Appendix A – WDT1596

[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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ATTACHMENTS

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 have been prepared separately identifying the combined impacts of all projects on the ISO Grid. 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 shall consist of all equipment and facilities comprising the IC's solar photovoltaic [redacted] Generating Facility to be located in [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 in Table A.1.

[redacted]

[redacted]

[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.

[redacted]

The GIA will provide for, a total net capacity of [redacted] at the POI. If the Generating Facility is capable of exceeding these values, the IC shall be required to install, own and maintain a control limiting device or, alternatively, by means of configuring the Generating Facility's control system, as approved by SCE that will ensure the Generating Facility complies with these restrictions.

The IC has requested, and the GIA will provide for, a total net capacity of [redacted] at the 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

Figure A.2: Generating Facility Location Map

Table A.2: Additional Generating Facility General Information

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

[2] 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.

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. 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.
      - For further details on the environmental evaluation and permitting/licensing requirements for generation projects refer to Appendix K of the Area report.
4. 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[3]

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**

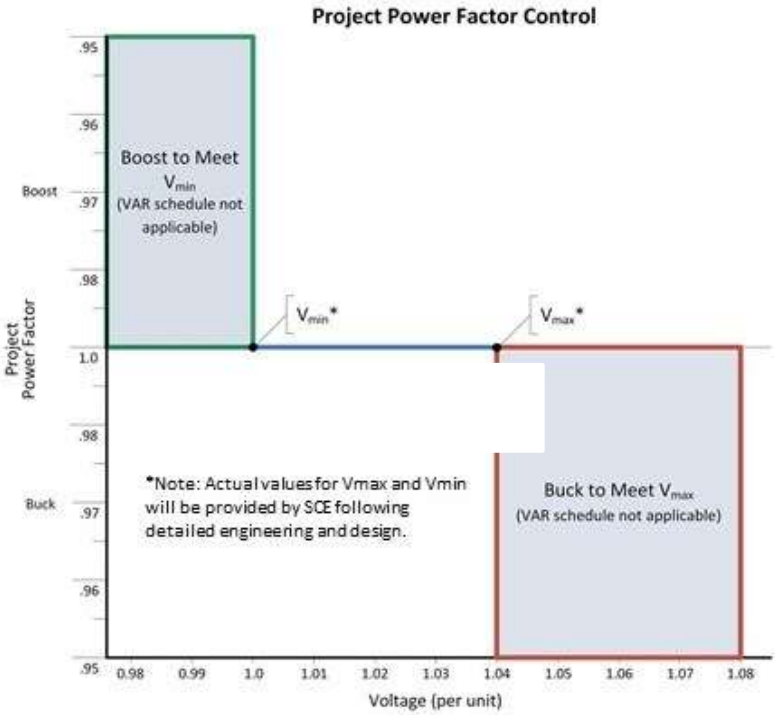
   The Generating Facility will be required to maintain a composite power delivery at continuous rated power output at the high-side of the IC's substation or other equivalent location at a power factor within the range of 0.95 leading to 0.95 lagging.

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

[3] 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.

and controlling voltage) of the Generating Facility in order to maintain scheduled voltage at a reference point.



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 Supplemental 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 is in compliance 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

In order 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.

[redacted]

- [redacted]

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 does not contribute to any overloads under normal, single contingency, and multiple contingency conditions. The details of the analysis are provided in the corresponding Area Reports

2. Subtransmission Assessment (66 kV or 115 kV)

   The subtransmission assessment indicated that the Generating Facility does not contribute to any overloads under normal, single contingency, and multiple contingency conditions. The details of the analysis are provided in the applicable Subtransmission Assessment Report.

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

1. Thermal Overloads

   The study found that the Generating Facility contributes to the following 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)

   [redacted]

   ii. Single Contingency (N-1)

   - [redacted]

2. Voltage Performance

   [redacted]

[redacted]

3. Protection

   i. [redacted]

4. Required Mitigations

[redacted]

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

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 in excess of 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 as a result of the inclusion of Phase I interconnections and corresponding Distribution and Network Upgrades, if any.

[redacted]

2. Affected Systems

[redacted]

G. DELIVERABILITY ASSESSMENT RESULTS

1. On Peak Deliverability Assessment

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

[redacted]

2. Off- Peak Deliverability Assessment

[redacted]

3. Required Mitigations

4. [redacted]

H. INTERCONNECTION FACILITIES, NETWORK UPGRADES, AND DISTRIBUTION UPGRADES

Please see Attachment 1 for SCE's IF's, RNU's, Delivery Network Upgrades[4] (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.

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– [redacted]

   b. Reliability Network Upgrades

      i. [redacted]

   c. Voltage Support Mitigation

      [redacted]

   d. Distribution Upgrades

      i. [redacted]

      ii. [redacted]

[redacted]

[4] 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.

Note 1: It is important to note that short-circuit duty upgrades identified as part of the QC11 Phase I interconnection studies were derived with the inclusion of all active higher-queued generation projects without regard to corresponding desired in-service dates or actual project status. Changes to the higher-queued generation projects as well as changes to generation projects in QC11, such as withdrawals, downsizing, suspensions, or deferrals to proposed in-service dates, may allow for the identified earliest in-service to be accelerated to align with the construction timing for the Plan of Service and Interconnection Facilities needed to interconnect the project. Ultimately, SCD upgrades will be scheduled based on actual development of generation resources identified to meaningfully increase SCD on the identified overstressed circuit breakers as determined based on execution of Generation Interconnection Agreements or other agreements that commit a project towards development.

Note 2: It is important to note that Distribution Upgrades (at the 66 kV voltage level) beyond the Plan of Service identified as part of the QC11 Phase I interconnection studies were derived with the inclusion of all active higher-queued generation projects without regard to corresponding desired in-service dates or actual project status. Changes to the earlier-queued generation projects as well as changes to generation projects in QC11, such as withdrawals, downsizing, suspensions, or deferrals of proposed in-service dates, may allow for the identified earliest in-service date to be accelerated to align with the construction timing for the Plan of Service and Interconnection Facilities needed to interconnect the project. Ultimately, design/construction of Distribution Upgrades will be scheduled based on actual development of generation resources triggering the need for those upgrades as determined based on execution of Generation Interconnection Agreements or other agreements that commit a project towards development.

Note 3: The IC is advised that the duration provided assumes the IC will perform environmental work related to the installation of SCE's IF's and/or DU's as specified in this report, in parallel with SCE's preliminary design and engineering. The IC is expected to engage SCE's ES group to obtain concurrence prior to commencement of this work and during execution of the work. Since SCE will be using the IC's environmental documents and/or work products, delays on the IC's part to produce such documents and/or work product(s) may delay SCE's ability to obtain required permits and/or license(s). Should delays occur, the commencement of SCE's detailed engineering, procurement, and construction of may be deferred, which will increase the duration identified in this report and push out the feasible ISD provided in Table K.1 ISD and COD Assessment.

3. Other Potential Costs to the Generating Facility

[redacted]

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
Add:	**30 CD**	Phase II Results Meetings
Add:	**15 BD (20 CD)**	**Starting Point:** TPD Results issued and IC response provided
Add:	**30 CD**	**Earliest Reasonable Tender of draft GIA**
Add:	**90 CD**	• GIA negotiation time, execution, filing, and related activities.
Add: Construction Duration	[redacted]	Construction duration outlined in the Phase I Study Report. Construction completion no earlier than date which reflects earliest ISD
	Reference:	IC-requested ISD via IR
	Reference:	IC-requested COD via IR
		Difference between IC ISD and COD
Equals:		Earliest achievable In-Service Date (ISD)
		Earliest achievable Commercial Operation Date (COD) (Using difference between ISD and COD requested by IC)

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**

[redacted]

SCE can reasonably tender a draft GIA by [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 J.1

The ISO will perform its Annual Reassessment [redacted]) and Transmission Plan Deliverability (TPD) Allocation[5] ([redacted]). Any changes in scope, cost, or schedule requirements that come out of ISO's Annual Reassessment and [redacted] Allocation will be reflected in a [redacted] 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.
- Cloud Cover: Solar generating facilities 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 including, but not limited to, the conditions identified above. 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

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

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. 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. **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. 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
Not applicable

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