BINGHAM

October 13, 2011

Via FedEx

Eric Solorio
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Quail Brush Generation Project, 2011-AFC-3
California Independent System Operator Phase II
Interconnection Study, Individual Project Report

Dear Mr. Solorio:

Per your request, Quail Brush Genco, LLC is submitting the enclosed document for filing in the docket relating to the Application for Certification of the Quail Brush Generation Project, 2011-AFC-3. The document is a report by California Independent System Operator ("CAISO") which is entitled "CIC2 Projects Phase II Appendix A - C565 Individual Project Report" and is dated August 24, 2011. Since this report contains information which is considered confidential under the CAISO tariff, selected portions of the report have been redacted. *See* CAISO Tariff Appendix Y, Section 13.1.

If you have any questions concerning this filing, please contact me at the address above.

Sincerely yours,
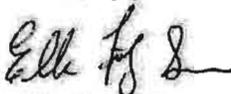
Ella Foley Gannon

Encl.

cc w/encl: Docket Unit, California Energy Commission

A/74546152.1/3321047-0000354112

C1C2 Projects Phase II

Appendix A – C565

Individual Project Report

Cogentrix Energy, LLC

Quail Brush Power Project

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

Table of Contents

Attachments:

1. Executive Summary

Cogentrix Energy LLC, an Interconnection Customer (IC), has submitted a completed Interconnection Request (IR) to the California Independent System Operator (CAISO) for their proposed Quail Brush Power Project (Project) interconnecting to the CAISO Controlled Grid. (Subsequent to the Phase I Study, the ownership of the Project was transferred from ENPEX Corporation and the project name was changed from San Diego Community Power Project 2.) The revised Project is a natural gas reciprocating engine generation facility with a net output of 100 MW to the Point of Interconnection (POI), which is in San Diego, California. The IC requested a revised POI for the Project to be at a new 230 kV switchyard looping into San Diego Gas & Electric Company's (SDG&E's) Miguel-Mission 230 kV transmission line (TL23023). The revised proposed Commercial Operation Date (COD) of the Project is May 15, 2014. The Project occupies Queue Position 565 in the CAISO Queue.

The IC elected Full Capacity Deliverability Status.

In accordance with Federal Energy Regulatory Commission (FERC) approved Generator Interconnection Procedures (GIP) for Interconnection Requests in a Queue Cluster Window (ISO Appendix Y), this project was one of the "Cluster 2" projects. SDG&E, as the Participating Transmission Owner (PTO) under the direction of the CAISO, performed the Reliability Study for this Phase II Study for Cluster 1, Cluster 2, and the Small Generator Interconnection Procedures Transition Cluster projects (C1C2 Projects).

The Group Report has been prepared separately identifying the combined impacts of all the C1C2 Projects on the CAISO Controlled Grid. This Individual Project Report focuses only on the impacts of this project.

The report provides the following:

    A. Transmission system impacts caused by this project,

    B. System reinforcements necessary to mitigate the adverse impacts caused by this project under various system conditions, and

    C. Required facilities and a non-binding, good faith estimate of this project's cost responsibility and time to construct these facilities.

The Phase II Study concluded the following:

    A. Transmission system impacts caused by this project

        1. The Project causes impacts to the transmission system as identified in the Deliverability Assessment.

            a. Multiple Category B overloads in the SDG&E transmission system

            b. Multiple Category B and C overloads in the SCE transmission systems

2.   The Reliability Study steady-state results indicate that the Project, evaluated with the C1C2 Projects, causes adverse impacts to the transmission system even with the associated C1C2 Projects' Delivery Network Upgrades modeled. These results are based upon system limitations as discussed in the Group Report.

    a.   The results of the steady-state thermal analysis identified one overloaded facility in the SDG&E transmission system:

        Bernardo-Felicita Tap 69 kV line

    b.   The Project did not cause any adverse impacts to the steady-state voltage performance of the SDG&E transmission system.

    c.   Per LGIA 9.6.1, synchronous generators are required to provide reactive power capability range of 0.90 lagging to 0.95 leading, measured at the generator terminals. As such, the steady-state reactive power capability test for these types of generators is not necessary since this capability is an inherent attribute.

3.   The short circuit analysis results indicate that no existing or planned (if planned rating is known) SDG&E transmission circuit breakers were overstressed due to the addition of the Project. Also, no Affected Systems were identified in the short circuit analysis as a result of the interconnection of the Project.

4.   Transient stability results concluded that the addition of the Project would not cause the SDG&E transmission system to become unstable following the select disturbances studied.

5.   Post-transient voltage stability analysis indicated that, under studied conditions and system configuration (including the C1C2 Projects' Delivery Network Upgrades), cases including the Project 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.

6.   The post-transient reactive power deficiency analysis indicated that, under the studied conditions and system configuration (including the C1C2 Projects' Delivery Network Upgrades), cases including the Project did not cause post-transient reactive power deficiency on the SDG&E transmission system.

7.   It appears that the energy produced by this Project will not cause an Impairment to the tax-exempt status of the Local Furnishing Bonds (LFBs) involving the Amended Annual Net Importer Test. However, if the energy from the Project is not sold exclusively to SDG&E, then an Impairment involving the Character Test may occur and if so, the IC is required to meet either of the two following requirements:

      a.   Pay any costs SDG&E incurs in mitigating the Impairment, and

      b.   Obtain a FERC order under Sections 211/213 of the Federal Power Act compelling SDG&E to provide transmission service, including interconnection service.

B.   Adverse impacts identified by the study are mitigated by:

    1.   The following Delivery Network Upgrades, which must be constructed for the Project to be fully deliverable:

      a.   SDG&E System

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

        ii.   Reconductor Friars-Doublet Tap 138 kV line

      b.   SCE System

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

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

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

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

    2.   The following identified Reliability Network Upgrades:

      a.   SDG&E System

         i.   Implement an SPS to protect Bernardo-Felicita Tap 69 kV line

        ii.   Implement an SPS to protect Mission-Old Town 230 kV line

    3.   Dispatch constraints, as discussed in the Group Report, were implemented in order to fully dispatch the Project.

C.   Specification of required facilities, a non-binding, good faith estimate of the Project's cost responsibility and approximate time to construct the required facilities:

    1.   The non-binding, good faith cost estimate of the PTO's Interconnection Facilities[1] to interconnect the Project is approximately ████████, exclusive of ITCC[2]. The non-binding, good faith cost estimate for the Network

---

[1] The transmission facilities owned, controlled, or operated by the PTO from the Point of Change of Ownership to the Point of Interconnection necessary to physically and electrically interconnect the Project to the CAISO Controlled Grid.

[2] Income Tax Component of Contr bution

Upgrades[3] to interconnect the Project and be fully deliverable is approximately ███████████ on the SDG&E transmission system and ███████████ on the SCE transmission system.

2. The non-binding, good faith estimate of time to construct (license/permit, design, procure material, and construct) the facilities in the SDG&E system that are needed to interconnect the Project is approximately 60 months from the submittal of written authorization to proceed after the execution of the Large Generator Interconnection Agreement (LGIA).

---

[3] The transmission facilities, other than Interconnection Facilities, beyond the Point of Interconnection necessary to accommodate the interconnection of the Project to the CAISO Controlled Grid.

2.   Project and Interconnection Information

Table 2.1 provides general information about the Project.

Table 2.1: Project General Information

Project Location	San Diego, California
Number and Type of Generators	11 – 9.341 MW Reciprocating Engines
Interconnection Voltage	230 kV
Maximum Generator Output	102.749 MW
Generator Auxiliary Load	2.749 MW
Maximum Net Output to Grid	100 MW
Step-up Transformer	One (1) - 230/13.8 kV transformer, three phase, rated for 84/112/140 MVA with 10% impedance on 42 MVA base
Point of Interconnection	Miguel-Mission 230 kV Line (TL 23023) via a new 230 kV switchyard
Alternative Point of Interconnection	None
Commercial Operation Date	May 15, 2014

Figure 2.1 provides a map for the Project. Figure 2.2 shows the conceptual single line diagram of the Project and transmission facilities in the vicinity.

**Figure 2.1: Map of the Project Location**

Figure 2.2: Proposed Single Line Diagram
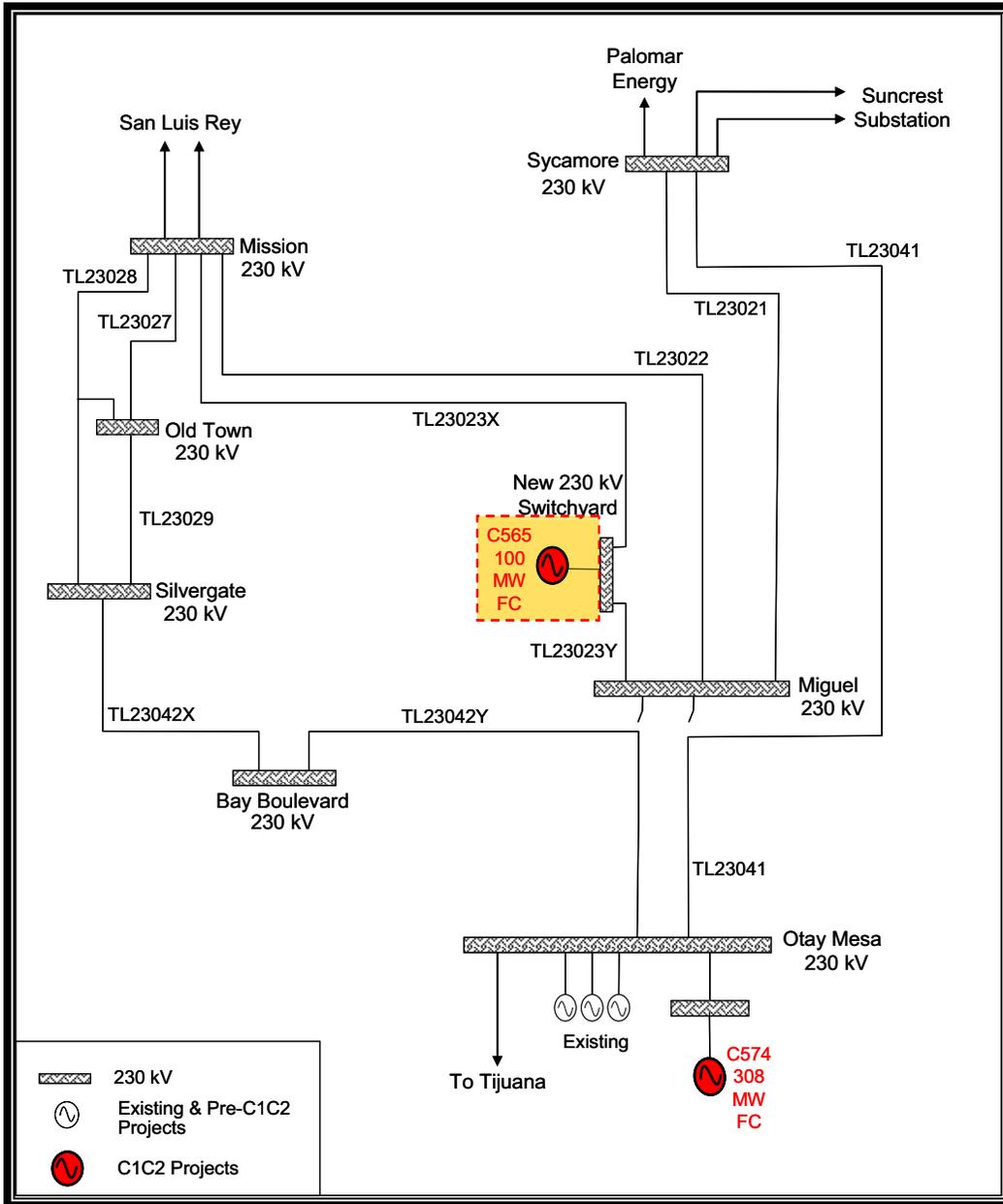
3.   Study Assumptions

For detailed assumptions, please refer to the Group Report. The following assumptions are only specific to this project:

A.   The requested In-Service Date of the Project is December 15, 2013.

B.   The expected Commercial Operation Date of the Project is May 15, 2014.

C.   The IC will engineer, procure, construct, own, and maintain its project facility.

4.   Deliverability Assessment

4.1   On-Peak Deliverability Assessment

CAISO performed an On-Peak Deliverability Assessment. The power flow study results for Category A, B, and C contingencies are detailed in the Group Report.

The Project contributes to the following overloads on the SDG&E transmission system.

Table 4.1: On-Peak Deliverability Assessment Results for SDG&E Area

Contingency	Overloaded Facilities
Category B	
Trip Escondido-Palomar 230 kV #1	Escondido-Palomar 230 kV #2
Trip Escondido-Palomar 230 kV #2	Escondido-Palomar 230 kV #1
Trip Old Town-Penasquitos 230 kV #1	Doublet Tap-Friars 138 kV #1

The Project contributes to the following overloads on the SCE transmission system.

Table 4.2: On-Peak Deliverability Assessment Results for SCE Area

Contingency	Overloaded Facilities
Category B	
Devers-RedBluff 500 kV Ckt 1	Devers-RedBluff 500 kV Ckt 2
Devers-RedBluff 500 kV Ckt 2	Devers-RedBluff 500 kV Ckt 1
Category C	
PaloVerde-ColoradoRiver 500 kV Ckt 1	Lugo-Victorville 500 kV Ckt 1
Lugo-Pisgah 500 kV Ckt 1&2	Lugo-Victorville 500 kV Ckt 1
Lugo-Pisgah 500 kV Ckt 1&2	Lugo-Majave 500 kV Ckt 1
ColoradoRiver-RedBluff 500 kV Ckt 1&2	N.Gila-ImperialValley 500 kV Ckt 1
ColoradoRiver-RedBluff 500 kV Ckt 1&2	Lugo-Victorville 500 kV Ckt 1
Devers-RedBluff 500 kV Ckt 1&2	North Gila-Imperial Valley 500 kV Ckt 1
Devers-RedBluff 500 kV Ckt 1&2	Lugo-Victorville 500 kV Ckt 1

4.2   Off-Peak Deliverability Assessment

A modified version of the 2014 Summer Off-Peak base case was created to perform the Off-Peak Deliverability Assessment of the C1C2 Projects. The assumptions to create this case are listed in the Group Report. The analysis concluded that the Project would not cause any criteria violations.

4.3   Operational Deliverability Assessment

The assumptions used to perform the operational Deliverability Assessment are presented in the Group Report. The table below shows the identified deliverability constraints and partial deliverability amounts for the Project.

Table 4.3: Deliverability Constraints and Partial Deliverability Allocation

Overloaded Facility									
Lugo - Victorville 500 kV line									
	Year								
	2012	2013	2014	2015	2016	2017	2018	2019	2020

5.   Reliability Study Steady-State Analysis

The Project was studied as part of the C1C2 Projects, the results of which can be found in the Group Report, Section 7.2, Reliability Study Results. The Project was modeled with the Network Upgrades identified in the Deliverability Assessment, the IV SPS, and dispatch constraints as noted in Section 7.2 of the Group Report.

5.1   Steady-State Thermal Overloads in SDG&E System

5.1.1   Bernardo-Felicita Tap 69 kV line

Under Light Load conditions and the N-2 contingency of the Escondido-Palomar 230 kV lines #1 and #2, the Project contributes to the 13% overload of the Bernardo-Felicita Tap 69 kV line. (Note that the Escondido-Palomar Energy 230 kV lines will be reconductored as a Delivery Network Upgrade identified in this study. The reconductoring of the lines does not protect the Bernardo-Felicita Tap 69 kV line from overloading following the N-2 contingency of the Escondido-Palomar 230 kV lines #1 and #2.)

5.2   Steady-State Voltage Results in SDG&E System

No steady-state voltage violations were attributed to the Project.

5.3   Steady-State Reactive Power Deficiency Results

Per LGIA 9.6.1, synchronous generators are required to provide reactive power capability range of 0.90 lagging to 0.95 leading, measured at the generator terminals. As such, the steady-state reactive power capability test for these types of generators is not necessary since this capability is an inherent attribute.

5.4   Affected Systems

No Affected Systems were identified as a result of the steady-state analysis.

6.   Short Circuit Analysis

Short circuit studies were performed to determine the maximum available fault current at 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.

6.1   Short Circuit Study Input Data

The following short circuit model input data was used to determine fault duty impacts of the Project:

Equivalent Reciprocating Engine Generator Unit @ 13.8 kV and 128.4 MVA Base:

A.   Positive Sequence subtransient reactance (X''_1)   = 0.186 p.u.

B.   Negative Sequence reactance (X_2)   = 0.214 p.u.

C.   Zero Sequence reactance (X_0)   = 0.061 p.u.

6.2   Results

6.2.1   SDG&E Transmission System

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

The IC is not responsible for mitigating any pre-existing overstressed circuit breakers.

6.2.2   Affected System

No Affected Systems were identified in the short circuit analysis as a result of the interconnection of the Project.

6.3   Preliminary Protection Requirements

The IC is responsible for the protection of its own system and equipment and must meet the requirements per the SDG&E Interconnection Handbook. The SDG&E Interconnection Handbook can be found at
http://sdge.com/documents/business/GenInterconectionHandBook.pdf.

7.   Transient Stability Analysis

Transient stability studies were conducted using the Heavy Summer and Light Load cases to ensure that the addition of the Project will not adversely impact the stability of the interconnected system following disturbances and abnormal operating conditions. The parameters for the generator dynamic model, as provided by the IC, were used in the evaluation of the Project and are as follows:

```
#
models
gensal  23157 "C565_G1    " 13.80  "1 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "10" : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "11" : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "2 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "3 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "4 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "5 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "6 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal  23157 "C565_G1    " 13.80  "7 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
```

"lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal   23157 "C565_G1   " 13.80 "8 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
gensal   23157 "C565_G1   " 13.80 "9 " : #9 mva=11.6760   "tpdo" 3.2000 "tppdo" 0.0280 "tppqo"
0.1280 "h" 1.1300 "d" 0.0200 "ld" 1.3100 /
 "lq" 0.6550 "lpd" 0.2570 "lppd" 0.1860 "ll" 0.1110 "s1" 0.0770 "s12" 0.3240 "ra" 0.0037 "rcomp" 0.0000
"xcomp" 0.0000
esac5a   23157 "C565_G1   " 13.80 "1 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "10" : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "11" : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "2 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "3 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "4 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "5 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "6 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "7 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "8 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
esac5a   23157 "C565_G1   " 13.80 "9 " : #9 "tr" 0.020000 "ka" 10.0000 "ta" 0.100000 "vrmax"
4.5700 "vrmin" 0.0 "ke" 1.000000 "te" 0.200000 "kf" 0.010000 "tf1" 0.100000 "tf2" 0.0 /
 "tf3" 0.0 "e1" 4.5700 "se1" 0.250000 "e2" 5.4800 "se2" 0.074000 "spdmlt" 0.0
ggov1   23157 "C565_G1   " 13.80 "1 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov" 5.9600 "kigov" 5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax" 1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb" 1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref" 10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset" 8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
ggov1   23157 "C565_G1   " 13.80 "10" : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov" 5.9600 "kigov" 5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax" 1.1400 /

"vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
 ggov1   23157 "C565_G1   " 13.80 "11" : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
 ggov1   23157 "C565_G1   " 13.80 "2" : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
 ggov1   23157 "C565_G1   " 13.80 "3 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
 ggov1   23157 "C565_G1   " 13.80 "4 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
 ggov1   23157 "C565_G1   " 13.80 "5 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
 ggov1   23157 "C565_G1   " 13.80 "6 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref"   10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000

ggov1   23157 "C565_G1   " 13.80 "7 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref" 10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
ggov1   23157 "C565_G1   " 13.80 "8 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref" 10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
ggov1   23157 "C565_G1   " 13.80 "9 " : #9 mwcap=9.3410 "r" 0.040000 "rselect" 1.000000 "tpelec"
0.160000 "maxerr" 10.0000 "minerr" -10.0000 "kpgov"   5.9600 "kigov"   5.9600 "kdgov" 0.001000
"tdgov" 0.010000 "vmax"   1.1400 /
 "vmin" 0.0 "tact" 0.025000 "kturb"   1.0800 "wfnl" 0.071000 "tb" 0.014600 "tc" -0.014600 "flag"
1.000000 "teng" 0.029200 "tfload" 1.000000 "kpload" 1.000000 /
 "kiload" 1.000000 "ldref" 10.0000 "dm" 0.0 "ropen" 0.100000 "rclose" -0.100000 "kimw" 0.007000
"pmwset"   8.4400 "aset" 0.0 "ka" 0.0 "ta" 0.010000 /
 "db" 0.0 "tsa" 1.000000 "tsb" 1.000000 "rup" 99.0000 "rdown" -99.0000
pss2a   23157 "C565_G1   " 13.80 "1 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1" 15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1   " 13.80 "10 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1" 15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1   " 13.80 "11 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1" 15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1   " 13.80 "2 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1" 15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1   " 13.80 "3 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1" 15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1   " 13.80 "4 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1" 15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0

```
pss2a   23157 "C565_G1     " 13.80  "5 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1"  15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1     " 13.80  "6 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1"  15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1     " 13.80  "7 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1"  15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1     " 13.80  "8 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1"  15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
pss2a   23157 "C565_G1     " 13.80  "9 " : #9 "j1" 1.000000 "k1" 0.0 "j2"   3.0000 "k2" 0.0 "tw1"
2.0000 "tw2"   2.0000 "tw3"   2.0000 "tw4" 0.0 "t6" 0.0 "t7"   2.0000 /
 "ks2" 0.237000 "ks3" 1.000000 "ks4" 1.000000 "t8" 0.500000 "t9" 0.100000 "n" 1.000000 "m"   5.0000
"ks1"  15.0000 "t1" 0.150000 "t2" 0.030000 /
 "t3" 0.150000 "t4" 0.030000 "vstmax" 0.100000 "vstmin" -0.100000 "a" 1.000000 "ta" 0.0 "tb" 0.0
#
```

7.1   Transient Stability Study Scenarios

Disturbance simulations were performed for a study period of 10 seconds for pre-Project
cases and 20 seconds for post-Project cases to determine whether the Project would create
any system instability or cause criteria violations during a variety of line and generator
outages. For the Project, line and generator outages were evaluated for disturbances
simulated by the switch files outlined in Table 9.3 of the Group Report.

Descriptions of the switching sequences can be found in Appendix H.

7.2   Results

The study concluded that the addition of the Project would not cause the SDG&E
transmission system to become unstable following the select disturbances studied.

Detailed results for the Project can be found in Attachment 2.

8.   Post-Transient Voltage Stability Analysis

Using the Heavy Summer and Light Load cases described in Section 7.1 of the Group
Report, the post-transient voltage stability analysis indicated that, under the studied
conditions and system configuration (including all C1C2 Projects' Delivery Network
Upgrades), the addition of the Project 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.

The Project will not be responsible for pre-existing post-transient voltage deviations.

Detailed results of the analysis are provided in Appendix K.

9. Post-Transient Reactive Power Deficiency Analysis

Using the Heavy Summer and Light Load cases described in Section 7.1 of the Group Report, post-transient reactive power deficiency analysis indicated that, under the studied conditions and system configuration (including all C1C2 Projects' Delivery Network Upgrades), cases including the Project 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.

This convergence indicates that the addition of the Project and the associated C1C2 Projects' Delivery Network Upgrades do not cause post-transient reactive power deficiency on the SDG&E transmission system.

Detailed results of the post-transient reactive power deficiency analysis are provided in Appendix K.

10. Environmental Evaluation/Permitting

Due to the anticipated scope of work associated with the upgrades for the Project, considerations for licensing and permitting are included in the estimates for cost and time to construct for the following Network Upgrades to the SDG&E transmission system:

> Construct new 230 kV switchyard and loop Miguel-Mission (TL23023) into new switchyard

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

To determine the cost responsibility of the C1C2 Projects, the CAISO developed Cost Allocation Factors for Delivery Network Upgrades based on the individual contribution of each project (Attachment 1). There are two (2) Delivery Network Upgrades assigned to the Project which were identified by the Deliverability Assessment for the SDG&E transmission system and three (3) Delivery Network Upgrades assigned to this Project by the Deliverability Assessment for the SCE system. The estimated costs, Cost Allocation Factors, and estimated time to construct for the PTO's Interconnection Facilities and Network Upgrades for which the Project is solely responsible for on the SDG&E system are shown in Table 11.1. The estimated costs, Cost Allocation Factors, and estimated time to construct for the Network Upgrades for the SCE system are shown in Table 11.2.

11.1   SDG&E Upgrades

The non-binding, good faith estimate of time to construct (license/permit, design, procure material, and construct) the facilities is based on the assumptions outlined in Section 3 of this report, and is applicable from the submittal of written authorization to proceed after the execution of the Large Generator Interconnection Agreement (LGIA). This is also 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 assessment and report. In the time to construct estimates, SDG&E included the time required for a Permit to Construct (PTC) or Certificate of Public Convenience and Necessity (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 11.1: SDG&E Upgrades, Estimated Costs, and Estimated Time to Construct Summary

Type of Upgrade	Upgrade		Cost Allocation Factor	Estimated Cost x 1,000 (Note 1)	Estimated Time to Construct (Note 2)
PTO's Interconnection Facilities (Note 7)	Extend gen-tie from the POI at the 230 kV bus at a new switchyard between Miguel and Mission to the PTO property line	• Install 200 circuit feet of bundled 900 ACSS/AW with 3 bundled dead-ends at the switchyard rack • Install 2-200 foot spans of shield wire with 2 dead-ends at the switchyard rack	100%	███████	6 Months
Reliability Network Upgrades	Construct new 230 kV switchyard and loop Miguel-Mission (TL23023) into new switchyard to accommodate the Project's interconnection	Construct new 230 kV switchyard with 2 bays: • Install 3-230 kV circuit breakers • Install 6-230 kV disconnects • Install associated structures, buildings, and relay protection Loop-in Miguel-Mission, TL23023: • Install 600 foot spans from interset 230 kV poles to the switchyard rack • Install bundled 900 ACSS/AW to 2 switchyard rack positions • Install shield wire to 4 dead-end positions at switchyard rack	100%	███████	60 Months
	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)	6%	███████	12 Months
		Protection and communication equipment to interface between SDG&E and project (included in Mission-Old Town SPS cost) (Note 6)	100%	███████	-
	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)	8%	███████	12 Months
		Protection and communication equipment to interface between SDG&E and project (Note 6)	100%	███████	12 Months

Type of Upgrade	Upgrade		Cost Allocation Factor	Estimated Cost x 1,000 *(Note 1)*	Estimated Time to Construct *(Note 2)*
Delivery Network Upgrades	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	10%	███	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	30%		12 Months
Total				███	**60 Months**

Notes for Table 11.1:

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 ███ 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 project's facility.

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

Note 7:   The Interconnection Customer is obligated to fund these upgrades and will not be reimbursed.

11.2 SCE Upgrades

Table 11.2: SCE Upgrades, Estimated Costs, and Estimated Time to Construct Summary

Type of Upgrade	Upgrade		Cost Allocation Factor	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	2%	███████	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	2%		72 Months
	New Red Bluff-Valley 500 kV T/L	Build new Red Bluff-Valley 500 kV T/L	2%		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	2%		84 Months
Total					**84 Months**

Note for Table 11.2:

Note1:   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.

12. Local Furnishing Bonds

Section 16 of the C1C2 Projects Phase II Interconnection Study Group Report identifies additional requirements for generators that connect to the SDG&E wholly-owned transmission system.

It appears that the energy produced by this Project will not cause an Impairment to the tax-exempt status of the Local Furnishing Bonds (LFBs) involving the Amended Annual Net Importer Test.

The Project is proposing to connect to SDG&E's Local Transmission System, which is used to transmit electricity at high voltages from SDG&E's and Imperial Irrigation District's Imperial Valley Substation located in Imperial County through SDG&E's distribution service area consisting of San Diego County and a contiguous portion of Orange County. If the output of this project is fully contracted to SDG&E, an Impairment will not occur from the construction and energization of new Interconnection Facilities and Network Upgrades that are required for this project located within the Local Transmission System. However, in the event output from this project is not fully contracted 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 SDG&E's Appendix B (SDG&E Encumbrances) to the CAISO's Transmission Control Agreement. This procedure requires SDG&E, in good faith, to promptly seek an opinion from a nationally recognized bond counsel selected by SDG&E that the requested action or inaction will not adversely affect the tax-exempt status of the LFBs. This procedure further requires that such opinion be of the type generally considered by the municipal bond market as unqualified. If SDG&E is unable to obtain such unqualified opinion, then pursuant to a written request by an Eligible Entity (as defined in the SDG&E Encumbrances), SDG&E, in good faith, will promptly seek a ruling from the IRS that the requested action or inaction will not adversely affect the tax-exempt status of interest on the LFBs. In addition, pursuant to certain provisions of the Code, SDG&E may also be required to redeem a portion of the LFBs in order to mitigate an Impairment.

The Project proposes to connect to SDG&E's Local Transmission System and therefore is required to meet either of the two following requirements:

A.   The energy from the Project must be fully contracted to SDG&E, or

B.   The Project must:

1.   Pay any costs SDG&E incurs in mitigating the Impairment, and

2.   Obtain a FERC order under Sections 211/213 of the Federal Power Act compelling SDG&E to provide transmission service, including interconnection service.

13. Items Not Covered in this Study

The Phase II Study does not address any requirements for standby power that the Project may require. If interested, the IC should make proper arrangements with the appropriate parties regarding this service.