[redacted]

WDT263

FEASIBILITY STUDY

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EXECUTIVE SUMMARY

[redacted] applied to Southern California Edison ("SCE") for interconnection and distribution service under the terms of SCE's Wholesale Distribution Access Tariff ("WDAT"). [redacted] will own and operate a 21 MW photovoltaic generating facility [redacted] to be interconnected at a new interconnection facility to be constructed by SCE. The [redacted] will tap into SCE's Chanslor 33kV distribution line (near Wiley's Well Road) out of [redacted] Distribution service pursuant to the WDAT is proposed to be from the [redacted] to the California Independent System Operator ("ISO") grid at SCE's [redacted] 161kV bus. The proposed in-service date of [redacted] is June 1, 2010.

The [redacted] is a proposed generation facility consisting of a 21 MW photovoltaic solar field, configured in 500 kW sections, connecting to [redacted] Xantrex GT-500E 500 kW photovoltaic inverters and [redacted] 480v/33kV transformers. As requested by [redacted] SCE performed a Feasibility Study to identify the general electrical system impacts of the [redacted] possible mitigation measures to maintain conformance with SCE, ISO, or other applicable reliability planning criteria, and non-binding order of magnitude cost estimates for these mitigation measures.

The Feasibility Study consisted of a power flow analysis to determine whether the energy associated with the [redacted] can be transmitted through SCE's distribution system to the ISO grid at [redacted] 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:

- For both peak load and light load conditions, the addition of the [redacted] caused 0 violations of SCE's thermal loading criteria under base case conditions.
- For both peak load and light load conditions, the addition of the [redacted] caused 0 violations of SCE's thermal loading criteria under N-1 conditions.
- There are [redacted] where the [redacted] increased three-phase short-circuit duties by 0.1 kA or more. The circuit breaker interrupting capabilities were reviewed at these substations and it was determined that 0 circuit breakers were required to be upgraded as a result of the [redacted]

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[redacted]

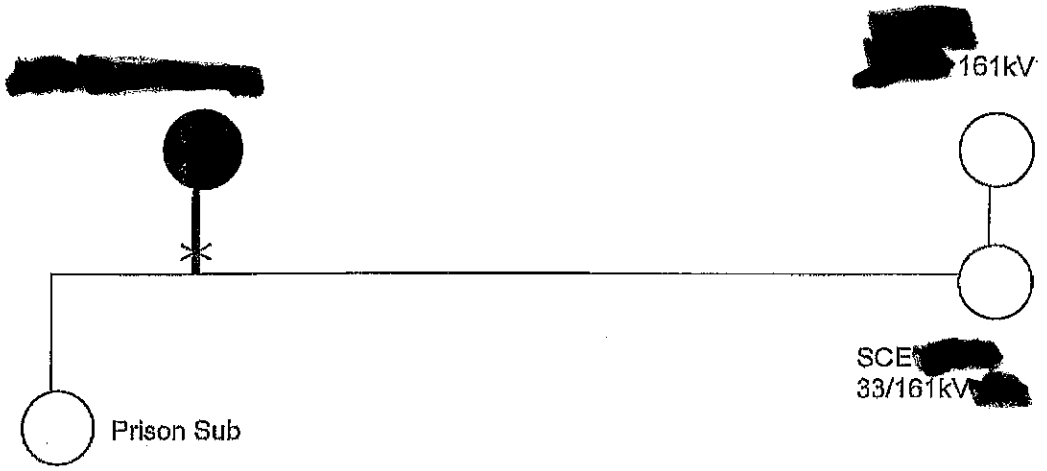
FEASIBILITY STUDY

May 8, 2008

1. INTRODUCTION

[redacted] applied to Southern California Edison ("SCE") for interconnection and distribution service under the terms of SCE's Wholesale Distribution Access Tariff ("WDAT"). DT Solar will own and operate a 21 MW photovoltaic generating facility [redacted] to be interconnected at a new interconnection facility to be constructed by SCE. [redacted] will tap into SCE's Chanslor 33kV distribution line (near Wiley's Well Road) out of [redacted] (see Figure 1 below).

Figure 1 – Proposed 33 kV Method of Service to [redacted]



Distribution service pursuant to the WDAT is proposed to be from the [redacted] to the California Independent System Operator ("ISO") grid at SCE's [redacted] 161 kV [redacted] The proposed in-service date of the [redacted] is June 1, 2010.

The [redacted] consists of a 21MW photovoltaic solar field, configured in 500 kW sections, connecting [redacted] Xantrex GT-500E 500 kW photovoltaic inverters and [redacted] 480v/33kV transformers. As requested by [redacted], SCE performed a Feasibility 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 Feasibility Study consisted of a power flow analysis to determine whether the energy associated with the [redacted] can be transmitted through SCE's distribution system to the ISO grid at SCE's [redacted] 161 kV [redacted] without creating the need for modifications to SCE's distribution system and/or the ISO grid. The Feasibility Study

alsoconsisted of a short-circuit duty analysis to determine the three-phase short-circuit duty impacts to substation circuit breakers in the area. This report describes the study conditions and assumptions and presents the results of the power flow and short circuit duty analyses on SCE's Blythe 33 kV subtransmission system and 161kV transmission 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 interconnection and distribution 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 thermal rating with all facilities in service (base case).

Line loading should not exceed 100% of a conductor's emergency 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 loads and light loads. The peak load forecast was based on SCE's 2008-2017 Distribution Substation Plan. The light load forecast was assumed to be 34.7% 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 33 kV level. [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 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]

3. DISCUSSION OF STUDY RESULTS

A. *Power Flow Study*

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

The net power flow from SCE's 161kV transmission system to SCE's 33kV distribution system remained positive indicating no negative impacts to the transmission system at 161kV and above (Bulk Power System).

B. *Short-Circuit Duty (SCD)Study*

Table 1 below summarizes the impact of the [redacted] on [redacted] three-phase short-circuit duties and X/R ratios at various 33 kV buses on the SCE system. 7 buses were flagged where the [redacted] increased three-phase short-circuit duties by 0.1 kA or more: [redacted] 33 kV, Dunes 33 kV, [redacted] 33 kV, Olive Lake 33 kV, Defrain 33 kV, Ripley 33 kV, and Prison 33 kV. A review of circuit breaker interrupting capabilities at these locations determined that the incremental contribution to increased SCD did not trigger the need for circuit breaker upgrades.

The SCD at the 161kV bus was less than 100 amps indicating no negative impact to the Bulk Power system.

Table 1: Three-Phase Short-Circuit Duty Summary

4. INTERCONNECTION Requirements

A. Protection Review

The interface protection will be composed of an overhead recloser with adequate recloser control. The recloser control will be coordinated with SCE's [redacted] circuit breaker controls to provide adequate protection for the distribution system.

B. Interconnection Facilities and Distribution Upgrades

Interconnection Facilities and Distribution Upgrades that are required to be installed by SCE are as follows:

- [redacted]33kV pole switch
- Approximately [redacted] of 3/C, 336 ACSR overhead conductor as well as associated conductors, poles, terminations, arrestors, and other miscellaneous material necessary to complete the interconnection
- [redacted]Automatic Recloser and associated control

C. Telemetering Requirements

Producers with wholesale generating facilities 10 MW or larger will require telemetering equipment and telecommunications at Producer's expense to transmit at minimum generator unit gross MW and MVAR, generator status, generator circuit breaker status and generator terminal voltage. In addition, real time telemetering of project net MW and MVAR is required.

5. NON-BINDING ORDER OF MAGNITUDE COST ESTIMATES

Non-binding order of magnitude cost estimates for the required Interconnection Facilities and 33 kV Distribution Upgrades are as follows:

[redacted]interconnection facility	$ 100 K
Protection Upgrades	$ 75 K
New IT Facilities	$ 0 K
RTU at [redacted]	$ 35 K
33 kV system line upgrades	$ 0 K
35% ITCC tax	$ 75 K
Total non-binding order of magnitude cost estimate	$ 285 K

Note: The 33kV system line upgrades do not include any required General Order 131D permitting costs.

6. CONCLUSIONS

The results of this Feasibility Study showed that, with the [redacted] on-line:

- For both peak load and light load conditions, the addition of the [redacted] caused 0 violations of SCE's thermal loading criteria under base case conditions.
- For both peak load and light load conditions, the addition of the [redacted] caused 0 violations of SCE's thermal loading criteria under N-1 conditions.
- There ar[redacted] where the [redacted] increased three-phase short-circuit duties by 0.1 kA or more. The circuit breaker interrupting capabilities were reviewed at these substations and it was determined that 0 circuit breakers were required to be upgraded as a result of the[redacted]
- There are no power flow or short circuit duty impacts to the Bulk Power System that require mitigation by the[redacted]
- Given the results of the Feasibility Study and SCE's determination that further stability and/or voltage studies are not required, a System Impact Study will not be necessary; therefore, the[redacted] can proceed to the Facilities Study. SCE will provide a copy of the Feasibility Study to the California Independent System Operator (CAISO) for their review and concurrence with SCE's results.
- The Facilities Study may include a Single-line-to-ground short circuit duty analysis if determined necessary by SCE.

Non-binding order of magnitude cost estimates for the required Interconnection Facilities and 33 kV Distribution Upgrades are as follows:

[redacted]nterconnection facility	$ 100 K
Protection Upgrades	$ 75 K
New IT Facilities	$ 0 K
RTU at[redacted]	$ 35 K
33 kV system line upgrades	$ 0 K
35% ITCC tax	$ 75 K
Total non-binding order of magnitude cost estimate	$ 285 K

Note: The 33kV system line upgrades do not include any required General Order 131D permitting costs.

Project Schedule

ELEMENT	START	END	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
PROJECT APPROVAL	Initiate Work Orders							
NEW SCE 33kV INTERCONNECTION FACILITY	New 33kV Facility							
Engineering & Design	Start of Mo.2	Start of Mo.3						
Major Equipment Procure & Deliver	Start of Mo.3	Start of Mo.6						
Construction	Middle of Mo.6	Middle of Mo.7						