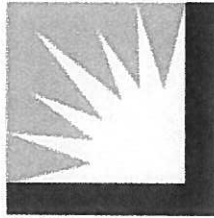




Facilities Study

March 14, 2014



SOUTHERN CALIFORNIA

**EDISON**

An *EDISON INTERNATIONAL*<sup>SM</sup> Company

Prepared and Approved by  
Lindsey Sayers, PE, AF/IF Engineer

Confidential: Contains Critical Energy Infrastructure Information (CEII)

**Southern California Edison**

**Table of Contents**

Description	Page
I. Executive Summary.....	3
II. System Impact Study Results.....	4
III. Facilities Study Assumptions.....	4
IV. Facilities Study Scope and Cost Estimate.....	4
IV – A Facilities Study Scope.....	5
IV – B Facilities Study Cost Estimate.....	10
V. Conclusions.....	11
VI. Exhibits	
Exhibit A	Transmission System Impact Re-Study
Exhibit B	Sub-Transmission System Impact Re-Study
Exhibit C	[REDACTED] One Line and Plot Plan
Exhibit D	Cost Summary

**I. Executive Summary**

[REDACTED] an Interconnection Customer (IC), applied to the California Independent System Operator (CAISO) for the interconnection of [REDACTED] of generation from their generating facility in Colton, CA to the CAISO Grid at the existing SCE Vista – Colton Cement – [REDACTED] under the terms of SCE’s Wholesale Distribution Access Tariff (WDAT).

The Project consists of one simple-cycle [REDACTED] with a net output of [REDACTED]. [REDACTED] will connect the [REDACTED] to the new SCE [REDACTED] and will interconnect to the CAISO Grid at the Vista Substation [REDACTED].

[REDACTED] will be connected to the SCE [REDACTED] via a new [REDACTED] to be owned, operated and maintained by SCE. The IC will engineer, design and construct the new [REDACTED] to SCE’s standards.

For the purpose of this study, the new facility will be referred to as [REDACTED]. This name may change.

[REDACTED] will be served by one of the following two options:

**Option 1 – Loop Substation**

Loop the [REDACTED] [REDACTED] to form the [REDACTED] [REDACTED] – [REDACTED] Connect the lines via [REDACTED] [REDACTED] an IC Owned [REDACTED]

**Option 2 – Tap Substation**

Tap the [REDACTED] and retire [REDACTED] to form the [REDACTED] [REDACTED] Connect the line to an IC owned [REDACTED] [REDACTED]

SCE completed a System Impact Study and a Facilities Study in 2006, which analyzed the impacts of the proposed Generating Facility on the distribution provider’s electrical system, including that portion of distribution provider’s electrical system that is part of the ISO Grid.

Since the completion of the original studies, there have been changes to SCE’s reliability standards, electric system topology, and area load conditions. SCE is conducting a reassessment study to determine if these changes would materially impact subsequently queued generation projects and this generation project.

A Transmission System Impact Re-Study was prepared to address the impact of the new generation to the SCE Transmission System.

A Sub – Transmission System Impact Re-Study dated was prepared to address the impact of the new generation to the SCE Sub – Transmission System.

**FOR ADDITIONAL DETAIL REFER TO THE FOLLOWING EXHIBIT:**

• **EXHIBIT A: SIS – EXECUTIVE SUMMARY**

**II. System Impact Study Results**

**SYSTEM IMPACT Re-STUDY RESULTS:**

The SIS concluded that the existing SCE System is adequate to support the additional generation.

**The Study conclusions are:**

1. With all serial queued ahead generation projects and all corresponding facility upgrades modeled, and with modeling active higher queued generation projects in the area, the power flow study found no overloads requiring mitigation on 66 kV or above facilities with the addition of the Project.
2. There are no new overloads created by the Project
3. There are no overloads aggravated by the Project
4. There are no buses identified with an increase of 0.1kA or more as a result of the new generation

**III. Facilities Study Assumptions**

- A. All required ISO metering equipment at the Generating Facility will be provided by the IC and is not included in the Facilities Study. The CAISO revenue meter requirements can be found in the California ISO Generator Interconnection Manual.
- B. Any required upgrades at facilities not owned by SCE are not included in the Facilities Study.
- C. For purposes of this study, the SCE owned interconnection substation will be referred to as [REDACTED]
- D. If the generation data cannot be obtained at the SCE [REDACTED] Substation [REDACTED] [REDACTED] at the generating facilities would also be needed to monitor generation data. The [REDACTED] to be installed at the Generating Facility will be installed by SCE and it is not included in the Facilities Study. An [REDACTED] will be installed at the SCE [REDACTED] Substation by SCE and it is included in the Facilities Study.
- E. IC shall install disconnect facilities in accordance with Section 5.11 of SCE's Interconnection Handbook in order to comply with SCE's switching and tagging procedures.
- F. The SCE [REDACTED] Substation will be constructed adjacent to the existing [REDACTED]
- G. Engineering and construction of the SCE [REDACTED] Substation will be completed by the IC and is not included in the Facilities Study.
- H. IC will install control cables as needed between the [REDACTED] [REDACTED] for protection and SCADA requirements.
- I. IC's [REDACTED] side is ungrounded.
- J. The existing customer at [REDACTED] agrees to the substation being removed.

**IV. Facilities Study Scope and Cost Estimate**

Pursuant to FERC's orders 2006-A (Small Generators) all Facilities Studies are required to provide the IC with its "maximum possible funding exposure", which shall include the costs of upgrades that are reasonably allocable to the Interconnection IC at the time the estimate is made, and the costs of any upgrades not yet constructed that were assumed in the

[REDACTED]  
[REDACTED]  
FACILITIES STUDY

interconnection studies for the Interconnection IC but are, at the time of the estimate, an obligation of an entity other than the Interconnection IC.

To comply with the FERC orders, the Scope of Work and Cost Estimate for all elements required for the interconnection are presented for the following two cases:

**CASE A: All facilities required exclusively by the Project**

And

**CASE B: All additional facilities that may be required by the Project**

The facilities included on Case B are those additional facilities required to remedy situations caused by earlier Projects, placed ahead of the Project in the Application Queue, and are expected to be implemented by them.

However, in the event that any of these earlier Projects withdraws or modifies their application in accordance with applicable tariff allowances, the Project may become responsible for any or all of these additional facilities.

#### **IV – A Facilities Study Scope**

##### **Option 1 – Loop Substation**

Install a [REDACTED] line to form the [REDACTED] and provide one point of service to the Project. For the purpose of this study, the new [REDACTED] will be referred to as [REDACTED]

IC will design and install a new substation to SCE's standards. SCE will own, operate and maintain the new [REDACTED]

IC will design, install, own, operate and maintain any section of new [REDACTED] between the point of change of ownership and the IC owned [REDACTED]

##### **CASE A: INTERCONNECTION FACILITIES:**

###### **Transmission:**

Install [REDACTED] between the last IC structure and the substation [REDACTED] at the [REDACTED]

###### **Wellhead Substation:**

Install [REDACTED] to the IC's generator. Install [REDACTED] for ground fault detection. Station One Line and Plot Plan Diagram are attached for reference as Exhibit B.

SCE will:

1. Review the complete engineering and design drawings, and bill of materials submitted by IC to verify compliance with SCE's engineering and design standards;
2. Inspect the site during construction to verify compliance with SCE's materials and construction standards;

3. Test [REDACTED] prior to energization.

Protection Relays as follows:

Gen-Tie 66 kV (to IC)

- Install [REDACTED] for overcurrent protection.
- Install [REDACTED] for overcurrent protection.

### **Metering Services Organization**

Install revenue meters required to meter the retail load at the generating facility. The IC will provide the required metering equipment (voltage and current transformers and metering cabinet).

### **DISTRIBUTION FACILITIES:**

#### **Wellhead Substation:**

Install [REDACTED]

[REDACTED] Station One Line and Plot Plan Diagram are attached for reference as Exhibit B.

SCE will:

1. Review the complete engineering and design drawings, and bill of materials submitted by IC to verify compliance with SCE's engineering and design standards;
2. Inspect the site during construction to verify compliance with SCE's materials and construction standards;
3. Test [REDACTED] prior to energization.

[REDACTED] as follows:

- Install [REDACTED] or its equivalent successor, for line differential protection.
- Install [REDACTED] or its equivalent successor, for directional overcurrent protection.

- Install [REDACTED] or its equivalent successor, for line differential protection.
- Install [REDACTED] or its equivalent successor, for directional overcurrent protection.

#### **Colton Cement Substation:**

Replace the existing [REDACTED] with [REDACTED] or its equivalent successor, for line differential protection and [REDACTED] or its equivalent successor, for directional overcurrent protection.

#### **Fibre Substation:**

Replace the existing [REDACTED] with one [REDACTED] or its equivalent successor, for line differential protection.

**Vista Substation:**

Replace the existing [REDACTED] with [REDACTED] or its equivalent successor, for line differential protection and [REDACTED] or its equivalent successor, for directional overcurrent protection.

**Transmission:**

Install [REDACTED] to loop the [REDACTED] and connect to the new [REDACTED] to form the [REDACTED]

**Power Systems Control:**

In order to maintain the integrity and the reliability of our system, a full size [REDACTED] is required at [REDACTED] to monitor the [REDACTED] MW, MVAR, phase amps, [REDACTED] status/control and generation data such as [REDACTED] net MW, net MVAR, kV, CB status, units MW, MVAR, terminal voltage, auxiliary load MW, MVAR and relay protection status alarm. If the generation data cannot be obtained at the [REDACTED] a second [REDACTED] will need to be installed at the Project generating facility to monitor the generation data.

**Telecommunication:**

Install approximately [REDACTED] [REDACTED] Vista, Colton Cement, Fibre and [REDACTED] to support protection requirements. Install [REDACTED] and associated equipment at Vista, Colton Cement, Fibre and [REDACTED]

NOTE: Possible pole replacement costs due to the addition of the fiber optic cable are not included.

**Environmental Health and Safety**

**Licensing**

**Real Properties**

Perform all required activities related to the SCE distribution portion of the [REDACTED] including substation, transmission and telecom elements. Review the IC's environmental documents related to the interconnection and distribution facilities to verify compliance with SCE's standards and/or provide support for potential licensing requirements by the California Public Utilities Commission (CPUC).

NOTE: Environmental activities and the support for potential permits and/or CPUC licensing requirements for the interconnection facilities scope of work are contingent on final Engineering and Design and ultimate licensing requirements of the Project, and therefore are not available for inclusion into this addendum. These costs will be part of the true-up costs of the Project.

**Option 2 – Tap Substation**

Remove Fibre Substation and install a [REDACTED] to tap the [REDACTED] and provide one point of service to the Project. For the purpose of this study, the new [REDACTED] will be referred to as [REDACTED]

[REDACTED]  
[REDACTED]  
FACILITIES STUDY

IC will design and install a new substation to SCE's standards. SCE will own, operate and maintain the new SCE [REDACTED] tap substation and the [REDACTED]

IC will design, install, own, operate and maintain any section of new [REDACTED] the point of change of ownership and the IC owned [REDACTED]

**CASE A:  
INTERCONNECTION FACILITIES:**

**Transmission:**

Install [REDACTED]  
[REDACTED] between the last IC structure and the substation [REDACTED]  
[REDACTED] at the [REDACTED]

**Wellhead Substation:**

Install [REDACTED] to the IC's generator. Install [REDACTED]  
[REDACTED] for ground fault detection. Install one [REDACTED] substation with one  
[REDACTED] Station One  
Line and Plot Plan Diagram are attached for reference as Exhibit B.

SCE will:

1. Review the complete engineering and design drawings, and bill of materials submitted by IC to verify compliance with SCE's engineering and design standards;
2. Inspect the site during construction to verify compliance with SCE's materials and construction standards;
3. Test [REDACTED] prior to energization.

[REDACTED] as follows:

- [REDACTED]  
[REDACTED] or its equivalent successor, for line differential protection.
- [REDACTED] or its equivalent successor, for directional overcurrent protection.
- [REDACTED]  
[REDACTED] or its equivalent successor, for overcurrent protection.
- [REDACTED] or its equivalent successor, for overcurrent protection.

**Power Systems Control:**

In order to maintain the integrity and the reliability of our system, a full size [REDACTED]  
[REDACTED]s required at [REDACTED] to monitor the [REDACTED] MW,  
MVAR, phase amps, [REDACTED] status/control and generation data such as [REDACTED]  
net MW, net MVAR, kV, CB status, units MW, MVAR, terminal voltage, auxiliary load MW,  
MVAR and relay protection status alarm. If the generation data cannot be obtained at the  
[REDACTED] a second [REDACTED] will need to be installed at the Project generating  
facility to monitor the generation data.

**Metering Services Organization**



[REDACTED]  
[REDACTED]  
FACILITIES STUDY

Install [REDACTED] required to meter the retail load at the generating facility. The IC will provide the required metering equipment (voltage and current transformers and metering cabinet).

**Transmission:**

Install [REDACTED] and connect to the new [REDACTED] to form the [REDACTED]. To support the removal of Fibre Substation, remove [REDACTED].

**Environmental Health and Safety**

**Licensing**

**Real Properties**

Perform all required activities related to the SCE portion of the [REDACTED] Project including substation, and transmission elements. Review the IC's environmental documents related to the interconnection and distribution facilities to verify compliance with SCE's standards and/or provide support for potential licensing requirements by the California Public Utilities Commission (CPUC).

**NOTE:** Environmental activities and the support for potential permits and/or CPUC licensing requirements for the interconnection facilities scope of work are contingent on final Engineering and Design and ultimate licensing requirements of the Project, and therefore are not available for inclusion into this addendum. These costs will be part of the true-up costs of the Project.

**DISTRIBUTION FACILITIES:**

**Colton Cement Substation:**

Replace the existing [REDACTED] with [REDACTED] or its equivalent successor, for line differential protection and [REDACTED] or its equivalent successor, for directional overcurrent protection.

**Fibre Substation:**

Move the existing customer to distribution service by installing a 1 [REDACTED]. [REDACTED] Remove all above ground equipment including [REDACTED].

**Vista Substation:**

Replace the existing [REDACTED] or its equivalent successor, for line differential protection and [REDACTED] or its equivalent successor, for directional overcurrent protection.

**Telecommunication:**

Install approximately [REDACTED] [REDACTED] Vista, Colton Cement, and Wellhead Substations to support protection requirements. Install [REDACTED] associated equipment at Vista, Colton Cement, and [REDACTED].

[REDACTED]  
[REDACTED]  
**FACILITIES STUDY**

NOTE: Possible pole replacement costs due to the addition of the fiber optic cable are not included.

**Environmental Health and Safety**

**Licensing**

**Real Properties**

Perform all required activities related to the SCE portion of the [REDACTED] including substation, transmission and telecom elements. For deed to interconnect facilities and interconnection facilities located on the IC's property, review the IC's environmental documents related to the interconnection facilities to verify compliance with SCE's standards and/or provide support for potential licensing requirements by the California Public Utilities Commission (CPUC).

NOTE: Environmental activities and the support for potential permits and/or CPUC licensing requirements for the interconnection facilities scope of work are contingent on final Engineering and Design and ultimate licensing requirements of the Project, and therefore are not available for inclusion into this addendum. These costs will be part of the true-up costs of the Project.

**Circuit Breakers Evaluation (queue order):**

The engineering study evaluated the circuit breakers short circuit capability at all locations where the Three-Phase and/or Single Phase to Ground SCD's were increased by 0.1kA or more as a result of the Project.

The study concluded that no CBs at were impacted by the project.

**FOR ADDITIONAL DETAIL REFER TO THE FOLLOWING EXHIBIT:**

- EXHIBIT B: [REDACTED] ONE LINE AND PLOT PLAN

**IV – B Facilities Study Cost Estimate**

**CASE A** Identifies the cost of all facilities that are required exclusively by the Project.

**CASE B** Identifies the cost of all upgrades required that were triggered by earlier Applicants placed ahead of the Project in the Application Queue.

In the event that any Applicant, presently placed ahead of the Project in the Application Queue, withdraws its Application, the system would need to be re-evaluated. The new evaluation may conclude that the Project would now trigger any of these upgrades and would then become responsible for some or all of the upgrades identified on Case B.

The total estimated cost of all elements of the interconnection as identified above in the Facilities Study Scope is as follows:

Option 1 – Loop Substation

CASE A:	\$ 8,710,915
CASE B (May be added to Case A):	<u>\$ 0</u>
POSSIBLE MAXIMUM COST EXPOSURE:	\$ 8,710,915

Option 2 – Tap Substation

[REDACTED]  
[REDACTED]  
FACILITIES STUDY

CASE A:	\$ 7,193,078
CASE B (May be added to Case A):	\$ 0
POSSIBLE MAXIMUM COST EXPOSURE:	\$ 7,193,078

**SEE EXHIBIT C: COST SUMMARY**

**V. Conclusions**

- A. For option 1 – loop substation, the estimated cost for the Interconnection is approximately \$8,710,915 for Case A with the potential additional cost of \$0 for Case B for a total Maximum Cost Exposure of \$8,710,915.  
For option 2 – tap substation, the estimated cost for the Interconnection is approximately \$7,193,078 for Case A with the potential additional cost of \$0 for Case B for a total Maximum Cost Exposure of \$7,193,078.
- B. The time required to complete the proposed project will be approximately 27 months for option 1 – loop substation and 27 to 32 months for option 2 – tap substation after receiving project authorization and funding. This time includes engineering, material procurement and construction. This timeframe is subject to final verification by SCE of available resources at the time of the Project. The timeframe assumes a complete description of SCE's upgrades needed to support the Project are included in the IC's environmental documents.  
**A detailed Project Schedule will be provided during the Engineering and Design Phase of the Project.**
- C. The costs indicated in the attached tables are shown 2014 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.
- D. The estimated Project Cost will be reconciled to actual costs upon closure of the subject work orders. The necessary billing adjustments will be made at that time.
- E. 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.
- F. the IC will be required to adhere to all applicable WECC policies including, but not limited to, the WECC Generating Unit Model Validation Policy. For example, the IC will be required to provide validated dynamic models for the proposed project within the timelines identified in the WECC policy. The latest policy is available on the WECC website at [www.wecc.biz](http://www.wecc.biz) .