Appendix A – WDT1535

[redacted]

Queue Cluster 11 Phase I Report

January 15, 2019

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	01/15/19	Queue Cluster 11 Phase I Appendix A Report	Final Phase I interconnection study report

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A. INTRODUCTION

[redacted], the Interconnection Customer (IC), submitted a completed Interconnection Request (IR) to Southern California Edison (SCE), the Distribution Provider, for their proposed [redacted] (Generating Facility).

In accordance with FERC approved SCE's WDAT Attachment I Generator Interconnection Procedures (GIP), the Generating Facility was grouped with Queue Cluster 11 (QC11) Phase I 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 has been prepared separately identifying the combined impacts of all projects on the ISO Grid and to distribution facilities served out of the Goleta 66 kV Subtransmission System, respectively. This Appendix A report focuses only on the impacts or impact contributions of the Generating Facility at SCE's electric system and is not intended to supersede any contractual terms or conditions specified in the forthcoming Generator Interconnection Agreement (GIA).

The report provides the following:

1. Distribution and transmission system impacts allocated to the Generating Facility.
2. System reinforcements or mitigation necessary to address the adverse impacts allocated 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 time to construct[1] these facilities. Such information is provided in Attachment 1 and Attachment 2 as separate documents in the Appendix A report package of the Generating Facility.
4. Identification of potential short circuit duty impacts to Affected Systems served from the Subtransmission or Distribution System.

The Generating Facility encompasses energy storage equipment that triggered the need to analyze its charging impacts on SCE's electric system. The analyses focused on the Charging Demand[2] aspects of the Generating Facility and considered varying levels of system demand with minimal generation dispatch within the local distribution system.

Consequently, the report also discloses the adequacy of SCE's electric system to support the Generating Facility when operating in charging mode, identifies system limitations that may restrict the Generating Facility when operating in charging mode during certain demand conditions, and provides a high-level explanation of potential exposure of the Generating Facility of charging restrictions on the electric

[1] It should be noted that construction is only part of the duration of months specified in the study, which includes detailed 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.

[2] Charging Demand: The flow of wholesale electric energy from the Distribution System solely to charge the storage component of the Eligible Customer's Resource from the Distribution System for later redelivery of such energy, net of Resource losses, to the Distribution System. Charging Demand does not include the delivery of energy for purposes that are subject to the SCE's retail tariff.

system. The Generating Facility will follow ISO market dispatch instructions when in charging mode and in discharging mode.

The Generating Facility shall consist of all equipment and facilities comprising the IC's energy storage [redacted] Generating Facility to be located in [redacted], California, 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 in Table A.1.

[redacted]

The IC has requested, and the GIA will provide for, a total net capacity of [redacted] at the POI. The Parties acknowledge that the Generating Facility has a total net capability that exceeds these values. Accordingly, the IC agrees to install, own, operate and maintain a control limiting device or, alternatively, by means of configuring the Generating Facility's control system to ensure the Generating Facility does not exceed the total net capacity provided under the GIA at POI.

The Interconnection Facilities of the Generating Facility are illustrated in Figure A.1. While Figure A.2 illustrates the location of the Generating Facility. Additional Generating Facility information is provided in Table A.2.

Figure A.1: Generating Facility One-Line Diagram

Table A.2: Additional Generating Facility General Information

Generating Facility Location	[redacted]
SCE's Planning Area	[redacted]
Interconnection Voltage	[redacted]
POI	[redacted]
Number and Types of Generators	[redacted]
Requested Maximum Generating Facility Delivery at POI	[redacted]
Pad-Mount Transformer(s) Downstream of Main Transformer Bank T1	[redacted]
Generator Data Downstream of Main Transformer Bank T1	[redacted]
Generator Auxiliary Load and/or Station Light and Power	[redacted]
Deliverability Requested	[redacted])
Proposed Dates[3]	
In-Service Date (ISD)	[redacted]
Initial Synchronization Date/Trial Operation	[redacted]
Commercial Operation Date (COD)	[redacted]

B. STUDY ASSUMPTIONS

For detailed assumptions regarding the group cluster analysis, please refer to the QC11 Phase I Area Report. Below are the assumptions specific to the Generating Facility:

1. The Generating Facility was modeled as described in Table A.1 and Table A.2 above.
2. The facilities that will be installed by SCE and the IC are detailed in Attachment 1.

[3] Such dates are specified in the Generating Facility's IR. Actual ISD and COD will depend on licensing, engineering, detailed design, and construction requirements to interconnect the Generating Facility after the GIA has been executed.

3. Roles and Responsibilities for Environmental Activities, Permits, and Licensing. The assumptions for the Environmental Activities, Permits, and Licensing are as follows:

   i. SCE Facilities

   a. SCE's Interconnection Facilities (IF's), Reliability Network Upgrades (RNU's), and Distribution Upgrades (DU's) allocated to the Generating Facility:

      - SCE will perform all environmental studies and monitoring of all SCE internal substation construction activities.
      - SCE's scope of work will not require a California Public Utilities Commission (CPUC) license.
      - ESD will act as the environmental liaison between the SCE team and IC team, and the lead for regulatory agency communication for permits covering SCE facilities. SCE environmental services include:
        - Collaborate with the IC during the environmental study phase on proposed study methodologies and findings, as studies are being planned and performed for SCE's scope of work.
        - Review IC's California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) documents, technical studies, surveys, and other environmental documentation addressing SCE's scope of work (IC to include SCE's scope of work in their environmental document).
        - Review of internal Environmental Services (ES) existing technical documents when available
        - Regulatory agency communication, consultation, and reporting for permits addressing SCE's facilities and scope of work
        - Permit acquisition
        - Support SCE team in developing the Generating Facility description, including scope changes during permitting/pre-construction or construction.
        - Communicate scope changes to the IC's environmental team, discuss/approve subsequent actions including new surveys as necessary
        - Prepare environmental requirements for construction clearance
        - Develop communication plan
        - Construction monitoring oversight
        - General Order 131-D Consistency Determination and Environmental Evaluation
        - Environmental Awareness/Worker Environmental Awareness Program (WEAP) training
        - Pre-construction coordination field visit
        - 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, DUs, and Network Upgrades. The IC's responsibilities include, 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, performing cultural resources inventories (survey and recording), performing testing and evaluation and/or data recovery of archaeological sites as applicable, and providing the appropriate documentation in the form of inventory reports, research

design and/or data recovery reports as applicable, cultural and paleontological monitoring when/if required, and arranging curation agreements for artifacts and fossil specimens collected, performing a California Natural Diversity Database search, performing a habitat assessment, performing 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, performing pre-construction biological resource surveys, performing biological resource monitoring during construction, performing cultural and paleontological monitoring during construction, mitigation costs including, but not limited to, offsite/compensatory mitigation and onsite restoration, and developing mitigation plans or other environmental reports or submittals, if required, to support installation of SCE's IF's, DUs, and Network Upgrades.

- Prior to commencing work and during execution of work, the IC should collaborate and obtain ES concurrence on all work outlined above. Should the IC-performed environmental studies, surveys, or monitoring not meet the Federal or State industry standards in accordance with Applicable Laws and Regulations, and as determined by ES, the IC shall be obligated to remedy deficiencies under SCE/ES's direction, or ES shall undertake additional environmental studies, surveys, or monitoring at the sole expense of the IC. If these scenarios occur, the cost estimate must be updated to reflect the changes to the assumptions.
- The estimated cost(s) provided in the Phase I study assumed that the IC will perform part of the environmental services scope of work (SOW) that would normally be performed by SCE for SCE-owned IF, RNUs, and DUs, if applicable, to interconnect the Generating Facility. The IC shall provide SCE an itemized accounting record of the actual costs for work performed by the IC in a form acceptable to SCE. 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 Contribution Component (ITCC).
- For further details on the environmental evaluation and permitting/licensing requirements for generation projects refer to Appendix K of the Area report.

4. **Energy Storage Considerations**:
    - With respect to charging, SCE currently offers "as available" service pursuant to the WDAT. Charging restrictions will be required and implemented through the use of Distributed Energy Resource Management System (DERMS).
    - The load assumptions used for SCE's Distribution System consider SCE's 2018-2027 Distribution Load Forecast.
    - To model the hourly forecast demand performance of SCE's distribution system, historical year 2017-2018 B-Bank and circuit data were obtained and adjusted to reflect the worst-case year within SCE's Distribution Load forecast. The use of historical data established a baseline upon which to build a comparable hourly demand performance for the worst-case year in SCE's Distribution Load Forecast.
    - The IC should note that, due to the dynamic nature of SCE's distribution system, the operational limitations yielded by the charging analysis results disclosed in this report are for informational purposes only. Furthermore, the charging analysis used historical system performance information, which can only speak to past system performance.

Hence, based on future real time operational conditions, the Generating Facility's ability to charge may be further restricted.

- This study assumes that the Generating Facility will include all equipment, software, appropriate controls, and other related equipment necessary to maintain the Charging Demand restriction per SCE's requirements.
- The Generating Facility will be required to comply with SCE's voltage regulation requirements as stated in SCE's Rule 2 at the Point of Change of Ownership (POCO) while in parallel with SCE's Distribution System. This will require limiting discharging ramp rate in order to avoid unnecessary flicker that may impact other customers.
- Upon execution of the GIA, SCE will provide the IC with the required ramp rate[4] control parameters and other necessary information to allow the IC to develop its storage control limit. Ongoing changes to the ramp rate control scheme may be required as determined by changes in the distribution system topology or other changes in the distribution system. However, typical ramp rates for facilities connected to SCE's Distribution System are 10% of nameplate rating, per minute.
- The IC is reminded that per GIP Section 3.13, it is mandatory that Interconnection Requests use smart inverters. Failure to use smart inverters may result in SCE not allowing a generating facility to interconnect and operate in parallel with SCE's Distribution System. For further information on smart inverters, the IC is encourage to visit the Go Solar California Website at the following link: http://www.gosolarcalifornia.ca.gov/equipment/inverters.php
- At this stage, since DERMS is conceptual and under development, it is assumed that DERMS will not be available prior to the commercial operation date of the Generating Facility. Further details will be available during the detailed engineering and design phase of the Generating Facility. In concept, DERMS will monitor system loading conditions from both monitored data of SCE's facilities and IC's facilities. DERMS will calculate the available charging capacity limits and will transmit the limits to the IC. It will be required that the IC's control system follows the provided limits. If the IC's control system does not comply with this requirement, SCE will mitigate this condition at its discretion including but not limited to disconnecting the Generating Facility from the grid using SCE controlled equipment.
- The facilities and costs to implement DERMS are included in Attachments 1 and 2. In order to ensure Charging Demand capability's limits and restrictions are communicated in a timely and reliable manner, the IC is responsible for providing reliable communications and identifying a location subject to SCE's requirements. The communication interface is based upon SCE's requirements.
- The preliminary charging analysis discussed in this report assumed that charging demand is curtailable before wholesale and retail load, and this assumption was used to determine the charging restrictions contained in this report for the Generating Facility.
- The energy storage component of the Generating Facility will need to be metered separately. The IC should be prepared to install multiple sets of metering (i.e. separate sets of potential transformers & current transformers and supporting metering

[4] It is assumed that ramp rates for each Generating Facility will be dependent upon their inherent technology types. While very quick response ramp rates (i.e. going from full charge to full discharge instantaneously, or vice-versa) may be beneficial for other grid services, SCE, may, at its discretion, require establishing limits to maintain safety and reliability of its distribution system.

equipment) for the Generating Facility. Additionally, the Generating Facility may also need to connect the energy storage component to a dedicated transformer.

5. Other Items to Consider:
    - Final metering requirements will be identified as part of execution of the Generating Facility and could result in modifications to the Generating Facility.

C. TECHNICAL REQUIREMENTS[5]

1. **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 SCE's Interconnection Handbook provided in Attachment 4.

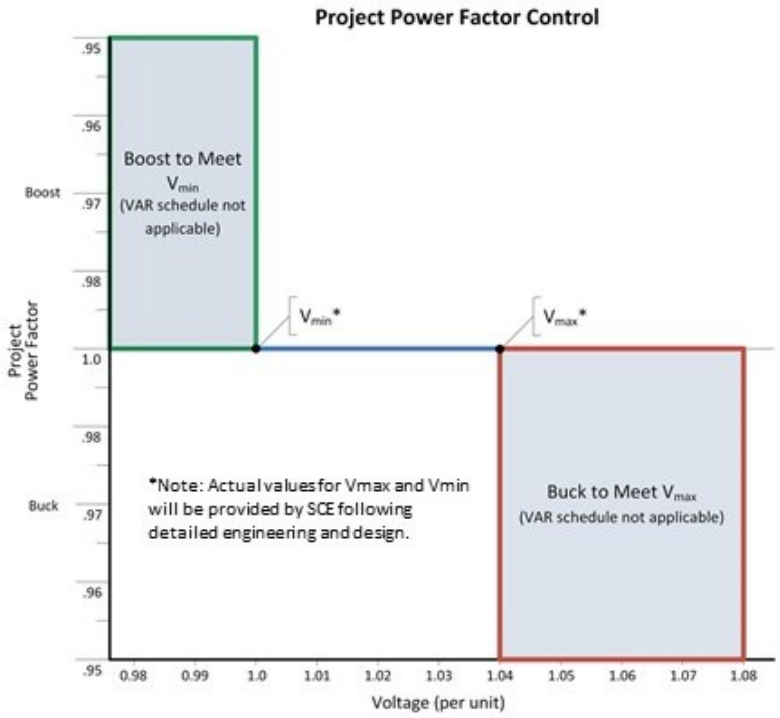
2. **Power Factor Requirements**

   The Generating Facility will be required to maintain a composite power delivery at continuous rated power output at the high-side of the IC's substation or other equivalent location at a power factor within the range of 0.95 leading to 0.95 lagging. This power factor range standard shall be dynamic.

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 GIA and detailed engineering and design are 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.

[5] The IC is advised that there may be technical requirements in addition to those outlined above in Section C of this report that will be addressed in the Generating Facility 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's grid strength. As with all equipment connected to SCE's Distribution 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 other SCE customers, including harmonic impacts, if the harmonic interference is caused by the IC.

   Given the amount of generation and the strength of the distribution system, SCE may require a harmonic study during the execution and construction phase to ensure that the Generation Facility complies with the harmonic current limits outlined in IEEE 519-2014. During that time, SCE will then provide the required SCE Distribution System data that are to be used as part of the harmonic study.

   Additionally, SCE may require the IC to be served through a dedicated distribution transformer which serves no other customers. The purpose of the dedicated transformer is to confine any voltage fluctuations or harmonics produced by the Generating Facility to the IC's own system.

5. **Low Voltage Ride-Through (LVRT) Capability**

   Actual fault events have demonstrated that certain asynchronous generators (i.e., inverters) from specific manufacturers may be susceptible to false tripping or temporary shutdown during fault conditions. The most severe disturbance to date resulted in the temporary loss of 1,178 MW at photovoltaic plants when inverter control systems throughout Southern California responded to a 500 kV fault by temporarily stopping the production of electric power. Based on

the results of an investigation performed into this issue, several causes and contributing factors have been identified which include:

a. Apparent miscalculated frequency at many inverters when fault-induced phase shifts occurred in the reference voltage

b. Inverter protection settings set to meet IEEE 1547 standards
c. Momentary overvoltage

The NERC PRC-024-2 standard currently allows generators to instantaneously trip if the system conditions are outside of a defined set of bounds. Because different inverter manufacturers use different methods to calculate frequency (zero crossing, DFT, PLL, etc.), the methods used by some manufacturers have resulted in calculations of the instantaneous frequency during power system disturbances that do not accurately reflect actual frequency. Inaccurate frequency calculations may result in the reduction of electric power from inverter-based resources which is an unacceptable response. In addition, voltage transients caused by capacitive switching (among other potential causes) can cause inverters to trip due to a momentary overvoltage condition which too is an unacceptable response unless the Generating Facility has reached the power factor lead (buck) limits and the voltage is still in excess of the maximum allowable voltage limit.

The IC should work with the inverter manufacturer to ensure these three issues are properly addressed. 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 as part of the study results. The results will evaluate performance to ensure that the Generating Facility remains online during voltage disturbances up to the time periods and corresponding maximum allowable voltage levels set forth in NERC PRC-024-2 and producing power immediately following fault disturbance clearing at the levels prior to the disturbance.

6. **Frequency Disturbance Ride-Through Capability**

An Asynchronous Generating Facility shall comply with the off nominal frequency requirements set forth in the UL1741 Supplement A or successor requirements as they may be amended from time to time.

D. RELIABILITY STANDARDS, STUDY CRITERIA AND METHODOLOGY

The generator interconnection studies were conducted to ensure the ISO-controlled grid complies with 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.

1. **Distribution Planning Criteria**

This study was conducted by applying SCE's Distribution Planning Criteria. More specifically, the key criteria applicable to this Phase I Study are as follows:

- The thermal rating of any conductor, connector, or apparatus shall not exceed 100% of its normal rated capacity with all facilities in service (N-0 or base case).
- The thermal rating of any conductor, connector, or apparatus shall not exceed 100% of its emergency rated capacity under loss of one element (N-1) conditions.
- The thermal rating of any B-Bank shall not exceed 100% of its nameplate rated capacity with all facilities in service (N-0 or base case).

- The thermal rating of any B-Bank shall not exceed 100% of its nameplate rating capacity under loss of one element (N-1) or emergency conditions.
- Operational flexibility, safety, and reliability of the distribution system shall be maintained at all times.
- Circuit voltage profiles shall be maintained to comply with SCE's CPUC Jurisdictional Rule 2 tariff requirements. The IC will be responsible for maintaining designated voltage levels under all conditions, including but not limited to the conditions identified above.
- The power factor for the Generating Facility is assumed to be within WDAT requirements of 0.95 lagging or leading.
- Expected loading on the distribution system, as projected by SCE's internal 2018-2027 distribution system forecast, is utilized for the purposes of this charging analysis.
- A Generating Facility with storage connected to the distribution system are analyzed offline (pre-project) and online (post-project) during peak demand conditions, as well as during absolute minimum demand conditions, as to determine the worst-case scenario between these two "book-ends" of demand.
- The short-circuit duty contribution from the inverter system was determined using inverter manufacturer specification sheets (as needed).

2. 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 Interconnection Request 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.

   Refer to Section F for additional information.

E. POWER FLOW RELIABILITY ASSESSMENT RESULTS

Distribution System Configuration Modifications

To interconnect the Generating Facility, distribution system configuration modifications are required to maintain compliance with SCE's Distribution Planning Criteria and standards. These modifications are specific to the location of interconnection and the technology type of the project.

1. Thermal Overload:

   The combined discharge and charge functions of the battery storage system creates increased underground duct bank conduit temperatures. As a result, the normal rated capacity of the existing underground cables on the Cienigitas 16 kV circuit and other circuits in the same duct bank conduit system is decreased. This causes thermal overloads on these circuits. To mitigate this overload and alleviate the elevated duct bank temperatures, the Cienigitas 16 kV circuit

must be removed from the existing underground duct bank conduit system and installed into a new underground duct bank conduit system. The following upgrades are required:

- Santa Barbara 66/16 Substation:
    a. Install cable trench blister and new underground duct bank conduit system from cable trench blister to fence
- Cienigitas 16 kV Circuit:
    a. Remove 587 feet of 1000 Aluminum JCN (Jacketed Concentric Neutral) primary cable
    b. Install 587 feet of 1000 Copper JCN (Jacketed Concentric Neutral) primary cable
    c. Install one (1) new 3-way RAG switch

2. Distribution Circuit Reconfiguration:

Certain circuit reconfigurations are required to facilitate the interconnection of this Generating Facility and are not related to a Distribution Planning Criteria, but rather to maintain compliance to a Distribution Design Standard. These upgrades include:

- Cienigitas 16 kV Circuit:
    a. None

I. Discharging Analysis of the Generating Facility

a. Steady State Power Flow Analysis Results – 55 kV and above

1. Group Study
   The group study on the Bulk system indicated that the Generating Facility contributes to overloads under normal, and/or single contingency, and/or multiple contingency conditions. The details of the analysis and overload levels is provided in the corresponding Area Report.

   To mitigate the overloads, additional RNUs are required. Given that the Generating Facility contributes to the overloads Generating Facility has been assigned costs for the following RNUs:

   1. New Moorpark RAS

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

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

2. Subtransmission Assessment (66 kV or 115 kV)

The subtransmisson assessment indicated that the Generating Facility contributes to overloads under normal, and/or single contingency, and/or multiple contingency conditions. The details of the analysis and overload levels is provided in the corresponding Subtransmission Assessment Report.

a. Goleta #1 280 MVA, 220/66 kV Transformer Bank
b. Goleta #4 280 MVA, 220/66 kV Transformer Bank

To mitigate the overloads, upgrades are required to mitigate the power flow impacts of the Generating Facility. The upgrades discussed in the Subtransmission Report and assigned to the Generating Facility involve:

- New 220/66 kV transformer bank at Goleta Substation

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

b. Steady State Power Flow Analysis Results – 50 kV and below

1. Thermal Overloads

   Under the conditions evaluated below, the study found that the Generating Facility does not contribute to any distribution facility overloads with all existing facilities and prior queued upgrades. The details of the analysis, as well as the recommended mitigations, are provided as follows:

   i. Normal Conditions (Base Case)
   - Santa Barbara 66/16 kV Substation
     - No thermal overloads have been identified
   - Cienigitas 16 kV Circuit
     - No thermal overloads have been identified

   ii. Single Contingency (N-1)
   - Due to the distribution system topology and various potential N-1 scenarios, thermal overloads under emergency N-1 conditions (loss of a B-Bank or loss of the Cienigitas 16 kV Circuit are expected.

     As a result, the Generating Facility may be disconnected to allow for system troubleshooting. SCE's Grid Operators will determine if and when the Generating Facility may be able to be reconnected during the abnormal condition. Once the system is returned to normal conditions, SCE's Grid Operators will reconnect the Generating Facilities for normal operation.

2. Voltage Performance

   The Cienigitas 16 kV Circuit is not expected to experience a voltage rise that exceeds allowable Rule 2 requirements with the Generating Facility in service. The Generating Facility should maintain a composite power delivery at continuous rated power output at the POI within the range of .95 leading to .95 lagging to improve power flow non-convergence and maintain the transmission transfer capability. Additionally, the generation system must be designed to

accommodate a VAR schedule provided by SCE. SCE will determine if the VAR schedule is necessary based on future re-arrangements of SCE's Distribution System.

3. Protection

i. Santa Barbara 66/16 kV Substation:

- The addition of the Generating Facility triggered inadequate coordination with the relay back at the substation.

ii. Cienigitas 16 kV Circuit:

- The line section between the Generating Facility and the 16 kV Point of Interconnection is expected to experience reverse power flow of approximately 10 MW, approximately 9.0 MW will flow back into the 16 kV bus at Santa Barbara Substation.

4. Required Mitigations

The following DUs are required to mitigate the power flow impacts of the Generating Facility described above and/or support the Generating Facility interconnection. The DUs assigned to the Generating Facility involve:

- Remove and install new *line protection relay*
- SAS Programming and point additions for bi-directional reads

Refer to Attachment 1 and Attachment 2 for scope description and associated cost responsibility of these DUs.

II. Charging Analysis of the Generating Facility

a. Steady State Power Flow Analysis Results – 55 kV and above

1. Group Study

The group study on the Bulk system indicated that the Generating Facility does not contribute to any overloads under normal, single contingency, and multiple contingency conditions when charging with the implementation of DERMS. The details of the analysis are provided in the corresponding Area Report.

2. Subtransmission Assessment

The subtransmisson assessment indicated that the Generating Facility contributes to overloads on the following facilities listed below under normal, single contingency, and/or 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 Area Report.

a. Goleta #1 280 MVA, 220/66 kV Transformer Bank
b. Goleta #4 280 MVA, 220/66 kV Transformer Bank

The Generating Facility is required to provide 0.95 leading/0.95 lagging power factor regulation capability at the high-side of the IC's substation or other equivalent location. With respect to Charging Demand, SCE currently offers "as-available" service pursuant to the WDAT. To optimize

the available system capacity for charging and to prevent the overloads specified above, it will necessary to include the Generating Facility in DERMS to monitor the following facilities:

a. Goleta #1 280 MVA, 220/66 kV Transformer Bank
b. Goleta #4 280 MVA, 220/66 kV Transformer Bank

Refer to Attachment 1 and Attachment 2 for scope description and associated cost responsibility of these Distribution Upgrade(s) to the Generating Facility.

b. Steady State Power Flow Analysis Results – 50 kV and below

Based on the assessment of the system loading projections, charging restrictions were identified for the Generating Facility. The charging restrictions are a function of system loading conditions and load forecast. Modifications or adjustments to the charging restrictions will be evaluated as required by SCE to maintain its distribution system within operating criteria. These modifications or adjustments reviews may be completed on a yearly basis, at any time when significant load is added to the distribution system, or as determined necessary by SCE. These reviews may affect the storage charging capabilities. The section below describe system impacts with charging restrictions applied:

1. Thermal Overloads

   Under the conditions evaluated below, the study found that the Generating Facility does not contribute to any distribution facility overloads with all existing facilities and prior queued upgrades. The details of the analysis, as well as the recommended mitigations, are provided as follows:

   i. Normal Conditions (Base Case)
      - No thermal overloads have been identified

   ii. Single Contingency (N-1)
      - No thermal overloads have been identified. However, due to the distribution system topology and various potential N-1 scenarios, the Generating Facility may be disconnected to allow for system troubleshooting. SCE's Grid Operators will determine if and when the Generating Facility may be able to be reconnected during the abnormal condition. Once the system is returned to normal conditions, SCE's Grid Operators will reconnect the Generating Facilities for normal operation.

2. Voltage Performance

   The Cienigitas 16 kV Circuit is not expected to experience a voltage rise that exceeds allowable Rule 2 requirements with the Generating Facility in service. The smart inverter Generating Facility should maintain a composite power delivery at continuous power factor near unity at the rated output or a Distribution specified power factor in accordance with the following requirements:

   i. Default power factor setting: 1.0 +/- 0.01 (0.99 Lagging to 0.99 Leading)

   ii. Aggregate Generating Facility is greater than 15 Kw: 1.0 +/- 0.15 (0.85 Lagging to 0.85 Leading) down to 20% rated power based on available reactive power.

iii. Aggregate Generating Facility is less than or equal to 15 kW: 1.0 +/- 0.10 (0.90 Lagging to 0.90 Leading) down to 20% rated power based on available reactive power.

Additionally, the Generating Facility must be designed to accommodate a VAR schedule provided by SCE. SCE will determine if the VAR schedule is necessary based on future re-arrangements of SCE's Distribution System.

In addition, the Generating Facility, including smart inverter technology, should be designed to parallel with SCE's electric system without causing a voltage fluctuation at the PCC greater than plus/minus 5% of the prevailing voltage level of SCE's electric system at the PCC.

The Generating Facility, including smart inverter technology, should also be designed to meet SCE's flicker requirement IEEE 1547-4.1.3. Furthermore, the Generating Facility shall not create objectionable flicker for other customers on SCE's Distribution or Transmission system. To minimize the adverse voltage effects experienced by other customers (IEEE 1547-4.3.2), flicker at the PCC caused by the Generating Facility should not exceed the limits defined by the "Maximum Borderline of Irritation Curve" identified in IEEE 519-1992 (IEEE Recommended Practices and Requirements for Harmonic Control in Electric Power Systems, IEEE STD 519-1992). This requirement is necessary to minimize the adverse voltage affects experienced by other customers on SCE's electric system.

3. Distribution System

   a. Individual Generating Facility Power Factor Requirements

      Please refer to the Technical Requirements section above.

   b. Distribution System Power Factor Requirements – 50 kV or below

      The Cienigitas 16 kV Circuit out of Santa Barbara 66/16 kV Substation is not expected to experience a voltage rise that exceeds Rule 2 requirements with the Generating Facility in service.

4. Protection

   No additional protection requirements are triggered by the charging aspect of the Generating Facility.

5. Charging Restrictions

   I. System Condition

      - Base Case

        Assuming adjusted 2017-2018 historical demand patterns adequately represent worst case year within SCE's Distribution Load forecast performance, the evaluation identified the need to restrict charging during portions of the day, month, and year. The need to restrict charging will increase over time as normal system demand continues to grow. See tables below for projected charging forecast.

      - Single Contingency (N-1 condition)

- Santa Barbara 66/16 kV Substation:
- Under an emergency (N-1) condition, (loss of a B Bank), the remaining capacity at the substation will not uphold additional charging from Generating Facility. SCE will implement zero (0) charging during this condition.

Additional Factor(s) to Restrictions

SCE provides, in Table 2-1, the Maximum Allowable Charging Schedule, the Generating Facility would be allowed to charge at a given demand value in a given month. The analysis results are based on historical data and they are not an indicator, or predictor of future real time operational conditions, which at that time will serve as the basis to restrict the Generating Facility's ability to charge from the grid to meet their Charge Demand profile. This is subject to change as loading on the distribution system changes. Note that charging restrictions illustrated in the tables below are before DERMS implementation for the respective areas within the Distribution system (i.e. distribution substation or distribution circuit). The Generating Facility's actual charging restrictions will be based on the most restrictive loading conditions and real time information from the distribution and transmission systems.

Table 2-1: Santa Barbara 66/16 kV Substation
Maximum Allowable Charging Schedule

On/Off Peak	Month/Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
On-Peak (MVA)	6AM - 9PM	9.38	10	6.08	3.11	4.50	1.73	0.26	0.00	0.00	0.00	1.32	8.55
Off-Peak (MVA)	9PM - 6AM	10	10	10	10	10	9.38	6.64	6.08	6.20	8.55	8.64	10

Table 2-2: Cienigitas 16 kV Circuit
Maximum Allowable Charging Schedule

On/Off Peak	Month/Time	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
On-Peak (MVA)	6AM - 9PM	8.11	8.11	8.70	7.82	8.23	7.82	7.02	7.55	6.35	6.52	8.52	8.73
Off-Peak (MVA)	9PM - 6AM	8.64	8.64	7.82	7.61	7.94	7.61	8.47	8.64	8.79	8.94	9.67	9.61

6. Required Mitigations

With respect to Charging Demand, SCE currently offers "as available" service pursuant to the WDAT. To optimize the available system capacity for charging and to prevent the overloads specified above, it will necessary to include the Generating Facility in DERMS to monitor the following facilities:

1. Santa Barbara 66/16 kV

2. Cienigitas 16 kV

Refer to Attachment 1 and Attachment 2 for scope description and associated cost responsibility of these DUs.

Similarly, please refer to the Subtransmission Assessment report for additional information on the subtransmission system elements being monitored by DERMS mentioned in Section E.II.a above.

The IC is advised that should DERMS not be operational prior to this Generating Facility initializing commercial operation, the Generating Facility is required to follow a static charging restriction schedule provided by SCE until DERMS is operational.

F. SHORT-CIRCUIT DUTY RESULTS

Short-circuit studies were performed to determine the fault duty impact of adding the Phase I projects to the distribution system and to ensure system coordination. The fault duties were calculated with and without the projects to identify any equipment overstress conditions. Once overstressed circuit breakers are identified, the fault current contribution from each individual project in Phase I is determined. Each project in the cluster will be responsible for its share of the upgrade cost based on the rules set forth in Section 4 of the GIP.

1. SCE-owned Facilities

   All bus locations where the Phase I projects increase the short-circuit duty by 0.1 kA or more and where duty was found to be more than 60% of the minimum breaker nameplate rating are listed in the Area Report (Appendix H). These values have been used to determine if any equipment is overstressed because of the inclusion of Phase I interconnections and corresponding Distribution and Network Upgrades, if any.

   The QC11 Phase I breaker evaluation identified overstressed circuit breakers triggered with the inclusion of the projects in QC11 Phase I.

Bus Name	Bus kV	CB#	Rated Interrupting Current (kA)	Computed Fault Current (kA)
Santa Barbara 3 & 4	16	46	17	18.1
Santa Barbara 3 & 4	16	50	17	18.1
Santa Barbara 3 & 4	16	52	17	18.1
Santa Barbara 3 & 4	16	56	17	18.1
Santa Barbara 3 & 4	16	62	17	18.1
Santa Barbara 3 & 4	16	66	17	18.1

To mitigate the overstressed circuit breakers, it was identified that replacement of breaker would be required at the Gonzales 16 kV bus.

The responsibility to finance short circuit related Distribution and Reliability Network Upgrades identified through a Group Study shall be assigned to all projects in that Group Study pro-rata based on SCD contribution of each Generating Facility.

Please refer to Attachment 1 and Attachment 2 for additional details.

2. Affected Systems

The specific SCD contribution from the Generating Facility was evaluated for impact to all known and modeled affected systems connected to the distribution system. There were no affected systems with an increase of 100 Amps or more. However, the QC11 Phase II study analysis will be conducted with inclusion of any additional affected systems identified on the distribution system.

G. DELIVERABILITY ASSESSMENT RESULTS

1. On Peak Deliverability Assessment

The Generating Facility contributes to the following overloads in this Cluster Study:

Contingency	Overloaded Facility	Flow %
Pardee - Sylmar 230kV No. 2	Pardee - Sylmar 230kV No. 1	104.28%
Moorpark - Santa Clara 230kV No. 1 & 2	Pardee - Santa Clara 220kV	152.04%
Base Case	Laguna Bell - Mesa 220kV No. 1	110.42%

2. Off- Peak Deliverability Assessment

Under off-peak conditions, Antelope – Vincent 500kV No. 1 and No. 2 transmission lines are overloaded under various contingency conditions. For details, see Section E.2 of the Area Report.

3. Required Mitigations

The following upgrades are required to mitigate overloads identified in the deliverability assessment:

a. Develop new Moorpark RAS to trip generation for Pardee – Sylmar outage
b. Upgrade Pardee – Santa Clara 220kV transmission line to increase area deliverability
c. Upgrade Laguna Bell – Mesa 220kV No. 1 transmission line to increase area deliverability

H. INTERCONNECTION FACILITIES, NETWORK UPGRADES, AND DISTRIBUTION UPGRADES

Please see Attachment 1 for SCE's IF's, RNU's, Delivery Network Upgrades[6] (DNU's), and DU's allocated to the Generating Facility. 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 Table J.1.

[6] 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.

I. COST AND CONSTRUCTION DURATION ESTIMATE

1. Cost Estimate

   The Generating Facility's estimated interconnection costs, adjusted for inflation and provided in 'constant' 2018 dollars escalated to the Generating Facility's feasible operating date (as identified below), are provided in Attachment 2 and the Generating Facility's allocated cost for shared network upgrades are provided in Attachment 3. The costs will be utilized in developing the GIA. However, should there be a delay in executing the GIA beyond 2020, a new cost estimate adjusted for inflation will be required and reflected into the GIA.

2. Construction Duration Estimate

   The construction duration for the identified facilities is as follows:

   a. SCE's Interconnection Facilities– 27 months

   These facilities involve non-network facilities located within SCE's Cienigitas 16 kV Circuit served out Santa Barbara 66/16 kV and at the IC's Generating Facility that are necessary to complete physical interconnection of the Generating Facility. Please refer to Attachment 1 for details related to these facilities.

   b. Reliability Network Upgrades

      i. Remedial Action Scheme (RAS) – 24 months

      These facilities involve network upgrades necessary to add Ventura Bulk Projects to the proposed Moorpark RAS. This Generating Facility will not be a participant to the RAS tripping but is subject to sharing the cost of installing the RAS due to its contribution. Please refer to Attachment 1 for the detailed description of scope corresponding to this RAS.

   c. Voltage Support Mitigation

   No required voltage support mitigations were identified in this Phase I Interconnection Study.

   d. Distribution Upgrades

      i. Plan of Service Upgrades – 27 months

         a. Santa Barbara 66/16 kV substation

         b. Cienigitas 16 kV circuit

      ii. Required Upgrades – 43 months

         a. At Goleta substation, one (1) 280 MVA, 220/66 kV Transformer Bank

      iii. DERMS – 27 months

      The Generating Facility will require DERMS to interconnect.

      iv. Short-Circuit Duty (SCD) Mitigation – 27 months

         b. Replace six (6) circuit breakers at Santa Barbara 66/16 kV Substation

Note 1—Construction Duration Estimates and 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 project status to identify Short Circuit Duty and Distribution upgrades and a duration for SCE to build them. Such duration, of course, affects the In-Service Date for this specific project. 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 Short Circuit Duty and Distribution upgrade when enough projects 1) execute and fund a Generation Interconnection Agreement and/or a Letter of Agreement with SCE and 2) those projects trigger the need for an upgrade.

Note 2 -- Construction Duration Estimates and Coordination of Environmental Work. The IC is advised that any durations provided above assume the IC will perform environmental work related to the installation of SCE's IF's and/or DU's specified in this report and will perform them in parallel with SCE's preliminary design and engineering. The IC is expected to engage SCE Environmental Services 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 detailed engineering, procurement, and construction. These delays could increase any durations identified in this report and push out the feasible ISD provided in Table K.1 ISD and COD Assessment.

All civil construction related to SCE's IF and DUs must be completed and approved by SCE inspectors prior to SCE scheduling the electrical construction of the Interconnection Facilities and Distribution Upgrades.

J. IN-SERVICE DATE AND COMMERCIAL OPERATION DATE ASSESSMENT

An ISD and COD assessment was performed for this Generating Facility to establish SCE's estimate of the earliest achievable ISD based on the QC11 Phase I Interconnection 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.

Details pertaining to Full Capacity Deliverability Status and Partial Deliverability Status are provided below.

1. **ISD Estimation Details**

   For the QC11 Phase I Interconnection Study, the estimated earliest achievable ISD is derived by the time requirements to complete the QC11 Interconnection Study Process, tender a draft GIA,

negotiate and execute the GIA, and construct the necessary facilities as described below in Table J.1.

Table J.1: ISD and COD Assessment

Reference starting point	Days/Months	Issuance of Phase II Interconnection Study Report	**11/20/19**
Add:	**30 CD**	Phase II Results Meetings	12/20/19
Add:	**15 BD (20 CD)**	**Starting Point:** TPD Results issued and IC response provided	4/2/20
Add:	**30 CD**	**Earliest Reasonable Tender of draft GIA**	5/2/20
Add:	**90 CD**	• GIA negotiation time, execution, filing, and related activities.	7/31/20
Add: Construction Duration	**43 months**	Construction duration outlined in the Phase I Study Report. Construction completion no earlier than date which reflects earliest ISD	2/29/24
	Reference:	IC-requested ISD via IR	4/15/2021
	Reference:	IC-requested COD via IR	6/30/2021
		Difference between IC ISD and COD	1 months
Equals:		Earliest achievable In-Service Date (ISD)	2/29/24
		Earliest achievable Commercial Operation Date (COD) (Using difference between ISD and COD requested by IC)	5/15/24

Notes on the Achievable ISD and COD calculation:

1) Assumes duration required 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) Assume that GIA is tendered after the TP Delivery allocation results are disclosed.

2. **ISD Conclusion**

Based on these timelines, the IC's requested ISD of 4/15/2021 and COD of 6/30/2021 does not appear to be achievable.

SCE can reasonably tender a draft GIA by May 2020. The draft GIA should be executed and/or filed at FERC no later than August 2020 and will include the earliest ISD and COD as identified in Table J.1 .

The ISO will perform its Annual Reassessment (January - July 2020) and Transmission Plan Deliverability (TPD) Allocation[7] (due April 2020). Any changes in scope, cost, or schedule requirements that come out of ISO's Annual Reassessment and 2020 TPD Allocation will be reflected in a 2020 Reassessment Report, which will be used to revise the draft LGIA (if under negotiation) or amend the LGIA (if already executed).

K. ADDITIONAL STUDY ANNOTATIONS

1. **Conceptual Plan of Service**

The results provided in this study are based on conceptual engineering and a preliminary Plan of Service (POS) and are not sufficient for permitting of facilities. The POS is subject to change as part of detailed 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 initial startup for systems of generating facilities. That is when each instance the Generating Facility commences to generate and export electrical energy to the electric system.
- Intermittent Operation: Inverter generating facilities can have significant generation output variation (Variability) which can have an impact on electric system voltage profiles.
- The customer's Generating Facility will have equipment, software, and the appropriate controls as in place to be able to control the generation output rates of change, as specified by SCE, in order to maintain appropriate voltage levels under all conditions. Upon execution of the appropriate Interconnection Agreement, SCE will provide the IC the required ramp rate control parameters. The ramp rate controls will be a function of the generation penetration on the electric system as well as SCE's electric system configuration but other parameters may be considered. Therefore, changes to the ramp rate control scheme may be required from time to time as required by increased generation, changes in the electric system topology, or other changes in the electric system.

3. **IC's Technical Data**

The study accuracy and results for the QC11 Phase I Interconnection Study was contingent upon the accuracy of the IR technical data provided by each IC during the Interconnection Study Cycle.

[7] The TPD Allocation Process is estimated to be completed in April 2020. The actual date may vary.

Any changes from the data provided as allowed under GIP should be submitted in the Attachment B within ten (10) Business Days following the Phase I Interconnection Study Results Meeting. Any changes in the Attachment B submission that extended beyond the modifications allowed in accordance with Section 4.5.7.2.2 of GIP would have been evaluated under a Material Modification Assessment (MMA). The MMA process would have determined if such change resulted in a material impact to queued-behind generation. These change(s) would have been permitted if it was determined that there were no material impacts to queued-behind generation.

4. **Study Impacts on Affected Systems**

   Results or consequences of this Phase I 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 Table F.1 above in Section F for additional information.

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

   The IC is responsible for acquiring all property rights necessary for the IC's Interconnection Facilities, including those required to cross SCE's facilities and property. This Phase I 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 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.

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 I 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 Interconnection Facilities. Should the Generating Facility require standby power or temporary

construction power from SCE prior to the ISD of the IFs, the IC is responsible to make appropriate arrangements with SCE to receive and pay for such retail service.

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 I 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 (Interconnection Facilities) 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 the 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 higher queued projects without a signed GIA and these upgrades have not been constructed were not considered in this study. Depending on the scope of these earlier higher queued projects, the cost of telecommunication upgrades identified for Phase I 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 detailed 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) contributions of the Generating Facility on the SCE electrical system; as well as establish the technical requirements to interconnect the Generating Facility to the POI that was evaluated in the Phase I 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 have 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. **Future Charging Restrictions**

    Charging restrictions not identified in this study may occur in the future if the underlying operating assumptions prove to be significantly different than the conditions evaluated in this study. Click or tap to enter a date.

17. **ISO Market Dispatch**

    This study did not evaluate any potential limitations that may be driven by the ISO market under real-time operating conditions.

18. Please note that SCE has made its best efforts to convey as much information as possible based on information provided by the IC about its proposed Generating Facility. The information contained herein may indicate to ICs that a project of its magnitude may be better suited to interconnect at higher voltage levels, or downsize as to not incur significant amount of restrictions. Any determination to change POIs or downsize is purely at the IC's discretion and would be subject to a SCE's material modification review pursuant to the tariff.

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

Phase I Network Upgrade Cost Allocation

Queue	WDT1535

Phase I RNU, LDNU and Potential NU Cost Allocation

	NU Total Cost (2018 $k)	Project Allocation (%)	Allocated Cost (2018 $k)	Allocated Cost (Escalated $k)
RNU				
New Moorpark RAS - monitoring infrastructure	$ 15,182.7	0.63%	$ 95.0	$ 109.0
New 220/66 kV transformer bank at Goleta Substation (220kV Bank Position)	$ 3,749.1	3.00%	$ 112.5	$ 129.1
RNU Total		**$**	**207.5**	**$ 238.1**
Total NU		**$**	**207.5**	**$ 238.1**

Phase I ADNU Cost Assignment

	NU Total Cost (2018 $k)	Incremental Deliverability MW	Cost Rate (2018 $k/MW)	Project MW	Allocated Cost (2018 $k)	Allocated Cost (Escalated $k)
Pardee – Santa Clara 220 kV T/L rating increase upgrade	$ 140,781.7	950	$148	10.00	$ 1,481.6	$ 1,779.6
Laguna Bell – Mesa upgrade #1 220 kV T/L rating increase upgrade	$ 10,529.1	1277	$8	10.00	$ 82.4	$ 90.4
Total ADNU				**$**	**1,564.0**	**$ 1,870.0**

Network Upgrade Cost Responsibility

Quarantina Energy Storage	QWDT1535
A. RNU Cost ($k)	$ 238
B. LDNU Cost ($k)	$ -
C. Generating Facility RNU and LDNU Cost Responsibility ($k) *(=A+B)*	$ 238
D. Potential NU Cost ($k)	$ -
E. Maximum RNU and LDNU Cost Responsibility ($k) *(=C+D)*	$ 238
F. Generating Facility ADNU Cost Estimate ($k)	$ 1,870

Notes:

"Generating Facility RNU and LDNU Cost Responsibility" is the RNU and LDNU cost currently assigned to the Generating Facility. It doesn't include the cost share of the Potential Network Upgrades. This is the RNU and LDNU cost that the IC is required to post the Interconnection Financial Security for.

"Maximum RNU and LDNU Cost Responsibility" is the maximum RNU and LDNU cost that could be assigned to the Generating Facility. The total cost re-allocation for RNU and LDNU in the subsequent reassessments shall not exceed this amount.

Attachment 4:
SCE's Interconnection Handbook

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

https://www.sce.com/wps/wcm/connect/348e4d71-5c2a-431f-bf78-16267486fdc9/Interconnection%2BHandbook_1483725988_1485215238.pdf?MOD=AJPERES

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

Attachment 6:
Not Used

Attachment 7:
Subtransmission Assessment Report
Please refer to separate document