[redacted]

WHOLESALE DISTRIBUTION ACCESS TARIFF
LARGE GENERATOR INTERCONNECTION

SYSTEM IMPACT STUDY

June 18, 2007

SOUTHERN CALIFORNIA
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[redacted]

SYSTEM IMPACT STUDY

EXECUTIVE SUMMARY

INTRODUCTION

[redacted] applied to Southern California Edison (SCE) for Interconnection pursuant to Wholesale Distribution Access Tariff (WDAT). [redacted] proposed to interconnect a new 25 MW generation project to be installed at a new landfill gas-to-energy project, located at the Orange County Olinda/Alpha Landfill in [redacted], at the [redacted] 66kV bus. The in-service date proposed by [redacted] is January 1, 2009. ***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]

Southern California Edison's Transmission & Interconnection Planning (SCE - TIP) has performed a System Impact Study (SIS) to determine the adequacy of SCE's Transmission System to accommodate the [redacted] The study indicates that the system is adequate to accommodate the 25 MW of generation without transmission line modifications.

POWER FLOW STUDY RESULTS

The power flow study results show that no overloading problems are found on the transmission lines for base-case, N-1 and N-2 contingencies. Specifically:

Base Case (Spring and Summer Conditions)

There were no base case overloads attributed to [redacted]

Single Contingencies (Spring and Summer Conditions)

There were no single contingency overloads attributed to [redacted]

Double Contingencies (Spring and Summer Conditions)

There were no double contingency overloads attributed to [redacted]

TRANSIENT STABILITY AND POST TRANSIENT STUDIES

SCE used study findings from earlier Interconnection Studies for large projects electrically proximate to this project and concluded that there are no transient stability and post transient impacts to the SCE transmission system from this proposed project.

SHORT CIRCUIT DUTY STUDY

The data provided by [redacted] has been used to study the Short Circuit Duty contribution by the project on the affected Transmission System substation circuit breakers. The addition of the Project did not significantly increase Short Circuit Duty. Apparatus Engineering has evaluated our existing breakers and determined that there is not need for circuit breaker upgrades.

THREE-PHASE FAULT DUTY
The addition of the project has impacted [redacted] 230kV substations with short circuit duty increases greater than 0.1kA

SINGLE – LINE TO GROUND FAULT DUTY
The addition of the project has impacted [redacted] 230kV substations with short circuit duty increases greater than 0.1kA.

See Tables 4.1 and 4.2 for more information

SCOPE OF WORK

The scope of work to accommodate the generation interconnection on the SCE Transmission System is listed below. This study has not assumed overload or short circuit mitigation requirements for projects ahead of it on the queue. The scope of work listed below are upgrades to mitigate pre-existing overloads, upon which this Project further increases the amount of overload, based on the current queue, at the time of this study.

1) No SCE Transmission System related components (Circuit Breakers and Transmission Lines) are triggered by the [redacted] Distribution related components will be addressed by the Field Engineering SIS. The [redacted] is only exposed to Case B costs triggered by projects ahead of [redacted] in the queue.

COST OF UPGRADES

There is no cost of upgrades for the Transmission System assigned to the project, at this time. However, the assignment of network upgrade costs could change if the interconnection queue changes.

Note: Study results may be affected by changes in other projects ahead of the queue in the area. A re-study may be required if there are changes in the project queue or the scope of projects ahead in the queue. All cost estimates are rough order of magnitude, and are non-binding cost estimates.

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SOUTHERN CALIFORNIA EDISON - TRANSMISSION SYSTEM

INTRODUCTION

[redacted]pplied to the Southern California Edison (SCE) for Interconnection pursuant to Wholesale Distribution Access Tariff (WDAT). [redacted]proposed to interconnect a new 25 MW generation project to be installed at a new landfill gas-to-energy project, located at the Orange County Olinda/Alpha Landfill in [redacted] 66kV bus. The in-service date proposed [redacted]is [redacted]

Southern California Edison's Transmission & Interconnection Planning (SCE - TIP) has performed a System Impact Study to determine the adequacy of SCE's transmission system to accommodate the [redacted]. The study indicates that the system is adequate to accommodate the 25 MW of generation without transmission line modifications. However, Circuit Breaker replacements, for greater capacity, are required.

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 for two system conditions: (a) 2009 heavy summer load forecast (one-in-ten-year heat wave assumption) with maximum SCE Eastern area generation, and (b) 2010 spring load forecast (65% of 2010 heavy summer peak load) with maximum SCE Eastern area generation. 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 System Impact 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 subtransmission lines and 500/230 kV transformer banks ("[redacted]

Assuming both San Onofre Units in service and then:

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

The following criteria are used:

Transmission Lines	Base Case N-1 N-2	Limiting Component Normal Rating Limiting Component A-Rating Limiting Component B-Rating
AA-Banks	Base Case Long Term & Short Term	Normal Loading Rating As defined by SCE Operating Bulletin

System upgrades or Special Protection Schemes 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 were used in determining whether congestion management, special protection schemes, 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.

- 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 [redacted] (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 [redacted]. 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 [redacted] 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 [redacted] may have to participate in mitigation of overloads triggered by subsequent projects in queue, subject to FERC protocols and policies.

The results of these studies should identify:

a. if capacity is available to accommodate the proposed [redacted] nd all projects ahead in queue without the need for special protection schemes, or facility upgrades

b. if overloads exist in the area after the addition of all projects in queue ahead of the [redacted] d all facilities in service

c. if congestion exists in the area with the addition of the [redacted] 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.

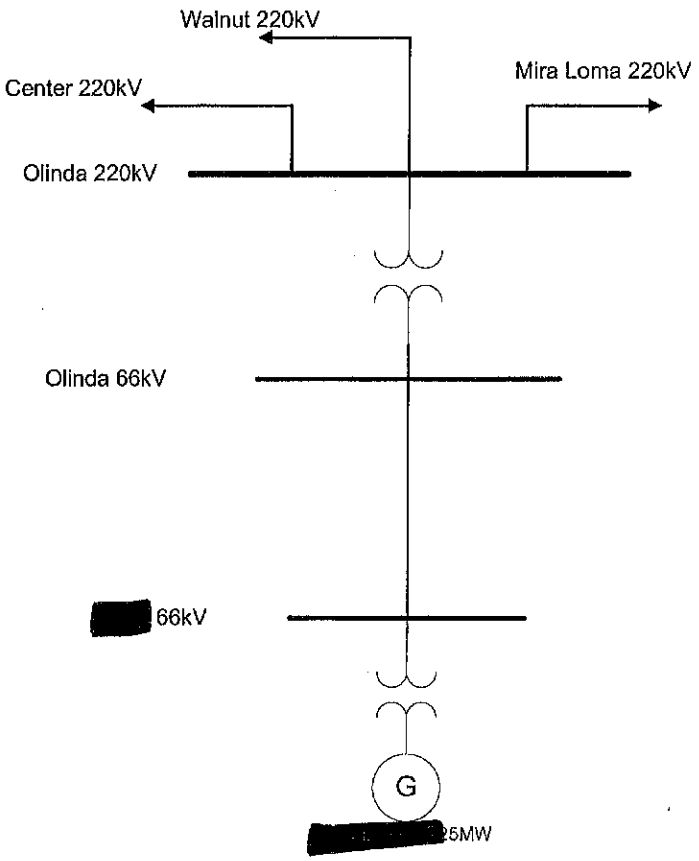
B. Modeling [redacted]

The proposed [redacted] is geographically within the [redacted] landfill that is located a [redacted]. The Project has proposed to connect to the 66kV bus at [redacted]. A one-line diagram of the proposed interconnection is shown below in Figure 1.

FIGURE 1

[redacted]

SIMPLIFIED SINGLE LINE DIAGRAM



System Conditions

To simulate the SCE transmission system for power flow analysis, the study selected the databases that were used to conduct the SCE CAISO Controlled 2005-2014 Transmission Expansion Plan. Power flow studies considered the existing system arrangement and reflected other transmission projects that occupy a higher position on the application queue. For Example:

- All [redacted] West of Devers 230-kV lines have been upgraded
- Rancho Vista 500/230-kV substation was modeled in service
- Oak Valley 230/115-kV substation is modeled.
- Jurupa 230/66-kV substation is modeled in service.
- WDT230 44.5 MW is modeled.
- WDT231 44.5 MW is modeled.
- WDT236 44.5 MW is modeled.
- CAISO136 300 MW is modeled.

The bulk power study considered scenarios that evaluated maximum generation from Qualified Facilities in SCE Eastern area. These conditions were evaluated to identify worst case scenarios that would stress the SCE's bulk transmission system network in the SCE Eastern area and vicinity. In addition, the study considered two system load conditions: 2009 heavy summer and 2010 spring (Appendix A). The summer peak load forecast was based on SCE's 2006 Transmission Expansion Plan, and reflects a one-in-ten-year heat wave assumption.

The 2009 heavy summer and 2010 light spring base cases were modified to reflect the inclusion of projects that occupy a higher position on the application queue than the [redacted]. The 2010 spring load forecast assumed 65% of the heavy summer load forecast for the bulk transmission system.

C. Power Flow Study

The Power Flow Study was conducted for 2009 Heavy Summer and 2010 Spring load conditions with and without the [redacted] for a total of 4 cases. Further description of the case assumptions follows:

a) *2010 Spring*:

Case 1 **without** and Case 2 **with** the [redacted]

These two cases assumed 2010 spring load (65% of summer peak load for the total system) with maximum generation in SCE's Eastern area. Generation included: all market and all regulatory must-run units. Generation patterns were maximized in the SCE Eastern area to fully stress the system in order to identify the extent of potential

[redacted]

Wholesale Distribution Access Tariff
System Impact Study

September 24, 2007

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Approved by:

Randy R. Smith
Engineering Manager

EXECUTIVE SUMMARY

[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] would own and operate a 27.6 megawatt (MW) gross output generating facility [redacted] with a net output of 25.0 MW to be interconnected to a dedicated position at the [redacted] 66 kilovolt (kV) switchrack. Distribution service pursuant to the WDAT is proposed to be from [redacted] to the California Independent System Operator (CAISO) grid at SCE's 230 kV Olinda Substation. The proposed in-service date of the [redacted] is [redacted]

[redacted] is a generation system consisting of 27.6 MW of landfill gas fired combustion turbines, comprised of 6 Solar Mercury 50 combustion turbine generators each rated at 4.6 MW gross. The generation facility would utilize [redacted] 1.5 megavolt-ampere (MVA), 66/4.16 kV step-up transformer to interconnect the generation to the SCE's system. As requested by [redacted] SCE performed a System Impact Study to identify the general electrical system impacts on the distribution system as a result of the [redacted] possible mitigation measures to maintain conformance with SCE, CAISO, or 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, three-phase short circuit duty analysis to determine any impacts that would be associated with the [redacted] transmitting energy through SCE's distribution system to the CAISO grid at Olinda Substation. The study showed that, with the [redacted] project on-line:

- Thermal loadings on the SCE distribution facilities used to provide the requested WDAT service would all be within criteria limits.
- No 66 kV circuit breakers would need to be upgraded due to the [redacted].

Non-binding order-of-magnitude cost estimates for the required interconnection facilities and distribution system upgrades are as follows:

Interconnection (66 kV substation, 66 kV interconnection tie line, protection)	$ 4.20M
New I.T. facilities [redacted]	$ 0.25M
RTU installed at [redacted]	$ 0.05M
Circuit breaker replacements (66 kV)	$ 0.00M
35% ITCC Tax	$ 1.58M
Total non-binding order-of-magnitude cost estimate	$ 6.08M

Additional system studies (e.g., 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 estimates do not include any G.O. 131D costs.

CONTENTS

[redacted]

1. INTRODUCTION

[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] would own and operate a 25.0 MW net output generating facility [redacted] to be interconnected to a dedicated position at SCE's [redacted] 66 kilovolt (kV) switchrack as shown on Figure 1.

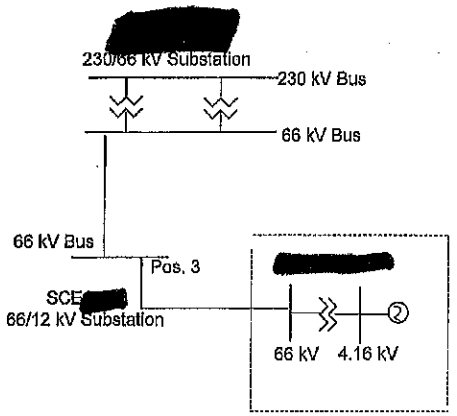

Figure 1

Distribution service pursuant to the WDAT is proposed to be from [redacted] to the California Independent System Operator (CAISO) grid at SCE's 230 kV Olinda Substation. The proposed in-service date of the [redacted] is [redacted]

[redacted] is a generation system consisting of 27.6 MW of landfill gas fired combustion turbines, comprised of [redacted] combustion turbine generators each rated at 4.6 MW gross. The generation facility would utilize [redacted] 41.5 megavolt-ampere (MVA), 66/4.16 kV step-up transformer to interconnect the generation to the SCE's system. As requested by [redacted] SCE performed a System Impact Study to identify the general electrical system impacts on the distribution system as a result of the [redacted] possible mitigation measures to maintain conformance with SCE, CAISO, or 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, three-phase short circuit duty analysis to determine any impacts that would be associated with the [redacted] transmitting energy through SCE's distribution system to the CAISO grid at Olinda Substation. This report describes the study conditions and assumptions and presents the results of the power flow and short circuit duty analysis on SCE's Olinda 66 kV distribution system.

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 the normal thermal rating of any conductor with all facilities in service (base case).

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

Short Circuit Duty Criteria

Short circuit duty should not exceed the interrupting capability of any circuit breaker with maximum area generation on-line.

B. System Load Conditions

The study considered [redacted] 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 55% 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 monitored 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 three-phase short circuit duties seen by substation circuit breakers at the 66 kV level. [redacted] three-phase fault currents 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 by 0.1 kiloamps (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]

3. DISCUSSION OF STUDY RESULTS

A. *Power Flow Study*

For peak-load and light-load conditions, the addition of the [redacted] caused no violations of SCE's thermal loading criteria under base case conditions.

For peak-load and light-load conditions, the addition of the [redacted] caused no violations of SCE's thermal loading criteria under N-1 conditions.

B. *Short Circuit Duty Study*

Table 1 below summarizes the impact of the [redacted] on [redacted] three-phase short circuit duties at various 66 kV buses on the SCE distribution system. [redacted] buses were identified where the [redacted] increased three-phase by 0.1 kA or more. A review of circuit breaker interrupting capabilities at these locations determined that no 66 kV circuit breakers would need to be replaced as a result of the [redacted]

4. NON-BINDING ORDER-OF-MAGNITUDE COST ESTIMATES

Non-binding order-of-magnitude cost estimates for the required interconnection facilities and distribution system upgrades are as follows:

Interconnection (66 kV substation, 66 kV interconnection tie line, protection)	$ 4.20M
New I.T. facilities [redacted]	$ 0.25M
RTU installed at [redacted]	$ 0.05M
Circuit breaker replacements (66 kV)	$ 0.00M
35% ITCC Tax	$ 1.58M
Total non-binding order-of-magnitude cost estimate	$ 6.08M

5. CONCLUSIONS

The study showed that with the [redacted] project on-line:

- Thermal loadings on the SCE distribution facilities used to provide the requested WDAT service would all be within criteria limits.
- No 66 kV circuit breakers would need to be upgraded due to the [redacted]

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Additional system studies (e.g., 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 estimates do not include any G.O. 131D costs.