

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA

In the Matter of the Application of  
SOUTHERN CALIFORNIA EDISON  
COMPANY (U338E) for a Permit to  
Construct Electrical Facilities: Eldorado  
Lugo Mohave Series Capacitor Project.

Application 18-05-007

**RESPONSE OF THE  
OFFICE OF RATEPAYER ADVOCATES TO  
SOUTHERN CALIFORNIA EDISON'S REPLY TO THE  
PROTEST OF THE OFFICE OF RATEPAYER ADVOCATES**

**I. INTRODUCTION**

Pursuant to the ALJ's July 3, 2018, ruling, the Office of Ratepayer Advocates (ORA) now files this response to Southern California Edison's ("SCE") reply to ORA's protest of SCE's proposed Eldorado Lugo Mohave ("ELM") project.

**II. BACKGROUND**

On June 1, 2018, protested SCE's proposed ELM project for the following reasons: (1) SCE's application did not comply with the Commission's General Order ("G.O") 131-D, and (2) SCE failed to meet its burden of proof demonstrating that the project is needed.

On June 11, 2018, SCE filed a reply to ORA's protest asserting that: (1) SCE's proposed series capacitors are the functional equivalent of substation facilities, (2) the modification of over 60 towers, including the raising of some by over 18 feet, constitutes minor modifications, and (3) the proposed fiber optic lines are a like-for-like replacement.

In this reply, ORA demonstrates that: (1) SCE’s proposed series capacitors are not functionally equivalent<sup>1</sup> to substation facilities, (2) SCE’s proposed fiber optic lines (approximately 235 miles) are not a like-for-like replacement and should not be treated as equivalent facilities, and (3) SCE’s proposal to modify over 60 towers, including raising some by over 18 feet, are major modifications, not minor as claimed by SCE.

### **III. SCE’S PROPOSED SERIES CAPACITORS ARE NOT FUNCTIONALLY EQUIVALENT TO SUBSTATION FACILITIES**

SCE asserts that the proposed series capacitor banks<sup>2</sup> are “functionally equivalent” to substation facilities.<sup>3</sup> That is simply not the case. An electric substation typically is an assembly of the following major electrical equipment:

- Electrical power transformers;
- Bus bars;
- Circuit breakers;
- Air switches;
- Conductors and insulators;
- Instrument transformer (current and voltage);
- Lightning arresters;
- Relays;
- Shunt reactor banks; and
- Control building.

The main functions of electric substation facilities are to step-up or step-down system voltages; regulate voltage to keep them within operating standards; switch electric lines in order to redistribute power to different loads; switch electric lines for routine maintenance; and provide relay protection of transformers, buses, and electric lines in the event of a problem.

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<sup>1</sup> On June 13, 2018, ORA sent a data request to SCE and asked that SCE provide a citation that defines the term “functionally equivalent” facilities and where it was used previously.

<sup>2</sup> A series capacitor bank is a set of capacitor units arranged in series within an enclosure.

<sup>3</sup> SCE’s Reply to ORA’s Protest, p. 3.

On the other hand, a series capacitor bank basically consists of three pieces of equipment:

- A number of individual capacitors mounted on an electrically insulated structure;
- Air switches; and
- Small control room.

The function of a series capacitor bank is to increase the transfer capability of transmission lines and provide transit control in the event of a power outage. A series capacitor bank does not perform the function(s) of any substation facility. In fact, a series capacitor bank's electrical performance is optimal when the bank is located at the mid-point of an electric line, not inside of a substation. However, in the 1960's, the bank's capacity was divided in half and the capacitors were installed inside the substations to improve security and to reduce costs.<sup>4</sup> Thus, while capacitor banks currently may be placed inside substations for security reasons, such placement does not and cannot result in the reclassification of series capacitor banks as substation facilities; nor does it make series capacitor banks "functionally equivalent" to any substation facility. (Please see the attached Declaration of Ken Lewis, registered electrical engineer, E9803).

### **III. SCE'S PROPOSED FIBER OPTIC LINES ARE NOT A LIKE-FOR-LIKE REPLACEMENT**

SCE asserts that replacing an overhead ground wire ("OHGW") with its proposed fiber optic lines ("optical ground wire" or "OPGW") are a like-for-like replacement.<sup>5</sup> This is an incorrect statement. An OHGW is a facility that serves the sole purpose of providing lightning protection and distributed grounding. An OPGW, on the other hand, contains optical fibers for telecommunication purposes

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<sup>4</sup> See attached Declaration of Ken Lewis.

<sup>5</sup> SCE's Reply to ORA's Protest, p. 4.

in addition to providing lightning protection and distributed grounding. This is clearly an upgrade of transmission facilities, not a like-for-like replacement.

#### **IV. SCE'S PLANS TO MODIFY OVER 60 TOWERS ARE MAJOR MODIFICATIONS**

SCE asserts that raising several 500kilovolt (“kV”) towers constitute minor vertical relocations.<sup>6</sup> Nothing could be further from the truth. The raising of at least nine 500kV towers by over 18 feet is neither minor, nor are they “vertical relocations”.<sup>7</sup> A relocation is the act of moving an object to a new location,<sup>8</sup> which is not the case here. These modifications are also not “minor.” SCE states in its Proponent’s Environmental Assessment (“PEA”) that existing towers range from 80 to 250 feet in height<sup>9</sup> and proposes raising 9 towers, some by at least 18.5 feet<sup>10</sup>. That is potentially a 7-23% change in height, at minimum, of several 500kV towers. This is not a minor modification.

Additionally, SCE lists 59 other modifications to 500kV towers,<sup>11</sup> while stating that “[m]odification of existing LSTs [lattice steel towers] typically involves raising towers.”<sup>12</sup> This is potentially raising the height of 59 towers. Since no further information is provided on these modifications, it is possible that SCE plans to make major modifications to these 59 towers.

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<sup>6</sup> *Id.*

<sup>7</sup> Note, SCE provides zero support for its “vertical relocation” argument with regards to raising the heights of numerous towers. SCE’s vertical relocation argument is akin to its unsupported argument that series capacitor banks are functionally equivalent to substations. Both are specious and should be rejected.

<sup>8</sup> Taken from the Merriam-Webster Dictionary: Relocate – “To move to a new location”.

<sup>9</sup> Eldorado-Lugo-Mohave Series Capacitor Project, Proponent’s Environmental Assessment (“ELM PEA”), p. 3-31.

<sup>10</sup> ELM PEA, p. 3-A-1, 3-A-2, and 3-A-3.

<sup>11</sup> ELM PEA, p. 3-77.

<sup>12</sup> ELM PEA, p. 3-75.

**V. ORA RECOMMENDATION**

ORA recommends that the Commission reject SCE’s ELM application without prejudice, allowing SCE to refile the application to comply with G.O. 131-D’s Certificate for Public Convenience and Necessity (“CPCN”) requirements. Alternatively, the Commission could change the Permit to Construct (“PTC”) application to a CPCN on its own volition and direct SCE to amend the application to comply with G.O. 131-D’s CPCN requirements. In addition, ORA recommends that the Commission adopt a procedural schedule that provides adequate time for discovery and analysis of the application.

Respectfully submitted,

/s/ NICHOLAS SHER

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Nicholas Sher

Attorney for the  
Office of Ratepayer Advocates

California Public Utilities Commission  
505 Van Ness Avenue  
San Francisco, CA 94102  
Telephone: (415) 703-4232  
E-mail: [nms@cpuc.ca.gov](mailto:nms@cpuc.ca.gov)

July 5, 2018

## **DECLARATION OF KEN LEWIS**

I, Ken Lewis, declare as follows:

1. I am a registered electrical engineer in the state of California (E9803) and am employed as an electrical engineer the Office of Ratepayer Advocates (ORA). My business address is 505 Van Ness Avenue, San Francisco, California.

2. I have 31 years of experience at Pacific Gas & Electric (PG&E) in the engineering and construction of electric substations (both transmission and distribution).

3. I also have 18 years of transmission project review experience at the California Public Utilities Commission (CPUC).

4. During the 1990's I was involved with the replacement of eleven 500 kV Series Capacitor Banks on the Pacific Intertie. This project replaced the original Series Capacitor Banks that were 30 Years old. The existing Banks were "fused" and were replaced with "fuseless" Banks.

5. In Southern California Edison Company's (SCE) reply to the Office of Ratepayer Advocates (ORA) protest, SCE states that a series capacitor bank is "functionally equivalent" to a substation facility. This is not correct.

6. An electric substation is an assembly of the following major electrical equipment:

- Electrical power transformers;
- Bus bars;
- Circuit breakers;
- Air switches;
- Conductors and insulators;
- Instrument transformer (current and voltage);
- Lightning arresters;
- Relays;
- Shunt reactor banks; and
- Control building.

7. The electrical equipment listed above allows the substation to change voltage levels up or down (step-up, step-down); to regulate voltage levels to keep them within

operating standards; to switch electric lines in order to reroute power; for relay protection of transformers, buses, and electric lines in the event of problems; and to switch electric lines or transformers out of service for maintenance.

8. A Series Capacitor Bank consists of the following equipment:

- A number of individual capacitors mounted on an electrically insulated structure;
- Air switches; and
- Small control room.

9. A series capacitor bank functions to provide voltage and system stability during an event such as a power outage.

10. A series capacitor bank helps increase the power flow capability of transmission lines and provides balance and/or control through multiple adjacent lines. (See, IEEE Standard P1726).

11. A series capacitor bank's electrical performance is optimum when the bank is located at the mid-point of an electric line.

12. Series capacitor banks do not have the same functionality as a substation facility.

13. For security and economic reasons when the 500 kV was engineered in the 1960's the banks capacity was divided in half and the capacitors were installed inside the two electric substations where the line terminated. (See also, "*Series Compensation on 400kV Transmission Line – A Few Design Aspects*", by R.N. Nayak, Y.K. Sehgal, and Subir Sen, National Power Systems Conference, NPSC 2004, section VIII, p. 210).

Executed under penalty of perjury under the laws of the State of California, on this 29th day of June, 2018, at San Francisco, California.

/s/ KENNETH LEWIS

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Kenneth Lewis  
Electrical Engineer, E9803  
Office of Ratepayer Advocates  
California Public Utilities Commission