
Appendix A – WDT1177

██
██
Queue Cluster 7 Phase II Report

November 24, 2015

This study has been completed in coordination with the California Independent System Operator Corporation (CAISO) per CAISO Tariff Appendix DD Generator Interconnection and Deliverability Allocation Procedures (GIDAP)

Table of Contents

A. Introduction	3
B. Study Assumptions.....	6
C. Reliability Standards, Study Criteria and Methodology	8
D. Power Flow Reliability Assessment Results	8
E. Short Circuit Duty Results.....	9
F. Transient Stability Evaluation.....	11
G. Power Factor Requirements.....	11
H. Deliverability Assessment Results	11
I. In-Service Date and Commercial Operation Date Assessment.....	11
J. Timing of Full Capacity Deliverability Status, Interim Deliverability, Area Constraints, and Operational Information	14
K. Interconnection Facilities, Network Upgrades, and Distribution Upgrades	15
L. Cost and Construction Duration Estimates	15
M. SCE Technical Requirements	16
N. Subsynchronous Interaction Evaluations.....	16
O. Environmental Evaluation, Permitting, and Licensing.....	16
P. Affected Systems Coordination	16
Q. Items not covered in this study	16

Attachments:

1. Interconnection Facilities, Network Upgrades, and Distribution Upgrades
2. Escalated Cost and Time to Construct for Interconnection Facilities, Reliability Network Upgrades, Delivery Network Upgrades, and Distribution Upgrades
3. Allocation of Network Upgrades for Cost Estimates and Maximum Network Upgrade Cost Responsibility
4. Distribution Provider Interconnection Handbook
5. Short Circuit Calculation Study Results (see Appendix H of the Area Report)
6. Customer Provided Dynamic Data
7. Not Used
8. Subtransmission Assessment Report (if applicable)

A. Introduction

██████████ the Interconnection Customer (IC), has submitted a completed Interconnection Request (IR) to Southern California Edison Company (SCE) for their proposed ██████████. The project requested a Point of Interconnection (POI) at Southern California Edison Company's (SCE) ██████████ located in Riverside County, CA. The IC elected that the Project be Option A with Full Capacity Deliverability Status, and desires an In-Service Date (ISD) of August 1, 2016 and a Commercial Operation Date (COD) of November 1, 2016. Such dates are specified in the Project Attachment B. Actual ISD and COD will depend on design and construction requirements to Interconnect for the Project.

In accordance with Federal Energy Regulatory Commission (FERC) approved CAISO Tariff Appendix DD Generator Interconnection and Deliverability Allocation Procedures (GIDAP), the Project was grouped with Queue Cluster 7 (QC7) Phase II projects to determine the impacts of the group as well as impacts of the Project on the CAISO Controlled Grid.

Please note that the discussion related to the combined impacts at the transmission and subtransmission levels of the group resides in the Area and Subtransmission Assessment Reports; both are included in the QC7 Phase II report package. This report focuses only on the impacts or impact contributions of the Project at the local Distribution system, and it is not intended to supersede any contractual terms or conditions specified in a Generator Interconnection Agreement (GIA).

The report provides the following:

1. Subtransmission System Impacts caused by the Project;
2. System reinforcements necessary to mitigate the adverse impacts caused by the Project under various system conditions;
3. A list of required facilities and a good faith estimate of the Project's cost responsibility and time to construct¹ these facilities. Such information is provided in Attachment 1 and Attachment 2 as separate documents in the Appendix A Project report package.

All equipment and facilities comprising the Project, located in Riverside County, California, as disclosed by the Interconnection Customer (IC) in its Interconnection Request (IR) and may have been amended during the interconnection Study process which consists of (i) ██████████, (ii) the associated infrastructure, (iii) meters and metering equipment, (iv) appurtenant equipment, and (v) ██████████ of auxiliary loads.

Based on the technical data provided for the project, internal project losses were identified to be ██████████. Subtracting these ██████████ losses and ██████████ auxiliary loads from the ██████████ gross output results

¹ It should be noted that construction is only part of the duration of months specified in the study, includes detailed engineering, licensing, etc, and other activities required to bring such facilities into service. These durations are from the execution of the Generator Interconnection Agreement, receipt of all required information, funding, and written authorization to proceed from the IC as will be specified in the Generator Interconnection Agreement to commence the work.

In a net output of [REDACTED] as measured at the high side of the main transformer bank. Losses on the [REDACTED] were found to be negligible resulting in an estimated [REDACTED] delivery at the Point of Interconnection.

The Project shall consist of the Generating Facility and the IC's Interconnection Facilities as illustrated below in Figure A.1 and summarized below in Table A.1. Figure A.2 provides a map that illustrates the location of the Project.

Figure A.1: Project IC Facilities One-Line Diagram

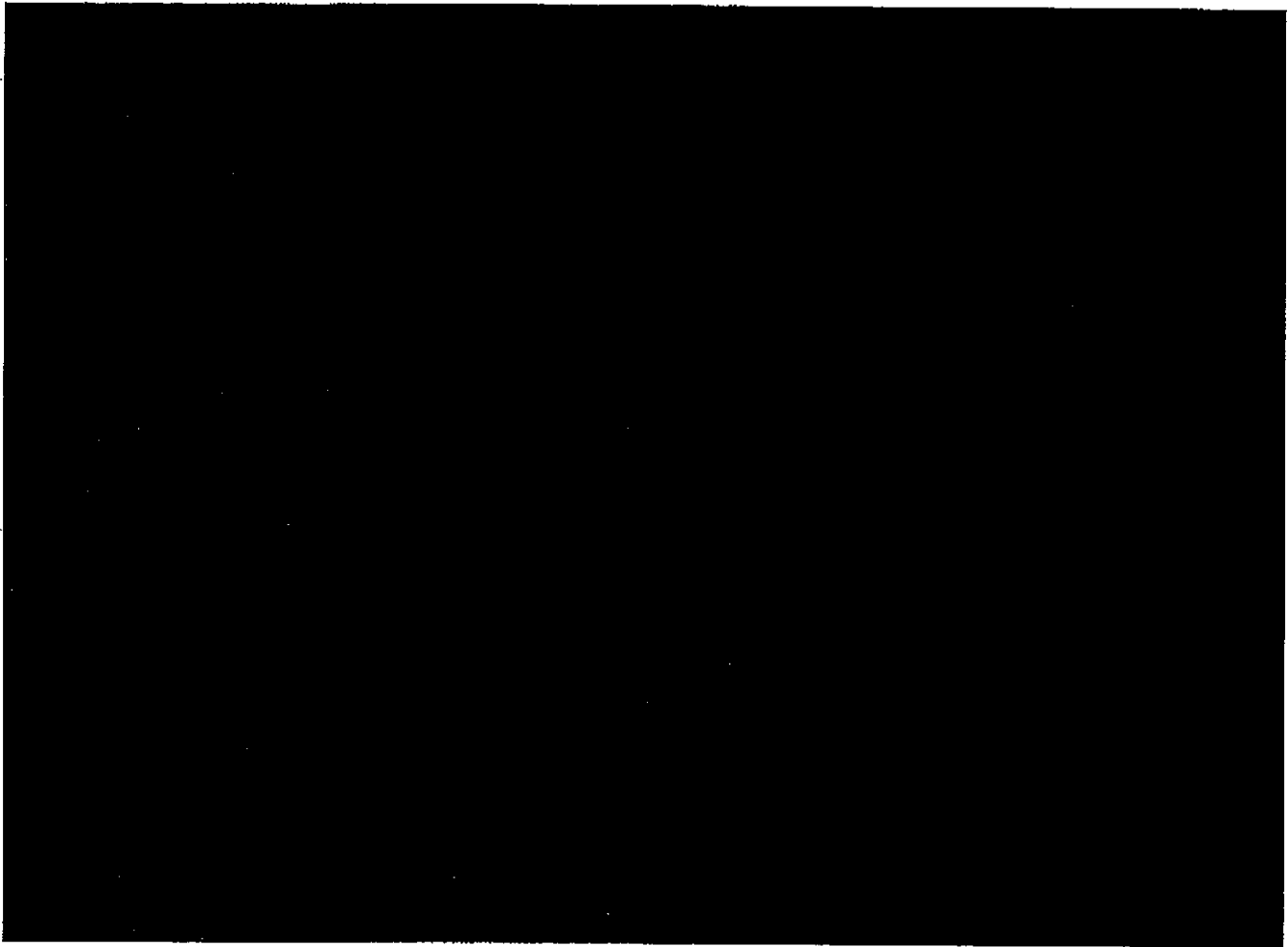


Figure A.2: Project Location Map

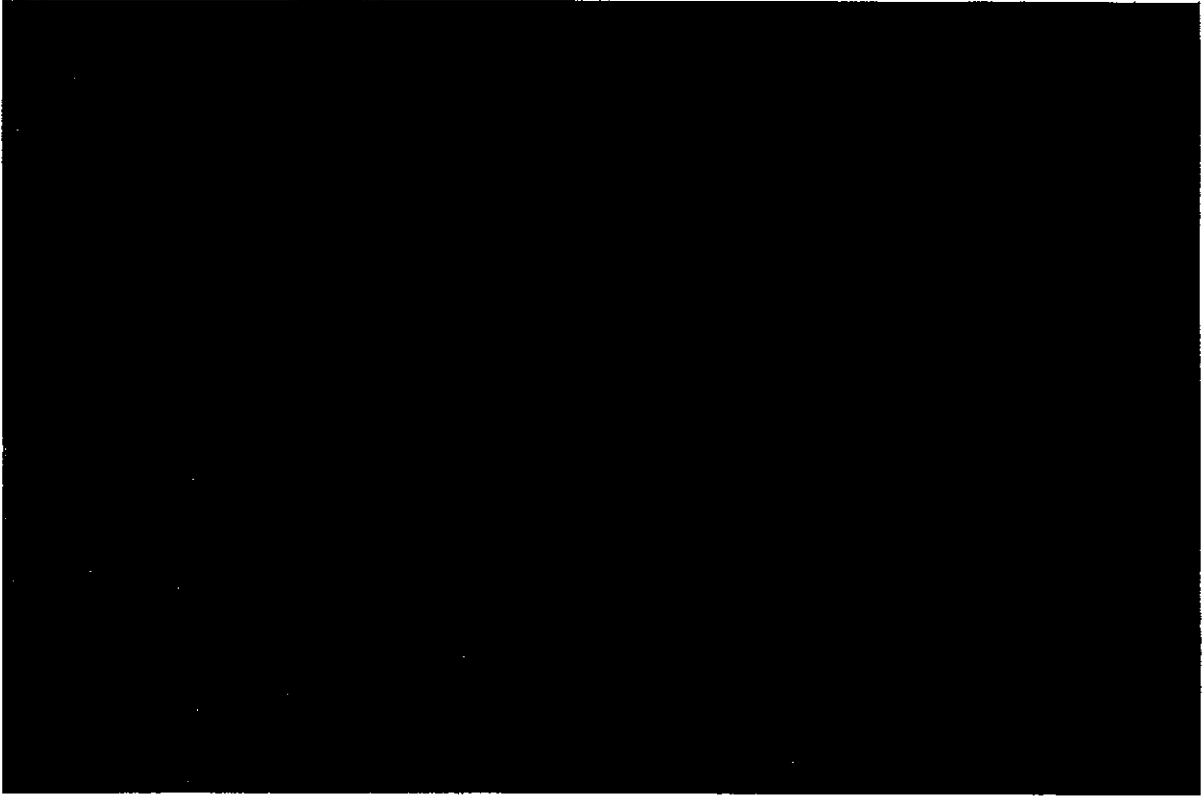


Table A.1 Project General Information

Project Location	[REDACTED]
Distribution Provider's Planning Area	SCE Eastern Bulk System
Number and Types of Generators	[REDACTED]
Interconnection Voltage	[REDACTED]
Maximum Generator Output (At Inverter Terminals)	[REDACTED] (gross)
Internal Generation Facility Losses	[REDACTED]
Generator Auxiliary Load	[REDACTED]
Maximum Net Output at Generation Facility (High-Side of Main Transformer)	[REDACTED]
Power Factor Range	[REDACTED] at POI per interconnection application
Step-up Transformer(s)	[REDACTED]
Gen-Tie	[REDACTED]
Estimated Losses on Gen-Tie Facilities (All Gen-Tie Facilities used to deliver to POI)	[REDACTED]
Estimated Deliver at POI (High Side of Main Transformer less Gen-Tie Losses)	[REDACTED]
POI	Distribution Provider's proposed [REDACTED]
IC Requested COD	November 1, 2016

B. Study Assumptions

For detailed assumptions regarding the group cluster analysis at the transmission and subtransmission level, please refer to the applicable QC7 Phase II Area and Subtransmission Assessment Reports. Below are the assumptions specific to the Project.

1. The following is the Plan of Service (POS) assumed for the Project in the Phase II Study:

The project was modeled as interconnecting to SCE's proposed [REDACTED] via [REDACTED]. The CAISO delivery point is at [REDACTED].

2. The following Facilities will be installed by SCE and are included in this Phase II Study:

- The segment of [REDACTED] inside the [REDACTED]
- The segments of each of the two generator – owned telecommunication paths inside the [REDACTED]
- The required revenue load meters.
- Lightwave, channel bank(s), and associated equipment at [REDACTED] and at the Generating Facility.

NOTE: SCE installation does not include metering, voltage, and current transformers. The SCE Meters will be connected to the generator – owned voltage and current transformers to be installed for their CAISO metering.

3. The following Facilities will be installed by the IC and are not included in this Phase II Study:

- The [REDACTED] from the Generating Facility to the last structure outside the Lakeview property line.
- The [REDACTED] to provide telecommunication paths required for the line protection relays.
- The required CAISO metering equipment (voltage and current transformers and CAISO meters).

NOTE: The metering voltage and current transformers installed for the CAISO metering will also be used for the SCE owned revenue meters.

- The following line protection relays to be installed at the Generating Facility end of the [REDACTED]
 - [REDACTED] with dual dedicated digital communication channels on diverse paths to [REDACTED]
 - [REDACTED] with dual dedicated digital communication channels to [REDACTED]

NOTE: SCE will install metering voltage, and current transformers to be used for the SCE owned revenue meters. The voltage and current transformers can be used for the customer CAISO metering.

4. Additional items were considered in the Phase II Study:

- For the purposes of this study SCE assumed that all facilities associated with the pending SCE [REDACTED] are already in service. Should the future [REDACTED] not materialize, the Project's facilities to interconnect will need to be reassessed which may potentially change the Plan of Service and associated Project costs.

C. Reliability Standards, Study Criteria and Methodology

The generator interconnection studies will be conducted to ensure the CAISO-controlled grid is in compliance with the North American Electric Reliability Corporation (NERC) reliability standards, WECC regional criteria, and the CAISO planning standards. Refer to Section C of the Area Report for details of the applicable reliability standards, study criteria and methodology.

D. Power Flow Reliability Assessment Results

I. Steady State Power Flow Analysis Results – 220 kV and above

1. Thermal Overloads - The group study indicated that the Project does not contribute to any overload problems on the Transmission System of the area.
2. Power Flow Non-Convergence - The group study indicated that the Project does not contribute to any case non-convergence issues.
3. Voltage Performance - With the generators providing the required power factor regulation capability ([REDACTED] at PO), no voltage performance issues were identified.
4. Required Mitigations – The study determined that with the project providing [REDACTED] power factor regulation capability at the POI, no mitigation is necessary for this Project to address any issues on the Bulk Electric System.

II. Steady State Power Flow Analysis Results –115 kV

1. Thermal Overloads - The Subtransmission Assessment indicated that the Project does not contribute to any overload problems on the Subtransmission System
2. Power Flow Non-Convergence - The Subtransmission Assessment indicated that the Project does not contribute to any case non-convergence issues.
3. Voltage Performance - With the generators providing the required power factor regulation capability ([REDACTED]) no voltage performance issues were identified.
4. Required Mitigations – The study determined that with the project providing [REDACTED] power factor regulation capability at the POI, no mitigation is necessary for this Project to address any issues on the Subtransmission System.

E. Short Circuit Duty Results

Short circuit studies were performed to determine the fault duty impact of adding the QC7 Phase II projects to the Transmission 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 QC7 Phase II is determined. Each project in the cluster will be responsible for its share of the upgrade cost based on the rules set forth in CAISO Tariff Appendix DD.

1. Short Circuit Duty Study Input Data

The customer provided technical data for the identified inverter (specified in Section 2). If the technical data obtained from the inverter manufacturer by SCE illustrates differences in the Short Circuit Duty (SCD) parameters, then SCE utilized the manufacturer data of the inverter model specified by the IC in the application in the SCD study. SCE did utilize the parameters provided by the IC.

"Inverter Based Generation"

Data for each generation unit: Maximum Fault contribution: [REDACTED]

[REDACTED]

Length:	[REDACTED]
Conductor:	[REDACTED]
Z1(p.u.) conductor impedance information:	[REDACTED]
Z0(p.u.) conductor impedance information:	[REDACTED]

Collector System:

Collector system information was not provided by the IC.

Generation Step-up and Pad-Mount Transformer technical details are provided above in Table A-1.

2. Short Circuit Duty Study Results

All bus locations where the QC7 Phase II projects increase the short-circuit duty by [REDACTED] 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 QC7 Phase II Interconnections and corresponding network upgrades, if any.

The responsibility to finance short circuit related Reliability Network Upgrades identified through a Group Study shall be assigned to all Interconnection Requests in that Group Study pro rata on the basis of short circuit duty contribution of each Generating Facility.

Please refer to the QC7 Phase II Area Report for the QC7 Phase II breaker evaluation identified overstressed circuit breakers at the SCE buses, and Attachment 2 for the pro-rata allocation with corresponding estimated costs (if any) for the Project, based on SCD contribution at each location.

3. SCE Substations with Ground Grid Duty Concerns

The short circuit studies flagged SCE-owned substations beyond the Project POI with ground grid duty concerns that necessitate a ground grid study. However, the Project does not contribute to the duty concerns at hand, and did not get allocated costs for ground grid studies at the flagged SCE-owned substations.

4. Preliminary Protection Requirements

Protection requirements are designed and intended to protect the Distribution Provider's system only. The preliminary protection requirements were based upon the interconnection plan as shown in the one-line diagram depicted in line item #7 in Attachment 1.

The IC is responsible for the protection of its own system and equipment and must meet the requirements in the SCE Interconnection Handbook provided in Attachment 4.

F. Transient Stability Evaluation

With the Project providing [REDACTED] power factor correction as measured at the POI, transient stability performance was found to be acceptable. Refer to enclosed Area Report and Subtransmission Assessment Report in the QC7 Phase II report package, for the QC7 Phase II transient stability evaluation criteria, and assessment results, respectively, on the CAISO Control (220 kV and above) and non-CAISO Control (115 kV) voltage levels.

G. Power Factor Requirements

Based on the results of the Study, the Project will need to be designed to maintain a composite power delivery at continuous rated power at the POI at a power factor within the range of [REDACTED] at POI for asynchronous generation and [REDACTED] at generator terminals for synchronous generators. 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 Transmission system.

H. Deliverability Assessment Results

1. On Peak Deliverability Assessment

The Project does not contribute to any deliverability constraints.

2. Off- Peak Deliverability Assessment

For off-peak deliverability assessment, see Section E.2 in the Area Report.

3. Required Mitigations

No Delivery Network Upgrades are required.

I. In-Service Date and Commercial Operation Date Assessment

The latest information provided by the IC has indicated that the requested generator ISD is August 1, 2016 and a proposed COD of November 1, 2016. To determine if these dates could be met, an In-Service Date and Commercial Operation Date Assessment was performed which considered both the QC7 Phase II process timelines as well as the following facilities needed to provide for reliable energy only Interconnection of the Project. Timing of the upgrades required to provide for the requested Full Capacity Deliverability Status are discussed in the section below.

1. QC7 Interconnection Process Timelines

To enable physical Interconnection, a Generator Interconnection Agreement (GIA) is required. As part of the QC7 Interconnection process, a GIA is not scheduled to be tendered until after completion of the CAISO's Reassessment and Transmission Planning Deliverability (TPD) Allocation Study Process which does not commence until late January 2016. The TPD Allocation

is scheduled to be completed by April. If the CAISO and SCE can make a determination that the TPD allocation outcomes do not change the scope requirements, a letter is provided at the end of April² informing no change to Network Upgrade requirements and initiating the GIA process. Otherwise, further re-assessment will be performed for the Project. Any updates to scope, costs and schedules are developed and updated reports are issued by the end of July. The GIA negotiations commences after either the issuance of the letter of no change to Network Upgrade requirements at the end of April or upon issuance of the updated reports at the end of July. Provided the Project does not elect to Park, the letter or updated reports are used as the basis to proceed with the GIA negotiations. Assuming a three month timeframe for GIA negotiations, a GIA is not expected until either early August 2016 or early November 2016 depending on TPD study results and decision to Park or proceed.

2. System Upgrade Timelines for Reliable Interconnection

The Operational Studies identified that the following facilities are required in order to provide for an energy only interconnection:

a. Distribution Provider's Interconnection Facilities

As described in Section 1.b of Attachment 1, [REDACTED] among other items will be required to terminate the [REDACTED] at the pending [REDACTED]. Preliminary durations estimated to install the Distribution Provider's Interconnection Facilities is 27 months.

b. Reliability Network Upgrades – Short-Circuit Duty (SCD) Mitigation

Short circuit duty operational mitigation was identified taking into account new generation projects which have executed GIAs, approved transmission system upgrades fully permitted and under construction, and new generation projects including QC7 Phase II Projects which do not yet have an executed GIA. The study results for these operational studies are provided in Section II of the Generation Sequencing Implementation (GSI) Short Circuit Duty evaluation (Appendix G). Based on the study results, the following upgrades/mitigation are required to be in place in order to enable energy only interconnection of this Project:

- Reconfiguration of the system to operate [REDACTED] on the east side as normally open (requires simply opening AA-Bank so no duration identified)
- [REDACTED] which has an estimated in-service date of July 2016

In addition to the above mitigation requirements which already have established in-service dates, the following additional SCD mitigations may be needed in order to enable [REDACTED] interconnection. It is important to note that projects to undertake the work have not

²The TPD allocation is estimated to complete in April. The actual date may vary.

been initiated since the timing of need is dependent on development of queued generation projects, including QC7, which have not yet executed a GIA.

- o Replacement of [REDACTED] (triggered by QC3&4)
- o Upgrade [REDACTED] (triggered by QC7)

The identification of need was based on the assumption that all queued generation projects actually materialize and are interconnected (as energy only). Timing to implement these SCD mitigations are currently estimated at 27 months from the date the need is identified. These additional SCD mitigations will be continuously evaluated as part of ongoing GIA negotiations and ongoing studies to properly define the time when actual need to undertake these mitigations is required based on the actual GIA negotiations with corresponding requested in-service dates. Once the actual need is triggered, project development will commence.

c. Voltage Support Mitigation

No voltage support upgrades were identified to be required to enable this project to interconnect.

d. Distribution Upgrades

The IC requested interconnection to the pending [REDACTED]. This new substation currently has an expected in-service date of June 2016.

3. Conclusion

Based on the standard timelines, the requested IC In-Service Date of August 1, 2016 cannot be met due to the following reasons:

- o The QC7 Interconnection Process Timelines will not yield a Generator Interconnection Agreement until either early August 2016 or early November 2016 depending on TPD study results which is beyond the requested IC In-Service Date.
- o Timelines associated with constructing the Interconnection Facilities needed for physical interconnection is contingent on actual construction timelines corresponding to the [REDACTED] and are estimated at 27 months from the date the GIA is executed, payments are made, and notice to proceed with interconnection is provided. Following the standard process, this would result in a best case in-service date of December 2018 or March 2019 depending on TPD study results. Such dates are beyond the requested In-Service Date. It should be noted that the ability to meet a best case in-service date is tied directly to the IC's timely execution of the Interconnection Agreement, submittal of payments, and notice to proceed.

- o Potential need to replace [REDACTED] [REDACTED] which would require an estimated 27 months to complete from the day a project is initiated to commence the upgrade at each location.

J. Timing of Full Capacity Deliverability Status, Interim Deliverability, Area Constraints, and Operational Information

The IC elected that the Project be Option A with Full Capacity Deliverability Status (FCDS). Timing of obtaining the requested FCDS is dependent on the completion of Delivery Network Upgrades. Until such time that the Delivery Network Upgrades are completed and placed into service, the Project may experience additional congestion exposure due to transmission limitations or may be granted Interim Deliverability Status based on annual system availability. The sections below provide a discussion of the timing of Full Capacity Deliverability Status, Interim Deliverability, Area Constraints, and Operational Information.

1. System Upgrades Required for Full Capacity Deliverability Status

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

- a. [REDACTED] which consists of upgrading all [REDACTED] [REDACTED] The WOD Project as proposed by SCE is currently estimated to be completed in late 2020. However, the Draft Environmental Impact Report//Draft Environmental Impact Assessment identified an environmentally superior alternative to SCE's proposed WOD Upgrade which, if ultimately selected and approved by the CPUC, would likely extend the estimated completion date beyond 2020.
- b. [REDACTED] which consists of upgrading the substation to include a [REDACTED] and [REDACTED] served by looping the [REDACTED] [REDACTED] in-and-out of the substation. These upgrades are expected to be completed in 2020.

2. Interim Operational Deliverability Assessment for Information Only

The operational deliverability assessment was performed for study years 2016 through 2020 by modeling the Transmission and generation in service in the corresponding study year. For details of the transmission and generation assumptions as well as the assessment results, refer to Section E.3 of the Area Report.

The Project is not deliverable in 2017 through 2020 due to overloads on [REDACTED] [REDACTED] Once all approved transmission upgrades modeled and all identified mitigation are in service, the Project will have deliverability status as granted by the Transmission Plan Deliverability allocation.

3. Area Constraints

With all approved transmission upgrades modeled and all identified mitigation included, no area deliverability constraints were identified for the Project. However, until all these upgrades are put in service, the CAISO Deliverability assessment indicates that the addition of this QC7 Phase II project contributes to the previously identified [REDACTED]. As such, Interconnection of new generation in advance of completing the approved transmission upgrades and upgrades triggered by queued ahead generation projects may result in increased congestion on the system. Furthermore, the system constraints will likely be exacerbated during the construction period of these upgrades as transmission facilities will be taken out of service (thus reducing system capability) to enable construction of new facilities. Refer to Section E.1.3 of the Eastern Area Report for additional information.

K. Interconnection Facilities, Network Upgrades, and Distribution Upgrades

Please see **Attachment 1** for the Interconnection Facilities, Reliability Network Upgrades, Delivery Network Upgrades and Distribution Upgrades allocated to the Project. Please note that SCE will not "reserve" the identified Interconnection Facilities (IF's) for the proposed POI. The identified scope/facilities will be allocated to the project upon the successful execution of the Generator Interconnection Agreement (GIA) and SCE has completed the detailed design and engineering of the facilities according to tariff timelines.

L. Cost and Construction Duration Estimates

To determine the cost responsibility of each generation project in QC7 Phase II, the CAISO developed cost allocation factors (Attachment 3) for Reliability Network Upgrades, Local Delivery Network Upgrades and Area Delivery Network Upgrades. Attachment 2³ provides the 'constant' 2015 dollars and their escalation to the estimated COD year for Interconnection Facilities, Reliability Network Upgrades, Delivery Network Upgrades, and Distribution Upgrades which the Project was allocated cost.

For the QC7 Phase II Study, the estimated COD is derived by assuming the duration of the work element will begin in December 2016, which accounts for the CAISO tariff scheduled completion date of the QC7 Phase II study plus: the TP Deliverability (TPD)⁴ allocation, Annual Reassessment effort, and the interconnection agreement signing period and submittal of required funds by the IC.

The IC should note that any Local Delivery Network Upgrades and Area Delivery Network Upgrades allocated to the Project may be assessed 35% Income Tax Component of Contribution (ITCC) pending the results of the TPD allocation Process several months after the Phase II Study Reports are released, [REDACTED]

[REDACTED] For your information, Attachment 2 contains a potential ITCC estimate⁵ based on the Phase II cost in this study. It does not represent the "maximum ITCC exposure" of the Project.

³For [REDACTED] the Attachment 2 includes upgrade(s) identified from the "Charging" analysis.

⁴ Transmission Plan Deliverability: Deliverability supported by the CAISO's Transmission Plan

⁵ The maximum ITCC exposure applies ITCC (35%) to assigned IF and DU facilities. Network upgrades that are not subject to transmission credits incremental to a repayment \$/MW cap or an award of 0 MW TPD Allocation, and that SCE will own the facilities in question. The maximum ITCC exposure is calculated by applying the following formula: [REDACTED]

Attachment 3 provides an estimated non-reimbursable RNU cost that would be subject to ITCC, taking into account the Network Upgrade maximum cost responsibility. The maximum ITCC warranted by the Project will be addressed, calculated, and included during the Interconnection Agreement development phase once the IC submits the TP Deliverability allocation options form confirming the acceptance, waiver (parking); or denial of awarded deliverability assigned to the Project.

M. SCE Technical Requirements

The IC is responsible for the protection of its own system and equipment and must meet the requirements in the Distribution Provider Interconnection Handbook provided in Attachment 4.

N. Subsynchronous Interaction Evaluations

Certain generators or inverter based generators when interconnected within electrical proximity of series capacitor banks on the Transmission System are susceptible to Sub-Synchronous Interaction (SI) conditions which must be evaluated. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

The IC is 100% responsible for any studies related to the SSR or SSTI. The only study that SCE will perform (at the IC's expense) is for SSCI; to ensure that the Project does not damage SCE's control systems.

The SSCI study will require that the IC provide a detailed PSCAD model of its Generating Facility and associated control systems, along with the manufacturer representative's contact information. The study will identify any mitigation(s) that will be required prior to initial synchronization of the Generating Facility. The study and the proposed mitigation(s) shall be at the expense of the IC.

It is the IC's responsibility to select, purchase, and install turbine/inverter based generators that are compatible with the series compensation in the area.

O. Environmental Evaluation, Permitting, and Licensing

Please see Appendix K of the QC7 Phase II Area Report.

P. Affected Systems Coordination

Please see Section H of the QC7 Phase II Area Report.

Q. Items not covered in this study

1. Conceptual Plan of Service

The results provided in this study are based on conceptual engineering and a preliminary Plan of Service and are not sufficient for permitting of facilities. The Plan of Service is subject to change as part of detailed engineering and design.

2. IC's Technical Data

The study accuracy and results for the QC7 Phase II Study are contingent upon the accuracy of the technical data provided by the IC. Any changes from the data provided could void the study results.

3. Study Impacts on Neighboring Utilities

Results or consequences of this QC7 Phase II 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 CAISO Controlled Grid, and sub-synchronous resonance (SSR). Refer to Affected Systems Coordination Section of the Area Report for additional information.

4. Use of Distribution Provider Facilities

The IC is responsible for acquiring all property rights necessary for the IC's Interconnection Facilities, including those required to cross Distribution Provider facilities and property. This Interconnection Study does not include the method or estimated cost to the IC of Distribution Provider mitigation measures that may be required to accommodate any proposed crossing of Distribution Provider facilities. The crossing of Distribution Provider property rights shall only be permitted upon written agreement between Distribution Provider and the IC at Distribution Provider's sole determination. Any proposed crossing of Distribution Provider property rights will require a separate study and/or evaluation, at the IC's expense, to determine whether such use may be accommodated.

5. Distribution Provider Interconnection Handbook

The IC shall be required to adhere to all applicable requirements in the Distribution Provider Interconnection Handbook. These include, but are not limited to, all applicable protection, voltage regulation, VAR correction, harmonics, switching and tagging, and metering requirements.

6. 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.

7. System Protection Coordination

Adequate Protection coordination will be required between Distribution Provider-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.

8. Standby Power and Temporary Construction Power

The QC7 Phase II Study does not address any requirements for standby power or temporary construction power that the Project may require prior to the In-Service Date of the Interconnection Facilities. Should the Project require standby power or temporary construction power from Distribution Provider prior to the In-Service Date of the Interconnection Facilities, the IC is responsible to make appropriate arrangements with Distribution Provider to receive and pay for such revenue service.

9. Licensing Cost and Estimated Time to Construct Estimate (Duration)

The estimated licensing cost and durations applied to this Project are based on the Project scope details presented in this study. These estimates are subject to change as Project environmental and real estate elements are further defined. Upon execution of the Interconnection Agreement, 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.

10. Network/Non-Network Classification of Telecommunication 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 diverse telecommunication paths associated with the IC's generation tie line, excluding terminal equipment at both ends. In addition, the telecommunication requirements for SPS were assumed based on tripping of the generator breaker as opposed to tripping the circuit breakers at the Distribution Provider substation. Due to uncertainties related to telecommunication upgrades for the numerous projects in queue ahead of QC7 Phase II, telecommunication upgrades for higher queued projects were not considered in this study. Depending on the outcome of interconnection studies for higher queued projects, the telecommunication upgrades identified for QC7 Phase II may be reduced. Any changes in these assumptions may affect the cost and schedule for the identified telecommunication facilities.

11. Ground Grid Analysis

A detailed ground grid analysis will be required as part of the detailed engineering for the Project at the SCE substations whose ground grids were flagged with duty concerns.

12. Applicability

This document has been prepared to identify the impact(s) contributions of the Project on the SCE electrical system; as well as establish the technical requirements to interconnect the Project to the POI that was evaluated in the QC7 Phase II Study for the Project. Nothing in this report is intended to supersede or establish terms/conditions specified in interconnection agreements agreed to by SCE, CAISO and the IC.

13. Process for synchronization/trial operations and commercial operations of the Project

The IC is reminded that the CAISO has implemented a New Resource Implementation (NRI) process that ensures that a generation resource meets all requirements before synchronization/trial operations and commercial operations. The NRI uses a bucket system for deliverables from the IC that are required to be approved by the CAISO. The first step of this

process is to submit an "ISO Initial Contact Information Request form" at least 7 months in advance of the planned initial synchronization. Subsequently an NRI project number will be assigned to the project for all future communications with the CAISO. The Distribution Providers 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 CAISO 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>

14. Potential Changes In Cost Responsibility

The IC is hereby placed on notice that interconnection of its proposed generating facility may be dependent upon certain Network Upgrades which are currently the cost responsibility of projects ahead of the proposed generating facility in the interconnection application queue. Section 14.2.2 of the GIDAP provides that should Network Upgrades required for queued-ahead projects be included in an executed GIA (or unexecuted GIA filed at FERC) at the time of withdrawal of the earlier queued generating facility, and the upgrades are determined to still be needed by later queued generating facilities, the financial responsibility for such upgrades falls to the Distribution Provider. However, if the Network Upgrades required by earlier queued generating facilities are not subject to an executed GIA (or unexecuted GIA filed at FERC) at the time of withdrawal of the earlier queued generating facilities, the financial responsibility for such upgrades may fall to the IC. Section 14.2.2 also discusses how Network Upgrades required by interconnection customers selecting Option (B) might be required to be reapportioned among interconnection customers selecting Option (B) in the case of withdrawals of earlier queued generating facilities. Changes in costs allocated to the IC could also arise as the result of the CAISO's reassessment process described in Section 7.4 of the GIDAP. SCE encourages the IC to review Sections 7.4 and 14.2.2 of the GIDAP for the rules and processes under which the financial responsibility might be reapportioned to the IC. Potential changes in the IC's cost responsibility resulting from application of the provisions of these Sections of GIDAP are not included in this Phase II study, nor are the potential impacts to the IC's maximum cost responsibility outlined.

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

Queue #	WDT1177			
	Project Allocation (%)	Total Upgrade Cost (2015 \$k)	Allocated Cost (2015 \$k)	Allocated Cost (Escalated \$k)
RNU				
Vista 220kV CB upgrade	2.10%	\$ 2,359	\$ 50	\$ 55
Vista 220kV CB upgrade grid ground study	100.00%	\$ 43	\$ 43	\$ 48
RNU Total		\$ 2,403	\$ 93	\$ 103
Grand Total		\$ 2,403	\$ 93	\$ 103

Attachment 4

Distribution Provider Interconnection Handbook

Preliminary Protection Requirements for Interconnection Facilities are outlined in the Distribution Provider Interconnection Handbook (separate document)

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

**Attachment 6
Customer Provided Dynamic Data**

The following data was submitted by the IC for Dynamic simulation:

[REDACTED]

Attachment 8
Subtransmission Assessment Report
Please refer to separate document

Queue Cluster 7 Phase II - Attachment 1

**████████████████████
Interconnection Facilities, Network Upgrades, and Distribution Upgrades**

Interconnection Facilities, Network Upgrades and Distribution Upgrades

Distribution Provider's Interconnection Facilities, Network Upgrades and Distribution Upgrades described below are based on the Distribution Provider's preliminary engineering and design. Such descriptions are subject to modification to reflect the actual facilities that are constructed and installed following the Distribution Provider's detailed engineering and design, identification of field conditions, and compliance with applicable environmental and permitting requirements.¹

1. Interconnection Facilities.

(a) **Interconnection Customer's Interconnection Facilities.** The Interconnection Customer shall:

- (i) [REDACTED]
- (ii) [REDACTED] from the Generating Facility to a position designated by the Distribution Provider, outside of the Distribution Provider's [REDACTED] where Interconnection Customer shall install a structure designed and engineered in accordance with the Distribution Provider's specifications ("Last Structure"). This [REDACTED] will be referred to as the [REDACTED]. The right-of-way for the [REDACTED] shall extend up to the edge of the [REDACTED].

(Note: The [REDACTED] name is subject to change by the Distribution Provider based upon its transmission line naming criteria. Should the [REDACTED] name be changed, this GIA may be amended to reflect such change.)
- (iii) The normal rating of the Interconnection Customer's [REDACTED] that is part of the [REDACTED]
- (iv) Install appropriate single mode fiber optic cable from the Generating Facility to a point designated by the Distribution Provider near the Distribution Provider's [REDACTED] to provide one of two telecommunication paths required for the line protection scheme and the Remote Terminal Unit ("RTU"). A minimum of [REDACTED] within the single mode fiber optic cable shall be provided for the Distribution Provider's exclusive use.

¹ Such descriptions are subject to modification to reflect the actual facilities that are constructed and installed following the Distribution Provider's detailed engineering and design, identification of field conditions, and compliance with applicable environmental and permitting requirements.

- (v) Install appropriate single mode fiber optic cable from the Generating Facility to a point designated by the Distribution Provider near the Distribution Provider's [REDACTED] to provide the second telecommunication path required for the line protection scheme and the SPS. A minimum of [REDACTED] within the single mode fiber optic cable shall be provided for the Distribution Provider's exclusive use. The telecommunication path shall meet the Applicable Reliability Standards criteria for diversity.
- (vi) Own, operate and maintain both telecommunication paths (including any fiber optic cables and appurtenant facilities), with the exception of the terminal equipment at both [REDACTED] and at the Generating Facility, which will be installed, owned, operated and maintained by the Distribution Provider.
- (vii) Allow the Distribution Provider to review the Interconnection Customer's telecommunication equipment design and perform inspections to ensure compatibility with the Distribution Provider's terminal equipment and protection engineering requirements; allow the Distribution Provider to perform acceptance testing of the telecommunication equipment and the right to request and/or to perform correction of installation deficiencies.
- (viii) Provide required data signals, make available adequate space, facilities, and associated dedicated electrical circuits within a secure building having suitable environmental controls for the installation of the Distribution Provider's RTU in accordance with the Interconnection Handbook.
- (ix) Make available adequate space, facilities, and associated dedicated electrical circuits within a secure building having suitable environmental controls for the installation of the Distribution Provider's telecommunications terminal equipment in accordance with the Interconnection Handbook.
- (x) Extend the single mode fiber optic cables for the two telecommunication paths to an Interconnection Customer provided and installed patch panel located adjacent to the Distribution Provider's telecommunications terminal equipment specified above.
- (xi) Install all required ISO-approved compliant metering equipment at the Generating Facility, in accordance with Section 10 of the ISO Tariff.
- (xii) Install a revenue metering cabinet and revenue metering equipment (typically, potential and current transformers) at the Generating Facility to meter the Generating Facility retail load, as specified by the Distribution Provider. The metering cabinet must be placed at a location that would allow twenty-four hour access for the Distribution Provider's metering personnel.
- (xiii) Allow the Distribution Provider to install, in the revenue metering cabinet provided by the Interconnection Customer, revenue meters and appurtenant equipment required to meter the retail load at the Generating Facility.
- (xiv) Install relay protection to be specified by the Distribution Provider to match the relay protection used by the Distribution Provider at [REDACTED]

[REDACTED] in order to protect the [REDACTED] as follows:

1. [REDACTED] via diversely routed dedicated digital communication channels to [REDACTED]. The make and type of [REDACTED] will be specified by the Distribution Provider during detailed engineering of the Distribution Provider's Interconnection Facilities.
- (xv) Install all equipment necessary to comply with the power factor requirements of Article 9.6.1 of the GIA, including the ability to automatically regulate the power factor to a schedule (VAR schedule) in accordance with the Interconnection Handbook.
- (xvi) Install disconnect facilities in accordance with the Distribution Provider's Interconnection Handbook to comply with the Distribution Provider's switching and tagging procedures.

(b) **Distribution Provider's Interconnection Facilities.** The Distribution Provider shall:

(i) **Lakeview Substation.**

1. Install facilities for a new [REDACTED] to terminate the [REDACTED]. This work includes the following:
[REDACTED]
[REDACTED]
[REDACTED]
2. Install the following relays to protect the [REDACTED]
[REDACTED]
 - a. [REDACTED] via diversely routed dedicated digital communications channels to the Generating Facility.

(ii) [REDACTED]
Install an appropriate number of [REDACTED] including insulator/hardware assemblies, and appropriate number of spans of conductor between the Last Structure and the dead-end substation structure at [REDACTED]. The actual number and location of the transmission tower structures and spans of conductor will be determined by the Distribution Provider following completion of detailed engineering of the Distribution Provider's Interconnection Facilities. The Phase II Interconnection Study assumed [REDACTED]
[REDACTED]

(iii) **Telecommunications.**

1. Install all required lightwave, channel banks, and associated equipment (including terminal equipment), supporting protection, RTU and SCADA requirements at the Generating Facility and [REDACTED] for the interconnection of the Generating

Facility. Notwithstanding that certain telecommunication equipment, including the telecommunications terminal equipment, will be located on the Interconnection Customer's side of the Point of Change of Ownership, the Distribution Provider shall own, operate and maintain such telecommunication equipment as part of the Distribution Provider's Interconnection Facilities.

2. Install appropriate length of fiber optic cable, including conduit and vaults, to extend the Interconnection Customer's main fiber optic cable from the point designated by the Distribution Provider near the Distribution Provider's [REDACTED] into the communication room at [REDACTED]. The actual location and length of fiber optic cable and conduit, and location and number of vaults, will be determined during detailed engineering of the Distribution Provider's Interconnection Facilities. The Phase II Interconnection Study assumed the installation of approximately 250 feet of underground fiber optic cable inside 5-inch conduit, and one (1) vault to extend the fiber optic cable into the communication room at [REDACTED].
3. Install appropriate length of fiber optic cable, including conduit and vaults, to extend the Interconnection Customer's diverse fiber optic cable from the point designated by the Distribution Provider near the Distribution Provider's [REDACTED] into the communication room at [REDACTED]. The actual location and length of fiber optic cable and conduit, and location and number of vaults, will be determined during detailed engineering of the Distribution Provider's Interconnection Facilities. The Phase II Interconnection Study assumed the installation of approximately [REDACTED].

(iv) **Real Properties, Transmission Project Licensing, and Corporate Environmental Health and Safety.**

Obtain easements and/or acquire land, obtain licensing and permits, and perform all required environmental activities for the installation of the Distribution Provider's Interconnection Facilities, including any associated telecommunication equipment for the [REDACTED].

(v) **Metering.**

Install revenue meters and appurtenant equipment required to meter the retail load at the Generating Facility. Notwithstanding that the meters and appurtenant equipment will be located on the Interconnection Customer's side of the Point of Change of Ownership, the Distribution Provider shall own, operate and maintain such facilities as part of the Distribution Provider's Interconnection Facilities.

(vi) **Power System Control.**

Install [REDACTED] at the Generating Facility to monitor typical generation elements such as MW, MVAR, terminal voltage and circuit breaker status for the Generating Facility and plant auxiliary load, and transmit the information received thereby to the Distribution Provider's grid control center. Notwithstanding that [REDACTED] will be located on the Interconnection Customer's side of the Point of Change of Ownership, the Distribution Provider shall own, operate and maintain [REDACTED] as part of the Distribution Provider's Interconnection Facilities.

2. Network Upgrades.

(a) **Stand Alone Network Upgrades.** None.

(b) **Other Network Upgrades.**

(i) **Reliability Network Upgrades.**

1. Short Circuit Duty (SCD) Mitigation – RNU

i. [REDACTED]

ii. Perform ground grid study.

b. Real Properties, Transmission Project Licensing, and Corporate Environmental Health and Safety
Obtain easements and/or acquire land, obtain licensing and permits, and perform all required environmental activities for the [REDACTED]

(ii) **Delivery Network Upgrades.**

1. **Area Delivery Network Upgrades.**

None identified in the Phase II Interconnection Study

2. **Local Delivery Network Upgrades.**

None identified in the Phase II Interconnection Study

3. Distribution Upgrades.

None identified in the Phase II Interconnection Study

4. Affected System Upgrades.

Not Used.

5. Point of Change of Ownership.

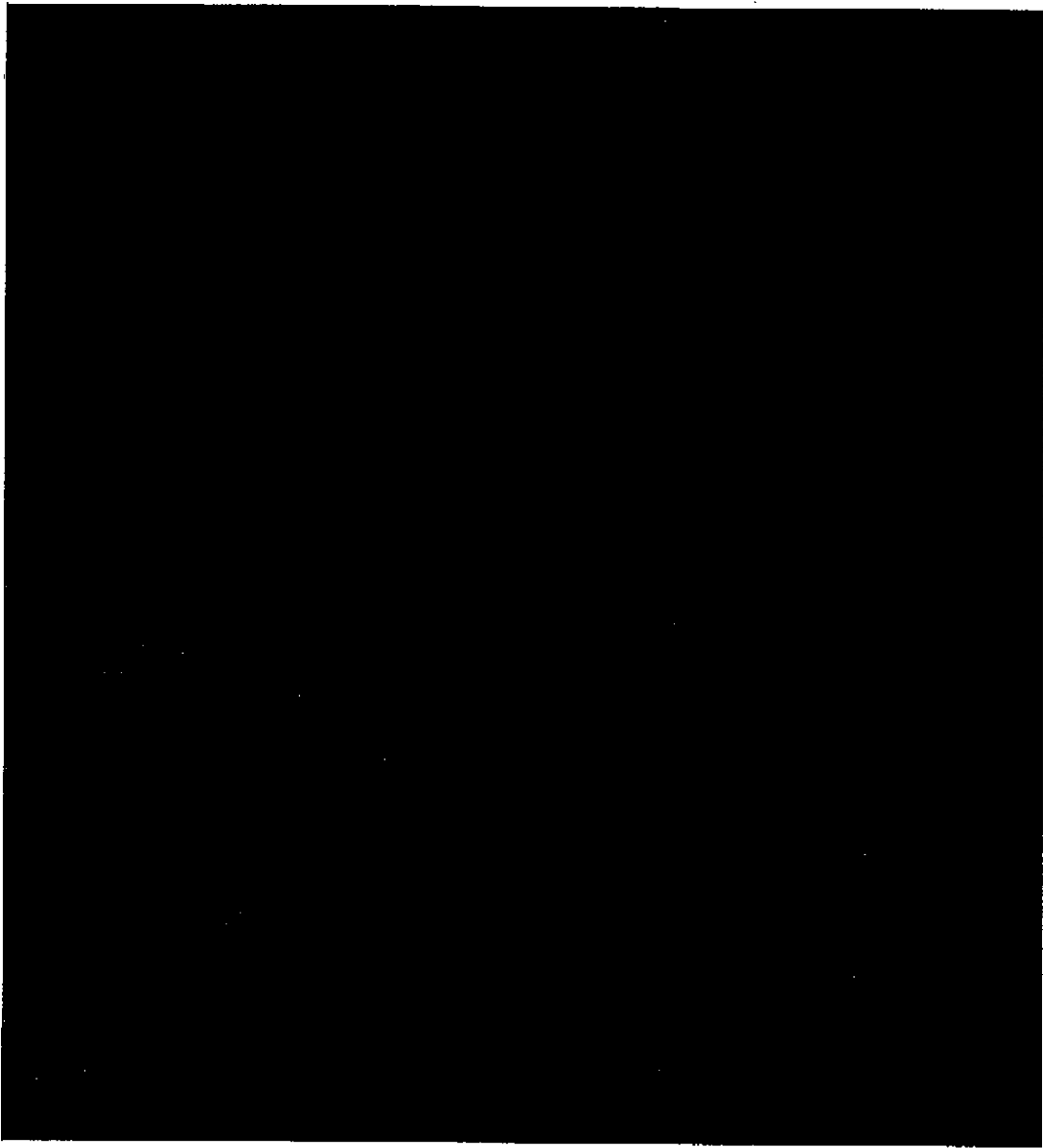
(a) [REDACTED] The Point of Change of Ownership shall be the point where the conductors of the [REDACTED] are attached to the Last Structure, which will be connected on the side of the Last Structure facing [REDACTED]. The Interconnection Customer shall own and maintain the Last Structure, the conductors, insulators and jumper loops from such Last Structure to the Interconnection Customer's Generating Facility.

The Distribution Provider will own and maintain the [REDACTED] as well as all circuit breakers, disconnects, relay facilities and metering within the [REDACTED] together with the line drop, in their entirety, from the Last Structure to [REDACTED]. The Distribution Provider will own the insulators that are used to attach the Distribution Provider-owned conductors to the Last Structure.

- (b) Telecommunication fiber optic cable: The Point of Change of Ownership shall be the point at a Distribution Provider owned vault, where the Interconnection Customer's fiber optic cable is connected to the Distribution Provider's fiber optic cable.
- (c) Telecommunication diverse fiber optic cable: The Point of Change of Ownership shall be the point at a Distribution Provider owned vault, where the Interconnection Customer's fiber optic cable is connected to the Distribution Provider's fiber optic cable.

6. **Point of Interconnection.** The Distribution Provider's [REDACTED]
[REDACTED]

7. **One-Line Diagram of Interconnection to** [REDACTED]



Addendum to Appendix A – WDT1177



Addendum #1

Cluster 7 Phase II Final Report

December 29, 2015

This study has been completed in coordination with the California Independent System Operator Corporation (CAISO) per CAISO Tariff Appendix DD Generator Interconnection and Deliverability Allocation Procedures (GIDAP)

Interconnection Study Document History

Project No.		No	Date	Document Title	Description of Document
WDT1177	██████████ ██████████	2	12/29/2015	Addendum #1 to Queue Cluster 7 Phase II Appendix A Final Report	The purpose of this report is to publish the written comments provided by the IC to SCE in accordance with the timelines stated per Section 4.6.10 in GIP
WDT1177	██████████ ██████████	1	11/24/2015	Queue Cluster 7 Phase II Appendix A Final Report	Report to disclose results of QC7 Phase II cluster.

Executive Summary

██████████ an Interconnection Customer (IC), received a Queue Cluster 7 Phase II (QC7 Phase II) study report dated November 24, 2015 for its Interconnection Request (IR) to Southern California Edison (SCE) for their proposed ██████████ (Project), queue position WDT1177.

Subsequent to the distribution of the report, to comply with GIP obligation to IC's written comments on interconnection studies as modified by FERC Order 792, SCE is publishing any written comments submitted by the IC per Section 4.6.10:

- Within ten (10) Business Days of receipt of the QC7 PII report, but in no event less than three (3) Business Days before the Results Meeting conducted to discuss the report; and/or
- Additional comments on the final QC7 Phase II Interconnection Study report up to (3) Business Days following the Results Meeting

This addendum report discloses below the written comments provided by the IC to SCE in accordance with the timelines stated in GIP for QC7 Phase II study report dated November 24, 2015. The Phase II study report is unaffected by this addendum report.

QC7 Phase II – WDT1177 - [REDACTED]

1. Written comments provided by IC within ten (10) Business Days of receipt of the QC7 PII report
 - a. Has the modification of the [REDACTED] completed or ongoing? If the modification is ongoing when will it be completed? Will it be completed prior to construction of our project? Do we have any schedule conflicts in synchronizing [REDACTED] If any please let us know.
 - b. Cluster Projects contribute thermal over loads at [REDACTED] under N-2 contingency analysis. According to the CA ISO Planning standards, when N-2 thermal overloads occur, ISO should mitigate thermal overloads by load shedding or congestion management. Do the cluster 7 projects responsible in sharing the cost of mitigating N-2 contingency analysis? In this case, we understand our project is not included in the cost allocation of the network upgrades
2. Written comments provided by IC three (3) Business Days following the Results Meeting
 - a. None