Appendix A – WDT1650

[redacted]

[redacted]

Queue Cluster 12 Phase II Report

November 20, 2020

This study has been completed in coordination with the California Independent System Operator Corporation (ISO) per Southern California Edison Company's Wholesale Distribution Access Tariff (WDAT), Attachment I Generator Interconnection Procedures (GIP)

Interconnection Study Document History

No.	Date	Document Title	Description of Document
1	11/20/20	Queue Cluster 12 Phase II Appendix A Report	Final Phase II interconnection study report

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ATTACHMENTS

A. INTRODUCTION

[redacted], the Interconnection Customer ("IC"), has submitted a completed Interconnection Request ("IR") to Southern California Edison ("SCE"), the Distribution Provider, for its proposed [redacted] ("Generating Facility"). The IC's IR and/or Attachment B stipulated Full Capacity Deliverability Status ("FCDS") and an Option A selection for the Generating Facility. In addition, the IC requested an In-Service Date ("ISD") and Commercial Operating Date ("COD") of 3/15/2022 and 5/15/2022, respectively. However, the actual in-service dates for the Generating Facility will depend on the duration required for: licensing, engineering, detailed design, and construction associated with the facilities required to interconnect the Generating Facility. The duration for these activities would commence after the Generation Interconnection Agreement ("GIA") for the Generating Facility has been executed or filed at the Federal Energy Regulatory Commission ("FERC") for acceptance and funded.

In accordance with FERC's approved SCE's Wholesale Distribution Access Tariff ("WDAT") Attachment I Generator Interconnection Procedures ("GIP"), the Generating Facility was grouped with Queue Cluster 12 ("QC12") Phase II projects to determine the impacts of the group as well as impacts of the Generating Facility on SCE's Distribution System and the ISO Grid. An Area Report and, where applicable, a Subtransmission Assessment Report have been prepared separately to discuss the combined impacts of all projects on the ISO Grid and to the distribution facilities served out of the [redacted], respectively. This Appendix A report focuses only on the impacts or impact contributions of the Generating Facility to SCE's Electric System and is not intended to supersede any contractual terms or conditions specified in a forthcoming GIA.

B. REPORT OBJECTIVE

SCE performed a QC12 Phase II Study that included the Generating Facility, and this report addresses the results of the analysis.

The report provides the following:

1. Transmission and Distribution system impacts attributed to the Generating Facility.
2. System reinforcements or mitigation necessary to address the adverse impacts attributed to the Generating Facility under various system conditions.
3. A list of required facilities and a good faith estimate of the Generating Facility's cost responsibility and SCE's construction schedule[1], assuming SCE is constructing the required facilities. Such information is provided in Attachment 1 and Attachment 2 as separate documents in the Appendix A report package for the Generating Facility.
4. Identification of potential short circuit duty impacts to Affected Systems served from the Transmission, Subtransmission or Distribution System.

Furthermore, since the Generating Facility encompasses a battery energy storage system ("BESS"), an "As-Available Charging" analysis to determine the charging impacts on SCE's Electric System was

[1] It should be noted that construction is only part of the duration of months specified in the study, which includes final engineering, licensing, and other activities required to bring such facilities into service. These durations are from the execution of the GIA, receipt of: all required information, funding, and written authorization to proceed with design and engineering, procurement, and construction from the IC as will be specified in the GIA to commence the work.

conducted as well. The analyses focused on the Charging Capacity2 aspects of the Generating Facility and considered varying levels of system demand with minimal generation dispatch within the local distribution system.

Accordingly, this report also discloses the following:

a. The adequacy of SCE's Electric System to support the Generating Facility under As-Available Charging Distribution Service ("ACDS").

b. Provides a high-level explanation of potential exposure to the Generating Facility of charging restrictions on the electric system.

c. As-Available Monthly Contract Demand Charge per kW (monthly rate) used to calculate the IC's Generating Facility demand charge rate. Please refer to Attachment 2 of this report for the monthly rate assigned to the IC's Generating Facility.

C. DESCRIPTION OF GENERATING FACILITY

Generating Facility: all equipment and facilities comprising the IC's [redacted] Generating Facility located in the [redacted] as disclosed by the IC in its IR and/or Attachment B, as may have been amended during the Interconnection Study process, as summarized below:

Table A.1: Generation Facility General Information per the IR and/or including Attachment B

[redacted]

[2] Charging Capacity: The load associated with the storage component of the Eligible Customer's Resource charged from the Distribution System that is used for later redelivery of the associated energy, net of Resource losses, to the Distribution System. Charging Capacity does not include load that is subject to the Distribution Provider's retail tariff.

Note: Detailed loss analysis used in defining net capability at high side of main transformer bank and net capacity at the POI

Generation Export Limit for the Generating Facility

The IC has requested a total net capacity of [redacted] as measured at the high-side of the main step-transformer(s) and [redacted] at the POI. The Parties acknowledge that should the Generating Facility exceeds these values or is capable of exceeding these values the IC agrees to: install, own, operate and maintain a control limiting device or, alternatively, limit output by means of configuring the Generating Facility's control system. This is to ensure the Generating Facility does not exceed the total net capacity at the high-side of the main step-up transformer(s) and POI.

As-Available Charging Capacity Limit for the Generating Facility

The IC has requested for a total Charging Capacity under As-Available Charging distribution service of [redacted] as measured at the high-side of the main step-up transformer(s) and [redacted] at the POI. The Parties acknowledge that should the Generating Facility exceed these values or is capable of exceeding these values the IC agrees to: install, own, operate and maintain a control limiting device or, alternatively, limit output by means of configuring the Generating Facility's control system. This is to ensure the Generating Facility does not exceed these total Charging Capacity values at the high-side of the main step-up transformer(s) and POI.

The scope of facilities that will be installed by SCE and the IC for physical interconnection of the Generating Facility, to provide for the requested [redacted] output at the POI taking into account the requested Deliverability, and in support of ACDS resulting from this study are detailed in Attachment 1 to this Appendix A report. The proposed plan for interconnecting the Generating Facility is illustrated in Figure A.1. and Figure A.2 illustrates the proposed location of the Generating Facility. Additional information is provided in Table A.2

Figure A.1: Generating Facility One-Line Diagram

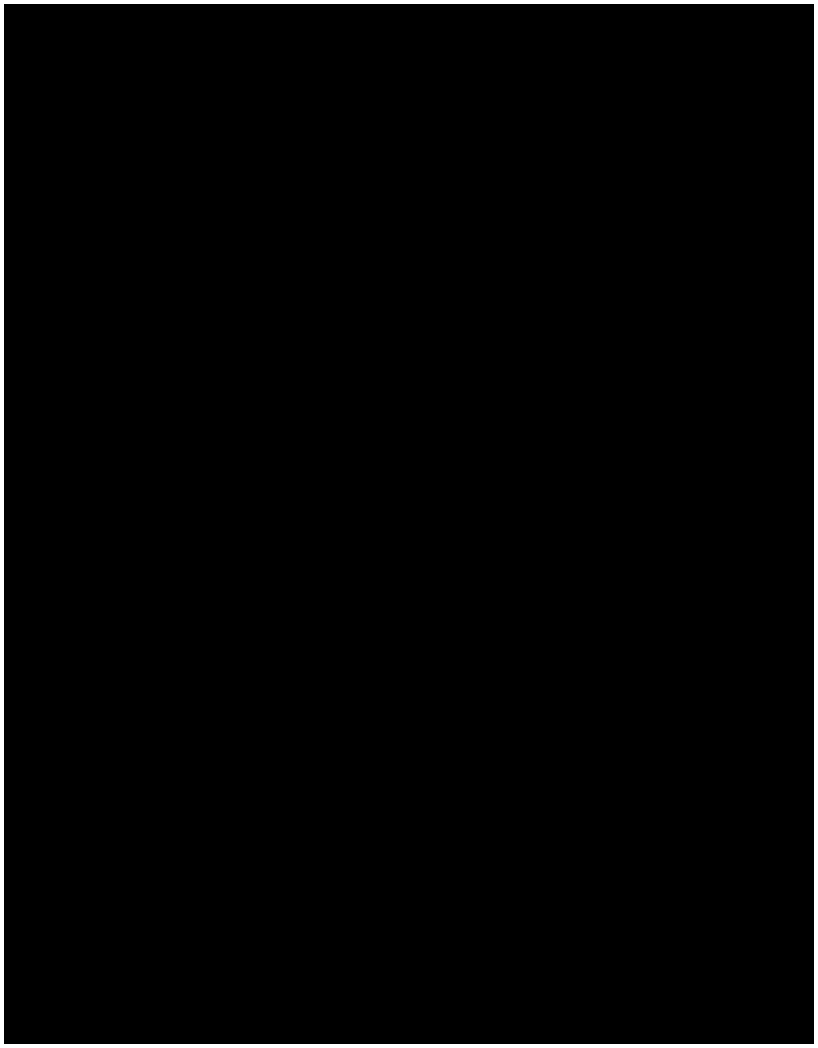

Figure A.2: Generating Facility Location Map

Table A.2: Additional Generating Facility General Information per IR and/or Attachment B

Generating Facility Location	[redacted]
SCE's Planning Area	
Interconnection Voltage	
POI	
Number and Types of Generators	
Requested Maximum Generating Facility Delivery at Point of Interconnection[3]	
Generation Tie Line	
Main Step-Up Transformer(s) Main Transformers T1	
Pad-Mount Transformer(s) Downstream of Main Transformer Bank T1	
Generator Data Downstream of Main Transformer Bank T1	
Generator Auxiliary Load and/or Station Light and Power	
Voltage Regulation Devices Downstream of Main Transformer Bank T1	

D. STUDY ASSUMPTIONS

For detailed assumptions regarding the transmission and subtransmission system, please refer to the Area Report and Subtransmission Assessment Report, respectively. Below are the assumptions specific to the Generating Facility:

[3] The MW output at the POI varies under different operating conditions. The IC is reminded that this value is tied to the generation tie-line (gen-tie) losses. The estimated Maximum Net Output value at POI and gen-tie Losses illustrated above are contingent upon the accuracy of the technical data provided by the IC and are subject to change should the IC change its gen-tie parameters during the final engineering and design phase of the Generating Facility. Please note that the Generating Facility shall not exceed the total net output of 80.0 MW at the POI.

1. The Generating Facility was modeled as described in Table A.1 and A.2 above.

2. Wildfire mitigation measures have been incorporated into all of SCE's construction standards and operational practices. SCE has notified ICs with a proposed project(s) and associated Interconnection Facilities to be in, or interconnecting to, an identified high fire risk area ("HFRA") or high fire risk area circuit ("HFRA circuit"). As a result of implementing these mitigation measures, please be advised that the facilities and their associated costs identified in this Appendix A report (Attachment 1 and Attachment 2) are above and beyond the mitigation identified in previous cluster studies. SCE is implementing these measures to address the heightened wildfire risk in HFRAs and HFRA circuits. In the future, SCE may develop and implement additional mitigation measures in these HFRAs that are not identified in this study as a means of continuously ensuring the safety and reliability of SCEs Electric System and the public it serves. If this occurs prior to in servicing the Generating Facility, additional scope will be included via an addendum to this study report or via Technical Study report outlining the facilities.

3. The facilities that will be installed by SCE and the IC are detailed in Attachment 1.

4. Environmental Activities, Permits, and Licensing.

   The assumptions for the Environmental Activities, Permits, and Licensing are as follows:

   i. SCE's Interconnection Facilities ("IF") and Distribution Upgrades ("DU") needed to interconnect the Generating Facility and provide for the level of service requested for Charging Capacity:

      SCE's scope of work will require a California Public Utilities Commission ("CPUC") license.

      a. SCE's IFs and DUs needed to interconnect the Generating Facility:

         - SCE will file for an "expedited" Certificate of Public Convenience and Necessity or "expedited" Permit to Construct4 by attaching the IC's certified final California Environmental Quality Act ("CEQA") document with SCE's scope of work sufficiently incorporated in lieu of a Proponent's Environmental Assessment ("PEA"). If a CEQA document is not required for the Generating Facility or if the Generating Facility's CEQA document does not sufficiently incorporate SCE's scope of work, SCE may be required to prepare a PEA for SCE's scope of work. In such cases, SCE's assumed environmental work and licensing level of effort will increase, resulting in the need to update cost and duration estimates, and potentially amend the IA.
         - SCE will act as the lead for regulatory agency communication for permits issued to SCE covering SCE facilities.
         - SCE environmental activities may include, but are not limited to, the following:
            - Perform all environmental studies and construction monitoring of SCE internal substation construction activities and provide study results to the IC for inclusion in its environmental documents, if applicable.

[4] See Appendix K of the Area report for additional discussion regarding "expedited" Certificate of Public Convenience and Necessity and "expedited" Permit to Construct.

- Collaborate with the IC during the environmental study phase on the IC's proposed study methodologies and findings, as studies are being planned and performed for SCE's scope of work.
- Review IC's CEQA and/or National Environmental Policy Act ("NEPA") documents, technical studies, surveys, and other environmental documentation to ensure SCE's scope of work is adequately described in such documents (IC will include SCE's scope of work in its environmental documents. If the Generating Facility's CEQA and/or NEPA documents do not sufficiently incorporate SCE's scope of work, SCE's assumed environmental work and permitting level of effort may increase, resulting in the need to update cost and duration estimates, and potentially amend the GIA).
- Review SCE's internal existing technical reports/documents when available.
- Prepare SCE's IF and DU description of the Generating Facility, including scope changes during permitting/pre-construction or construction.
- Communicate scope changes to the IC's environmental team and discuss/approve subsequent actions including new surveys as necessary.
- Complete General Order 131-D Consistency Determination and Environmental Evaluation.
- Regulatory agency communication, consultation, reporting, and acquisition of SCE permits addressing SCE's facilities and scope of work.
- Prepare environmental requirements for construction clearance.
- Develop communication plan.
- Perform pre-construction coordination field visit.
- Provide Environmental Awareness/Worker Environmental Awareness Program ("WEAP") training.
- Perform construction monitoring oversight for IFs and DUs.
- Complete construction and post-construction site assessments.

- IC performs all environmental studies and prepares draft environmental permit applications related to the installation of SCE's IFs and DUs, except for the SCE internal substation activities as described above. The IC's responsibilities include as applicable, but are not limited to: notifications to the Native American Heritage Commission ("NAHC") and follow-up notifications to the tribes and individuals in the NAHC contact list; performing cultural and paleontological resources records searches, cultural resources inventories (survey and recording), testing and evaluation and/or data recovery of archaeological sites, and appropriate documents in the form of inventory reports, research design and/or data recovery reports; cultural and paleontological monitoring when/if required, and arranging curation agreements for artifacts and fossil specimens collected; performing a California Natural Diversity Database search, habitat assessment, and protocol or focused surveys for species with the potential of occurring in identified suitable habitat; conducting jurisdictional delineations for wetlands or other regulated waters; preparing draft environmental permit applications, pre-construction biological resource surveys for IFs and DUs, biological resource monitoring during construction for IFs and DUs, and cultural and paleontological monitoring during construction for IFs and DUs; mitigation costs including, but not limited to, offsite/compensatory mitigation and onsite restoration, and developing mitigation plans or other environmental reports or submittals to support installation of SCE's IFs and DUs.

- Prior to commencing work and during execution of work, the IC should collaborate and obtain SCE concurrence on all work outlined above. The IC is advised that should the environmental studies and resulting reports not meet the industry standards utilized in the State of California and/or by SCE in accordance with Applicable Laws and Regulations, as determined by SCE, the IC shall be required to remedy all deficiencies under SCE's direction.
- The estimated costs provided in this study assume that the IC will perform part of the environmental scope of work that would normally be performed by SCE for SCE-owned IFs and DUs, if applicable, to interconnect the Generating Facility. The IC shall provide SCE a signed declaration summarizing the actual costs for work performed by the IC within thirty (30) calendar days from the Generating Facility's ISD. The IC acknowledges and accepts that these costs will be subject to an Interconnection Facilities Charge, a Distribution Facilities Charge, if applicable, and Income Tax Component of Contribution ("ITCC").
- As a requirement for Interconnection Customers electing to share the responsibility to perform the Environmental Activities for SCE-owned IFs, DUs as disclosed above, and to ensure proper accounting of costs used in the calculation of the ITCC and Operations & Maintenance ("O&M") charges, referred to as an Interconnection Facilities Charge and/or a Distribution Upgrades Charge, if applicable in the forthcoming GIA for the Generating Facility, the IC is required to complete and submit an Environmental Services Costs Declaration for SCE-owned IFs and/or DUs required to interconnect the Generating Facility . An authorized representative of the IC will sign the Form attesting to the actual costs spent on environmental services work that would otherwise have been performed by SCE for SCE-owned IF and/or DUs required to interconnect the Generating Facility.

  The declaration shall be provided to SCE by a specified date in the Generating Facility's forthcoming GIA Appendix B - Milestone table. Should the IC fail to provide the declaration by the specified deadline, SCE will hold the IC in default of the GIA pursuant to the terms therein. The costs declared by the IC in the declaration, once approved, will be used by SCE to adjust the ITCC and the applicable monthly O&M charges for the Generation Facility and will be reflected via an amendment to the GIA upon true-up.

  The information stated in the declaration is subject to review and/or audit by SCE pursuant to the terms and conditions in the forthcoming GIA. Should an audit be deemed necessary by SCE, the IC will need to provide supporting documentation (copies of invoices/receipts) to substantiate the costs stated in the declaration within ten (10) business days from receipt of notice.

b. SCE's Shared DUs assigned to the Generating Facility and needed to interconnect the Generating Facility:

- SCE will perform all required environmental studies, prepare environmental permit applications, obtain required environmental permits, and perform monitoring of all SCE construction activities related to the installation of SCE's Shared DUs.
- Under certain circumstances, SCE's Shared DUs may need to be described and analyzed as part of the IC's CEQA and/or NEPA documents for the Generating

Facility. Further coordination to discuss these circumstances may occur during GIA negotiations and/or after GIA execution. Any changes to the environmental and licensing assumptions may result in the need to update cost and duration estimates, and potentially amend the GIA.

ii. SCE's Reliability Network Upgrades ("RNUs") and Delivery Network Upgrades ("DNUs") assigned to the Generating Facility: No Environmental activities were assumed as no environmental impacts were identified based on the RNUs and DNUs that will be installed by SCE disclosed in Attachment 1.

iii. For further details on the environmental evaluation and permitting/licensing requirements for generation interconnection projects, refer to Appendix K of the Area report.

5. Energy Storage Considerations:
   - SCE currently offers ACDS pursuant to SCE's WDAT Energy Storage filing under Docket No. ER19-25055 accepted by FERC and effective October 30, 20196. Interconnection customers will be assessed an As-Available Monthly Contract Demand Charge per kW (monthly rate) in addition to the mitigation costs identified in this Study. The monthly rate is based on the POI and the type of facilities used by the IC's Generating Facility to charge its BESS from SCE's Distribution System. Please refer to Attachment 2 of this Study for the monthly rate assigned to the IC's Generating Facility.
   - SCE's Distribution Standards and Practices are in the process of being updated to address BESS facilities. The proposed Plan of Service in this report may require changes to comply with SCE's Distribution Standards and Practices.
   - This study assumes that the Generating Facility will include all equipment, software, appropriate controls, and other related equipment necessary to maintain Charging Capacity restrictions per SCE's requirements.
   - In order to ensure limits are communicated in a timely and reliable manner, the IC is responsible for providing reliable communication between the Generating Facility and SCE to transmit the required telemetry data as outlined in SCE's Interconnection Handbook. Should the communication channel fail, the Generating Facility's operating limits will automatically revert to zero (no charging allowed).
   - If the Generating Facility does not follow the given charging limitations, the Generating Facility will be disconnected.
   - The preliminary charging analysis discussed in this report assumed that Charging Capacity is curtailable before wholesale and retail load, and this assumption was used to determine the charging restrictions mentioned in this report for the Generating Facility. The BESS component of the Generating Facility will need to be metered separately. The IC is required to install multiple sets of metering (i.e. separate sets of potential transformers & current transformers and supporting metering equipment) for the Generating Facility.
   - SCE plans to deploy the Constraint Management System ("CMS") to implement real time charging restrictions for BESS projects electing to receive ACDS on an interim basis while the Distributed Energy Resource Management System ("DERMS") is completed. However, there are certain situations where a BESS project will not be able to participate in either CMS or DERMS. These situations include but are not limited to:

[5] Link: https://www.ferc.gov/CalendarFiles/20200124142753-ER19-2505-001.pdf

[6] FERC accepted SCE's proposed WDAT revisions effective October 30, 2019 subject to refund, and established hearing and settlement judge procedures

1. the project does not intend to use a dedicated RTU
2. the ACDS study results identified thermal overloads on subtransmission lines
3. inability to monitor overloaded facilities properly to enable ACDS

Any project that falls into one of the situations listed above, will not be able to participate in either CMS or DERMS and the only means available to the BESS project to receive ACDS is through a safety charging schedule provided to the IC that will be updated on an as-needed basis as new BESS projects interconnect, or at a very minimum once a year to adjust the charging schedule in accordance to the annual load forecast.

BESS projects deemed CMS compatible, will be added to the CMS on an interim basis until such time the project is migrated over to the DERMS once its operational.

6. Other Items to Consider:
   - [redacted]

E. TECHNICAL REQUIREMENTS[7]

1. **Preliminary Protection Requirements**
   Protection requirements are designed and intended to protect SCE's electric system only. The preliminary protection requirements were based upon the interconnection plan as shown in the one-line diagram depicted in line item #4 in Attachment 1.

   The IC is responsible for the protection of its own system and equipment and must meet the requirements in the SCE's Interconnection Handbook.

2. **Power Factor Requirements**
   The Generating Facility will be required to maintain a composite power delivery at continuous rated power output at the terminals of the Electric Generating Unit at a power factor within the range of 0.95 leading to 0.90 lagging.

3. **Operating Voltage Requirements**
   Under real-time operations, the Generating Facility will be required to operate under the control of automatic voltage regulator with settings as shown in the figure below. The actual values of the Vmin and Vmax will be provided once the Generating Facility executes a Generation Interconnection Agreement ("GIA") and final engineering and design is complete. The Vmin and Vmax values are to be used as the basis for setting up the automatic voltage control mode (with its automatic voltage regulator in service and controlling voltage) of the Generating Facility in order to maintain scheduled voltage at a reference point.

[7] The IC is advised that it shall comply with mandatory regulatory standards of but not limited to FERC/NERC/WECC/CPUC and there may be technical requirements in addition to those that outlined above in Section C of this report that are included in the SCE's Interconnection Handbook or that will be addressed in the Generating Facility's GIA.

4. **Harmonic Requirements**
   The harmonic impact of the subject inverter-based generation was not part of this study. Impacts on voltage distortion levels may be significant due to the penetration level of the Generating Facility with respect to the local distribution grid strength. As with all equipment connected to SCE's Electric System, the Generating Facility will be subject to the provisions of CPUC Rule 2.E, allowing SCE to require the IC to mitigate interference with service to other SCE customers, including harmonic impacts, if the harmonic interference is caused by the IC.

5. **Sub-Synchronous Control Interaction**
   A detailed screening for Sub-Synchronous Control Interaction ("SSCI") was performed as part of the Phase II study utilizing the technical data in PSLF format (epc and dyd files) provided by the IC. The detailed screening will identify if a detailed Power System Computer Aided Design ("PSCAD") model of the Generating Facility and associated control systems, along with the manufacturer representative's contact information, may be required for further SSCI analysis. If a complete SSCI study is required using the Generating Facility PSCAD model, this will be done as part of execution for the Generating Facility and will need to be completed prior to Initial Synchronization Date of the Generating Facility. The SSCI study will identify potential controls interaction that will need to be mitigated by the IC. Any identified mitigation shall be at the expense of the IC.

   Conventional synchronous generating facilities are susceptible to Sub-synchronous Interactions including Sub-synchronous Resonance ("SSR") and Sub-synchronous Torsional Interactions ("SSTI") The IC will be 100% responsible for conducting any studies related to SSR or SSTI including screening and/or final engineering studies. The IC will be responsible for performing a SSR or SSTI study as part of project execution and will need to be completed prior to Initial

Synchronization Date of the Generating Facility. The SSR or SSTI study will identify any mitigation(s) that will be required. Any identified mitigation shall be at the expense of the IC.

Synchronous generators close to series compensated transmission line and all inverter-based generators are required by the ISO Transmission Planning Process Business Practice Manual8 to submit an electromagnetic transient model. The PSCAD model, if required, must be submitted within one hundred twenty (120) calendar days after to achieving its COD, or from the date of request made by the ISO, whichever is later.

Please refer to Section G for the results of the SSCI screen.

6. **Low/High Voltage Ride-Through ("LHVRT") and Low/High Frequency Ride-Through ("LHFRT") Capability**
Consistent with PRC-024, the Generating Facility may not trip or cease to inject current within the "no-trip" zone of the frequency and voltage ride through curves of PRC-024. Momentary cessation—ceasing to inject current during a fault—is prohibited unless transient high voltage conditions rise to 1.20 per unit or more. For transient low voltage conditions, the Generating Facility will inject reactive current directionally proportional to the decrease in voltage. The inverter must produce full rating reactive current when the AC voltage at the inverter terminals drops to a level of 0.50 per unit and must continue to operate and attempt to maintain voltage for transient voltage conditions between 1.10 and 1.20 per unit. In addition, the Generating Facility may not trip or cease to inject current for momentary loss of synchrony within the no-trip zone of PRC-024.

7. **Primary Frequency Response Requirement**
Per FERC Order 842, the IC is required to install a governor or equivalent controls with the capability of operating: (1) with a maximum 5 percent droop and ±0.036 Hz deadband; or (2) in accordance with the relevant droop, deadband, and timely and sustained response settings from the Approved Applicable Reliability Standards providing for equivalent or more stringent parameters. The IC shall ensure that the Electric Generating Unit's real power response to sustained frequency deviations outside of the deadband setting is automatically provided and shall begin immediately after frequency deviates outside of the deadband, and to the extent the Electric Generating Unit has operating capability in the direction needed to correct the frequency deviation.

Per FERC Order 841, nuclear generating facilities and certain Combined Heat and Power ("CHP") facilities are exempt from these primary frequency response requirements.

An operating range shall be identified in the GIA that specifies a minimum state of charge and a maximum state of charge between which the electric storage resource will be required to provide primary frequency response. The GIA shall also specify whether the operating range is static or dynamic; in addition, the operating range is subject to reevaluation and modification by SCE in consultation with the IC and ISO.

F. RELIABILITY STANDARDS, STUDY CRITERIA AND METHODOLOGY

- **Study Criteria**

[8] https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Transmission%20Planning%20Process

The generator interconnection studies were conducted to ensure the ISO Grid follows the North American Electric Reliability Corporation ("NERC") reliability standards, WECC regional criteria, and the ISO planning standards. Refer to Section C of the Area Report for details of the applicable reliability standards, study criteria, and methodology. In addition, the Subtransmission Assessment was performed in compliance with SCE's Subtransmission Planning Criteria and Guidelines.

- **SCE Short Circuit Duty Study Methodology**
  All bus locations where the Phase II projects increased the Short Circuit Duty ("SCD") by 0.1 kA or more and where duty was found to be in excess of 60% of the minimum breaker nameplate rating are listed in the Area Report (Appendix H) and applicable Subtransmission Assessment Report (Attachment 7). These values have been used to determine if any SCE equipment is overstressed and associated mitigation. Similarly, this information is also utilized to identify any SCE-owned substations that may require a ground grid study.

  The responsibility to finance the SCD mitigation(s) identified in the Phase II Study due to increases in SCD, shall be assigned pro rata to all projects requiring the SCD mitigation based on their respective SCD contribution.

- **Coordination with Affected Systems**
  Per GIP section 3.7, SCE will notify the Affected System Operators that are potentially affected by an IC's IR or group of interconnection requests subject to a Group Study. SCE will coordinate the conduct of any studies required to determine the impact of the IR on Affected Systems with Affected System Operators and, if possible, include those results (if available) in its applicable Interconnection Study within the time frame specified in the GIP. SCE will include such Affected System Operators in all meetings held with IC as required by the GIP. IC will cooperate with SCE in all matters related to the conduct of studies and the determination of modifications to Affected Systems. A transmission provider which may be an Affected System shall cooperate with SCE with whom interconnection has been requested in all matters related to the conduct of studies and the determination of modifications to Affected Systems.

G. STUDY RESULTS

1. ISO controlled facilities (Bulk Level Facilities)

a. Generation Export Analysis

i. Steady State Power Flow Reliability Analysis

[redacted]

ii. Transient Analysis

Refer to the Area Report for additional details pertaining to the transient stability evaluation criteria and assessment results on the Bulk System, respectively.

b. Deliverability Assessment

Section I – Deliverability Assessment Results of this report provides information on any Delivery Network Upgrades (Local or Area) assigned to the Generating Facility, if any.

c. SCD Analysis

i. SCE-owned Facilities

[redacted]

ii. SCE's Ground Grid Duty Concerns

[redacted]

iii. SCD Considerations

[redacted]

d. As-Available Charging Analysis

[redacted]

2. Non-ISO controlled Subtransmission System (66 kV or 115 kV)

a. Generation Export Analysis

i. Steady State Power Flow Analysis

1. **Thermal Overloads**
   The subtransmission assessment indicates that the Generating Facility contributes to overloads on subtransmssion facilities under normal, single, and multiple contingency conditions. The details of the analysis with overload level information, and associated recommended mitigation, is provided in the corresponding Subtransmission Assessment Report. Provided below is a summary of this information.

   I. Normal Conditions
   - [redacted]

   II. Single Contingency
   - [redacted]

2. **Power Flow Non-Convergence**
   There were no non-convergence issues identified with the inclusion of the Generating Facility operating at the required power factor range; refer to Area Report and/or Subtransmission Assessment Report for additional details.

3. **Voltage Performance**
   There were no voltage performance issues identified with the inclusion of the Generating Facility; refer to Area Report and/or Subtransmission Assessment Report for additional details.

4. **Required Mitigations**
   To mitigate the system issues that the Generation Facility triggers or contributes to as the identified above, additional system upgrades are required. As a result, the following required system upgrades are assigned to the Generating Facility

   a. [redacted]

   b. [redacted]

   The details of the analysis and overload levels are provided in the corresponding Subtransmission Assessment Report.

   In addition, the Generating Facility got assigned systemwide relay coordination study due to the IC's transformer configuration (wye-grounded on the high side).

   Please refer to Attachment 1 and Attachment 2 for additional scope and costs information.

5. **Line Loss Analysis for Generating Facility**
   Based on the technical data provided for the individual generator unit(s), the collector system equivalent, pad-mount and main transformer banks, the internal Generating Facility losses are shown in Table 1. In addition, losses incurred on the generation tie

line are shown in Table 2 below. The Generating Facility losses identified represent those assuming the Generating Facility is limiting its output at the high side of the main transformer bank to achieve the desired MW delivery at the POI.

[redacted]

a. Power Factor Evaluation

FERC Order 827 provides the reactive power requirements for newly interconnecting non-synchronous generators which requires these resources to design the facility to be capable of providing reactive power to meet power factor 0.95 as measured on the high-side of the IC's substation or other equivalent location. This capability should be dynamic.

Base case power flow was evaluated to determine reactive power losses internal to the Generating Facility in order to ascertain if the reactive capability of the Generating Facility is adequate to supply these losses and meet the power factor requirements. A summary of the power factor evaluation is provided in the table below.

	[redacted]
Generating Facility MW Output at Terminal (MW)	
Ambient Temperature for Generator Capability (^{o}C)	
Effective Power Factor at Generator Terminal	
Generating Facility MW at High Side of the Transformer (MW)	
Padmount transformer losses (MVar)	

Main transformer losses (Mvar)	[redacted]
PF Requirements at High Side of Transformer (Mvar)	
Total VAR Requirements (Mvar)	
Power Electronics Freemaq PCS ES Inverters at Pgen (Mvar)	
Shunt Capacitors (Mvar)	
Total VAR Supply (Mvar)	
Total Dynamic VAR Supply (Mvar)	
Total Reactive Power (Shortage) / Surplus Total Requirements less Total Supply	
Dynamic Reactive Power (Shortage) / Surplus PF Requirements at High Side of Transformer less Total Dynamic VAR Supply	

Based on the technical details provided, the Generating Facility, as proposed, has the capability to meet 0.95 power factor requirement as measured at the high-side of the IC's substation or other equivalent location during normal operating temperatures. However, during record temperatures the Generating Facilities does not have the capability to meet 0.95 power factor requirements as measured at the high-side of the IC's substation or other equivalent location. Additional reactive power resources may need to be installed to address the Generating Facility reactive power deficiencies. These additional reactive power resources shall be dynamic and can be provided with adding additional inverters or installation with dynamic VAR devices.

b. Subsynchronous Interaction Evaluations

As part of the QC12 Phase II study a detailed screening for SSCI was performed utilizing the technical data in PSLF format (epc and dyd files) provided[9] by the IC for the Generating Facility to determine if a detailed SSCI study is needed. The SSCI screen determined that the Generating Facility does not require a detailed SSCI analysis. However, as previously mentioned in Section E.5 of this report, all inverter-based generators are required by the CAISO Transmission Planning Process Business Practice Manual[10] to submit the final Power System Computer Aided Design ("PSCAD") of the Generating Facility.

Please refer to Appendix L of the Area report for details on the study and Attachment 1 for additional requirements after the Generating Facility achieves commercial operation.

c. Transient Analysis

i. Generating Facility Performance

[9] Any changes from the data provided will need to be re-evaluated by SCE in accordance with the Material Modification Process per GIDAP Section 6.7.2.

[10] https://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Transmission%20Planning%20Process

Dynamic simulation study results illustrating the frequency and voltage performance of the Generating Facility based on the technical parameters supplied for the Generating Facility are provided below.

Voltage and Frequency Plots for Generating Facility at the high-side of the IC's substation or other equivalent location with fault at POI

Power Output Flow Plots for Generating Facility at inverter terminal with fault at POI

The results indicate acceptable performance and reflect the expected performance when Generating Facility ultimately interconnects.

ii. System Performance

d. SCD Analysis

i. SCE's Ground Grid Duty Concerns

ii. SCD Considerations

[redacted]

e. As-Available Charging Analysis

i. Steady State Power Flow Analysis

1. Thermal Overloads

The subtransmission assessment study indicated that the Generating Facility contributes to overloads on the following facilities listed below under normal, single contingency, and multiple contingency conditions. The details of the analysis and overload levels, as well as the details of the recommended mitigation to address these overloads, are provided in the corresponding Subtransmission Assessment Report(s). Provided below is a summary of the overloaded facilities under normal, single contingency, and/or multiple contingency conditions.

I. Normal Conditions

[redacted]

II. Single Contingency

[redacted]

2. Power Flow Non-Convergence

[redacted]

3. Voltage Performance

[redacted]

4. **Power Factor Requirement under As-Available Charging operation of the Generating Facility**

[redacted]

5. **As-Available Charging Restrictions of the Generating Facility**

[redacted]

1. [redacted]
2. [redacted]
3. [redacted]
4. [redacted]
5. [redacted]

[redacted]

6. **Implementation of ACDS Charging Restrictions for the Generating Facility**

The Generating Facility is in a location that is not CMS ready. The SCE system facilities that require monitoring do not have the data points necessary to properly inform CMS of their real time status and/or the Generating Facility is less than 10 MW and currently does not have a dedicated RTU assigned. Additional Distribution Upgrades, that are not required in support of discharge operations, are needed to enable charging restrictions to be implemented via the CMS/DERMS. Therefore, the charging restrictions cannot be implemented utilizing CMS; and the Generating Facility does not qualify to be added to CMS. The charging restrictions for the Generating Facility will be implemented via a static safety charging schedule that will be updated on an as-needed basis as new BESS projects interconnect, or at a very minimum once a year to adjust the charging schedule in accordance to the annual load forecast. The IC will be responsible for implementing the required logic in their BESS control limiting device to curtail charging in order to follow the static safety charging schedule, and will be required to demonstrate that the BESS limiting device of the Generating Facility is able to follow the static safety charging schedule.

Refer to Attachment 1 and Attachment 2 for scope description and associated cost responsibility for implementing the static safety charging schedule for the Generating Facility.

NOTE: If the location becomes CMS ready in the future as a result of data points being made available from future generation interconnections, a determination of whether the Generating Facility could be added to CMS and then migrated over to DERMS could be done via a technical assessment performed by SCE, at the IC's request and expense, when such potential is identified by SCE. [redacted]

H. AFFECTED SYSTEMS SCD RESULTS

The specific SCD contribution from the Generating Facility to Neighboring Utilities is outlined in Table F.1 below. Impacts on the Affected Systems with the addition of all QC12 Phase II projects, are provided in the Area Report (Section H.2), and in Attachment 7.

Table F.1: Short-Circuit Duty Evaluation of Neighboring Utilities Impacted by the Generating Facility

[redacted]

I. DELIVERABILITY ASSESSMENT RESULTS

1. **On Peak Deliverability Assessment**
   The Generating Facility does not contribute to any on-peak deliverability constraints.

2. **Off- Peak Deliverability Assessment**
   The Generating Facility does not contribute to any off-peak deliverability constraints

3. **Required Mitigations**
   No mitigation is required.

J. INTERCONNECTION FACILITIES, NETWORK UPGRADES, AND DISTRIBUTION UPGRADES

Please see Attachment 1 for SCE's IF's, RNU's, DNU's[11], and DU's allocated to the Generating Facility for physical interconnection, to provide for the requested MW export at the POI taking into account the requested Deliverability, and in support of ACDS. Please note that SCE considered current system configuration, approved SCE sponsored projects, and all queued generation in determining scope for IFs and/or Plan of Service but will not "reserve" the identified scope of upgrades for the proposed POI unless a GIA is executed per the specified timelines shown in Tale L.1.

[11] At the IC's discretion, the IC or parties other than SCE pursuant to Section 10 2 under GIP may construct an Option (B) Generating Facility Area Delivery Network Upgrades (ADNUs) not allocated TP Deliverability. If SCE does not construct the ADNUs, the IC is not required to make the third Interconnection Financial Security posting to SCE pursuant to Section 4.8.4.2.1 under GIP.

K. COST AND CONSTRUCTION DURATION ESTIMATE

I. Cost Estimate

The Generating Facility's estimated interconnection costs, adjusted for inflation and provided in 'constant' 2020 dollars escalated to the Generating Facility's feasible COD (as identified below in Table L.1), are provided in Attachment 2 and the Generating Facility's allocated cost for shared network upgrades are provided in Attachment 3 to this Appendix A report. Furthermore, Attachment 2 includes the IC's Generating Facilities Charging Capacity rate as it relates to ACDS. The interconnection costs will be documented in the forthcoming GIA for the Generating Facility. However, should there be a delay in executing the GIA beyond 2021, a new cost estimate adjusted for inflation will be required and reflected into the GIA.

II. Preliminary Durations for SCE Engineering, Design, and Construction to enable interconnection of the Generating Facility

The duration shown in Table K.1 represents the estimated time needed for SCE to design, procure, and construct the applicable facilities with the start date of the duration based on the effective date of the GIA; and necessarily include timely receipt of all required information and written authorizations to proceed ("ATP"), and timely receipt of construction payments and financial security postings and other milestones. The durations for the facilities identified for the Generating Facility is as follows:

Table K.1 Estimated Execution Duration

Facilities	Description	Duration	Notes
Interconnection Facilities (IF)	Facilities described in Section 1.b of Attachment 1	[redacted]	2,3
Reliability Network Upgrades (RNU)	No required RNU were identified in the Phase II Interconnection Study	NA	NA
Area Delivery Network Upgrades (ADNU)	Because the Generating Facility elected to proceed under Option A, no Area Delivery Network Upgrades were identified for the Generating Facility in the Phase II Interconnection Study	NA	NA
Local Delivery Network Upgrades (LDNU)	No required LDNUs were identified in the Phase II Interconnection Study	NA	NA
Distribution Upgrades (DU)	DUs described in Section 3 of Attachment 1	[redacted]	1,2,3

SCE Notes for SCE Facilities Timelines Identified in Table K.1:

1. **Construction Duration Estimates for Identified Upgrades**
   Any construction durations identified in this section may vary. During the cluster study process, SCE includes all queued and active generation projects without regard to corresponding desired in-service dates or actual status to identify system upgrades, including SCD related upgrades, and a duration for SCE to build them. Such duration affects the ISD for this specific Generating Facility. As status for queued projects change (withdrawals, downsizing, suspensions, or deferred in-service dates), SCE may be able to accelerate in-service dates for projects affected by status changes. Furthermore, SCE will only begin design/construction of an identified system upgrade when enough projects 1) execute and fund a GIA and/or a Letter of Agreement with SCE and 2) those projects trigger the need for an upgrade.

2. **Coordination of Environmental Work**
   Where this study assumes that the IC will perform environmental work related to the installation of SCE's IFs, and DUs as specified in this report, the IC is advised that any durations provided above assume so and that the IC will perform this environmental work related to the installation of SCE's IFs and/or DUs specified in this report and will perform them in parallel with SCE's preliminary design and engineering. The IC is expected to engage SCE to obtain concurrence prior to commencement of any environmental work and during execution of that work. Since SCE will be using the IC's environmental documents and/or work products, IC delays producing them may delay SCE's ability to obtain required permits and/or license(s). Such delays would likely cause additional delays in the commencement of SCE's final engineering, procurement, and construction. These delays could increase any durations identified in this report and push out the feasible ISD provided in Table L.1 ISD and COD Assessment.

3. **Substation Standard Durations**
   The standard duration for the identified facilities is 46 – months. The duration could be reduced to 39 months on the condition the IC agrees, in writing, to have SCE perform the design, engineering, and procurement in parallel with the licensing effort for the Generating Facility. If the IC accepts the 39 month duration conditions, it is with the acknowledgment that the GIA payment schedule will be front loaded and the 3rd IFS posting will be required earlier than under the standard duration. If the IC accepts the conditions associated with the 39-month duration, SCE will tender an addendum to the report within the prescribed timelines in the GIP.

L. IN-SERVICE DATE AND COMMERCIAL OPERATION DATE ASSESSMENT

An ISD and COD assessment was performed for the Generating Facility to establish SCE's estimate of the earliest achievable ISD based on the cluster study process timelines and the time required for SCE to complete the facilities needed to enable physical interconnection as an Interim Deliverability or Energy Only Deliverability interconnection (as applicable) for the Generating Facility. This date

may be different from the IC's requested ISD and will be the basis for establishing the associated milestones in the draft GIA.

1. ISD Estimation Details

For the QC12 Phase II Interconnection Study, the estimated earliest achievable ISD is derived by the time requirements to complete the following:

1. QC12 Interconnection Study Process
2. Tender a draft GIA
3. Negotiate and execute the GIA
4. Longest duration associated with the facilities required to interconnect the Generating Facility (i.e., IF, RNU, and DU), per the durations specified in table K.1. above.

Table L.1 ISD and COD Assessment

Action or Assumption	Calendar Days or Months for Calculation	Item Description
		Issuance of Phase II Interconnection Study Report
Add:	30 CD	Phase II Results Meetings
Starting Point:		**For WDTs the assumption is that the TPD Results issued and IC response provided before starting the draft GIA** *(the IC does have the option to start the GIA negotiation earlier)*
Add:	30 CD	Earliest reasonable Tender draft GIA
Add:	90 CD	GIA negotiation time, execution, and related activities
Add: Construction Duration (Months)	[redacted]	Construction duration outlined in the Phase II Study Report. Construction completion no earlier than date which reflects earliest ISD
Reference:		IC-requested ISD via Attachment B
Reference:		IC-requested COD via Attachment B
		Duration difference between ISD and COD (months)
Equals:		Earliest achievable In-Service Date (ISD) per estimated construction duration
		Earliest achievable Commercial Operation Date (COD) (Using difference between ISD and COD requested by IC)

Notes on the Achievable ISD and COD calculation:

1) This calculation assumes that the duration to construct those facilities required for an Interim Deliverability Interconnection or Energy Only interconnection (as applicable) for the Generating Facility until the applicable DNUs are completed.
2) The construction durations shown represent the estimated amount of time needed to design, procure, and construct the facilities with the start date of the duration based on the effective date of the GIA; and necessarily include timely receipt of all required information and written authorizations to proceed ("ATP"), and timely receipt of construction payments and financial security postings and other milestones.
3) The IC-requested dates are specified in the Generating Facility's IR and/or Attachment B. Actual ISD, Initial Synchronization Date, and COD will depend on licensing, engineering, detailed design, and construction requirements to interconnect the Generating Facility after the GIA has been executed or filed at the FERC for acceptance. Table L.1 provides SCE's preliminary estimated achievable ISD and COD for the Generating Facility.
4) Assumes that GIA is tendered after the Transmission Plan Deliverability ("TPD") allocation results are disclosed.

2. ISD Conclusion

[redacted]

SCE can reasonably tender a draft [redacted]. The draft GIA should be executed and/or filed at FERC no later than [redacted] and will include the earliest ISD and COD as identified in Table L.1.

The ISO will perform its [redacted] and TPD allocation[12] ([redacted]. Any changes in scope, cost, or schedule requirements that come out of ISO's Annual Reassessment and [redacted] if applicable, which will be used to revise the draft GIA (if under negotiation) or amend the GIA (if already executed).

M. TIMING OF FULL CAPACITY DELIVERABILITY STATUS, INTERIM DELIVERABILITY STATUS, AREA CONSTRAINTS, AND OPERATIONAL INFORMATION

The Generating Facility would be granted its requested FCDS only if the Generating Facility receives TPD allocation in the forthcoming TPD Allocation Study Process. Furthermore, timing of obtaining the requested FCDS is dependent on the completion of DNUs identified below in this report, which may be updated in any subsequent annual reassessment. Until such time that these DNUs are completed and placed in-service, the Generating Facility may be granted Interim Deliverability Status based on annual system availability. The sections below provide a discussion of the timing of FCDS, Interim Deliverability Status, Area Constraints, and Operational Information.

[12] The TPD Allocation Process is estimated to be completed in April 2021. The actual date may vary.

1. System Upgrades Required for Full Capacity Deliverability Status

   In order to provide for Full Capacity Deliverability Status, the following facilities are required in addition to the Reliability Network Upgrades described in Section 2.(b) of Attachment 1:

   a. Triggered Delivery Network Upgrades –

   b. Delivery Network Upgrades Triggered by Earlier Queued Projects

   c. Approved Transmission Upgrades -

   d.

2. Interim Operational Deliverability Assessment for Information Only

3. Area Constraints

N. ADDITIONAL STUDY ANNOTATIONS

1. **Conceptual Plan of Service**
   The results provided in this study are based on conceptual engineering and are preliminary. The information is not sufficient for permitting purposes and is subject to change as part of final engineering and design.
2. The study does not include analysis related to the power output rate of change that may occur due to the following or other conditions:
   - System morning start up for solar generating facilities: That is when each morning the Generating Facility commences to generate and export electrical energy to the electric system.
   - Cloud Cover: Solar generating facilities have significant generation output variation (Variability) which can have an impact on electric system voltage profiles.
3. **IC's Technical Data**
   The study accuracy and results for the QC12 Phase II Interconnection Study were contingent upon the accuracy of the IR technical data provided by each IC during the Interconnection Study

Cycle. Any changes from the data provided as allowed under GIP should were submitted in Attachment B within ten (10) Business Days following the Phase I Interconnection Study Results Meeting. Any changes from the data provided would need to be evaluated under a Material Modification Assessment (MMA) to determine if such change(s) results in a material impact to queued-behind generation.

4. **Study Impacts on Affected Systems**
   Results or consequences of this Phase II Interconnection Study may require additional studies, facility additions, and/or operating procedures to address impacts to neighboring utilities and/or regional forums. For example, impacts may include but are not limited to WECC Path Ratings, short-circuit duties outside of the ISO Controlled Grid, and sub-synchronous resonance (SSR). Refer to Affected Systems Coordination Section H of the Area Report and above in Section F for additional information.

5. **Use of SCE's Facilities**

   a. **Crossing of SCE-owned Lines and Property**
      The IC is responsible for acquiring all property rights necessary for the IC's Interconnection Facilities, including those required to cross the SCE's facilities and property. This Interconnection Study does not include the method or estimated cost to the IC of SCE mitigation measures that may be required to accommodate any proposed crossing of SCE's facilities. The crossing of SCE's property rights shall only be permitted upon written agreement between SCE and the IC at SCE's sole determination. Any proposed crossing of SCE property rights will require a separate study and/or evaluation, at the IC's expense, to determine whether such use may be accommodated. If the IC's Facilities result in the need to modify SCE's existing facilities, SCE recommends that the IC identify and include a description of such modifications in the IC's environmental study reports submitted to the lead agency permitting the Generating Facility. An interconnection customer may initiate this process by contacting SCE's Land Management Department at this link: https://www.sce.com/partners/real-estate-and-locations/secondary-land-use.

   b. **Utilizing SCE Property or ROW**
      In instances where a site deposit is provided in lieu of site control documents for the location of a Generating Facility, and the site plan for the Generating Facility included in the IR package depicts the Generating Facility location on SCE owned property or utilizing SCE ROW; the IC will be required to provide an alternative site or submit a secondary land use request to SCE's Land Management Department for review and approval. A secondary land use request to support third party generation development is unlikely to get approved by SCE, but nevertheless the IC can submit a secondary land use request to SCE's Land Management Department for a review and approval at this link: https://www.sce.com/partners/real-estate-and-locations/secondary-land-use.

6. **SCE's Interconnection Handbook**
   The IC shall be required to adhere to all applicable requirements in SCE's Interconnection Handbook. These include, but are not limited to, all applicable protection, voltage regulation, VAR correction, harmonics, switching and tagging, and metering requirements.

7. **Western Electricity Coordinating Council ("WECC") Policies**
   The IC shall be required to adhere to all applicable WECC policies including, but not limited to, the WECC Generating Unit Model Validation Policy.

8. **System Protection Coordination**

Adequate Protection coordination will be required between SCE-owned protection and IC-owned protection. If adequate protection coordination cannot be achieved, then modifications to the IC-owned facilities (i.e., Generation-tie or Substation modifications) may be required to allow for ample protection coordination.

9. **Standby Power and Temporary Construction Power**
   The Phase II Interconnection Study does not address any requirements for standby power or temporary construction power that the Generating Facility may require prior to the ISD of the IF's. Should the Generating Facility require standby power or temporary construction power from SCE prior to the ISD of the IF's, the IC is responsible to make appropriate arrangements with SCE to receive and pay for such retail service. SCE recommends that the IC identify and include a description of such facilities in the IC's environmental study reports submitted to the lead agency permitting the Generating Facility.

10. **Licensing Cost and Estimated Time to Construct Estimate (Duration)**
    The estimated licensing cost and durations applied to this Generating Facility are based on the Generating Facility scope details presented in this Phase II Interconnection Study. These estimates are subject to change as the Generating Facility's environmental and real estate elements are further defined. Upon execution of the GIA, additional evaluation including but not limited to preliminary engineering, environmental surveys, and property right checks may enable licensing cost and/or duration updates to be provided.

11. **Network/Non-Network Classification of Telecommunication Facilities**
    a. Non-Network (IF) Telecommunications Facilities: The cost for telecommunication facilities that were identified as part of the IC's Interconnection Facilities was based on an assumption that these facilities would be sited, licensed, and constructed by the IC. The IC will own, operate, maintain, and construct main and diverse telecommunication paths associated with the IC's generation tie line, excluding terminal equipment at both ends. In addition, the telecommunication requirements for the RAS were assumed based on tripping of the generator's breaker in lieu of tripping the circuit breakers and opening the IC's gen-tie at SCE's substation.
    b. Network (Network Upgrades) Telecommunications Upgrades: Due to uncertainties related to telecommunication upgrades for the numerous projects in queues ahead of this Generating Facility, telecommunication upgrades for earlier queued projects without a signed GIA which upgrades have not been constructed were not considered in this study. Depending on the scope of these earlier queued projects, the cost of telecommunication upgrades identified for Phase II may be reduced. Any changes in these assumptions may affect the cost and schedule for the identified telecommunication upgrades.

12. **Ground Grid Analysis**
    A detailed ground grid analysis will be required as part of the final engineering for the Generating Facility at the SCE substations whose ground grids were flagged with duty concerns.

13. **SCE Technical Requirements**
    The IC is advised that there may be technical requirements in addition to those that outlined above in Section C of this report that will be addressed in the Generating Facility GIA.

14. **Applicability**
    This document has been prepared to identify the impact(s) of the Generating Facility on the SCE's electric system; as well as establish the technical requirements to interconnect the Generating Facility to the POI that was evaluated in the final Phase II Interconnection Study for

the Generating Facility. Nothing in this report is intended to supersede or establish terms/conditions specified in GIAs agreed to by the SCE, ISO, and the IC.

15. **Process for Initial Synchronization Date/Trial Operation Date and COD of the Generating Facility**
    The IC is reminded that the ISO has implemented a New Resource Implementation ("NRI") process that ensures that a generation resource meets all requirements before Initial Synchronization Date/Trial Operation Date and COD. The NRI uses a bucket system for deliverables from the IC that are required to be approved by the ISO. The first step of this process is to submit an "ISO Initial Contact Information Request form" at least seven (7) months in advance of the planned Initial Synchronization Date. Subsequently an NRI project number will be assigned to the Generating Facility for all future communications with the ISO. SCE has no involvement in this NRI process except to inform the IC of this process requirement. Further information on the NRI process can be obtained from the ISO Website using the following links:
    New Resource Implementation webpage:
    http://www.caiso.com/participate/Pages/NewResourceImplementation/Default.aspx

    NRI Checklist:
    http://www.caiso.com/Documents/NewResourceImplementationChecklist.xls

    NRI Guide:
    http://www.caiso.com/Documents/NewResourceImplementationGuide.doc

16. **ISO Market Dispatch**
    This study did not evaluate any potential limitations that may be driven by the ISO market under real-time operating conditions.
17. **Interconnection Request to Third-Party Owned Facilities**
    Generating Facility's requesting to interconnect to a Third party owned facility will need to obtain written approval from the owner(s) of the facility prior to execution of the GIA.
18. **Future Charging Restrictions**
    Charging restrictions not identified in this study may occur in the future if the underlying operating assumptions prove to be different from the conditions evaluated in this study.
19. **Transmission Voltage Reference**
    Identification of facility voltages (220 kV) in this Phase II Study are shown consistent with SCE System Operating Bulletin 123. However, all studies were predicated on the base voltages reflected in the WECC base cases. For the SCE bulk power system, the WECC base cases reflect 230 kV and 500 kV base voltages; consequently, all per-unit calculations presented were based on 230 kV and 500 kV voltages.

20. **The IC is advised that SCE reserves its right to issue an addendum or revision to this report, if applicable to comply with future tariff amendments filed and accepted by FERC associated with the treatment of energy storage devices interconnected or proposing to interconnect to the Distribution System.**

Attachment 1:
Interconnection Facilities, Network Upgrades, and Distribution Upgrades
Please refer to separate document

Attachment 2:
Escalated Cost and Time to Construct for Interconnection Facilities, Reliability Network Upgrades, Delivery Network Upgrades, and Distribution Upgrades

Please refer to separate document

Attachment 3:
Allocation of Network Upgrades for Cost Estimates and Maximum Network Upgrade Cost Responsibility

Not Applicable

Attachment 4:
SCE's Interconnection Handbook

Preliminary Protection Requirements for Interconnection Facilities are outlined in SCE's Interconnection Handbook at the following link:

https://library.sce.com/content/dam/sce-doclib/documents/business/generating-your-own-power/grid-interconnections/SCE_InterconnectionHandbook.pdf

Attachment 5:
Short-Circuit Duty Calculation Study Results
Please refer to the Appendix H of the Area Report

Attachment 6:
IC Provided Generating Facility Dynamic Data

regc_a 99030 "WDT1650_G" 0.4800 0.48 "1 " : #99 mva=88 0.0 10.0 0.9 0.5 1.0 1.1 0.8
0.4 -0.328 0.01 0.02 0.015 99.0 -99.0 0.0
mvab vdip vup trv dbd1 dbd2 kqv iqh1 iql1 vref0 SOCini SOCmax SOCmin T tp qmax
qmin vmax vmin kqp kqi kvp kvi tiq dpmax dpmin pmax pmin imax tpord pfflag vflag
qflag pqflag vq1 iq1 vq2 iq2 vq3 iq3 vq4 iq4 vp1 ip1 vp2 ip2 vp3 ip3 vp4 ip4

reec_c 99030 "WDT1650_G" 0.4800 0.48 "1 " : #99 0.0 0.9 1.1 0.01668 -0.05 0.05 3.0 1.0 -1.0
1.0 1.0 1.0 0.05 14400 0.01668 0.3908 -0.3908 1.15 0.85 0.2 10.0 0.02 0.0001 0.01668
0.45 -0.45 1.0 -1.0 1.11 0.01668 0 0 1 0 0.0 1.45 2.00 1.45 0.0 0.0 0.0 0.0 0.0 1.15
2.00 1.15 0.0 0.0 0.0 0.0
mvab tfltr kp ki tft tfv refflg vfrz rc xc kc vcmpflg emax emin dbd qmax qmin kpg kig tp
fdbd1 fdbd2 femax femin pmax pmin tlag ddn dup frqflg outflag

repc_a 99030 "WDT1650_G" 0.4800 0.48 "1 " 99028 "WDT1650_H" 66.0000 : #1 0.0 0.2 18 5 0
0.15 1 -1 0 0 0 1 999 -999 0 0.3908 -0.3908 0.1 0.05 0.25 -0.0006 0.0006 999 -
999 1.0 -1.0 0.1 20 20 1 0
vref dvtrp1 dvtrp2 dvtrp3 dvtrp4 dvtrp5 dvtrp6 dvtrp7 dvtrp8 dvtrp9 dvtrp10 dttrp1 dttrp2
dttrp3 dttrp4 dttrp5 dttrp6 dttrp7 dttrp8 dttrp9 dttrp10

lhvrt 99030 "WDT1650_G" 0.4800 0.48 "1 " 99028 "WDT1650_H" 66.0000 : #1 1.00 0.2 0.175
0.15 0.1 -0.55 -0.35 -0.25 -0.1 0 0 0 0.2 0.5 1 0.15 0.3 2 3 0 0
fref dftrp1 dftrp2 dftrp3 dftrp4 dftrp5 dftrp6 dftrp7 dftrp8 dftrp9 dftrp10 dttrp1 dttrp2 dttrp3
dttrp4 dttrp5 dttrp6 dttrp7 dttrp8 dttrp9 dttrp10
dttrp1 changed from 0 to 0.16

lhfrt 99030 "WDT1650_G" 0.4800 0.48 "1 " : #1 60.00 1.7 1.6 0.6 -3 -2.7 -2.2 -1.6 -0.6
0 0 0.16 30 180 0.05

Attachment 7:
Subtransmission Assessment Report
Please refer to separate document