DOCKETED

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AES Alamitos Energy, LLC
690 North Studebaker Road
Long Beach, CA 90803
Tel 562 493 7891
Fax 562 493 7320

April 8, 2016

Raeann Quadro
Queue Management Specialist
California ISO
250 Outcropping Way
Folsom, CA 95630

Dear Ms. Quadro,

Please find enclosed the repowering Affidavit per Section 25.1.2 of the CAISO Tariff associated with redevelopment at the AES Alamitos generating facility ("AES").

We have provided two scenarios in the attached Affidavit package based on two different retirement assumptions for Units 5&6 at Alamitos. The Power Purchase Agreement for the existing six legacy generating units ends on May 31, 2018. If Units 5&6 are not able to secure new contracts that support continued operation beyond this date, then the first block of new generation ("CCGT") can interconnect to the existing Unit 5 position. Under this configuration, the new CCGT will be the only resource connected to the east side of the substation bus and our studies indicate there are no short circuit concerns. The "**2024 and Beyond Scenario**" reflects this configuration and also includes the remainder of the new units in our redevelopment plan.

Alternatively, if Unit 5&6 are able to obtain new contracts to continue operating beyond 2018, then we have proposed constructing a new 230kV bay on the east end of the Alamitos east bus in order to connect the new CCGT. In addition, although Unit 5 will need to be shutdown before the new CCGT begins operating, Unit 6 and the CCGT will both be in operation and connected to the east bus. Under this configuration, our studies indicate that current limiting reactors ("CLRs") would be needed temporarily to limit the short circuit contribution of the new CCGT to the east bus. We have prepared the "**2020 Scenario**" to reflect this configuration.

The two scenarios are described in more detail below:

2024 and Beyond Scenario: All of the Alamitos repowering units are online, namely the 689 MW CCGT, four (4) 100.8 MW CTs and the three (3) 100 MW Battery Energy Storage ("BES") systems, and all of the existing Alamitos units are retired. The CCGT interconnects at the SCE Alamitos East Switchyard, specifically ALMITOSE (bus #24006), at a new 230 kV feeder bay to be built east of the existing feeder bay of the Barre #1 transmission line. The four CTs and the BES systems interconnect at the SCE Alamitos West Switchyard, specifically ALMITOSW (bus #24008), at the existing feeder bays of ALAMIT_7_UNIT 4 and ALAMIT_7_UNIT 2 respectively. No CLRs are included in this scenario.

2020 Scenario: The new 689 MW CCGT is online and interconnects at the SCE Alamitos East Switchyard at a rebuilt Unit 5 bay or a new 230 kV feeder bay to be built east of the existing feeder bay of the Barre #1 transmission line. During 2020, Alamitos Unit 3, Unit 4 and Unit 6 are assumed to still be in operation. This scenario includes temporary 230 kV CLRs in series with the AES 230 kV line of the CCGT between the GSU transformer and the SCE switchyard to control the fault levels below the existing short circuit duty.

Although the simultaneous operation of the existing units and the CCGT is not currently guaranteed, AES requests that the CAISO and SCE study both operational scenarios to address the possibility that Unit 5&6 are able to secure contracts to continue operating beyond May 31, 2018.

AES believes that the information provided in the Affidavit package does not result in a substantial change in the electrical characteristics of the Alamitos facility.

Should you require any additional information, please do not hesitate to contact me. We appreciate your timely consideration to this request.

Kind Regards,

Eric Pendergraft
President
AES Alamitos Energy, LLC

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690 North Studebaker Road
Long Beach, CA 90803
Tel 562 493 7891
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REPOWERING AFFIDAVIT

This affidavit is being submitted in satisfaction of the requirements in Section 25.1.2 of the CAISO Tariff of the California Independent System Operator Corporation ("CAISO").

(1) I, **Eric Pendergraft**, the undersigned, as a representative of the AES Alamitos Energy, LLC, located at 690 North Studebaker Road, Long Beach CA, 90803, am authorized to execute this affidavit on behalf of AES Alamitos Energy, LLC.

(2) AES Alamitos Energy, LLC is an affiliate of AES Alamitos, LLC which is the legal owner of the Alamitos Generating Station, a 6-unit 1,956 MW conventional thermal generating facility located at 690 North Studebaker Road, Long Beach CA, 90803 and connected to the CAISO Controlled Grid at the SCE Alamitos substation. The resource IDs for the six units at the Alamitos Generating Station are ALAMIT_7_UNIT 1, ALAMIT_7_UNIT 2, ALAMIT_7_UNIT 3, ALAMIT_7_UNIT 4, ALAMIT_7_UNIT 5 and ALAMIT_7_UNIT 6.

(3) AES Alamitos, LLC sells the total electrical output of Alamitos Generating Station to BE CA, LLC, a subsidiary of JP Morgan.

(4) AES Alamitos Energy, LLC plans to replace/repower the existing units at the Alamitos Generating Station with new generating facilities that will sell their electrical output to Southern California Edison pursuant to bilateral agreements.

(5) AES Alamitos Energy, LLC will repower the Alamitos Generating Station into a 1,392.2 MW generating facility comprised of one (1) 2x1 gas-fired combined cycle (CCGT), four (4) open-cycle combustion turbines (CTs) and three (3) 100 MW battery energy storage (BES) units. The repowered facilities will be connected to the CA ISO Controlled Grid at the SCE Alamitos Substation. The proposed In Service Dates are 04/01/2019 for the CCGT, 04/01/2020 for the BES and 01/01/2021 for the CTs. The proposed Commercial Operation Dates are 04/01/2020 for the CCGT, 01/01/2021 for BES-Unit 1, 01/01/2022 for BES-Unit 2, 01/01/2023 for BES-Unit 3 and 07/01/2021 for the CTs.

(6) AES Alamitos Energy, LLC represents that the total capability and/or electrical characteristics of the repowered generating units at Alamitos Generating Station will remain substantially unchanged.

I, **Eric Pendergraft**, declare under penalty of perjury that the foregoing statements are true to the best of my knowledge.

Signed _____ Notary Public

Eric Pendergraft
President

AES Alamitos Energy, LLC
690 North Studebaker Road
Long Beach CA, 90803
Phone Number: (562) 493-7891

Date: April 8, 2016

CICELY HERNANDEZ
COMM. #1981158
Notary Public - California
Orange County
My Comm. Expires June 7, 2016

4/8/16

Appendix 1 Interconnection Request
INTERCONNECTION REQUEST

Provide **one copy** of this completed form pursuant to Section 7 of this Appendix 1 below.

1. The undersigned Interconnection Customer submits this request to interconnect its Generating Facility with the CAISO Controlled Grid pursuant to the CAISO Tariff (check one):
   - ☐ Fast Track Process.
   - ☐ Independent Study Process.
   - ☐ Queue Cluster Process.
   - ☐ Annual Deliverability Assessment pursuant to GIDAP Section 9.2.
   - ☐ Deliverability Assessment Study for project interconnecting to a Non-Participating TO pursuant to GIDAP Section 9.4.

2. This Interconnection Request is for (check one):
   - ☐ A proposed new Generating Facility.
   - ☐ An increase in the generating capacity or a Material Modification to an existing Generating Facility.

3. Requested Deliverability Status is for (check one):
   - ☒ Full Capacity (For Independent Study Process and Queue Cluster Process only)
     (Note – Deliverability analysis for Independent Study Process is conducted with the next annual Cluster Study – See GIDAP Section 4.6)
   - ☐ Partial Deliverability for _____ % of electrical output
     (for Independent Study Process and Queue Cluster Process ONLY)
   - ☐ Energy Only

4. The Interconnection Customer provides the following information:

   a. Address or location, including the county, of the proposed new Generating Facility site or, in the case of an existing Generating Facility, the name and specific location, including the county, of the existing Generating Facility;

      Project Name: **Alamitos Energy Center**

      Project Location:
      Street Address: **690 N. Studebaker Road**
      City, State: **Long Beach, California**
      County: **Los Angeles**
      Zip Code: **90803**
      GPS Coordinates (decimal format):
      Latitude: **33.76926944** Longitude: **-118.1003139**

   b. Maximum net megawatt electrical output (**as defined by section 2.C. of Attachment A to this appendix**) of the proposed new Generating Facility or the amount of net megawatt increase in the generating capacity of an existing Generating Facility;

      Maximum net megawatt electrical output (MW): **689.0** ***OR***
      Net Megawatt increase (MW): **0**

c. Type of project (i.e., gas turbine, hydro, wind, etc.) and general description of the equipment configuration (if more than one type is chosen include net MW for each);

- ☐ Cogeneration _____ (MW)
- ☐ Reciprocating Engine _____ (MW)
- ☐ Biomass _____ (MW)
- ☐ Steam Turbine _____ (MW)
- ☐ Gas Turbine _____ (MW)
- ☐ Wind _____ (MW)
- ☐ Hydro _____ (MW)
- ☐ Photovoltaic _____ (MW)
- ☒ Combined Cycle **689** (MW)
- ☐ Storage

  Storage type (e.g. Pumped-Storage Hydro, Battery (w/type), etc.): _____
  Maximum Instantaneous Capability: _____
  Total Storage Capability: _____
  Maximum Charge Duration: _____
  Maximum Discharge Duration: _____
  Charge/Discharge Cycle Efficiency: _____

- ☐ Other (please describe): _____ (MW)

_____

General description of the equipment configuration (e.g. number, size, type, etc):
The project is comprised of one 2x1 CCGT block (Block 1) having a maximum net output of 689 MW. Block 1 is comprised of two (2) Combustion Turbine Generators (CTGs) and one (1) Steam Turbine Generator (STG); each CTG has a maximum gross output of 234.5 MW and the STG has a maximum gross output of 241.1 MW.

d. Proposed In-Service Date (first date transmission is needed to the facility), Trial Operation date and Commercial Operation Date in MM/DD/YYYY format and term of service (**dates must be sequential**):

Proposed In-Service Date: **04/01/2019**
Proposed Trial Operation Date: **11/01/2019**
Proposed Commercial Operation Date: **04/01/2020**
Proposed Term of Service (years): **30 years (All blocks)**

The expected retirement schedule of the existing Alamitos units is as follows:
Unit 1: 12/31/2019
Unit 2: 12/31/2019
Unit 3: 12/31/2020
Unit 4: 12/31/2020
Unit 5: 12/31/2019
Unit 6: 12/31/2020
Based on the above, this interconnection request tackles the 2020 operational year during which the CCGT block is online and the existing units #3, #4 and #6 are assumed to be still operating.

e. Name, address, telephone number, and e-mail address of the Interconnection Customer's contact person (primary person who will be contacted);

Name: **Eric Pendergraft**
Title: **President**

Company Name:	**AES Alamitos Energy, LLC**
Street Address:	**690 North Studebaker Rd.**
City, State:	**Long Beach, CA**
Zip Code:	**90803**
Phone Number:	**(562) 493-7855**
Fax Number:	**(562) 493-7737**
Email Address:	**eric.pendergraft@aes.com**

f. Approximate location of the proposed Point of Interconnection (i.e., specify transmission facility interconnection point name, voltage level, and the location of interconnection);

230 kV Alamitos Switching Station as shown in the attached General Arrangement/Site Plan.
The CCGT block will interconnect at the SCE 230 kV Alamitos East Switchyard, namely ALMITOSE bus (bus #24006), at a new 230 kV feeder bay to be built to the East of the existing feeder bay of the Barre #1 transmission line. Refer to the one-line diagram separately attached for more information.

g. Interconnection Customer data (set forth in Attachment A)

The Interconnection Customer shall provide to the CAISO the technical data called for in GIDAP Appendix 1, Attachment A. One (1) copy is required.

5. Applicable deposit amount made payable to California ISO. Send check to CAISO (see section 7 for details) along with the:
   a. Interconnection Request for processing.
   b. Attachment A (Interconnection Request Generating Facility Data).

6. Evidence of Site Exclusivity as specified in the GIDAP and name(s), address(es) and contact information of site owner(s) (check one):

Current Title Report is available upon request. Site is an existing generating facility wholly owned by AES.

Plant Manager: Weikko Wirta
690 N. Studebaker Road
Long Beach, CA 90803
(562) 493-7831

☐ Is attached to this Interconnection Request
☐ Deposit in lieu of Site Exclusivity attached, Site Exclusivity will be provided at a later date in accordance with this GIDAP

7. This Interconnection Request shall be submitted to the CAISO representative indicated below:

California ISO
Attn: Grid Assets
P.O. Box 639014
Folsom, CA 95763-9014

Overnight address:
California ISO
Attn: Grid Assets

250 Outcropping Way
Folsom, CA 95630

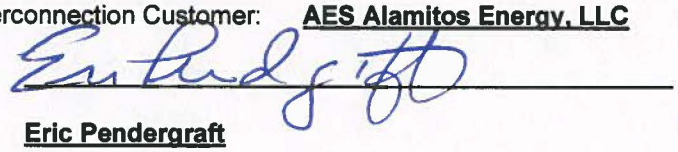
8. Representative of the Interconnection Customer to contact:

[To be completed by the Interconnection Customer]

Name:	**Robert Sims**
Title:	**Project Director**
Company Name:	**AES Alamitos Energy, LLC**
Street Address:	***690 North Studebaker Rd.***
City, State:	**Long Beach, CA**
Zip Code:	**90803**
Phone Number:	**(858) 573-2054**
Fax Number:	**(562) 493-7737**
Email Address:	**Robert.sims@aes.com**

9. This Interconnection Request is submitted by:

Legal name of the Interconnection Customer: **AES Alamitos Energy, LLC**

By (signature): 

Name (type or print): **Eric Pendergraft**

Title: **President**

Date: 4/8/2016

Project Name: Alamitos Energy Center

Attachment A Generating Facility Data
To GIDAP Appendix 1
Interconnection Request

GENERATING FACILITY DATA

Provide one (1) copy of this completed form pursuant to Section 7 of GIDAP Appendix 1.

1. **Provide one set of original prints (no larger than 11" x 17") or soft copy on cd/flashdrive of the following:**

   A. Site drawing to scale, showing generator location and Point of Interconnection with the CAISO Controlled Grid.
   B. Single-line diagram showing applicable equipment such as generating units, step-up transformers, auxiliary transformers, switches/disconnects of the proposed interconnection, including the required protection devices and circuit breakers. For wind and photovoltaic generator plants, the one line diagram should include the distribution lines connecting the various groups of generating units, the generator capacitor banks, the step up transformers, the distribution lines, and the substation transformers and capacitor banks at the Point of Interconnection with the CAISO Controlled Grid.

2. Generating Facility Information

A. Total Generating Facility rated output (MW): **710.1 MW**
B. Generating Facility auxiliary Load (MW): **21.1 MW**
C. Project net capacity (A.-B.) (MW): **689.0 MW**
D. Standby Load when Generating Facility is off-line (MW): **3.7 MW**
E. Number of Generating Units: **The CCGT block is comprised of two (2) CTGs and one (1) STG**
(Please repeat the following items for each generator)
F. Individual generator rated output (MW for each unit):
CTG: 234.5 MW
STG: 241.1 MW
G. Manufacturer: **CTG: GE; STG: Toshiba**
H. Year Manufactured: _____
I. Nominal Terminal Voltage (kV): **18 kV**
J. Rated Power Factor (%):**85% (for all generators)**
K. Type (Induction, Synchronous, D.C. with Inverter): **Synchronous (for all generators)**
L. Phase (three phase or single phase): **Three phase (for all generators)**
M. Connection (Delta, Grounded WYE, Ungrounded WYE, impedance grounded):
Impedance grounded (for all generators)
N. Generator Voltage Regulation Range (+/- %):
CTG: +/- 5%
STG: +/- 5%
O. Generator Power Factor Regulation Range: **90% Lagging to 95% Leading (for all generators)**
P. For combined cycle plants, specify the plant net output capacity (MW) for an outage of the steam turbine or an outage of a single combustion turbine **0 MW for an outage of the STG and 337.4 MW for an outage of one of the CTGs**

3. Synchronous Generator – General Information:

(Please repeat the following for each generator model)

A. Rated Generator speed (rpm): **3600 (for all generators)**
B. Rated MVA:
CTG: 272 MVA
STG: 290 MVA
C. Rated Generator Power Factor: **85% lagging (for all generators)**
D. Generator Efficiency at Rated Load (%):
CTG: 98.93%
STG: 98.87%
E. Moment of Inertia (including prime mover):
Each CTG: 527,356 lb.ft2
STG: 51,045 kg.m2 or 10,454.84 lb.ft2
F. Inertia Time Constant (on machine base) H: _____
5.8043 kW.sec/kVA for each CTG,
3.12 kW.sec/kVA for the STG, sec or MJ/MVA
G. SCR (Short-Circuit Ratio - the ratio of the field current required for rated open-circuit voltage to the field current required for rated short-circuit current):
CTG: 0.5
STG: not less than 0.5
H. Please attach generator reactive capability curves.
I. Rated Hydrogen Cooling Pressure in psig (Steam Units only): **N/A**
J. Please attach a plot of generator terminal voltage versus field current that shows the air gap line, the open-circuit saturation curve, and the saturation curve at full load and rated power factor.

4. Excitation System Information

(Please repeat the following for each generator model)

A. Indicate the Manufacturer **CTG: GE; STG: Toshiba/Tosmap** and Type **CTG: EX2100e; STG: ESST1A** of excitation system used for the generator. For exciter type, please choose from 1 to 9 below or describe the specific excitation system.

- ☐ (1) Rotating DC commutator exciter with continuously acting regulator. The regulator power source is independent of the generator terminal voltage and current.
- ☐ (2) Rotating DC commentator exciter with continuously acting regulator. The regulator power source is bus fed from the generator terminal voltage.
- ☐ (3) Rotating DC commutator exciter with non-continuously acting regulator (i.e., regulator adjustments are made in discrete increments).
- ☐ (4) Rotating AC Alternator Exciter with non-controlled (diode) rectifiers. The regulator power source is independent of the generator terminal voltage and current (not bus-fed).
- ☐ (5) Rotating AC Alternator Exciter with controlled (thyristor) rectifiers. The regulator power source is fed from the exciter output voltage.
- ☐ (6) Rotating AC Alternator Exciter with controlled (thyristor) rectifiers.
- ☐ (7) Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from the generator terminal voltage.
- ☐ (8) Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current (compound-source controlled rectifiers system.
- ☒ (9) Other (specify):
CTG: Static Excitation EX2100
STG: Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current.

B. Attach a copy of the block diagram of the excitation system from its instruction manual. The diagram should show the input, output, and all feedback loops of the excitation system.
C. Excitation system response ratio (ASA): **CTG: 2.4 pu/s, STG: >2.0 PU**
D. Full load rated exciter output voltage: **CTG: 417 Vdc, STG: 479 V**
E. Maximum exciter output voltage (ceiling voltage): **CTG: 160% VFFL (100°C) ceiling at Vt = 1.0pu, STG: 1.6 PU of rated field voltage**
F. Other comments regarding the excitation system?

_____

5. Power System Stabilizer Information

(Please repeat the following for each generator model. All new generators are required to install PSS unless an exemption has been obtained from WECC. Such an exemption can be obtained for units that do not have suitable excitation systems.)

A. Manufacturer: **CTG: GE, STG: Toshiba**
B. Is the PSS digital or analog? **Digital for all generators**
C. Note the input signal source for the PSS:
☐ Bus frequency ☐ Shaft speed ☐ Bus Voltage
☐ Other (specify source): **CTG: Voltage & Frequency, STG: Power & Frequecy**
D. Please attach a copy of a block diagram of the PSS from the PSS Instruction Manual and the correspondence between dial settings and the time constants or PSS gain.
E: Other comments regarding the PSS?

_____

6. Turbine-Governor Information

(Please repeat the following for each generator model)

Please complete Part A for steam, gas or combined-cycle turbines, Part B for hydro turbines, and Part C for both.

A. Steam, gas or combined-cycle turbines:

(1) List type of unit (Steam, Gas, or Combined-cycle): **Combined-cycle (2 CTGs and 1 STG)**
(2) If steam or combined-cycle, does the turbine system have a reheat process (i.e., both high and low pressure turbines)? **The STG only**
(3) If steam with reheat process, or if combined-cycle, indicate in the space provided, the percent of full load power produced by each turbine:
Low pressure turbine or gas turbine: **42**%
High pressure turbine or steam turbine: **58**%

B. Hydro turbines:

(1) Turbine efficiency at rated load: **N/A**%
(2) Length of penstock: **N/A**ft
(3) Average cross-sectional area of the penstock: **N/A**ft2
(4) Typical maximum head (vertical distance from the bottom of the penstock, at the gate, to the water level): **N/A**ft
(5) Is the water supply run-of-the-river or reservoir: **N/A**
(6) Water flow rate at the typical maximum head: **N/A**ft3/sec
(7) Average energy rate: **N/A**kW-hrs/acre-ft
(8) Estimated yearly energy production: **N/A**kW-hrs

C. Complete this section for each machine, independent of the turbine type.

(1) Turbine manufacturer: **CTG: GE, STG: Toshiba**
(2) Maximum turbine power output: **CTG: 234.5 MW, STG: 241.1 MW**
(3) Minimum turbine power output (while on line): **CTG: 0.1 MW, STG: 0.1 MW**
(4) Governor information:
  (a) Droop setting (speed regulation): **CTG: 4%, STG: 5%**
  (b) Is the governor mechanical-hydraulic or electro-hydraulic (Electro-hydraulic governors have an electronic speed sensor and transducer.)? **CTG: Electro-hydraulic, STG: Electro-hydraulic**
  (c) Other comments regarding the turbine governor system? _____

7. Induction Generator Data:

A. Rated Generator Power Factor at rated load: _____
B. Moment of Inertia (including prime mover): _____
C. Do you wish reclose blocking? ☐Yes ☐No
Note: Sufficient capacitance may be on the line now, or in the future, and the generator may self-excite unexpectedly.

7a. **Wind Generators**

Number of generators to be interconnected pursuant to this Interconnection Request: _____

Average Site Elevation: _____ ☐Single Phase ☐Three Phase

Field Volts: _____
Field Amperes: _____
Motoring Power (MW): _____
Neutral Grounding Resistor (if applicable): _____
I22t or K (Heating Time Constant): _____
Rotor Resistance: _____
Stator Resistance: _____
Stator Reactance: _____
Rotor Reactance: _____
Magnetizing Reactance: _____
Short Circuit Reactance: _____
Exciting Current: _____
Temperature Rise: _____
Frame Size: _____
Design Letter: _____
Reactive Power Required in Vars (No Load): _____
Reactive Power Required in Vars (Full Load): _____
Total Rotating Inertia, H: _____ Per Unit on 100 MVA Base

Note: A completed General Electric Company Power Systems Load Flow (PSLF) data sheet must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device then they shall be provided and discussed at the Scoping Meeting.

8. Generator Short Circuit Data
For each generator model, provide the following reactances expressed in p.u. on the generator base:

- X"1 – positive sequence subtransient reactance: **CTG: 0.165, STG: 0.159** p.u**
- X2 – negative sequence reactance: **CTG: 0.165, STG: 0.159** p.u**
- X0 – zero sequence reactance: **CTG: 0.110, STG: 0.097** p.u**

Generator Grounding (select 1 for each model):

A. ☐ Solidly grounded
B. ☒ Grounded through an impedance
(Impedance value in p.u on generator base R: **CTG: 346.1634, STG: 99999** p.u. X: **CTG: 346.2016, STG: 0** p.u.)
C. ☐ Ungrounded

9. Step-Up Transformer Data

For each step-up transformer, fill out the data form provided in Table 1.

10. Interconnection Facilities Line Data

There is no need to provide data for new lines that are to be planned by the Participating TO. However, for transmission lines that are to be planned by the generation developer, please provide the following information:

Nominal Voltage: **230** kV
Line Length: **0.31 mile**
Line termination Points: **Switchyard positions; refer to the one-line diagram for more details**
Conductor Type: **ACSS** Size: **1113 Kcmil Bluejay**
If bundled. Number per phase: **2**, Bundle spacing: **18**in.
Phase Configuration. Vertical: **X**, Horizontal: _____
Phase Spacing: A-B: **15**ft., B-C: **15**ft., C-A: **30**ft.
Distance of lowest conductor to Ground at full load and 40ºC: **25**ft
Ground Wire Type: **EHS** Size: **197.3 kcmil** Distance to Ground: **65**ft
Attach Tower Configuration Diagram
Summer line ratings in amperes (normal and emergency) **2,206 A Normal & Emergency**
Positive Sequence Resistance (R): **0.000025** p.u.** (for entire line length)
Positive Sequence Reactance: (X): **0.000307** p.u**(for entire line length)
Zero Sequence Resistance (R0): **0.000156** p.u.** (for entire line length)
Zero Sequence Reactance: (X0): **0.000959** p.u** (for entire line length)
Line Charging (B/2): **0.000683** p.u**
** On 100-MVA and nominal line voltage (kV) Base

A 230 kV, 25 ohms (66.31 mH) three-phase current limiting reactor (CLR) is planned to be installed in series with the tie line of the CCGT Block. The CLR has the following specifications:
Positive Sequence Resistance (R): 0.000473 p.u.**
Positive Sequence Reactance: (X): 0.047259 p.u**
Zero Sequence Resistance (R0): 0.000402 p.u.**
Zero Sequence Reactance (X0): 0.040170 p.u**
Continuous Rating: 2000 A
**** On 100-MVA and nominal line voltage (kV) Base**

10a. For Wind/photovoltaic plants, provide collector System Equivalence Impedance Data Provide values for each equivalence collector circuit at all voltage levels.

Nominal Voltage: _____
Summer line ratings in amperes (normal and emergency) _____
Positive Sequence Resistance (R1): _____ p.u. ** (for entire line length of each collector circuit)

Positive Sequence Reactance: (X1): _____ p.u** (for entire line length of each collector circuit)
Zero Sequence Resistance (R0): _____ p.u. ** (for entire line length of each collector circuit)
Zero Sequence Reactance: (X0): _____ p.u** (for entire line length of each collector circuit)
Line Charging (B/2): _____ p.u** (for entire line length of each collector circuit)
** On 100-MVA and nominal line voltage (kV) Base

11. Inverter-Based Machines

Number of inverters to be interconnected pursuant to this Interconnection Request: _____

Inverter manufacturer, model name, number, and version:

_____

List of adjustable set points for the protective equipment or software:

_____

Maximum design fault contribution current:

_____

Harmonics Charactgerixtics:

_____

Start-up requirements:

_____

Note: A completed General Electric Company Power Systems Load flow (PSLF) data sheet must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device then they shall be provided and discussed at the Scoping Meeting.

12. Load Flow and Dynamic Models (to be provided on DVD, CD, or USB Flash Drive):

Provide load flow model for the generating plant and its interconnection facilities in GE PSLF *.epc format, including new buses, generators, transformers, interconnection facilities. An equivalent model is required for the plant with generation collector systems. This data should reflect the technical data provided in this Attachment A.

For each generator, governor, exciter and power system stabilizer, select the appropriate dynamic model from the General Electric PSLF Program Manual and provide the required input data. For inverter based generating facilities, select the appropriate generator and control models from the General Electric PSLF Program Manual and provide the required input data. **Provide a completed *.dyd file that contains the information specified in this section. One copy of this data should be provided on DVD, CD, or USB flash drive media.**

If you require assistance in developing the models, we suggest you contact General Electric. Accurate models are important to obtain accurate study results. Costs associated with any changes in facility requirements that are due to differences between model data provided by the generation developer and the actual generator test data, may be the responsibility of the generation developer.

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **STG**

NUMBER OF TRANSFORMERS **One (1)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**171/228/285**	**171/228/285**	_____
Connection (Delta, Wye, Gnd.)	**Wye Grounded**	**Delta**	_____
Cooling Type (OA,OA/FA, etc) :	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**	_____
Temperature Rise Rating	**65°C**	**65°C**	_____
Rated Voltage	**230 kV**	**18 kV**	_____
BIL	**900 kV**	**150 kV**	_____
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**12% Z, 10.2% Z0, 42 X/R**	_____	_____
MVA Base	**171**	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	**30 ohms Neutral Grouding Resistor**	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **CTGs**

NUMBER OF TRANSFORMERS **Two (2)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**169/225/282**	**169/225/282**	_____
Connection (Delta, Wye, Gnd.)	**Wye Grounded**	**Delta**	_____
Cooling Type (OA,OA/FA, etc) :	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**	_____
Temperature Rise Rating	**65°C**	**65°C**	_____
Rated Voltage	**230 kV**	**18 kV**	_____
BIL	**900 kV**	**150 kV**	_____
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**12% Z, 10.2% Z0, 42 X/R**	_____	_____
MVA Base	**169**	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	**30 ohms Neutral Grouding Resistor**	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available

Appendix 1 Interconnection Request
INTERCONNECTION REQUEST

Provide **one copy** of this completed form pursuant to Section 7 of this Appendix 1 below.

1. The undersigned Interconnection Customer submits this request to interconnect its Generating Facility with the CAISO Controlled Grid pursuant to the CAISO Tariff (check one):
   - ☐ Fast Track Process.
   - ☐ Independent Study Process.
   - ☐ Queue Cluster Process.
   - ☐ Annual Deliverability Assessment pursuant to GIDAP Section 9.2.
   - ☐ Deliverability Assessment Study for project interconnecting to a Non-Participating TO pursuant to GIDAP Section 9.4.

2. This Interconnection Request is for (check one):
   - ☐ A proposed new Generating Facility.
   - ☐ An increase in the generating capacity or a Material Modification to an existing Generating Facility.

3. Requested Deliverability Status is for (check one):
   - ☒ Full Capacity (For Independent Study Process and Queue Cluster Process only)
     (Note – Deliverability analysis for Independent Study Process is conducted with the next annual Cluster Study – See GIDAP Section 4.6)
   - ☐ Partial Deliverability for _____ % of electrical output
     (for Independent Study Process and Queue Cluster Process ONLY)
   - ☐ Energy Only

4. The Interconnection Customer provides the following information:

   a. Address or location, including the county, of the proposed new Generating Facility site or, in the case of an existing Generating Facility, the name and specific location, including the county, of the existing Generating Facility;

      Project Name: **Alamitos Energy Center**

      Project Location:
      Street Address: **690 N. Studebaker Road**
      City, State: **Long Beach, California**
      County: **Los Angeles**
      Zip Code: **90803**
      GPS Coordinates (decimal format):
      Latitude: **33.76926944** Longitude: **-118.1003139**

   b. Maximum net megawatt electrical output (**as defined by section 2.C. of Attachment A to this appendix**) of the proposed new Generating Facility or the amount of net megawatt increase in the generating capacity of an existing Generating Facility;

      Maximum net megawatt electrical output (MW): **1392.2** ***OR***
      Net Megawatt increase (MW): **0**

c. Type of project (i.e., gas turbine, hydro, wind, etc.) and general description of the equipment configuration (if more than one type is chosen include net MW for each);

☐	Cogeneration	_____ (MW)
☐	Reciprocating Engine	_____ (MW)
☐	Biomass	_____ (MW)
☐	Steam Turbine	_____ (MW)
☒	Gas Turbine	**403.2** (MW)
☐	Wind	_____ (MW)
☐	Hydro	_____ (MW)
☐	Photovoltaic	_____ (MW)
☒	Combined Cycle	**689** (MW)
☒	Storage	

Storage type (e.g. Pumped-Storage Hydro, Battery (w/type), etc.): **Battery**
Maximum Instantaneous Capability: **300 MW (net output at POI; auxilliary and efficiency losses already subtracted)**
Total Storage Capability: **1200 MWh (net output at POI; auxilliary and efficiency losses already subtracted)**
Maximum Charge Duration: **4.5 hours at 300 MW (proportionally longer for lower power)**
Maximum Discharge Duration: **4.0 hours at 300 MW (proportionally longer for lower power)**
Charge/Discharge Cycle Efficiency: **85-90% at POI (for full power cycle; includes auxilliary and efficiency losses)**

☐ Other (please describe): _____ (MW)

_____

General description of the equipment configuration (e.g. number, size, type, etc):
The project is comprised of one 2x1 CCGT block (Block 1), four (4) LMS100 Gas Turbines (Block 2) and 300 MW Battery Energy Storage System (BESS) having a maximum net output of 1392.2 MW. Block 1 is comprised of two (2) Combustion Turbine Generators (CTGs) and one (1) Steam Turbine Generator (STG); each CTG has a maximum gross output of 234.5 MW and the STG has a maximum gross output of 241.1 MW. Whereas, each LMS100 GT (Block 2) has a maximum gross output of 103.3 MW. The BESS will consist of 3 Units each having 2 x 50 MW blocks (net at the POI) connected via a 74/100/124 MVA three-winding GSU transformer.

d. Proposed In-Service Date (first date transmission is needed to the facility), Trial Operation date and Commercial Operation Date in MM/DD/YYYY format and term of service (**dates must be sequential**):

Proposed In-Service Date: **Block 1: 04/01/2019, Block 2: 01/01/2021, BESS: 04/01/2020**
Proposed Trial Operation Date: **Block 1: 11/01/2019, Block 2: 04/01/2021, BESS Unit 1: 05/01/2020, BESS Unit 2: 05/01/2021, BESS Unit 3: 05/01/2022**
Proposed Commercial Operation Date: **Block 1: 04/01/2020, Block 2: 07/01/2021, BESS Unit 1: 01/01/2021, BESS Unit 2: 01/01/2022, BESS Unit 3: 01/01/2023**
Proposed Term of Service (years): **30 years (All blocks)**

The expected retirement schedule of the existing Alamitos units is as follows:
Unit 1: 12/31/2019
Unit 2: 12/31/2019
Unit 3: 12/31/2020
Unit 4: 12/31/2020
Unit 5: 12/31/2019

Unit 6: 12/31/2020
Based on the above, this interconnection request tackles the 2024 operational year and beyond when all the repowering units are online and all the existing units are retired.

e. Name, address, telephone number, and e-mail address of the Interconnection Customer's contact person (primary person who will be contacted);

Name:	**Eric Pendergraft**
Title:	**President**
Company Name:	**AES Alamitos Energy, LLC**
Street Address:	**690 North Studebaker Rd.**
City, State:	**Long Beach, CA**
Zip Code:	**90803**
Phone Number:	**(562) 493-7855**
Fax Number:	**(562) 493-7737**
Email Address:	**eric.pendergraft@aes.com**

f. Approximate location of the proposed Point of Interconnection (i.e., specify transmission facility interconnection point name, voltage level, and the location of interconnection);

230 kV Alamitos Switching Station as shown in the attached General Arrangement/Site Plan.
The CCGT block will interconnect at the SCE 230 kV Alamitos East Switchyard, namely ALMITOSE bus (bus #24006), at a new 230 kV feeder bay to be built to the East of the existing feeder bay of the Barre #1 transmission line. The 4 GTs block as well as the BESS will interconnect at the SCE 230 kV Alamitos West Switchyard, namely ALMITOSW bus (bus #24008), at the existing feeder bays of existing units 4 and 2 respectively. Refer to the one-line diagram separately attached for more information.

g. Interconnection Customer data (set forth in Attachment A)

The Interconnection Customer shall provide to the CAISO the technical data called for in GIDAP Appendix 1, Attachment A. One (1) copy is required.

5. Applicable deposit amount made payable to California ISO. Send check to CAISO (see section 7 for details) along with the:
   a. Interconnection Request for processing.
   b. Attachment A (Interconnection Request Generating Facility Data).

6. Evidence of Site Exclusivity as specified in the GIDAP and name(s), address(es) and contact information of site owner(s) (check one):

Current Title Report is available upon request. Site is an existing generating facility wholly owned by AES.

Plant Manager: Weikko Wirta
690 N. Studebaker Road
Long Beach, CA 90803
(562) 493-7831

☐ Is attached to this Interconnection Request
☐ Deposit in lieu of Site Exclusivity attached, Site Exclusivity will be provided at a later date in accordance with this GIDAP

7. This Interconnection Request shall be submitted to the CAISO representative indicated below:

California ISO
Attn: Grid Assets
P.O. Box 639014
Folsom, CA 95763-9014

Overnight address:
California ISO
Attn: Grid Assets
250 Outcropping Way
Folsom, CA 95630

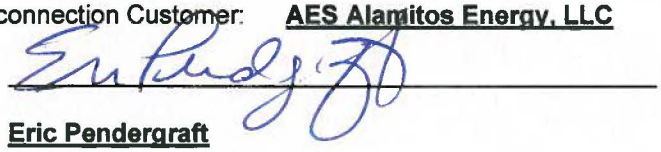
8. Representative of the Interconnection Customer to contact:

[To be completed by the Interconnection Customer]

Name:	**Robert Sims**
Title:	**Project Director**
Company Name:	**AES Alamitos Energy, LLC**
Street Address:	***690 North Studebaker Rd.***
City, State:	**Long Beach, CA**
Zip Code:	**90803**
Phone Number:	**(858) 573-2054**
Fax Number:	**(562) 493-7737**
Email Address:	**Robert.sims@aes.com**

9. This Interconnection Request is submitted by:

Legal name of the Interconnection Customer: **AES Alamitos Energy, LLC**

By (signature): 

Name (type or print): **Eric Pendergraft**

Title: **President**

Date: ____

Project Name: Alamitos Energy Center

Attachment A Generating Facility Data
To GIDAP Appendix 1
Interconnection Request

GENERATING FACILITY DATA

Provide one (1) copy of this completed form pursuant to Section 7 of GIDAP Appendix 1.

1. **Provide one set of original prints (no larger than 11" x 17") or soft copy on cd/flashdrive of the following:**

   A. Site drawing to scale, showing generator location and Point of Interconnection with the CAISO Controlled Grid.
   B. Single-line diagram showing applicable equipment such as generating units, step-up transformers, auxiliary transformers, switches/disconnects of the proposed interconnection, including the required protection devices and circuit breakers. For wind and photovoltaic generator plants, the one line diagram should include the distribution lines connecting the various groups of generating units, the generator capacitor banks, the step up transformers, the distribution lines, and the substation transformers and capacitor banks at the Point of Interconnection with the CAISO Controlled Grid.

2. Generating Facility Information

A. Total Generating Facility rated output (MW): **1423.3 MW**
B. Generating Facility auxiliary Load (MW): **31.1 MW**
C. Project net capacity (A.-B.) (MW): **1392.2 MW**
D. Standby Load when Generating Facility is off-line (MW): **4.62 MW**
E. Number of Generating Units: **Block 1: CCGT comprised of two (2) CTGs and one (1) STG, Block 2: four (4) LMS100 GT, BESS: 3 Units each comprised of 2 blocks**
(Please repeat the following items for each generator)
F. Individual generator rated output (MW for each unit):
CTG (Block 1): 234.5 MW
STG (Block 1): 241.1 MW
GT (Block 2): 103.3 MW
BESS: six (6) x 50 MW net at the POI (the gross output of each BESS block is adjustable to reach 50 MW net output at the POI)
G. Manufacturer: **Block 1: GE & Toshiba for the CTG & STG respectively; Block 2: Brush; BESS: Parker**
H. Year Manufactured: _____
I. Nominal Terminal Voltage (kV): **Block 1: 18 kV; Block 2: 13.8 kV; BESS: 0.4 kV**
J. Rated Power Factor (%):**Blocks 1 & 2: 85% (for all generators); BESS: 100%**
K. Type (Induction, Synchronous, D.C. with Inverter): **Blocks 1 & 2: Synchronous (for all generators); BESS: D.C. with Inverter**
L. Phase (three phase or single phase): **Three phase (for all generators)**
M. Connection (Delta, Grounded WYE, Ungrounded WYE, impedance grounded): **Blocks 1 & 2: Impedance grounded (for all generators); BESS: Delta**
N. Generator Voltage Regulation Range (+/- %):
CTG (Block 1): +/- 5%
STG (Block 1): +/- 5%
GT (Block 2): +/- 20%
BESS: +/- 5%

O. Generator Power Factor Regulation Range: **Blocks 1 & 2: 90% Lagging to 95% Leading (for all generators); BESS: 95% Lagging to 95% Leading**

P. For combined cycle plants, specify the plant net output capacity (MW) for an outage of the steam turbine or an outage of a single combustion turbine **0 MW for an outage of the STG and 337.4 MW for an outage of one of the CTGs**

3. Synchronous Generator – General Information:

(Please repeat the following for each generator model)

A. Rated Generator speed (rpm): **3600 (for all generators)**

B. Rated MVA:
CTG (Block 1): 272 MVA
STG (Block 1): 290 MVA
GT (Block 2): 155.07 MVA

C. Rated Generator Power Factor: **85% lagging (for all generators)**

D. Generator Efficiency at Rated Load (%):
CTG (Block 1): 98.93%
STG (Block 1): 98.87%
GT (Block 2): 98.72%

E. Moment of Inertia (including prime mover):
Each CTG (Block 1): 527,356 lb.ft2
STG (Block 1): 51,045 kg.m2 or 10,454.84 lb.ft2
Each GT (Block 2): 71,891.9 lb.ft2

F. Inertia Time Constant (on machine base) H: _____
5.8043 kW.sec/kVA for each CTG of Block 1,
3.12 kW.sec/kVA for the STG of Block 1,
1.388 kW.sec/kVA for each GT of Block 2 sec or MJ/MVA

G. SCR (Short-Circuit Ratio - the ratio of the field current required for rated open-circuit voltage to the field current required for rated short-circuit current):
CTG (Block 1): 0.5
STG (Block 1): not less than 0.5
GT (Block 2): 0.47

H. Please attach generator reactive capability curves.

I. Rated Hydrogen Cooling Pressure in psig (Steam Units only): **N/A**

J. Please attach a plot of generator terminal voltage versus field current that shows the air gap line, the open-circuit saturation curve, and the saturation curve at full load and rated power factor.

4. Excitation System Information

(Please repeat the following for each generator model)

A. Indicate the Manufacturer **Block 1: GE & Toshiba/Tosmap for the CTGs & STG respectively; Block 2: GE** and Type **Block 1: EX2100e & ESST1A for the CTGs & STG respectively; Block 2: ESAC7B** of excitation system used for the generator. For exciter type, please choose from 1 to 9 below or describe the specific excitation system.

- ☐ (1) Rotating DC commutator exciter with continuously acting regulator. The regulator power source is independent of the generator terminal voltage and current.
- ☐ (2) Rotating DC commentator exciter with continuously acting regulator. The regulator power source is bus fed from the generator terminal voltage.
- ☐ (3) Rotating DC commutator exciter with non-continuously acting regulator (i.e., regulator adjustments are made in discrete increments).
- ☐ (4) Rotating AC Alternator Exciter with non-controlled (diode) rectifiers. The regulator power source is independent of the generator terminal voltage and current (not bus-fed).

☐ (5) Rotating AC Alternator Exciter with controlled (thyristor) rectifiers. The regulator power source is fed from the exciter output voltage.
☐ (6) Rotating AC Alternator Exciter with controlled (thyristor) rectifiers.
☐ (7) Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from the generator terminal voltage.
☐ (8) Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current (compound-source controlled rectifiers system.
☒ (9) Other (specify):
CTG (Block 1): Static Excitation EX2100
STG (Block 1): Static Exciter with controlled (thyristor) rectifiers. The regulator power source is bus-fed from a combination of generator terminal voltage and current.
GT (Block 2): Brushless excitation system with Rotating AC alternator with Permanent Magnet Generator (PMG) exciter

B. Attach a copy of the block diagram of the excitation system from its instruction manual. The diagram should show the input, output, and all feedback loops of the excitation system.
C. Excitation system response ratio (ASA): **CTG: 2.4 pu/s, STG: >2.0 PU, GT: 1.28 Secs-1**
D. Full load rated exciter output voltage: **CTG: 417 Vdc, STG: 479 V, GT: 161 V**
E. Maximum exciter output voltage (ceiling voltage): **CTG: 160% VFFL (100°C) ceiling at Vt = 1.0pu, STG: 1.6 PU of rated field voltage, GT: 338 V**
F. Other comments regarding the excitation system?

_____

5. Power System Stabilizer Information

(Please repeat the following for each generator model. All new generators are required to install PSS unless an exemption has been obtained from WECC. Such an exemption can be obtained for units that do not have suitable excitation systems.)

A. Manufacturer: **CTG: GE, STG: Toshiba, GT: GE**
B. Is the PSS digital or analog? **Digital for all generators**
C. Note the input signal source for the PSS:
☐ Bus frequency ☐ Shaft speed ☐ Bus Voltage
☐ Other (specify source): **CTG: Voltage & Frequency, STG: Power & Frequecy, GT: Voltage & Frequency**
D. Please attach a copy of a block diagram of the PSS from the PSS Instruction Manual and the correspondence between dial settings and the time constants or PSS gain.
E: Other comments regarding the PSS?

_____

6. Turbine-Governor Information

(Please repeat the following for each generator model)

Please complete Part A for steam, gas or combined-cycle turbines, Part B for hydro turbines, and Part C for both.

A. Steam, gas or combined-cycle turbines:

(1) List type of unit (Steam, Gas, or Combined-cycle): **Block 1: Combined-cycle (2 CTGs and 1 STG), Block 2: GT**
(2) If steam or combined-cycle, does the turbine system have a reheat process (i.e., both high and low pressure turbines)? **The STG only**

(3) If steam with reheat process, or if combined-cycle, indicate in the space provided, the percent of full load power produced by each turbine:

Low pressure turbine or gas turbine: **42**%
High pressure turbine or steam turbine: **58**%

B. Hydro turbines:

(1) Turbine efficiency at rated load: **N/A**%
(2) Length of penstock: **N/A**ft
(3) Average cross-sectional area of the penstock: **N/A**ft2
(4) Typical maximum head (vertical distance from the bottom of the penstock, at the gate, to the water level): **N/A**ft
(5) Is the water supply run-of-the-river or reservoir: **N/A**
(6) Water flow rate at the typical maximum head: **N/A**ft3/sec
(7) Average energy rate: **N/A**kW-hrs/acre-ft
(8) Estimated yearly energy production: **N/A**kW-hrs

C. Complete this section for each machine, independent of the turbine type.

(1) Turbine manufacturer: **CTG: GE, STG: Toshiba, GT: GE**
(2) Maximum turbine power output: **CTG: 234.5 MW, STG: 241.1 MW, GT: 103.3** MW
(3) Minimum turbine power output (while on line): **CTG: 0.1 MW, STG: 0.1 MW, GT: 0.1** MW
(4) Governor information:
(a) Droop setting (speed regulation): **CTG: 4%, STG: 5%, GT: 5%**
(b) Is the governor mechanical-hydraulic or electro-hydraulic (Electro-hydraulic governors have an electronic speed sensor and transducer.)? **CTG: Electro-hydraulic, STG: Electro-hydraulic, GT: Servo-Electric**
(c) Other comments regarding the turbine governor system? _____

7. Induction Generator Data:

A. Rated Generator Power Factor at rated load: _____
B. Moment of Inertia (including prime mover): _____
C. Do you wish reclose blocking? ☐Yes ☐No
Note: Sufficient capacitance may be on the line now, or in the future, and the generator may self-excite unexpectedly.

7a. **Wind Generators**

Number of generators to be interconnected pursuant to this Interconnection Request: _____

Average Site Elevation: _____ ☐Single Phase ☐Three Phase

Field Volts: _____
Field Amperes: _____
Motoring Power (MW): _____
Neutral Grounding Resistor (if applicable): _____
I22t or K (Heating Time Constant): _____
Rotor Resistance: _____
Stator Resistance: _____
Stator Reactance: _____
Rotor Reactance: _____
Magnetizing Reactance: _____

Short Circuit Reactance: _____
Exciting Current: _____
Temperature Rise: _____
Frame Size: _____
Design Letter: _____
Reactive Power Required in Vars (No Load): _____
Reactive Power Required in Vars (Full Load): _____
Total Rotating Inertia, H: _____ Per Unit on 100 MVA Base

Note: A completed General Electric Company Power Systems Load Flow (PSLF) data sheet must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device then they shall be provided and discussed at the Scoping Meeting.

8. Generator Short Circuit Data

For each generator model, provide the following reactances expressed in p.u. on the generator base:

- X"1 – positive sequence subtransient reactance: **CTG: 0.165, STG: 0.159, GT: 0.117** p.u**
- X2 – negative sequence reactance: **CTG: 0.165, STG: 0.159, GT: 0.152** p.u**
- X0 – zero sequence reactance: **CTG: 0.110, STG: 0.097, GT: 0.010** p.u**

Generator Grounding (select 1 for each model):

A. ☐ Solidly grounded
B. ☒ Grounded through an impedance
(Impedance value in p.u on generator base R: **CTG: 346.1634, STG: 99999, GT: 726.3479** p.u. X: **CTG: 346.2016, STG: 0, GT: 0** p.u.)
C. ☐ Ungrounded

9. Step-Up Transformer Data

For each step-up transformer, fill out the data form provided in Table 1.

10. Interconnection Facilities Line Data

There is no need to provide data for new lines that are to be planned by the Participating TO. However, for transmission lines that are to be planned by the generation developer, please provide the following information:

Nominal Voltage: **230** kV
Line Length: **Block 1: 0.31 mile**
Block 2: 0.16 mile
BESS: 300 feet
Line termination Points: **Switchyard positions; refer to the one-line diagram for more details**
Conductor Type: **ACSS** Size: **Block 1: 1113 Kcmil Bluejay; Block 2: 1431 Kcmil Bobolink; BESS: 954 Kcmil Redbird**
If bundled. Number per phase: **Block 1: 2, Block 2 & BESS: No**, Bundle spacing: **18**in.
Phase Configuration. Vertical: **X**, Horizontal: _____
Phase Spacing: A-B: **15**ft., B-C: **15**ft., C-A: **30**ft.
Distance of lowest conductor to Ground at full load and 40ºC: **25**ft
Ground Wire Type: **EHS** Size: **197.3 kcmil** Distance to Ground: **65**ft
Attach Tower Configuration Diagram
Summer line ratings in amperes (normal and emergency) **Block 1: 2,206 A Normal & Emergency; Block 2: 1,286 A Normal & Emergency; BESS: 1,021 A Normal & Emergency.**
Positive Sequence Resistance (R): **Block 1: 0.000025; Block 2: 0.000020, BESS: 0.000010** p.u.** (for entire line length)

Positive Sequence Reactance: (X): **Block 1: 0.000307; Block 2: 0.000219, BESS: 0.000080** p.u**(for entire line length)
Zero Sequence Resistance (R0): **Block 1: 0.000156; Block 2: 0.000088, BESS: 0.000034** p.u.** (for entire line length)
Zero Sequence Reactance: (X0): **Block 1: 0.000959; Block 2: 0.000556, BESS: 0.000200** p.u** (for entire line length)
Line Charging (B/2): **Block 1: 0.000683; Block 2: 0.000254, BESS: 0.000088** p.u**
** On 100-MVA and nominal line voltage (kV) Base

10a. For Wind/photovoltaic plants, provide collector System Equivalence Impedance Data Provide values for each equivalence collector circuit at all voltage levels.

Nominal Voltage: _____
Summer line ratings in amperes (normal and emergency) _____
Positive Sequence Resistance (R1): _____ p.u. ** (for entire line length of each collector circuit)
Positive Sequence Reactance: (X1): _____ p.u** (for entire line length of each collector circuit)
Zero Sequence Resistance (R0): _____ p.u. ** (for entire line length of each collector circuit)
Zero Sequence Reactance: (X0): _____ p.u** (for entire line length of each collector circuit)
Line Charging (B/2): _____ p.u** (for entire line length of each collector circuit)
** On 100-MVA and nominal line voltage (kV) Base

11. Inverter-Based Machines

Number of inverters to be interconnected pursuant to this Interconnection Request: **156 2MW AC battery sub-arrays**

Inverter manufacturer, model name, number, and version:
Various

List of adjustable set points for the protective equipment or software:
Set points per CAISO requirements

Maximum design fault contribution current:
Inverter short circuit current contribution is 1.5x rated current at 0.4 kV level for 1 cycle then drops to controlled value

Harmonics Charactgerixtics:
Conforms to IEEE 519

Start-up requirements:
Available in less than one second when synced. When in standby mode, inverter must be closed

Note: A completed General Electric Company Power Systems Load flow (PSLF) data sheet must be supplied with the Interconnection Request. If other data sheets are more appropriate to the proposed device then they shall be provided and discussed at the Scoping Meeting.

12. Load Flow and Dynamic Models (to be provided on DVD, CD, or USB Flash Drive):

Provide load flow model for the generating plant and its interconnection facilities in GE PSLF *.epc format, including new buses, generators, transformers, interconnection facilities. An equivalent model is required for the plant with generation collector systems. This data should reflect the technical data provided in this Attachment A.

For each generator, governor, exciter and power system stabilizer, select the appropriate dynamic model from the General Electric PSLF Program Manual and provide the required input data. For inverter based generating facilities, select the appropriate generator and control models from the General Electric PSLF Program Manual and provide the required input data. **Provide a completed *.dyd file that contains the information specified in this section. One copy of this data should be provided on DVD, CD, or USB flash drive media.**

If you require assistance in developing the models, we suggest you contact General Electric. Accurate models are important to obtain accurate study results. Costs associated with any changes in facility requirements that are due to differences between model data provided by the generation developer and the actual generator test data, may be the responsibility of the generation developer.

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **STG of Block 1**

NUMBER OF TRANSFORMERS **One (1)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**171/228/285**	**171/228/285**	_____
Connection (Delta, Wye, Gnd.)	**Wye Grounded**	**Delta**	_____
Cooling Type (OA,OA/FA, etc) :	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**	_____
Temperature Rise Rating	**65°C**	**65°C**	_____
Rated Voltage	**230 kV**	**18 kV**	_____
BIL	**900 kV**	**150 kV**	_____
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**12% Z, 10.2% Z0, 42 X/R**	_____	_____
MVA Base	**171**	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	_____	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **CTGs of Block 1**

NUMBER OF TRANSFORMERS **Two (2)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**169/225/282**	**169/225/282**	_____
Connection (Delta, Wye, Gnd.)	**Wye Grounded**	**Delta**	_____
Cooling Type (OA,OA/FA, etc) :	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**	_____
Temperature Rise Rating	**65°C**	**65°C**	_____
Rated Voltage	**230 kV**	**18**	_____
BIL	**900 kV**	**150 kV**	_____
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**12% Z, 10.2% Z0, 42 X/R**	_____	_____
MVA Base	**169**	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	_____	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **GTs of Block 2**

NUMBER OF TRANSFORMERS **Four (4)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**73/97/122**	**73/97/122**	_____
Connection (Delta, Wye, Gnd.)	**Wye Grounded**	**Delta**	_____
Cooling Type (OA,OA/FA, etc) :	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**	_____
Temperature Rise Rating	**65°C**	**65°C**	_____
Rated Voltage	**230 kV**	**13.8**	_____
BIL	**900 kV**	**95 kV**	_____
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**10% Z, 8.5% Z0, 34.1 X/R**	_____	_____
MVA Base	**73**	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	_____	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **230 kV / 13.8 kV / 13.8 kV GSUs of BESS**

NUMBER OF TRANSFORMERS **Three (3)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**74/100/124**	**37/50/62**	**37/50/62**
Connection (Delta, Wye, Gnd.)	**Wye Grounded**	**Delta**	**Delta**
Cooling Type (OA,OA/FA, etc) :	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**	**ONAN/ONAF/ONAF**
Temperature Rise Rating	**65°C**	**65°C**	**65°C**
Rated Voltage	**230 kV**	**13.8**	**13.8**
BIL	**900 kV**	**95 kV**	**95**
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**10% Z, 8.5% Z0, 27.3 X/R**	**10% Z, 8.5% Z0, 27.3 X/R**	_____
MVA Base	**37**	**37**	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	_____	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available

TABLE 1

TRANSFORMER DATA
(Provide for each level of transformation)

UNIT **13.8 kV / 0.4 kV GSUs of BESS**

NUMBER OF TRANSFORMERS **One Hundred Fifty-Six (156)** PHASE **Three**

RATING	H Winding	X Winding	Y Winding
Rated MVA	**2.25**	**2.25**	_____
Connection (Delta, Wye, Gnd.)	**Delta**	**Delta**	_____
Cooling Type (OA,OA/FA, etc) :	**ONAN**	**ONAN**	_____
Temperature Rise Rating	**65°C**	**65°C**	_____
Rated Voltage	**13.8 kV**	**0.4 kV**	_____
BIL	**95 kV**	**30 kV**	_____
Available Taps (% of rating)	**±2 x 2.5%**	**N/A**	_____
Load Tap Changer? (Y or N)	**N**	**N**	_____
Tap Settings	**N/A**	**N/A**	_____
IMPEDANCE	H-X	H-Y	X-Y
Percent	**7.5% Z, 6.375% Z0, 10.67 X/R**	_____	_____
MVA Base	**2.25**	_____	_____
Tested Taps	_____	_____	_____
WINDING RESISTANCE	H	X	Y
Ohms	_____	_____	_____

CURRENT TRANSFORMER RATIOS

H_____ X_____ Y_____ N_____

Percent exciting current at 100% Voltage _____ 110% Voltage _____

Supply copy of nameplate and manufacture's test report when available