

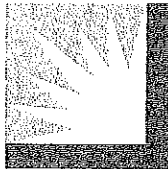


SYSTEM IMPACT STUDY

January 19, 2007

Prepared by:

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SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONALSM Company

SOUTHERN CALIFORNIA EDISON COMPANY

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EXECUTIVE SUMMARY

[REDACTED] applied to Southern California Edison ("SCE") for distribution service under the terms of SCE's Wholesale Distribution Access Tariff ("WDAT"). [REDACTED] will own and operate a 47.2 MW generating facility [REDACTED] to be interconnected at a new interconnection facility [REDACTED] to be constructed by SCE. The [REDACTED] will be served by tapping off of the existing Gonzales-Mandalay 66 kV line. Distribution service pursuant to the WDAT is proposed to be from [REDACTED] to the California Independent System Operator ("ISO") grid at SCE's 230 kV bus at Santa Clara Substation. The proposed in-service date of the [REDACTED] is July 2, 2007.

The [REDACTED] is a generation system consisting of [REDACTED] 71.2 KVA [REDACTED] PC-Spring gas fired turbine-generator, with a net generation export of 47.2 MW. The generation facility will utilize [REDACTED] (OA/FA), 13.8/66 kV step-up transformer to interconnect the generator to SCE's system. As requested by [REDACTED], SCE performed a System Impact Study to identify the general electrical system impacts of the [REDACTED] possible mitigation measures to maintain conformance with SCE, ISO, and other applicable reliability planning criteria, and non-binding order of magnitude cost estimates for these mitigation measures.

The System Impact Study consisted of a power flow analysis and three-phase and single-line-to-ground short circuit duty analyses to determine whether the power associated with the [REDACTED] can be transmitted through SCE's distribution system to the ISO 230 kV grid at Santa Clara Substation without creating the need for modifications to SCE's distribution system and/or the ISO grid. The study showed that, with the [REDACTED] on-line:

- The Sub-transmission System Power Flow study results showed two thermal overloads.
 - 1) Under base-case conditions with the [REDACTED] on-line, the Mandalay-San Miguel 66 kV line becomes 100.7% loaded. This line has 0.89 mi. of 336 ACSR that becomes overloaded. The options to fix this thermal overload are
 - Option 1: Reconductor the 0.89 mi. of 336 ACSR with 954 SAC.
 - Option 2: Limit generation to 45 MW for 2007. It is expected in 2008 the violation ceases as more load is added to the system and the project can operate at 47.2 MW.
 - 2) Under N-1 conditions with the [REDACTED] on-line, the Santa Clara-Colonia-Procgen 66kV line becomes 105.4% loaded of the emergency rating of the conductor when the Estero Tap of the Estero-Levy-Ormond Beach-Wastewater-Williamette 66 kV line is out. This line was previously identified as a violation in 2007 without the Peaker unit, and an exception was taken until 2008 when a reconductor project (PIN 5091) fixes the violation. Under the condition that this Estero Tap is out, the Peaker will not be allowed to operate until the same reconductor project (PIN 5091) is completed. Estimated completion date is 6/1/08.
- Appendix B details study results for the ISO-controlled transmission grid.

- [REDACTED] 66 kV circuit breakers and [REDACTED] 230 kV circuit breakers will need to be upgraded due to the [REDACTED] as a result of the increased available short circuit duty. One 66 kV circuit breaker has been identified as needing to be replaced independent of the project.

Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 1 (full application generation) are as follows:

Interconnection (Substation and 66 kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU [REDACTED]	\$0.05 M
66 kV system line upgrades	\$0.70 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	\$3.15 M
Total non-binding order of magnitude cost estimate	\$12.15M

Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 2 (limiting net generation to 45 MW for 2007) are as follows:

Interconnection (Substation and 66 kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU [REDACTED]	\$0.05 M
66 kV system line upgrades	\$0.00 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	\$2.9 M
Total non-binding order of magnitude cost estimate	\$11.19 M

Additional system studies (i.e., transient stability) will not be required unless requested by a third party. Refined cost estimates will be developed in a subsequent Facilities Study if requested by [REDACTED]. Non-binding cost estimate does not include any Public Utility Commission General Order (GO) 131-D costs.

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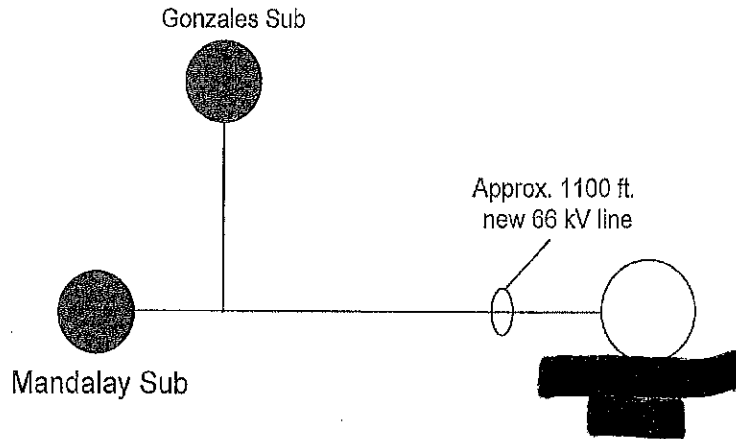
[REDACTED]

SYSTEM IMPACT STUDY

January 16, 2007

1. INTRODUCTION

[REDACTED] applied to Southern California Edison ("SCE") for distribution service under the terms of SCE's Wholesale Distribution Access Tariff ("WDAT"). [REDACTED] will own and operate a net 47.2 MW generating facility [REDACTED] to be interconnected at a new interconnection facility [REDACTED] to be constructed by SCE. [REDACTED] will be served by tapping off the existing [REDACTED] 66 kV line. (see Figure 1 below).



Distribution service pursuant to the WDAT is proposed to be from [REDACTED] Project to the California Independent System Operator ("ISO") grid at SCE's 230 kV bus at Santa Clara Substation. The proposed in-service date of the [REDACTED] Project is July 2, 2007.

The [REDACTED] is a generation system consisting of [REDACTED] 13.8 kV, 71.2 kVA [REDACTED] PC-Spring gas fired turbine-generator package which will include: Selective Catalytic Reduction, Gas Compressor, Water Injection, Black Start Capability, and Continuous Emissions Monitoring system with a net generation export of 47.2 MW. The generation facility will utilize [REDACTED], 13.8/66 kV step-up transformer to interconnect the generator to SCE's system. As requested by [REDACTED] SCE performed a System Impact Study to identify the general electrical system impacts of the [REDACTED] possible mitigation measures to maintain conformance with SCE, ISO, and other applicable reliability planning criteria, and non-binding order of magnitude cost estimates for these mitigation measures.

The System Impact Study consisted of a power flow analysis and three-phase and single-line-to-ground short circuit duty analyses to determine whether the power associated with

the [REDACTED] can be transmitted through SCE's distribution system to the ISO 230 kV grid at Santa Clara Substation without creating the need for modifications to SCE's distribution system and/or the ISO grid. This report describes the study conditions and assumptions and presents the results of the power flow and short-circuit duty analyses on SCE's Santa Clara 66 kV sub-transmission system. Appendix B details study results for the ISO-controlled 230 kV transmission grid.

2. STUDY CONDITIONS AND METHODOLOGY

A. Planning Criteria

The study was conducted by applying SCE's planning criteria to the SCE facilities used to provide the requested WDAT service. Specifically, the main criteria applicable to this study are as follows:

Power Flow Criteria

Line loading should not exceed 100% of a conductor's normal thermal rating with all facilities in service (base case).

Line loading should not exceed 100% of a conductor's emergency thermal rating with one line out of service (N-1).

Short-Circuit Duty Criteria

Short-circuit duty should not exceed a circuit breaker's interrupting capability with maximum area generation on-line.

B. System Load Conditions

The study considered two system load conditions: peak load and light load. The peak load forecast was based on SCE's 2007-2016 Distribution Substation Plan. The light load forecast was assumed to be 33% of the peak load forecast.

C. Power Flow Study

This study evaluated the [REDACTED] impact on line loadings for base case and N-1 conditions. Both peak load and light load conditions were modeled. Line loadings were modeled both with and without the [REDACTED] to determine if the addition of the [REDACTED] caused any violations of SCE's thermal loading criteria.

D. Short-Circuit Duty Study

This study evaluated the [REDACTED] impact on substation circuit breakers at the 66 kV level based on additional three-phase and line-to-ground short-circuit duty contributions from the generating facility. [REDACTED] three-phase fault currents and X/R ratios were calculated both with and without the [REDACTED] to determine if the addition of the [REDACTED] caused any violations of SCE's short-circuit duty criteria.

The dataset used for the short-circuit study represented all existing generation and all projects in the queue (up to and including the [REDACTED] as on-line. Substations where the [REDACTED] increased three-phase short-circuit duties by 0.1 kA or more were identified, and circuit breaker interrupting capabilities were reviewed at these substations to determine if any circuit breakers required replacement as a result of the [REDACTED] short-circuit duty contributions.

3. DISCUSSION OF STUDY RESULTS

A. Power Flow Study

There were no violations under light load (33% of peak) conditions. Under peak load conditions, the addition of the [REDACTED] caused one violation of SCE's thermal loading criteria under base case conditions. This violation was on the Mandalay-San Miguel 66kV line, loaded to 100.7%. This violation can be remedied by reconductoring 0.89 mi. of 336 ACSR or limiting generation to 45 MW. The violation is expected to cease in 2008 as more load is added to the system and the project can operate at 47.2 MW.

For light load conditions, the addition of the [REDACTED] caused no violations of SCE's thermal loading criteria under N-1 conditions. For peak load conditions, the addition of the [REDACTED] caused one violation of SCE's thermal loading criteria under N-1 conditions. With the Estero Tap of the Estero-Levy-Ormond Beach-Wastewater-Williamette 66kV line out, the Santa Clara-Colonia-Procggen 66 kV line is loaded to 105.4% of the emergency rating of the conductors. This line was previously identified for a violation in 2007 without the [REDACTED] and an exception was taken until 2008 when a reconductor project (PIN5091) remedies the violation. With this section of line out, the [REDACTED] will not be allowed to operate until PIN 5091 is completed. Expected completion date of project is 6/1/08.

B. Short-Circuit Duty Study

Table 1 below summarizes the impact of the [REDACTED] three-phase and single-line to ground short-circuit duties and X/R ratios at various 66 kV buses on the SCE system. Eighteen buses were identified where the [REDACTED] increased three-phase short-circuit duties by 0.1 kA or more. A review of circuit breaker interrupting capabilities at these locations determined that [REDACTED] 66kV circuit breakers will need to be replaced as a result of the [REDACTED] circuit breaker has been identified as needing to be replaced independent of the project.

Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 2 (limiting net generation to 45MW for 2007) are as follows:

Interconnection (Substation and 66kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU [REDACTED]	\$0.05 M
66 kv system line upgrades	\$0.00 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	\$2.9 M
Total non-binding order of magnitude cost estimate	\$11.19 M

Additional system studies (i.e., transient stability) will not be required unless requested by a third party. Refined cost estimates will be developed in a subsequent Facilities Study if requested by [REDACTED]. Non-binding cost estimate does not include any Public Utility Commission General Order (GO) 131-D costs

5. CONCLUSIONS

The results of this System Impact Study show that, with the [REDACTED] on-line:

- The Sub-transmission System Power Flow study results showed [REDACTED] thermal overloads.
 - 1) Under base-case conditions with the [REDACTED] online, the Mandalay-San Miguel 66kV line becomes 100.7% loaded. This line has 0.89 mi. of 336 ACSR that becomes overloaded. The options to fix this thermal overload are
 - Option 1: Reconductor the 0.89 mi. of 336ACSR to 954SAC.
 - Option 2: Limit generation to 45MW for 2007. It is expected in 2008 the violation ceases as more load is added to the system and the project can operate at 47.2MW.
 - 2) Under N-1 conditions with the [REDACTED] online, the Santa Clara-Colonia-Progen 66kV line becomes 105.4% loaded of the emergency rating of the conductor when the Estero Tap of the Estero-Levy-Ormond Beach-Wastewater-Williamette 66kV line is out. This line was previously identified as a violation in 2007 without the [REDACTED] and an exception was taken until 2008 when a reconductor project (PIN 5091) fixes the violation. Under the condition that this Estero Tap is out, the Peaker will not be allowed to operate until the same reconductor project (PIN 5091) is completed. Estimated completion date is 6/1/08.
- Appendix B details study results for the ISO-controlled transmission grid.
- [REDACTED] 66 kV circuit breakers and zero 230 kV circuit breakers will need to be upgraded due to the [REDACTED] 66kV circuit breaker has been identified as needing to be replaced independent of the project.

Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 1 (full application generation) are as follows:

Interconnection (Substation and 66kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU [REDACTED]	\$0.05 M
66 kV system line upgrades	\$0.70 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	\$3.15 M
<hr/> Total non-binding order of magnitude cost estimate	<hr/> \$12.15M

Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 2 (limiting net generation to 45MW for 2007) are as follows:

Interconnection (Substation and 66kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU [REDACTED]	\$0.05 M
66 kV system line upgrades	\$0.00 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	\$2.9 M
<hr/> Total non-binding order of magnitude cost estimate	<hr/> \$11.19 M

Additional system studies (i.e., transient stability) will not be required unless requested by a third party. Refined cost estimates will be developed in a subsequent Facilities Study if requested by [REDACTED]. Non-binding cost estimate does not include any Public Utility Commission General Order (GO) 131-D costs

66kV System Operational Study Results

Appendix A

[REDACTED] applied to Southern California Edison ("SCE") Transmission and Distribution Business Units (TDBU) for distribution service under the terms of SCE's Wholesale Distribution Access Tariff ("WDAT"). [REDACTED] will own and operate a net 47.2 MW generating facility [REDACTED] to be interconnected by tapping off the existing [REDACTED] kV line. Distribution service pursuant to the WDAT is proposed to be from the [REDACTED] to the California Independent System Operator ("ISO") grid at SCE's 230 kV Santa Clara Substation. The proposed in-service date of the [REDACTED] is July 2, 2007.

As requested by [REDACTED], SCE performed an Operational Study to identify the general electrical system impacts of the [REDACTED] and the required mitigation measures to maintain conformance with SCE, ISO, and other applicable reliability planning criteria, and non-binding order of magnitude cost estimates for these mitigation measures.

The Study Conditions and Methodology are similar to those in the System Impact Study except that the dataset used for the short-circuit study analysis represented all existing generation and all projects which are expected to be on line by July 2, 2007 (including the [REDACTED]). Substations where the [REDACTED] increased short-circuit duties (three phase or phase to ground) by 0.1 kA or more were flagged, and circuit breaker interrupting capabilities were reviewed at these substations to determine if any circuit breakers required replacement as a result of the [REDACTED].

The Operational Study showed that, with the [REDACTED] on-line:

- The Sub-transmission System Power Flow study results showed [REDACTED] thermal overloads.
 - 3) Under base-case conditions with the [REDACTED] online, the Mandalay –San Miguel 66kV line becomes 100.7% loaded. This line has 0.89 mi. of 336 ACSR that becomes overloaded. The options to fix this thermal overload are
 - Option 1: Reconductor the 0.89 mi. of 336ACSR to 954SAC.
 - Option 2: Limit generation to 45MW for 2007. It is expected in 2008 the violation ceases as more load is added to the system and the project can operate at 47.2MW.
 - 4) Under N-1 conditions with the [REDACTED] online, the Santa Clara-Colonia-Progen 66kV line becomes 105.4% loading of the emergency rating of the conductor when the Estero Tap of the Estero-Levy-Ormond Beach-Wastewater-Williamette 66kV line is out. This line was previously identified as a violation in 2007 without the [REDACTED] and an exception was taken until 2008 when a reconductor project (PIN 5091) fixes the violation. Under the condition that this Estero Tap is out, the [REDACTED] will not be allowed to operate until the same reconductor project (PIN 5091) is completed. Estimated completion date is 6/1/08.
- Appendix B details study results for the ISO-controlled transmission grid.

- [REDACTED] 66 kV circuit breakers and [REDACTED] 230 kV circuit breakers will need to be upgraded due to the [REDACTED]. [REDACTED] circuit breaker has been identified as needing to be replaced independent of the project.

Table 1: Short-Circuit Duty Summary

[REDACTED]	
------------	--

* One 66 kV circuit breaker has been identified as needing to be replaced independent of the project.

Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 1 (full application generation) are as follows:

Interconnection (Substation and 66kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU at [REDACTED]	\$0.05 M
66 kV system line upgrades	\$0.70 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	<u>\$3.15 M</u>

Total non-binding order of magnitude cost estimate \$12.15M
Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades for option 2 (limiting net generation to 45MW for 2007) are as follows:

Interconnection (Substation and 66kV tie line)	\$1.86 M
Protection Upgrades	\$0.30 M
New IT Facilities	\$0.25 M
RTU [REDACTED]	\$0.05 M
66 kV system line upgrades	\$0.00 M
Circuit breaker replacements (66 kV, 230 kV)	\$5.83 M
35% ITCC tax	\$2.9 M
Total non-binding order of magnitude cost estimate	\$11.19 M

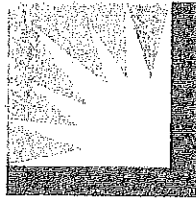
Additional system studies (i.e., transient stability) will not be required unless requested by a third party. Refined cost estimates will be developed in a subsequent Facilities Study if requested by [REDACTED]. Non-binding cost estimate does not include any Public Utility Commission General Order (GO) 131-D costs

[REDACTED]

WHOLESALE DISTRIBUTION ACCESS TARIFF

SYSTEM IMPACT STUDY
TRANSMISSION ASSESSMENT

December 18, 2006



SOUTHERN CALIFORNIA
EDISON[®]
An EDISON INTERNATIONAL[®] Company

Prepared by
Meng Shen

Southern California Edison Company

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Patricia L Arons
for

[REDACTED]

SYSTEM IMPACT STUDY - TRANSMISSION ASSESSMENT

EXECUTIVE SUMMARY

[REDACTED] proposed to install 5 peaking generating stations on its distribution or sub-transmission grid. The installation of up to 250 MW peaking generation was directed by California Public Utilities Commission (CPUC) to meet the reliability requirement for summer 2007. [REDACTED] ("Project") is one of the five peaking generating stations. The Project will consist of [REDACTED] simple cycle gas turbine, with a maximum operating output of 47.21 MW. The interconnection point is [REDACTED] 66 kV bus. The delivery point to the ISO Grid is at Santa Clara 220 kV bus. The in-service date proposed by [REDACTED] is [REDACTED].

SCE has performed a System Impact Study to determine the adequacy of SCE's transmission system to accommodate the Project. The study found the following:

- The system is adequate to accommodate the Project under 2007 Peak Load conditions per the operational queue.
- The system is adequate to accommodate the Project under Peak Load conditions per the application queue.
- The system is not adequate to accommodate the Project under Off Peak Load conditions without modification per the application queue.

A facilities study will be required for the Project.

The results of the System Impact Study will be used as the basis to determine project cost allocation 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. SCE's Field Engineering department has performed a System Impact Study on the SCE affected distribution network.

STUDY RESULTS

A. Power Flow Study Conclusions

1) Operational Queue Study

There were no overloads identified.

2) Application Queue Study

Base case

Under both Peak and Off Peak Load conditions, there was no base case overload identified.

Single Contingencies

Under Peak Load conditions, there was no N-1 overload identified.

Under Off Peak Load conditions, there [REDACTED] transmission lines with N-1 overloads. With the addition of the Project, the post-contingency loadings on Pardee-Sylmar No.1 and 2 increased from 3639 A (121%) to 3704 A (123%).

Double Contingencies

Under Peak Load conditions, there was no N-2 overload identified.

Under Off Peak Load conditions, there [REDACTED] transmission lines with N-2 overloads. With the addition of the Project, the post-contingency loadings on Pardee-Sylmar No.1 and 2 increased from 3554 A (118%) to 3595 A (120%).

B. Short Circuit Study Conclusions

1) Operational Queue Study

The 3-phase short circuit duty increases by 0.1 kA or more at four 230 kV substations. The 1-phase short circuit duty increases by 0.1 kA or more at one 230 kV substations. Engineering concluded that no CB replacements or upgrades are triggered by the Project on the Bulk Power System.

2) Application Queue Study

The 3-phase short circuit duty increases by 0.1 kA or more at five 230 kV substations. The 1-phase short circuit duty increases by 0.1 kA or more at two 230 kV substations. Engineering concluded that no CB replacements or upgrades are triggered by the Project on the Bulk Power System.

SCOPE OF WORK FOR FACILITIES STUDY

1. Interconnection Facilities:
Refer to Field engineering System Impact Study Report.
2. Transmission Upgrades (Case A: Triggered Cost)
There are no transmission upgrades triggered by the Project.
3. Transmission Upgrades (Case B: All Cost)
There are other transmission upgrades triggered by the projects in queue ahead of the Project. There upgrades will accommodate the Project. These upgrades include the following:
 - i. Upgrade Pardee-Sylmar No.1 and 2 lines.
 - Replace two wave traps with new 4000A rating at SCE Pardee end at a cost of \$172,000 total (not subject to ITCC tax).

- Replace [REDACTED] wave traps, four circuit breakers and [REDACTED] disconnect switches with new 4000A rating at LADWP Sylmar end, cost to be determined by LADWP.
- ii. The following Circuit Breakers need to be replaced or upgraded:
 - Application Queue: [REDACTED] CBs at Pardee 220 kV at a total cost of \$1,296,000 (not subject to ITCC tax)
 - Operational Queue: [REDACTED] CBs at Pardee 220 kV and [REDACTED] CB at Vincent 220 kV at a total cost of \$1,584,000 (not subject to ITCC tax).

Note:

- a. The above cost estimates are order of magnitude estimates subject to change based on results of the Facilities Study.
- b. Study results may change due to other projects ahead of the queue in the area. A new study may be required if projects ahead of the queue are changed.

COST ESTIMATE

The *Nonbinding* Cost Estimates associated with the transmission upgrades identified to be triggered by the Project is \$0.

The nonbinding cost estimates associated with the transmission upgrades identified to be triggered by prior projects in the queue is \$3,052,000 (excluding ITCC tax) as specified in Item 3 under "Scope of Work for Facilities Study".

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POWER FLOW DIAGRAMS
OPERATIONAL QUEUE
APPLICATION QUEUE

[REDACTED]

WHOLESALE DISTRIBUTION ACCESS TARIFF

SYSTEM IMPACT STUDY TRANSMISSION ASSESSMENT

I. INTRODUCTION

[REDACTED] proposed to install [REDACTED] units on its distribution or sub-transmission grid. The installation of up to 250 MW peaking generation was directed by California Public Utilities Commission (CPUC) to meet the reliability requirement for summer 2007. [REDACTED] ("Project") is [REDACTED] peaking generating stations. The Project will consist of [REDACTED] simple cycle gas turbine with a maximum operating output of 47.21 MW. The interconnection point is [REDACTED] bus. The delivery point to the ISO Grid is at Santa Clara 220 kV bus. The in-service date proposed by [REDACTED] is July 2, 2007.

SCE has performed a System Impact Study to determine the adequacy of SCE's transmission system to accommodate the Project. The study found the following:

- The system is adequate to accommodate the Project under 2007 Peak Load conditions per the operational queue.
- The system is adequate to accommodate the Project under Peak Load conditions per the application queue.
- The system is not adequate to accommodate the Project under Off Peak Load conditions without modification per the application queue.

A facilities study will be required for the Project.

The results of the System Impact Study will be used as the basis to determine project cost allocation 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. SCE's Field Engineering department has performed a System Impact Study on the SCE affected distribution network.

The study was performed for [REDACTED] system conditions representing: (a) Operational Queue: 2007 Peak Load per the operational queue with very high internal northern area generation and Midway – Vincent (Path 26) flow at its maximum rating of 4000 MW, (b) Application Queue: 2010 Peak load with very high internal northern area generation and Midway – Vincent (Path 26) flow at its maximum rating of 4000 MW, and (c) Application Queue: 2011 Off-Peak load with very high internal northern area generation and Midway – Vincent (Path 26) flow at its maximum rating of 4000 MW. These conditions reflected the most critical expected loading conditions for the transmission system in SCE's northern area.

II. 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 or sub-transmission lines and 500/230 kV transformer banks ("AA-Bank"):

Assuming both San Onofre Units 2 and 3 in service and then:

- Single Contingencies (N-1 Line or N-1 AA-Bank)
- Double Contingencies (N-1 [REDACTED] and N-1 AA-Bank)
(Outages of [REDACTED] AA-Banks are beyond the Planning Criteria)

The following criteria are used:

Table 2.1 Transmission Planning Criteria

Transmission Lines	Base Case	Limiting Component Normal Rating
	N-1	Limiting Component A-Rating
	N-2	Limiting Component B-Rating
500-230 kV Transformer Banks	Base Case	Normal Loading Rating
	Long & Short Term	As Defined by SCE Operating Bulletins

System upgrades or Special Protection Systems for transmission lines are generally recommended only for base case overloads, single contingency overloads in excess of the A-Rating, and common mode failure double contingencies in excess of the B-Rating.

Congestion Assessment

The following principles, outlined below, were used for interconnecting generation into the SCE transmission system, which fall under CAISO jurisdiction (these principles may be subject to change for future interconnection projects).

- Congestion management, as a means to mitigate base case overloads and contingency 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.
- Special protection schemes (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 special protection scheme 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).

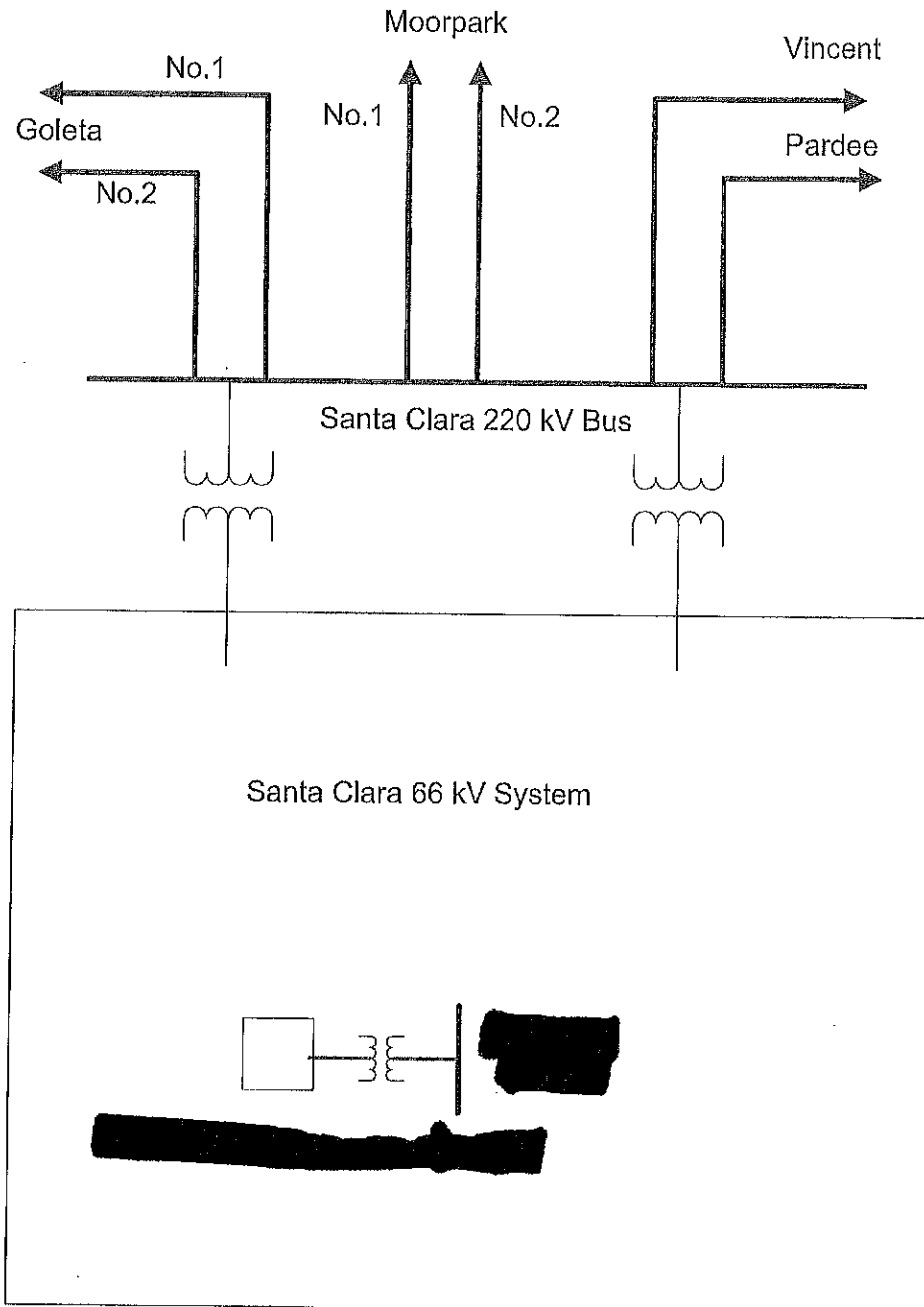
The results of these studies should identify:

- 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.

[REDACTED]

[REDACTED] is located in the city of Oxnard, California. The interconnection point [REDACTED] 56 kV bus. The delivery point to the ISO grid is Santa Clara 220 kV. The proposed operating date is July 2, 2007. Figure 1 displays the equivalent one line diagram that Transmission & Interconnection Planning use to model the new generation.

FIGURE 1



C. System Conditions

To simulate the SCE transmission system for analysis, the study selected the databases that were used to conduct the SCE Annual CAISO Controlled Transmission Assessment.

The Operational Queue Study considered the existing system arrangement with the addition of all planned transmission projects and all generating projects which have an earlier or the same operating date, regardless of the position in the application queue.

The Application Queue Study considered the existing system arrangement with the addition of all higher-queued transmission projects and the proposed transmission upgrades to accommodate higher-queued generating projects. Also considered are the 4500 MW Tehachapi wind generation and the Tehachapi Transmission Plan proposed in the California Southern Regional Transmission Plan (CSRTP) forum.

The bulk power study considered scenarios that evaluated maximum Midway – Vincent (Path 26) imports and maximum generation from Big Creek hydro units, Tehachapi Wind generation, market generation and Qualified Facilities in the Northern area. These conditions were evaluated to identify critical case scenarios that would stress the SCE 500-kV transmission system and the South of Vincent transmission system. In addition, the study considered [REDACTED] load conditions: 2007 Peak Load Conditions for Operational Queue Study, 2010 Peak Load and 2011 Off Peak Load Conditions for Application Queue Study.

D. Power Flow Study

Power flow studies were conducted with and without the Project for a total of 6 base cases. Further descriptions of the base case assumptions are as follows:

- a) 2007 Peak Load Conditions: Case 1 **without** the Project and Case 2 **with** the Project. This is an operational queue study.
- b) 2010 Peak Load Conditions: Case 3 **without** the Project and Case 4 **with** the Project. This is an application queue study.
- c) 2011 OffPeak Load Conditions: Case 5 **without** the Project and Case 6 **with** the Project. This is an application queue study.

With the addition of the Project, SCE's area total generation, imports, loads, and losses for each case are summarized in Table 2.2 below:

Table 2.2 Power Flow Cases

SCE AREA TOTAL GENERATION, IMPORT, LOAD AND LOSSES (MW)						
	17206	17209	19633	19638	13063	13068
	9051	9052	8156	8156	5442	5442
	24435	24435	26241	26241	17014	17014
	552	555	695	699	555	560

E. Short Circuit Duty

The data provided by [REDACTED] is used to evaluate short circuit duty impact on bulk power substations with duty increase at or above 0.1 kA.

III. POWER FLOW STUDY RESULTS

A. 2007 Peak Load Results (Operational Queue Study)

There were no overloads identified.

B. 2010 Peak Load Results (Application Queue Study)

There were no overloads identified.

C. 2011 Off Peak Load Results (Application Queue Study)

Base Case

There were no overloads identified.

Single Contingencies (N-1)

There were two transmission lines with N-1 overloads. With the addition of the Project, the post-contingency loadings on Pardee-Sylmar No.1 and 2 increased from 3639 A (121%) to 3704 A (123%).

Double Contingencies (N-2)

There were two transmission lines with N-2 overloads. With the addition of the Project, the post-contingency loadings on Pardee-Sylmar No.1 and 2 increased from 3554 A (118%) to 3595 A (120%).

Table 3-1. Overload Results (2011 Off Peak Load Results)

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	3000	3000	3639	121%	3704	123%	65	2%
[REDACTED]	[REDACTED]	3000	3000	3639	121%	3704	123%	65	2%
[REDACTED]	[REDACTED]	3000	3000	3554	118%	3595	120%	41	2%
[REDACTED]	[REDACTED]	3000	3000	3554	118%	3595	120%	41	2%

IV. SHORT CIRCUIT DUTY STUDY RESULTS

Three-Phase Short Circuit Duty Study Results

1) Operational Queue Study

The results of the maximum symmetrical three-phase short circuit duty at the critical buses in the SCE bulk transmission system are summarized in Table 4-1.

Table 4-1 Three Phase (3PH) Short Circuit Duty Study Results

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	230	14.4	16.8	14.4	16.9	0.1
[REDACTED]	230	21.6	34.4	21.6	34.5	0.1
[REDACTED]	230	16.6	51.1	16.6	51.2	0.1
[REDACTED]	230	14.2	22.2	14.3	22.4	0.2
[REDACTED]	230	19.1	50.9	19.1	51	0.1

The results of the maximum single-phase short circuit duty at the critical buses in the SCE bulk transmission system are summarized in Table 4-2.

Table 4-2 Single Phase (1PH) Short Circuit Duty Study Results

[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	230	13.1	57.3	13.1	57.4
[REDACTED]	230	14.6	19.9	14.6	20

2) Application Queue Study

The results of the maximum symmetrical three-phase short circuit duty at the critical buses in the SCE bulk transmission system are summarized in Table 4-3.

Table 4-3 Three Phase (3PH) Short Circuit Duty Study Results

	230	14.3	16.9	14.3	17	0.1
	230	35.3	32	35.3	32.1	0.1
	230	17.4	56.1	17.4	56.2	0.1
	230	14.1	22.4	14.2	22.6	0.2

The results of the maximum single-phase short circuit duty at the critical buses in the SCE bulk transmission system are summarized in Table 4-4.

Table 4-4 Single Phase (1PH) Short Circuit Duty Study Results

	230	14.6	20	14.6	20.1	0.1
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V. CONCLUSIONS

A. Power Flow Study Conclusions

1) Operational Queue Study

There were no overloads identified.

2) Application Queue Study

Base case

Under both Peak and Off Peak Load conditions, there was no base case overload identified.

Single Contingencies

Under Peak Load conditions, there was no N-1 overload identified.

Under Off Peak Load conditions, there were [redacted] transmission lines with N-1 overloads. With the addition of the Project, the post-contingency loadings on Pardee-Sylmar No.1 and 2 increased from 3639 A (121%) to 3704 A (123%).

Double Contingencies

Under Peak Load conditions, there was no N-2 overload identified.

Under Off Peak Load conditions, there were two transmission lines with N-2 overloads. With the addition of the Project, the post-contingency loadings on Pardee-Sylmar No.1 and 2 increased from 3554 A (118%) to 3595 A (120%).

B. Short Circuit Duty Study Conclusions

1) Operational Queue Study

The 3-phase short circuit duty increases by 0.1 kA [REDACTED] 230 kV substations. The 1-phase short circuit duty increases by 0.1 kA [REDACTED] 230 kV substations. Engineering concluded that no CB replacements or upgrades are triggered by the Project on the Bulk Power System.

2) Application Queue Study

The 3-phase short circuit duty increases by 0.1 kA [REDACTED] 230 kV substations. The 1-phase short circuit duty increases by 0.1 kA [REDACTED] 230 kV substations. Engineering concluded that no CB replacements or upgrades are triggered by the Project on the Bulk Power System.

VI. SCOPE OF WORK FOR FACILITIES STUDY

1. Interconnection Facilities:

Refer to Field engineering System Impact Study Report

2. Transmission Upgrades (Case A: Triggered Cost)

There are no transmission upgrades triggered by the Project.

3. Transmission Upgrades (Case B: All Cost)

There are other transmission upgrades triggered by the projects in queue ahead of the Project. There upgrades will accommodate the Project. These upgrades include the following:

- i. Upgrade Pardee-Sylmar No.1 and 2 lines.
 - Replace [REDACTED] wave traps with new 4000A rating at SCE Pardee end at a cost of \$172,000 total (not subject to ITCC tax).
 - Replace [REDACTED] wave traps [REDACTED] circuit breakers and [REDACTED] disconnect switches with new 4000A rating at LADWP Sylmar end, cost to be determined by LADWP.
- ii. The following Circuit Breakers need to be replaced or upgraded:
 - Application Queue: [REDACTED] CBs at Pardee 220 kV at a total cost of \$1,296,000 (not subject to ITCC tax).
 - Operational Queue: [REDACTED] CBs at Pardee 220 kV and 1 CB at Vincent 220 kV at a total cost of \$1,584,000 (not subject to ITCC tax).

Note:

Study results may change due to other projects ahead of the queue in the area. A new study may be required if projects ahead of the queue are changed.

APPENDIX A. Power Flow Diagrams

2007 Peak Load Case Power Flow Diagram (Pre Project)

2007 Peak Load Case Power Flow Diagram (Post Project)

2010 Peak Load Case Power Flow Diagram (Pre Project)

2010 Peak Load Case Power Flow Diagram (Post Project)


2011 Off-Peak Load Case Power Flow Diagram (Pre Project)

2011 Off-Peak Load Case Power Flow Diagram (Post Project)

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CEII REGULATIONS**

APPENDIX B. Operational Queue

Project Name	Project Size (MW)
WDT038	110
WDT044	49.9
WDT041	34
WDT040	17.1
TOT040	110
WDT075	39.6
WDT072	10.5
WDT086	8
WDT080	28.5
TOT010	450
TOT048	45.3
TOT056	90.6
WDT082	19.8
7068	47
WDT098	40
2538	14.66
TOT005	830
TOT005	20
WDT019	45.5
TOT102	65
WDT073	80
WDT131	8.4
WDT124	32
WDT133	48.3
TOT111	17

TOT112	82
TOT095	185
TOT018	750
TOT067	330
EAK049	134
WDT177	96
TOT004	1000
TOT109	72
WDT164	80
TOT127	65
WDT179	49.9
WDT190	49.9
WDT 223	49.9
WDT230	44.55
	47.21

APPENDIX C. Application Queue

Project Name	Project Size (MW)
TOT005	830
WDT011	9
WDT034	2.1
WDT016	11.57
TOT022	16.5
WDT028	2.5
TOT023	3.71
1114	2.8
TOT015	45
TOT004	1000
TOT010	450
TOT018	750
WDT044	49.9
WDT014	5.6
WDT038	110
WDT040	17.1
WDT041	34
WDT042	40
TOT019	44.4
TOT021	22.2
TOT051	22.44
TOT032	850
TOT040	110
TOT041	280
WDT054	16.5

WDT072	10.5
TOT048	45.3
TOT056	90.6
WDT073	80
WDT075	39.6
WDT082	19.8
WDT080	28.5
TOT005	20
7019	1.5
WDT086	8
WDT085	2.4
WDT053	42.6
TOT067	330
WDT092	66
7033	6
7030	6
7044	2.25
2495	1.28
2502	2.7
7045	7.3
7034	2
7042	1
7068	47
WDT109	4.2
WDT110	5.6
WDT111	3.93
7056	2.12
WDT098	40

7057	1.3
2530	1.21
7075	2
7071	1.13
7036	3.8
2535	1
2521	10.6
EAK049	134
2529	2.28
2522	1.06
7070	5.74
2538	14.66
2540	1.1
7088	8
WDT118	9
WDT112	16.54
7084	2.4
TOT095	185
WDT019	45.5
TOT100	63
7094	1.4
7010	3.3
7100	1.5
7101	1.77
WDT133	48.3
WDT129	2.56
WDT123	8.73
WDT123	3

WDT123	6.75
2531	2.4
2546	4.9
TOT096	50
WDT124	32
WDT082	1.2
2543	1.1
TOT079	520
TOT102	65
TOT108	300
WDT147	45.6
TOT109	72
TOT111	17
TOT112	82
WDT131	8.4
TOT113	201
TOT117	300
TOT116	10
WDT163	5.6
WDT164	80
TOT119	157
WDT165	325
TOT120	100.5
WDT177	96
TOT121	599
WDT176	6.5
TOT037	810
TOT127	65

TOT129	1650
WDT179	49.9
TOT135	500.5
WDT182	507
TOT138	424.8
TOT131	850
TOT132	500
WDT190	49.9
TOT148	250
WDT205	99
TOT146	51
TOT149	610
TOT150	60
WDT213	49
TOT151	400
TOT152	120
TOT155	33
TOT156	34
TOT166	613.5
TOT160	570
TOT153	51
TOT154	570
TOT161	220
TOT164	180
TOT162	550
TOT163	600
TOT165	160
TOT167	120

TOT149	304
WDT221	8.5
TOT159	635
TOT157	600
TOT158	1400
[REDACTED]	8
TOT171	150
TOT169	50
TOT170	150
WDT223	49.9
TOT172	550
TOT173	500
TOT174	1200
WDT227	102
WDT228	63
TOT175	300
WDT230	44.55
[REDACTED]	47.21