SYSTEM IMPACT STUDY

May 24, 2007

SOUTHERN CALIFORNIA
EDISON®
An *EDISON INTERNATIONAL*® Company

Prepared by

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Interconnection Planning

EXECUTIVE SUMMARY

INTRODUCTION

[redacted] applied to Southern California Edison ("SCE") for Interconnection pursuant to the Wholesale Distribution Access Tariff (WDAT). [redacted] proposed to interconnect the [redacted] a new 190 MW large generating facility ("Project") to SCE's subtransmission system by looping into the [redacted] 5 kV No. 2 Transmission line. The in-service date proposed [redacted] is [redacted]

SCE's Transmission and Interconnection Planning (TIP) and Field Engineering departments have jointly performed a System Impact Study (SIS) to determine the adequacy of SCE's electric system to accommodate the Project. More specifically TIP has studied the impact of the Project on the Transmission portion of the grid, while Field Engineering has performed a System Impact Study that identifies the impact of the Project on SCE's distribution system.
The study indicated that the system is not adequate to accommodate the 190 MW of generation without modifications. A Facilities Study will be required for the Project.

The results of the System Impact Study will be used as the basis to determine the Project's cost responsibility for facility upgrades in the Facilities Study. ***The study accuracy and the results for the assessment of the system adequacy are contingent on the accuracy of the technical data provided by*** [redacted] Any changes from the attached data could void the study results.

LOAD FLOW STUDY RESULTS

The study results show that the existing system is not adequate to accommodate [redacted] Project without system upgrades.

A. Power Flow Study

Power Flow study results show several pre-existing overload problems on various transmission lines for [redacted] contingencies (see Appendix A for details). Only [redacted] Transmission line overload was found, during peak condition, to be attributed by the addition of the Project.

Base Case (N-0)
No base case overloads triggered by the Project were found with the addition of the Project.

Single Contingencies (N-1)
[redacted] 230 kV No. 1
The line above was triggered by the Project during peak conditions

Double Contingency (N-2)
[redacted] 230 kV No. 1
The line above was triggered by the Project during peak conditions

*Disconnects on this Transmission line are scheduled to be upgraded as part of SCE's Expansion plan.

B. Post-Transient Voltage Stability Study

No post transient stability voltage violations were found with the addition of the Project.

C. Transient Stability Study

Based on the transient stability study results, with dynamic models representing the Project, the Project has no negative impact on the Bulk System performance or reliability criteria violation for all contingencies on the CAISO controlled Bulk System.

The transient stability study results showed significant high frequency (2 ~ 4 Hz) oscillation under local (115kV system) fault with clearing time of more than [redacted] cycles. At this time, dynamic model tuning has not completely resolved the issue; further dynamic model and performance tuning of the Project may resolve this issue.

In order to protect the power grid, a Special Protective Scheme (SPS) should be designed and implemented. Study results showed that if the Project can be tripped within the first [redacted] cycles of the fault initiation, there will be insignificant impact to the power grid. A rough estimate of the SPS cost is included in this report. The SPS design will be addressed in the Facility Study and the associated cost estimate will be revised accordingly.

D. Short Circuit Study

3-PHASE FAULT DUTY
The addition of the Project has aggravated, but not triggered, [redacted] 500 kV substations and [redacted] 230 kV substation with short circuit duty increases greater than 0.1 kA

SINGLE – LINE TO GROUND FAULT DUTY
The addition of the Project has aggravated, but not triggered [redacted] 500 kV substations and [redacted] 230 kV substation with short circuit duty increases greater than 0.1 kA.

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The study indicated that the system is not adequate to accommodate the 190 MW of generation without modifications. A Facilities Study will be required for the project.

The results of the System Impact Study will be used as the basis to determine the Project's cost responsibility for facility upgrades in the Facilities Study. ***The study accuracy and the results for the assessment of the system adequacy are contingent on the accuracy of the technical data provided by*** [redacted] Any changes from the attached data could void the study results.

The study was performed fo[redacted] system conditions: (a) representing 2011 peak summer load condition (one-in-ten-year heat wave assumption) with maximum eastern area generation, high East-of-River/West-of-River (EOR/WOR) power flow, and high power flow into the Devers 500-kV substation, and (b) representing 65% of peak summer load, an off peak load condition with maximum eastern area generation, high EOR/WOR power flow, and high power flow into the Devers 500-kV substation. These conditions reflect the most critical expected loading condition for the transmission system in SCE's eastern area.

STUDY CONDITIONS AND ASSUMPTIONS

A. Planning Criteria

The study was conducted by applying the California Independent System Operator (CAISO) Reliability Criteria. More specifically, the main criteria applicable to this study are as follows:

Power Flow Assessment

The following contingencies are considered for transmission and sub-transmission lines and 500/230 kV transformer banks ("[redacted]"):

- Single Contingencies (loss of one line or one [redacted])
- Credible Double Contingencies (loss of two lines or one line and one [redacted]) (Outages of two [redacted] are beyond the Planning Criteria)

The following reliability criteria are used:

Transmission Lines	Base Case	Limiting Component Normal Rating
	N-1	Limiting Component Emergency-Rating
	N-2	Limiting Component Emergency-Rating
AA-Banks	Base Case	Normal Loading Rating
	Long Term & Short Term	Bank Emergency-Rating

System upgrades for transmission lines are generally recommended for all reliability criteria violations. Special Protection Schemes (SPS) may be allowed for single contingency and credible double contingencies reliability criteria violation in place of system upgrade.

Congestion Assessment

The following principles were used in determining whether congestion management, special protection schemes ("SPS"), or facility upgrades are required to mitigate base case, single contingency, or double contingency overloads:

- Congestion management, as a means to mitigate base case overloads, can be used if it is determined to be manageable and the CAISO concurs with the implementation.

- Facility upgrades will be required if it is determined that the use of congestion management is unmanageable as defined in the congestion management section that follows.
- SPS, in lieu of facility upgrades, will be recommended if the scheme is effective, does not jeopardize system integrity, does not exceed the current CAISO single and double contingency tripping limitations, does not adversely effect existing or proposed special protection schemes in the area, and can be readily implemented.

- Facility upgrades will be required if use of protection schemes is determined to be ineffective, the amount of tripping exceeds the current CAISO single and double contingency tripping limitations, adverse impacts are identified on existing or currently proposed special protection schemes, or the scheme cannot be readily implemented.

- Congestion management in preparation for the next contingency will be required, with CAISO concurrence, if no facility upgrades or special protection schemes are implemented.

The following study method was implemented to assess the extent of possible congestion:

a) Under Base Case with all transmission facilities in service, the system was evaluated with all existing interconnected generation and all generation requests in the area that have a queue position ahead of this request (pre-project).

b) Under Base Case with all transmission facilities in service, the system was reevaluated with the inclusion of the Project (post-project).

If the normal loading limits of facilities are exceeded in (a), the overload is identified as an existing overload that was triggered by a project in queue ahead of the Project. If the normal loading limits of facilities are exceeded in (b) and were not exceeded in (a), the overload is identified as triggered by the addition of the Project. The Project, assuming it is a market participant, and other market participants in the area may be subjected to congestion management, potential upgrade cost and/or participation of any proposed SPS if the Project addition aggravates or triggers the overload. Additionally, the Project may have to participate in mitigation of overloads triggered by subsequent projects in queue, subject to FERC protocols and policies.

In order for congestion management to be a feasible alternative to system facilities, all of the following factors need to be satisfied:

- Time requirements for necessary coordination and communication between the CAISO operators, scheduling operators and SCE operators.

- Distinct Path/Corridor rating should be well defined so monitoring and detecting congestion and implementing congestion of the contributing generation resources can be performed when limits are exceeded.

- Sufficient amount of market generation in either side of the congested path/corridor should be available to eliminate market power.

- Manageable generation in the affected area is necessary so that operators can implement congestion management if required (i.e. the dispatch schedule is known and controllable).

The results of these studies should identify:

a. if capacity is available to accommodate the proposed Project and all projects ahead in queue without the need for congestion management, special protection schemes, or facility upgrades

b. if overloads exist in the area after the addition of all projects in queue ahead of the Project and all facilities in service

c. if congestion exists in the area with the addition of the Project and all projects ahead in queue under single and double element outage conditions assuming no new special protection schemes are in place

d. if sufficient capacity is maintained to accommodate all Must-Run and Regulatory Must-Take generation resources with all facilities in service

e. if sufficient capacity is maintained to accommodate the total output of any one generation resource which is not classified as Must-Run.

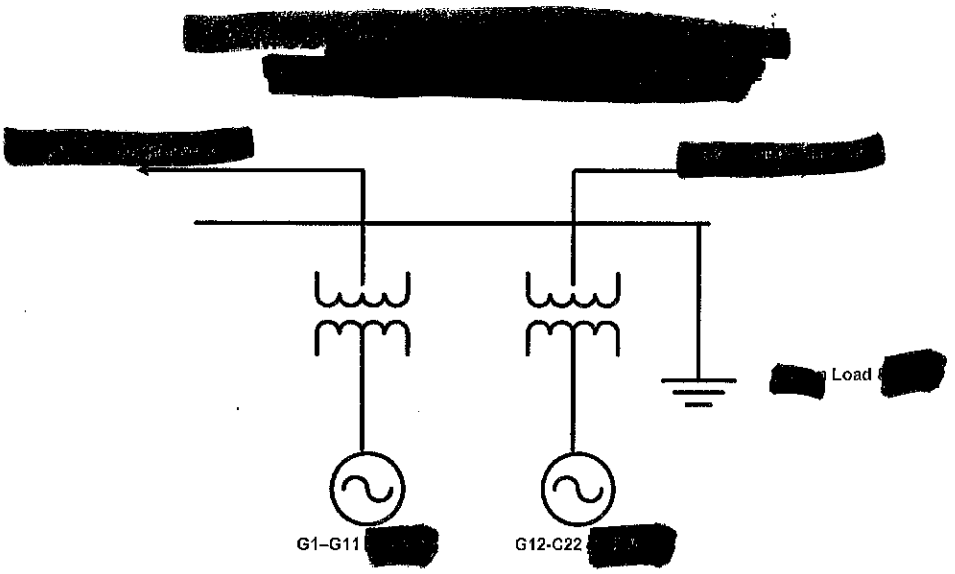
B. [redacted]

The proposed Project is geographically located within [redacted] miles of SCE's [redacted] in Riverside County. The Project proposed to be looped into the [redacted] 115 kV No. 2 Transmission line. A one-line diagram (electrical equivalent) of the Project is provided in Figure 1.

FIGURE 1

[redacted]

ELECTRICAL EQUIVALENT SCHEMATIC
SINGLE LINE DIAGRAM



C. System Conditions

To simulate the SCE transmission system for analysis, the study selected the databases that were used to conduct the CAISO Controlled Transmission 2012 assessment. Power flow studies considered the existing system arrangement and reflected other transmission projects that occupy a higher position on the application queue. For example:

- Palo Verde-Devers No. 2 500-kV line was modeled in service
- All [redacted] West of Devers 230 kV lines have been upgraded
- Rancho Vista 500/230-kV substation was modeled in service
- Devers-Mirage 115-kV system was modeled in "split" configuration.

The bulk power study considered scenarios that evaluated maximum EOR/WOR imports and maximum generation from Qualified Facilities in the eastern area. These conditions were evaluated to identify worst case scenarios that would stress the SCE 500-kV transmission system network in the eastern area vicinity. In addition, the study considered two system load conditions: representing 2011 peak summer load and 2011 off peak load. The summer peak load forecast was based on SCE's 2006 Transmission Substation Transformer Capacity Assessment, and reflects a one-in-ten-year heat wave assumption. The 2007-2016 heavy summer load forecast is shown in Appendix A. The 2007-2016 off peak load assumed 65% of peak summer load forecast.

D. Power Flow Study

The Power Flow Study was conducted under 2011 peak summer load and 2011 off peak load conditions with and without the Project for a total of [redacted] cases. Further description of the case assumptions follows:

a) *2011 Peak Load*:

Case 1 **without** and Case 2 **with** the Project

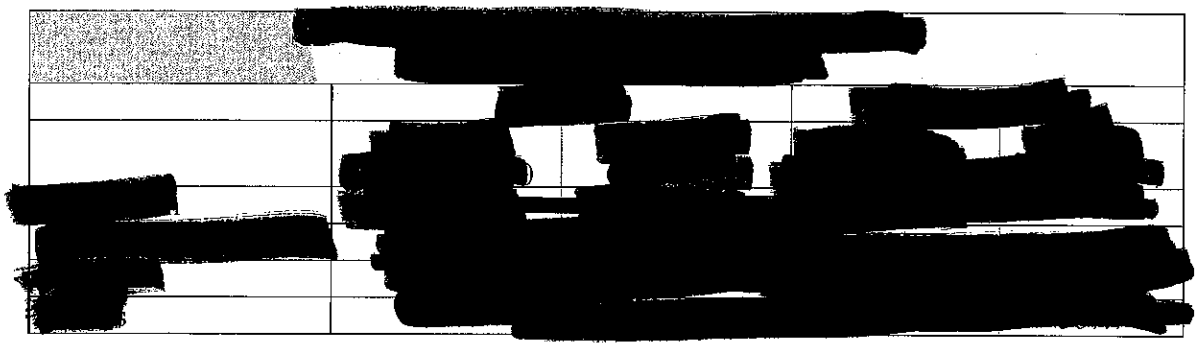
These cases represented expected 2011 peak load with maximum generation in SCE's eastern area electrical system, maximum EOR/WOR power flow, and high power flow into Devers 500-kV substation. Generation included: all market and all regulatory must-take units. Generation patterns were maximized in the eastern area to fully stress the system in order to identify extent of potential congestion on the bulk power system with the addition of the Project.

b) 2011 Off Peak Load:

Case 3 **without** and Case 4 **with** the Project

These cases represented expected 2011 off peak load with maximum generation in SCE's eastern area, maximum EOR/WOR power flow, and high power flow into Devers 500-kV substation. Generation included: all market and all regulatory must-take units. Generation patterns were maximized in the eastern area to fully stress the system in order to identify the extent of potential congestion on the bulk power system with the addition of the Project.

With the addition of the Project, SCE area total generation, imports, loads, and losses for cases 1-4 are summarized in the table below. For each of the four cases, load flow simulations of the bulk power system were conducted for the base case, single contingencies and double contingencies for transmission lines and 500/230-kV transformer banks to determine impacts to the SCE system. All single and double contingencies were simulated without implementation of applicable existing SPS.



E. Post Transient Voltage Stability Study

Those contingencies that show significant voltage deviations in the power flow analysis are selected for further analysis using governor power flow analysis. The voltage deviations are compared to the SCE guidelines of 7% for single contingency outages and 10% for double contingency outages.

F. Transient Stability Study

WECC currently is in the process of adopting Generator Electrical Grid Fault Ride Through Capability Criteria. SCE currently supports a Low Voltage Ride-Through Criteria to ensure continued reliable service. A proposed Criteria that SCE supports, is as follows:

1. Generator is to remain in-service during system faults (three phase faults with normal clearing and single-line-to-ground with delayed clearing) unless clearing the fault effectively disconnects the generator from the system.

2. During the transient period, generator is required to remain in-service for the low voltage and frequency excursions specified in WECC Table W-1 (provided below) as applied to load bus constraint. These performance criteria are applied to the generator interconnection point, not the generator terminals.

3. Generators may be tripped after the fault period if this action is intended as part of a special protection scheme.

4. This Standard will not apply to individual units or to a site where the sum of the installed capabilities of all machines is less than 10 MVA, unless it can be proven that reliability concerns exist.

5. The performance criteria of this Standard may be satisfied with performance of the generators or by installing equipment to satisfy the performance criteria.

6. The performance criterion of this Standard applies to any generation independent of the interconnected voltage level.

7. No exemption from this Standard will be given because of minor impact to the interconnected system.

8. Existing generators that go through any refurbishments or any replacements are then required to meet this Standard.

Table W-1
WECC DISTURBANCE-PERFORMANCE TABLE (in addition to NERC requirements)
OF ALLOWABLE EFFECTS ON OTHER SYSTEMS

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	Not Applicable	Nothing in Addition to NERC		
[redacted]	≥ 0.33	Not to exceed **25%** at load buses or **30%** at non-load buses. Not to exceed **20%** **for more than 20 cycles** at load buses.	Not below **59.6 Hz** for 6 cycles or more at a load bus	Not to exceed **5%** at any bus
[redacted]	0.033 – 0.33	Not to exceed 30% at any bus. Not to exceed **20%** **for more than 40 cycles** at load buses.	Not below **59.0 Hz** for 6 cycles or more at a load bus	Not to exceed **10%** at any bus
[redacted]	< 0.033	Nothing in Addition to NERC		

Note 2: As an example in applying the WECC Disturbance-Performance Table, Category B disturbance in one system shall not cause a transient voltage dip in another system that is greater than 20% for more than 20 cycles at load buses, or exceed 25% at load buses or 30% at non-load buses at any time other than during the fault.

G. GE PSLF Version 16 Models

GE PSLF Version 16, adopted by WECC, supports updated system configurations and the generation turbine type proposed by [redacted] for the Project.

GENSAL
This model is used to represent the generator model for the turbines.

EXAC8B
This model is used to represent the excitation system for the turbines.

GGOV1
This model is used to represent the governor controls for the turbines.

PSS2A
This model is used to represent the power system stabilizer controls for the turbines.

H. Short Circuit Duty Study

Short Circuit Duty (SCD) analysis was performed as part of this study. The data provided by [redacted] was used to determine the impact on the short circuit duty to determine the need for circuit breaker upgrades

POWER FLOW STUDY RESULTS

Power Flow study results show several pre-existing overload problems on 6 transmission lines for [redacted] contingencies. Only one Transmission line overload was found during peak condition to be attributed by the addition of the Project. (See Appendix A for details)

A.

t.

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he Project.

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*Disconnects on this Transmission line are scheduled to be upgraded as part of SCE's Expansion plan.

B. Off Peak Load Condition Results

Base Case (N-0)

Triggered:
No base case overloads were triggered by the Project

Aggravated:
No base case overloads were aggravated by the Project.

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POST TRANSIENT VOLTAGE STUDY RESULTS

No post transient stability voltage violations were found with the addition of the Project.

TRANSIENT STABILITY STUDY RESULTS

Based on the transient stability study results, with dynamic models representing the Project, the Project has no negative impact on the Bulk System performance or reliability criteria violation for all contingencies on the CAISO controlled Bulk System.

The transient stability study results showed significant high frequency (2 ~ 4 Hz) oscillation under local (115kV system) fault with clearing time of more tha[redacted]cycles. At this time, dynamic model tuning has not completely resolved the issue; further dynamic model and performance tuning of the Project may resolve this issue.

In order to protect the power grid, a Special Protective Scheme (SPS) should be designed and implemented. Study results showed that if the Project can be tripped within the first [redacted]cycles of the fault initiation, there will be insignificant impact to the power grid. A rough estimate of the

SPS cost is included in this report. The SPS design will be addressed in the Facility Study and the associated cost estimate will be revised accordingly.

SHORT CIRCUIT STUDY RESULTS

3-PHASE FAULT DUTY

The addition of the Project has impacted [redacted] 500 kV substations and [redacted] 230 kV substation with short circuit duty increases greater than 0.1 kA

[redacted]	
26.3	0.2
23	0.1
51	0.1
33.8	0.1
24.1	0.3
43.2	0.1
21.6	0.1

SINGLE – LINE TO GROUND FAULT DUTY

The addition of the Project has impacted [redacted] 500 kV substations and [redacted] 230 kV substations with short circuit duty increases greater than 0.1 kA.

Note: Study results may be affected by changes to projects queued ahead of the [redacted]. Such changes may include, but not be limited to, withdrawal of projects queued ahead of the [redacted] and modifications to such projects as allowed under the applicable tariffs. . Such changes may necessitate a re-study of this SIS.

CONCLUSIONS

Power Flow study results show several pre-existing overload problems on [redacted] ansmission lines for [redacted] contingencies. Only one Transmission line overload was found during peak condition to be attributed by the addition of the Project. (see Appendix A for details). [redacted] s responsible for the facility upgrades associated with those Transmission line overloads which have been triggered by the Project. Transmission line overloads which have been aggravated by the Project will be upgraded by projects queued ahead of the [redacted], unless determined otherwise by a restudy as a result of a change in the queue.

A. Peak Load Condition Results

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f SCE's Expansion plan.

B. Off Peak Load Condition Results

Base Case (N-0)

Triggered:
No base case overloads were triggered by the Project

Aggravated:
No base case overloads were aggravated by the Project.

Single Contingencies (N-1)

Triggered:
No single contingency overloads were triggered by the Project.

Aggravated:

*Di ı plan.

*Disconnects on this Transmission line are scheduled to be upgraded as part of SCE's Expansion plan.

C. Post-Transient Voltage Stability Study Conclusions

No post transient stability voltage violations were found with the addition of the Project.

D. Transient Stability Study Conclusions

Based on the transient stability study results, with dynamic models representing the Project, the Project has no negative impact on the Bulk System performance or reliability criteria violation for all contingencies on the CAISO controlled Bulk System.

The transient stability study results showed significant high frequency (2 ~ 4 Hz) oscillation under local (115kV system) fault with clearing time of more than [redacted] cycles. At this time, dynamic model tuning has not completely resolved the issue; further dynamic model and performance tuning of the Project may resolve this issue.

In order to protect the power grid, a Special Protective Scheme (SPS) should be designed and implemented. Study results showed that if the Project can be tripped within the first [redacted] cycles of the fault initiation, there will be insignificant impact to the power grid. A rough estimate of the SPS cost is included in this report. The SPS design will be addressed in the Facility Study and the associated cost estimate will be revised accordingly.

E. Short Circuit Study Conclusions

3-PHASE FAULT DUTY
The addition of the Project has aggravated, but not triggered, [redacted] 500 kV substations and [redacted] 230 kV substation with short circuit duty increases greater than 0.1 kA

SINGLE – LINE TO GROUND FAULT DUTY
The addition of the Project has aggravated, but not triggered, [redacted] 500 kV substations and [redacted] 230 kV substation with short circuit duty increases greater than 0.1 kA.

COST OF UPGRADES

CASE A reflects those facilities that are required exclusively by the Project (e.g., interconnection facilities and system upgrades, including Special Protection Schemes, required to mitigate planning criteria violations triggered by the Project. [redacted] is responsible for all costs associated with CASE A.

CASE B reflects those additional facilities that have been identified to mitigate planning criteria violations triggered by projects queued ahead of the [redacted] and which are expected to be implemented by such earlier queued projects. However, in the event of a change in the queue ahead of the [redacted], such additional facilities may then be triggered by the [redacted] (as determined by a restudy). In that event, [redacted] would have cost responsibility for those additional Case B facilities (some or all depending on restudy conclusions) that have been triggered by the [redacted] as a result of such change in queue. Case B (together with CASE A) is intended to provide [redacted] an estimate of the Project's maximum cost exposure.

The scope and the cost responsibility of the upgrades required to accommodate the Project are listed below. These upgrades are required to be in-service by the proposed interconnection date of [redacted] ***All cost estimates are rough, order of magnitude estimates and are non-binding.***

CASE A:

The ***Nonbinding Cost Estimate*** for the Project's Reliability Network Upgrades is $2,613,00 in 20011 dollars. The Interconnection Facility cost is addressed in Field Engineering's SIS.

[redacted]

ELEMENT	INTERCONNECTION FACILITIES Subject to O&M	RELIABILITY UPGRADES Not Subject to O&M	Income Tax Component of Contribution *	ONE TIME PAYMENT
Substation				
SPS at [redacted] 115kV	$ 780,000	$ -	$ 273,000	$ 1,053,000
SPS at [redacted] 115kV	$ -	$ 780,000	$ -	$ 780,000
SPS at [redacted] 115kV	$ -	$ 780,000	$ -	$ 780,000
TOTAL	$ 780,000	$ 1,560,000	$ 273,000	$ 2,613,000

* ITCC tax (calculated at 35%) is collected via Letter of Credit.
* Persuant to FERC Order 2003A, there will be no ITCC collected on Reliability Upgrades.

Although, the Project triggered an overload on the [redacted] 230 kV T/L, the Disconnects on that line will be upgraded as part of SCE's Expansion plan and, assuming SCE's Expansion Plan is approved and proceeds, the Project would not be responsible for this upgrade. Therefore, this upgrade is shown under CASE B for the Project.

CASE B:

The ***Nonbinding Cost Estimate*** for the Project's Reliability Network Upgrades is $19,965,000 in 2009 dollars.

[redacted]

ELEMENT	INTERCONNECTION FACILITIES Subject to O&M	RELIABILITY UPGRADES Not Subject to O&M	Income Tax Component of Contribution *	ONE TIME PAYMENT
Transmission				
Chino [redacted] 220kV Line remove ground clearnce limitation	$ -	$ 600,000	$ -	$ 600,000
Substations				
Eldorado Substation 500kV - Replace existing 1900A series capacitor bank with a 2200A bank	$ -	$ 10,000,000	$ -	$ 10,000,000
Etiwanda Substation 220kV - Replac[redacted]sets of disconnect switches	$ -	$ 350,000	$ -	$ 350,000
Etiwanda Substation 220kV - Replace 2000A wave trap with 3000A wave trap	$ -	$ 65,000	$ -	$ 65,000
Lugo Substation 500kV - Install [redacted] sets of TRVs to upgrade [redacted] CBs	$ -	$ 1,680,000	$ -	$ 1,680,000
Devers Substation 220kV - [redacted] CB Replacements, Install [redacted] sets of TRVs to upgrade [redacted] CBs	$ -	$ 7,270,000	$ -	$ 7,270,000
TOTAL	$ -	$ 19,965,000	$ -	$ 19,965,000

* ITCC tax (calculated at 35%) is collected via Letter of Credit.
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NOTE: Study results may be affected by changes to projects queued ahead of the [redacted] Such changes may include, but not be limited to, withdrawal of projects queued ahead of the [redacted] and modifications to such projects as allowed under the applicable tariffs. Such changes may necessitate a re-study of this SIS.

FACILITIES STUDY

A Facilities Study is required for the Project. The scope of the Facilities Study will need to include the following:

1) [redacted]500 kV No. 1
Replace existing series capacitor bank

2) [redacted]230 kV No. 1
Replace [redacted] disconnect switches at Etiwanda Substation with 3000A disconnect switches

3) [redacted]30 kV No. 1
Replace 2000A wave trap at Etiwanda Substation with a 3000A wave trap

4) [redacted]230 kV No. 3
Remove ground clearance

5) Verify that the Disconnect upgrades on the [redacted]230 kV No. 1 are sufficient to mitigate the N-1 and N-2 overloads. If applicable, evaluate the feasibility and cost of upgrading the [redacted]230 kV line No. 1 to increase the N-1 and N-2 Spring & Summer emergency line capacity.

6) SPS for the following: [redacted]15 kV substation, [redacted]15 kV substation and the Project

In addition, an Operational Study is required to identify which upgrades would need to be completed prior to the in-service date of the Project. The Operational Study is expected to be performed by SCE during the Facilities Study. The Operational Study may determine that upgrades triggered by projects ahead in queue (but with later in-service dates) of the [redacted] may need to be accelerated by the [redacted]n order to meet the in-service date desired by [redacted] In that event, [redacted] would be responsible for the cost to accelerate such upgrades, subject to refund in accordance with the Large Generator Interconnection Procedures and Agreement.

PAGES OMITTED FOR CEII REGULATIONS

APPENDIX B

2007-2016 PEAK SUMMER
LOAD FORECAST

PAGES OMITTED FOR CEII REGULATIONS

APPENDIX D

LIST OF CONTINGENCIES

FOR

POST-TRANSIENT

AND

TRANSIENT STABILITY STUDIES

PAGES OMITTED FOR CEII REGULATIONS

APPENDIX E

POST-TRANSIENT STUDY RESULTS
Var-Margin Comparisons
(TABULATED)

PAGES OMITTED FOR CEII REGULATIONS