

California Energy Commission

DOCKETED

09-AFC-7C

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California Energy Commission
Dockets Unit
1516 Ninth Street
Sacramento, CA 95814-5512

**Subject: ADDITIONAL TRANSMISSION SYSTEM ENGINEERING
INFORMATION RELATED TO SCE'S RED BLUFF SUBSTATION
PALEN SOLAR ELECTRIC GENERATING SYSTEM
DOCKET NO. (09-AFC-7C)**

Enclosed for filing with the California Energy Commission is the electronic version of the **ADDITIONAL TRANSMISSION SYSTEM ENGINEERING INFORMATION RELATED TO SCE'S RED BLUFF SUBSTATION**, for the Palen Solar Electric Generating System (09-AFC-7C).

Sincerely,



Marie Fleming

N: 2199750.5839
E: 6846205.2071

WESTERN PERIMETER WALL

495.89'

REFERENCE LINE
N77°26'18"W



* REVISE ON AUTOCAD SYSTEM ONLY *



RED BLUFF SUBSTATION
POSITION 2
NORTHING AND EASTING

Palen SEGS related Major Equipment at Red Bluff Substation

1. Participating TO's Interconnection Facilities.

A. Generation Tie-Line:

- Install one 220kV dead end structure, two (exact number to be specified by SCE based on planned configuration) spans of conductors, OPGW, and twelve (exact number to be specified by SCE based on planned configuration) dead end insulator / hardware assemblies between the Interconnection Customer-owned Last Structure and the substation dead-end rack at the Red Bluff 220kV switchyard.

B. Red Bluff Substation:

Install the following facilities to terminate the new 220 kV Generation Tie-Line:

- One dead-end structure (60 feet high x 50 feet wide) – exact dimensions may be changed by SCE
- One dedicated double breaker position
- Three 220kV coupling capacitor voltage transformers
- One GE L90 current differential relay with telecommunication channel to the Generating Facility via the 220kV Generation Tie-Line OPGW.
- One SEL 311L current differential relay with telecommunication channel to the Generating Facility via the 220kV Generating Tie-Line OPGW

C. Power System Control:

- Install one (1) RTU at the Generating Facility to monitor typical generation elements such as MW, MVAR, terminal voltage and circuit breaker status at each Electric Generating Unit as well as the plant auxiliary load. This information will be transmitted to the SCE Grid Control Center.

D. Telecommunications:

- Install all required light-wave, channel and related terminal equipment at the Generating Facility and Red Bluff Substation to support the RTU, SCADA and line protection relays for the Generation Tie-Line and SPS.
- Install underground vaults, risers, conduits, and cable as required at the Red Bluff Substation to complete all terminations.

2. Network Upgrades:

A. Participating TO's Reliability Network Upgrades: The Participating TO shall:

1. Terminate the Generation Tie-Line at Red Bluff Substation.
 - a. Red Bluff Substation
 - i. Install the following equipment for a dedicated 220kV double

Palen SEGS related Major Equipment at Red Bluff Substation

breaker line position on a breaker-and-a-half configuration to terminate the Generation Tie-Line:

- One 220kV 3000A – 50kA circuit breakers
 - Two 220kV 3000A – 80kA horizontal-mounted group-operated disconnect switches
 - One grounding switch attachment
 - Eighteen (exact number to be specified by SCE based on planned configuration) 220kV bus supports with associated steel pedestals
 - 2-1590 kcmil ACSR
 - One GE C60 breaker management relays inside existing Control Room
- ii. Power System Control – Expand the RTU at Red Bluff Substation to install additional points required for the Generation Tie-Line.
2. Loop the Colorado River-Devers No.2 500kV Transmission Line into Red Bluff Substation forming the new Devers-Red Bluff No.2 and Colorado River-Red Bluff No.2 500 kV transmission lines. The work requires the following:
- a. Transmission
- i. Install approximately one circuit mile of 2B-2156 kcmil ACSR and OPGW
 - ii. Install four (4) dead-end 500kV lattice steel structures
 - iii. Install thirty (30) insulator/hardware assemblies
- b. Red Bluff 500/220kV Substation
- i. Install two (2) new double breaker line positions within the 500 kV Switchyard to terminate the new Colorado River No. 2 and Devers No. 2 500 kV transmission lines
 - ii. Install the following protection relays in the control room
 - Four (4) GE C60 breaker management relays
 - Two (2) GE D60 distance relays (digital communication channel)
 - Two (2) GE L90 current differential relay (digital communication channel)
 - Two (2) SEL-421 current differential relay with RFL 9780 on Programmable Logic Controller Circuits (“PLCC”)
 - Two (2) additional RFL 9780 direct transfer trip on PLCC
 - Two (2) RFL 9745 direct transfer trip on PLCC
3. New SPS to trip generation under simultaneous outage of the Devers-Red Bluff No.1 and No.2 500 kV transmission lines.
- a. Devers Substation
- i. SPS Relays
 - Install two (2) N60 relays (one each for SPS A and SPS B) for line monitoring
 - Install one (1) SEL-2407 satellite synchronized clock

Palen SEGS related Major Equipment at Red Bluff Substation

- ii. Telecommunications – install two (2) channel banks (one each for SPS A and SPS B) to support the SPS
- iii. Power Systems Control – expand the RTU at Devers to install additional points required to support the SPS
- b. Red Bluff Substation
 - i. SPS Relays
 - Install two (2) N60 relays (one each for SPS A and SPS B) for line monitoring
 - Install one (1) SEL-2407 satellite synchronized clock
 - ii. Power Systems Control- expand the RTU at Red Bluff to install additional points required to support the SPS
- c. Colorado River Substation
 - i. SPS Relays
 - Install four (4) N60 relays (two each for SPS A and SPS B) for logic central processing and sending of tripping signals to generators
 - Install one (1) SEL-2407 satellite synchronized clock
 - ii. Power Systems Control – install dual RTUs for SPS arming, control, status and alarm indications at Colorado River Substation.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
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**PALEN SOLAR ELECTRIC
GENERATING SYSTEM AMENDMENT**

**Docket No. 09-AFC-7C
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(Revised 05/23/2013)**

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DECLARATION OF SERVICE

I, Marie Fleming, declare that on May 28, 2013, I served and filed copies of the attached **Additional Transmission System Engineering Information Related to SCE's Red Bluff Substation**, dated May 28, 2013. This document is accompanied by the most recent Proof of Service, which I copied from the web page for this project at: <http://www.energy.ca.gov/sitingcases/palen/compliance/>.

The document has been sent to the other persons on the Service List above in the following manner:

(Check one)

For service to all other parties and filing with the Docket Unit at the Energy Commission:

 X I e-mailed the document to all e-mail addresses on the Service List above and personally delivered it or deposited it in the U.S. mail with first class postage to those parties noted above as "hard copy required";
OR

 Instead of e-mailing the document, I personally delivered it or deposited it in the U.S. mail with first class postage to all of the persons on the Service List for whom a mailing address is given.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am over the age of 18 years.

Dated: May 28, 2013



Marie Fleming