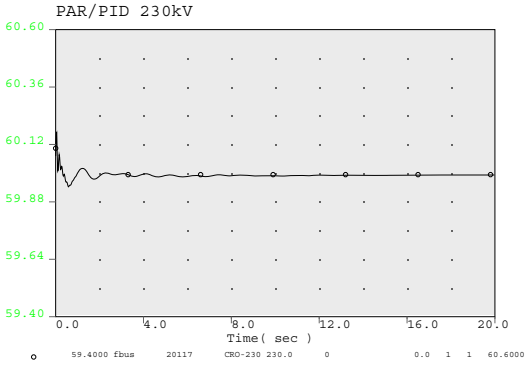
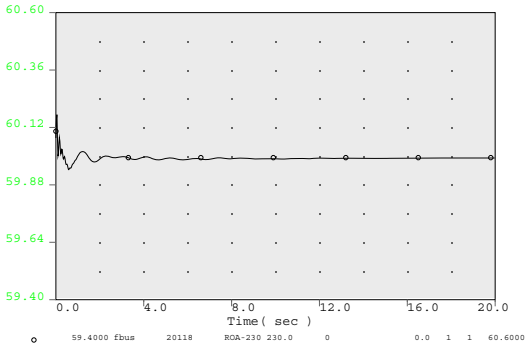
Affected System Frequency Check and Comparison

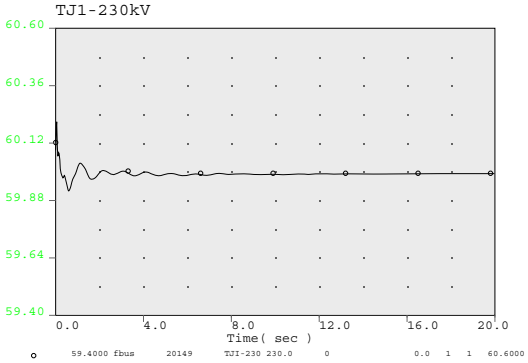
PAR/PID 230kV



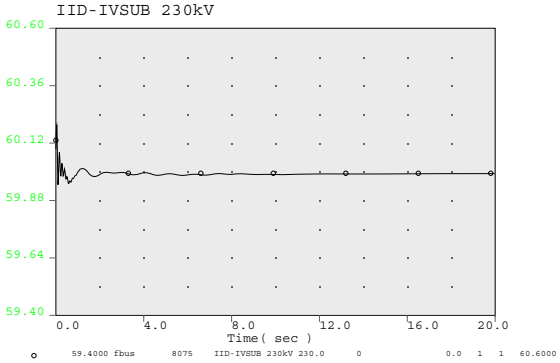
ROA-230kV



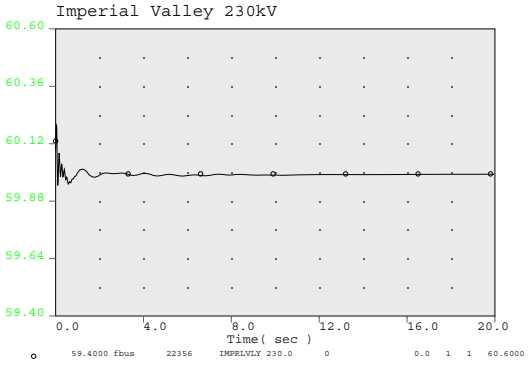
TJ1-230kV



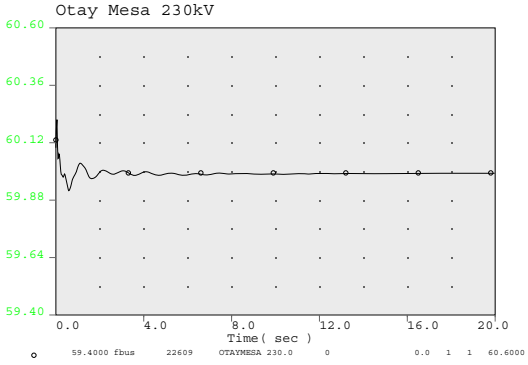
IID-IVSUB 230kV



Imperial Valley 230kV



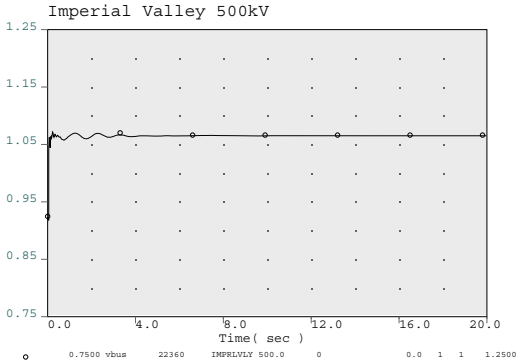
Otay Mesa 230kV



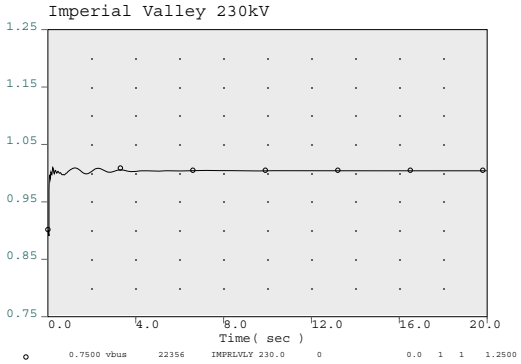
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

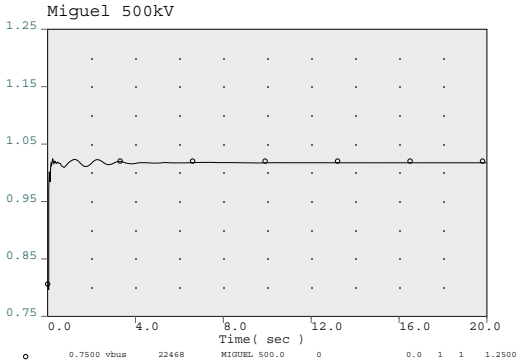
Imperial Valley 500kV



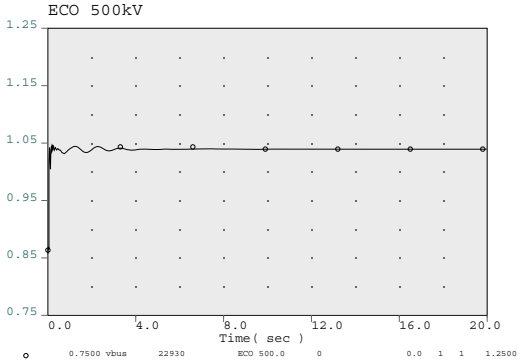
Imperial Valley 230kV



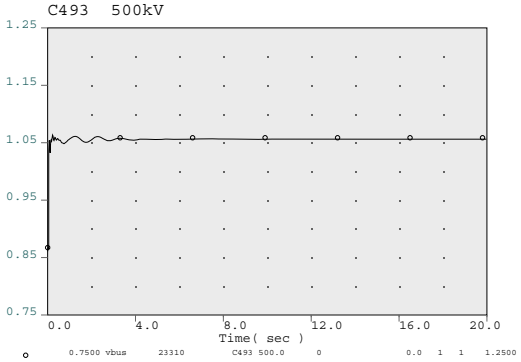
Miguel 500kV



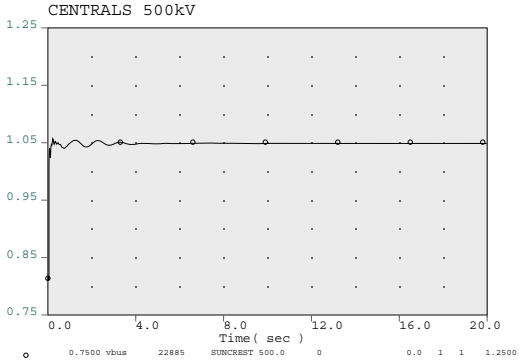
ECO 500kV



C493 500kV

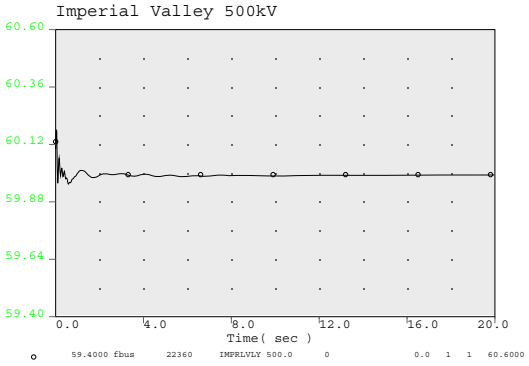


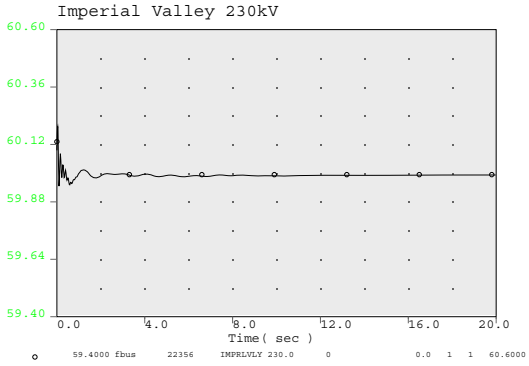
CENTRALS 500kV

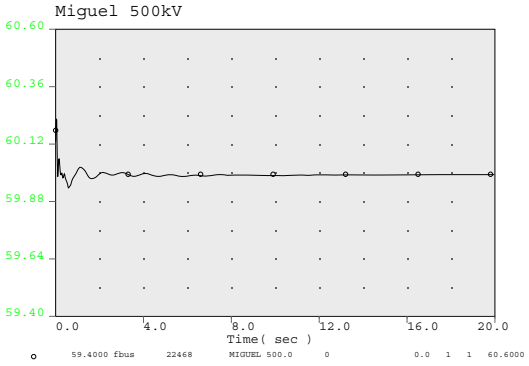


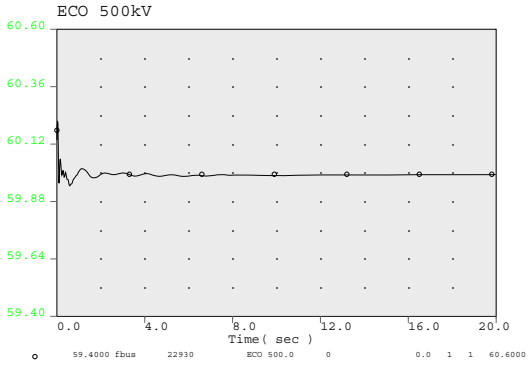
C1 C2 Heavy Summer Post With Upgrades

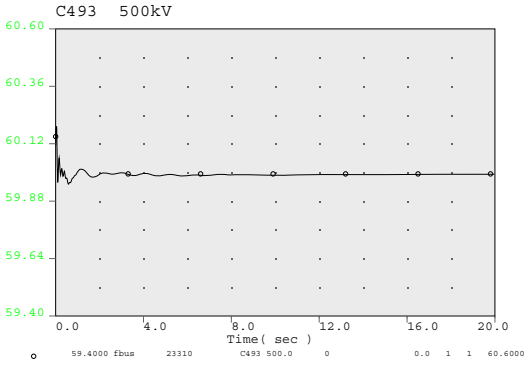
FREQUENCY

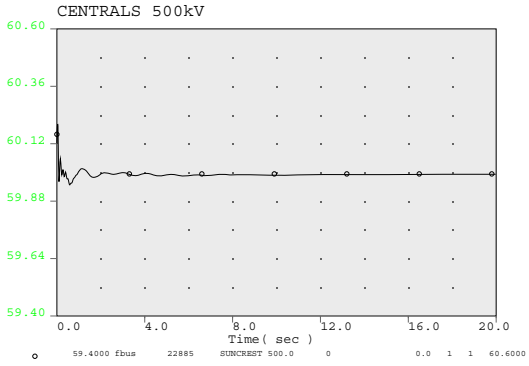






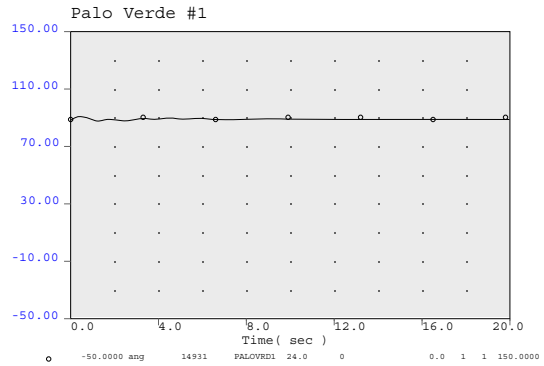


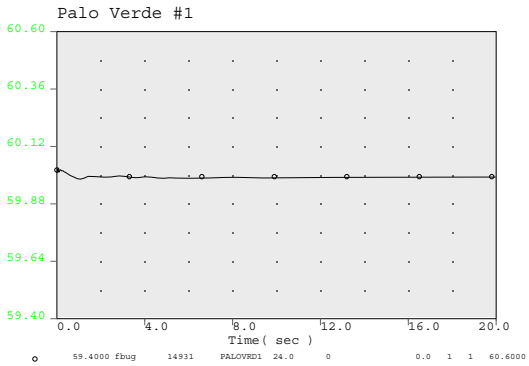


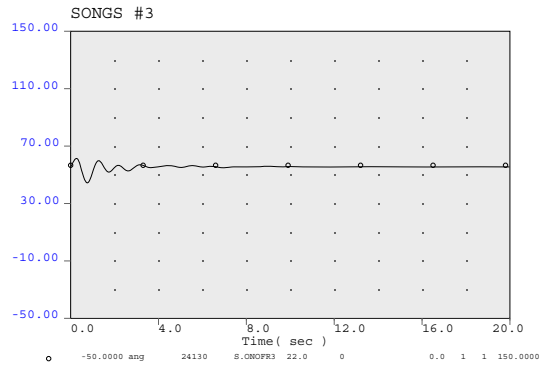


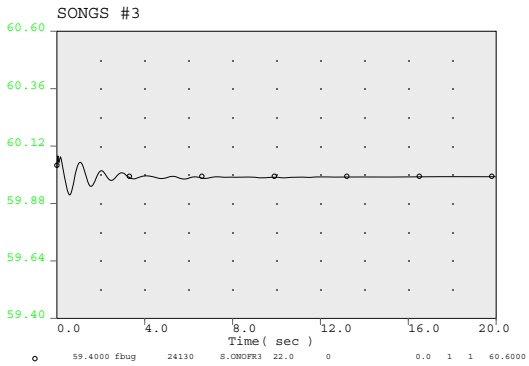
C1 C2 Heavy Summer Post With Upgrades

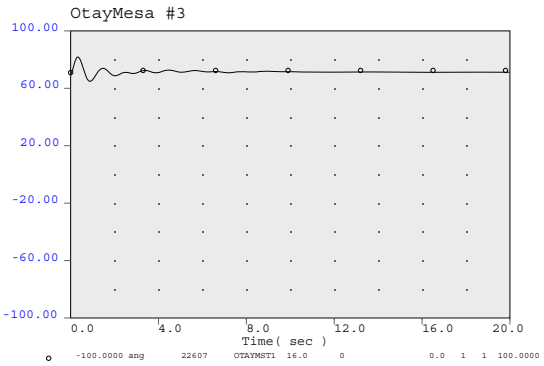
RELATIVE ROTOR ANGLE & FREQUENCY

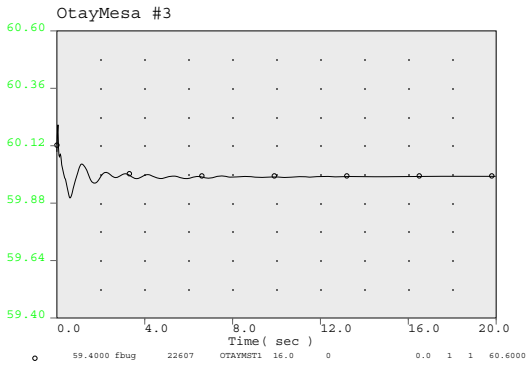












C1 C2 Heavy Summer Post With Upgrades

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RELATIVE VOLTAGE

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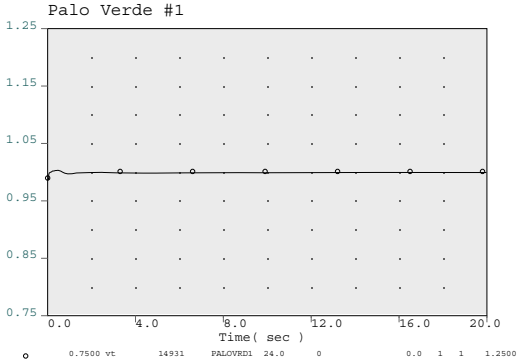
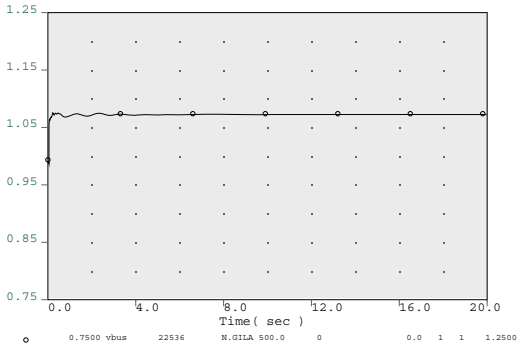


N Gila 500kV



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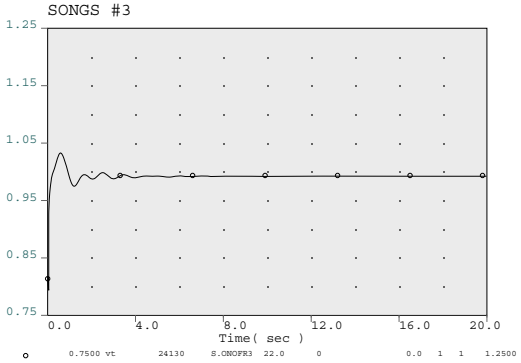
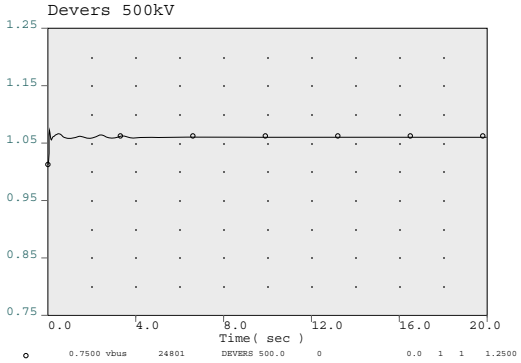
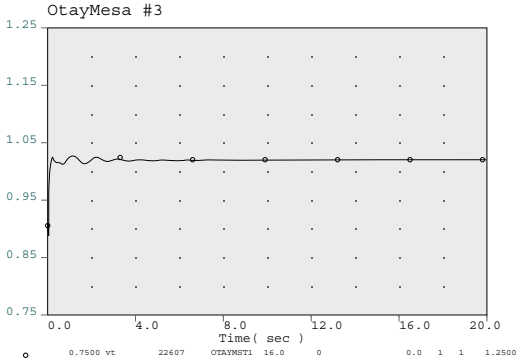


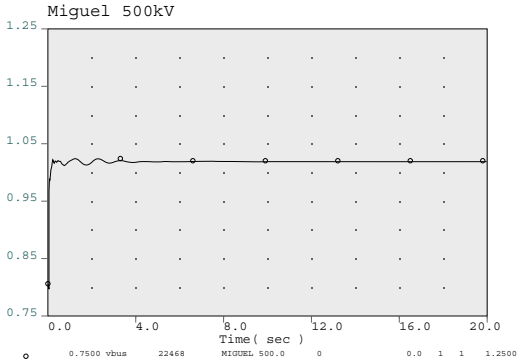
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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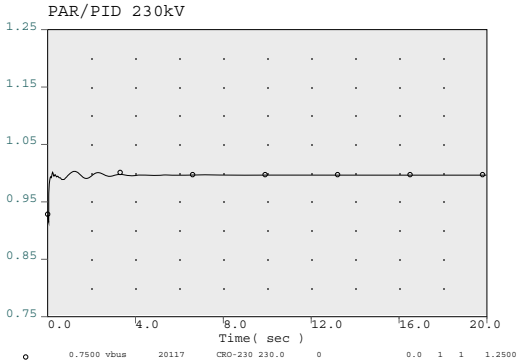
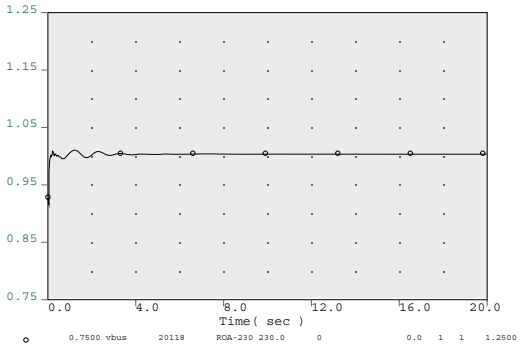
Affected System Voltage Check and Comparison

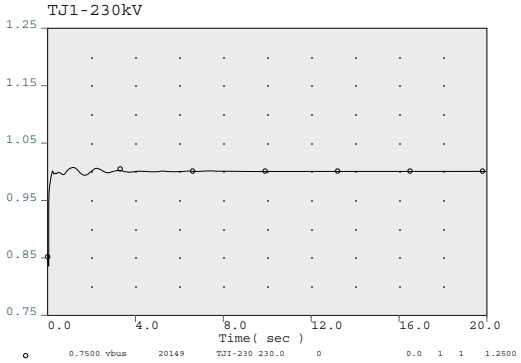
PAR/PID 230kV



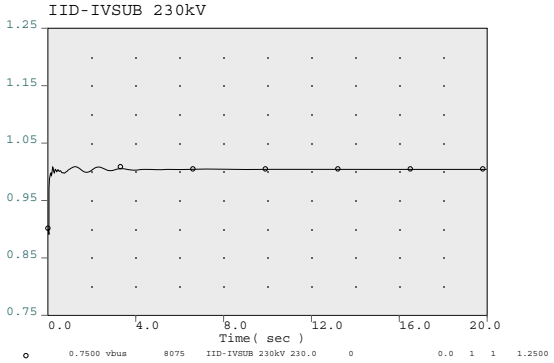
ROA-230kV



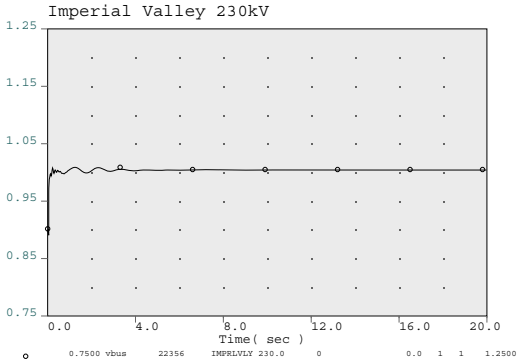
TJ1-230kV



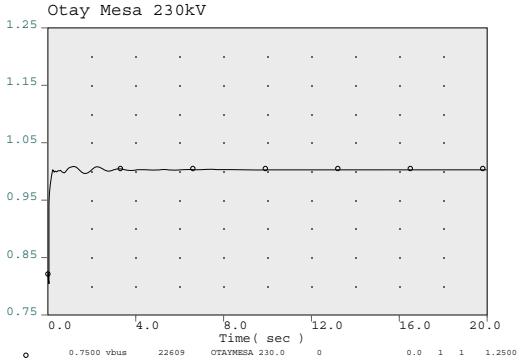
IID-IVSUB 230kV



Imperial Valley 230kV



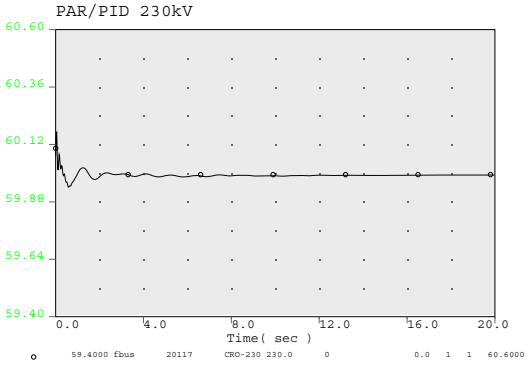
Otay Mesa 230kV



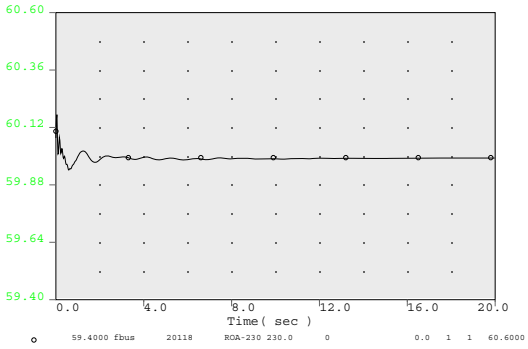
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

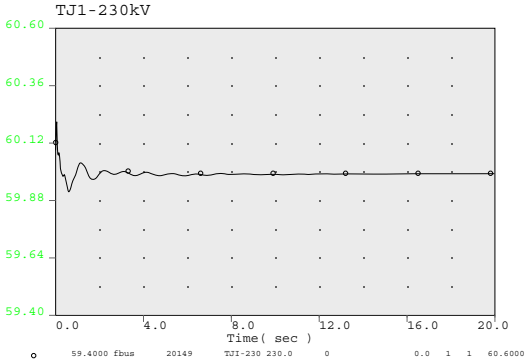
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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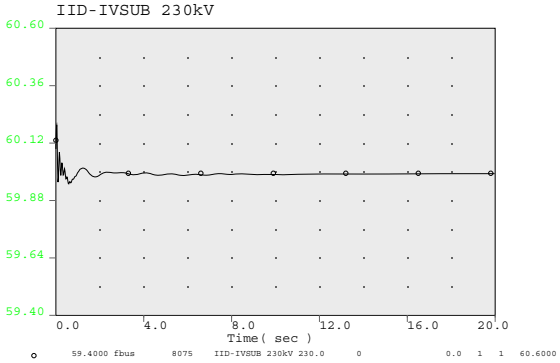
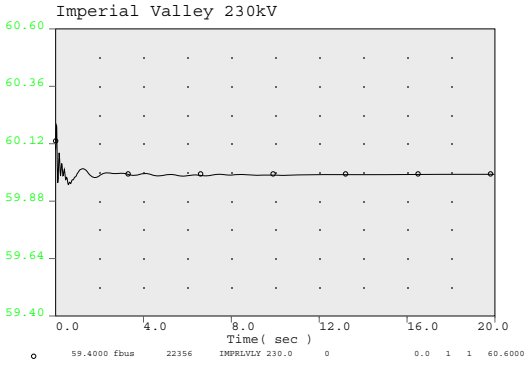


Imperial Valley 230kV



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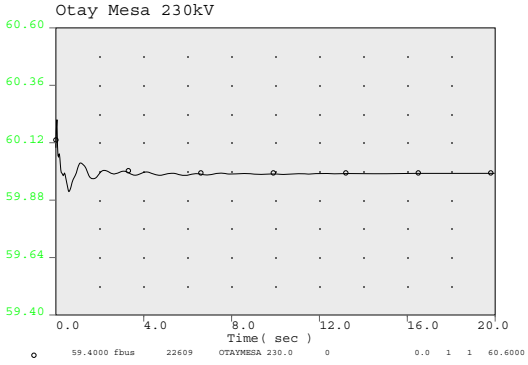
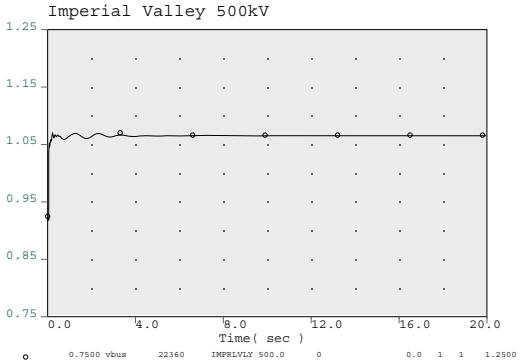


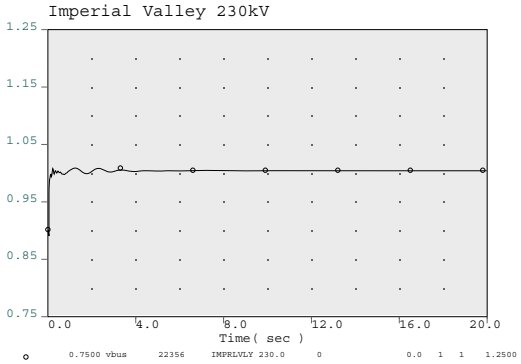
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

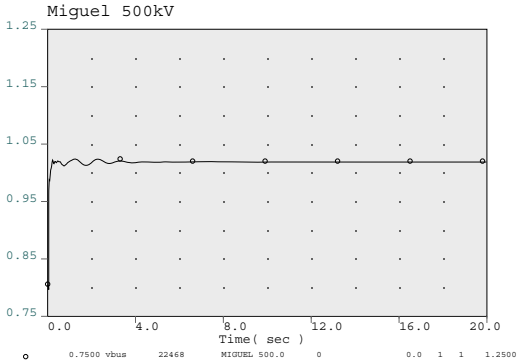
Imperial Valley 500kV



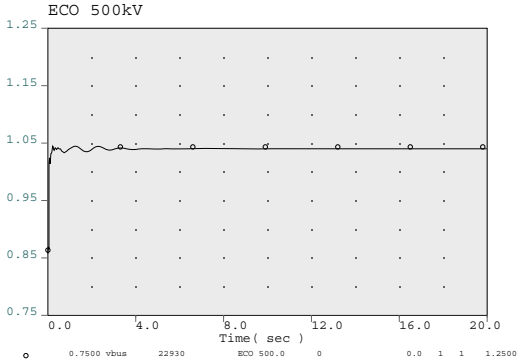
Imperial Valley 230kV



Miguel 500kV



ECO 500kV



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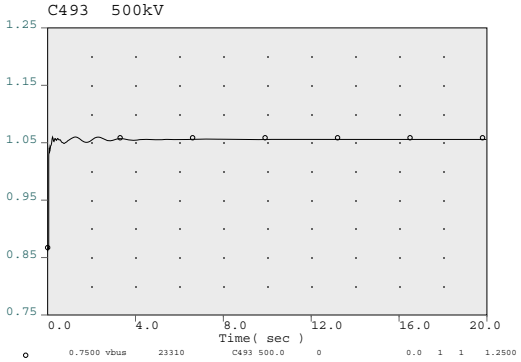
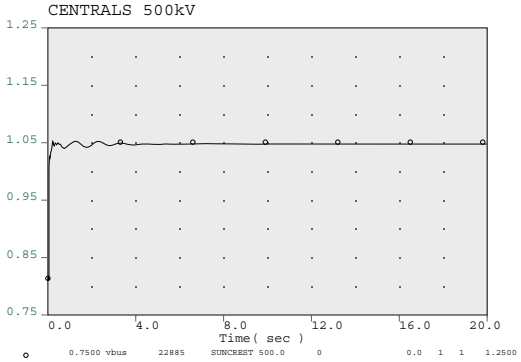


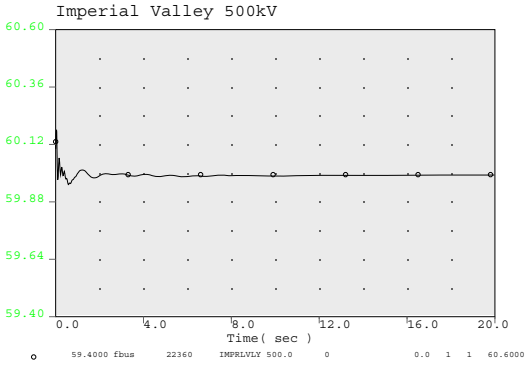
CENTRALS 500kV



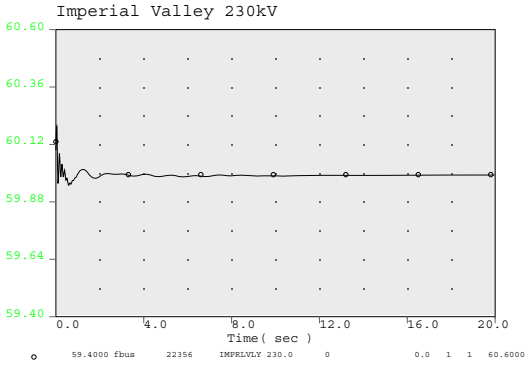
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

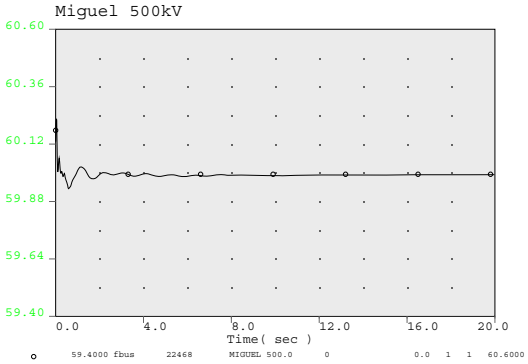
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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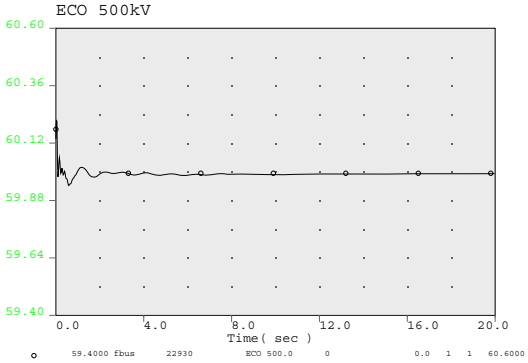

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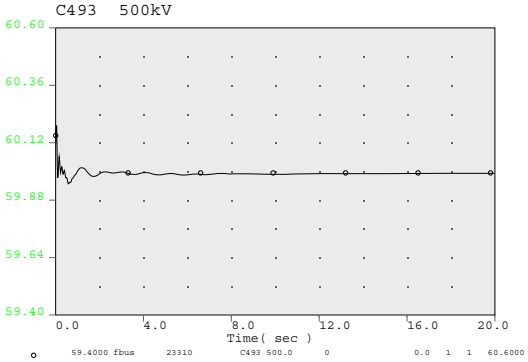
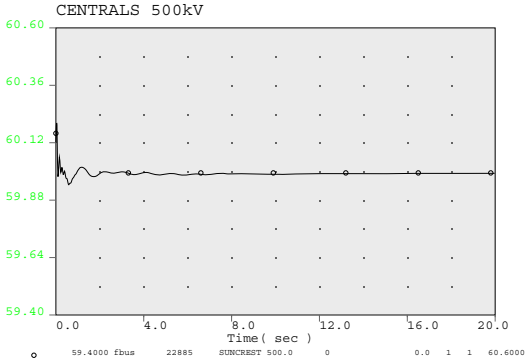
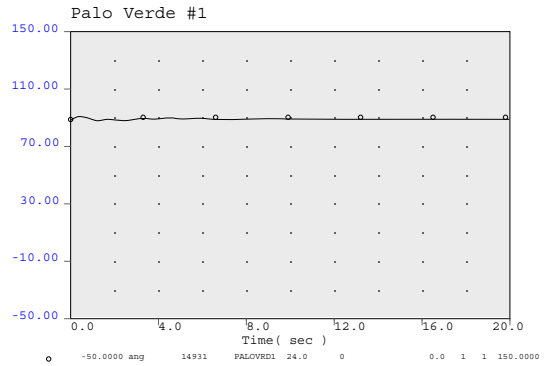


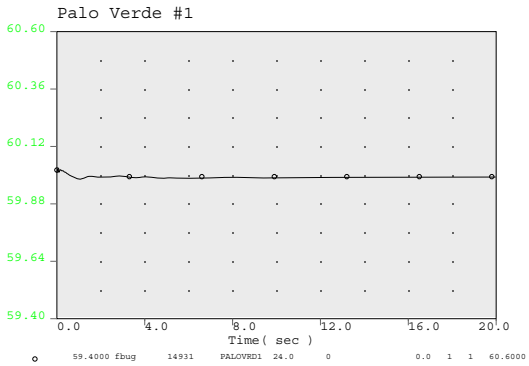
CENTRALS 500kV

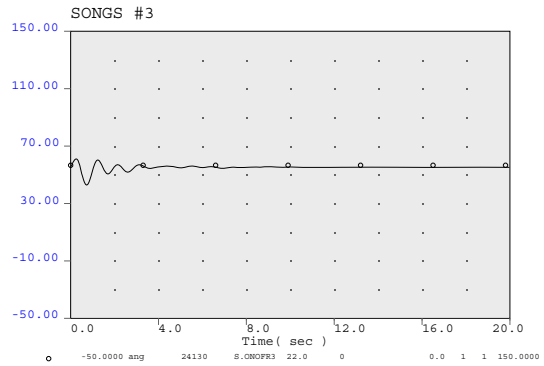


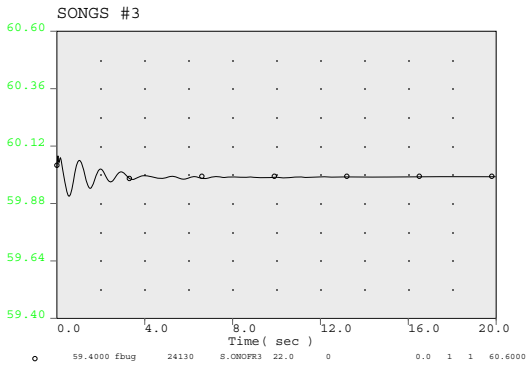
C1 C2 Heavy Summer Post With Upgrades

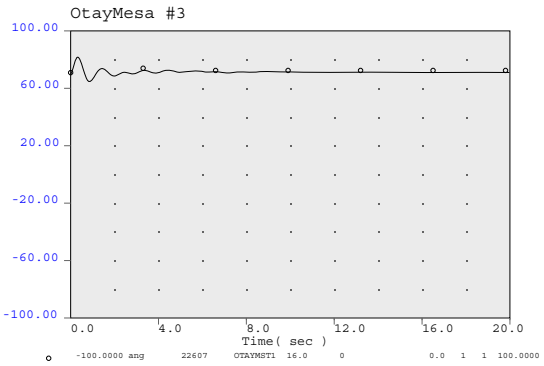
RELATIVE ROTOR ANGLE & FREQUENCY

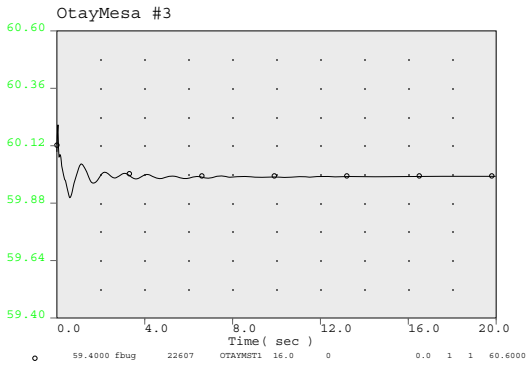












C1 C2 Heavy Summer Post With Upgrades

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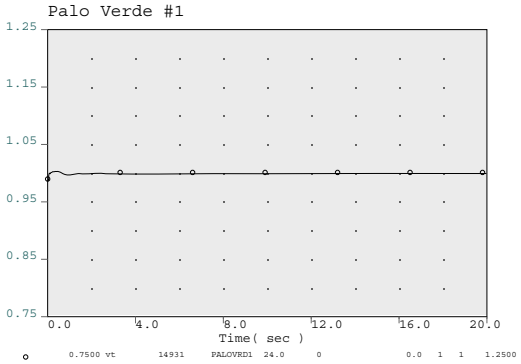
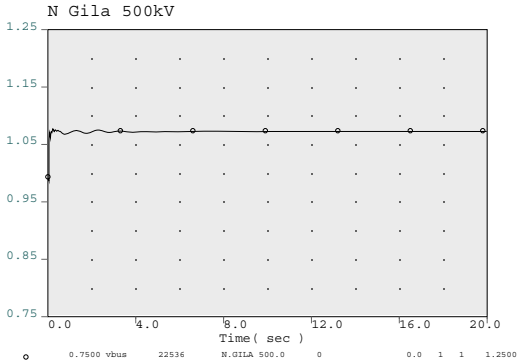
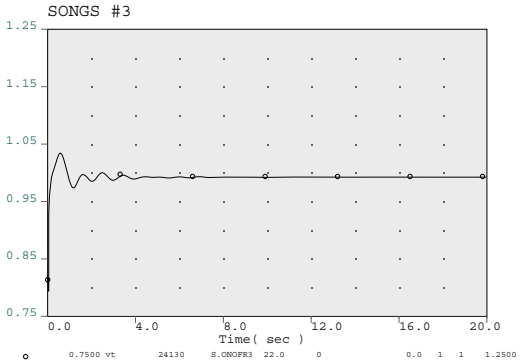
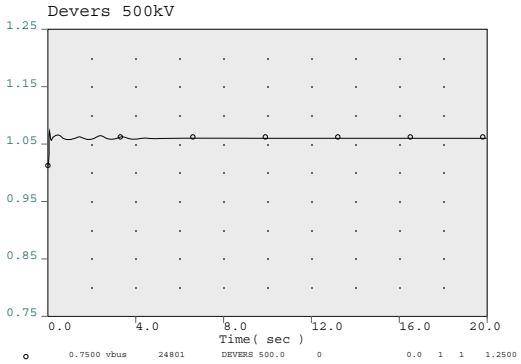
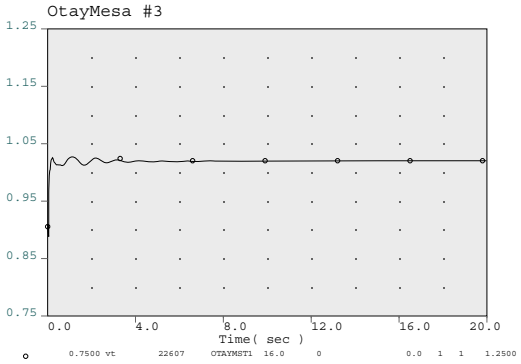
RELATIVE VOLTAGE

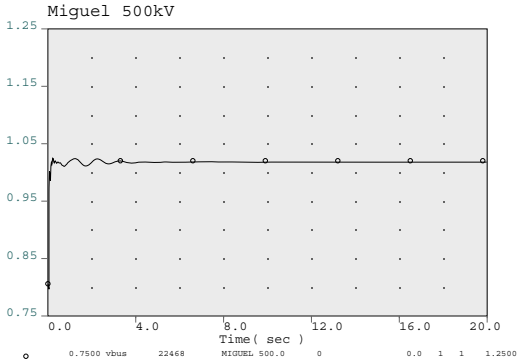












C1 C2 Heavy Summer Post With Upgrades

Page 2

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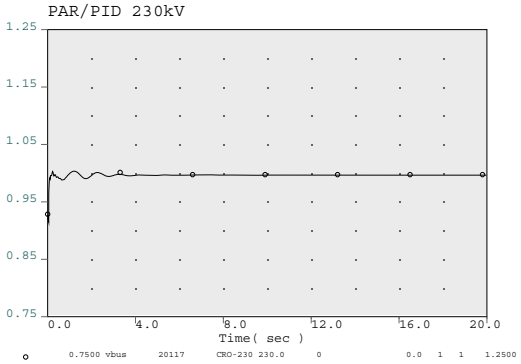
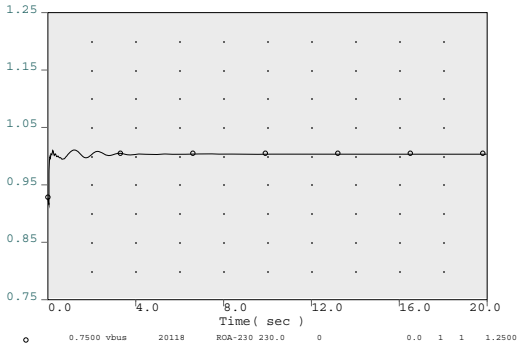
Affected System Voltage Check and Comparison

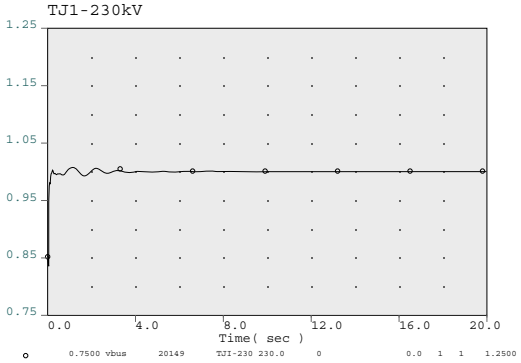
PAR/PID 230kV



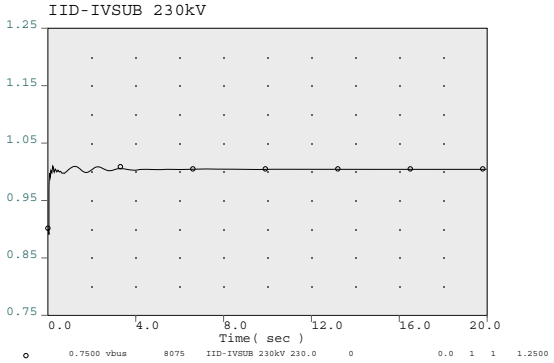
ROA-230kV



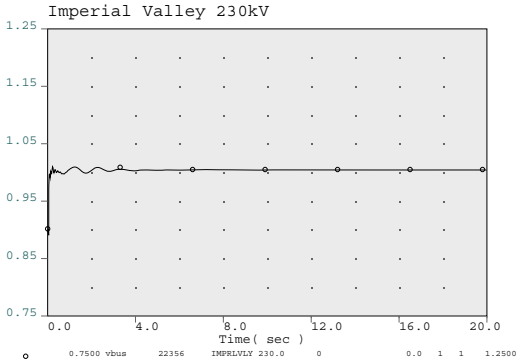
TJ1-230kV



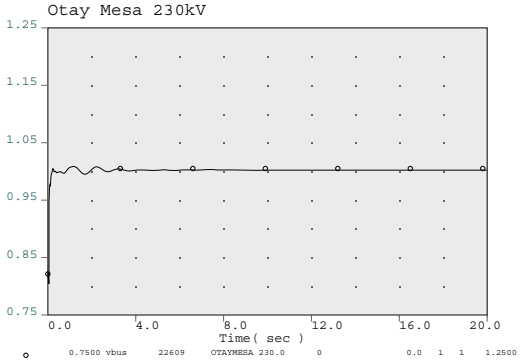
IID-IVSUB 230kV



Imperial Valley 230kV



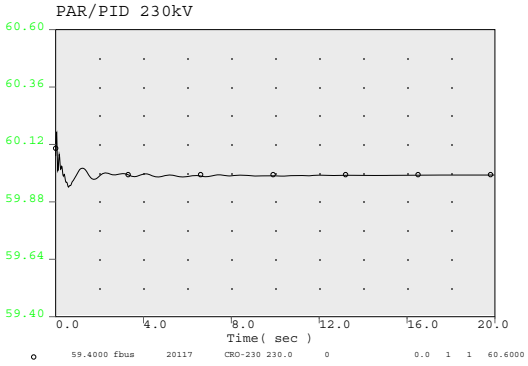
Otay Mesa 230kV



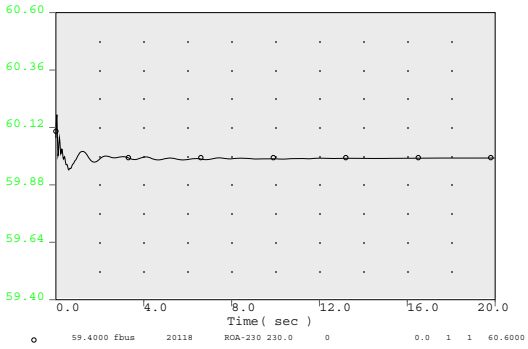
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

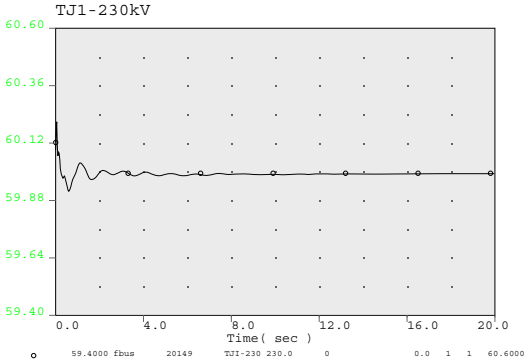
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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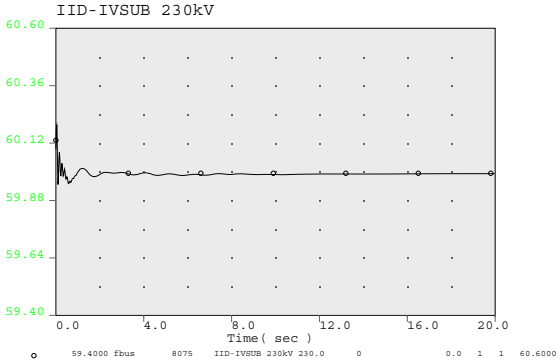
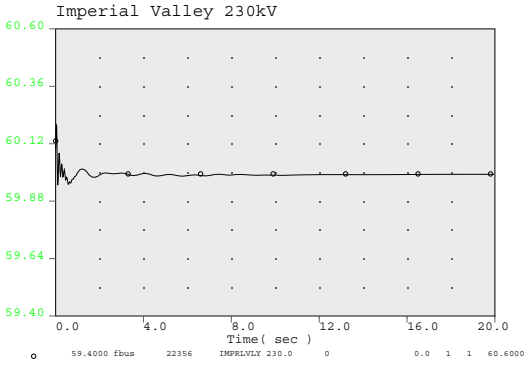
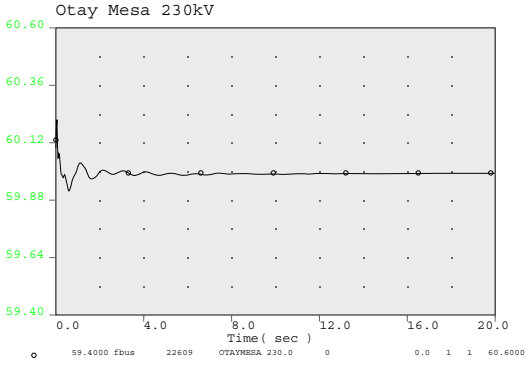


Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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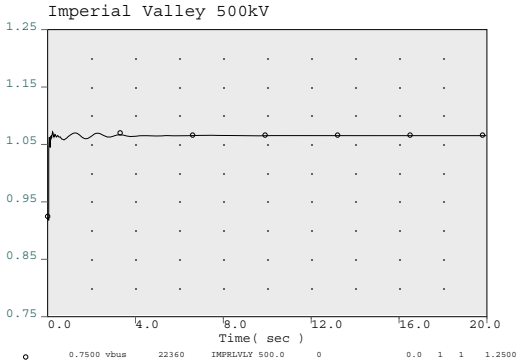
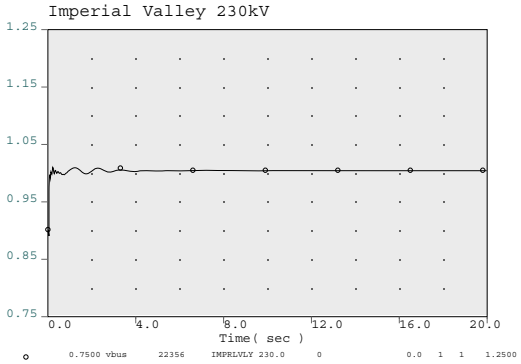
VOLTAGE

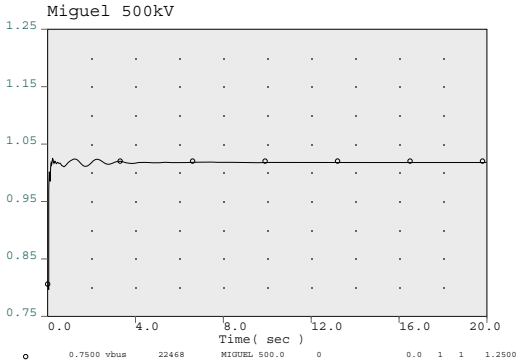
Imperial Valley 500kV



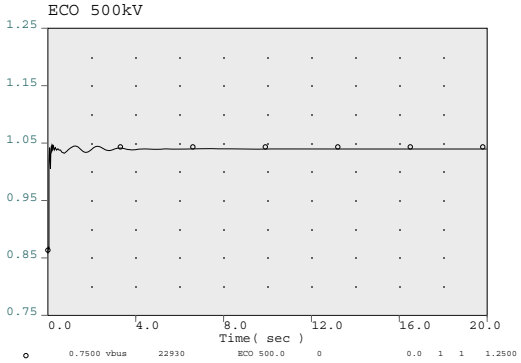
Imperial Valley 230kV



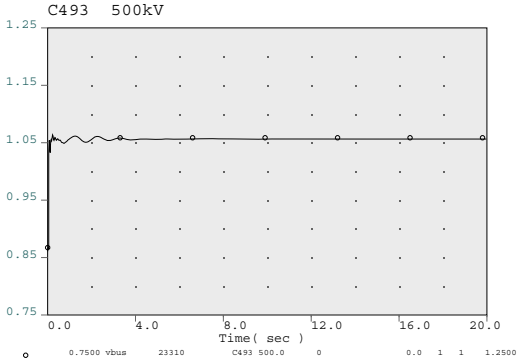
Miguel 500kV



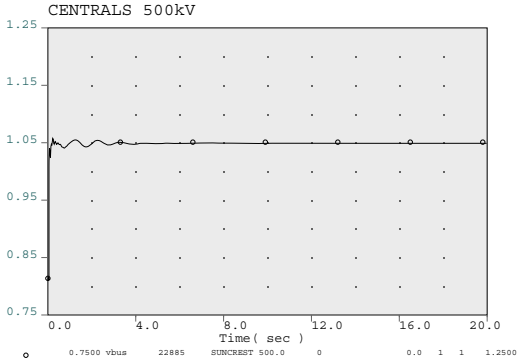
ECO 500kV



C493 500kV



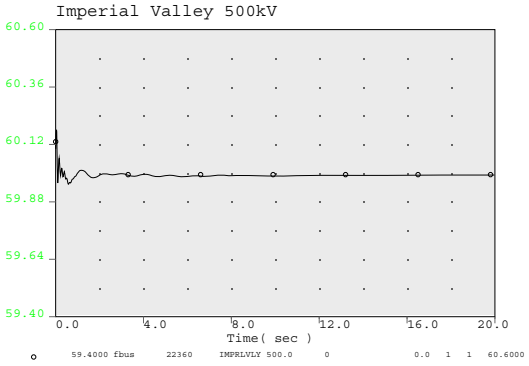
CENTRALS 500kV



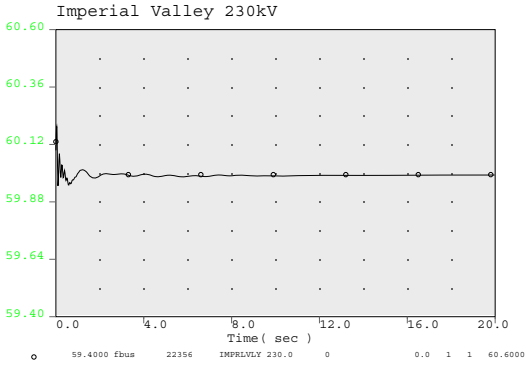
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

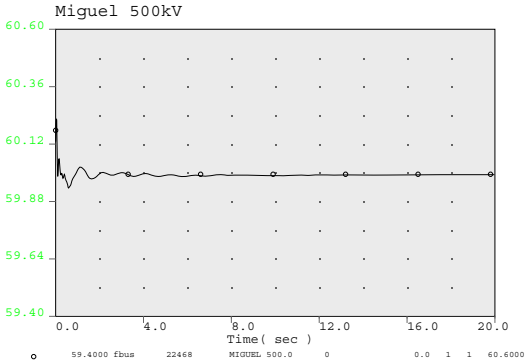
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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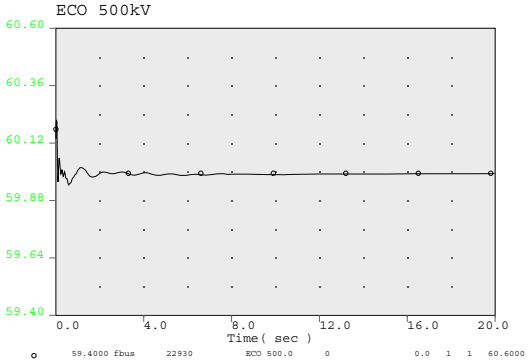

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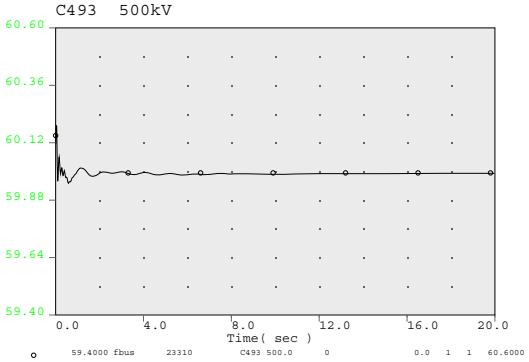
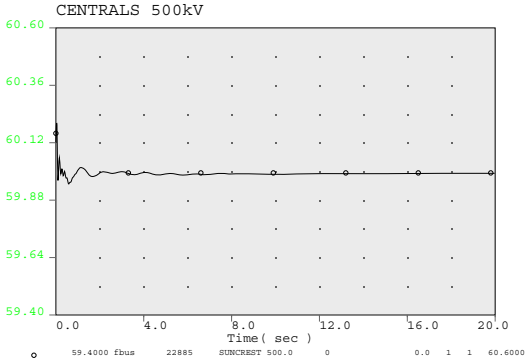
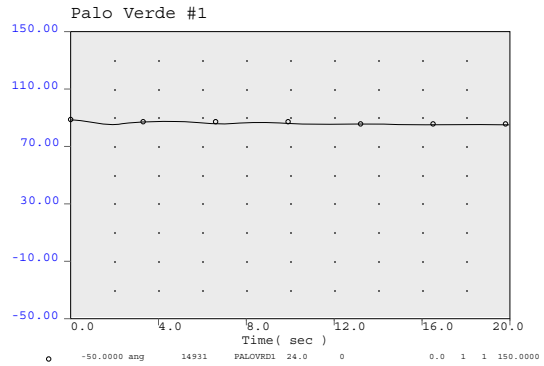


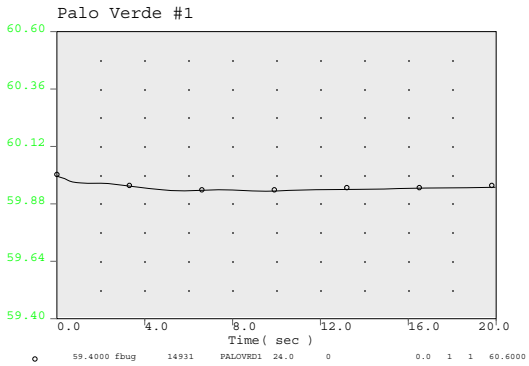
CENTRALS 500kV

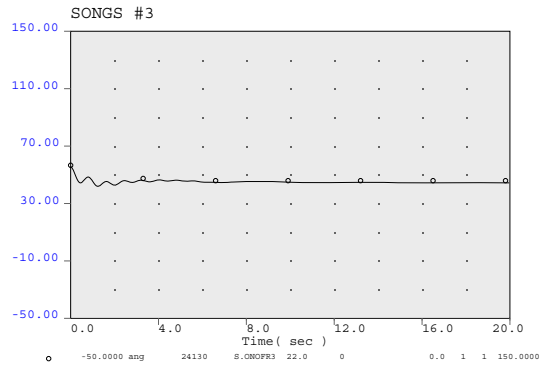


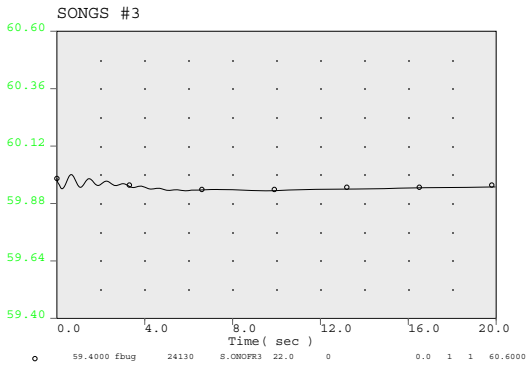
C1 C2 Heavy Summer Post With Upgrades

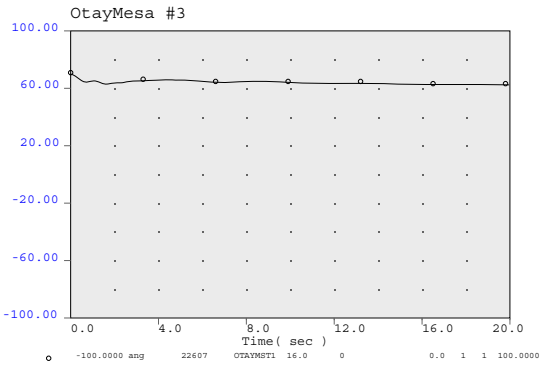
RELATIVE ROTOR ANGLE & FREQUENCY

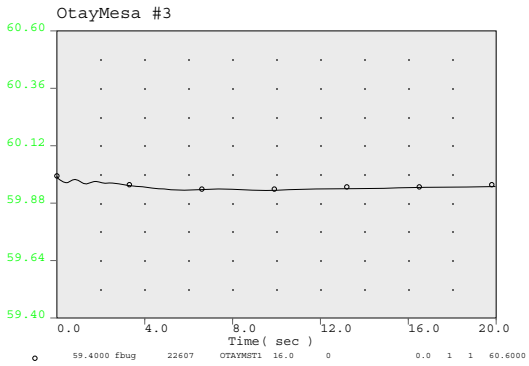












C1 C2 Heavy Summer Post With Upgrades

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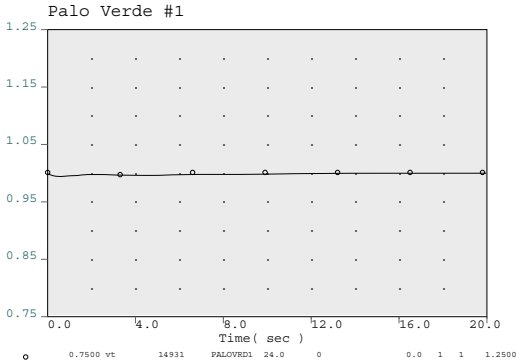
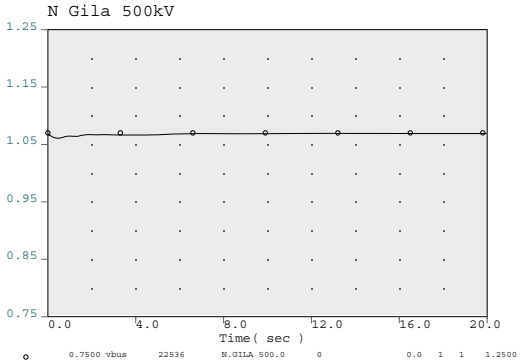
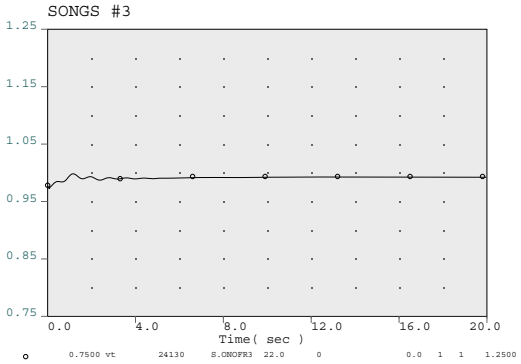
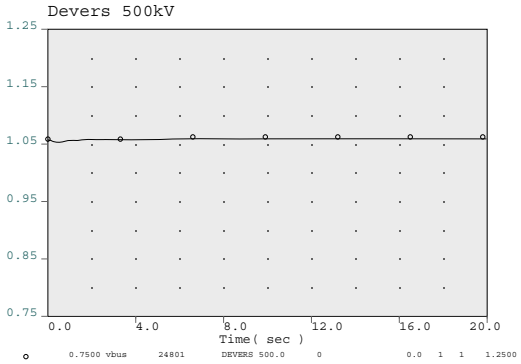
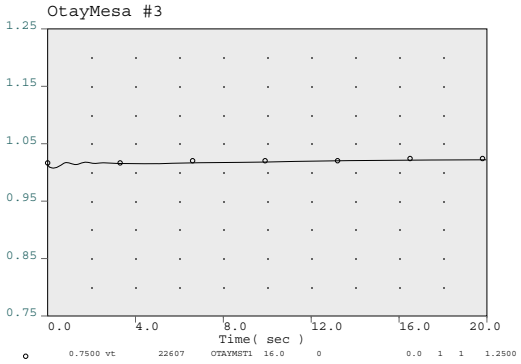
RELATIVE VOLTAGE

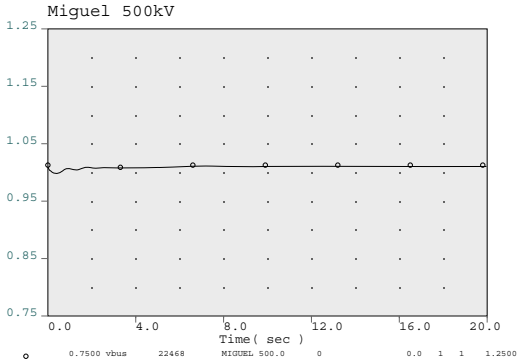












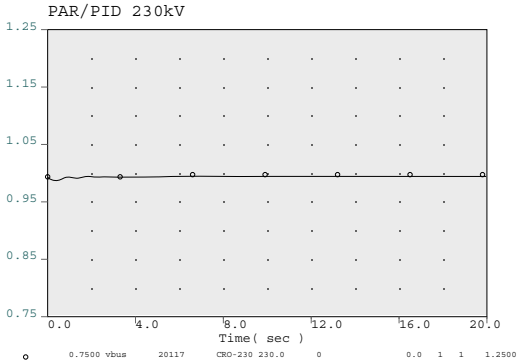
C1 C2 Heavy Summer Post With Upgrades

Page 2

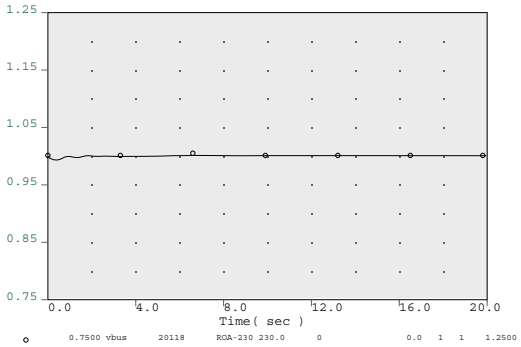
SDGE A Sempra Energy utility	tran-c1c2-hs-pstup-r15_SONG-g1.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:43:20 2011

Affected System Voltage Check and Comparison

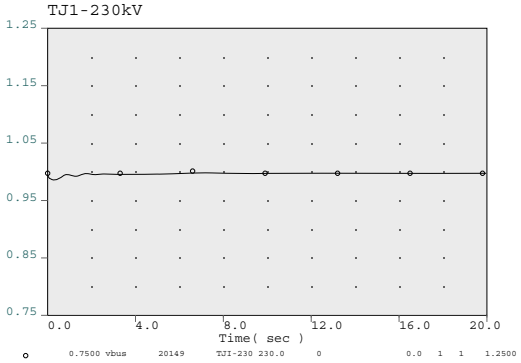
PAR/PID 230kV



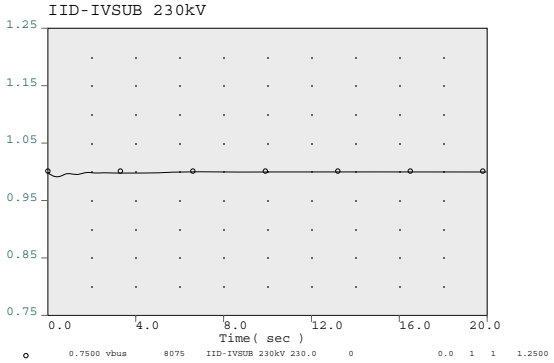
ROA-230kV



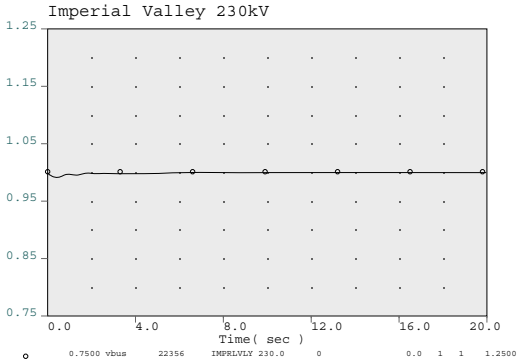
TJ1-230kV



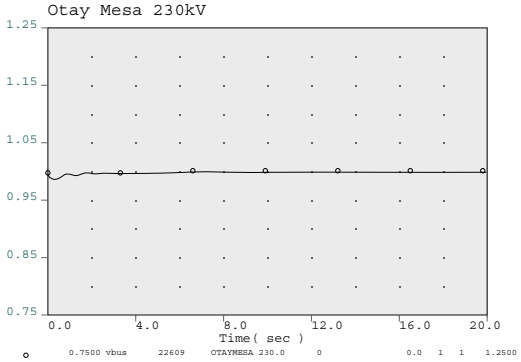
IID-IVSUB 230kV



Imperial Valley 230kV



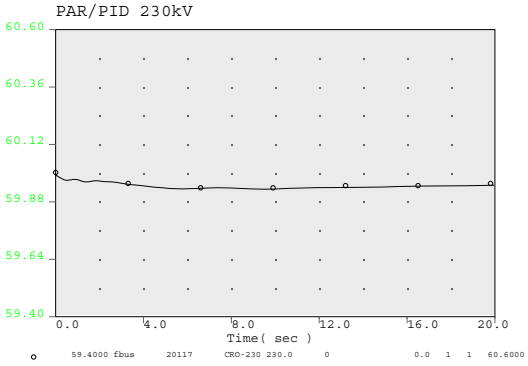
Otay Mesa 230kV



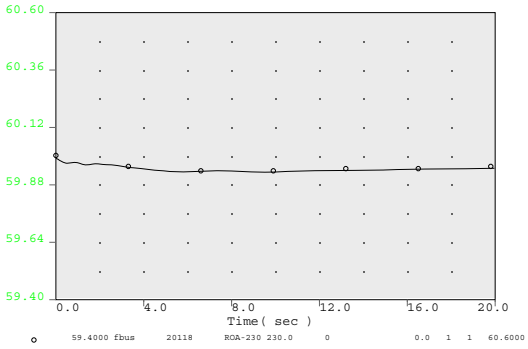
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

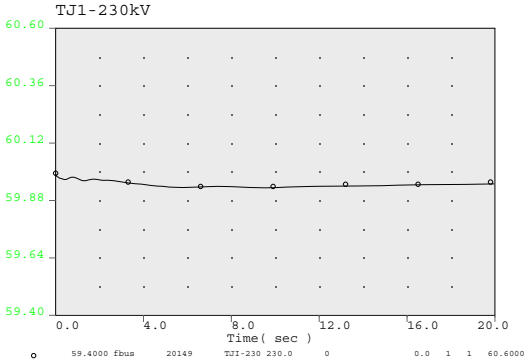
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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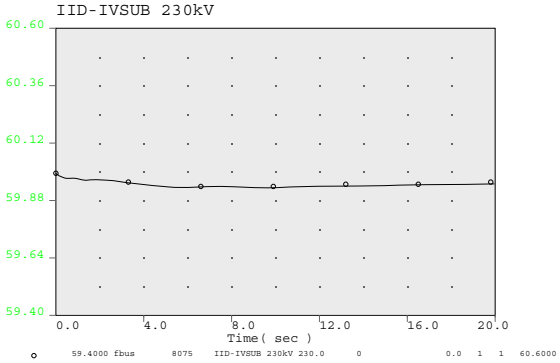
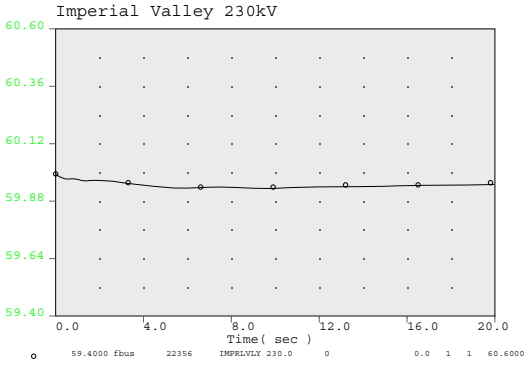
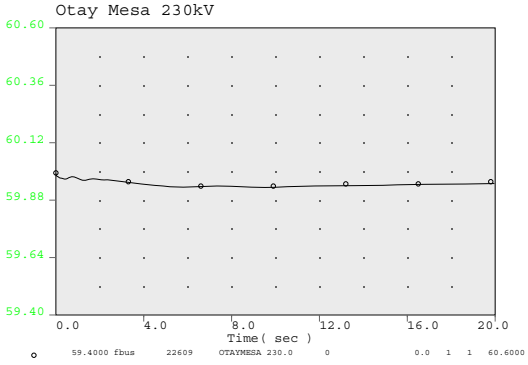


Imperial Valley 230kV



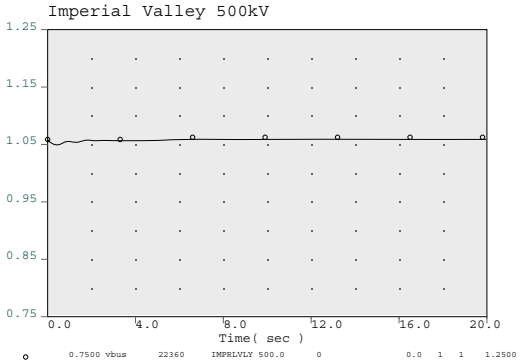
Otay Mesa 230kV



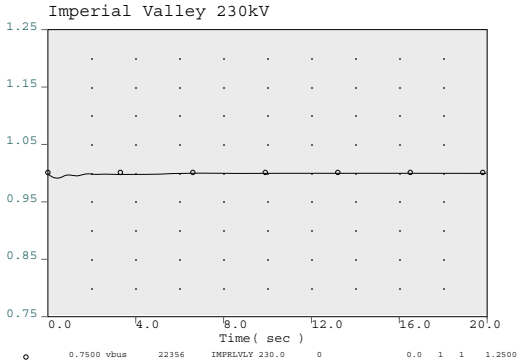
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

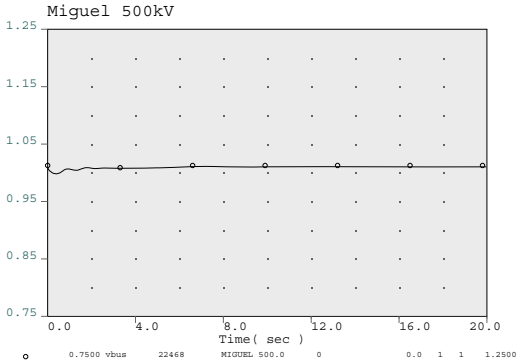
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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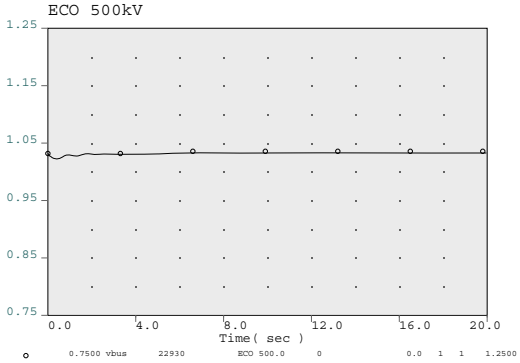
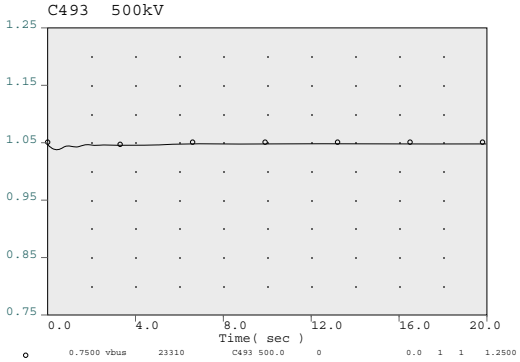


C493 500kV



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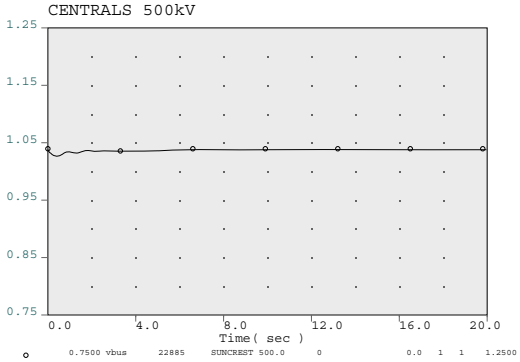
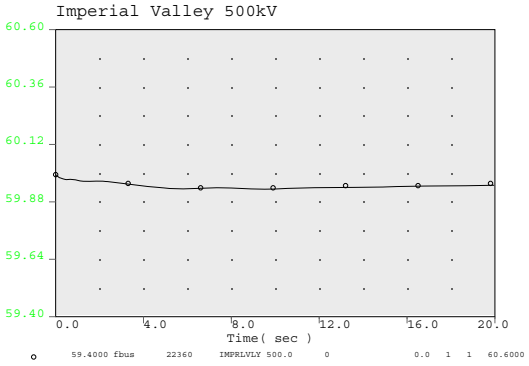


C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

Imperial Valley 500kV



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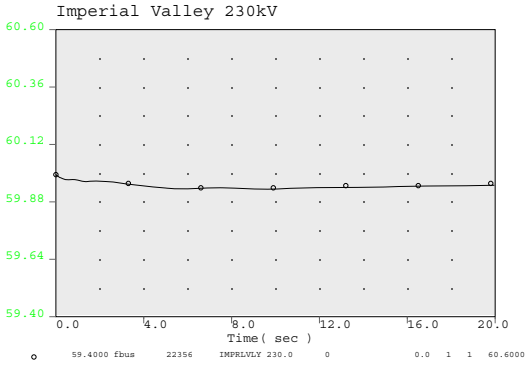

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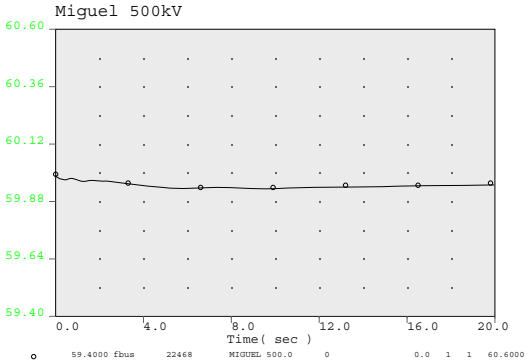

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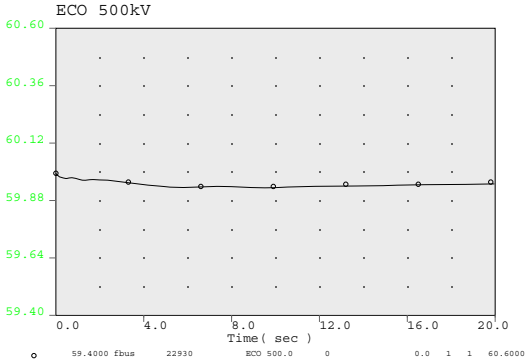

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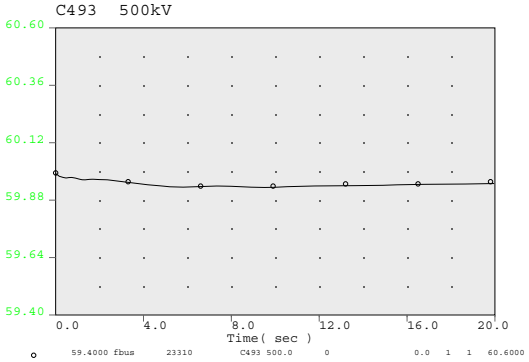

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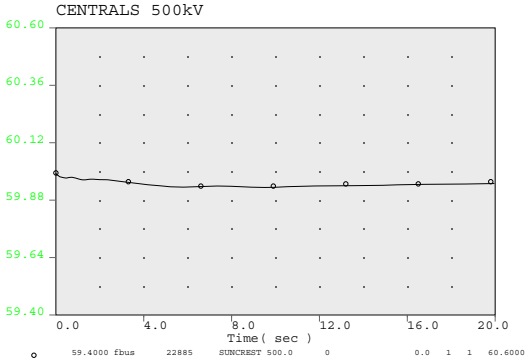
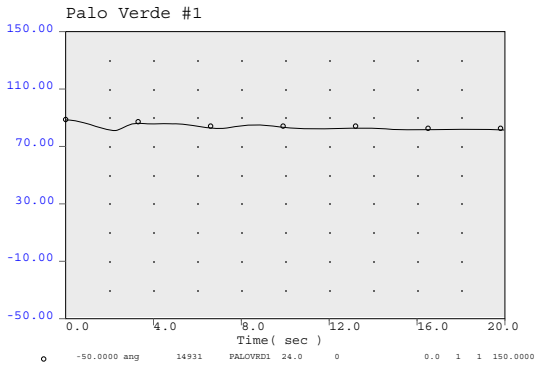
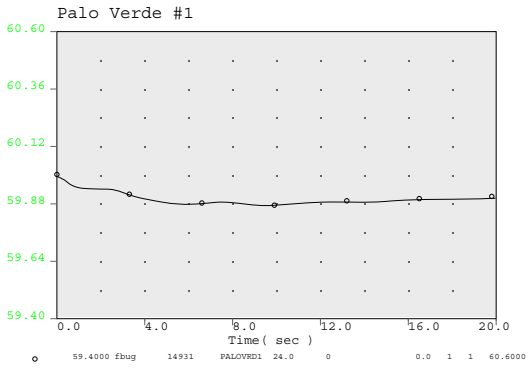
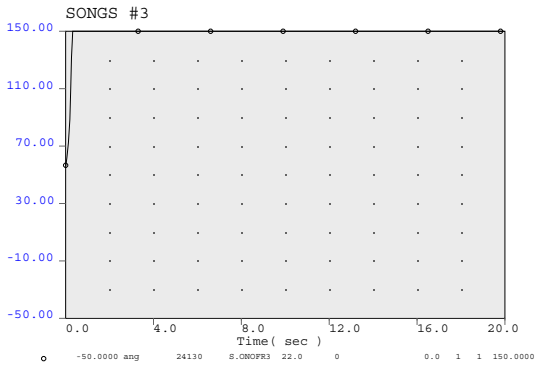


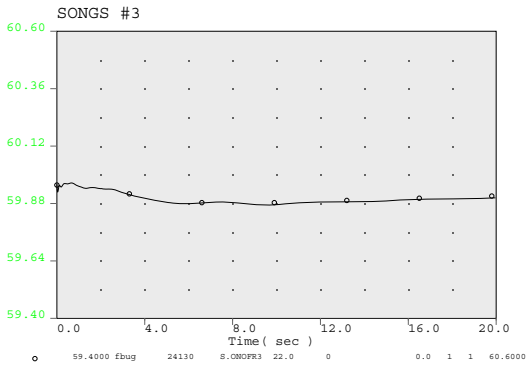
C1 C2 Heavy Summer Post With Upgrades

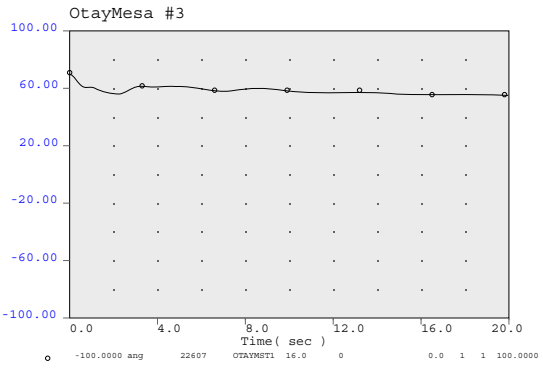
RELATIVE ROTOR ANGLE & FREQUENCY

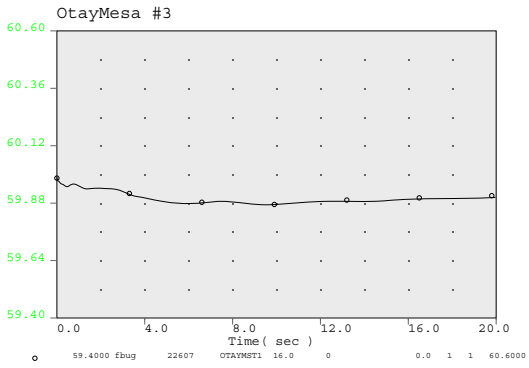












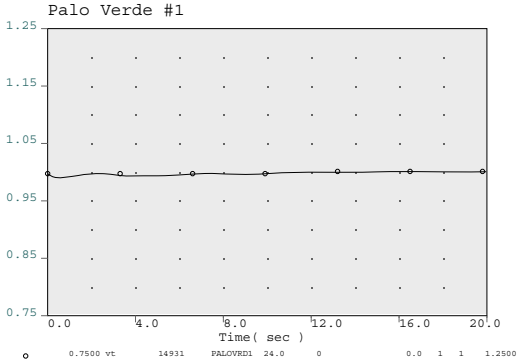
C1 C2 Heavy Summer Post With Upgrades

Page 1

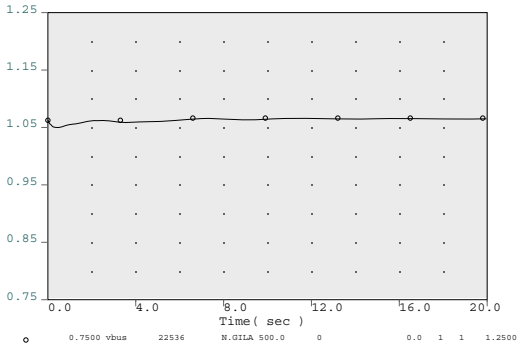
SDGE A Sempra Energy utility	tran-c1c2-hs-pstup-r15_SONGS-g2.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:44:30 2011

RELATIVE VOLTAGE

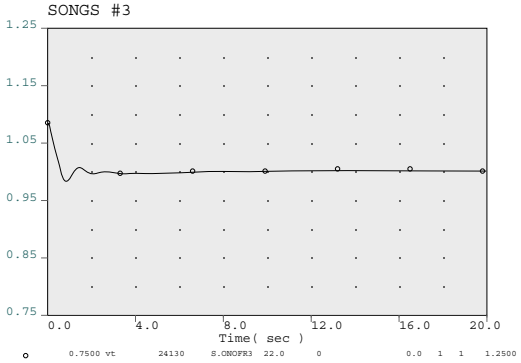
Palo Verde #1



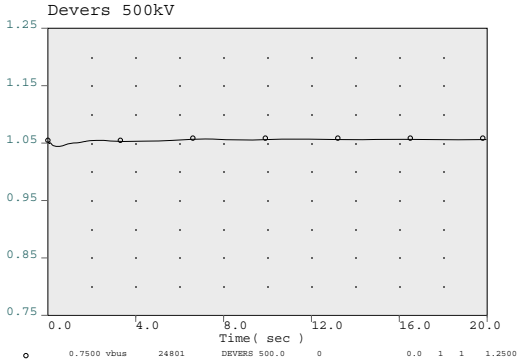
N Gila 500kV



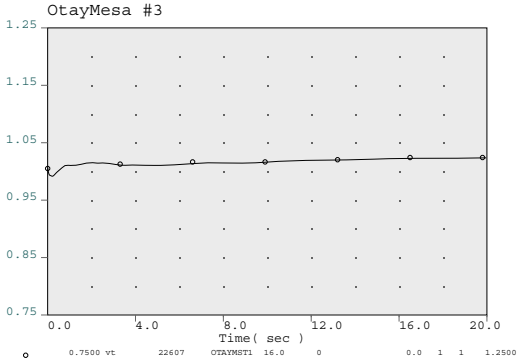
SONGS #3



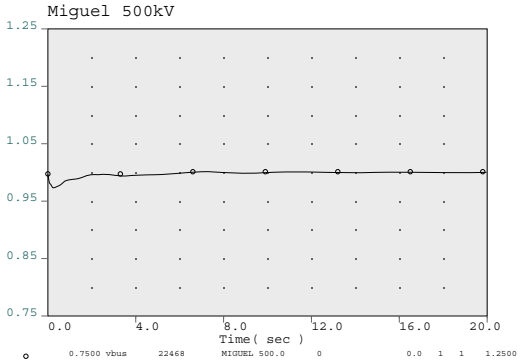
Devers 500kV



OtayMesa #3



Miguel 500kV



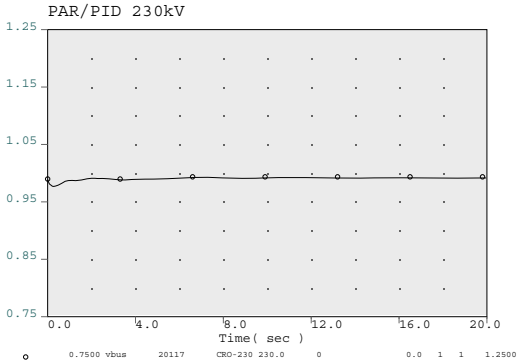
C1 C2 Heavy Summer Post With Upgrades

Page 2

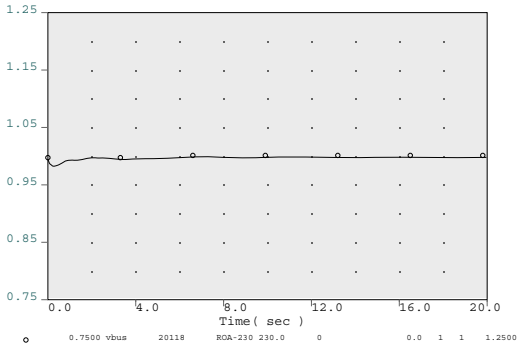
SDGE	tran-c1c2-hs-pstup-r15_SONGS-g2.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:44:30 2011

Affected System Voltage Check and Comparison

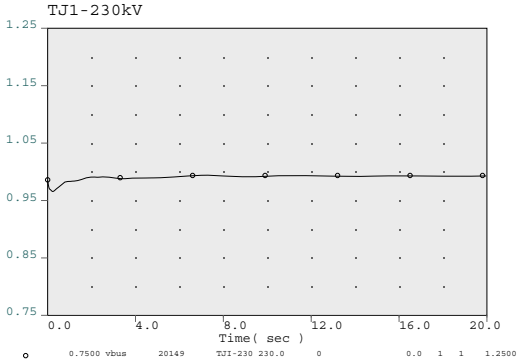
PAR/PID 230kV



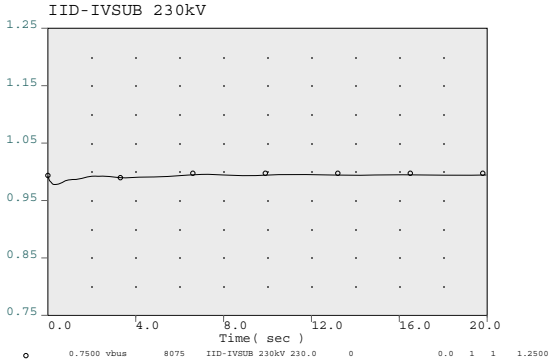
ROA-230kV



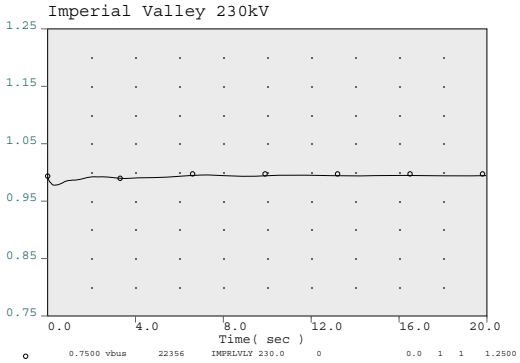
TJ1-230kV



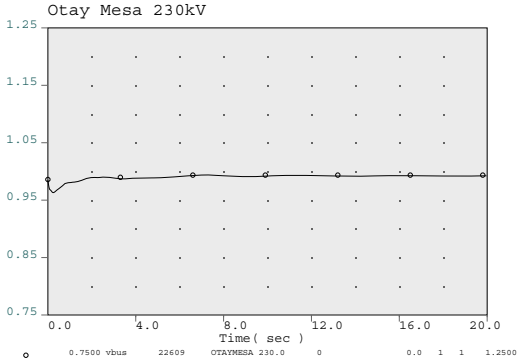
IID-IVSUB 230kV



Imperial Valley 230kV



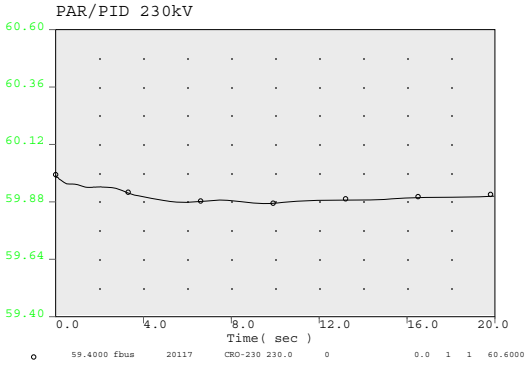
Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

PAR/PID 230kV



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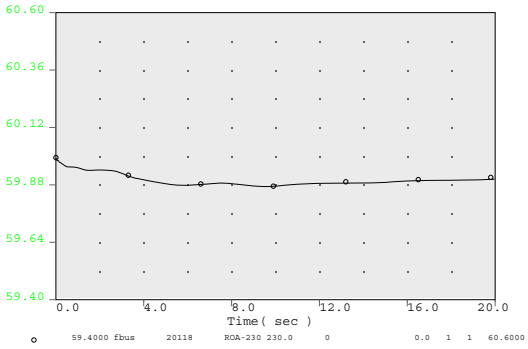

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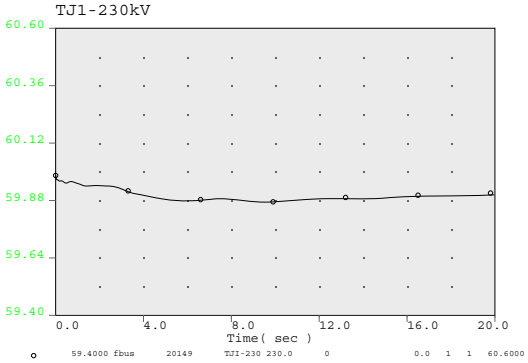

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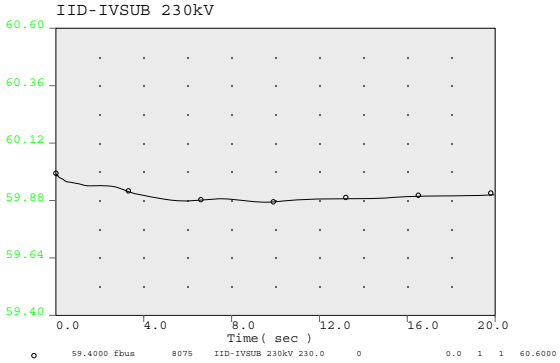
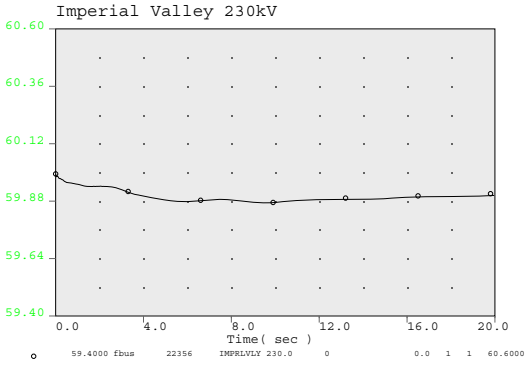


Imperial Valley 230kV



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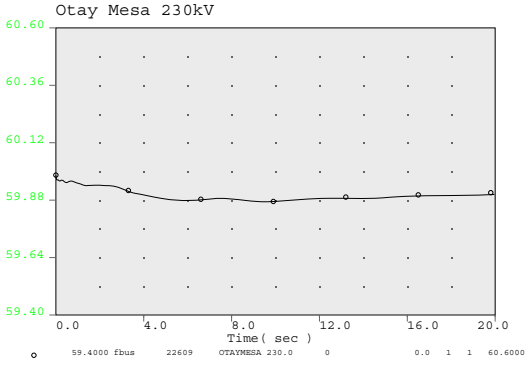
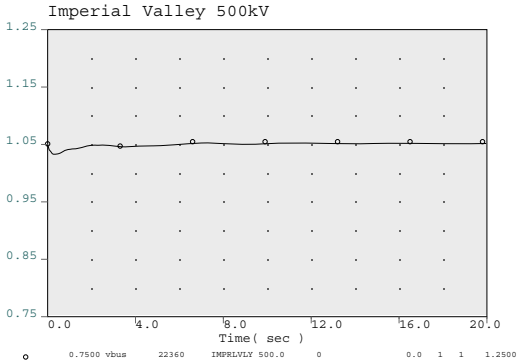


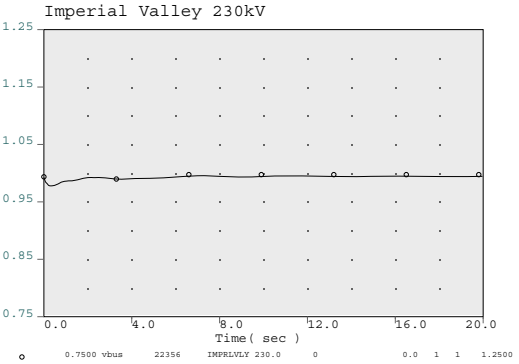
C1 C2 Heavy Summer Post With Upgrades

VOLTAGE

Imperial Valley 500kV



Imperial Valley 230kV



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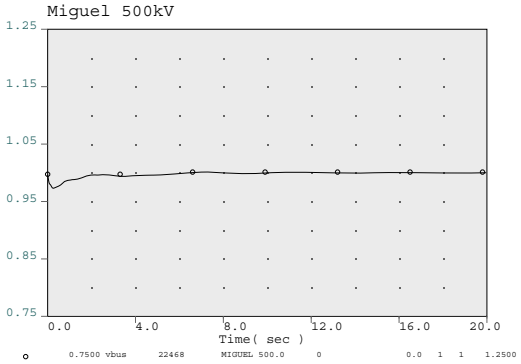
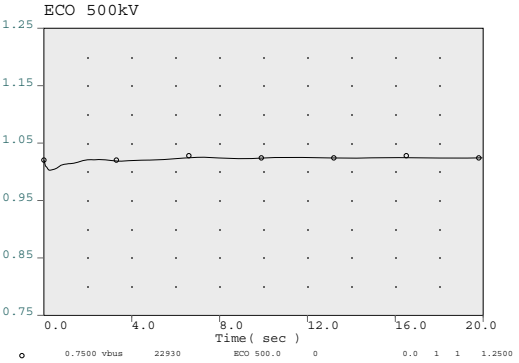
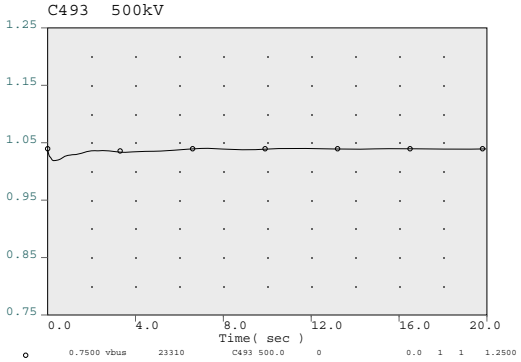


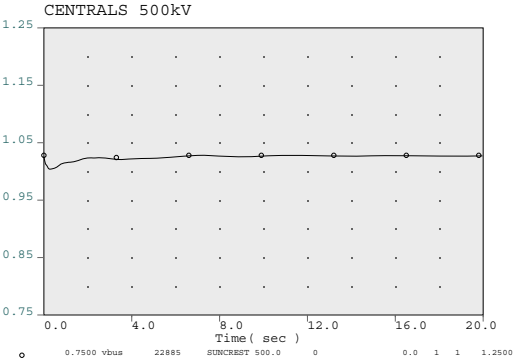
ECO 500kV



C493 500kV



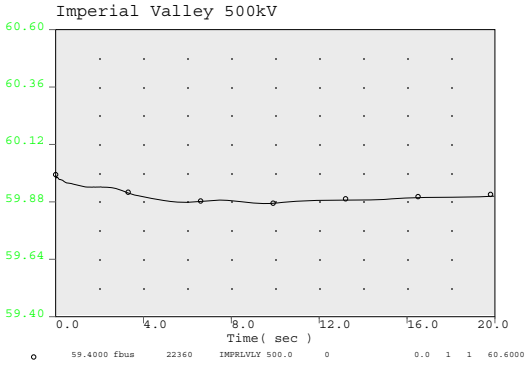
CENTRALS 500kV



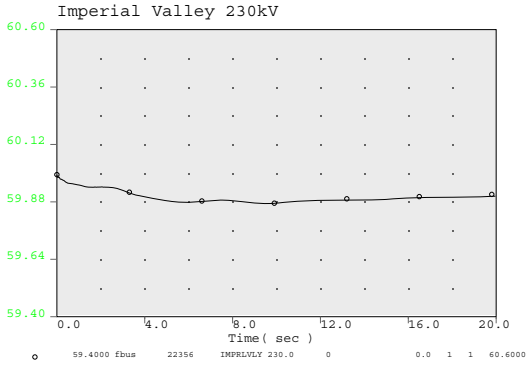
C1 C2 Heavy Summer Post With Upgrades

FREQUENCY

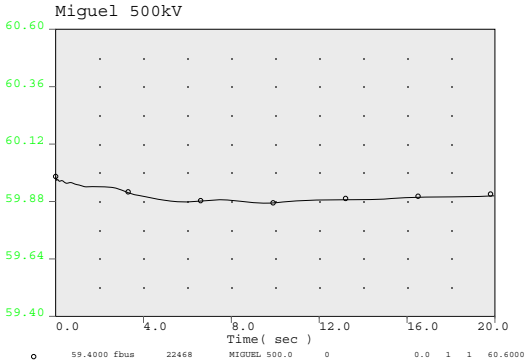
Imperial Valley 500kV



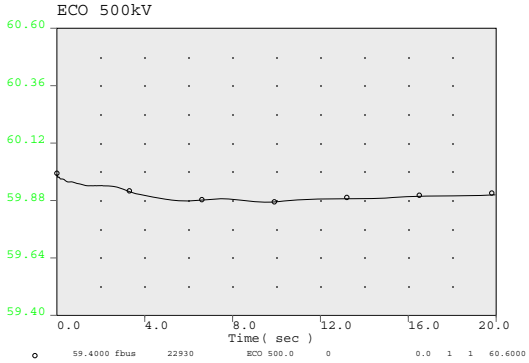
Imperial Valley 230kV



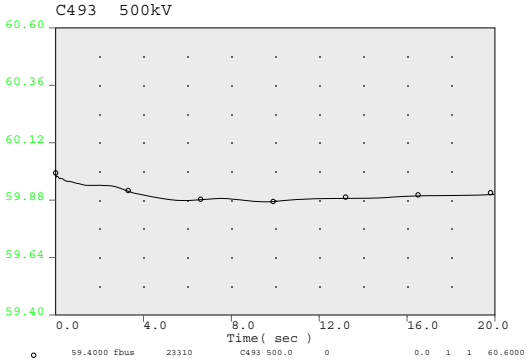
Miguel 500kV



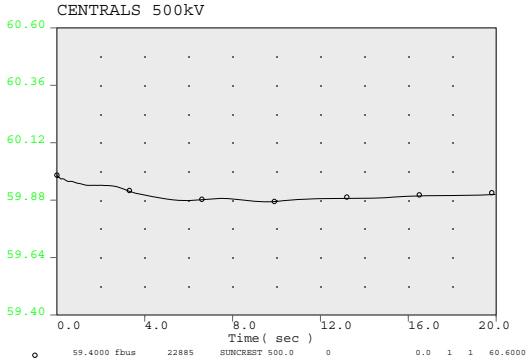
ECO 500kV



C493 500kV

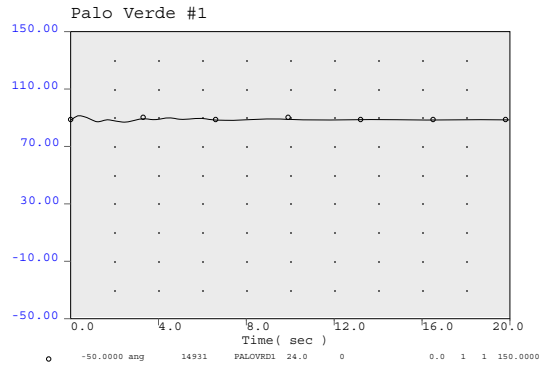


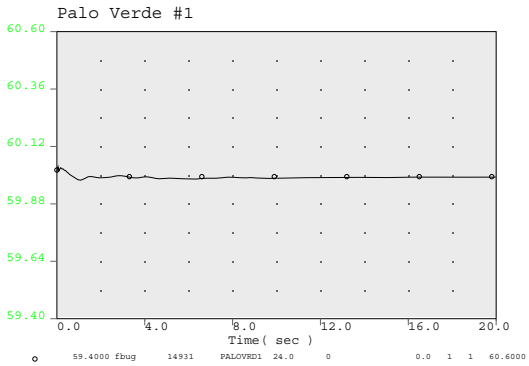
CENTRALS 500kV

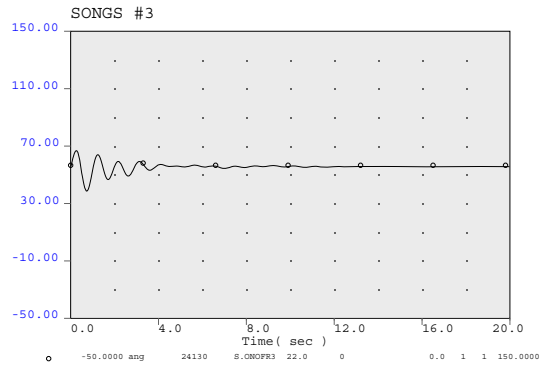


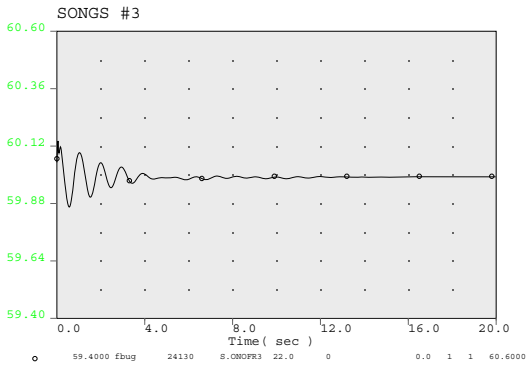
C1 C2 Heavy Summer Post With Upgrades

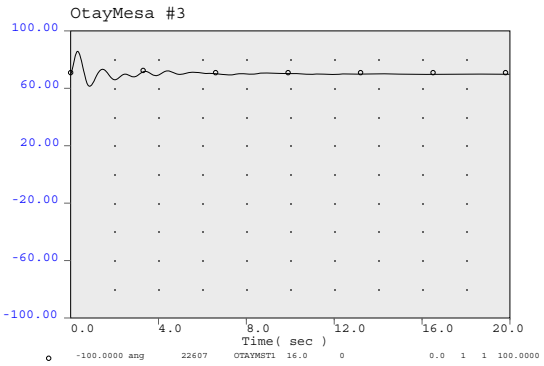
RELATIVE ROTOR ANGLE & FREQUENCY

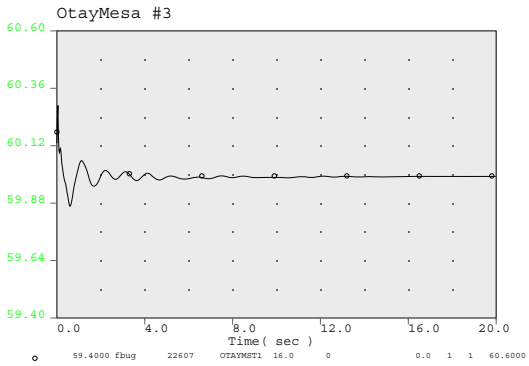












C1 C2 Heavy Summer Post With Upgrades

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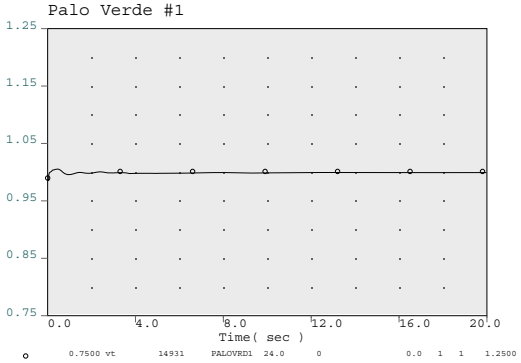
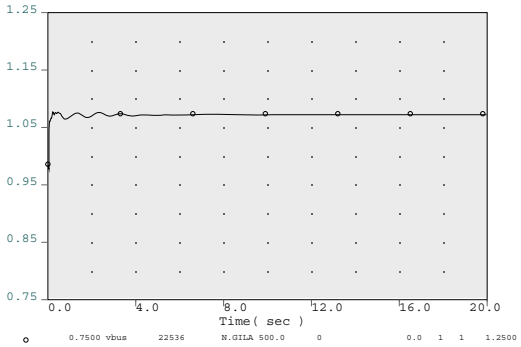
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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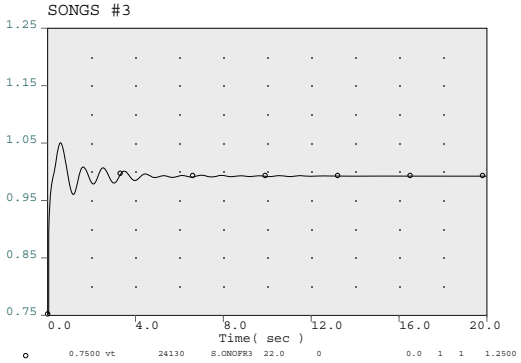
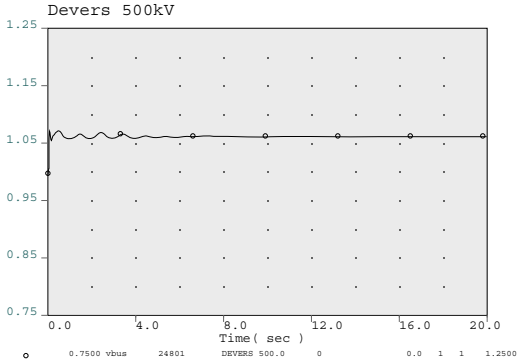
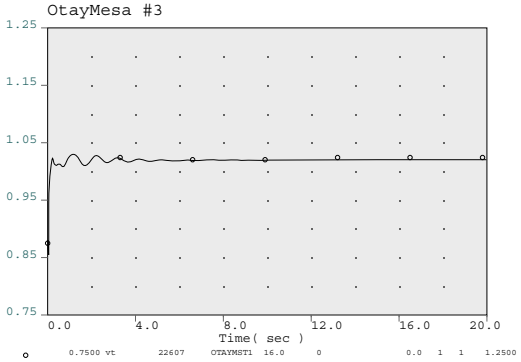


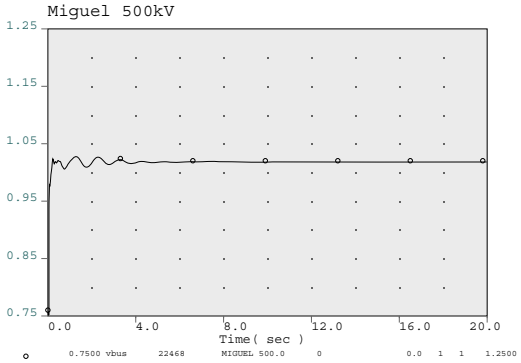
Devers 500kV



OtayMesa #3



Miguel 500kV



C1 C2 Heavy Summer Post With Upgrades

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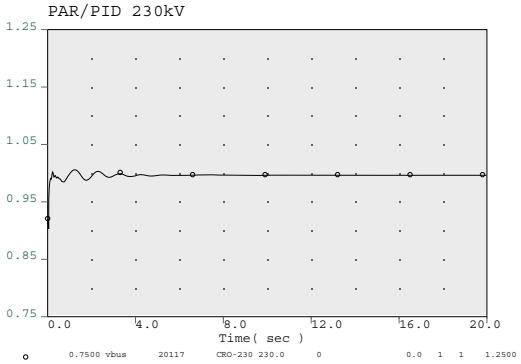
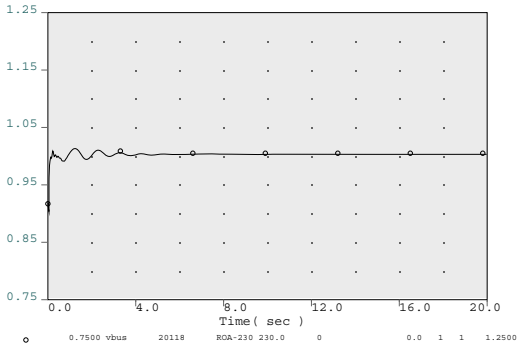
Affected System Voltage Check and Comparison

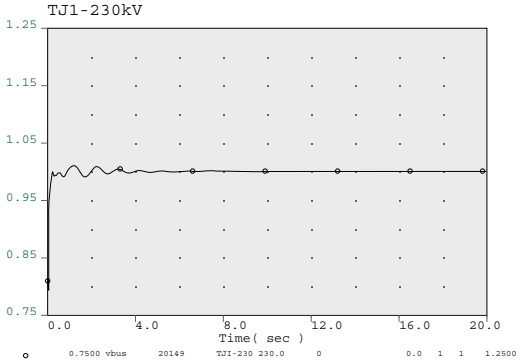
PAR/PID 230kV



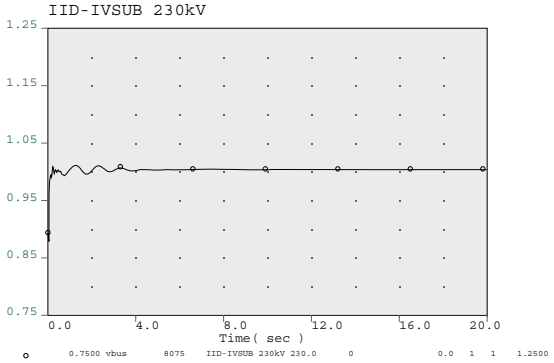
ROA-230kV



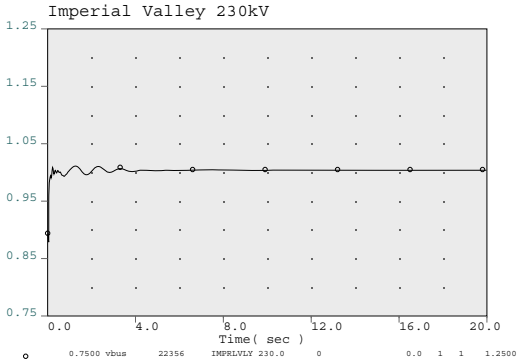
TJ1-230kV



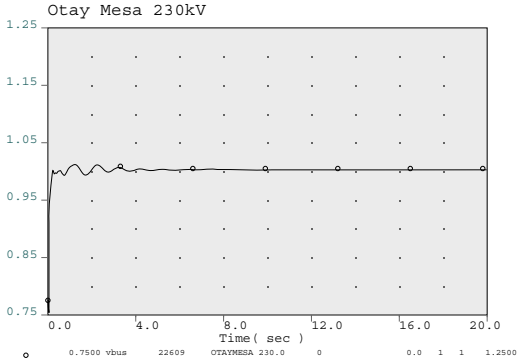
IID-IVSUB 230kV



Imperial Valley 230kV



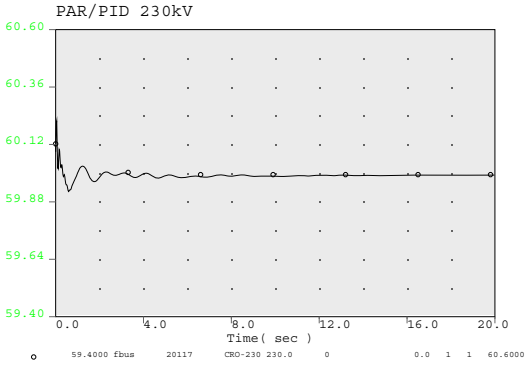
Otay Mesa 230kV



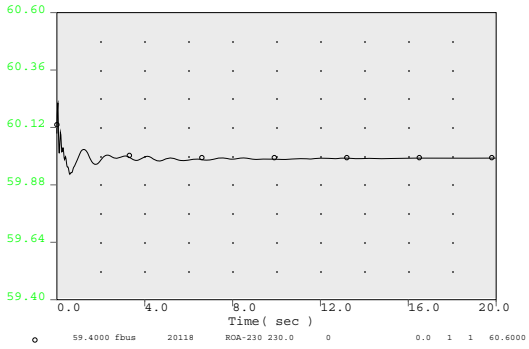
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

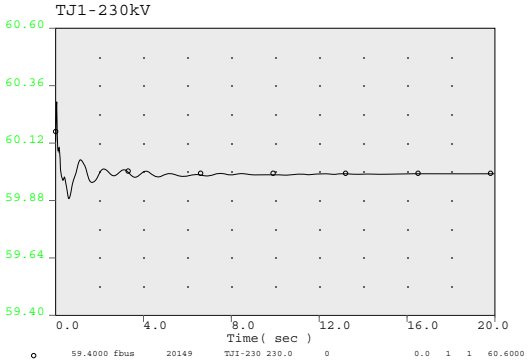
PAR/PID 230kV



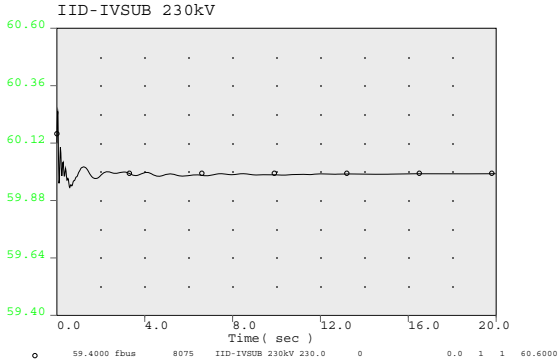
ROA-230kV



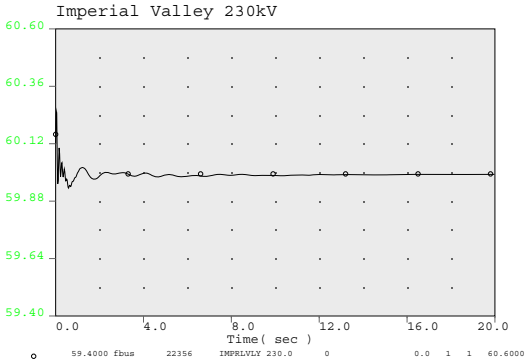
TJ1-230kV



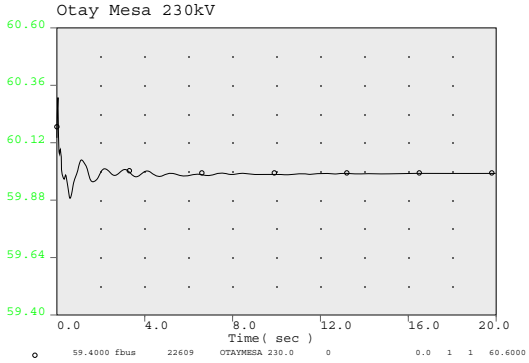
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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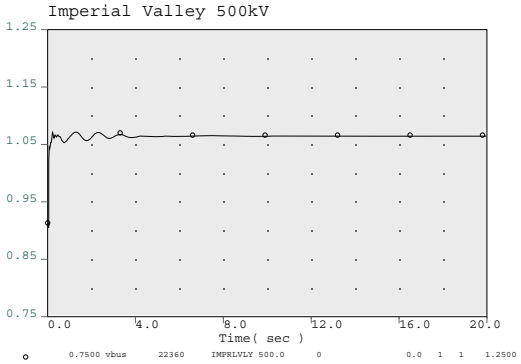
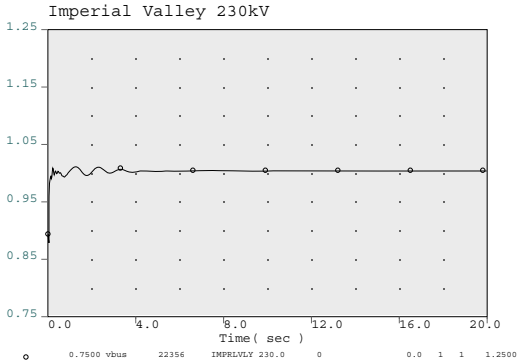
VOLTAGE

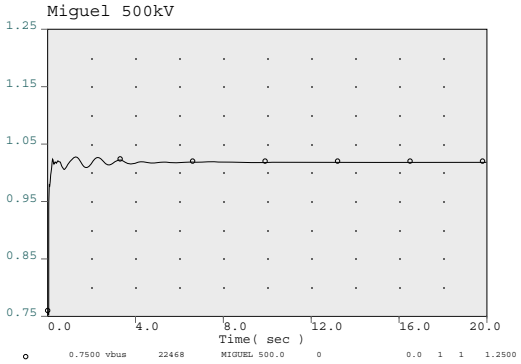
Imperial Valley 500kV



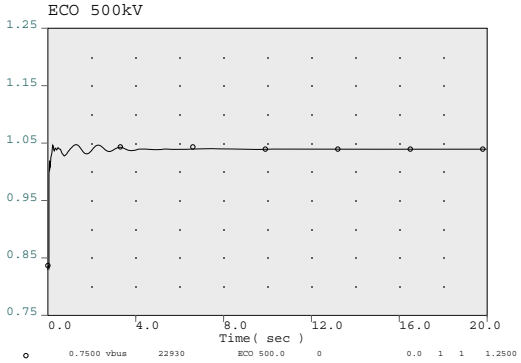
Imperial Valley 230kV



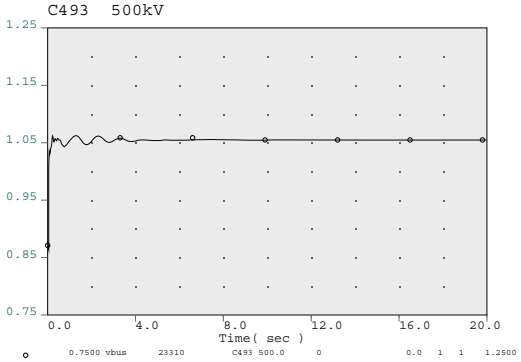
Miguel 500kV



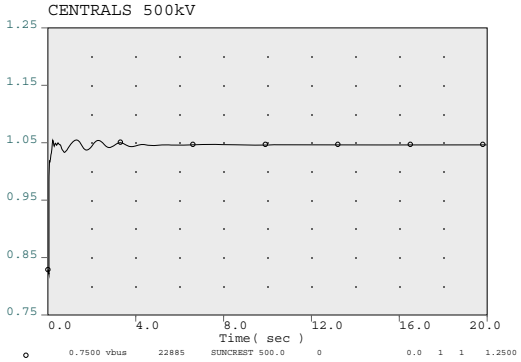
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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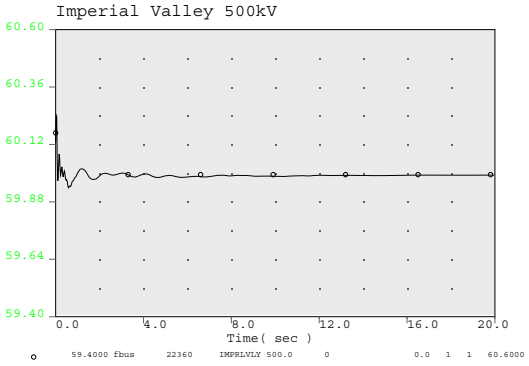
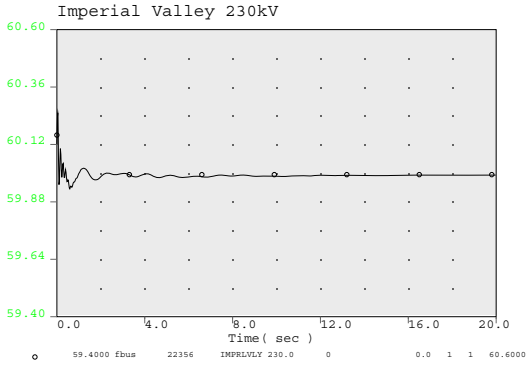
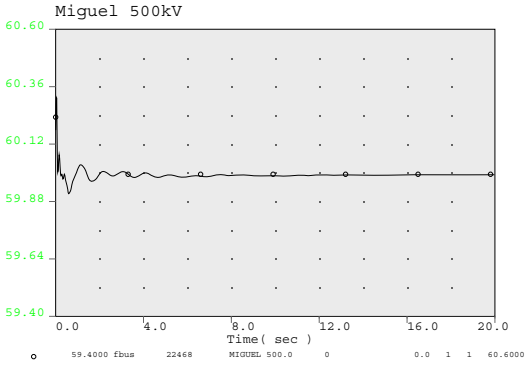
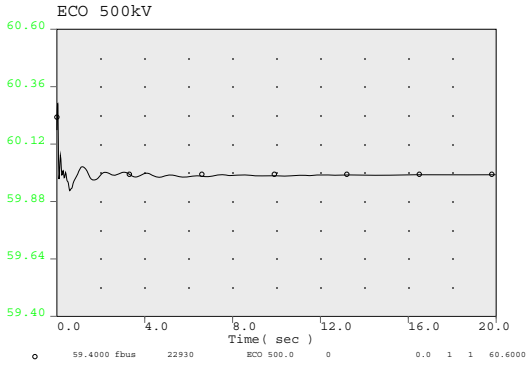
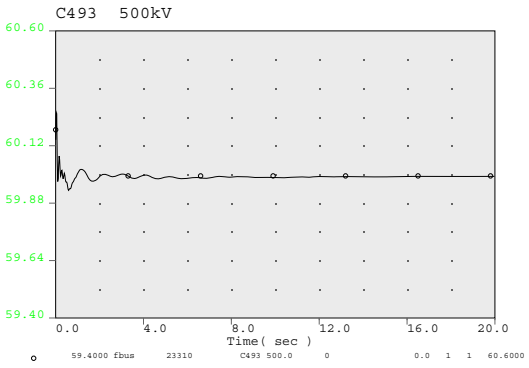
FREQUENCY

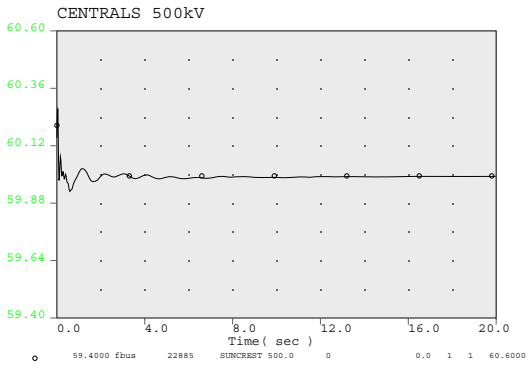






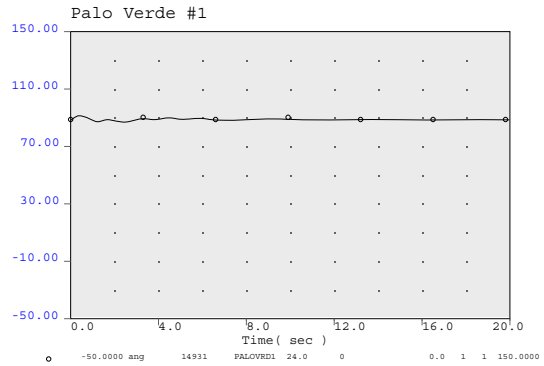


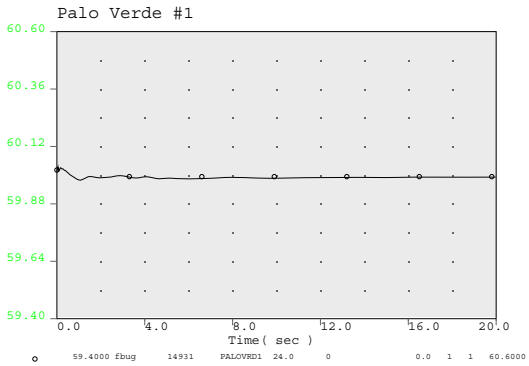


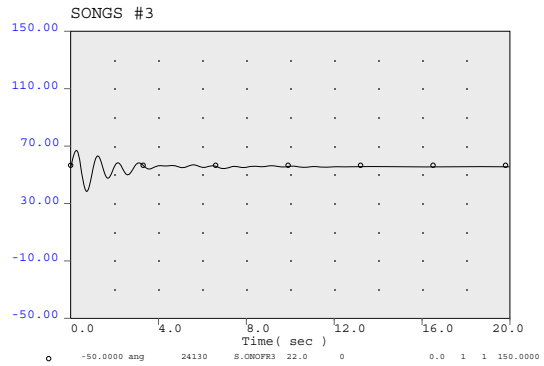


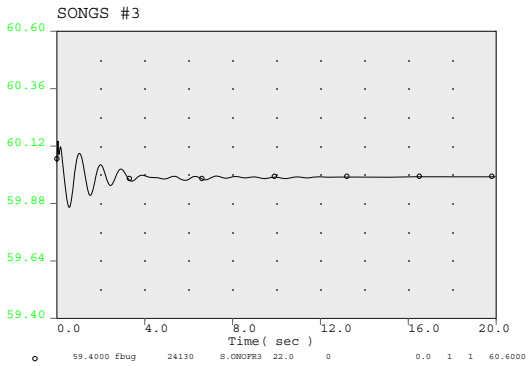
C1 C2 Heavy Summer Post With Upgrades

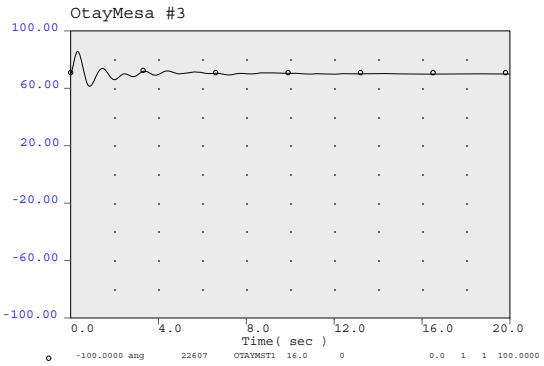
RELATIVE ROTOR ANGLE & FREQUENCY

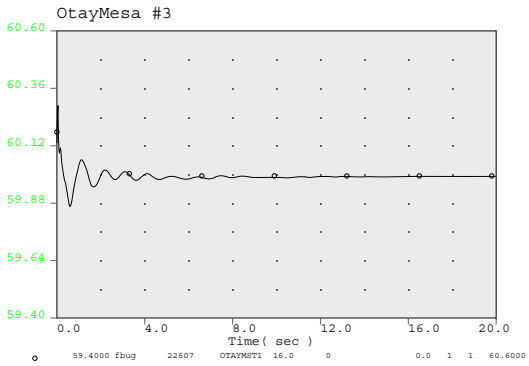












C1 C2 Heavy Summer Post With Upgrades

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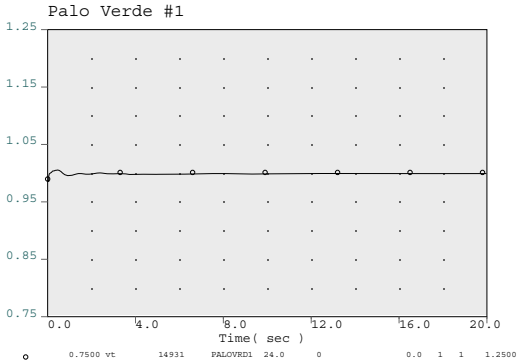
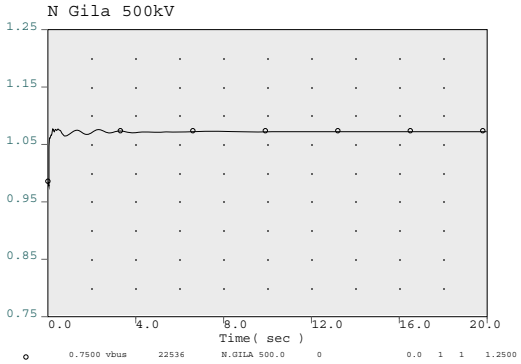
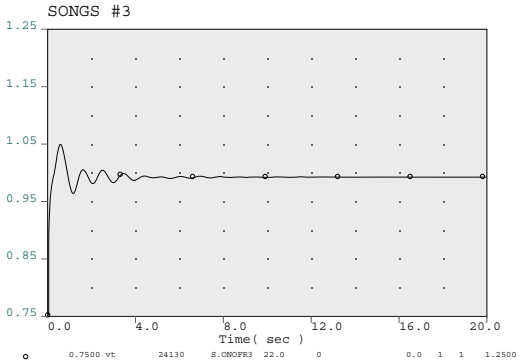
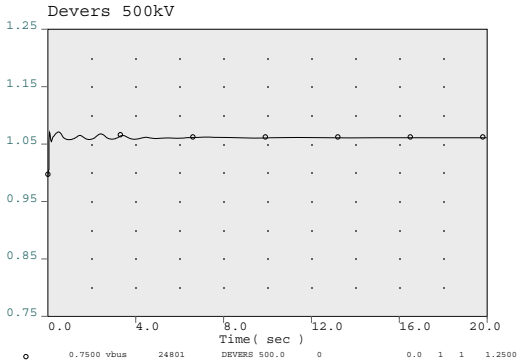
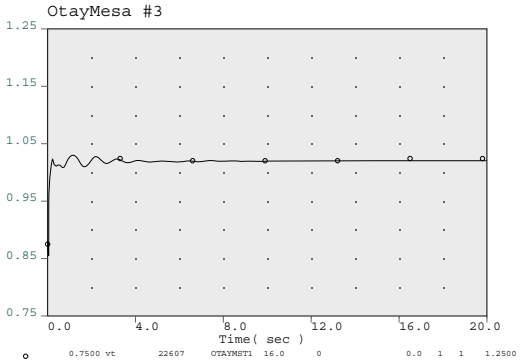
RELATIVE VOLTAGE

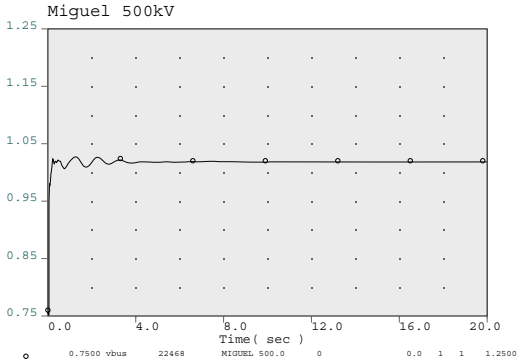












C1 C2 Heavy Summer Post With Upgrades

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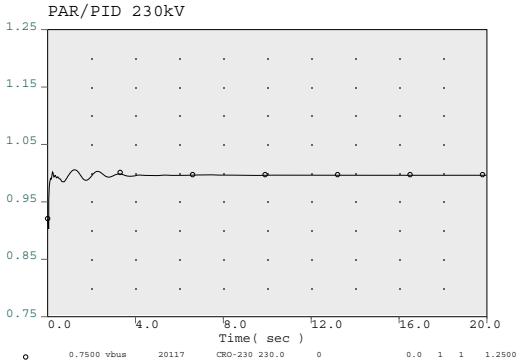
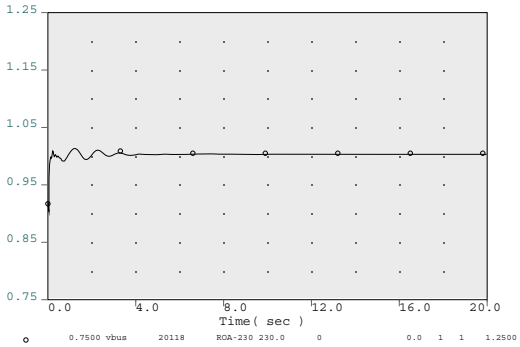
Affected System Voltage Check and Comparison

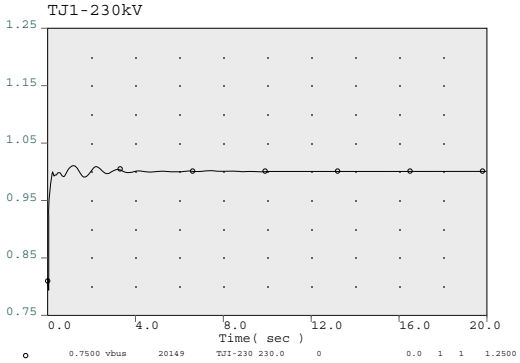
PAR/PID 230kV



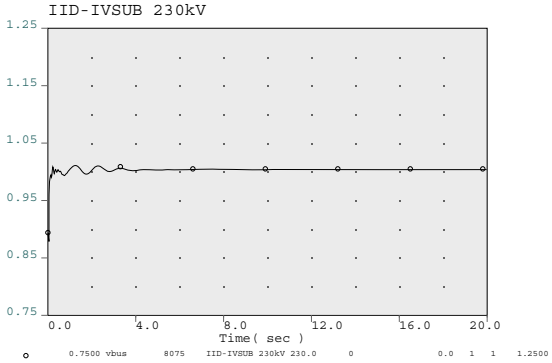
ROA-230kV



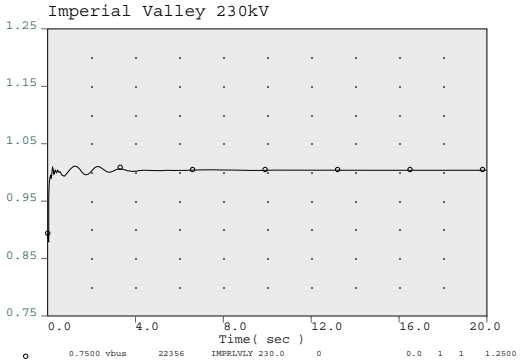
TJ1-230kV



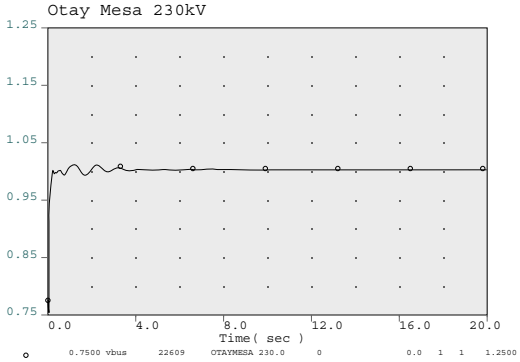
IID-IVSUB 230kV



Imperial Valley 230kV



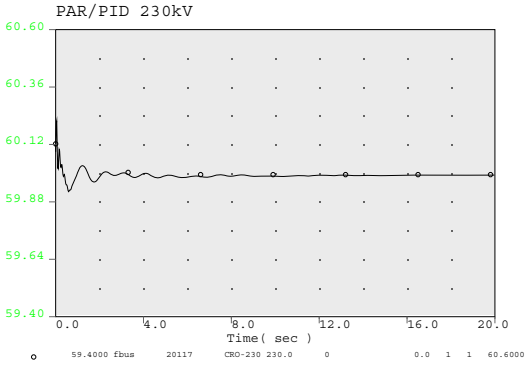
Otay Mesa 230kV



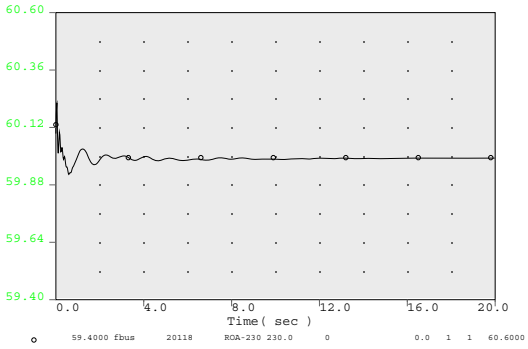
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

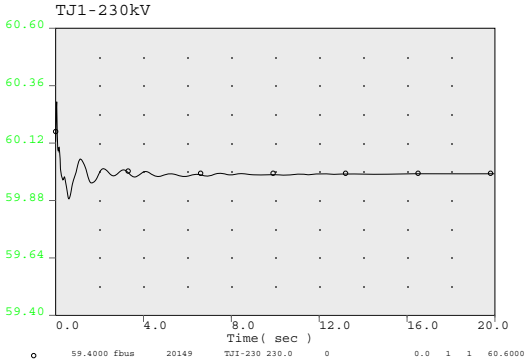
PAR/PID 230kV



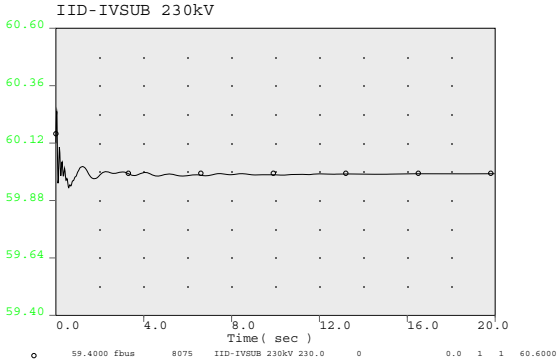
ROA-230kV



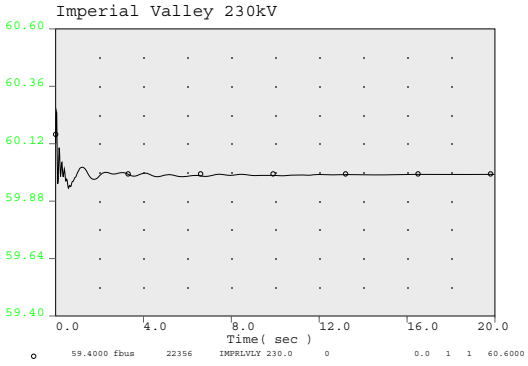
TJ1-230kV



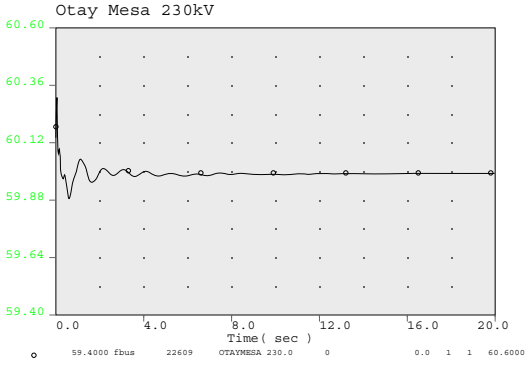
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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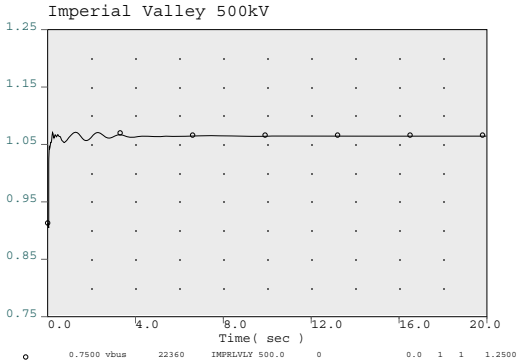
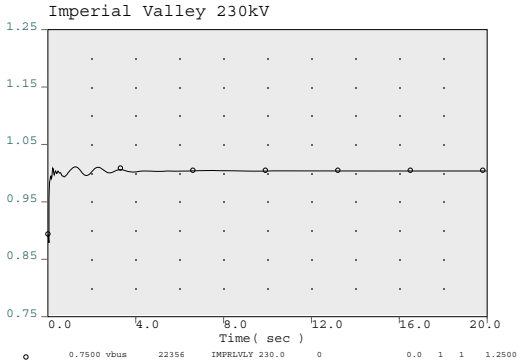
VOLTAGE

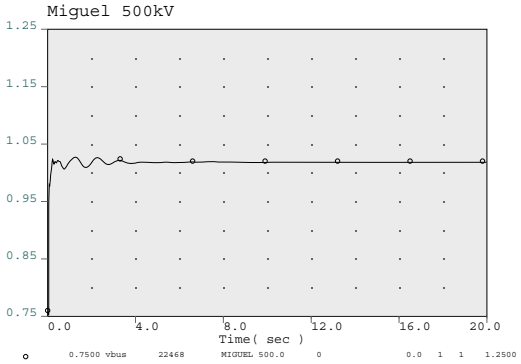
Imperial Valley 500kV



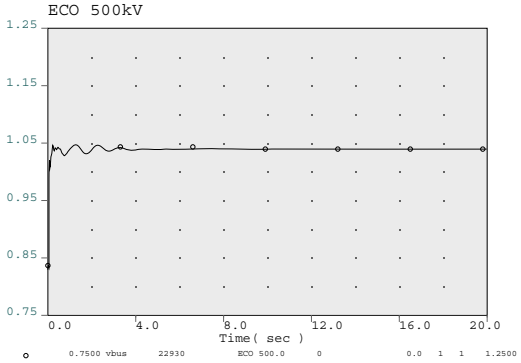
Imperial Valley 230kV



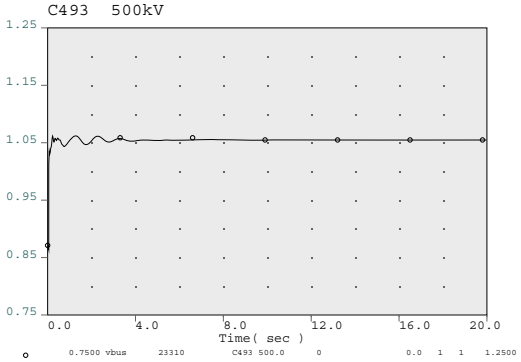
Miguel 500kV



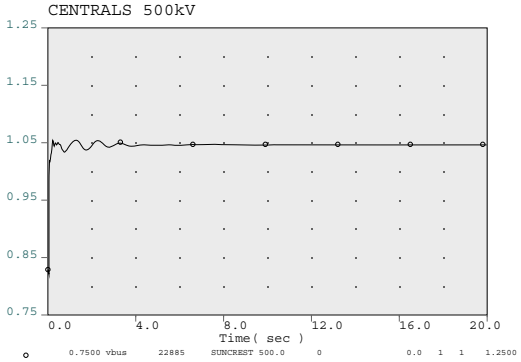
ECO 500kV



C493 500kV

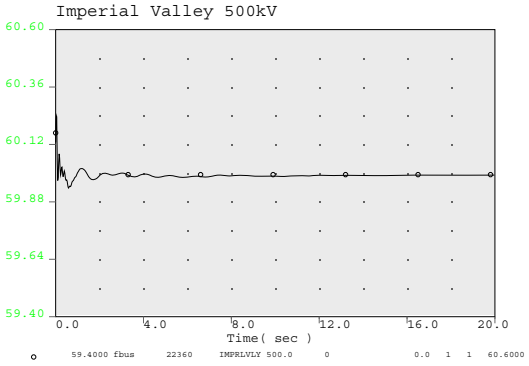


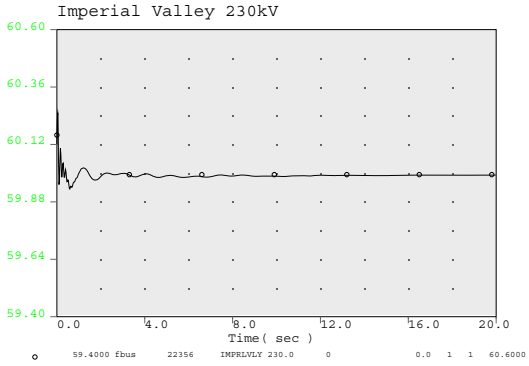
CENTRALS 500kV

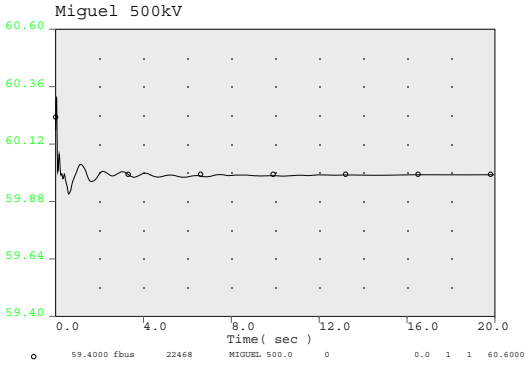


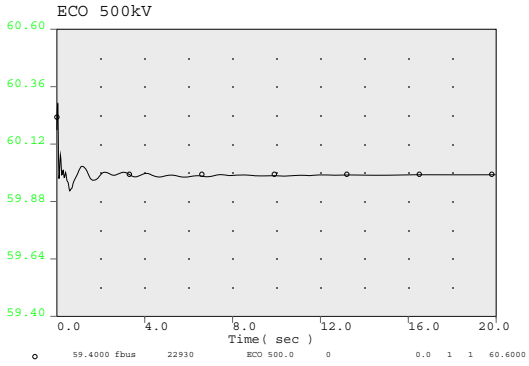
C1 C2 Heavy Summer Post With Upgrades

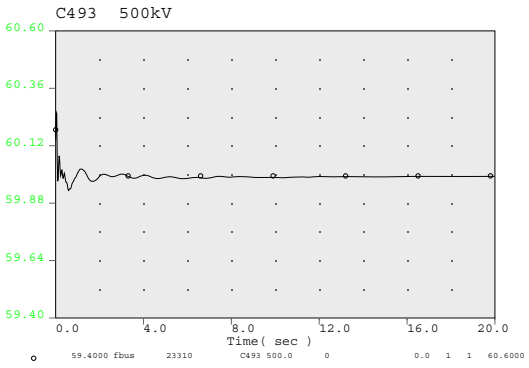
FREQUENCY

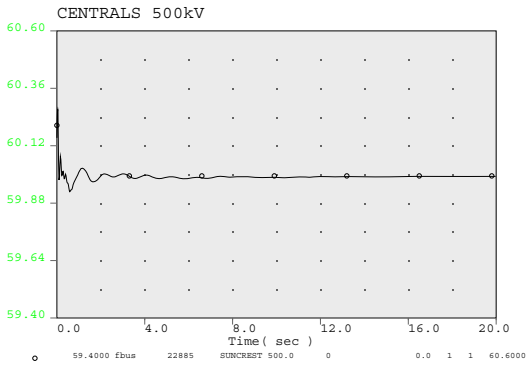






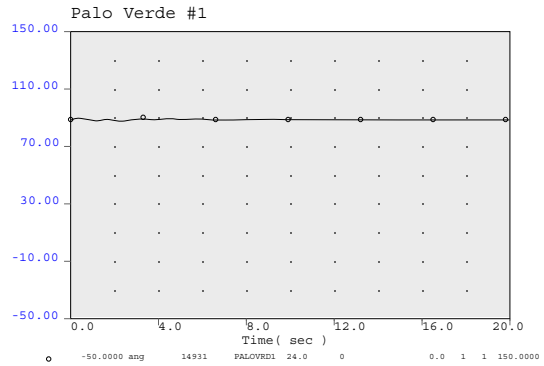


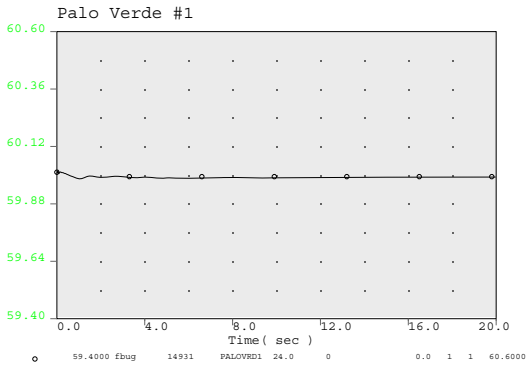


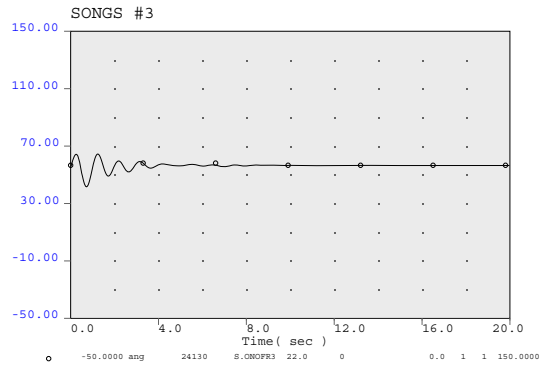


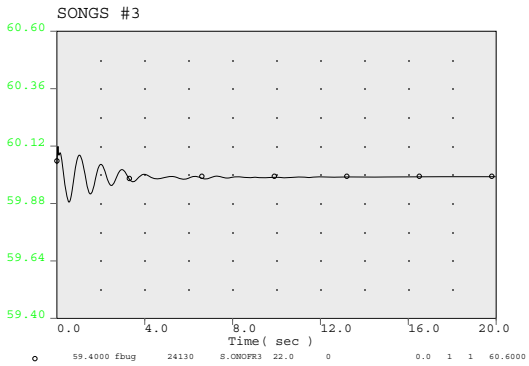
C1 C2 Heavy Summer Post With Upgrades

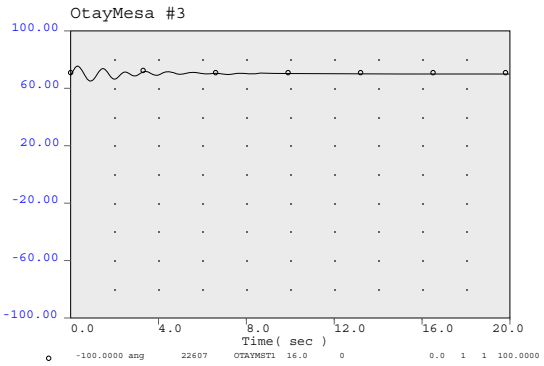
RELATIVE ROTOR ANGLE & FREQUENCY

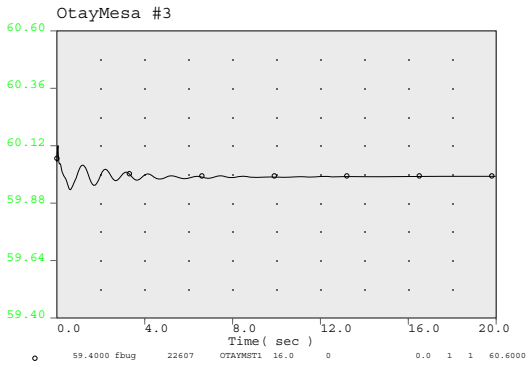












C1 C2 Heavy Summer Post With Upgrades

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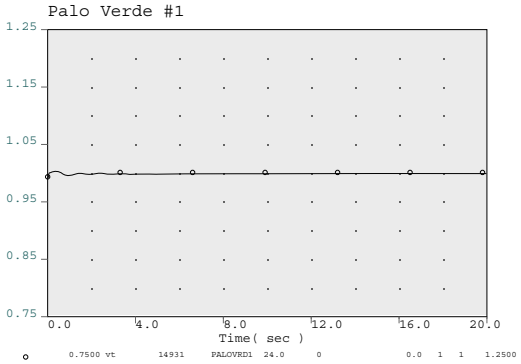
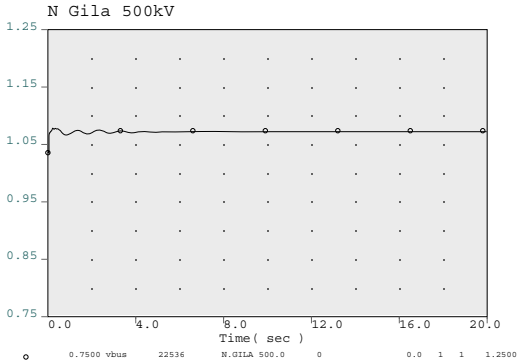
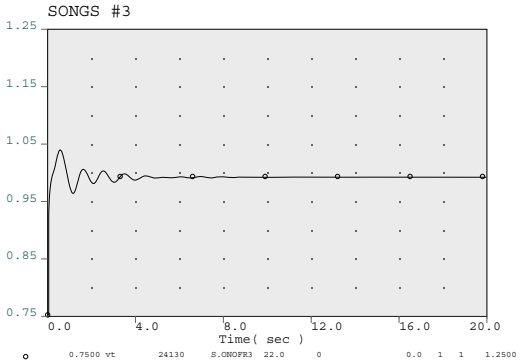
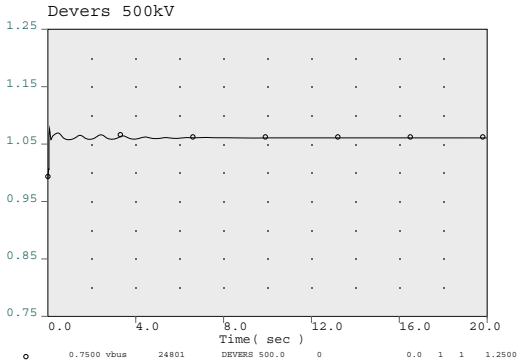
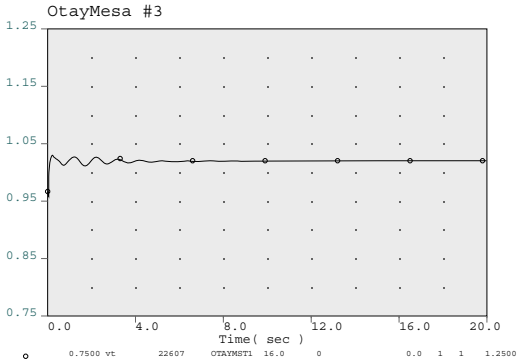
RELATIVE VOLTAGE

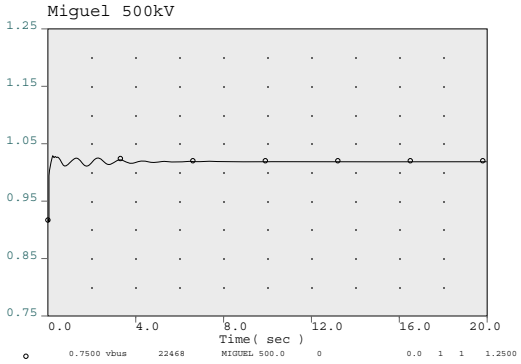












C1 C2 Heavy Summer Post With Upgrades

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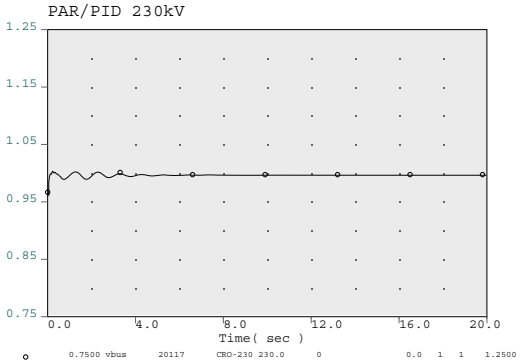
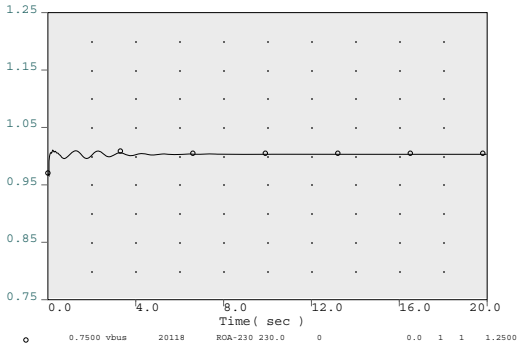
Affected System Voltage Check and Comparison

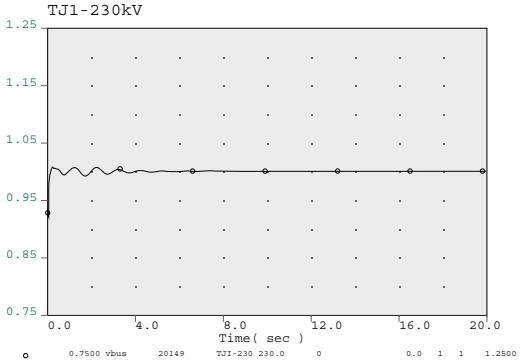
PAR/PID 230kV



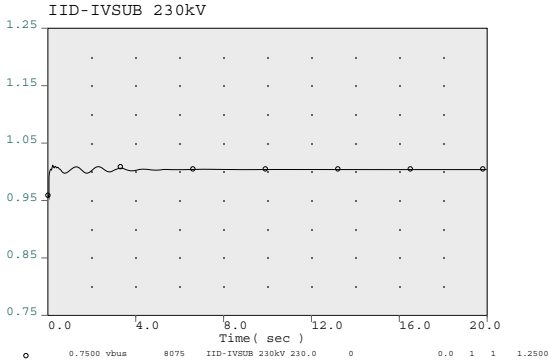
ROA-230kV



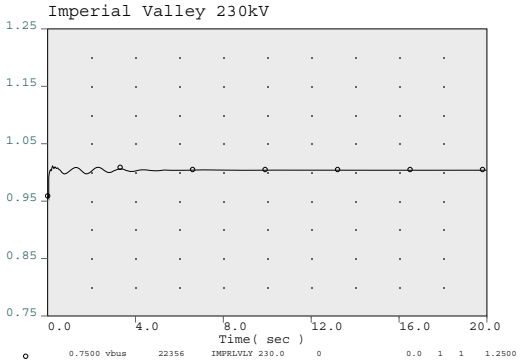
TJ1-230kV



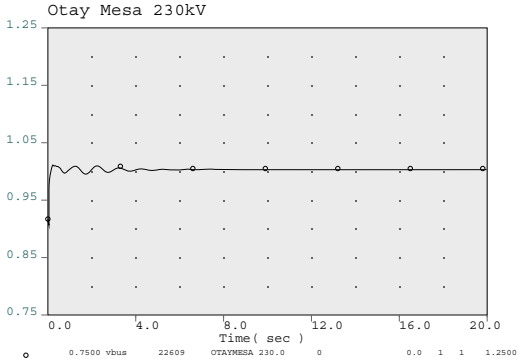
IID-IVSUB 230kV



Imperial Valley 230kV



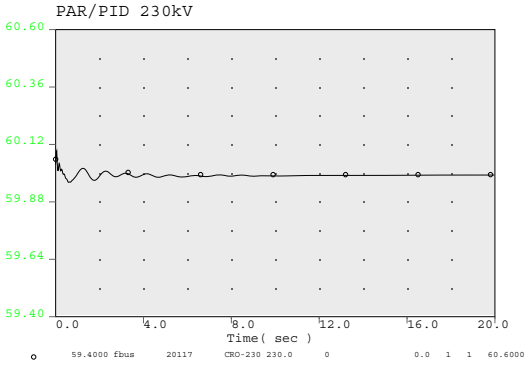
Otay Mesa 230kV



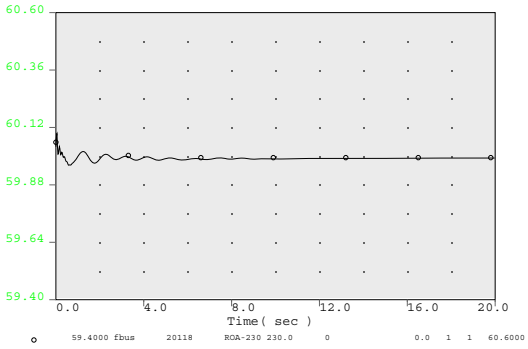
C1 C2 Heavy Summer Post With Upgrades

Affected System Frequency Check and Comparison

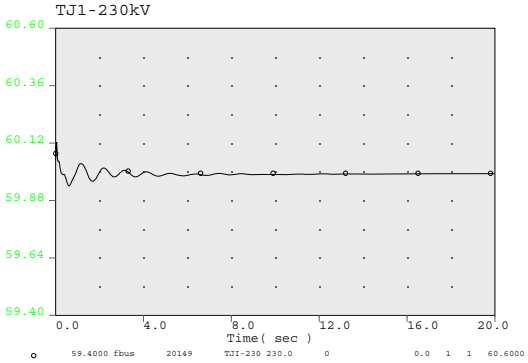
PAR/PID 230kV



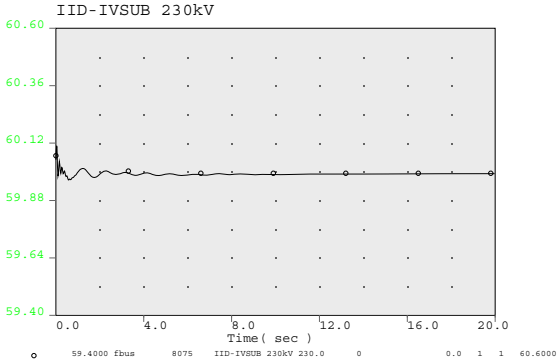
ROA-230kV



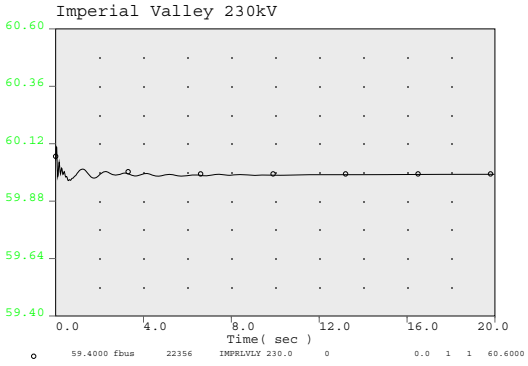
TJ1-230kV



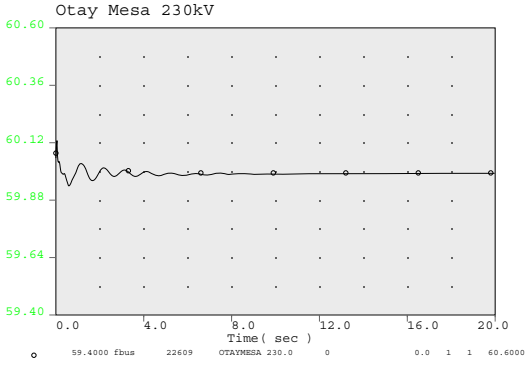
IID-IVSUB 230kV



Imperial Valley 230kV



Otay Mesa 230kV



C1 C2 Heavy Summer Post With Upgrades

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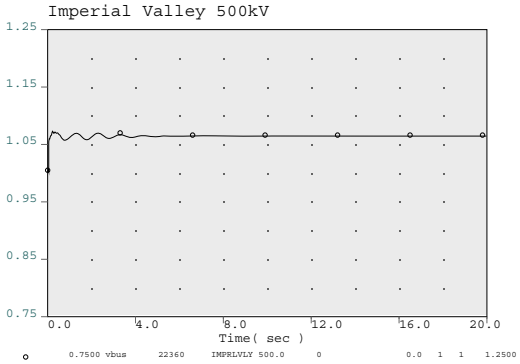
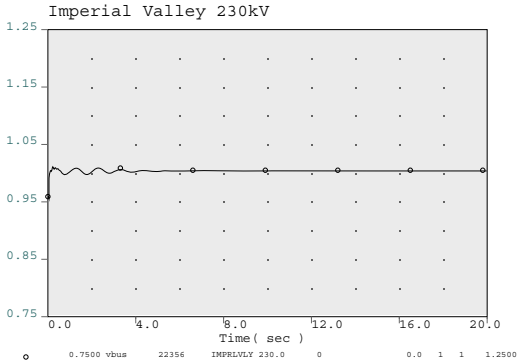
VOLTAGE

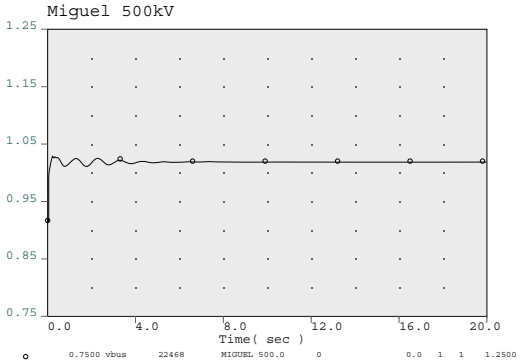
Imperial Valley 500kV



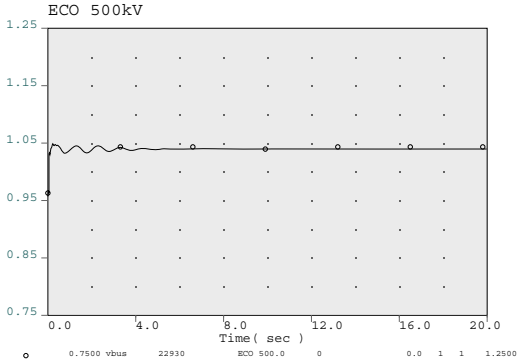
Imperial Valley 230kV



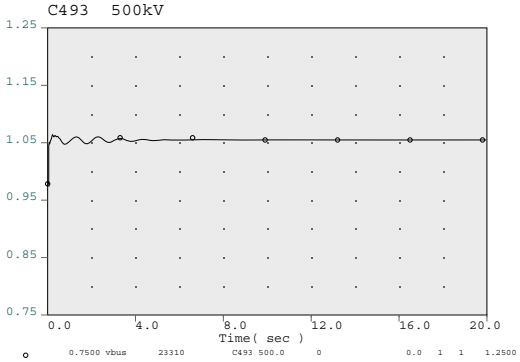
Miguel 500kV



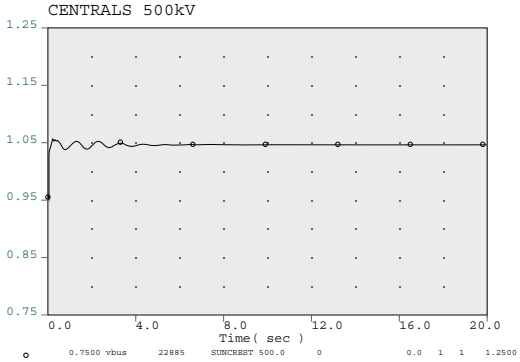
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

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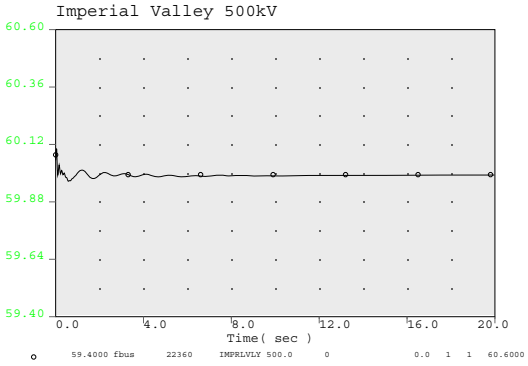
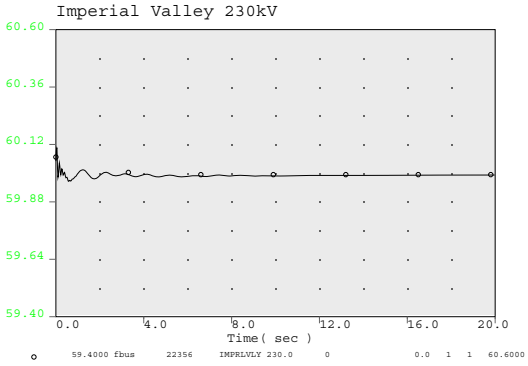
FREQUENCY

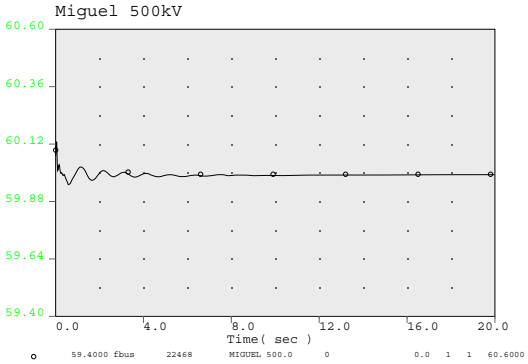
Imperial Valley 500kV



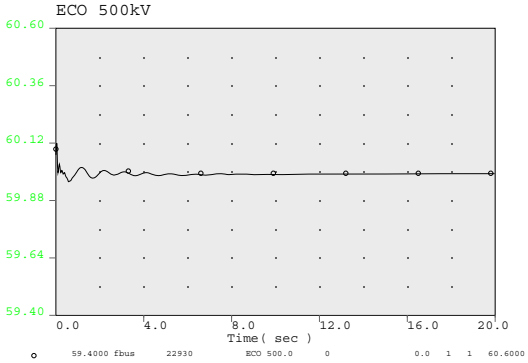
Imperial Valley 230kV



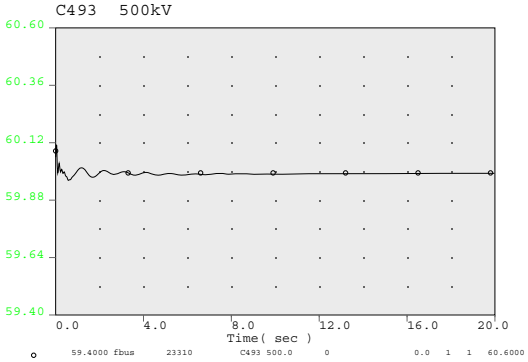
Miguel 500kV



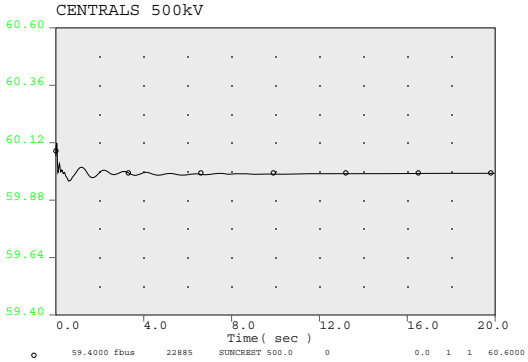
ECO 500kV



C493 500kV



CENTRALS 500kV



C1 C2 Heavy Summer Post With Upgrades

Page 6

SDGE	tran-c1c2-hs-pstup-r15_SO-TA-dlo.chf	anstab\hs\pst\ws_pst_c1c2 Sun Jul 17 15:41:48 2011

Appendix J-5

Transient Stability Analysis Plots

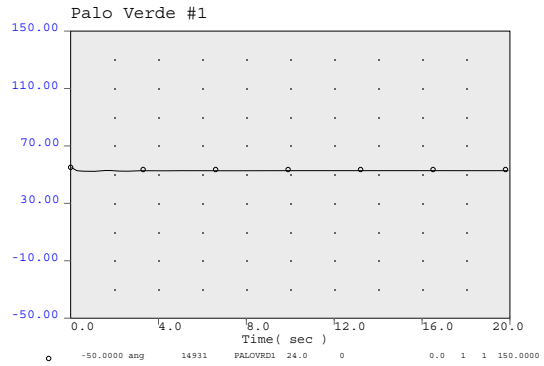
Boulevard Cluster

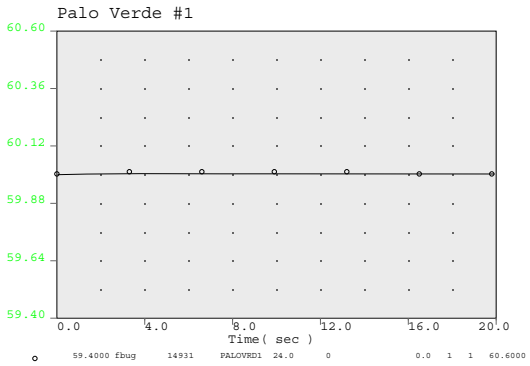
Heavy Summer Post

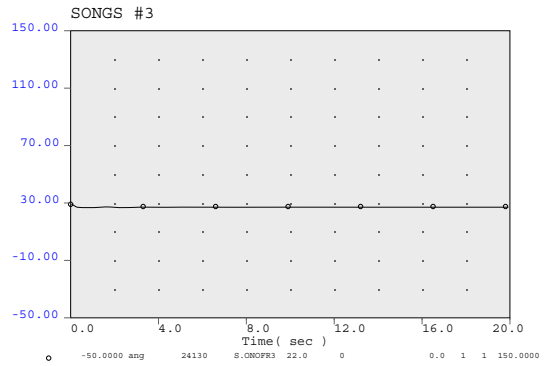
Imperial Valley Area - Frequency

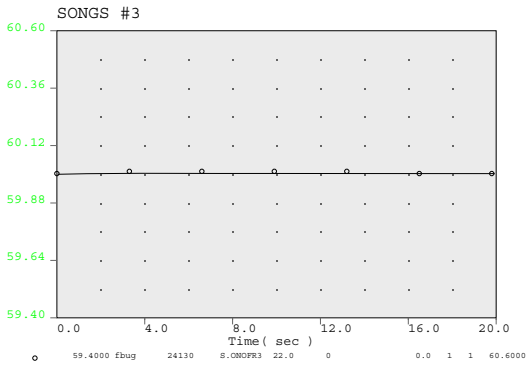
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

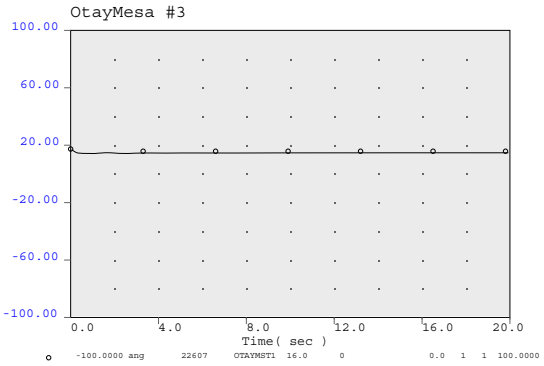
RELATIVE ROTOR ANGLE & FREQUENCY

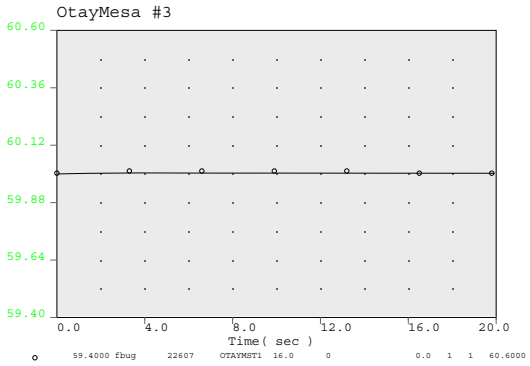










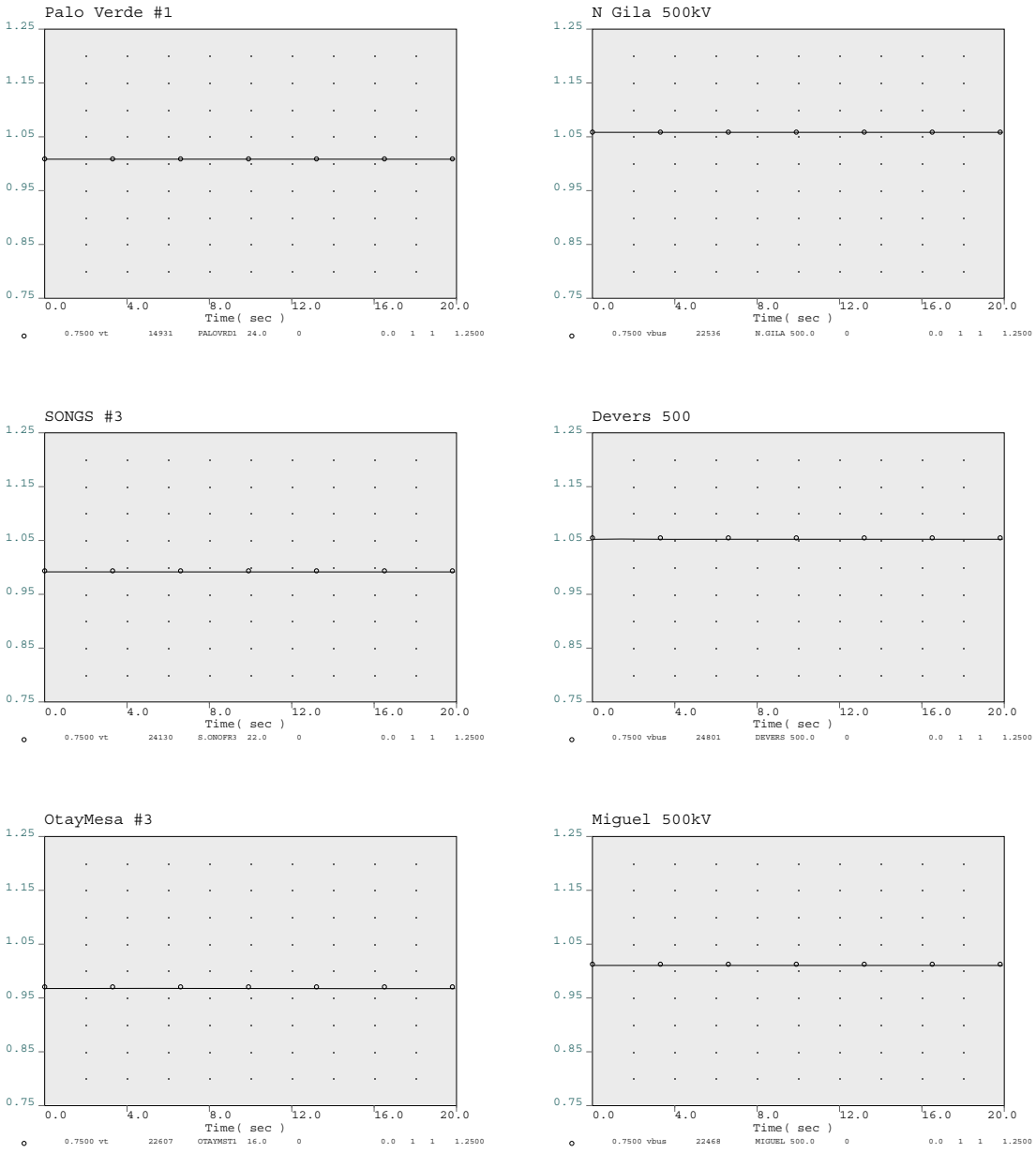


SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Page 1

SDGE	flat_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:23:02 2010

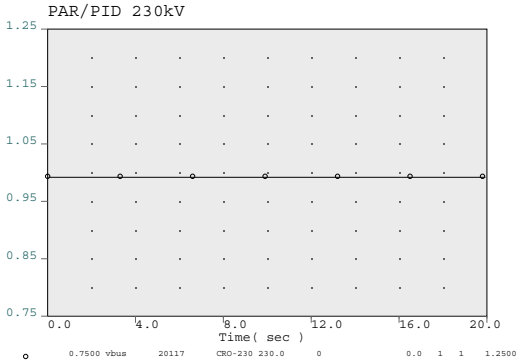
RELATIVE VOLTAGE



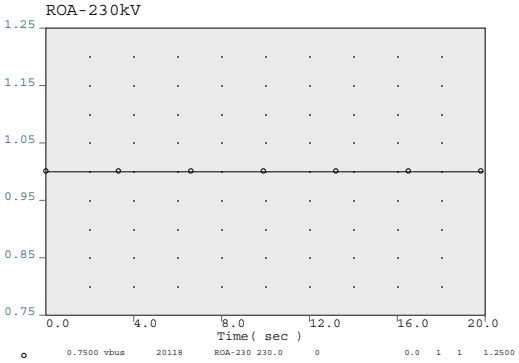
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Affected System Voltage Check and Comparison

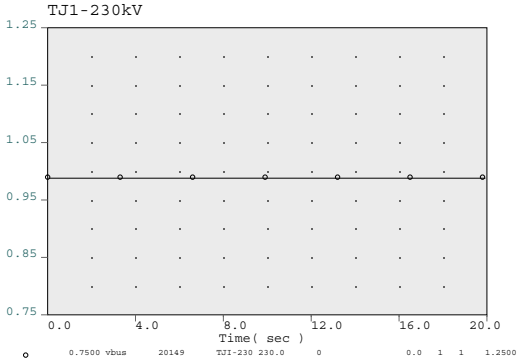
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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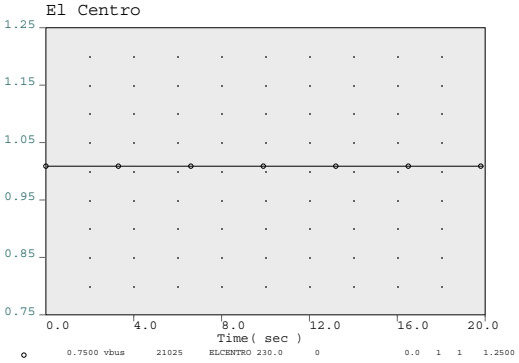
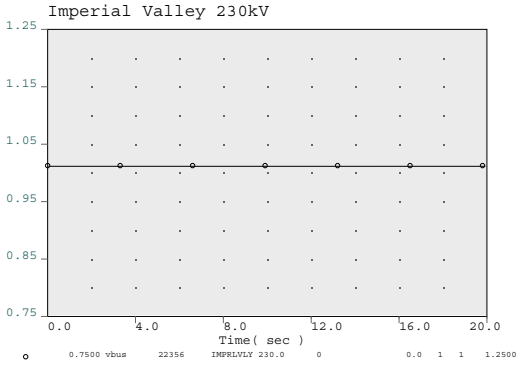
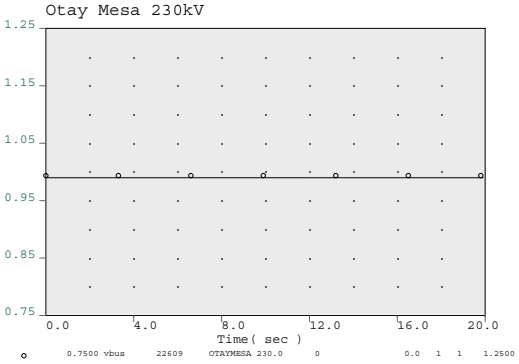


Imperial Valley 230kV



Otay Mesa 230kV

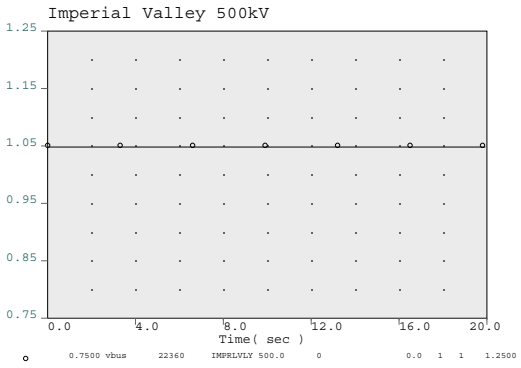


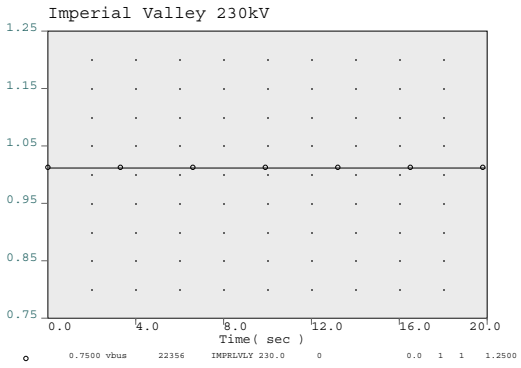
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

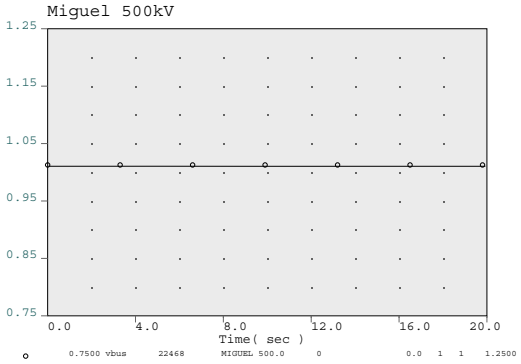
Affected System Frequency Check and Comparison

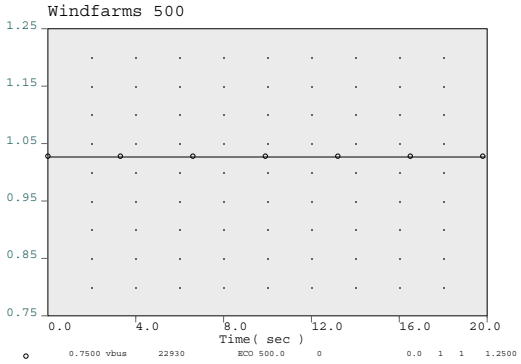
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

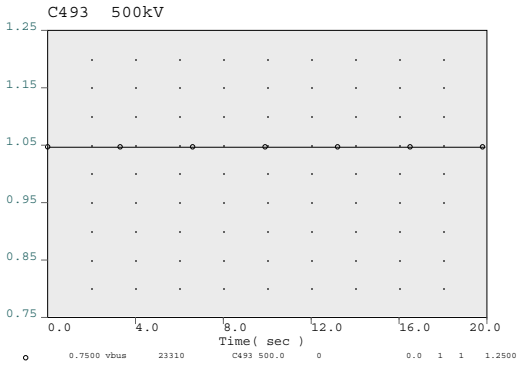
Imperial Valley Area - VOLTAGE

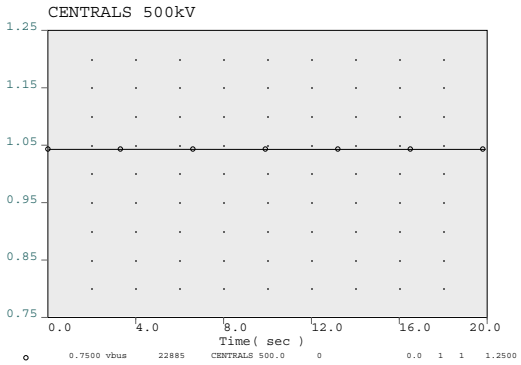










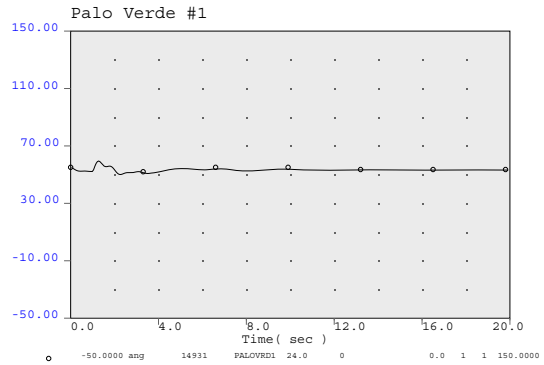


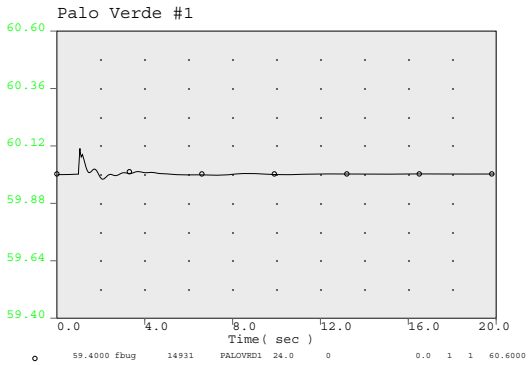
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

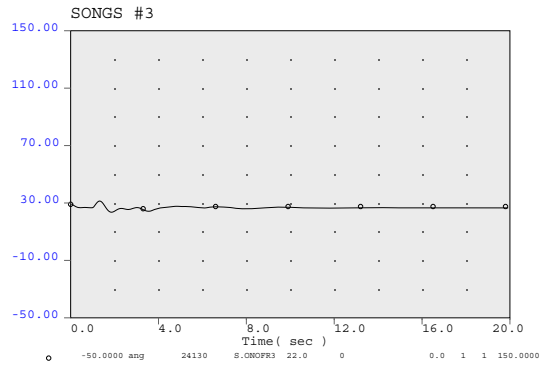
Imperial Valley Area - Frequency

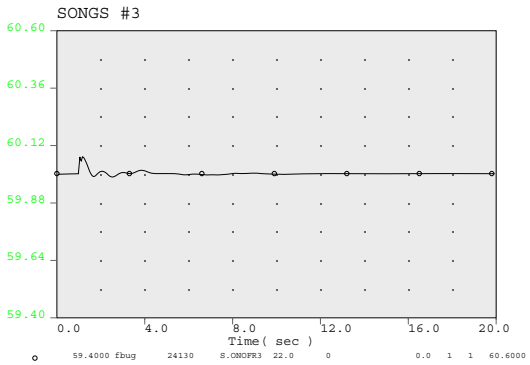
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

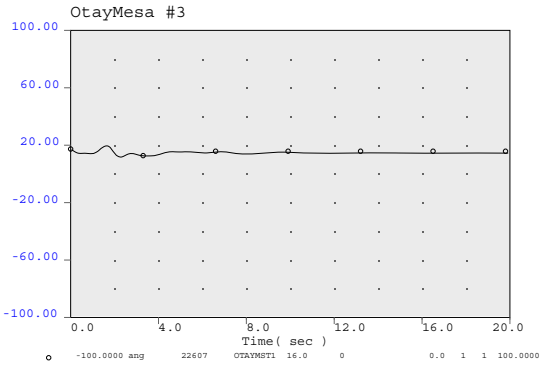
RELATIVE ROTOR ANGLE & FREQUENCY

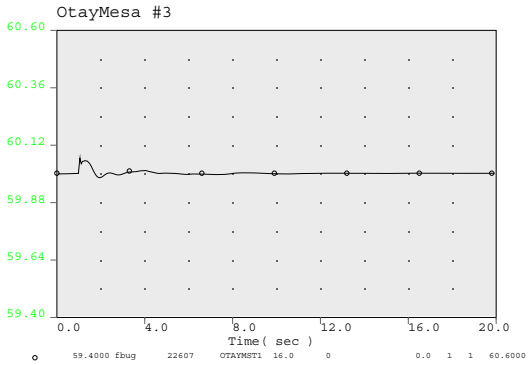












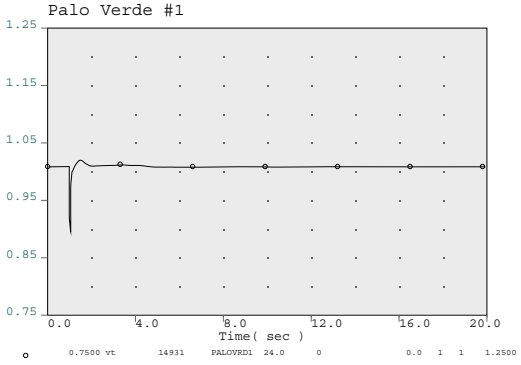
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Page 1

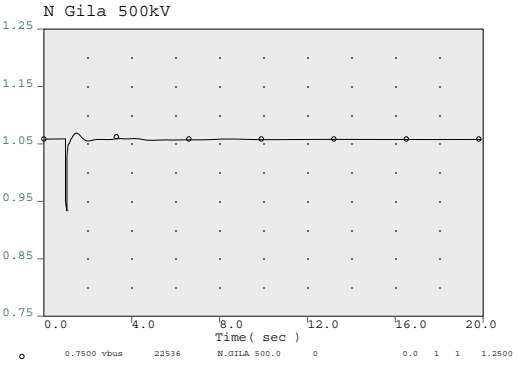
SDGE	Dev_Val_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:23:18 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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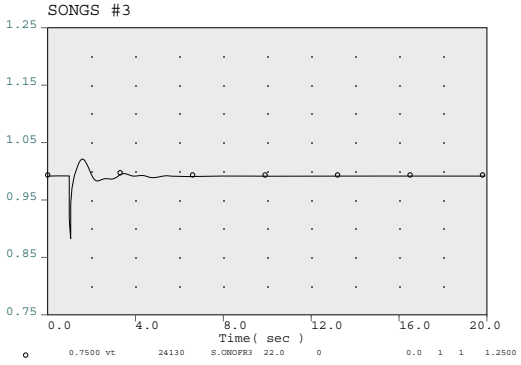
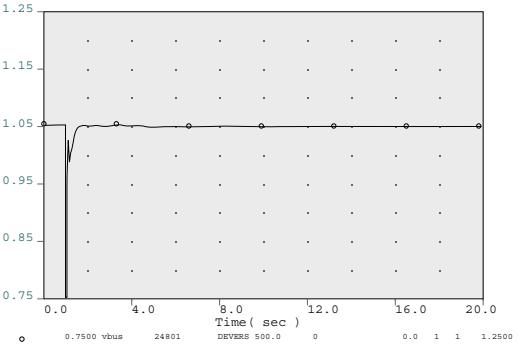
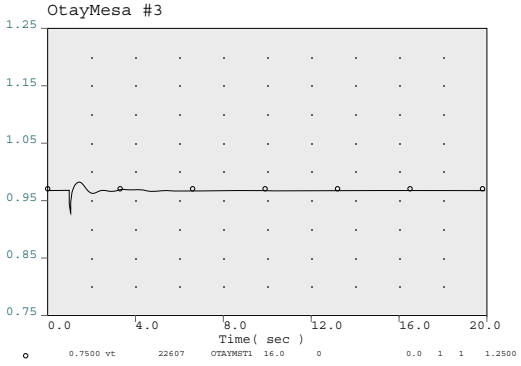


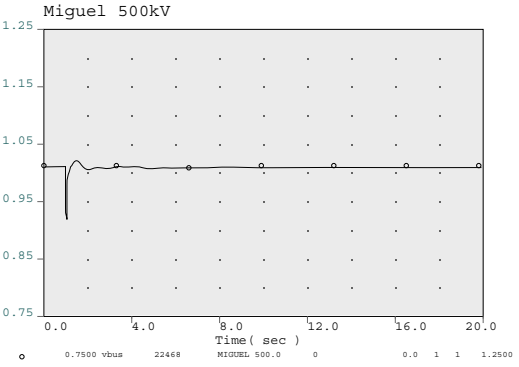
Devers 500



OtayMesa #3



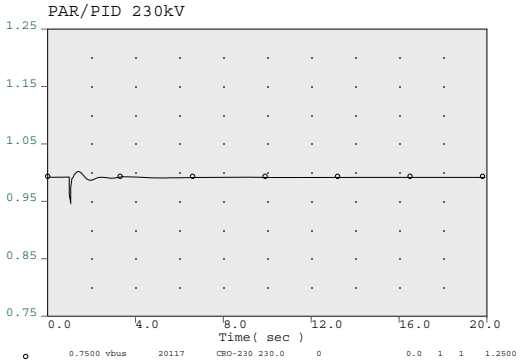
Miguel 500kV



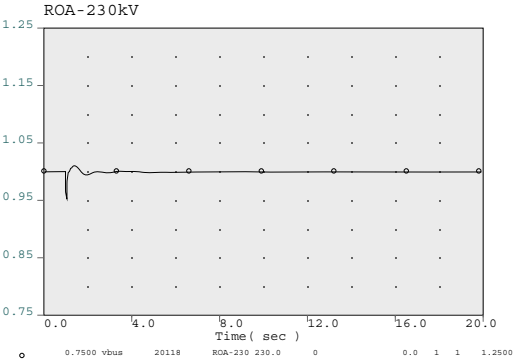
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Affected System Voltage Check and Comparison

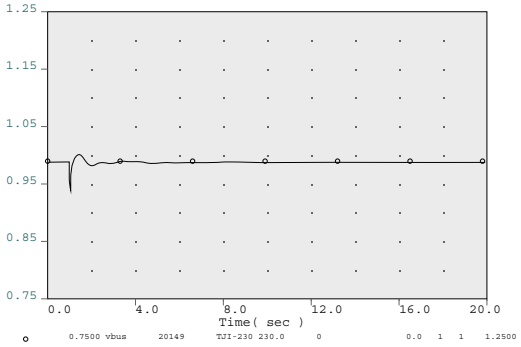
PAR/PID 230kV



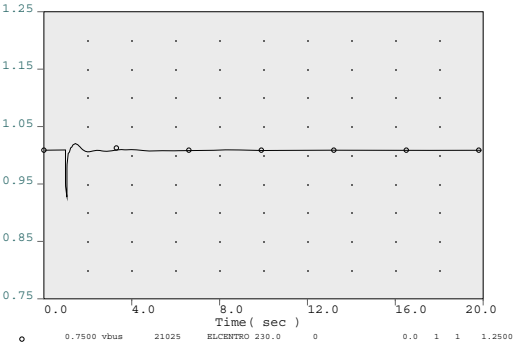
ROA-230kV



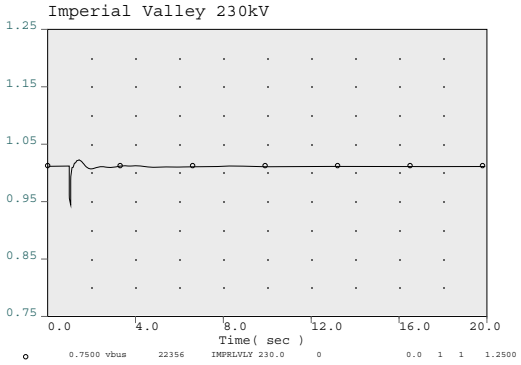
TJ1-230kV



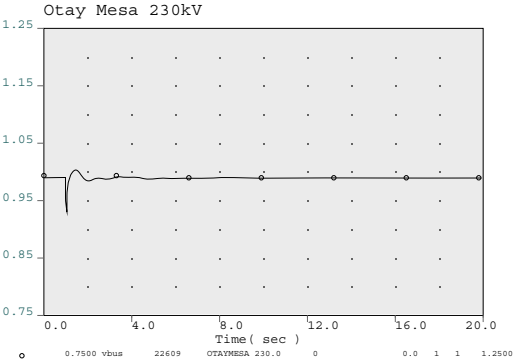
El Centro



Imperial Valley 230kV



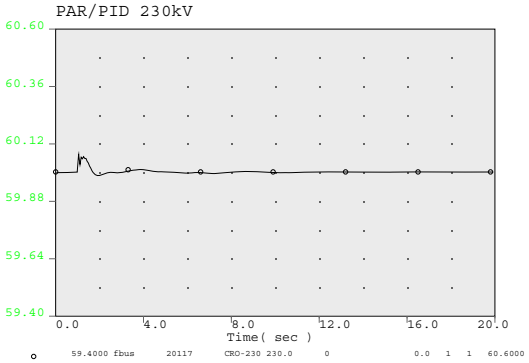
Otay Mesa 230kV



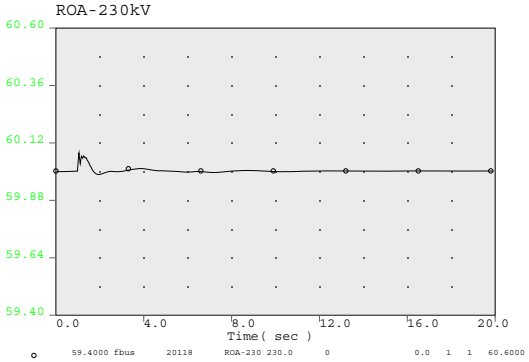
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Affected System Frequency Check and Comparison

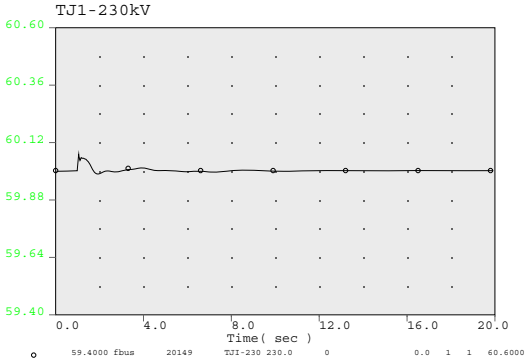
PAR/PID 230kV



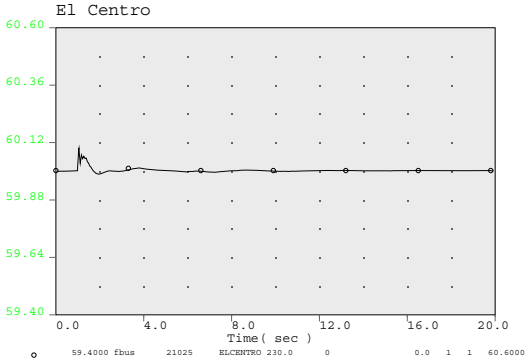
ROA-230kV



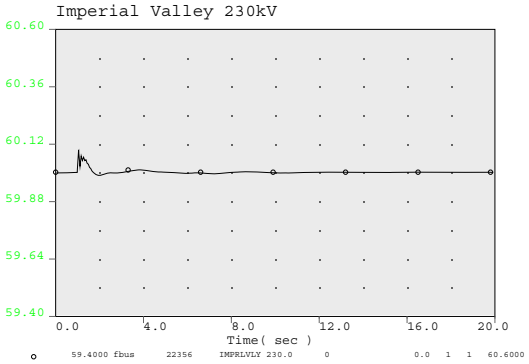
TJ1-230kV



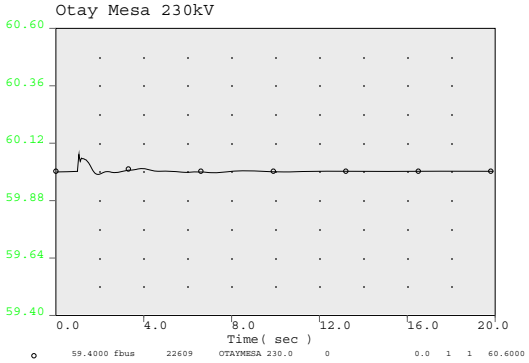
El Centro



Imperial Valley 230kV



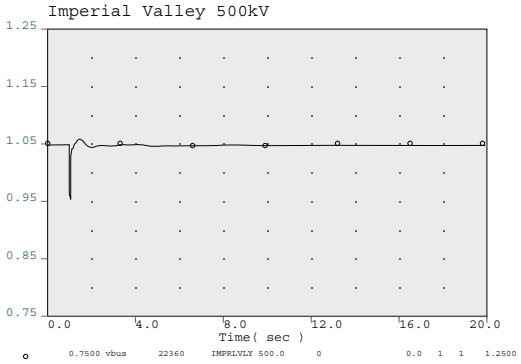
Otay Mesa 230kV



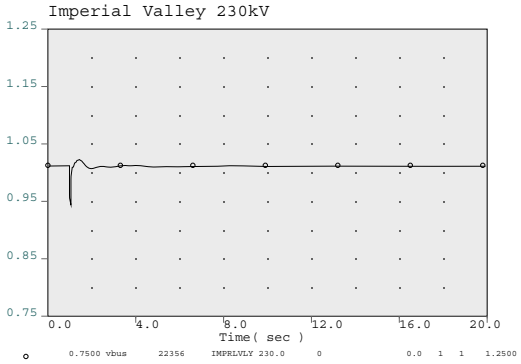
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Imperial Valley Area - VOLTAGE

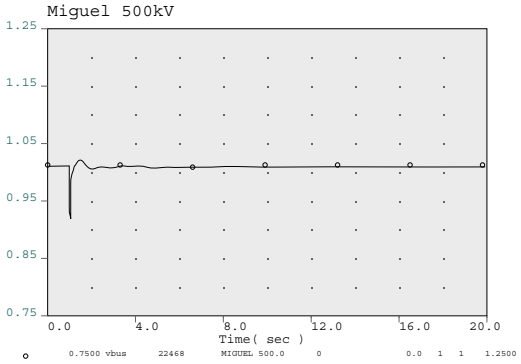
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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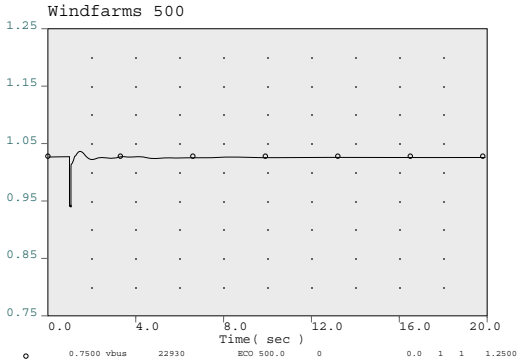
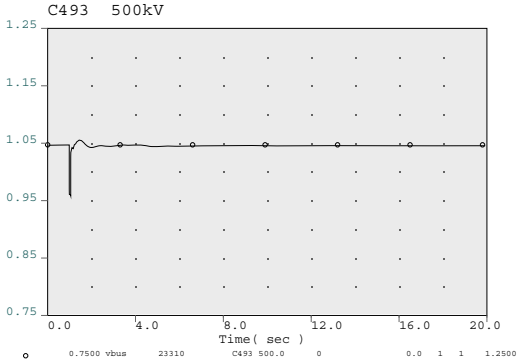
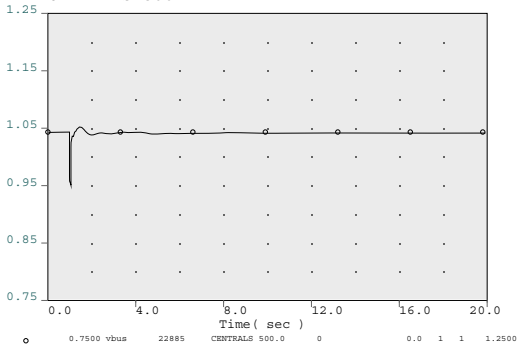


C493 500kV



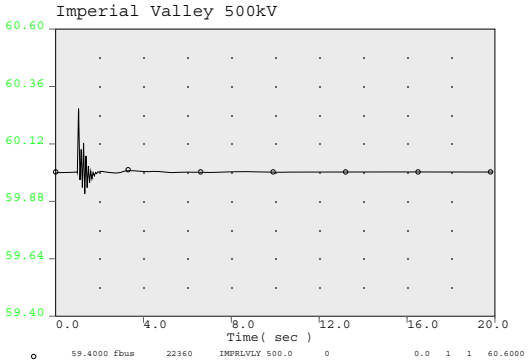
CENTRALS 500kV



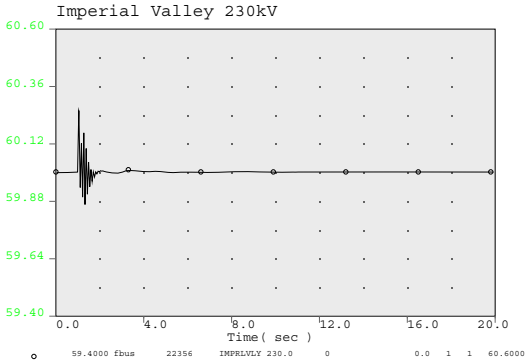
SDG&E Cluster 2 - post
2014 Heavy Summer
Valley - Devers 500 kV line

Imperial Valley Area - Frequency

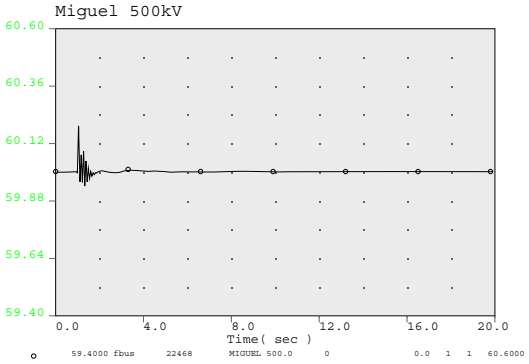
Imperial Valley 500kV



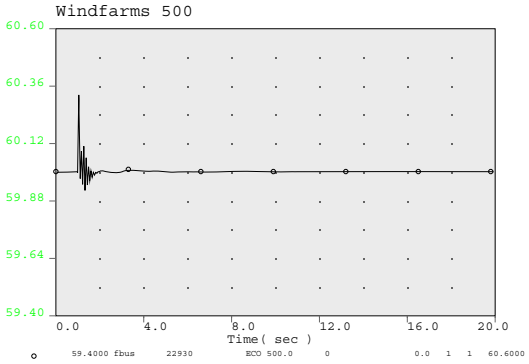
Imperial Valley 230kV



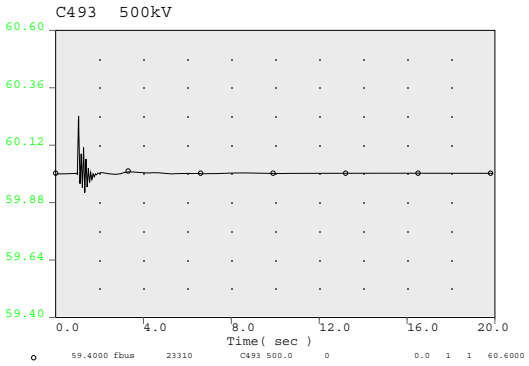
Miguel 500kV



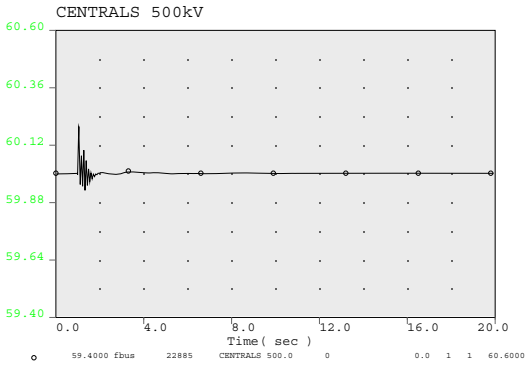
Windfarms 500



C493 500kV

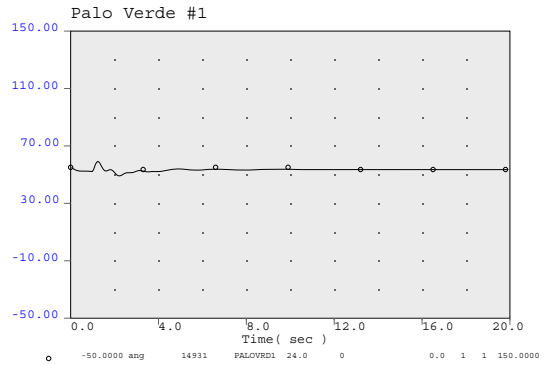


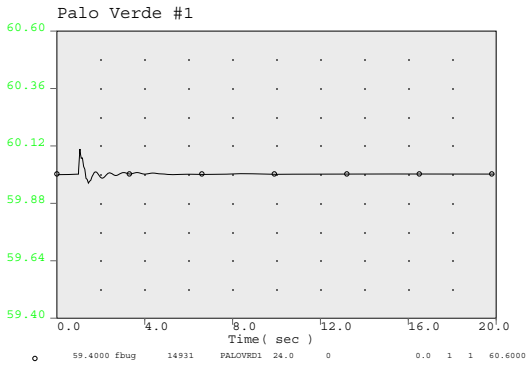
CENTRALS 500kV

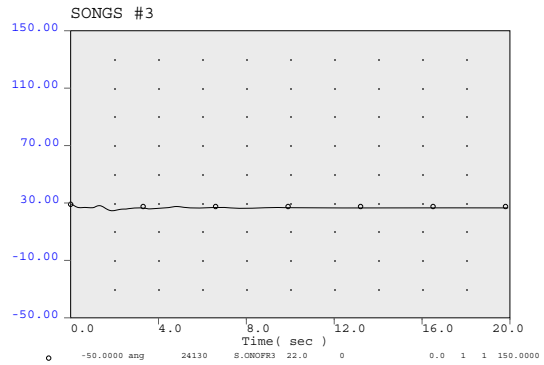


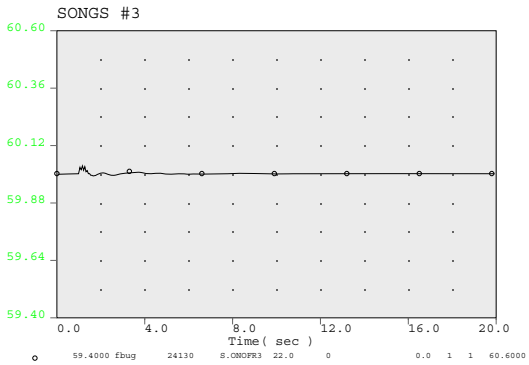
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

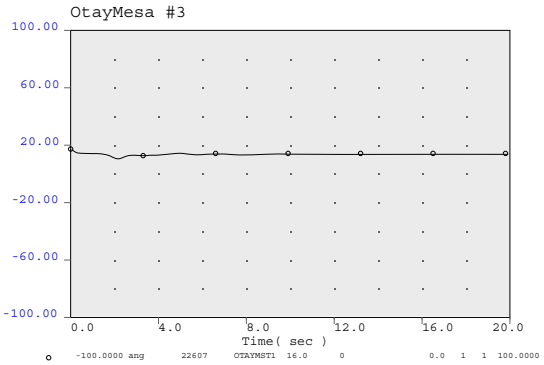
RELATIVE ROTOR ANGLE & FREQUENCY

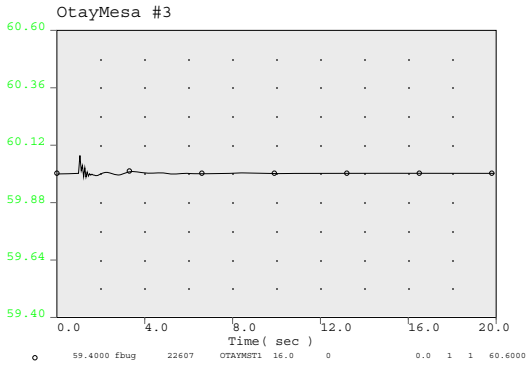












SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Page 1

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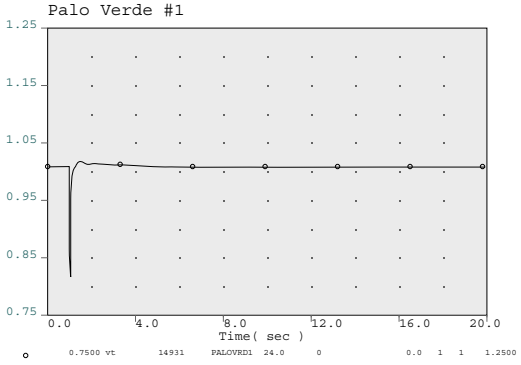
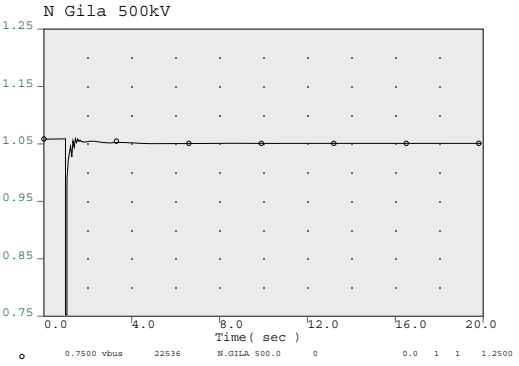
RELATIVE VOLTAGE

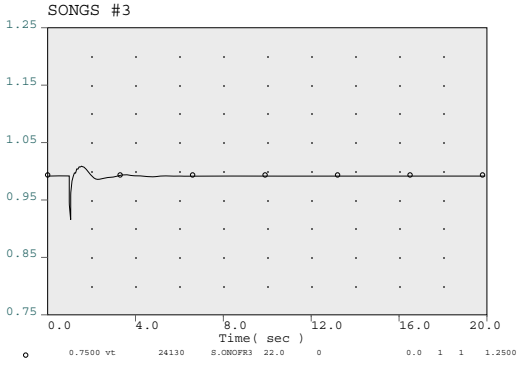
Palo Verde #1



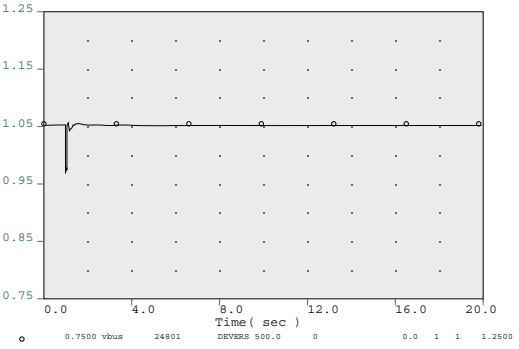
N Gila 500kV



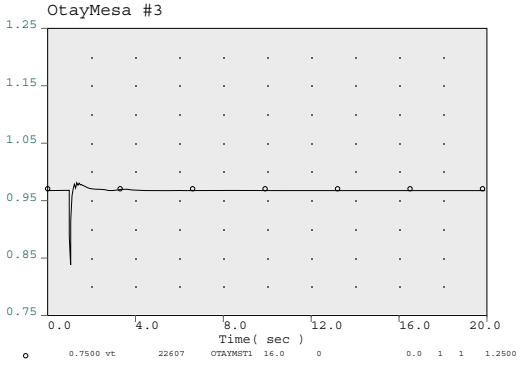
SONGS #3



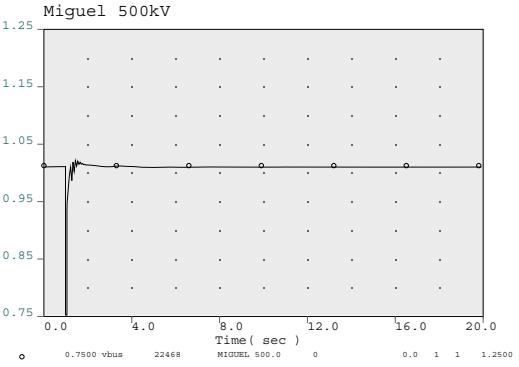
Devers 500



OtayMesa #3



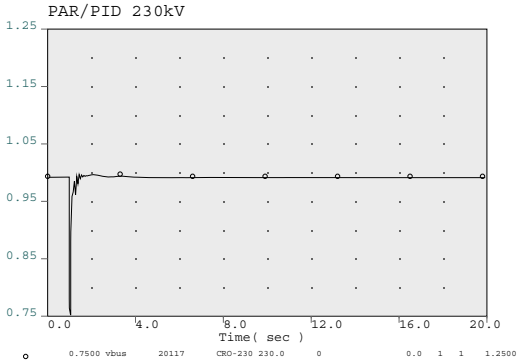
Miguel 500kV



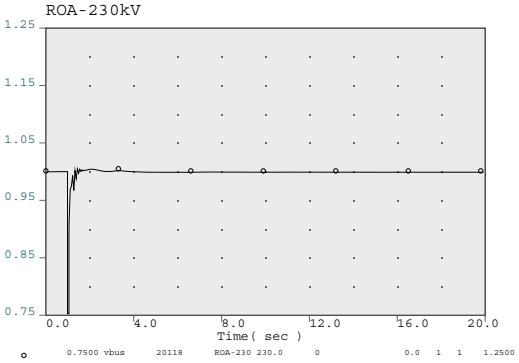
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

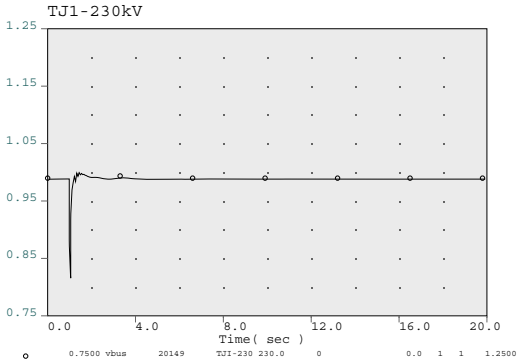
PAR/PID 230kV



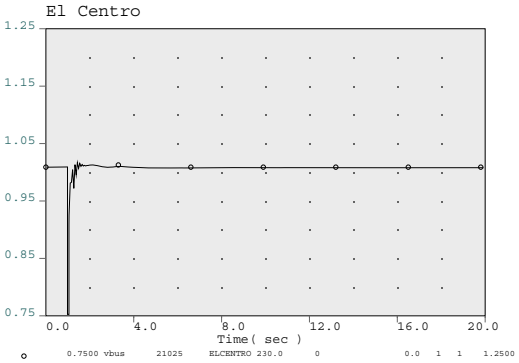
ROA-230kV



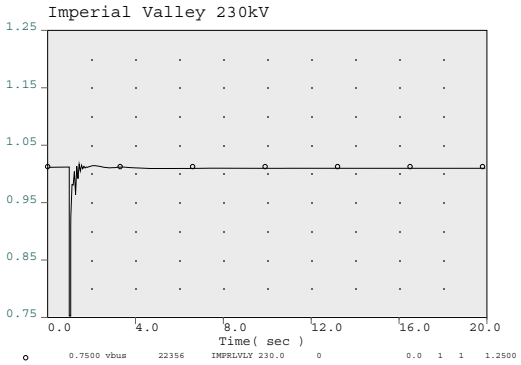
TJ1-230kV



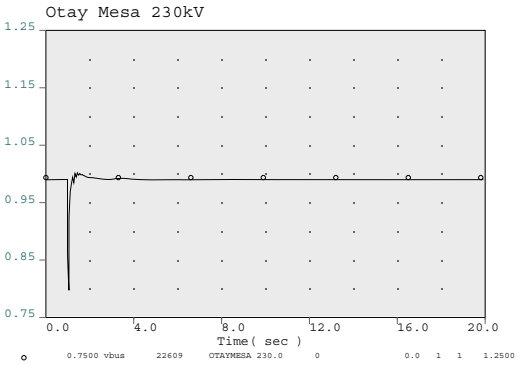
El Centro



Imperial Valley 230kV



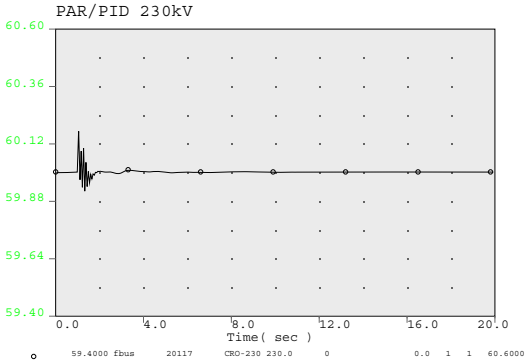
Otay Mesa 230kV



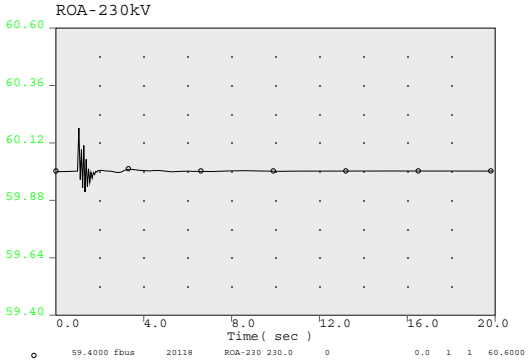
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Affected System Frequency Check and Comparison

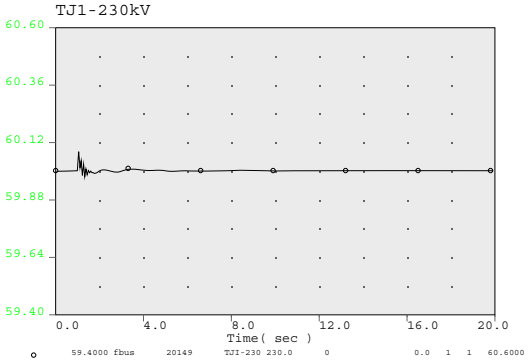
PAR/PID 230kV



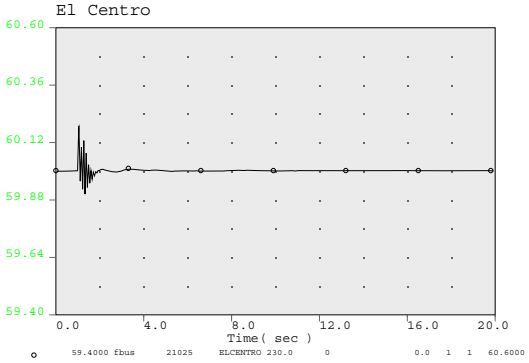
ROA-230kV



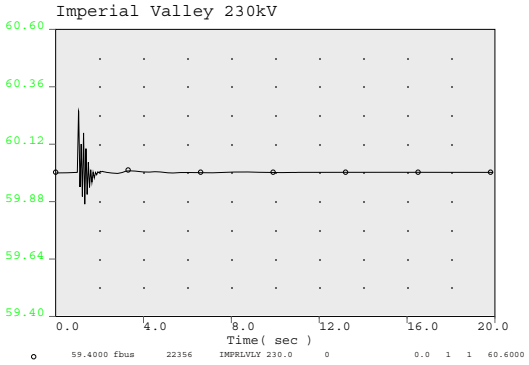
TJ1-230kV



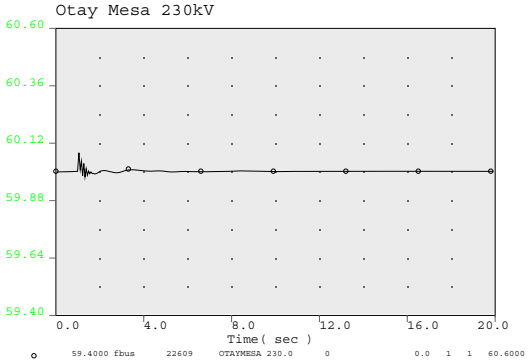
El Centro



Imperial Valley 230kV



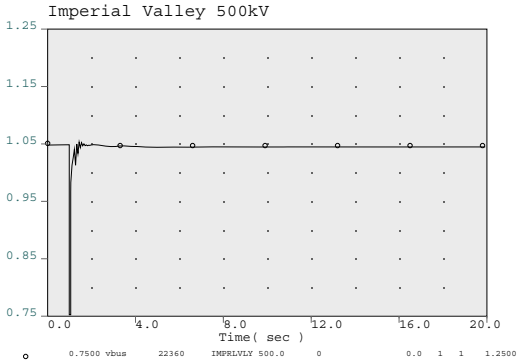
Otay Mesa 230kV



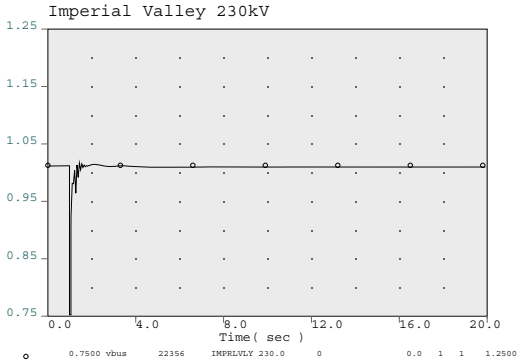
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

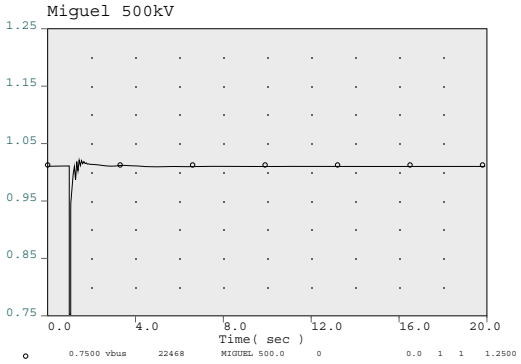
Imperial Valley 500kV



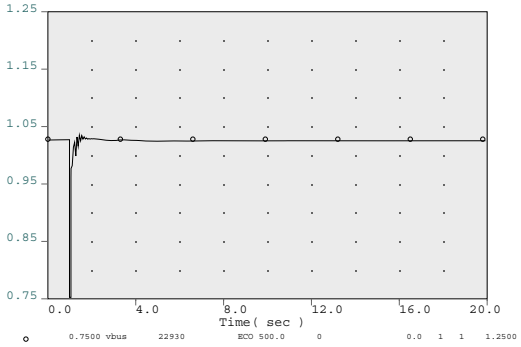
Imperial Valley 230kV



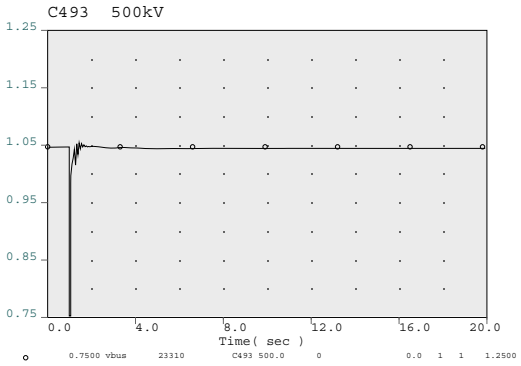
Miguel 500kV



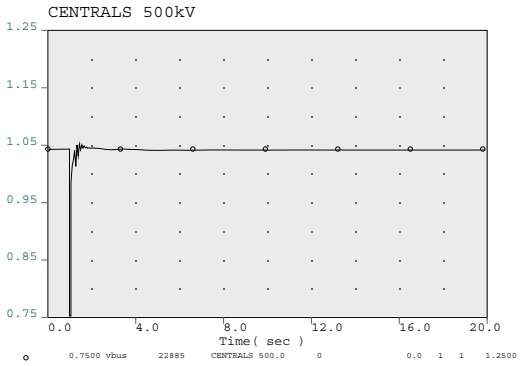
Windfarms 500



C493 500kV



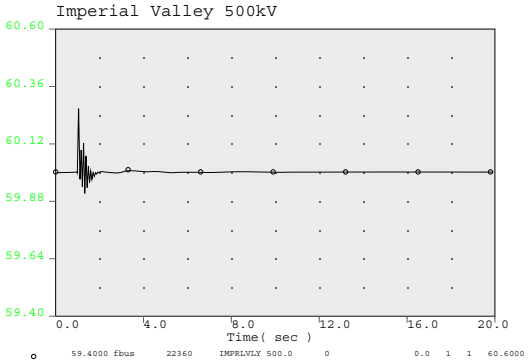
CENTRALS 500kV



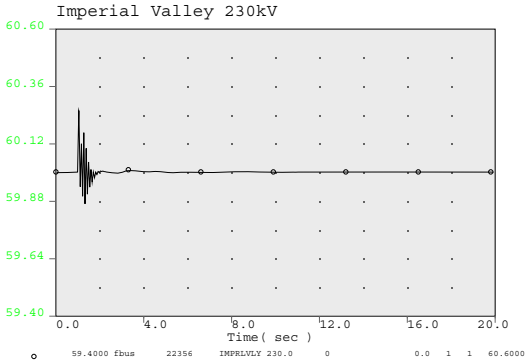
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - Frequency

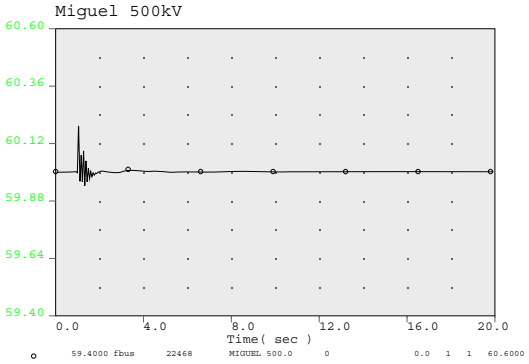
Imperial Valley 500kV



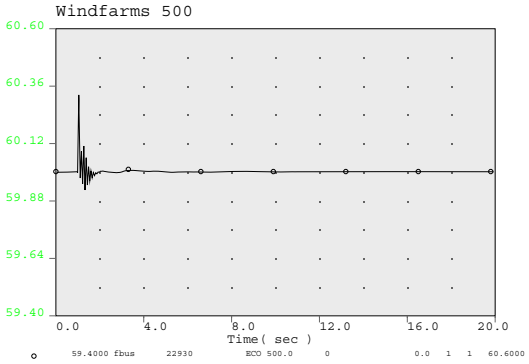
Imperial Valley 230kV



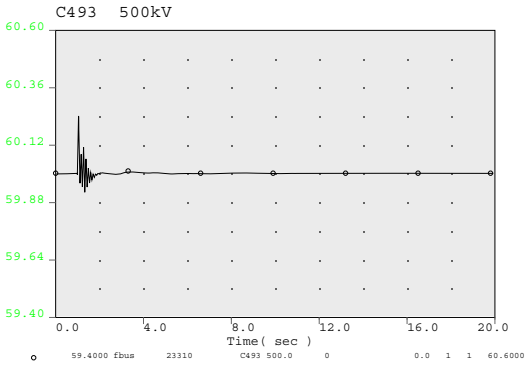
Miguel 500kV



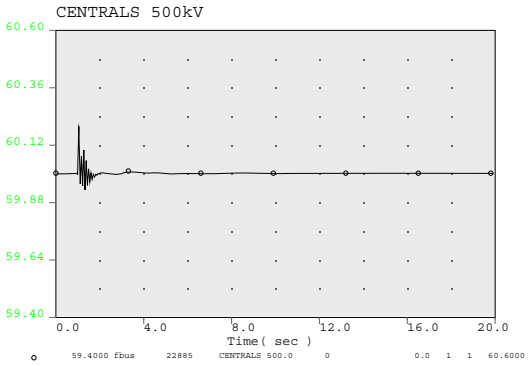
Windfarms 500



C493 500kV

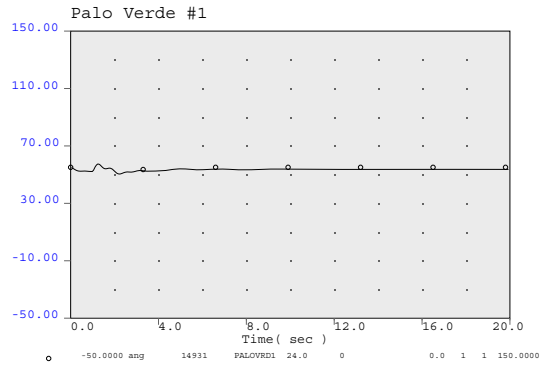


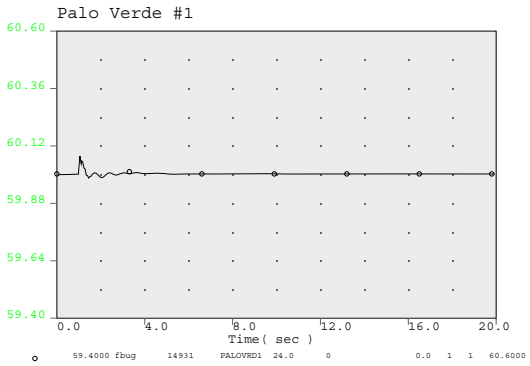
CENTRALS 500kV

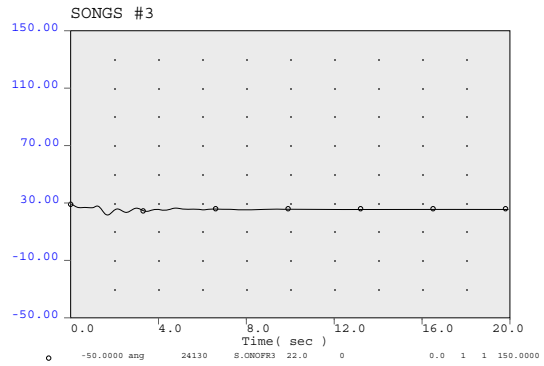


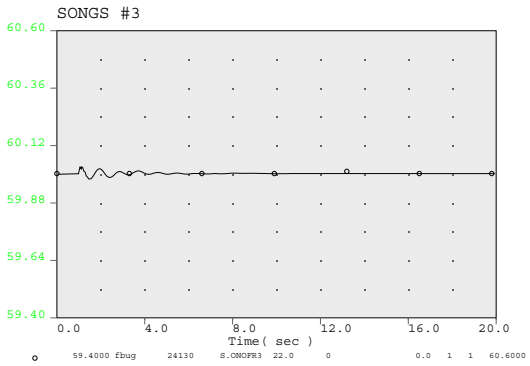
SDG&E Cluster 2 - post
2014 Heavy Summer
Haasyampa-N.Gila 500 kV line

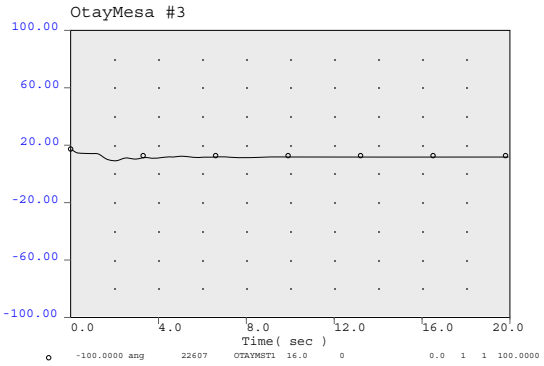
RELATIVE ROTOR ANGLE & FREQUENCY

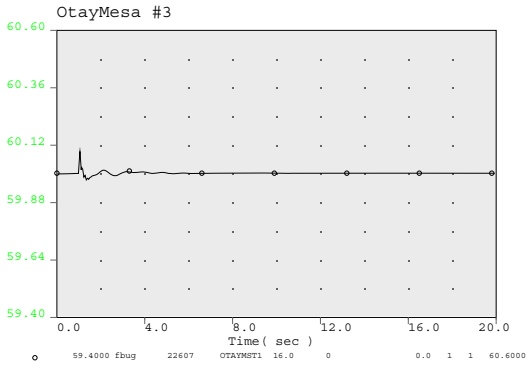












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

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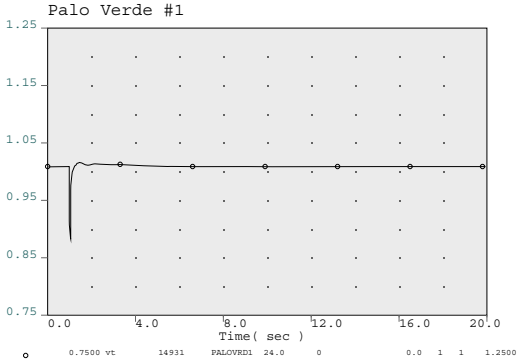
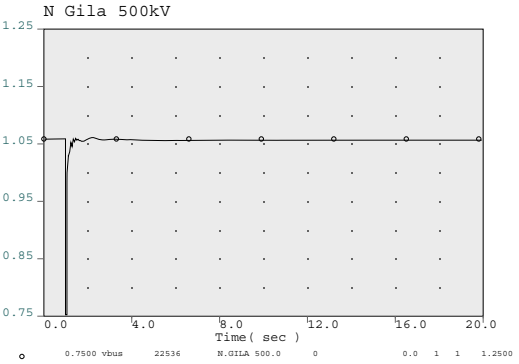
RELATIVE VOLTAGE

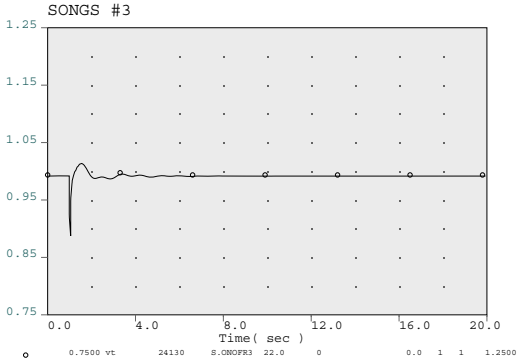
Palo Verde #1



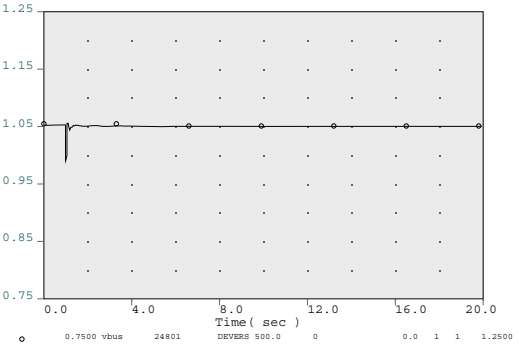
N Gila 500kV



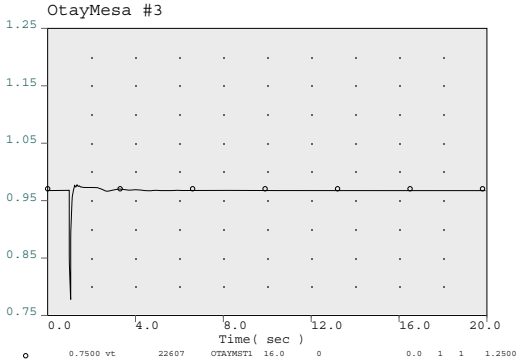
SONGS #3



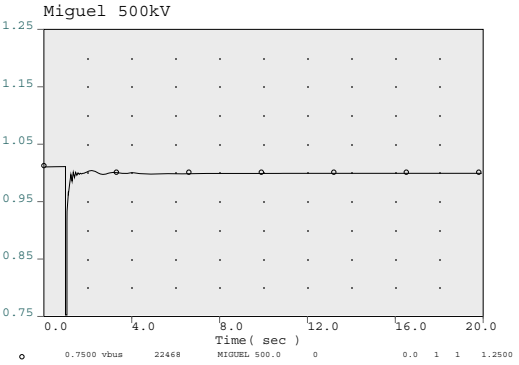
Devers 500



OtayMesa #3



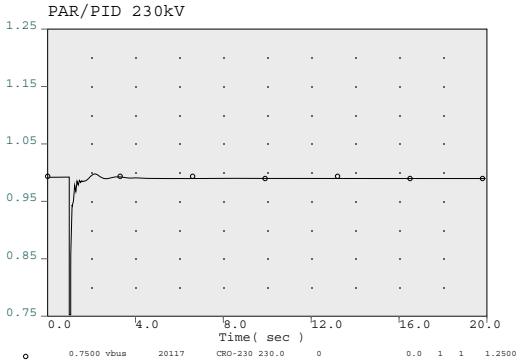
Miguel 500kV



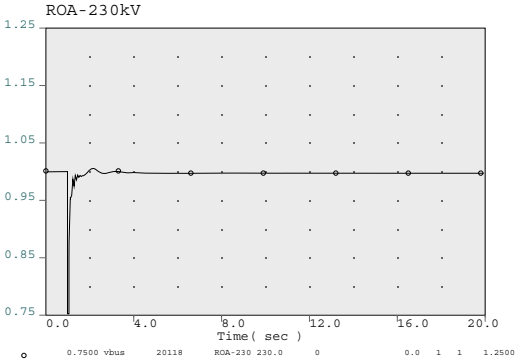
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

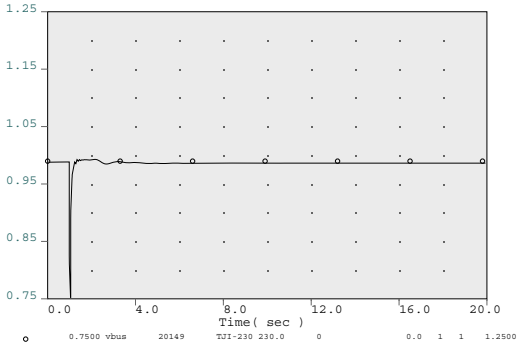
PAR/PID 230kV



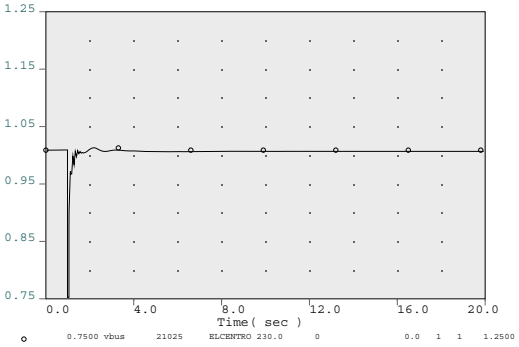
ROA-230kV



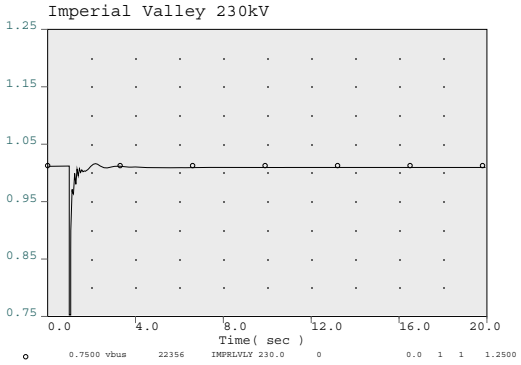
TJ1-230kV



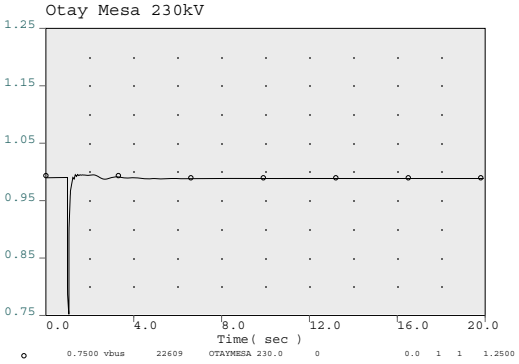
El Centro



Imperial Valley 230kV



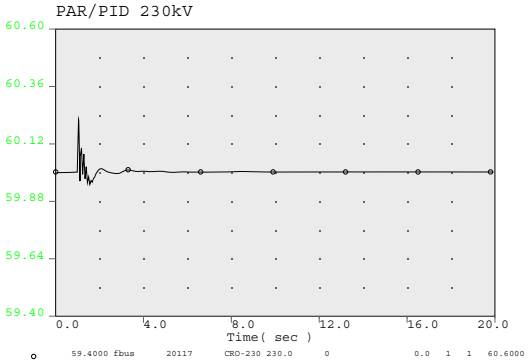
Otay Mesa 230kV



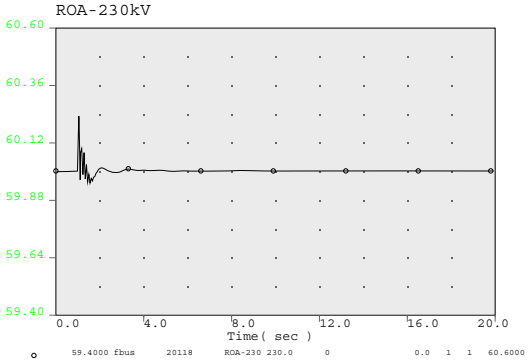
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

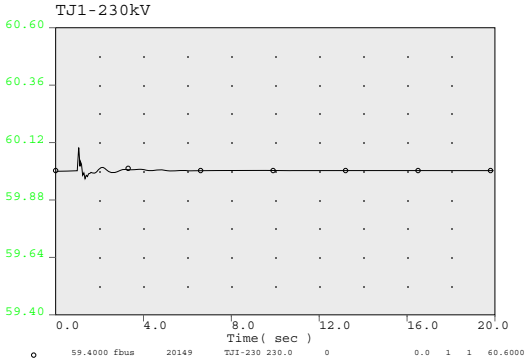
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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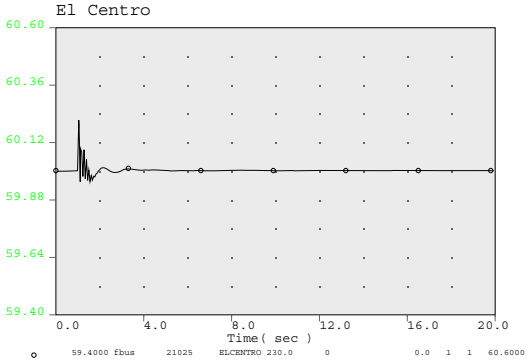
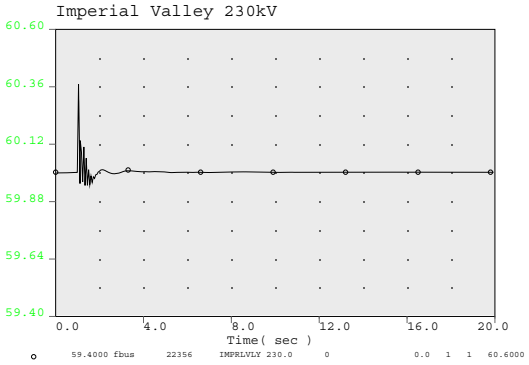
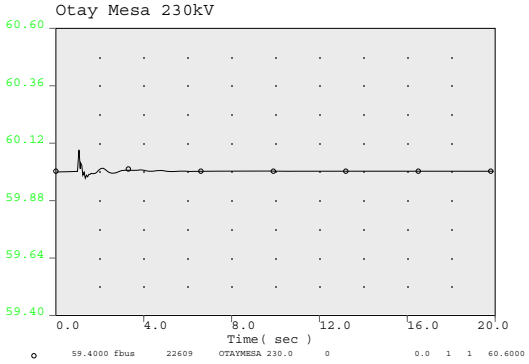


Imperial Valley 230kV

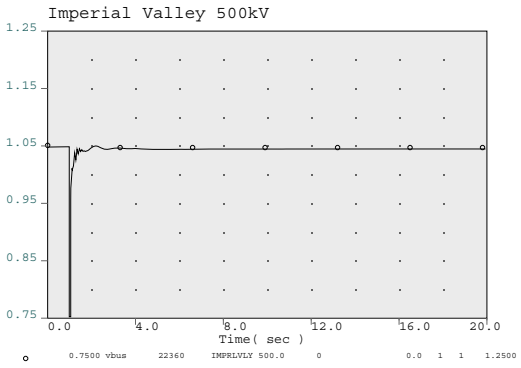


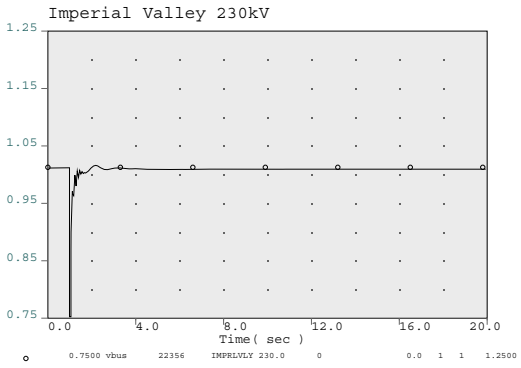
Otay Mesa 230kV

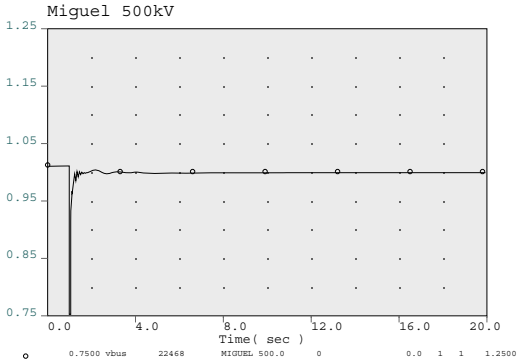


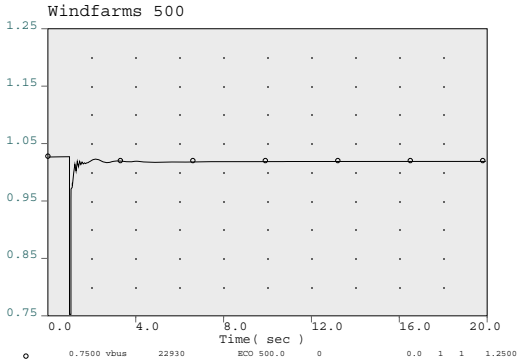
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

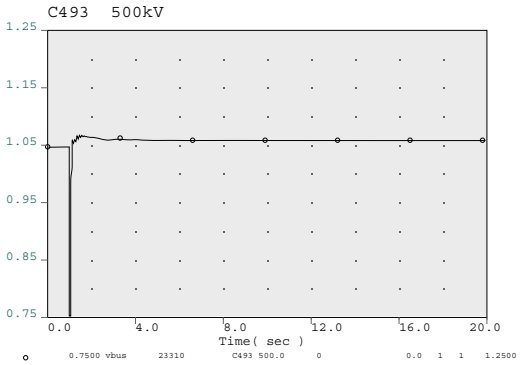
Imperial Valley Area - VOLTAGE

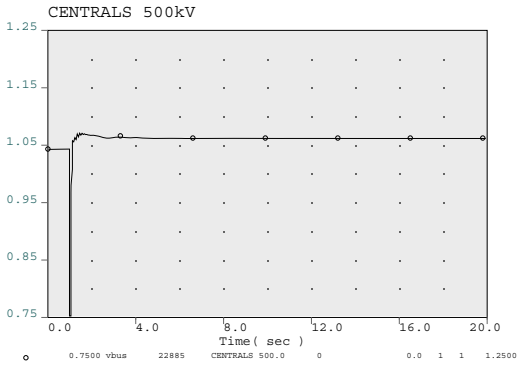






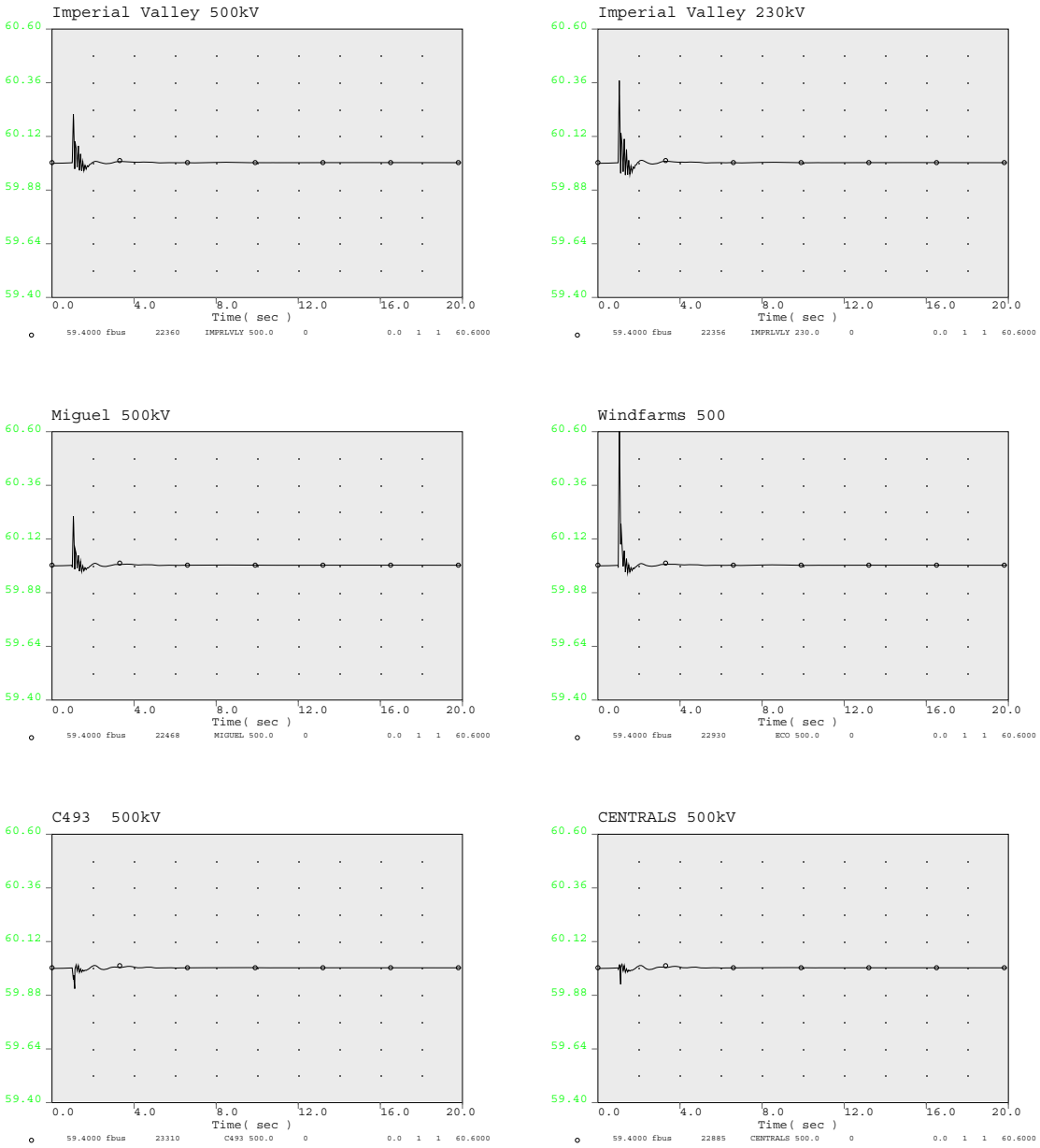






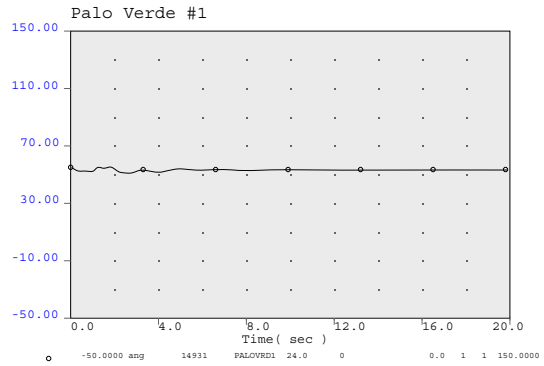
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

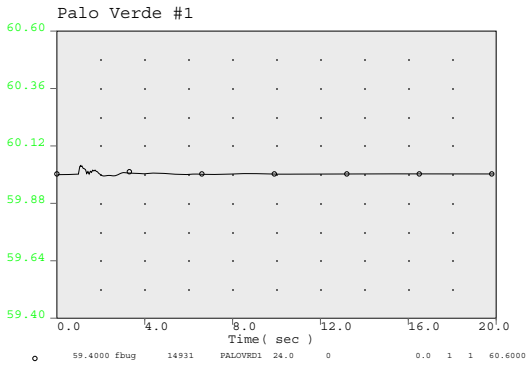
Imperial Valley Area - Frequency

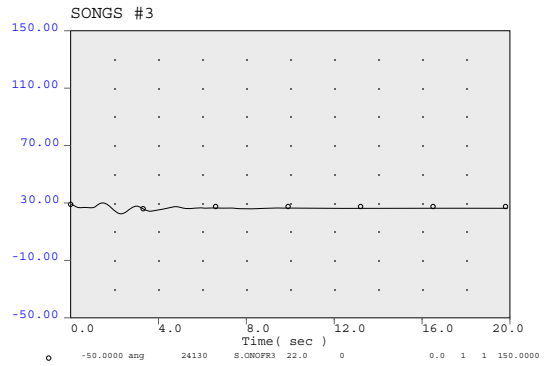


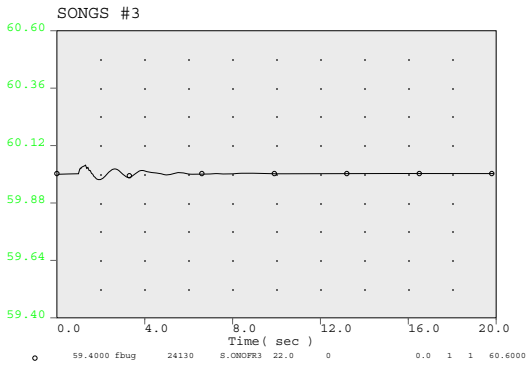
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

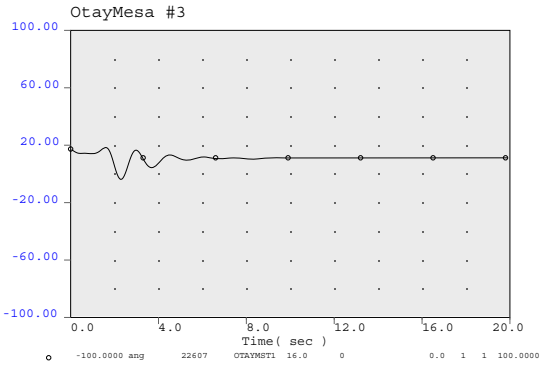
RELATIVE ROTOR ANGLE & FREQUENCY

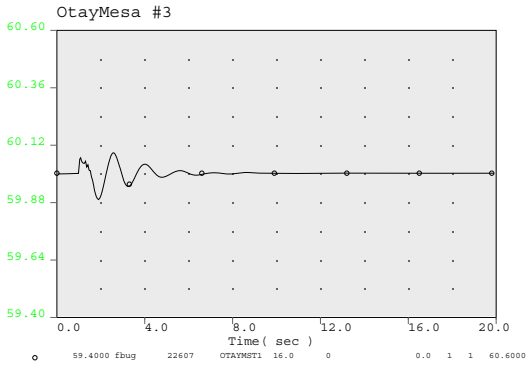












SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

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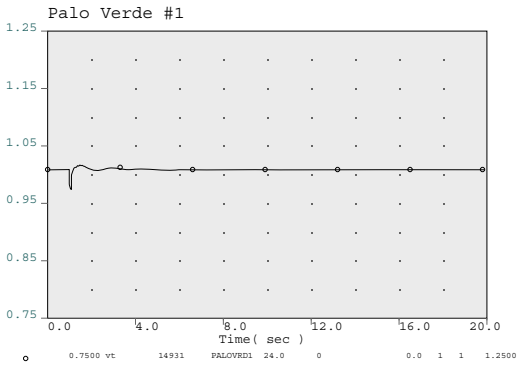
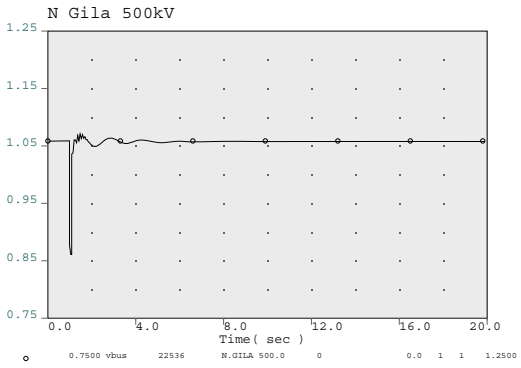
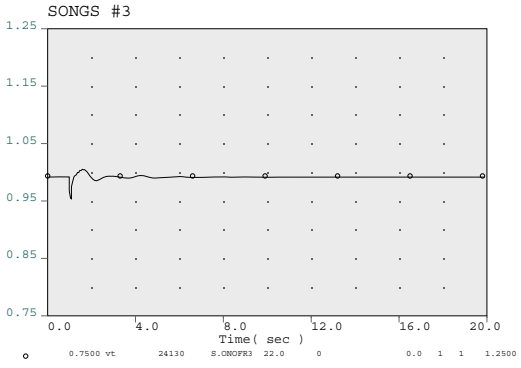
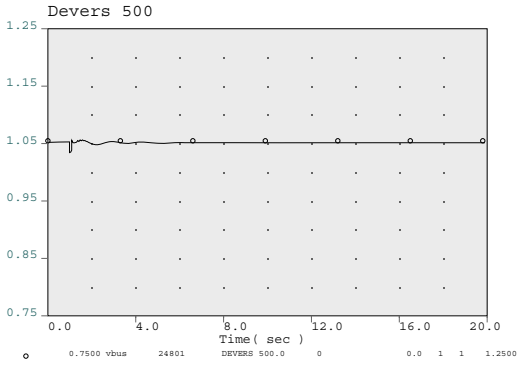
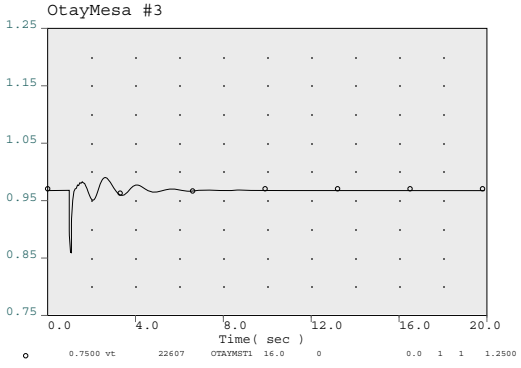
RELATIVE VOLTAGE

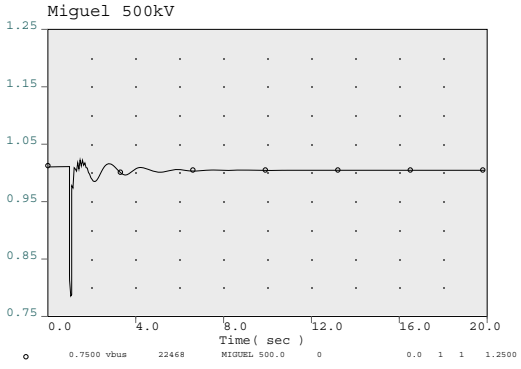








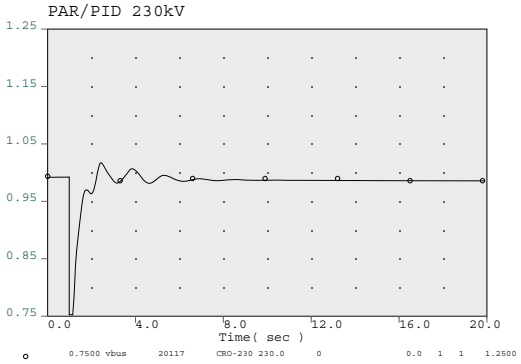




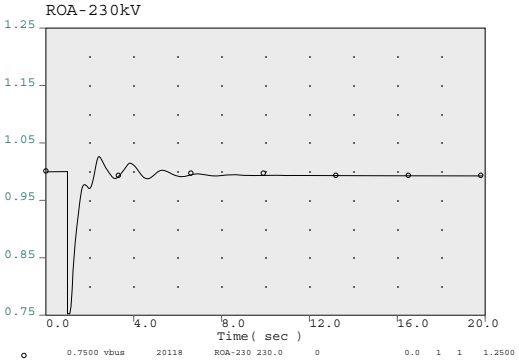
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

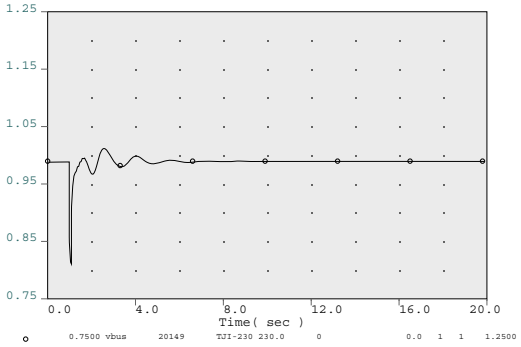
PAR/PID 230kV



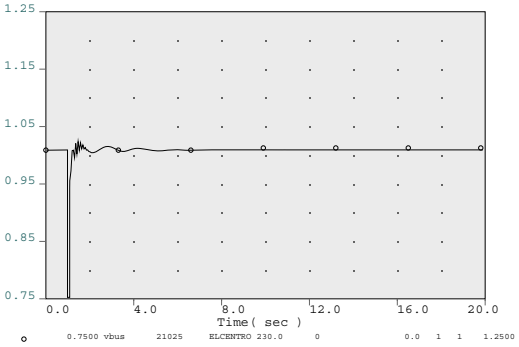
ROA-230kV



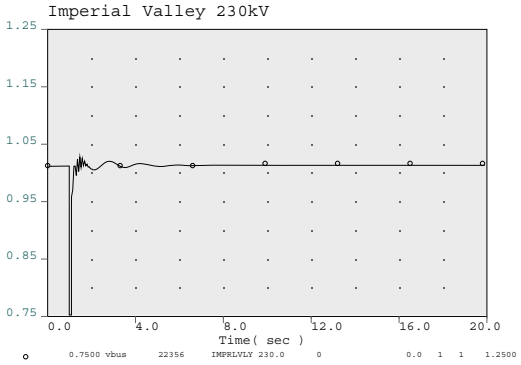
TJ1-230kV



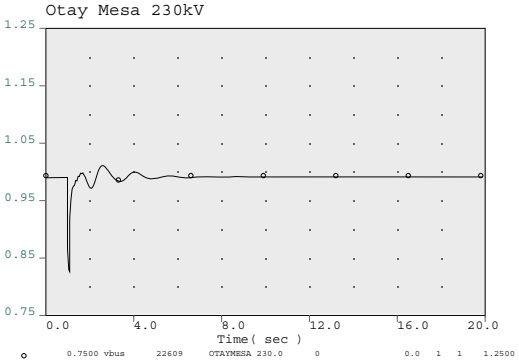
El Centro



Imperial Valley 230kV



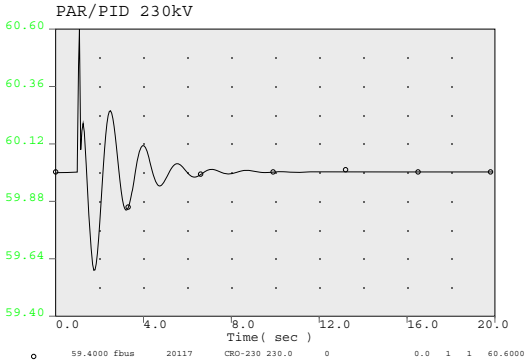
Otay Mesa 230kV



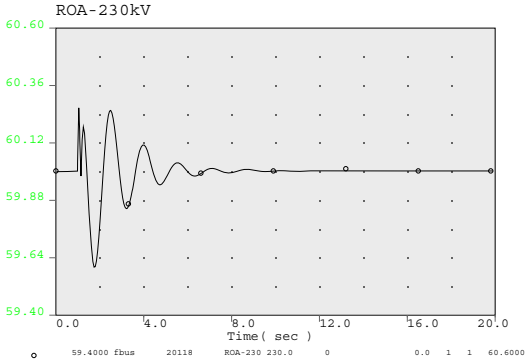
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Frequency Check and Comparison

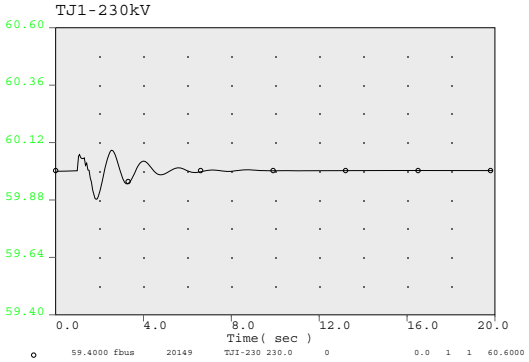
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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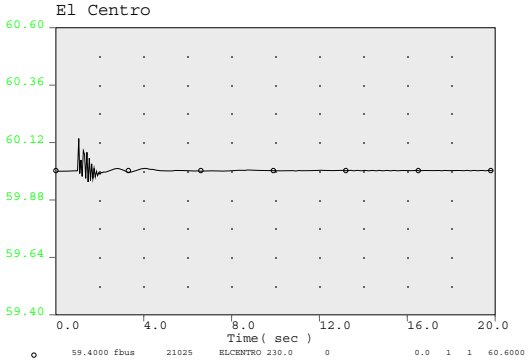
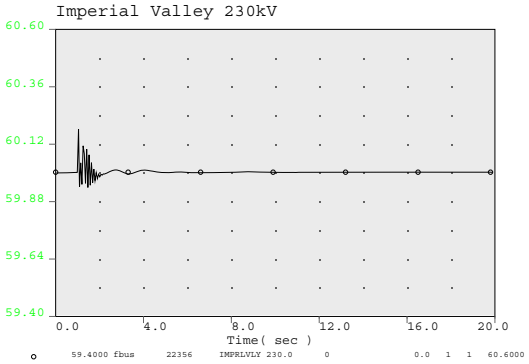
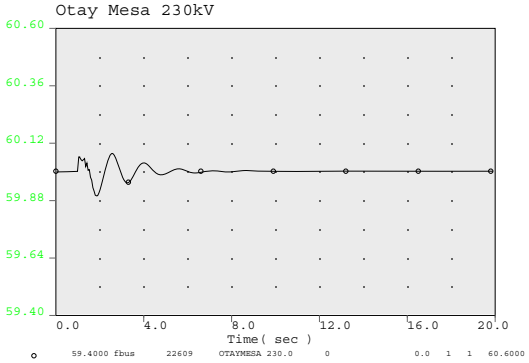


Imperial Valley 230kV



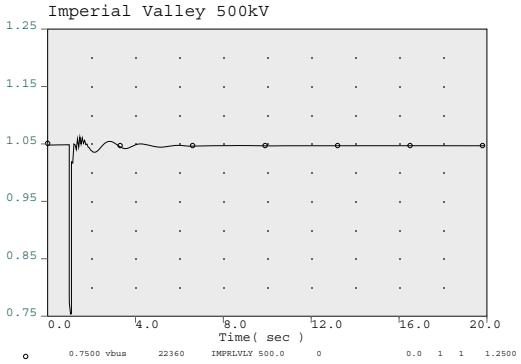
Otay Mesa 230kV



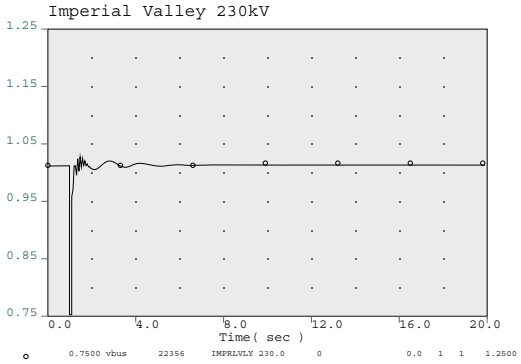
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

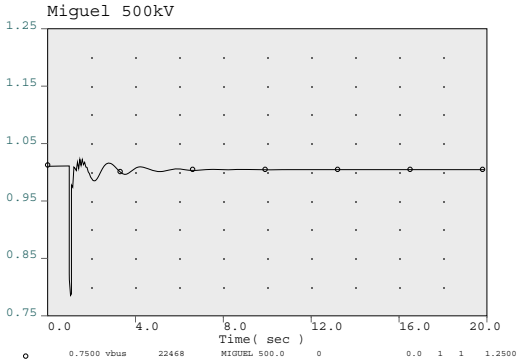
Imperial Valley 500kV



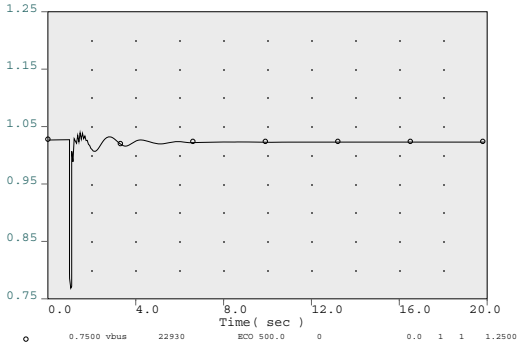
Imperial Valley 230kV



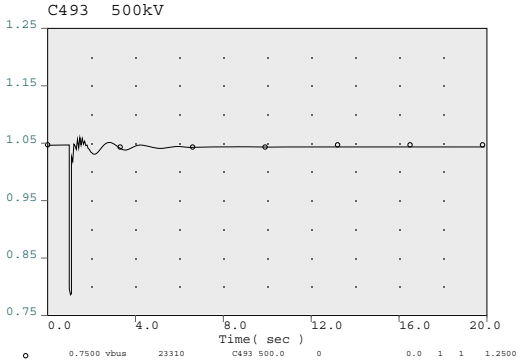
Miguel 500kV



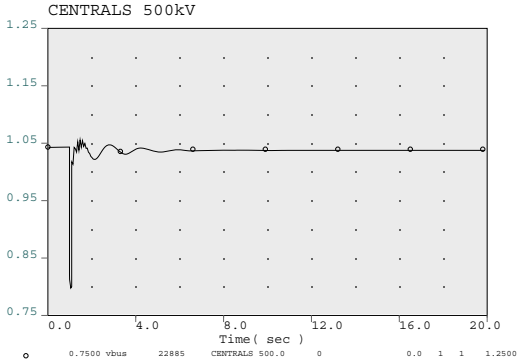
Windfarms 500



C493 500kV

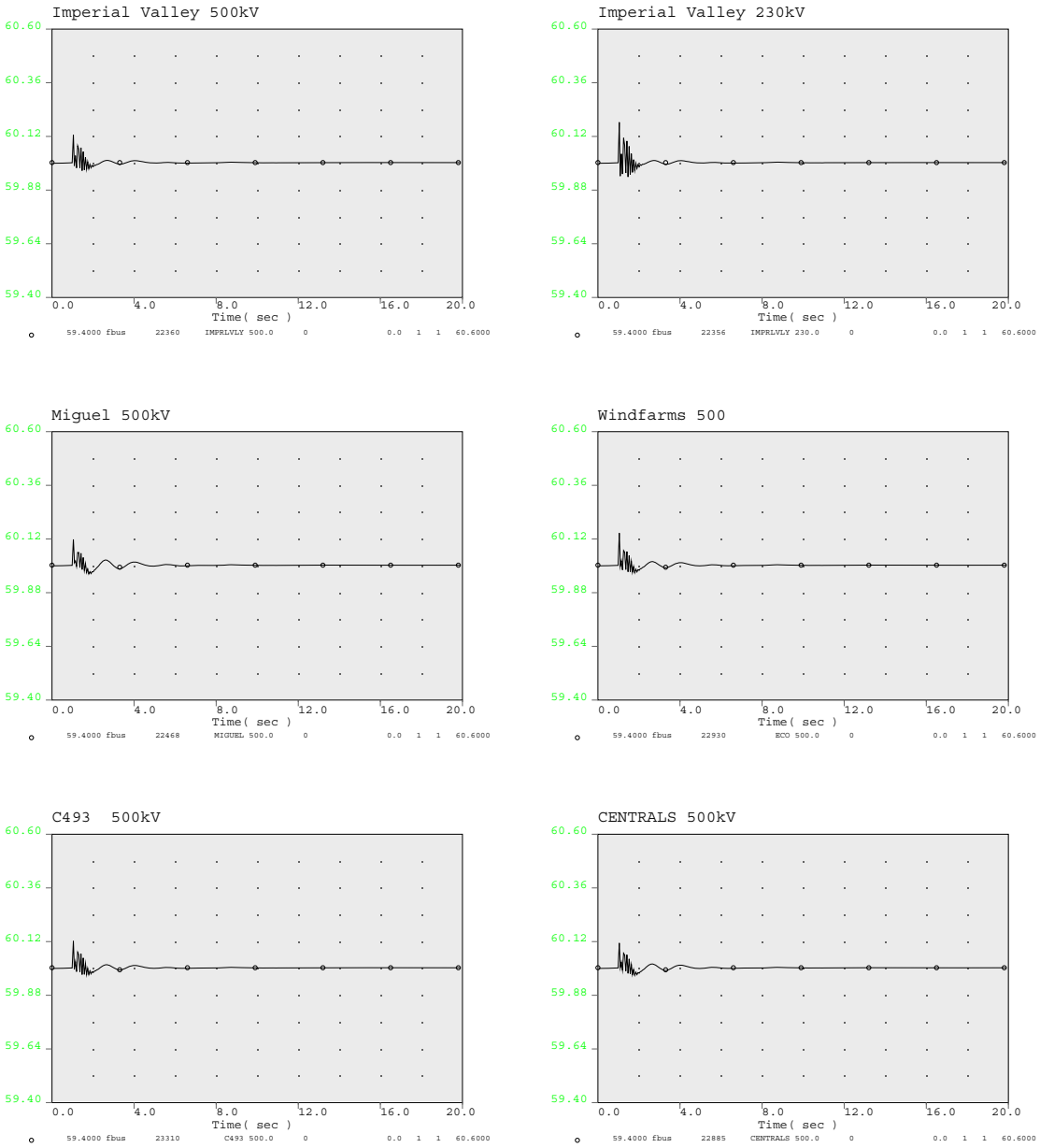


CENTRALS 500kV



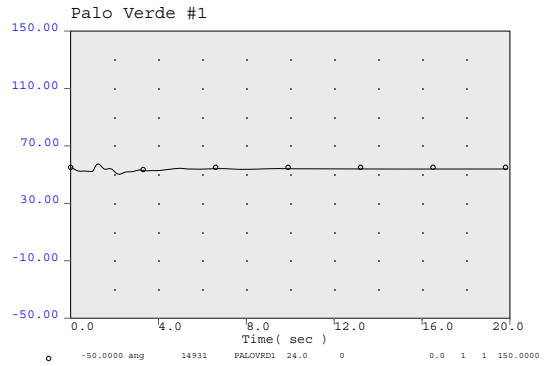
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

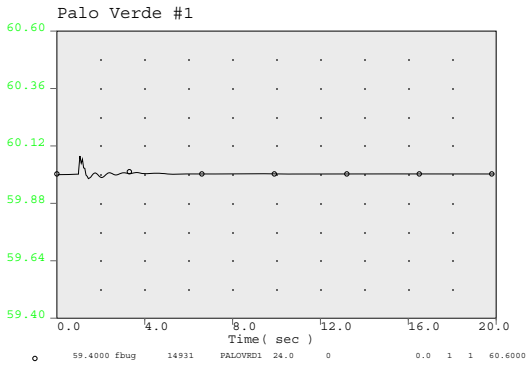
Imperial Valley Area - Frequency

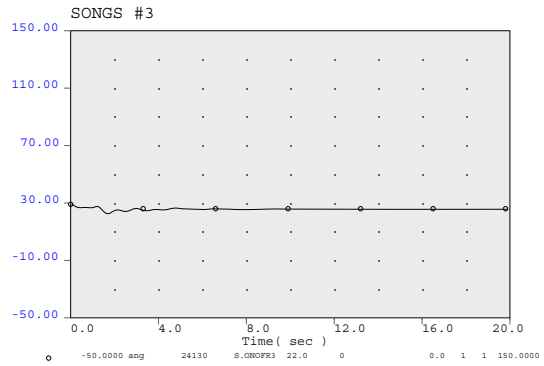


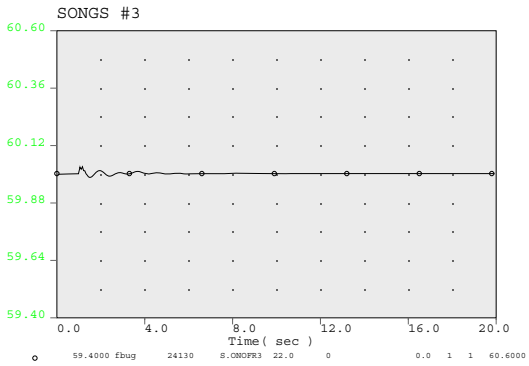
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

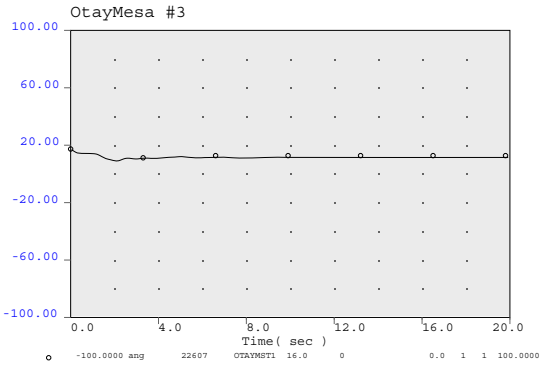
RELATIVE ROTOR ANGLE & FREQUENCY

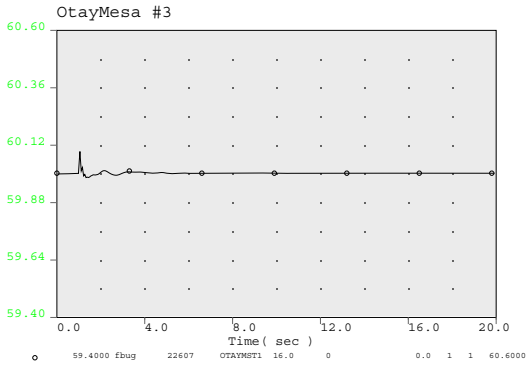












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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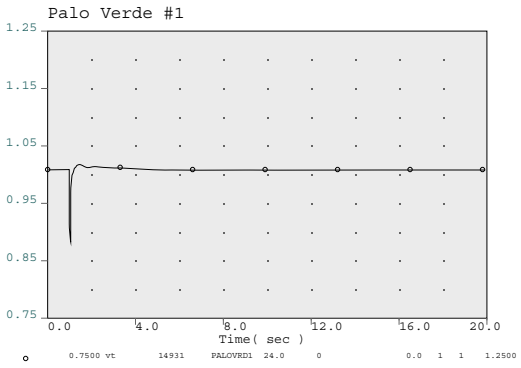
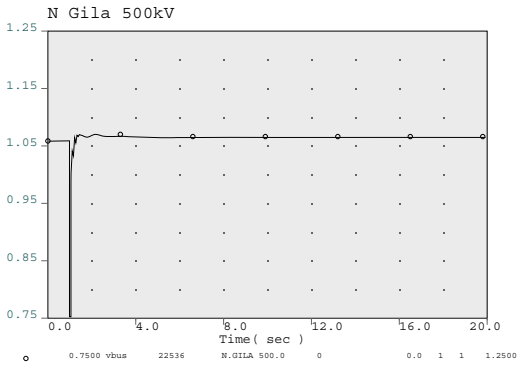
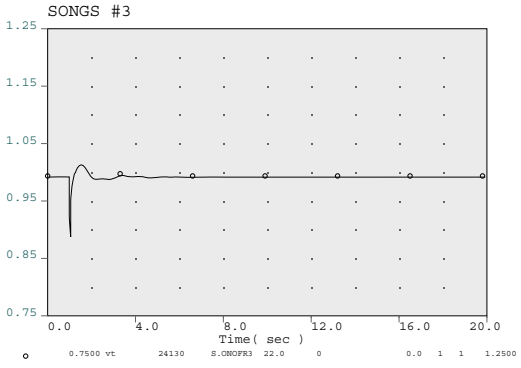
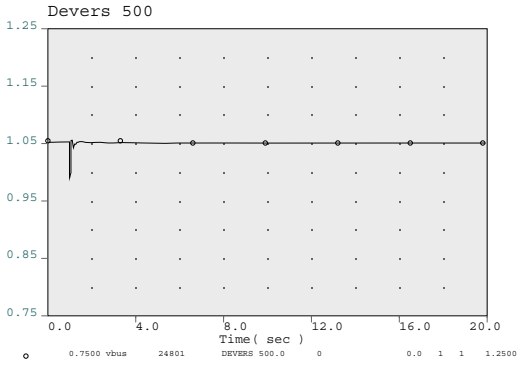
SDGE	IV_Wnd1_noRAS_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:23:49 2010

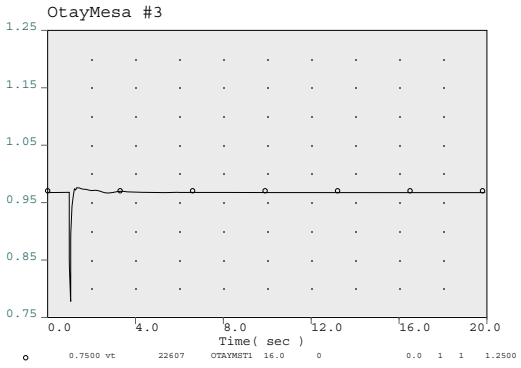
RELATIVE VOLTAGE

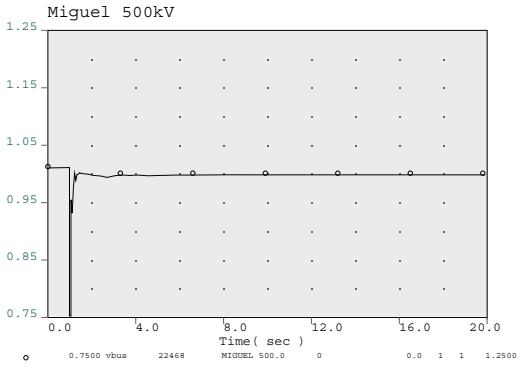








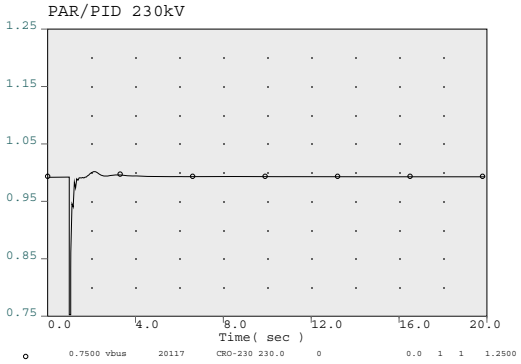




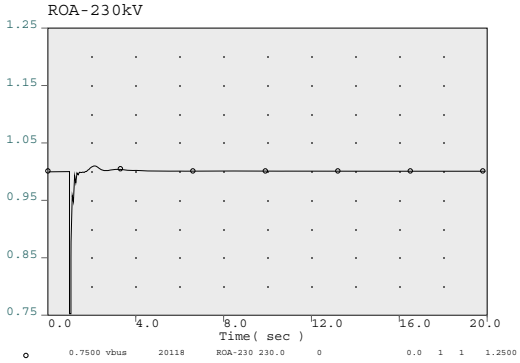
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

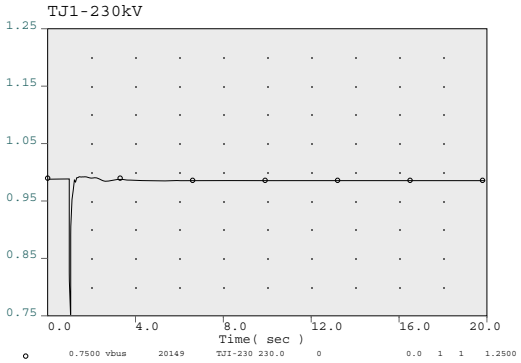
PAR/PID 230kV



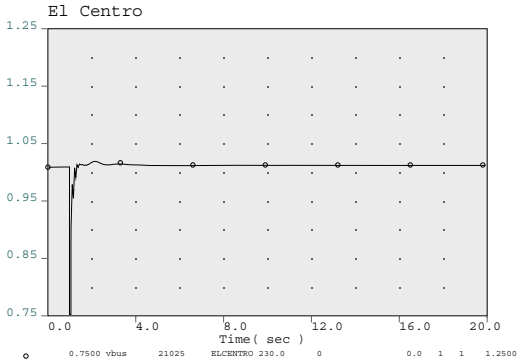
ROA-230kV



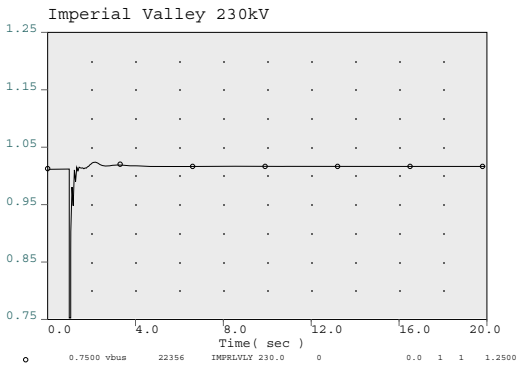
TJ1-230kV



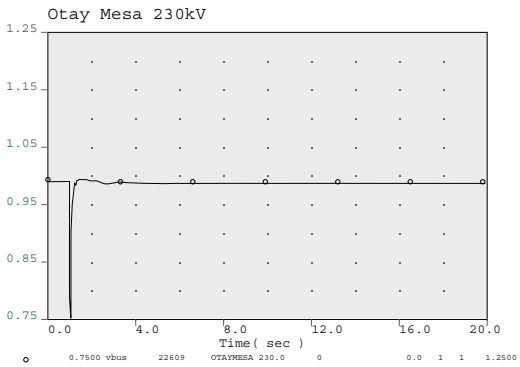
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



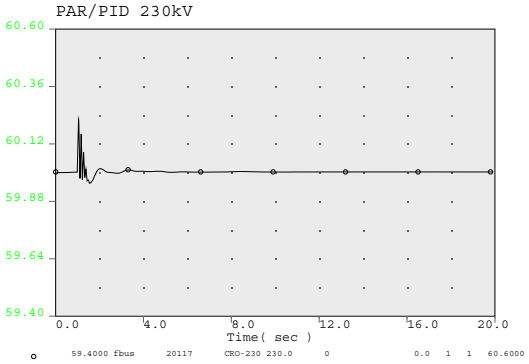
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Page 3

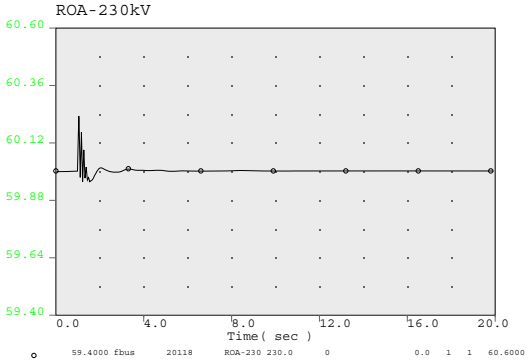
SDGE	IV_Wnd1_noRAS_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:23:49 2010

Affected System Frequency Check and Comparison

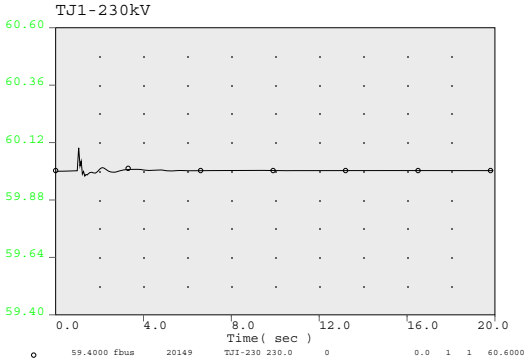
PAR/PID 230kV



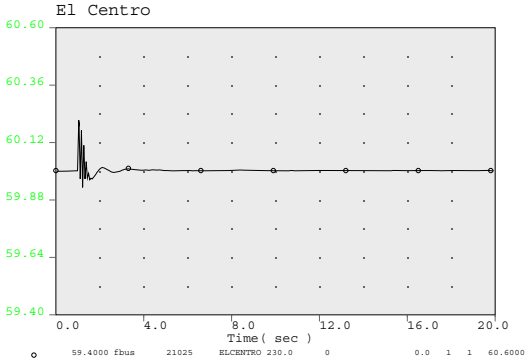
ROA-230kV



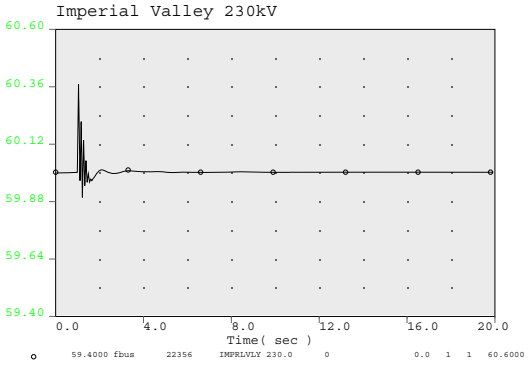
TJ1-230kV



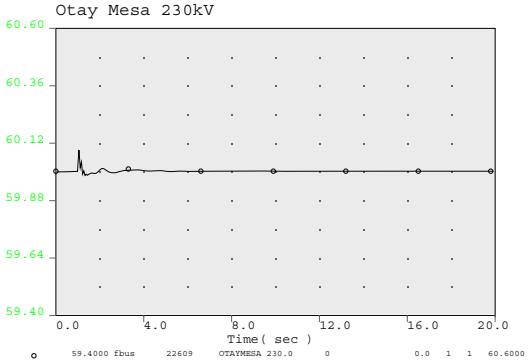
El Centro



Imperial Valley 230kV



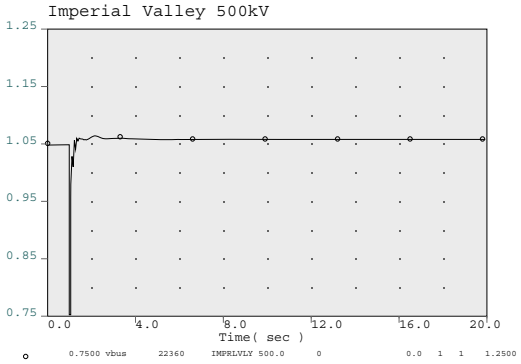
Otay Mesa 230kV



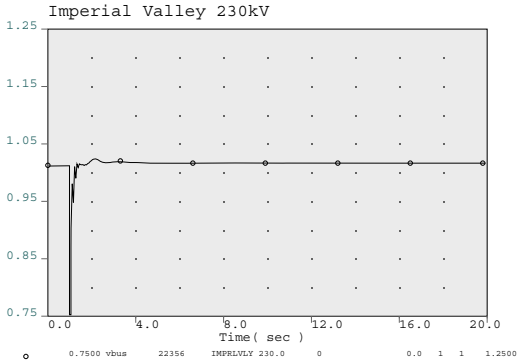
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

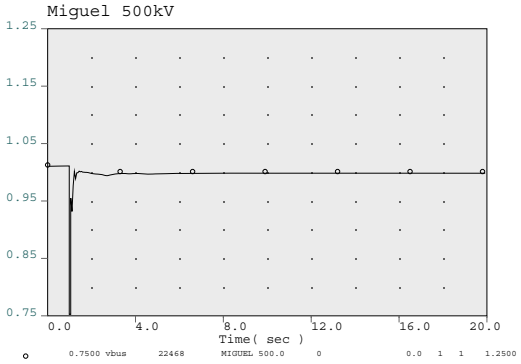
Imperial Valley 500kV



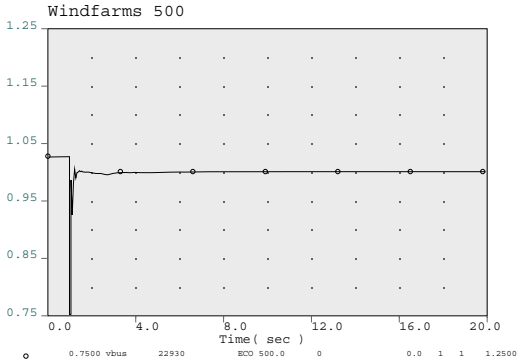
Imperial Valley 230kV



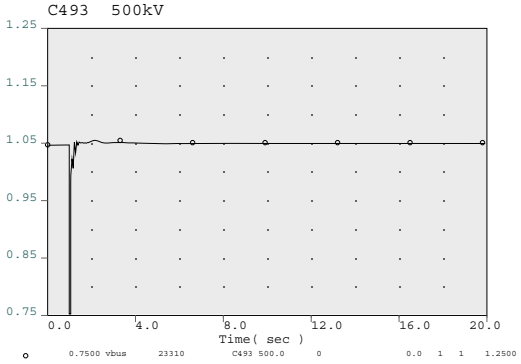
Miguel 500kV



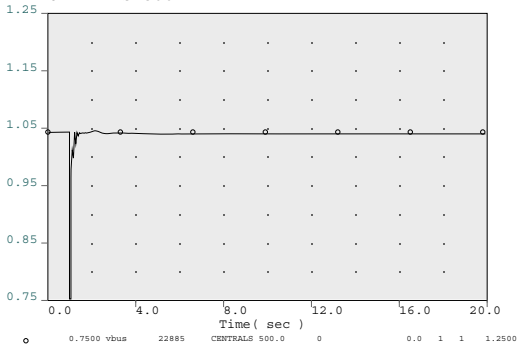
Windfarms 500



C493 500kV

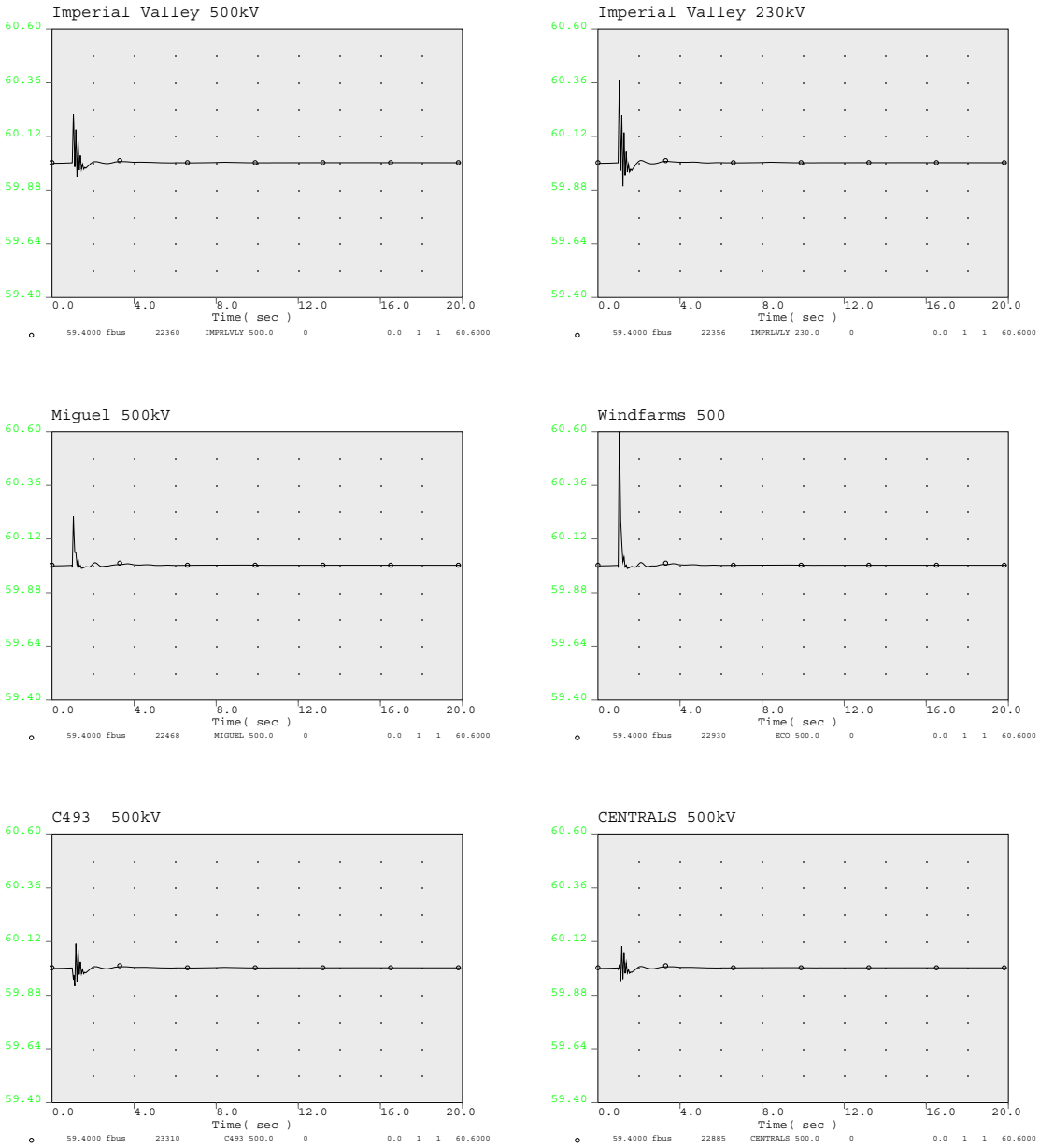


CENTRALS 500kV



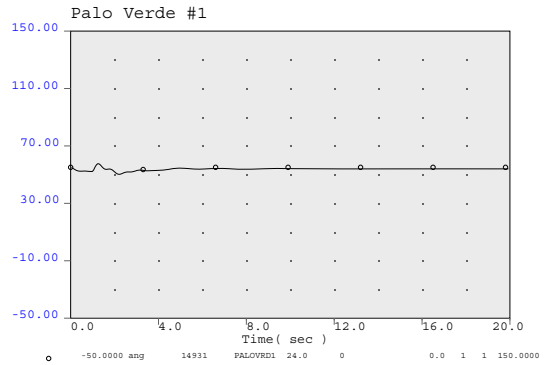
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

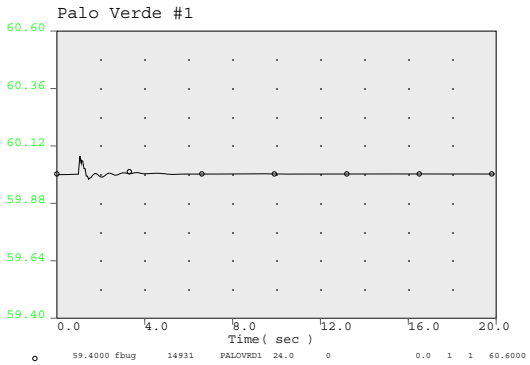
Imperial Valley Area - Frequency

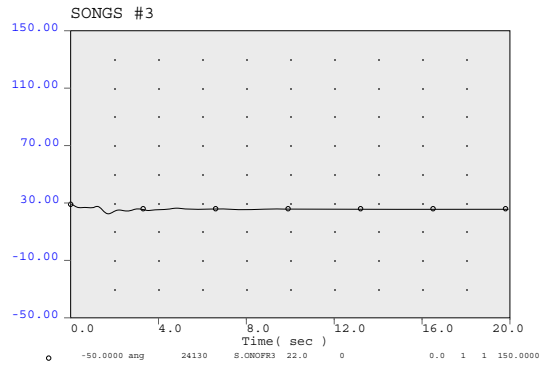


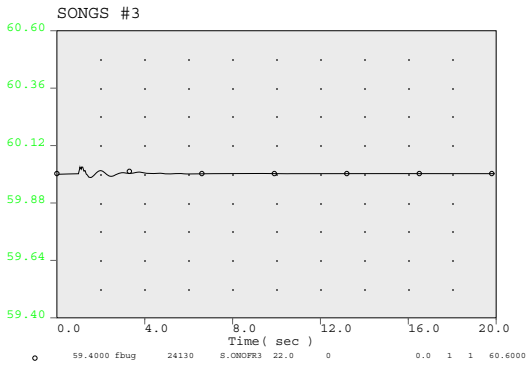
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

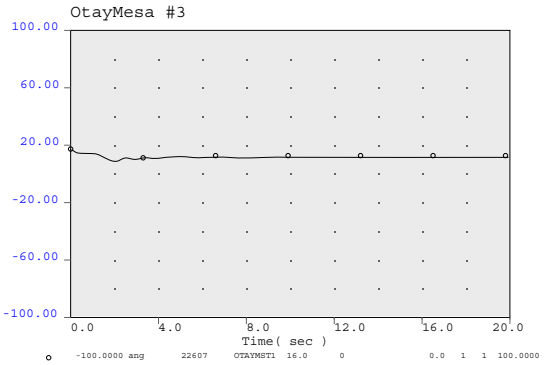
RELATIVE ROTOR ANGLE & FREQUENCY

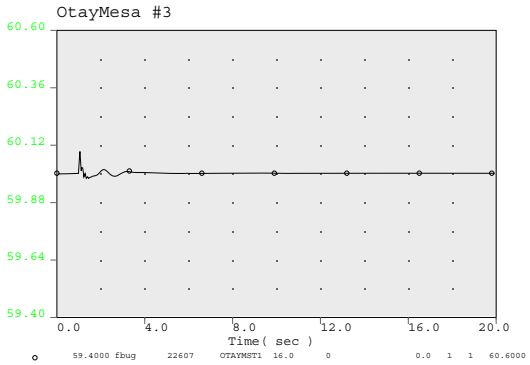












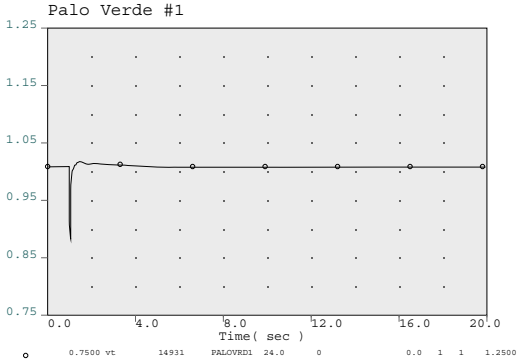
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Page 1

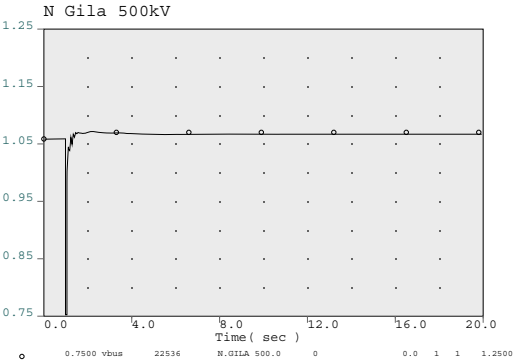
SDGE	IV_Wnd1_noXTrp_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:24:03 2010

RELATIVE VOLTAGE

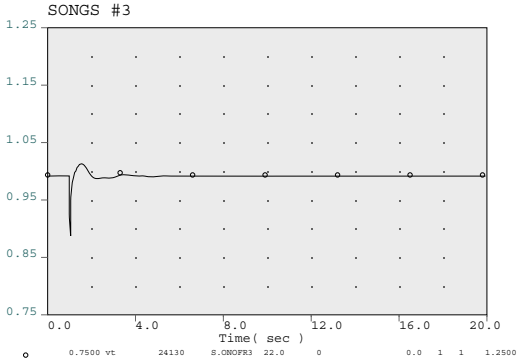
Palo Verde #1



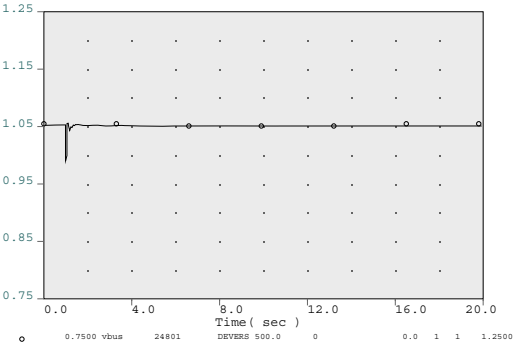
N Gila 500kV



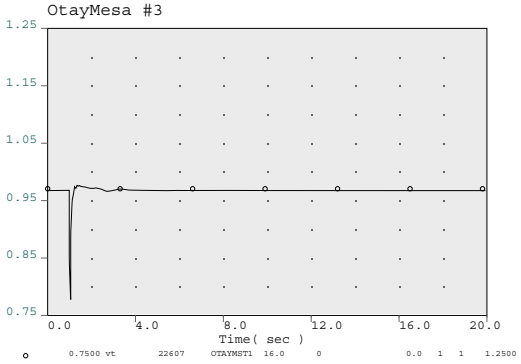
SONGS #3



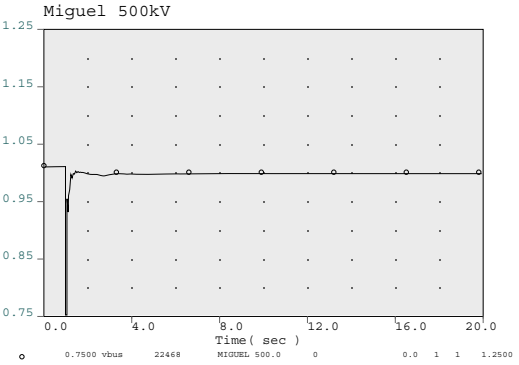
Devers 500



OtayMesa #3



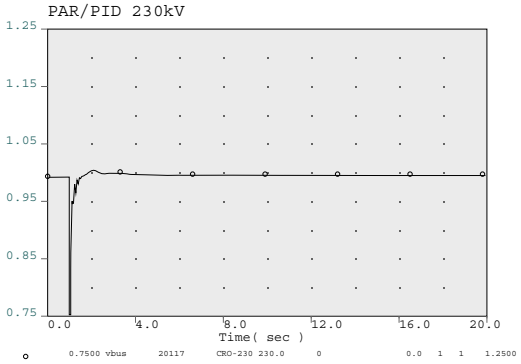
Miguel 500kV



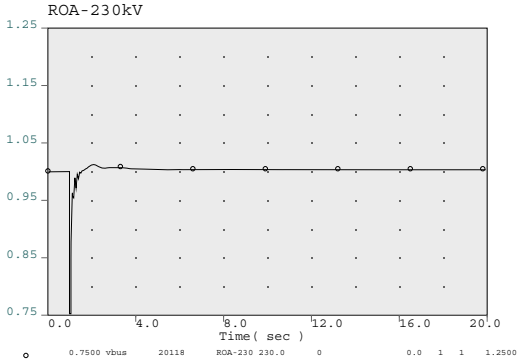
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

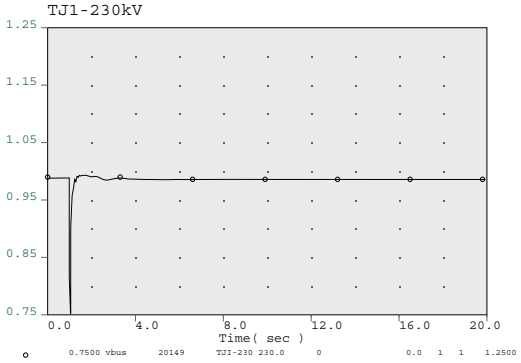
PAR/PID 230kV



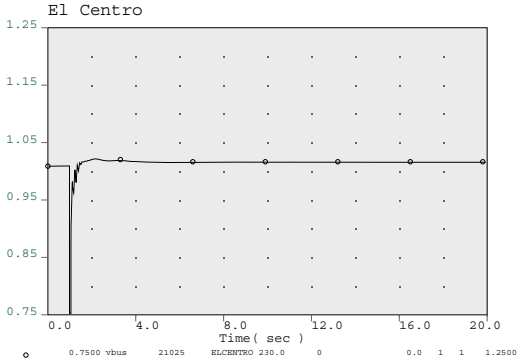
ROA-230kV



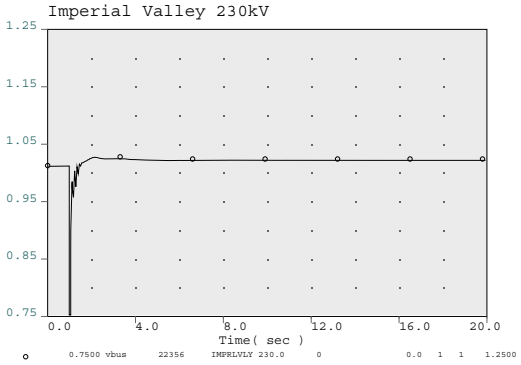
TJ1-230kV



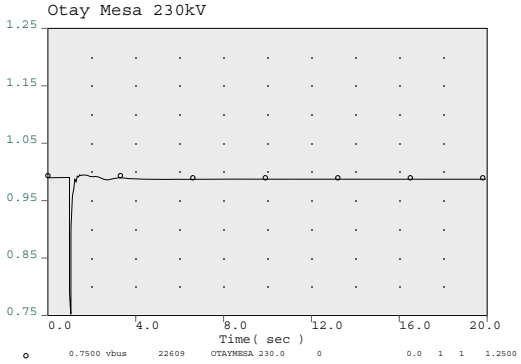
El Centro



Imperial Valley 230kV



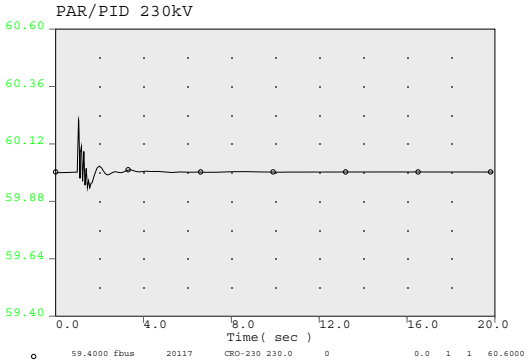
Otay Mesa 230kV



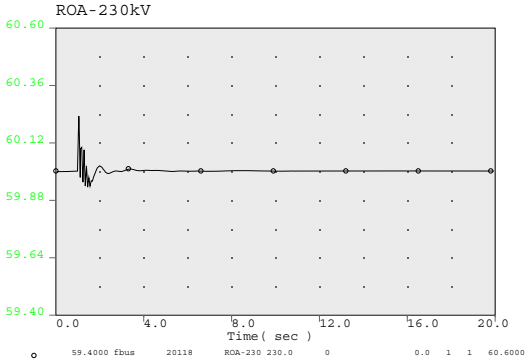
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

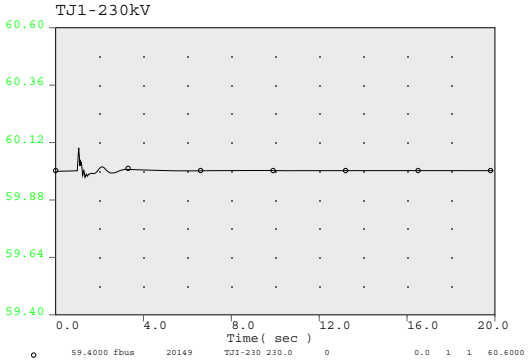
PAR/PID 230kV



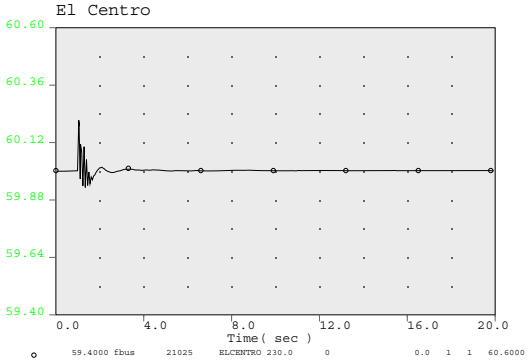
ROA-230kV



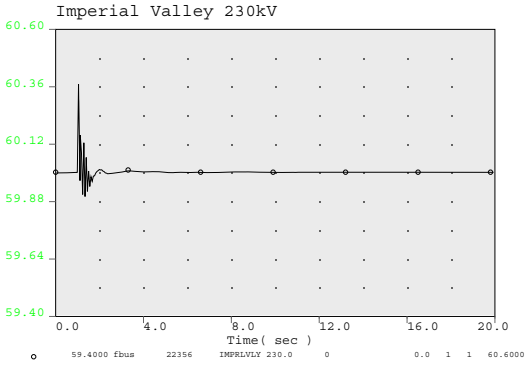
TJ1-230kV



El Centro



Imperial Valley 230kV



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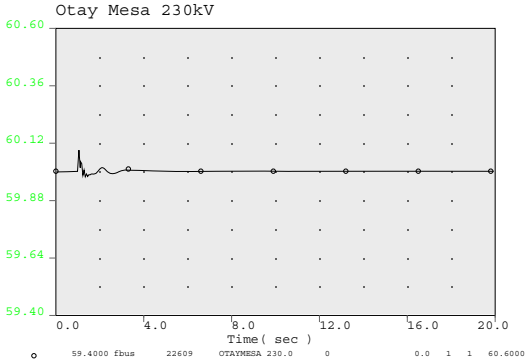
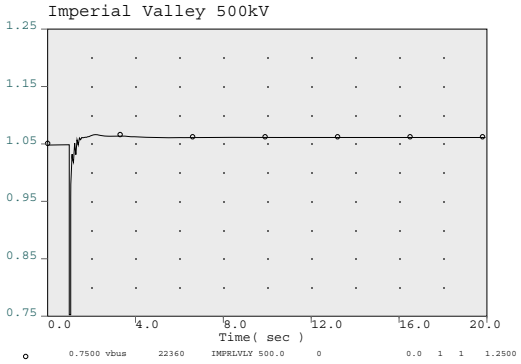


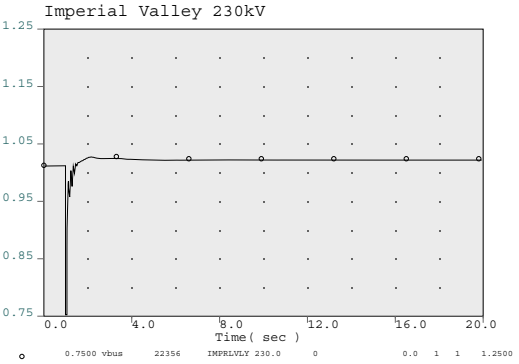
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

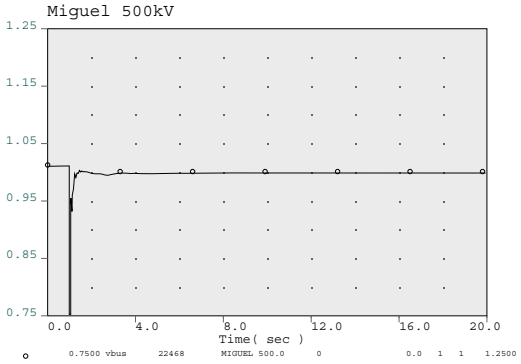
Imperial Valley 500kV



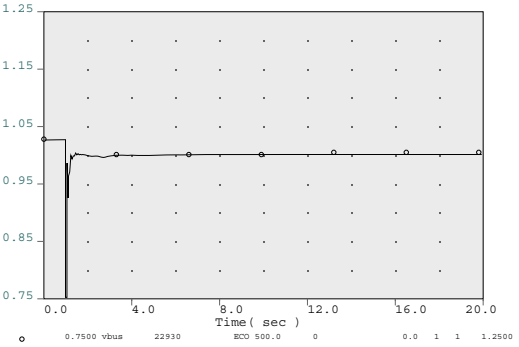
Imperial Valley 230kV



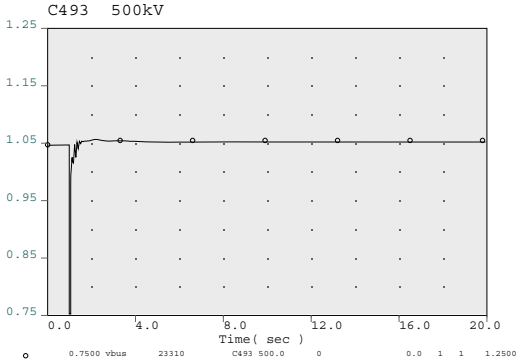
Miguel 500kV



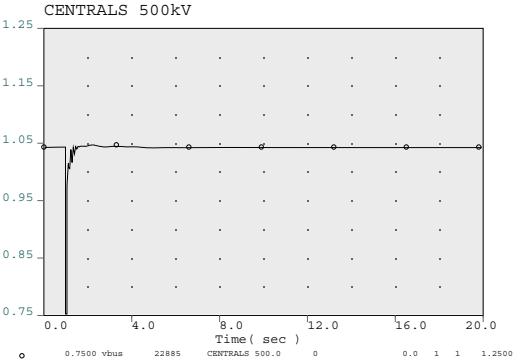
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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IV_Wnd1_noXTrp_pst_hs_eco4.chf

ii phase i\dyds\pst_bu4up

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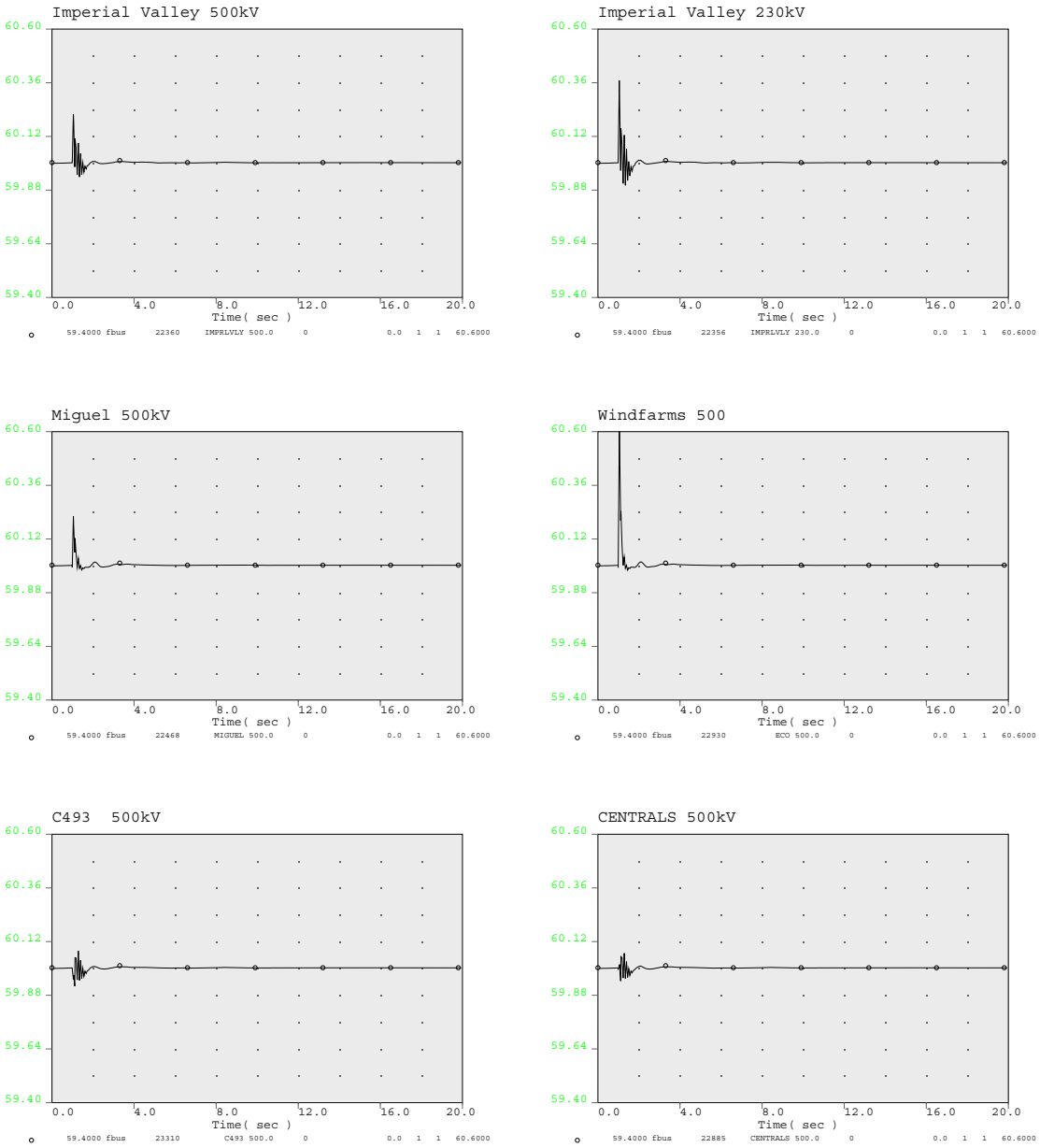
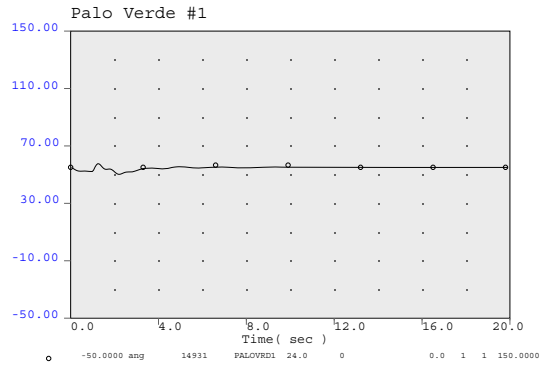
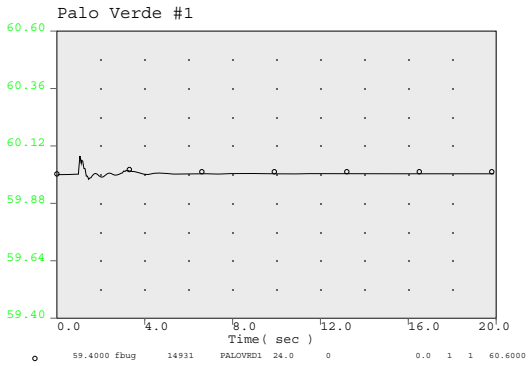
Imperial Valley Area - Frequency

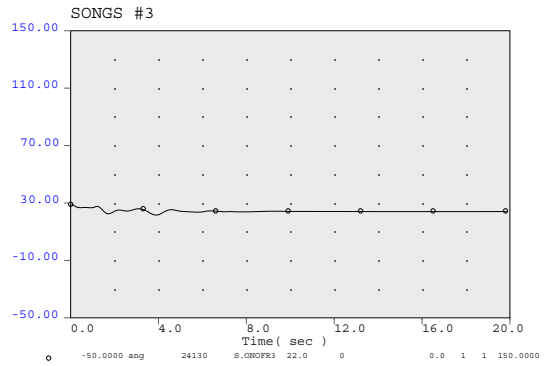


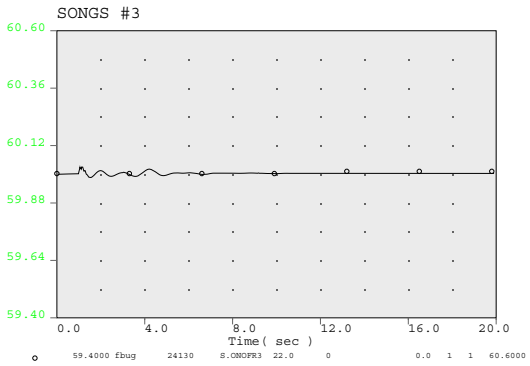
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

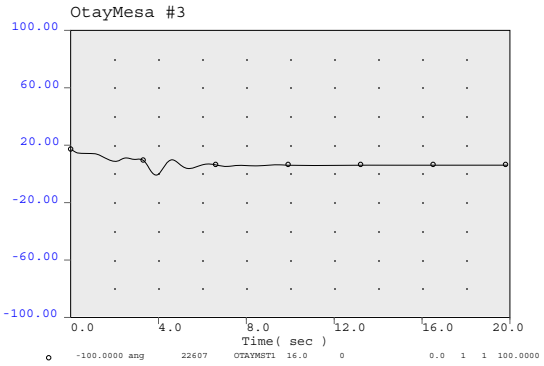
RELATIVE ROTOR ANGLE & FREQUENCY

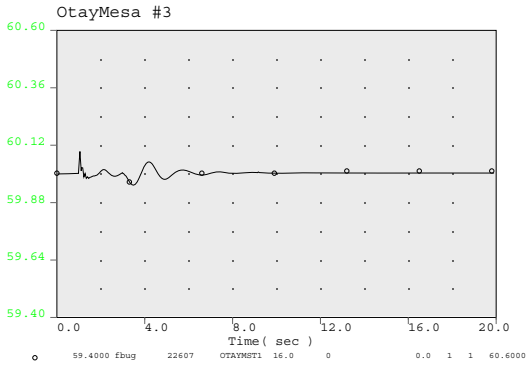












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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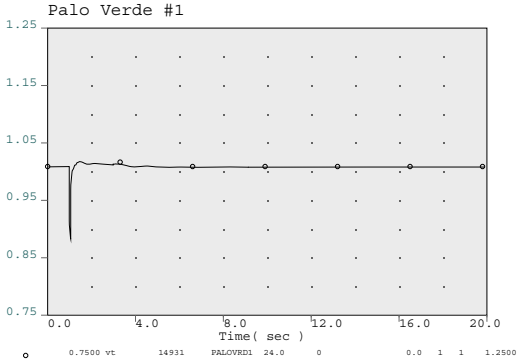
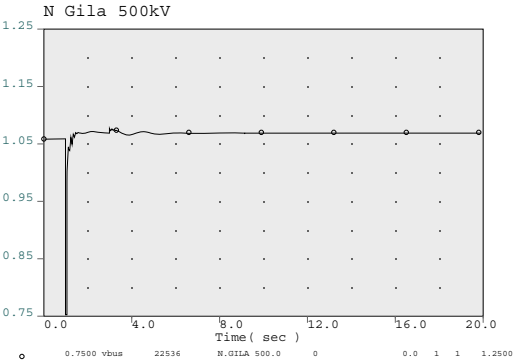
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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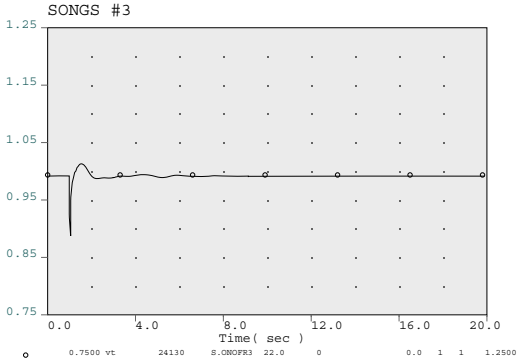
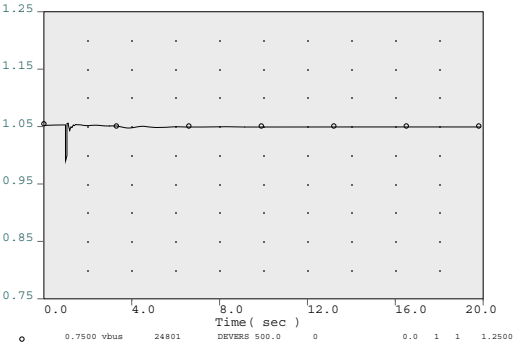
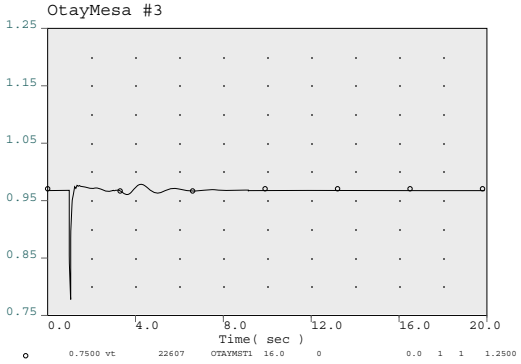


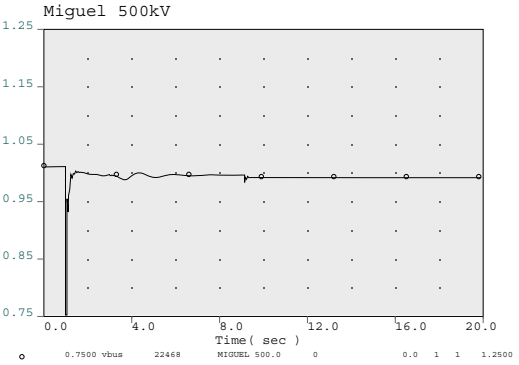
Devers 500



OtayMesa #3



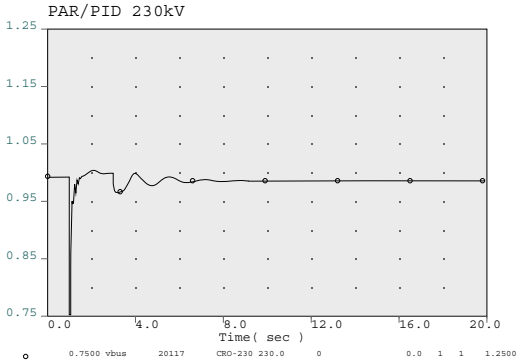
Miguel 500kV



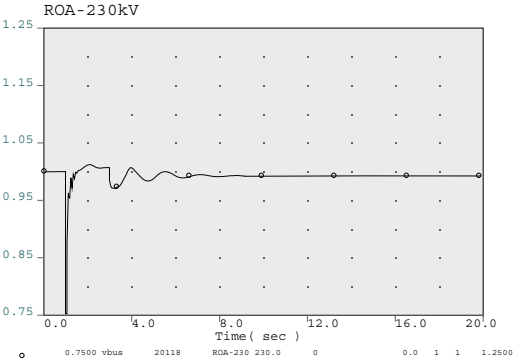
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

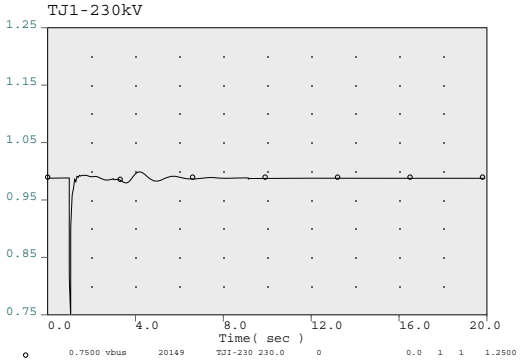
PAR/PID 230kV



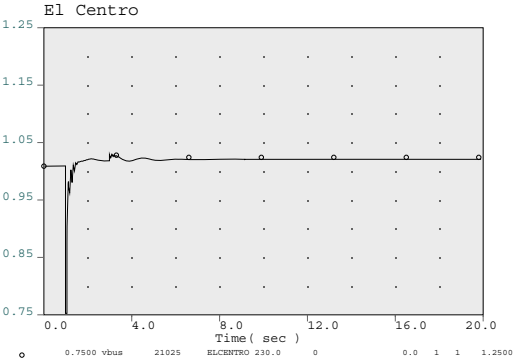
ROA-230kV



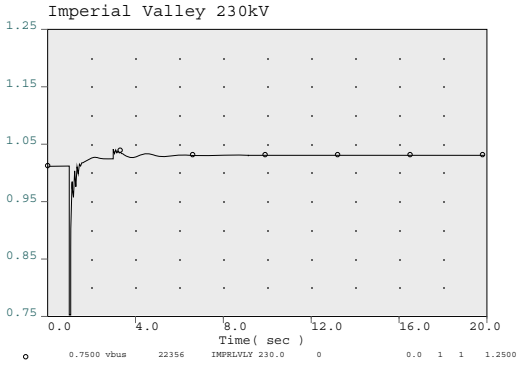
TJ1-230kV



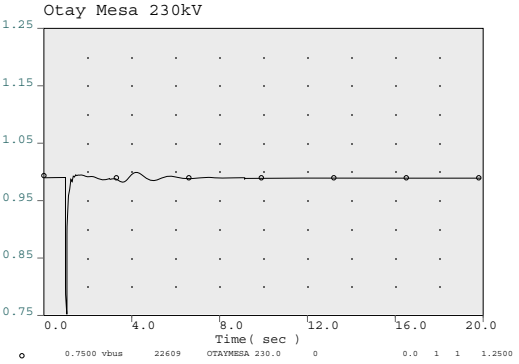
El Centro



Imperial Valley 230kV



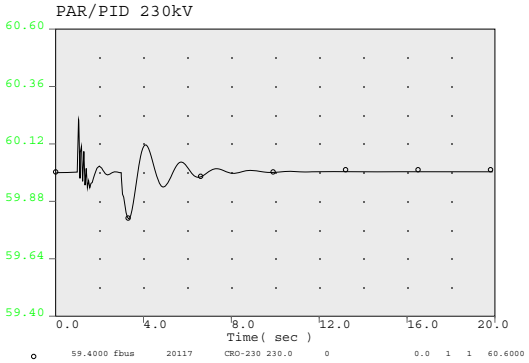
Otay Mesa 230kV



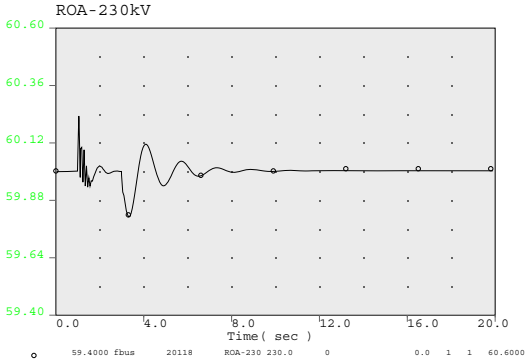
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

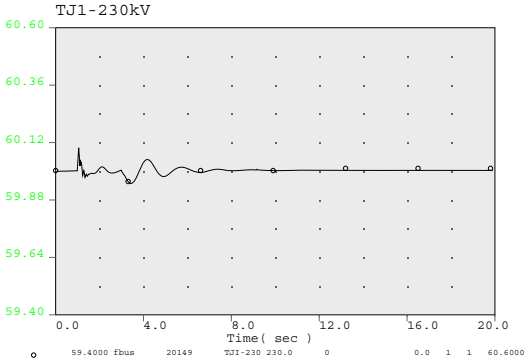
PAR/PID 230kV



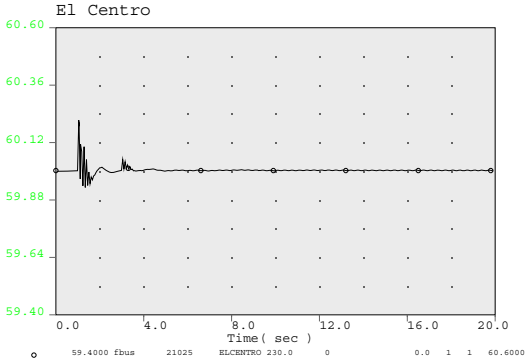
ROA-230kV



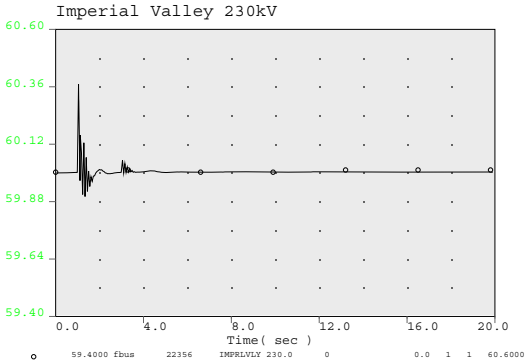
TJ1-230kV



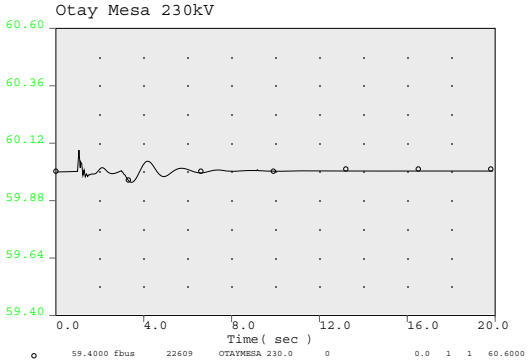
El Centro



Imperial Valley 230kV



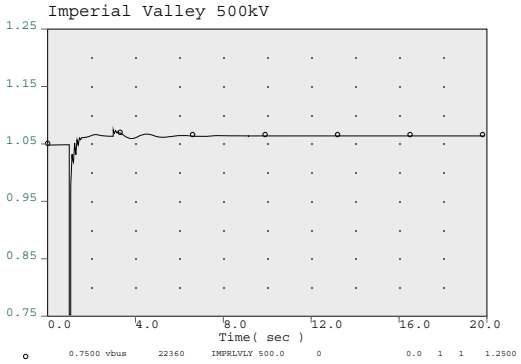
Otay Mesa 230kV



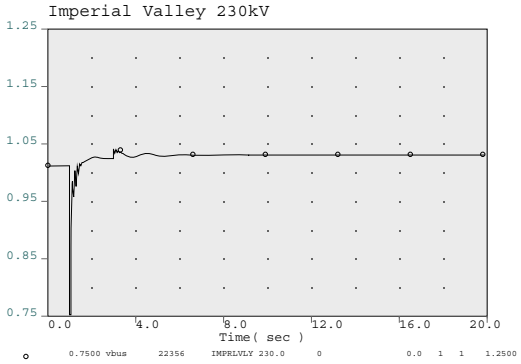
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

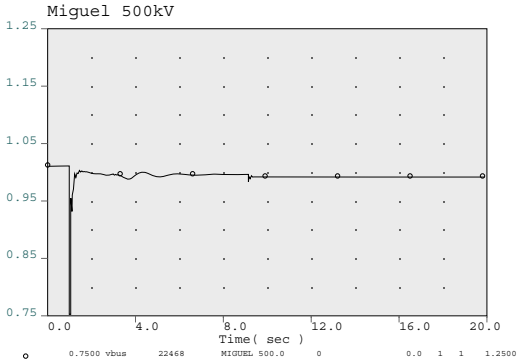
Imperial Valley 500kV



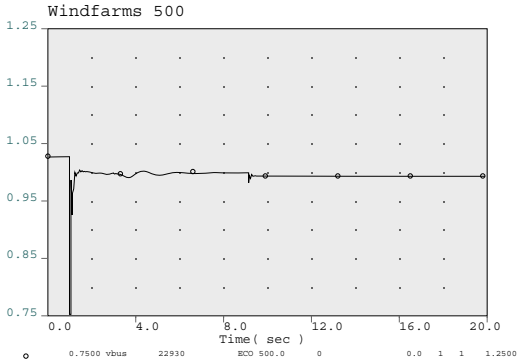
Imperial Valley 230kV



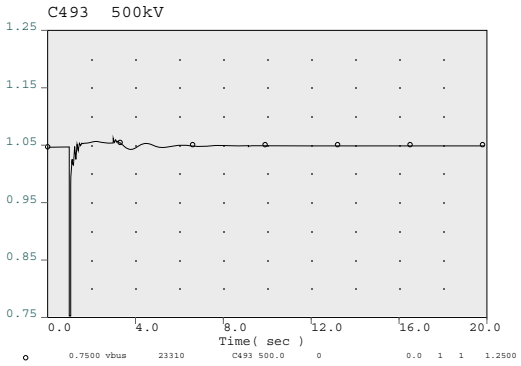
Miguel 500kV



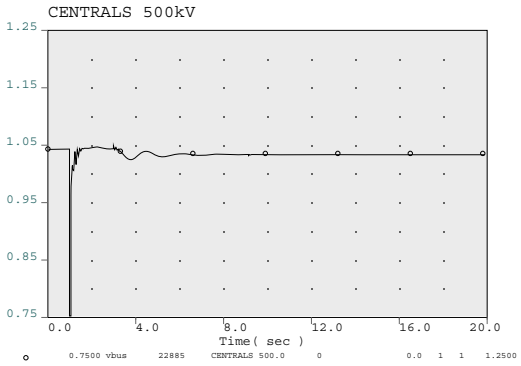
Windfarms 500



C493 500kV

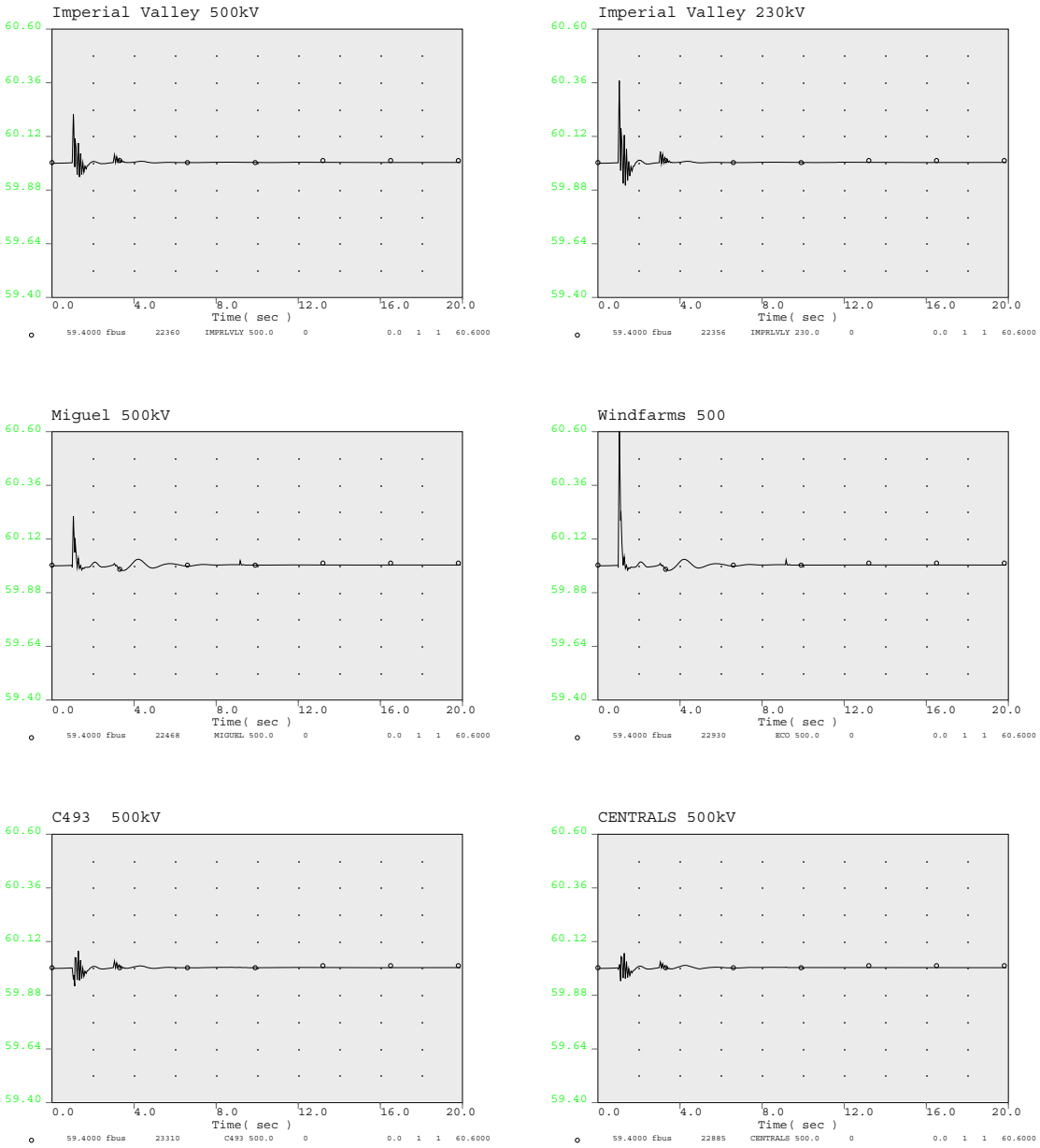


CENTRALS 500kV



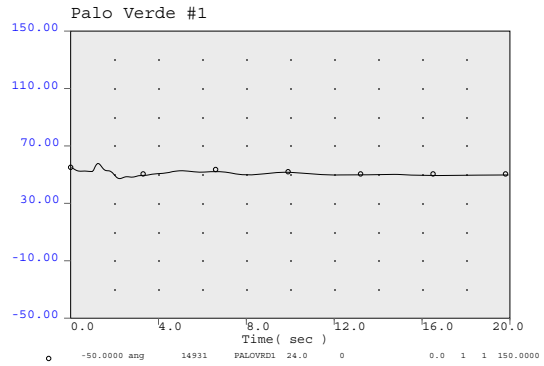
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

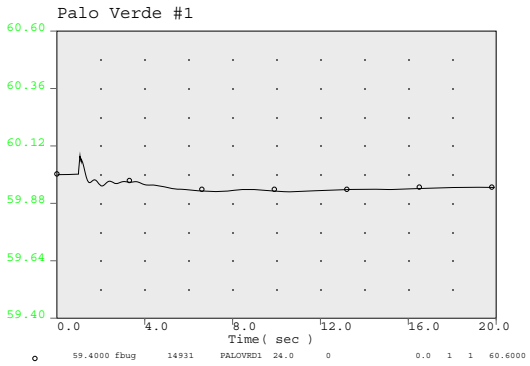
Imperial Valley Area - Frequency

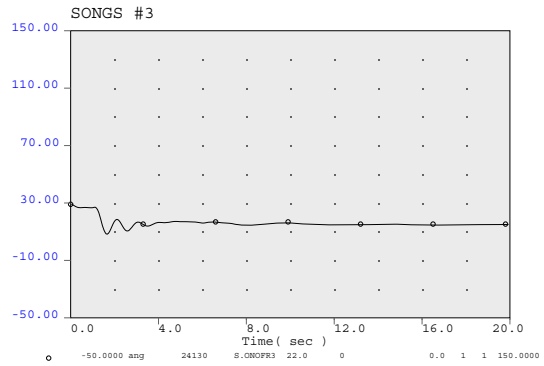


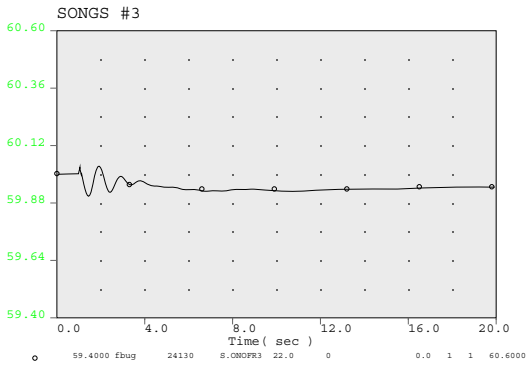
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

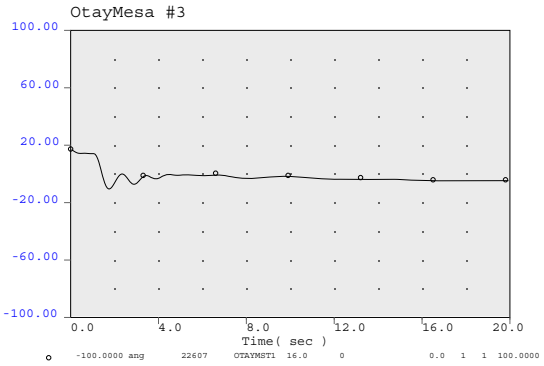
RELATIVE ROTOR ANGLE & FREQUENCY

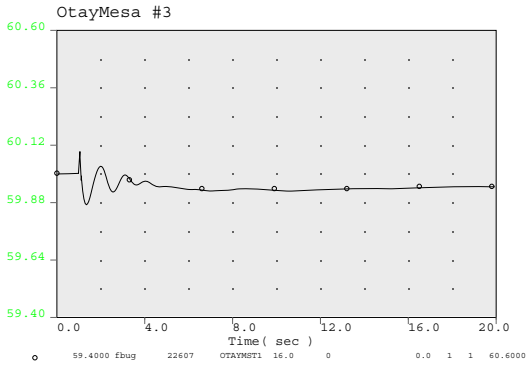












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

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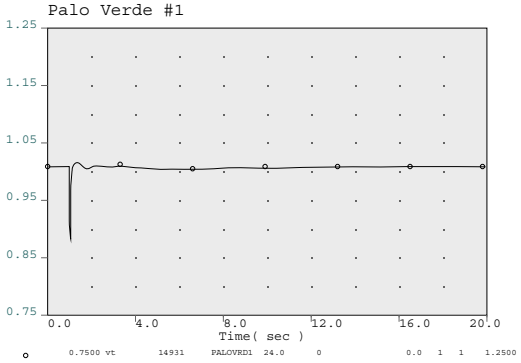
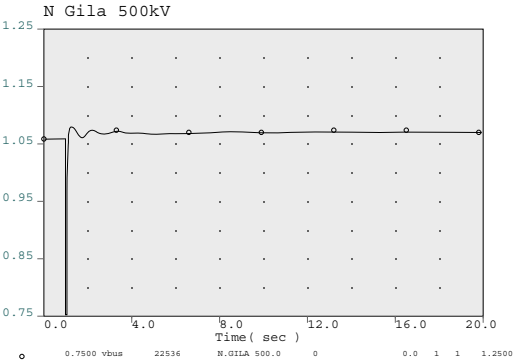
RELATIVE VOLTAGE

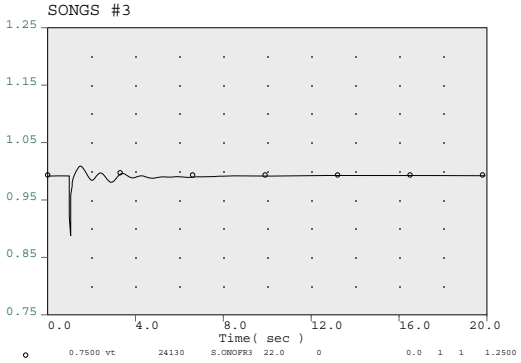
Palo Verde #1



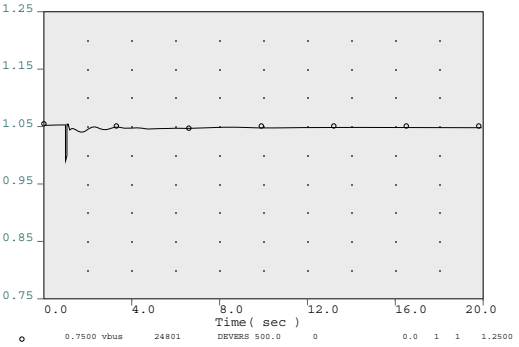
N Gila 500kV



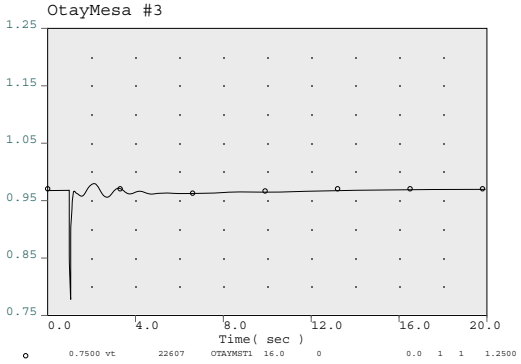
SONGS #3



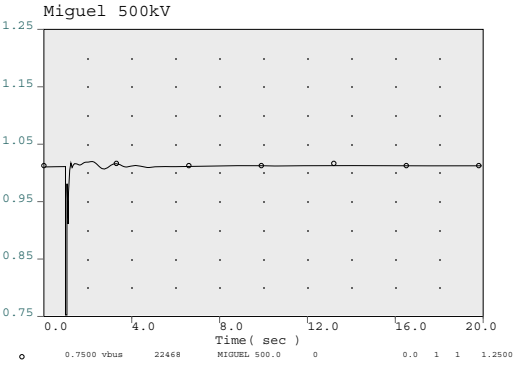
Devers 500



OtayMesa #3



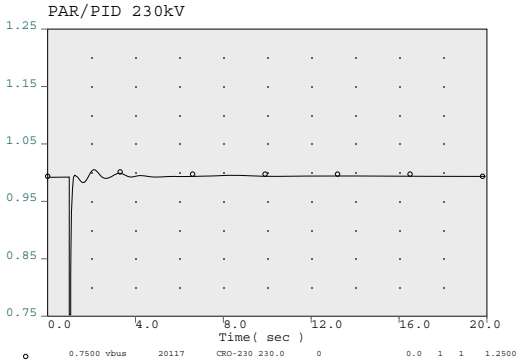
Miguel 500kV



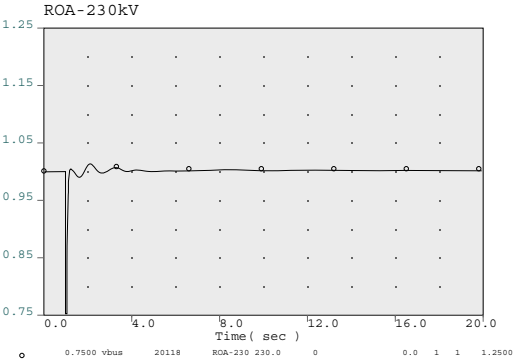
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

Affected System Voltage Check and Comparison

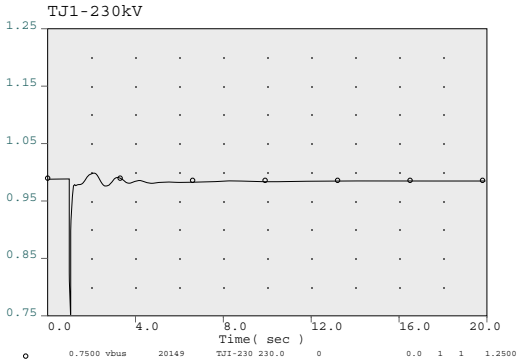
PAR/PID 230kV



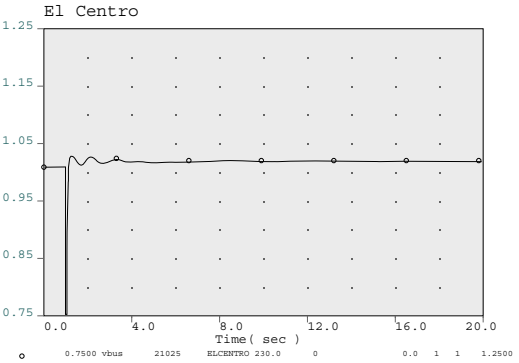
ROA-230kV



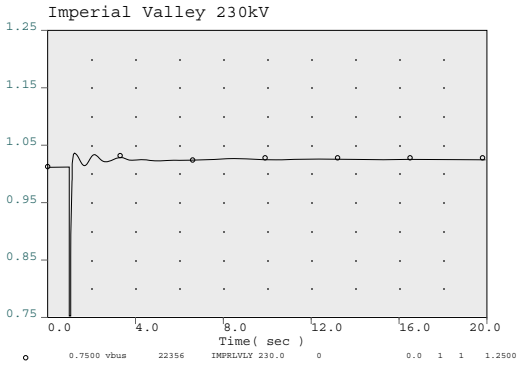
TJ1-230kV



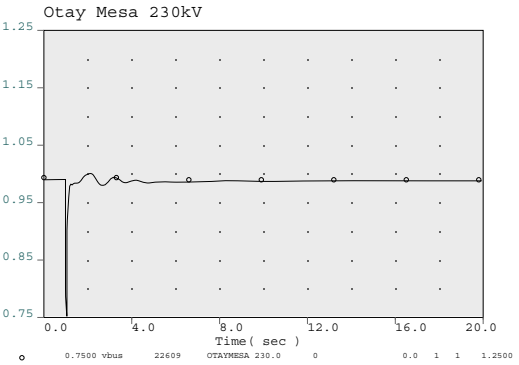
El Centro



Imperial Valley 230kV



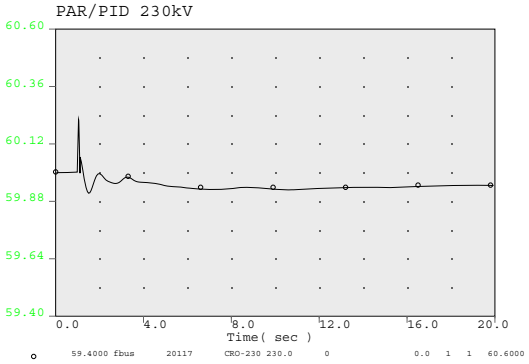
Otay Mesa 230kV



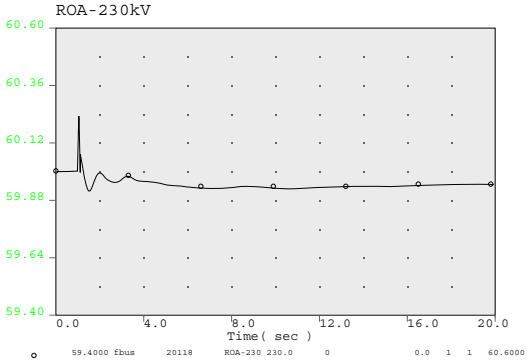
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

Affected System Frequency Check and Comparison

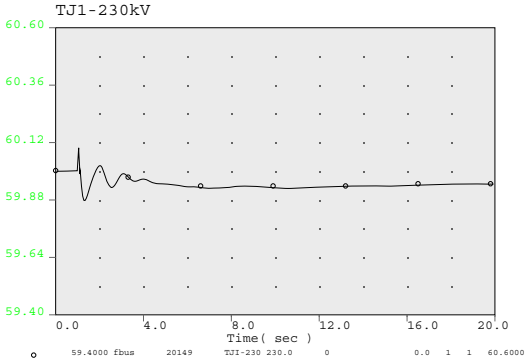
PAR/PID 230kV



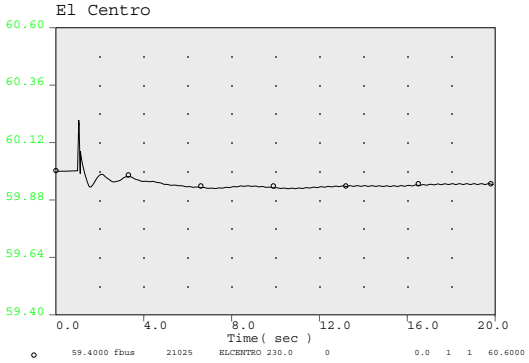
ROA-230kV



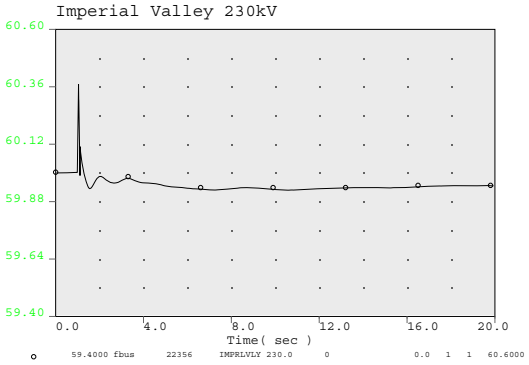
TJ1-230kV



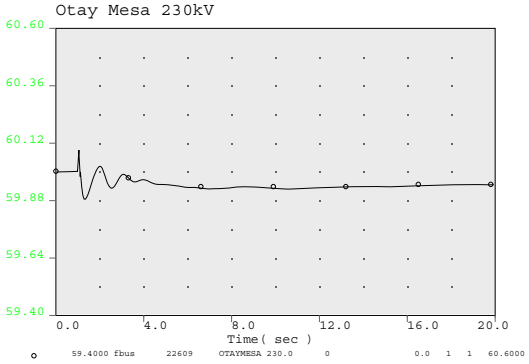
El Centro



Imperial Valley 230kV



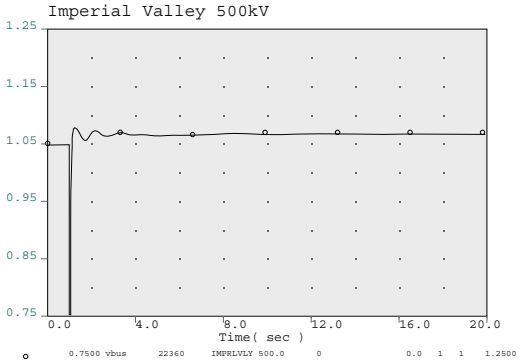
Otay Mesa 230kV



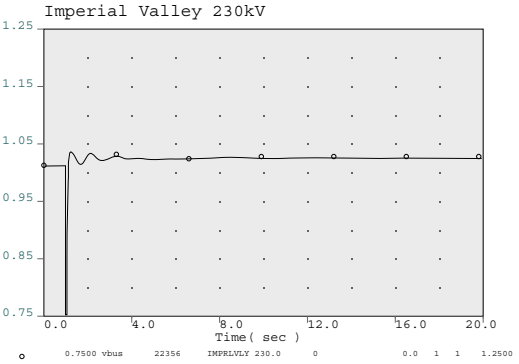
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

Imperial Valley Area - VOLTAGE

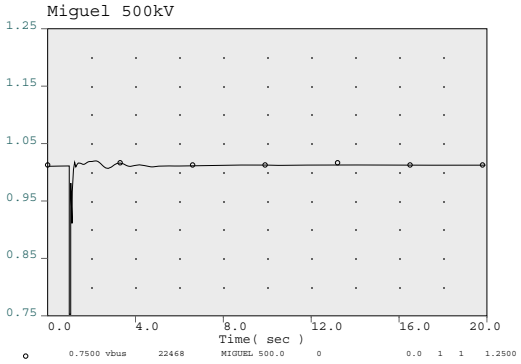
Imperial Valley 500kV



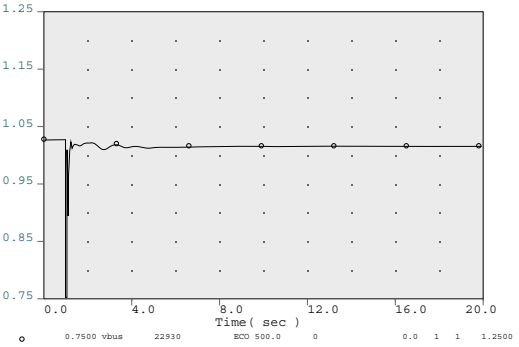
Imperial Valley 230kV



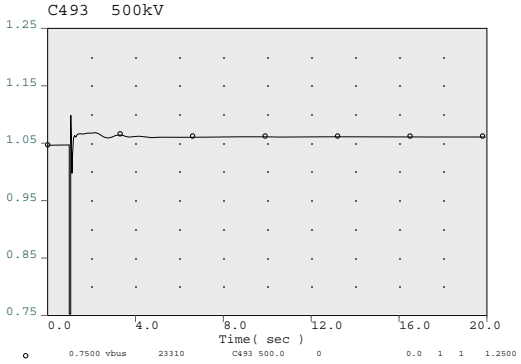
Miguel 500kV



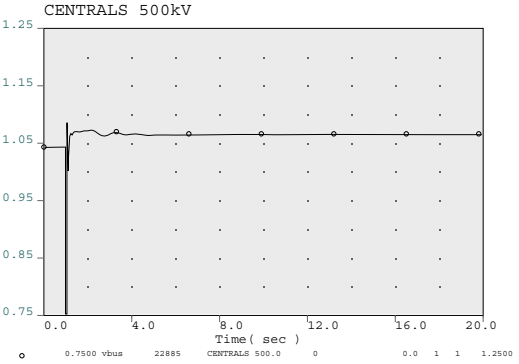
Windfarms 500



C493 500kV

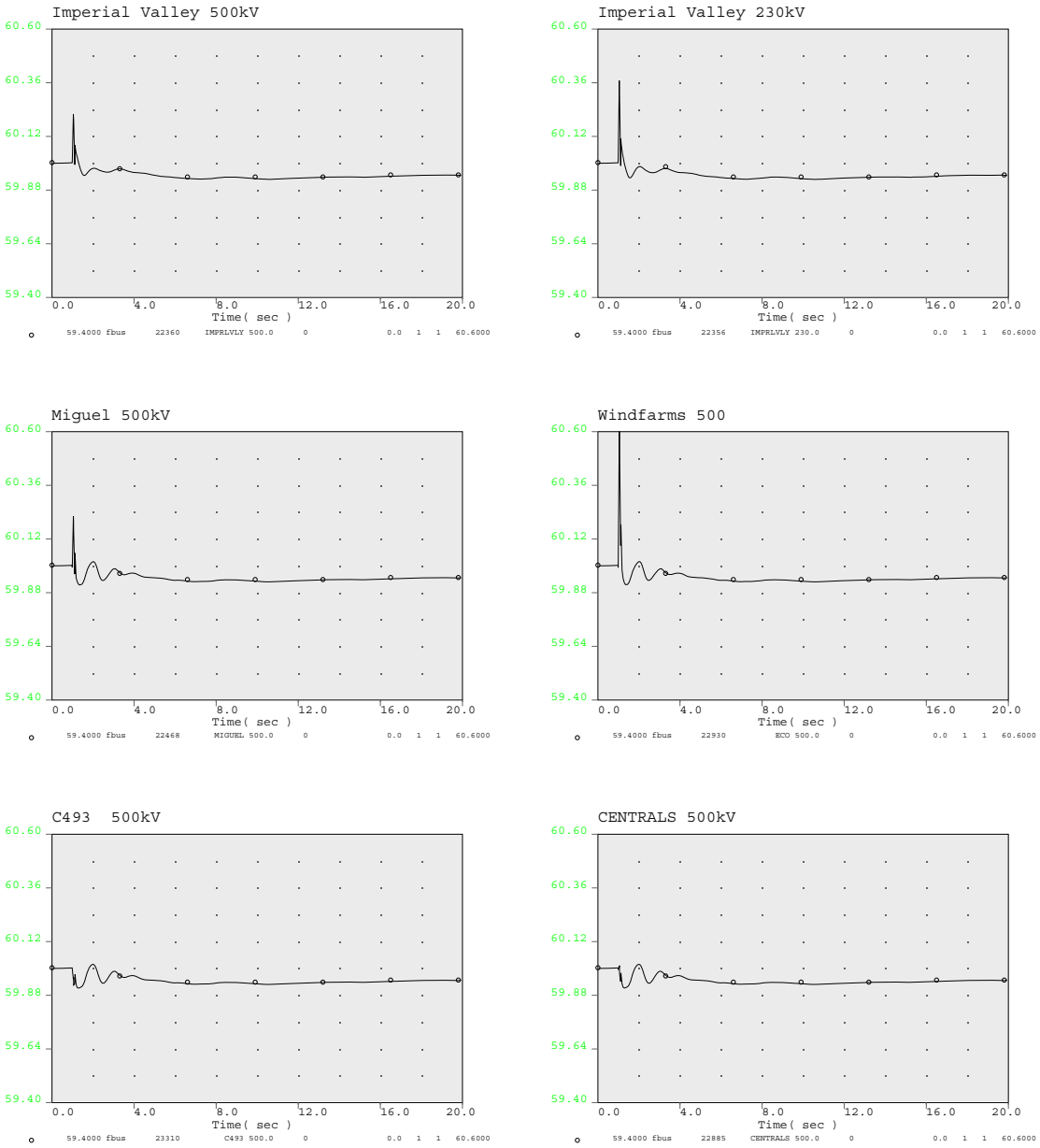


CENTRALS 500kV



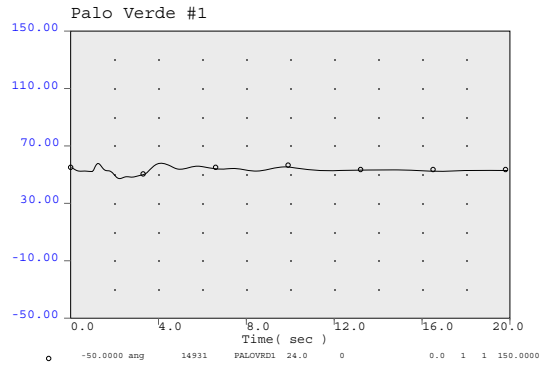
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

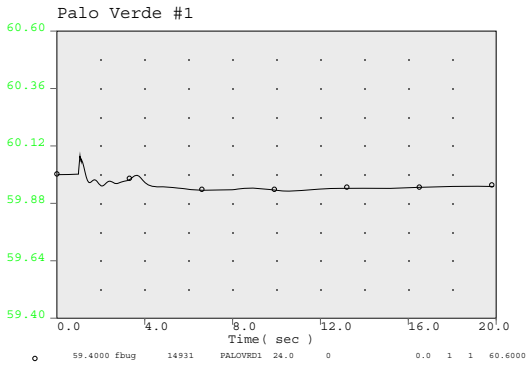
Imperial Valley Area - Frequency

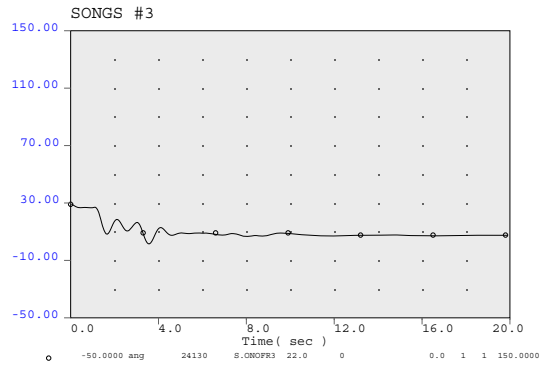


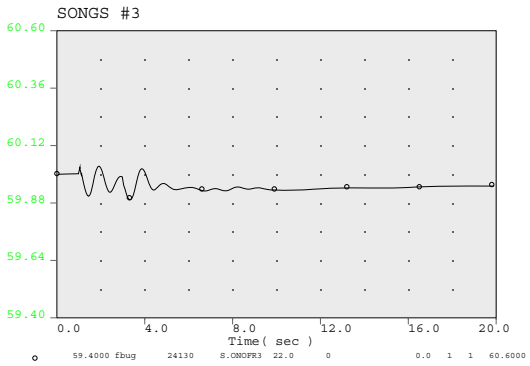
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage

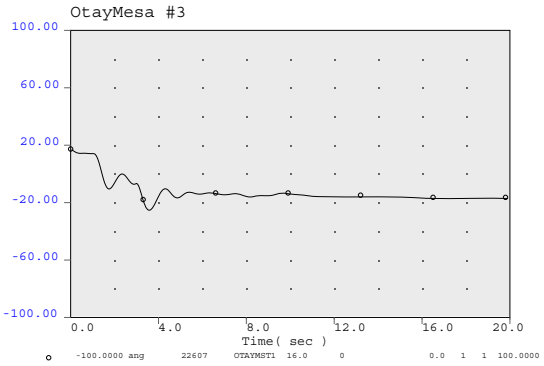
RELATIVE ROTOR ANGLE & FREQUENCY

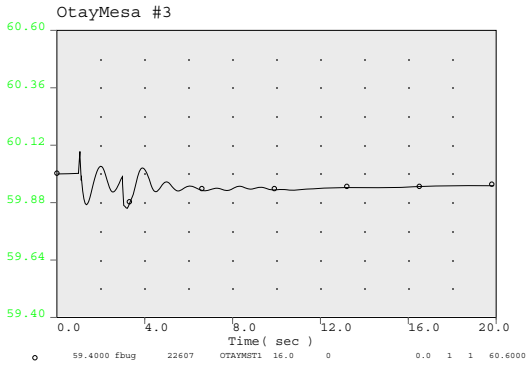










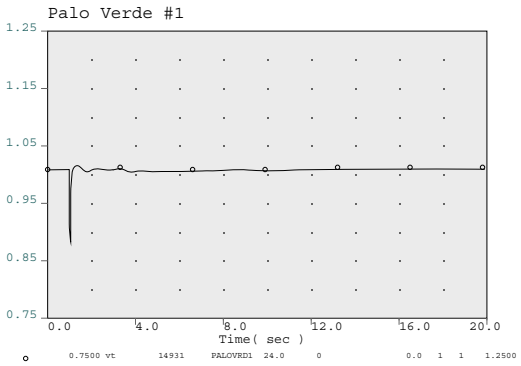


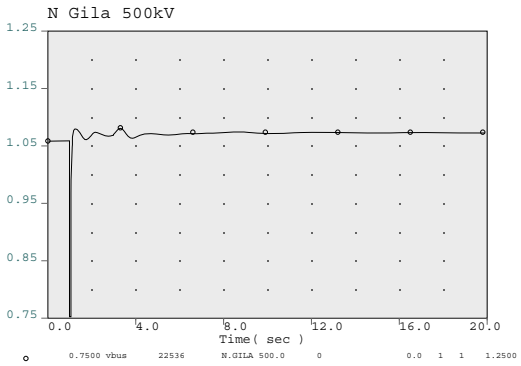
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

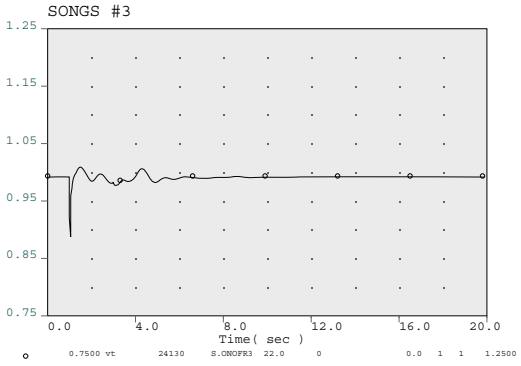
Page 1

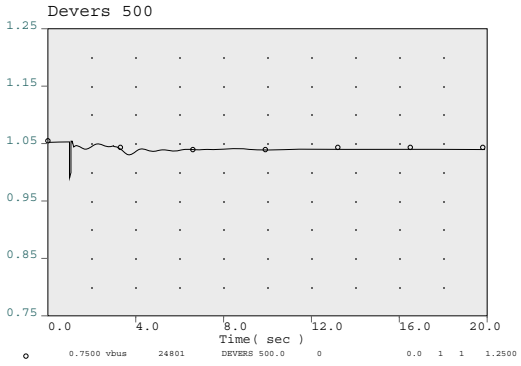
SDGE	IV_Wnd_dlo_RxR_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:24:55 2010

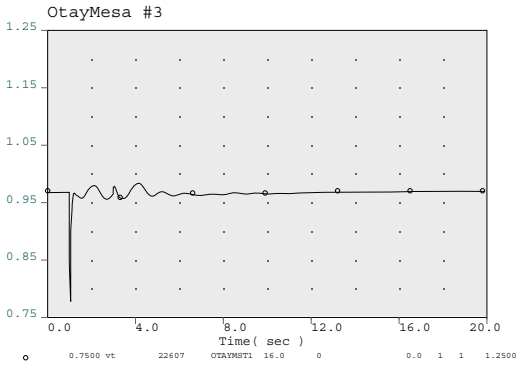
RELATIVE VOLTAGE

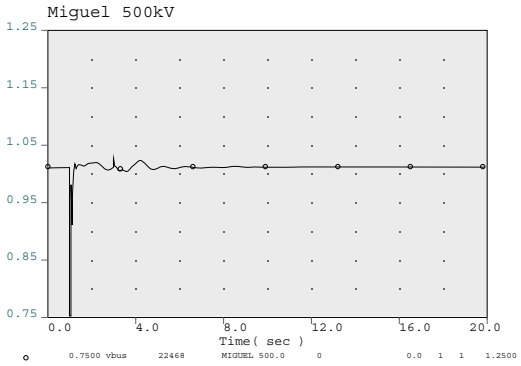








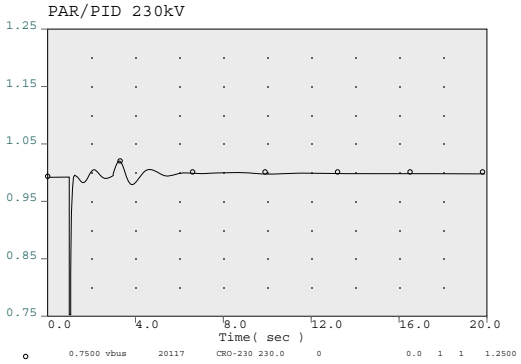




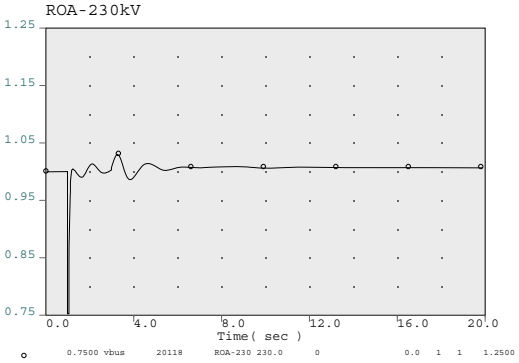
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

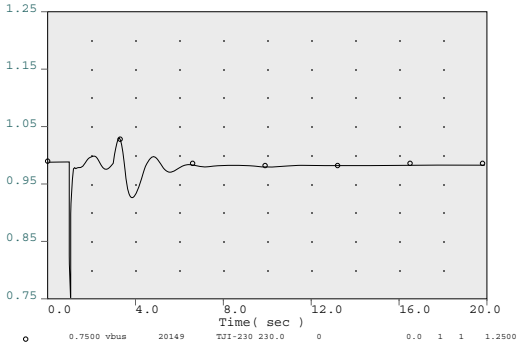
PAR/PID 230kV



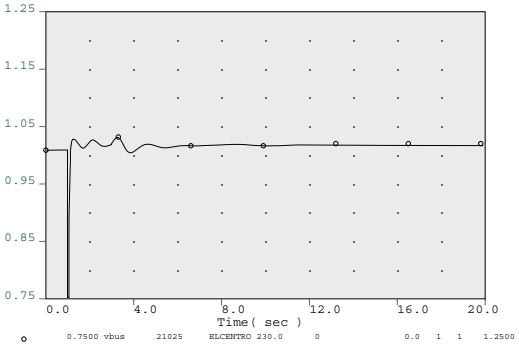
ROA-230kV



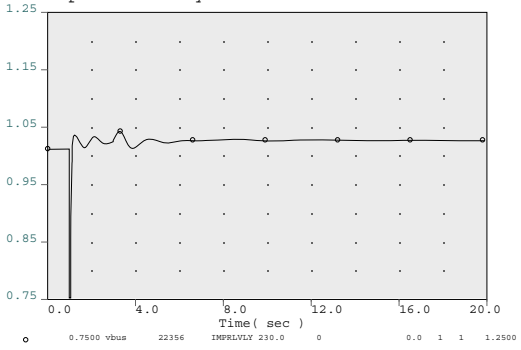
TJ1-230kV



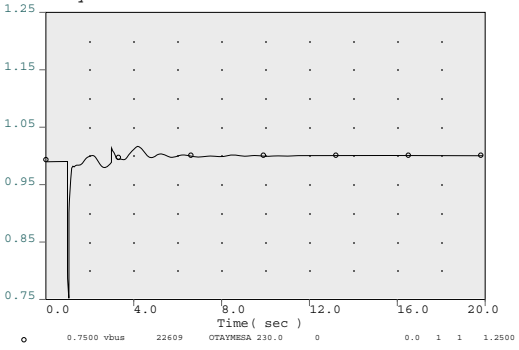
El Centro



Imperial Valley 230kV



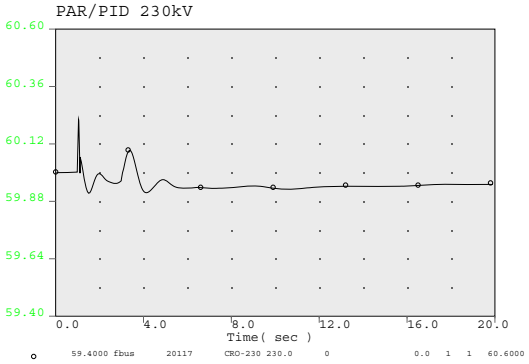
Otay Mesa 230kV



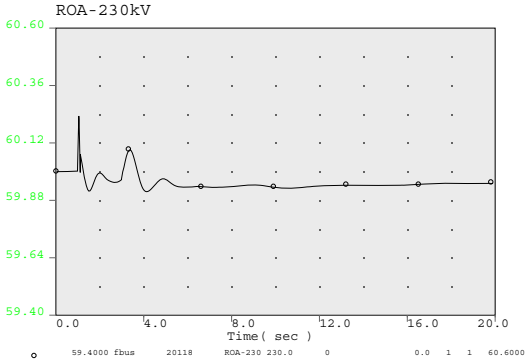
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison

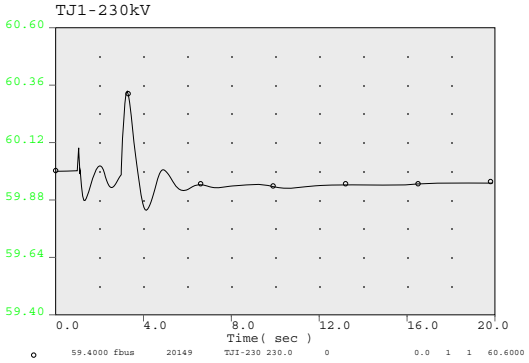
PAR/PID 230kV



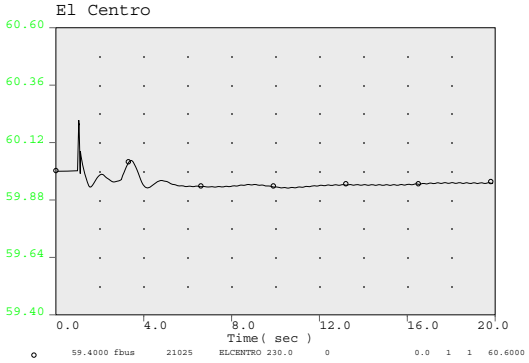
ROA-230kV



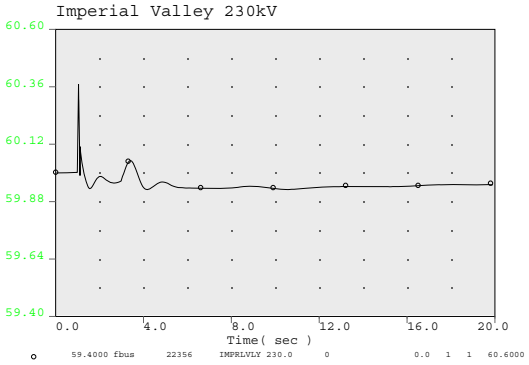
TJ1-230kV



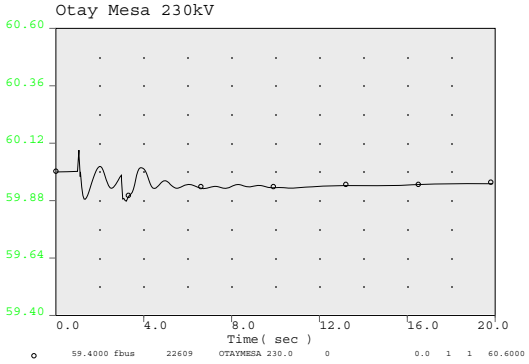
El Centro



Imperial Valley 230kV



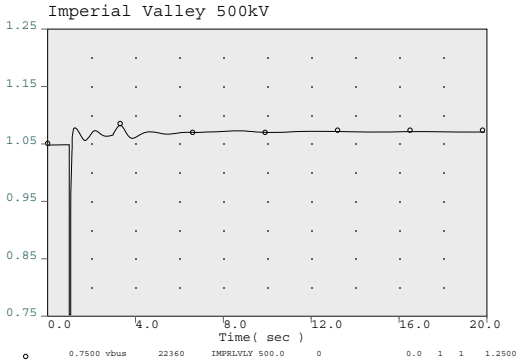
Otay Mesa 230kV



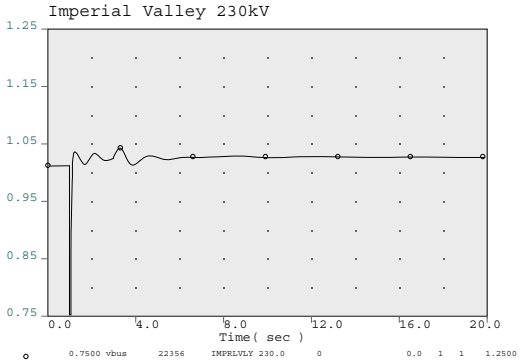
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Imperial Valley Area - VOLTAGE

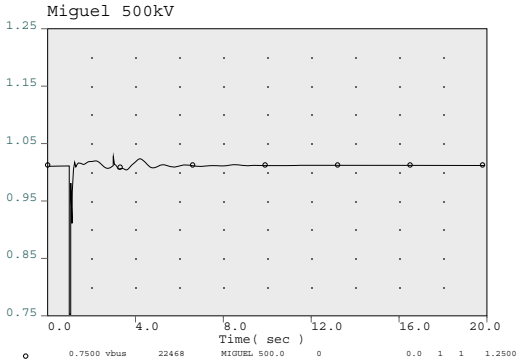
Imperial Valley 500kV



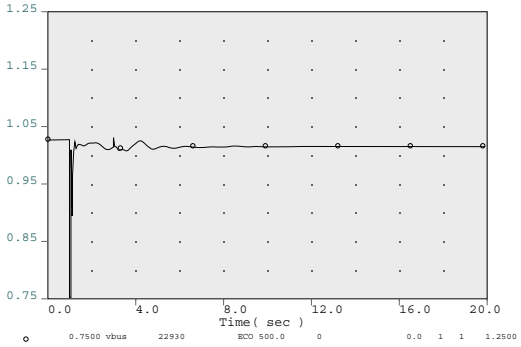
Imperial Valley 230kV



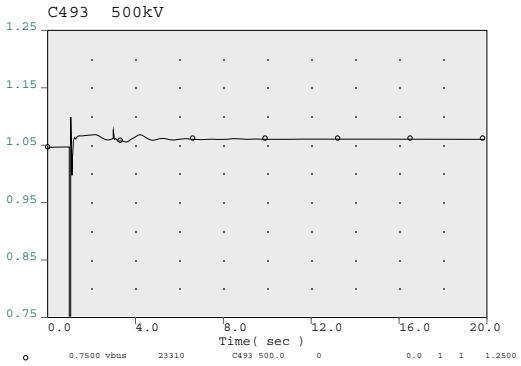
Miguel 500kV



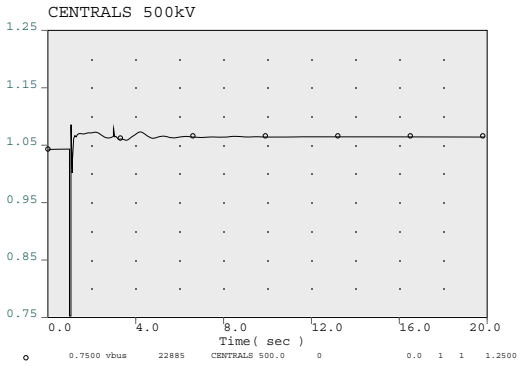
Windfarms 500



C493 500kV

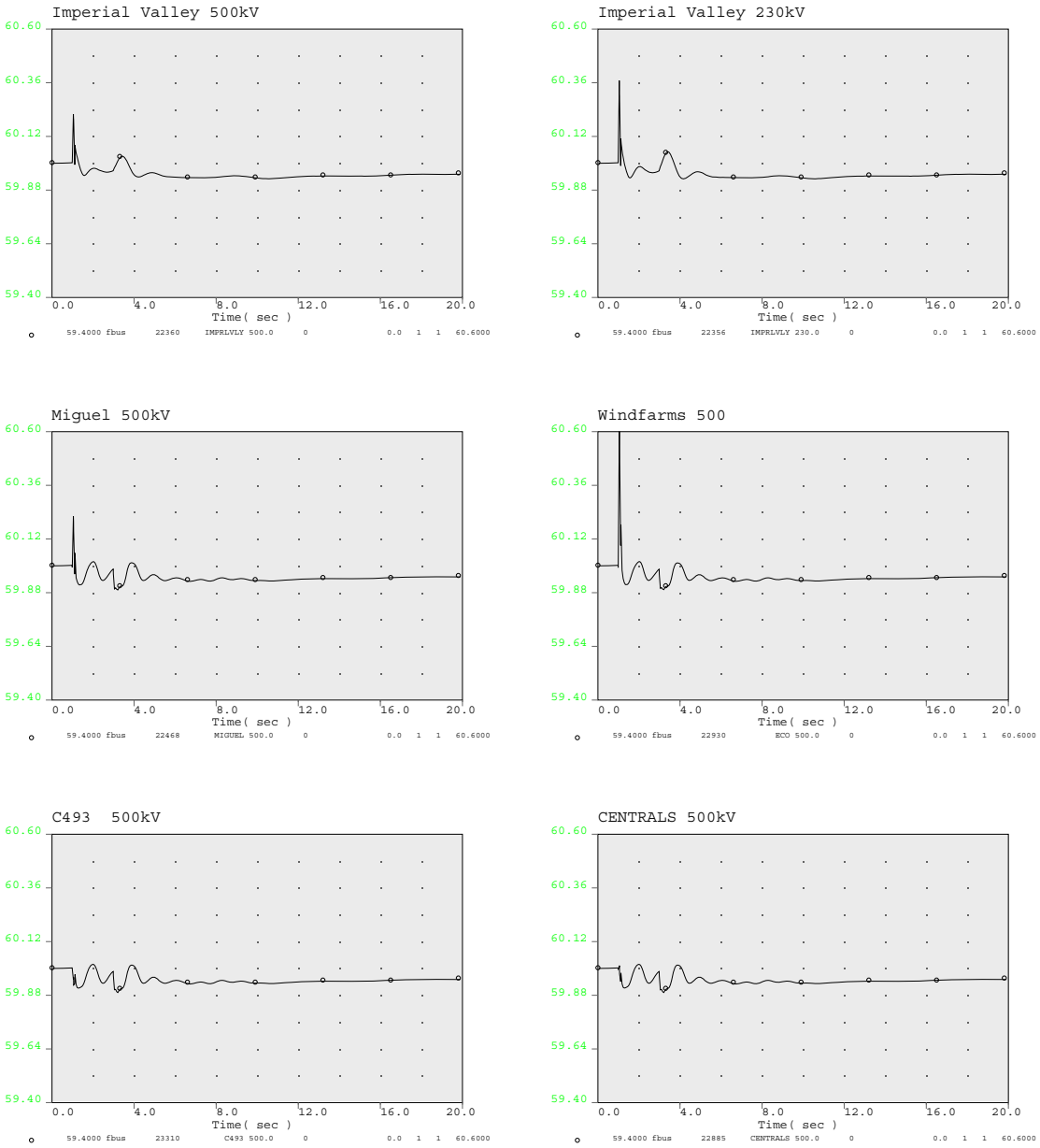


CENTRALS 500kV



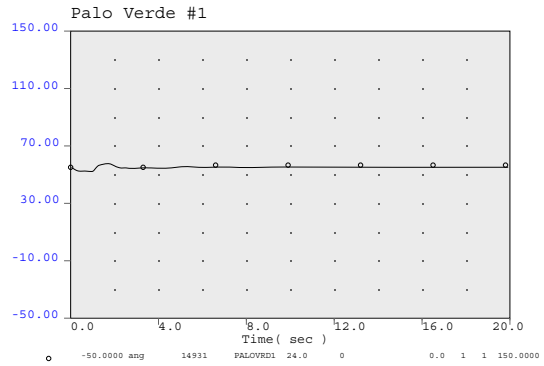
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

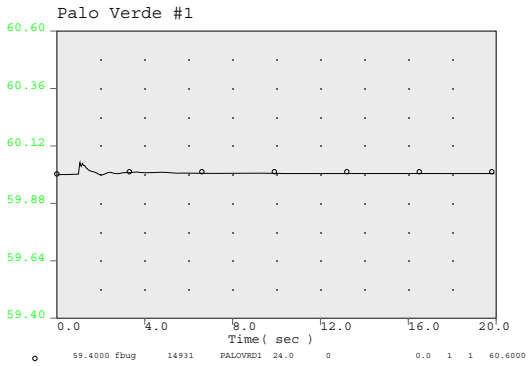
Imperial Valley Area - Frequency

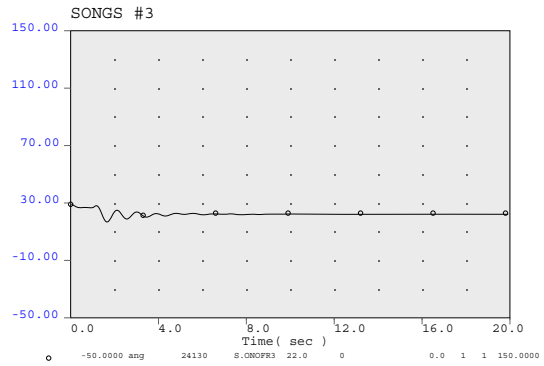


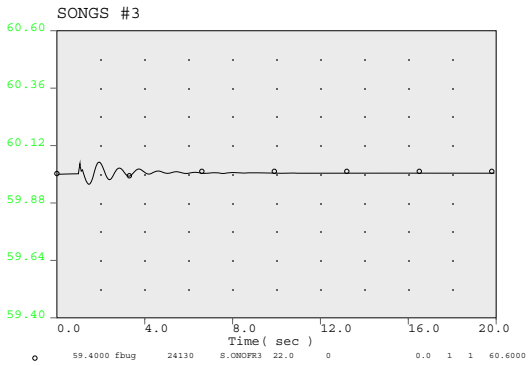
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

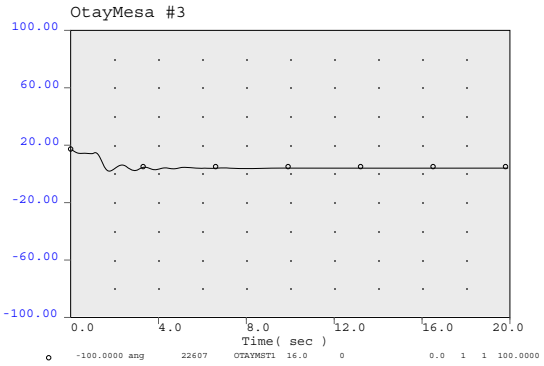
RELATIVE ROTOR ANGLE & FREQUENCY

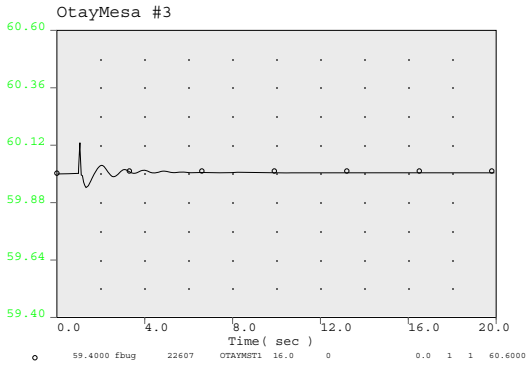










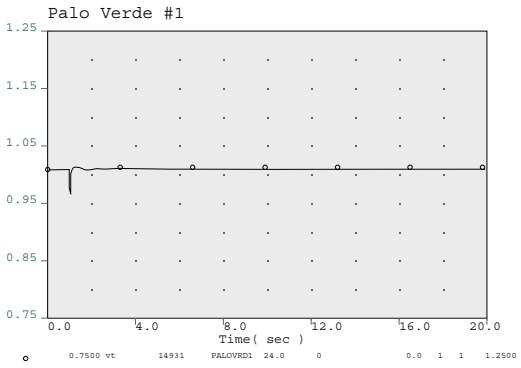


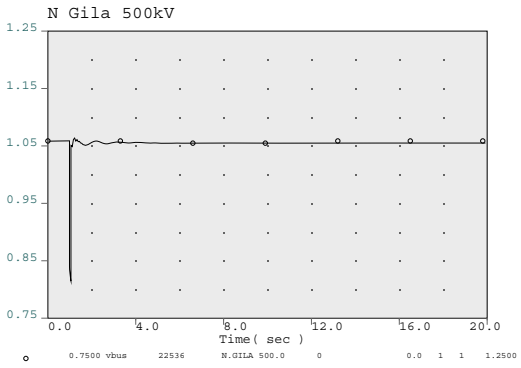
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

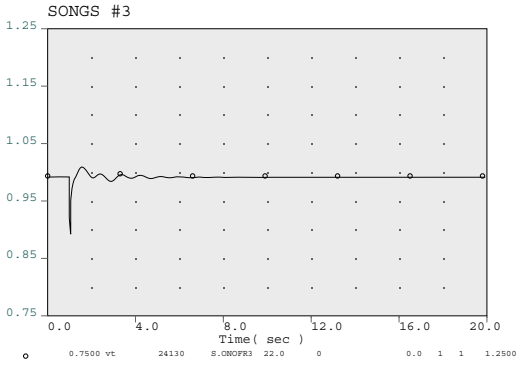
Page 1

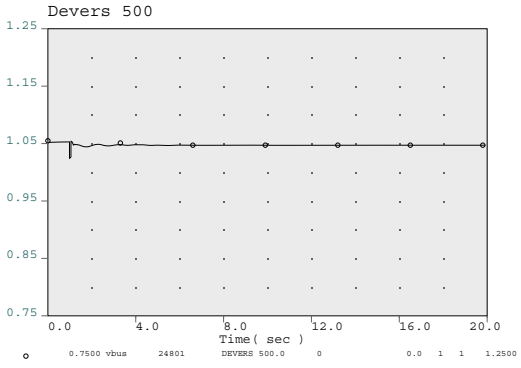
SDGE	ML_Wnd_noRAS_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:25:12 2010

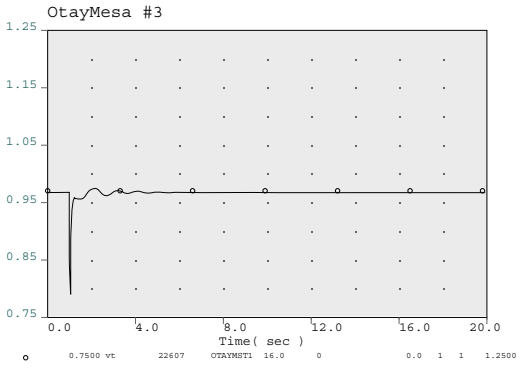
RELATIVE VOLTAGE

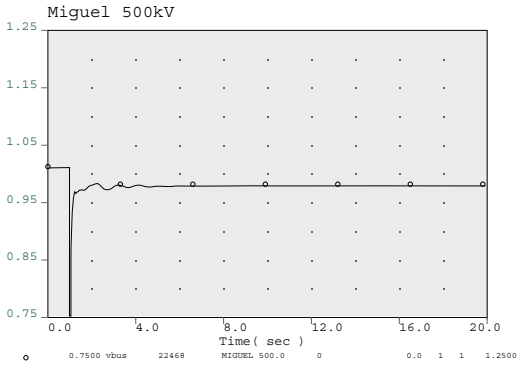








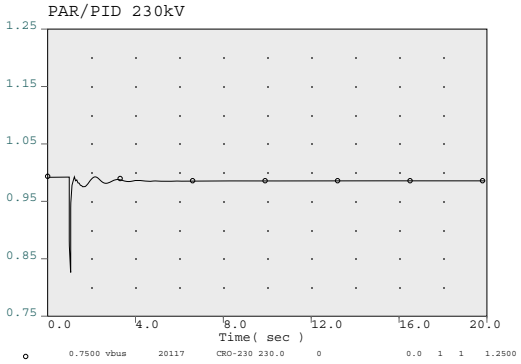




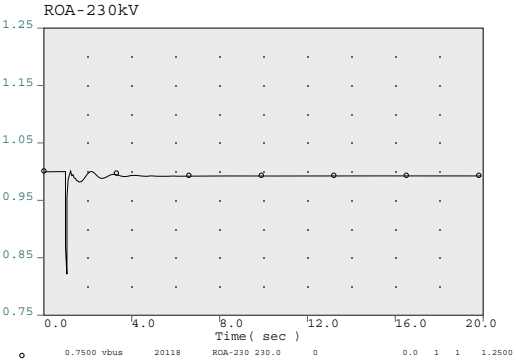
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

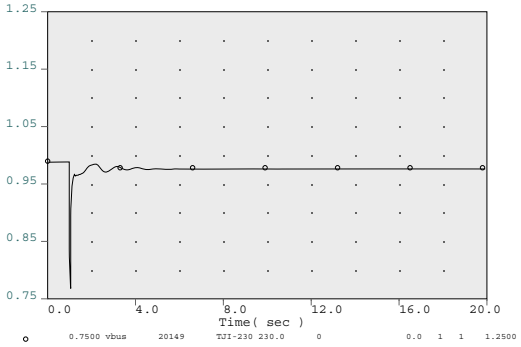
PAR/PID 230kV



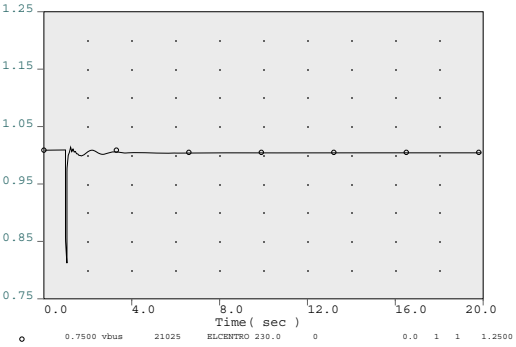
ROA-230kV



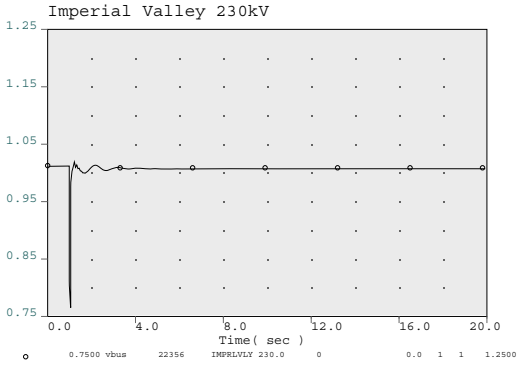
TJ1-230kV



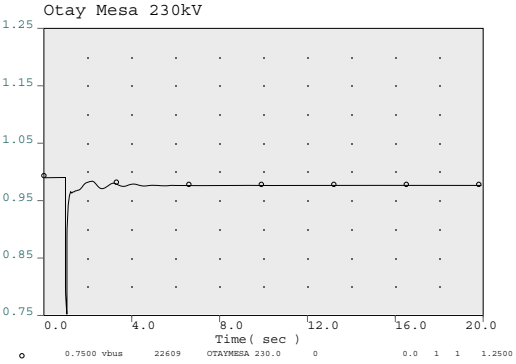
El Centro



Imperial Valley 230kV



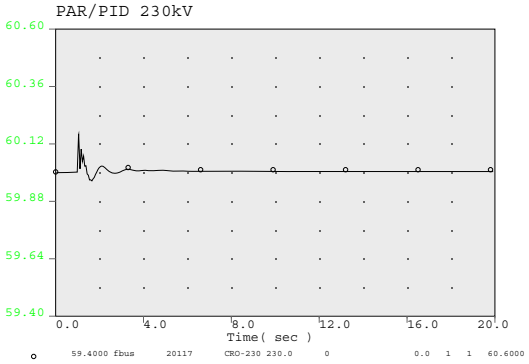
Otay Mesa 230kV



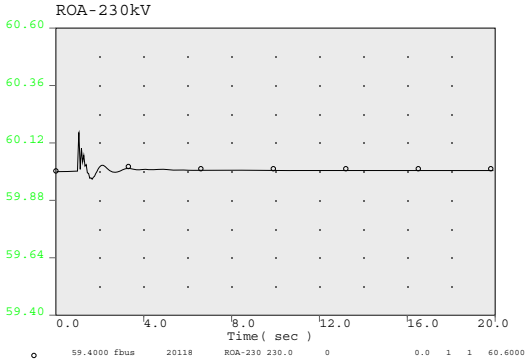
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

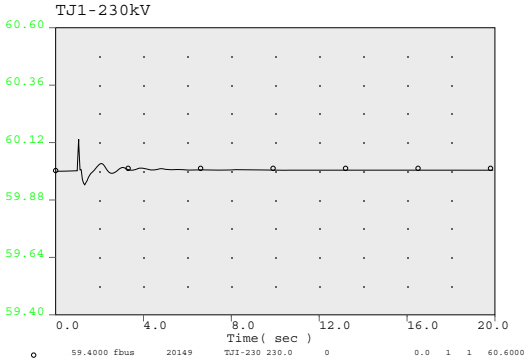
PAR/PID 230kV



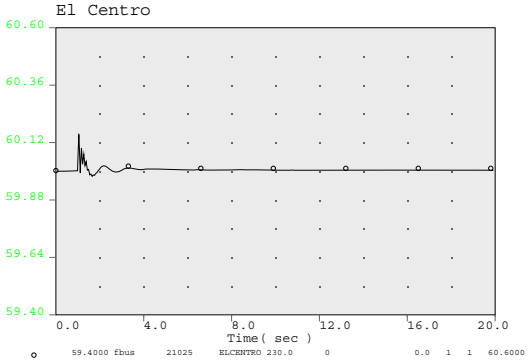
ROA-230kV



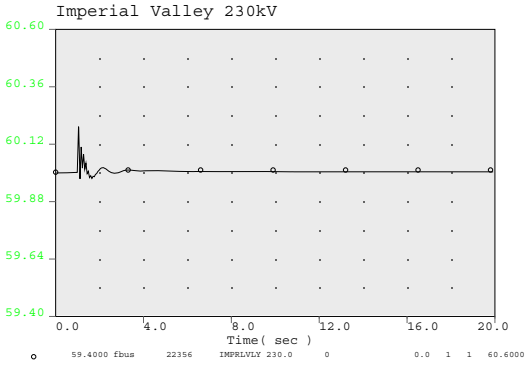
TJ1-230kV



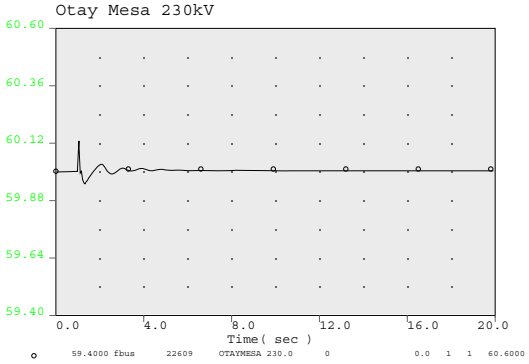
El Centro



Imperial Valley 230kV

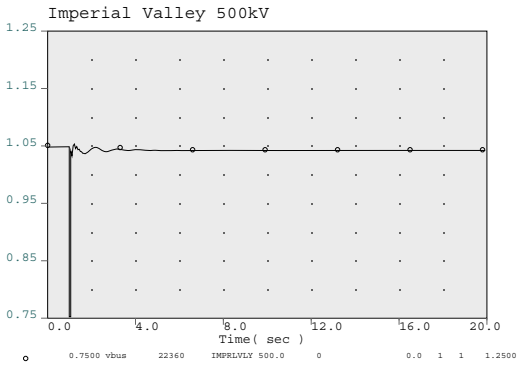


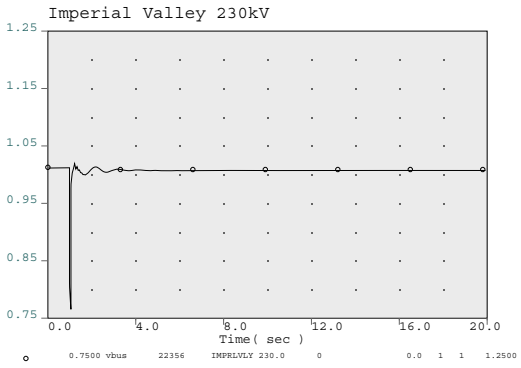
Otay Mesa 230kV

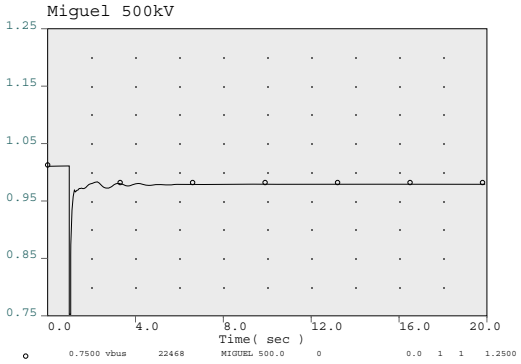


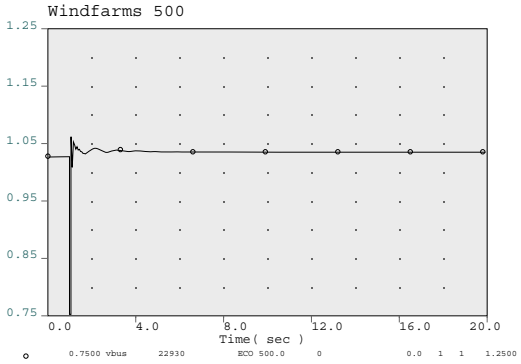
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

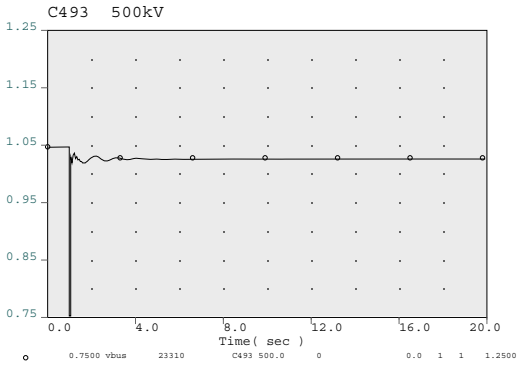
Imperial Valley Area - VOLTAGE

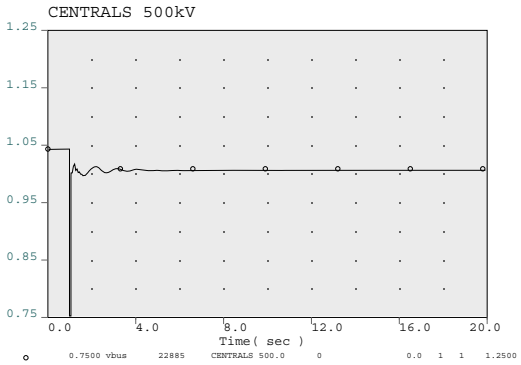










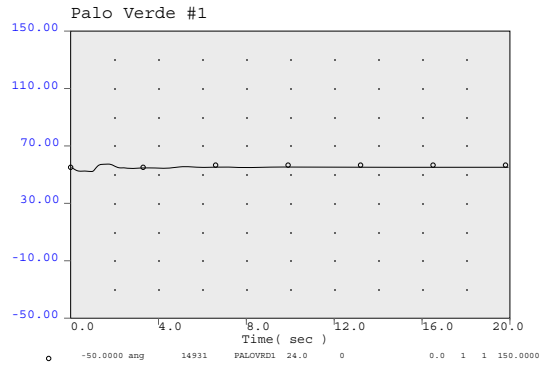


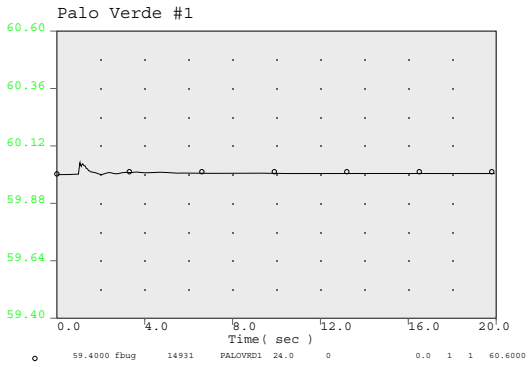
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

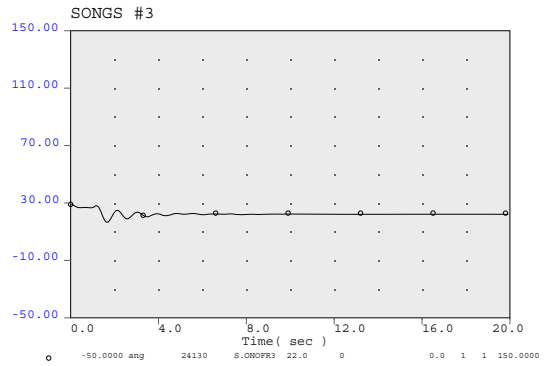
Imperial Valley Area - Frequency

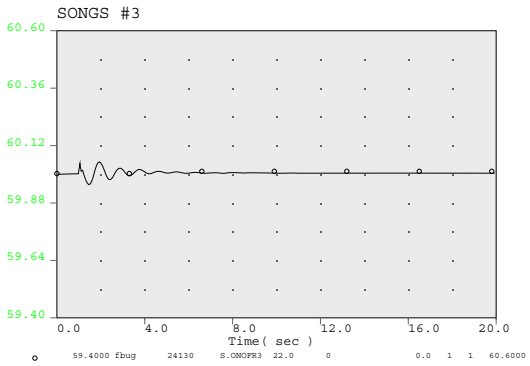
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

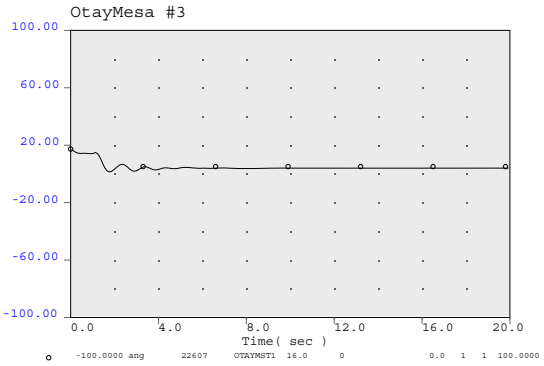
RELATIVE ROTOR ANGLE & FREQUENCY

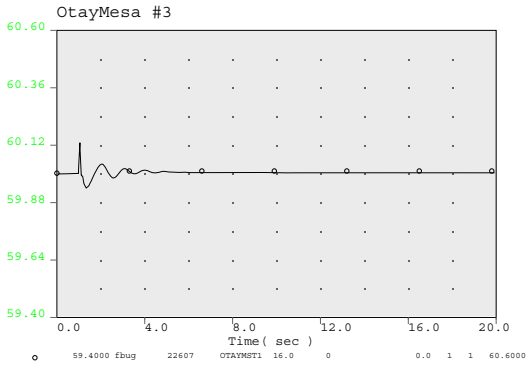












SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

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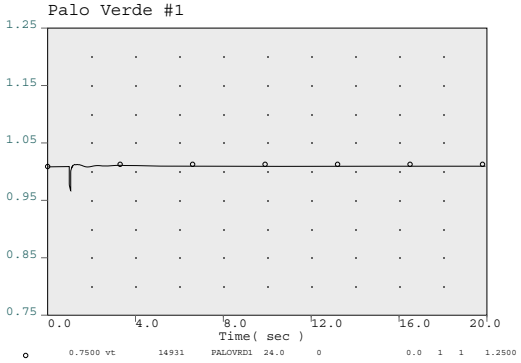
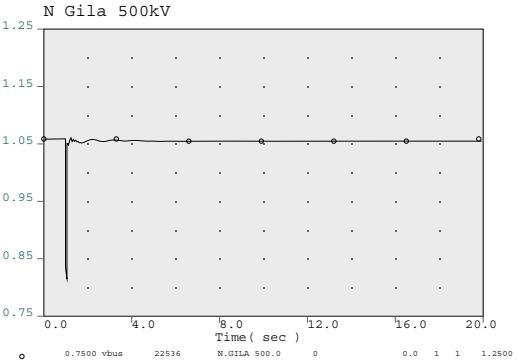
SDGE	ML_Wnd_noXTrp_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:25:26 2010

RELATIVE VOLTAGE

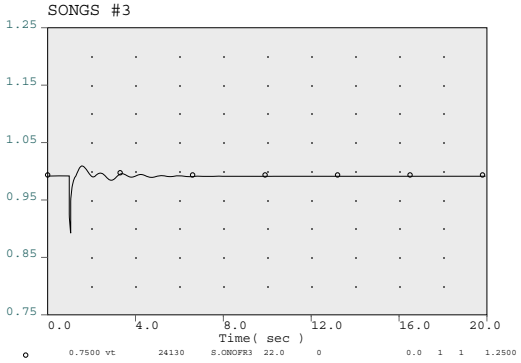
Palo Verde #1



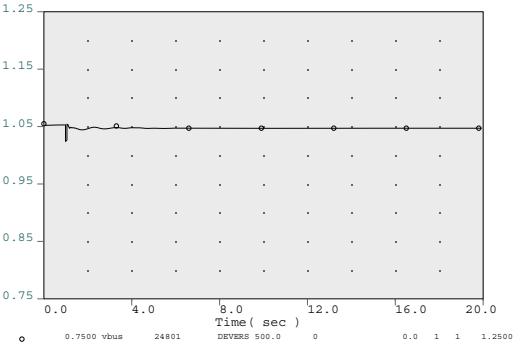
N Gila 500kV



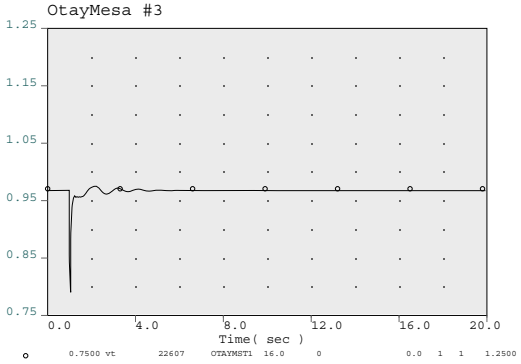
SONGS #3



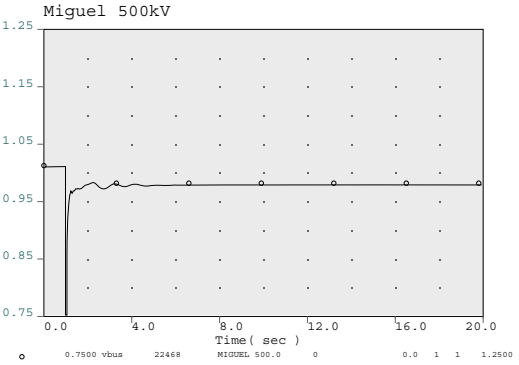
Devers 500



OtayMesa #3



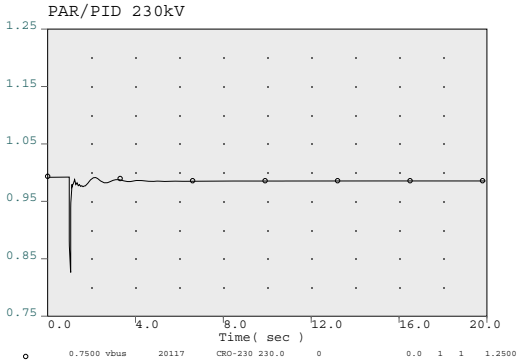
Miguel 500kV



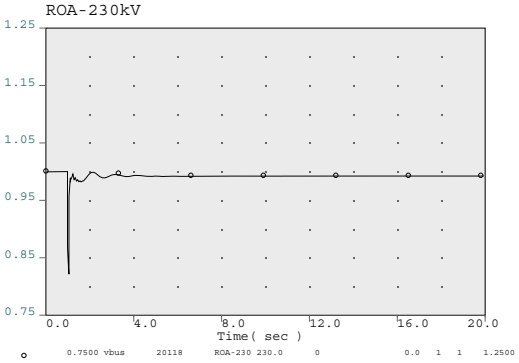
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

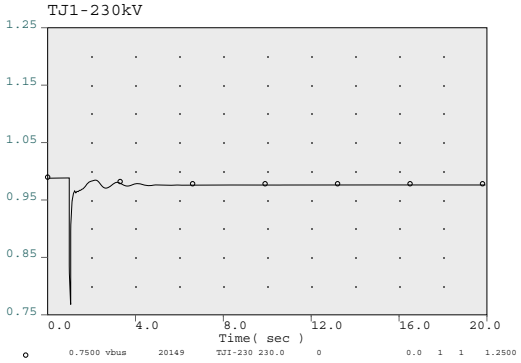
PAR/PID 230kV



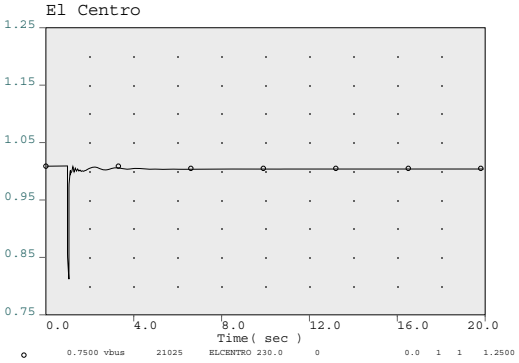
ROA-230kV



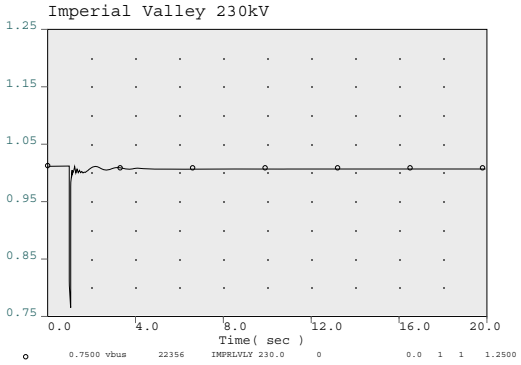
TJ1-230kV



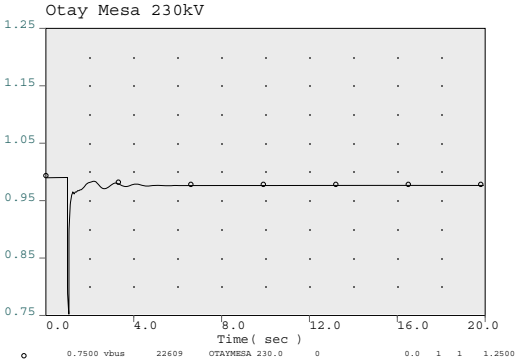
El Centro



Imperial Valley 230kV



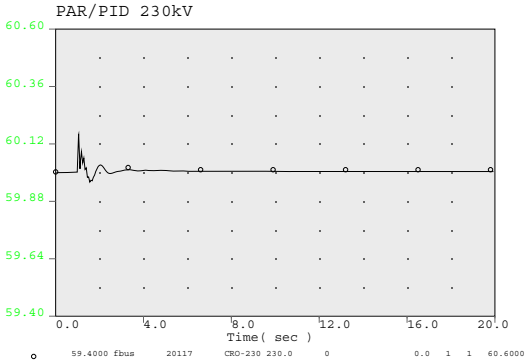
Otay Mesa 230kV



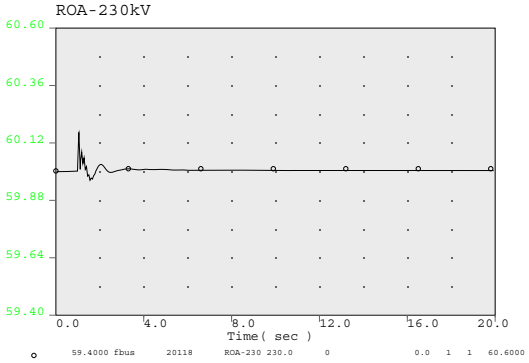
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

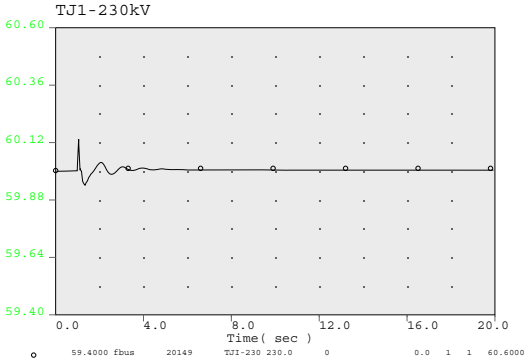
PAR/PID 230kV



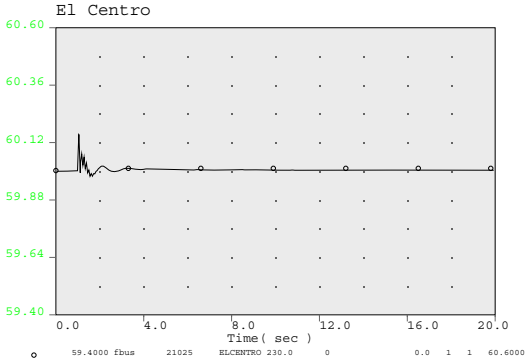
ROA-230kV



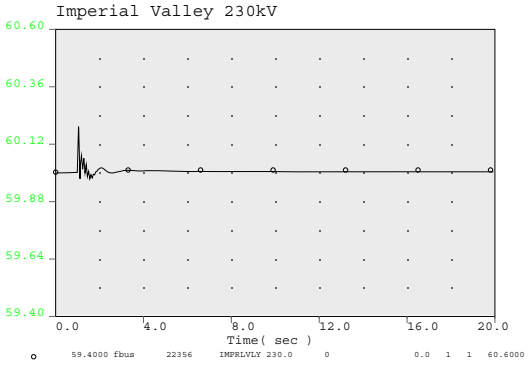
TJ1-230kV



El Centro



Imperial Valley 230kV



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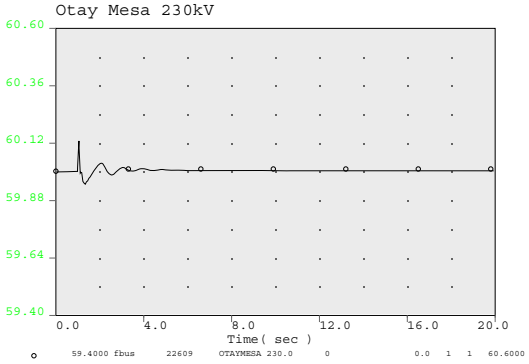
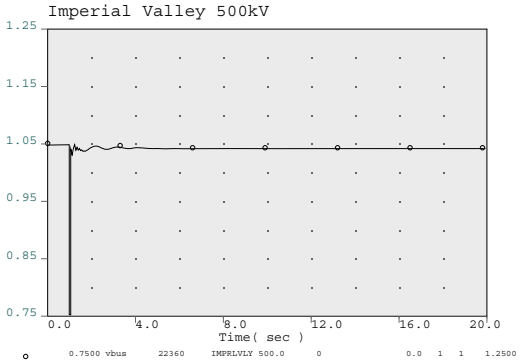


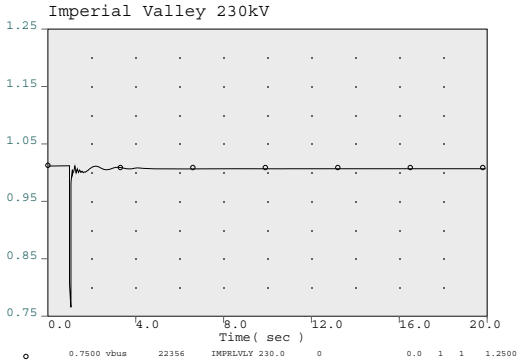
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

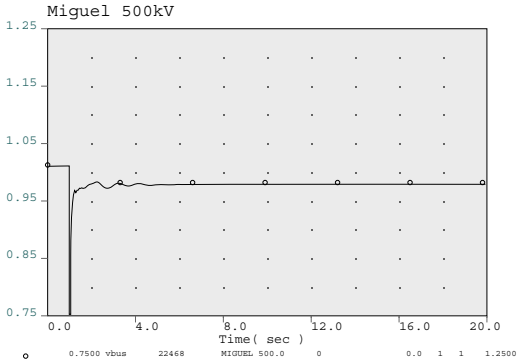
Imperial Valley 500kV



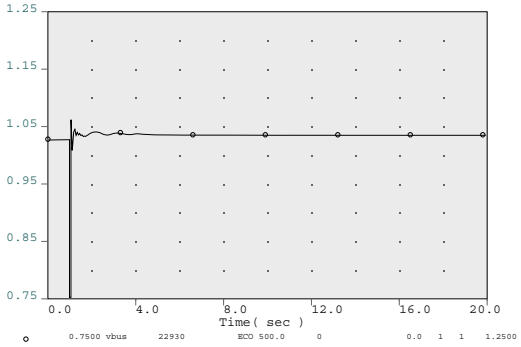
Imperial Valley 230kV



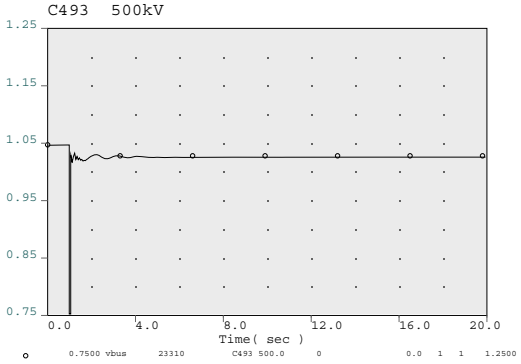
Miguel 500kV



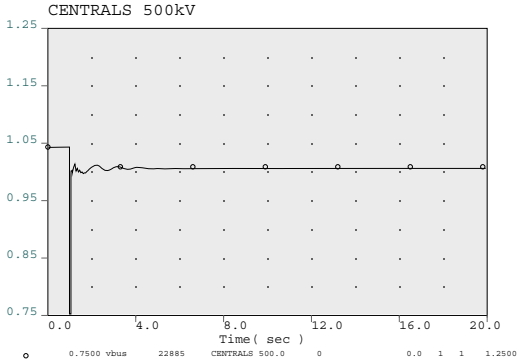
Windfarms 500



C493 500kV



CENTRALS 500kV

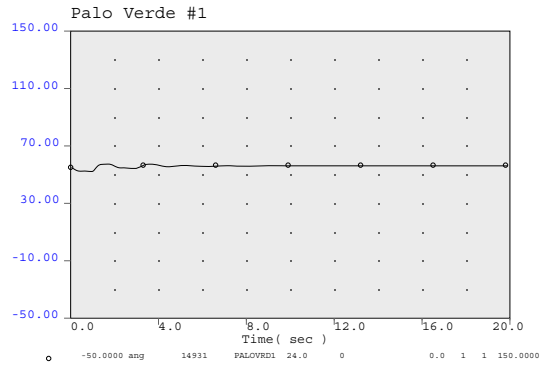


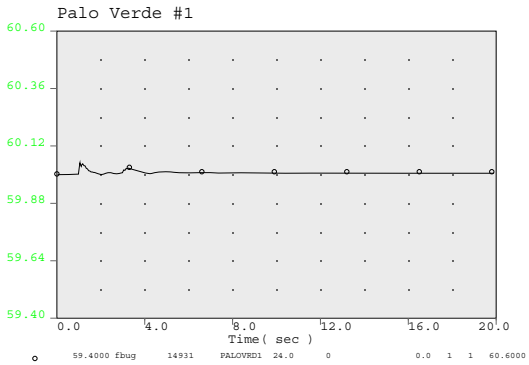
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

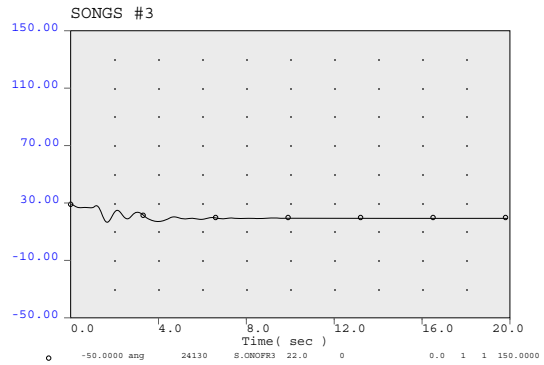
Imperial Valley Area - Frequency

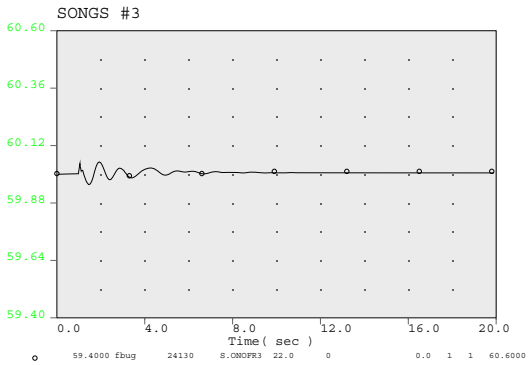
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

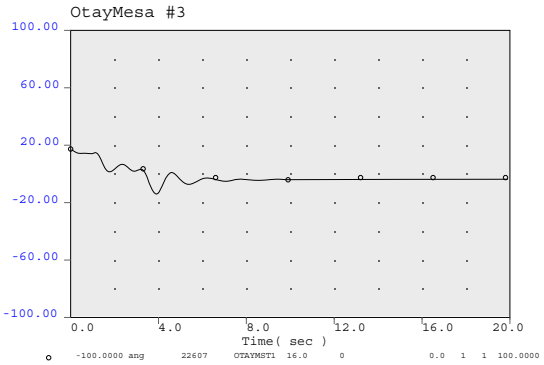
RELATIVE ROTOR ANGLE & FREQUENCY

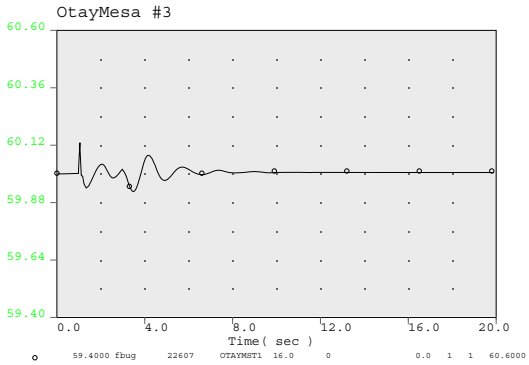












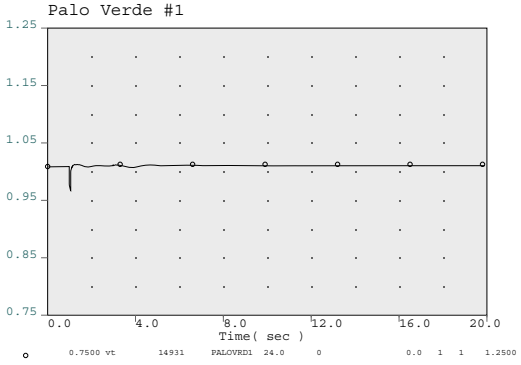
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Page 1

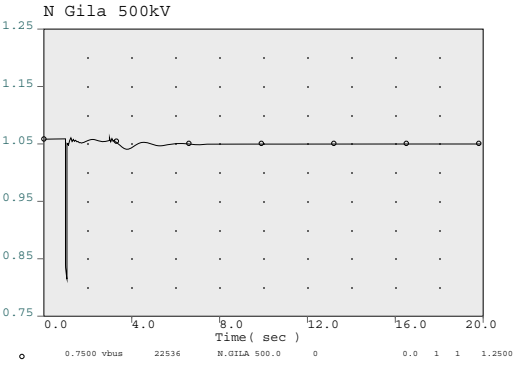
SDGE	ML_Wnd_RAS_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:25:43 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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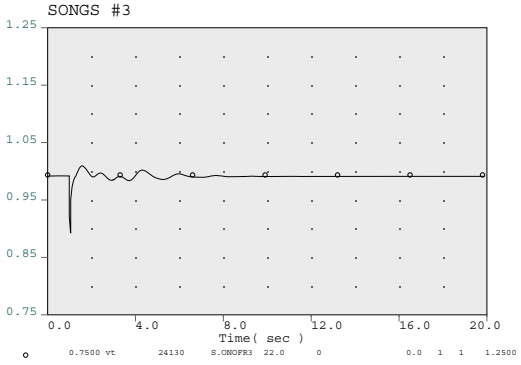
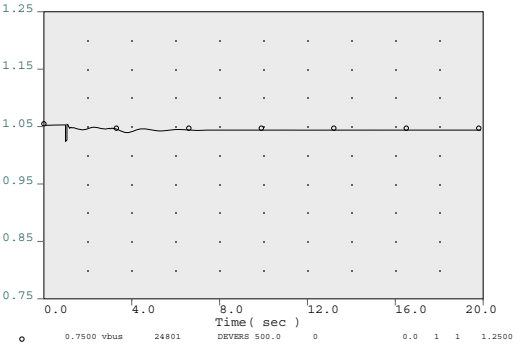
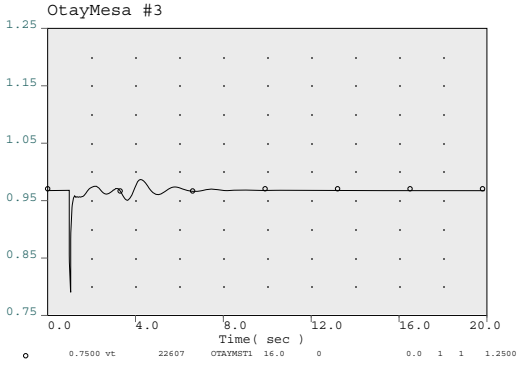


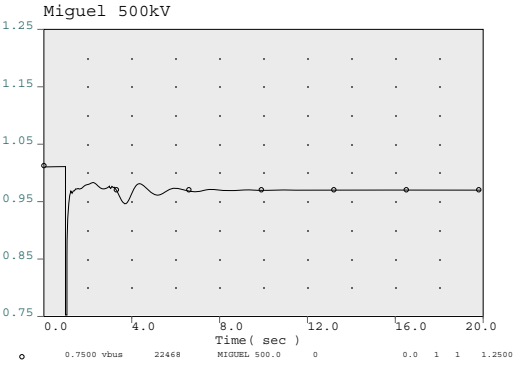
Devers 500



OtayMesa #3



Miguel 500kV

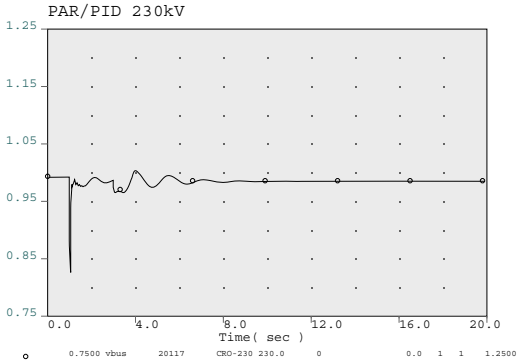


SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

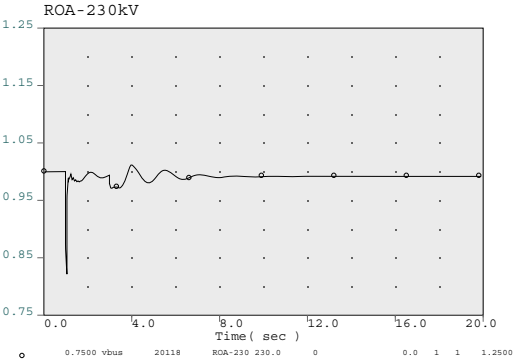
SDGE	ML_Wnd_RAS_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:25:43 2010

Affected System Voltage Check and Comparison

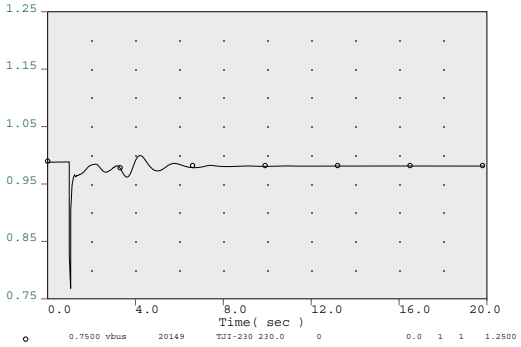
PAR/PID 230kV



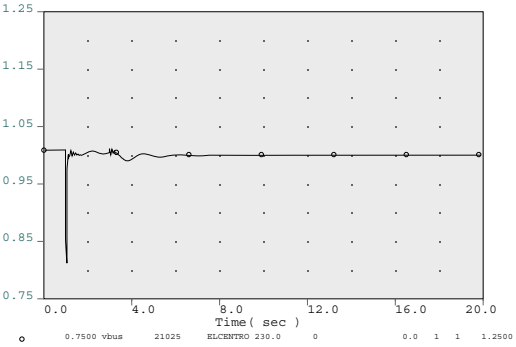
ROA-230kV



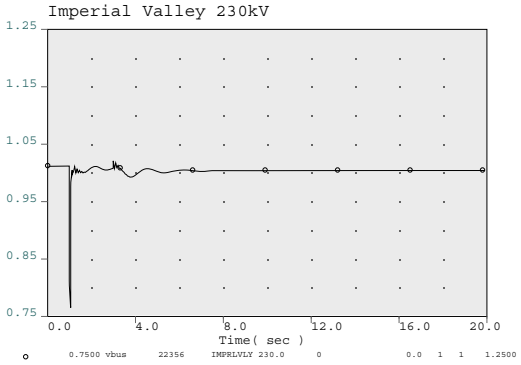
TJ1-230kV



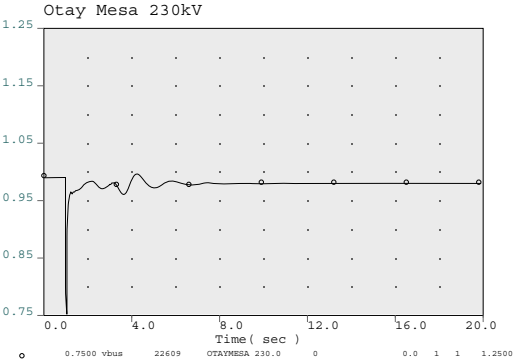
El Centro



Imperial Valley 230kV



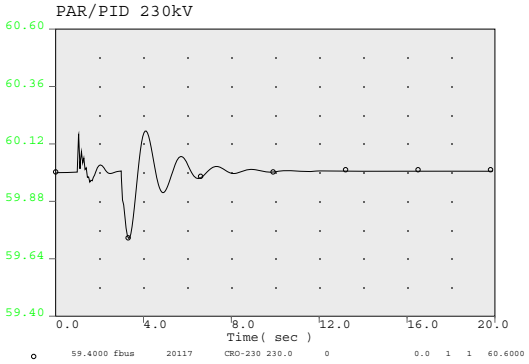
Otay Mesa 230kV



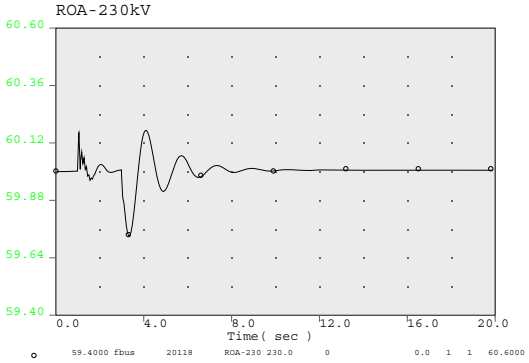
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

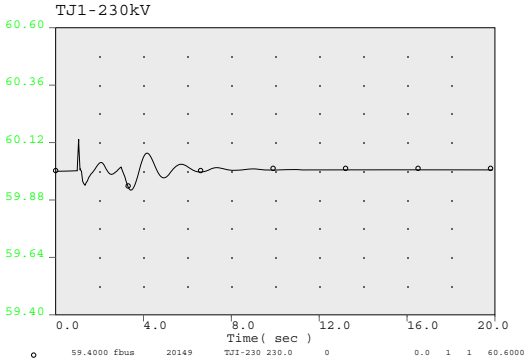
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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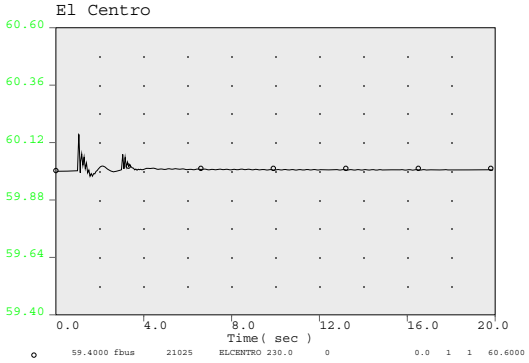
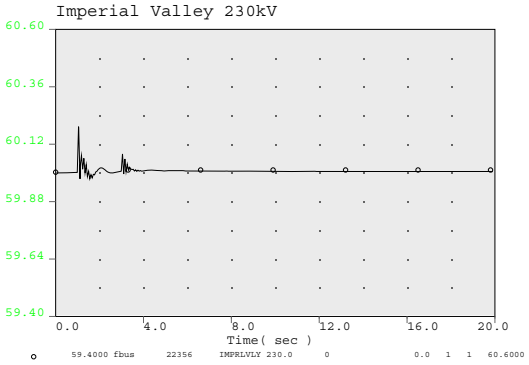
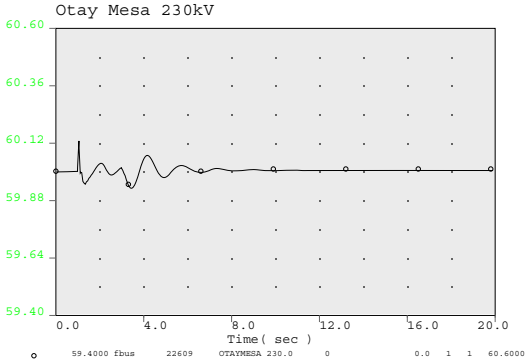


Imperial Valley 230kV



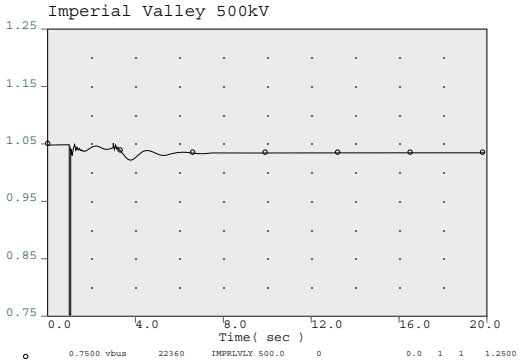
Otay Mesa 230kV



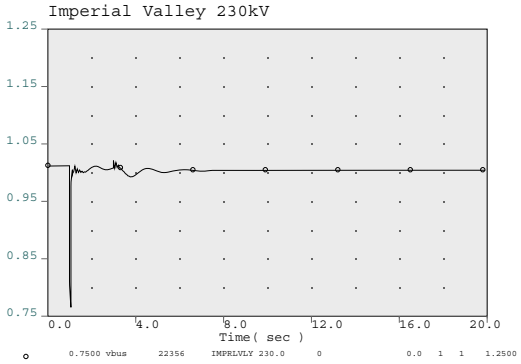
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

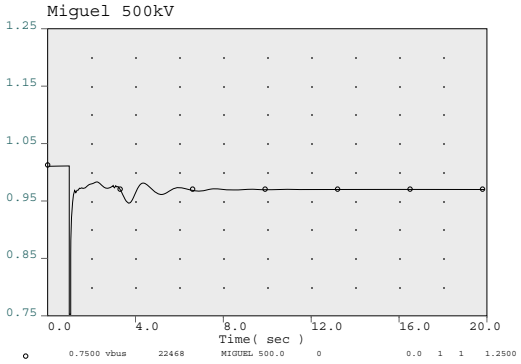
Imperial Valley 500kV



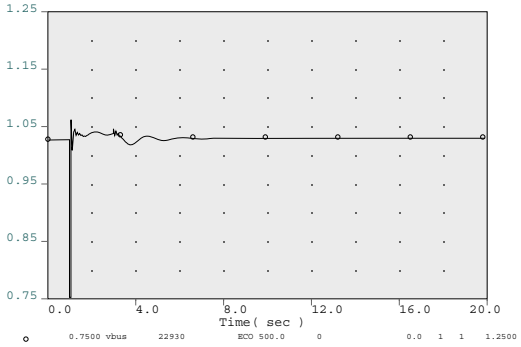
Imperial Valley 230kV



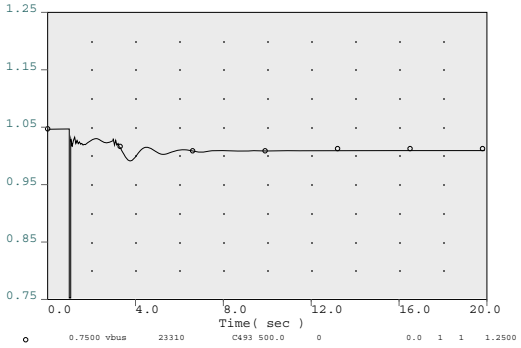
Miguel 500kV



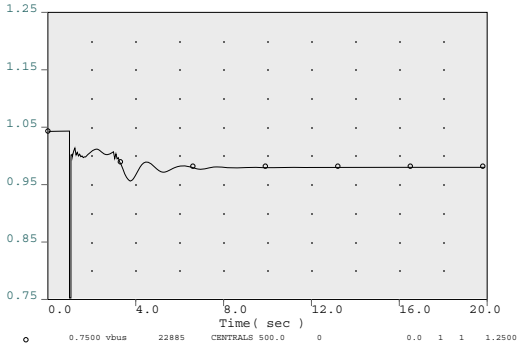
Windfarms 500



C493 500kV

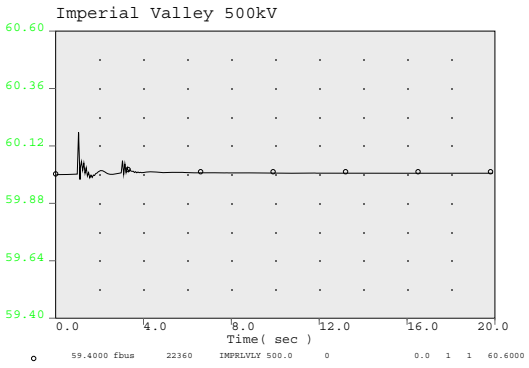


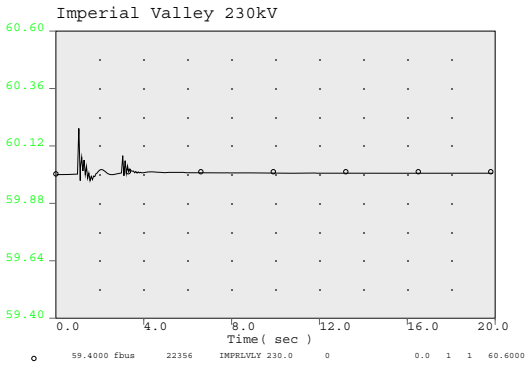
CENTRALS 500kV

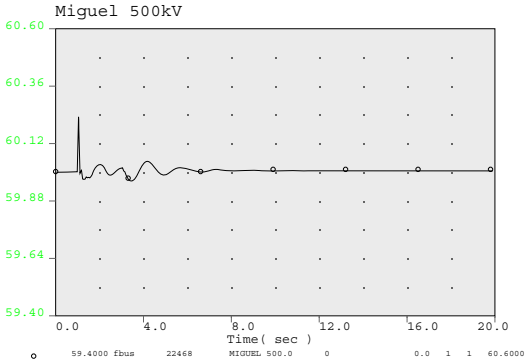


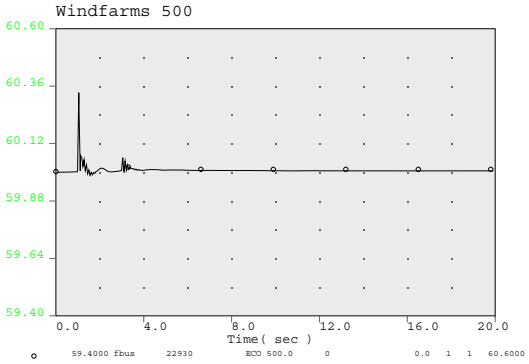
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

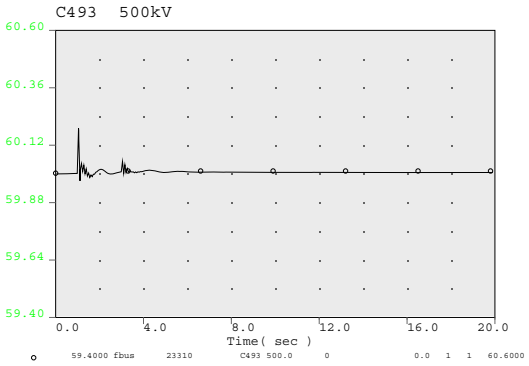
Imperial Valley Area - Frequency

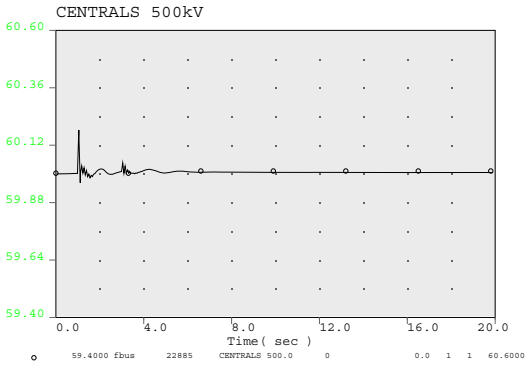






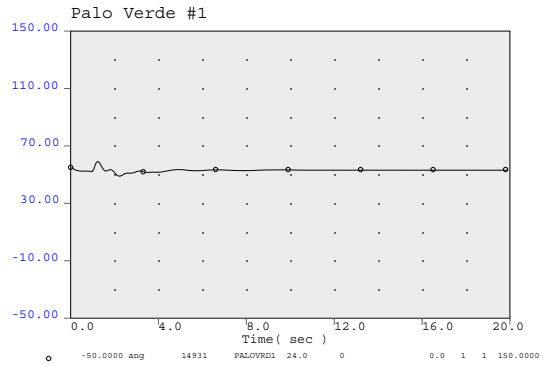


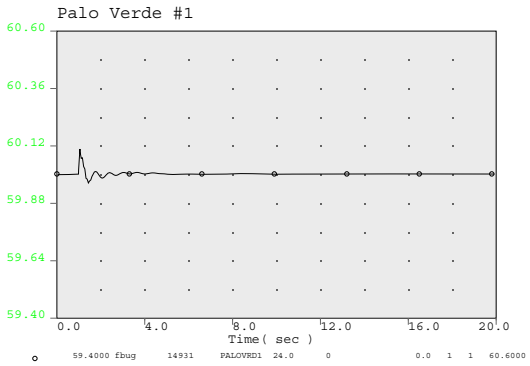


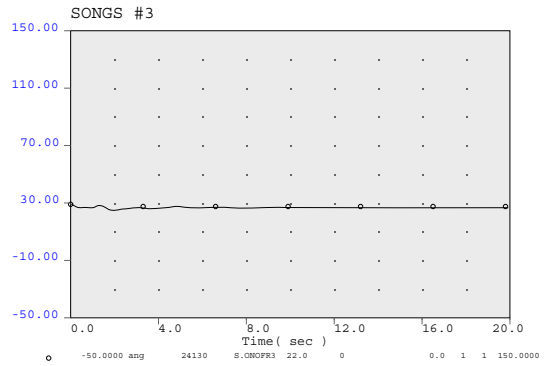


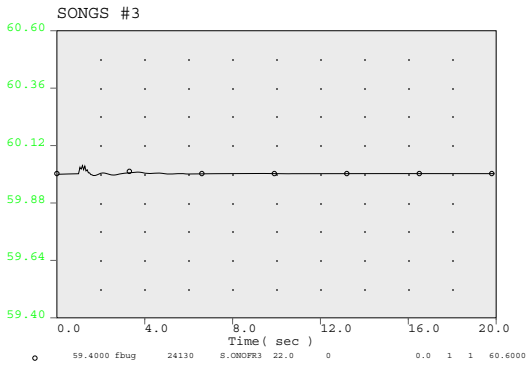
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

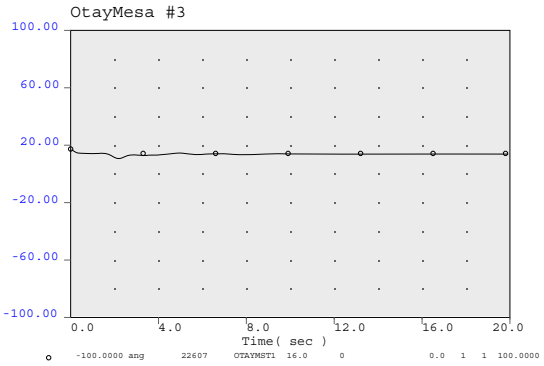
RELATIVE ROTOR ANGLE & FREQUENCY

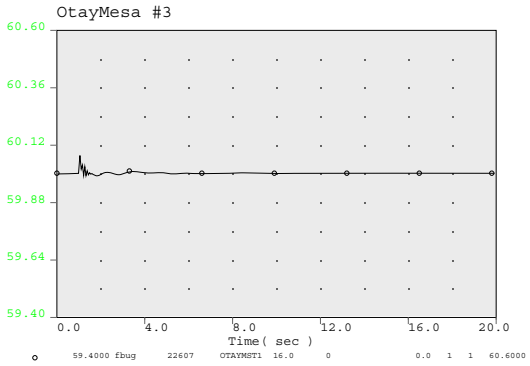










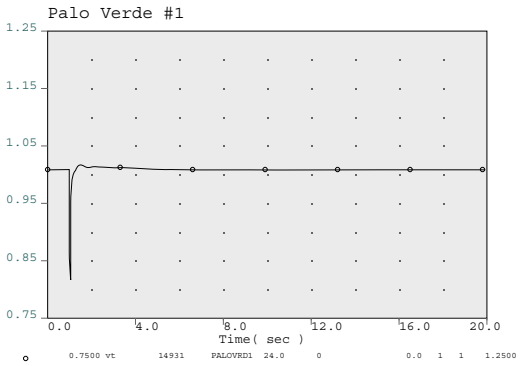


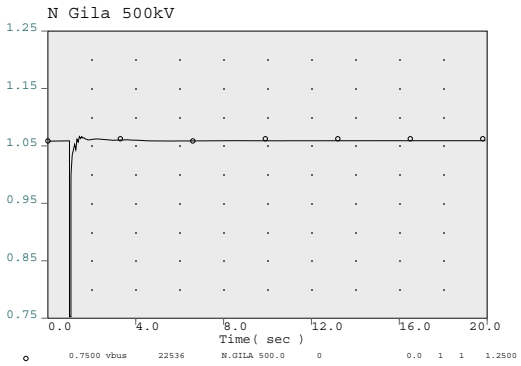
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

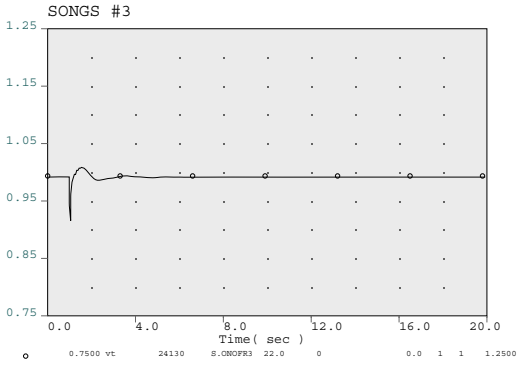
Page 1

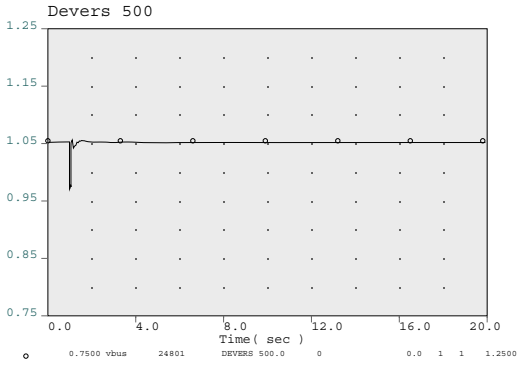
SDGE	NGila_IV_slo_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:28:30 2010

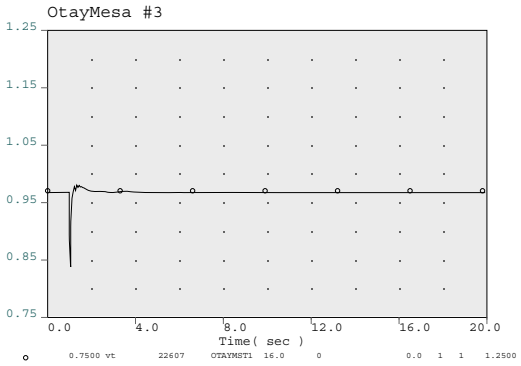
RELATIVE VOLTAGE

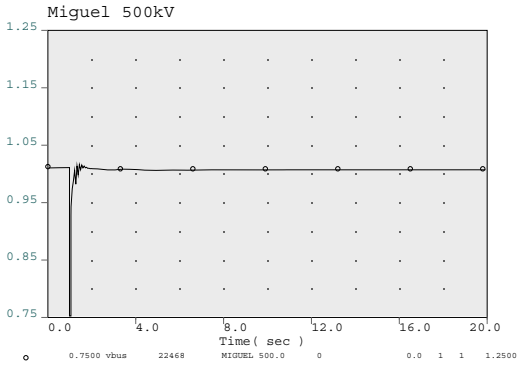








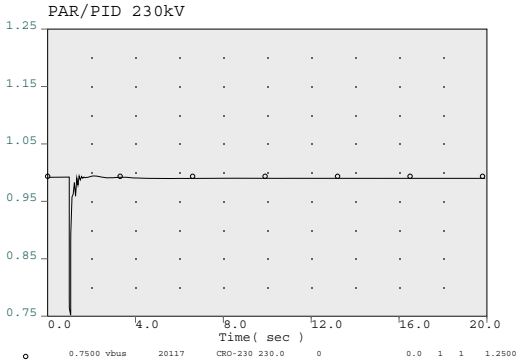




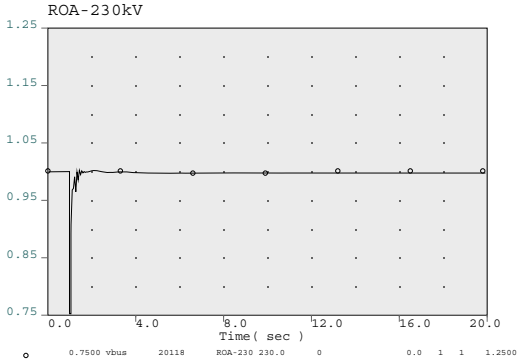
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

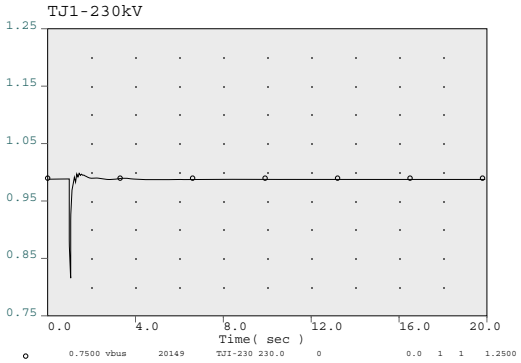
PAR/PID 230kV



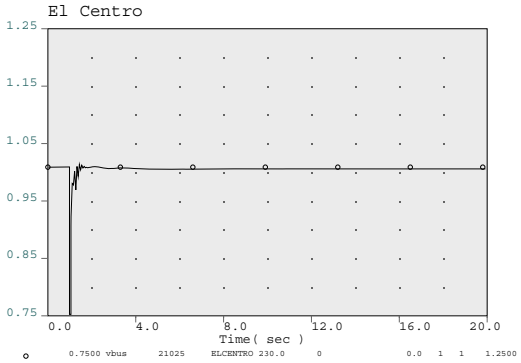
ROA-230kV



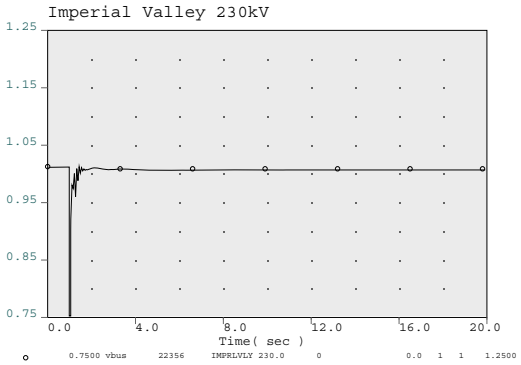
TJ1-230kV



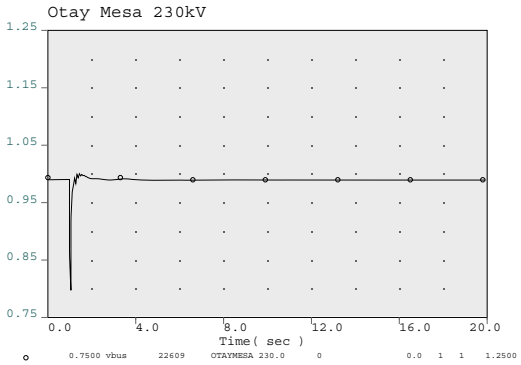
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



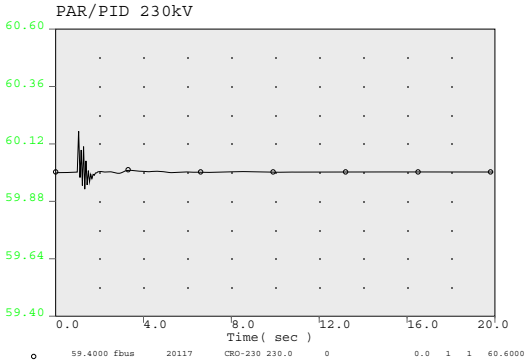
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Page 3

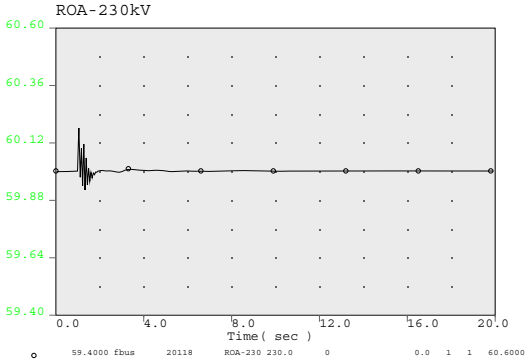
SDGE	NGila_IV_slo_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:28:30 2010

Affected System Frequency Check and Comparison

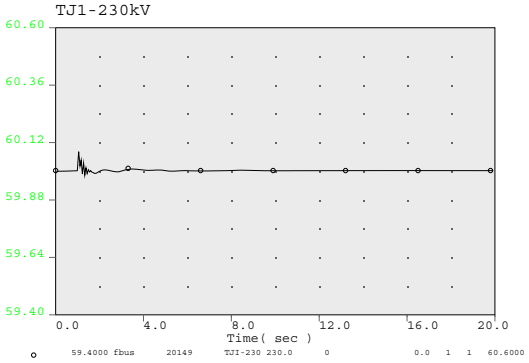
PAR/PID 230kV



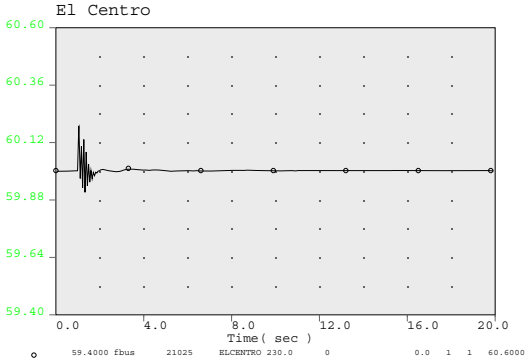
ROA-230kV



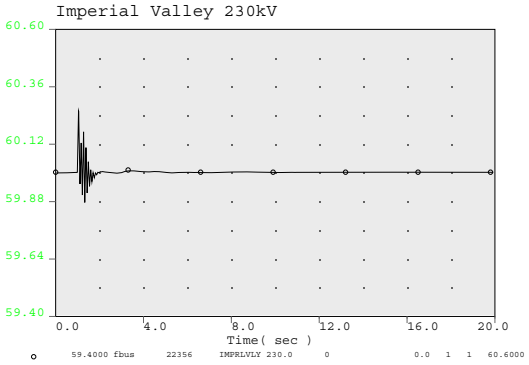
TJ1-230kV



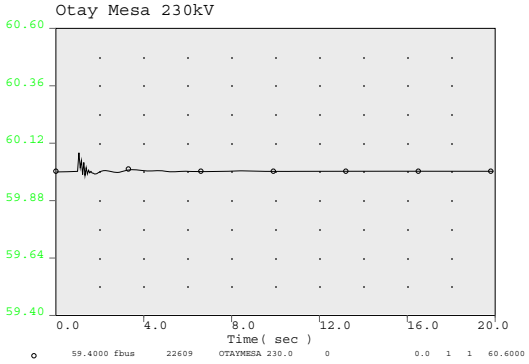
El Centro



Imperial Valley 230kV



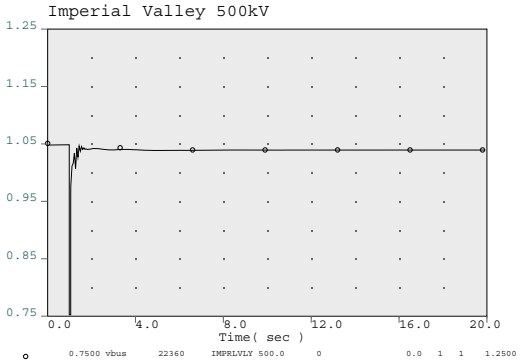
Otay Mesa 230kV



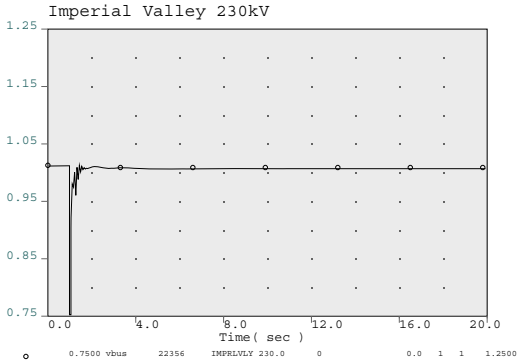
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

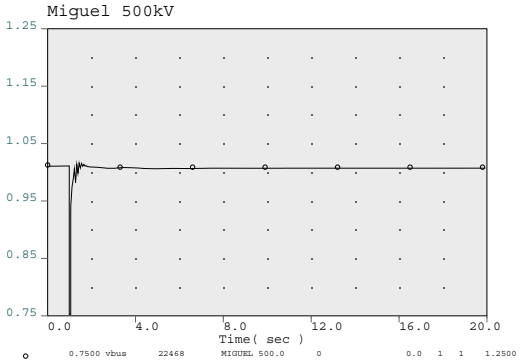
Imperial Valley 500kV



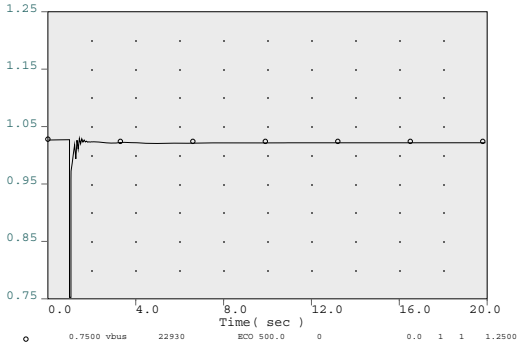
Imperial Valley 230kV



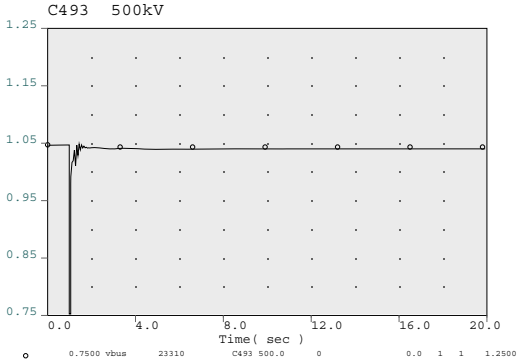
Miguel 500kV



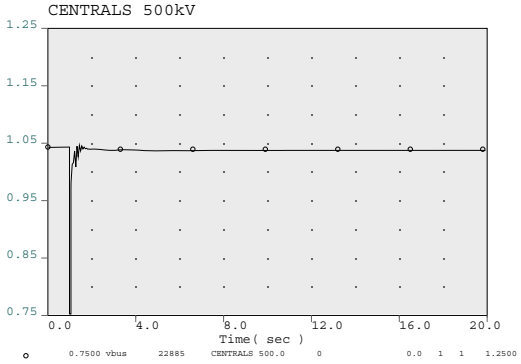
Windfarms 500



C493 500kV

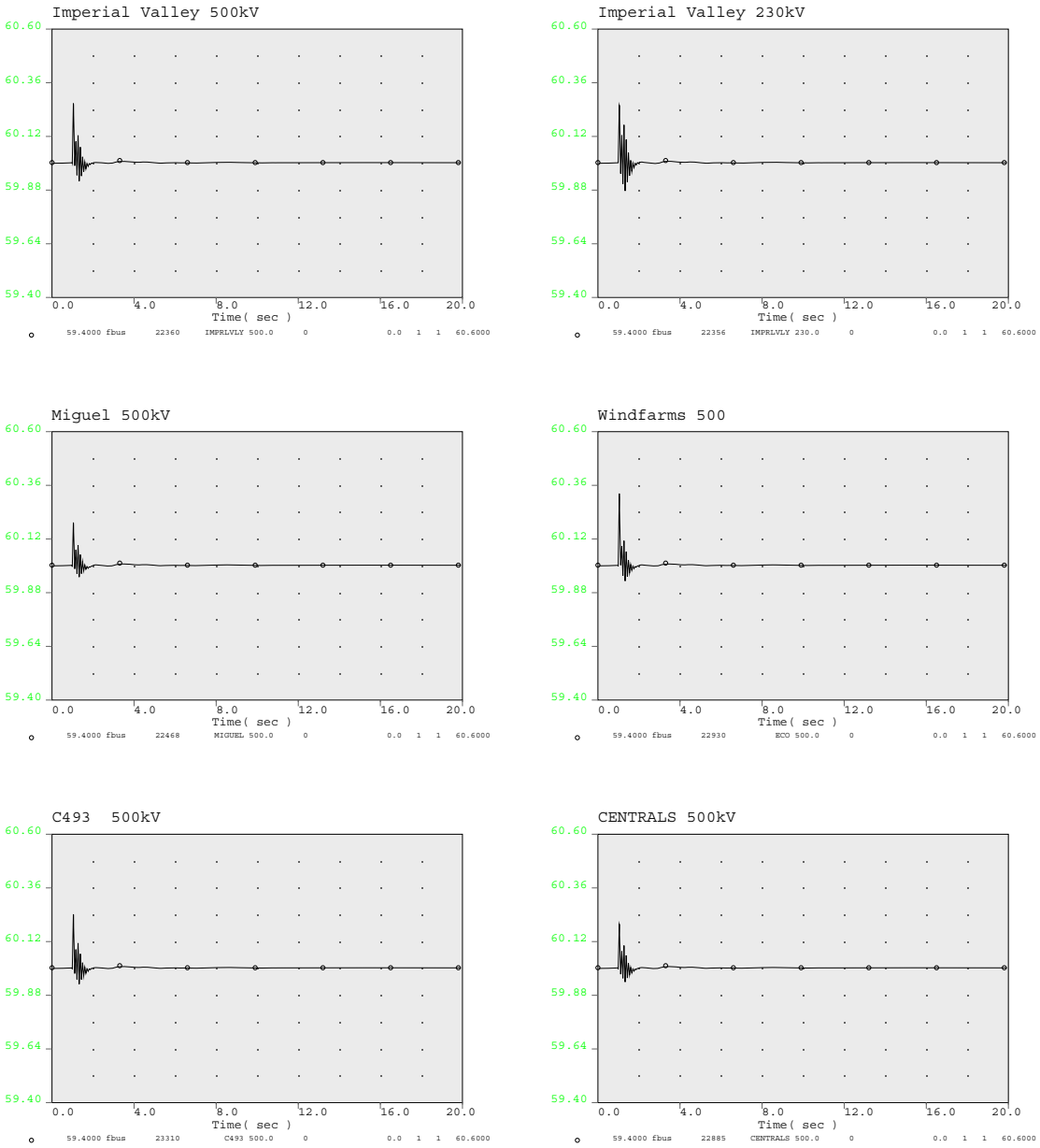


CENTRALS 500kV



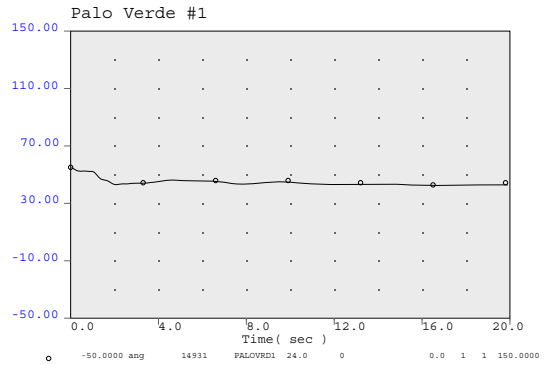
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

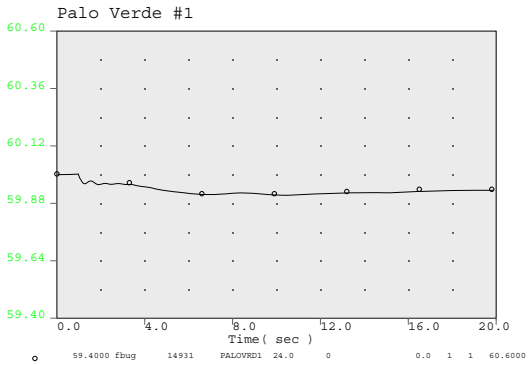
Imperial Valley Area - Frequency

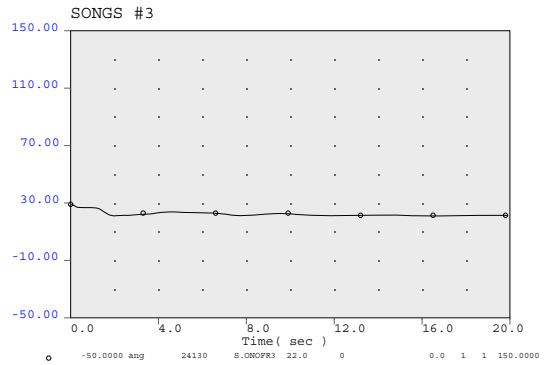


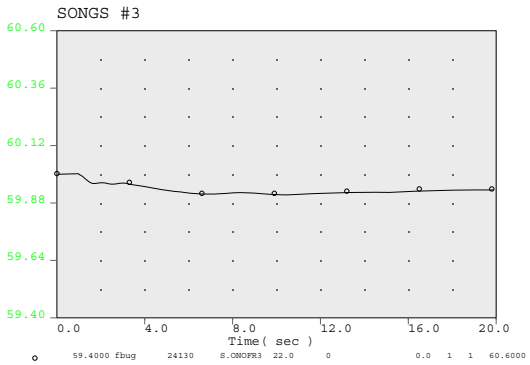
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

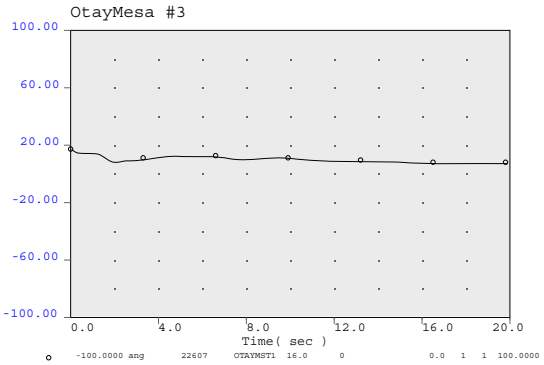
RELATIVE ROTOR ANGLE & FREQUENCY

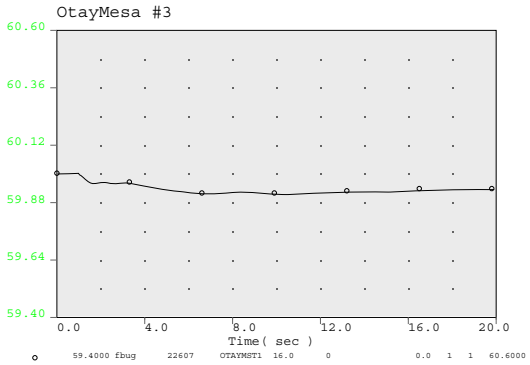










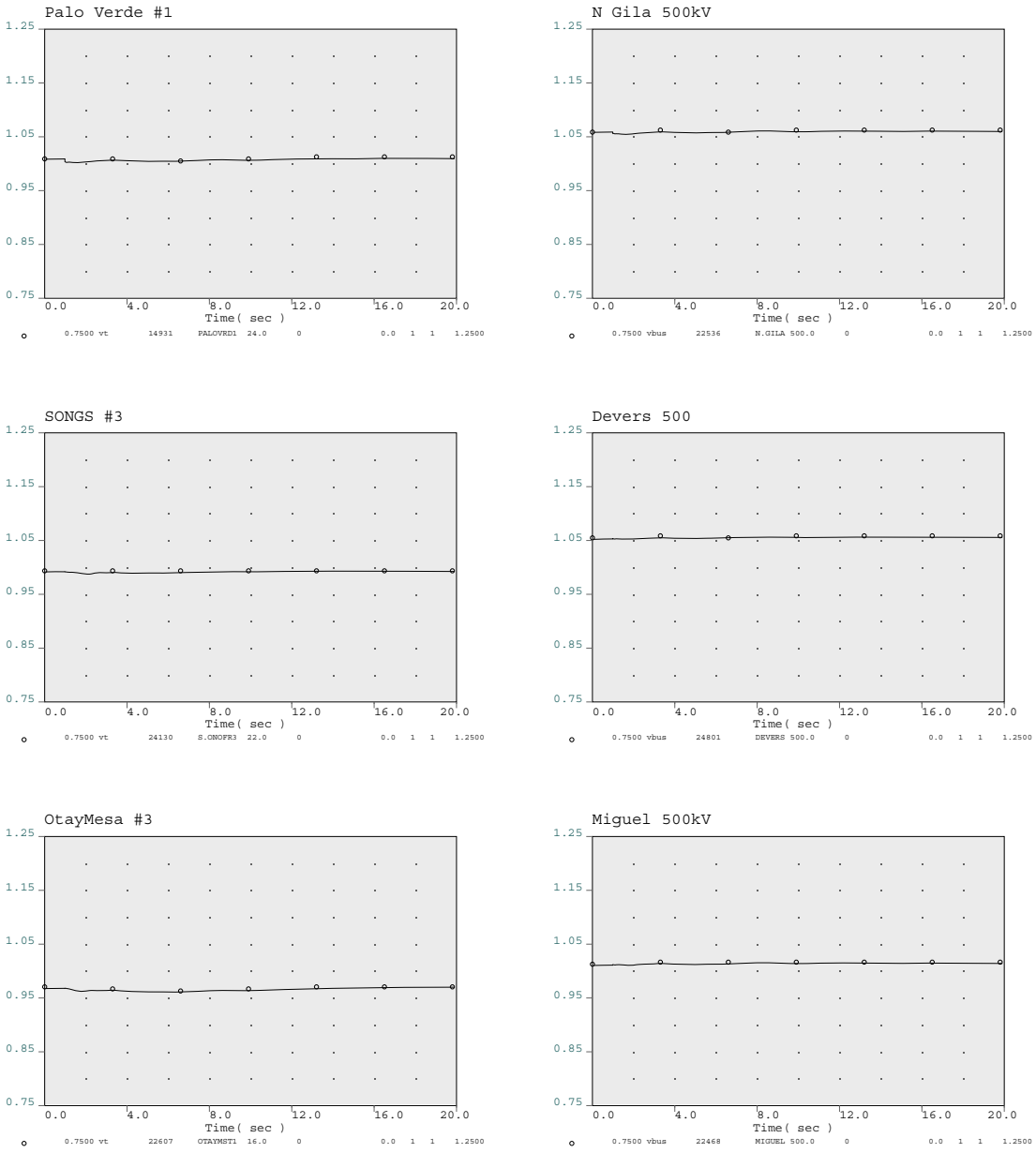


SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Page 1

SDGE	PaloVerde-g1_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:25:57 2010

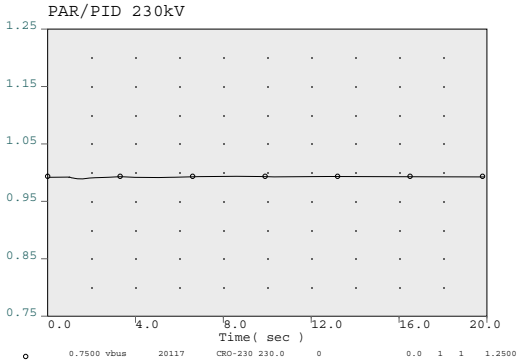
RELATIVE VOLTAGE



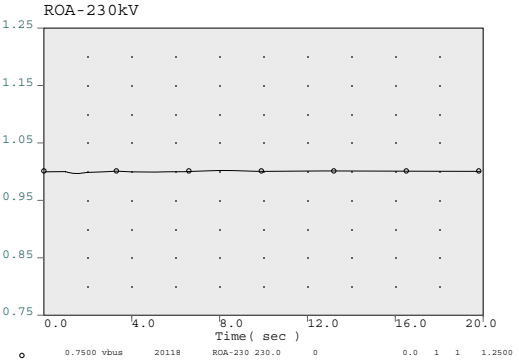
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

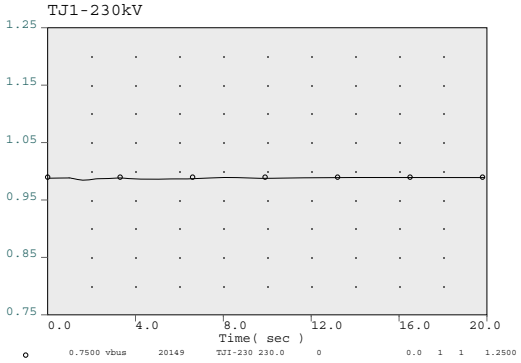
PAR/PID 230kV



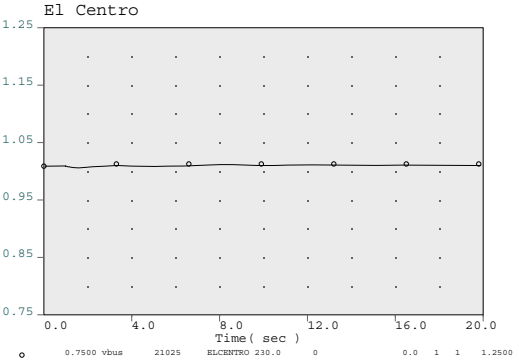
ROA-230kV



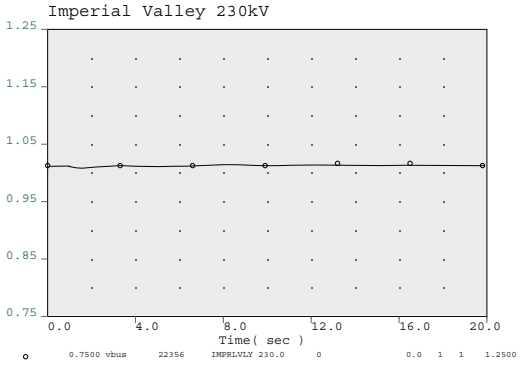
TJ1-230kV



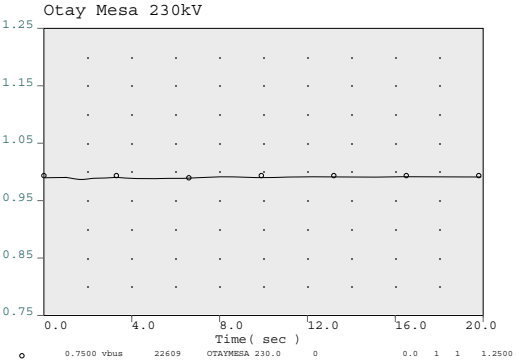
El Centro



Imperial Valley 230kV



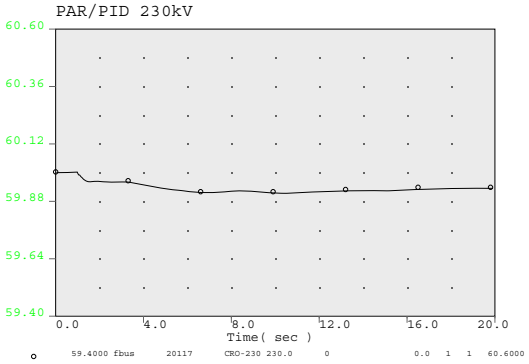
Otay Mesa 230kV



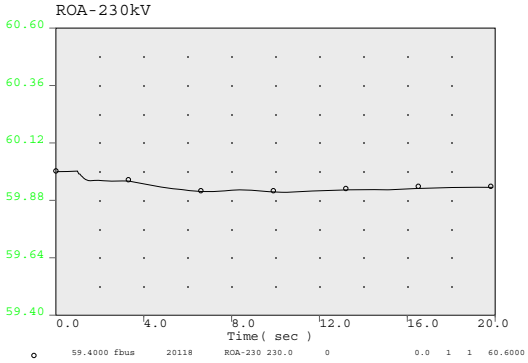
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

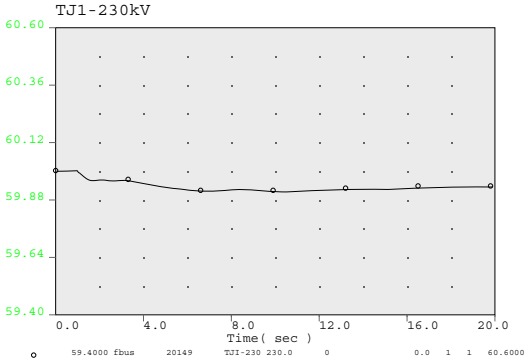
PAR/PID 230kV



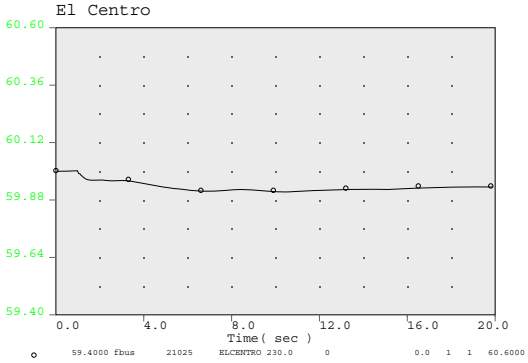
ROA-230kV



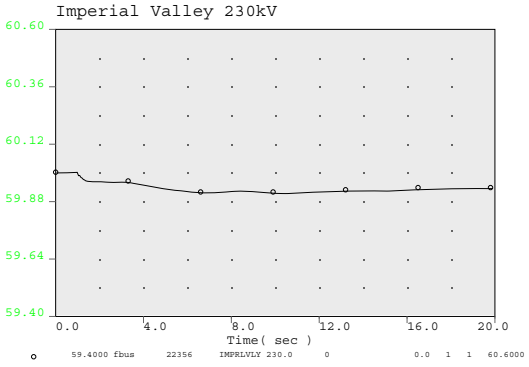
TJ1-230kV



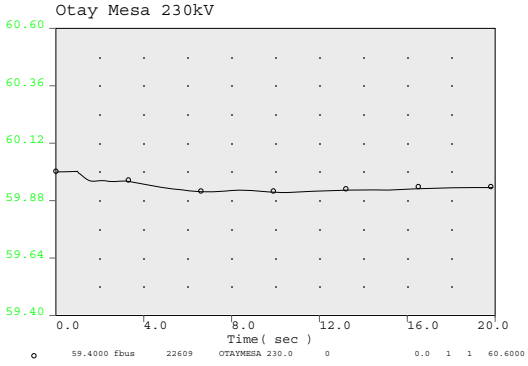
El Centro



Imperial Valley 230kV

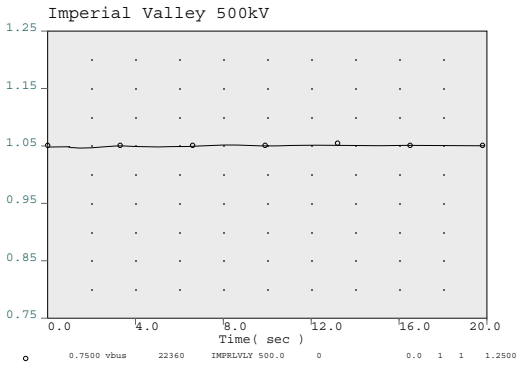


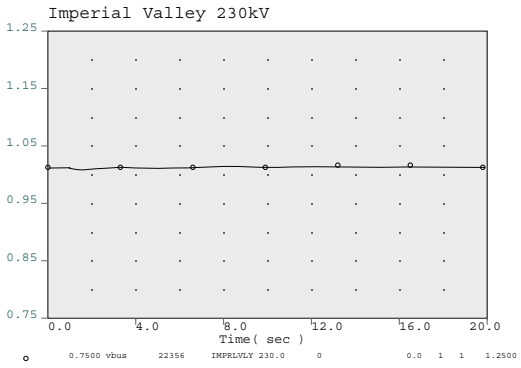
Otay Mesa 230kV

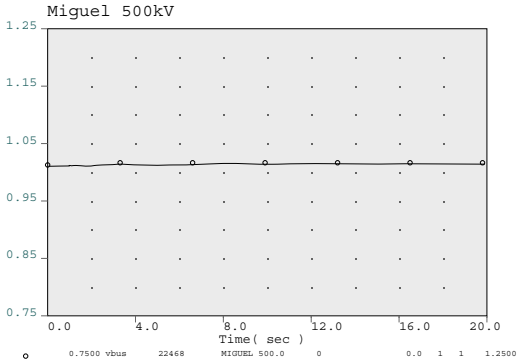


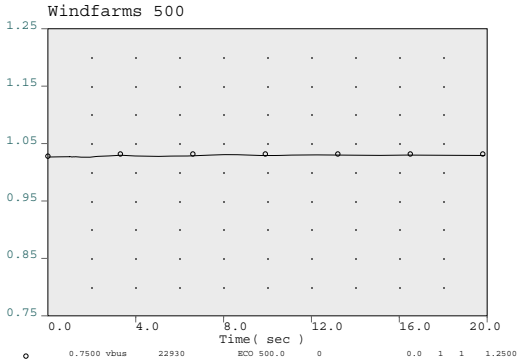
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

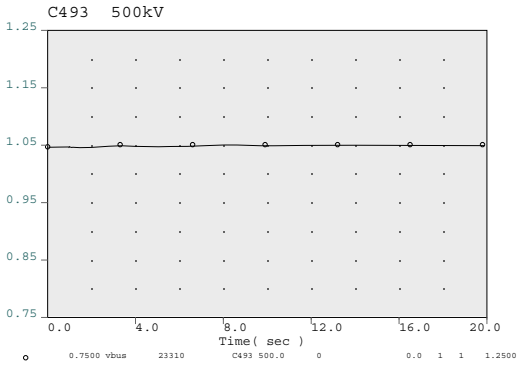
Imperial Valley Area - VOLTAGE

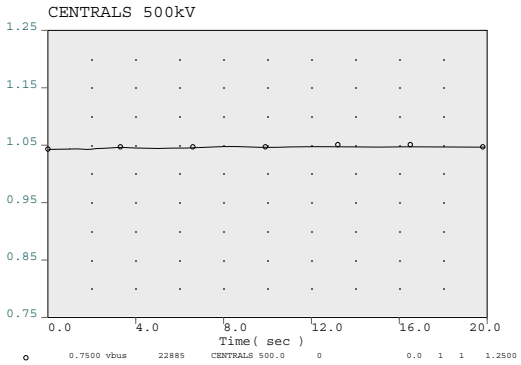










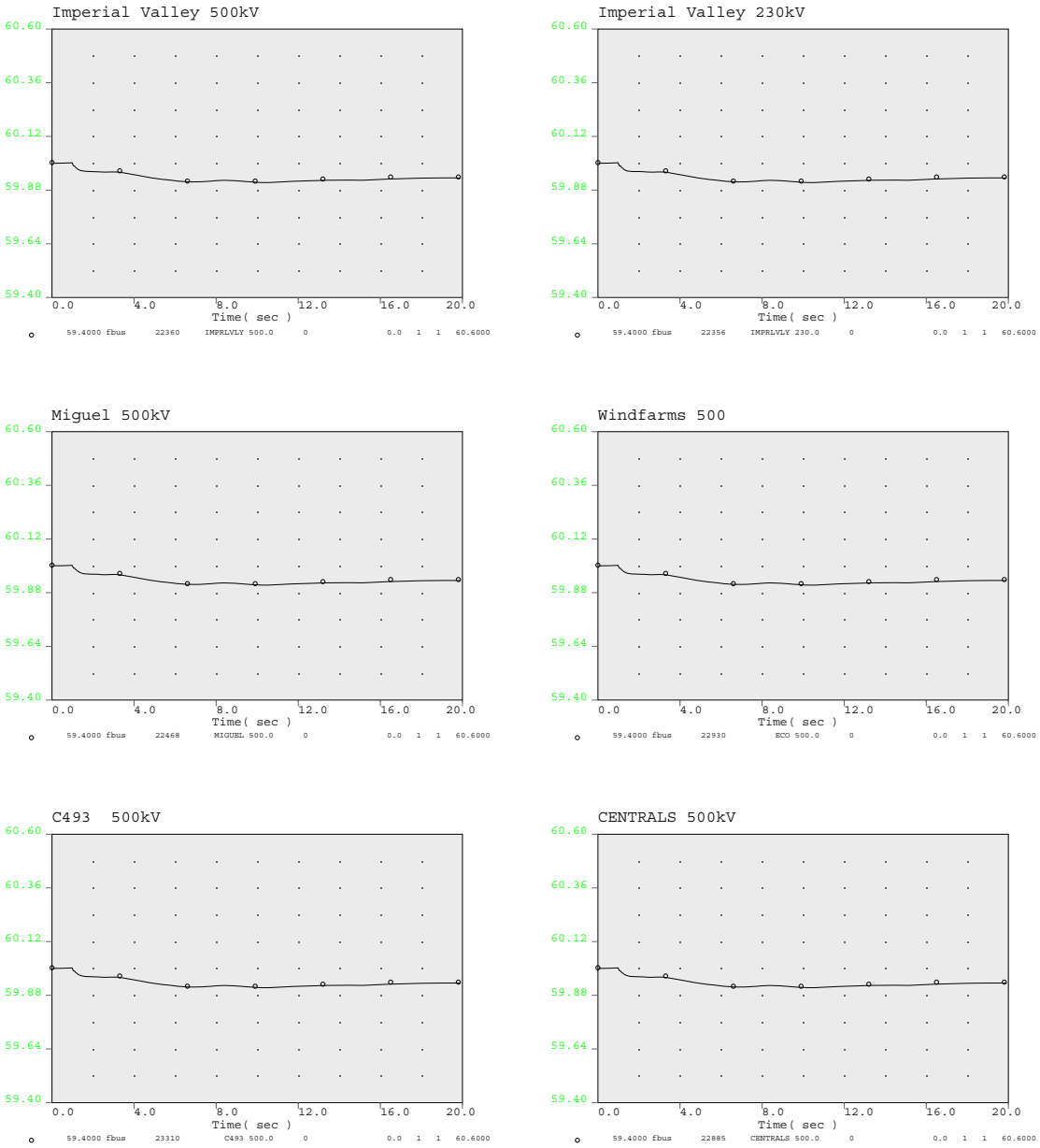


SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Page 5

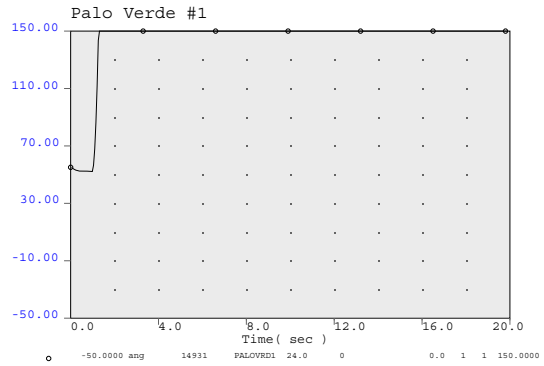
SDGE	PaloVerde-g1_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:25:57 2010

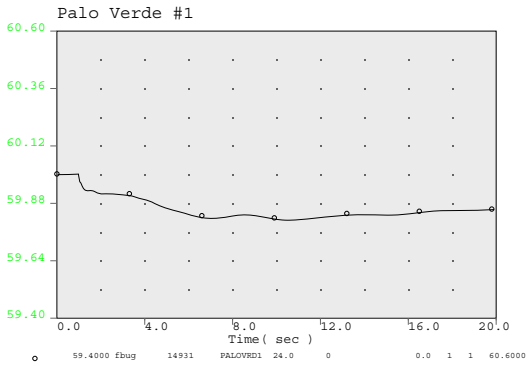
Imperial Valley Area - Frequency

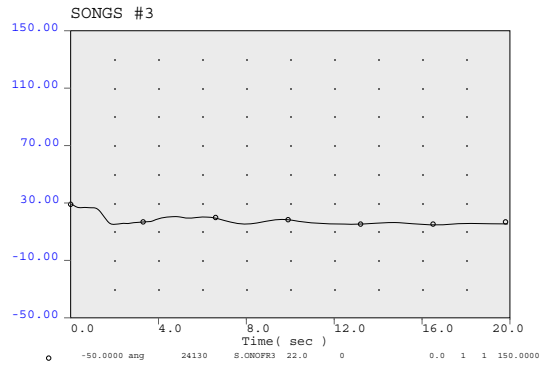


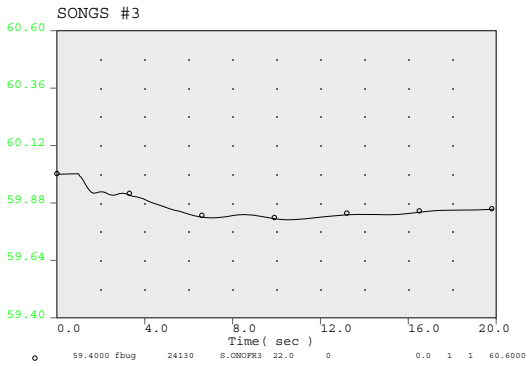
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

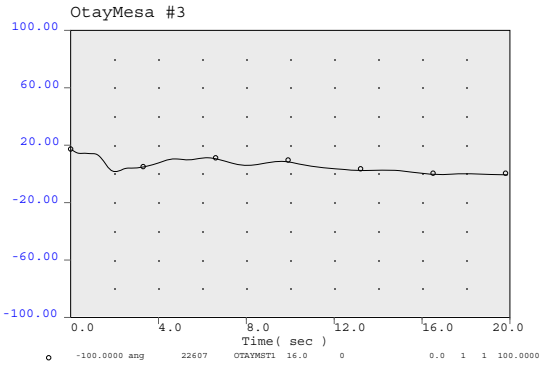
RELATIVE ROTOR ANGLE & FREQUENCY

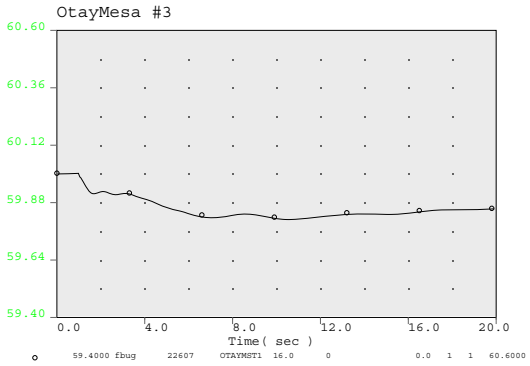












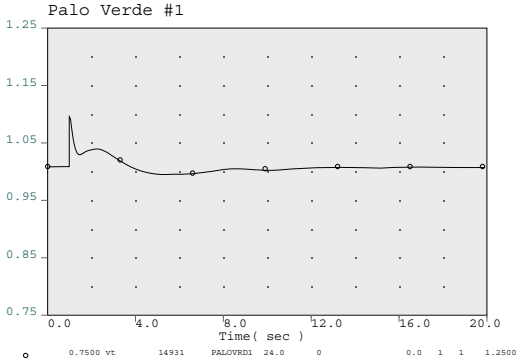
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Page 1

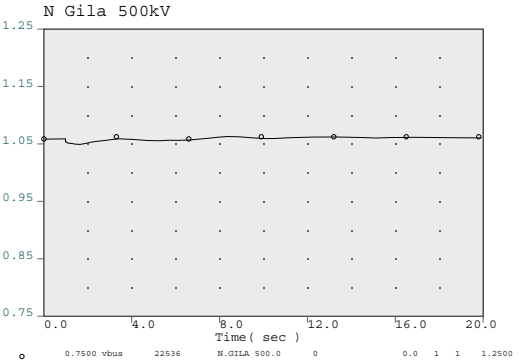
SDGE	PaloVerde-g2_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:26:13 2010

RELATIVE VOLTAGE

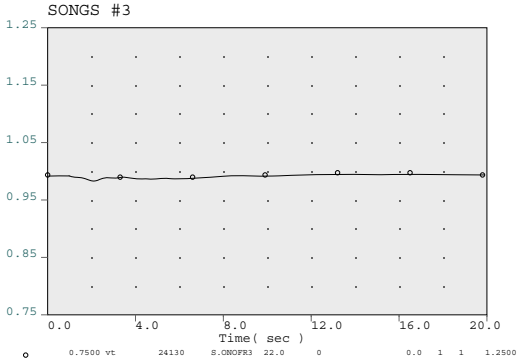
Palo Verde #1



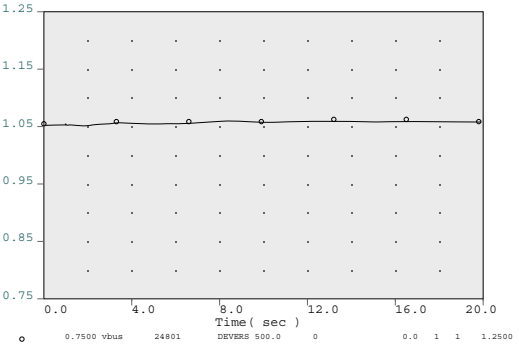
N Gila 500kV



SONGS #3



Devers 500



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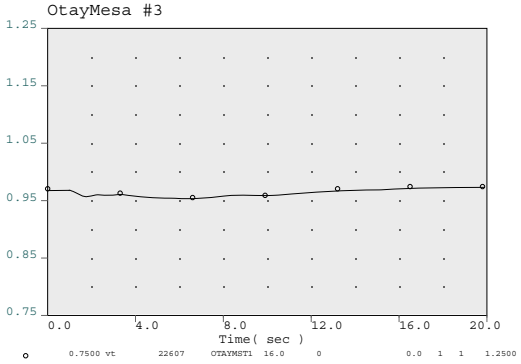
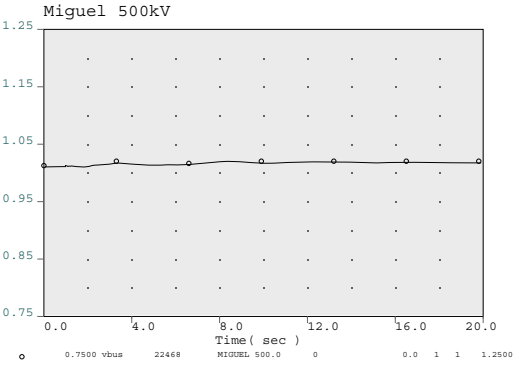


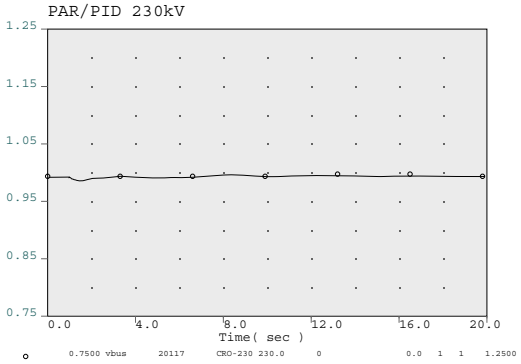
Miguel 500kV



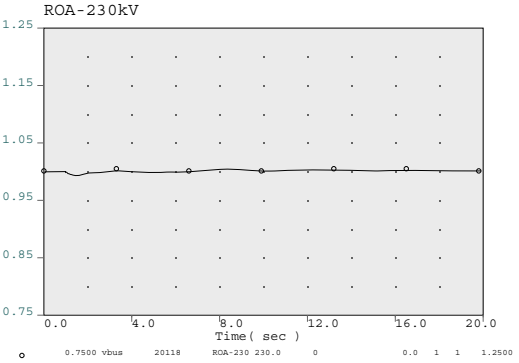
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

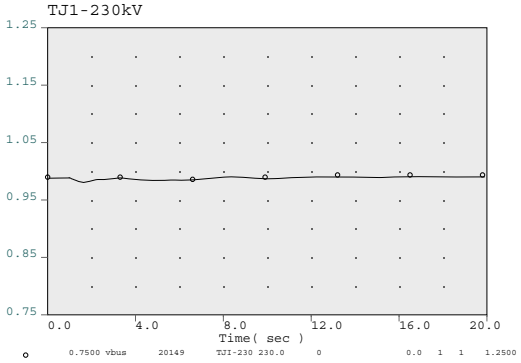
PAR/PID 230kV



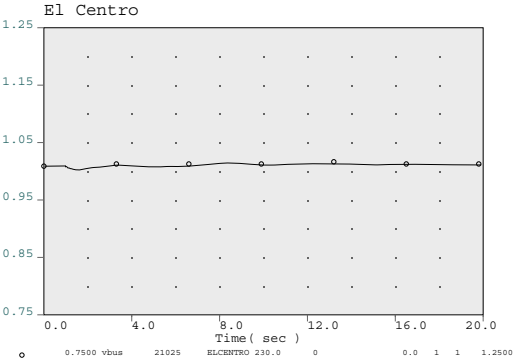
ROA-230kV



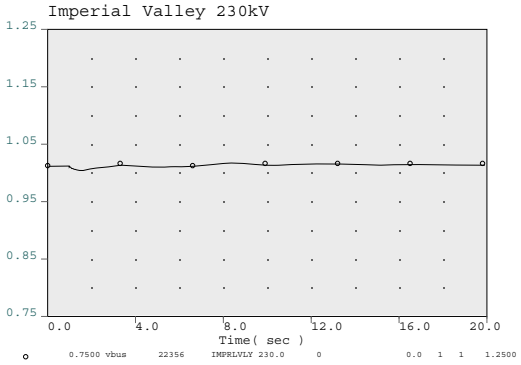
TJ1-230kV



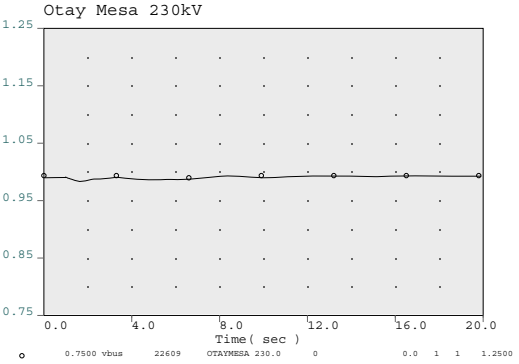
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Page 3

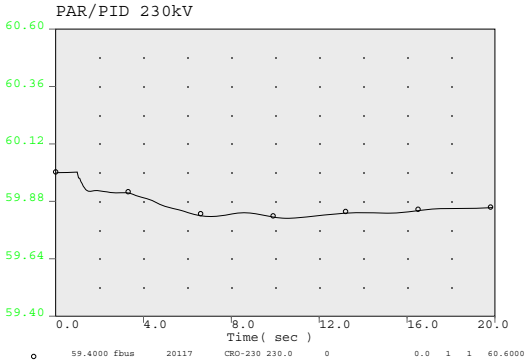
PaloVerde-g2_pst_hs_eco4.chf

ii phase i\dyds\pst_bu4up

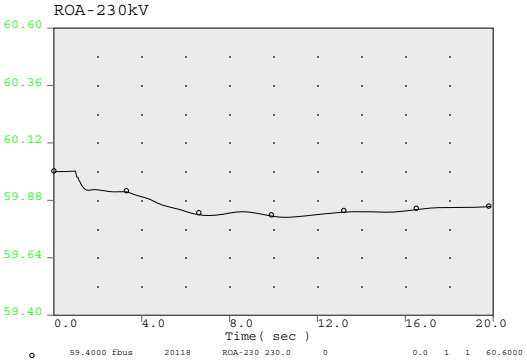
Tue Oct 12 14:26:13 2010

Affected System Frequency Check and Comparison

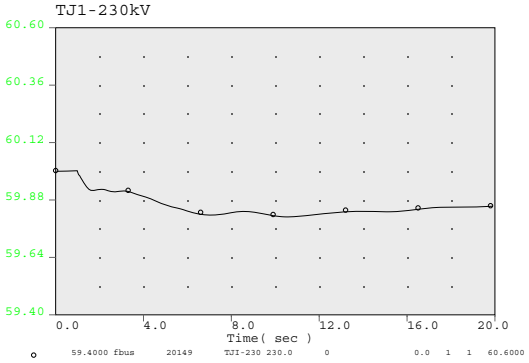
PAR/PID 230kV



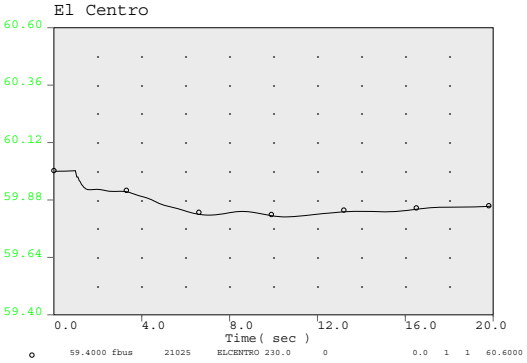
ROA-230kV



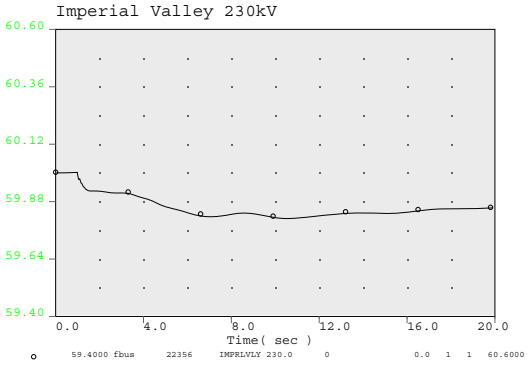
TJ1-230kV



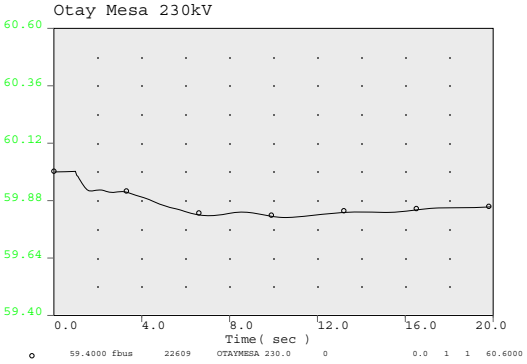
El Centro



Imperial Valley 230kV

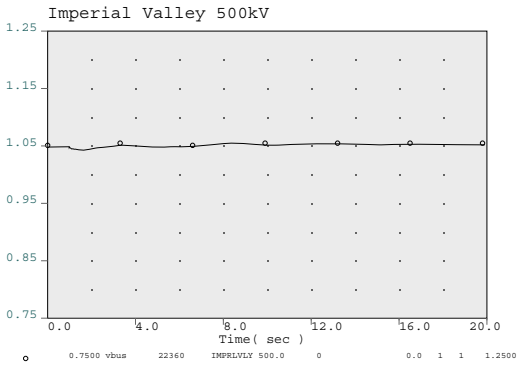


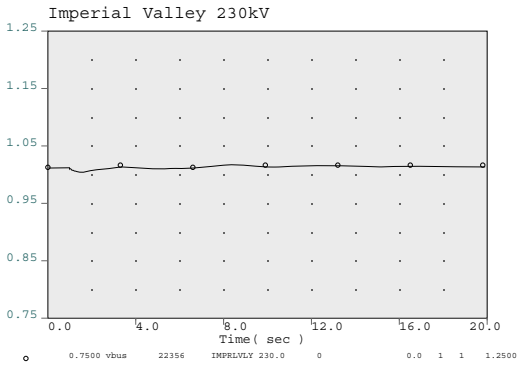
Otay Mesa 230kV

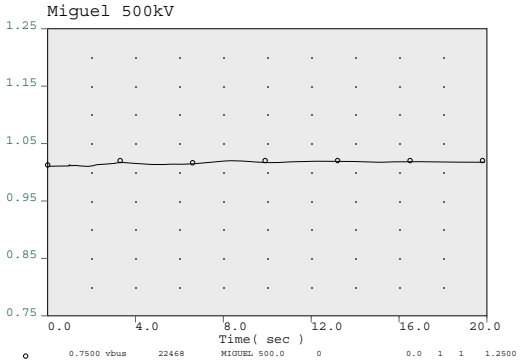


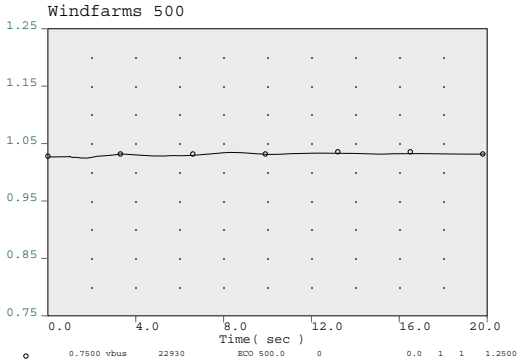
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

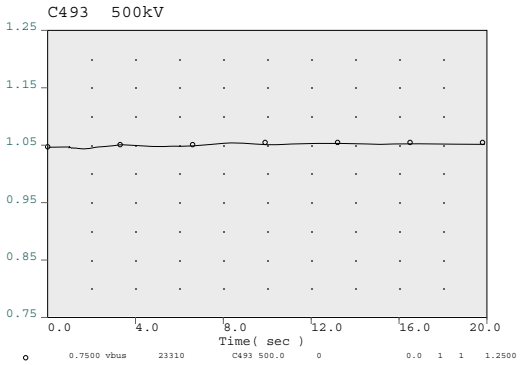
Imperial Valley Area - VOLTAGE

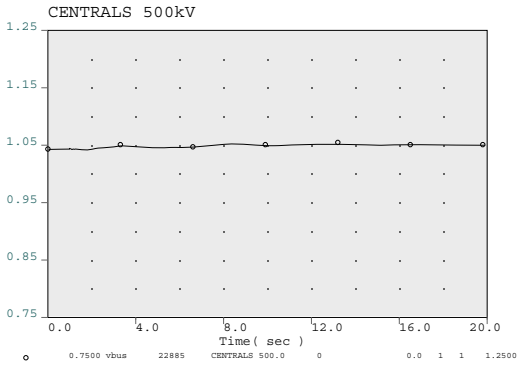








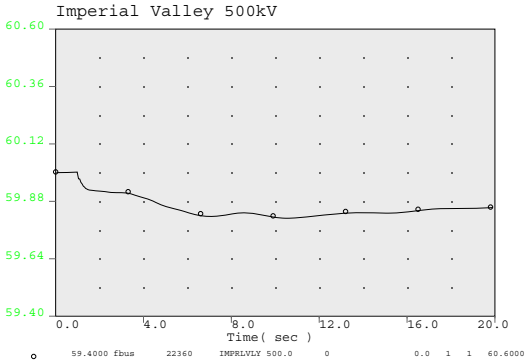




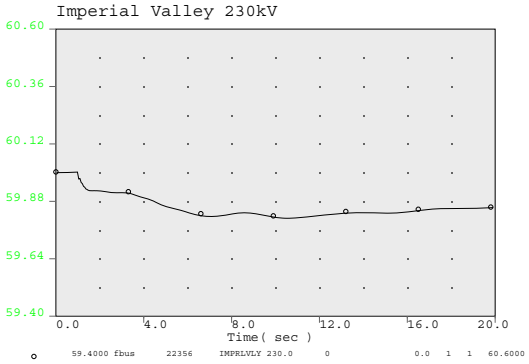
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - Frequency

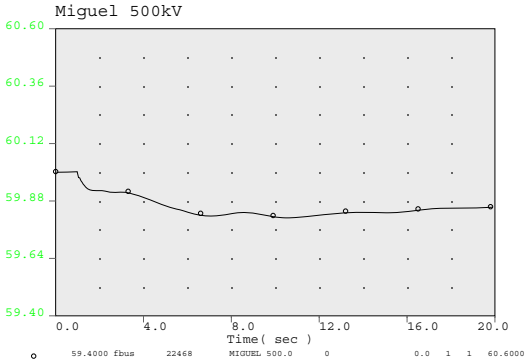
Imperial Valley 500kV



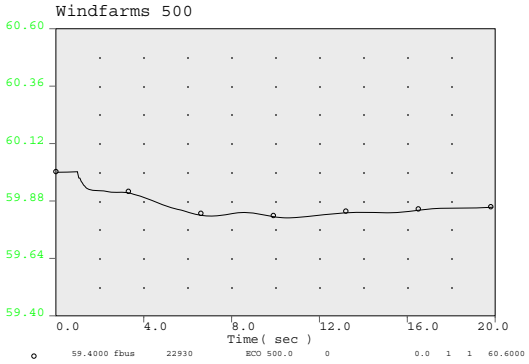
Imperial Valley 230kV



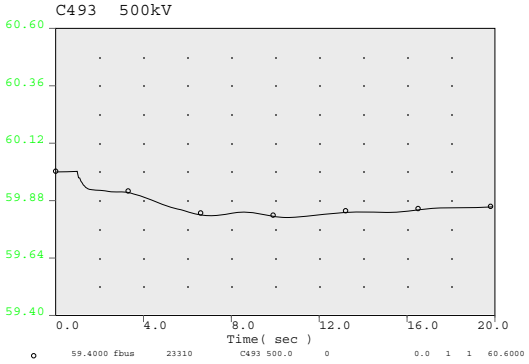
Miguel 500kV



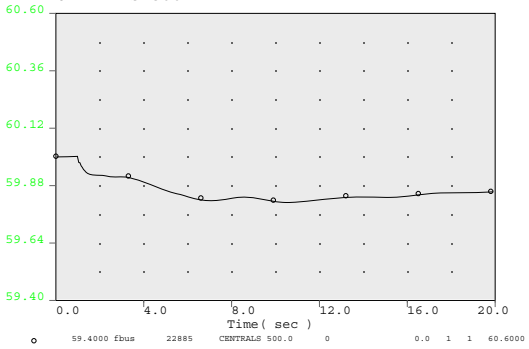
Windfarms 500



C493 500kV

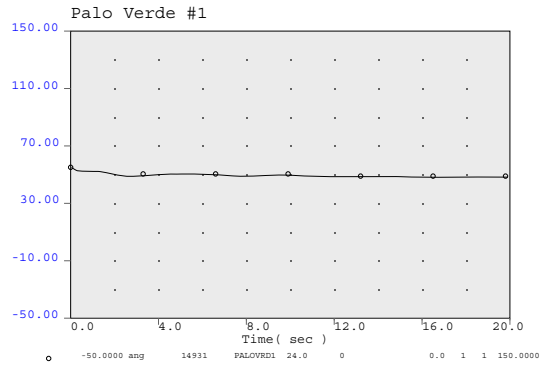


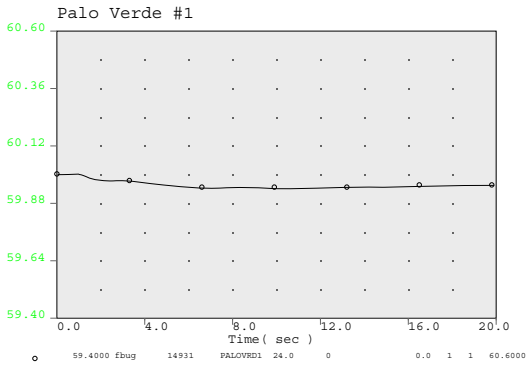
CENTRALS 500kV

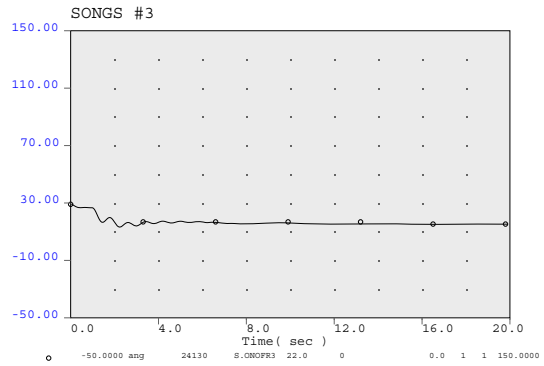


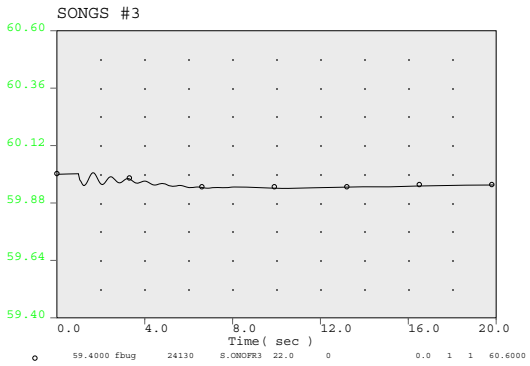
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

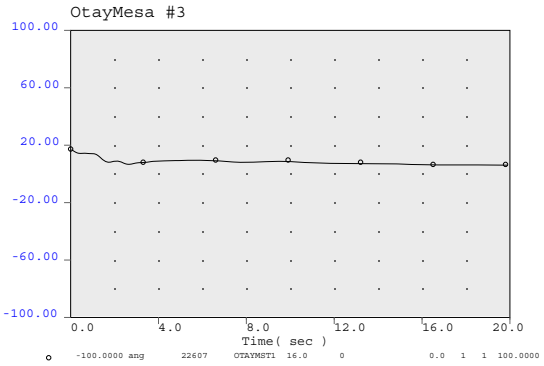
RELATIVE ROTOR ANGLE & FREQUENCY

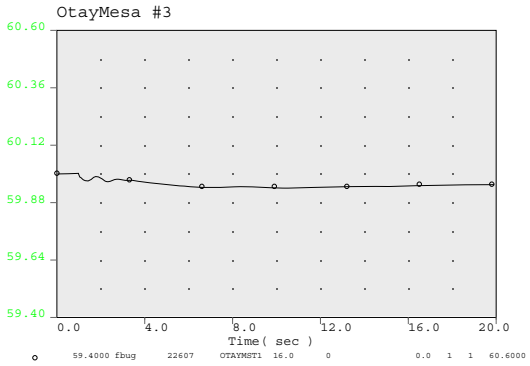










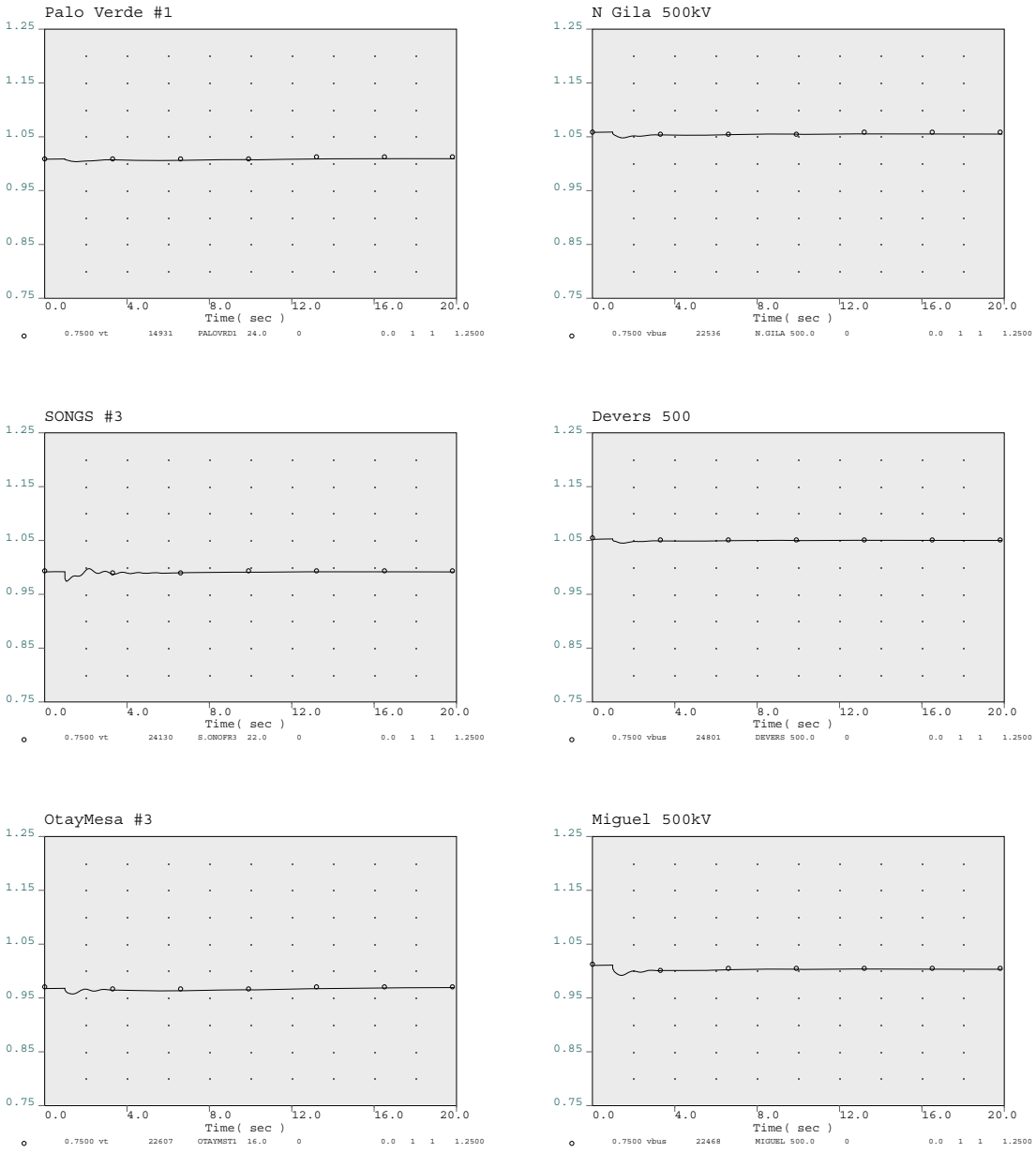


SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

Page 1

SDGE	SONGS-g1_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:26:29 2010

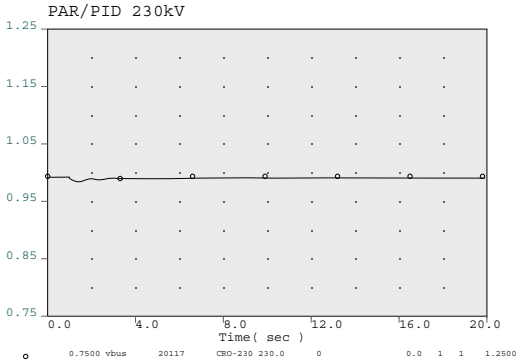
RELATIVE VOLTAGE



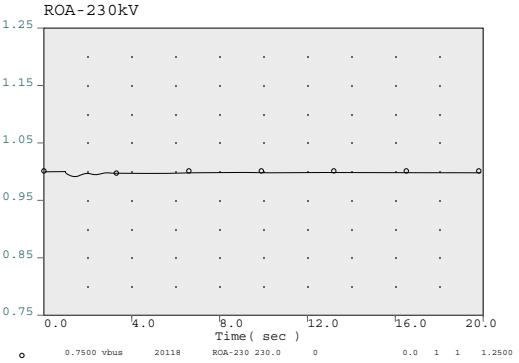
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

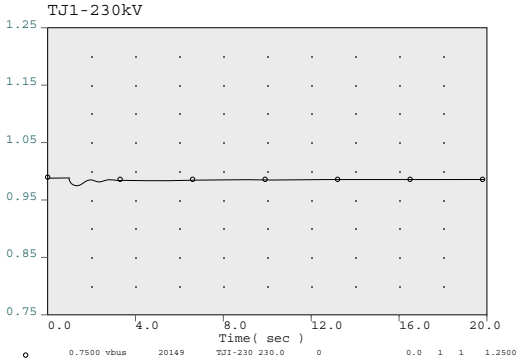
PAR/PID 230kV



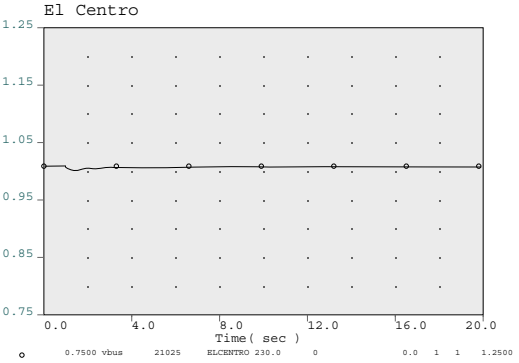
ROA-230kV



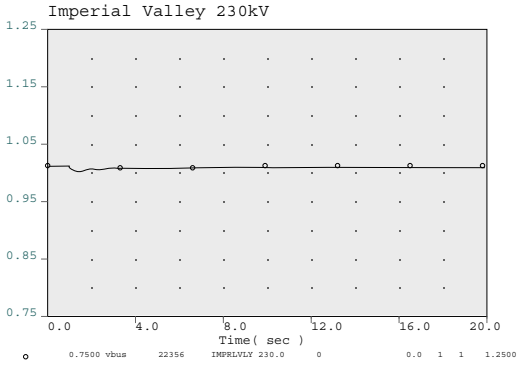
TJ1-230kV



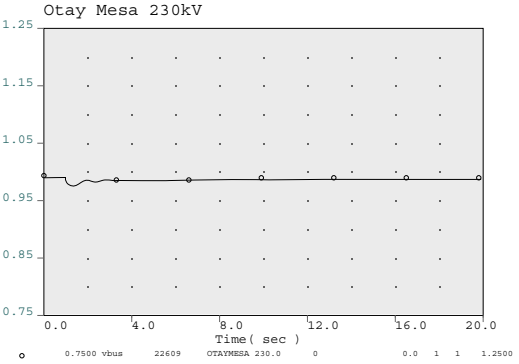
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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2014 Heavy Summer
Trip San Onofre Generator #2

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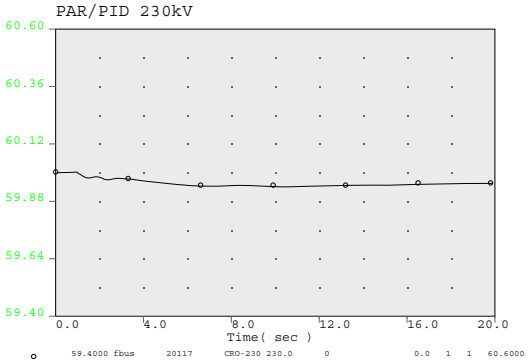
SONGS-g1_pst_hs_eco4.chf

ii phase i\dyds\pst_bu4up

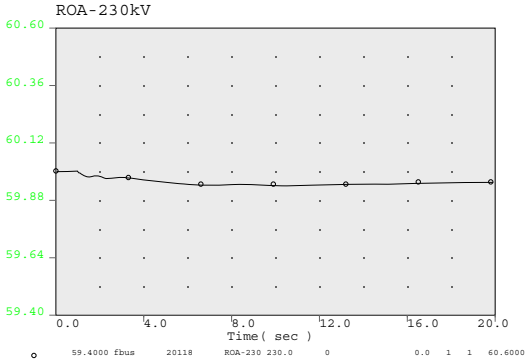
Tue Oct 12 14:26:29 2010

Affected System Frequency Check and Comparison

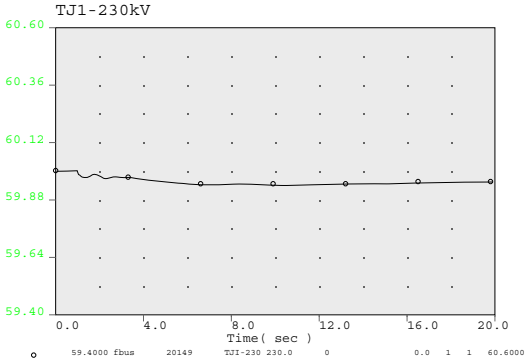
PAR/PID 230kV



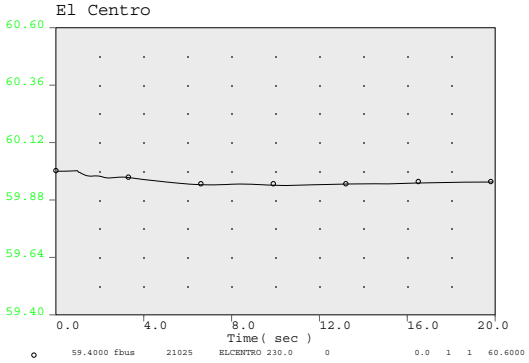
ROA-230kV



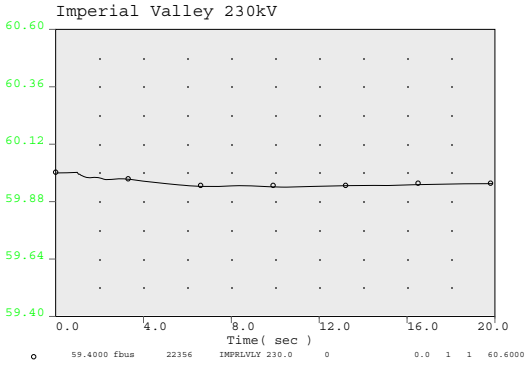
TJ1-230kV



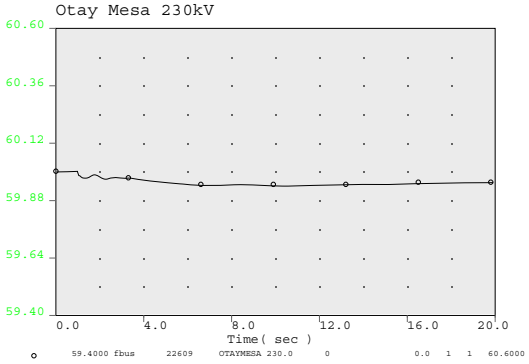
El Centro



Imperial Valley 230kV

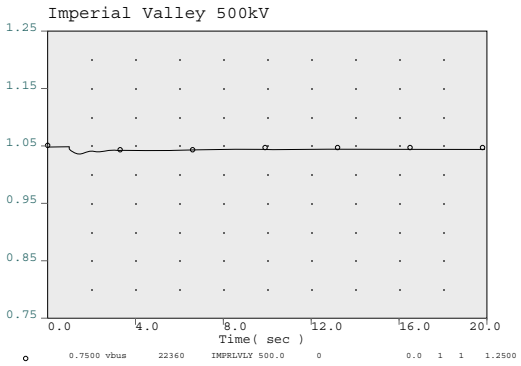


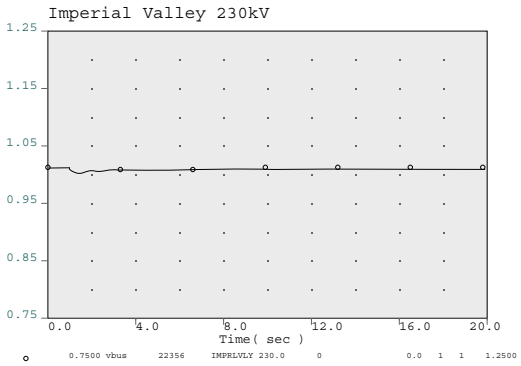
Otay Mesa 230kV

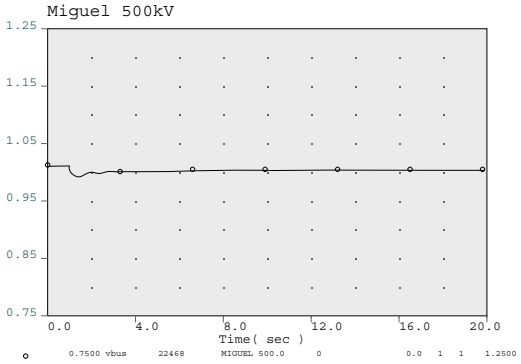


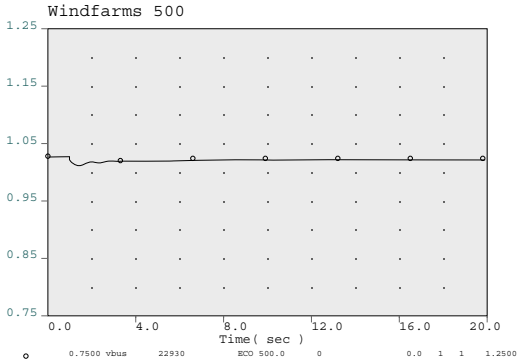
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

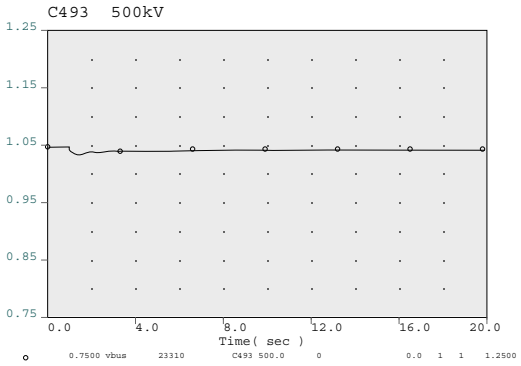
Imperial Valley Area - VOLTAGE

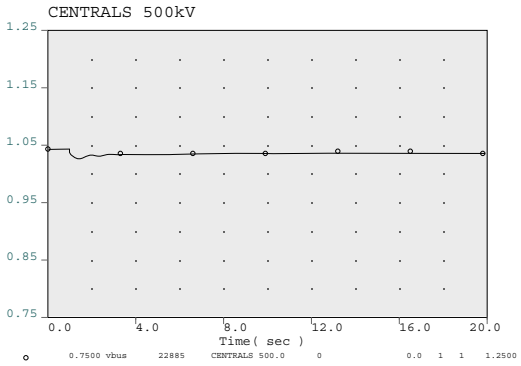












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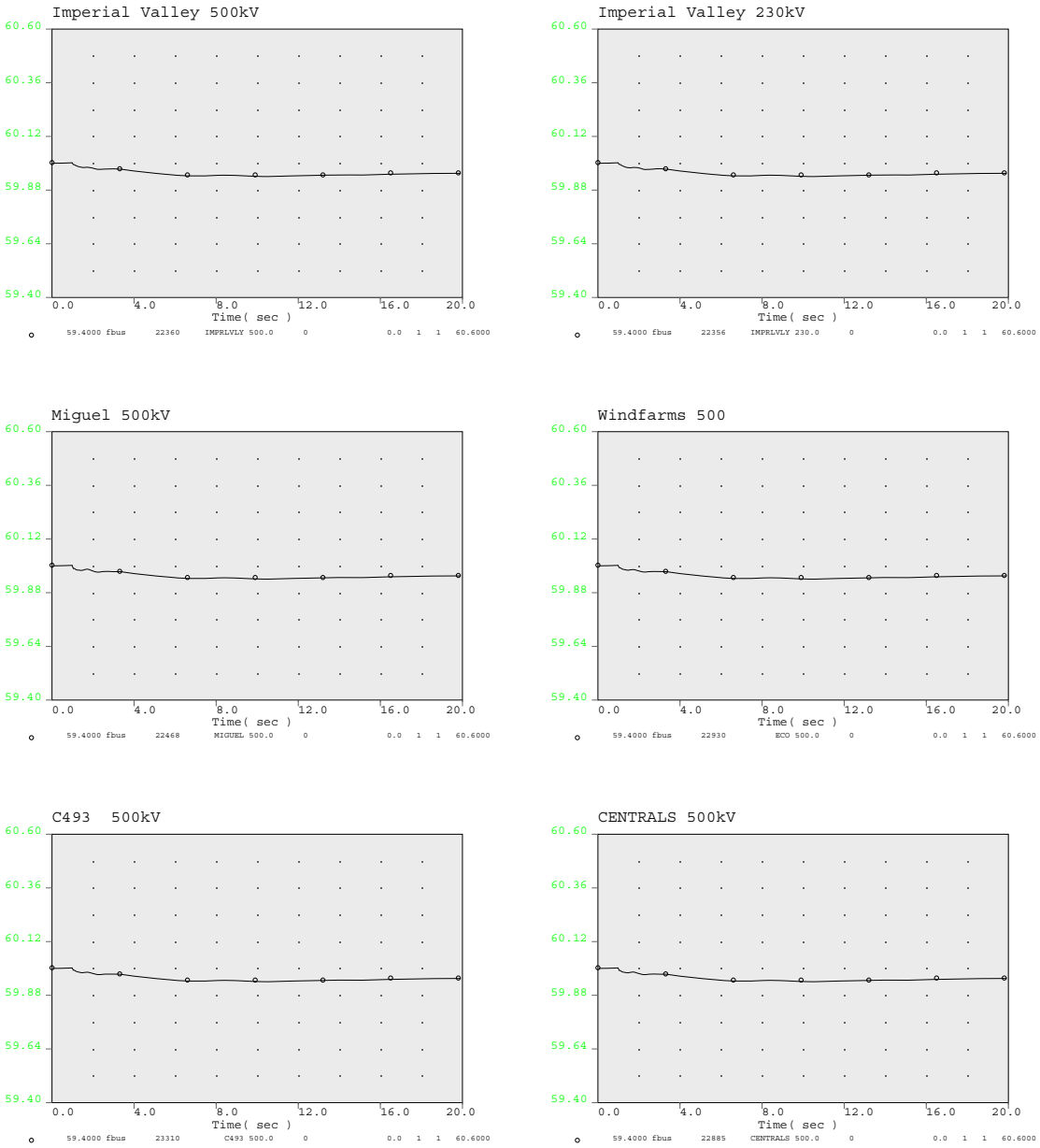
2014 Heavy Summer
Trip San Onofre Generator #2

Page 5

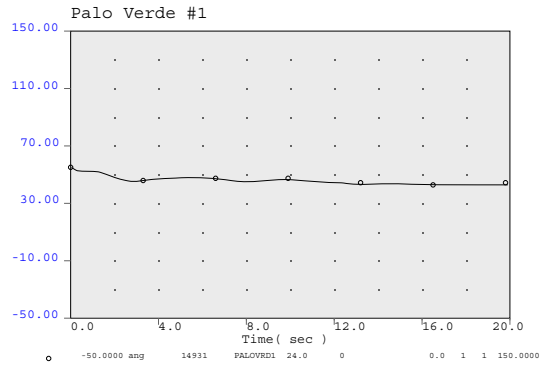
SDGE	SONGS-g1_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:26:29 2010

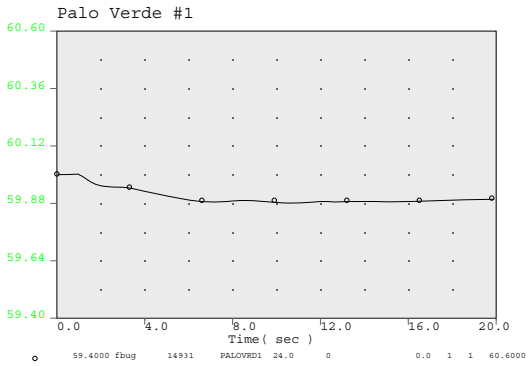
Imperial Valley Area - Frequency

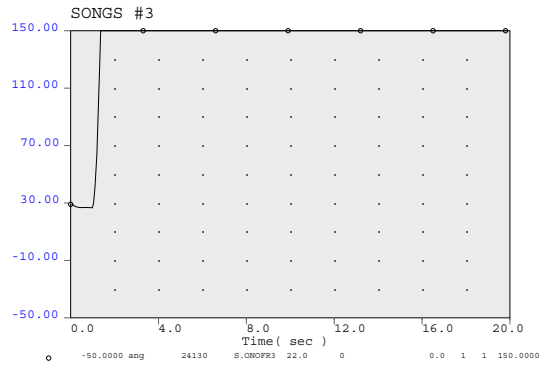


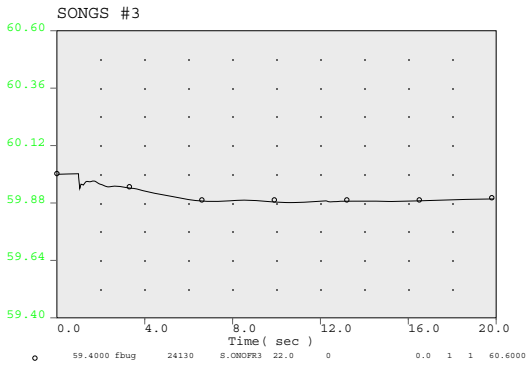
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

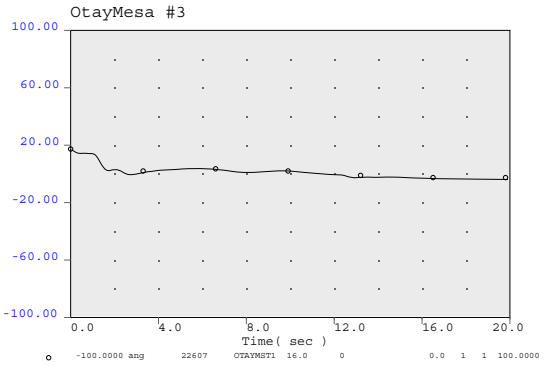
RELATIVE ROTOR ANGLE & FREQUENCY

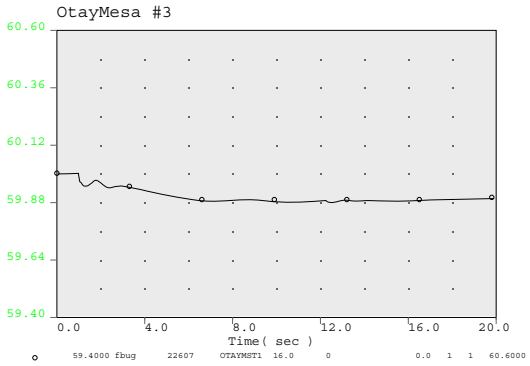












SDG&E Cluster 2 - post
2014 Heavy Summer
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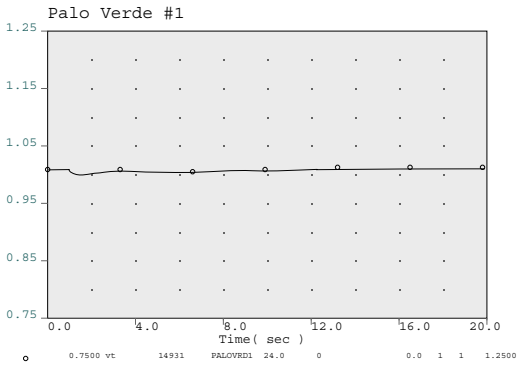
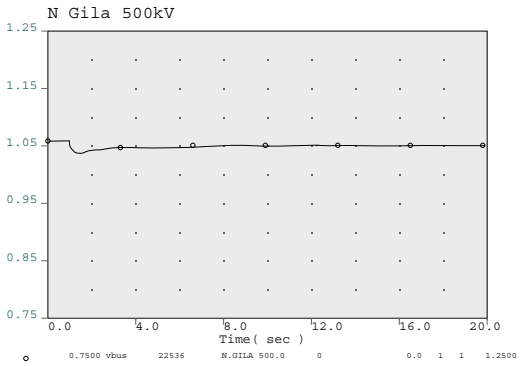
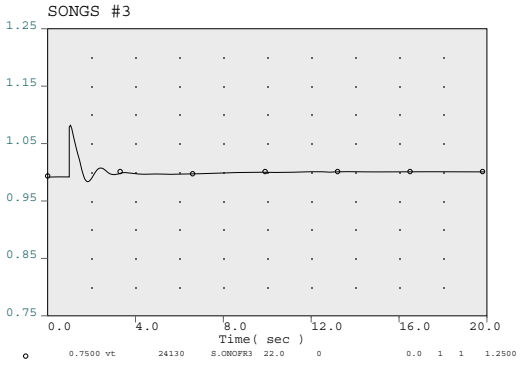
Page 1

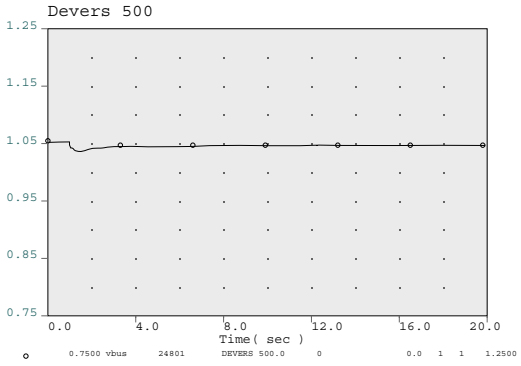
SDGE	SONGS-g2_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:26:45 2010

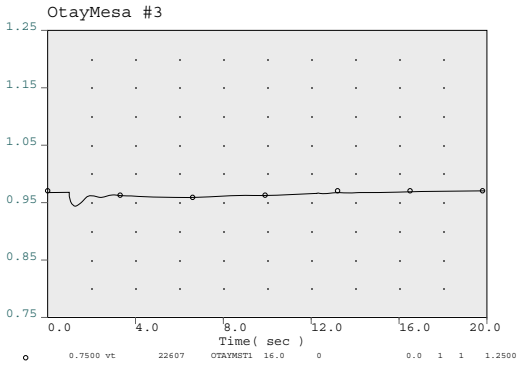
RELATIVE VOLTAGE

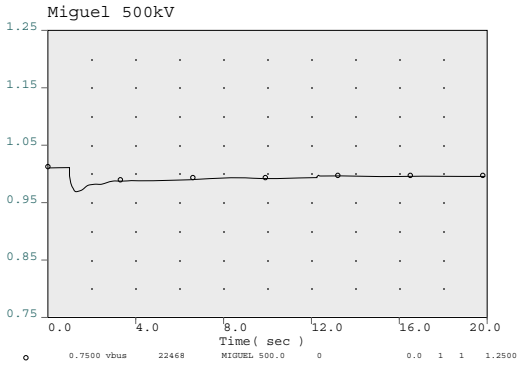












SDG&E Cluster 2 - post
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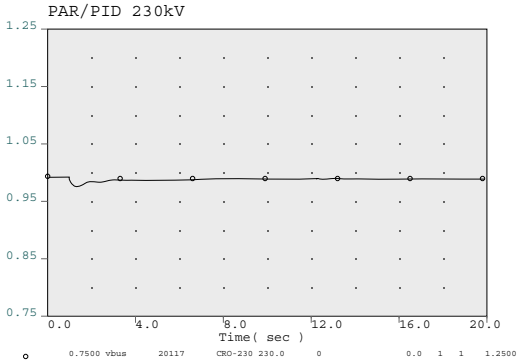
Page 2

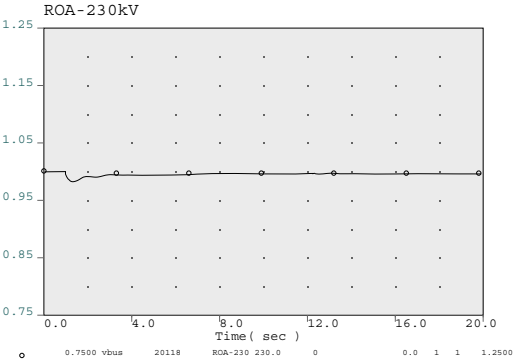
SDGE	SONGS-g2_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:26:45 2010

Affected System Voltage Check and Comparison

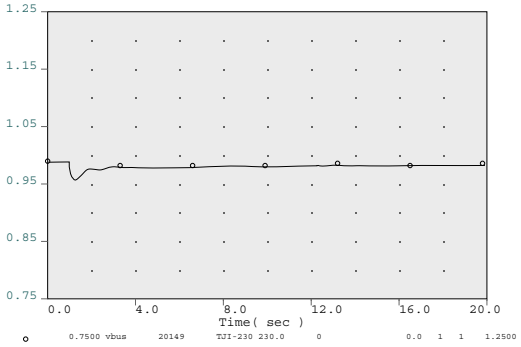
PAR/PID 230kV



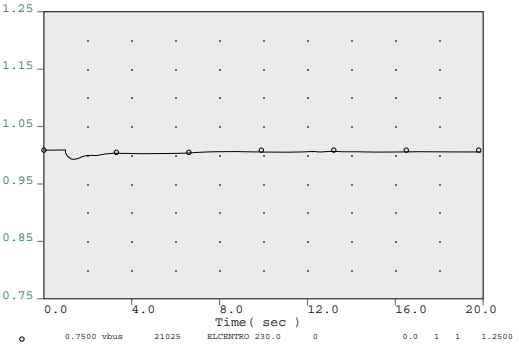
ROA-230kV



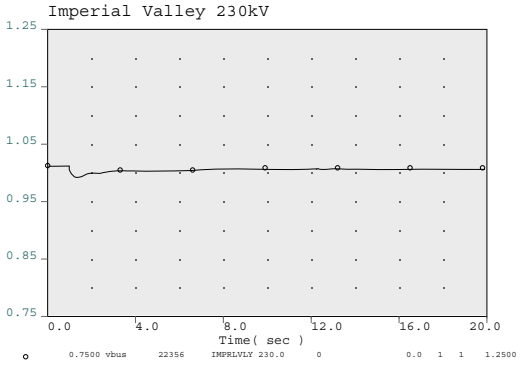
TJ1-230kV



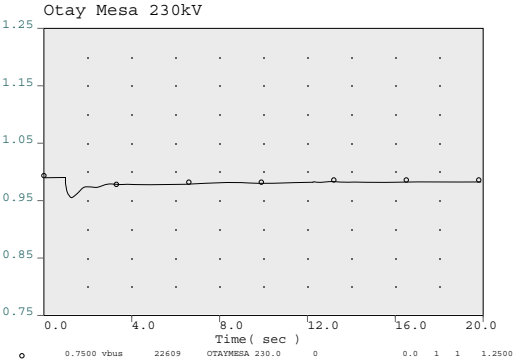
El Centro



Imperial Valley 230kV



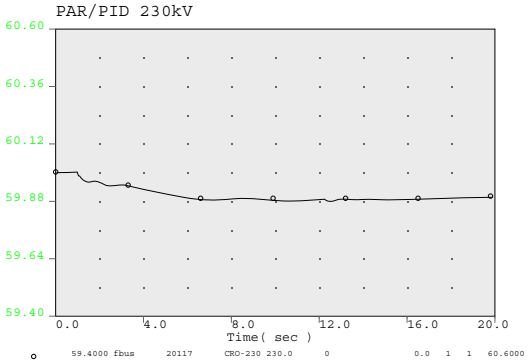
Otay Mesa 230kV



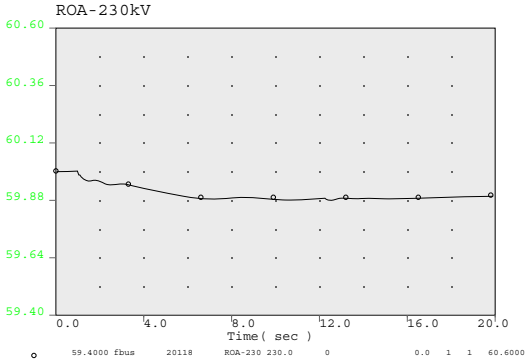
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Affected System Frequency Check and Comparison

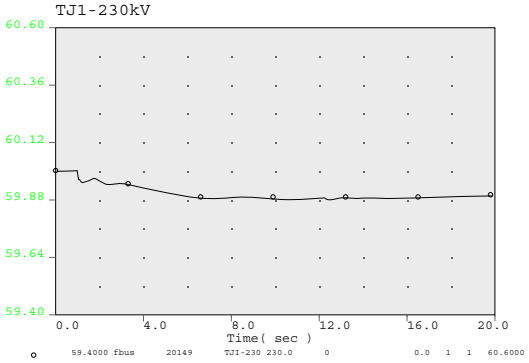
PAR/PID 230kV



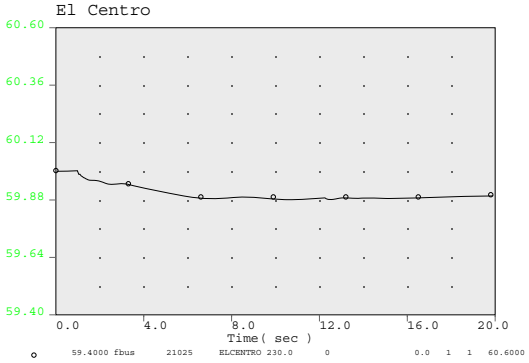
ROA-230kV



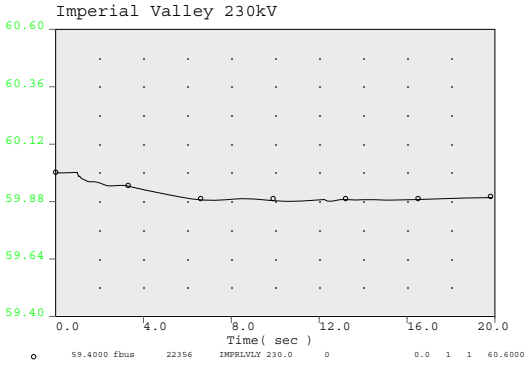
TJ1-230kV



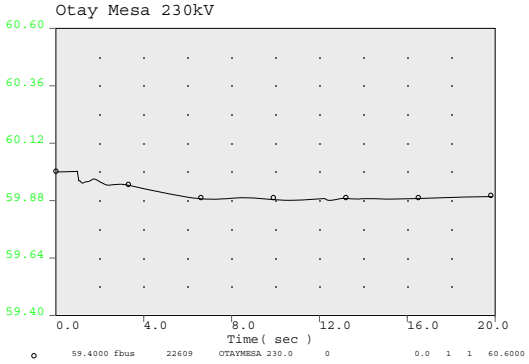
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - post
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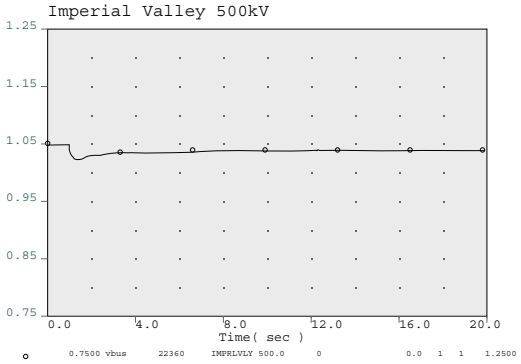
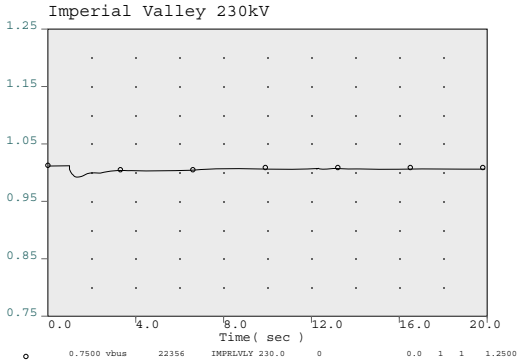
Imperial Valley Area - VOLTAGE

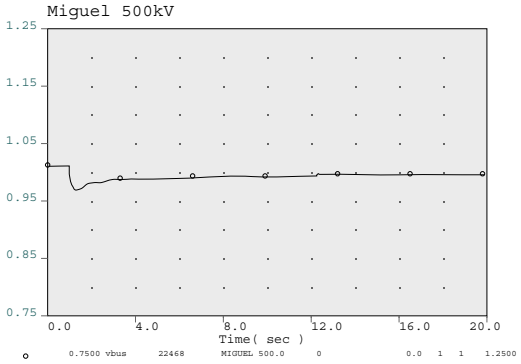
Imperial Valley 500kV



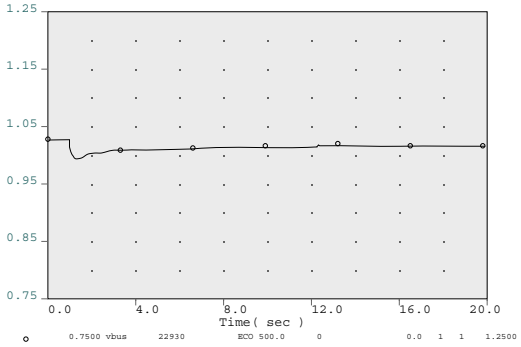
Imperial Valley 230kV



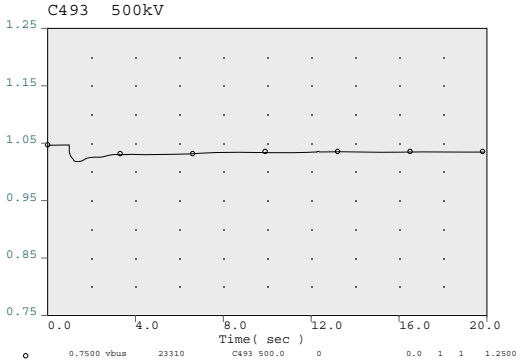
Miguel 500kV



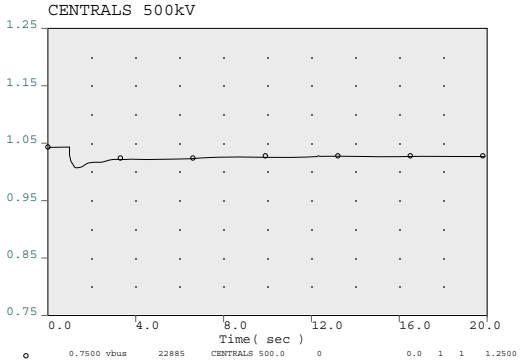
Windfarms 500



C493 500kV

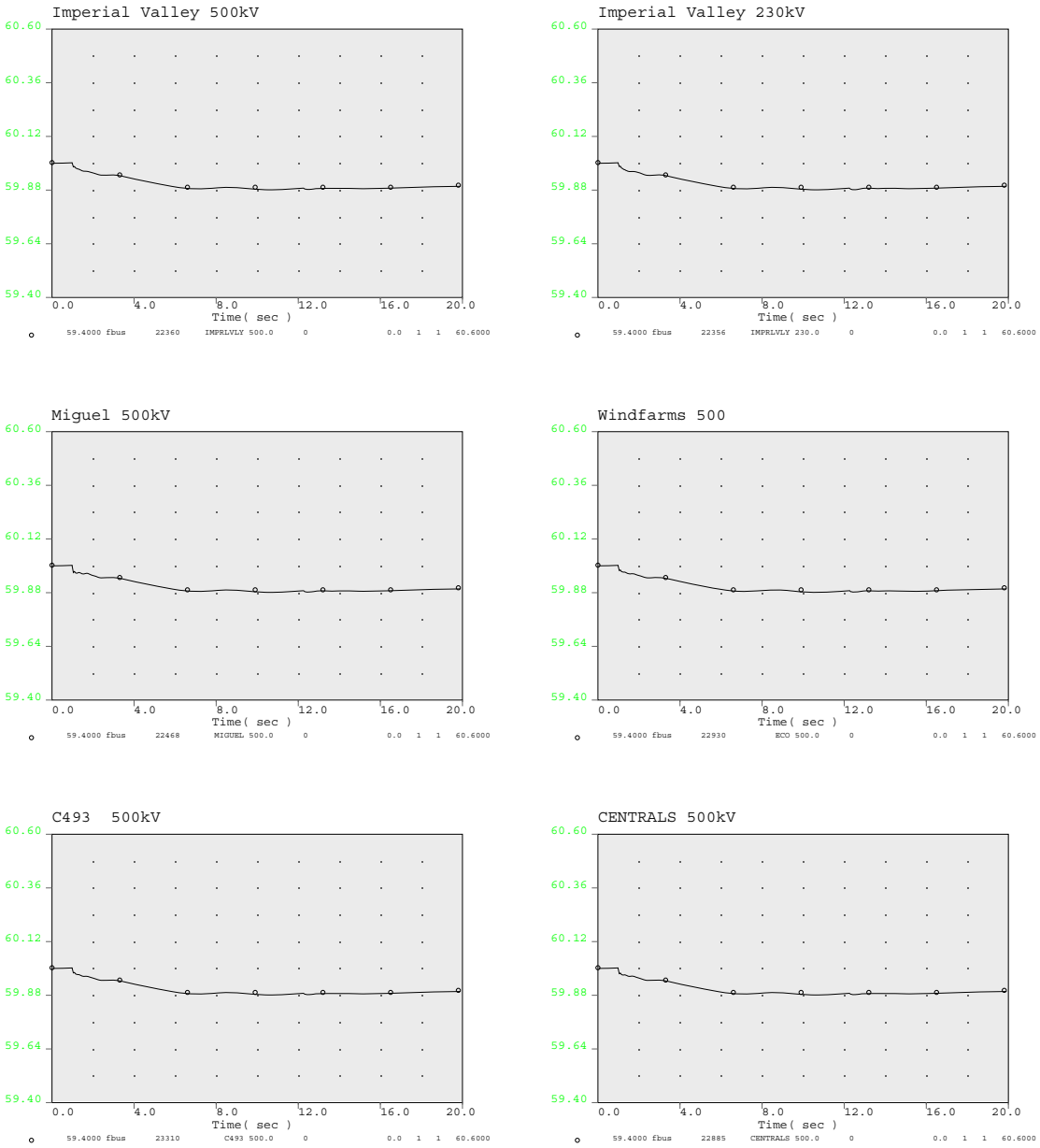


CENTRALS 500kV



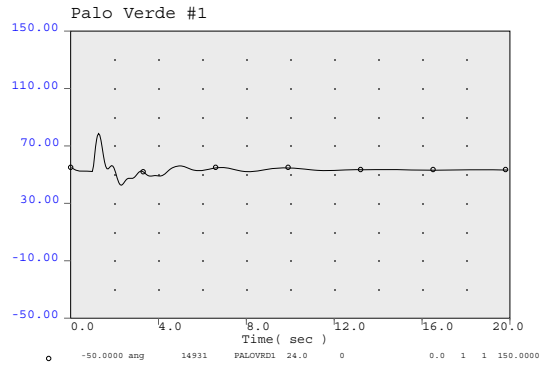
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

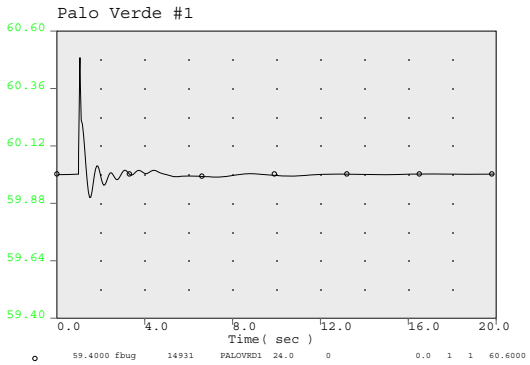
Imperial Valley Area - Frequency

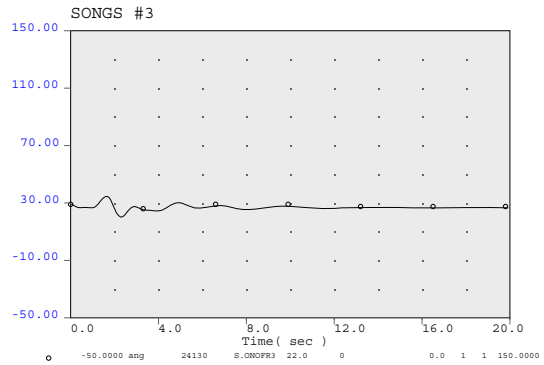


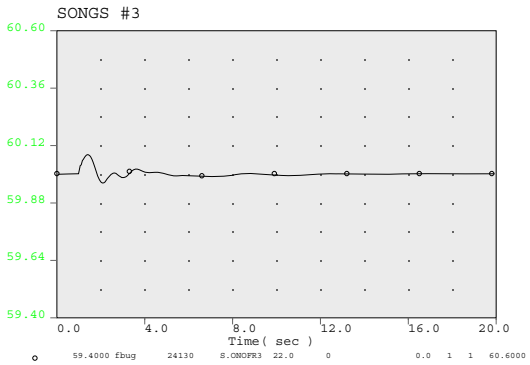
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

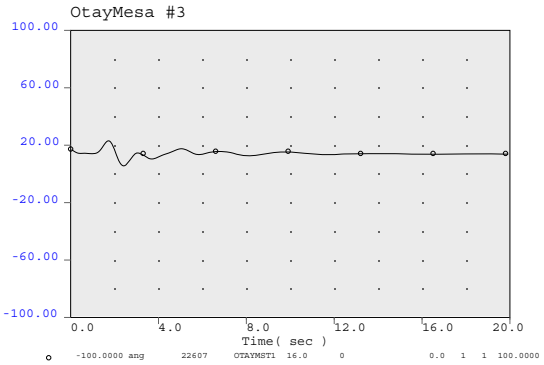
RELATIVE ROTOR ANGLE & FREQUENCY

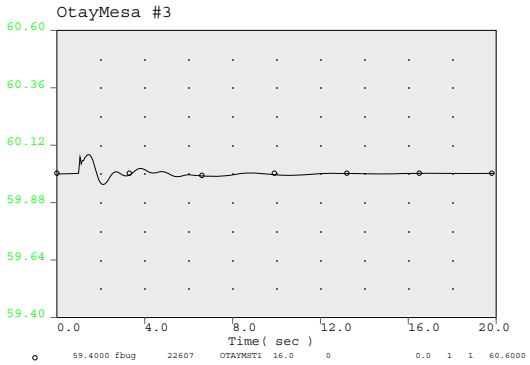












SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

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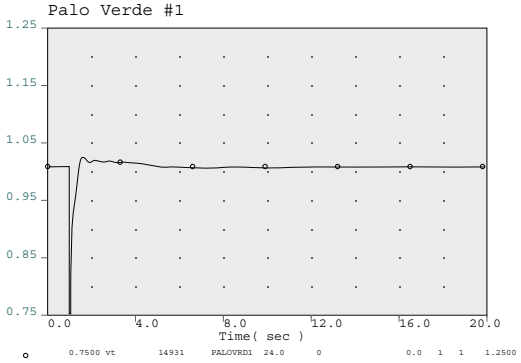
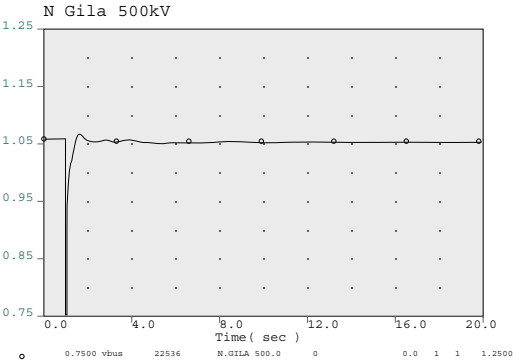
SDGE	T468_HAA_slo_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:27:18 2010

RELATIVE VOLTAGE

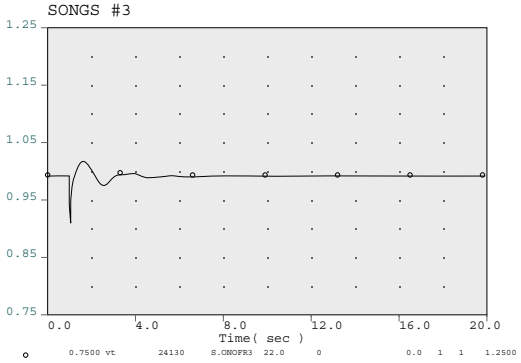
Palo Verde #1



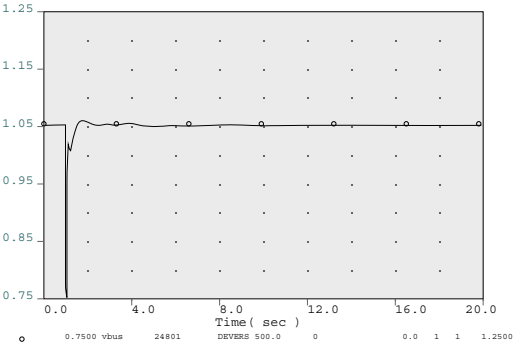
N Gila 500kV



SONGS #3



Devers 500



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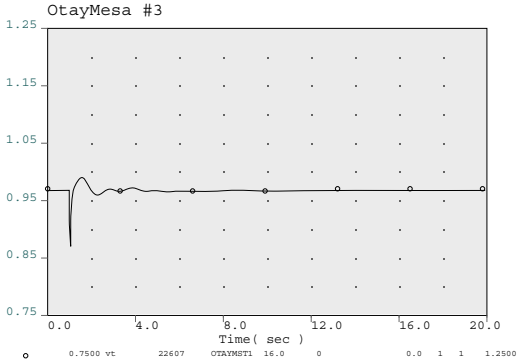
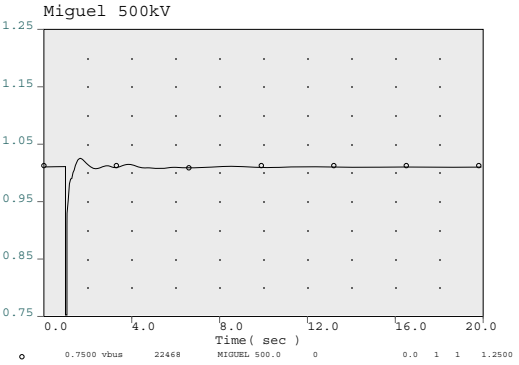


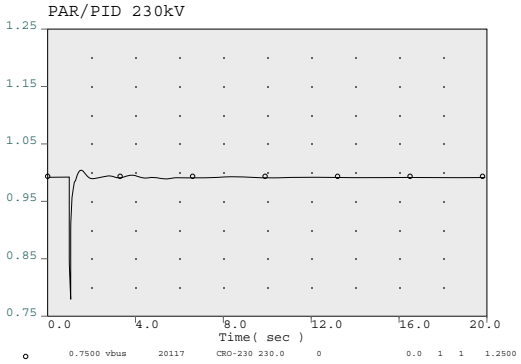
Miguel 500kV



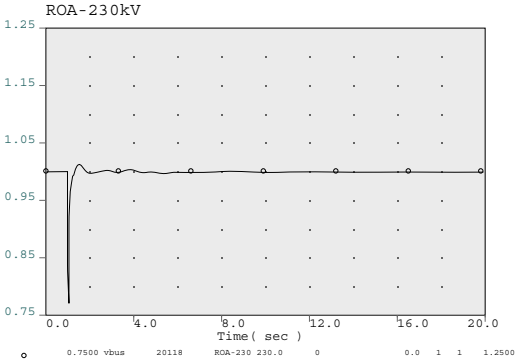
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

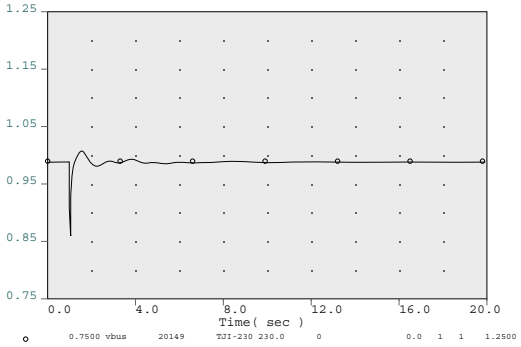
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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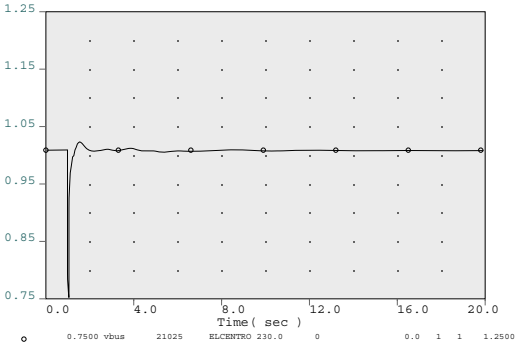
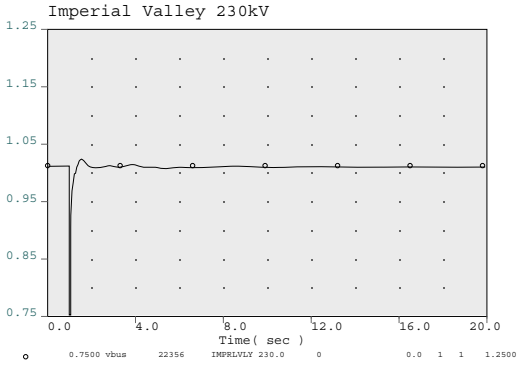
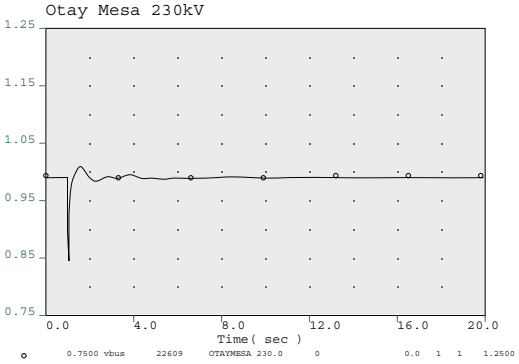


Imperial Valley 230kV



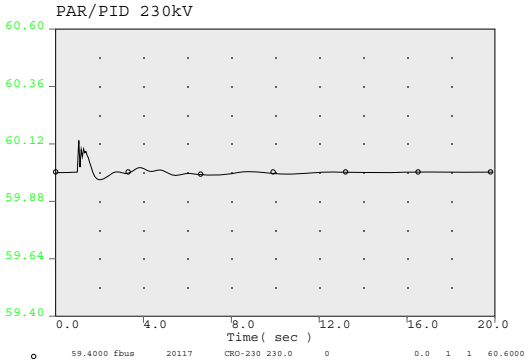
Otay Mesa 230kV



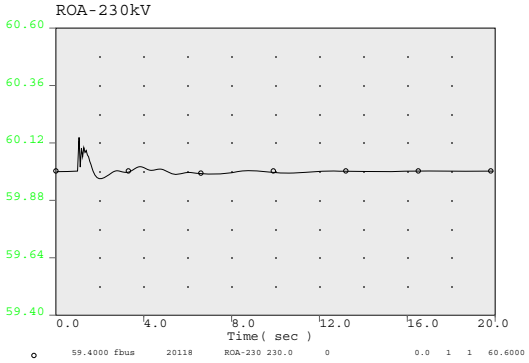
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Frequency Check and Comparison

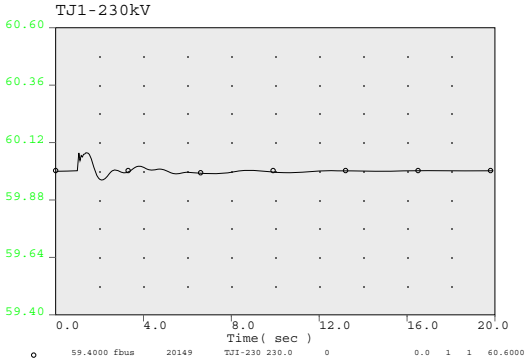
PAR/PID 230kV



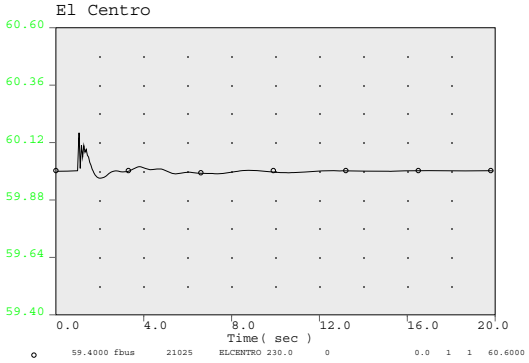
ROA-230kV



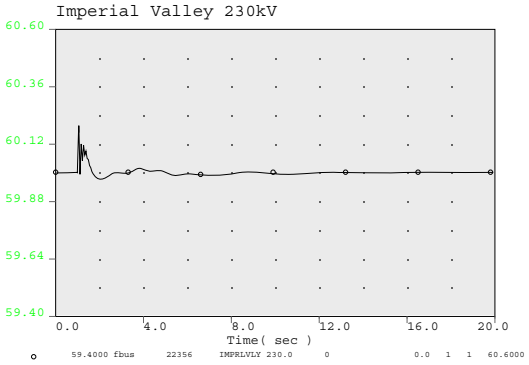
TJ1-230kV



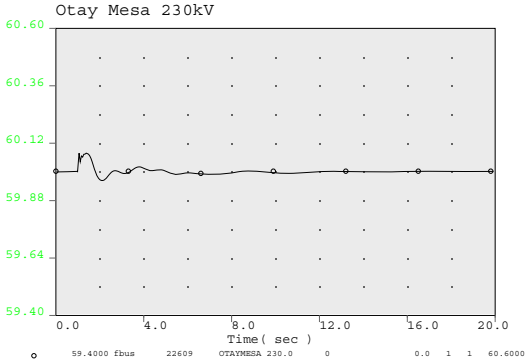
El Centro



Imperial Valley 230kV



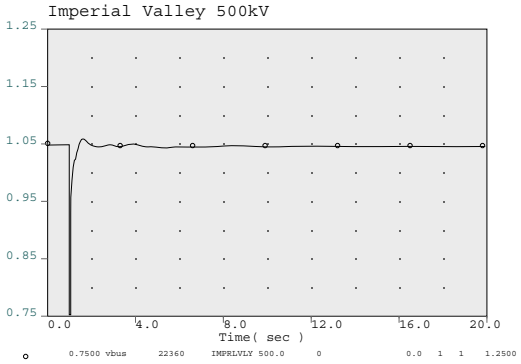
Otay Mesa 230kV



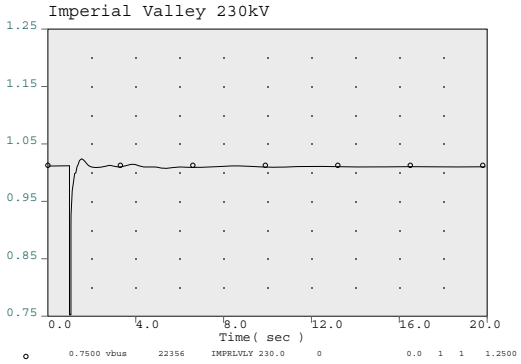
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

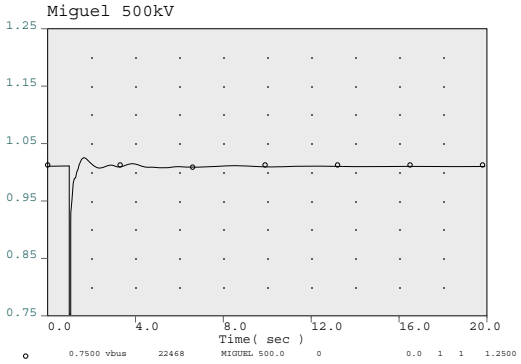
Imperial Valley 500kV



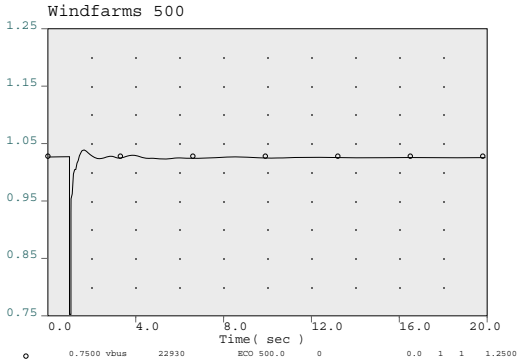
Imperial Valley 230kV



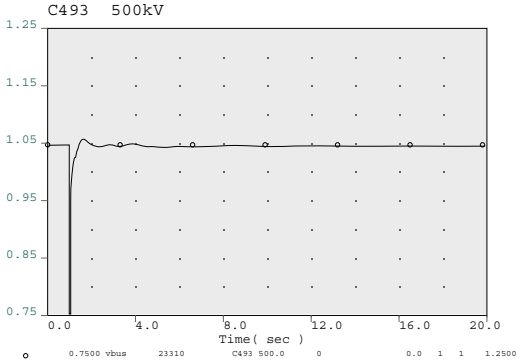
Miguel 500kV



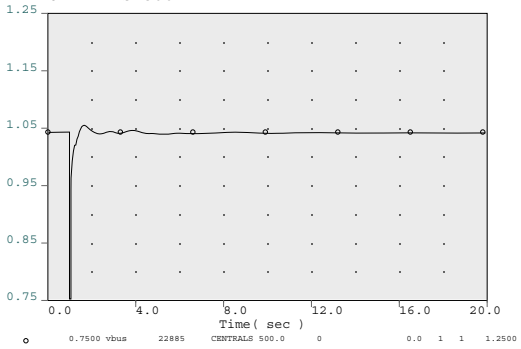
Windfarms 500



C493 500kV



CENTRALS 500kV

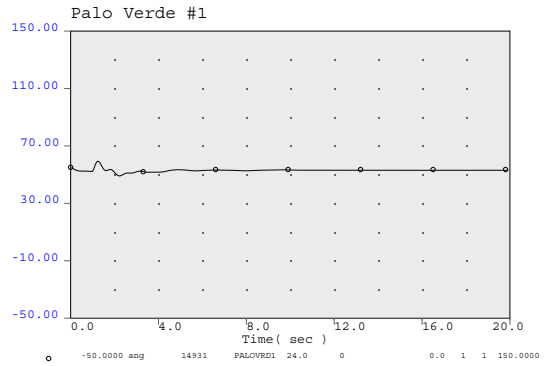


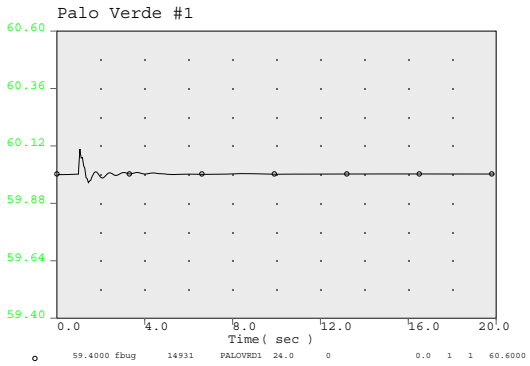
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

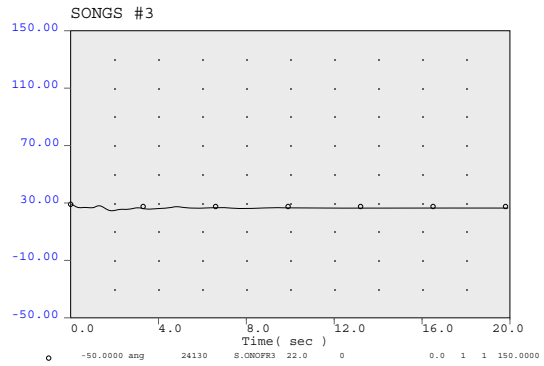
Imperial Valley Area - Frequency

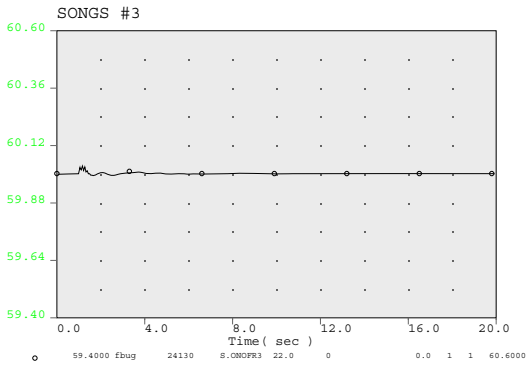
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

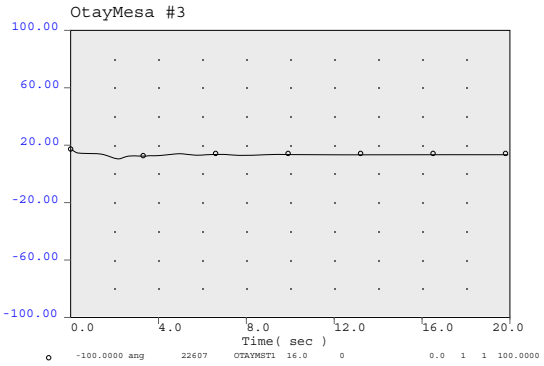
RELATIVE ROTOR ANGLE & FREQUENCY

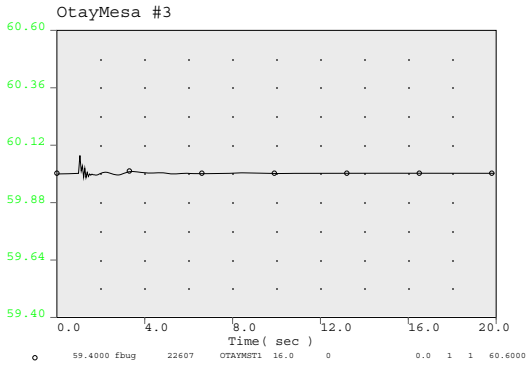












SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

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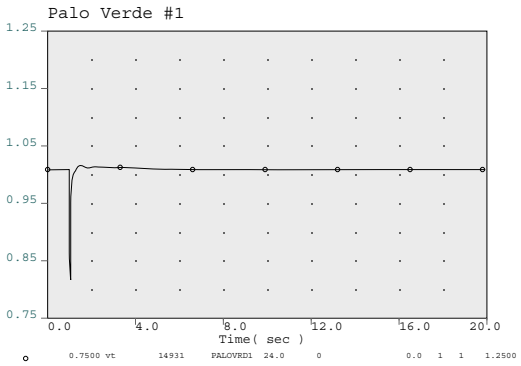
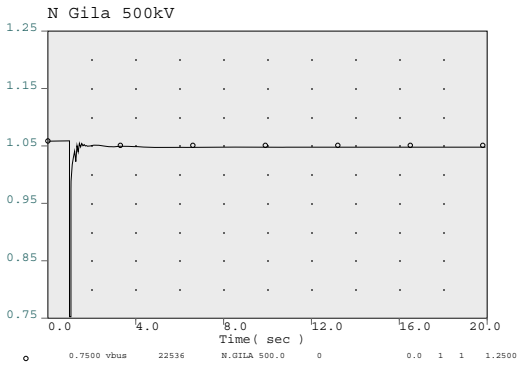
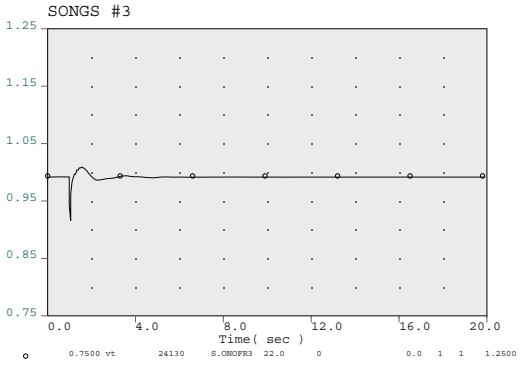
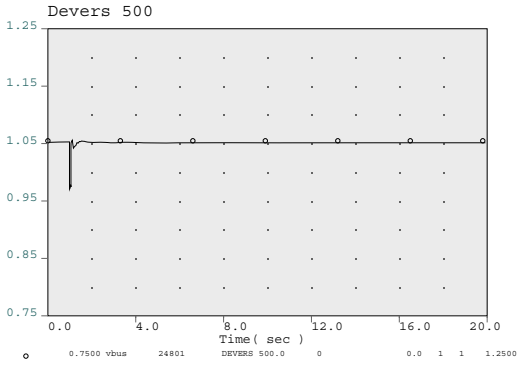
SDGE	T468_NGila_slo_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:27:35 2010

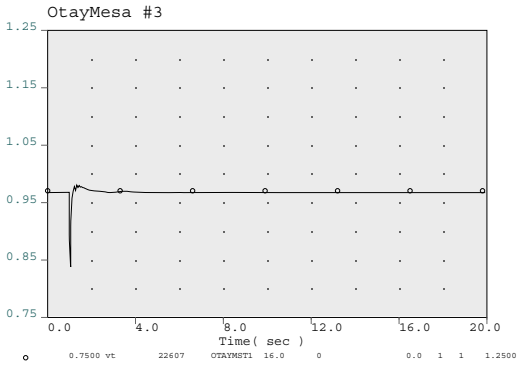
RELATIVE VOLTAGE

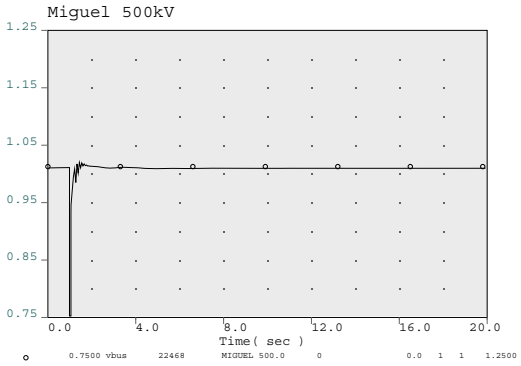








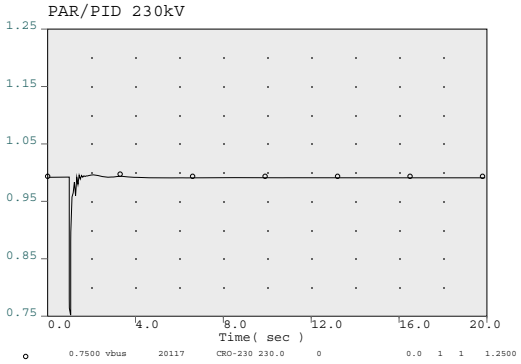




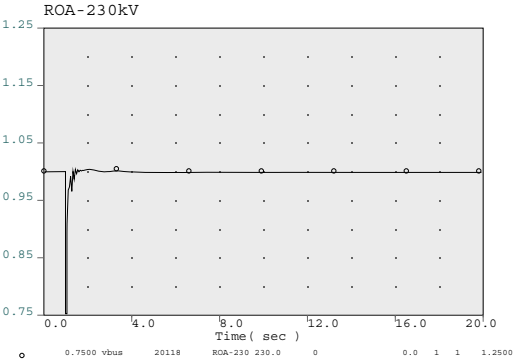
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

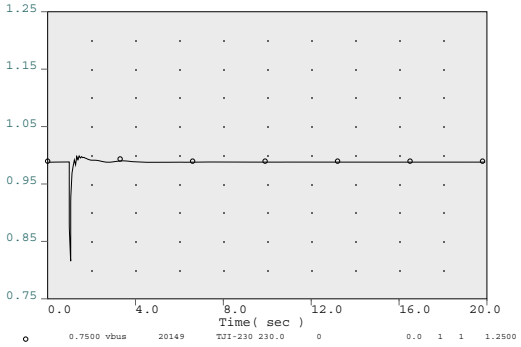
PAR/PID 230kV



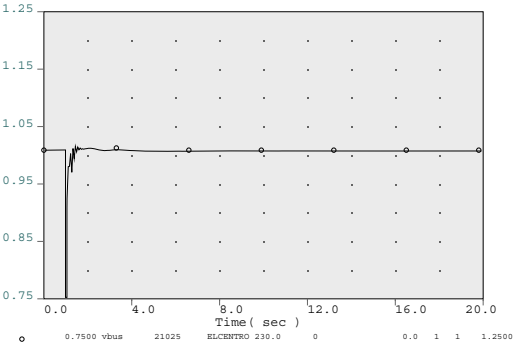
ROA-230kV



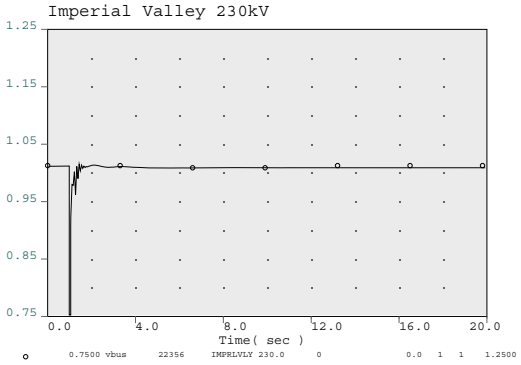
TJ1-230kV



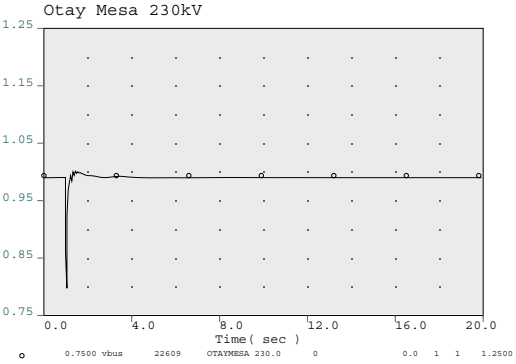
El Centro



Imperial Valley 230kV



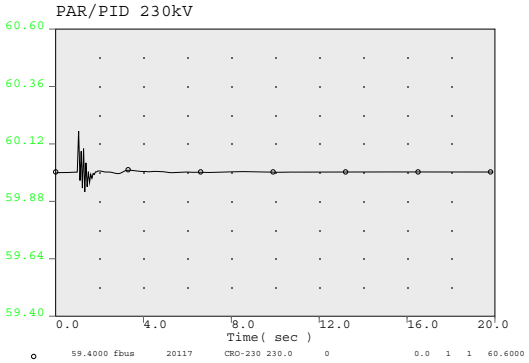
Otay Mesa 230kV



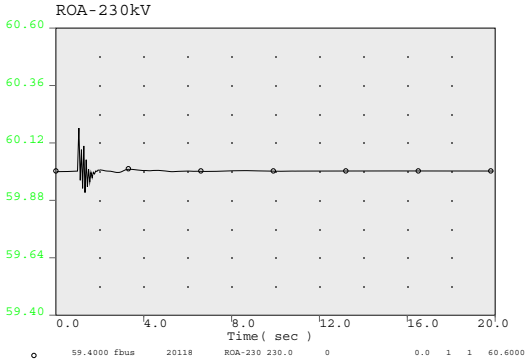
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

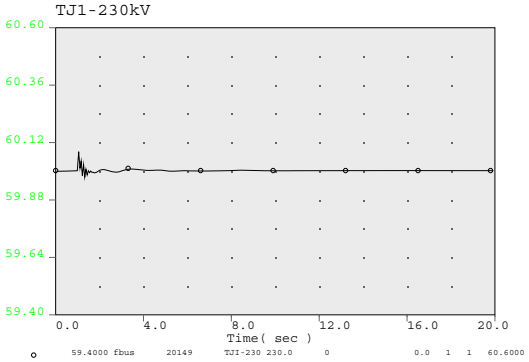
PAR/PID 230kV



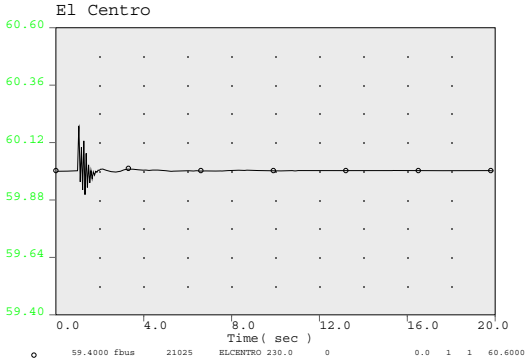
ROA-230kV



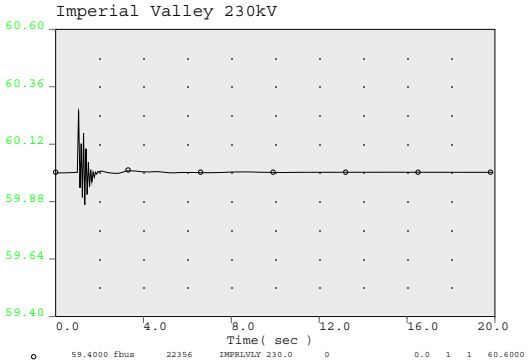
TJ1-230kV



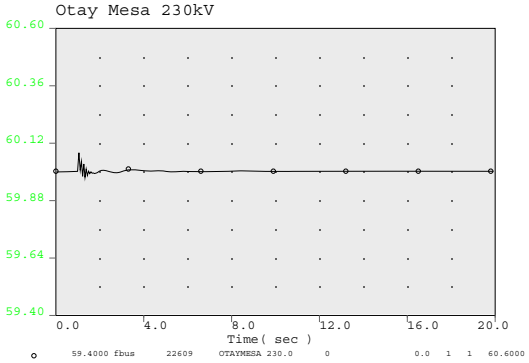
El Centro



Imperial Valley 230kV



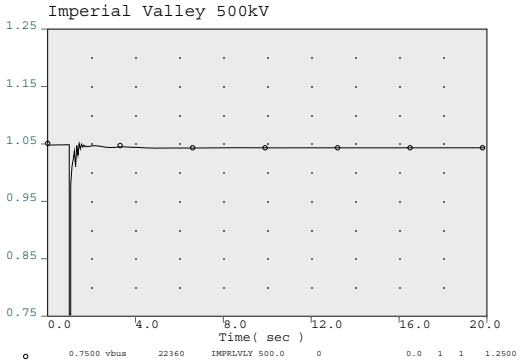
Otay Mesa 230kV



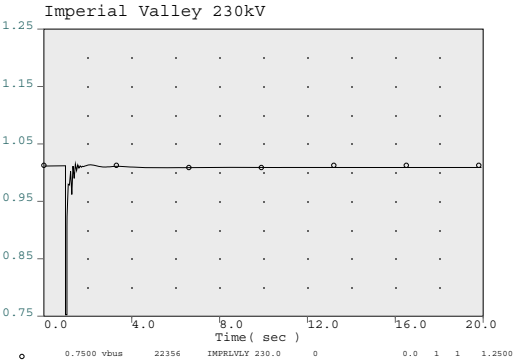
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

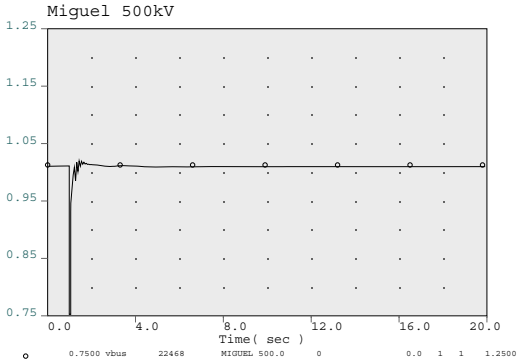
Imperial Valley 500kV



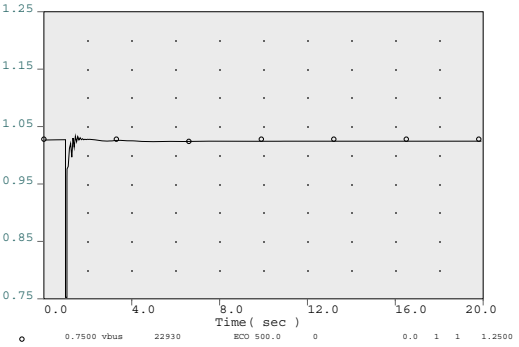
Imperial Valley 230kV



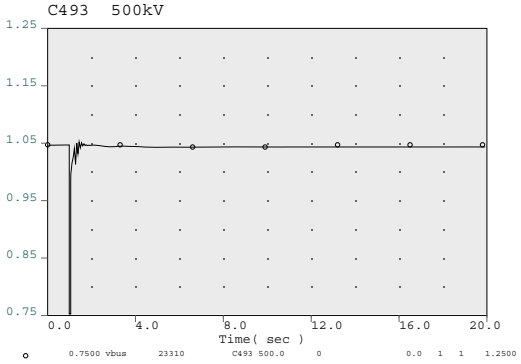
Miguel 500kV



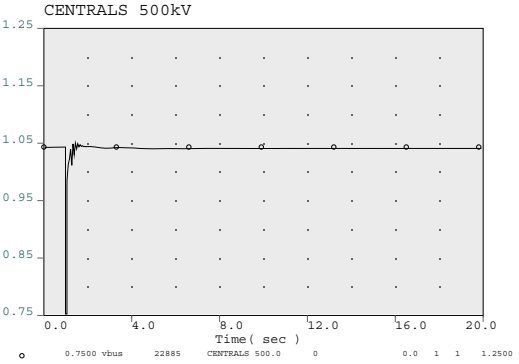
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
T468-N.Gila 500 kV line

Page 5

SDGE	T468_NGila_slo_pst_hs_eco4.chf	ii phase i\dyds\pst_bu4up Tue Oct 12 14:27:35 2010

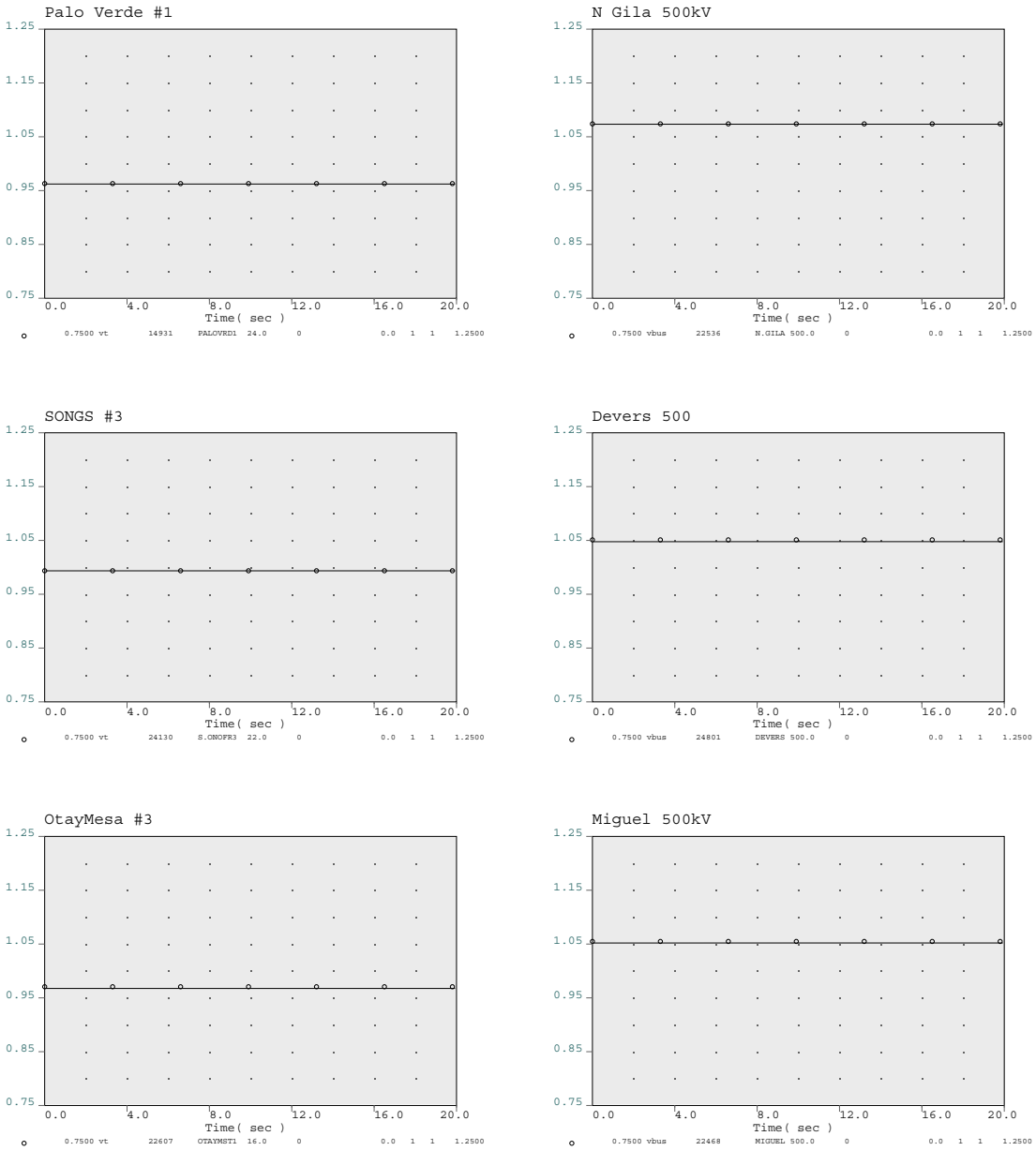
Appendix J-6

Transient Stability Analysis Plots

Boulevard Cluster

Light Load (Spring or Light Autumn) Post

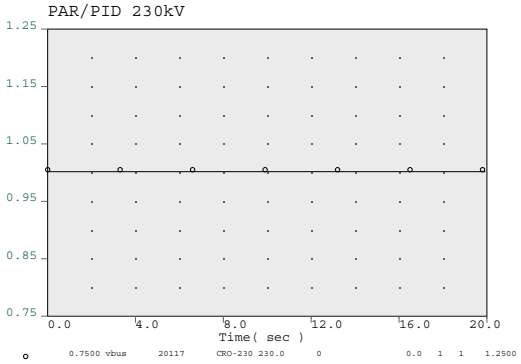
RELATIVE VOLTAGE



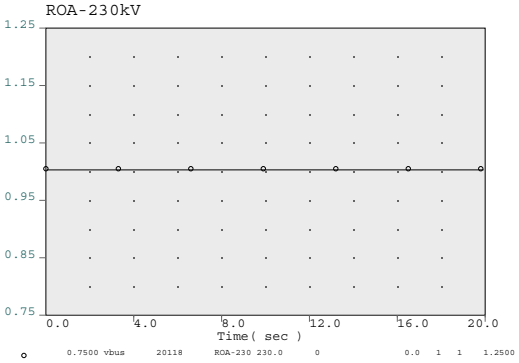
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Voltage Check and Comparison

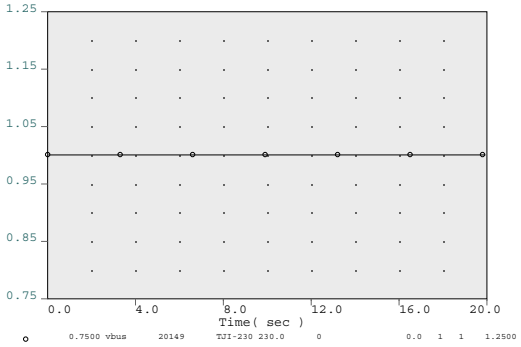
PAR/PID 230kV



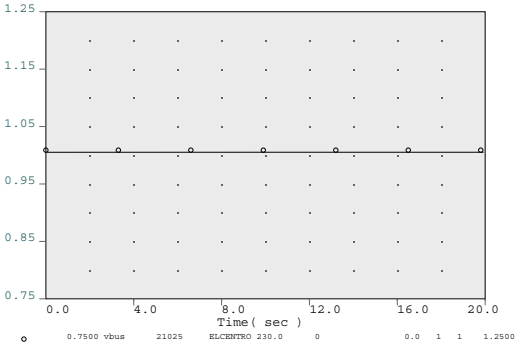
ROA-230kV



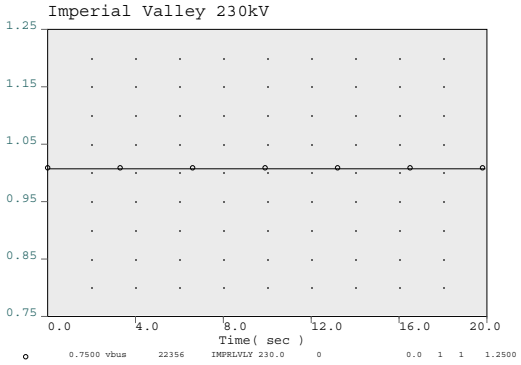
TJ1-230kV



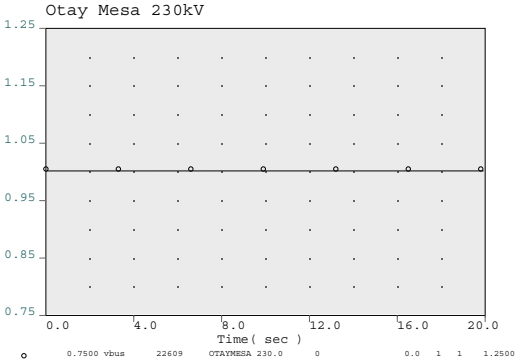
El Centro



Imperial Valley 230kV

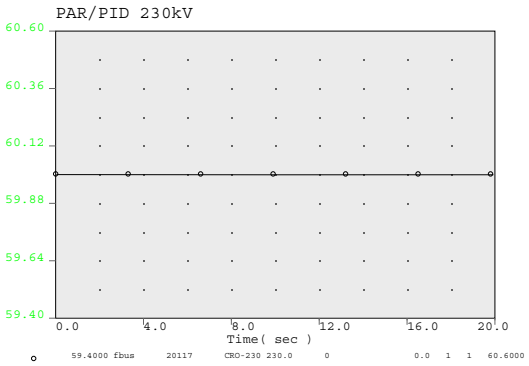


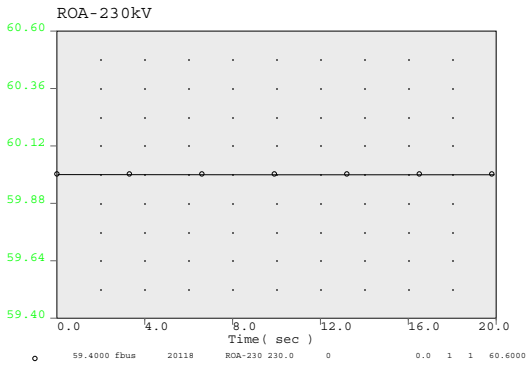
Otay Mesa 230kV

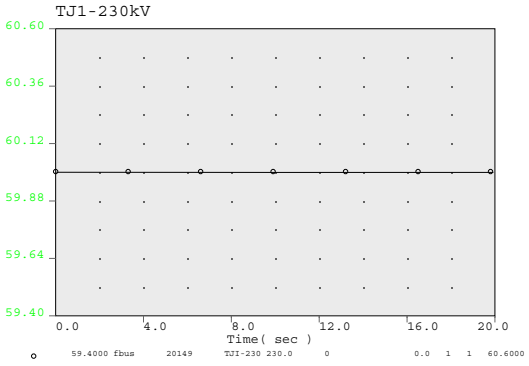


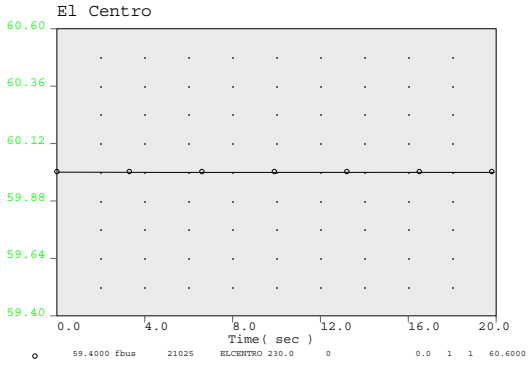
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

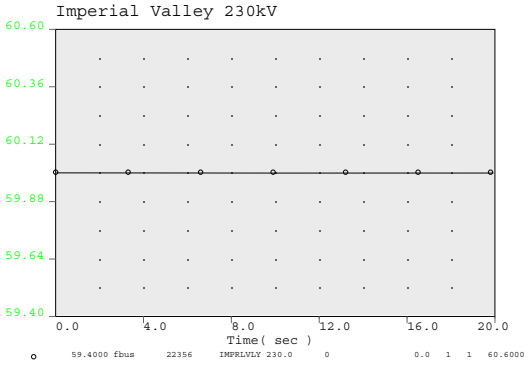
Affected System Frequency Check and Comparison

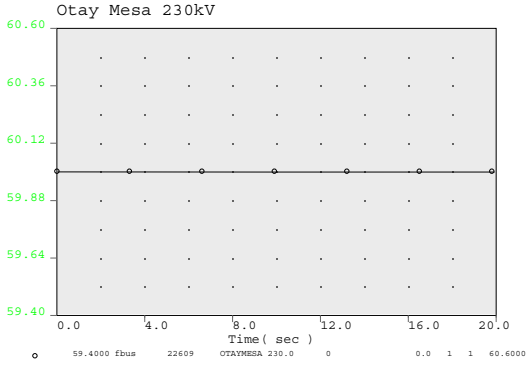










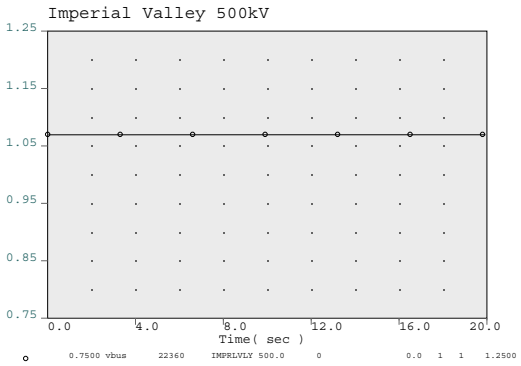


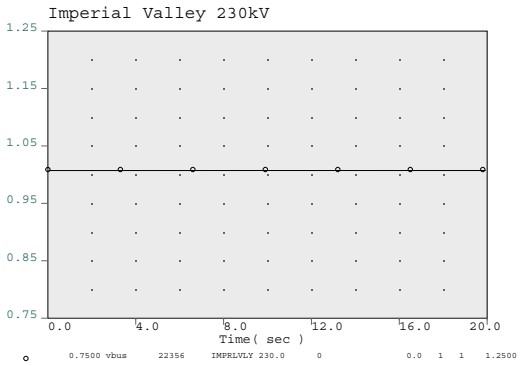
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

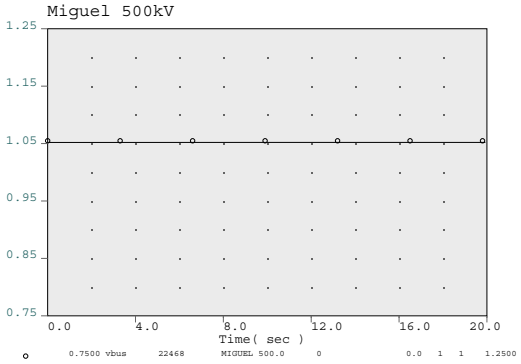
Page 4

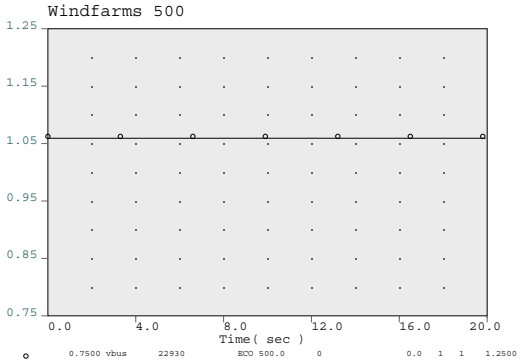
SDGE	flat_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:24:36 2010

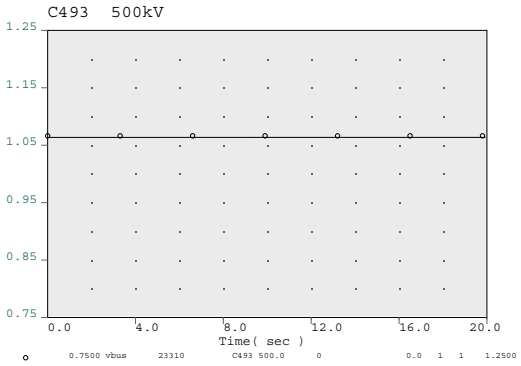
Imperial Valley Area - VOLTAGE

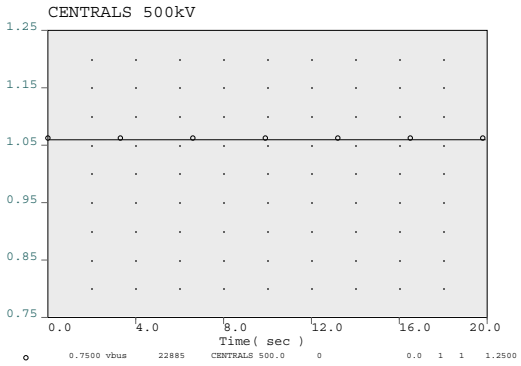










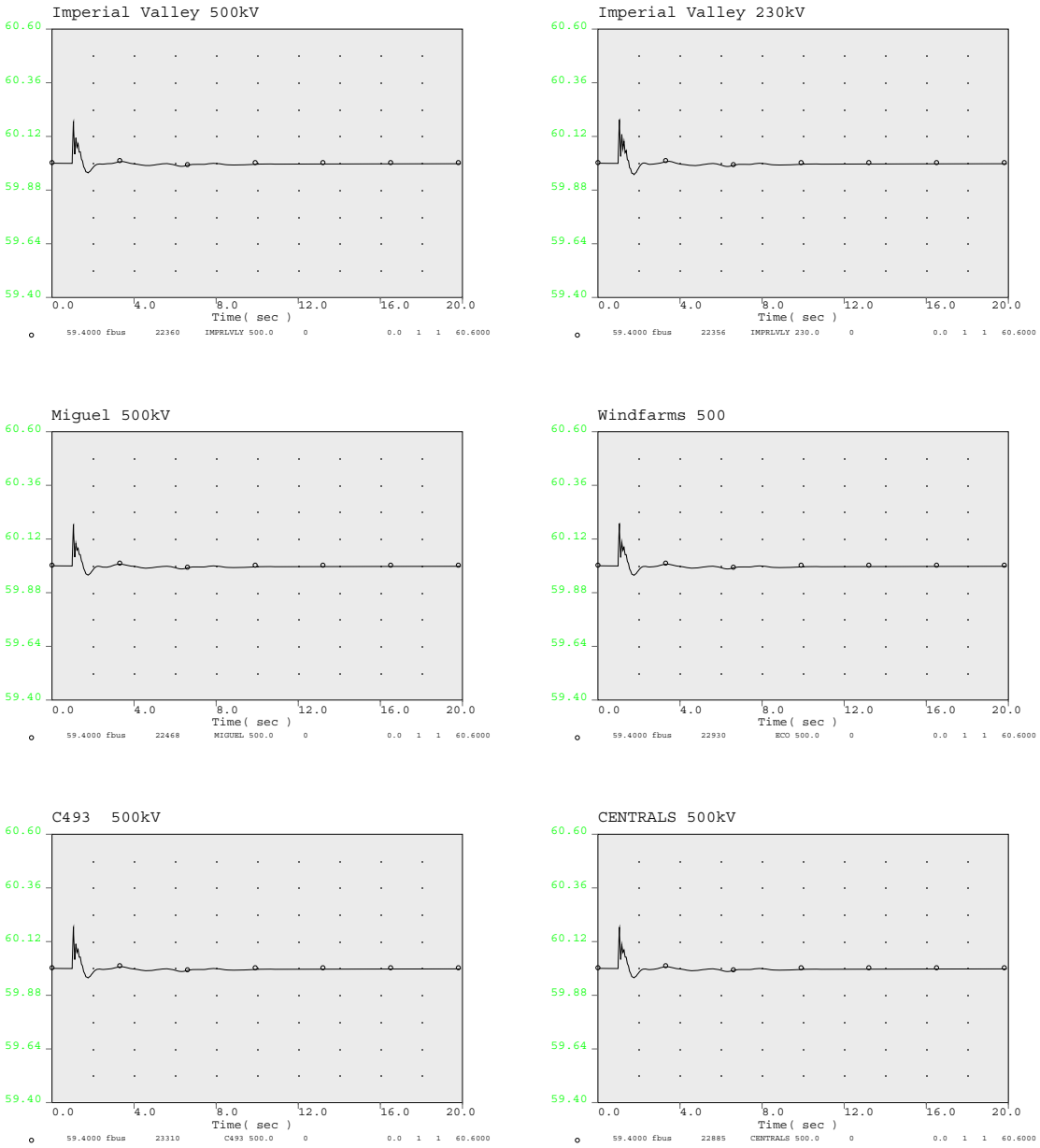


SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Page 5

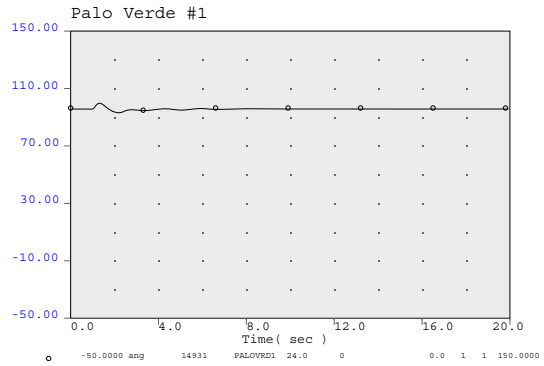
SDGE	flat_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:24:36 2010

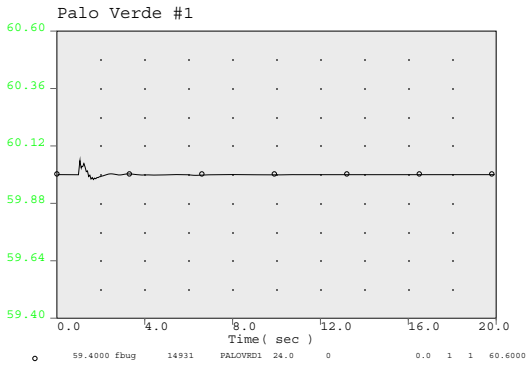
Imperial Valley Area - Frequency

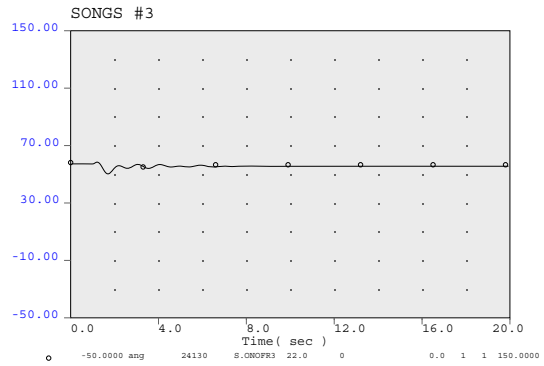


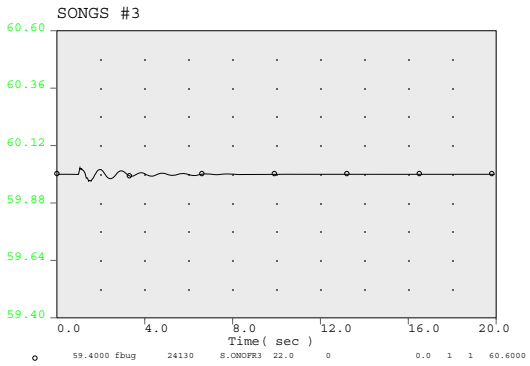
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

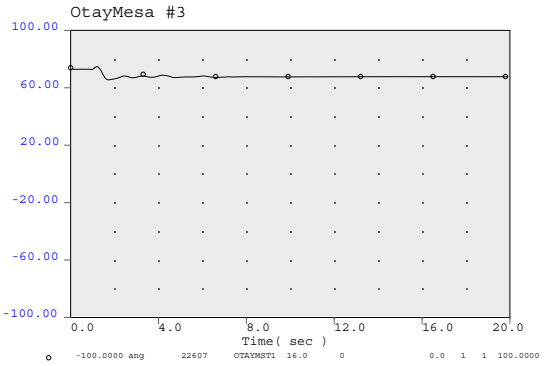
RELATIVE ROTOR ANGLE & FREQUENCY

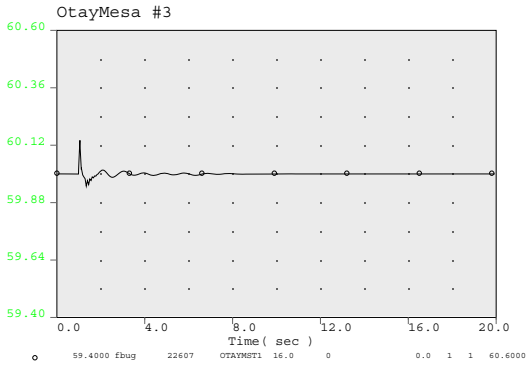












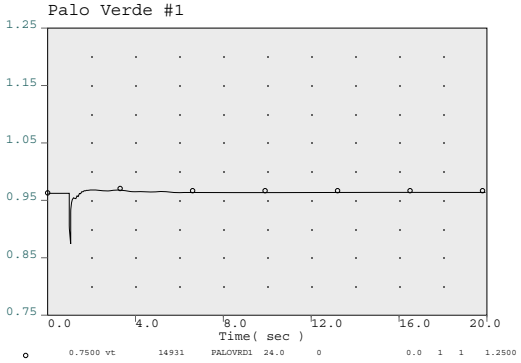
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Page 1

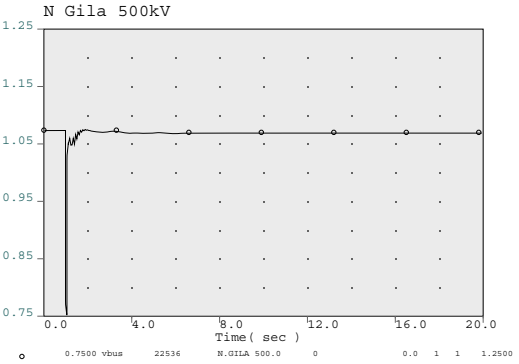
SDGE	C493_Cen_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:32:06 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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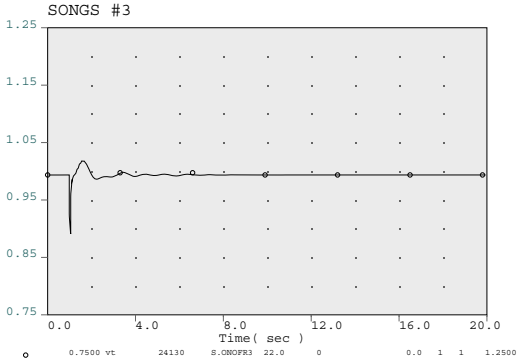
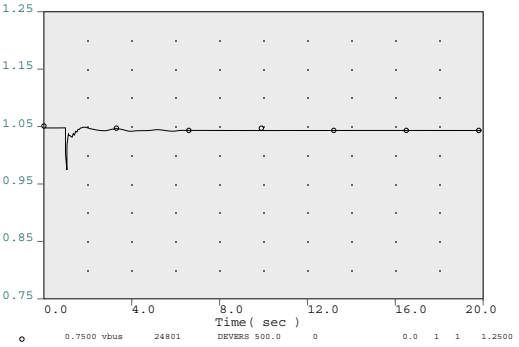
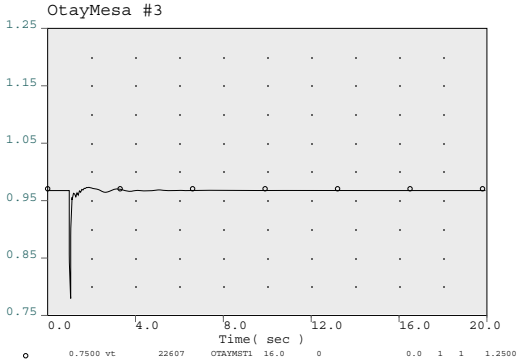


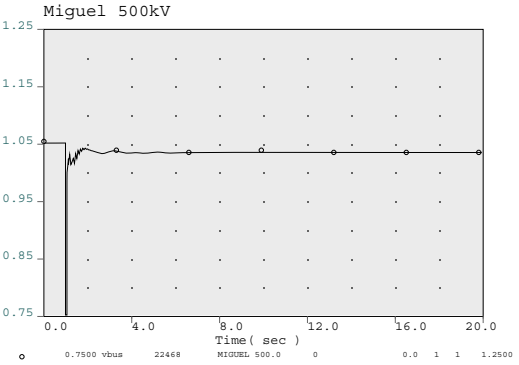
Devers 500



OtayMesa #3



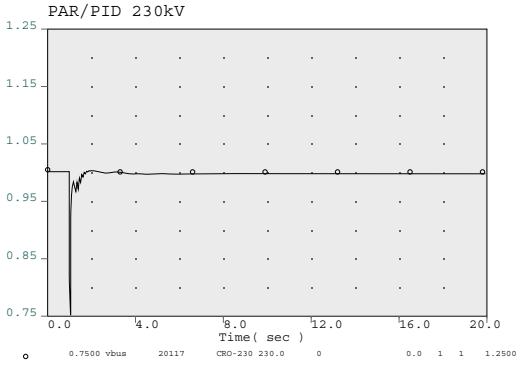
Miguel 500kV



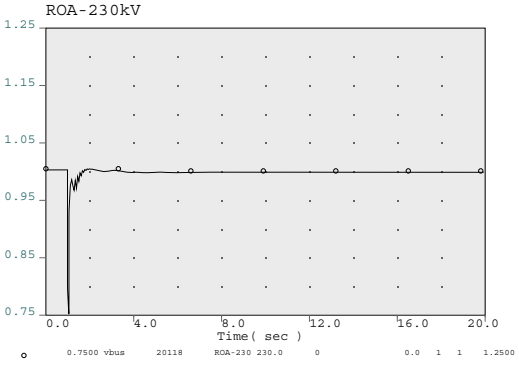
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

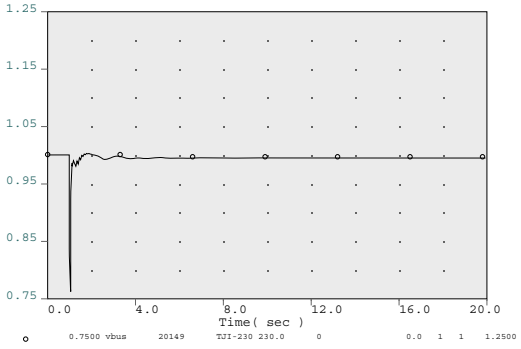
PAR/PID 230kV



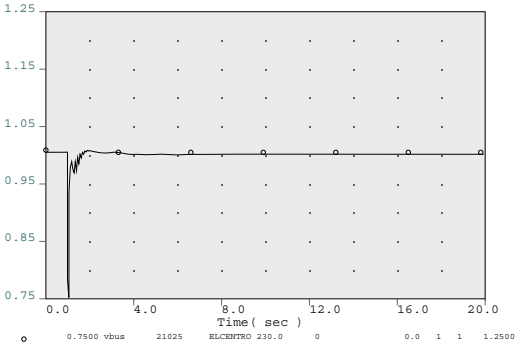
ROA-230kV



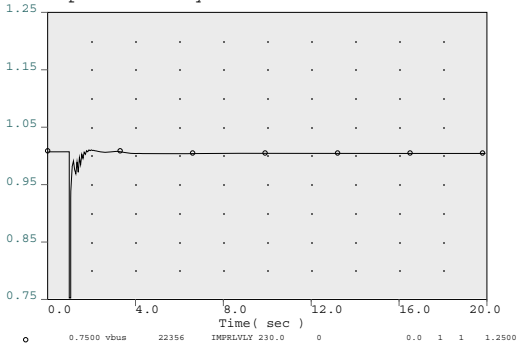
TJ1-230kV



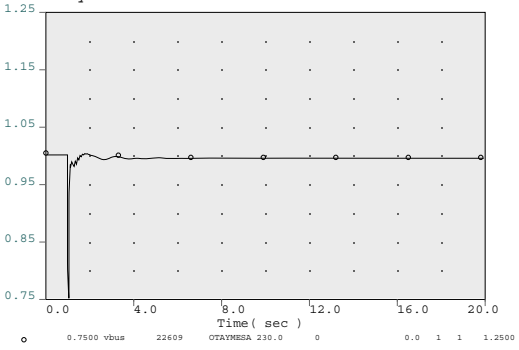
El Centro



Imperial Valley 230kV



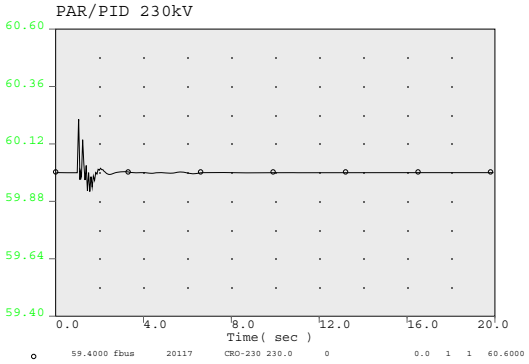
Otay Mesa 230kV



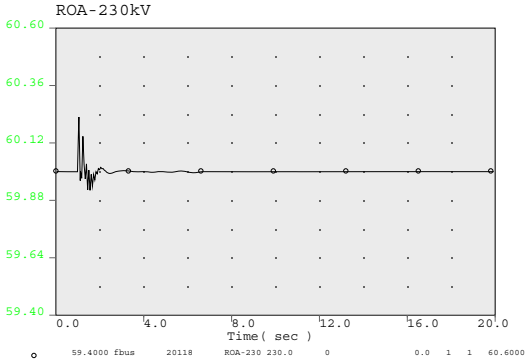
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

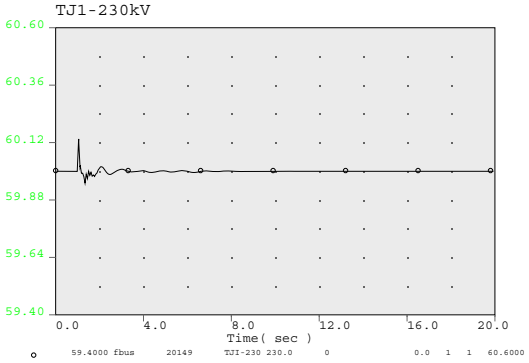
PAR/PID 230kV



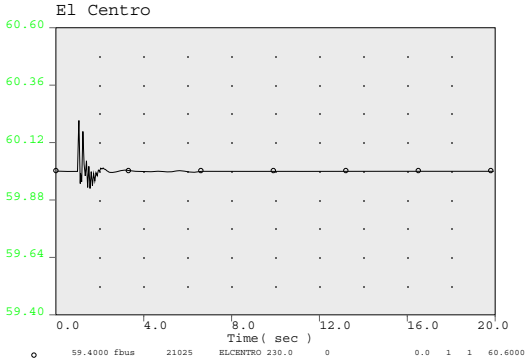
ROA-230kV



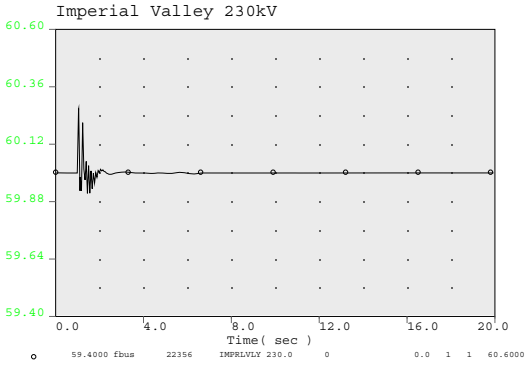
TJ1-230kV



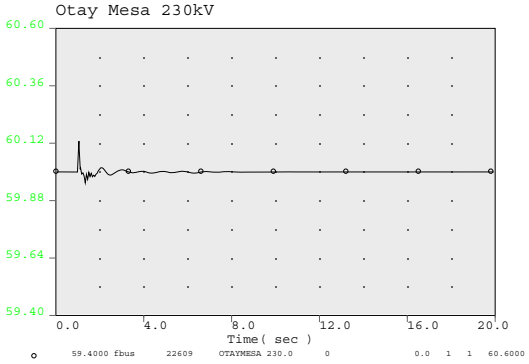
El Centro



Imperial Valley 230kV

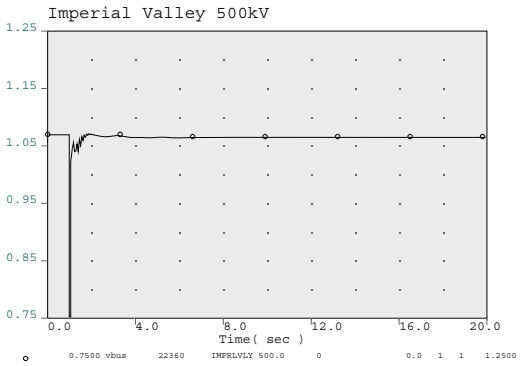


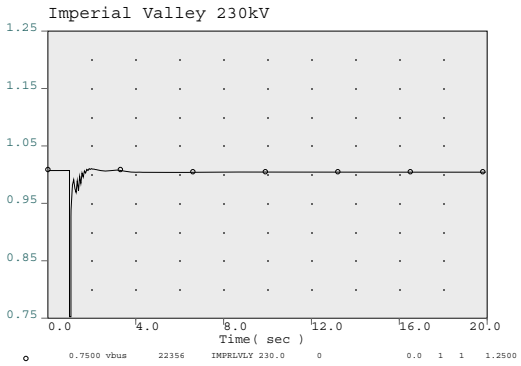
Otay Mesa 230kV

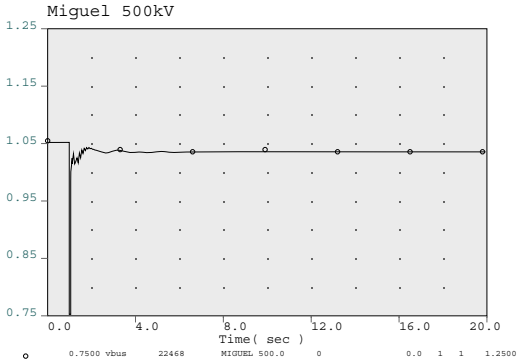


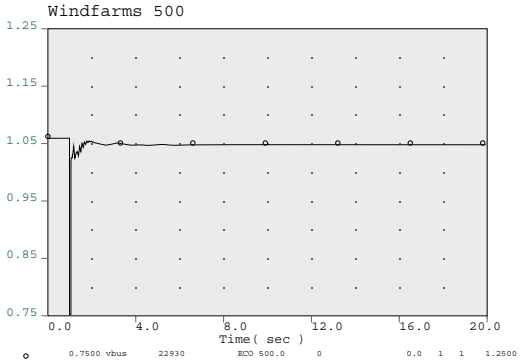
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

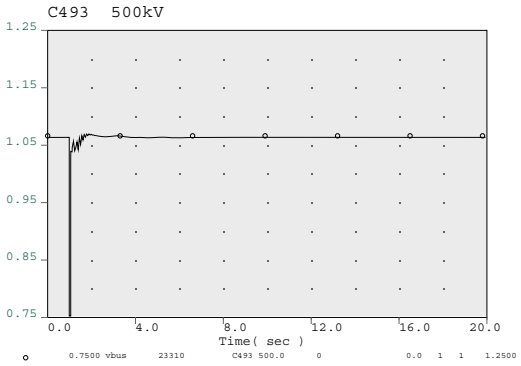
Imperial Valley Area - VOLTAGE

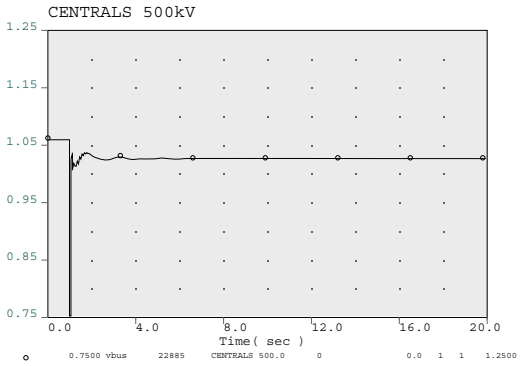






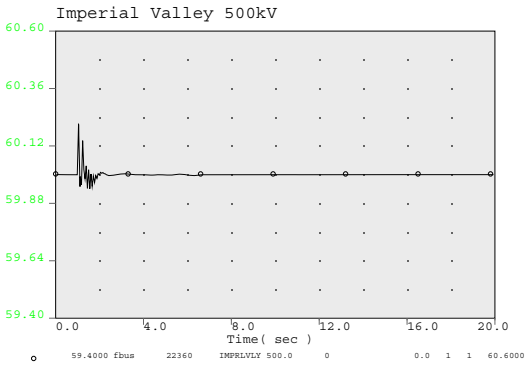


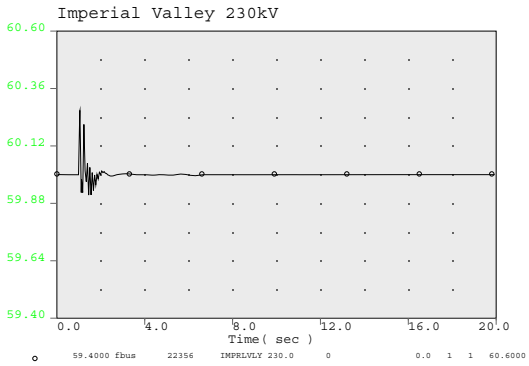


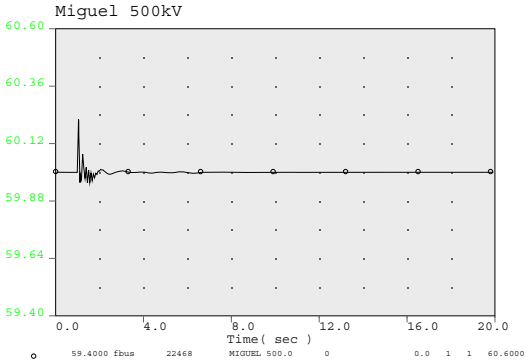


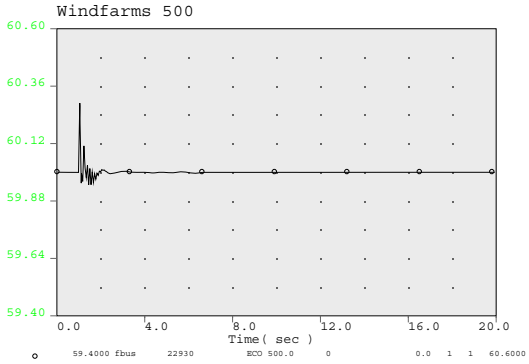
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

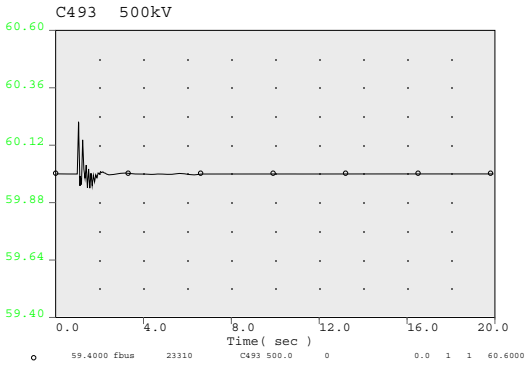
Imperial Valley Area - Frequency

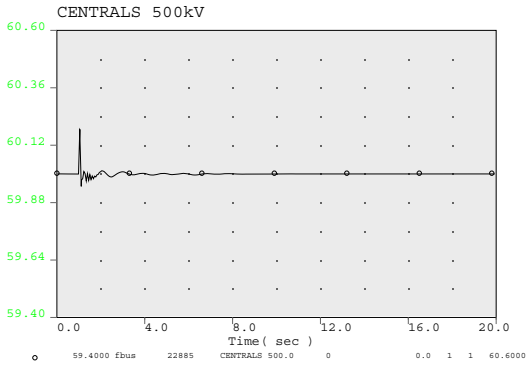






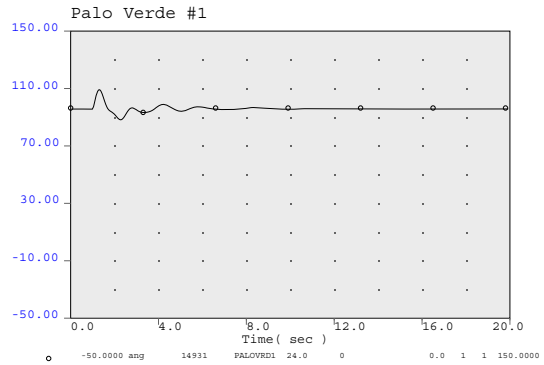


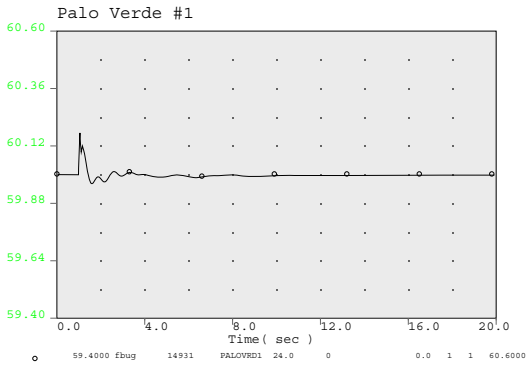


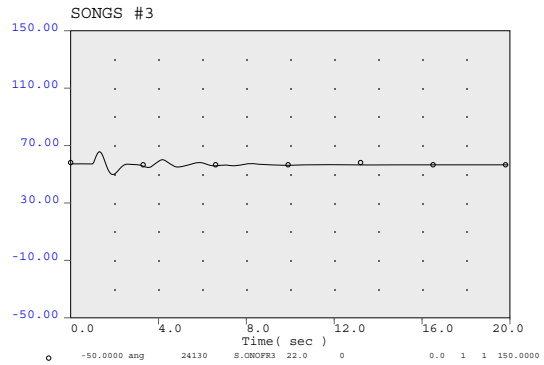


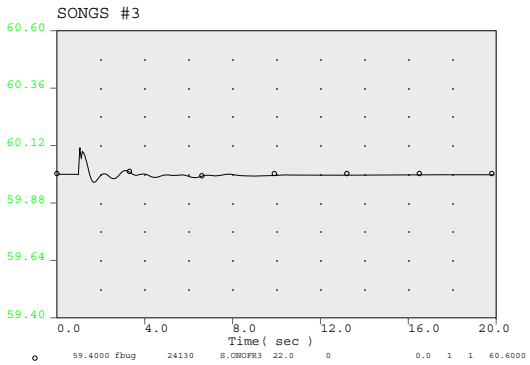
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

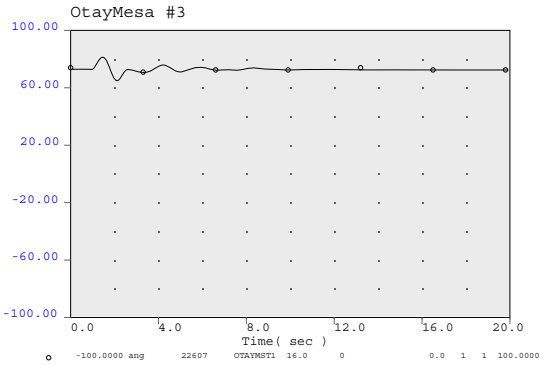
RELATIVE ROTOR ANGLE & FREQUENCY

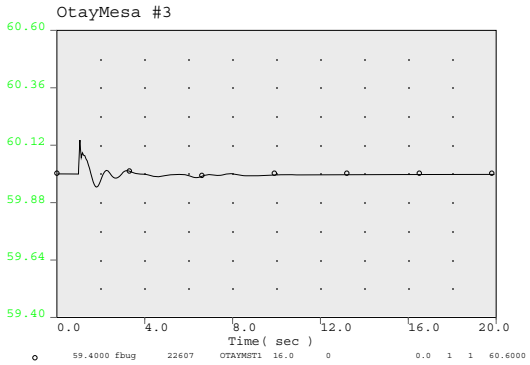










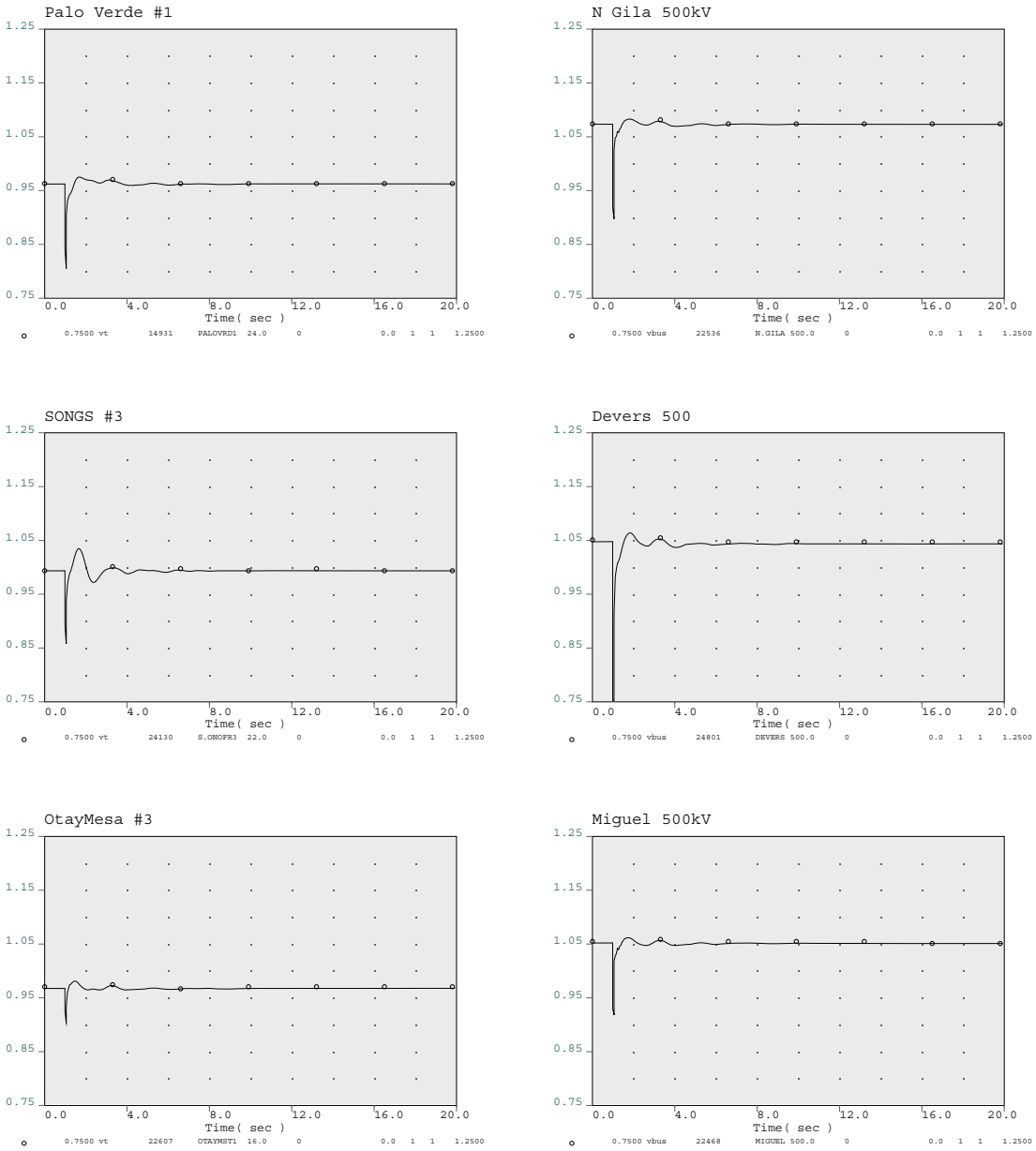


SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Page 1

SDGE	Dev_Val_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:24:56 2010

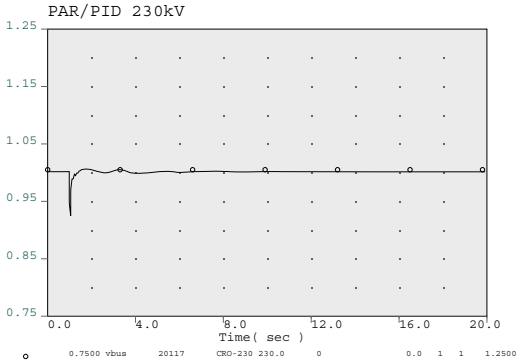
RELATIVE VOLTAGE



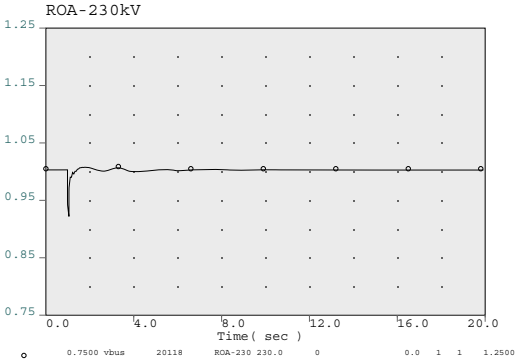
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Affected System Voltage Check and Comparison

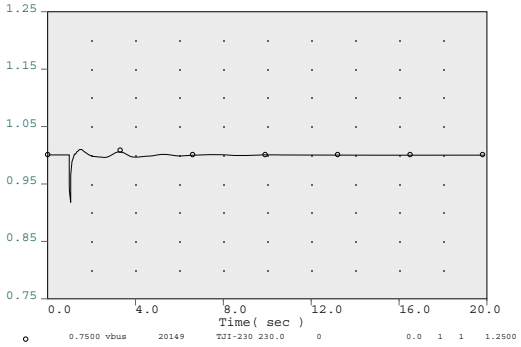
PAR/PID 230kV



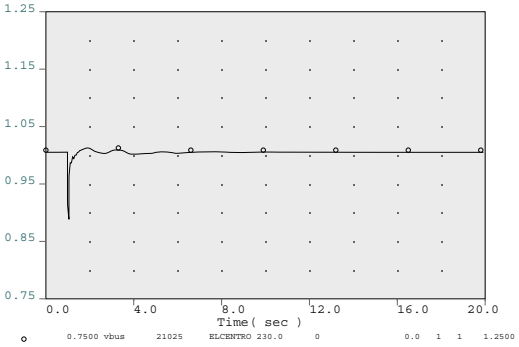
ROA-230kV



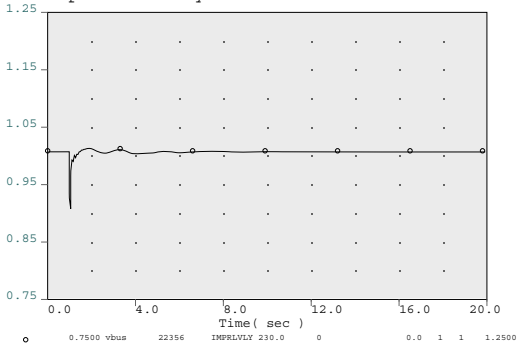
TJ1-230kV



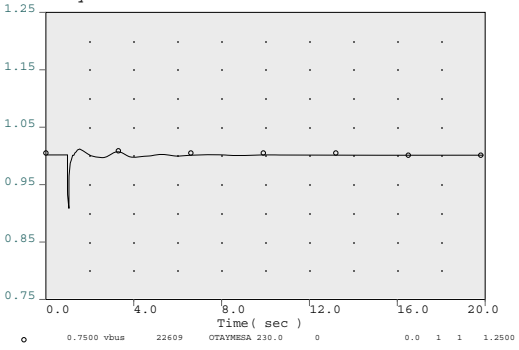
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



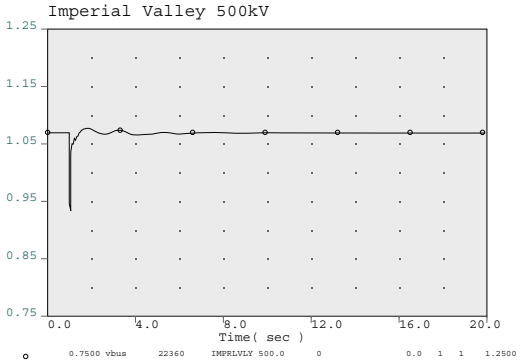
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Affected System Frequency Check and Comparison

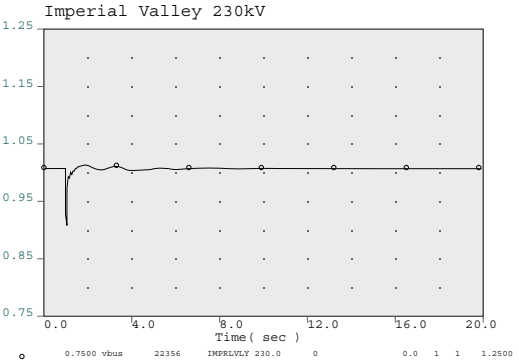
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

Imperial Valley Area - VOLTAGE

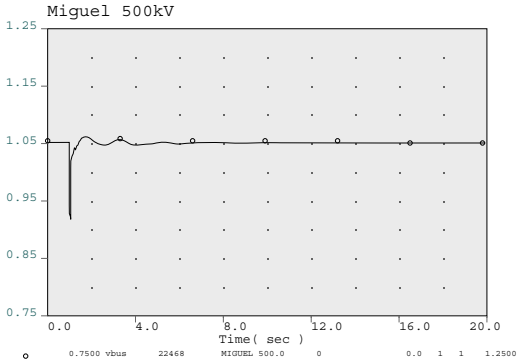
Imperial Valley 500kV



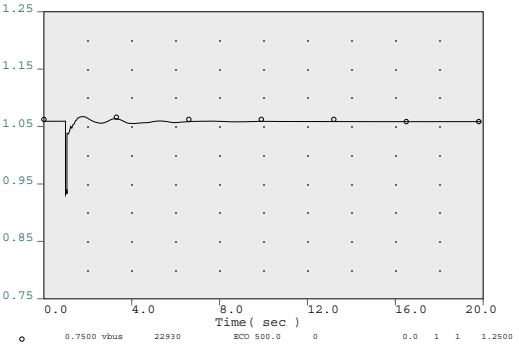
Imperial Valley 230kV



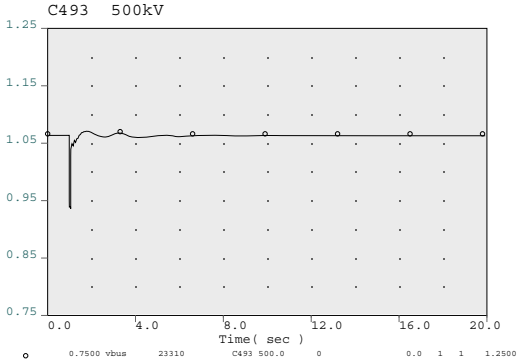
Miguel 500kV



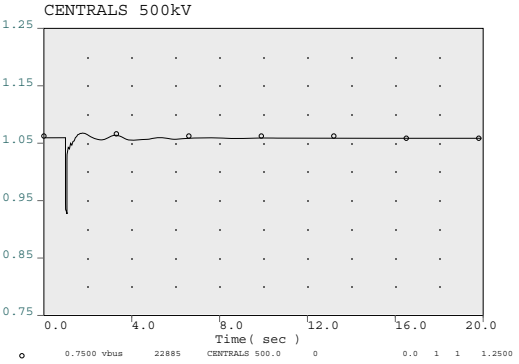
Windfarms 500



C493 500kV

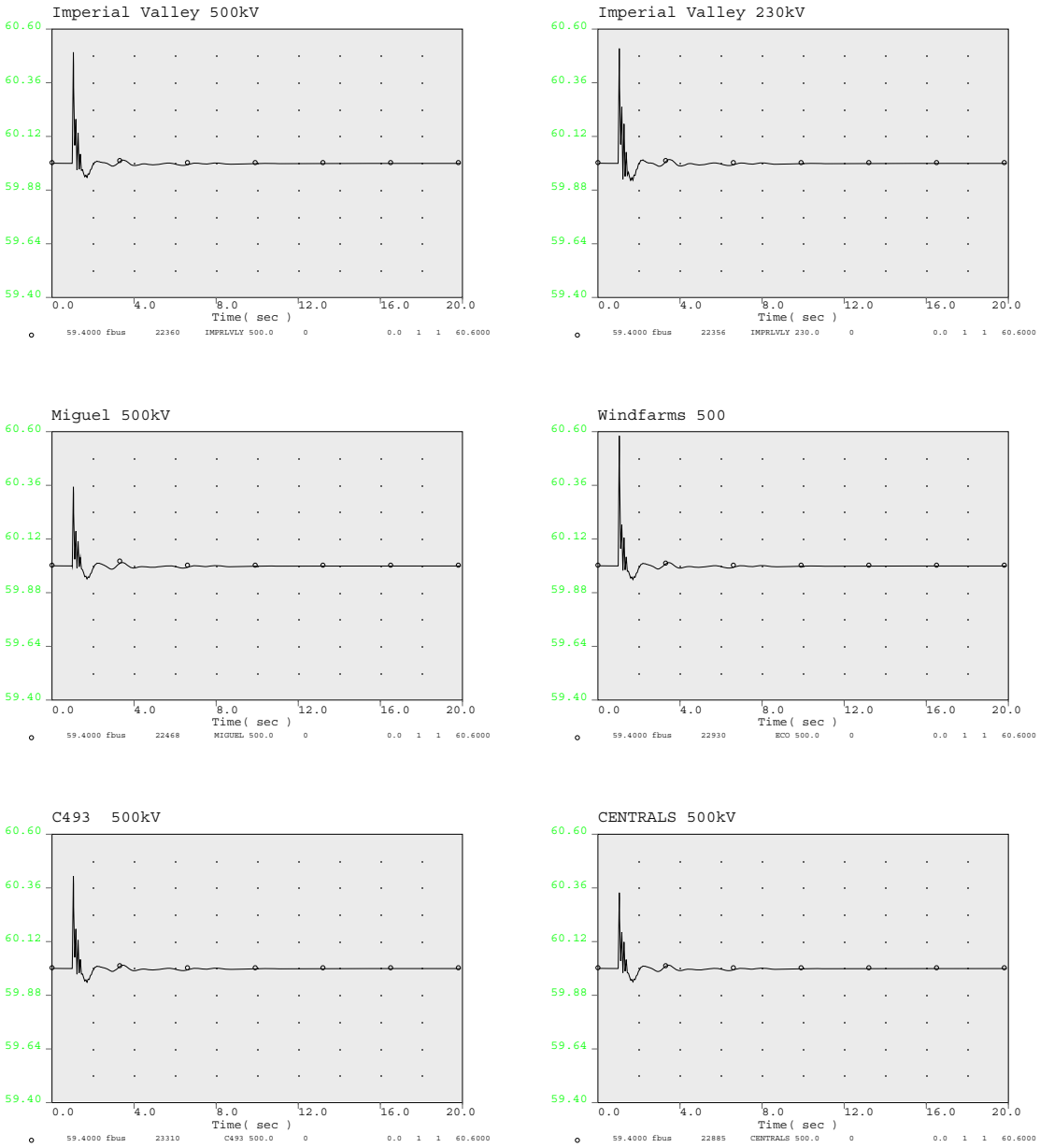


CENTRALS 500kV



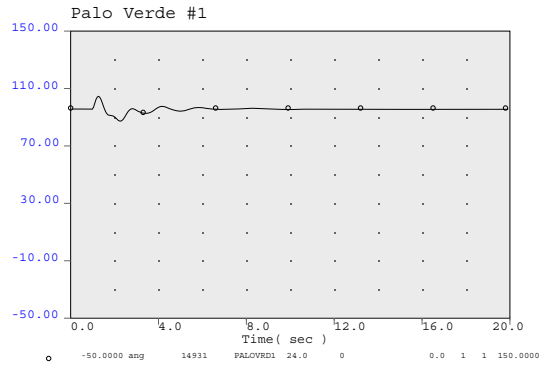
SDG&E Cluster 2 - post
2014 Light Autumn
Valley - Devers 500 kV line

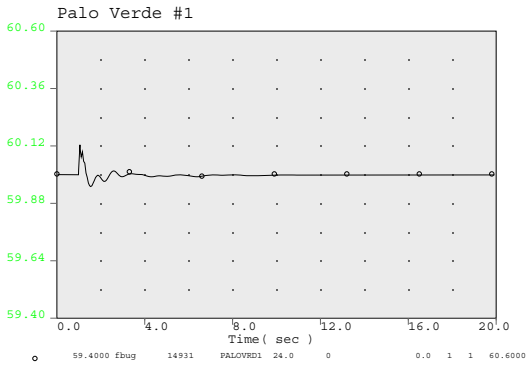
Imperial Valley Area - Frequency

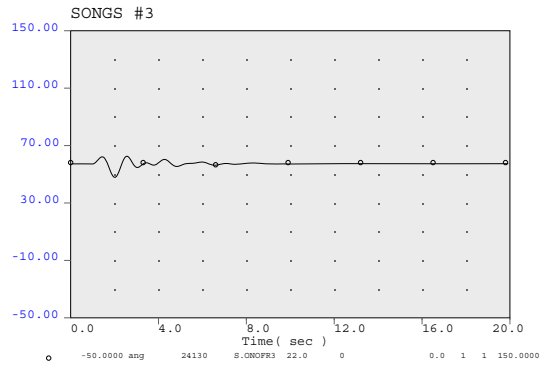


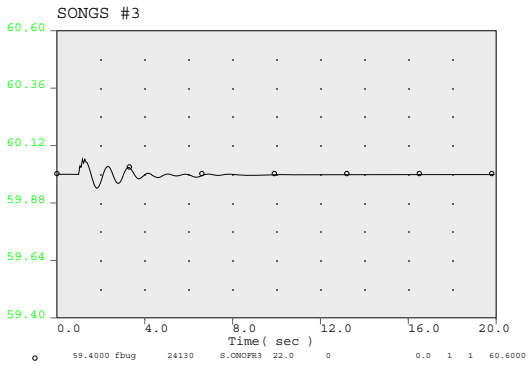
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

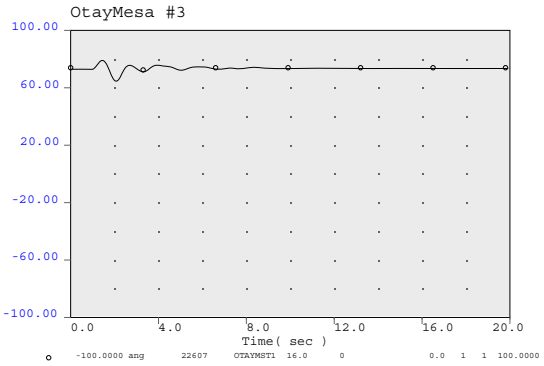
RELATIVE ROTOR ANGLE & FREQUENCY

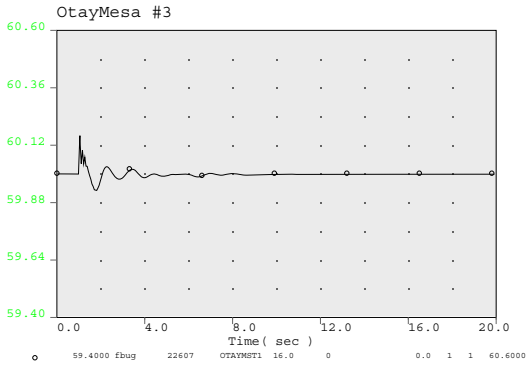












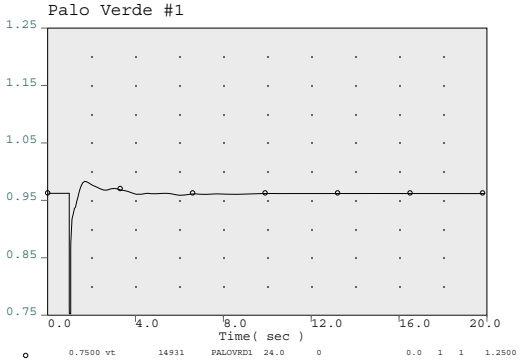
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Page 1

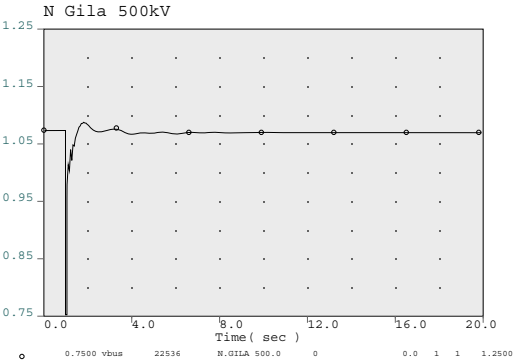
SDGE	HAA_NGila_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:30:58 2010

RELATIVE VOLTAGE

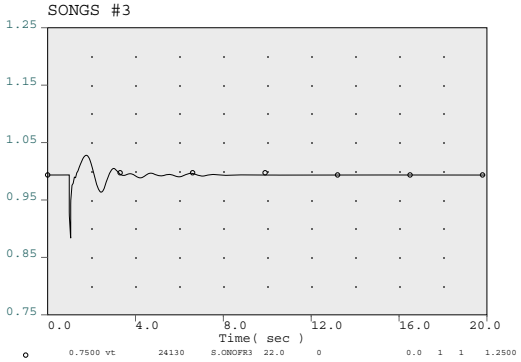
Palo Verde #1



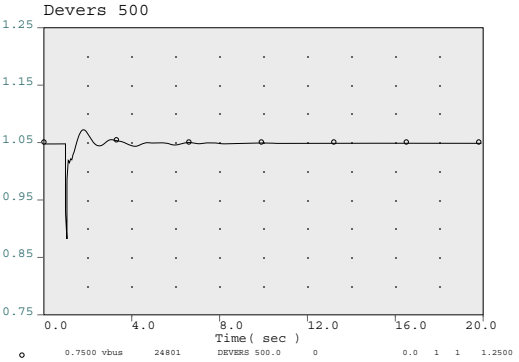
N Gila 500kV



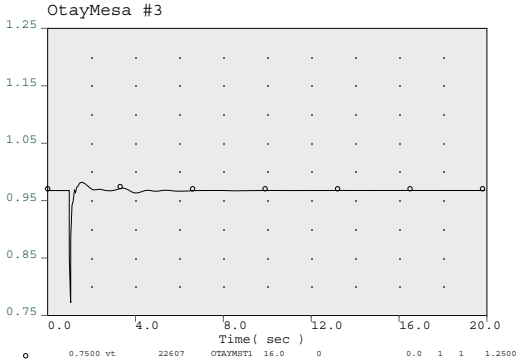
SONGS #3



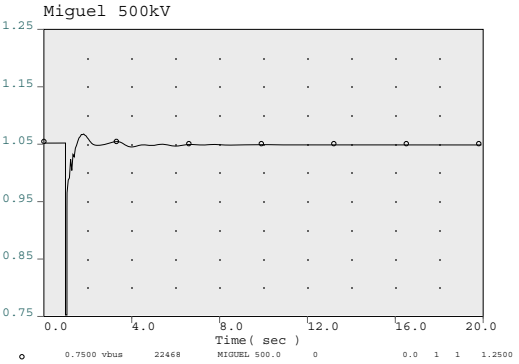
Devers 500



OtayMesa #3



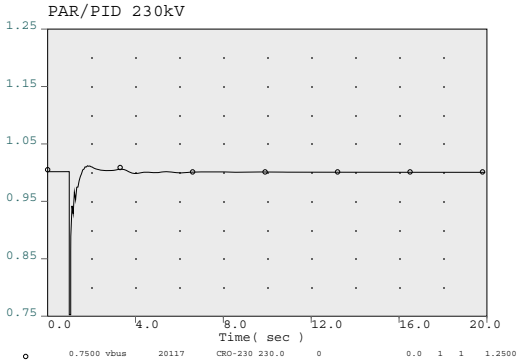
Miguel 500kV



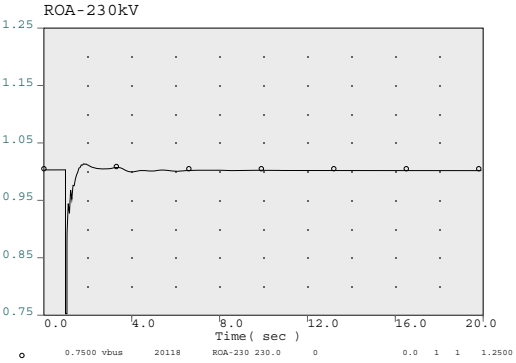
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

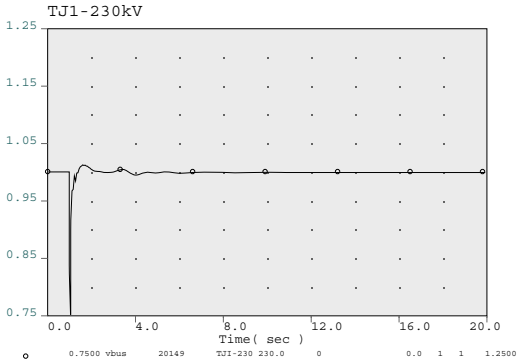
PAR/PID 230kV



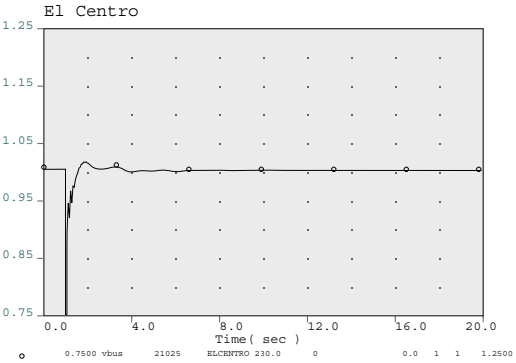
ROA-230kV



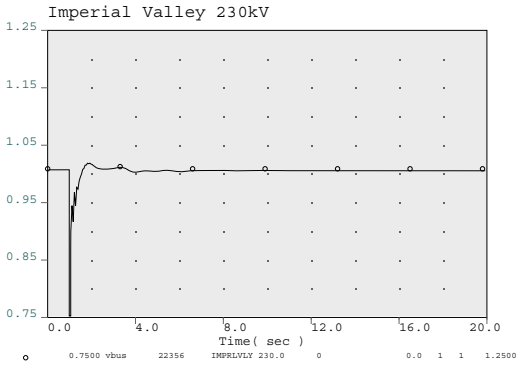
TJ1-230kV



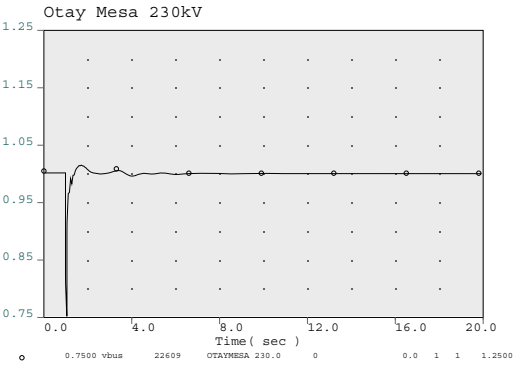
El Centro



Imperial Valley 230kV



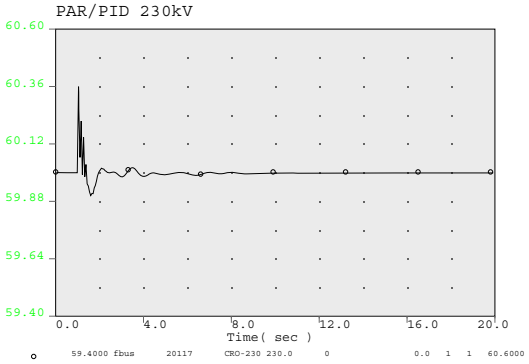
Otay Mesa 230kV



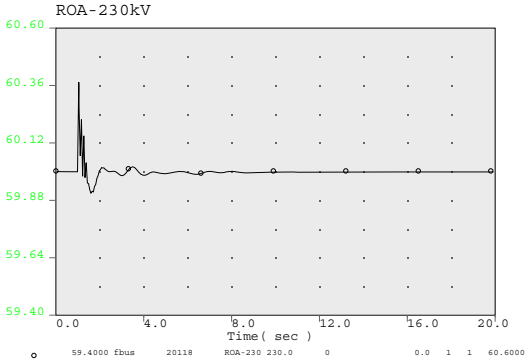
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Frequency Check and Comparison

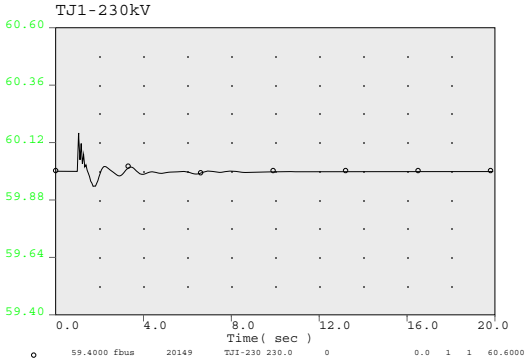
PAR/PID 230kV



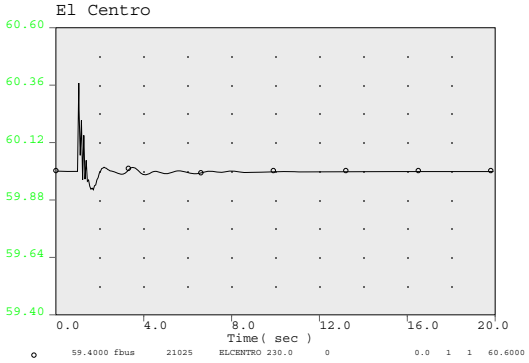
ROA-230kV



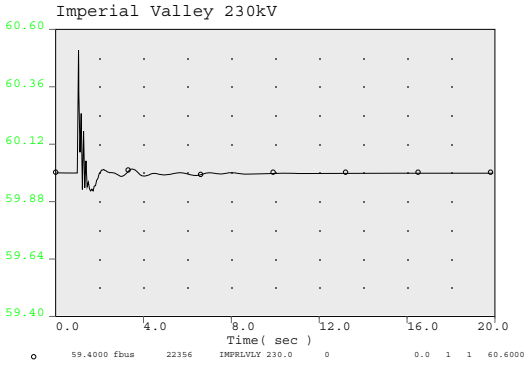
TJ1-230kV



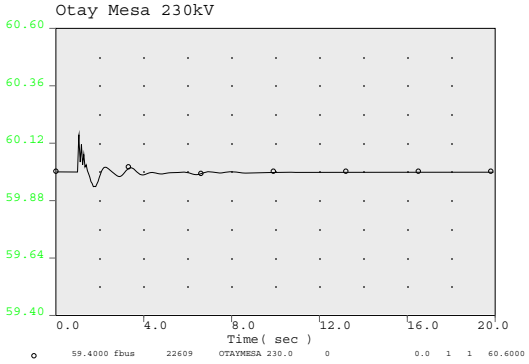
El Centro



Imperial Valley 230kV



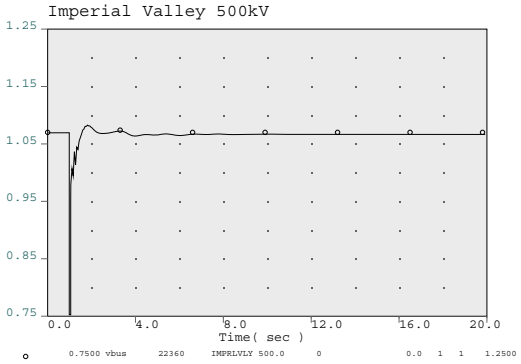
Otay Mesa 230kV



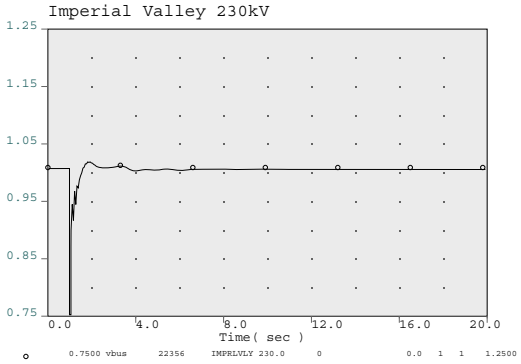
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

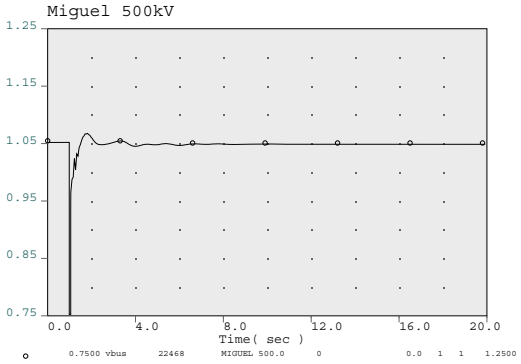
Imperial Valley 500kV



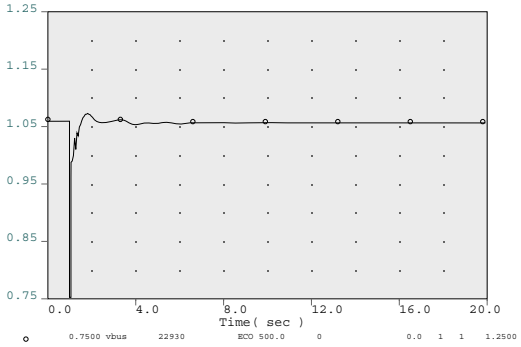
Imperial Valley 230kV



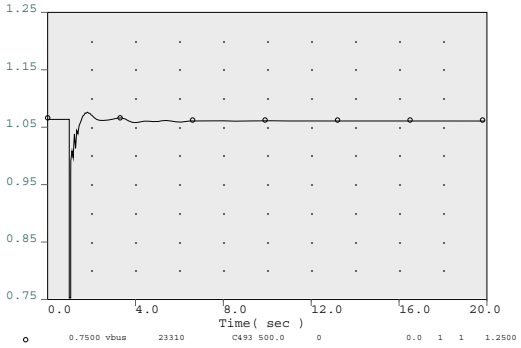
Miguel 500kV



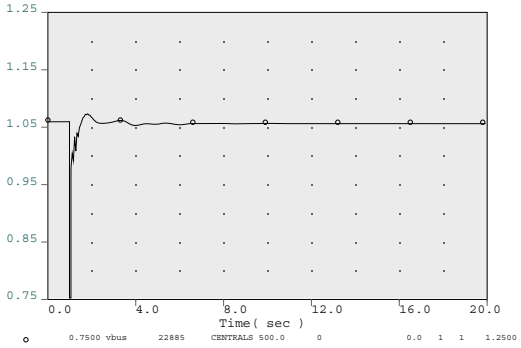
Windfarms 500



C493 500kV

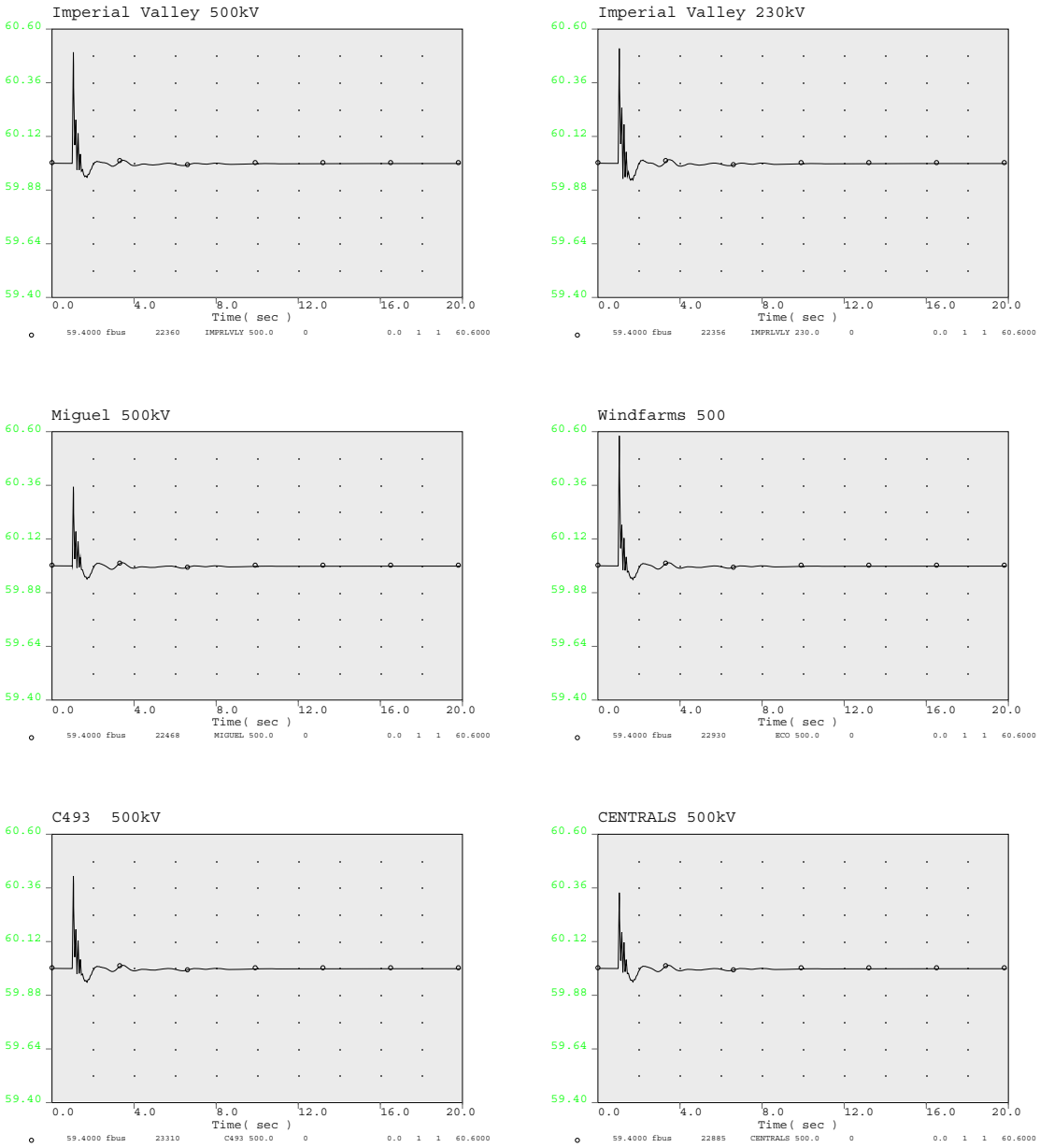


CENTRALS 500kV



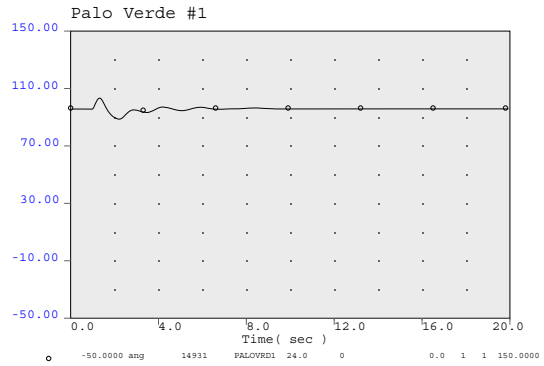
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

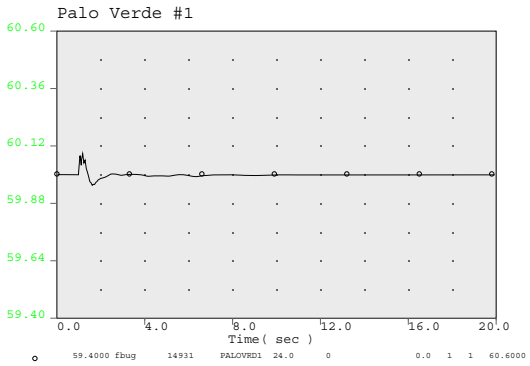
Imperial Valley Area - Frequency

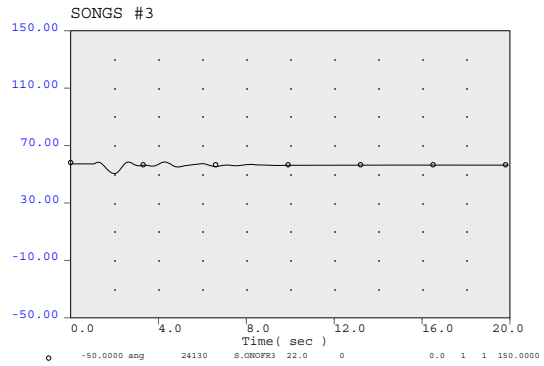


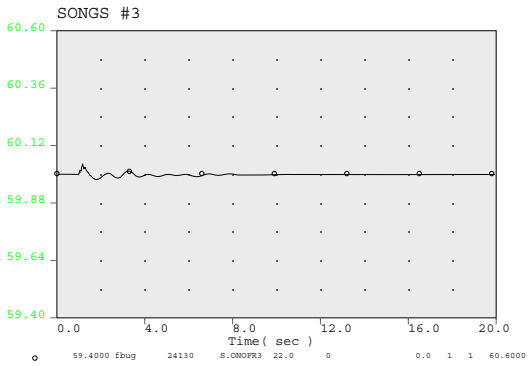
SDG&E Cluster 2 - post
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

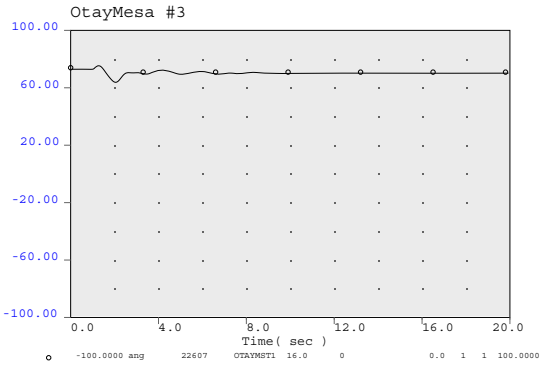
RELATIVE ROTOR ANGLE & FREQUENCY

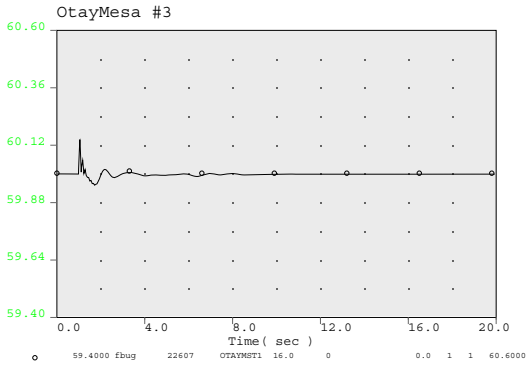










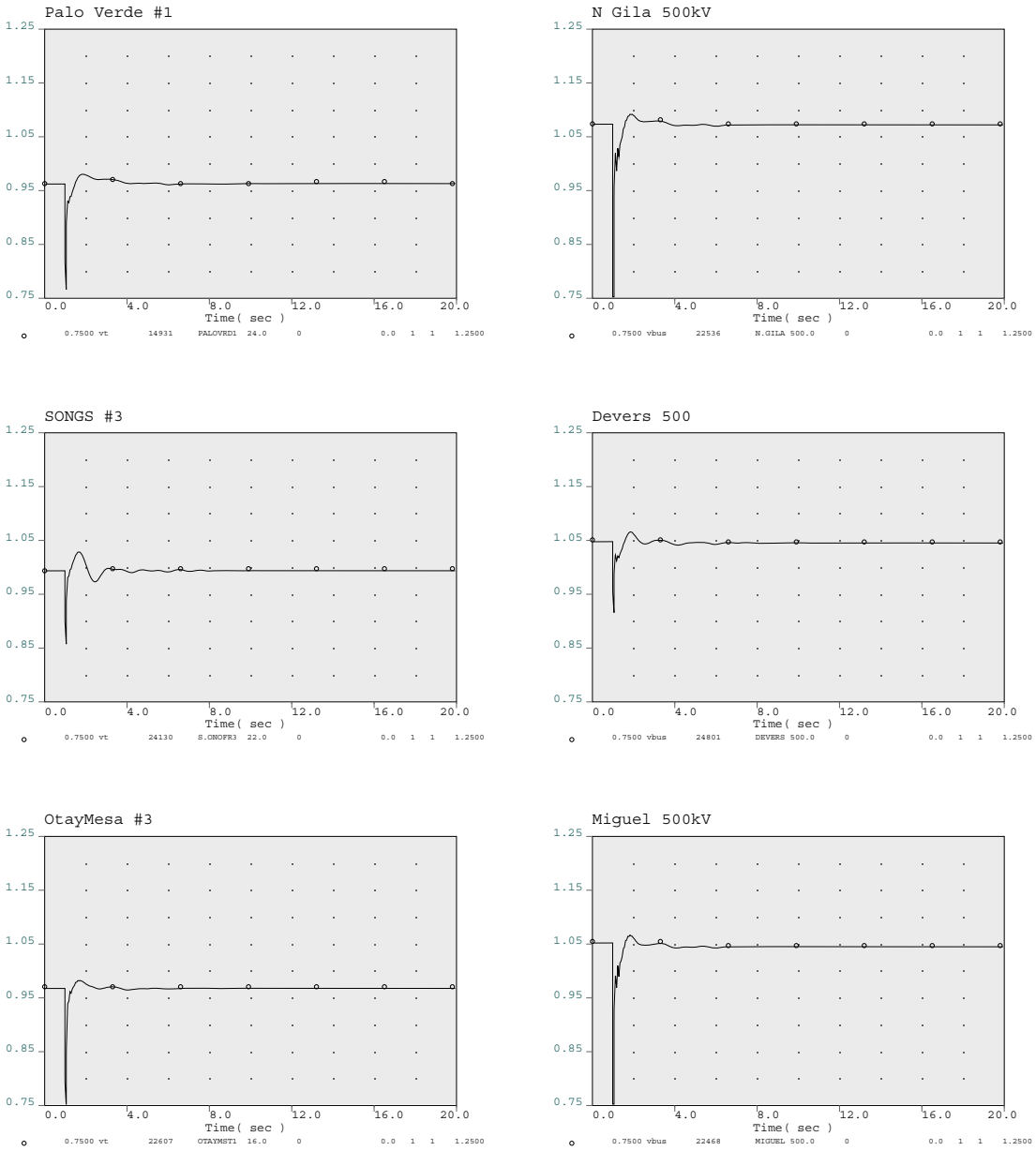


SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Page 1

SDGE	IV_C493_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:32:25 2010

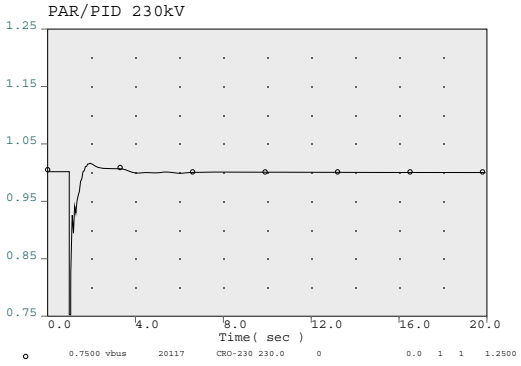
RELATIVE VOLTAGE



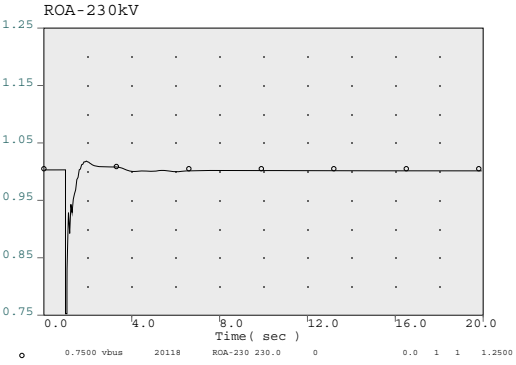
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

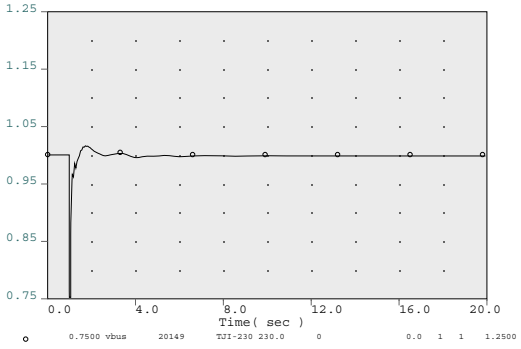
PAR/PID 230kV



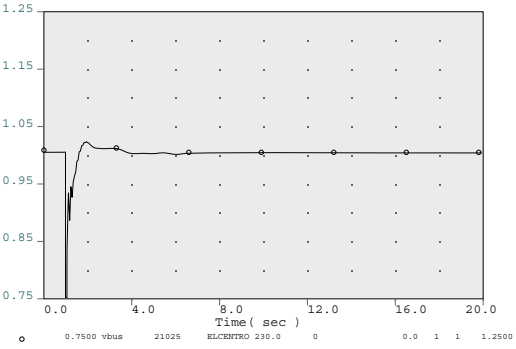
ROA-230kV



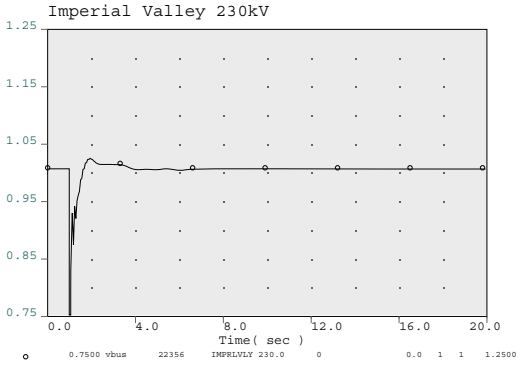
TJ1-230kV



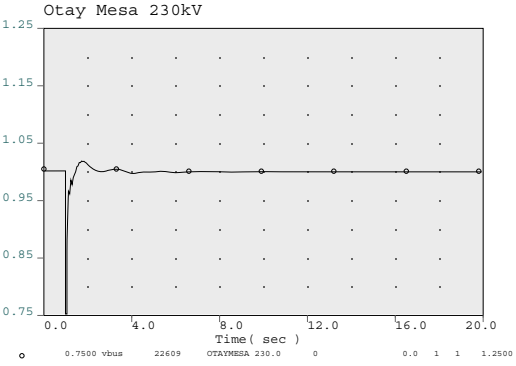
El Centro



Imperial Valley 230kV

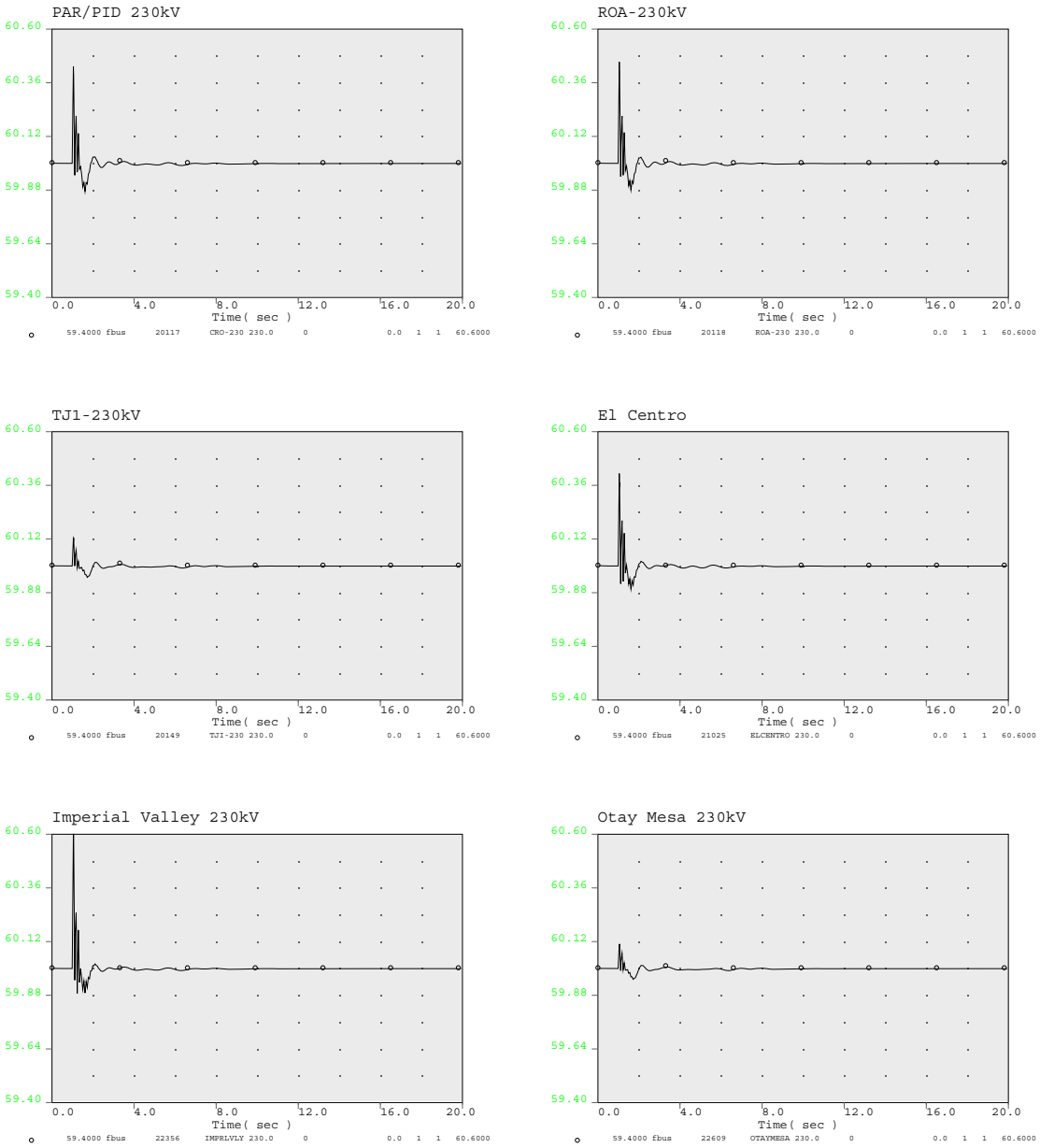


Otay Mesa 230kV



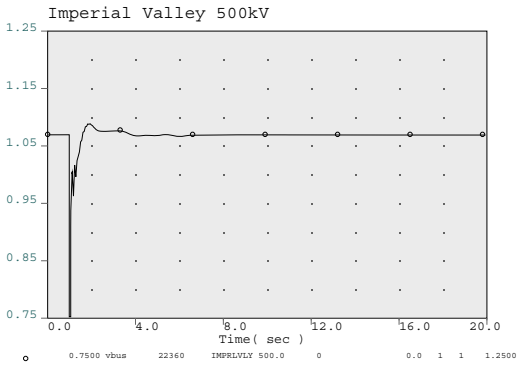
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

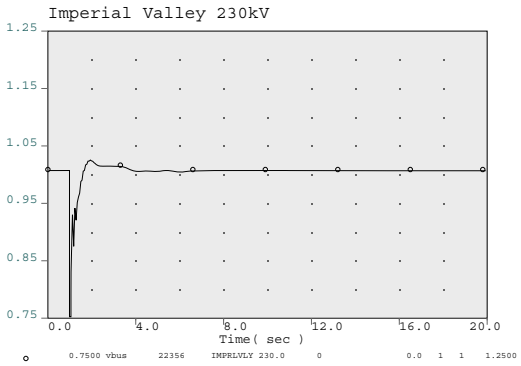
Affected System Frequency Check and Comparison

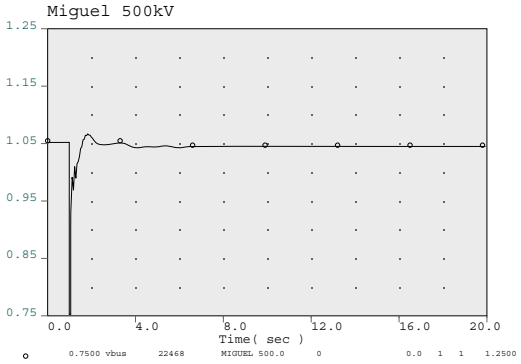


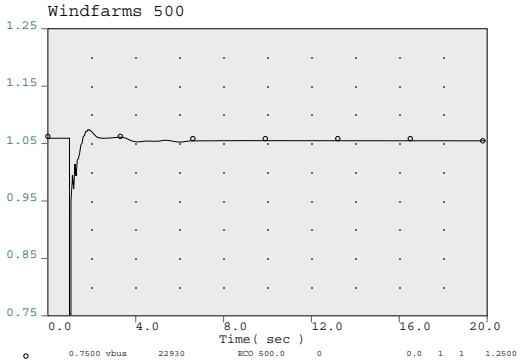
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

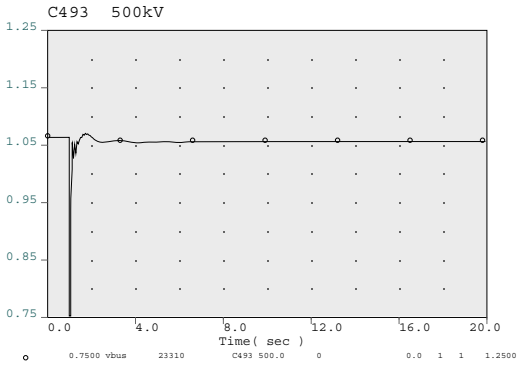
Imperial Valley Area - VOLTAGE

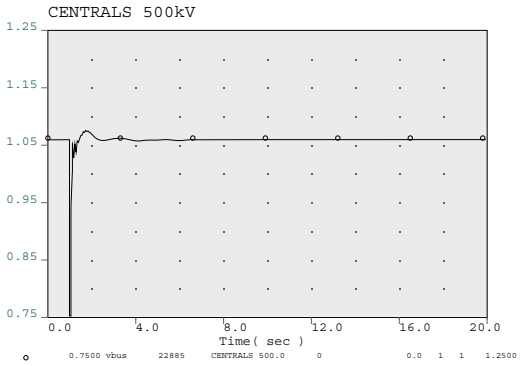






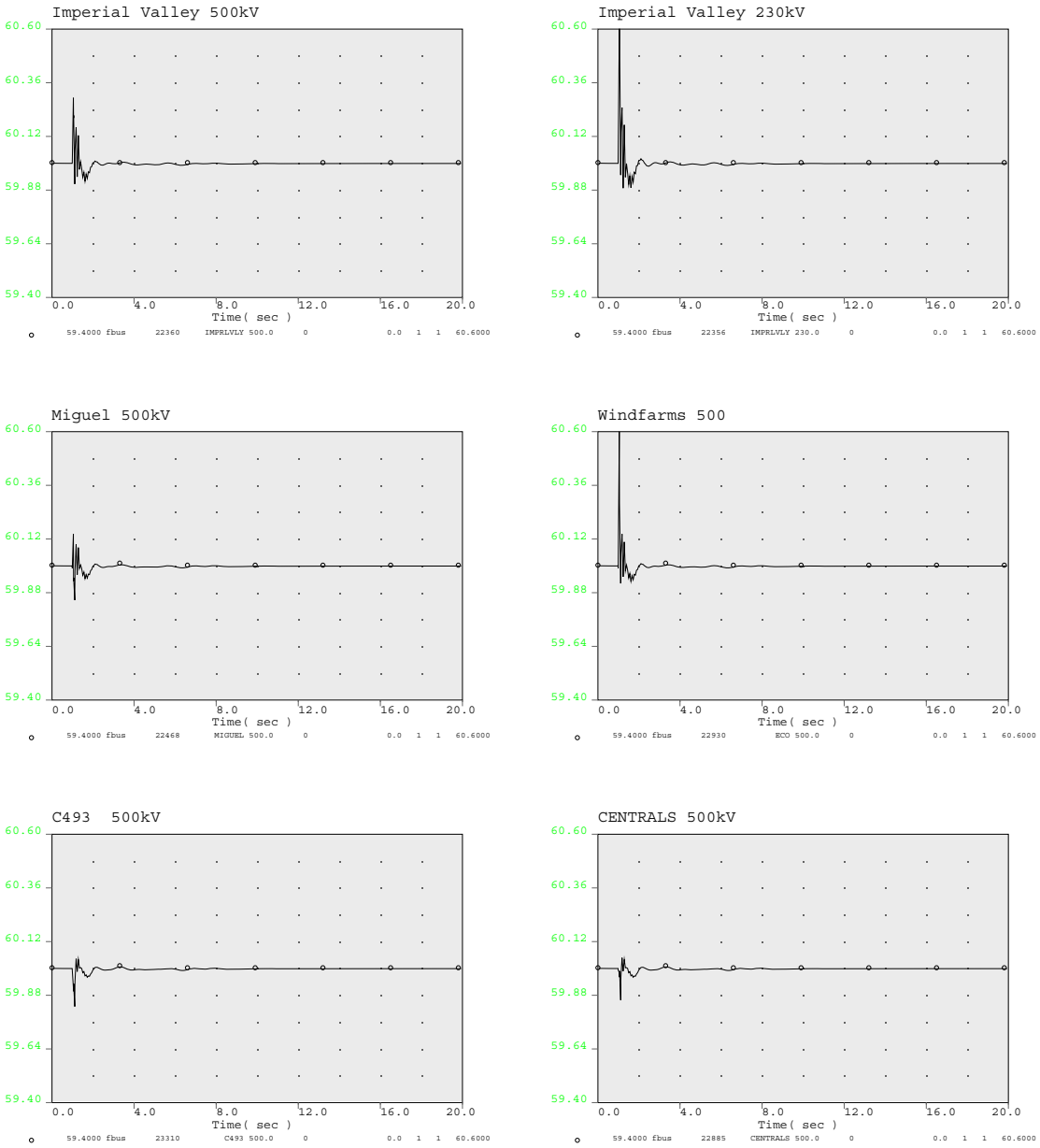






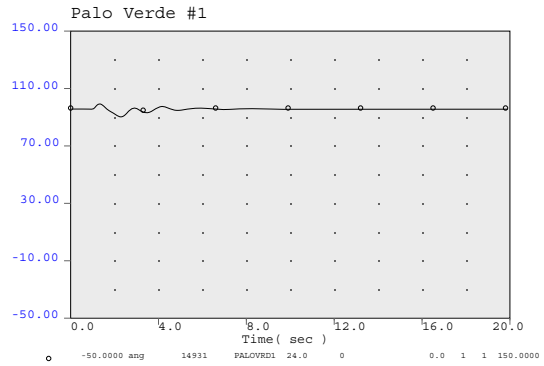
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

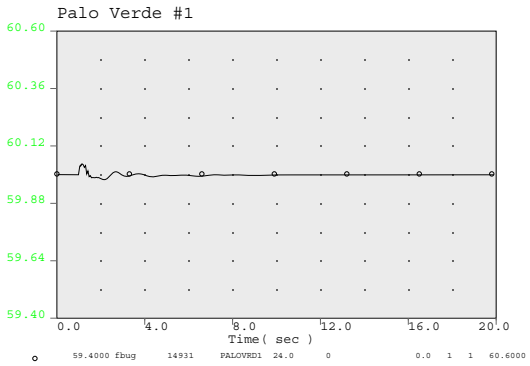
Imperial Valley Area - Frequency

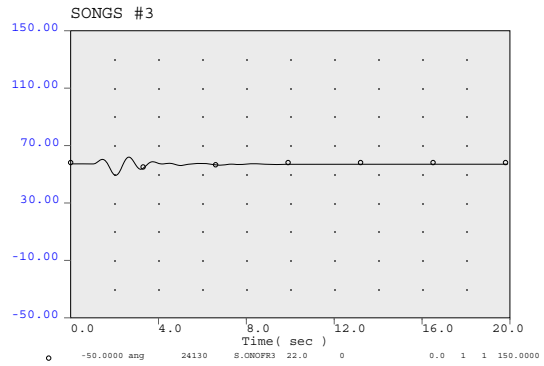


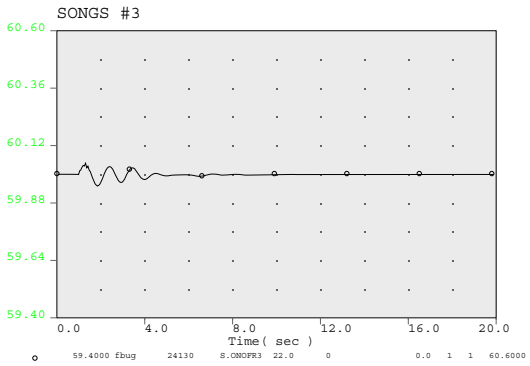
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

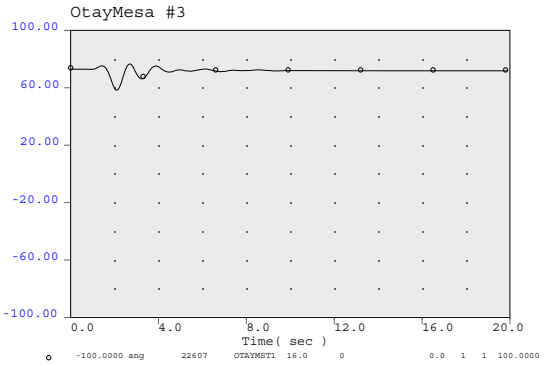
RELATIVE ROTOR ANGLE & FREQUENCY

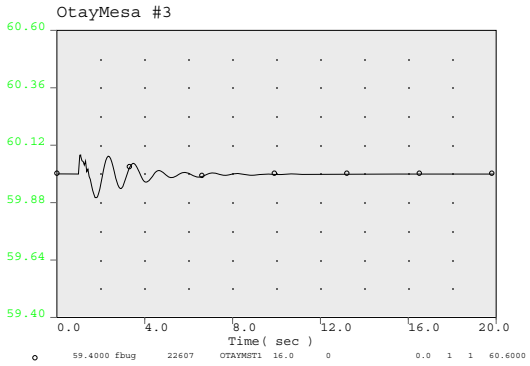










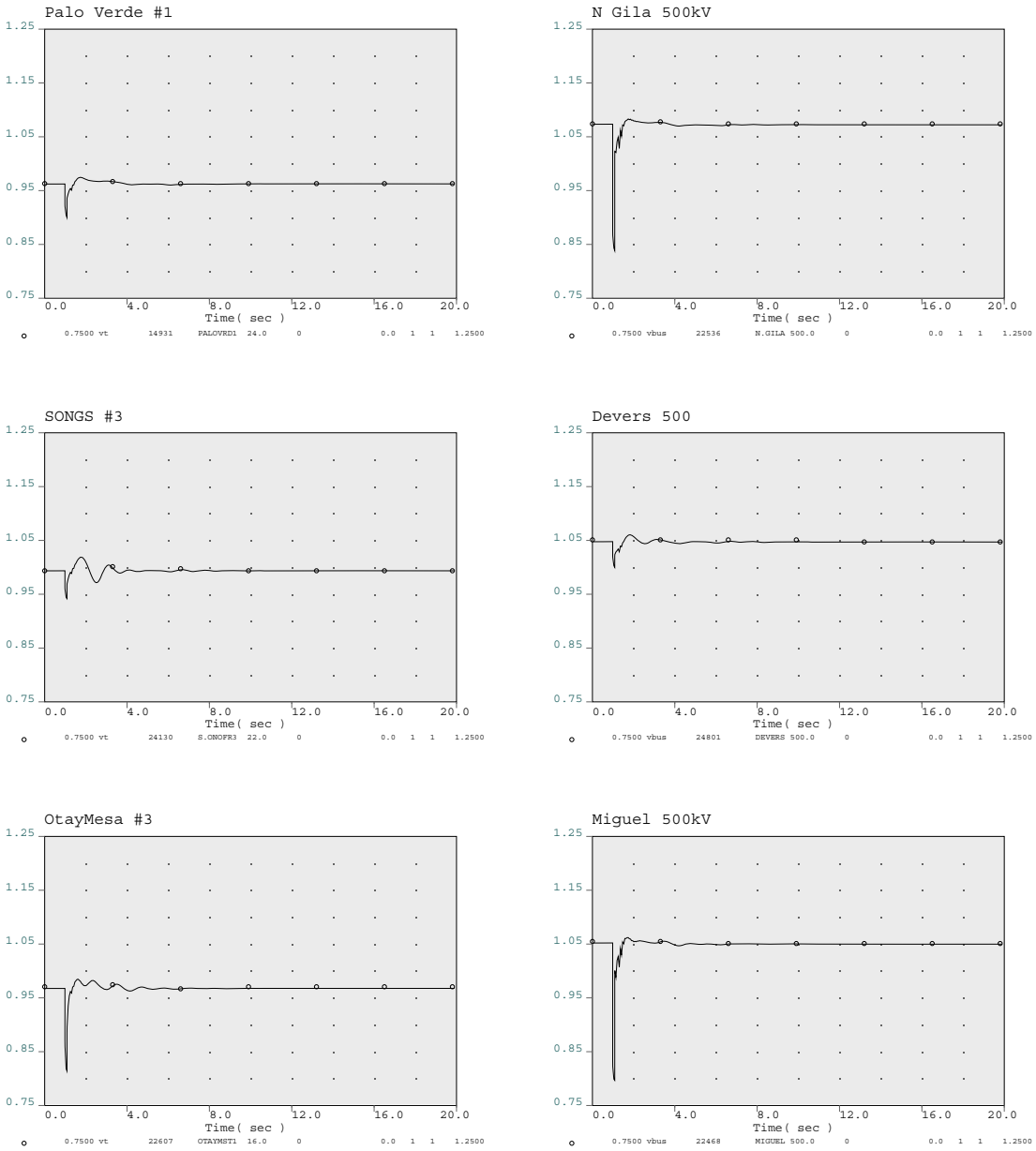


SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Page 1

SDGE	iv_roa_6_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:25:19 2010

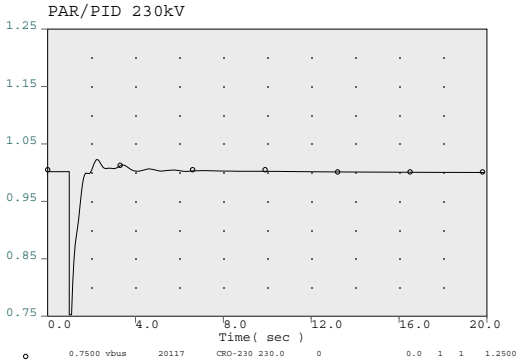
RELATIVE VOLTAGE



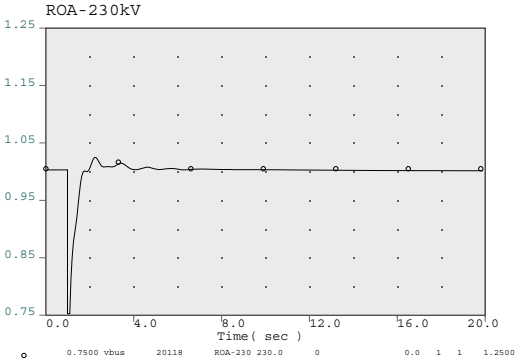
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

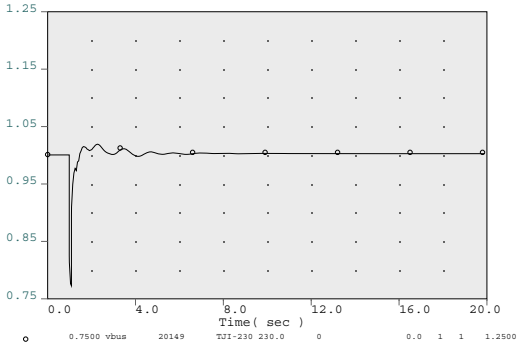
PAR/PID 230kV



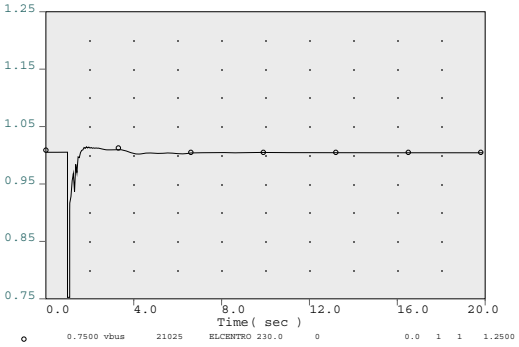
ROA-230kV



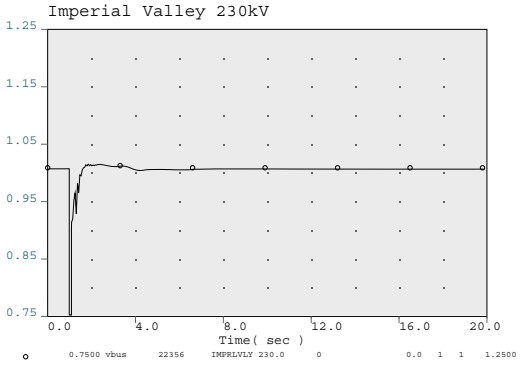
TJ1-230kV



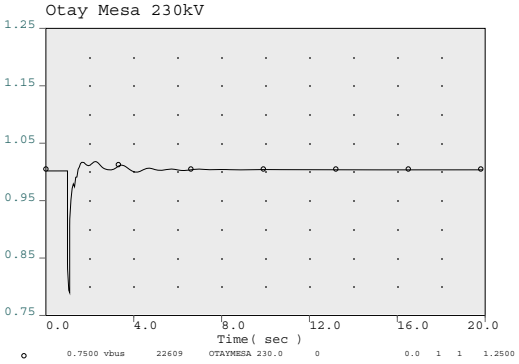
El Centro



Imperial Valley 230kV

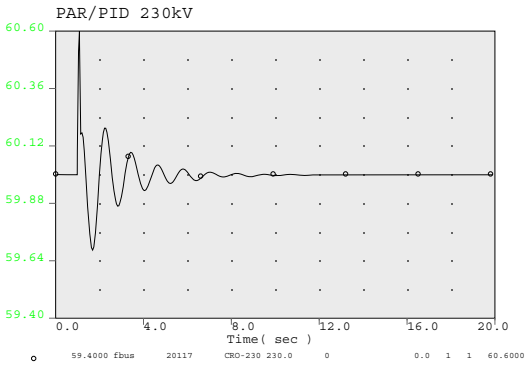


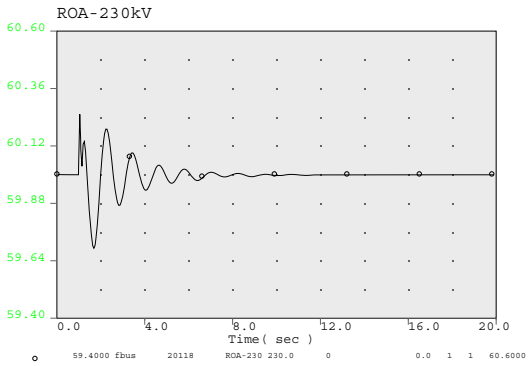
Otay Mesa 230kV

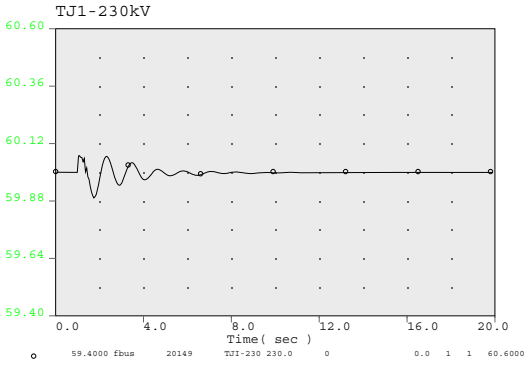


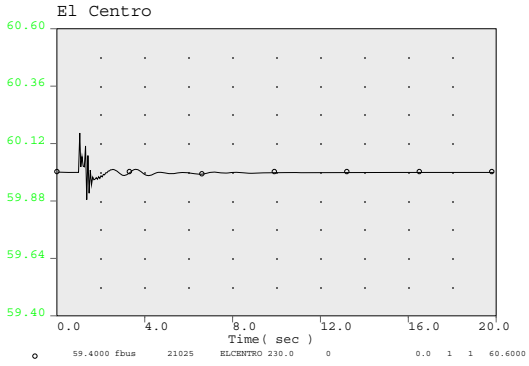
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

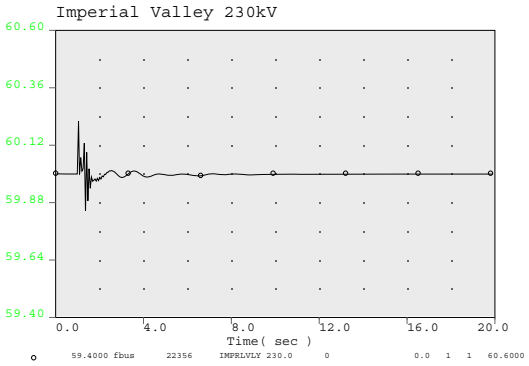
Affected System Frequency Check and Comparison

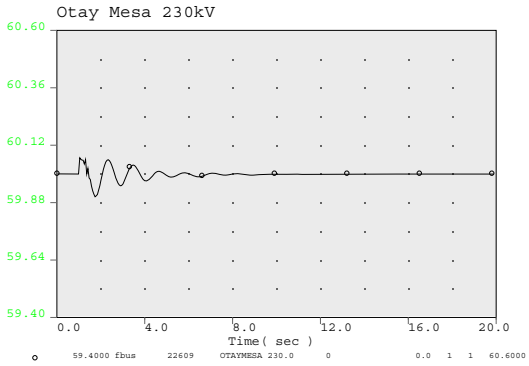








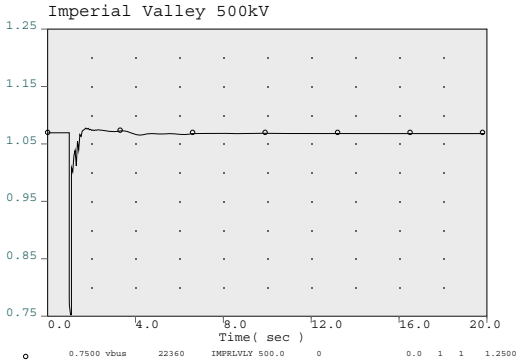




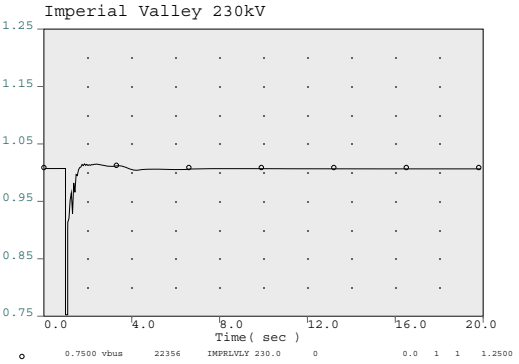
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

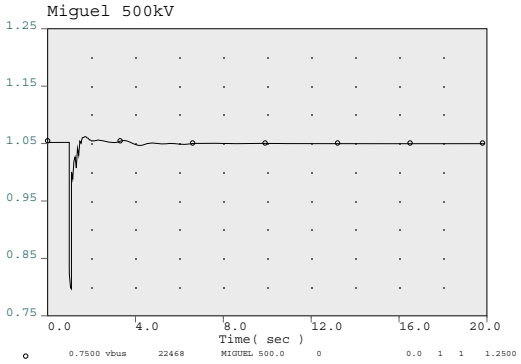
Imperial Valley 500kV



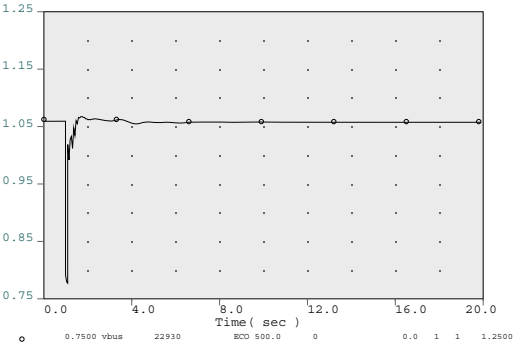
Imperial Valley 230kV



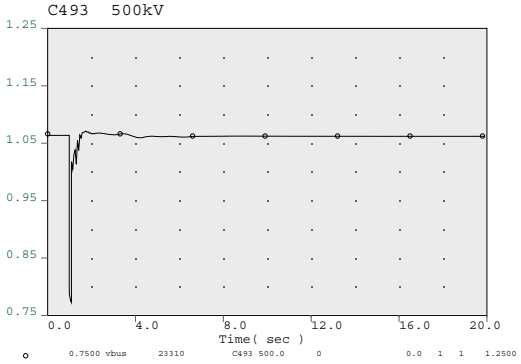
Miguel 500kV



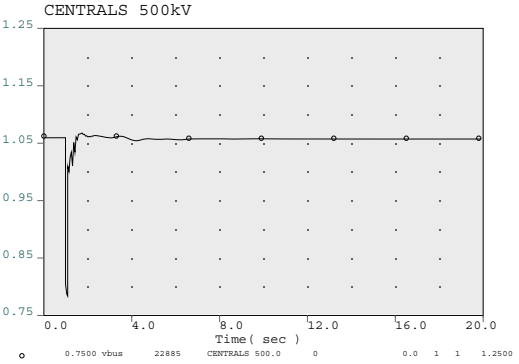
Windfarms 500



C493 500kV

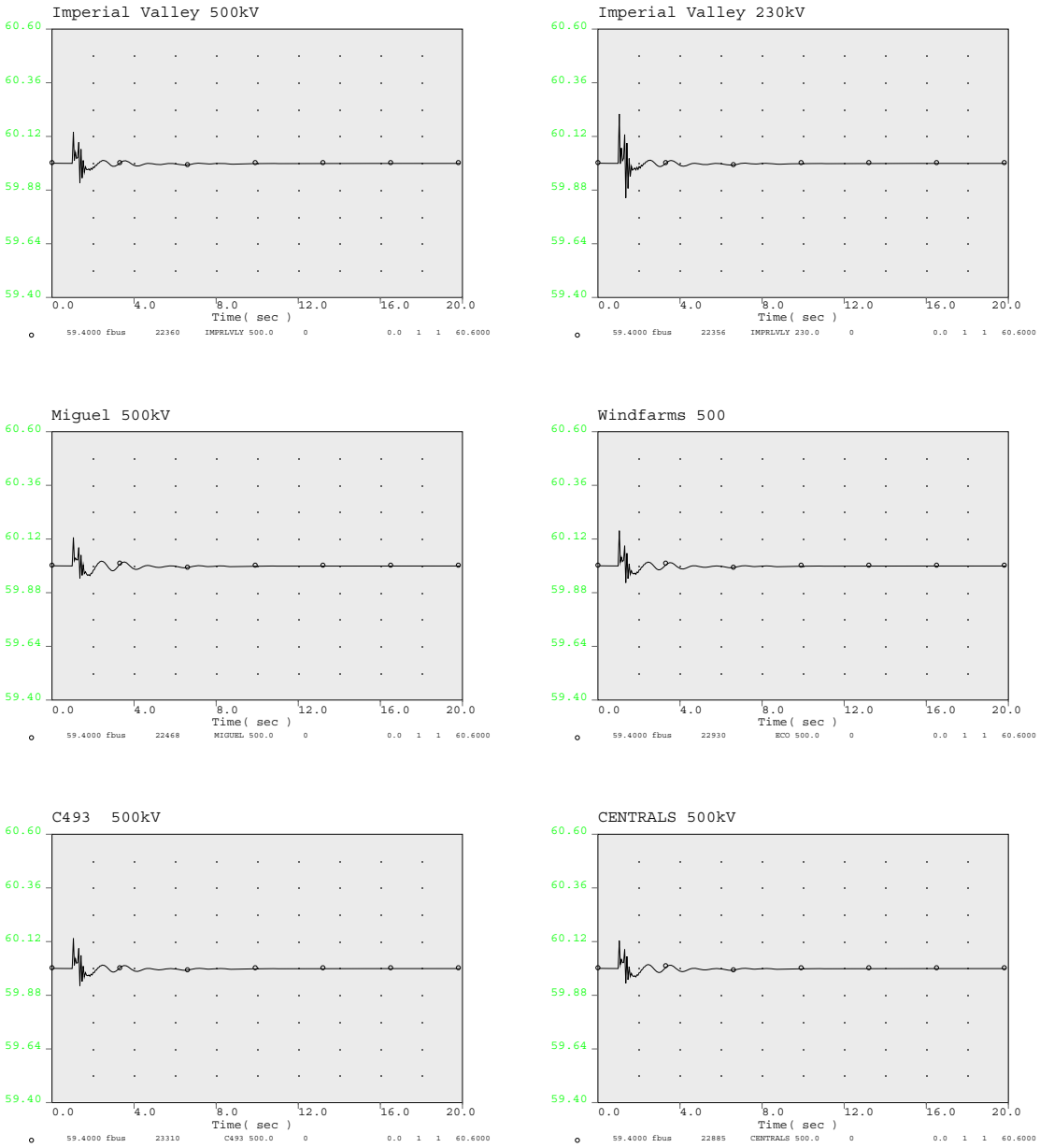


CENTRALS 500kV



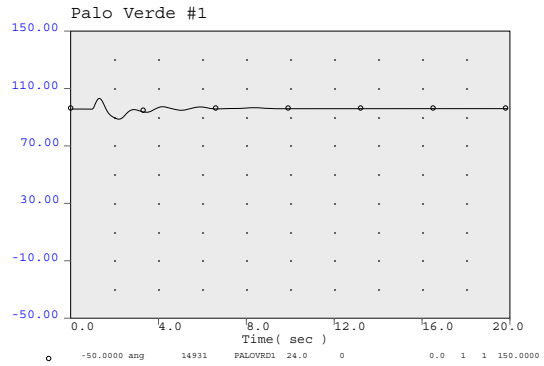
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

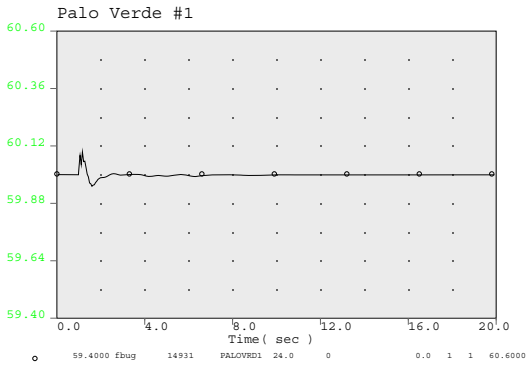
Imperial Valley Area - Frequency

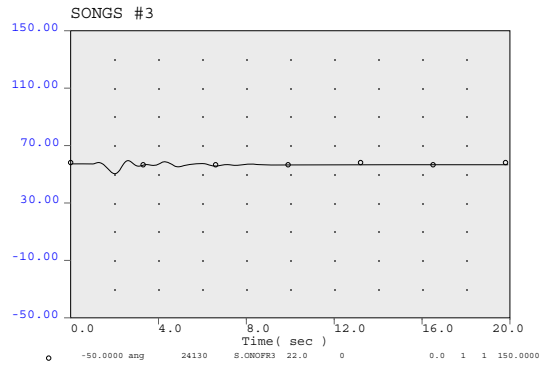


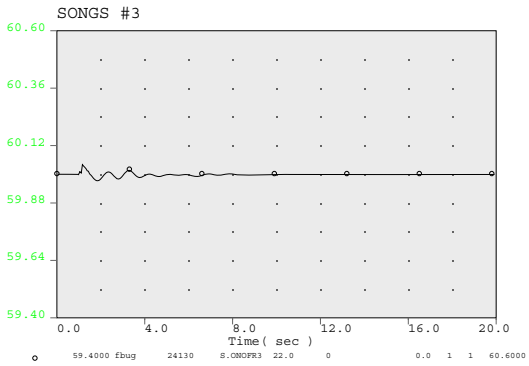
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

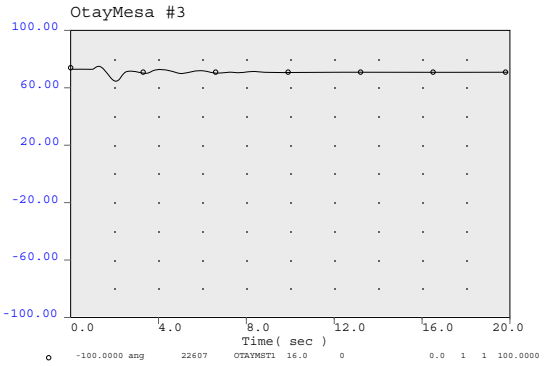
RELATIVE ROTOR ANGLE & FREQUENCY

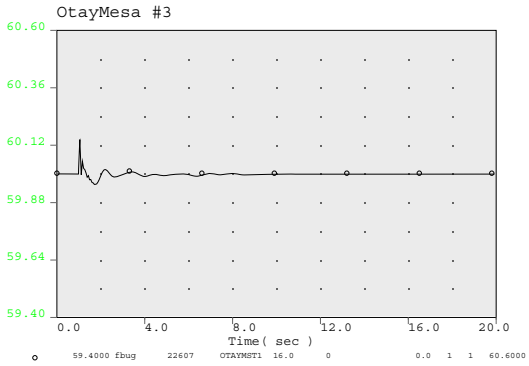










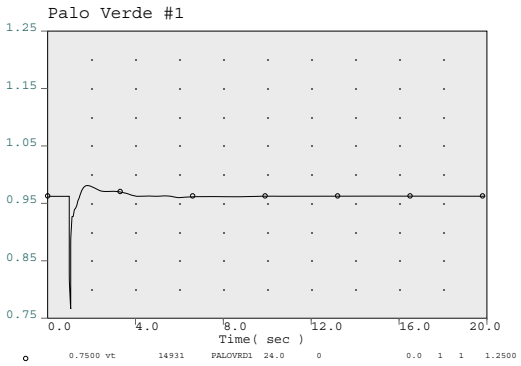


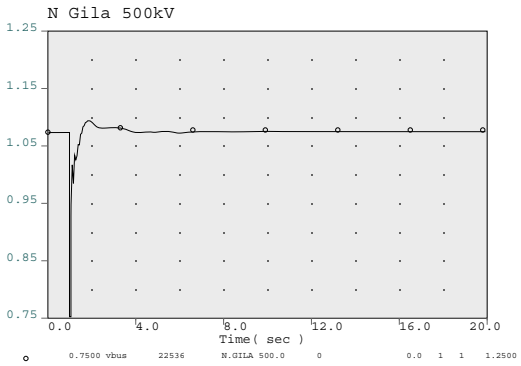
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

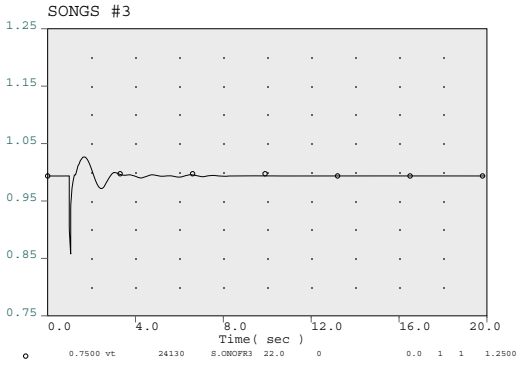
Page 1

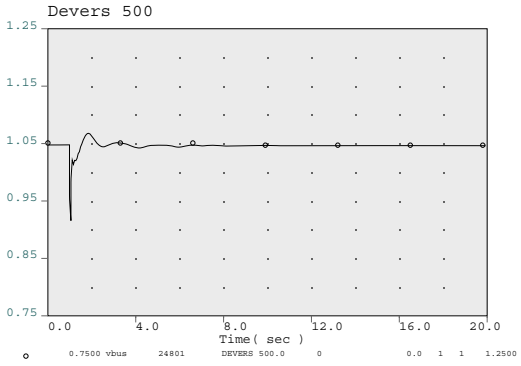
IV_Wnd1_noRAS_pst_ll_bu.chf | 2_p_i\ll\pst_bu\ws_pst_bu | Tue Nov 02 07:25:52 2010

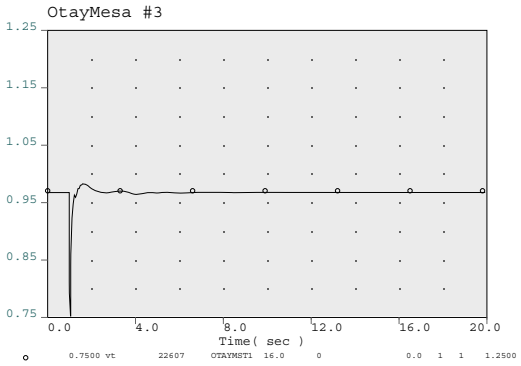
RELATIVE VOLTAGE

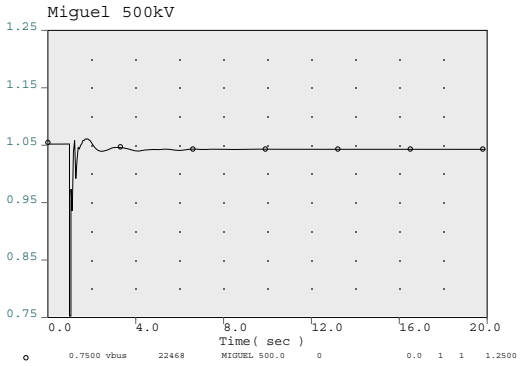








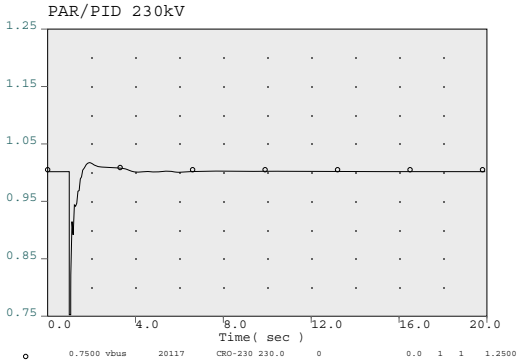




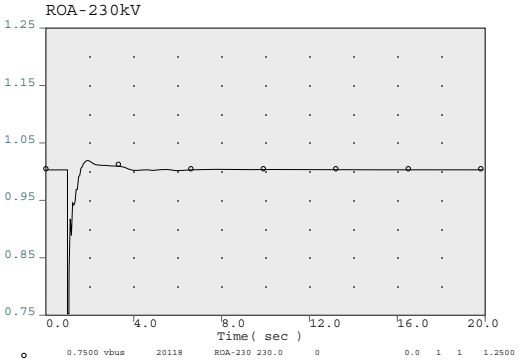
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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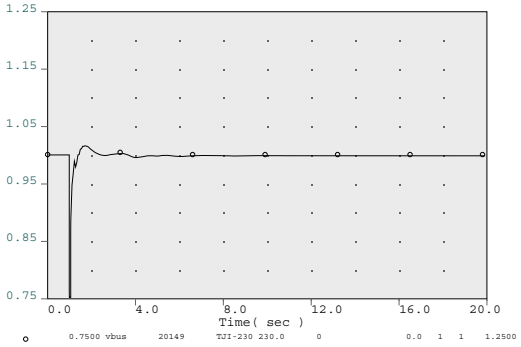

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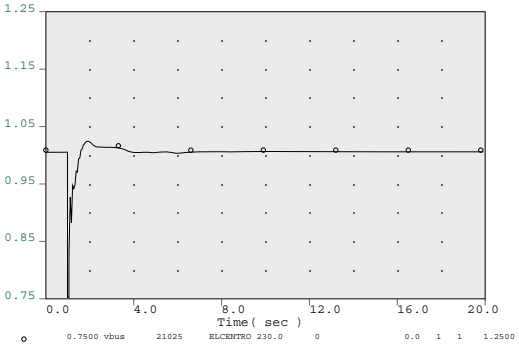
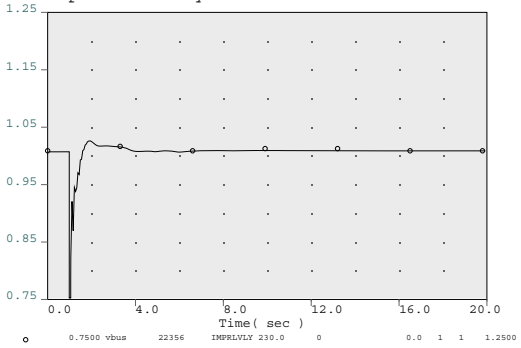
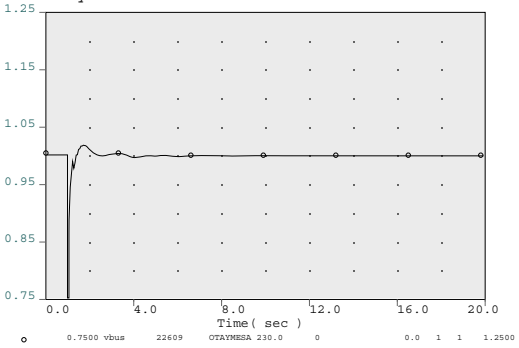


Imperial Valley 230kV

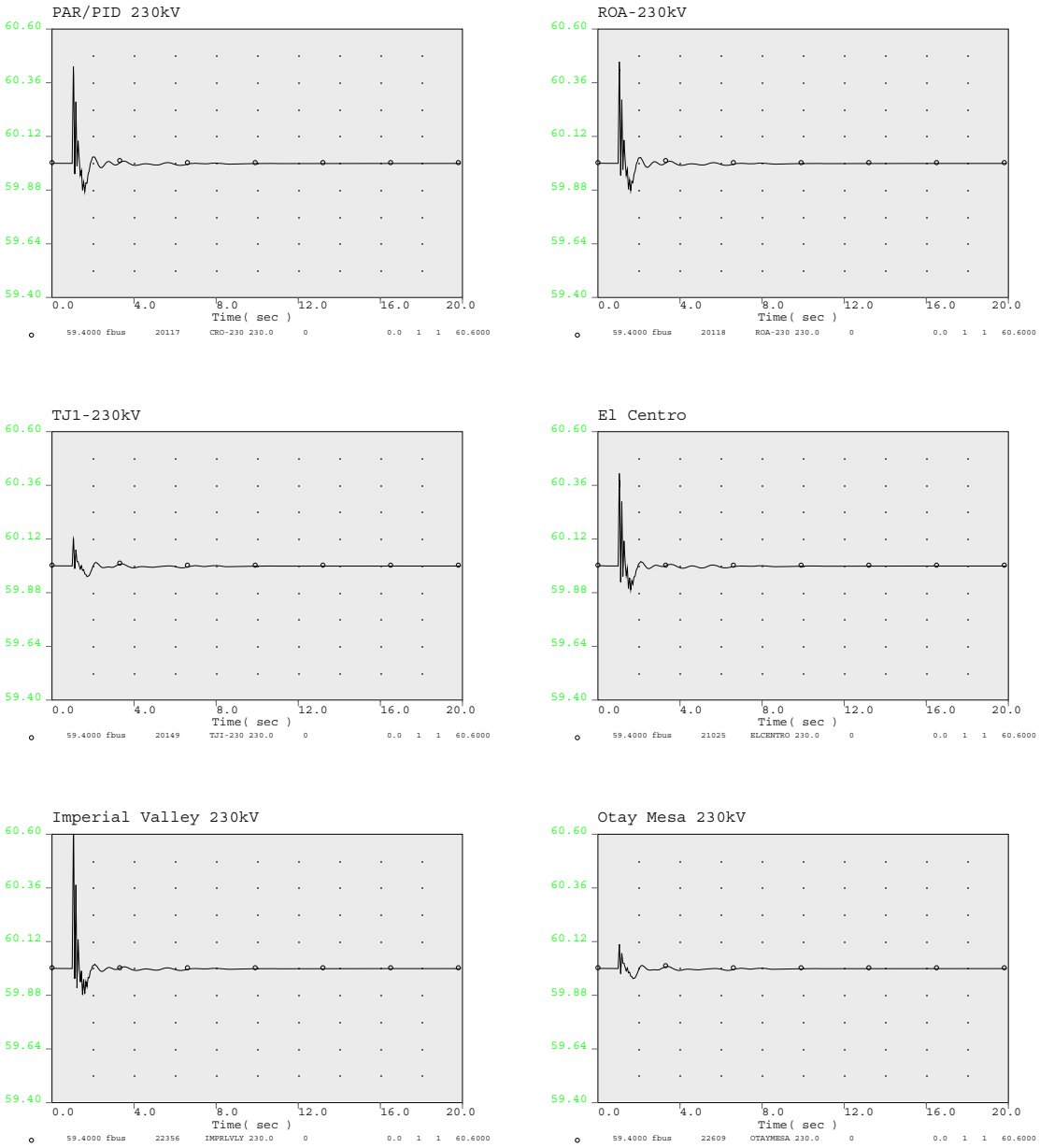


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

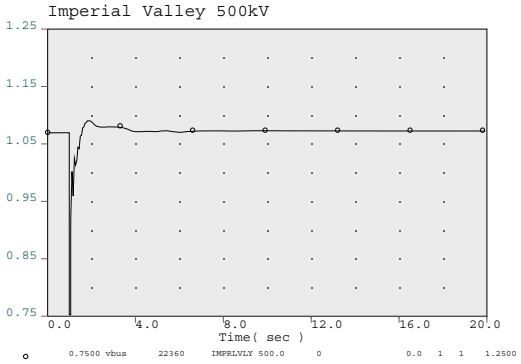
Affected System Frequency Check and Comparison



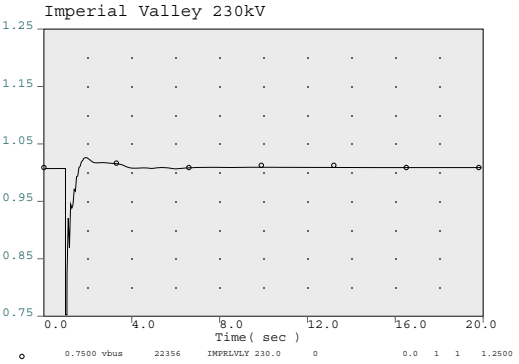
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

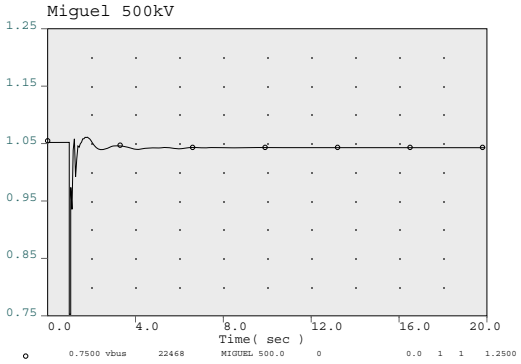
Imperial Valley 500kV



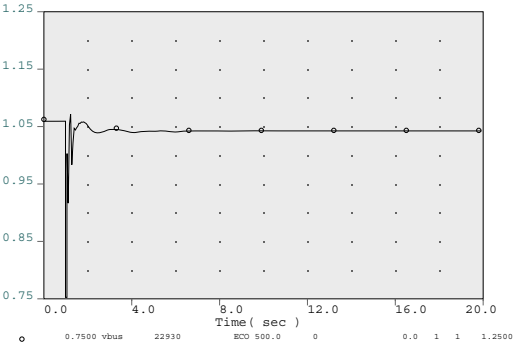
Imperial Valley 230kV



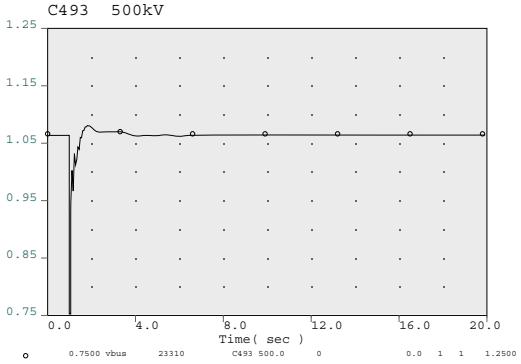
Miguel 500kV



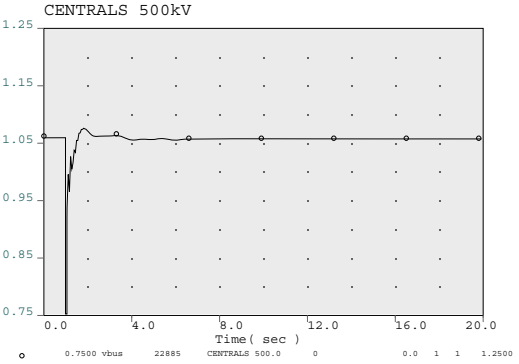
Windfarms 500



C493 500kV

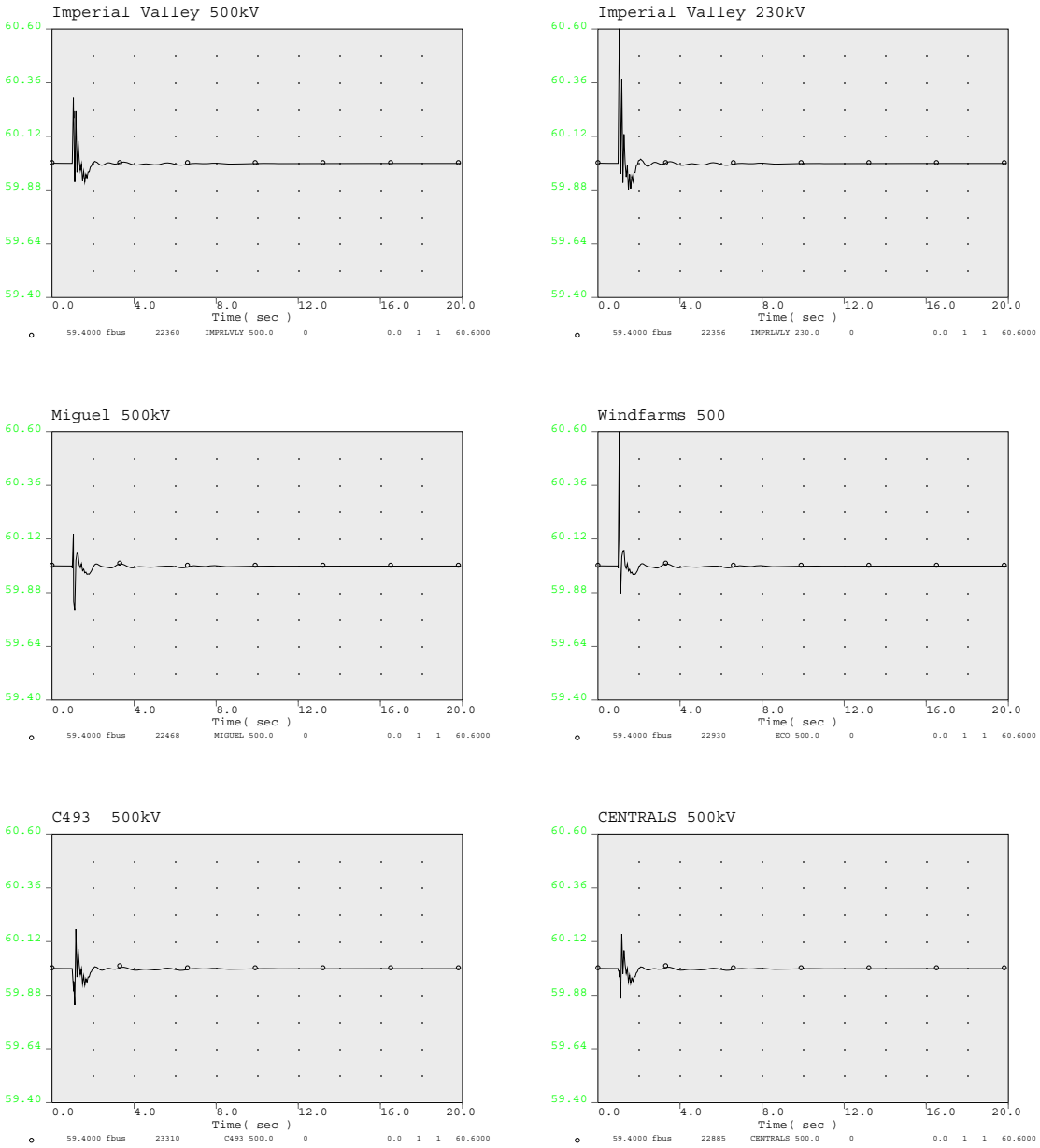


CENTRALS 500kV



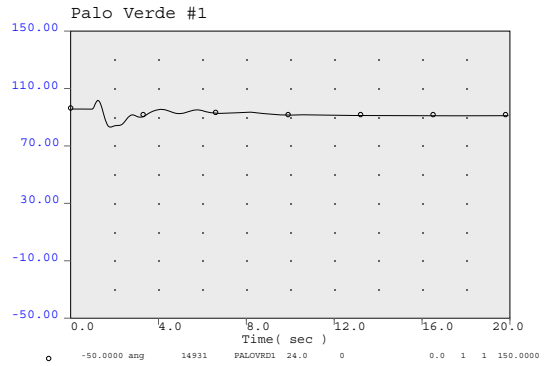
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

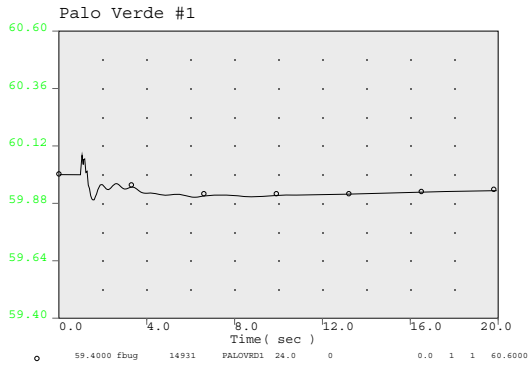
Imperial Valley Area - Frequency

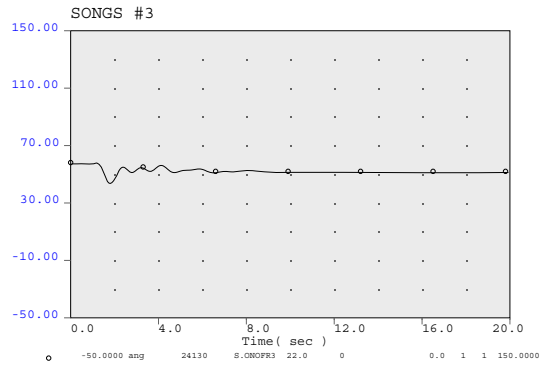


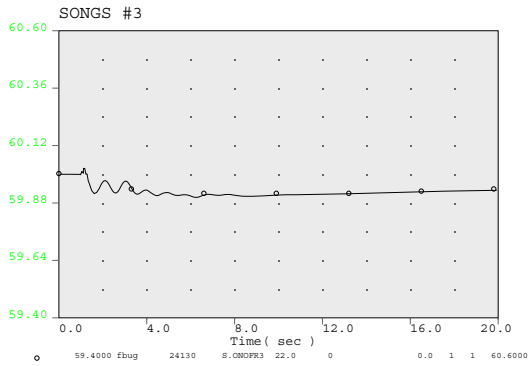
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

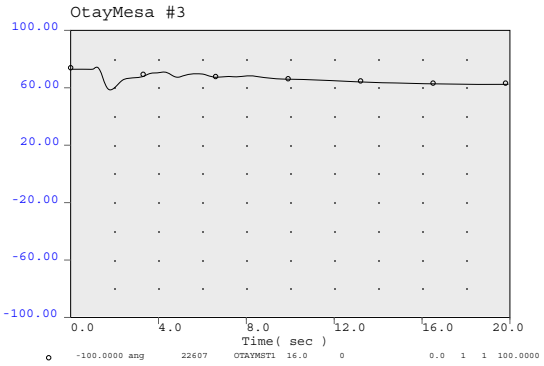
RELATIVE ROTOR ANGLE & FREQUENCY

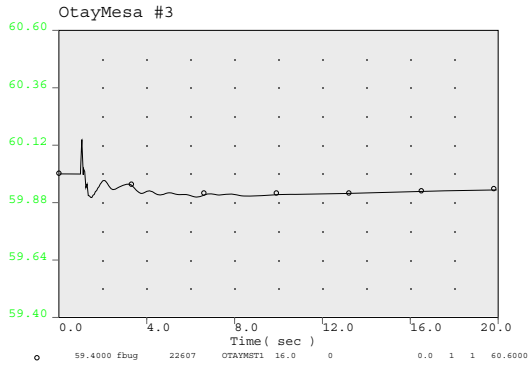












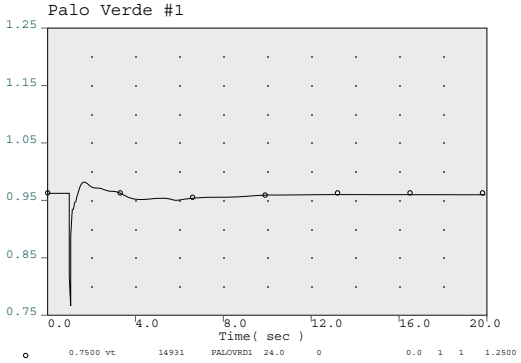
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Page 1

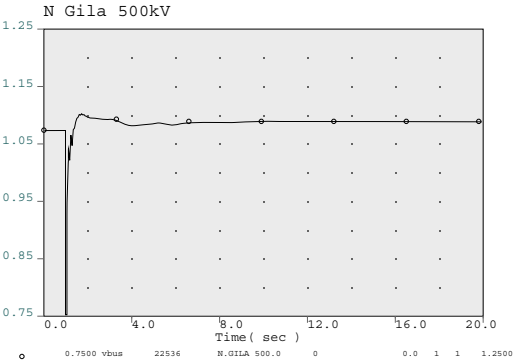
SDGE	IV_Wnd1_noXTrp_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:26:24 2010

RELATIVE VOLTAGE

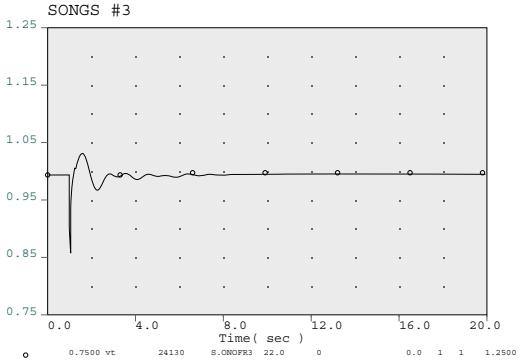
Palo Verde #1



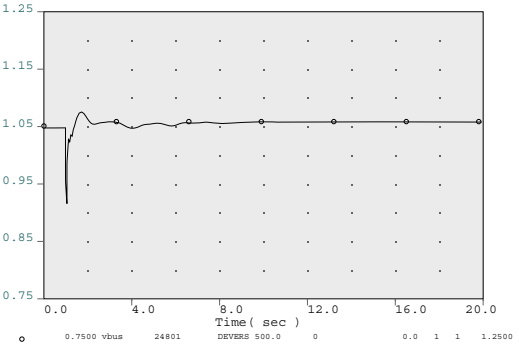
N Gila 500kV



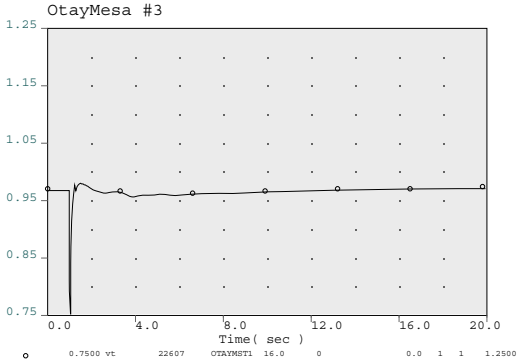
SONGS #3



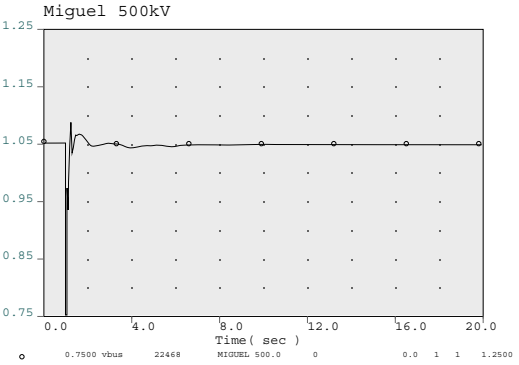
Devers 500



OtayMesa #3



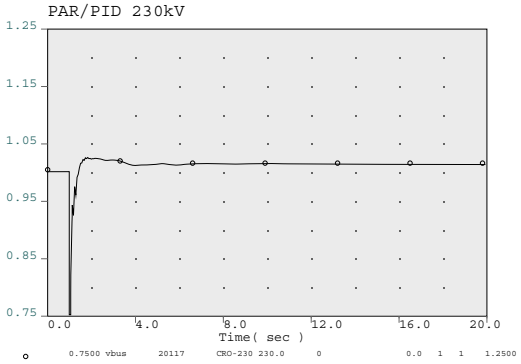
Miguel 500kV



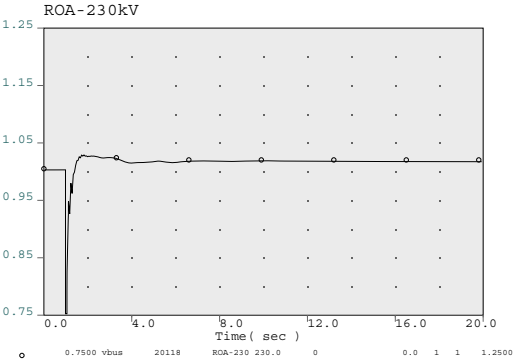
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

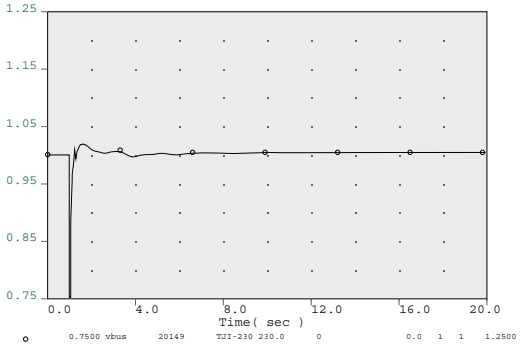
PAR/PID 230kV



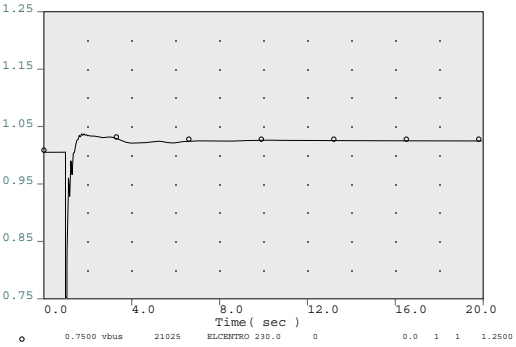
ROA-230kV



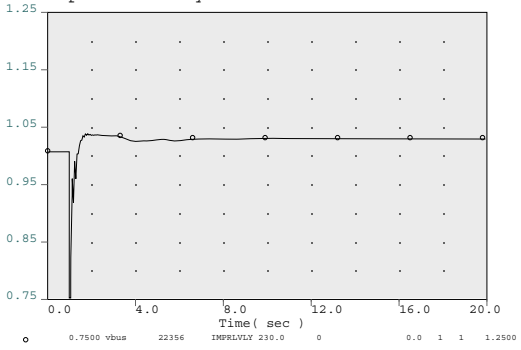
TJ1-230kV



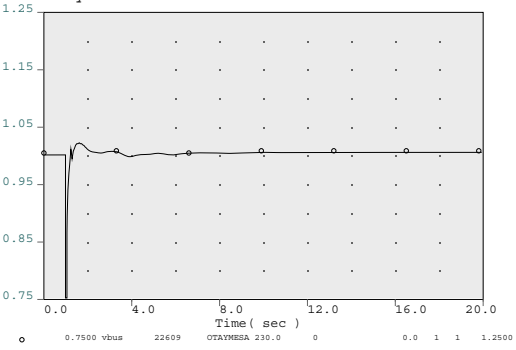
El Centro



Imperial Valley 230kV



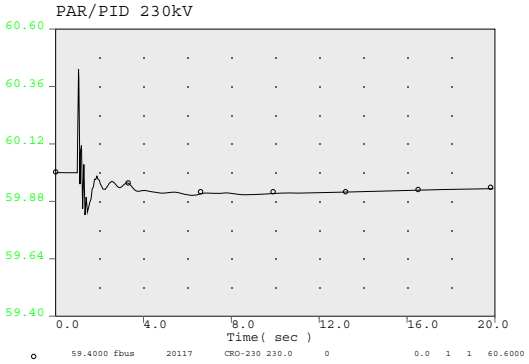
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

PAR/PID 230kV



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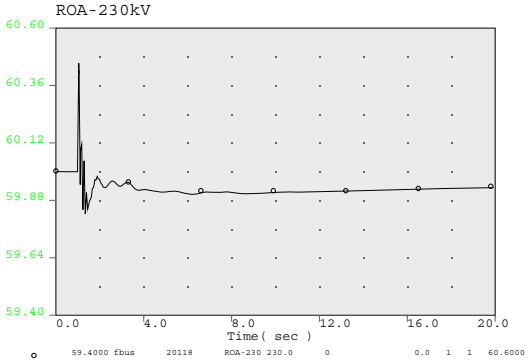
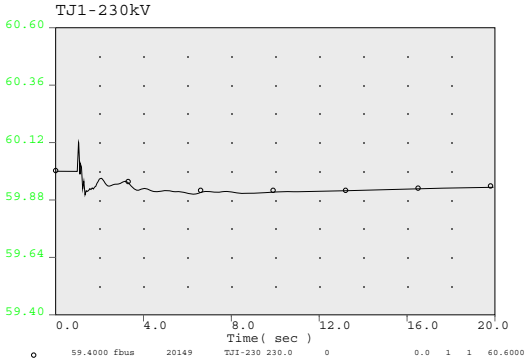
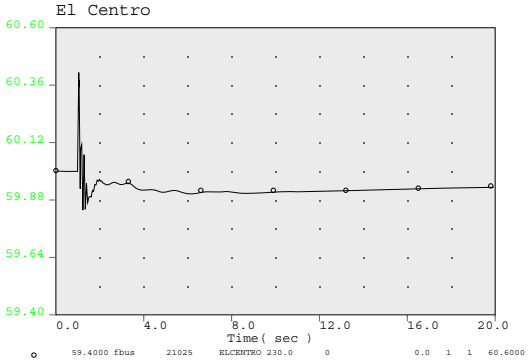


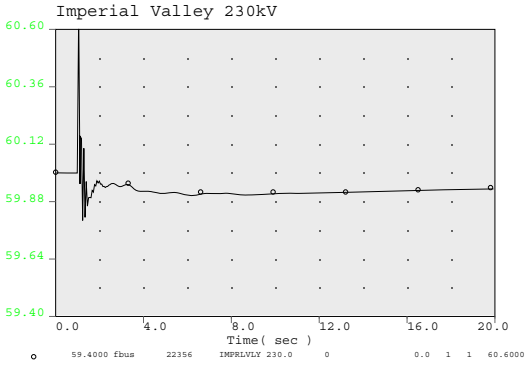
TJ1-230kV



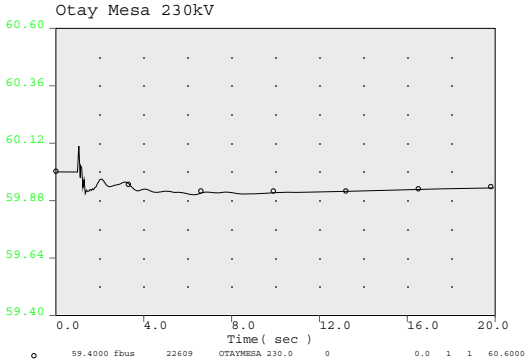
El Centro



Imperial Valley 230kV



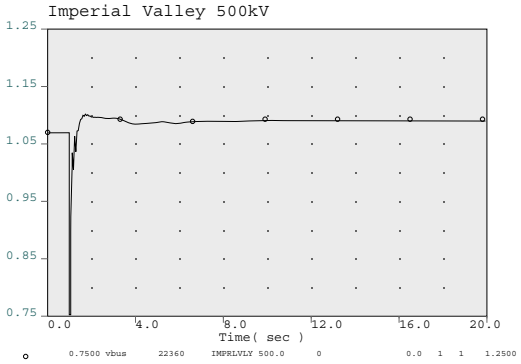
Otay Mesa 230kV



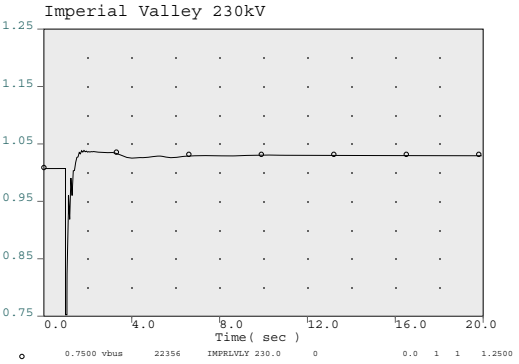
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

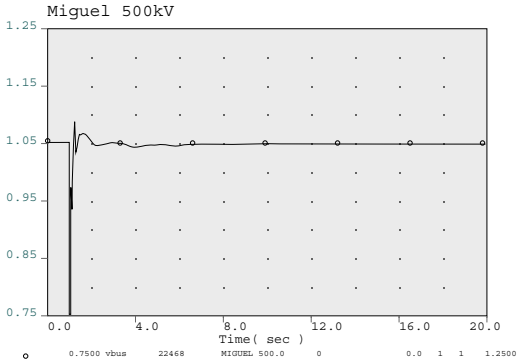
Imperial Valley 500kV



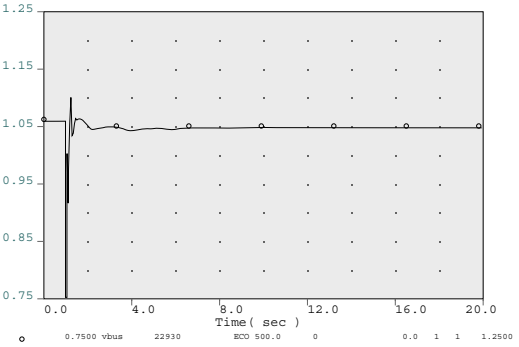
Imperial Valley 230kV



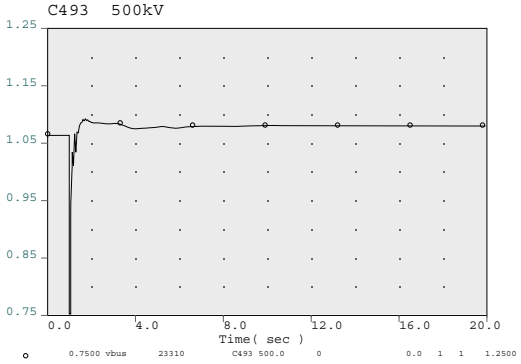
Miguel 500kV



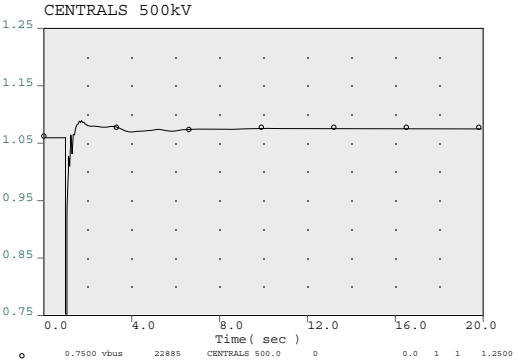
Windfarms 500



C493 500kV

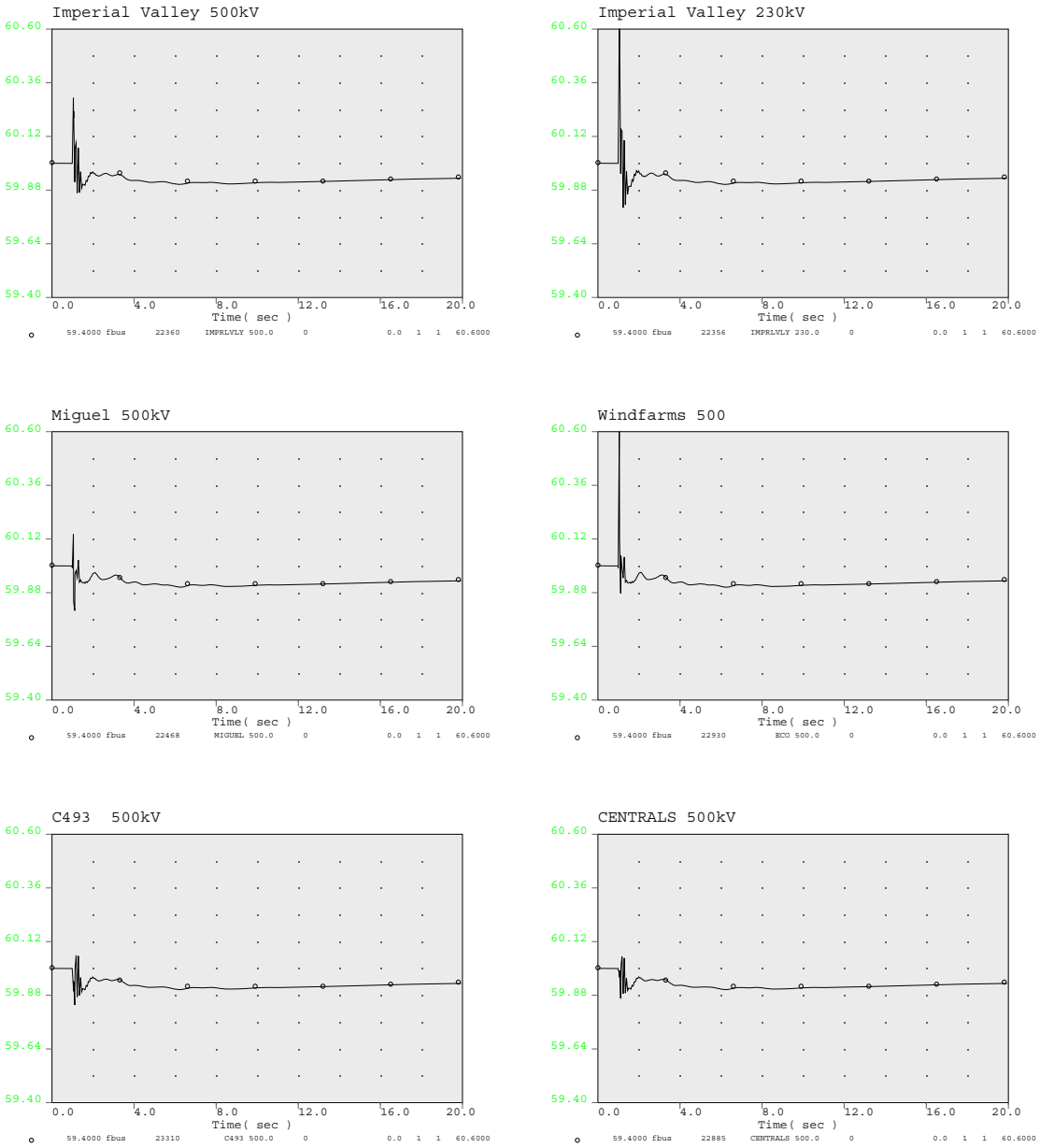


CENTRALS 500kV



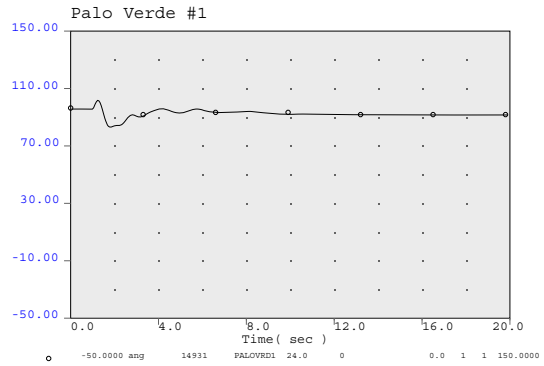
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

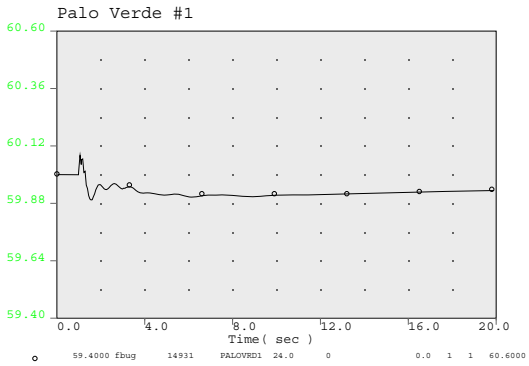
Imperial Valley Area - Frequency

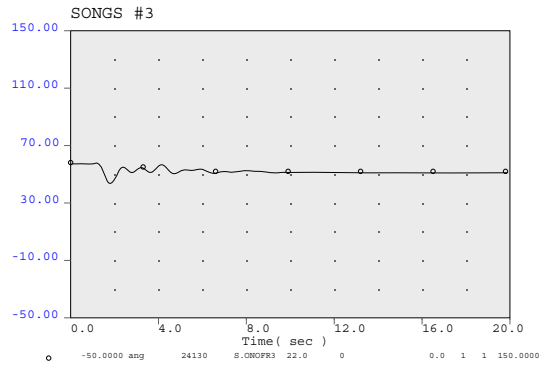


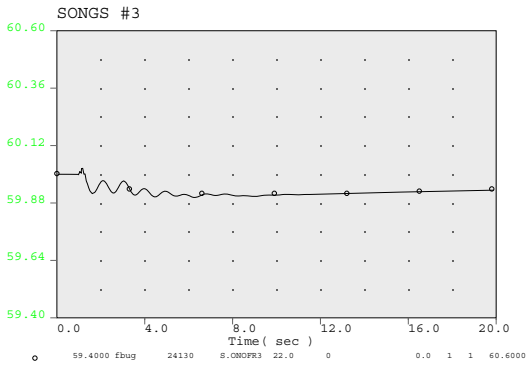
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

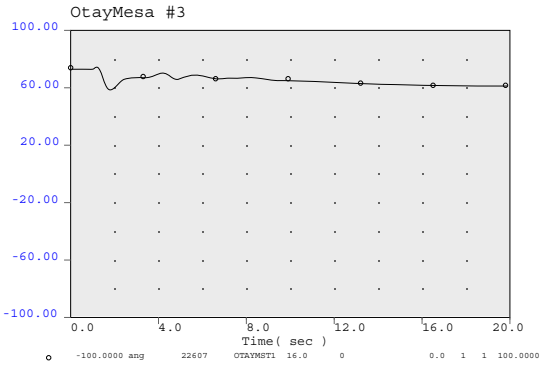
RELATIVE ROTOR ANGLE & FREQUENCY

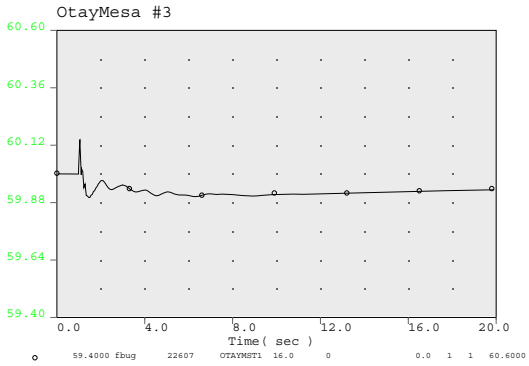










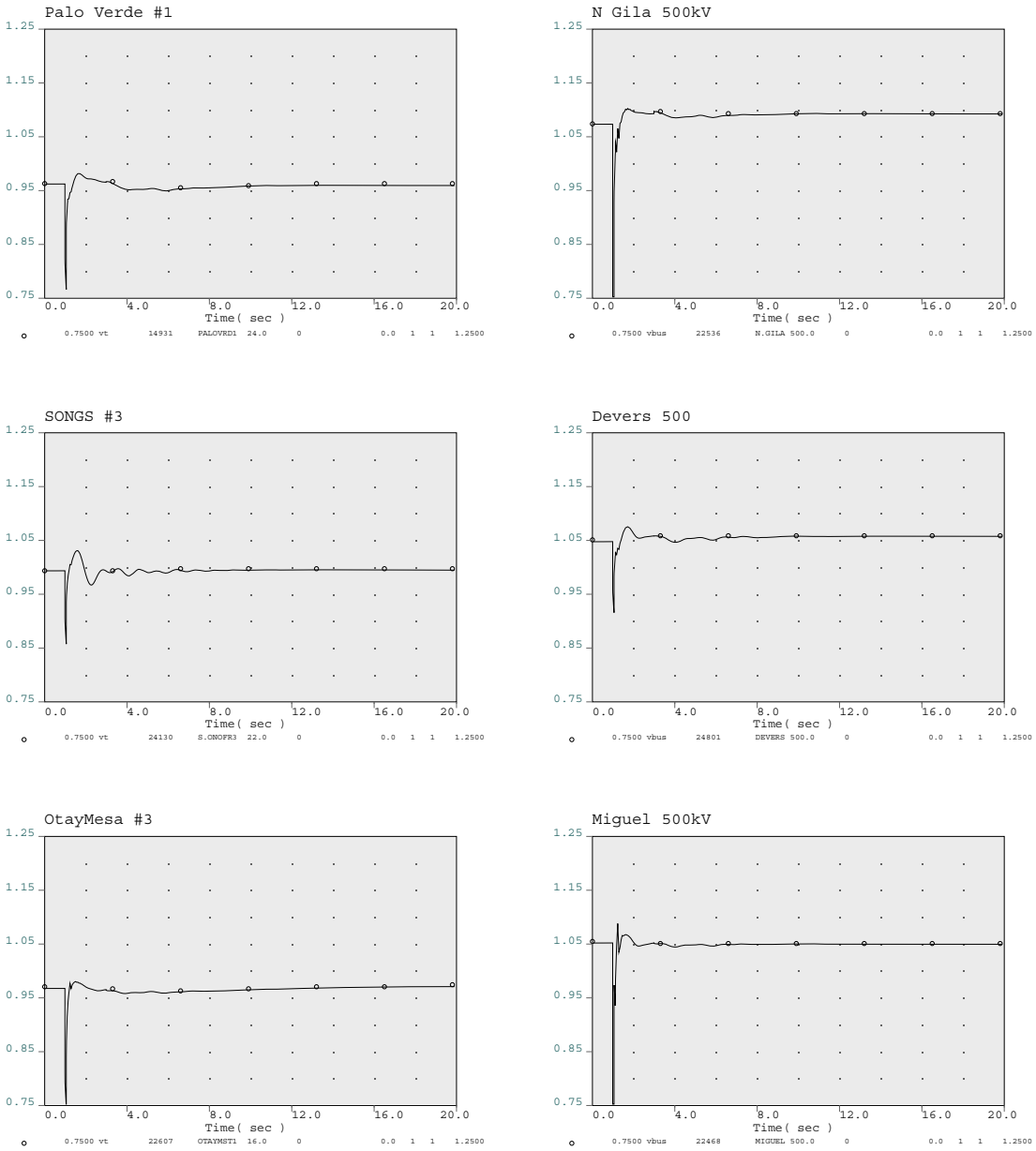


SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Page 1

SDGE	IV_Wnd1_RAS_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:26:44 2010

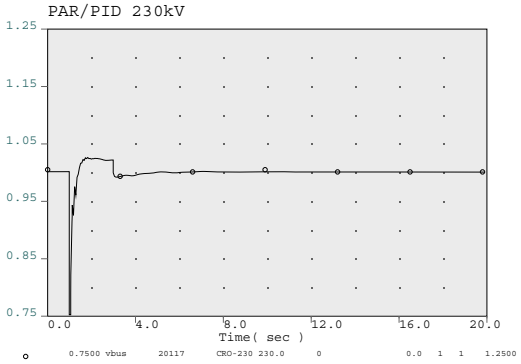
RELATIVE VOLTAGE



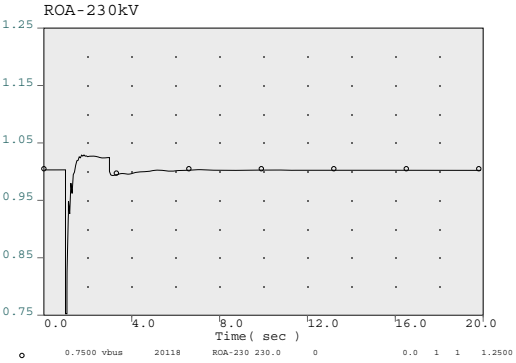
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

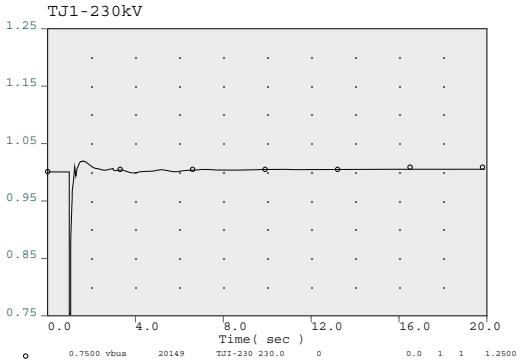
PAR/PID 230kV



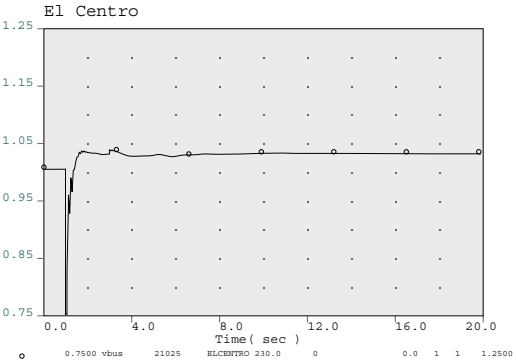
ROA-230kV



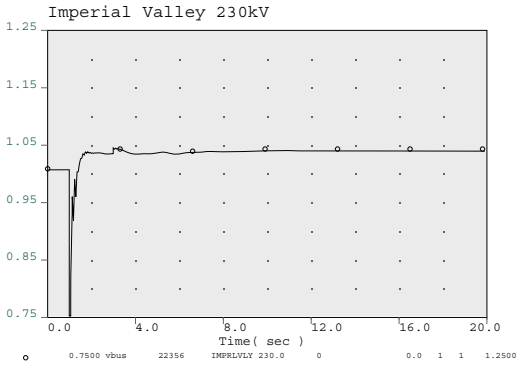
TJ1-230kV



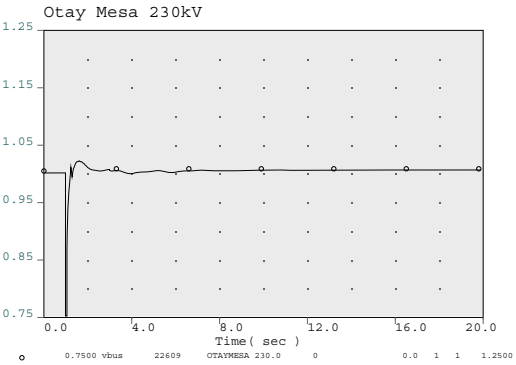
El Centro



Imperial Valley 230kV



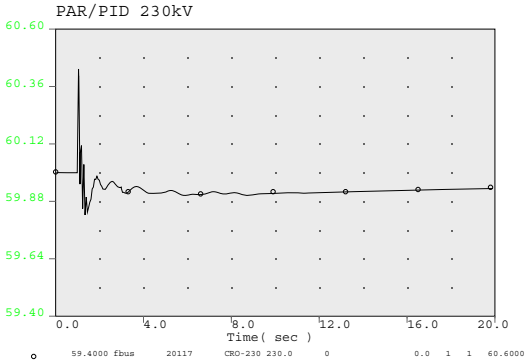
Otay Mesa 230kV



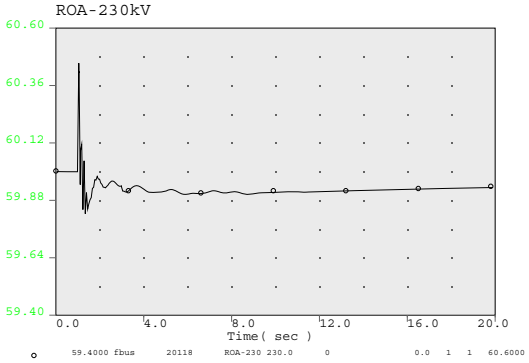
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

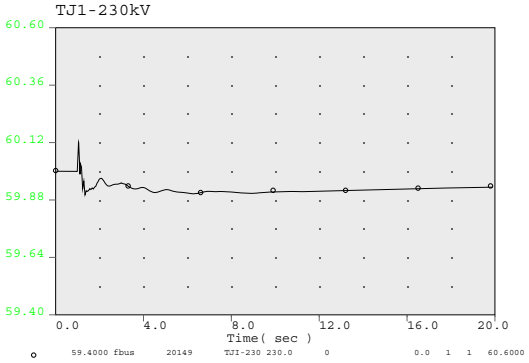
PAR/PID 230kV



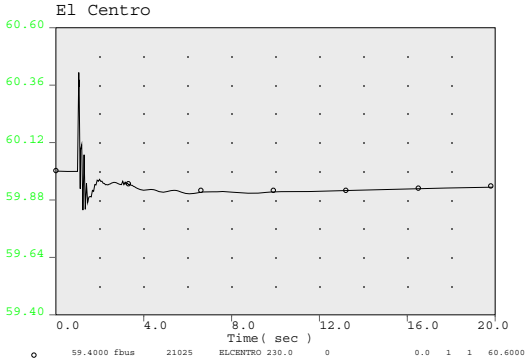
ROA-230kV



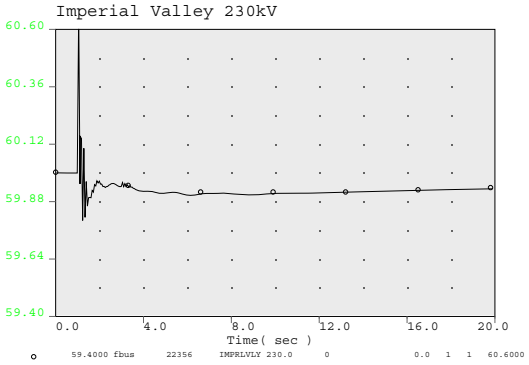
TJ1-230kV



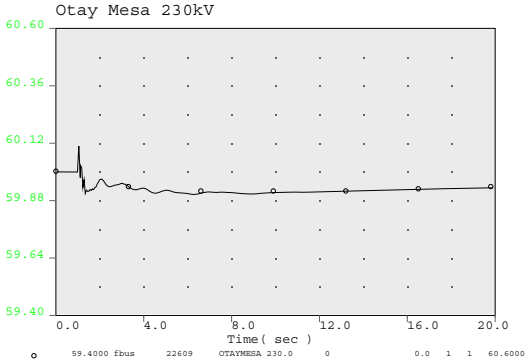
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

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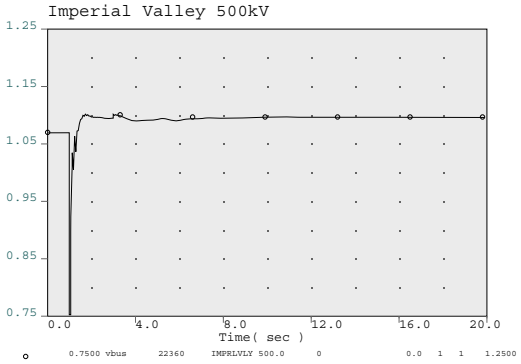
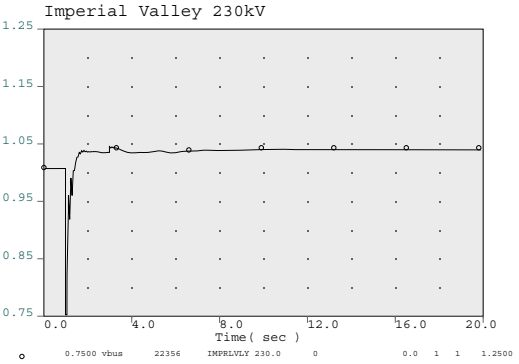
SDGE	IV_Wnd1_RAS_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:26:44 2010

Imperial Valley Area - VOLTAGE

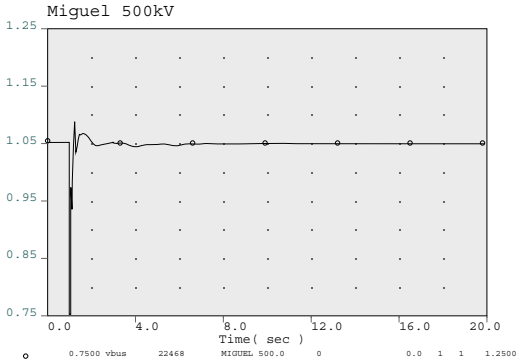
Imperial Valley 500kV



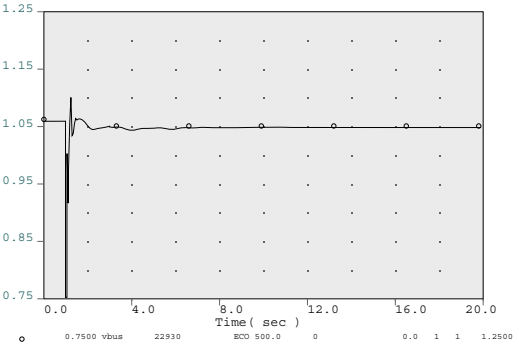
Imperial Valley 230kV



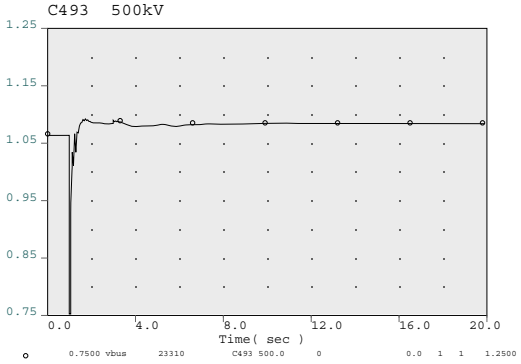
Miguel 500kV



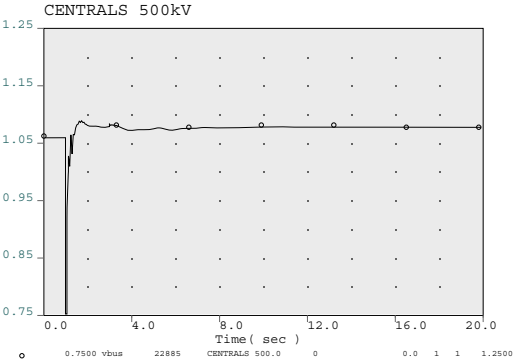
Windfarms 500



C493 500kV

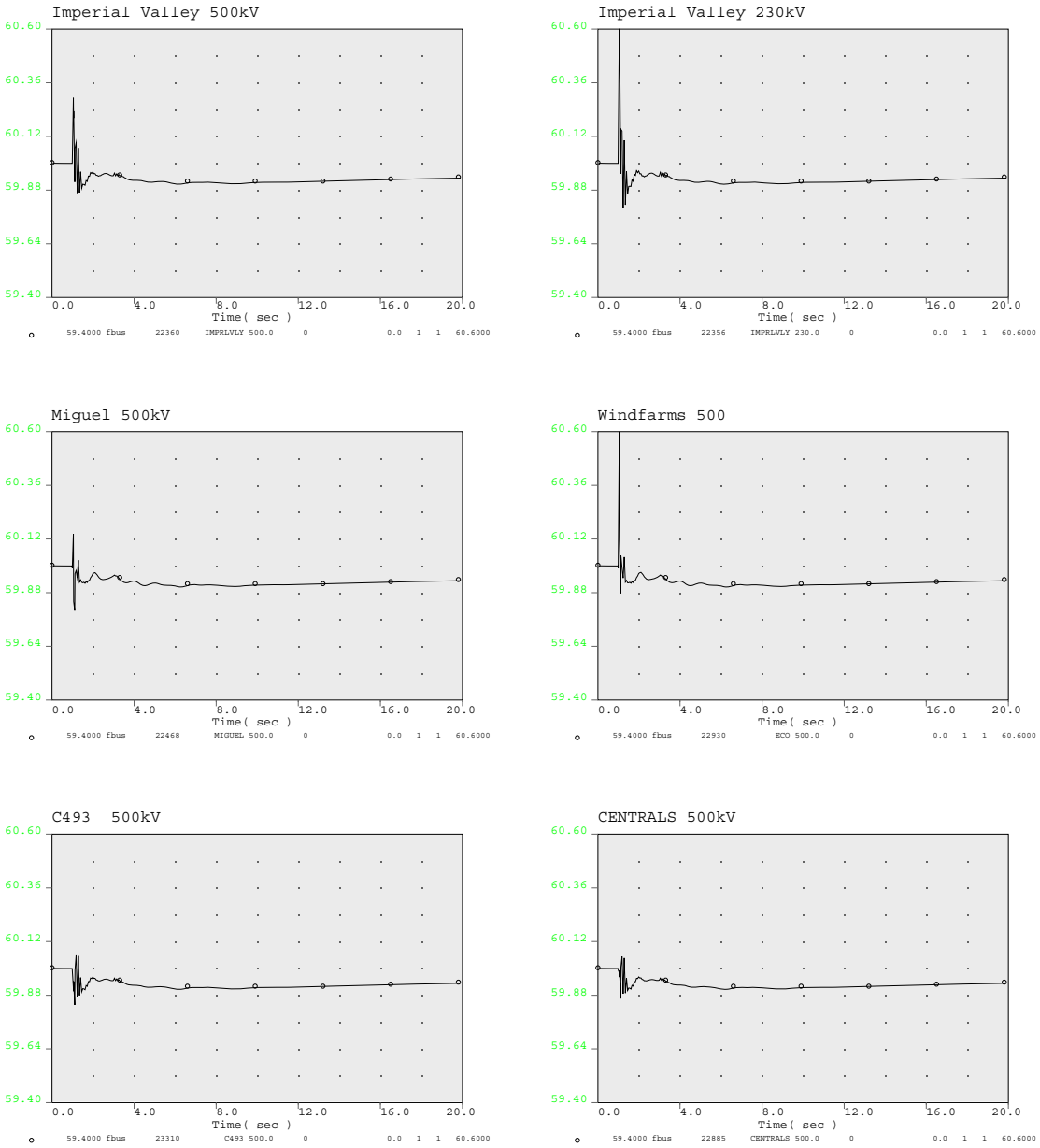


CENTRALS 500kV



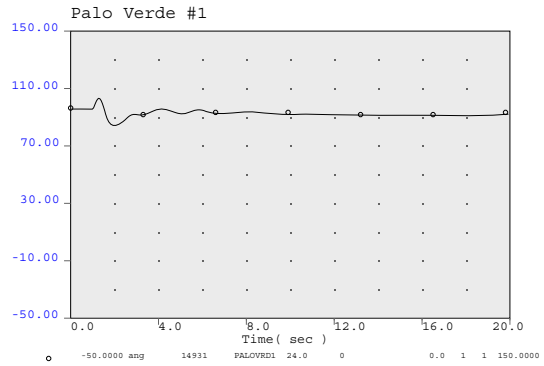
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

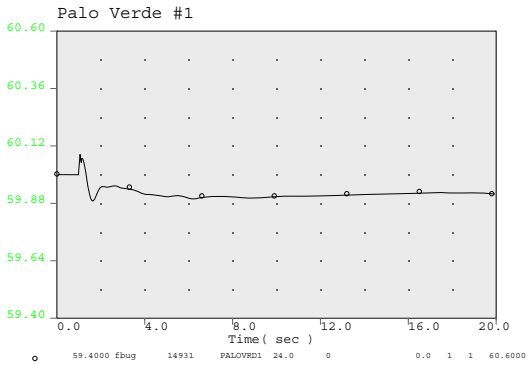
Imperial Valley Area - Frequency

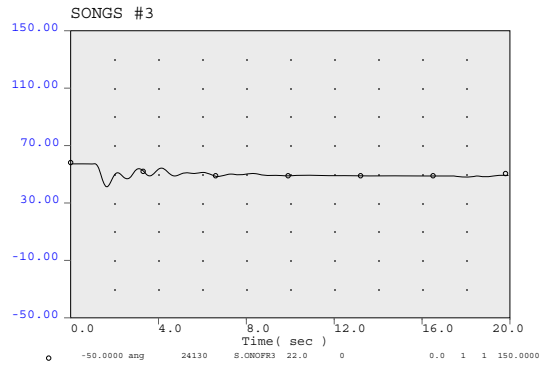


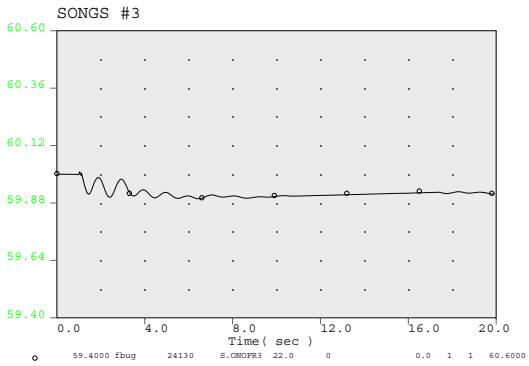
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

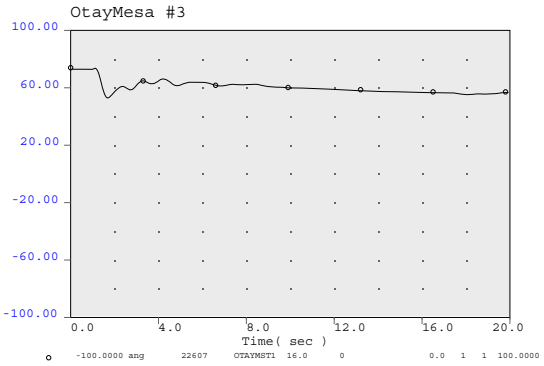
RELATIVE ROTOR ANGLE & FREQUENCY

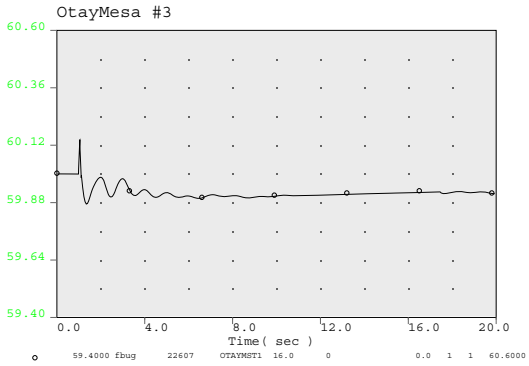












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

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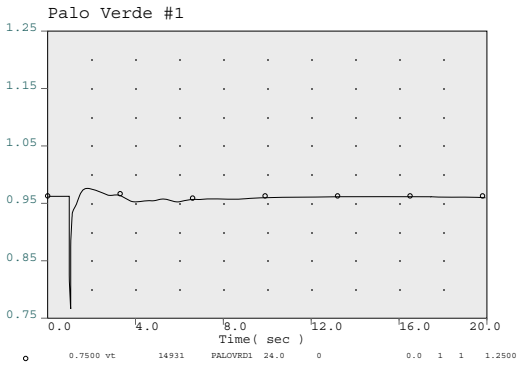
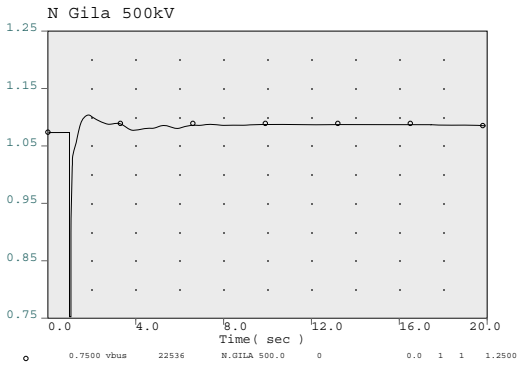
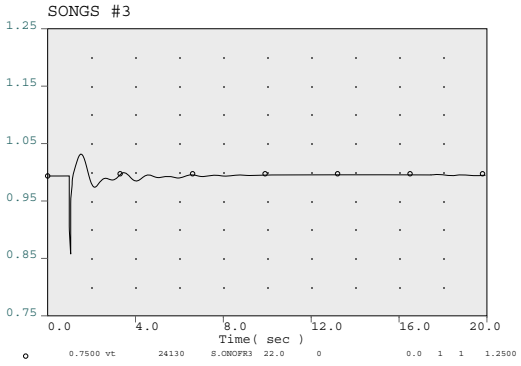
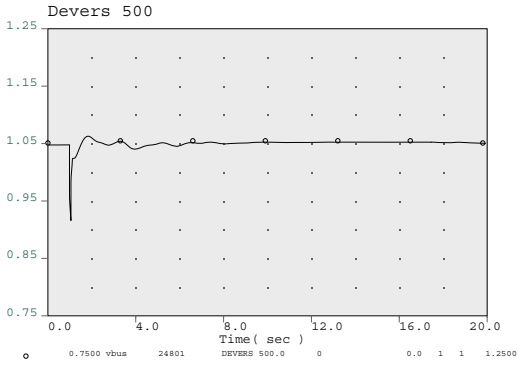
SDGE	IV_Wnd_dlo_noX_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:27:10 2010

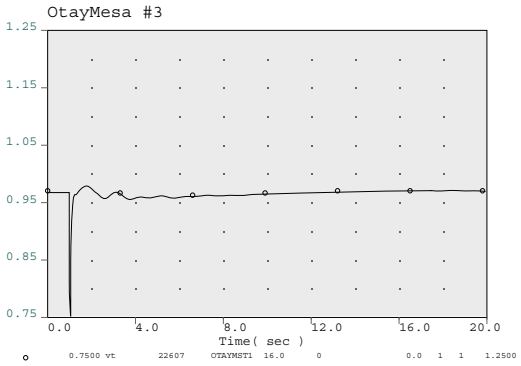
RELATIVE VOLTAGE

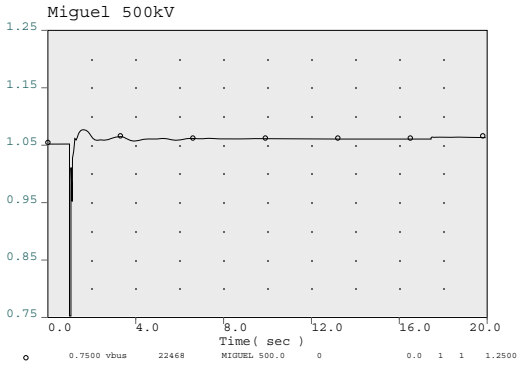








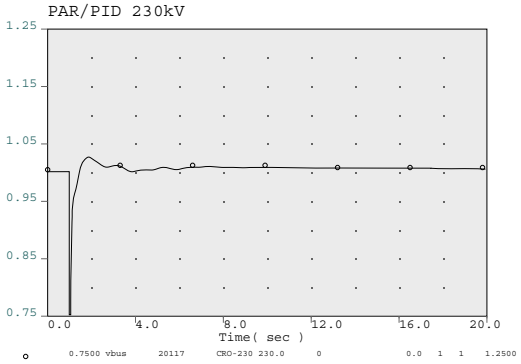




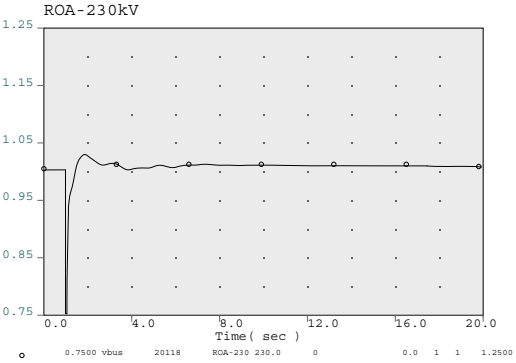
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

Affected System Voltage Check and Comparison

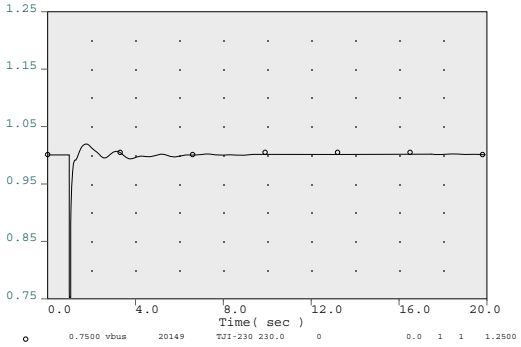
PAR/PID 230kV



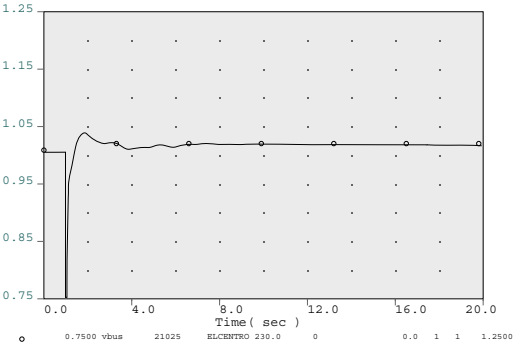
ROA-230kV



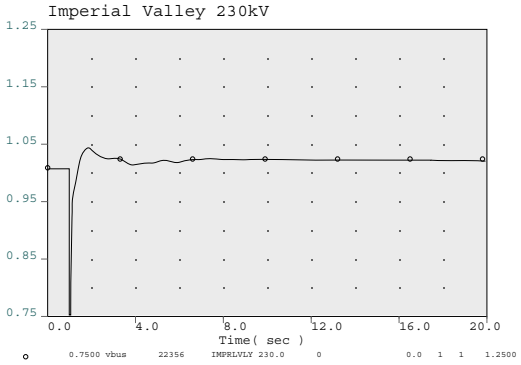
TJ1-230kV



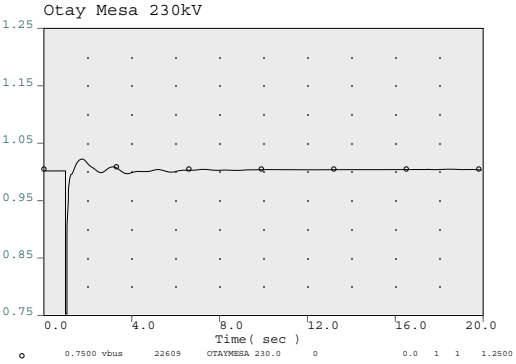
El Centro



Imperial Valley 230kV

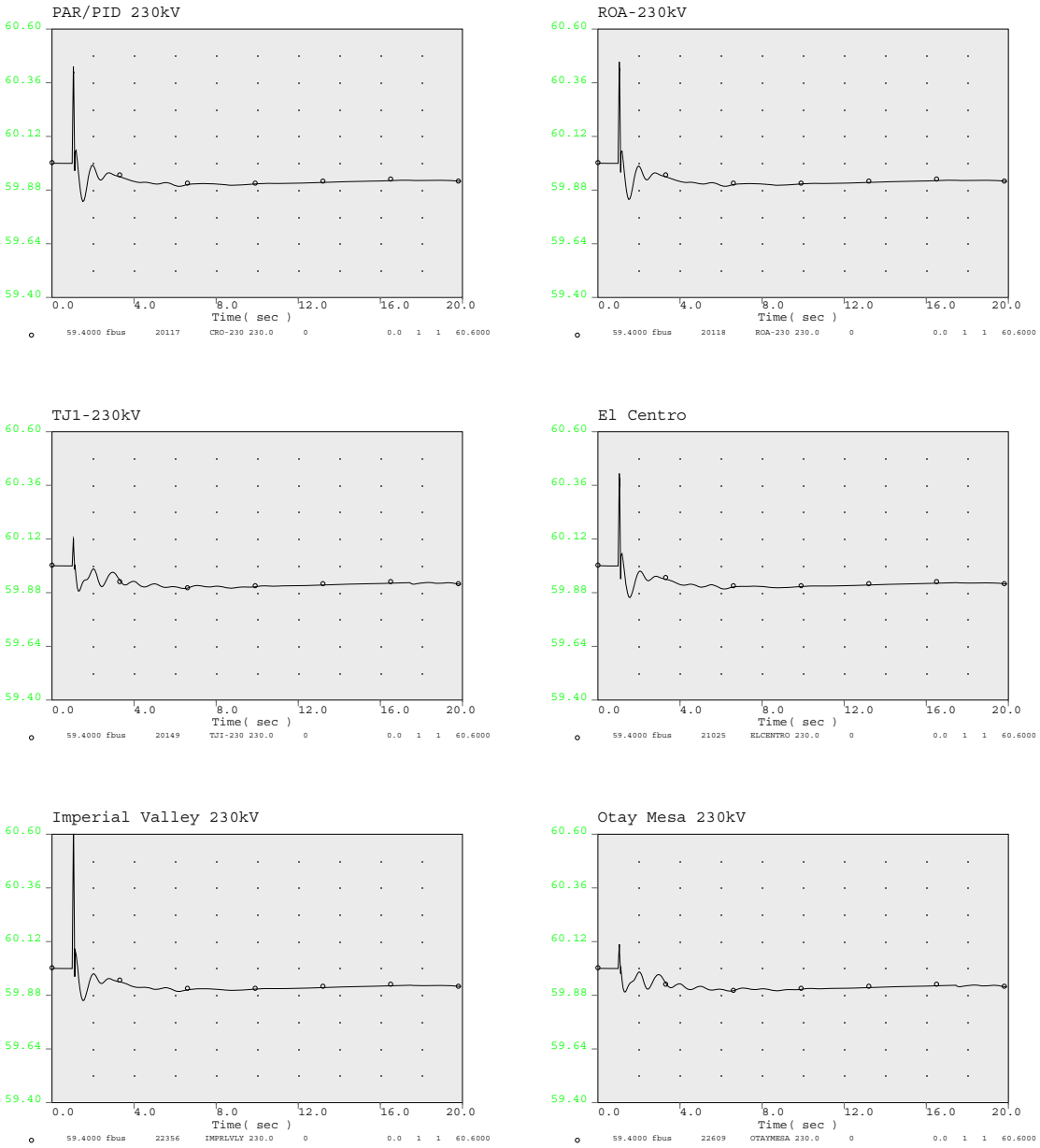


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

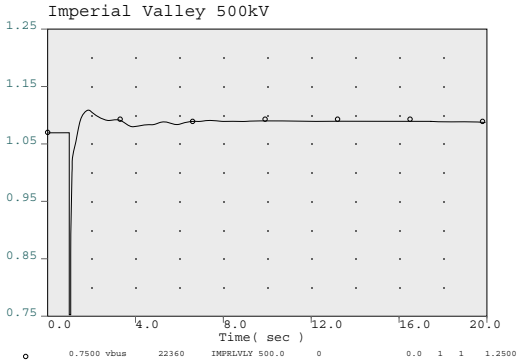
Affected System Frequency Check and Comparison



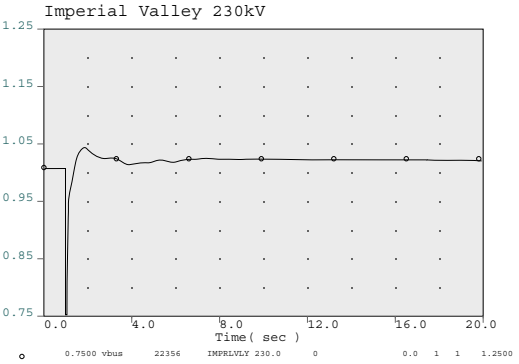
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

Imperial Valley Area - VOLTAGE

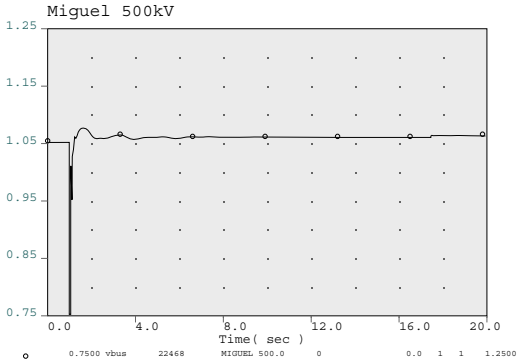
Imperial Valley 500kV



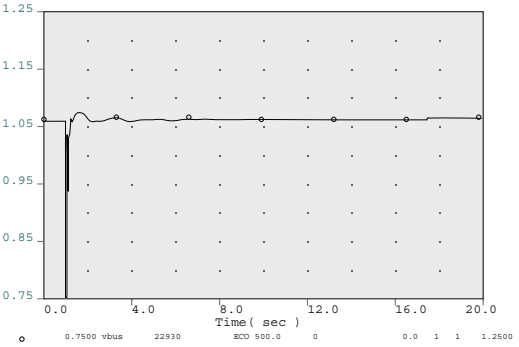
Imperial Valley 230kV



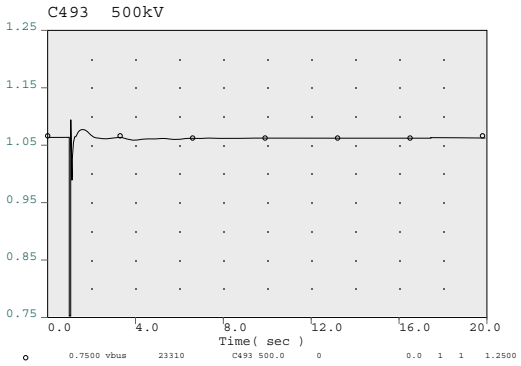
Miguel 500kV



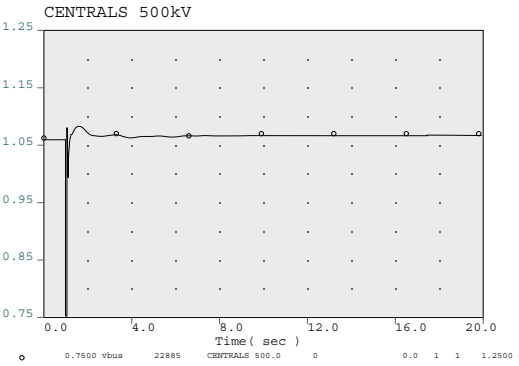
Windfarms 500



C493 500kV

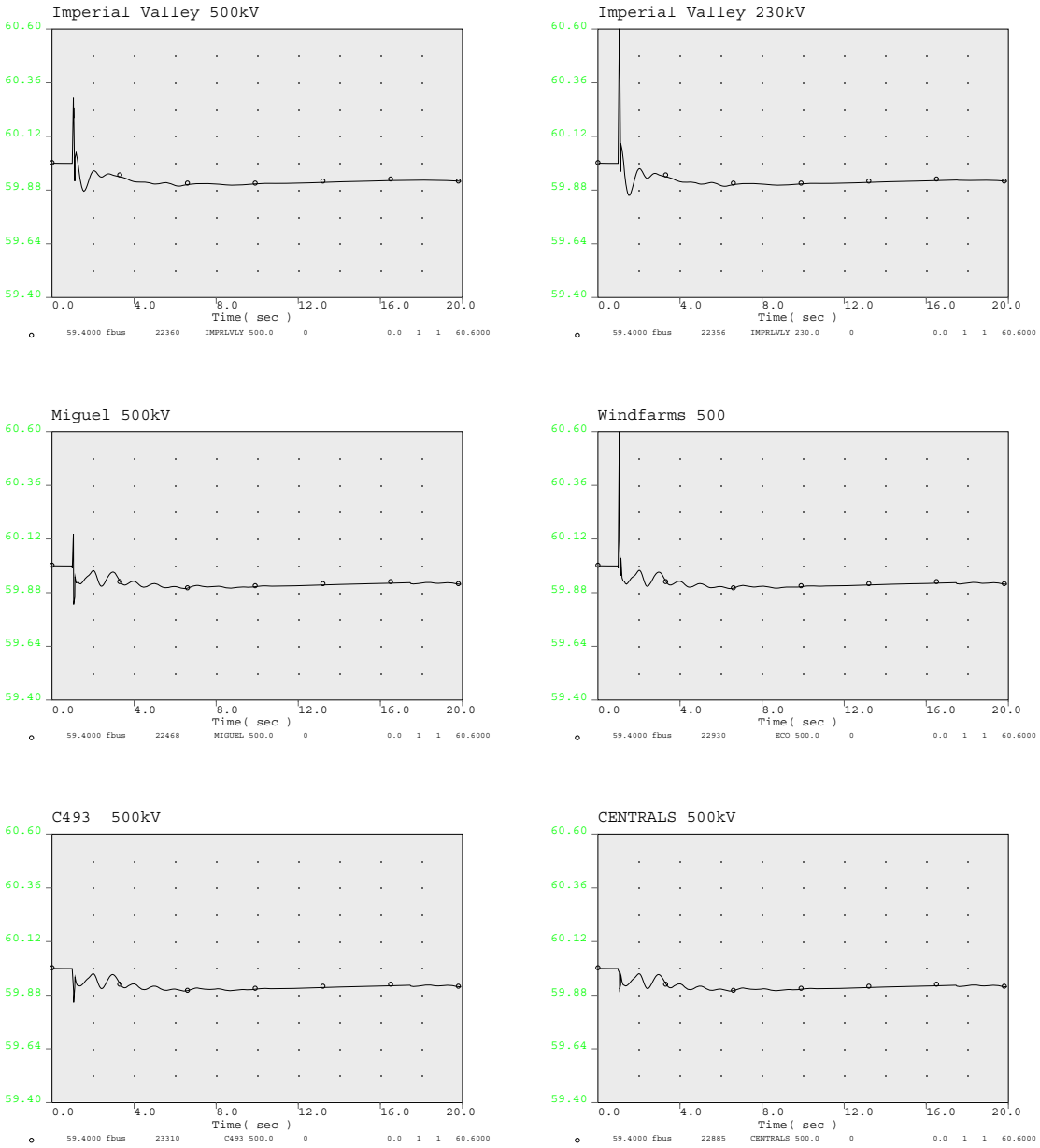


CENTRALS 500kV



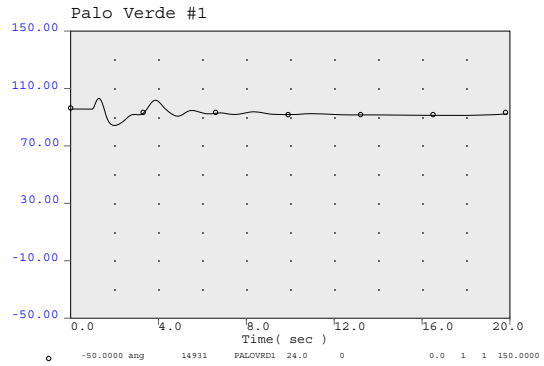
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

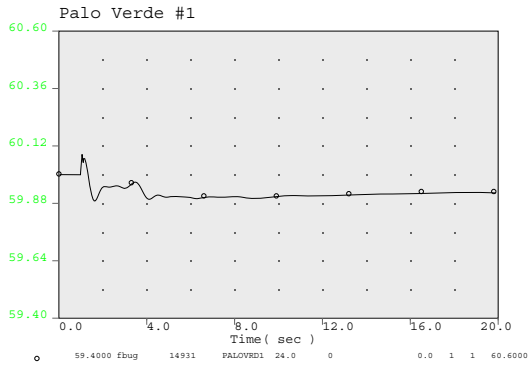
Imperial Valley Area - Frequency

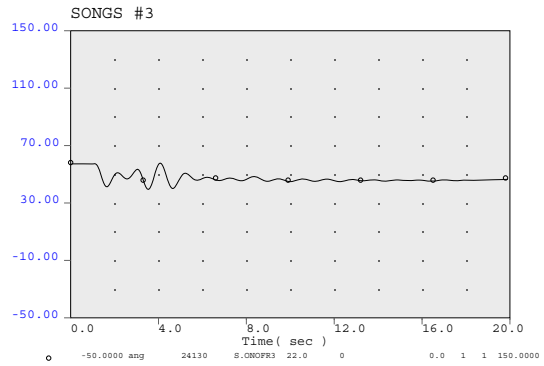


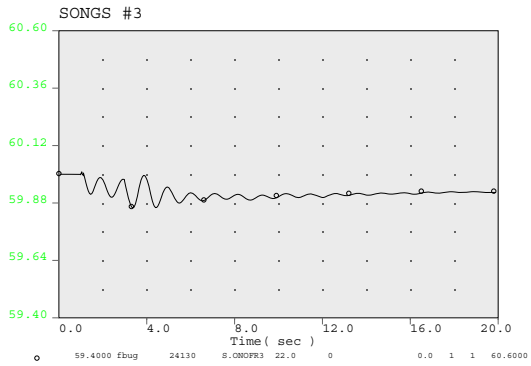
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage

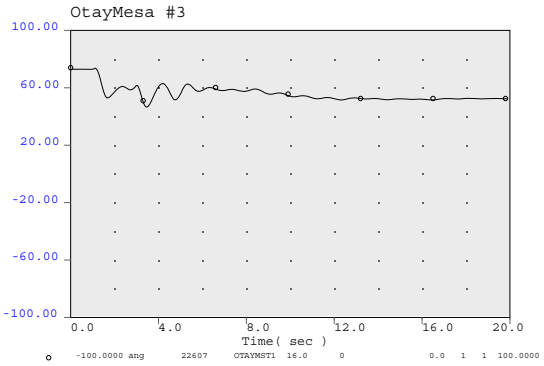
RELATIVE ROTOR ANGLE & FREQUENCY

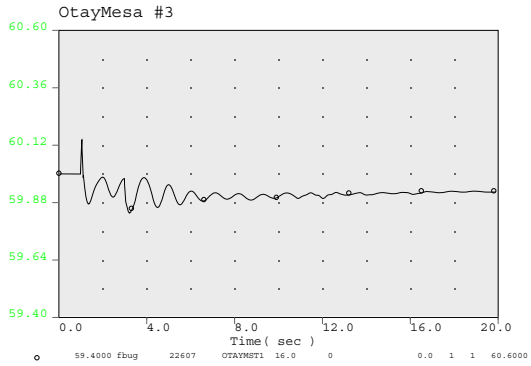












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Page 1

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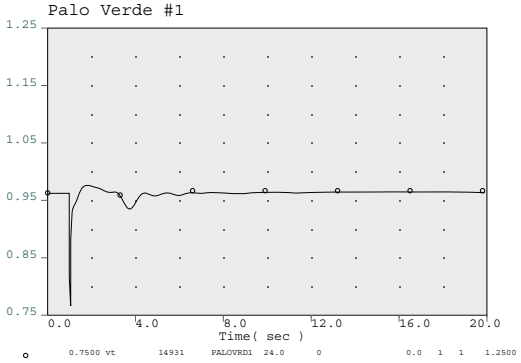
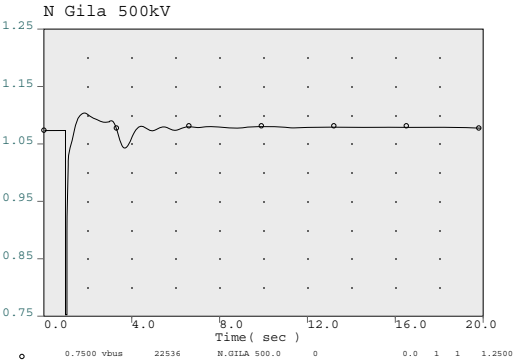
RELATIVE VOLTAGE

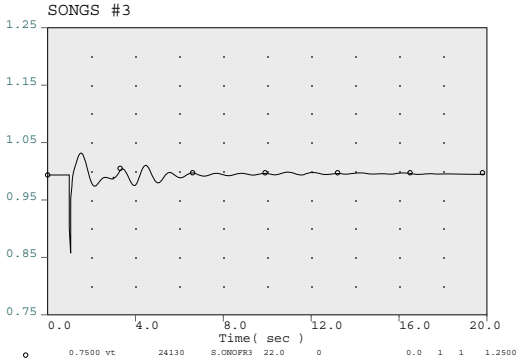
Palo Verde #1



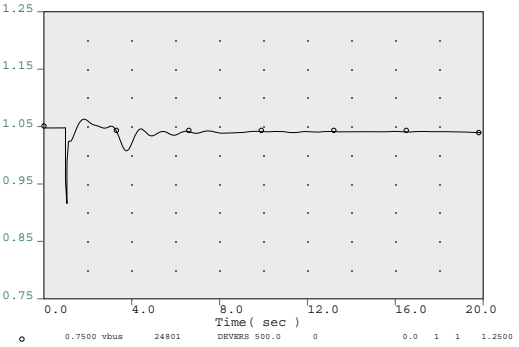
N Gila 500kV



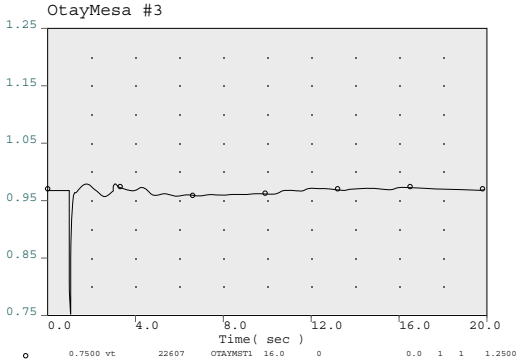
SONGS #3



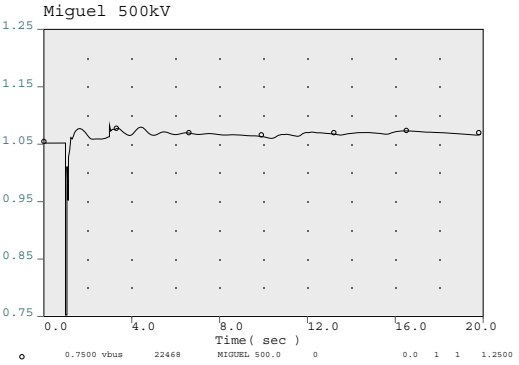
Devers 500



OtayMesa #3



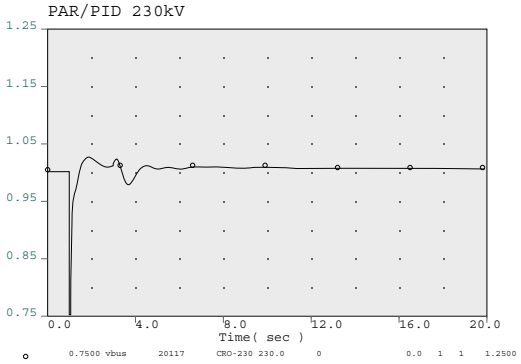
Miguel 500kV



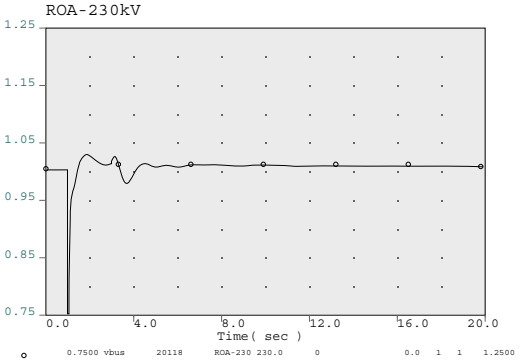
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

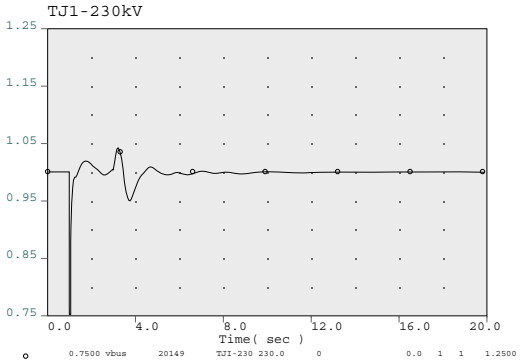
PAR/PID 230kV



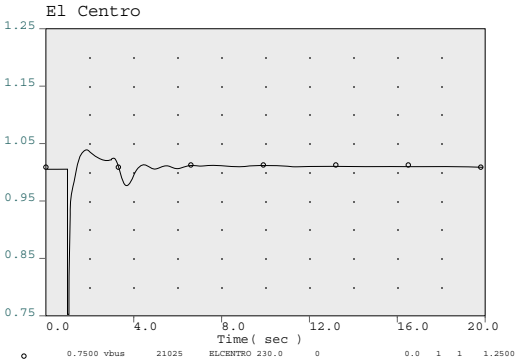
ROA-230kV



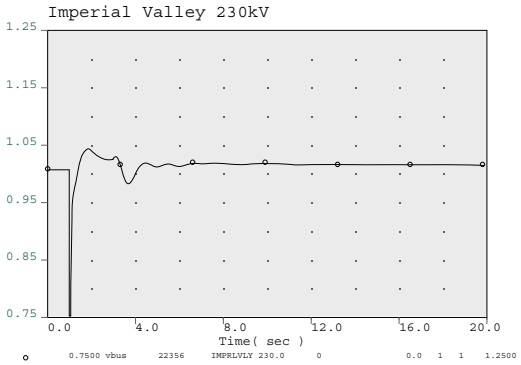
TJ1-230kV



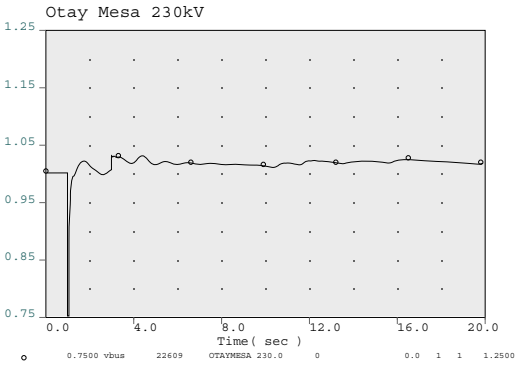
El Centro



Imperial Valley 230kV

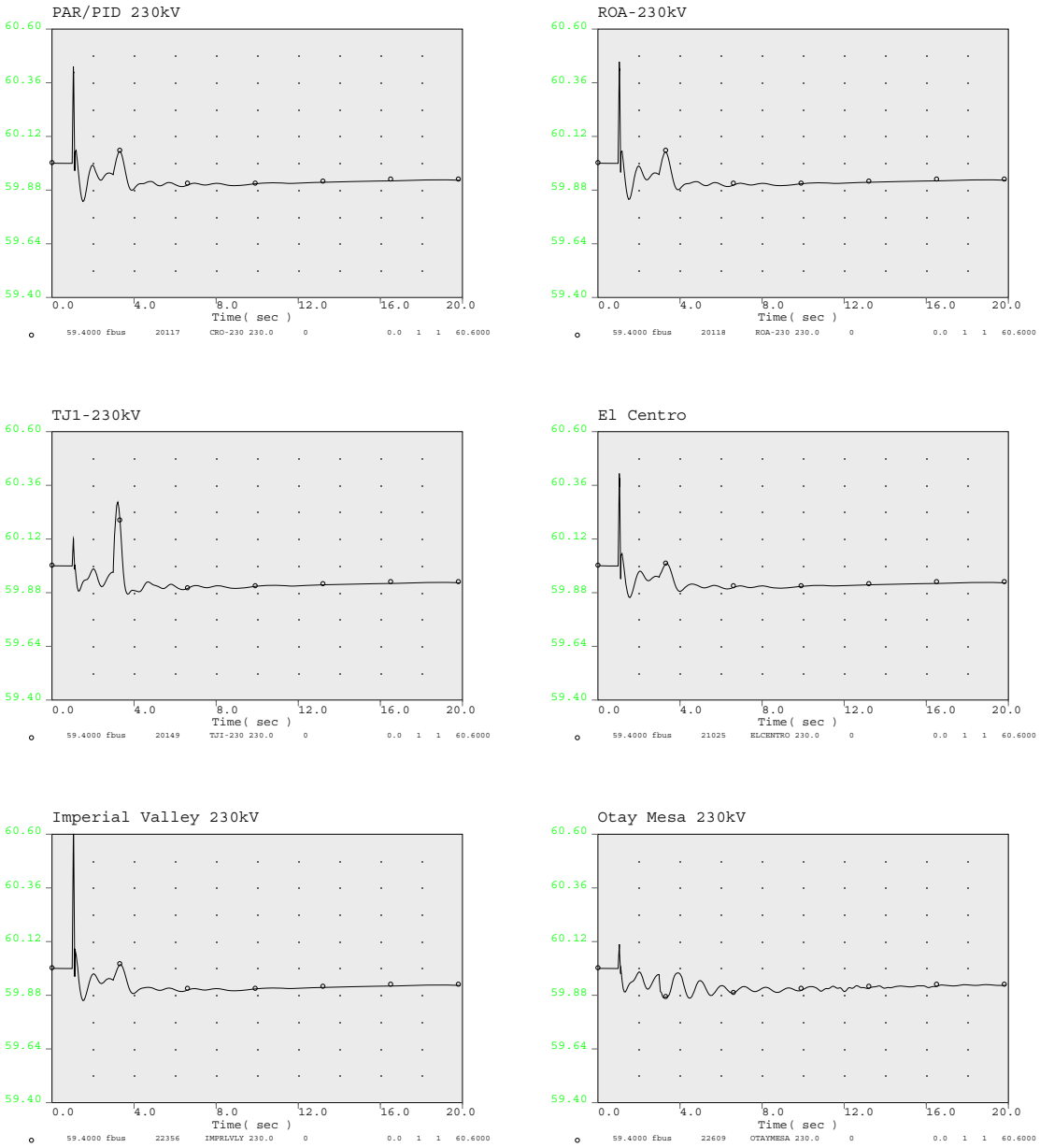


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison



SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

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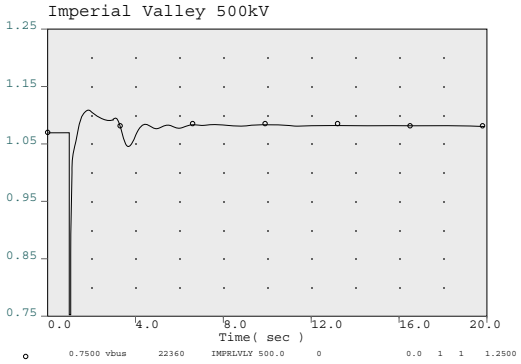
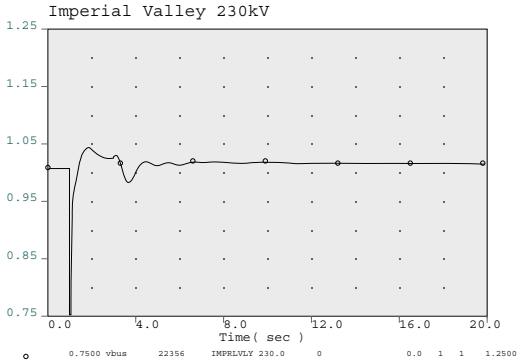
SDGE	IV_Wnd_dlo_RxR_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:27:44 2010

Imperial Valley Area - VOLTAGE

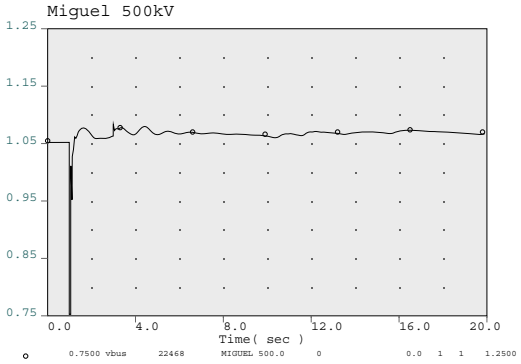
Imperial Valley 500kV



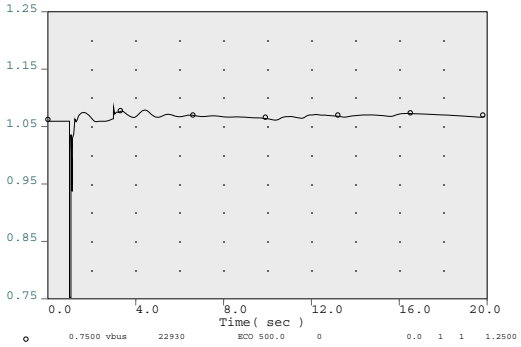
Imperial Valley 230kV



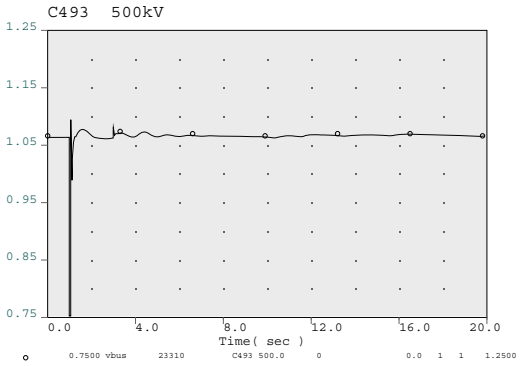
Miguel 500kV



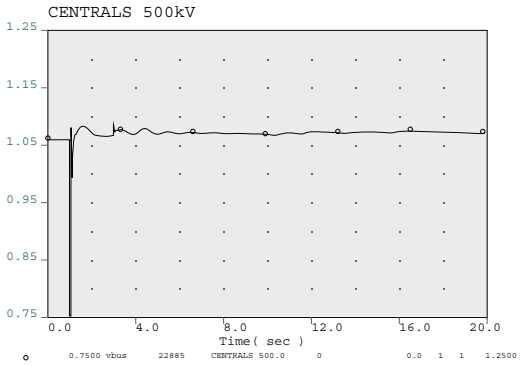
Windfarms 500



C493 500kV

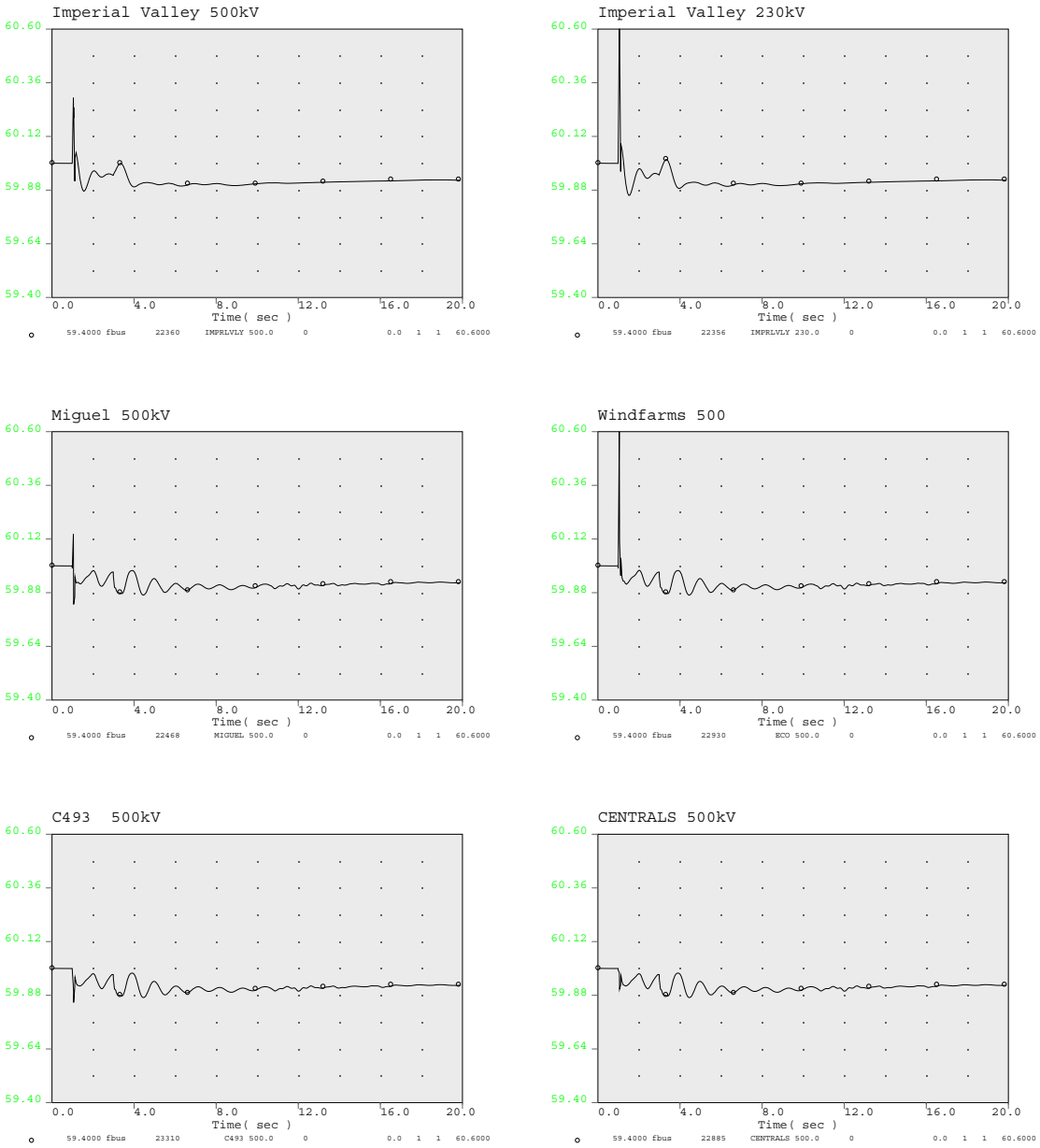


CENTRALS 500kV



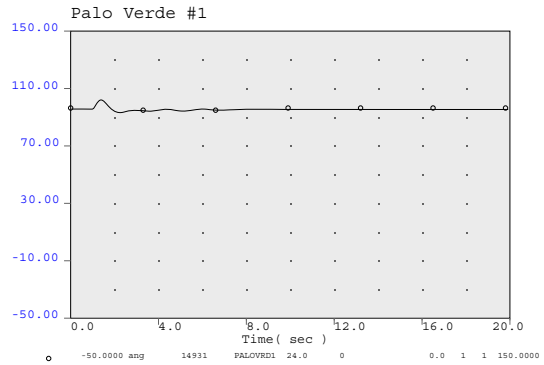
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

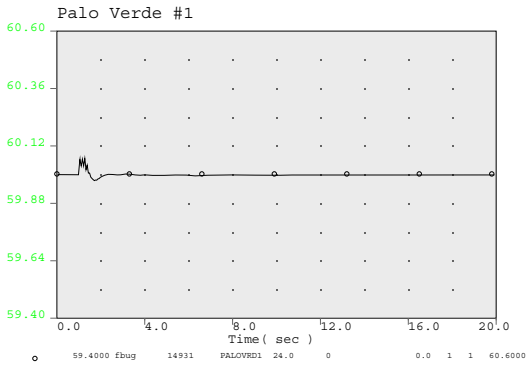
Imperial Valley Area - Frequency

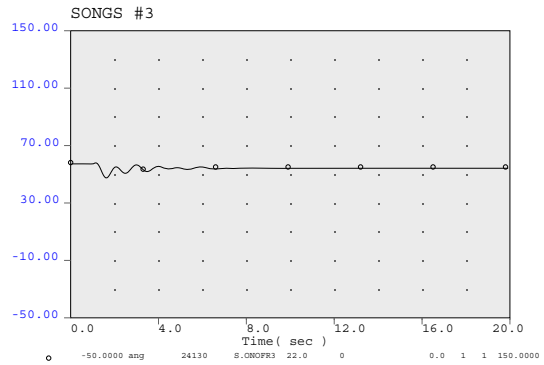


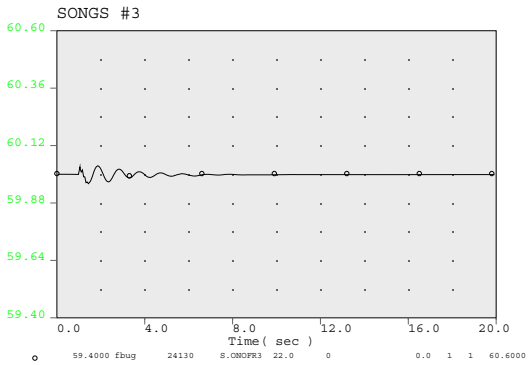
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

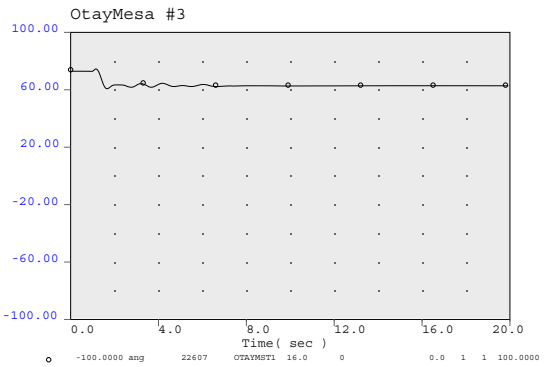
RELATIVE ROTOR ANGLE & FREQUENCY

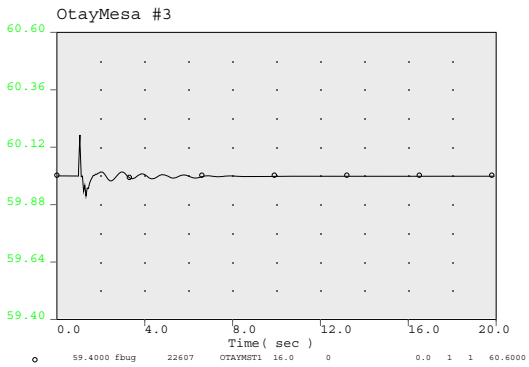






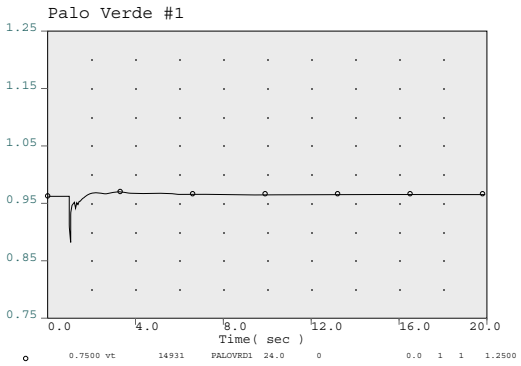


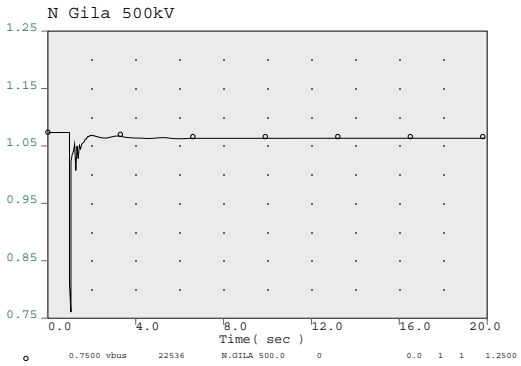


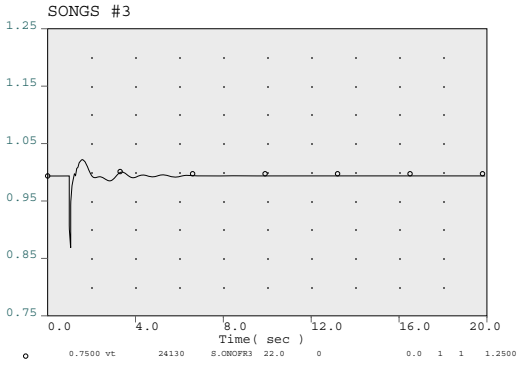


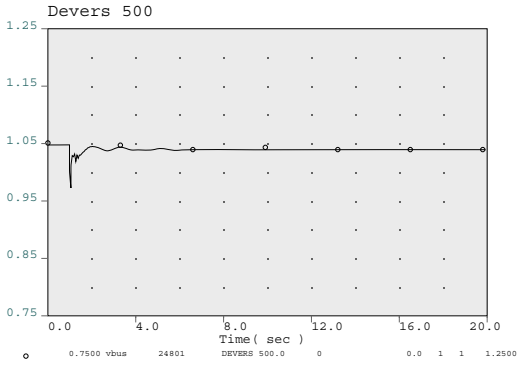
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

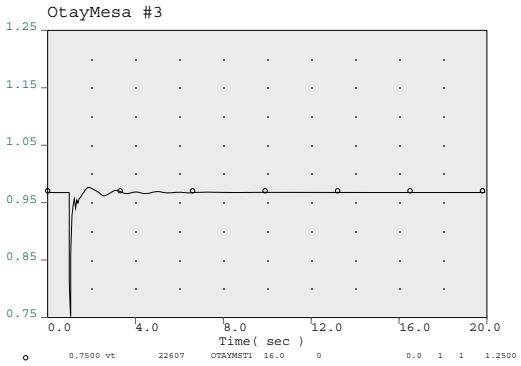
RELATIVE VOLTAGE

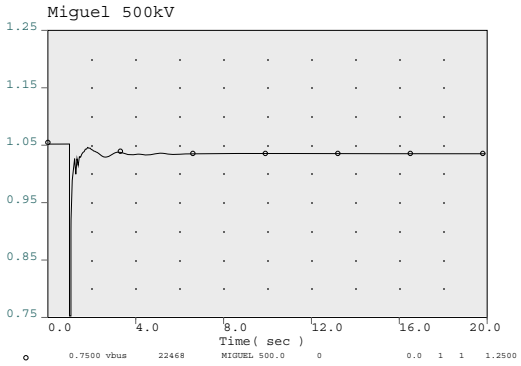








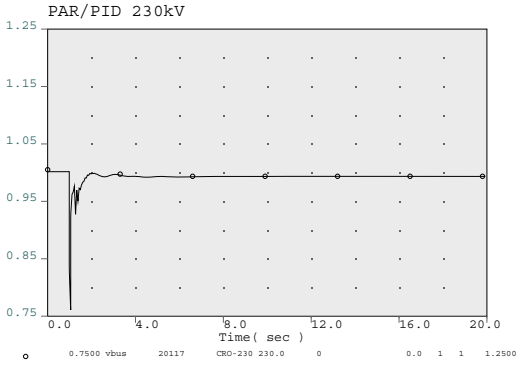




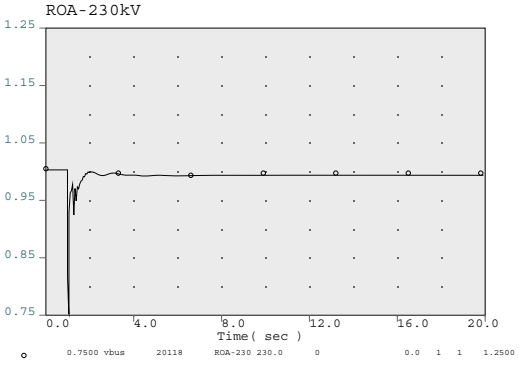
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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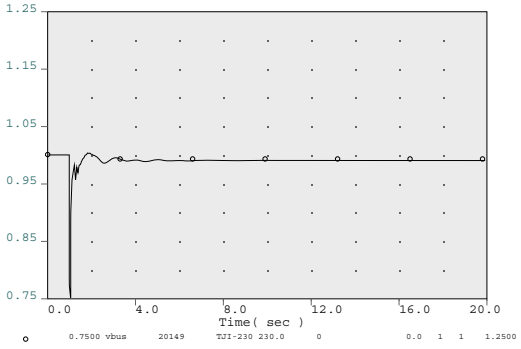
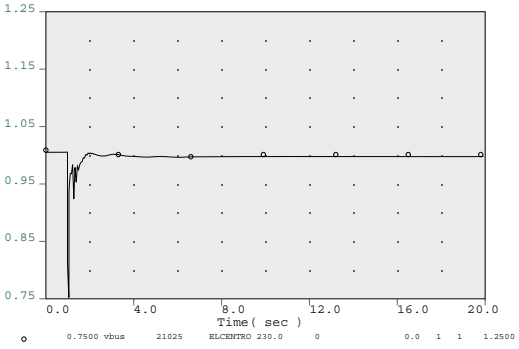
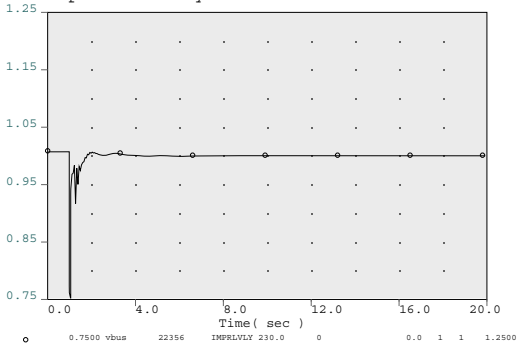


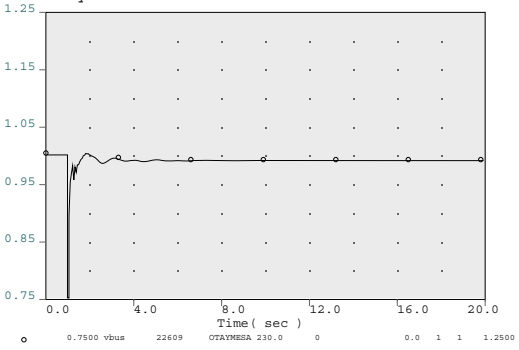
El Centro



Imperial Valley 230kV

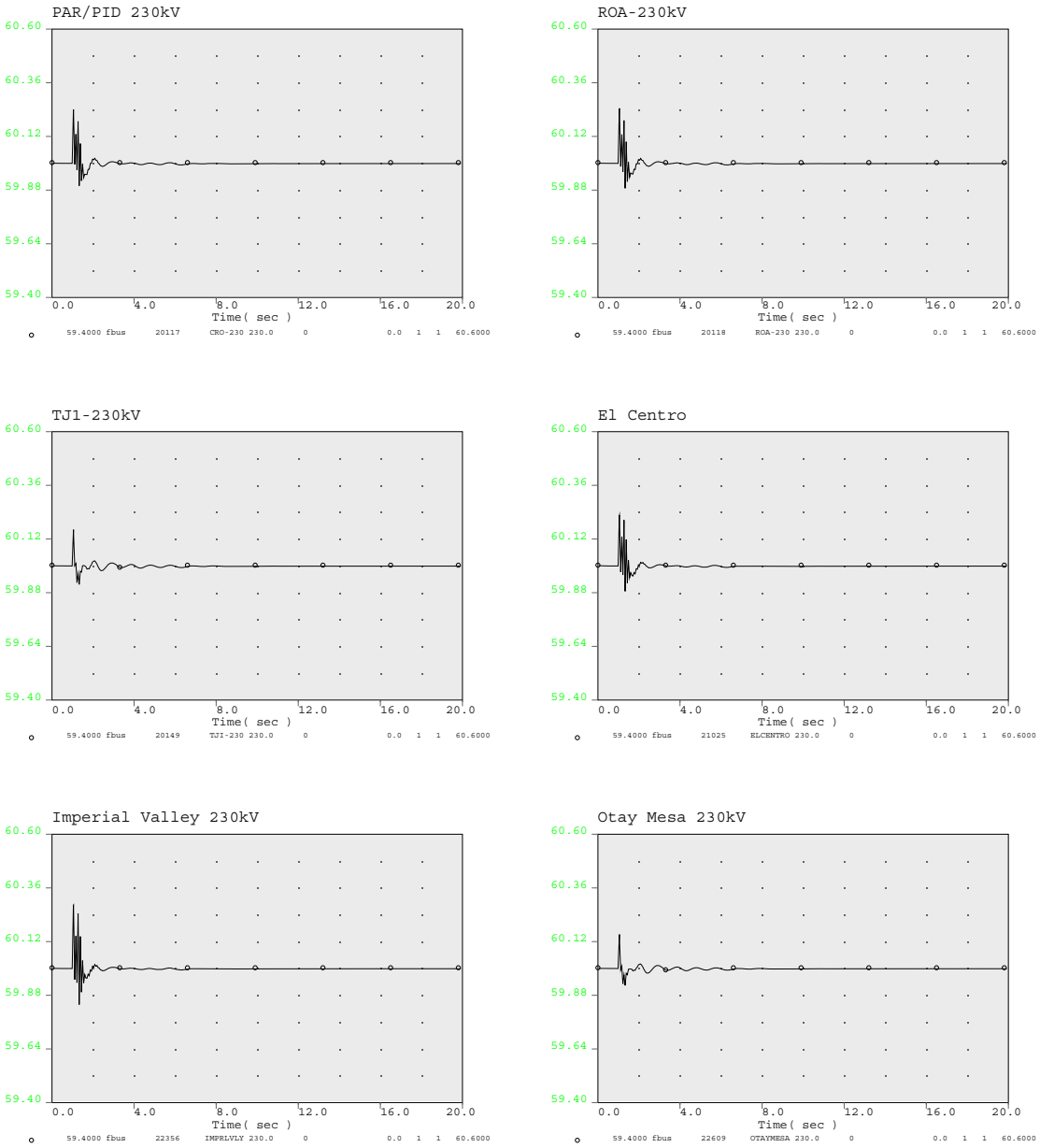


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

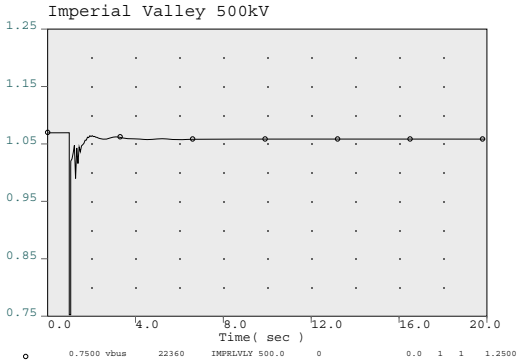
Affected System Frequency Check and Comparison



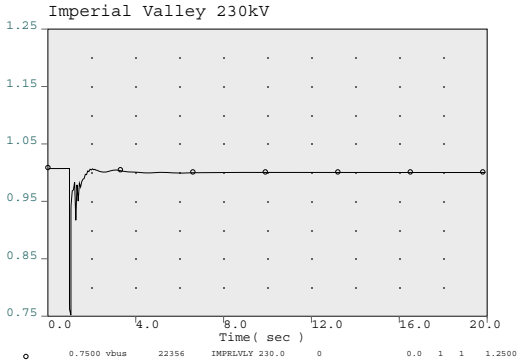
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

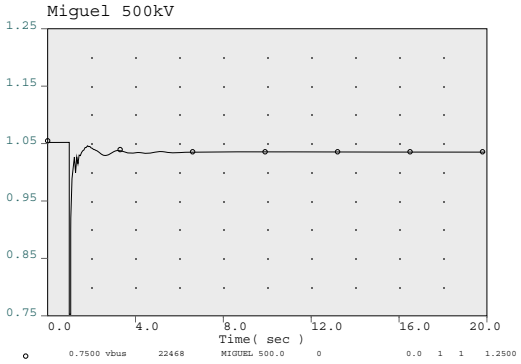
Imperial Valley 500kV



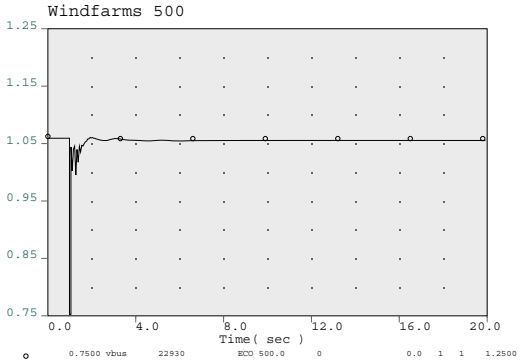
Imperial Valley 230kV



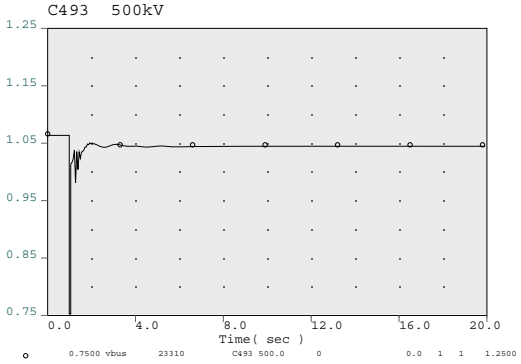
Miguel 500kV



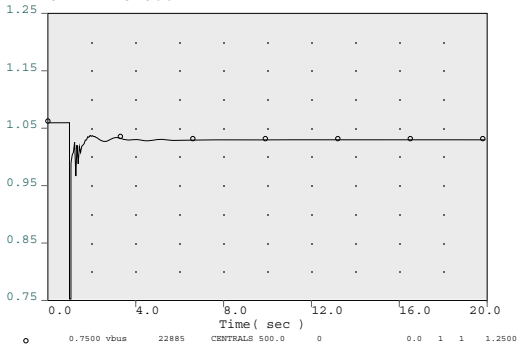
Windfarms 500



C493 500kV

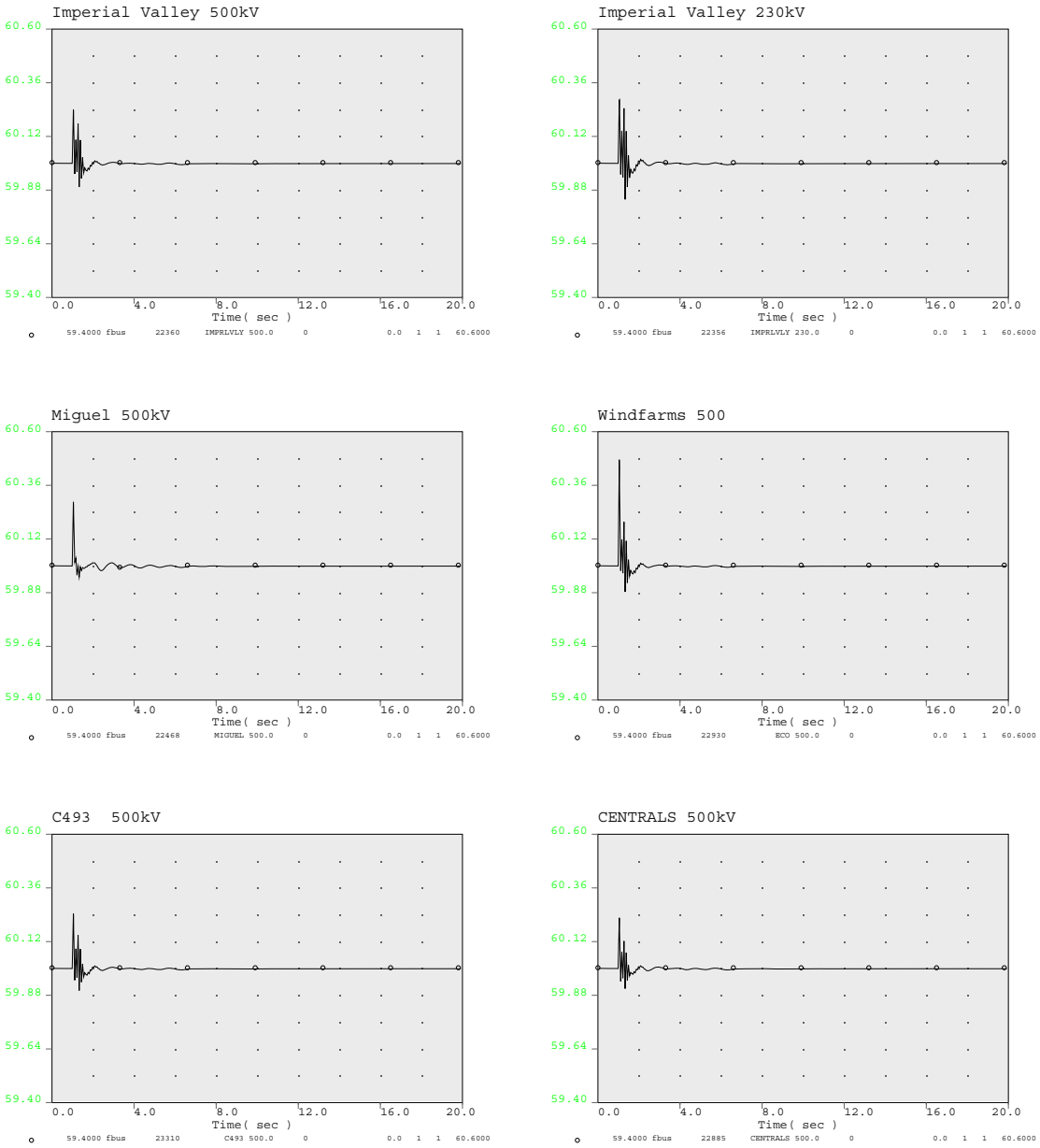


CENTRALS 500kV



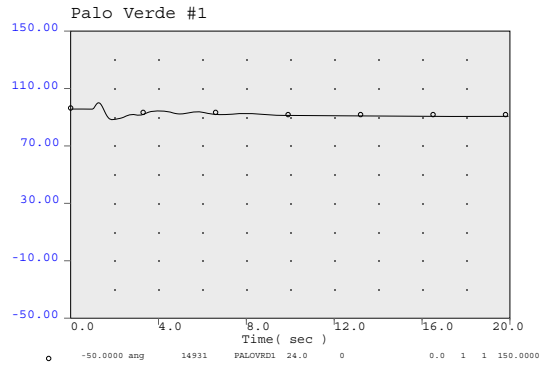
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

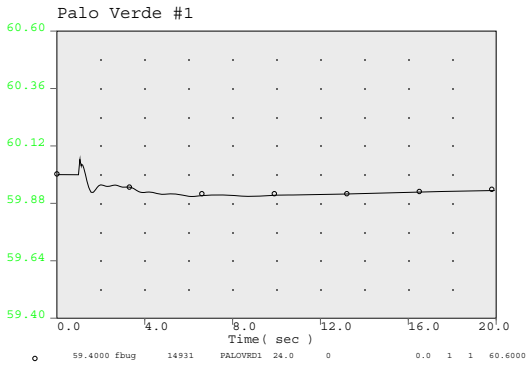
Imperial Valley Area - Frequency

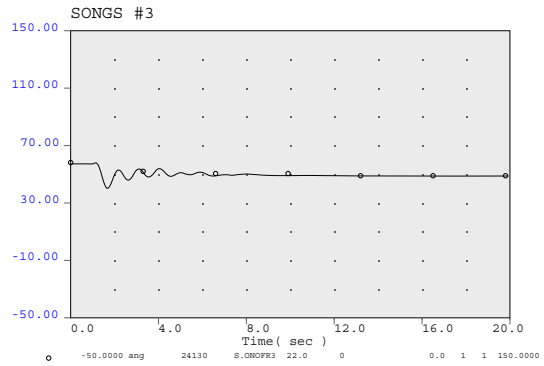


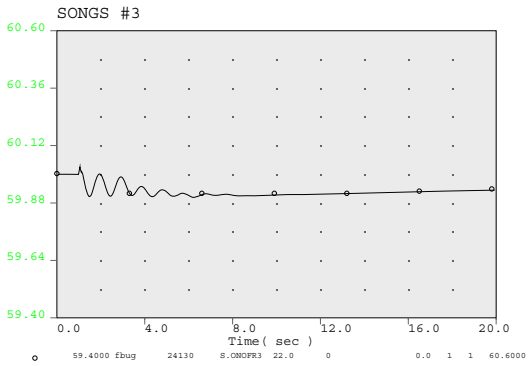
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

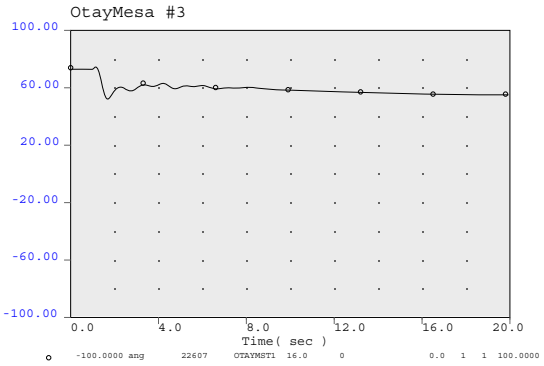
RELATIVE ROTOR ANGLE & FREQUENCY

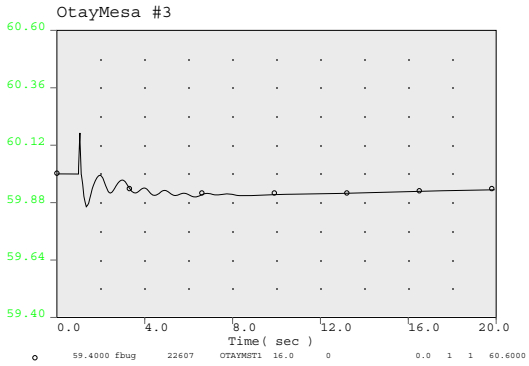










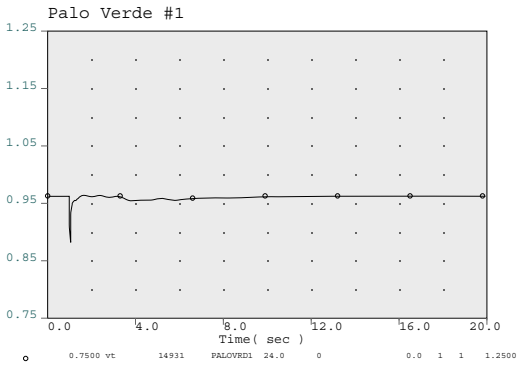


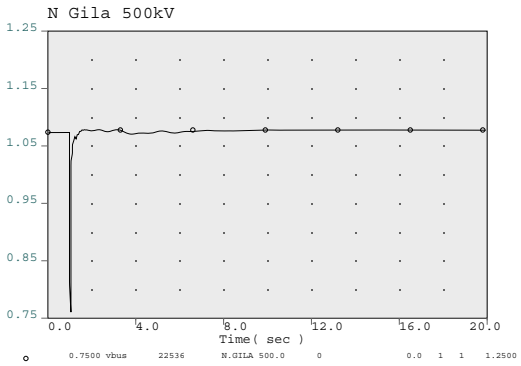
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

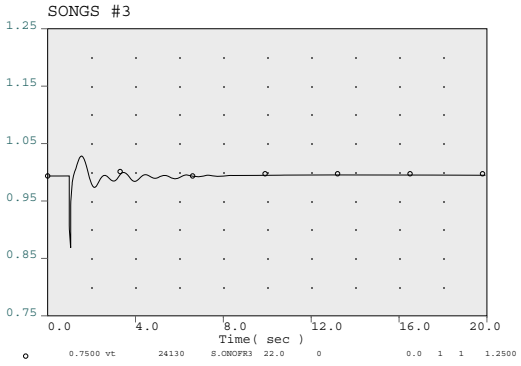
Page 1

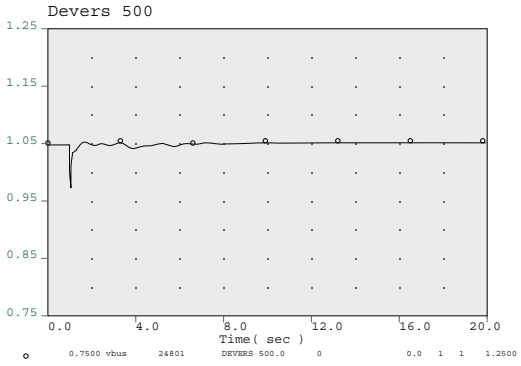
SDGE	ML_Wnd_noXTrp_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:28:47 2010

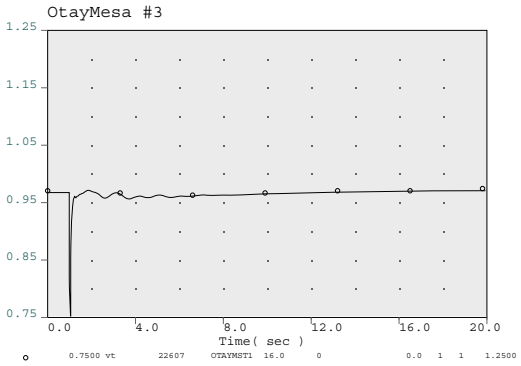
RELATIVE VOLTAGE

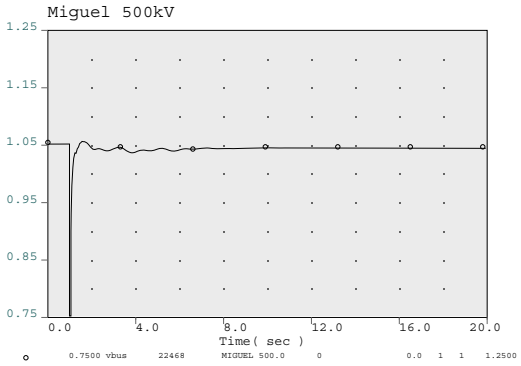








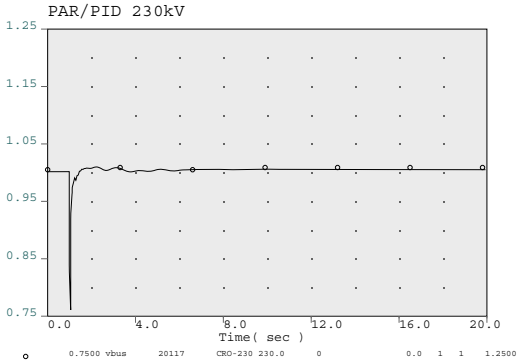




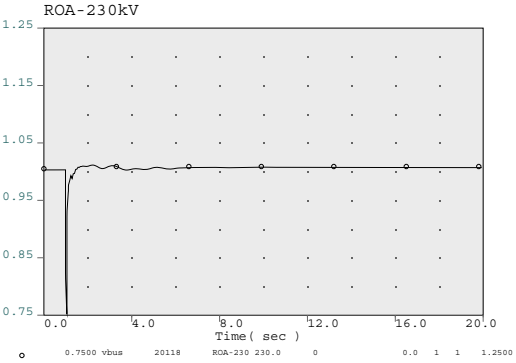
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

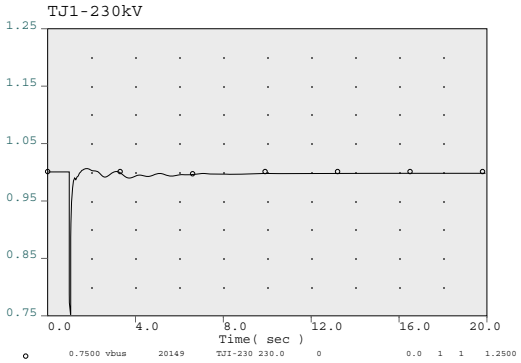
PAR/PID 230kV



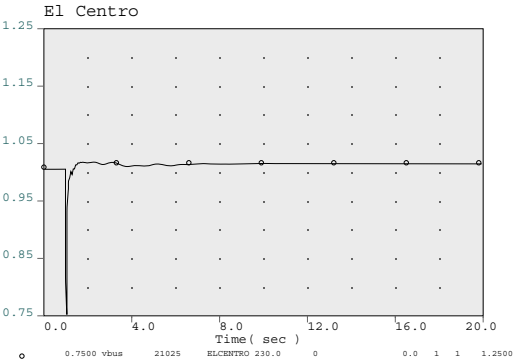
ROA-230kV



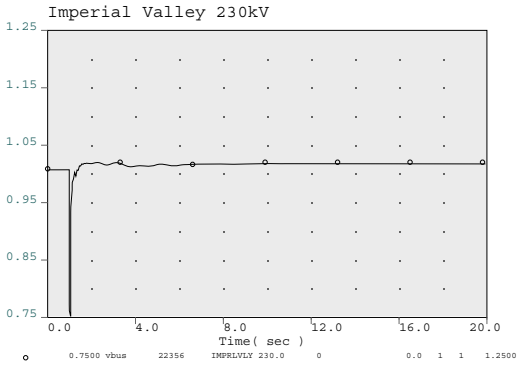
TJ1-230kV



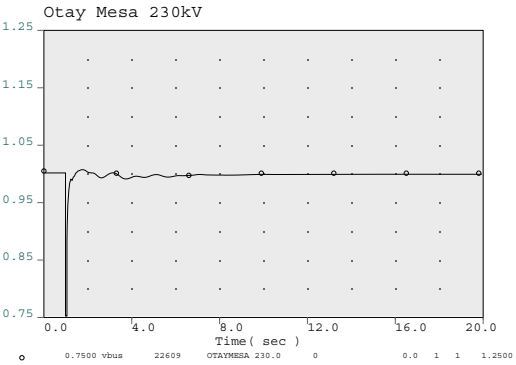
El Centro



Imperial Valley 230kV



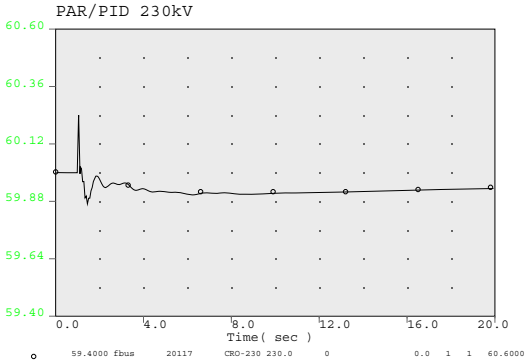
Otay Mesa 230kV



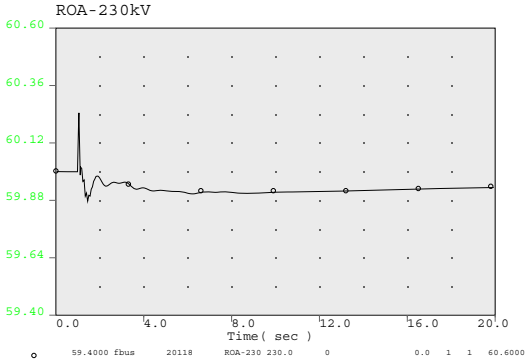
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

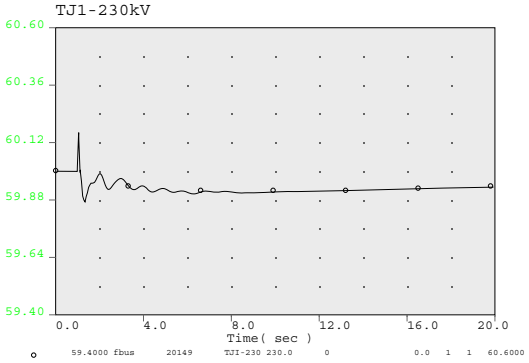
PAR/PID 230kV



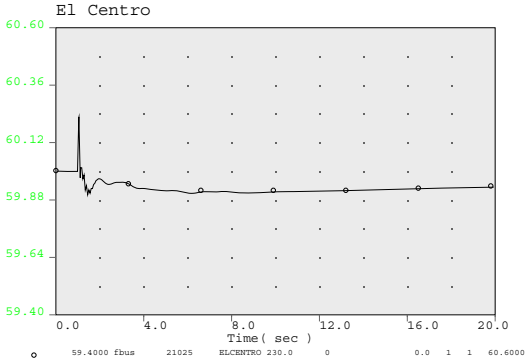
ROA-230kV



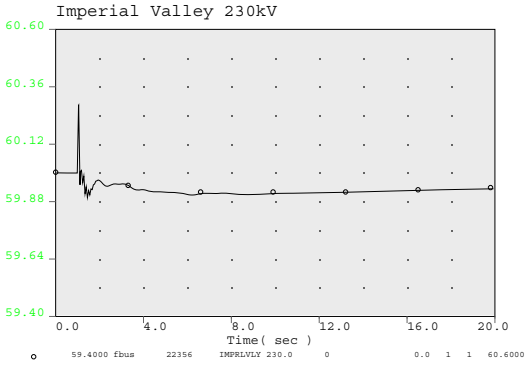
TJ1-230kV



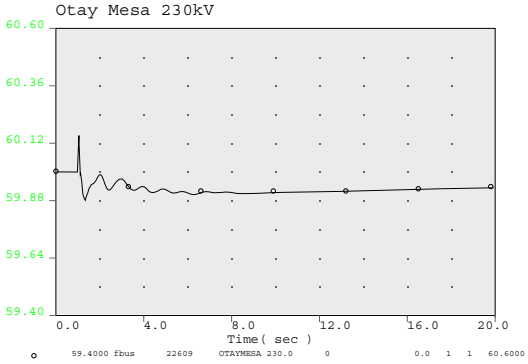
El Centro



Imperial Valley 230kV



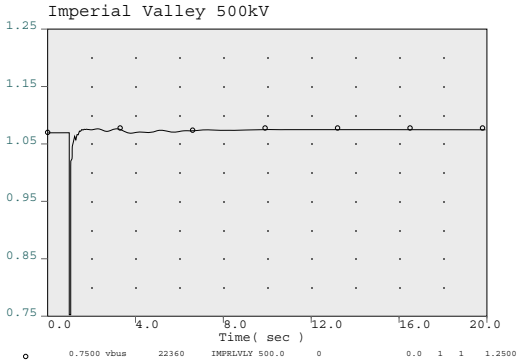
Otay Mesa 230kV



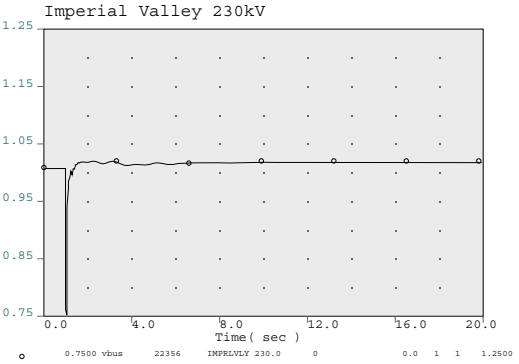
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

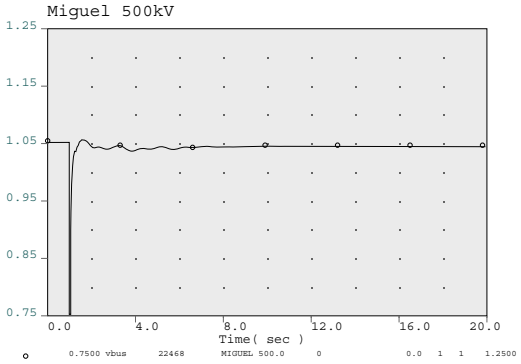
Imperial Valley 500kV



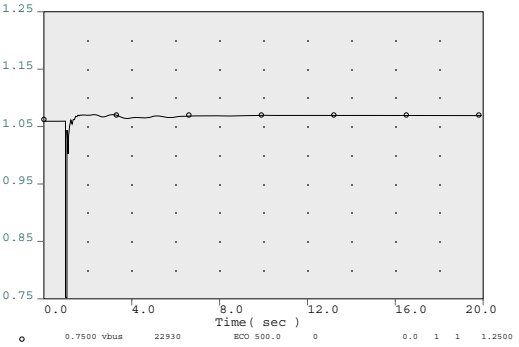
Imperial Valley 230kV



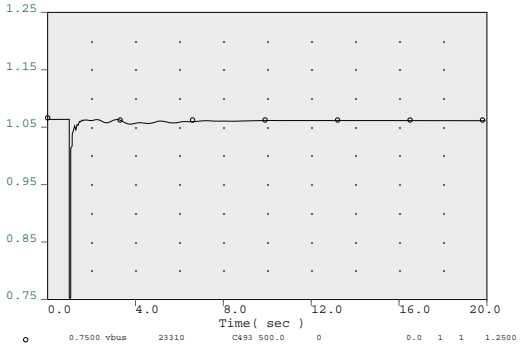
Miguel 500kV



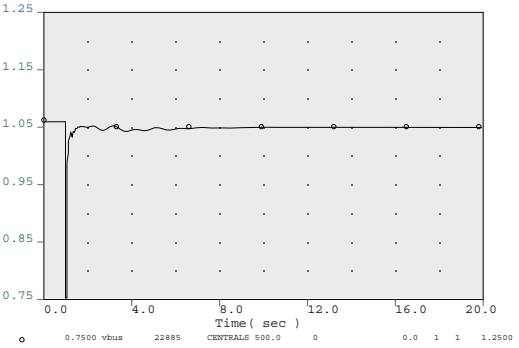
Windfarms 500



C493 500kV

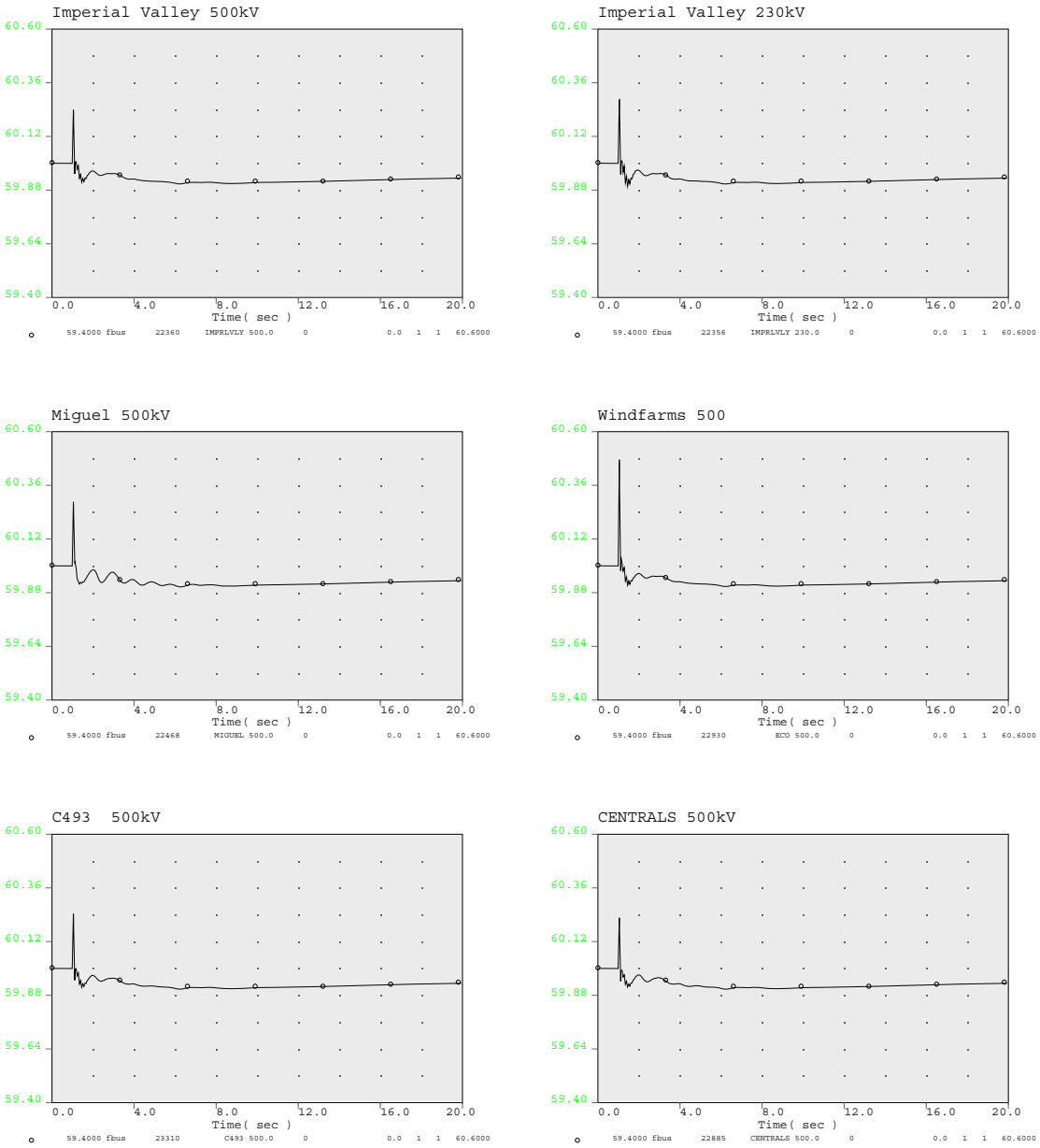


CENTRALS 500kV



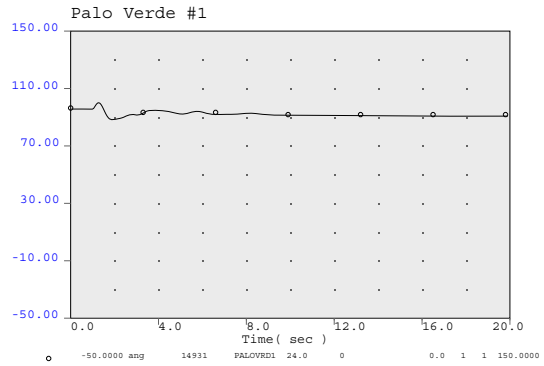
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

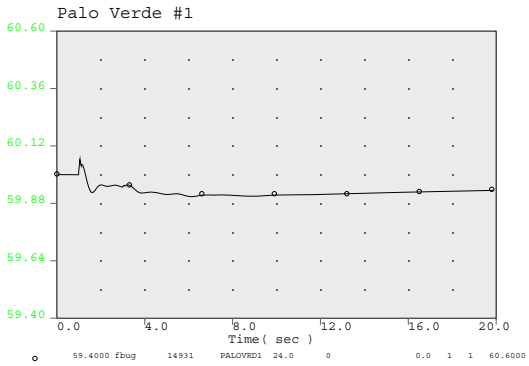
Imperial Valley Area - Frequency

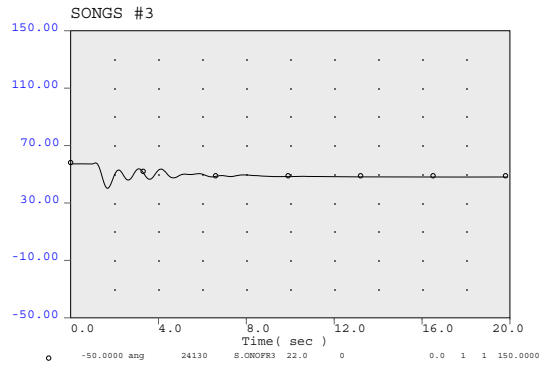


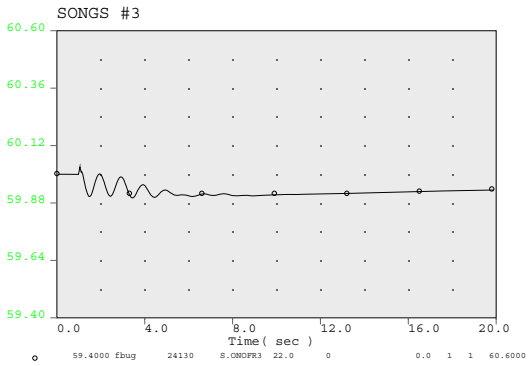
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

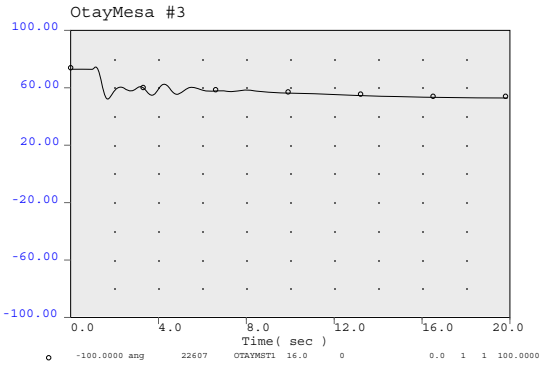
RELATIVE ROTOR ANGLE & FREQUENCY

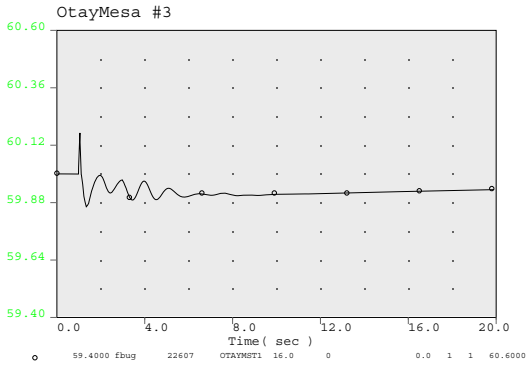






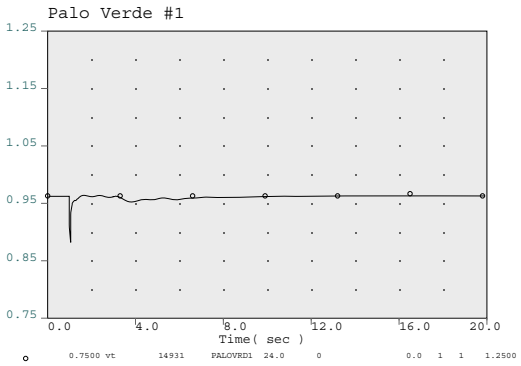


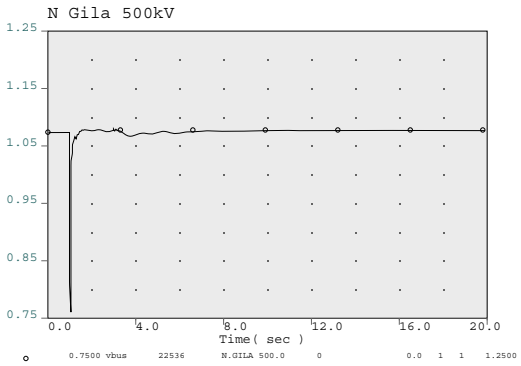


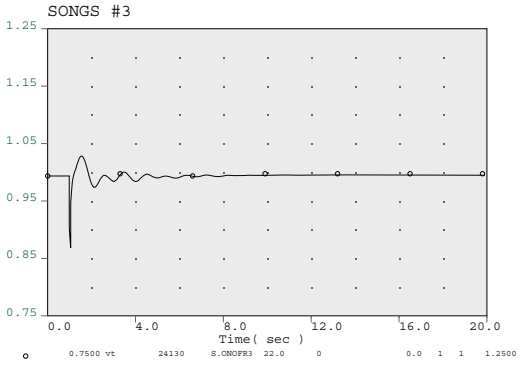


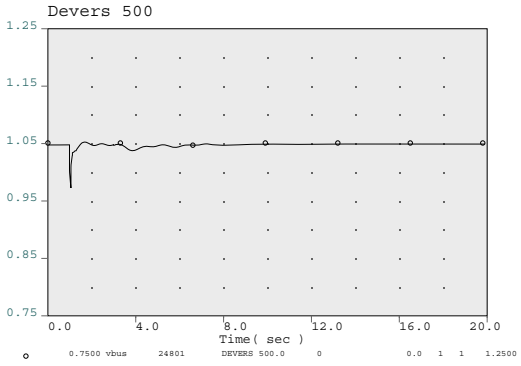
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

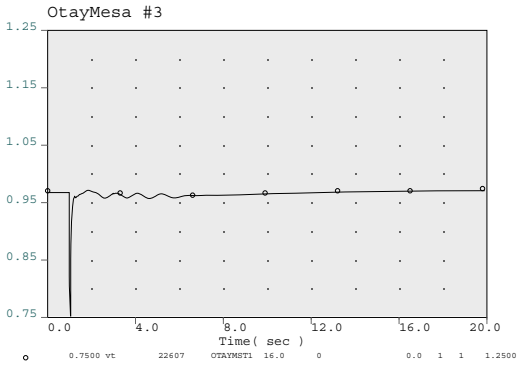
RELATIVE VOLTAGE

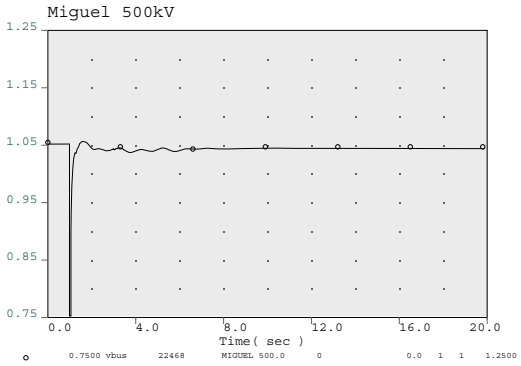








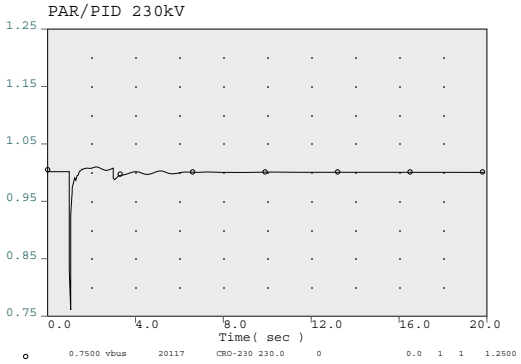




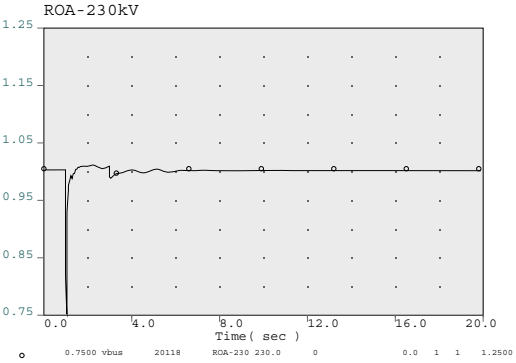
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

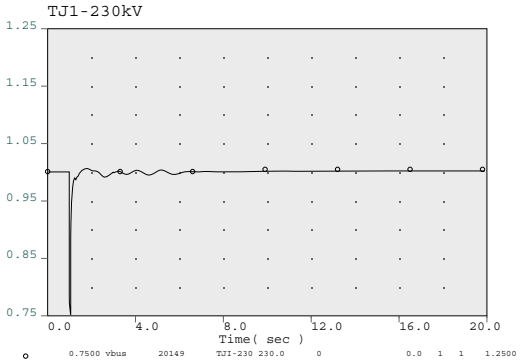
PAR/PID 230kV



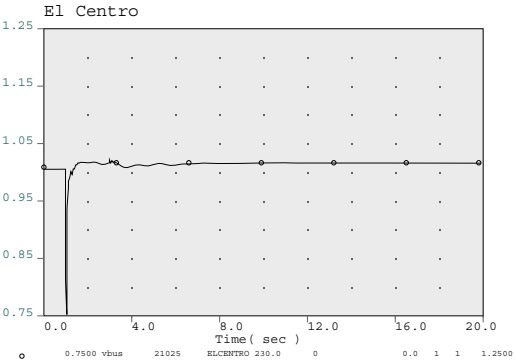
ROA-230kV



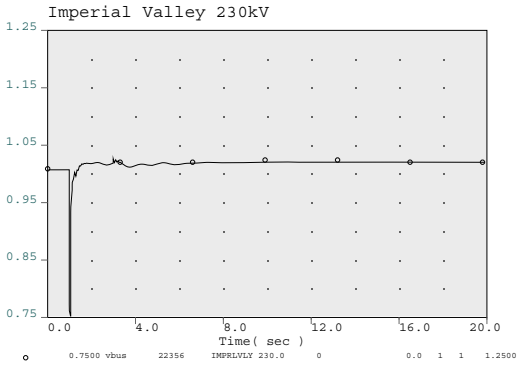
TJ1-230kV



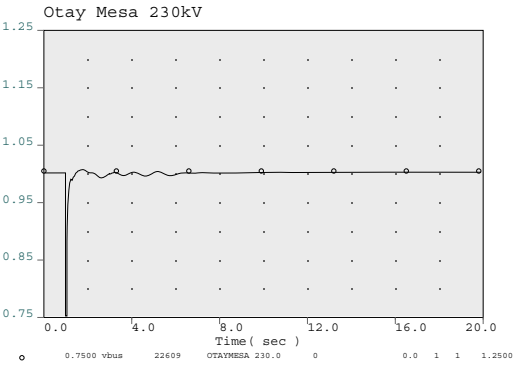
El Centro



Imperial Valley 230kV

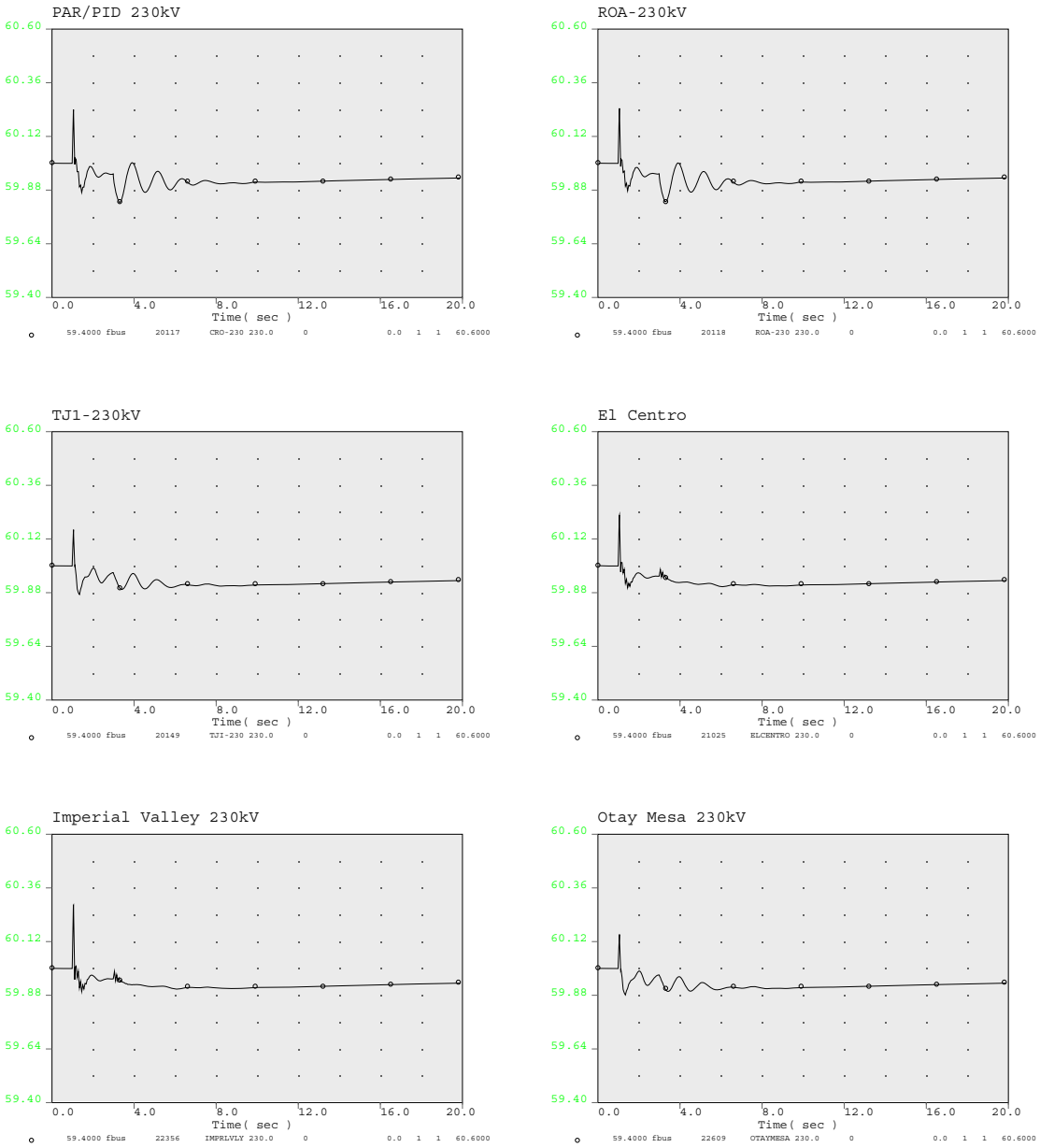


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

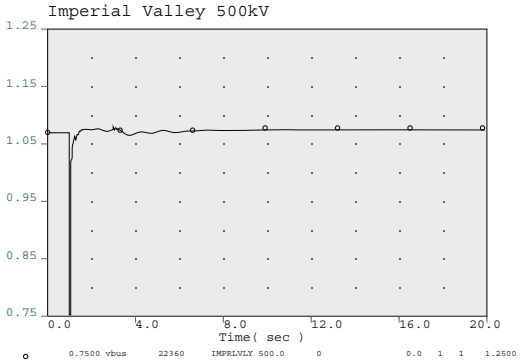
Affected System Frequency Check and Comparison



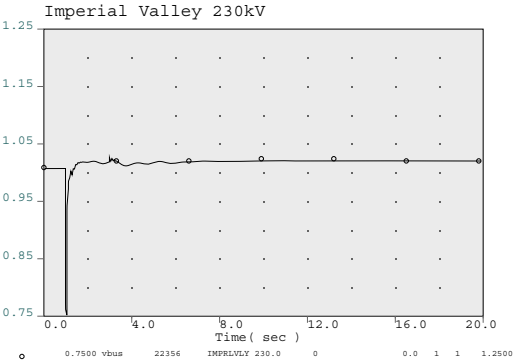
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

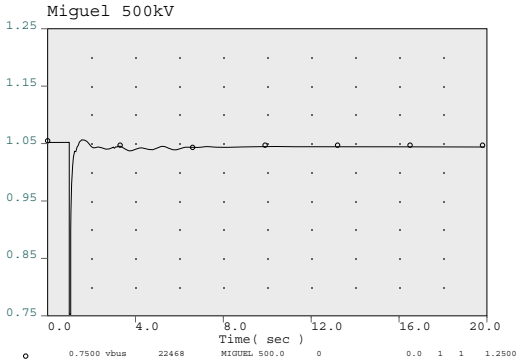
Imperial Valley 500kV



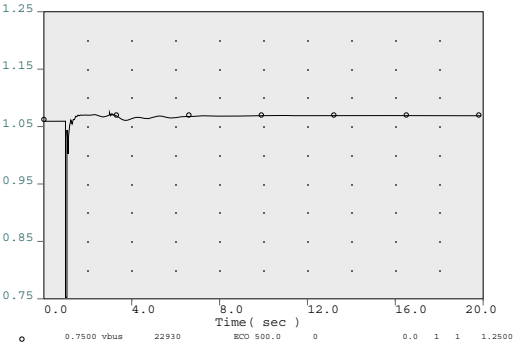
Imperial Valley 230kV



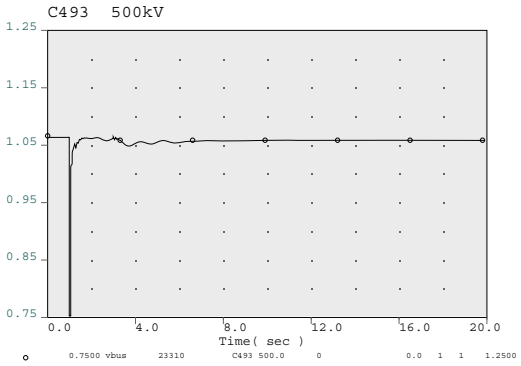
Miguel 500kV



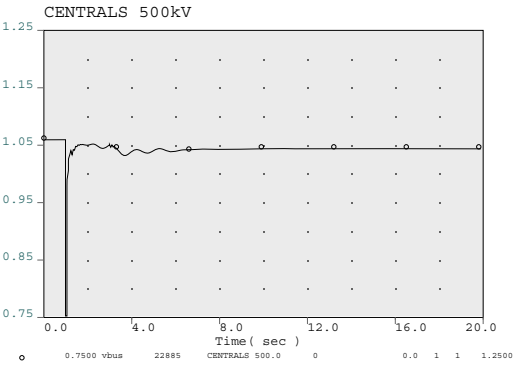
Windfarms 500



C493 500kV

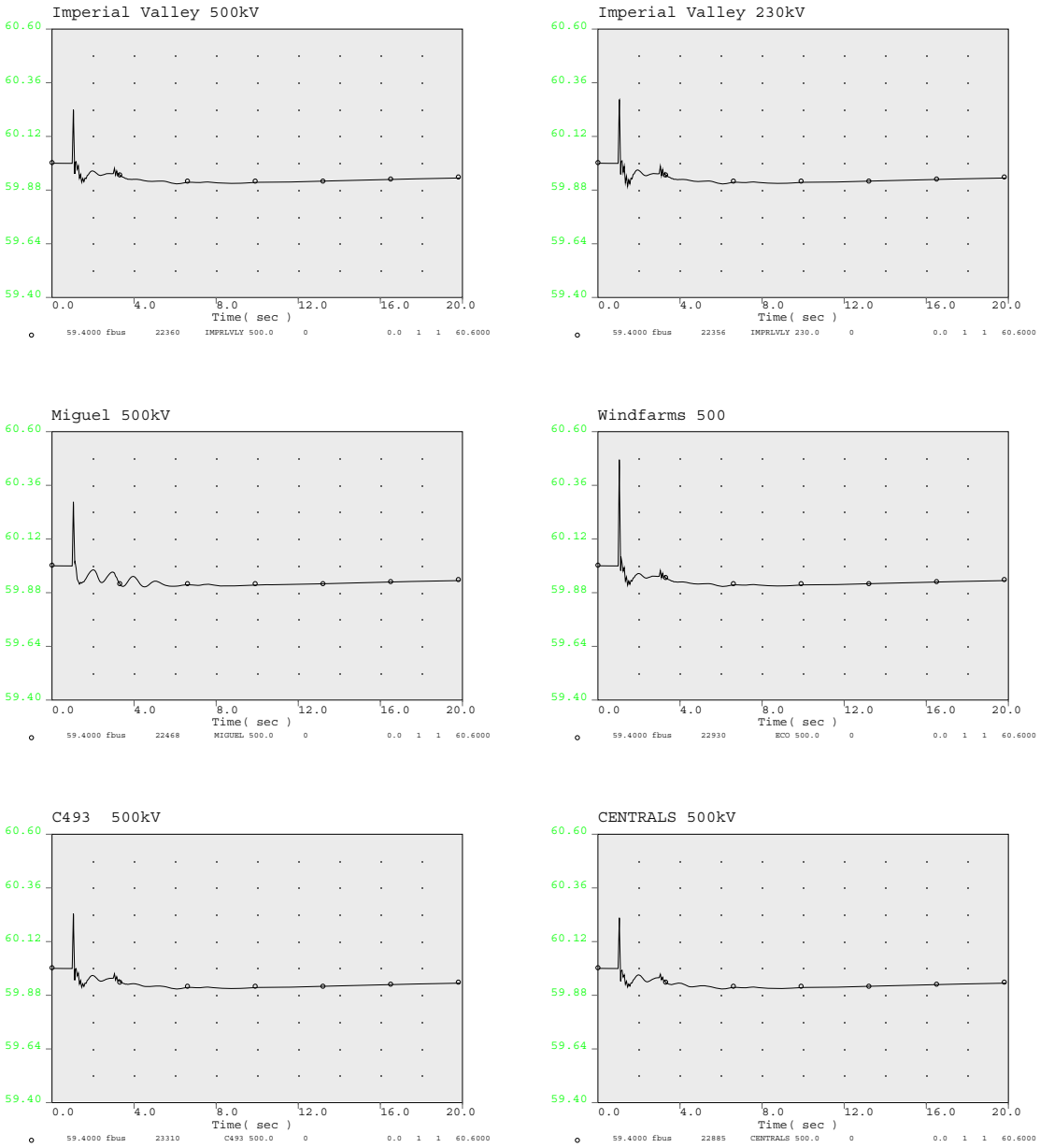


CENTRALS 500kV



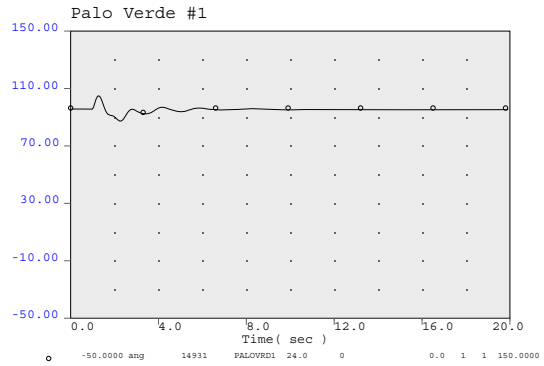
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

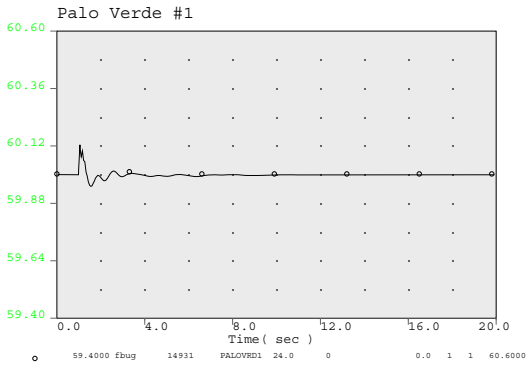
Imperial Valley Area - Frequency

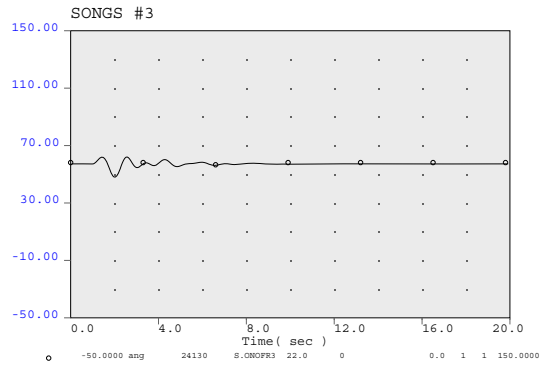


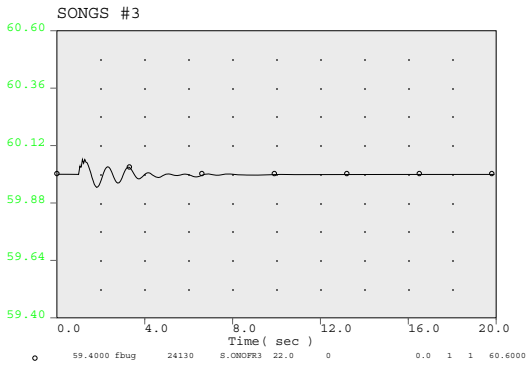
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

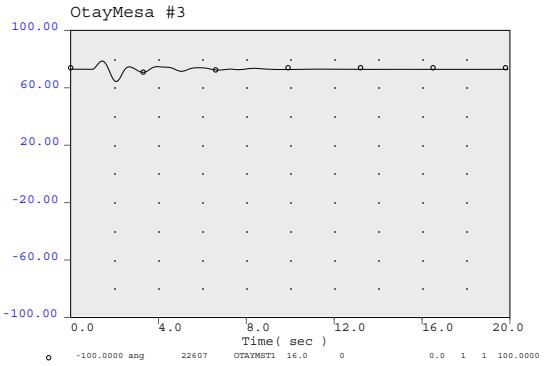
RELATIVE ROTOR ANGLE & FREQUENCY

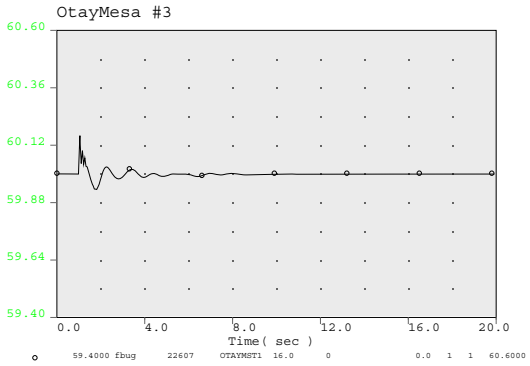










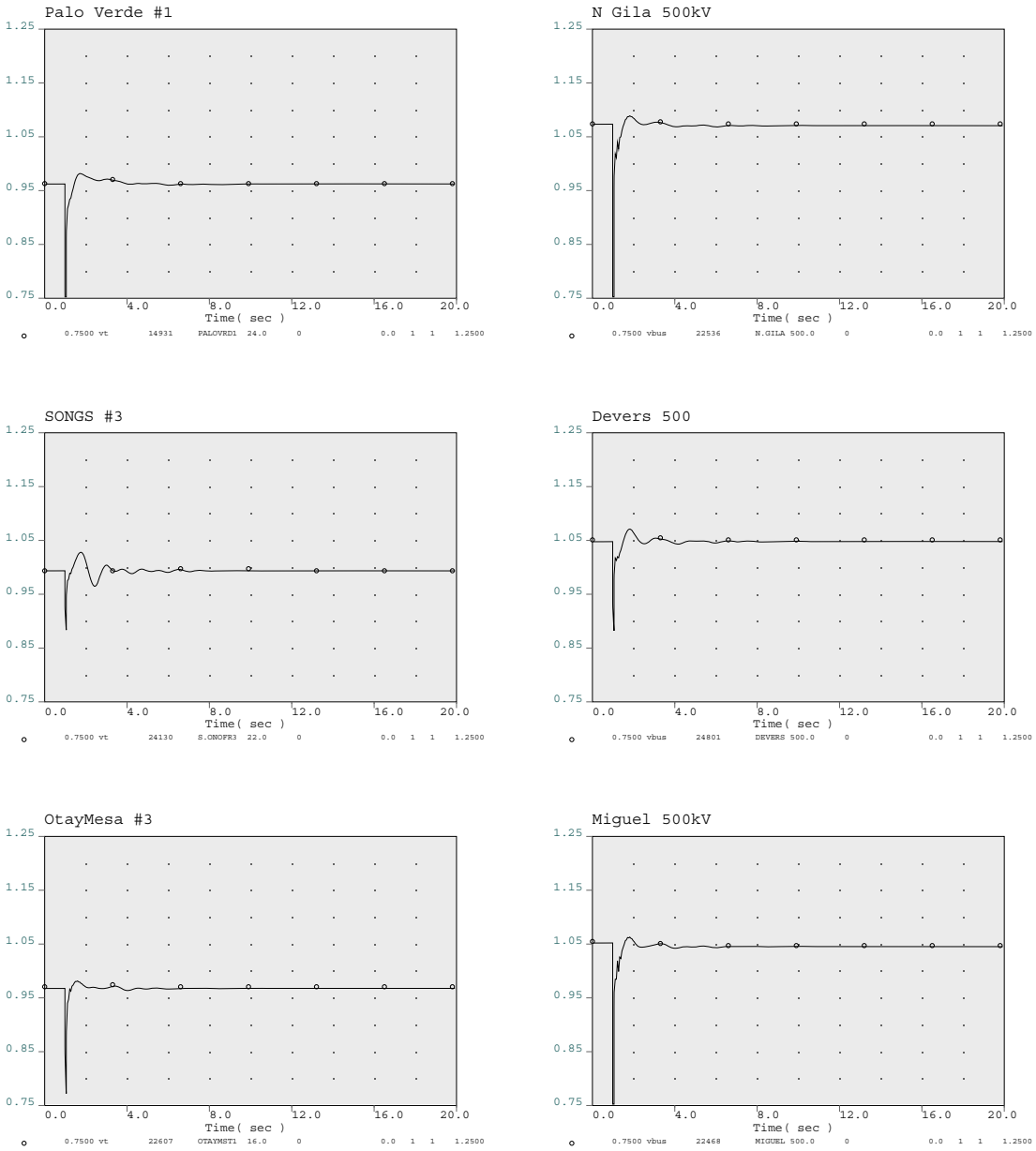


SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Page 1

SDGE	NGila_IV_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:32:43 2010

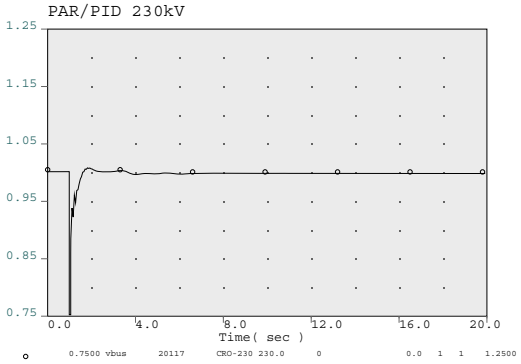
RELATIVE VOLTAGE



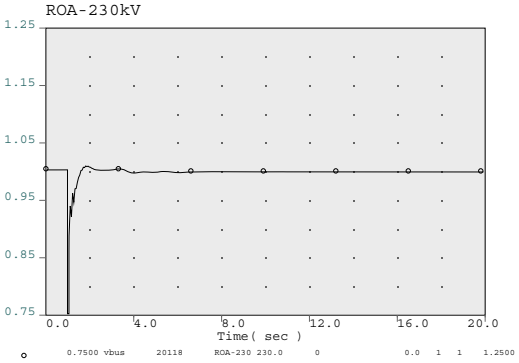
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

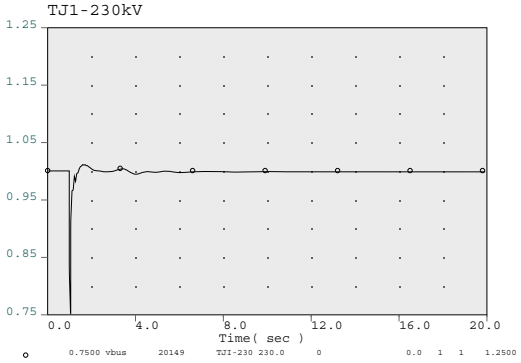
PAR/PID 230kV



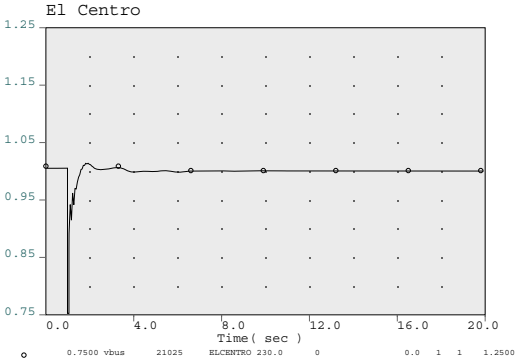
ROA-230kV



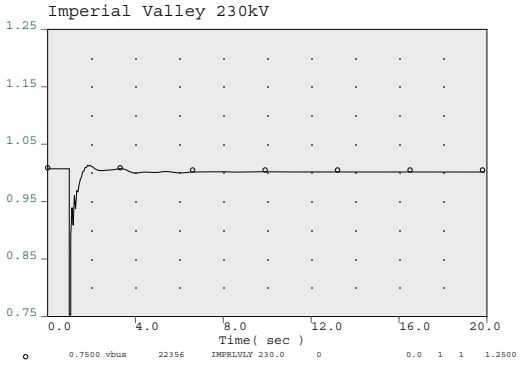
TJ1-230kV



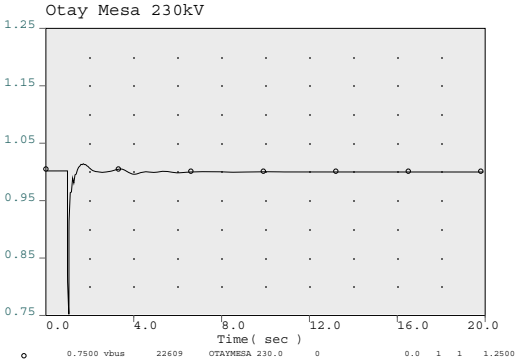
El Centro



Imperial Valley 230kV

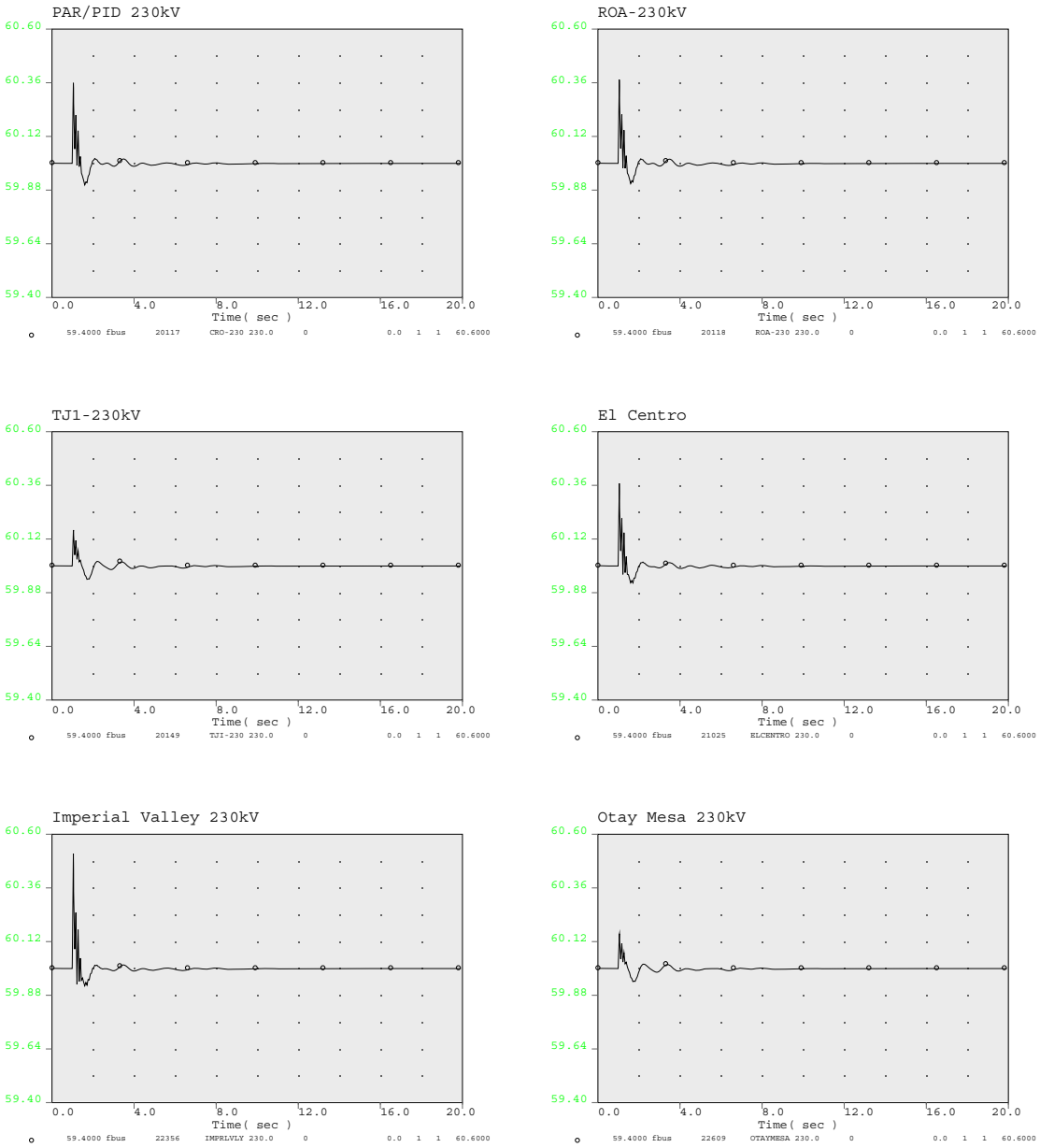


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

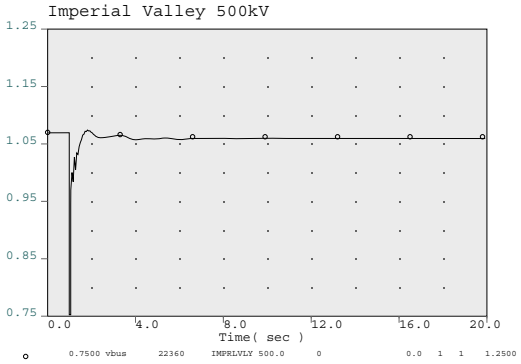
Affected System Frequency Check and Comparison



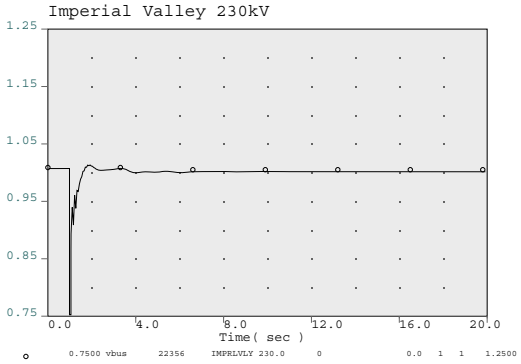
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

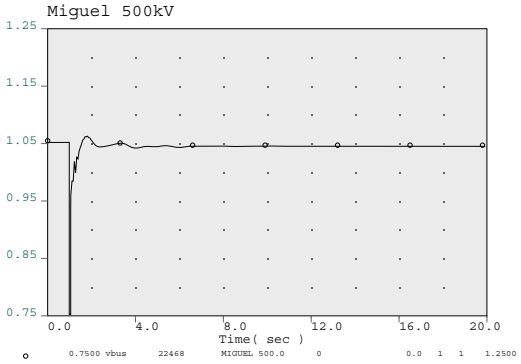
Imperial Valley 500kV



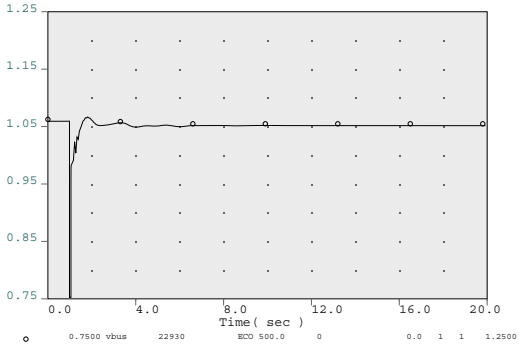
Imperial Valley 230kV



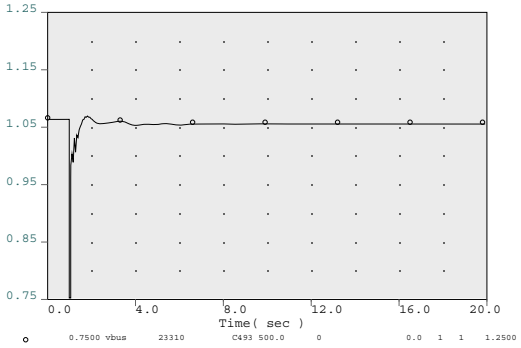
Miguel 500kV



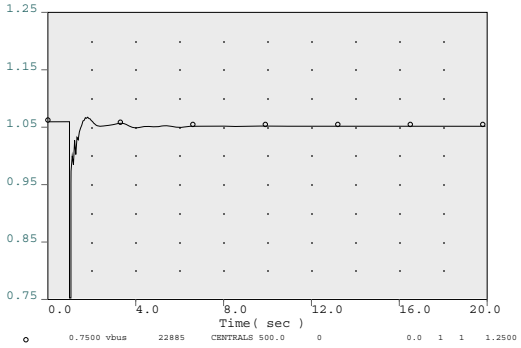
Windfarms 500



C493 500kV



CENTRALS 500kV

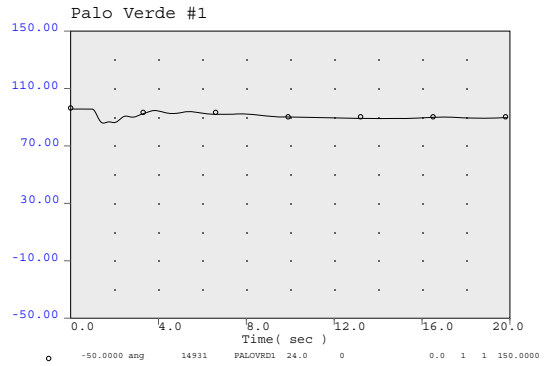


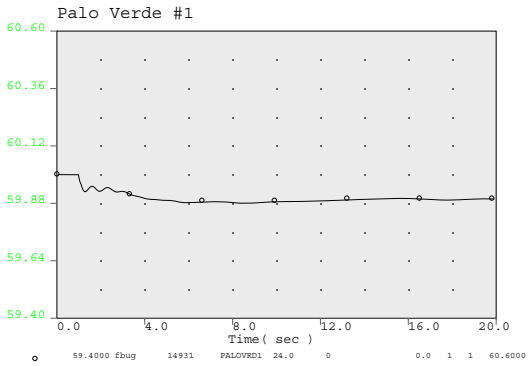
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

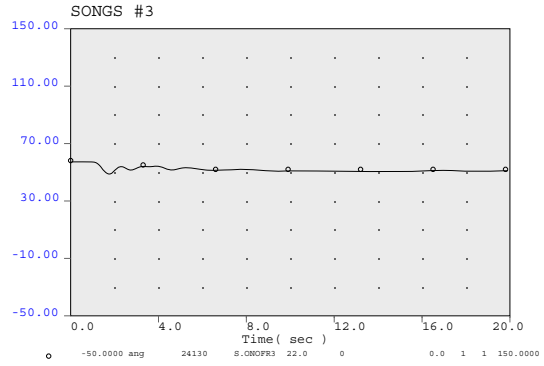
Imperial Valley Area - Frequency

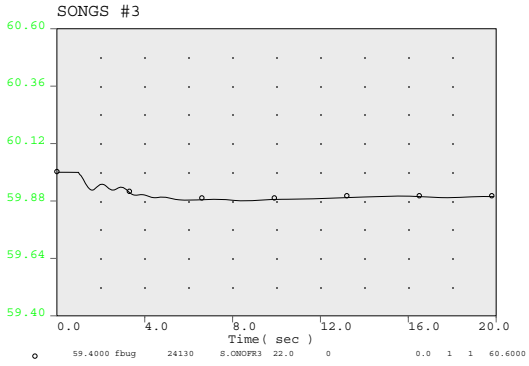
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

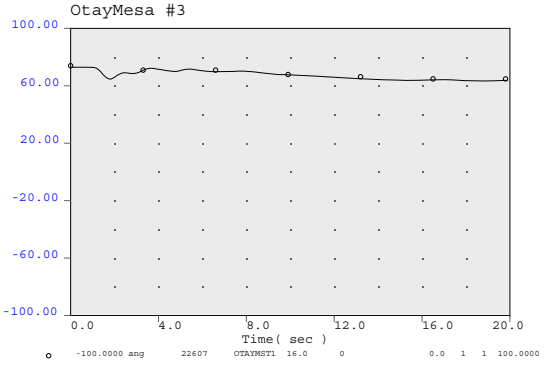
RELATIVE ROTOR ANGLE & FREQUENCY

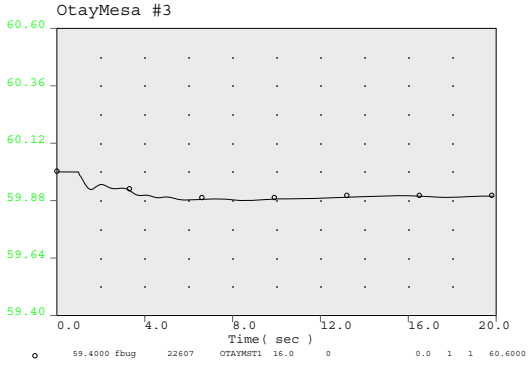












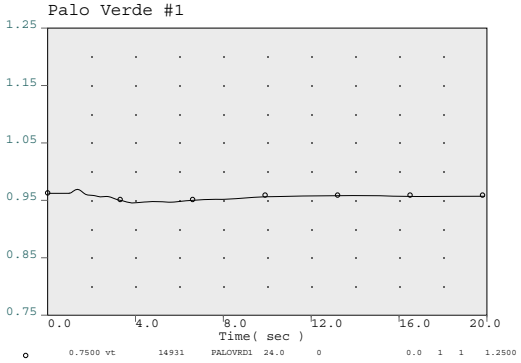
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Page 1

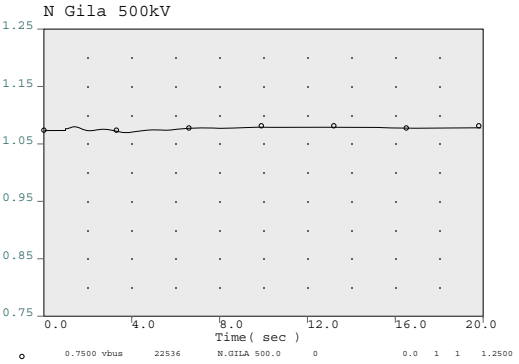
SDGE	PaloVerde-g1_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:29:34 2010

RELATIVE VOLTAGE

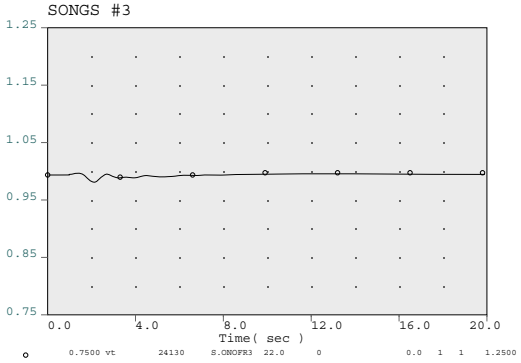
Palo Verde #1



N Gila 500kV



SONGS #3



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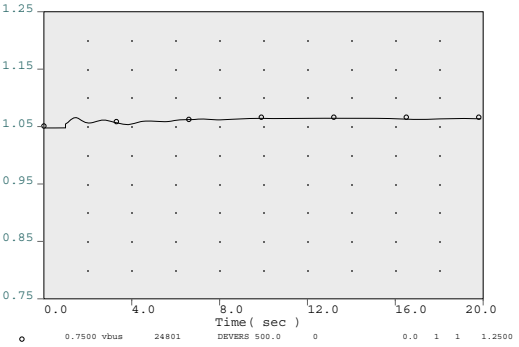
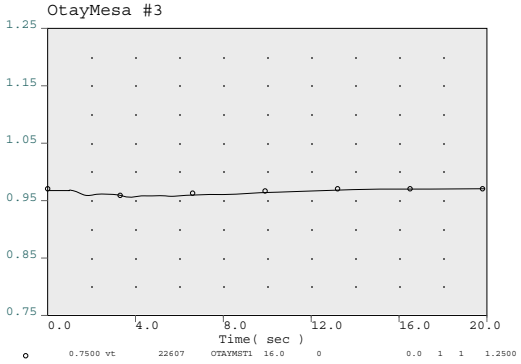
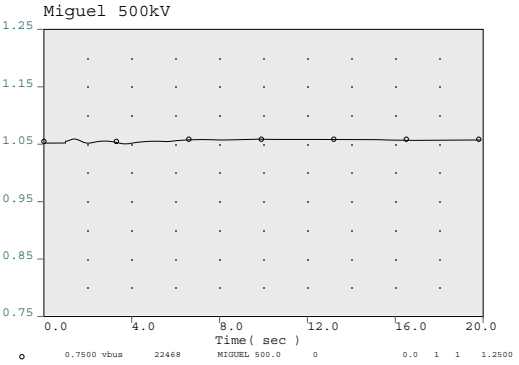


OtayMesa #3



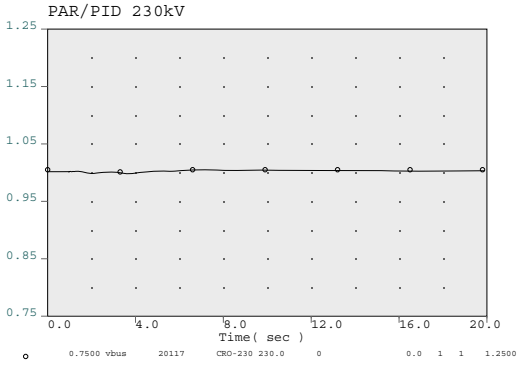
Miguel 500kV



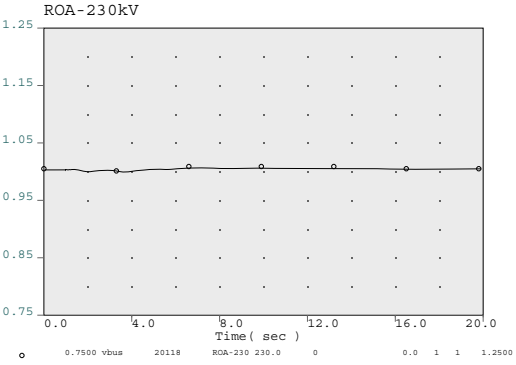
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

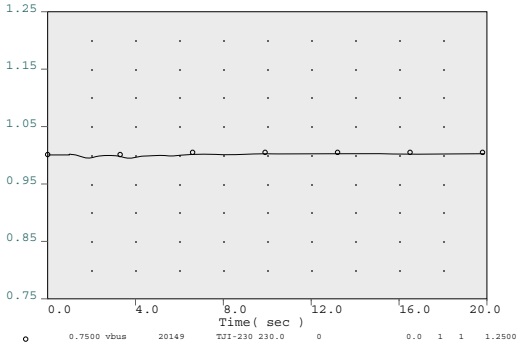
PAR/PID 230kV



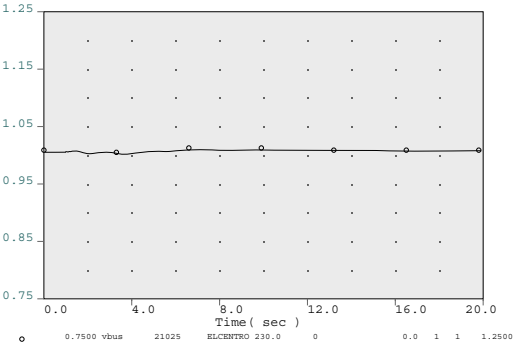
ROA-230kV



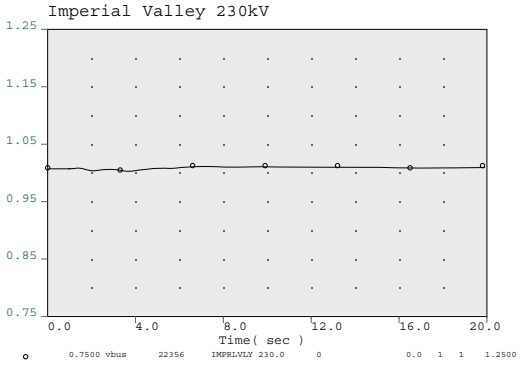
TJ1-230kV



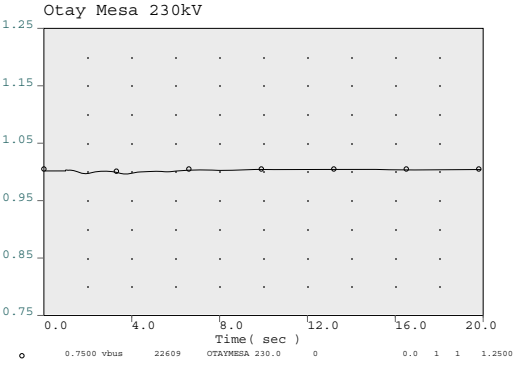
El Centro



Imperial Valley 230kV

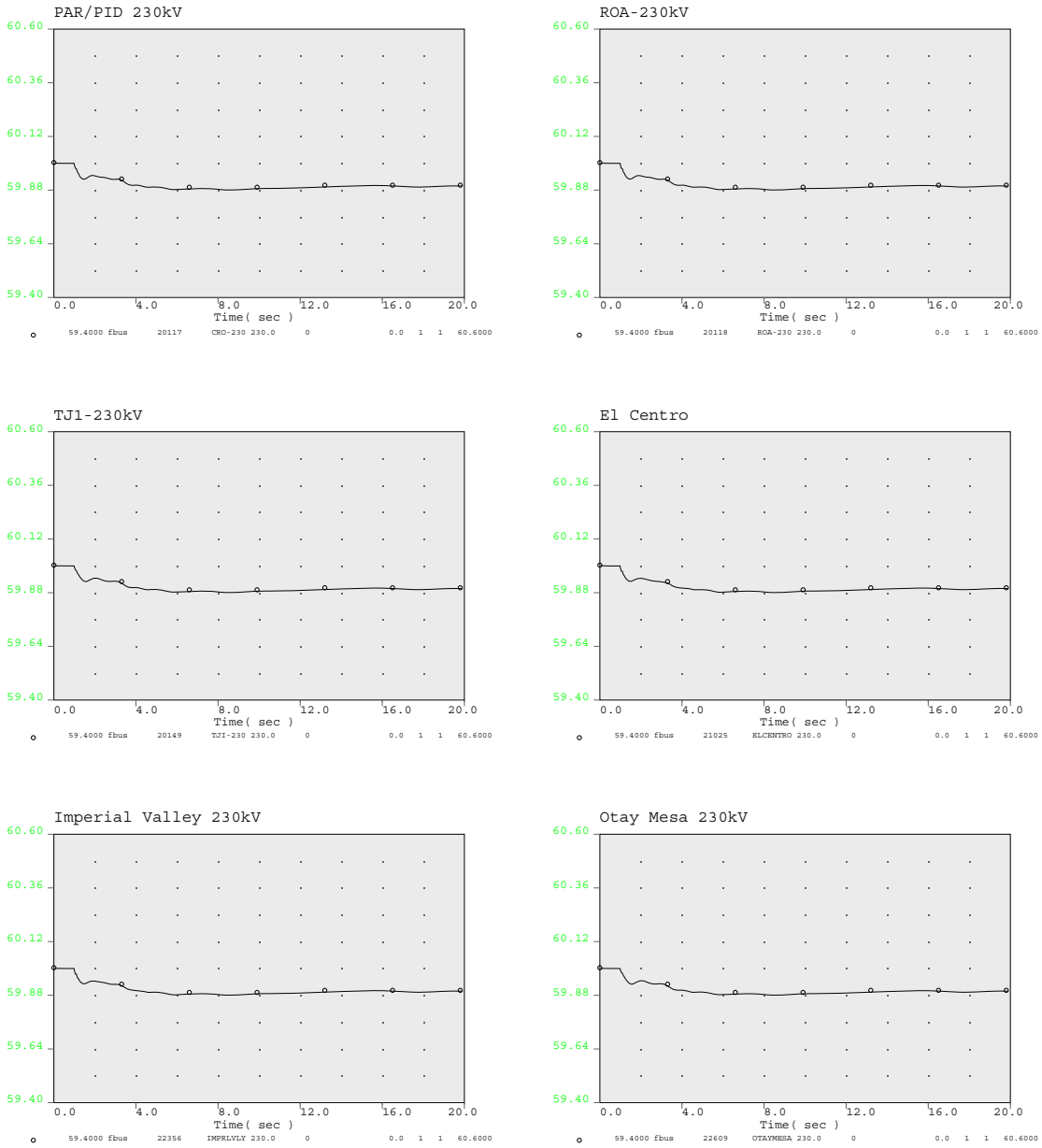


Otay Mesa 230kV



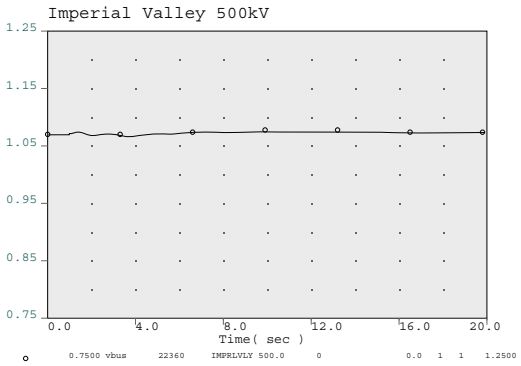
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

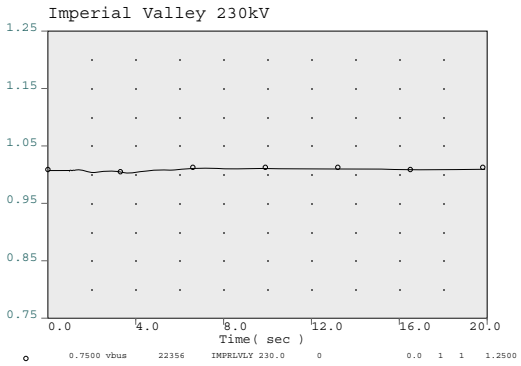
Affected System Frequency Check and Comparison

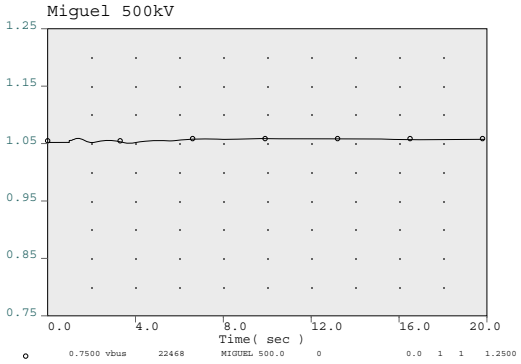


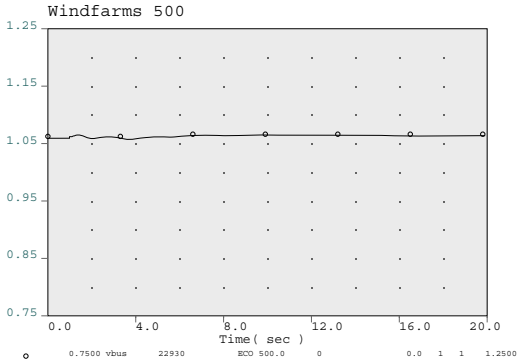
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

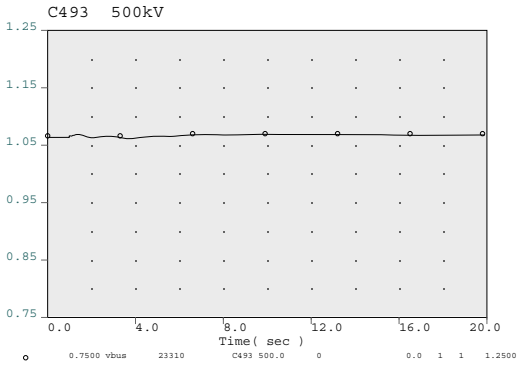
Imperial Valley Area - VOLTAGE

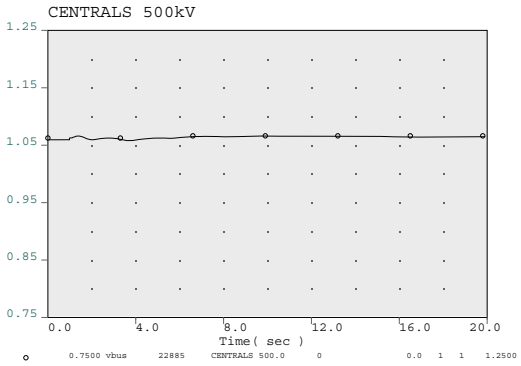






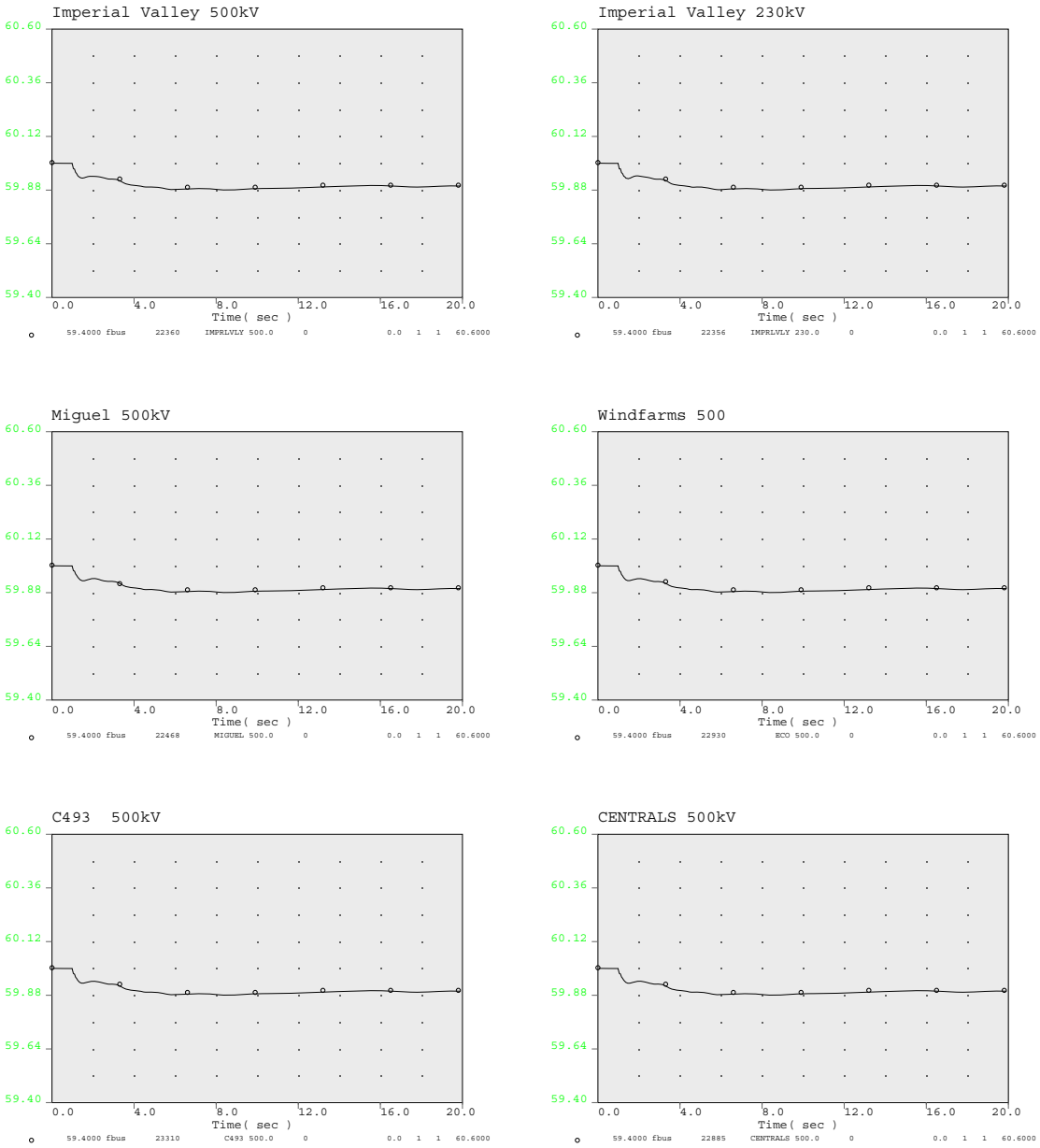






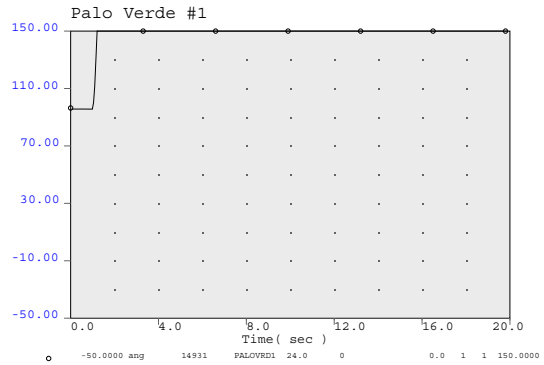
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

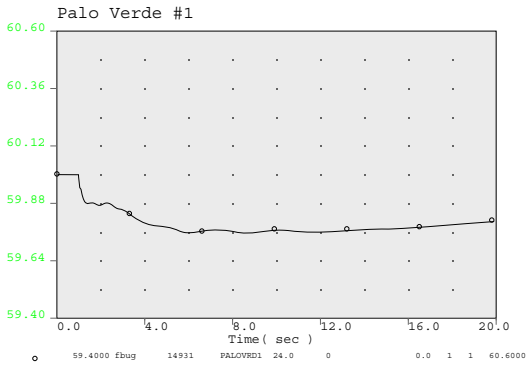
Imperial Valley Area - Frequency

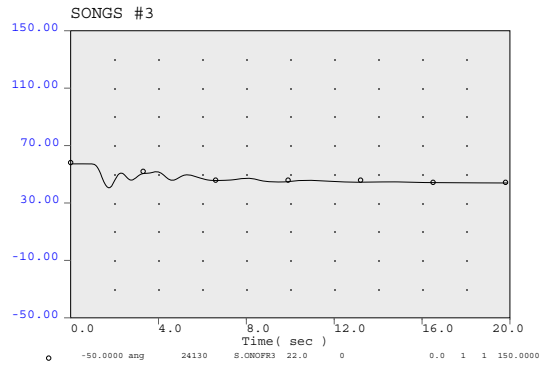


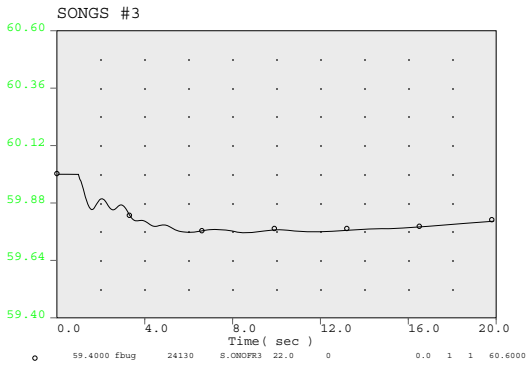
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

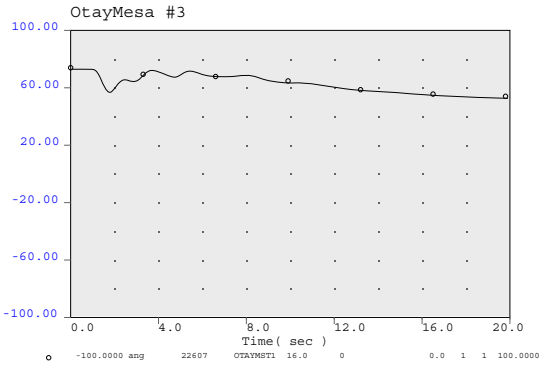
RELATIVE ROTOR ANGLE & FREQUENCY

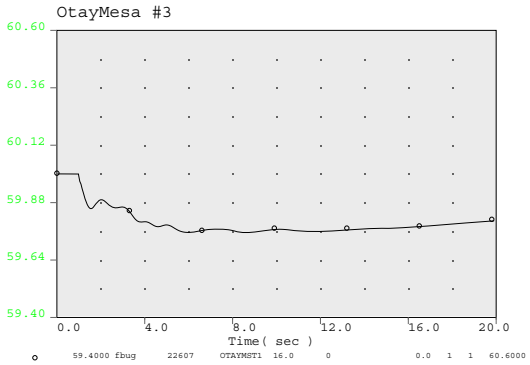










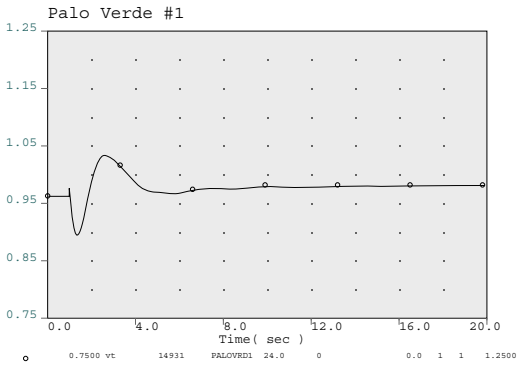


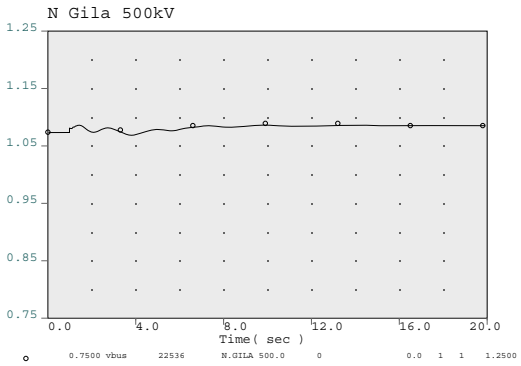
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

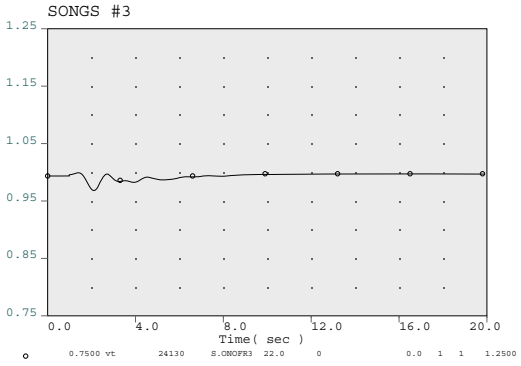
Page 1

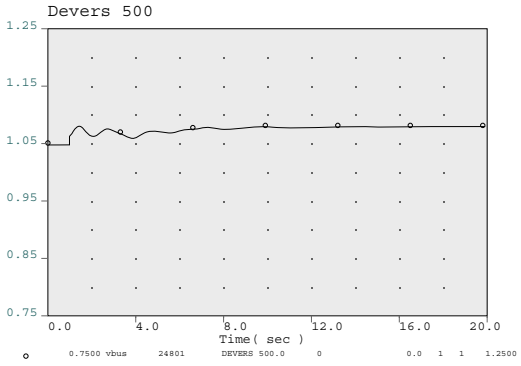
PaloVerde-g2_pst_ll_bu.chf | 2_p_i\ll\pst_bu\ws_pst_bu | Tue Nov 02 07:29:56 2010

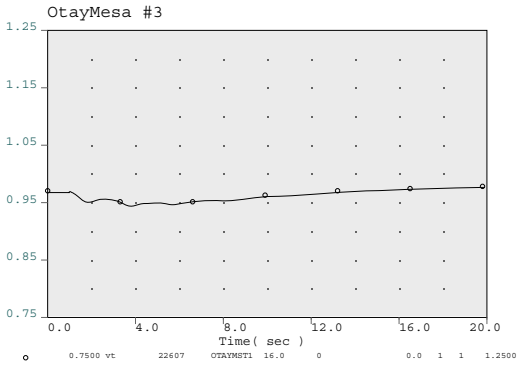
RELATIVE VOLTAGE

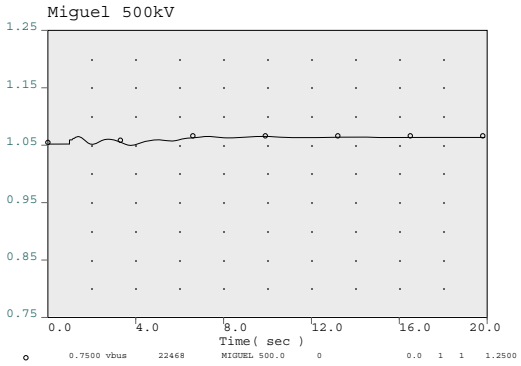








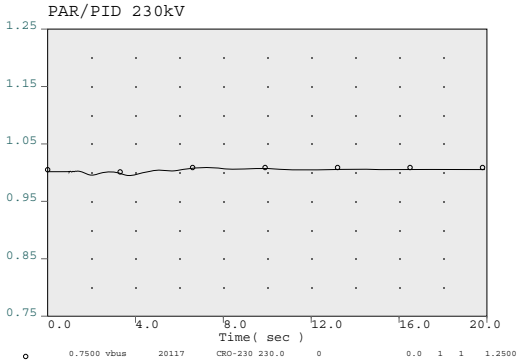




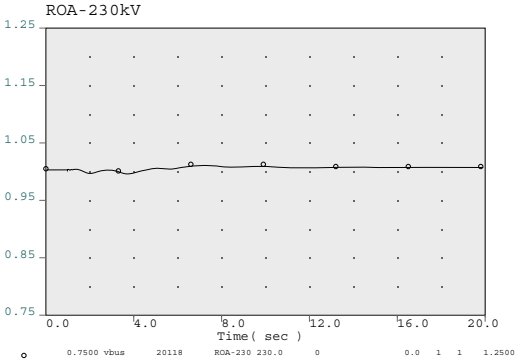
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

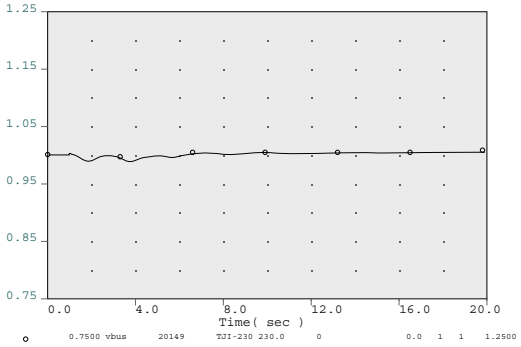
PAR/PID 230kV



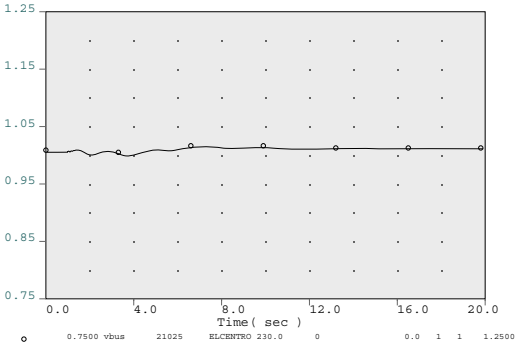
ROA-230kV



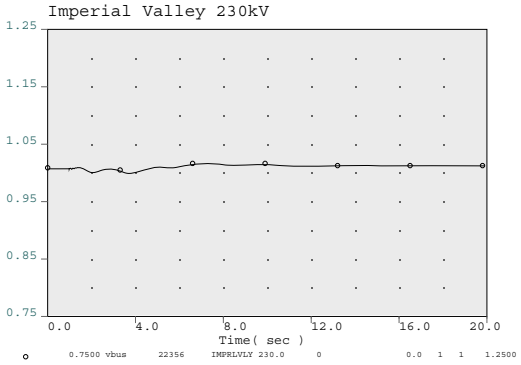
TJ1-230kV



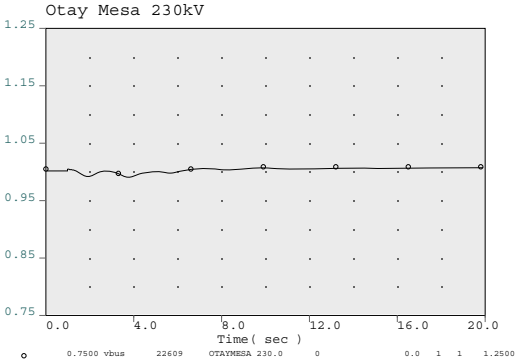
El Centro



Imperial Valley 230kV

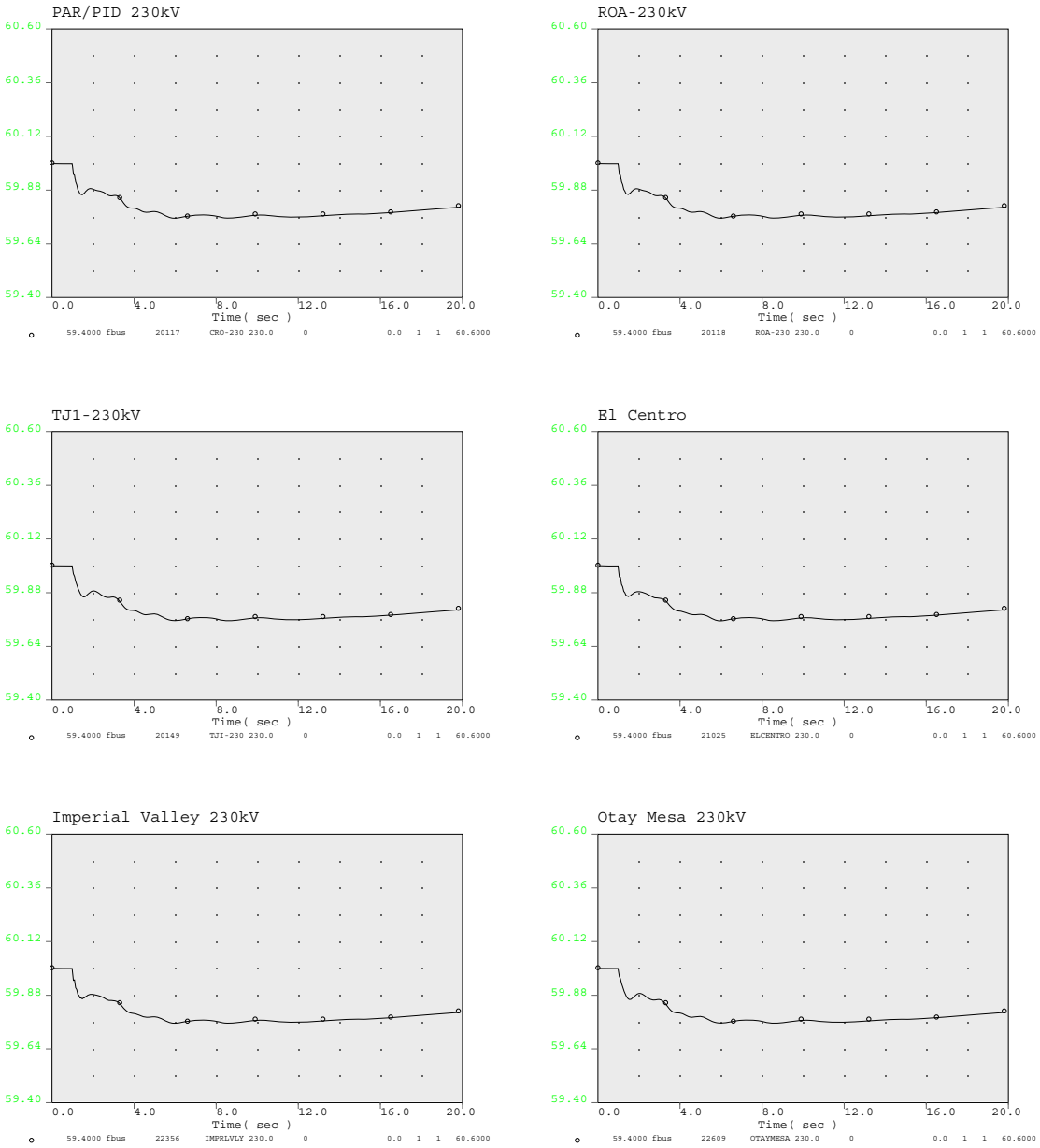


Otay Mesa 230kV



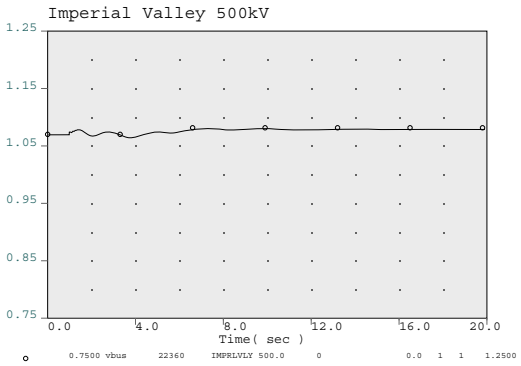
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

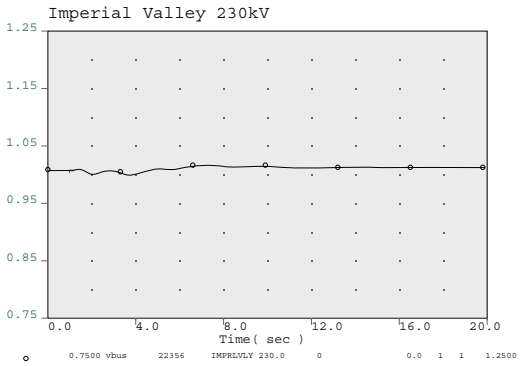
Affected System Frequency Check and Comparison

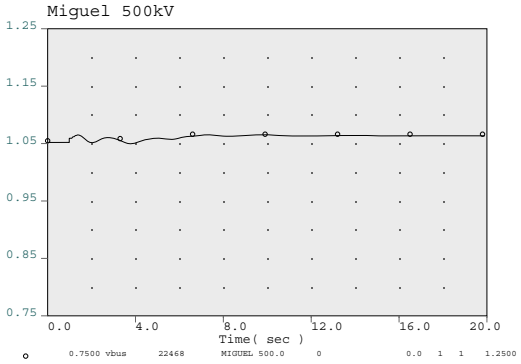


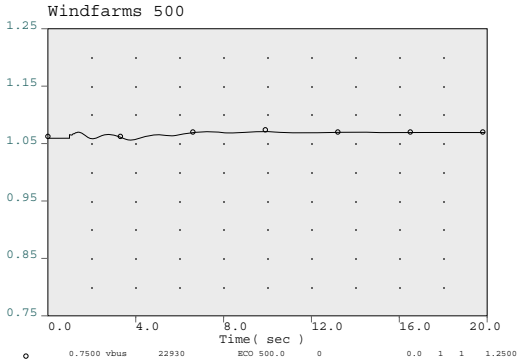
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

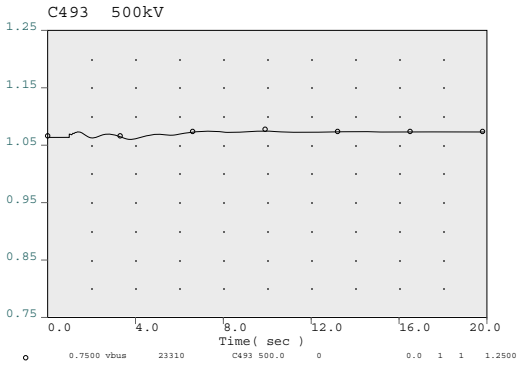
Imperial Valley Area - VOLTAGE

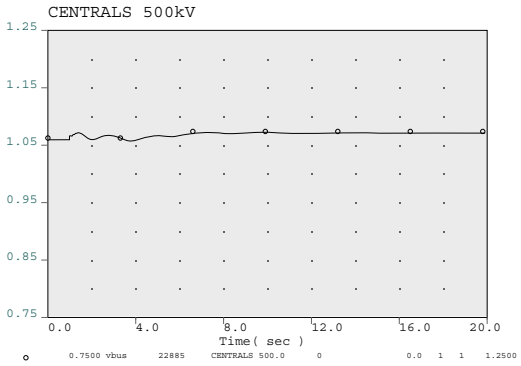






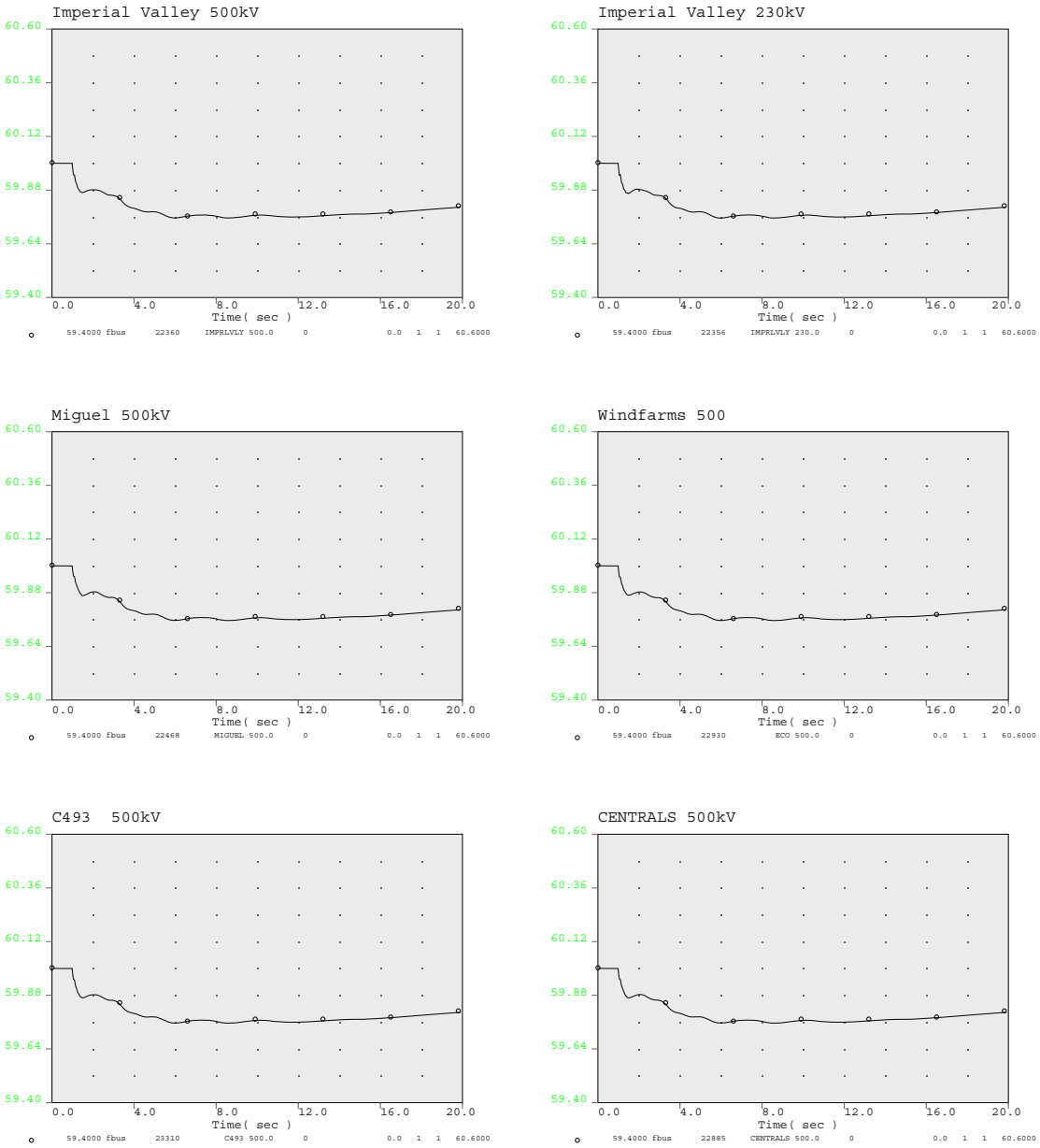






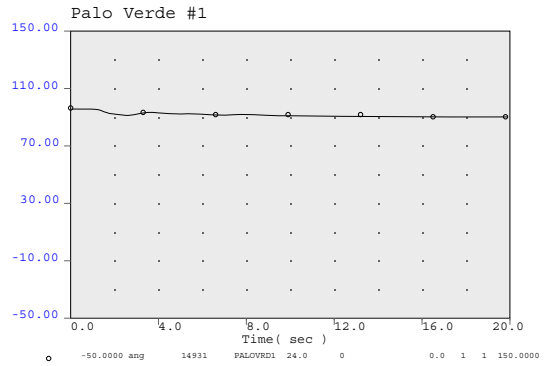
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

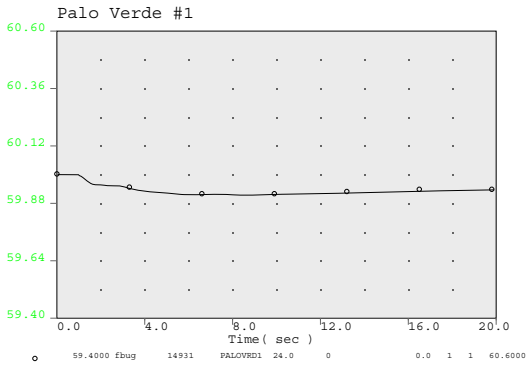
Imperial Valley Area - Frequency

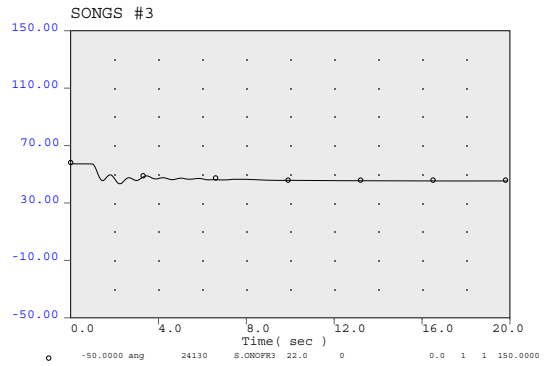


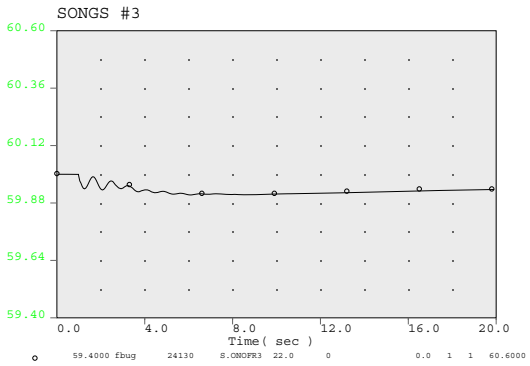
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

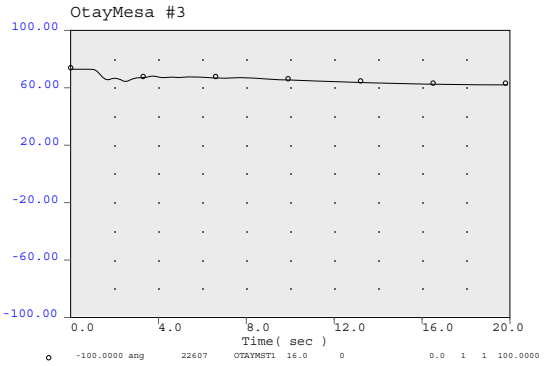
RELATIVE ROTOR ANGLE & FREQUENCY

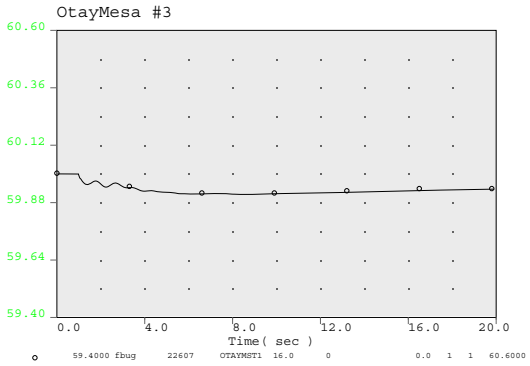












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2014 Light Autumn
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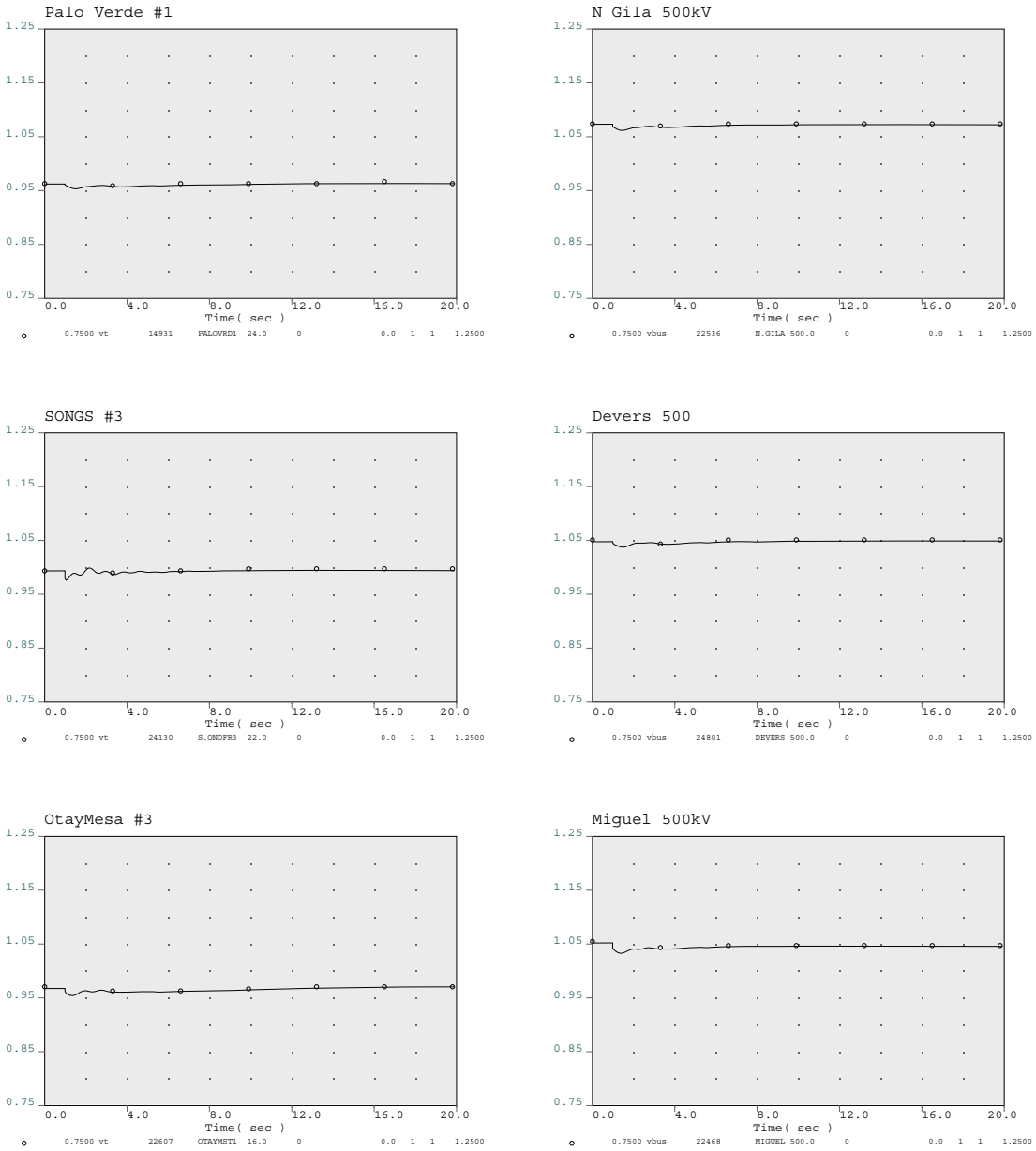
SDGE	SONGS-g1_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:30:16 2010

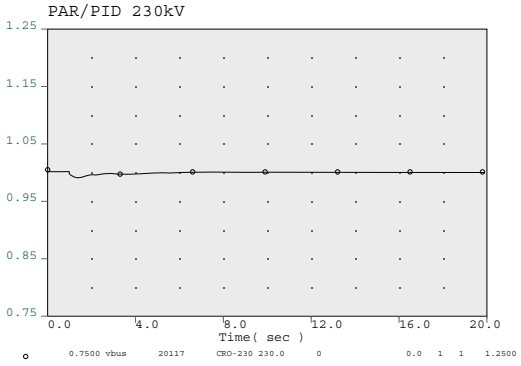
RELATIVE VOLTAGE



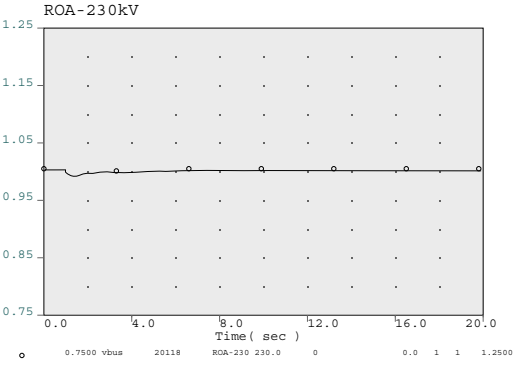
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

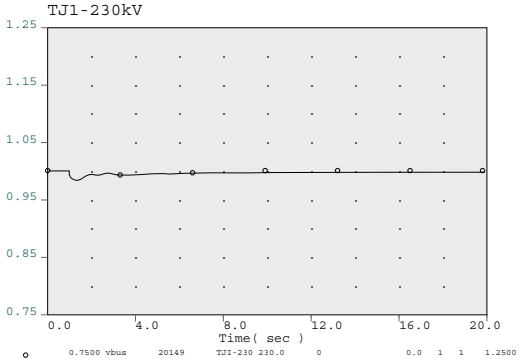
PAR/PID 230kV



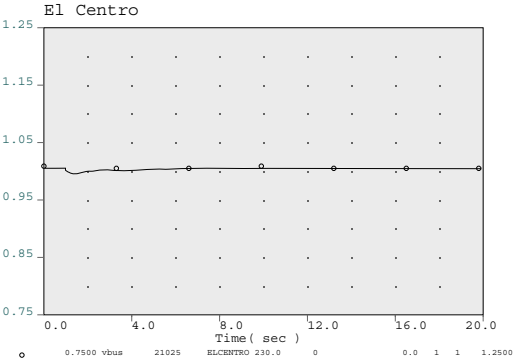
ROA-230kV



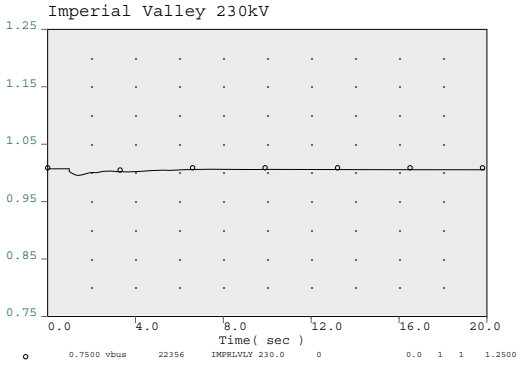
TJ1-230kV



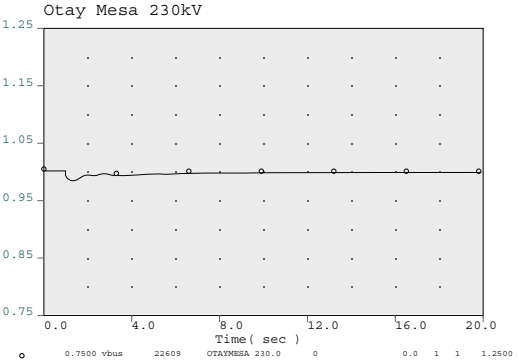
El Centro



Imperial Valley 230kV



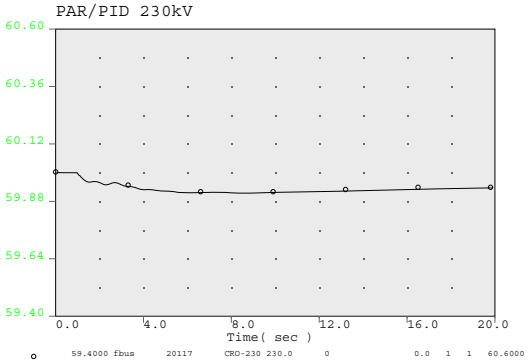
Otay Mesa 230kV



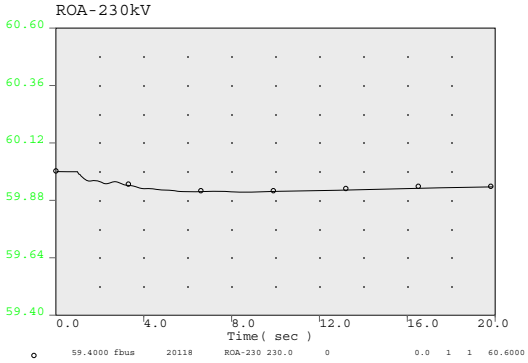
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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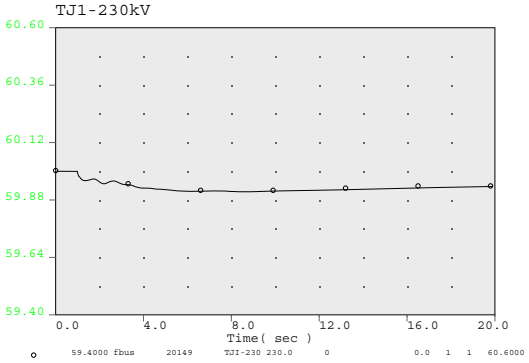
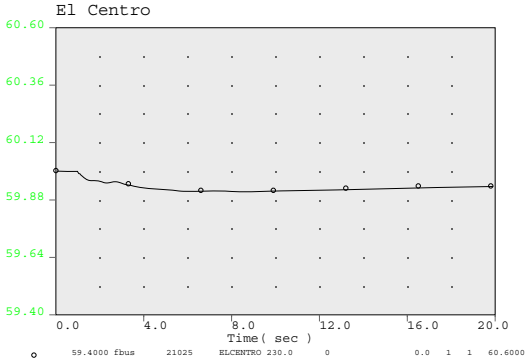
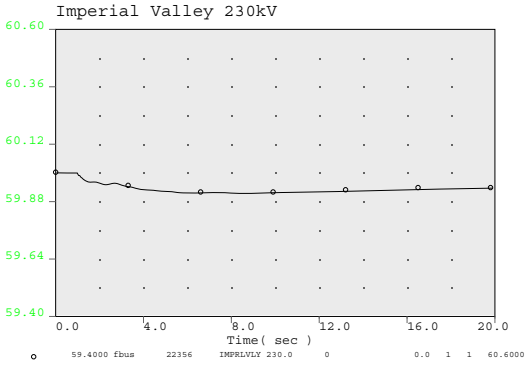


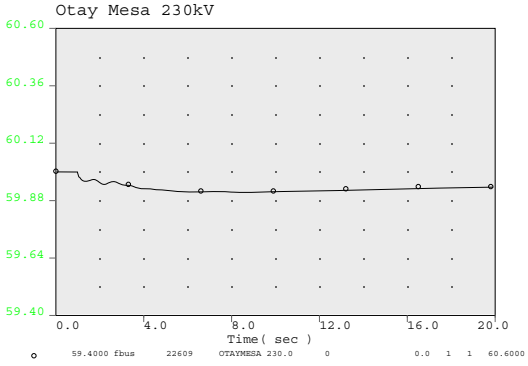
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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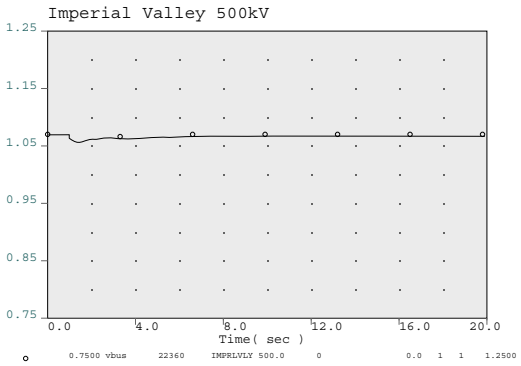
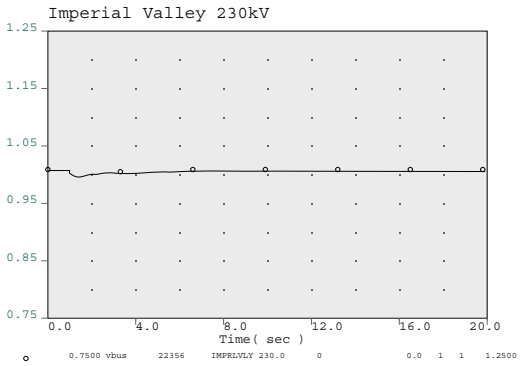
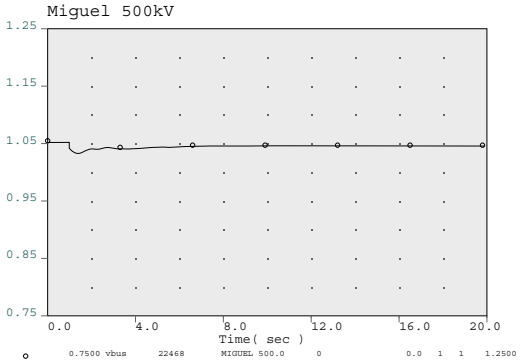
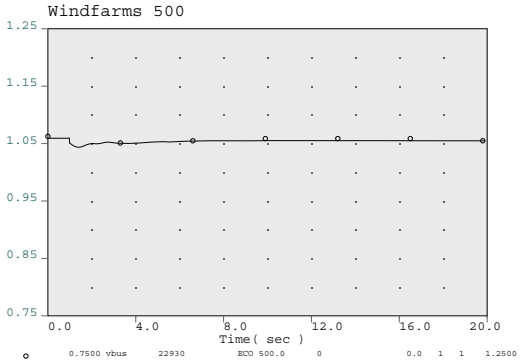
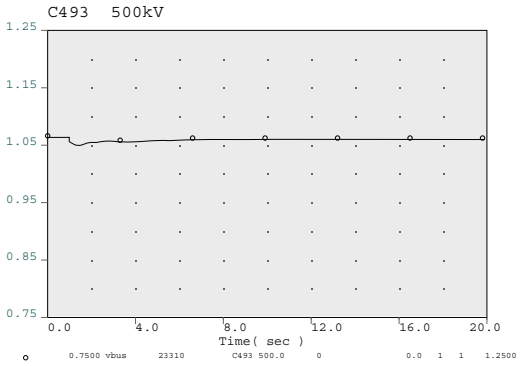
Imperial Valley Area - VOLTAGE

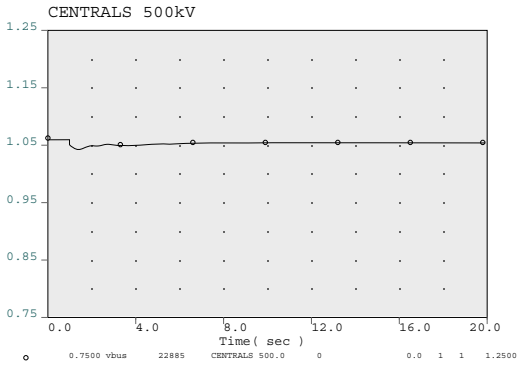






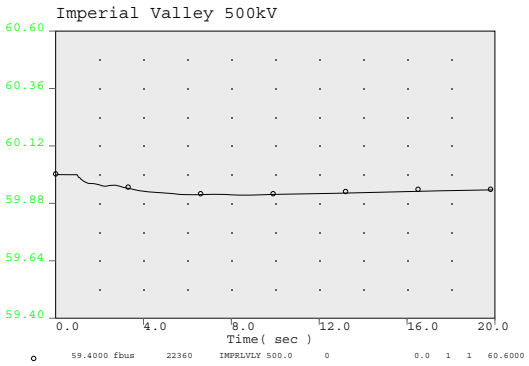


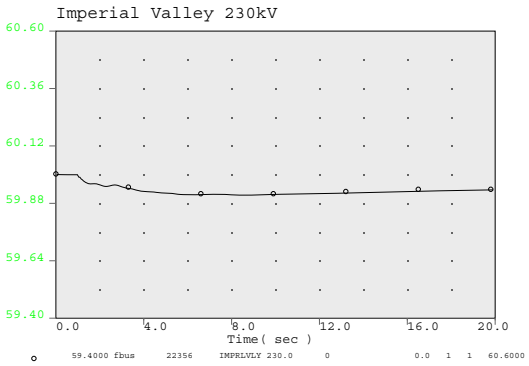


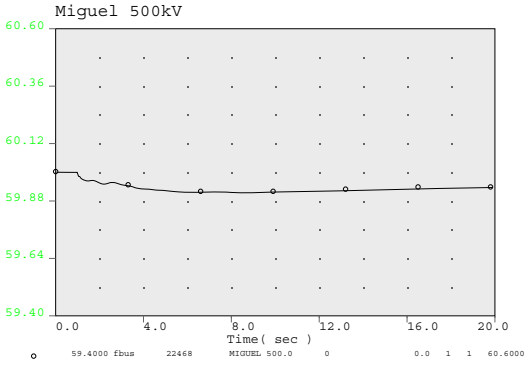


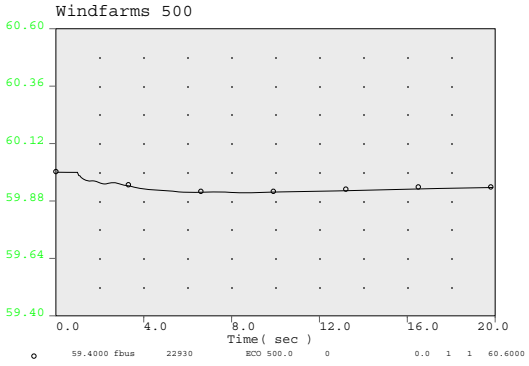
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

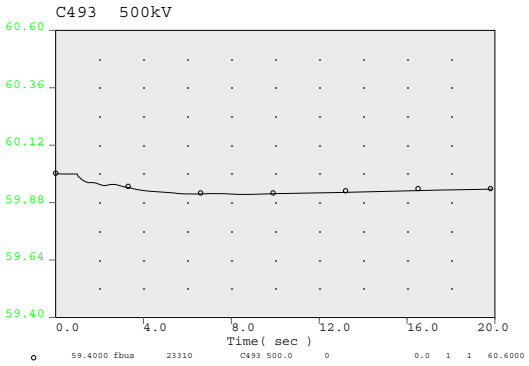
Imperial Valley Area - Frequency

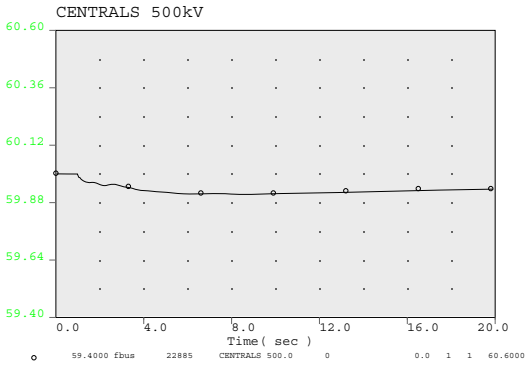






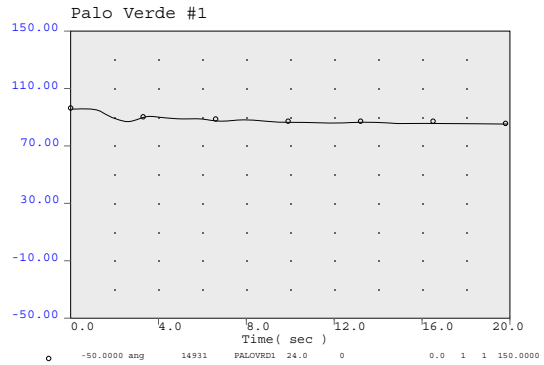


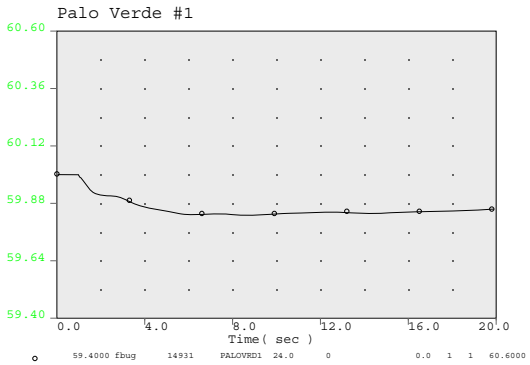


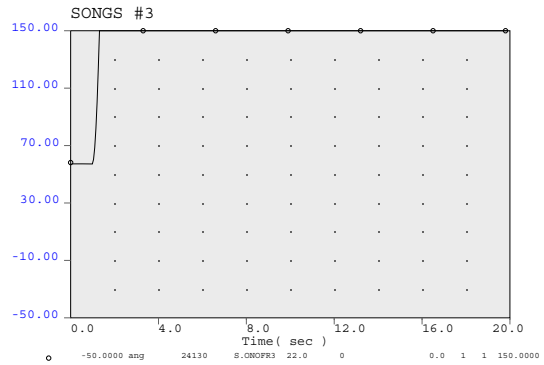


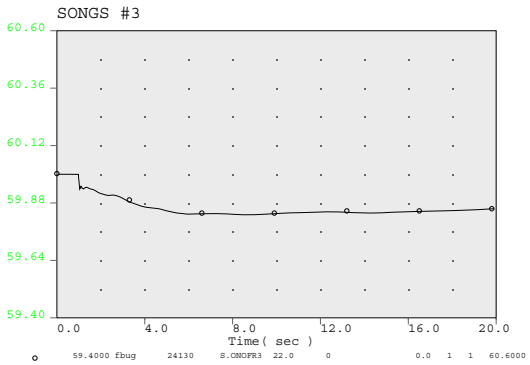
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

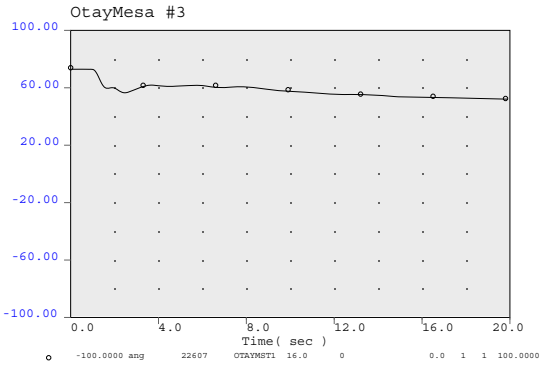
RELATIVE ROTOR ANGLE & FREQUENCY

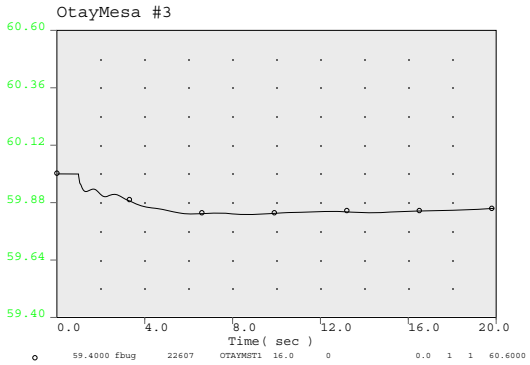












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2014 Light Autumn
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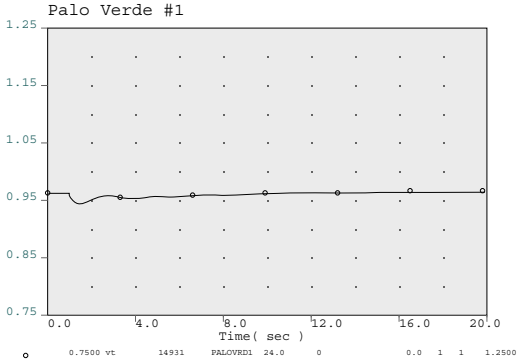
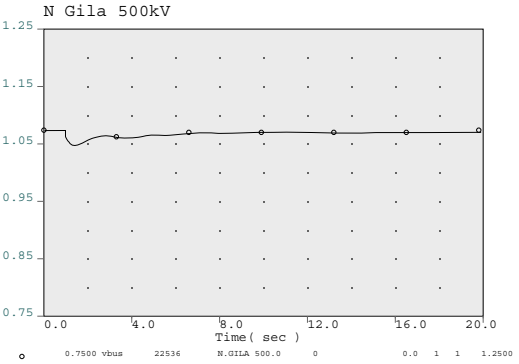
SDGE	SONGS-g2_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:30:34 2010

RELATIVE VOLTAGE

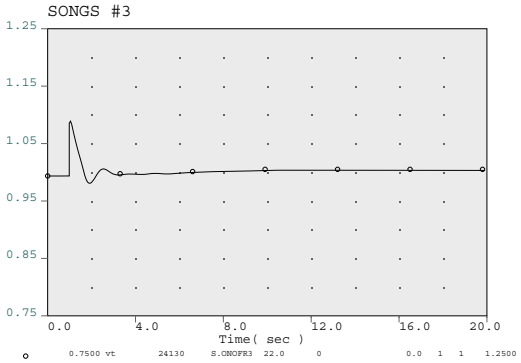
Palo Verde #1



N Gila 500kV



SONGS #3



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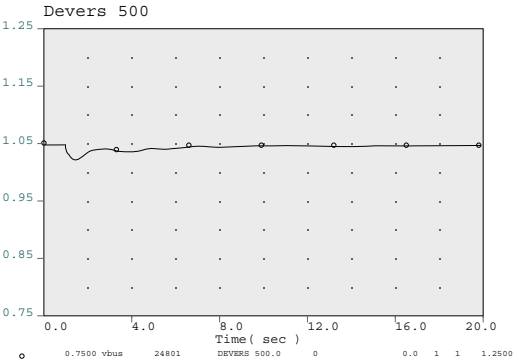
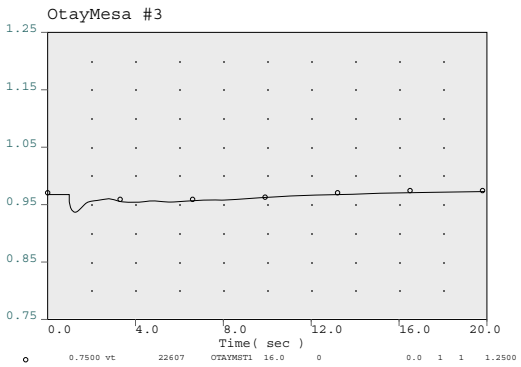
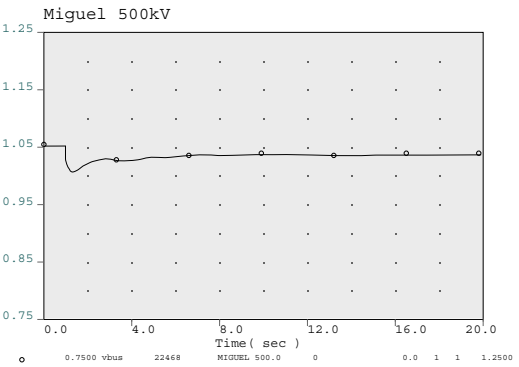


OtayMesa #3



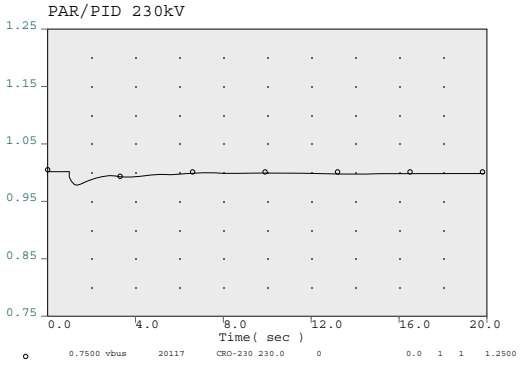
Miguel 500kV



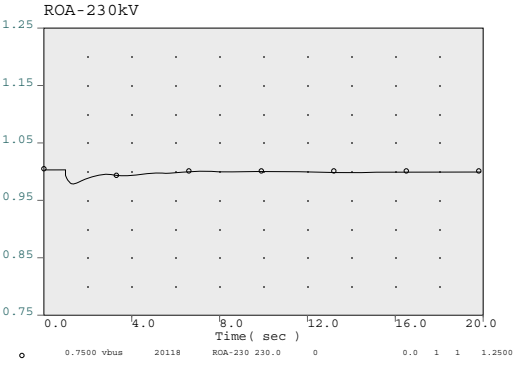
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

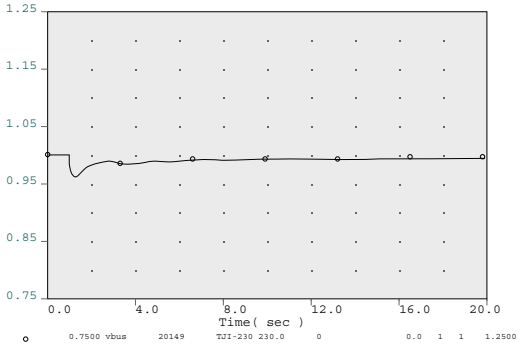
PAR/PID 230kV



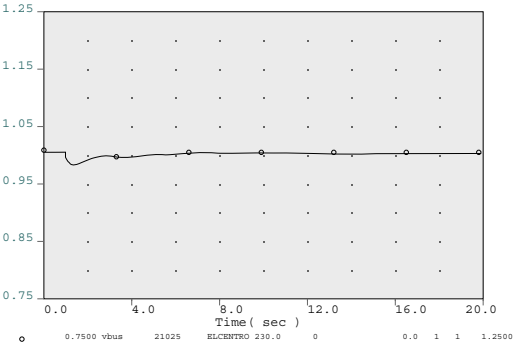
ROA-230kV



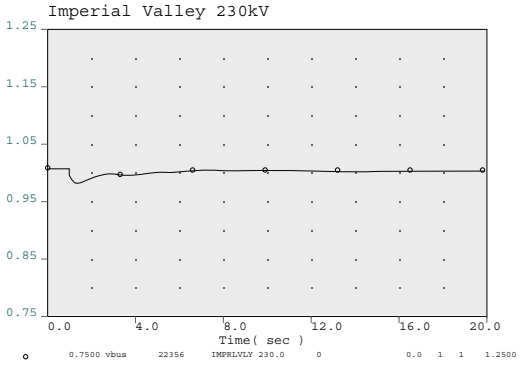
TJ1-230kV



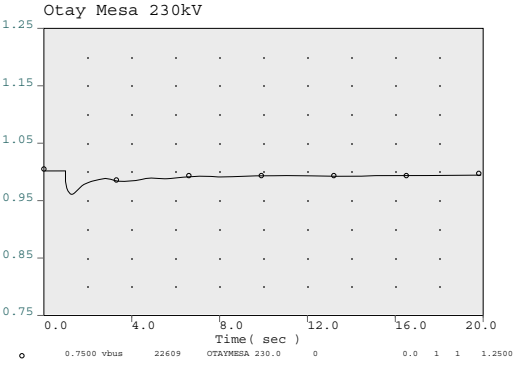
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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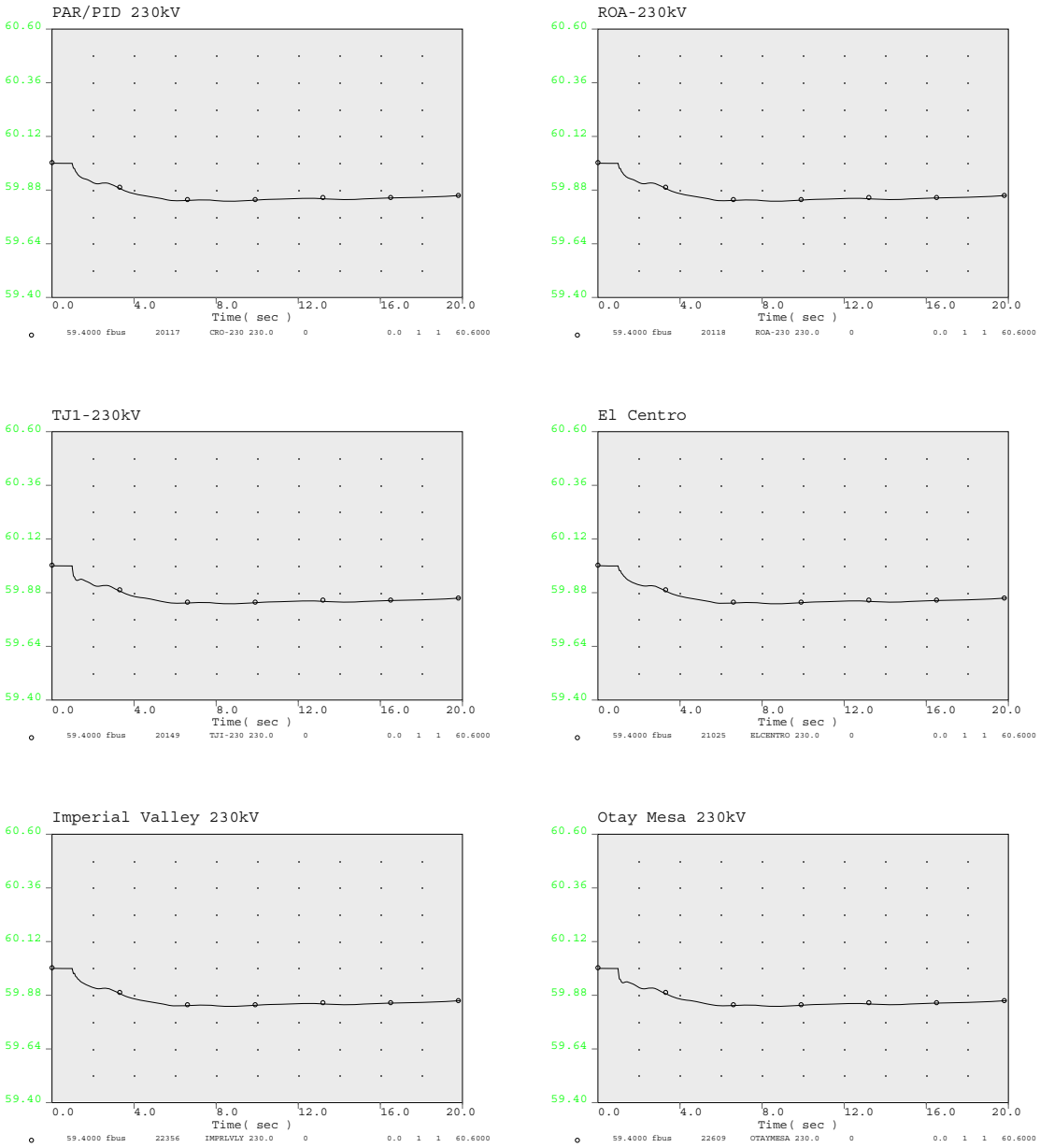
Affected System Frequency Check and Comparison



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2014 Light Autumn
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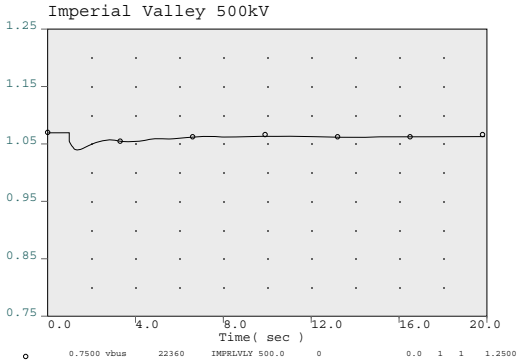
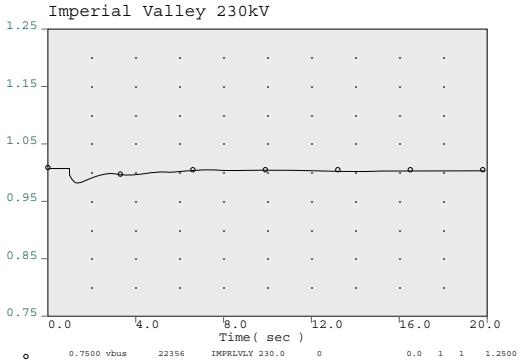
Imperial Valley Area - VOLTAGE

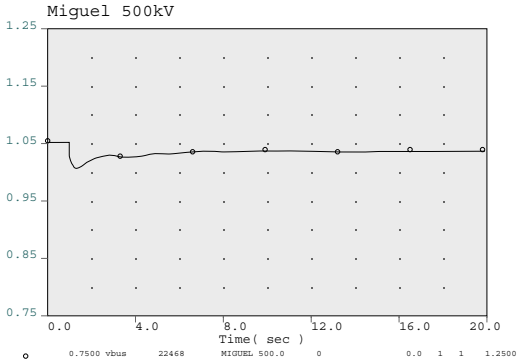
Imperial Valley 500kV



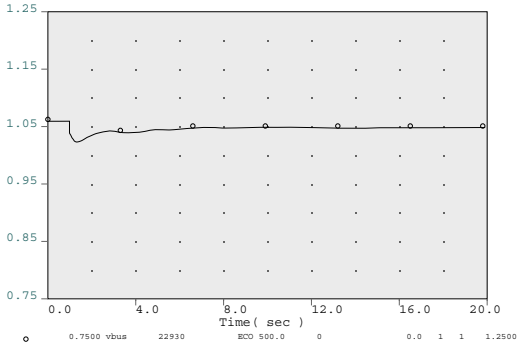
Imperial Valley 230kV



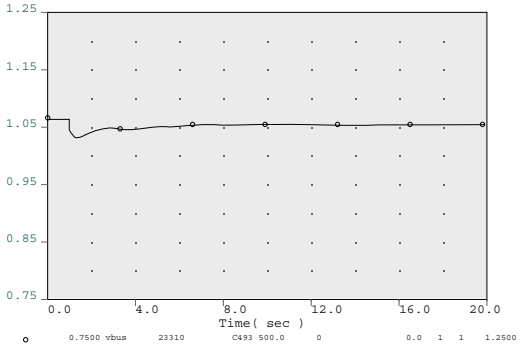
Miguel 500kV



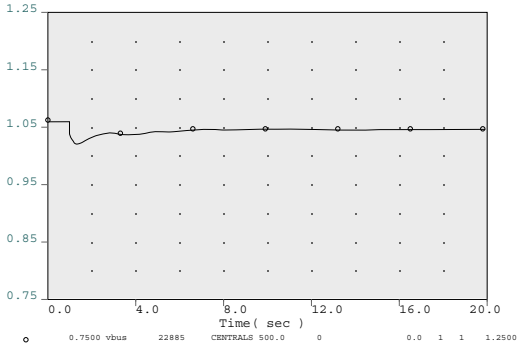
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

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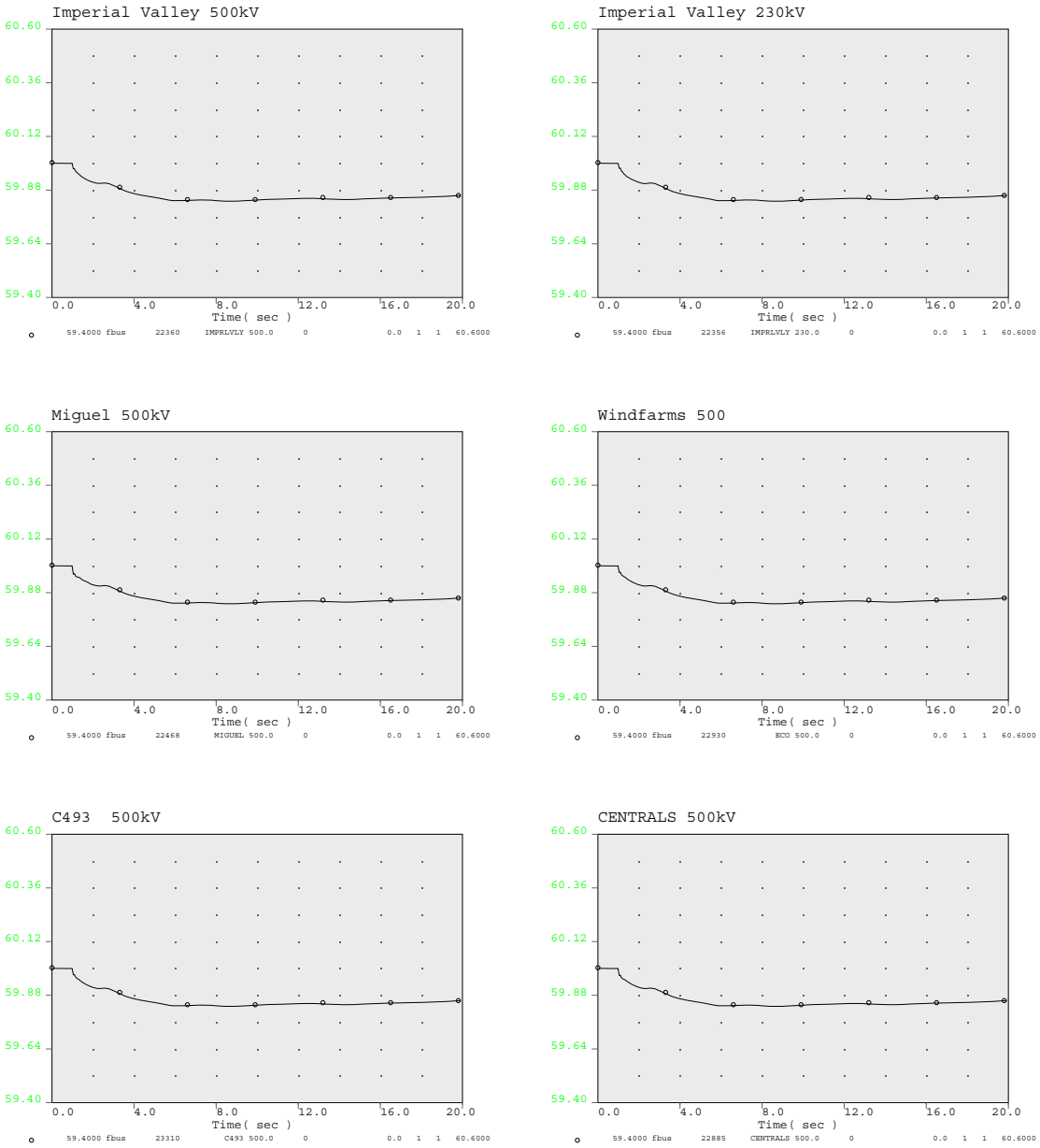
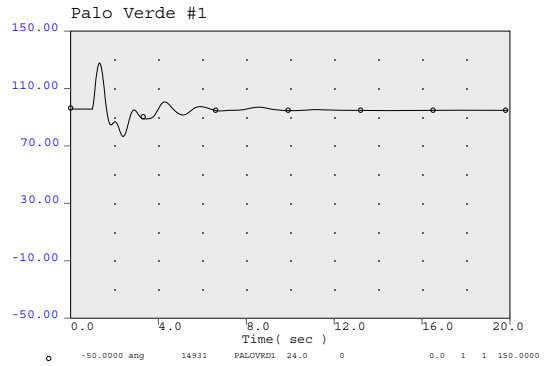
SDGE	SONGS-g2_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:30:34 2010

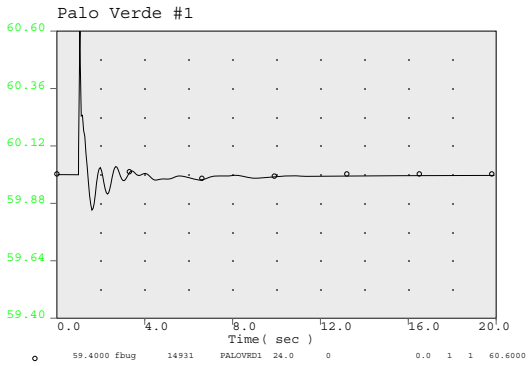
Imperial Valley Area - Frequency

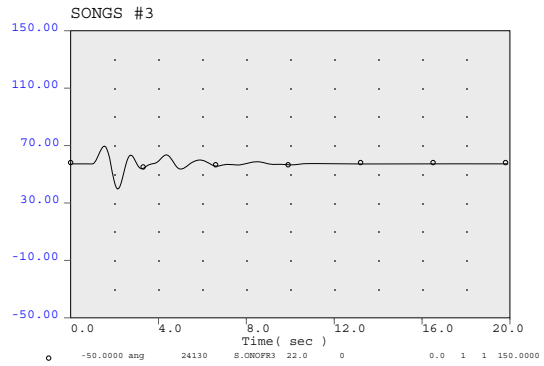


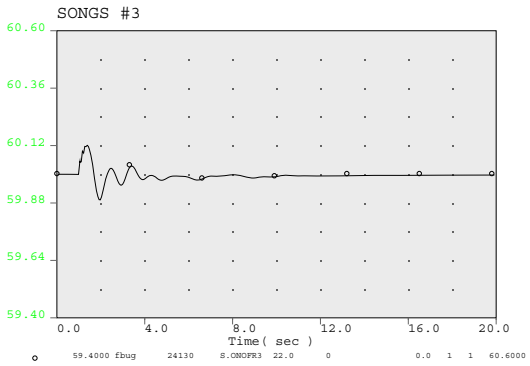
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

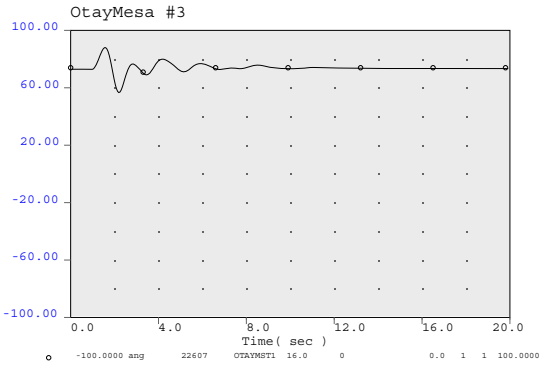
RELATIVE ROTOR ANGLE & FREQUENCY

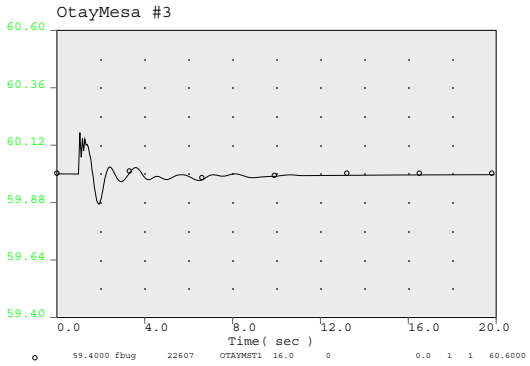












SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

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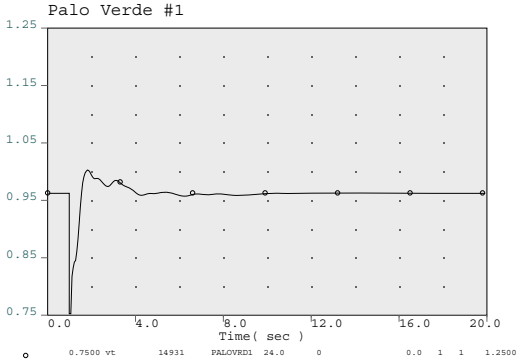
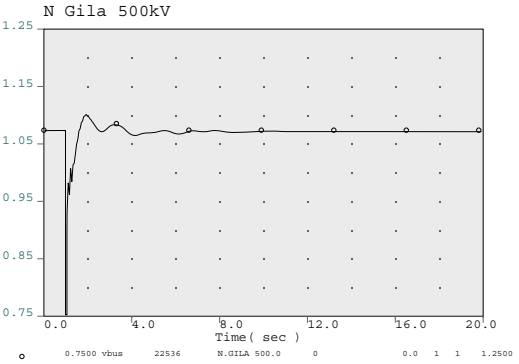
SDGE	T468_HAA_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:31:23 2010

RELATIVE VOLTAGE

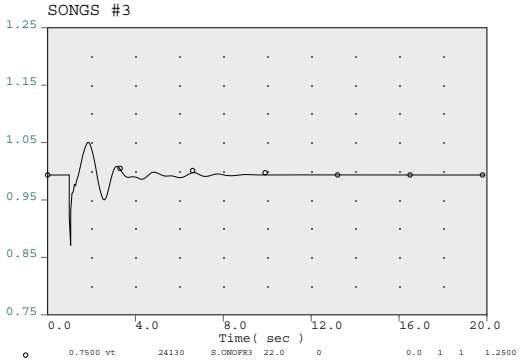
Palo Verde #1



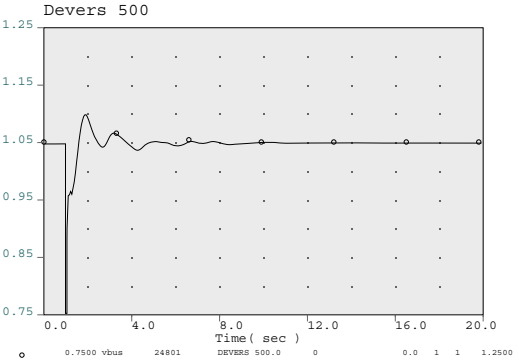
N Gila 500kV



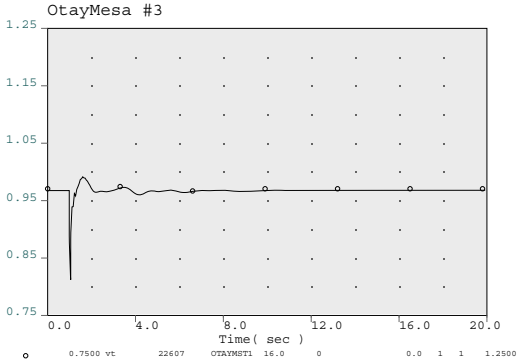
SONGS #3



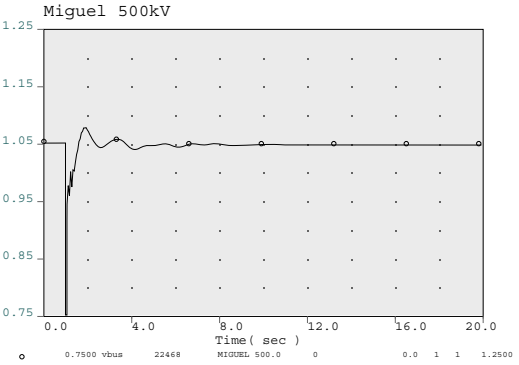
Devers 500



OtayMesa #3



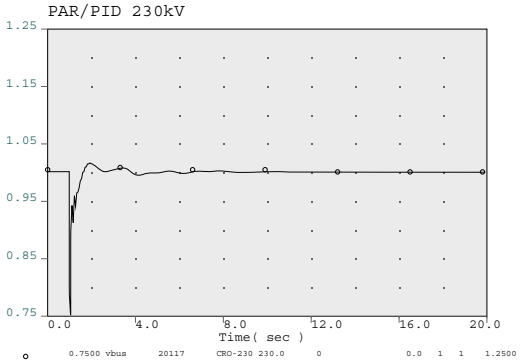
Miguel 500kV



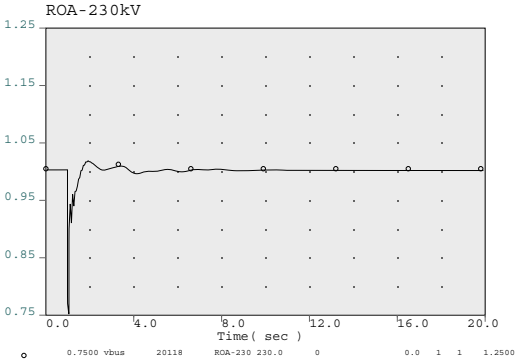
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

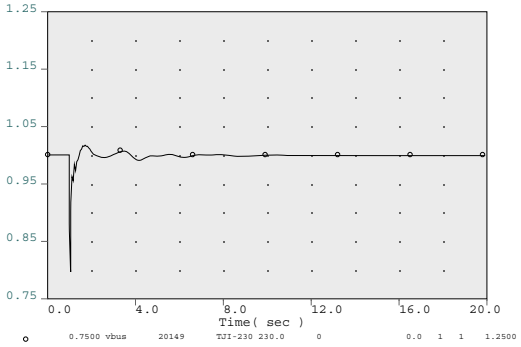
PAR/PID 230kV



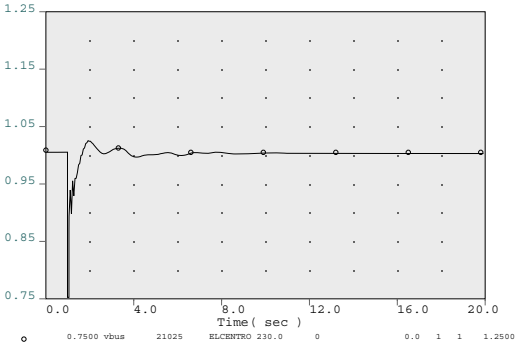
ROA-230kV



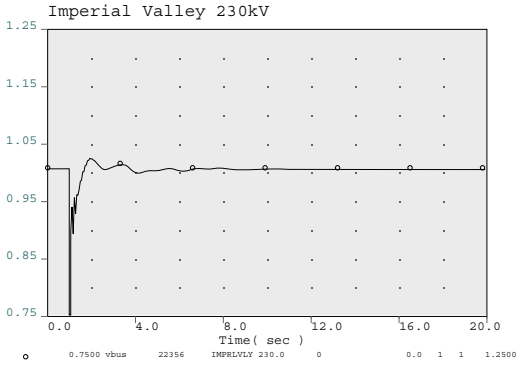
TJ1-230kV



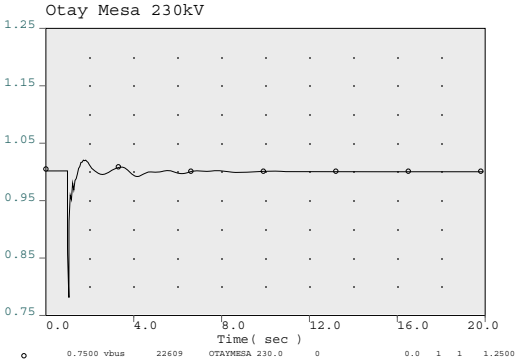
El Centro



Imperial Valley 230kV

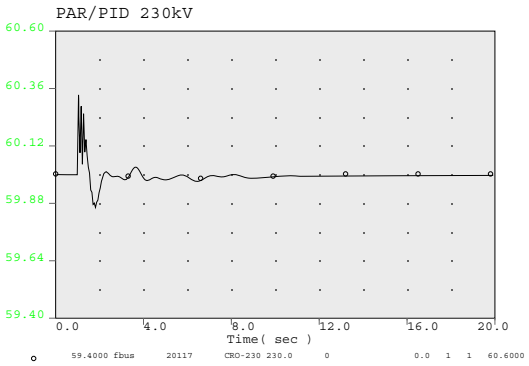


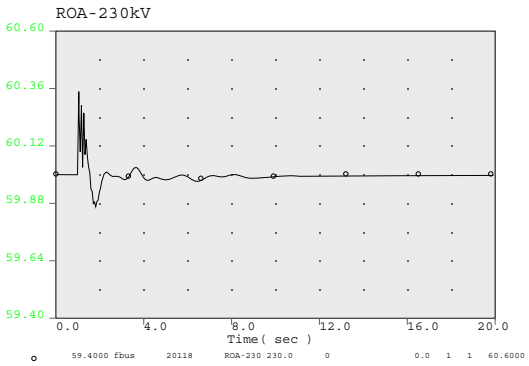
Otay Mesa 230kV

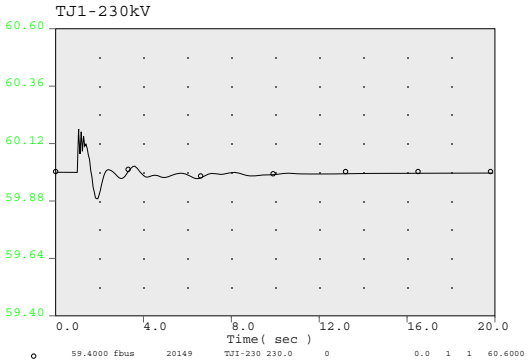


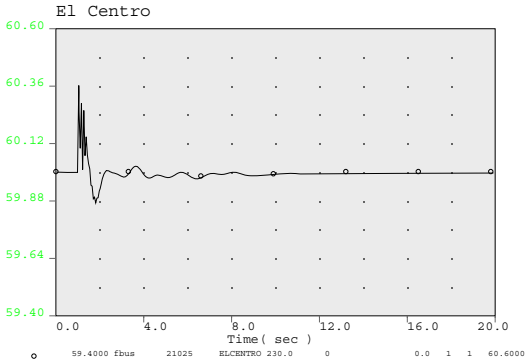
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

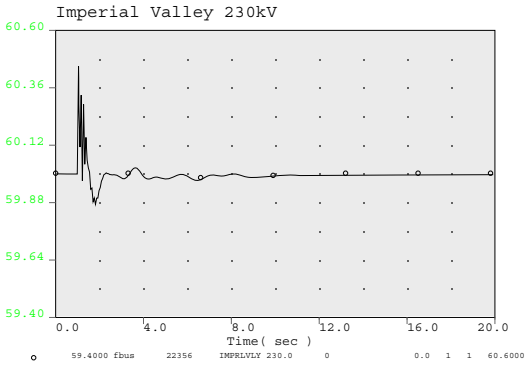
Affected System Frequency Check and Comparison

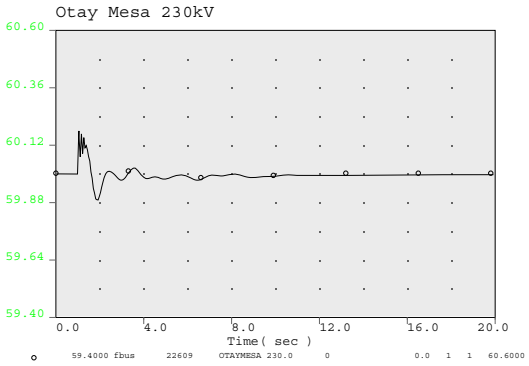








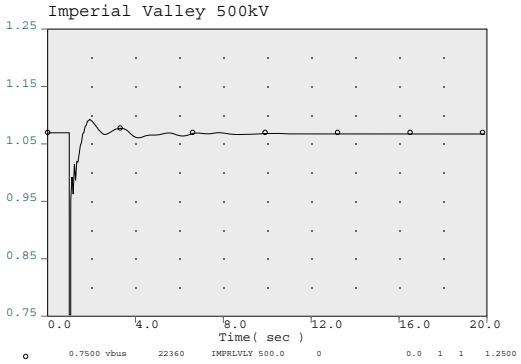




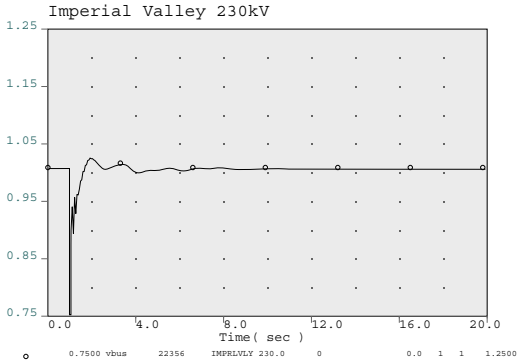
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

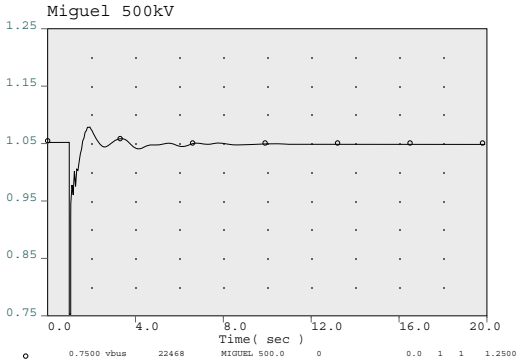
Imperial Valley 500kV



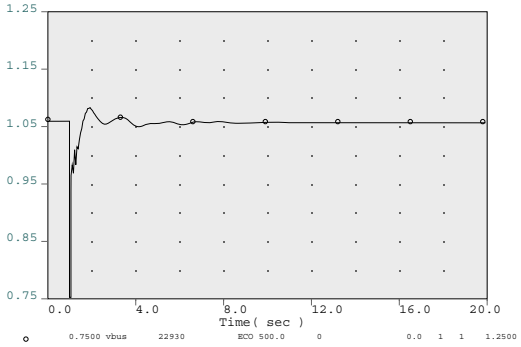
Imperial Valley 230kV



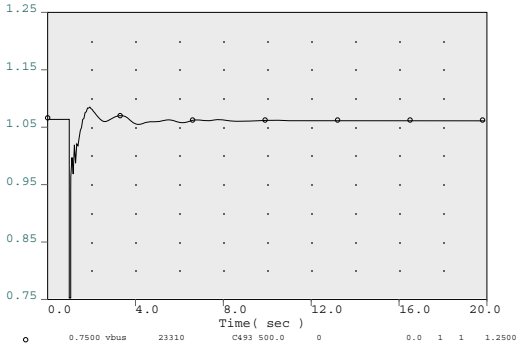
Miguel 500kV



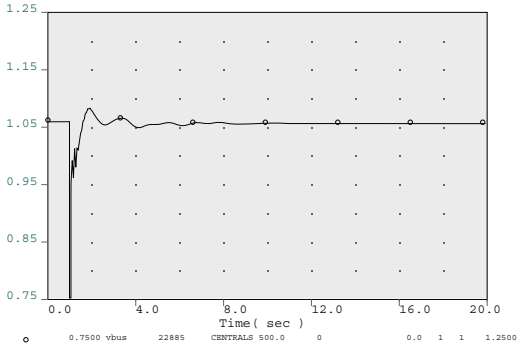
Windfarms 500



C493 500kV

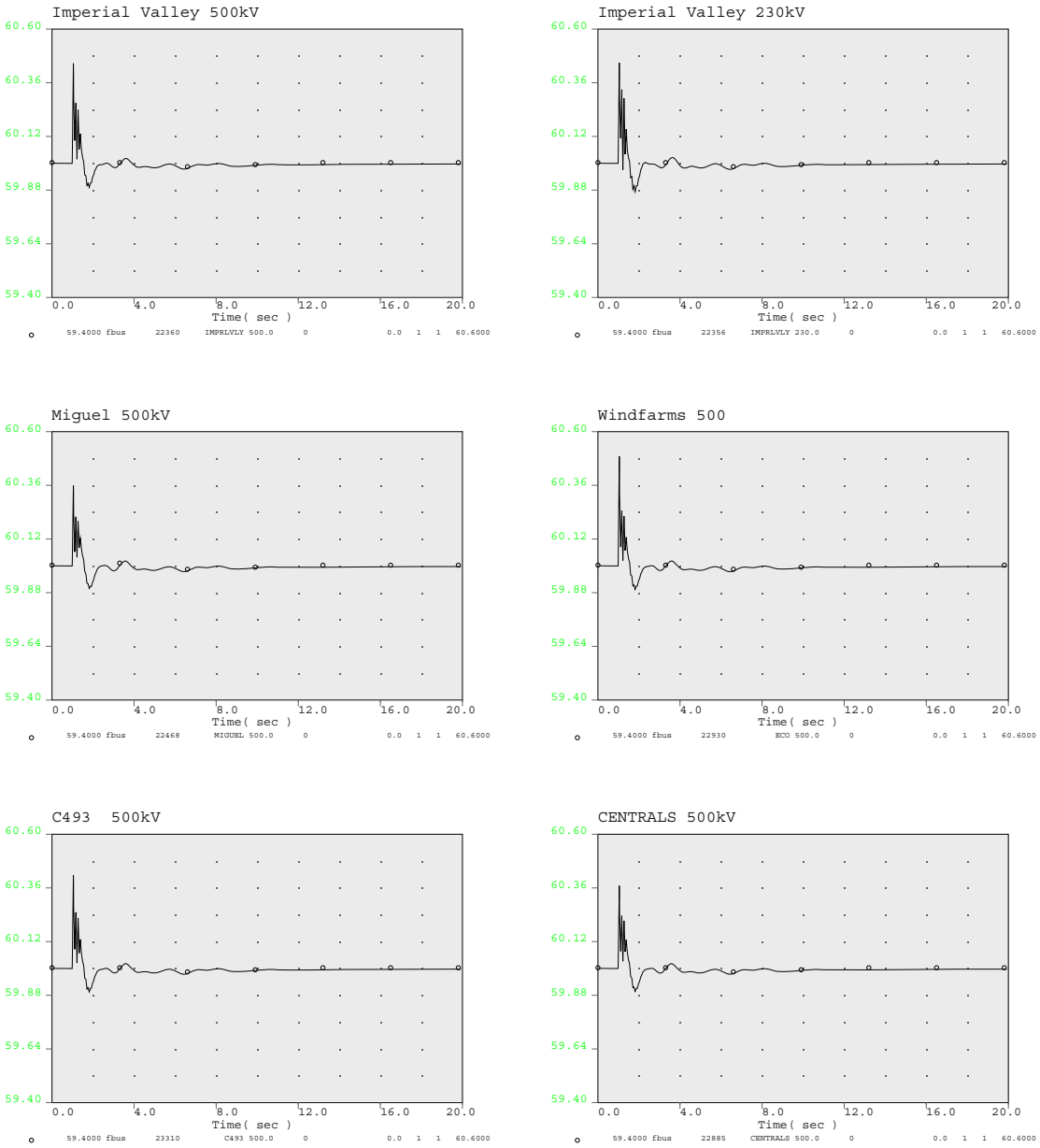


CENTRALS 500kV



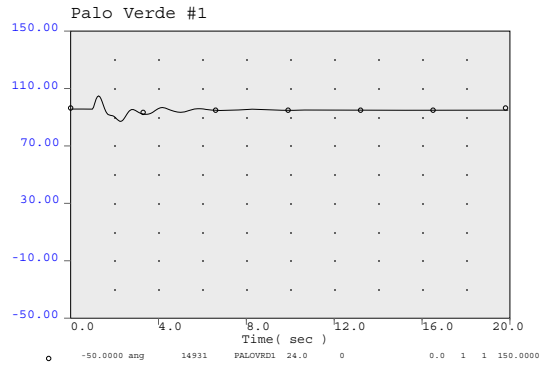
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

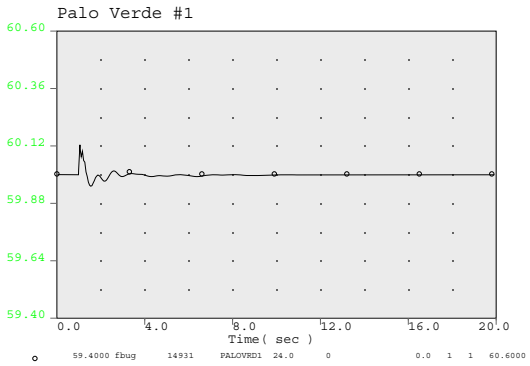
Imperial Valley Area - Frequency

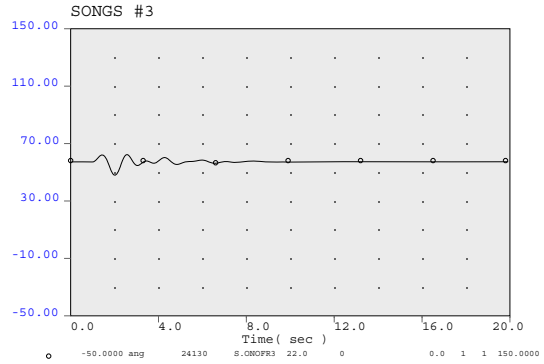


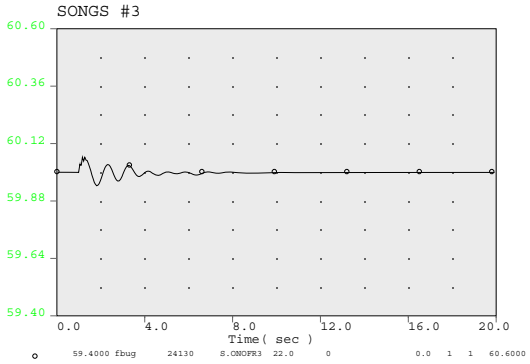
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

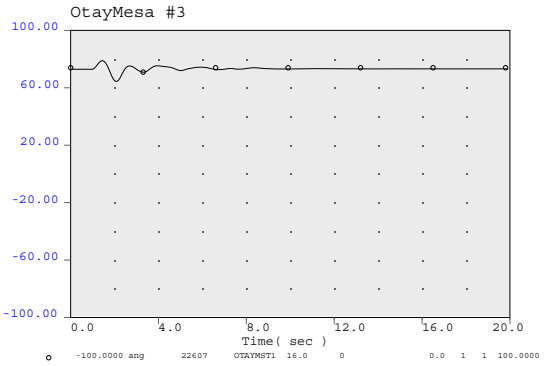
RELATIVE ROTOR ANGLE & FREQUENCY

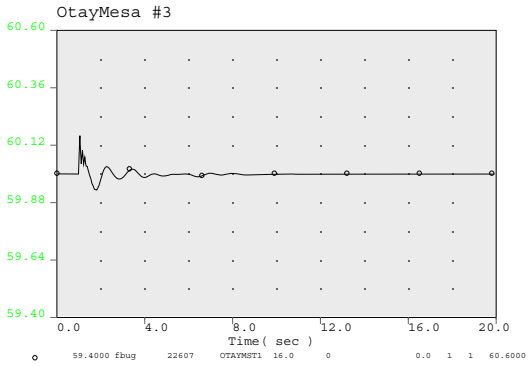












SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

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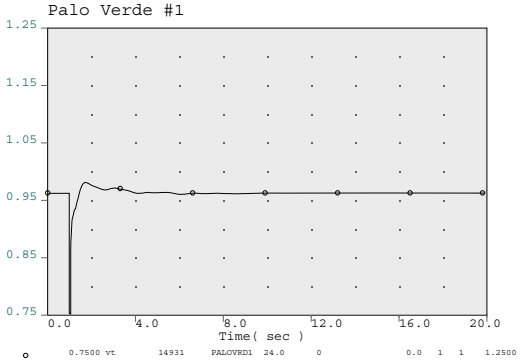
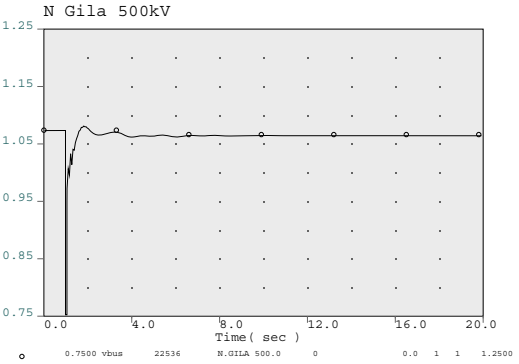
SDGE	T468_NGila_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:31:42 2010

RELATIVE VOLTAGE

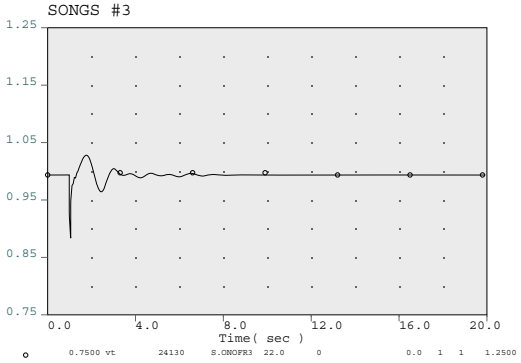
Palo Verde #1



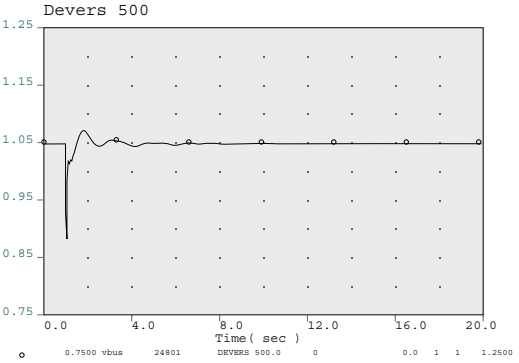
N Gila 500kV



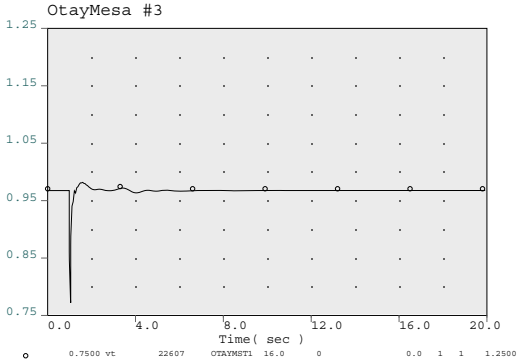
SONGS #3



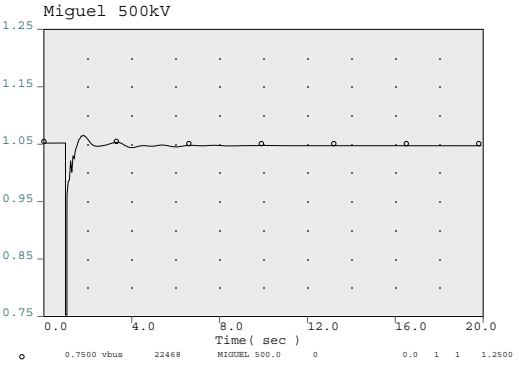
Devers 500



OtayMesa #3



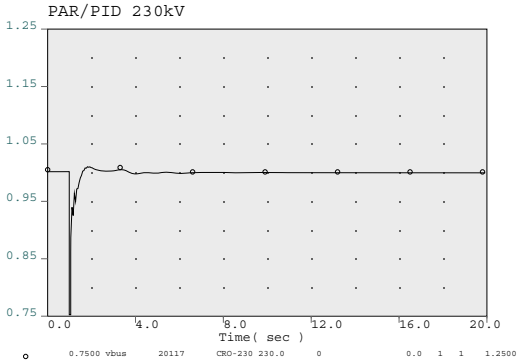
Miguel 500kV



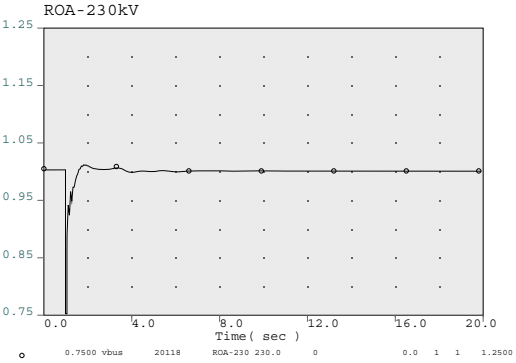
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

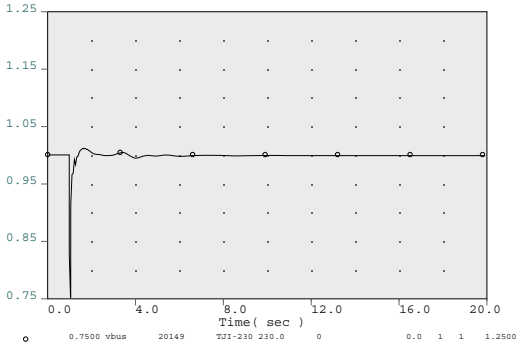
PAR/PID 230kV



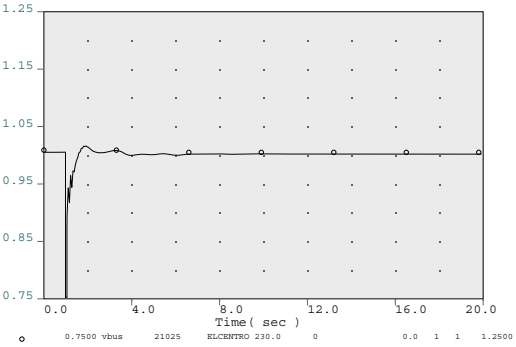
ROA-230kV



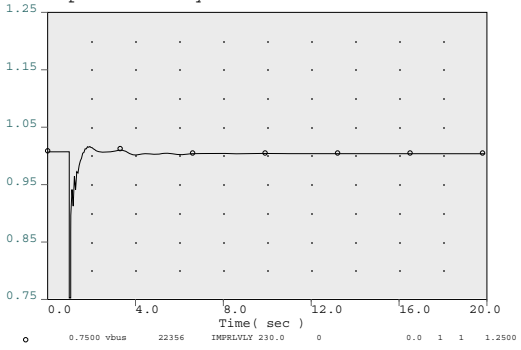
TJ1-230kV



El Centro



Imperial Valley 230kV



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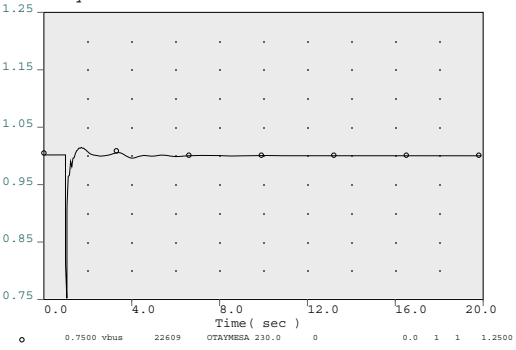
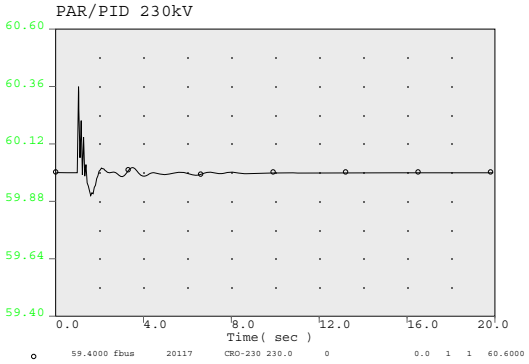


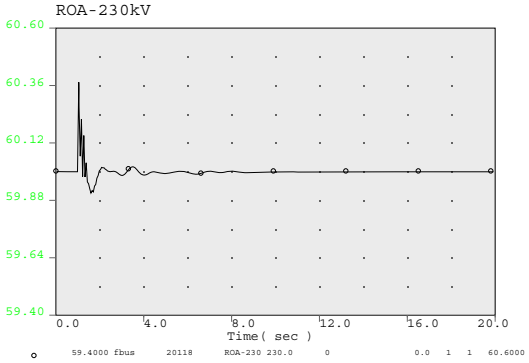
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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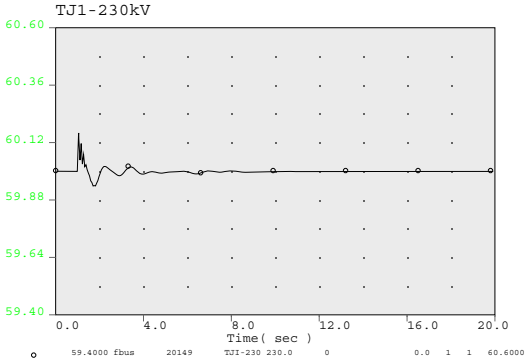

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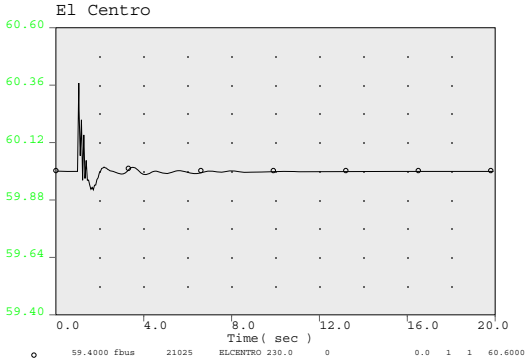
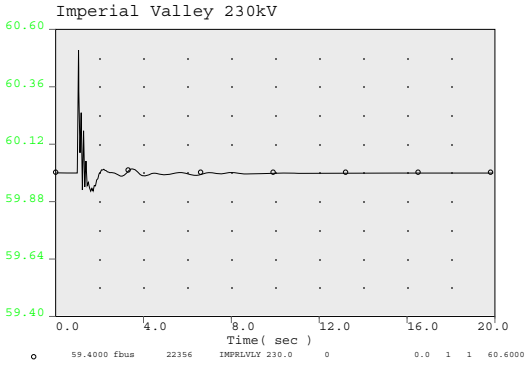


Imperial Valley 230kV



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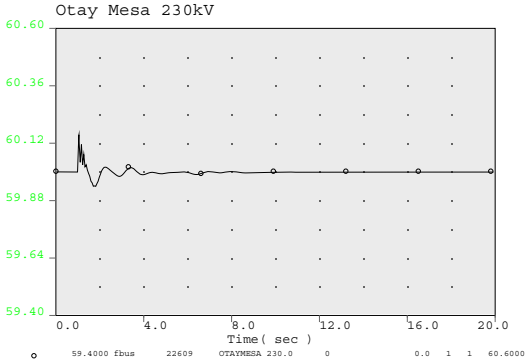
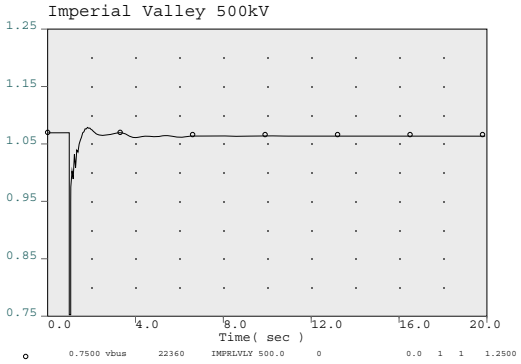


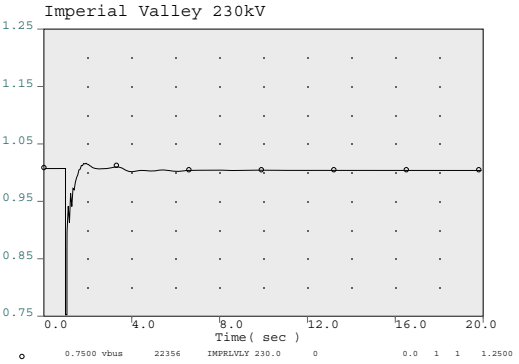
SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

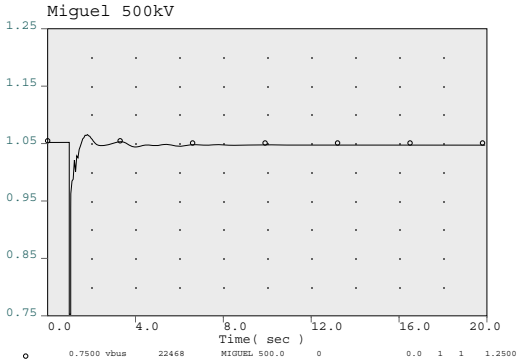
Imperial Valley 500kV



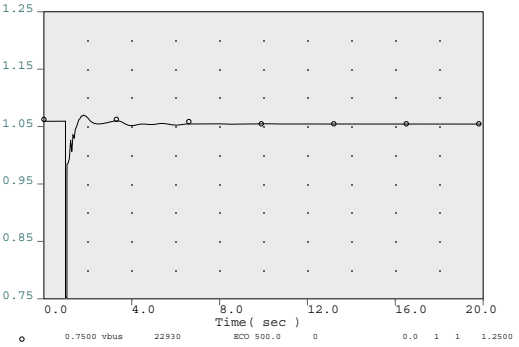
Imperial Valley 230kV



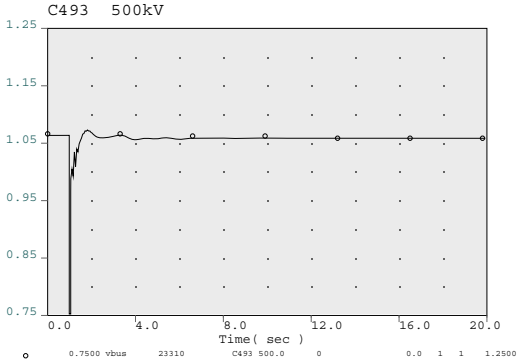
Miguel 500kV



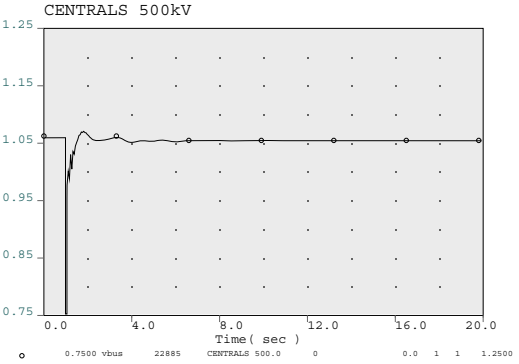
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-N.Gila 500 kV line

Page 5

SDGE	T468_NGila_slo_pst_ll_bu.chf	2_p_i\ll\pst_bu\ws_pst_bu Tue Nov 02 07:31:42 2010

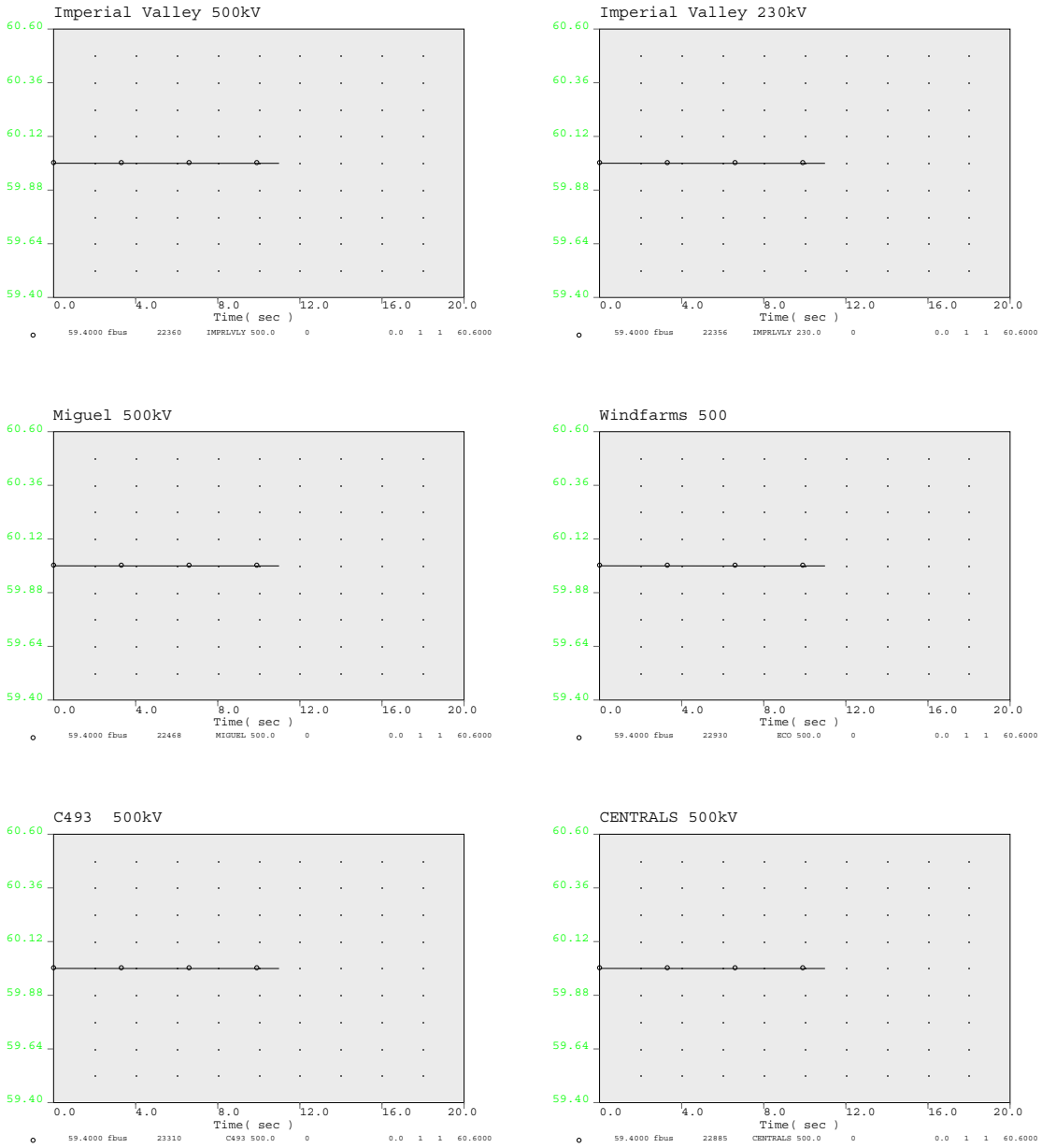
Appendix J-7

Transient Stability Analysis Plots

Internal Cluster

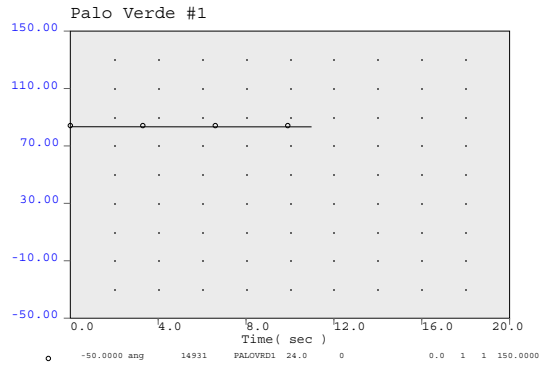
Heavy Summer Pre

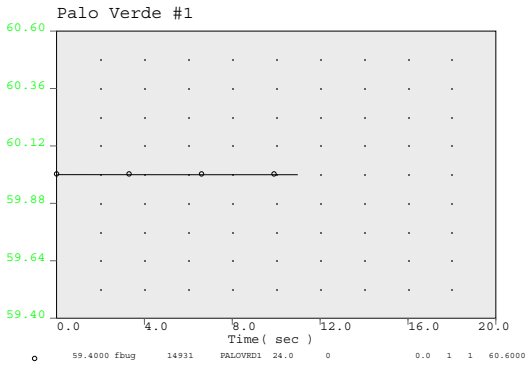
Imperial Valley Area - Frequency

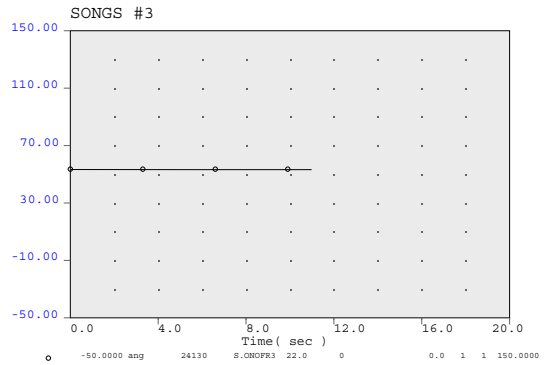


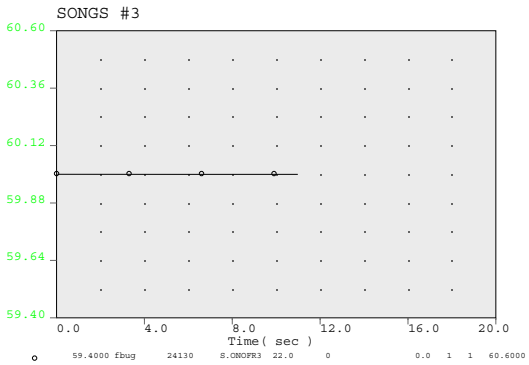
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

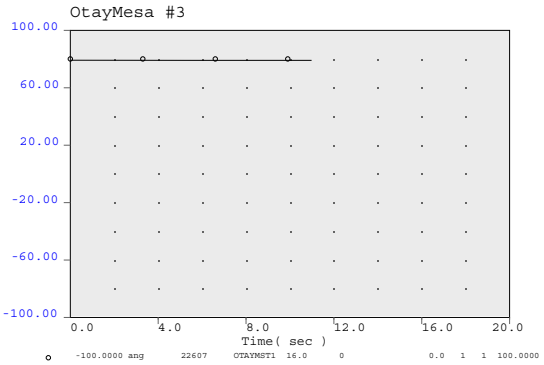
RELATIVE ROTOR ANGLE & FREQUENCY

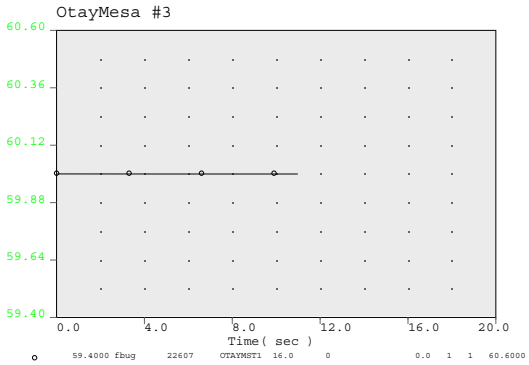






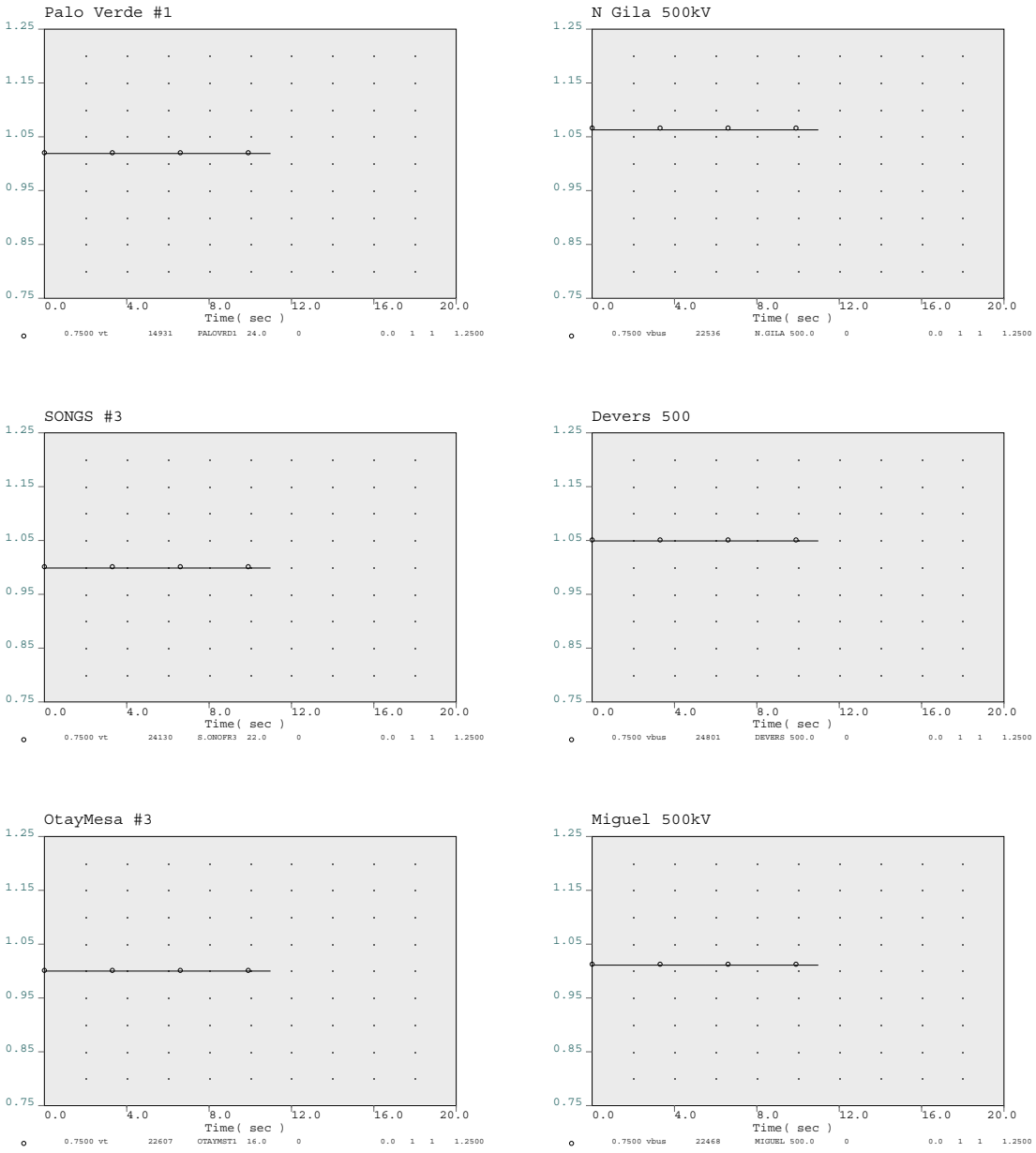






SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

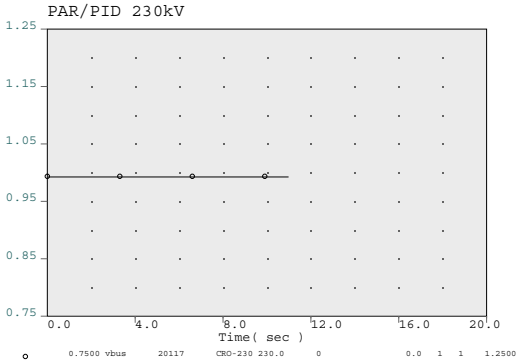
RELATIVE VOLTAGE



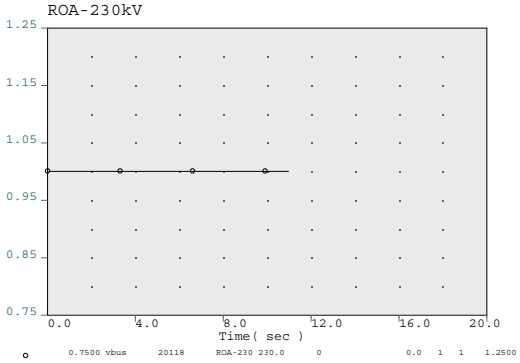
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

Affected System Voltage Check and Comparison

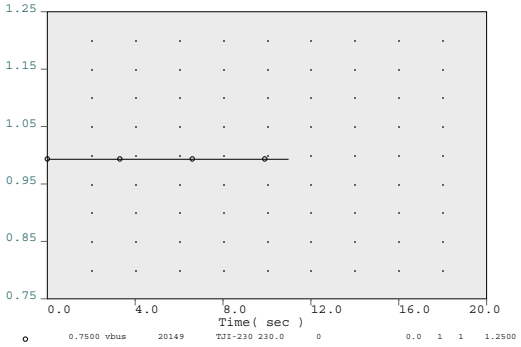
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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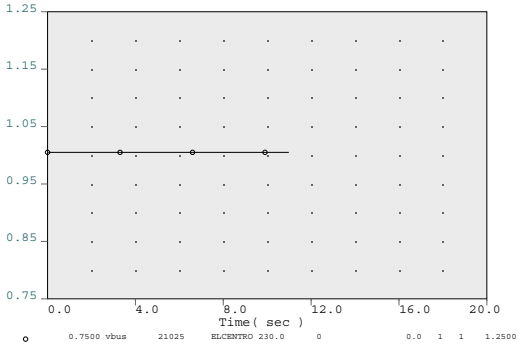
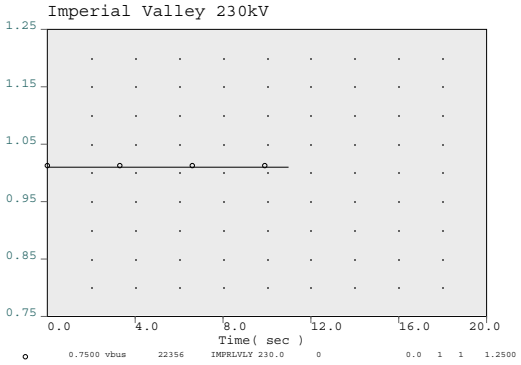
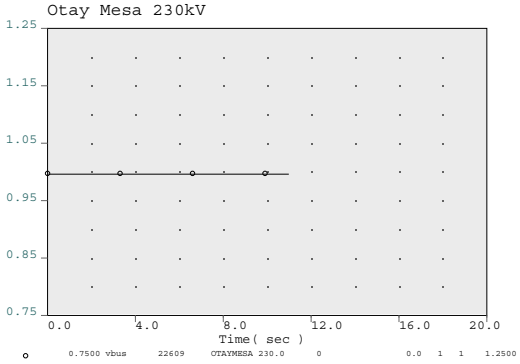


Imperial Valley 230kV

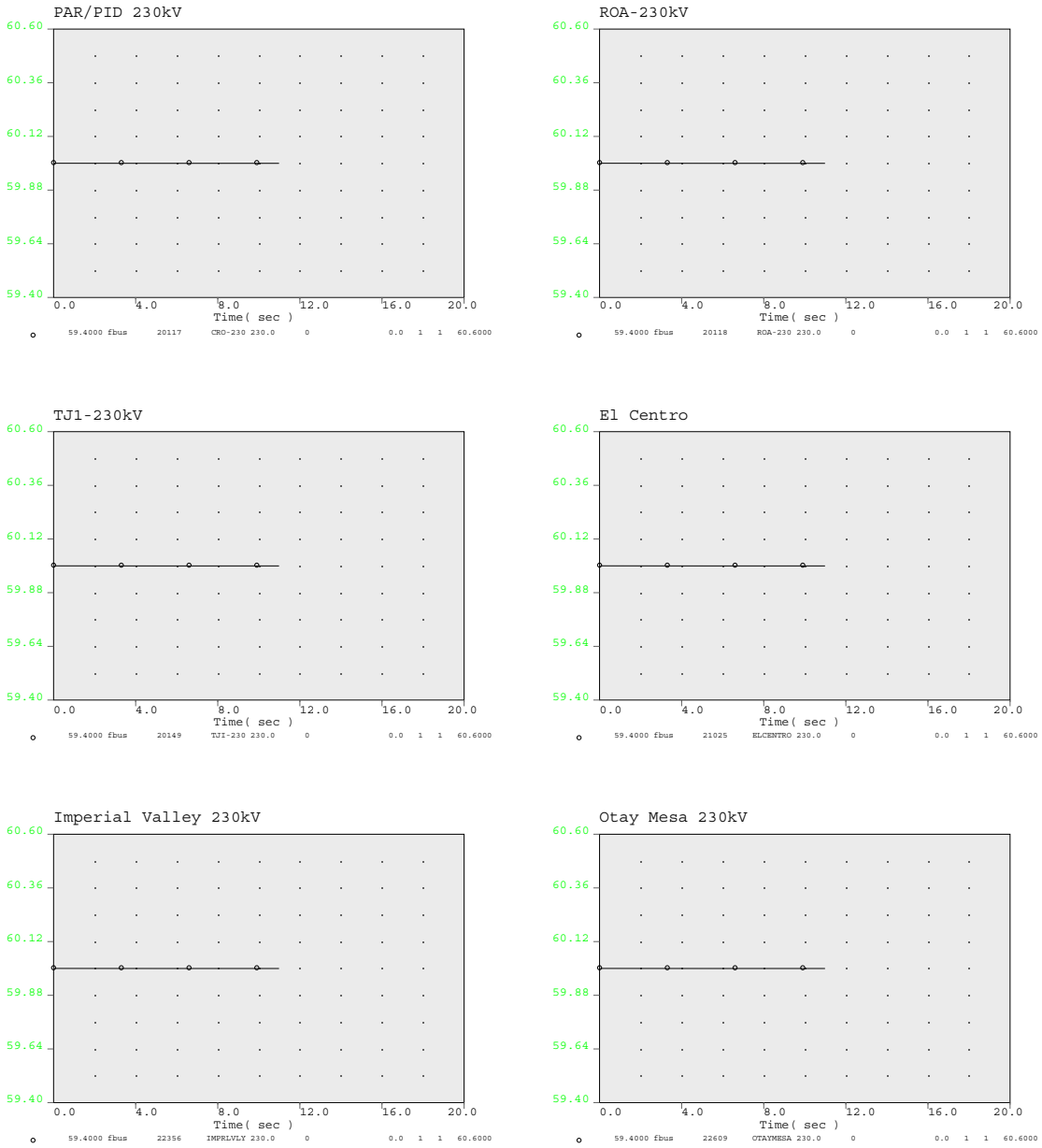


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

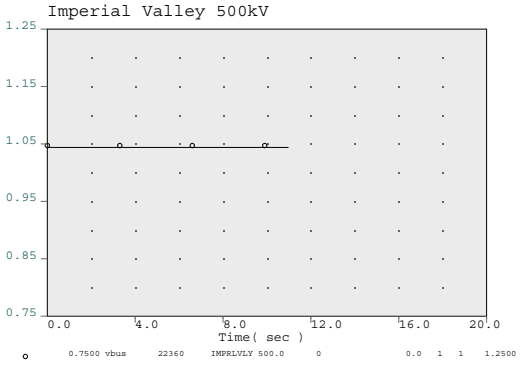
Affected System Frequency Check and Comparison



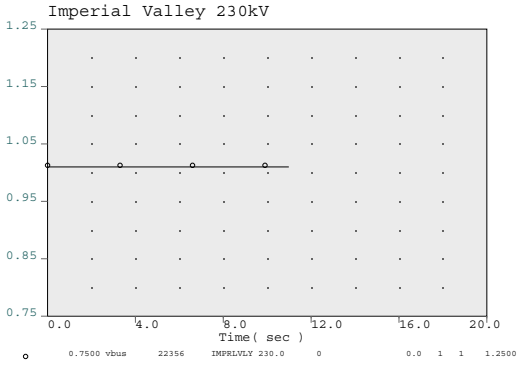
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

Imperial Valley Area - VOLTAGE

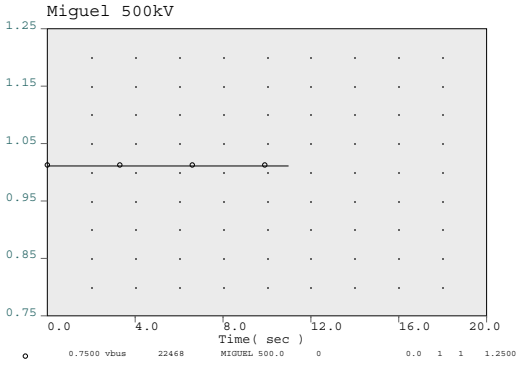
Imperial Valley 500kV



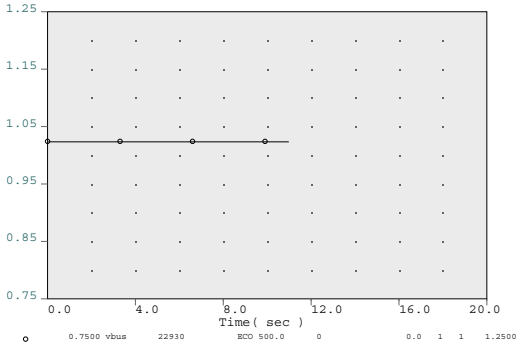
Imperial Valley 230kV



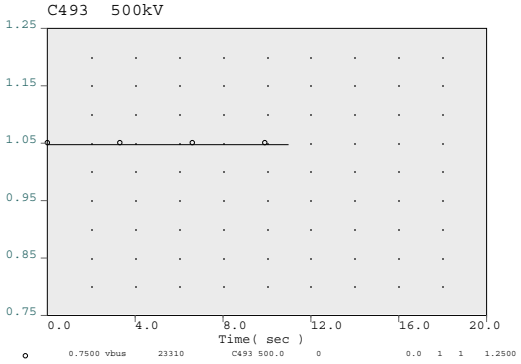
Miguel 500kV



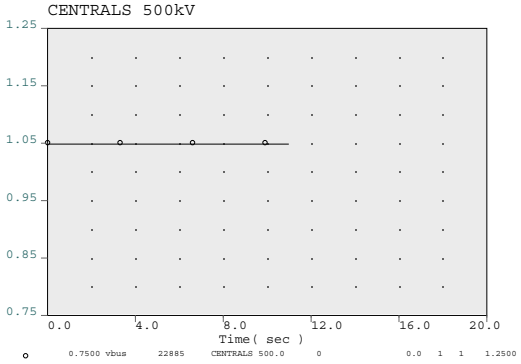
Windfarms 500



C493 500kV



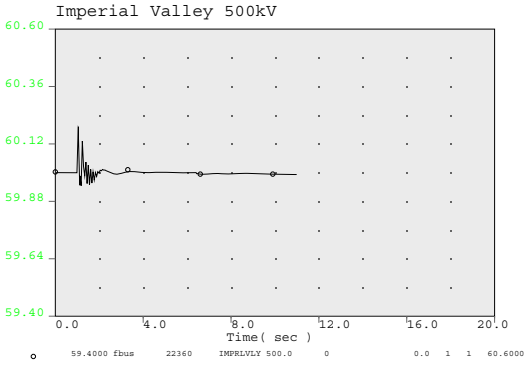
CENTRALS 500kV



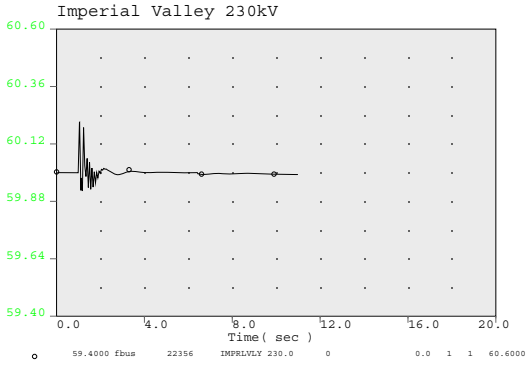
SDG&E Cluster 2 - pre
2014 Heavy Summer
Flat

Imperial Valley Area - Frequency

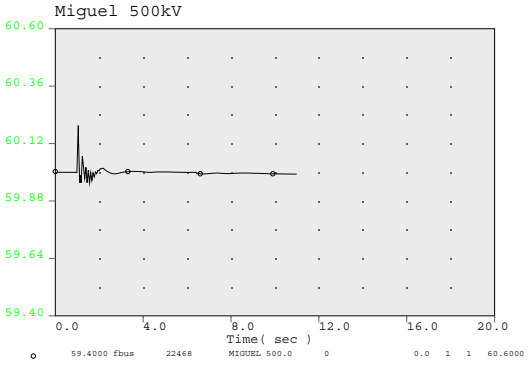
Imperial Valley 500kV



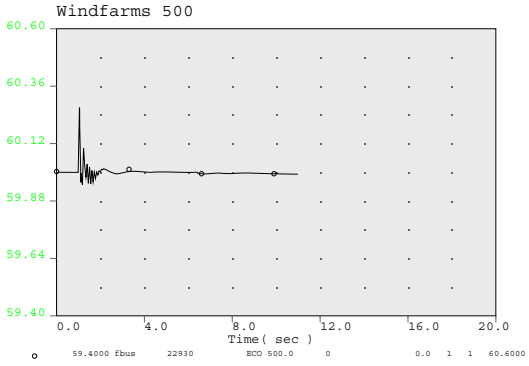
Imperial Valley 230kV



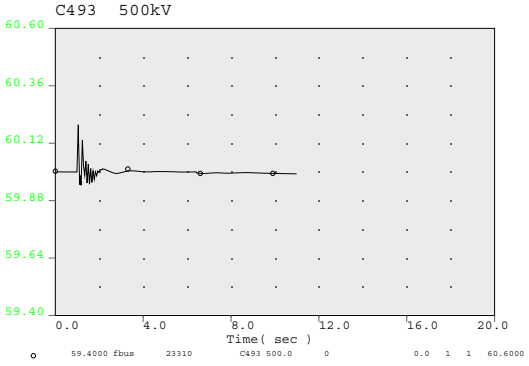
Miguel 500kV



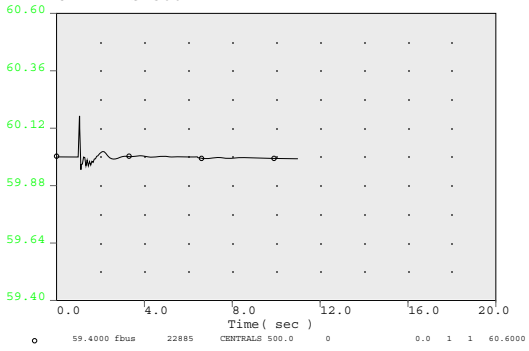
Windfarms 500



C493 500kV

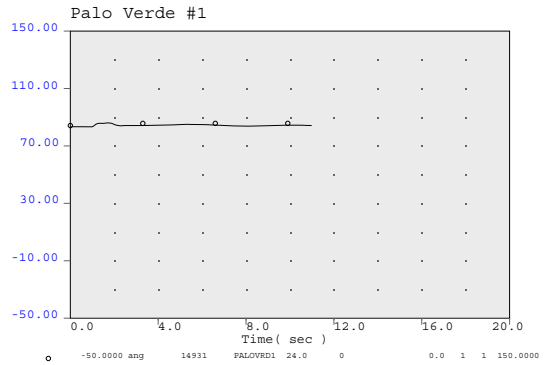


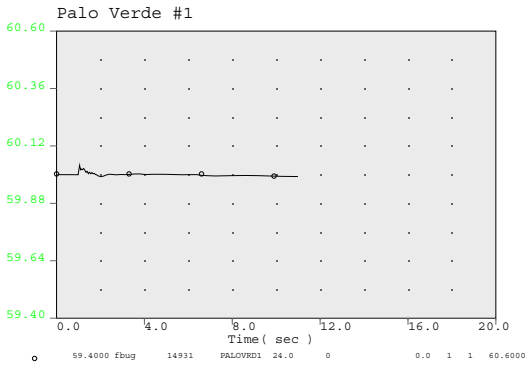
CENTRALS 500kV

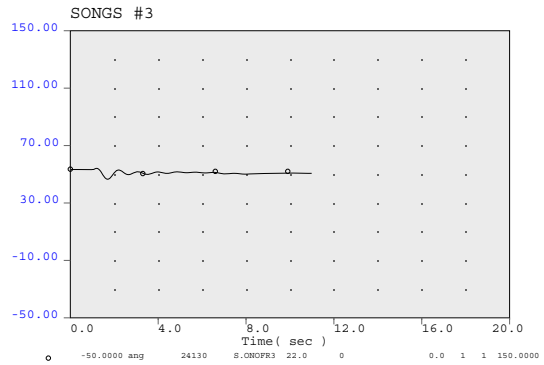


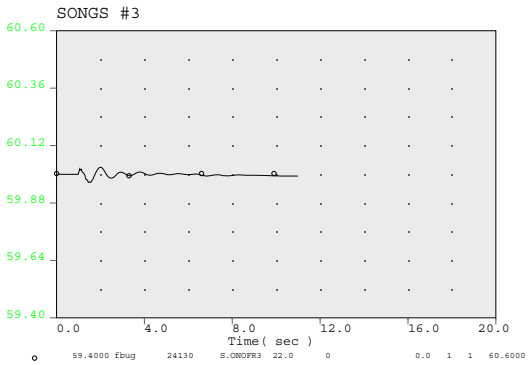
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

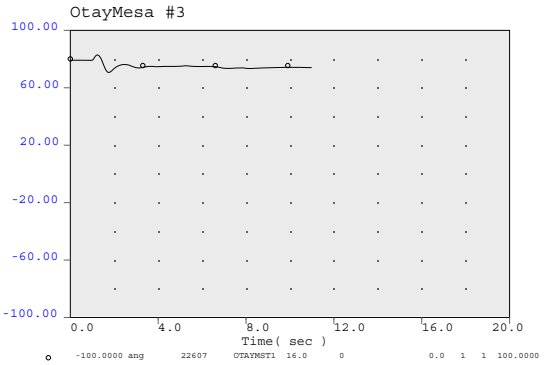
RELATIVE ROTOR ANGLE & FREQUENCY

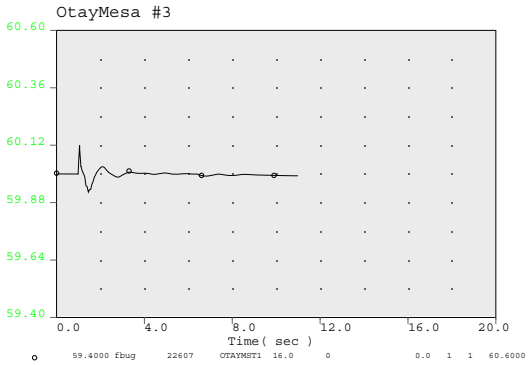








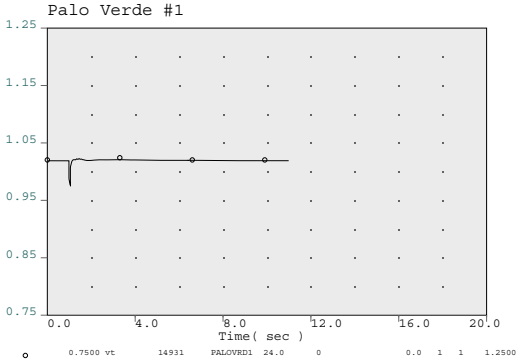




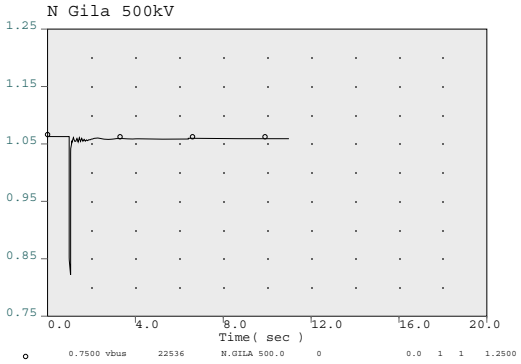
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

RELATIVE VOLTAGE

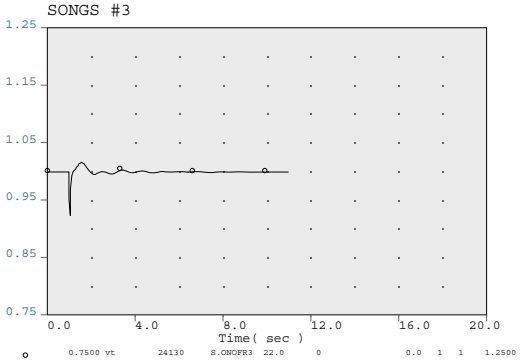
Palo Verde #1



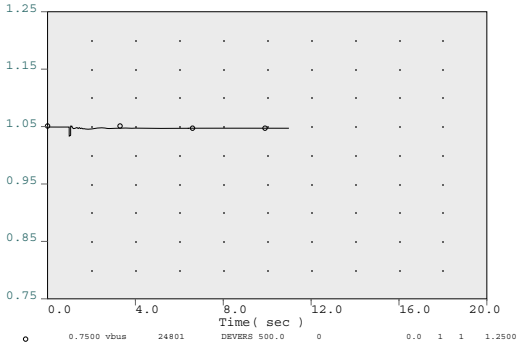
N Gila 500kV



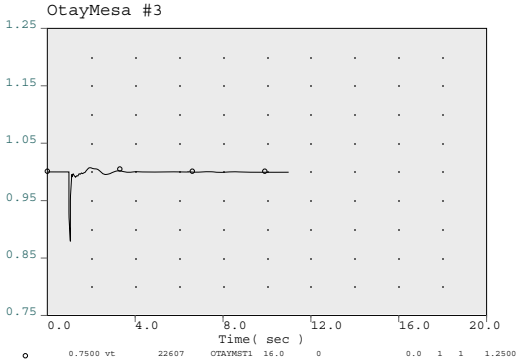
SONGS #3



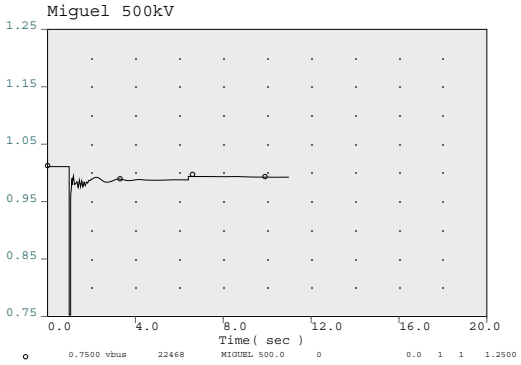
Devers 500



OtayMesa #3



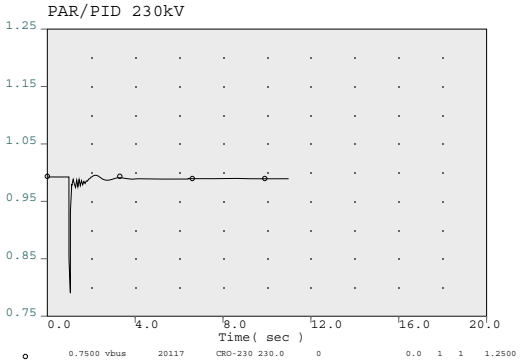
Miguel 500kV



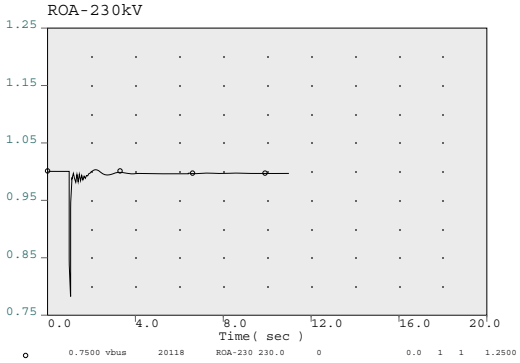
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

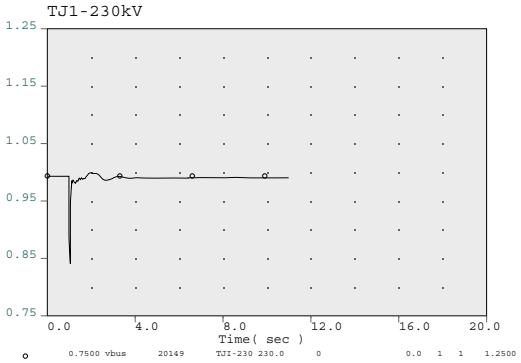
PAR/PID 230kV



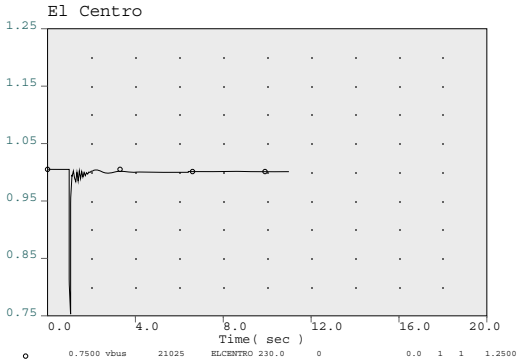
ROA-230kV



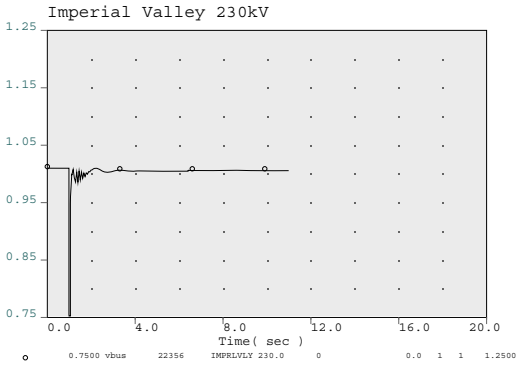
TJ1-230kV



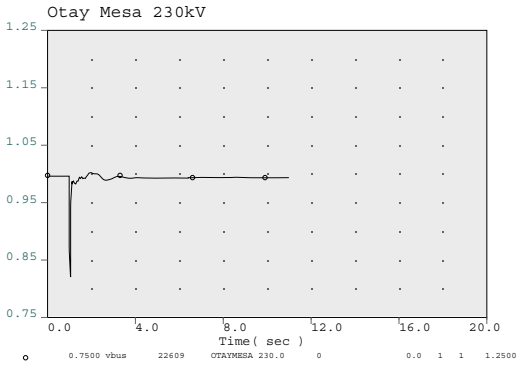
El Centro



Imperial Valley 230kV



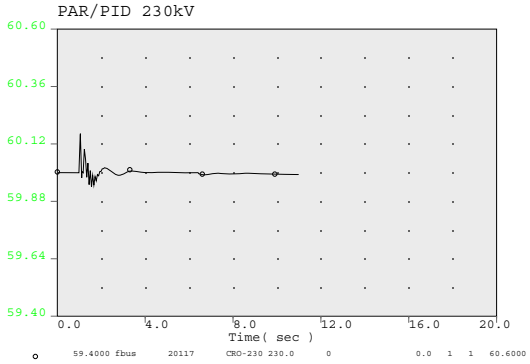
Otay Mesa 230kV



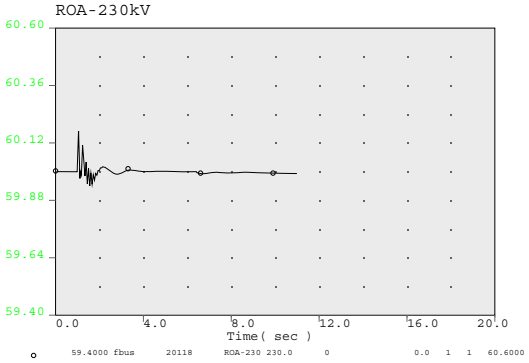
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

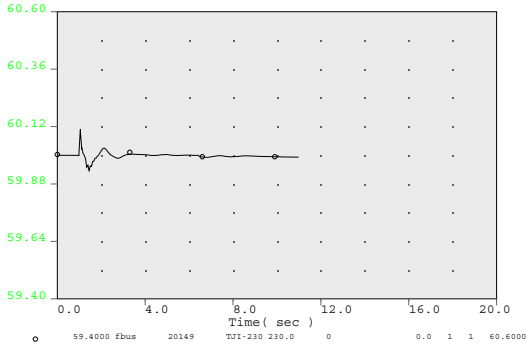
PAR/PID 230kV



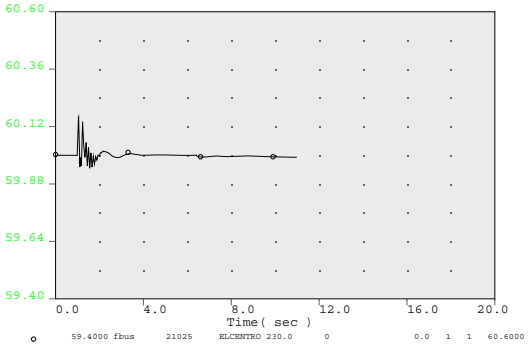
ROA-230kV



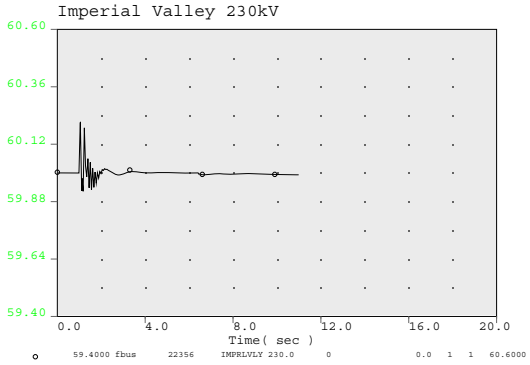
TJ1-230kV



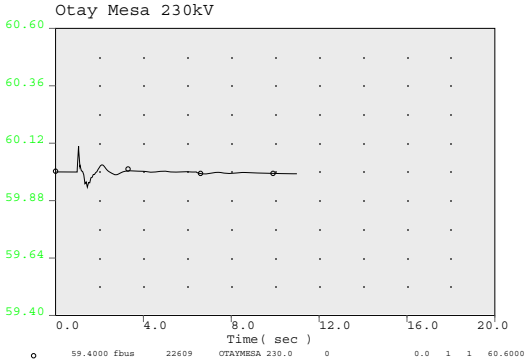
El Centro



Imperial Valley 230kV



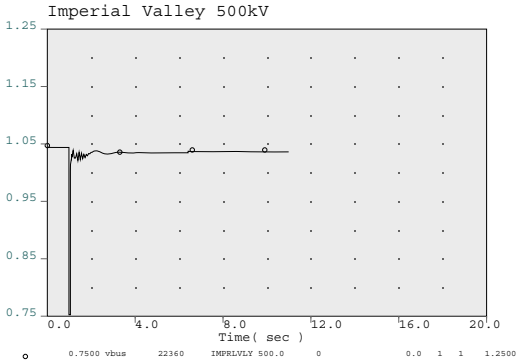
Otay Mesa 230kV



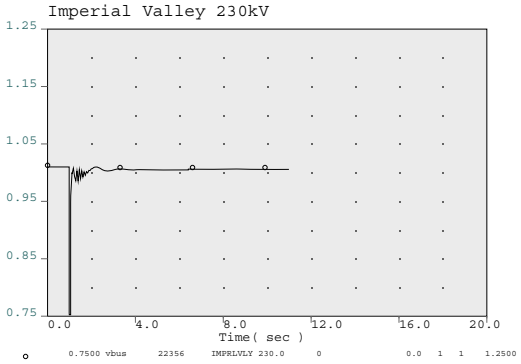
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

Imperial Valley Area - VOLTAGE

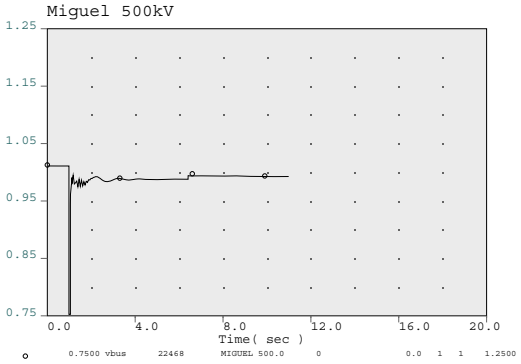
Imperial Valley 500kV



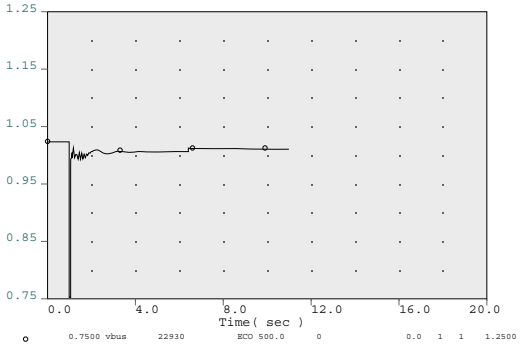
Imperial Valley 230kV



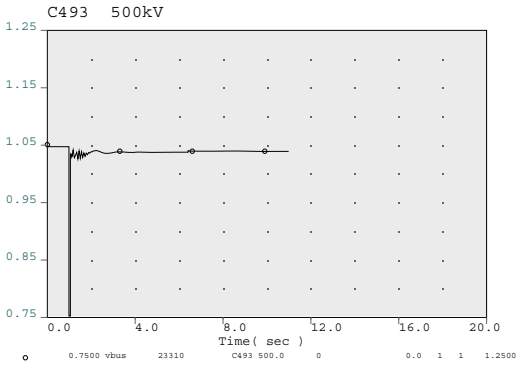
Miguel 500kV



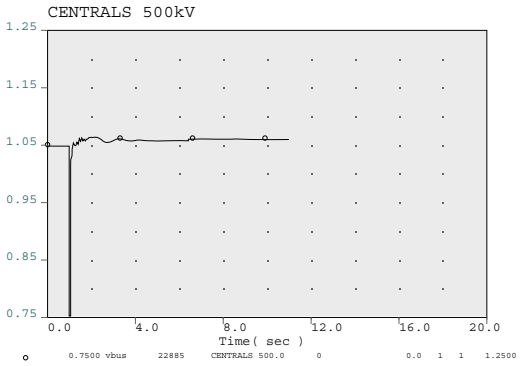
Windfarms 500



C493 500kV



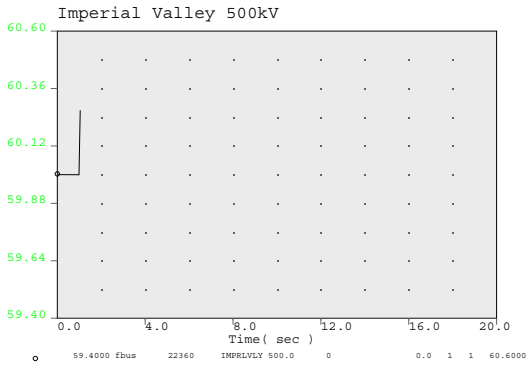
CENTRALS 500kV

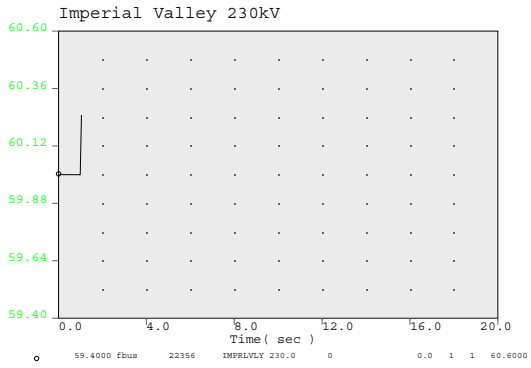


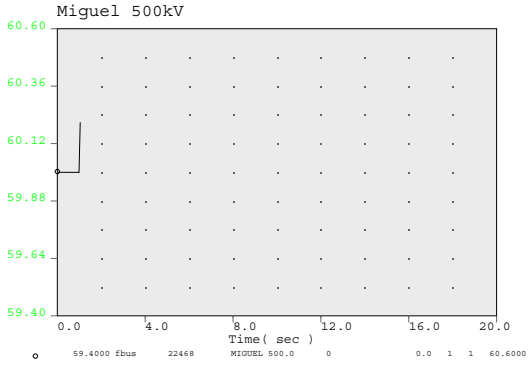
SDG&E Cluster 2 - pre
2014 Heavy Summer
C493 - CENTRALS 500kV line

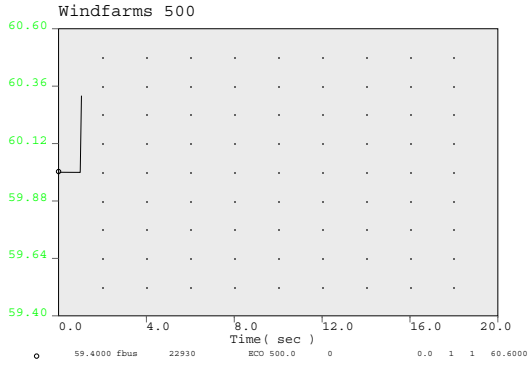
SDGE	C493_Centrals_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:21 2010

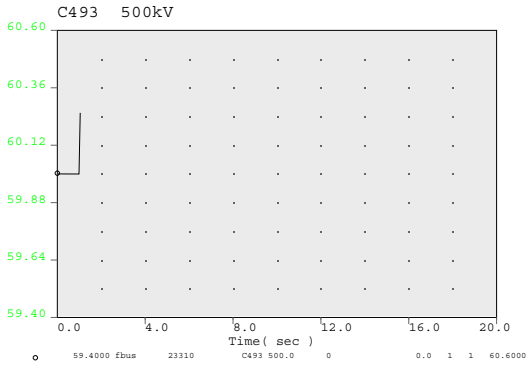
Imperial Valley Area - Frequency

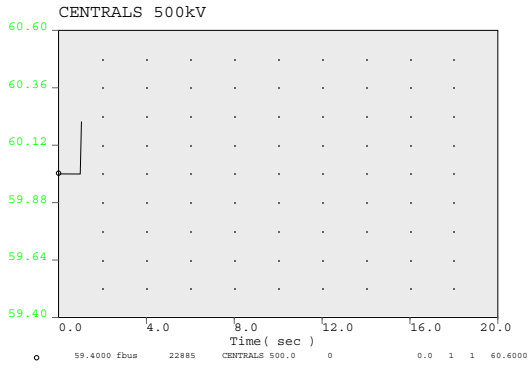






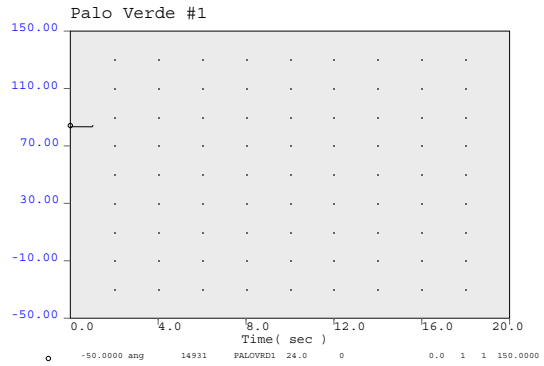


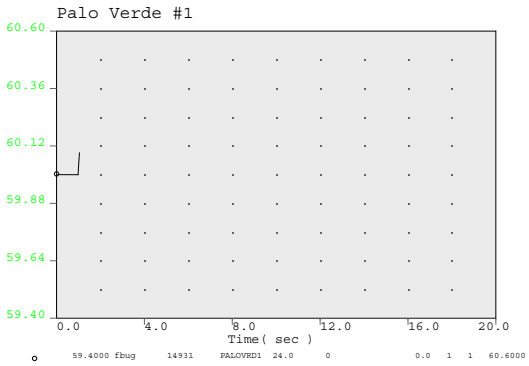


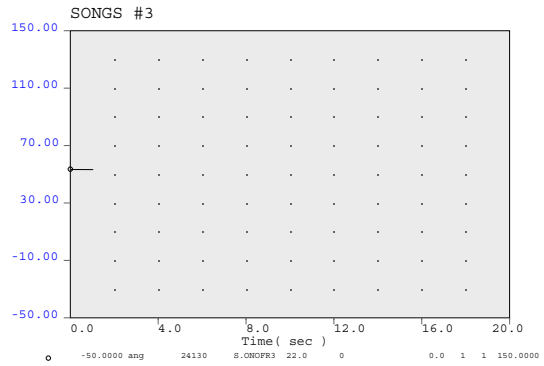


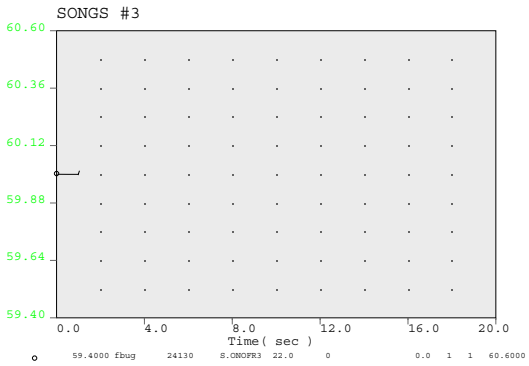
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

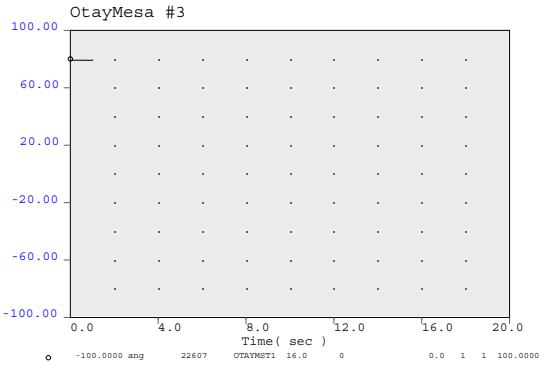
RELATIVE ROTOR ANGLE & FREQUENCY

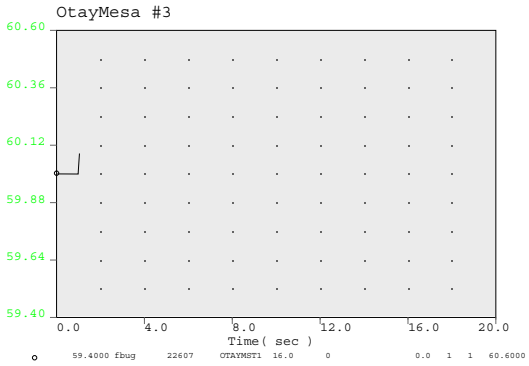












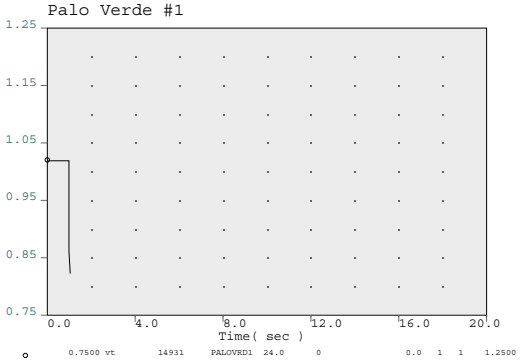
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Page 1

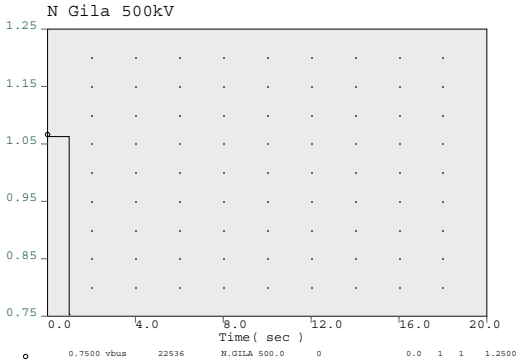
SDGE	HAA_NGila_slo_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:24 2010

RELATIVE VOLTAGE

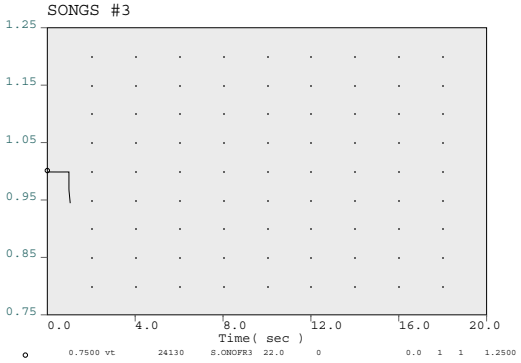
Palo Verde #1



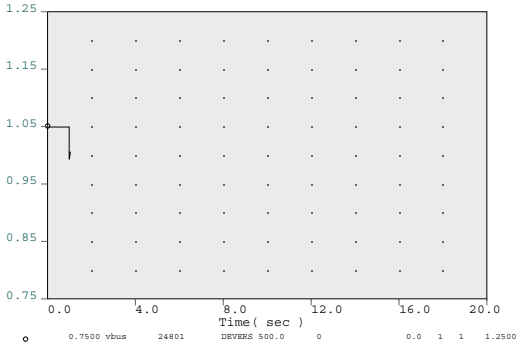
N Gila 500kV



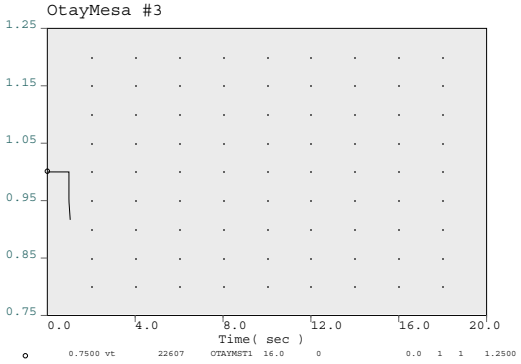
SONGS #3



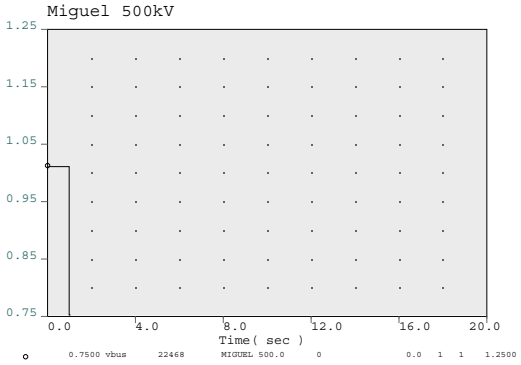
Devers 500



OtayMesa #3



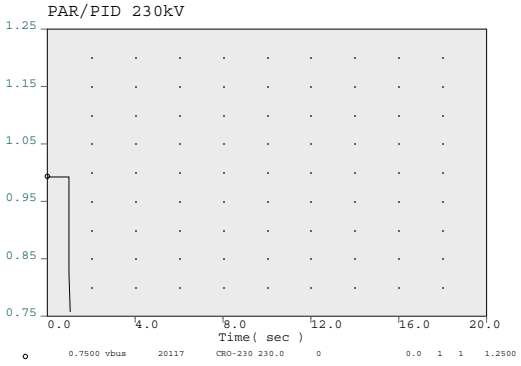
Miguel 500kV



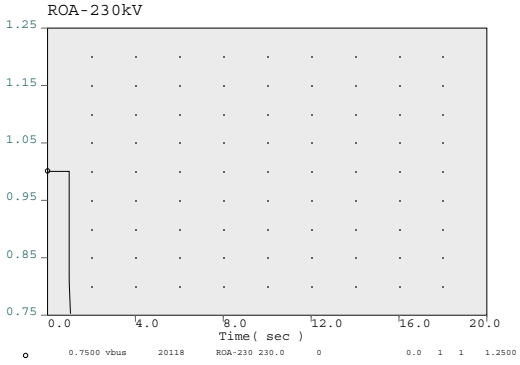
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Affected System Voltage Check and Comparison

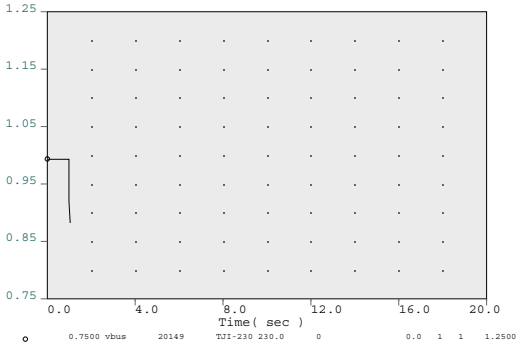
PAR/PID 230kV



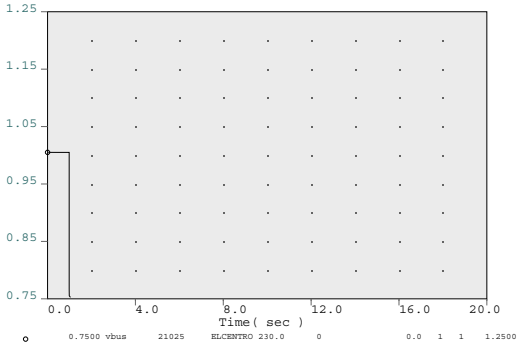
ROA-230kV



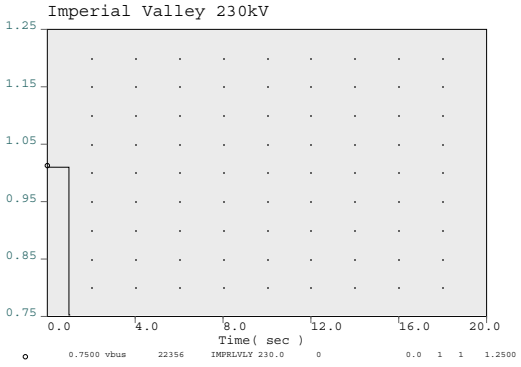
TJ1-230kV



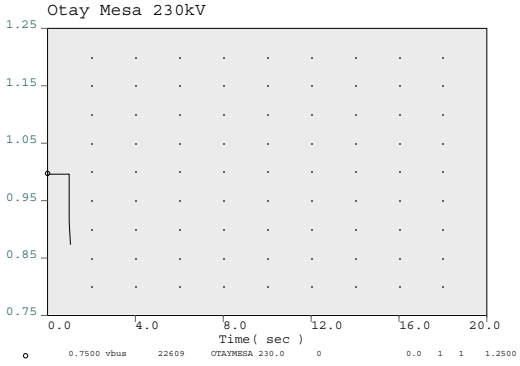
El Centro



Imperial Valley 230kV



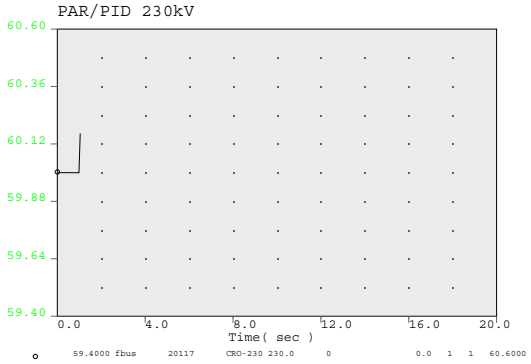
Otay Mesa 230kV



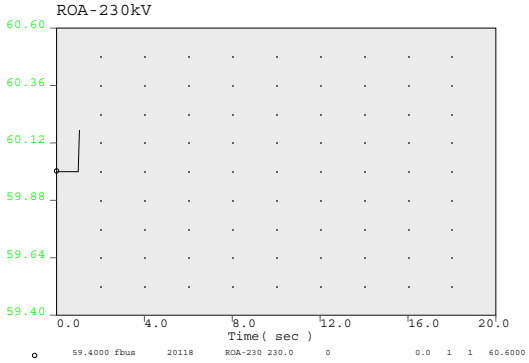
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Affected System Frequency Check and Comparison

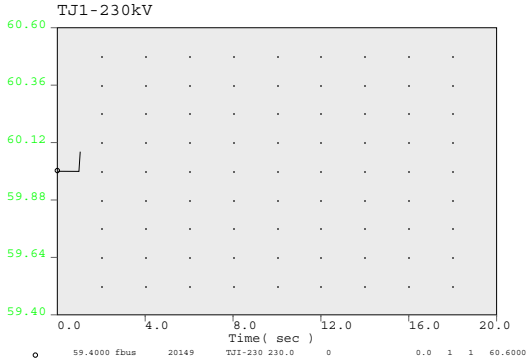
PAR/PID 230kV



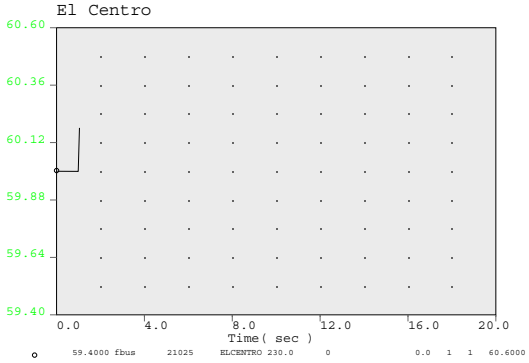
ROA-230kV



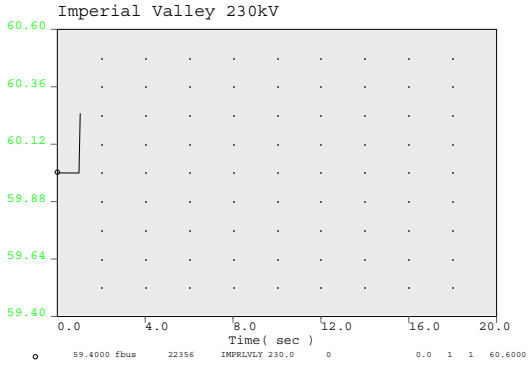
TJ1-230kV



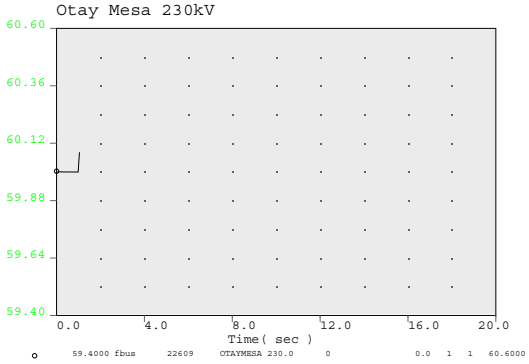
El Centro



Imperial Valley 230kV



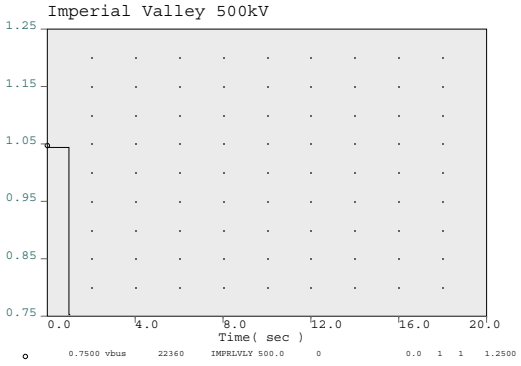
Otay Mesa 230kV



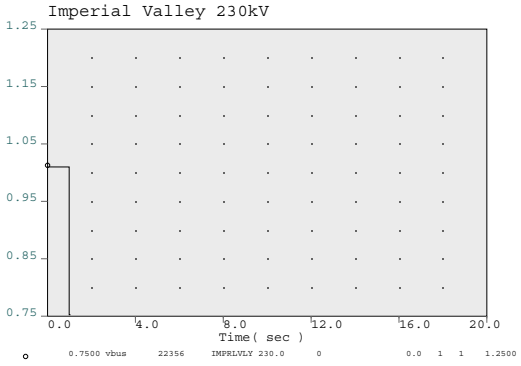
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Imperial Valley Area - VOLTAGE

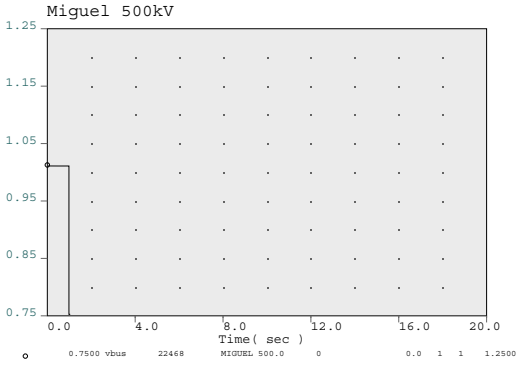
Imperial Valley 500kV



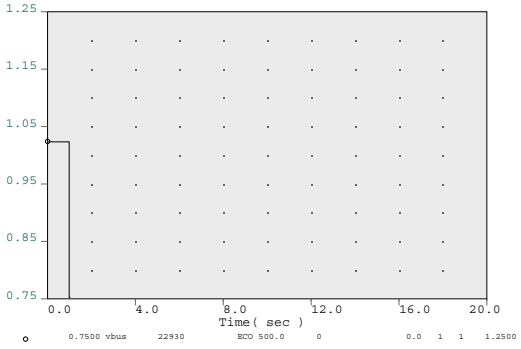
Imperial Valley 230kV



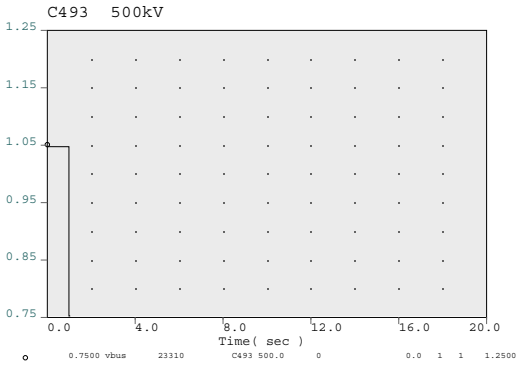
Miguel 500kV



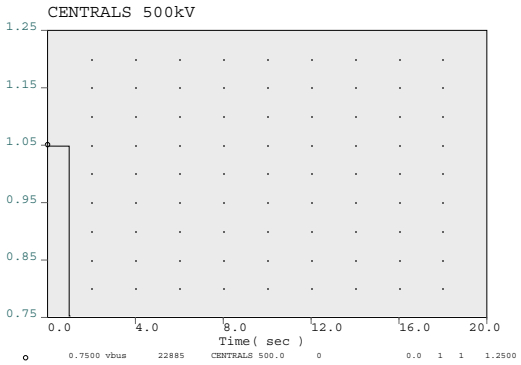
Windfarms 500



C493 500kV

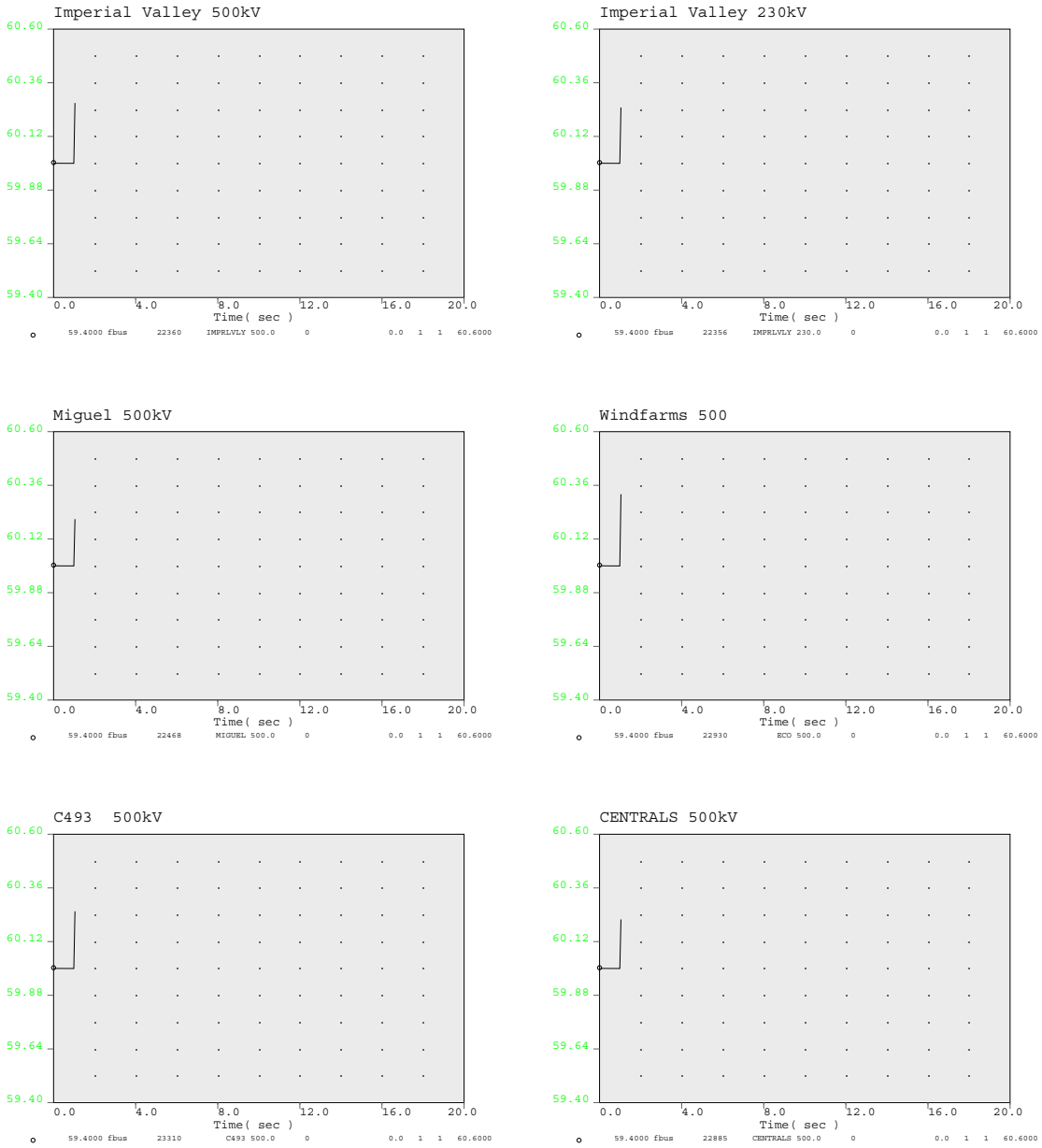


CENTRALS 500kV



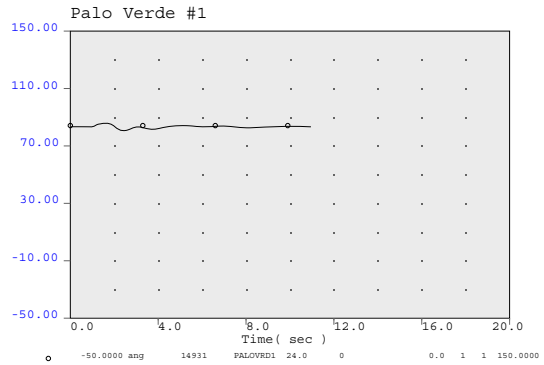
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

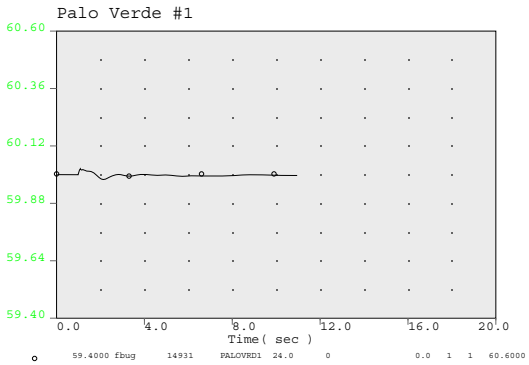
Imperial Valley Area - Frequency

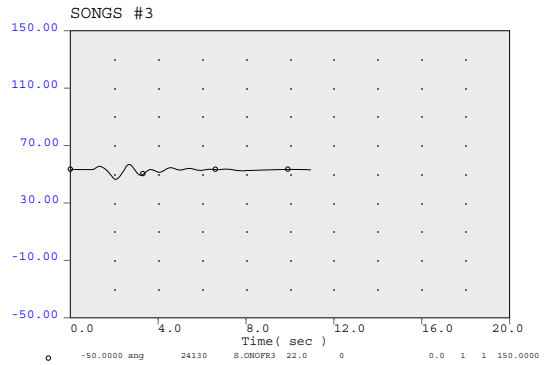


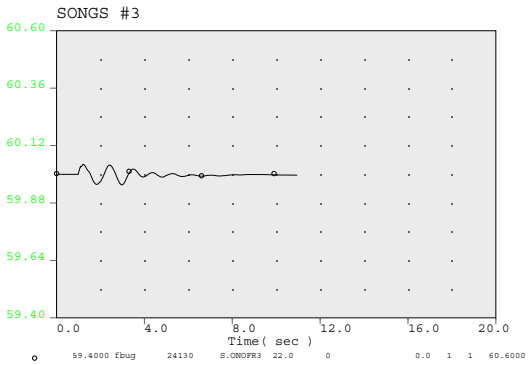
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

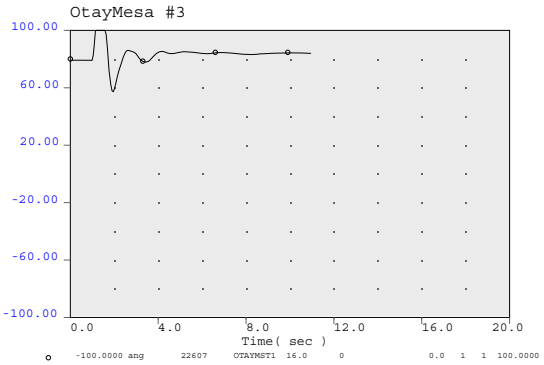
RELATIVE ROTOR ANGLE & FREQUENCY

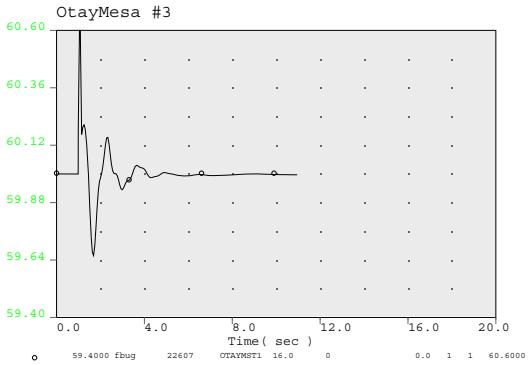






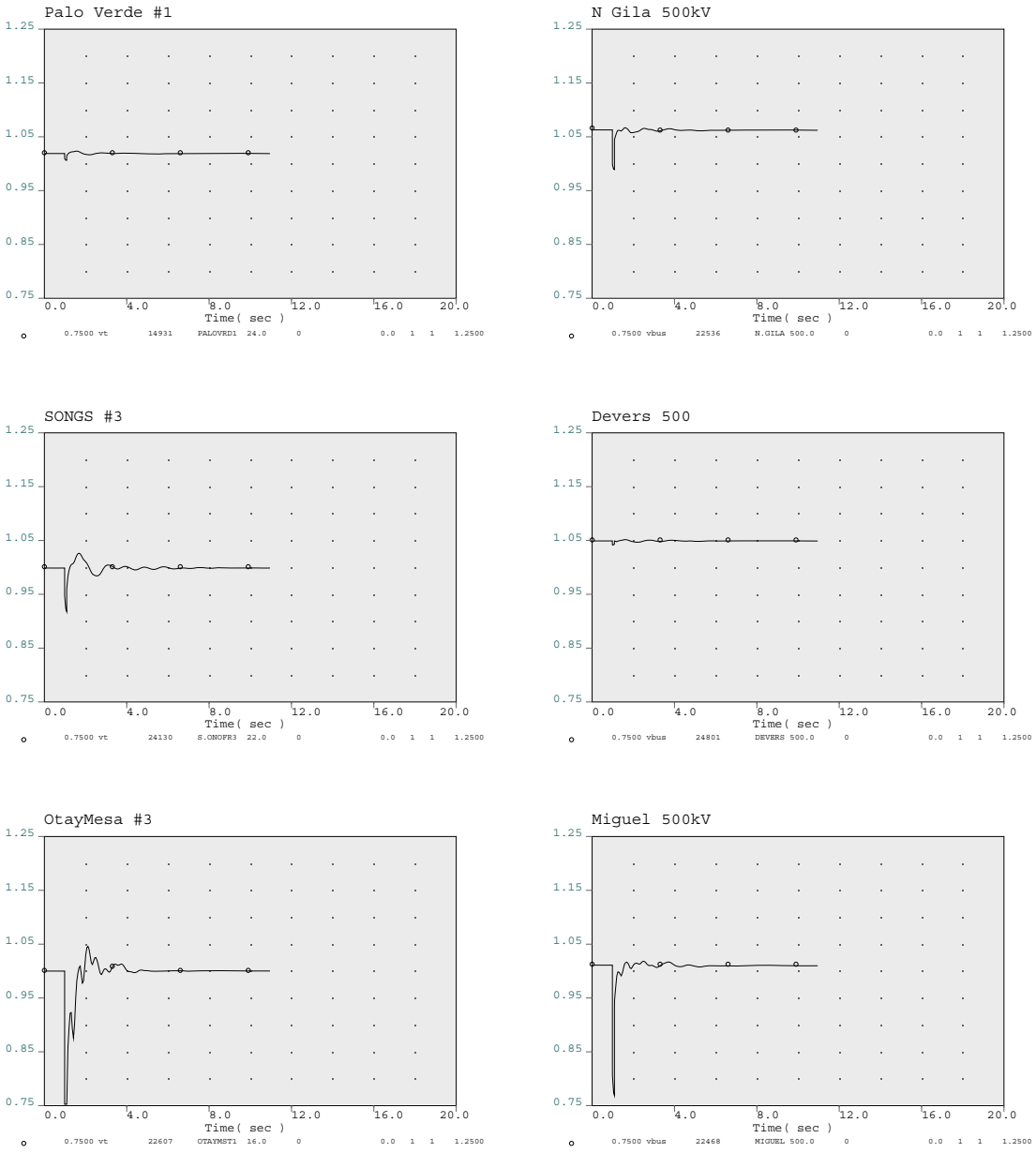






SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

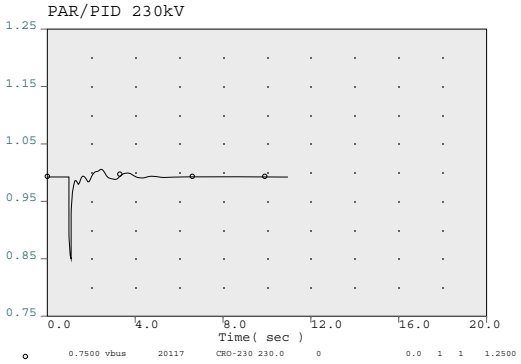
RELATIVE VOLTAGE



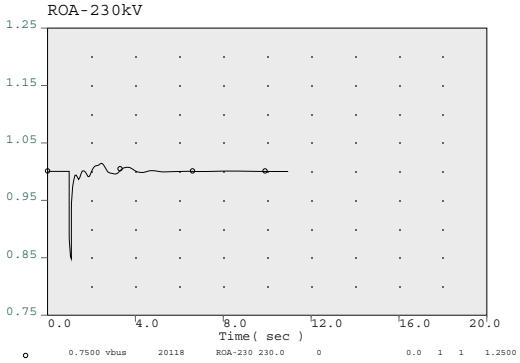
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Affected System Voltage Check and Comparison

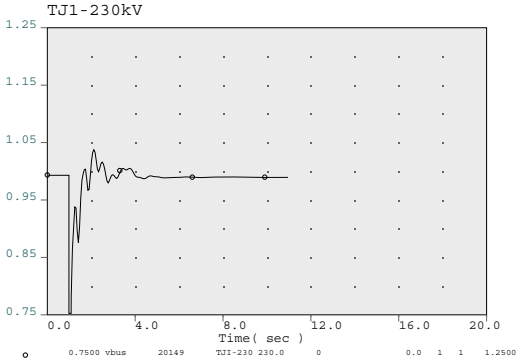
PAR/PID 230kV



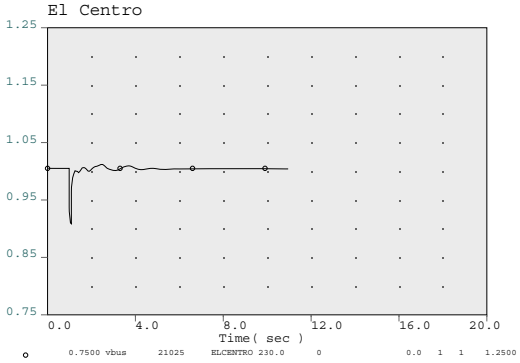
ROA-230kV



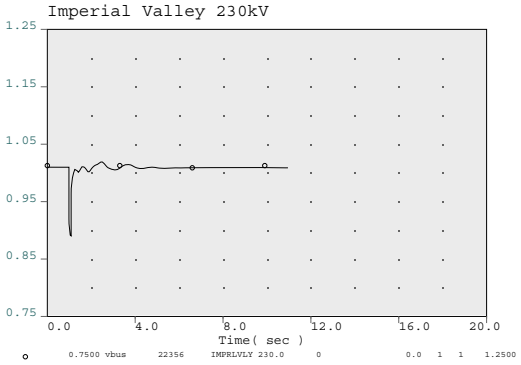
TJ1-230kV



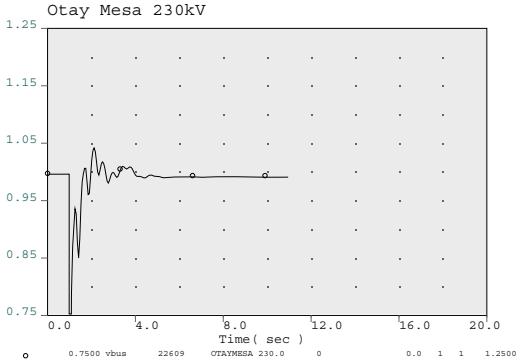
El Centro



Imperial Valley 230kV



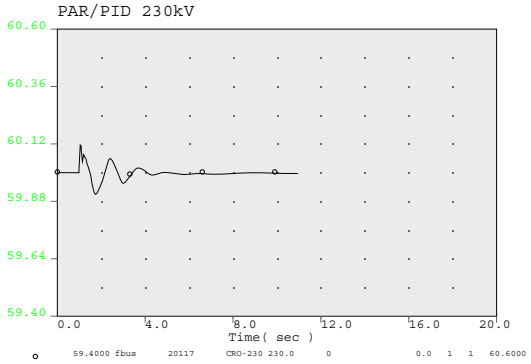
Otay Mesa 230kV



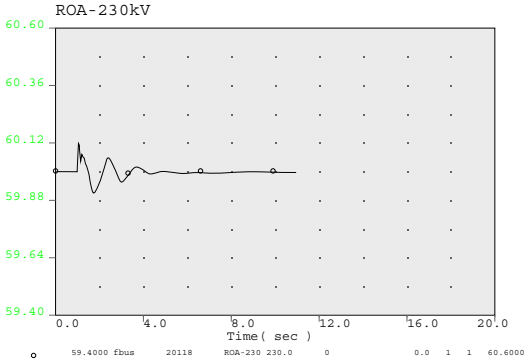
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Affected System Frequency Check and Comparison

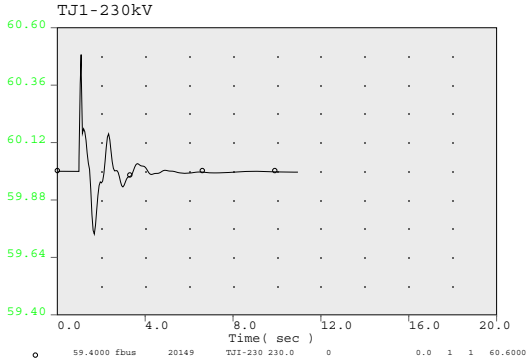
PAR/PID 230kV



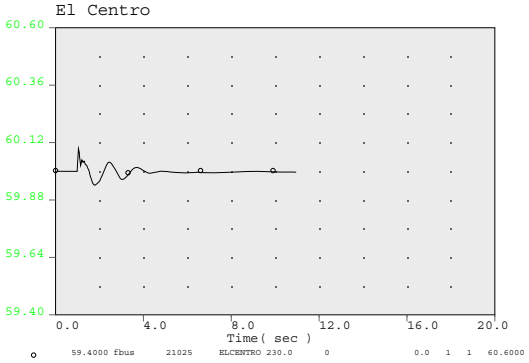
ROA-230kV



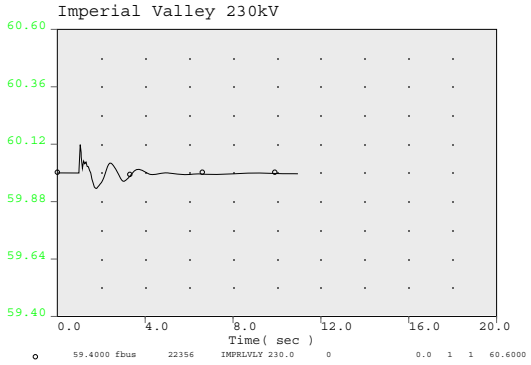
TJ1-230kV



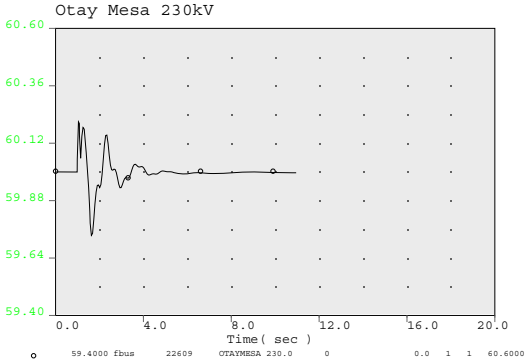
El Centro



Imperial Valley 230kV



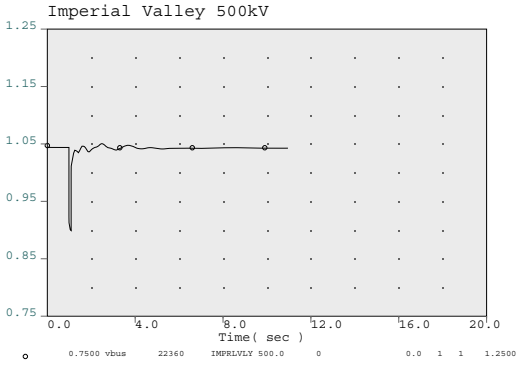
Otay Mesa 230kV



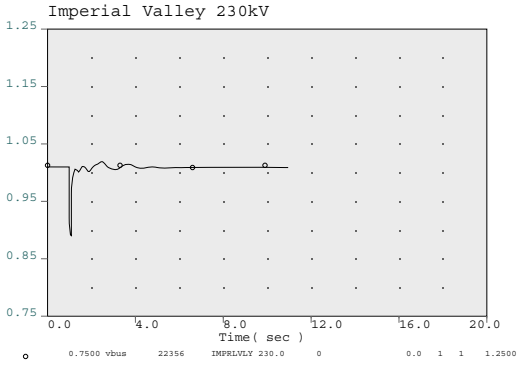
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Imperial Valley Area - VOLTAGE

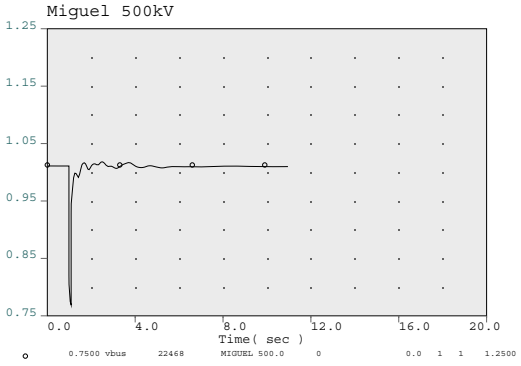
Imperial Valley 500kV



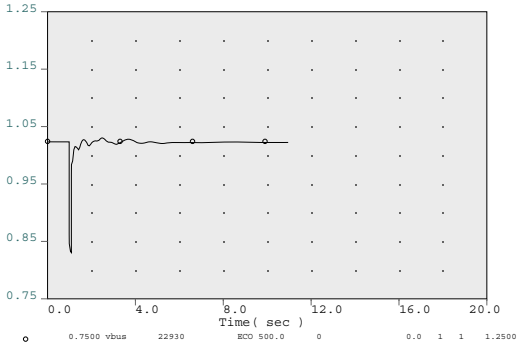
Imperial Valley 230kV



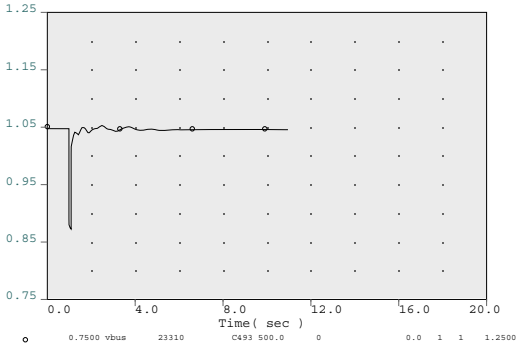
Miguel 500kV



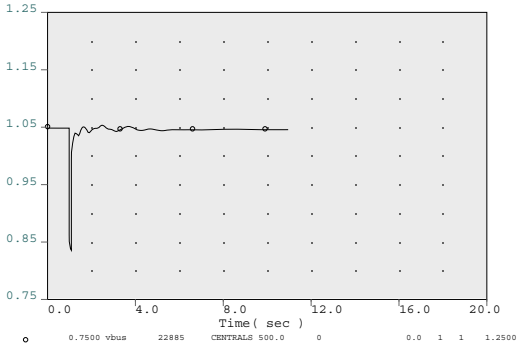
Windfarms 500



C493 500kV



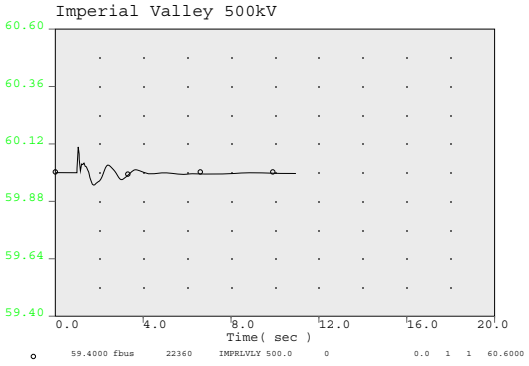
CENTRALS 500kV



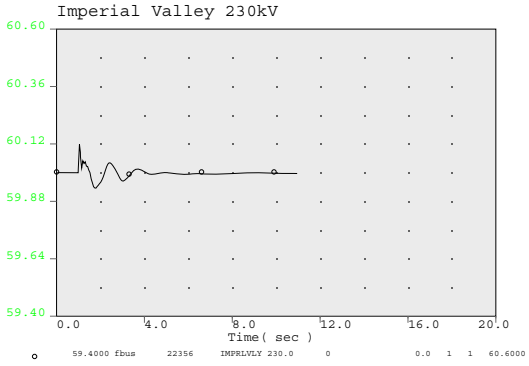
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

Imperial Valley Area - Frequency

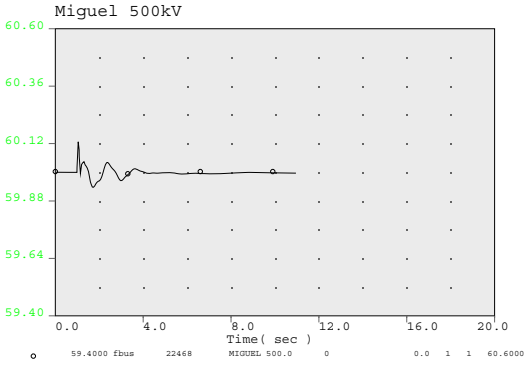
Imperial Valley 500kV



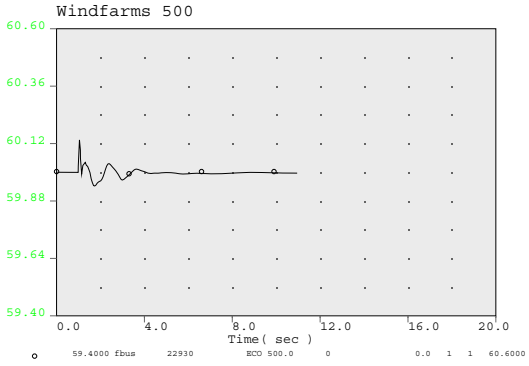
Imperial Valley 230kV



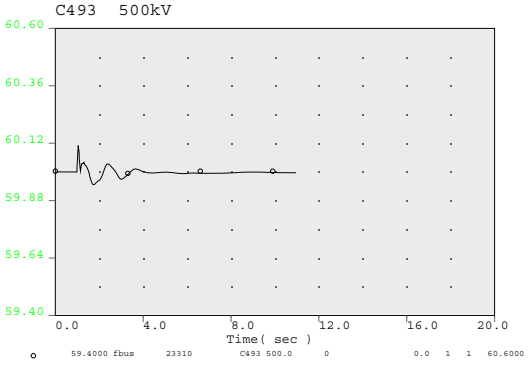
Miguel 500kV



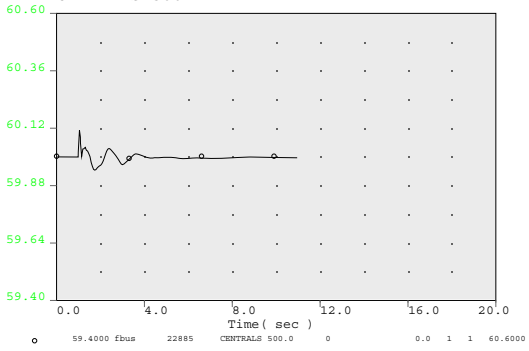
Windfarms 500



C493 500kV

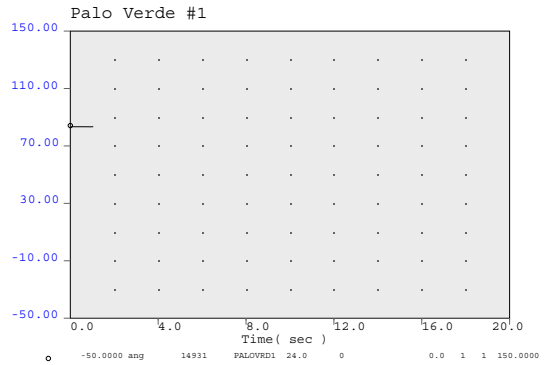


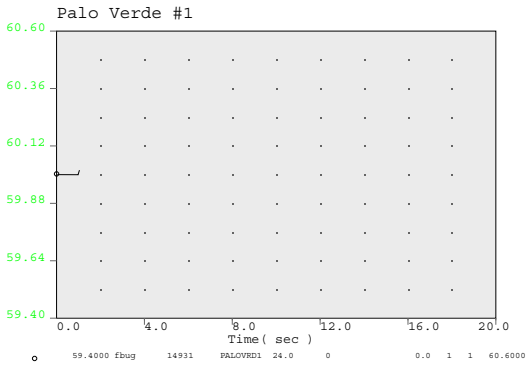
CENTRALS 500kV

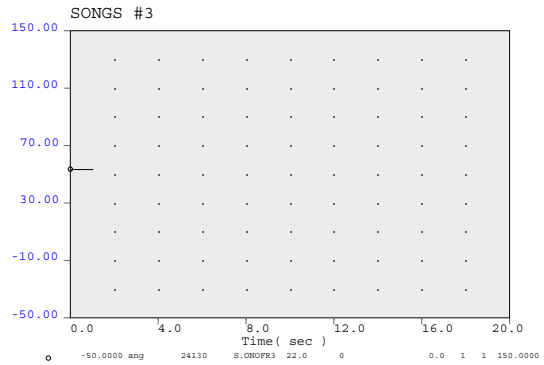


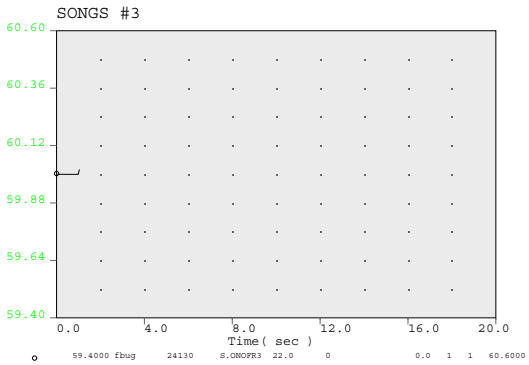
SDG&E Cluster 2 - pre int
2014 Heavy Summer
OM - SX 230 kV N-1

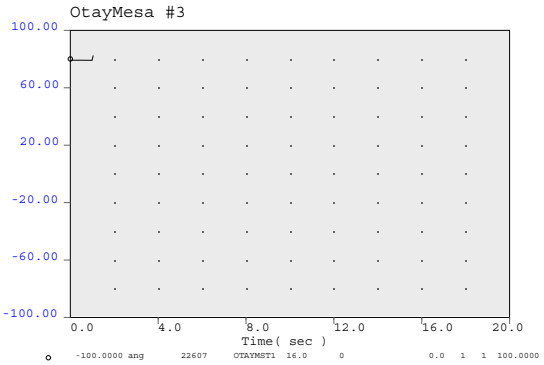
RELATIVE ROTOR ANGLE & FREQUENCY

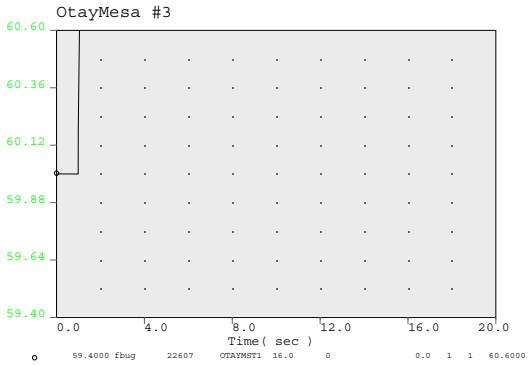












SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Page 1

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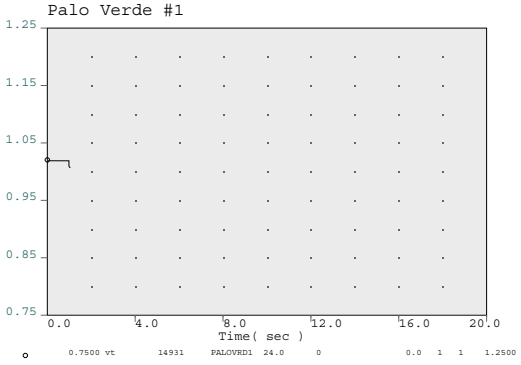
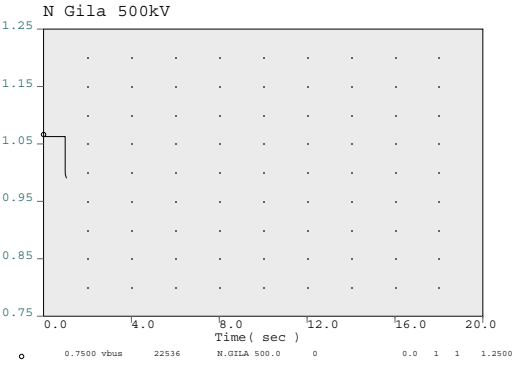
RELATIVE VOLTAGE

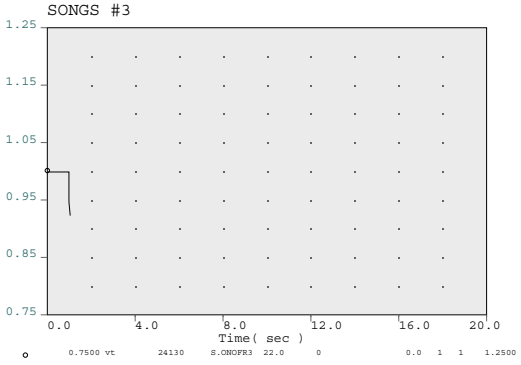
Palo Verde #1



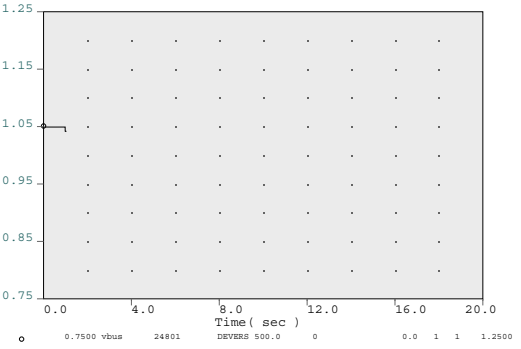
N Gila 500kV



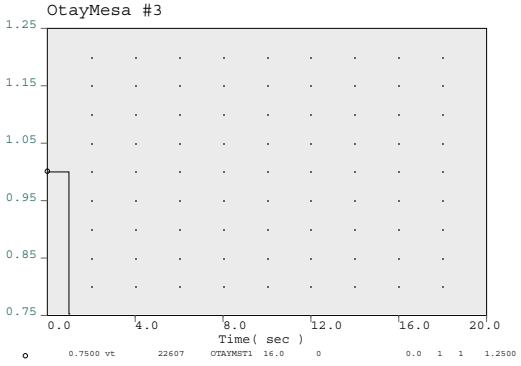
SONGS #3



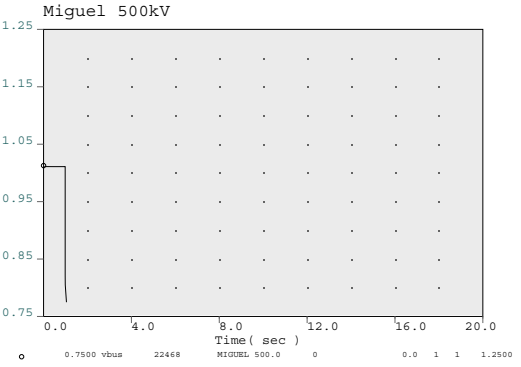
Devers 500



OtayMesa #3



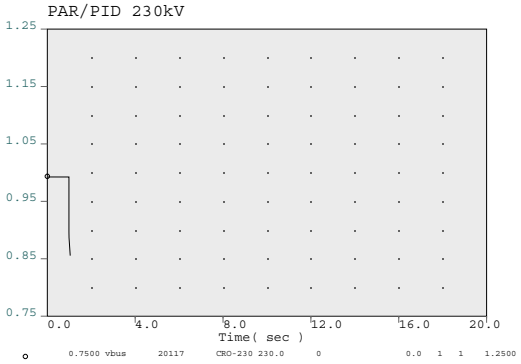
Miguel 500kV



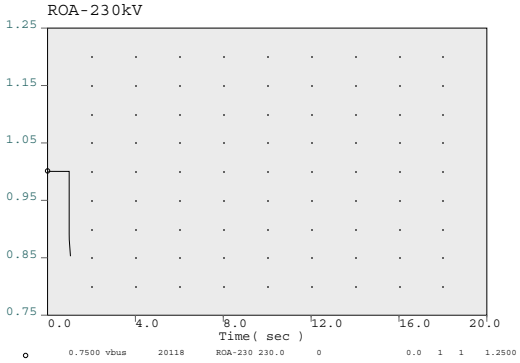
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Affected System Voltage Check and Comparison

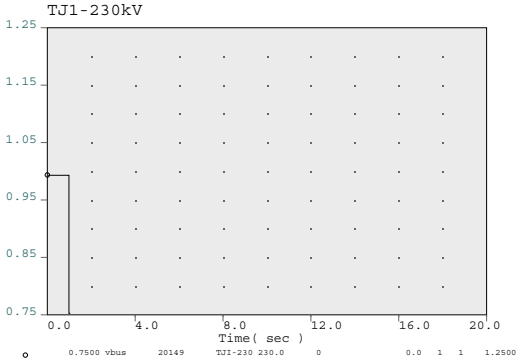
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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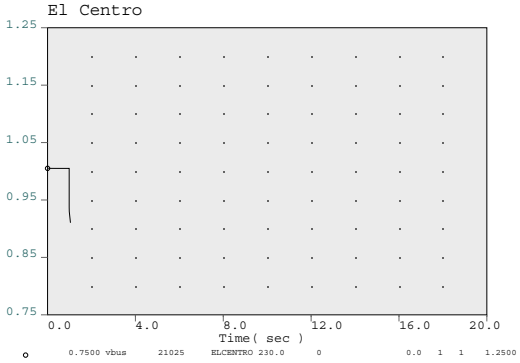
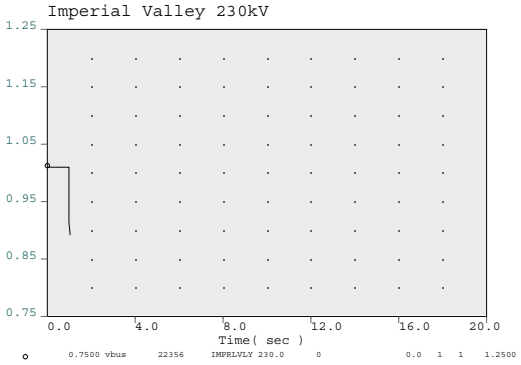
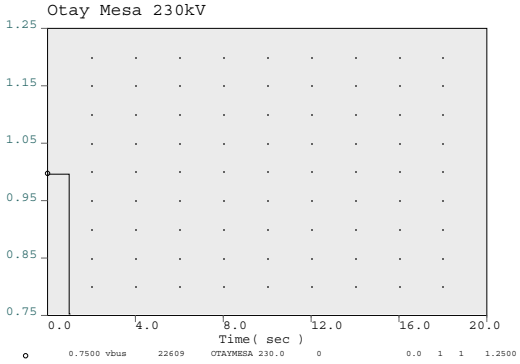


Imperial Valley 230kV



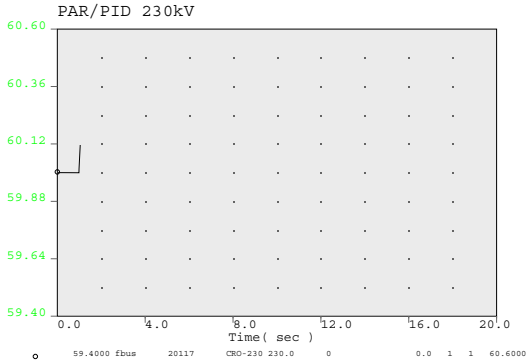
Otay Mesa 230kV



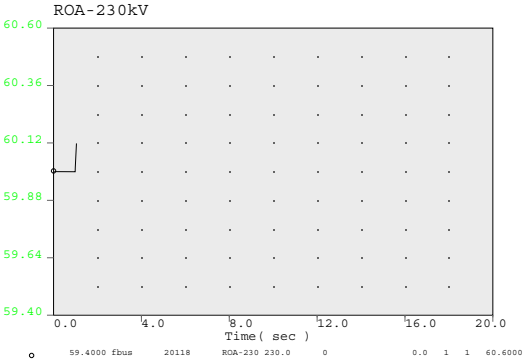
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Affected System Frequency Check and Comparison

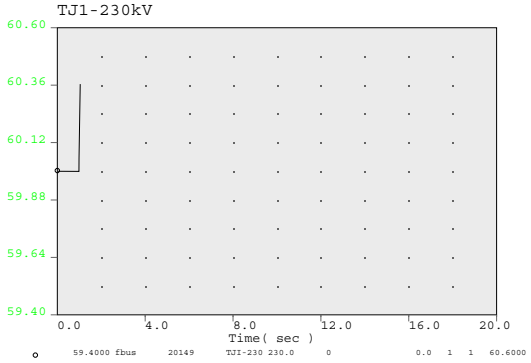
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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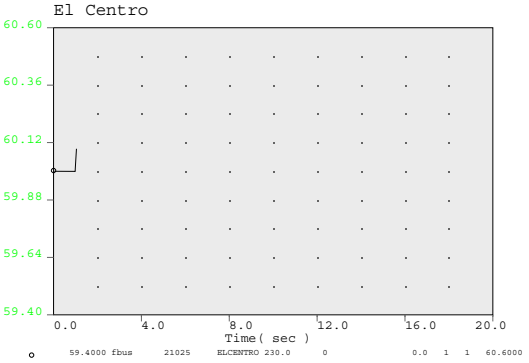
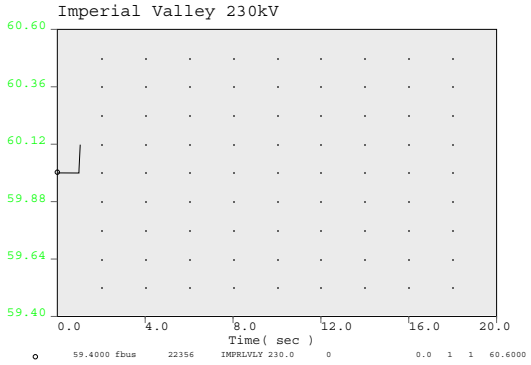
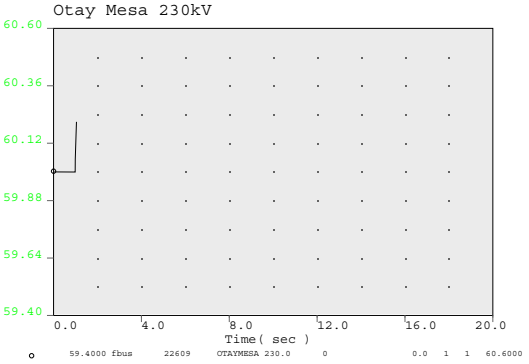


Imperial Valley 230kV



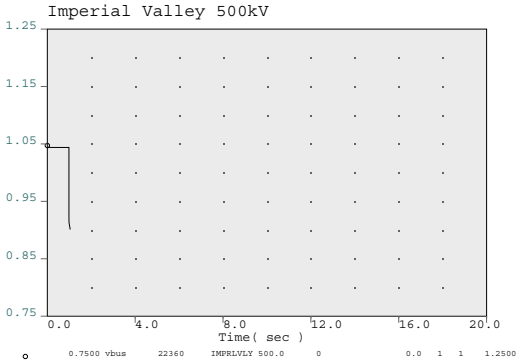
Otay Mesa 230kV



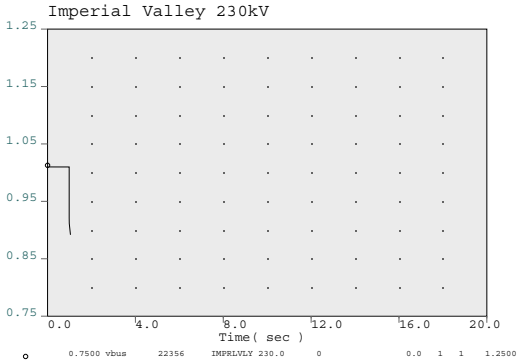
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Imperial Valley Area - VOLTAGE

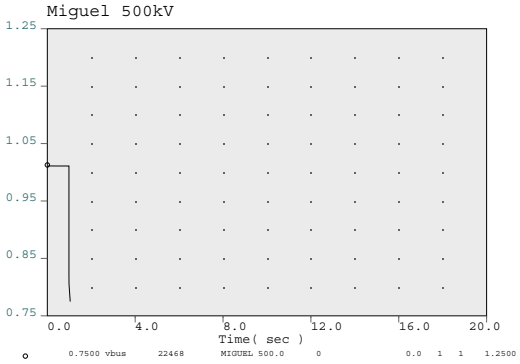
Imperial Valley 500kV



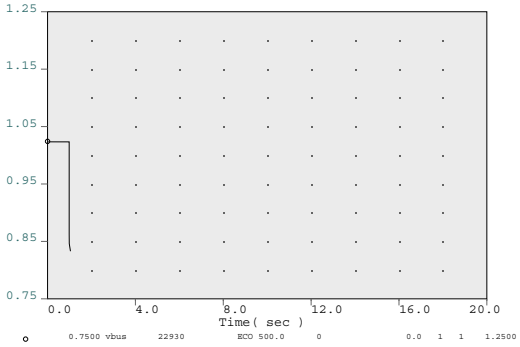
Imperial Valley 230kV



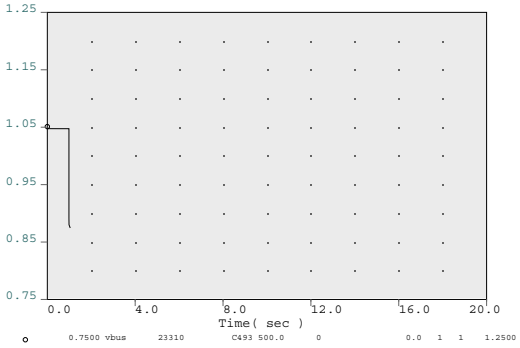
Miguel 500kV



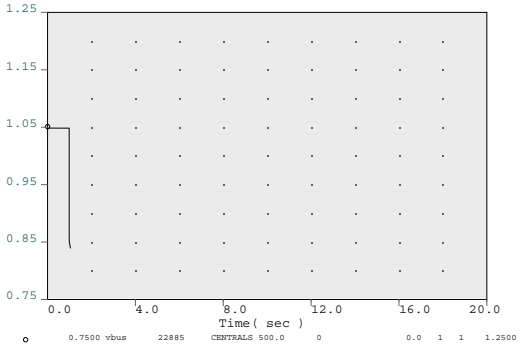
Windfarms 500



C493 500kV

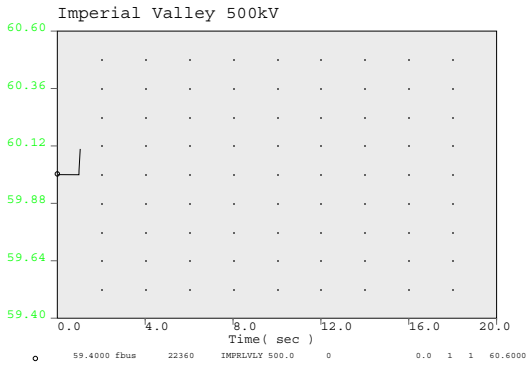


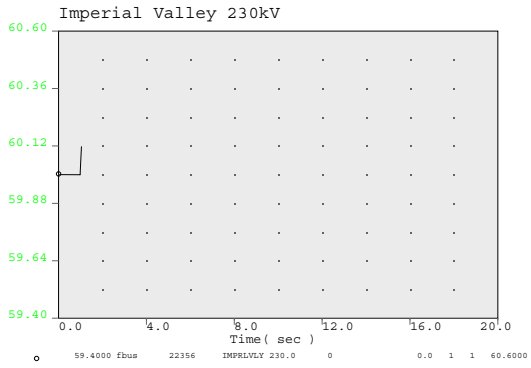
CENTRALS 500kV

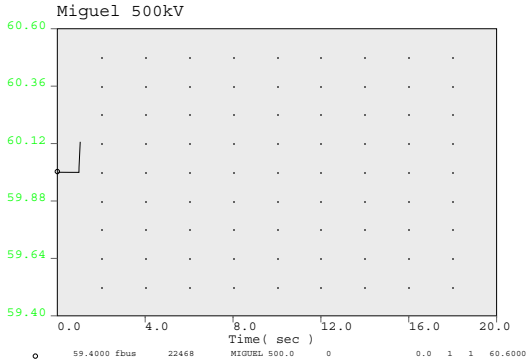


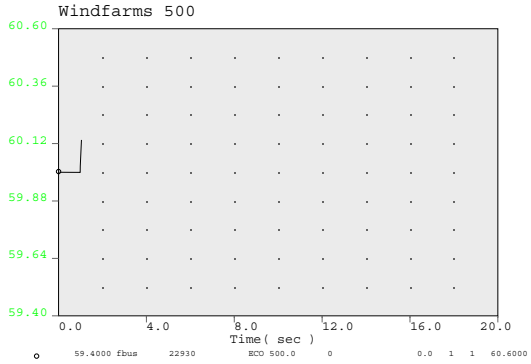
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

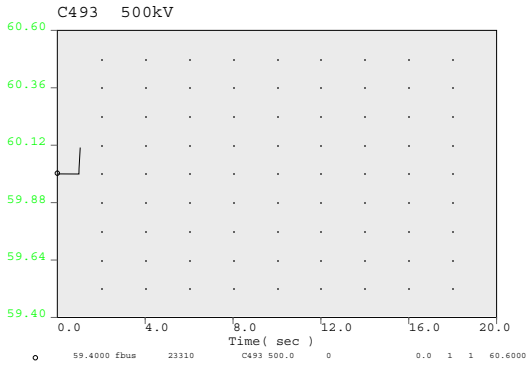
Imperial Valley Area - Frequency

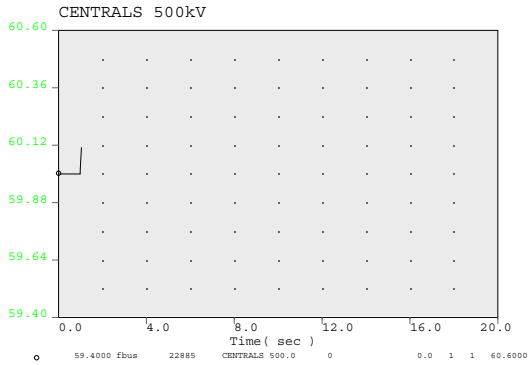






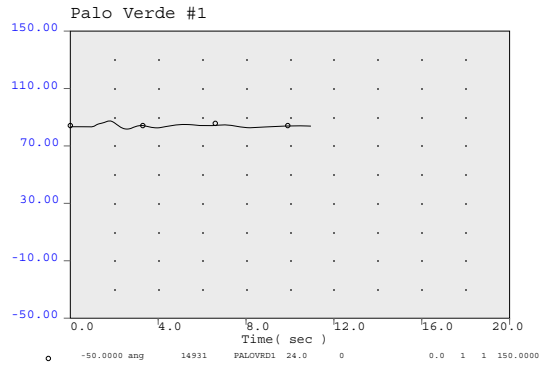


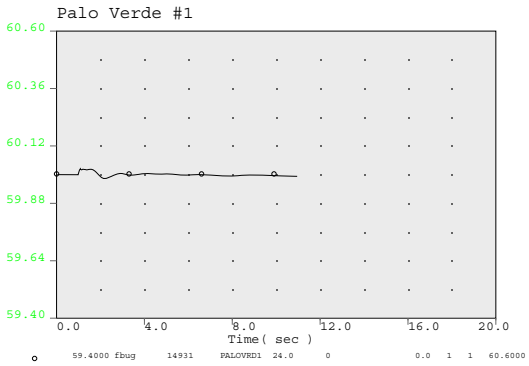


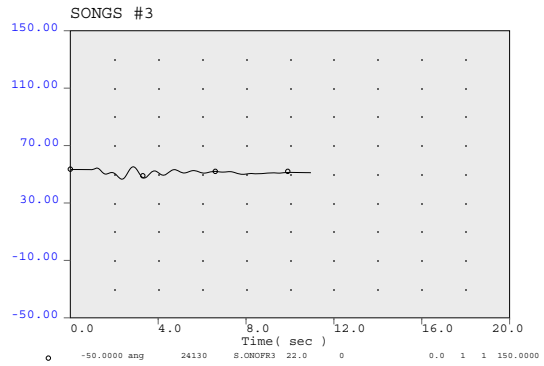


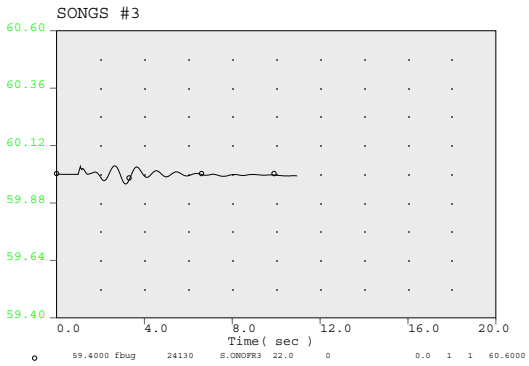
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

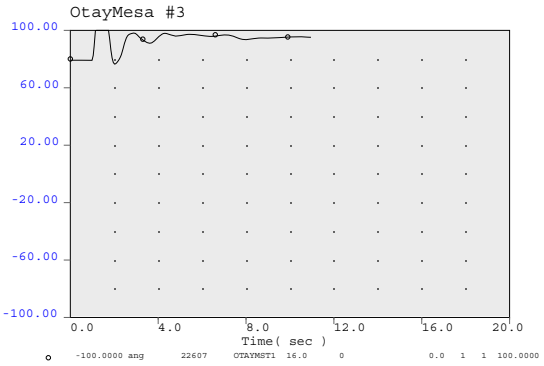
RELATIVE ROTOR ANGLE & FREQUENCY

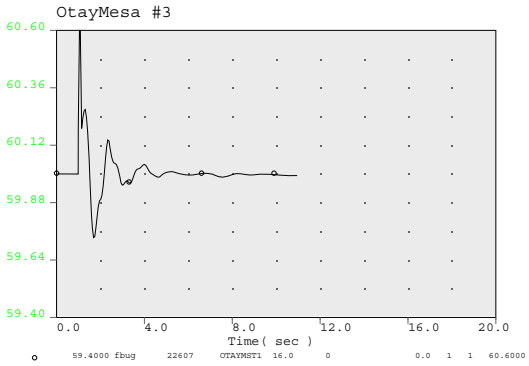












SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

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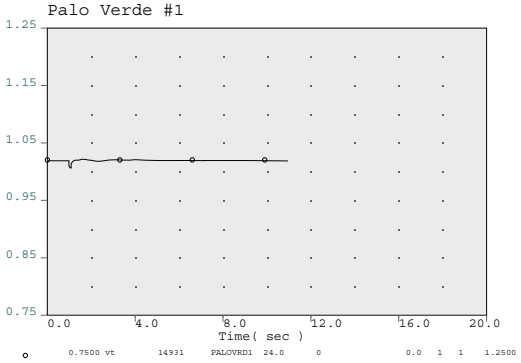
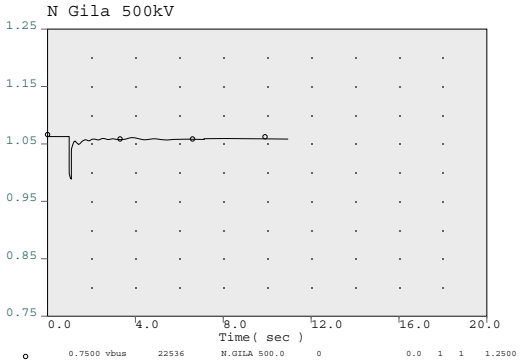
SDGE	int_OM-SY_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:32 2010

RELATIVE VOLTAGE

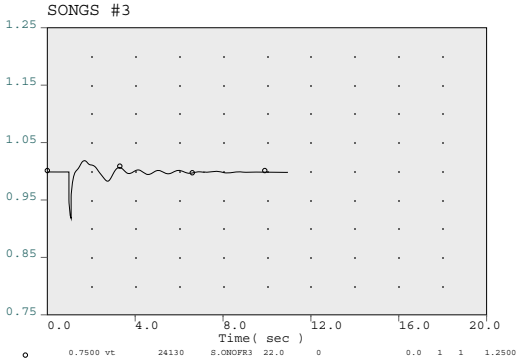
Palo Verde #1



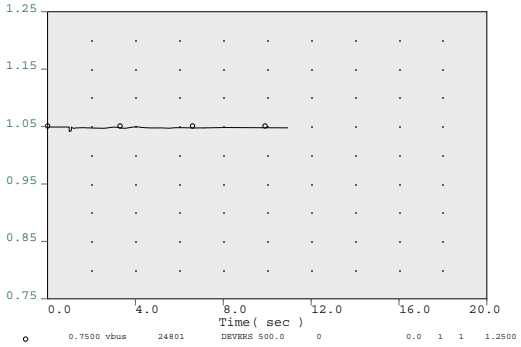
N Gila 500kV



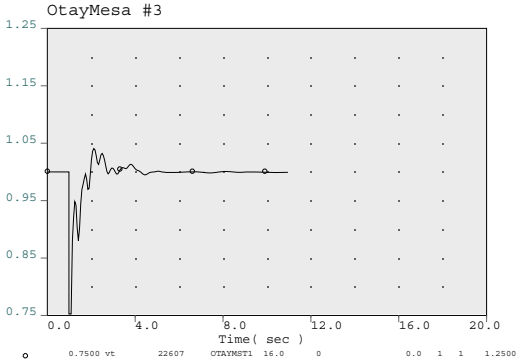
SONGS #3



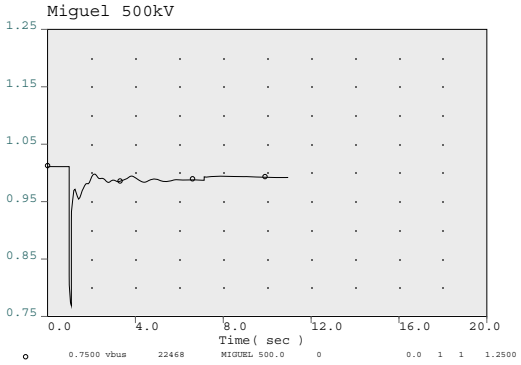
Devers 500



OtayMesa #3



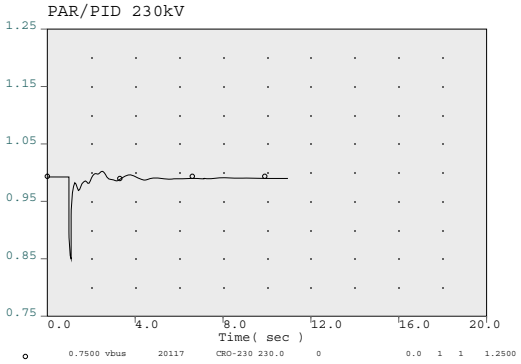
Miguel 500kV



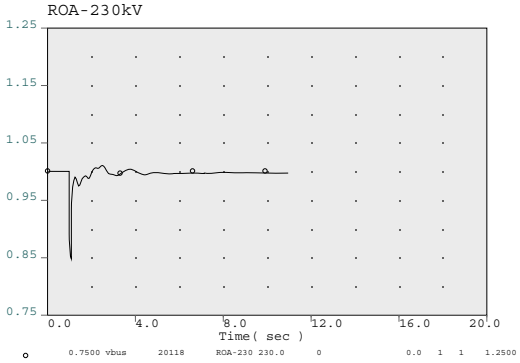
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Affected System Voltage Check and Comparison

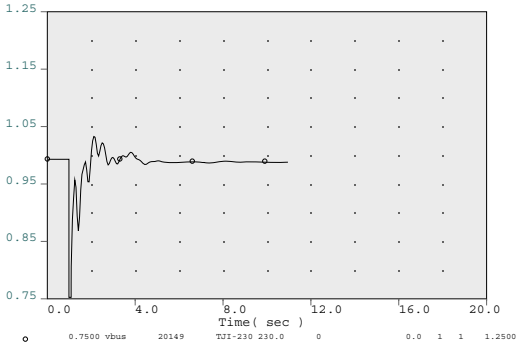
PAR/PID 230kV



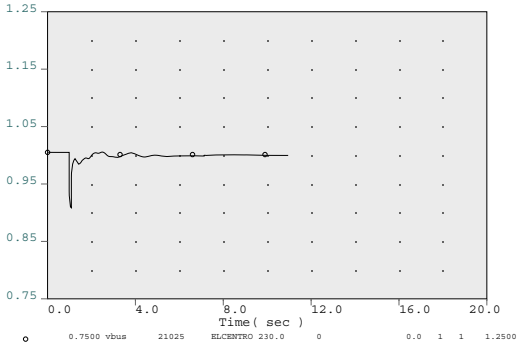
ROA-230kV



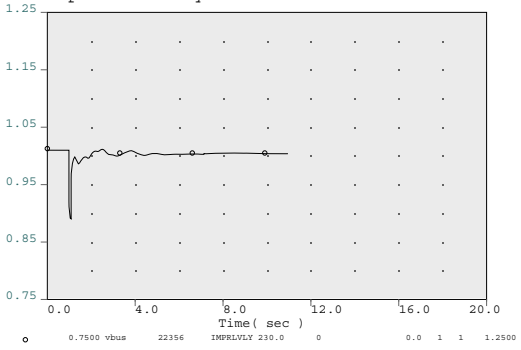
TJ1-230kV



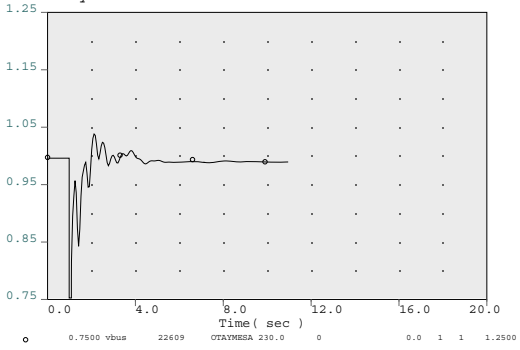
El Centro



Imperial Valley 230kV



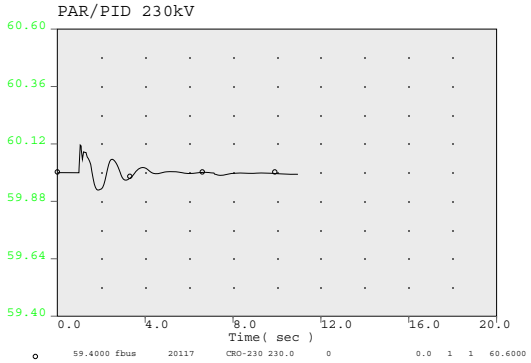
Otay Mesa 230kV



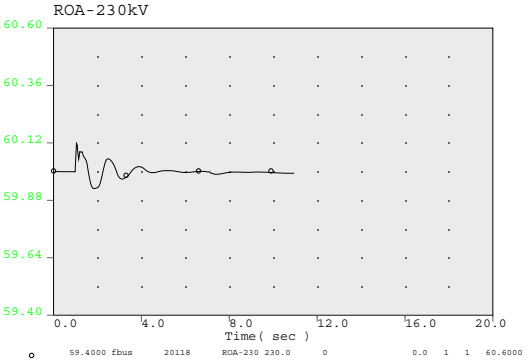
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Affected System Frequency Check and Comparison

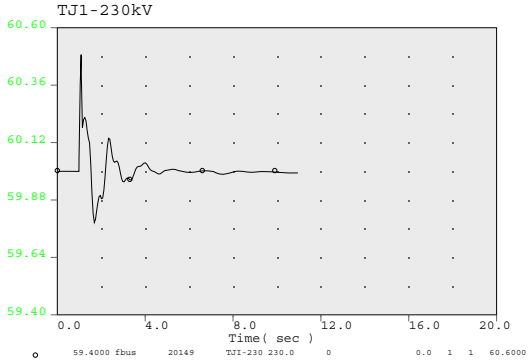
PAR/PID 230kV



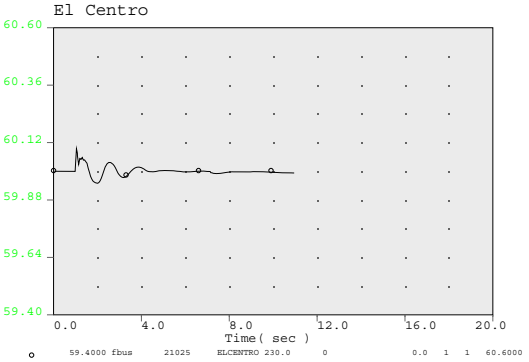
ROA-230kV



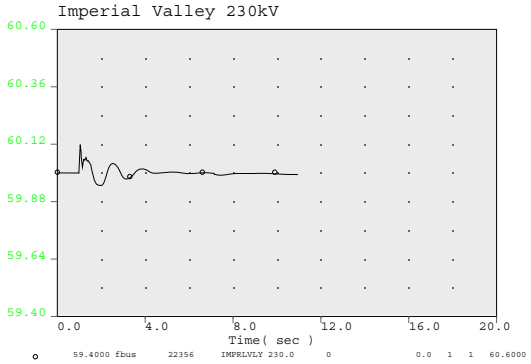
TJ1-230kV



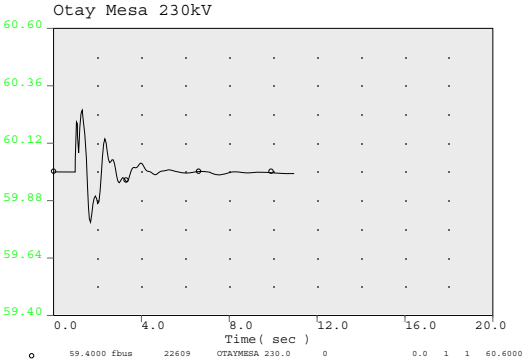
El Centro



Imperial Valley 230kV



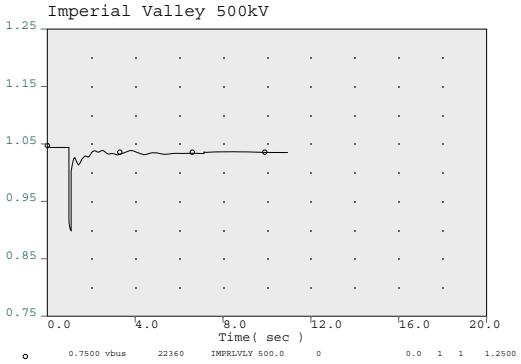
Otay Mesa 230kV



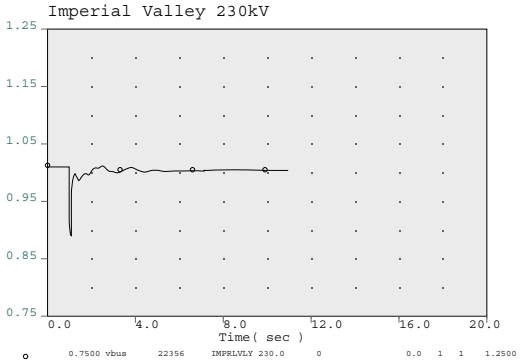
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

Imperial Valley Area - VOLTAGE

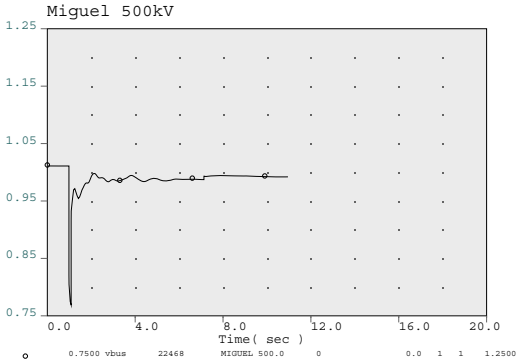
Imperial Valley 500kV



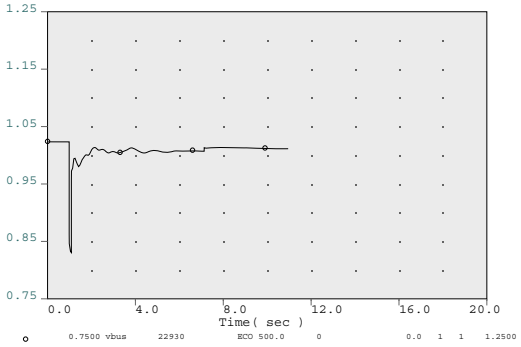
Imperial Valley 230kV



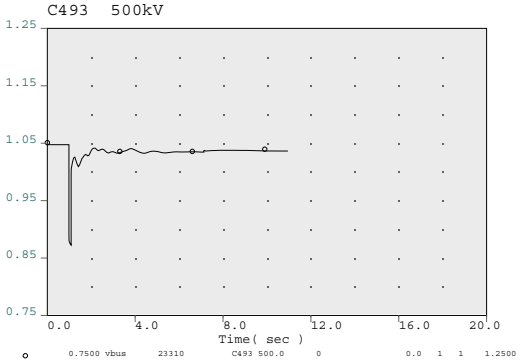
Miguel 500kV



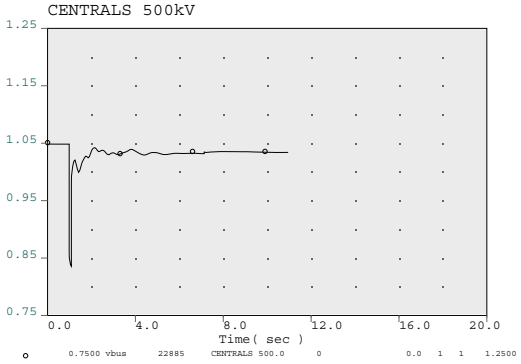
Windfarms 500



C493 500kV



CENTRALS 500kV

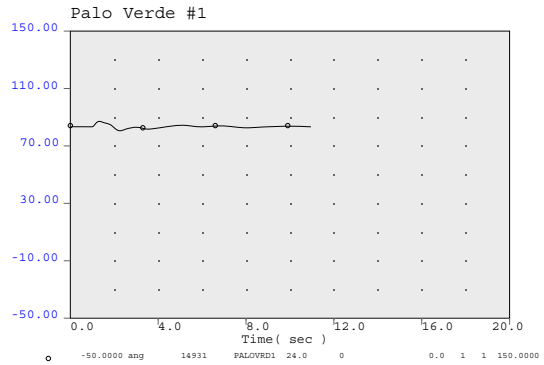


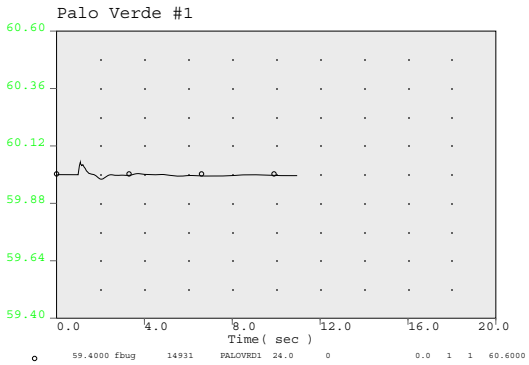
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

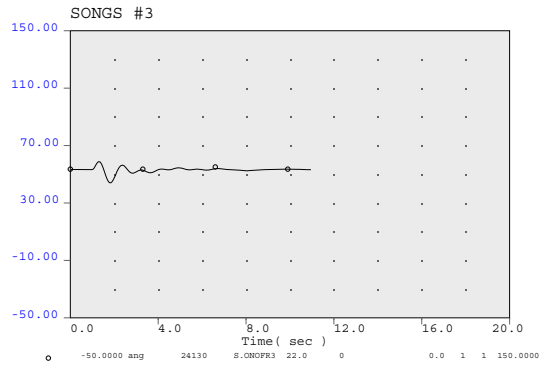
Imperial Valley Area - Frequency

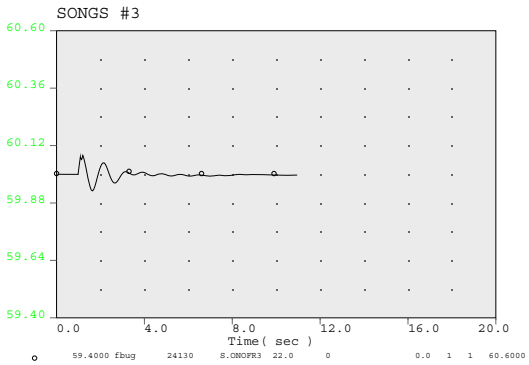
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Otay Mesa - Southbay 230 kV N-1

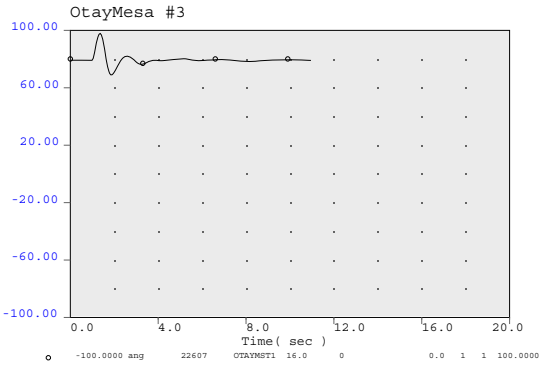
RELATIVE ROTOR ANGLE & FREQUENCY

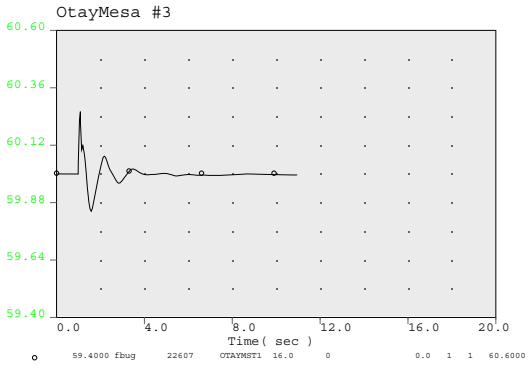






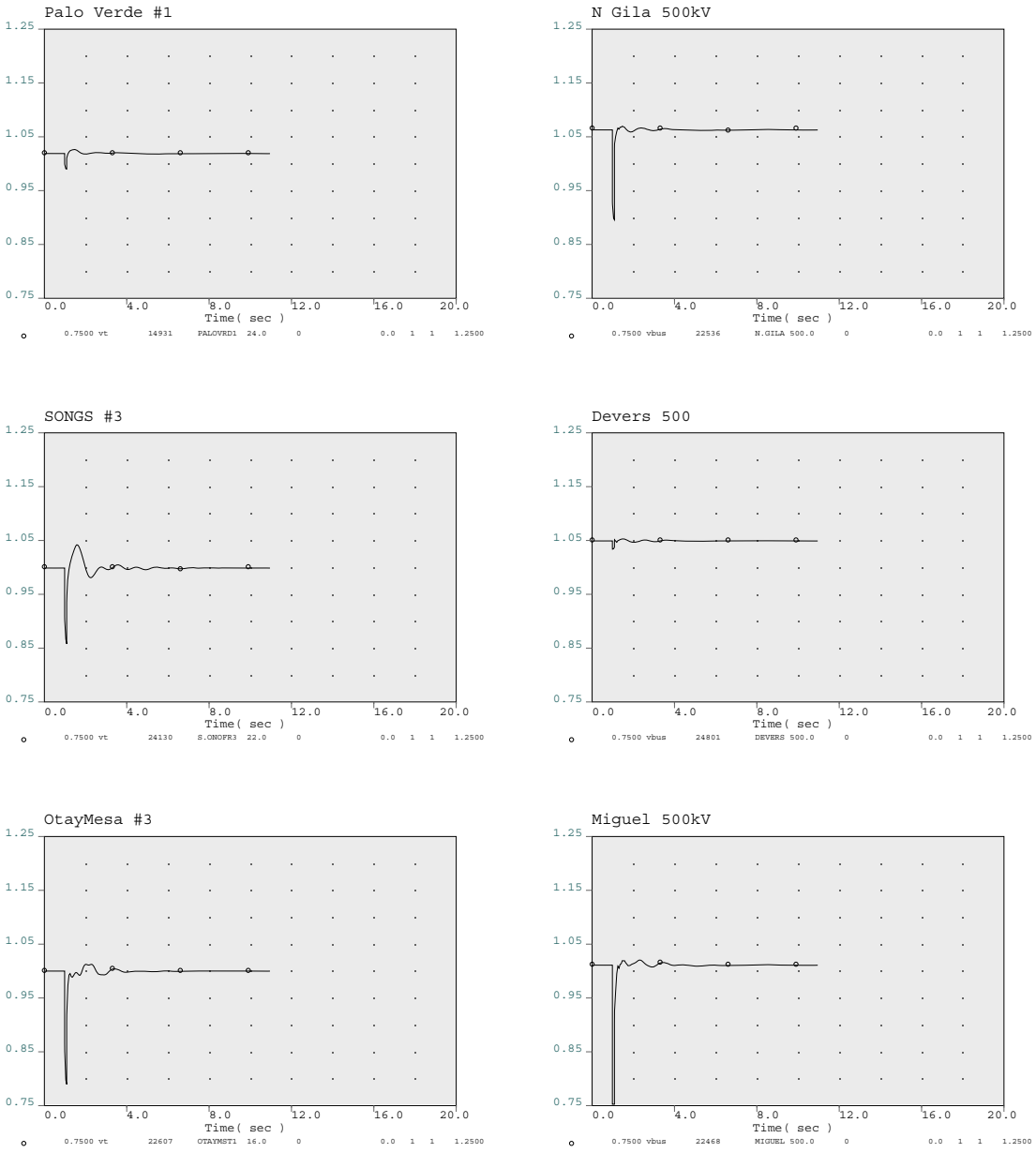






SDG&E Cluster 2 - pre int
2014 Heavy Summer
Sycamore - Miguel 230 kV N-1

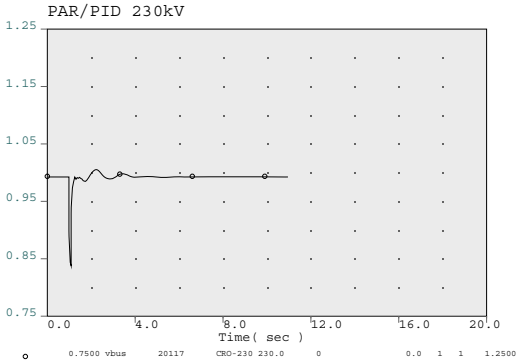
RELATIVE VOLTAGE



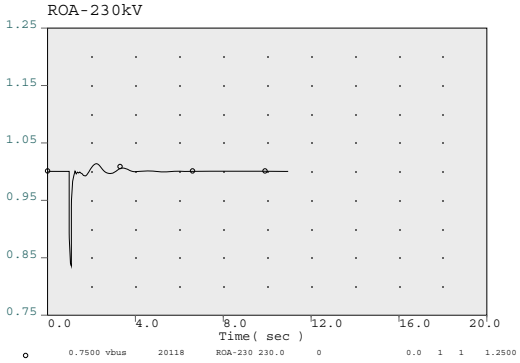
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Sycamore - Miguel 230 kV N-1

Affected System Voltage Check and Comparison

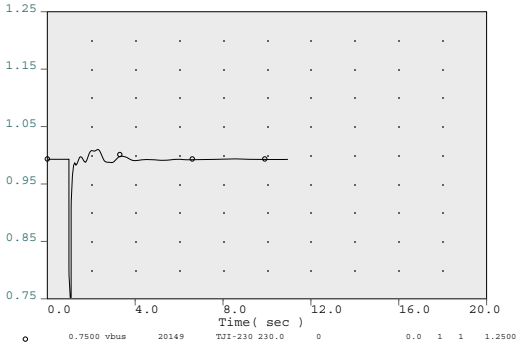
PAR/PID 230kV



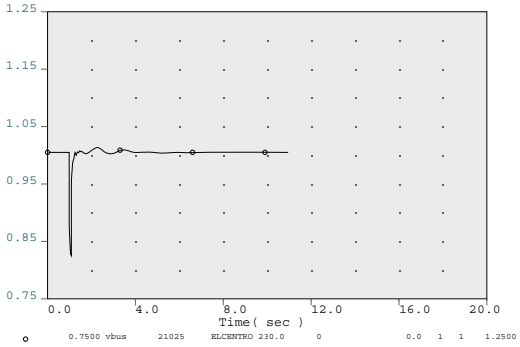
ROA-230kV



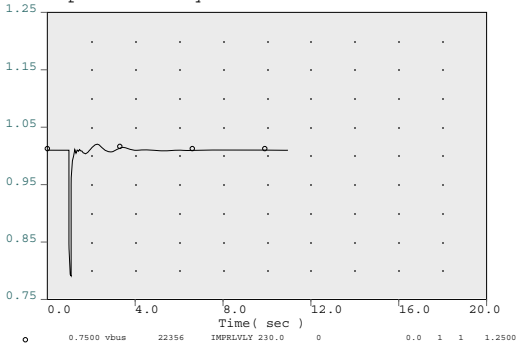
TJ1-230kV



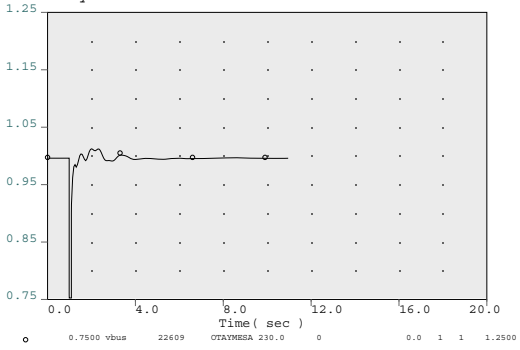
El Centro



Imperial Valley 230kV



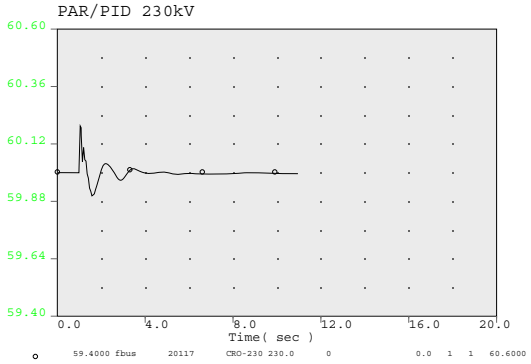
Otay Mesa 230kV



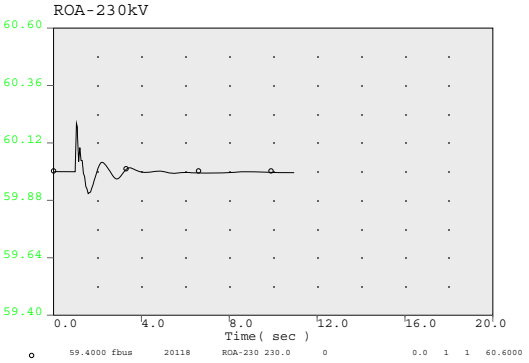
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Sycamore - Miguel 230 kV N-1

Affected System Frequency Check and Comparison

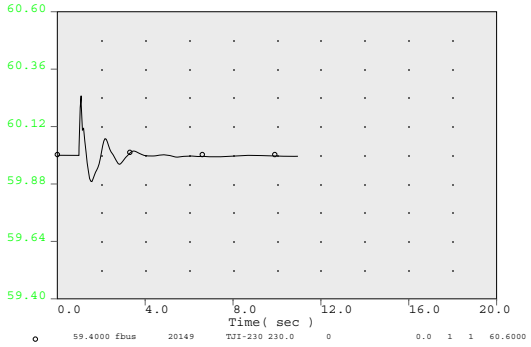
PAR/PID 230kV



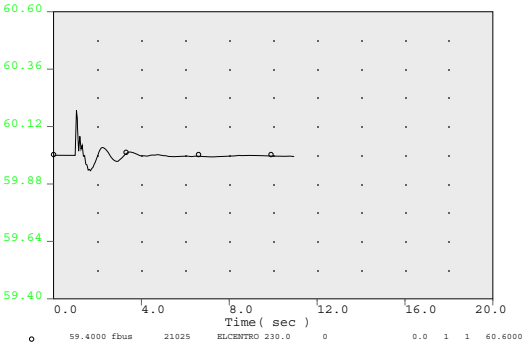
ROA-230kV



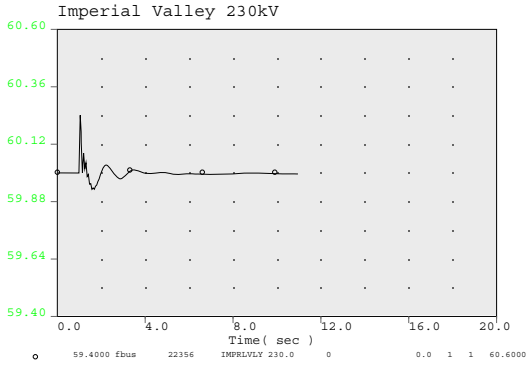
TJ1-230kV



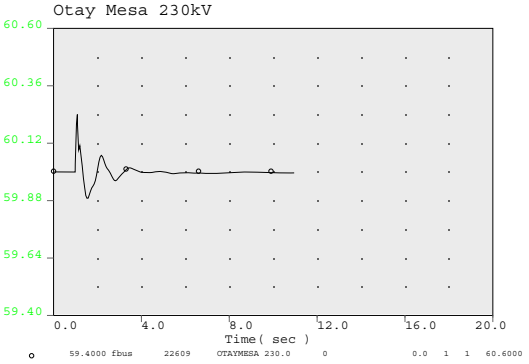
El Centro



Imperial Valley 230kV



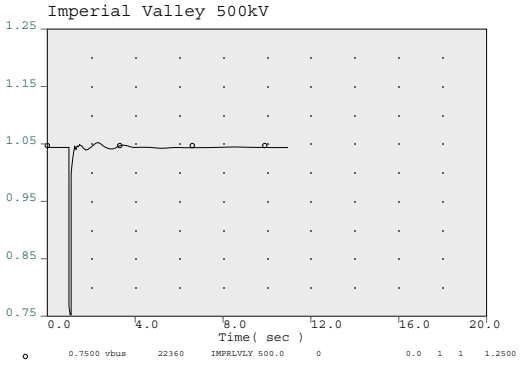
Otay Mesa 230kV



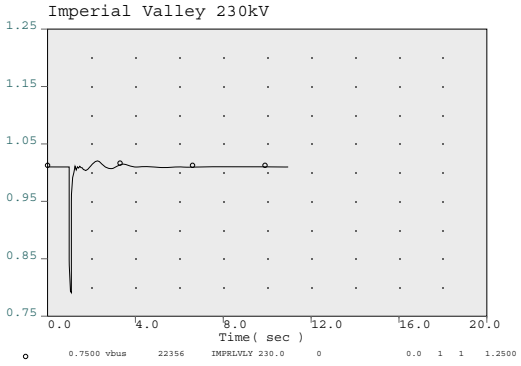
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Sycamore - Miguel 230 kV N-1

Imperial Valley Area - VOLTAGE

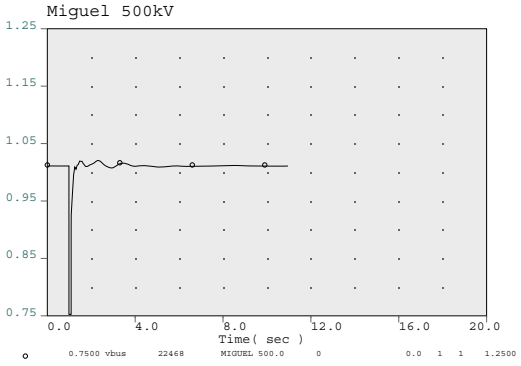
Imperial Valley 500kV



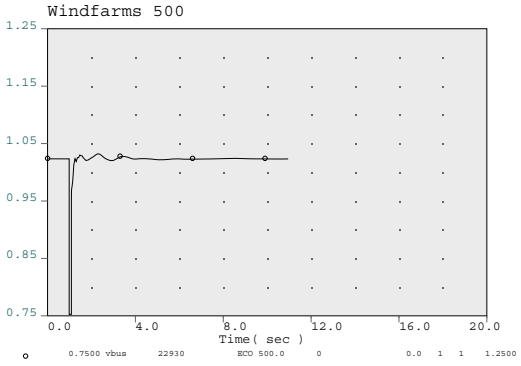
Imperial Valley 230kV



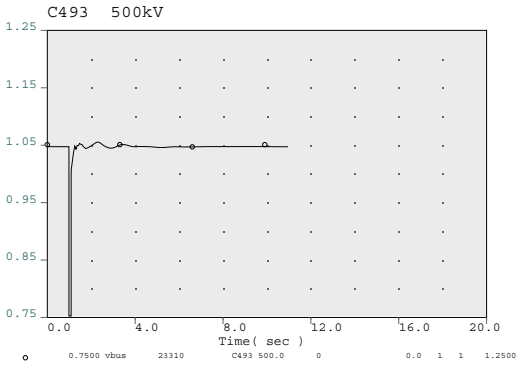
Miguel 500kV



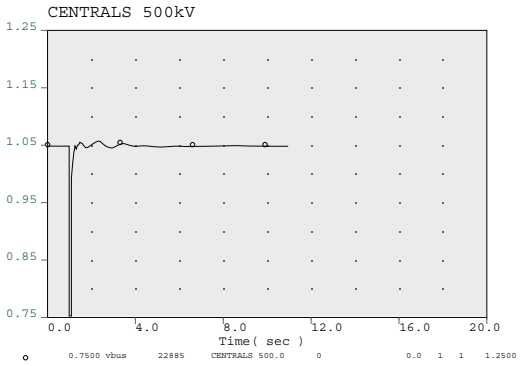
Windfarms 500



C493 500kV

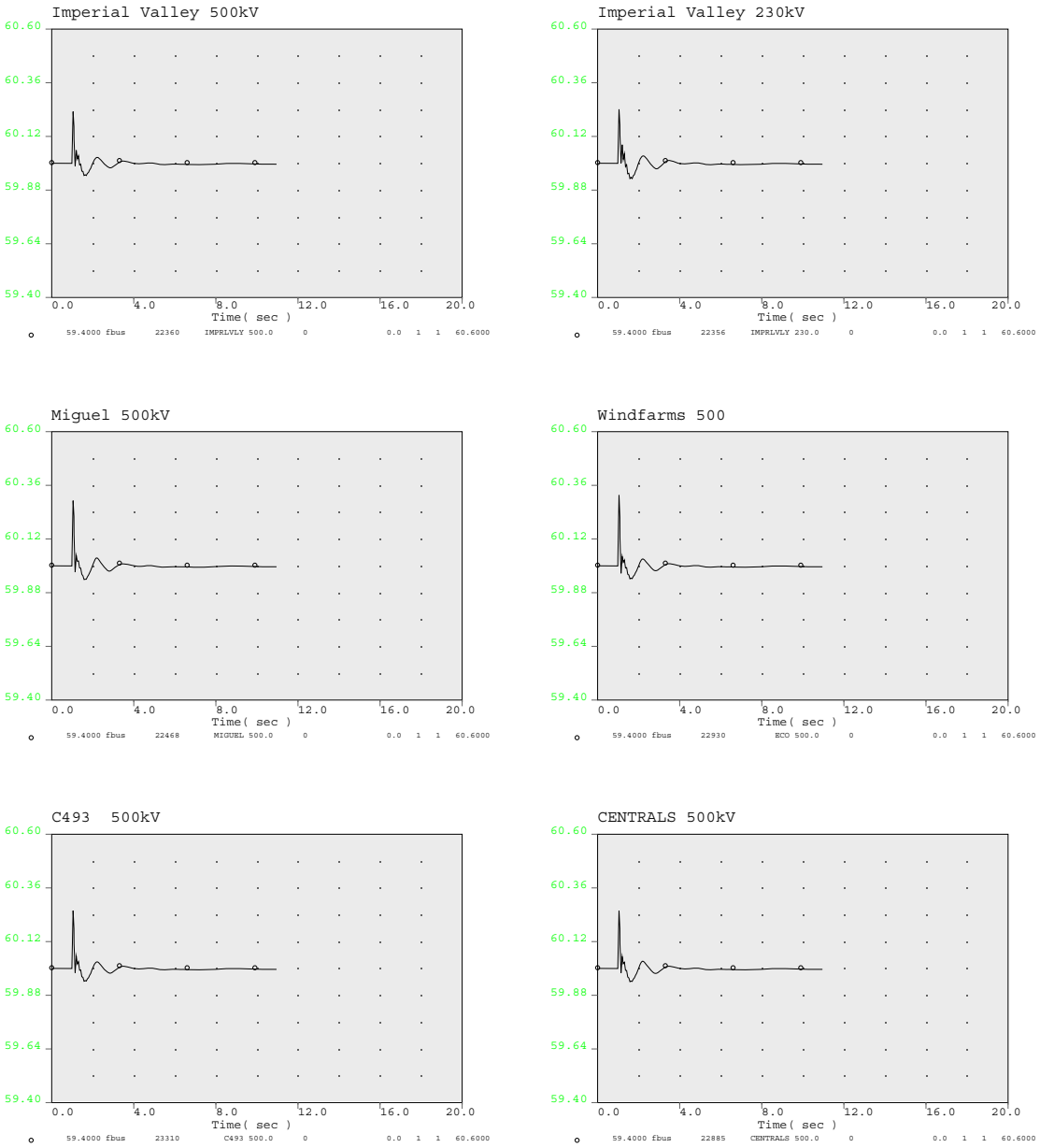


CENTRALS 500kV



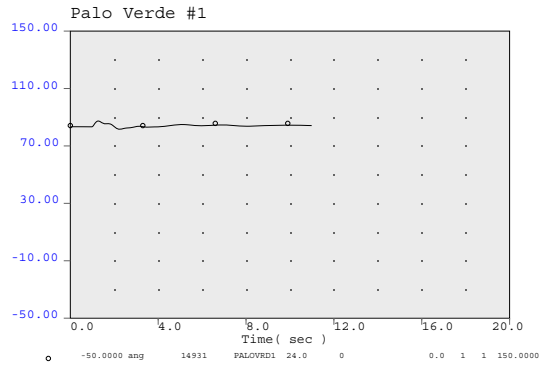
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Sycamore - Miguel 230 kV N-1

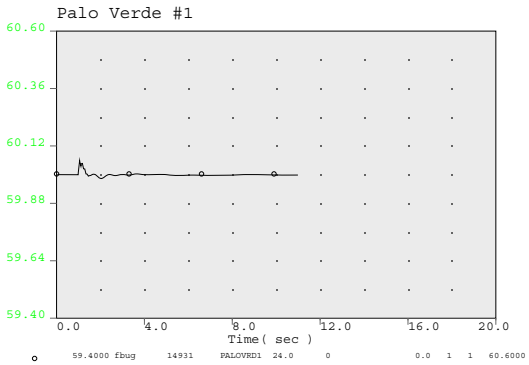
Imperial Valley Area - Frequency

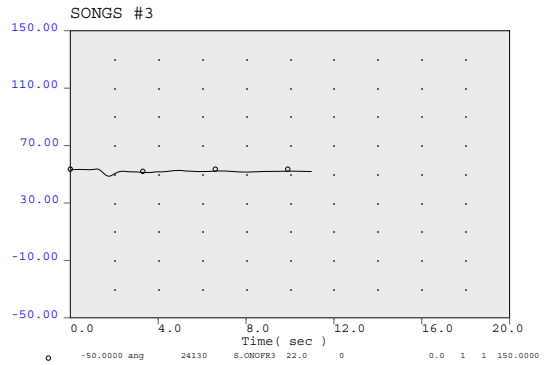


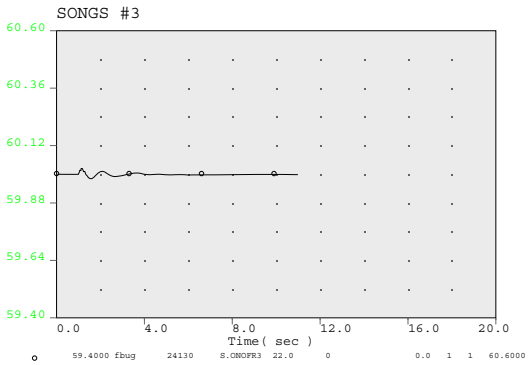
SDG&E Cluster 2 - pre int
2014 Heavy Summer
Sycamore - Miguel 230 kV N-1

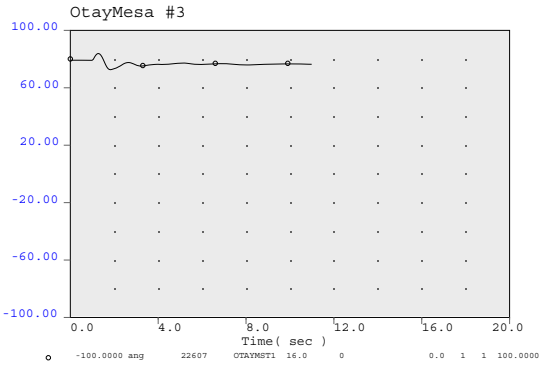
RELATIVE ROTOR ANGLE & FREQUENCY

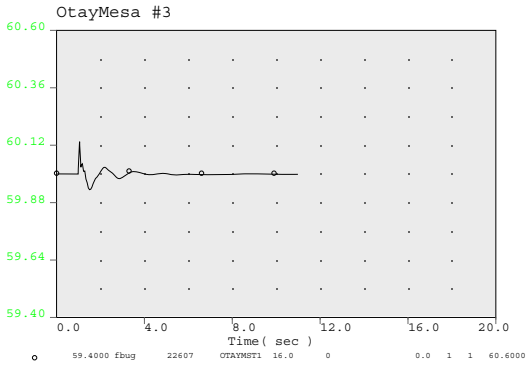








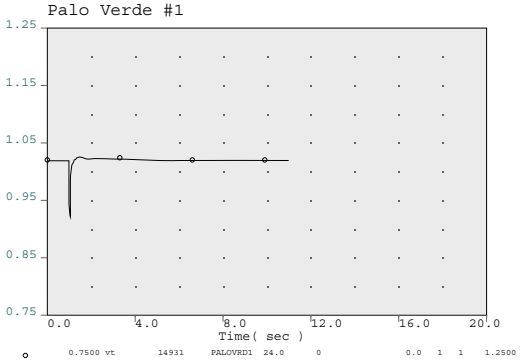




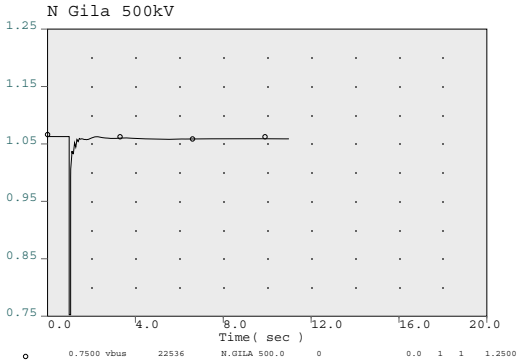
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

RELATIVE VOLTAGE

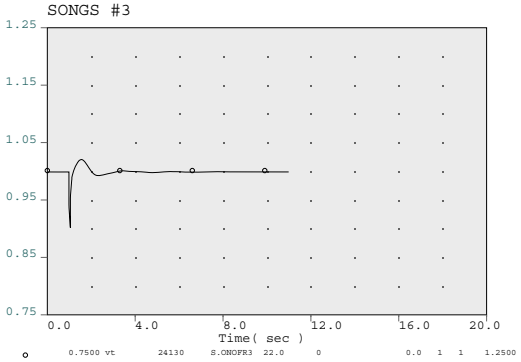
Palo Verde #1



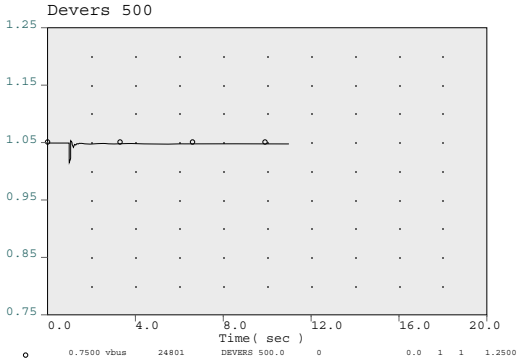
N Gila 500kV



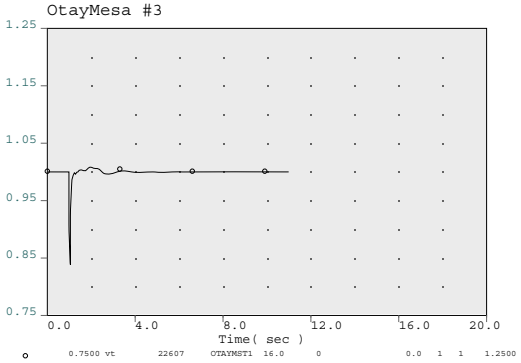
SONGS #3



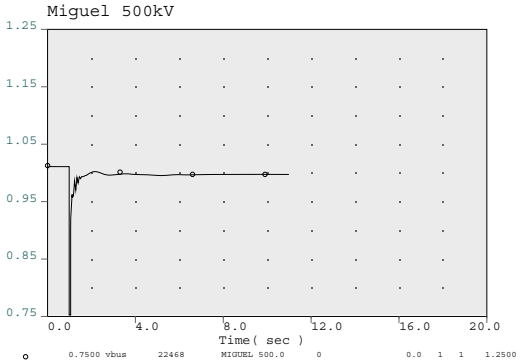
Devers 500



OtayMesa #3



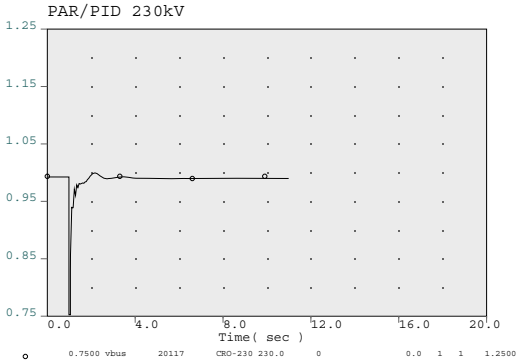
Miguel 500kV



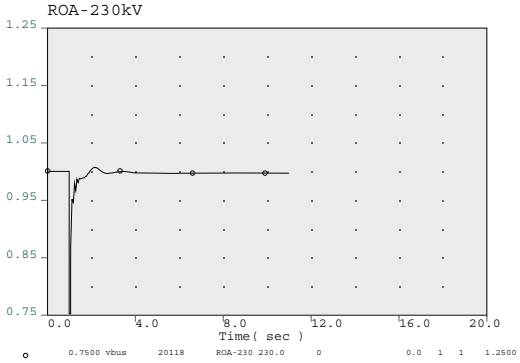
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

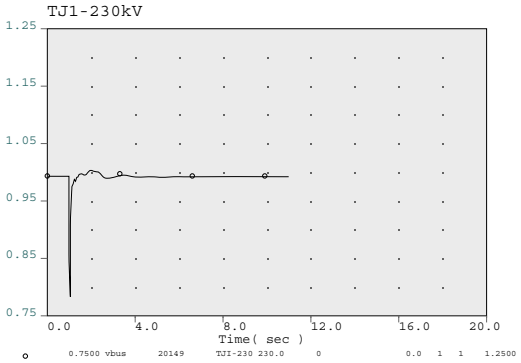
PAR/PID 230kV



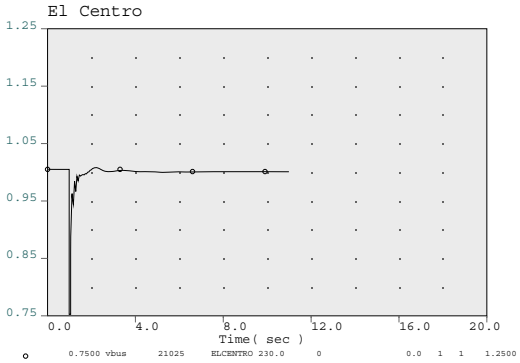
ROA-230kV



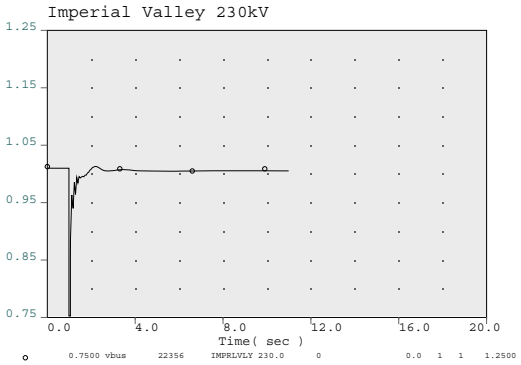
TJ1-230kV



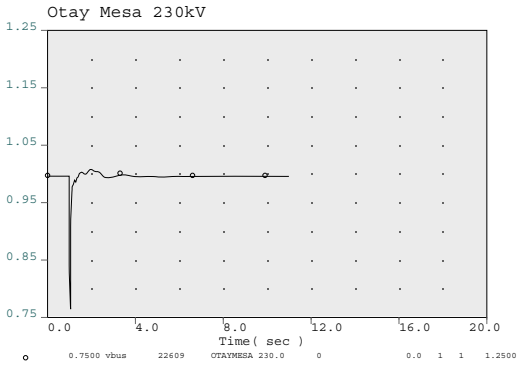
El Centro



Imperial Valley 230kV



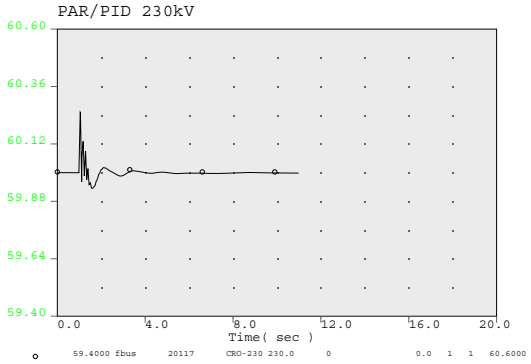
Otay Mesa 230kV



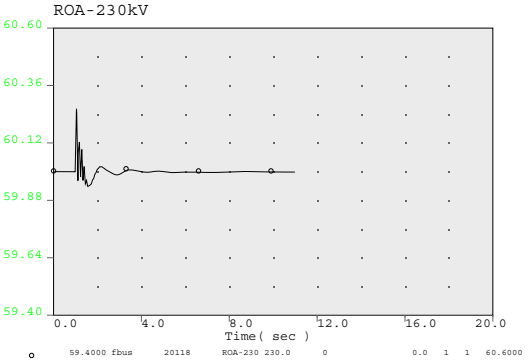
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

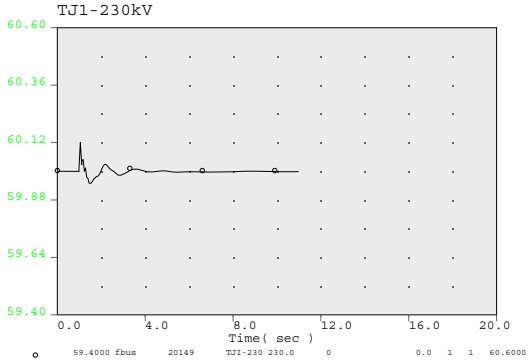
PAR/PID 230kV



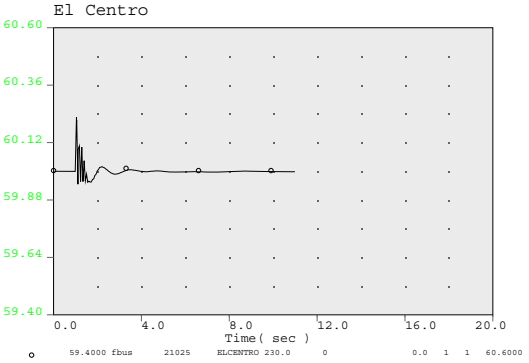
ROA-230kV



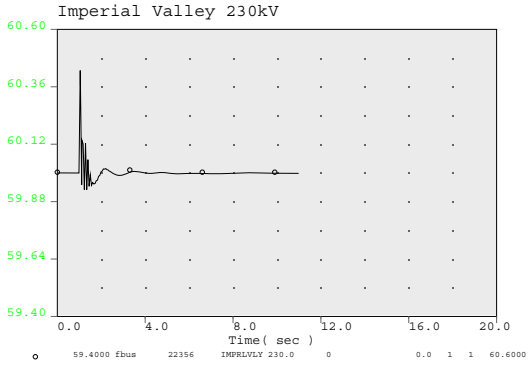
TJ1-230kV



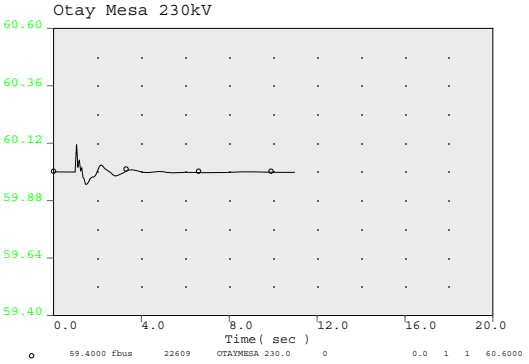
El Centro



Imperial Valley 230kV



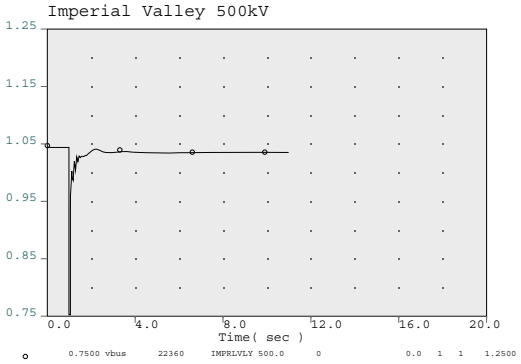
Otay Mesa 230kV



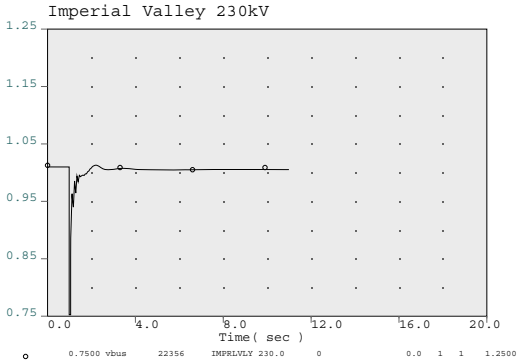
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Imperial Valley Area - VOLTAGE

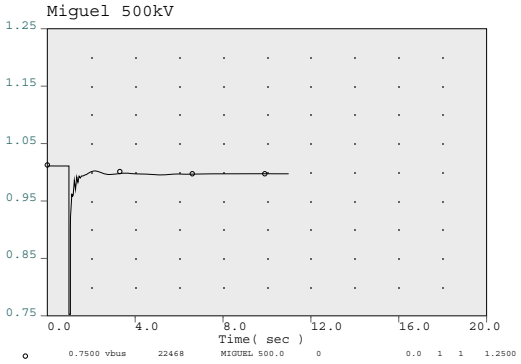
Imperial Valley 500kV



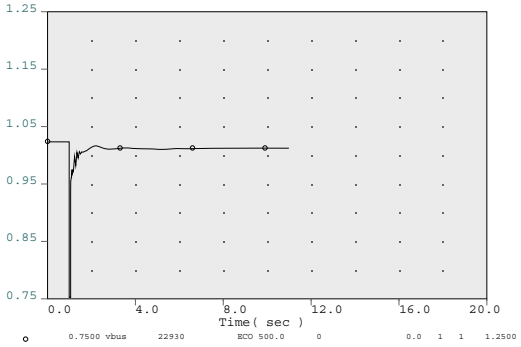
Imperial Valley 230kV



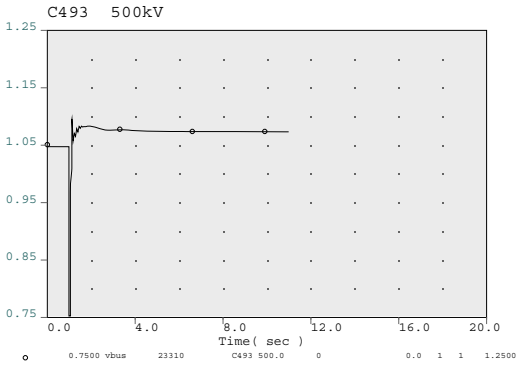
Miguel 500kV



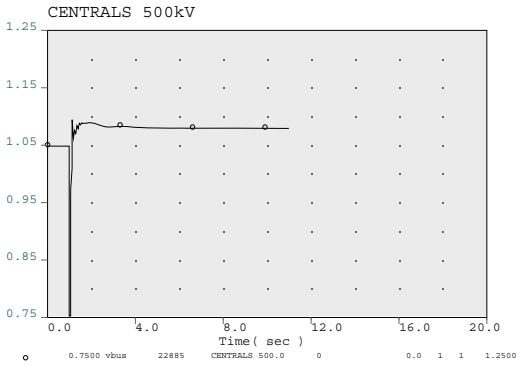
Windfarms 500



C493 500kV



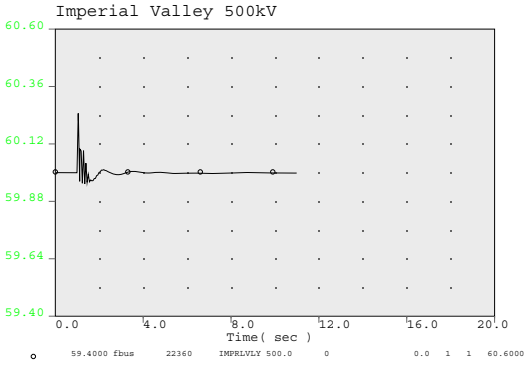
CENTRALS 500kV



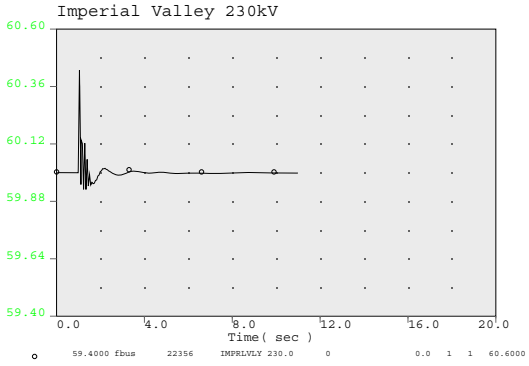
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Imperial Valley Area - Frequency

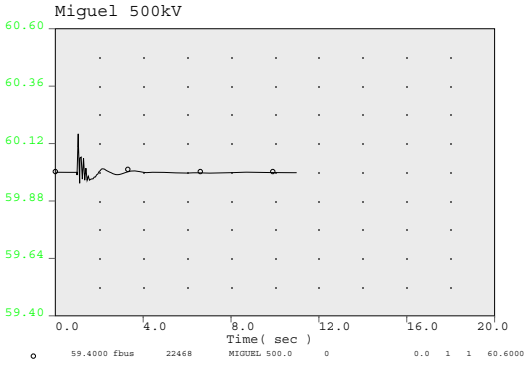
Imperial Valley 500kV



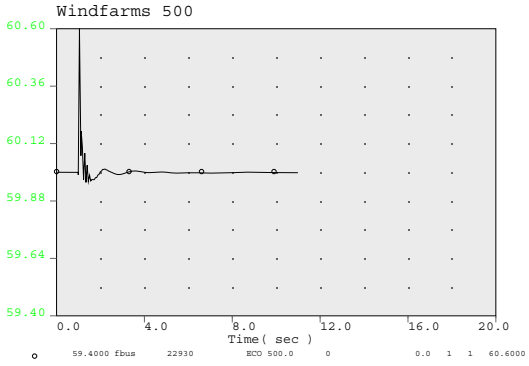
Imperial Valley 230kV



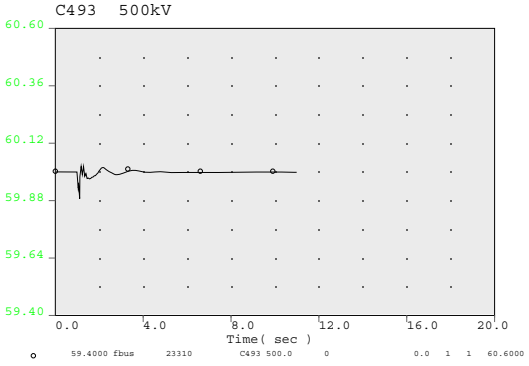
Miguel 500kV



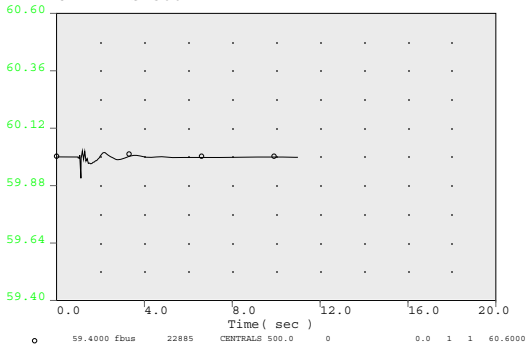
Windfarms 500



C493 500kV

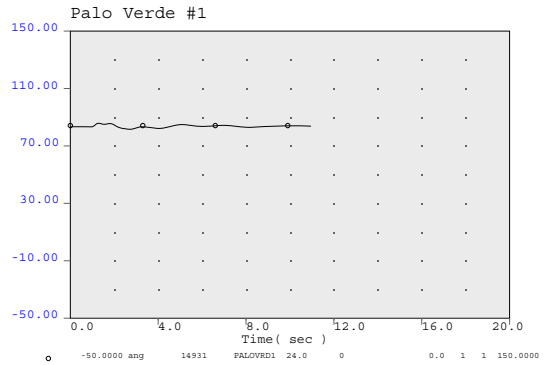


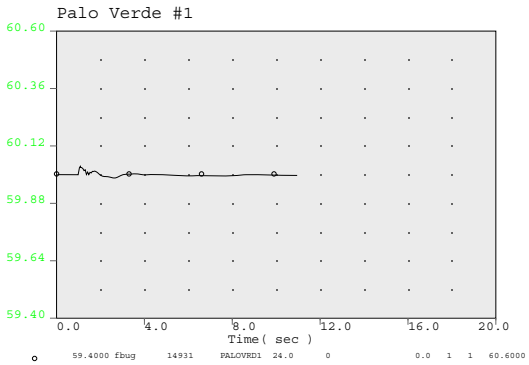
CENTRALS 500kV

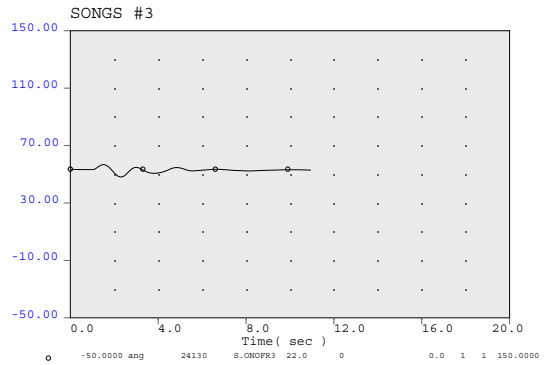


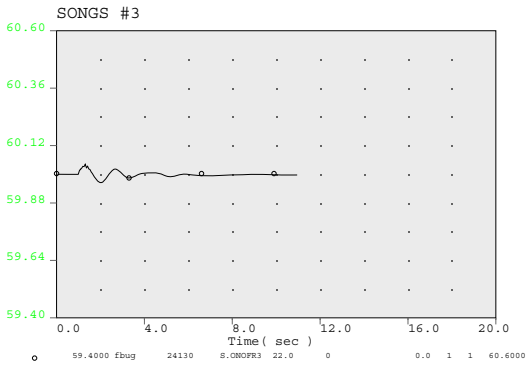
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley- C493 500kV line1

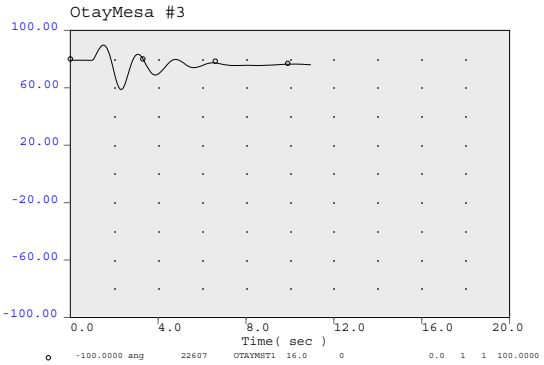
RELATIVE ROTOR ANGLE & FREQUENCY

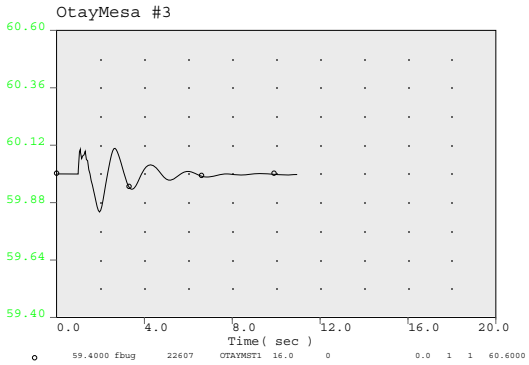












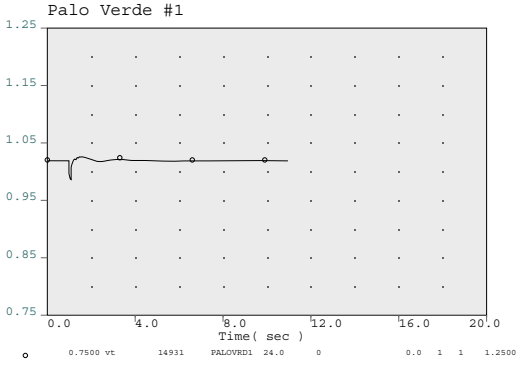
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Page 1

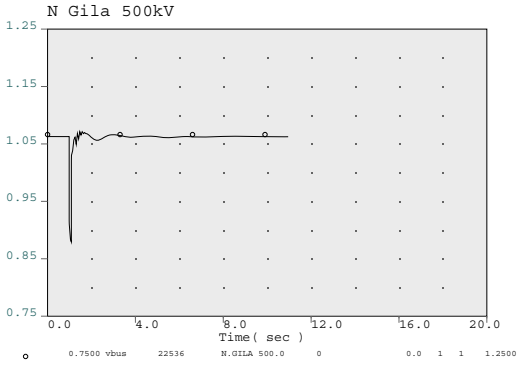
SDGE	iv_roa_6_slo_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:43 2010

RELATIVE VOLTAGE

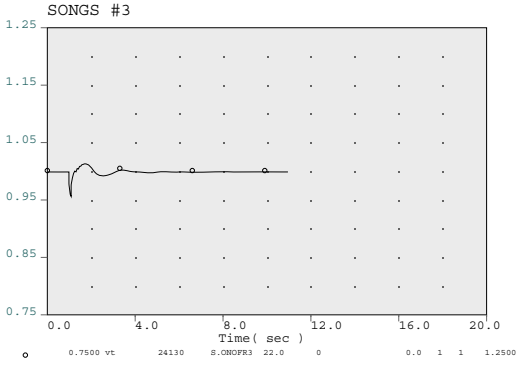
Palo Verde #1



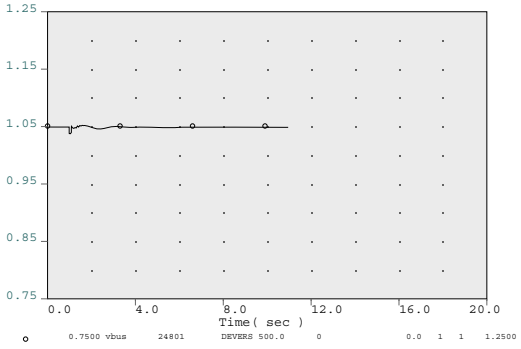
N Gila 500kV



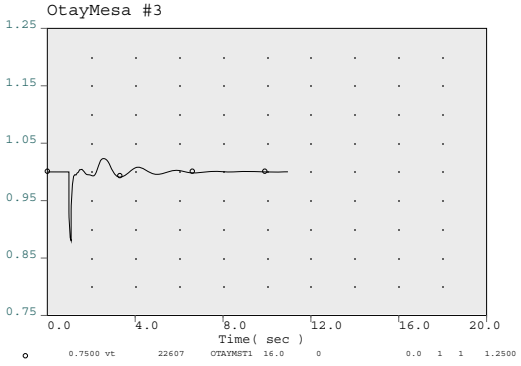
SONGS #3



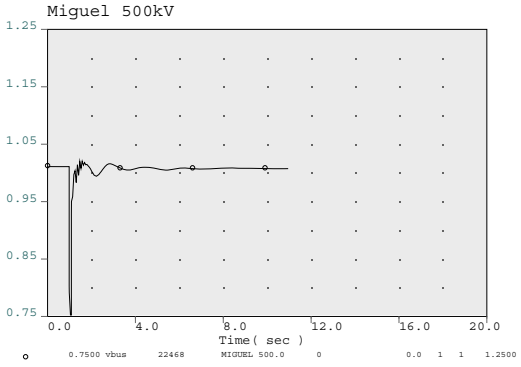
Devers 500



OtayMesa #3



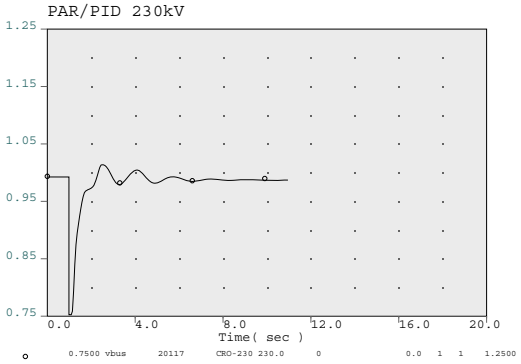
Miguel 500kV



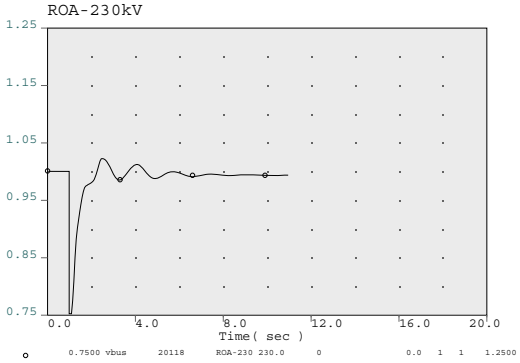
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

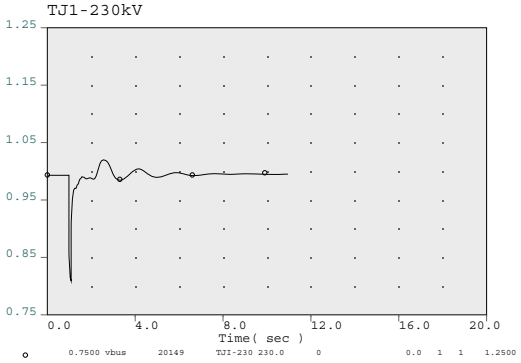
PAR/PID 230kV



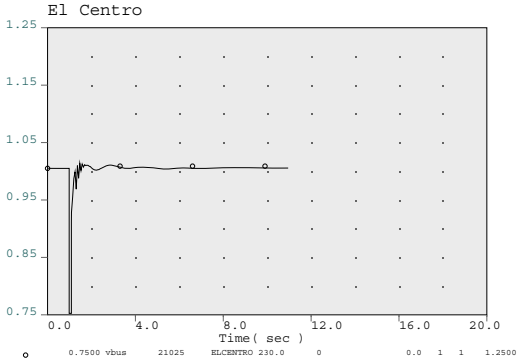
ROA-230kV



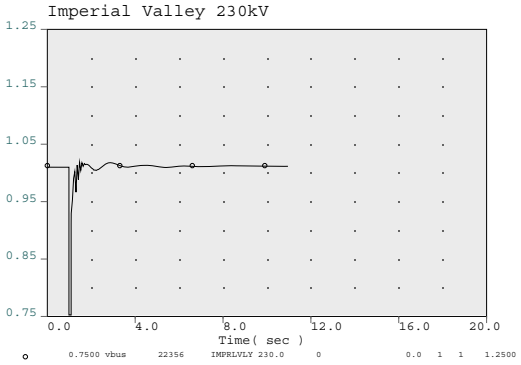
TJ1-230kV



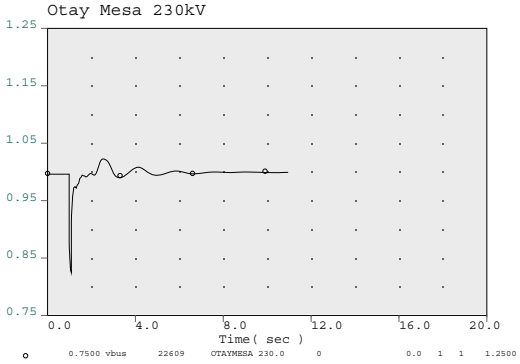
El Centro



Imperial Valley 230kV



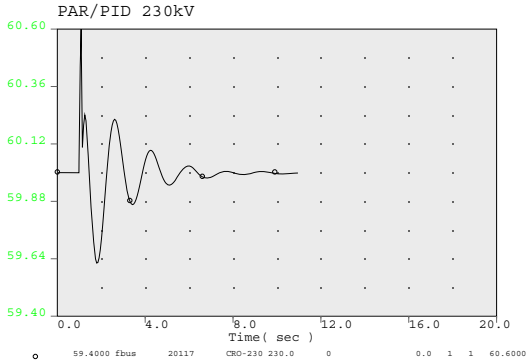
Otay Mesa 230kV



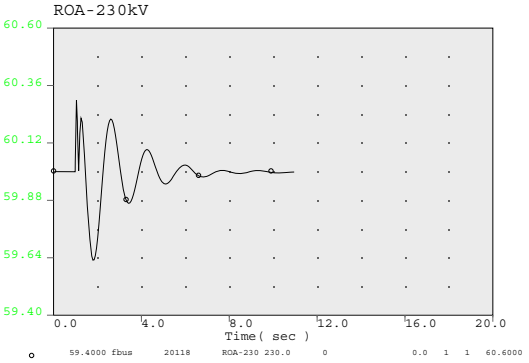
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Affected System Frequency Check and Comparison

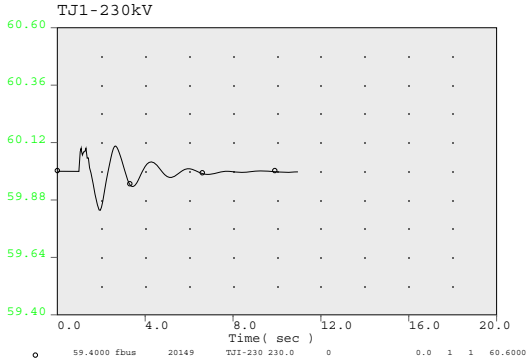
PAR/PID 230kV



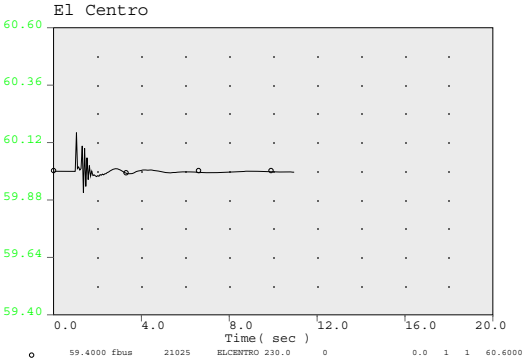
ROA-230kV



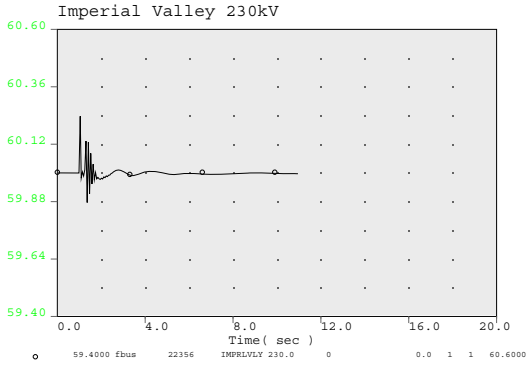
TJ1-230kV



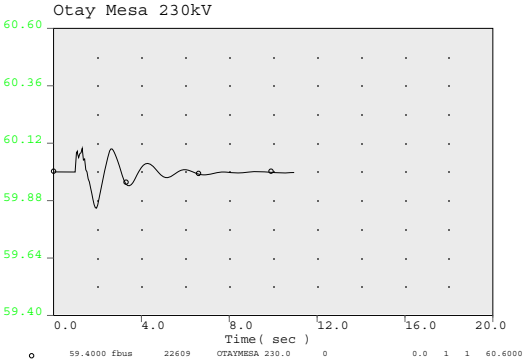
El Centro



Imperial Valley 230kV



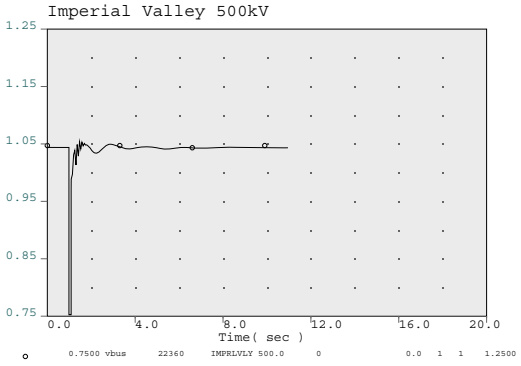
Otay Mesa 230kV



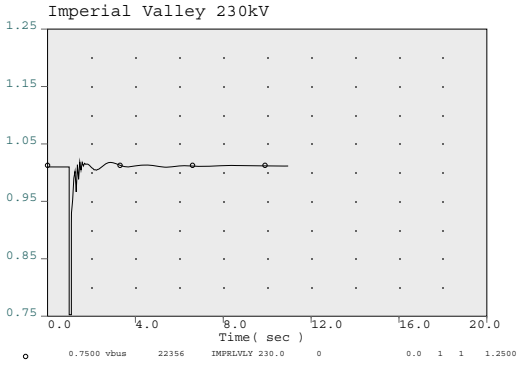
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

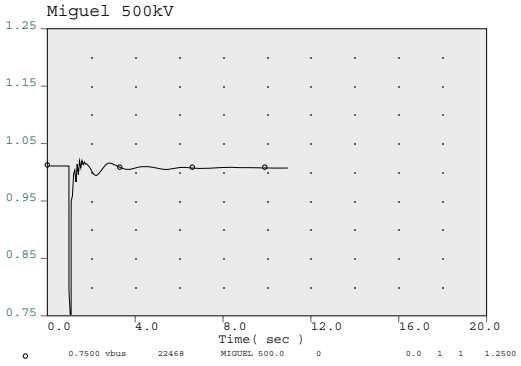
Imperial Valley 500kV



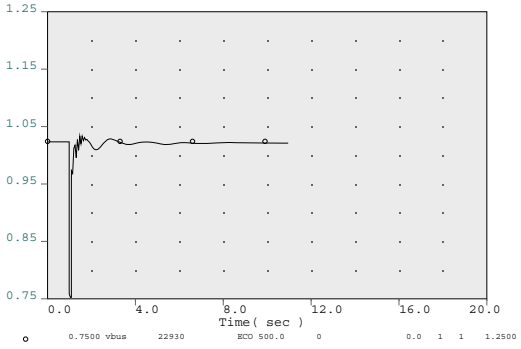
Imperial Valley 230kV



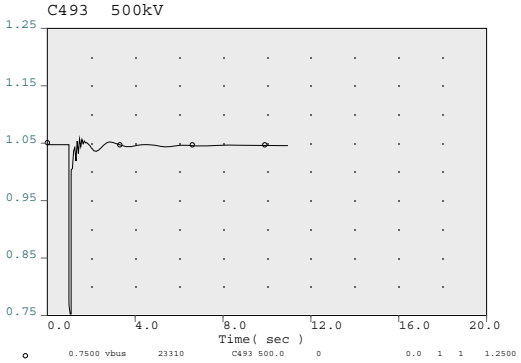
Miguel 500kV



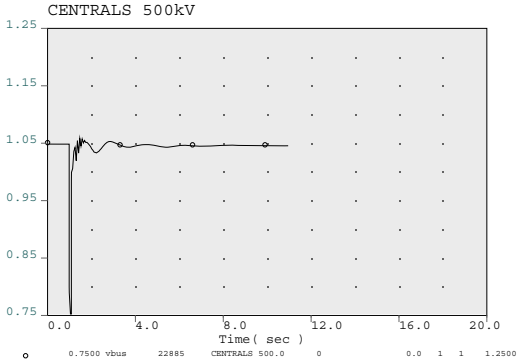
Windfarms 500



C493 500kV

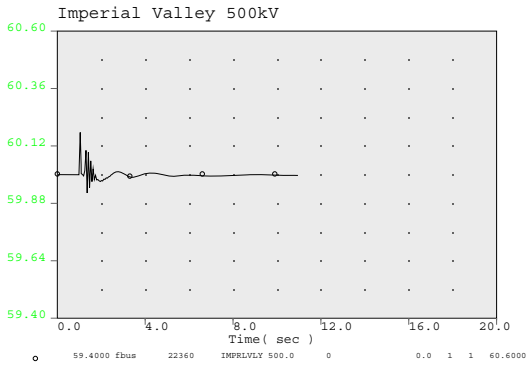


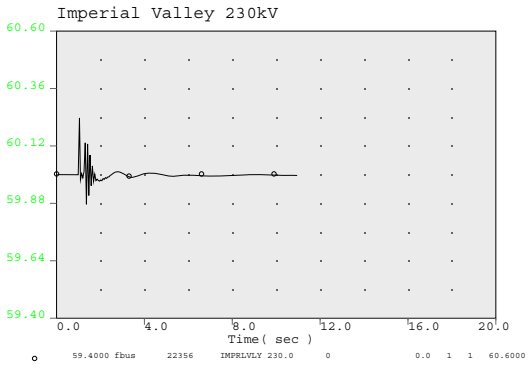
CENTRALS 500kV

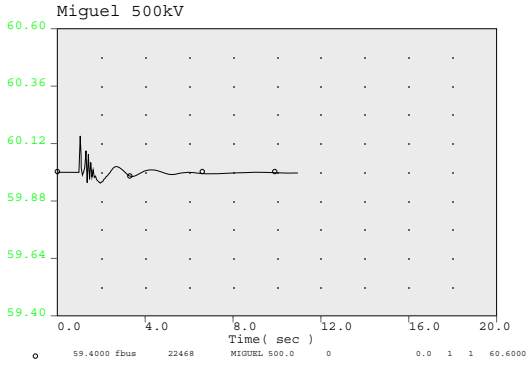


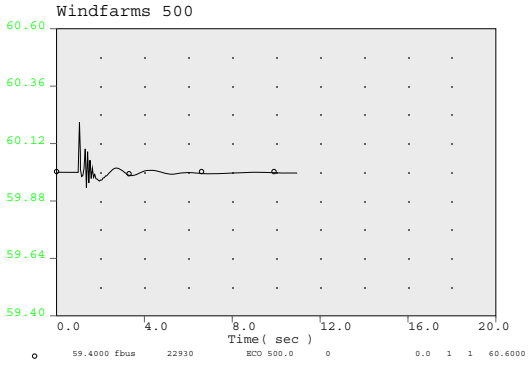
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

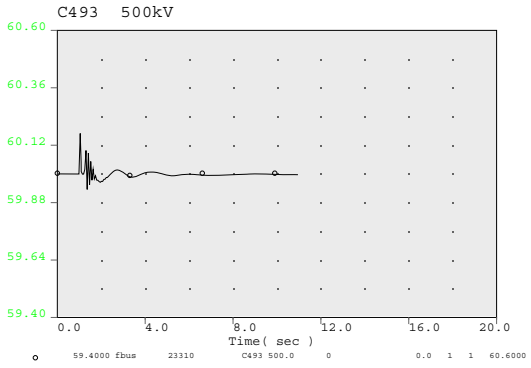
Imperial Valley Area - Frequency

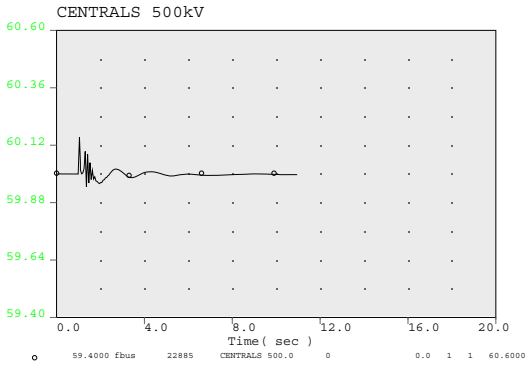






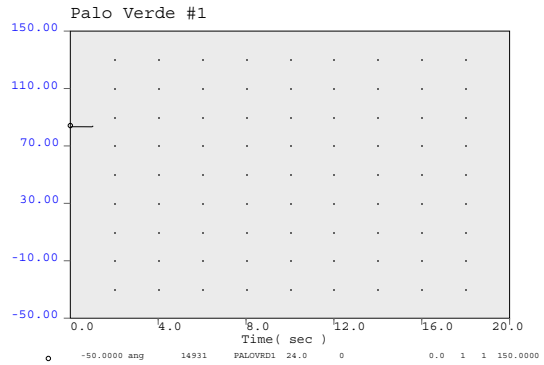


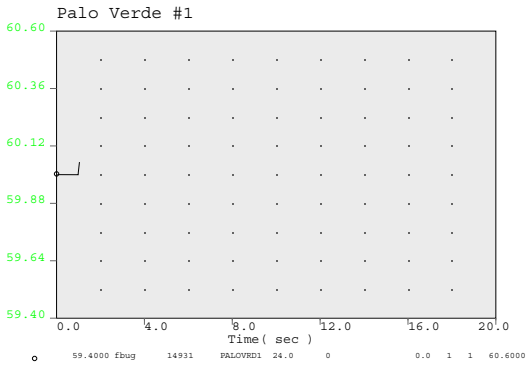


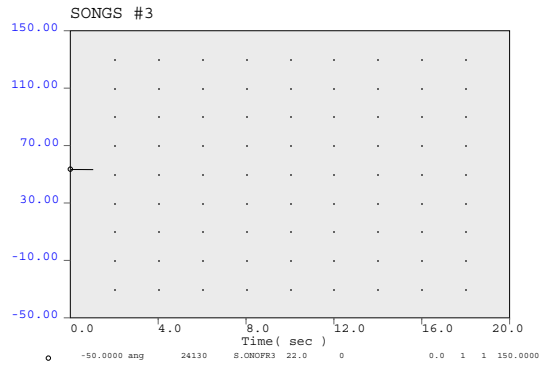


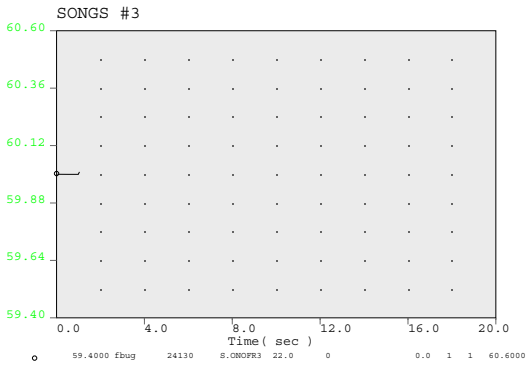
SDG&E Cluster 2 - pre
2014 Heavy Summer
Loss of IV-ROA 230 kV SLO

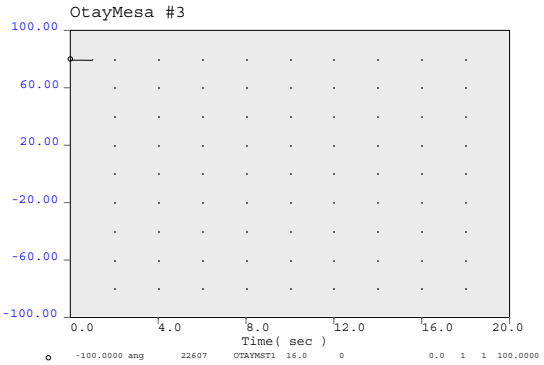
RELATIVE ROTOR ANGLE & FREQUENCY

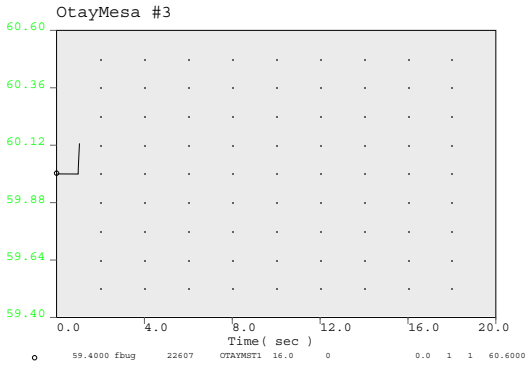












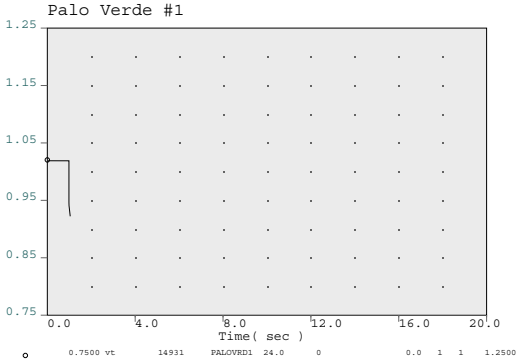
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-Windfarms 500 kV line1

Page 1

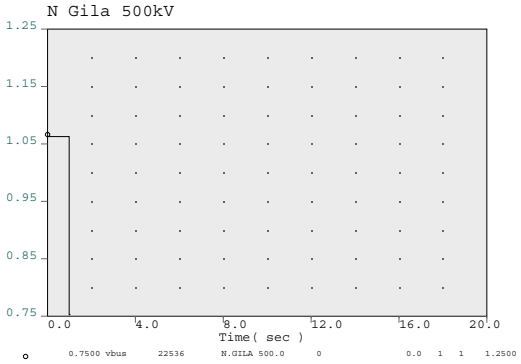
SDGE	IV_Wnd1_noRAS_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:46 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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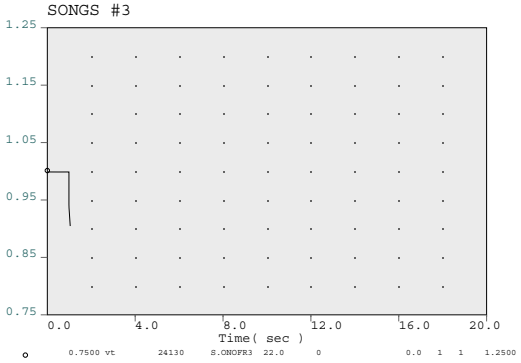
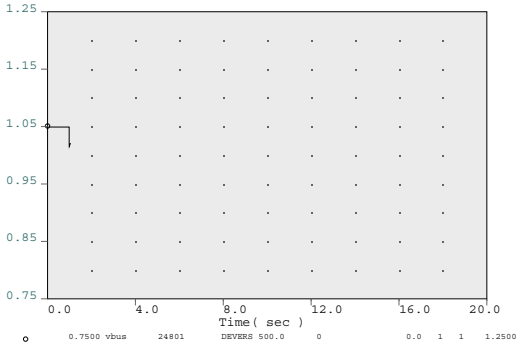
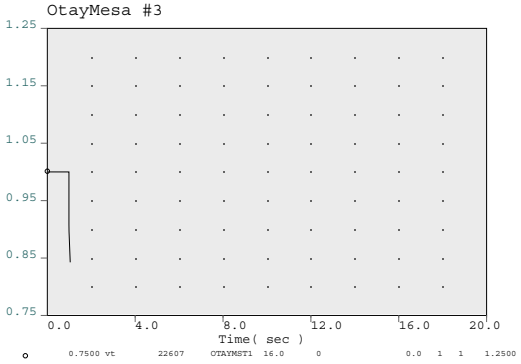


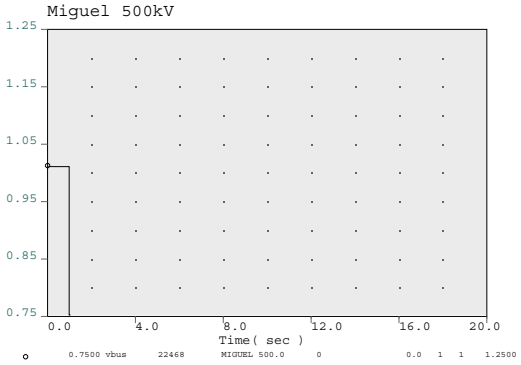
Devers 500



OtayMesa #3



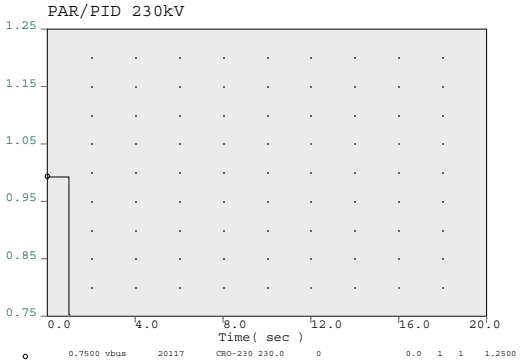
Miguel 500kV



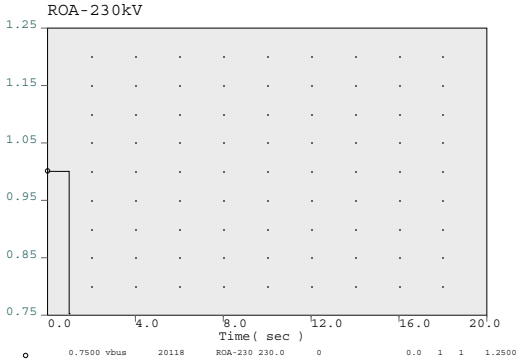
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-Windfarms 500 kV line1

Affected System Voltage Check and Comparison

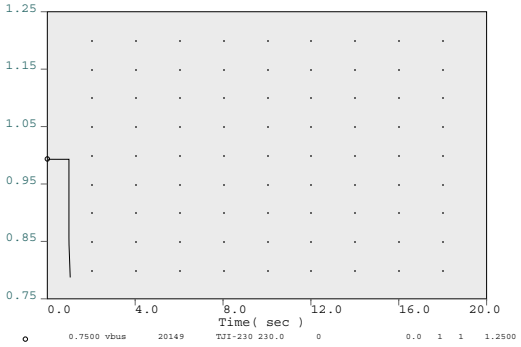
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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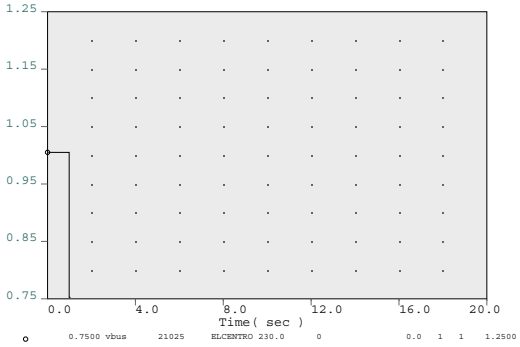
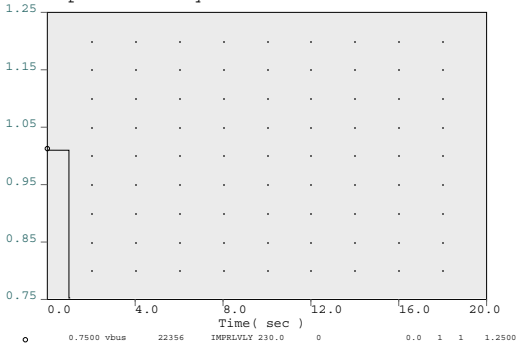
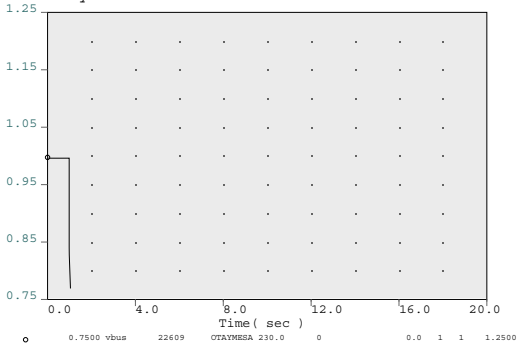


Imperial Valley 230kV



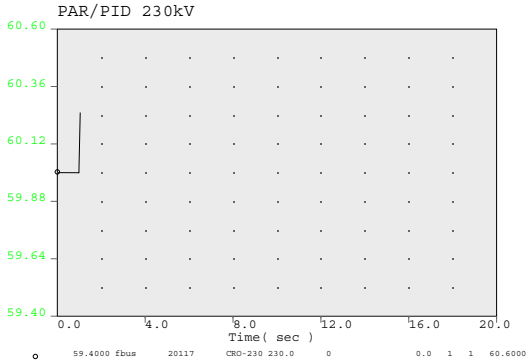
Otay Mesa 230kV



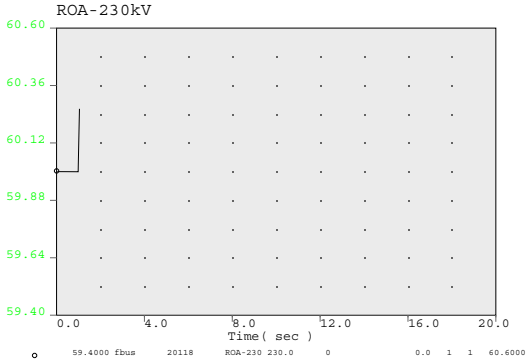
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-Windfarms 500 kV line1

Affected System Frequency Check and Comparison

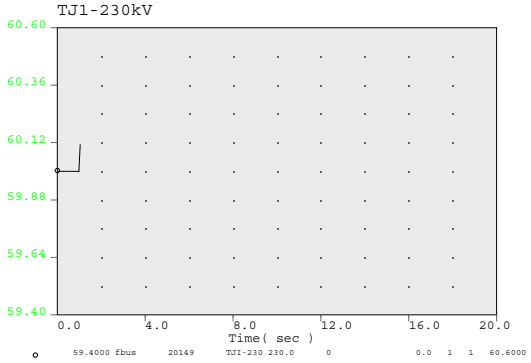
PAR/PID 230kV



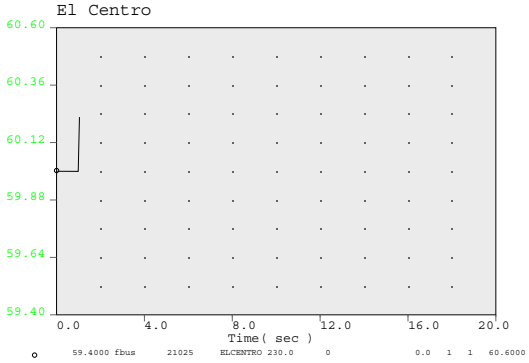
ROA-230kV



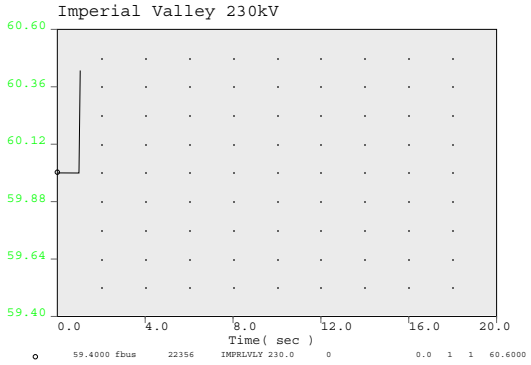
TJ1-230kV



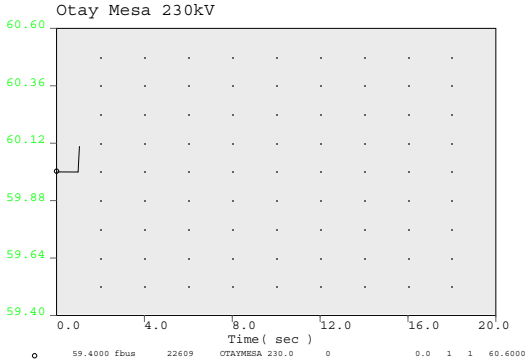
El Centro



Imperial Valley 230kV

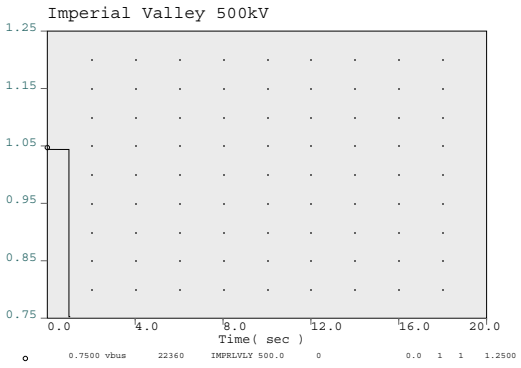


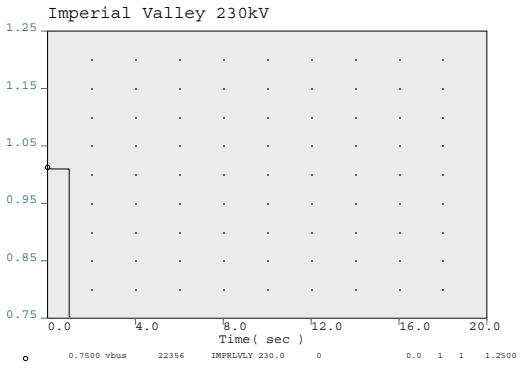
Otay Mesa 230kV

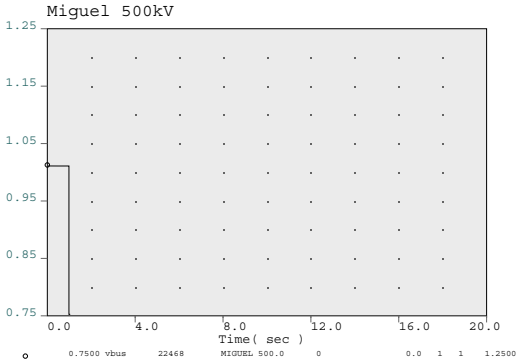


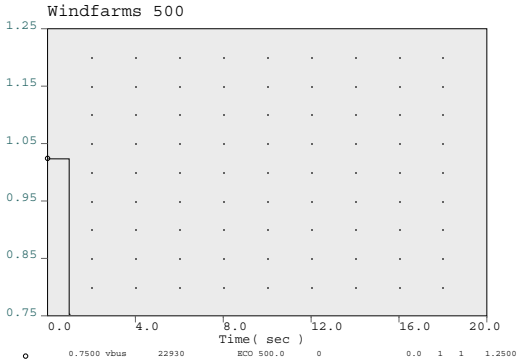
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-Windfarms 500 kV line1

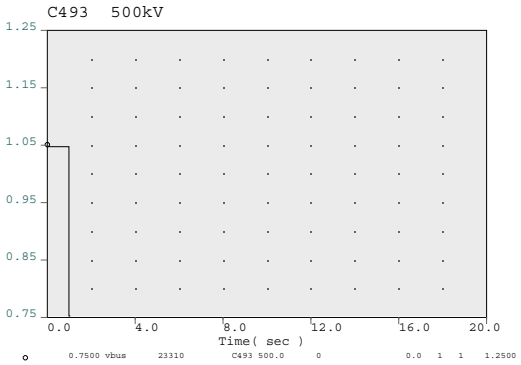
Imperial Valley Area - VOLTAGE

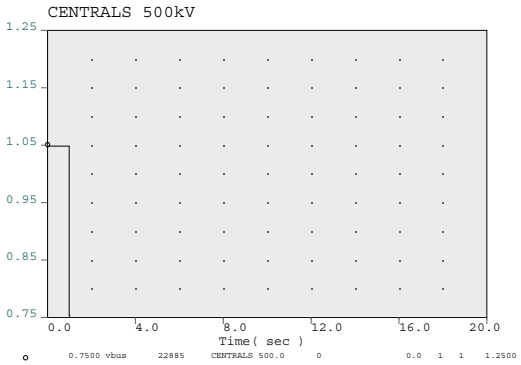






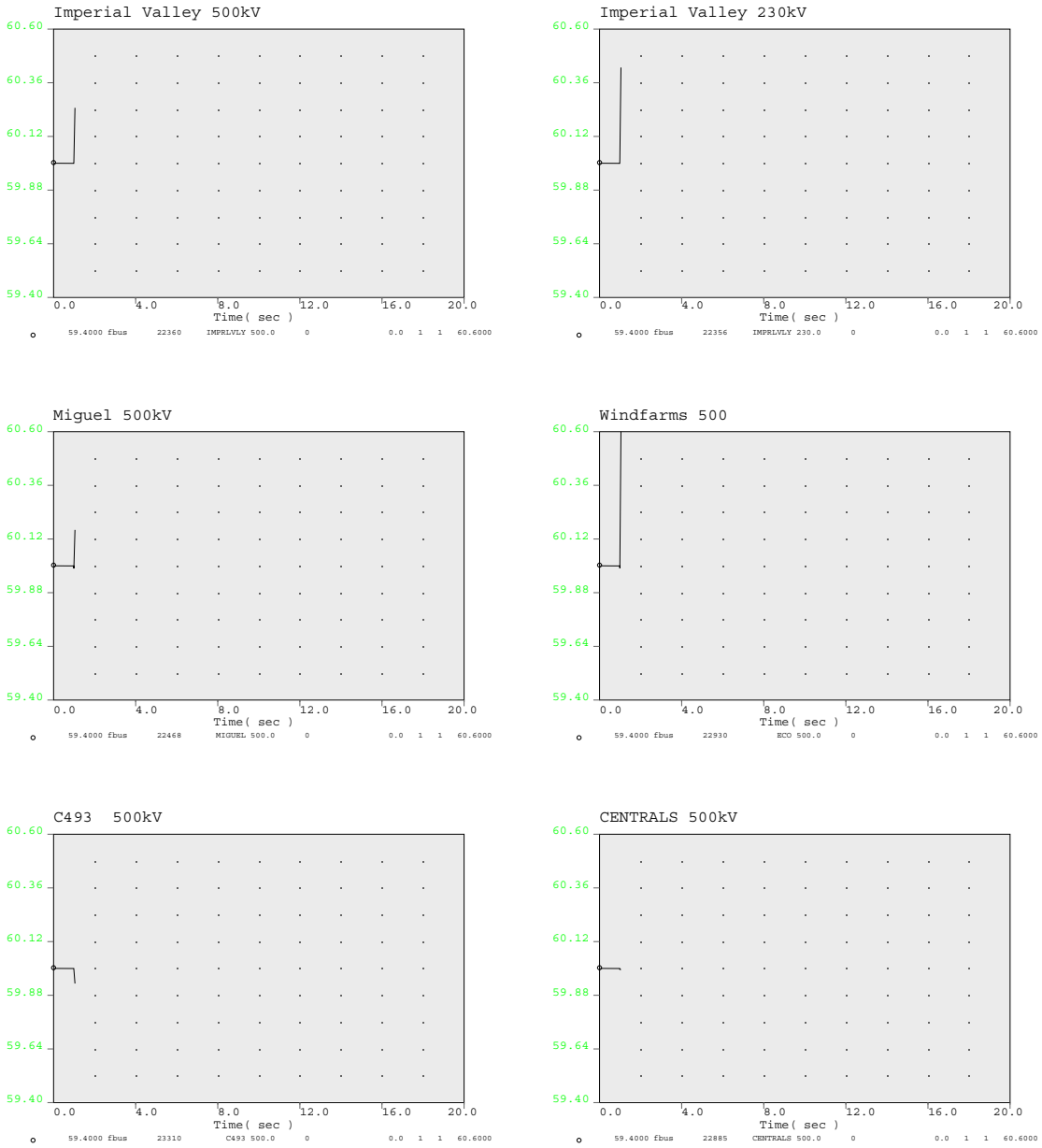






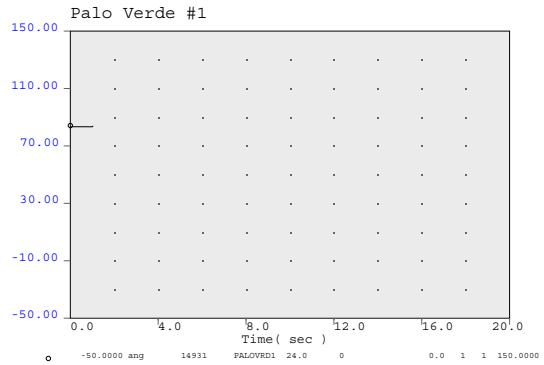
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-Windfarms 500 kV line1

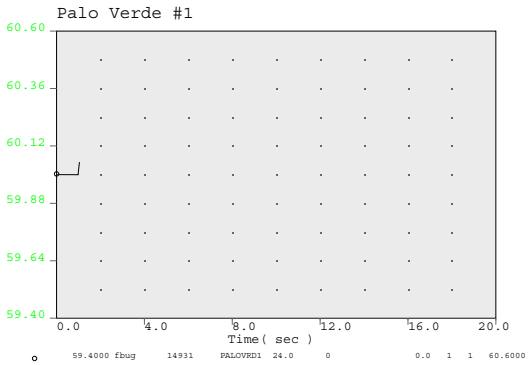
Imperial Valley Area - Frequency

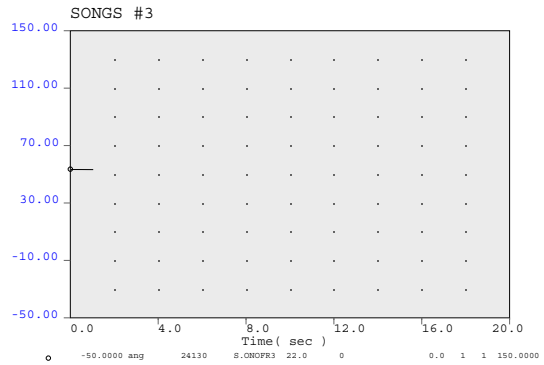


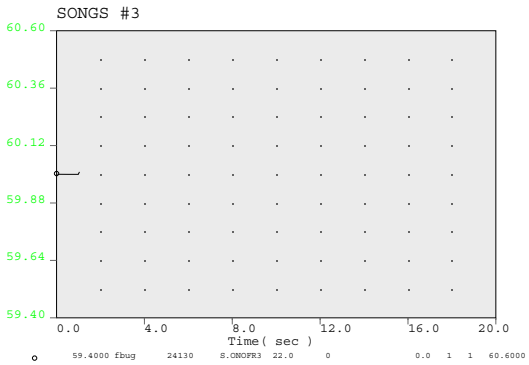
SDG&E Cluster 2 - pre
2014 Heavy Summer
Imperial Valley-Windfarms 500 kV line1

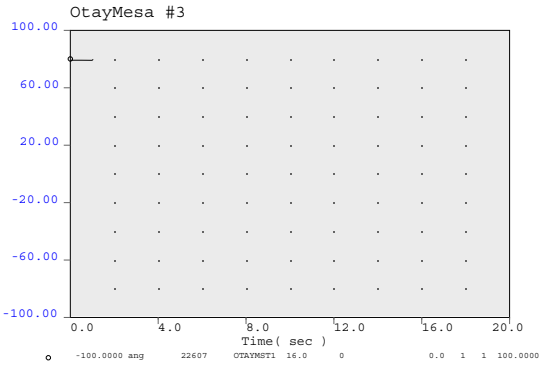
RELATIVE ROTOR ANGLE & FREQUENCY

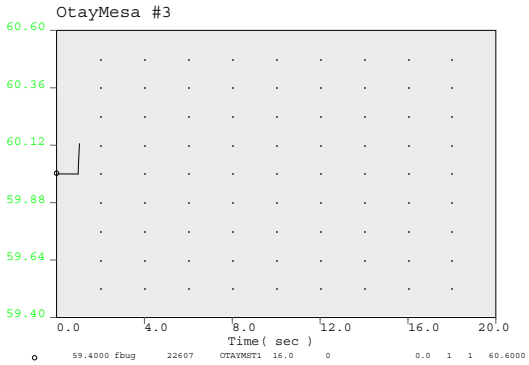








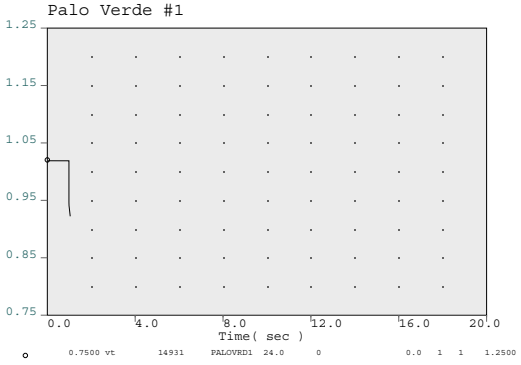




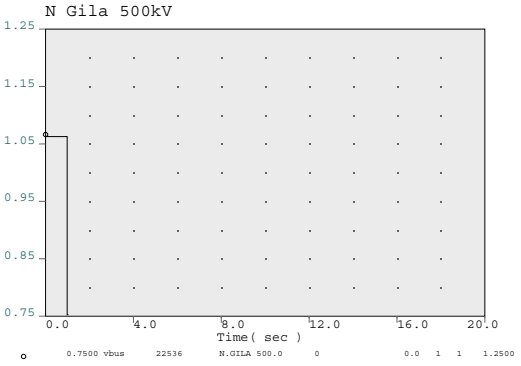
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

RELATIVE VOLTAGE

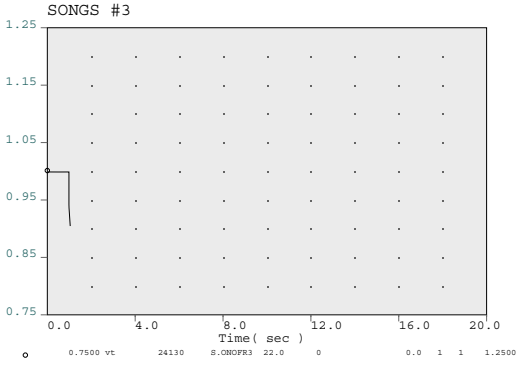
Palo Verde #1



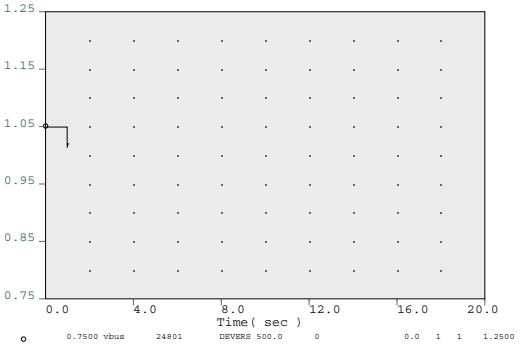
N Gila 500kV



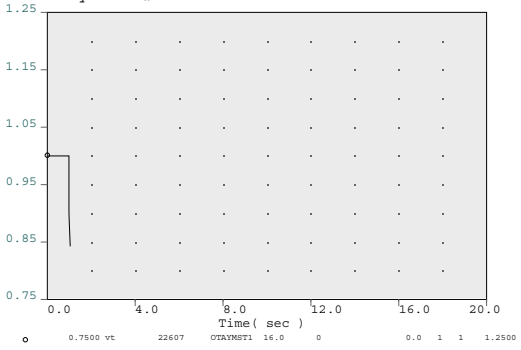
SONGS #3



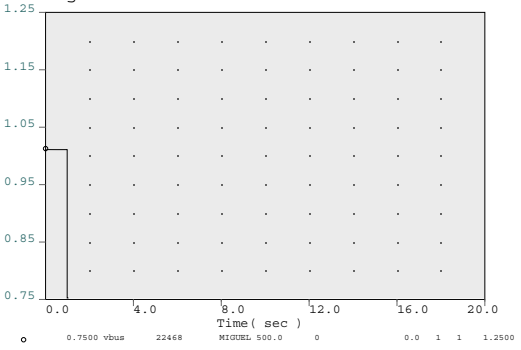
Devers 500



OtayMesa #3



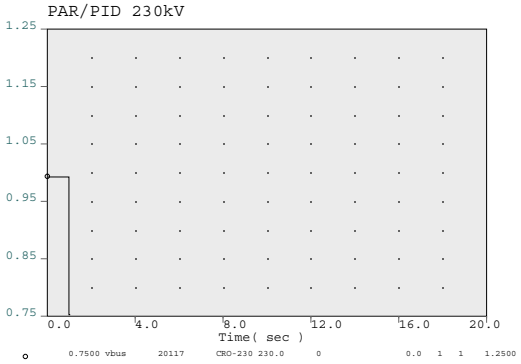
Miguel 500kV



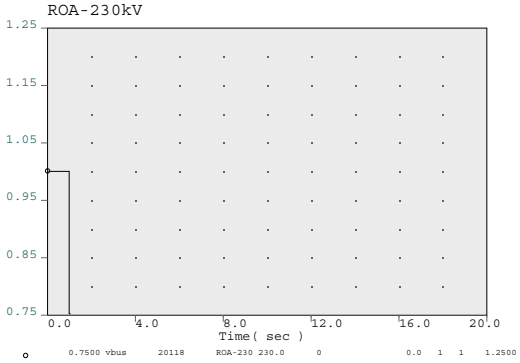
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Voltage Check and Comparison

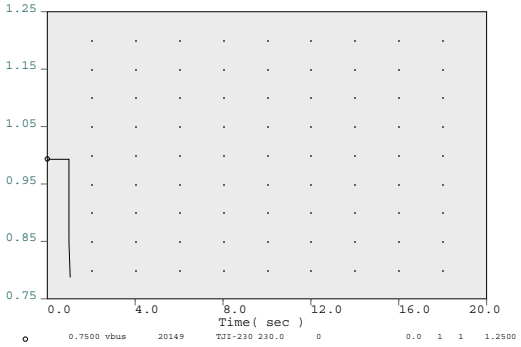
PAR/PID 230kV



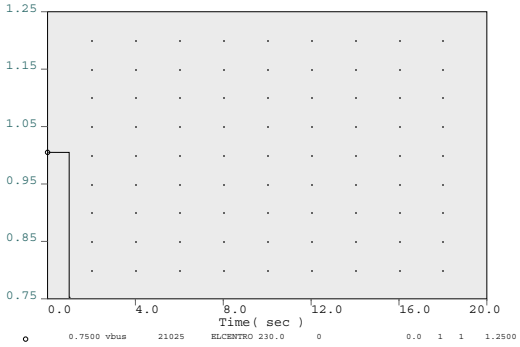
ROA-230kV



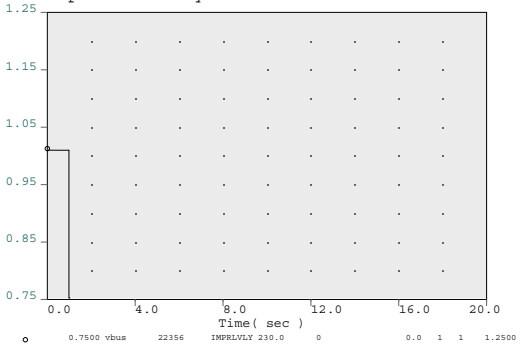
TJ1-230kV



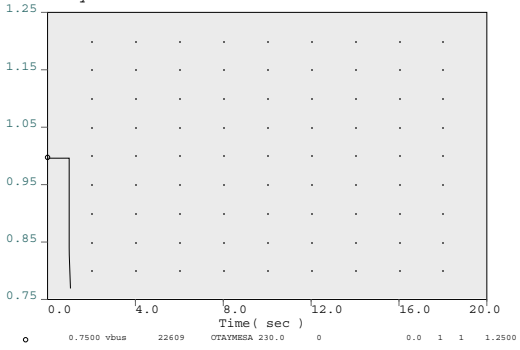
El Centro



Imperial Valley 230kV



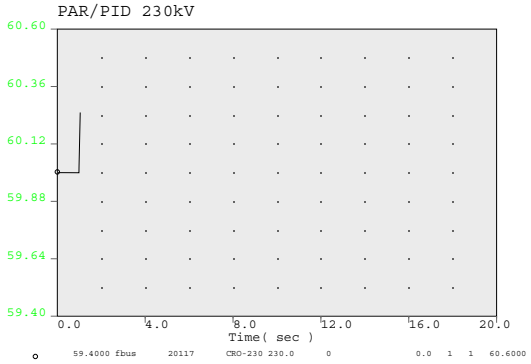
Otay Mesa 230kV



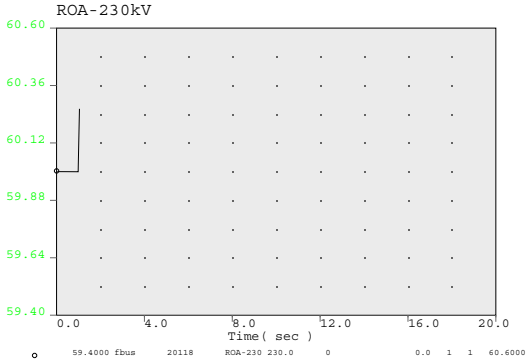
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Frequency Check and Comparison

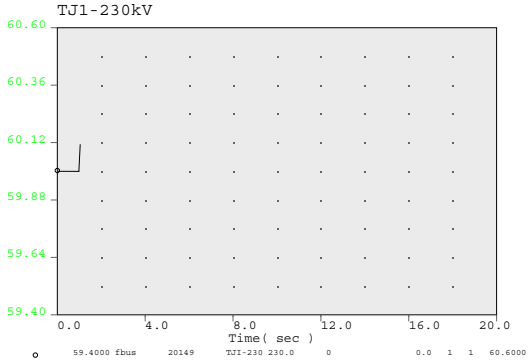
PAR/PID 230kV



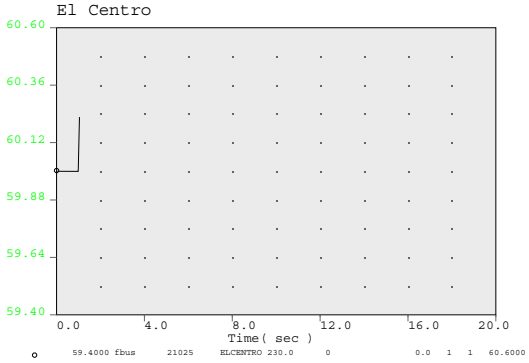
ROA-230kV



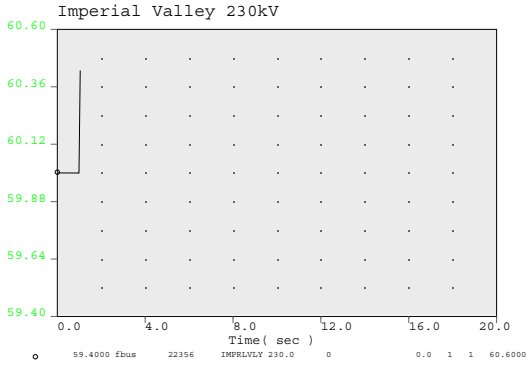
TJ1-230kV



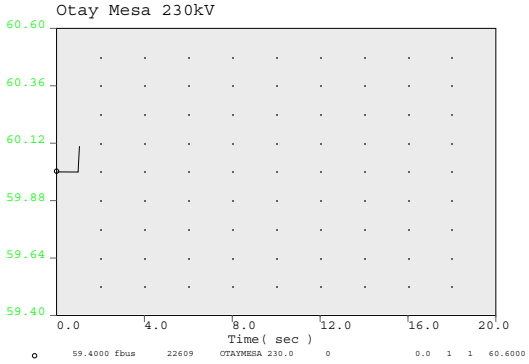
El Centro



Imperial Valley 230kV



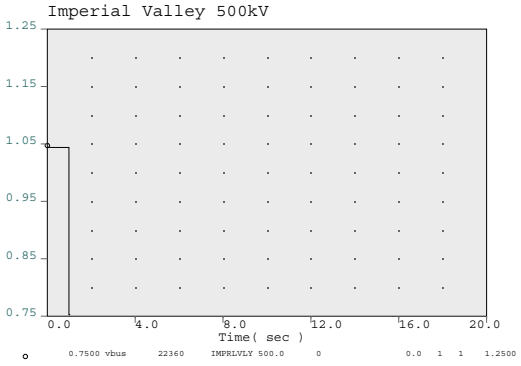
Otay Mesa 230kV



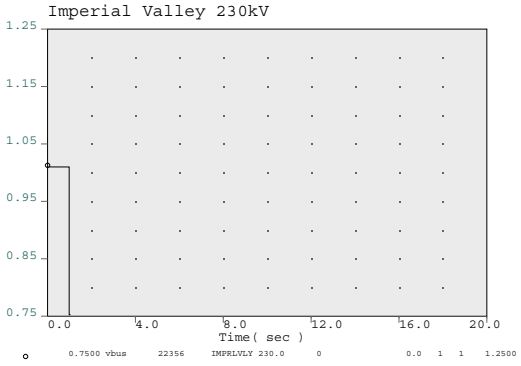
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Imperial Valley Area - VOLTAGE

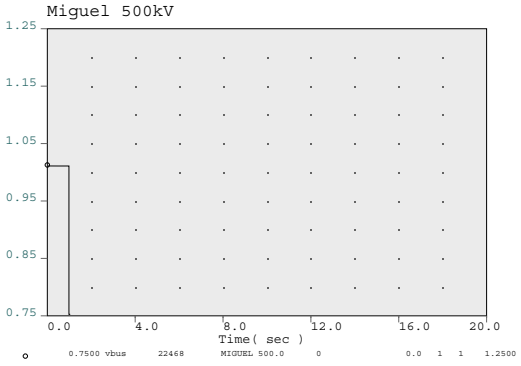
Imperial Valley 500kV



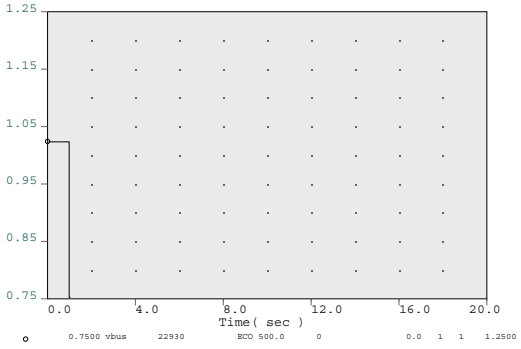
Imperial Valley 230kV



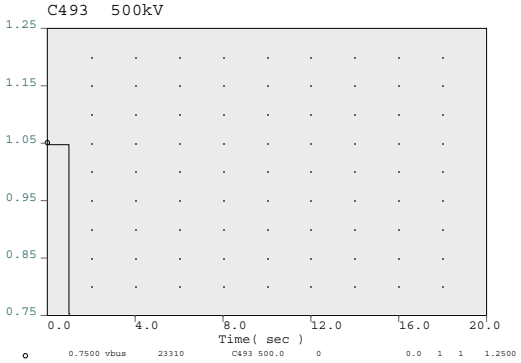
Miguel 500kV



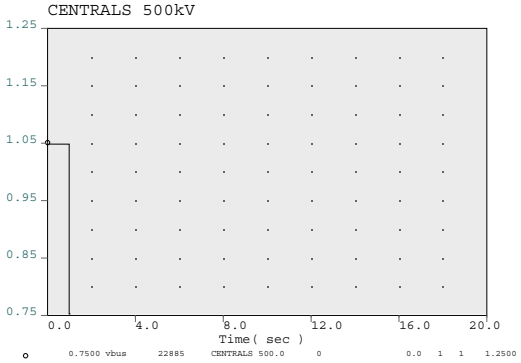
Windfarms 500



C493 500kV

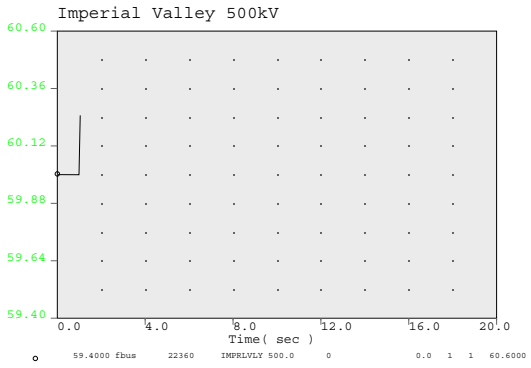


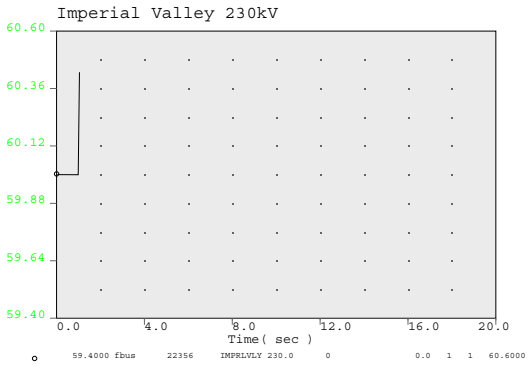
CENTRALS 500kV

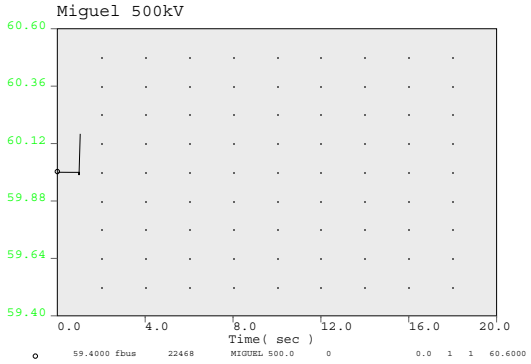


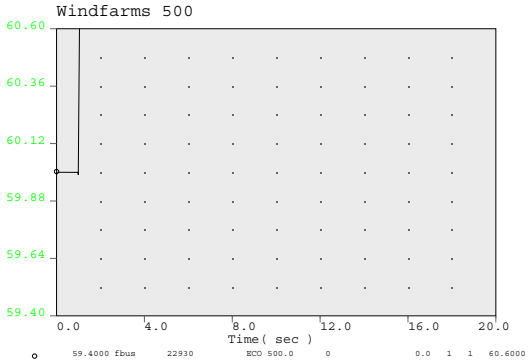
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

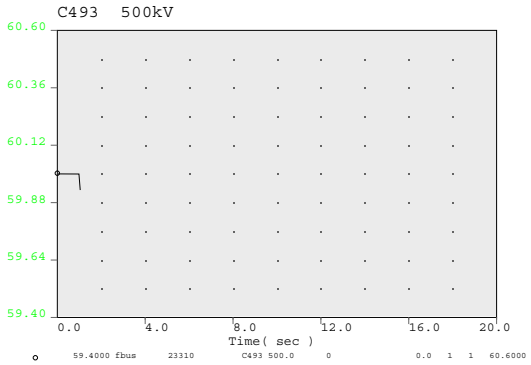
Imperial Valley Area - Frequency

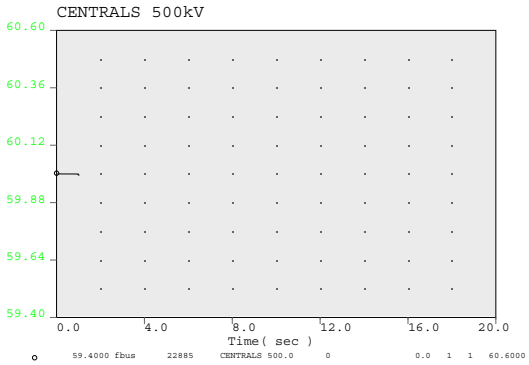






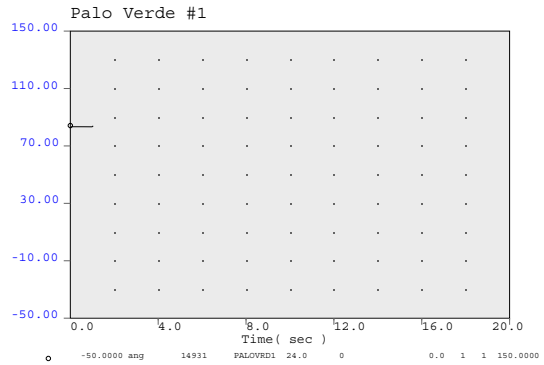


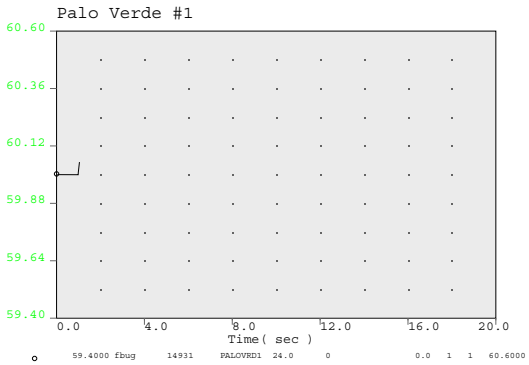


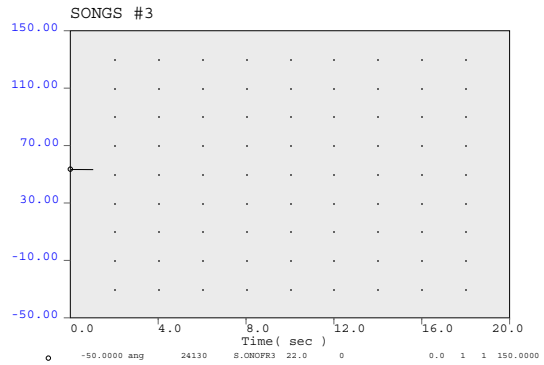


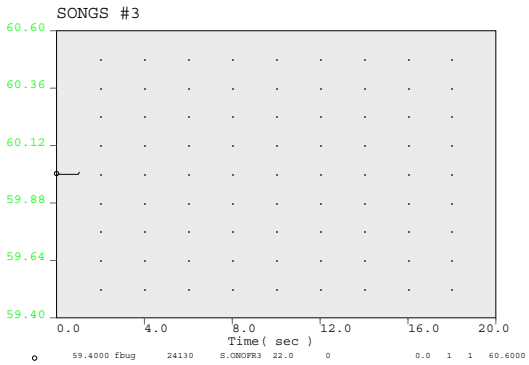
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

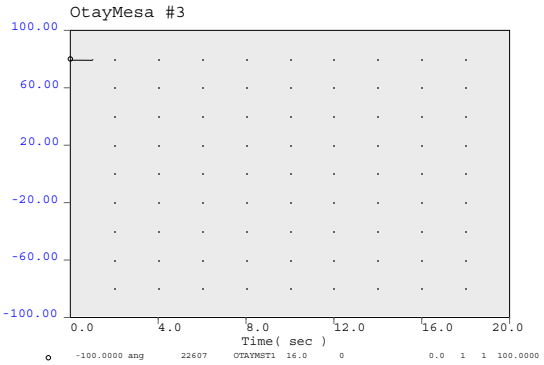
RELATIVE ROTOR ANGLE & FREQUENCY

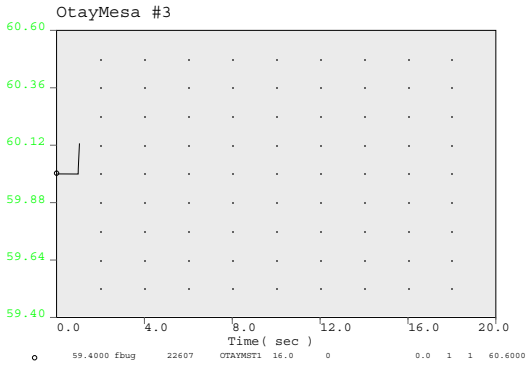












SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

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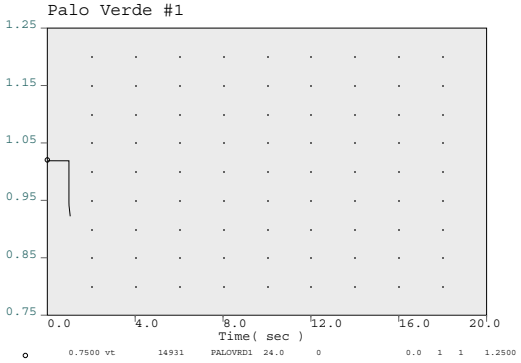
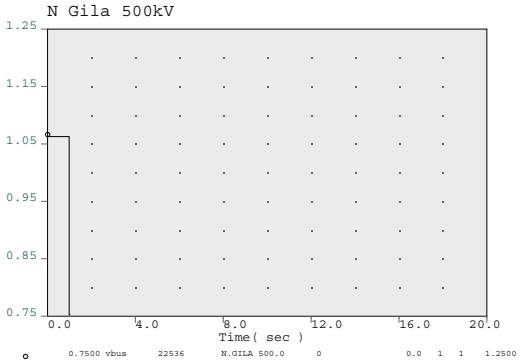
SDGE	IV_Wnd_dlo_RASxR1_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:51 2010

RELATIVE VOLTAGE

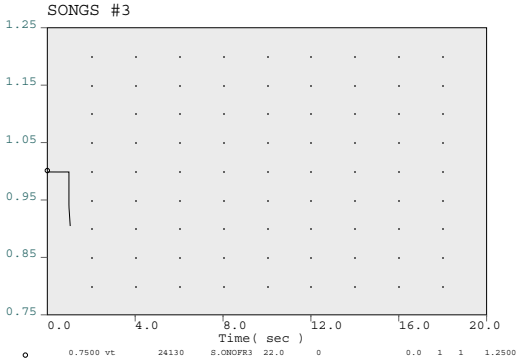
Palo Verde #1



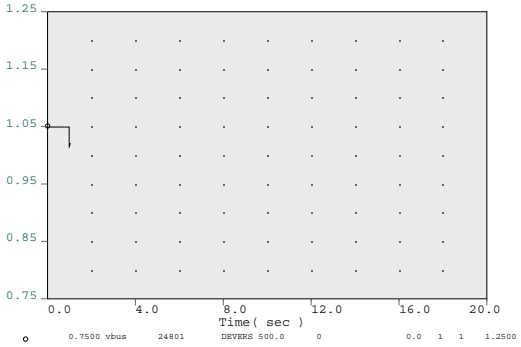
N Gila 500kV



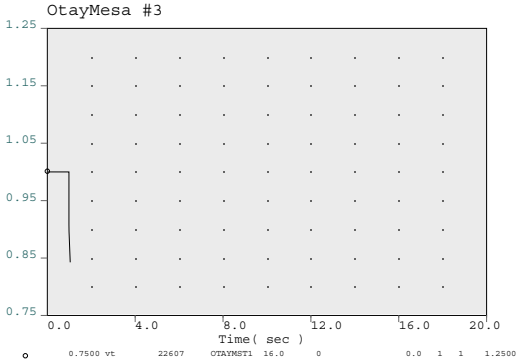
SONGS #3



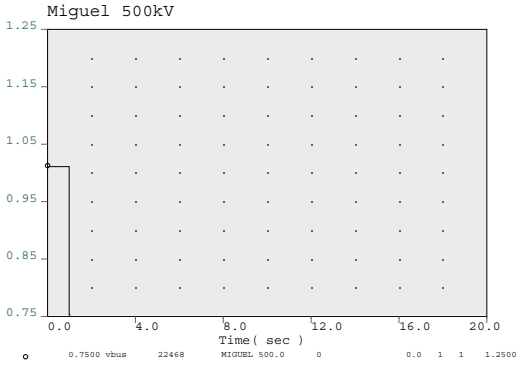
Devers 500



OtayMesa #3



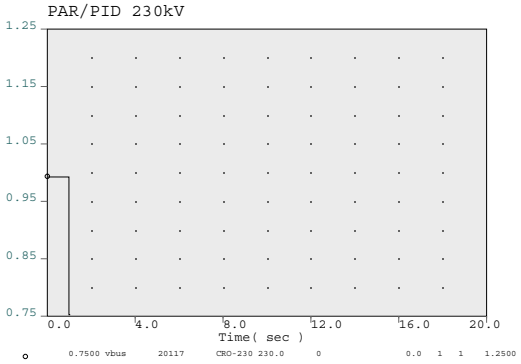
Miguel 500kV



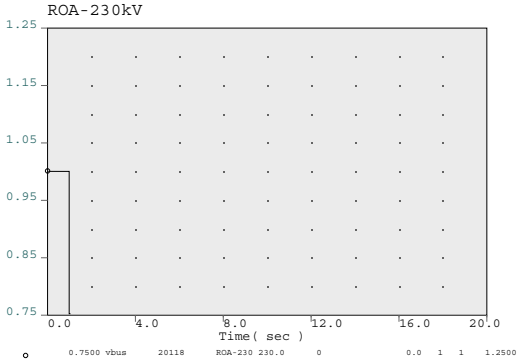
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Voltage Check and Comparison

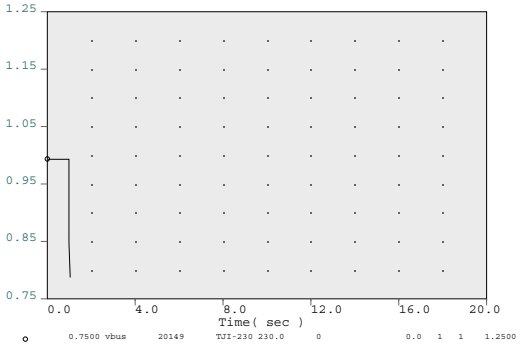
PAR/PID 230kV



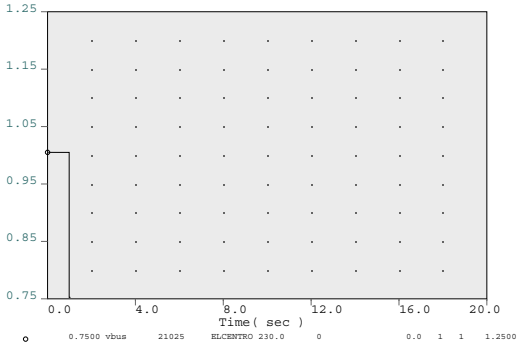
ROA-230kV



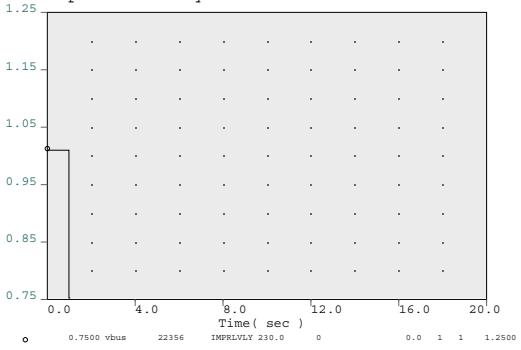
TJ1-230kV



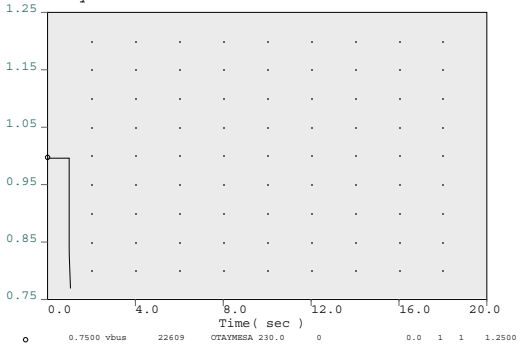
El Centro



Imperial Valley 230kV



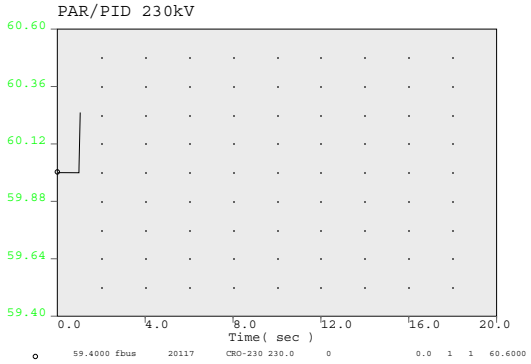
Otay Mesa 230kV



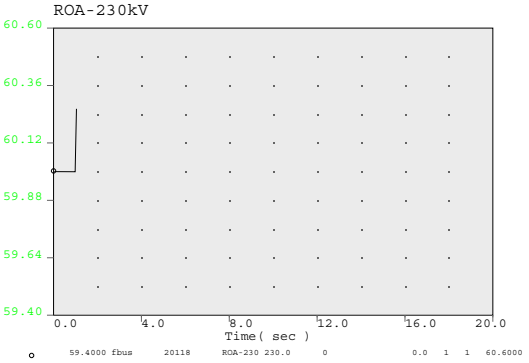
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Frequency Check and Comparison

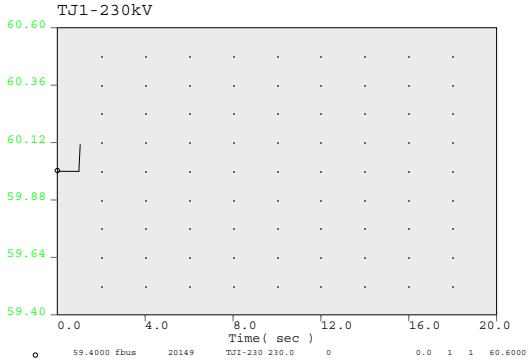
PAR/PID 230kV



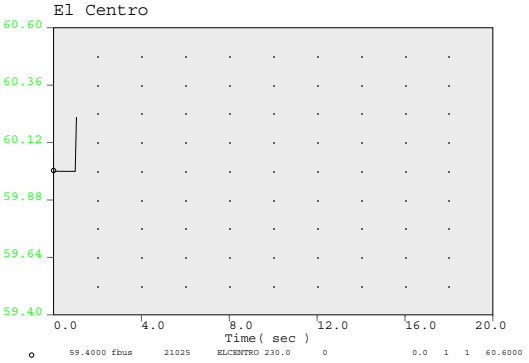
ROA-230kV



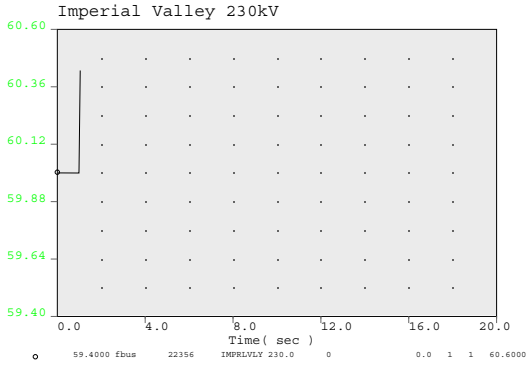
TJ1-230kV



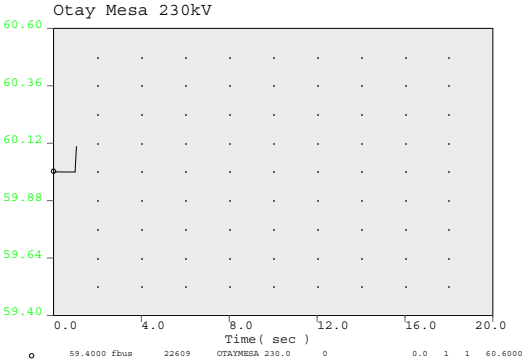
El Centro



Imperial Valley 230kV



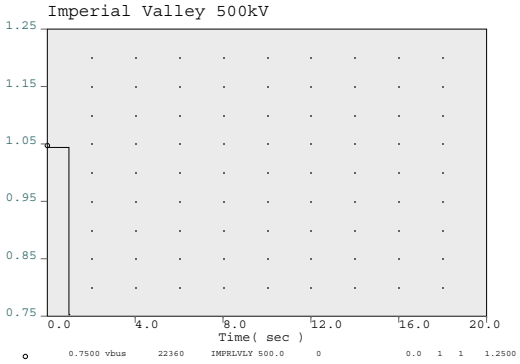
Otay Mesa 230kV



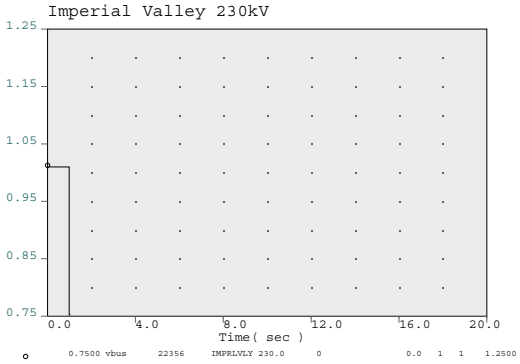
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Imperial Valley Area - VOLTAGE

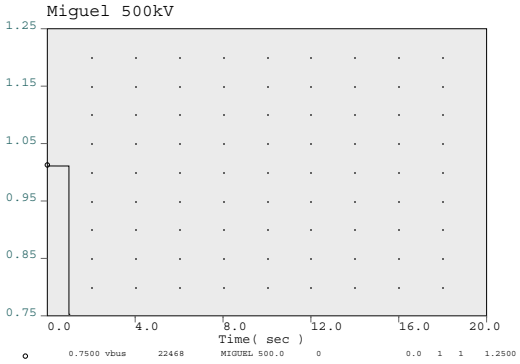
Imperial Valley 500kV



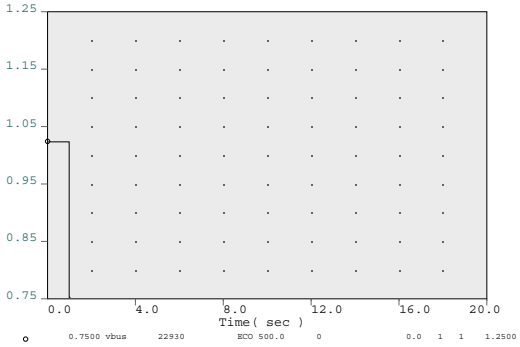
Imperial Valley 230kV



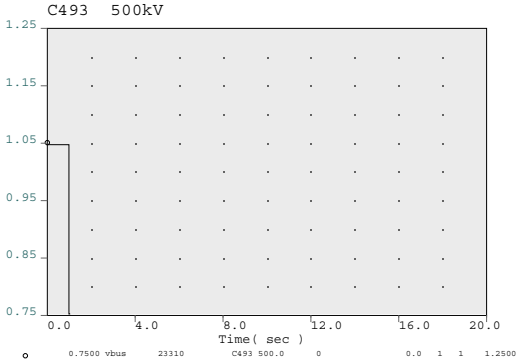
Miguel 500kV



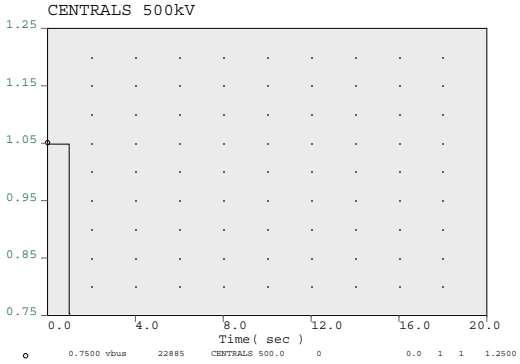
Windfarms 500



C493 500kV

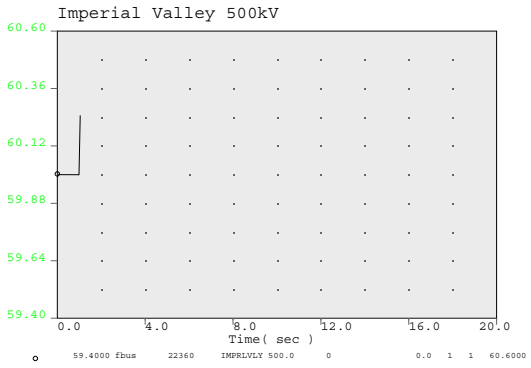


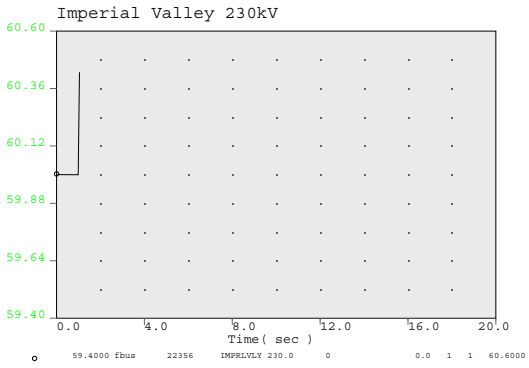
CENTRALS 500kV

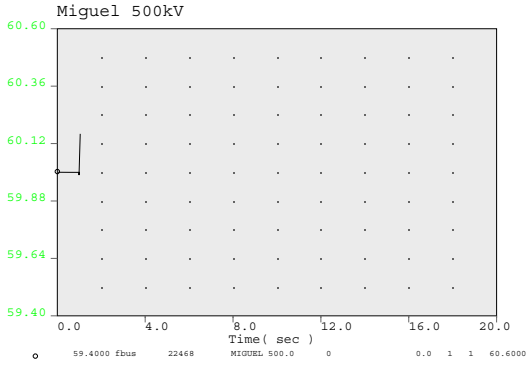


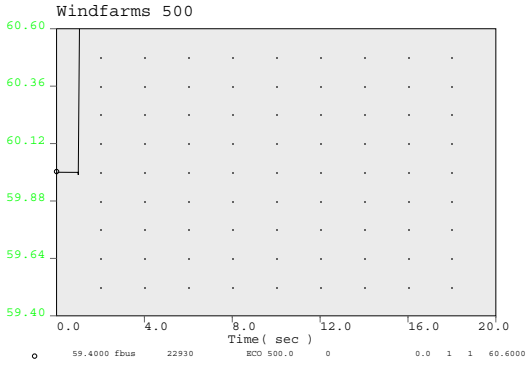
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

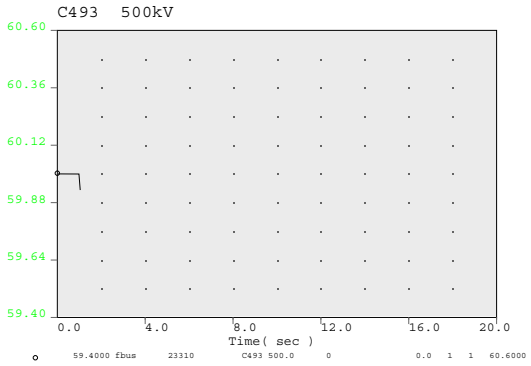
Imperial Valley Area - Frequency

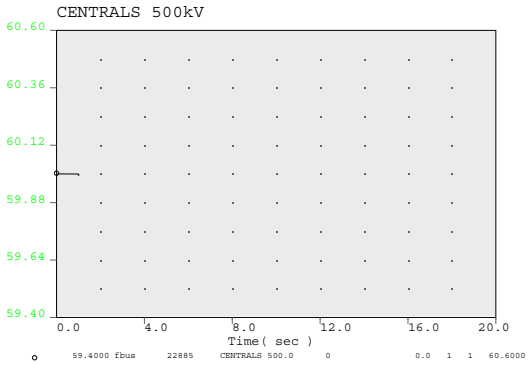






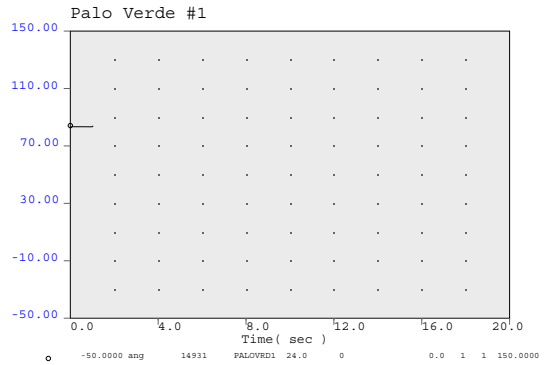


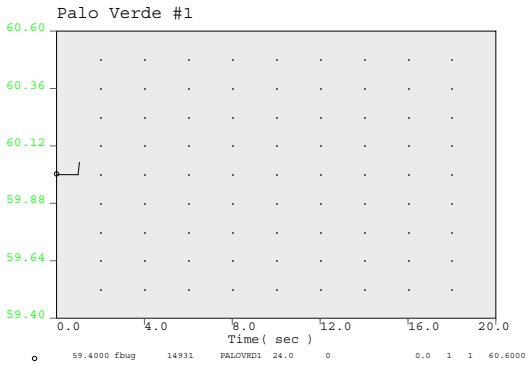


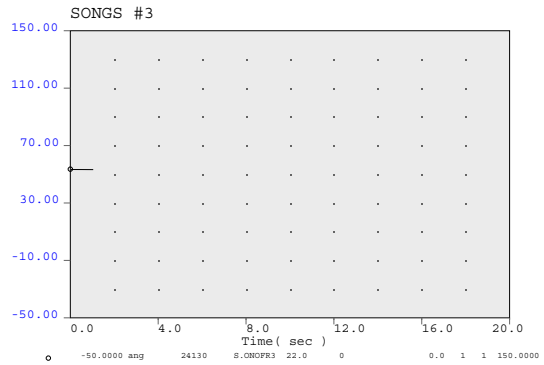


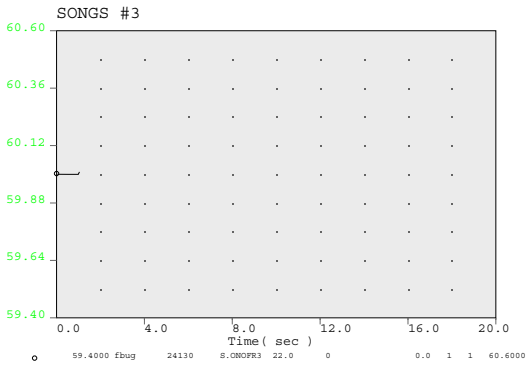
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

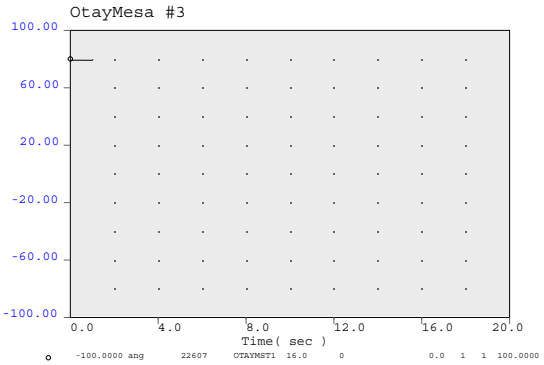
RELATIVE ROTOR ANGLE & FREQUENCY

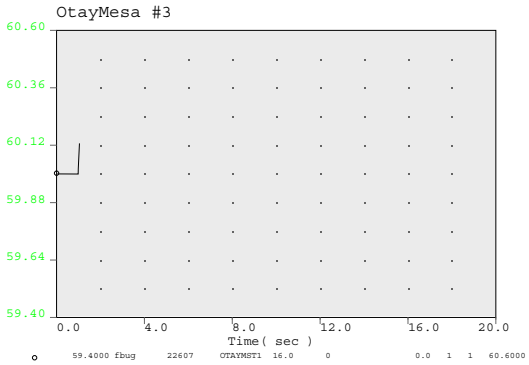












SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

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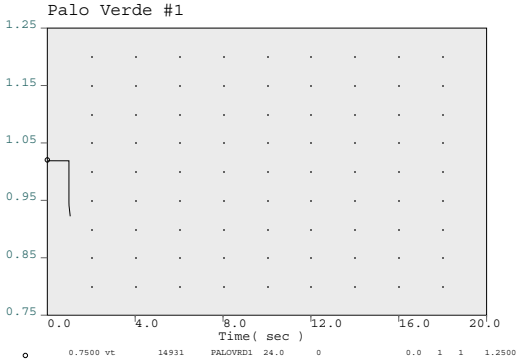
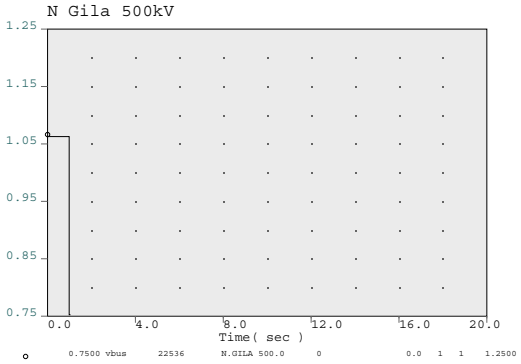
SDGE	ML_Wnd_RAS_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:22:50 2010

RELATIVE VOLTAGE

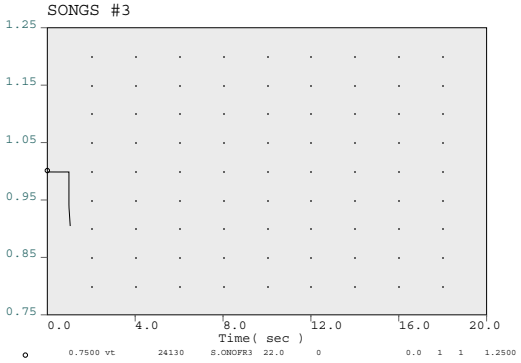
Palo Verde #1



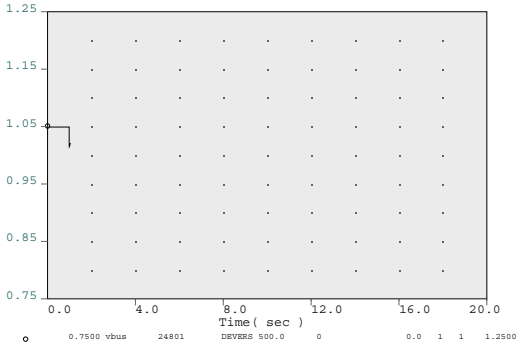
N Gila 500kV



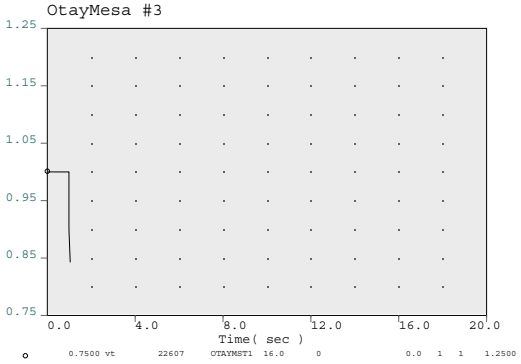
SONGS #3



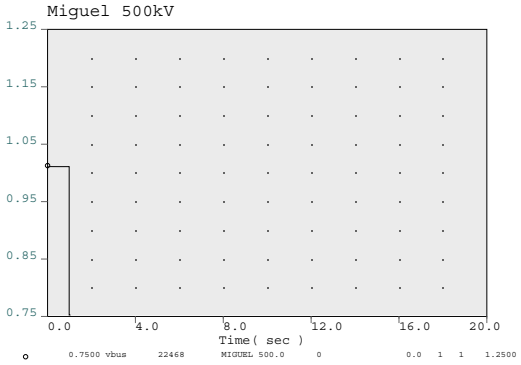
Devers 500



OtayMesa #3



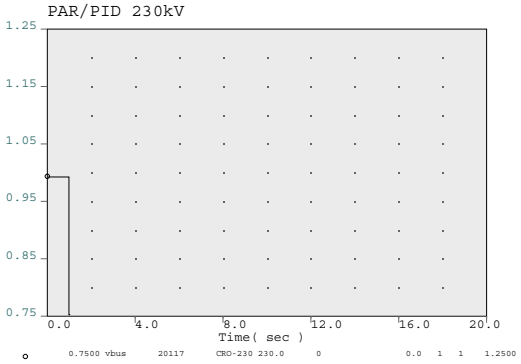
Miguel 500kV



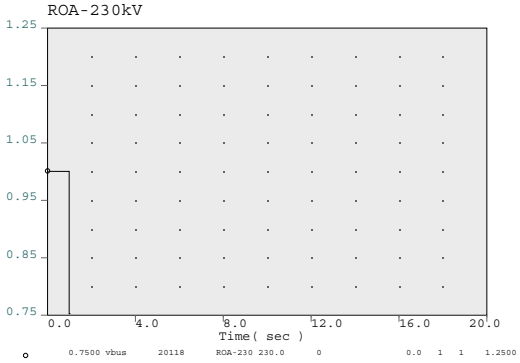
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Voltage Check and Comparison

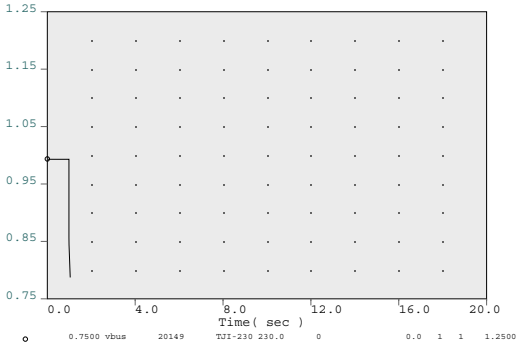
PAR/PID 230kV



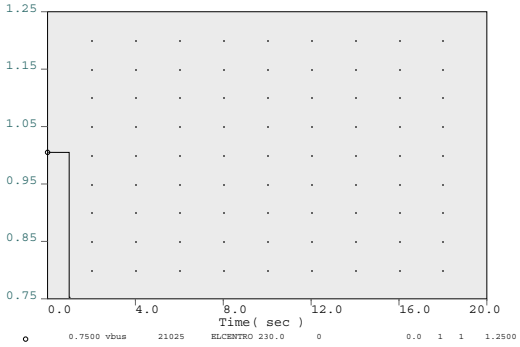
ROA-230kV



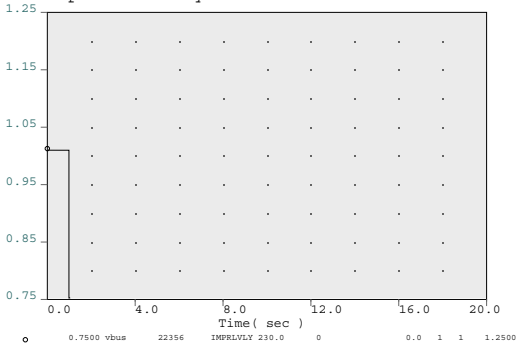
TJ1-230kV



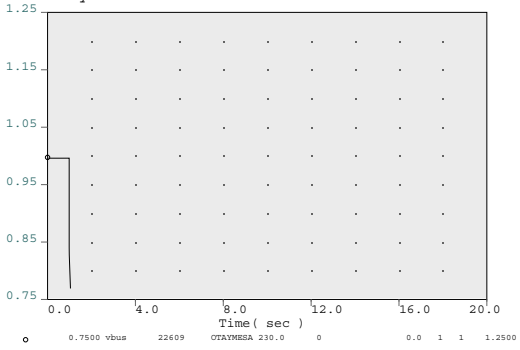
El Centro



Imperial Valley 230kV



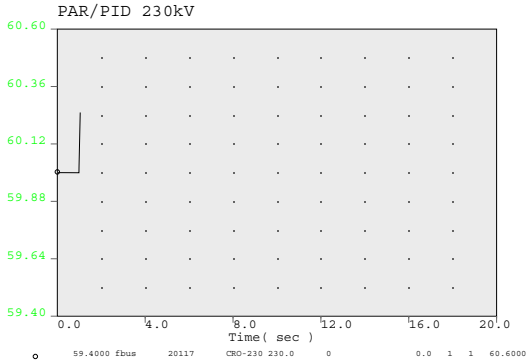
Otay Mesa 230kV



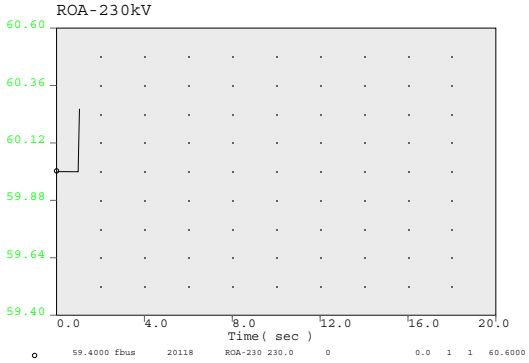
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Frequency Check and Comparison

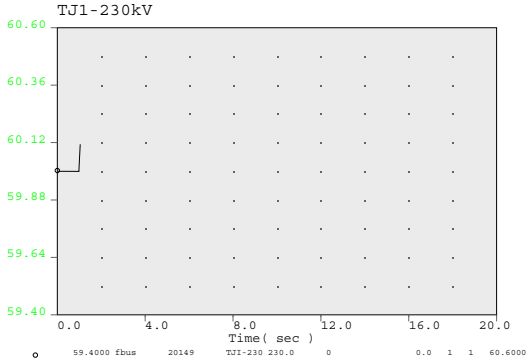
PAR/PID 230kV



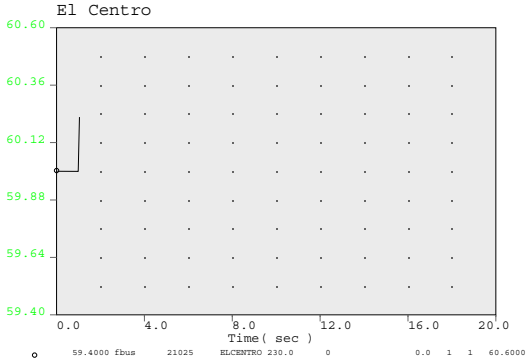
ROA-230kV



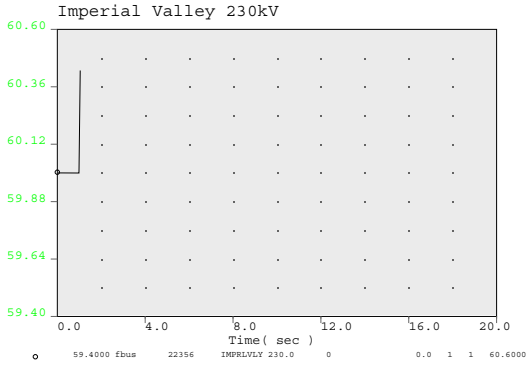
TJ1-230kV



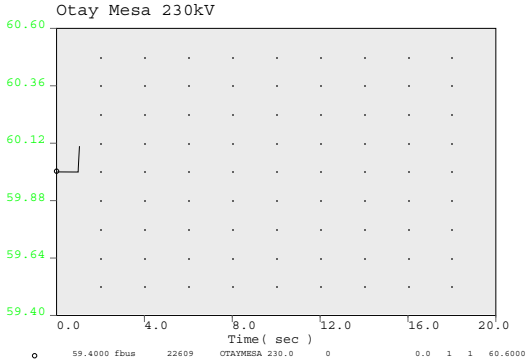
El Centro



Imperial Valley 230kV



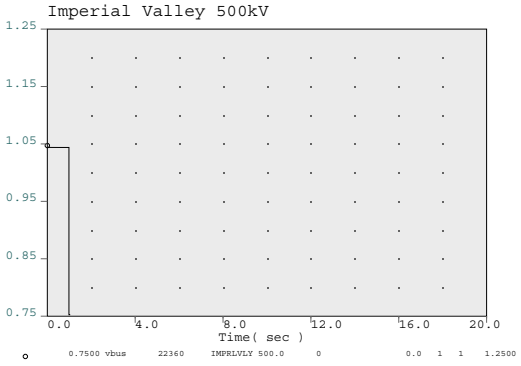
Otay Mesa 230kV



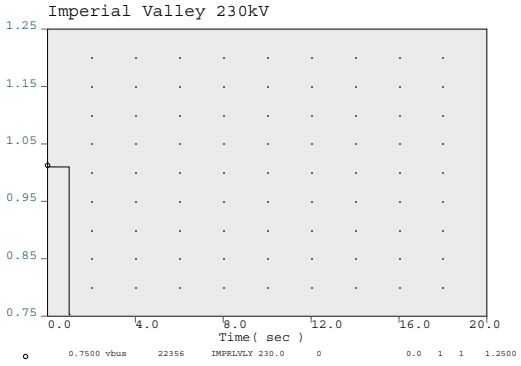
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Imperial Valley Area - VOLTAGE

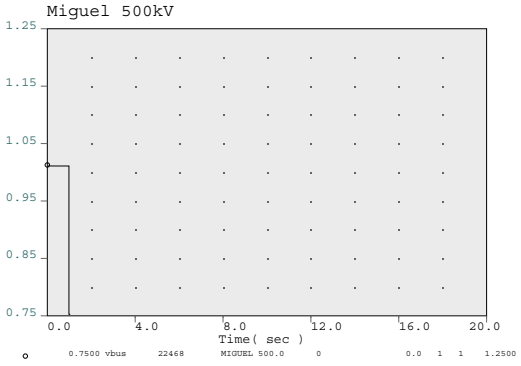
Imperial Valley 500kV



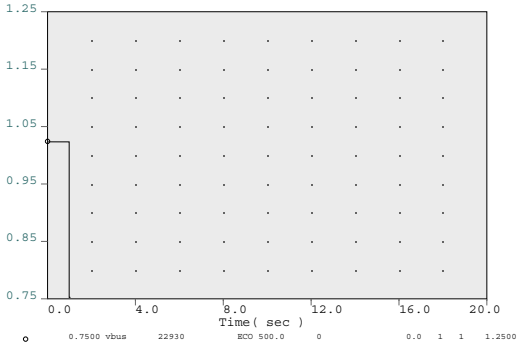
Imperial Valley 230kV



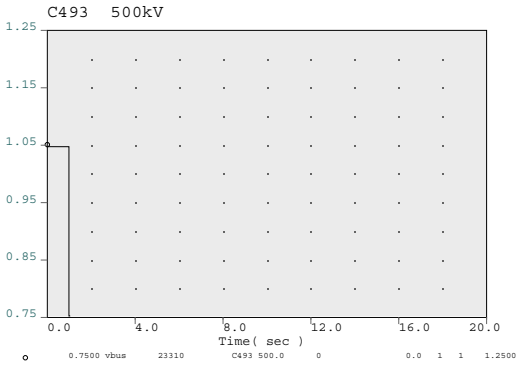
Miguel 500kV



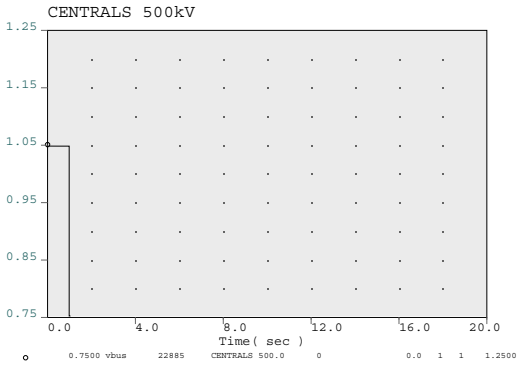
Windfarms 500



C493 500kV

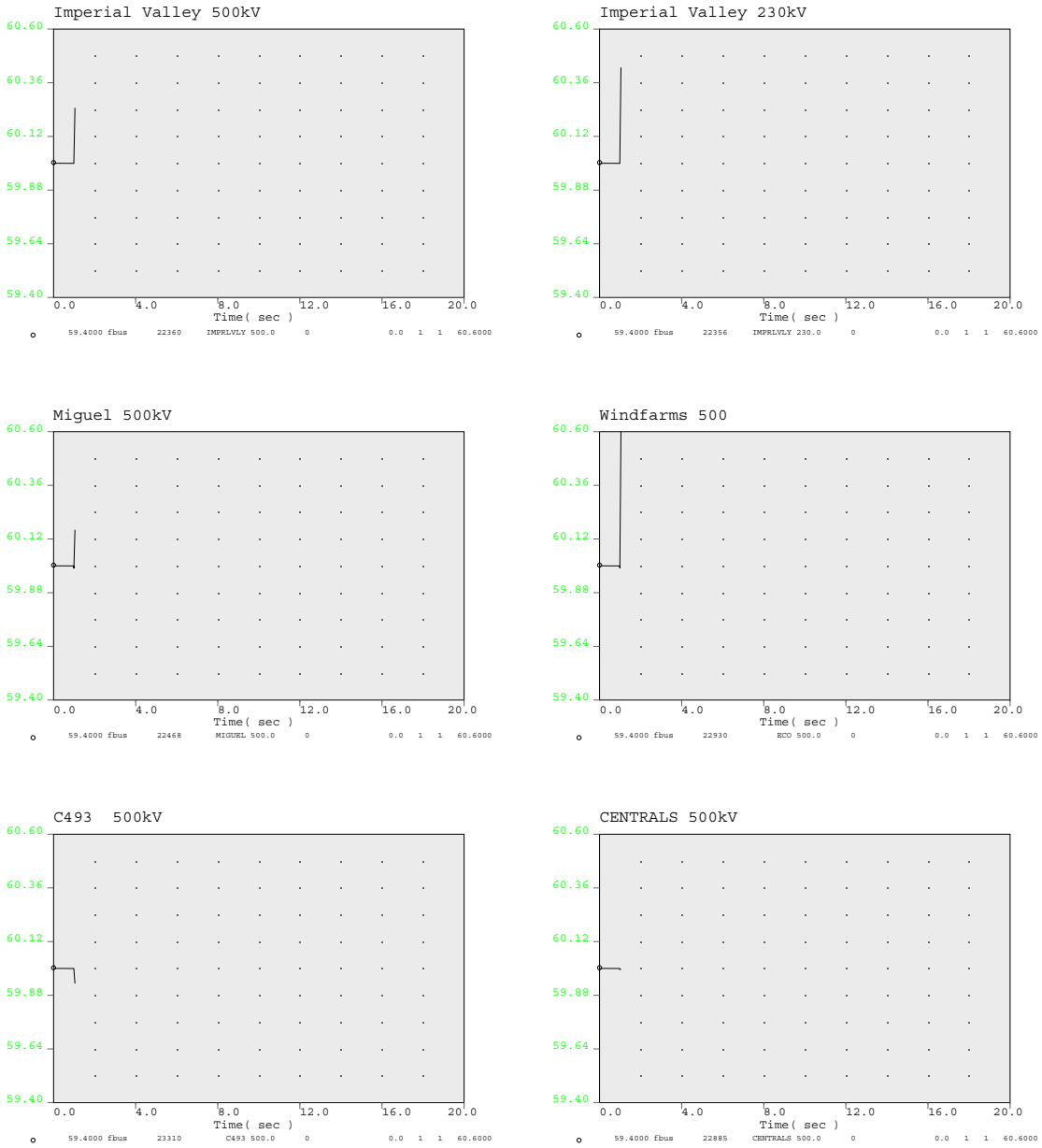


CENTRALS 500kV



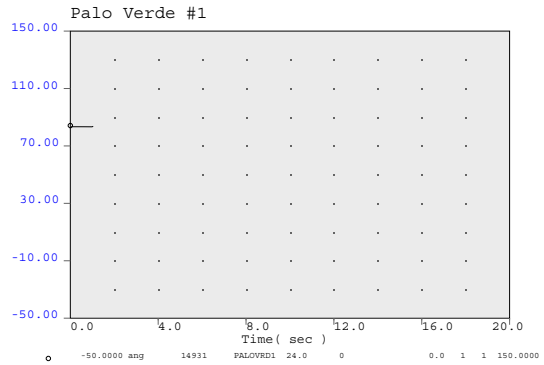
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

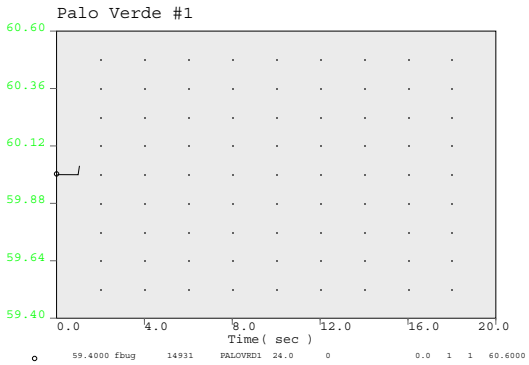
Imperial Valley Area - Frequency

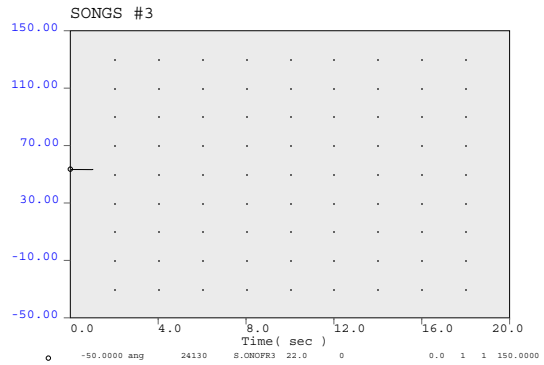


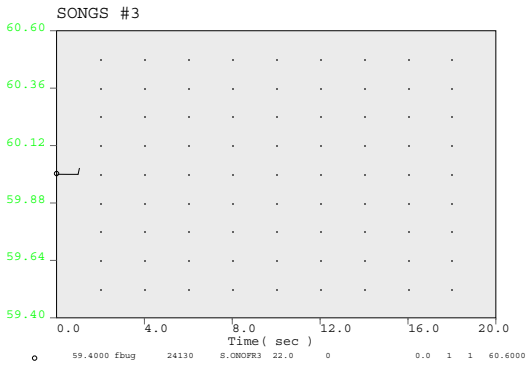
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

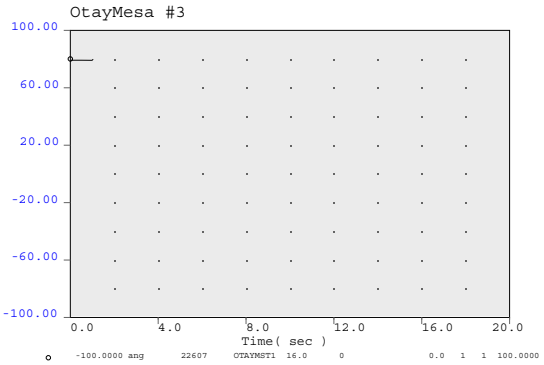
RELATIVE ROTOR ANGLE & FREQUENCY

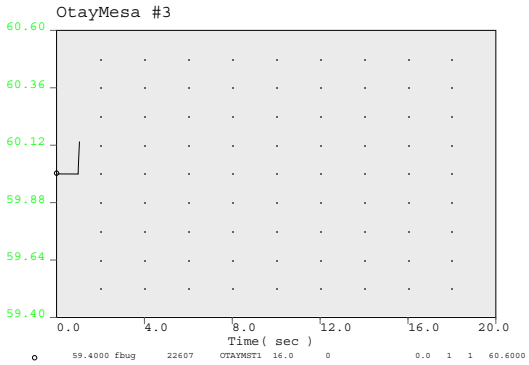












SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

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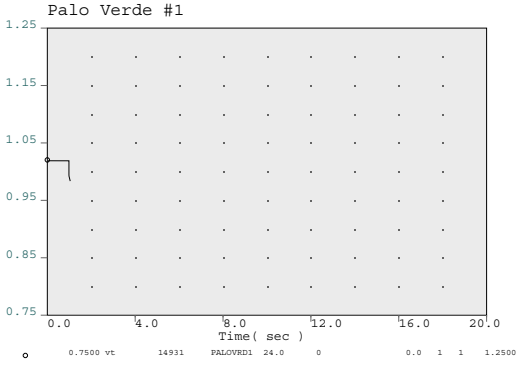
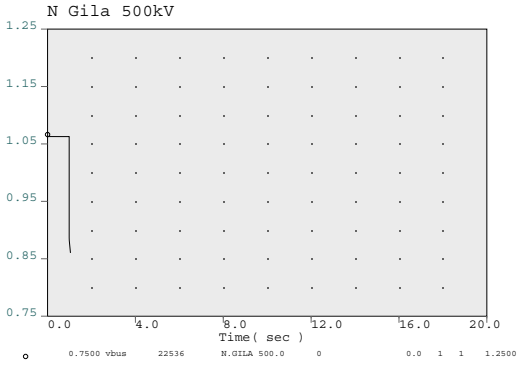
RELATIVE VOLTAGE

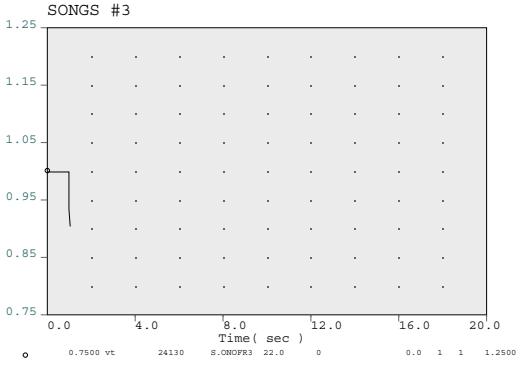
Palo Verde #1



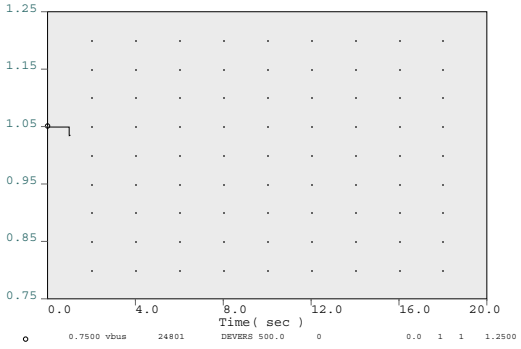
N Gila 500kV



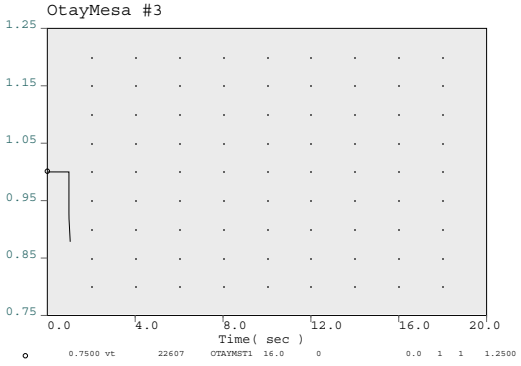
SONGS #3



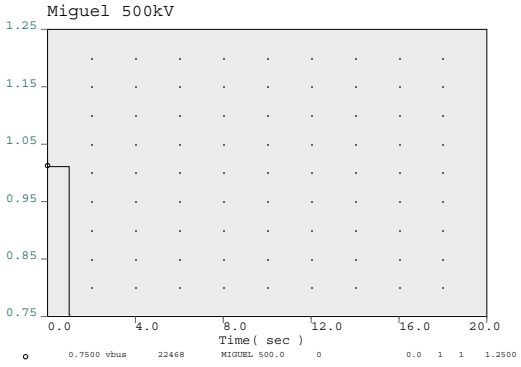
Devers 500



OtayMesa #3



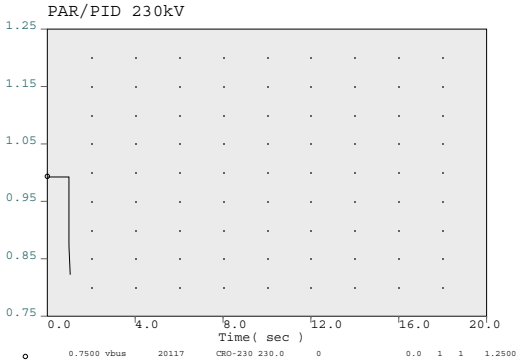
Miguel 500kV



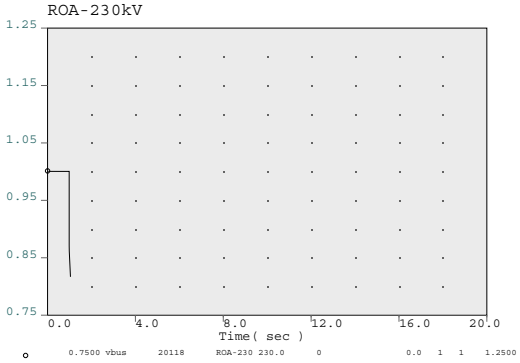
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

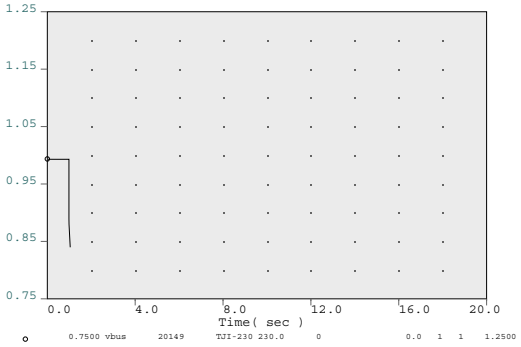
PAR/PID 230kV



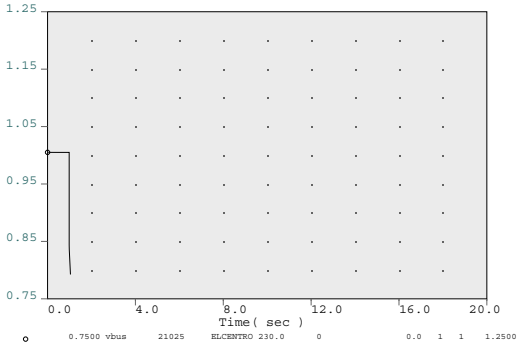
ROA-230kV



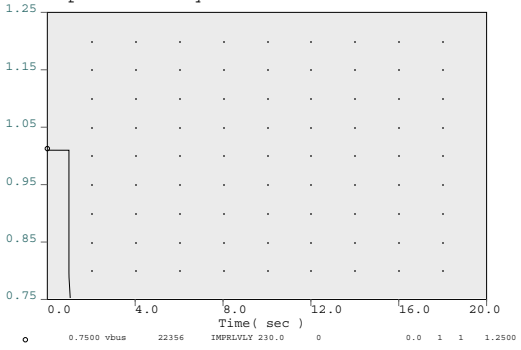
TJ1-230kV



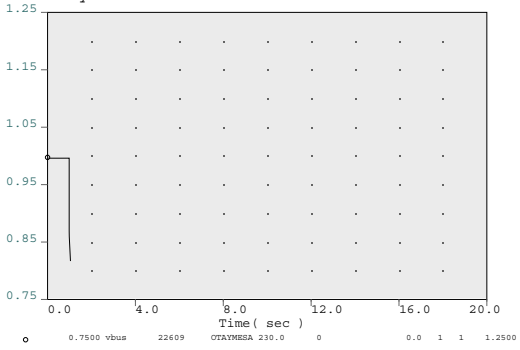
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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North Gila - Imperial Valley 500 kV line

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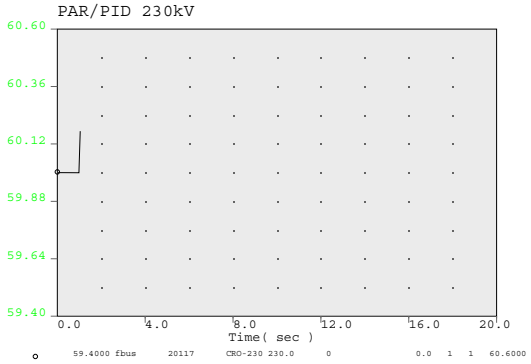
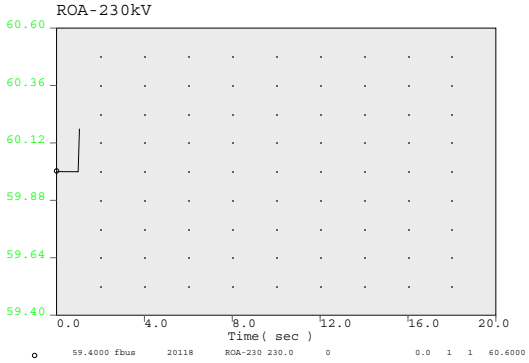
SDGE	ML_Wnd_RAS_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:53 2010

Affected System Frequency Check and Comparison

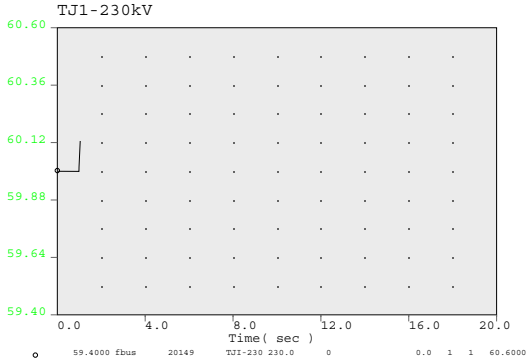
PAR/PID 230kV



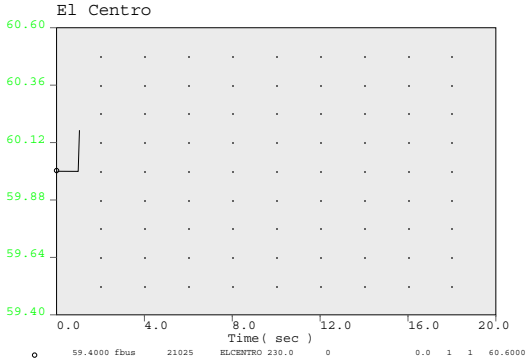
ROA-230kV



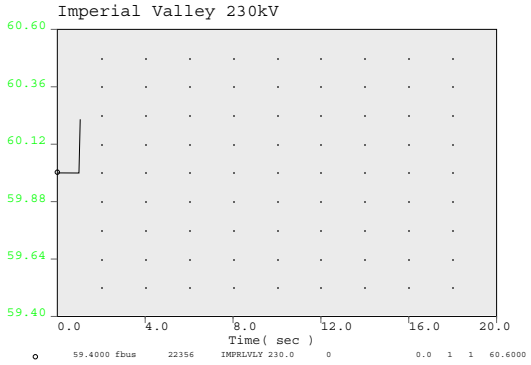
TJ1-230kV



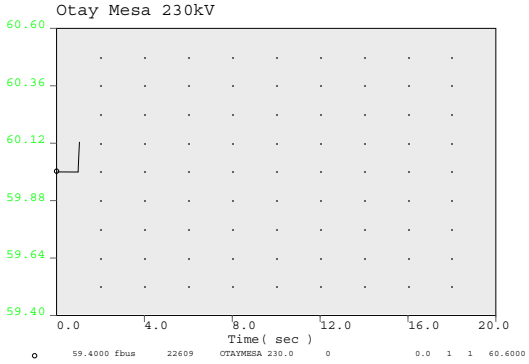
El Centro



Imperial Valley 230kV



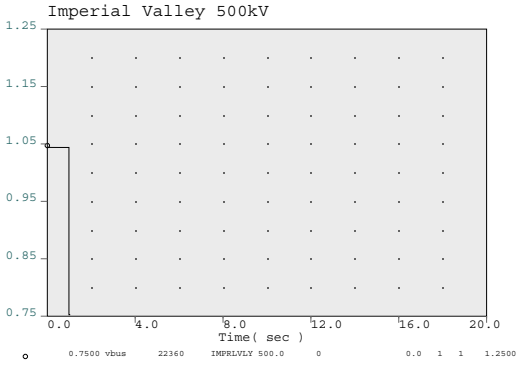
Otay Mesa 230kV



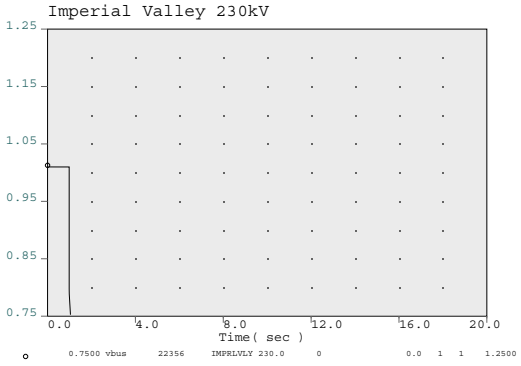
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

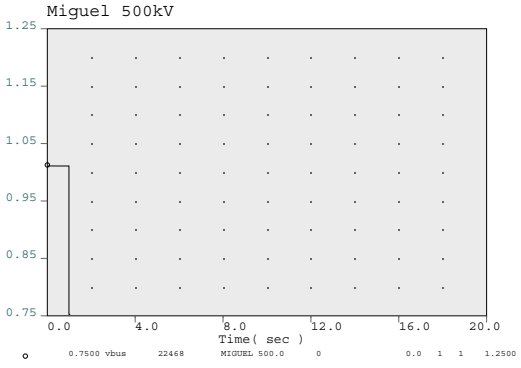
Imperial Valley 500kV



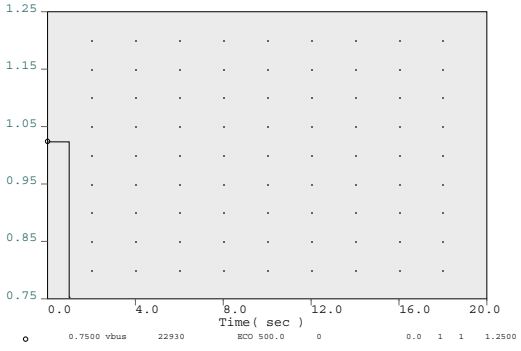
Imperial Valley 230kV



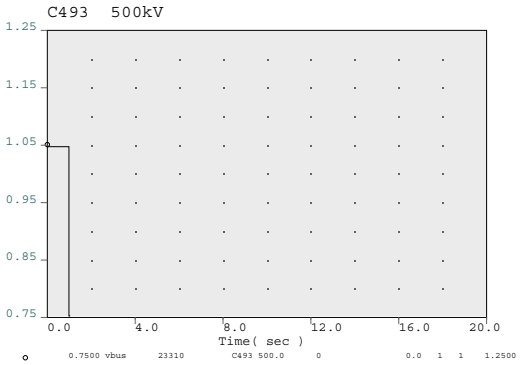
Miguel 500kV



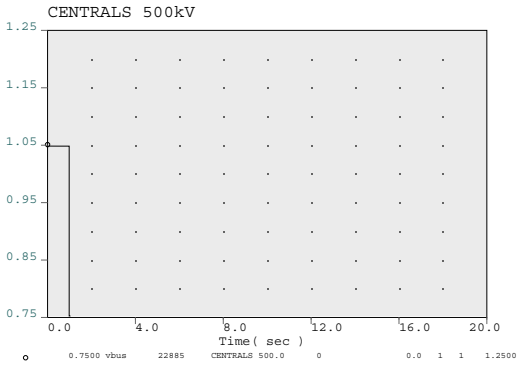
Windfarms 500



C493 500kV

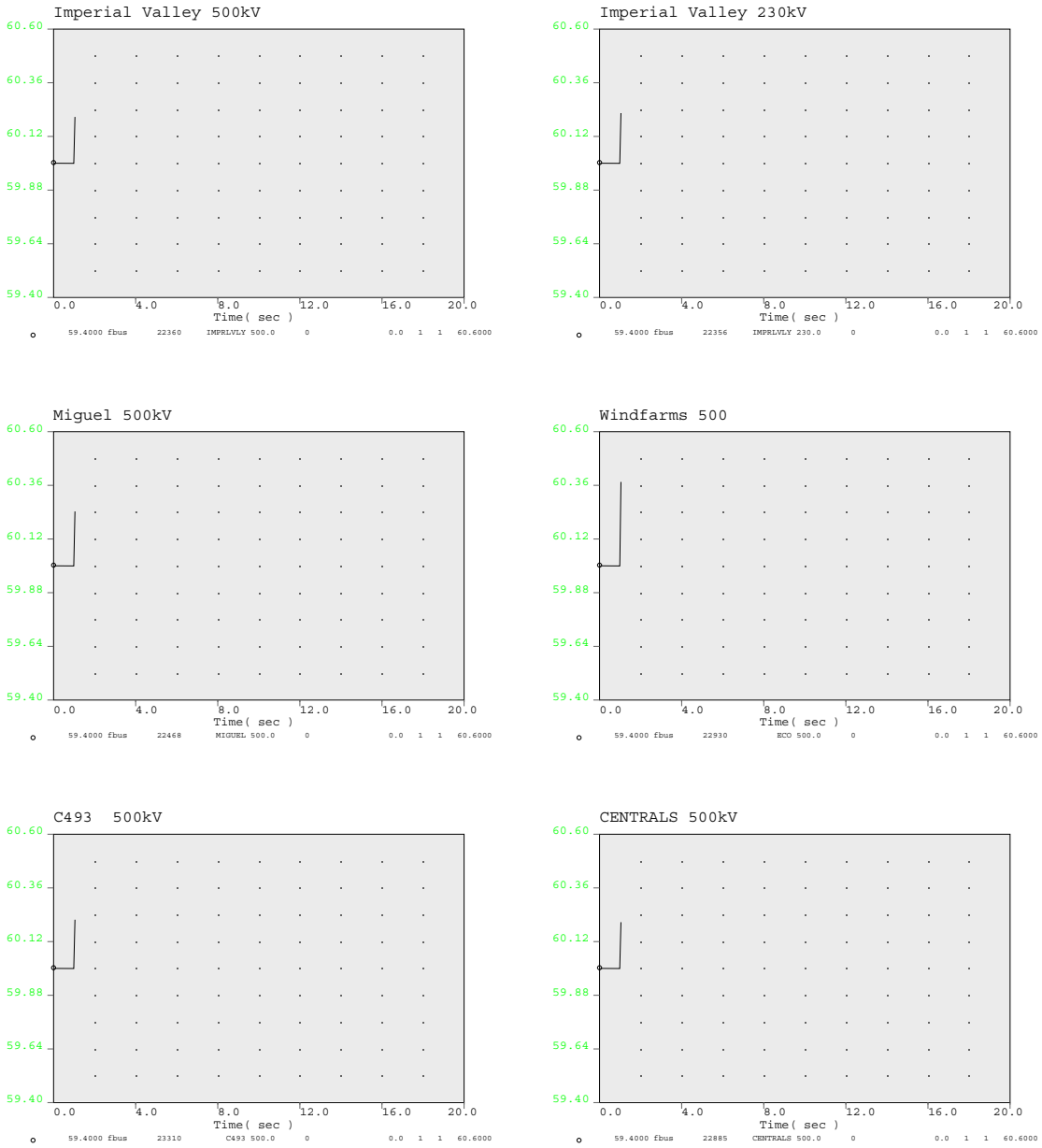


CENTRALS 500kV



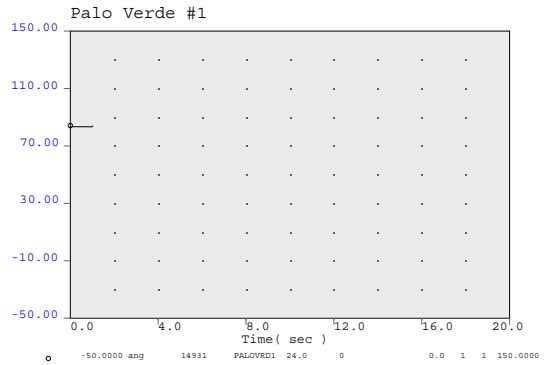
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

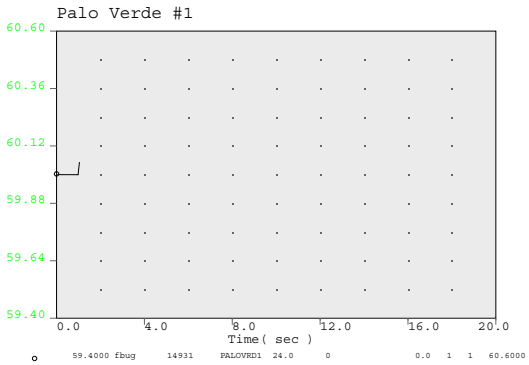
Imperial Valley Area - Frequency

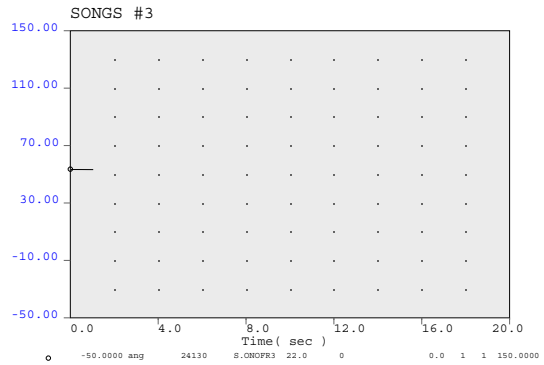


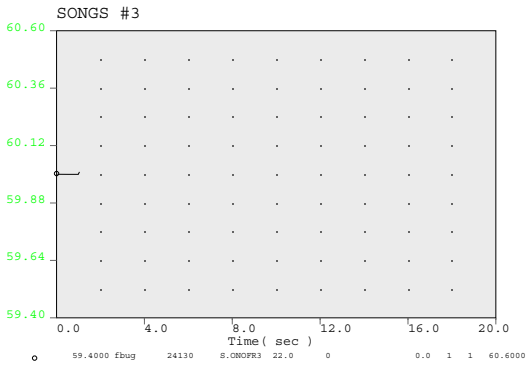
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

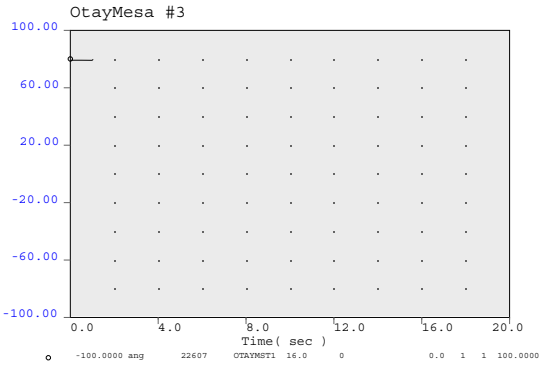
RELATIVE ROTOR ANGLE & FREQUENCY

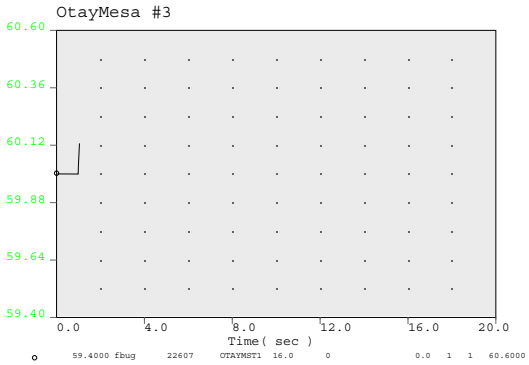












SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

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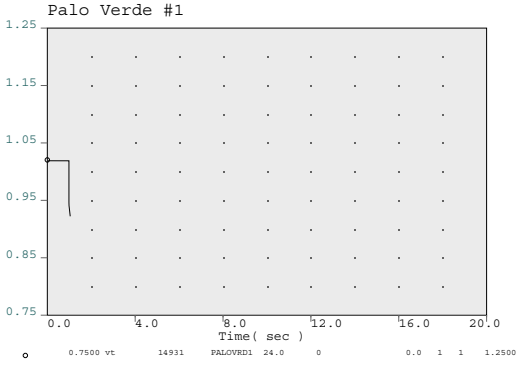
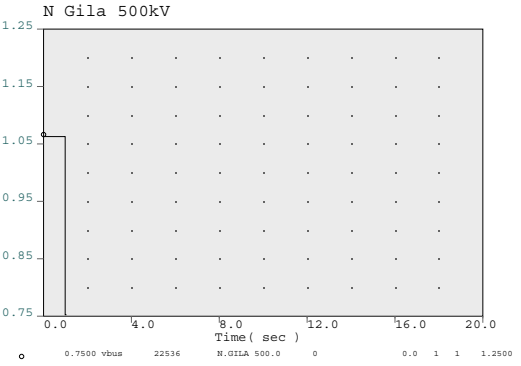
RELATIVE VOLTAGE

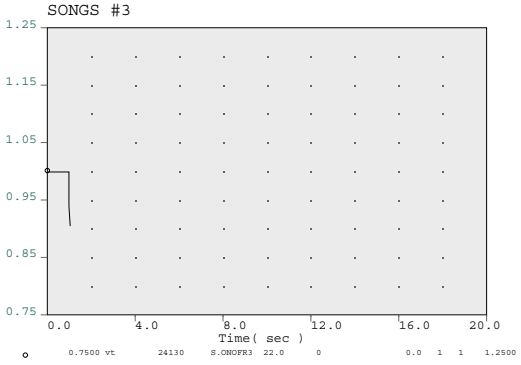
Palo Verde #1



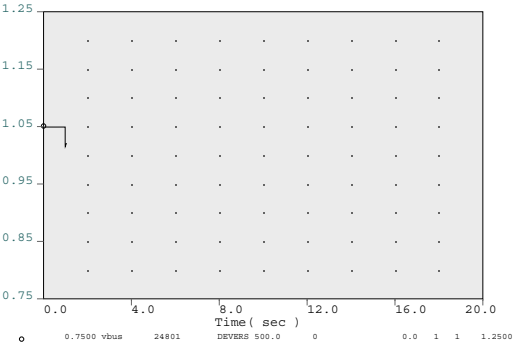
N Gila 500kV



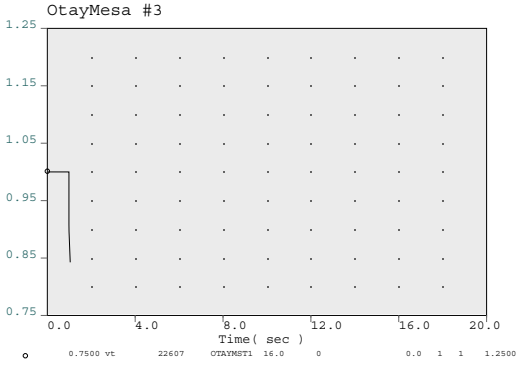
SONGS #3



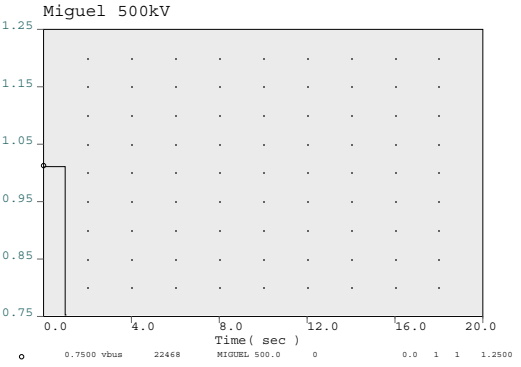
Devers 500



OtayMesa #3



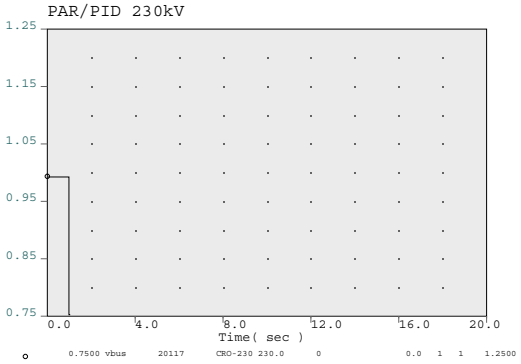
Miguel 500kV



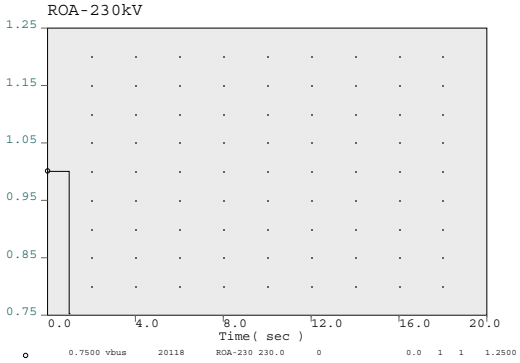
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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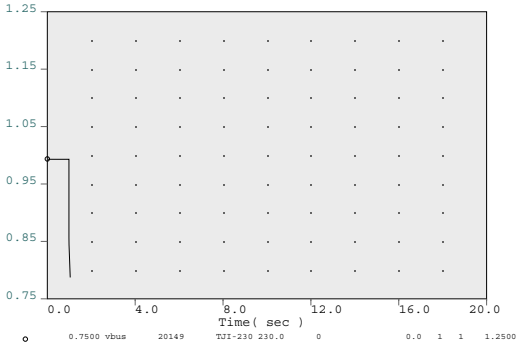

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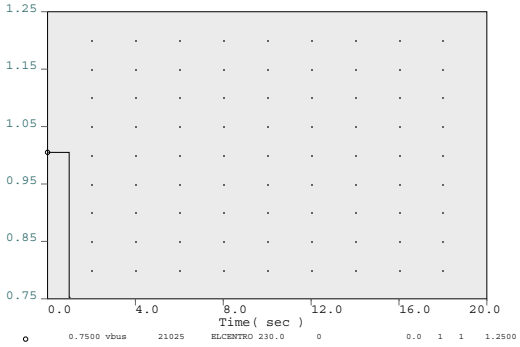
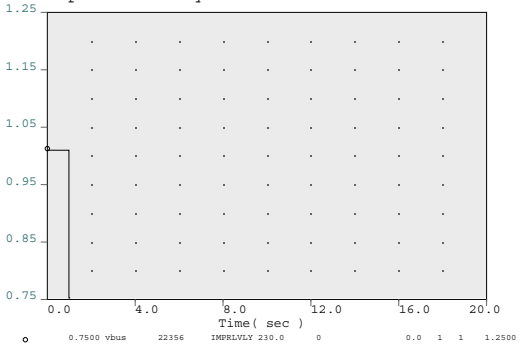
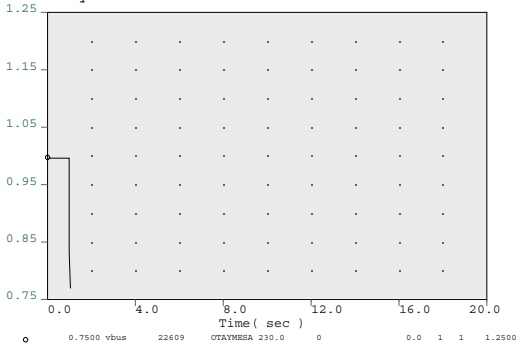


Imperial Valley 230kV



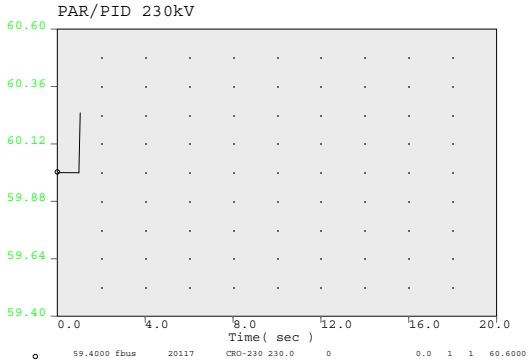
Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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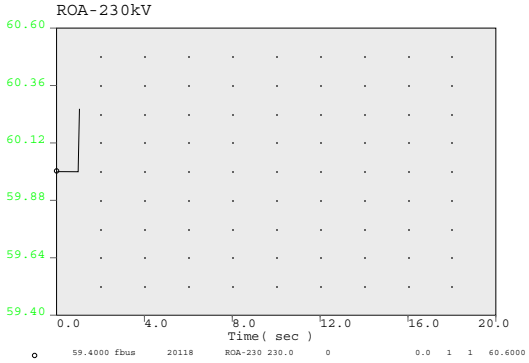
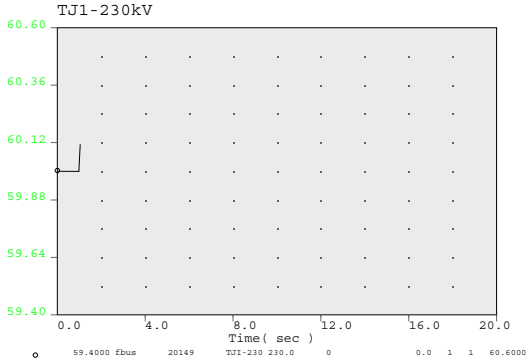
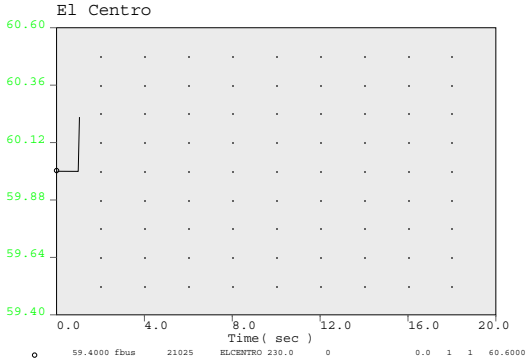


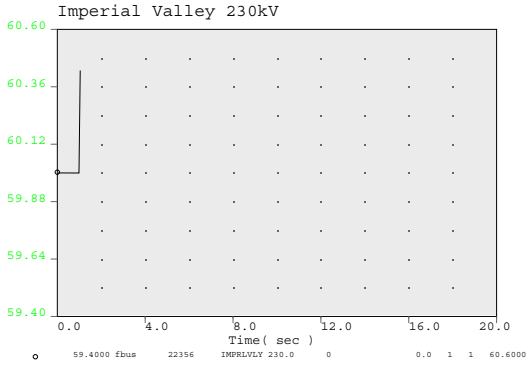
TJ1-230kV



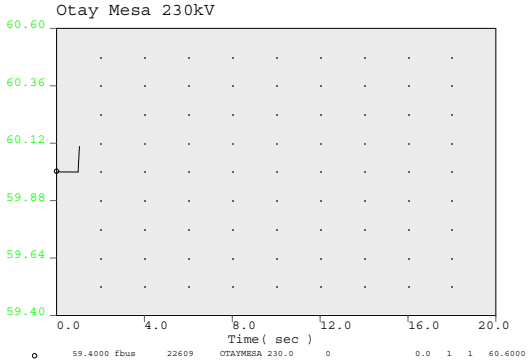
El Centro



Imperial Valley 230kV



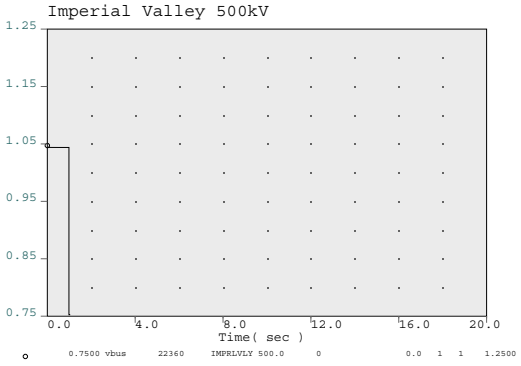
Otay Mesa 230kV



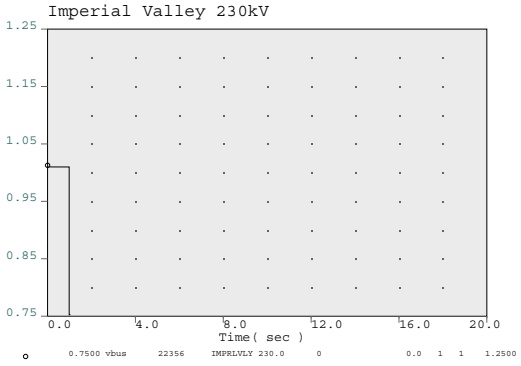
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

Imperial Valley Area - VOLTAGE

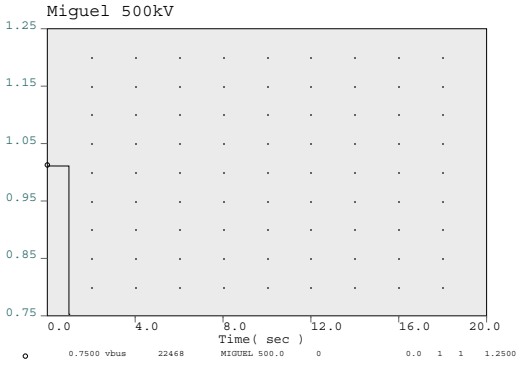
Imperial Valley 500kV



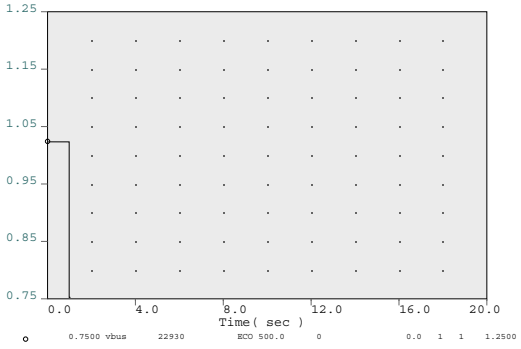
Imperial Valley 230kV



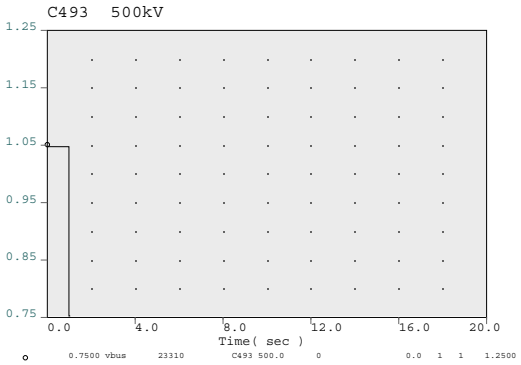
Miguel 500kV



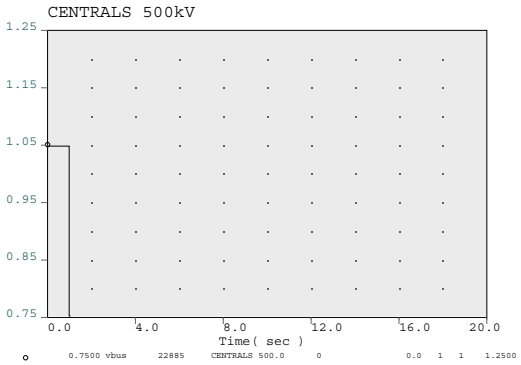
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

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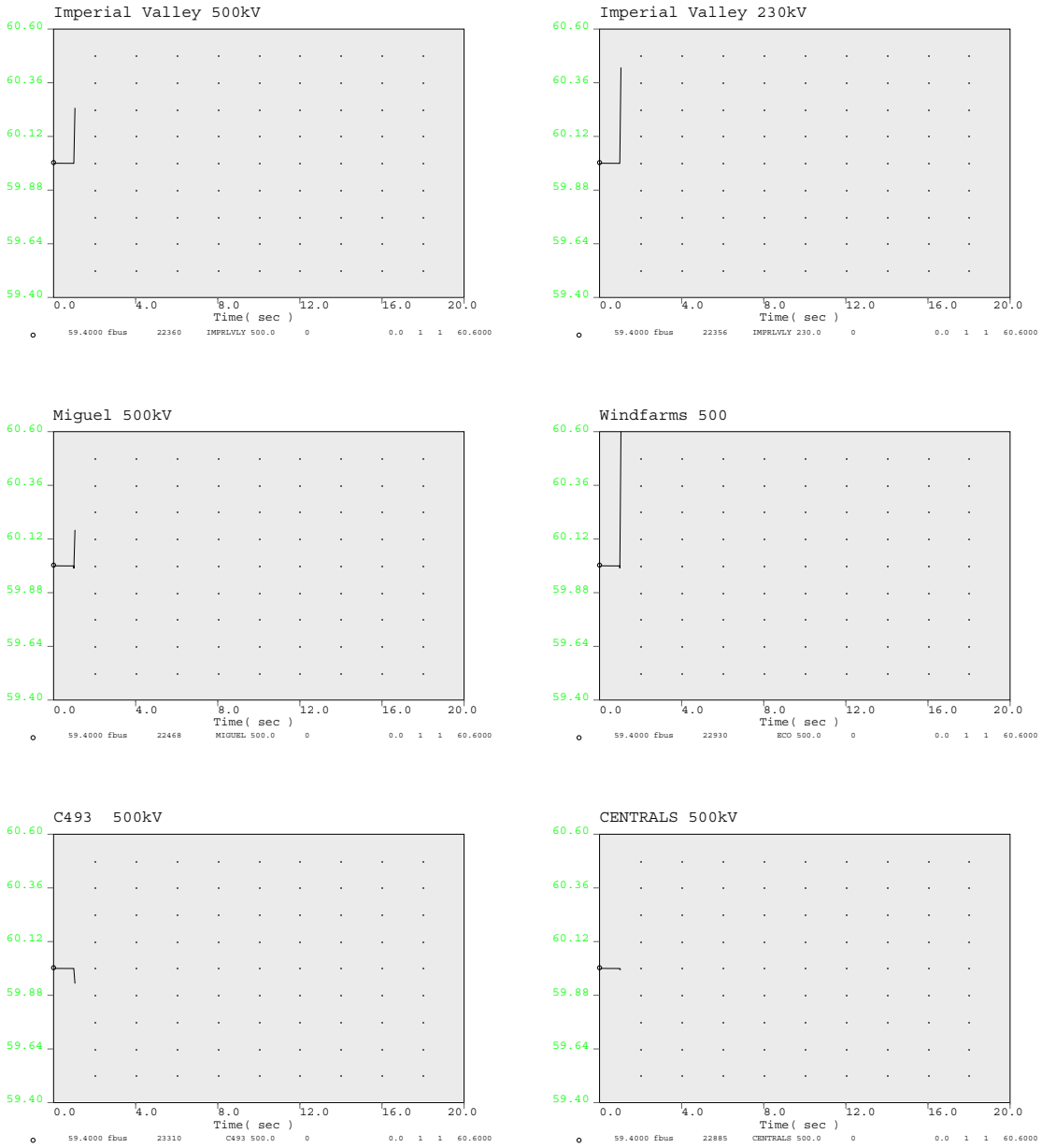
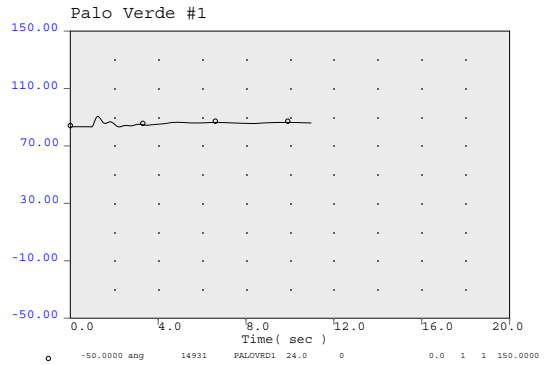
SDGE	ML_Wnd_RAS_slo_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:16:45 2010

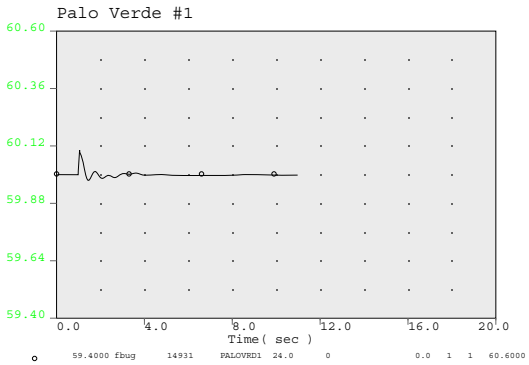
Imperial Valley Area - Frequency

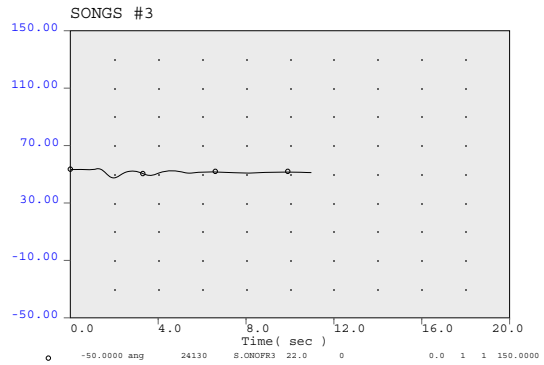


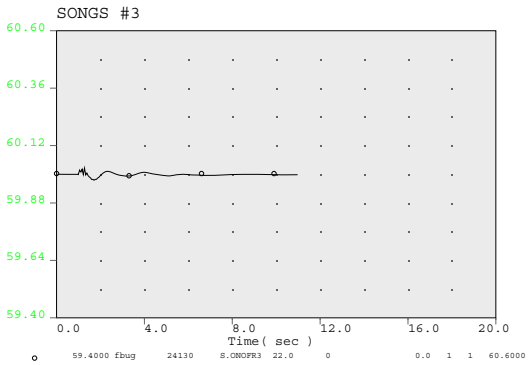
SDG&E Cluster 2 - pre
2014 Heavy Summer
Miguel-Windfarms 500 kV line

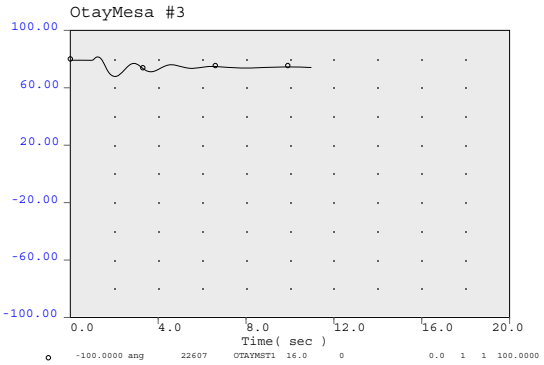
RELATIVE ROTOR ANGLE & FREQUENCY

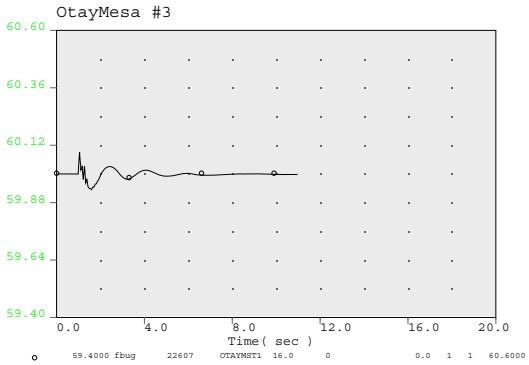












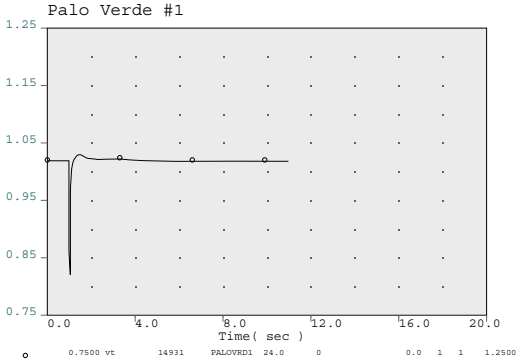
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Page 1

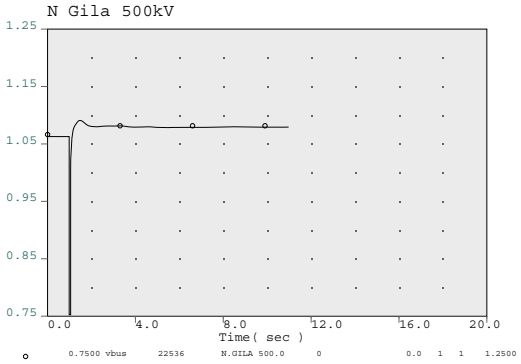
SDGE	NGila_IV_slo_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:56 2010

RELATIVE VOLTAGE

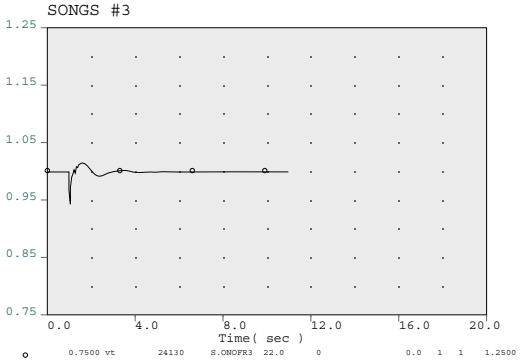
Palo Verde #1



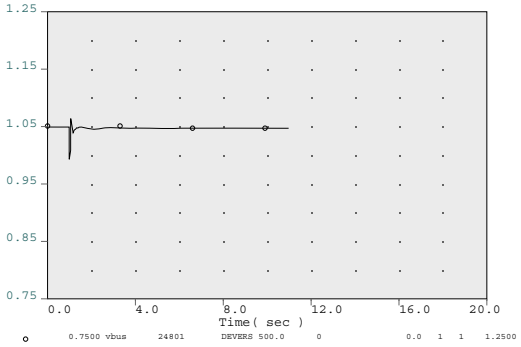
N Gila 500kV



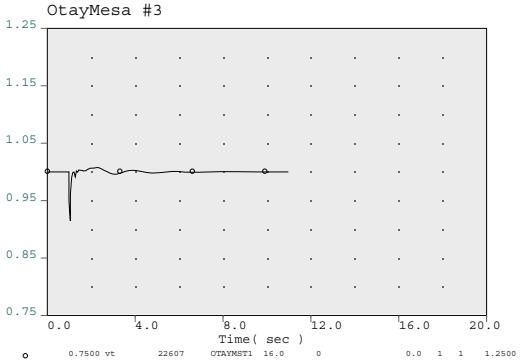
SONGS #3



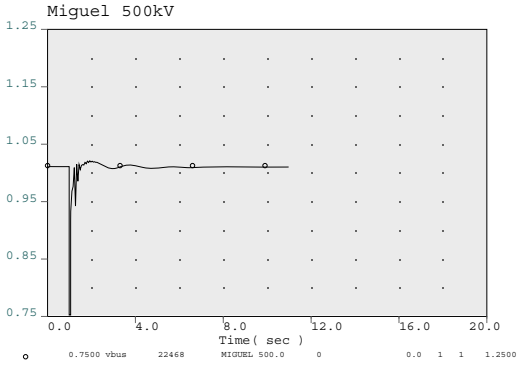
Devers 500



OtayMesa #3



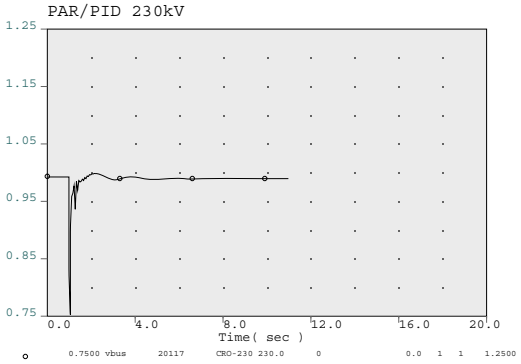
Miguel 500kV



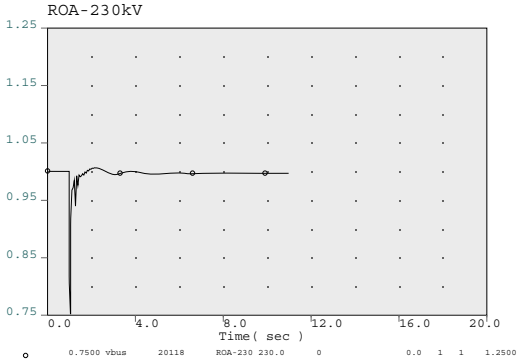
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

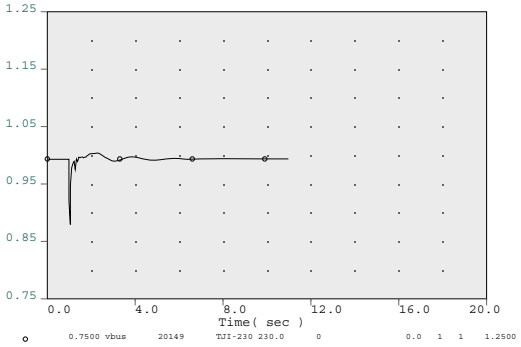
PAR/PID 230kV



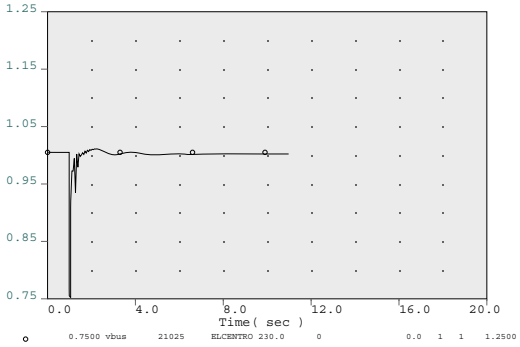
ROA-230kV



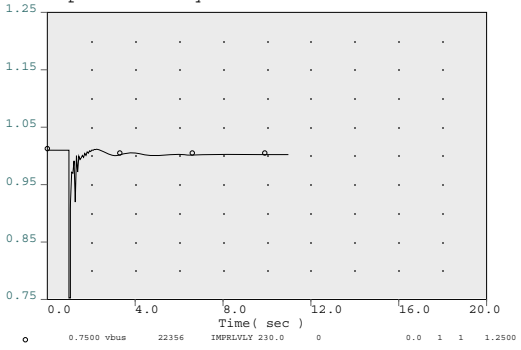
TJ1-230kV



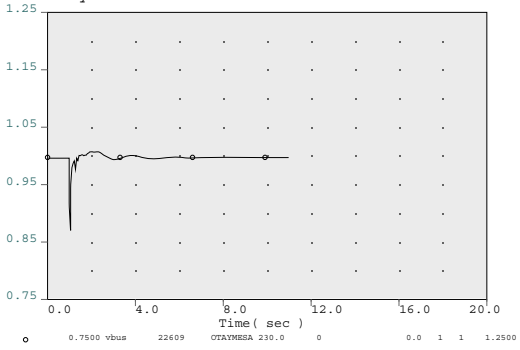
El Centro



Imperial Valley 230kV



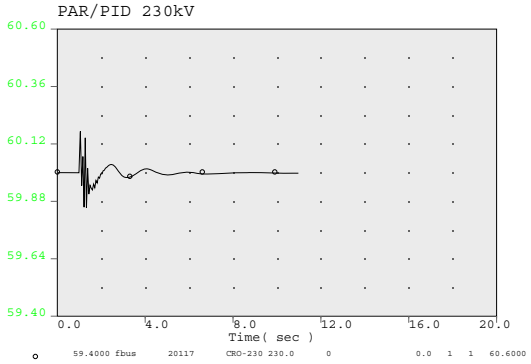
Otay Mesa 230kV



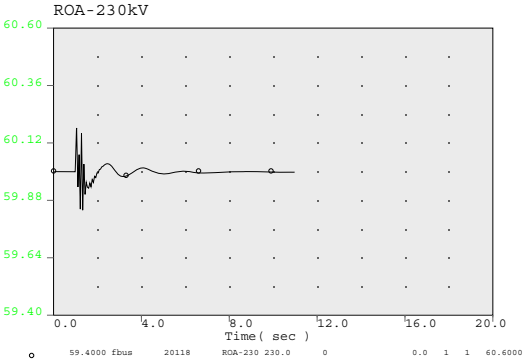
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

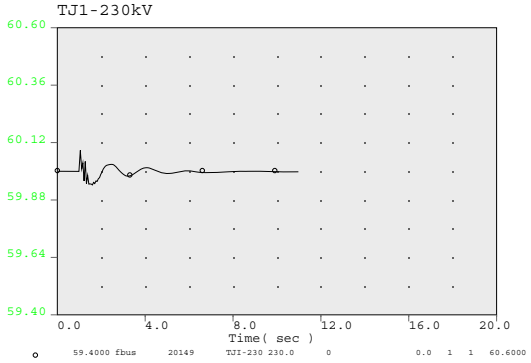
PAR/PID 230kV



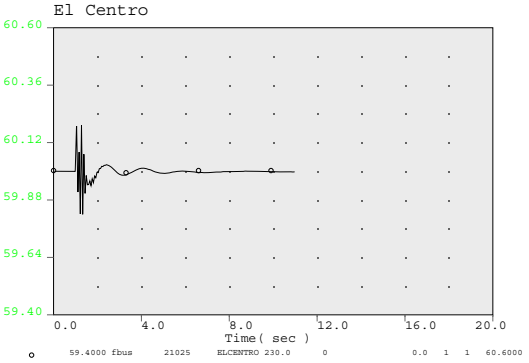
ROA-230kV



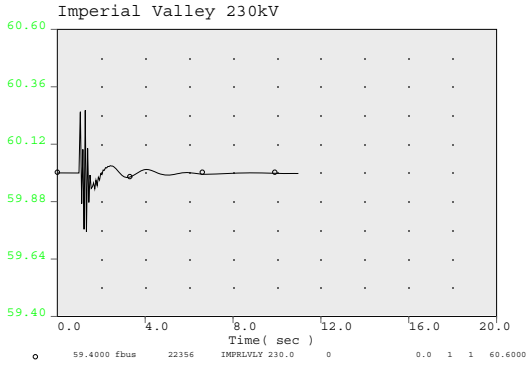
TJ1-230kV



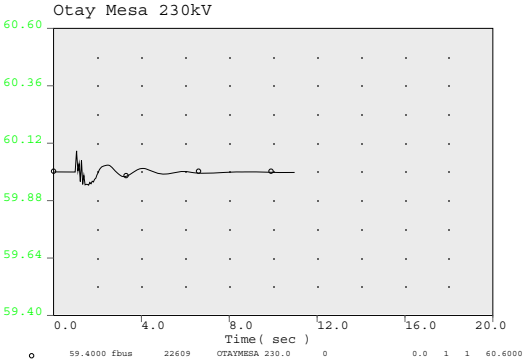
El Centro



Imperial Valley 230kV



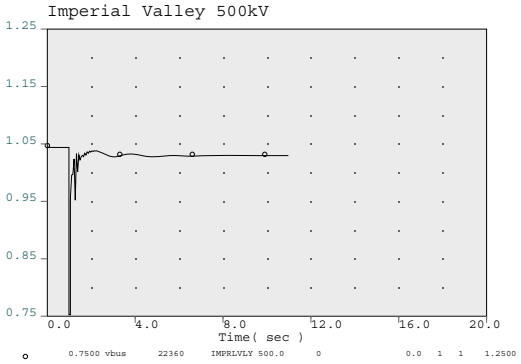
Otay Mesa 230kV



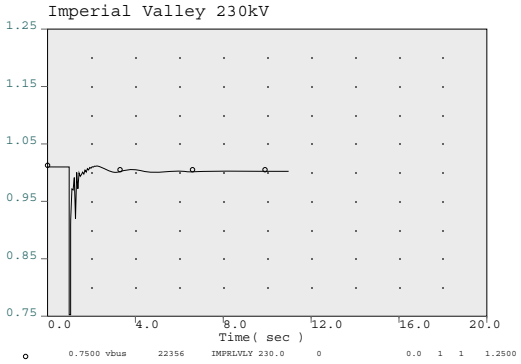
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

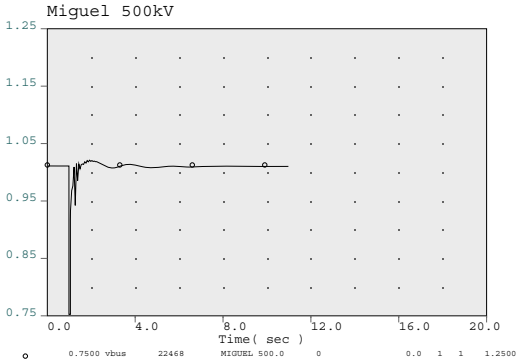
Imperial Valley 500kV



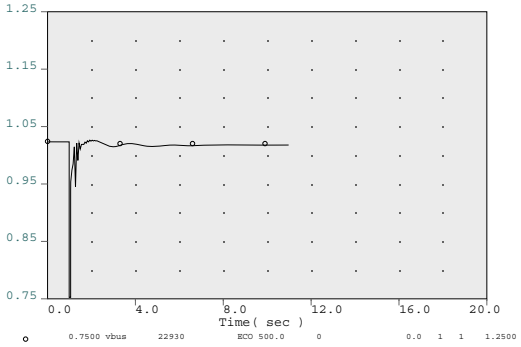
Imperial Valley 230kV



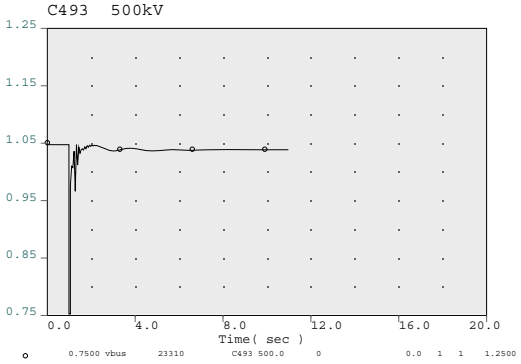
Miguel 500kV



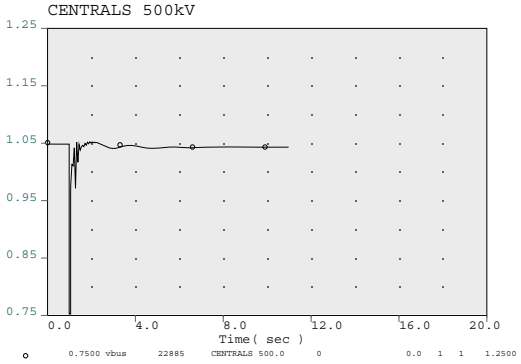
Windfarms 500



C493 500kV



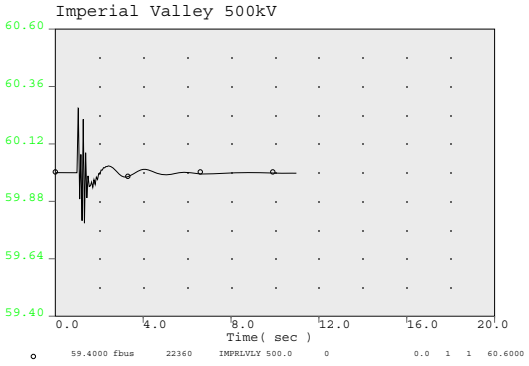
CENTRALS 500kV



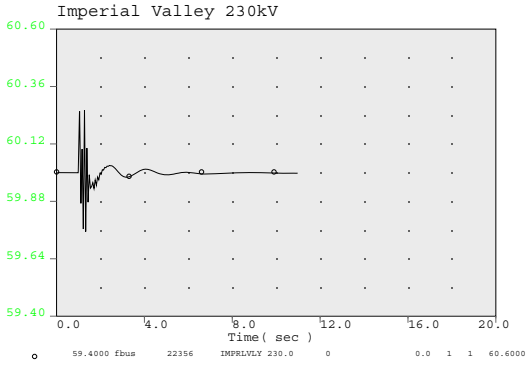
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - Frequency

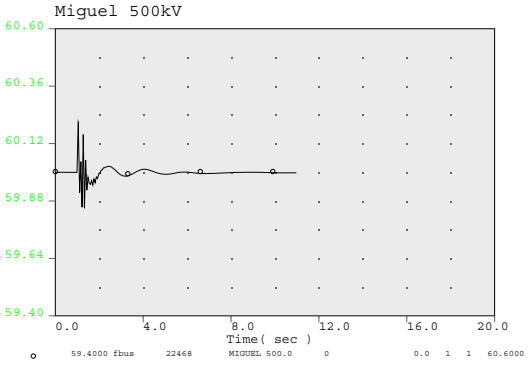
Imperial Valley 500kV



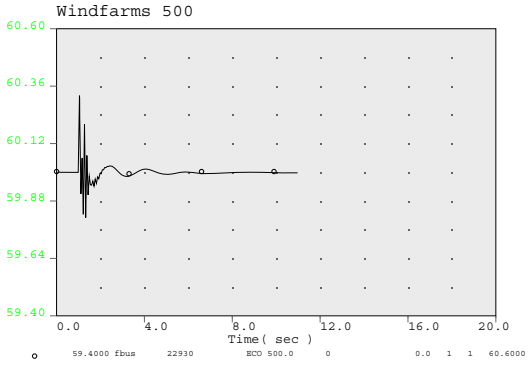
Imperial Valley 230kV



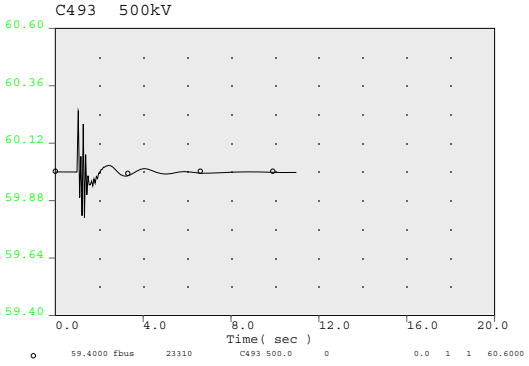
Miguel 500kV



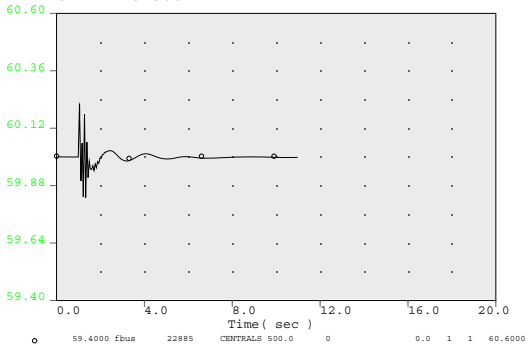
Windfarms 500



C493 500kV

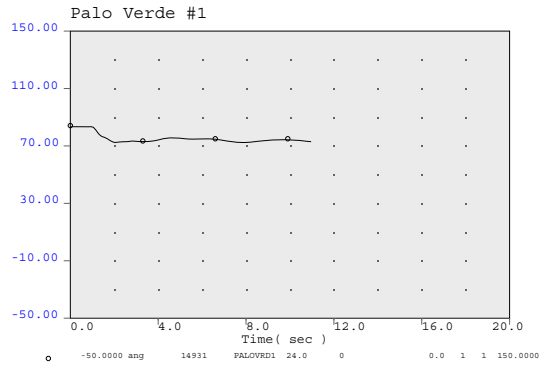


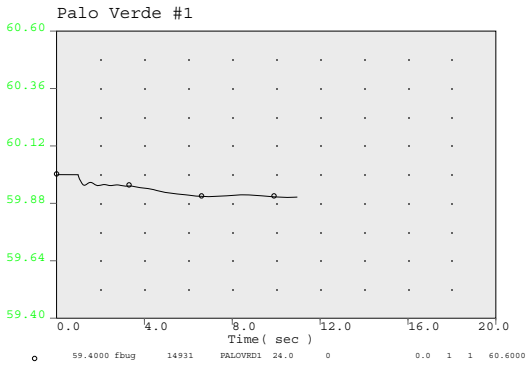
CENTRALS 500kV

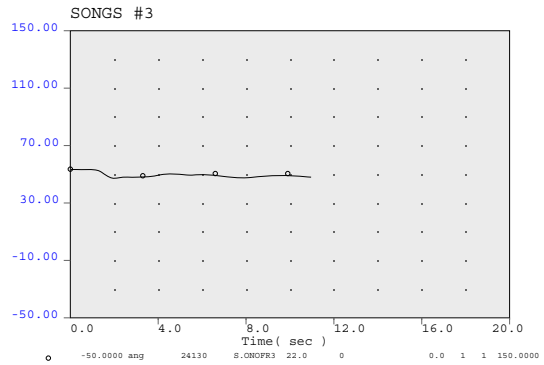


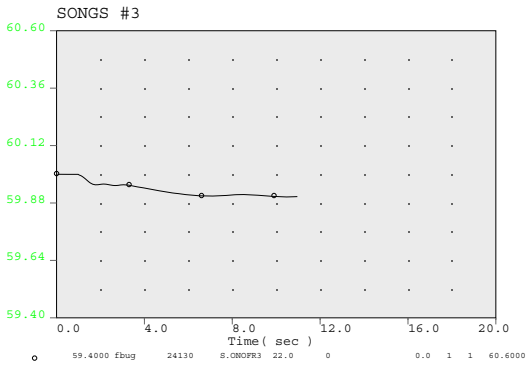
SDG&E Cluster 2 - pre
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

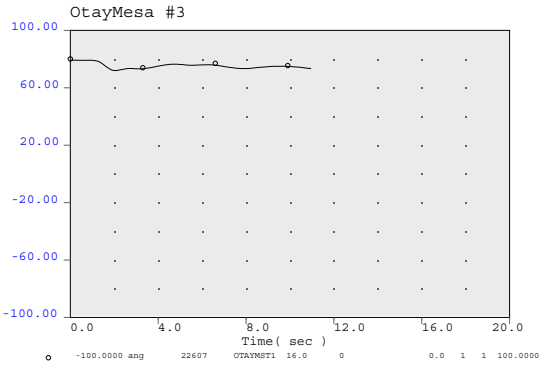
RELATIVE ROTOR ANGLE & FREQUENCY

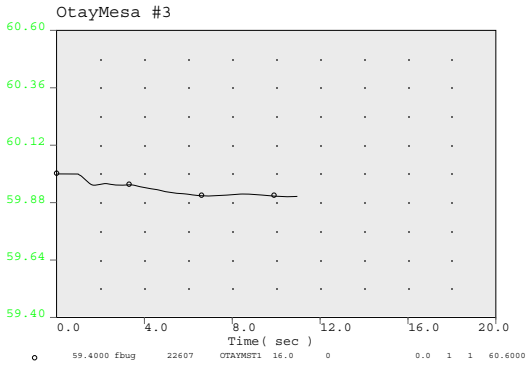










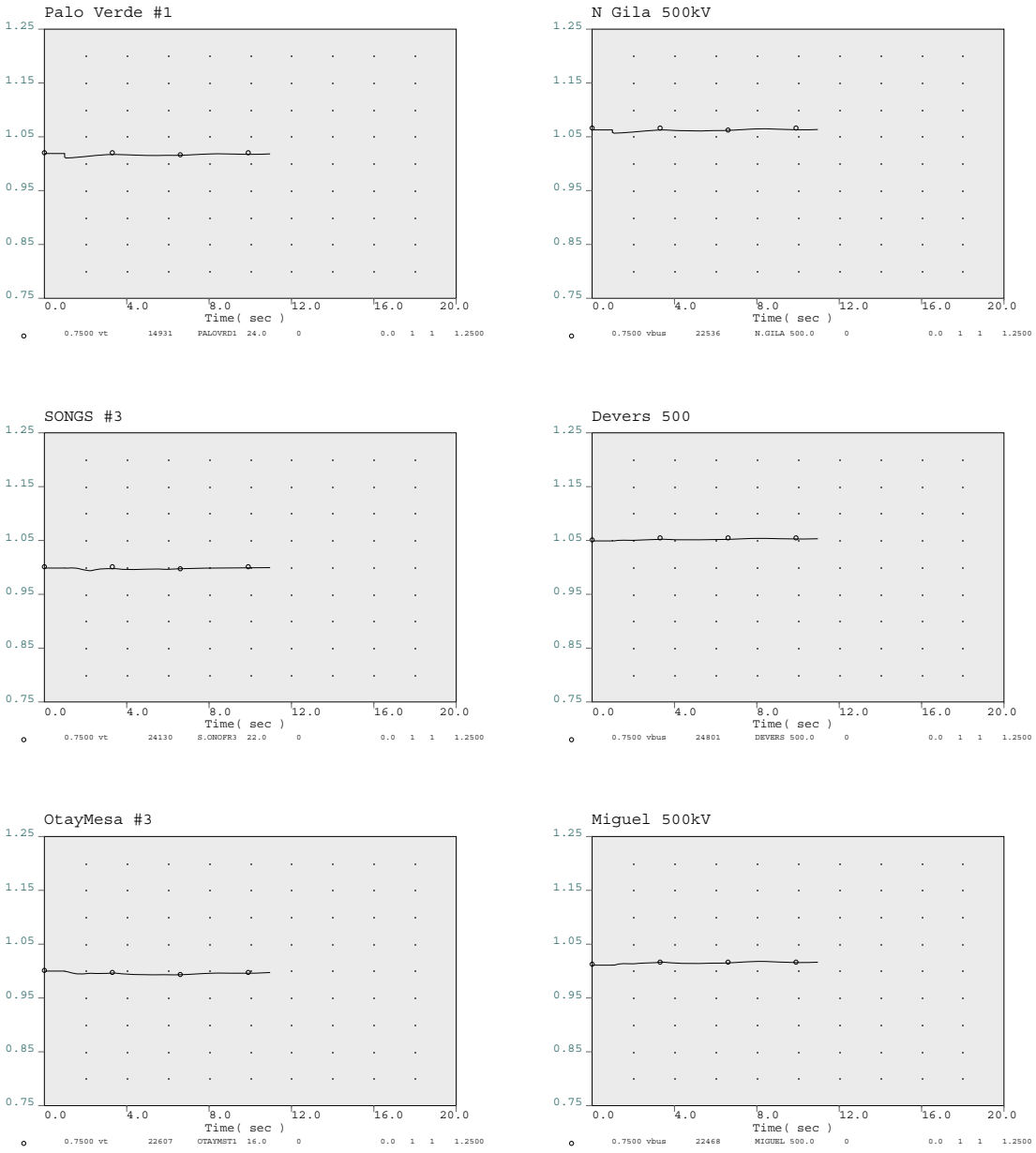


SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Page 1

SDGE	PaloVerde-g1_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:23:59 2010

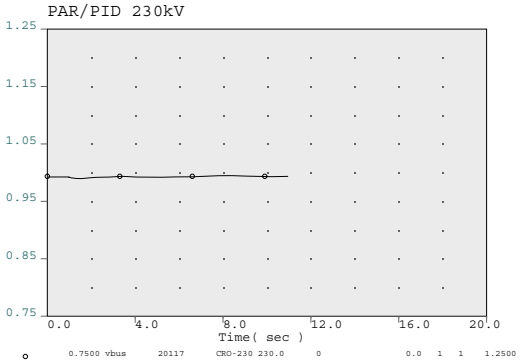
RELATIVE VOLTAGE



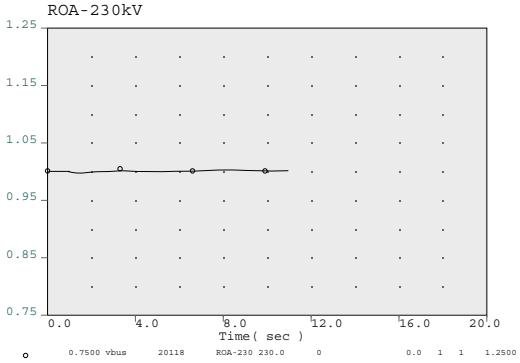
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

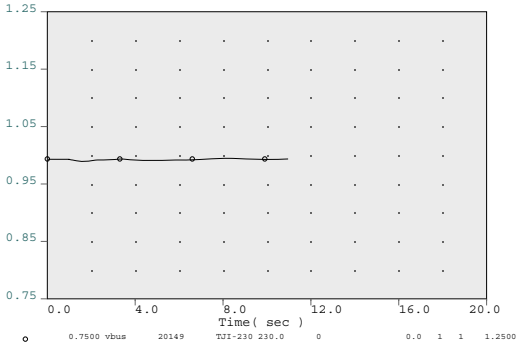
PAR/PID 230kV



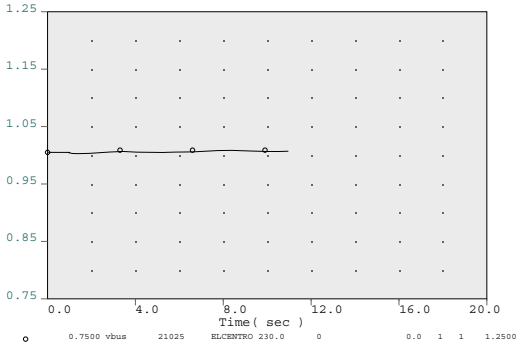
ROA-230kV



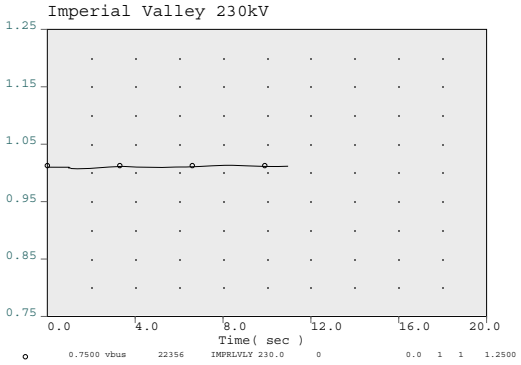
TJ1-230kV



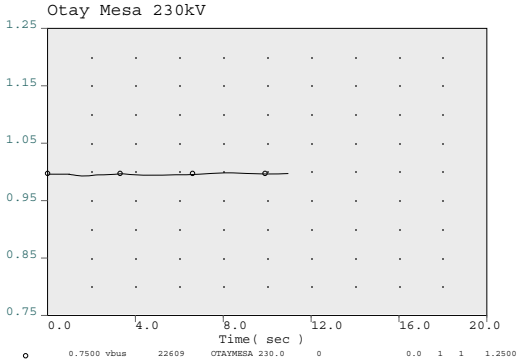
El Centro



Imperial Valley 230kV



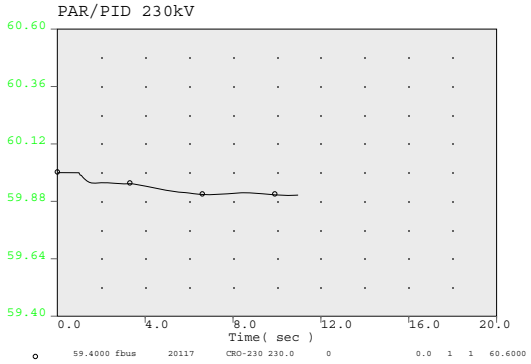
Otay Mesa 230kV



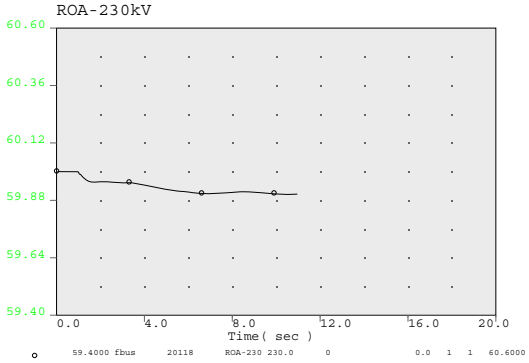
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

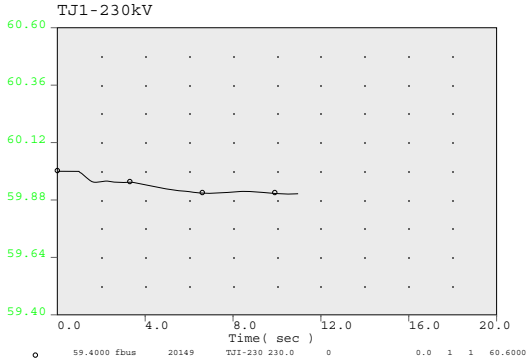
PAR/PID 230kV



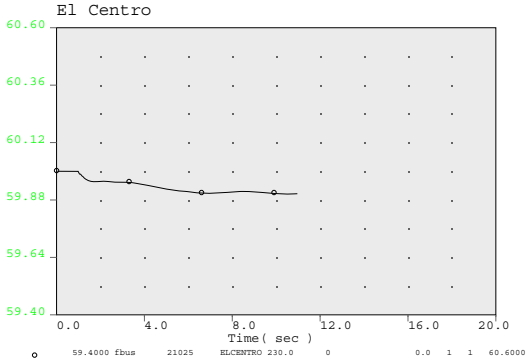
ROA-230kV



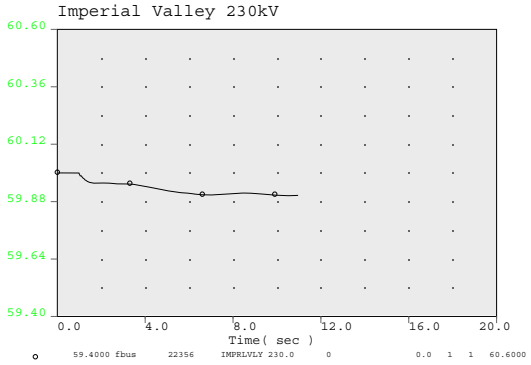
TJ1-230kV



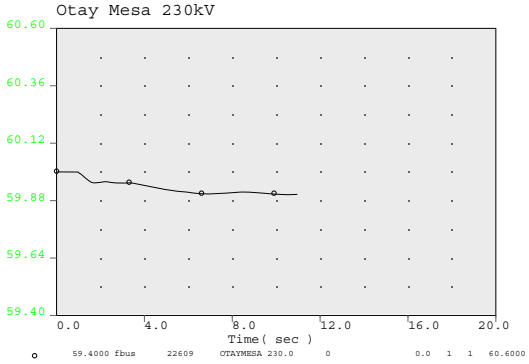
El Centro



Imperial Valley 230kV



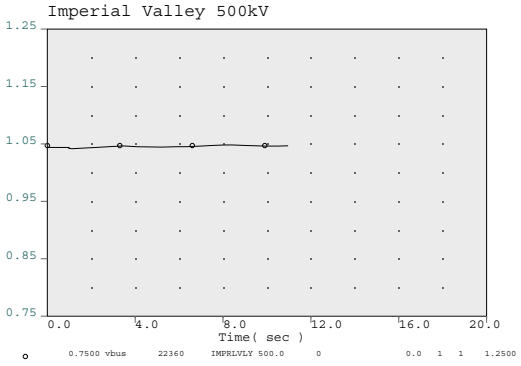
Otay Mesa 230kV



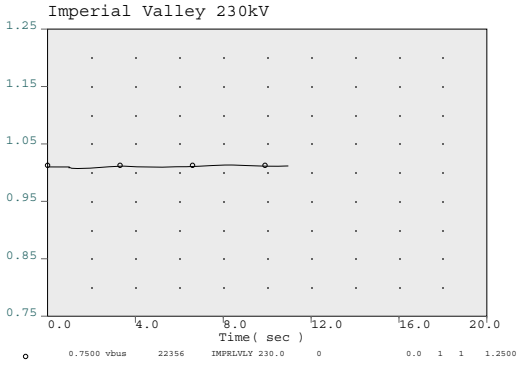
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

Imperial Valley Area - VOLTAGE

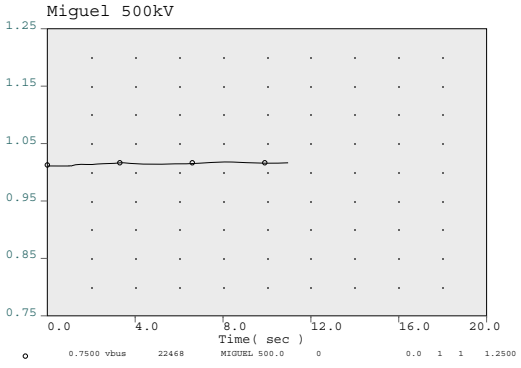
Imperial Valley 500kV



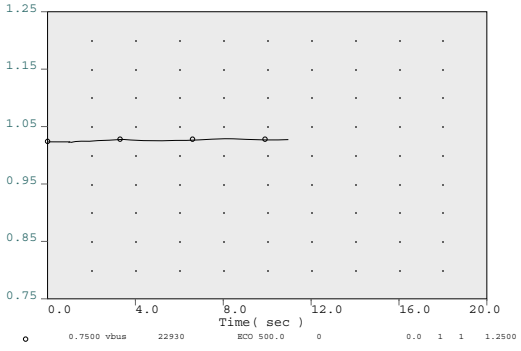
Imperial Valley 230kV



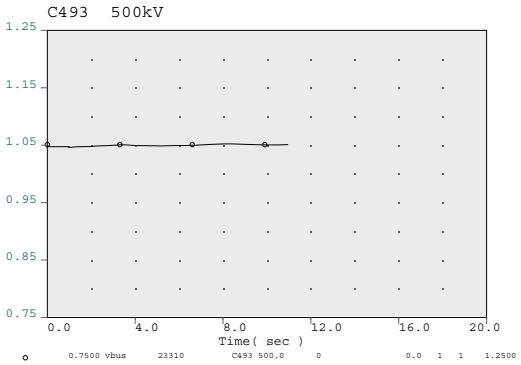
Miguel 500kV



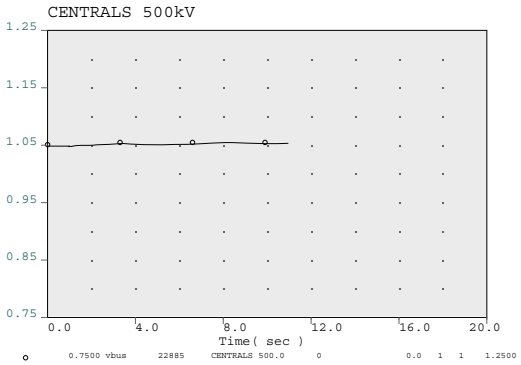
Windfarms 500



C493 500kV

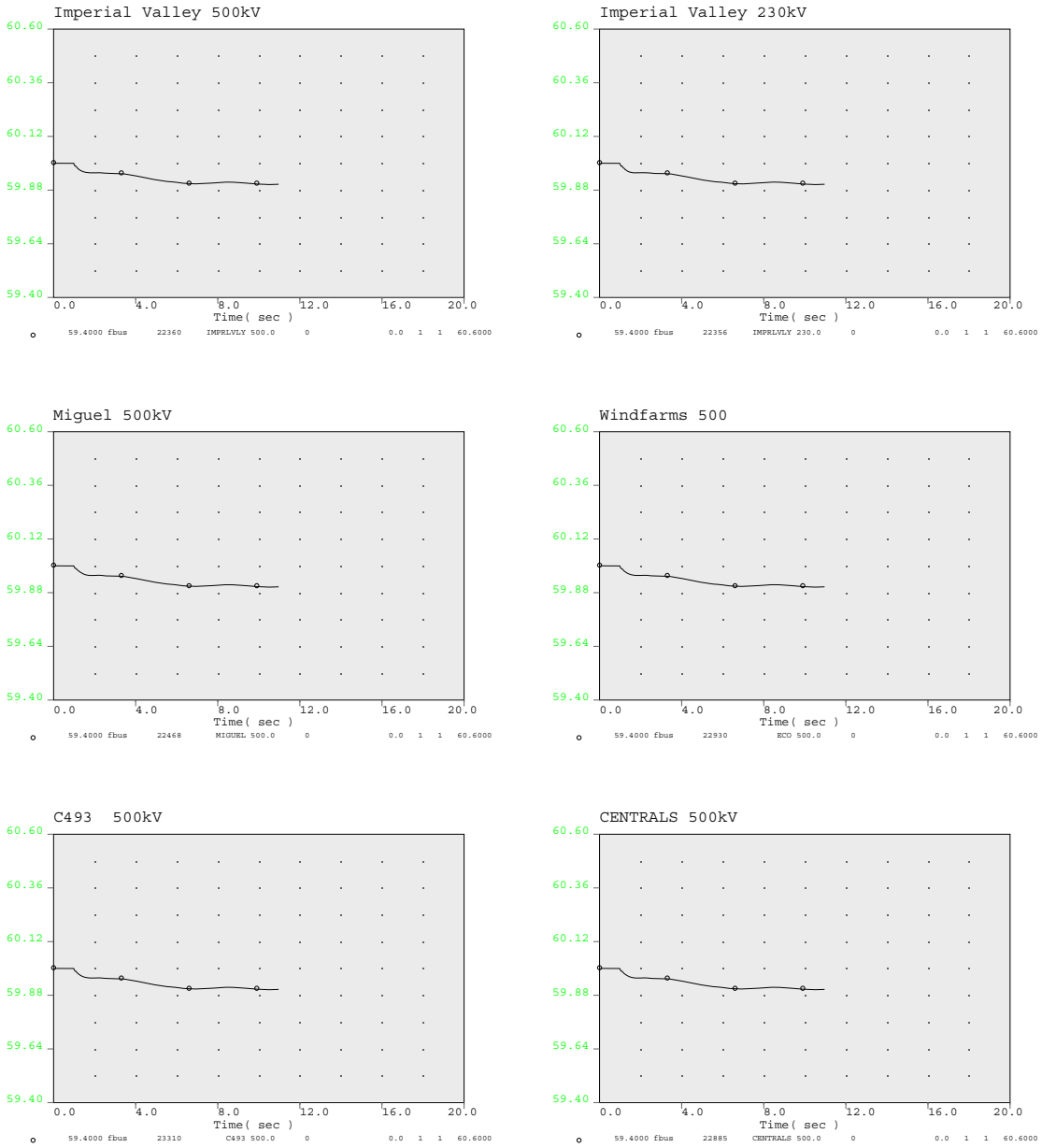


CENTRALS 500kV



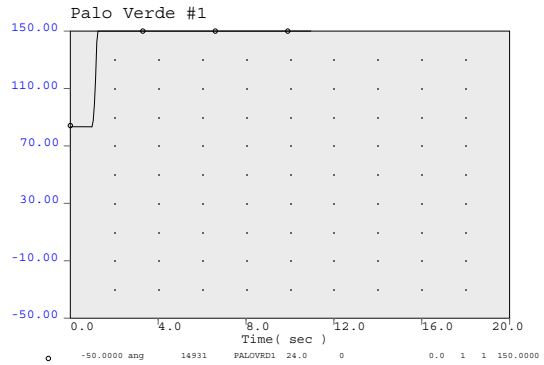
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

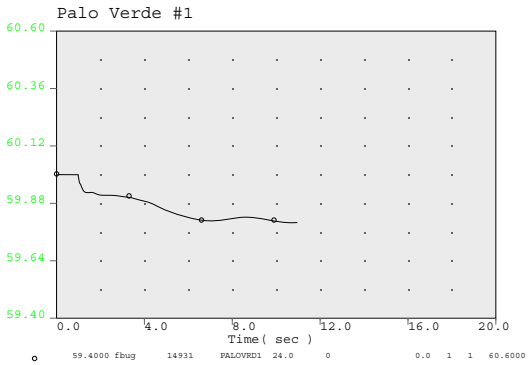
Imperial Valley Area - Frequency

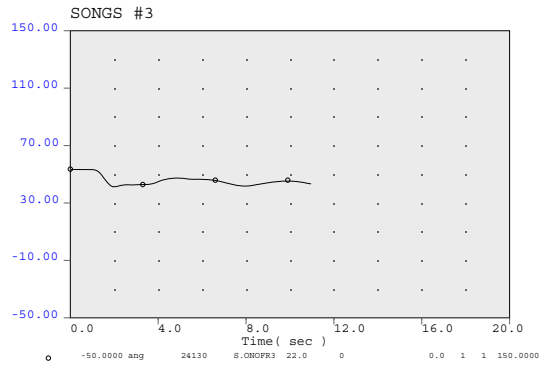


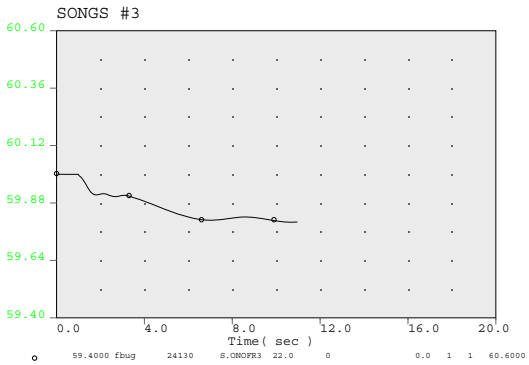
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generator #2

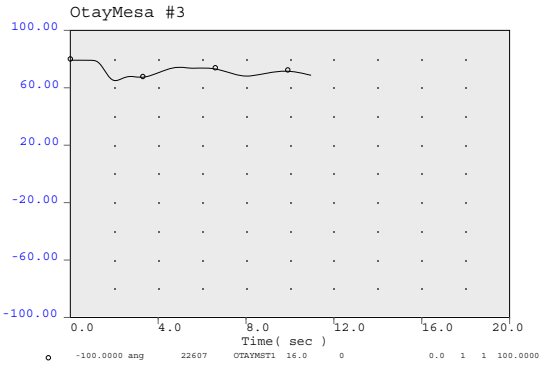
RELATIVE ROTOR ANGLE & FREQUENCY

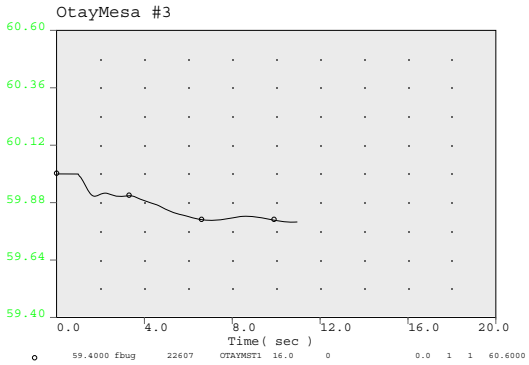












SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

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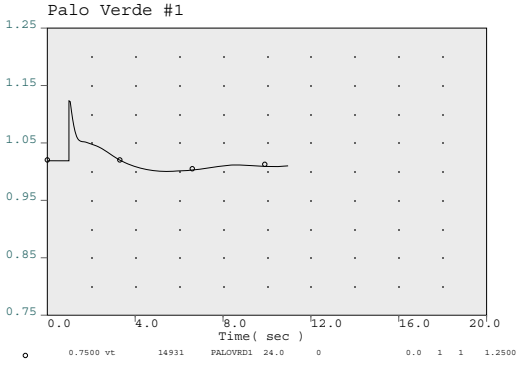
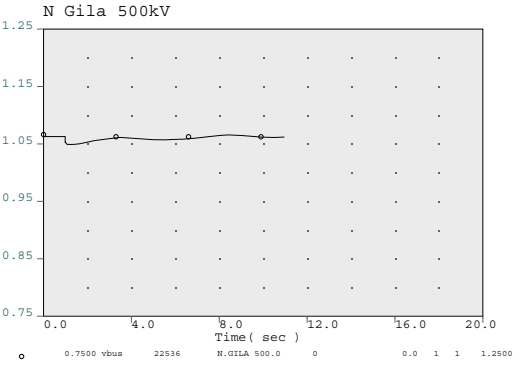
RELATIVE VOLTAGE

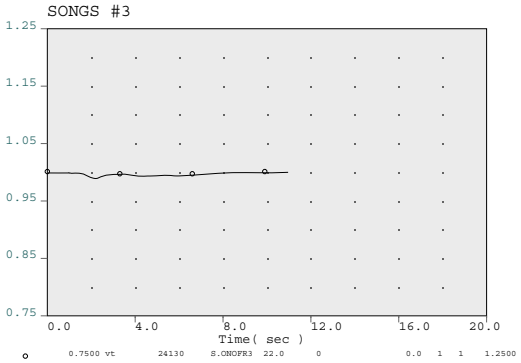
Palo Verde #1



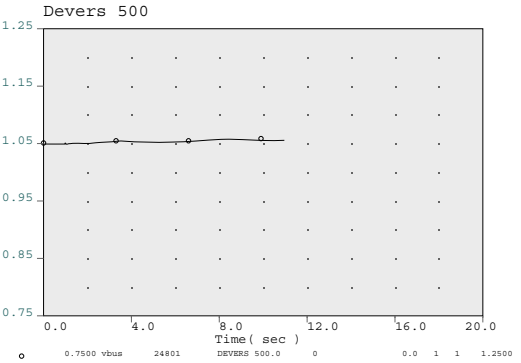
N Gila 500kV



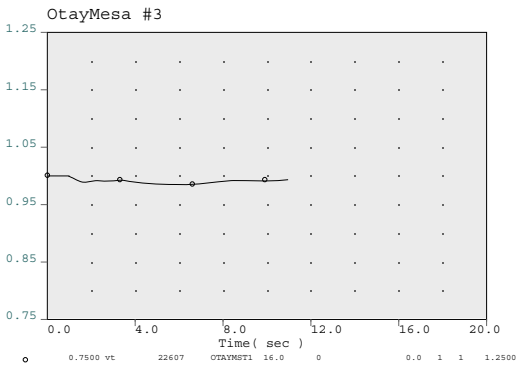
SONGS #3



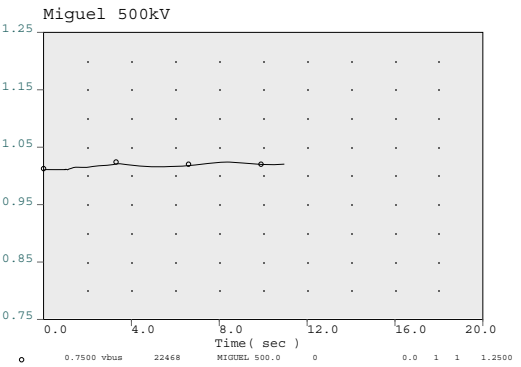
Devers 500



OtayMesa #3



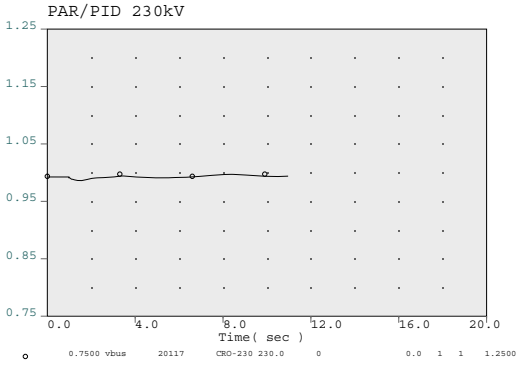
Miguel 500kV



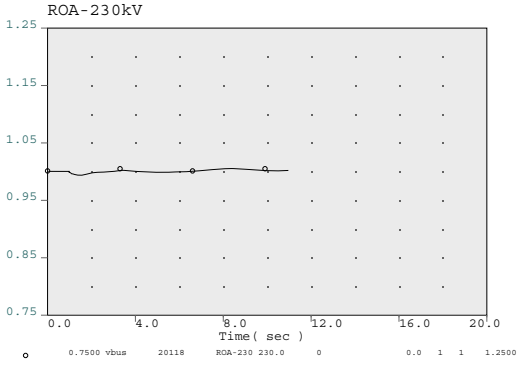
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

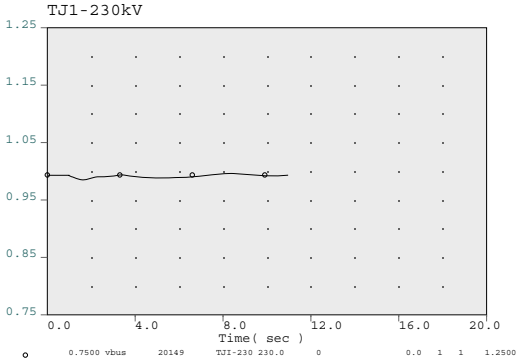
PAR/PID 230kV



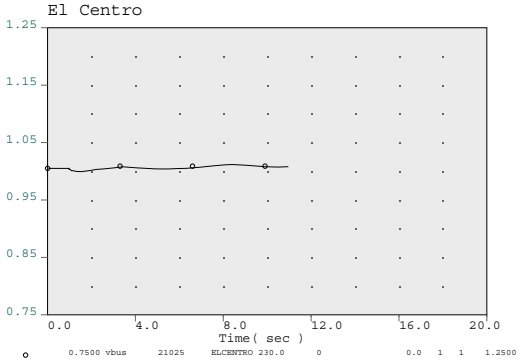
ROA-230kV



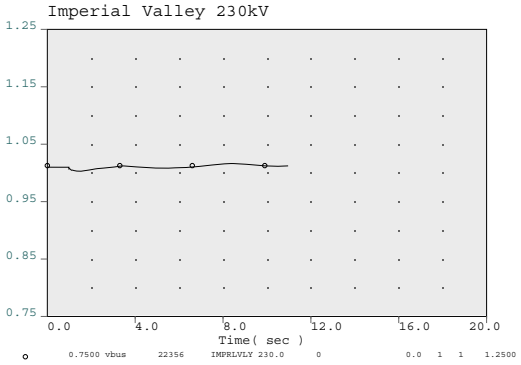
TJ1-230kV



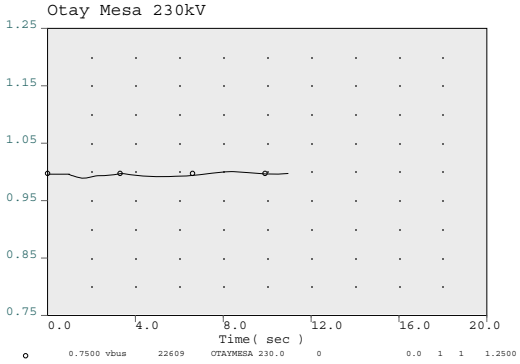
El Centro



Imperial Valley 230kV



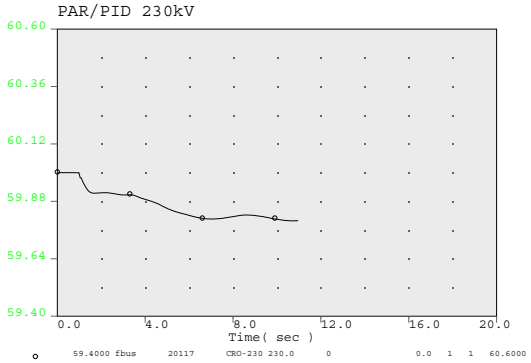
Otay Mesa 230kV



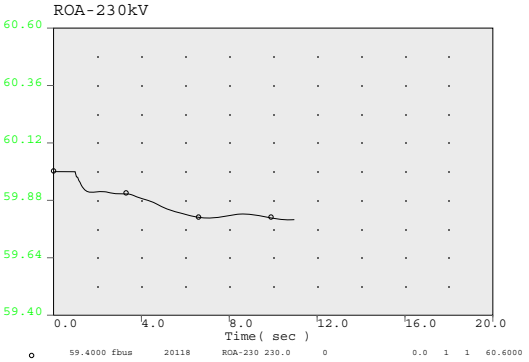
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

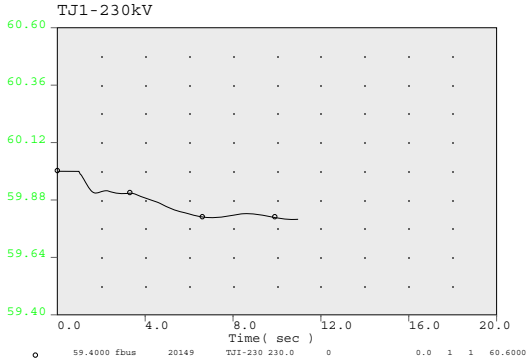
PAR/PID 230kV



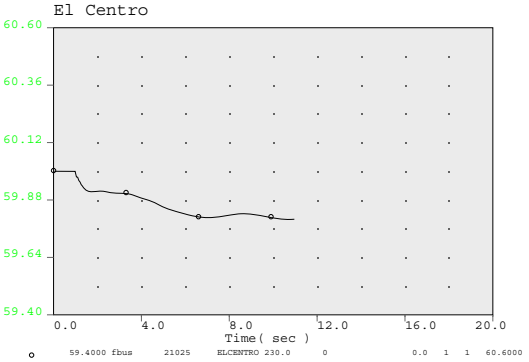
ROA-230kV



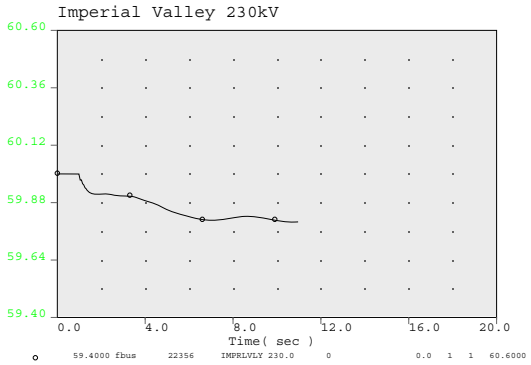
TJ1-230kV



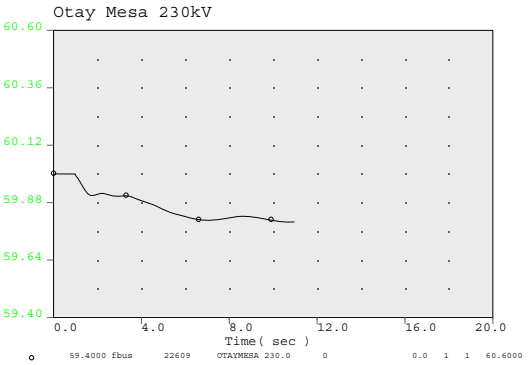
El Centro



Imperial Valley 230kV



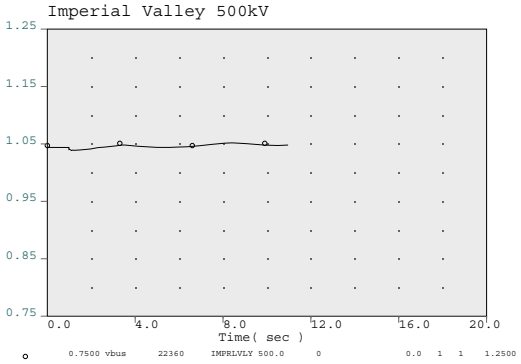
Otay Mesa 230kV



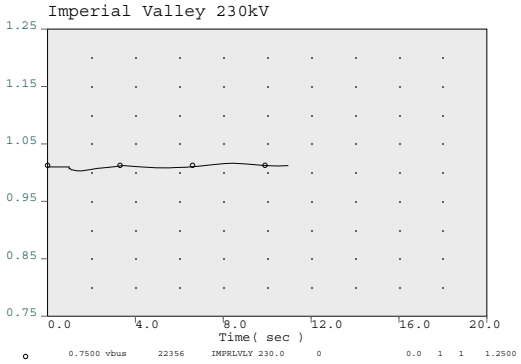
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE

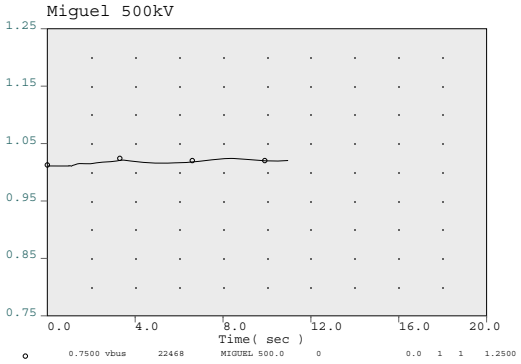
Imperial Valley 500kV



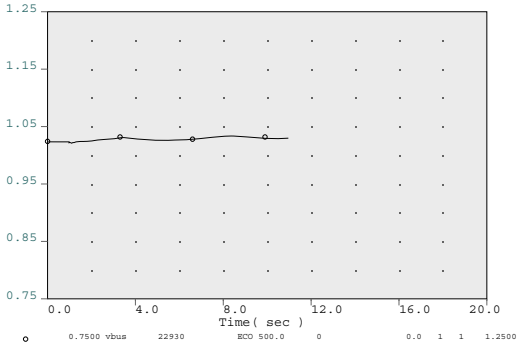
Imperial Valley 230kV



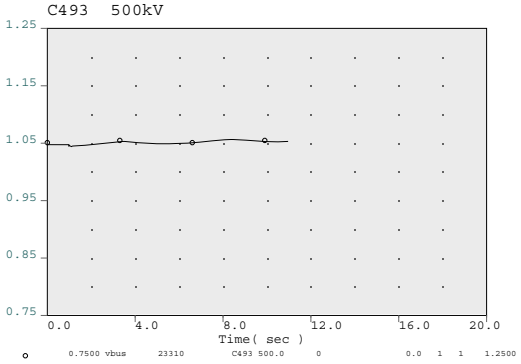
Miguel 500kV



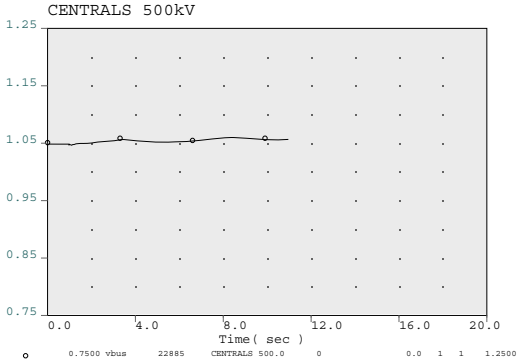
Windfarms 500



C493 500kV



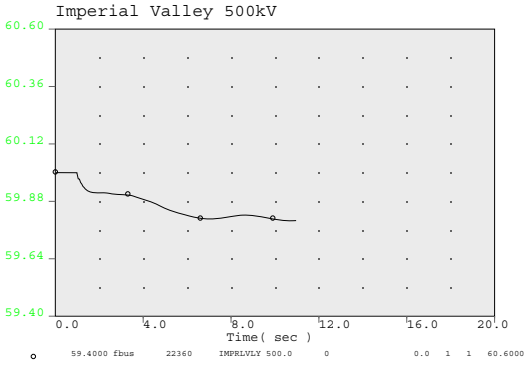
CENTRALS 500kV



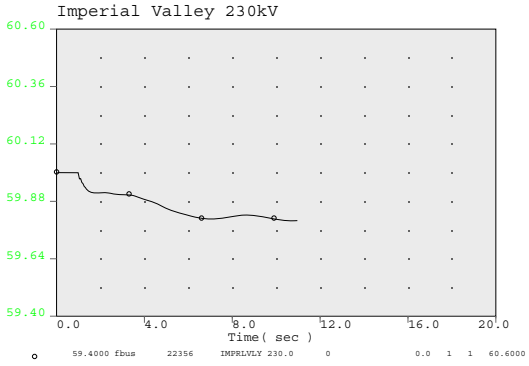
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - Frequency

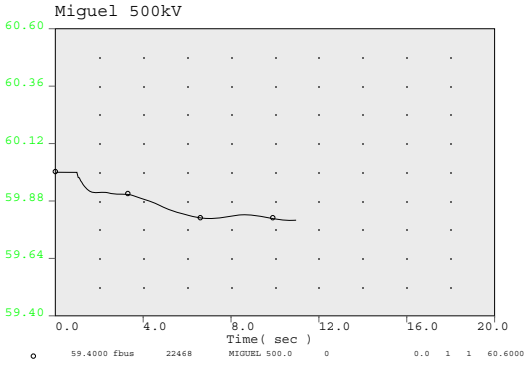
Imperial Valley 500kV



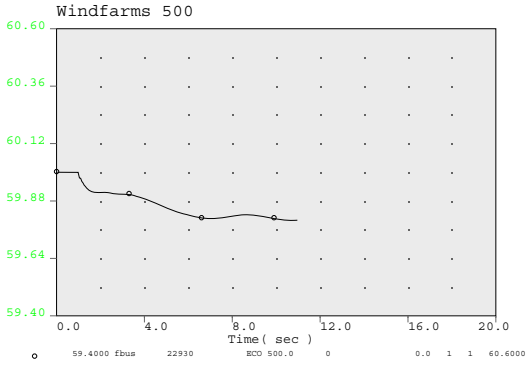
Imperial Valley 230kV



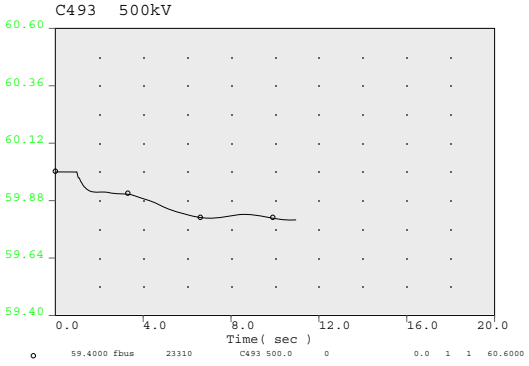
Miguel 500kV



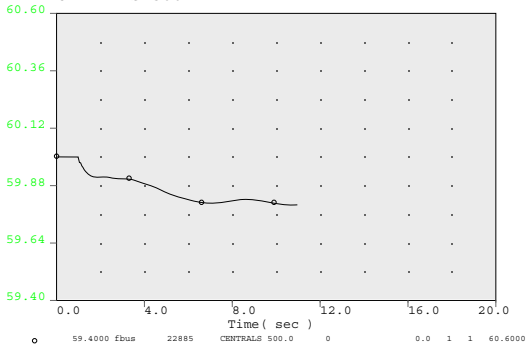
Windfarms 500



C493 500kV

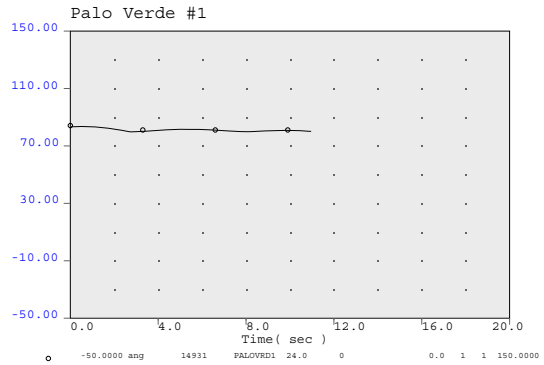


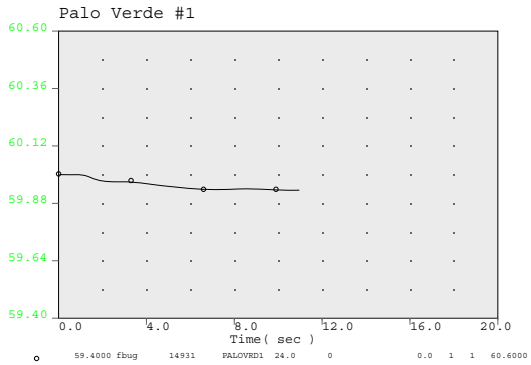
CENTRALS 500kV

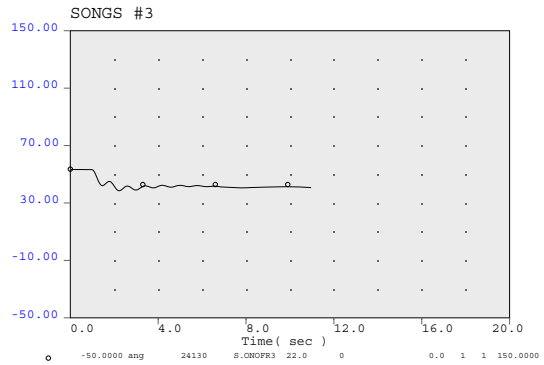


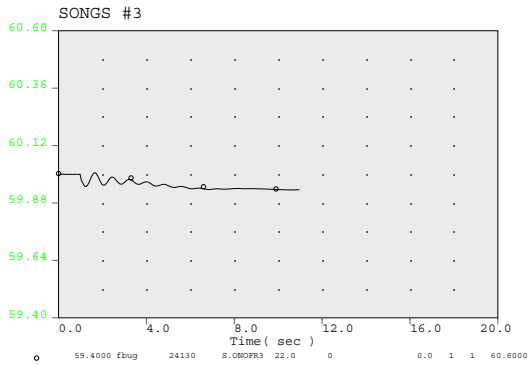
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

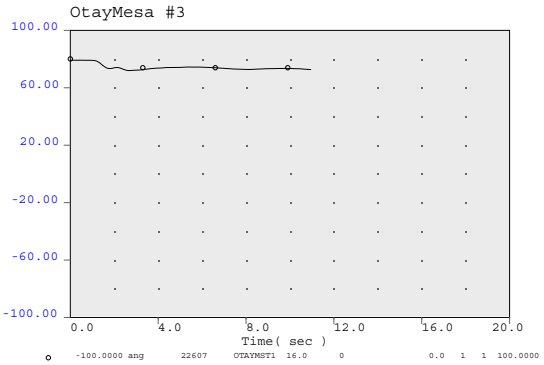
RELATIVE ROTOR ANGLE & FREQUENCY

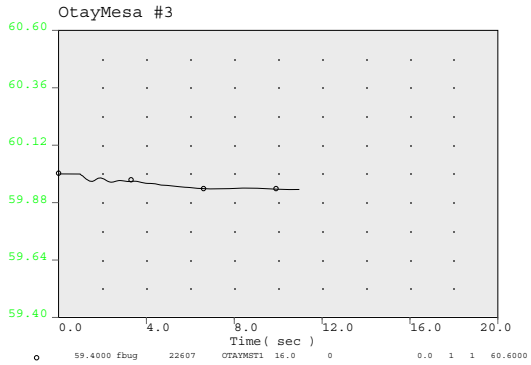










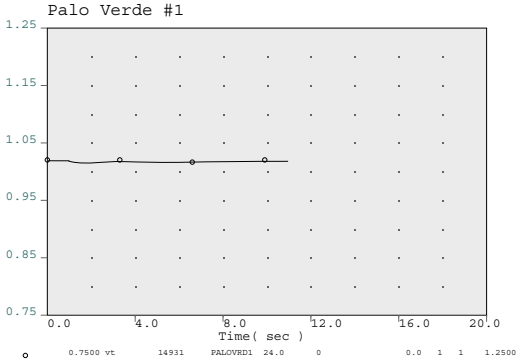


SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

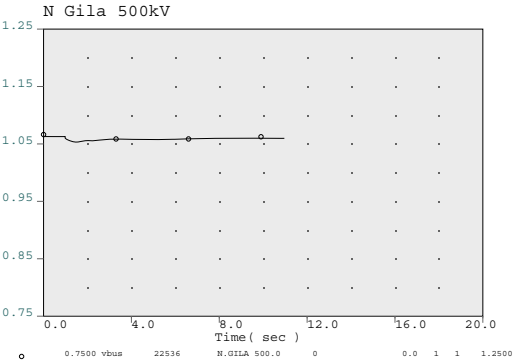
SDGE	SONGS-g1_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:24:05 2010

RELATIVE VOLTAGE

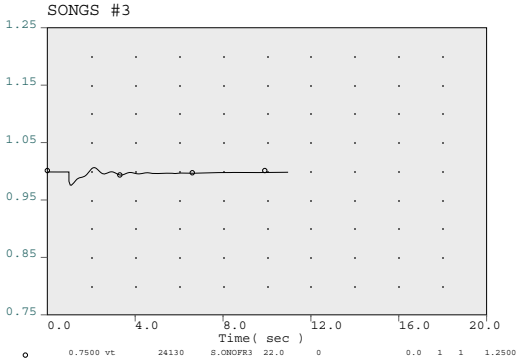
Palo Verde #1



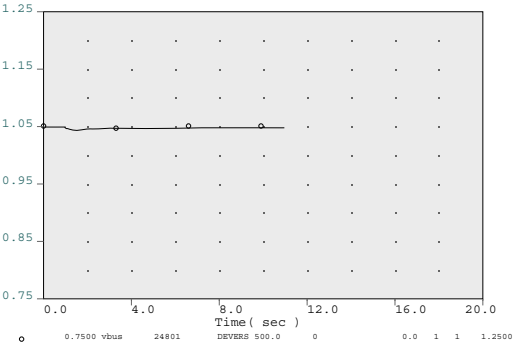
N Gila 500kV



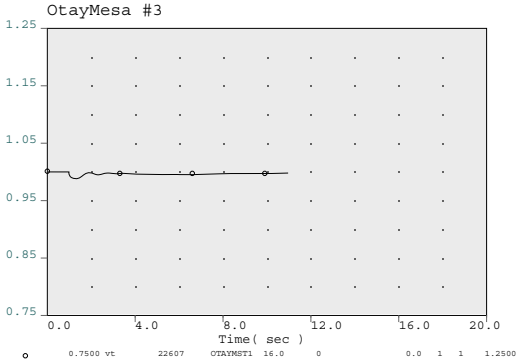
SONGS #3



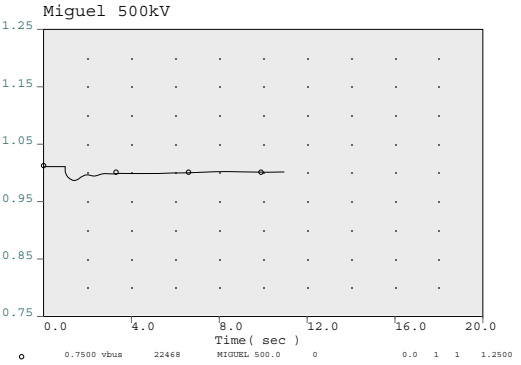
Devers 500



OtayMesa #3



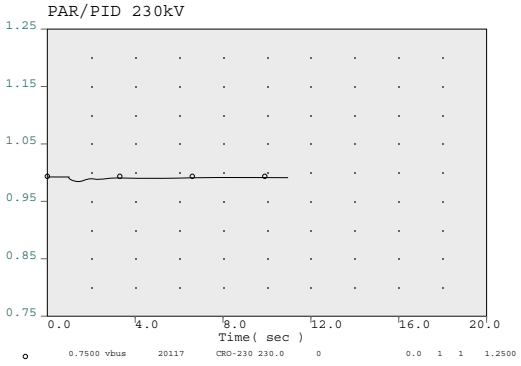
Miguel 500kV



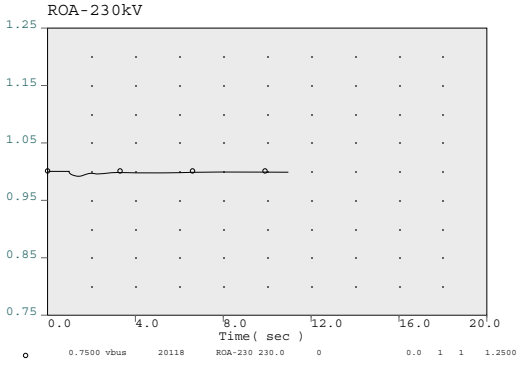
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

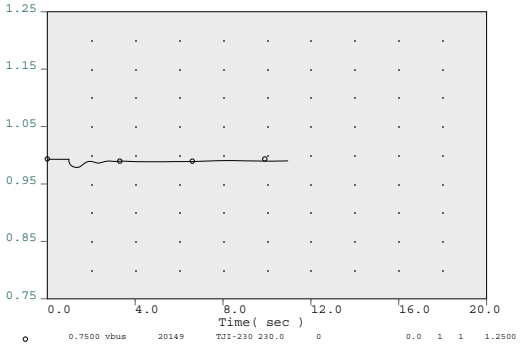
PAR/PID 230kV



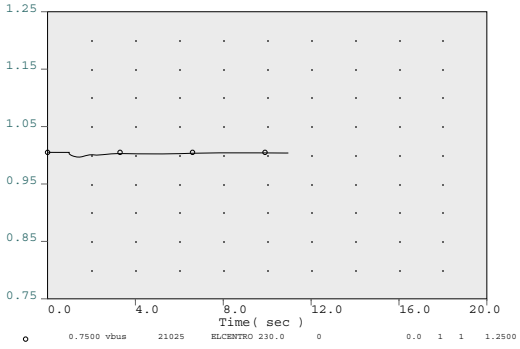
ROA-230kV



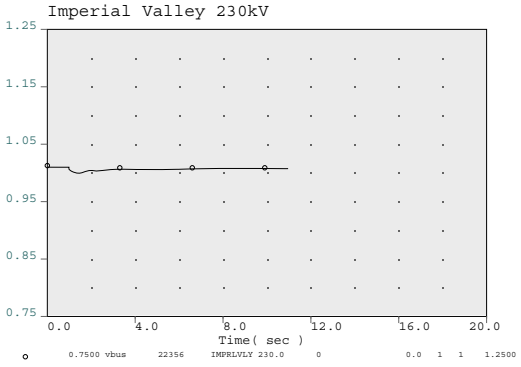
TJ1-230kV



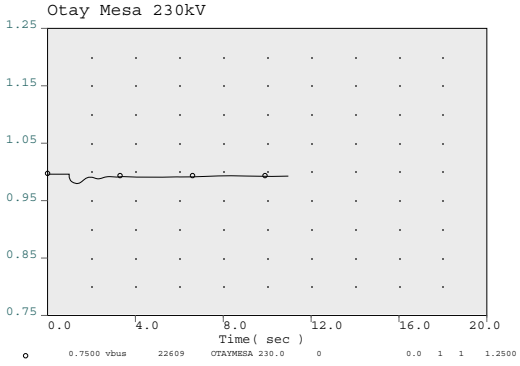
El Centro



Imperial Valley 230kV



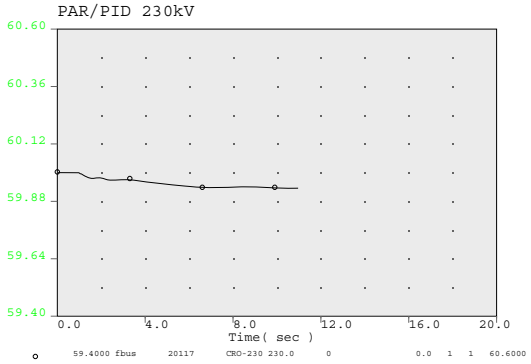
Otay Mesa 230kV



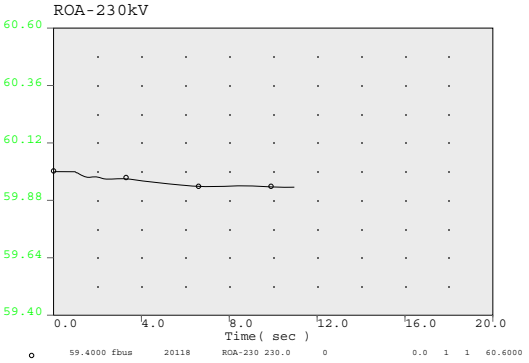
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison

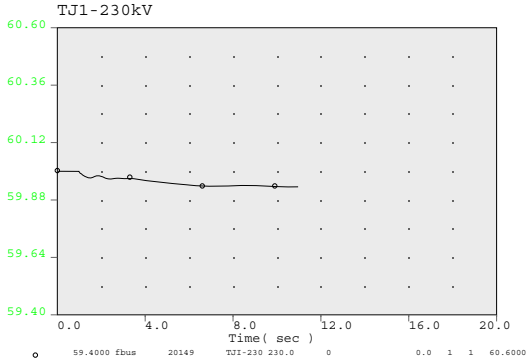
PAR/PID 230kV



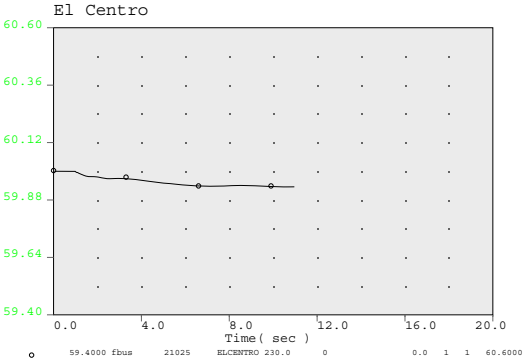
ROA-230kV



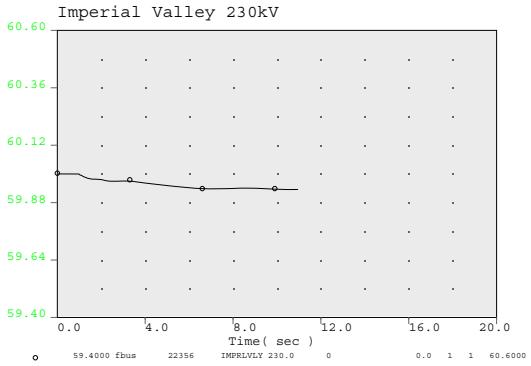
TJ1-230kV



El Centro



Imperial Valley 230kV



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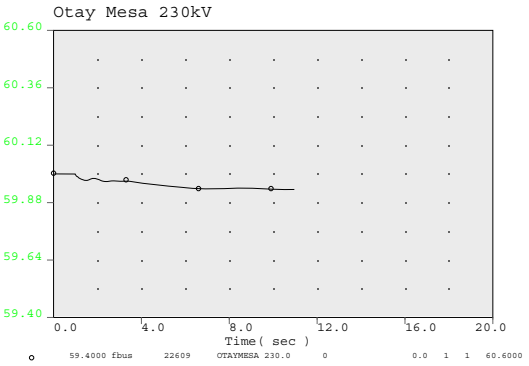
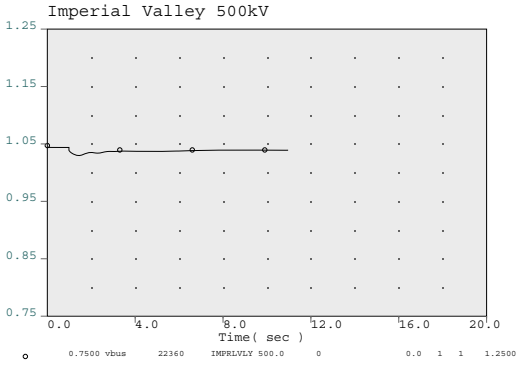


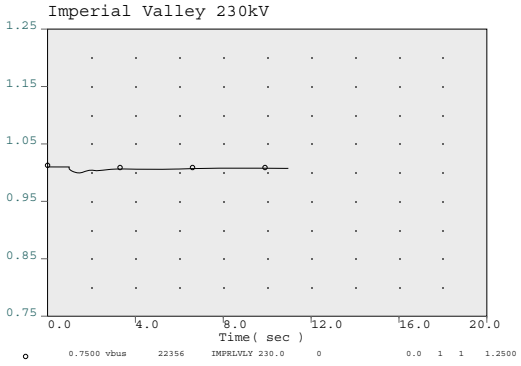
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

Imperial Valley Area - VOLTAGE

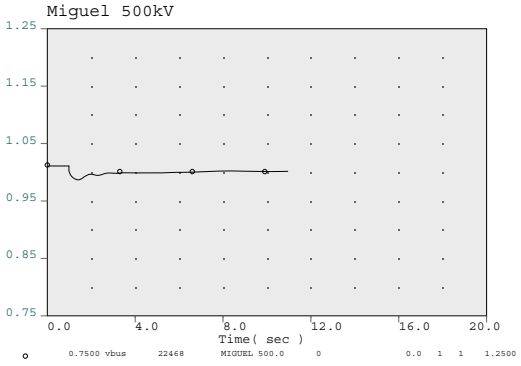
Imperial Valley 500kV



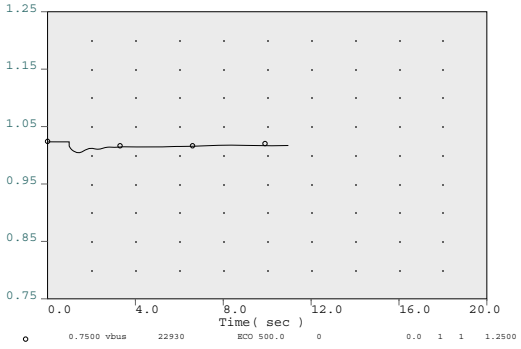
Imperial Valley 230kV



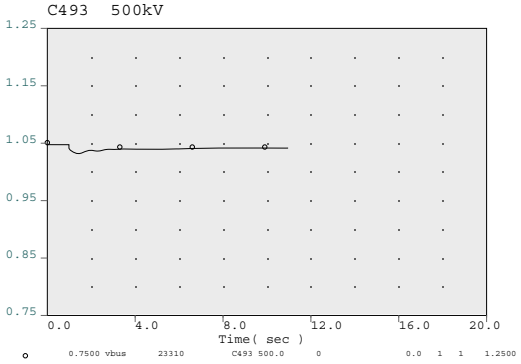
Miguel 500kV



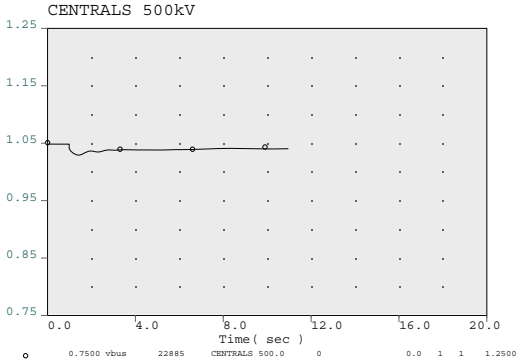
Windfarms 500



C493 500kV

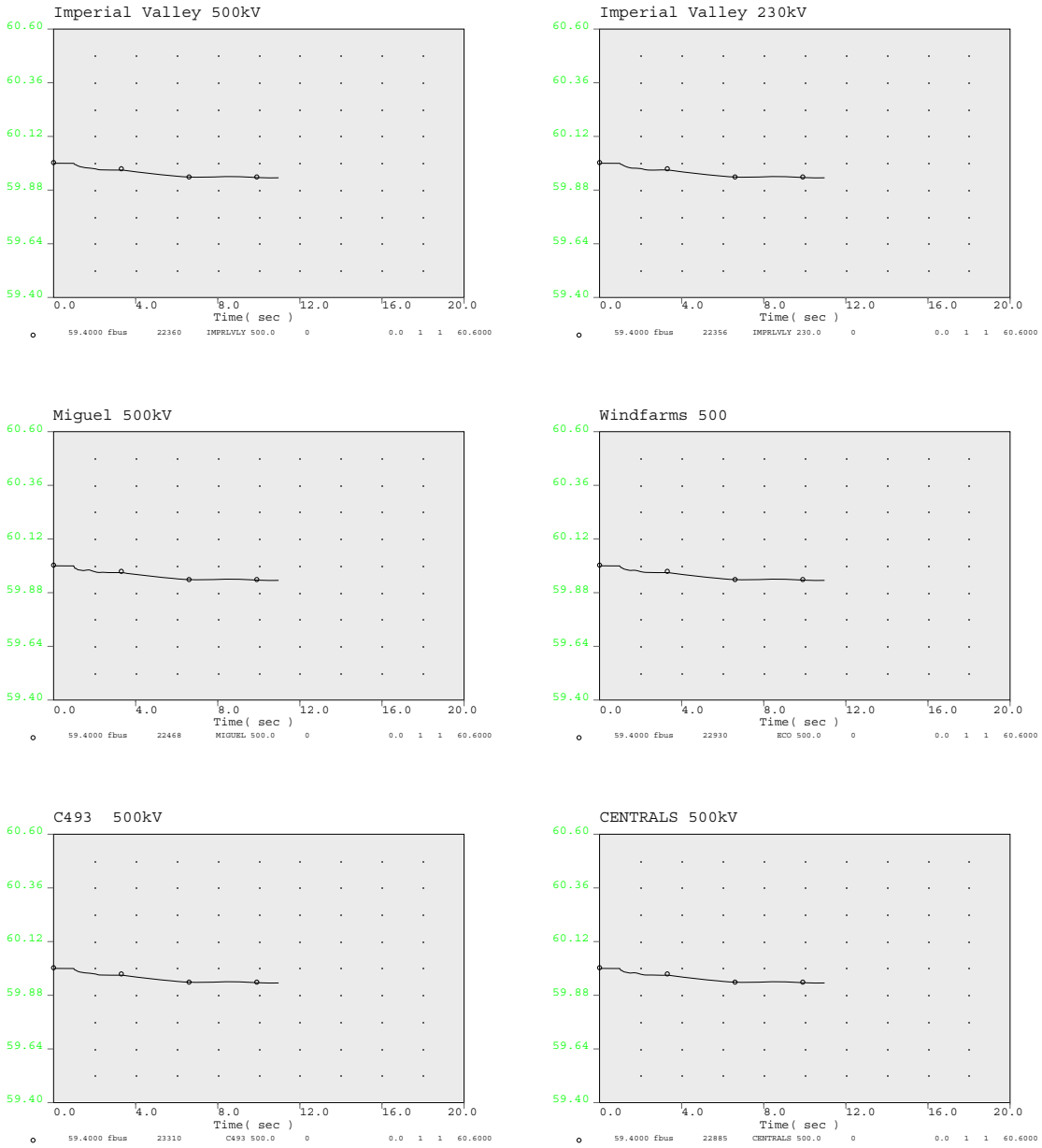


CENTRALS 500kV



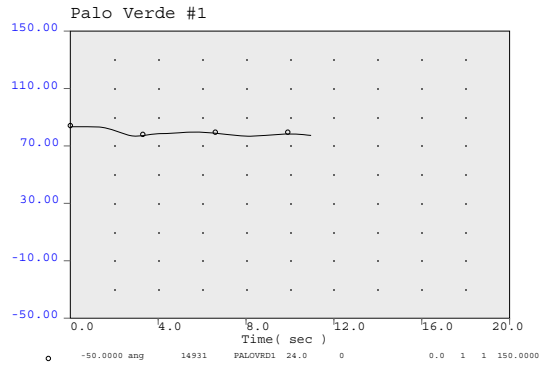
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

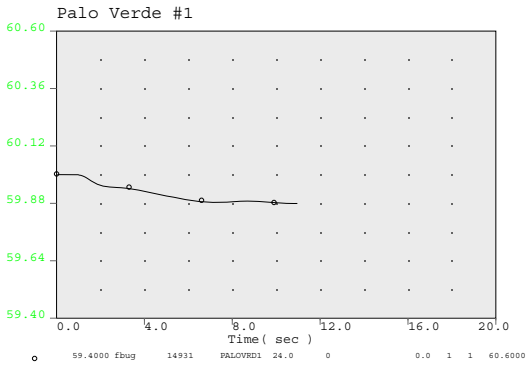
Imperial Valley Area - Frequency

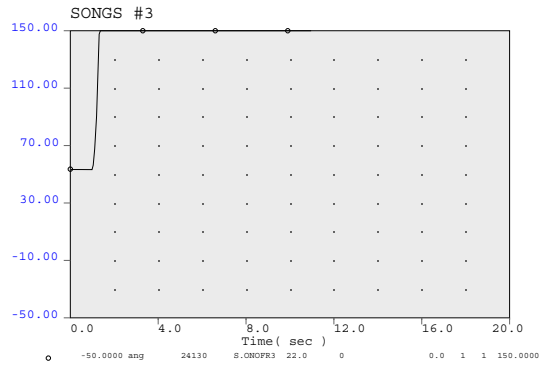


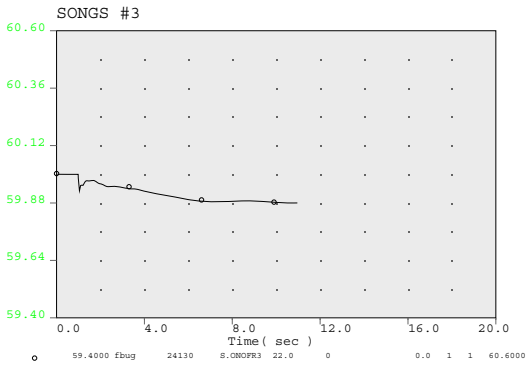
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generator #2

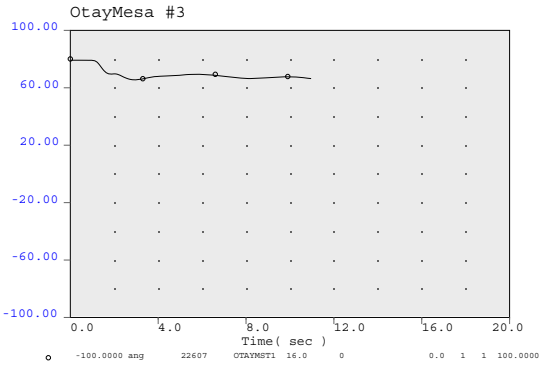
RELATIVE ROTOR ANGLE & FREQUENCY

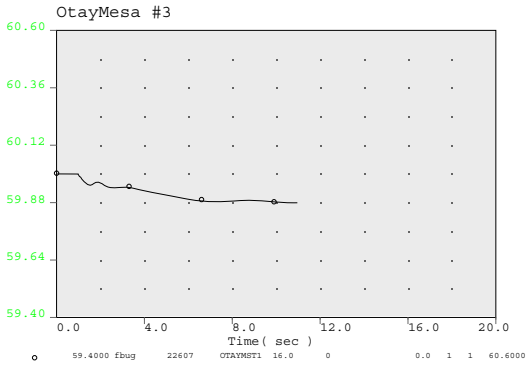












SDG&E Cluster 2 - pre
2014 Heavy Summer
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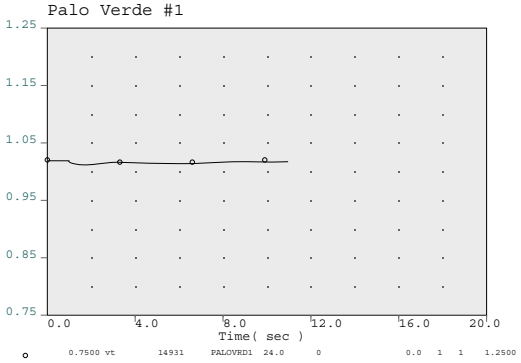
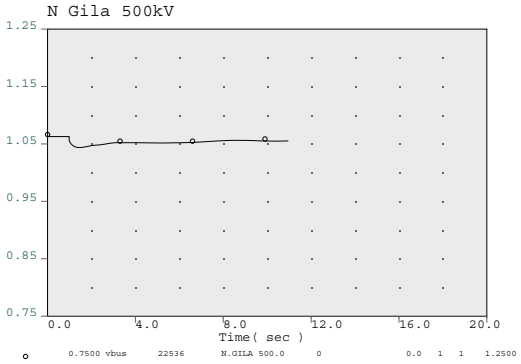
RELATIVE VOLTAGE

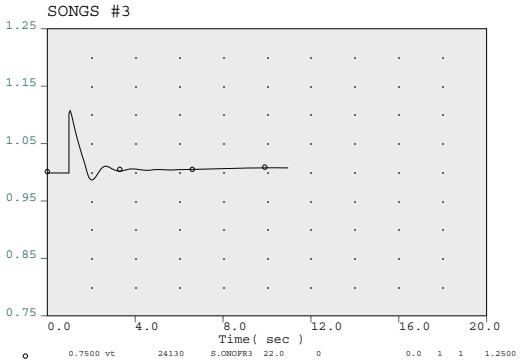
Palo Verde #1



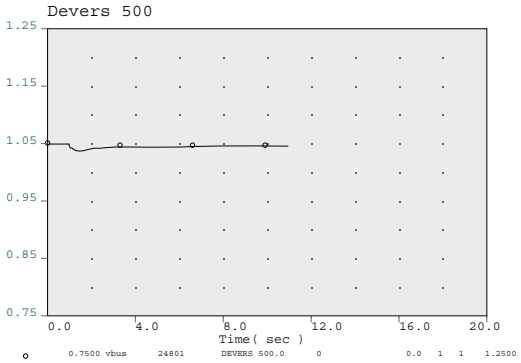
N Gila 500kV



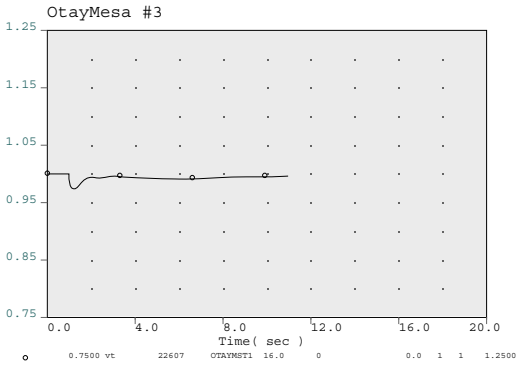
SONGS #3



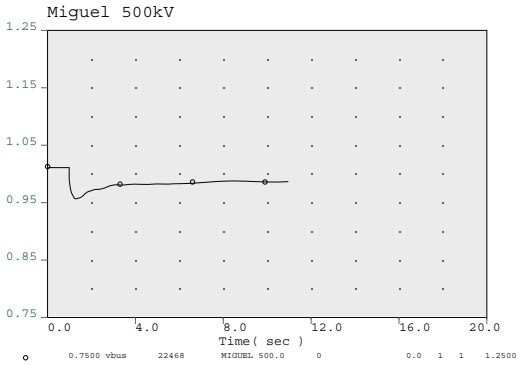
Devers 500



OtayMesa #3



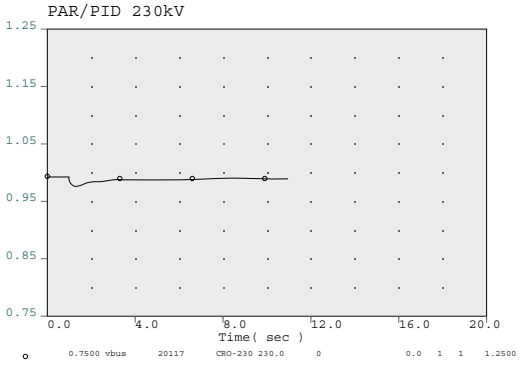
Miguel 500kV



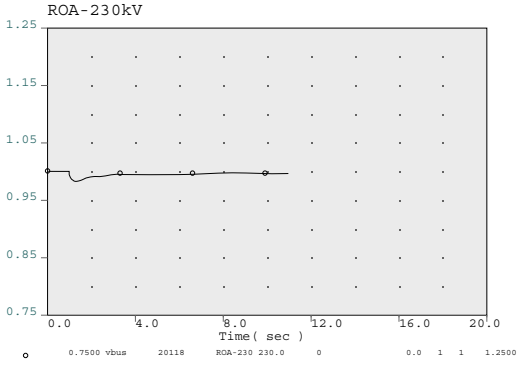
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

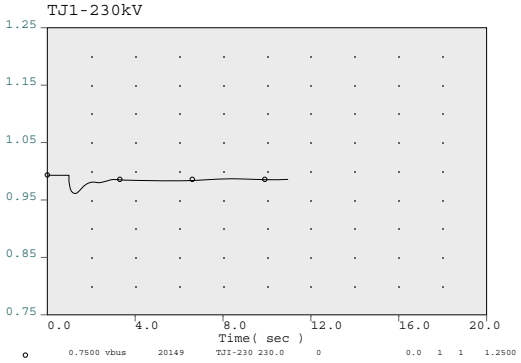
PAR/PID 230kV



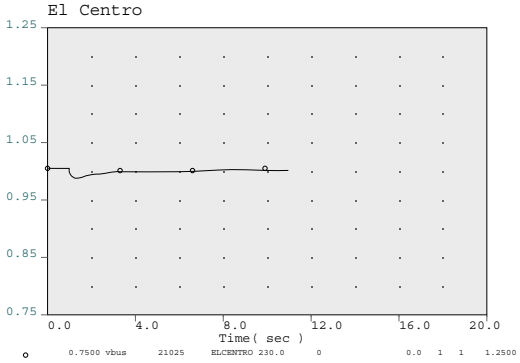
ROA-230kV



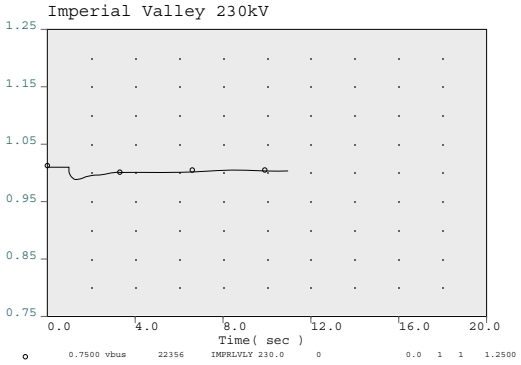
TJ1-230kV



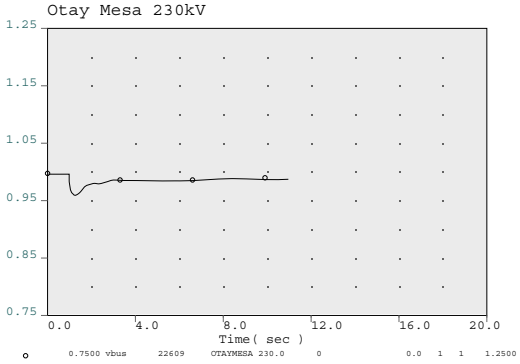
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



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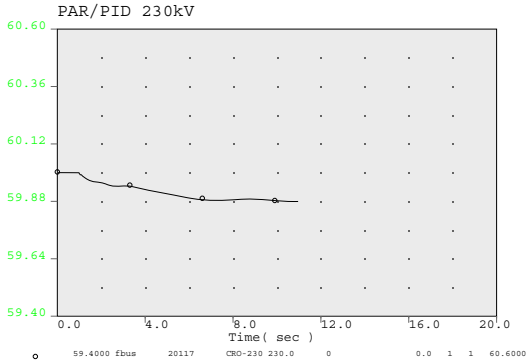
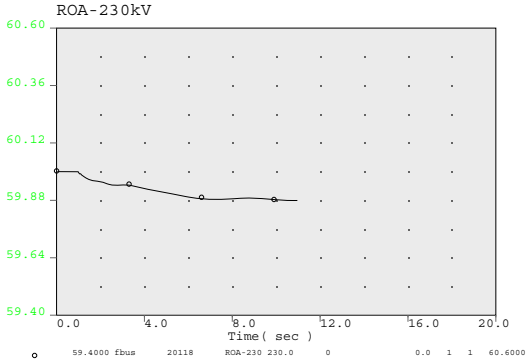
SDGE	SONGS-g2_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:24:08 2010

Affected System Frequency Check and Comparison

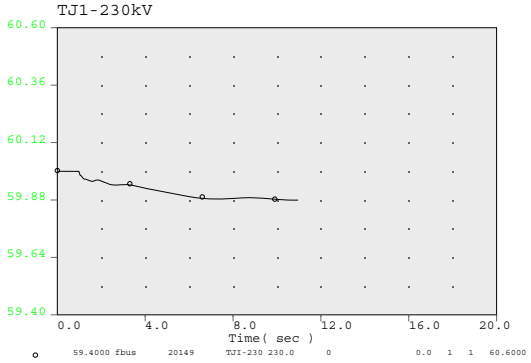
PAR/PID 230kV



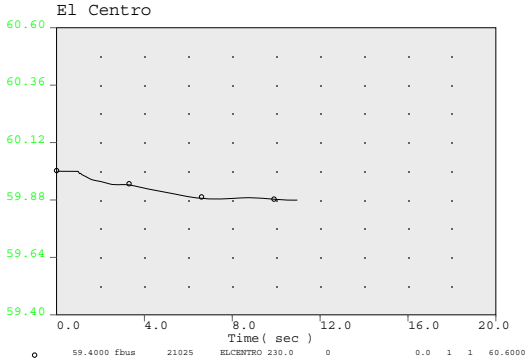
ROA-230kV



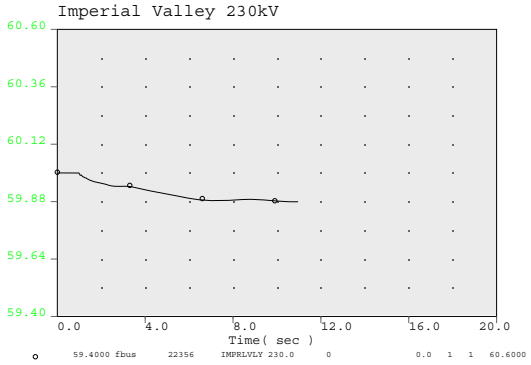
TJ1-230kV



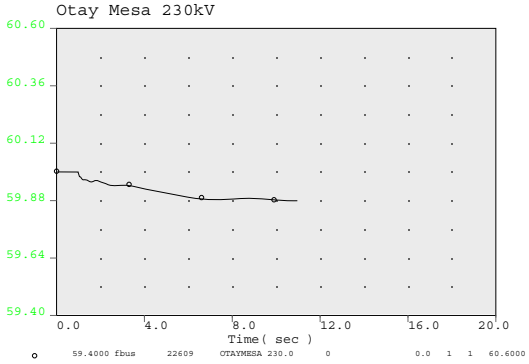
El Centro



Imperial Valley 230kV



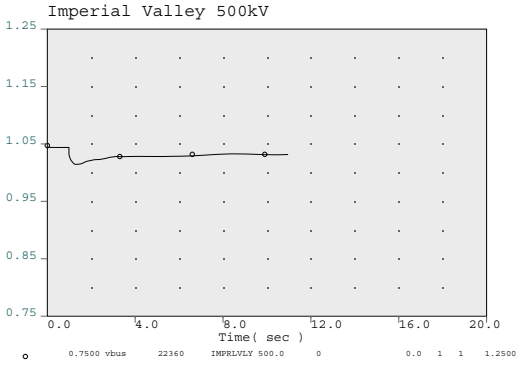
Otay Mesa 230kV



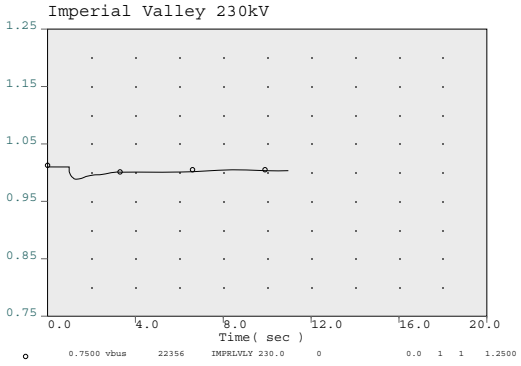
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Imperial Valley Area - VOLTAGE

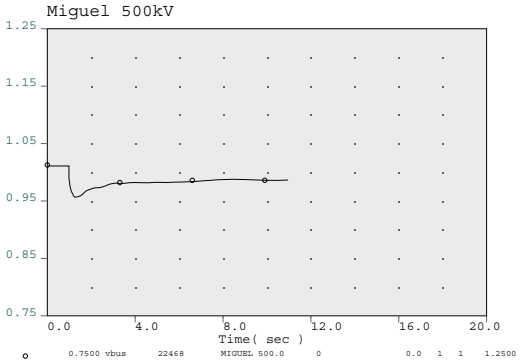
Imperial Valley 500kV



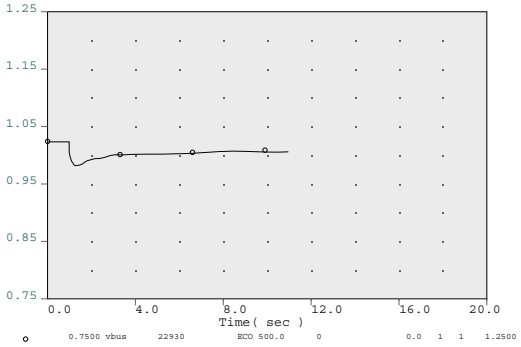
Imperial Valley 230kV



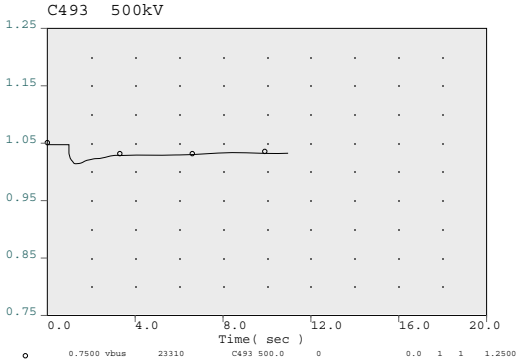
Miguel 500kV



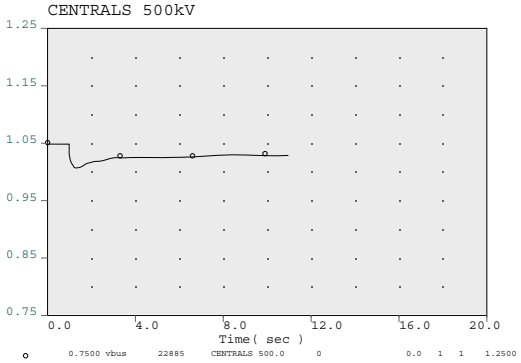
Windfarms 500



C493 500kV



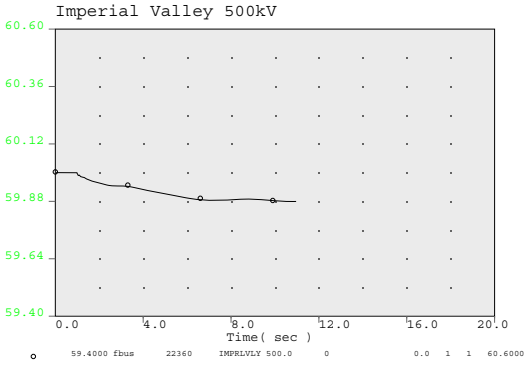
CENTRALS 500kV



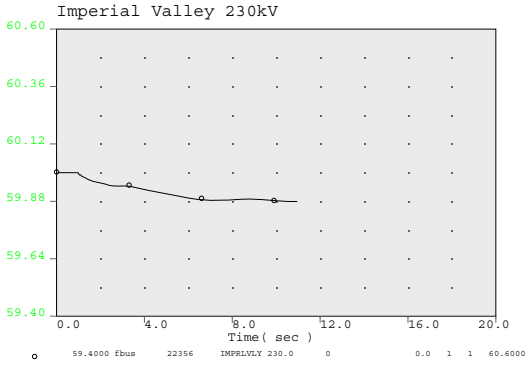
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Imperial Valley Area - Frequency

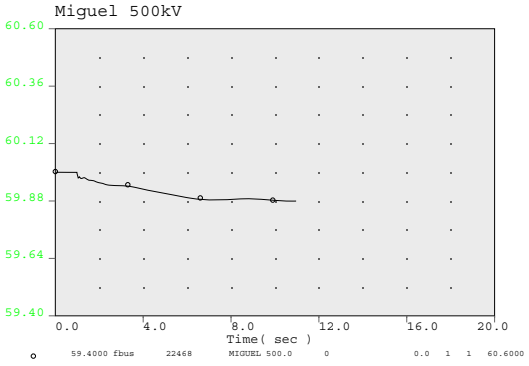
Imperial Valley 500kV



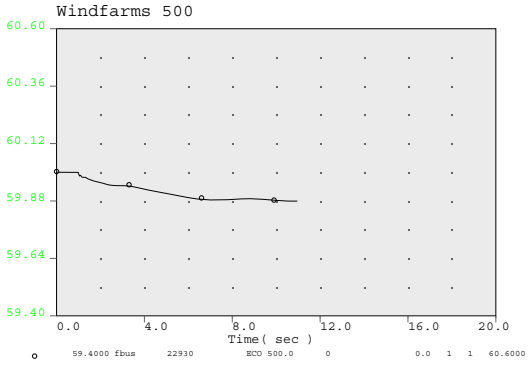
Imperial Valley 230kV



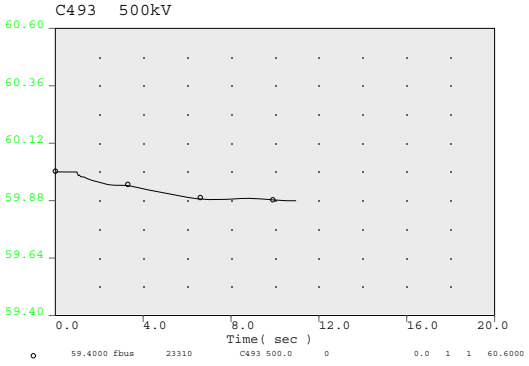
Miguel 500kV



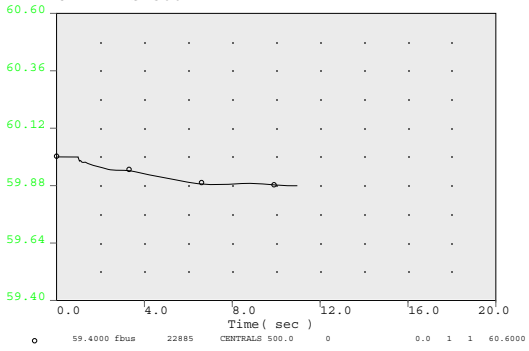
Windfarms 500



C493 500kV

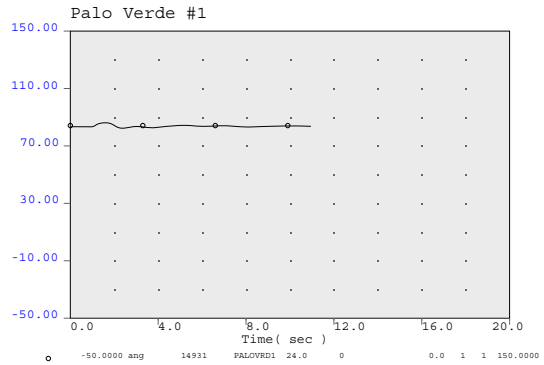


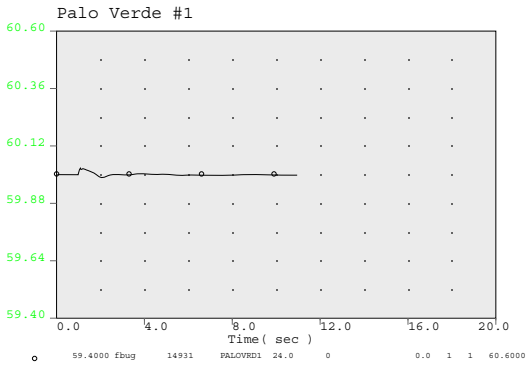
CENTRALS 500kV

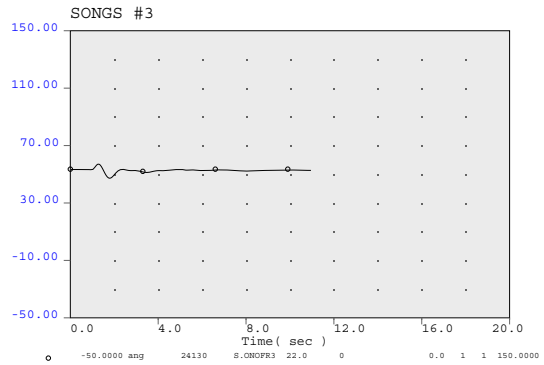


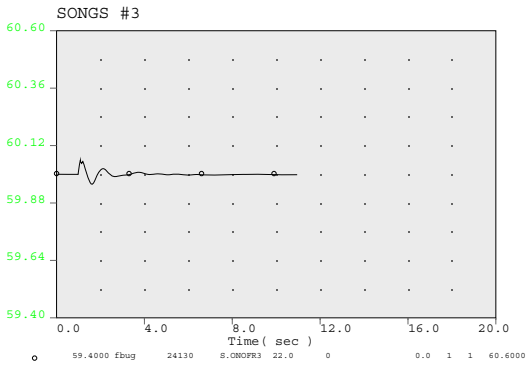
SDG&E Cluster 2 - pre
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

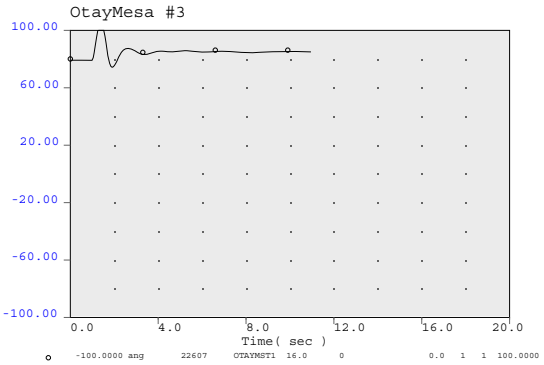
RELATIVE ROTOR ANGLE & FREQUENCY

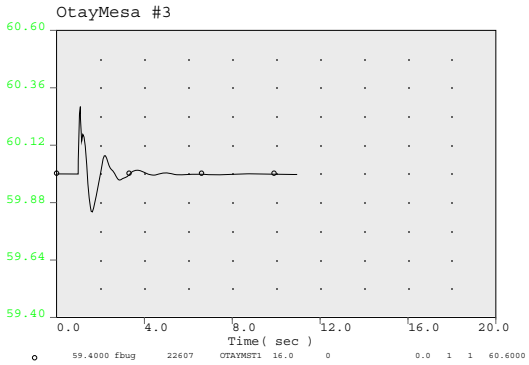












SDG&E Cluster 2 - pre int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Page 1

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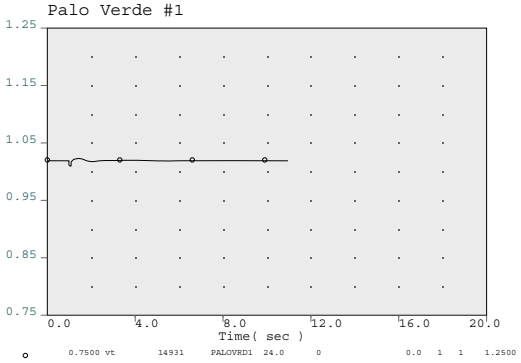
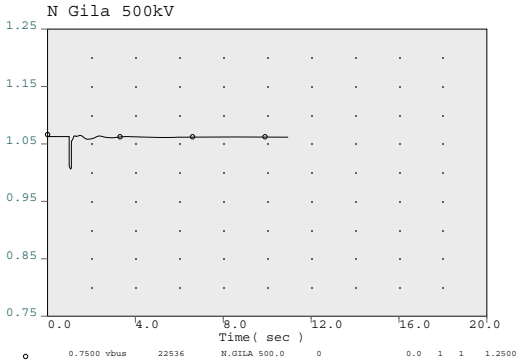
RELATIVE VOLTAGE

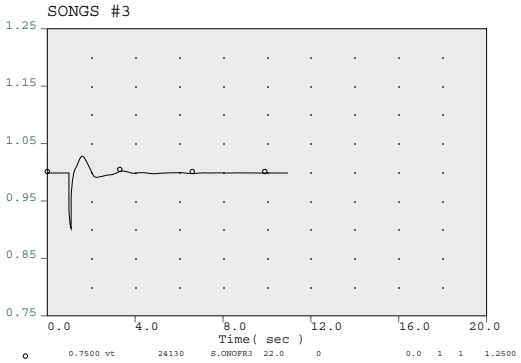
Palo Verde #1



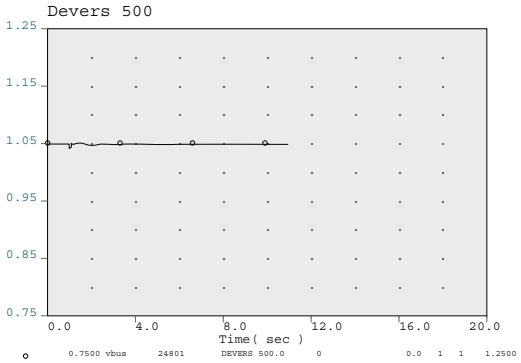
N Gila 500kV



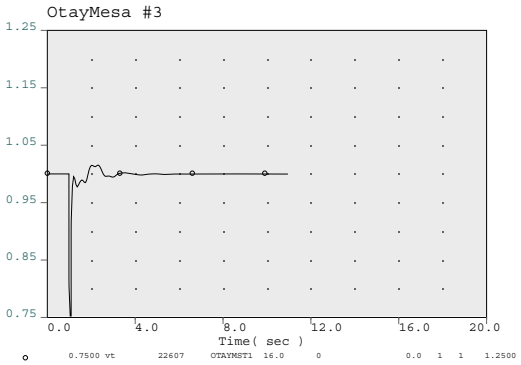
SONGS #3



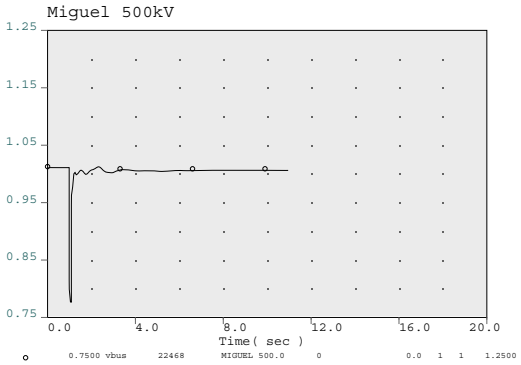
Devers 500



OtayMesa #3



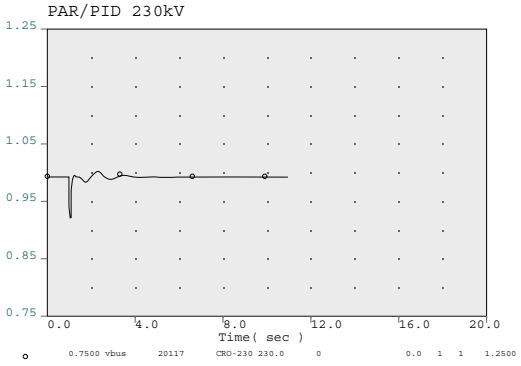
Miguel 500kV



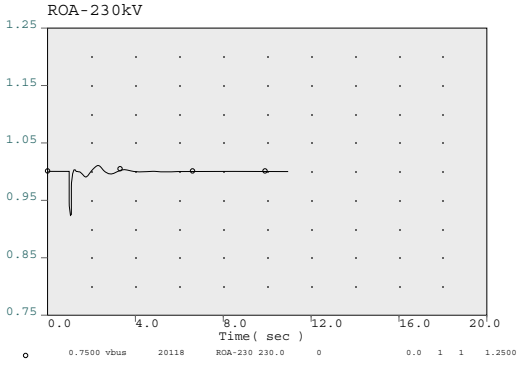
SDG&E Cluster 2 - pre int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Affected System Voltage Check and Comparison

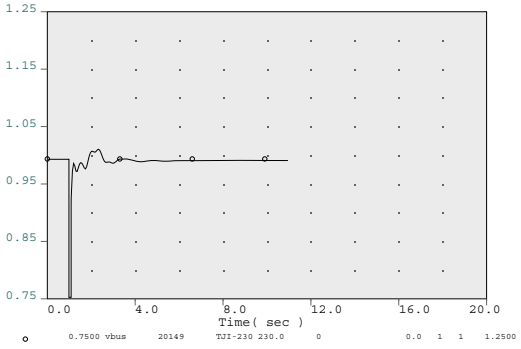
PAR/PID 230kV



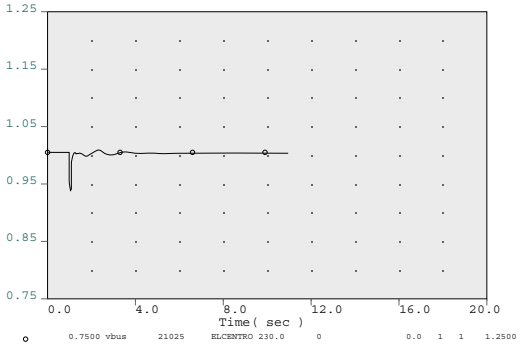
ROA-230kV



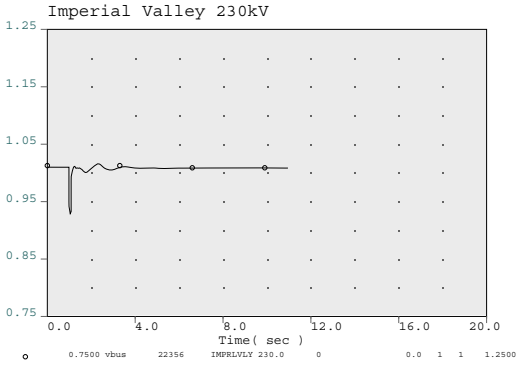
TJ1-230kV



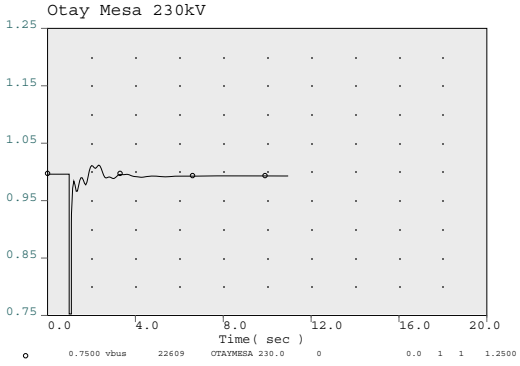
El Centro



Imperial Valley 230kV



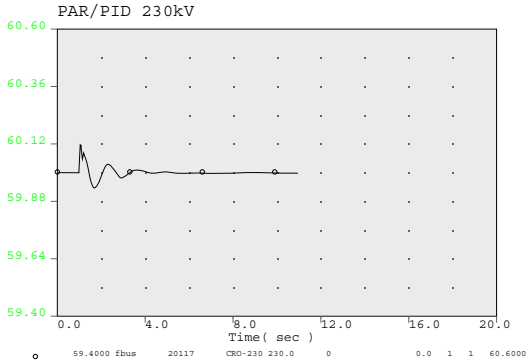
Otay Mesa 230kV



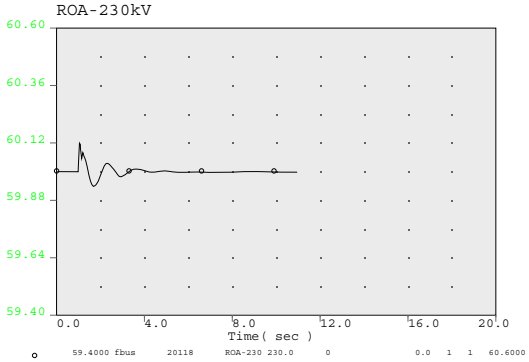
SDG&E Cluster 2 - pre int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Affected System Frequency Check and Comparison

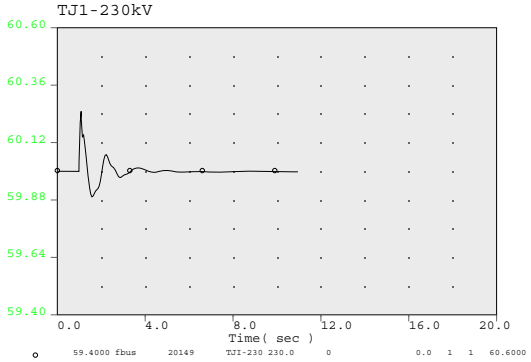
PAR/PID 230kV



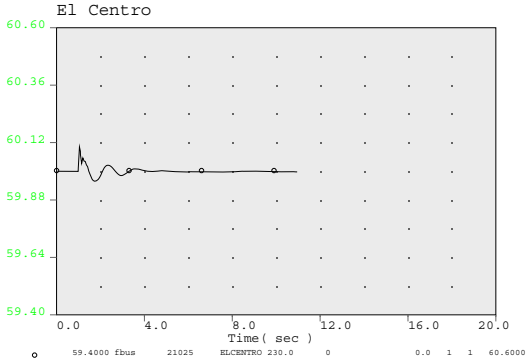
ROA-230kV



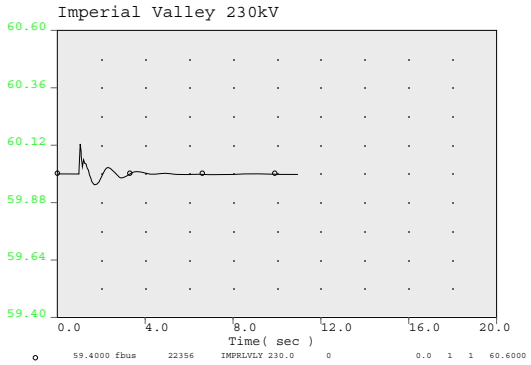
TJ1-230kV



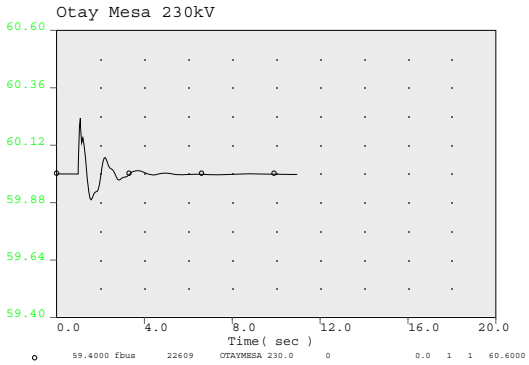
El Centro



Imperial Valley 230kV



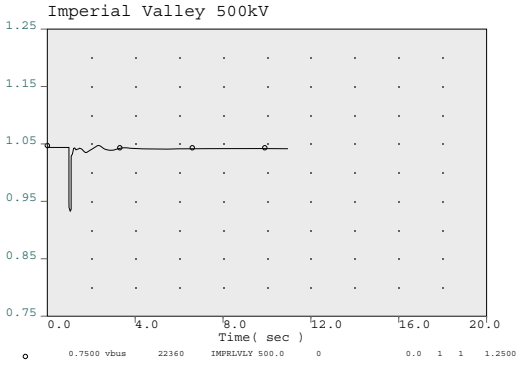
Otay Mesa 230kV



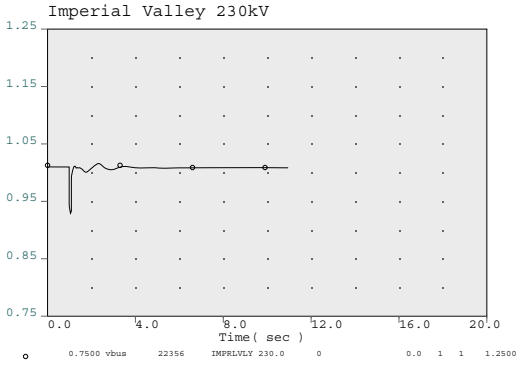
SDG&E Cluster 2 - pre int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Imperial Valley Area - VOLTAGE

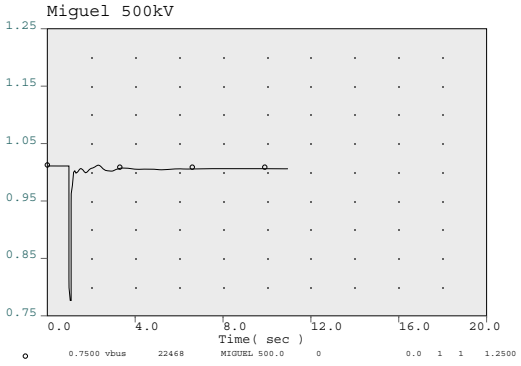
Imperial Valley 500kV



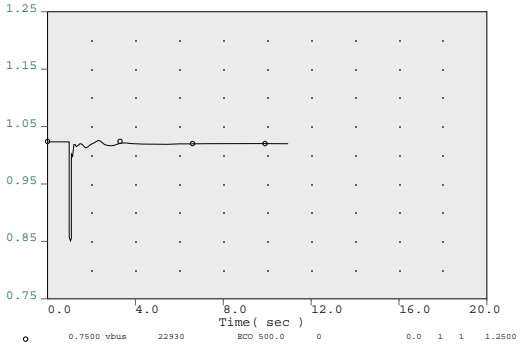
Imperial Valley 230kV



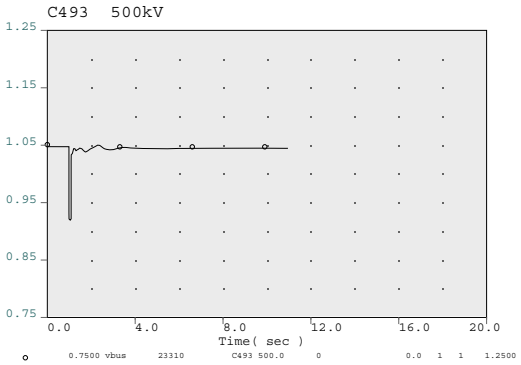
Miguel 500kV



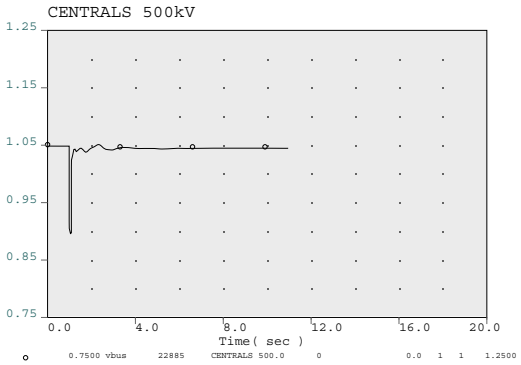
Windfarms 500



C493 500kV



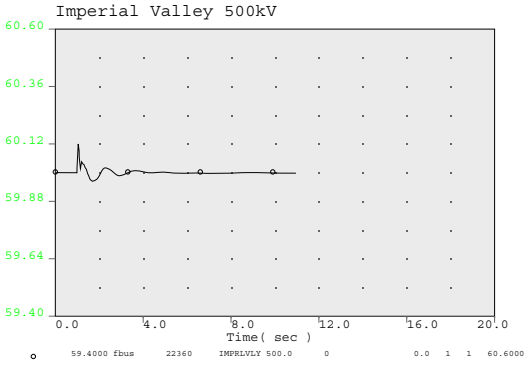
CENTRALS 500kV



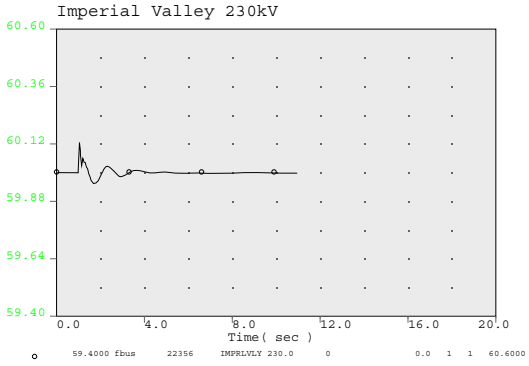
SDG&E Cluster 2 - pre int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Imperial Valley Area - Frequency

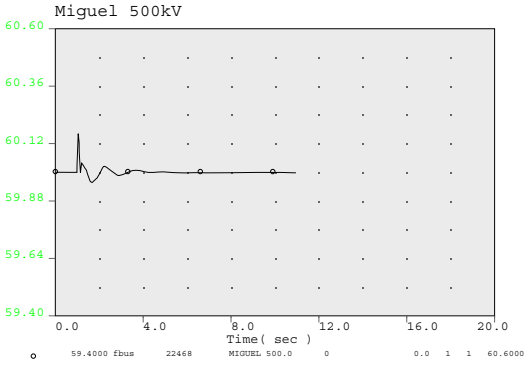
Imperial Valley 500kV



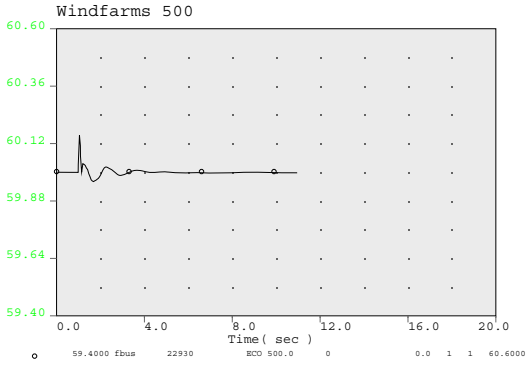
Imperial Valley 230kV



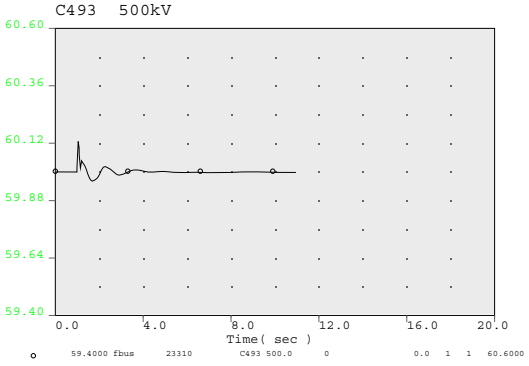
Miguel 500kV



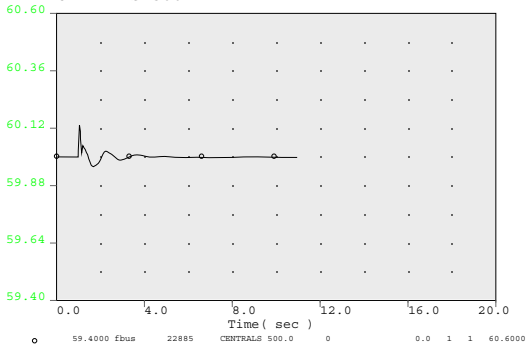
Windfarms 500



C493 500kV

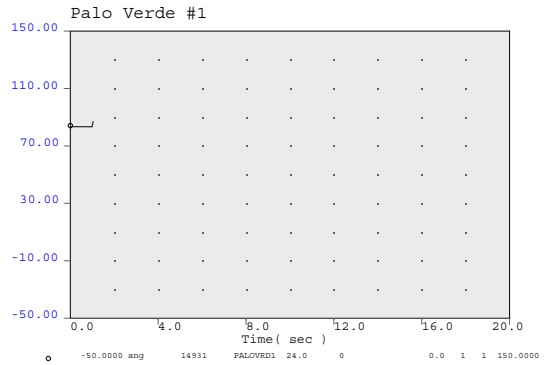


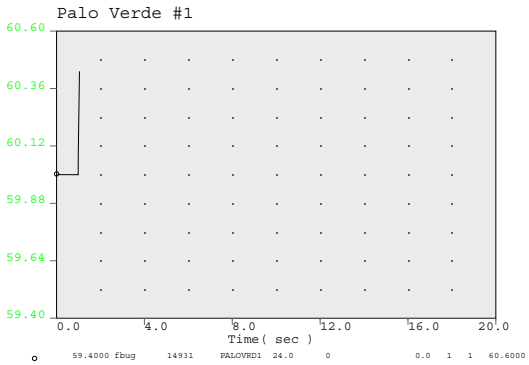
CENTRALS 500kV

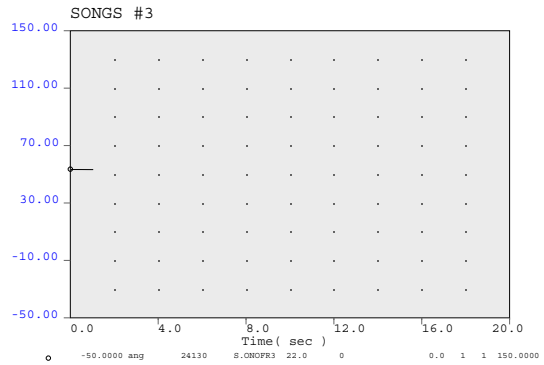


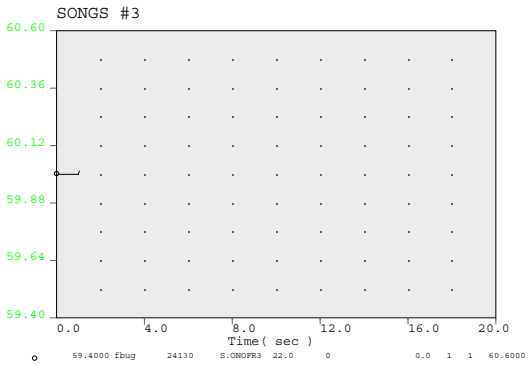
SDG&E Cluster 2 - pre int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

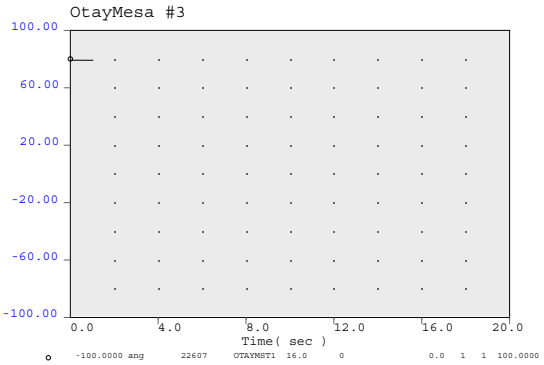
RELATIVE ROTOR ANGLE & FREQUENCY

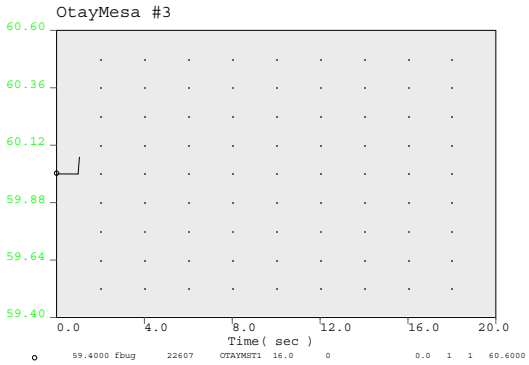












SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Page 1

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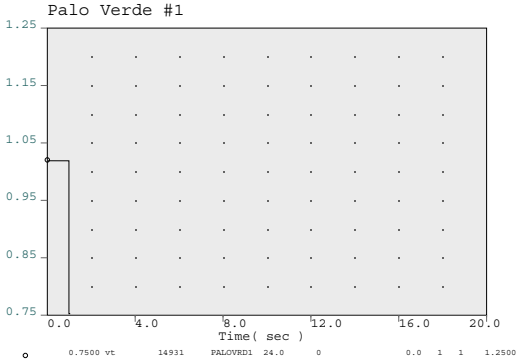
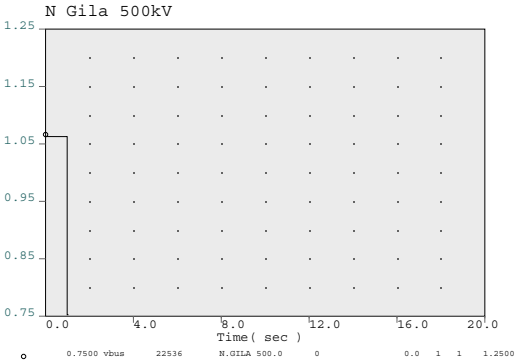
RELATIVE VOLTAGE

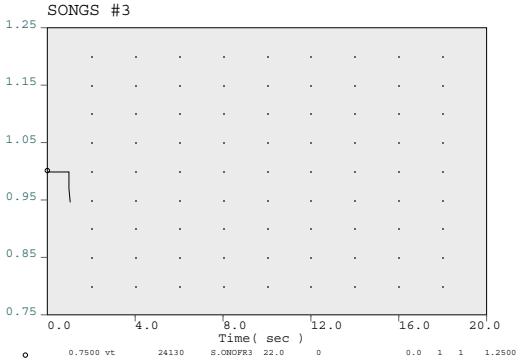
Palo Verde #1



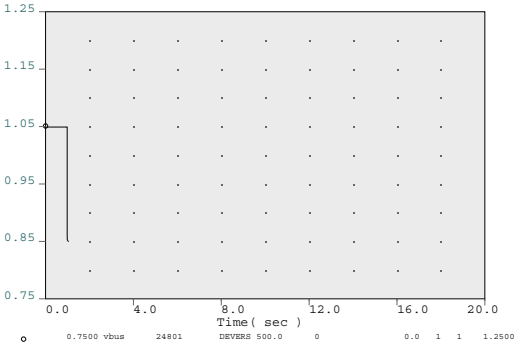
N Gila 500kV



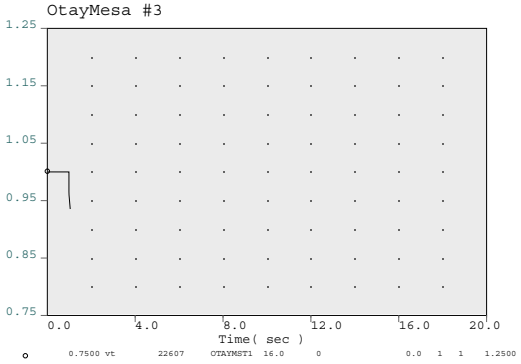
SONGS #3



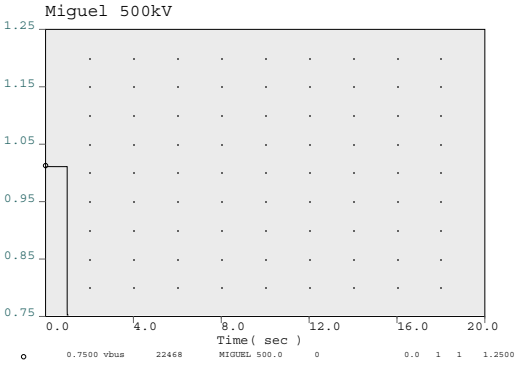
Devers 500



OtayMesa #3



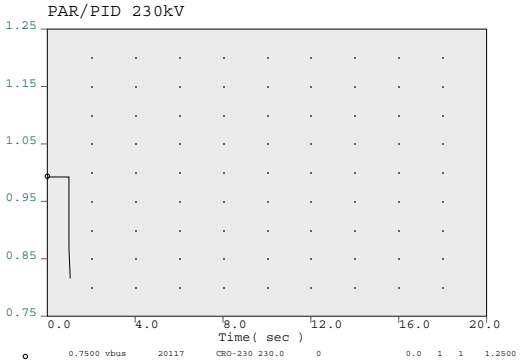
Miguel 500kV



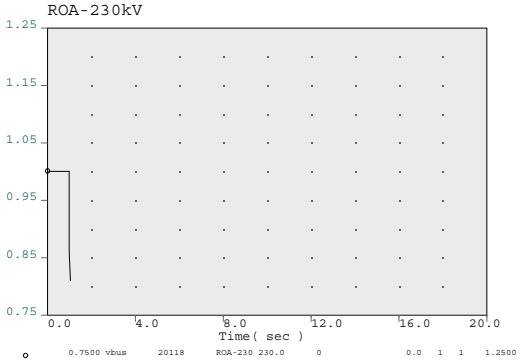
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

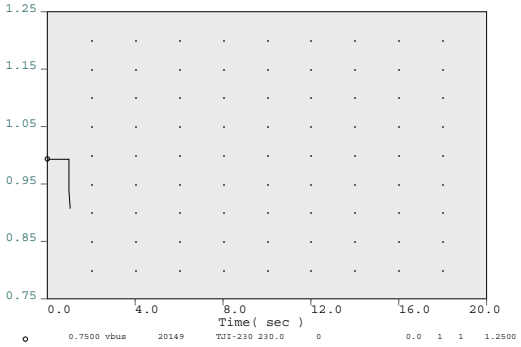
PAR/PID 230kV



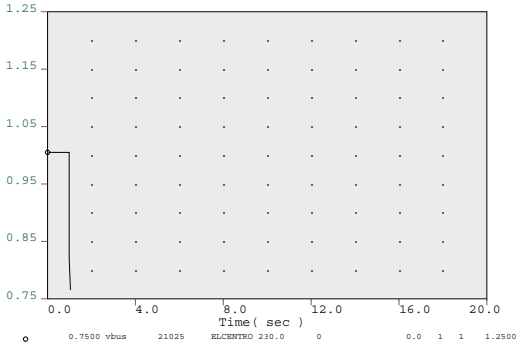
ROA-230kV



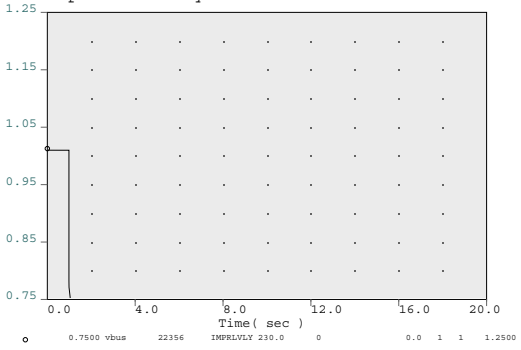
TJ1-230kV



El Centro



Imperial Valley 230kV



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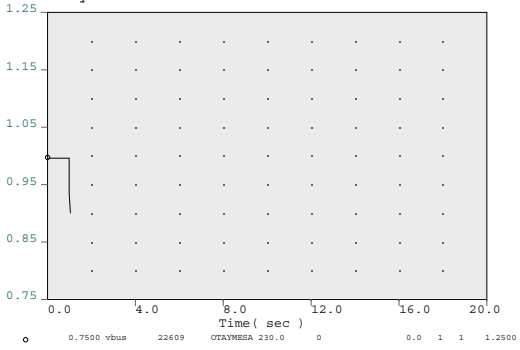
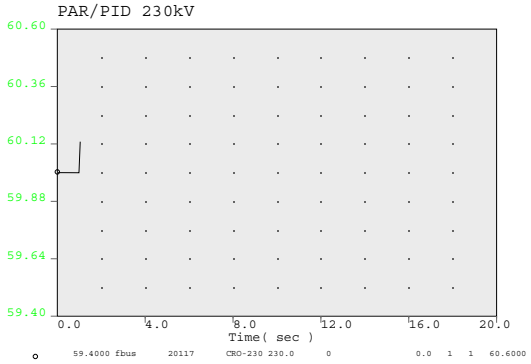


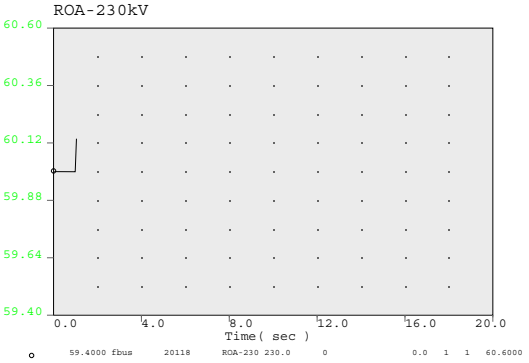
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



ROA-230kV



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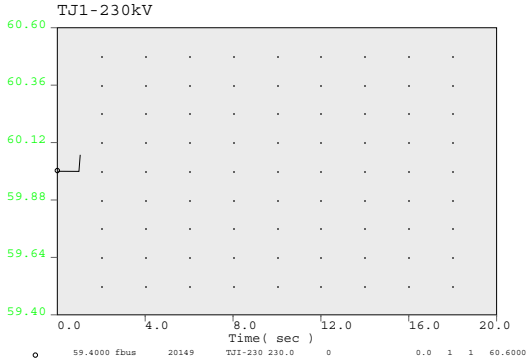
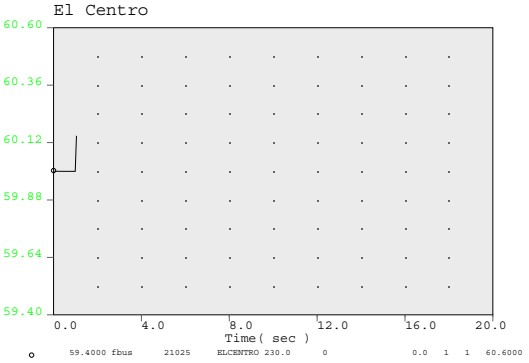


El Centro



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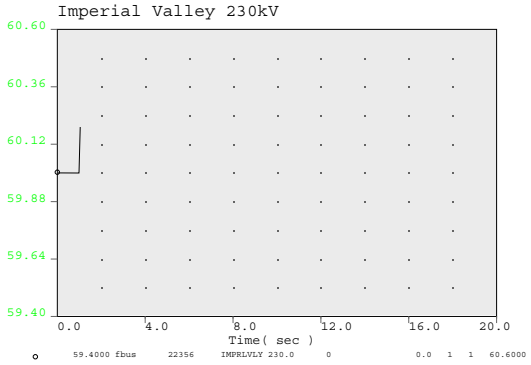

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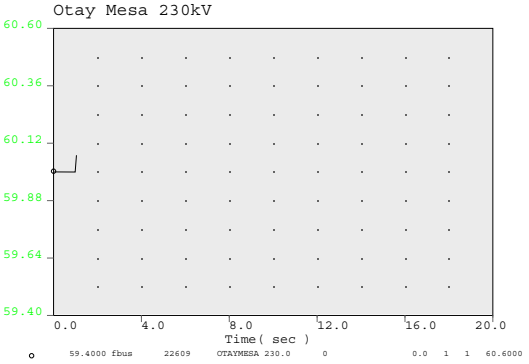
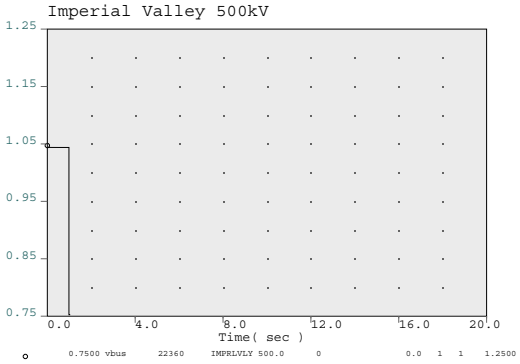


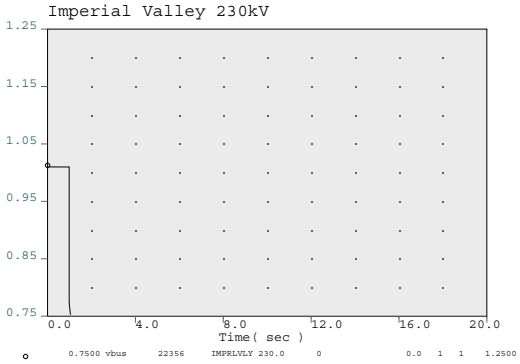
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

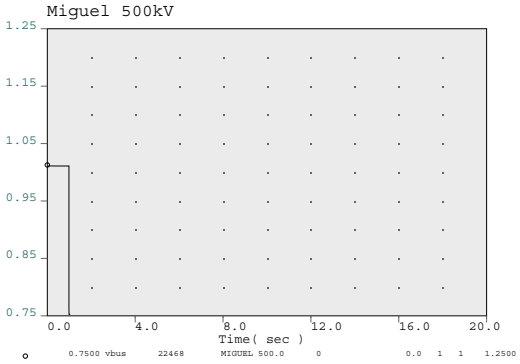
Imperial Valley 500kV



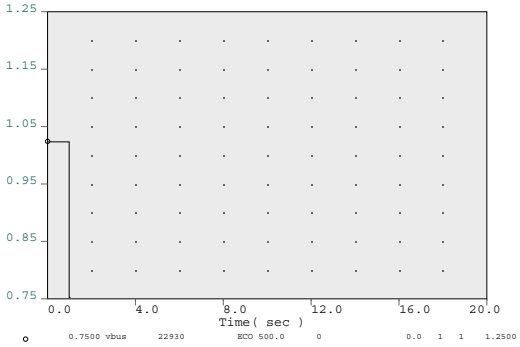
Imperial Valley 230kV



Miguel 500kV



Windfarms 500



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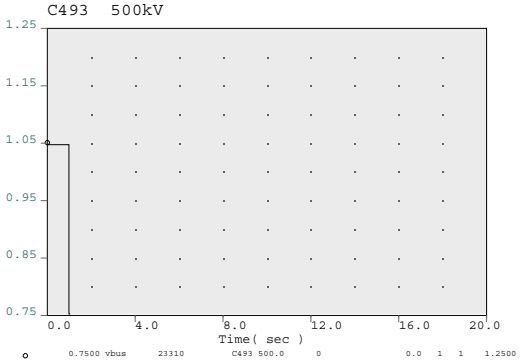
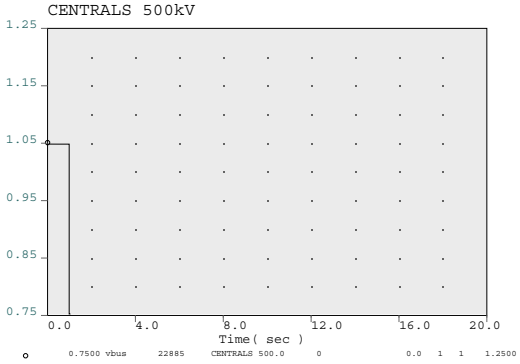
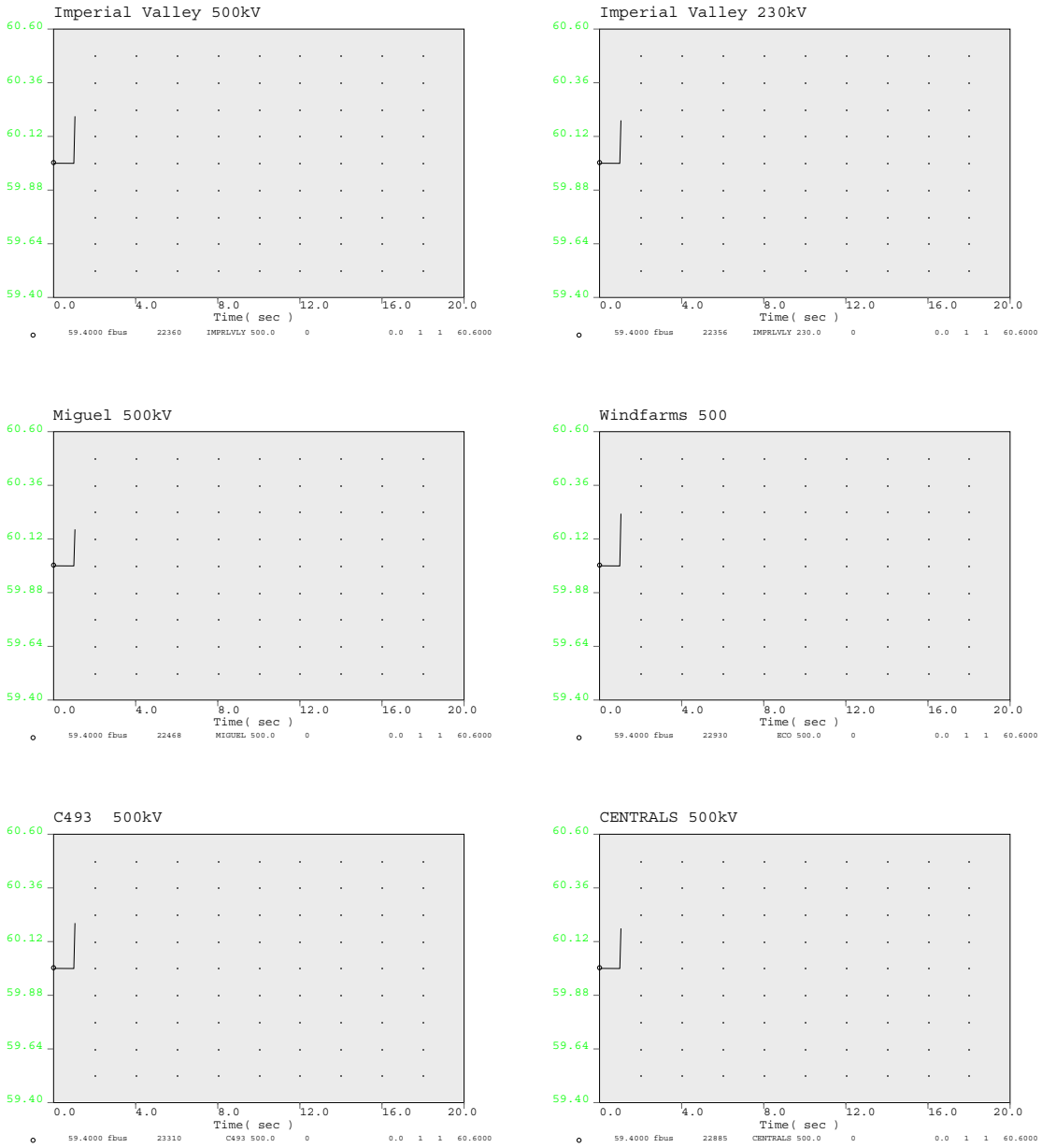


CENTRALS 500kV



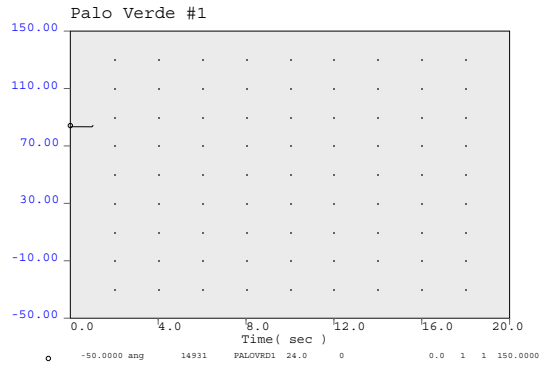
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

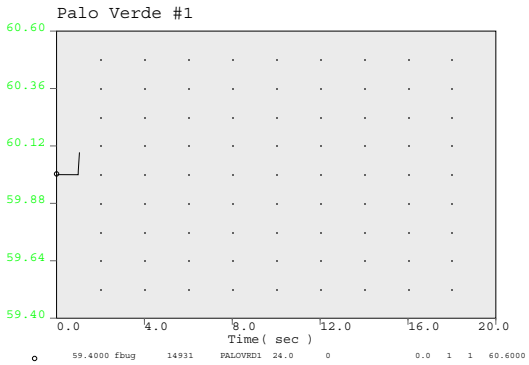
Imperial Valley Area - Frequency

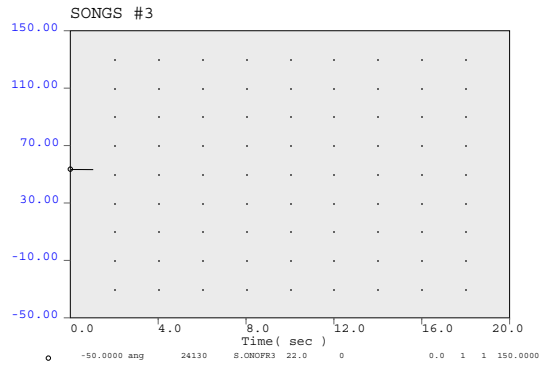


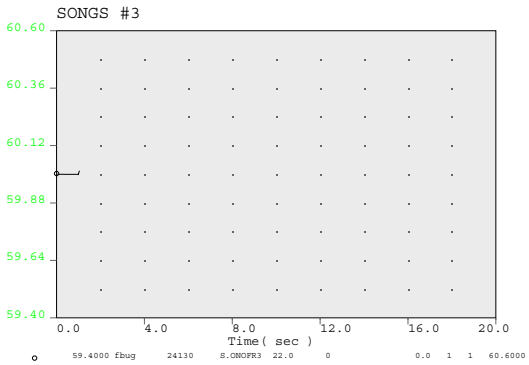
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

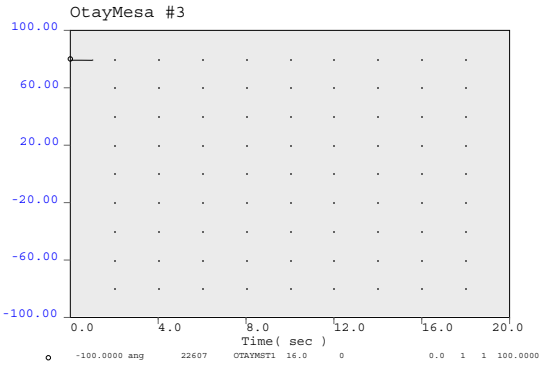
RELATIVE ROTOR ANGLE & FREQUENCY

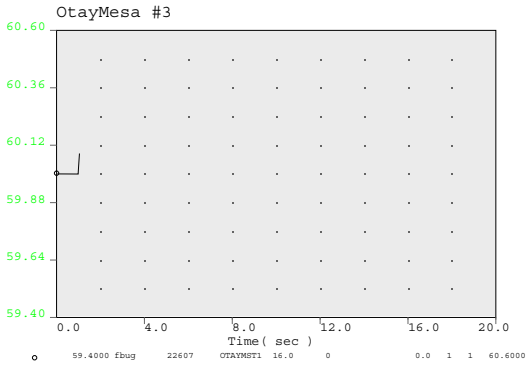












SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Page 1

SDGE	T468_NGila_pre_int9_hs.chf	i\hs\pre_int9\ws_pre_int9 Mon Oct 11 08:24:14 2010

RELATIVE VOLTAGE

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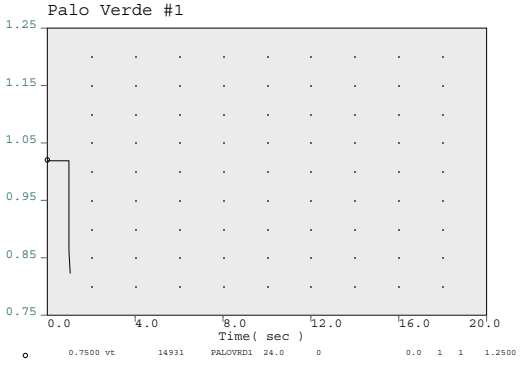
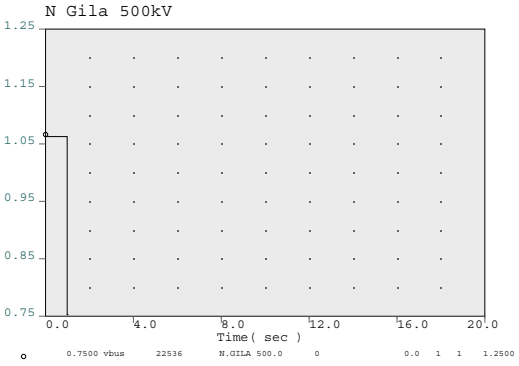


N Gila 500kV



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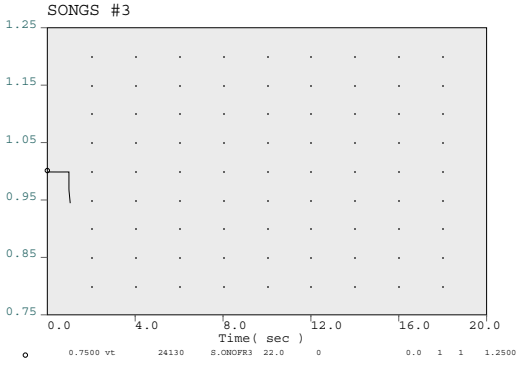
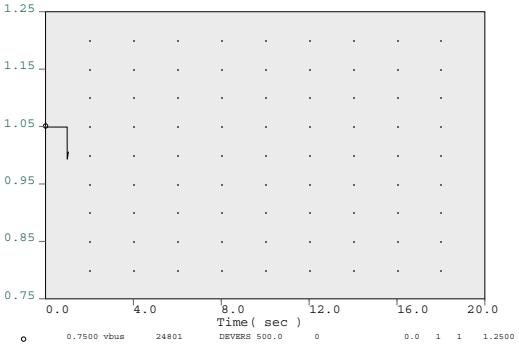


Devers 500



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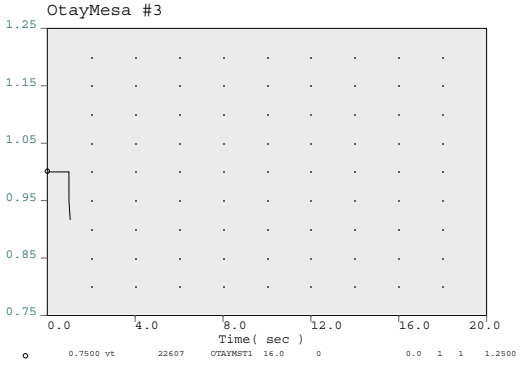
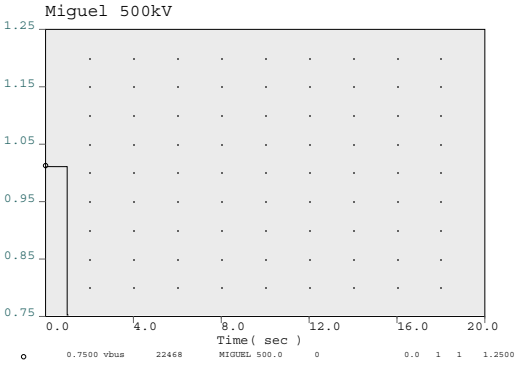


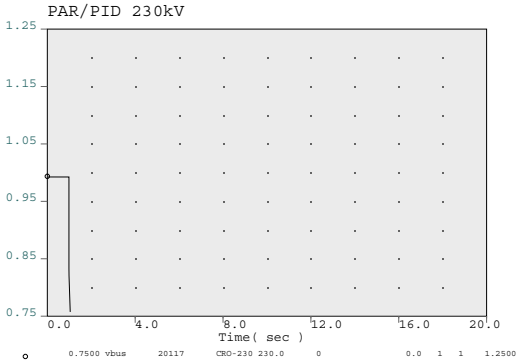
Miguel 500kV



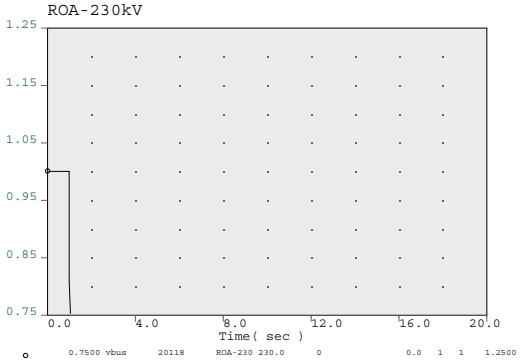
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

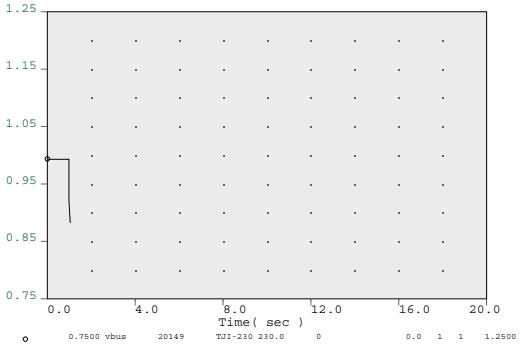
PAR/PID 230kV



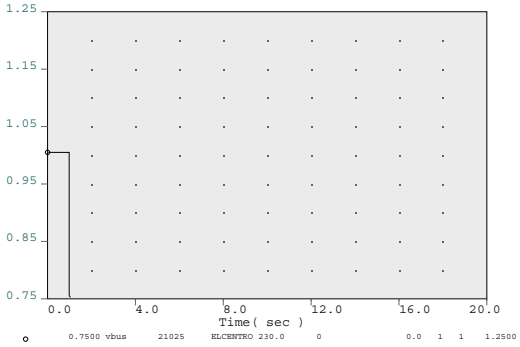
ROA-230kV



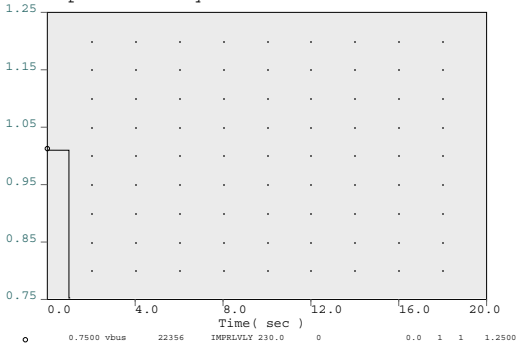
TJ1-230kV



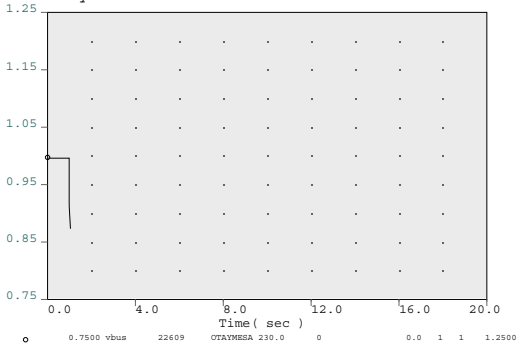
El Centro



Imperial Valley 230kV



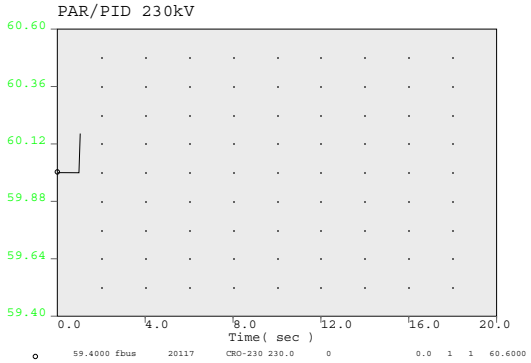
Otay Mesa 230kV



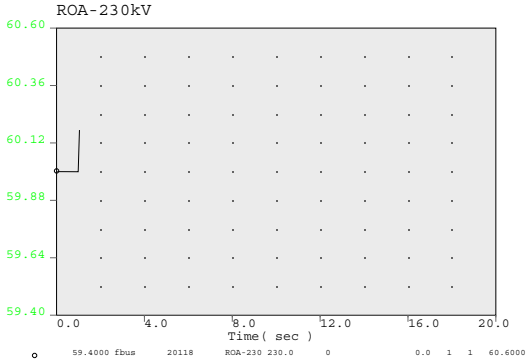
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

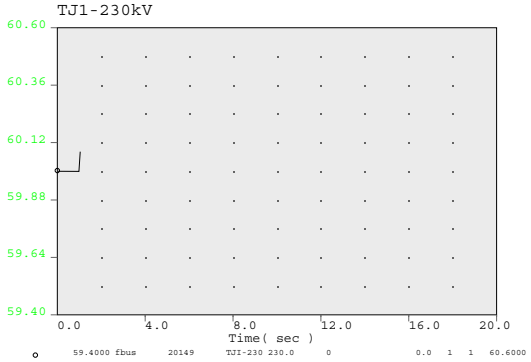
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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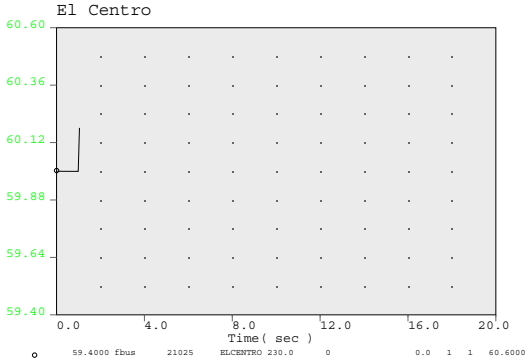
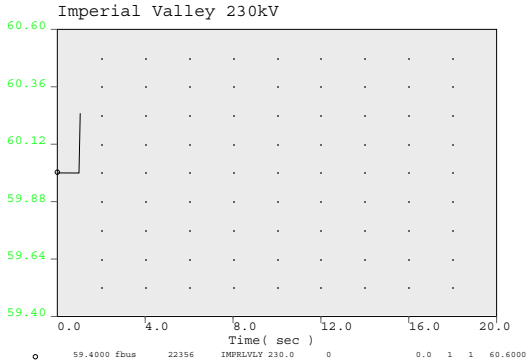
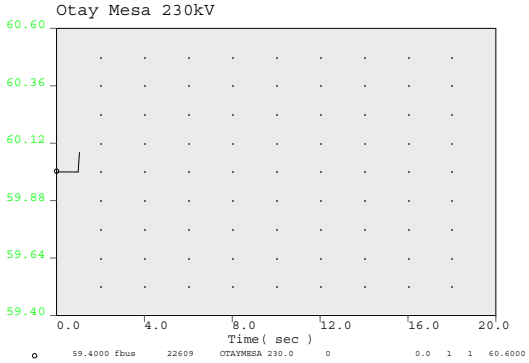


Imperial Valley 230kV



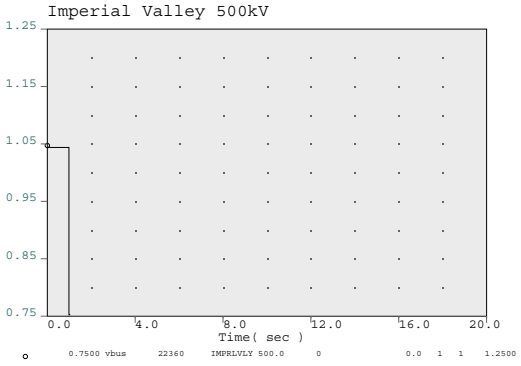
Otay Mesa 230kV



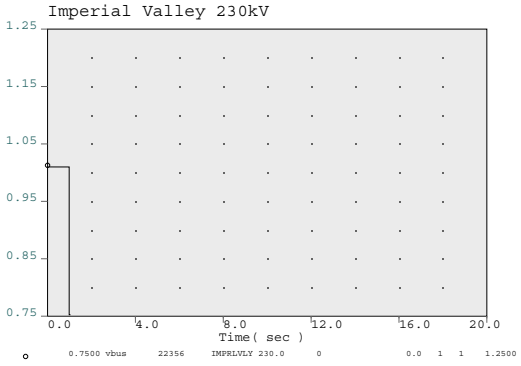
SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

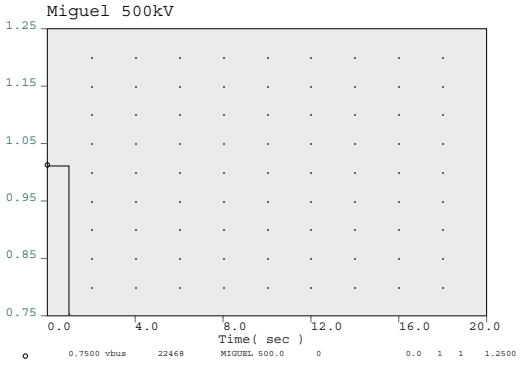
Imperial Valley 500kV



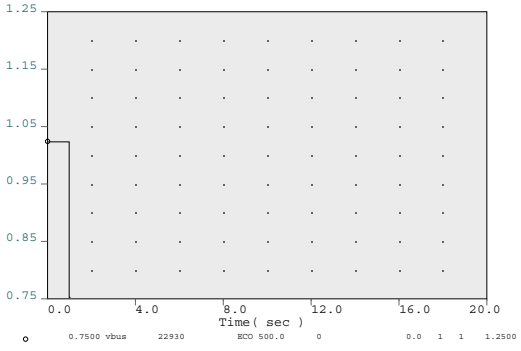
Imperial Valley 230kV



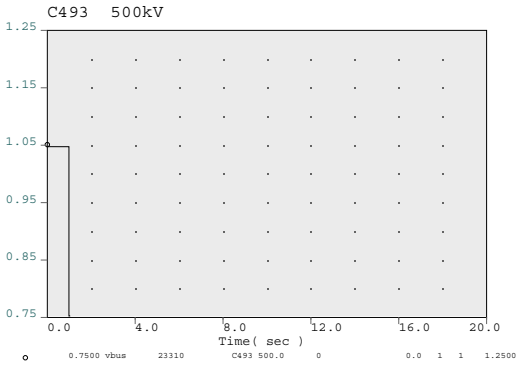
Miguel 500kV



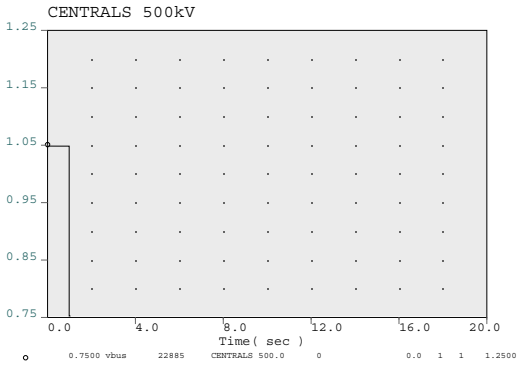
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Heavy Summer
T468-N.Gila 500 kV line

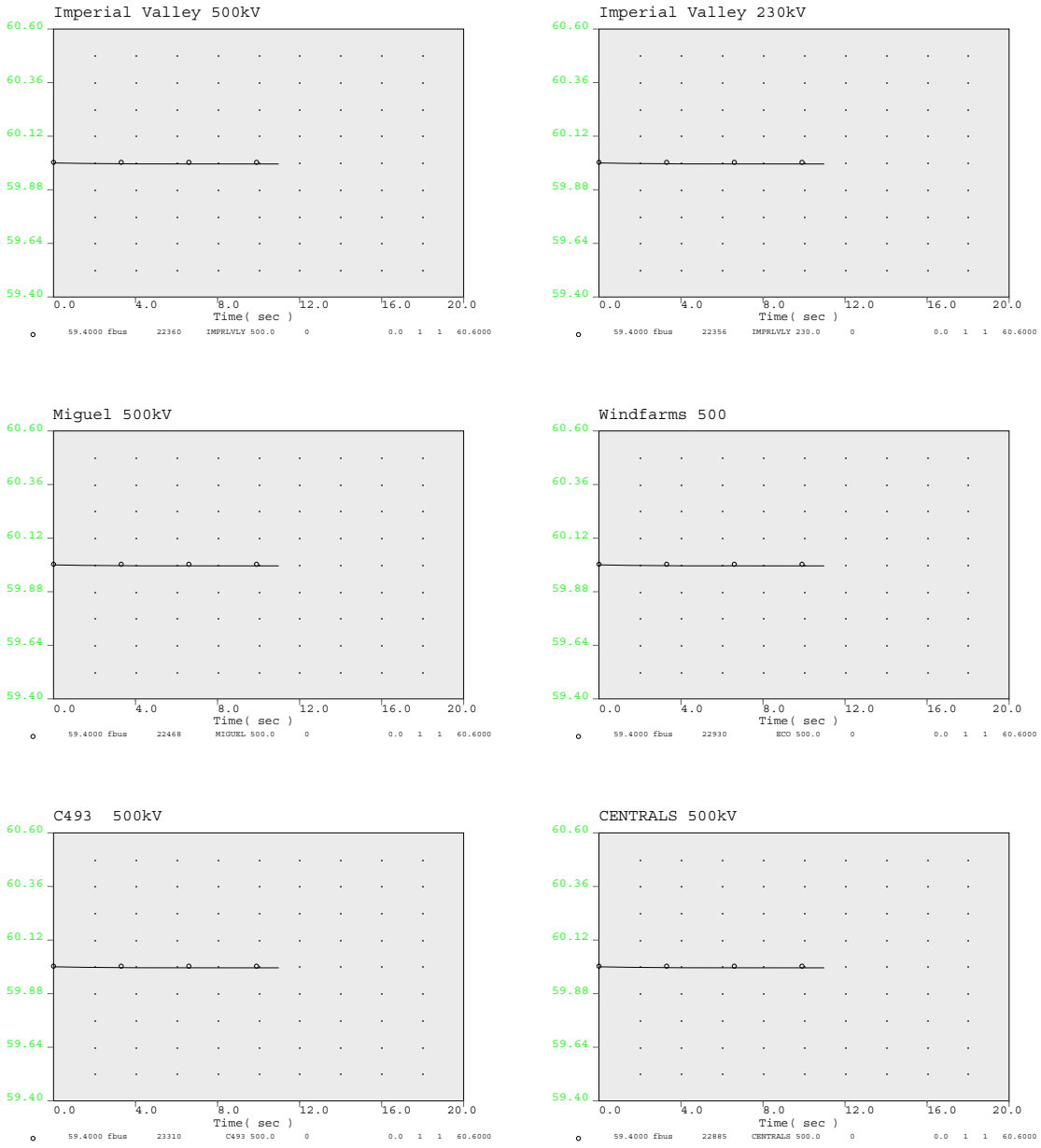
Appendix J-8

Transient Stability Analysis Plots

Internal Cluster

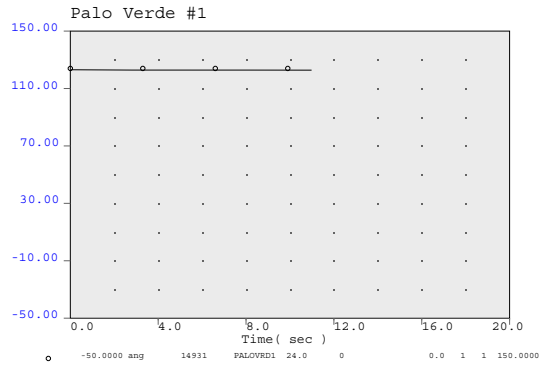
Light Load (Spring or Light Autumn) Pre

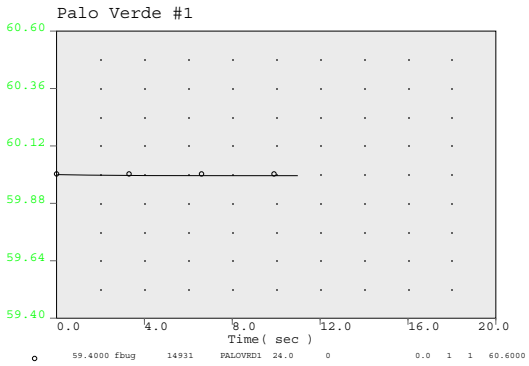
Imperial Valley Area - Frequency

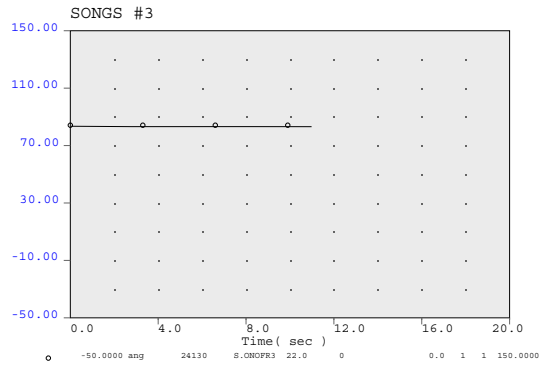


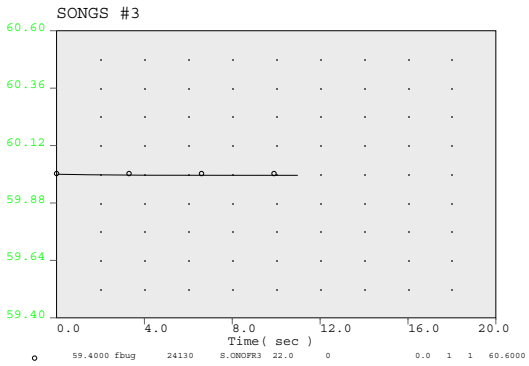
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

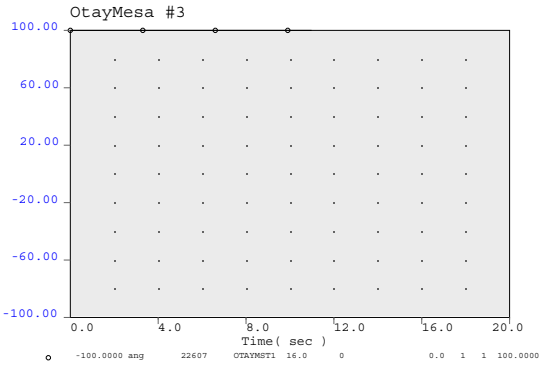
RELATIVE ROTOR ANGLE & FREQUENCY

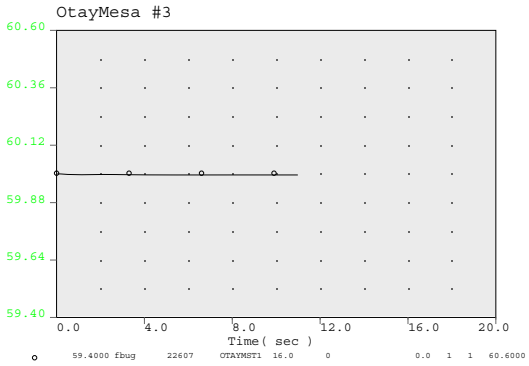












SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

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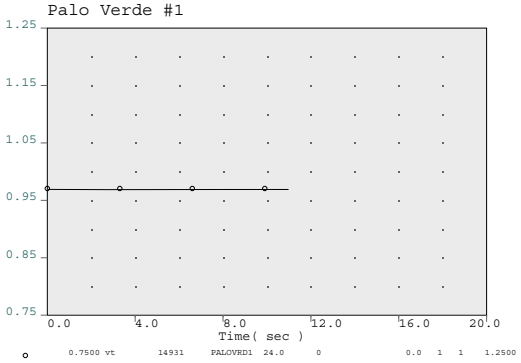
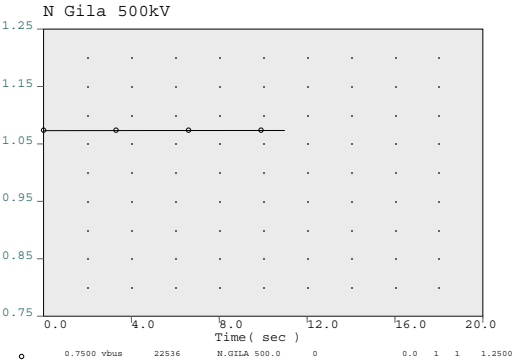
RELATIVE VOLTAGE

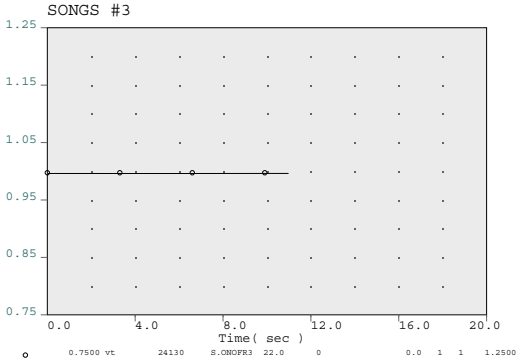
Palo Verde #1



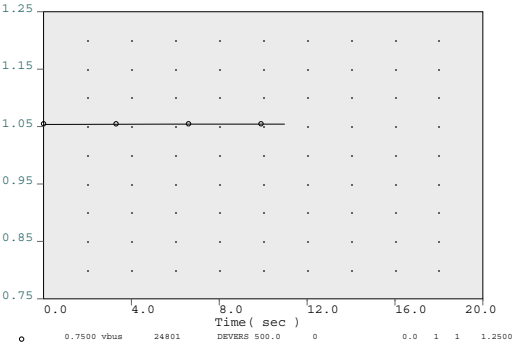
N Gila 500kV



SONGS #3



Devers 500



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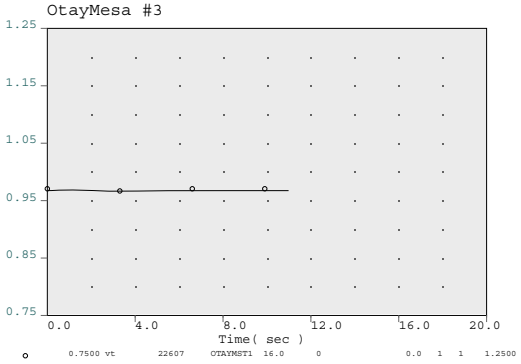
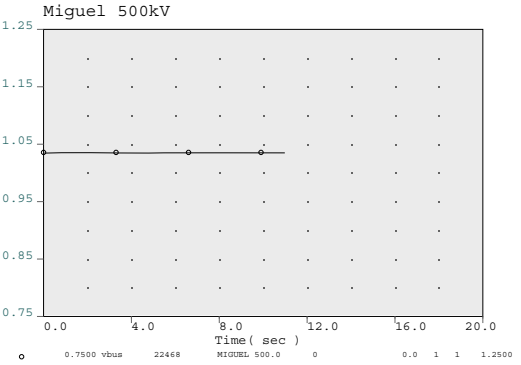


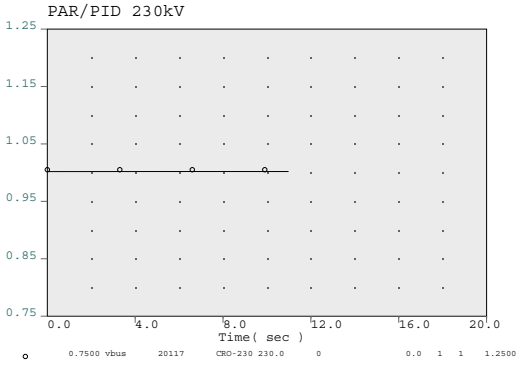
Miguel 500kV



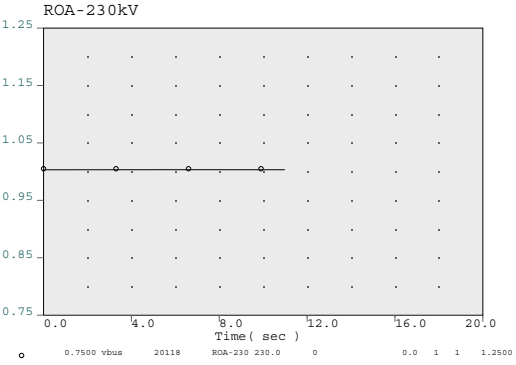
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

Affected System Voltage Check and Comparison

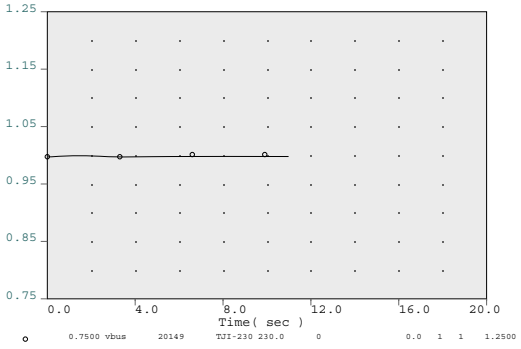
PAR/PID 230kV



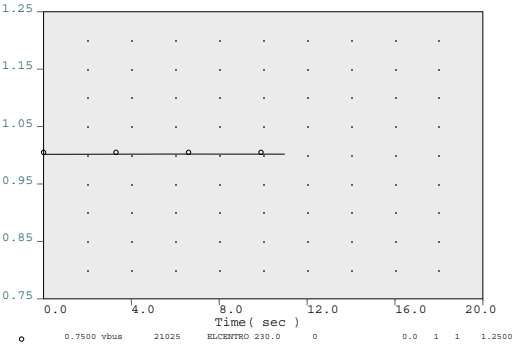
ROA-230kV



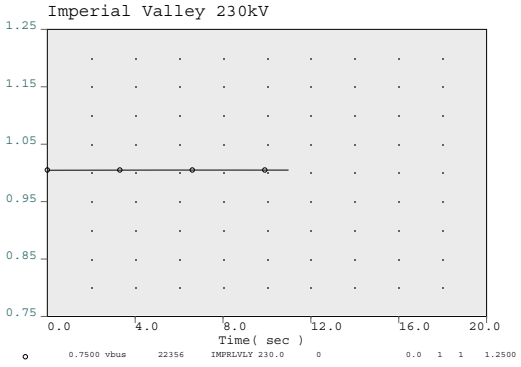
TJ1-230kV



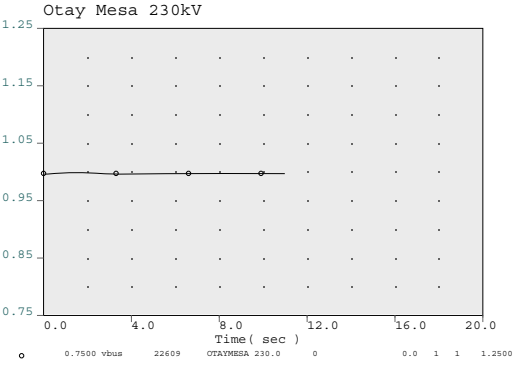
El Centro



Imperial Valley 230kV

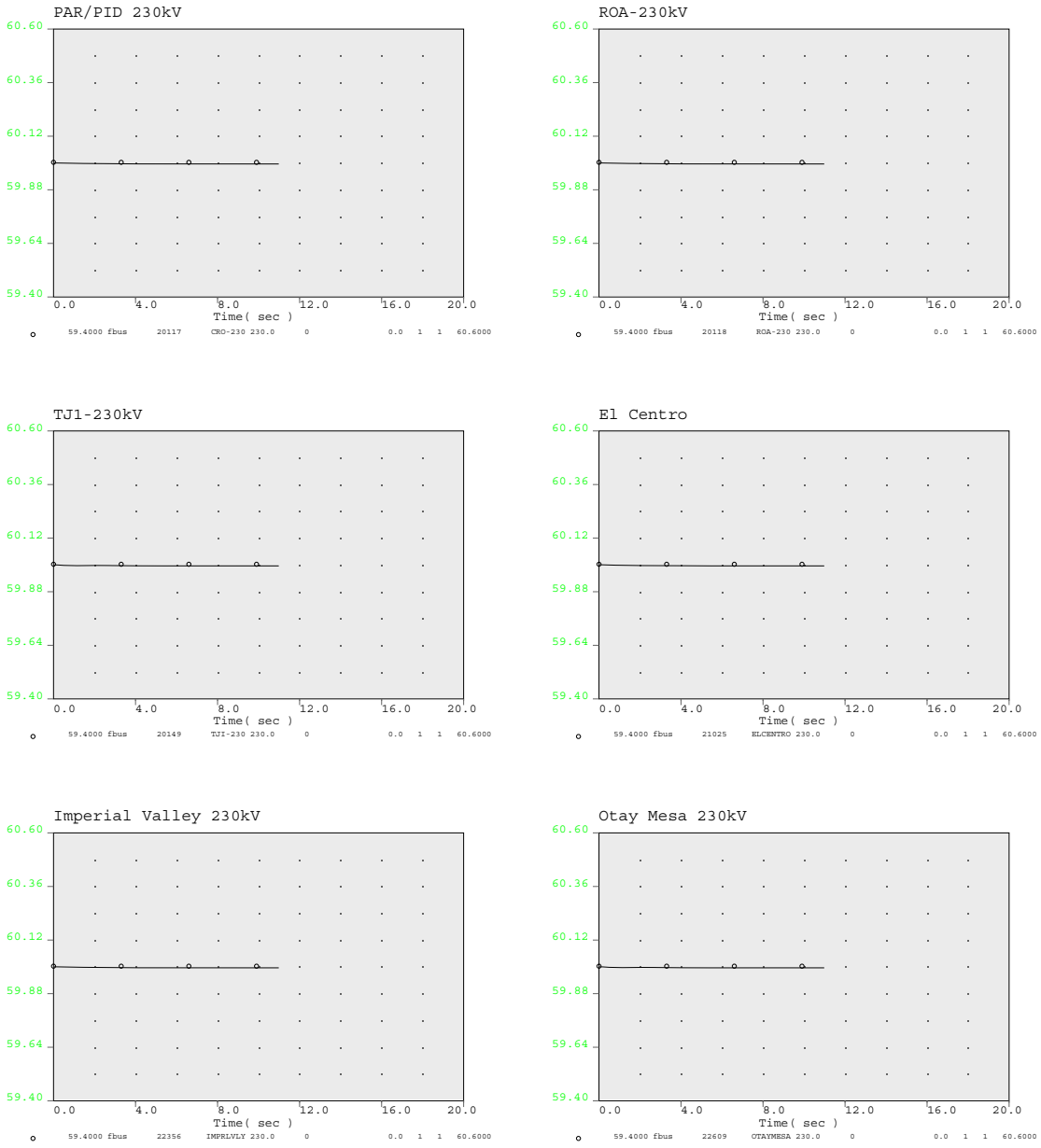


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

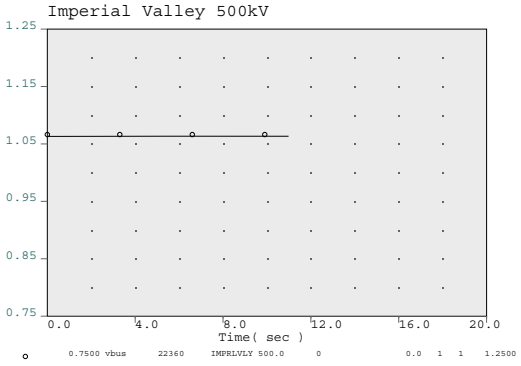
Affected System Frequency Check and Comparison



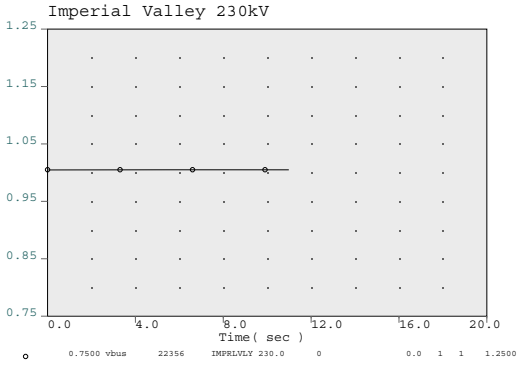
SDG&E Cluster 2 - pre
2014 Light Autumn
Flat

Imperial Valley Area - VOLTAGE

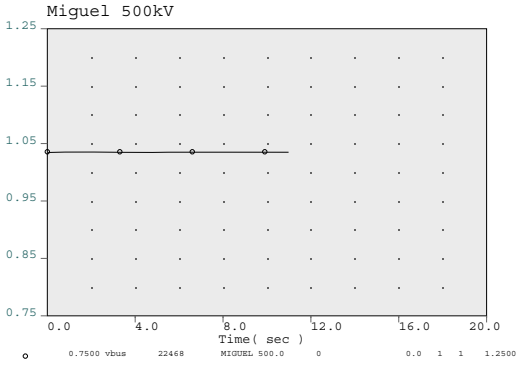
Imperial Valley 500kV



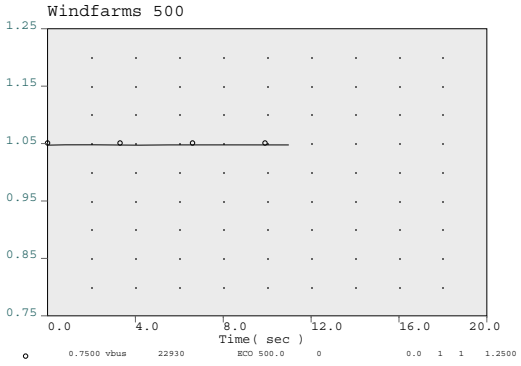
Imperial Valley 230kV



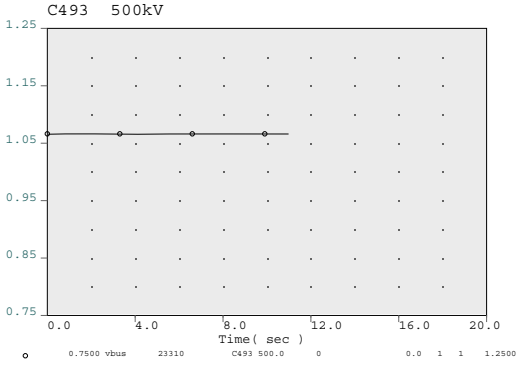
Miguel 500kV



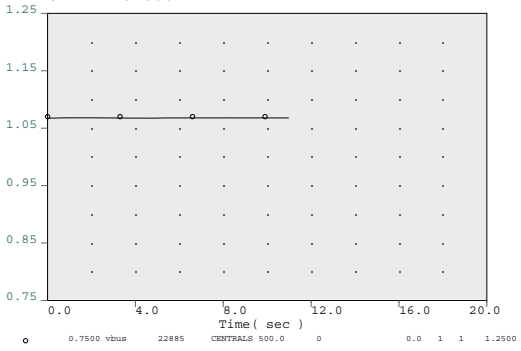
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pre
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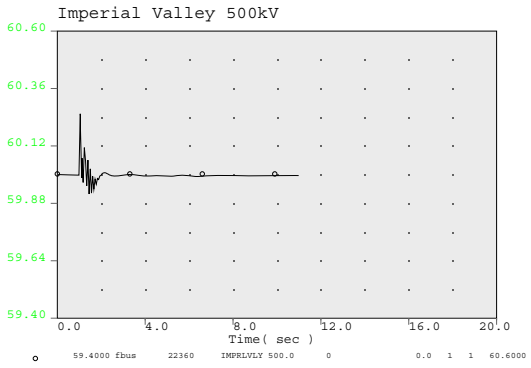
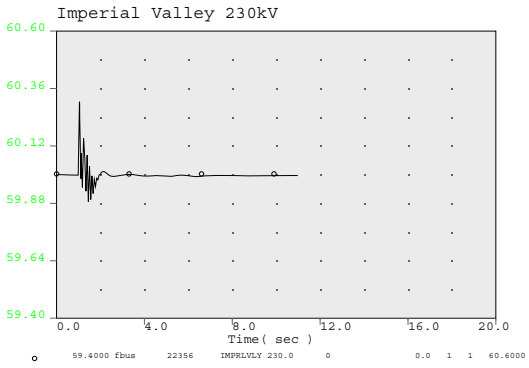
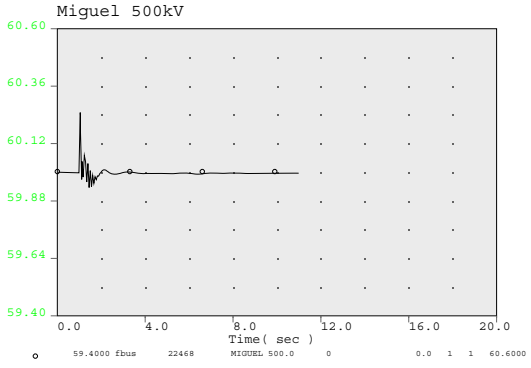
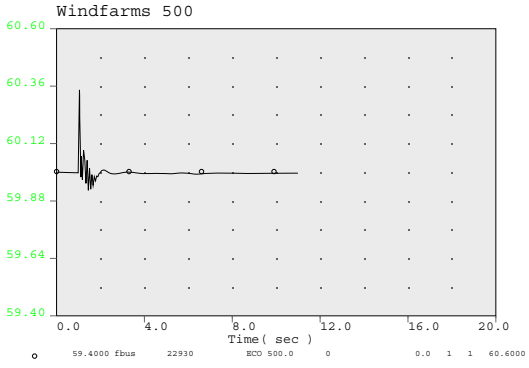
Flat

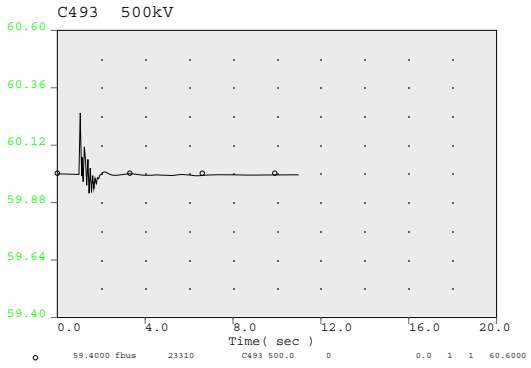
Imperial Valley Area - Frequency

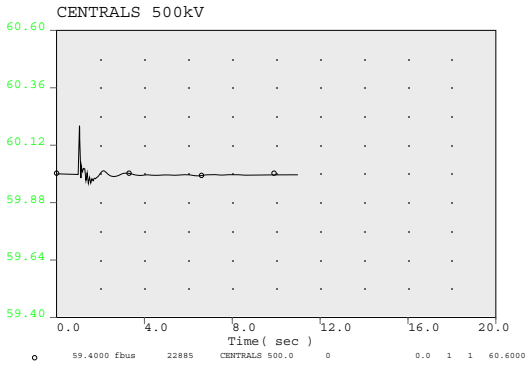






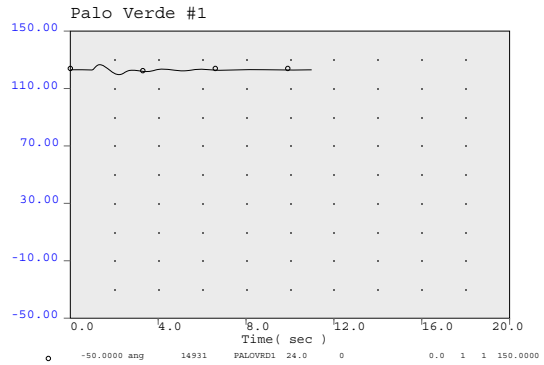


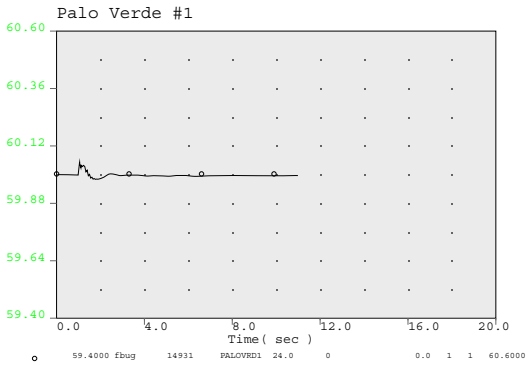


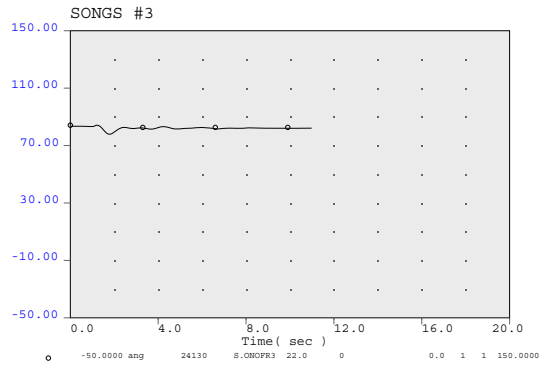


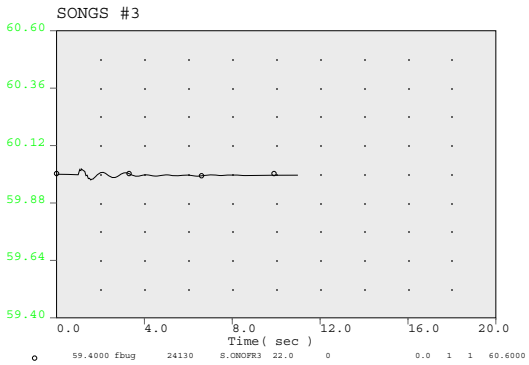
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

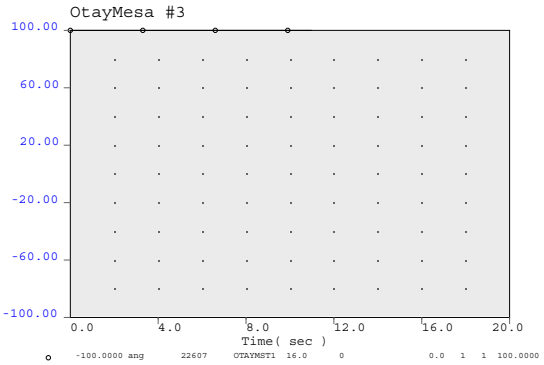
RELATIVE ROTOR ANGLE & FREQUENCY

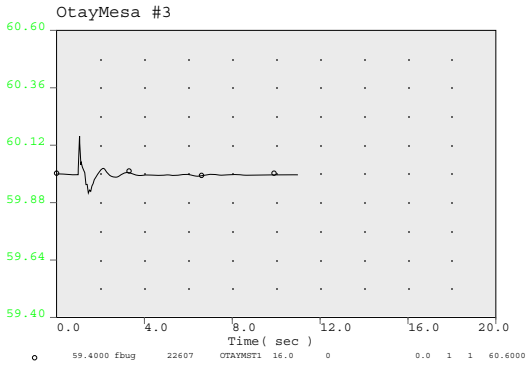






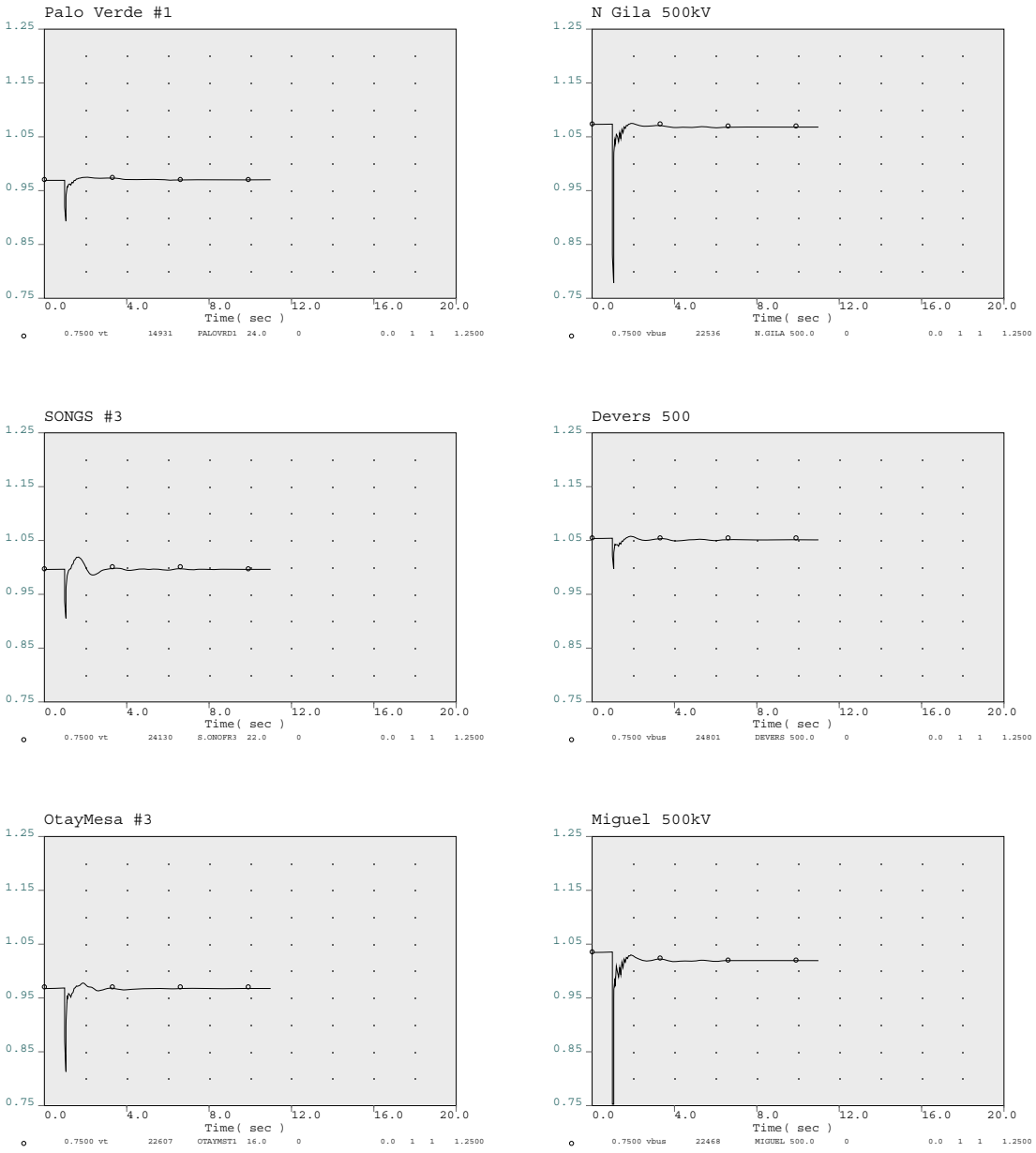






SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

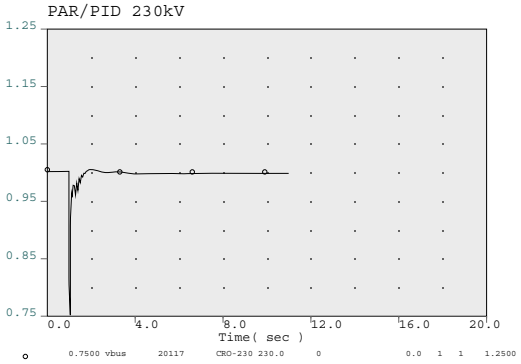
RELATIVE VOLTAGE



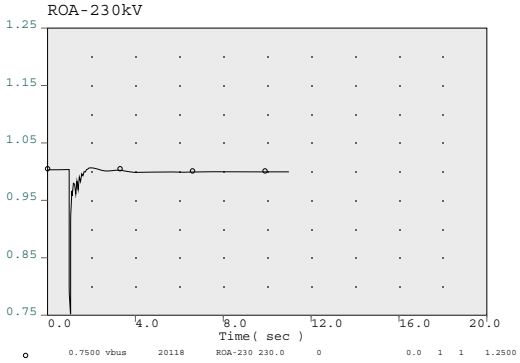
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

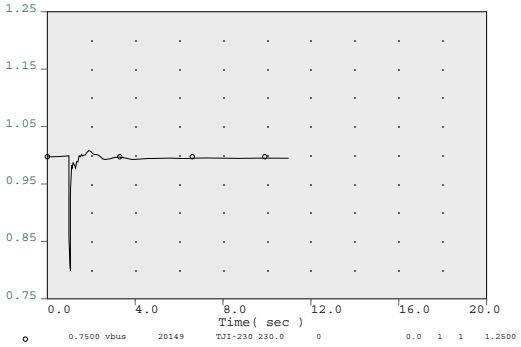
PAR/PID 230kV



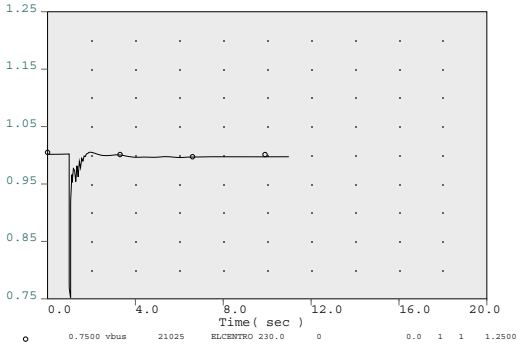
ROA-230kV



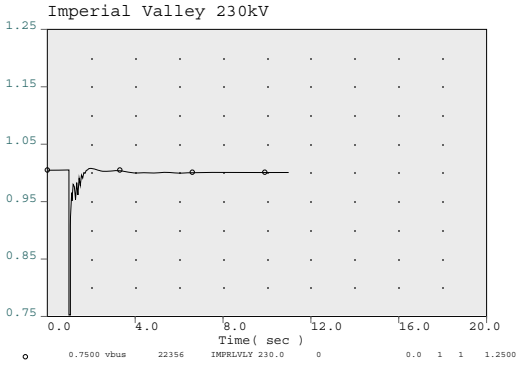
TJ1-230kV



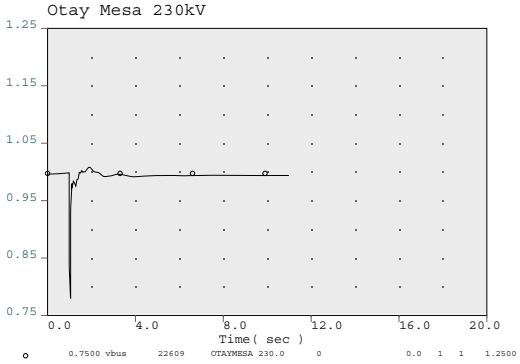
El Centro



Imperial Valley 230kV

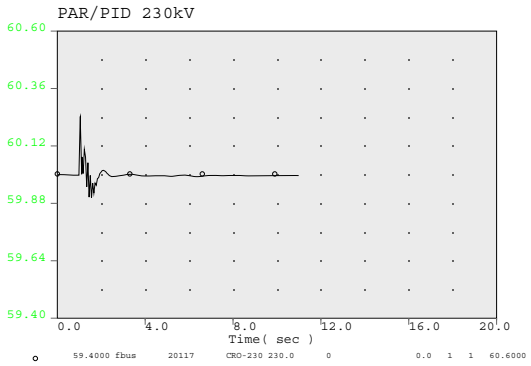


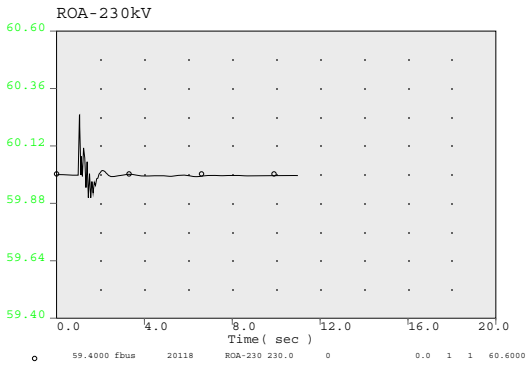
Otay Mesa 230kV

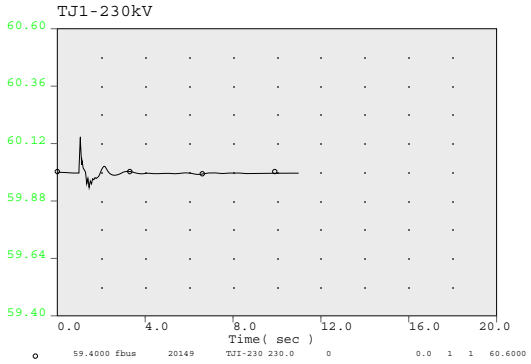


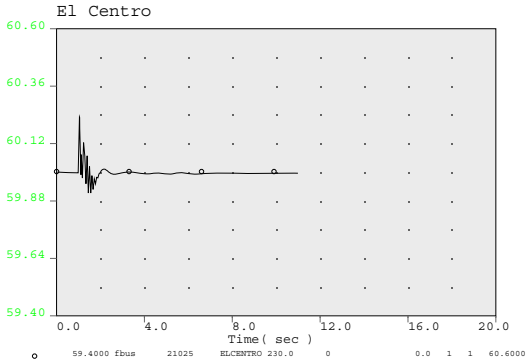
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

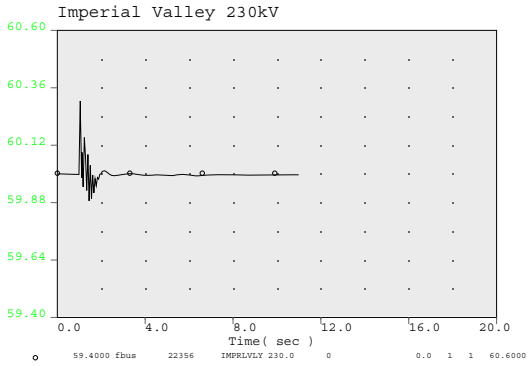
Affected System Frequency Check and Comparison

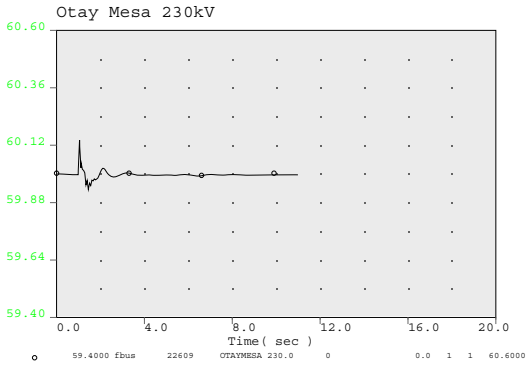








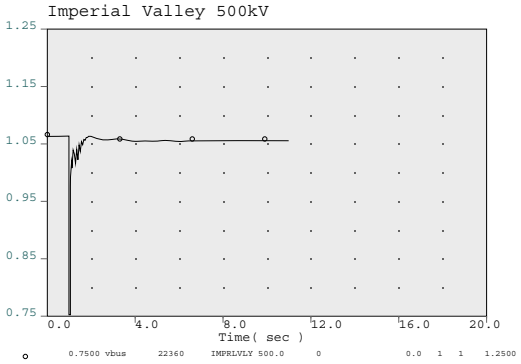




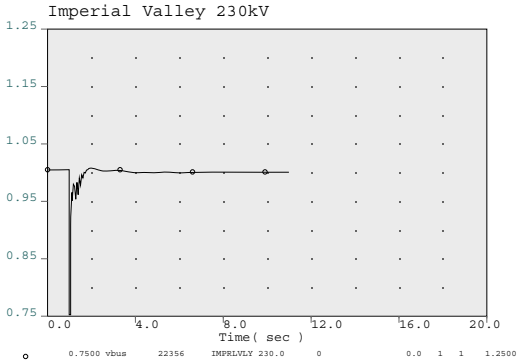
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

Imperial Valley Area - VOLTAGE

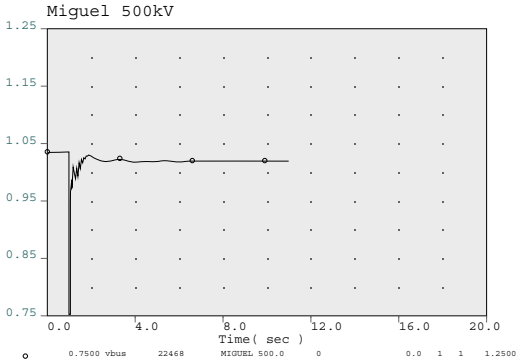
Imperial Valley 500kV



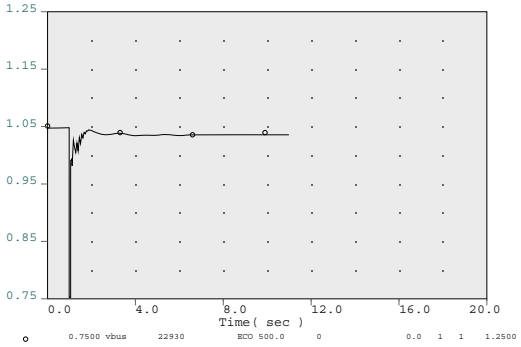
Imperial Valley 230kV



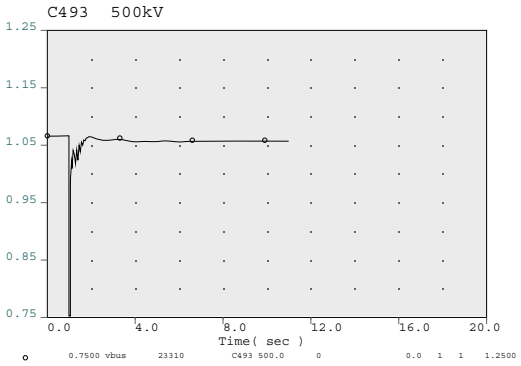
Miguel 500kV



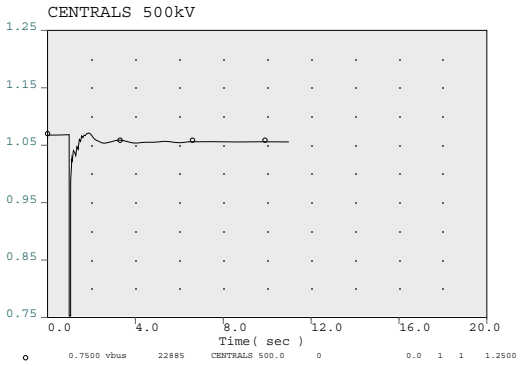
Windfarms 500



C493 500kV

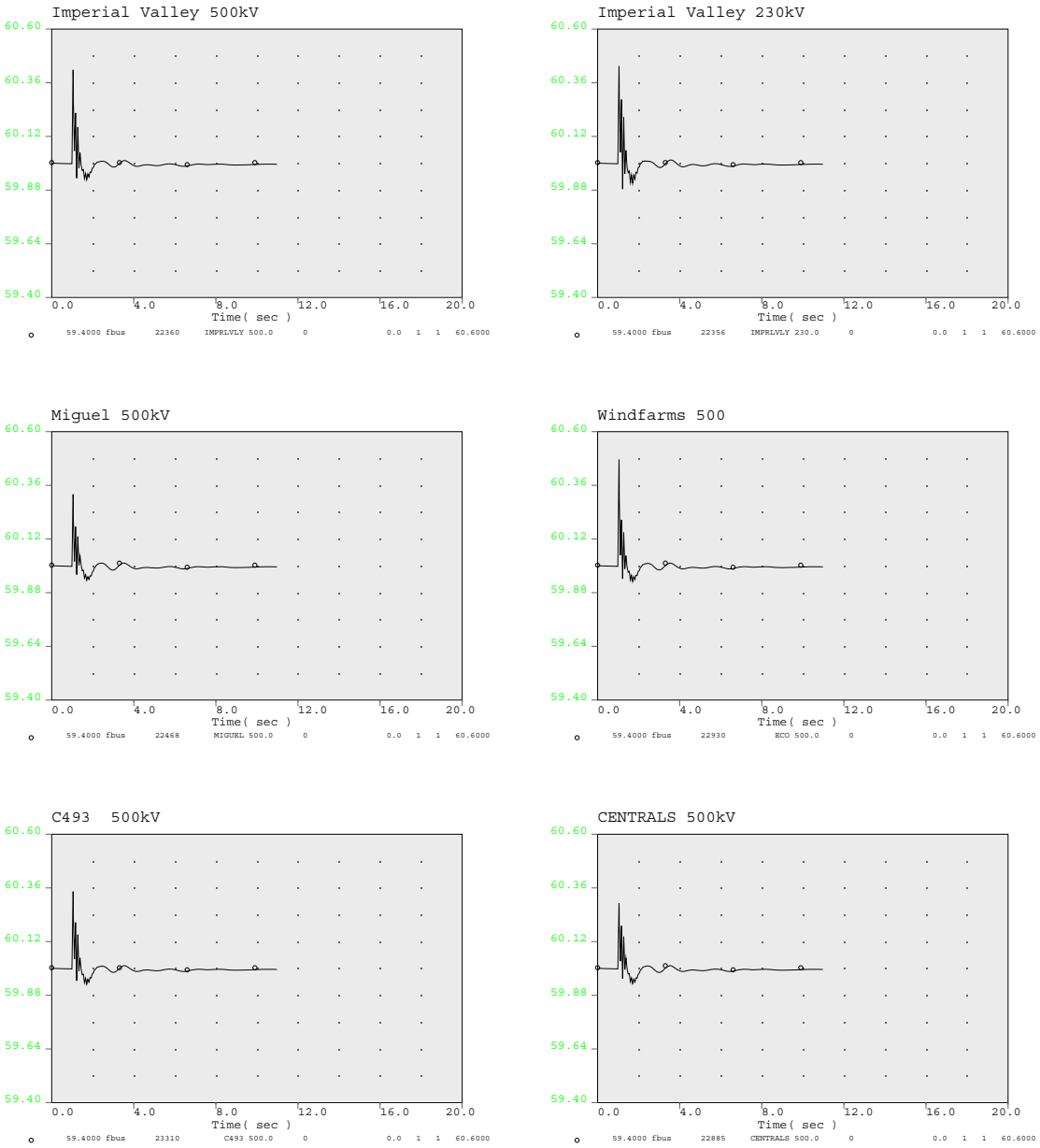


CENTRALS 500kV



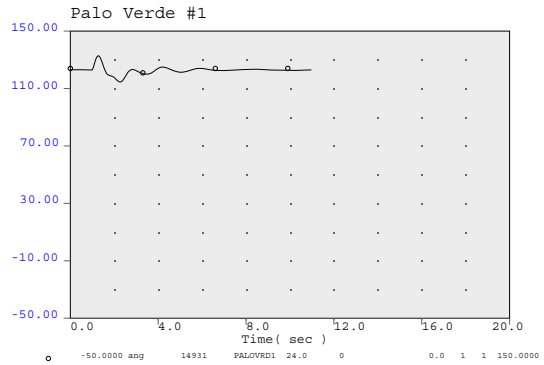
SDG&E Cluster 2 - pre
2014 Light Autumn
C493 - CENTRALS 500kV line

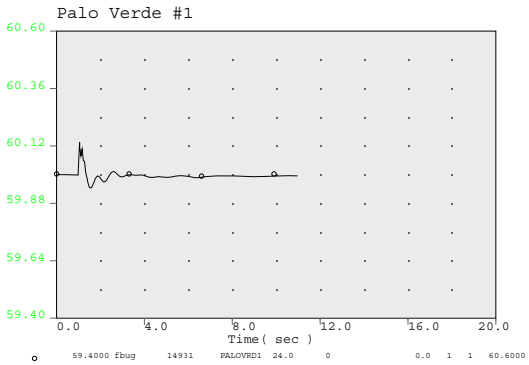
Imperial Valley Area - Frequency

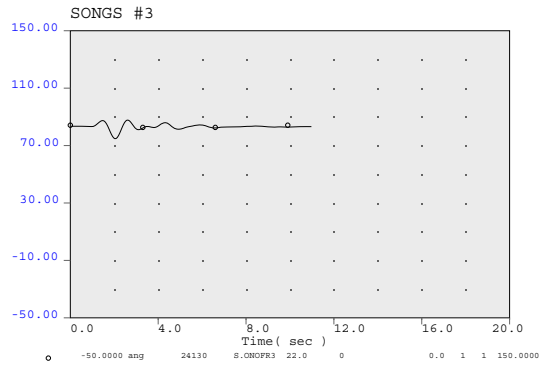


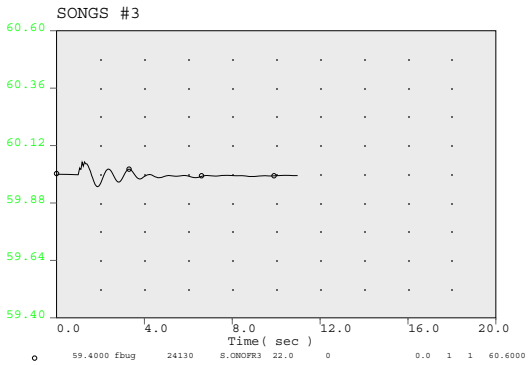
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

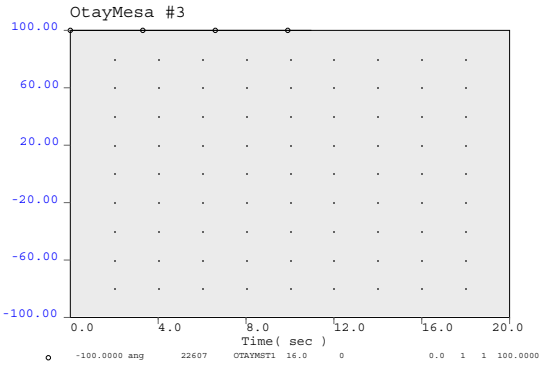
RELATIVE ROTOR ANGLE & FREQUENCY

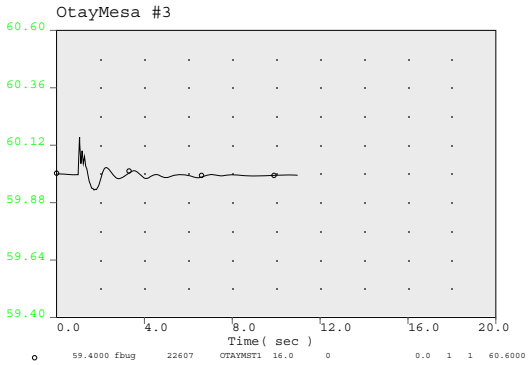










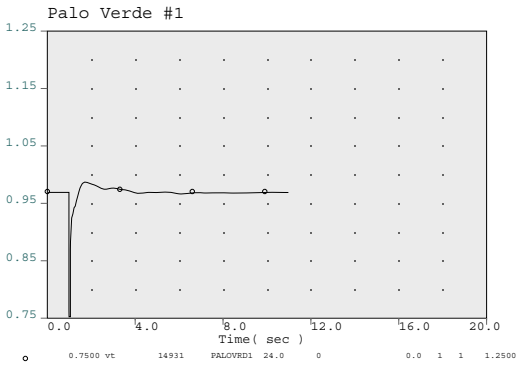


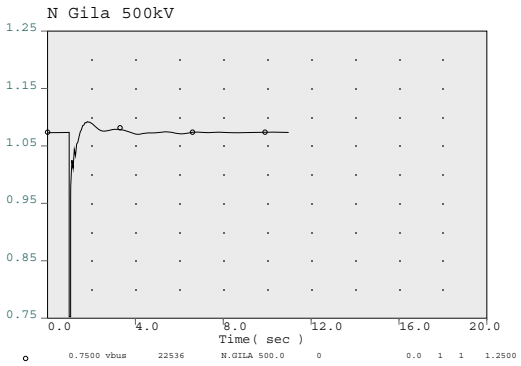
SDG&E Cluster 2 - pre
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

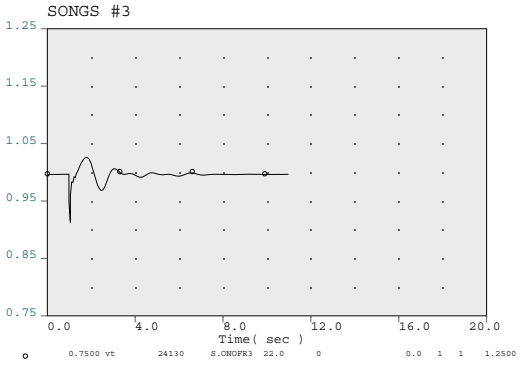
Page 1

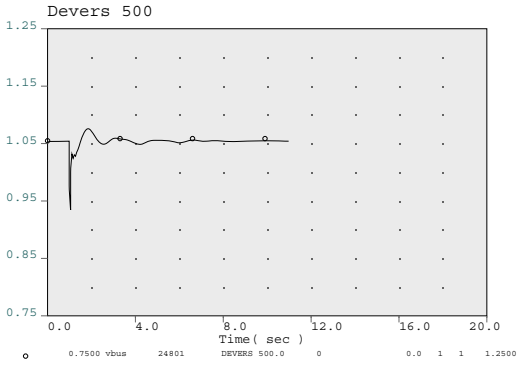
SDGE	HAA_NGila_slo_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:23:12 2010

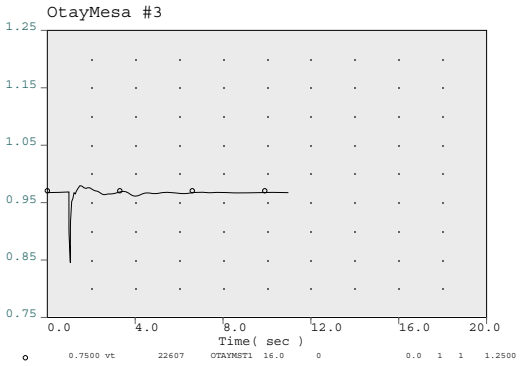
RELATIVE VOLTAGE

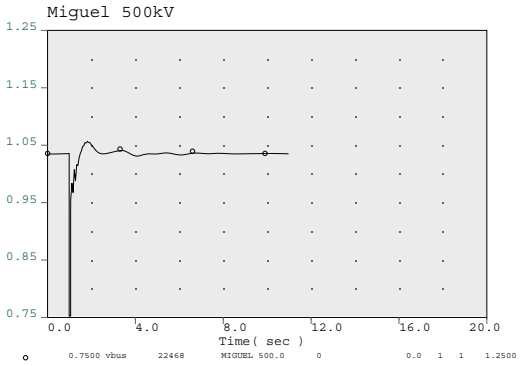








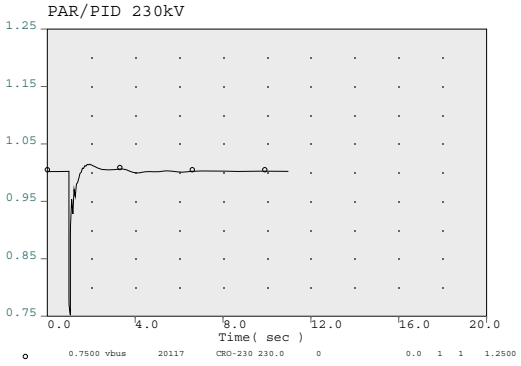




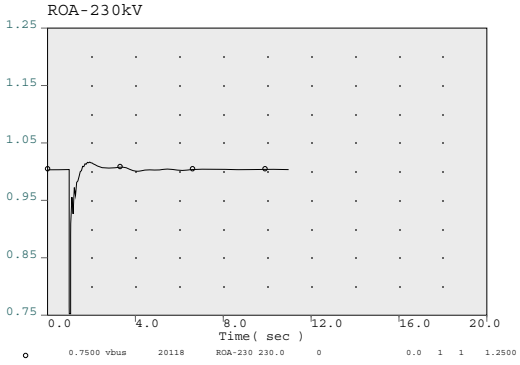
SDG&E Cluster 2 - pre
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Affected System Voltage Check and Comparison

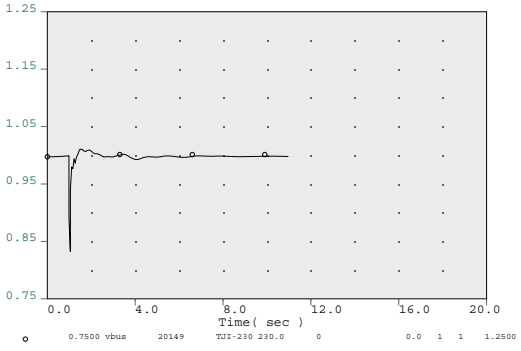
PAR/PID 230kV



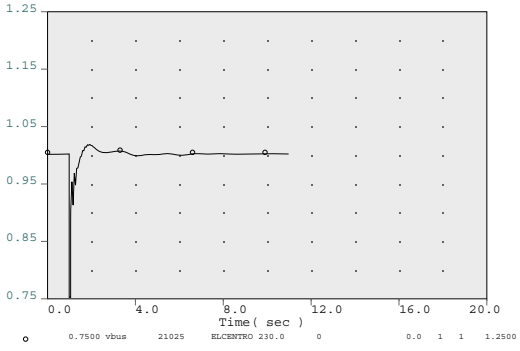
ROA-230kV



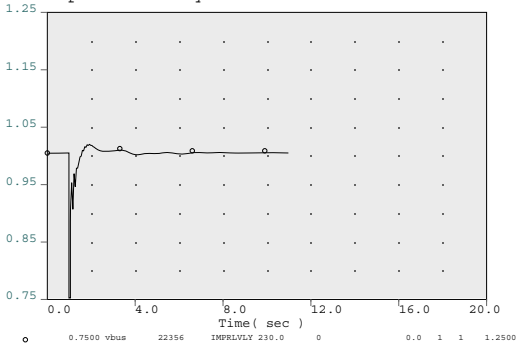
TJ1-230kV



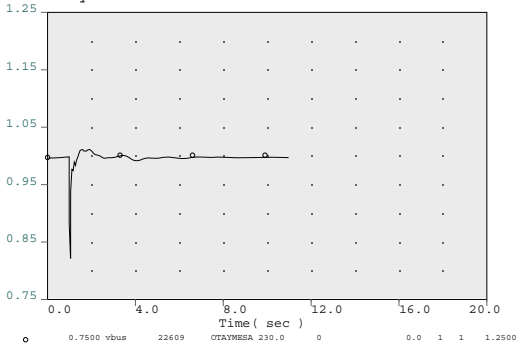
El Centro



Imperial Valley 230kV

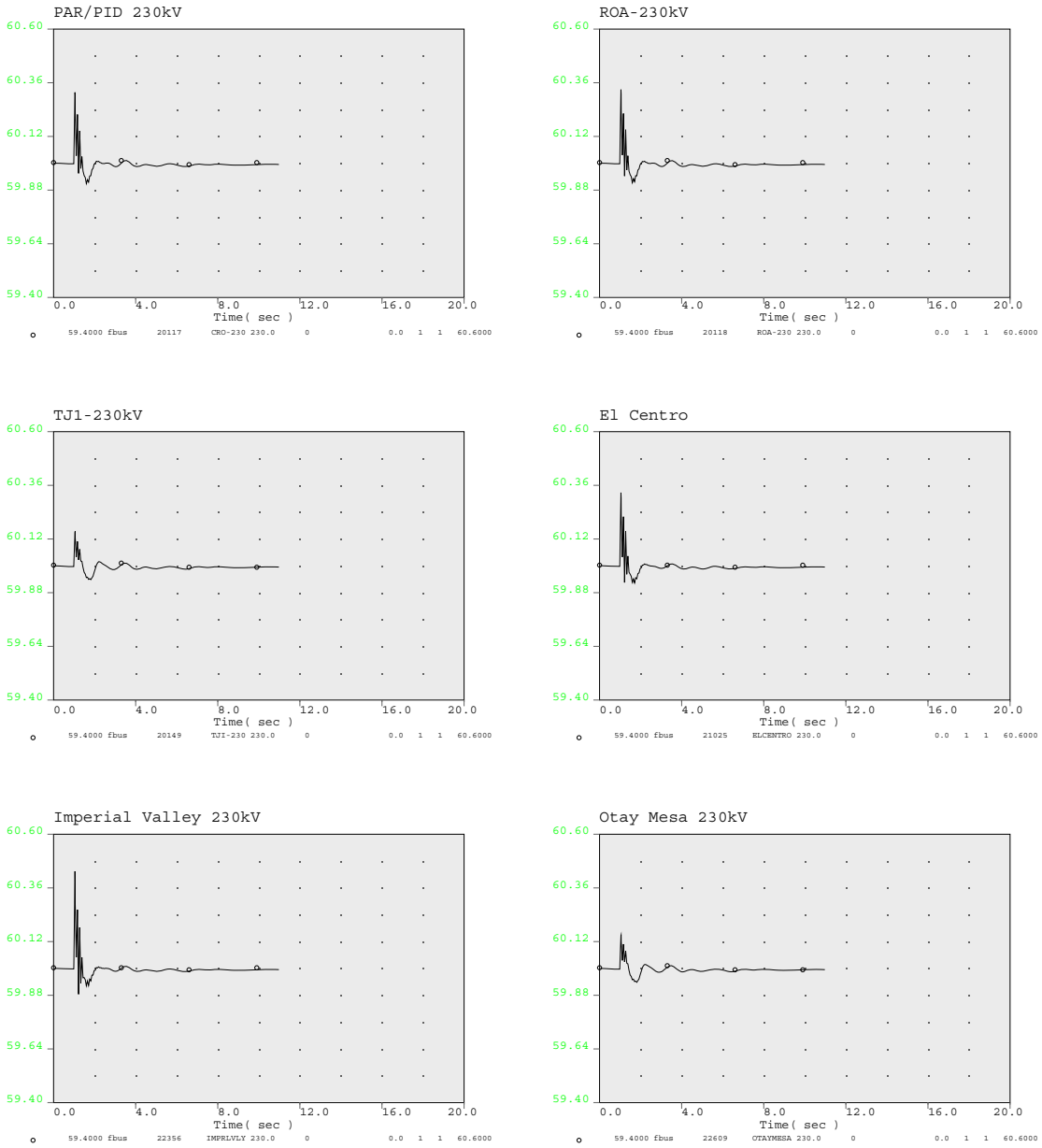


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

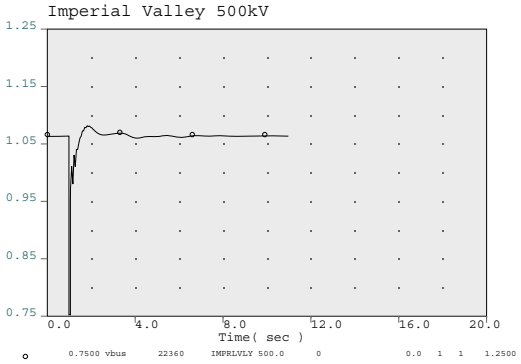
Affected System Frequency Check and Comparison



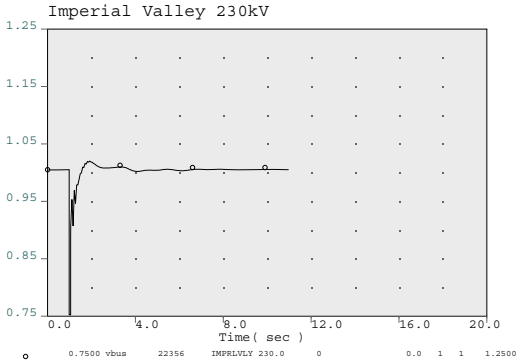
SDG&E Cluster 2 - pre
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

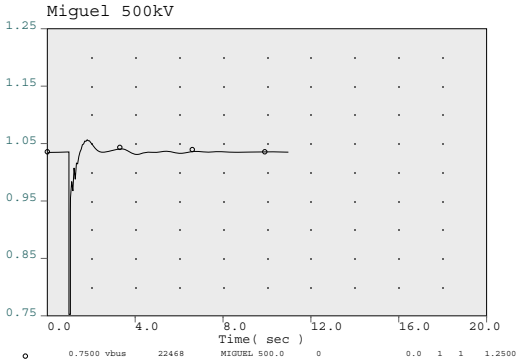
Imperial Valley 500kV



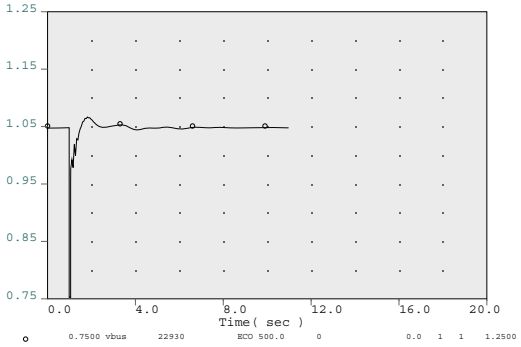
Imperial Valley 230kV



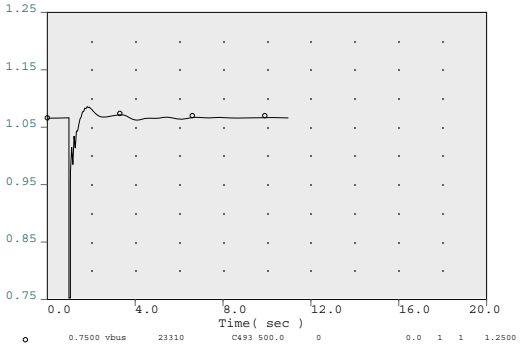
Miguel 500kV



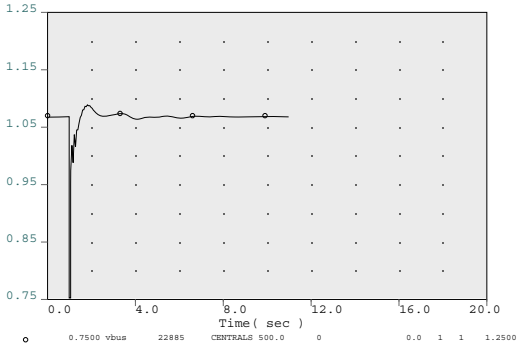
Windfarms 500



C493 500kV

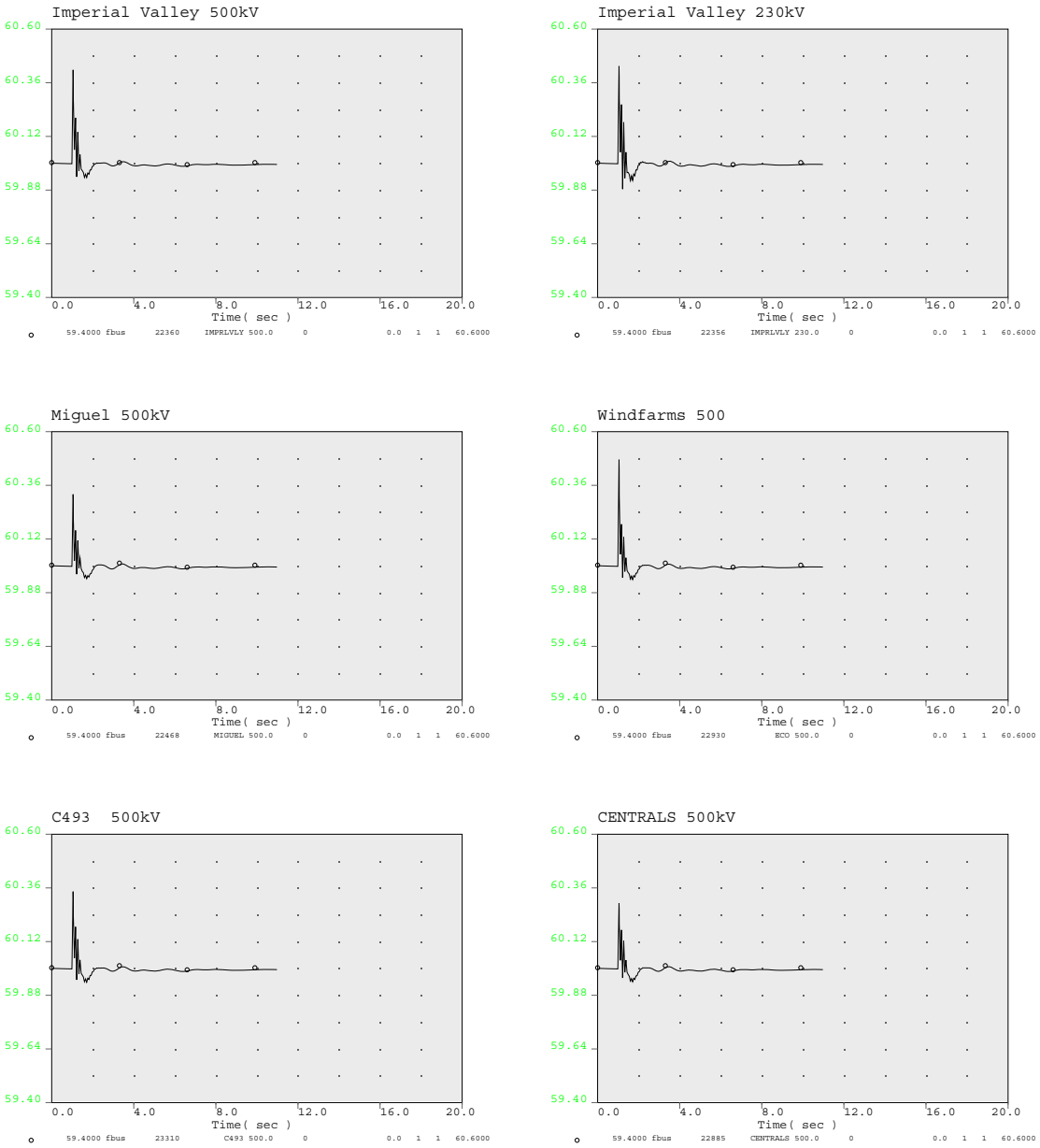


CENTRALS 500kV



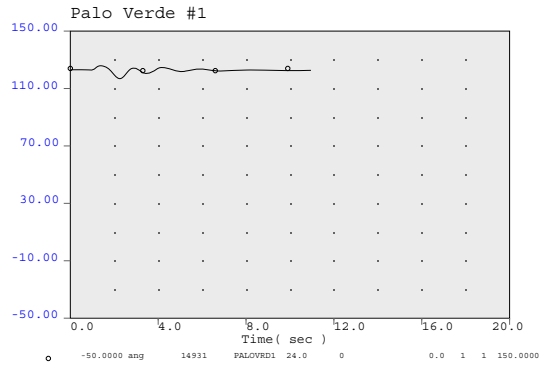
SDG&E Cluster 2 - pre
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

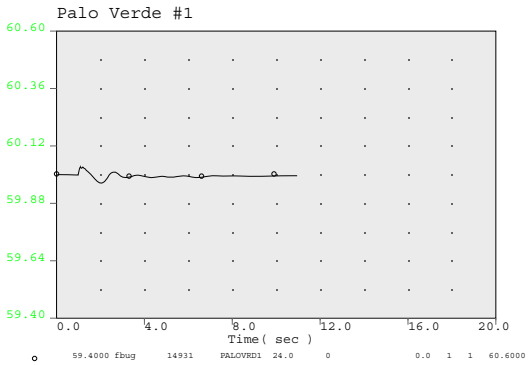
Imperial Valley Area - Frequency

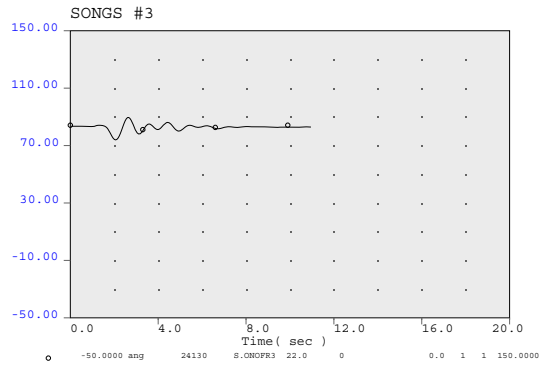


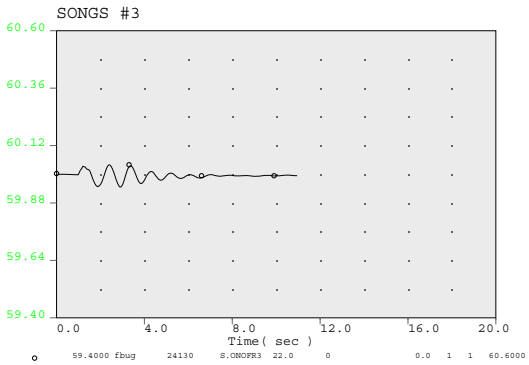
SDG&E Cluster 2 - pre
2014 Light Autumn
Haasyampa-N.Gila 500 kV line

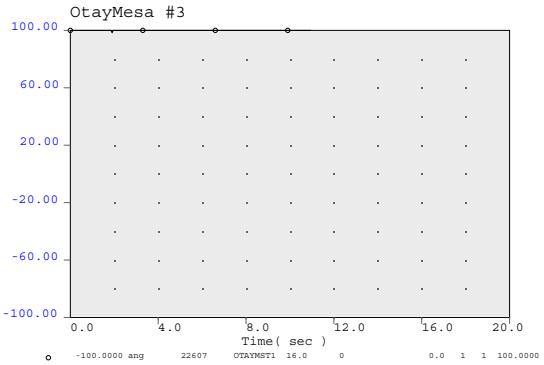
RELATIVE ROTOR ANGLE & FREQUENCY

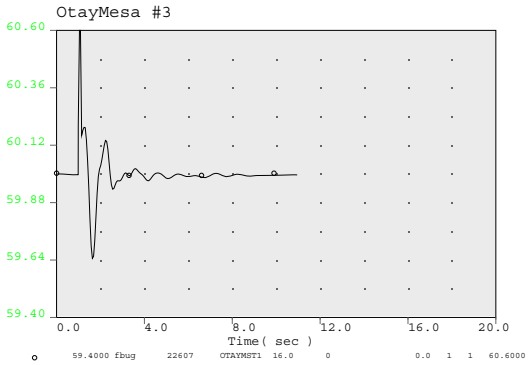












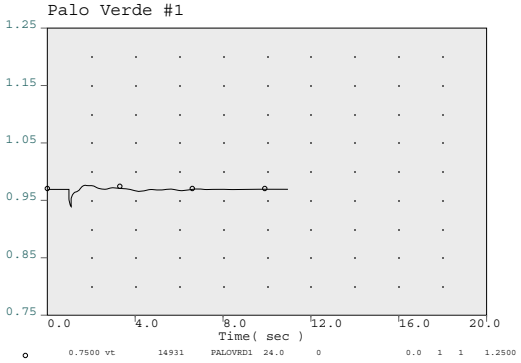
SDG&E Cluster 2 - pre int
2014 Light Autumn
OM - SX 230 kV N-1

Page 1

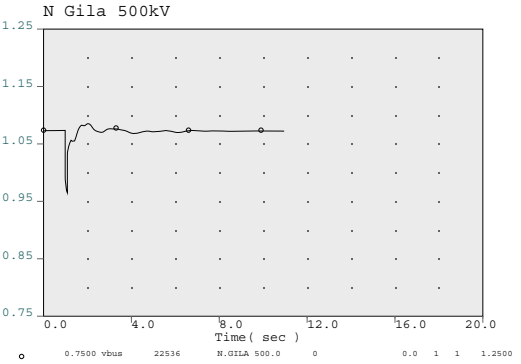
int_OM-SX_pre_int_ll.chf | p_i\ll\pre_int\ws_pre_int | Tue Nov 02 07:23:18 2010

RELATIVE VOLTAGE

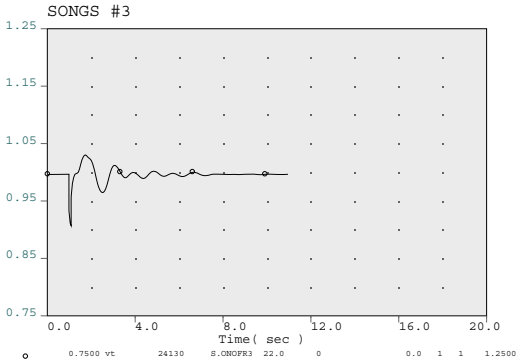
Palo Verde #1



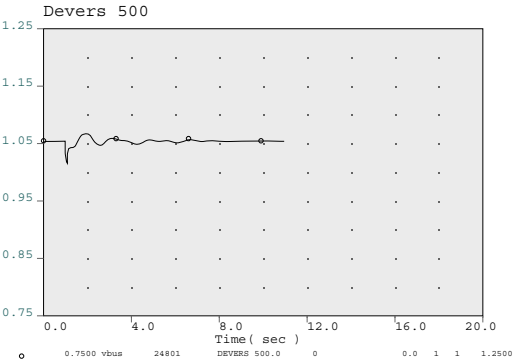
N Gila 500kV



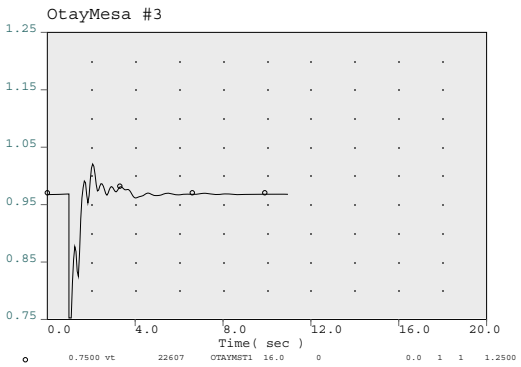
SONGS #3



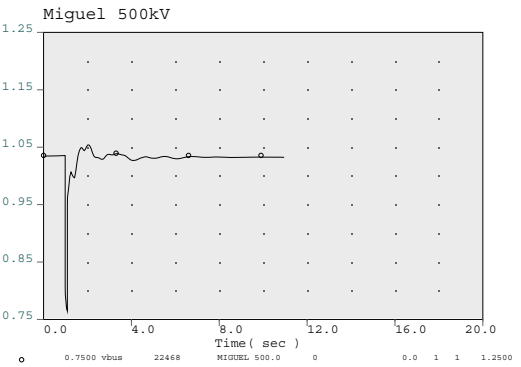
Devers 500



OtayMesa #3



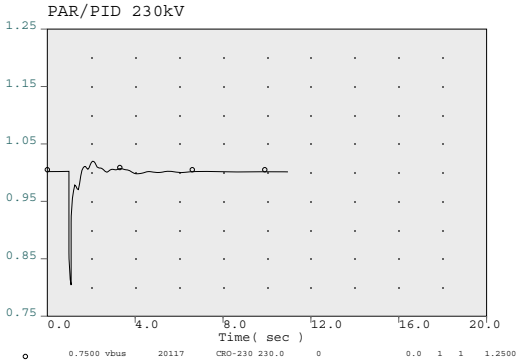
Miguel 500kV



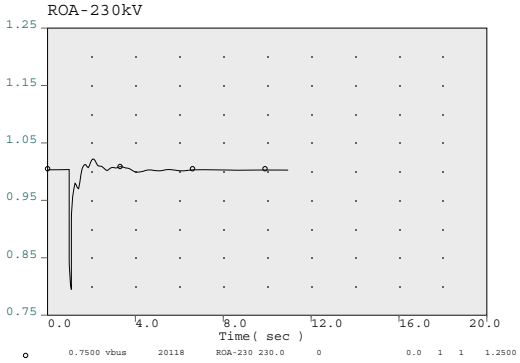
SDG&E Cluster 2 - pre int
2014 Light Autumn
OM - SX 230 kV N-1

Affected System Voltage Check and Comparison

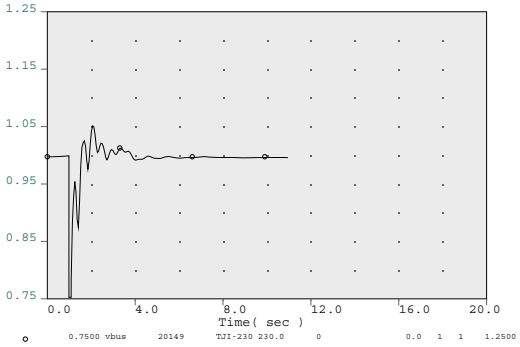
PAR/PID 230kV



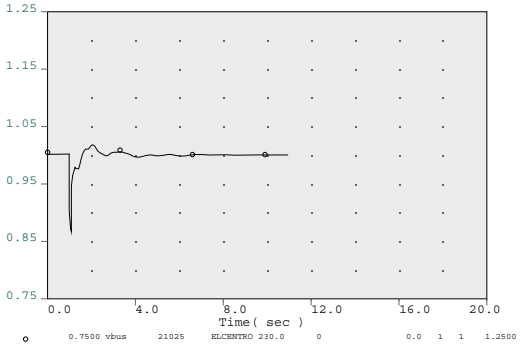
ROA-230kV



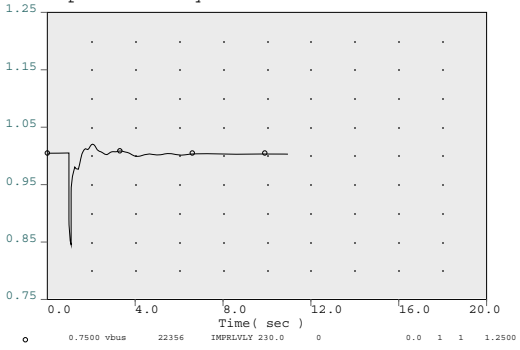
TJ1-230kV



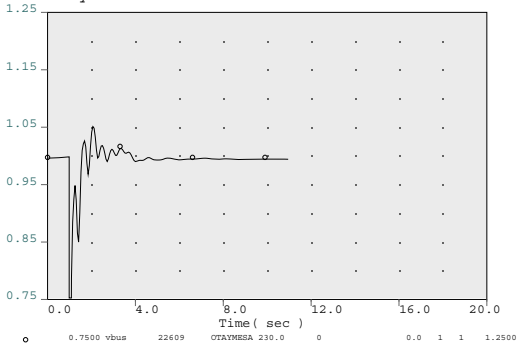
El Centro



Imperial Valley 230kV

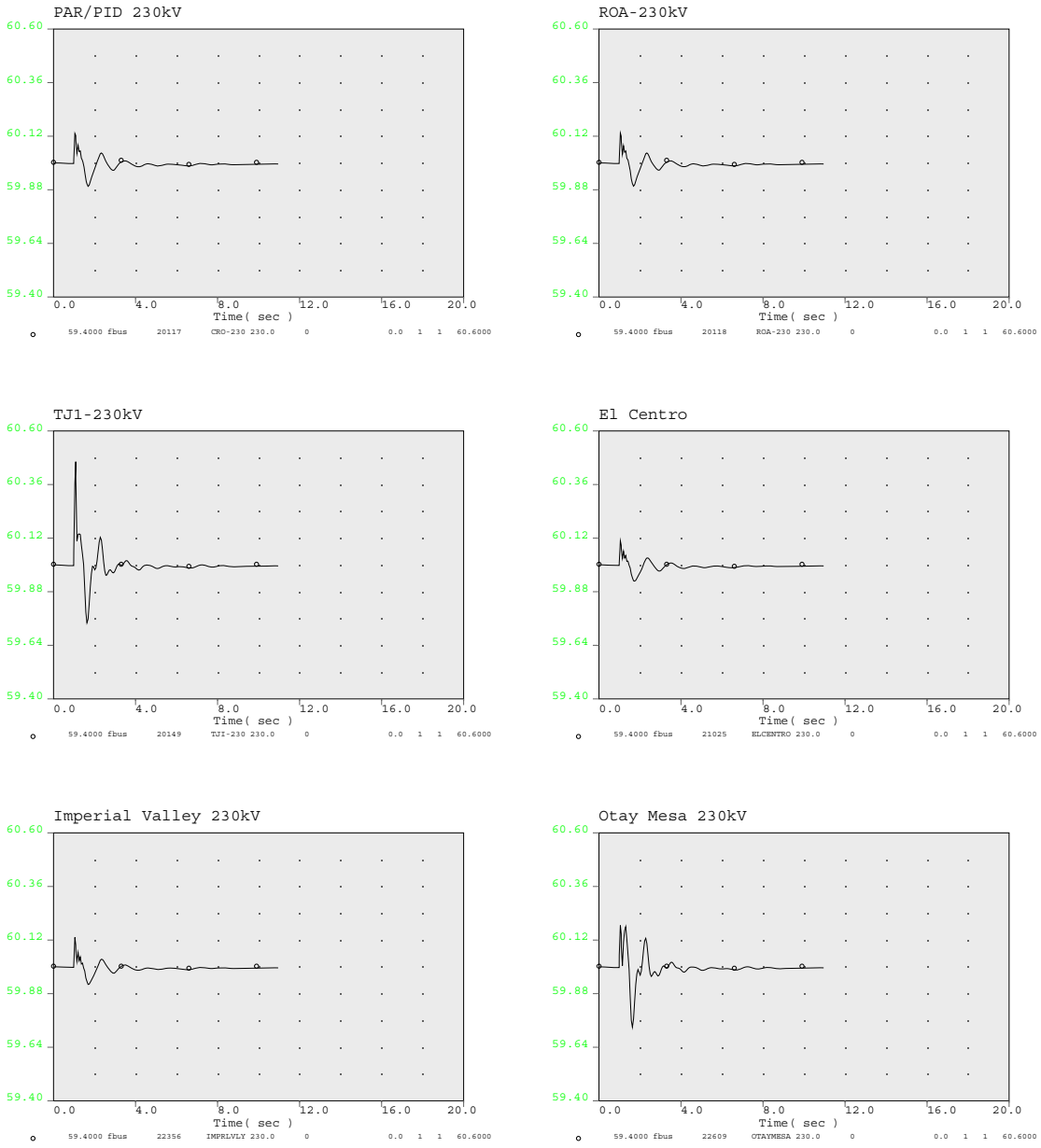


Otay Mesa 230kV



SDG&E Cluster 2 - pre int
2014 Light Autumn
OM - SX 230 kV N-1

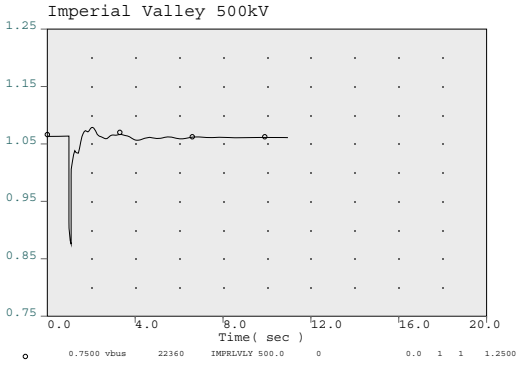
Affected System Frequency Check and Comparison



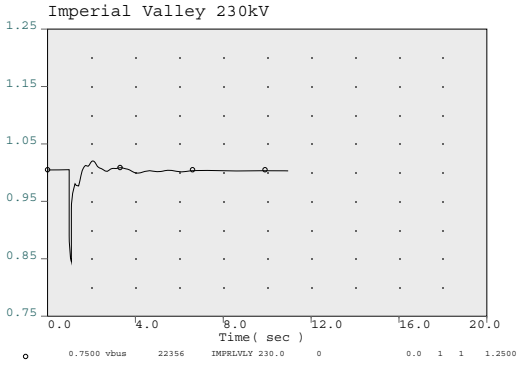
SDG&E Cluster 2 - pre int
2014 Light Autumn
OM - SX 230 kV N-1

Imperial Valley Area - VOLTAGE

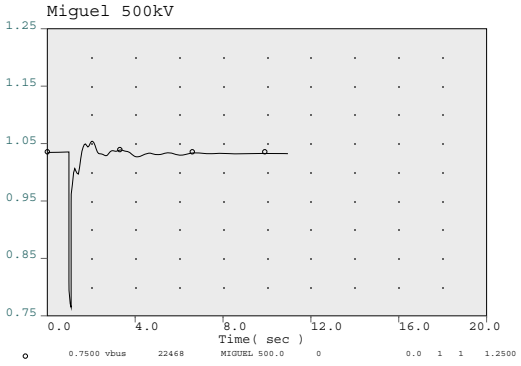
Imperial Valley 500kV



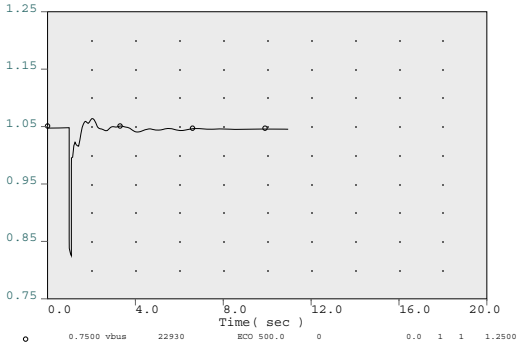
Imperial Valley 230kV



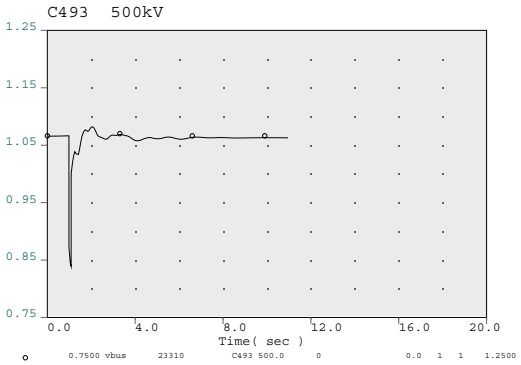
Miguel 500kV



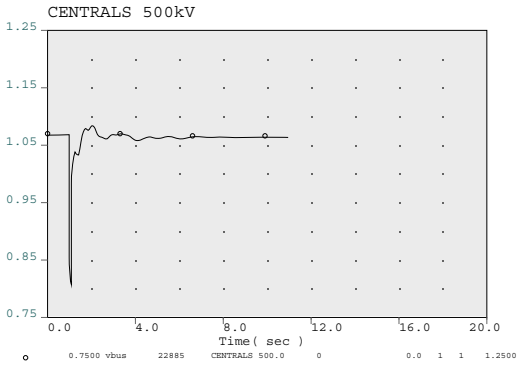
Windfarms 500



C493 500kV



CENTRALS 500kV

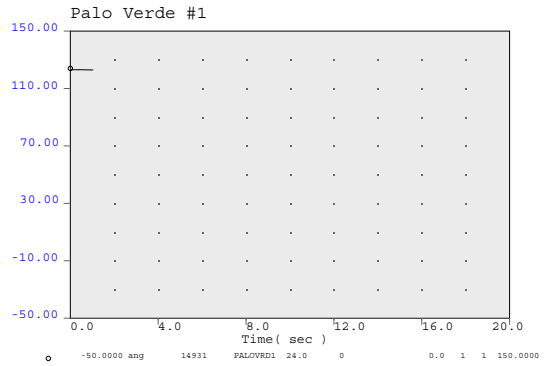


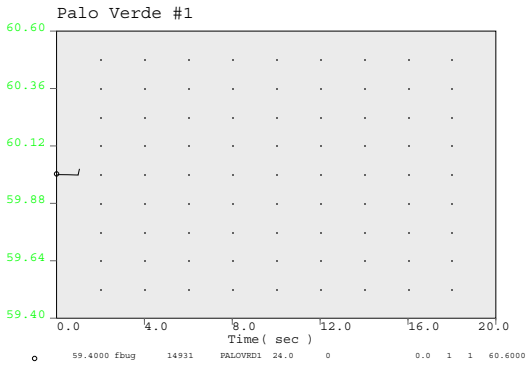
SDG&E Cluster 2 - pre int
2014 Light Autumn
OM - SX 230 kV N-1

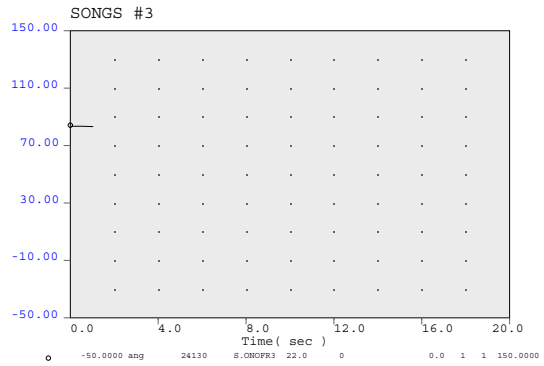
Imperial Valley Area - Frequency

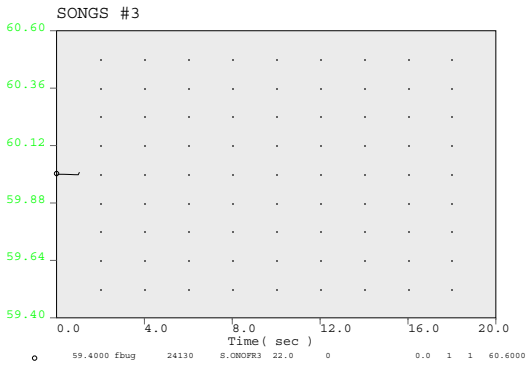
SDG&E Cluster 2 - pre int
2014 Light Autumn
OM - SX 230 kV N-1

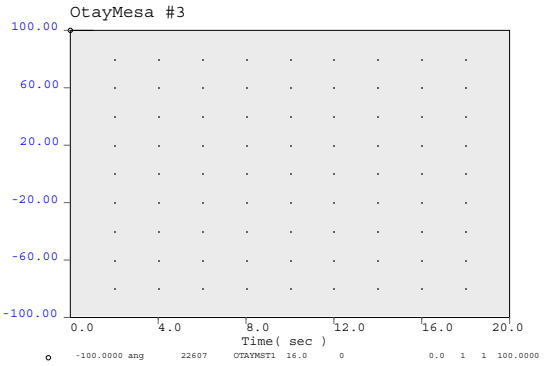
RELATIVE ROTOR ANGLE & FREQUENCY

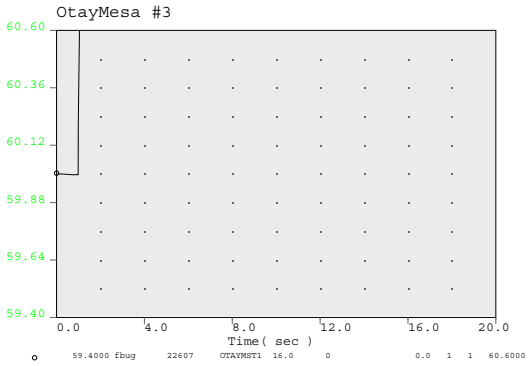












SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

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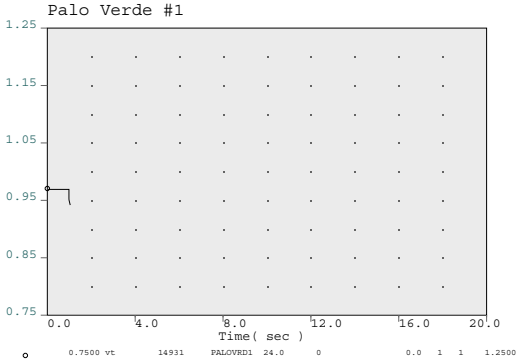
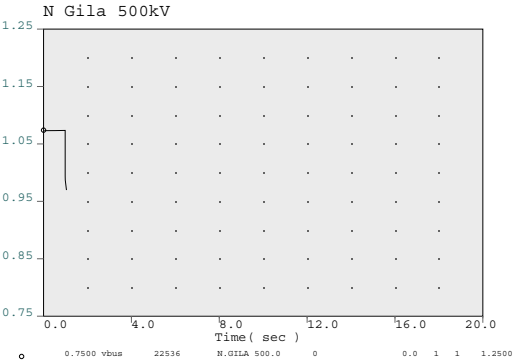
SDGE	int_OM-SX_SYwRAS_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:23:21 2010

RELATIVE VOLTAGE

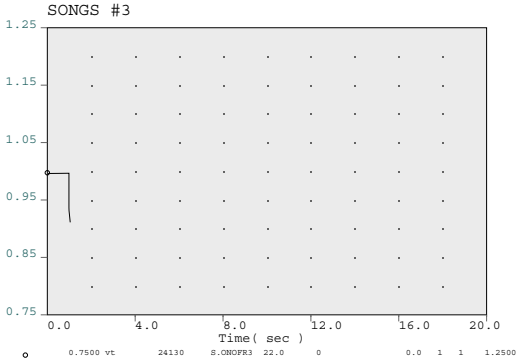
Palo Verde #1



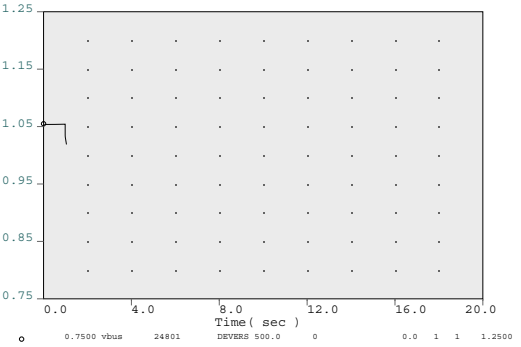
N Gila 500kV



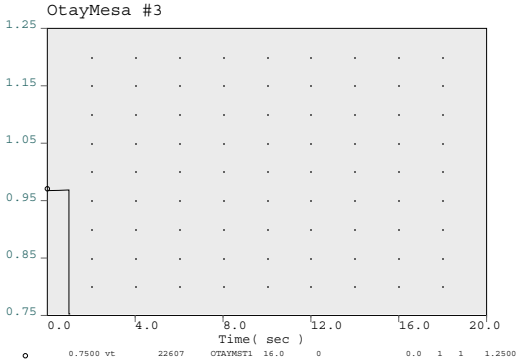
SONGS #3



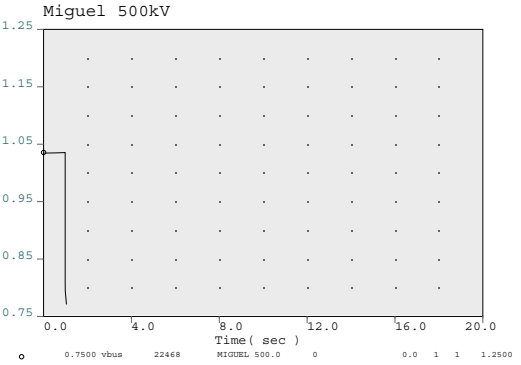
Devers 500



OtayMesa #3



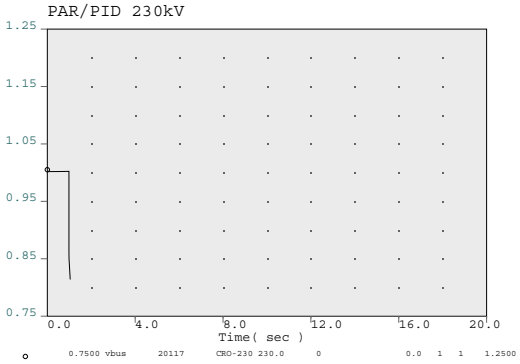
Miguel 500kV



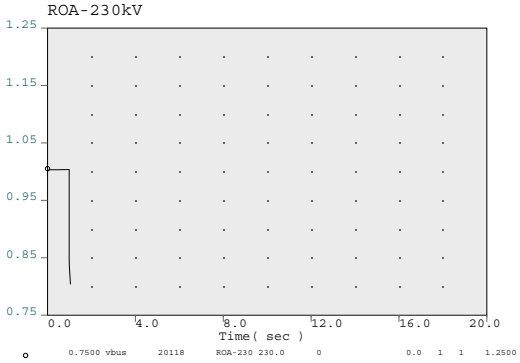
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

Affected System Voltage Check and Comparison

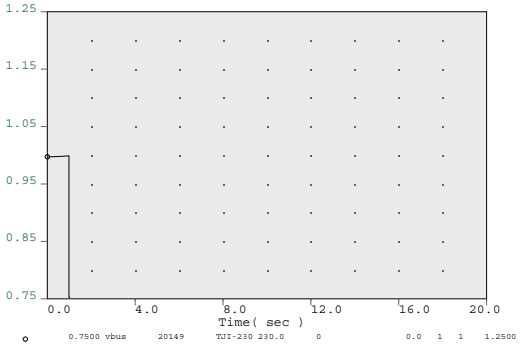
PAR/PID 230kV



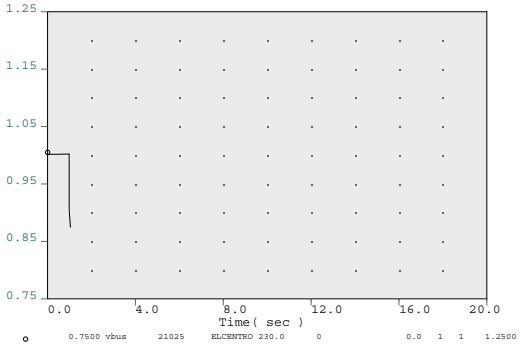
ROA-230kV



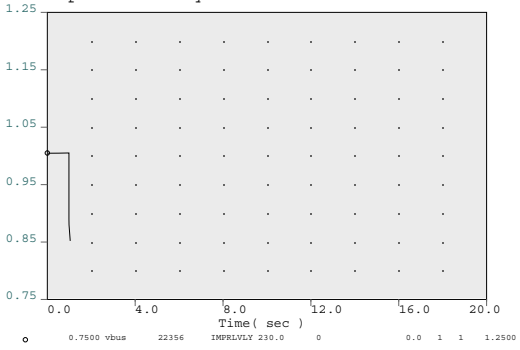
TJ1-230kV



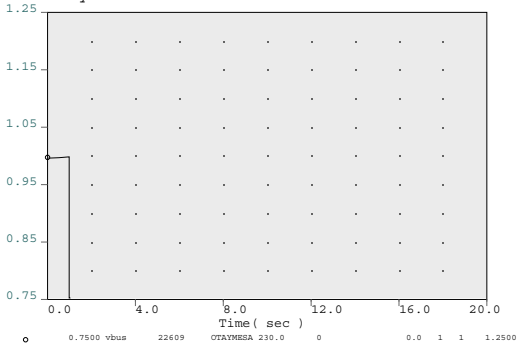
El Centro



Imperial Valley 230kV

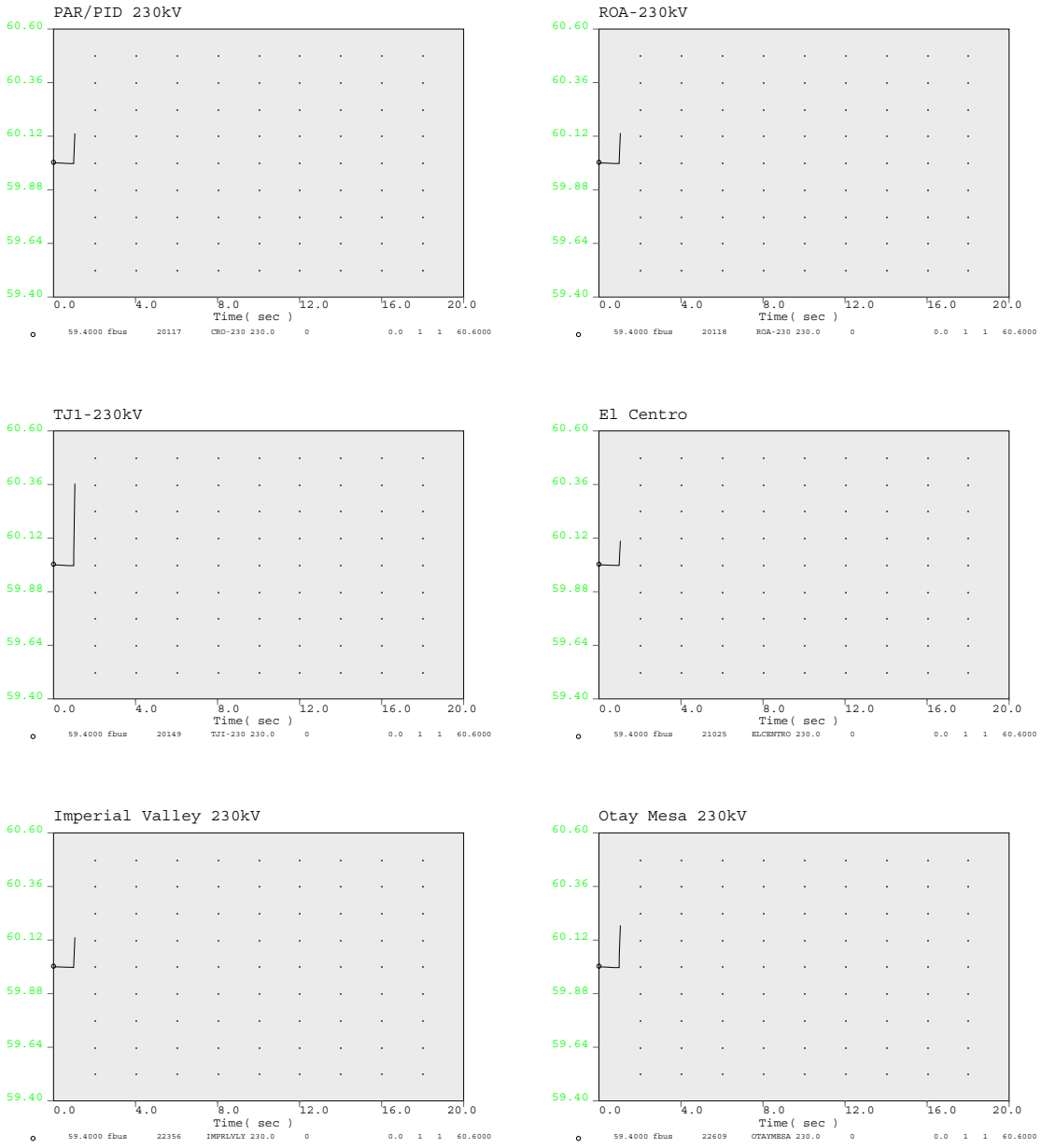


Otay Mesa 230kV



SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

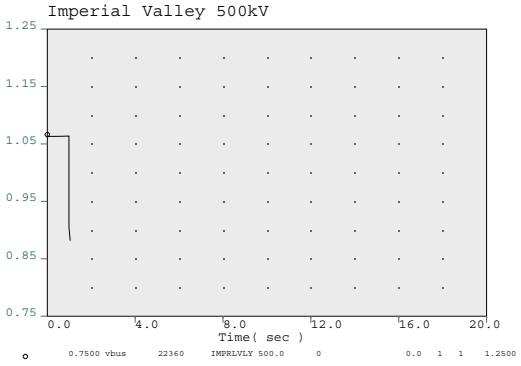
Affected System Frequency Check and Comparison



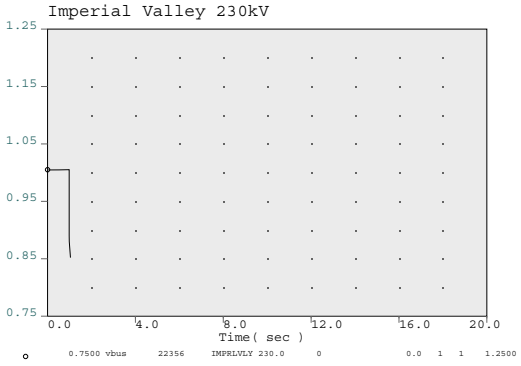
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

Imperial Valley Area - VOLTAGE

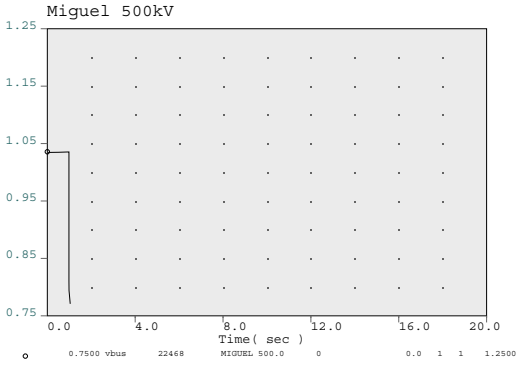
Imperial Valley 500kV



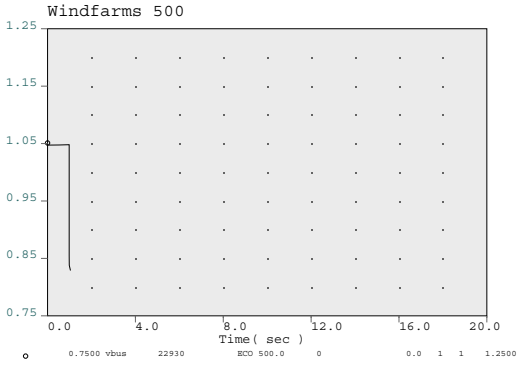
Imperial Valley 230kV



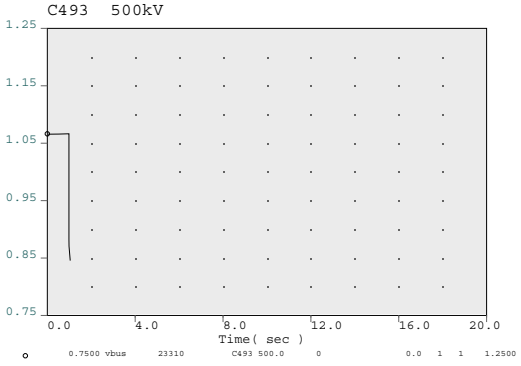
Miguel 500kV



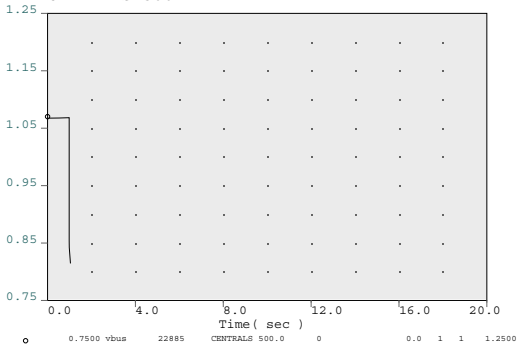
Windfarms 500



C493 500kV

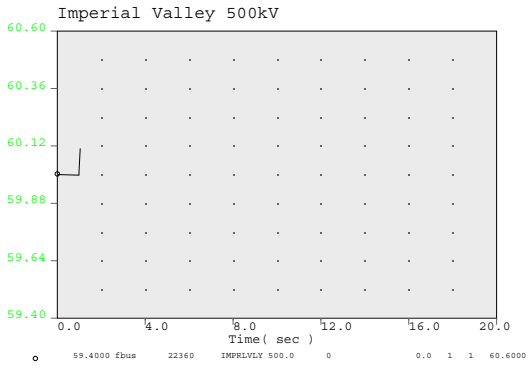


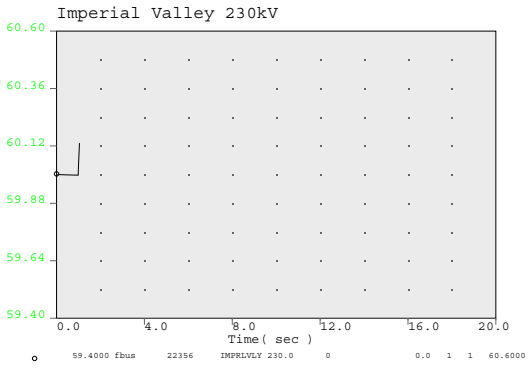
CENTRALS 500kV

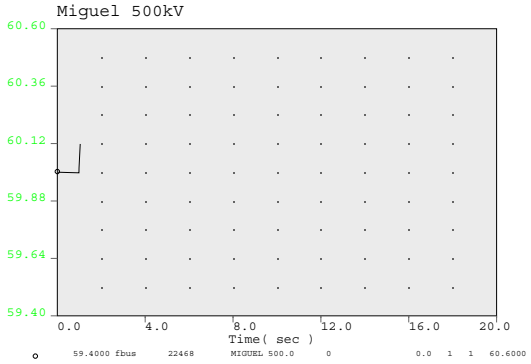


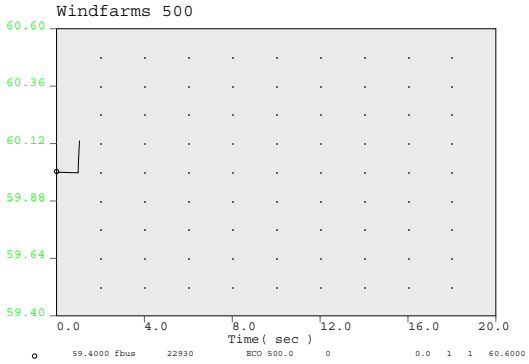
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

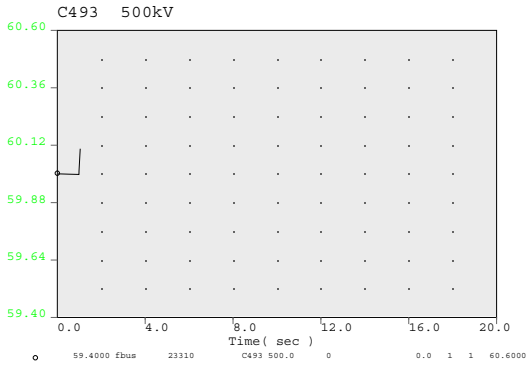
Imperial Valley Area - Frequency

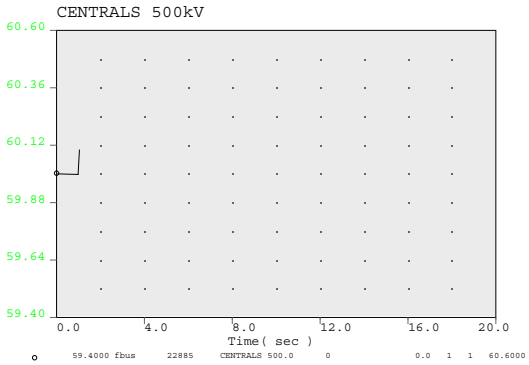






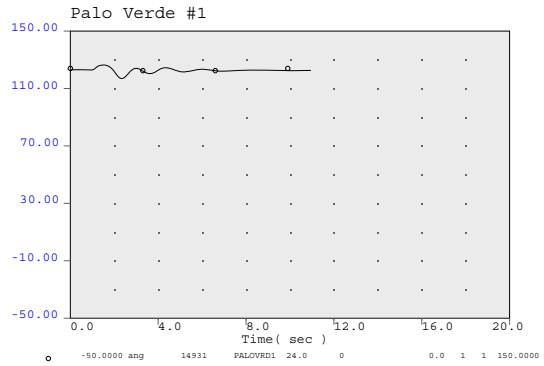


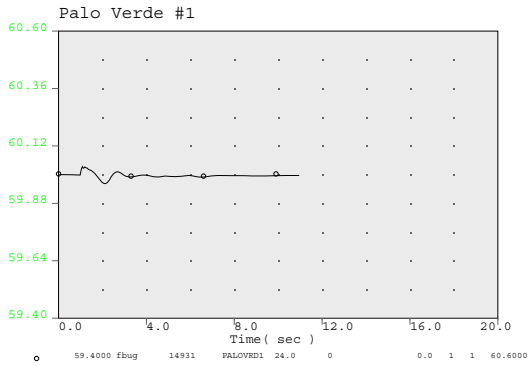


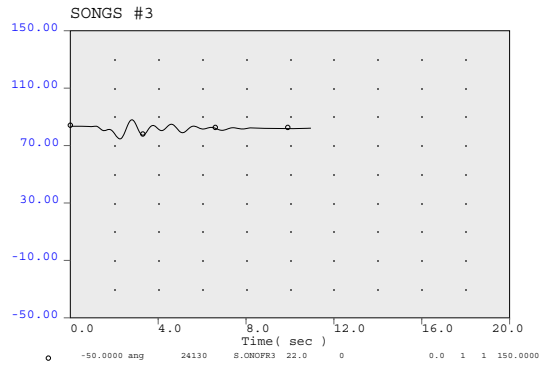


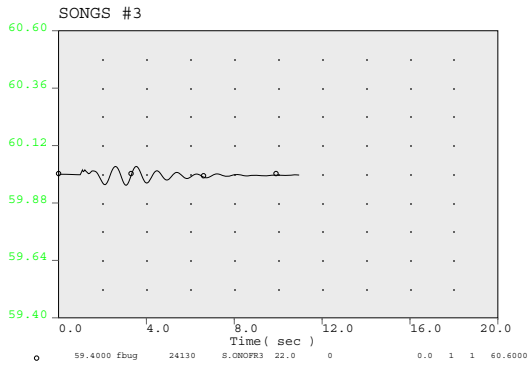
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

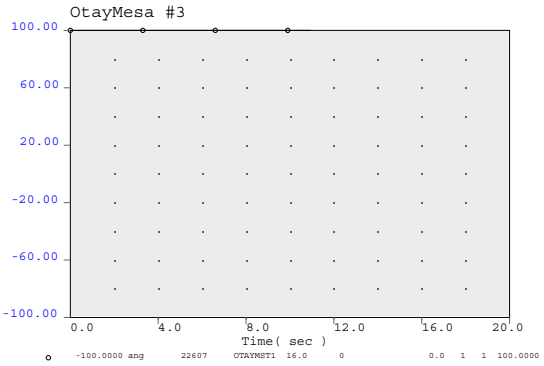
RELATIVE ROTOR ANGLE & FREQUENCY

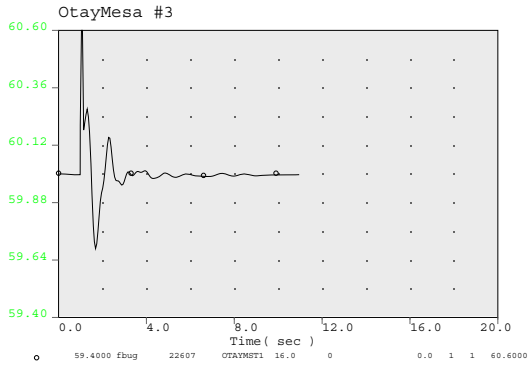












SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

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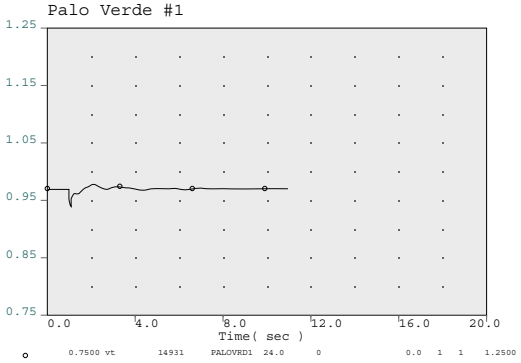
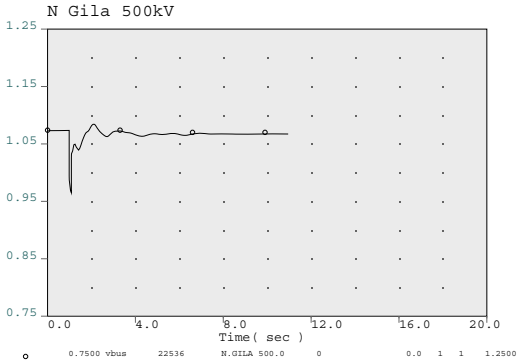
SDGE	int_OM-SY_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:23:29 2010

RELATIVE VOLTAGE

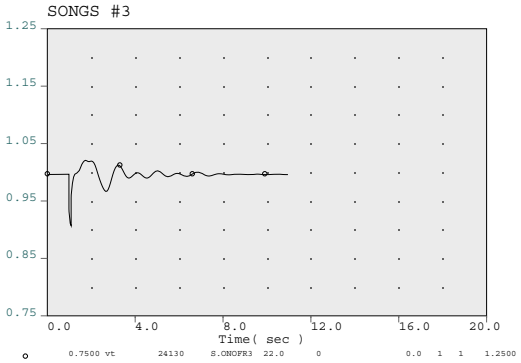
Palo Verde #1



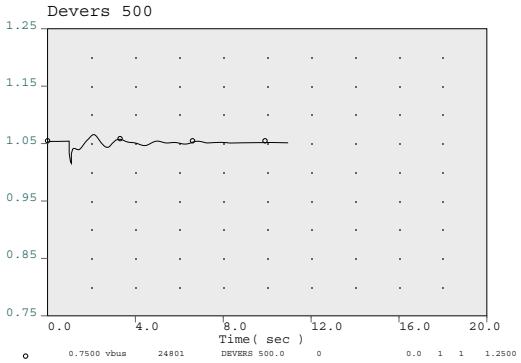
N Gila 500kV



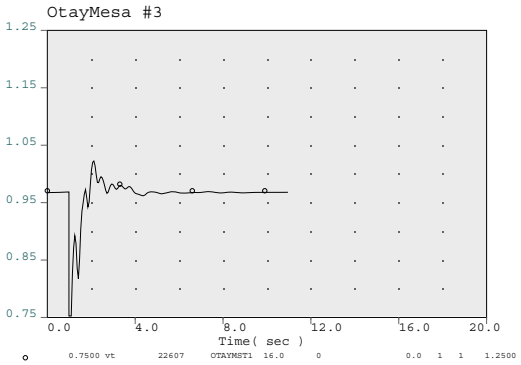
SONGS #3



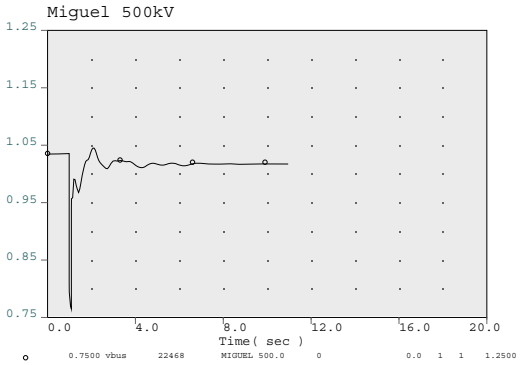
Devers 500



OtayMesa #3



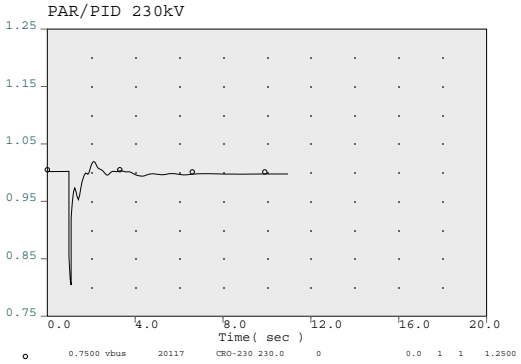
Miguel 500kV



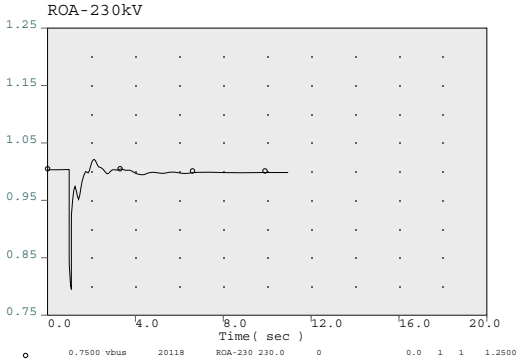
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

Affected System Voltage Check and Comparison

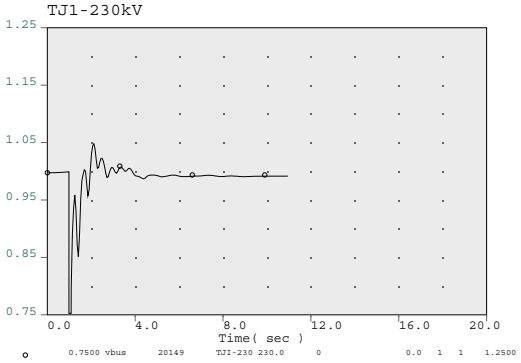
PAR/PID 230kV



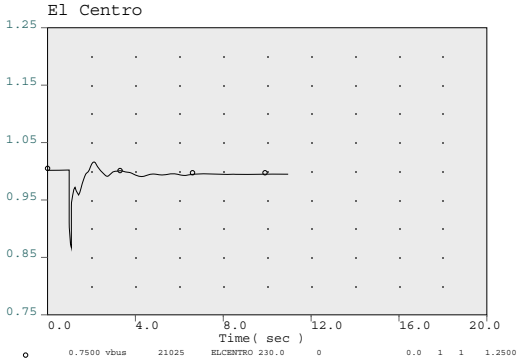
ROA-230kV



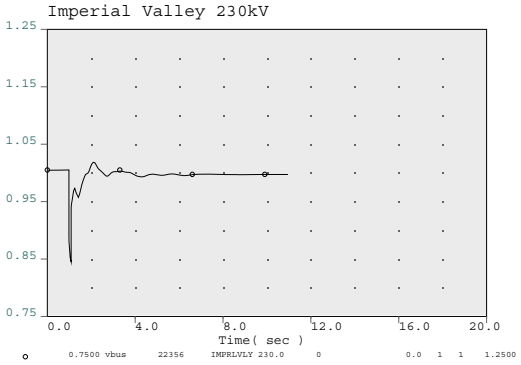
TJ1-230kV



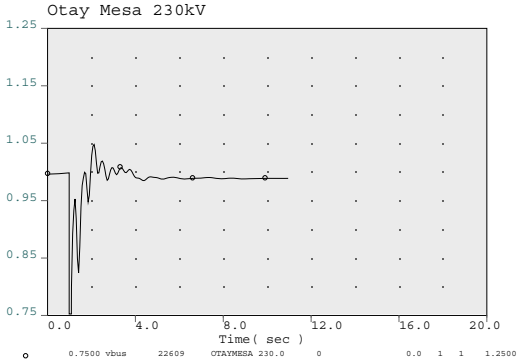
El Centro



Imperial Valley 230kV

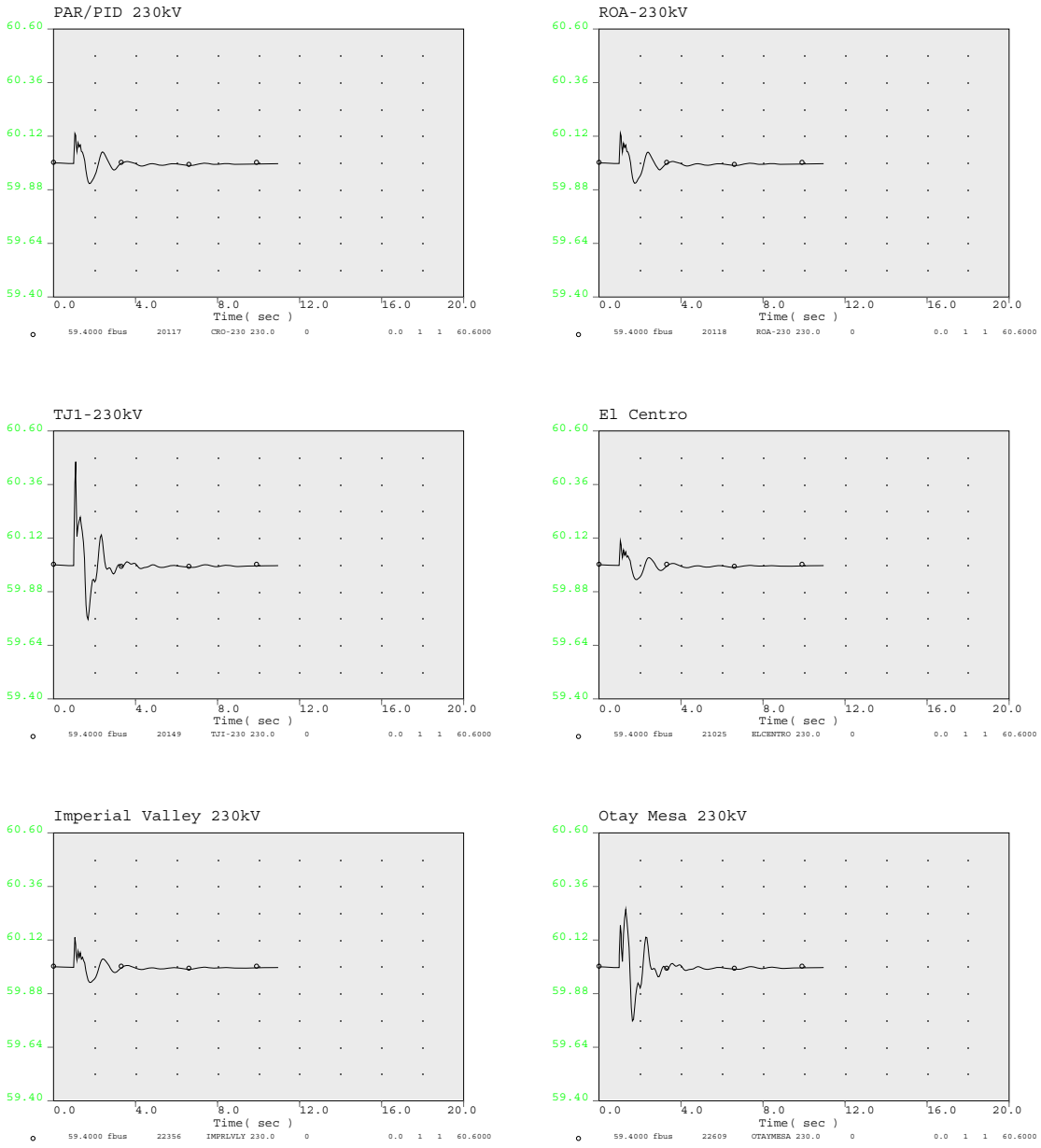


Otay Mesa 230kV



SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

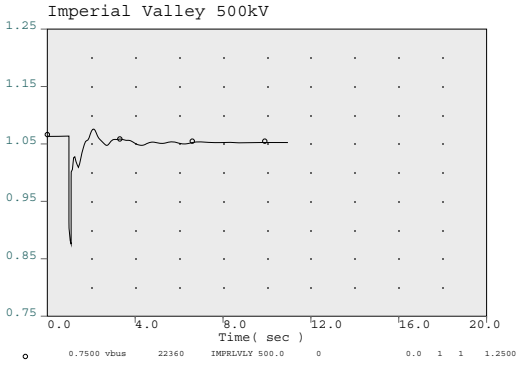
Affected System Frequency Check and Comparison



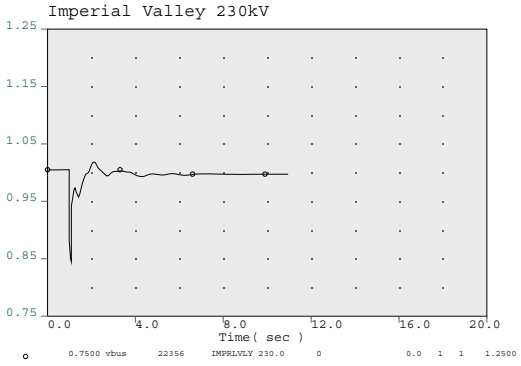
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

Imperial Valley Area - VOLTAGE

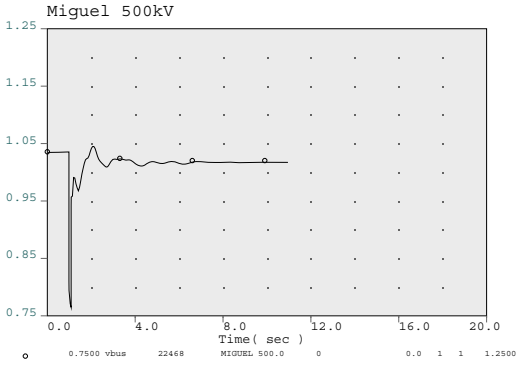
Imperial Valley 500kV



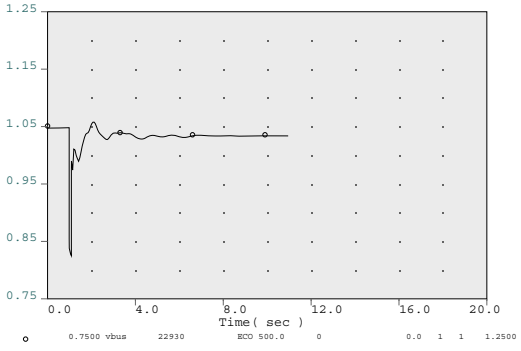
Imperial Valley 230kV



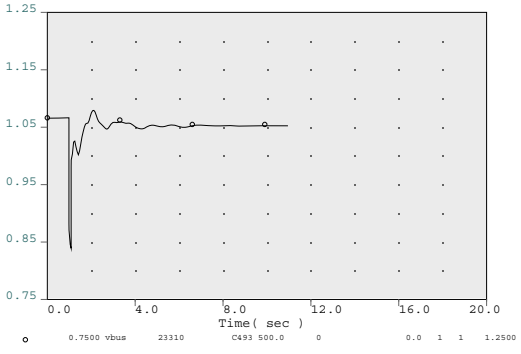
Miguel 500kV



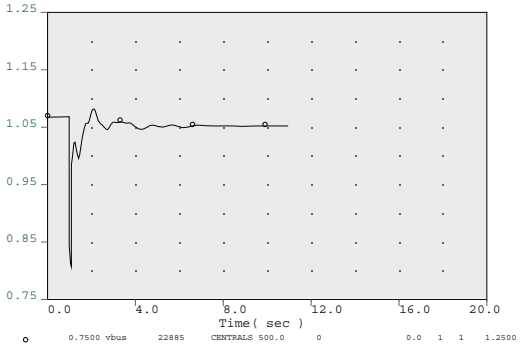
Windfarms 500



C493 500kV



CENTRALS 500kV

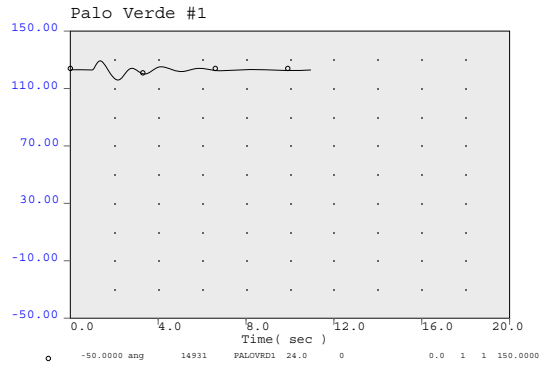


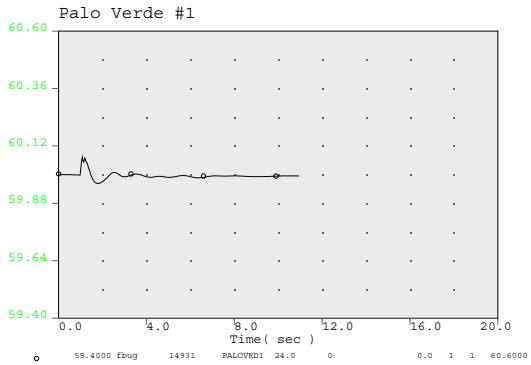
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

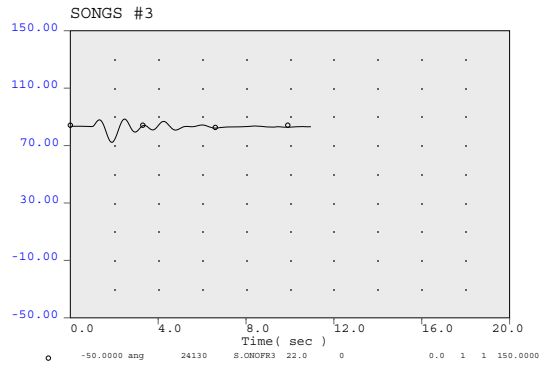
Imperial Valley Area - Frequency

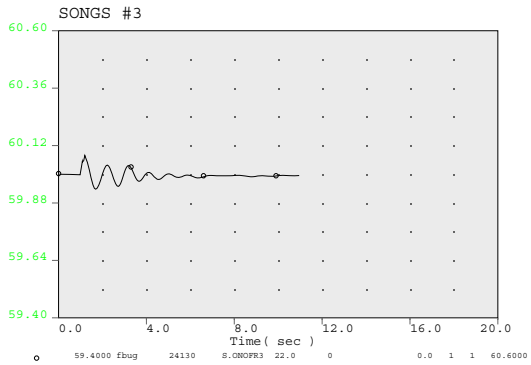
SDG&E Cluster 2 - pre int
2014 Light Autumn
Otay Mesa - Southbay 230 kV N-1

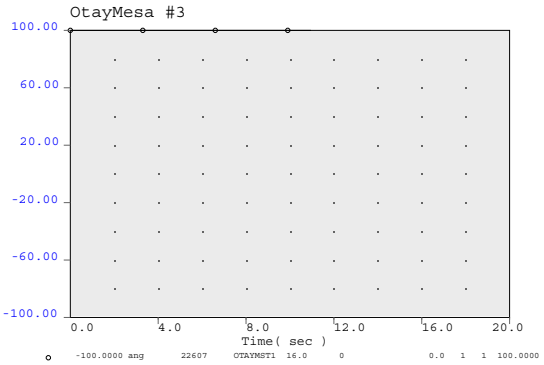
RELATIVE ROTOR ANGLE & FREQUENCY

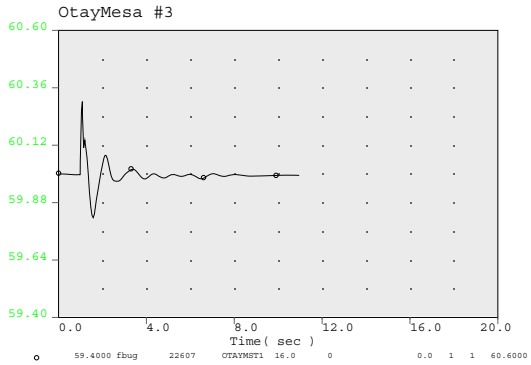












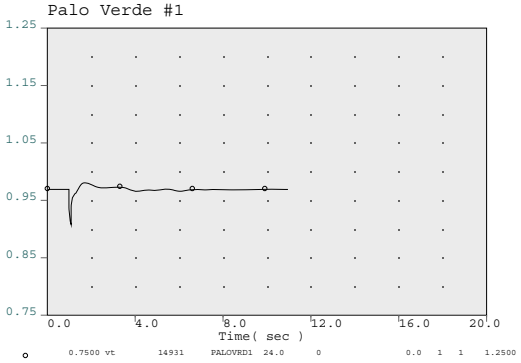
SDG&E Cluster 2 - pre int
2014 Light Autumn
Sycamore - Miguel 230 kV N-1

Page 1

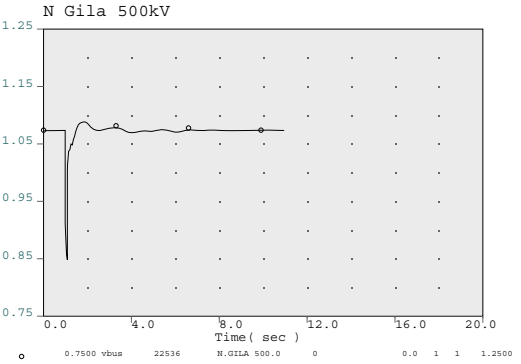
SDGE	int_SX-ML_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:23:35 2010

RELATIVE VOLTAGE

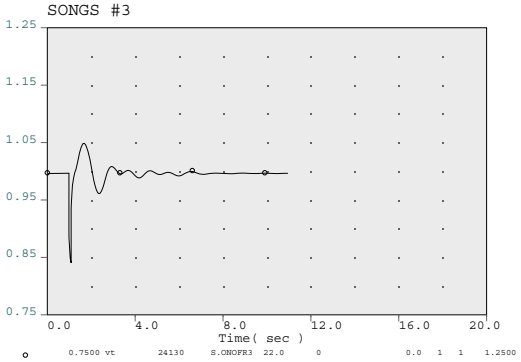
Palo Verde #1



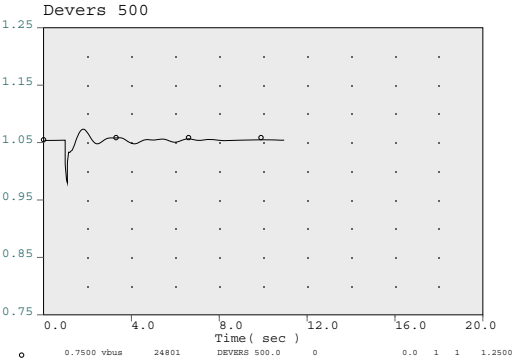
N Gila 500kV



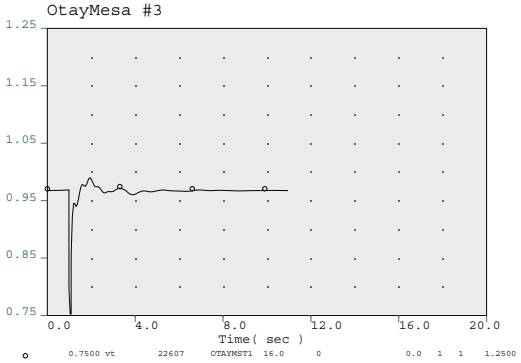
SONGS #3



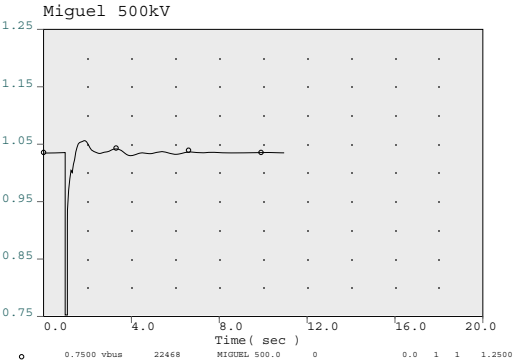
Devers 500



OtayMesa #3



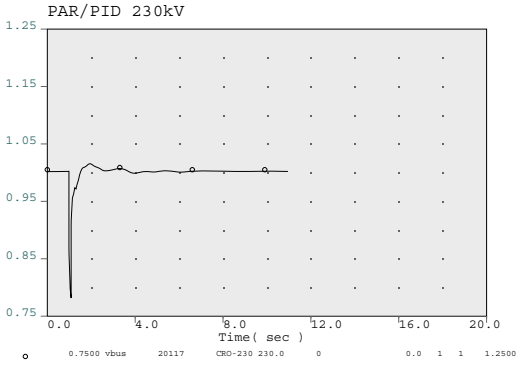
Miguel 500kV



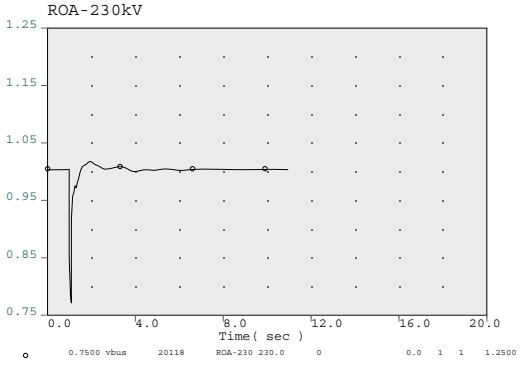
SDG&E Cluster 2 - pre int
2014 Light Autumn
Sycamore - Miguel 230 kV N-1

Affected System Voltage Check and Comparison

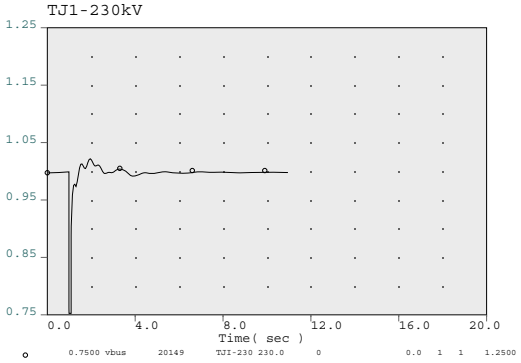
PAR/PID 230kV



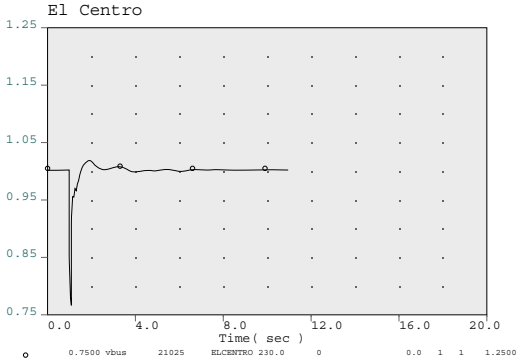
ROA-230kV



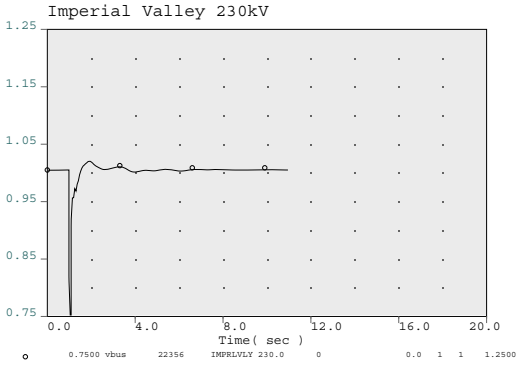
TJ1-230kV



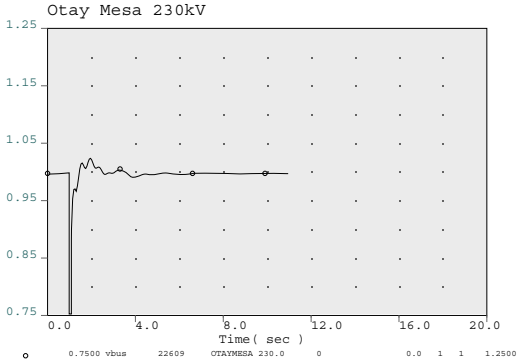
El Centro



Imperial Valley 230kV



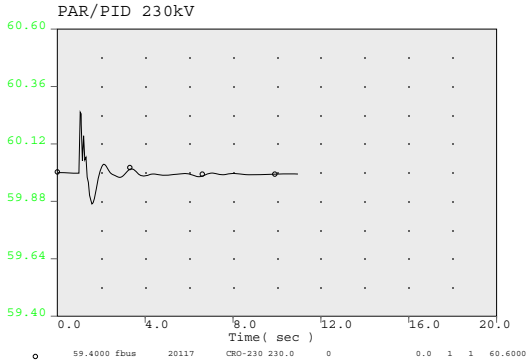
Otay Mesa 230kV



SDG&E Cluster 2 - pre int
2014 Light Autumn
Sycamore - Miguel 230 kV N-1

Affected System Frequency Check and Comparison

PAR/PID 230kV



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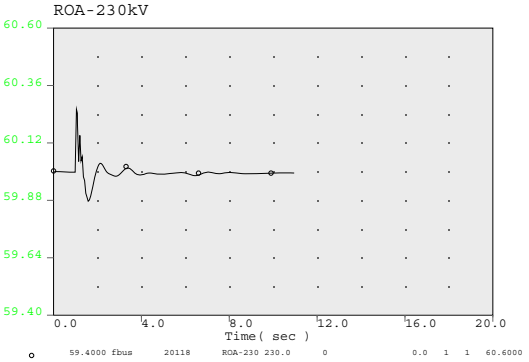
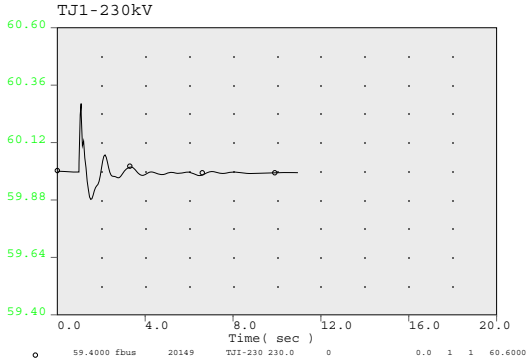
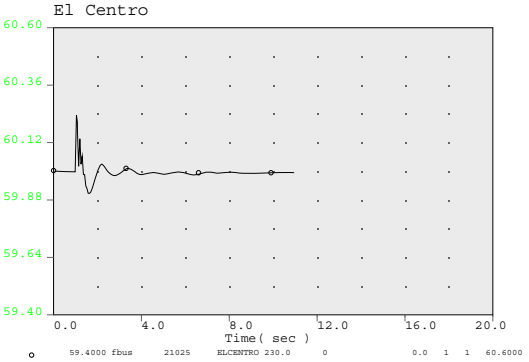


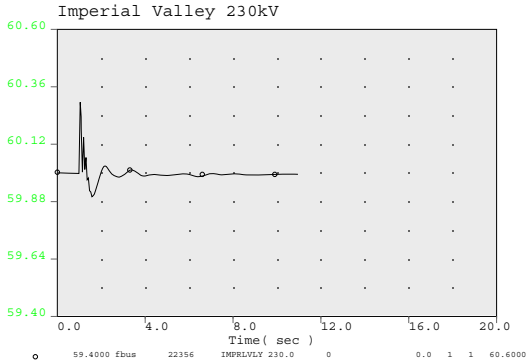
TJ1-230kV



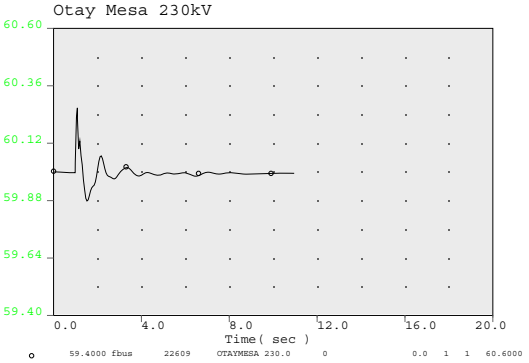
El Centro



Imperial Valley 230kV



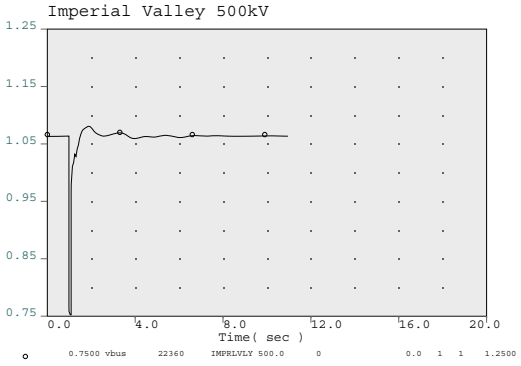
Otay Mesa 230kV



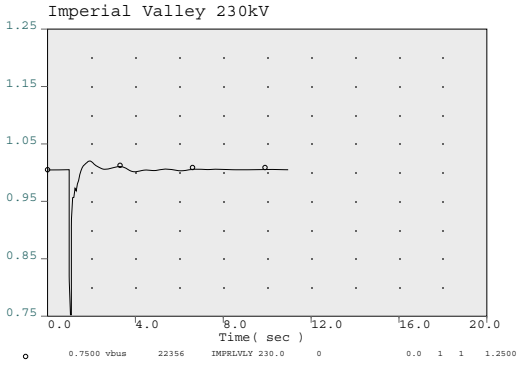
SDG&E Cluster 2 - pre int
2014 Light Autumn
Sycamore - Miguel 230 kV N-1

Imperial Valley Area - VOLTAGE

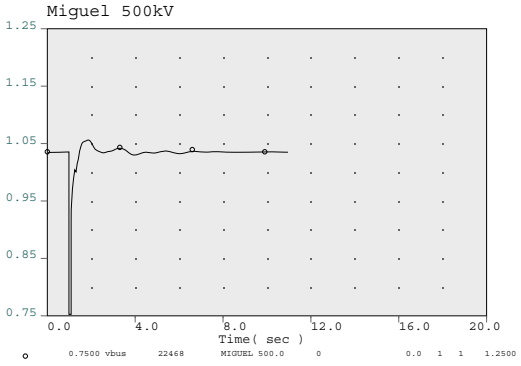
Imperial Valley 500kV



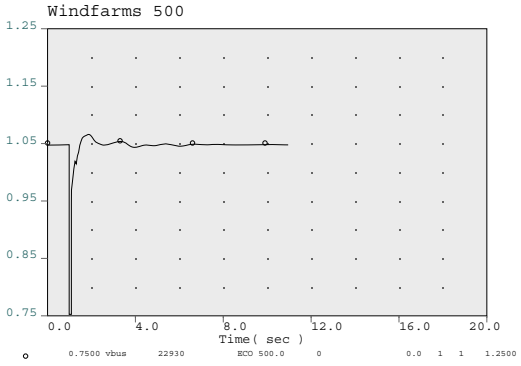
Imperial Valley 230kV



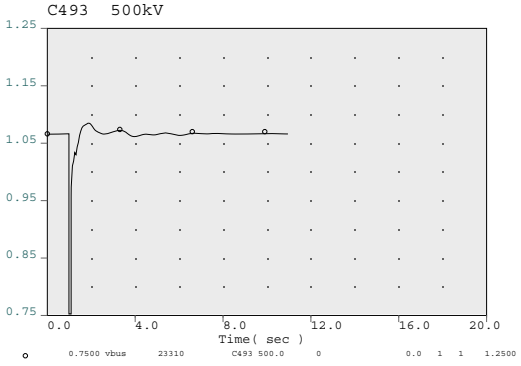
Miguel 500kV



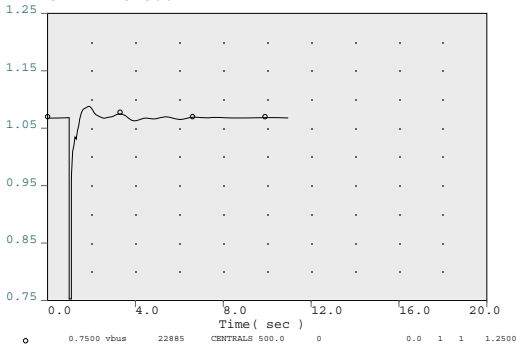
Windfarms 500



C493 500kV

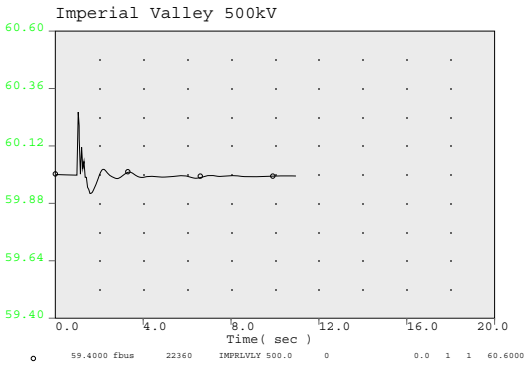


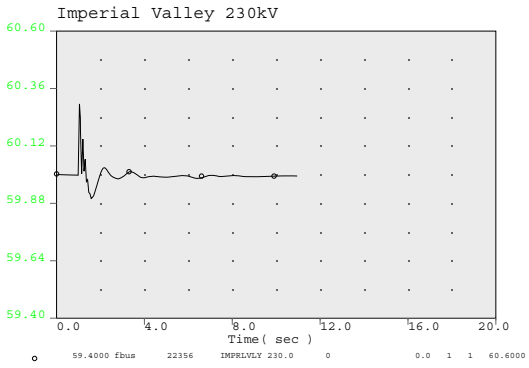
CENTRALS 500kV

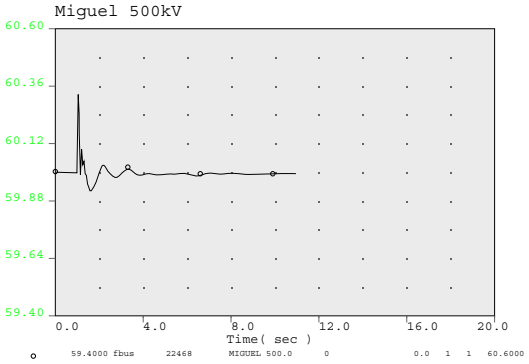


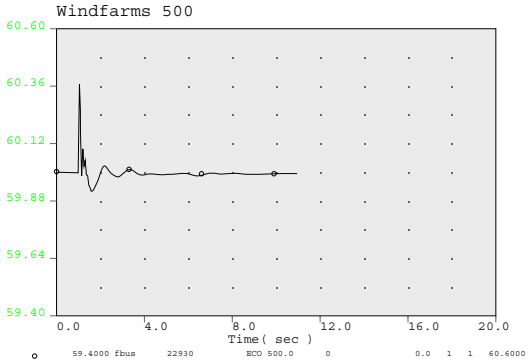
SDG&E Cluster 2 - pre int
2014 Light Autumn
Sycamore - Miguel 230 kV N-1

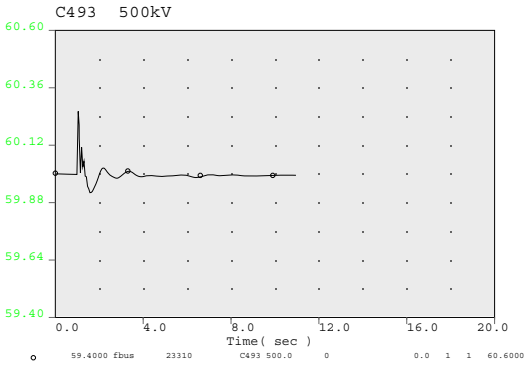
Imperial Valley Area - Frequency

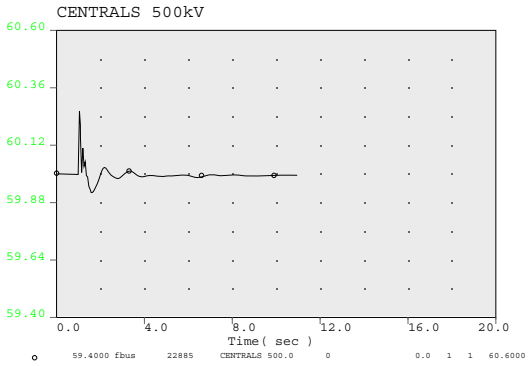






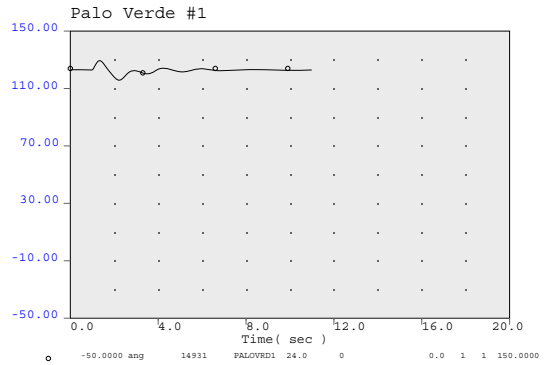


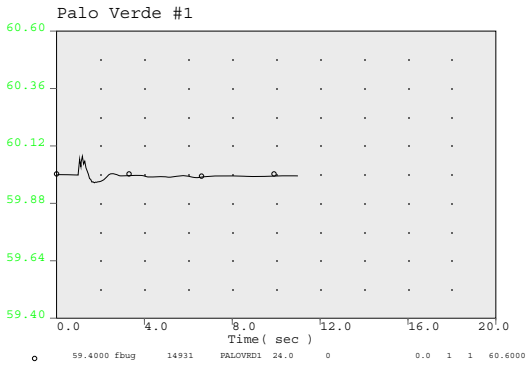


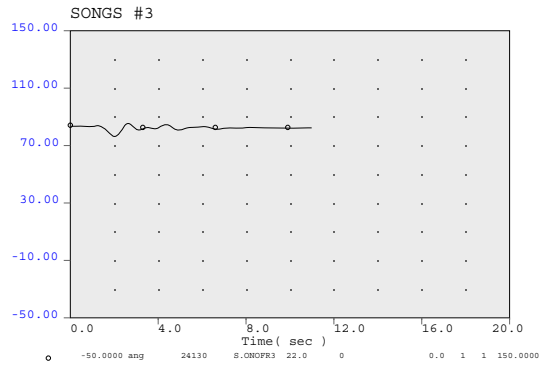


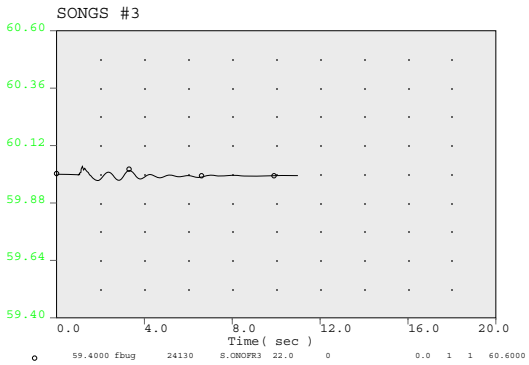
SDG&E Cluster 2 - pre int
2014 Light Autumn
Sycamore - Miguel 230 kV N-1

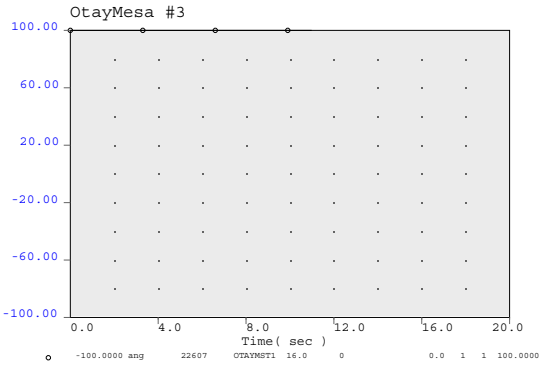
RELATIVE ROTOR ANGLE & FREQUENCY

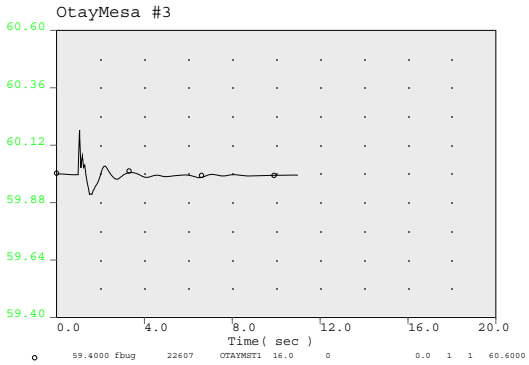








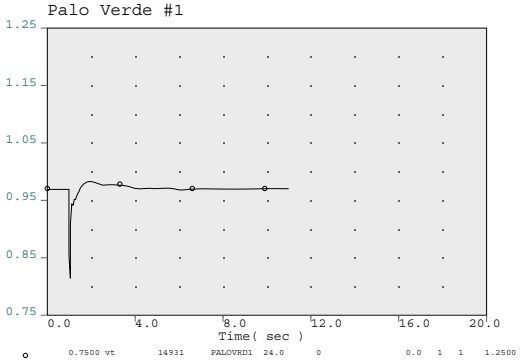




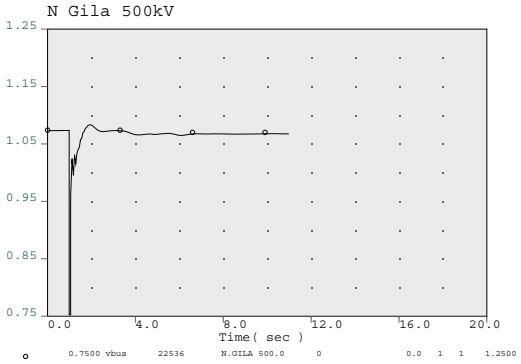
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

RELATIVE VOLTAGE

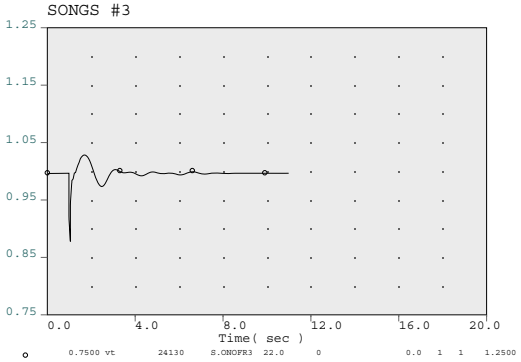
Palo Verde #1



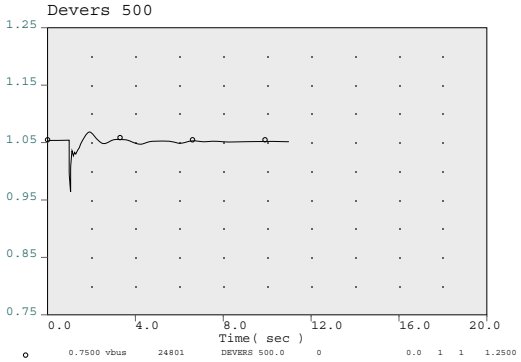
N Gila 500kV



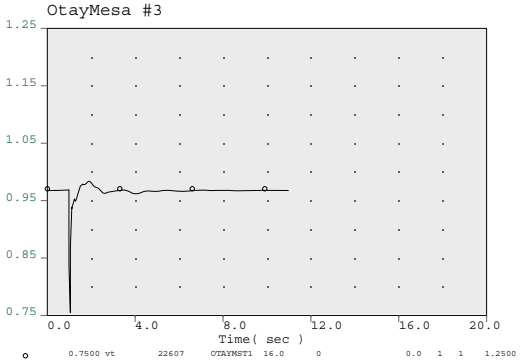
SONGS #3



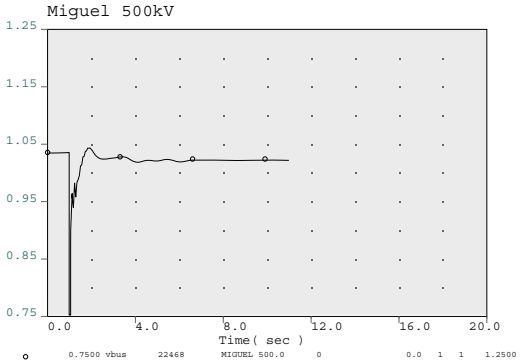
Devers 500



OtayMesa #3



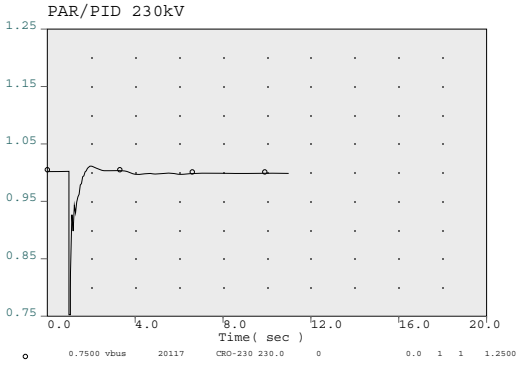
Miguel 500kV



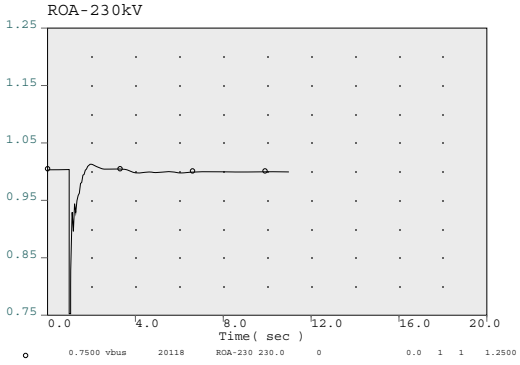
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

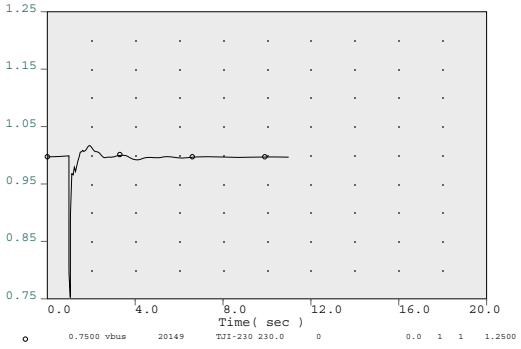
PAR/PID 230kV



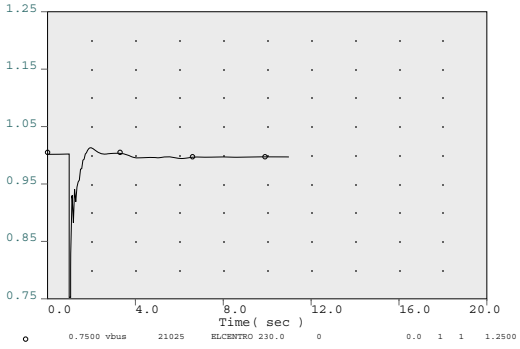
ROA-230kV



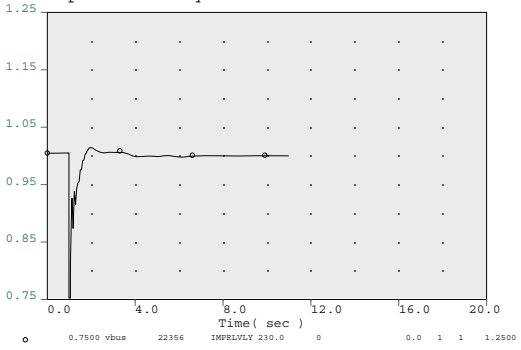
TJ1-230kV



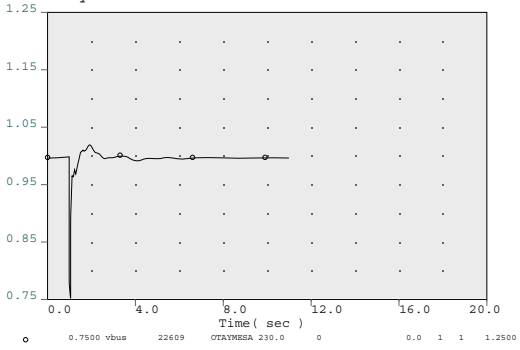
El Centro



Imperial Valley 230kV



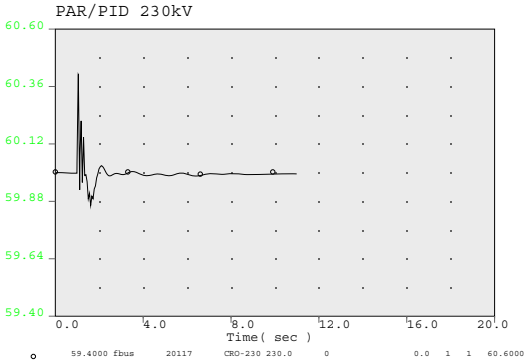
Otay Mesa 230kV



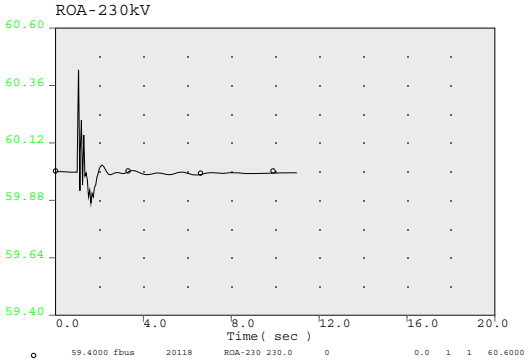
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

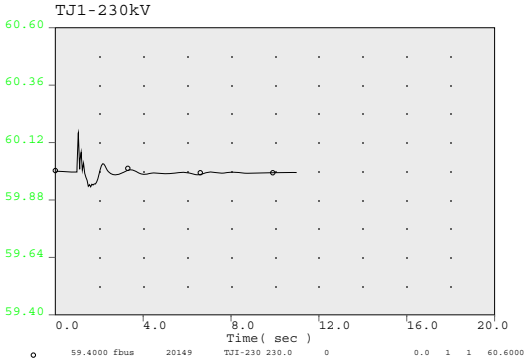
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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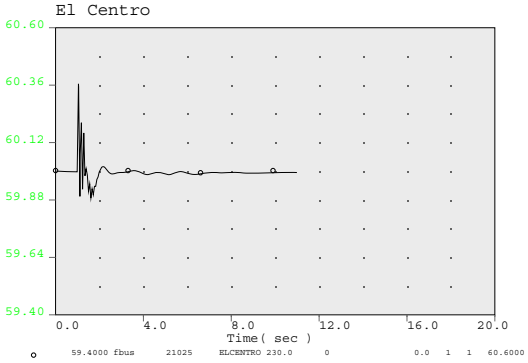
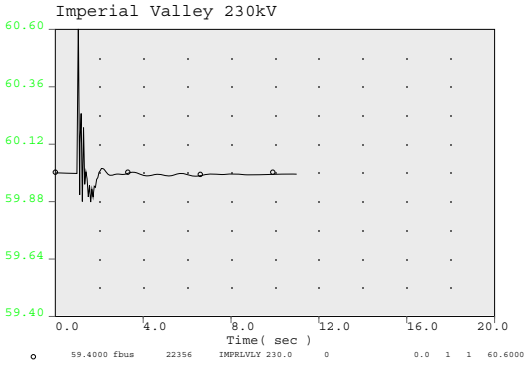
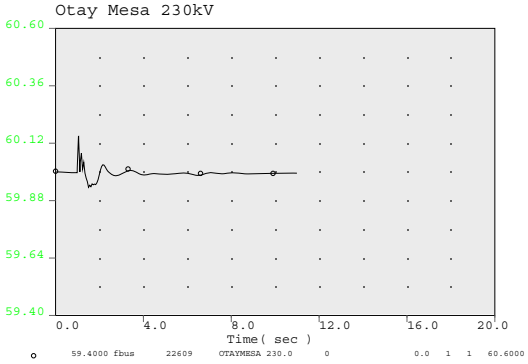


Imperial Valley 230kV



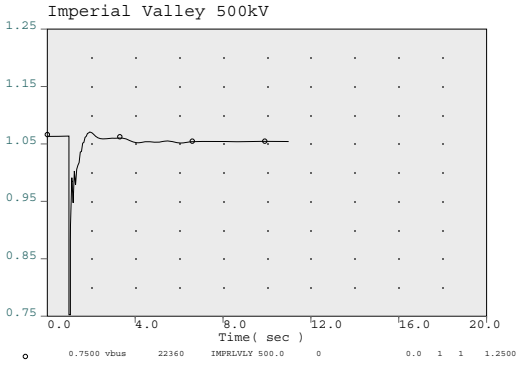
Otay Mesa 230kV



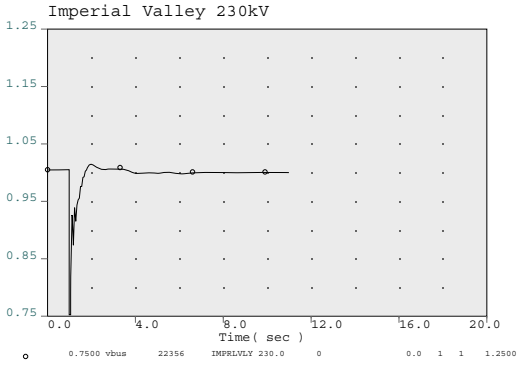
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

Imperial Valley Area - VOLTAGE

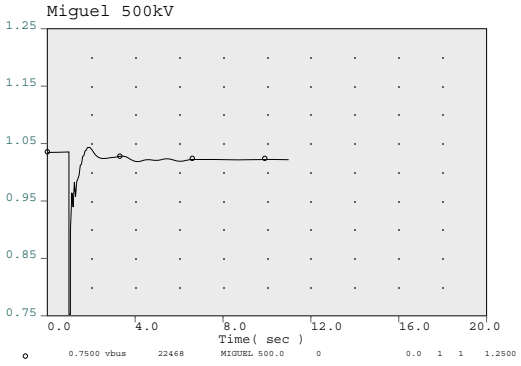
Imperial Valley 500kV



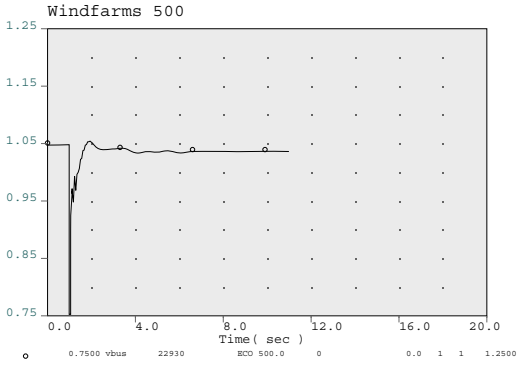
Imperial Valley 230kV



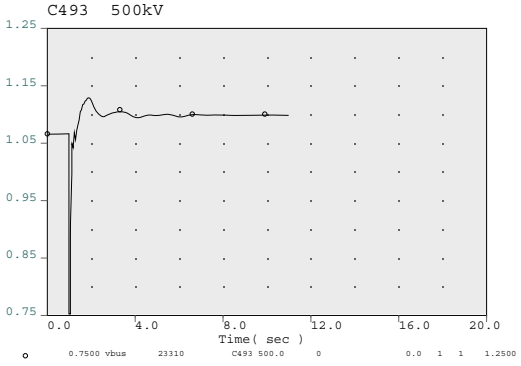
Miguel 500kV



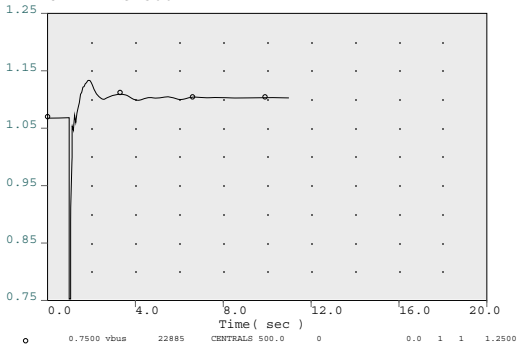
Windfarms 500



C493 500kV

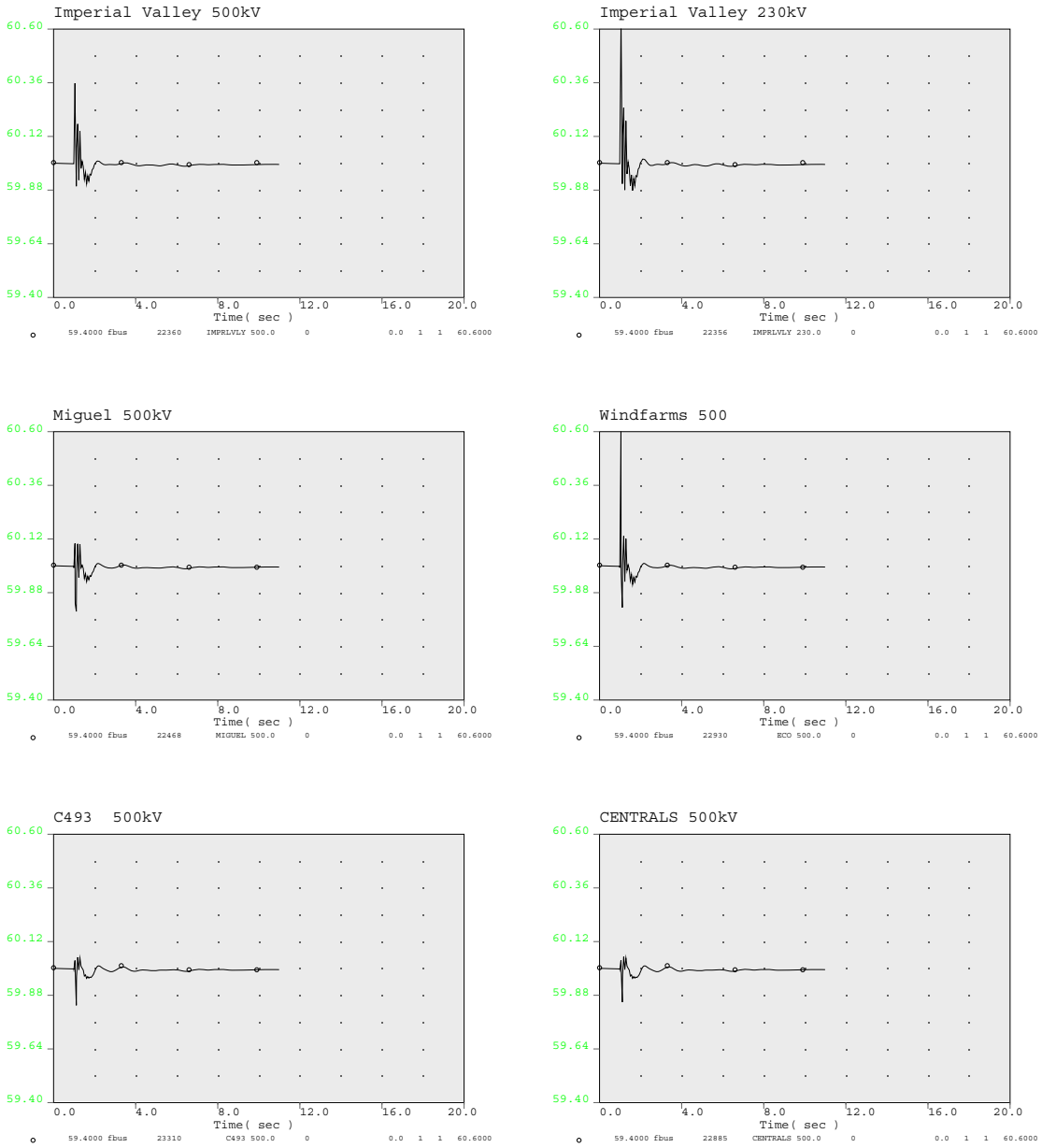


CENTRALS 500kV



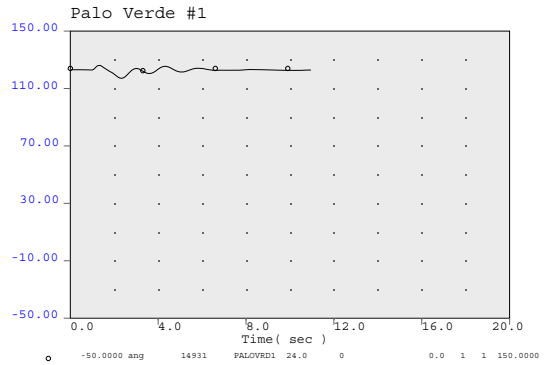
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

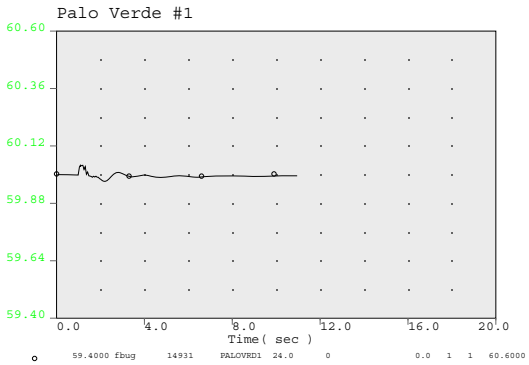
Imperial Valley Area - Frequency

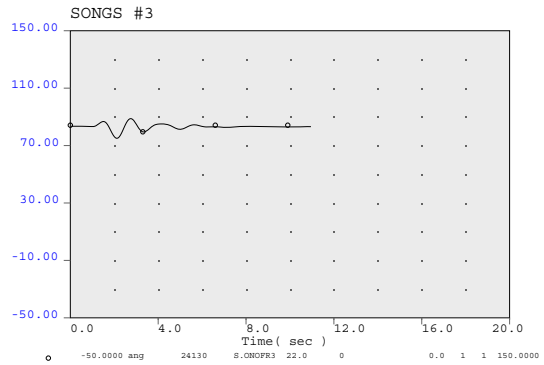


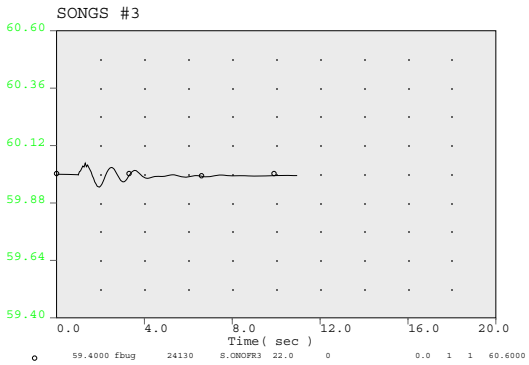
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley- C493 500kV line1

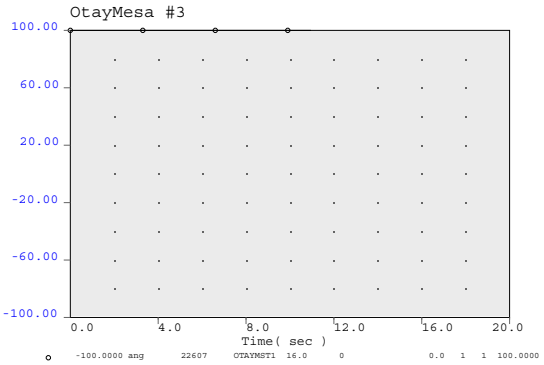
RELATIVE ROTOR ANGLE & FREQUENCY

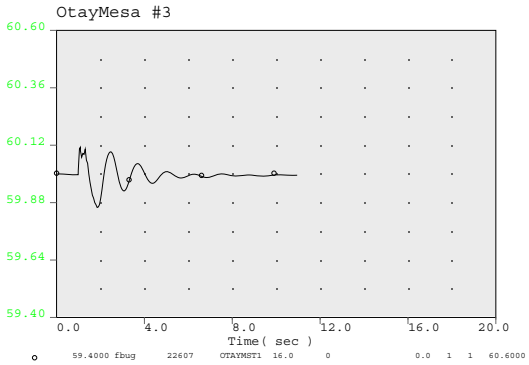












SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

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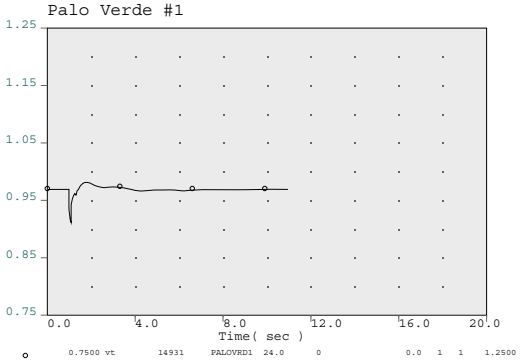
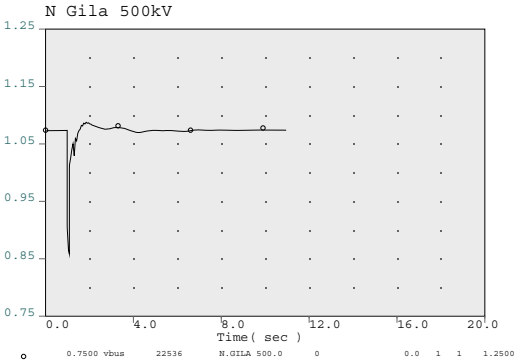
SDGE	iv_roa_6_slo_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:24:06 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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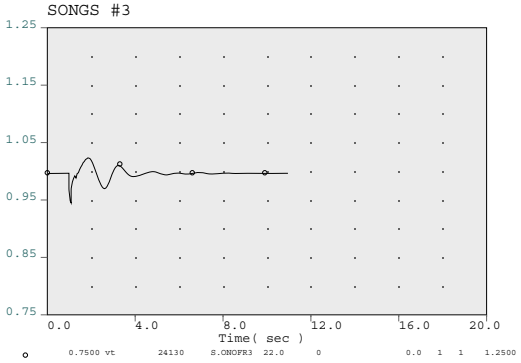
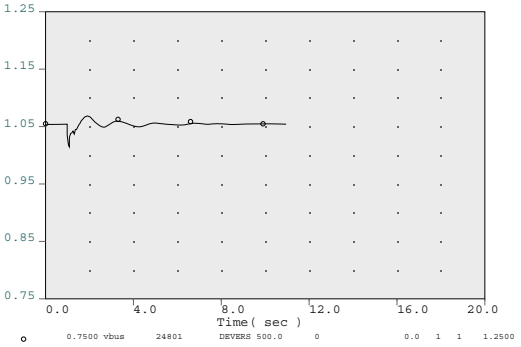
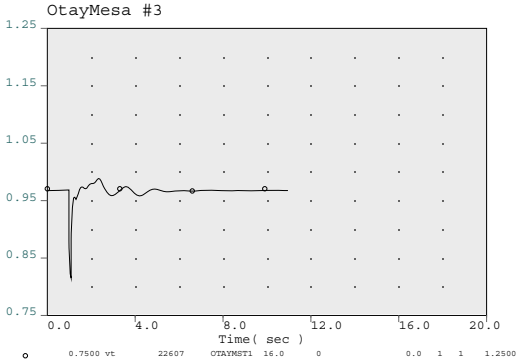


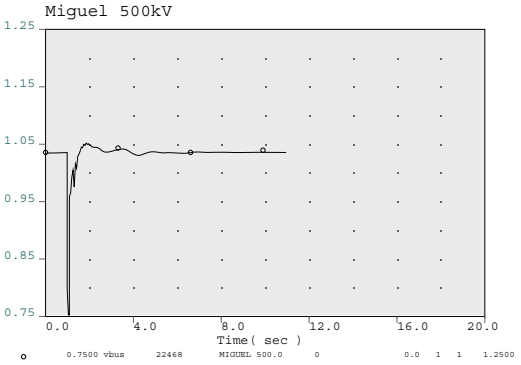
Devers 500



OtayMesa #3



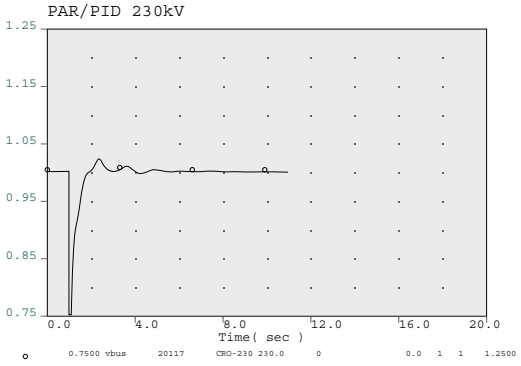
Miguel 500kV



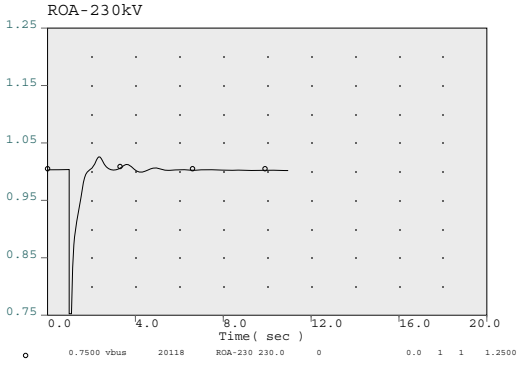
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

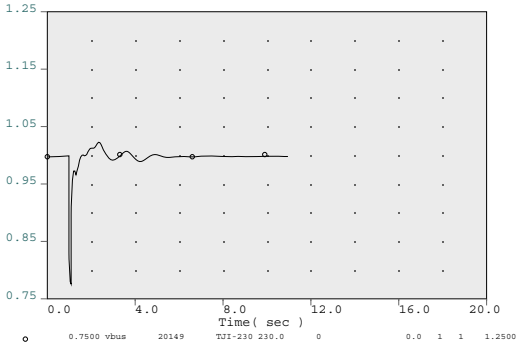
PAR/PID 230kV



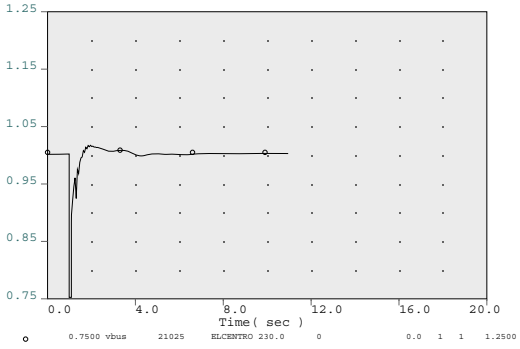
ROA-230kV



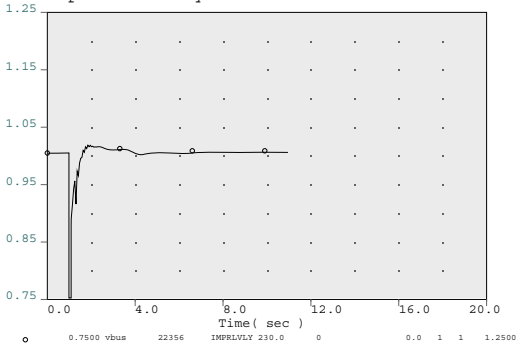
TJ1-230kV



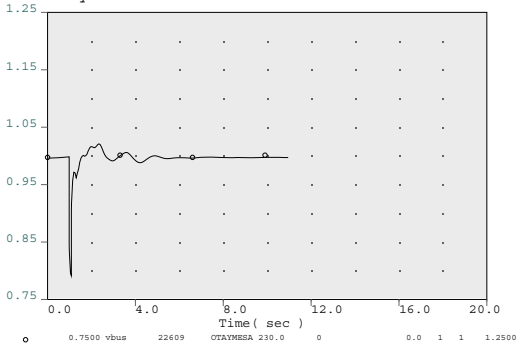
El Centro



Imperial Valley 230kV

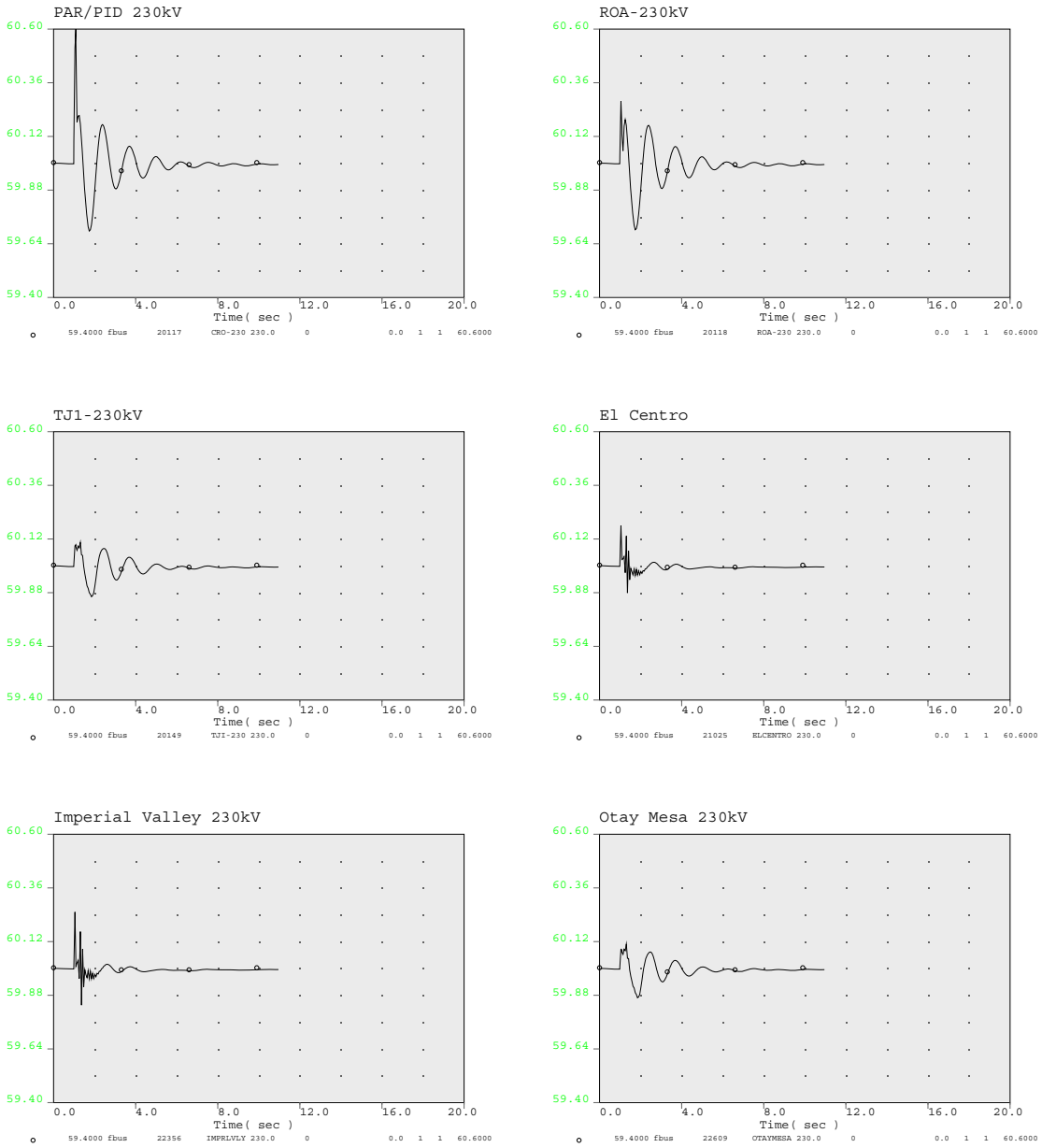


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

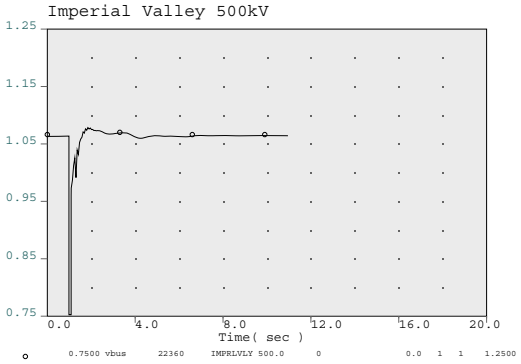
Affected System Frequency Check and Comparison



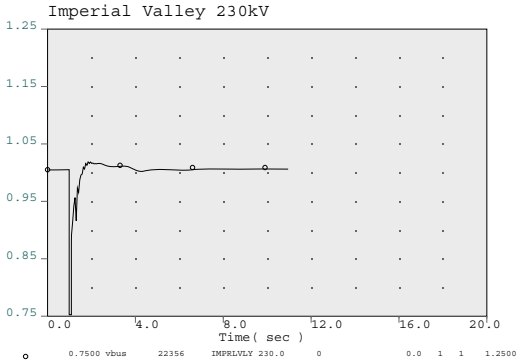
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

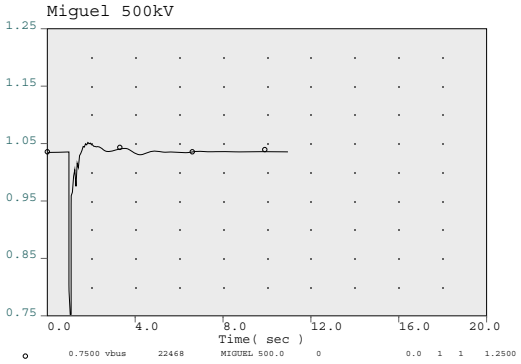
Imperial Valley 500kV



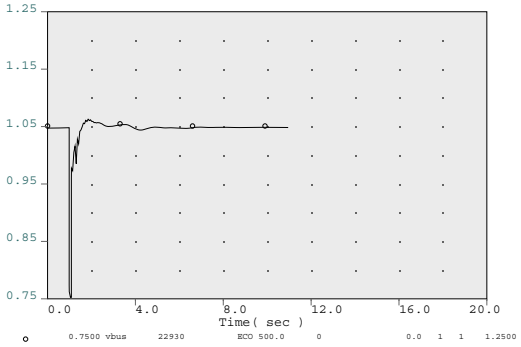
Imperial Valley 230kV



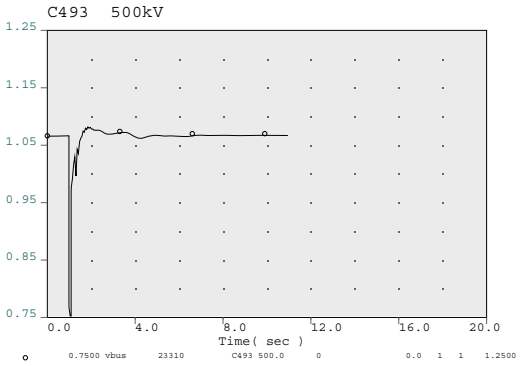
Miguel 500kV



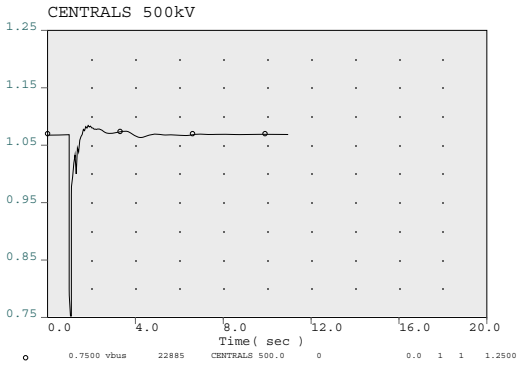
Windfarms 500



C493 500kV

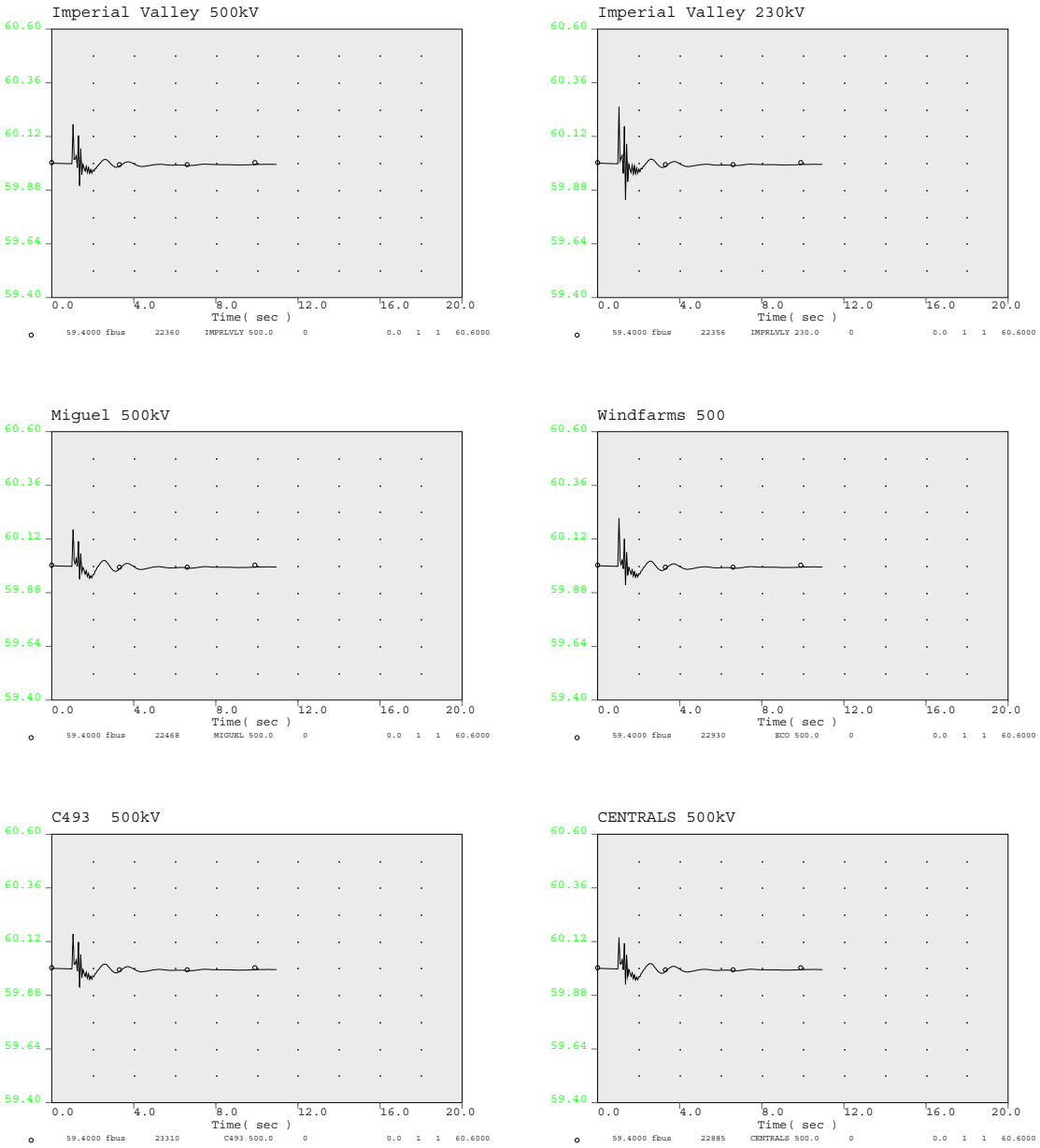


CENTRALS 500kV



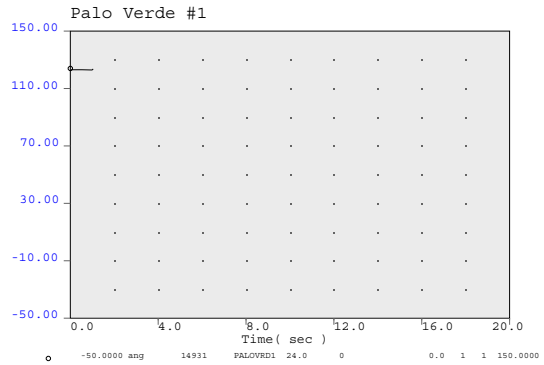
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

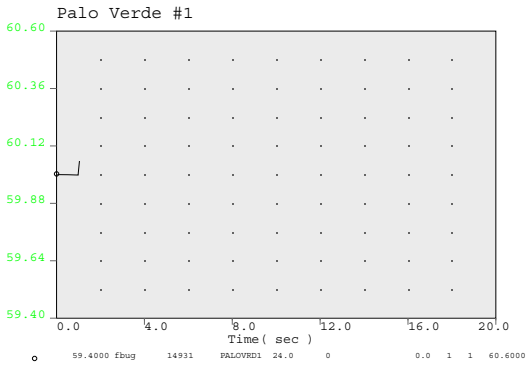
Imperial Valley Area - Frequency

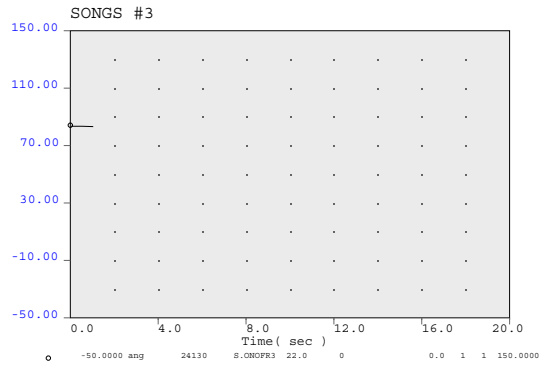


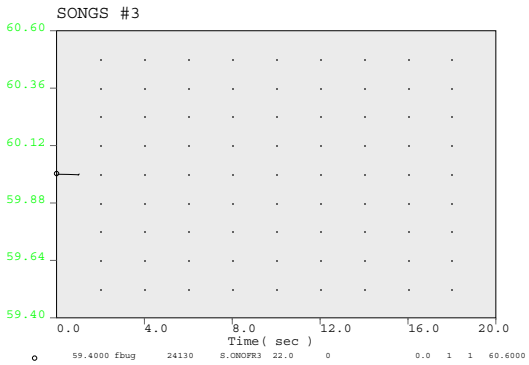
SDG&E Cluster 2 - pre
2014 Light Autumn
Loss of IV-ROA 230 kV SLO

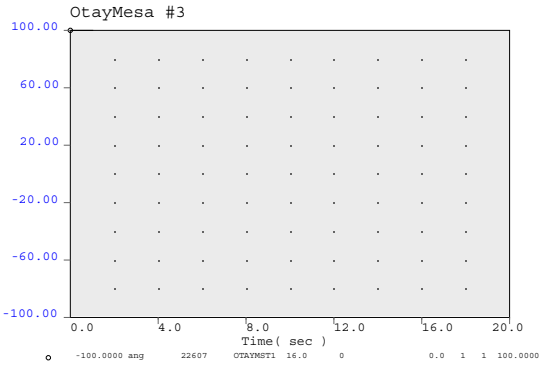
RELATIVE ROTOR ANGLE & FREQUENCY

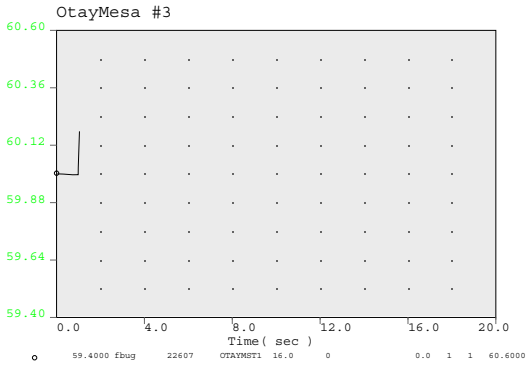












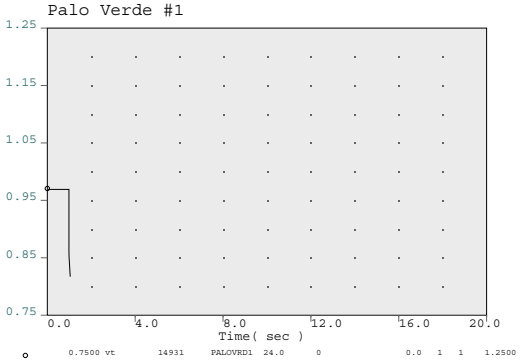
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-Windfarms 500 kV line1

Page 1

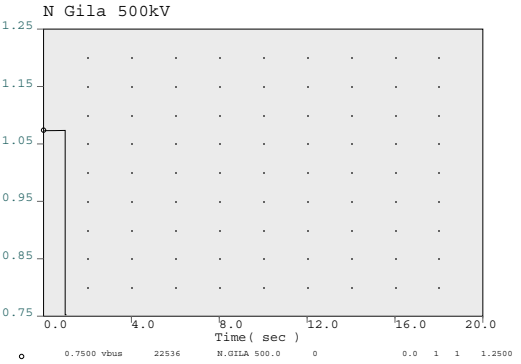
SDGE	IV_Wnd1_noRAS_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:24:10 2010

RELATIVE VOLTAGE

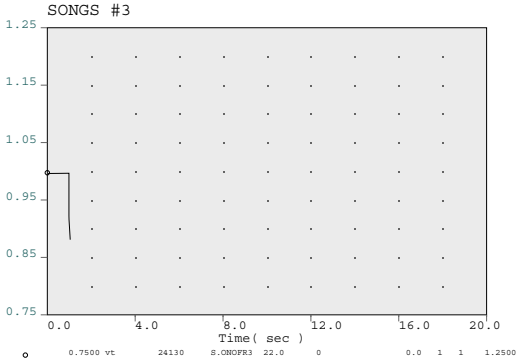
Palo Verde #1



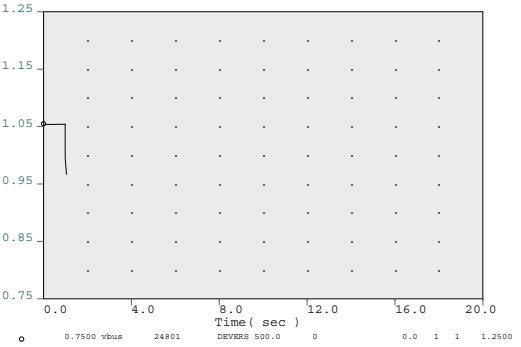
N Gila 500kV



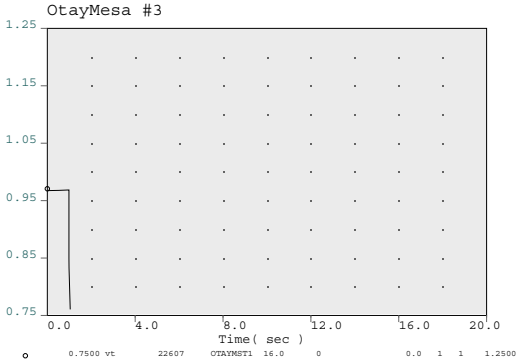
SONGS #3



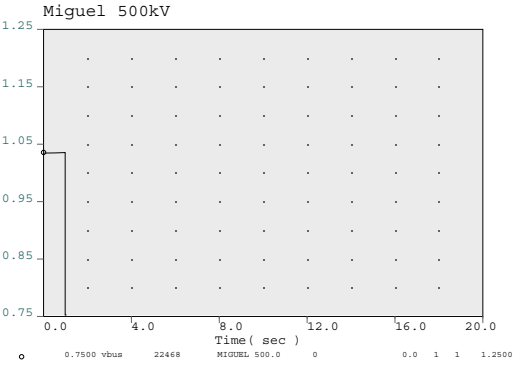
Devers 500



OtayMesa #3



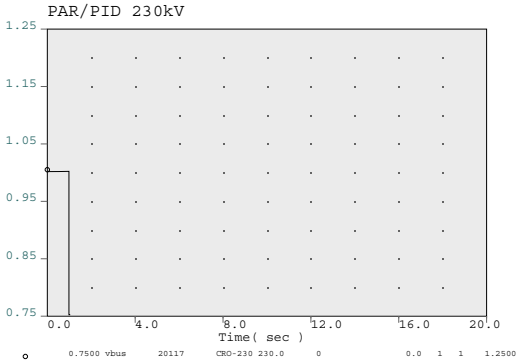
Miguel 500kV



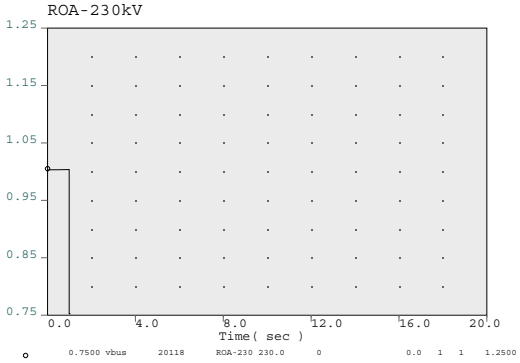
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-Windfarms 500 kV line1

Affected System Voltage Check and Comparison

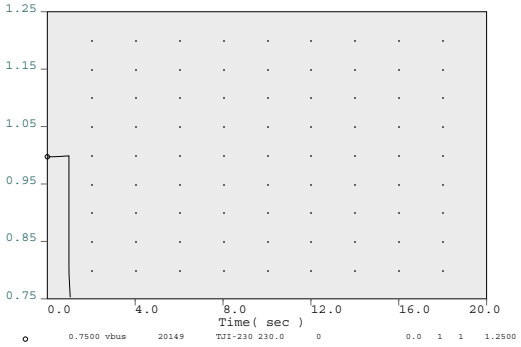
PAR/PID 230kV



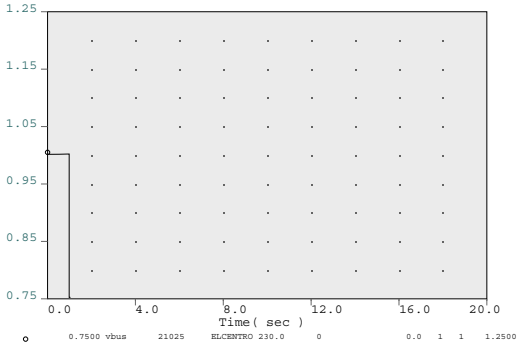
ROA-230kV



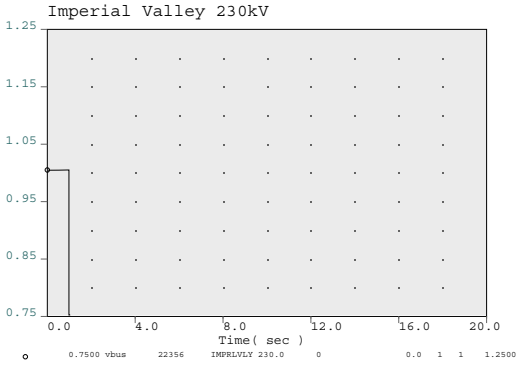
TJ1-230kV



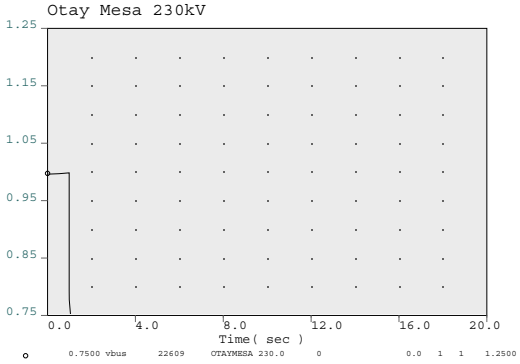
El Centro



Imperial Valley 230kV

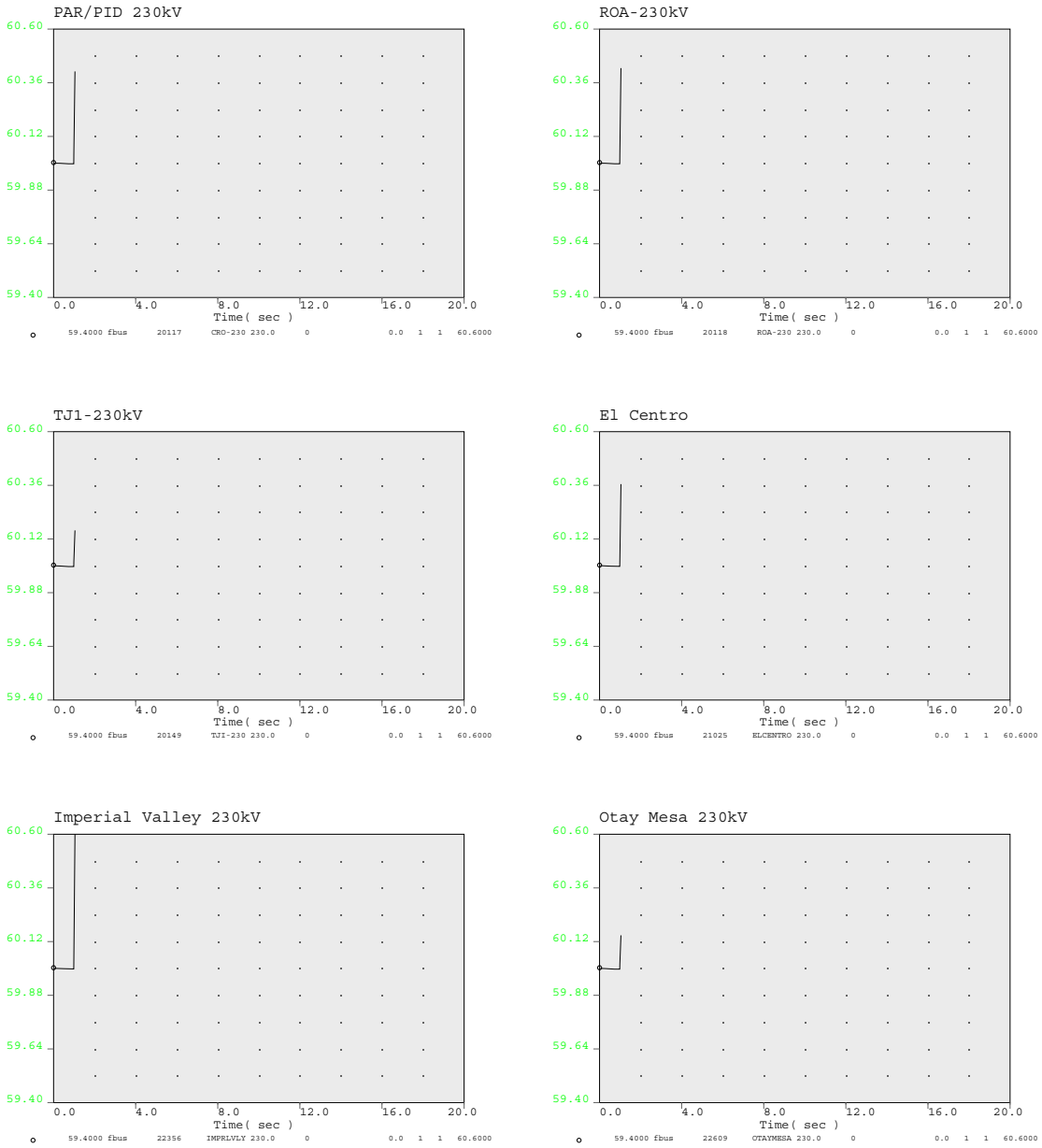


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-Windfarms 500 kV line1

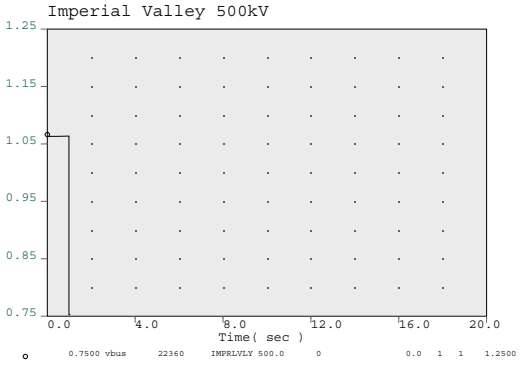
Affected System Frequency Check and Comparison



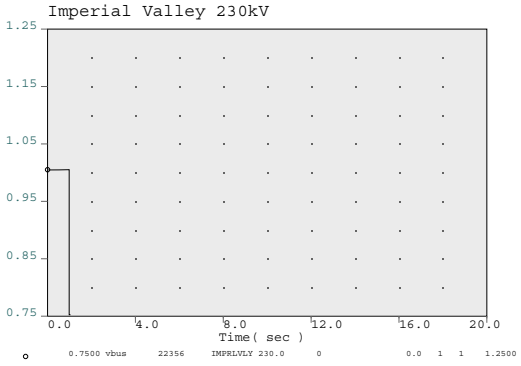
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-Windfarms 500 kV line1

Imperial Valley Area - VOLTAGE

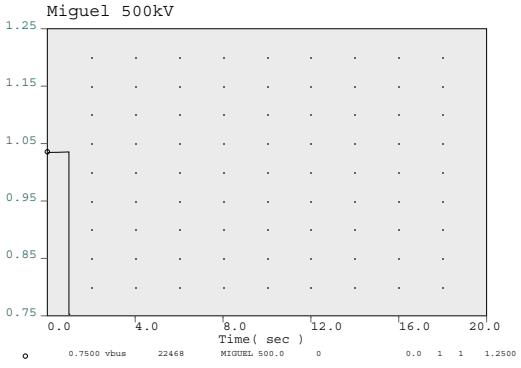
Imperial Valley 500kV



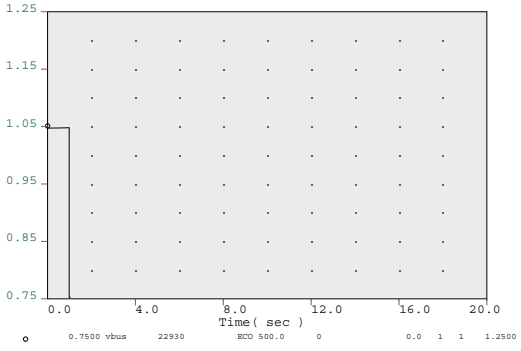
Imperial Valley 230kV



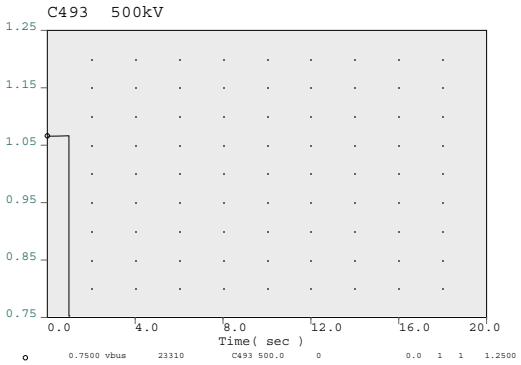
Miguel 500kV



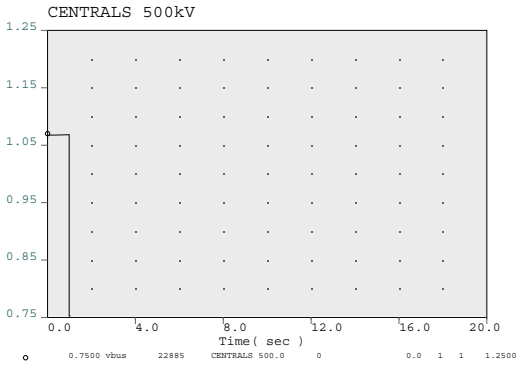
Windfarms 500



C493 500kV

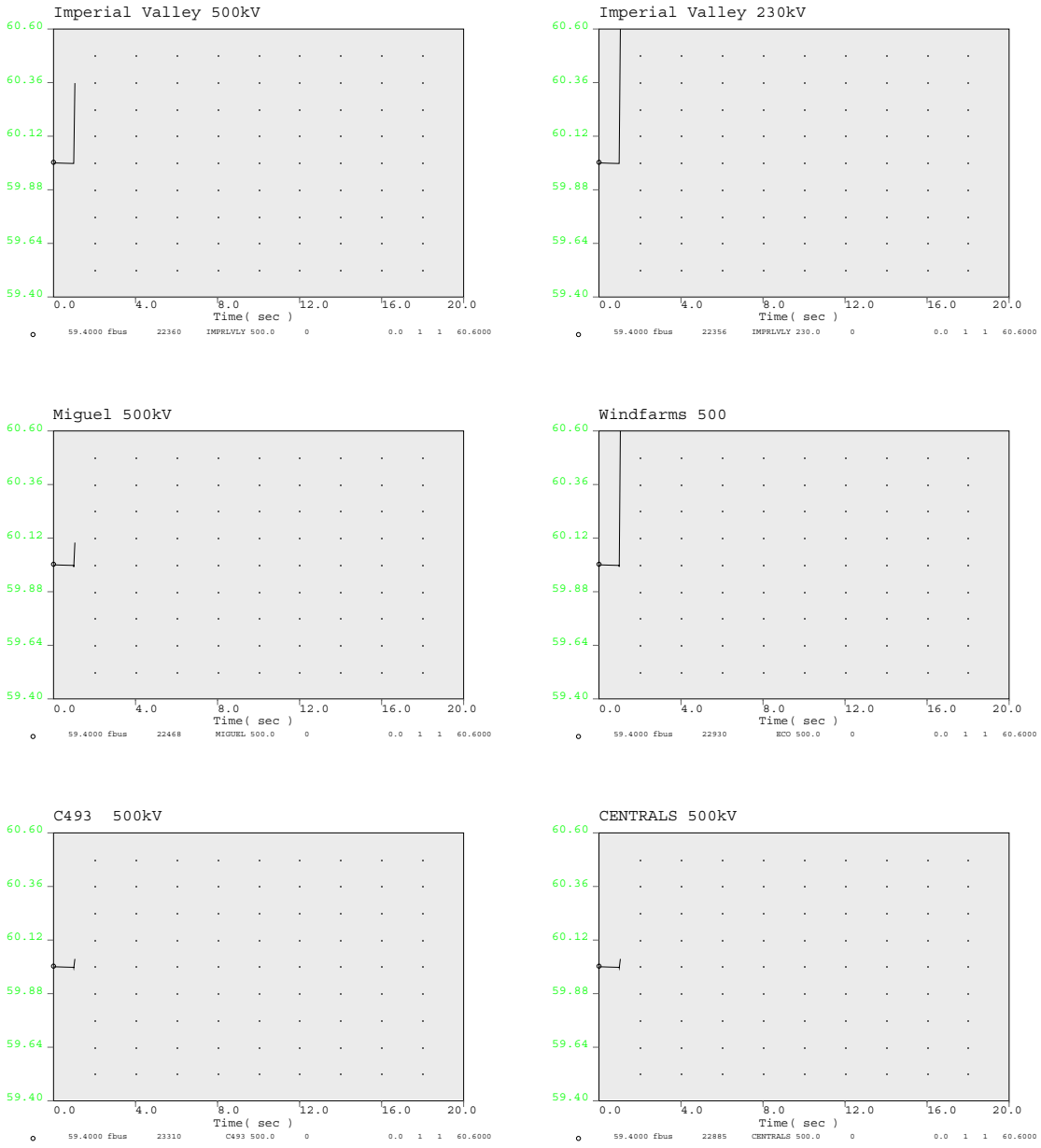


CENTRALS 500kV



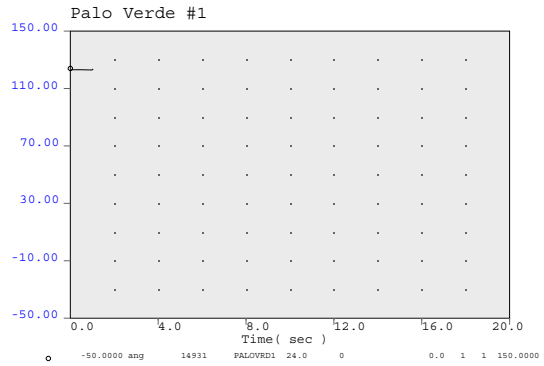
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-Windfarms 500 kV line1

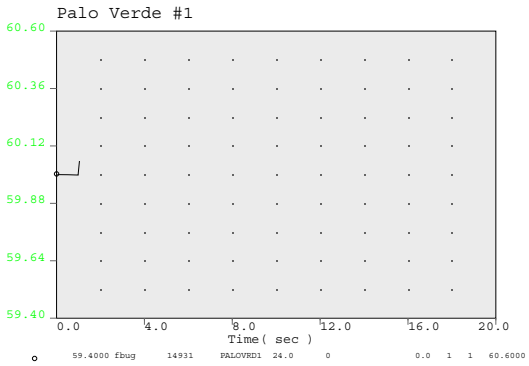
Imperial Valley Area - Frequency

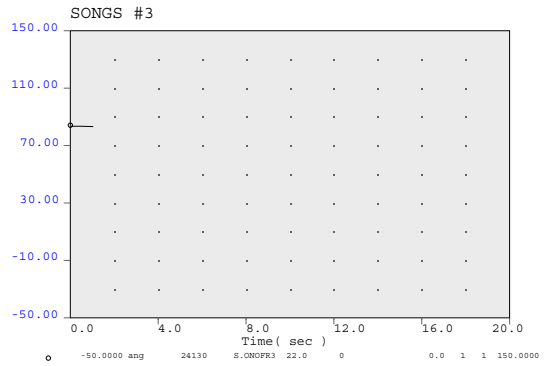


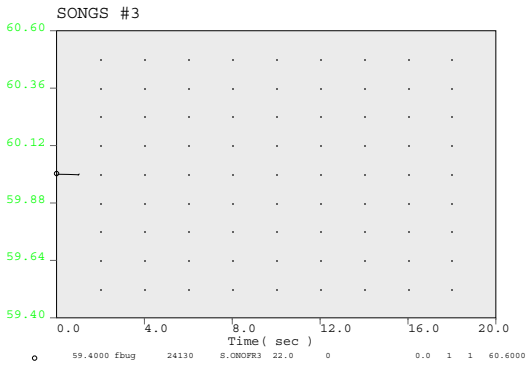
SDG&E Cluster 2 - pre
2014 Light Autumn
Imperial Valley-Windfarms 500 kV line1

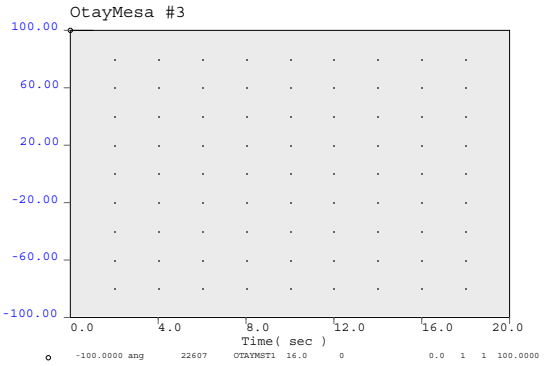
RELATIVE ROTOR ANGLE & FREQUENCY

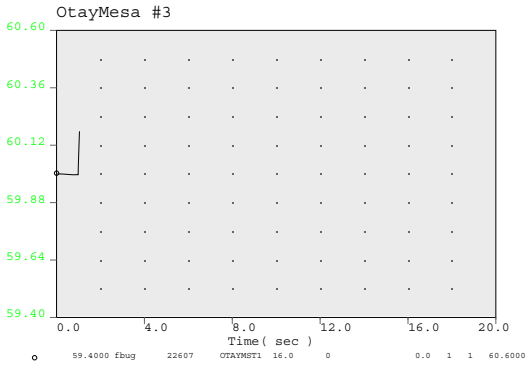












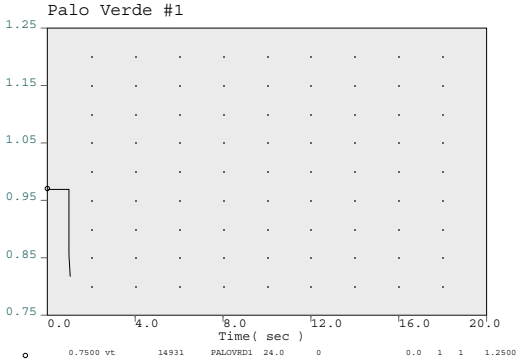
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-Windfarms & IV-C493 500 kV Double line outage

Page 1

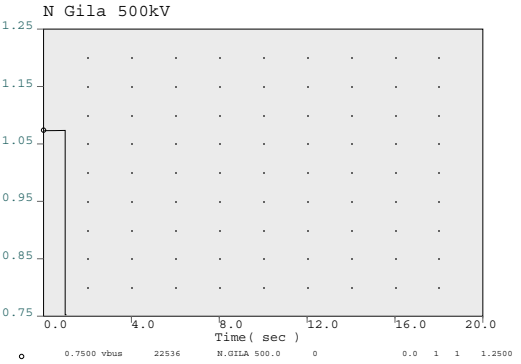
SDGE	IV_Wnd1_RAS_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:24:15 2010

RELATIVE VOLTAGE

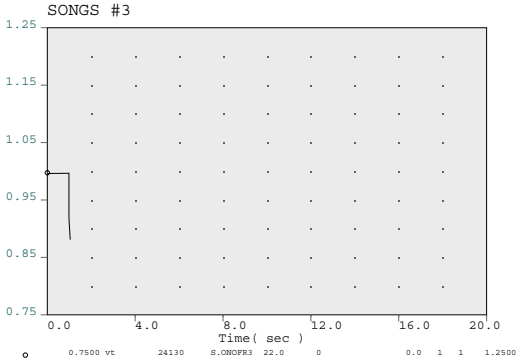
Palo Verde #1



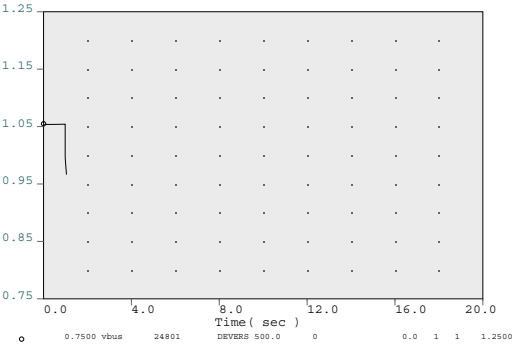
N Gila 500kV



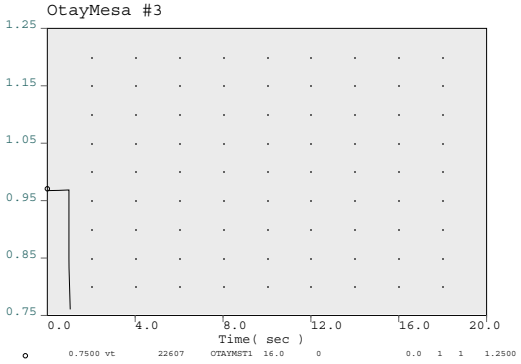
SONGS #3



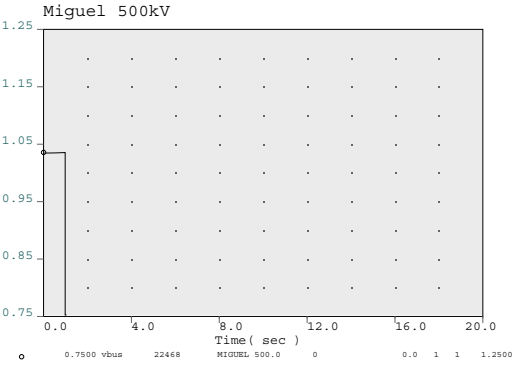
Devers 500



OtayMesa #3



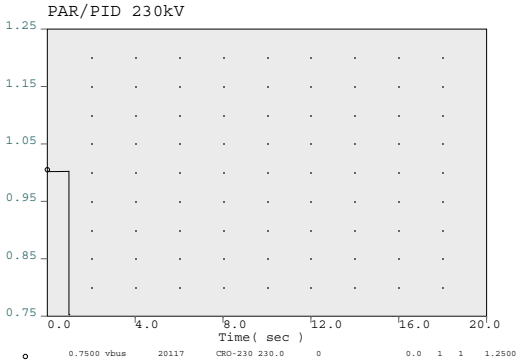
Miguel 500kV



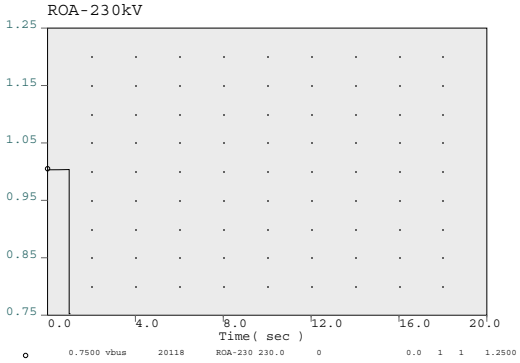
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-Windfarms & IV-C493 500 kV Double line outage

Affected System Voltage Check and Comparison

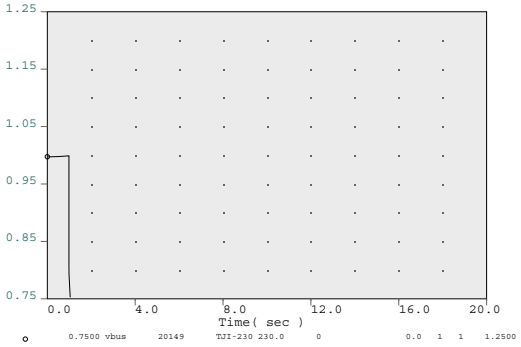
PAR/PID 230kV



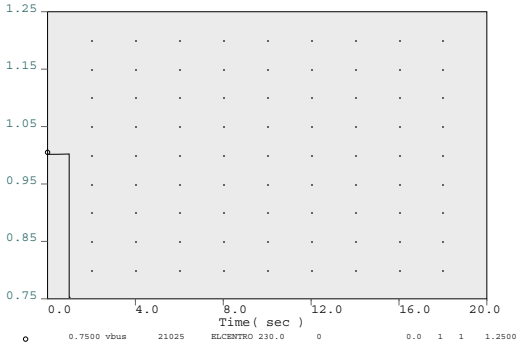
ROA-230kV



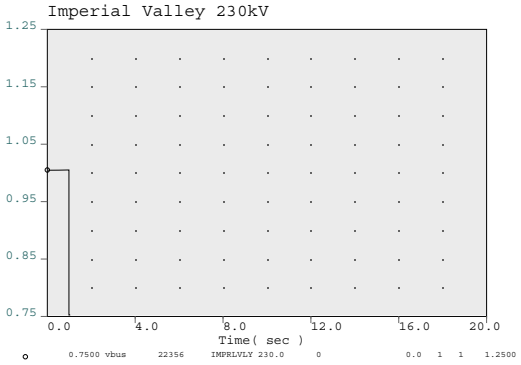
TJ1-230kV



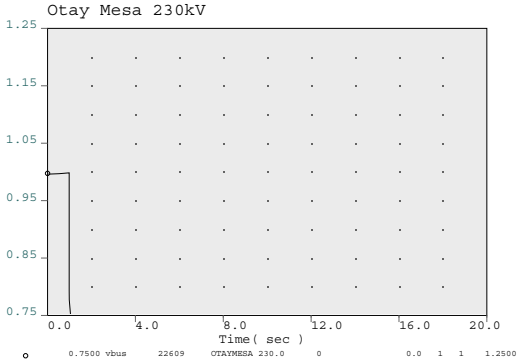
El Centro



Imperial Valley 230kV

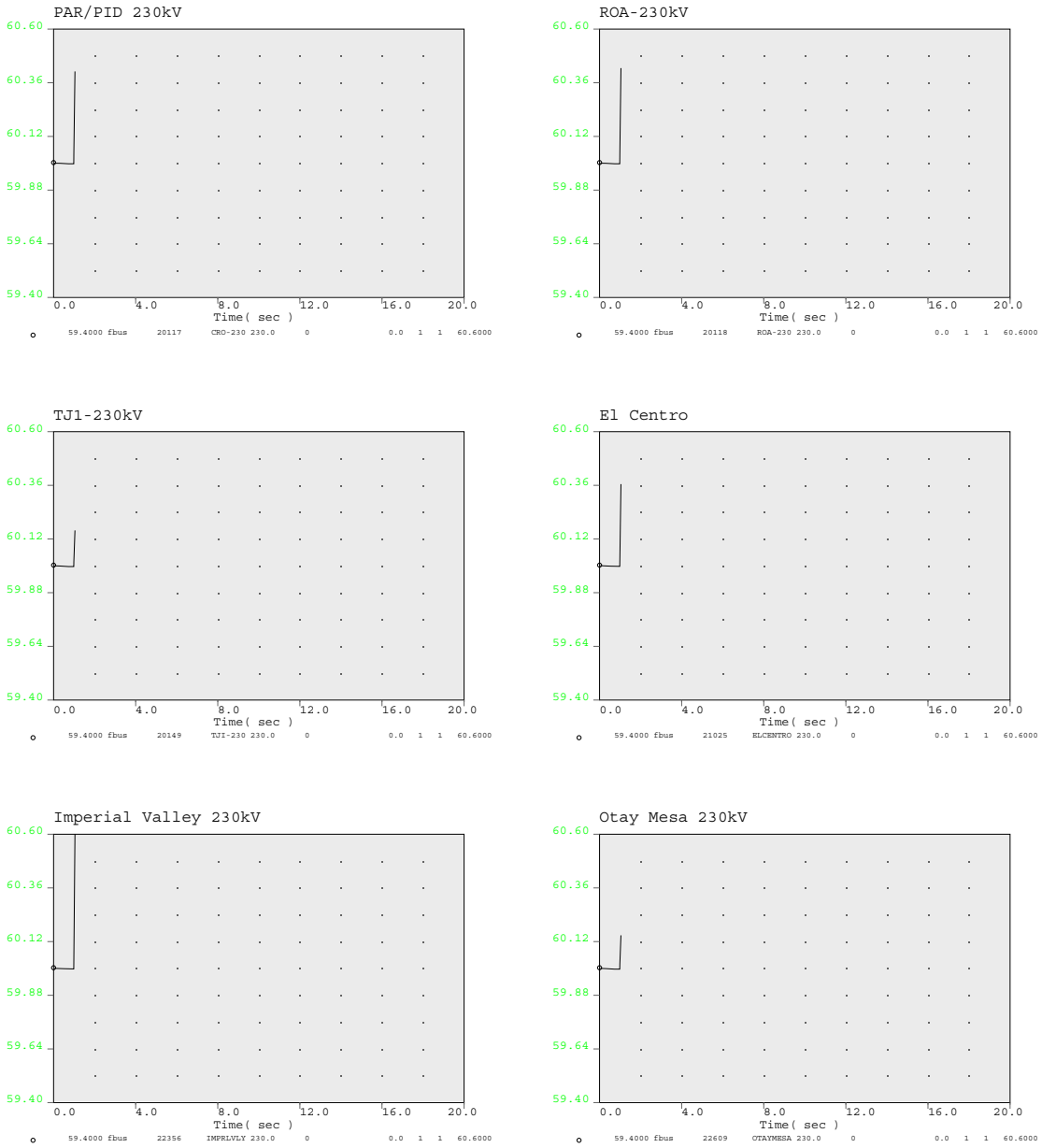


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
IV-Windfarms & IV-C493 500 kV Double line outage

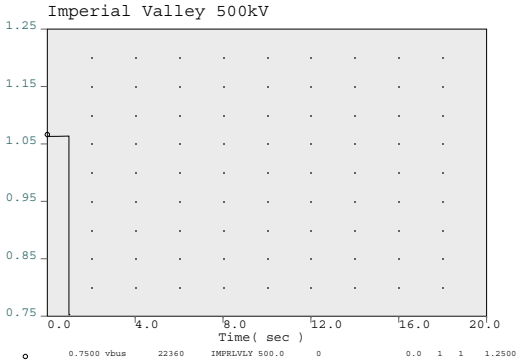
Affected System Frequency Check and Comparison



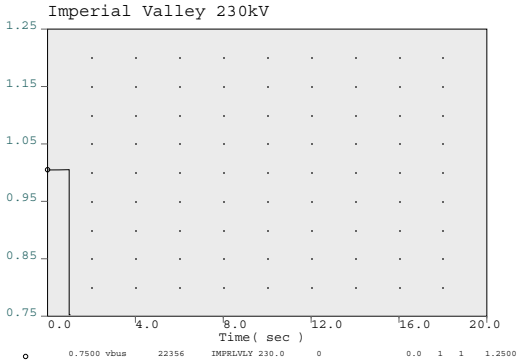
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-Windfarms & IV-C493 500 kV Double line outage

Imperial Valley Area - VOLTAGE

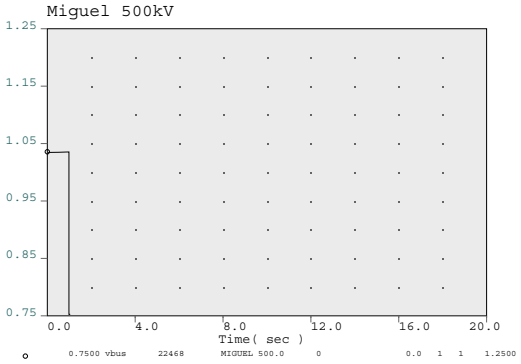
Imperial Valley 500kV



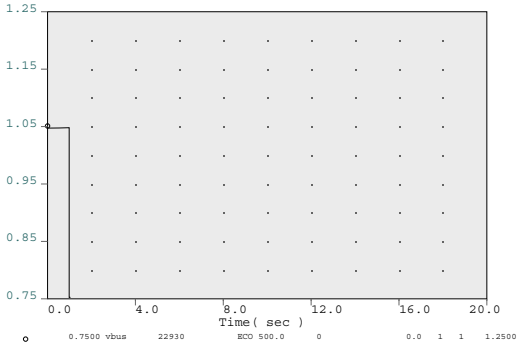
Imperial Valley 230kV



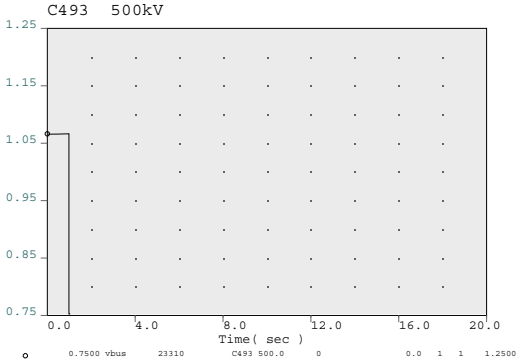
Miguel 500kV



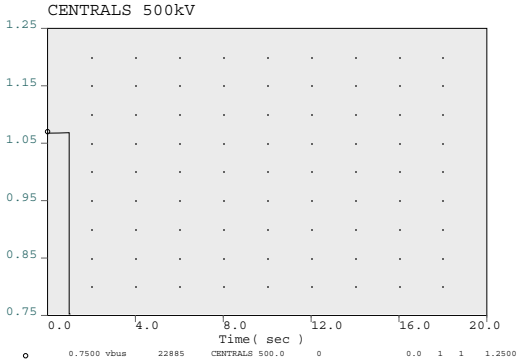
Windfarms 500



C493 500kV

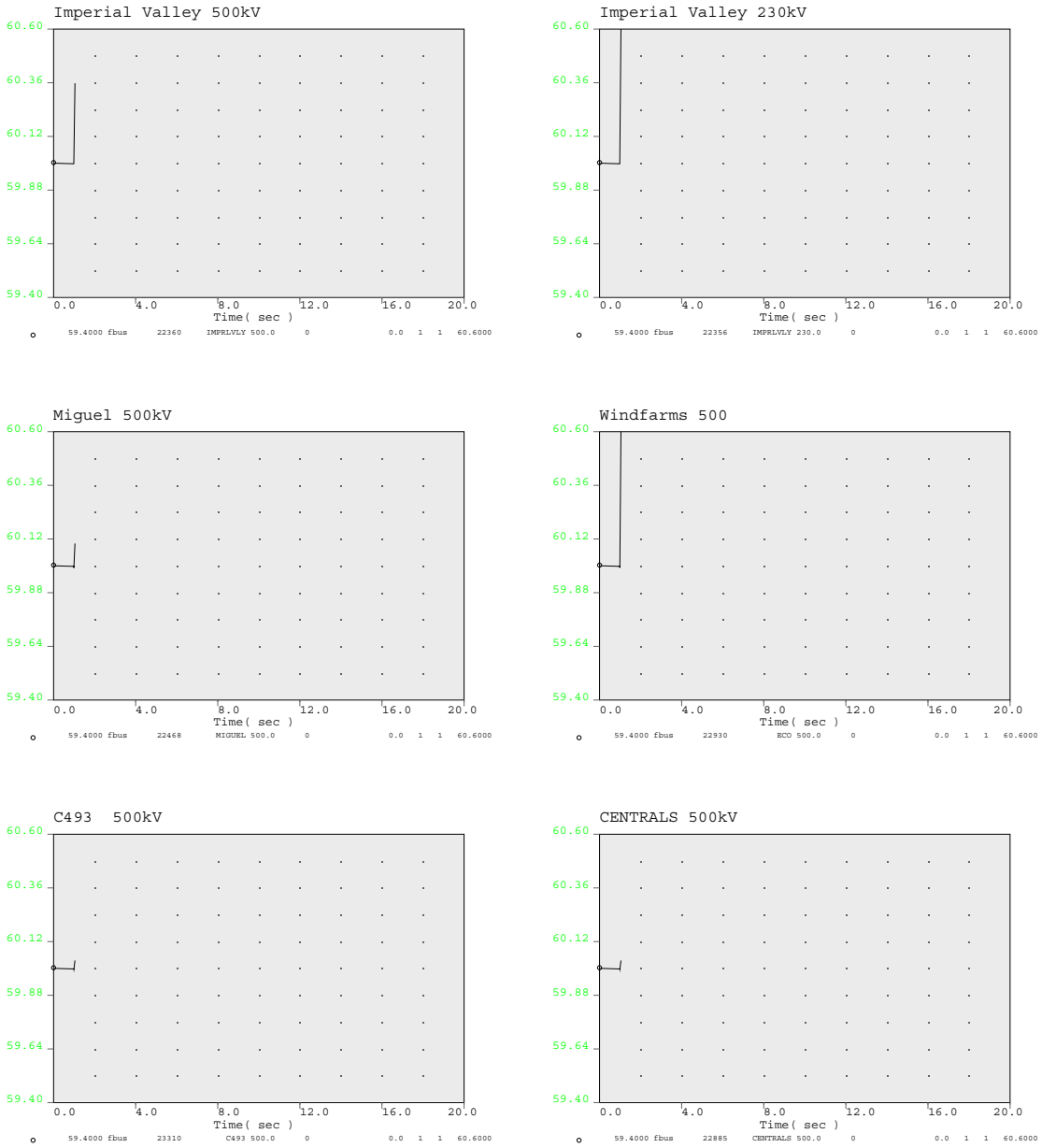


CENTRALS 500kV



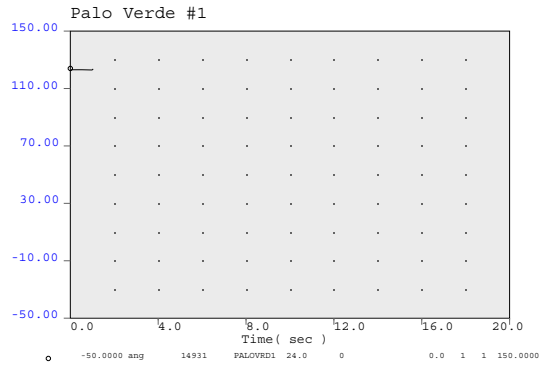
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-Windfarms & IV-C493 500 kV Double line outage

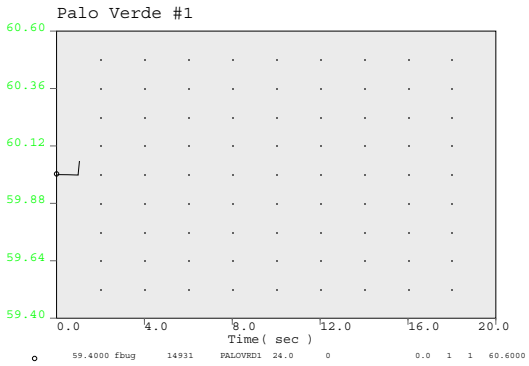
Imperial Valley Area - Frequency

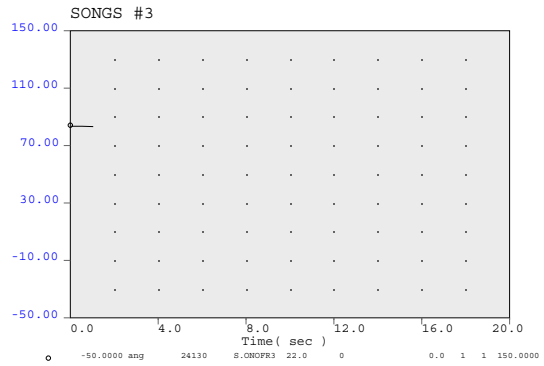


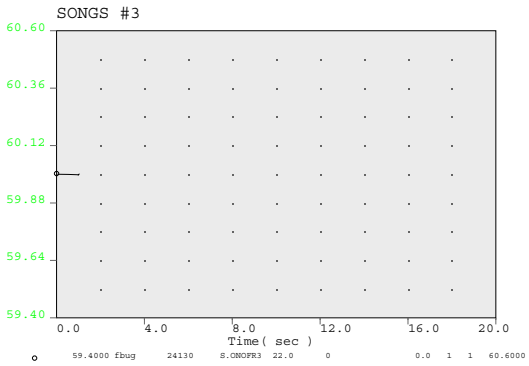
SDG&E Cluster 2 - pre
2014 Light Autumn
IV-Windfarms & IV-C493 500 kV Double line outage

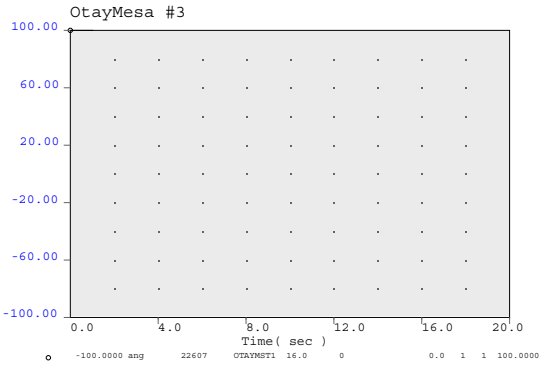
RELATIVE ROTOR ANGLE & FREQUENCY

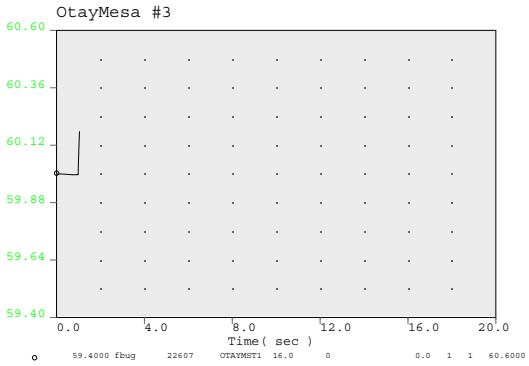










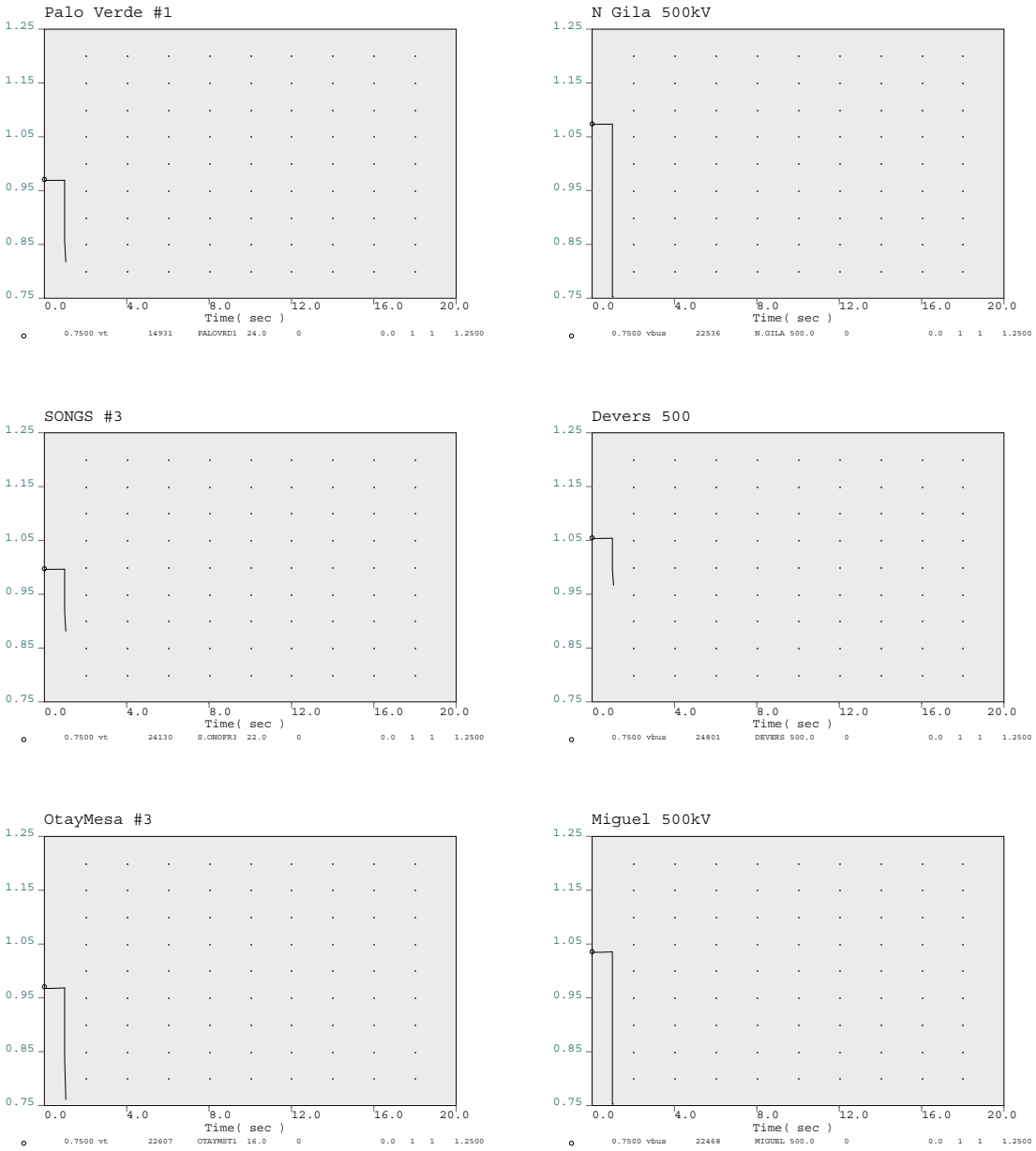


SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-Windfarms 500 kV line

Page 1

SDGE	IV_Wnd_dlo_RASxR1_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:24:20 2010

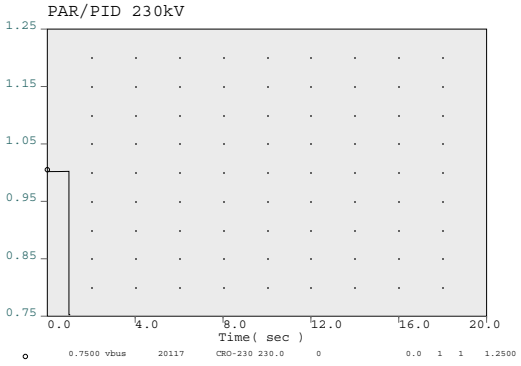
RELATIVE VOLTAGE



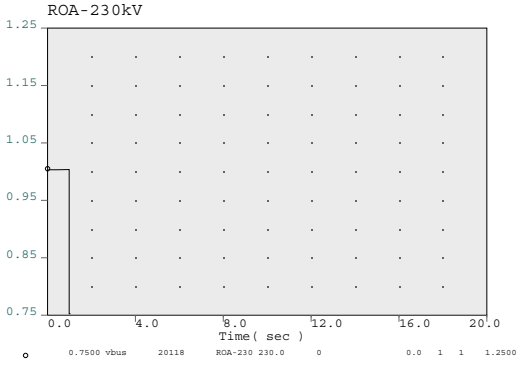
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-Windfarms 500 kV line

Affected System Voltage Check and Comparison

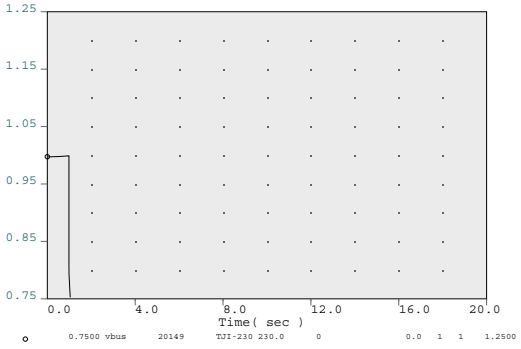
PAR/PID 230kV



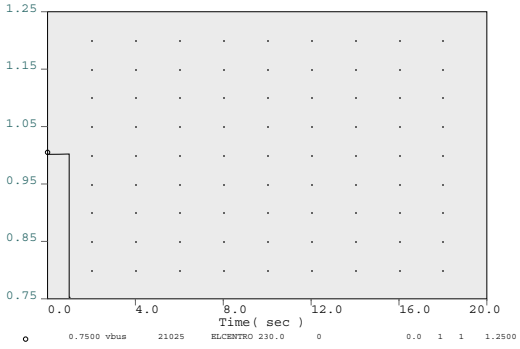
ROA-230kV



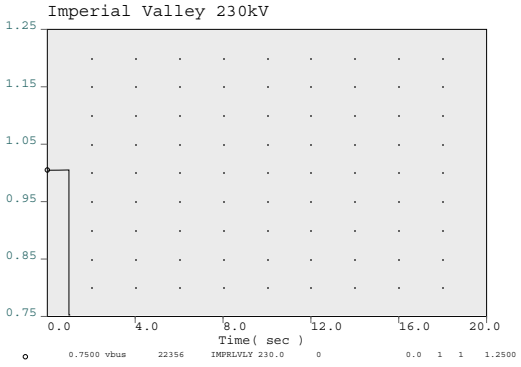
TJ1-230kV



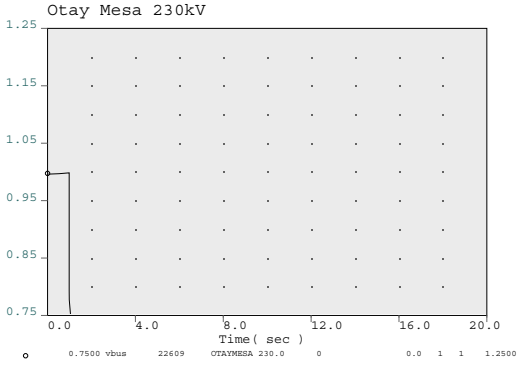
El Centro



Imperial Valley 230kV

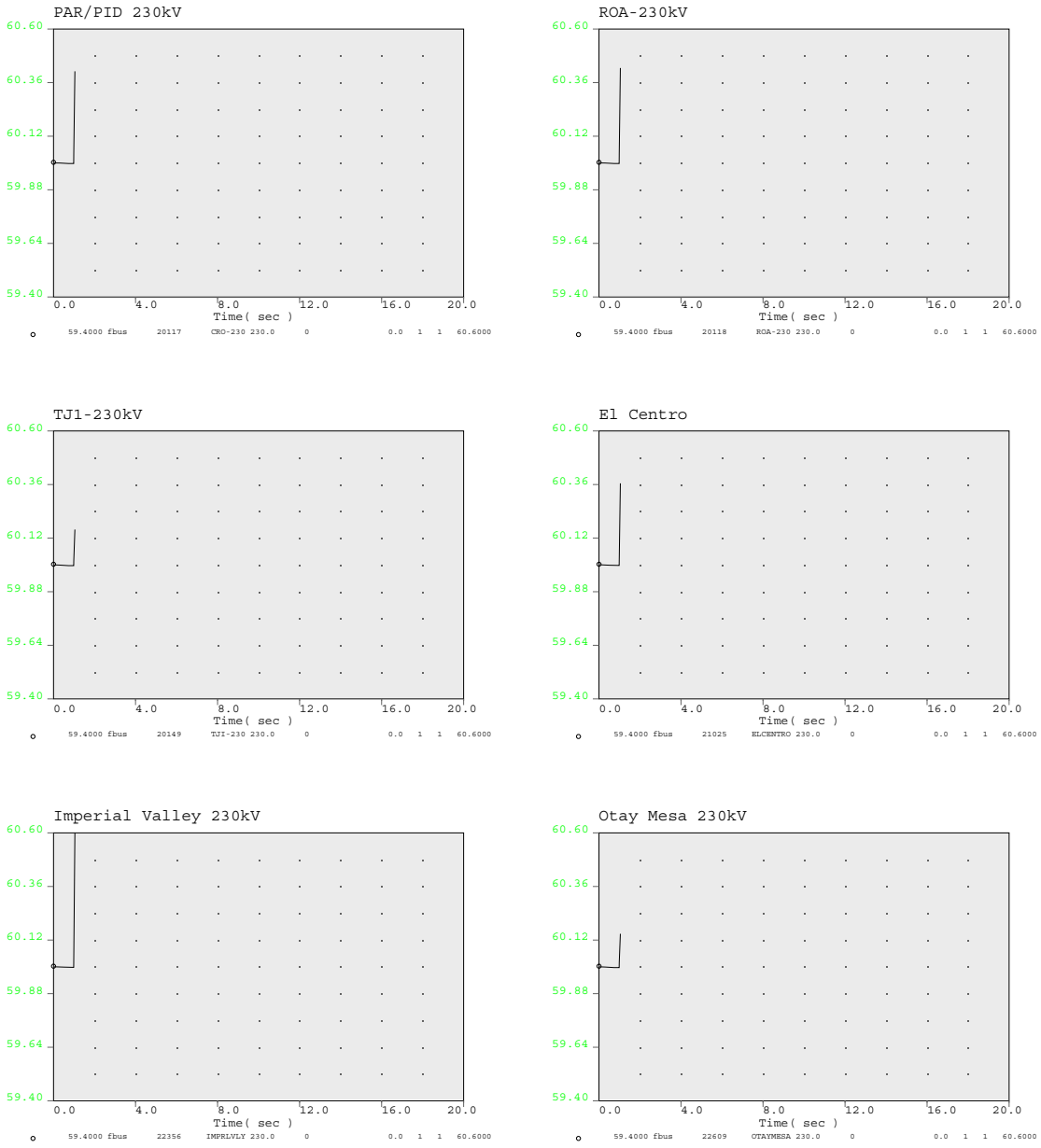


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-Windfarms 500 kV line

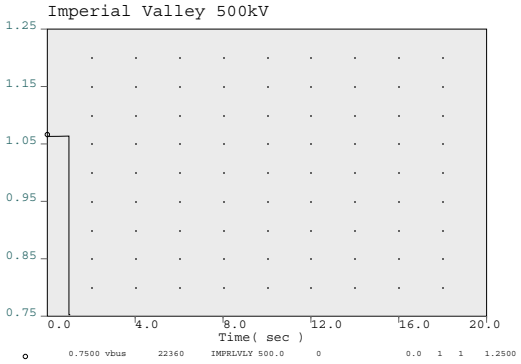
Affected System Frequency Check and Comparison



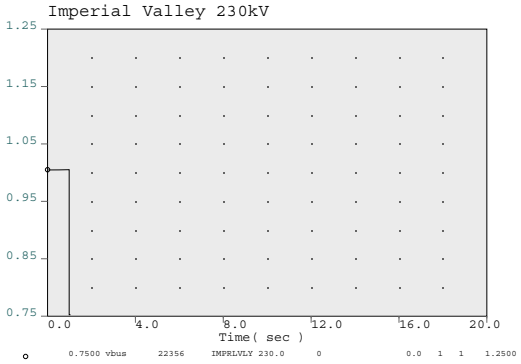
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-Windfarms 500 kV line

Imperial Valley Area - VOLTAGE

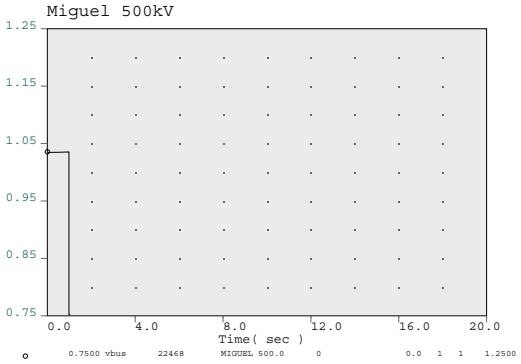
Imperial Valley 500kV



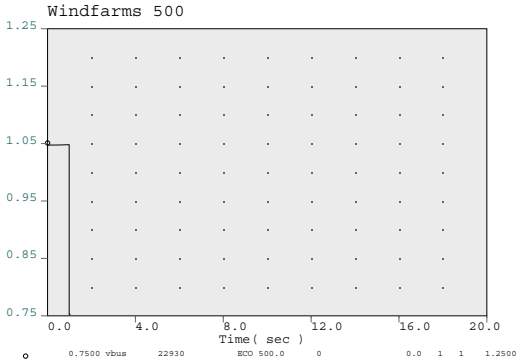
Imperial Valley 230kV



Miguel 500kV



Windfarms 500



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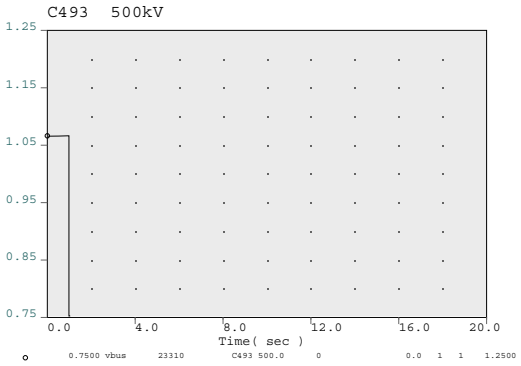

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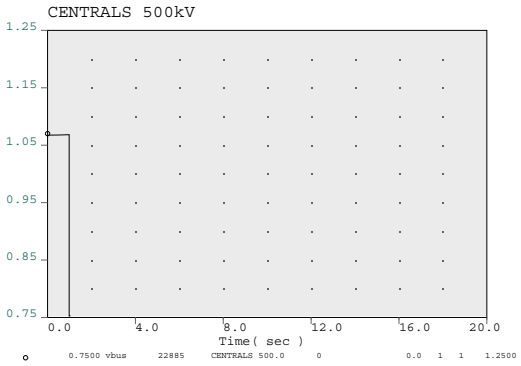
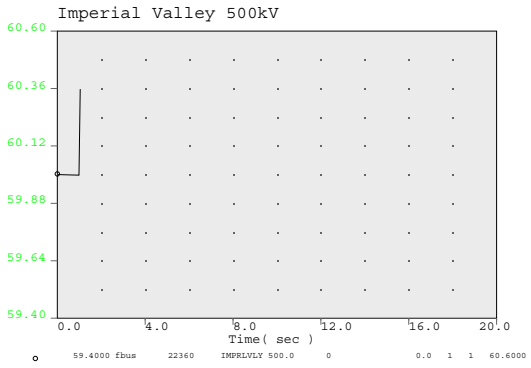
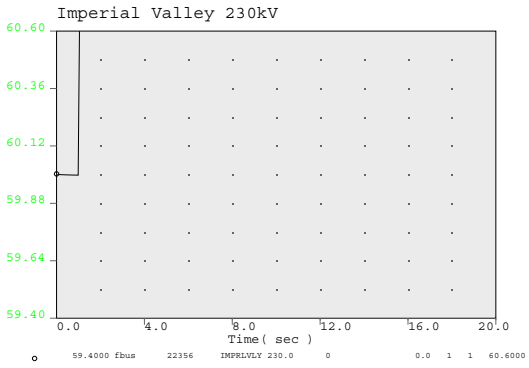
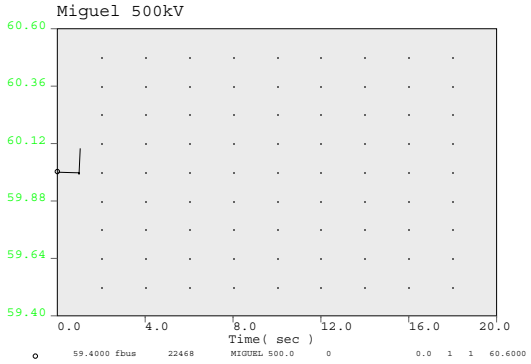


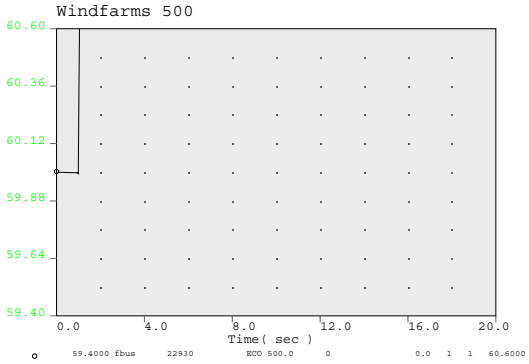
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-Windfarms 500 kV line

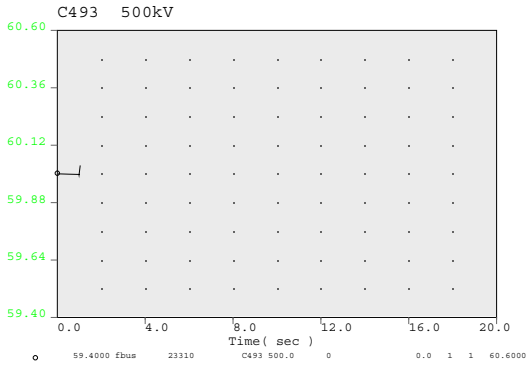
Imperial Valley Area - Frequency

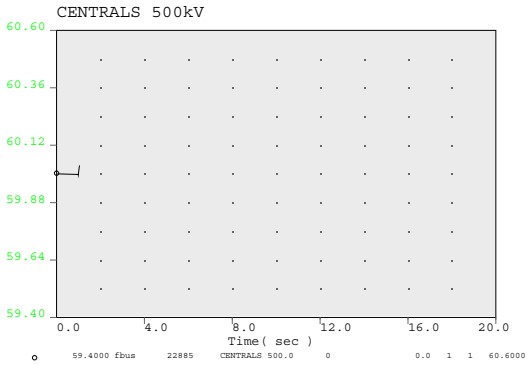






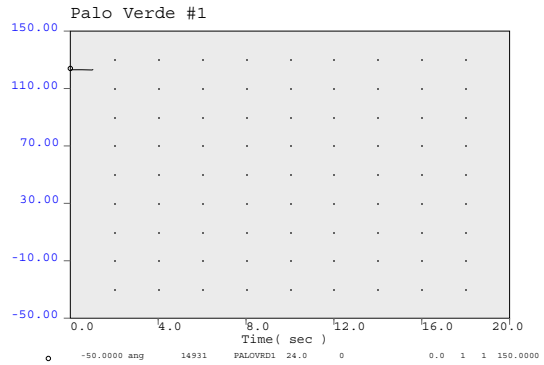


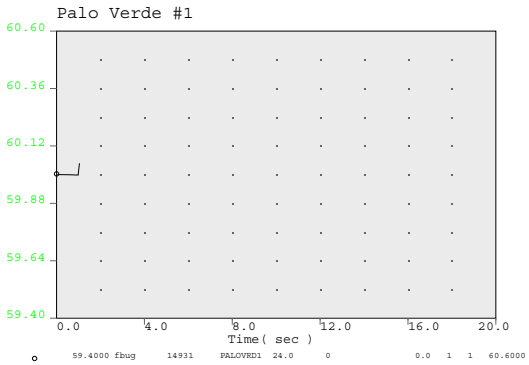


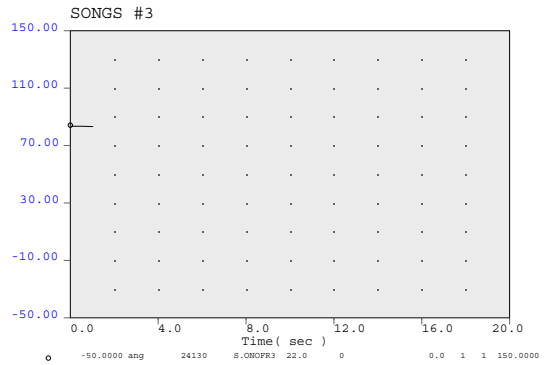


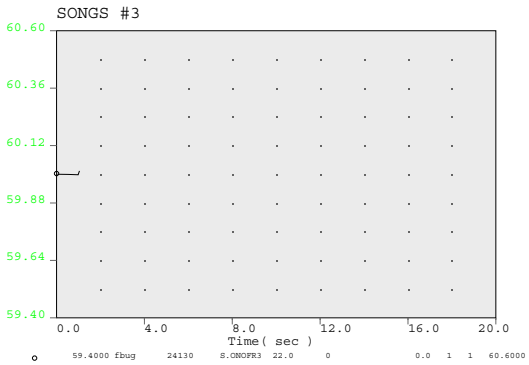
SDG&E Cluster 2 - pre
2014 Light Autumn
Miguel-Windfarms 500 kV line

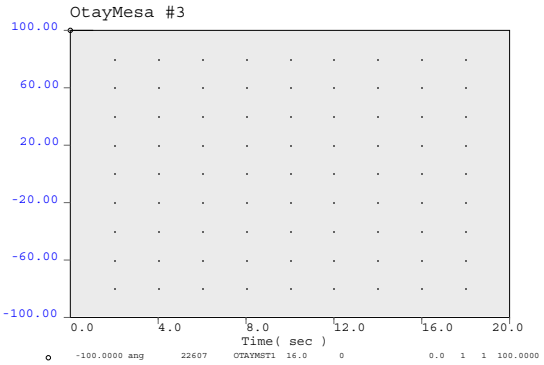
RELATIVE ROTOR ANGLE & FREQUENCY

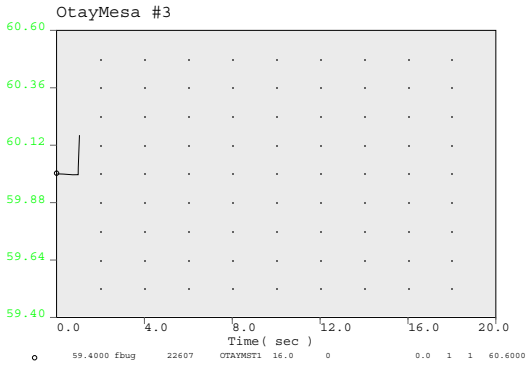












SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

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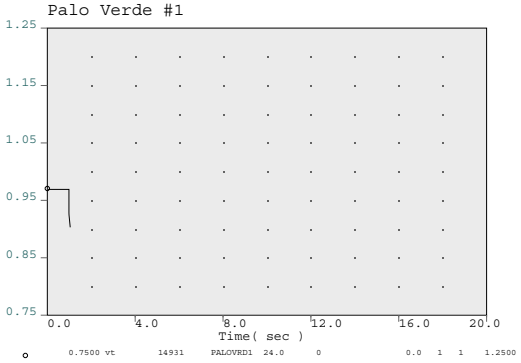
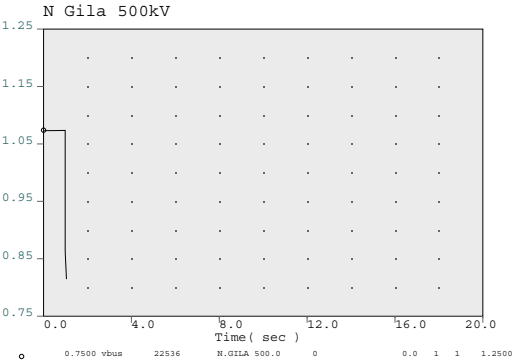
SDGE	ML_Wnd_RAS_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:24:27 2010

RELATIVE VOLTAGE

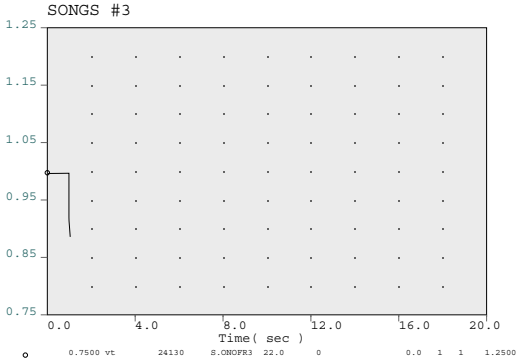
Palo Verde #1



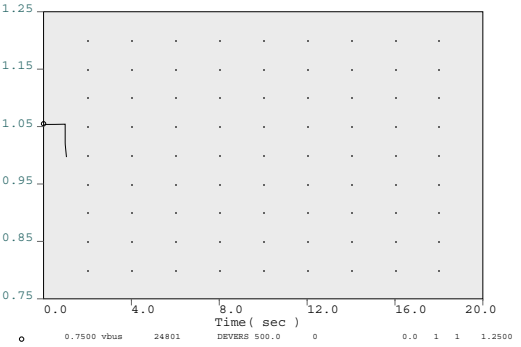
N Gila 500kV



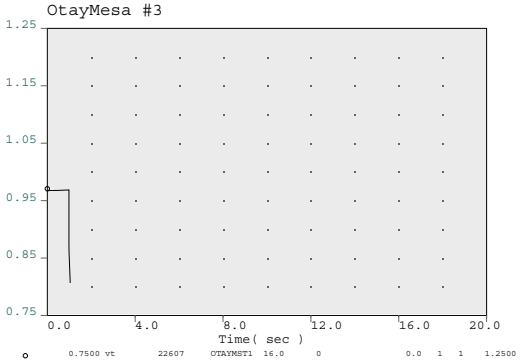
SONGS #3



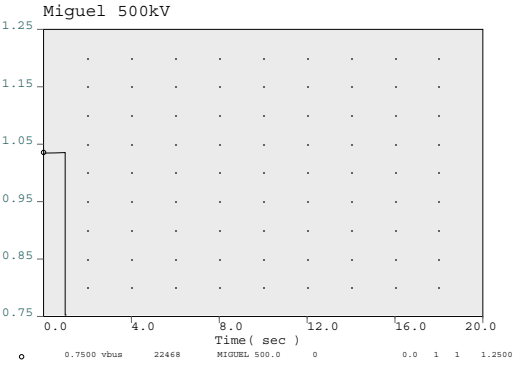
Devers 500



OtayMesa #3



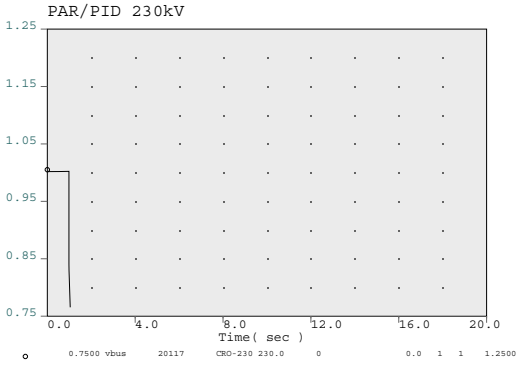
Miguel 500kV



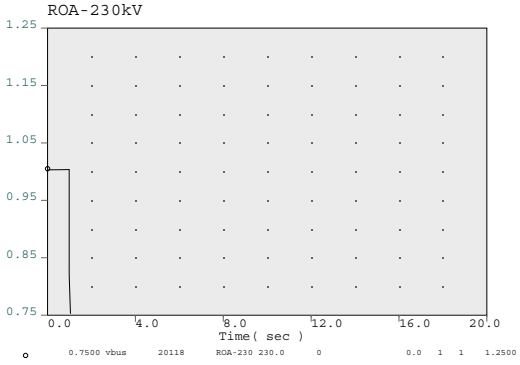
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

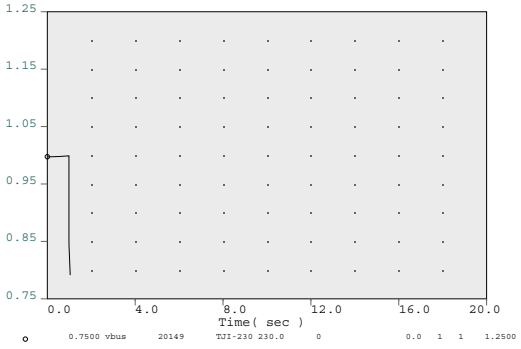
PAR/PID 230kV



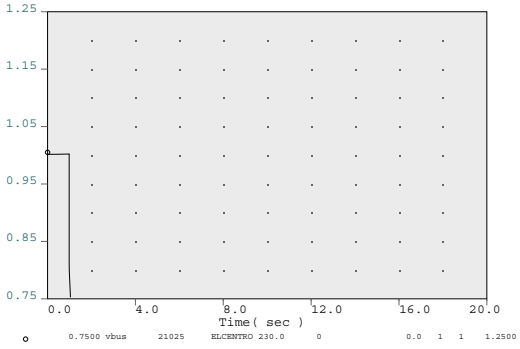
ROA-230kV



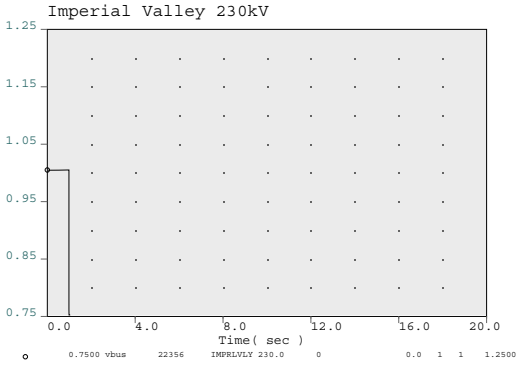
TJ1-230kV



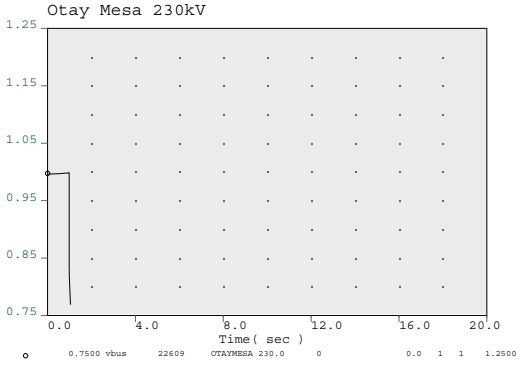
El Centro



Imperial Valley 230kV



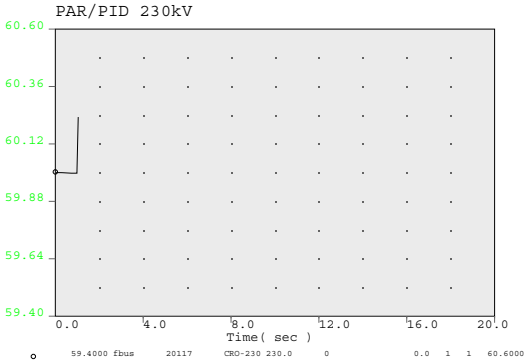
Otay Mesa 230kV



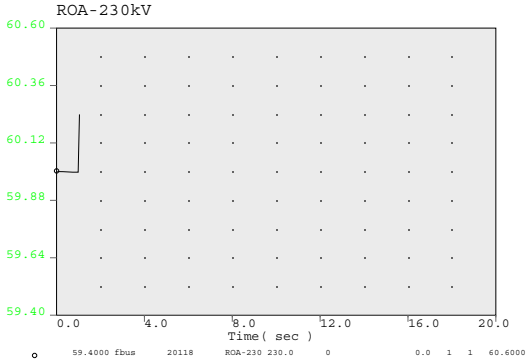
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

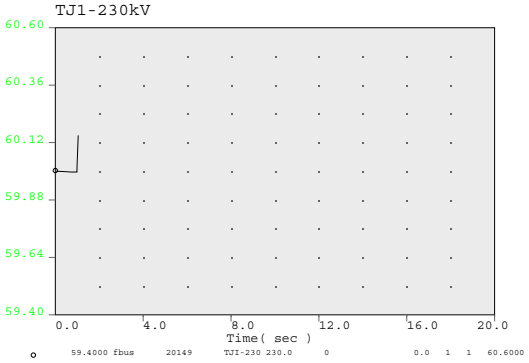
PAR/PID 230kV



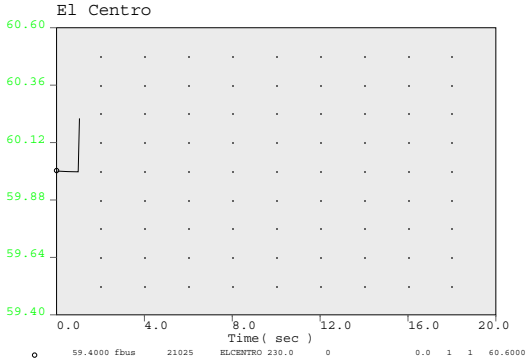
ROA-230kV



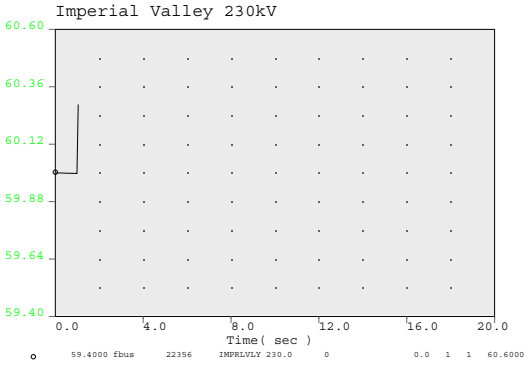
TJ1-230kV



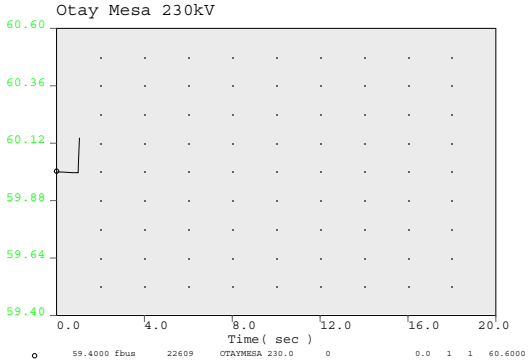
El Centro



Imperial Valley 230kV



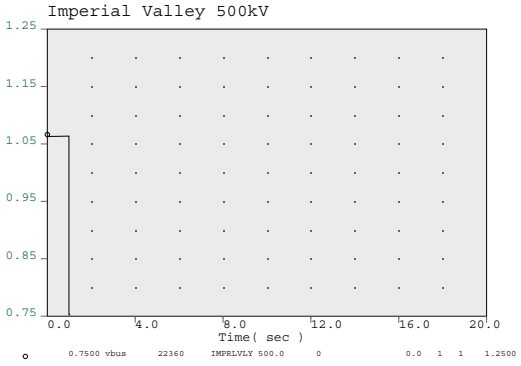
Otay Mesa 230kV



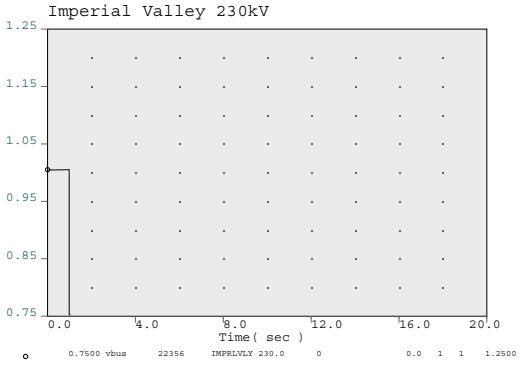
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

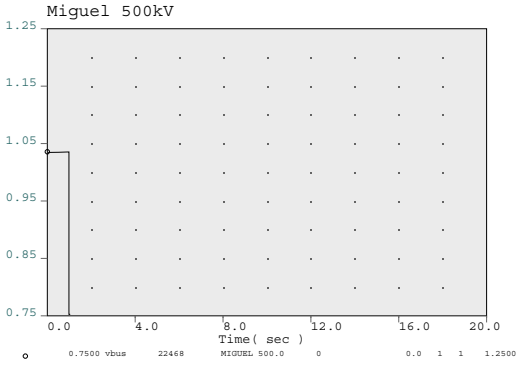
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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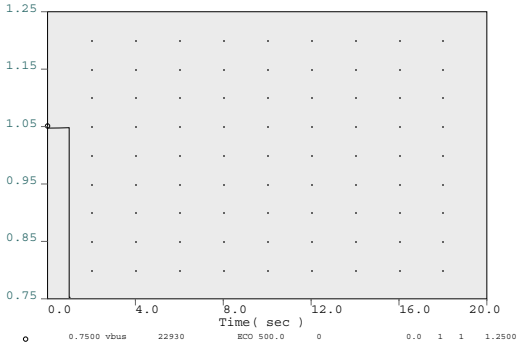

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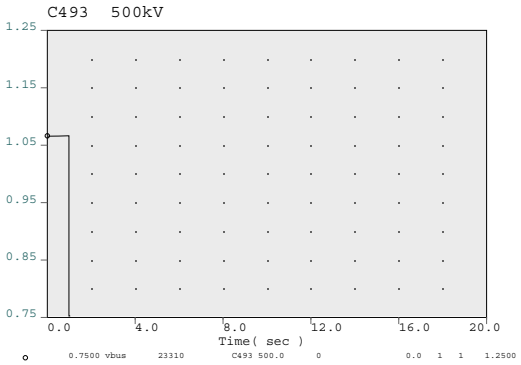
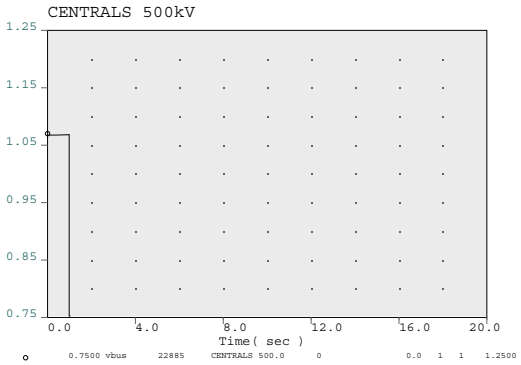
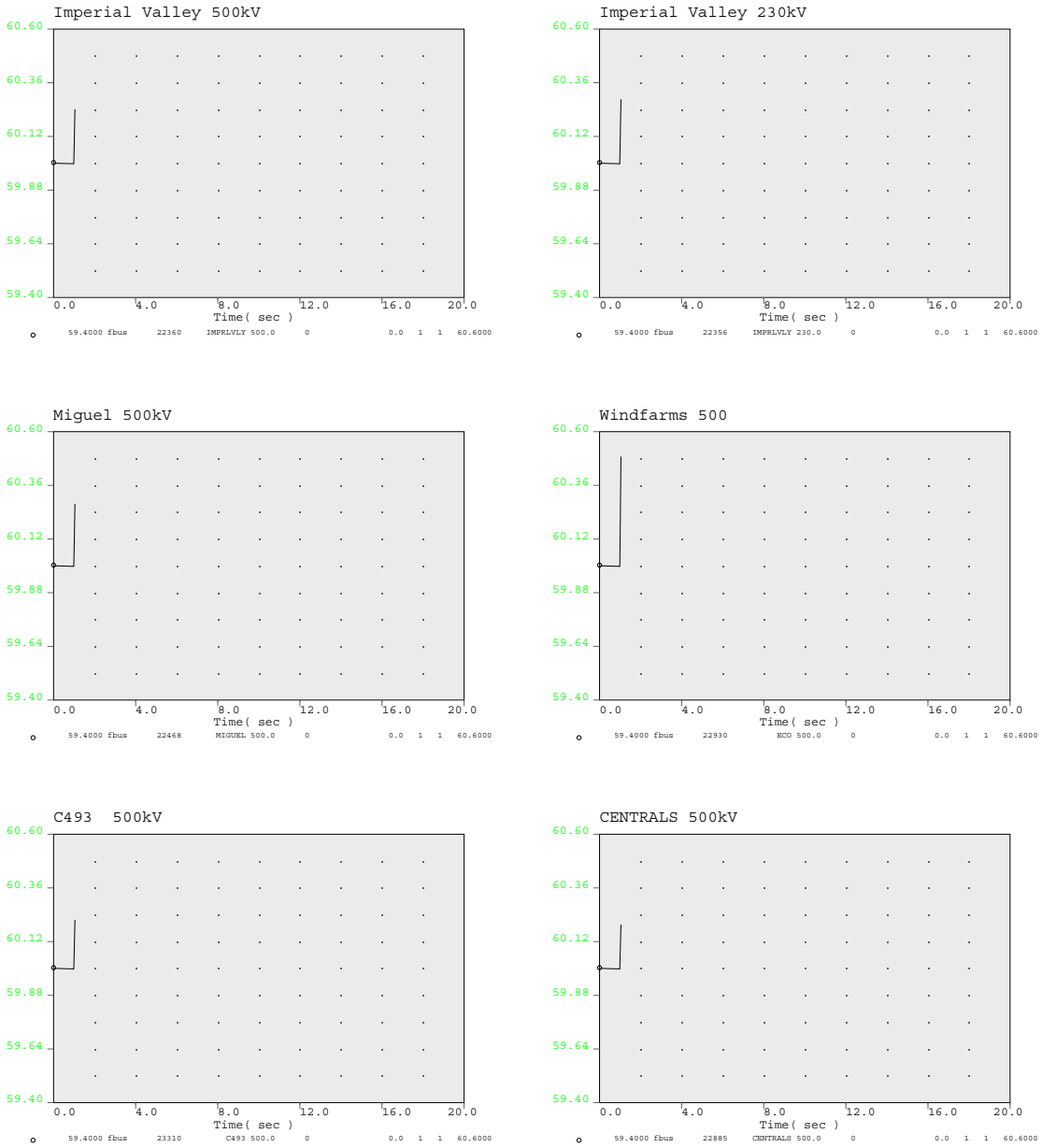


CENTRALS 500kV



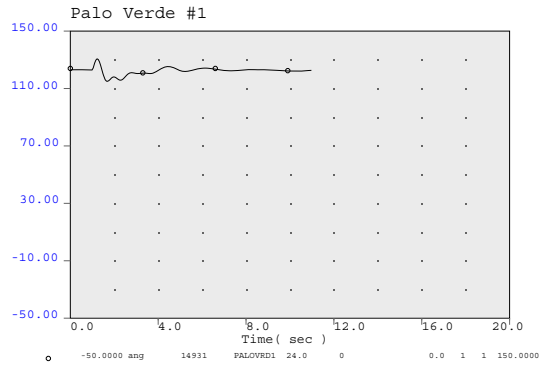
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

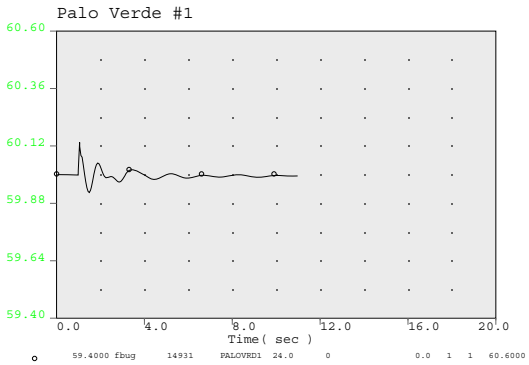
Imperial Valley Area - Frequency

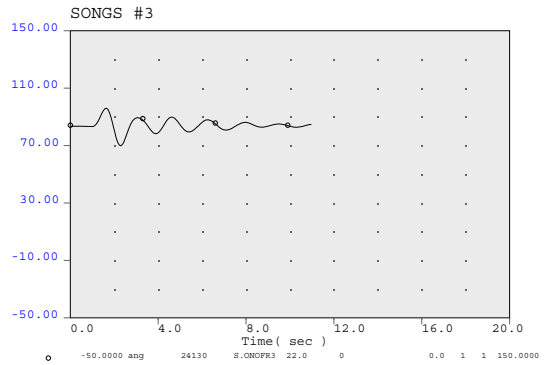


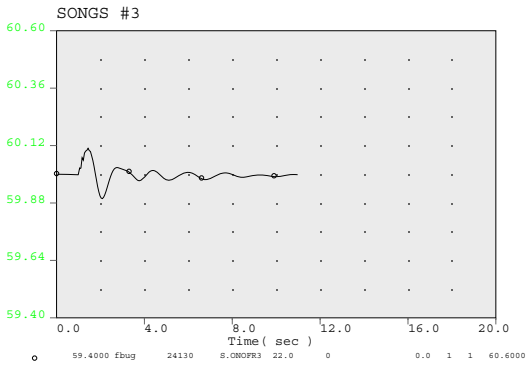
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

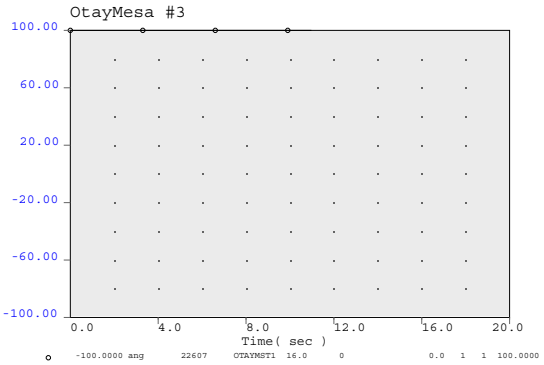
RELATIVE ROTOR ANGLE & FREQUENCY

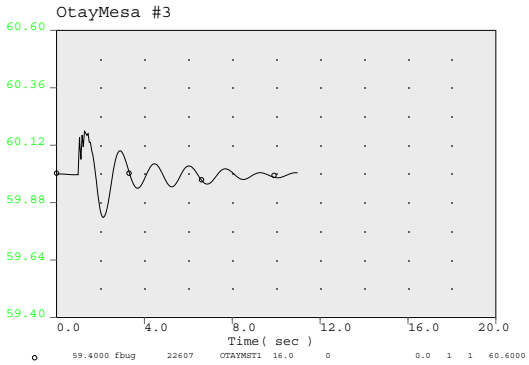










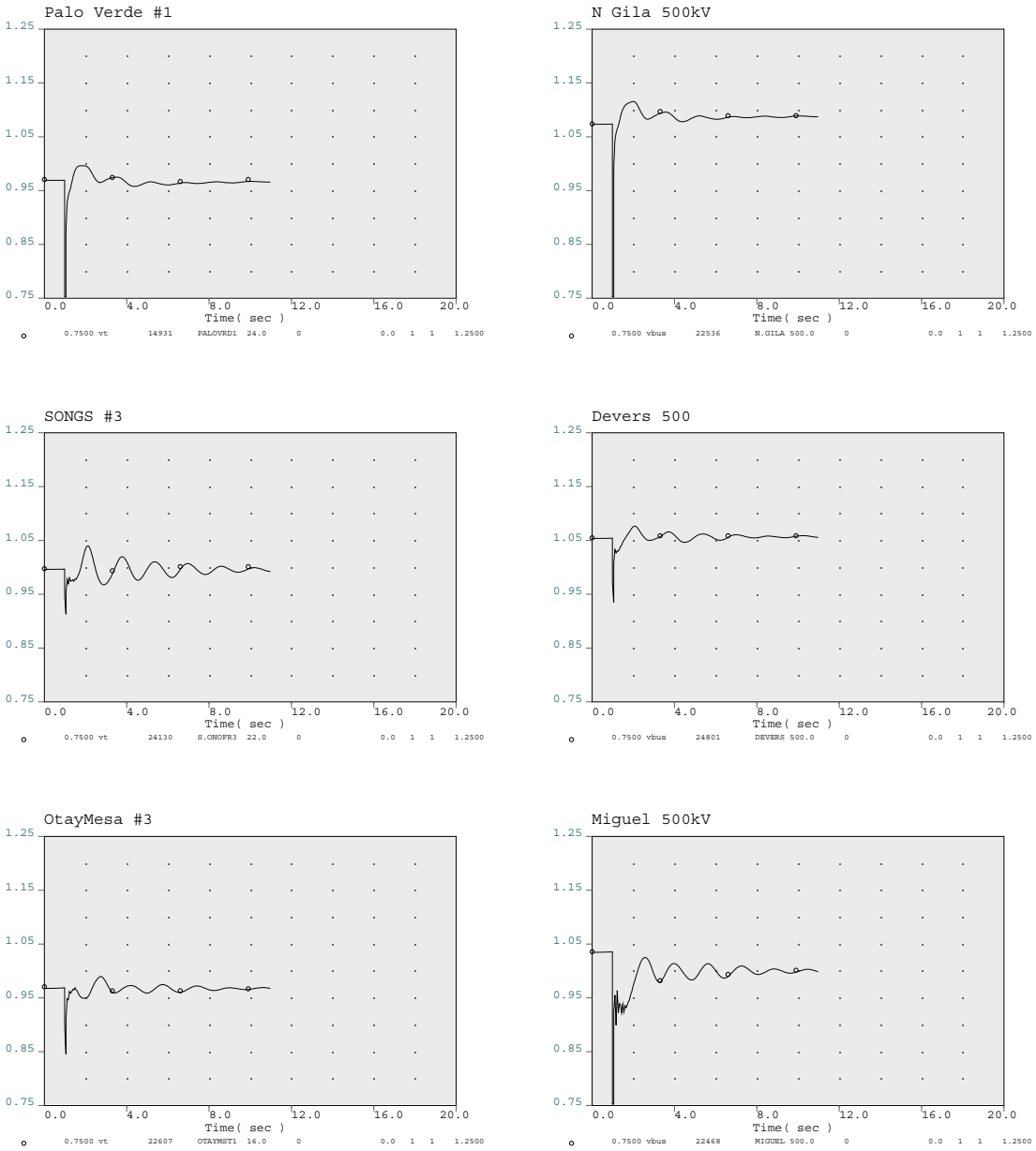


SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Page 1

SDGE	NGila_IV_slo_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:24:40 2010

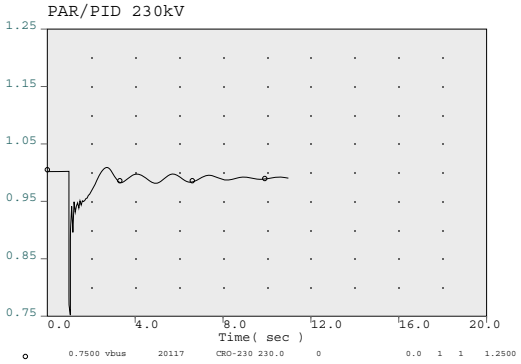
RELATIVE VOLTAGE



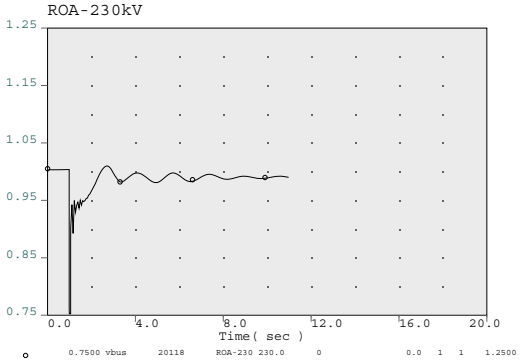
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

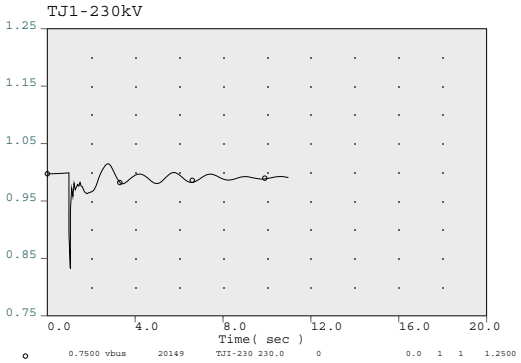
PAR/PID 230kV



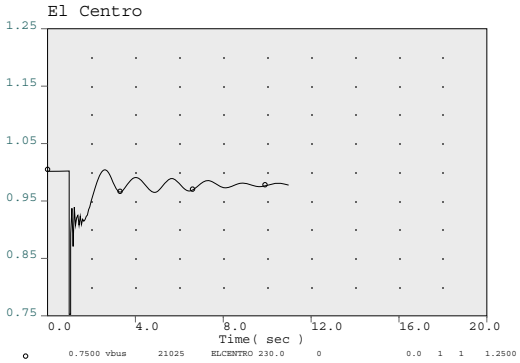
ROA-230kV



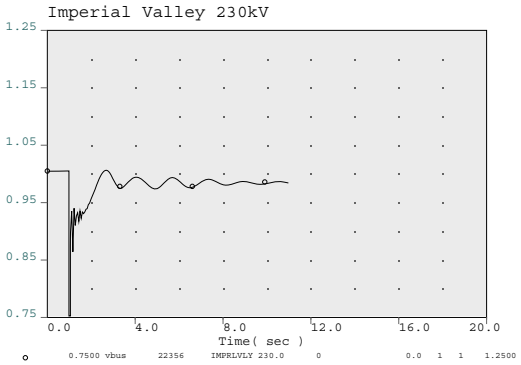
TJ1-230kV



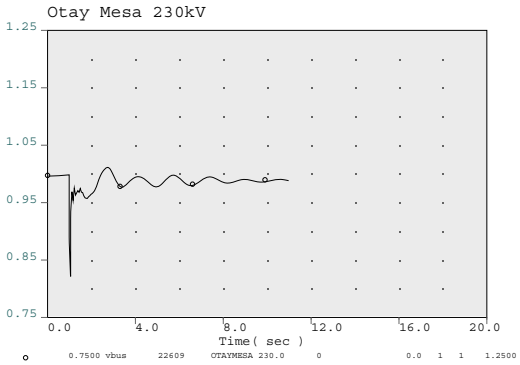
El Centro



Imperial Valley 230kV

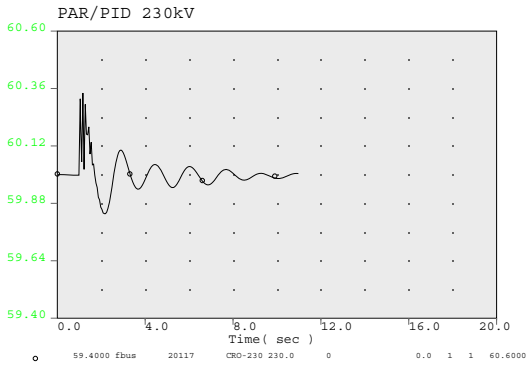


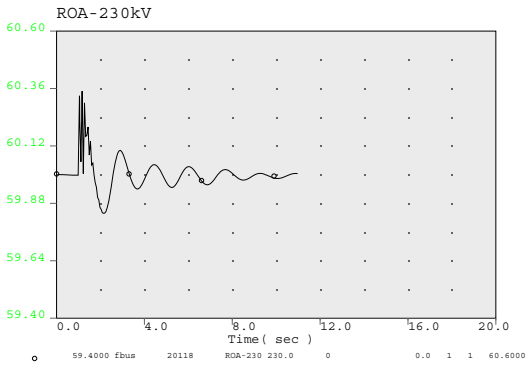
Otay Mesa 230kV

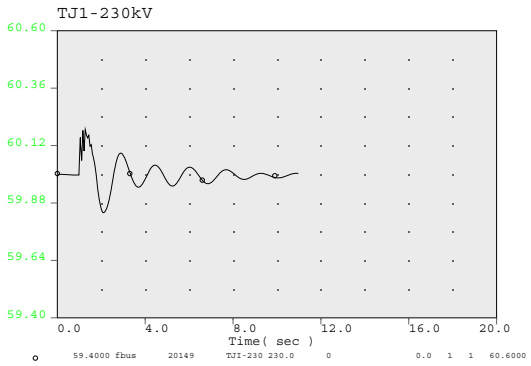


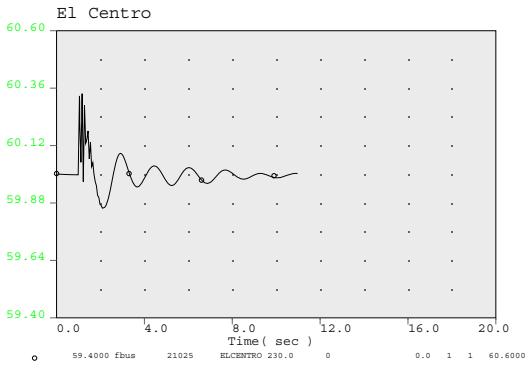
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

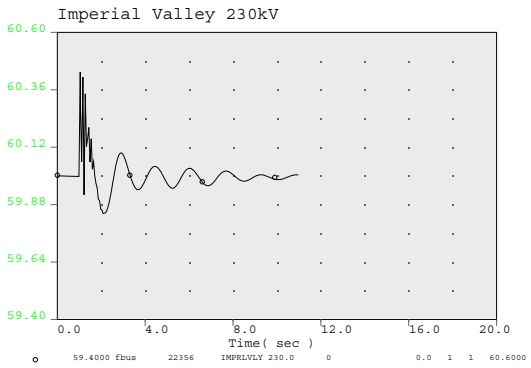
Affected System Frequency Check and Comparison

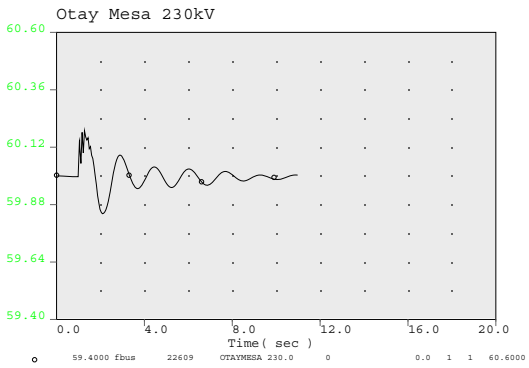








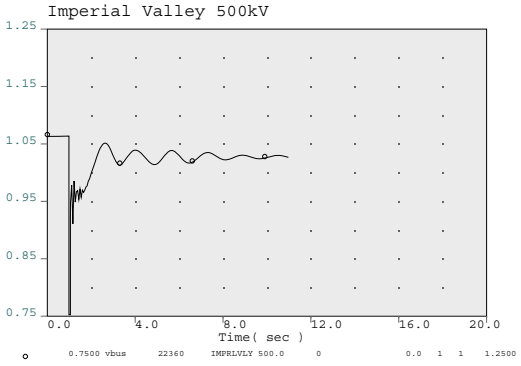




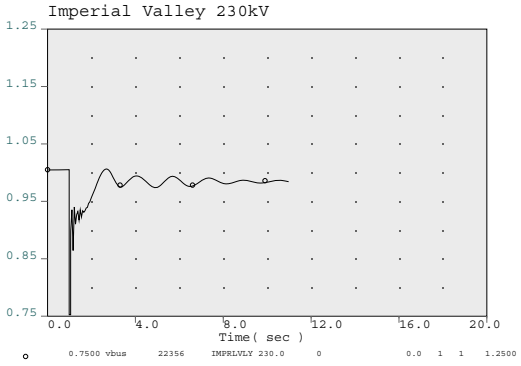
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

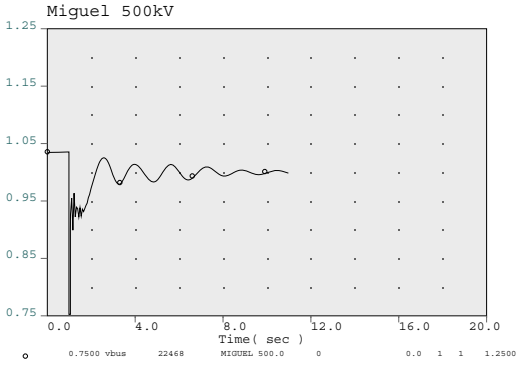
Imperial Valley 500kV



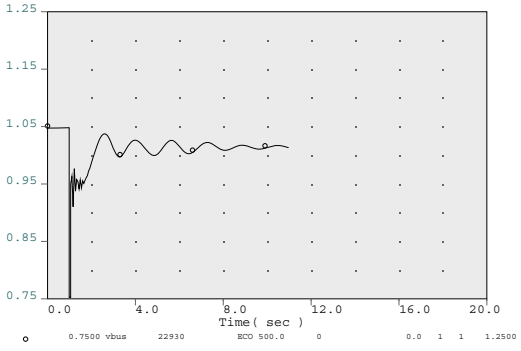
Imperial Valley 230kV



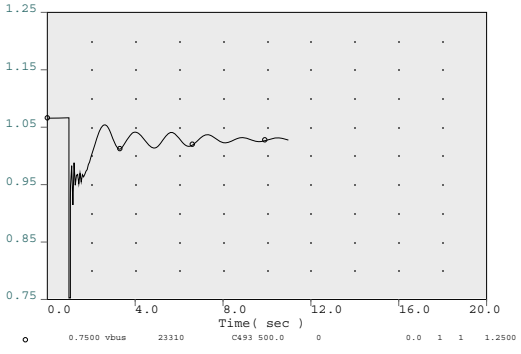
Miguel 500kV



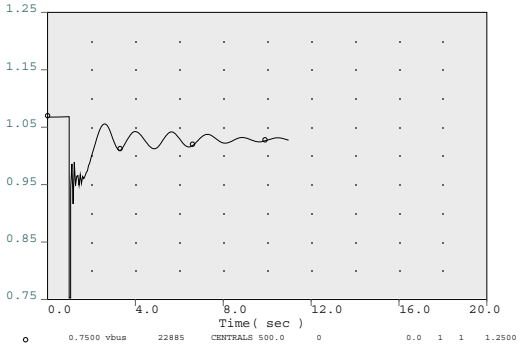
Windfarms 500



C493 500kV

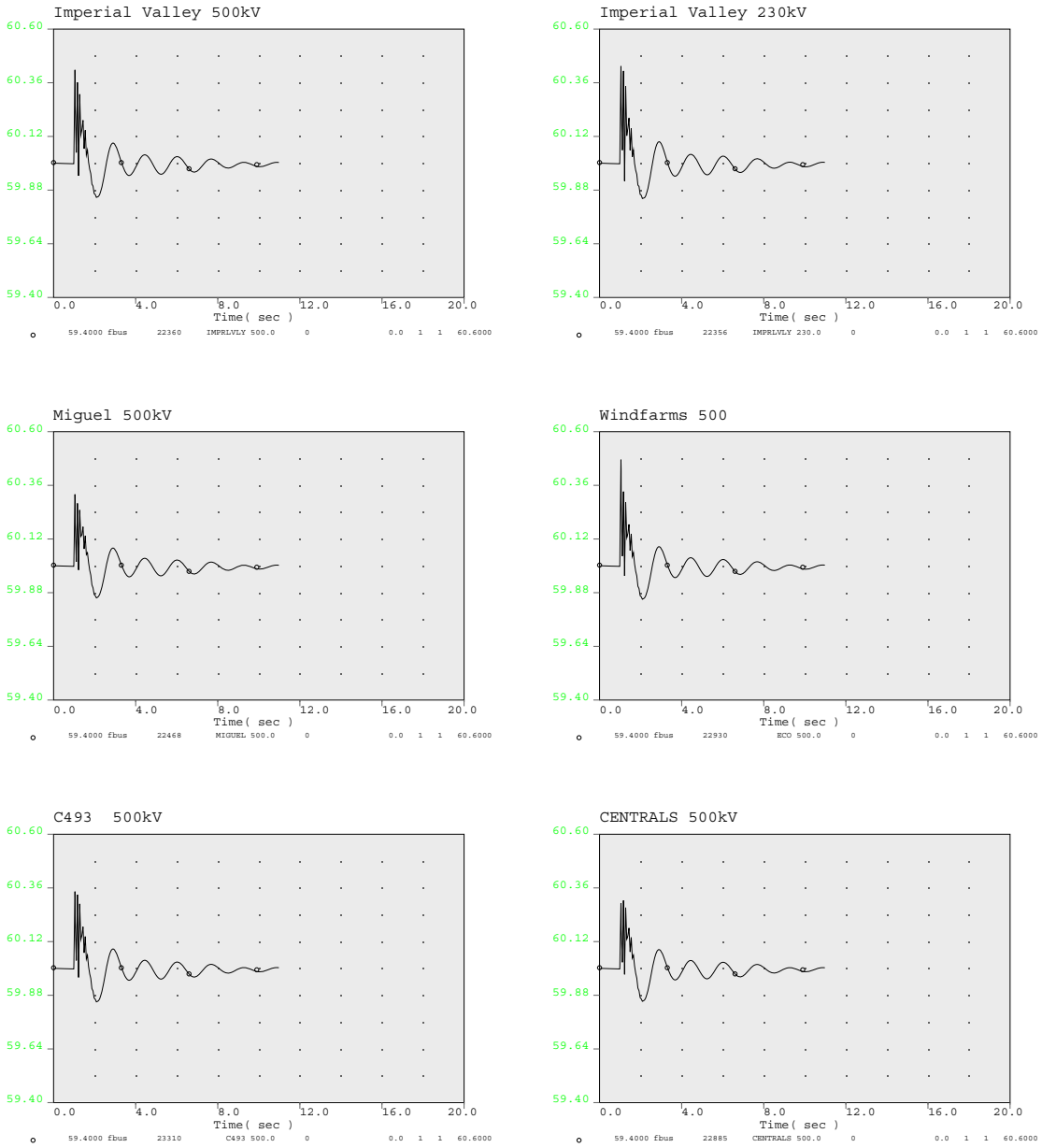


CENTRALS 500kV



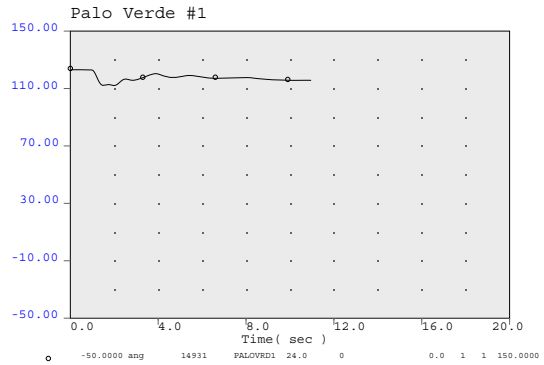
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

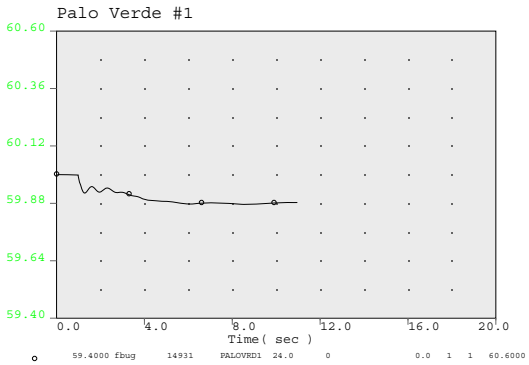
Imperial Valley Area - Frequency

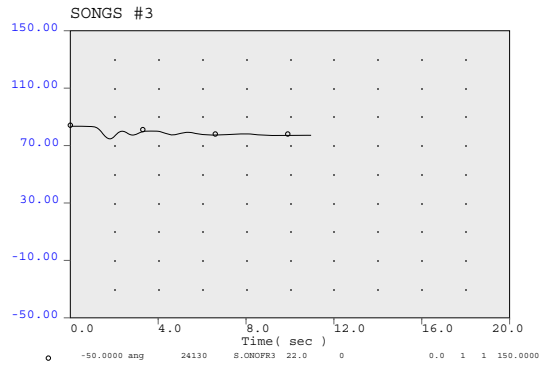


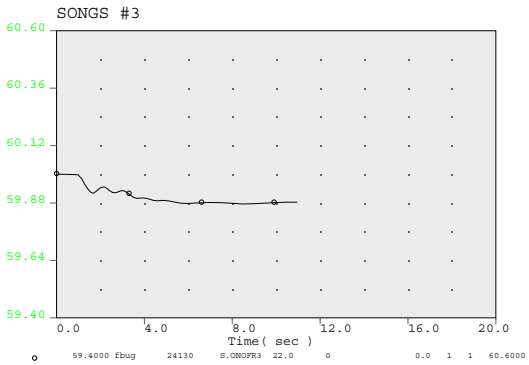
SDG&E Cluster 2 - pre
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

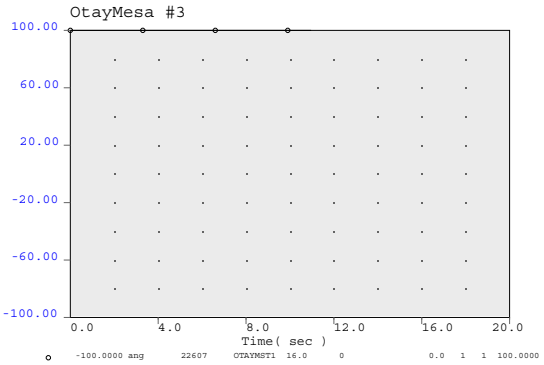
RELATIVE ROTOR ANGLE & FREQUENCY

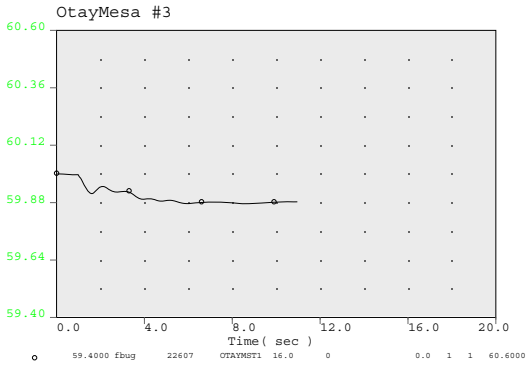








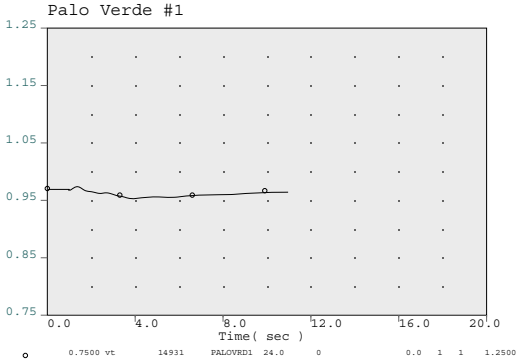




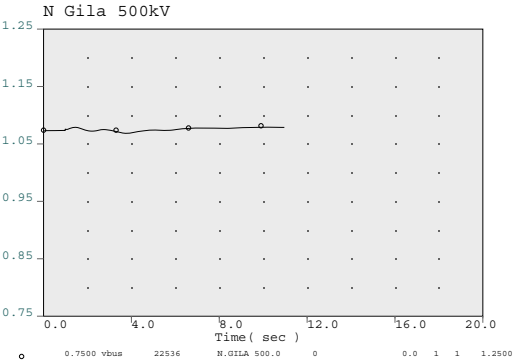
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

RELATIVE VOLTAGE

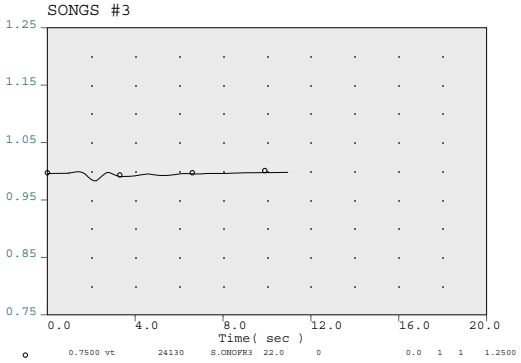
Palo Verde #1



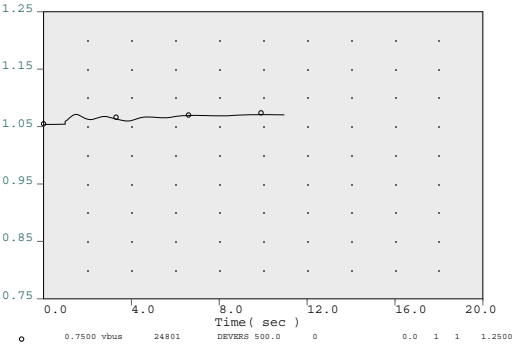
N Gila 500kV



SONGS #3



Devers 500



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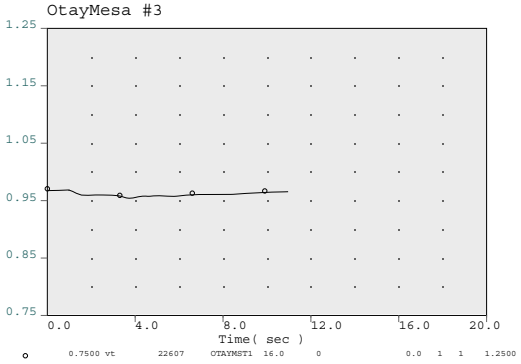
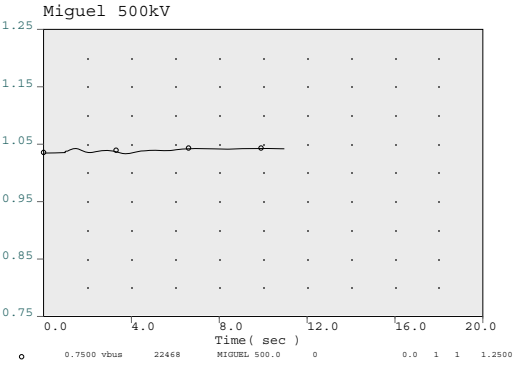


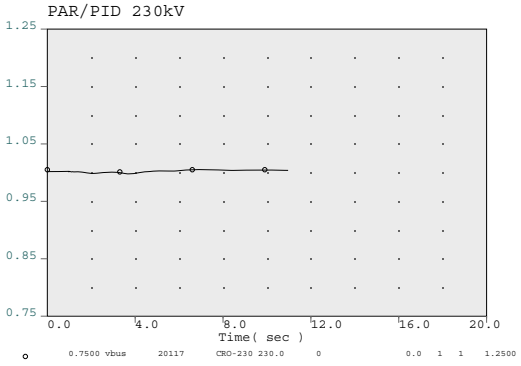
Miguel 500kV



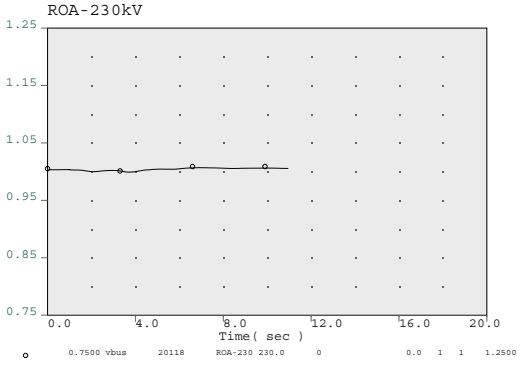
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

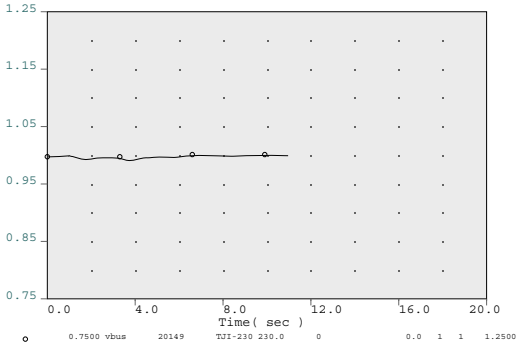
PAR/PID 230kV



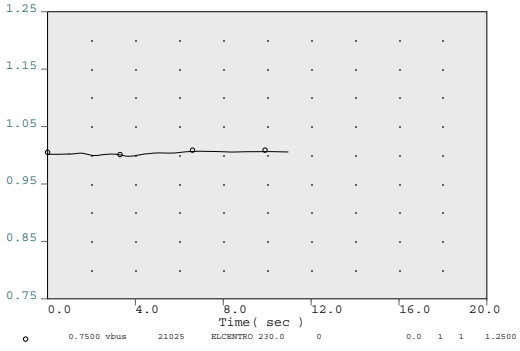
ROA-230kV



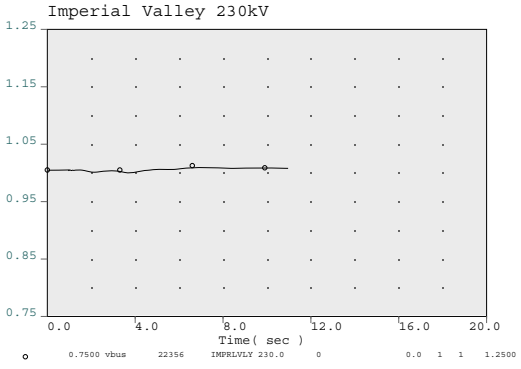
TJ1-230kV



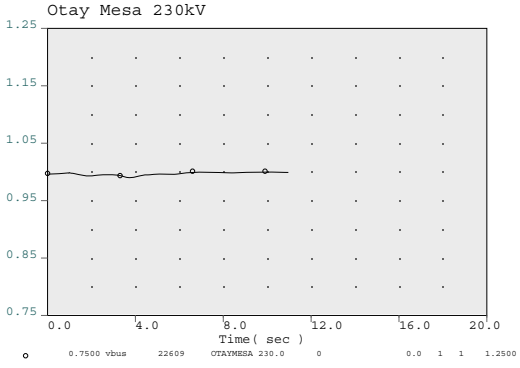
El Centro



Imperial Valley 230kV

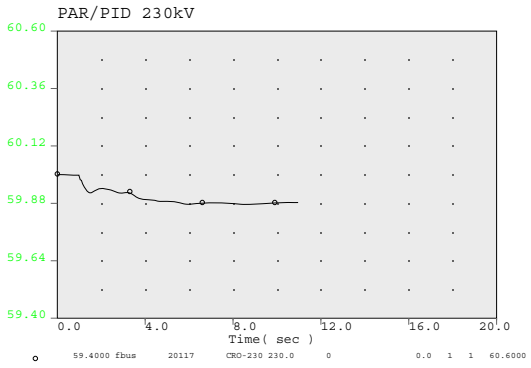


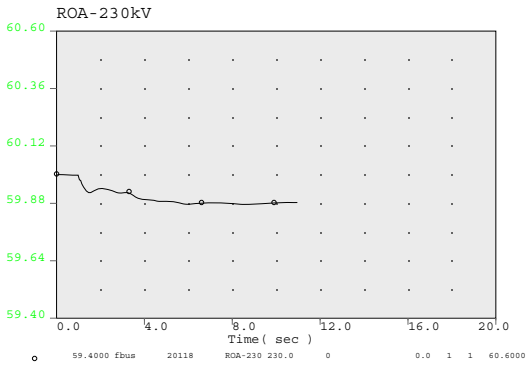
Otay Mesa 230kV

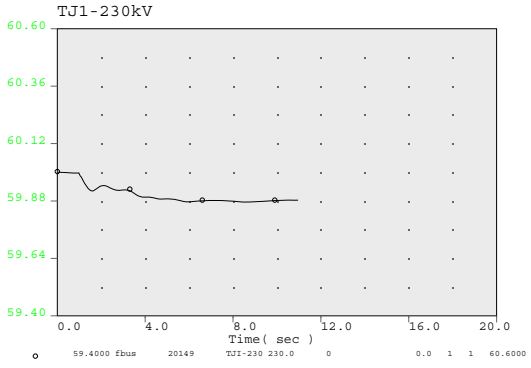


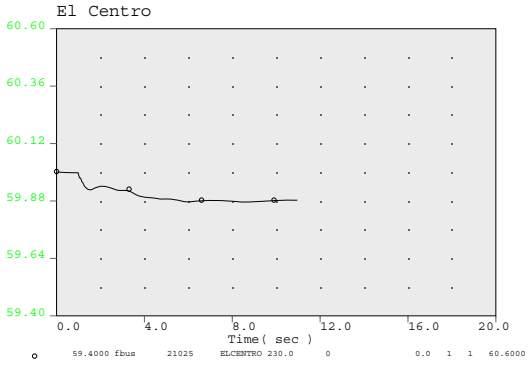
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

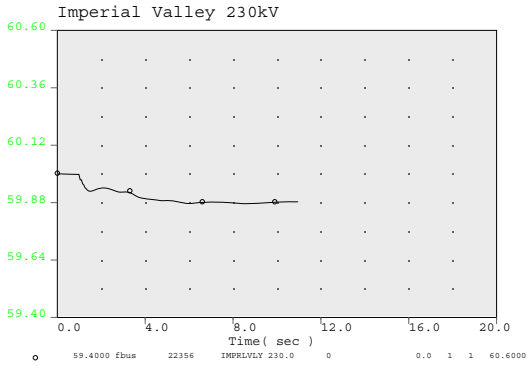
Affected System Frequency Check and Comparison

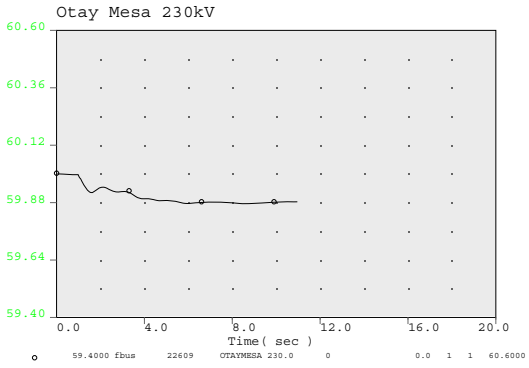








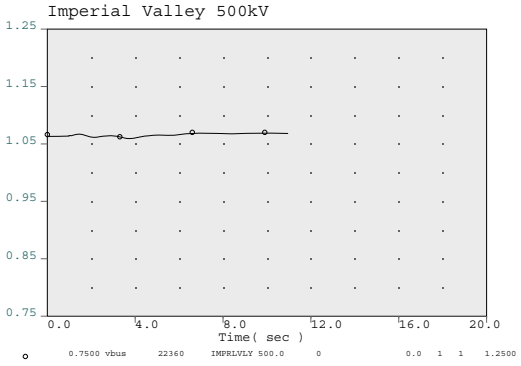




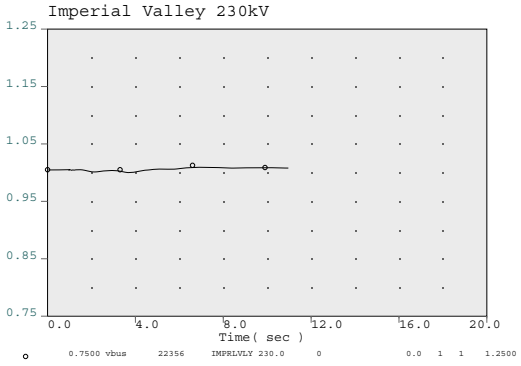
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

Imperial Valley Area - VOLTAGE

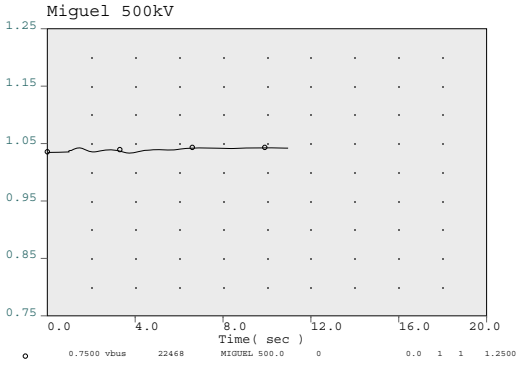
Imperial Valley 500kV



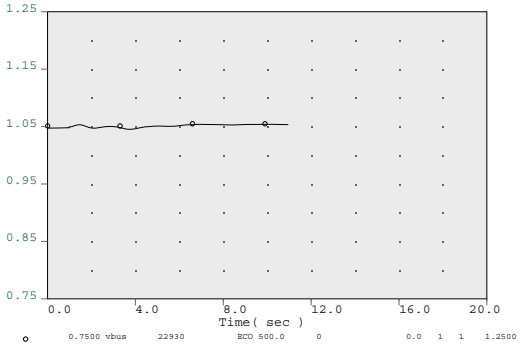
Imperial Valley 230kV



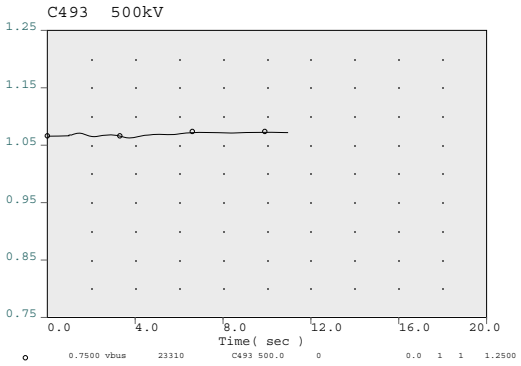
Miguel 500kV



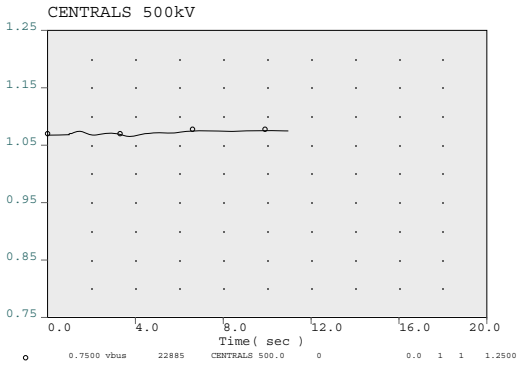
Windfarms 500



C493 500kV

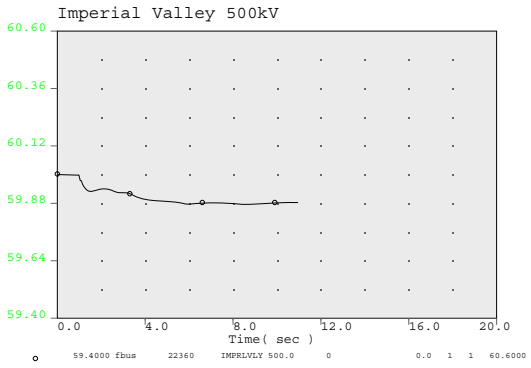


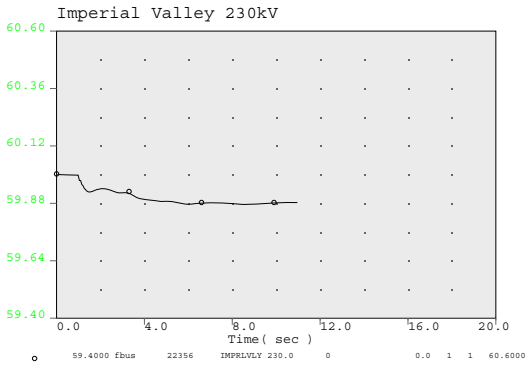
CENTRALS 500kV

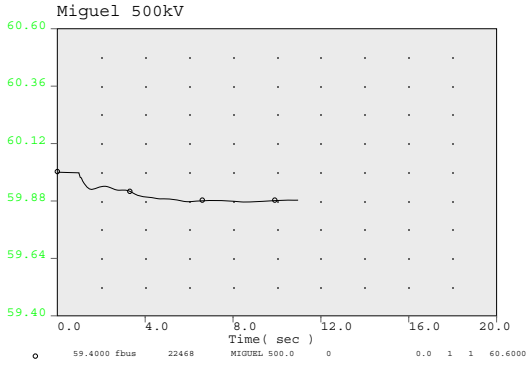


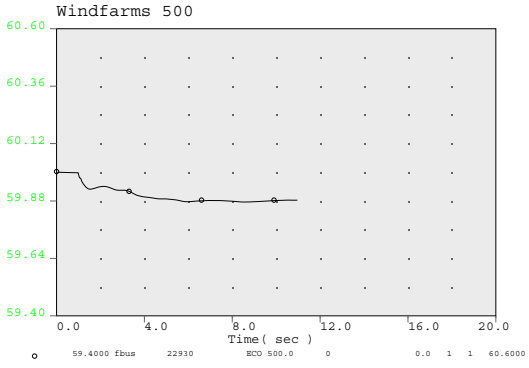
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

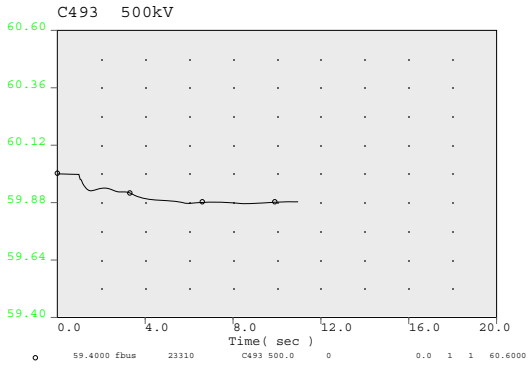
Imperial Valley Area - Frequency

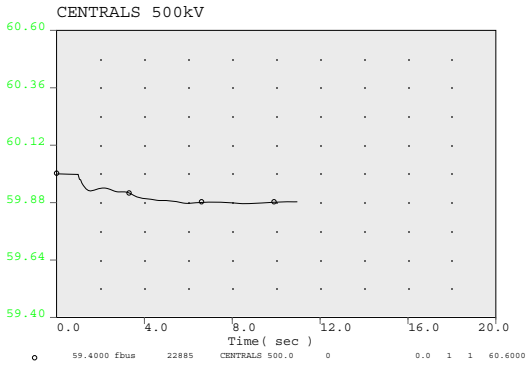






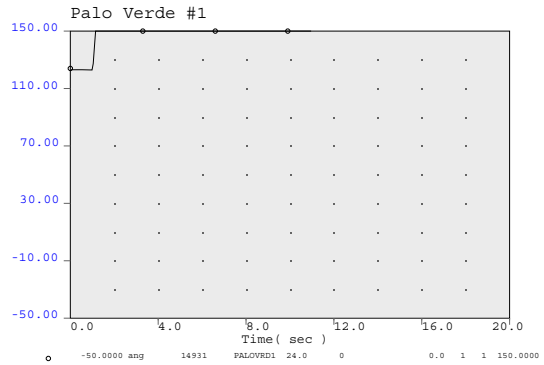


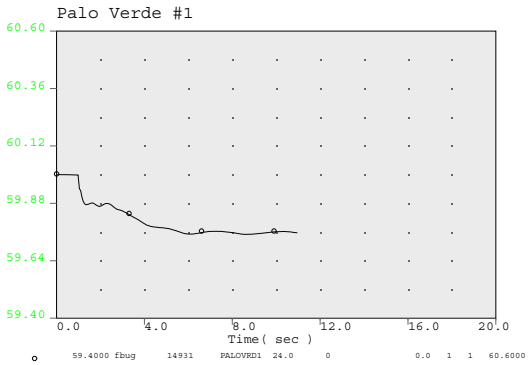


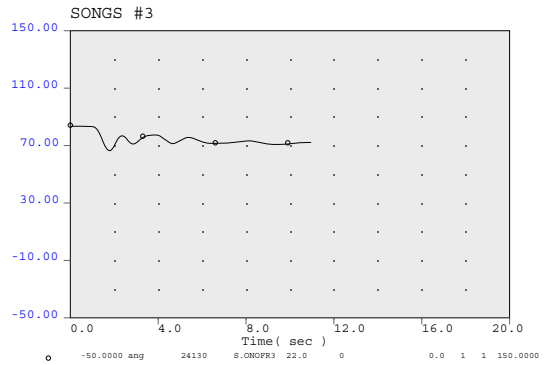


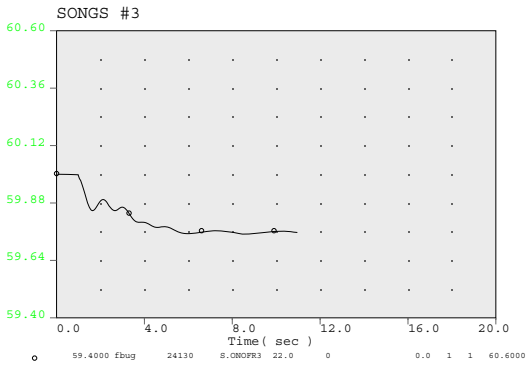
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generator #2

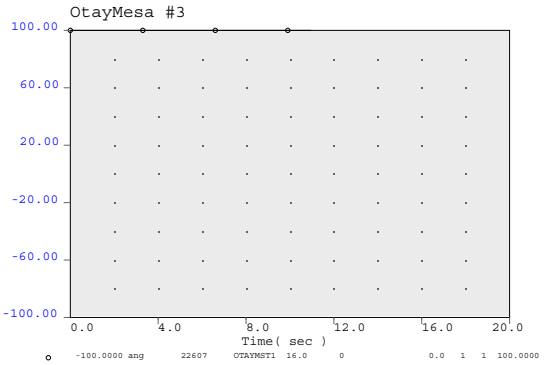
RELATIVE ROTOR ANGLE & FREQUENCY

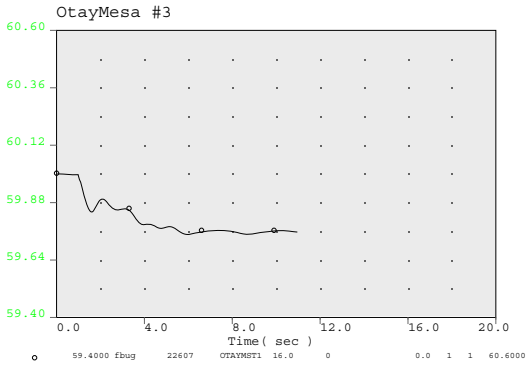








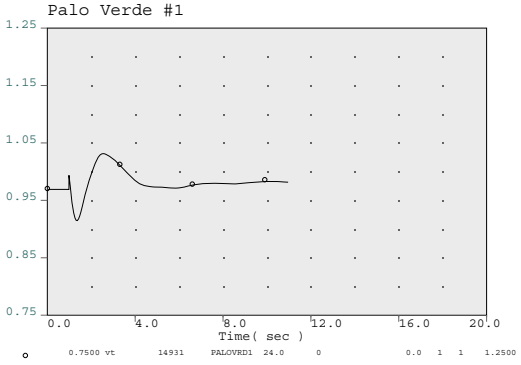




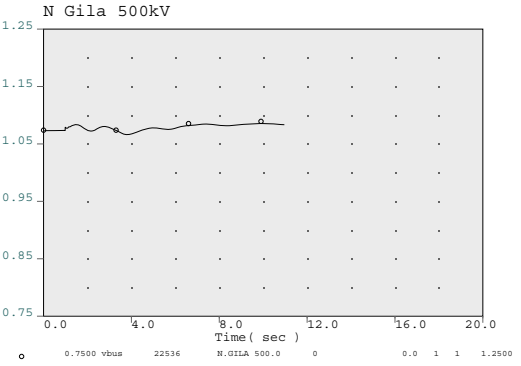
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

RELATIVE VOLTAGE

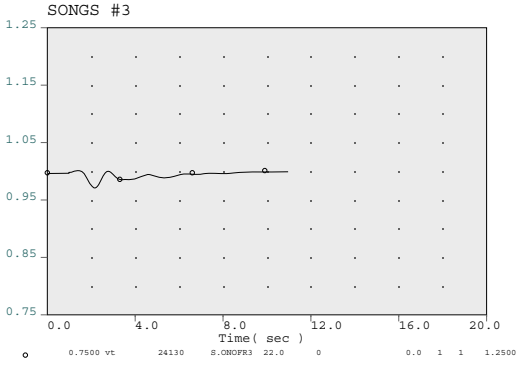
Palo Verde #1



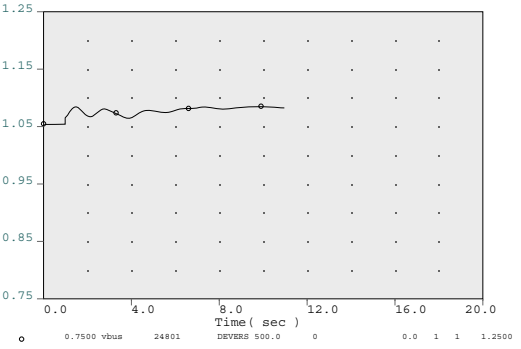
N Gila 500kV



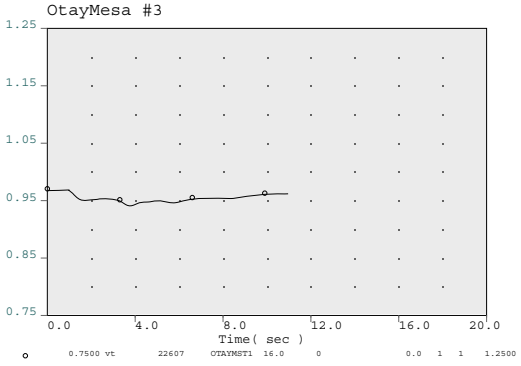
SONGS #3



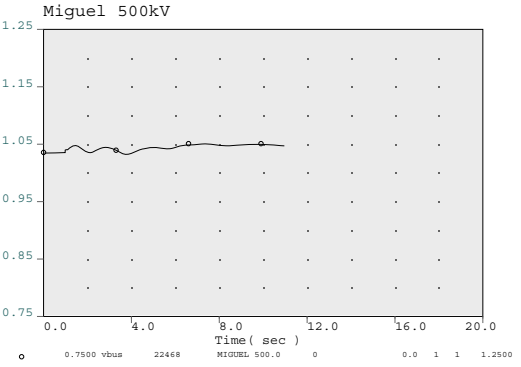
Devers 500



OtayMesa #3



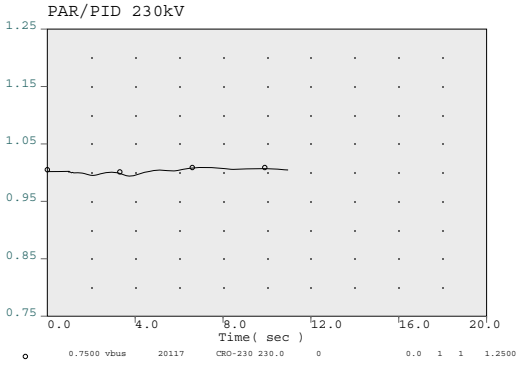
Miguel 500kV



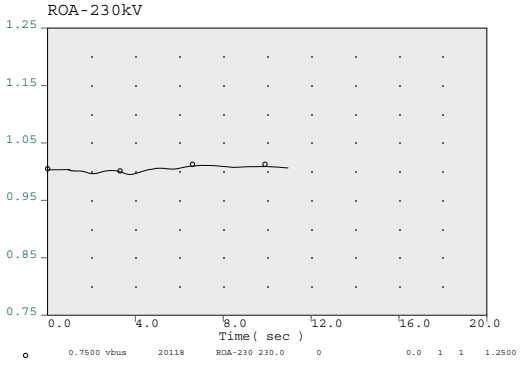
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

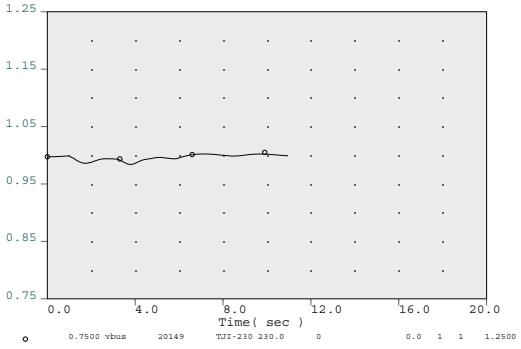
PAR/PID 230kV



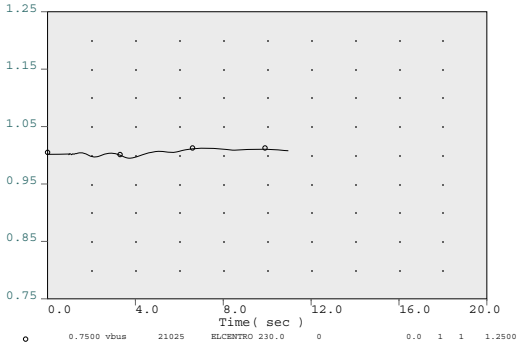
ROA-230kV



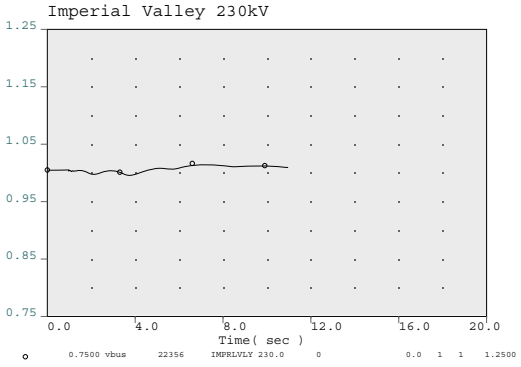
TJ1-230kV



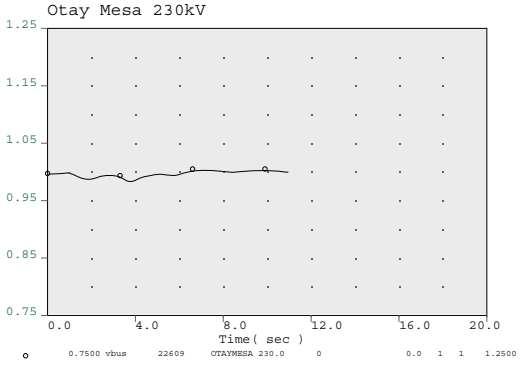
El Centro



Imperial Valley 230kV

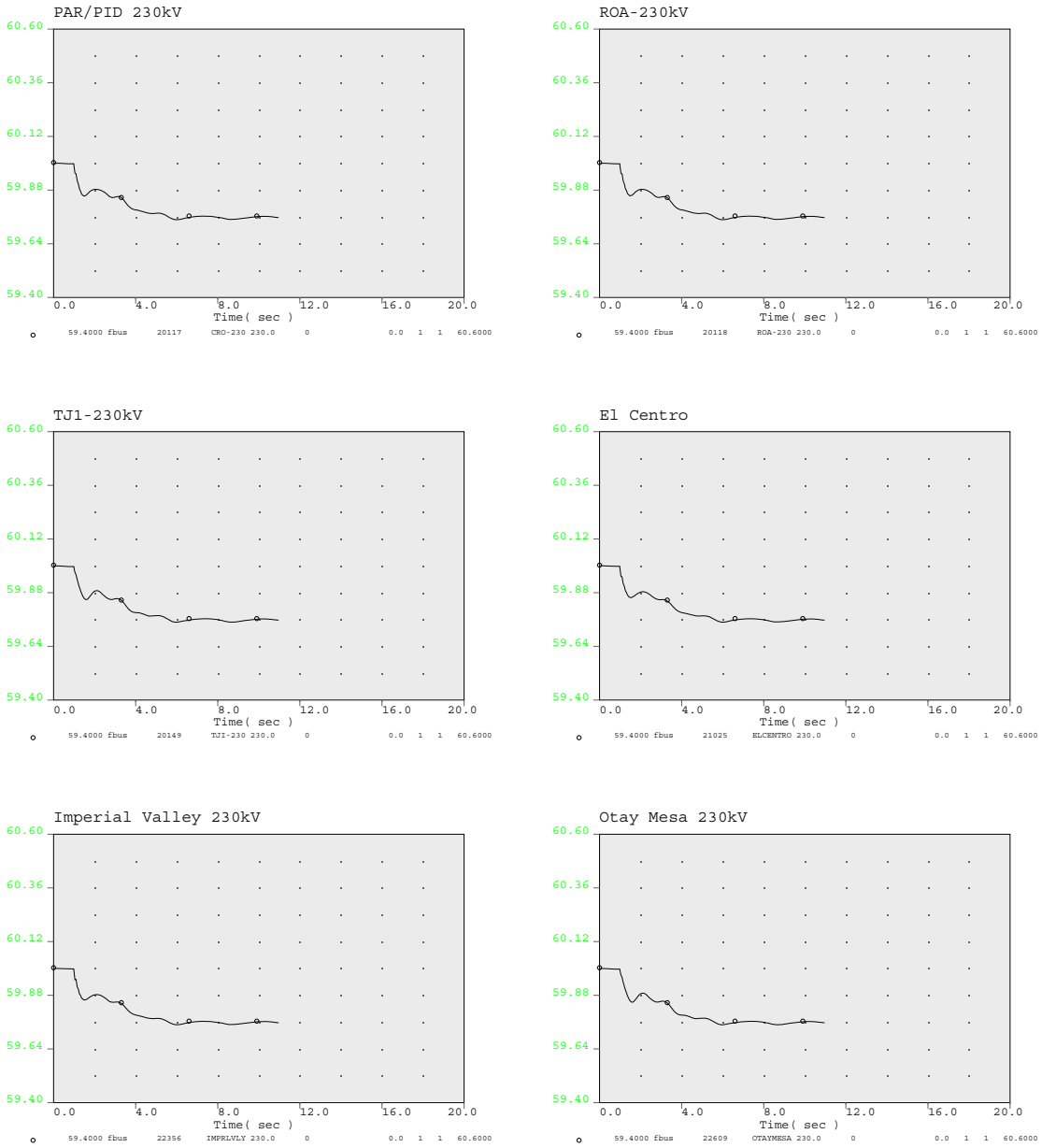


Otay Mesa 230kV



SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

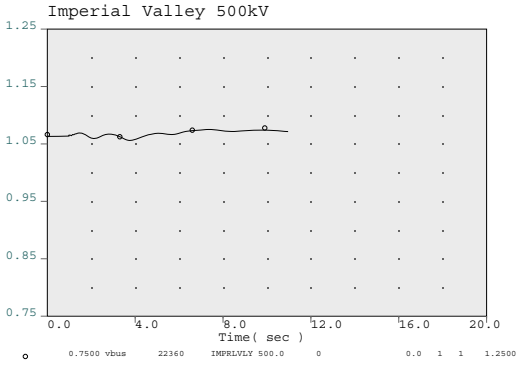
Affected System Frequency Check and Comparison



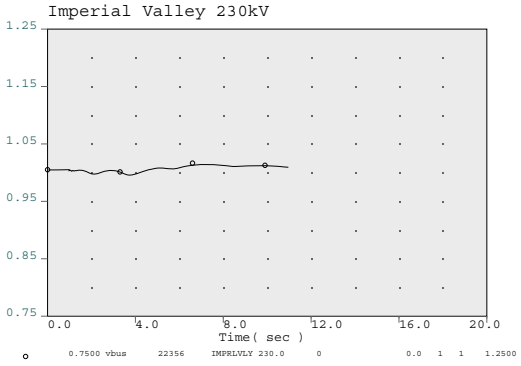
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE

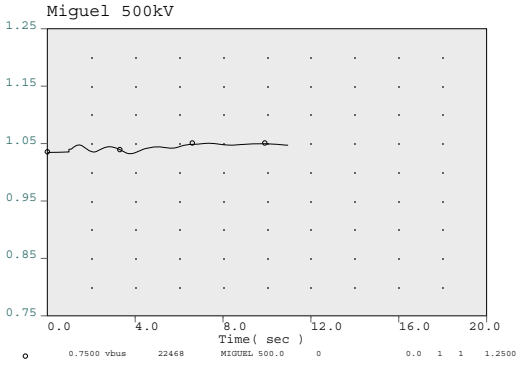
Imperial Valley 500kV



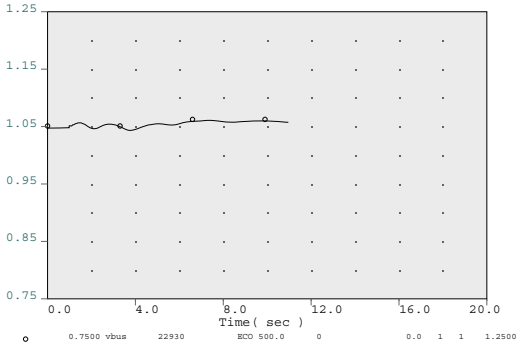
Imperial Valley 230kV



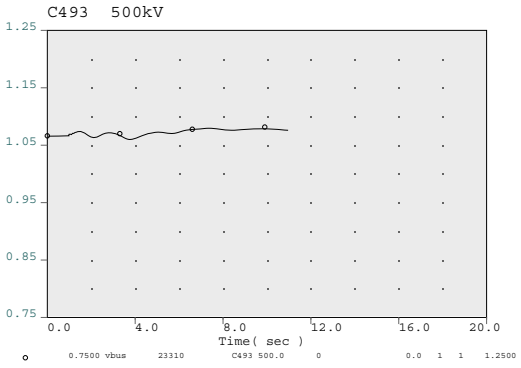
Miguel 500kV



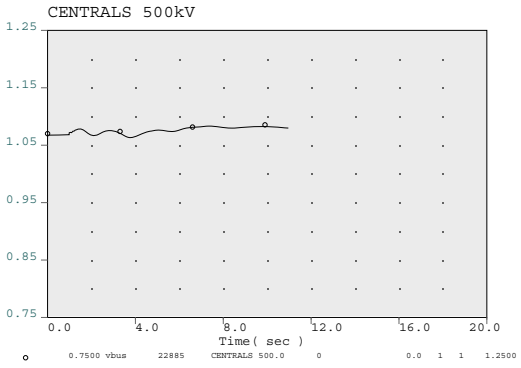
Windfarms 500



C493 500kV

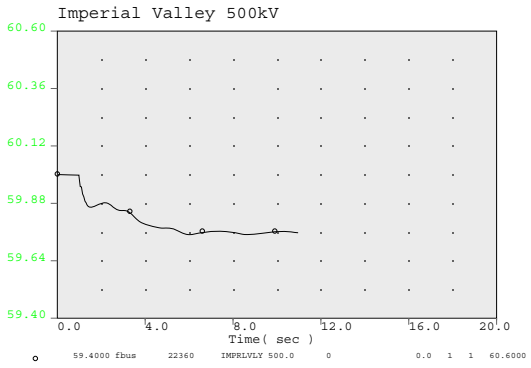


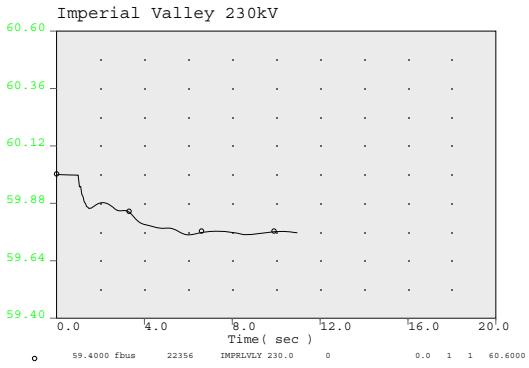
CENTRALS 500kV

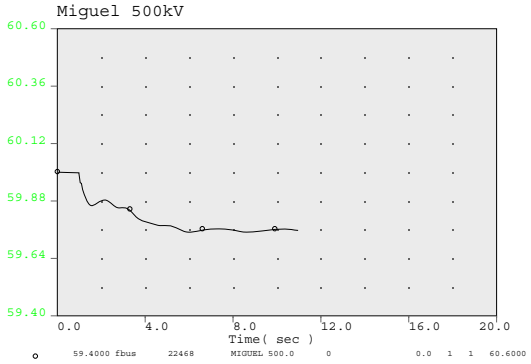


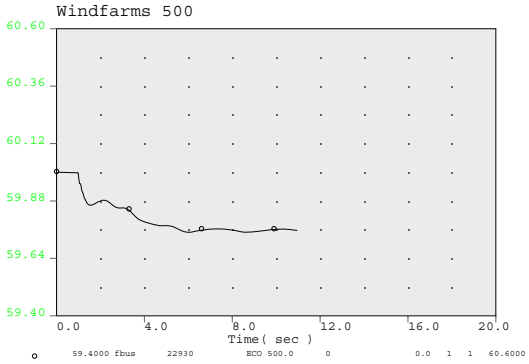
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

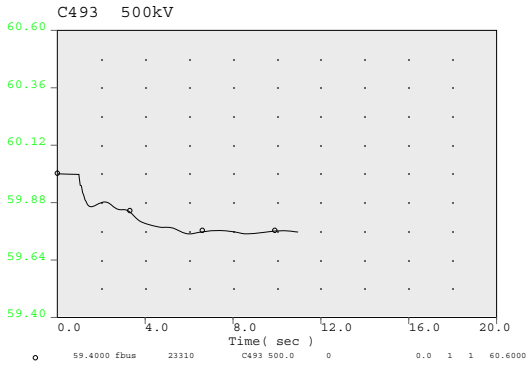
Imperial Valley Area - Frequency

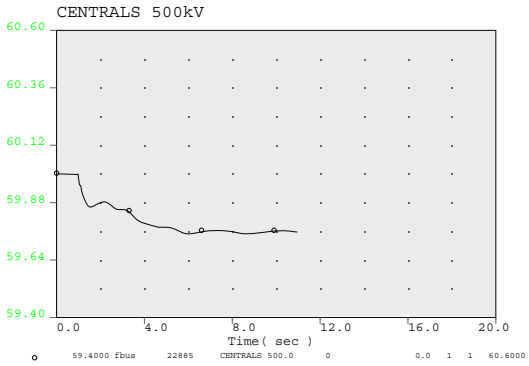






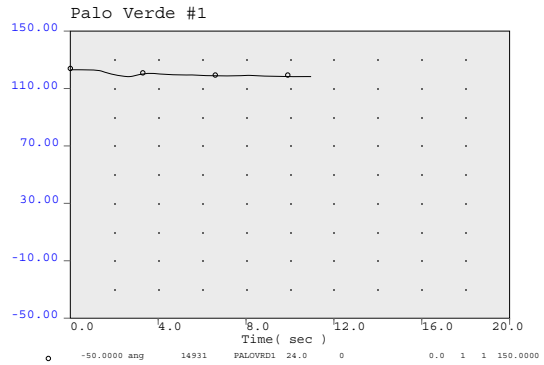


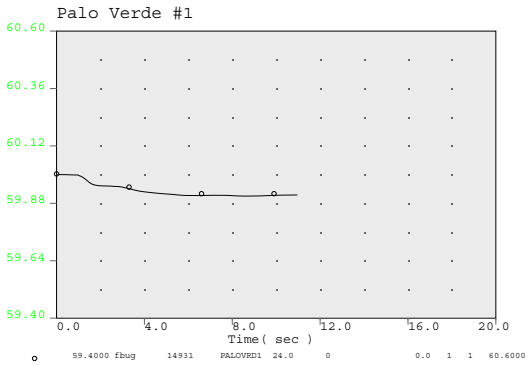


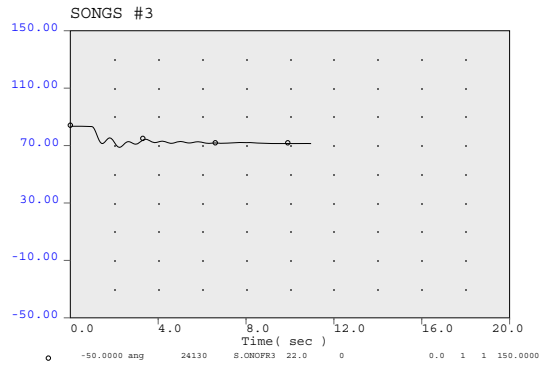


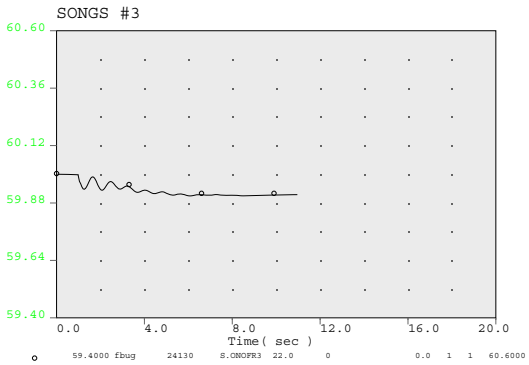
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

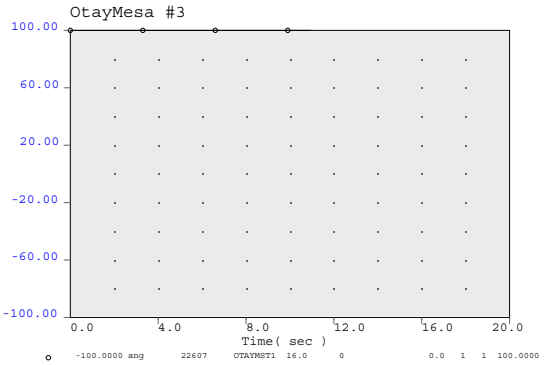
RELATIVE ROTOR ANGLE & FREQUENCY

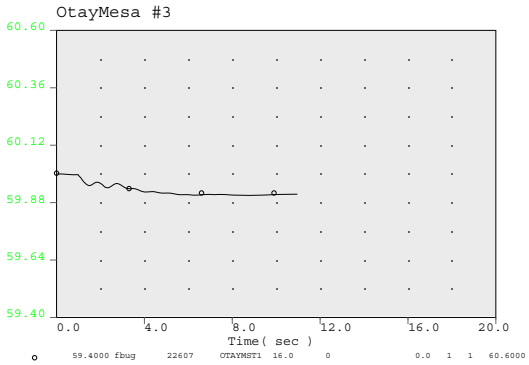












SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

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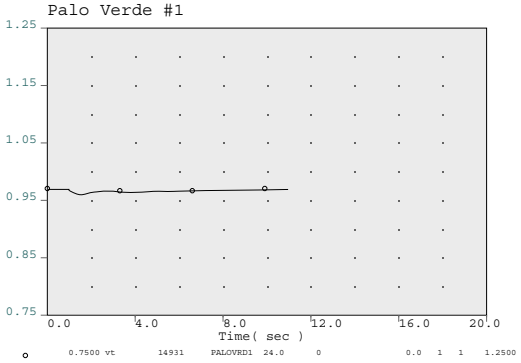
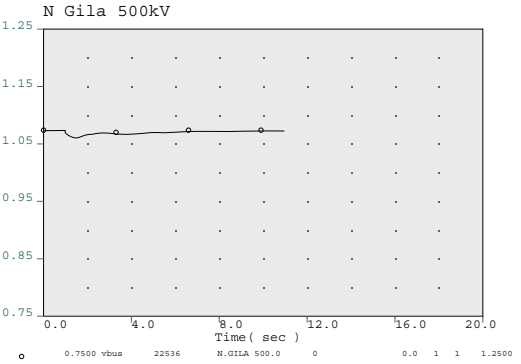
SDGE	SONGS-g1_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:25:37 2010

RELATIVE VOLTAGE

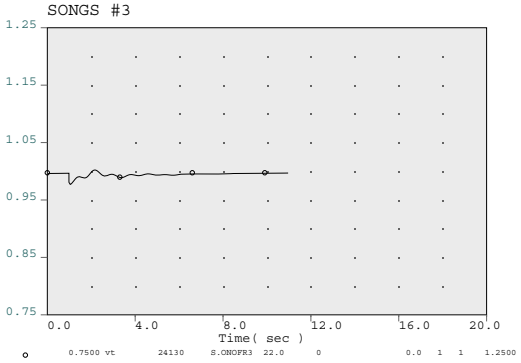
Palo Verde #1



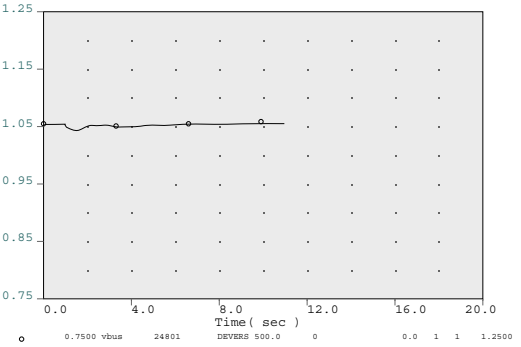
N Gila 500kV



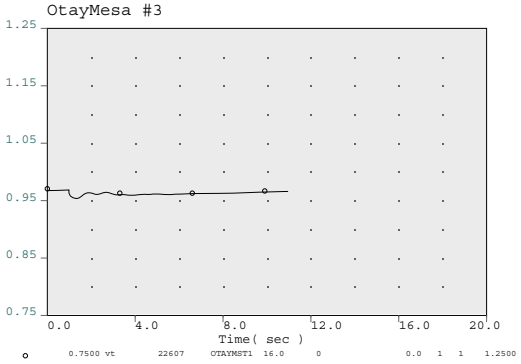
SONGS #3



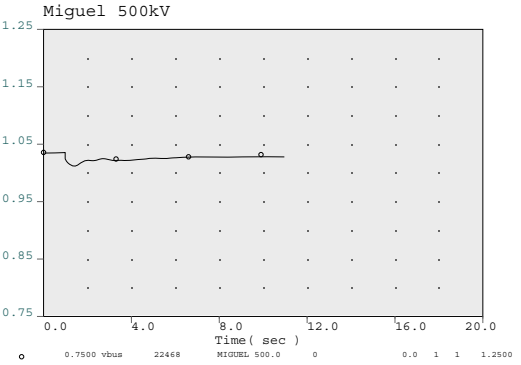
Devers 500



OtayMesa #3



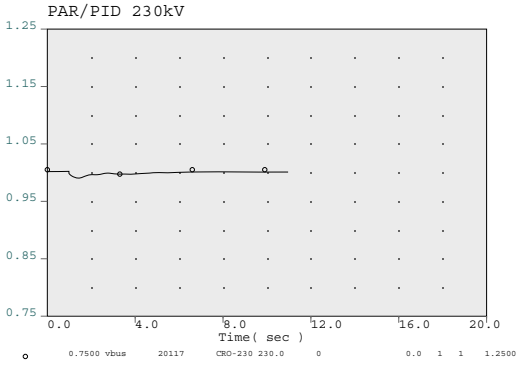
Miguel 500kV



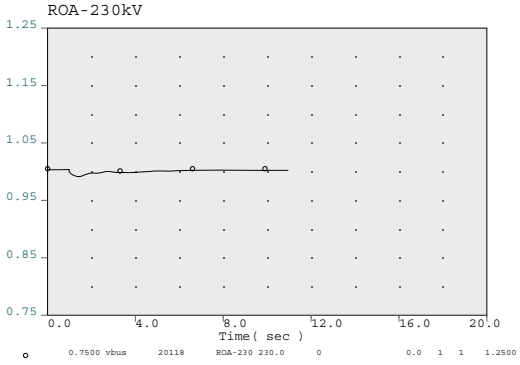
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

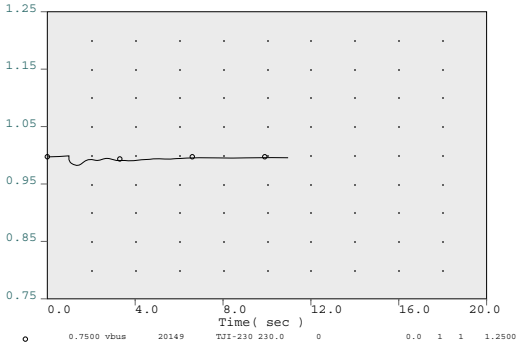
PAR/PID 230kV



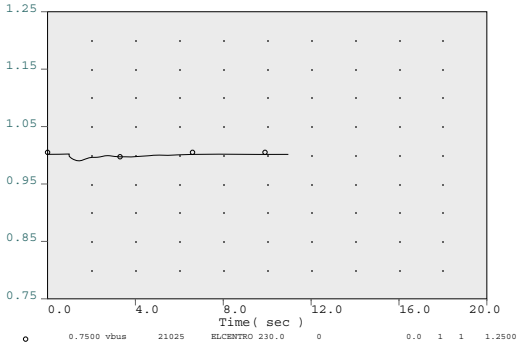
ROA-230kV



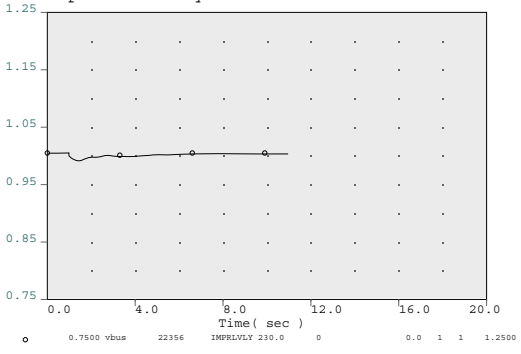
TJ1-230kV



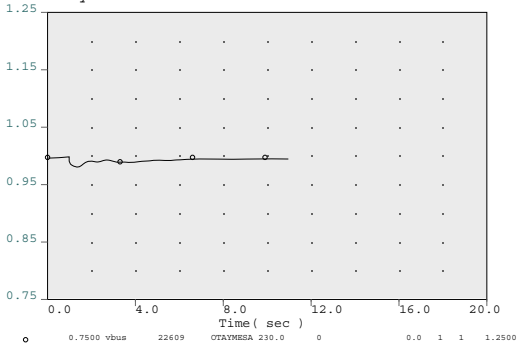
El Centro



Imperial Valley 230kV



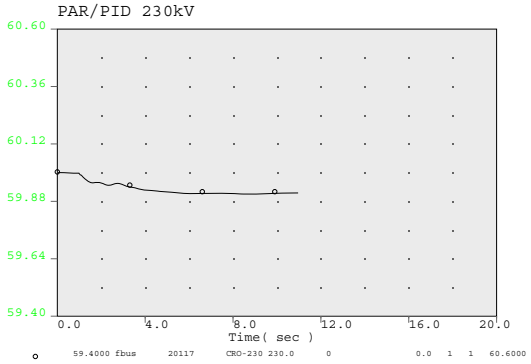
Otay Mesa 230kV



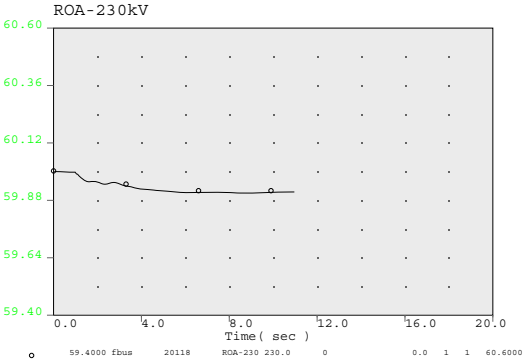
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Frequency Check and Comparison

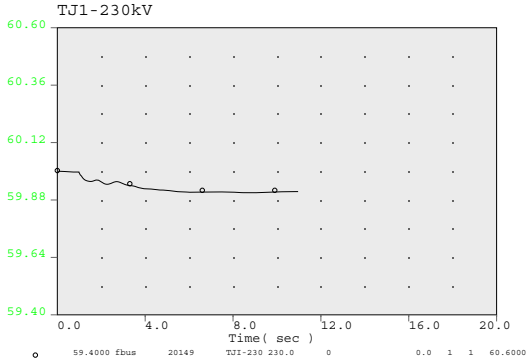
PAR/PID 230kV



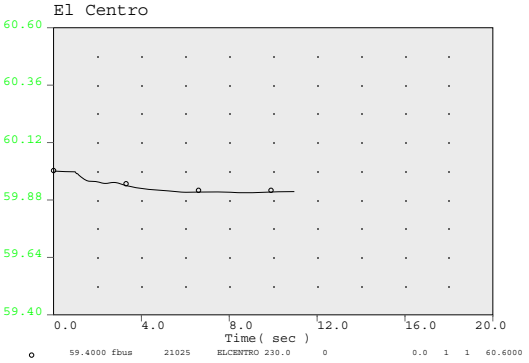
ROA-230kV



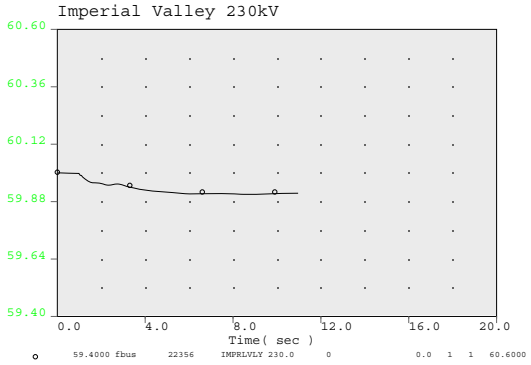
TJ1-230kV



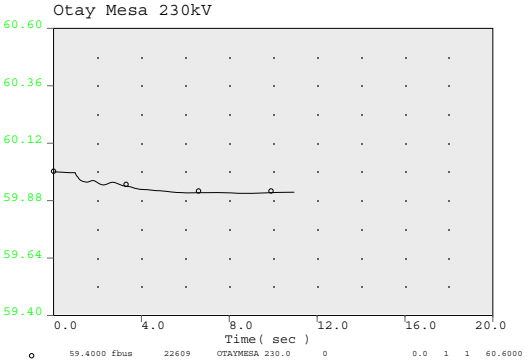
El Centro



Imperial Valley 230kV



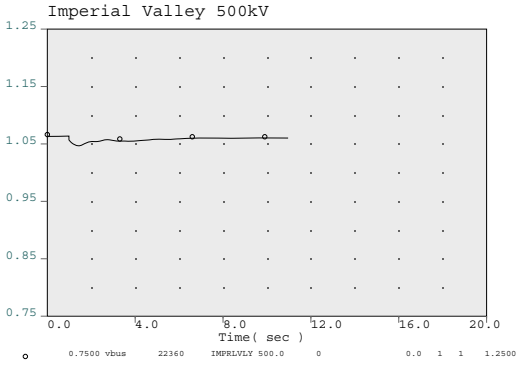
Otay Mesa 230kV



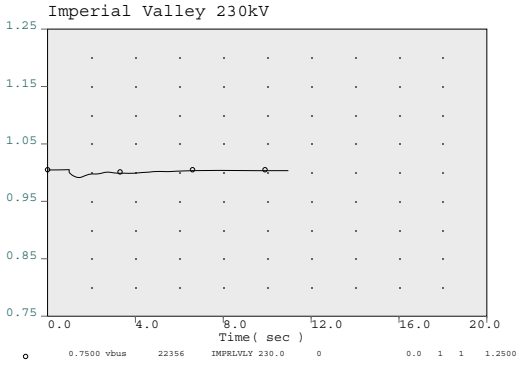
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

Imperial Valley Area - VOLTAGE

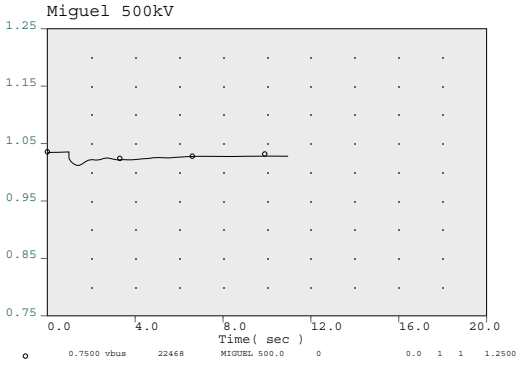
Imperial Valley 500kV



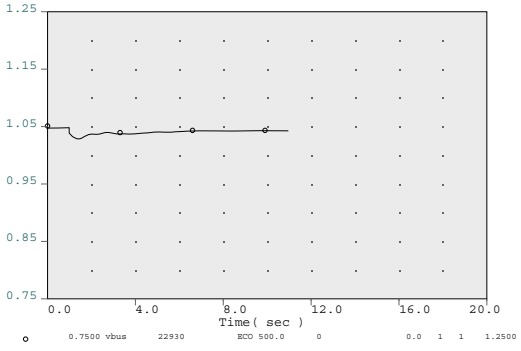
Imperial Valley 230kV



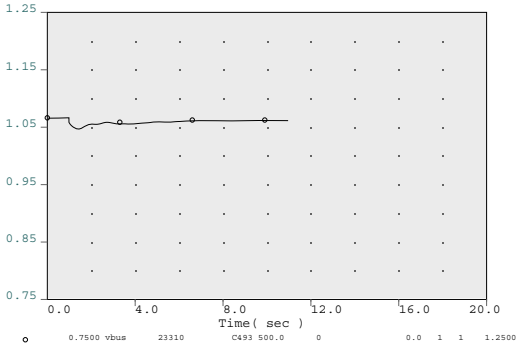
Miguel 500kV



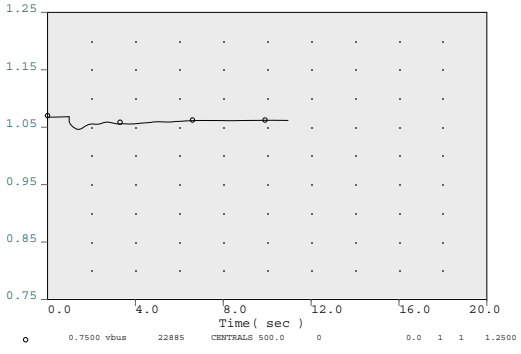
Windfarms 500



C493 500kV

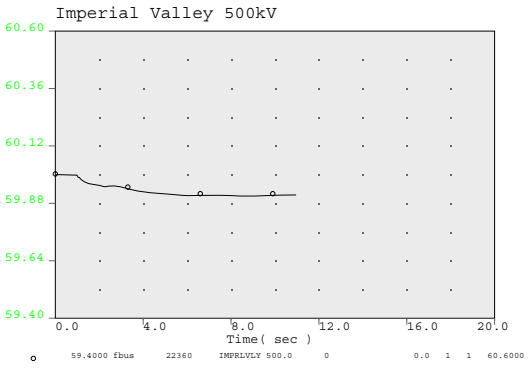


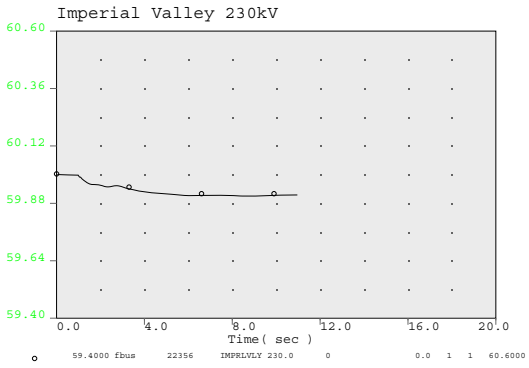
CENTRALS 500kV

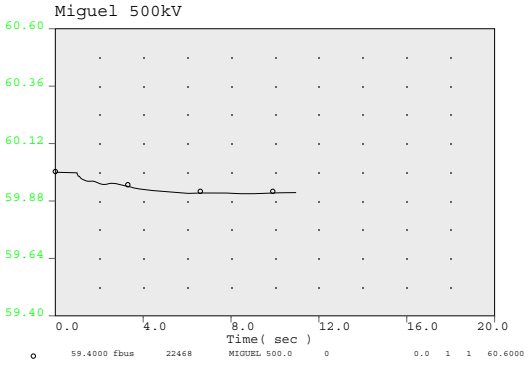


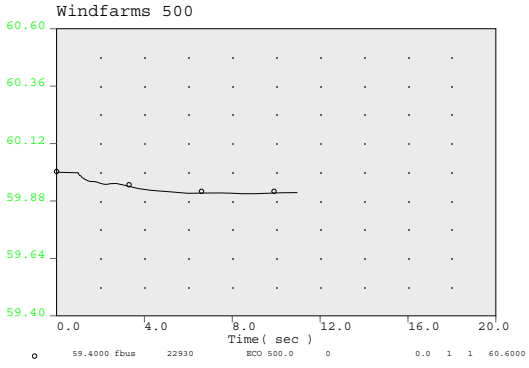
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

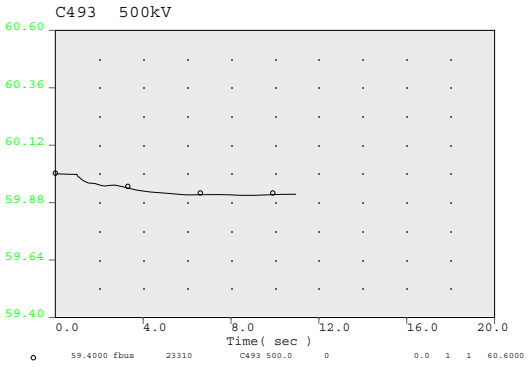
Imperial Valley Area - Frequency

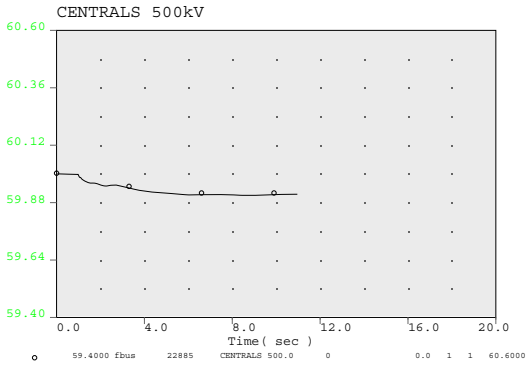






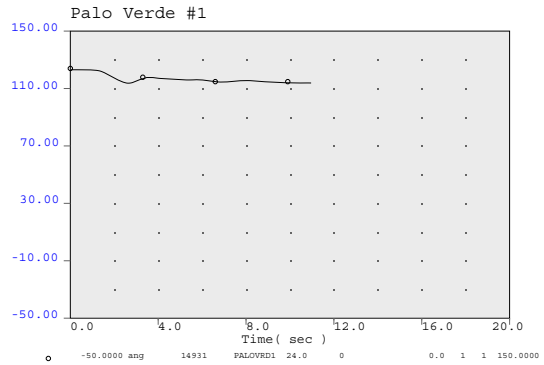


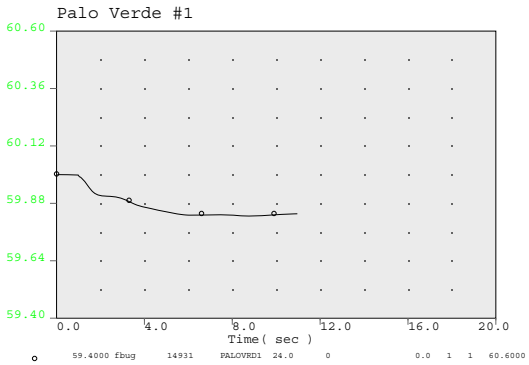


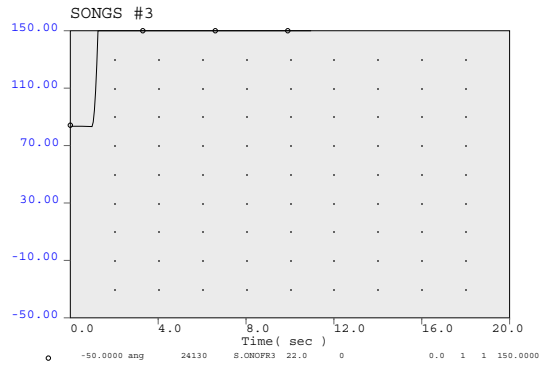


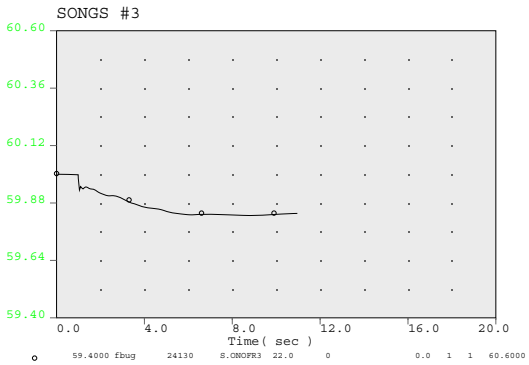
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generator #2

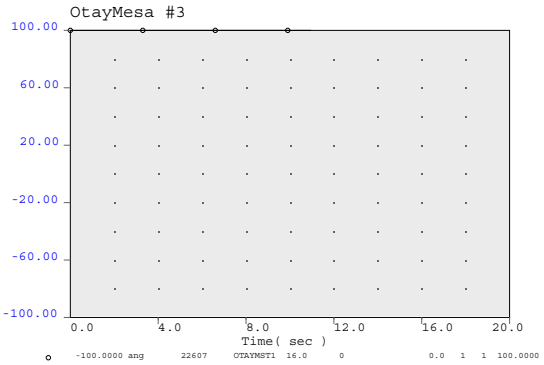
RELATIVE ROTOR ANGLE & FREQUENCY

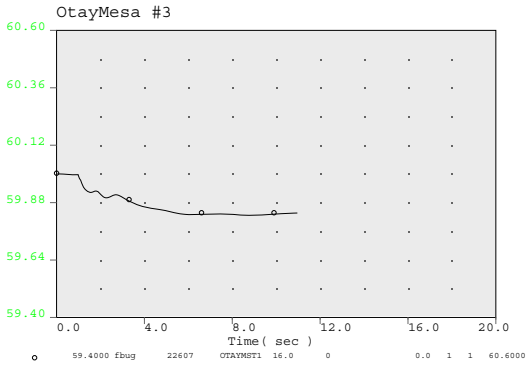












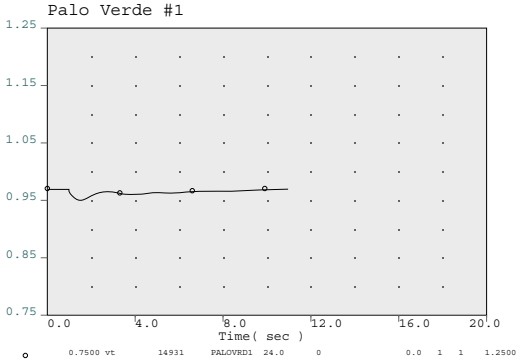
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Page 1

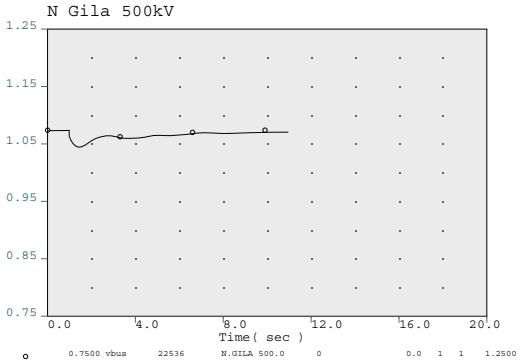
SDGE	SONGS-g2_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:25:55 2010

RELATIVE VOLTAGE

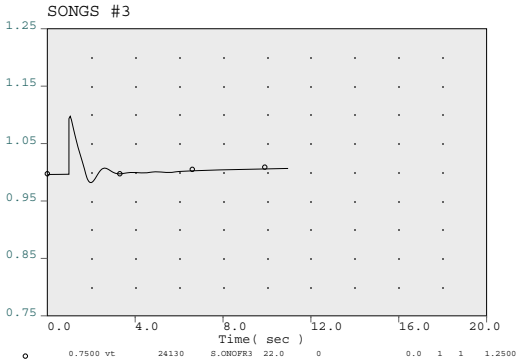
Palo Verde #1



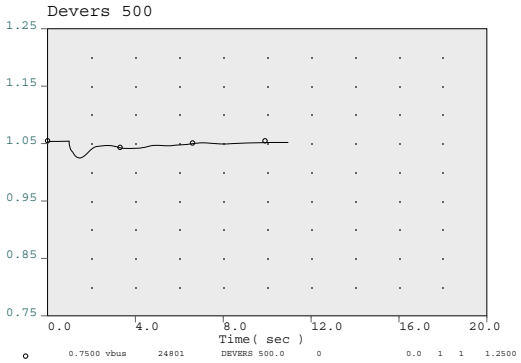
N Gila 500kV



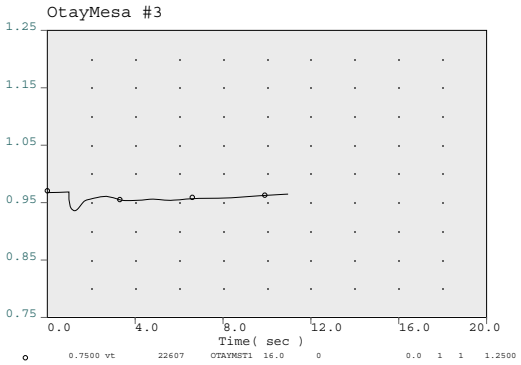
SONGS #3



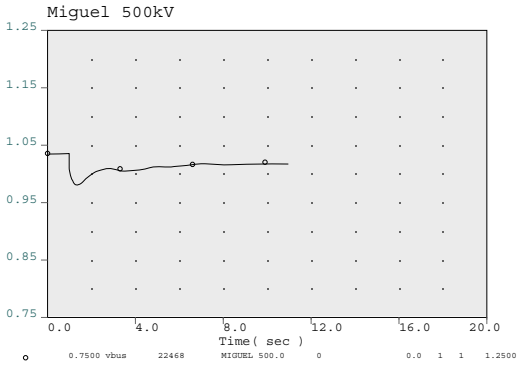
Devers 500



OtayMesa #3



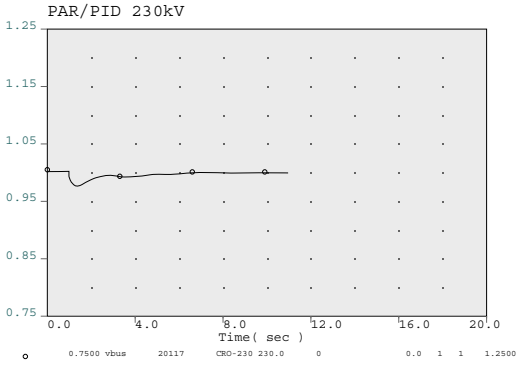
Miguel 500kV



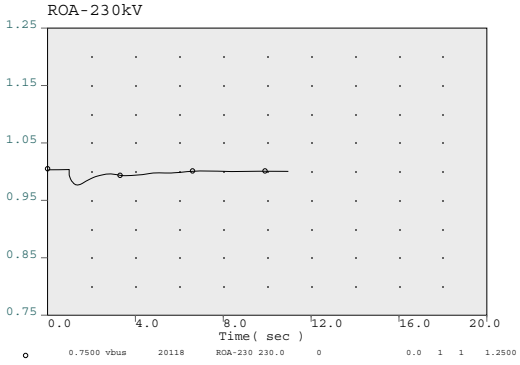
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

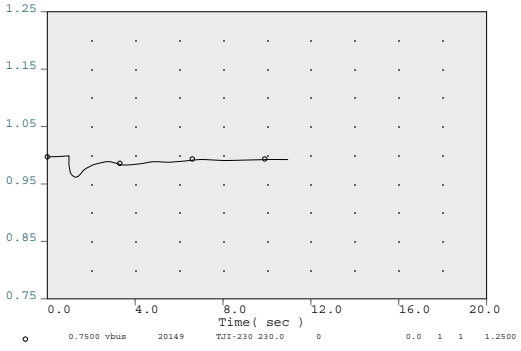
PAR/PID 230kV



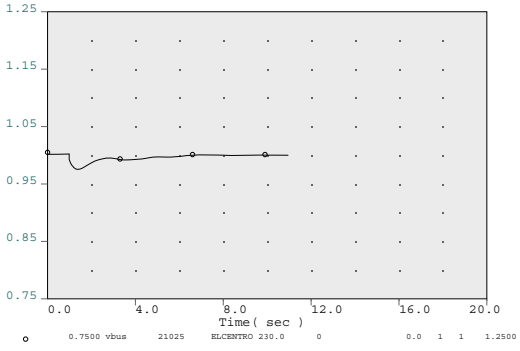
ROA-230kV



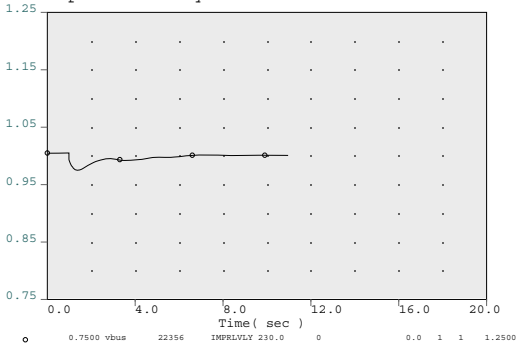
TJ1-230kV



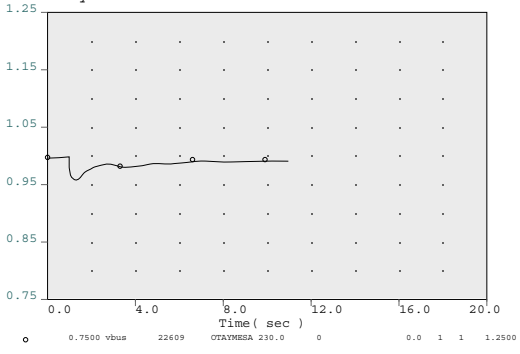
El Centro



Imperial Valley 230kV



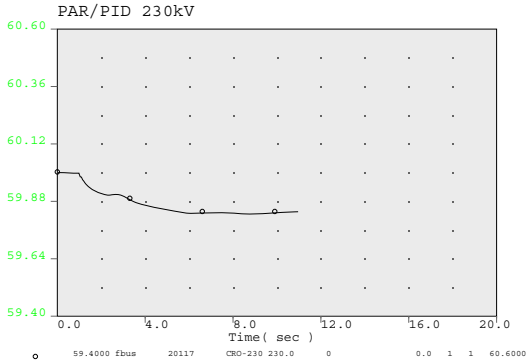
Otay Mesa 230kV



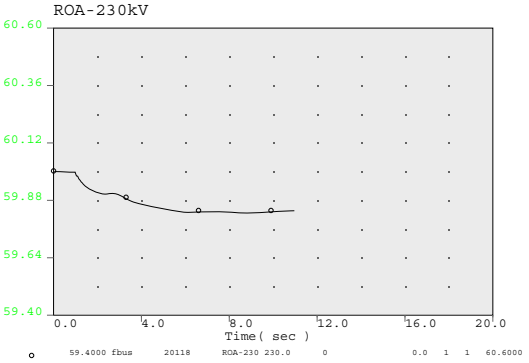
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Frequency Check and Comparison

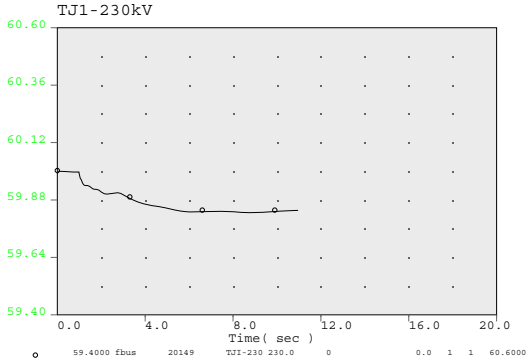
PAR/PID 230kV



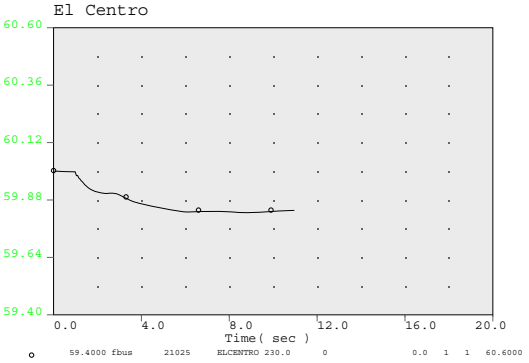
ROA-230kV



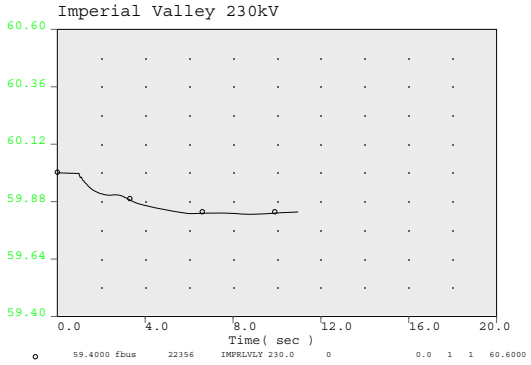
TJ1-230kV



El Centro



Imperial Valley 230kV



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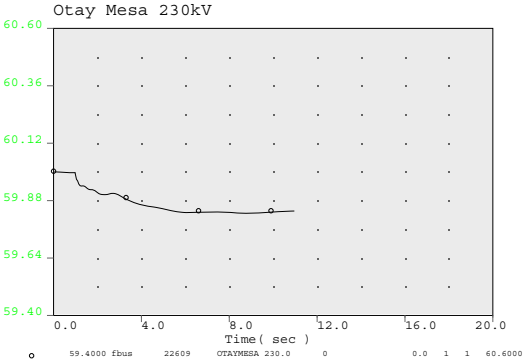
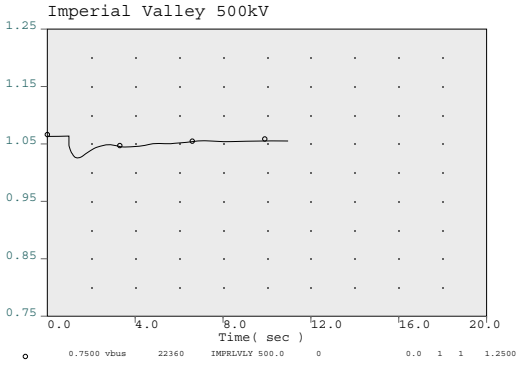


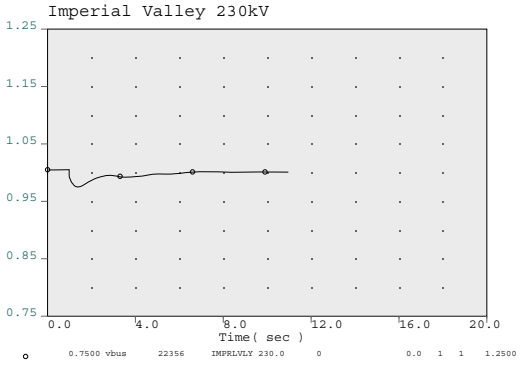
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Imperial Valley Area - VOLTAGE

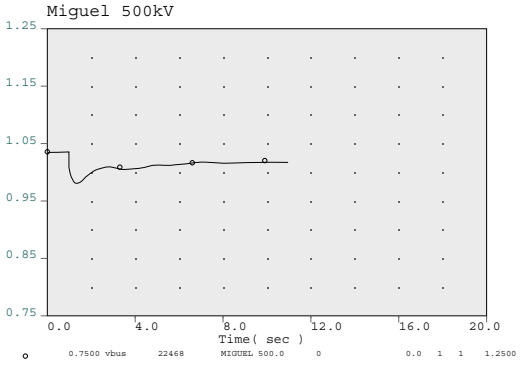
Imperial Valley 500kV



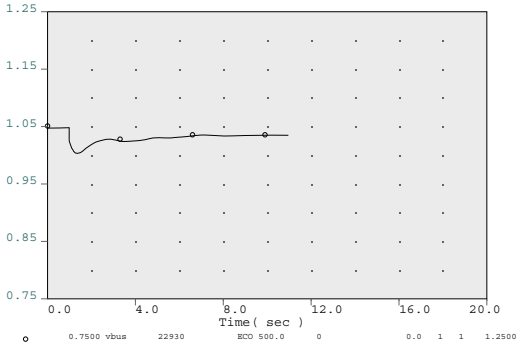
Imperial Valley 230kV



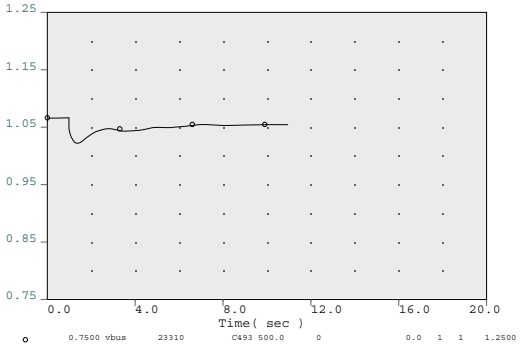
Miguel 500kV



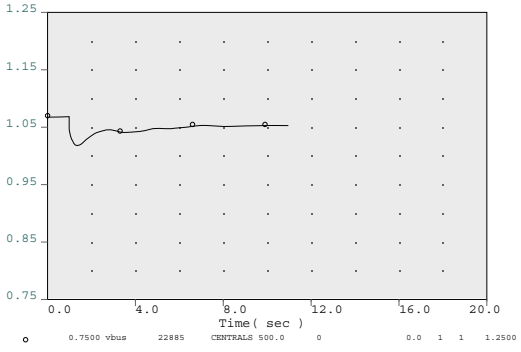
Windfarms 500



C493 500kV

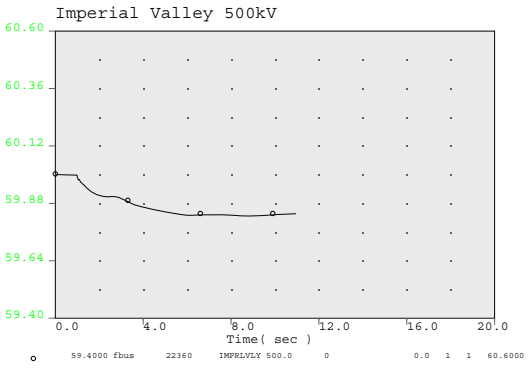


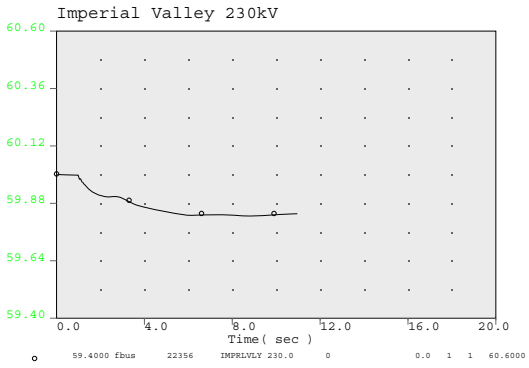
CENTRALS 500kV

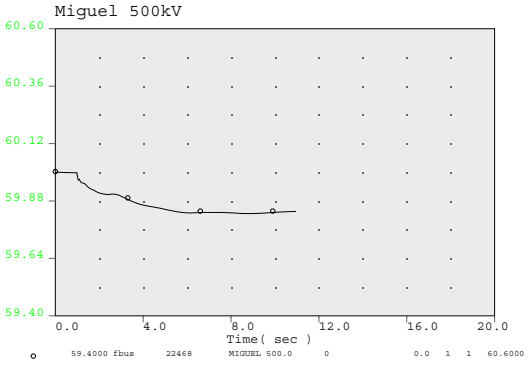


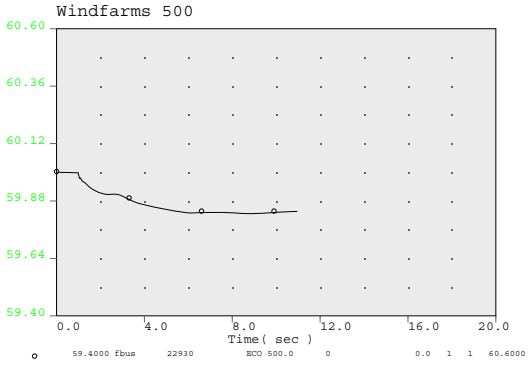
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

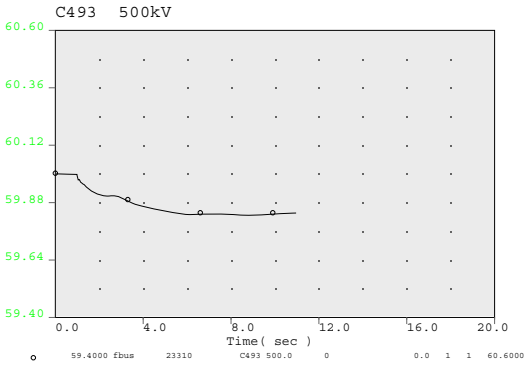
Imperial Valley Area - Frequency

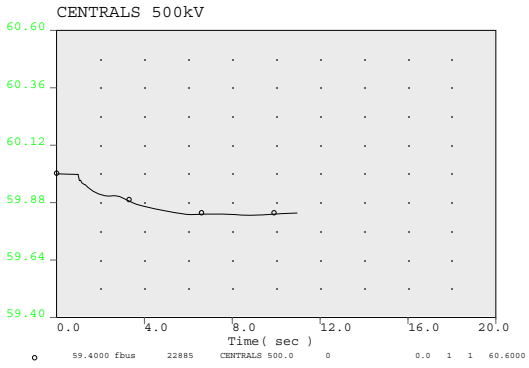






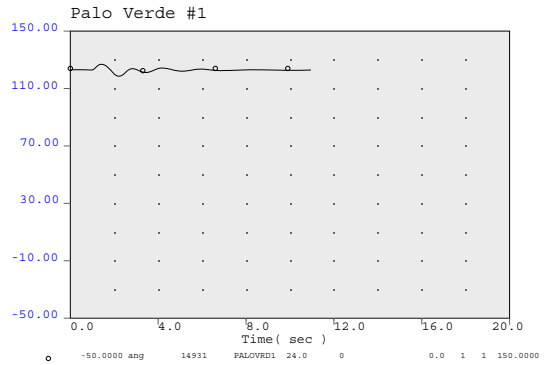


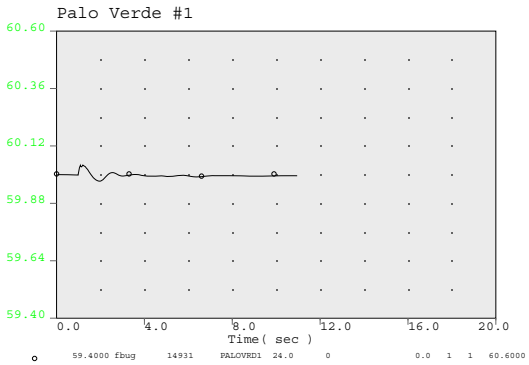


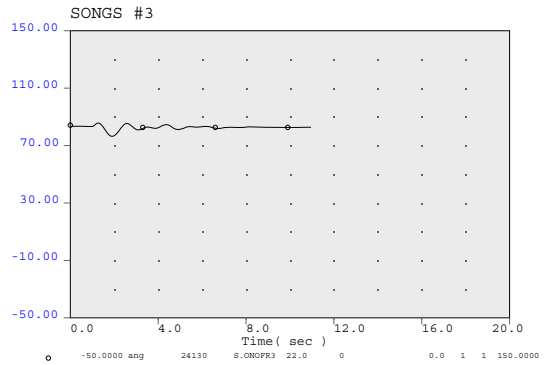


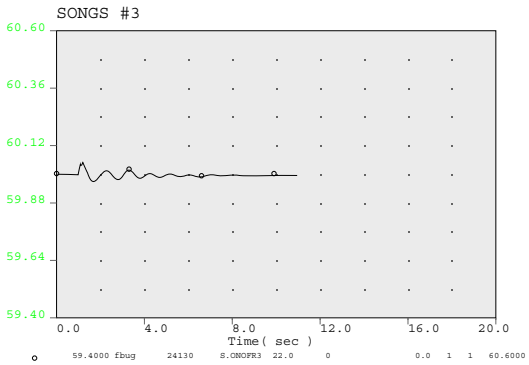
SDG&E Cluster 2 - pre
2014 Light Autumn
Trip San Onofre Generators 2 & 3

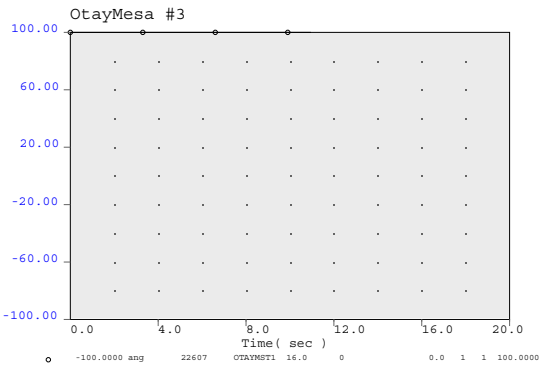
RELATIVE ROTOR ANGLE & FREQUENCY

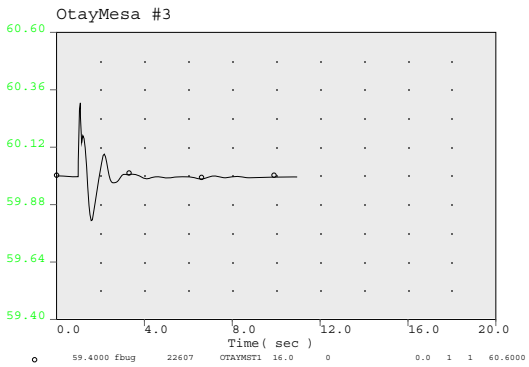












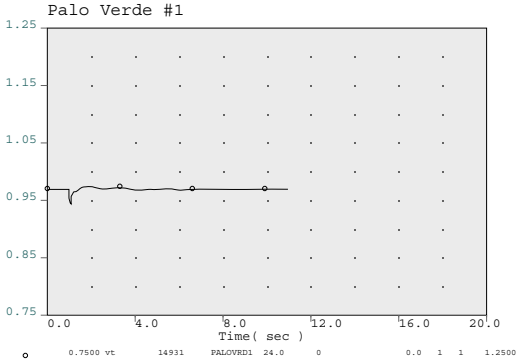
SDG&E Cluster 2 - pre int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Page 1

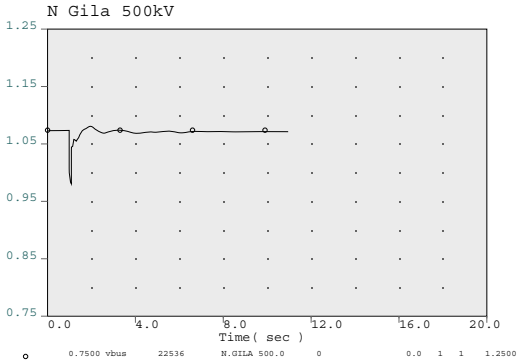
SDGE	SY230-SG_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:23:49 2010

RELATIVE VOLTAGE

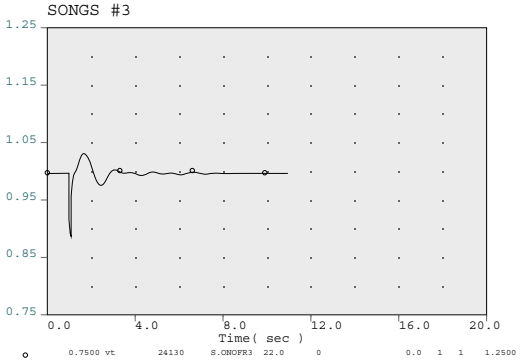
Palo Verde #1



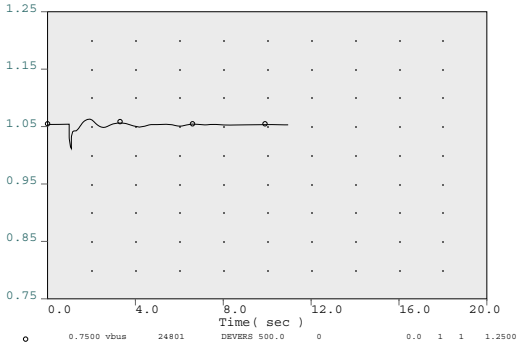
N Gila 500kV



SONGS #3



Devers 500



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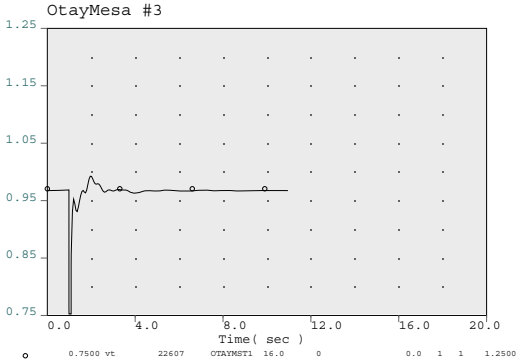
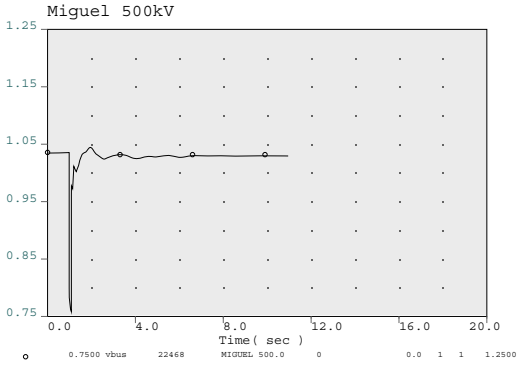


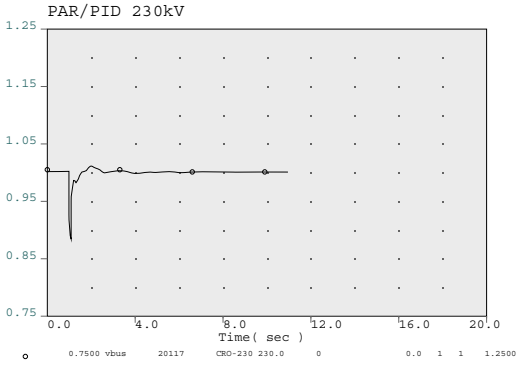
Miguel 500kV



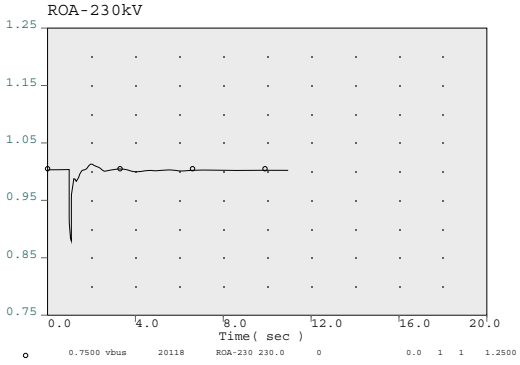
SDG&E Cluster 2 - pre int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Affected System Voltage Check and Comparison

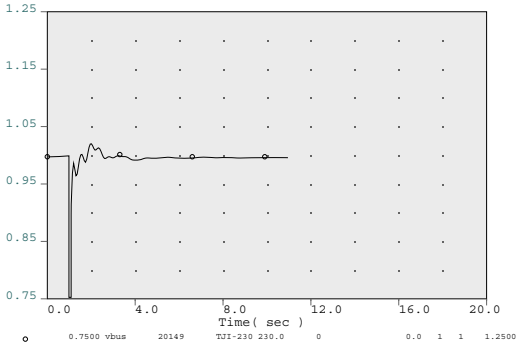
PAR/PID 230kV



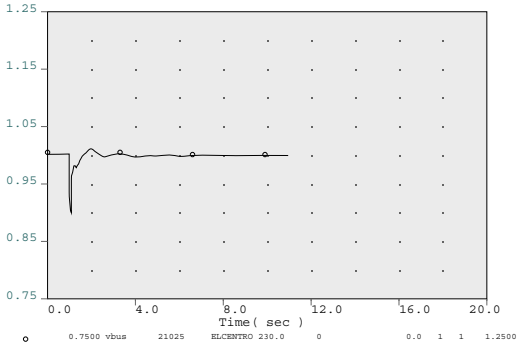
ROA-230kV



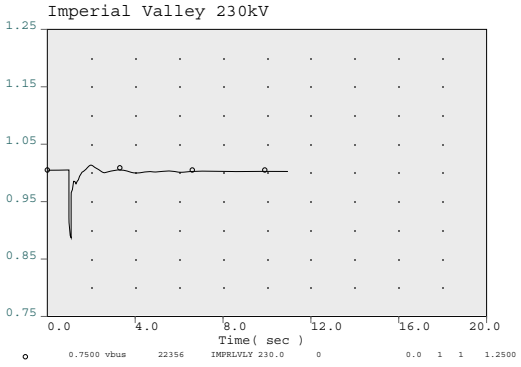
TJ1-230kV



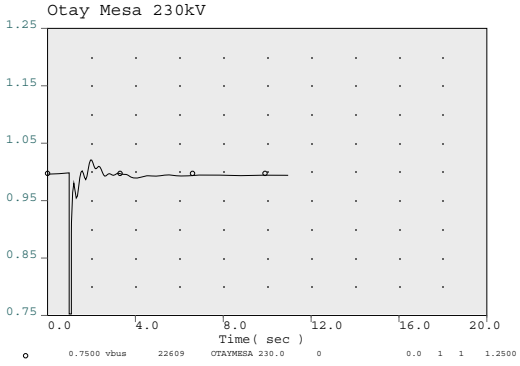
El Centro



Imperial Valley 230kV



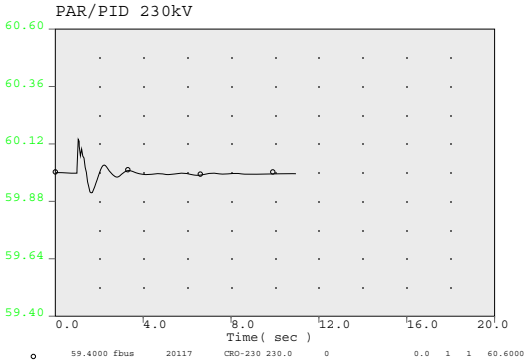
Otay Mesa 230kV



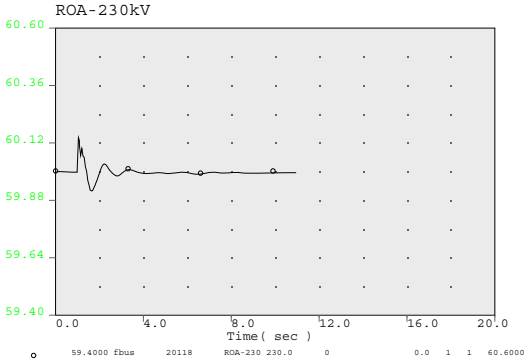
SDG&E Cluster 2 - pre int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Affected System Frequency Check and Comparison

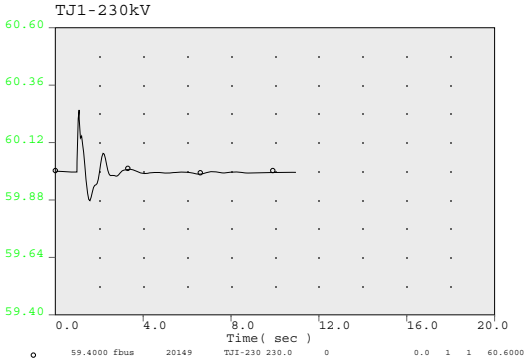
PAR/PID 230kV



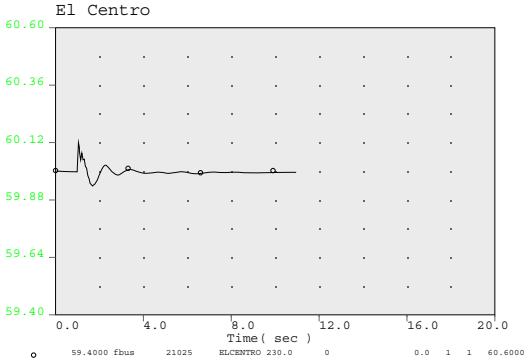
ROA-230kV



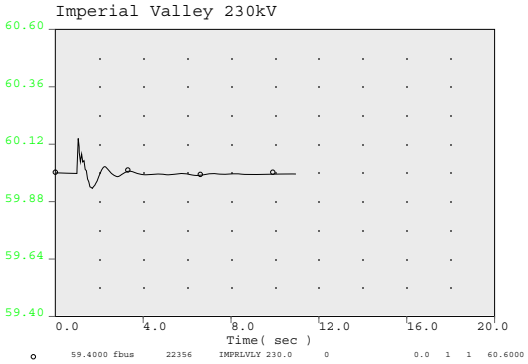
TJ1-230kV



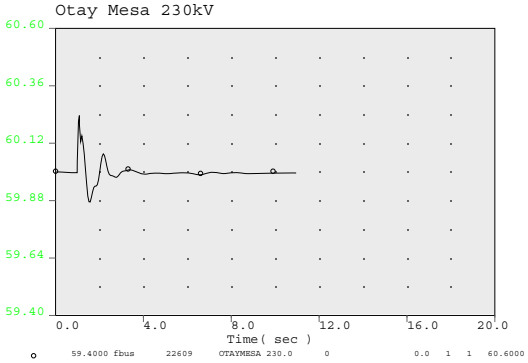
El Centro



Imperial Valley 230kV



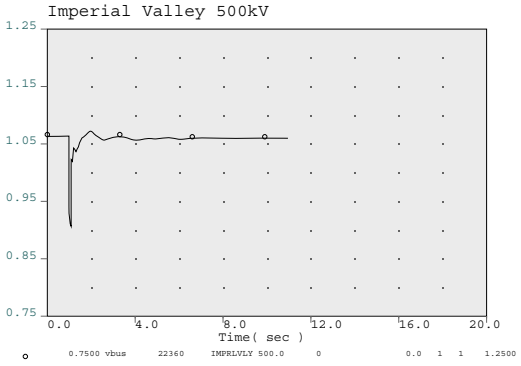
Otay Mesa 230kV



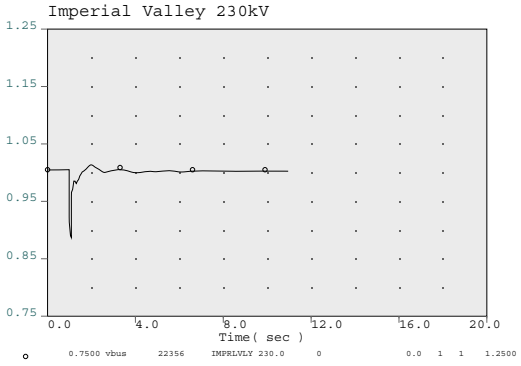
SDG&E Cluster 2 - pre int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Imperial Valley Area - VOLTAGE

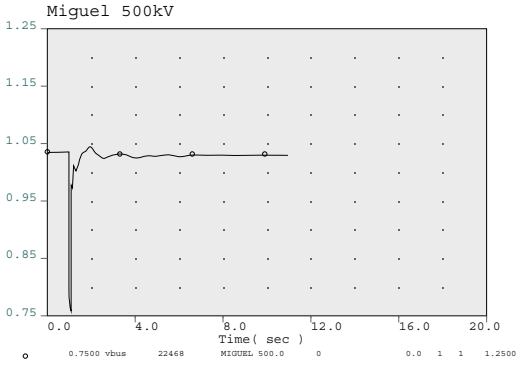
Imperial Valley 500kV



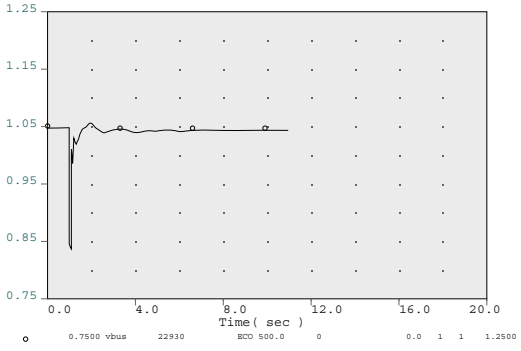
Imperial Valley 230kV



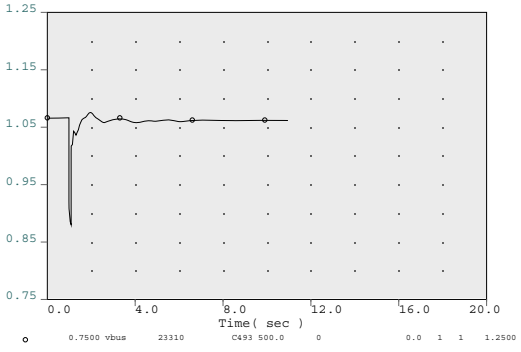
Miguel 500kV



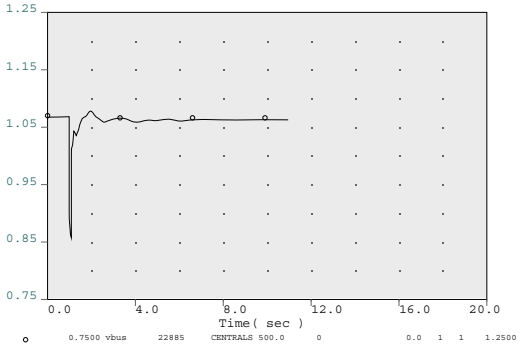
Windfarms 500



C493 500kV



CENTRALS 500kV

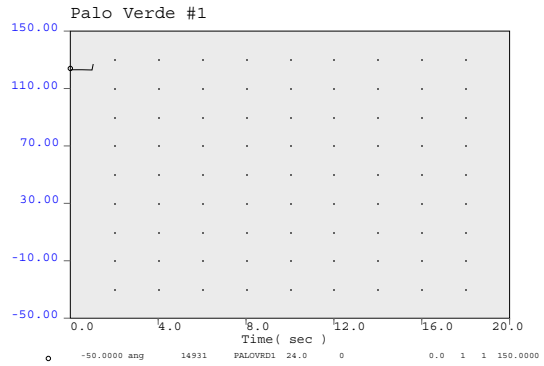


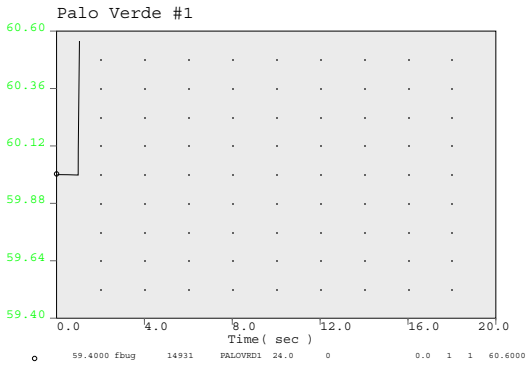
SDG&E Cluster 2 - pre int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

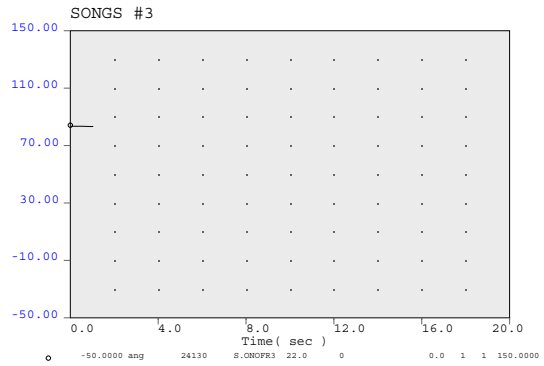
Imperial Valley Area - Frequency

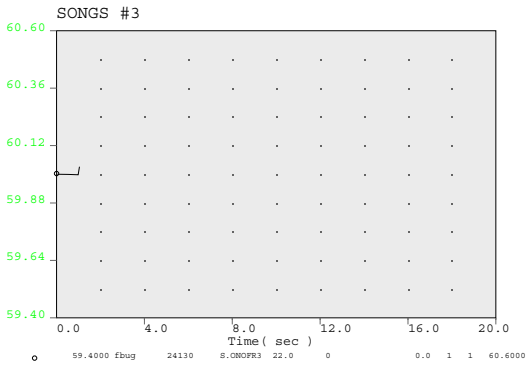
SDG&E Cluster 2 - pre int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

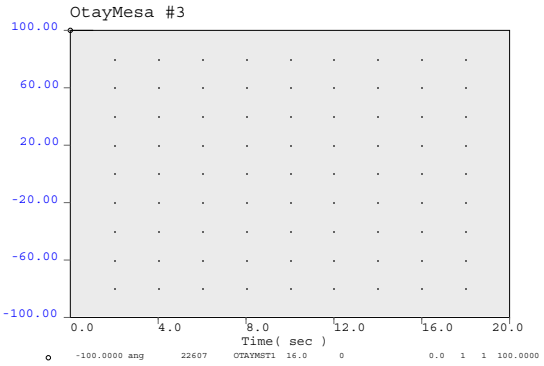
RELATIVE ROTOR ANGLE & FREQUENCY

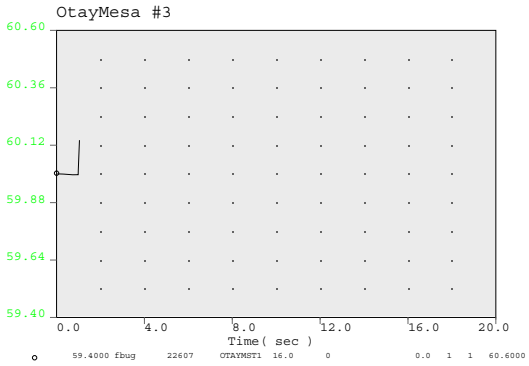












SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

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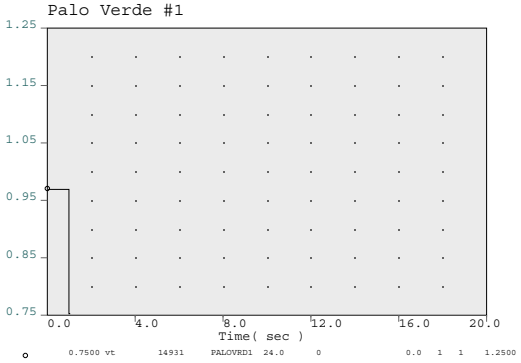
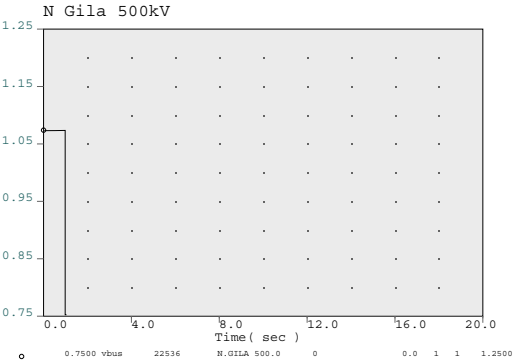
SDGE	T468_HAA_slo_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:26:03 2010

RELATIVE VOLTAGE

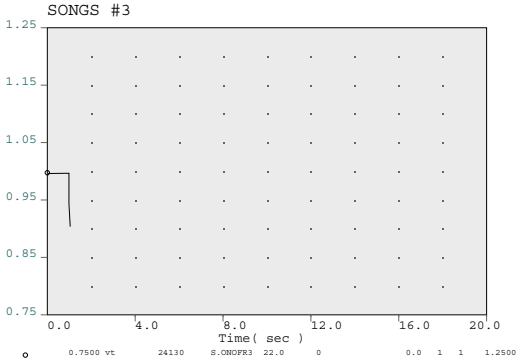
Palo Verde #1



N Gila 500kV



SONGS #3



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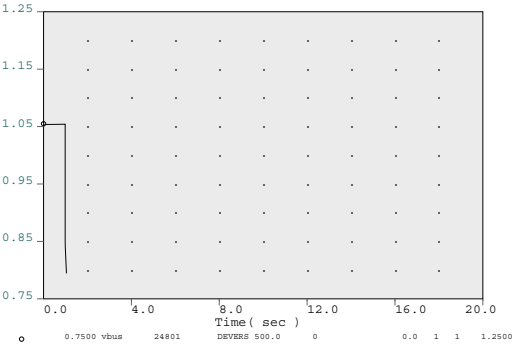
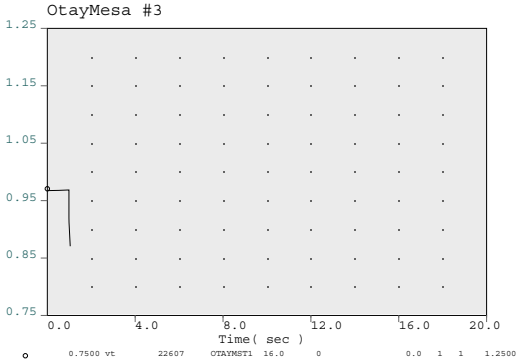
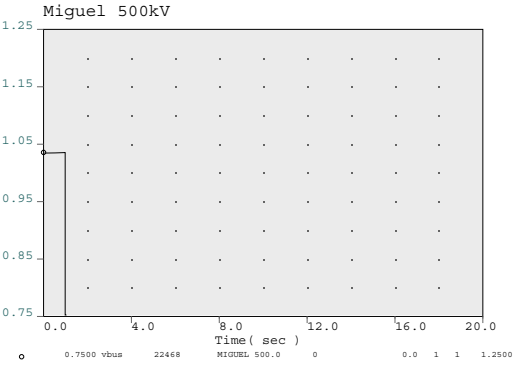


OtayMesa #3



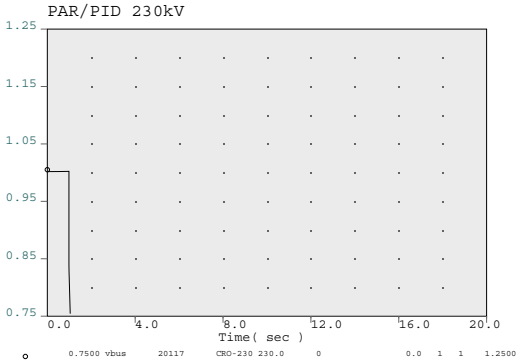
Miguel 500kV



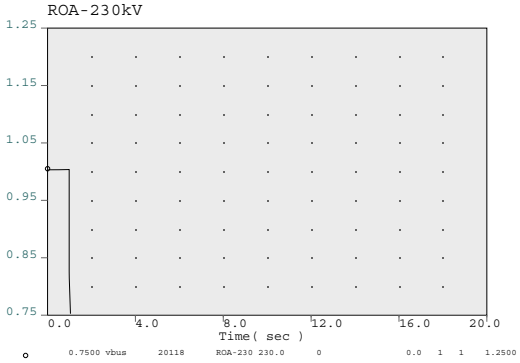
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

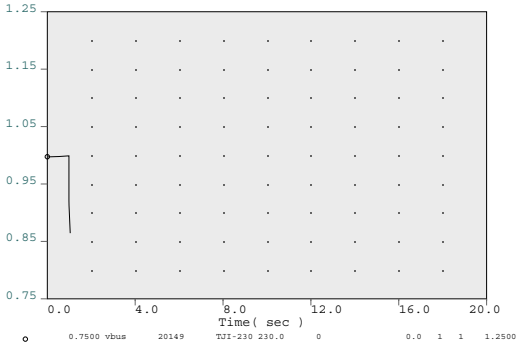
PAR/PID 230kV



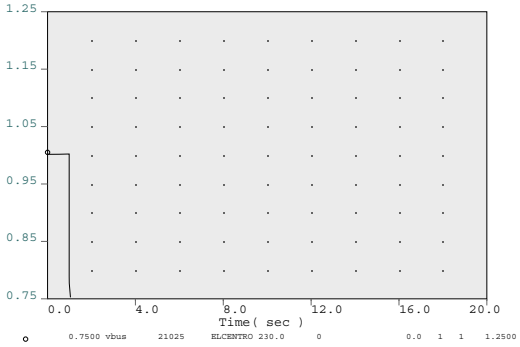
ROA-230kV



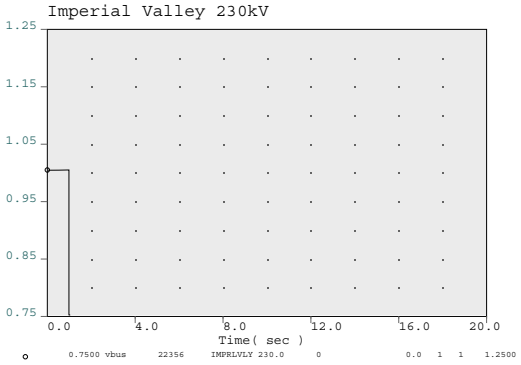
TJ1-230kV



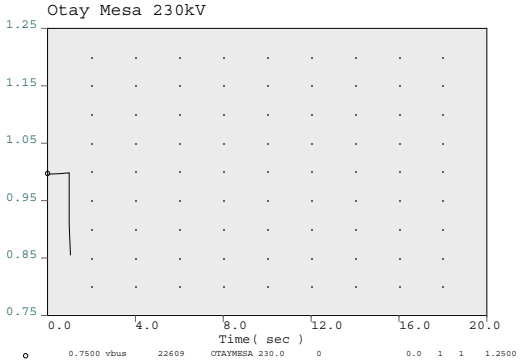
El Centro



Imperial Valley 230kV



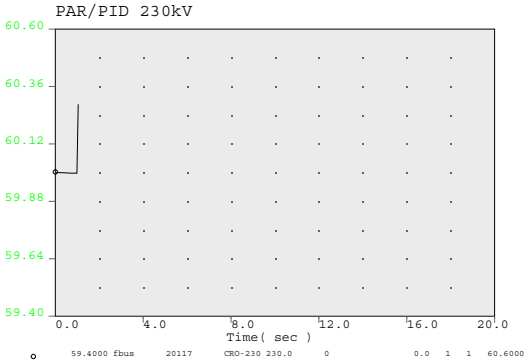
Otay Mesa 230kV



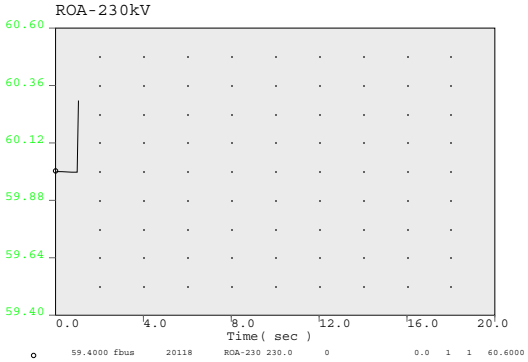
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

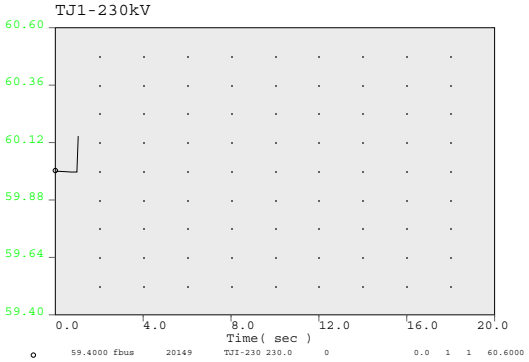
PAR/PID 230kV



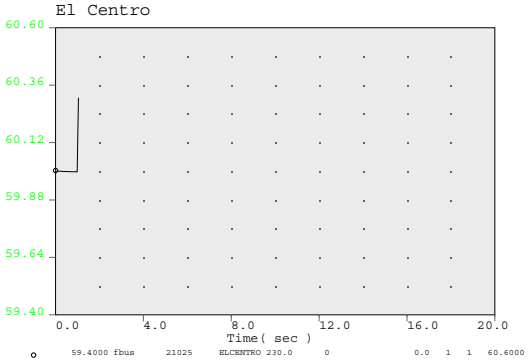
ROA-230kV



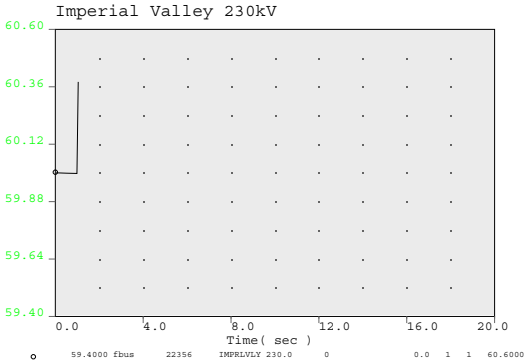
TJ1-230kV



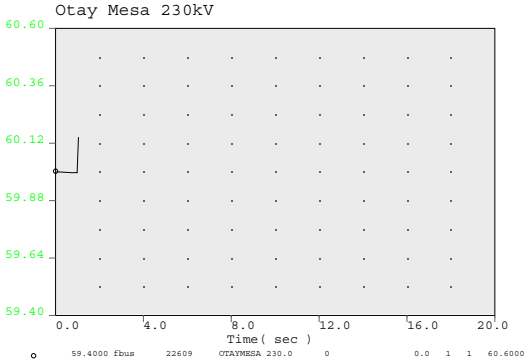
El Centro



Imperial Valley 230kV



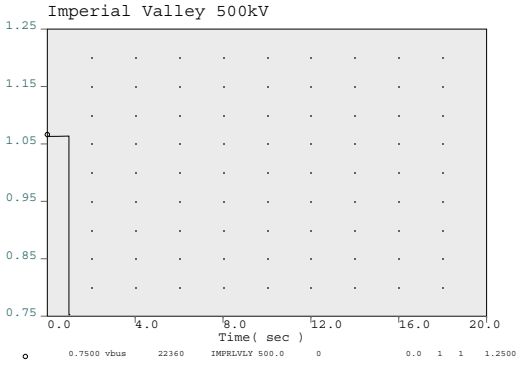
Otay Mesa 230kV



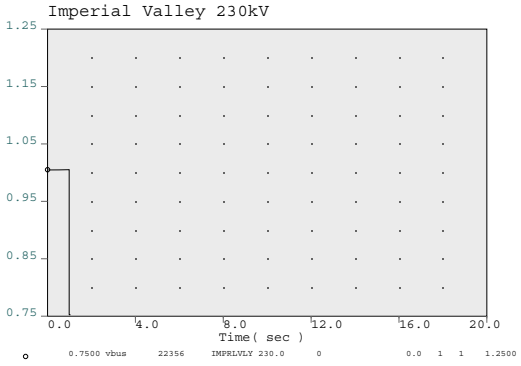
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

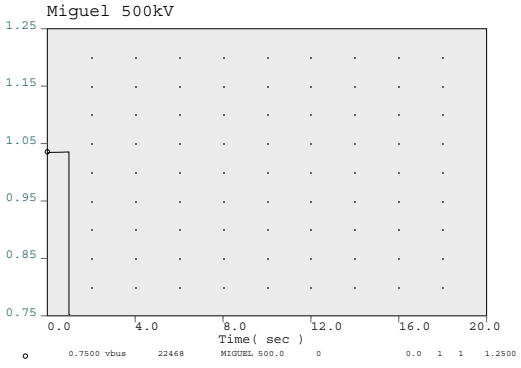
Imperial Valley 500kV



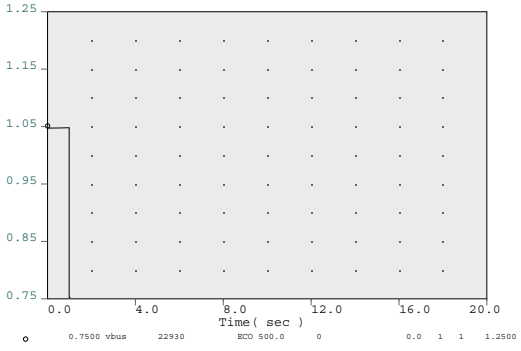
Imperial Valley 230kV



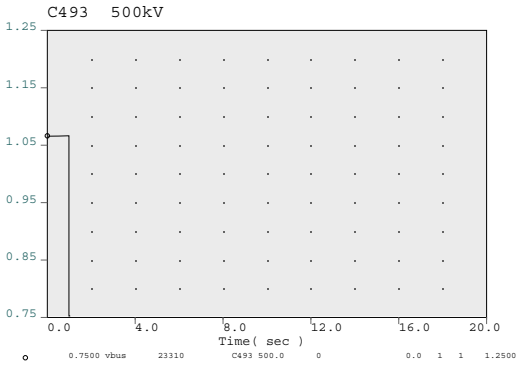
Miguel 500kV



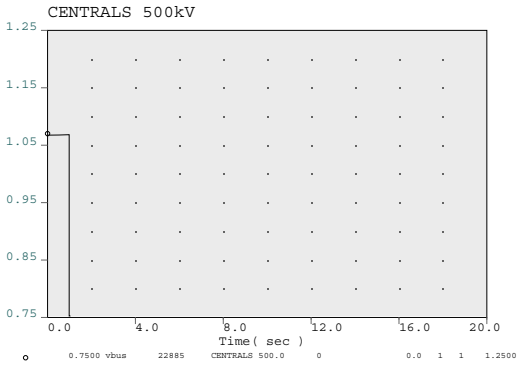
Windfarms 500



C493 500kV

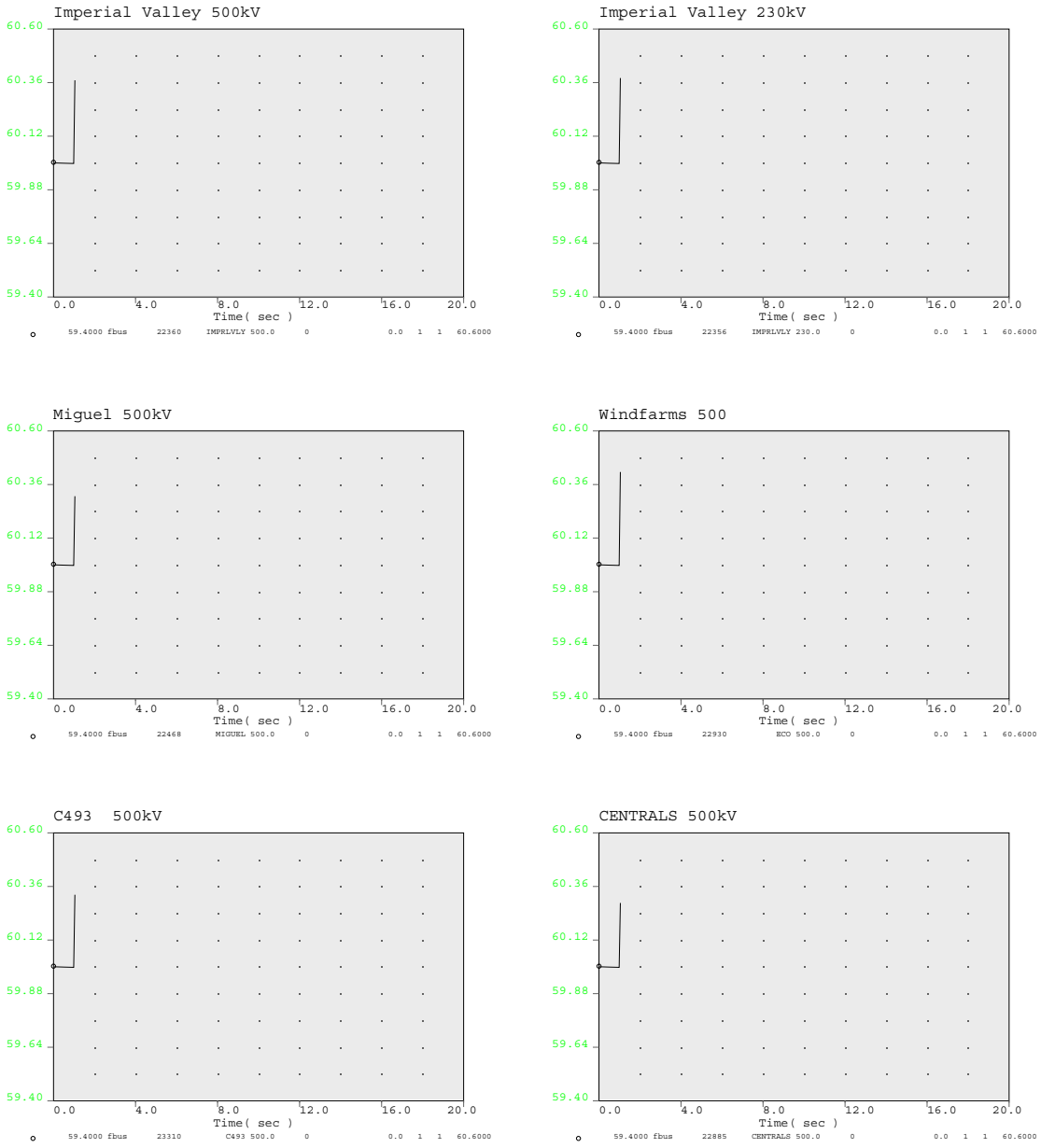


CENTRALS 500kV



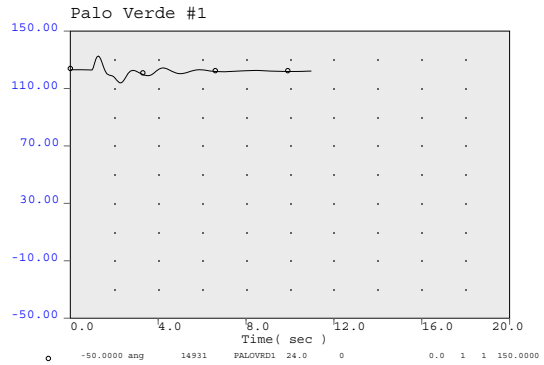
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

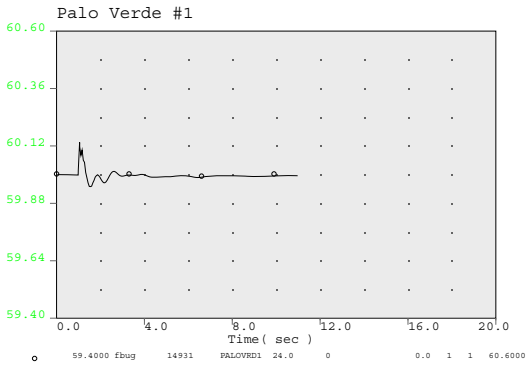
Imperial Valley Area - Frequency

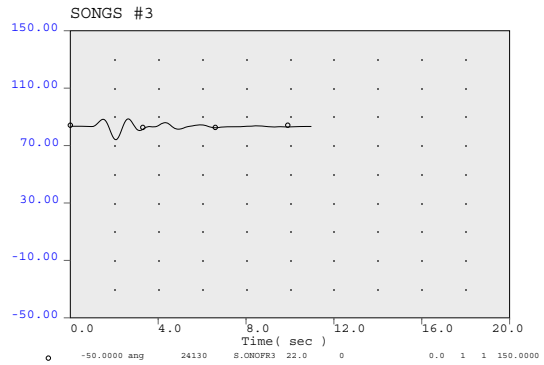


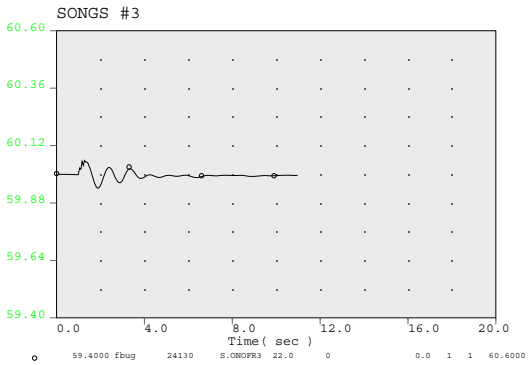
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

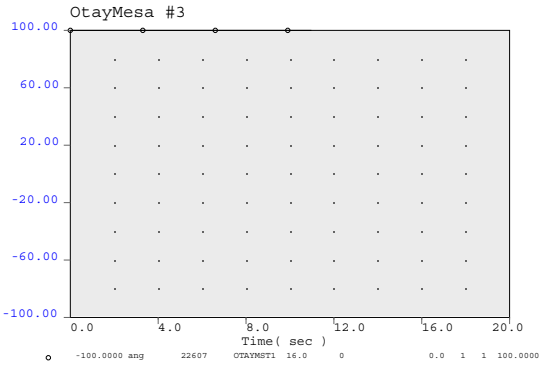
RELATIVE ROTOR ANGLE & FREQUENCY

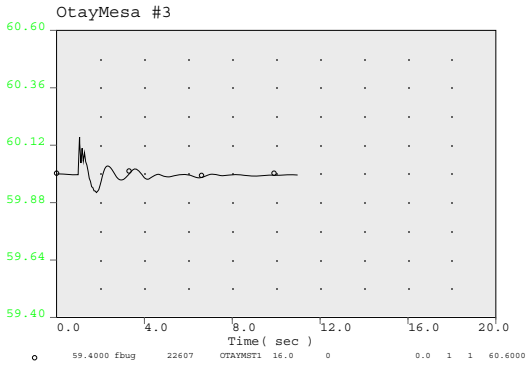












SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

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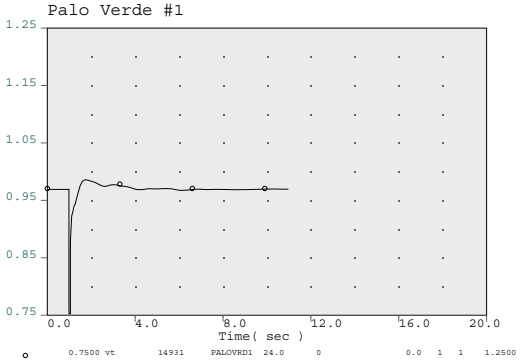
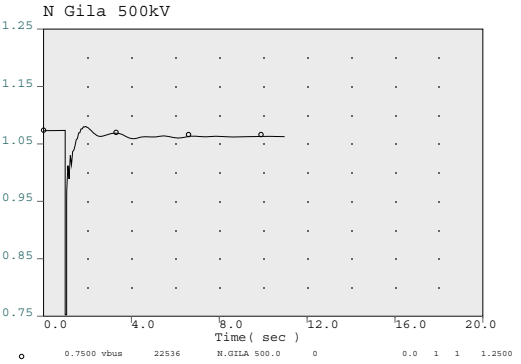
SDGE	T468_NGila_pre_int_ll.chf	p_i\ll\pre_int\ws_pre_int Tue Nov 02 07:26:25 2010

RELATIVE VOLTAGE

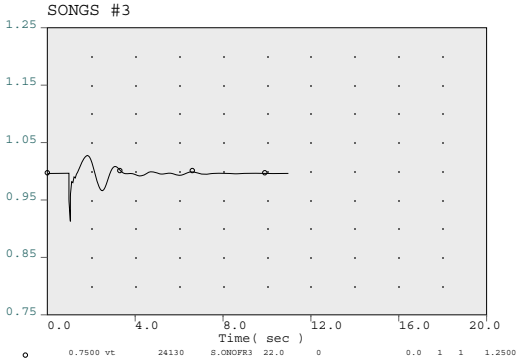
Palo Verde #1



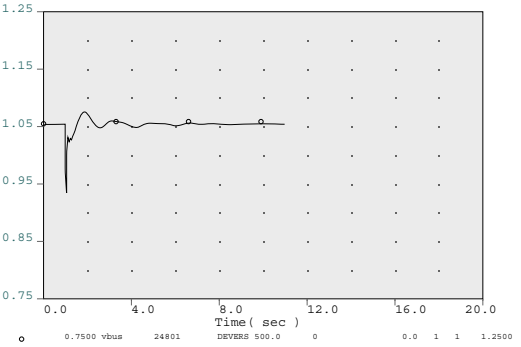
N Gila 500kV



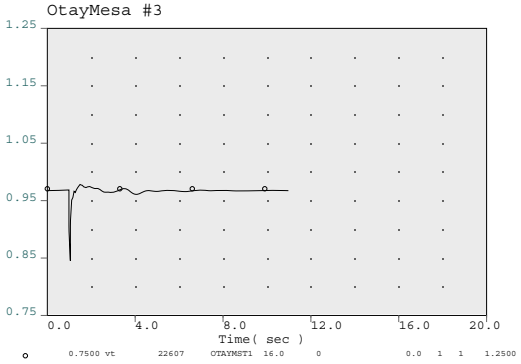
SONGS #3



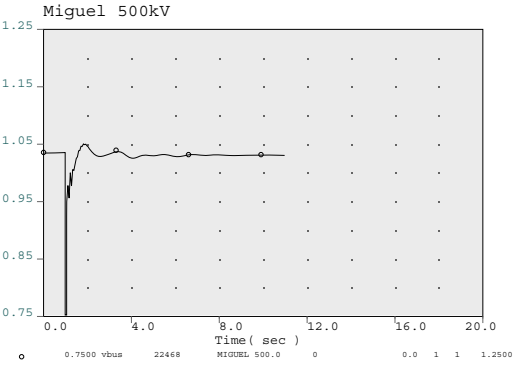
Devers 500



OtayMesa #3



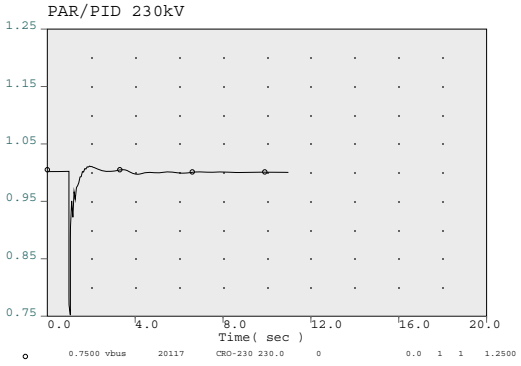
Miguel 500kV



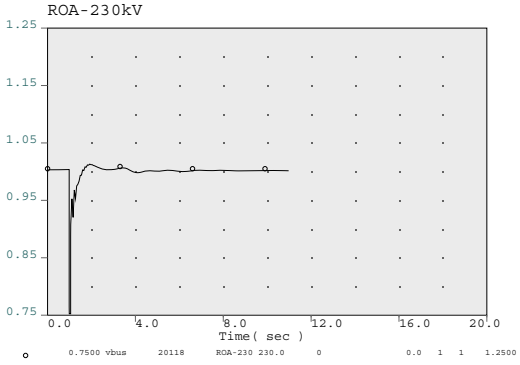
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Voltage Check and Comparison

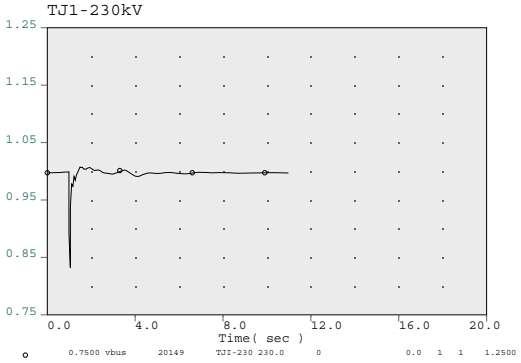
PAR/PID 230kV



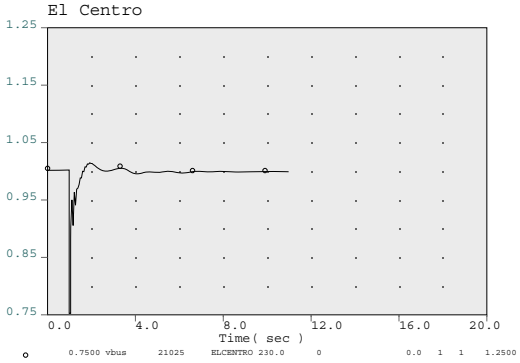
ROA-230kV



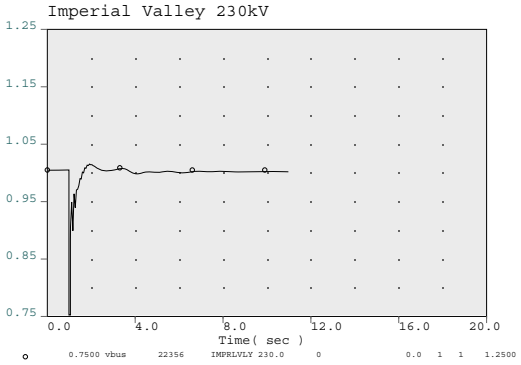
TJ1-230kV



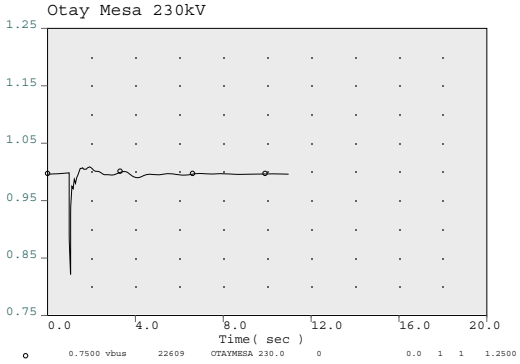
El Centro



Imperial Valley 230kV



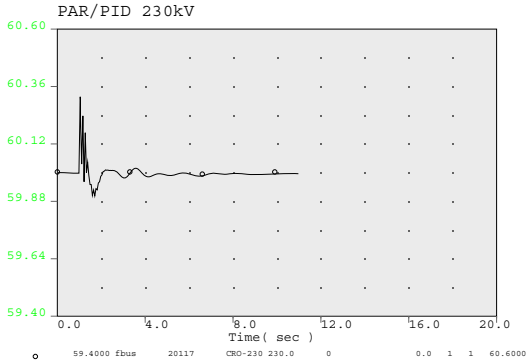
Otay Mesa 230kV



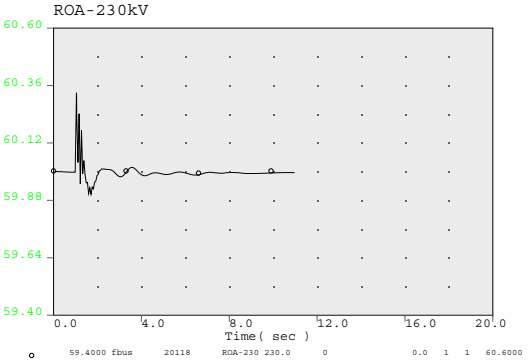
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Affected System Frequency Check and Comparison

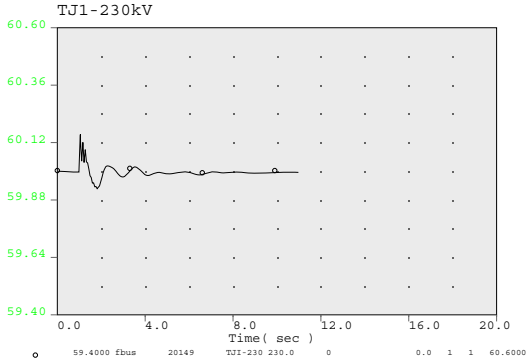
PAR/PID 230kV



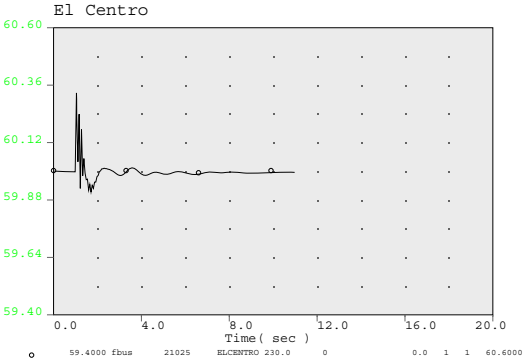
ROA-230kV



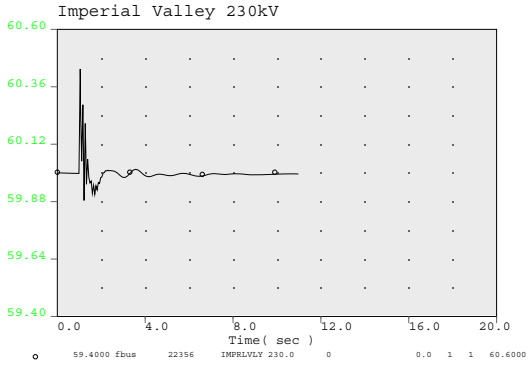
TJ1-230kV



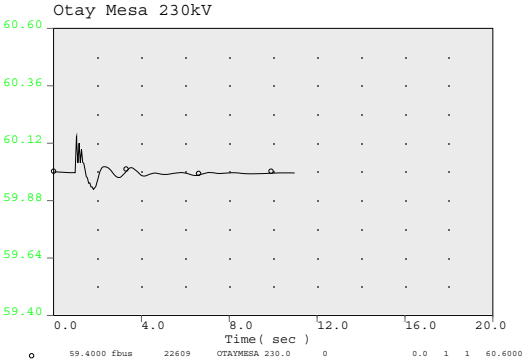
El Centro



Imperial Valley 230kV



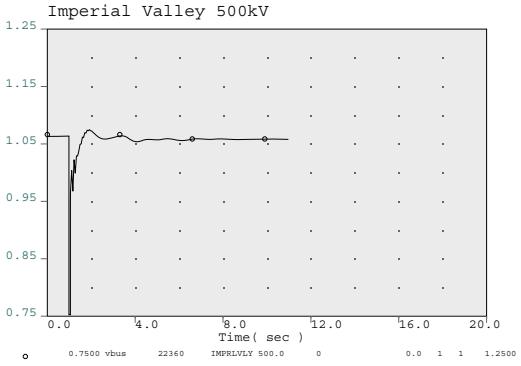
Otay Mesa 230kV



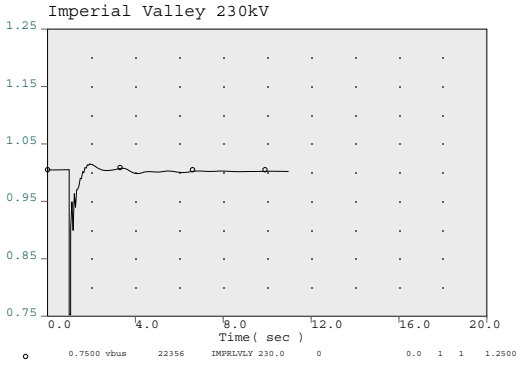
SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Imperial Valley Area - VOLTAGE

Imperial Valley 500kV



Imperial Valley 230kV



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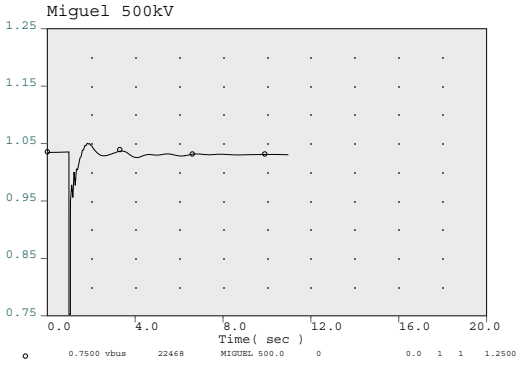

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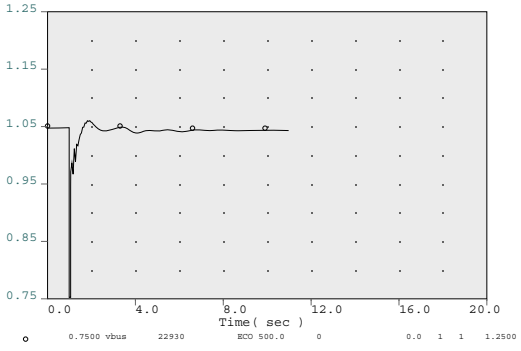
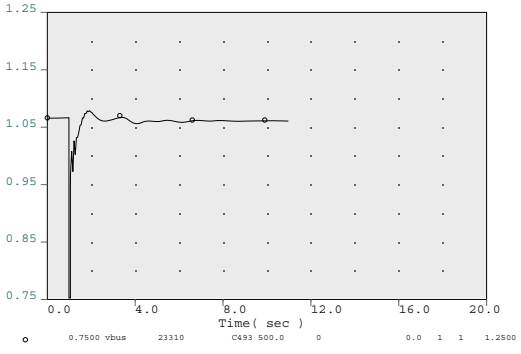
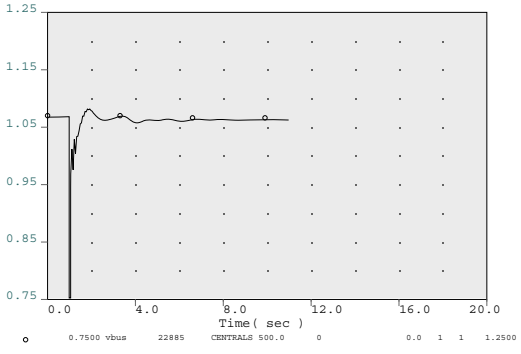


C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pre
2014 Light Autumn
T468-N.Gila 500 kV line

Appendix J-9

Transient Stability Analysis Plots

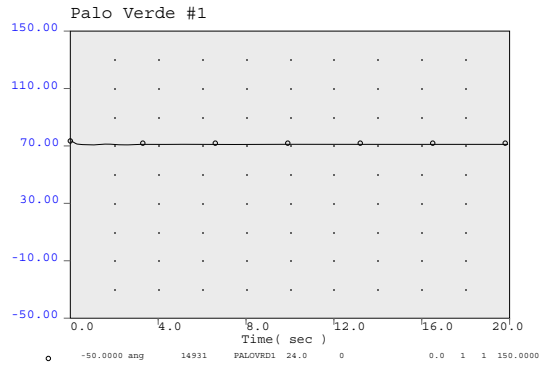
Internal Cluster

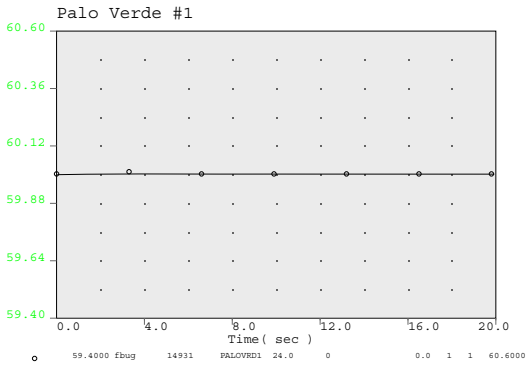
Heavy Summer Post

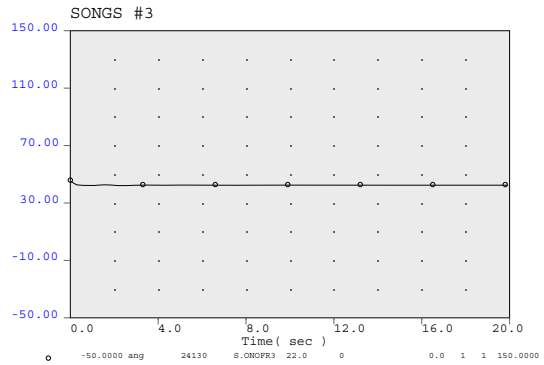
Imperial Valley Area - Frequency

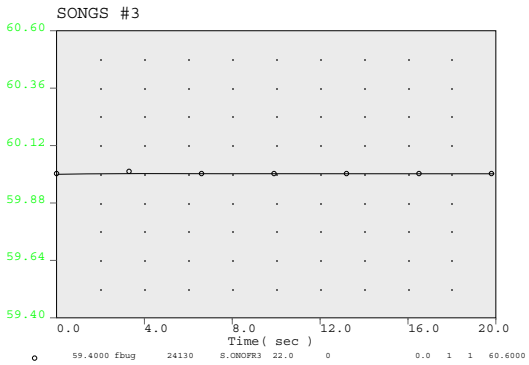
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

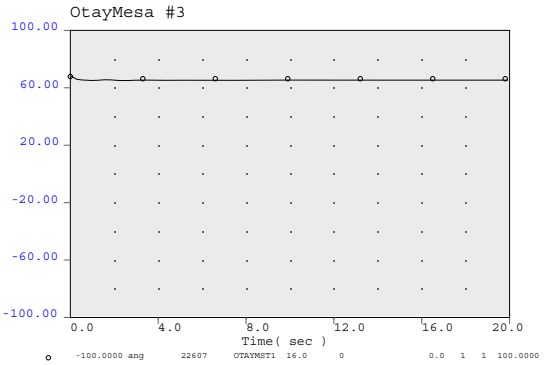
RELATIVE ROTOR ANGLE & FREQUENCY

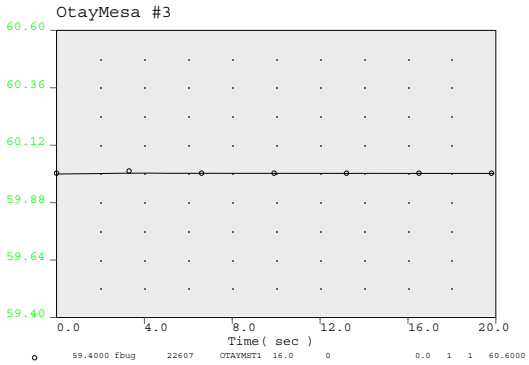










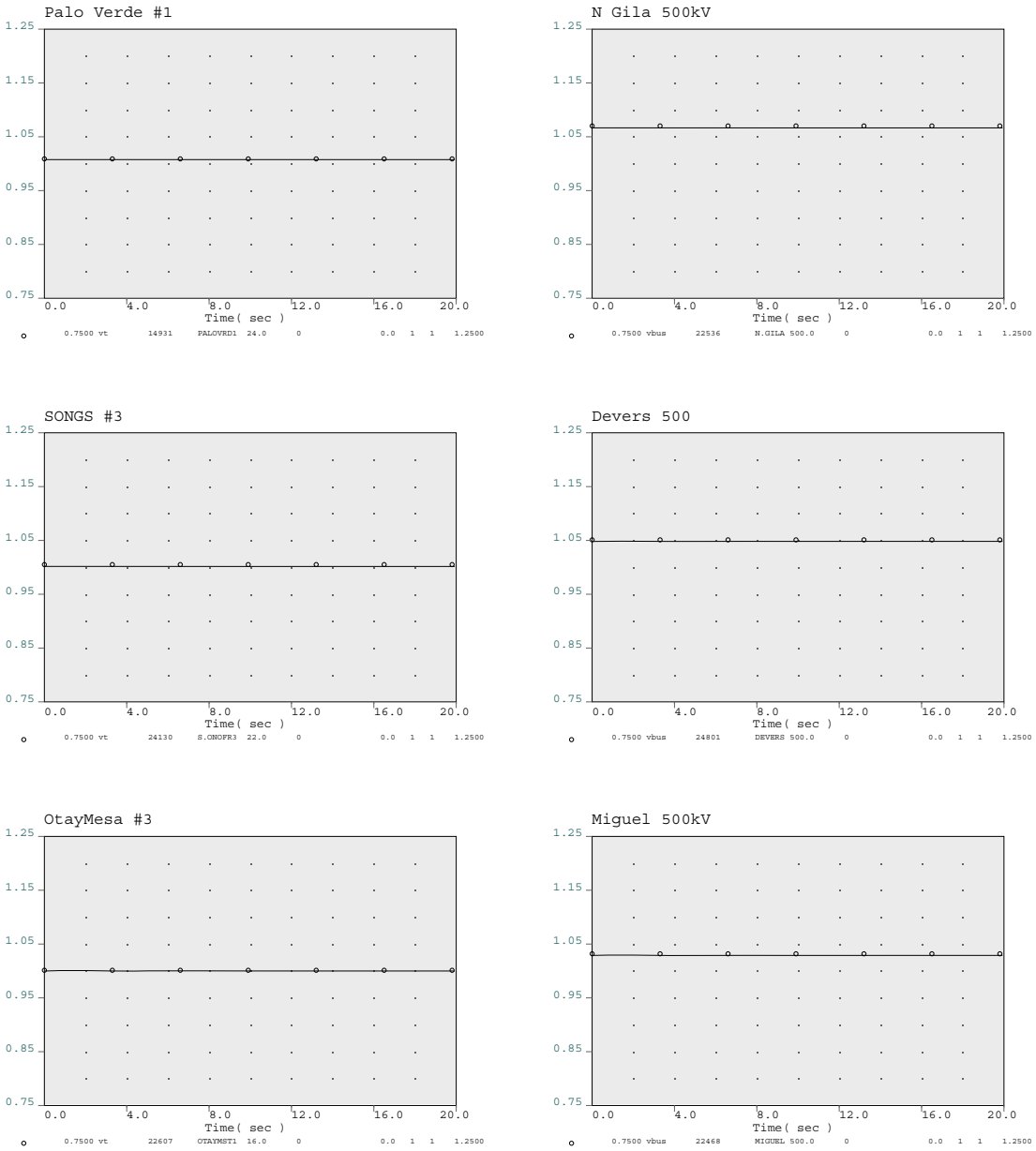


SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Page 1

SDGE	flat_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:37:32 2010

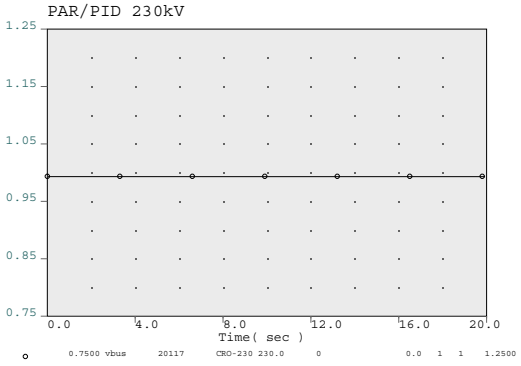
RELATIVE VOLTAGE



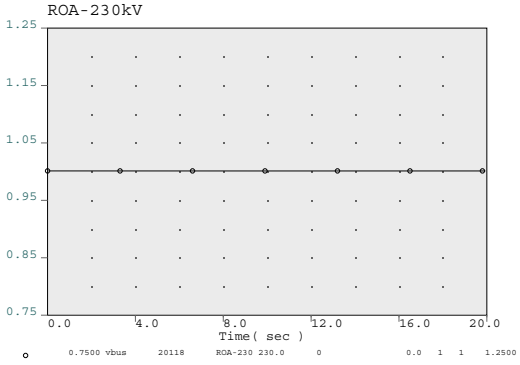
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Affected System Voltage Check and Comparison

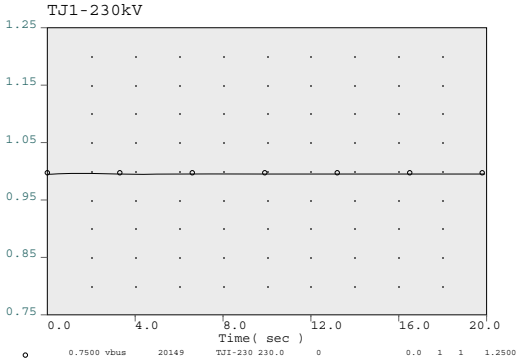
PAR/PID 230kV



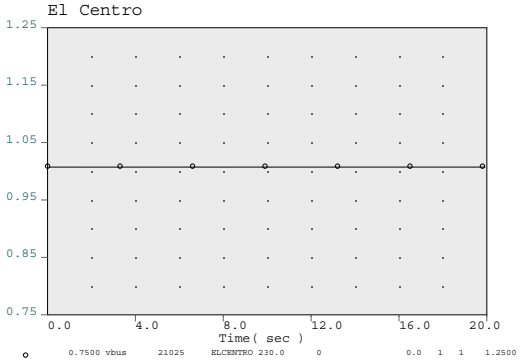
ROA-230kV



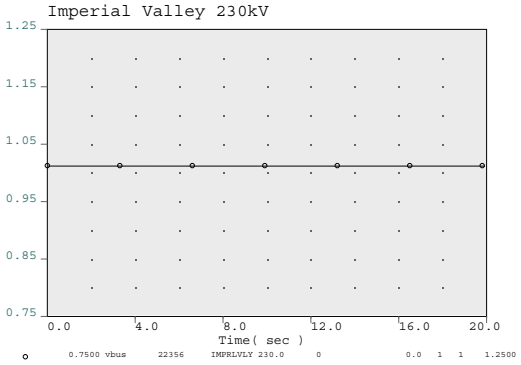
TJ1-230kV



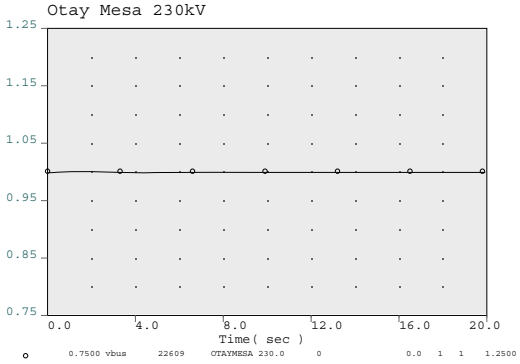
El Centro



Imperial Valley 230kV



Otay Mesa 230kV

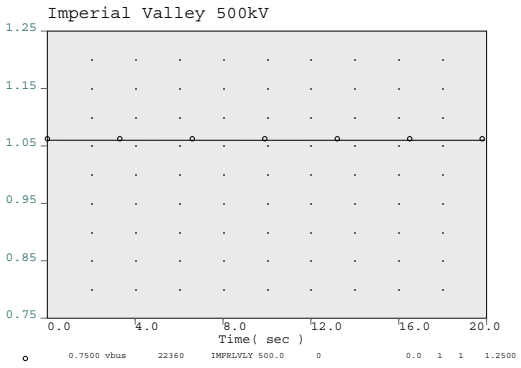


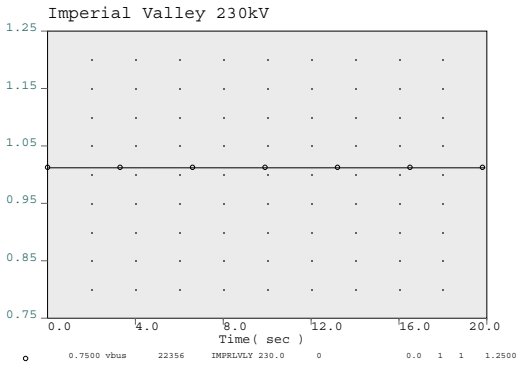
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

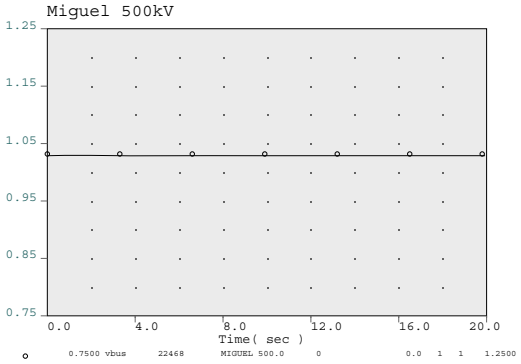
Affected System Frequency Check and Comparison

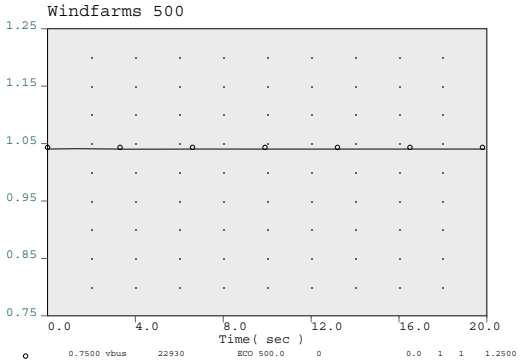
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

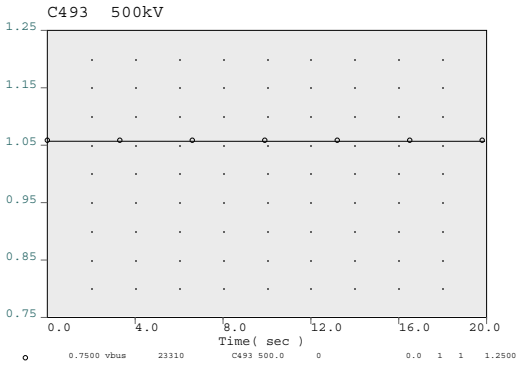
Imperial Valley Area - VOLTAGE

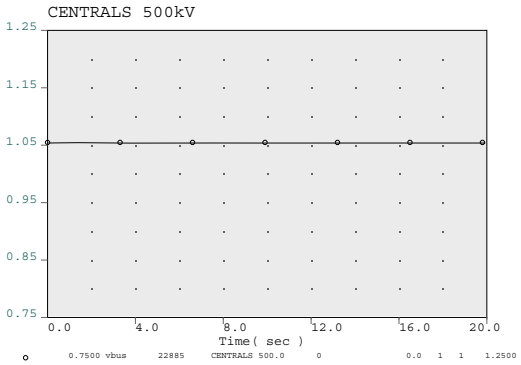








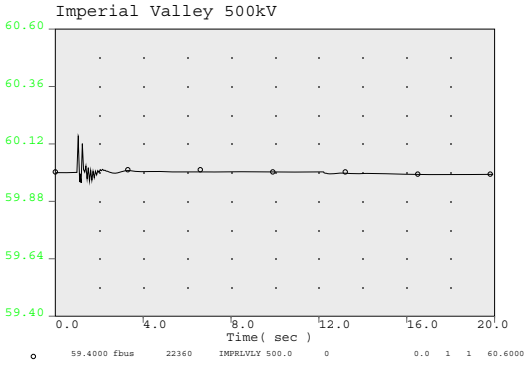




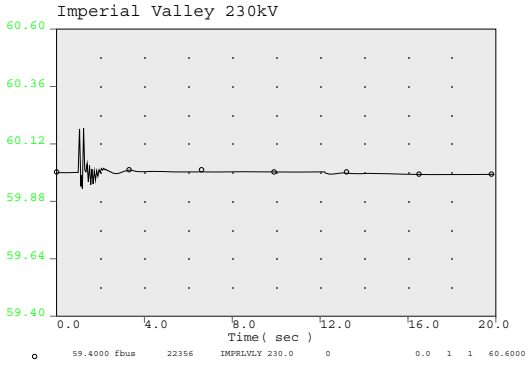
SDG&E Cluster 2 - post
2014 Heavy Summer
Flat

Imperial Valley Area - Frequency

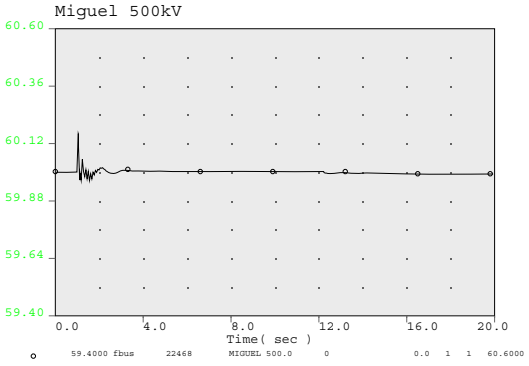
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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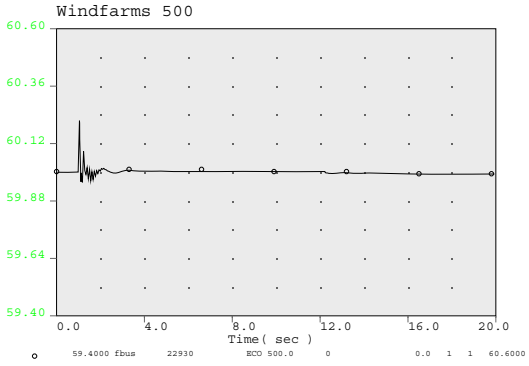
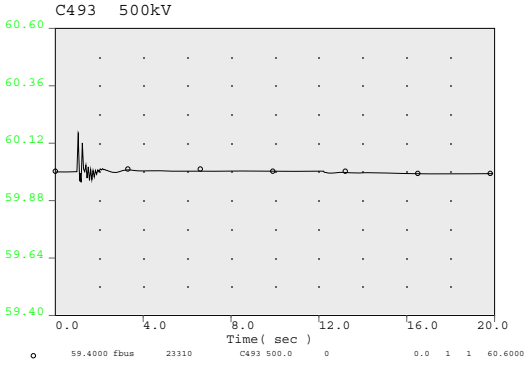
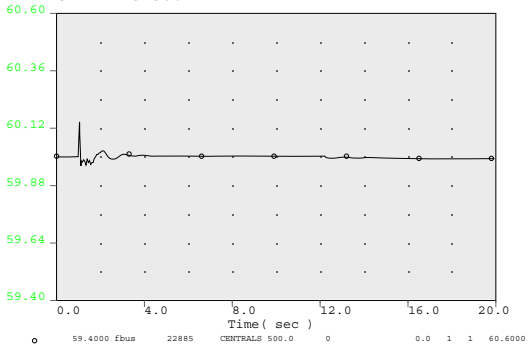


C493 500kV

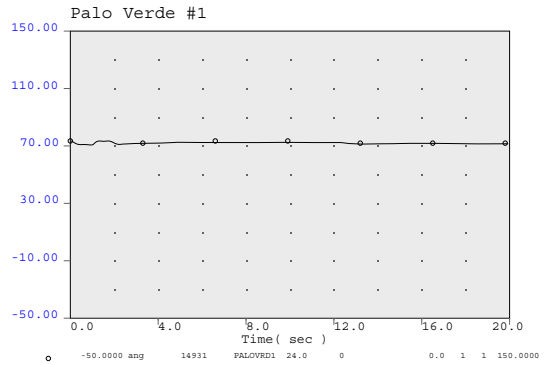


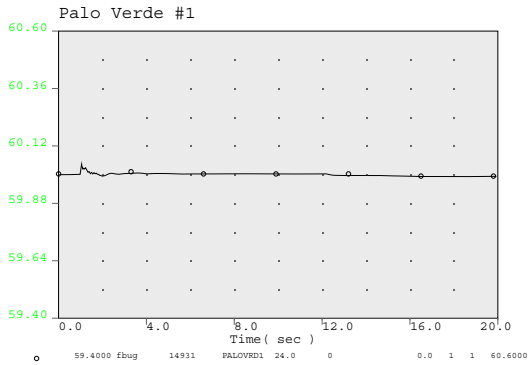
CENTRALS 500kV

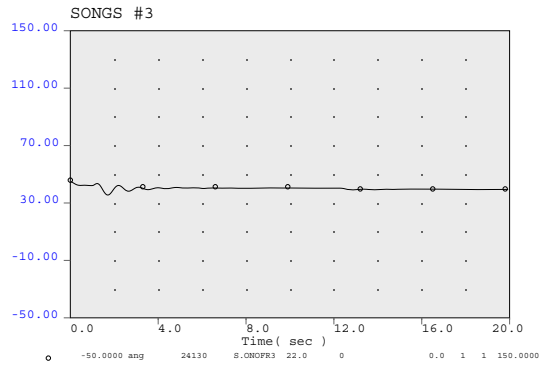


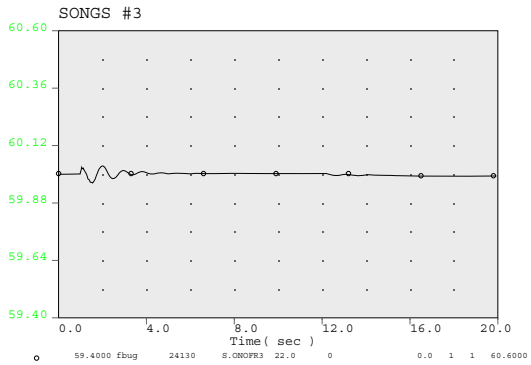
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

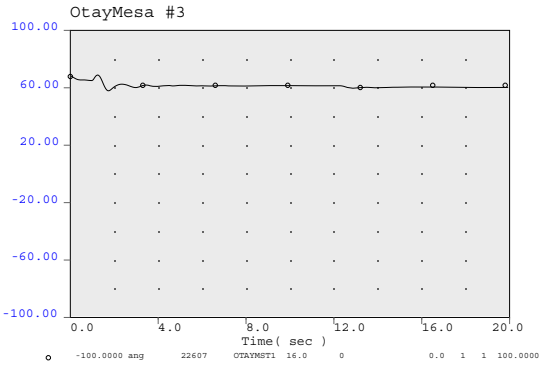
RELATIVE ROTOR ANGLE & FREQUENCY

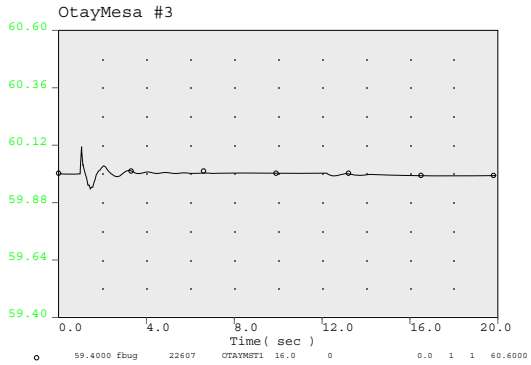












SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

RELATIVE VOLTAGE

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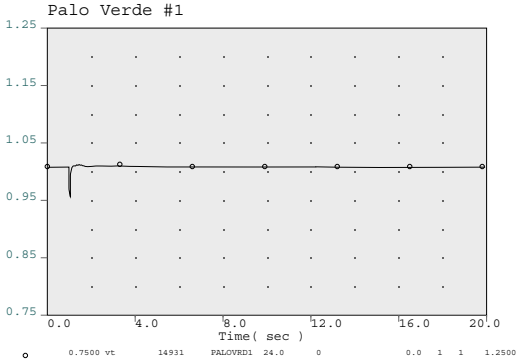
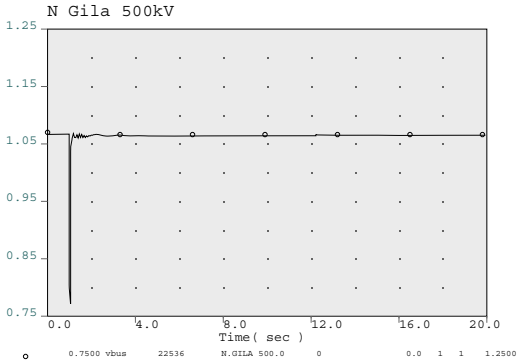


N Gila 500kV



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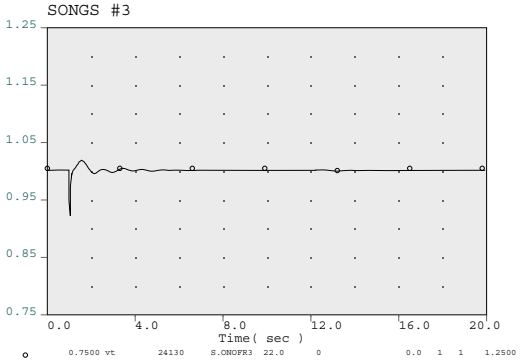

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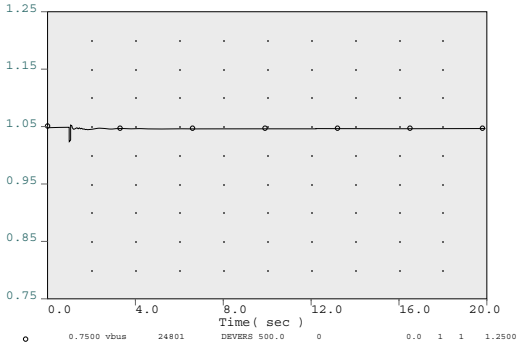

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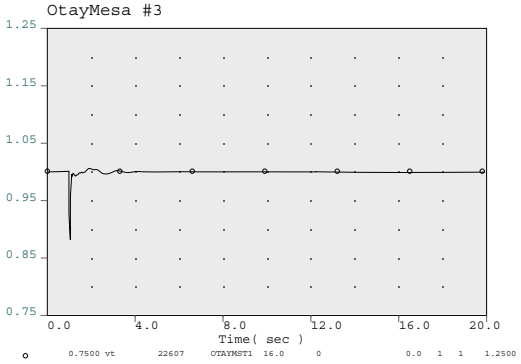
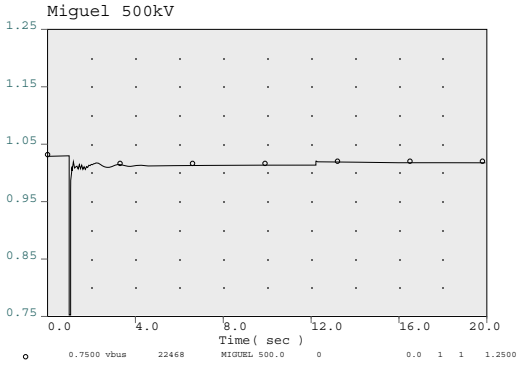


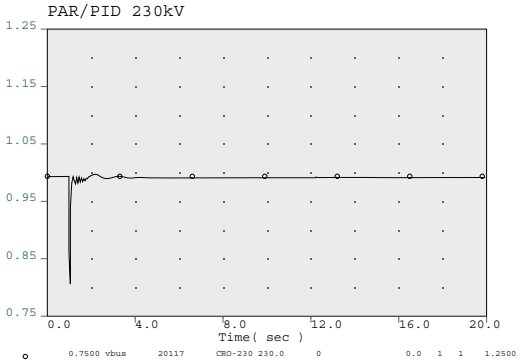
Miguel 500kV



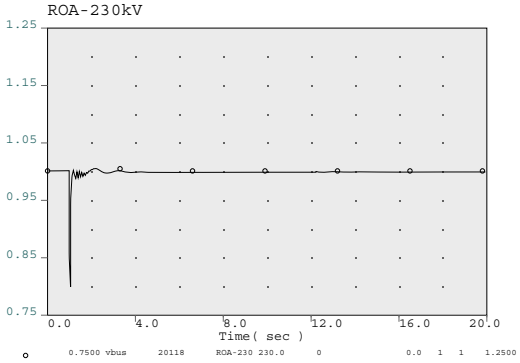
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

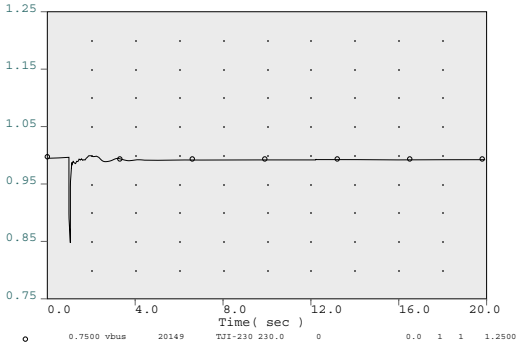
PAR/PID 230kV



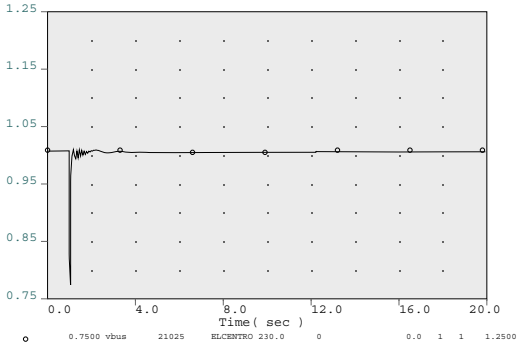
ROA-230kV



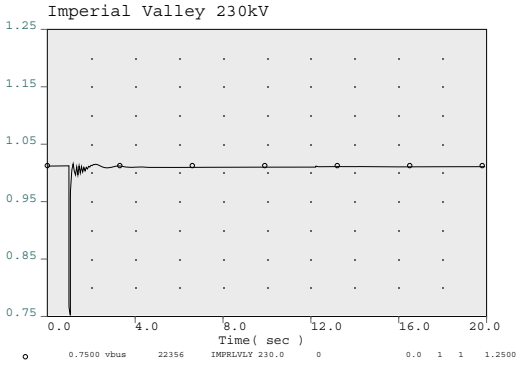
TJ1-230kV



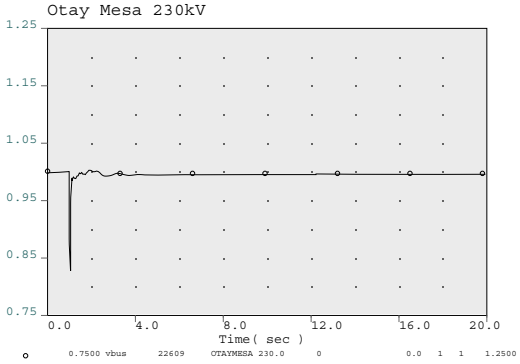
El Centro



Imperial Valley 230kV

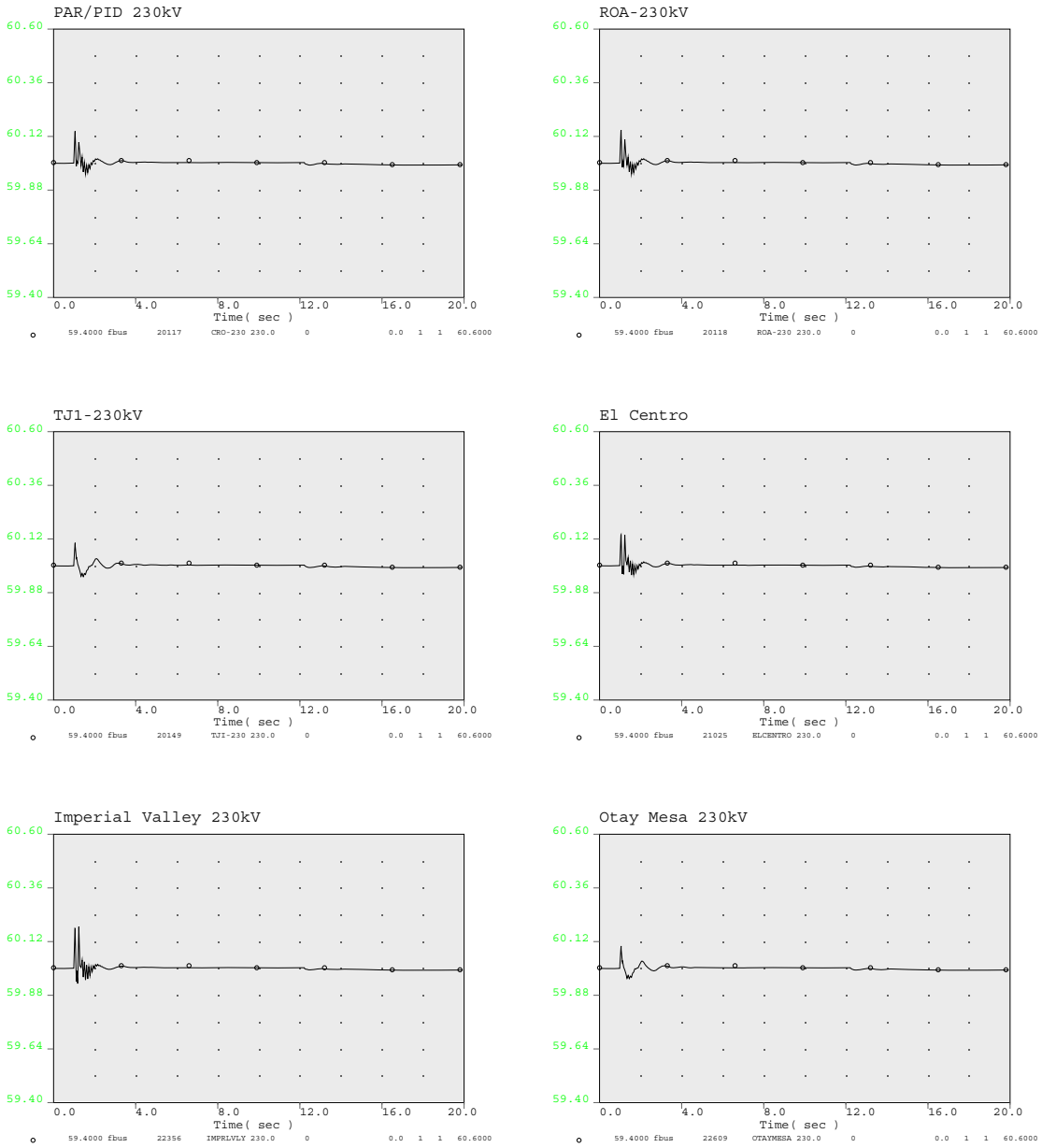


Otay Mesa 230kV



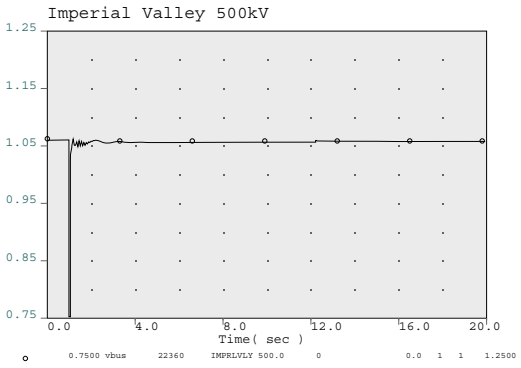
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

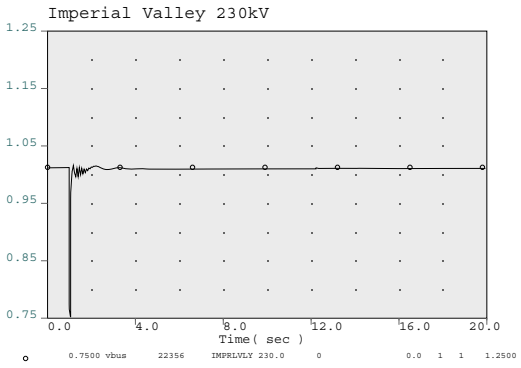
Affected System Frequency Check and Comparison

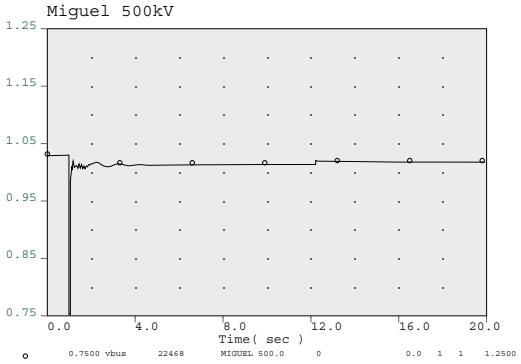


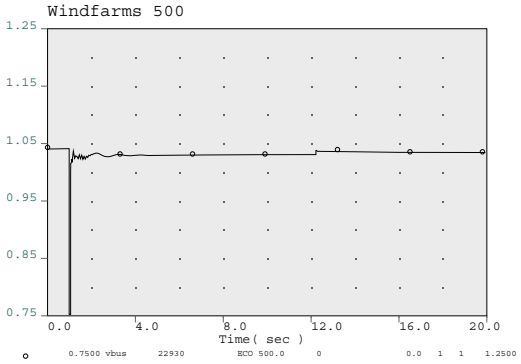
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

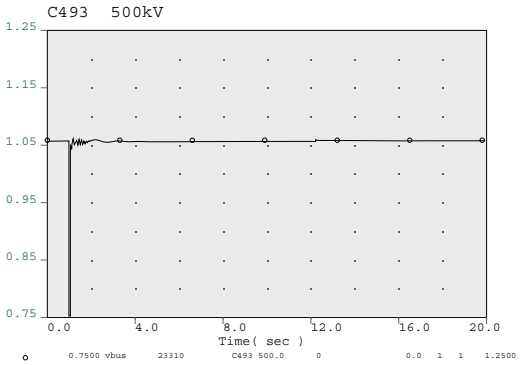
Imperial Valley Area - VOLTAGE

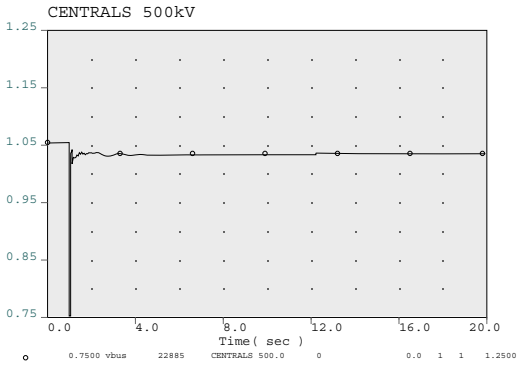






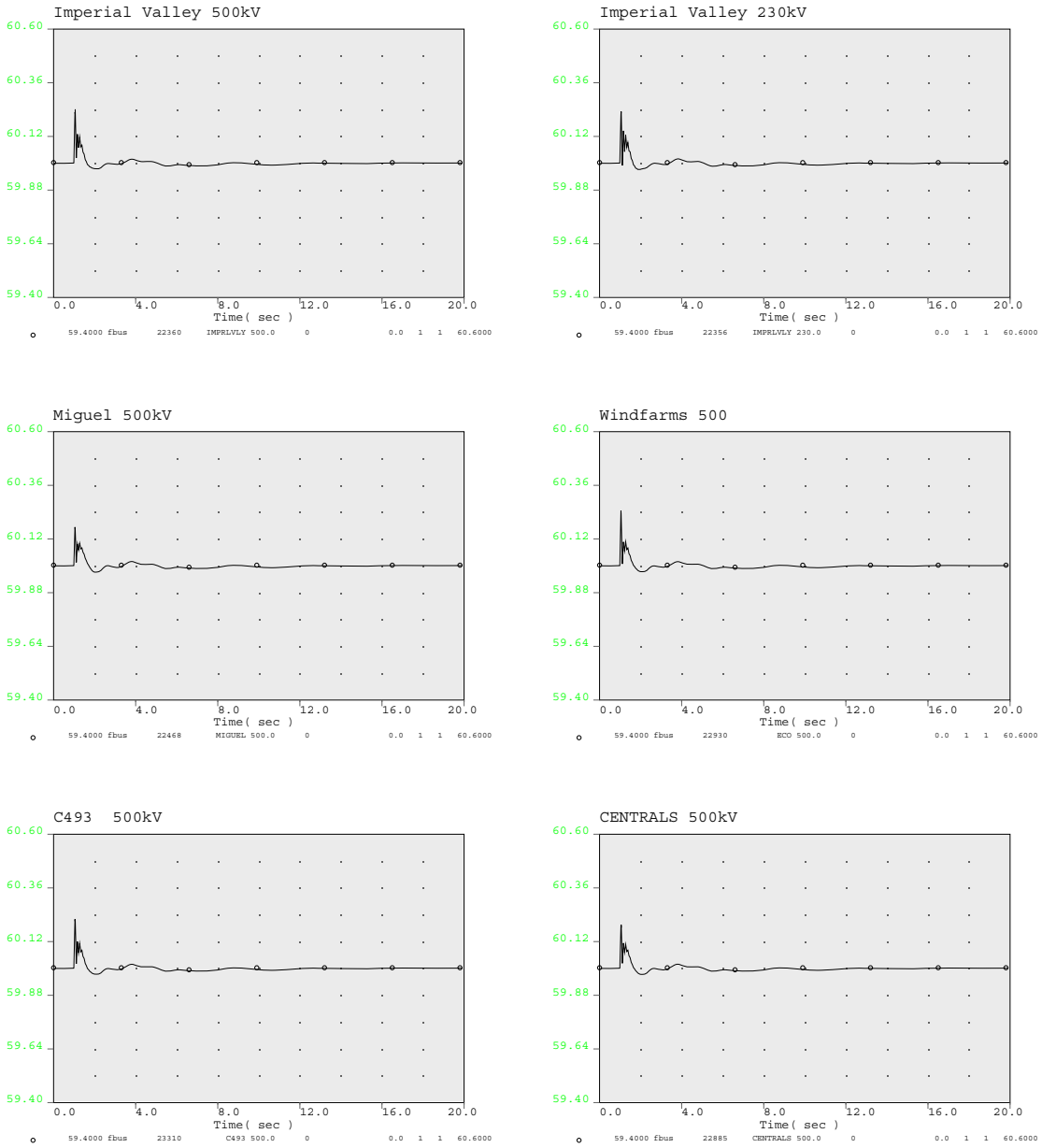






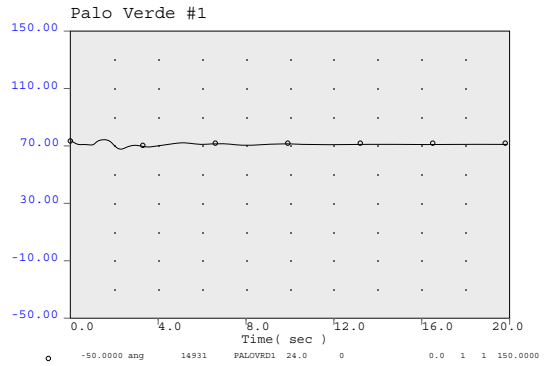
SDG&E Cluster 2 - post
2014 Heavy Summer
C493 - CENTRALS 500kV line

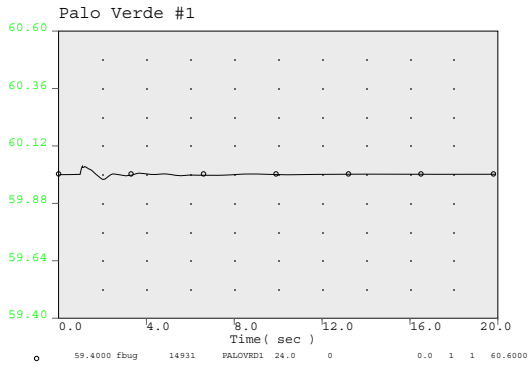
Imperial Valley Area - Frequency

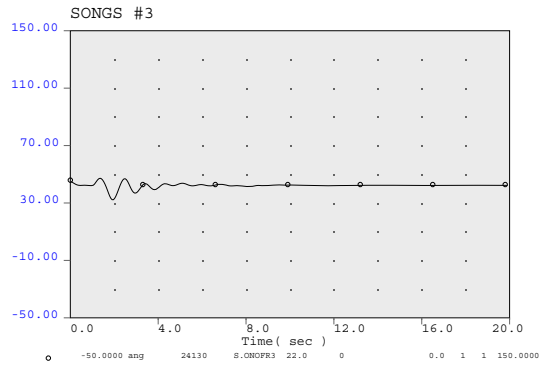


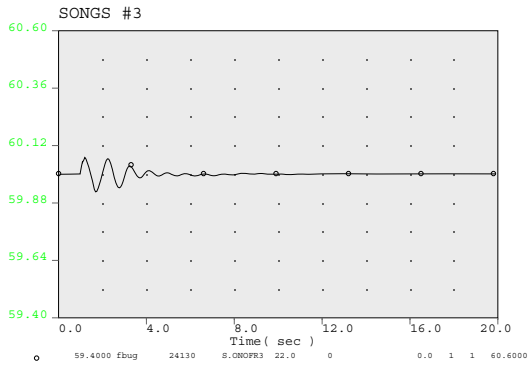
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

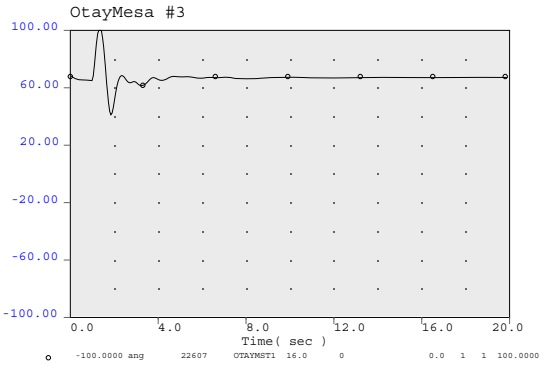
RELATIVE ROTOR ANGLE & FREQUENCY

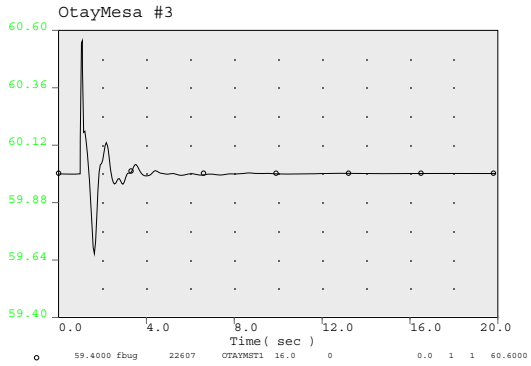












SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SX 230 kV N-1

Page 1

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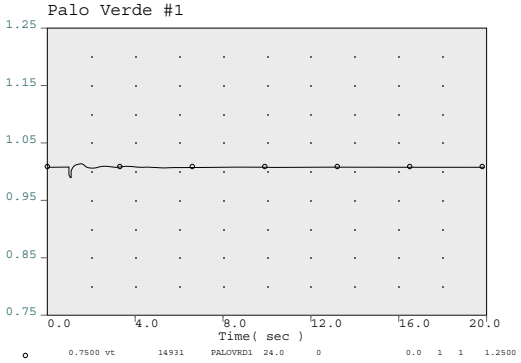
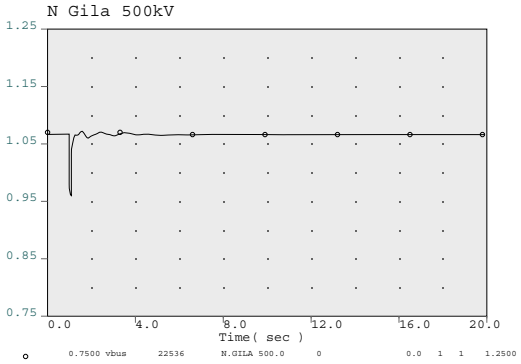
RELATIVE VOLTAGE

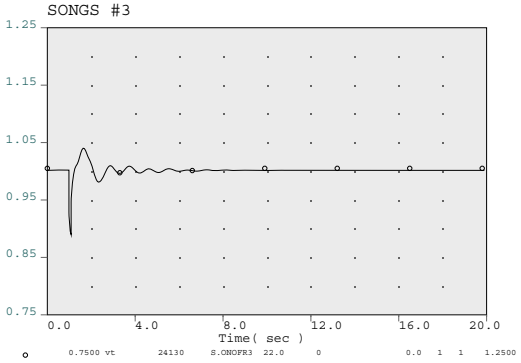
Palo Verde #1



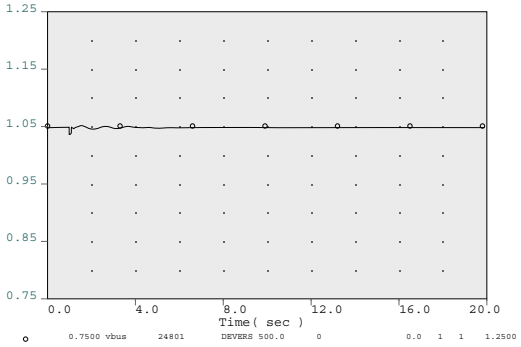
N Gila 500kV



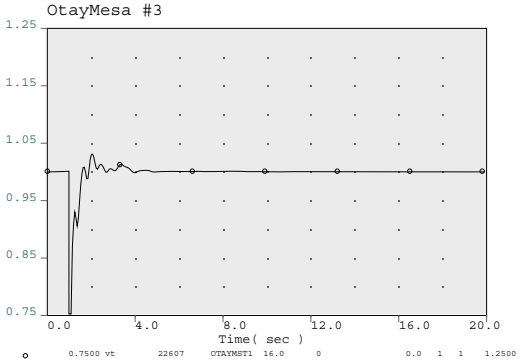
SONGS #3



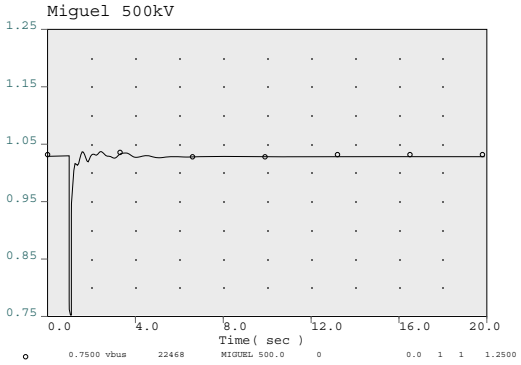
Devers 500



OtayMesa #3



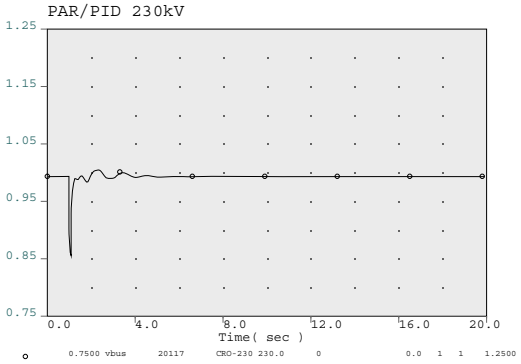
Miguel 500kV



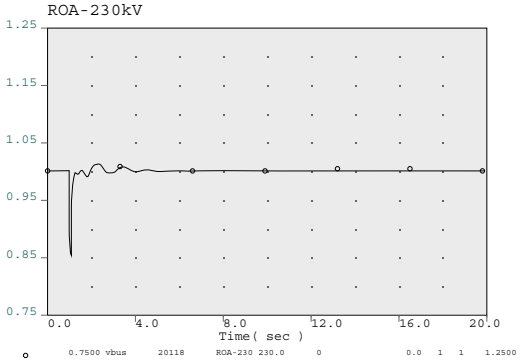
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SX 230 kV N-1

Affected System Voltage Check and Comparison

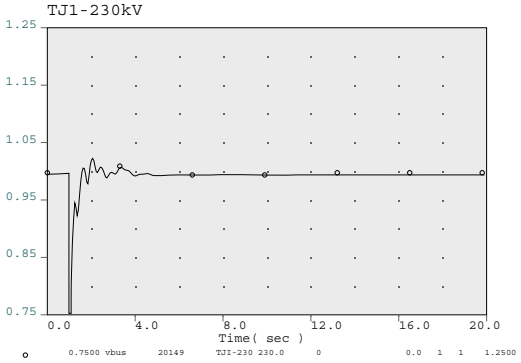
PAR/PID 230kV



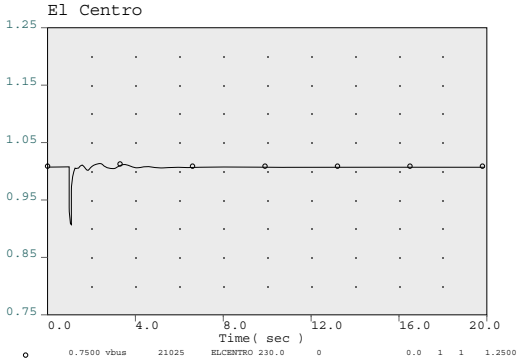
ROA-230kV



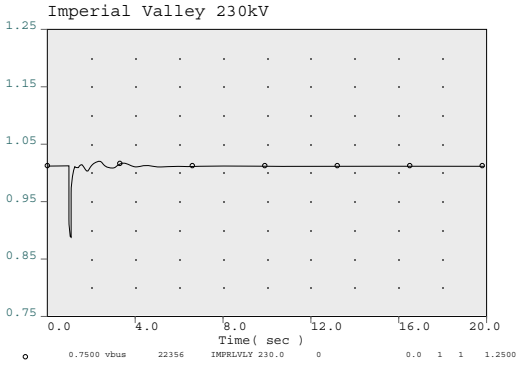
TJ1-230kV



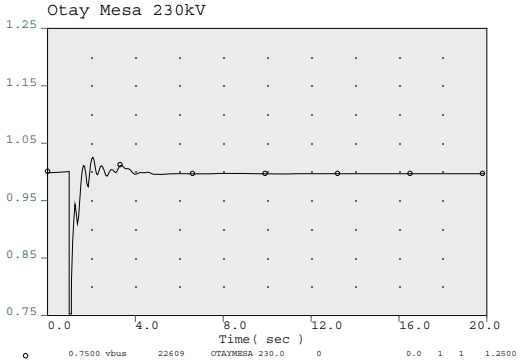
El Centro



Imperial Valley 230kV



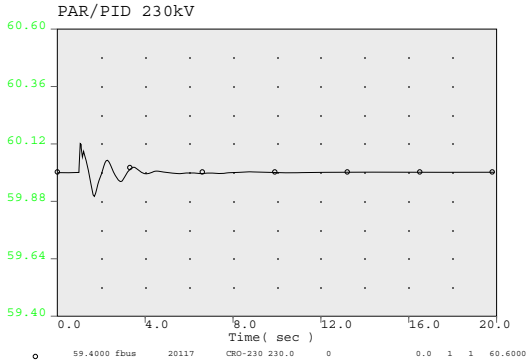
Otay Mesa 230kV



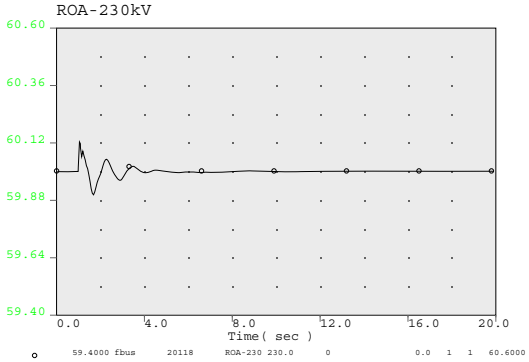
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SX 230 kV N-1

Affected System Frequency Check and Comparison

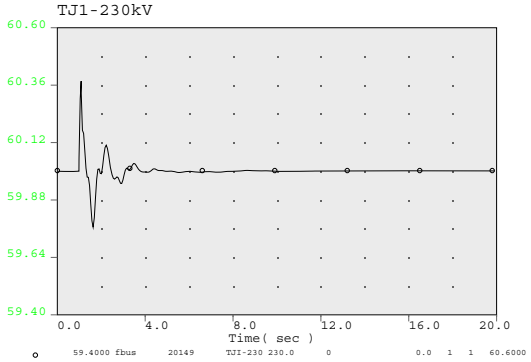
PAR/PID 230kV



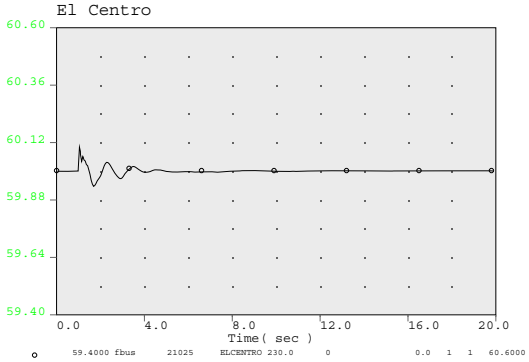
ROA-230kV



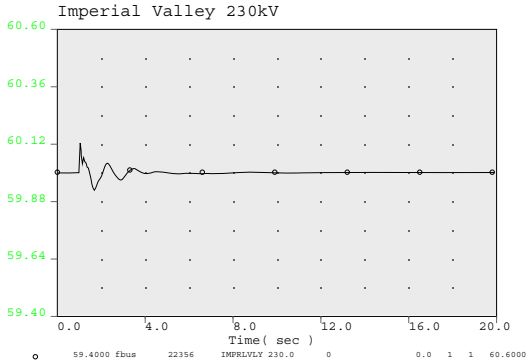
TJ1-230kV



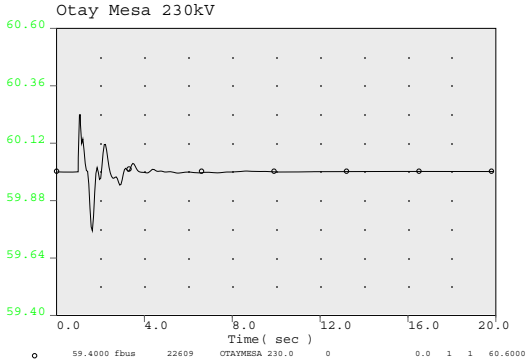
El Centro



Imperial Valley 230kV

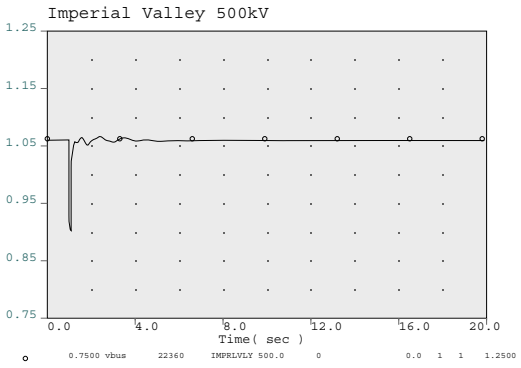


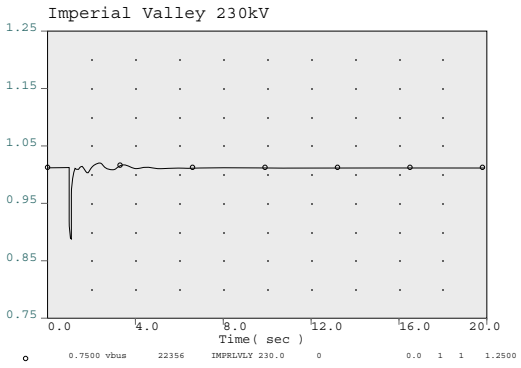
Otay Mesa 230kV

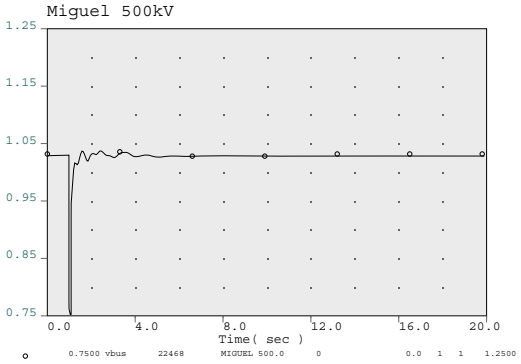


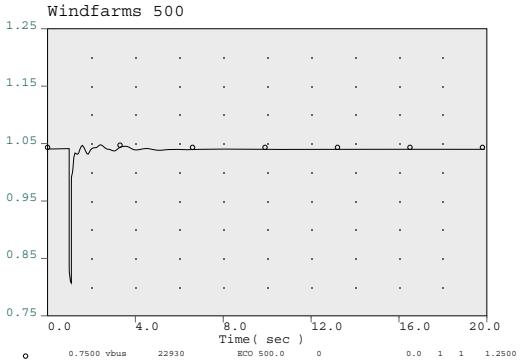
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SX 230 kV N-1

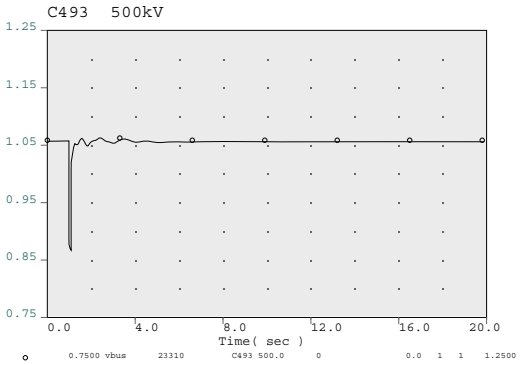
Imperial Valley Area - VOLTAGE

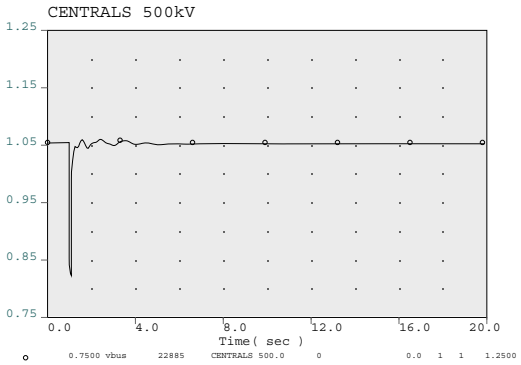










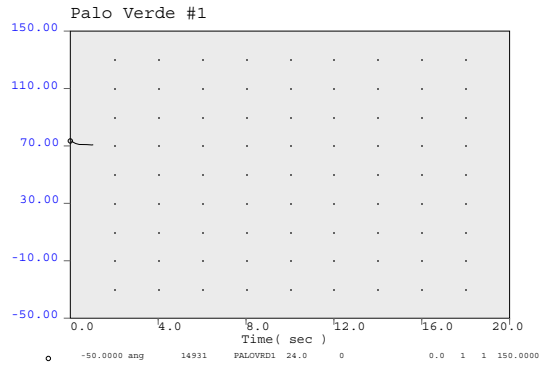


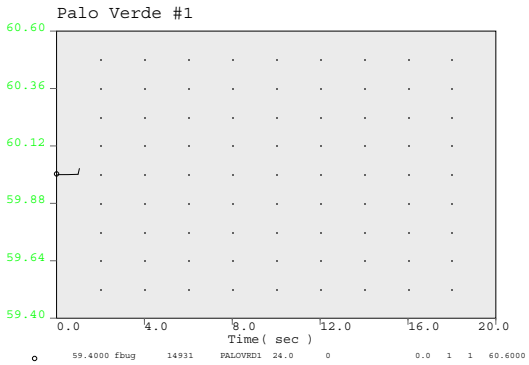
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SX 230 kV N-1

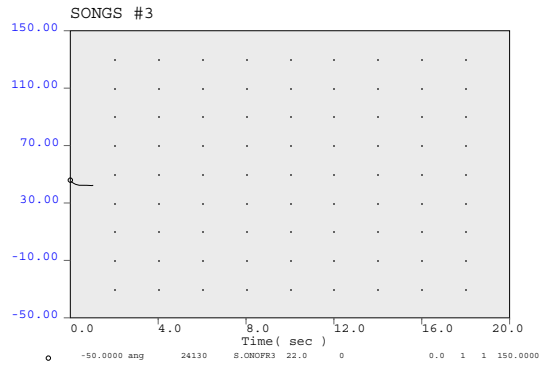
Imperial Valley Area - Frequency

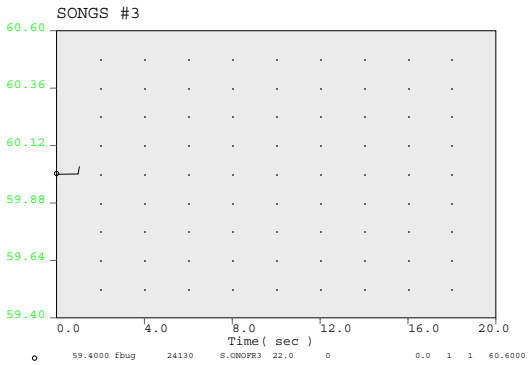
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SX 230 kV N-1

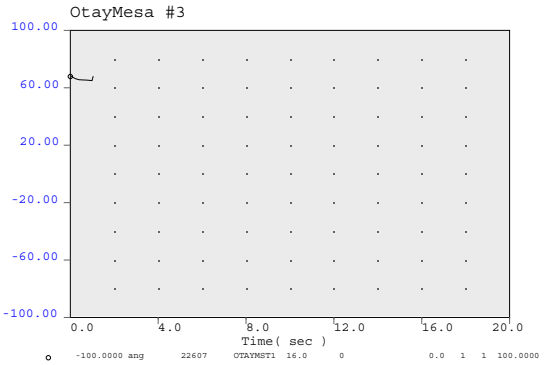
RELATIVE ROTOR ANGLE & FREQUENCY

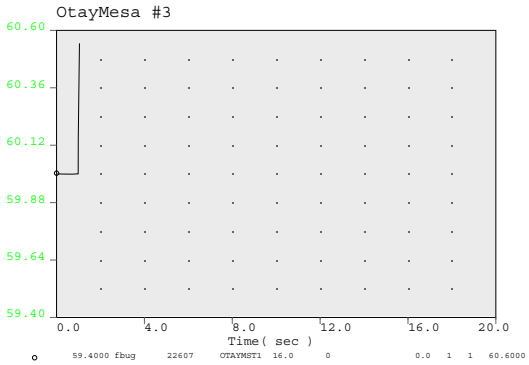












SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SY 230 kV N-1

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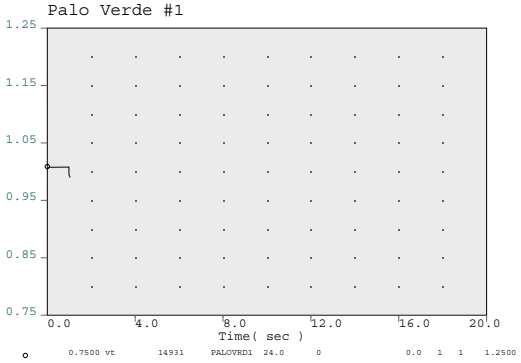
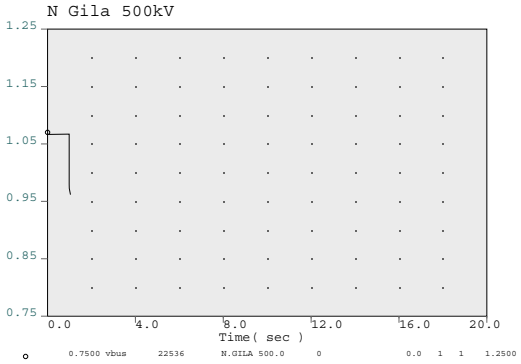
RELATIVE VOLTAGE

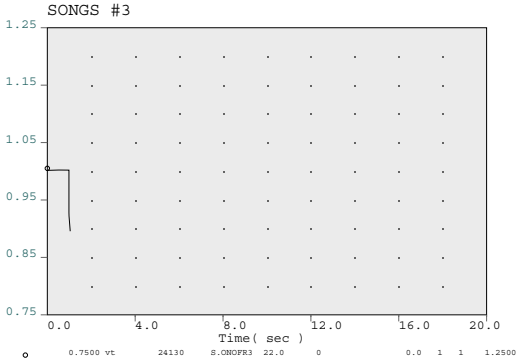
Palo Verde #1



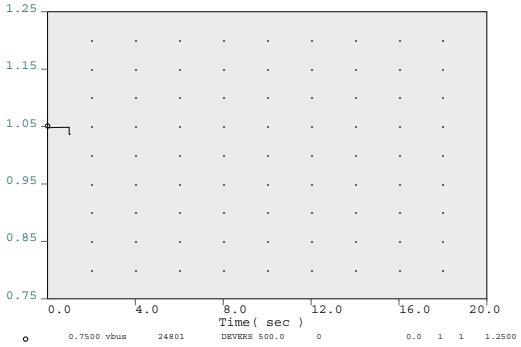
N Gila 500kV



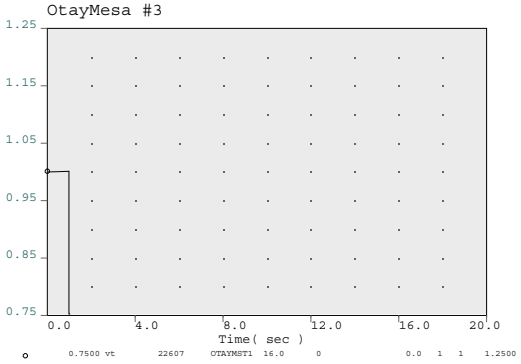
SONGS #3



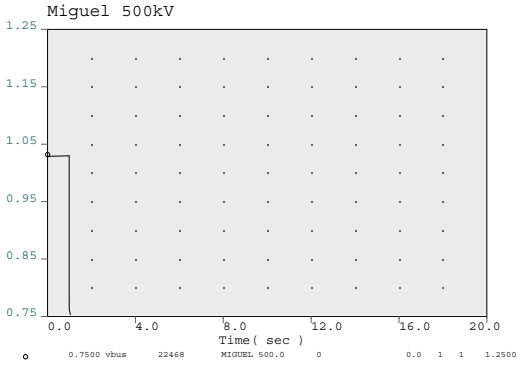
Devers 500



OtayMesa #3



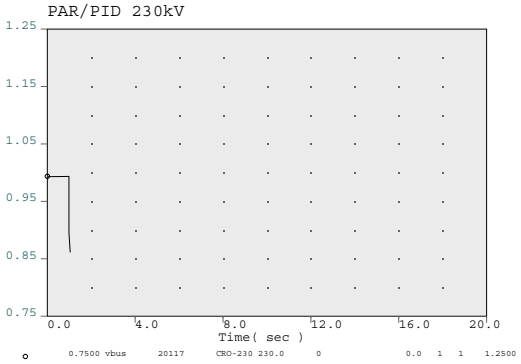
Miguel 500kV



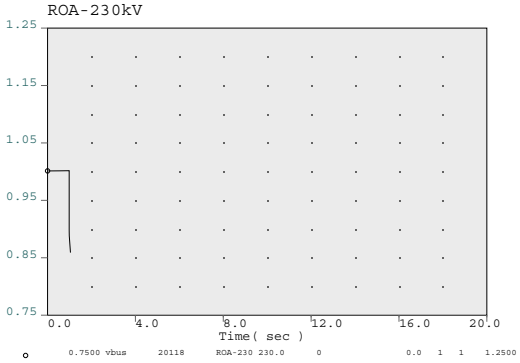
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SY 230 kV N-1

Affected System Voltage Check and Comparison

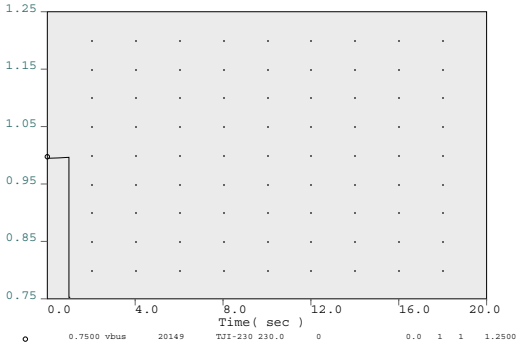
PAR/PID 230kV



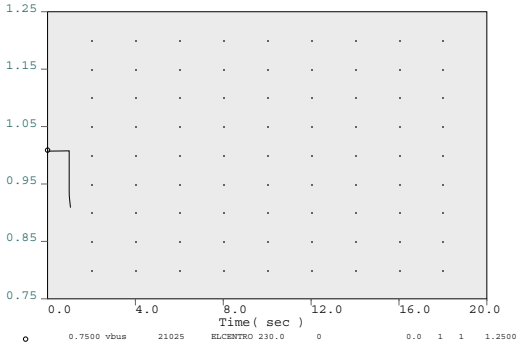
ROA-230kV



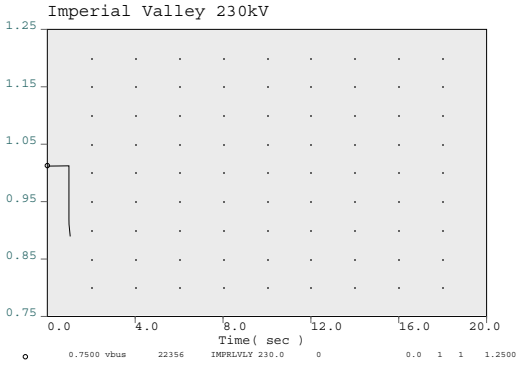
TJ1-230kV



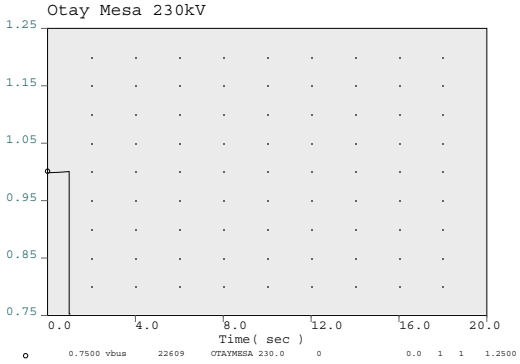
El Centro



Imperial Valley 230kV



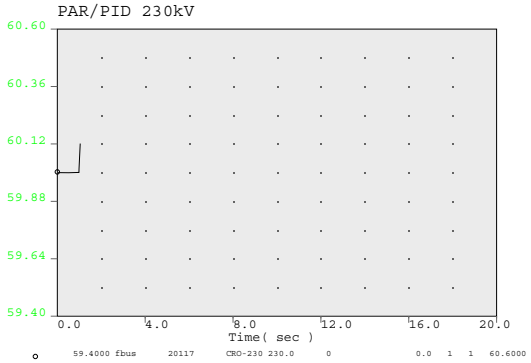
Otay Mesa 230kV



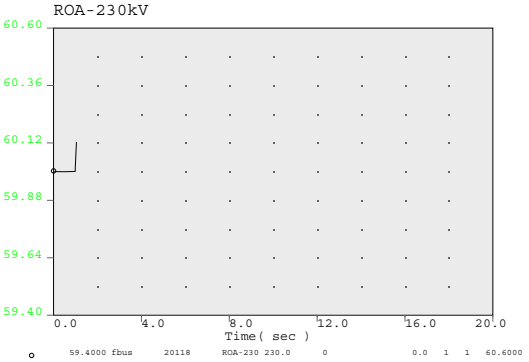
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SY 230 kV N-1

Affected System Frequency Check and Comparison

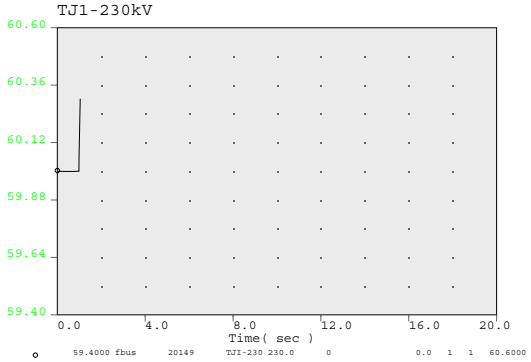
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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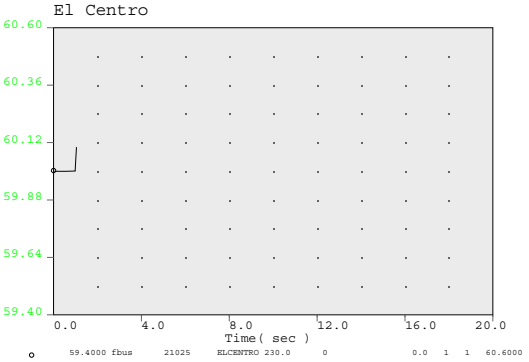
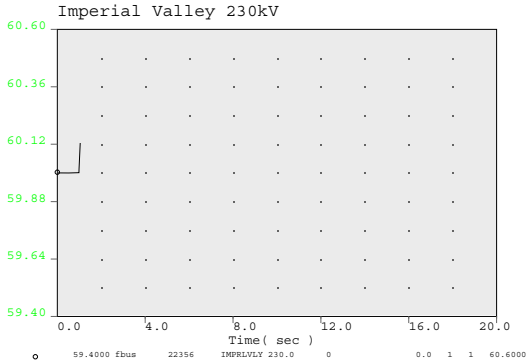
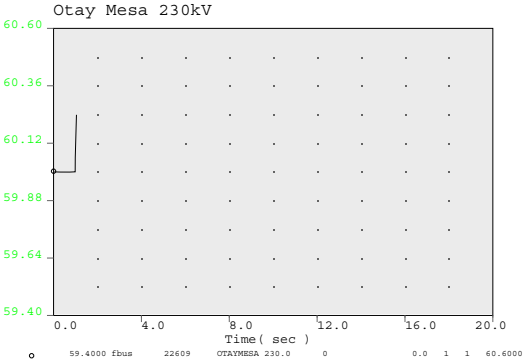


Imperial Valley 230kV



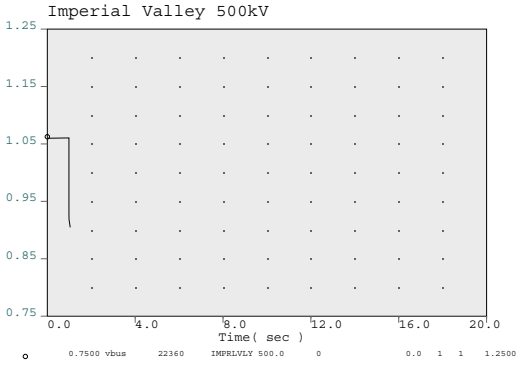
Otay Mesa 230kV



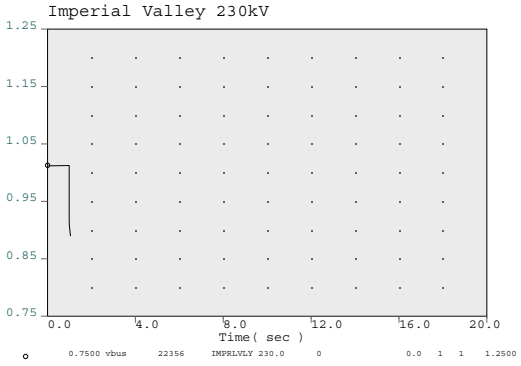
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SY 230 kV N-1

Imperial Valley Area - VOLTAGE

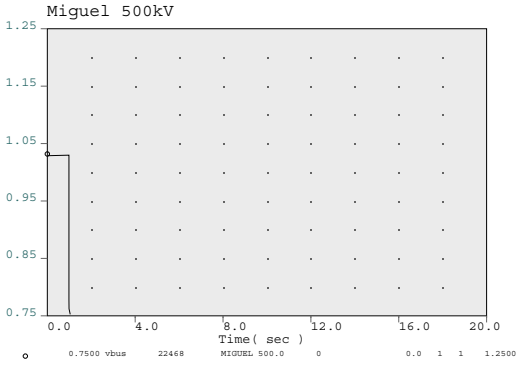
Imperial Valley 500kV



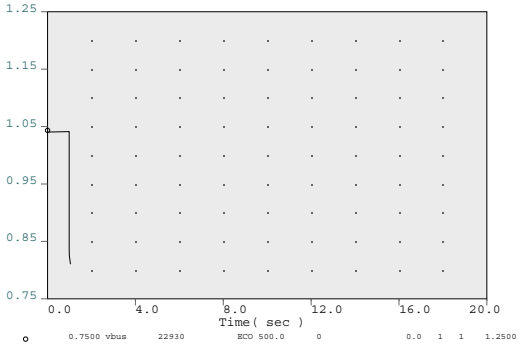
Imperial Valley 230kV



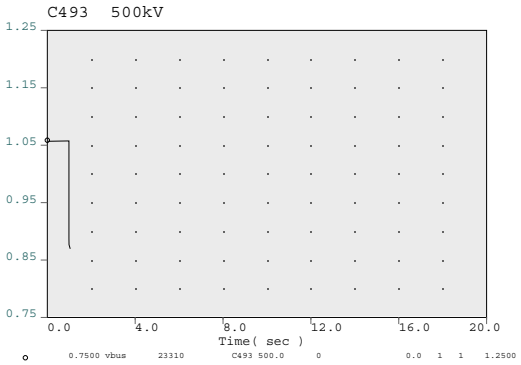
Miguel 500kV



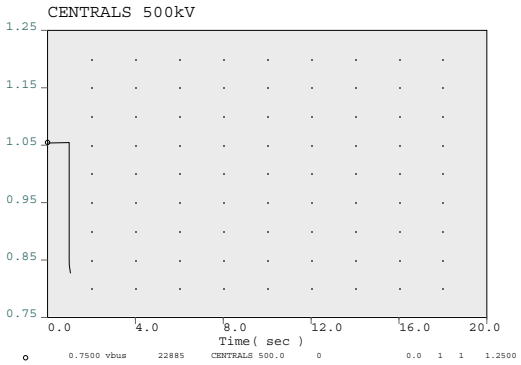
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SY 230 kV N-1

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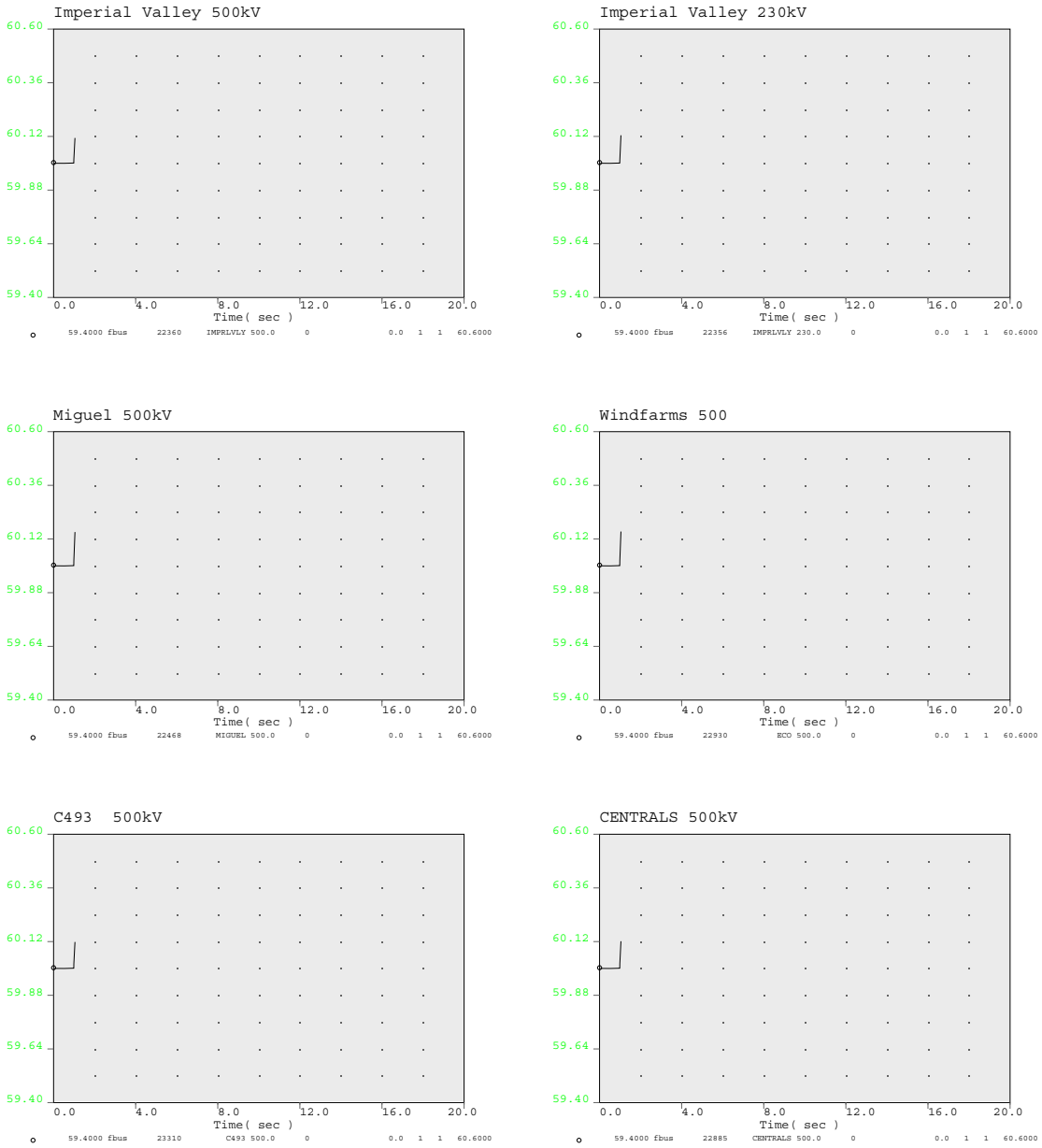
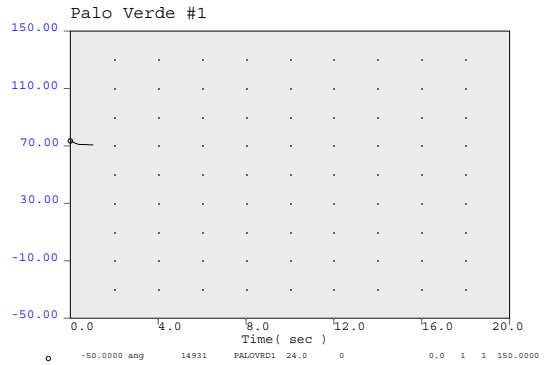
SDGE	int_C574-SX_SYwRAS_int_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:38:44 2010

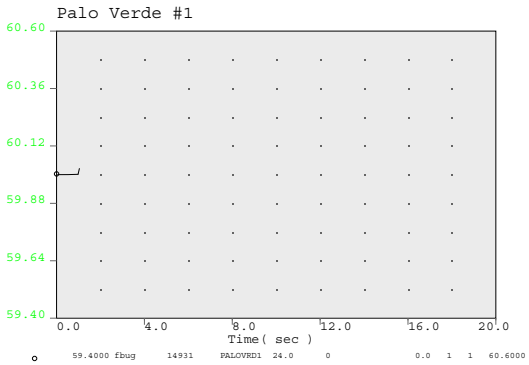
Imperial Valley Area - Frequency

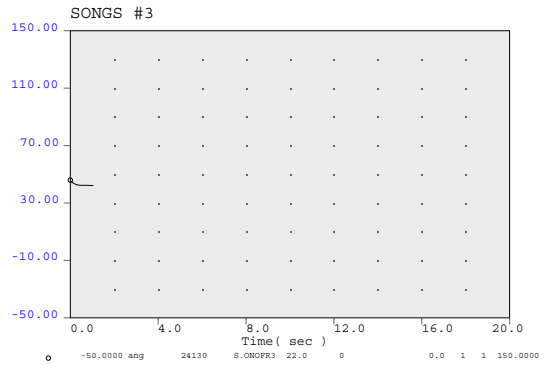


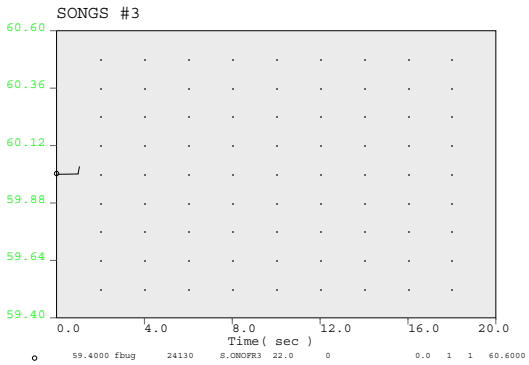
SDG&E Cluster 2 - pst int
2014 Heavy Summer
C574 - SY 230 kV N-1

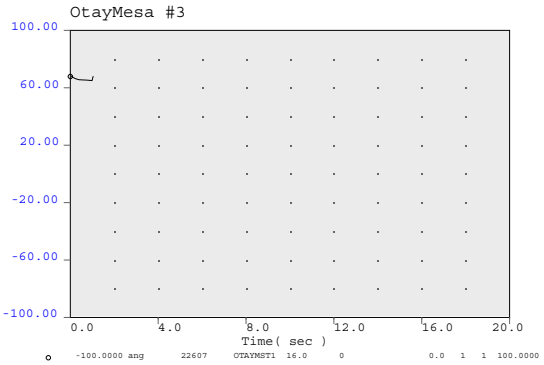
RELATIVE ROTOR ANGLE & FREQUENCY

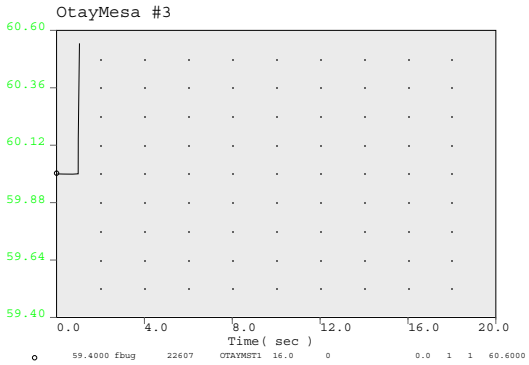












SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

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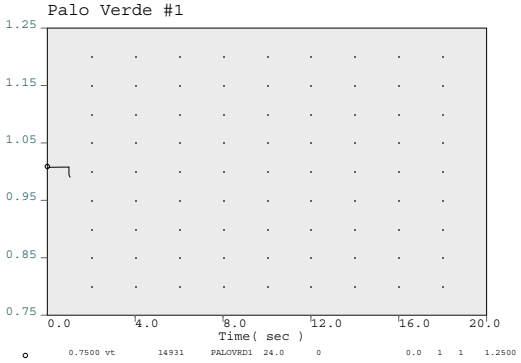
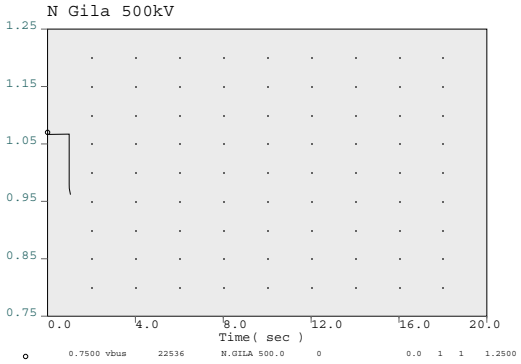
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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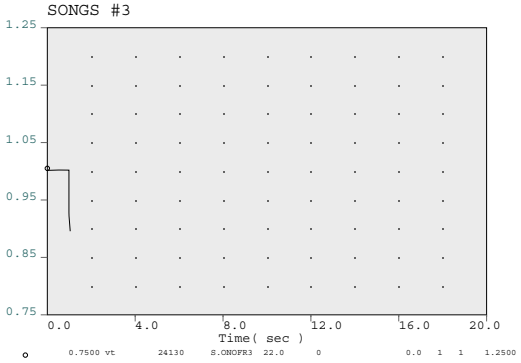
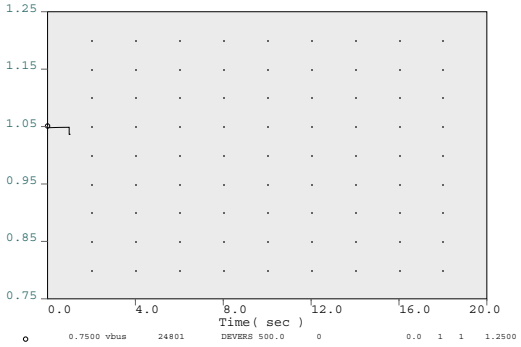
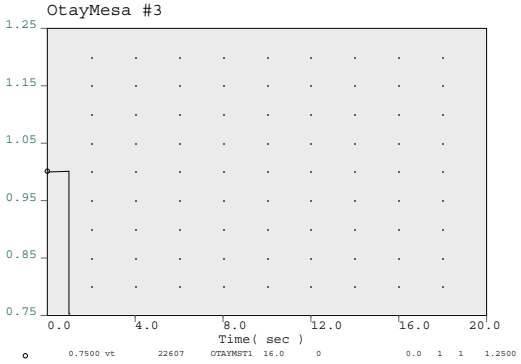


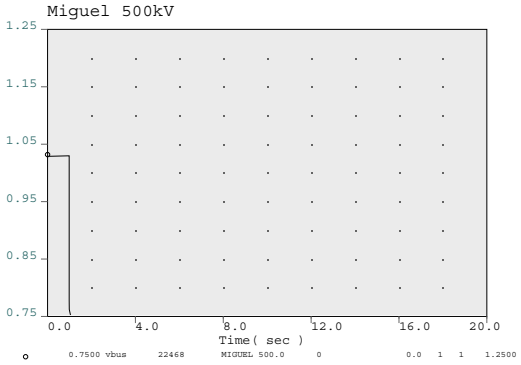
Devers 500



OtayMesa #3



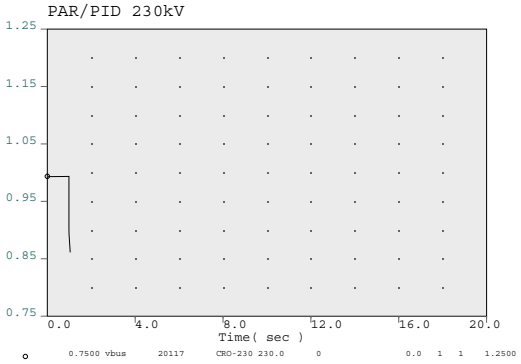
Miguel 500kV



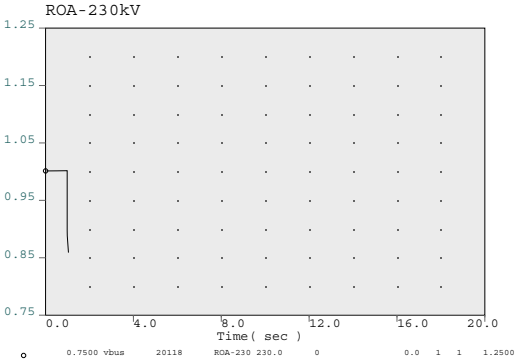
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Affected System Voltage Check and Comparison

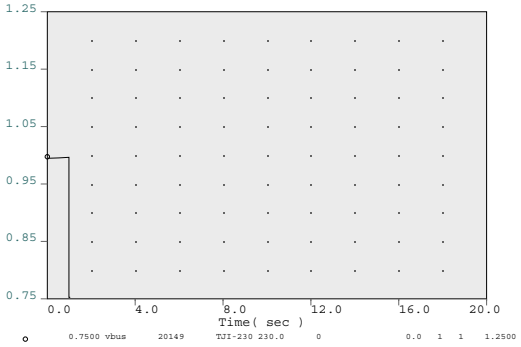
PAR/PID 230kV



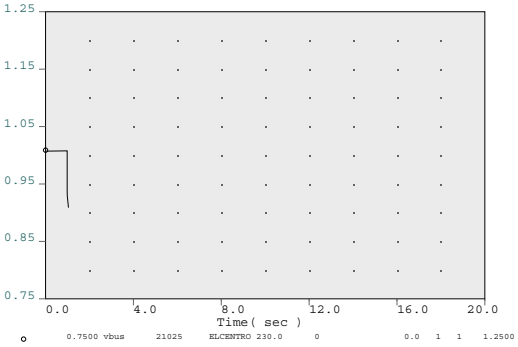
ROA-230kV



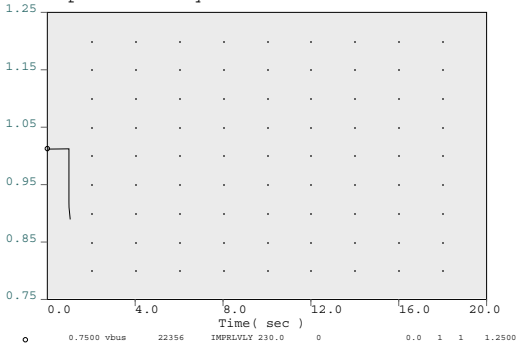
TJ1-230kV



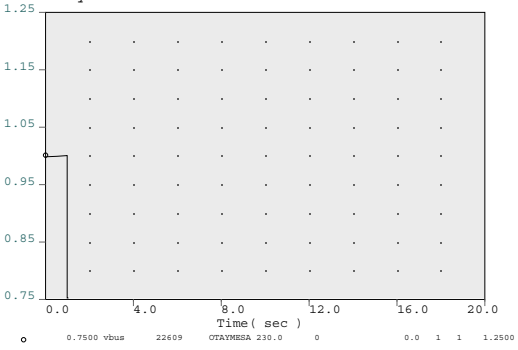
El Centro



Imperial Valley 230kV



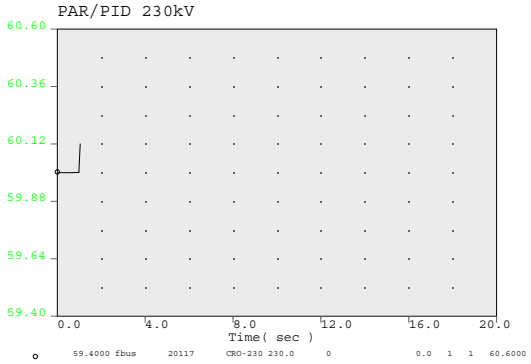
Otay Mesa 230kV



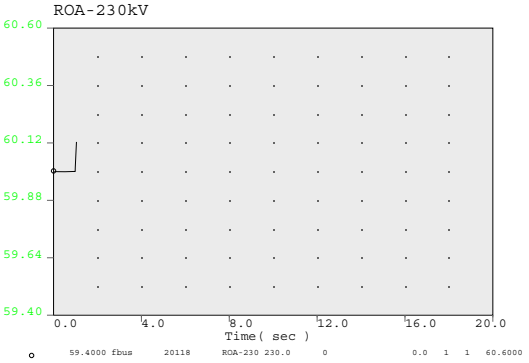
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Affected System Frequency Check and Comparison

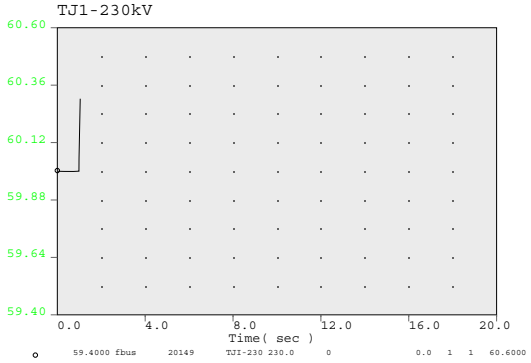
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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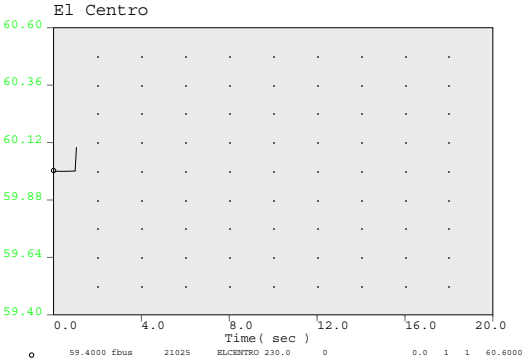
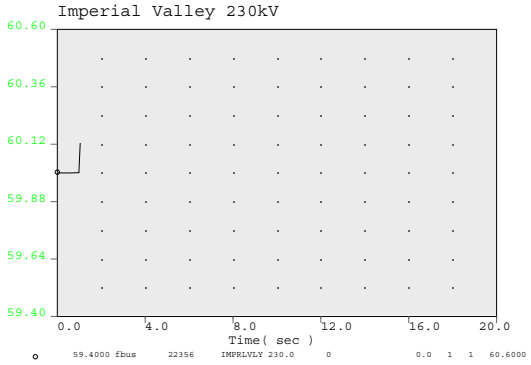
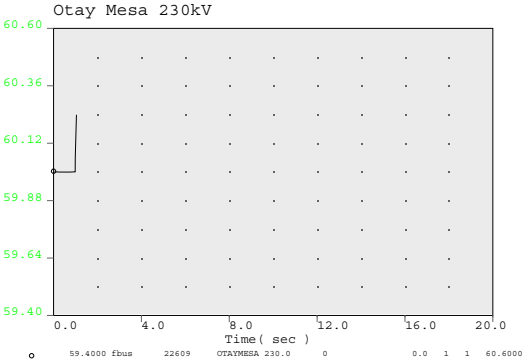


Imperial Valley 230kV



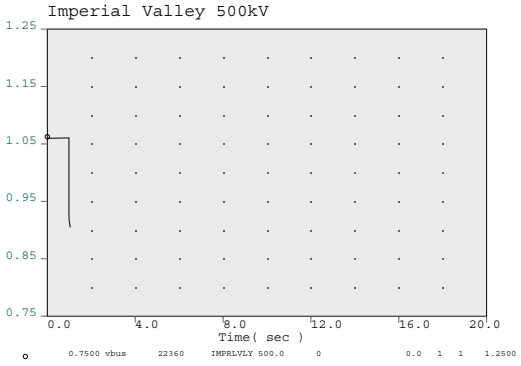
Otay Mesa 230kV



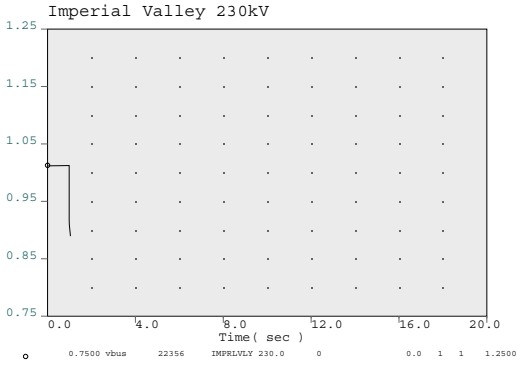
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Imperial Valley Area - VOLTAGE

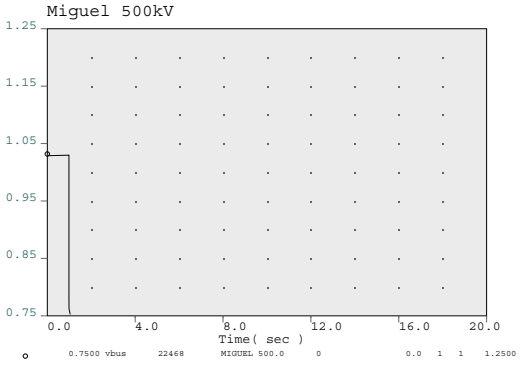
Imperial Valley 500kV



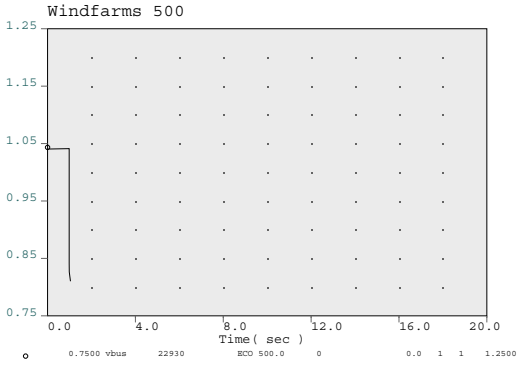
Imperial Valley 230kV



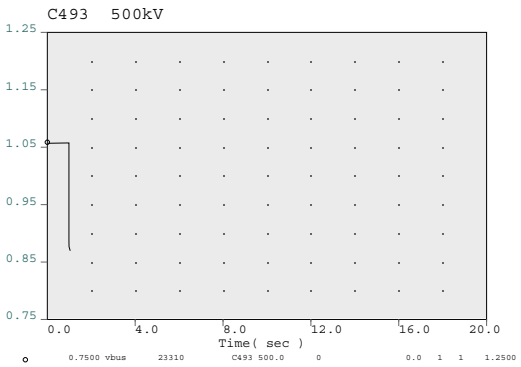
Miguel 500kV



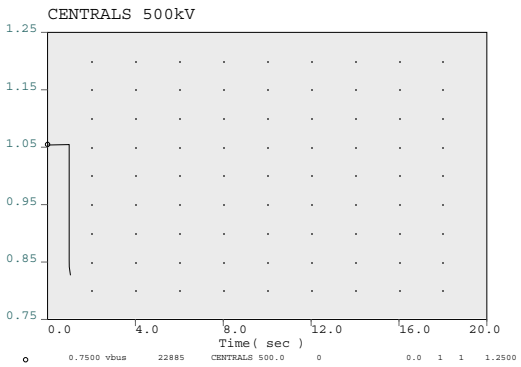
Windfarms 500



C493 500kV

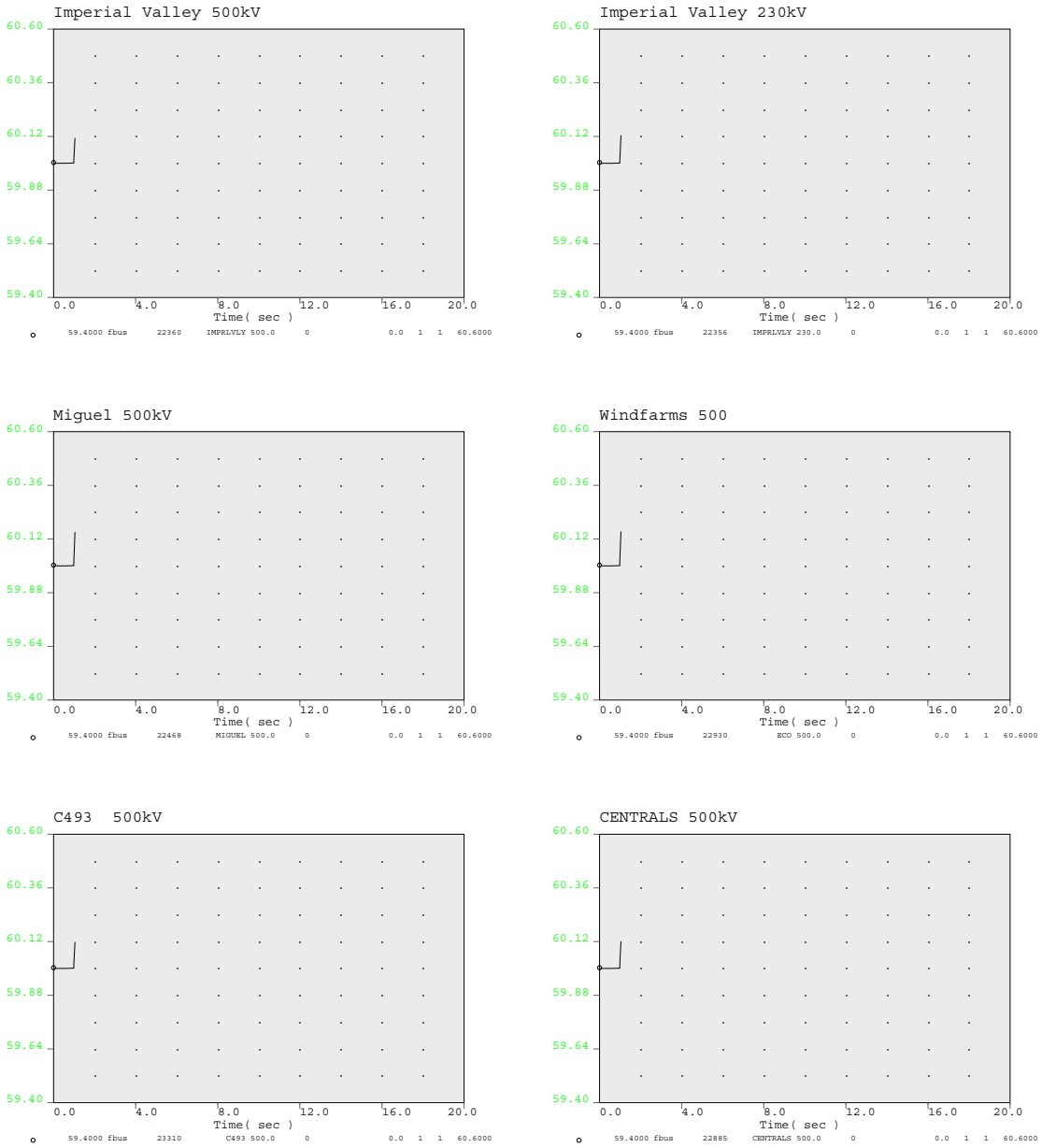


CENTRALS 500kV



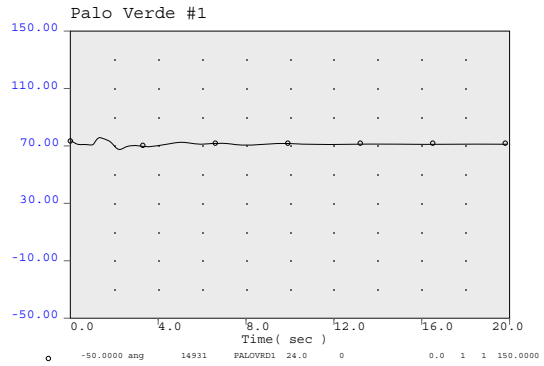
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

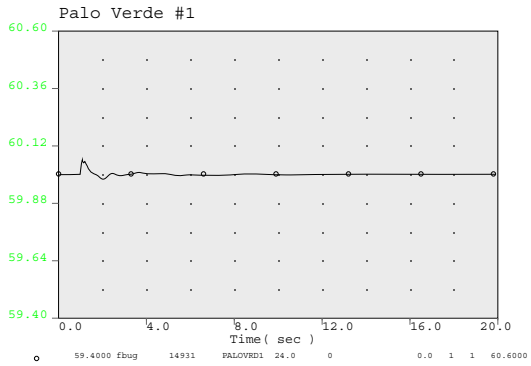
Imperial Valley Area - Frequency

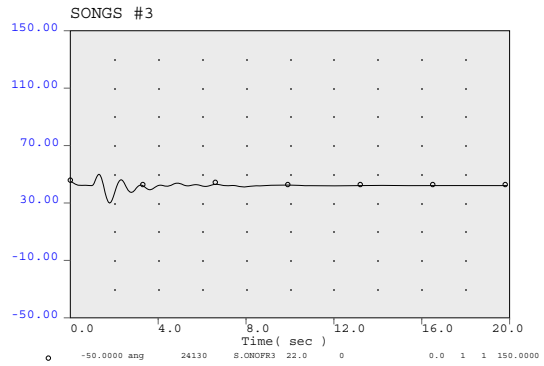


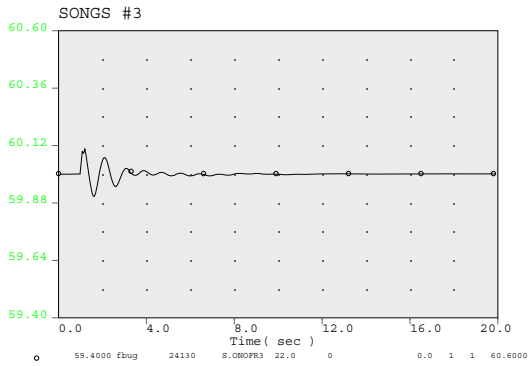
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

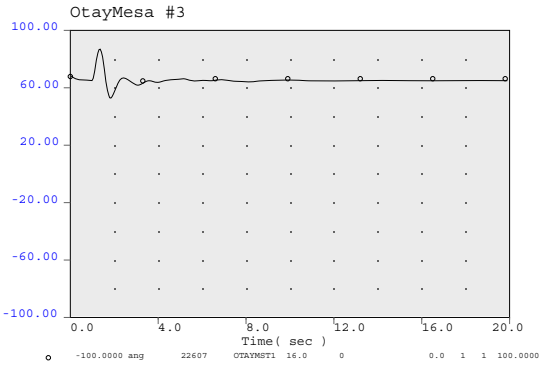
RELATIVE ROTOR ANGLE & FREQUENCY

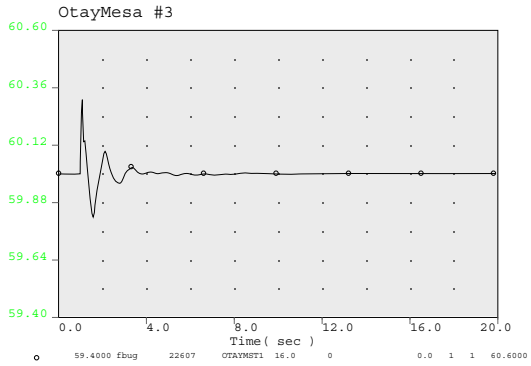












SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Page 1

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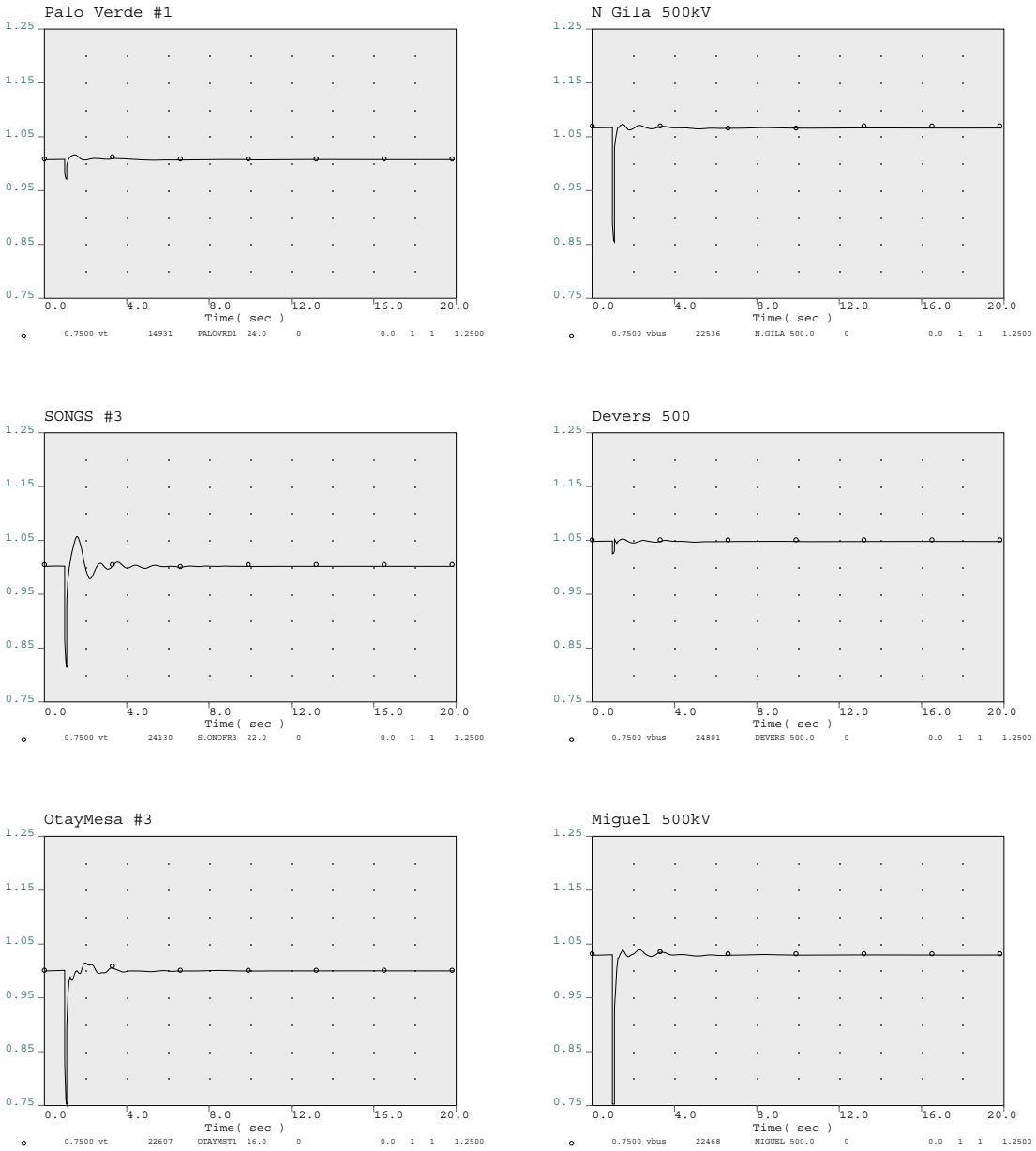
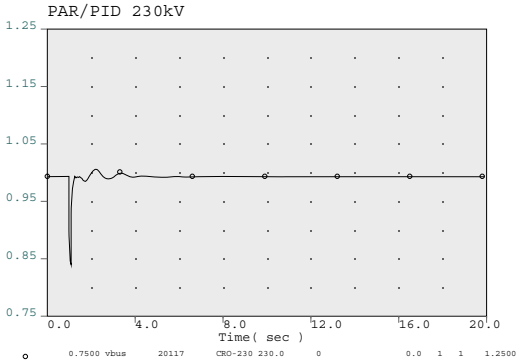
RELATIVE VOLTAGE



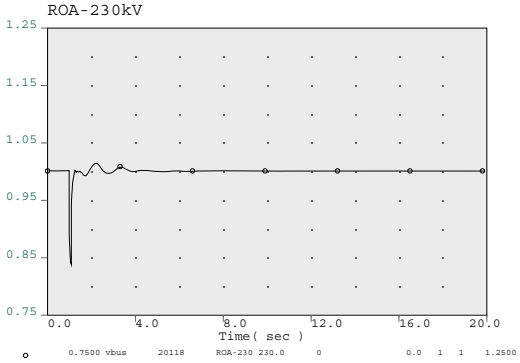
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Affected System Voltage Check and Comparison

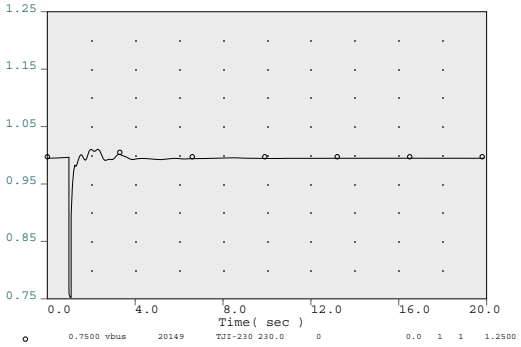
PAR/PID 230kV



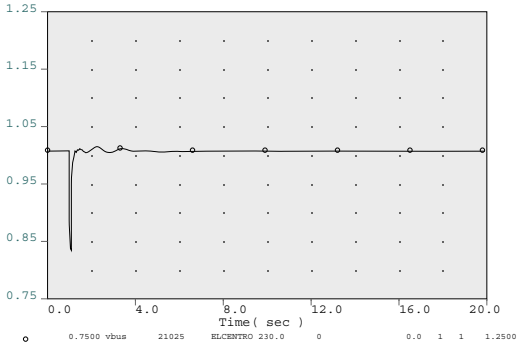
ROA-230kV



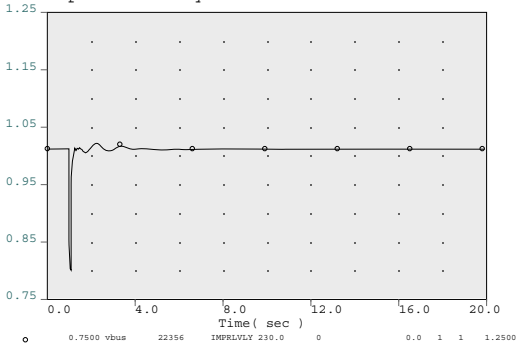
TJ1-230kV



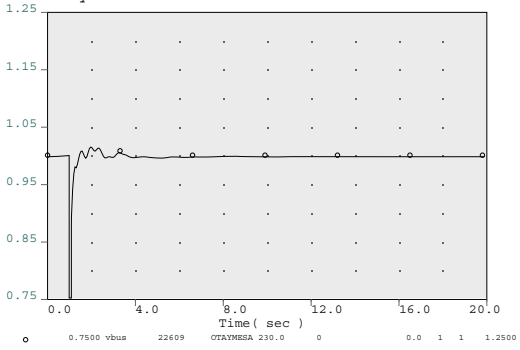
El Centro



Imperial Valley 230kV



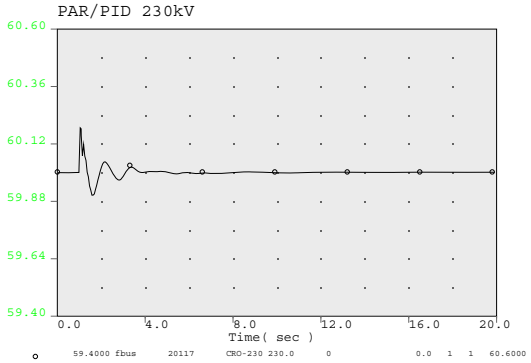
Otay Mesa 230kV



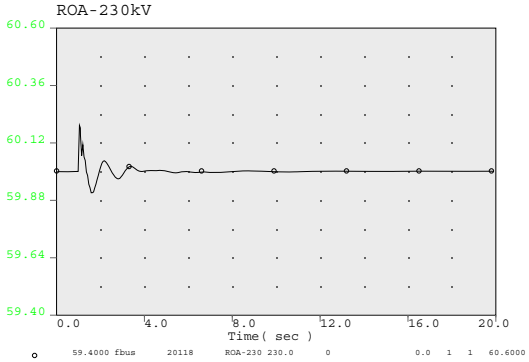
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Affected System Frequency Check and Comparison

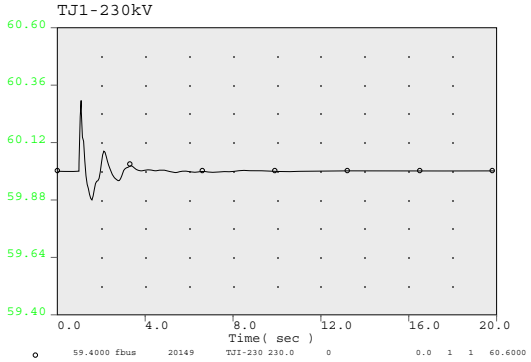
PAR/PID 230kV



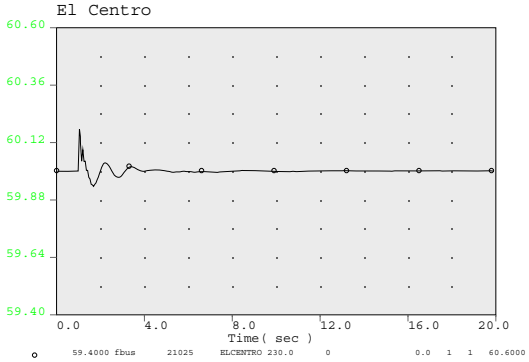
ROA-230kV



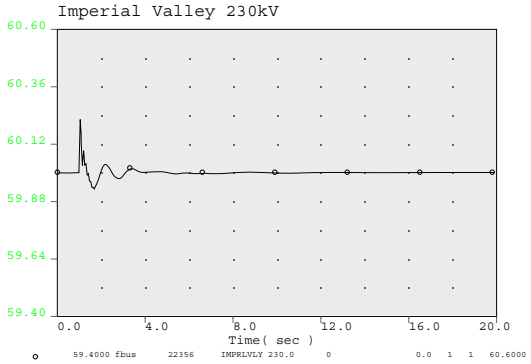
TJ1-230kV



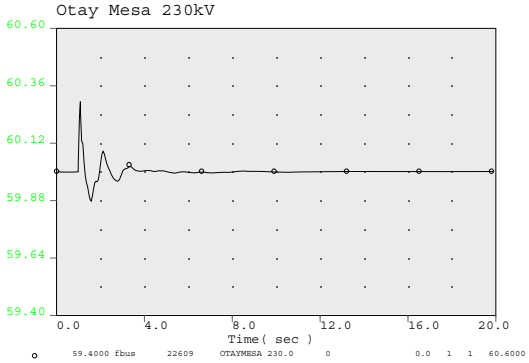
El Centro



Imperial Valley 230kV



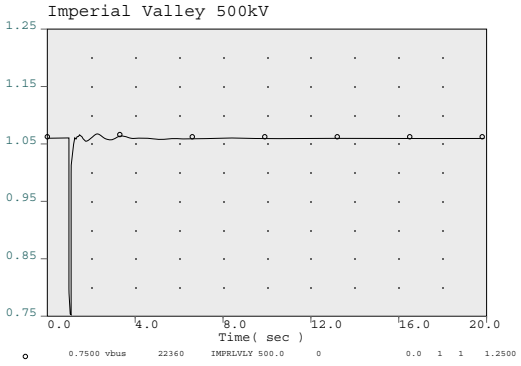
Otay Mesa 230kV



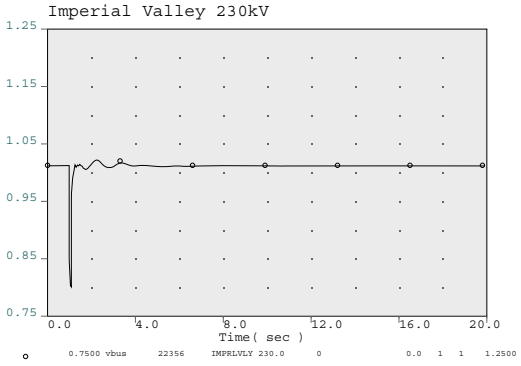
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

Imperial Valley Area - VOLTAGE

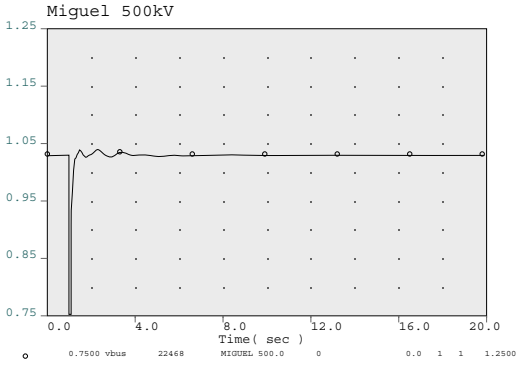
Imperial Valley 500kV



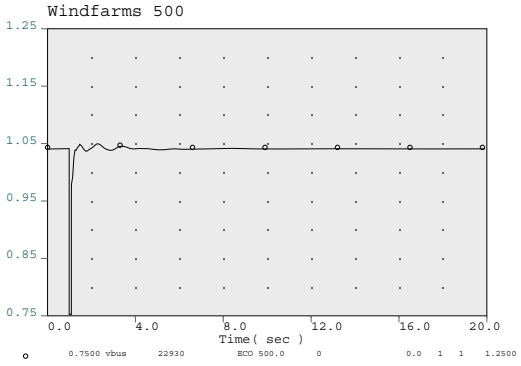
Imperial Valley 230kV



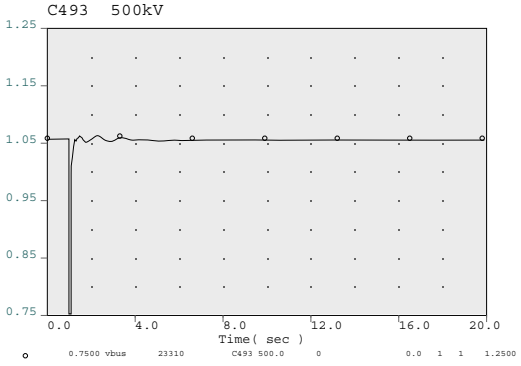
Miguel 500kV



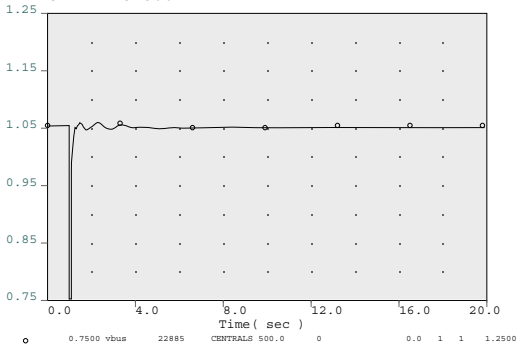
Windfarms 500



C493 500kV



CENTRALS 500kV

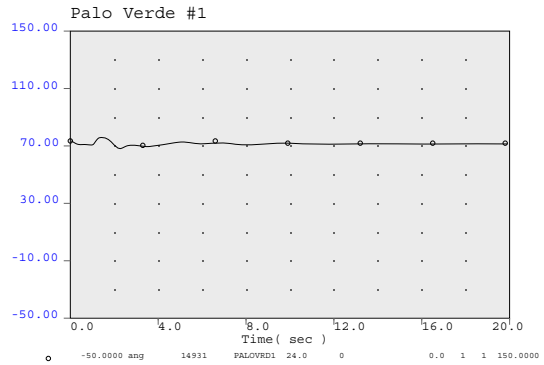


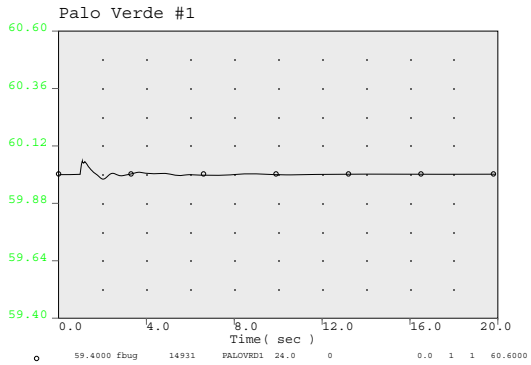
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

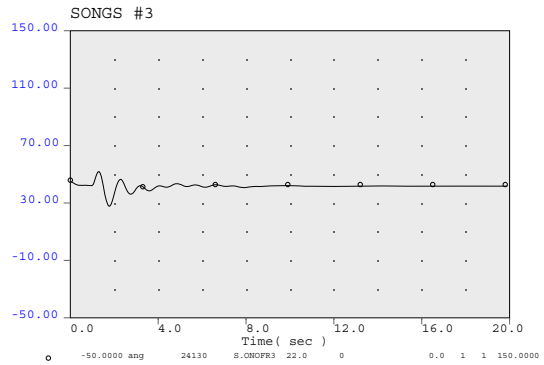
Imperial Valley Area - Frequency

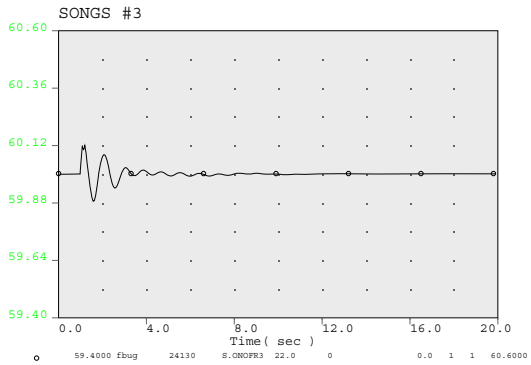
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - C565 230 kV N-1

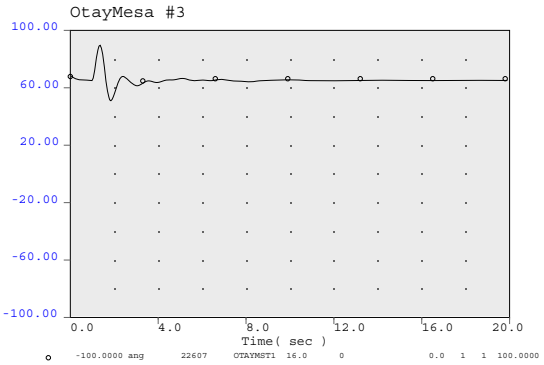
RELATIVE ROTOR ANGLE & FREQUENCY

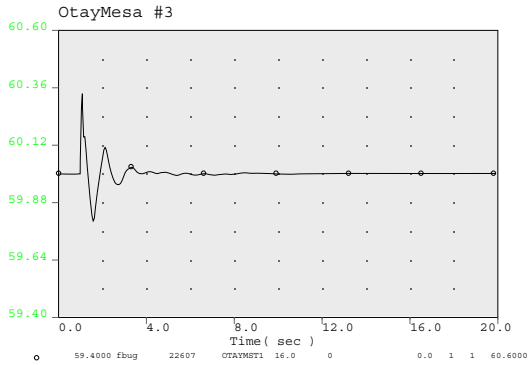










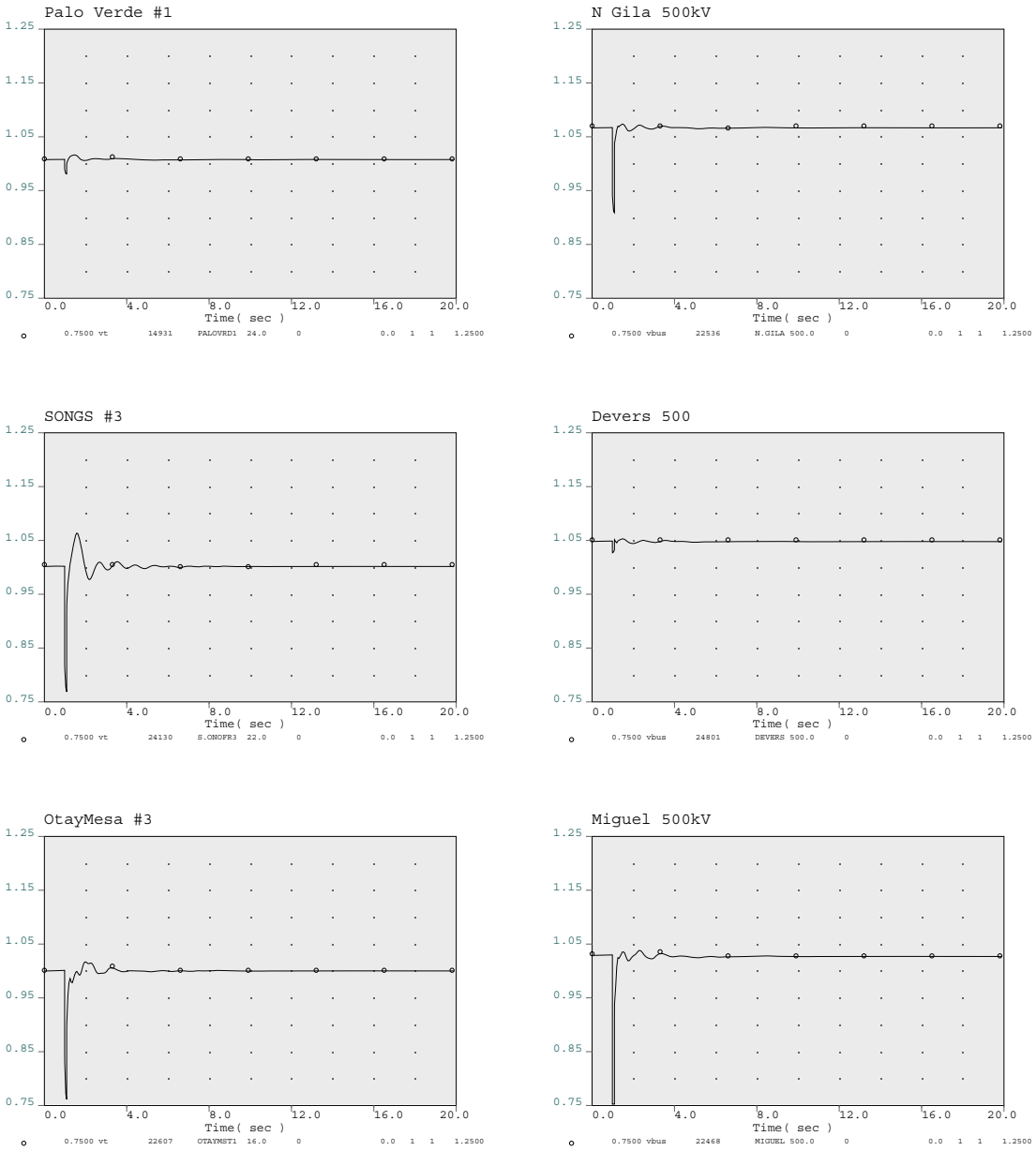


SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - Penasquitos 230 kV N-1

Page 1

SDGE	int_SX-PQ_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:39:52 2010

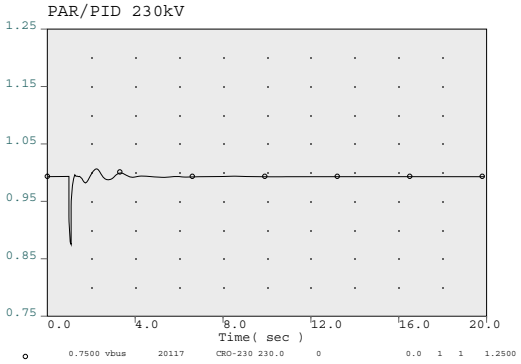
RELATIVE VOLTAGE



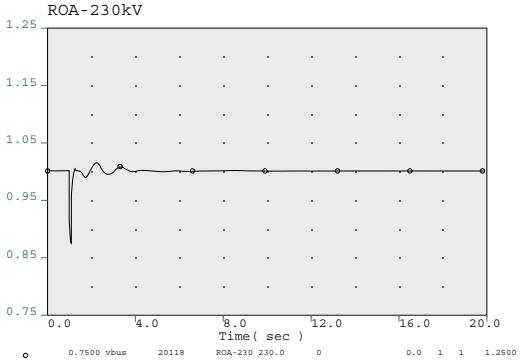
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - Penasquitos 230 kV N-1

Affected System Voltage Check and Comparison

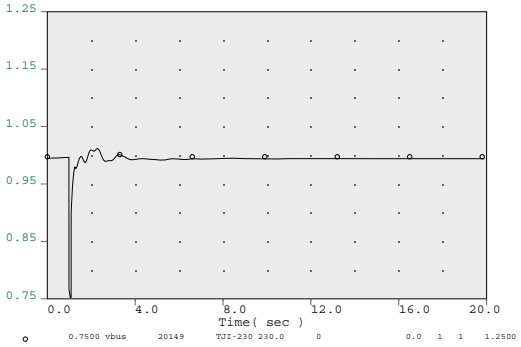
PAR/PID 230kV



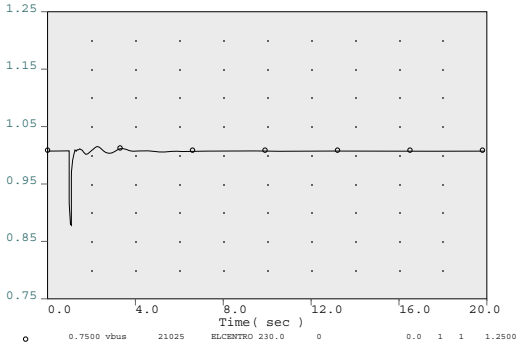
ROA-230kV



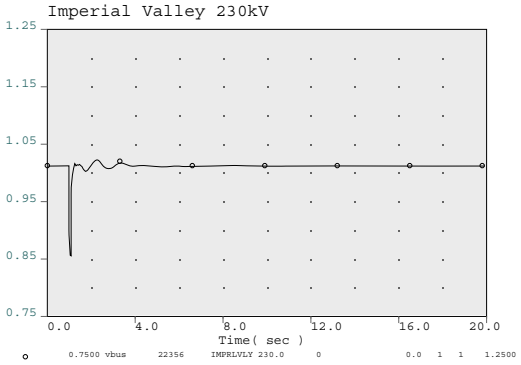
TJ1-230kV



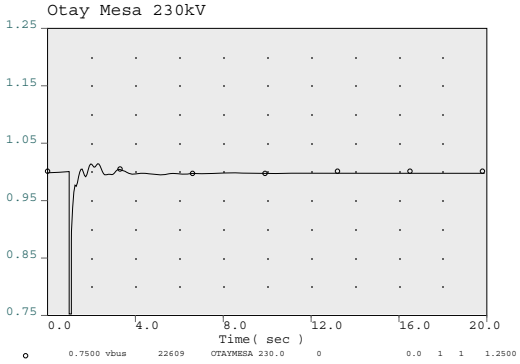
El Centro



Imperial Valley 230kV



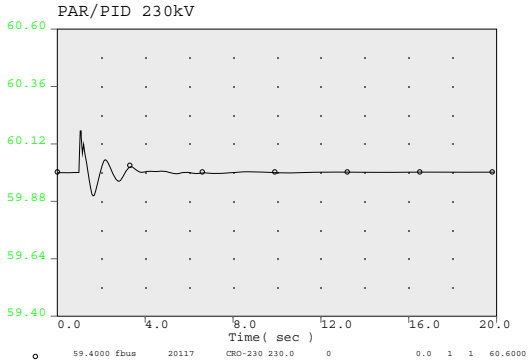
Otay Mesa 230kV



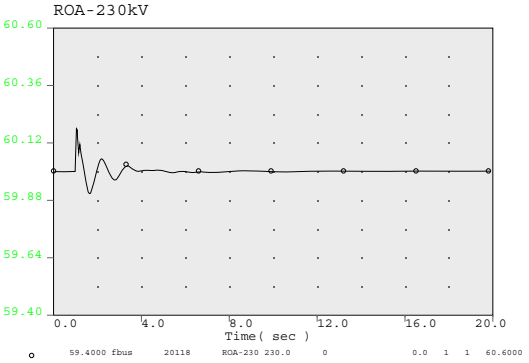
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - Penasquitos 230 kV N-1

Affected System Frequency Check and Comparison

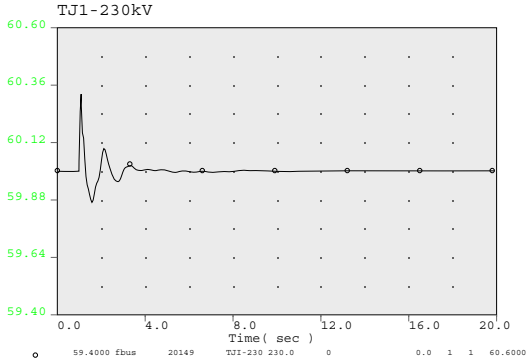
PAR/PID 230kV



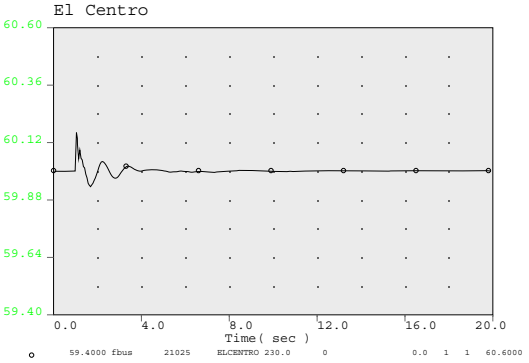
ROA-230kV



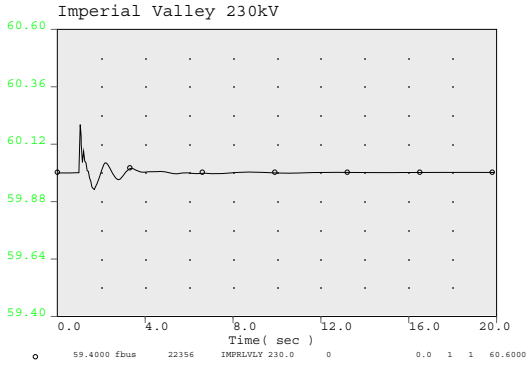
TJ1-230kV



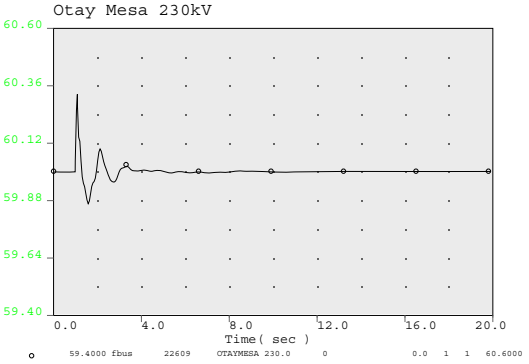
El Centro



Imperial Valley 230kV



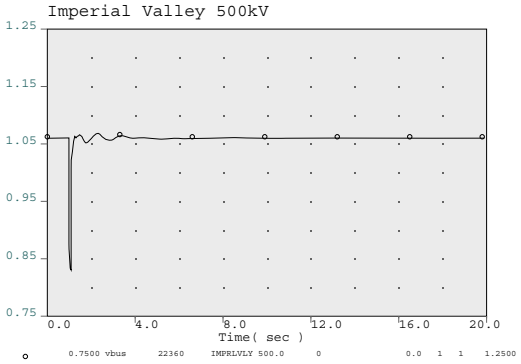
Otay Mesa 230kV



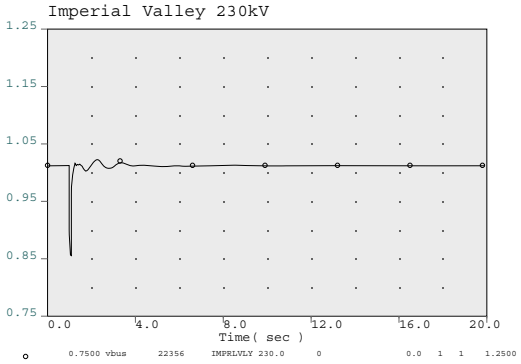
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - Penasquitos 230 kV N-1

Imperial Valley Area - VOLTAGE

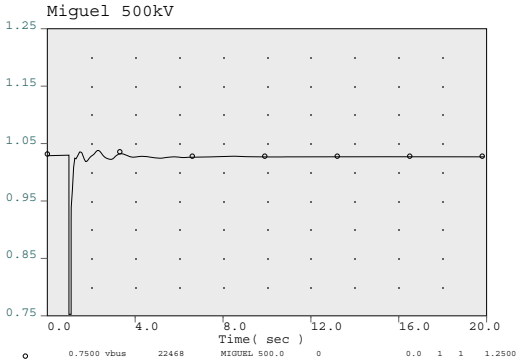
Imperial Valley 500kV



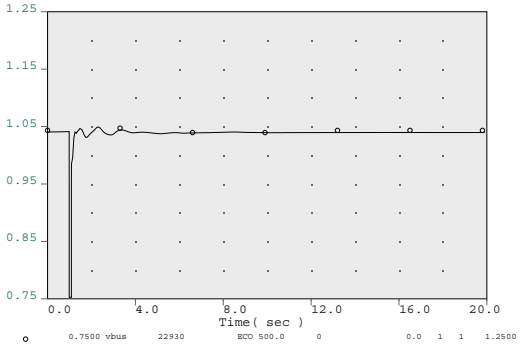
Imperial Valley 230kV



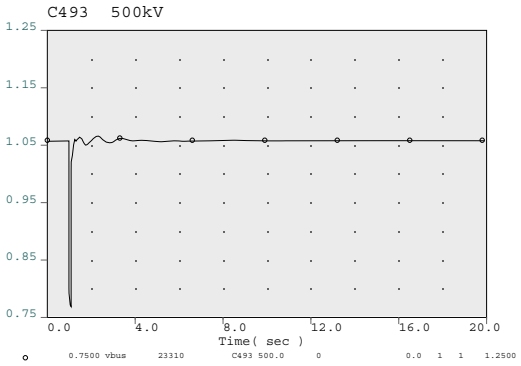
Miguel 500kV



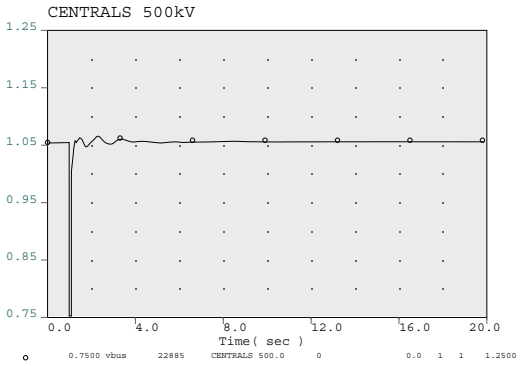
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - Penasquitos 230 kV N-1

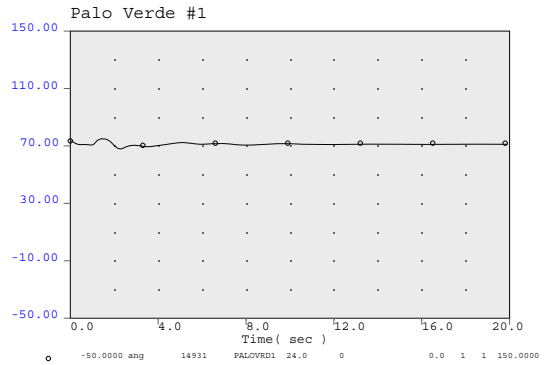
Page 5

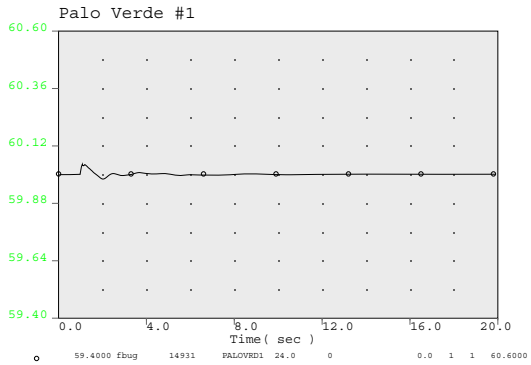
SDGE	int_SX-PQ_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:39:53 2010

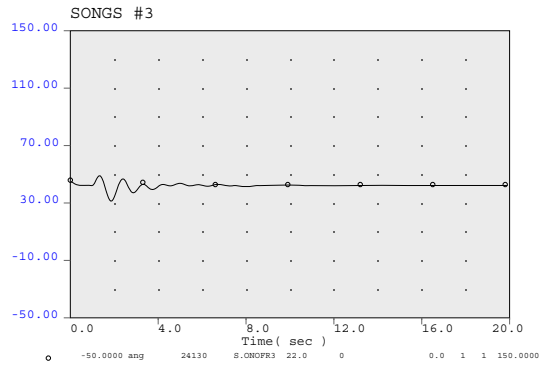
Imperial Valley Area - Frequency

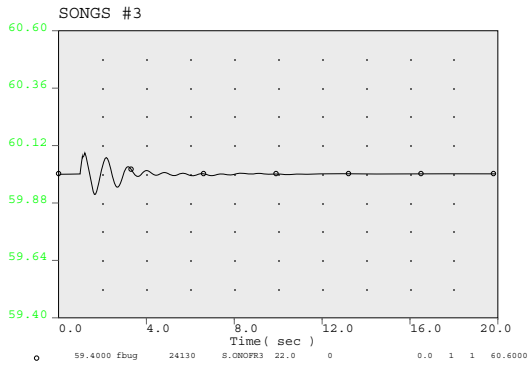
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Sycamore - Penasquitos 230 kV N-1

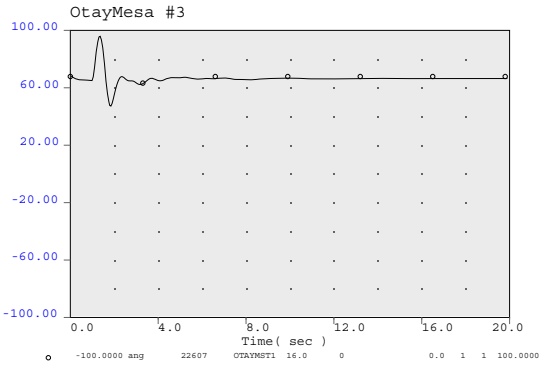
RELATIVE ROTOR ANGLE & FREQUENCY

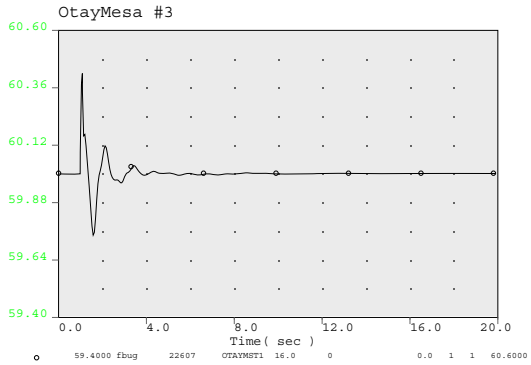












SDG&E Cluster 2 - pst int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Page 1

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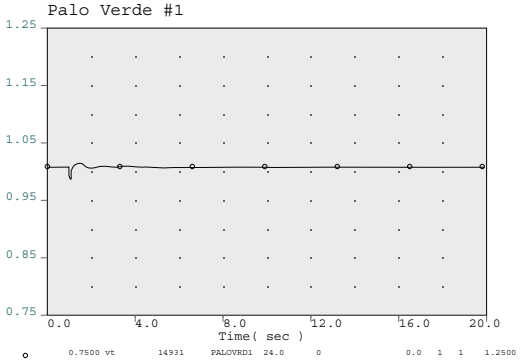
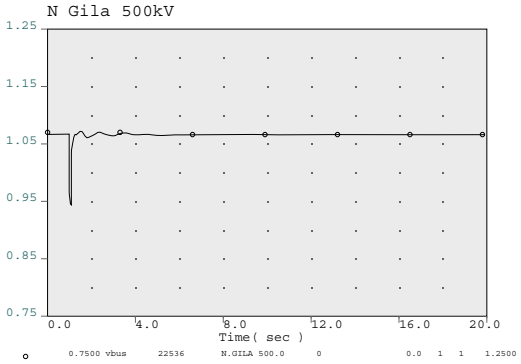
RELATIVE VOLTAGE

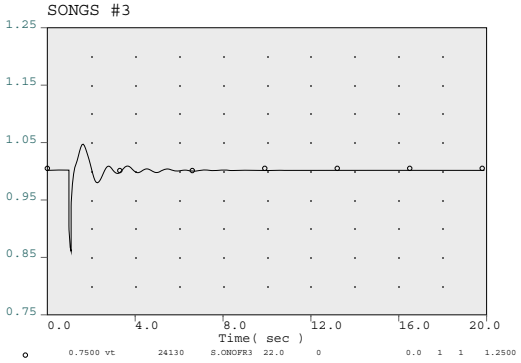
Palo Verde #1



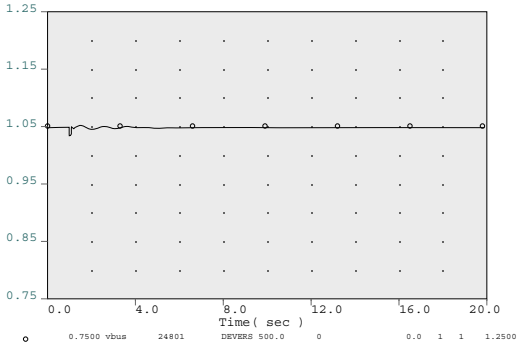
N Gila 500kV



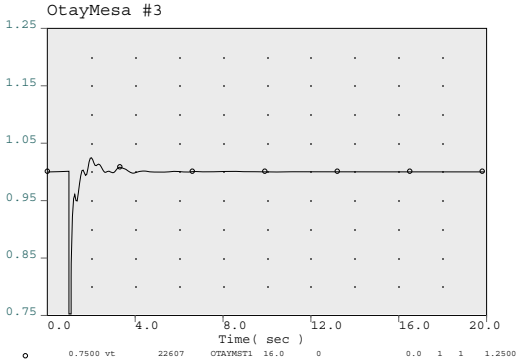
SONGS #3



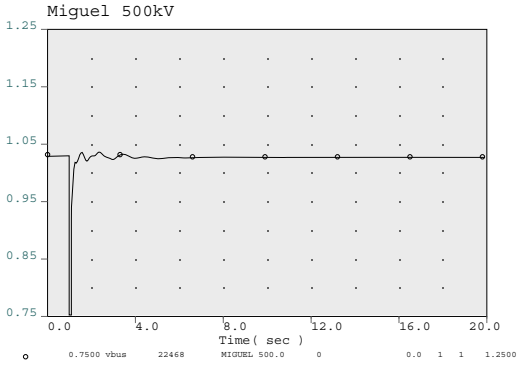
Devers 500



OtayMesa #3



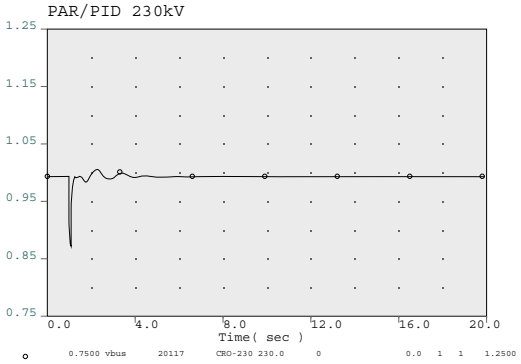
Miguel 500kV



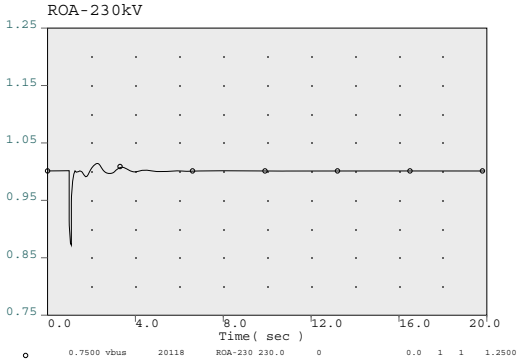
SDG&E Cluster 2 - pst int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Affected System Voltage Check and Comparison

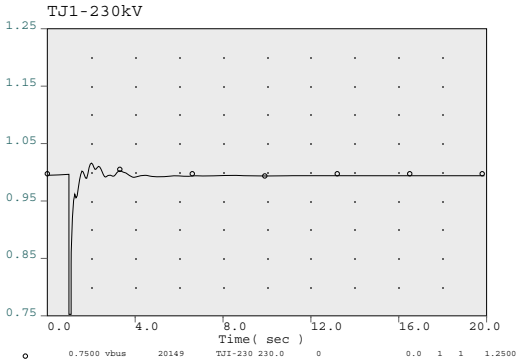
PAR/PID 230kV



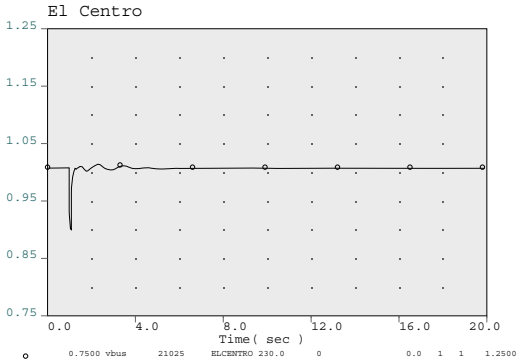
ROA-230kV



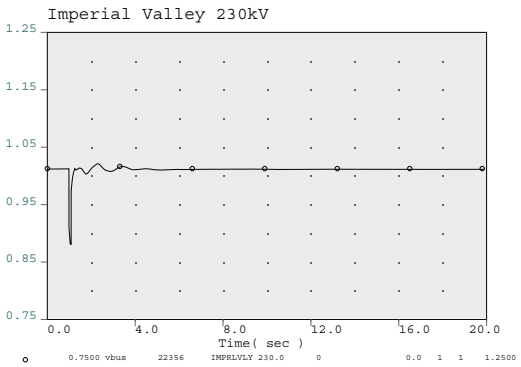
TJ1-230kV



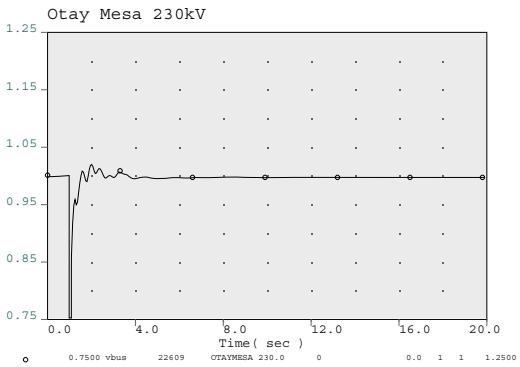
El Centro



Imperial Valley 230kV



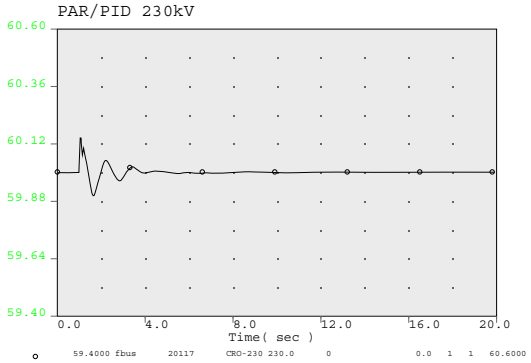
Otay Mesa 230kV



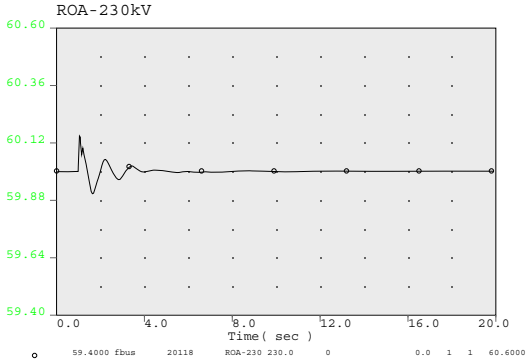
SDG&E Cluster 2 - pst int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Affected System Frequency Check and Comparison

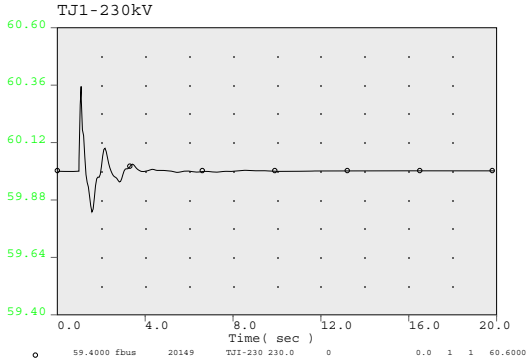
PAR/PID 230kV



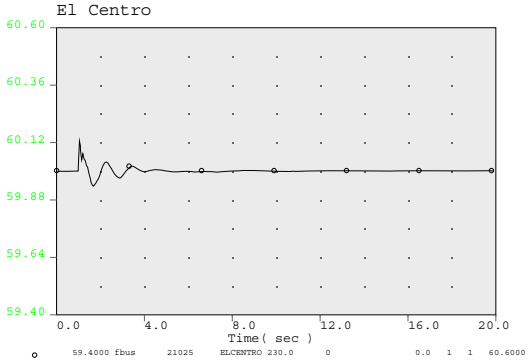
ROA-230kV



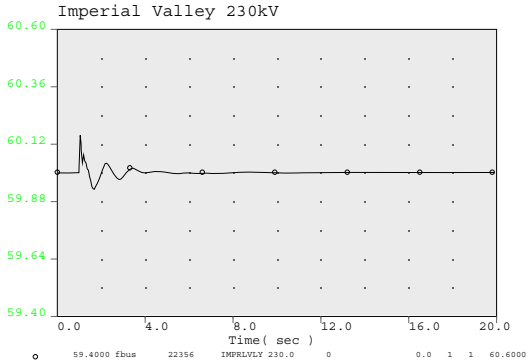
TJ1-230kV



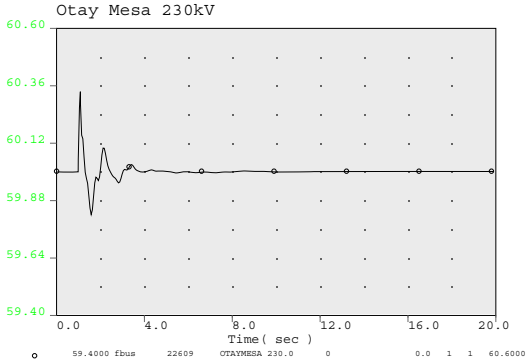
El Centro



Imperial Valley 230kV



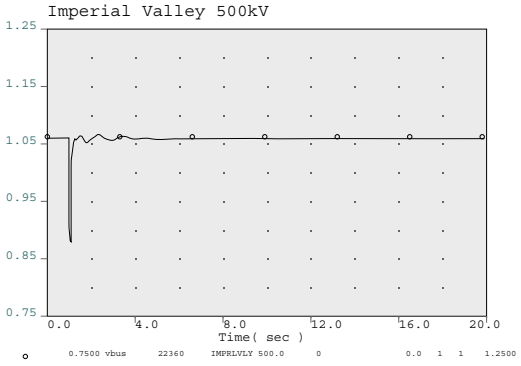
Otay Mesa 230kV



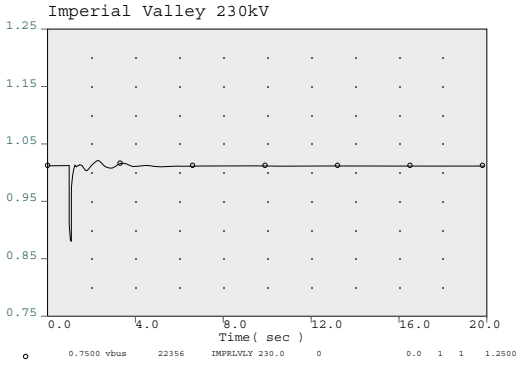
SDG&E Cluster 2 - pst int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

Imperial Valley Area - VOLTAGE

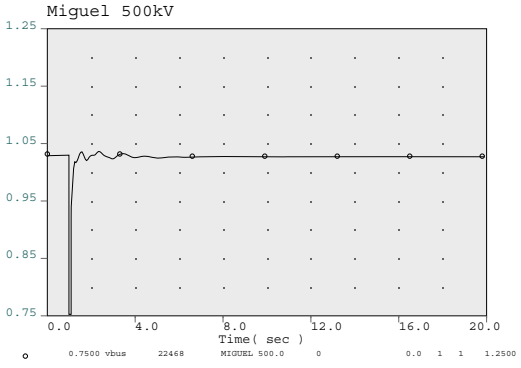
Imperial Valley 500kV



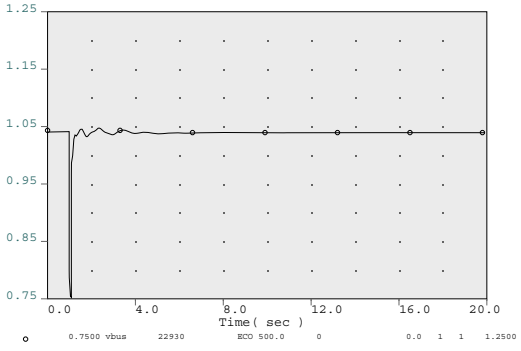
Imperial Valley 230kV



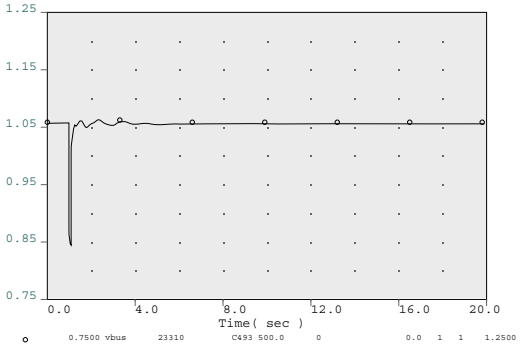
Miguel 500kV



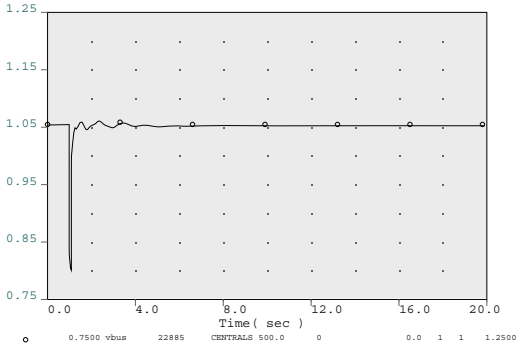
Windfarms 500



C493 500kV



CENTRALS 500kV

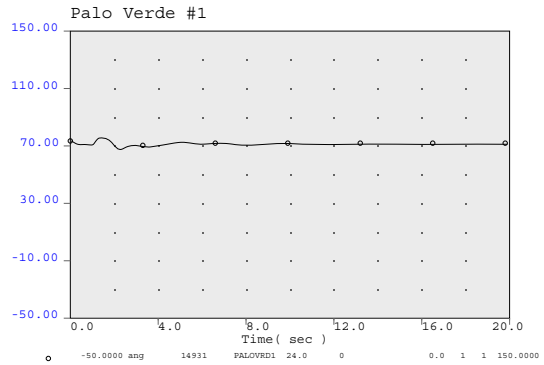


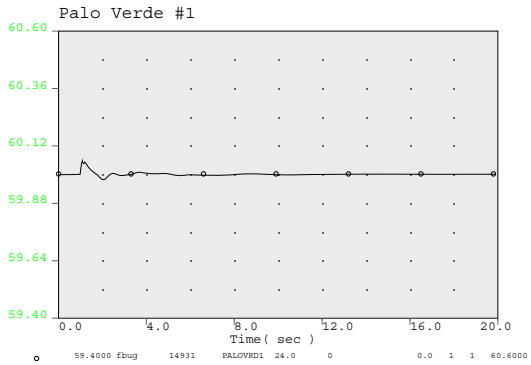
SDG&E Cluster 2 - pst int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

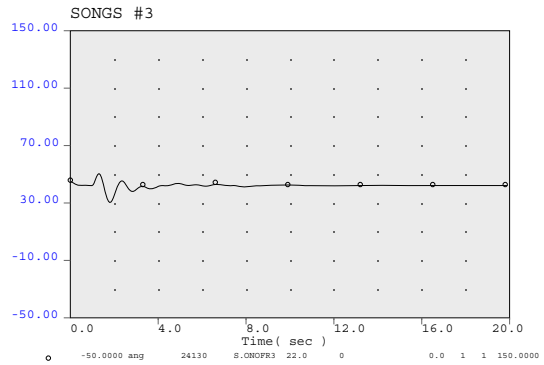
Imperial Valley Area - Frequency

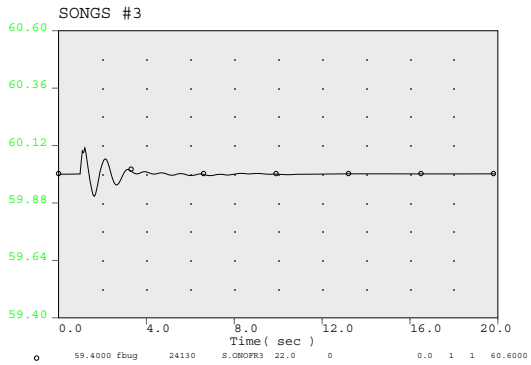
SDG&E Cluster 2 - pst int
2014 Heavy Summer
South Bay - Silvergate 230 kV N-1

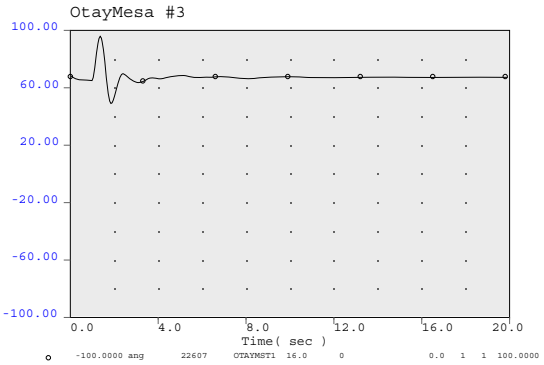
RELATIVE ROTOR ANGLE & FREQUENCY

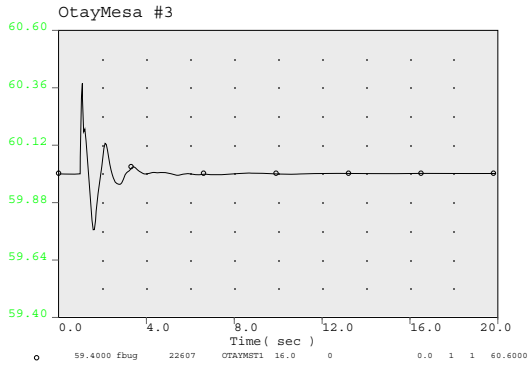












SDG&E Cluster 2 - pst int
2014 Heavy Summer
Southbay - Mission 230 kV N-1

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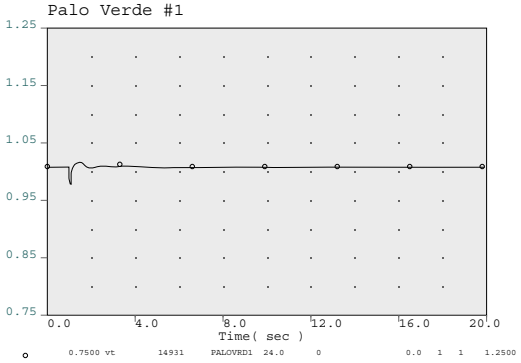
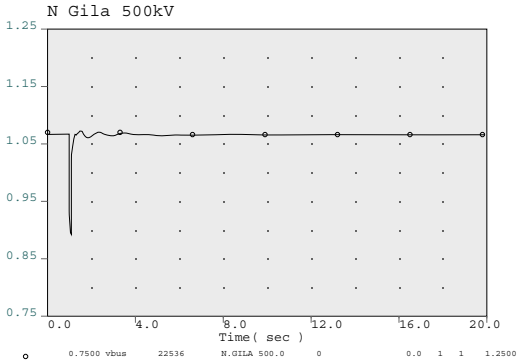
SDGE	int_SY-MS_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:40:53 2010

RELATIVE VOLTAGE

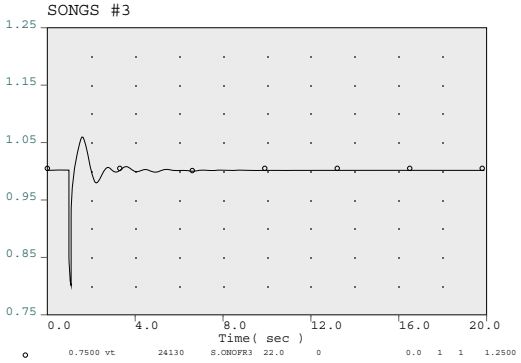
Palo Verde #1



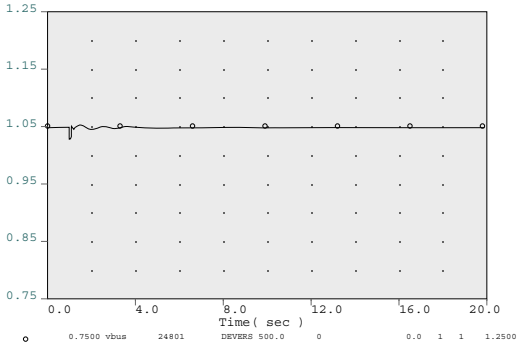
N Gila 500kV



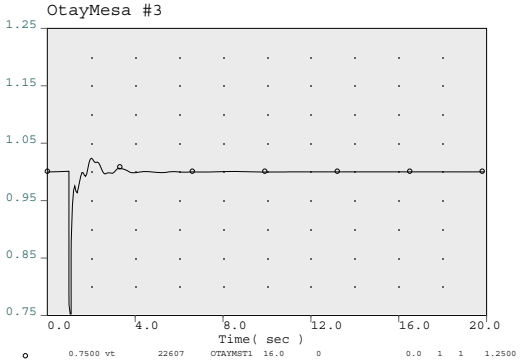
SONGS #3



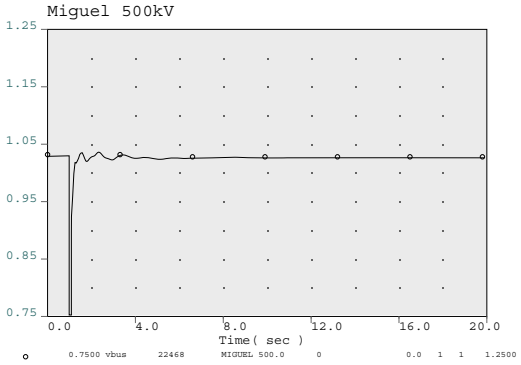
Devers 500



OtayMesa #3



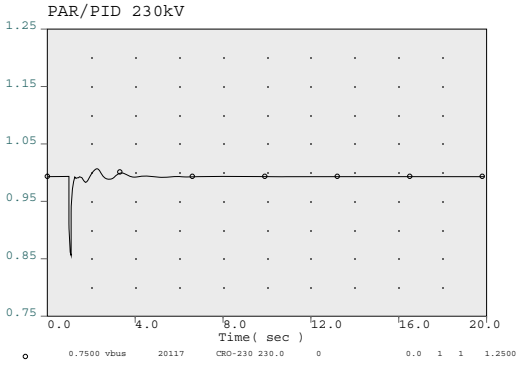
Miguel 500kV



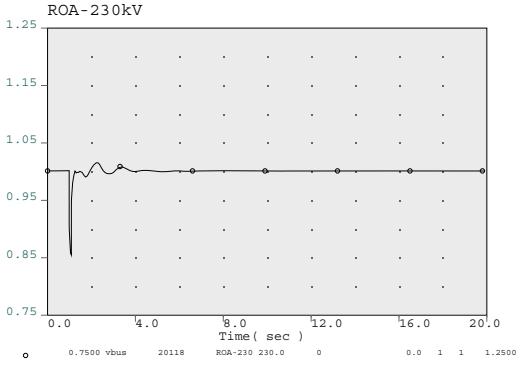
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Southbay - Mission 230 kV N-1

Affected System Voltage Check and Comparison

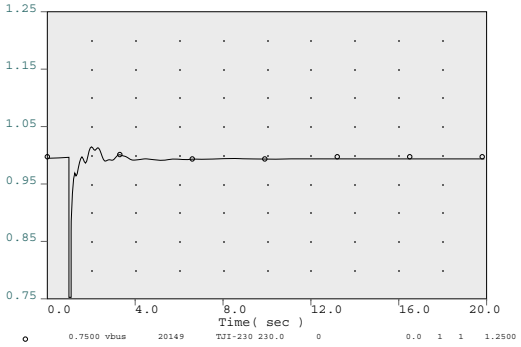
PAR/PID 230kV



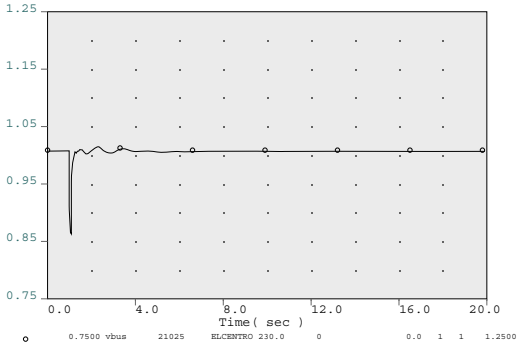
ROA-230kV



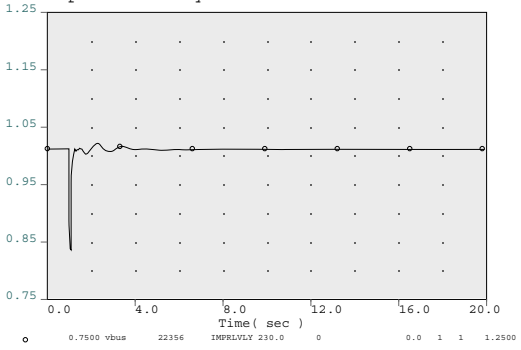
TJ1-230kV



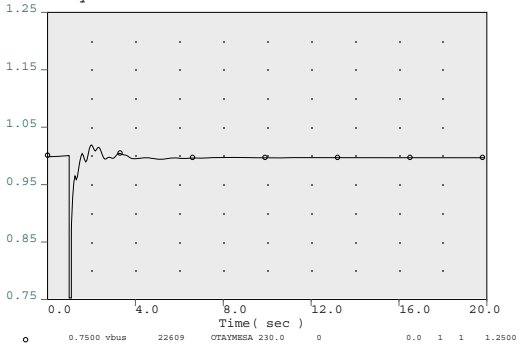
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



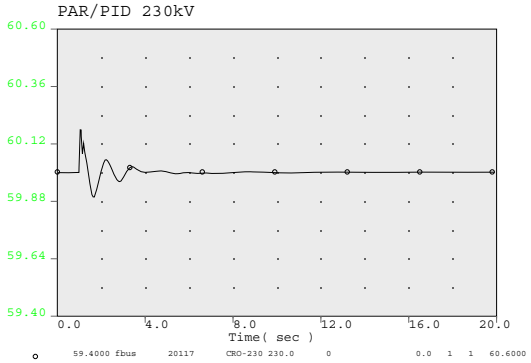
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Southbay - Mission 230 kV N-1

Page 3

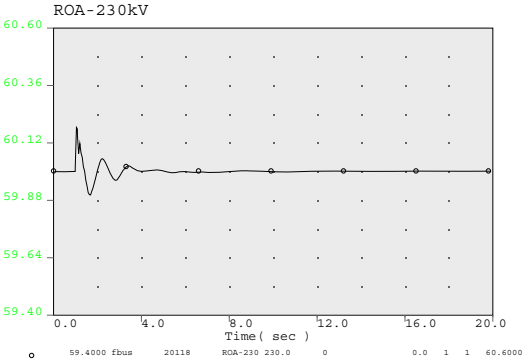
SDGE	int_SY-MS_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:40:53 2010

Affected System Frequency Check and Comparison

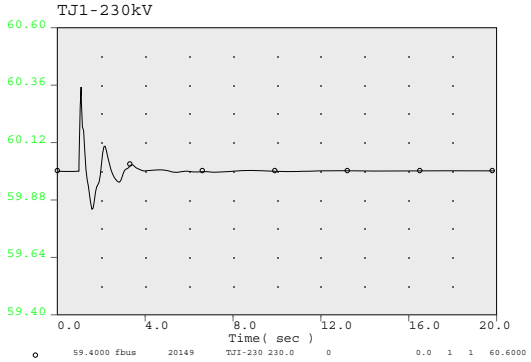
PAR/PID 230kV



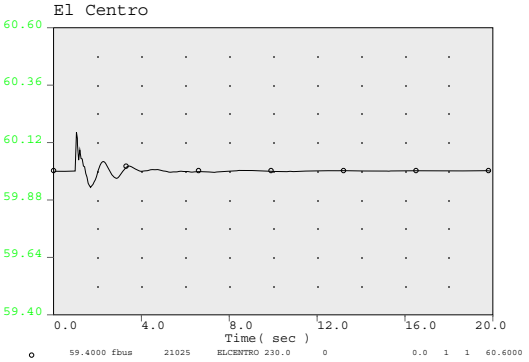
ROA-230kV



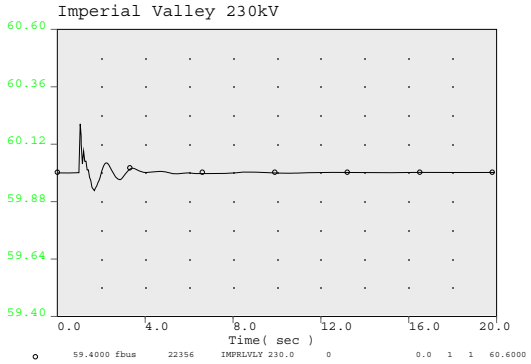
TJ1-230kV



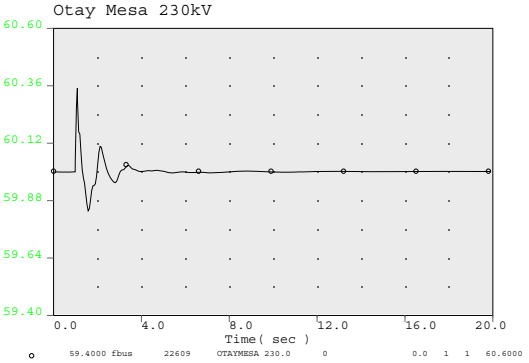
El Centro



Imperial Valley 230kV



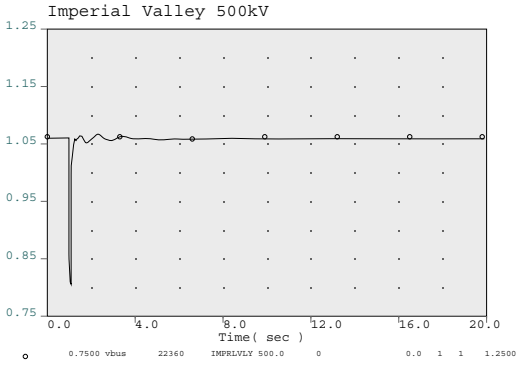
Otay Mesa 230kV



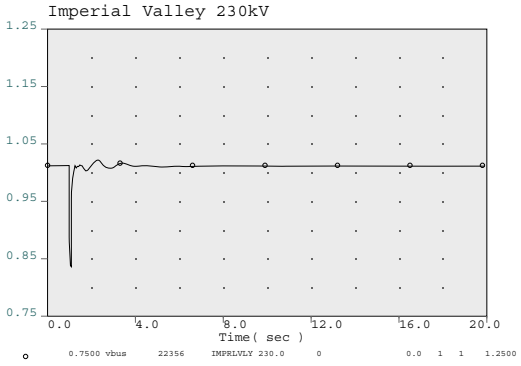
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Southbay - Mission 230 kV N-1

Imperial Valley Area - VOLTAGE

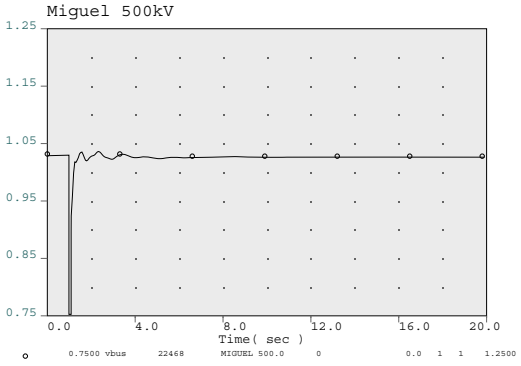
Imperial Valley 500kV



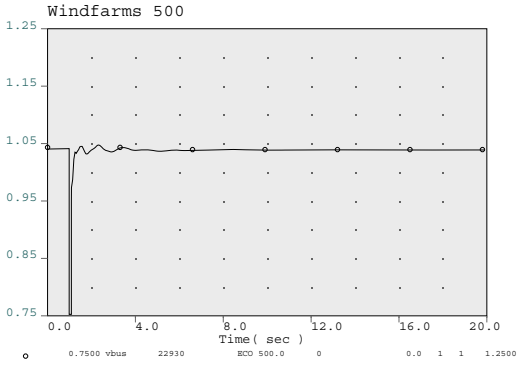
Imperial Valley 230kV



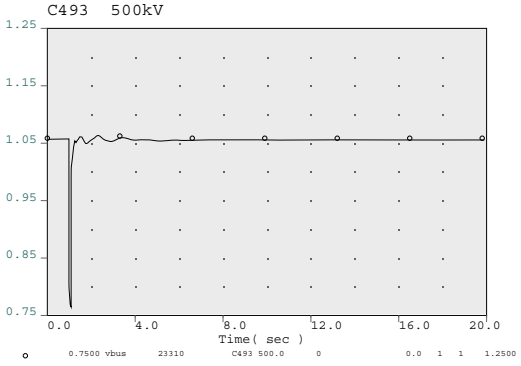
Miguel 500kV



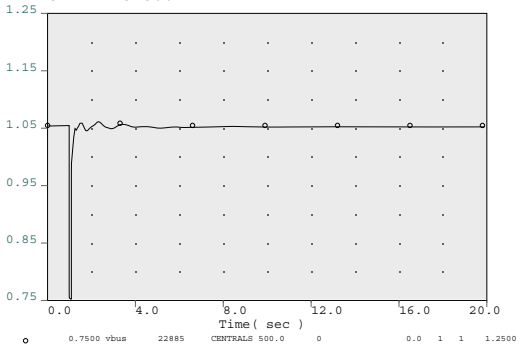
Windfarms 500



C493 500kV



CENTRALS 500kV

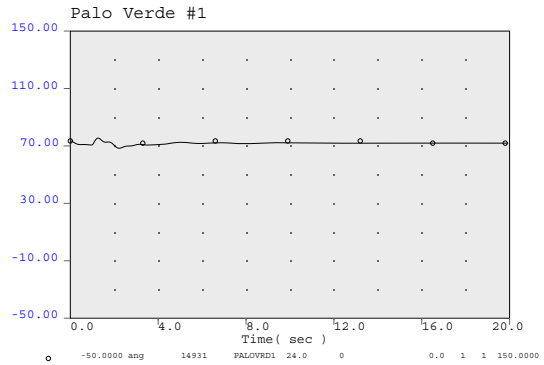


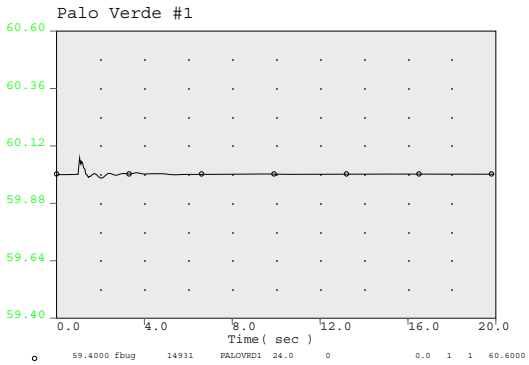
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Southbay - Mission 230 kV N-1

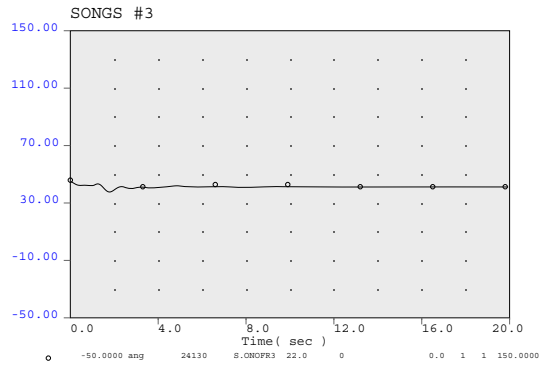
Imperial Valley Area - Frequency

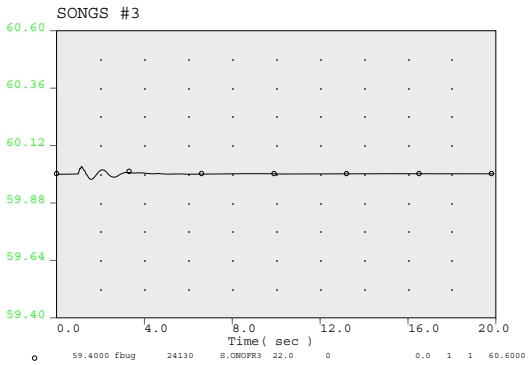
SDG&E Cluster 2 - pst int
2014 Heavy Summer
Southbay - Mission 230 kV N-1

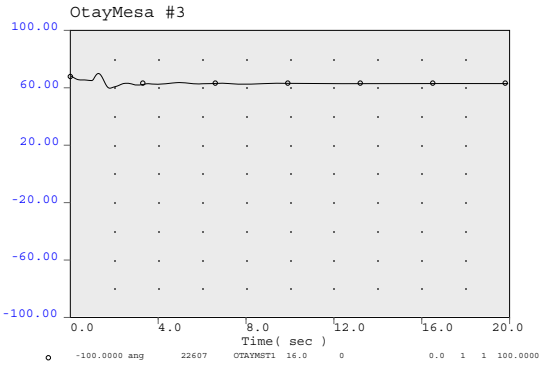
RELATIVE ROTOR ANGLE & FREQUENCY

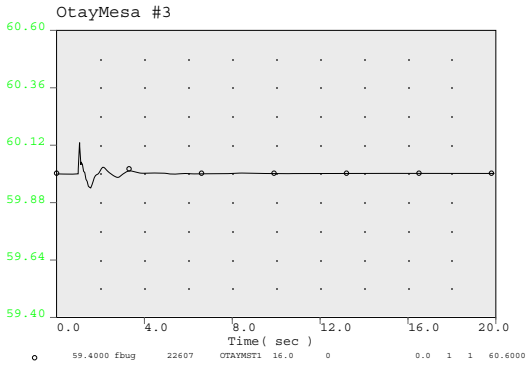












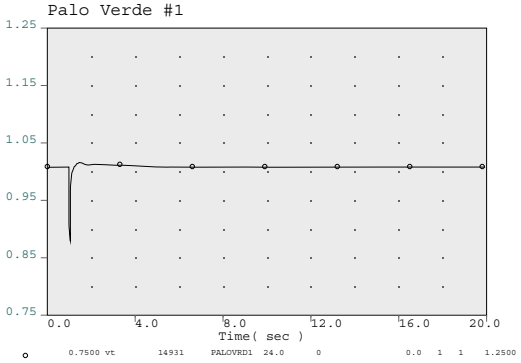
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Page 1

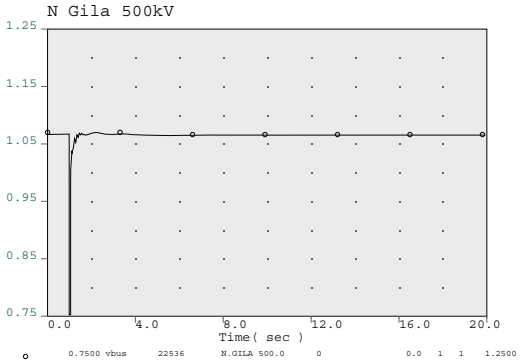
SDGE	IV_C493_slo_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:41:24 2010

RELATIVE VOLTAGE

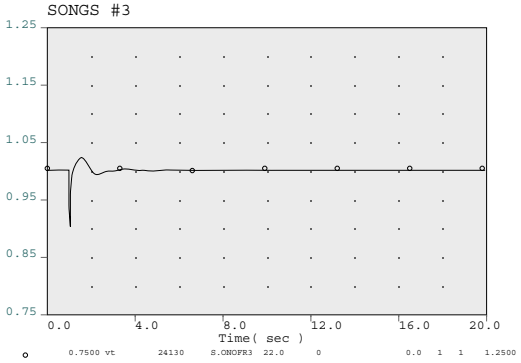
Palo Verde #1



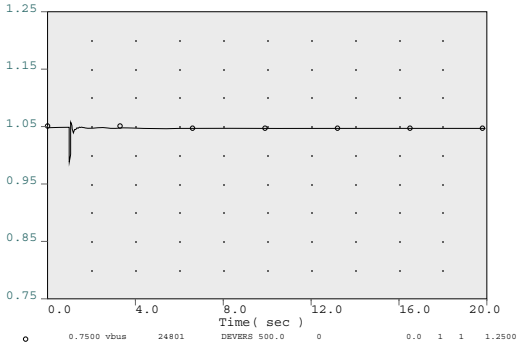
N Gila 500kV



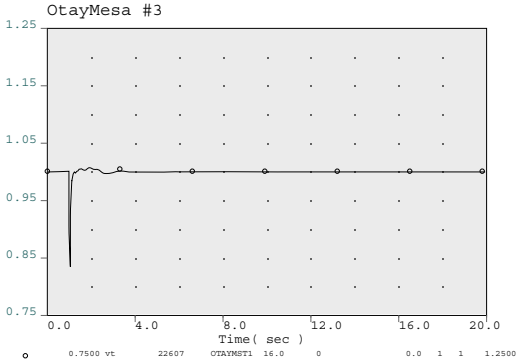
SONGS #3



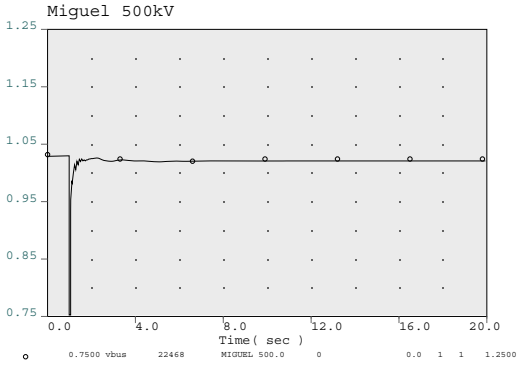
Devers 500



OtayMesa #3



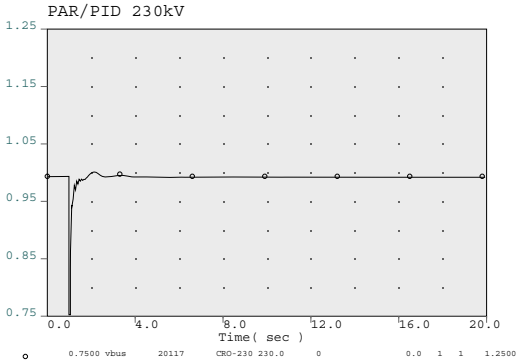
Miguel 500kV



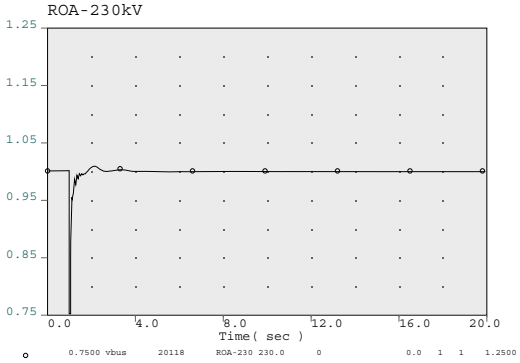
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

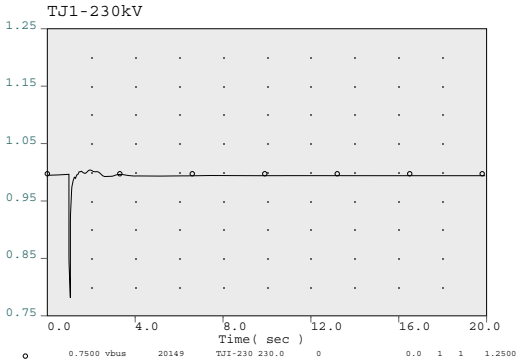
PAR/PID 230kV



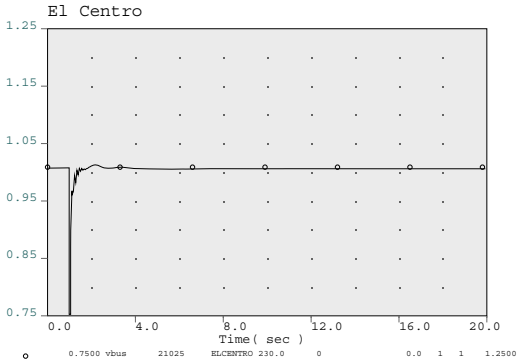
ROA-230kV



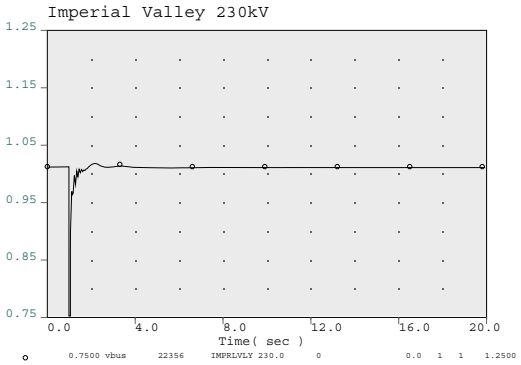
TJ1-230kV



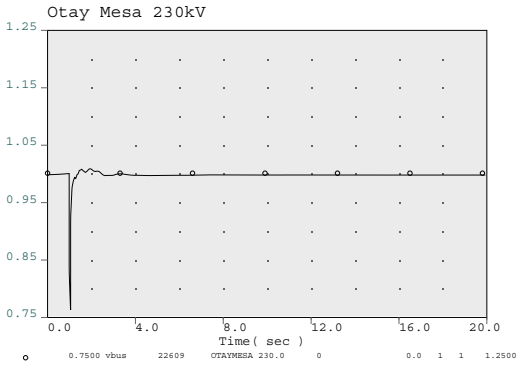
El Centro



Imperial Valley 230kV



Otay Mesa 230kV

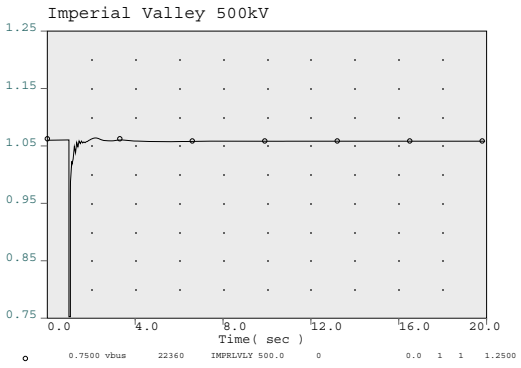


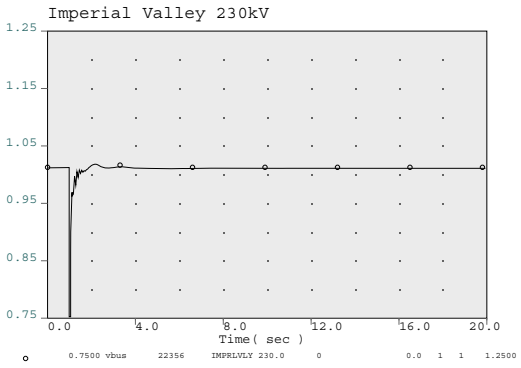
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

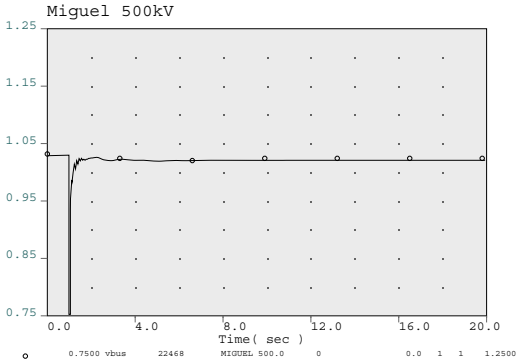
Affected System Frequency Check and Comparison

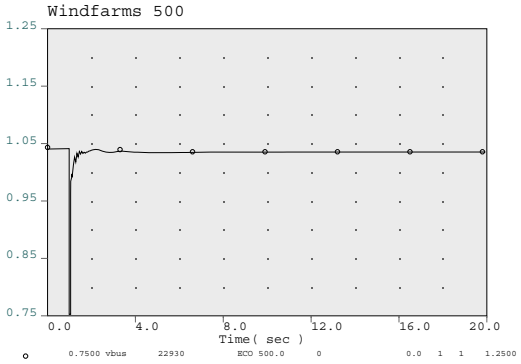
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

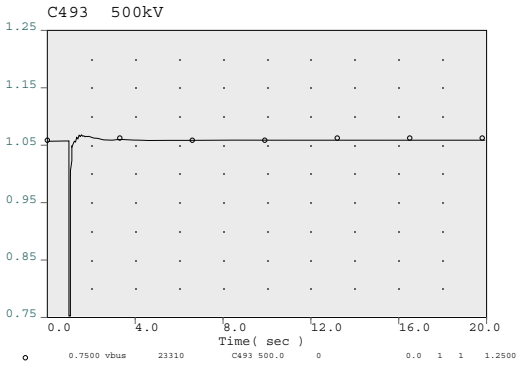
Imperial Valley Area - VOLTAGE

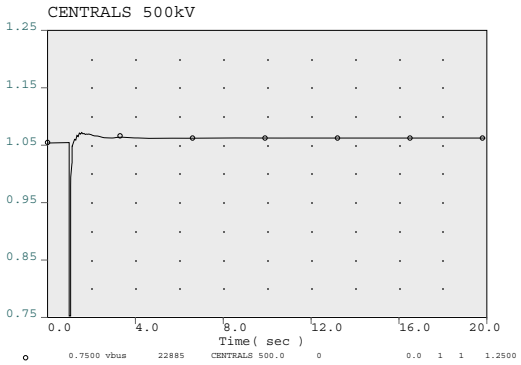










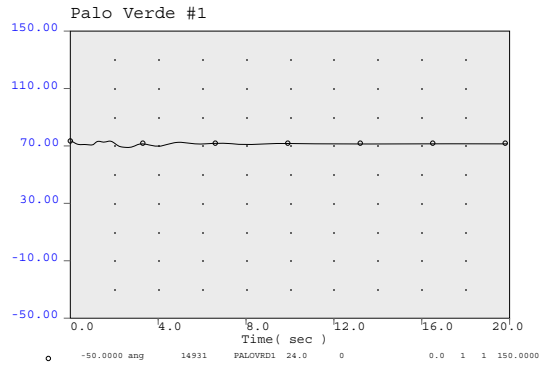


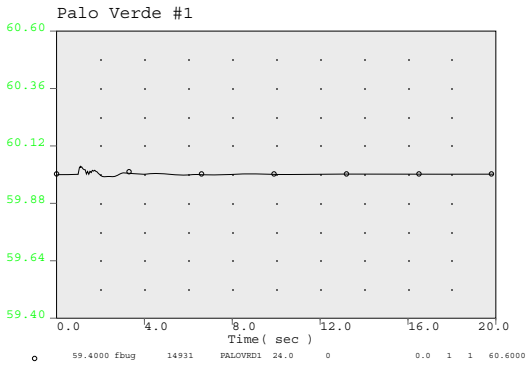
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

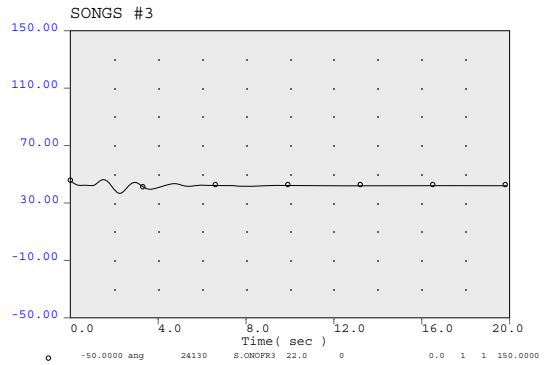
Imperial Valley Area - Frequency

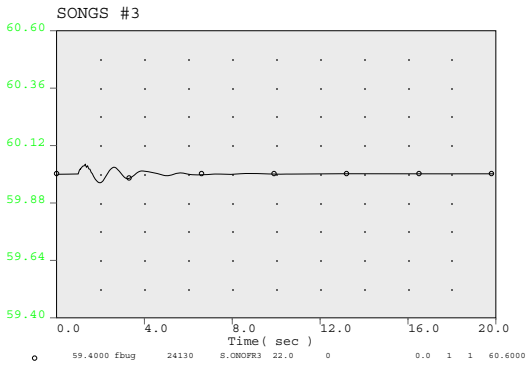
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley- C493 500kV line1

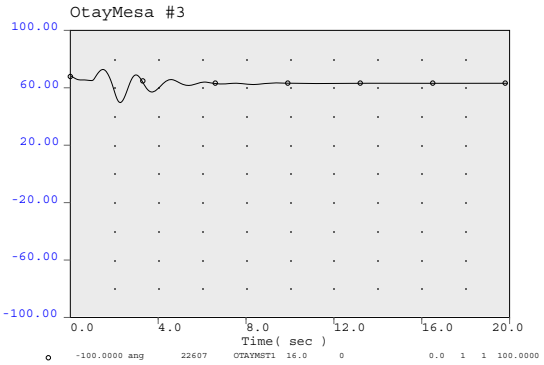
RELATIVE ROTOR ANGLE & FREQUENCY

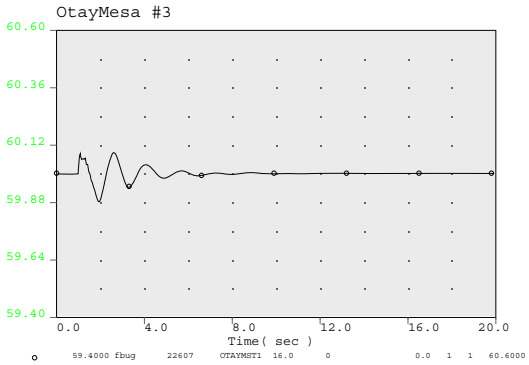










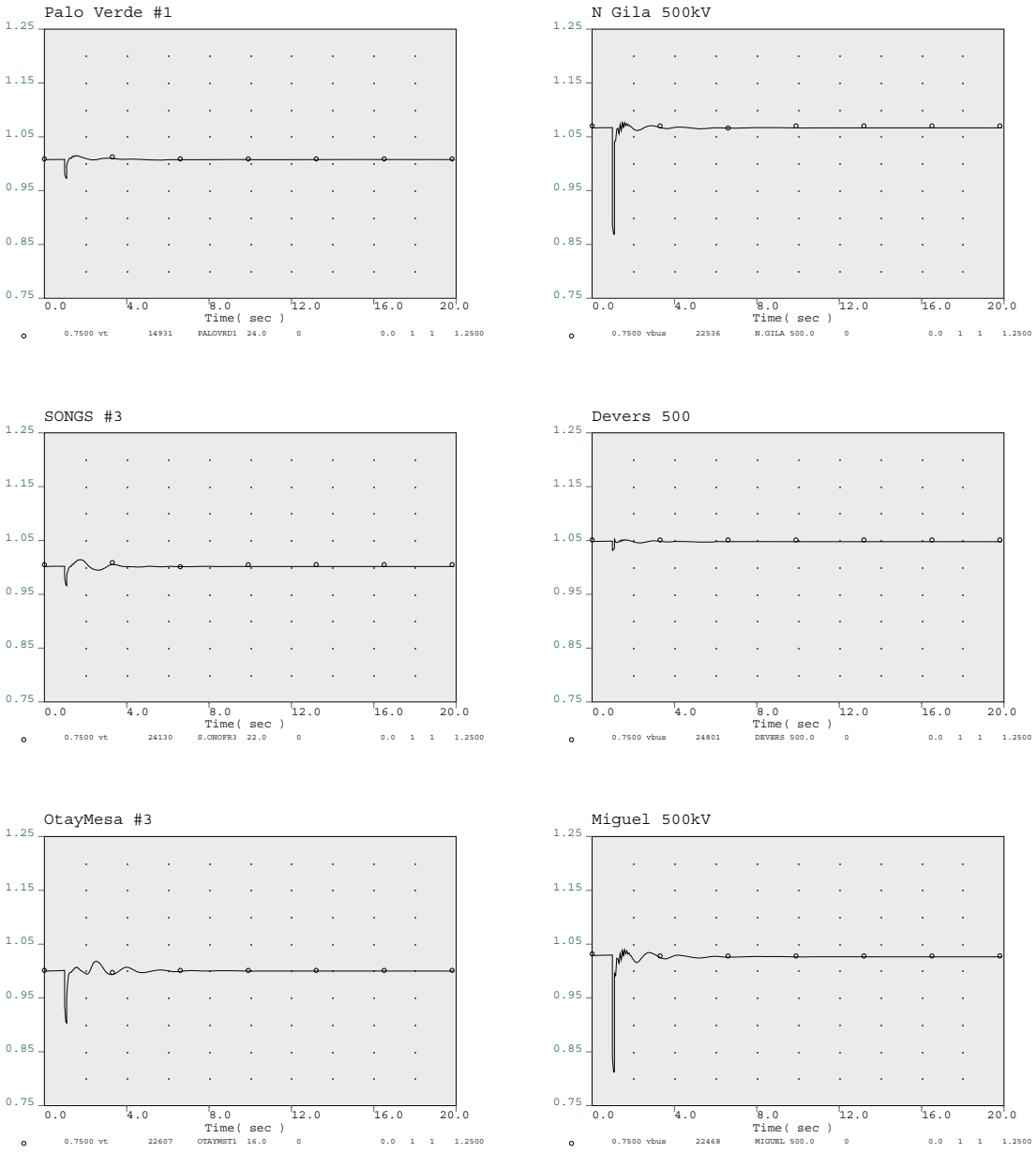


SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Page 1

SDGE	IV_ROA_6_slo_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:41:55 2010

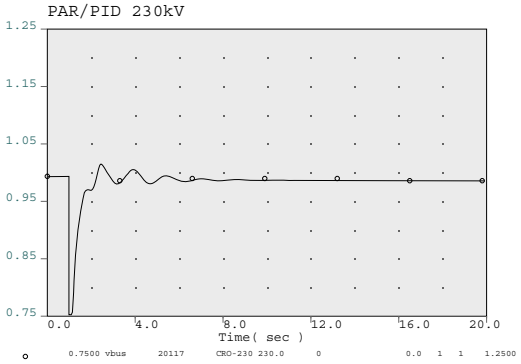
RELATIVE VOLTAGE



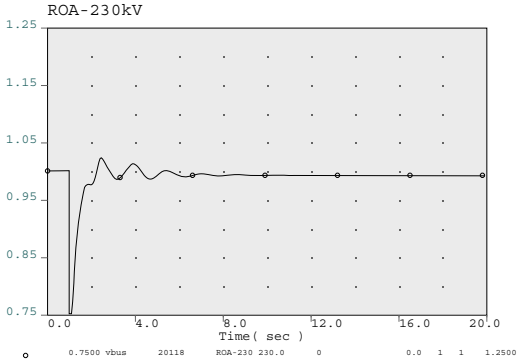
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

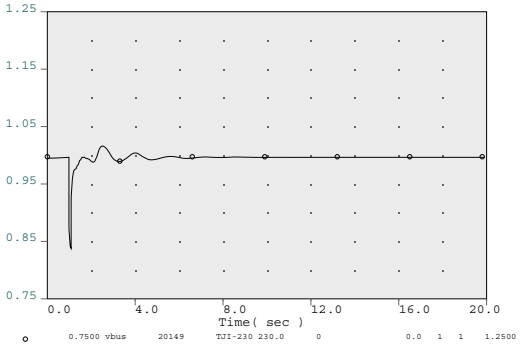
PAR/PID 230kV



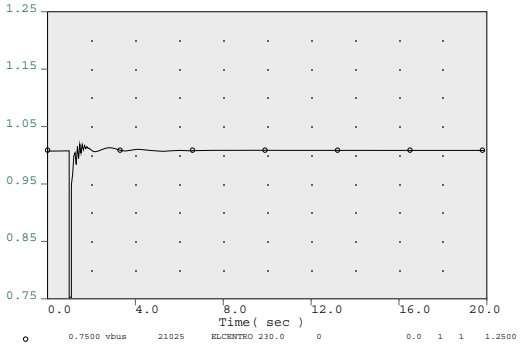
ROA-230kV



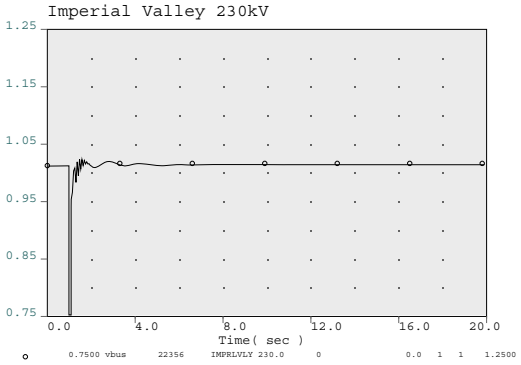
TJ1-230kV



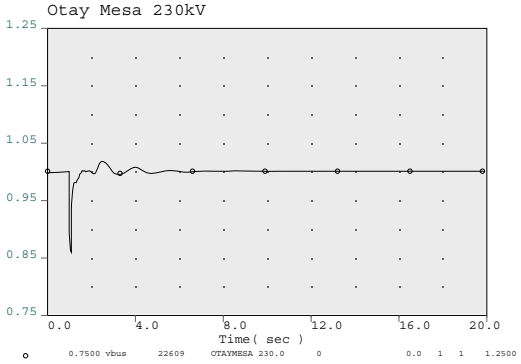
El Centro



Imperial Valley 230kV



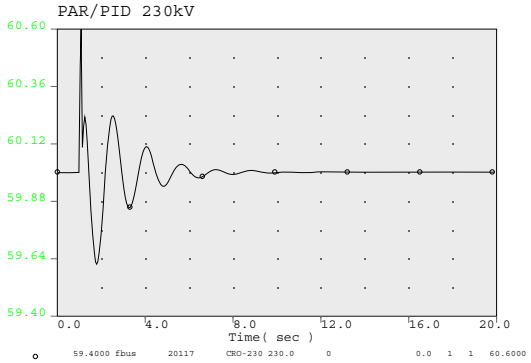
Otay Mesa 230kV



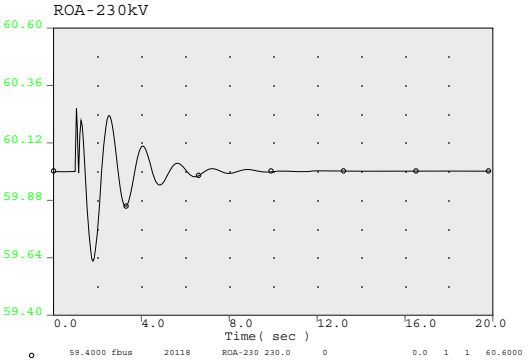
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Frequency Check and Comparison

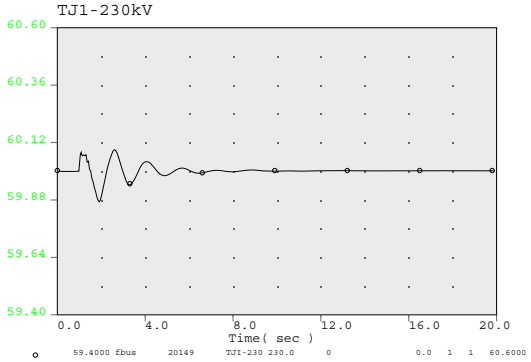
PAR/PID 230kV



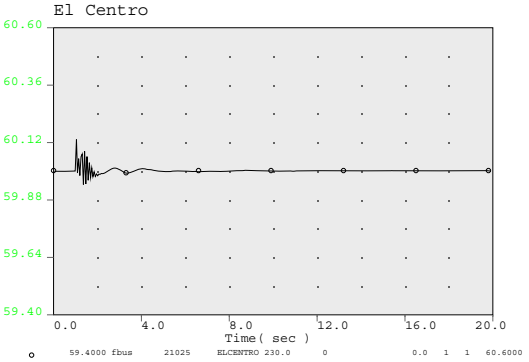
ROA-230kV



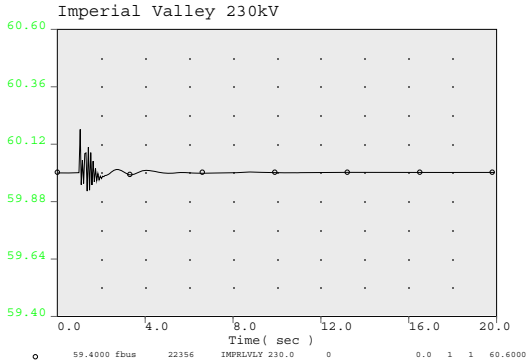
TJ1-230kV



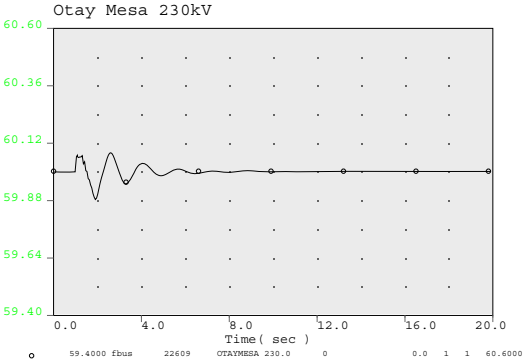
El Centro



Imperial Valley 230kV

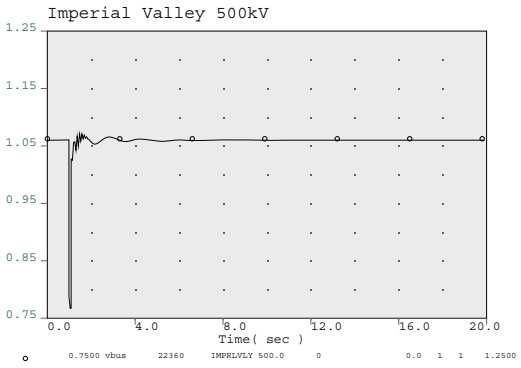


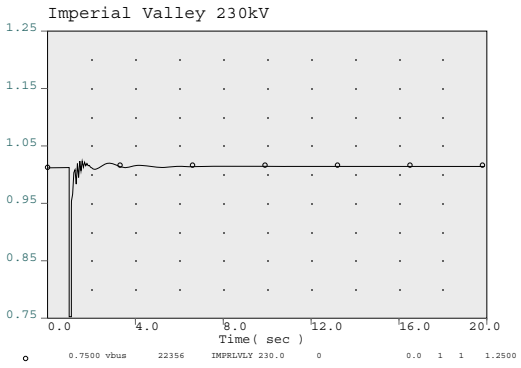
Otay Mesa 230kV

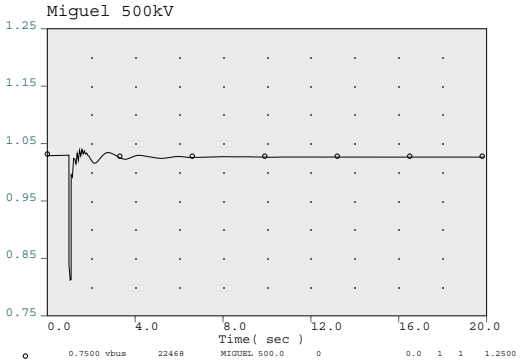


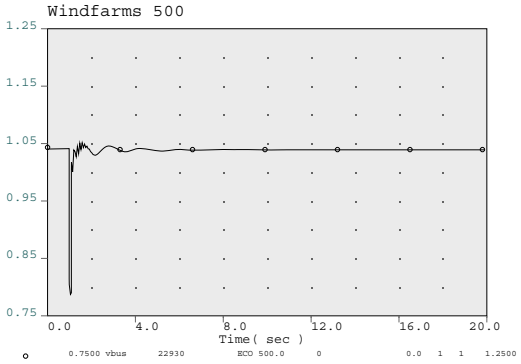
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

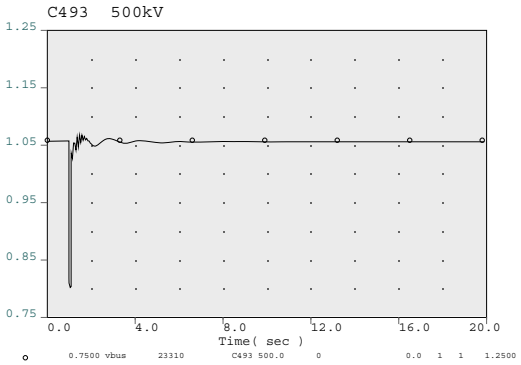
Imperial Valley Area - VOLTAGE

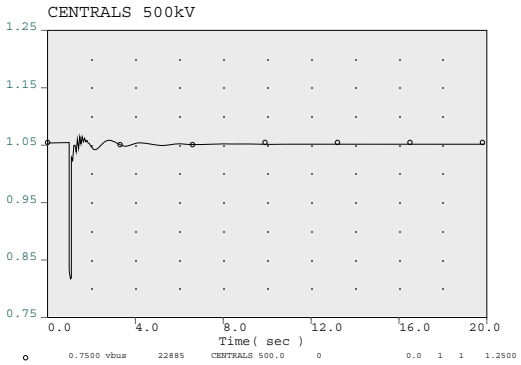








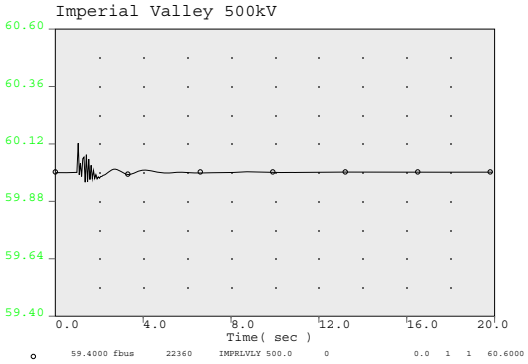




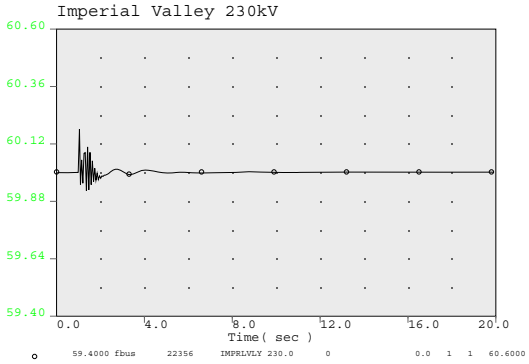
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - Frequency

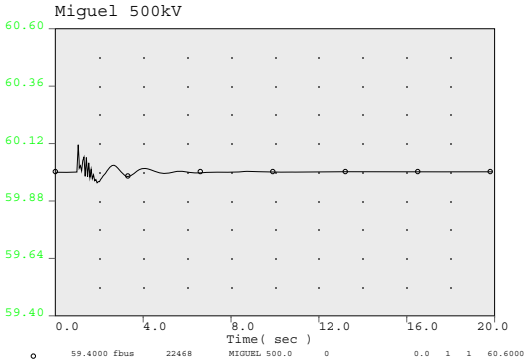
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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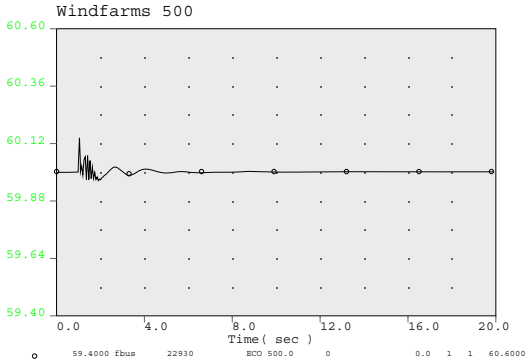
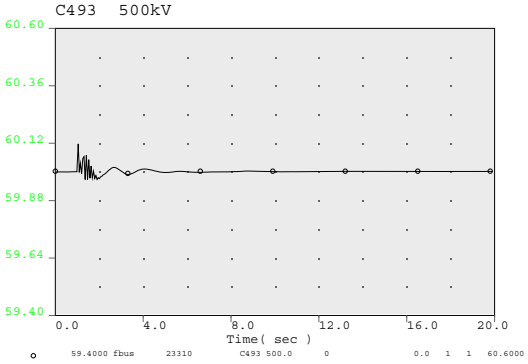
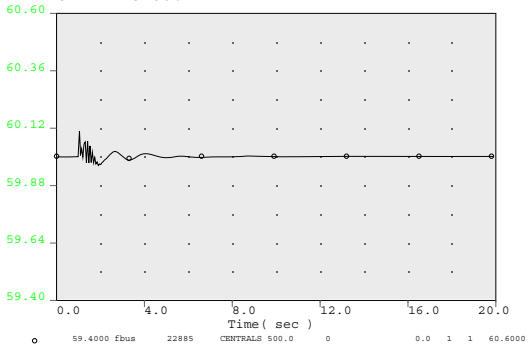


C493 500kV

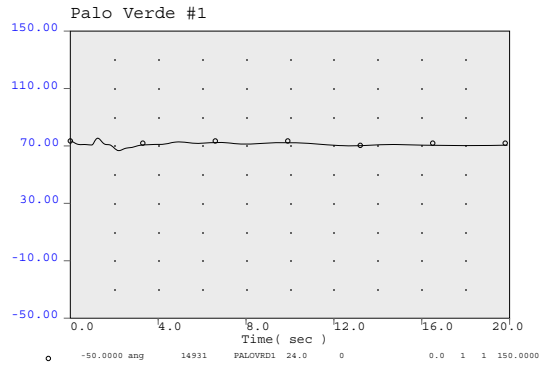


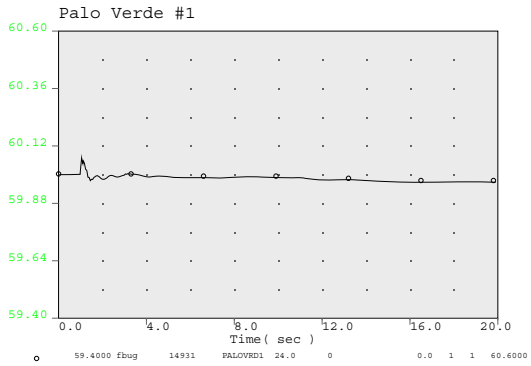
CENTRALS 500kV

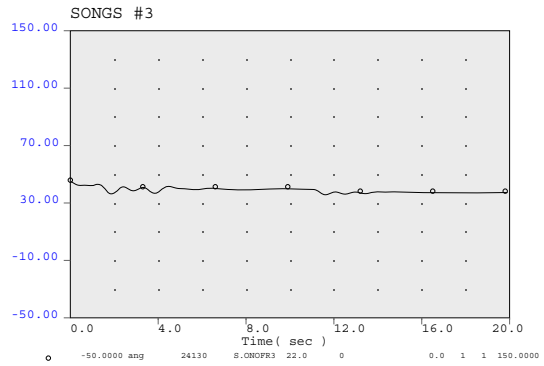


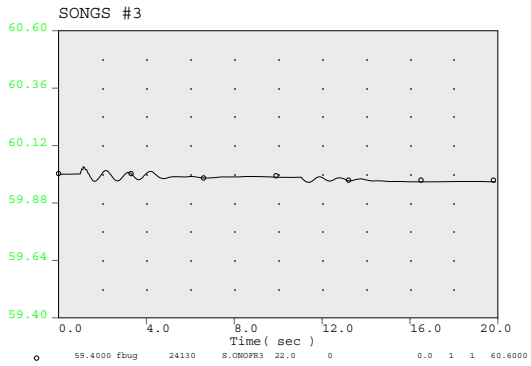
SDG&E Cluster 2 - post
2014 Heavy Summer
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

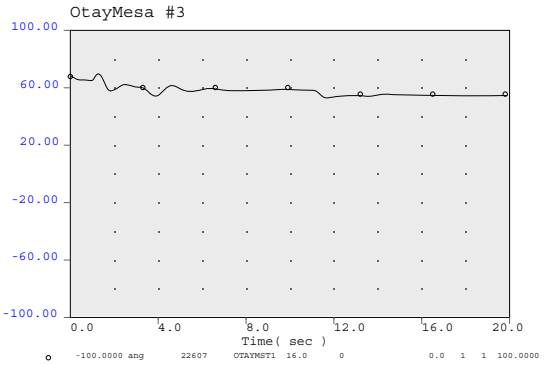
RELATIVE ROTOR ANGLE & FREQUENCY

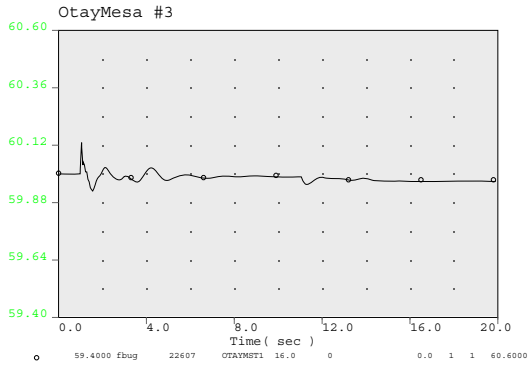












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

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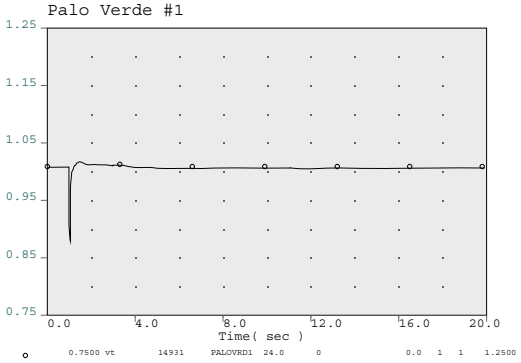
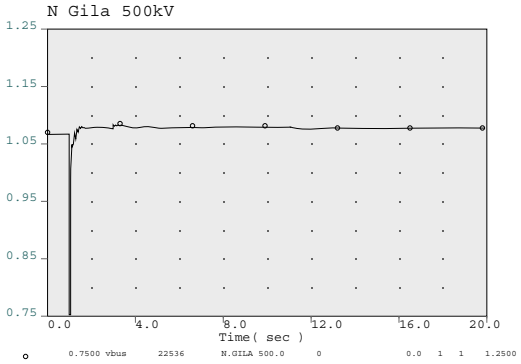
RELATIVE VOLTAGE

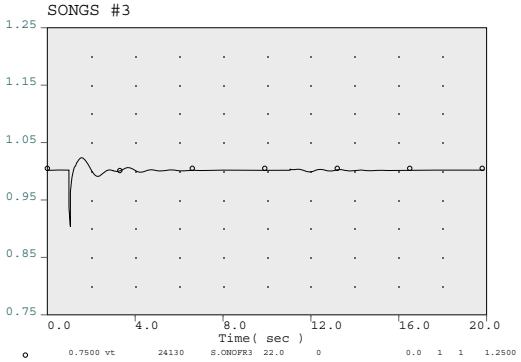
Palo Verde #1



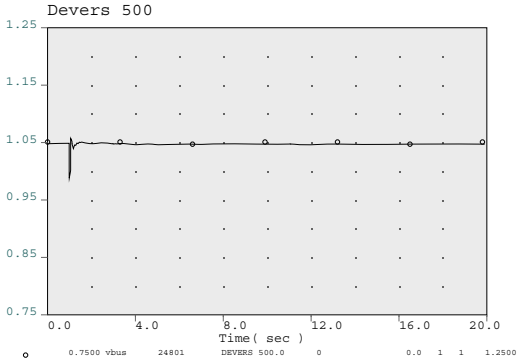
N Gila 500kV



SONGS #3



Devers 500



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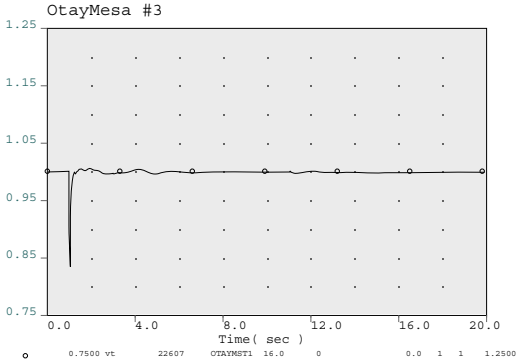
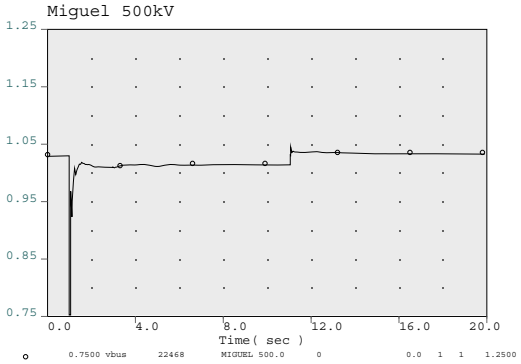


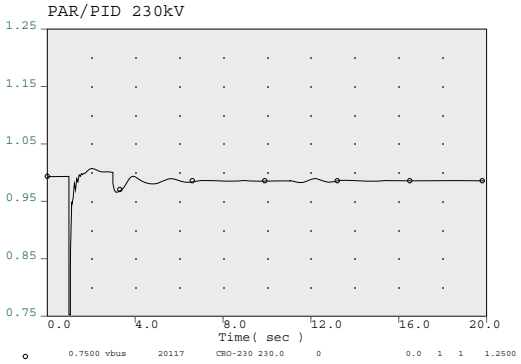
Miguel 500kV



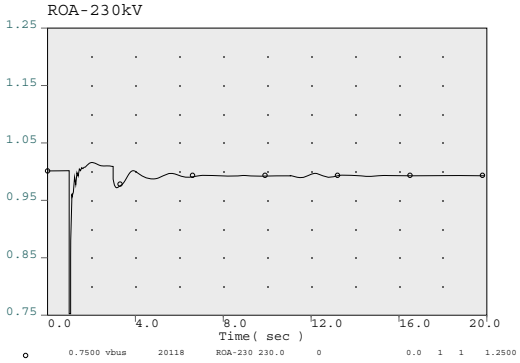
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

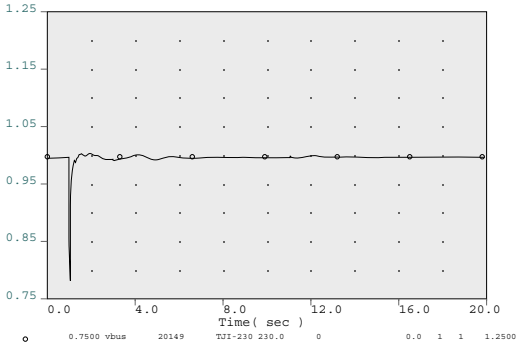
PAR/PID 230kV



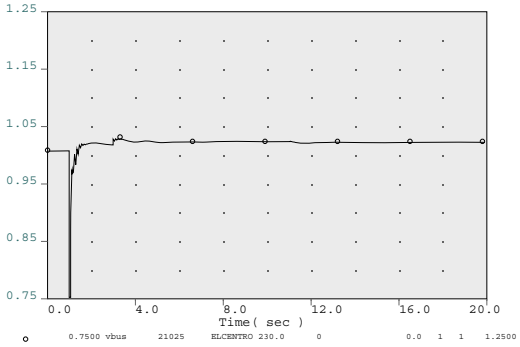
ROA-230kV



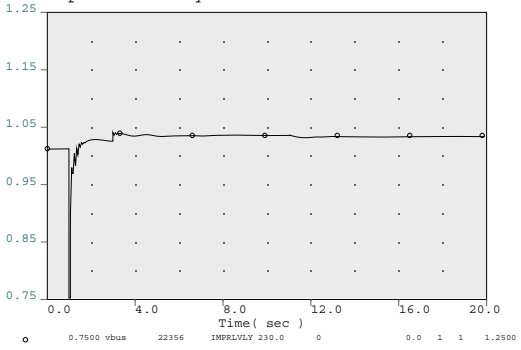
TJ1-230kV



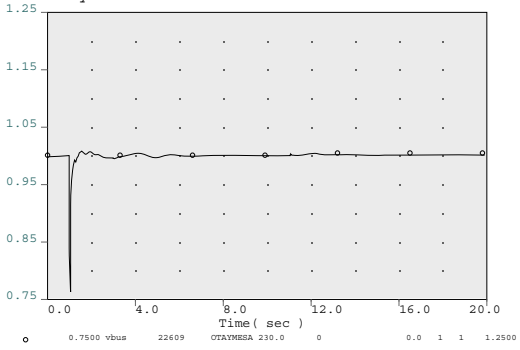
El Centro



Imperial Valley 230kV



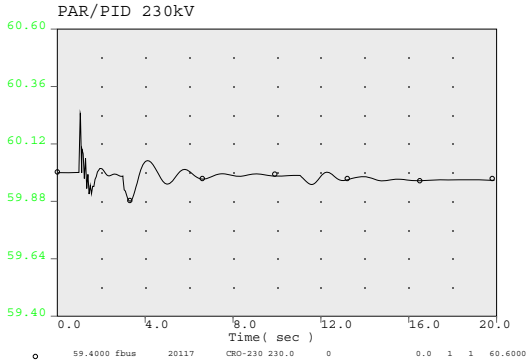
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

PAR/PID 230kV



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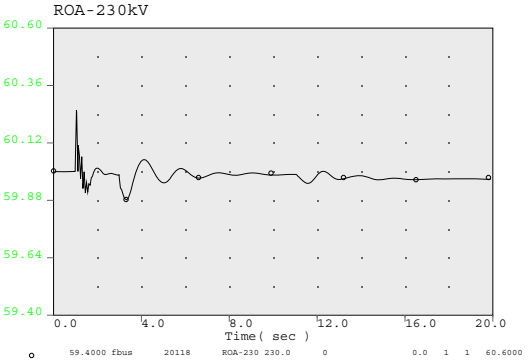
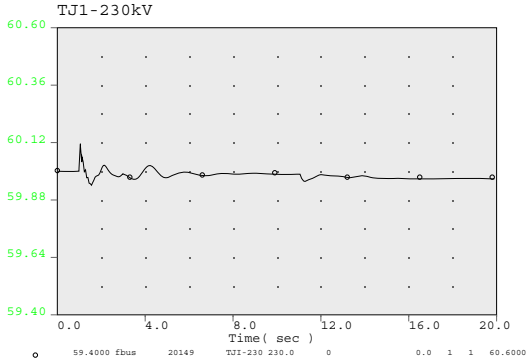
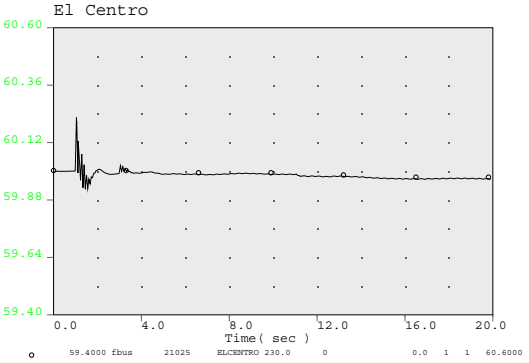


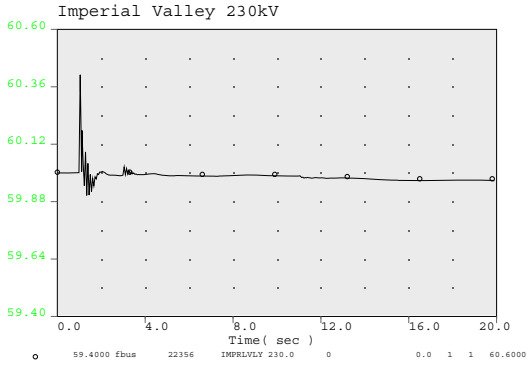
TJ1-230kV



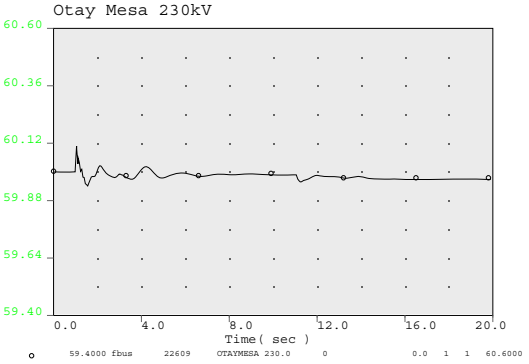
El Centro



Imperial Valley 230kV



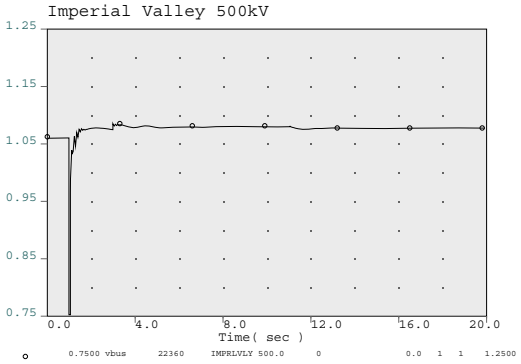
Otay Mesa 230kV



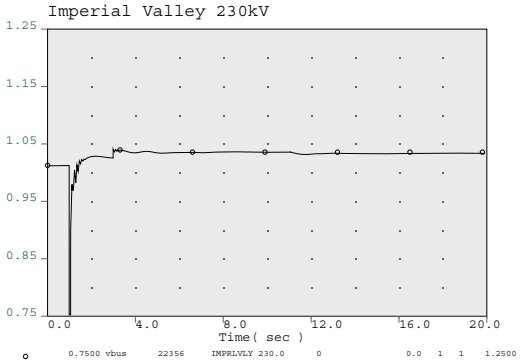
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

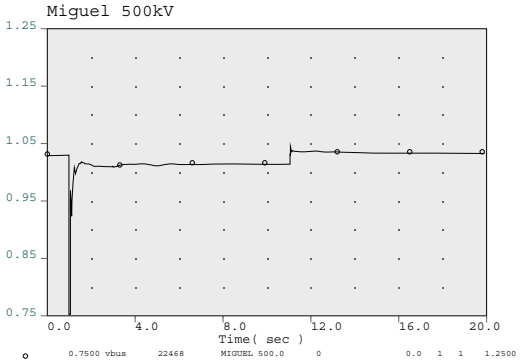
Imperial Valley 500kV



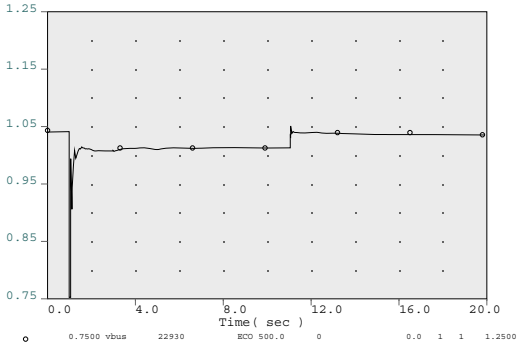
Imperial Valley 230kV



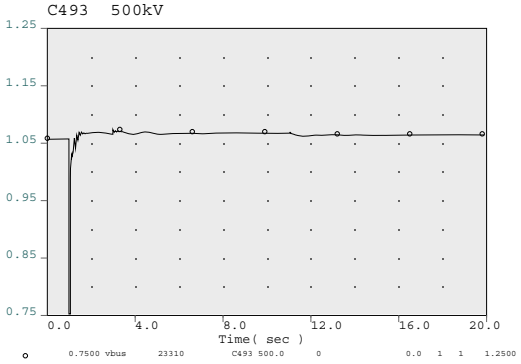
Miguel 500kV



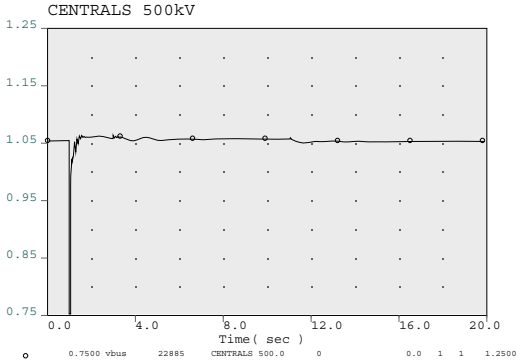
Windfarms 500



C493 500kV



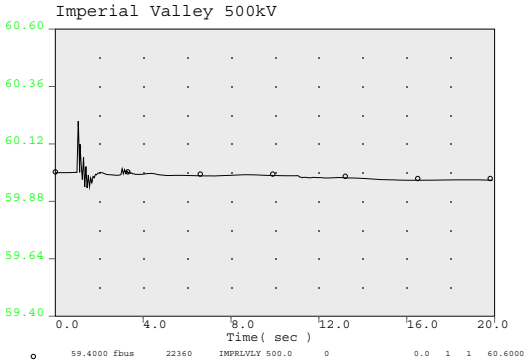
CENTRALS 500kV



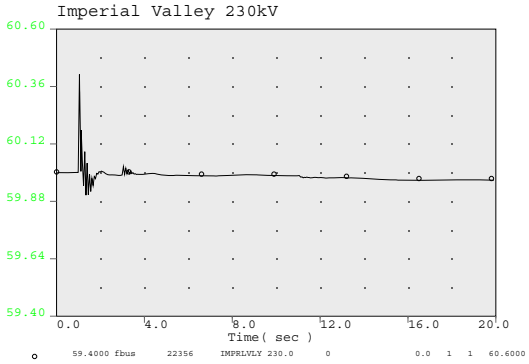
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - Frequency

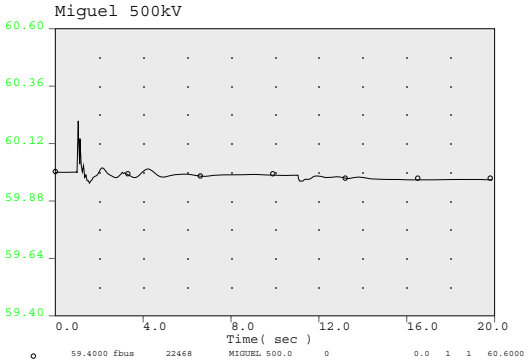
Imperial Valley 500kV



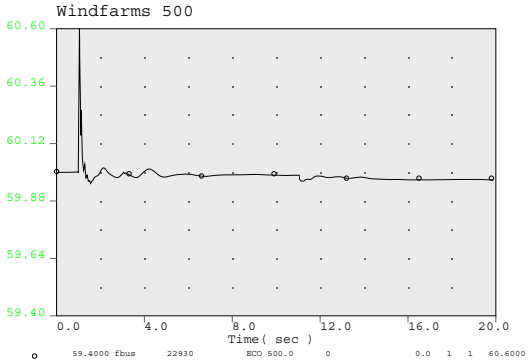
Imperial Valley 230kV



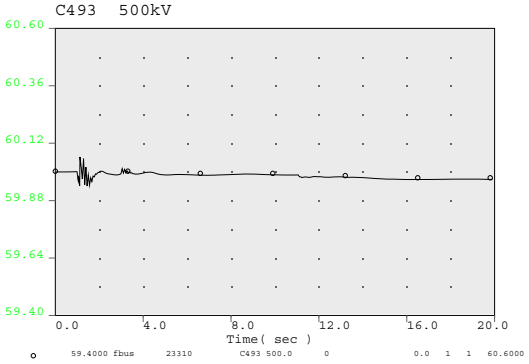
Miguel 500kV



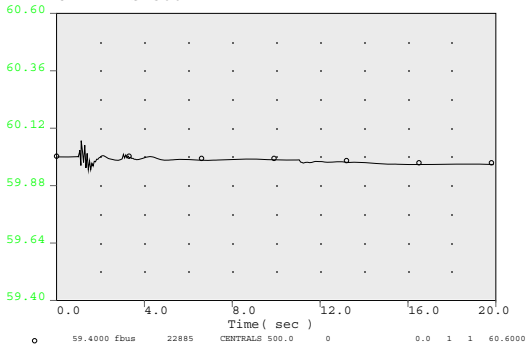
Windfarms 500



C493 500kV

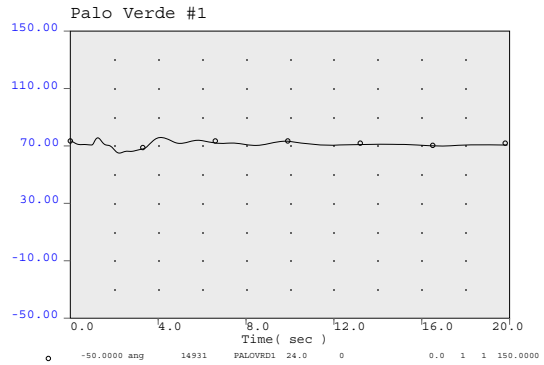


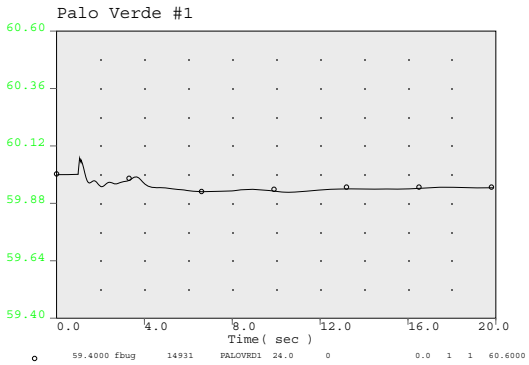
CENTRALS 500kV

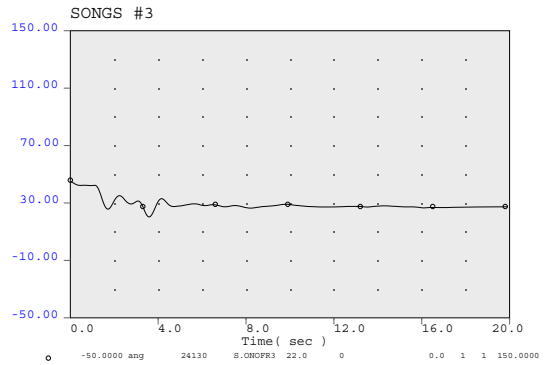


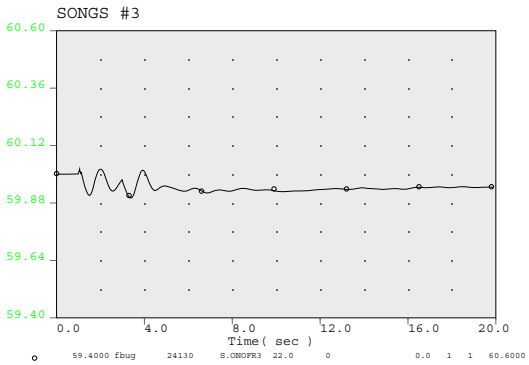
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-ECO 500 kV line1

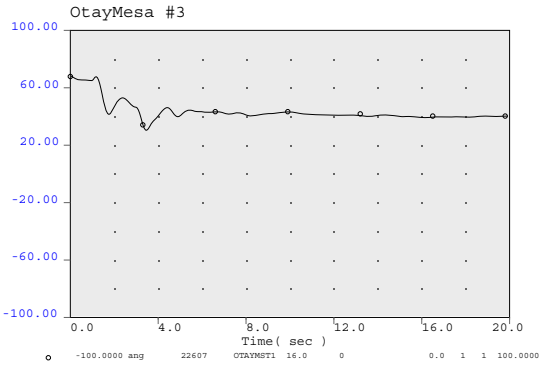
RELATIVE ROTOR ANGLE & FREQUENCY

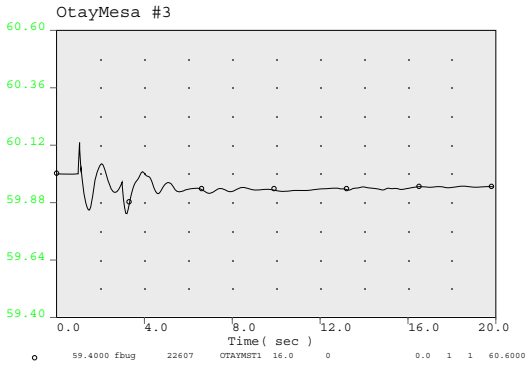












SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

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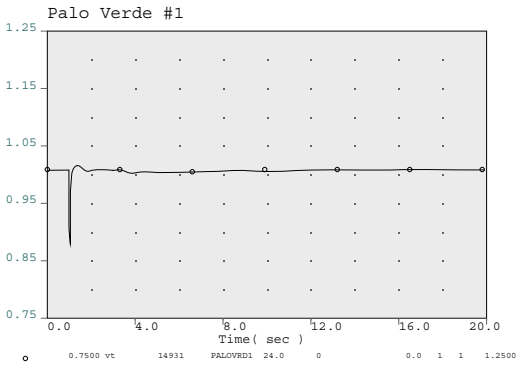
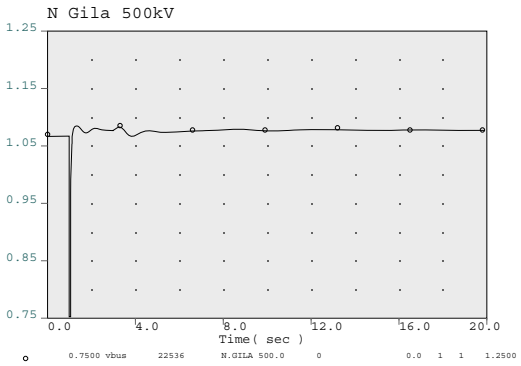
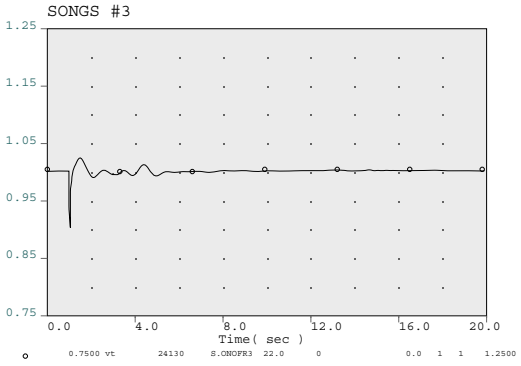
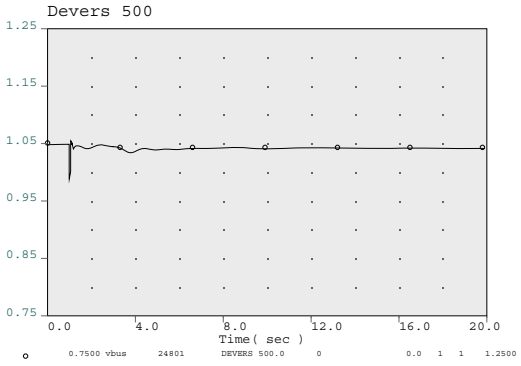
SDGE	IV_Wnd_dlo_RASxR1_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:42:59 2010

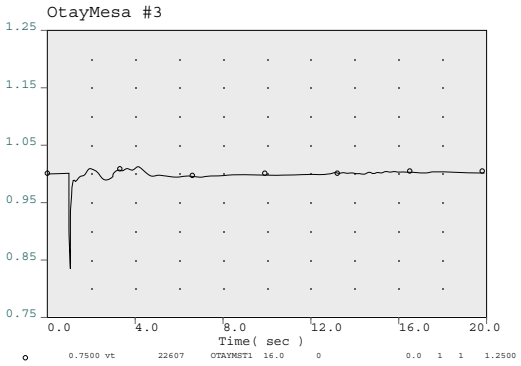
RELATIVE VOLTAGE

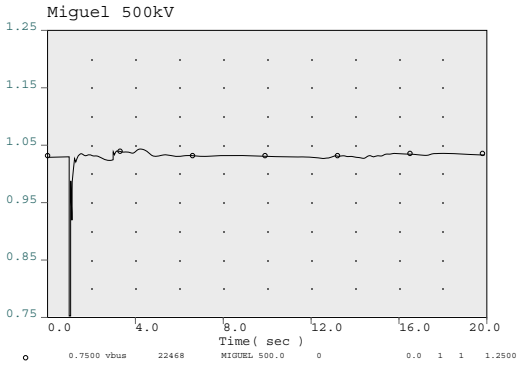








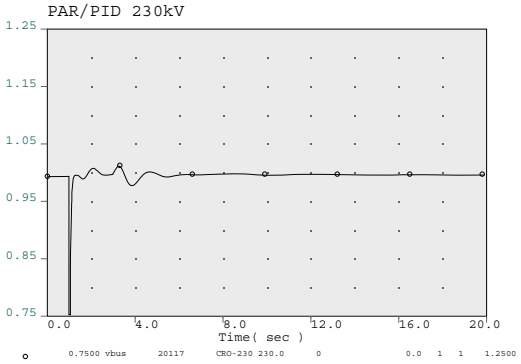




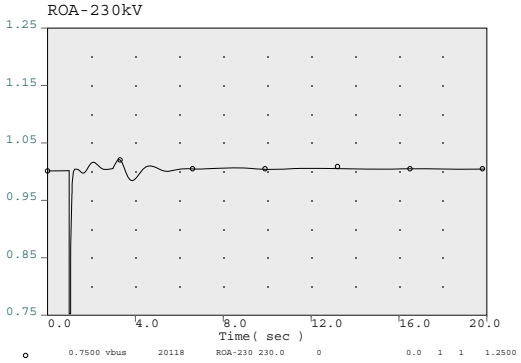
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

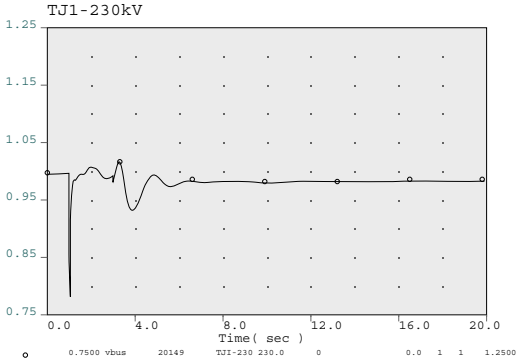
PAR/PID 230kV



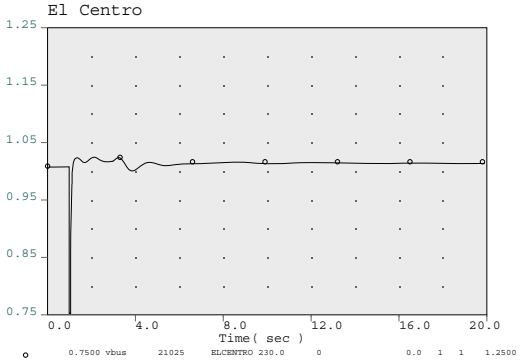
ROA-230kV



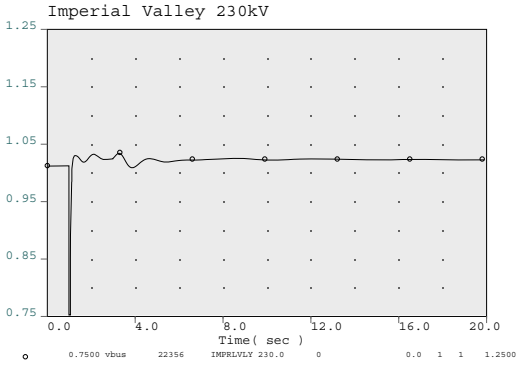
TJ1-230kV



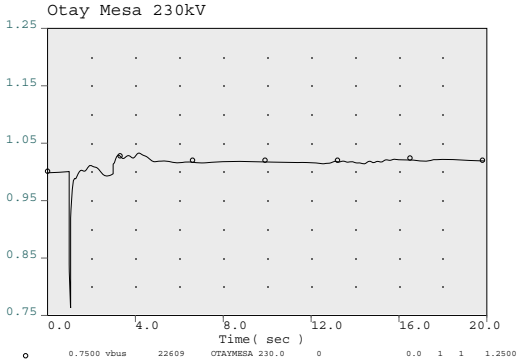
El Centro



Imperial Valley 230kV



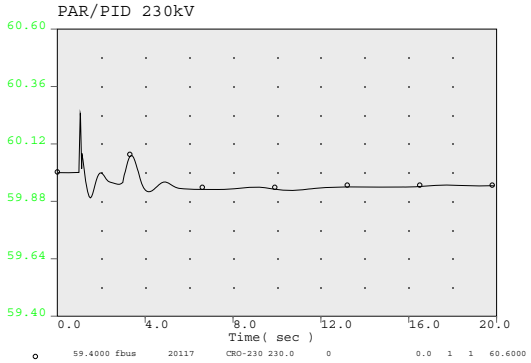
Otay Mesa 230kV



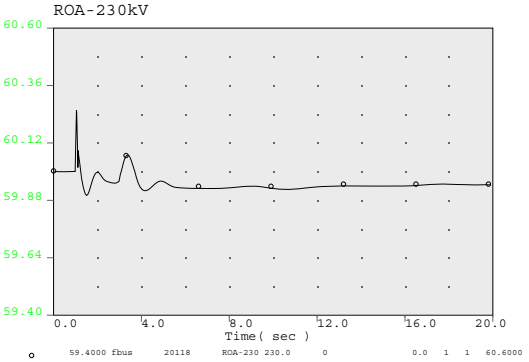
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison

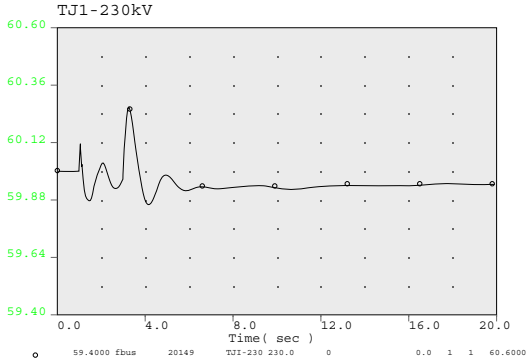
PAR/PID 230kV



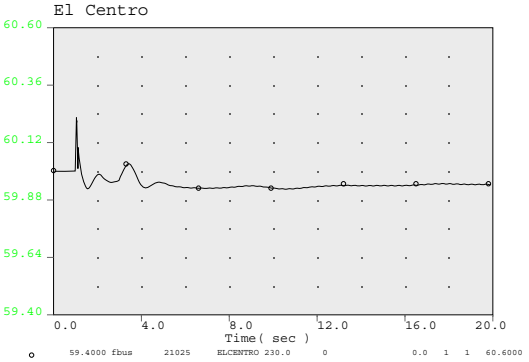
ROA-230kV



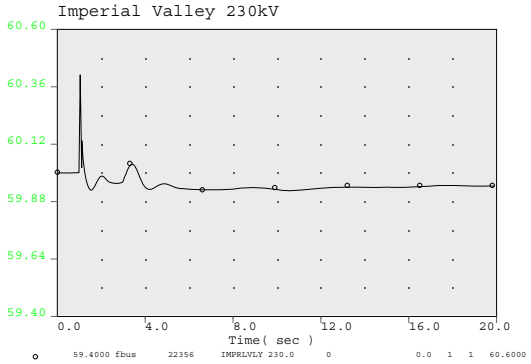
TJ1-230kV



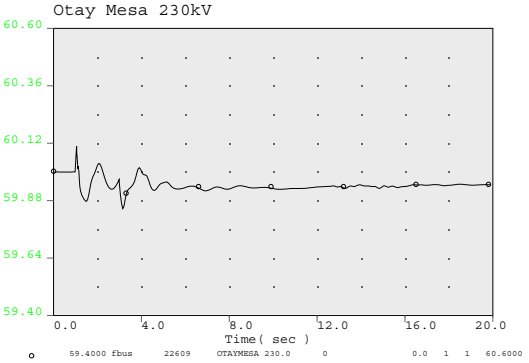
El Centro



Imperial Valley 230kV



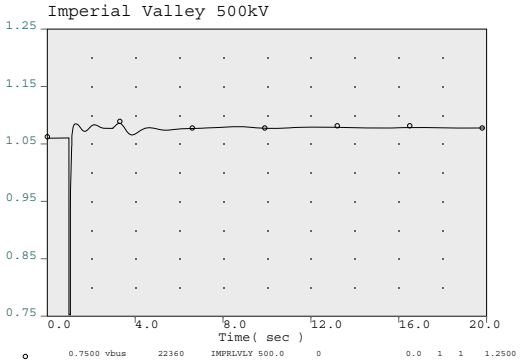
Otay Mesa 230kV



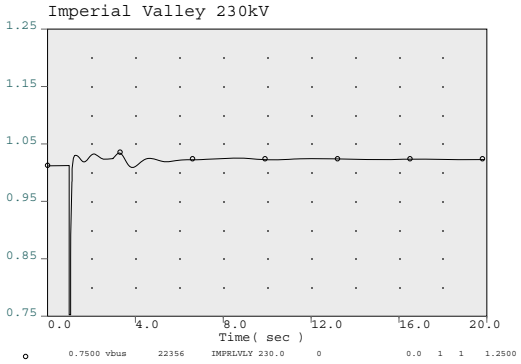
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Imperial Valley Area - VOLTAGE

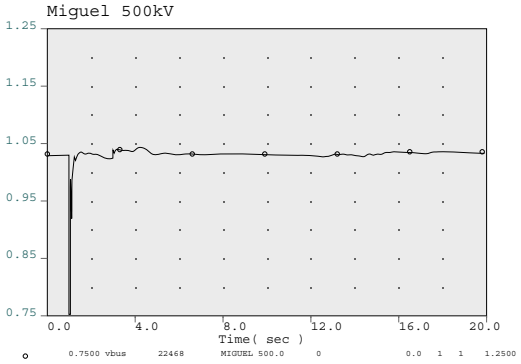
Imperial Valley 500kV



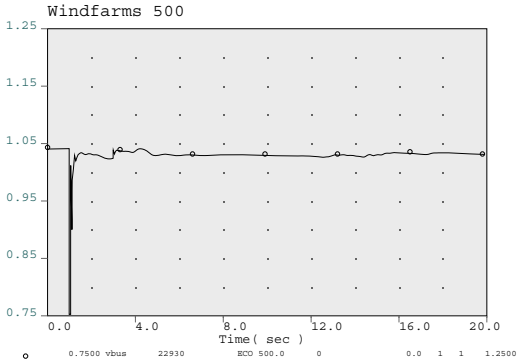
Imperial Valley 230kV



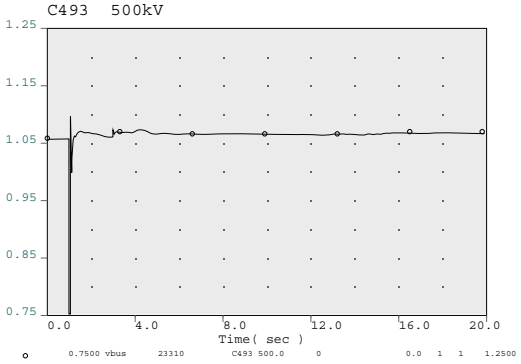
Miguel 500kV



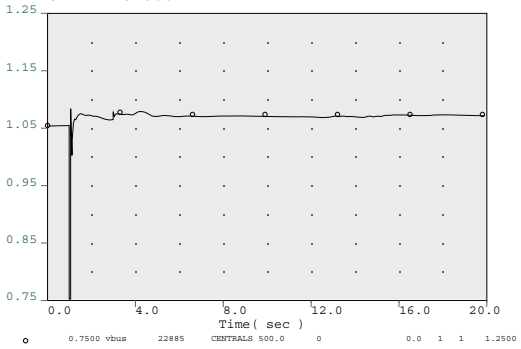
Windfarms 500



C493 500kV

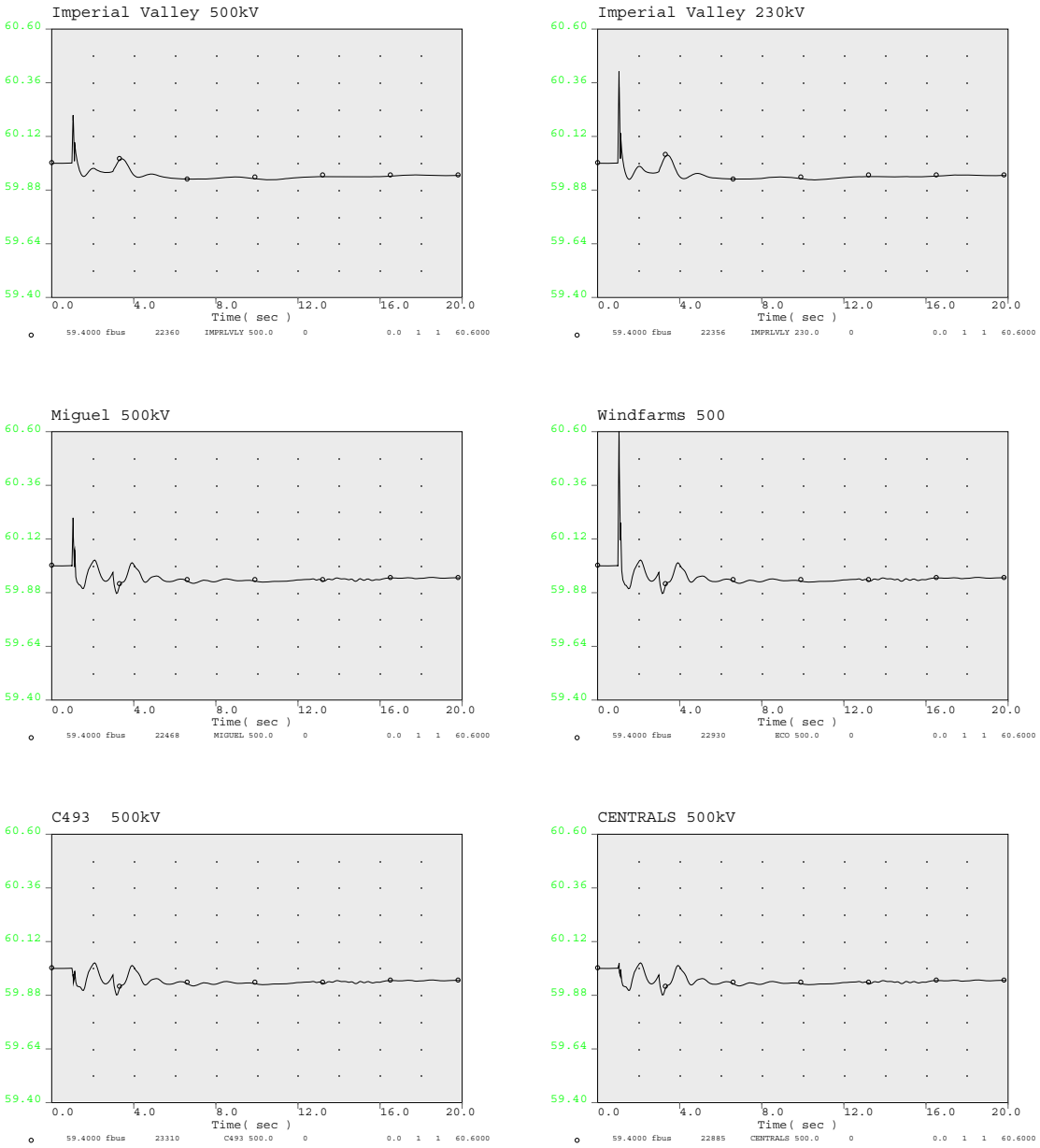


CENTRALS 500kV



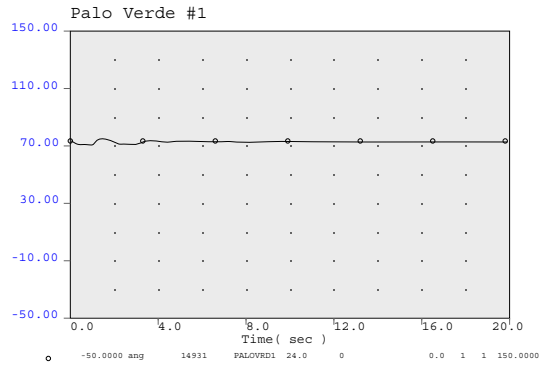
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

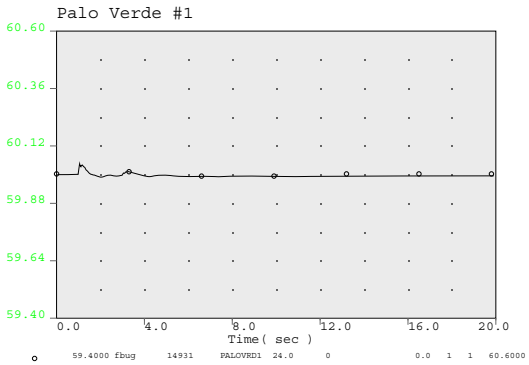
Imperial Valley Area - Frequency

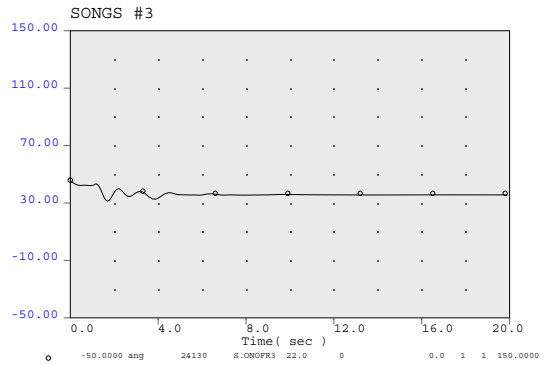


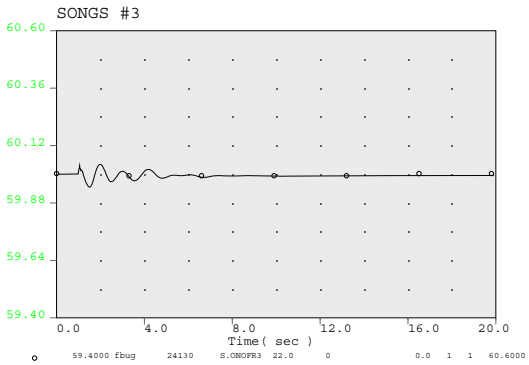
SDG&E Cluster 2 - post
2014 Heavy Summer
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

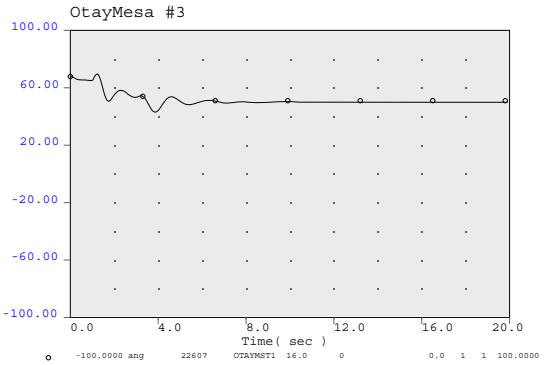
RELATIVE ROTOR ANGLE & FREQUENCY

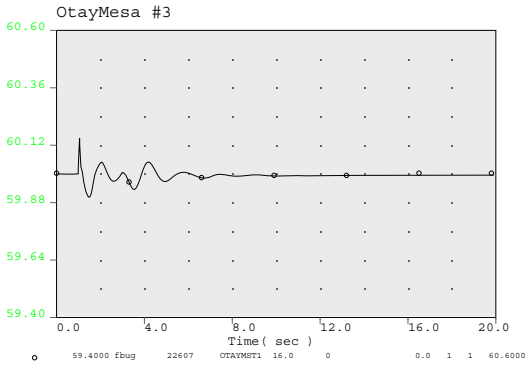












SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

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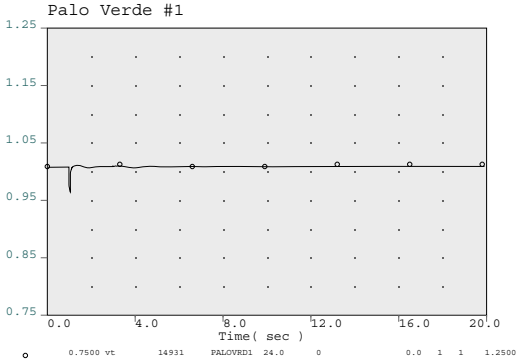
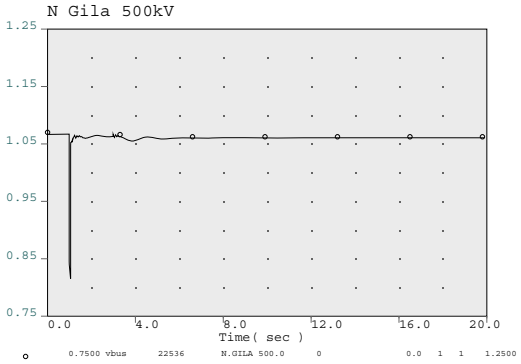
SDGE	ML_Wnd_RAS_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:43:33 2010

RELATIVE VOLTAGE

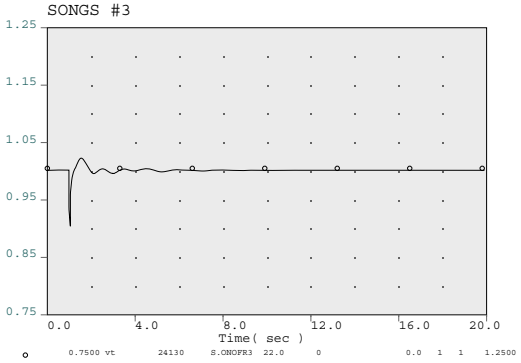
Palo Verde #1



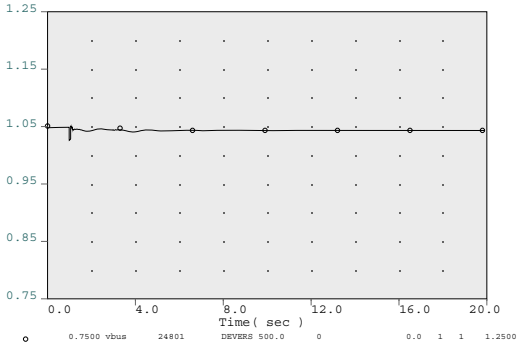
N Gila 500kV



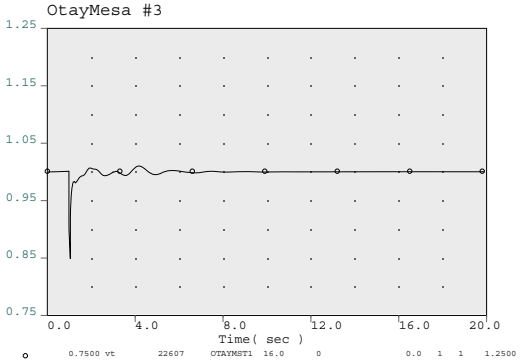
SONGS #3



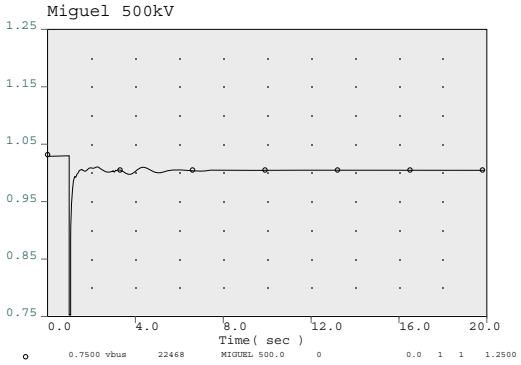
Devers 500



OtayMesa #3



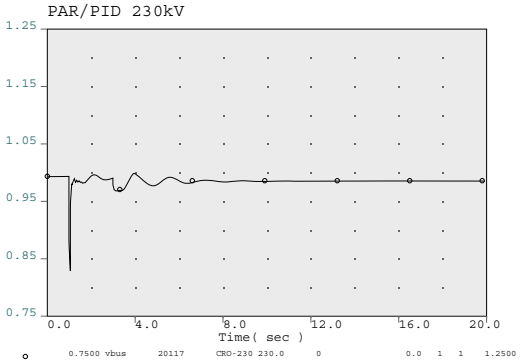
Miguel 500kV



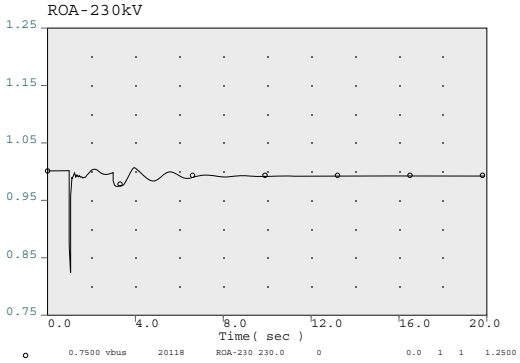
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

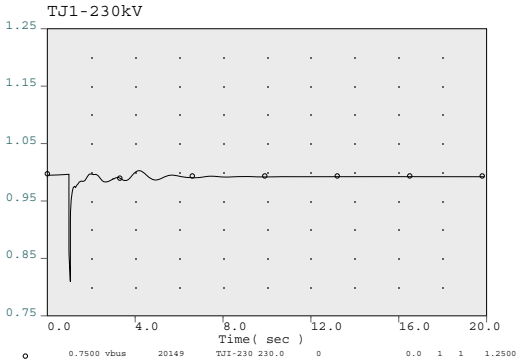
PAR/PID 230kV



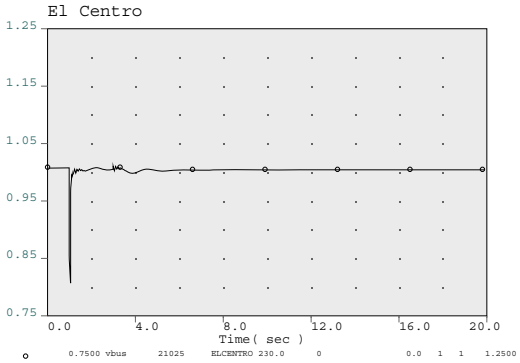
ROA-230kV



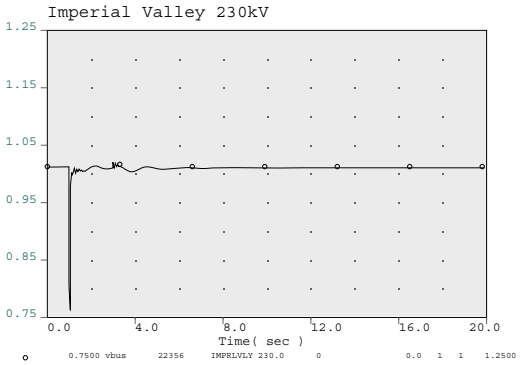
TJ1-230kV



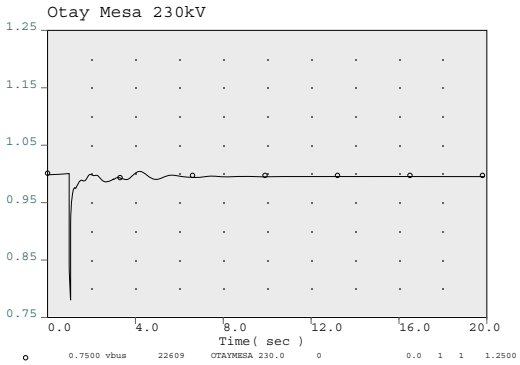
El Centro



Imperial Valley 230kV



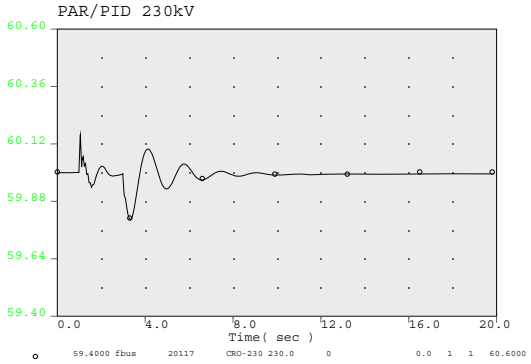
Otay Mesa 230kV



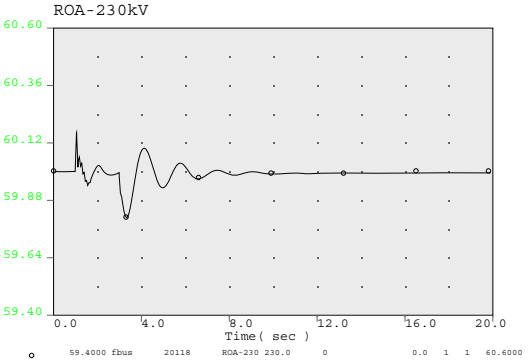
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

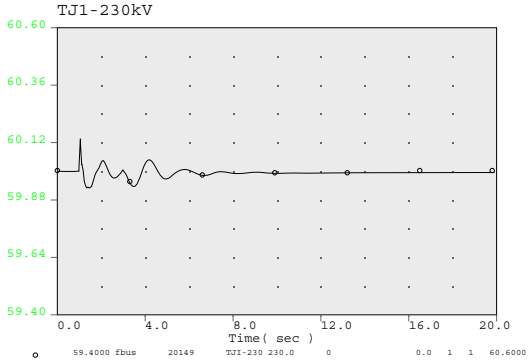
PAR/PID 230kV



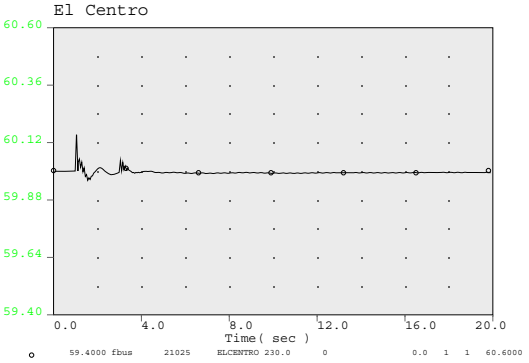
ROA-230kV



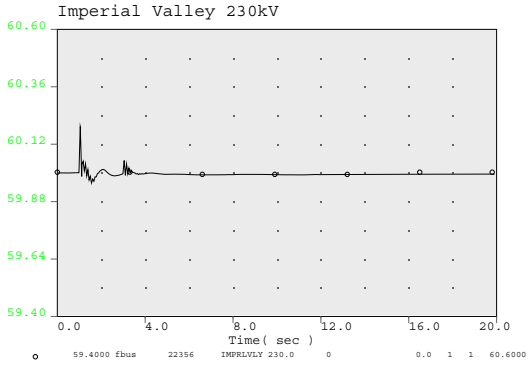
TJ1-230kV



El Centro



Imperial Valley 230kV



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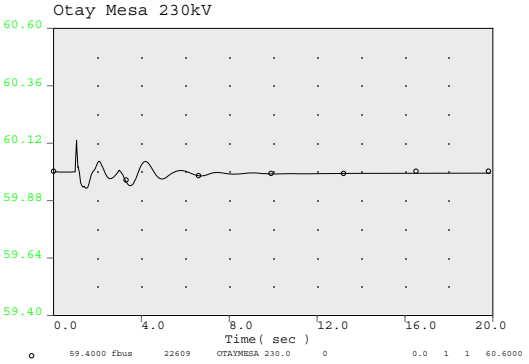
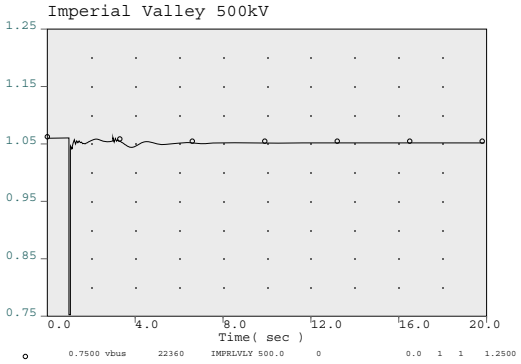


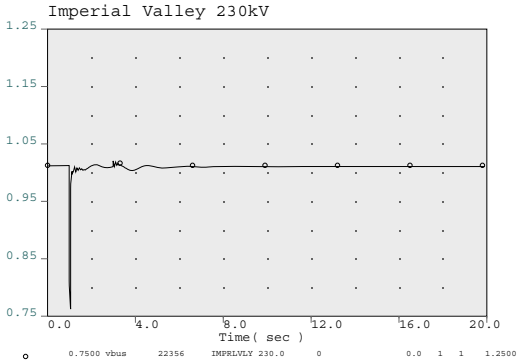
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

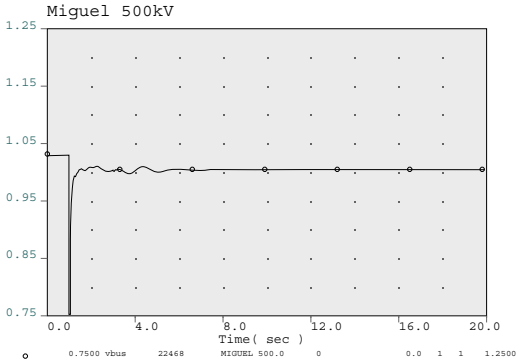
Imperial Valley 500kV



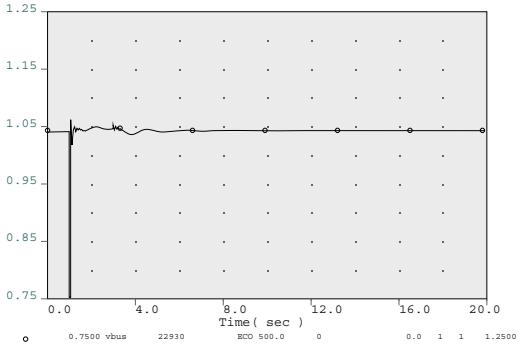
Imperial Valley 230kV



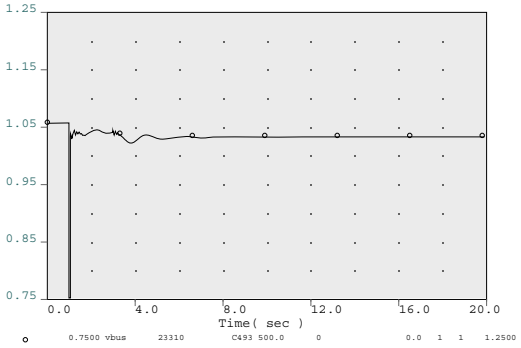
Miguel 500kV



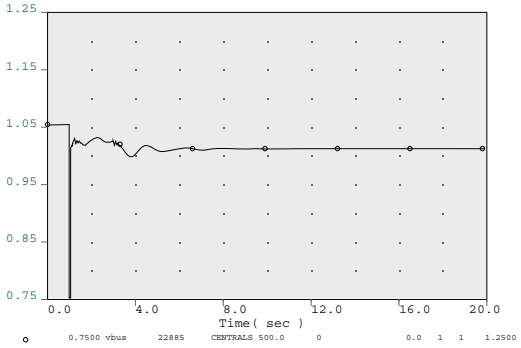
Windfarms 500



C493 500kV



CENTRALS 500kV

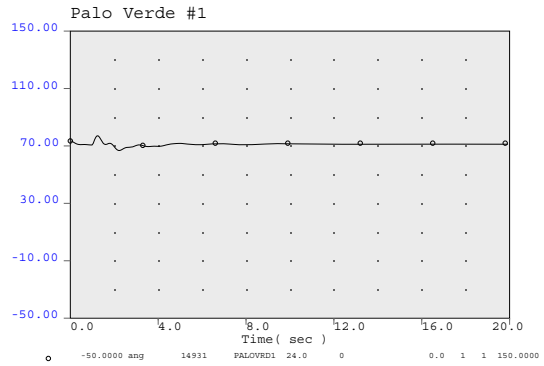


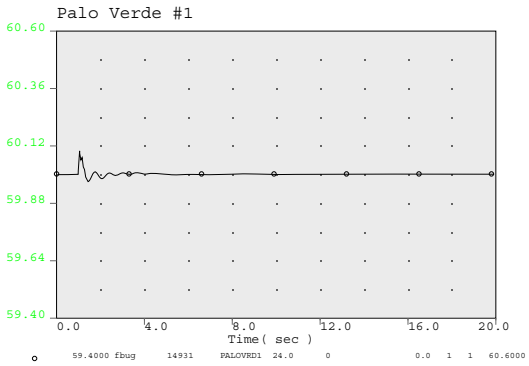
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

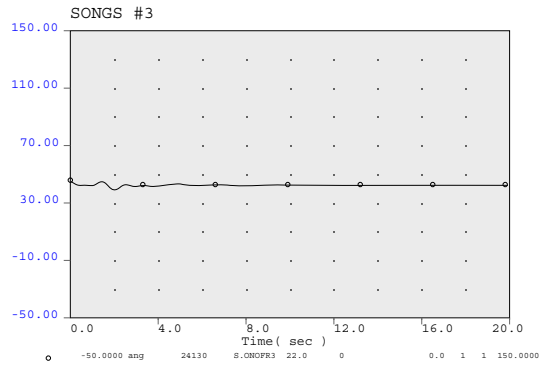
Imperial Valley Area - Frequency

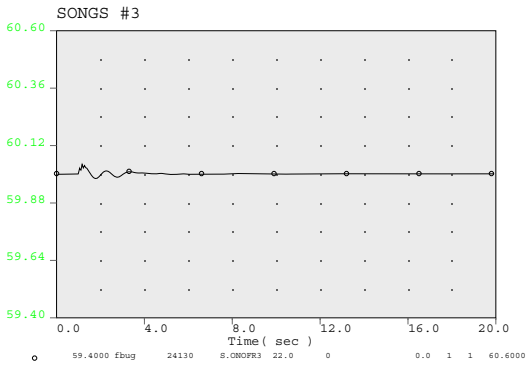
SDG&E Cluster 2 - post
2014 Heavy Summer
Miguel-ECO 500 kV line

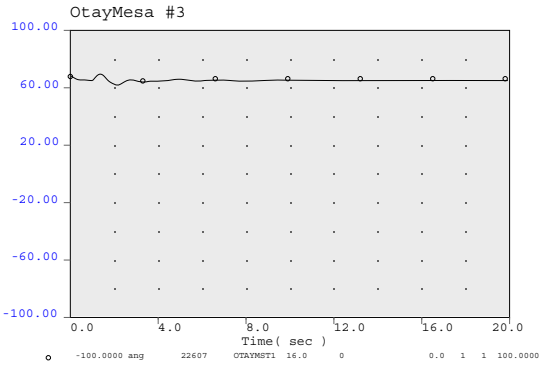
RELATIVE ROTOR ANGLE & FREQUENCY

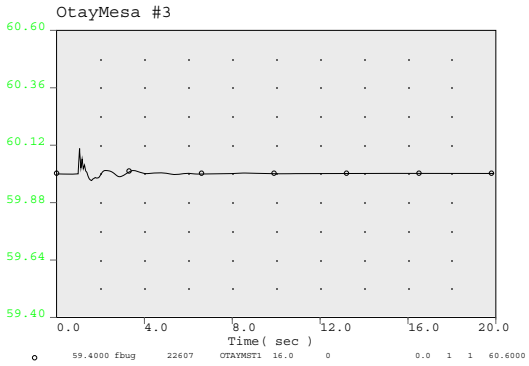












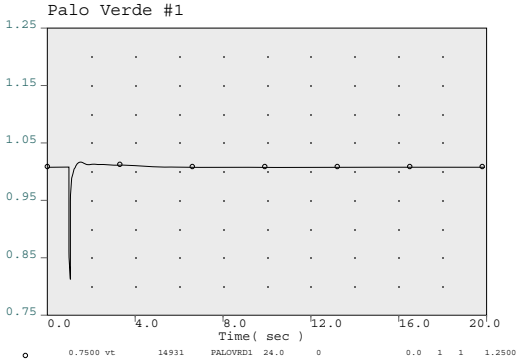
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Page 1

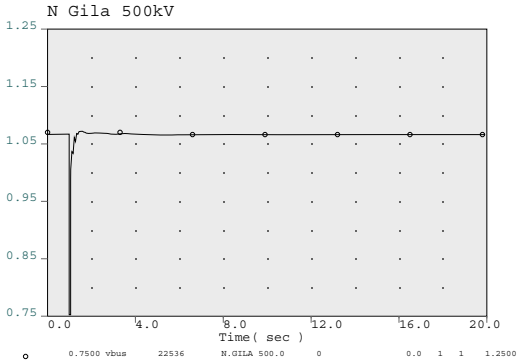
SDGE	NGila_IV_slo_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:44:00 2010

RELATIVE VOLTAGE

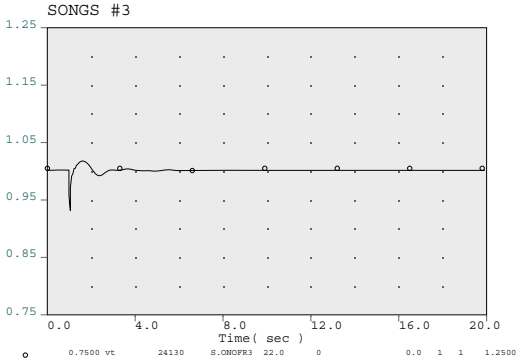
Palo Verde #1



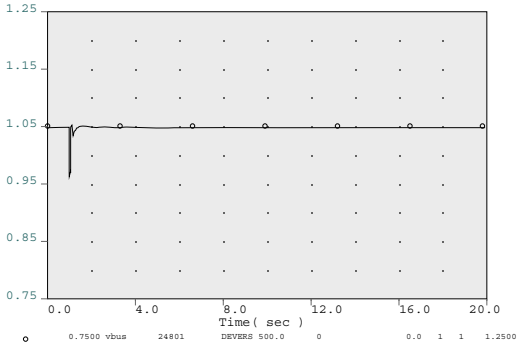
N Gila 500kV



SONGS #3



Devers 500



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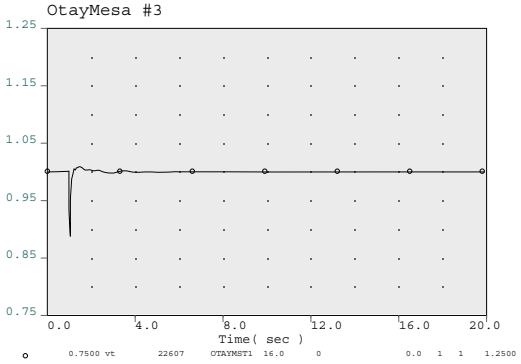
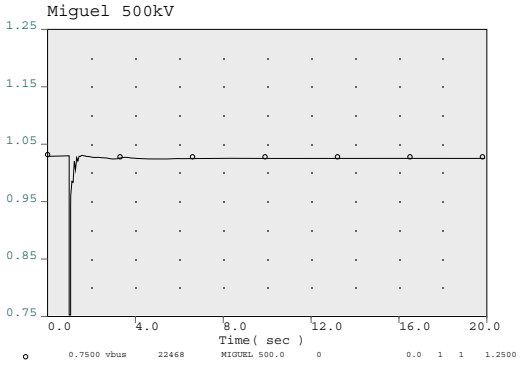


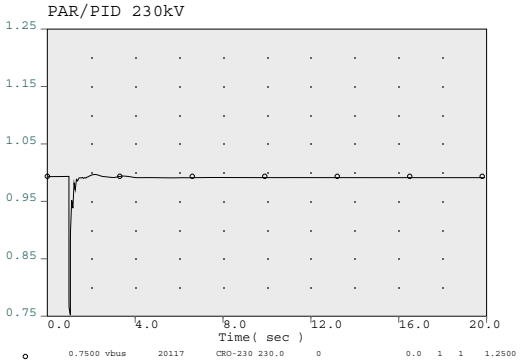
Miguel 500kV



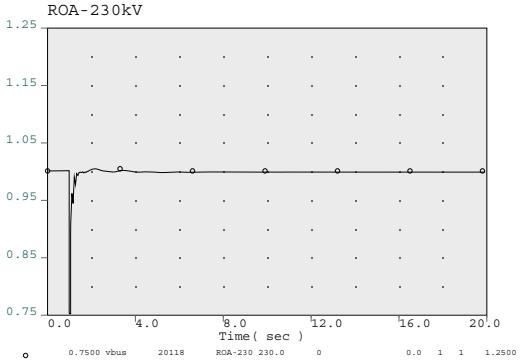
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

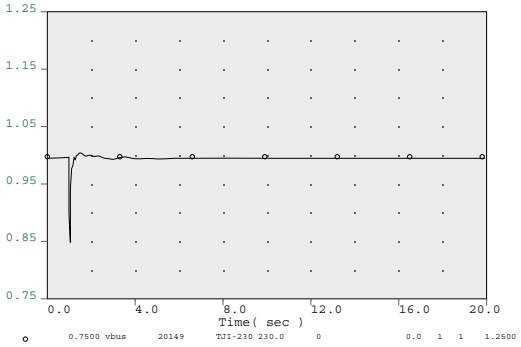
PAR/PID 230kV



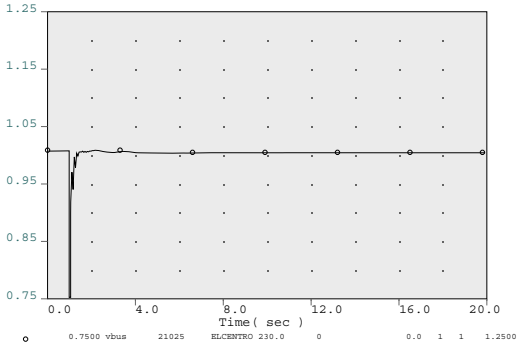
ROA-230kV



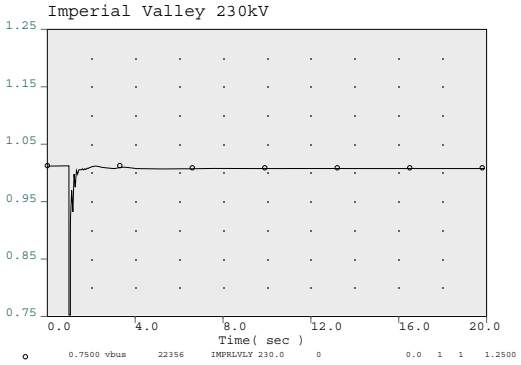
TJ1-230kV



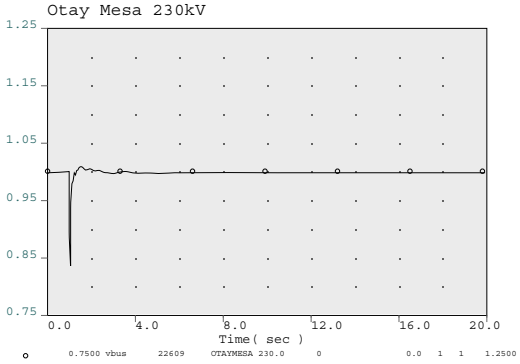
El Centro



Imperial Valley 230kV



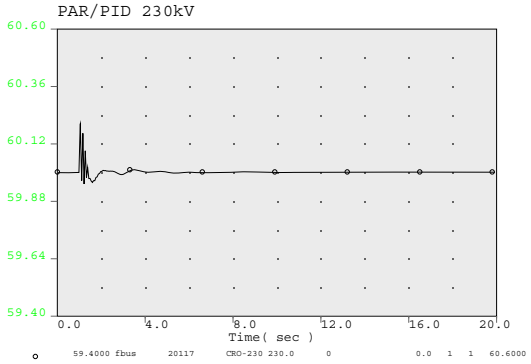
Otay Mesa 230kV



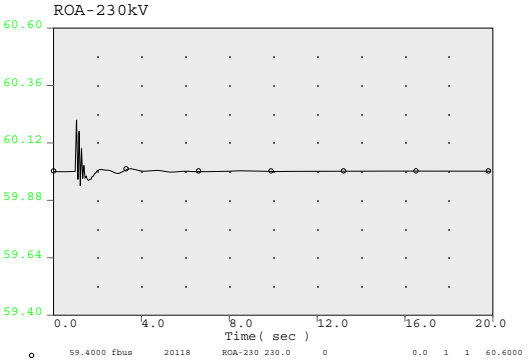
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

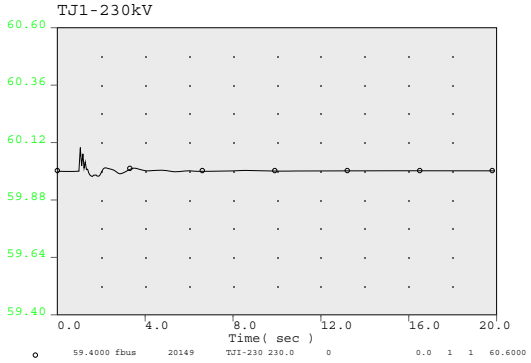
PAR/PID 230kV



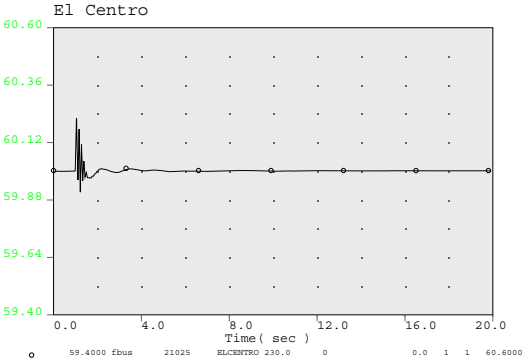
ROA-230kV



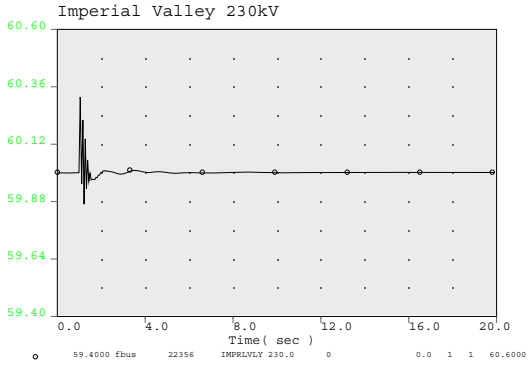
TJ1-230kV



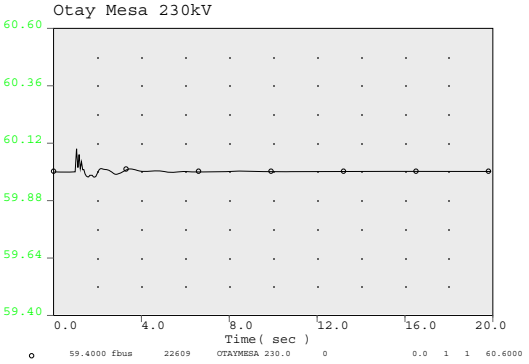
El Centro



Imperial Valley 230kV



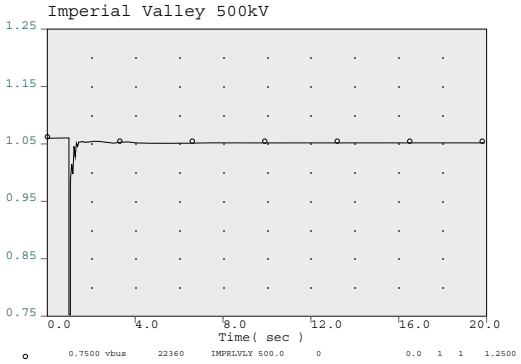
Otay Mesa 230kV



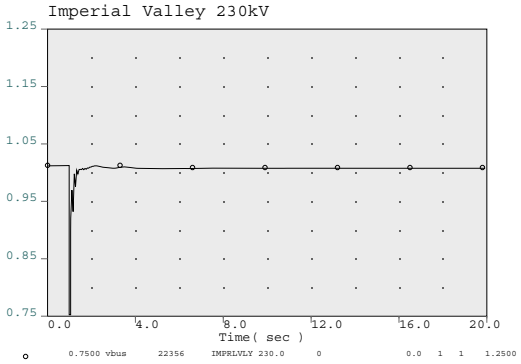
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

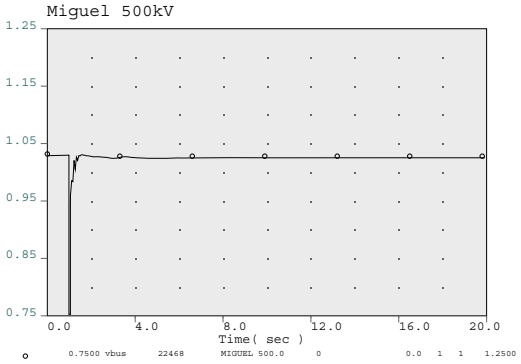
Imperial Valley 500kV



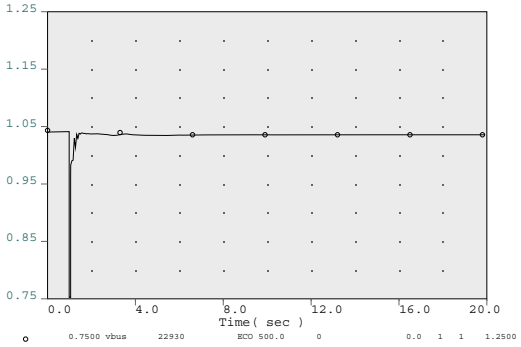
Imperial Valley 230kV



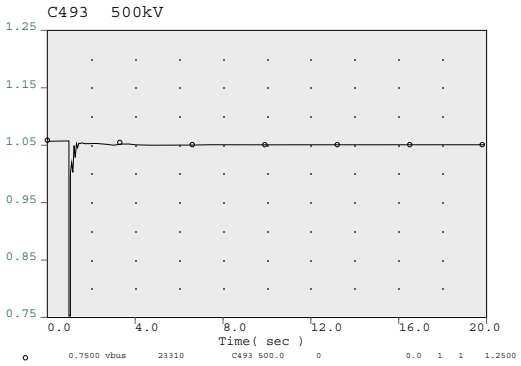
Miguel 500kV



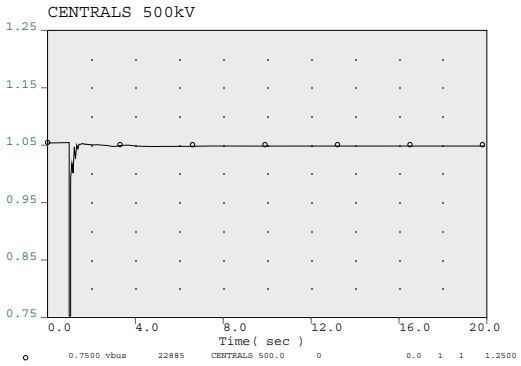
Windfarms 500



C493 500kV

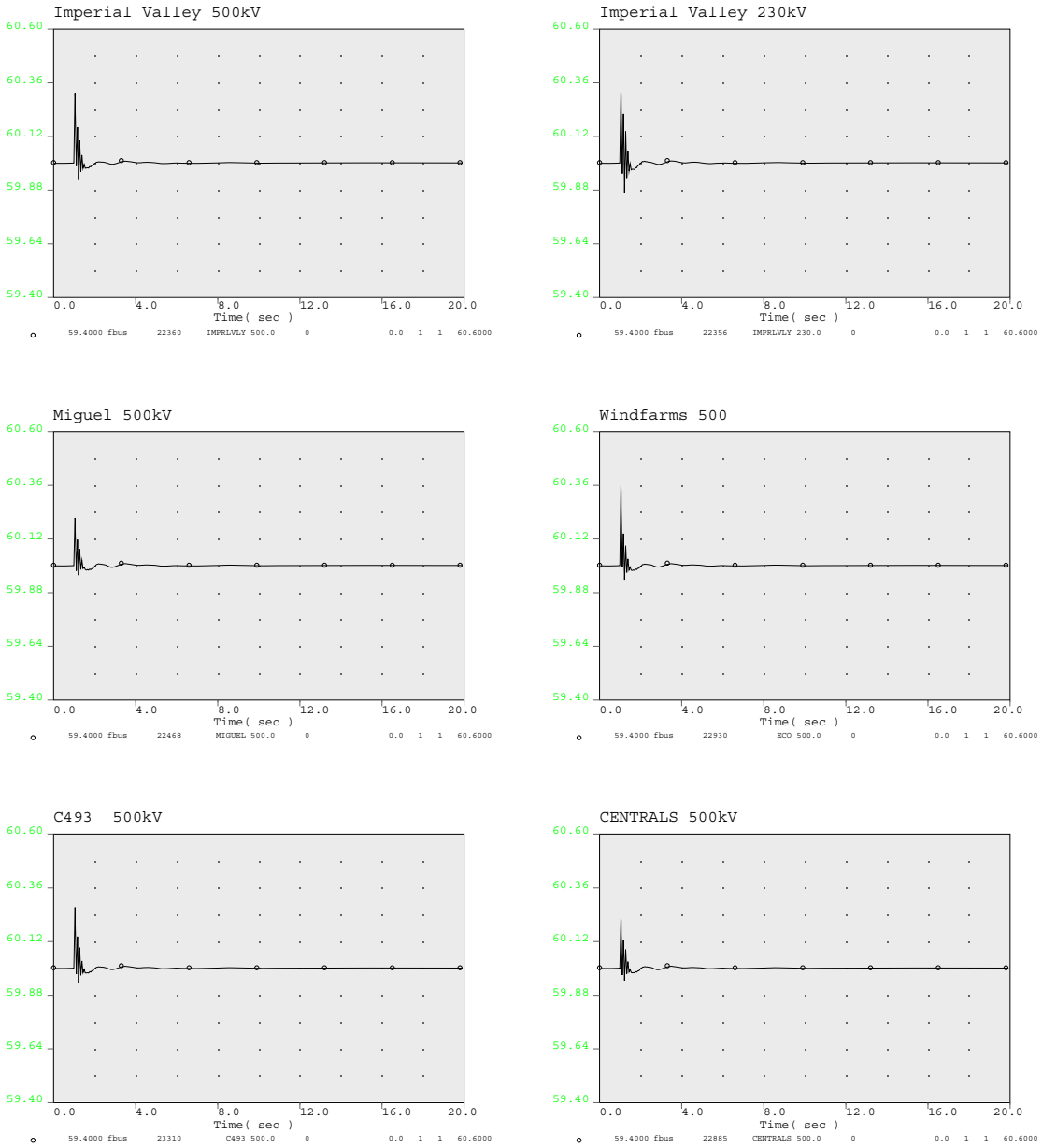


CENTRALS 500kV



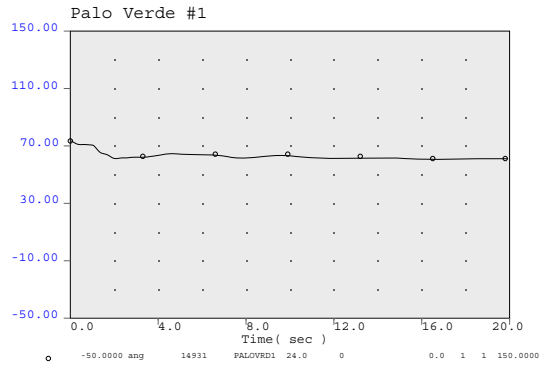
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

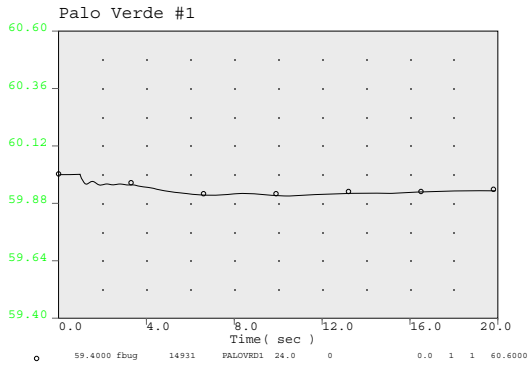
Imperial Valley Area - Frequency

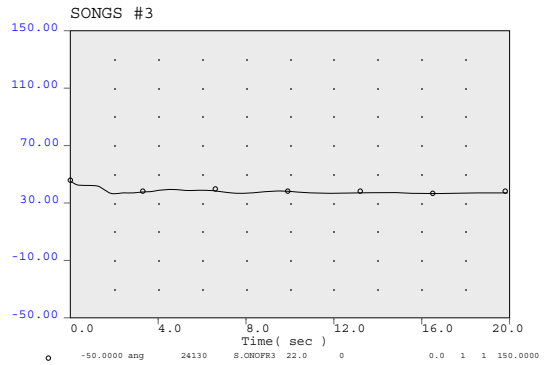


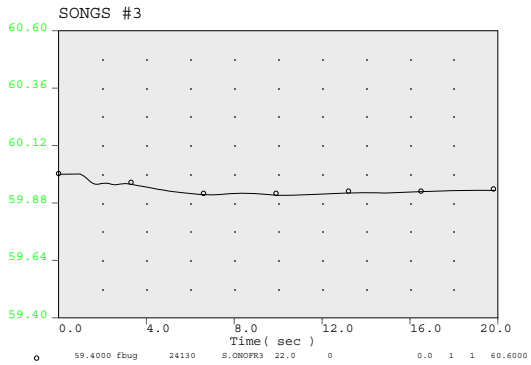
SDG&E Cluster 2 - post
2014 Heavy Summer
North Gila - Imperial Valley 500 kV line

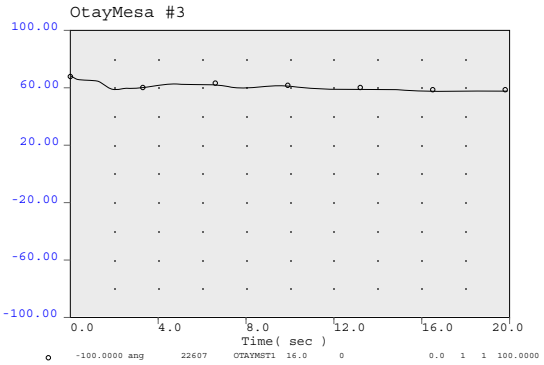
RELATIVE ROTOR ANGLE & FREQUENCY

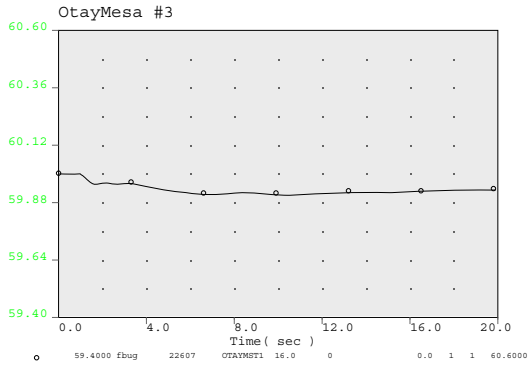










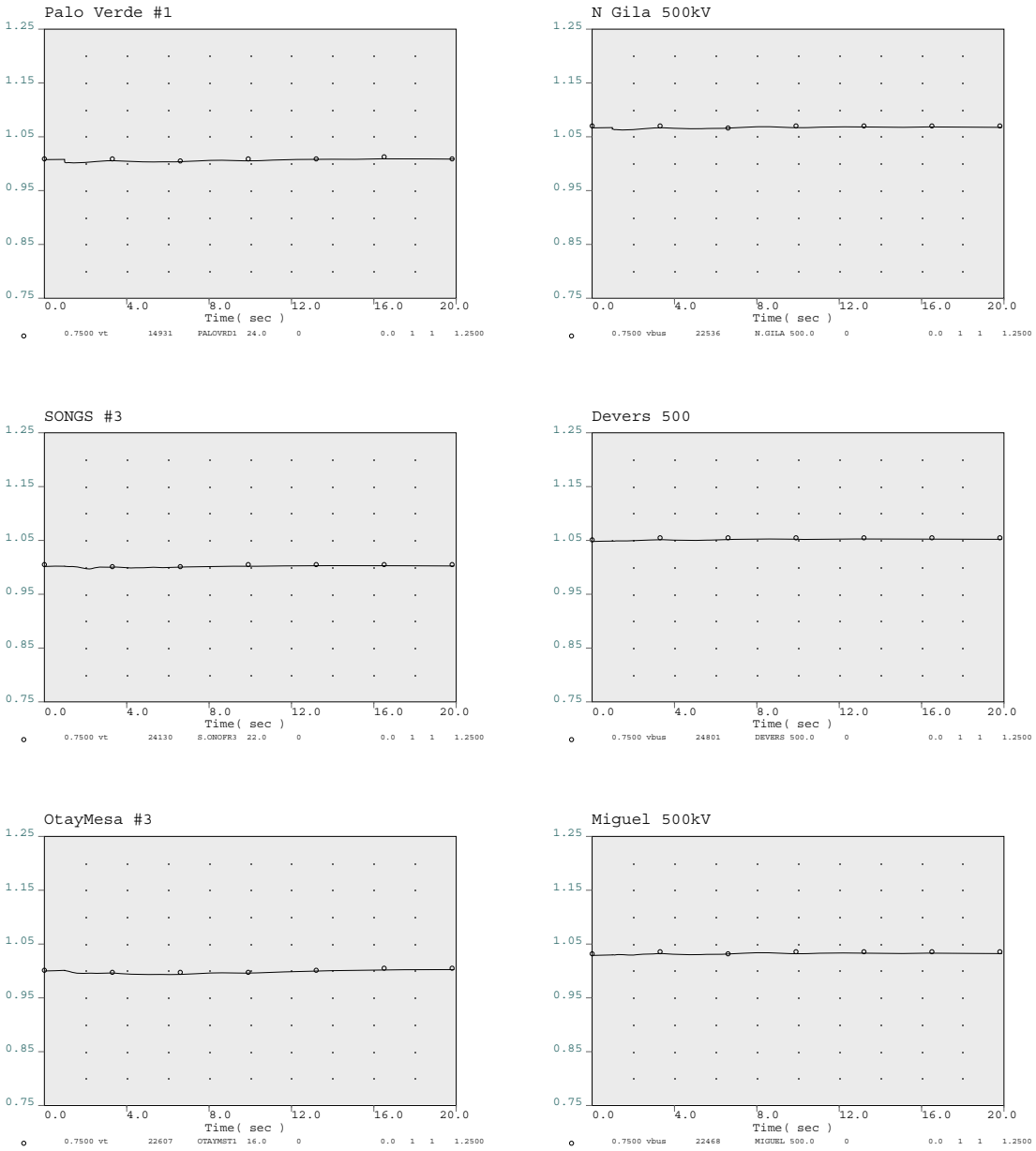


SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Page 1

SDGE	PaloVerde-g1_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:44:26 2010

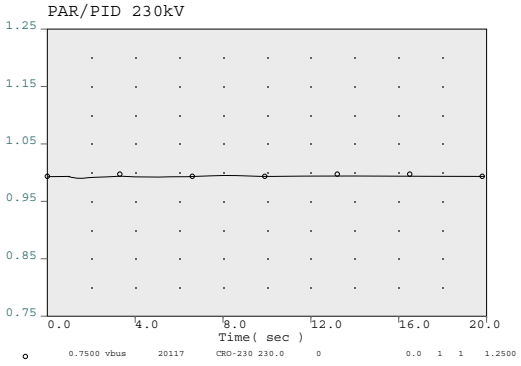
RELATIVE VOLTAGE



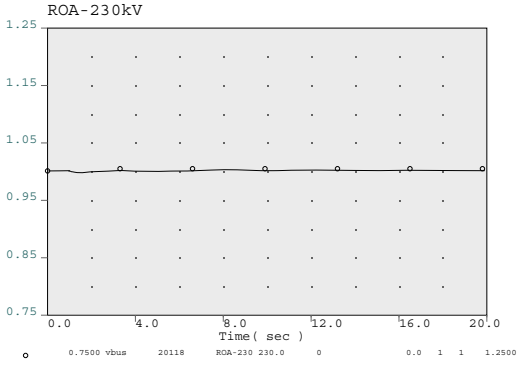
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

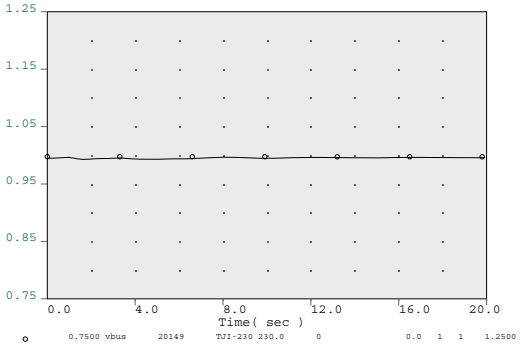
PAR/PID 230kV



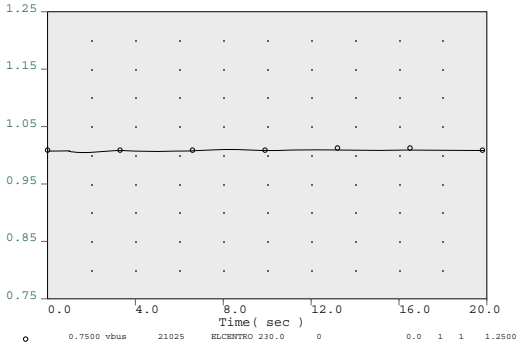
ROA-230kV



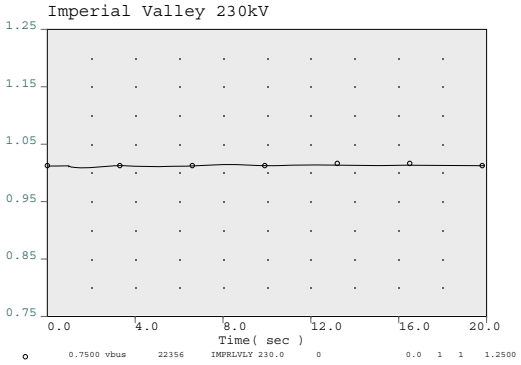
TJ1-230kV



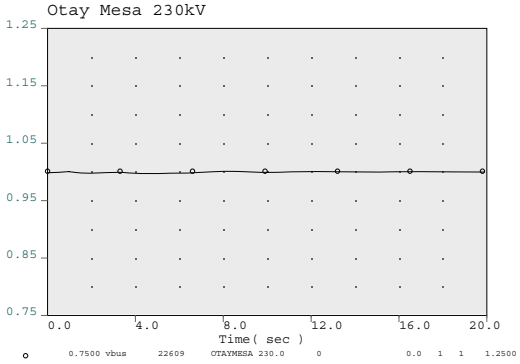
El Centro



Imperial Valley 230kV



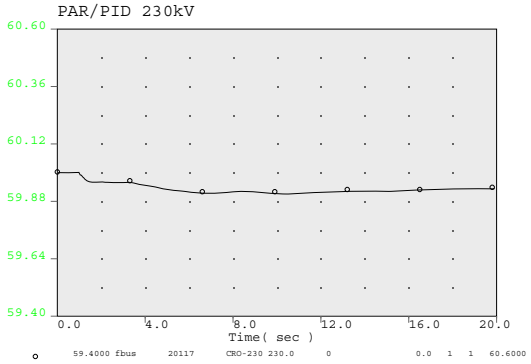
Otay Mesa 230kV



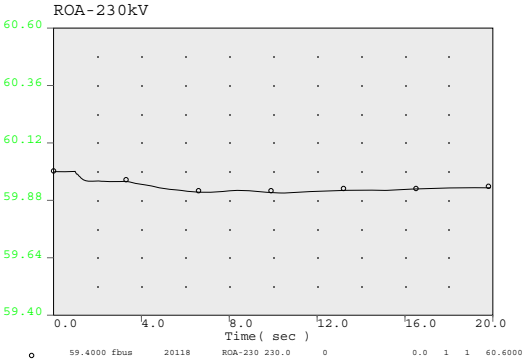
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

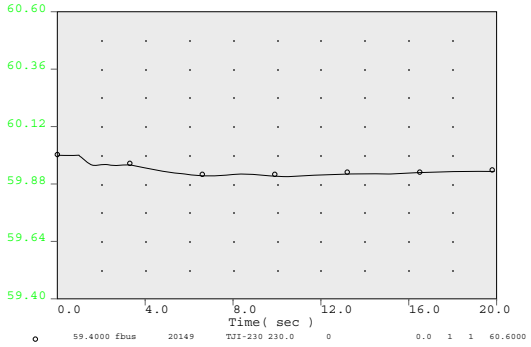
PAR/PID 230kV



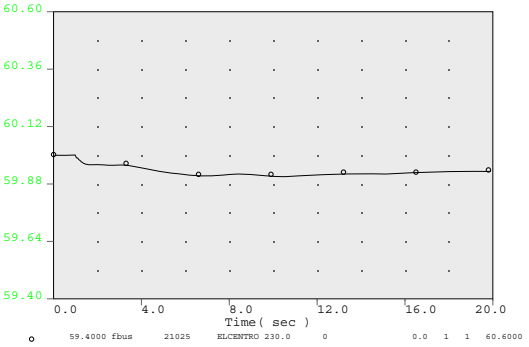
ROA-230kV



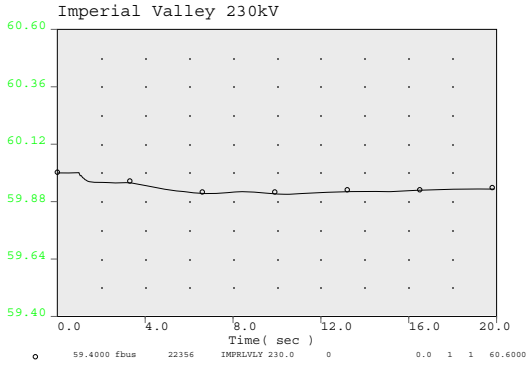
TJ1-230kV



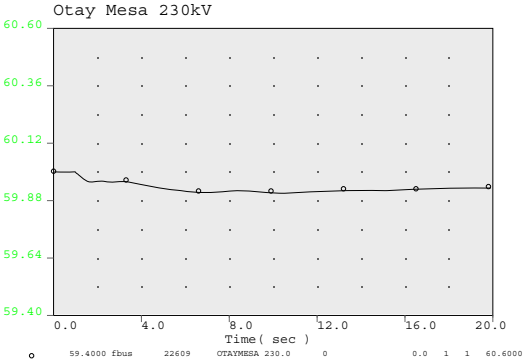
El Centro



Imperial Valley 230kV



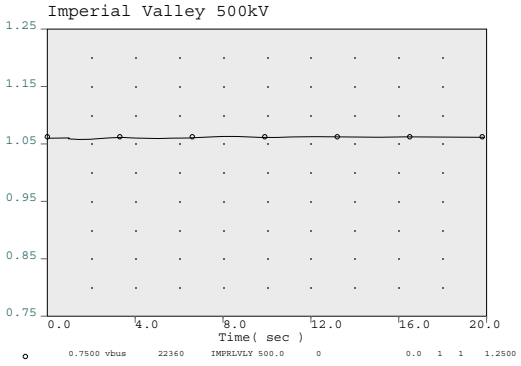
Otay Mesa 230kV



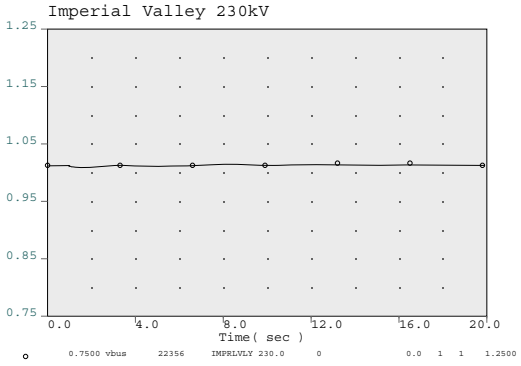
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

Imperial Valley Area - VOLTAGE

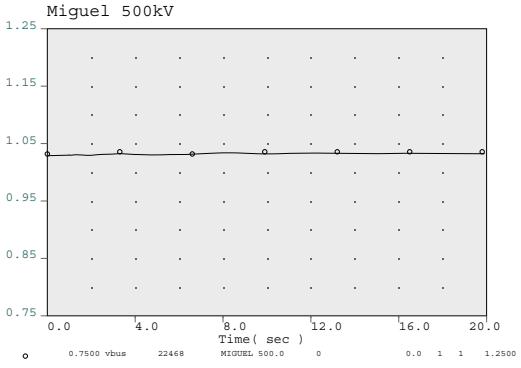
Imperial Valley 500kV



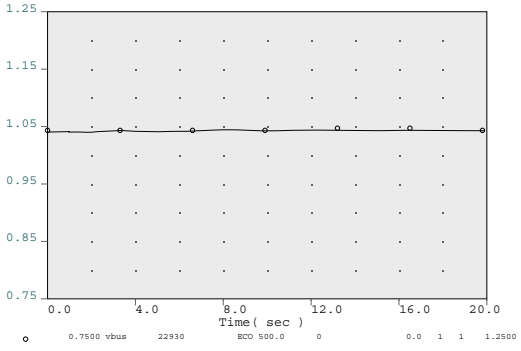
Imperial Valley 230kV



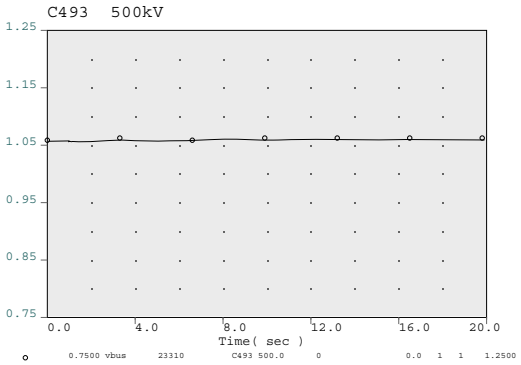
Miguel 500kV



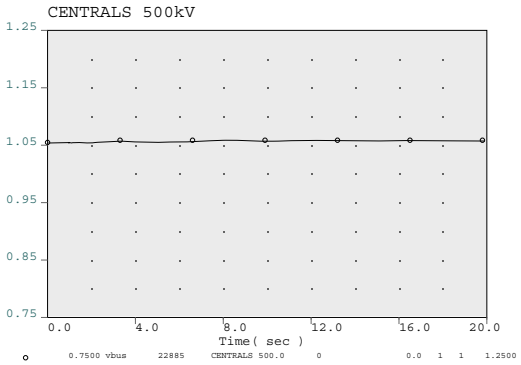
Windfarms 500



C493 500kV

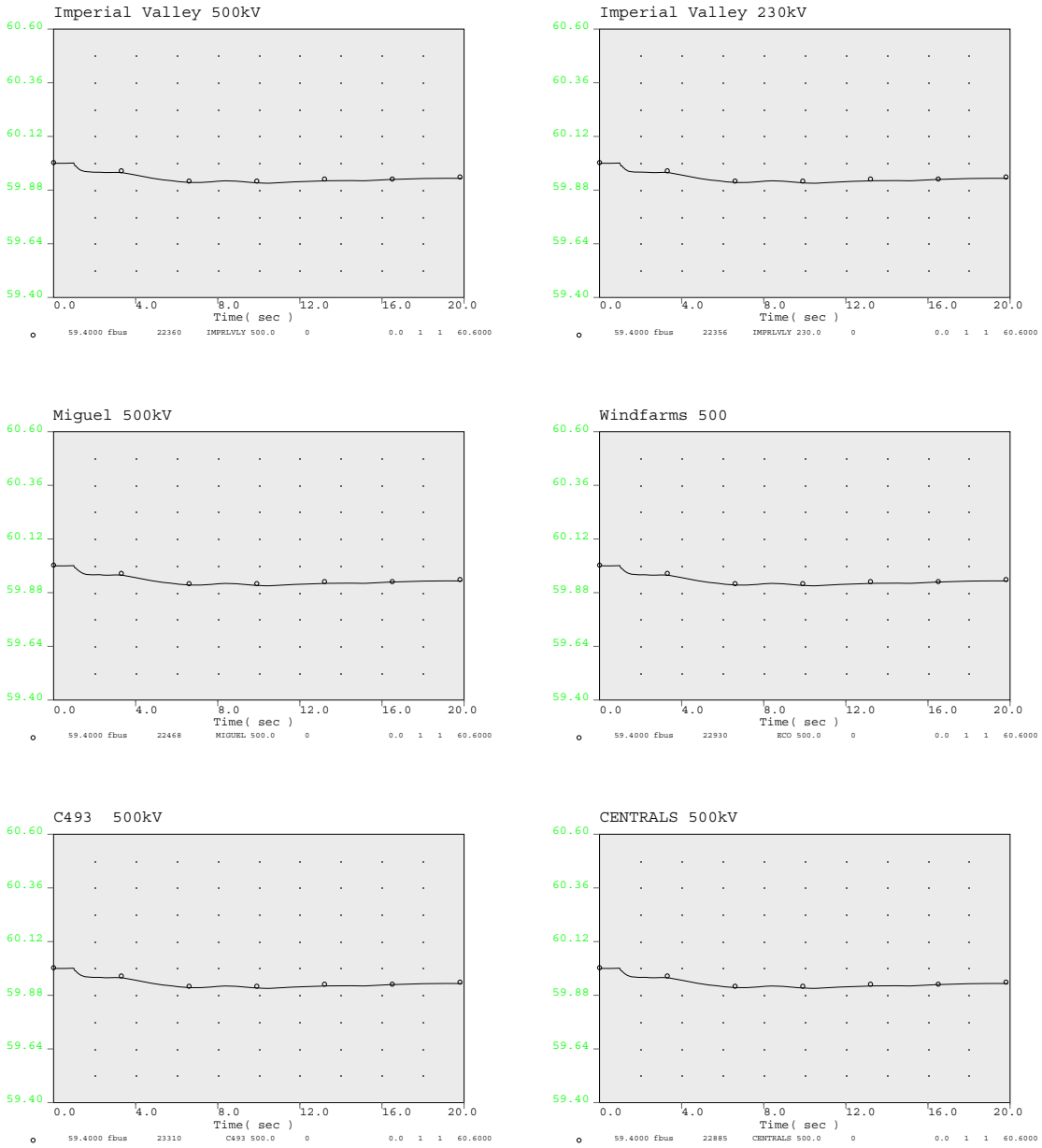


CENTRALS 500kV



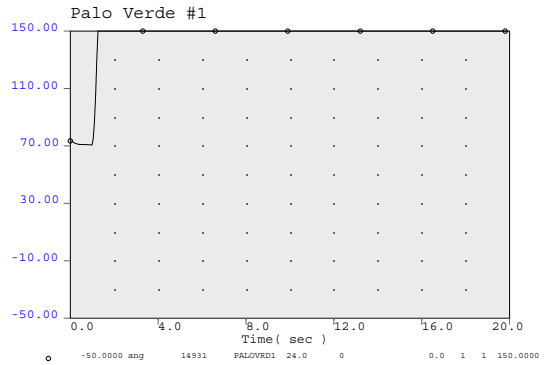
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

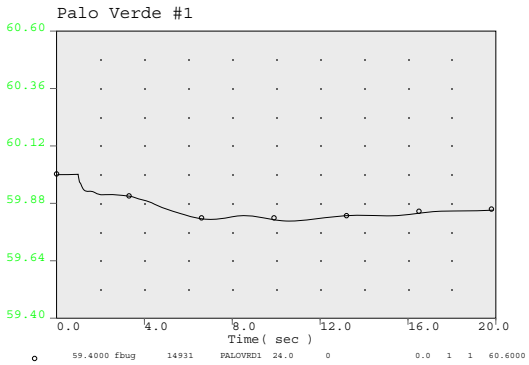
Imperial Valley Area - Frequency

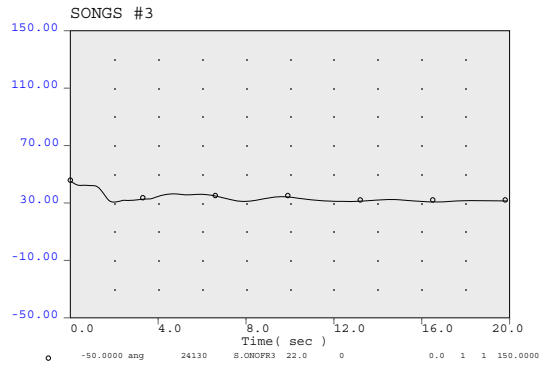


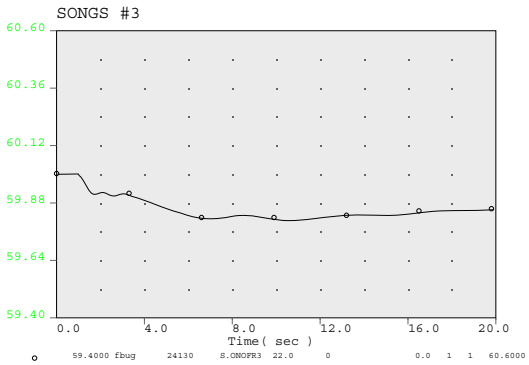
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generator #2

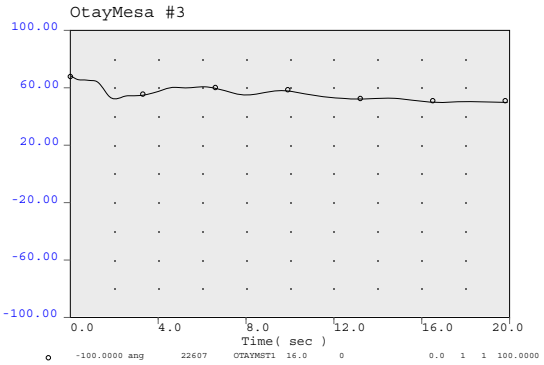
RELATIVE ROTOR ANGLE & FREQUENCY

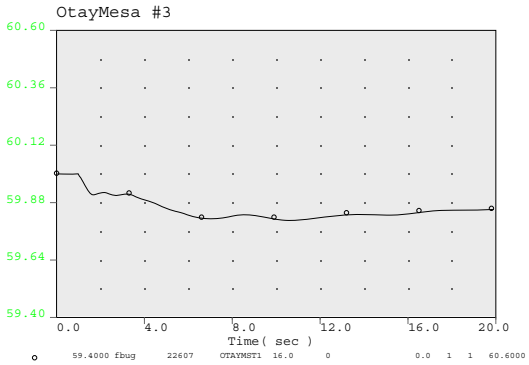








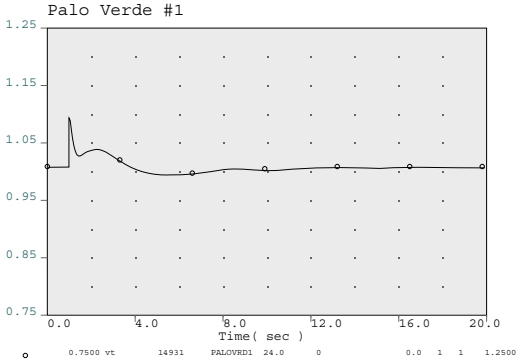




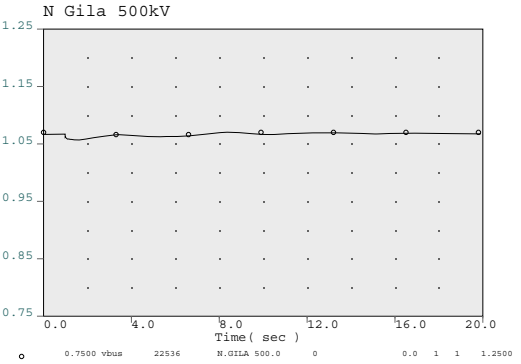
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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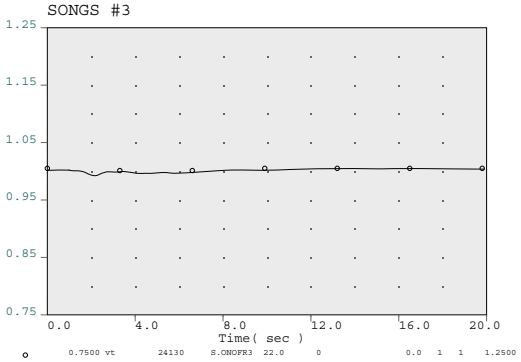
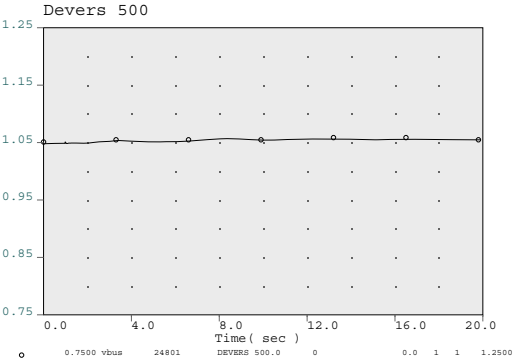
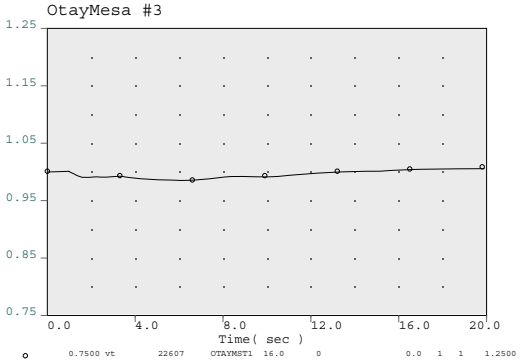


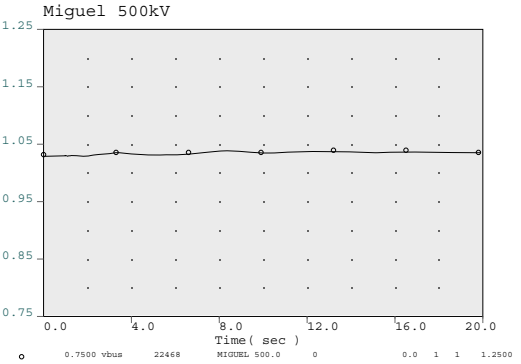
Devers 500



OtayMesa #3



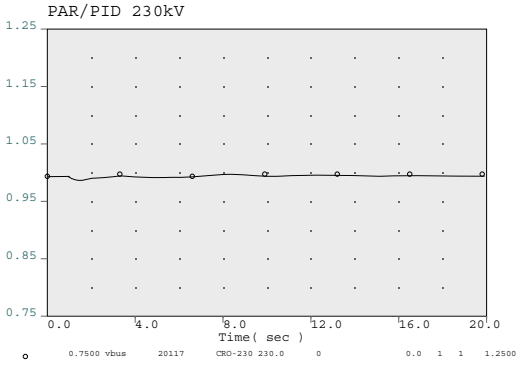
Miguel 500kV



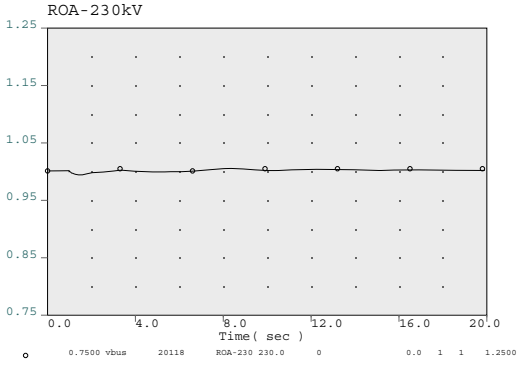
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

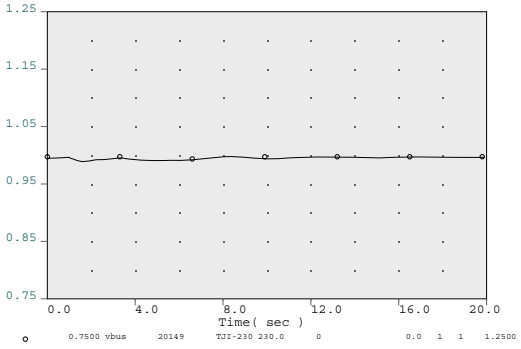
PAR/PID 230kV



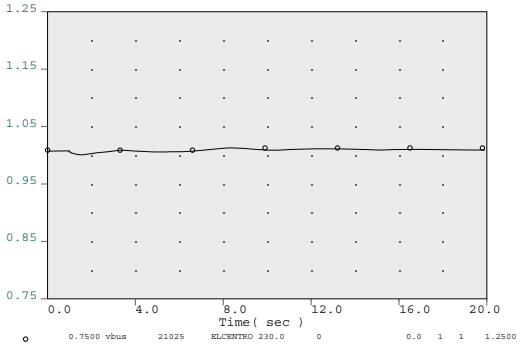
ROA-230kV



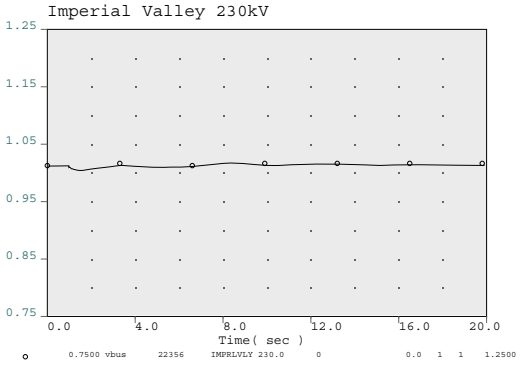
TJ1-230kV



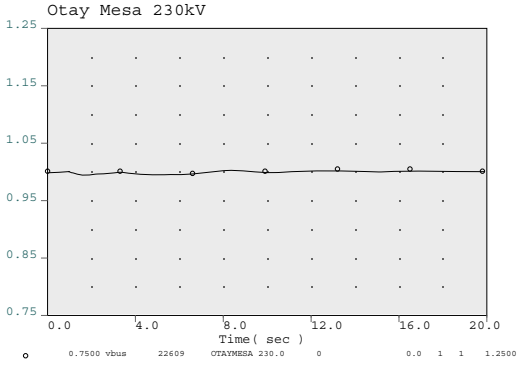
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - post
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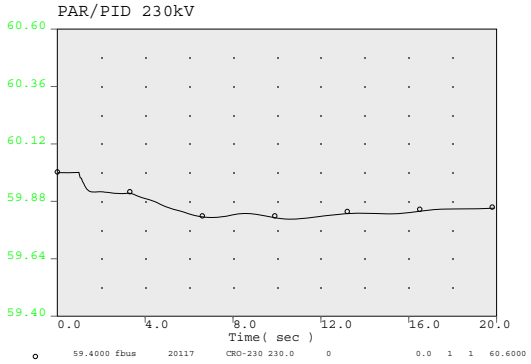
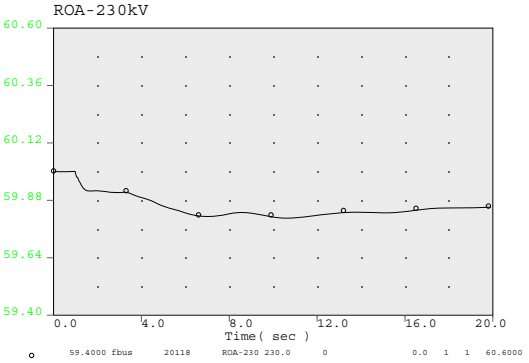
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

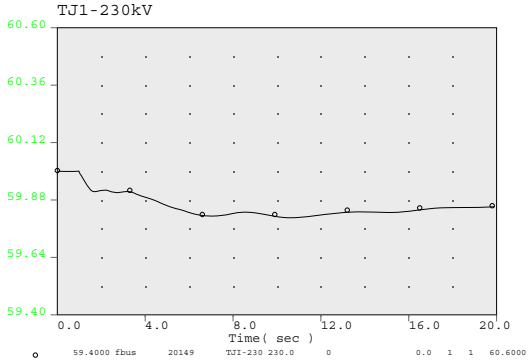
PAR/PID 230kV



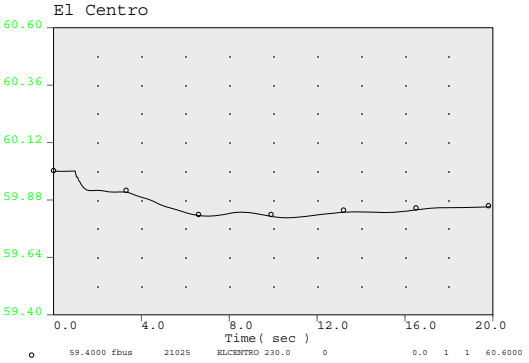
ROA-230kV



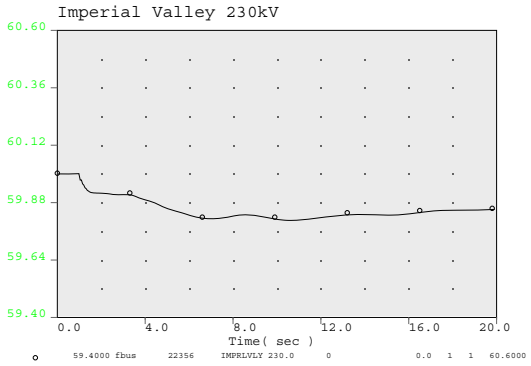
TJ1-230kV



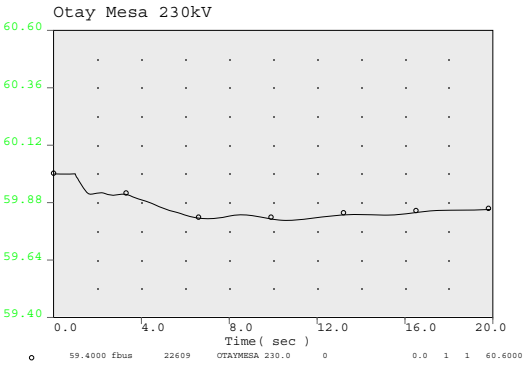
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



SDG&E Cluster 2 - post
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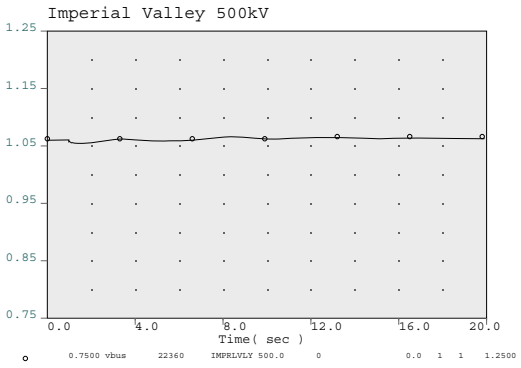
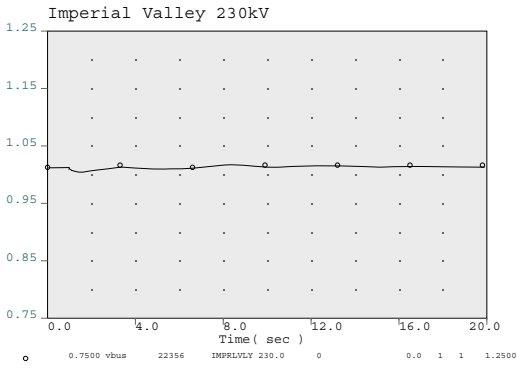
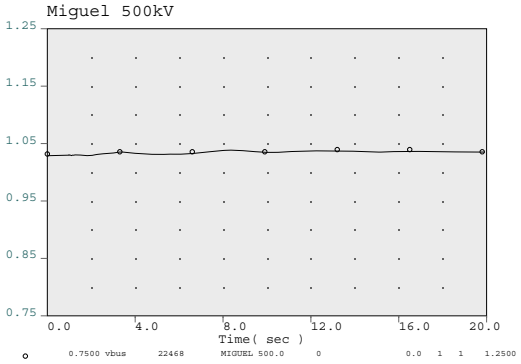
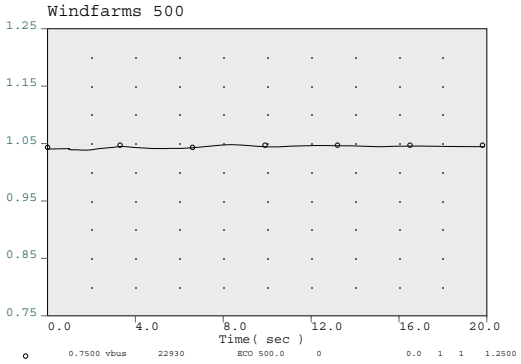
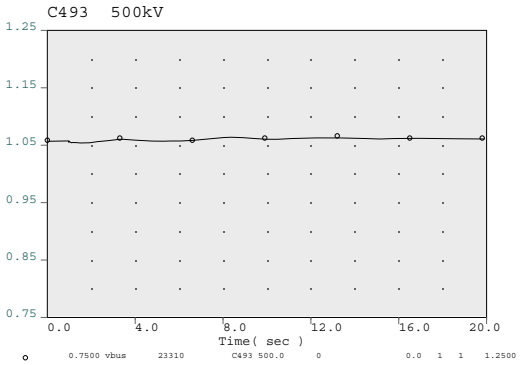
Imperial Valley Area - VOLTAGE

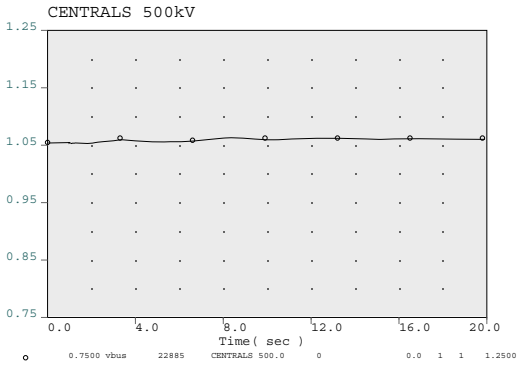






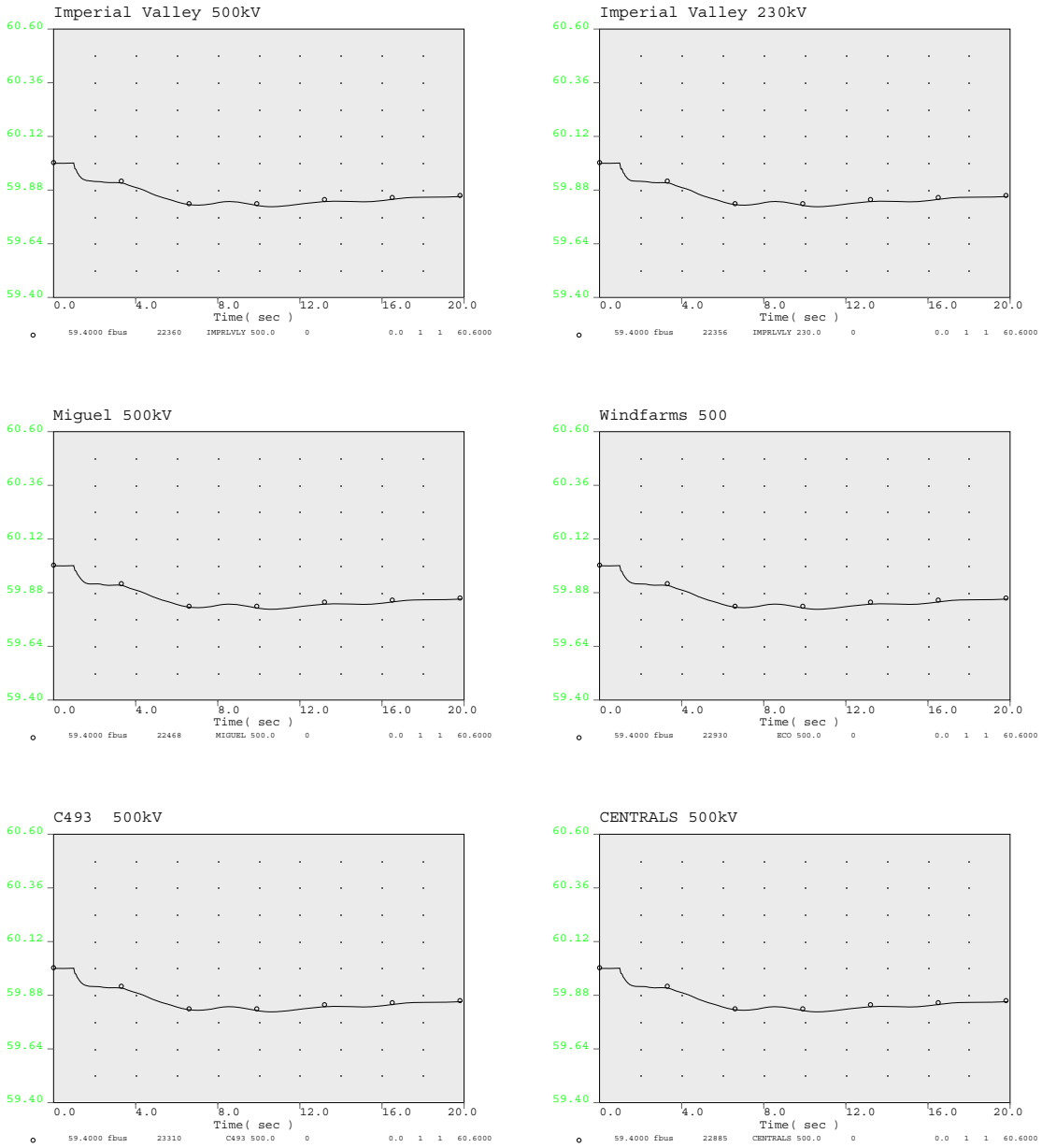






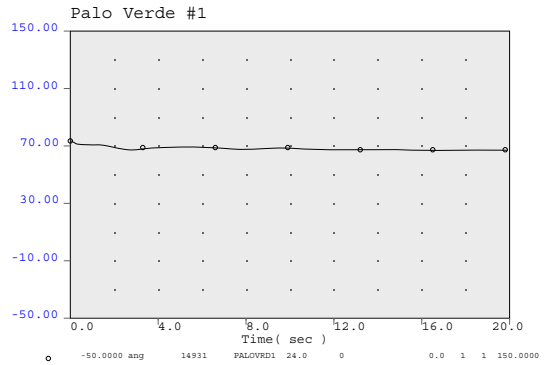
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

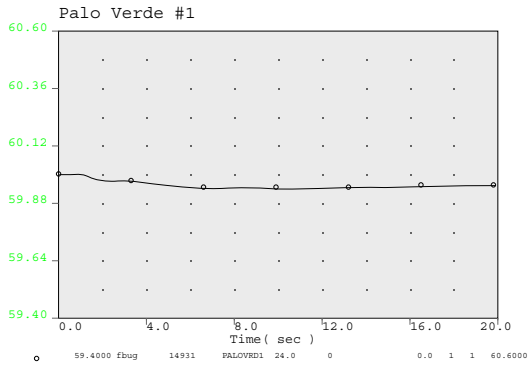
Imperial Valley Area - Frequency

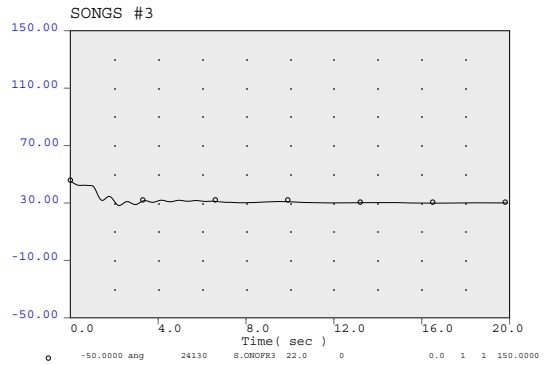


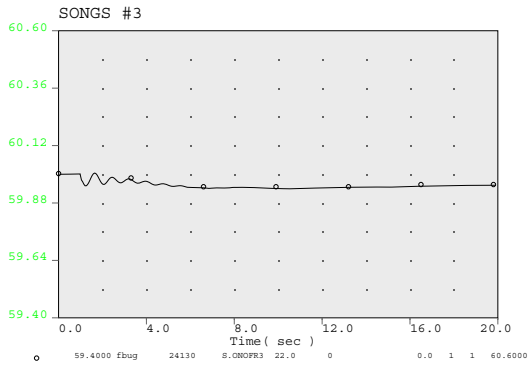
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip PaloVerde Generators 1 & 2

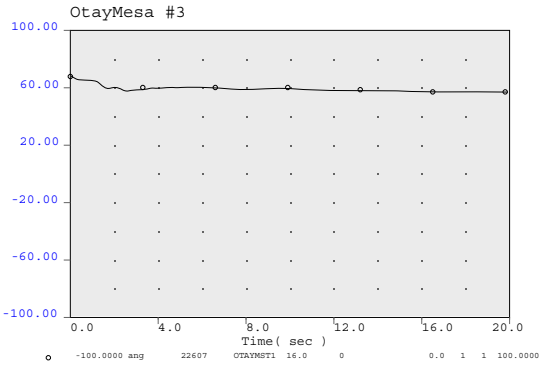
RELATIVE ROTOR ANGLE & FREQUENCY

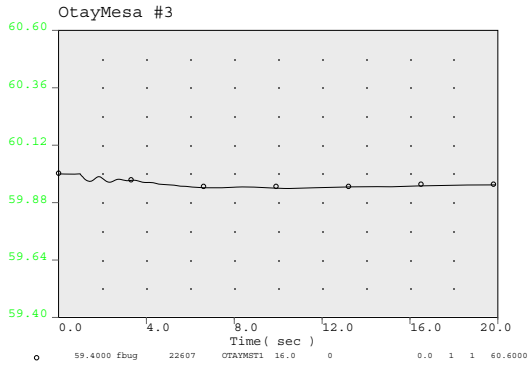












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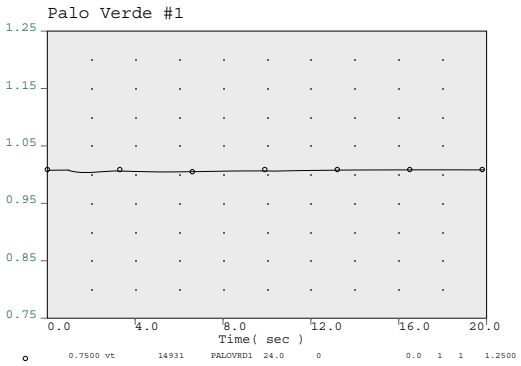
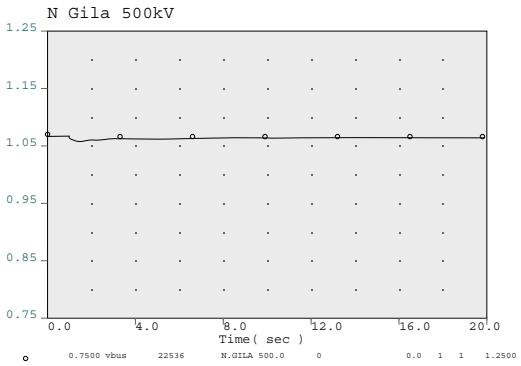
Trip San Onofre Generator #2

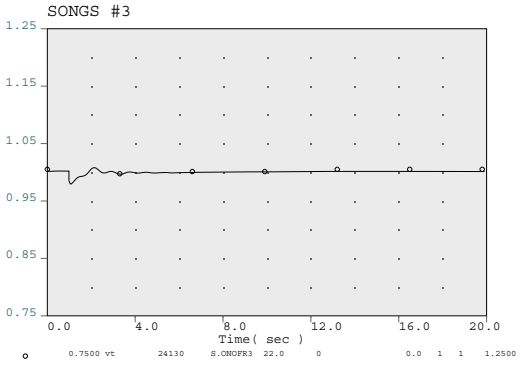
Page 1

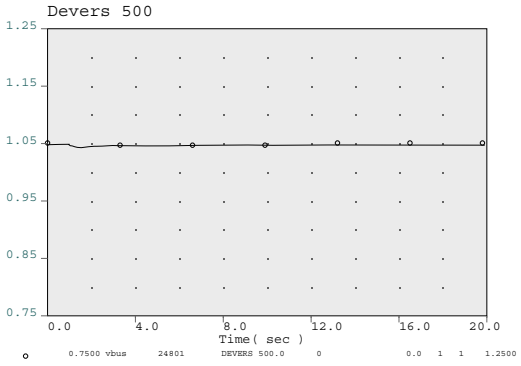
SDGE	SONGS-g1_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:45:17 2010

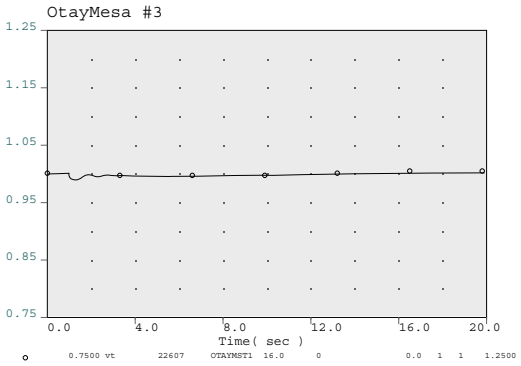
RELATIVE VOLTAGE

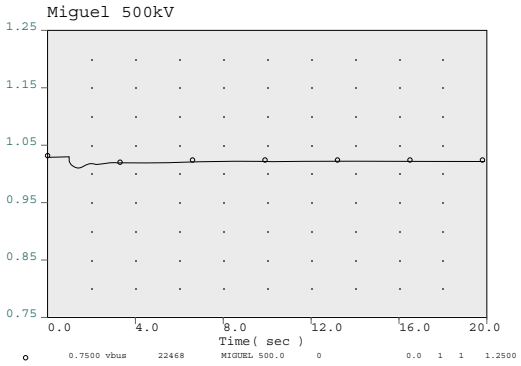








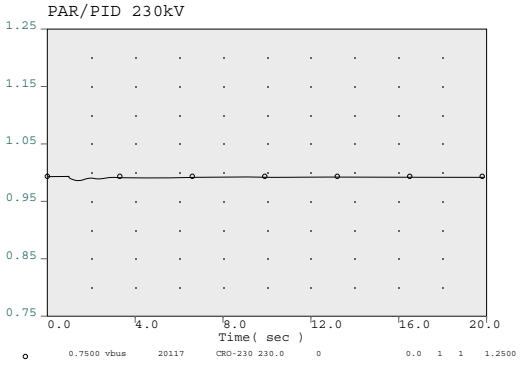




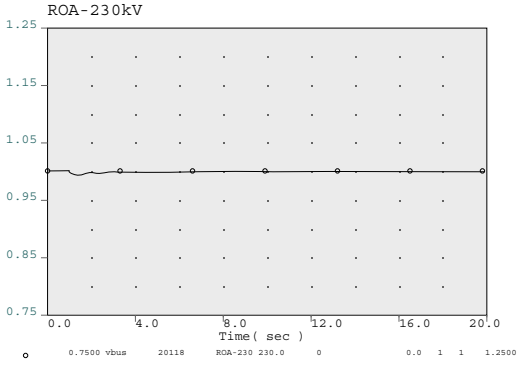
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

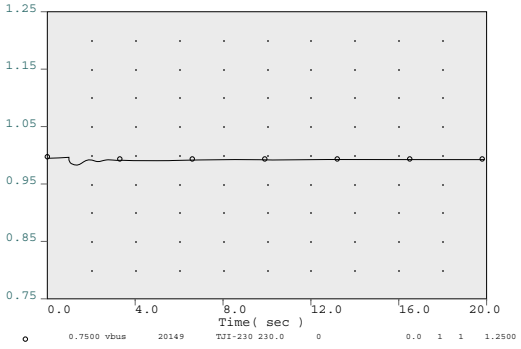
PAR/PID 230kV



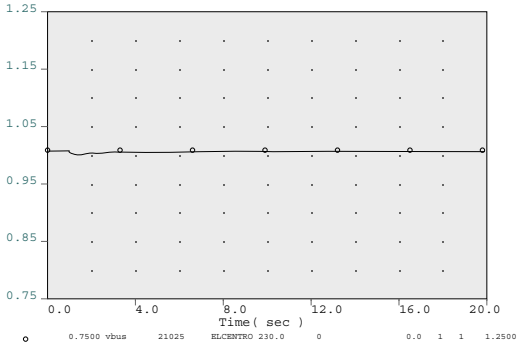
ROA-230kV



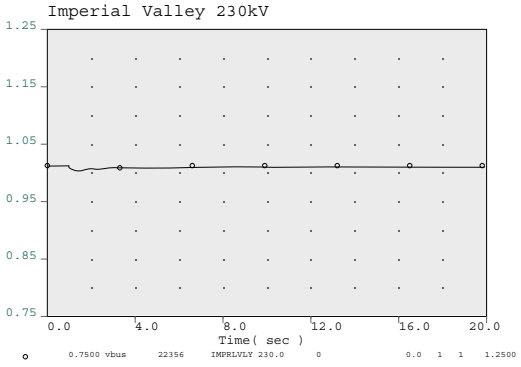
TJ1-230kV



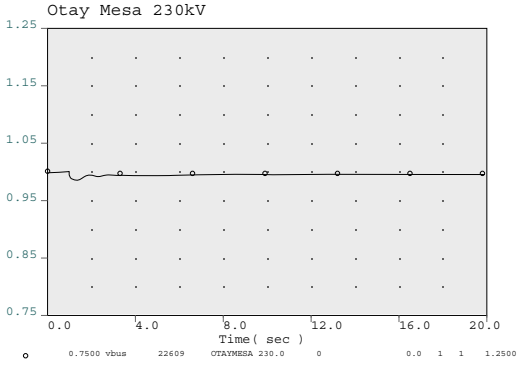
El Centro



Imperial Valley 230kV

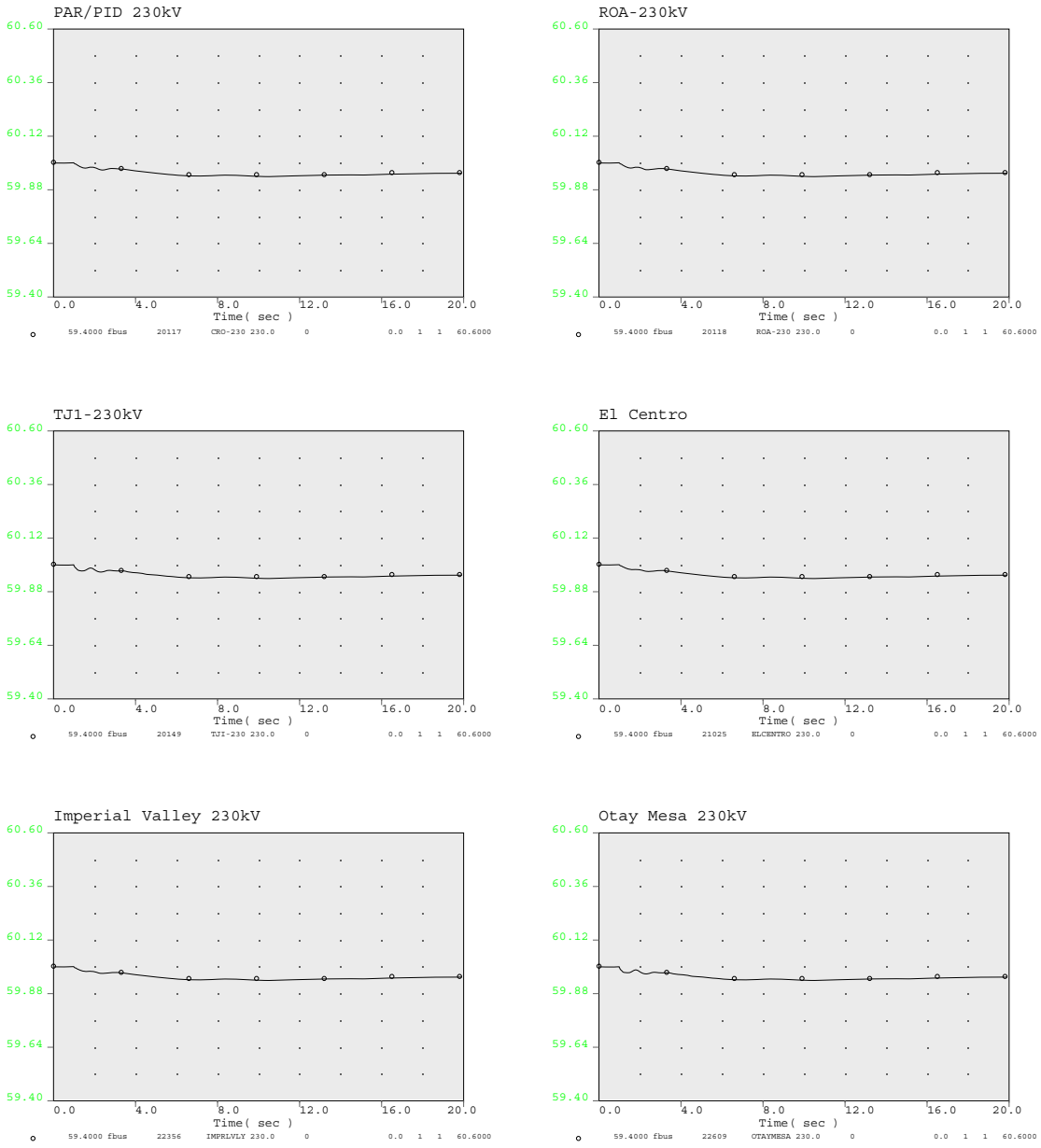


Otay Mesa 230kV



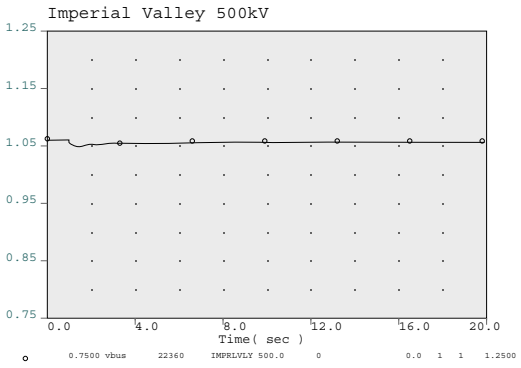
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

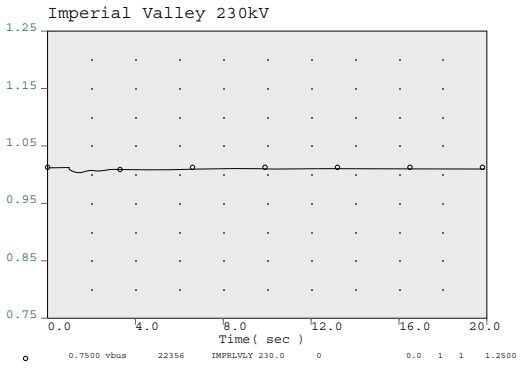
Affected System Frequency Check and Comparison

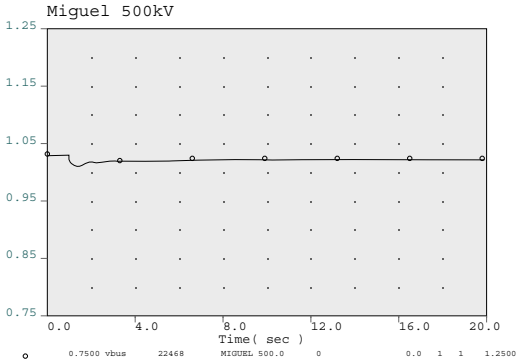


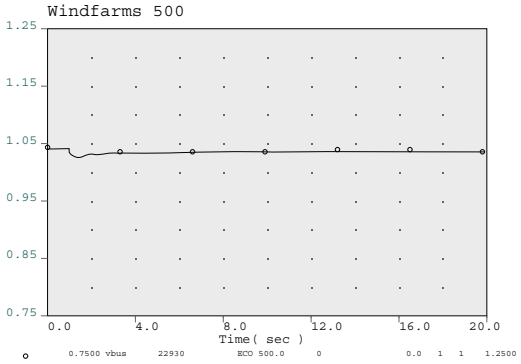
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

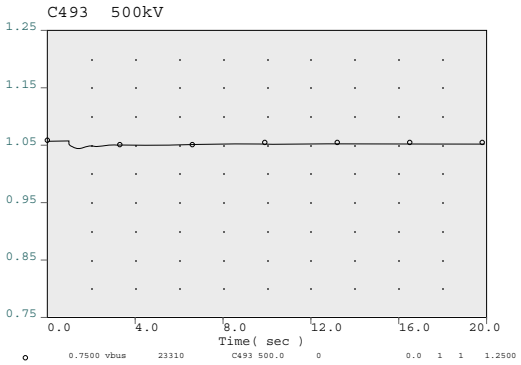
Imperial Valley Area - VOLTAGE

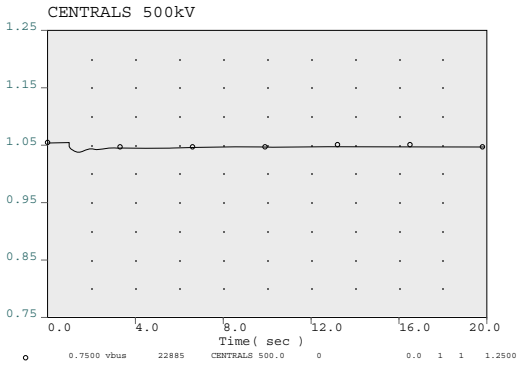












SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

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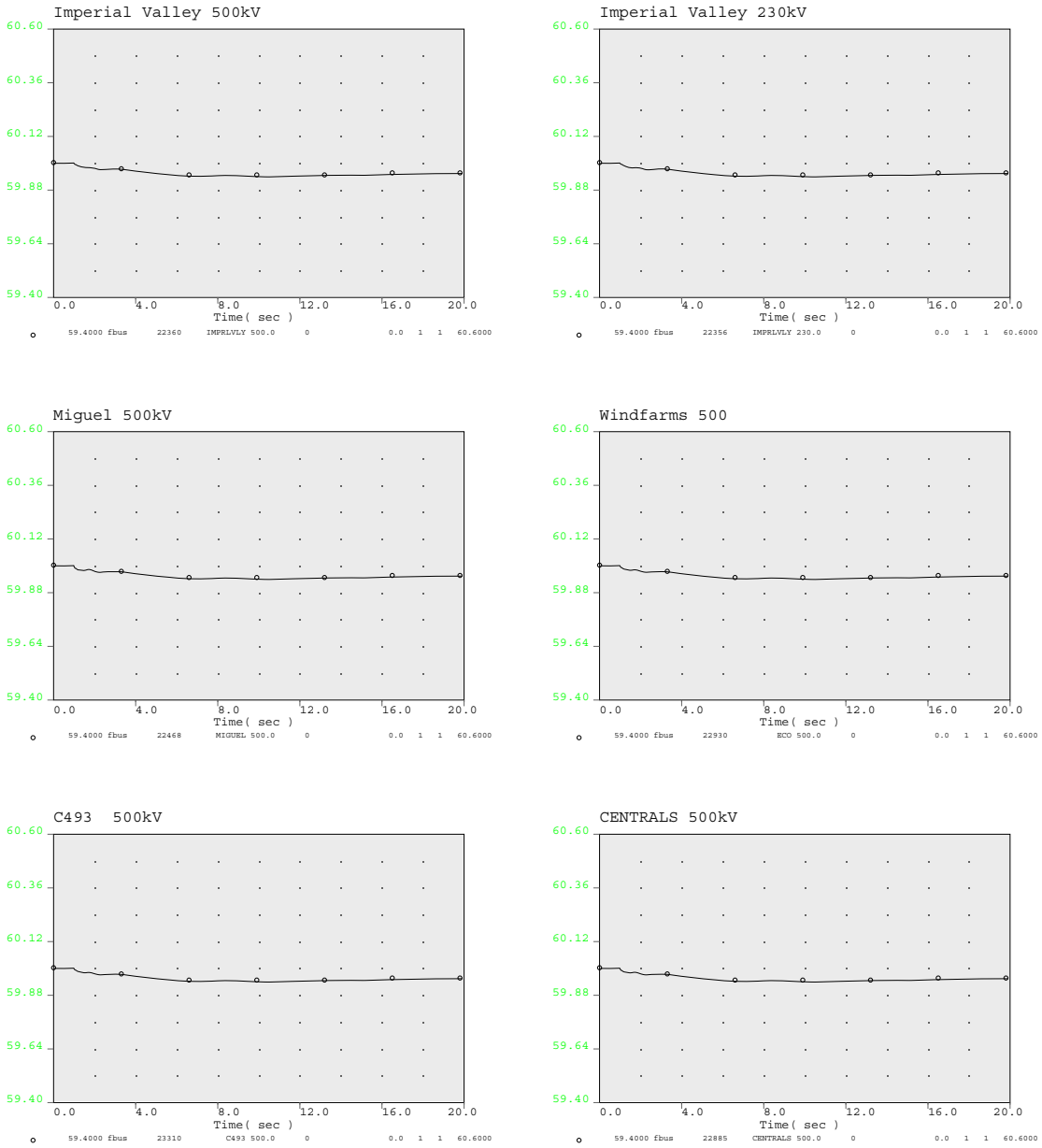
SDGE	SONGS-g1_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:45:17 2010

Imperial Valley Area - Frequency



SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generator #2

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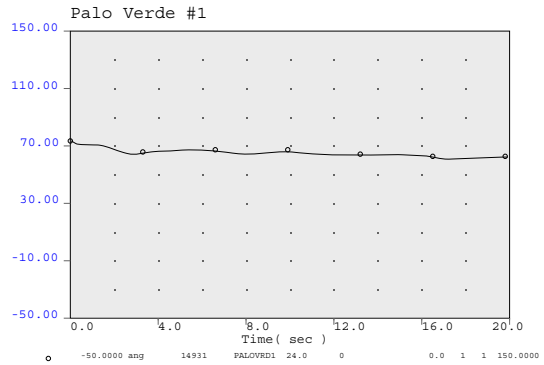
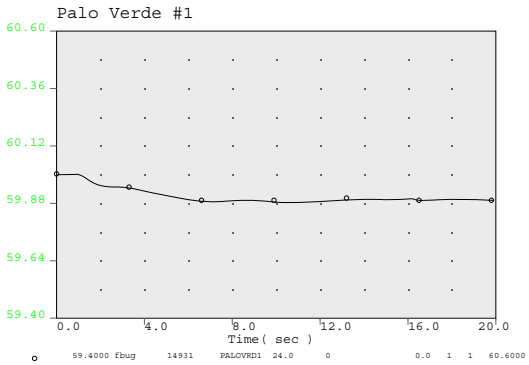
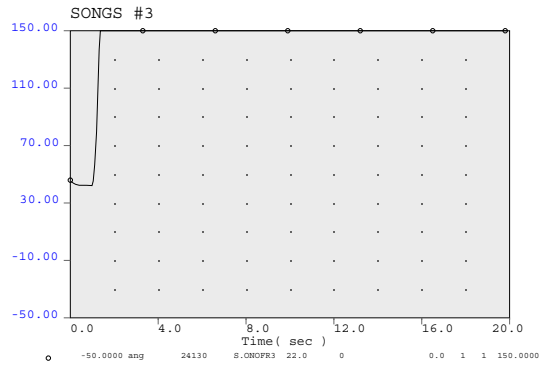
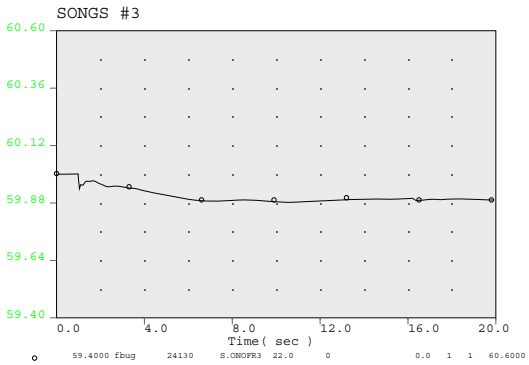
SDGE	SONGS-g1_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:45:17 2010

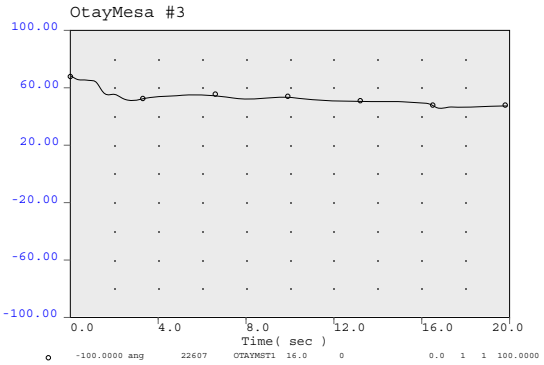
RELATIVE ROTOR ANGLE & FREQUENCY

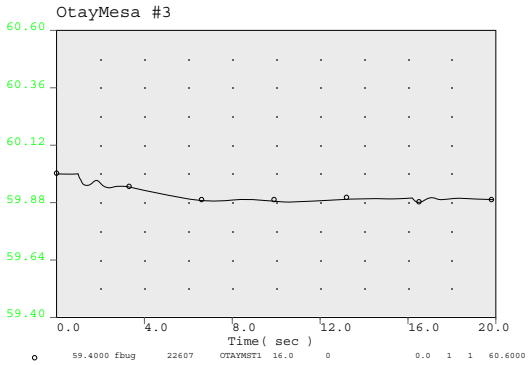










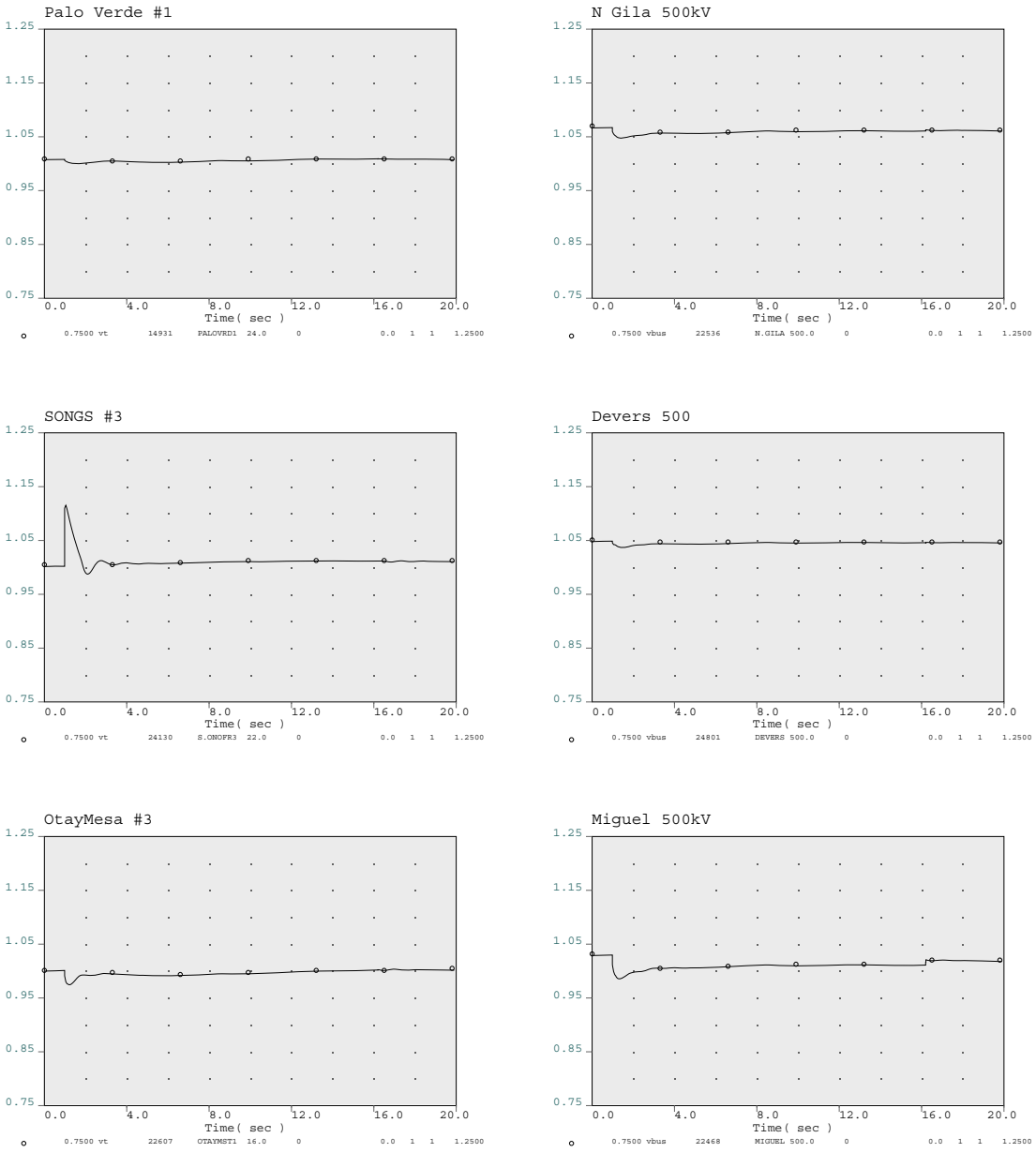


SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Page 1

SDGE	SONGS-g2_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:45:42 2010

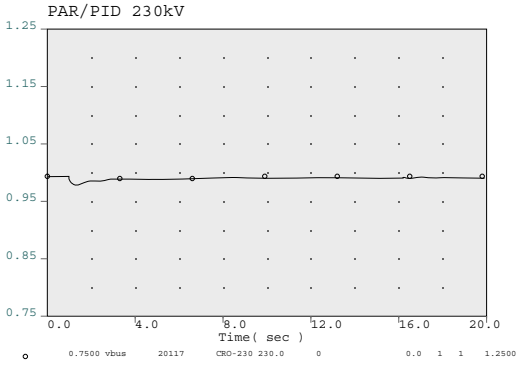
RELATIVE VOLTAGE



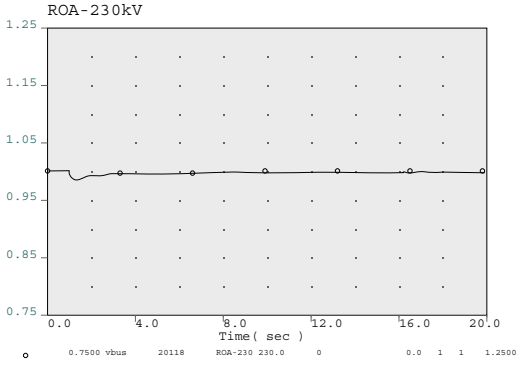
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

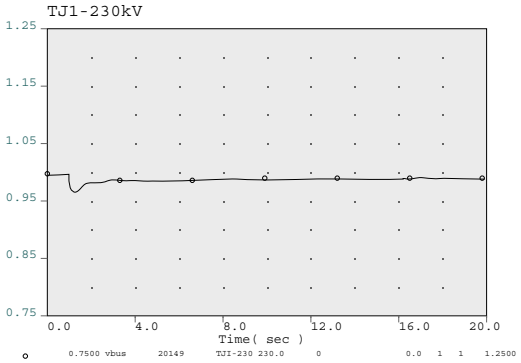
PAR/PID 230kV



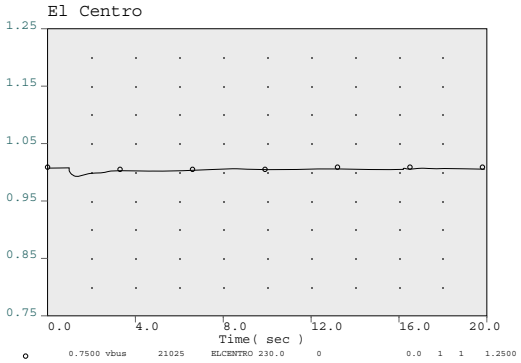
ROA-230kV



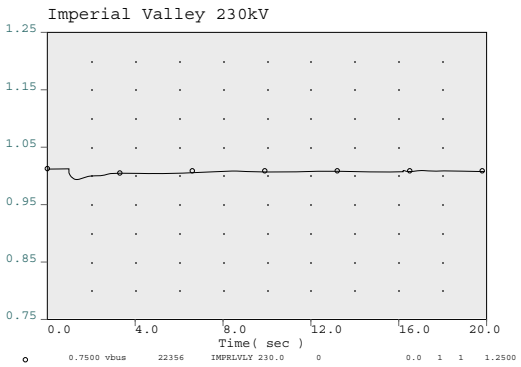
TJ1-230kV



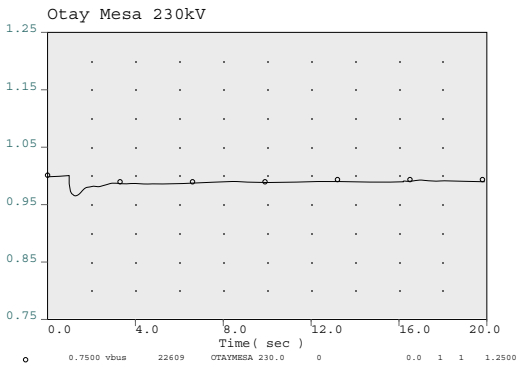
El Centro



Imperial Valley 230kV



Otay Mesa 230kV

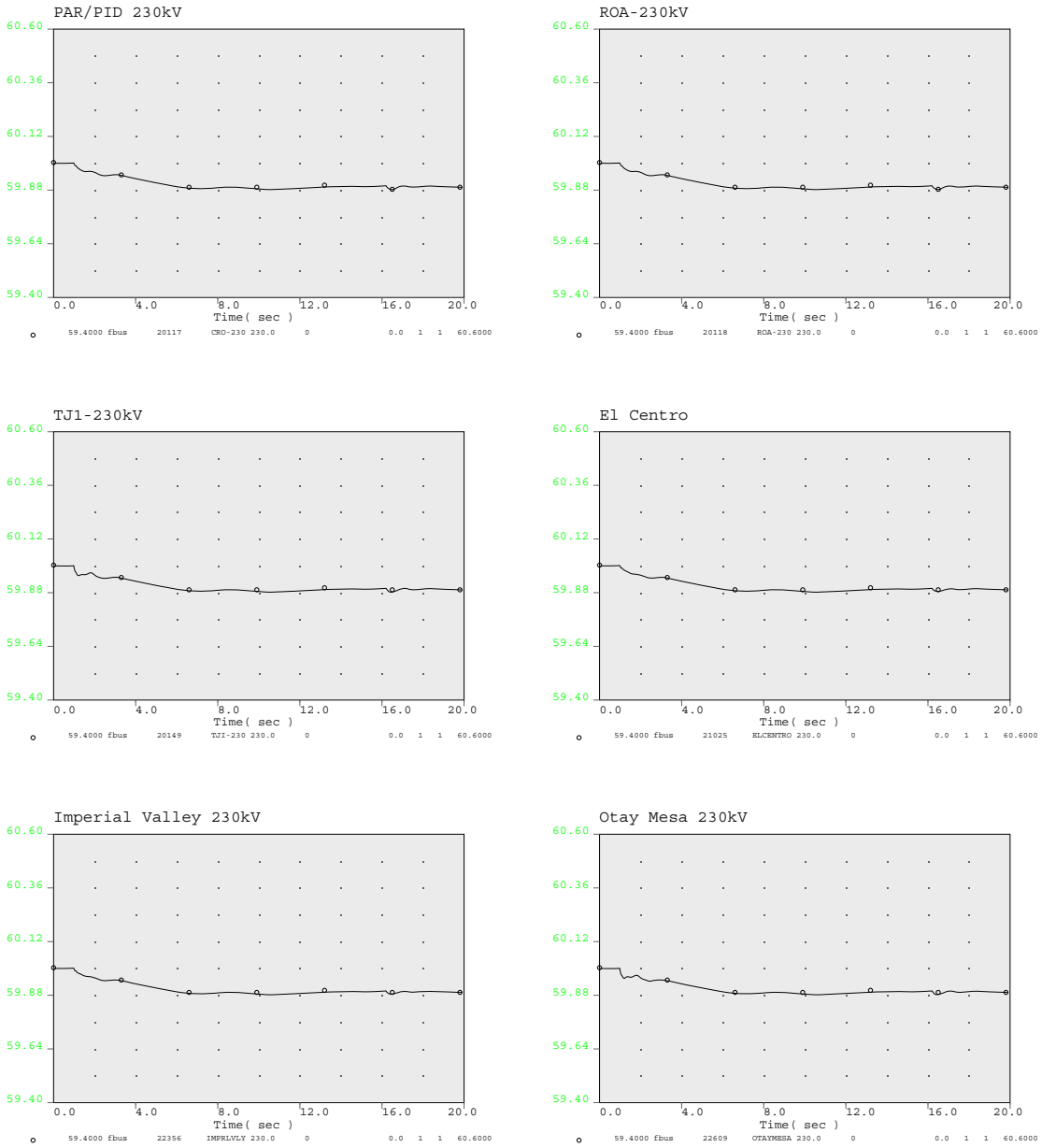


SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Page 3

SDGE	SONGS-g2_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:45:42 2010

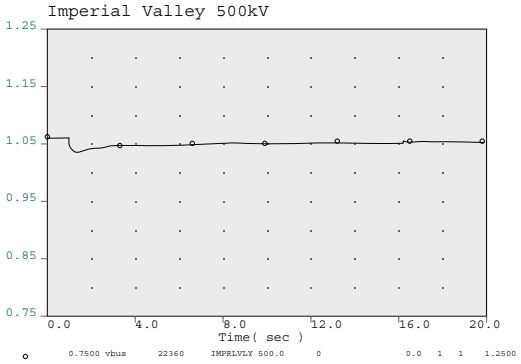
Affected System Frequency Check and Comparison



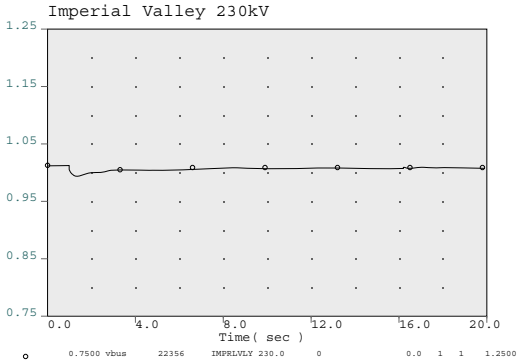
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

Imperial Valley Area - VOLTAGE

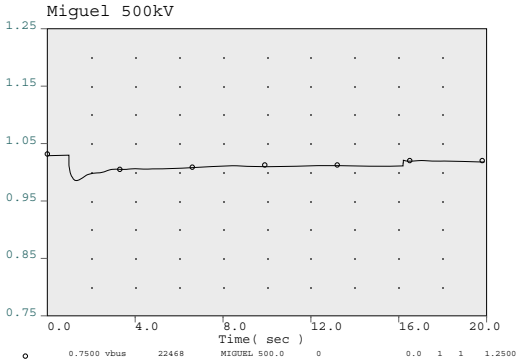
Imperial Valley 500kV



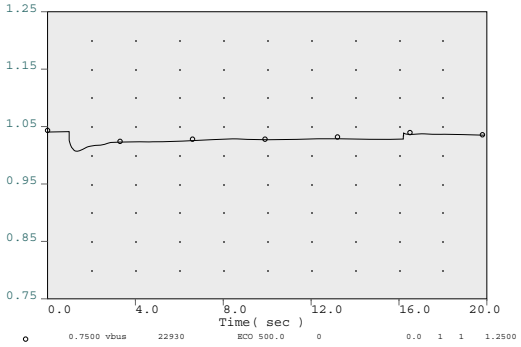
Imperial Valley 230kV



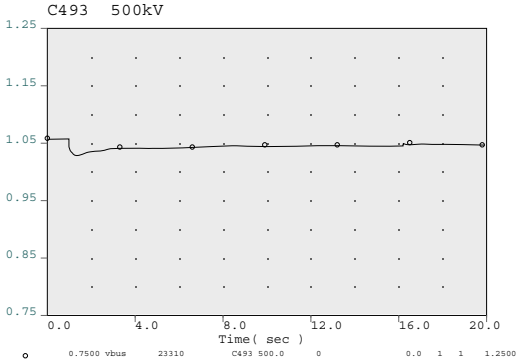
Miguel 500kV



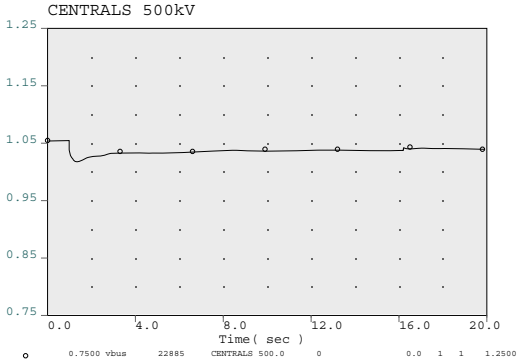
Windfarms 500



C493 500kV

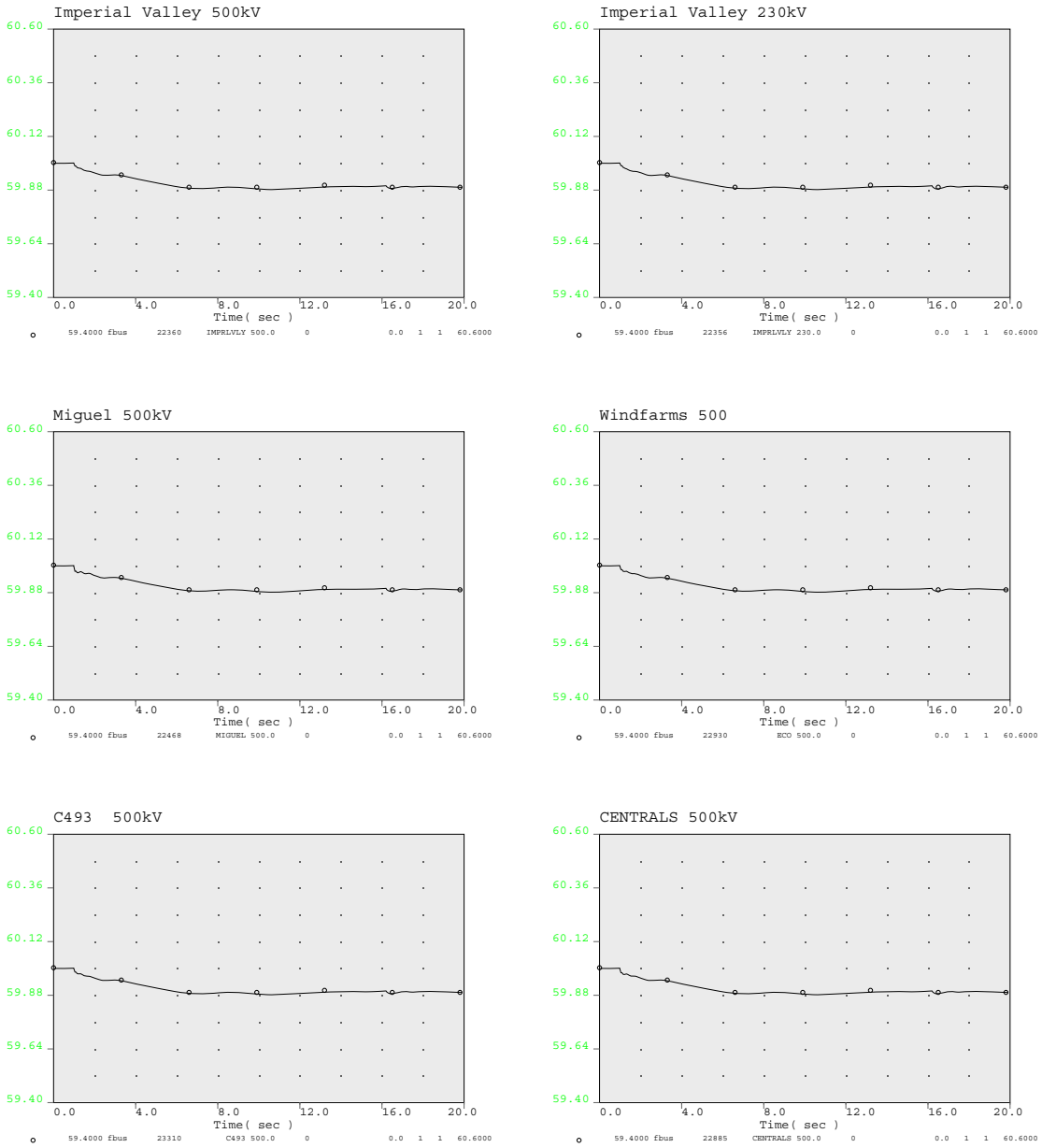


CENTRALS 500kV



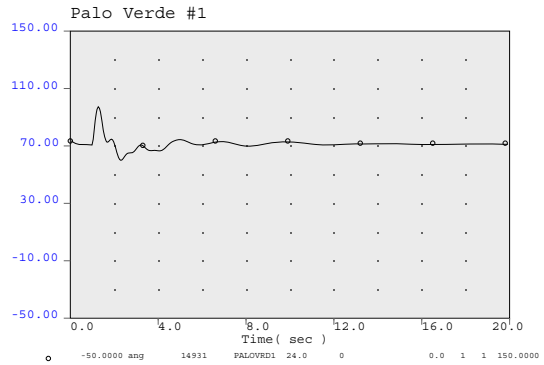
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

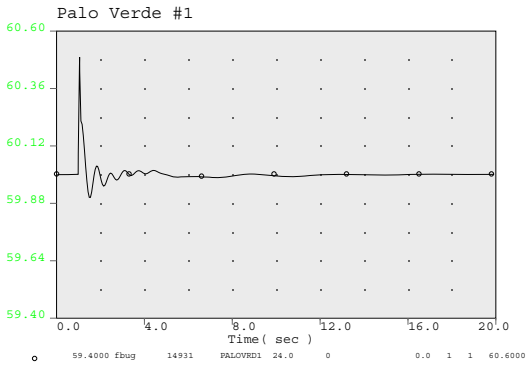
Imperial Valley Area - Frequency

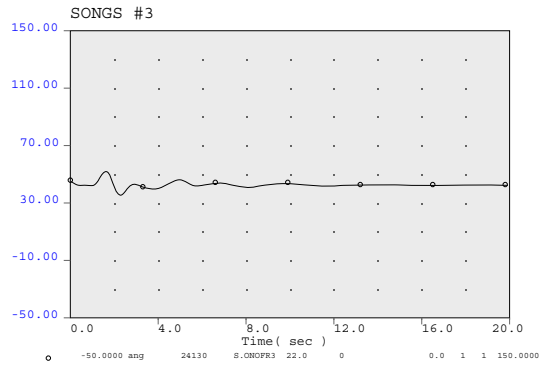


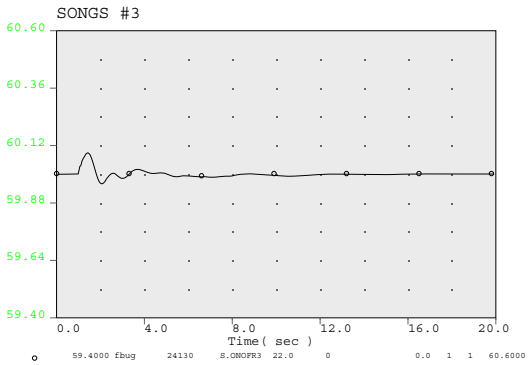
SDG&E Cluster 2 - post
2014 Heavy Summer
Trip San Onofre Generators 2 & 3

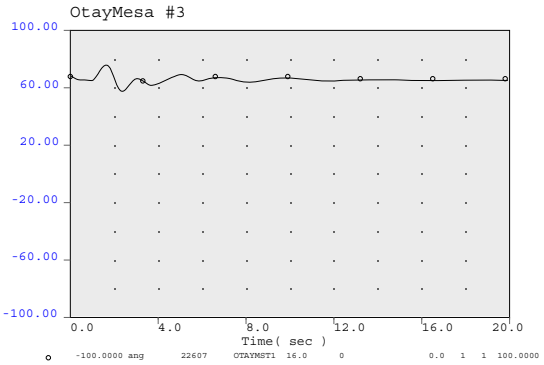
RELATIVE ROTOR ANGLE & FREQUENCY

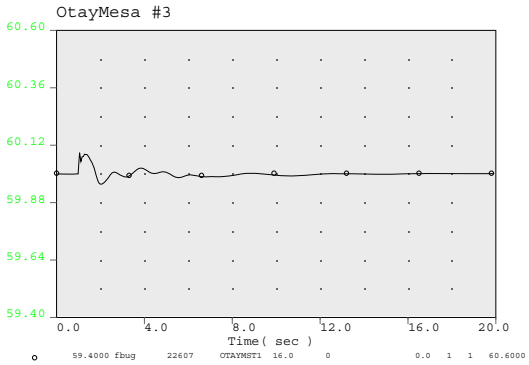












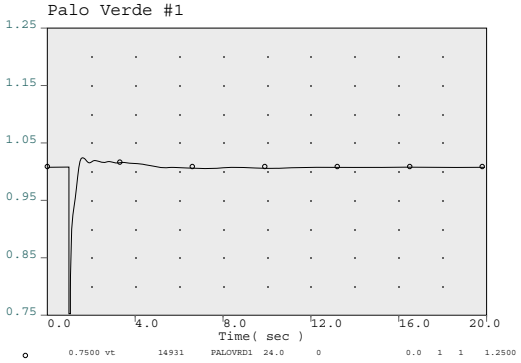
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Page 1

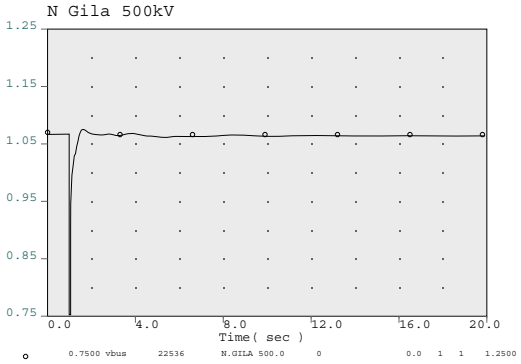
SDGE	T468_HAA_slo_pst_int5_hs.chf	b\hs\pst_int5\ws_pst_int5 Wed Oct 13 16:46:11 2010

RELATIVE VOLTAGE

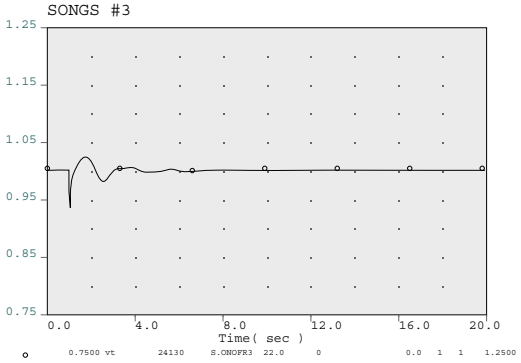
Palo Verde #1



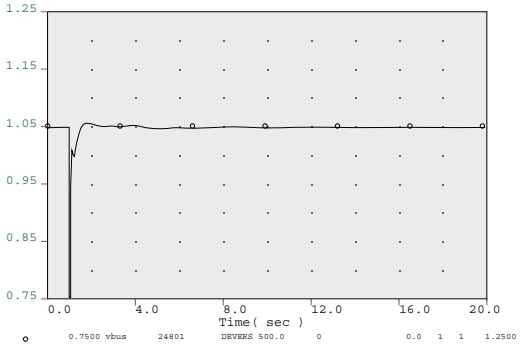
N Gila 500kV



SONGS #3



Devers 500



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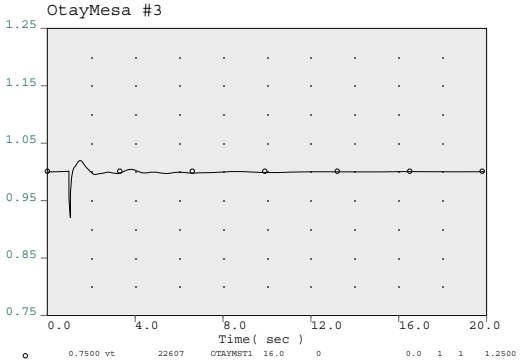
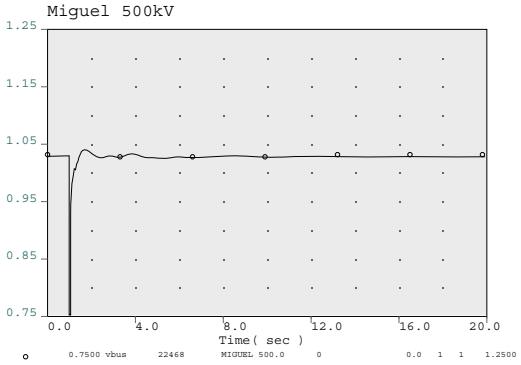


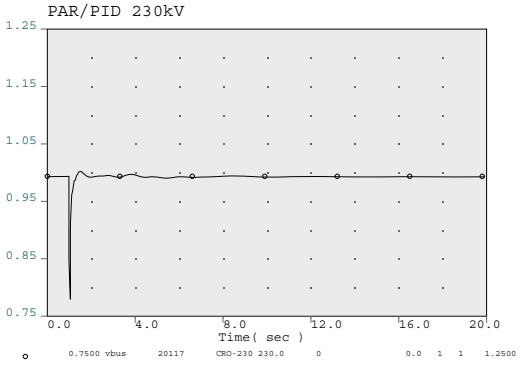
Miguel 500kV



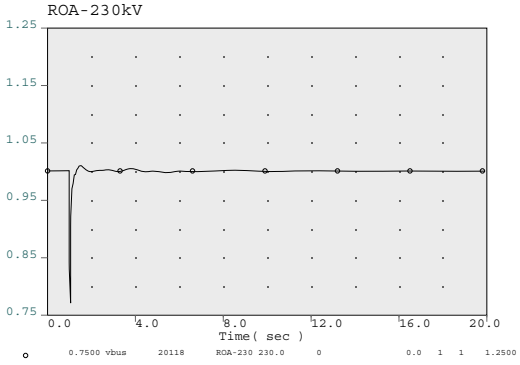
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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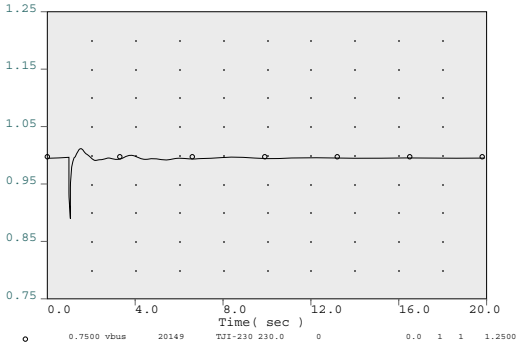

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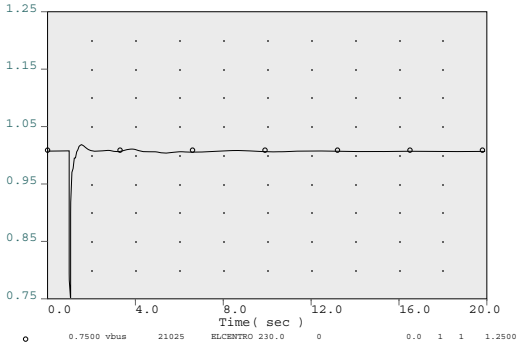
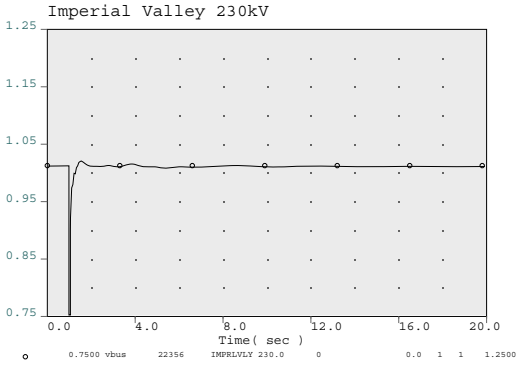


Imperial Valley 230kV



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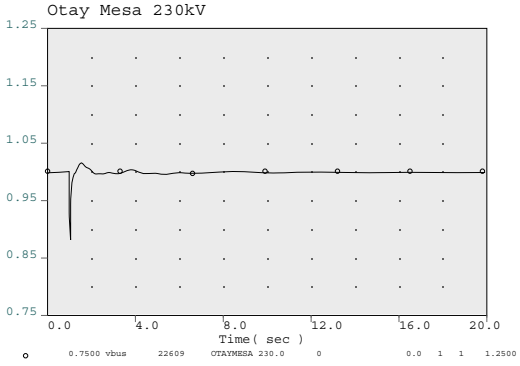
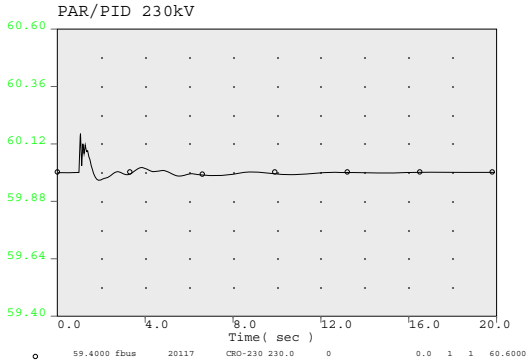


SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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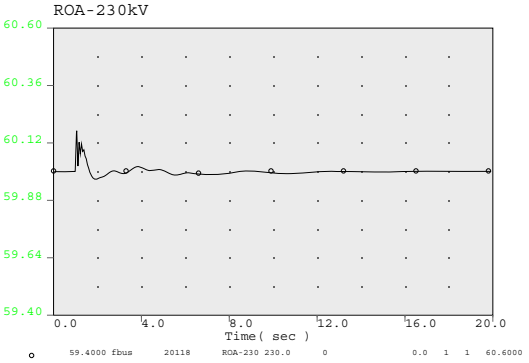
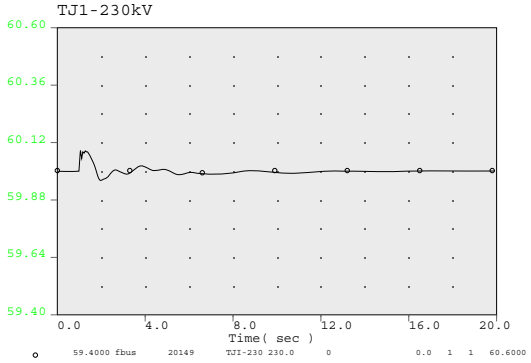
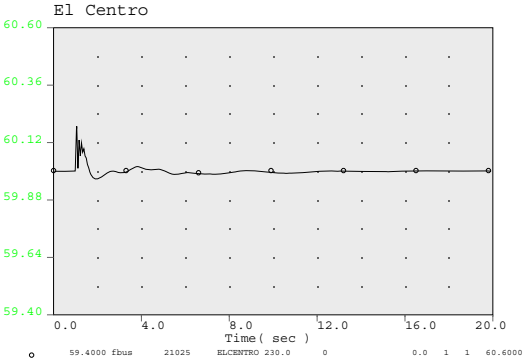


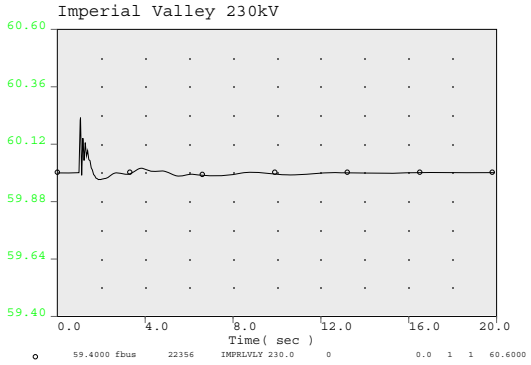
TJ1-230kV



El Centro



Imperial Valley 230kV



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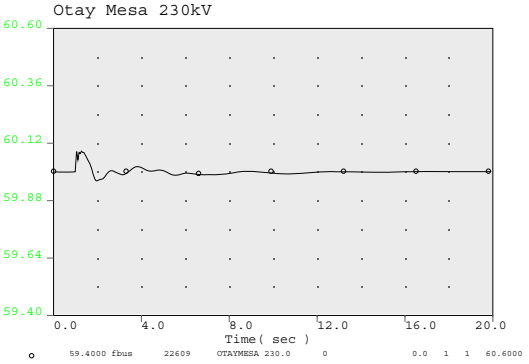
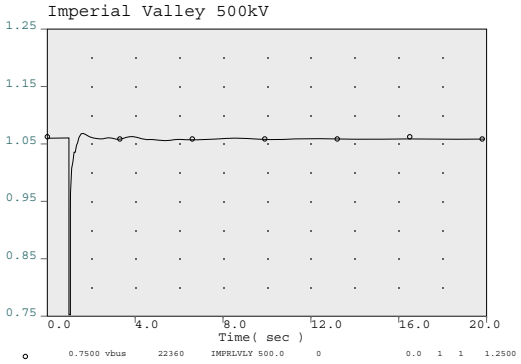


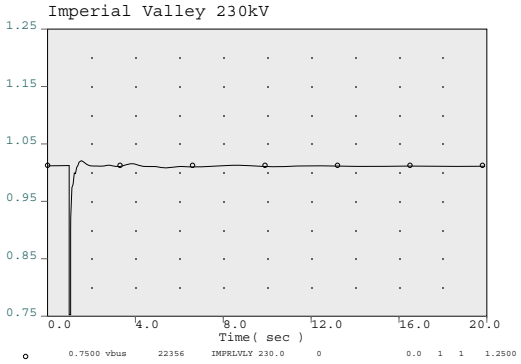
SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

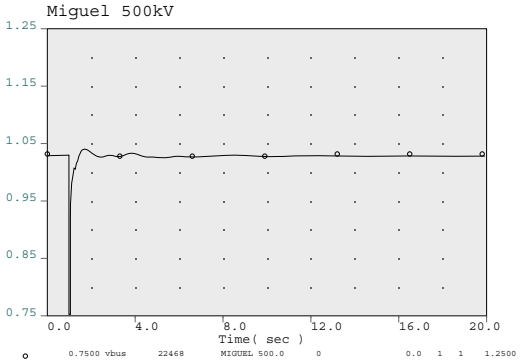
Imperial Valley 500kV



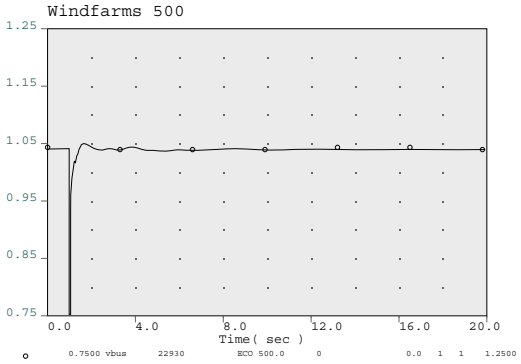
Imperial Valley 230kV



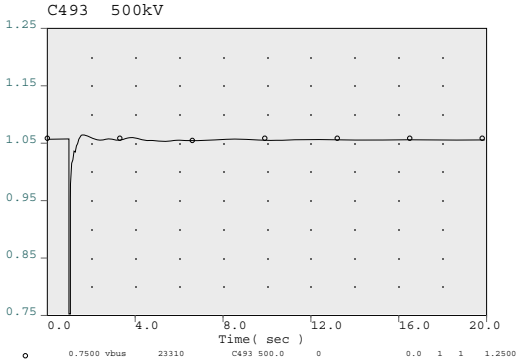
Miguel 500kV



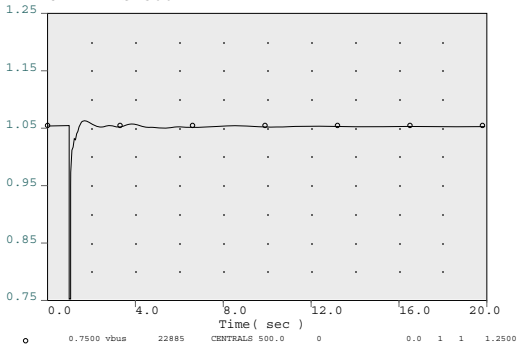
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Heavy Summer
T468-Hassyampa 500 kV line

Appendix J-10

Transient Stability Analysis Plots

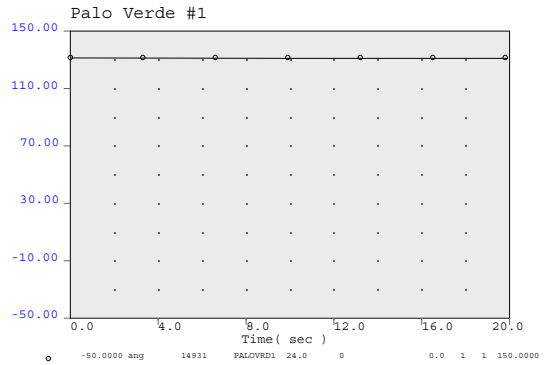
Internal Cluster

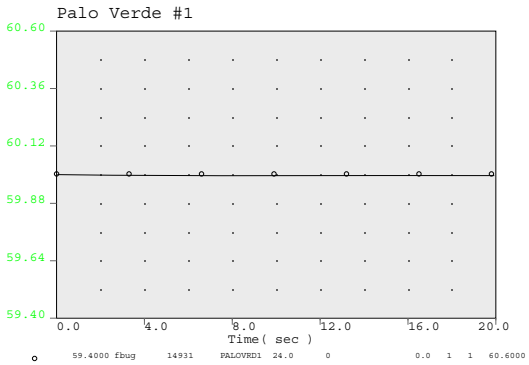
Light Load (Spring or Light Autumn) Post

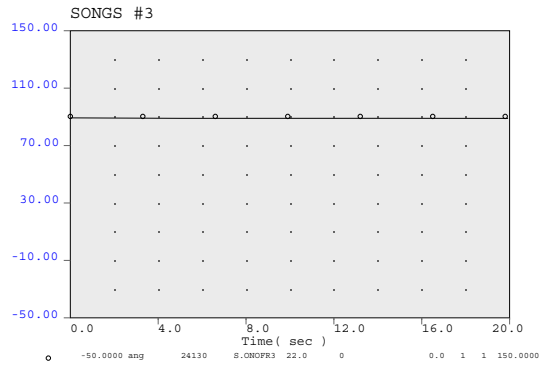
Imperial Valley Area - Frequency

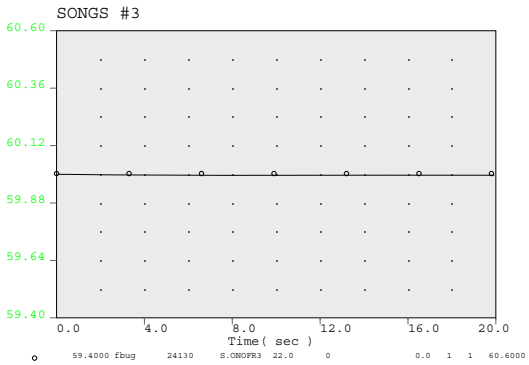
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

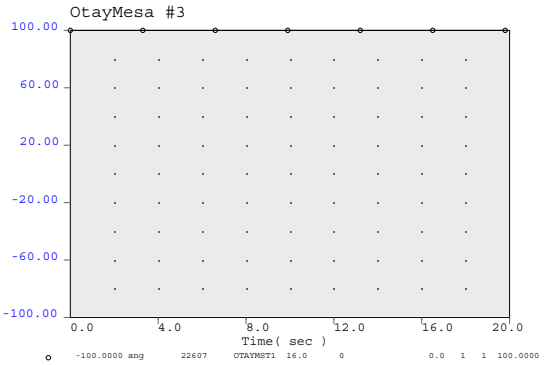
RELATIVE ROTOR ANGLE & FREQUENCY

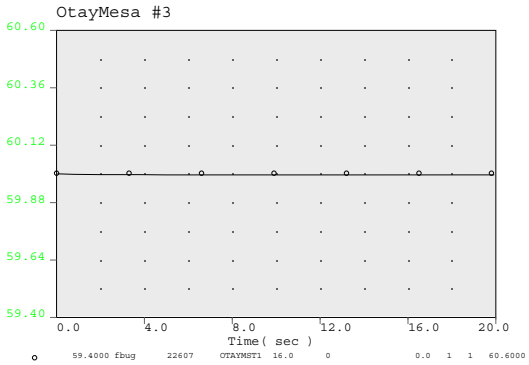












SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Page 1

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RELATIVE VOLTAGE

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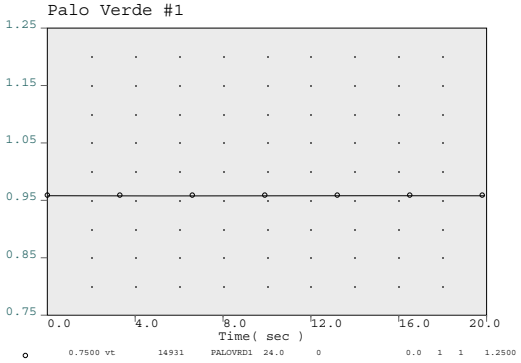

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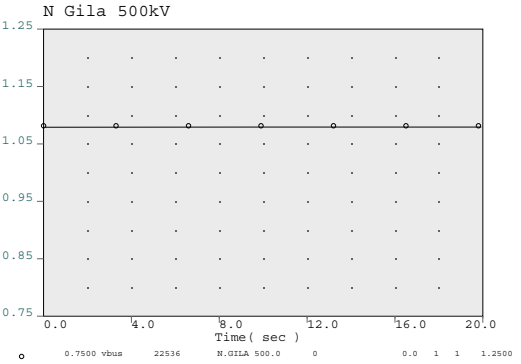

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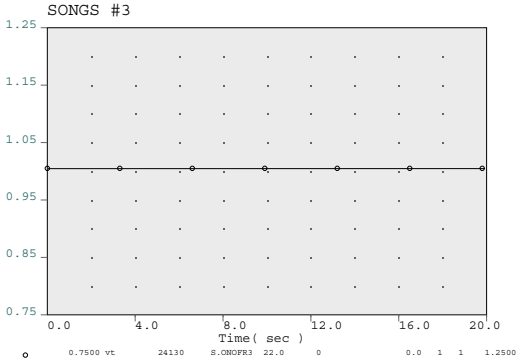
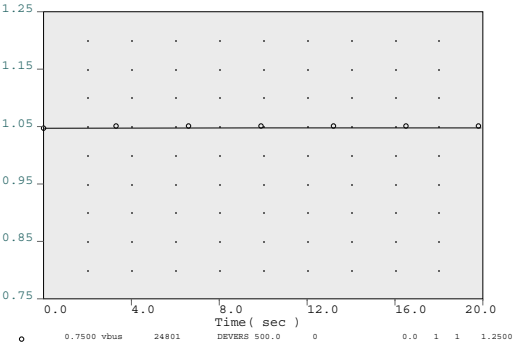


Devers 500



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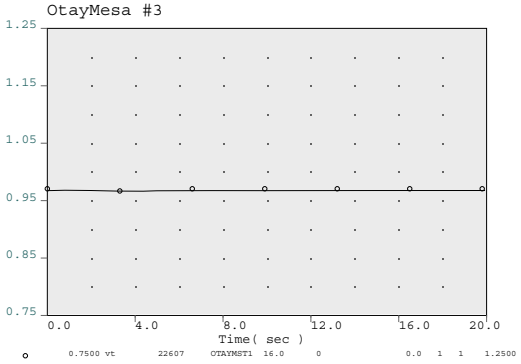
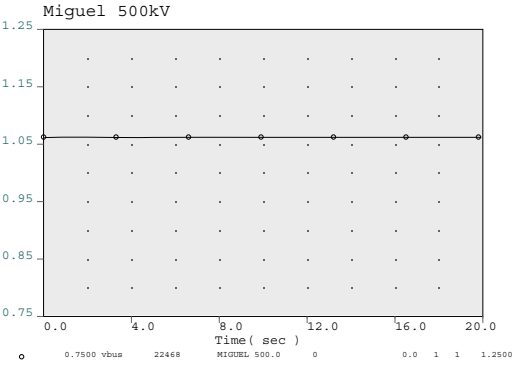


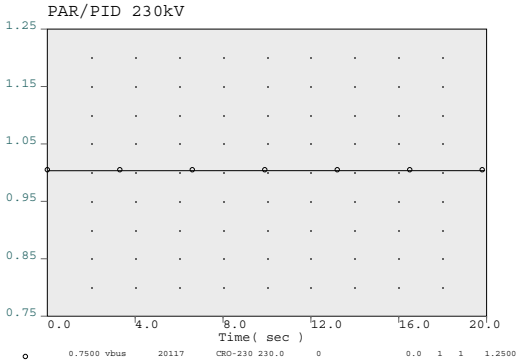
Miguel 500kV



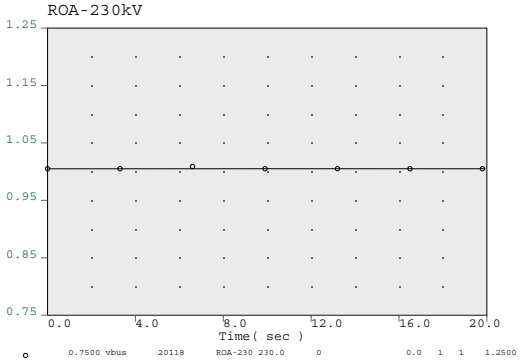
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Voltage Check and Comparison

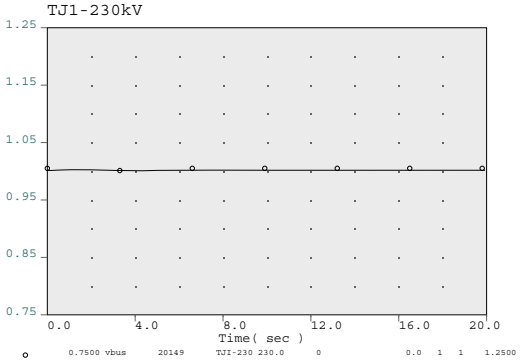
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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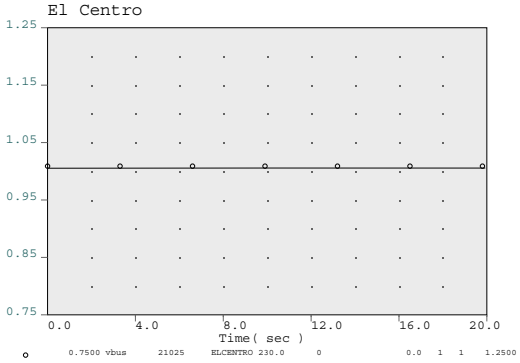
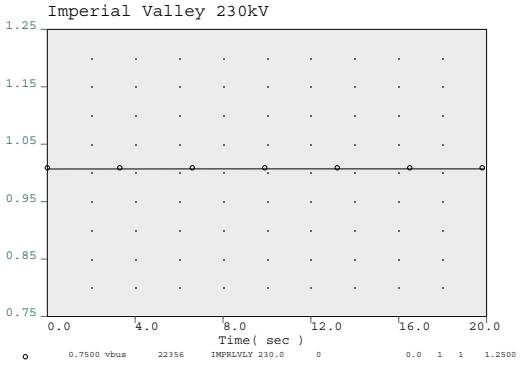
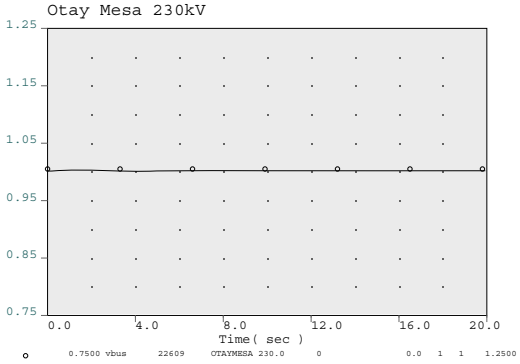


Imperial Valley 230kV



Otay Mesa 230kV



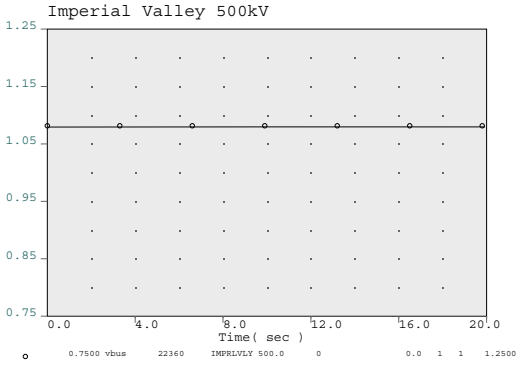
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Affected System Frequency Check and Comparison

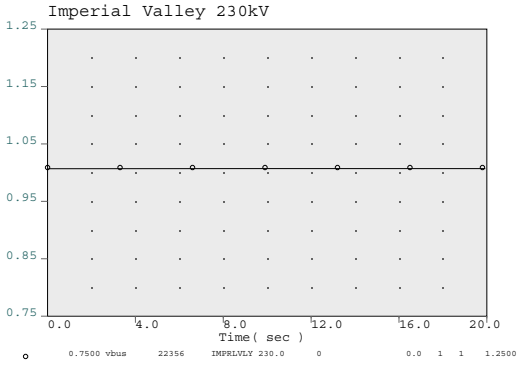
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

Imperial Valley Area - VOLTAGE

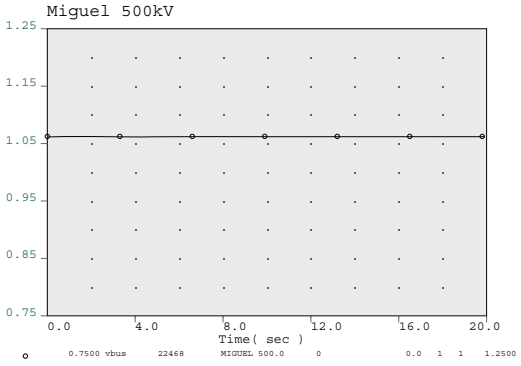
Imperial Valley 500kV



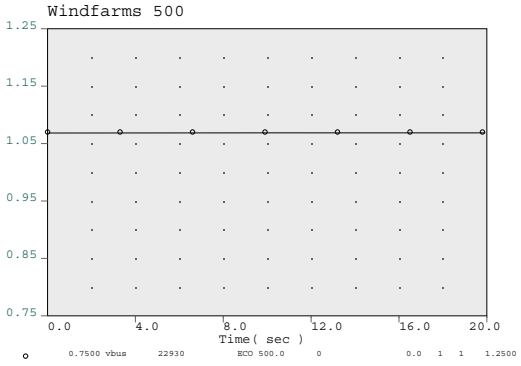
Imperial Valley 230kV



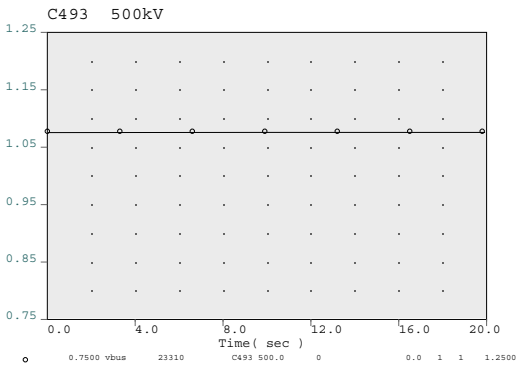
Miguel 500kV



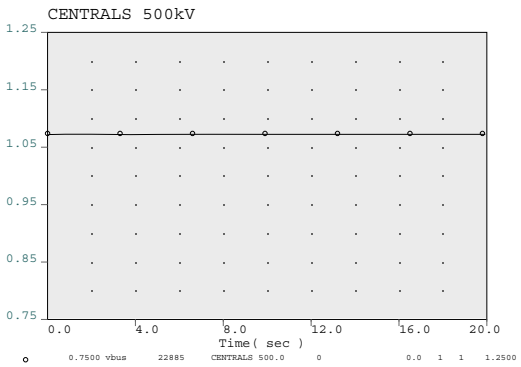
Windfarms 500



C493 500kV



CENTRALS 500kV

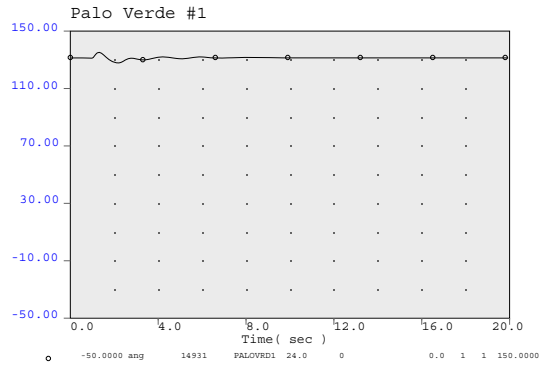


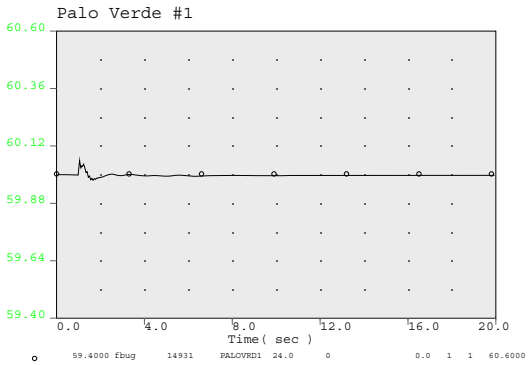
SDG&E Cluster 2 - post
2014 Light Autumn
Flat

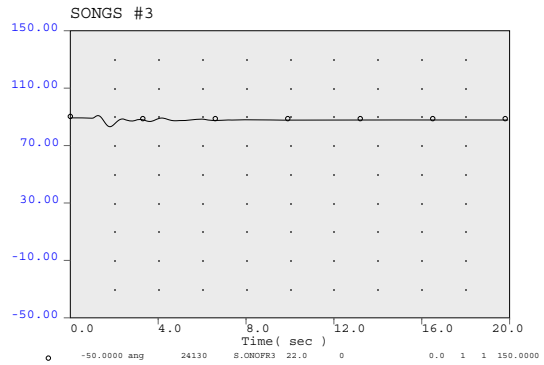
Imperial Valley Area - Frequency

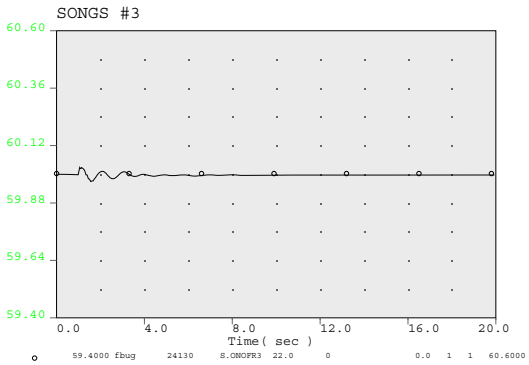
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

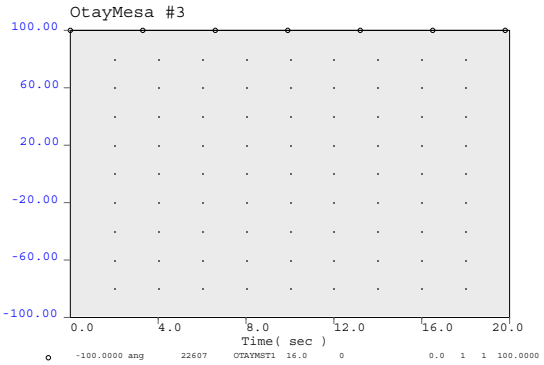
RELATIVE ROTOR ANGLE & FREQUENCY

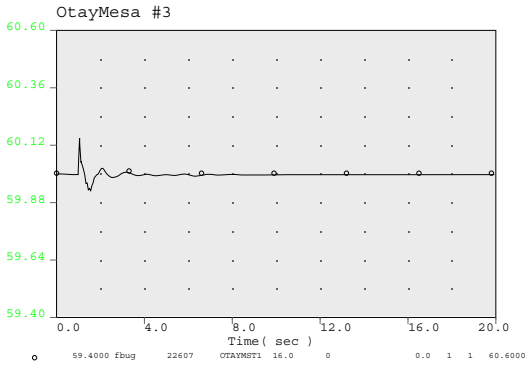












SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

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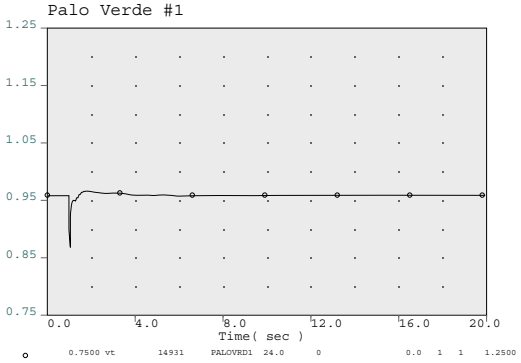
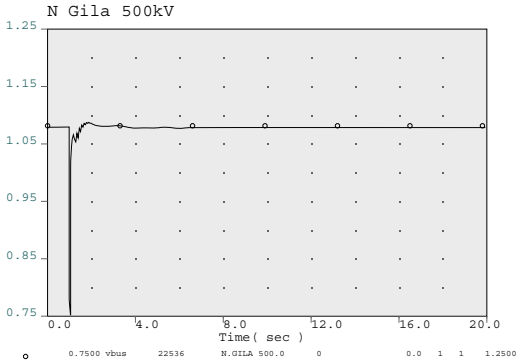
RELATIVE VOLTAGE

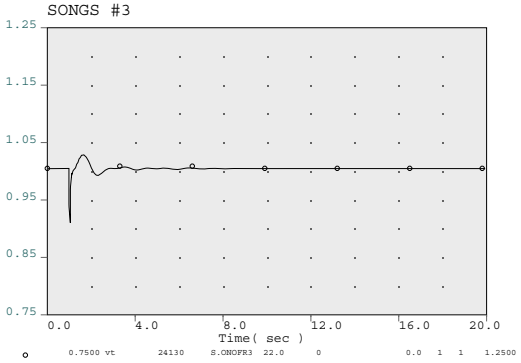
Palo Verde #1



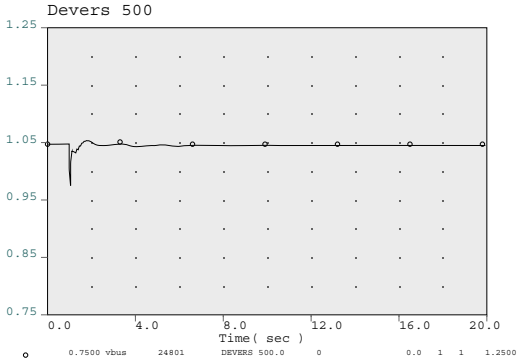
N Gila 500kV



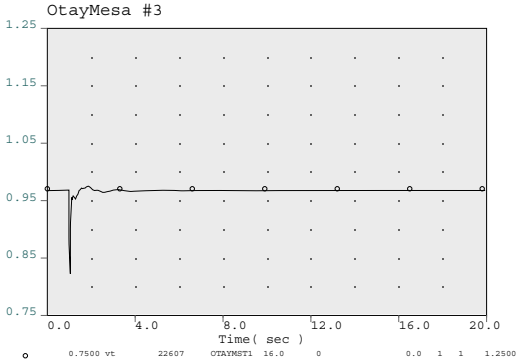
SONGS #3



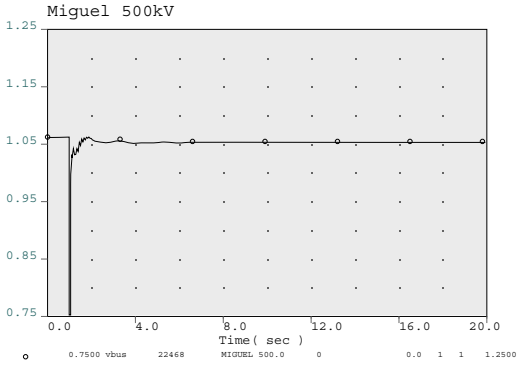
Devers 500



OtayMesa #3



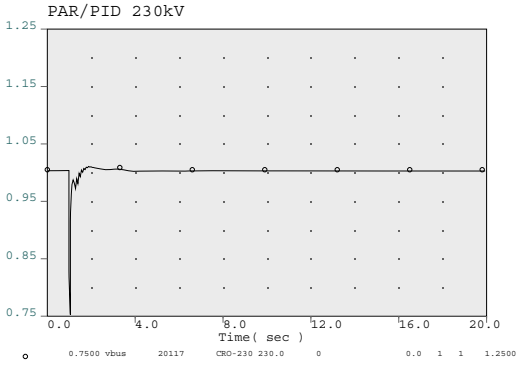
Miguel 500kV



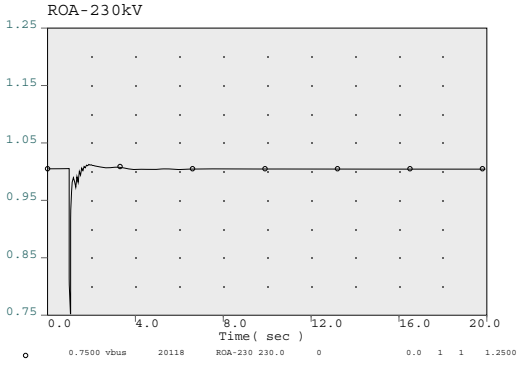
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Voltage Check and Comparison

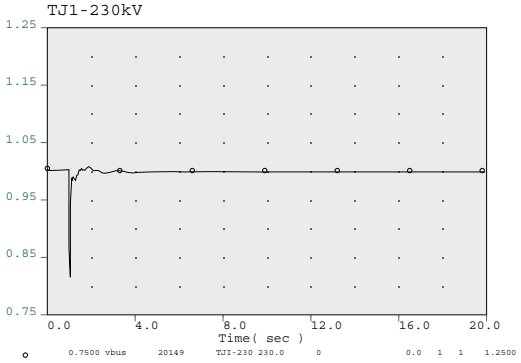
PAR/PID 230kV



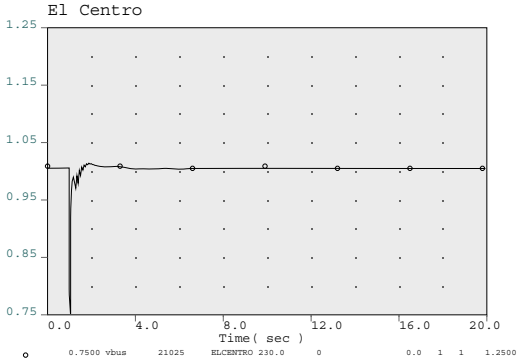
ROA-230kV



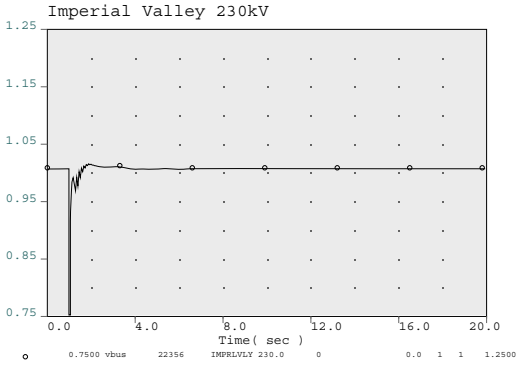
TJ1-230kV



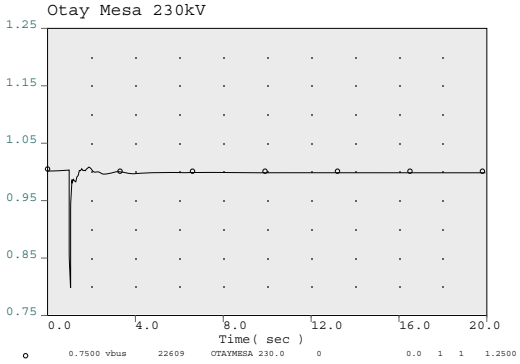
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



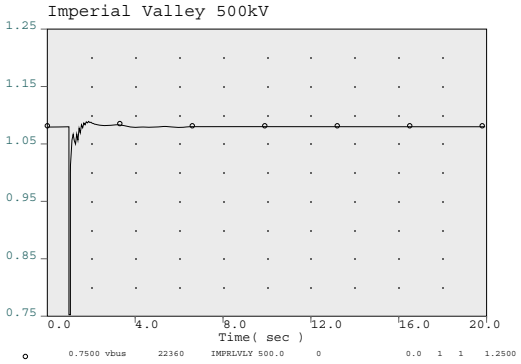
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Affected System Frequency Check and Comparison

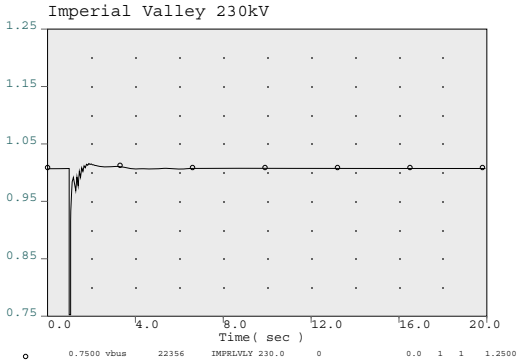
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

Imperial Valley Area - VOLTAGE

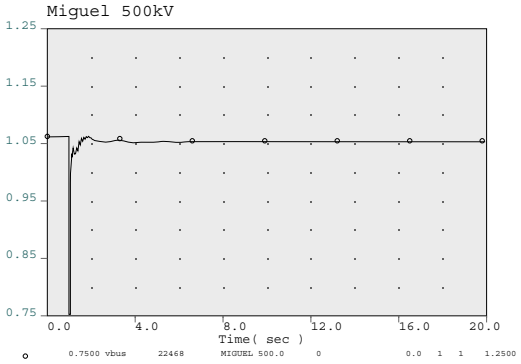
Imperial Valley 500kV



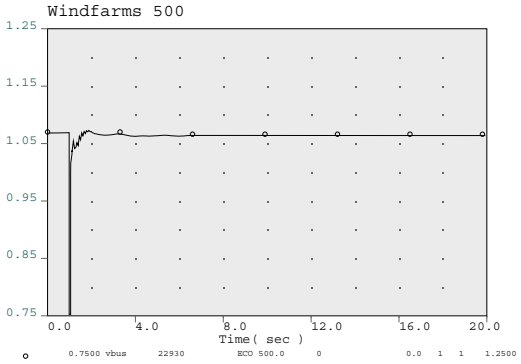
Imperial Valley 230kV



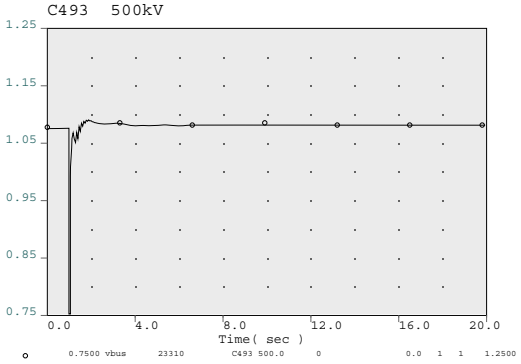
Miguel 500kV



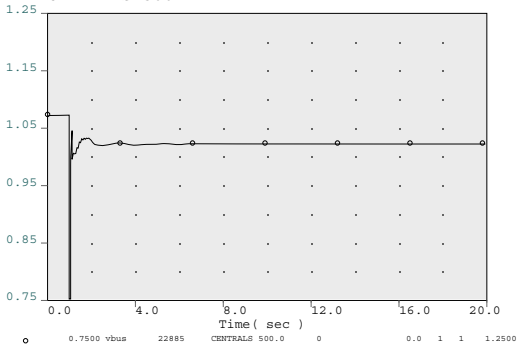
Windfarms 500



C493 500kV

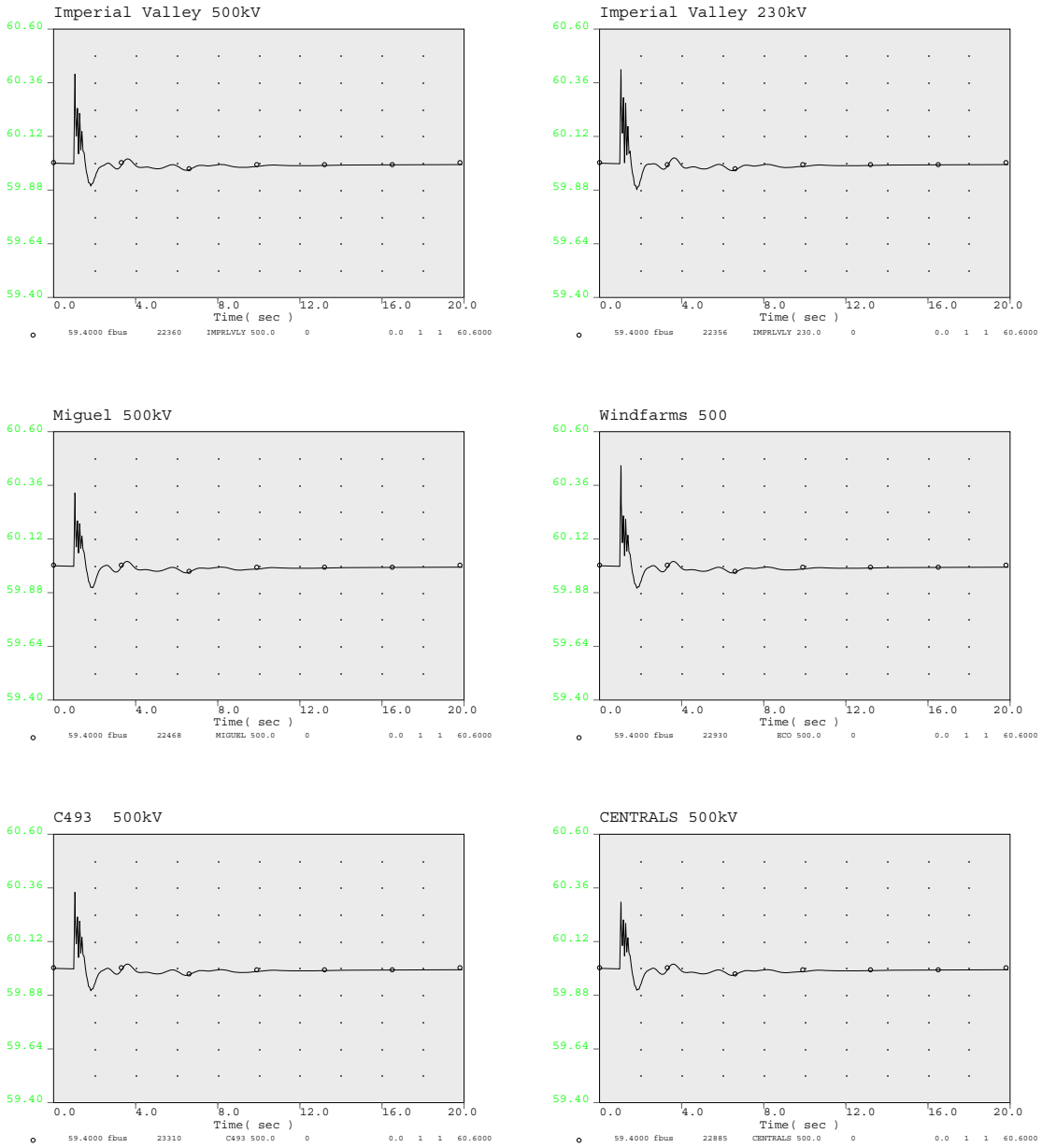


CENTRALS 500kV



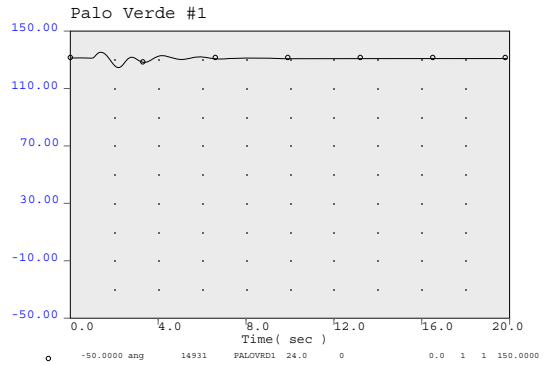
SDG&E Cluster 2 - post
2014 Light Autumn
C493 - CENTRALS 500kV line

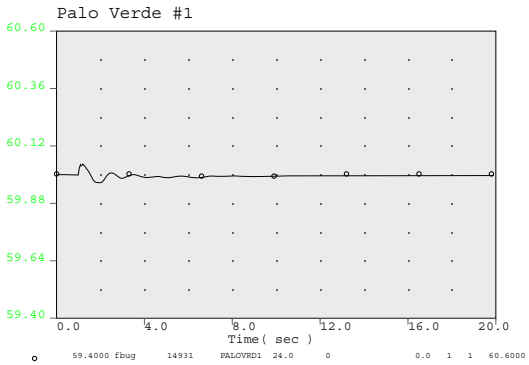
Imperial Valley Area - Frequency

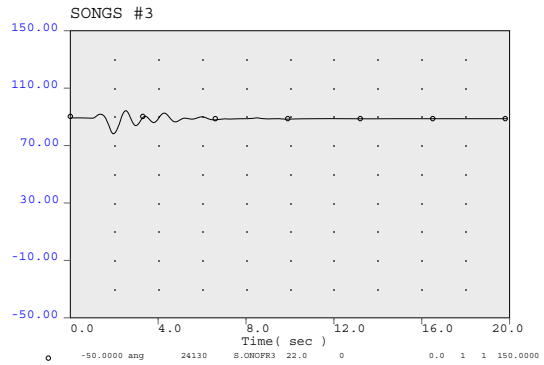


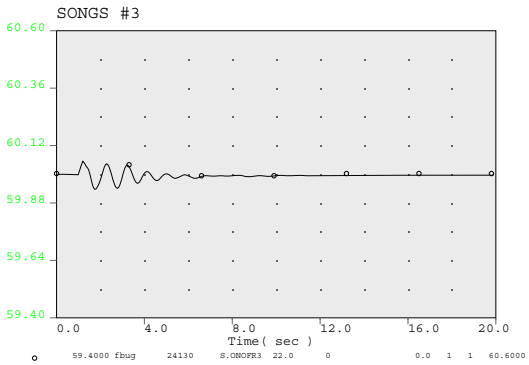
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

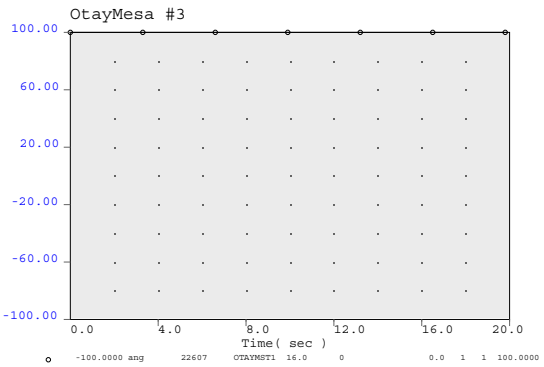
RELATIVE ROTOR ANGLE & FREQUENCY

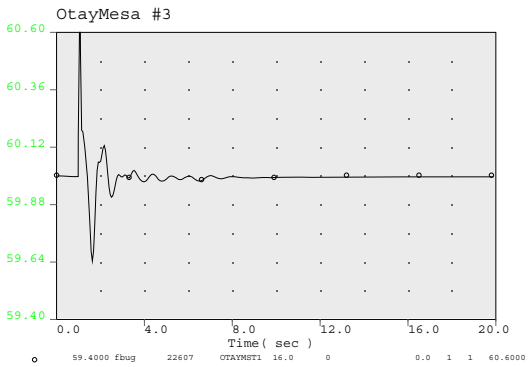








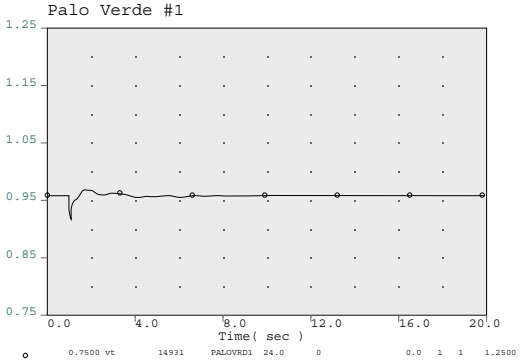




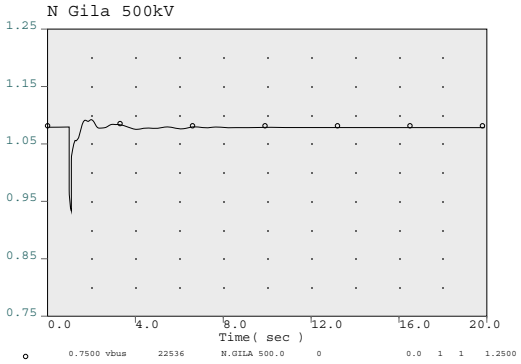
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

RELATIVE VOLTAGE

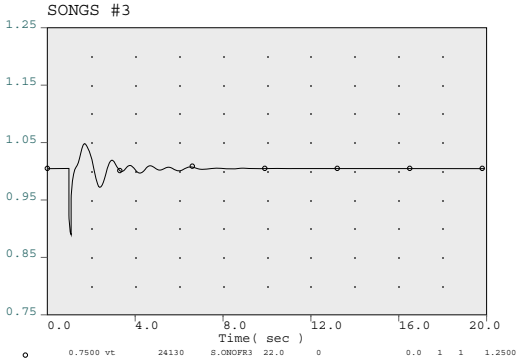
Palo Verde #1



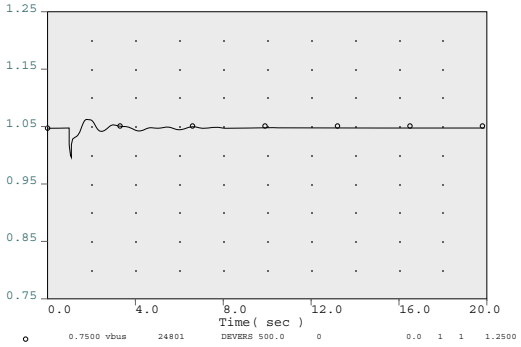
N Gila 500kV



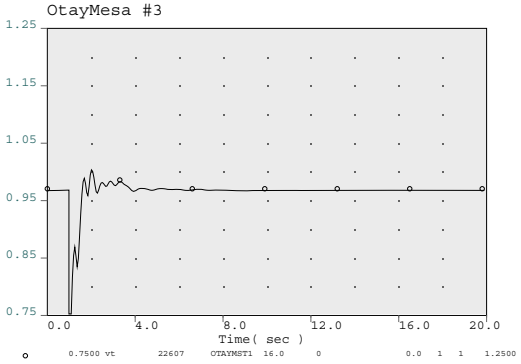
SONGS #3



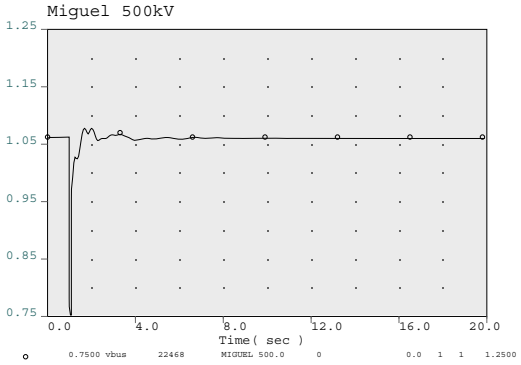
Devers 500



OtayMesa #3



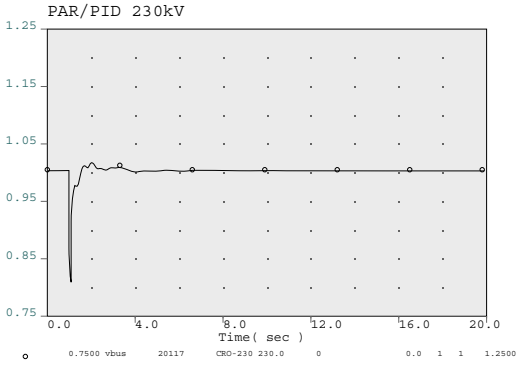
Miguel 500kV



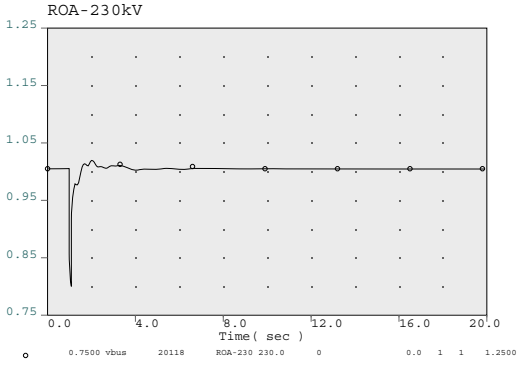
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

Affected System Voltage Check and Comparison

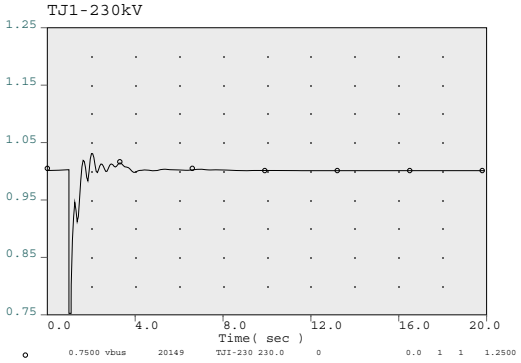
PAR/PID 230kV



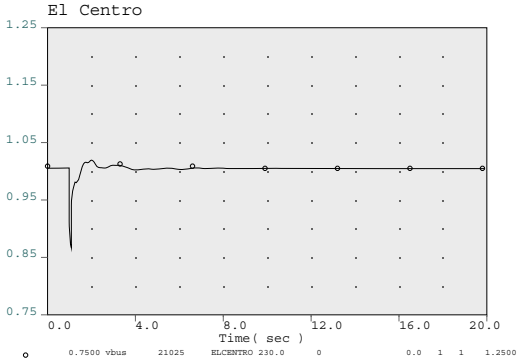
ROA-230kV



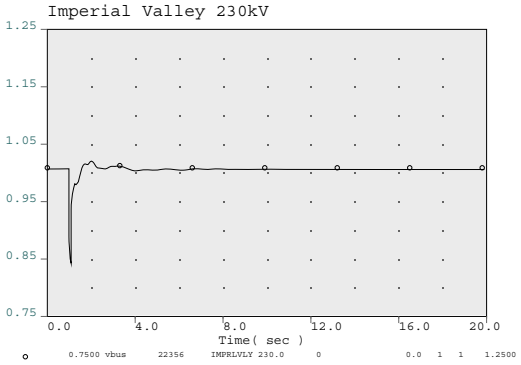
TJ1-230kV



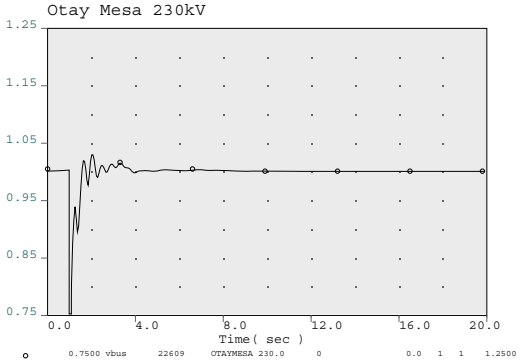
El Centro



Imperial Valley 230kV

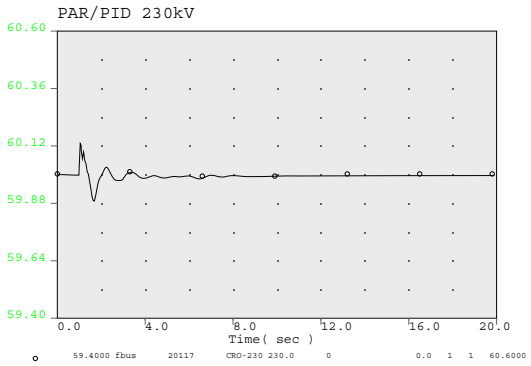


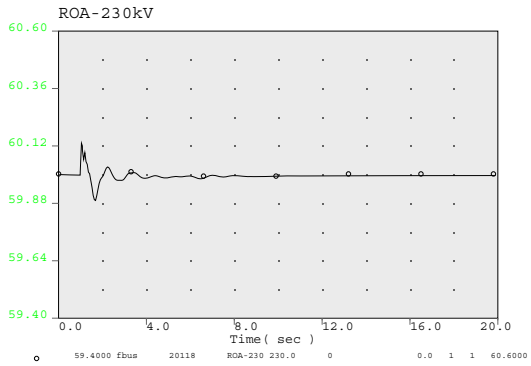
Otay Mesa 230kV

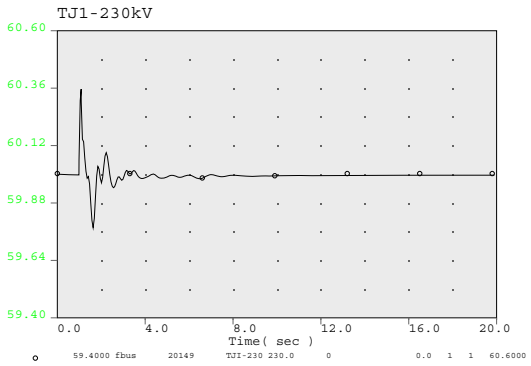


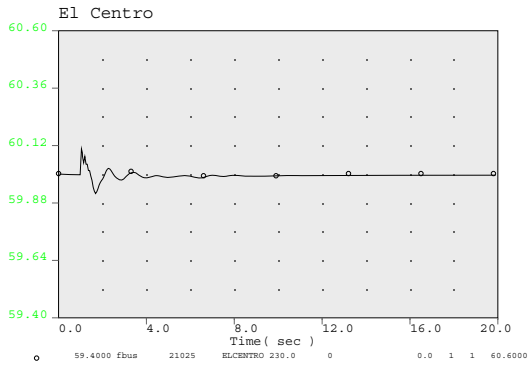
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

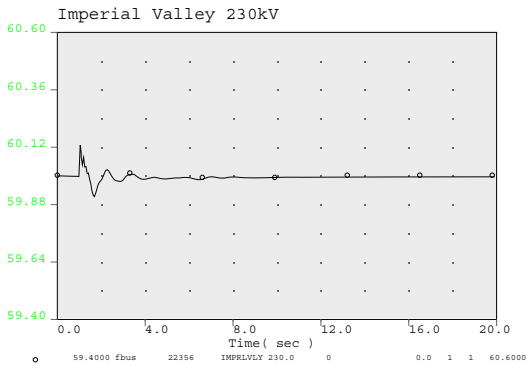
Affected System Frequency Check and Comparison

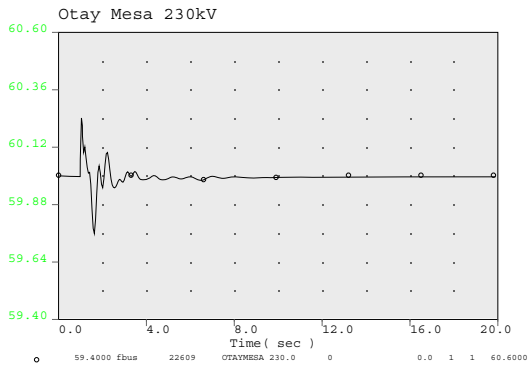








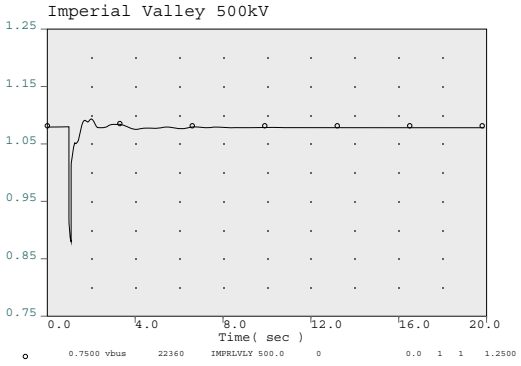




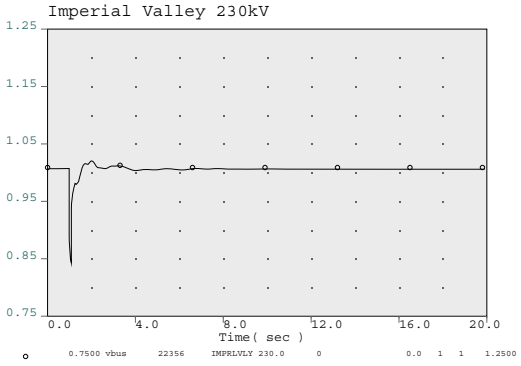
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

Imperial Valley Area - VOLTAGE

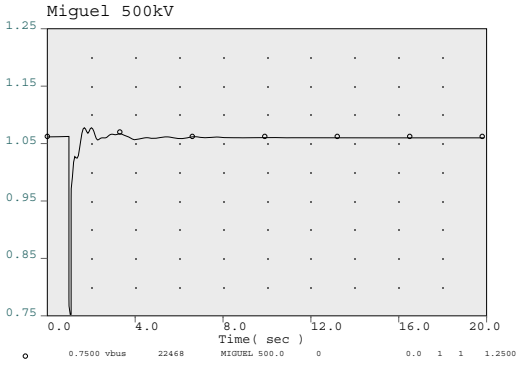
Imperial Valley 500kV



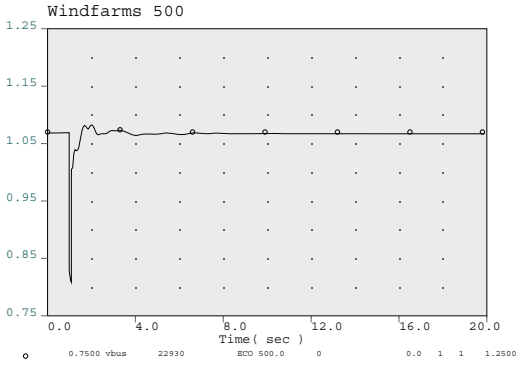
Imperial Valley 230kV



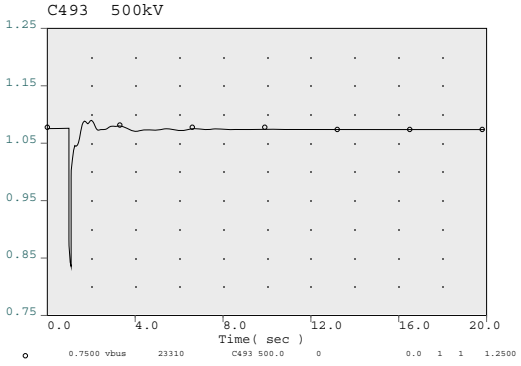
Miguel 500kV



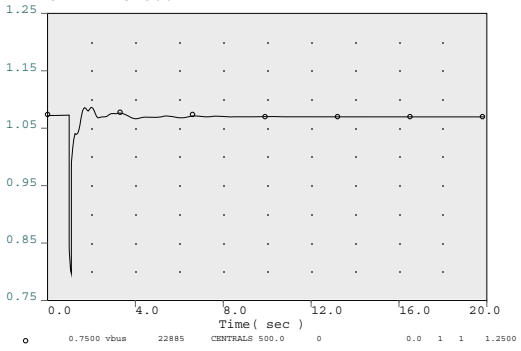
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

Page 5

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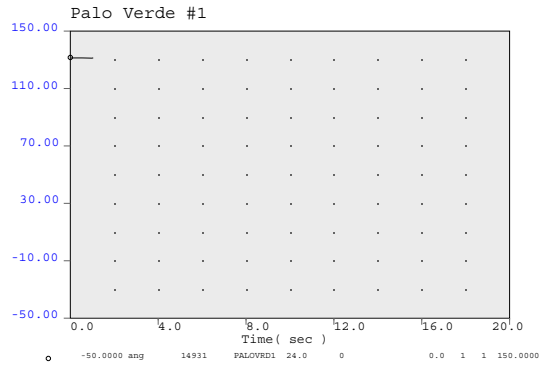
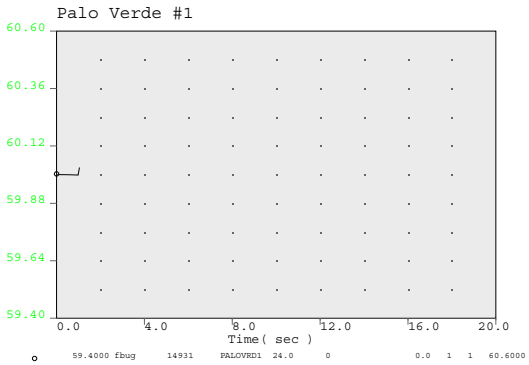
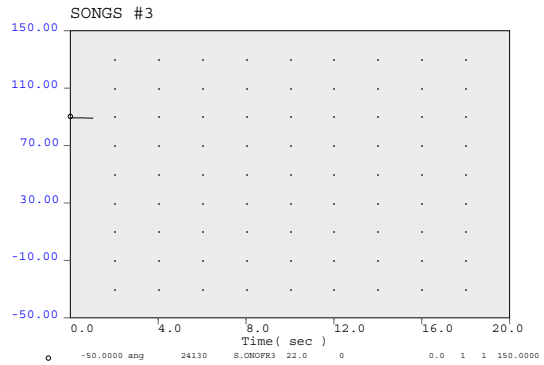
Imperial Valley Area - Frequency

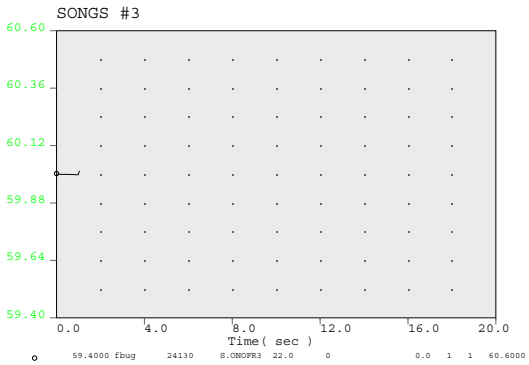
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SX 230 kV N-1

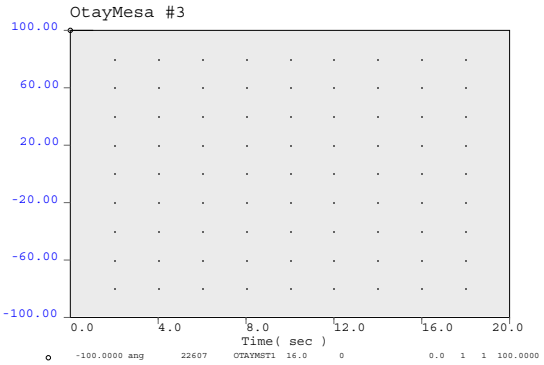
RELATIVE ROTOR ANGLE & FREQUENCY

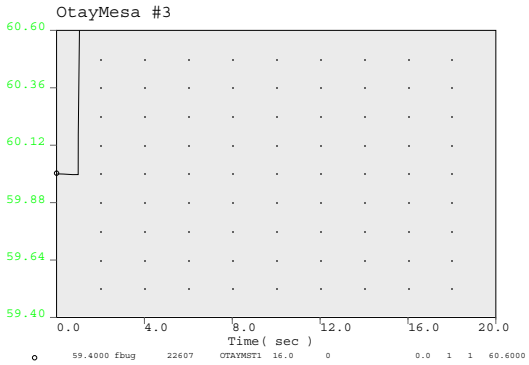












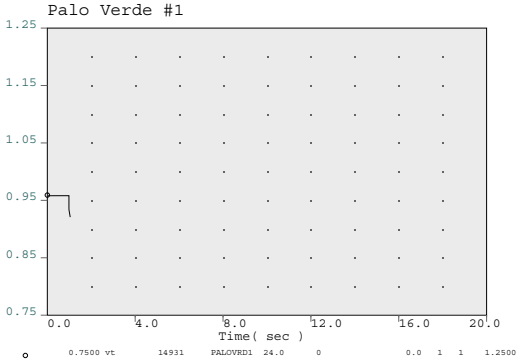
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

Page 1

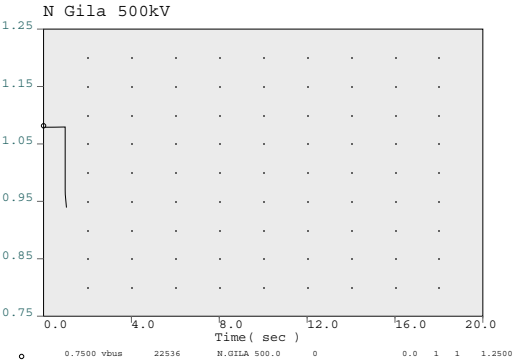
int_C574-SX_SYwRAS_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:26:37 2010

RELATIVE VOLTAGE

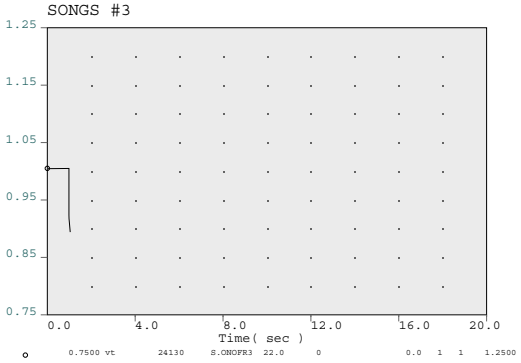
Palo Verde #1



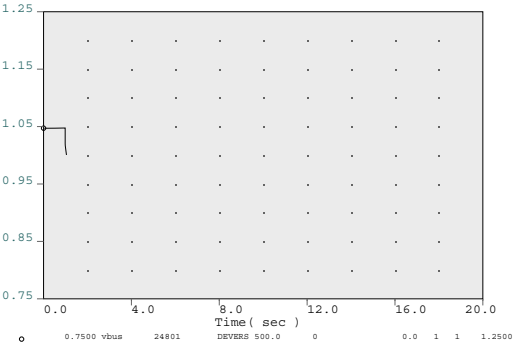
N Gila 500kV



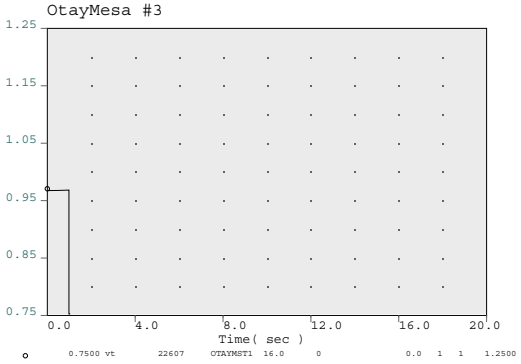
SONGS #3



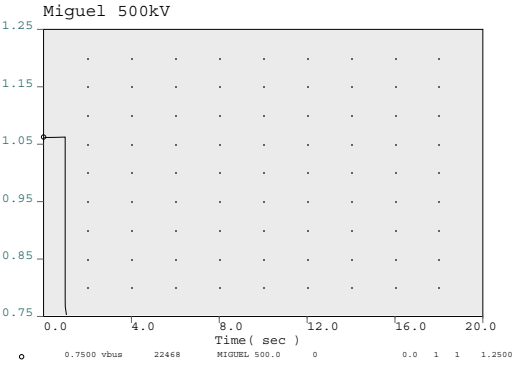
Devers 500



OtayMesa #3



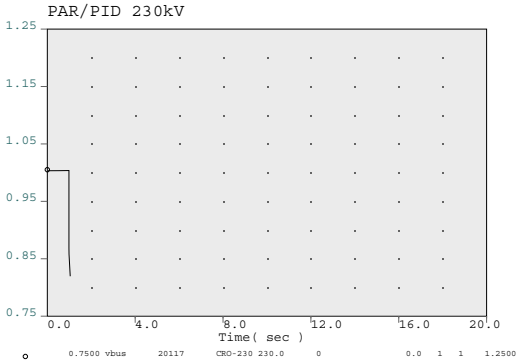
Miguel 500kV



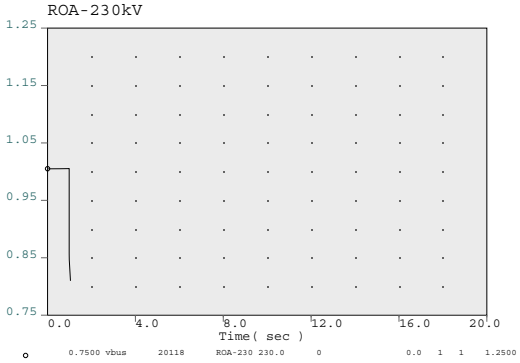
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

Affected System Voltage Check and Comparison

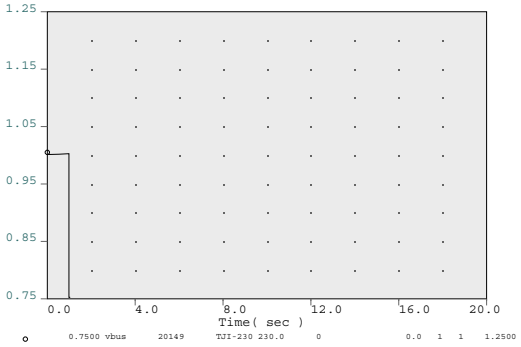
PAR/PID 230kV



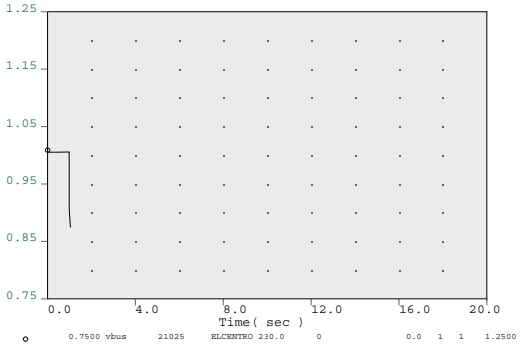
ROA-230kV



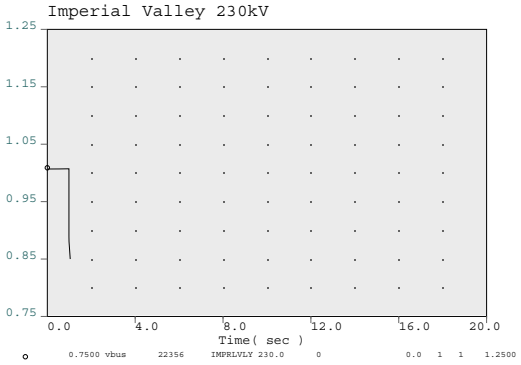
TJ1-230kV



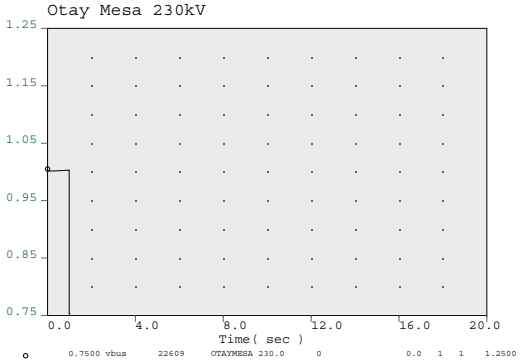
El Centro



Imperial Valley 230kV

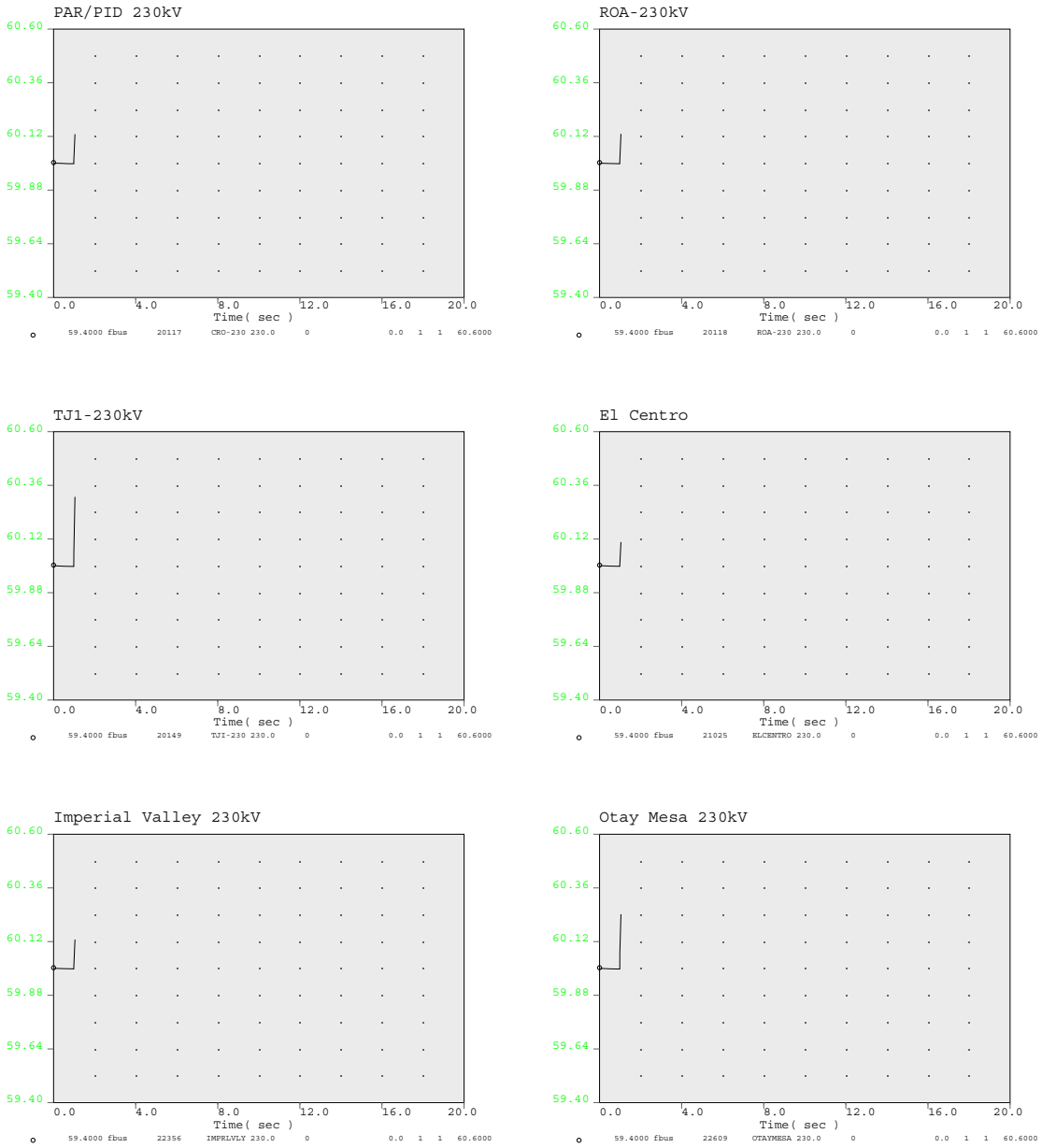


Otay Mesa 230kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

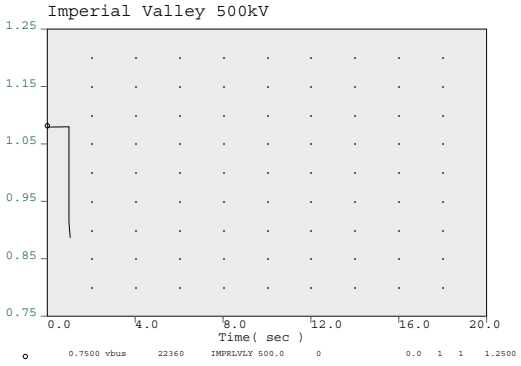
Affected System Frequency Check and Comparison



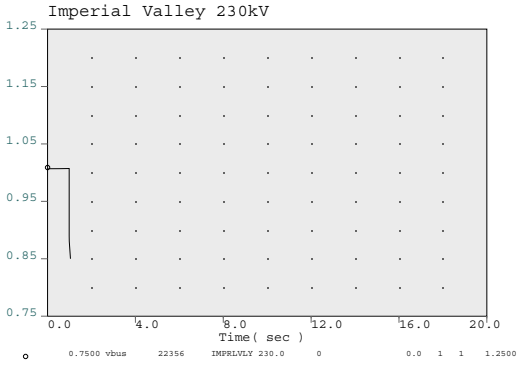
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

Imperial Valley Area - VOLTAGE

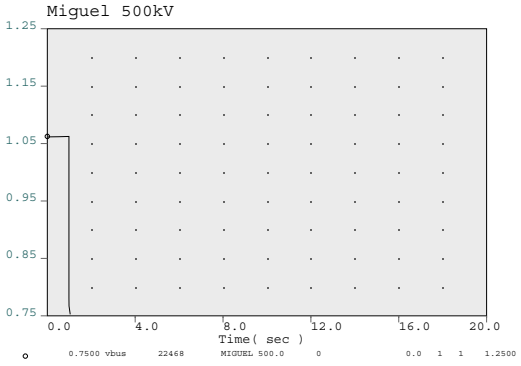
Imperial Valley 500kV



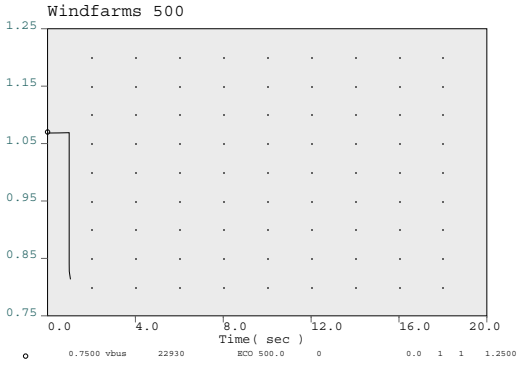
Imperial Valley 230kV



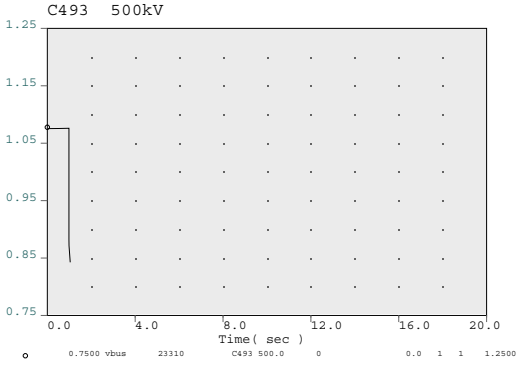
Miguel 500kV



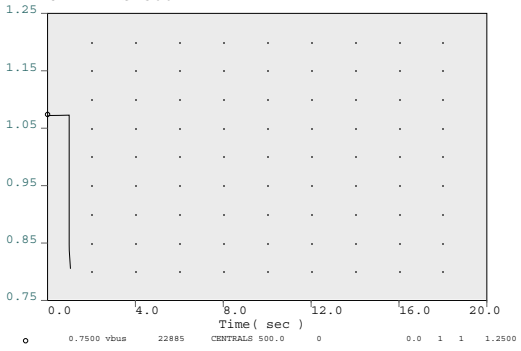
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

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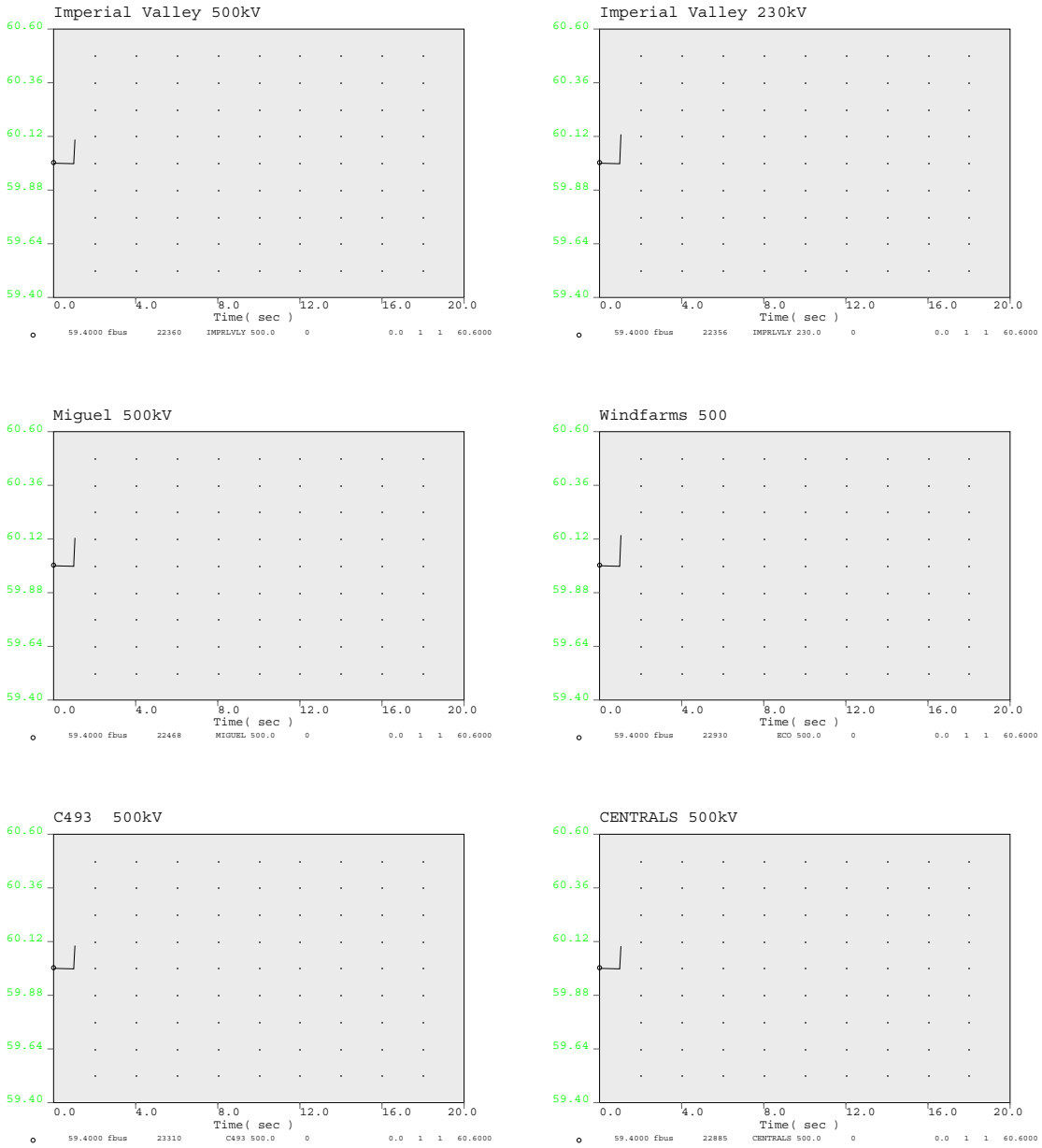
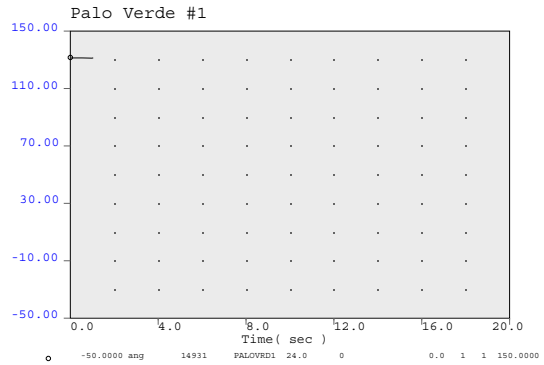
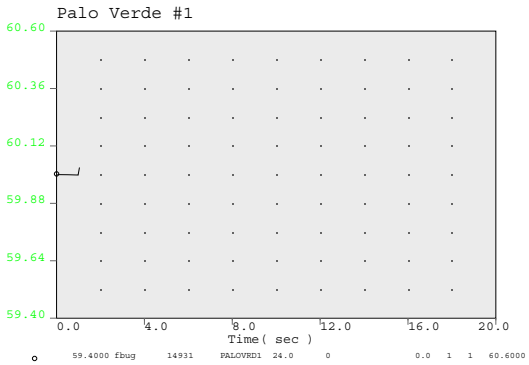
Imperial Valley Area - Frequency

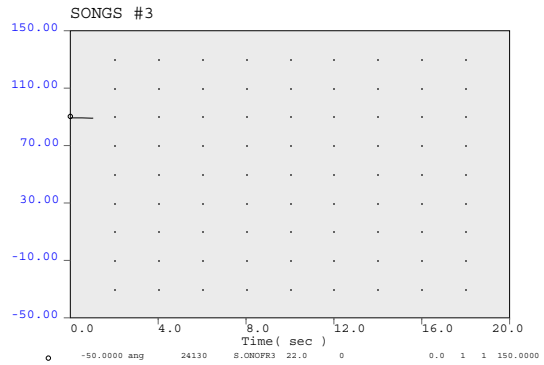


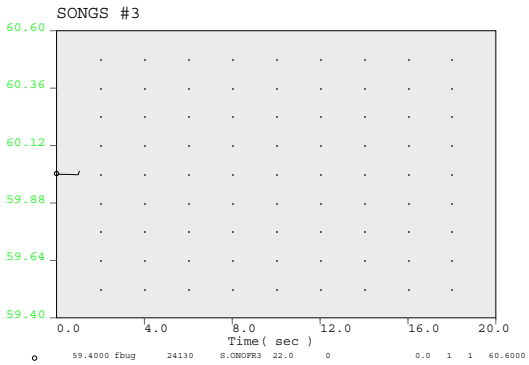
SDG&E Cluster 2 - pst int
2014 Light Autumn
C574 - SY 230 kV N-1

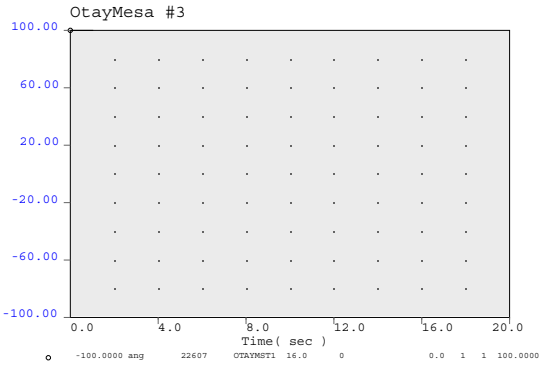
RELATIVE ROTOR ANGLE & FREQUENCY

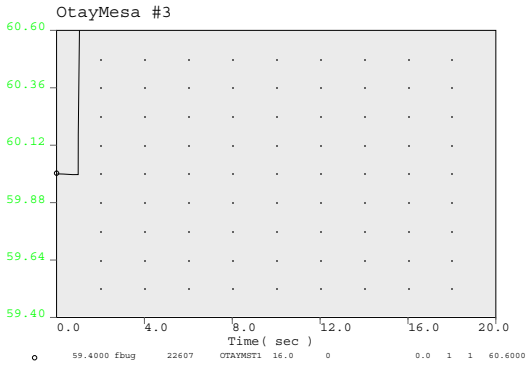












SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

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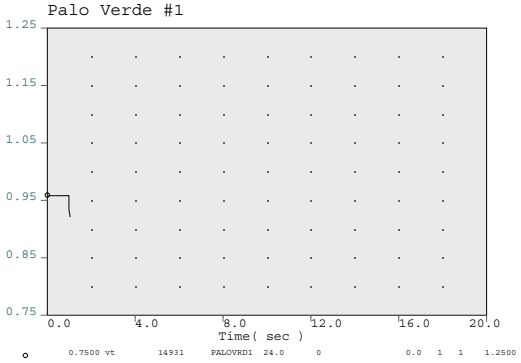
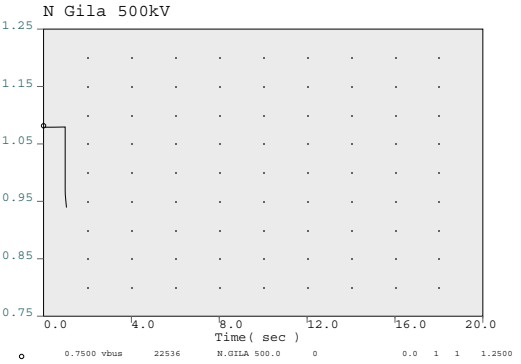
SDGE	int_C574-SY_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:26:43 2010

RELATIVE VOLTAGE

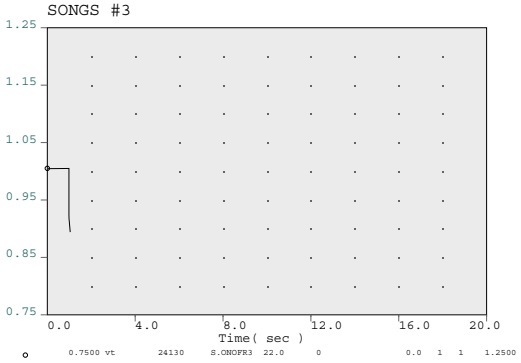
Palo Verde #1



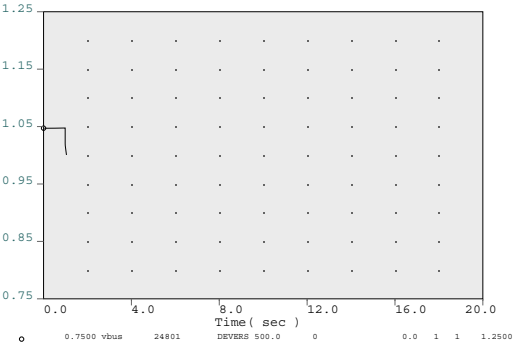
N Gila 500kV



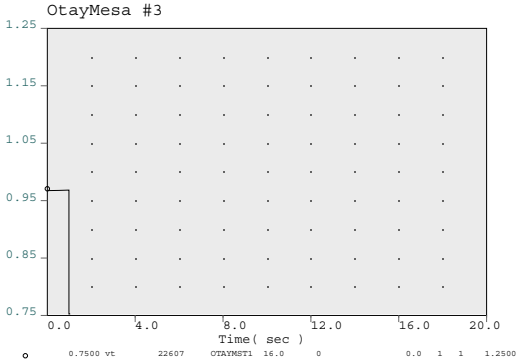
SONGS #3



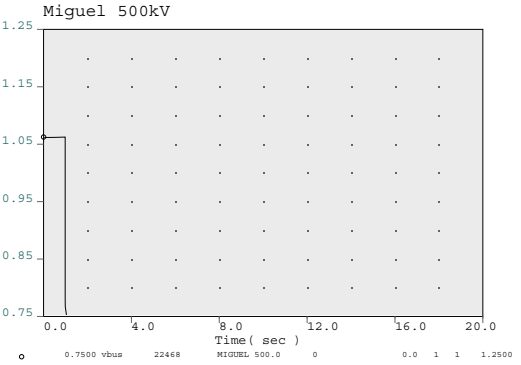
Devers 500



OtayMesa #3



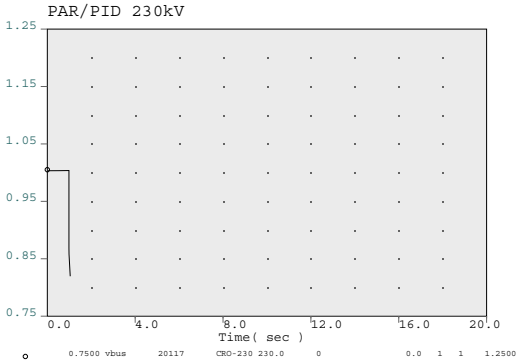
Miguel 500kV



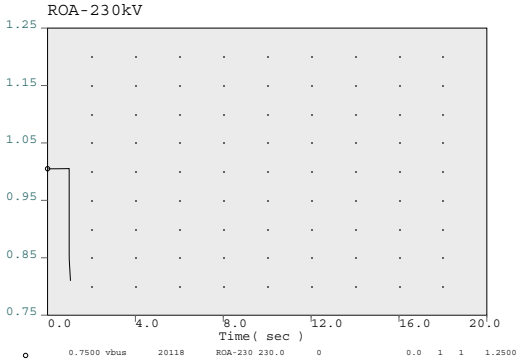
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Affected System Voltage Check and Comparison

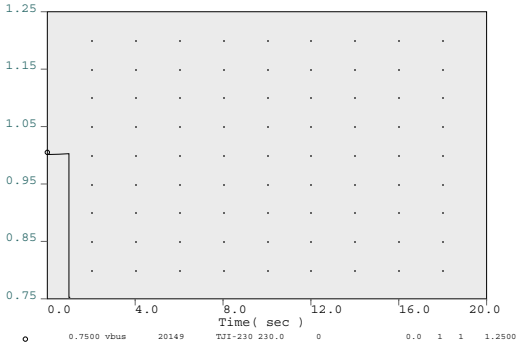
PAR/PID 230kV



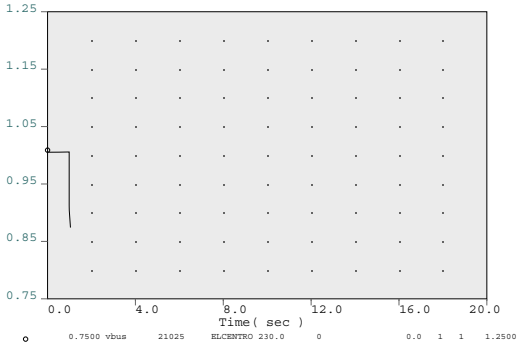
ROA-230kV



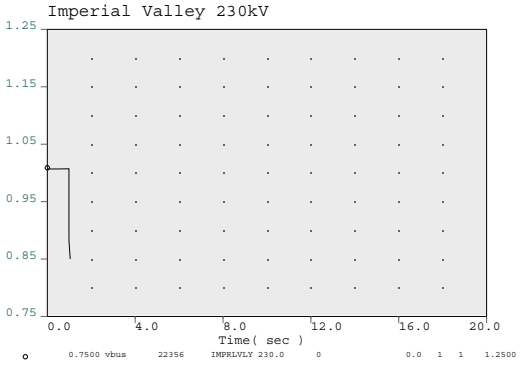
TJ1-230kV



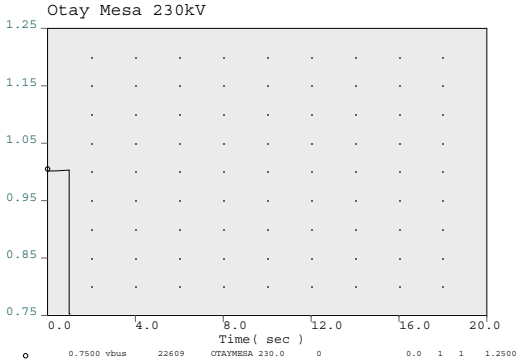
El Centro



Imperial Valley 230kV

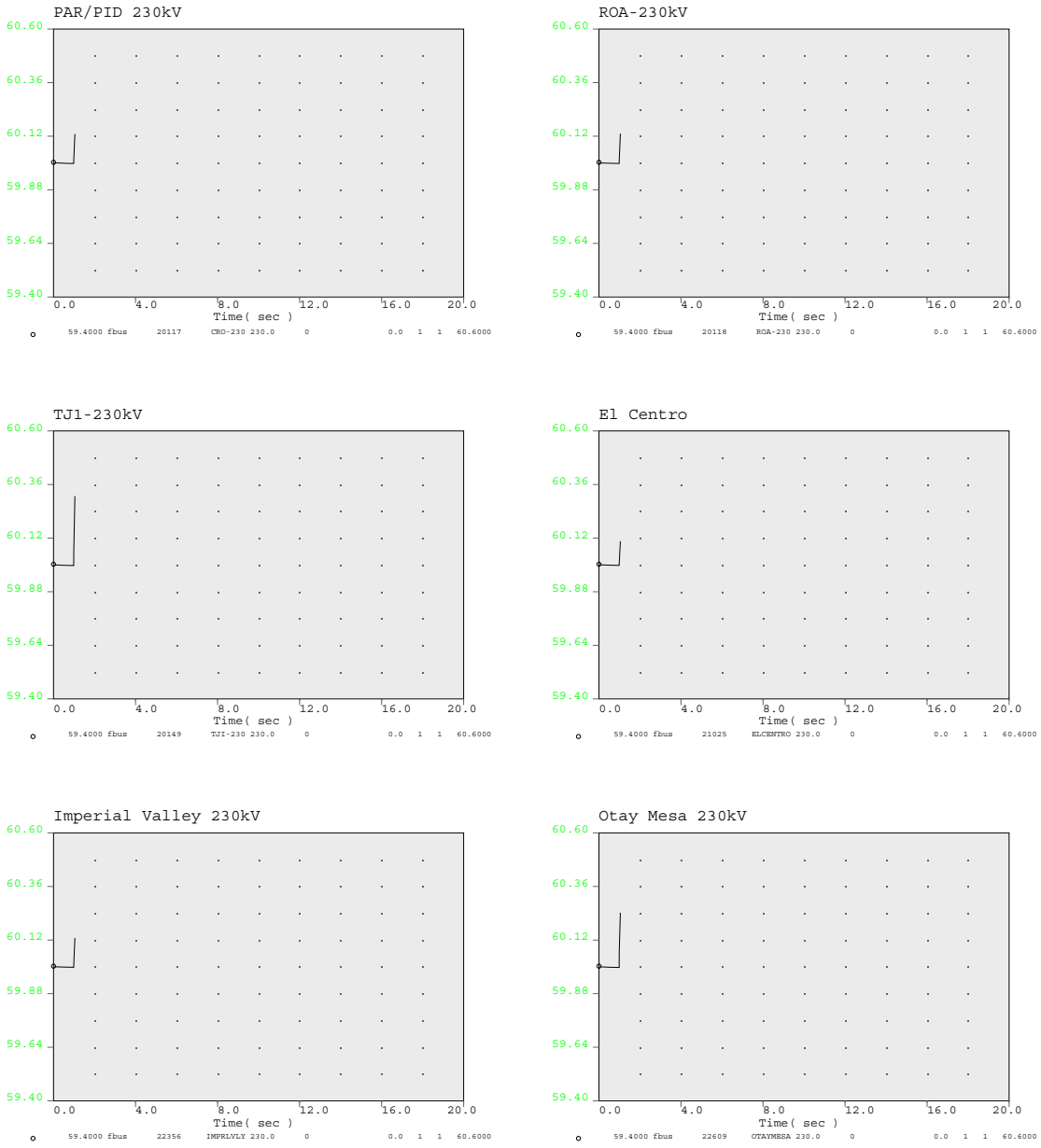


Otay Mesa 230kV



SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

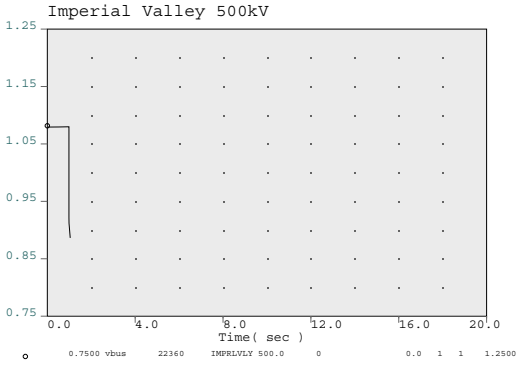
Affected System Frequency Check and Comparison



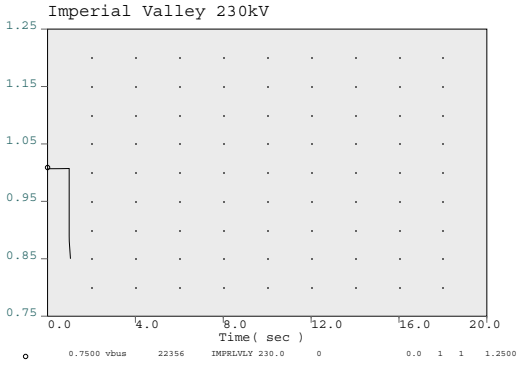
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Imperial Valley Area - VOLTAGE

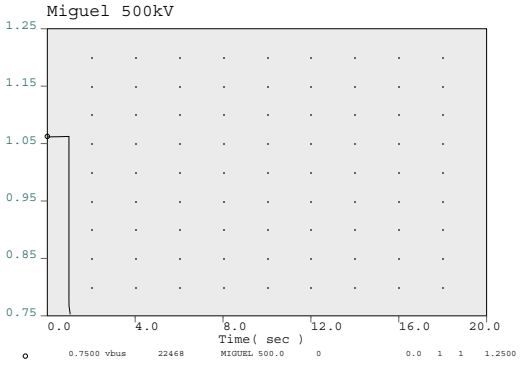
Imperial Valley 500kV



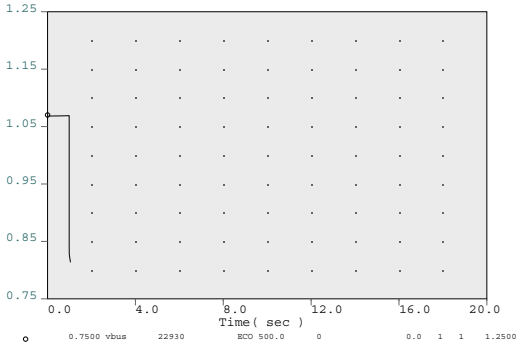
Imperial Valley 230kV



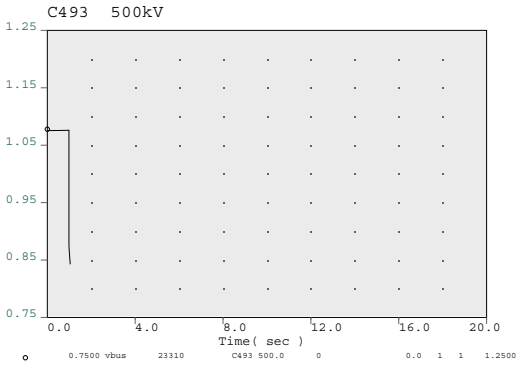
Miguel 500kV



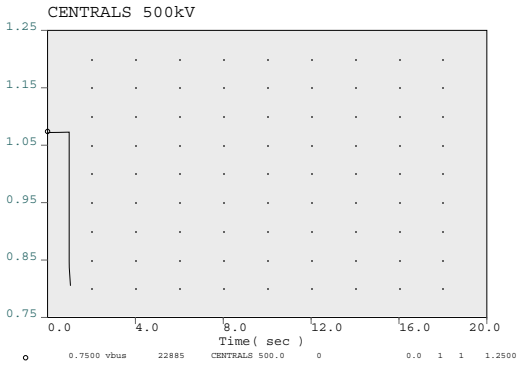
Windfarms 500



C493 500kV

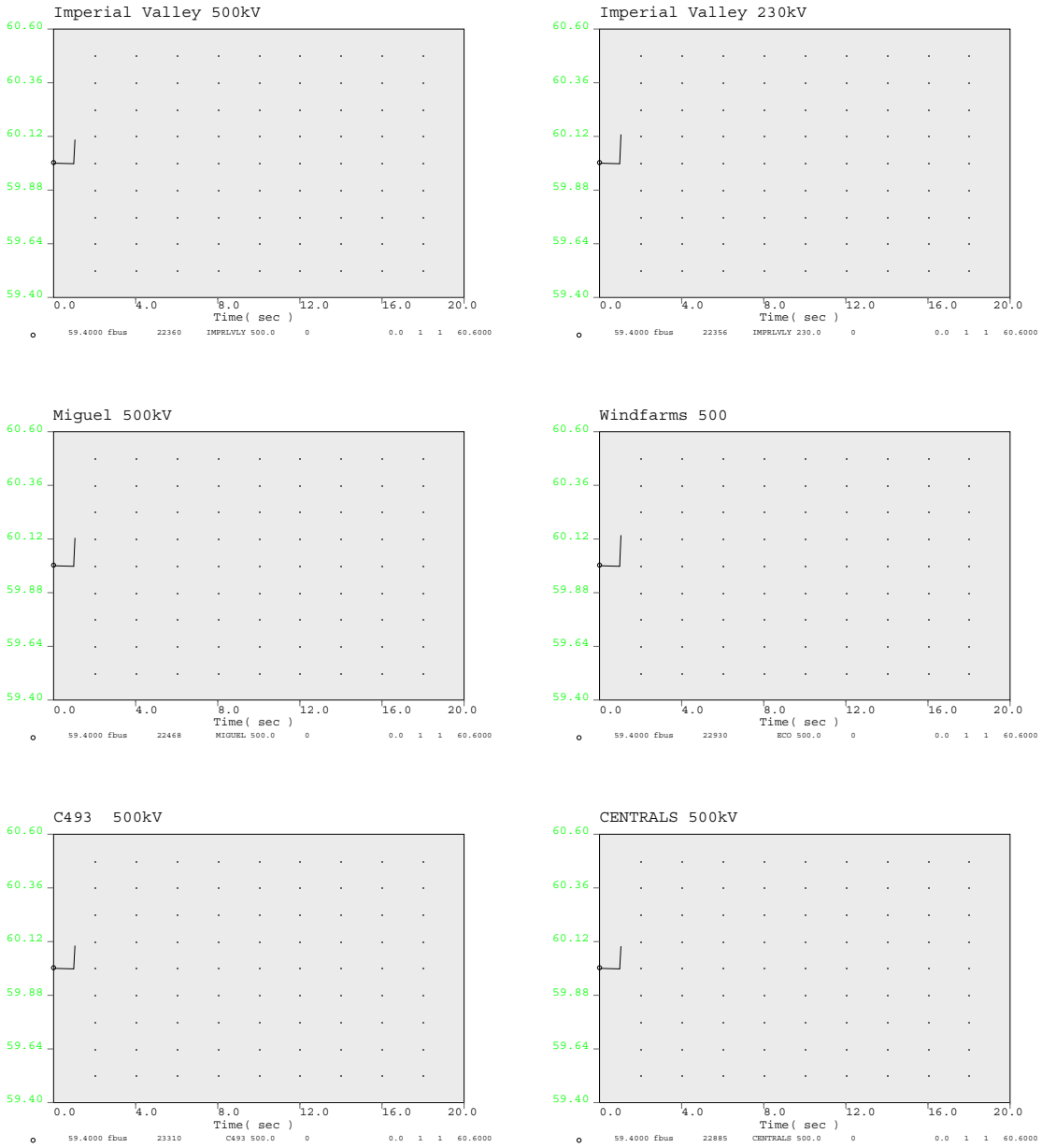


CENTRALS 500kV



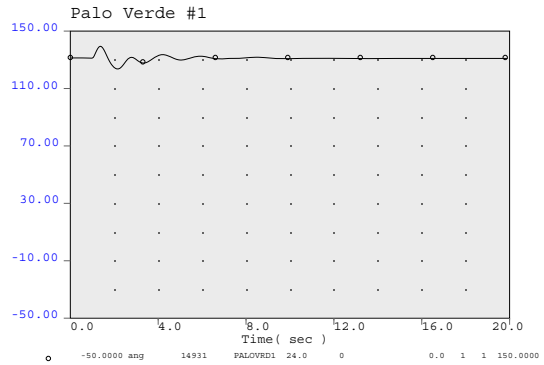
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

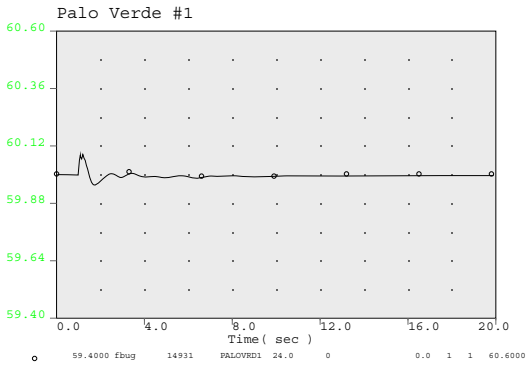
Imperial Valley Area - Frequency

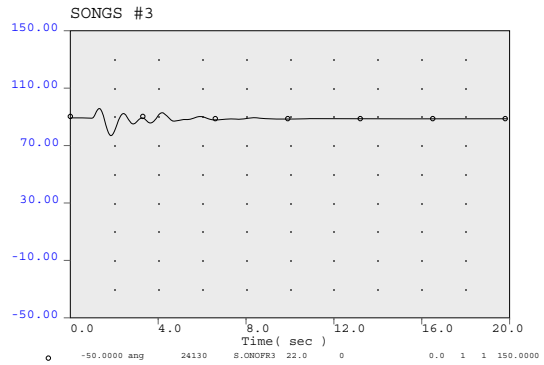


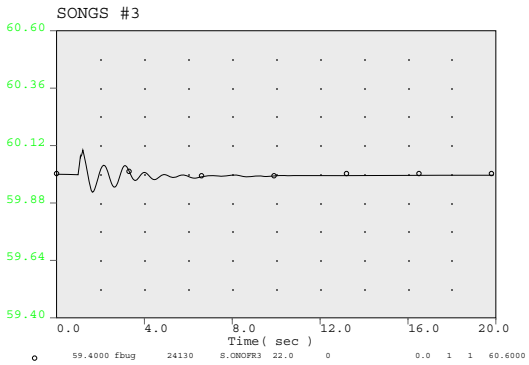
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

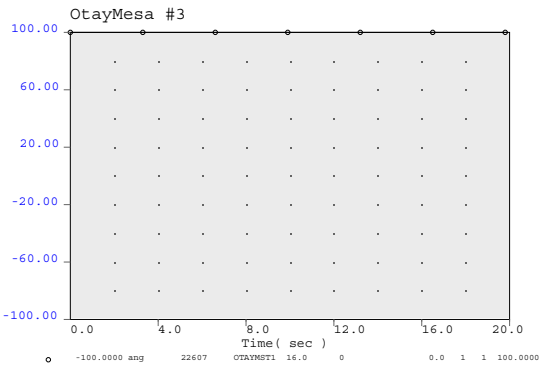
RELATIVE ROTOR ANGLE & FREQUENCY

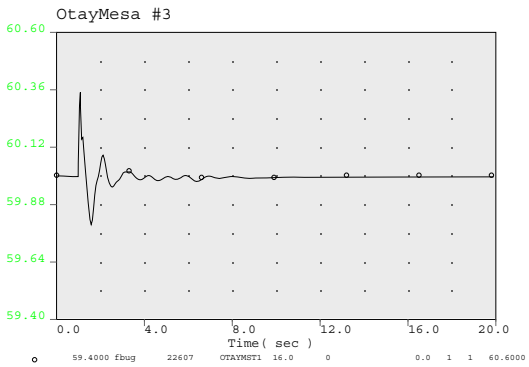












SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

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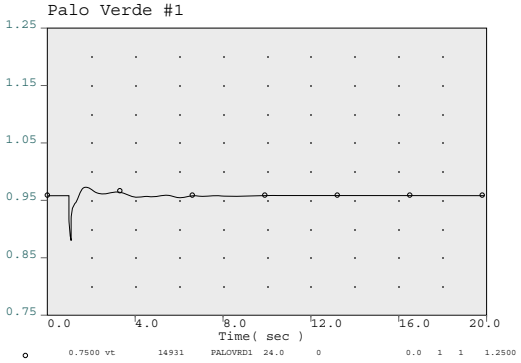
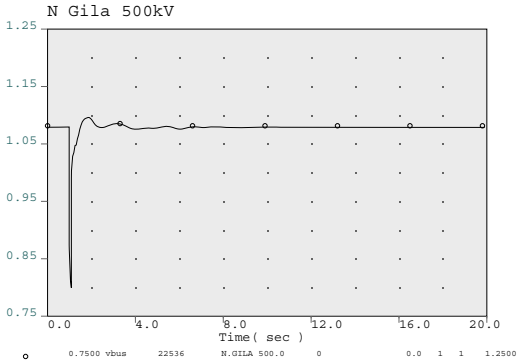
int_SX-C565_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:27:16 2010

RELATIVE VOLTAGE

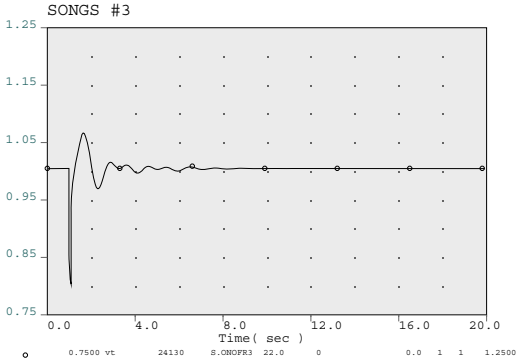
Palo Verde #1



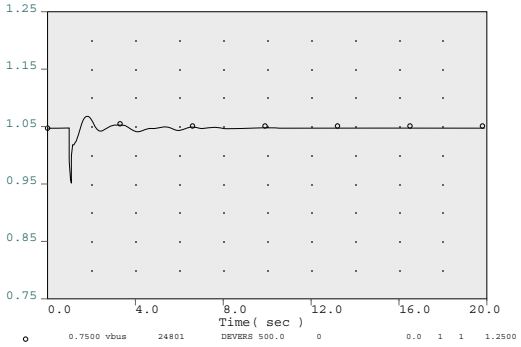
N Gila 500kV



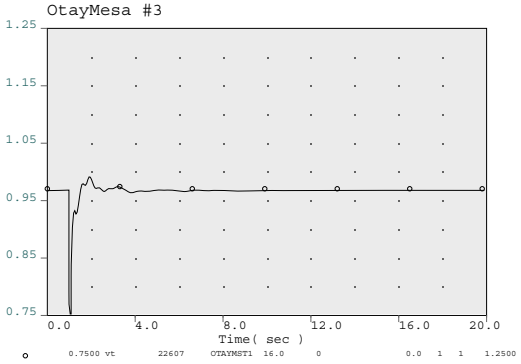
SONGS #3



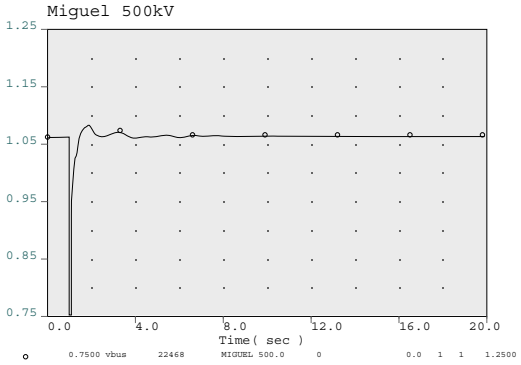
Devers 500



OtayMesa #3



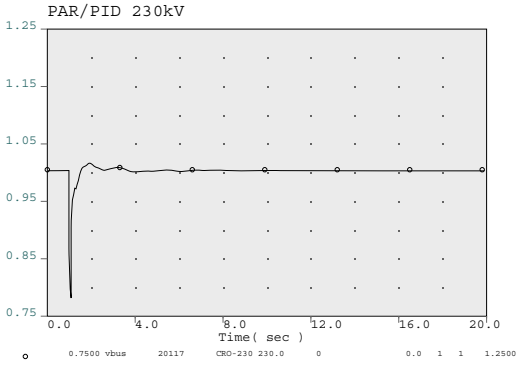
Miguel 500kV



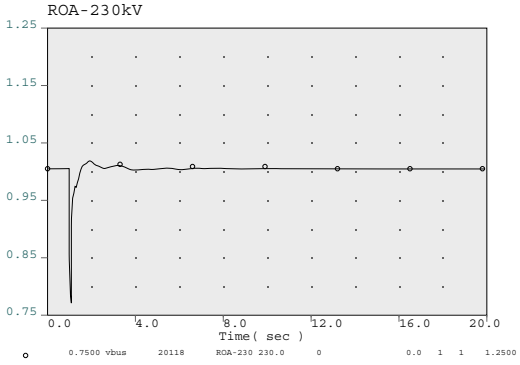
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Affected System Voltage Check and Comparison

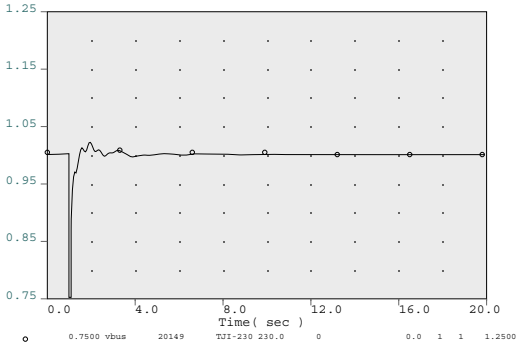
PAR/PID 230kV



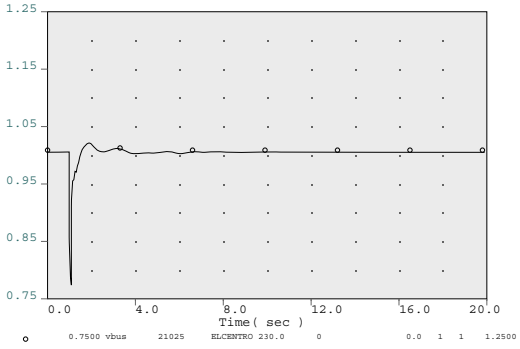
ROA-230kV



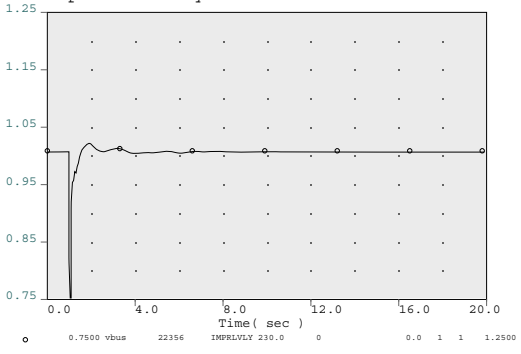
TJ1-230kV



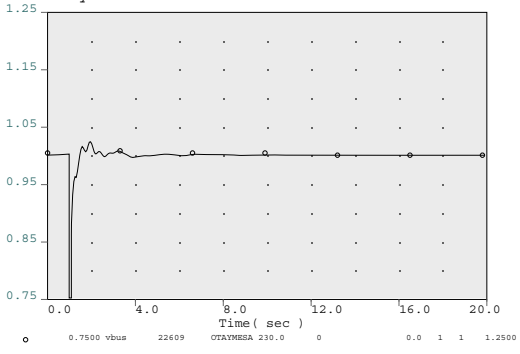
El Centro



Imperial Valley 230kV



Otay Mesa 230kV



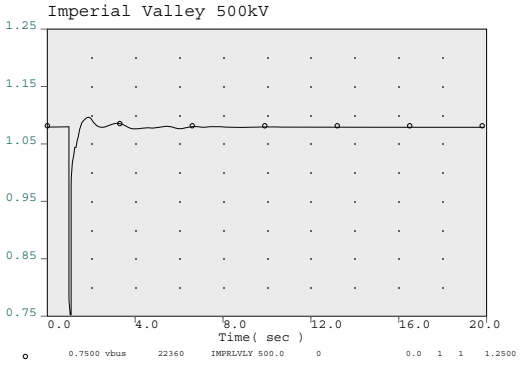
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Affected System Frequency Check and Comparison

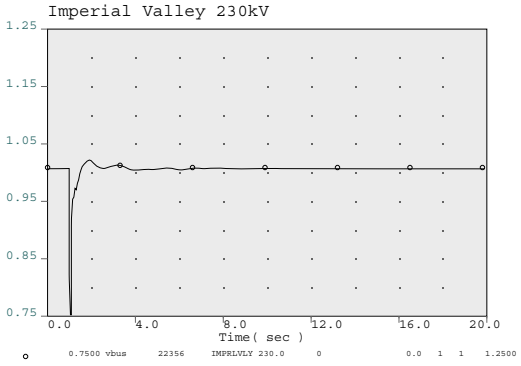
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

Imperial Valley Area - VOLTAGE

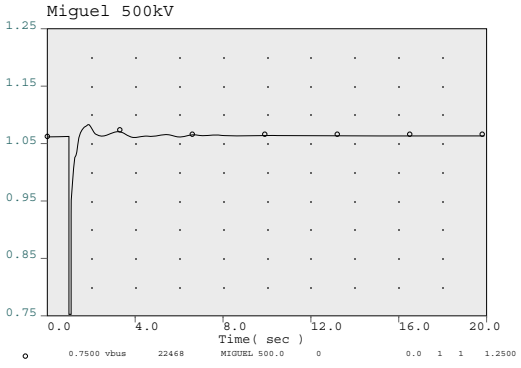
Imperial Valley 500kV



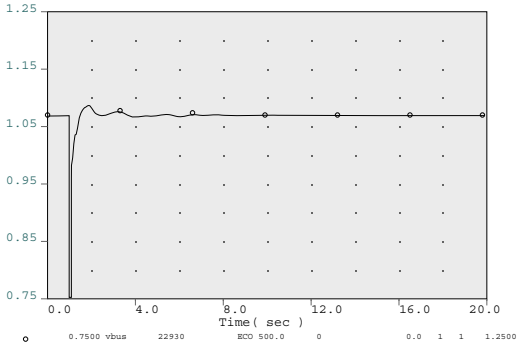
Imperial Valley 230kV



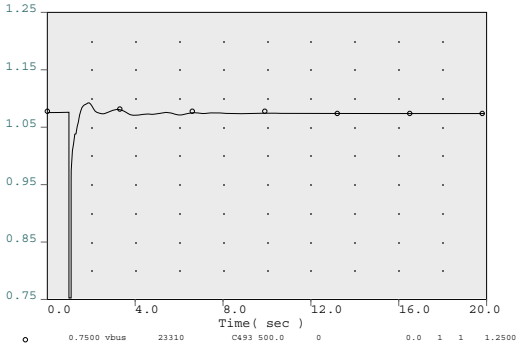
Miguel 500kV



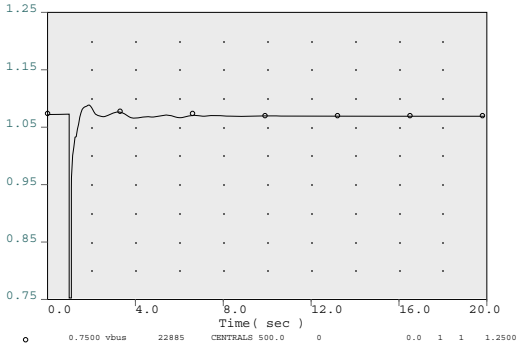
Windfarms 500



C493 500kV



CENTRALS 500kV

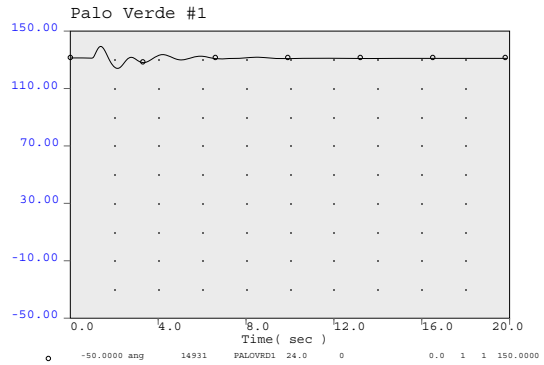


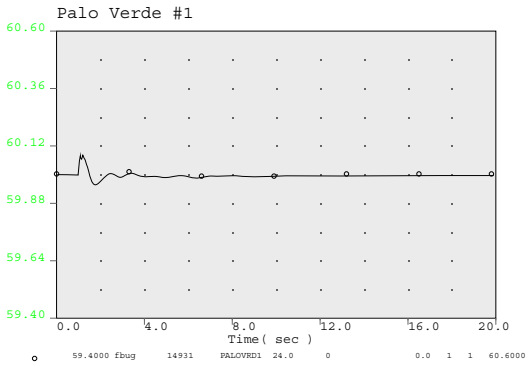
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

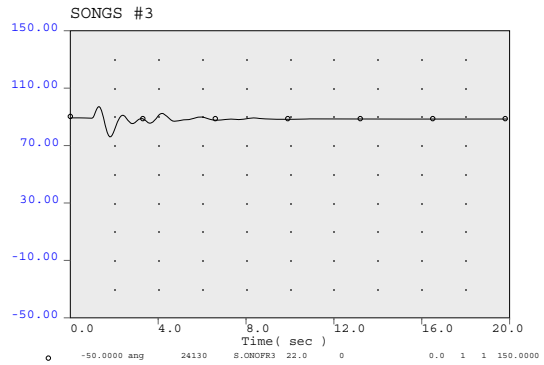
Imperial Valley Area - Frequency

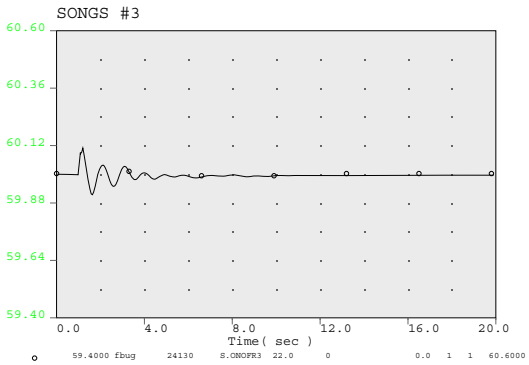
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - C565 230 kV N-1

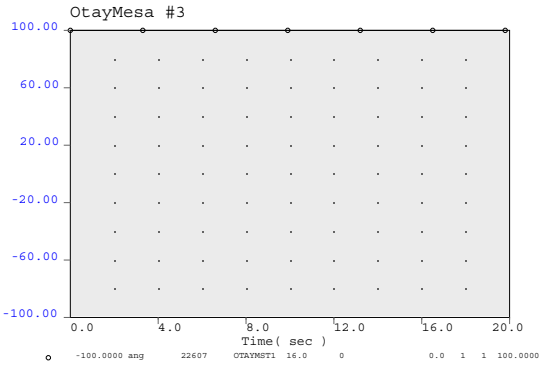
RELATIVE ROTOR ANGLE & FREQUENCY

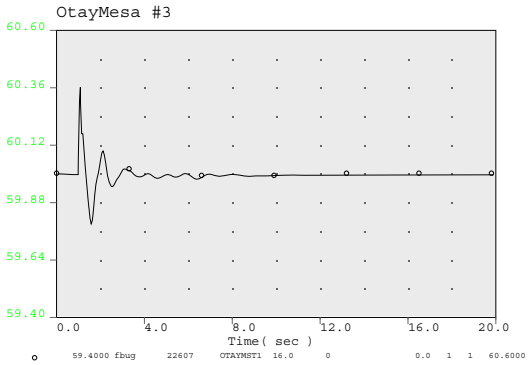












SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

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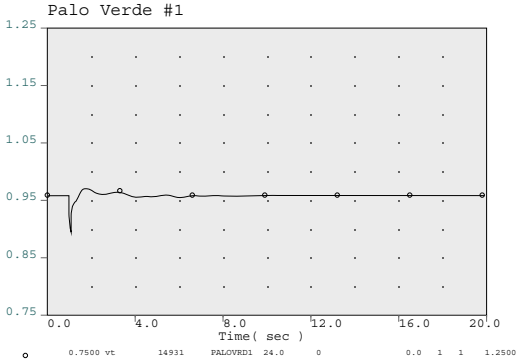
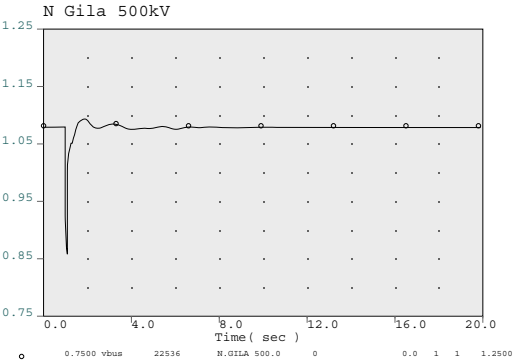
SDGE	int_SX-PQ_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:27:41 2010

RELATIVE VOLTAGE

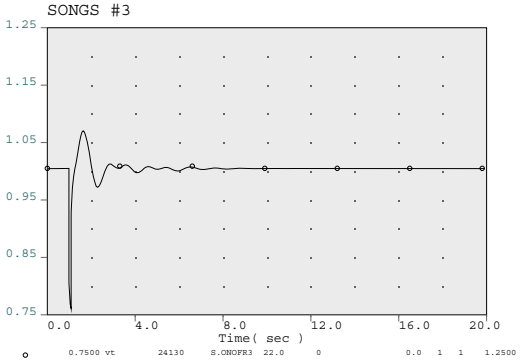
Palo Verde #1



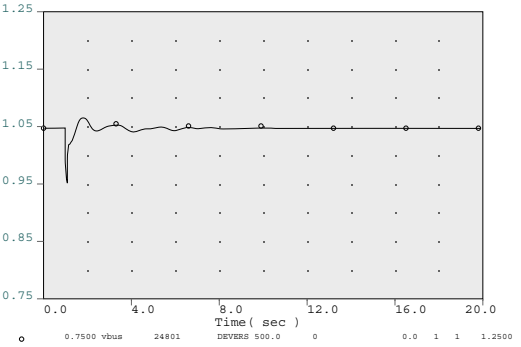
N Gila 500kV



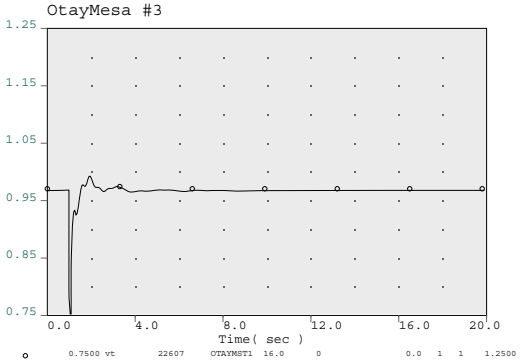
SONGS #3



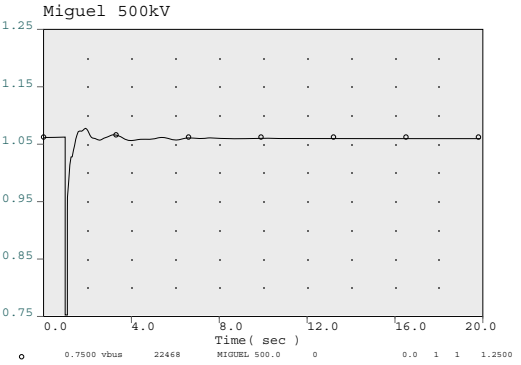
Devers 500



OtayMesa #3



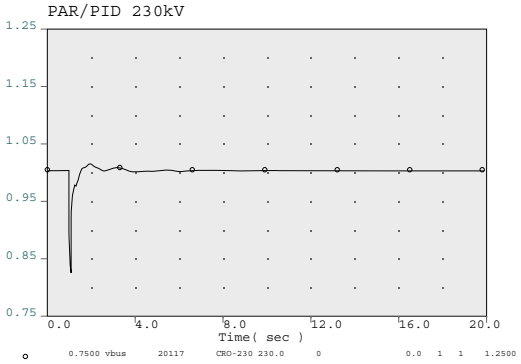
Miguel 500kV



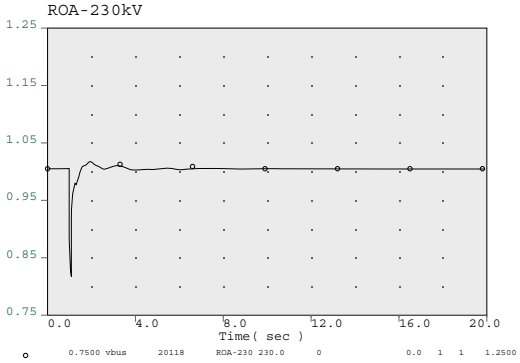
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

Affected System Voltage Check and Comparison

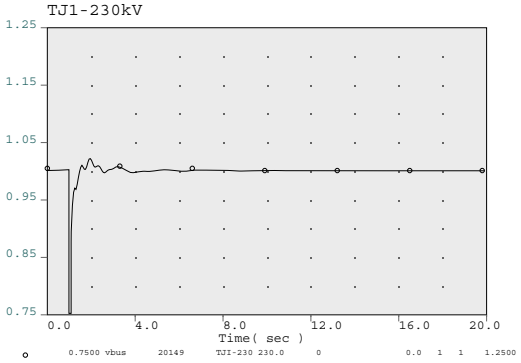
PAR/PID 230kV



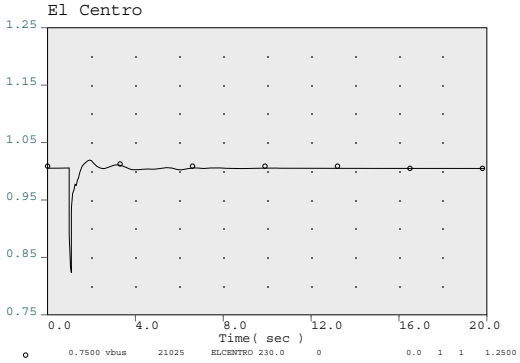
ROA-230kV



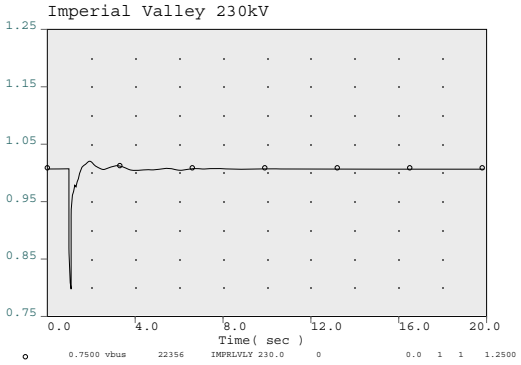
TJ1-230kV



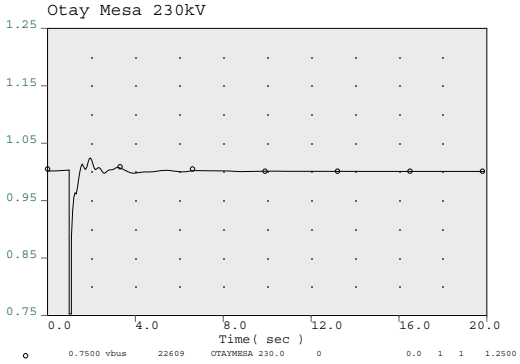
El Centro



Imperial Valley 230kV



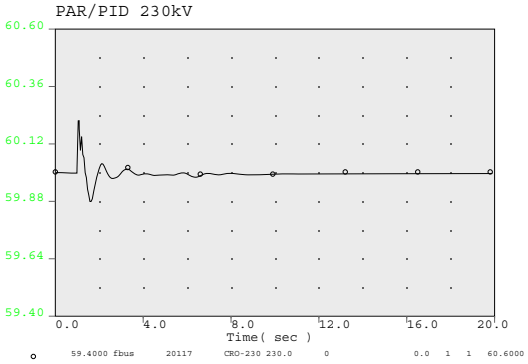
Otay Mesa 230kV



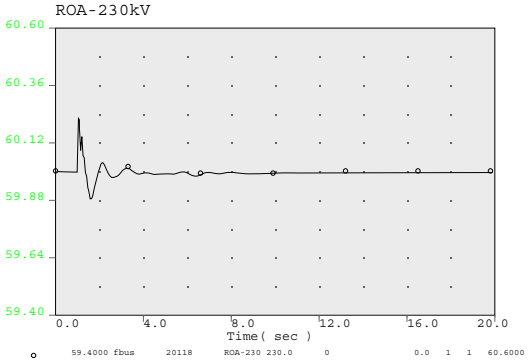
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

Affected System Frequency Check and Comparison

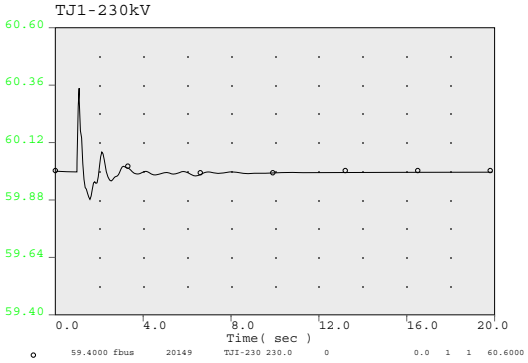
PAR/PID 230kV



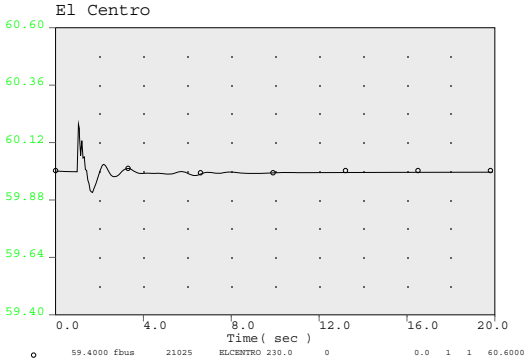
ROA-230kV



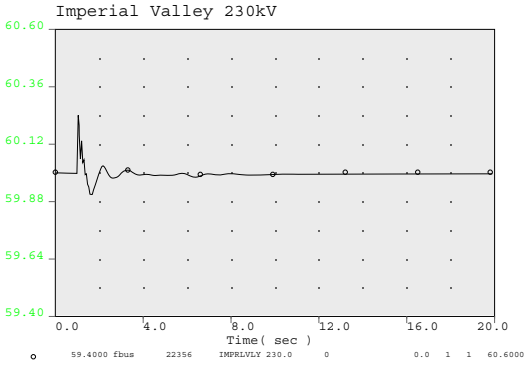
TJ1-230kV



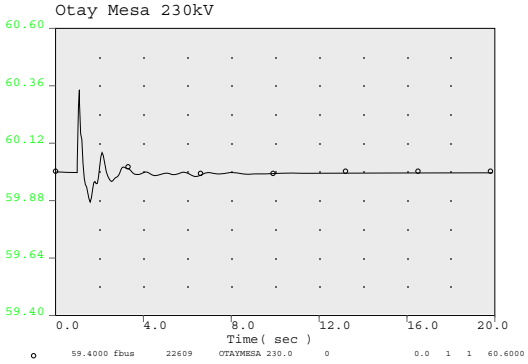
El Centro



Imperial Valley 230kV



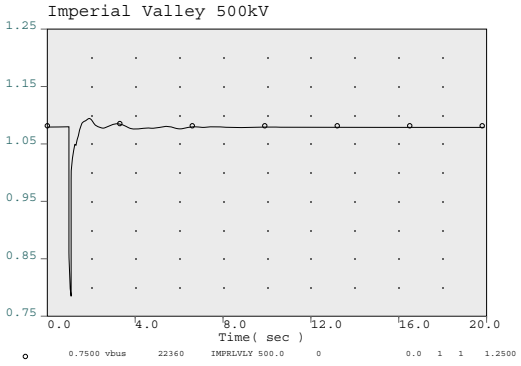
Otay Mesa 230kV



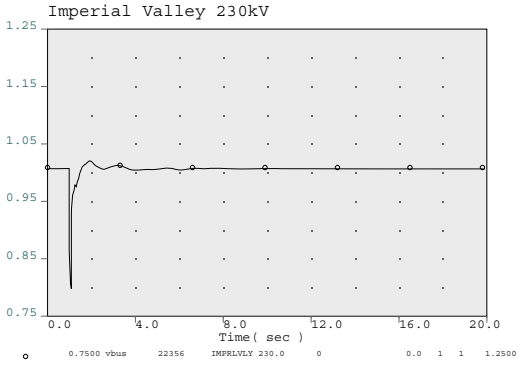
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

Imperial Valley Area - VOLTAGE

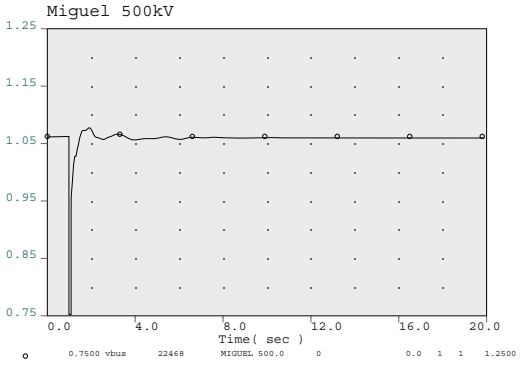
Imperial Valley 500kV



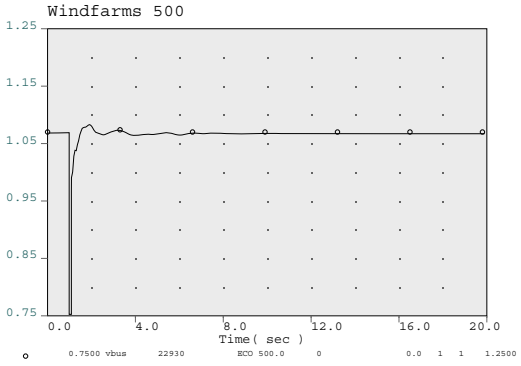
Imperial Valley 230kV



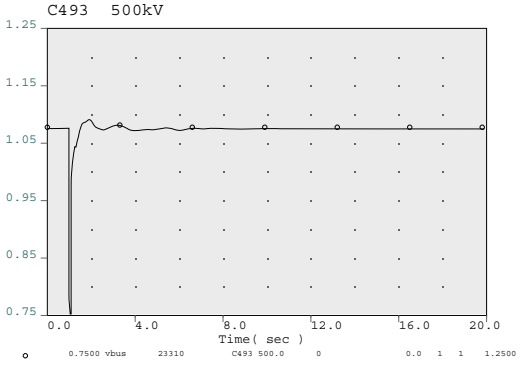
Miguel 500kV



Windfarms 500



C493 500kV



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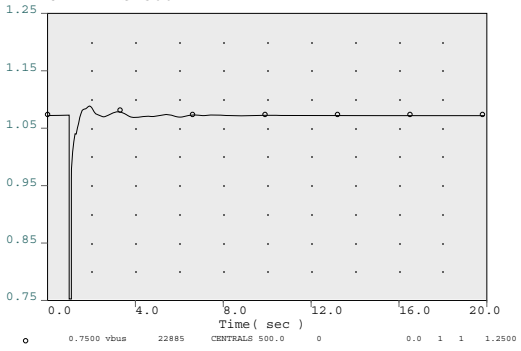
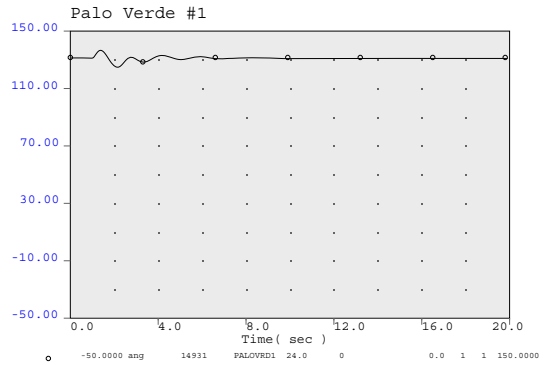


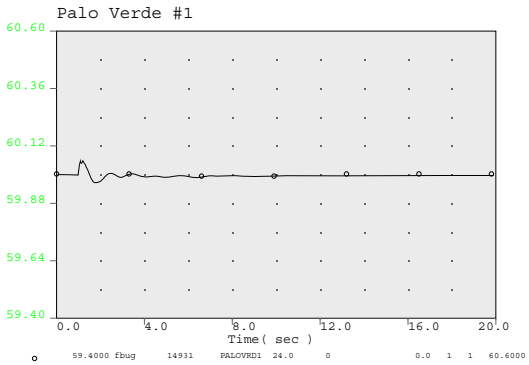
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

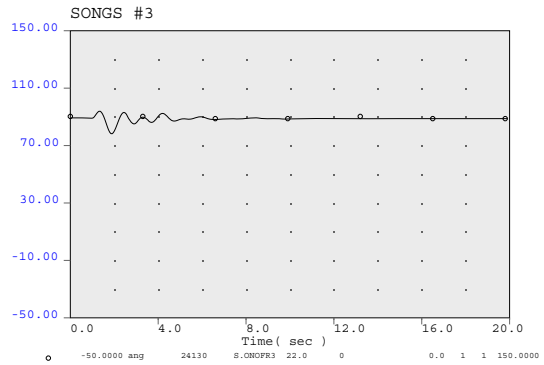
Imperial Valley Area - Frequency

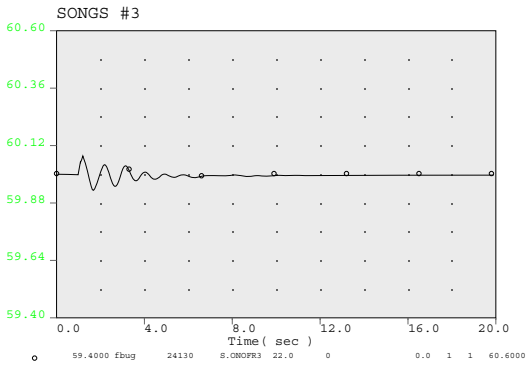
SDG&E Cluster 2 - pst int
2014 Light Autumn
Sycamore - Penasquitos 230 kV N-1

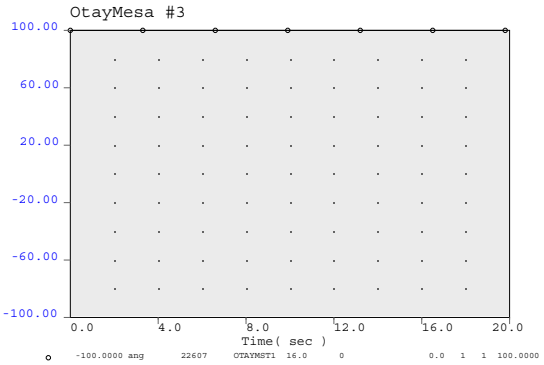
RELATIVE ROTOR ANGLE & FREQUENCY

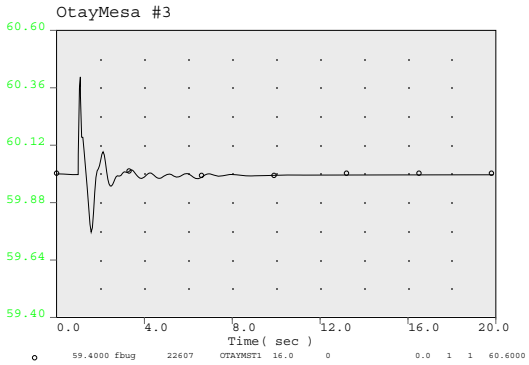












SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

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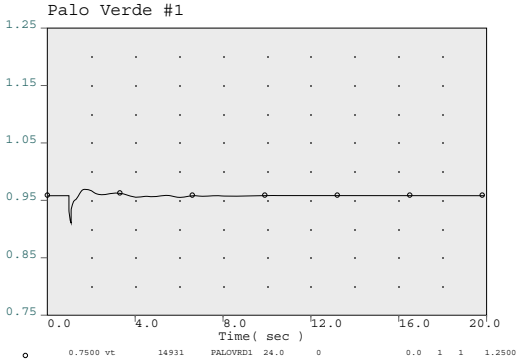
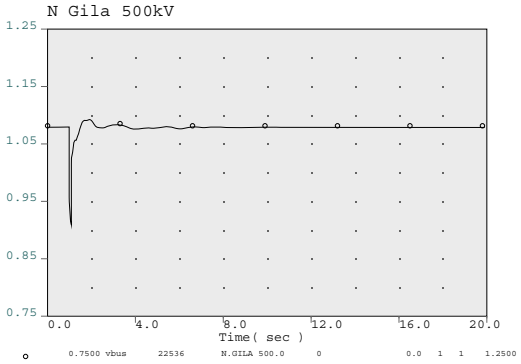
RELATIVE VOLTAGE

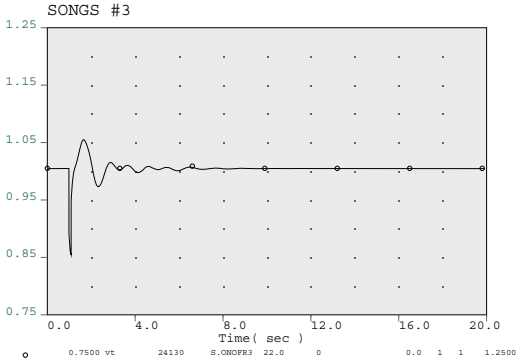
Palo Verde #1



N Gila 500kV



SONGS #3



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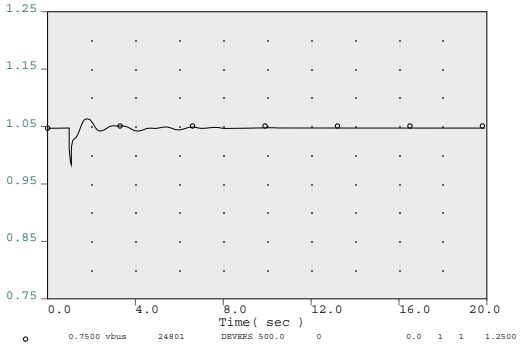
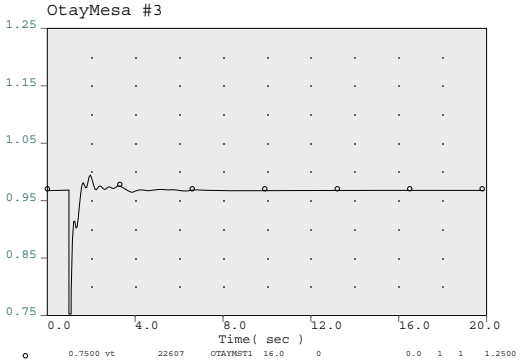
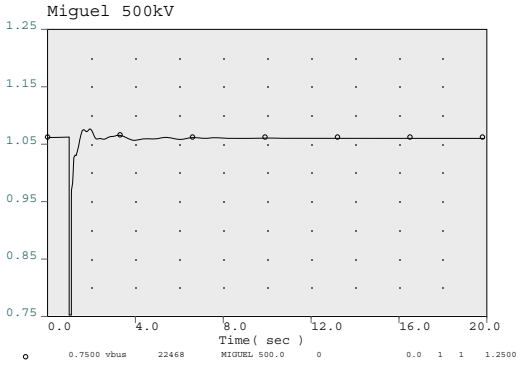


OtayMesa #3



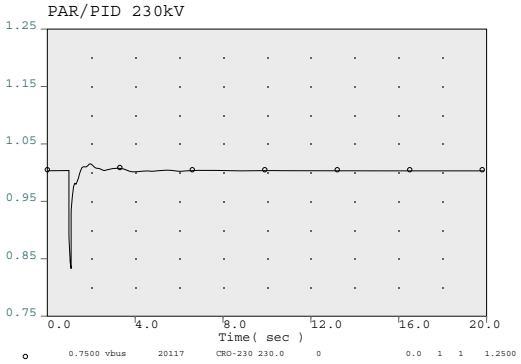
Miguel 500kV



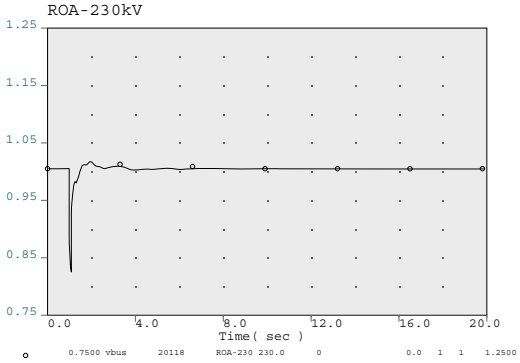
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Affected System Voltage Check and Comparison

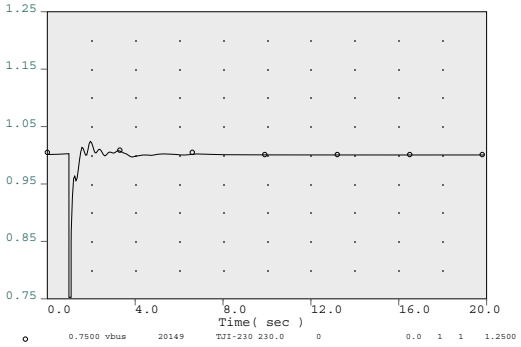
PAR/PID 230kV



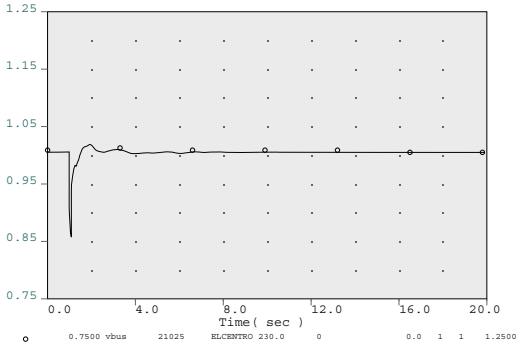
ROA-230kV



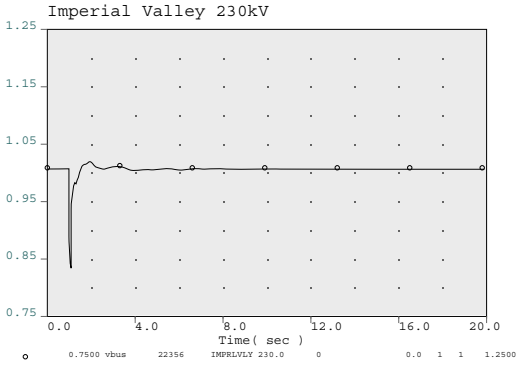
TJ1-230kV



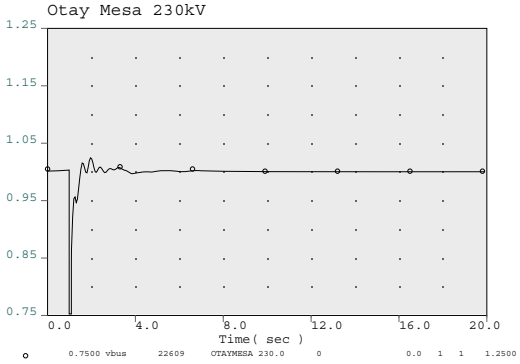
El Centro



Imperial Valley 230kV



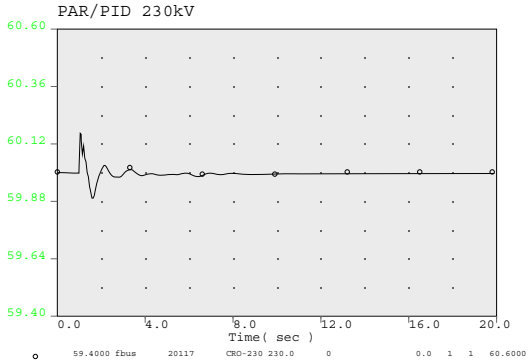
Otay Mesa 230kV



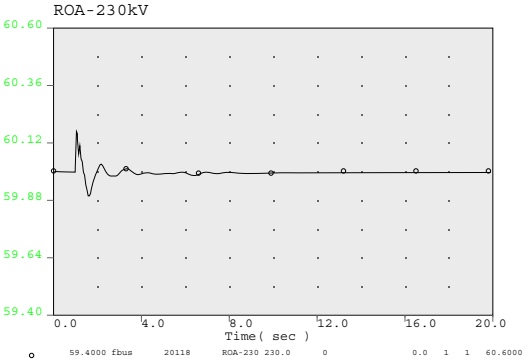
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Affected System Frequency Check and Comparison

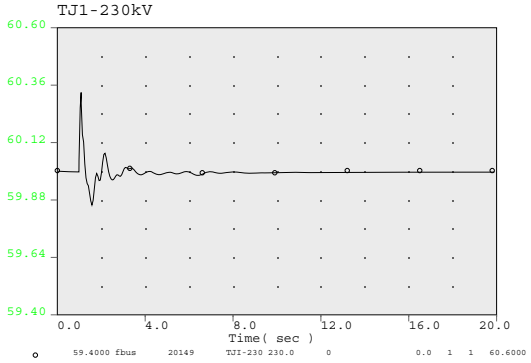
PAR/PID 230kV



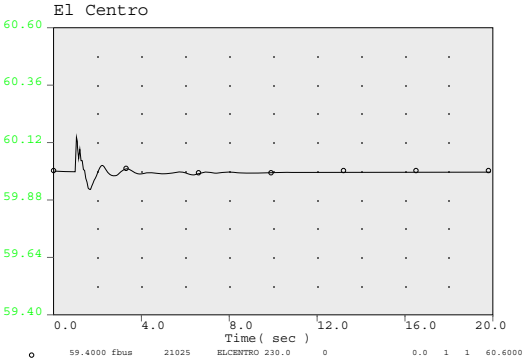
ROA-230kV



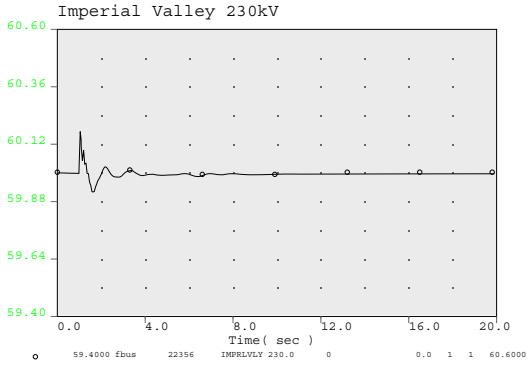
TJ1-230kV



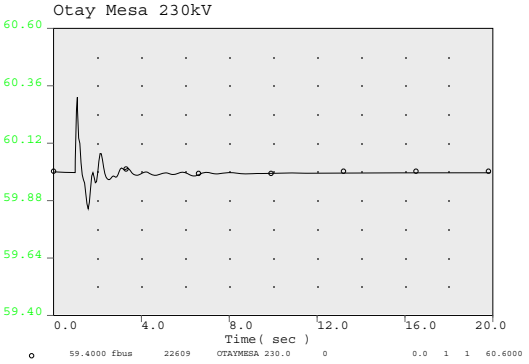
El Centro



Imperial Valley 230kV



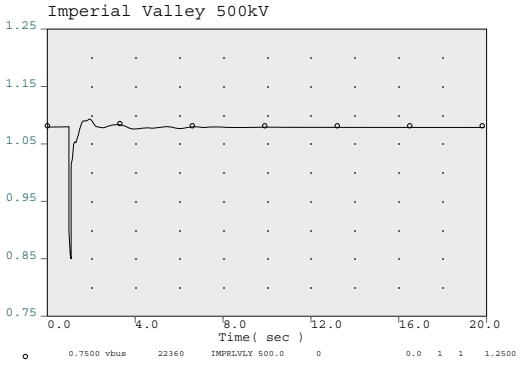
Otay Mesa 230kV



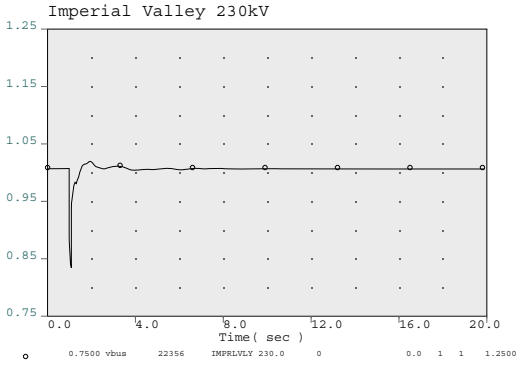
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

Imperial Valley Area - VOLTAGE

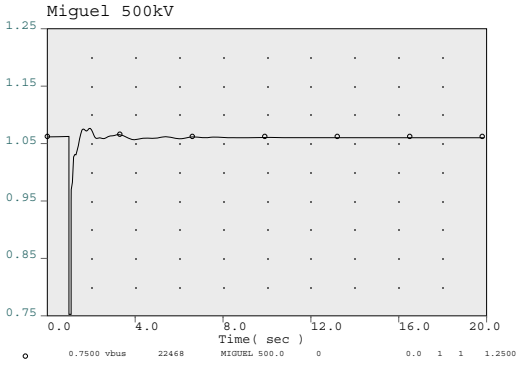
Imperial Valley 500kV



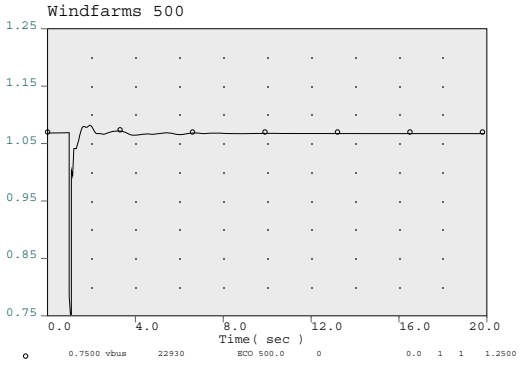
Imperial Valley 230kV



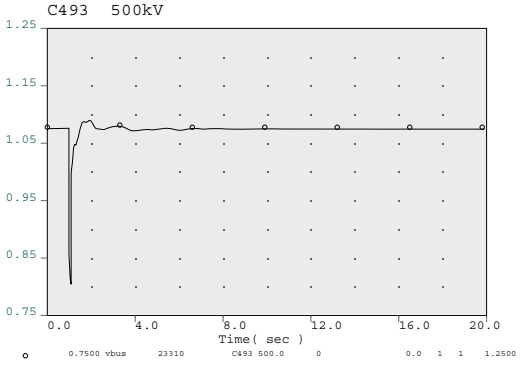
Miguel 500kV



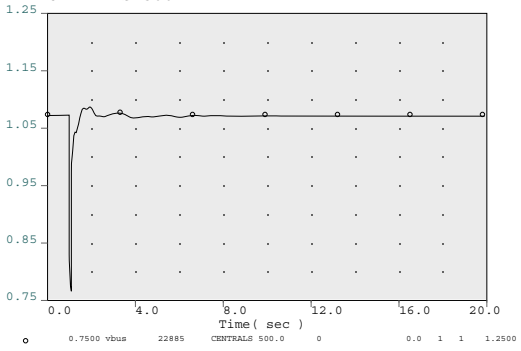
Windfarms 500



C493 500kV



CENTRALS 500kV

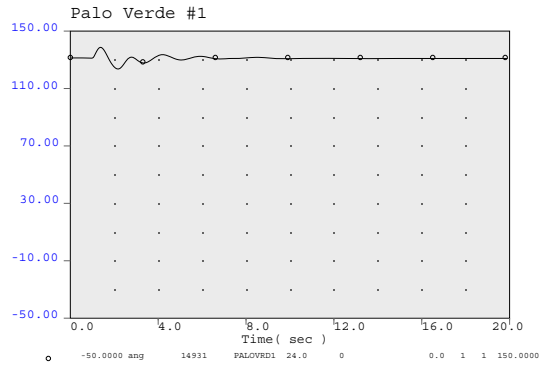


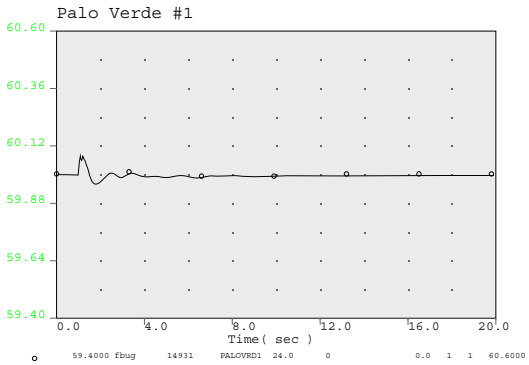
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

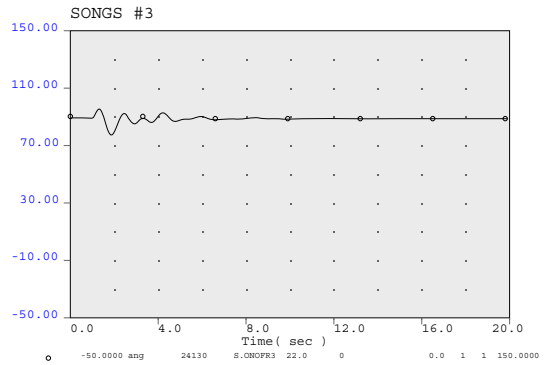
Imperial Valley Area - Frequency

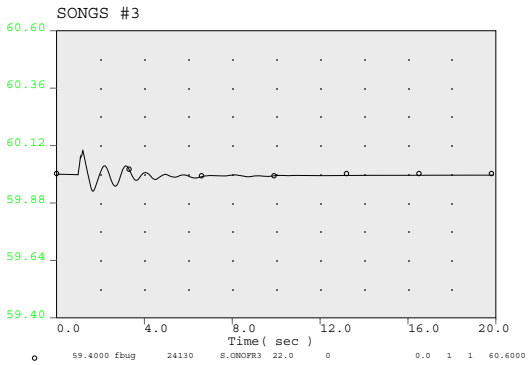
SDG&E Cluster 2 - pst int
2014 Light Autumn
South Bay - Silvergate 230 kV N-1

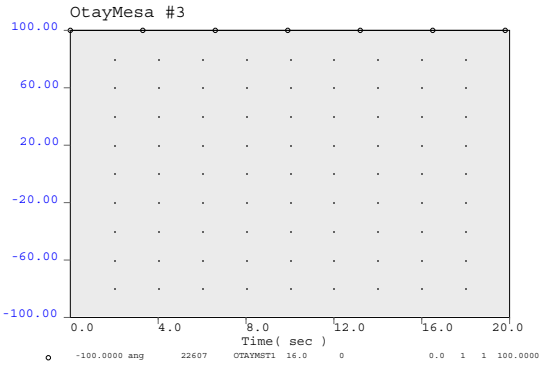
RELATIVE ROTOR ANGLE & FREQUENCY

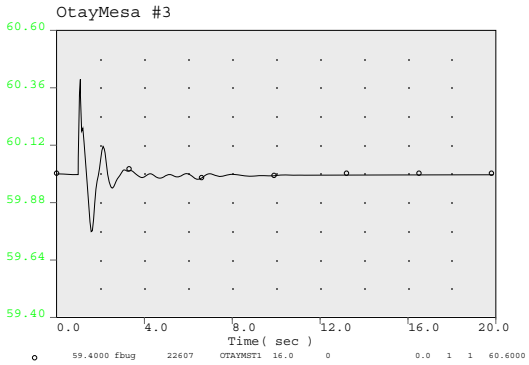












SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

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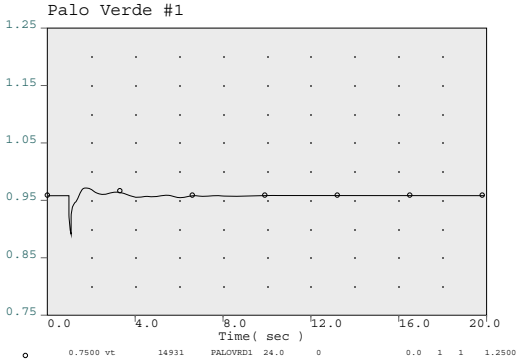
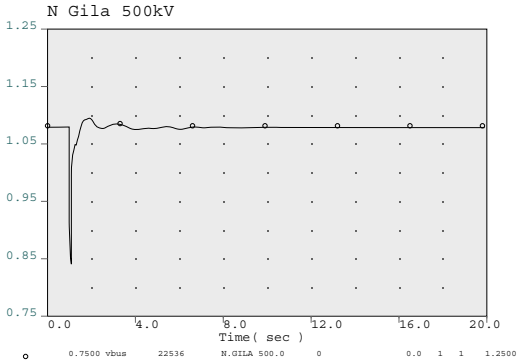
SDGE	int_SY-MS_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:28:34 2010

RELATIVE VOLTAGE

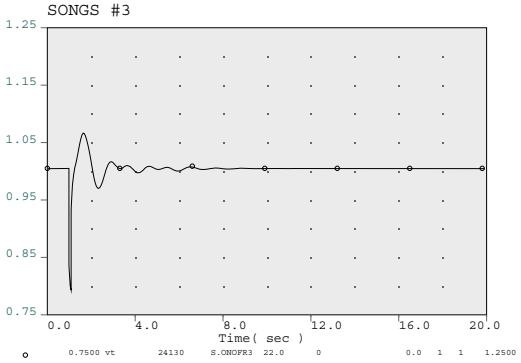
Palo Verde #1



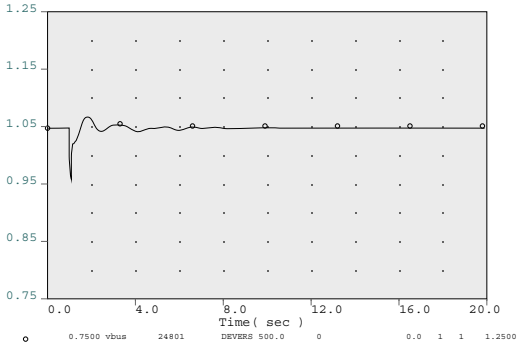
N Gila 500kV



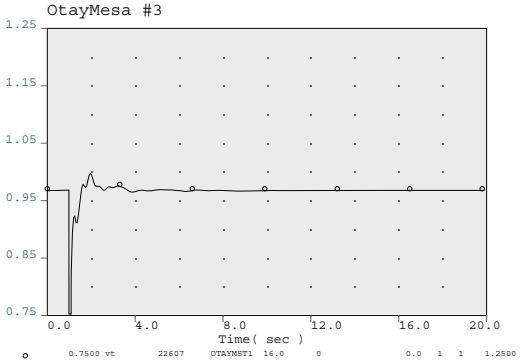
SONGS #3



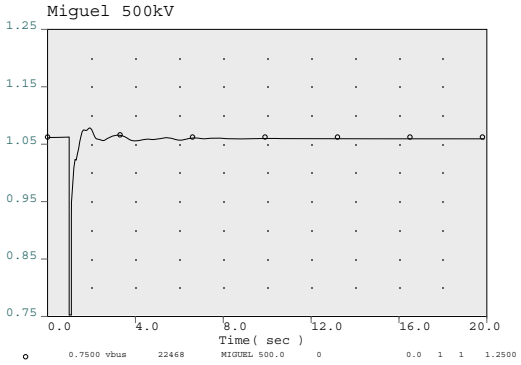
Devers 500



OtayMesa #3



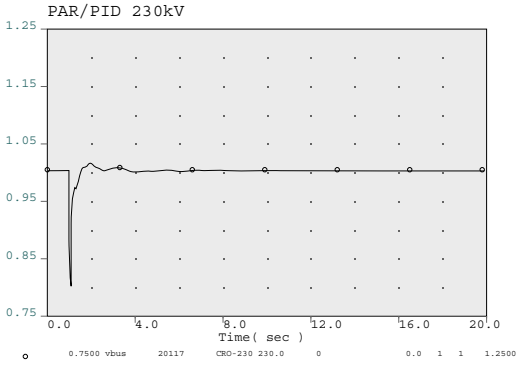
Miguel 500kV



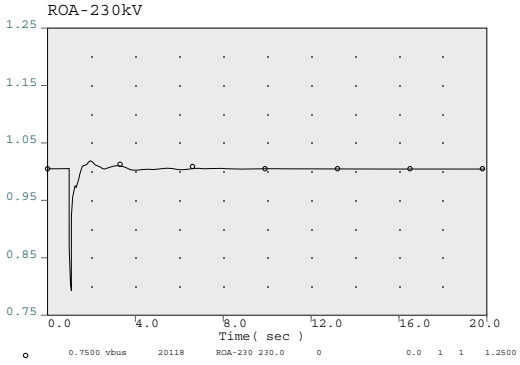
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

Affected System Voltage Check and Comparison

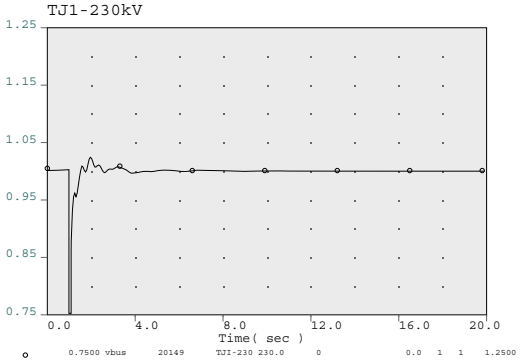
PAR/PID 230kV



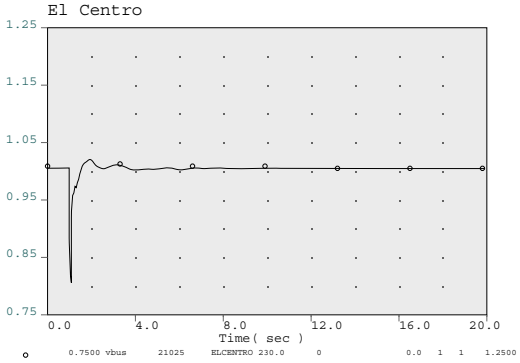
ROA-230kV



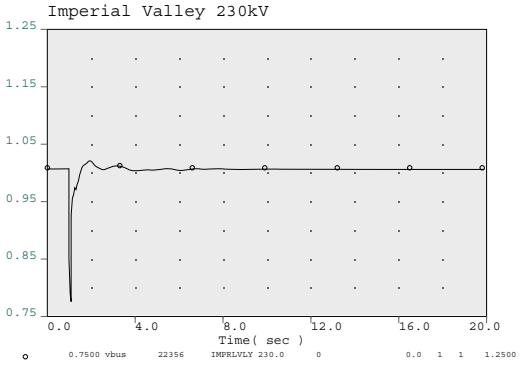
TJ1-230kV



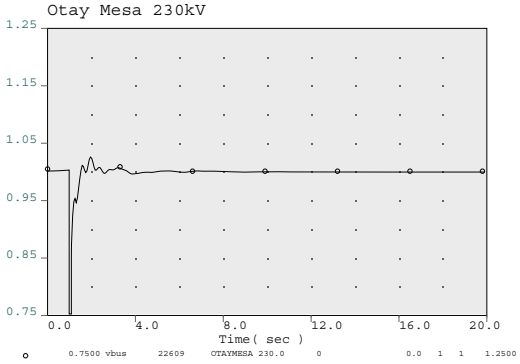
El Centro



Imperial Valley 230kV

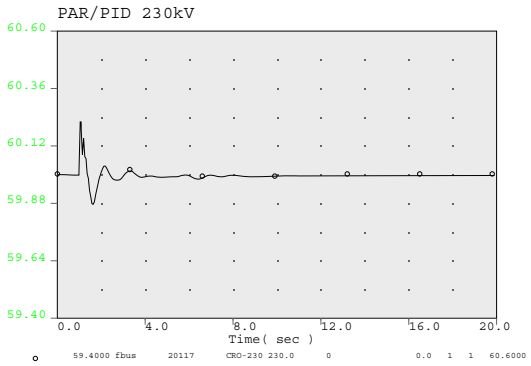


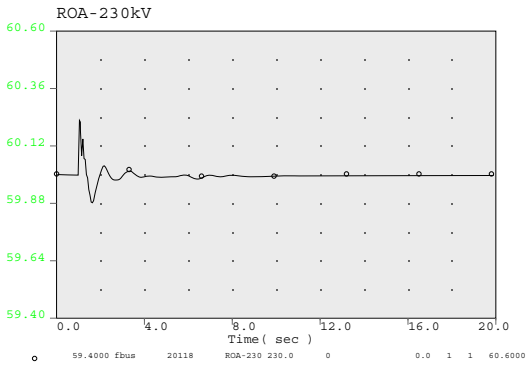
Otay Mesa 230kV

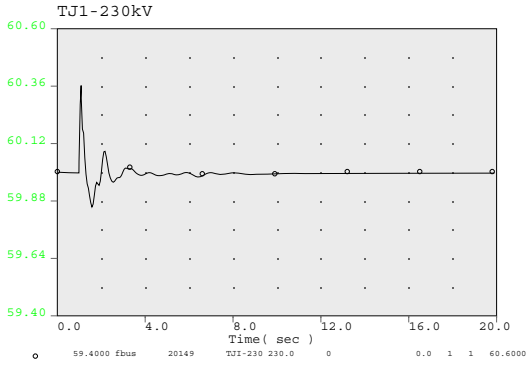


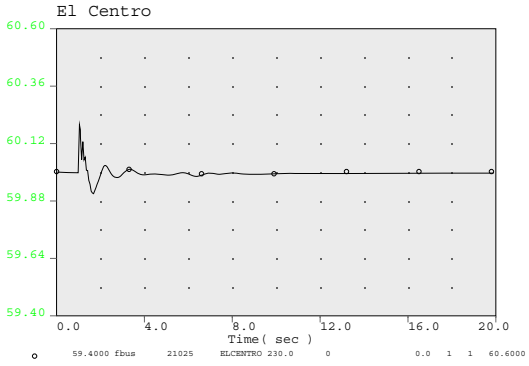
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

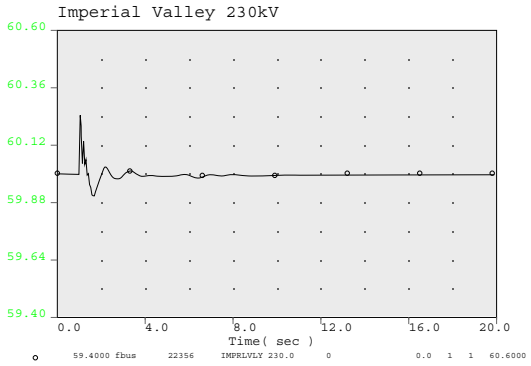
Affected System Frequency Check and Comparison

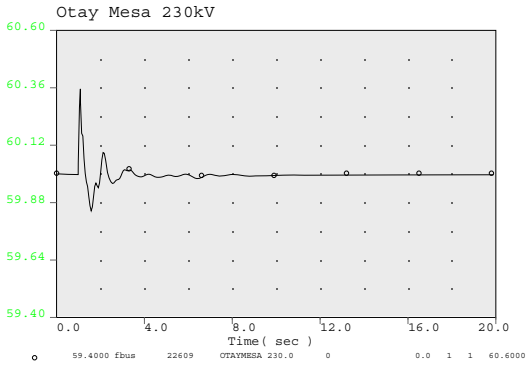








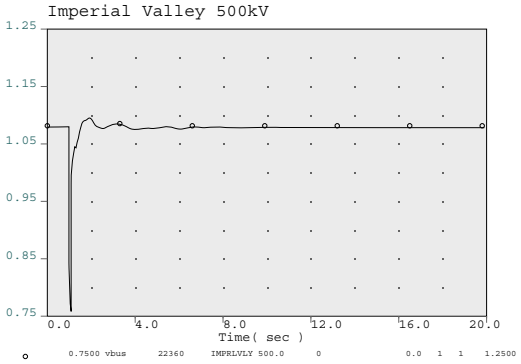




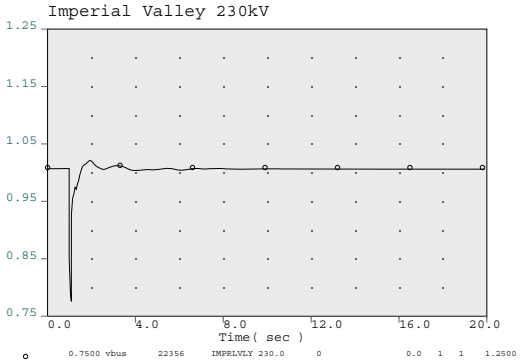
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

Imperial Valley Area - VOLTAGE

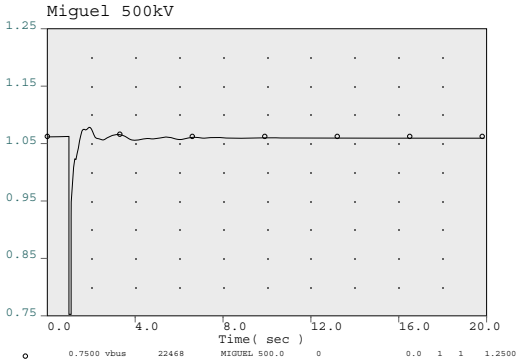
Imperial Valley 500kV



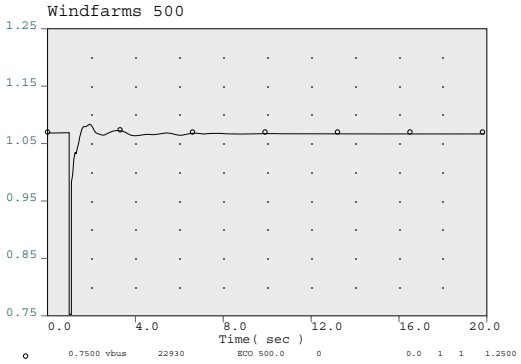
Imperial Valley 230kV



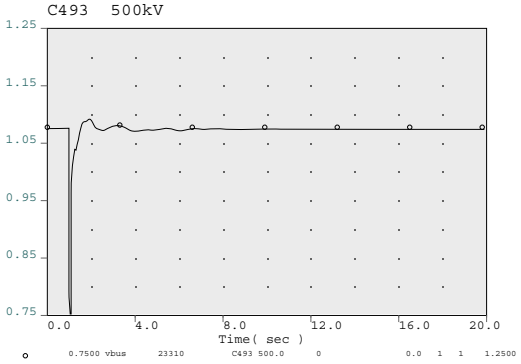
Miguel 500kV



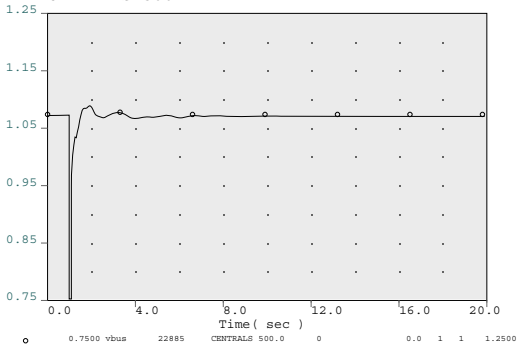
Windfarms 500



C493 500kV

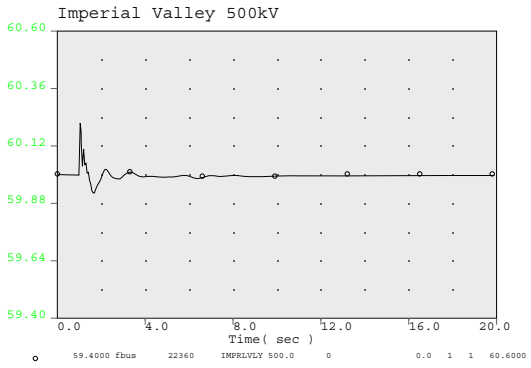


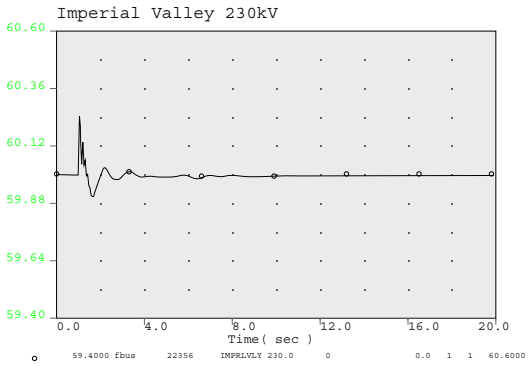
CENTRALS 500kV

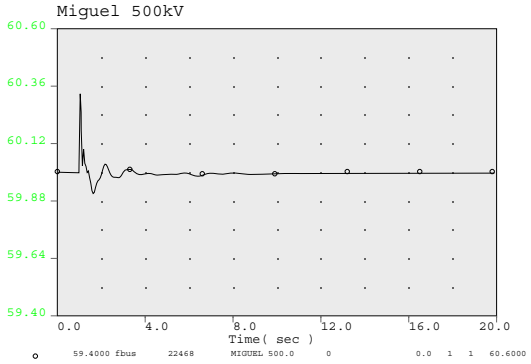


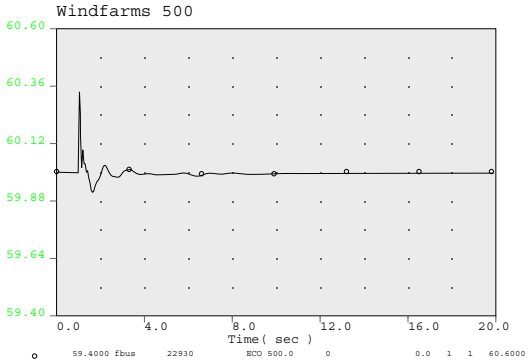
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

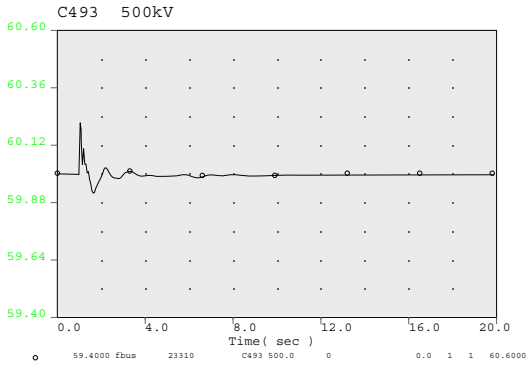
Imperial Valley Area - Frequency

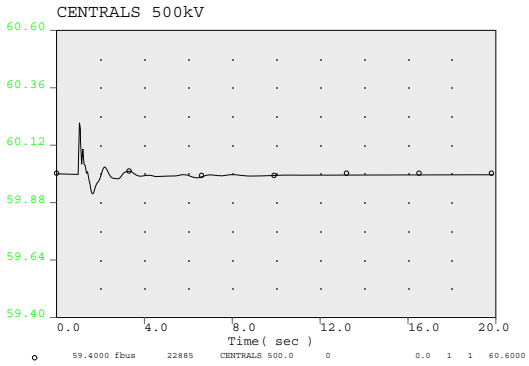






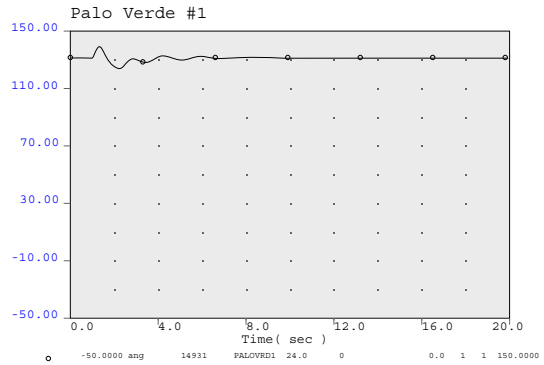


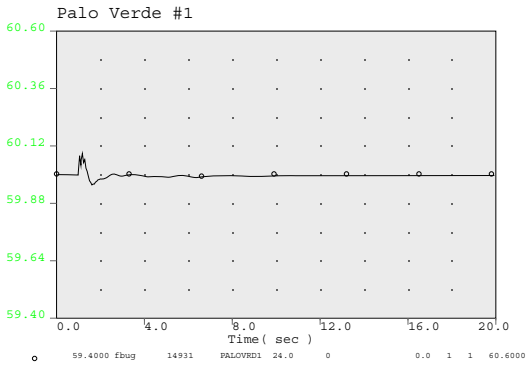


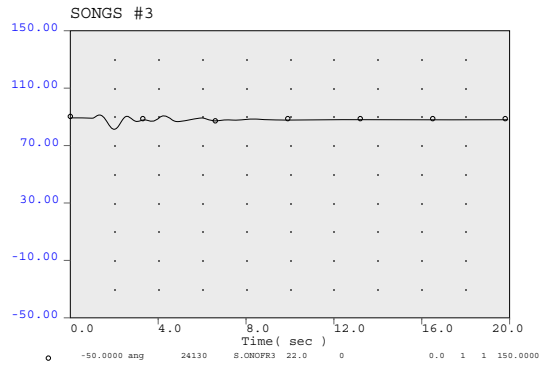


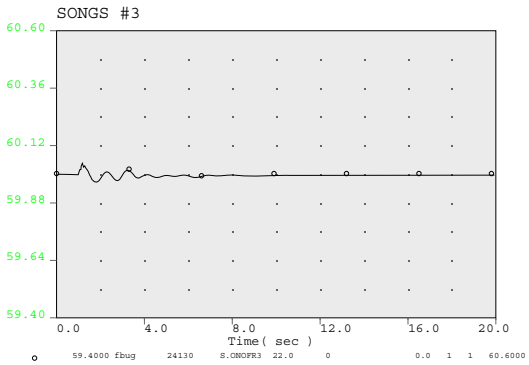
SDG&E Cluster 2 - pst int
2014 Light Autumn
Southbay - Mission 230 kV N-1

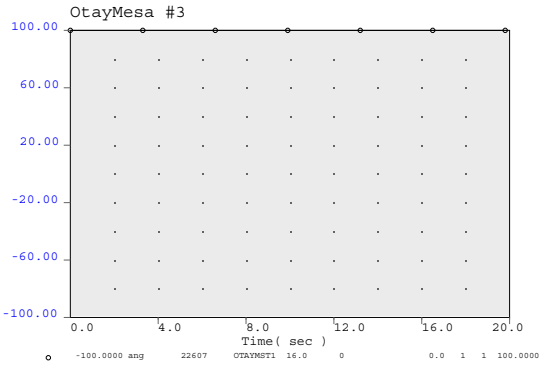
RELATIVE ROTOR ANGLE & FREQUENCY

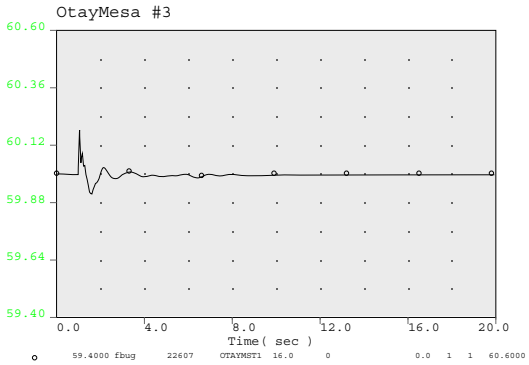












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

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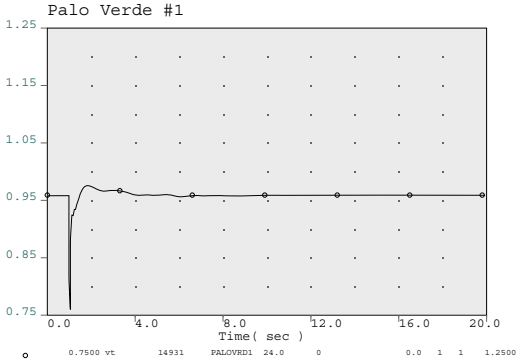
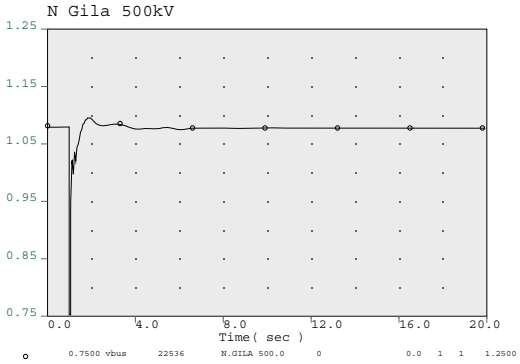
SDGE	IV_C493_slo_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:29:00 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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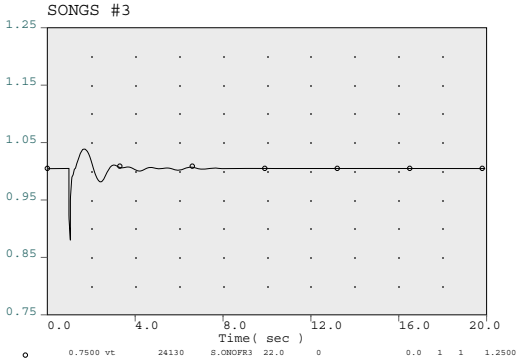
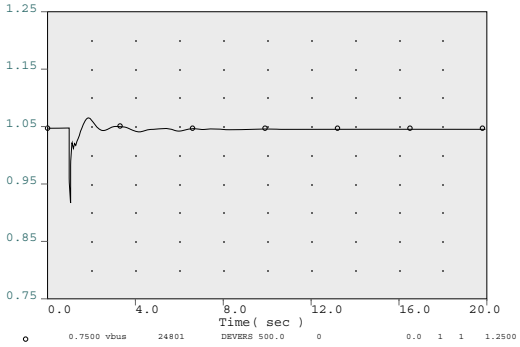


Devers 500



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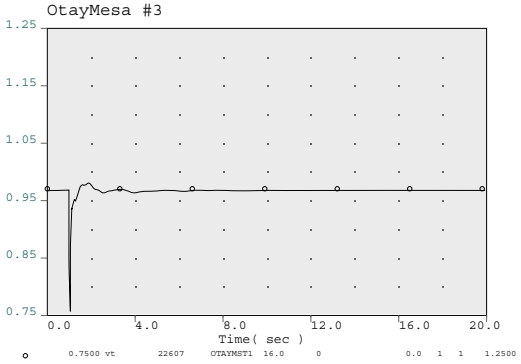
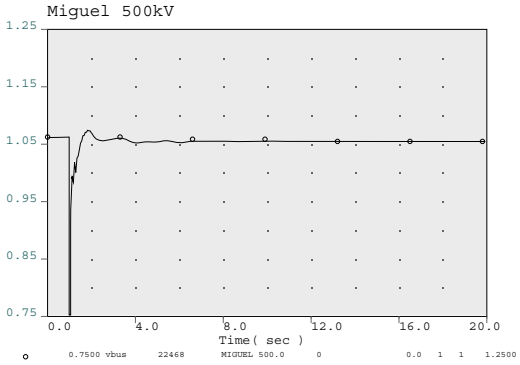


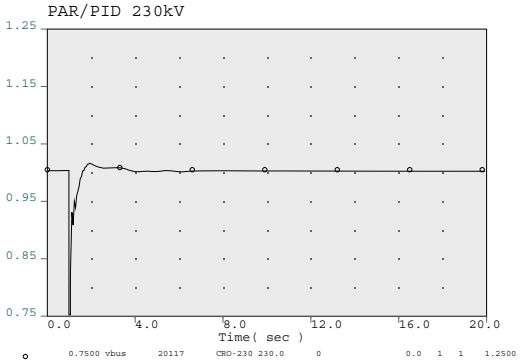
Miguel 500kV



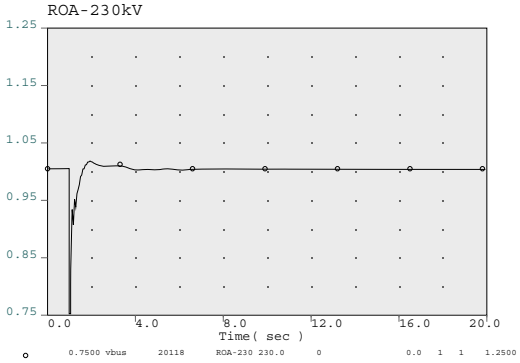
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Voltage Check and Comparison

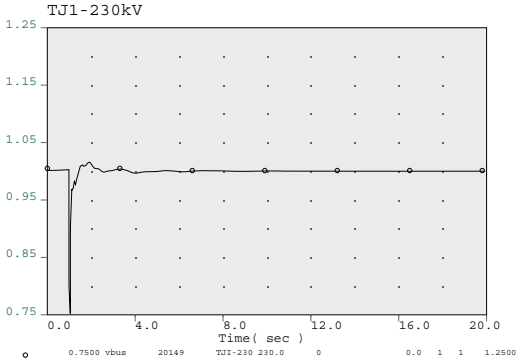
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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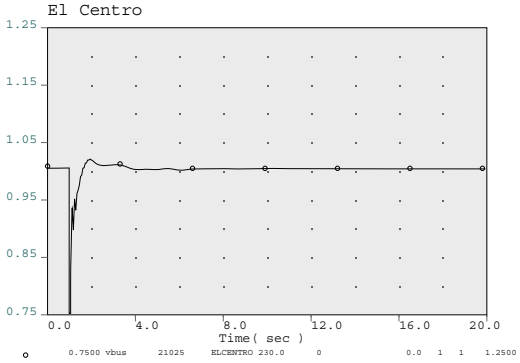
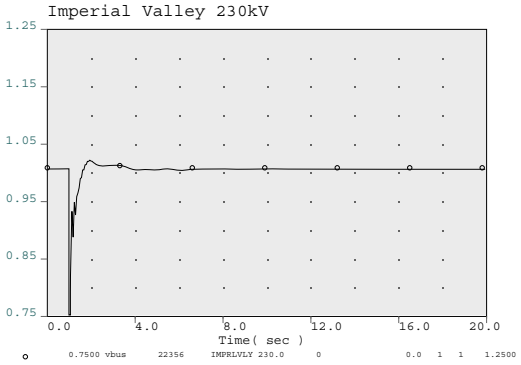
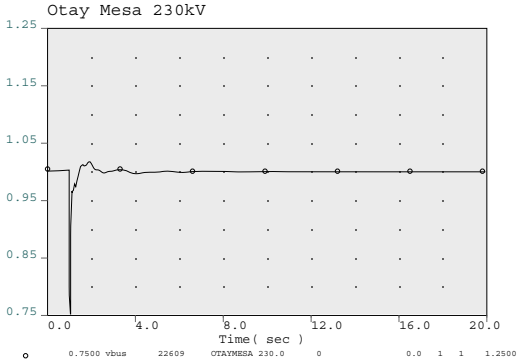


Imperial Valley 230kV



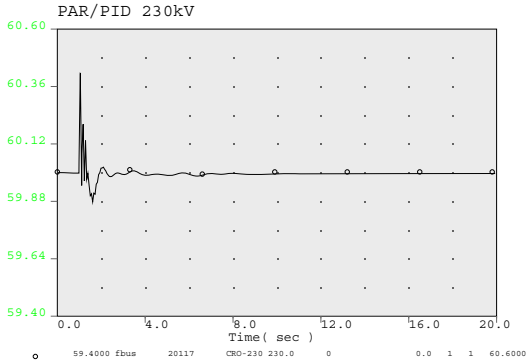
Otay Mesa 230kV



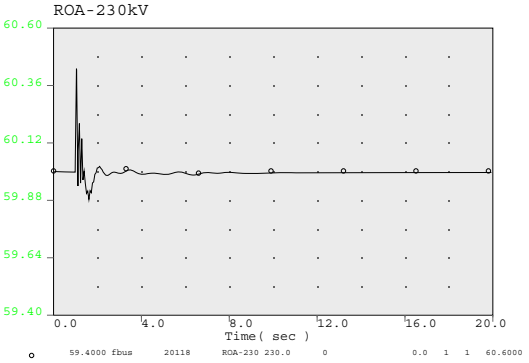
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Affected System Frequency Check and Comparison

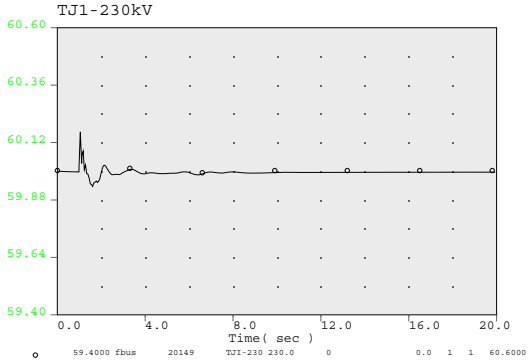
PAR/PID 230kV



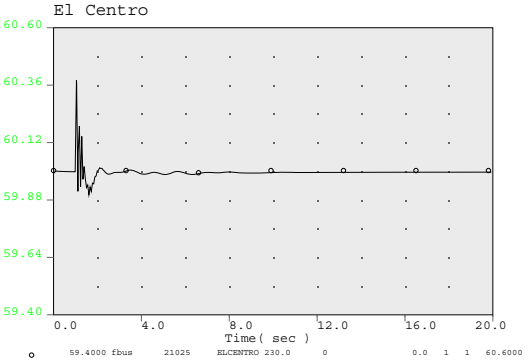
ROA-230kV



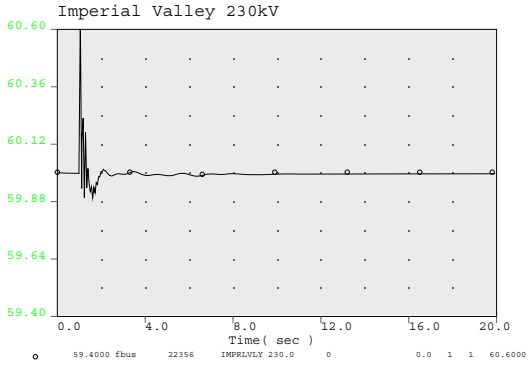
TJ1-230kV



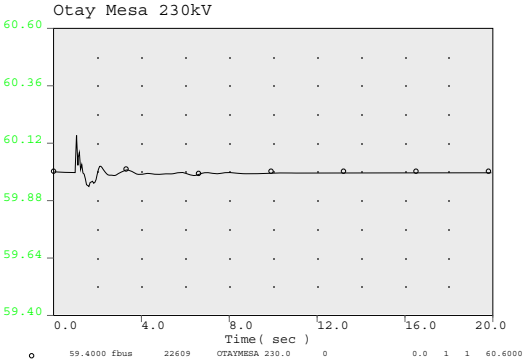
El Centro



Imperial Valley 230kV



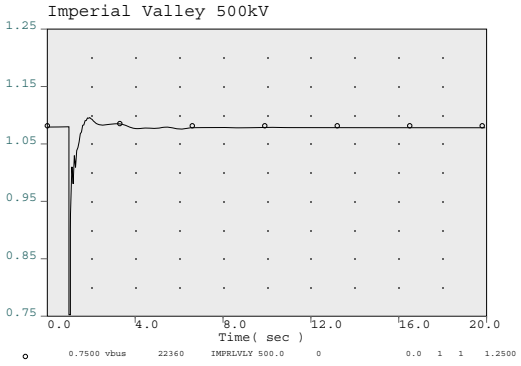
Otay Mesa 230kV



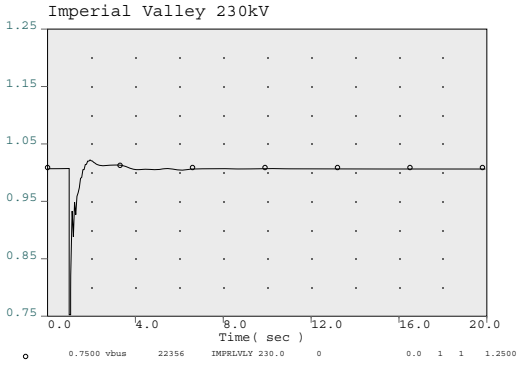
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

Imperial Valley Area - VOLTAGE

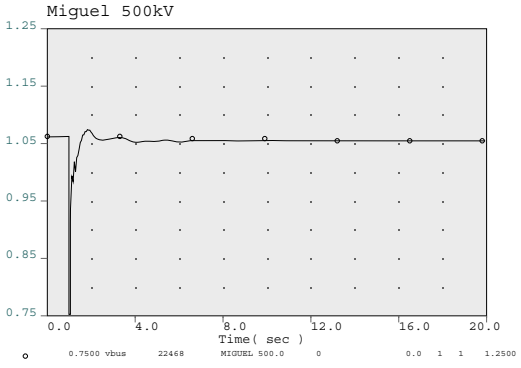
Imperial Valley 500kV



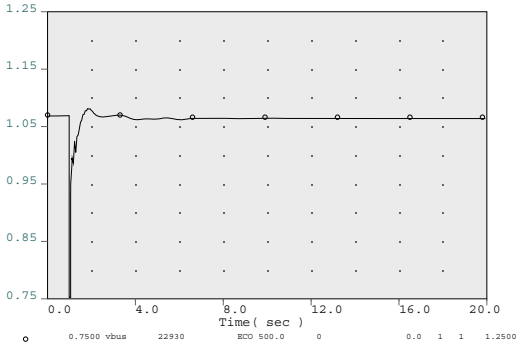
Imperial Valley 230kV



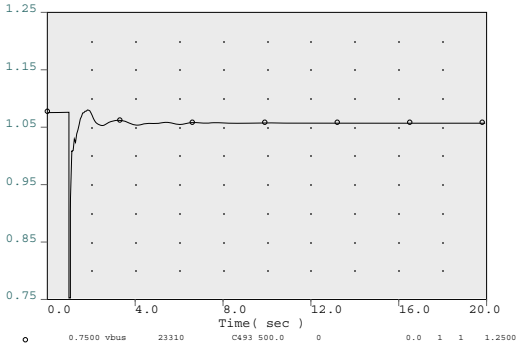
Miguel 500kV



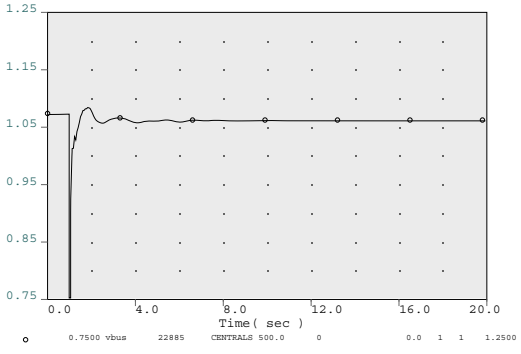
Windfarms 500



C493 500kV



CENTRALS 500kV

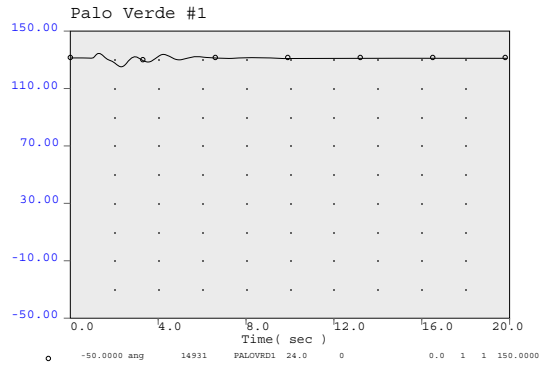


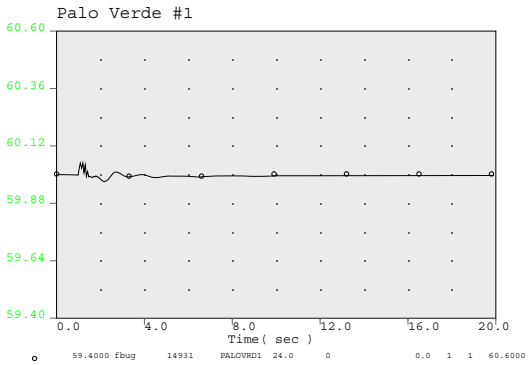
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

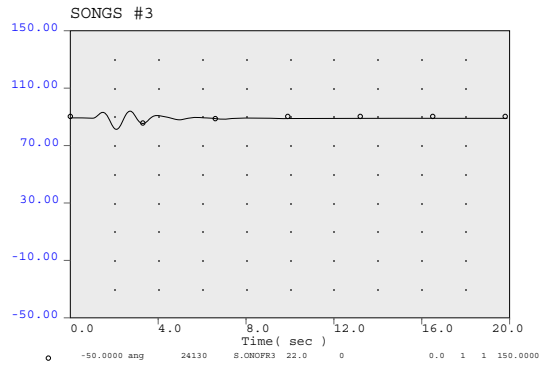
Imperial Valley Area - Frequency

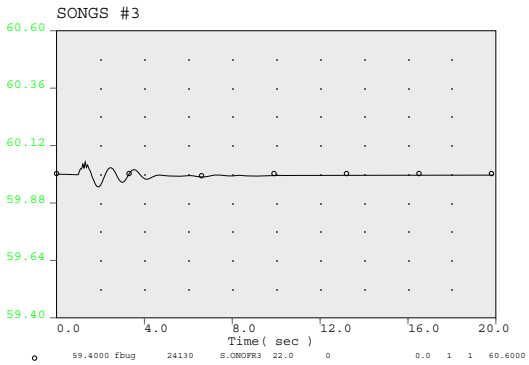
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley- C493 500kV line1

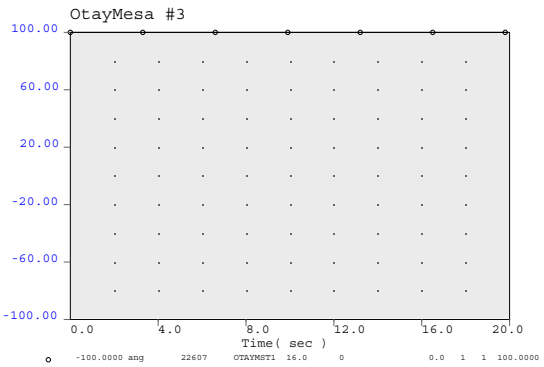
RELATIVE ROTOR ANGLE & FREQUENCY

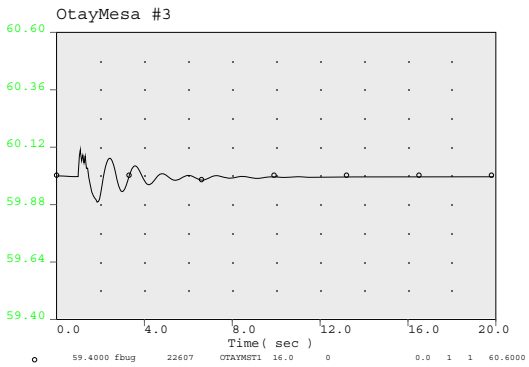












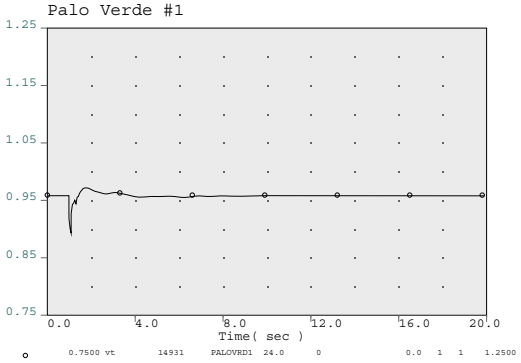
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Page 1

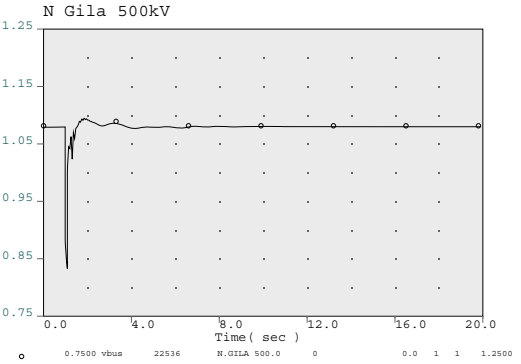
IV_ROA_6_slo_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:29:22 2010

RELATIVE VOLTAGE

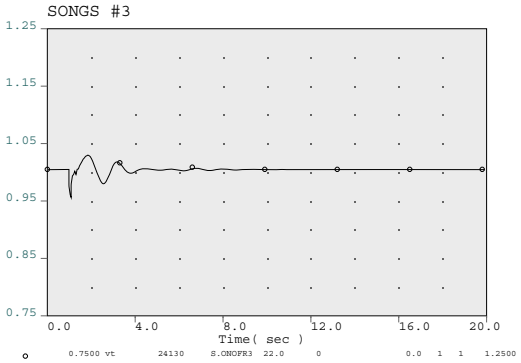
Palo Verde #1



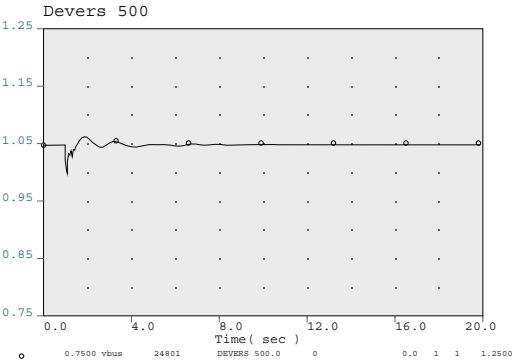
N Gila 500kV



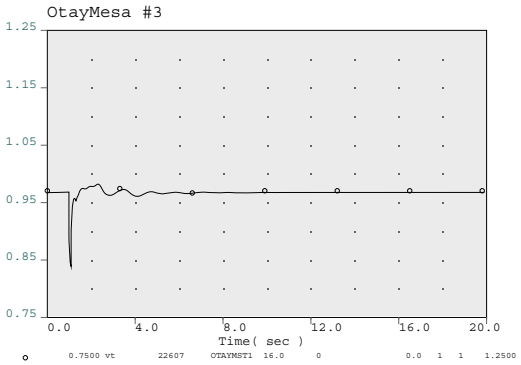
SONGS #3



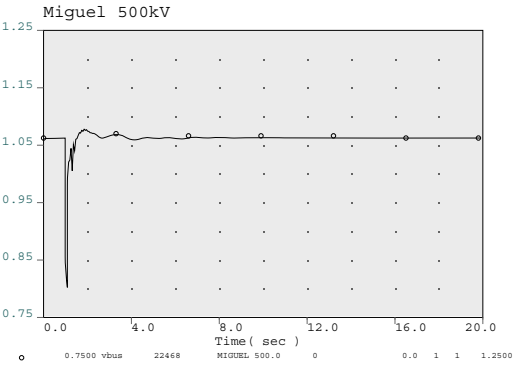
Devers 500



OtayMesa #3



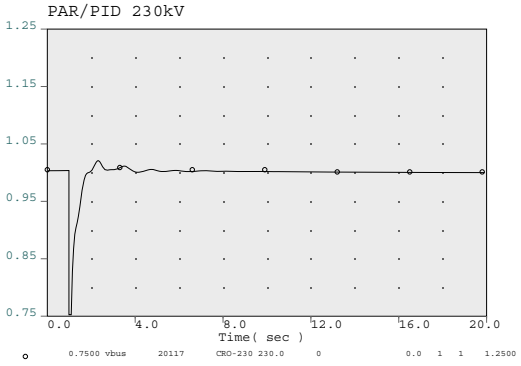
Miguel 500kV



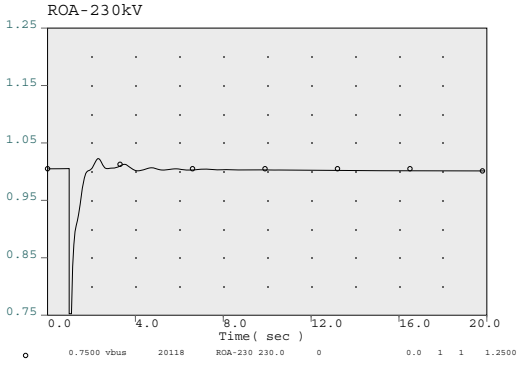
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Affected System Voltage Check and Comparison

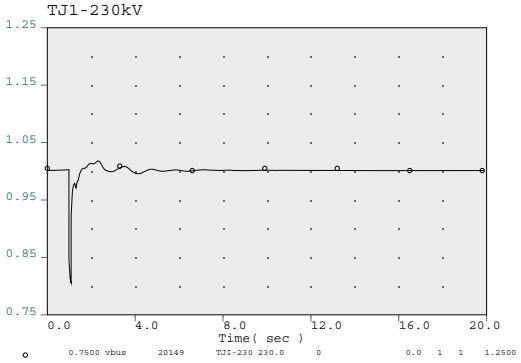
PAR/PID 230kV



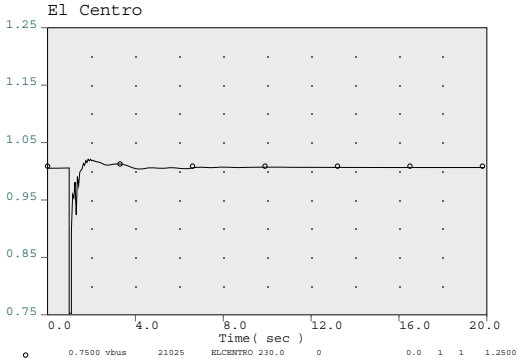
ROA-230kV



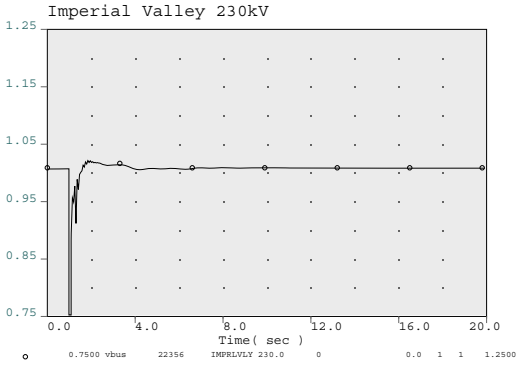
TJ1-230kV



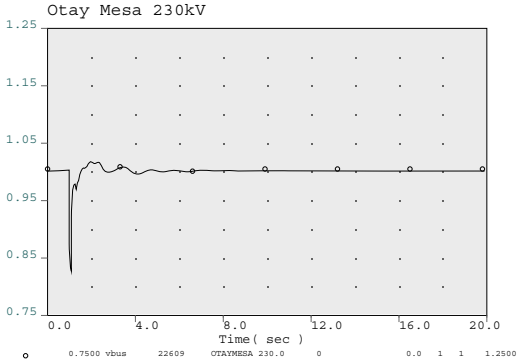
El Centro



Imperial Valley 230kV

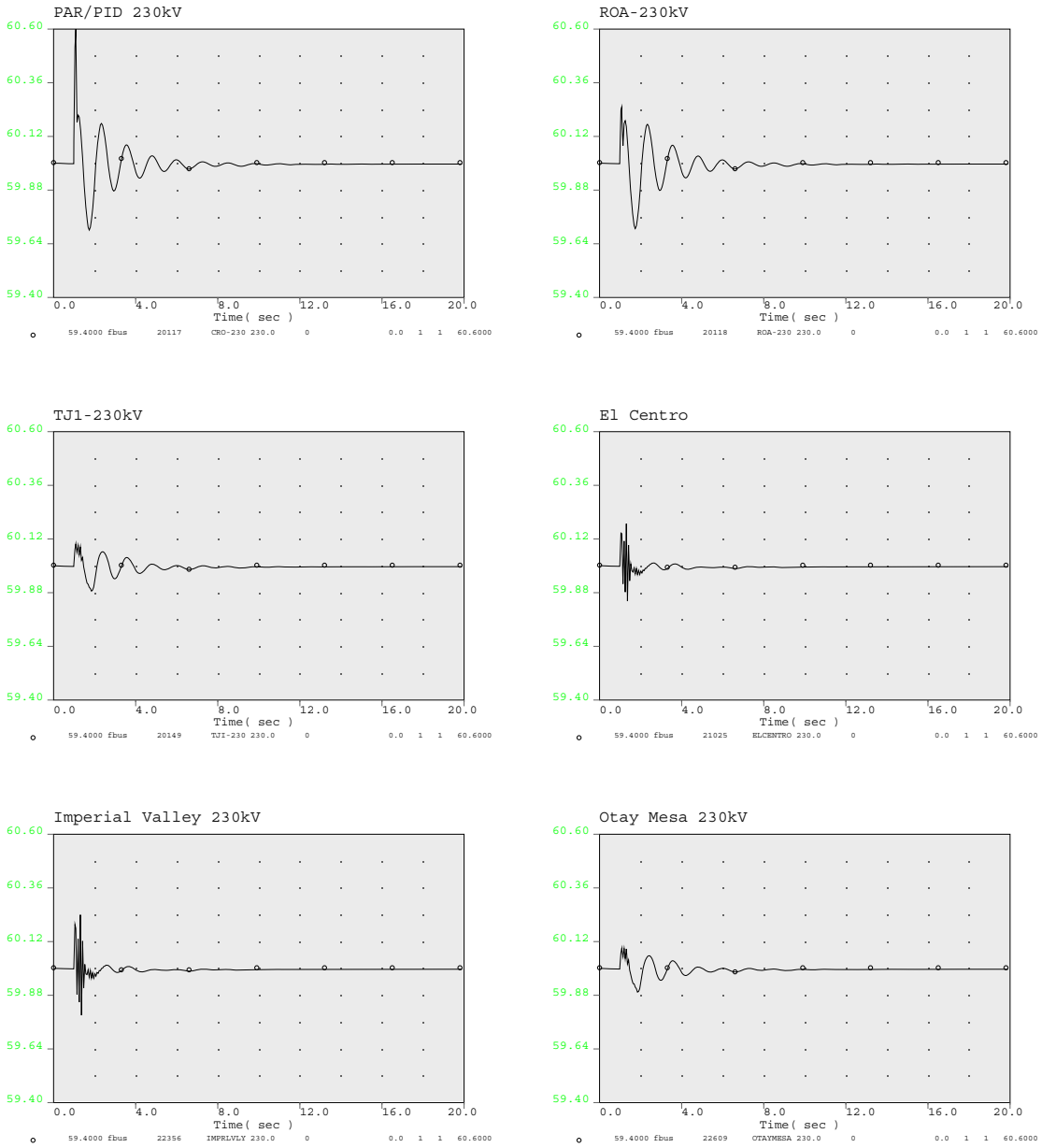


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

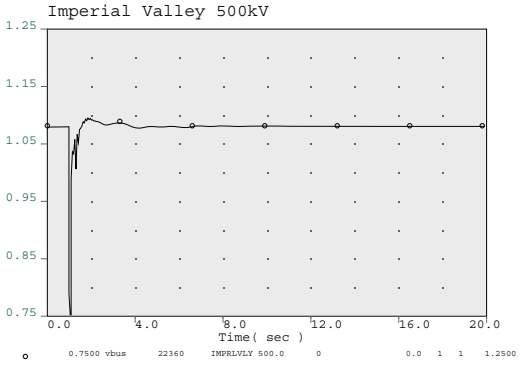
Affected System Frequency Check and Comparison



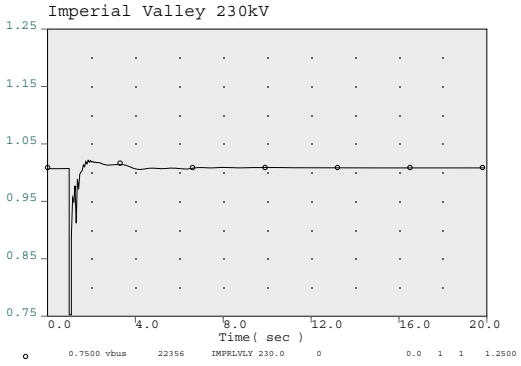
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

Imperial Valley Area - VOLTAGE

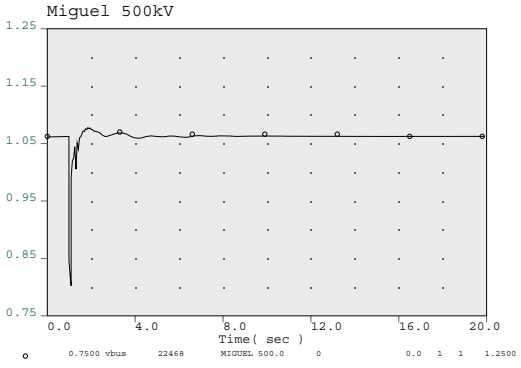
Imperial Valley 500kV



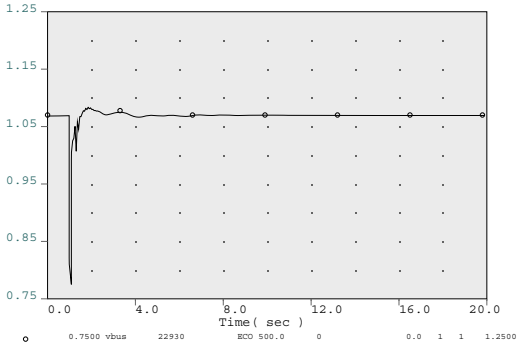
Imperial Valley 230kV



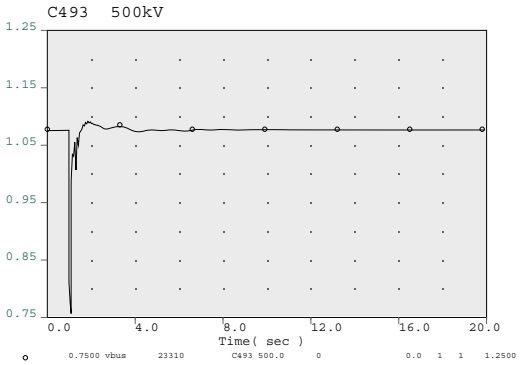
Miguel 500kV



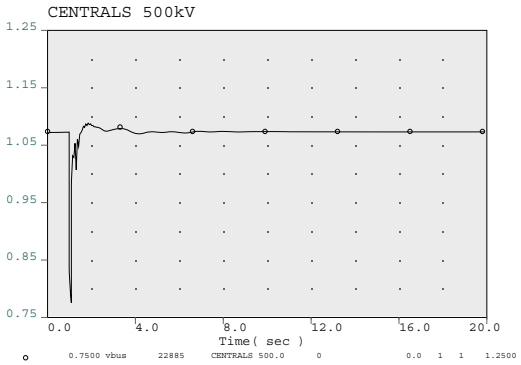
Windfarms 500



C493 500kV

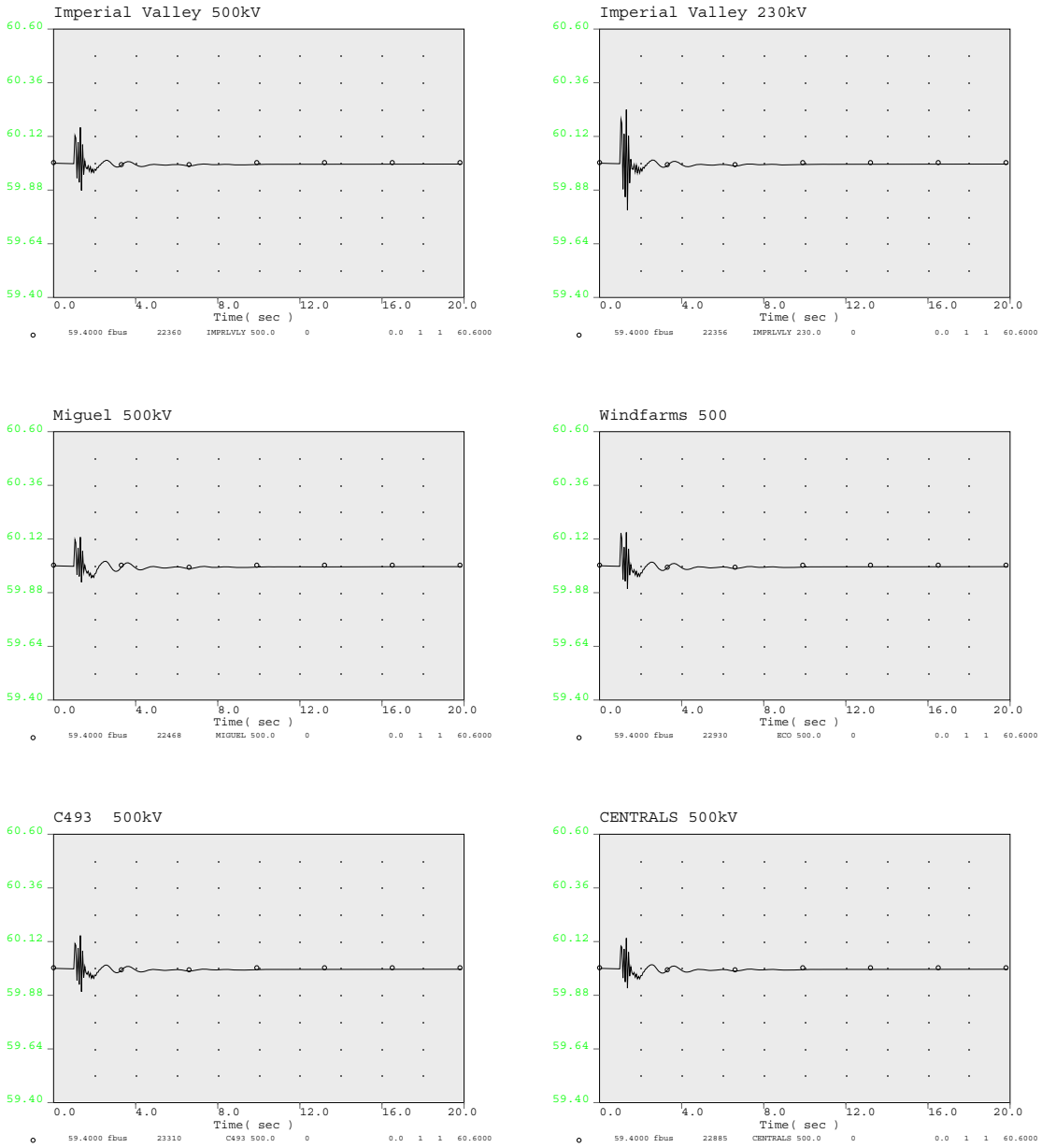


CENTRALS 500kV



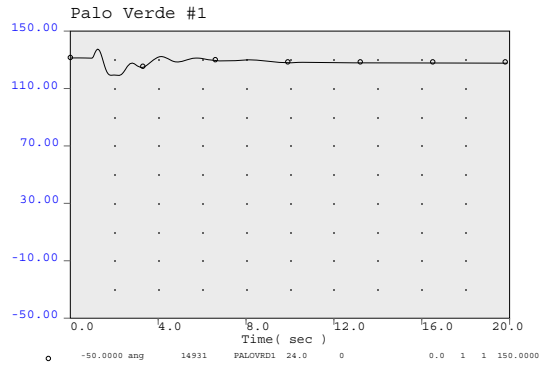
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

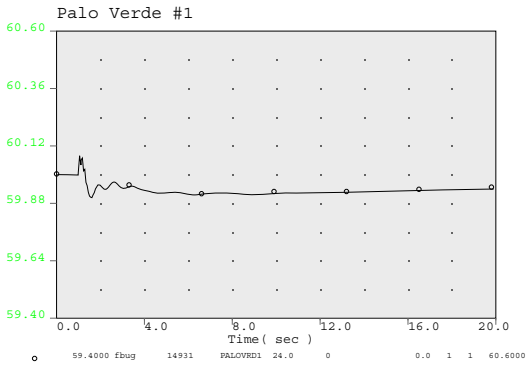
Imperial Valley Area - Frequency

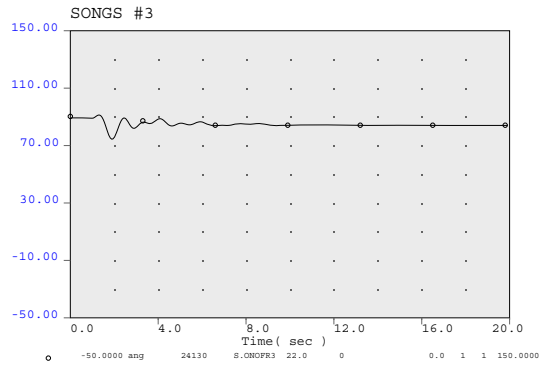


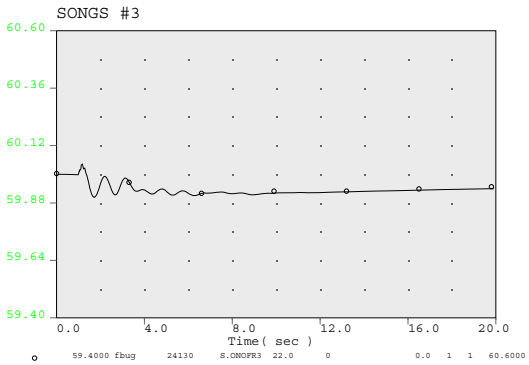
SDG&E Cluster 2 - post
2014 Light Autumn
Fault Imperial Valley 230 kV
Loss of IV-ROA 230 kV SLO

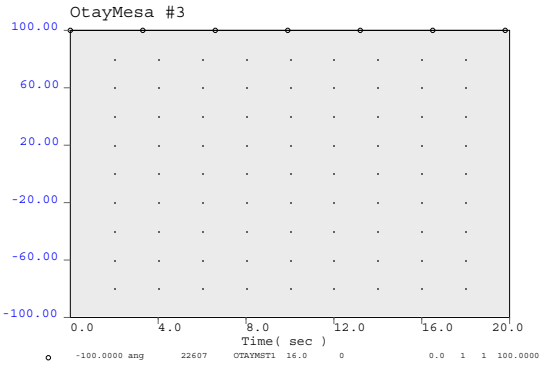
RELATIVE ROTOR ANGLE & FREQUENCY

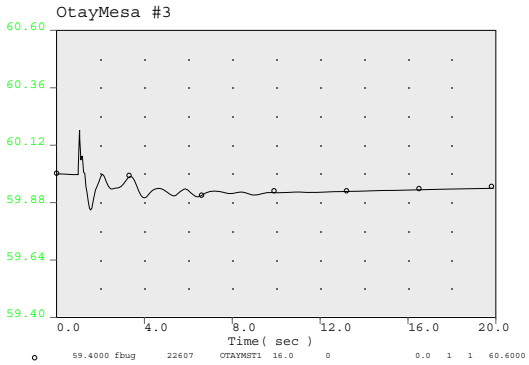












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

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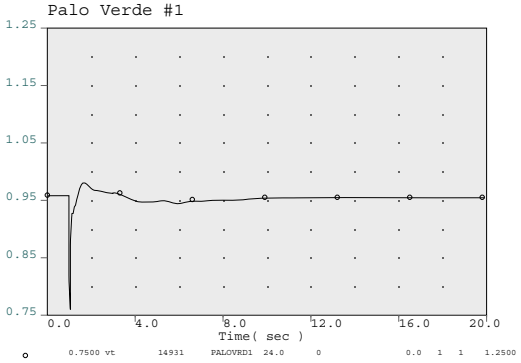
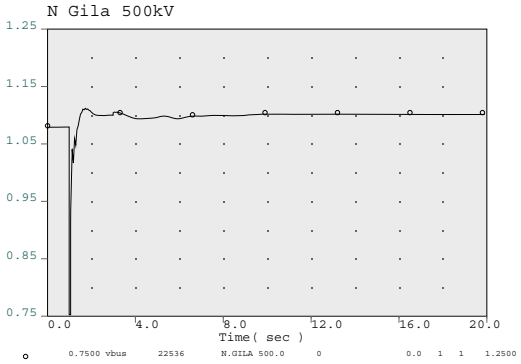
SDGE	IV_Wnd1_RAS_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:29:45 2010

RELATIVE VOLTAGE

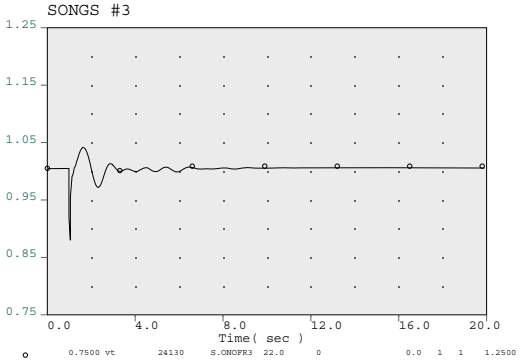
Palo Verde #1



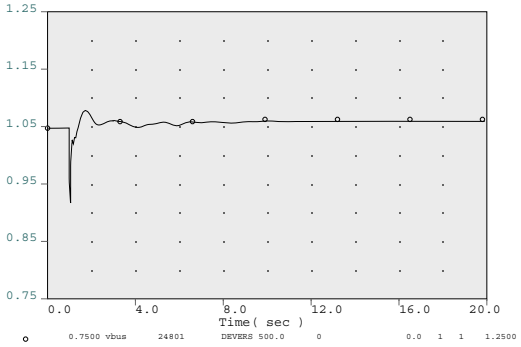
N Gila 500kV



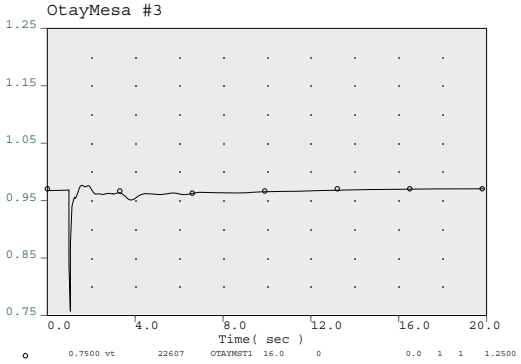
SONGS #3



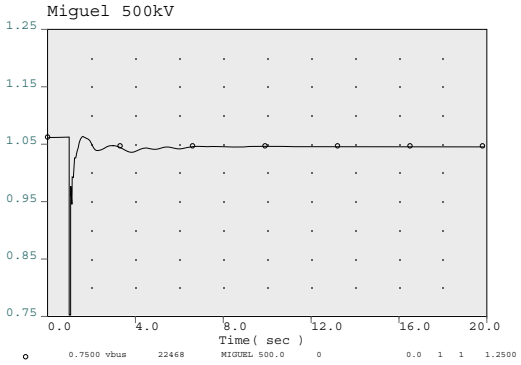
Devers 500



OtayMesa #3



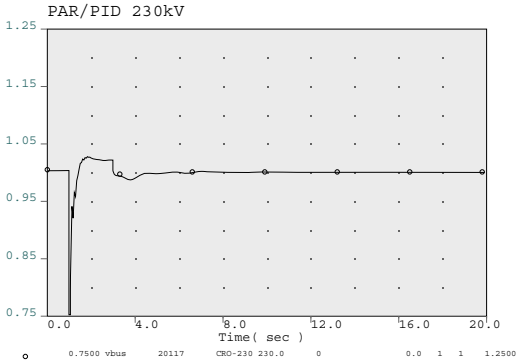
Miguel 500kV



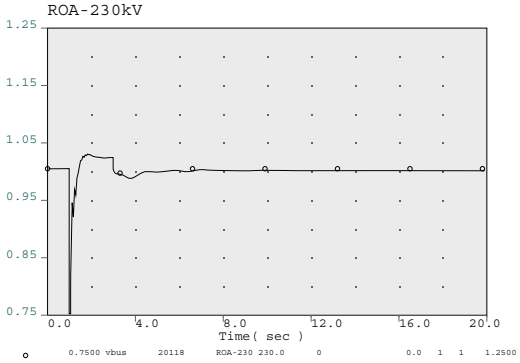
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Voltage Check and Comparison

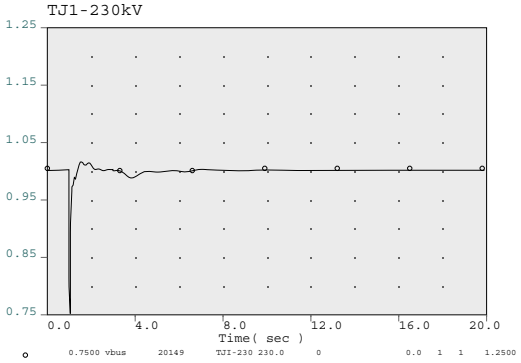
PAR/PID 230kV



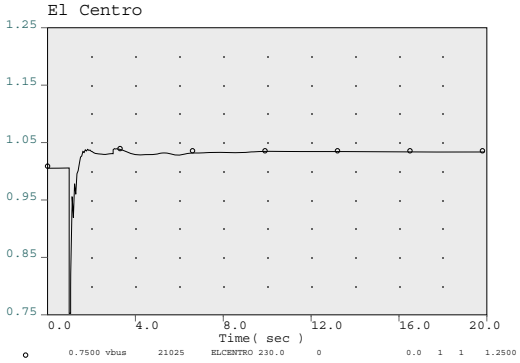
ROA-230kV



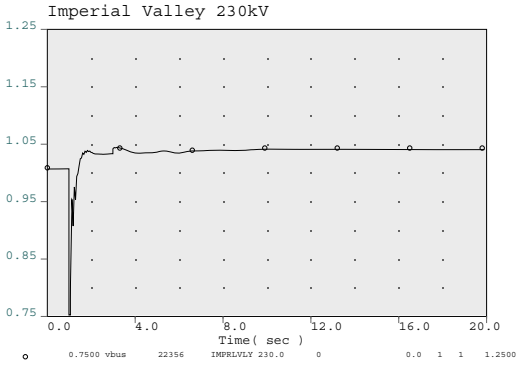
TJ1-230kV



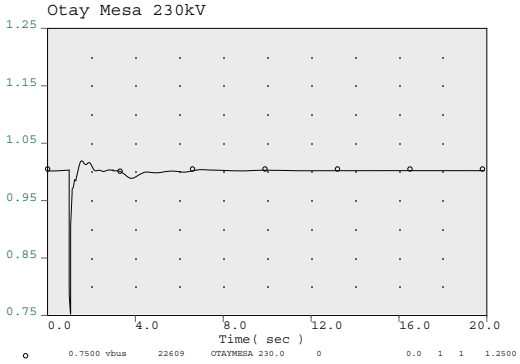
El Centro



Imperial Valley 230kV



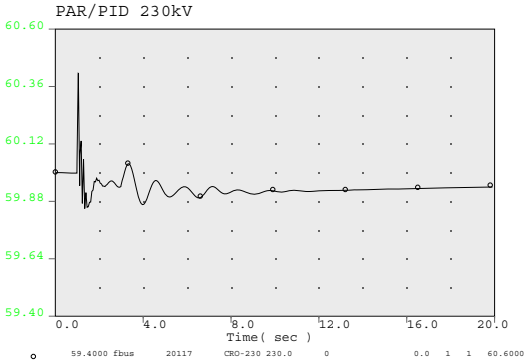
Otay Mesa 230kV



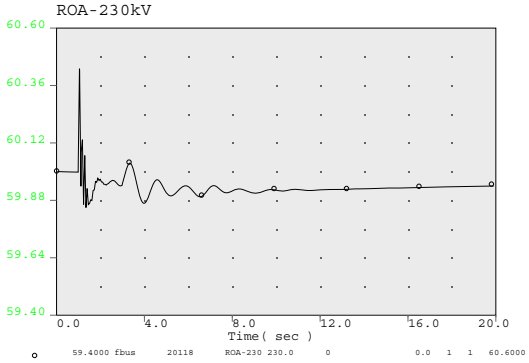
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Affected System Frequency Check and Comparison

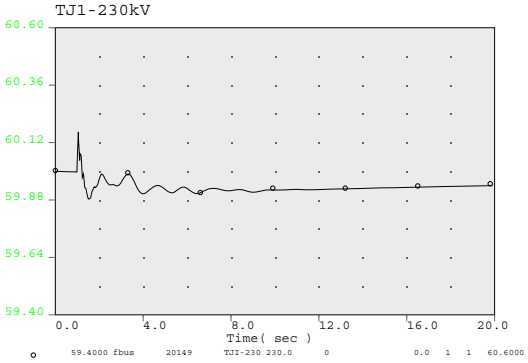
PAR/PID 230kV



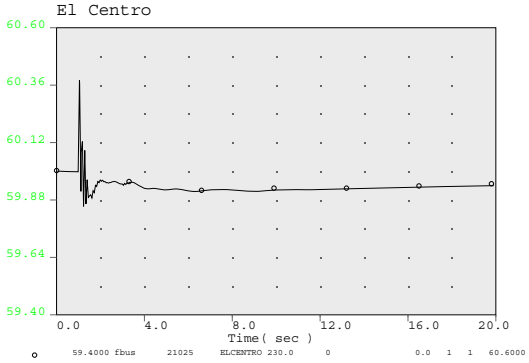
ROA-230kV



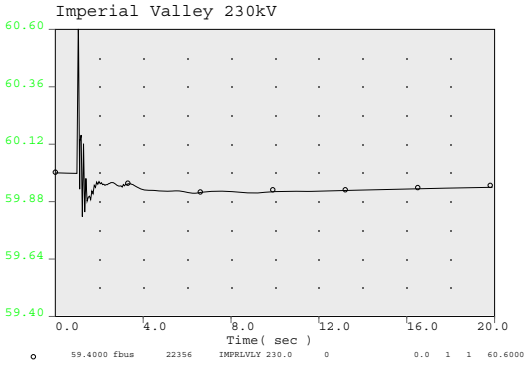
TJ1-230kV



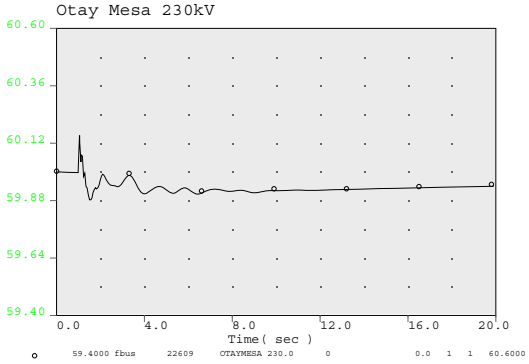
El Centro



Imperial Valley 230kV



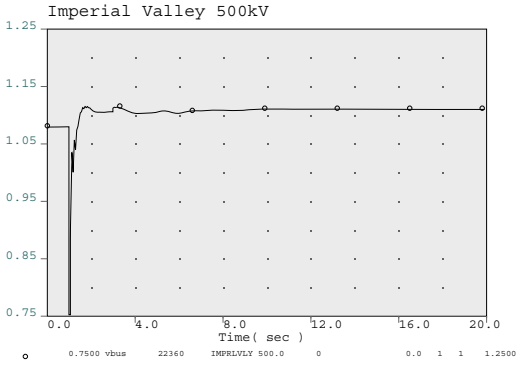
Otay Mesa 230kV



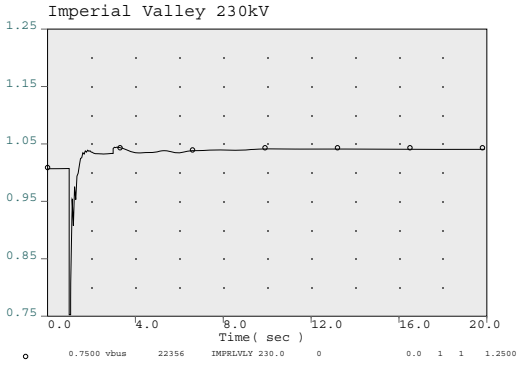
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

Imperial Valley Area - VOLTAGE

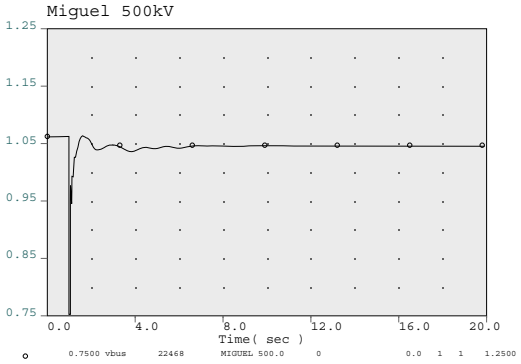
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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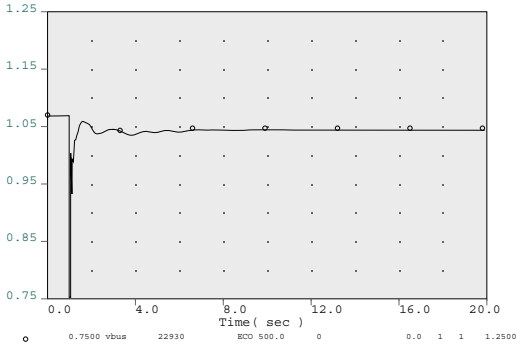
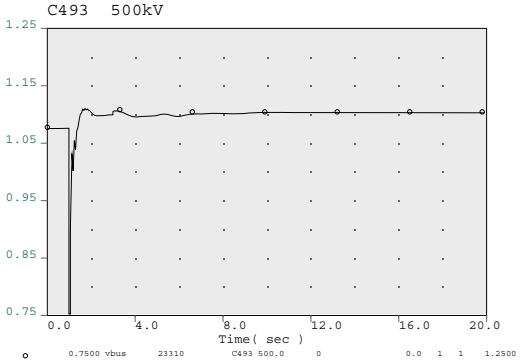
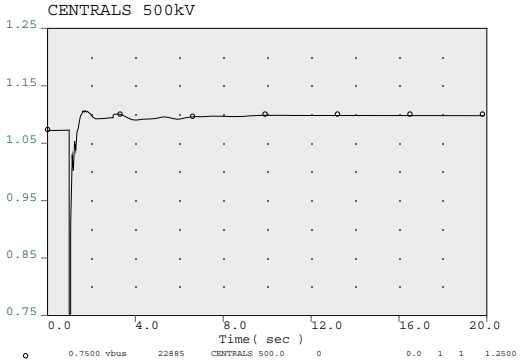


C493 500kV

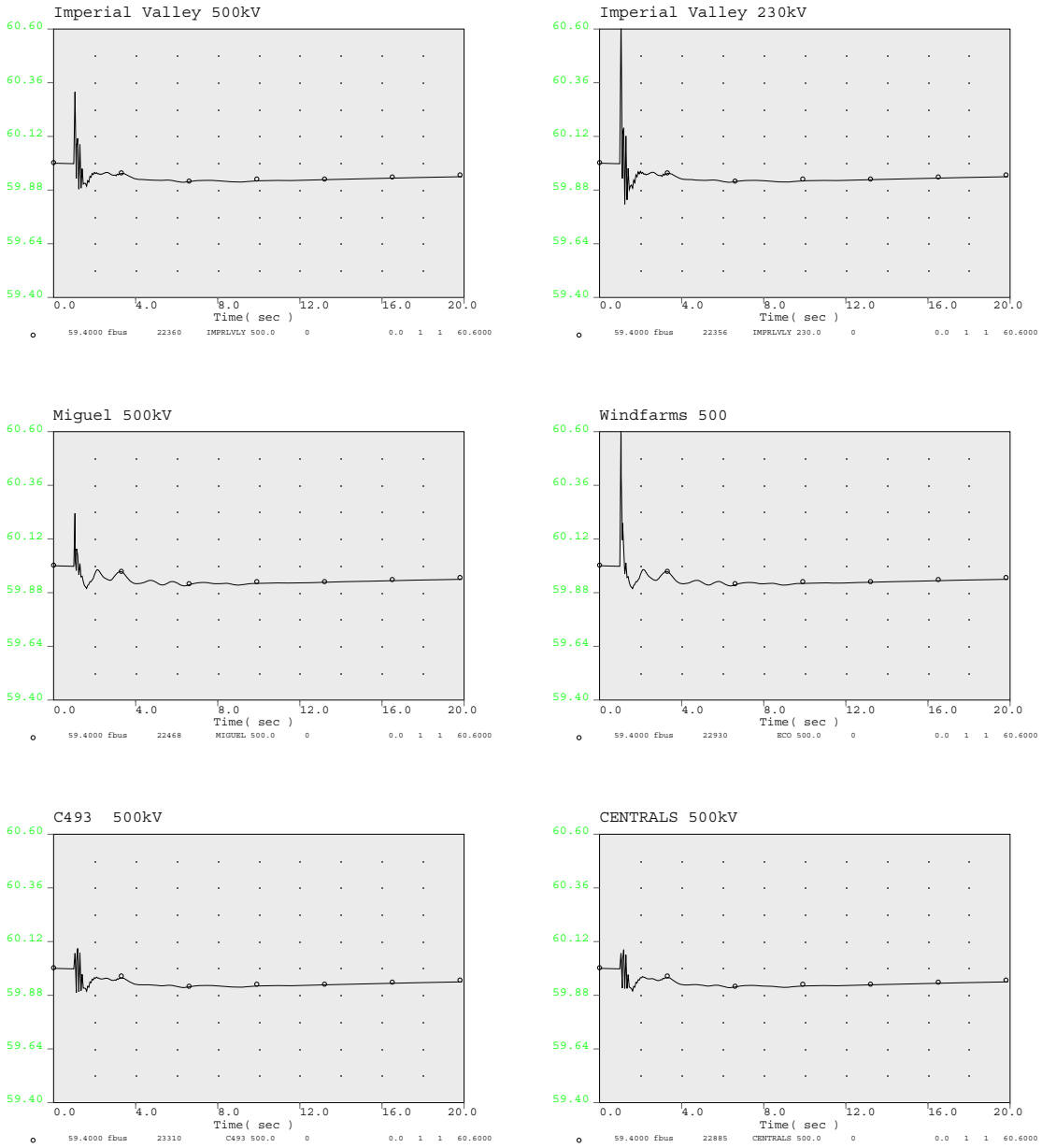


CENTRALS 500kV



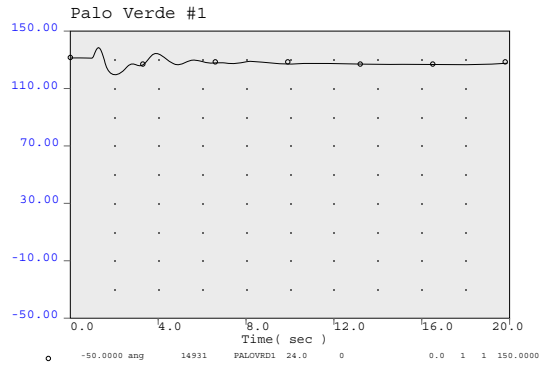
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

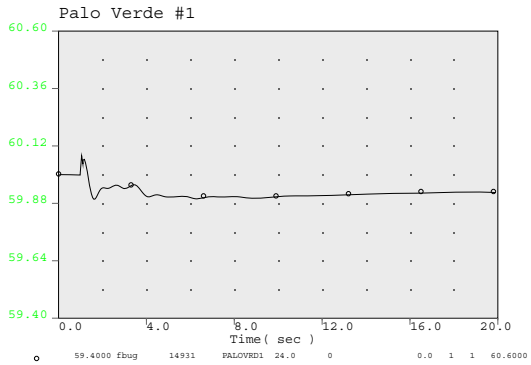
Imperial Valley Area - Frequency

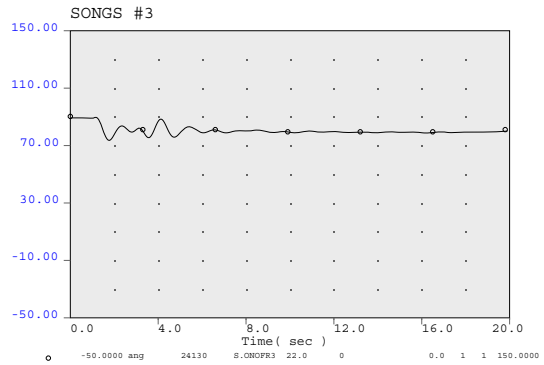


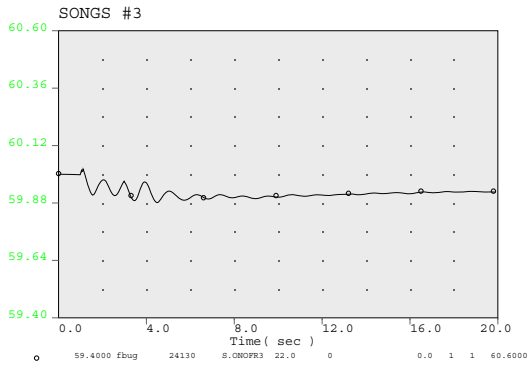
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-ECO 500 kV line1

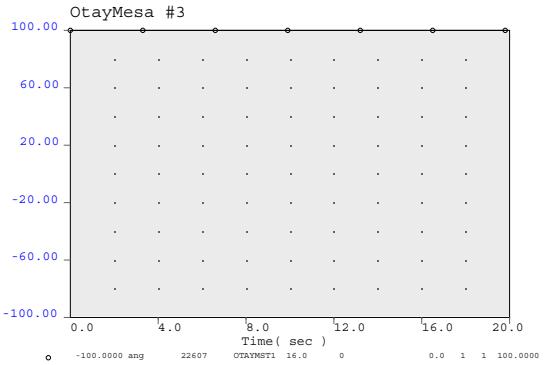
RELATIVE ROTOR ANGLE & FREQUENCY

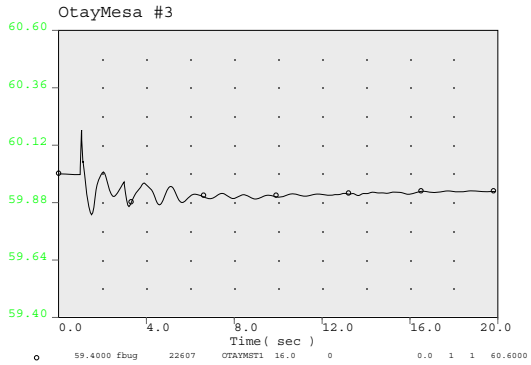












SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

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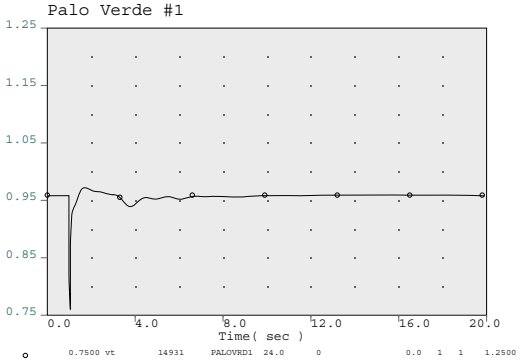
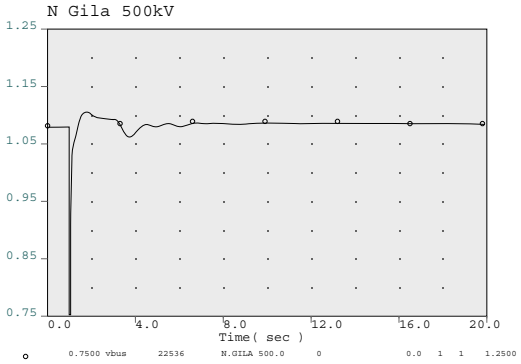
SDGE	IV_Wnd_dlo_RASxR1_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:30:08 2010

RELATIVE VOLTAGE

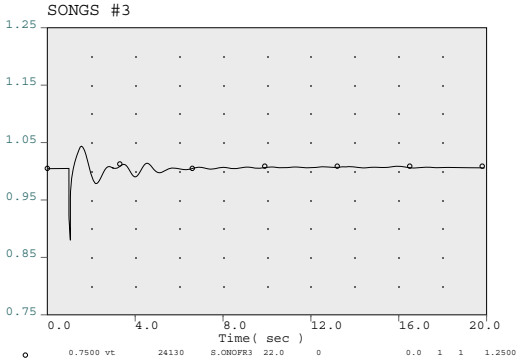
Palo Verde #1



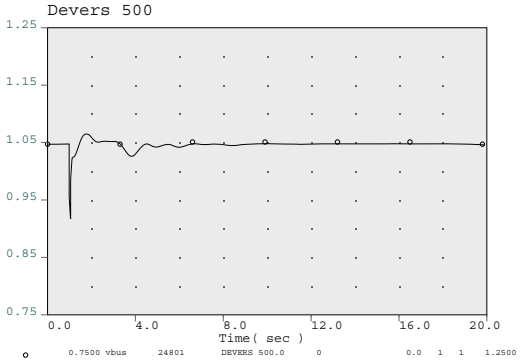
N Gila 500kV



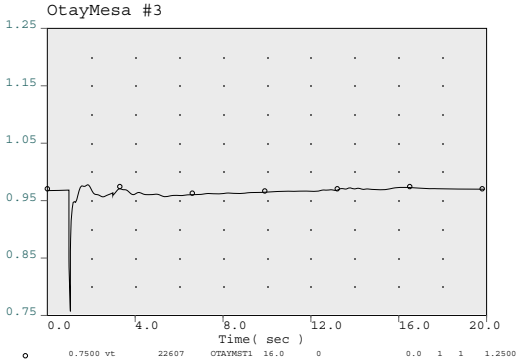
SONGS #3



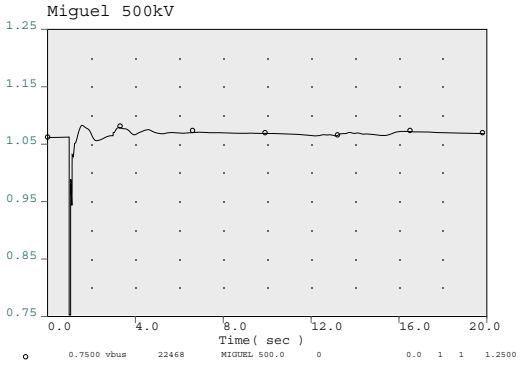
Devers 500



OtayMesa #3



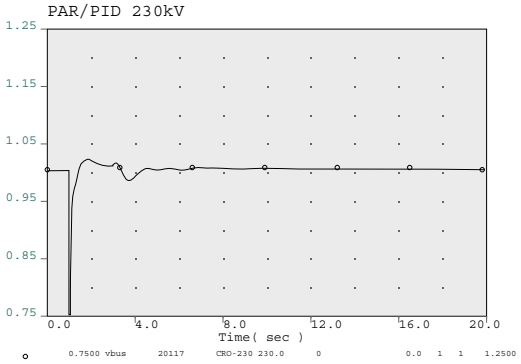
Miguel 500kV



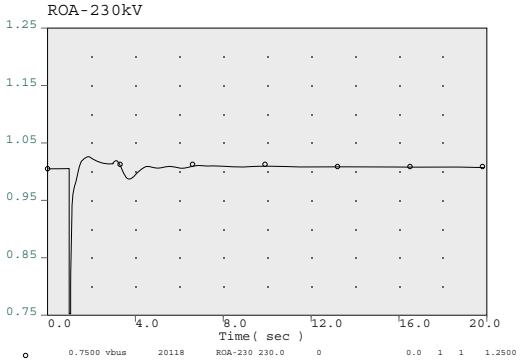
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Voltage Check and Comparison

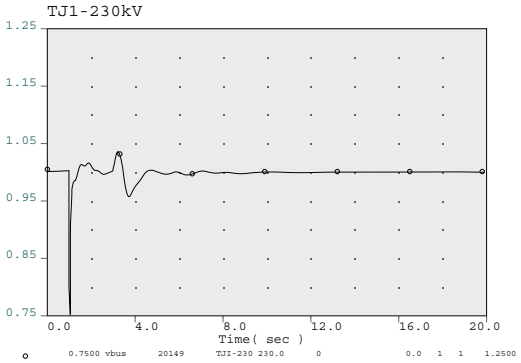
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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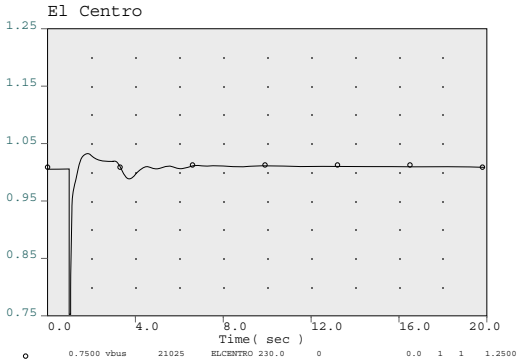
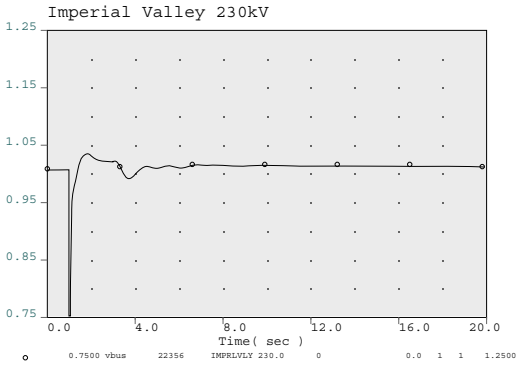
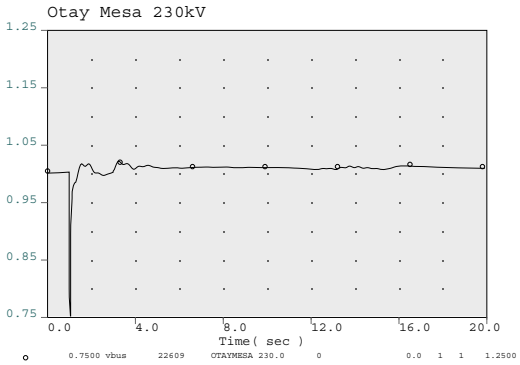


Imperial Valley 230kV



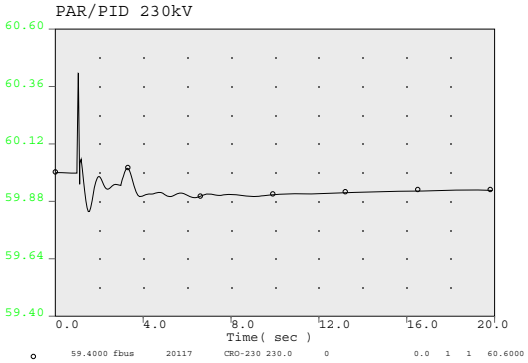
Otay Mesa 230kV



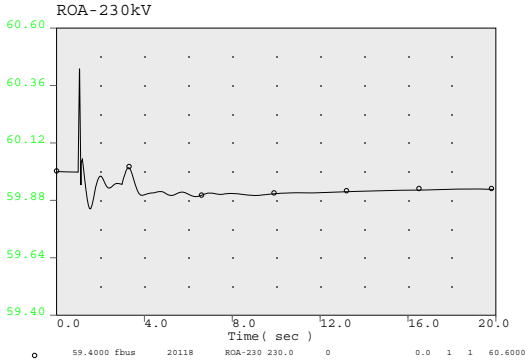
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Affected System Frequency Check and Comparison

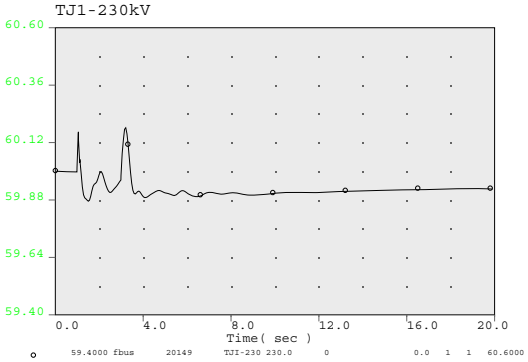
PAR/PID 230kV



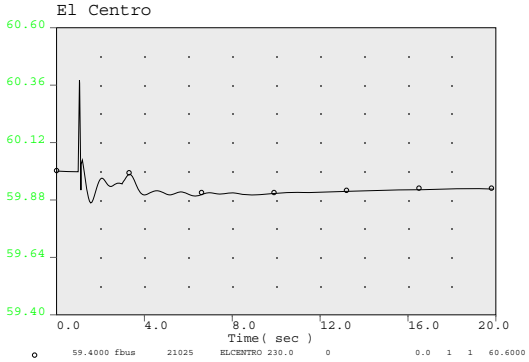
ROA-230kV



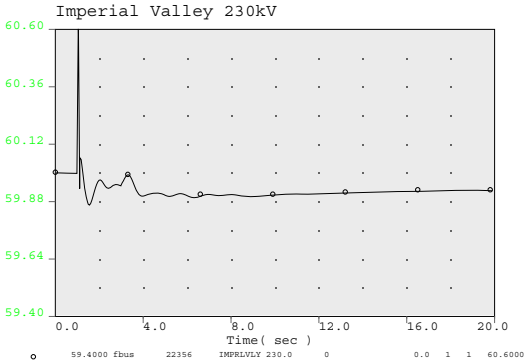
TJ1-230kV



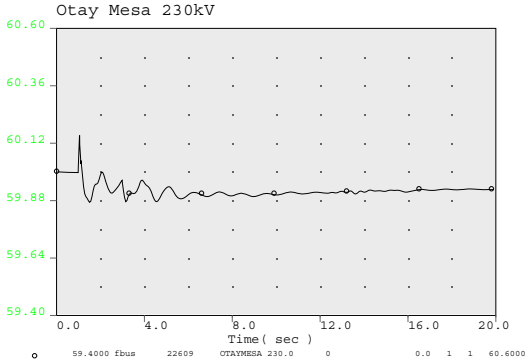
El Centro



Imperial Valley 230kV



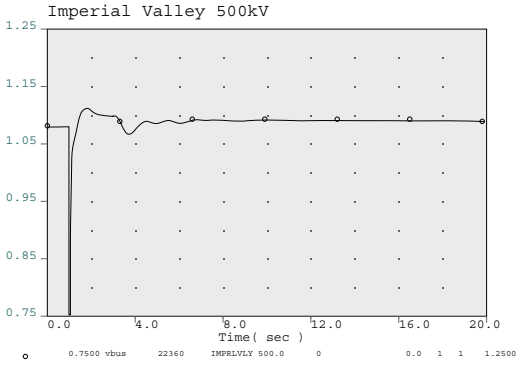
Otay Mesa 230kV



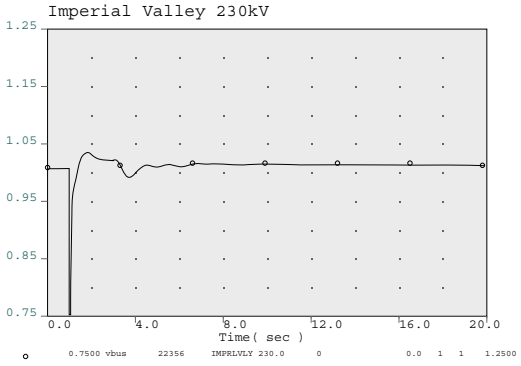
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

Imperial Valley Area - VOLTAGE

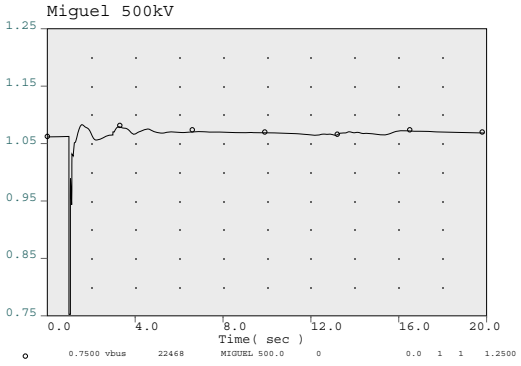
Imperial Valley 500kV



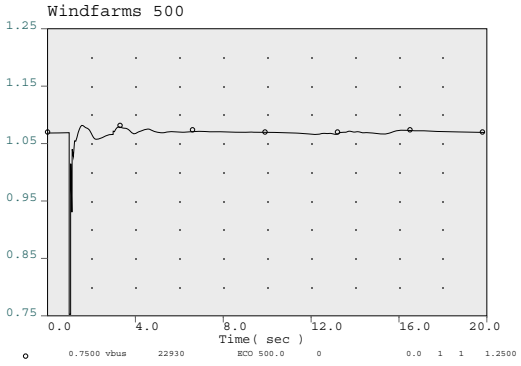
Imperial Valley 230kV



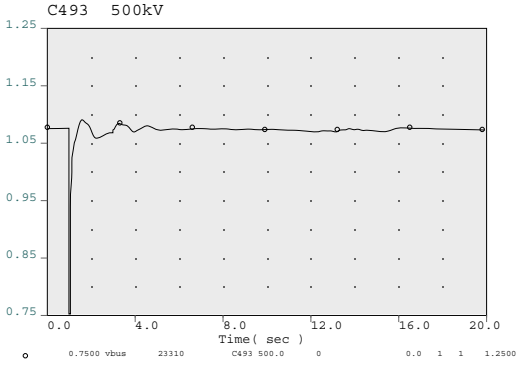
Miguel 500kV



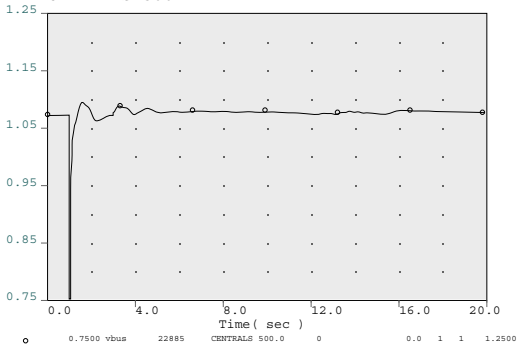
Windfarms 500



C493 500kV

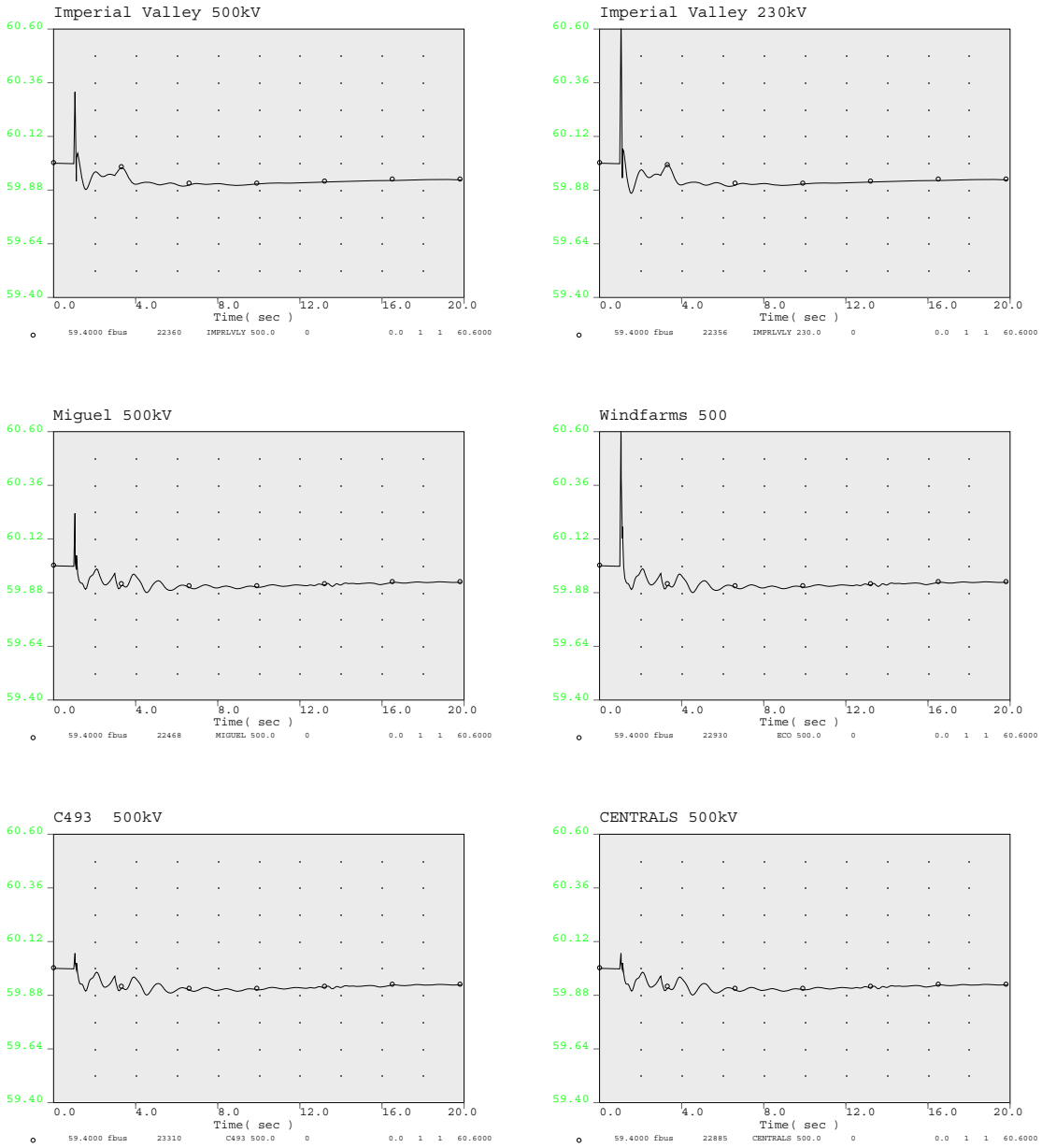


CENTRALS 500kV



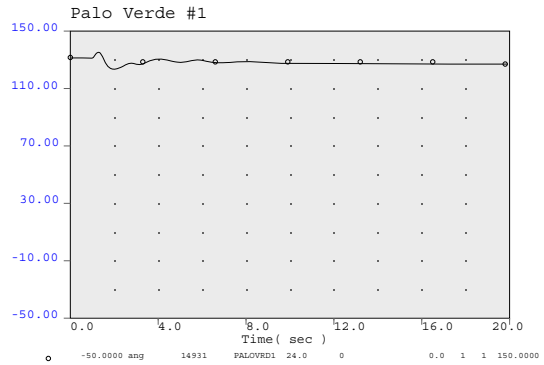
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

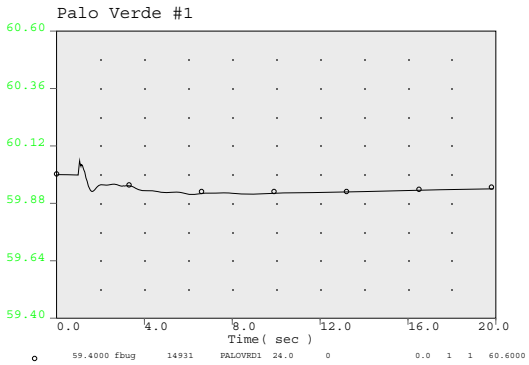
Imperial Valley Area - Frequency

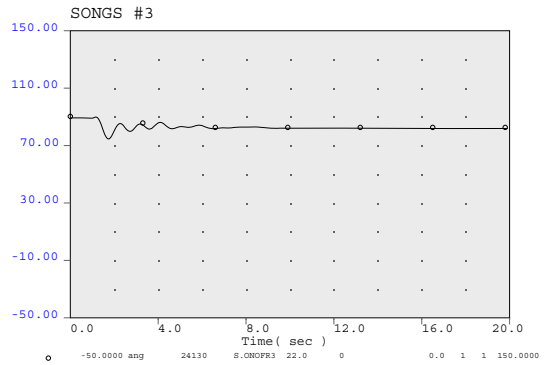


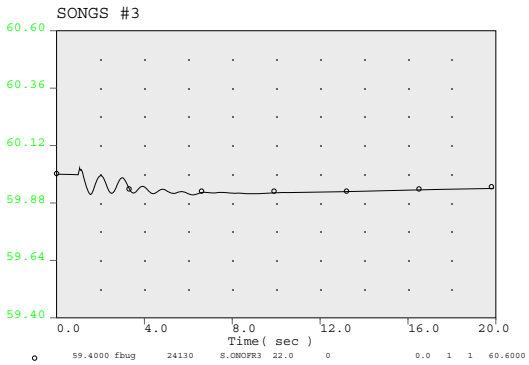
SDG&E Cluster 2 - post
2014 Light Autumn
Imperial Valley-C493-ECO 500 kV Double line outage
with Xtrp

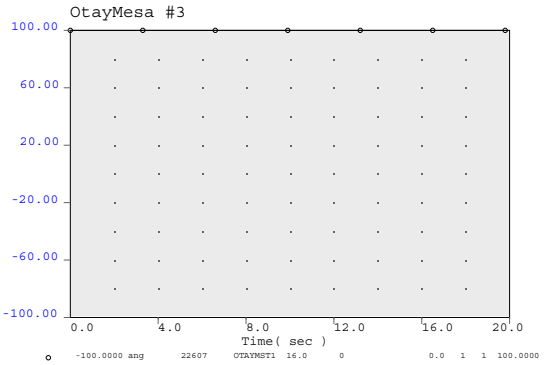
RELATIVE ROTOR ANGLE & FREQUENCY

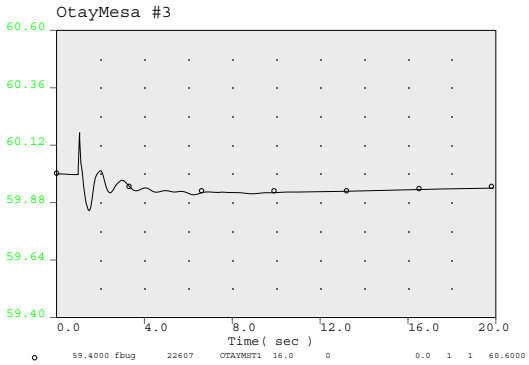












SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

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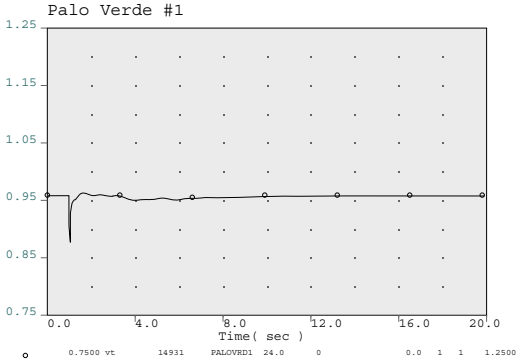
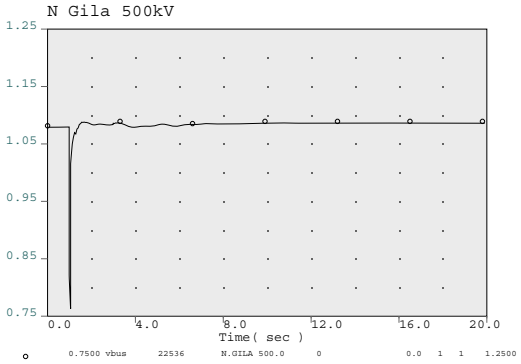
SDGE	ML_Wnd_RAS_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:30:29 2010

RELATIVE VOLTAGE

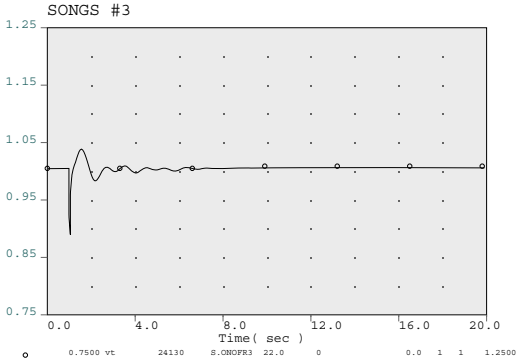
Palo Verde #1



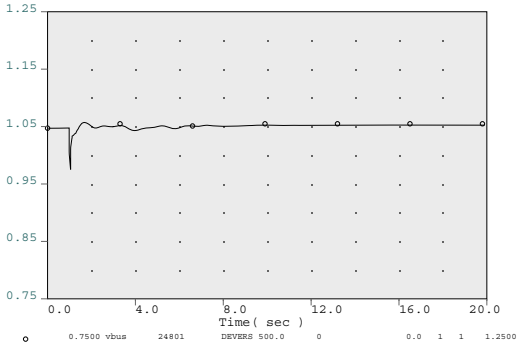
N Gila 500kV



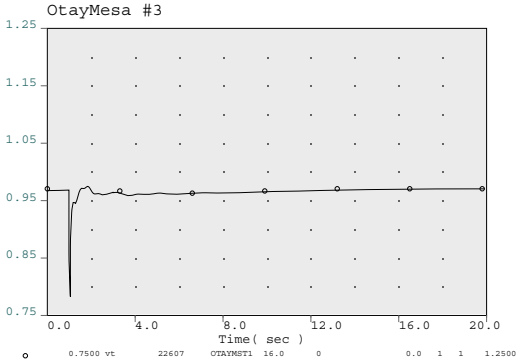
SONGS #3



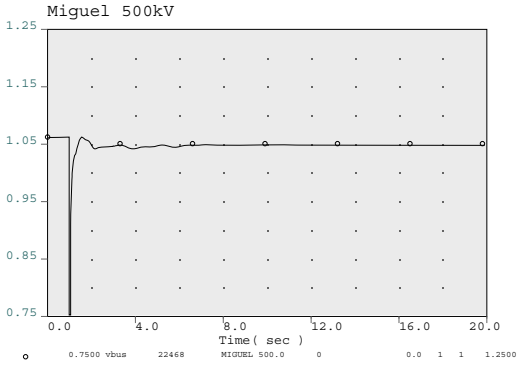
Devers 500



OtayMesa #3



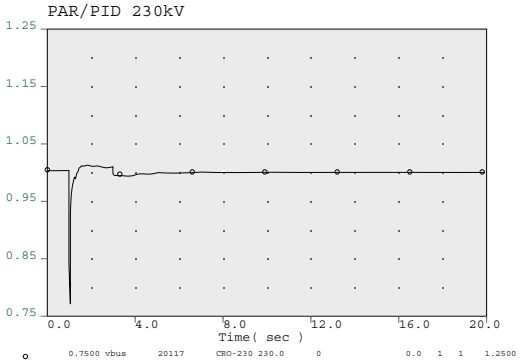
Miguel 500kV



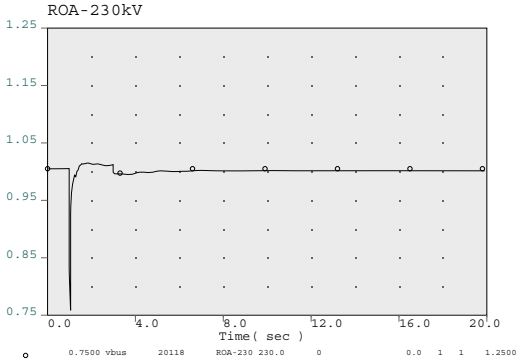
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Voltage Check and Comparison

PAR/PID 230kV



ROA-230kV



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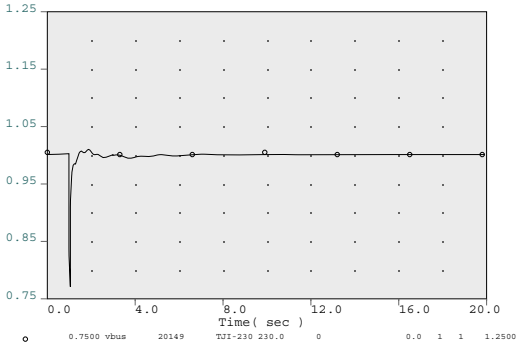

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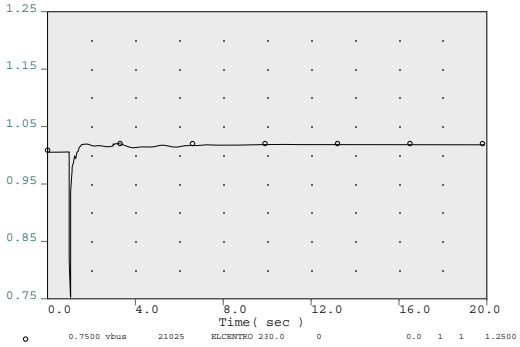
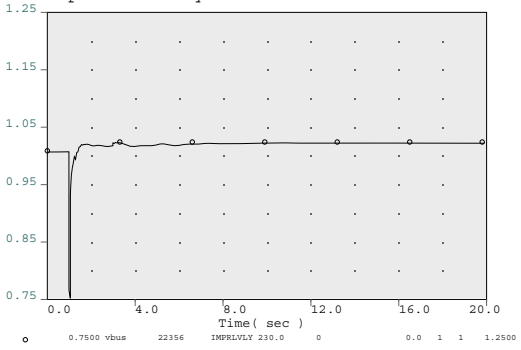


Imperial Valley 230kV



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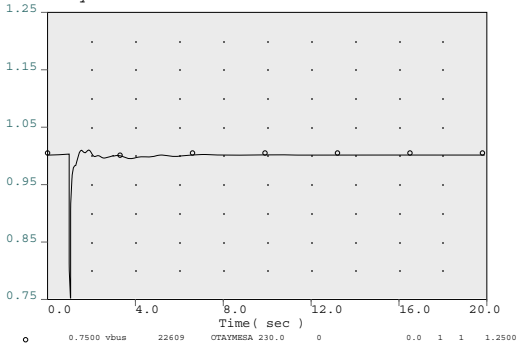
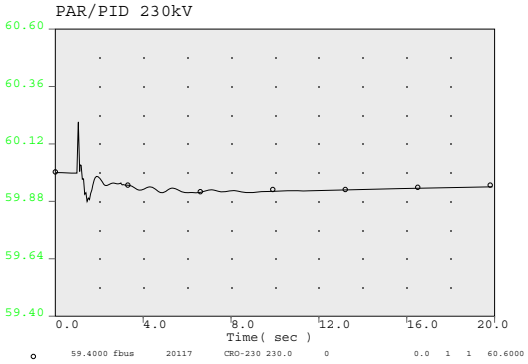


SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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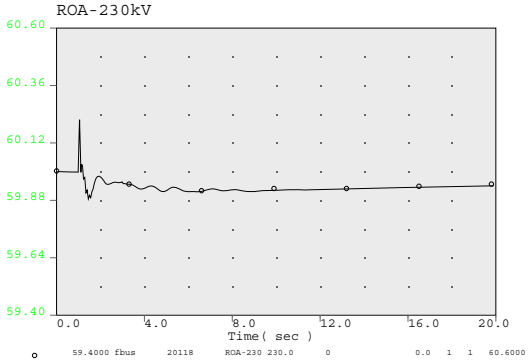

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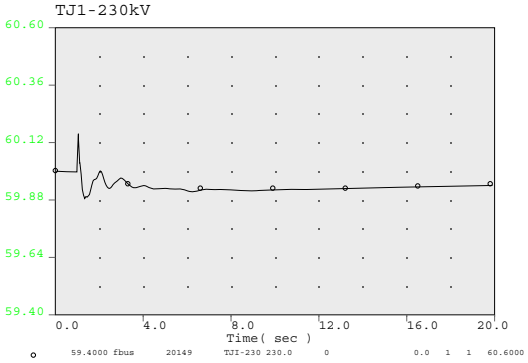

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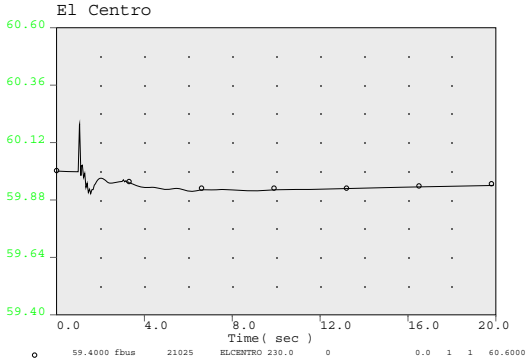
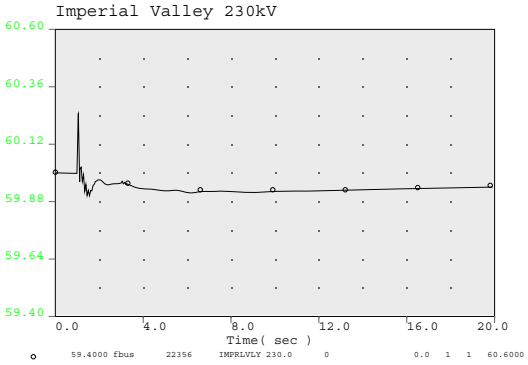


Imperial Valley 230kV



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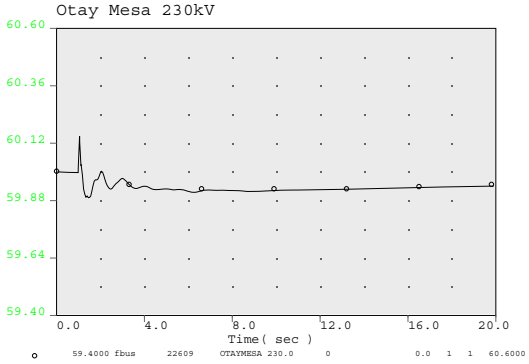
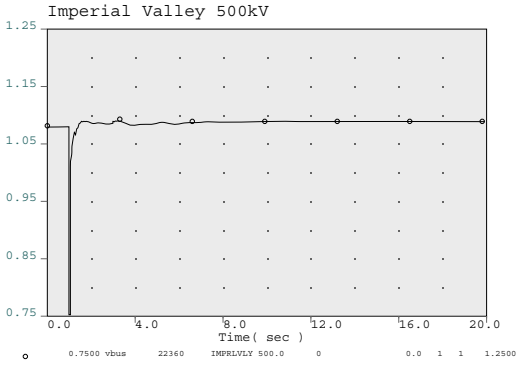


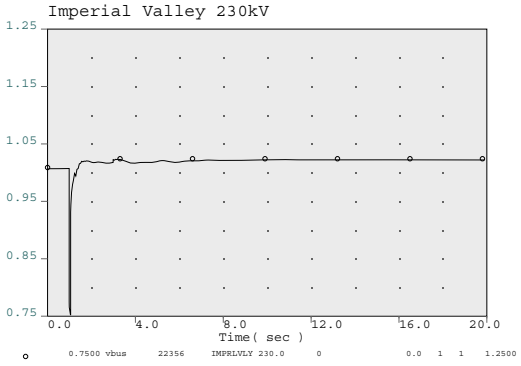
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

Imperial Valley Area - VOLTAGE

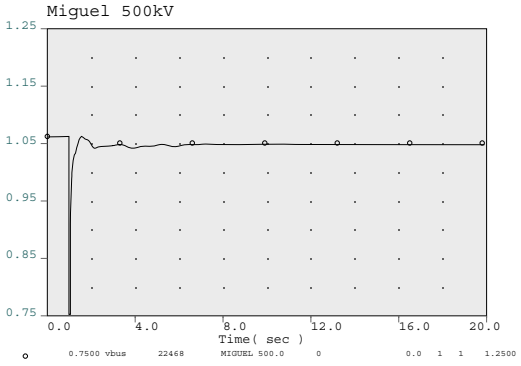
Imperial Valley 500kV



Imperial Valley 230kV



Miguel 500kV



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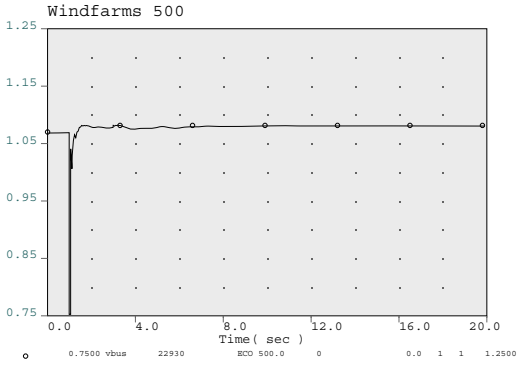

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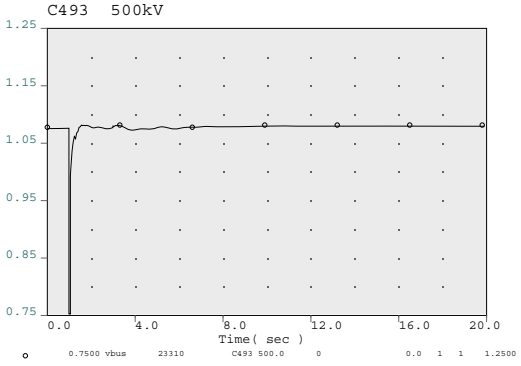
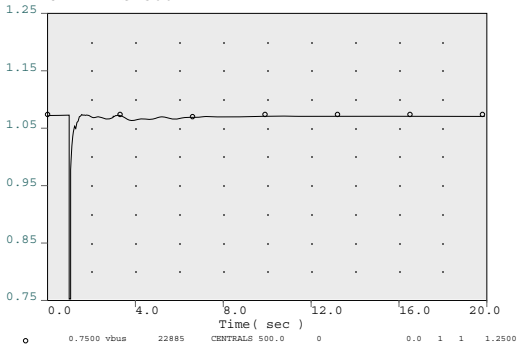
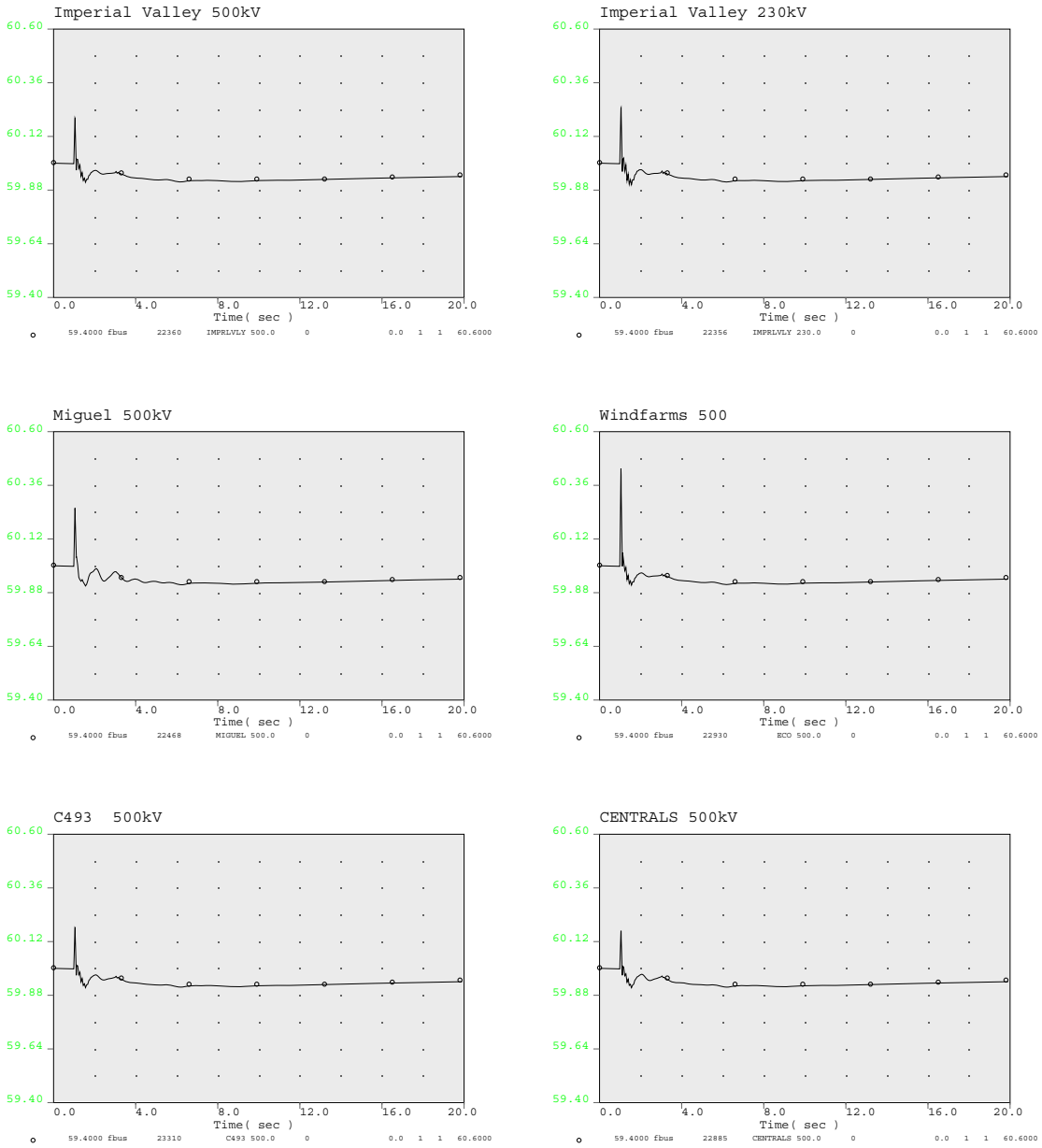


CENTRALS 500kV



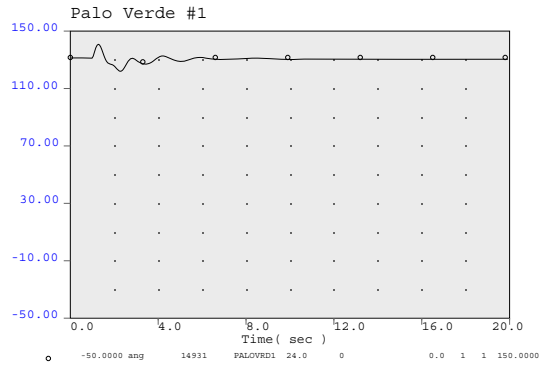
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

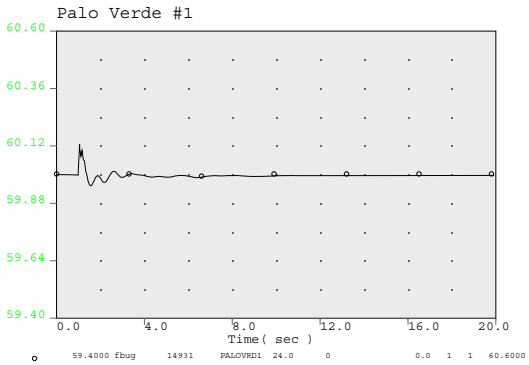
Imperial Valley Area - Frequency

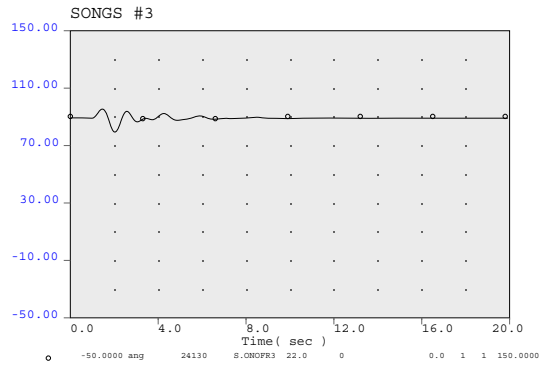


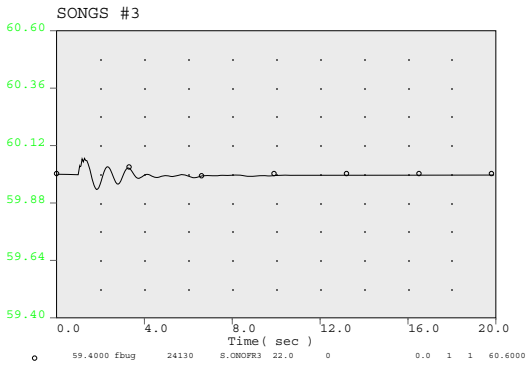
SDG&E Cluster 2 - post
2014 Light Autumn
Miguel-ECO 500 kV line

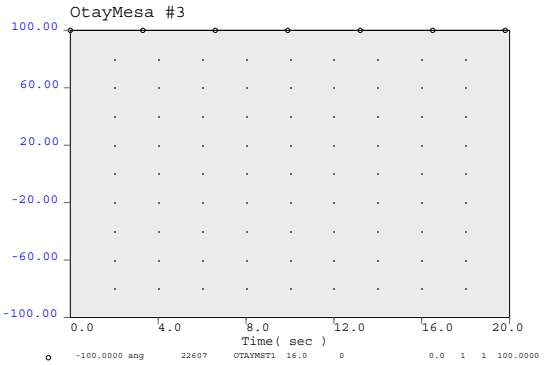
RELATIVE ROTOR ANGLE & FREQUENCY

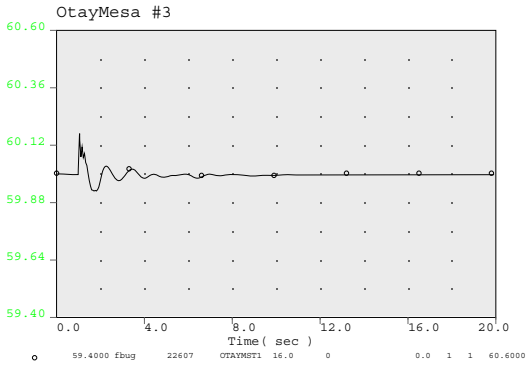












SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

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SDGE	NGila_IV_slo_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:30:49 2010

RELATIVE VOLTAGE

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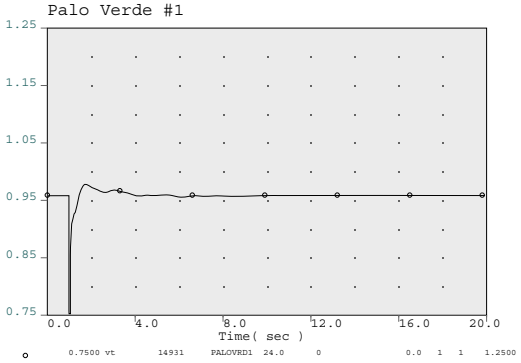
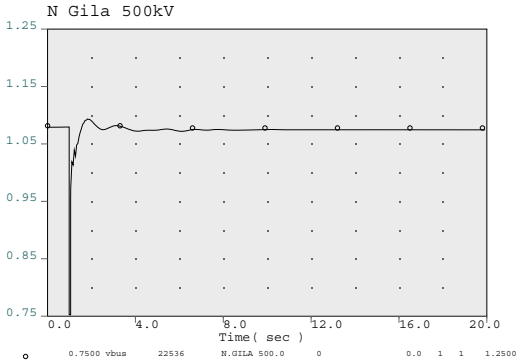


N Gila 500kV



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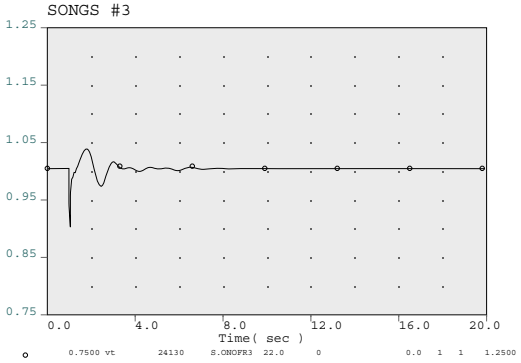
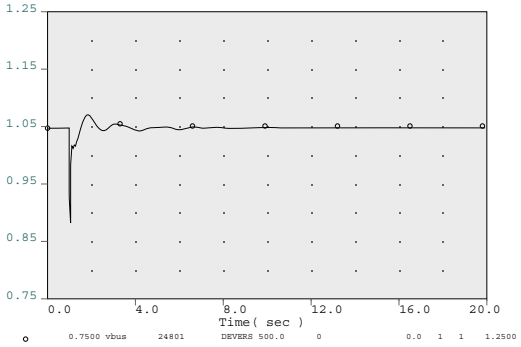


Devers 500



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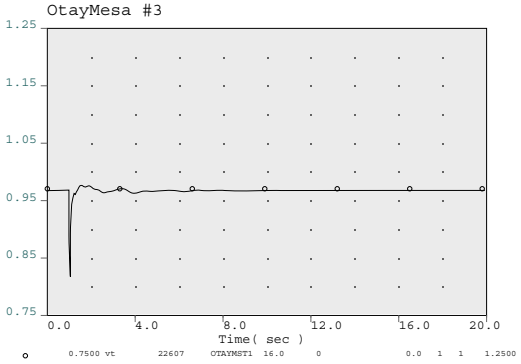
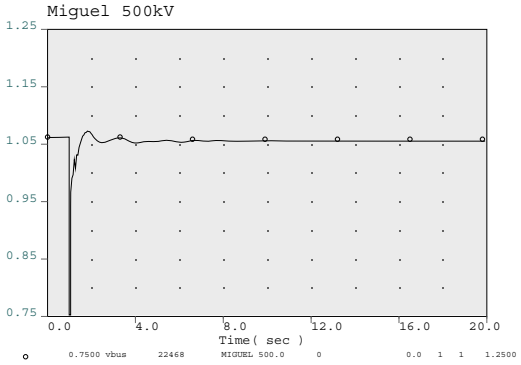


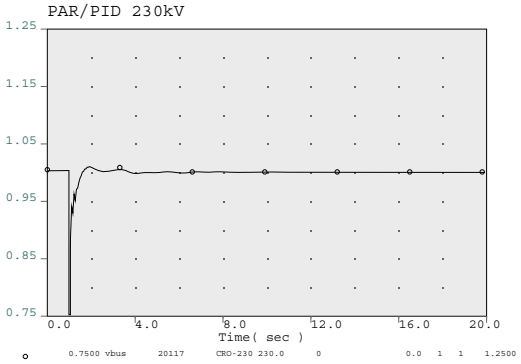
Miguel 500kV



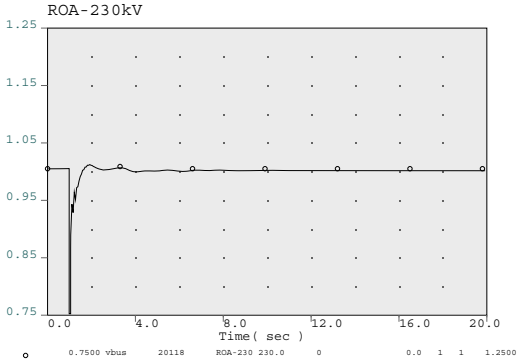
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Voltage Check and Comparison

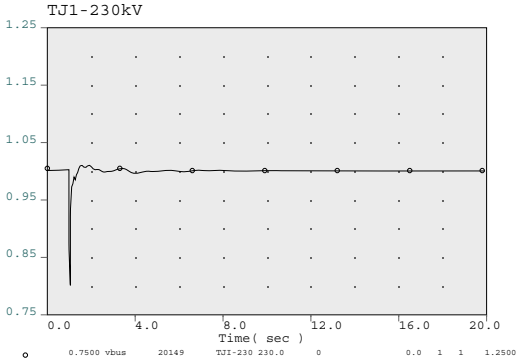
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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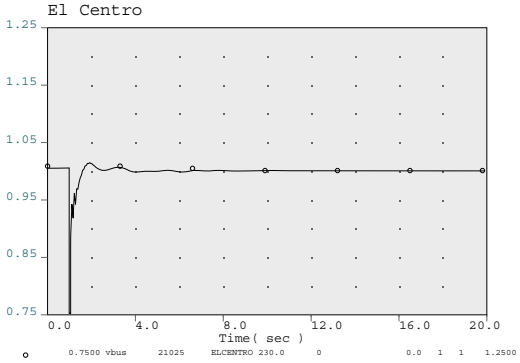
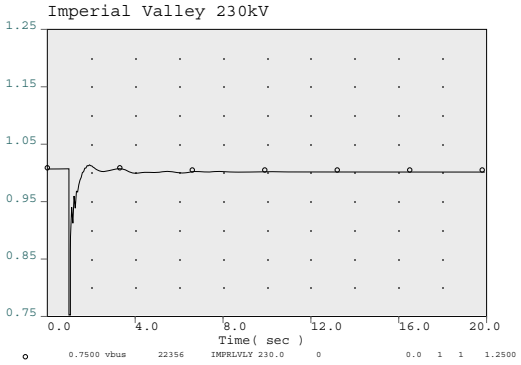
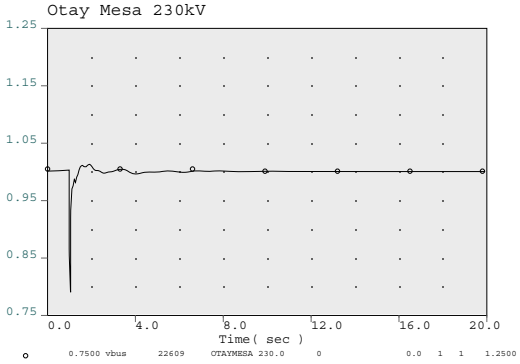


Imperial Valley 230kV



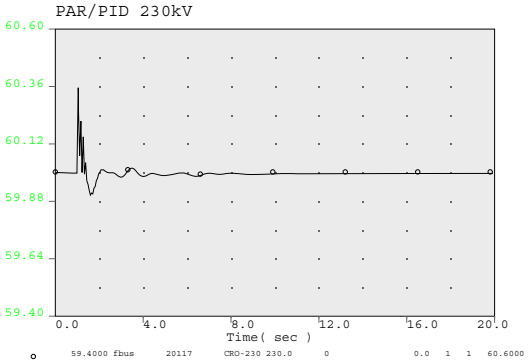
Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Affected System Frequency Check and Comparison

PAR/PID 230kV



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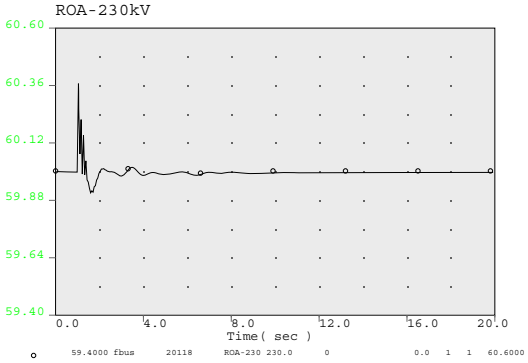

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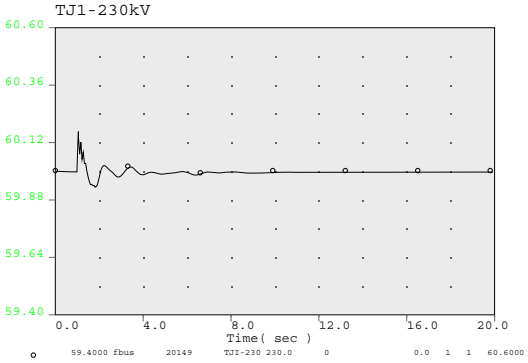

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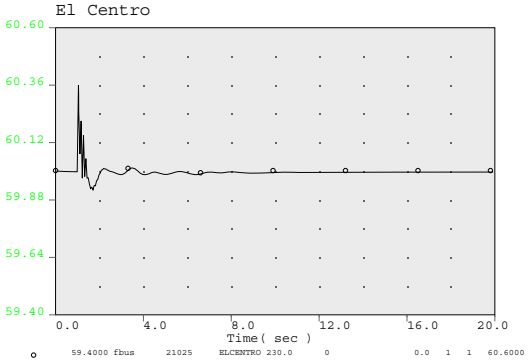
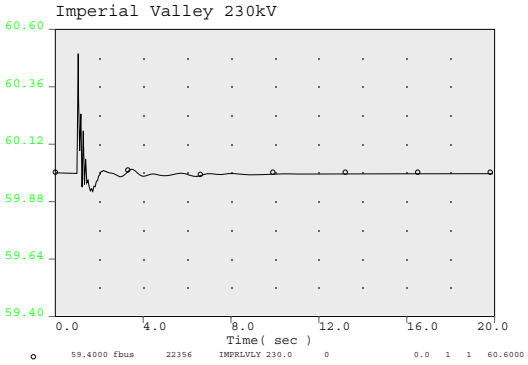
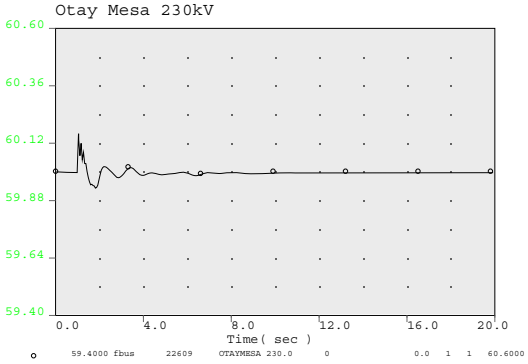


Imperial Valley 230kV



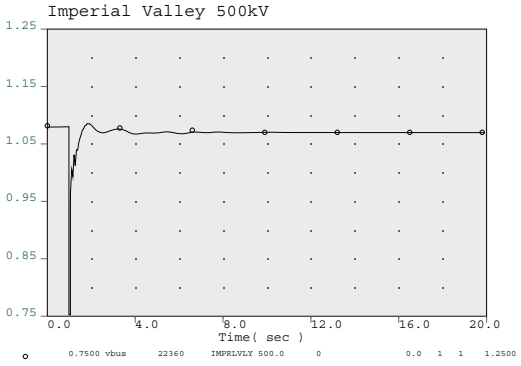
Otay Mesa 230kV



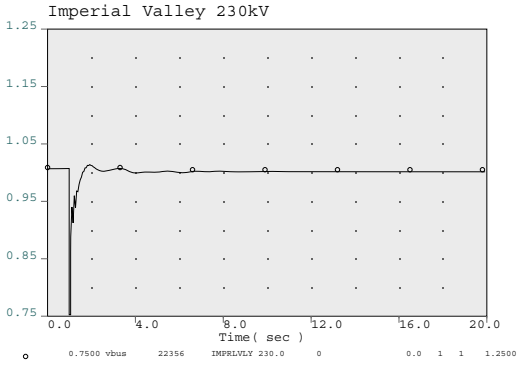
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

Imperial Valley Area - VOLTAGE

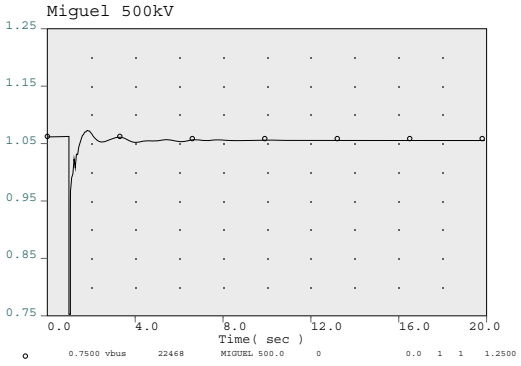
Imperial Valley 500kV



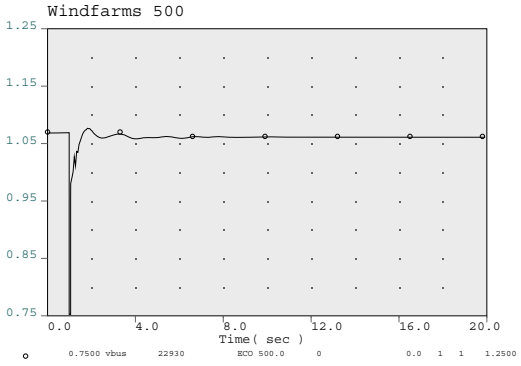
Imperial Valley 230kV



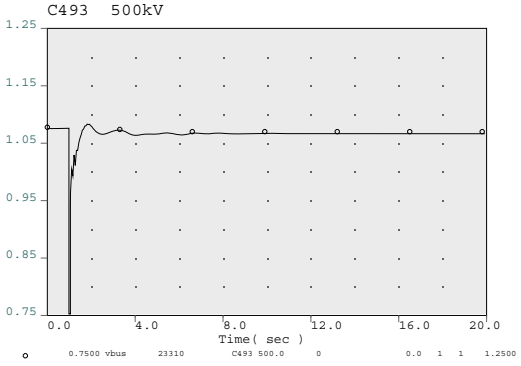
Miguel 500kV



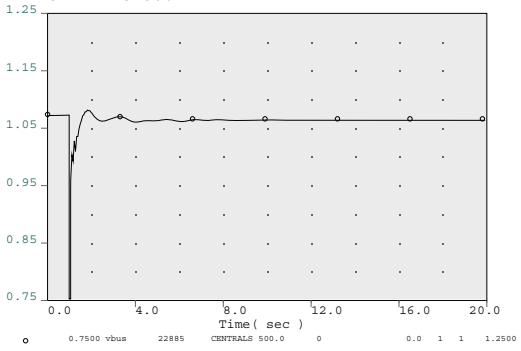
Windfarms 500



C493 500kV



CENTRALS 500kV

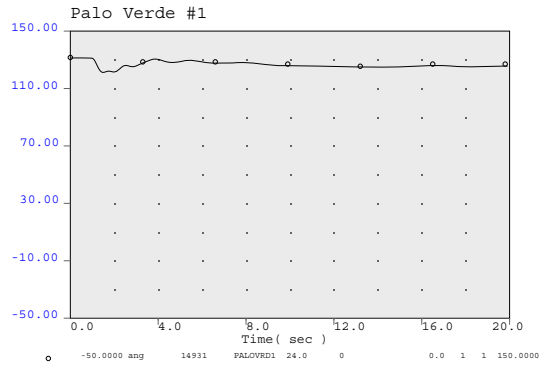


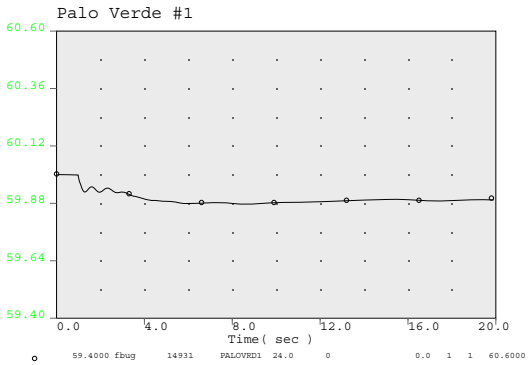
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

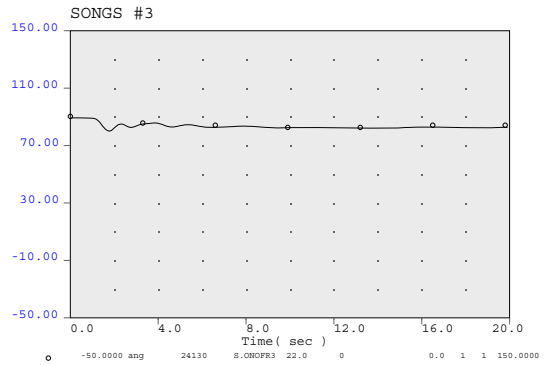
Imperial Valley Area - Frequency

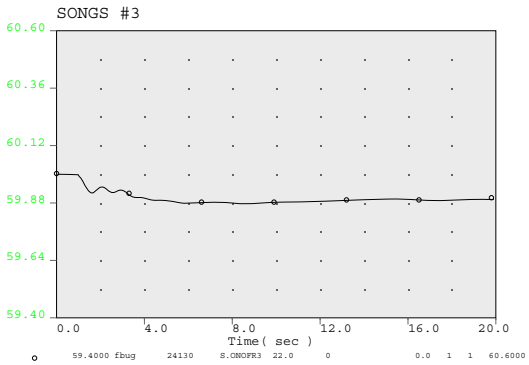
SDG&E Cluster 2 - post
2014 Light Autumn
North Gila - Imperial Valley 500 kV line

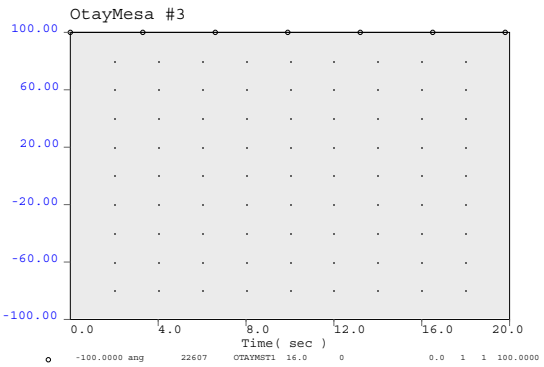
RELATIVE ROTOR ANGLE & FREQUENCY

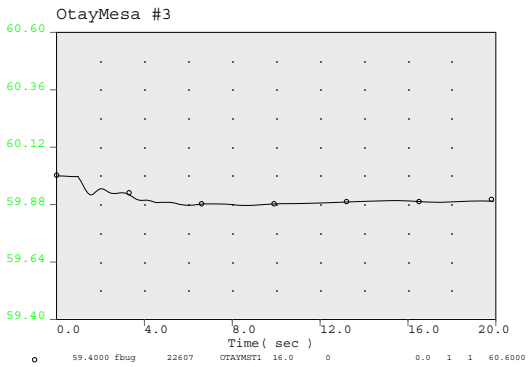












SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

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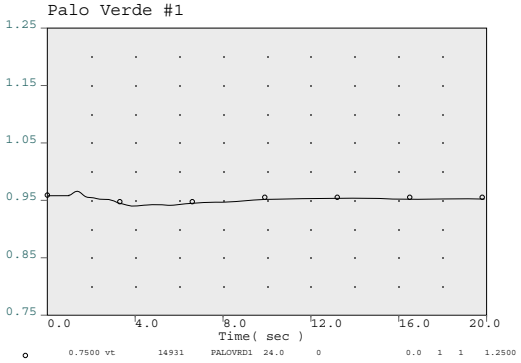
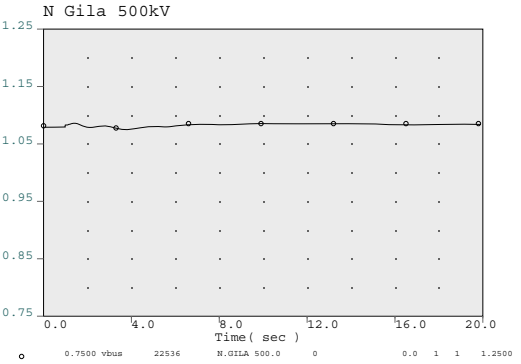
SDGE	PaloVerde-g1_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:31:15 2010

RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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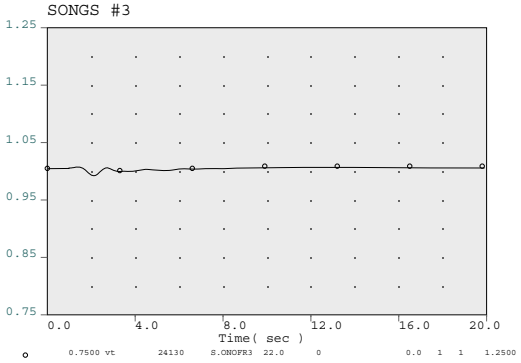
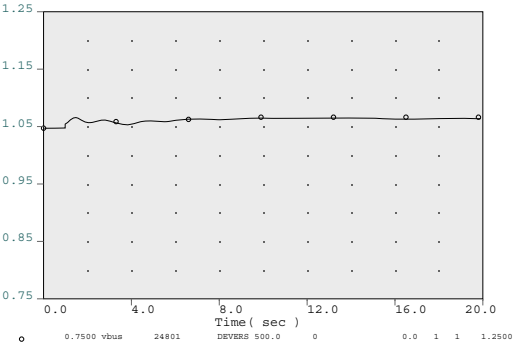
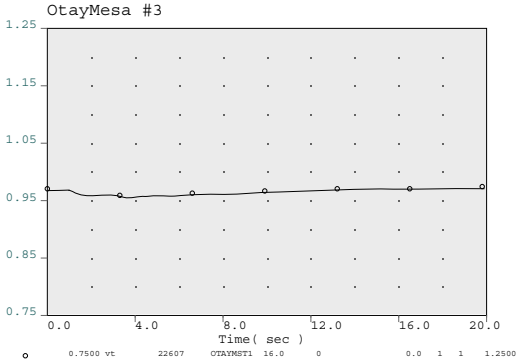


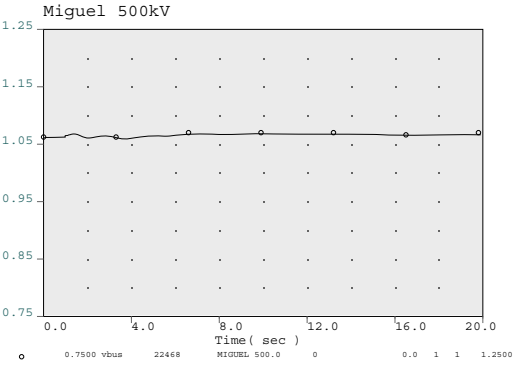
Devers 500



OtayMesa #3



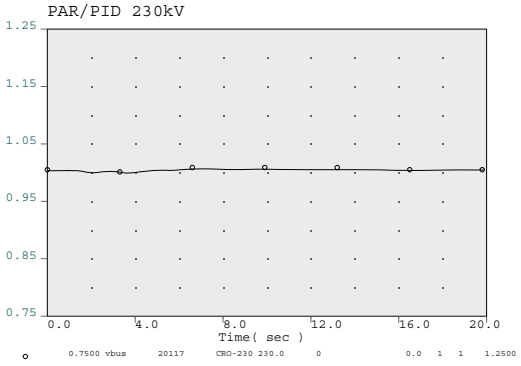
Miguel 500kV



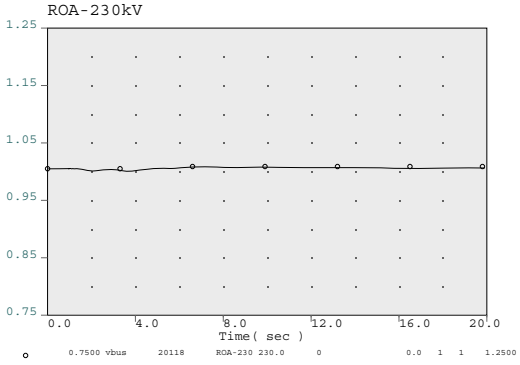
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Voltage Check and Comparison

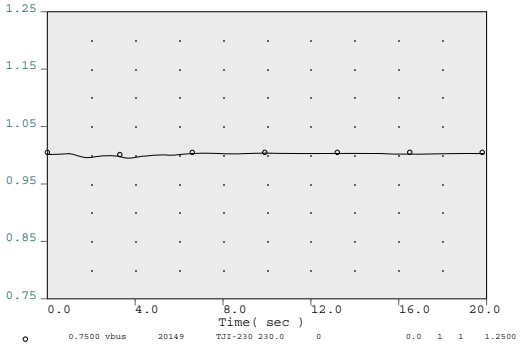
PAR/PID 230kV



ROA-230kV



TJ1-230kV



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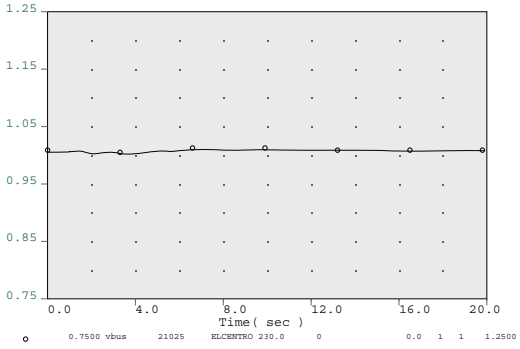
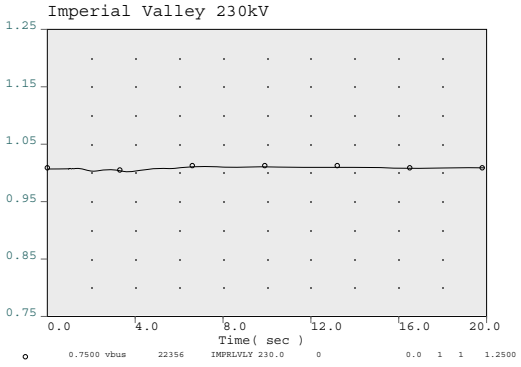
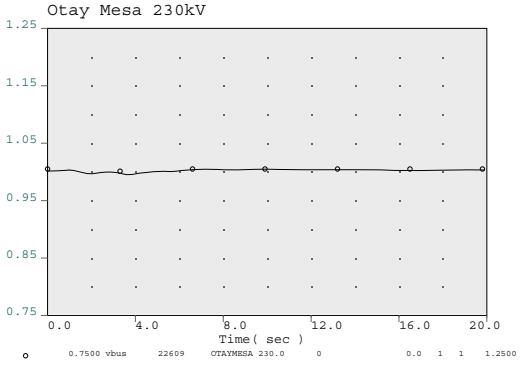


Imperial Valley 230kV



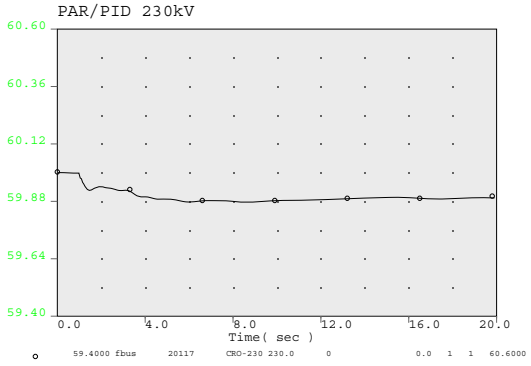
Otay Mesa 230kV



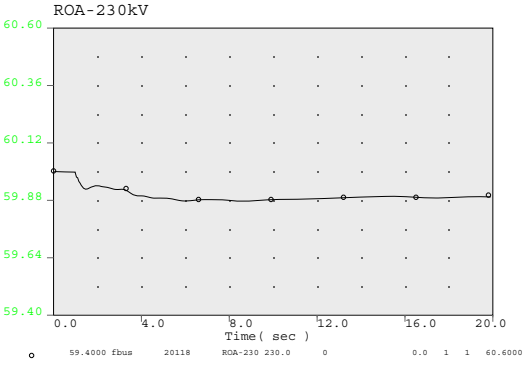
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Affected System Frequency Check and Comparison

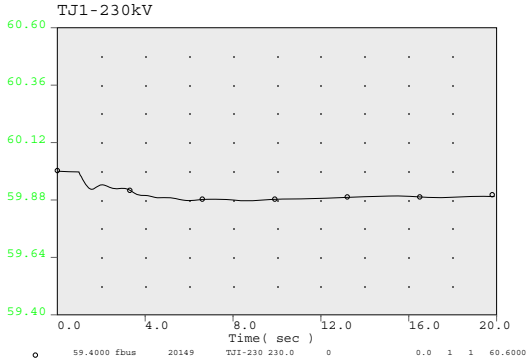
PAR/PID 230kV



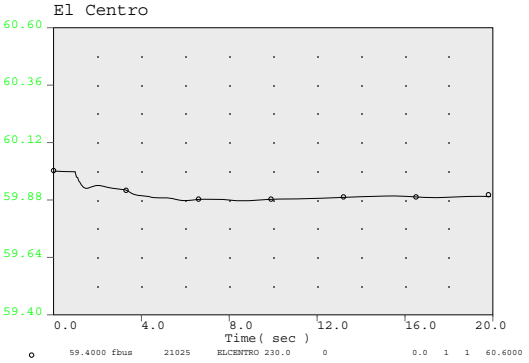
ROA-230kV



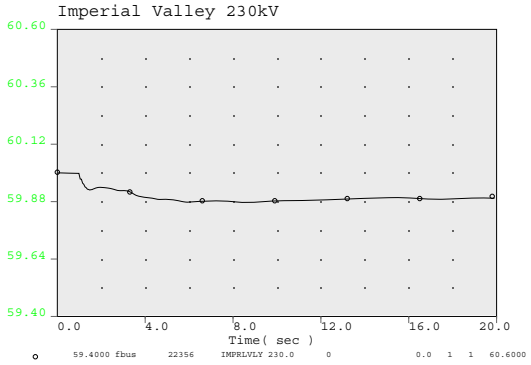
TJ1-230kV



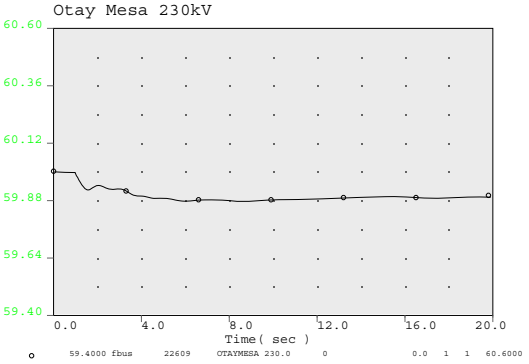
El Centro



Imperial Valley 230kV



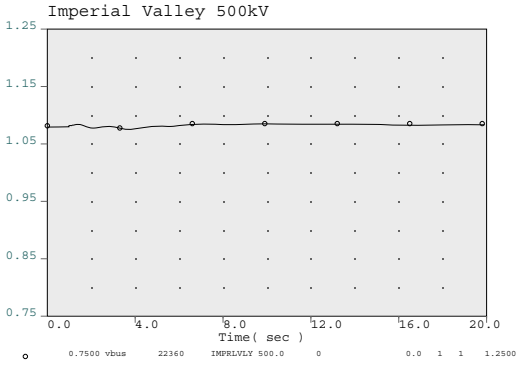
Otay Mesa 230kV



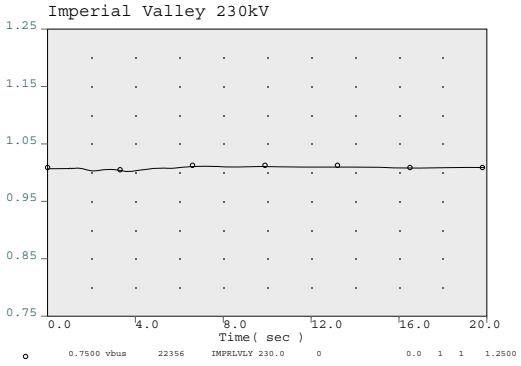
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

Imperial Valley Area - VOLTAGE

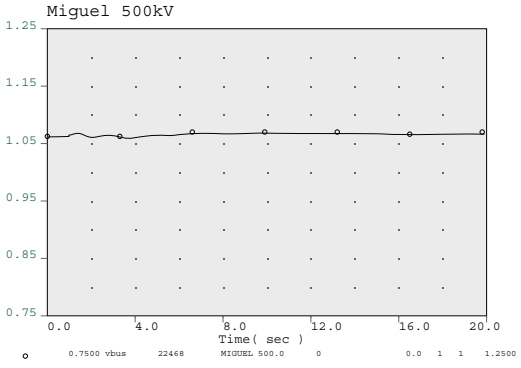
Imperial Valley 500kV



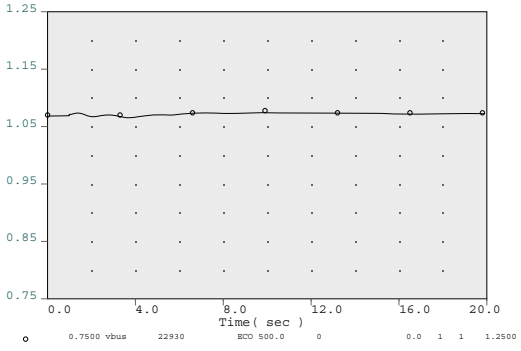
Imperial Valley 230kV



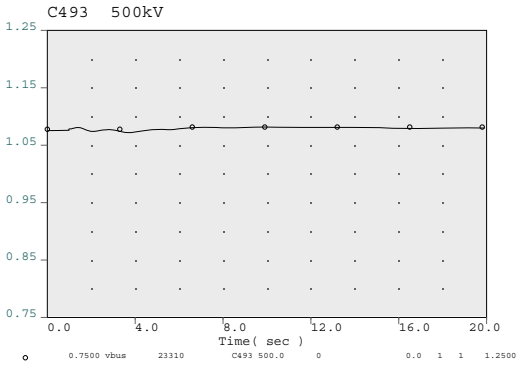
Miguel 500kV



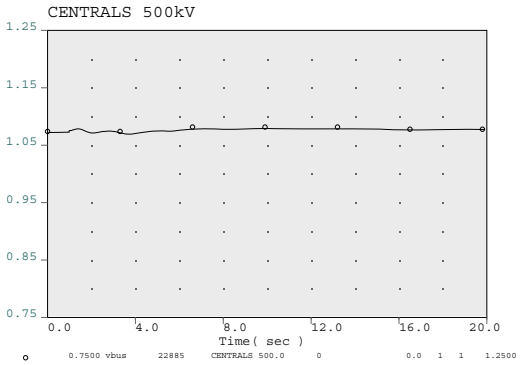
Windfarms 500



C493 500kV

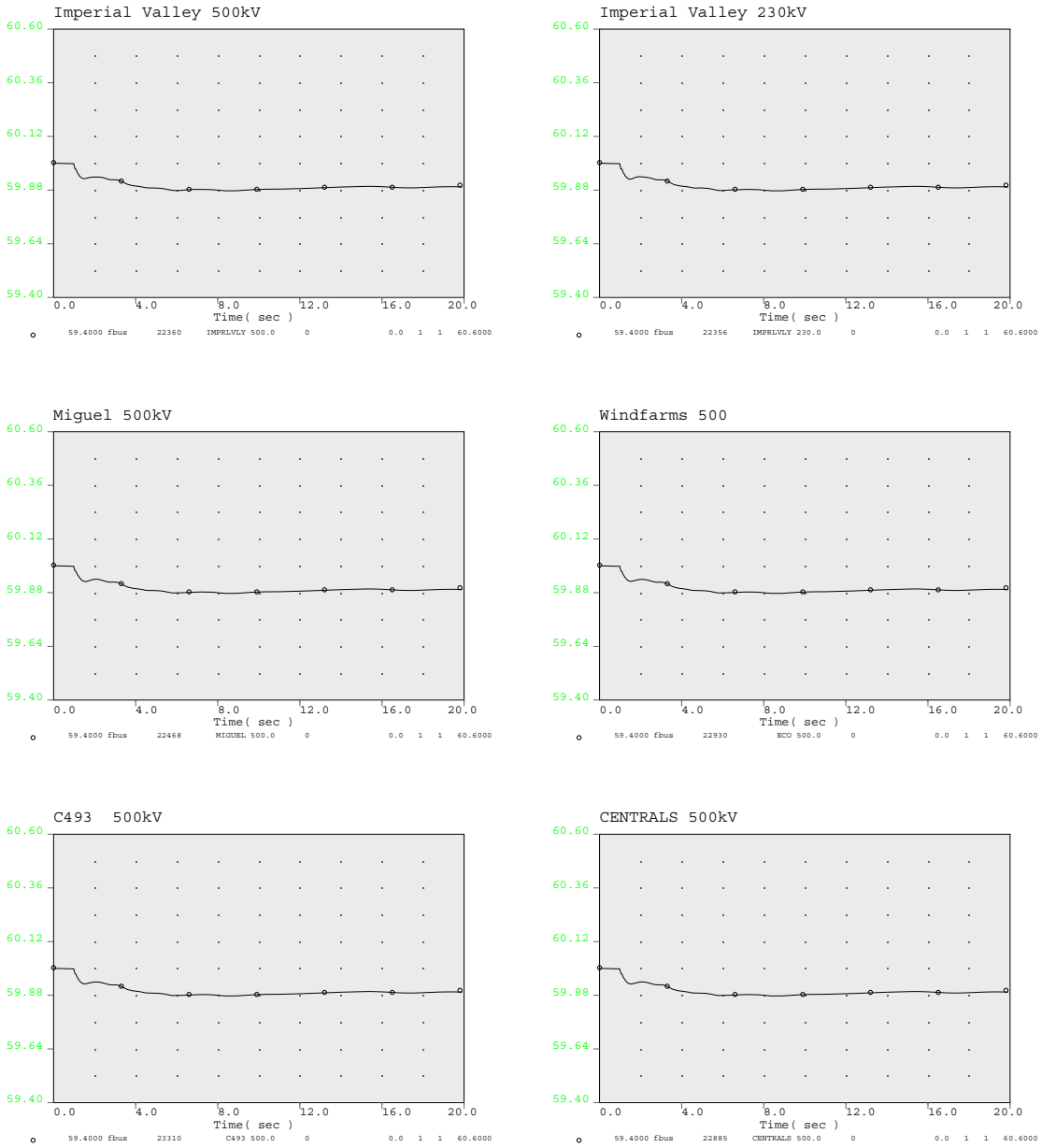


CENTRALS 500kV



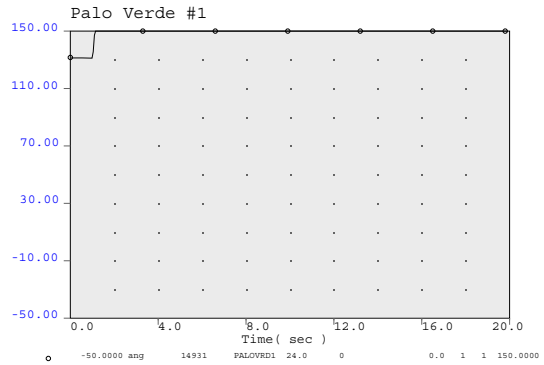
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

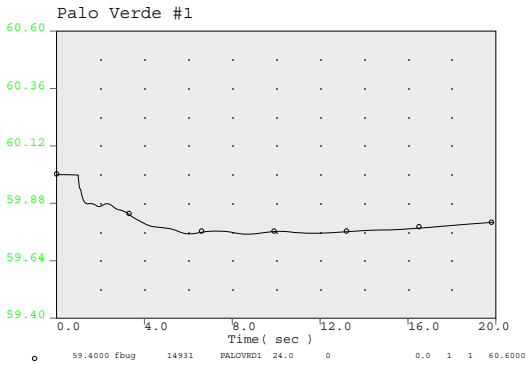
Imperial Valley Area - Frequency

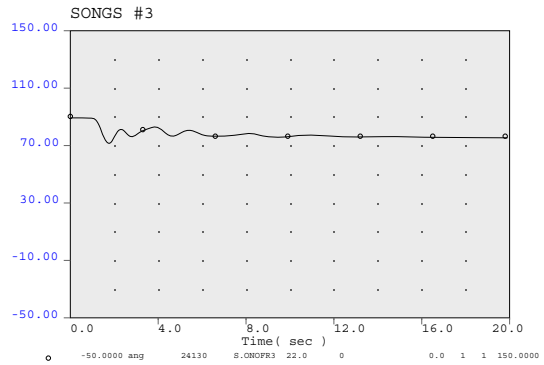


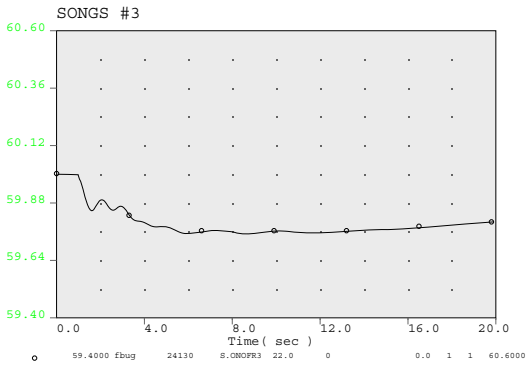
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generator #2

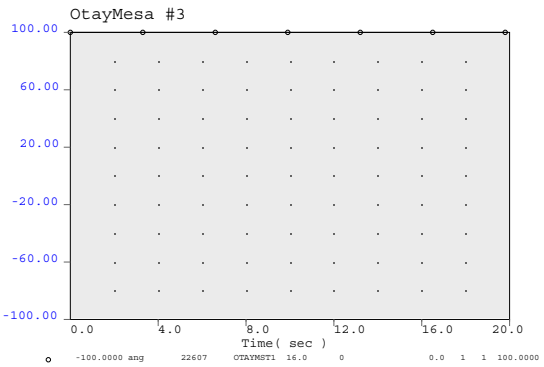
RELATIVE ROTOR ANGLE & FREQUENCY

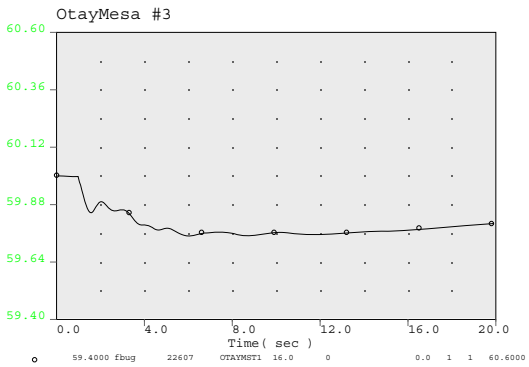












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2014 Light Autumn
Trip PaloVerde Generators 1 & 2

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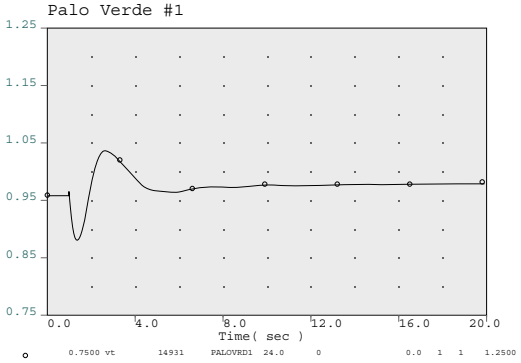
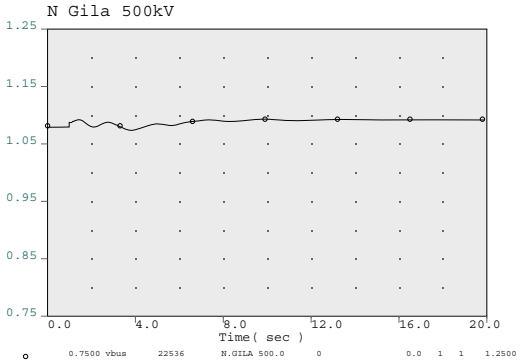
PaloVerde-g2_pst_int_ll.chf | p_i\ll\pst_int\ws_pst_int | Tue Nov 02 07:31:39 2010

RELATIVE VOLTAGE

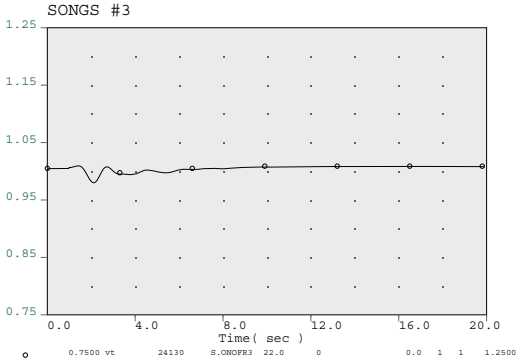
Palo Verde #1



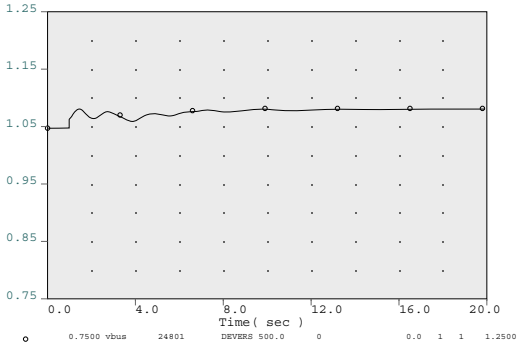
N Gila 500kV



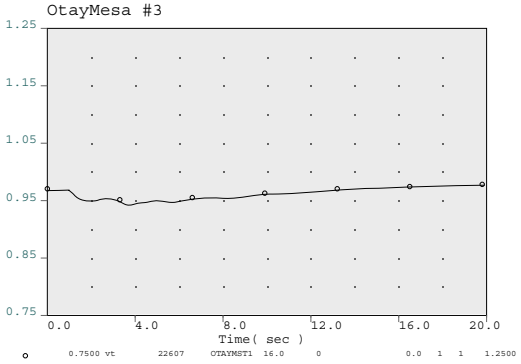
SONGS #3



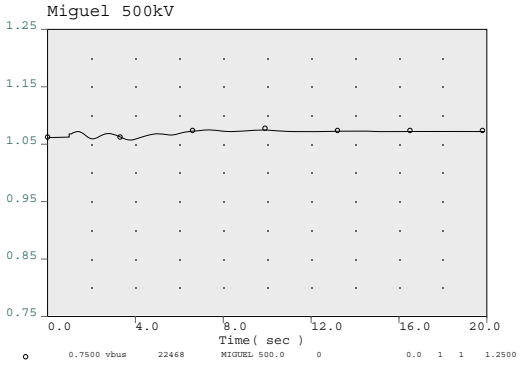
Devers 500



OtayMesa #3



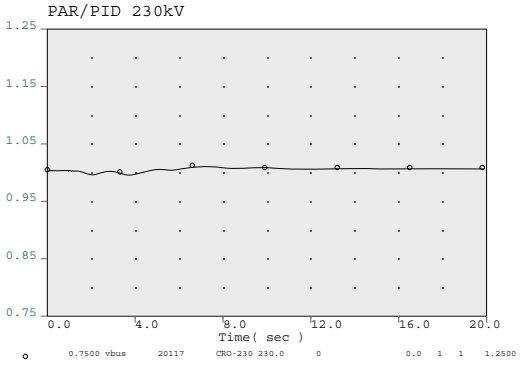
Miguel 500kV



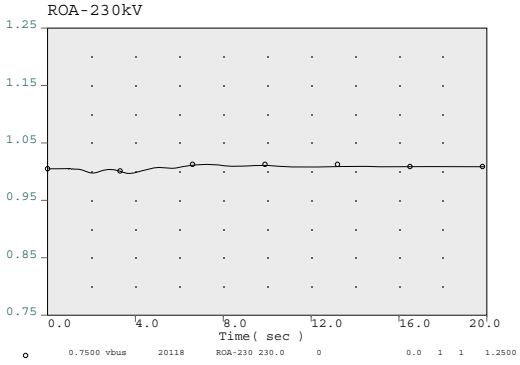
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Voltage Check and Comparison

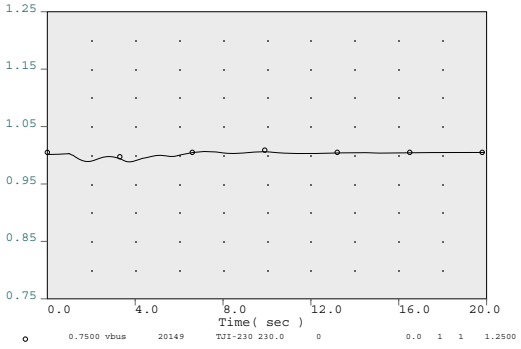
PAR/PID 230kV



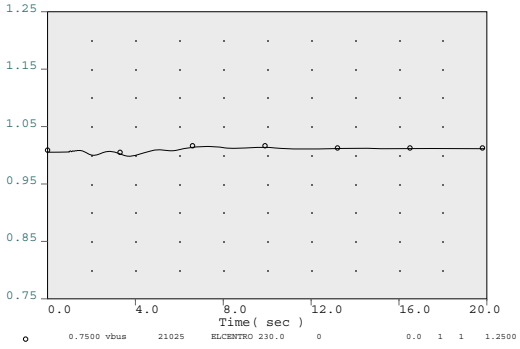
ROA-230kV



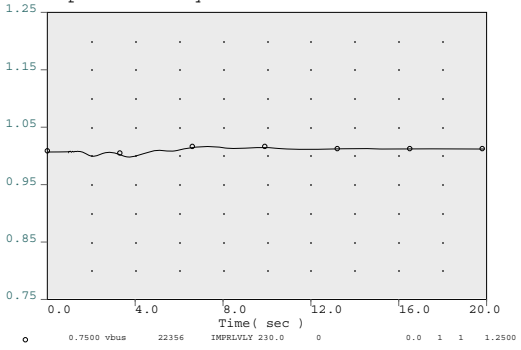
TJ1-230kV



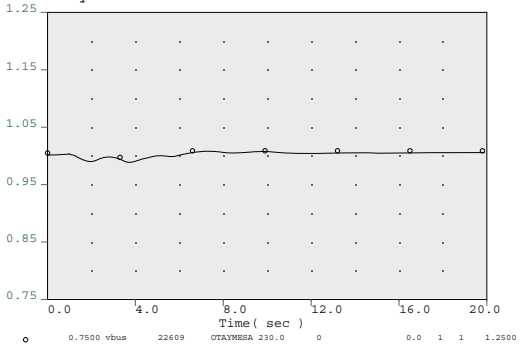
El Centro



Imperial Valley 230kV



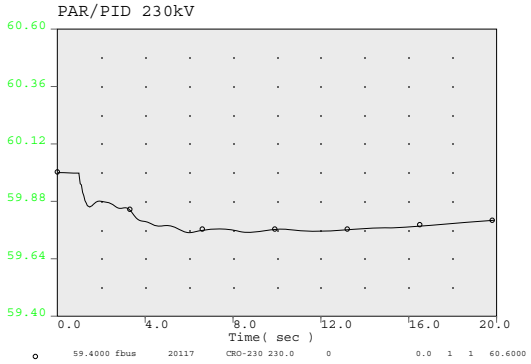
Otay Mesa 230kV



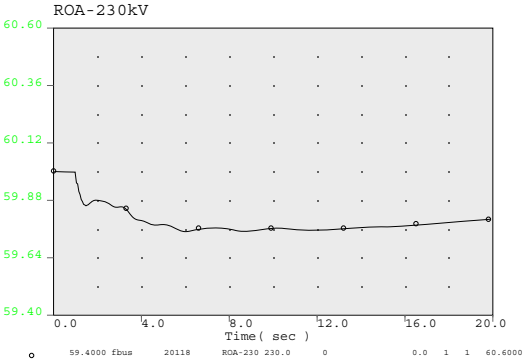
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Affected System Frequency Check and Comparison

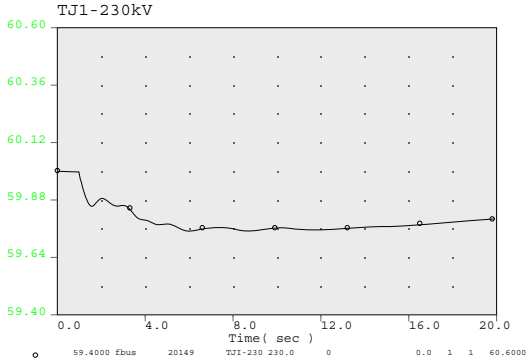
PAR/PID 230kV



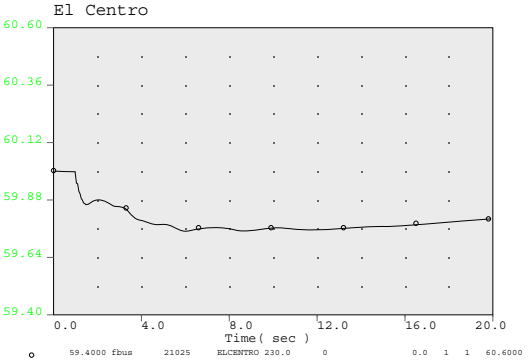
ROA-230kV



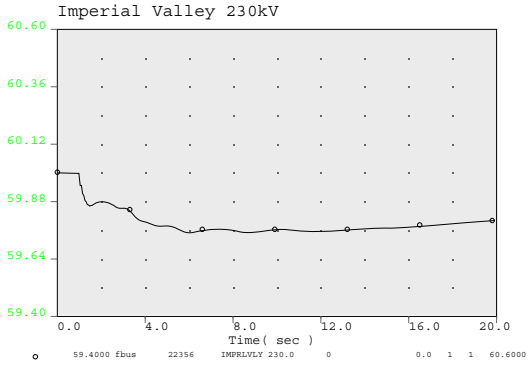
TJ1-230kV



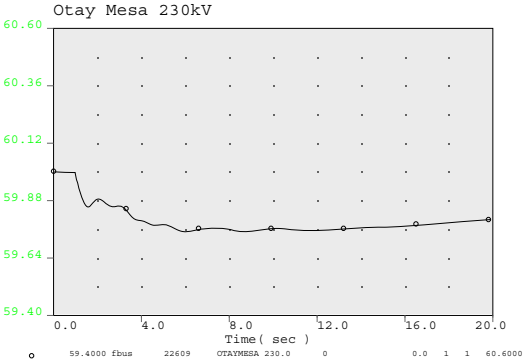
El Centro



Imperial Valley 230kV



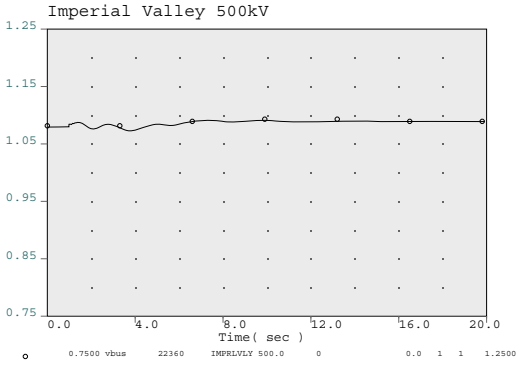
Otay Mesa 230kV



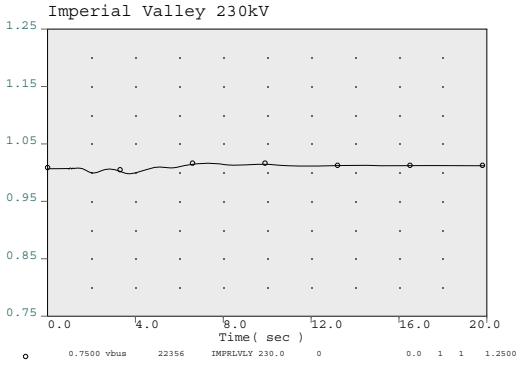
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

Imperial Valley Area - VOLTAGE

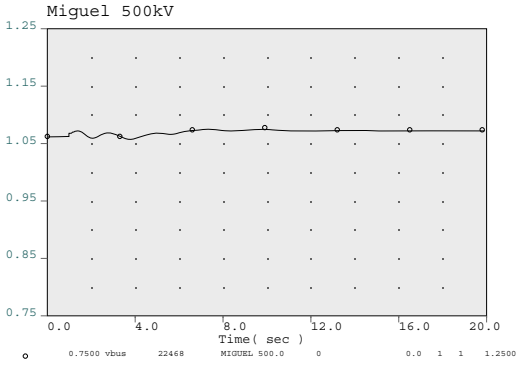
Imperial Valley 500kV



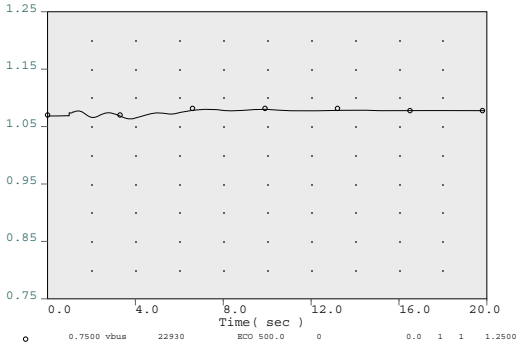
Imperial Valley 230kV



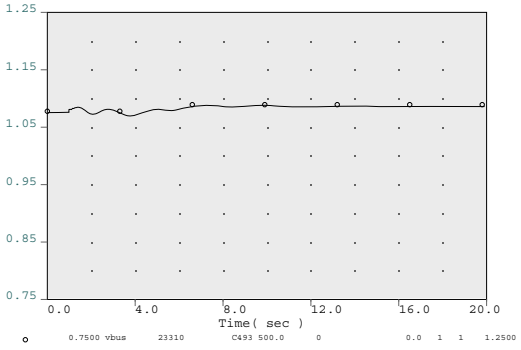
Miguel 500kV



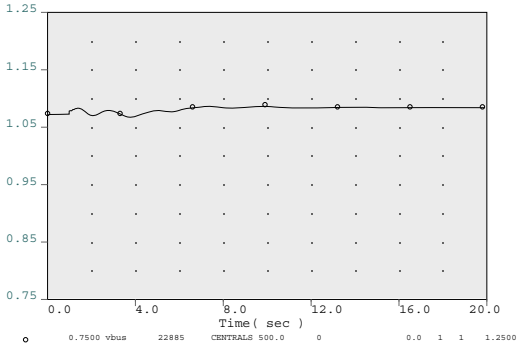
Windfarms 500



C493 500kV

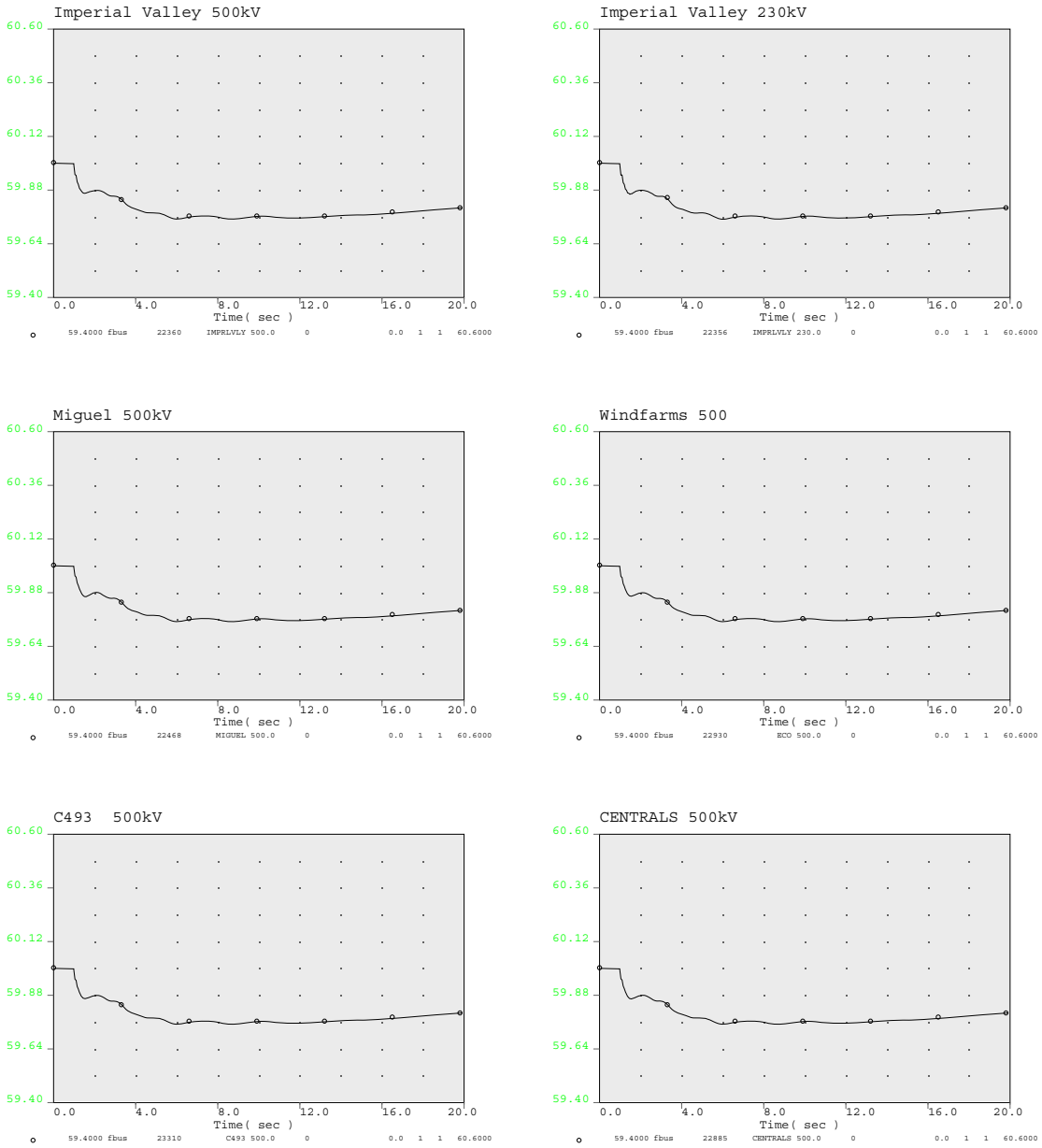


CENTRALS 500kV



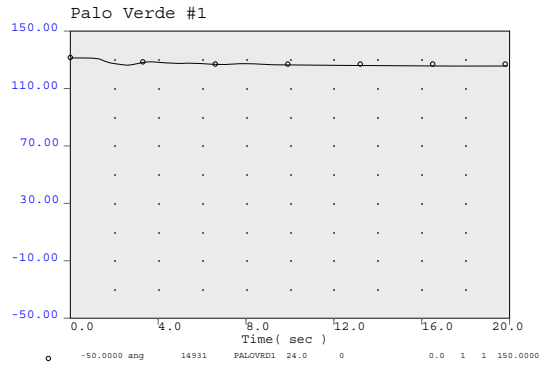
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

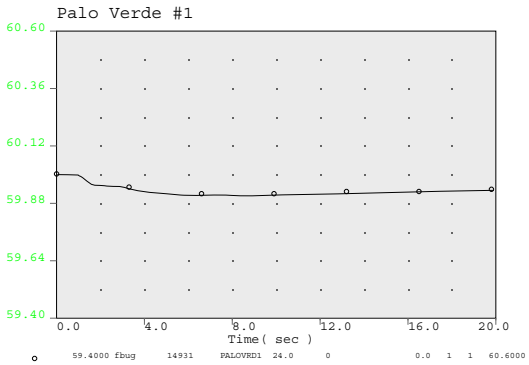
Imperial Valley Area - Frequency

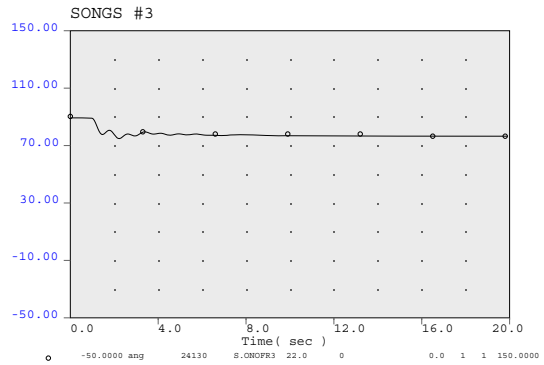


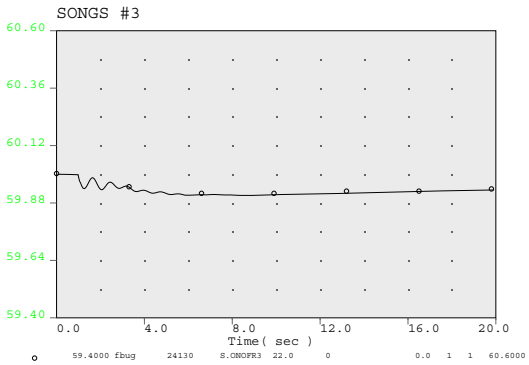
SDG&E Cluster 2 - post
2014 Light Autumn
Trip PaloVerde Generators 1 & 2

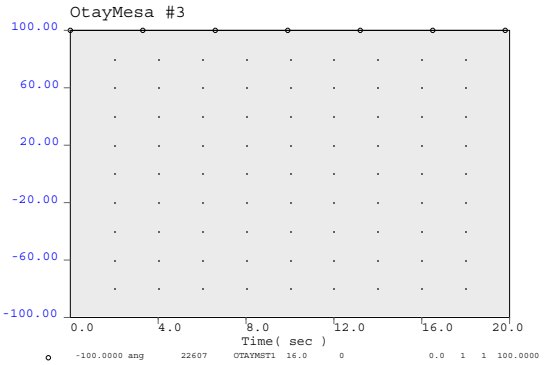
RELATIVE ROTOR ANGLE & FREQUENCY

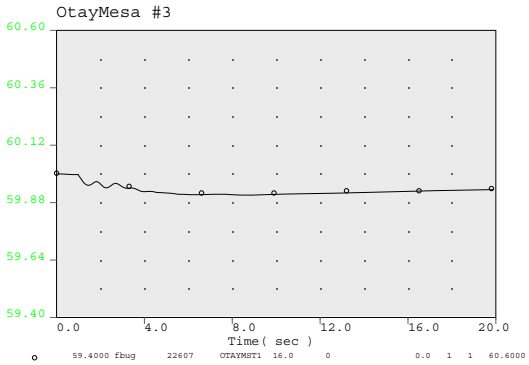












SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Page 1

SONGS-g1_pst_int_ll.chf

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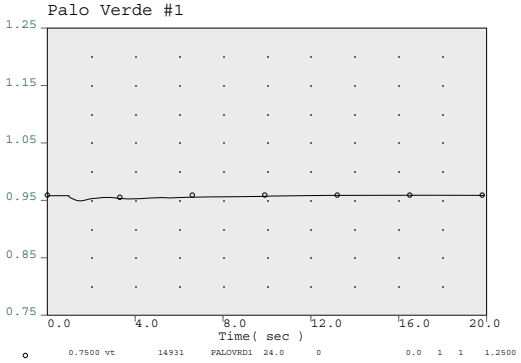
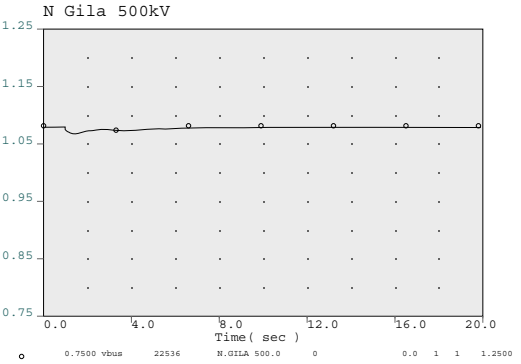
RELATIVE VOLTAGE

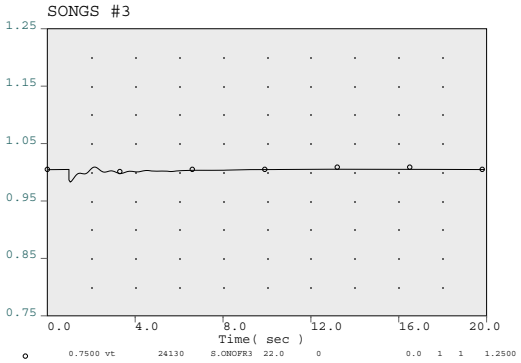
Palo Verde #1



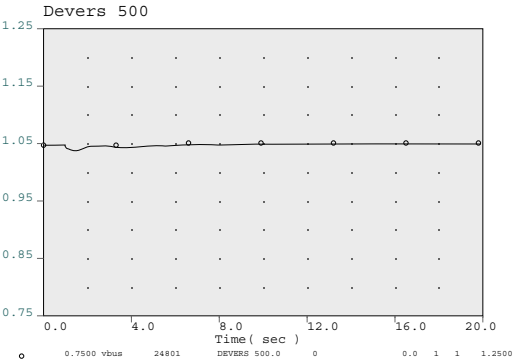
N Gila 500kV



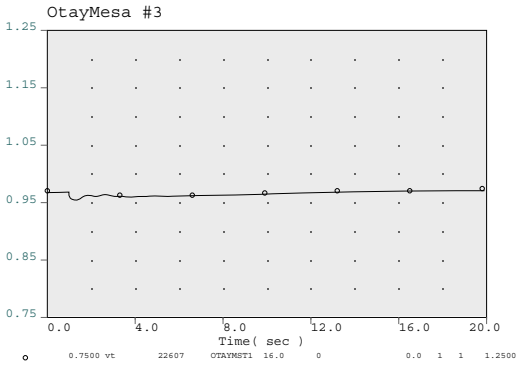
SONGS #3



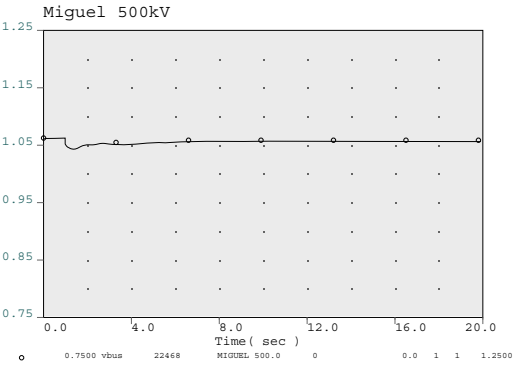
Devers 500



OtayMesa #3



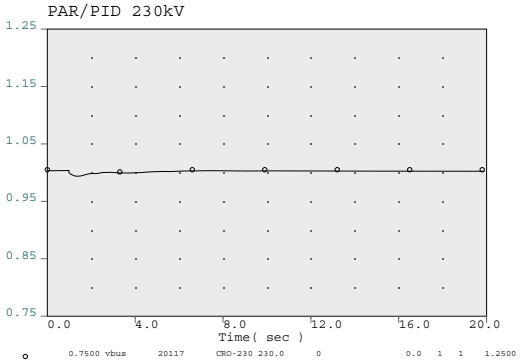
Miguel 500kV



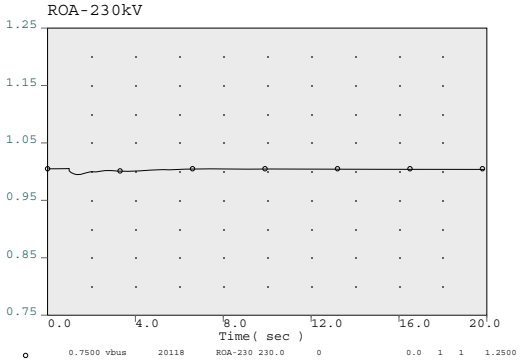
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

Affected System Voltage Check and Comparison

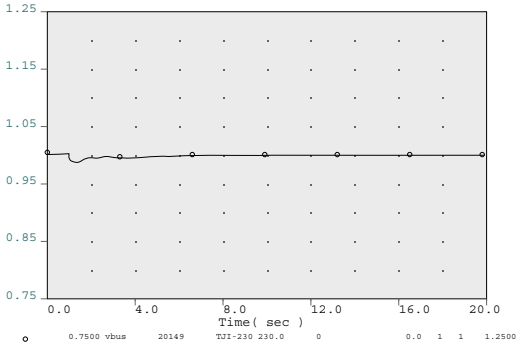
PAR/PID 230kV



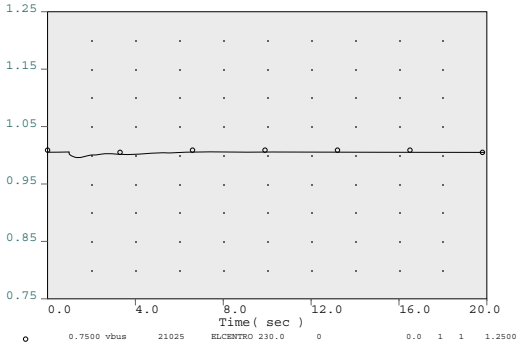
ROA-230kV



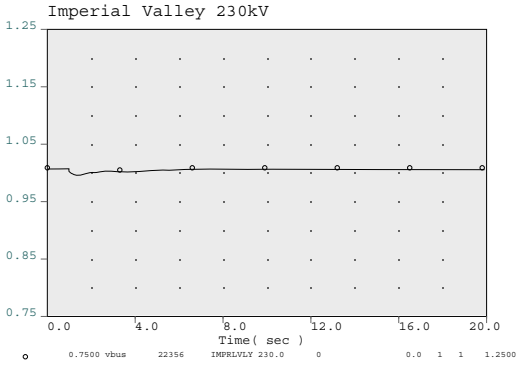
TJ1-230kV



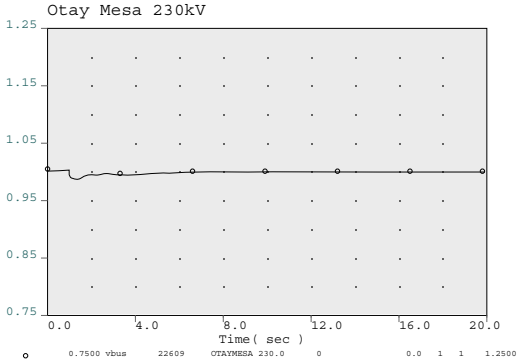
El Centro



Imperial Valley 230kV

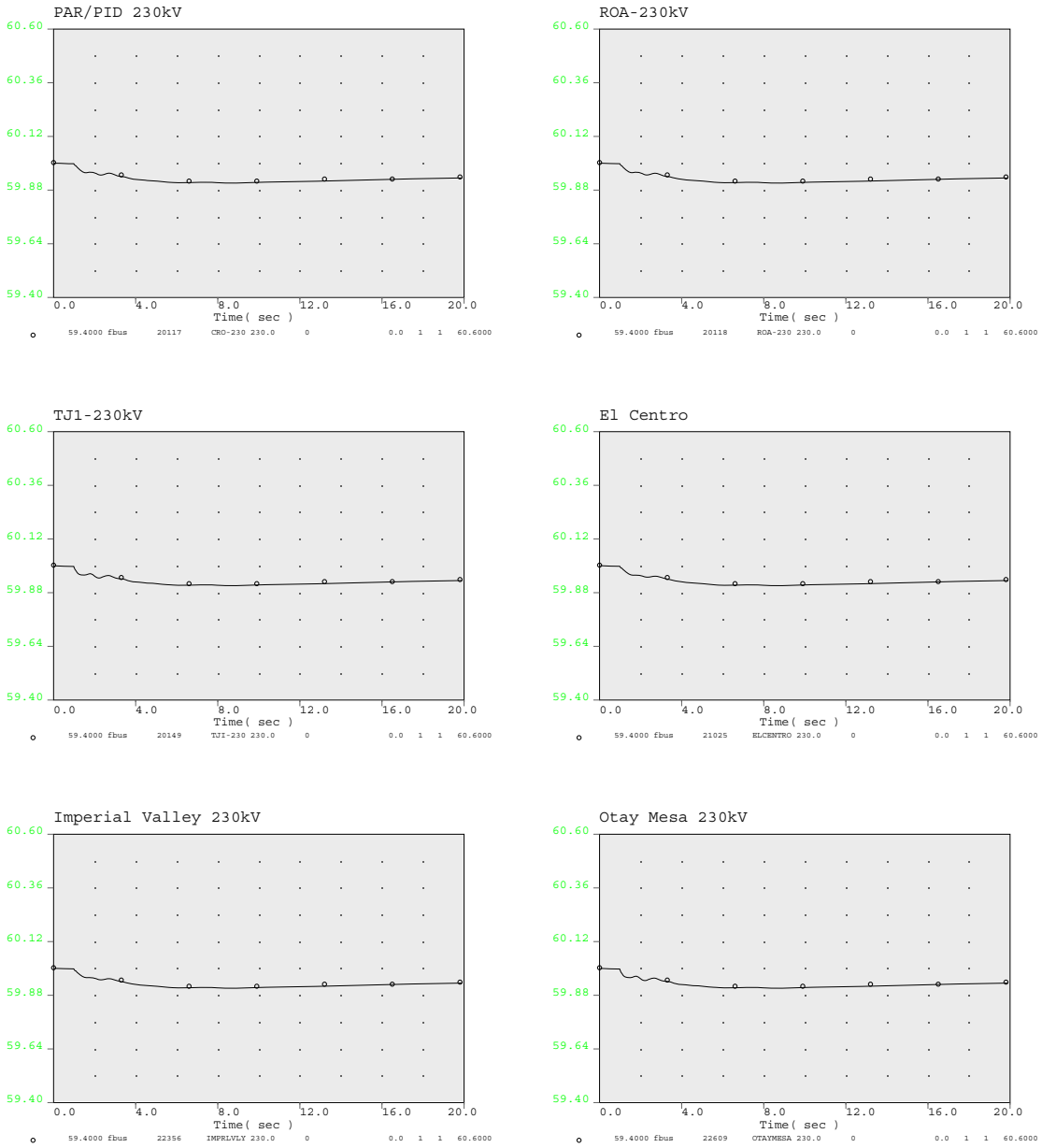


Otay Mesa 230kV



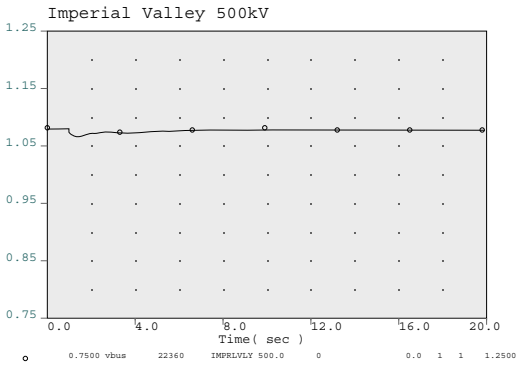
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

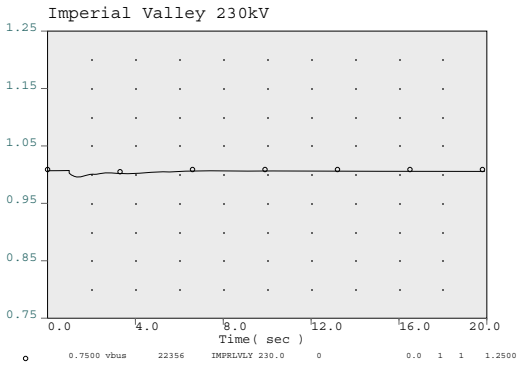
Affected System Frequency Check and Comparison

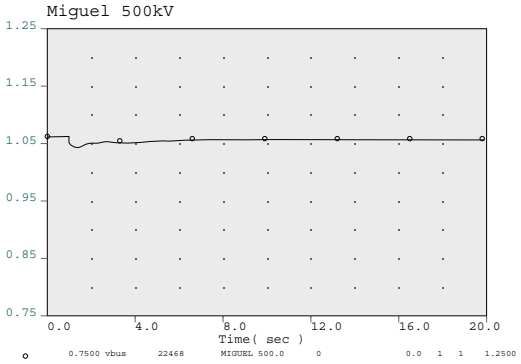


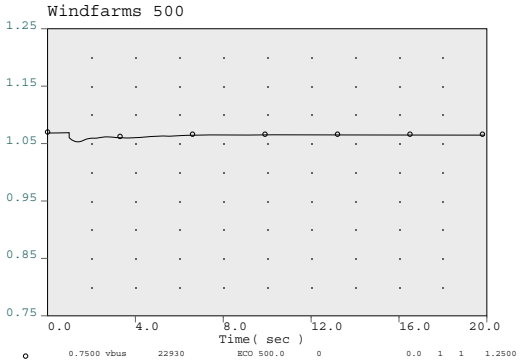
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

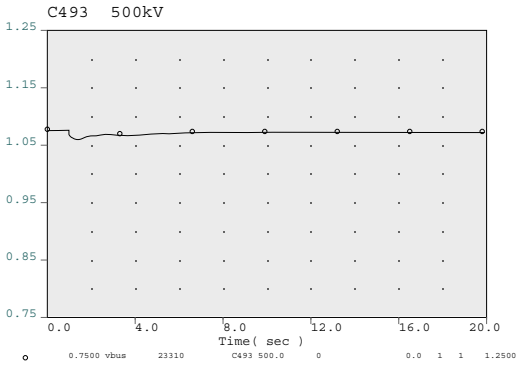
Imperial Valley Area - VOLTAGE

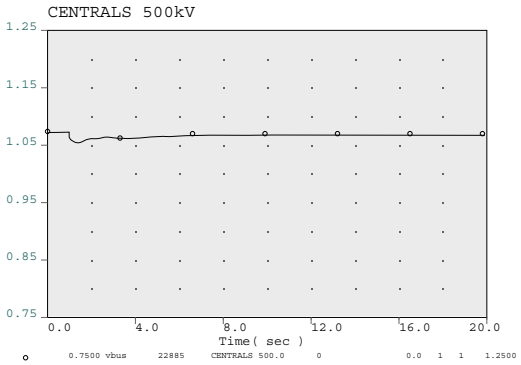






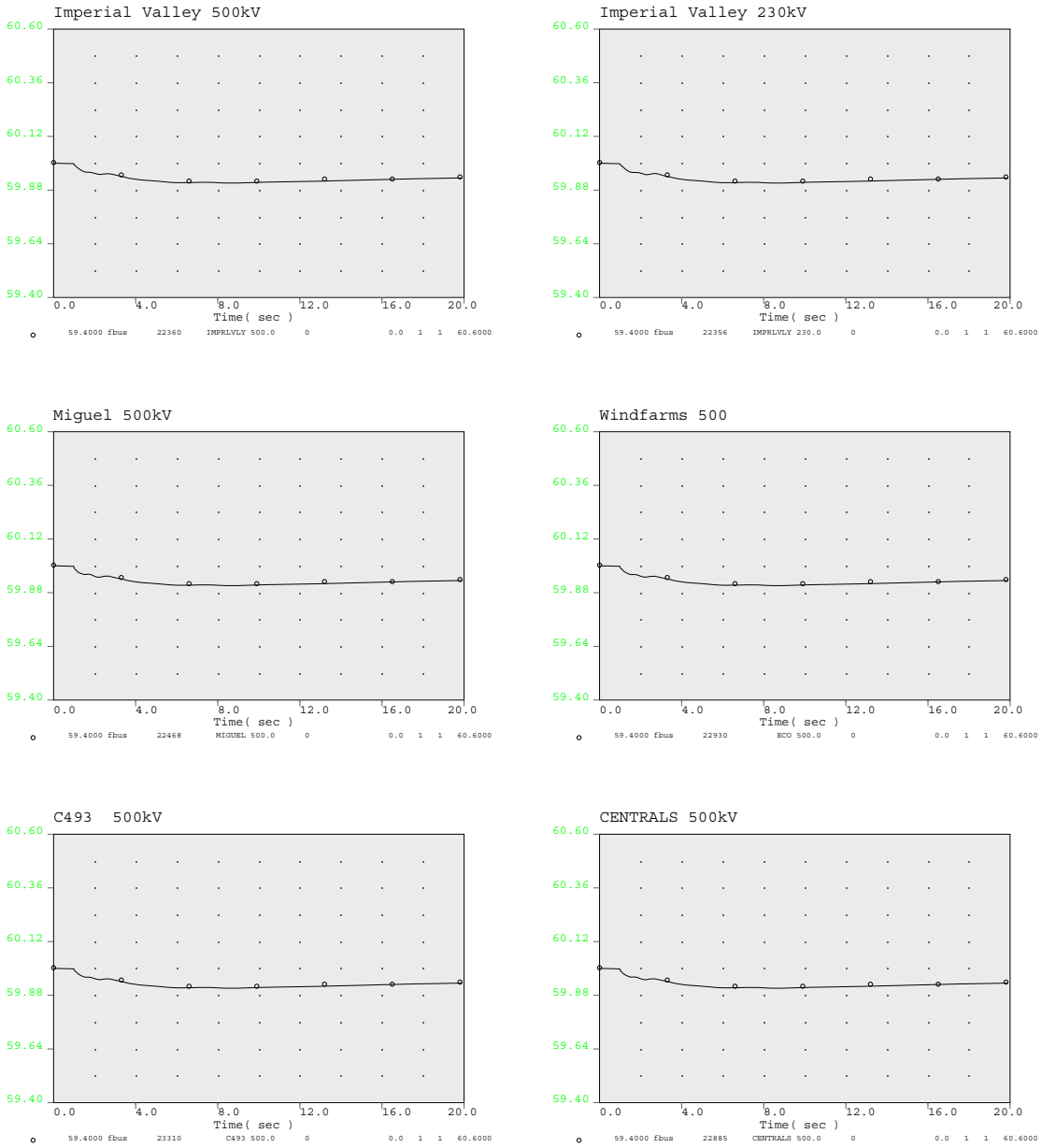






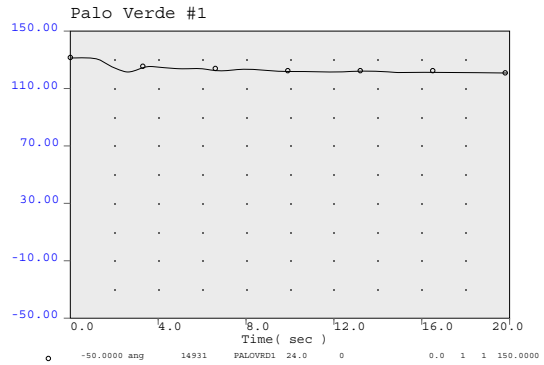
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

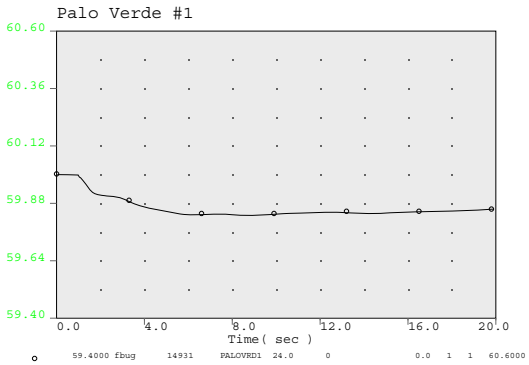
Imperial Valley Area - Frequency

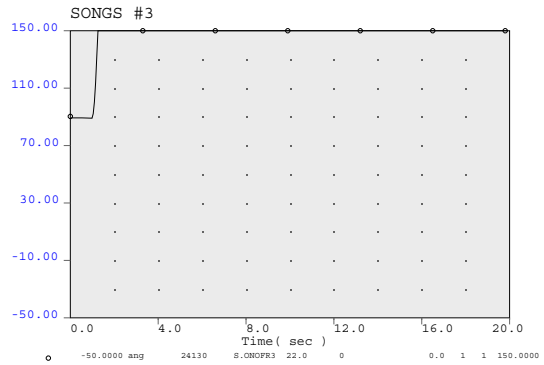


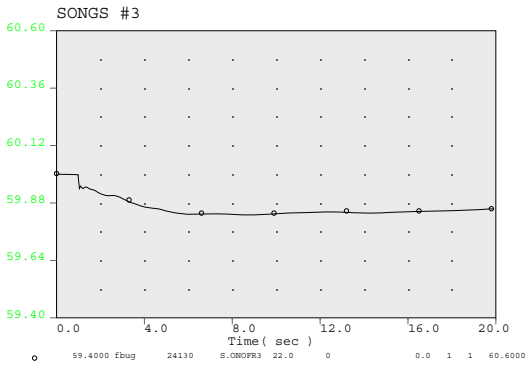
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generator #2

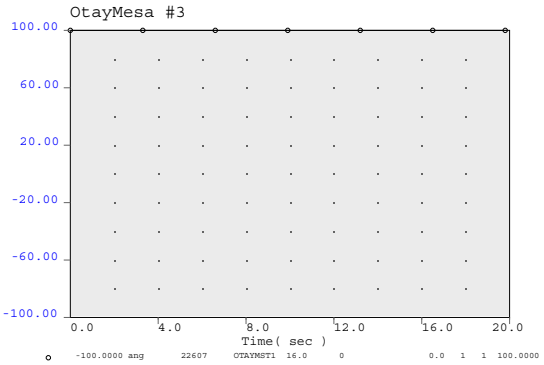
RELATIVE ROTOR ANGLE & FREQUENCY

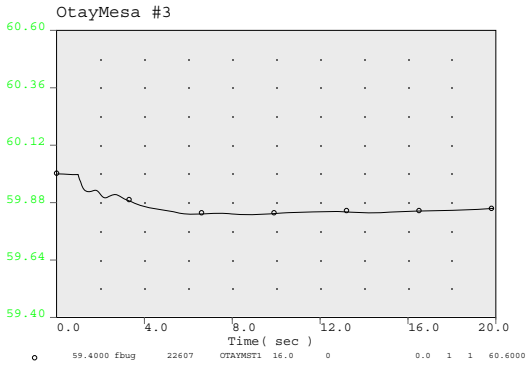












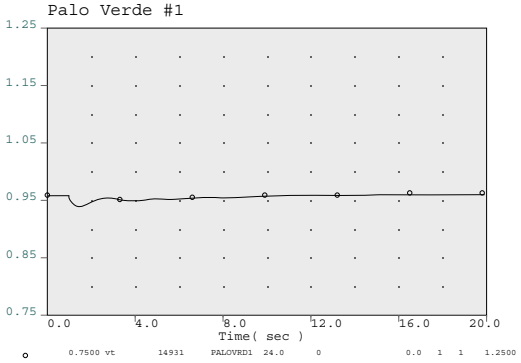
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Page 1

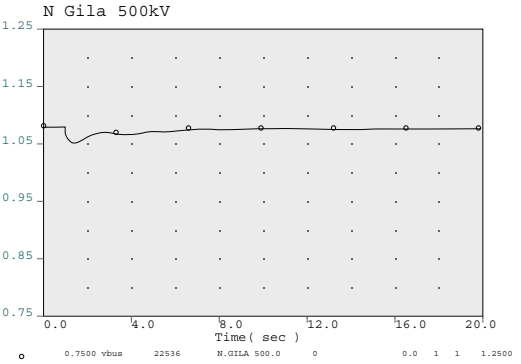
SDGE	SONGS-g2_pst_int_ll.chf	p_i\ll\pst_int\ws_pst_int Tue Nov 02 07:32:24 2010

RELATIVE VOLTAGE

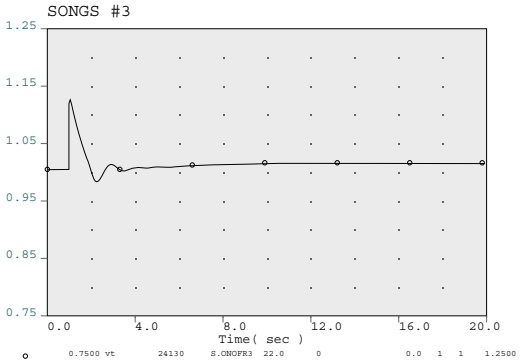
Palo Verde #1



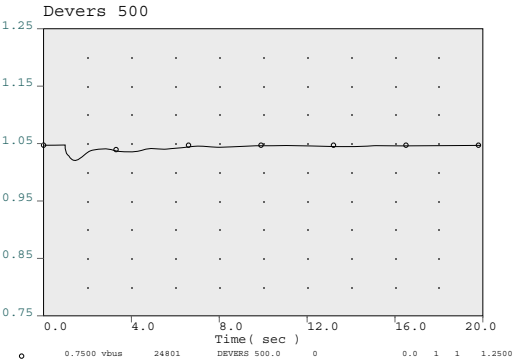
N Gila 500kV



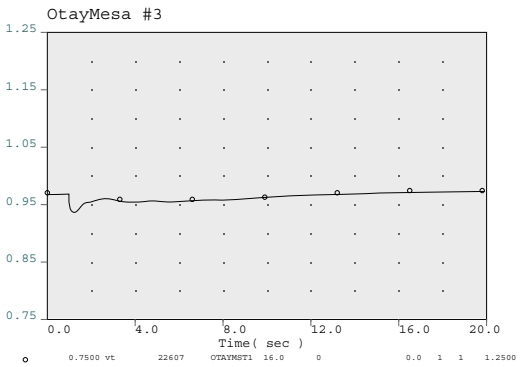
SONGS #3



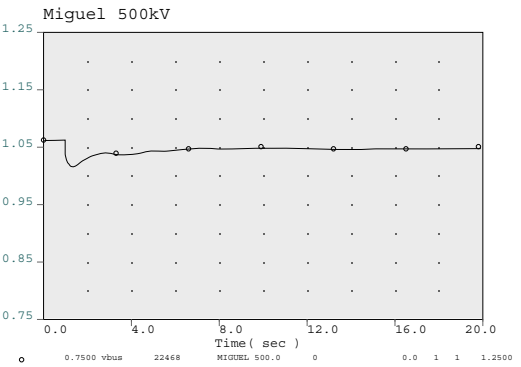
Devers 500



OtayMesa #3



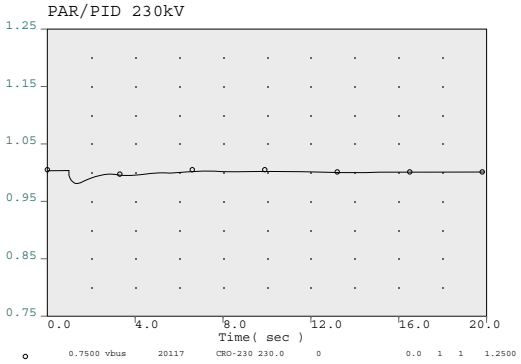
Miguel 500kV



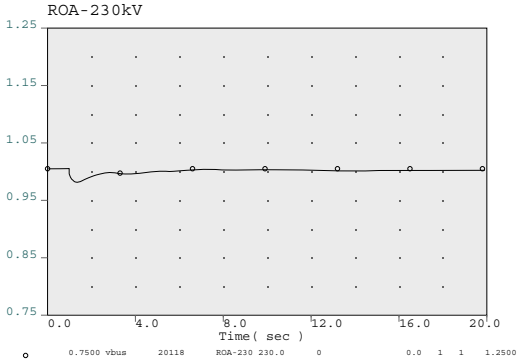
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

Affected System Voltage Check and Comparison

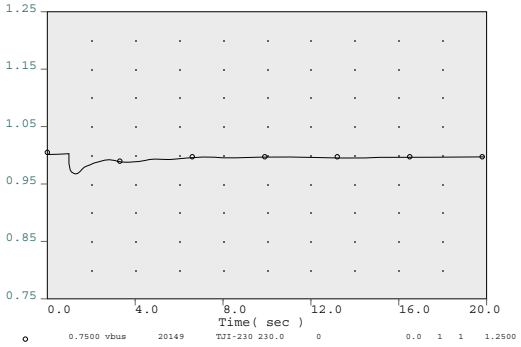
PAR/PID 230kV



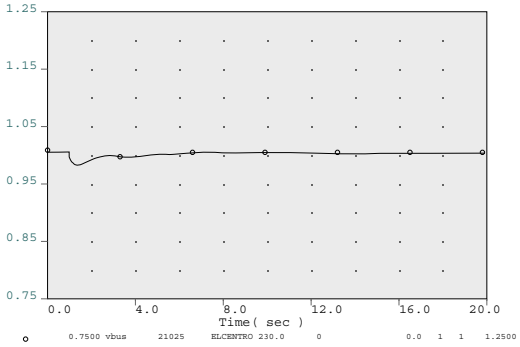
ROA-230kV



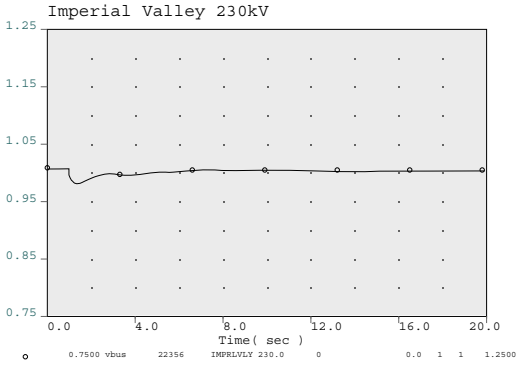
TJ1-230kV



El Centro



Imperial Valley 230kV



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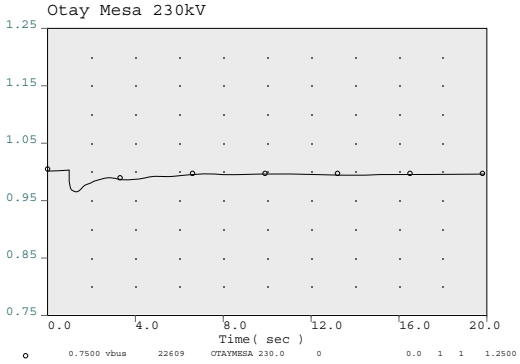
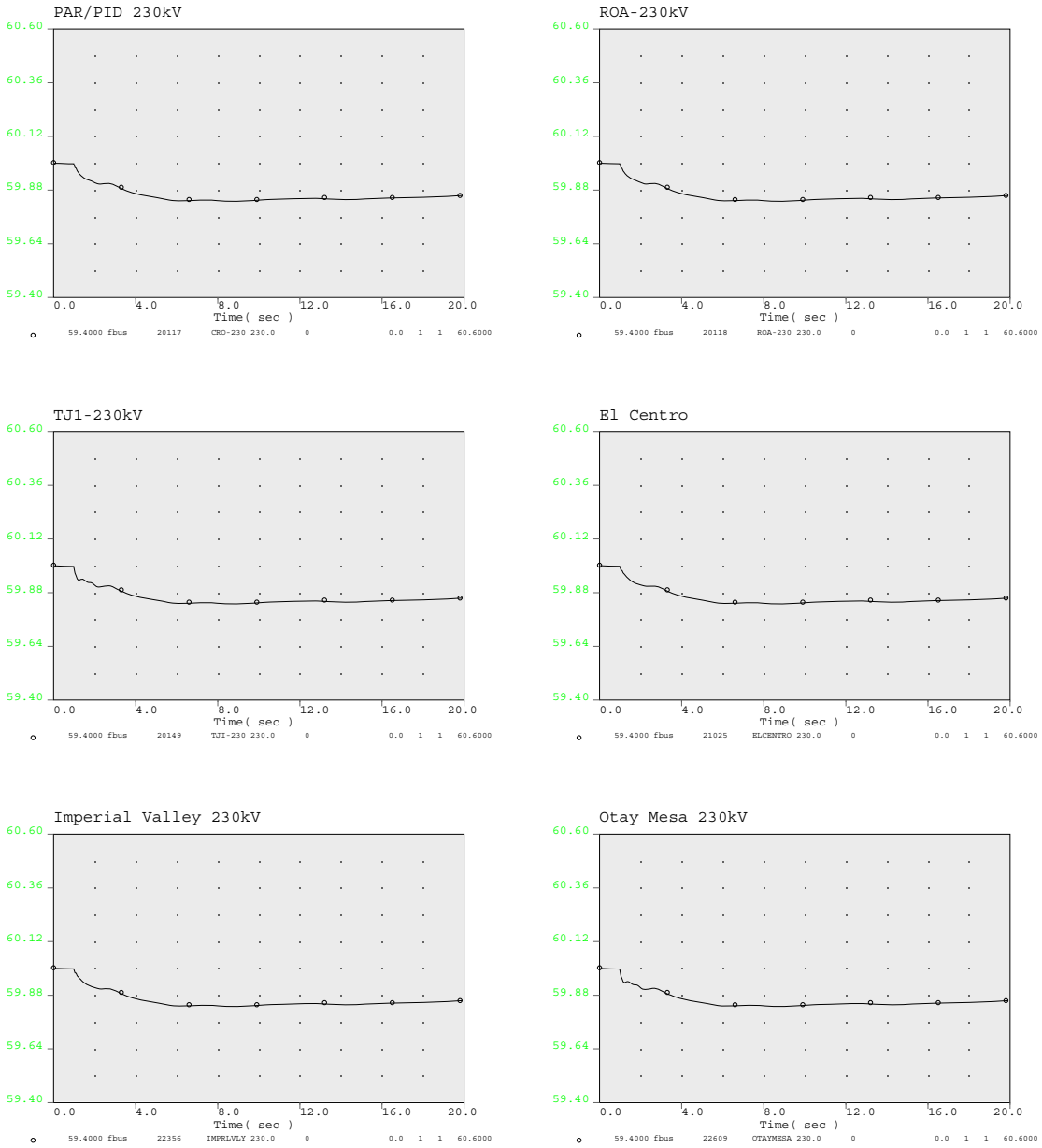


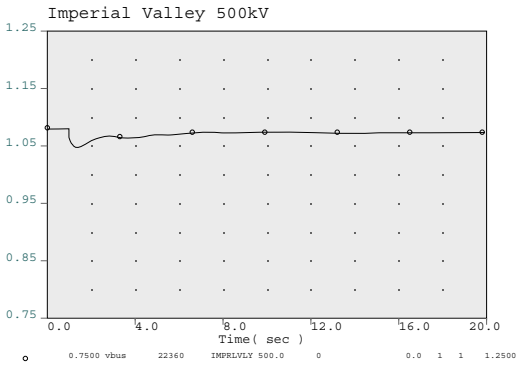
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

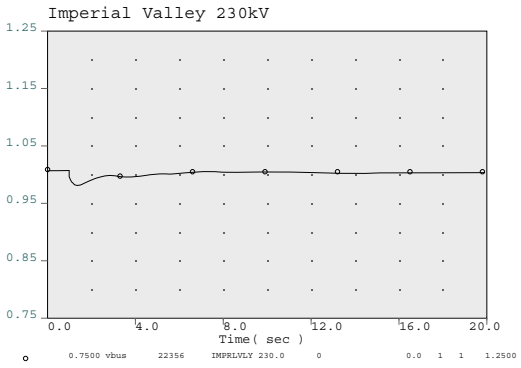
Affected System Frequency Check and Comparison

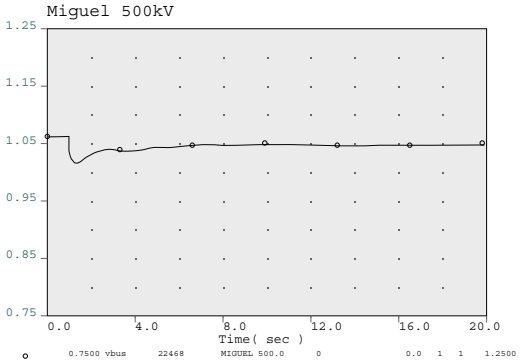


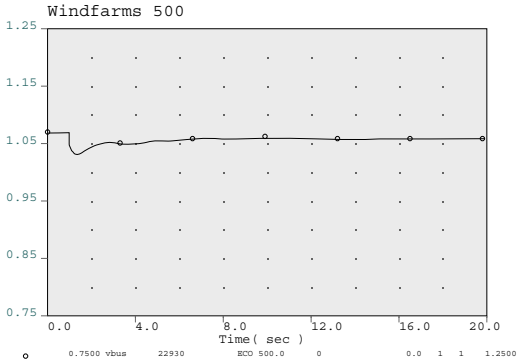
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

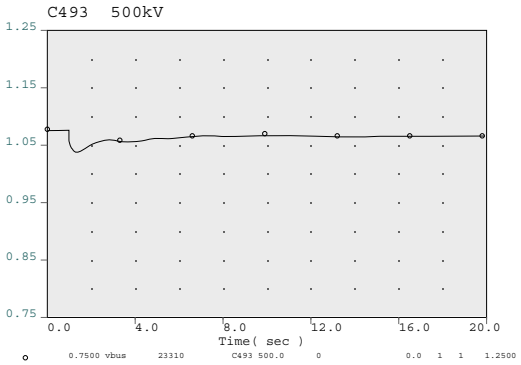
Imperial Valley Area - VOLTAGE

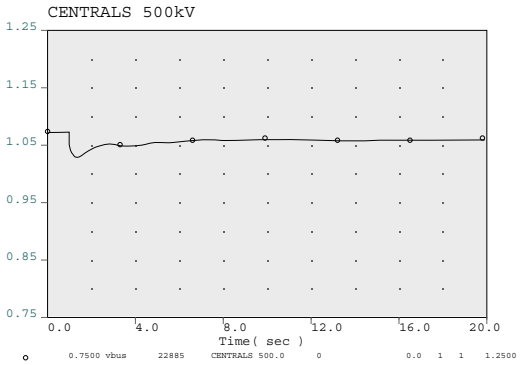






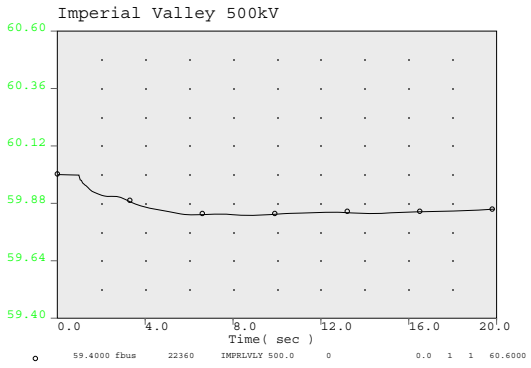


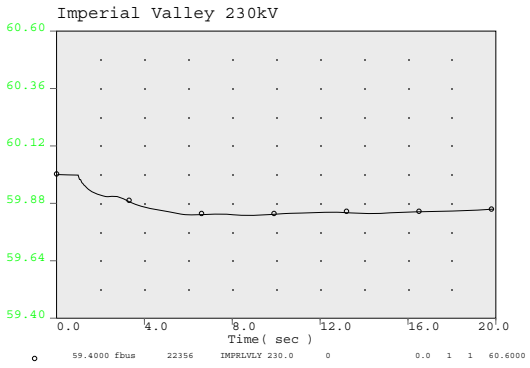


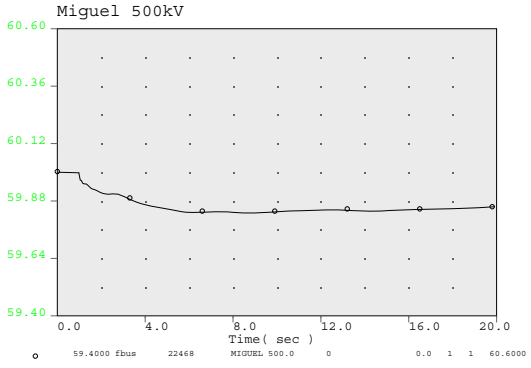


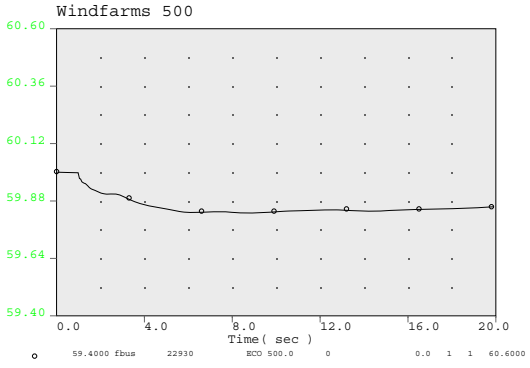
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

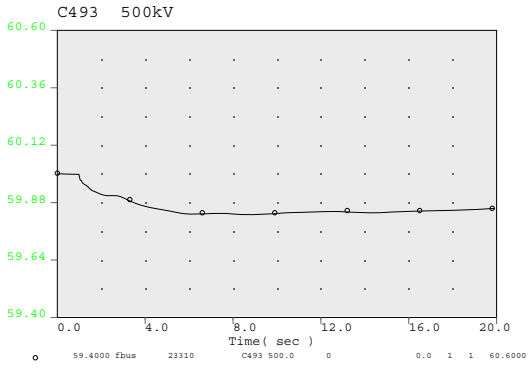
Imperial Valley Area - Frequency

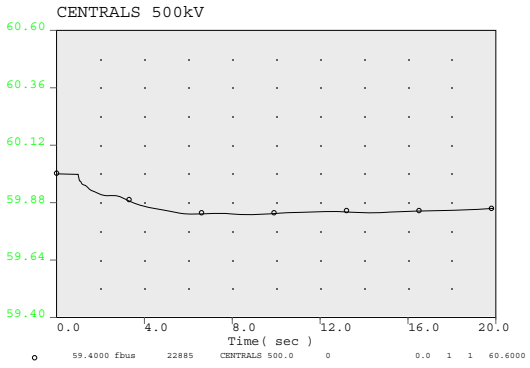






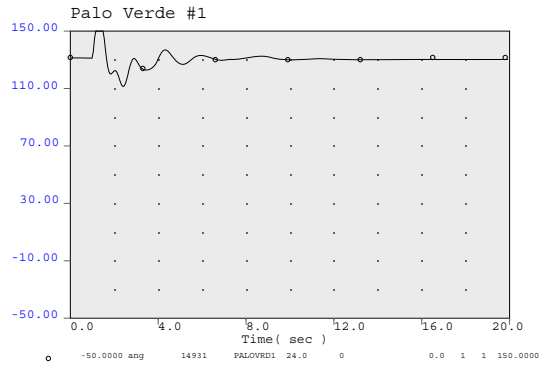


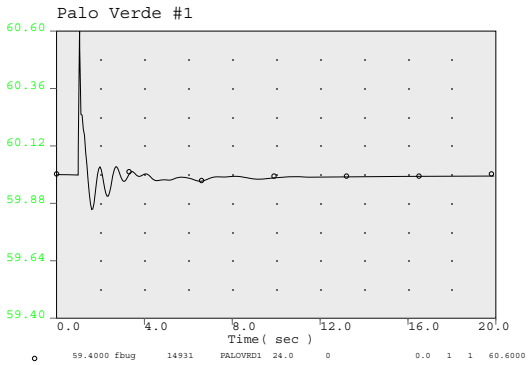


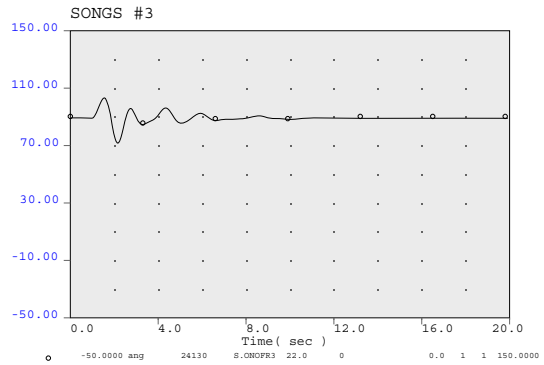


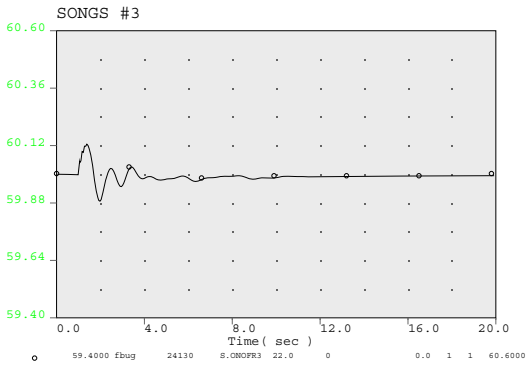
SDG&E Cluster 2 - post
2014 Light Autumn
Trip San Onofre Generators 2 & 3

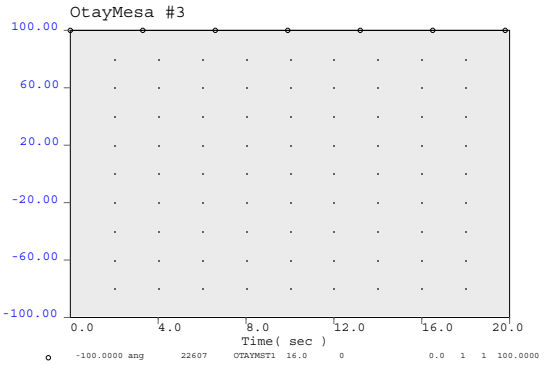
RELATIVE ROTOR ANGLE & FREQUENCY

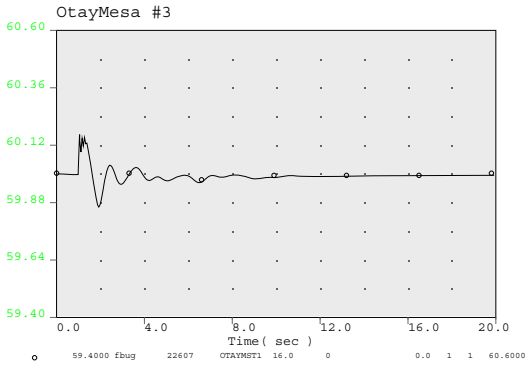












SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Page 1

T468_HAA_slo_pst_int_ll.chf

p_i\ll\pst_int\ws_pst_int

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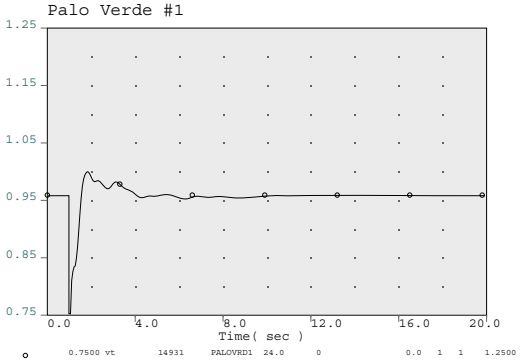
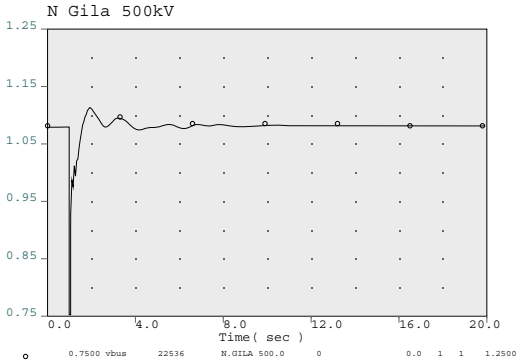
RELATIVE VOLTAGE

Palo Verde #1



N Gila 500kV



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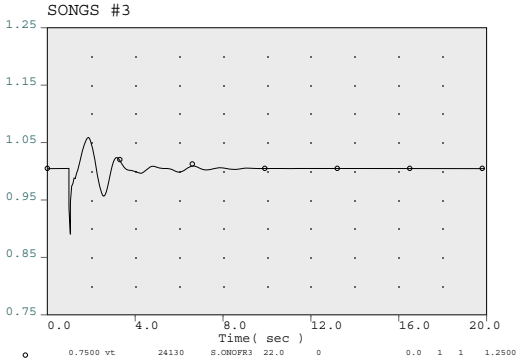
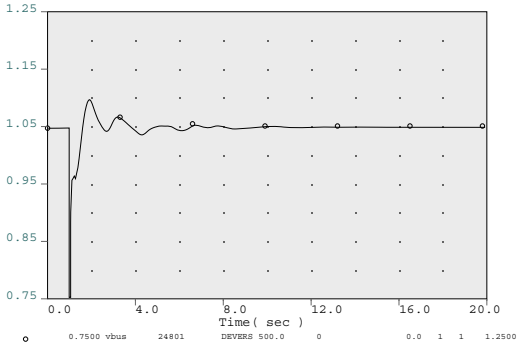
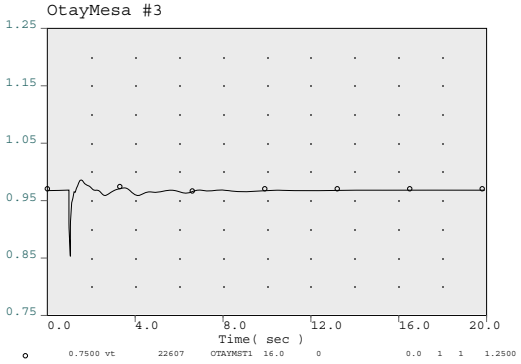


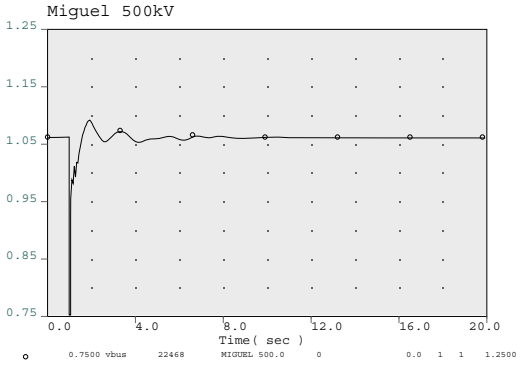
Devers 500



OtayMesa #3



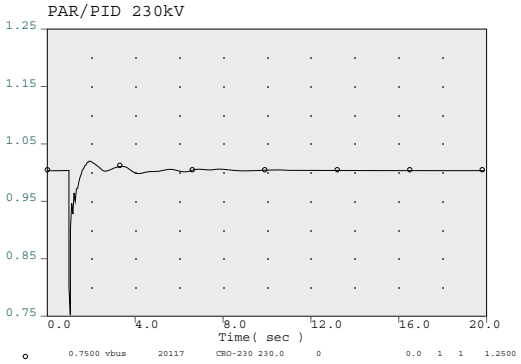
Miguel 500kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Affected System Voltage Check and Comparison

PAR/PID 230kV



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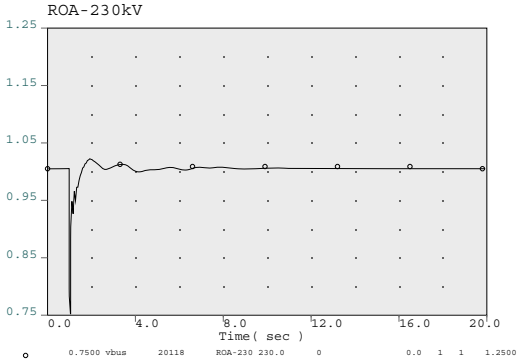

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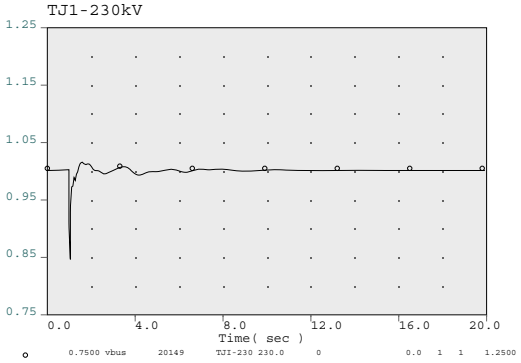
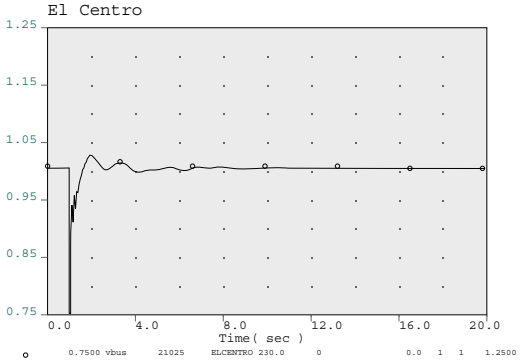
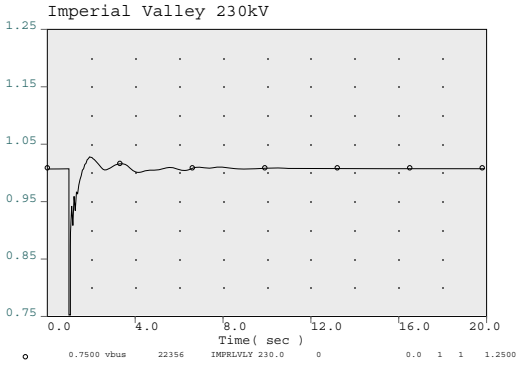


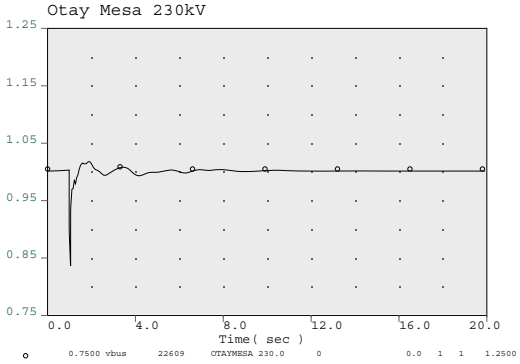
El Centro



Imperial Valley 230kV

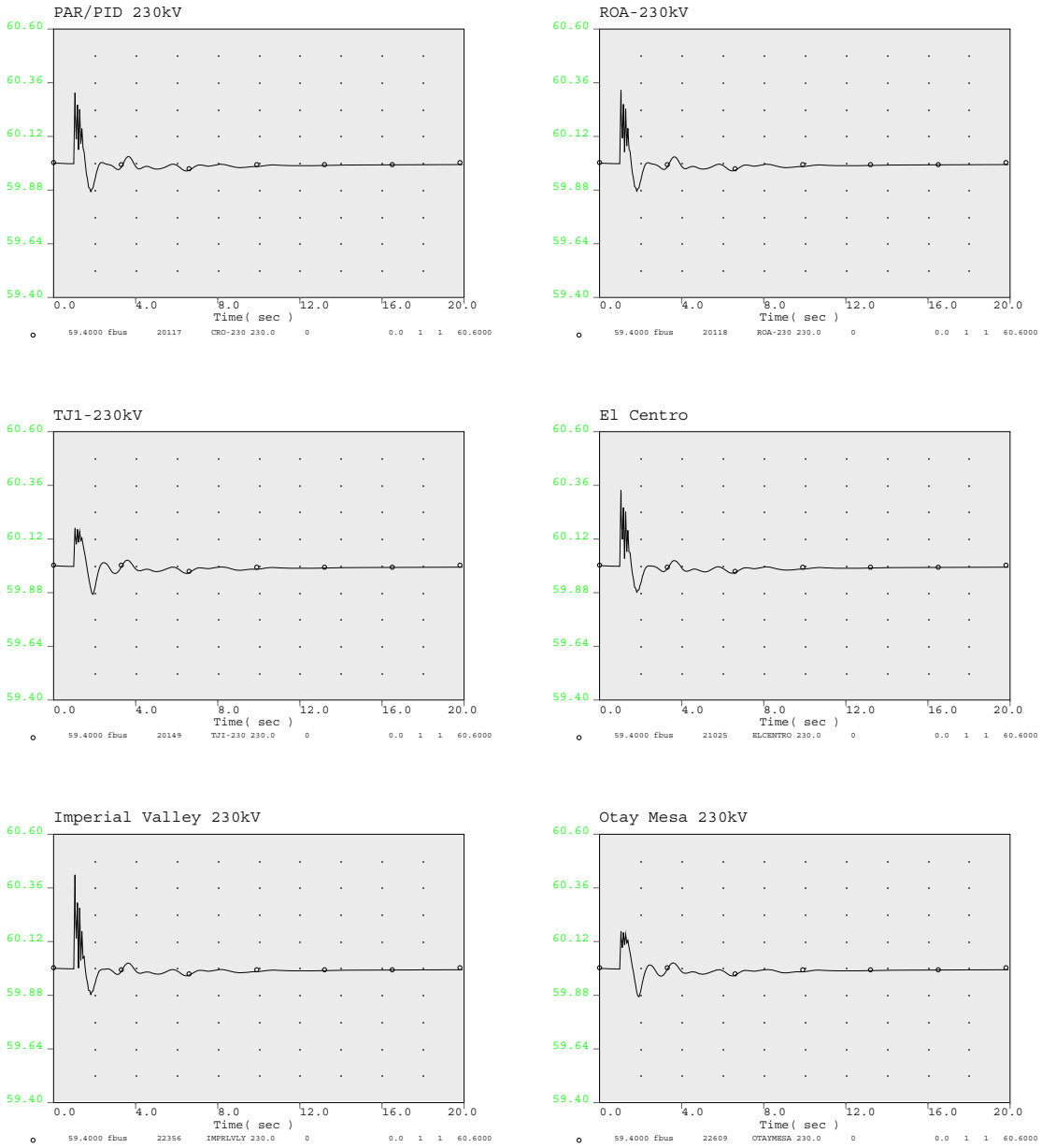


Otay Mesa 230kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

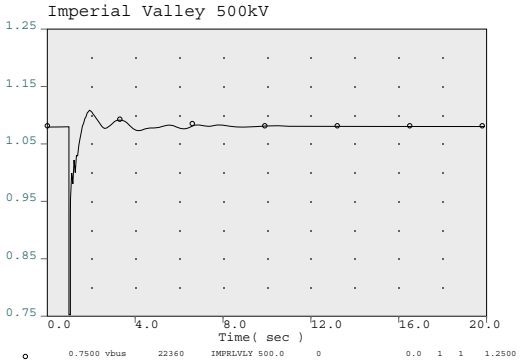
Affected System Frequency Check and Comparison



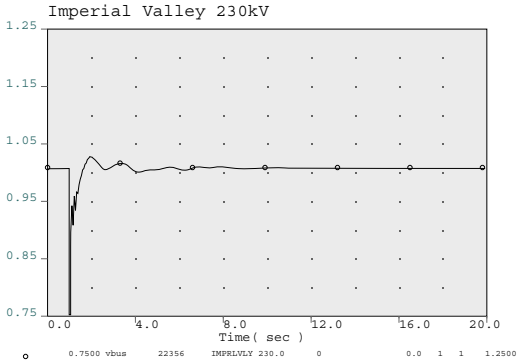
SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Imperial Valley Area - VOLTAGE

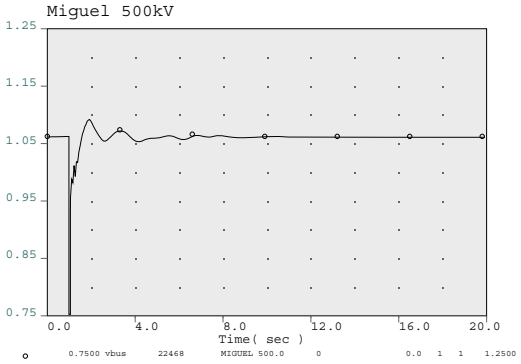
Imperial Valley 500kV



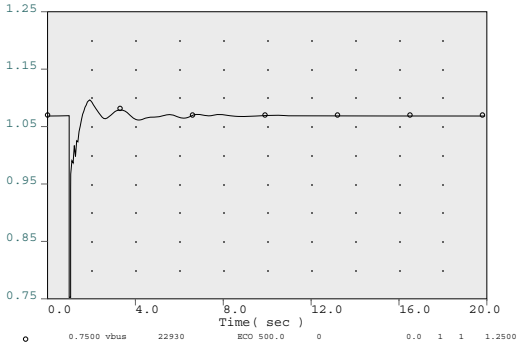
Imperial Valley 230kV



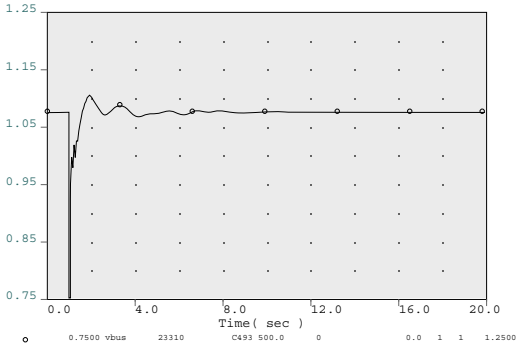
Miguel 500kV



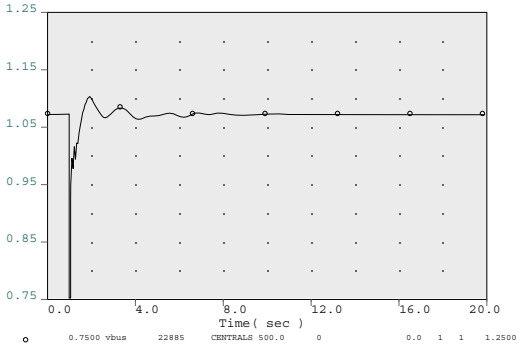
Windfarms 500



C493 500kV



CENTRALS 500kV



SDG&E Cluster 2 - post
2014 Light Autumn
T468-Hassyampa 500 kV line

Appendix K

Post-Transient:
Voltage and Reactive Power Deficiency Results
And
Contingency Lists

Heavy Summer Category B Post Transient Voltage Stability Analysis Results

Name	Contingency	Data	HS Pre-IVA Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-BU Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-INT Cluster	HS Post-INT Cluster w/ Delivery Network Upgrades
CENTRALS12.0	ECO-ML	Limit	0.0500		0.0500			
		Delta V	0.0505		0.0507			
		Violation	-0.0005		-0.0007			
CENTRALS230.	ECO-ML	Limit	0.0500		0.0500		0.0500	
		Delta V	0.0561		0.0563		0.0552	
		Violation	-0.0061		-0.0063		-0.0052	
CENTRMPS500.	ECO-ML	Limit	0.0500		0.0500		0.0500	
		Delta V	0.0557		0.0559		0.0548	
		Violation	-0.0057		-0.0059		-0.0048	
SYCAMORE230.	ECO-ML	Limit			0.0500			
		Delta V			0.0501			
		Violation			-0.0001			

Heavy Summer Category C Post Transient Voltage Stability Analysis Results

Name	Contingency	Data	HS Pre-IVA Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-BU Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-INT Cluster	HS Post-INT Cluster w/ Delivery Network Upgrades
		Limit						
		Delta V						
		Violation						

Light Load Category B Post Transient Voltage Stability Analysis Results

Name	Contingency	Data	LL Pre-IVA Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-BU Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-INT Cluster	LL Post-INT Cluster w/ Delivery Network Upgrades
BARRETT 69.0	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0695		0.0703			
		Violation	0.0195		0.0203			
CAMERNTP69.0	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0525		0.0533			
		Violation	0.0025		0.0033			
CAMERON 69.0	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0640		0.0648			
		Violation	0.0140		0.0148			
CRESTWD 69.0	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0522		0.0529			
		Violation	0.0022		0.0029			
KUMEYAAY0.69	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0579		0.0587			
		Violation	0.0079		0.0087			
KUMEYAAY34.5	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0578		0.0586			
		Violation	0.0078		0.0086			
KUMEYAAY69.0	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0522		0.0529			
		Violation	0.0022		0.0029			
PFC-AVC 0.60	TL00625	Limit	0.0500		0.0500			
		Delta V	0.0579		0.0587			
		Violation	0.0079		0.0087			

Light Load Category C Post Transient Voltage Stability Analysis Results

Name	Contingency	Data	LL Pre-IVA Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-BU Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-INT Cluster	LL Post-INT Cluster w/ Delivery Network Upgrades
		Limit						
		Delta V						
		Violation						

Heavy Summer Category B Reactive Power Deficiency Analysis Results

Contingency	HS Pre-IVA Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-BU Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-INT Cluster	HS Post-INT Cluster w/ Delivery Network Upgrades
C493-SCR		Thermal Violation		Thermal Violation		
C574-SX230					Thermal Violation	
C574-SY230					Thermal Violation	Thermal Violation
ECO60				Thermal Violation		
ECO-ML	VV/TV	Thermal Violation	VV/TV	Thermal Violation	VV/TV	
ECO-ML + 1150MW IV230 Gen Trip		Thermal Violation		Thermal Violation		
ECO-ML+1150MW IV230 Gen Trip					Thermal Violation	
IV-C493		Thermal Violation				
IV-ECO		Thermal Violation				
ML80	Thermal Violation		Thermal Violation		Thermal Violation	
ML80+1150MW IV230 Gen Trip	Thermal Violation		Thermal Violation		Thermal Violation	
ML81	Thermal Violation		Thermal Violation		Thermal Violation	
ML81+1150MW IV230 Gen Trip	Thermal Violation		Thermal Violation		Thermal Violation	
Pre-contg	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	
TL00625	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation
TL06923	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation
TL23013					Thermal Violation	
TL23041					Thermal Violation	
TL23042 - OM-SY230					Thermal Violation	Thermal Violation
TL2304X - SY230-SG					Thermal Violation	
TL23051					Thermal Violation	

Heavy Summer Category C Reactive Power Deficiency Analysis Results

Contingency	HS Pre-IVA Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-BU Cluster	HS Post-IVA Cluster w/ Delivery Network Upgrades	HS Pre-INT Cluster	HS Post-INT Cluster w/ Delivery Network Upgrades
23041-23042					Voltage Collapse	Thermal Violation
C574-MLMS3TP+C574-MLSXTAP						Thermal Violation
IV-C493+IV-ECO	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation
IV-C493+IV-ECO+1400MW IV230 Gen	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation		
MLSXTap-SX+ML-C565					Thermal Violation	
MLSXTap-SX+SX-C565					Thermal Violation	
OMG-C574						Thermal Violation
OM-SY230+C574-MLMS3TAP						Thermal Violation
OM-SY230+OM-C574						Thermal Violation
OT-1T					Thermal Violation	
OT-2N					Thermal Violation	
OT-2T					Thermal Violation	
Pre-contg	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation	
SX-23T					Thermal Violation	
TL23021/41					Thermal Violation	
TL23021/41+1400 IV230 Gen Trip					Thermal Violation	
TL23051-23011					Thermal Violation	

Light Load Category B Reactive Power Deficiency Analysis Results

Contingency	LL Pre-IVA Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-BU Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-INT Cluster	LL Post-INT Cluster w/ Delivery Network Upgrades
C574-SY230					Thermal Violation	
ECO60				Thermal Violation		
ECO-ML	Thermal Violation	Thermal Violation		Thermal Violation		
IV BK81		Thermal Violation				
IV-ECO+1150MW Gen Trip+IV-ROA	Voltage Violation	Voltage Violation	Voltage Violation	Voltage Violation	Voltage Violation	Voltage Violation
ML81	Thermal Violation		Thermal Violation			
NG-IV	Thermal Violation		Thermal Violation		Thermal Violation	
Pre-contg	Thermal Violation		Thermal Violation		Thermal Violation	
TL00625	VV/TV	Thermal Violation	VV/TV	Thermal Violation		
TL00626	Thermal Violation			Thermal Violation		
TL06923	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation		
TL23007						Thermal Violation
TL23013	Thermal Violation		Thermal Violation		Thermal Violation	
TL23042 - OM-SY230					Thermal Violation	
TL2304X - SY230-SG					Thermal Violation	

Light Load Category C Reactive Power Deficiency Analysis Results

Contingency	LL Pre-IVA Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-BU Cluster	LL Post-IVA Cluster w/ Delivery Network Upgrades	LL Pre-INT Cluster	LL Post-INT Cluster w/ Delivery Network Upgrades
23041-23042					VV/TV	Thermal Violation
C574-MLMS3TP+C574-MLSXTAP						Thermal Violation
IV-C493+IV-ECO	Thermal Violation	Thermal Violation	Thermal Violation	Thermal Violation		
IV-NG #1 AND #2		Thermal Violation		Thermal Violation		Thermal Violation
IV-NG-IV81	Thermal Violation		Thermal Violation		Thermal Violation	
OM-SY230+C574-MLMS3TAP						Thermal Violation
OT-2N	Thermal Violation		Thermal Violation		Thermal Violation	
OT-2T	Thermal Violation		Thermal Violation		Thermal Violation	
Pre-contg	Thermal Violation		Thermal Violation		Thermal Violation	

Heavy Summer Category B (including Delivery Network Upgrades) Contingency List Used for Post Transient Voltage and Reactive Power Deficiency Analyses (VSAT v10.0)

[VSAT 10.0 Contingency]

{Contingency}
  Contingency name = 'SA230-EA230 #3'
  Outage Branch = 22716 22232 '3'
{End contingency}
{Contingency}
  Contingency name = 'IV-NG #2'
  Outage Branch = 22536 22360 '2'
{End contingency}
{Contingency}
  Contingency name = 'ML82'
  Outage Branch = 22464 22468 '3'
{End contingency}
{Contingency}
  Contingency name = 'PLV-CLRDORVR #2'
  Outage Branch = 15021 24900 '2'
{End contingency}
{Contingency}
  Contingency name = 'SY230-MS230'
  Outage Branch = 22771 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'OM230-SY230'
  Outage Branch = 22771 22609 '1'
{End contingency}
{Contingency}
  Contingency name = 'SX230-PQ230'
  Outage Branch = 22832 22652 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574-OM230 #1'
  Outage Branch = 22609 23160 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574-OM230 #2'
  Outage Branch = 22609 23160 '2'
{End contingency}
{Contingency}
  Contingency name = 'C574-SY230'
  Outage Branch = 23160 22466 '2'
  Outage Branch = 22609 22466 '1'
  Outage Branch = 22771 22466 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574-SX230'

```
  Outage Branch = 23160 22467 '1'
  Outage Branch = 22609 22467 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'C565-ML230'
  Outage Branch = 22927 22464 '1'
{End contingency}
{Contingency}
  Contingency name = 'C565-SX230'
  Outage Branch = 22832 22927 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574 GEN TRIP'
  Outage Branch = 23160 23161 '1'
  Change Generation = 23162 '1' 0
  Change Generation = 23163 '1' 0
  Change Generation = 23164 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'C555 GEN TRIP'
  Outage Branch = 23215 23288 '1'
  Change Generation = 23221 'C2' 0
  Change Generation = 23222 'C2' 0
  Change Generation = 23223 'C2' 0
  Change Generation = 23224 'C2' 0
{End contingency}
{Contingency}
  Contingency name = 'C561 GEN TRIP'
  Outage Branch = 22356 23274 '1'
  Change Generation = 23279 'C' 0
  Change Generation = 23280 'C' 0
{End contingency}
{Contingency}
  Contingency name = 'C565 GEN TRIP'
  Outage Branch = 23159 22927 '1'
  Change Generation = 23157 '1' 0
  Change Generation = 23158 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'C583 GEN TRIP'
  Outage Branch = 23266 23288 '1'
  Change Generation = 23271 'C2' 0
  Change Generation = 23272 'C2' 0
  Change Generation = 23273 'C2' 0
{End contingency}
{Contingency}
  Contingency name = 'C590 GEN TRIP'
  Outage Branch = 22356 23306 '1'
  Change Generation = 23309 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'C608 GEN TRIP'
  Outage Branch = 22356 23306 '1'
```

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  Change Generation = 23155 '1' 0
  Change Generation = 23156 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'SRPL'
  Outage Branch = 22360 22885 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-C493'
  Outage Branch = 22360 23310 '1'
{End contingency}
{Contingency}
  Contingency name = 'C493-SCR'
  Outage Branch = 23310 22885 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-ECO'
  Outage Branch = 22360 22930 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-ECO+1150MW Gen Trip+IV-ROA'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 25
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
  Outage Branch = 22356 20118 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-ECO+1150MW Gen Trip+TJ-OM'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 25
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
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  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
  Outage Branch = 22609 20149 '1'
{End contingency}
{Contingency}
  Contingency name = 'ECO-ML'
  Outage Branch = 22930 22468 '1'
{End contingency}
{Contingency}
  Contingency name = 'ECO-ML + 1150MW IV230 Gen Trip'
  Outage Branch = 22930 22468 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 25
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'T429 Gen Tie'
  Change Generation = 23255 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'T442 Gen Tie'
  Change Generation = 23265 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'T468 Gen Tie'
  Change Generation = 23262 'T' 0
  Change Generation = 23263 'T' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'IV-ECO #2'
  Outage Branch = 22360 22930 '2'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'ECO-SCR'
  Outage Branch = 22885 22930 '1'
{End contingency}
{Contingency}
  Contingency name = 'NG-IV'
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  Outage Branch = 22536 22360 '1'
{End contingency}
{Contingency}
  Contingency name = 'HAA-T468'
  Outage Branch = 15090 23256 '1'
{End contingency}
{Contingency}
  Contingency name = 'T468-NG'
  Outage Branch = 23256 22536 '1'
{End contingency}
{Contingency}
  Contingency name = 'NG-HAA #2'
  Outage Branch = 15090 22536 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'ECO BK81'
  Outage Branch = 22931 22930 '2'
{End contingency}
{Contingency}
  Contingency name = 'IV BK80'
  Outage Branch = 22356 22360 '2'
{End contingency}
{Contingency}
  Contingency name = 'IV BK81'
  Outage Branch = 22356 22360 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV BK82'
  Outage Branch = 22356 22360 '3'
{End contingency}
{Contingency}
  Contingency name = 'ML80'
  Outage Branch = 22468 22472 '1'
  Outage Branch = 22464 22472 '1'
  Outage Branch = 22452 22472 '1'
{End contingency}
{Contingency}
  Contingency name = 'ML80+1150MW IV230 Gen Trip'
  Outage Branch = 22468 22472 '1'
  Outage Branch = 22464 22472 '1'
  Outage Branch = 22452 22472 '1'
  Outage Branch = 22356 23293 '1'
  Outage Branch = 22984 22356 '1'
  Outage Branch = 22984 22356 '2'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
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  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
  Change Generation = 20187 '1' 45
  Outage Branch = 22356 23050 '1'
{End contingency}
{Contingency}
  Contingency name = 'ML81'
  Outage Branch = 22464 22468 '2'
{End contingency}
{Contingency}
  Contingency name = 'ML81+1150MW IV230 Gen Trip'
  Outage Branch = 22464 22468 '2'
  Outage Branch = 22356 23293 '1'
  Outage Branch = 22984 22356 '1'
  Outage Branch = 22984 22356 '2'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
  Change Generation = 20187 '1' 45
  Outage Branch = 22356 23050 '1'
{End contingency}
{Contingency}
  Contingency name = 'SCR-SX #1'
  Outage Branch = 22886 22832 '1'
{End contingency}
{Contingency}
  Contingency name = 'SCR-SX #2'
  Outage Branch = 22886 22832 '2'
{End contingency}
{Contingency}
  Contingency name = 'SCR BK80'
  Outage Branch = 22885 22888 '1'
  Outage Branch = 22886 22888 '1'
  Outage Branch = 22887 22888 '1'
{End contingency}
{Contingency}
  Contingency name = 'SCR BK81'
  Outage Branch = 22885 22888 '2'
  Outage Branch = 22886 22888 '2'
  Outage Branch = 22887 22888 '2'
{End contingency}
{Contingency}
  Contingency name = 'ECO80'
  Outage Branch = 22930 22934 '1'
  Outage Branch = 22931 22934 '1'
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  Outage Branch = 22933 22934 '1'
{End contingency}
{Contingency}
  Contingency name = 'ECO80+ECO/BU Gen Drop'
  Outage Branch = 22930 22934 '1'
  Outage Branch = 22931 22934 '1'
  Outage Branch = 22933 22934 '1'
  Change Generation = 22942 'G1' 0
  Change Generation = 22945 'G2' 0
  Change Generation = 22895 'Q' 0
  Change Generation = 22907 'Q' 0
  Change Generation = 22908 'Q' 0
  Change Generation = 23053 'Q' 0
  Change Generation = 23054 'Q' 0
  Change Generation = 23055 'Q' 0
  Change Generation = 23100 'Q1' 0
  Change Generation = 23105 'Q1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23141 'T' 0
  Change Generation = 23144 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'ECO60'
  Outage Branch = 22931 22932 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'ECO60+360MW BU Gen Drop'
  Outage Branch = 22931 22932 '1'
  Change Generation = 22942 'G1' 0
  Change Generation = 22945 'G2' 0
  Change Generation = 22895 'Q' 0
  Change Generation = 22907 'Q' 0
  Change Generation = 22908 'Q' 0
  Change Generation = 23053 'Q' 0
  Change Generation = 23054 'Q' 0
  Change Generation = 23055 'Q' 0
{End contingency}
{Contingency}
  Contingency name = 'TL23001  '
  Outage Branch = 22716 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23002  '
  Outage Branch = 22716 24131 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23003  '
  Outage Branch = 22716 22232 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23004  '
  Outage Branch = 22716 22504 '2'
{End contingency}
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{Contingency}
  Contingency name = 'TL23006  '
  Outage Branch = 22716 24131 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23007  '
  Outage Branch = 22844 24131 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23010  '
  Outage Branch = 22716 24131 '3'
{End contingency}
{Contingency}
  Contingency name = 'TL23011  '
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
  Outage Branch = 22261 22227 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23012  '
  Outage Branch = 22652 22232 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23013  '
  Outage Branch = 22652 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23014  '
  Outage Branch = 22261 22260 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23021  '
  Outage Branch = 22832 22464 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23022  '
  Outage Branch = 22464 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23023  '
  Outage Branch = 22464 22504 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23027  '
  Outage Branch = 22596 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23028  '
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22596 22597 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23029  '
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  Outage Branch = 22430 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'ES-Q72  '
  Outage Branch = 22260 99125 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q72-TA #1 '
  Outage Branch = 99125 22844 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q72-TA #2 '
  Outage Branch = 99125 22844 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23040  '
  Outage Branch = 22609 20149 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23041  '
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23042 - OM-SY230'
  Outage Branch = 22771 22466 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL2304X - SY230-SG'
  Outage Branch = 22430 22771 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23045  '
  Outage Branch = 22998 22356 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23046  '
  Outage Branch = 22998 22356 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23047  '
  Outage Branch = 22984 22356 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23048  '
  Outage Branch = 22984 22356 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23050  '
  Outage Branch = 22356 20118 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23051  '
  Outage Branch = 22261 22832 '1'
{End contingency}
```

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{Contingency}
  Contingency name = 'TL23052  '
  Outage Branch = 22844 24131 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23053'
  Outage Branch = 22652 22232 '2'
{End contingency}
{Contingency}
  Contingency name = 'SONGS Unit 2  '
  Change Generation = 24129 '2' 0
{End contingency}
{Contingency}
  Contingency name = 'SONGS Unit 3  '
  Change Generation = 24130 '3' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00682  '
  Outage Branch = 22884 22688 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00683  '
  Outage Branch = 22688 22404 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00685  '
  Outage Branch = 22884 22736 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00686  '
  Outage Branch = 22884 22540 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00686 + T337 Trip  '
  Outage Branch = 22884 22540 '1'
  Change Generation = 22082 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00687  '
  Outage Branch = 22084 22540 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00687 + T337 Trip  '
  Outage Branch = 22084 22540 '1'
  Change Generation = 22082 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'ML60  '
  Outage Branch = 22464 22461 '1'
{End contingency}
{Contingency}
  Contingency name = 'ML61  '
  Outage Branch = 22464 22460 '2'
{End contingency}
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{Contingency}
  Contingency name = 'ML70  '
  Outage Branch = 22456 22464 '1'
{End contingency}
{Contingency}
  Contingency name = 'ML71 '
  Outage Branch = 22456 22464 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL00629  '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL00629 + KU Gen Trip '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00626  '
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00625  '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06923  '
  Outage Branch = 22040 22104 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL06923 + KU Gen Trip  '
  Outage Branch = 22040 22104 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'TL06904  '
  Outage Branch = 22416 22004 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06914  '
  Outage Branch = 22416 22408 '1'
{End contingency}
{Contingency}
```

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  Contingency name = 'C493 Gen Tie'
  Change Generation = 23314 'C1' 0
  Change Generation = 23318 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C496 Gen Tie'
  Change Generation = 23232 'C1' 0
  Change Generation = 23233 'C1' 0
  Change Generation = 23234 'C1' 0
  Change Generation = 23235 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C501 Gen Tie'
  Change Generation = 23250 'C1' 0
  Change Generation = 23252 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C509 Gen Tie'
  Change Generation = 23320 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C510 Gen Tie'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00624  '
  Outage Branch = 22208 22364 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00630  '
  Outage Branch = 22208 22336 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00631  '
  Outage Branch = 22208 22408 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06925  '
  Outage Branch = 22306 22208 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06938(CalpkEC Trip)'
  Change Generation = 22150 '1' 0
{End contingency}

[End]
```

Heavy Summer Category C (including Delivery Network Upgrades) Contingency List Used for Post Transient Voltage and Reactive Power Deficiency Analyses (VSAT v10.0)

```
[VSAT 10.0 Contingency]

{Contingency}
  Contingency name = 'IV-C493+IV-ECO'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22360 23310 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-C493+IV-ECO+1400MW IV230 Gen Trip'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22360 23310 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 50
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 25
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q159A T183 T215 Double Gen Tie Trip'
  Change Generation = 23100 'Q1' 0
  Change Generation = 23105 'Q1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23141 'T' 0
  Change Generation = 23144 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'TL23022/23'
  Outage Branch = 22464 22504 '1'
  Outage Branch = 22464 22504 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23022/23+1400 IV230 Gen Trip'
```

```
  Outage Branch = 22464 22504 '1'
  Outage Branch = 22464 22504 '2'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 50
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 25
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23021/41'
  Outage Branch = 22832 22464 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23021/41+1400 IV230 Gen Trip'
  Outage Branch = 22832 22464 '1'
  Outage Branch = 22832 22467 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 50
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 25
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23051-23011'
  Outage Branch = 22261 22832 '1'
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
```

```
  Outage Branch = 22261 22227 '1'
{End contingency}
{Contingency}
  Contingency name = '23014-23015'
  Outage Branch = 22261 22260 '1'
  Outage Branch = 22261 22260 '2'
{End contingency}
{Contingency}
  Contingency name = '23028-23027'
  Outage Branch = 22596 22597 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22596 22504 '1'
{End contingency}
{Contingency}
  Contingency name = '23011-23003'
  Outage Branch = 22716 22232 '1'
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
  Outage Branch = 22261 22227 '1'
{End contingency}
{Contingency}
  Contingency name = '23011-13806'
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
  Outage Branch = 22261 22227 '1'
  Outage Branch = 22228 22632 '1'
{End contingency}
{Contingency}
  Contingency name = '23001-13805'
  Outage Branch = 22716 22504 '1'
  Outage Branch = 22632 22048 '1'
{End contingency}
{Contingency}
  Contingency name = '23010-23002'
  Outage Branch = 22716 24131 '1'
  Outage Branch = 22716 24131 '3'
{End contingency}
{Contingency}
  Contingency name = '23004-23001'
  Outage Branch = 22716 22504 '1'
  Outage Branch = 22716 22504 '2'
{End contingency}
{Contingency}
  Contingency name = '23052-23007'
  Outage Branch = 22844 24131 '1'
  Outage Branch = 22844 24131 '2'
  Outage Branch = 22836 22848 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/626/6923  '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
```

```
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22040 22104 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/626/6923 + KU Gen Trip '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22040 22104 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/629  '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/629 + KU Gen Trip '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/6914/6904  '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
```

```
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/6914/6904 + KU Gen Trip '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626 '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626 + KU Gen Trip '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6923  '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22104 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6923 + KU Gen Trip '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22104 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6914/6904 '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
```

```
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6914/6904 + KU Gen Trip'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/625'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/625 + KU Gen Trip'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'OT-1N'
  Outage Branch = 22430 22596 '1'
  Outage Branch = 22592 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'OT-1T'
  Outage Branch = 22430 22596 '1'
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22596 22597 '1'
{End contingency}
{Contingency}
  Contingency name = 'OT-1S'
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22597 22504 '1'
```

```
  Outage Branch = 22596 22597 '1'
  Outage Branch = 22592 22596 '2'
{End contingency}
{Contingency}
  Contingency name = 'OT-2S'
  Outage Branch = 22596 22504 '1'
  Outage Branch = 22592 22596 '2'
{End contingency}
{Contingency}
  Contingency name = 'OT-2N'
  Outage Branch = 22652 22596 '1'
  Outage Branch = 22430 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'OT-2T'
  Outage Branch = 22652 22596 '1'
  Outage Branch = 22596 22504 '1'
{End contingency}
{Contingency}
  Contingency name = '23041-23042'
  Outage Branch = 22609 22467 '1'
  Outage Branch = 22832 22467 '1'
  Outage Branch = 22609 22466 '1'
  Outage Branch = 22771 22466 '1'
{End contingency}
{Contingency}
  Contingency name = 'SX-23T'
  Outage Branch = 22832 22828 '1'
  Outage Branch = 22832 22467 '1'
  Outage Branch = 22609 22467 '1'
{End contingency}
{Contingency}
  Contingency name = '23012-23053'
  Outage Branch = 22652 22232 '1'
  Outage Branch = 22652 22232 '2'
{End contingency}
{Contingency}
  Contingency name = 'MS-1T'
  Outage Branch = 22504 22500 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22596 22597 '1'
  Outage Branch = 22430 22597 '1'
{End contingency}
{Contingency}
  Contingency name = 'SWPL-IV82'
  Outage Branch = 22356 22360 '3'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22609 20149 '1'
  Change Generation = 20187 '1' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
```

```
{End contingency}
{Contingency}
  Contingency name = 'IV-NG-IV81'
  Outage Branch = 22356 22360 '2'
  Outage Branch = 22536 22360 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL00624/00630'
  Outage Branch = 22208 22364 '1'
  Outage Branch = 22208 22336 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q72-TA #1 AND #2'
  Outage Branch = 99125 22844 '1'
  Outage Branch = 99125 22844 '2'
{End contingency}
{Contingency}
  Contingency name = 'Q72-ES #1 AND #2'
  Outage Branch = 22260 99125 '1'
  Outage Branch = 22260 99125 '2'
{End contingency}
{Contingency}
  Contingency name = 'IV-NG #1 AND #2'
  Outage Branch = 22536 22360 '1'
  Outage Branch = 22536 22360 '2'
{End contingency}
{Contingency}
  Contingency name = 'OMG-C574'
  Outage Branch = 22609 23160 '1'
  Outage Branch = 22609 23160 '2'
{End contingency}
{Contingency}
  Contingency name = 'C574-MLMS3TP+C574-MLSXTAP'
  Outage Branch = 23160 22467 '1'
  Outage Branch = 23160 22466 '2'
{End contingency}
{Contingency}
  Contingency name = 'MLSXTap-SX+ML-C565'
  Outage Branch = 22927 22464 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'MLSXTap-SX+SX-C565'
  Outage Branch = 22832 22927 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'EA-SA #1 and #2'
  Outage Branch = 22716 22232 '1'
  Outage Branch = 22716 22232 '3'
{End contingency}
{Contingency}
  Contingency name = 'OM-SY230+OM-C574'
  Outage Branch = 22771 22609 '1'
```

```
  Outage Branch = 22609 23160 '1'
{End contingency}
{Contingency}
  Contingency name = 'OM-SY230+C574-MLMS3TAP'
  Outage Branch = 22771 22609 '1'
  Outage Branch = 23160 22466 '2'
{End contingency}

[End]
```

Light Load Category B (including Delivery Network Upgrades) Contingency List Used for Post Transient Voltage and Reactive Power Deficiency Analyses (VSAT v10.0)

[VSAT 10.0 Contingency]

{Contingency}
  Contingency name = 'SA230-EA230 #3'
  Outage Branch = 22716 22232 '3'
{End contingency}
{Contingency}
  Contingency name = 'IV-NG #2'
  Outage Branch = 22536 22360 '2'
{End contingency}
{Contingency}
  Contingency name = 'ML82'
  Outage Branch = 22464 22468 '3'
{End contingency}
{Contingency}
  Contingency name = 'PLV-CLRDORVR #2'
  Outage Branch = 15021 24900 '2'
{End contingency}
{Contingency}
  Contingency name = 'SY230-MS230'
  Outage Branch = 22771 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'OM230-SY230'
  Outage Branch = 22771 22609 '1'
{End contingency}
{Contingency}
  Contingency name = 'SX230-PQ230'
  Outage Branch = 22832 22652 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574-OM230 #1'
  Outage Branch = 22609 23160 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574-OM230 #2'
  Outage Branch = 22609 23160 '2'
{End contingency}
{Contingency}
  Contingency name = 'C574-SY230'
  Outage Branch = 23160 22466 '2'
  Outage Branch = 22609 22466 '1'
  Outage Branch = 22771 22466 '1'
{End contingency}
{Contingency}

```
  Contingency name = 'C574-SX230'
  Outage Branch = 23160 22467 '1'
  Outage Branch = 22609 22467 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'C565-ML230'
  Outage Branch = 22927 22464 '1'
{End contingency}
{Contingency}
  Contingency name = 'C565-SX230'
  Outage Branch = 22832 22927 '1'
{End contingency}
{Contingency}
  Contingency name = 'C574 GEN TRIP'
  Outage Branch = 23160 23161 '1'
  Change Generation = 23162 '1' 0
  Change Generation = 23163 '1' 0
  Change Generation = 23164 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'C555 GEN TRIP'
  Outage Branch = 23215 23288 '1'
  Change Generation = 23221 'C2' 0
  Change Generation = 23222 'C2' 0
  Change Generation = 23223 'C2' 0
  Change Generation = 23224 'C2' 0
{End contingency}
{Contingency}
  Contingency name = 'C561 GEN TRIP'
  Outage Branch = 22356 23274 '1'
  Change Generation = 23279 'C' 0
  Change Generation = 23280 'C' 0
{End contingency}
{Contingency}
  Contingency name = 'C565 GEN TRIP'
  Outage Branch = 23159 22927 '1'
  Change Generation = 23157 '1' 0
  Change Generation = 23158 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'C583 GEN TRIP'
  Outage Branch = 23266 23288 '1'
  Change Generation = 23271 'C2' 0
  Change Generation = 23272 'C2' 0
  Change Generation = 23273 'C2' 0
{End contingency}
{Contingency}
  Contingency name = 'C590 GEN TRIP'
  Outage Branch = 22356 23306 '1'
  Change Generation = 23309 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'C608 GEN TRIP'
```

```
  Outage Branch = 22356 23306 '1'
  Change Generation = 23155 '1' 0
  Change Generation = 23156 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'SRPL'
  Outage Branch = 22360 22885 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-C493'
  Outage Branch = 22360 23310 '1'
{End contingency}
{Contingency}
  Contingency name = 'C493-SCR'
  Outage Branch = 23310 22885 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-ECO'
  Outage Branch = 22360 22930 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-ECO+1150MW Gen Trip+IV-ROA'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22356 23293 '1'
  Outage Branch = 22984 22356 '1'
  Outage Branch = 22984 22356 '2'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
  Change Generation = 20187 '1' 45
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 20118 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-ECO+1150MW Gen Trip+TJ-OM'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22356 23293 '1'
  Outage Branch = 22984 22356 '1'
  Outage Branch = 22984 22356 '2'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
```

```
  Change Generation = 23265 'T' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
  Change Generation = 20187 '1' 45
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22609 20149 '1'
{End contingency}
{Contingency}
  Contingency name = 'ECO-ML'
  Outage Branch = 22930 22468 '1'
{End contingency}
{Contingency}
  Contingency name = 'ECO-ML+1150MW IV230 Gen Trip'
  Outage Branch = 22930 22468 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 75
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'T429 Gen Tie'
  Change Generation = 23255 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'T442 Gen Tie'
  Change Generation = 23265 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'T468 Gen Tie'
  Change Generation = 23262 'T' 0
  Change Generation = 23263 'T' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'IV-ECO #2'
  Outage Branch = 22360 22930 '2'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'ECO-SCR'
  Outage Branch = 22885 22930 '1'
{End contingency}
```

```
{Contingency}
  Contingency name = 'NG-IV'
  Outage Branch = 22536 22360 '1'
{End contingency}
{Contingency}
  Contingency name = 'HAA-T468'
  Outage Branch = 15090 23256 '1'
{End contingency}
{Contingency}
  Contingency name = 'T468-NG'
  Outage Branch = 23256 22536 '1'
{End contingency}
{Contingency}
  Contingency name = 'NG-HAA #2'
  Outage Branch = 15090 22536 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'ECO BK81'
  Outage Branch = 22931 22930 '2'
{End contingency}
{Contingency}
  Contingency name = 'IV BK80'
  Outage Branch = 22356 22360 '2'
{End contingency}
{Contingency}
  Contingency name = 'IV BK81'
  Outage Branch = 22356 22360 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV BK82'
  Outage Branch = 22356 22360 '3'
{End contingency}
{Contingency}
  Contingency name = 'ML80+1150MW IV230 Gen Trip'
  Outage Branch = 22468 22472 '1'
  Outage Branch = 22464 22472 '1'
  Outage Branch = 22452 22472 '1'
  Outage Branch = 22356 23293 '1'
  Outage Branch = 22984 22356 '1'
  Outage Branch = 22984 22356 '2'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
  Change Generation = 20187 '1' 45
  Outage Branch = 22356 23050 '1'
```

```
{End contingency}
{Contingency}
  Contingency name = 'ML81'
  Outage Branch = 22464 22468 '2'
{End contingency}
{Contingency}
  Contingency name = 'ML81+1150MW IV230 Gen Trip'
  Outage Branch = 22464 22468 '2'
  Outage Branch = 22356 23293 '1'
  Outage Branch = 22984 22356 '1'
  Outage Branch = 22984 22356 '2'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
  Change Generation = 20187 '1' 45
  Outage Branch = 22356 23050 '1'
{End contingency}
{Contingency}
  Contingency name = 'SCR-SX #1'
  Outage Branch = 22886 22832 '1'
{End contingency}
{Contingency}
  Contingency name = 'SCR-SX #2'
  Outage Branch = 22886 22832 '2'
{End contingency}
{Contingency}
  Contingency name = 'SCR BK80'
  Outage Branch = 22885 22888 '1'
  Outage Branch = 22886 22888 '1'
  Outage Branch = 22887 22888 '1'
{End contingency}
{Contingency}
  Contingency name = 'SCR BK81'
  Outage Branch = 22885 22888 '2'
  Outage Branch = 22886 22888 '2'
  Outage Branch = 22887 22888 '2'
{End contingency}
{Contingency}
  Contingency name = 'ECO80'
  Outage Branch = 22930 22934 '1'
  Outage Branch = 22931 22934 '1'
  Outage Branch = 22933 22934 '1'
{End contingency}
{Contingency}
  Contingency name = 'ECO80+ECO/BU Gen Drop'
```

```
  Outage Branch = 22930 22934 '1'
  Outage Branch = 22931 22934 '1'
  Outage Branch = 22933 22934 '1'
  Change Generation = 22942 'G1' 0
  Change Generation = 22945 'G2' 0
  Change Generation = 22895 'Q' 0
  Change Generation = 22907 'Q' 0
  Change Generation = 22908 'Q' 0
  Change Generation = 23053 'Q' 0
  Change Generation = 23054 'Q' 0
  Change Generation = 23055 'Q' 0
  Change Generation = 23100 'Q1' 0
  Change Generation = 23105 'Q1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23141 'T' 0
  Change Generation = 23144 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'ECO60'
  Outage Branch = 22931 22932 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'ECO60+360MW BU Gen Drop'
  Outage Branch = 22931 22932 '1'
  Change Generation = 22942 'G1' 0
  Change Generation = 22945 'G2' 0
  Change Generation = 22895 'Q' 0
  Change Generation = 22907 'Q' 0
  Change Generation = 22908 'Q' 0
  Change Generation = 23053 'Q' 0
  Change Generation = 23054 'Q' 0
  Change Generation = 23055 'Q' 0
{End contingency}
{Contingency}
  Contingency name = 'TL23001  '
  Outage Branch = 22716 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23002  '
  Outage Branch = 22716 24131 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23003  '
  Outage Branch = 22716 22232 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23004  '
  Outage Branch = 22716 22504 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23006  '
  Outage Branch = 22716 24131 '2'
{End contingency}
```

```
{Contingency}
  Contingency name = 'TL23007  '
  Outage Branch = 22844 24131 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23010  '
  Outage Branch = 22716 24131 '3'
{End contingency}
{Contingency}
  Contingency name = 'TL23011  '
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
  Outage Branch = 22261 22227 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23012  '
  Outage Branch = 22652 22232 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23013  '
  Outage Branch = 22652 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23014  '
  Outage Branch = 22261 22260 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23021  '
  Outage Branch = 22832 22464 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23022  '
  Outage Branch = 22464 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23023  '
  Outage Branch = 22464 22504 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23027  '
  Outage Branch = 22596 22504 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23028  '
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22596 22597 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23029  '
  Outage Branch = 22430 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'ES-Q72  '
```

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  Outage Branch = 22260 99125 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q72-TA #1 '
  Outage Branch = 99125 22844 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q72-TA #2 '
  Outage Branch = 99125 22844 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23040  '
  Outage Branch = 22609 20149 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23041  '
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23042 - OM-SY230'
  Outage Branch = 22771 22466 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL2304X - SY230-SG'
  Outage Branch = 22430 22771 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23045  '
  Outage Branch = 22998 22356 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23046  '
  Outage Branch = 22998 22356 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23047  '
  Outage Branch = 22984 22356 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23048  '
  Outage Branch = 22984 22356 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23050  '
  Outage Branch = 22356 20118 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23051  '
  Outage Branch = 22261 22832 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23052  '
  Outage Branch = 22844 24131 '1'
{End contingency}
```

```
{Contingency}
  Contingency name = 'TL23053'
  Outage Branch = 22652 22232 '2'
{End contingency}
{Contingency}
  Contingency name = 'SONGS Unit 2  '
  Change Generation = 24129 '2' 0
{End contingency}
{Contingency}
  Contingency name = 'SONGS Unit 3  '
  Change Generation = 24130 '3' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00682  '
  Outage Branch = 22884 22688 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00683  '
  Outage Branch = 22688 22404 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00685  '
  Outage Branch = 22884 22736 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00686  '
  Outage Branch = 22884 22540 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00686 + T337 Trip  '
  Outage Branch = 22884 22540 '1'
  Change Generation = 22082 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00687  '
  Outage Branch = 22084 22540 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00687 + T337 Trip  '
  Outage Branch = 22084 22540 '1'
  Change Generation = 22082 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'ML60  '
  Outage Branch = 22464 22461 '1'
{End contingency}
{Contingency}
  Contingency name = 'ML61  '
  Outage Branch = 22464 22460 '2'
{End contingency}
{Contingency}
  Contingency name = 'ML70  '
  Outage Branch = 22456 22464 '1'
{End contingency}
```

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{Contingency}
  Contingency name = 'ML71 '
  Outage Branch = 22456 22464 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL00629  '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL00629 + KU Gen Trip '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00626  '
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00625  '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06923  '
  Outage Branch = 22040 22104 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL06923 + KU Gen Trip  '
  Outage Branch = 22040 22104 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'TL06904  '
  Outage Branch = 22416 22004 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06914  '
  Outage Branch = 22416 22408 '1'
{End contingency}
{Contingency}
  Contingency name = 'C493 Gen Tie'
  Change Generation = 23314 'C1' 0
  Change Generation = 23318 'C1' 0
{End contingency}
```

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{Contingency}
  Contingency name = 'C496 Gen Tie'
  Change Generation = 23232 'C1' 0
  Change Generation = 23233 'C1' 0
  Change Generation = 23234 'C1' 0
  Change Generation = 23235 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C501 Gen Tie'
  Change Generation = 23250 'C1' 0
  Change Generation = 23252 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C509 Gen Tie'
  Change Generation = 23320 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'C510 Gen Tie'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
{End contingency}
{Contingency}
  Contingency name = 'TL00624  '
  Outage Branch = 22208 22364 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00630  '
  Outage Branch = 22208 22336 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL00631  '
  Outage Branch = 22208 22408 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06925  '
  Outage Branch = 22306 22208 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL06938(CalpkEC Trip)'
  Change Generation = 22150 '1' 0
{End contingency}

[End]
```

Light Load Category C (including Delivery Network Upgrades) Contingency List Used for Post Transient Voltage and Reactive Power Deficiency Analyses (VSAT v10.0)

[VSAT 10.0 Contingency]

{Contingency}
  Contingency name = 'IV-C493+IV-ECO'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22360 23310 '1'
{End contingency}
{Contingency}
  Contingency name = 'IV-C493+IV-ECO+1400MW IV230 Gen Trip'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22360 23310 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q159A T183 T215 Double Gen Tie Trip'
  Change Generation = 23100 'Q1' 0
  Change Generation = 23105 'Q1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23141 'T' 0
  Change Generation = 23144 'T' 0
{End contingency}
{Contingency}
  Contingency name = 'TL23022/23'
  Outage Branch = 22464 22504 '1'
  Outage Branch = 22464 22504 '2'
{End contingency}
{Contingency}
  Contingency name = 'TL23022/23+1400 IV230 Gen Trip'

```
  Outage Branch = 22464 22504 '1'
  Outage Branch = 22464 22504 '2'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23021/41'
  Outage Branch = 22832 22464 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23021/41+1400 IV230 Gen Trip'
  Outage Branch = 22832 22464 '1'
  Outage Branch = 22832 22467 '1'
  Outage Branch = 22356 23293 '1'
  Change Generation = 23298 'C1' 0
  Change Generation = 23299 'C1' 0
  Change Generation = 23131 'T' 0
  Change Generation = 23134 'T' 0
  Change Generation = 23004 'Q1' 0
  Change Generation = 23009 'Q2' 0
  Change Generation = 23014 'Q3' 0
  Change Generation = 23255 'T' 0
  Change Generation = 23265 'T' 0
  Change Generation = 23019 'Q1' 0
  Change Generation = 23024 'Q2' 0
  Change Generation = 23029 'Q3' 0
  Change Generation = 23034 'Q4' 0
  Change Generation = 23039 'Q5' 0
  Change Generation = 23044 'Q6' 0
  Outage Branch = 22356 23050 '1'
  Outage Branch = 22356 23052 '1'
{End contingency}
{Contingency}
  Contingency name = 'TL23051-23011'
  Outage Branch = 22261 22832 '1'
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
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  Outage Branch = 22261 22227 '1'
{End contingency}
{Contingency}
  Contingency name = '23014-23015'
  Outage Branch = 22261 22260 '1'
  Outage Branch = 22261 22260 '2'
{End contingency}
{Contingency}
  Contingency name = '23028-23027'
  Outage Branch = 22596 22597 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22596 22504 '1'
{End contingency}
{Contingency}
  Contingency name = '23011-23003'
  Outage Branch = 22716 22232 '1'
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
  Outage Branch = 22261 22227 '1'
{End contingency}
{Contingency}
  Contingency name = '23011-13806'
  Outage Branch = 22227 22232 '1'
  Outage Branch = 22227 22716 '1'
  Outage Branch = 22261 22227 '1'
  Outage Branch = 22228 22632 '1'
{End contingency}
{Contingency}
  Contingency name = '23001-13805'
  Outage Branch = 22716 22504 '1'
  Outage Branch = 22632 22048 '1'
{End contingency}
{Contingency}
  Contingency name = '23010-23002'
  Outage Branch = 22716 24131 '1'
  Outage Branch = 22716 24131 '3'
{End contingency}
{Contingency}
  Contingency name = '23004-23001'
  Outage Branch = 22716 22504 '1'
  Outage Branch = 22716 22504 '2'
{End contingency}
{Contingency}
  Contingency name = '23052-23007'
  Outage Branch = 22844 24131 '1'
  Outage Branch = 22844 24131 '2'
  Outage Branch = 22836 22848 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/626/6923  '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
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  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22040 22104 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/626/6923 + KU Gen Trip '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22040 22104 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/629  '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/629 + KU Gen Trip '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/6914/6904  '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
```

```
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626/6914/6904 + KU Gen Trip '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626 '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL625/626 + KU Gen Trip '
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Outage Branch = 22064 22168 '1'
  Outage Branch = 22064 22736 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6923  '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22104 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6923 + KU Gen Trip '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22104 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6914/6904 '
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
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  Outage Branch = 22324 22328 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/6914/6904 + KU Gen Trip'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22416 22408 '1'
  Outage Branch = 22416 22004 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/625'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL629/625 + KU Gen Trip'
  Outage Branch = 22072 22104 '1'
  Outage Branch = 22072 22328 '1'
  Outage Branch = 22072 22902 '1'
  Outage Branch = 22168 22328 '1'
  Outage Branch = 22324 22328 '1'
  Outage Branch = 22040 22044 '1'
  Outage Branch = 22168 22044 '1'
  Outage Branch = 22416 22044 '1'
  Change Generation = 22915 '1' 0
{End contingency}
{Contingency}
  Contingency name = 'OT-1N'
  Outage Branch = 22430 22596 '1'
  Outage Branch = 22592 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'OT-1T'
  Outage Branch = 22430 22596 '1'
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22596 22597 '1'
{End contingency}
{Contingency}
  Contingency name = 'OT-1S'
  Outage Branch = 22430 22597 '1'
  Outage Branch = 22597 22504 '1'
```

```
  Outage Branch = 22596 22597 '1'
  Outage Branch = 22592 22596 '2'
{End contingency}
{Contingency}
  Contingency name = 'OT-2S'
  Outage Branch = 22596 22504 '1'
  Outage Branch = 22592 22596 '2'
{End contingency}
{Contingency}
  Contingency name = 'OT-2N'
  Outage Branch = 22652 22596 '1'
  Outage Branch = 22430 22596 '1'
{End contingency}
{Contingency}
  Contingency name = 'OT-2T'
  Outage Branch = 22652 22596 '1'
  Outage Branch = 22596 22504 '1'
{End contingency}
{Contingency}
  Contingency name = '23041-23042'
  Outage Branch = 22609 22467 '1'
  Outage Branch = 22832 22467 '1'
  Outage Branch = 22609 22466 '1'
  Outage Branch = 22771 22466 '1'
{End contingency}
{Contingency}
  Contingency name = 'SX-23T'
  Outage Branch = 22832 22828 '1'
  Outage Branch = 22832 22467 '1'
  Outage Branch = 22609 22467 '1'
{End contingency}
{Contingency}
  Contingency name = '23012-23053'
  Outage Branch = 22652 22232 '1'
  Outage Branch = 22652 22232 '2'
{End contingency}
{Contingency}
  Contingency name = 'MS-1T'
  Outage Branch = 22504 22500 '1'
  Outage Branch = 22597 22504 '1'
  Outage Branch = 22596 22597 '1'
  Outage Branch = 22430 22597 '1'
{End contingency}
{Contingency}
  Contingency name = 'SWPL-IV82'
  Outage Branch = 22356 22360 '3'
  Outage Branch = 22360 22930 '1'
  Outage Branch = 22609 20149 '1'
  Change Generation = 20187 '1' 0
  Change Generation = 22997 '1' 0
  Change Generation = 22996 '1' 0
  Change Generation = 22981 '1' 0
  Change Generation = 22982 '1' 0
  Change Generation = 22983 '1' 0
```

```
{End contingency}
{Contingency}
  Contingency name = 'IV-NG-IV81'
  Outage Branch = 22356 22360 '2'
  Outage Branch = 22536 22360 '1'
{End contingency}
{Contingency Don't Run}
  Contingency name = 'TL00624/00630'
  Outage Branch = 22208 22364 '1'
  Outage Branch = 22208 22336 '1'
{End contingency}
{Contingency}
  Contingency name = 'Q72-TA #1 AND #2'
  Outage Branch = 99125 22844 '1'
  Outage Branch = 99125 22844 '2'
{End contingency}
{Contingency}
  Contingency name = 'Q72-ES #1 AND #2'
  Outage Branch = 22260 99125 '1'
  Outage Branch = 22260 99125 '2'
{End contingency}
{Contingency}
  Contingency name = 'IV-NG #1 AND #2'
  Outage Branch = 22536 22360 '1'
  Outage Branch = 22536 22360 '2'
{End contingency}
{Contingency}
  Contingency name = 'OMG-C574'
  Outage Branch = 22609 23160 '1'
  Outage Branch = 22609 23160 '2'
{End contingency}
{Contingency}
  Contingency name = 'C574-MLMS3TP+C574-MLSXTAP'
  Outage Branch = 23160 22467 '1'
  Outage Branch = 23160 22466 '2'
{End contingency}
{Contingency}
  Contingency name = 'MLSXTap-SX+ML-C565'
  Outage Branch = 22927 22464 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'MLSXTap-SX+SX-C565'
  Outage Branch = 22832 22927 '1'
  Outage Branch = 22832 22467 '1'
{End contingency}
{Contingency}
  Contingency name = 'EA-SA #1 and #2'
  Outage Branch = 22716 22232 '1'
  Outage Branch = 22716 22232 '3'
{End contingency}
{Contingency}
  Contingency name = 'OM-SY230+OM-C574'
  Outage Branch = 22771 22609 '1'
```

```
  Outage Branch = 22609 23160 '1'
{End contingency}
{Contingency}
  Contingency name = 'OM-SY230+C574-MLMS3TAP'
  Outage Branch = 22771 22609 '1'
  Outage Branch = 23160 22466 '2'
{End contingency}

[End]
```

Appendix K-1

Post-Transient Voltage Stability
and
Reactive Power Deficiency Results

Light Load Pre-Case

c1c2-ll-pre-r12_IV-ECO-RAS-slo_pt.log

The following buses had changes greater than 5 percent:

Q159A_C1	34.5	35.74	33.14	-2.60	-7.28	22	5PercentChangeBusV
Q159A_C2	34.5	35.30	33.14	-2.16	-6.13	22	5PercentChangeBusV
Q159A_G1	0.7	0.72	0.66	-0.06	-8.53	22	5PercentChangeBusV
Q78_1A1Q	0.5	0.49	0.52	0.03	5.62	22	5PercentChangeBusV
Q78_1A2Q	0.5	0.49	0.52	0.03	5.62	22	5PercentChangeBusV
Q78_1B1Q	0.5	0.49	0.52	0.03	5.62	22	5PercentChangeBusV
Q1241B1	34.5	33.08	34.79	1.71	5.16	22	5PercentChangeBusV
Q1242A1Q	0.5	0.48	0.51	0.03	5.90	22	5PercentChangeBusV
Q1242A2Q	0.5	0.48	0.51	0.03	5.90	22	5PercentChangeBusV
Q1242B1Q	0.5	0.48	0.51	0.03	5.90	22	5PercentChangeBusV
Q1243A1Q	0.5	0.47	0.51	0.04	7.57	22	5PercentChangeBusV
Q1243A2Q	0.5	0.47	0.51	0.04	7.57	22	5PercentChangeBusV
Q1243B1Q	0.5	0.47	0.51	0.04	7.64	22	5PercentChangeBusV

WARNING: 13 buses with 5 percent or greater change

****

c1c2-ll-pre-r12_IVECO-RASX-slo_pt.log

The following buses had changes greater than 5 percent:

Q159A_C1	34.5	35.74	33.16	-2.58	-7.22	22	5PercentChangeBusV
Q159A_C2	34.5	35.30	33.16	-2.14	-6.07	22	5PercentChangeBusV
Q159A_G1	0.7	0.72	0.66	-0.06	-8.47	22	5PercentChangeBusV
Q78_1A1Q	0.5	0.49	0.53	0.03	6.62	22	5PercentChangeBusV
Q78_1A2Q	0.5	0.49	0.53	0.03	6.62	22	5PercentChangeBusV
Q78_1B1Q	0.5	0.49	0.53	0.03	6.62	22	5PercentChangeBusV
Q1241B1	34.5	33.08	35.12	2.04	6.16	22	5PercentChangeBusV
Q1241B1T	13.8	13.25	14.05	0.79	5.99	22	5PercentChangeBusV
Q1241B1i	13.8	13.25	14.05	0.79	5.99	22	5PercentChangeBusV
Q1242A1Q	0.5	0.48	0.51	0.03	6.91	22	5PercentChangeBusV
Q1242A1T	13.8	13.25	14.05	0.79	5.99	22	5PercentChangeBusV
Q1242A1i	13.8	13.25	14.05	0.79	5.99	22	5PercentChangeBusV
Q1242A2Q	0.5	0.48	0.51	0.03	6.91	22	5PercentChangeBusV
Q1242B1Q	0.5	0.48	0.51	0.03	6.91	22	5PercentChangeBusV
Q1243A1Q	0.5	0.47	0.51	0.04	8.59	22	5PercentChangeBusV
Q1243A1Q	34.5	33.19	35.12	1.93	5.81	22	5PercentChangeBusV
Q1243A2Q	0.5	0.47	0.51	0.04	8.59	22	5PercentChangeBusV
Q1243A2Q	34.5	33.19	35.12	1.93	5.81	22	5PercentChangeBusV
Q1243B1Q	34.5	33.17	35.12	1.95	5.88	22	5PercentChangeBusV
Q1243B1Q	0.5	0.47	0.51	0.04	8.66	22	5PercentChangeBusV

WARNING: 20 buses with 5 percent or greater change

****

c1c2-ll-pre-r12_PaloVerde-g1_pt.log

The following buses had changes greater than 5 percent:

PALOVRD2	24.0	22.60	23.99	1.39	6.13	14	5PercentChangeBusV

WARNING: 1 buses with 5 percent or greater change

****

Appendix K-2

Post-Transient Voltage Stability
and
Reactive Power Deficiency Results

Light Load Post-Case

c1c2-ll-pstup-r15_IV-C493-line-slo_pt.log

The following buses had changes greater than 5 percent:

C510_3	34.5	36.44	34.50	-1.94	-5.31	22	5PercentChangeBusV
C510_4	34.5	36.44	34.50	-1.94	-5.31	22	5PercentChangeBusV
C510_G1	0.2	0.21	0.20	-0.01	-5.49	22	5PercentChangeBusV
C510_G2	0.2	0.21	0.20	-0.01	-5.49	22	5PercentChangeBusV
Q1241B1	34.5	32.85	34.50	1.65	5.03	22	5PercentChangeBusV

WARNING: 5 buses with 5 percent or greater change
****

c1c2-ll-pstup-r15_IV-ECO-RAS-slo_pt.log

The following buses had changes greater than 5 percent:

C510_1	34.5	34.91	36.85	1.94	5.55	22	5PercentChangeBusV
C510_2	34.5	34.91	36.85	1.94	5.55	22	5PercentChangeBusV
Q159A_C1	34.5	35.79	33.98	-1.81	-5.05	22	5PercentChangeBusV
Q159A_G1	0.7	0.72	0.68	-0.04	-6.20	22	5PercentChangeBusV
Q78_1A1Q	0.5	0.49	0.52	0.03	6.49	22	5PercentChangeBusV
Q78_1A2Q	0.5	0.49	0.52	0.03	6.49	22	5PercentChangeBusV
Q78_1B1Q	0.5	0.49	0.52	0.03	6.49	22	5PercentChangeBusV
Q1241B1	34.5	32.85	34.65	1.80	5.48	22	5PercentChangeBusV
Q1241B1T	13.8	13.16	13.86	0.70	5.30	22	5PercentChangeBusV
Q1241B1i	13.8	13.16	13.86	0.70	5.30	22	5PercentChangeBusV
Q1242A1Q	0.5	0.48	0.51	0.03	6.26	22	5PercentChangeBusV
Q1242A1T	13.8	13.16	13.86	0.70	5.30	22	5PercentChangeBusV
Q1242A1i	13.8	13.16	13.86	0.70	5.30	22	5PercentChangeBusV
Q1242A2Q	0.5	0.48	0.51	0.03	6.26	22	5PercentChangeBusV
Q1242B1Q	0.5	0.48	0.51	0.03	6.26	22	5PercentChangeBusV
Q1243A1Q	0.5	0.47	0.51	0.04	7.93	22	5PercentChangeBusV
Q1243A1Q	34.5	32.95	34.65	1.69	5.13	22	5PercentChangeBusV
Q1243A2Q	0.5	0.47	0.51	0.04	7.93	22	5PercentChangeBusV
Q1243A2Q	34.5	32.95	34.65	1.69	5.13	22	5PercentChangeBusV
Q1243B1Q	34.5	32.93	34.65	1.71	5.20	22	5PercentChangeBusV
Q1243B1Q	0.5	0.47	0.51	0.04	8.00	22	5PercentChangeBusV

WARNING: 21 buses with 5 percent or greater change

****

c1c2-ll-pstup-r15_IVECO-RASX-slo_pt.log

The following buses had changes greater than 5 percent:

C510_1	34.5	34.91	37.04	2.13	6.09	22	5PercentChangeBusV
C510_2	34.5	34.91	37.04	2.13	6.09	22	5PercentChangeBusV
Q159A_G1	0.7	0.72	0.68	-0.04	-6.13	22	5PercentChangeBusV
Q78_1A1Q	0.5	0.49	0.52	0.03	7.03	22	5PercentChangeBusV
Q78_1A2Q	0.5	0.49	0.52	0.03	7.03	22	5PercentChangeBusV
Q78_1B1Q	0.5	0.49	0.52	0.03	7.03	22	5PercentChangeBusV
Q1241B1	34.5	32.85	34.82	1.98	6.02	22	5PercentChangeBusV
Q1241B1T	13.8	13.16	13.93	0.77	5.84	22	5PercentChangeBusV
Q1241B1i	13.8	13.16	13.93	0.77	5.84	22	5PercentChangeBusV
Q1242A1Q	0.5	0.48	0.51	0.03	6.80	22	5PercentChangeBusV
Q1242A1T	13.8	13.16	13.93	0.77	5.84	22	5PercentChangeBusV
Q1242A1i	13.8	13.16	13.93	0.77	5.84	22	5PercentChangeBusV
Q1242A2Q	0.5	0.48	0.51	0.03	6.80	22	5PercentChangeBusV

Q1242B1Q	0.5	0.48	0.51	0.03	6.80	22	5PercentChangeBusV
Q1243A1Q	0.5	0.47	0.51	0.04	8.49	22	5PercentChangeBusV
Q1243A1Q	34.5	32.95	34.82	1.87	5.67	22	5PercentChangeBusV
Q1243A2Q	0.5	0.47	0.51	0.04	8.49	22	5PercentChangeBusV
Q1243A2Q	34.5	32.95	34.82	1.87	5.67	22	5PercentChangeBusV
Q1243B1Q	34.5	32.93	34.82	1.89	5.74	22	5PercentChangeBusV
Q1243B1Q	0.5	0.47	0.51	0.04	8.55	22	5PercentChangeBusV

WARNING: 20 buses with 5 percent or greater change

****

c1c2-ll-pstup-r15_MLECO-RASX-line-slo_pt.log

The following buses had changes greater than 5 percent:

C510_3	34.5	36.44	34.50	-1.94	-5.31	22	5PercentChangeBusV
C510_4	34.5	36.44	34.50	-1.94	-5.31	22	5PercentChangeBusV
C510_G1	0.2	0.21	0.20	-0.01	-5.49	22	5PercentChangeBusV
C510_G2	0.2	0.21	0.20	-0.01	-5.49	22	5PercentChangeBusV
Q1241B1	34.5	32.85	34.50	1.65	5.03	22	5PercentChangeBusV

WARNING: 5 buses with 5 percent or greater change
****

Appendix K-3

Post-Transient Voltage Stability
and
Reactive Power Deficiency Results

Heavy Summer Pre-Case

c1c2-hs-pre-r12_C493-CE-slo_pt.log

The following buses had changes greater than 5 percent:
SUNCREST 500.0 526.63 496.53 -30.11 -5.72 22 5PercentChangeBusV

WARNING: 1 buses with 5 percent or greater change

****

c1c2-hs-pre-r12_IV-ECO-RAS-slo_pt.log

The following buses had changes greater than 5 percent:
Q159A_C1 34.5 35.82 33.81 -2.01 -5.61 22 5PercentChangeBusV
Q159A_G1 0.7 0.72 0.68 -0.05 -6.67 22 5PercentChangeBusV
Q1243A1Q 0.5 0.47 0.50 0.03 5.27 22 5PercentChangeBusV
Q1243A2Q 0.5 0.47 0.50 0.03 5.27 22 5PercentChangeBusV
Q1243B1Q 0.5 0.47 0.50 0.03 5.34 22 5PercentChangeBusV

WARNING: 5 buses with 5 percent or greater change

****

c1c2-hs-pre-r12_IVECO-RASX-slo_pt.log

The following buses had changes greater than 5 percent:
Q159A_C1 34.5 35.82 33.81 -2.00 -5.59 22 5PercentChangeBusV
Q159A_G1 0.7 0.72 0.68 -0.05 -6.66 22 5PercentChangeBusV
Q1243A1Q 0.5 0.47 0.50 0.03 5.55 22 5PercentChangeBusV
Q1243A2Q 0.5 0.47 0.50 0.03 5.55 22 5PercentChangeBusV
Q1243B1Q 0.5 0.47 0.50 0.03 5.62 22 5PercentChangeBusV

WARNING: 5 buses with 5 percent or greater change

****

c1c2-hs-pre-r12_MLECO-RASX-line-slo_pt.log

The following buses had changes greater than 5 percent:
BORREGO 69.0 70.34 65.86 -4.48 -6.37 22 5PercentChangeBusV
BORREGO 12.5 13.02 12.17 -0.85 -6.52 22 5PercentChangeBusV
CREELMAN 69.0 70.63 66.97 -3.66 -5.18 22 5PercentChangeBusV
MIGUEL 12.0 10.93 10.37 -0.56 -5.10 22 5PercentChangeBusV
MIGUEL 230.0 230.27 218.72 -11.55 -5.02 22 5PercentChangeBusV
MIGUEL 500.0 514.83 486.76 -28.06 -5.45 22 5PercentChangeBusV
MIGUELMP 500.0 512.69 486.55 -26.14 -5.10 22 5PercentChangeBusV
NARROWS 69.0 70.27 66.04 -4.23 -6.02 22 5PercentChangeBusV
SYCAMORE 230.0 229.53 217.37 -12.16 -5.30 22 5PercentChangeBusV
WARNERS 69.0 70.07 66.47 -3.61 -5.15 22 5PercentChangeBusV
SUNCREST 230.0 234.40 221.62 -12.78 -5.45 22 5PercentChangeBusV
SUNCREST 12.0 11.03 10.44 -0.59 -5.31 22 5PercentChangeBusV
SNCRSTMP 500.0 522.57 494.81 -27.76 -5.31 22 5PercentChangeBusV
WARNERS 12.5 12.58 11.91 -0.67 -5.30 22 5PercentChangeBusV
T337_HV 69.0 70.35 65.84 -4.51 -6.41 22 5PercentChangeBusV
T337_G 0.2 0.21 0.20 -0.01 -6.99 22 5PercentChangeBusV
T337_MV 34.5 34.84 32.38 -2.46 -7.05 22 5PercentChangeBusV
T337_T 34.5 35.38 32.95 -2.42 -6.85 22 5PercentChangeBusV

S480	69.0	70.34	65.86	-4.48	-6.37	22	5PercentChangeBusV
S480_1	12.5	12.71	11.90	-0.81	-6.37	22	5PercentChangeBusV
S480_2	12.5	12.71	11.90	-0.81	-6.37	22	5PercentChangeBusV
S480_3	12.5	12.71	11.90	-0.81	-6.37	22	5PercentChangeBusV
S480G1	0.5	0.49	0.46	-0.03	-6.37	22	5PercentChangeBusV
S480G2	0.5	0.49	0.46	-0.03	-6.37	22	5PercentChangeBusV

Appendix K-4

Post-Transient Voltage Stability
and
Reactive Power Deficiency Results

Heavy Summer Post-Case

c1c2-hs-pstup-r15_IV-ECO-RAS-slo_pt.log

The following buses had changes greater than 5 percent:

C510_1	34.5	33.25	34.97	1.72	5.18	22	5PercentChangeBusV
C510_2	34.5	33.25	34.97	1.72	5.18	22	5PercentChangeBusV
Q159A_C1	34.5	35.82	34.00	-1.83	-5.10	22	5PercentChangeBusV
Q159A_G1	0.7	0.72	0.68	-0.04	-6.15	22	5PercentChangeBusV
Q78_1A1Q	0.5	0.49	0.52	0.03	5.43	22	5PercentChangeBusV
Q78_1A2Q	0.5	0.49	0.52	0.03	5.43	22	5PercentChangeBusV
Q78_1B1Q	0.5	0.49	0.52	0.03	5.43	22	5PercentChangeBusV
Q1243A1Q	0.5	0.47	0.50	0.03	6.60	22	5PercentChangeBusV
Q1243A2Q	0.5	0.47	0.50	0.03	6.60	22	5PercentChangeBusV
Q1243B1Q	0.5	0.47	0.50	0.03	6.66	22	5PercentChangeBusV

WARNING: 10 buses with 5 percent or greater change

****

c1c2-hs-pstup-r15_IV-RASX-dlo_pt.log

The following buses had changes greater than 10 percent:

Q1243B1Q	0.5	0.47	0.52	0.05	10.06	22	10PercentChangeBusV

WARNING: 1 buses with 10 percent or greater change

****

c1c2-hs-pstup-r15_IVECO-RASX-slo_pt.log

The following buses had changes greater than 5 percent:

C510_1	34.5	33.25	35.12	1.87	5.63	22	5PercentChangeBusV
C510_2	34.5	33.25	35.12	1.87	5.63	22	5PercentChangeBusV
Q159A_G1	0.7	0.72	0.68	-0.04	-5.98	22	5PercentChangeBusV
Q78_1A1Q	0.5	0.49	0.52	0.03	5.89	22	5PercentChangeBusV
Q78_1A2Q	0.5	0.49	0.52	0.03	5.89	22	5PercentChangeBusV
Q78_1B1Q	0.5	0.49	0.52	0.03	5.89	22	5PercentChangeBusV
Q1242A1Q	0.5	0.48	0.51	0.03	5.40	22	5PercentChangeBusV
Q1242A2Q	0.5	0.48	0.51	0.03	5.40	22	5PercentChangeBusV
Q1242B1Q	0.5	0.48	0.51	0.03	5.40	22	5PercentChangeBusV
Q1243A1Q	0.5	0.47	0.51	0.03	7.06	22	5PercentChangeBusV
Q1243A2Q	0.5	0.47	0.51	0.03	7.06	22	5PercentChangeBusV
Q1243B1Q	0.5	0.47	0.51	0.03	7.13	22	5PercentChangeBusV

WARNING: 12 buses with 5 percent or greater change

****

Appendix L

Steady-State Reactive Power Deficiency Results

Study Assumptions

Reactive power deficiency analysis will be performed for asynchronous generating facilities only.
Power flow solution options enabled: load tap changers, static VAR devices (with online status only), phase shifting transformers.

Pre-contingency bus voltage are within SDG&E-accepted operating limits.
In order to analyze C1C2 Projects in Phase II under the most stressed conditions where minimal reactive support is available, existing or higher-queued generators connecting to the POI under study are not dispatched.
Cluster projects are dispatched and analyzed by geographic region or common POIs.
Light load base cases are used for this reactive power deficiency analysis.

Voltage Min/Max Violations

The reactive power deficiency analysis results indicate that the addition of the C1C2 Projects did not cause any SDG&E system voltages to exceed minimum and maximum thresholds.

Voltage Deviation Summary [pu]

NUMBER	NAME	KV	CONTINGENCY DESCRIPTION	CONTINGENCY CATEGORY	c1c2_ll_pre_bu_pf_rev1	c1c2_ll_pst_bu_pf_rev1	c1c2_ll_pre_iv_pf_rev1	c1c2_ll_pst_c493_pf_rev1	c1c2_ll_pst_iv_pf_rev1
22930	ECO	500	IV-ECO SPS+IVGens+IV-ROA	B	-0.036	-0.045	-0.058	-0.057	-0.051
22930	ECO	500	IV-ECO SPS+IVGens+OM-TJI	B	-0.038	-0.046	-0.059	-0.059	-0.053

Pre-existing voltage violation

The reactive power deficiency analysis results indicate that the addition of the C1C2 Projects in Phase II did not cause new voltage deviations greater than the allowable 5% following contingencies. It is important to recognize that other potentially more stressed scenarios including severe renewable intermittency due to unforeseen weather conditions are not considered for this analysis. Note that if, in real-time operation, reactive compensation or corrective action schemes are not designed to meet SDG&E's specified voltage schedule under all system conditions, the project(s) may not be able to fully dispatch. Therefore, asynchronous generator projects are urged to construct generators with 0.95 lagging to 0.95 leading power factor range capability. If needed, power factor correction and voltage control equipment such as capacitors, inductors, SVCs among others should be installed either by the Generator or as part of the facilities installed by SDG&E at the Generator's expense. This provision is pursuant to LGIA Articles 9.3 and 9.6.1 and 10.5.

Synchronous generating facilities will be required to provide 0.90 lagging to 0.95 leading power factor measured at the generator terminals per LGIA Article 9.6.1. The models provided by the Interconnection Customers for the synchronous generators in C1C2 confirm this capability.