

WDT263

FACILITIES 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"). FSE 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]. 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 for the [REDACTED]

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 FSE, 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 was first transmitted to FSE and the California Independent System Operator (CAISO) on May 9, 2008 and was subsequently amended on June 24, 2008 to incorporate the CAISO's comments. The CAISO granted preliminary interconnection approval to the [REDACTED] in its letter dated July 2, 2008, subject to the successful completion of the forthcoming Facilities Study. A copy of the amended Feasibility Study and the CAISO letter is attached hereto as Appendix B and C respectively. With FSE's concurrence, a copy of the Feasibility Study and CAISO Letter was also transmitted to the Metropolitan Water District ("MWD") for its review as a potential Affected System. On August 7, 2008, MWD informed SCE that the [REDACTED] does not appear to have a significant impact to MWD's facilities.

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 7 substations 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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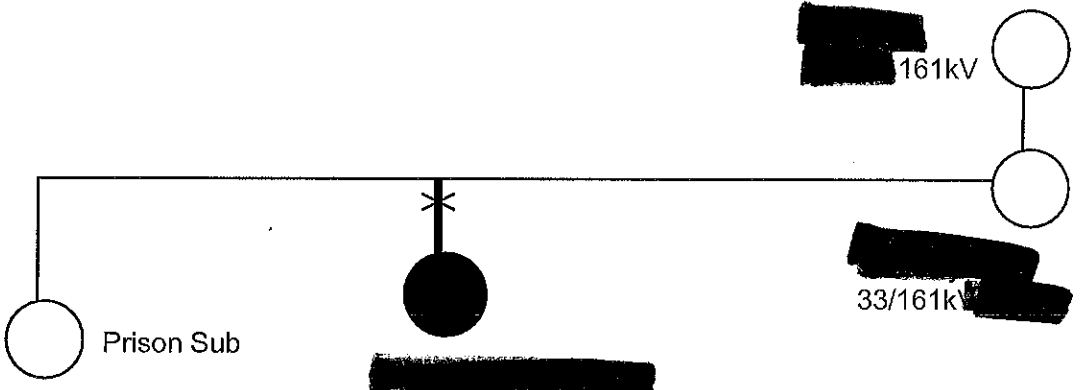
[REDACTED]

FACILITIES STUDY

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"). FSE will own and operate a 21 MW photovoltaic generating facility [REDACTED] 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 Blythe Substation (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 bus. The proposed in-service date for the [REDACTED] is June 1, 2010.

[REDACTED] consists of a 21MW 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, and other applicable reliability planning criteria, and non-binding order of magnitude cost estimates for these mitigation measures.

The Feasibility Study was first transmitted to [REDACTED] and the California Independent System Operator (CAISO) on May 9, 2008 and was subsequently amended on June 24, 2008 to incorporate the CAISO's comments. The CAISO granted preliminary interconnection approval to the [REDACTED] in its letter dated July 2, 2008, subject to the successful completion of the forthcoming Facilities Study. A copy of the amended Feasibility Study and the CAISO letter is attached hereto as Appendix B and C respectively. With FSE's concurrence, a copy of the Feasibility Study and CAISO Letter was also transmitted to the Metropolitan Water District ("MWD") for its review as a potential Affected System. On

August 7, 2008, MWD informed SCE that the [REDACTED] does not appear to have a significant impact to MWD's facilities.

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 also consisted of a short-circuit duty analysis to determine the three-phase short-circuit duty impacts to substation circuit breakers in the area.

2. DISCUSSION OF FEASIBILITY 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).

- The pre-project (generator off) flow through [REDACTED] is 25 MVA under the light loading conditions. The post-project (generator on) flow through [REDACTED] is 5 MVA under the light loading conditions.

SCE Transmission Interconnection Planning (TIP) determined that there is no need to perform Bulk Power System studies including stability and post-transient studies. TIP reviewed valid sample Bulk Power System interconnection application queue study cases and determined the following:

- The [REDACTED] offsets the area load (about 60 MW in 2013 summer, and about 39 MW in 2013 spring).
- The power flow impact to the Bulk Power System lines [REDACTED] 161kV and [REDACTED] 161kV) would be as small as 10-25 MW in the summer or spring cases. The line flows in both cases are lower than 100 MW with each line having greater than a 200 MVA line rating.

B. Short-Circuit Duty (SCD) Study

Table 1 below summarizes the impact of the [REDACTED] on symmetrical three-phase short-circuit duties and X/R ratios at various 33 kV buses on the SCE system. [REDACTED] 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

0
0
0
0
0
0
0
0
0
0
0
0
0

3. FACILITIES STUDY ASSUMPTIONS

- A. All required ISO metering equipment at the generating facility will be provided by [REDACTED] and is not included in the Facilities Study.
- B. Any required upgrades at facilities not owned by SCE would be the responsibility of [REDACTED] and are not included in the Facilities Study. As of the date of this Facilities Study, SCE is not aware of any mitigation requirements to third party transmission systems resulting from the interconnection of the [REDACTED] to SCE's Chanslor 33kV line.
- C. As agreed to in principle by SCE and [REDACTED] following transmittal of the Feasibility Study, SCE will construct, own, operate and maintain the 33kV generation tie line pursuant to a generation tie line agreement. Accordingly, this Facilities Study includes a cost estimate for the generation tie line.
- D. The Preliminary Project Schedule does not include the time to negotiate, execute and file the appropriate interconnection agreements. SCE and [REDACTED] are pursuing a letter agreement prior to execution of the interconnection agreement and generation tie-line agreement in order to advance the project schedule.
- E. SCE does not anticipate that any permits will be required to be obtained by SCE for SCE to perform the work described in this Facilities Study.

4. FACILITIES STUDY SCOPE

- A. Protection

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:

- 1-33kV pole switch
- Approximately 250' of 3/C, 336 ACSR overhead conductor as well as associated conductors, poles, terminations, arrestors, and other miscellaneous material necessary to complete the interconnection
- 1 Automatic Recloser and associated control
- 1 Meter, associated voltage transformers and meter cabinet

C. Generation Tie Line

A generation tie line shall be constructed from the generating facility to tie into the Chanslor 33kV line out of Blythe substation. This line will consist of the following:

- Approximately 2600' of 3/C, 336 ACSR overhead conductor
- [REDACTED] consisting of [REDACTED] poles and [REDACTED] poles
- associated terminations, arrestors, and other miscellaneous material

Note: SCE's construction, ownership and maintenance of the Generation Tie Line will be the subject of an agreement other than the Large Generator Interconnection Agreement to be negotiated by SCE and [REDACTED]

D. Telemetry Requirements

Telemetry and telecommunications equipment will be required to transmit, at minimum, generator unit gross MW and MVAR, generator status, generator circuit breaker status and generator terminal voltage. In addition, real time telemetry of project net MW and MVAR is required. The telemetry requirements shall consist of the following:

- Remote Terminal Unit
- RTU circuit from the [REDACTED] to Devers Substation

5. FACILITIES STUDY COST ESTIMATES

Cost estimates for the required Interconnection Facilities and 33 kV Distribution Upgrades are as follows:

[REDACTED] interconnection facility	\$ <u>100</u> K
Meter, VTs and meter cabinet	\$ <u>25</u> K
Protection Upgrades (Automatic Recloser and Control)	\$ <u>75</u> K
Gen Tie Line	\$ <u>200</u> K
RTU at [REDACTED]	\$ <u>35</u> K

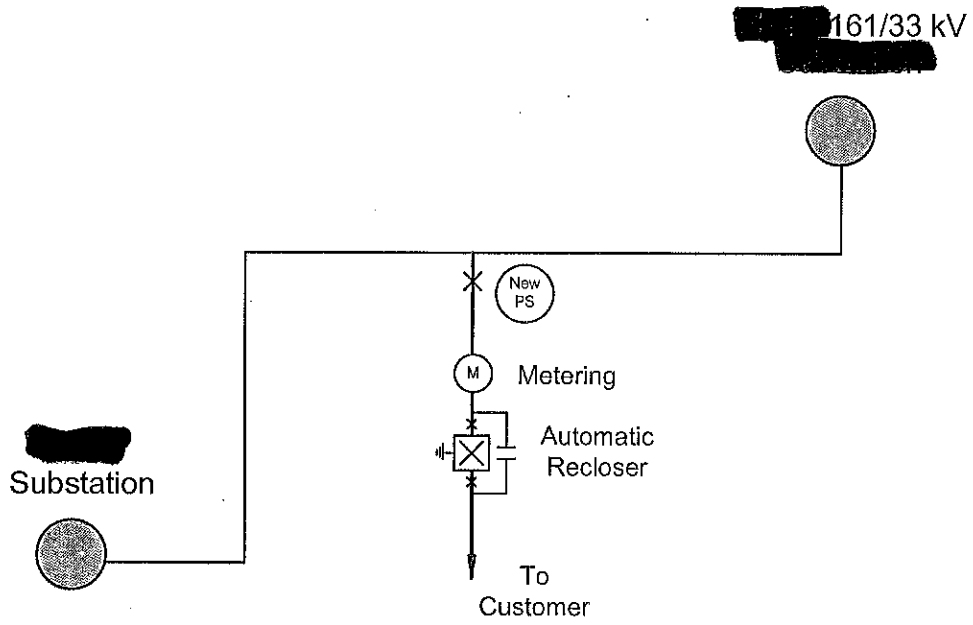
RTU circuit	\$ 65 K
22% ITCC tax (may be collected via Letter of Credit)	\$ 110 K
<hr/>	
Total cost estimate	\$ 610 K

Note: The estimated tax liability is based on the current tax rate of 22% for facilities placed into service during year 2009, which is currently pending approval at the California Public Utilities Commission.

6. FACILITY STUDY CONCLUSIONS

- A. The estimated cost to interconnect the [REDACTED] is approximately \$610,000. The costs indicated in the table above are shown in 2009 Dollars and are not firm. These are only preliminary estimates based on conceptual engineering and system unit costs, and are subject to change based on the final design and actual material costs. This Facilities Study and cost estimates as presented are valid for a period of 90 days.
- B. The estimated costs will be reconciled to actual costs following closure of the associated work orders. The necessary billing adjustments will be made in accordance with the terms of the interconnection agreement and generation tie line agreement as applicable.
- C. The time required to complete the proposed interconnection will be approximately six months following execution and regulatory approval of the appropriate agreements. This time estimate is subject to final verification by SCE of available resources at the time the interconnection agreement is executed.

Project Single Line



Preliminary Project Schedule

ELEMENT	START	END	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7
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	Start of Mo.6	Middle of Mo.7							