BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

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In the Matter of the Application of SOUTHERN CALIFORNIA EDISON COMPANY (U 338-E) for a Permit to Construct Electrical Facilities With Voltages Between 50 kV and 200 kV: Banducci Substation Project	)))))	Application No. A1211011

APPLICATION OF SOUTHERN CALIFORNIA EDISON COMPANY (U-338-E) FOR A PERMIT TO CONSTRUCT ELECTRICAL FACILITIES WITH VOLTAGES BETWEEN 50 KV AND 200 KV: BANDUCCI SUBSTATION PROJECT

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Dated: **November 15, 2012**

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I.

INTRODUCTION

Pursuant to California Public Utilities Commission (Commission or CPUC), General Order 131-D (G.O. 131-D), Southern California Edison Company (SCE) respectfully submits this application (Application) for a permit to construct (PTC) authorizing SCE to construct the proposed project known as the Banducci Substation Project (Proposed Project). The Proposed Project consists of: (1) construction of a new unstaffed, automated, 56 megavolt ampere (MVA), low-profile 66/12 kV substation (with a potential capacity of 112 MVA at final build out) on approximately 6.3 acres in the unincorporated Cummings Valley area of Kern County; (2) looping the existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line into and out of the new substation, through the construction of two new 66 kV subtransmission line segments: the Banducci-Kern River 1 66 kV Subtransmission Line and Banducci-Correction-Cummings 66 kV Subtransmission Line; (3) construction of three new underground 12 kV

distribution getaways; and (4) installation of telecommunications facilities to connect the proposed Banducci Substation to SCE's existing telecommunications system.

II.

BACKGROUND AND SUMMARY OF REQUEST

The purpose of this Proposed Project is to provide additional capacity to serve the current and projected electrical demand for electricity, maintain system reliability, resolve anticipated service delivery voltage problems, and enhance reliability and system operational flexibility in the unincorporated Cummings Valley area of Kern County and the surrounding areas (Electrical Needs Area or ENA).

The ENA is located within the Antelope-Bailey 66 kV System and is bounded by Woodford-Tehachapi Road to the east, El Camino Drive to the north, Pacific Gas & Electric (PG&E) service territory to the west, and High Gun Drive to the south. The ENA's approximately 7,250 metered customers are currently served by Cummings 66/12 kV Substation, which is connected to the Antelope-Bailey 66 kV System through a network of 66 kV subtransmission lines. Cummings Substation is interconnected to the 66 kV system with Monolith 66/12 kV Substation to the east and Correction 66/12 kV Substation, which is a customer dedicated substation, to the west.

The amount of electrical load that can be served in the ENA is limited to the maximum amount of electrical power that Cummings Substation can deliver before exceeding its maximum operating limit. That limit is 24.4 MVA. Yet over the past five years, the area in and around the ENA has seen significant load growth of approximately 3 to 4 percent per year, with most of this growth occurring in the Bear Valley Springs and Stallion Springs communities. As a result, whereas in 2006 demand in the ENA was 21.8 MVA, based on historical growth trends and known residential and agricultural developments either under construction or planned to be constructed, SCE projects that by 2016, the 2012-2021 forecasted criteria peak demand of a 1-in-10 year heat storm in the ENA would be 24.6 MVA. This criteria projected electrical peak

demand is forecasted to exceed the maximum operating limit of 24.4 MVA of the transformers currently serving the ENA, thereby increasing the risks of service interruptions. Therefore, construction of a new substation is necessary to provide the additional capacity required to serve anticipated future electrical demand in the ENA.

The need to increase operating limit capacity and/or provide load relief at Cummings Substation is reflective of long-term growth in and around the ENA, and SCE has previously undertaken stopgap measures to accommodate the growth in demand without undertaking a new substation project. For example, the maximum operating limit of the transformers in Cummings substation was 19.5 MVA until late July of 2007, while the historical peak demand in the ENA grew to 21.8 MVA in 2006 and 23.6 MVA in 2007. To alleviate the risk of dropping load due to peak demand exceeding the maximum operating limit, in August 2007 SCE increased Cummings Substation's maximum operating limit from 19.5 MVA to 24.4 MVA by adding cooling fans to the existing single phase transformers.

In addition, in 2008, SCE further relieved Cummings Substation by transferring approximately 6.5 MVA of load to the existing Monolith 66/12 kV Substation located approximately 6.5 miles east of Cummings Substation. While load transfers are part of SCE's typical procedure to resolve distribution circuit and substation overloads during normal and abnormal operating conditions, reliability issues arise from longer distribution circuits which create difficulties in transferring load between distribution circuits and between distribution substations. As distribution circuits increase in length and the load on those circuits continues to grow, the delivery voltage to the end of the circuits decreases and exposure to outages increases, thereby resulting in reduced reliability to the customers served by those circuits. If the ability to transfer load is limited, the end result would be diminished operating capabilities and reduced reliability.

In the ENA, the existing 12 kV distribution circuits that exit Cummings Substation to serve the Bear Valley Springs and Stallion Springs communities are approximately 22 miles and 14 miles long, respectively. These circuits have very limited load transfer capability, and the

lengths of the circuits significantly exceed SCE's maximum preferred distribution circuit length for urban circuits of approximately three to five miles. In fact, the customers in the Bear Valley Springs and Stallion Springs communities have experienced outages due to excessive load at Cummings Substation in excess of the maximum operating limit in the past until SCE increased the maximum operating limit at Cummings Substation.[1] SCE has also implemented improvements on these 12 kV distribution circuits to correct low voltage problems. These improvements include the addition of circuit regulators used to boost circuit voltage, the addition of field capacitor banks to improve power factor, and the replacement of circuit conductors to reduce voltage drop.

Based on SCE's most recent 2012 – 2021 peak demand forecast however, even with these 12 kV circuit improvements in place, the projected electrical demand is still forecasted to exceed the maximum operating limit of 24.4 MVA of Cummings Substation by 2016. Yet with a planned operation date of June 2016, the Proposed Project would be able to accommodate the forecasted growth in demand by providing the needed additional capacity to serve the ENA. In addition, the Proposed Project would be located closer to the Bear Valley Springs and Stallion Springs communities, thus providing the additional benefit of shorter distribution circuits to serve these communities.

In sum, the Proposed Project is needed to ensure that safe and reliable electric service is available to meet customer electrical demand in the ENA. This would be accomplished by: (1) providing sufficient capacity to serve long-term forecasted electrical demand requirements in the Cummings Valley (including the Bear Valley Springs and Stallions Springs communities); (2)

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[1] On July 25, 2006, due to higher than expected load growth in the Stallion Springs and Bear Valley Springs communities, SCE had to initially drop approximately 3.6 MVA of load which resulted in approximately four rolling power outages for approximately one hour each time. These outages affected a significant number of customers in the Bear Valley Springs community area. On July 6, 2007, SCE had to once again drop approximately 4.6 MVA of load one time for the same reason which affected a number of customers in the Bear Valley Springs community area for approximately 45 minutes.

relieving Cummings Substation by transferring the load of Bear Valley Springs and Stallion Springs from Cummings Substation to the proposed Banducci Substation; (3) improving electrical reliability and operational flexibility in Cummings Valley and the western part of the greater Tehachapi area; and (4) alleviating the anticipated service delivery voltage problems as the forecasted demand in the Bear Valley Springs and Stallion Springs areas grows beyond what can be reliably served by the existing 12 kV distribution circuits from the existing Cummings Substation.

The estimated cost of the Banducci Substation Project is approximately $36.6 million in 2012 constant dollars.[2] A Proponent's Environmental Assessment (PEA) prepared for the Proposed Project is attached to this Application. The PEA will be referenced in this Application, where appropriate, as the source of the information required in an Application for a PTC[3] pursuant to G.O. 131-D, Section IX.B. A complete project description is located in Chapter 3 of the PEA. A statement of purpose and need is located in Chapter 1 of the PEA.

Construction of the Proposed Project is scheduled to begin in September 2015 and to be completed by June 2016. A schedule for the Proposed Project is included in this Application as Appendix C.

Upon completion of its review of this Application and preparation of an initial study, SCE requests that the Commission issue and certify an appropriate environmental document and issue a PTC authorizing SCE to construct the Proposed Project set forth in this Application and the attached PEA within the timelines set forth in Section III.H. of this Application.

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[2] This is a conceptual estimate, prepared in advance of final engineering and prior to CPUC approval. Pension and benefits, administrative and general expenses, and allowance for funds used during construction are not included in this estimate.

[3] Other required information for a PTC application (*e.g.* Balance Sheet, Articles of Incorporation, *etc*.) is contained in this Application or its appendices.

III.

STATUTORY AND PROCEDURAL REQUIREMENTS

A. Applicant

The applicant is Southern California Edison Company, an electric public utility company organized and existing under the laws of the State of California. SCE's principal place of business is 2244 Walnut Grove Avenue, Post Office Box 800, Rosemead, California 91770. Please address correspondence or communications in regard to this Application to:

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With a copy to:

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B. Articles of Incorporation

A copy of SCE's Restated Articles of Incorporation, as amended through June 1, 1993, and as presently in effect, certified by the California Secretary of State, was filed with the Commission on June 15, 1993, in connection with Application No. 93-06-022 [4] and is

[4] Application No. 93-06-22, filed June 15, 1993, regarding approval of a Self-Generation Deferral Agreement between Mobile Oil Corporation Torrance Refinery and Southern California Edison Company.

incorporated herein by reference; pursuant to Rule 2.2 of the Commission's Rules of Practice and Procedure.

C. Balance Sheet And Statement of Income

Appendix A to this Application contains copies of SCE's balance sheet and statement of income as of September 30, 2012. The balance sheet reflects SCE's utility plant at original cost, less accumulated depreciation.

Since 1954, pursuant to Commission Decision No. 49665 dated February 16, 1954, in Application No. 33952, as modified by Decision No. 91799 in 1980, SCE has utilized straightline remaining life depreciation for computing depreciation expense for accounting and ratemaking purposes in connection with its operations.

Pursuant to Commission Decision No. 59926, dated April 12, 1960, SCE uses accelerated depreciation for income tax purposes and "flows through" reductions in income tax to customers within the Commission's jurisdiction for property placed in service prior to 1981. Pursuant to Decision No. 93848 in OII-24, SCE uses the Accelerated Cost Recovery System (ACRS) for federal income tax purposes and "normalizes" reductions in income tax to customers for property placed in service after 1980 in compliance with the Economic Recovery Tax Act of 1981, and also in compliance with the Tax Reform Act of 1986. Pursuant to Decision No. 88-01-061, dated January 28, 1988, SCE uses a gross of tax interest rate in calculating the AFUDC Rate, and income tax normalization to account for the increased income tax expense occasioned by the Tax Relief Act of 1986 provisions requiring capitalization of interest during construction for income tax purposes.

D. Description of Southern California Edison Company

SCE is an investor-owned public utility engaged in the business of generating, transmitting, and distributing electric energy in portions of central and southern California. In addition to its properties in California, it owns, in some cases jointly with others, facilities in

Nevada, Arizona, and New Mexico, its share of which produces power and energy for the use of its customers in California. In conducting such business, SCE operates an interconnected and integrated electric utility system.

E. Service Territory

SCE's service territory is located in 15 counties in central and southern California, consisting of Fresno, Imperial, Inyo, Kern, Kings, Los Angeles, Madera, Mono, Orange, Riverside, San Bernardino, Tulare, Tuolumne[5], and Ventura Counties, and includes approximately 179 incorporated communities as well as outlying rural territories. A list of the counties and municipalities served by SCE is attached hereto as Appendix B. SCE also supplies electricity to certain customers for resale under tariffs filed with the Federal Energy Regulatory Commission.

F. Location of Items Required In A Permit To Construct Pursuant To G.O. 131-D, Section IX.B

Much of the information required to be included in a PTC application pursuant to G.O. 131-D, Section IX.B is found in the PEA.

Required PTC application information has been cross-referenced to the PEA in the following text. The PTC application requirements of G.O. 131-D, Section IX.B are in ***bold italics***, and the PEA references follow in plain text.

a. A description of the proposed power line or substation facilities, including the proposed power line route; proposed power line equipment, such as tower design and appearance, heights, conductor sizes, voltages, capacities, substations, switchyards, etc., and a proposed schedule for authorization, construction, and commencement of operation of the facilities.

- Descriptions of the Proposed Project are found in the Executive Summary, Chapter 1, Chapter 2, Chapter 3, and throughout Chapter 4.

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[5] SCE provides electric service to a small number of customer accounts in Tuolumne County and is not subject to franchise requirements.

- The substation site is described in Section 3.1.1 ("Substation Description") and illustrated in Figures 1.1 ("Proposed Project Location"), 1.2 ("Electrical Needs Area and Substation Study Area"), 3.1 ("Proposed Banducci Substation Layout"), and 4.4-1 ("Project Location").

- The physical characteristics of the Proposed Project are described and illustrated in Section 3.1 ("Proposed Project Components"), including sections 3.1.1 ("Substation Description"), 3.1.2 ("Distribution Getaways"), and 3.1.4 ("Telecommunications Description") and Figures 3.1 ("Proposed Banducci Substation Layout"), 3.2 ("Typical Distribution Vault"), and 3.3 ("Typical Duct Bank"). The physical characteristics and routes of the 66 kV subtransmission lines and relevant structures are described and illustrated in Section 3.1.3 ("Subtransmission Line Description"), including Subsections 3.1.3.1 ("66 kV Subtransmission Line Route Description"), 3.1.3.2 ("66 KV Subtransmission Pole Descriptions"), and Figures 3.4 ("Subtransmission Source Line Route Description"), 3.5 ("Subtransmission Structures"), and 3.6 ("Proposed Telecommunication Routes").

- The proposed Project Schedule is discussed in Section 3.12 and attached to this Application as Appendix C.

b. A map of the proposed power line routing or substation location showing populated areas, parks, recreational areas, scenic areas, and existing electrical transmission or power lines within 300 feet of the proposed route or substation.

- Regional (Figures 1.1 ("Proposed Project Location") and 4.4-1 ("Project Location")) and Proposed Project area (Figures 1.2 ("Electrical Needs Area and Substation Study Area"), 3.1 ("Proposed Banducci Substation Layout"), 3.4 ("Subtransmission Source Line Route Description"), 3.6 ("Proposed Telecommunication Routes"), 3.7 ("Potential Staging Areas"), 4.4-2 (a-c) ("Topography"), 4.4-3 (a-j) ("Soils"), 4.4-4 (a-j) ("Vegetation"), 4.10-1 ("General Plan Land Uses"), 4.10-2 ("Kern County Zoning"), 4.14-1 ("Public Services in the Proposed Project Vicinity"), 4.15-1A ("Recreation Resources in the Proposed Project Vicinity"), 4.15-1B ("Parks and Open Spaces"), 4.16-1 ("Average Daily Traffic Locations")) maps and aerial photographs showing existing features, including land uses and populated areas, are provided in the PEA.

- Maps of current land uses, including designation of parks, recreational, and scenic areas are provided as Figures 4.1-1A ("Existing Context Photo and Key Observation Point Locations"), 4.1-1B ("Existing Context Photo Locations"), 4.10-1 ("General Plan Land Uses"), 4.10-2 ("Kern County Zoning") and 4.14-1 ("Public Services in the Proposed Project Vicinity"), 4.15-1A ("Recreation Resources in the Proposed Project Vicinity"), 4.15-1B ("Parks and Open Spaces").

- Maps of the substation location are provided at Figures 1.1 ("Proposed Project Location"), 1.2 ("Electrical Needs Area and Substation Study Area"), 3.1 ("Proposed Banducci Substation Layout"), 3.4 ("Subtransmission Source Line Route Description"), 4.4-1 ("Project Location"), and maps of proposed power line route and telecommunication cable route, and proximity to existing electrical transmission and power lines are provided at Figures 3.4 ("Subtransmission Source Line Route Description"), 3.6 ("Proposed Telecommunication Routes"), 4.4-1 ("Project Location"), 4.4-2 (a–c) ("Topography"), 4.4-3 (a–j) ("Soils"), and 4.4-4 (a–j) ("Vegetation").

c. Reasons for adoption of the power line route or substation location selected, including comparison with alternative routes or locations, including the advantages and disadvantages of each.

- Reasons for the adoption of the site for the proposed substation and 66 kV subtransmission lines, including the infeasibility and additional environmental impacts associated with alternative sites, are discussed in Sections 2.1 ("Substation Site and Subtransmission Line Route Evaluation Methodology") and 5.0 ("Comparison Of Alternatives"). As discussed therein, no alternative substation site or route locations could reasonably be expected to allow for development of the Proposed Project as feasibly as the proposed site while also reducing environmental impacts, especially because the substation site selected as preferred would be adjacent to the existing subtransmission lines that would be looped into and out of the new substation.

- One alternative substation site was analyzed in the PEA because it could be viewed as providing a reasonable alternative to the location selected for the Proposed Project. However, the alternative substation site studied in the PEA has been developed and currently is the location of an existing house and appurtenant structures associated with its current use as an office. Construction of a substation at the alternative site would require additional work, including but not limited to demolition of these existing developed features. That additional work would be expected to cause additional environmental impacts in areas such as aesthetics, air quality, greenhouse gas emissions, hazards and hazardous materials, and noise. Although the alternative substation site would not require the conversion of Prime Farmland as would the proposed substation site, overall, the substation site selected for the Proposed Project is expected to result in fewer overall environmental impacts when compared to the alternative site.

- In addition, 26 other substation sites were analyzed and eliminated from further consideration in the PEA because they failed to meet basic project objectives, would not be feasible, or would not avoid or substantially reduce potential environmental effects of the Proposed Project.

d. A listing of the governmental agencies with which proposed power line route or substation location reviews have been undertaken, including a written agency response to applicant's written request for a brief position statement by that agency. (Such listing shall include The Native American Heritage Commission, which shall constitute notice on California Indian Reservation Tribal governments.) In the absence of a written agency position

statement, the utility may submit a statement of its understanding of the position of such agencies.

- SCE met with representatives from the County of Kern multiple times over the last several years (September 2010, April 2011, March 2012, July 2012, September 2012, October 2012), including the Honorable Zack Scrivner, Supervisor from the Second District, in whose district the Banducci Substation property is located. Proposed Project information, including the proposed location of the Banducci Substation and the alternative substation site, was presented and discussed. SCE believes the position of the County of Kern to be favorable towards the Proposed Project.[6]

- SCE met with representatives from the City of Tehachapi to provide an initial briefing about the project in September 2010 and an update in May 2011). These representatives included Mayor Vernon, Councilman Grimes, and other members of city staff.[7] Proposed Project information, including the proposed location of the Banducci Substation and the alternative substation site was presented and discussed. SCE understands the position of the City to be favorable towards the Proposed Project.

- SCE also communicated with representatives from the Stallion Springs and Bear Valley Springs Community Services Districts (CSD)[8] regarding the Proposed Project on several occasions. Initial briefings were conducted in March 2011. A pre-application filing update was provided in October 2012. SCE believes the position of the Community Services Districts to be favorable towards the Proposed Project.

- In 2011, SCE requested the Native American Heritage Commission (NAHC) conduct a records search of the Sacred Lands File for cultural resources that may be affected by the Proposed Project. The Sacred Lands File search revealed that no Native American cultural resources were identified within the Proposed Project Area. The NAHC suggested that SCE consult with Native American tribes and communities and Native American individuals who hold special interest in the Proposed Project Study Area and provided a list of those individuals (*See* PEA at pp. 4.5-12, 4.5-18 (referencing Singleton, D. (2011) *Sacred Lands File Search and Native American Contacts List for the "Proposed Banducci Substation Project;" Located in Tehachapi, Kern County, California*), attached to the PEA in Appendix F: Agency Consultations. SCE sent a certified letter on July 9, 2011, to the 11 Tribal entities and individuals on the NAHC list. (*See* PEA at 4.5-12, 4.5-18 (referencing Morgan, K.M. (2011) Letter Re: Proposed

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[6] In addition to meeting with Supervisors McQuiston and Scrivner, SCE met with the John Nilon, County CAO and Lorelei Oviatt, Planning and Community Development Director.

[7] In addition to the Mayor and Councilman, SCE met with Greg Garrett (Tehachapi City Manager), Chris Kirk (Tehachapi Assistant City Manager), Dennis Wahlstrom (Tehachapi Public Works Director), John Curry (Tehachapi Utility Director), and David James (Tehachapi Economic Development Director).

[8] SCE met with the Mary Beth Garrison, General Manager of Stallion Springs CSD, and John Yeakley and Sandy Janzen, Former General Manager and Interim General Manager, respectively, of Bear Valley Springs CSD.

Banducci Substation Project, August 17, 2011) attached to the PEA in Appendix F: Agency Consultations. The letter described the Proposed Project, cultural resource survey, and background research completed at that time and encouraged participation in the project review process to enhance preservation of sacred lands or resources that might be present within the Proposed Project's area of potential effect. Only the Tejon Indian Tribe responded via letter to SCE's July 9, 2011 letter, stating that the "Tejon Indian Tribe has no conflict with this project nor do we know of any cultural resources that might be impacted at this site." The Tejon Indian Tribe asked to be notified should any sites or artifacts be discovered during the Project (referencing Morgan, K.M. dated August 17, 2011). Additional follow-up letters and correspondence were sent on April 4, 2012 to the same 11 tribal entities and individuals, providing updated information regarding the cultural surveys performed since the initial letter. Only the Tubatulabal Tribe (referencing Begay, D. e-mail dated April 5, 2012) and the Tejon Indian Tribe (referencing Morgan, K.M. letter dated April 13, 2012) responded. The Tubatulabal Tribe noted "Our Tribe does not have any concerns for this project site" and the Tejon Indian Tribe noted again that it "has no conflict with this project…."[9] In June 2012, phone calls were made to those Tribal entities and individuals that had not responded. Three additional comments were received via phone. No Native American entities or community members called had any objections to the construction of the Proposed Project. One person contacted expressed general concerns that cultural resources may be impacted by such projects, going on to state that cultural surveys of the Proposed Project area should be conducted and that tribal monitoring during construction should be conducted by appropriately trained people.

e. A PEA or equivalent information on the environmental impact of the project in accordance with the provisions of CEQA and this Commission's Rules of Practice and Procedure Rule 2.4 [formerly 17.1 and 17.3]. If a PEA is filed, it may include the data described in Items a. through d. above.

- A PEA is attached to this Application.

G. Compliance With G.O. 131-D, Section X

G.O. 131-D, Section X, requires applications for a PTC to describe measures taken to reduce potential exposure to electric and magnetic fields (EMF) generated by the proposed facilities. A complete description of EMF-related issues is contained in SCE's EMF Field Management Plan for the Proposed Project, which is attached as Appendix F to this Application.

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[9] Correspondence to and from the various Native American tribes is contained within Appendix F, including: Begay, D. (2012). Email Re: Proposed Banducci Substation Project. April 5, 2012; Morgan, K. M. (2011). Letter Re: Proposed Banducci Substation Project. August 17, 2011; and Morgan, K. M. (2012). Letter Re: Proposed Banducci Substation Project. April 13, 2012.

H. Compliance With Rule 2.1(c)

In compliance with Rule 2.1(c) of the Commission's Rules of Practice and Procedure (California Code of Regulations, Title 20), SCE is required to state in this Application "[t]he proposed category for the proceeding, the need for hearing, the issues to be considered, and a proposed schedule." SCE proposes to categorize this Application as a rate-setting proceeding. SCE anticipates that a hearing will not be necessary. This proceeding involves the Commission's: (1) environmental review of the Proposed Project in compliance with the California Environmental Quality Act (CEQA) (Public Resources Code § 21000 *et seq*.) and the Commission's G.O. 131-D; and (2) issuance of a PTC authorizing SCE to construct the Proposed Project.

SCE suggests the following proposed schedule for this Application:

Date	Event
November 2012	Application filed
December 2012	Application accepted as complete
January 2013	Initial Study issued
December 2013	Draft CEQA document (Negative Declaration, Mitigated Negative Declaration or EIR) circulated for public comment
March 2014	Final CEQA document issued
May 2014	Proposed Commission Decision issued
May 2014	Final CEQA document certified
July 2014	Final Commission Decision issued

I. Statutory Authority

This Application is made pursuant to the provisions of CEQA, G.O. 131-D, the Commission's Rules of Practice and Procedure, and prior orders and resolutions of the Commission.

J. Public Notice

Pursuant to G.O. 131-D, Section XI.A, notice of this Application shall be given: (1) to certain public agencies and legislative bodies; (2) to owners of property located on or within 300 feet of the project area; (3) by advertisement in a newspaper or newspapers of general circulation; and (4) by posting a notice on-site and off-site at the project location. SCE has given, or will give, proper notice within the time limits prescribed in G.O. 131- D. A copy of the Notice of Application for a Permit to Construct and list of newspapers which will publish the notice are contained in Appendix D. A copy of the Certificate of Service of Notice of Application for a Permit to Construct and a service list are contained in Appendix E.

K. Supporting Appendices And Attachment

Appendices A through F and the attached PEA listed below are made a part of this Application:

- Appendix A: Balance Sheet and Statement of Income as of September 30, 2010.
- Appendix B: List of Counties and Municipalities Served by SCE
- Appendix C: Banducci Substation Project Schedule
- Appendix D: Notice of Application for a Permit to Construct
- Appendix E: Certificate of Service of Notice of Application for a Permit to Construct
- Appendix F: Field Management Plan
- Attachment: Proponent's Environmental Assessment

L. Compliance With Rule 2.5

In accordance with Rule 2.5 of the Commission's Rules of Practice and Procedure, SCE is enclosing a deposit to be applied to the costs the Commission incurs to prepare a negative declaration or an environmental impact report for the Proposed Project.

M. Request For Ex Parte Relief

SCE requests that the relief requested in this Application be provided *ex parte* as provided for in G.O. 131-D, Section IX.B.6.

N. Request For Timely Relief

SCE requests the Commission to issue a decision within the time limits prescribed by Government Code Section 65920 *et seq*. (the Permit Streamlining Act) as provided for in G.O. 131-D, Section IX.B.6.

Moreover, as addressed in the same subsection of G.O. 131-D, SCE requests that the Commission refrain from assigning an ALJ to this proceeding, unless a valid protest is received by the Commission, and in the absence of any valid protest allow the Energy Division to process this Application.[10]

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[10] D.95-08-038, Appendix A, p. 25.

IV.

CONCLUSION

SCE respectfully requests the Commission to issue a PTC authorizing SCE to construct the Banducci Substation Project described in this Application and the attached PEA. SCE further requests that the relief be provided *ex parte* and within the time limits prescribed by the Permit Streamlining Act.

Respectfully submitted,

SOUTHERN CALIFORNIA EDISON COMPANY

/s/ Paul L. Multari

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Telephone: (626) 302-6634
Facsimile: (626) 302-1926
E-mail: tammy.jones@sce.com

November 15, 2012

VERIFICATION

I am an officer of the applicant corporation herein, and am authorized to make this verification on its behalf. I am informed and believe that the matters stated in the foregoing document are true.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 15th day of November, 2012, at Brea, California.

/s/ Paul L. Multari

By: Paul L. Multari
Vice President, Major Projects
SOUTHERN CALIFORNIA EDISON COMPANY
Telephone: (714) 255 - 4894

APPENDIX A: BALANCE SHEET AND STATEMENT OF INCOME AS OF SEPTEMBER 30, 2012

SOUTHERN CALIFORNIA EDISON COMPANY

BALANCE SHEET

SEPTEMBER 30, 2012

A S S E T S

(Unaudited)

(Millions of Dollars)

UTILITY PLANT:	
Utility plant, at original cost	$31,968
Less - Accumulated depreciation	(7,378)
	24,590
Construction work in progress	4,110
Nuclear fuel, at amortized cost	614
	29,314
OTHER PROPERTY AND INVESTMENTS:	
Nonutility property - less accumulated depreciation of $115	71
Nuclear decommissioning trusts	3,997
Other Investments	112
	4,180
CURRENT ASSETS:	
Cash and cash equivalents	90
Receivables, less allowances of $75 for uncollectible accounts	1,067
Accrued unbilled revenue	787
Inventory	338
Prepaid taxes	48
Derivative assets	37
Regulatory assets	270
Deferred income taxes	170
Other current assets	110
	2,917
DEFERRED CHARGES:	
Regulatory assets	6,068
Derivative assets	74
Other long-term assets	506
	6,648
	$43,059

Appendix B: LIST OF COUNTIES AND MUNICIPALITIES

Citizens or some of the citizens of the following counties and municipal corporations will or may be affected by the changes in rates proposed herein.

COUNTIES

Fresno	Kings	Orange	Tuolumne*
Imperial	Los Angeles	Riverside	Tulare
Inyo	Madera	San Bernardino	Ventura
Kern	Mono	Santa Barbara	

MUNICIPAL CORPORATIONS

Adelanto	Covina	Jurupa Valley	Norco	Santa Clarita
Agoura Hills	Cudahy	La Canada Flintridge	Norwalk	Santa Fe Springs
Alhambra	Culver City	La Habra	Ojai	Santa Monica
Aliso Viejo	Cypress	La Habra Heights	Ontario	Santa Paula
Apple Valley	Delano	La Mirada	Orange	Seal Beach
Arcadia	Desert Hot Springs	La Palma	Oxnard	Sierra Madre
Artesia	Diamond Bar	La Puente	Palm Desert	Signal Hill
Avalon	Downey	La Verne	Palm Springs	Simi Valley
Baldwin Park	Duarte	Laguna Beach	Palmdale	South El Monte
Barstow	Eastvale	Laguna Hills	Palos Verdes Estates	South Gate
Beaumont	El Monte	Laguna Niguel	Paramount	South Pasadena
Bell	El Segundo	Laguna Woods	Perris	Stanton
Bell Gardens	Exeter	Lake Elsinore	Pico Rivera	Tehachapi
Bellflower	Farmersville	Lake Forest	Placentia	Temecula
Beverly Hills	Fillmore	Lakewood	Pomona	Temple City
Big Bear Lake	Fontana	Lancaster	Port Hueneme	Thousand Oaks
Bishop	Fountain Valley	Lawndale	Porterville	Torrance
Blythe	Fullerton	Lindsay	Rancho Cucamonga	Tulare
Bradbury	Garden Grove	Loma Linda	Rancho Mirage	Tustin
Brea	Gardena	Lomita	Rancho Palos Verdes	Twentynine Palms
Buena Park	Glendora	Long Beach	Rancho Santa	Upland
Calabasas	Goleta	Los Alamitos	Margarita	Valencia
California City	Grand Terrace	Lynwood	Redlands	Vernon
Calimesa	Hanford	Malibu	Redondo Beach	Victorville
Camarillo	Hawaiian Gardens	Mammoth Lakes	Rialto	Villa Park
Canyon Lake	Hawthorne	Manhattan Beach	Ridgecrest	Visalia
Carpinteria	Hemet	Maywood	Rolling Hills	Walnut
Carson	Hermosa Beach	McFarland	Rolling Hills Estates	West Covina
Catalina Island	Hesperia	Menifee	Rosemead	West Hollywood
Cathedral City	Hidden Hills	Mission Viejo	San Bernardino	Westlake Village
Cerritos	Highland	Monrovia	San Buenaventura	Westminster
Chino	Huntington Beach	Montclair	San Dimas	Whittier
Chino Hills	Huntington Park	Montebello	San Fernando	Wildomar
Claremont	Indian Wells	Monterey Park	San Gabriel	Woodlake
Commerce	Industry	Moorpark	San Jacinto	Yorba Linda
Compton	Inglewood	Moreno Valley	San Marino	Yucaipa
Corona	Irvine	Murrieta	Santa Ana	Yucca Valley
Costa Mesa	Irwindale	Newport Beach	Santa Barbara	

*SCE provides electric service to a small number of customer accounts in Tuolumne County and is not subject to franchise requirements.

APPENDIX C: BANDUCCI SUBSTATION PROJECT SCHEDULE

Date	Event
November 2012	Application filed
December 2012	Application accepted as complete
January 2013	Initial Study issued
December 2013	Draft CEQA document (Negative Declaration, Mitigated Negative Declaration or EIR) circulated for public comment
March 2014	Final CEQA document issued
May 2014	Proposed Commission Decision issued
May 2014	Final CEQA document certified
July 2014	Final Commission Decision issued
September 2015	Commence construction
June 2016	Construction complete
June 2016	Commence operation

Appendix D: NOTICE OF APPLICATION FOR A PERMIT TO CONSTRUCT

NOTICE OF APPLICATION FOR A PERMIT TO CONSTRUCT

BANDUCCI SUBSTATION PROJECT

Date: November 15, 2012

Project: Southern California Edison Company (SCE) has filed an application with the California Public Utilities Commission (CPUC) for a Permit to Construct (PTC) for the Banducci Substation Project (Proposed Project).

The purpose of the Proposed Project is to meet the future electricity needs of SCE's customers in the Bear Valley and Stallion Springs communities and the unincorporated Cummings Valley area of Kern County, while also providing the additional benefit of enhancing electrical system reliability and operational flexibility to this region. Demand for electricity in the region continues to grow and is projected to exceed the capacity of SCE's local and regional electric system. The increased demand is due in part to growth in existing customer demand, and in part to planned new development projects in the area. SCE forecasts that the projected peak demand beyond 2016 would exceed the operating limits of the existing Cummings 66/12 kV Substation which currently serves the area. Therefore SCE is proposing the Banducci Substation Project to meet the growing demand, improve reliability and improve operational flexibility.

The Proposed Project includes the following elements:

- Construction of a new Banducci 66/12 kV Substation. The proposed Banducci Substation would be an unstaffed, automated, 56 megavolt ampere (MVA), low-profile substation with a potential capacity of 112 MVA at final build out. The proposed 66/12 kV distribution substation would be located on approximately 6.3 acres in the unincorporated Cummings Valley area of Kern County.

- Construction of two new 66 kV subtransmission line segments that would loop the existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line: one that would enter and one that would exit the proposed Banducci Substation creating the new Banducci-Kern River 1 66 kV Subtransmission Line and the new Banducci-Correction-Cummings 66 kV Subtransmission Line.

- Construction of three new underground 12 kV distribution getaways.

- Installation of telecommunications facilities to connect the proposed Banducci Substation to SCE's existing telecommunications system.

Construction is scheduled to begin in mid-2015. The Proposed Project is planned to be operational by June 2016.

EMF Compliance: The CPUC requires utilities to employ "no-cost" and "low-cost" measures to reduce public exposure to electric and magnetic fields (EMF). In accordance with "EMF Design Guidelines" filed with the CPUC in compliance with CPUC Decisions 93-11-013 and 06-01-042, SCE would implement the following measure(s) for the proposed project:

1. Utilizing subtransmission structure heights that meet or exceed SCE's preferred EMF design criteria.

2. Utilizing subtransmission line construction that reduces the space between conductors compared with other designs.

3. Placing major substation electrical equipment (such as transformers, switchracks, buses and underground duct banks) away from the substation property lines.

4. Configuring the transfer and operating buses with the transfer bus closest to the nearest property line.

Environmental Review: SCE has prepared a Proponent's Environmental Assessment (PEA) which includes analysis of potential environmental impacts that could be created by the construction and operation of the Project. The PEA concludes that with the implementation of Applicant Proposed Measures (APMs), any potential significant environmental effects associated with the Project would be reduced to less than significant levels.

Pursuant to the California Environmental Quality Act (CEQA), the CPUC's Energy Division will conduct an independent review of the Project's environmental impacts. Depending on the results of its review, the Energy Division will issue a Negative Declaration that the proposed project will not result in any significant environmental impacts, or an environmental impact report (EIR) identifying the potentially significant environmental impacts and mitigation measures and alternatives to avoid or reduce them.

Public Participation:

- The public may participate in the environmental review by submitting comments on the Notice of Intent to Approve a Negative Declaration, or on the Notice of Preparation of EIR and Draft EIR, and by participating in any scoping meetings or public meetings that may be conducted. For information on the environmental review, contact the CPUC's Energy division at enviro_team@cpuc.ca.gov or (415) 703-2126.

- Persons wishing to present testimony in evidentiary hearings and/or legal briefing on all other issues, including EMF compliance, and, if one is prepared, whether the EIR complies with CEQA, require party status. Persons may obtain party status by filing a protest to the application by December 15, 2012 in compliance with Rule 2.6, or by making a motion for party status at any time in compliance with Rule 1.4, of the CPUC's Rules of Practice and Procedure (posted at www.cpuc.ca.gov).

- The public may communicate their views regarding the application by writing to the CPUC at 505 Van Ness Avenue, San Francisco, CA 94102, or by emailing the Public Advisor at public.advisor@cpuc.ca.gov. In addition, the CPUC may, at its discretion, hold a public participation hearing in order to take oral public comment.

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sign up to receive notification of documents filed in this proceeding (or other CPUC matters), visit www.cpuc.ca.gov/subscription.

Contacts: For assistance from the CPUC, please contact the Public Advisor in San Francisco at (415) 703-2074 (public.advisor@cpuc.ca.gov) or in Los Angeles at (213) 567-7055 (Public.Advisor.LA@cpuc.ca.gov).

To obtain a copy of SCE's Application, or to request further information about the Project, please contact:

Calvin Rossi
Regional Manager
Southern California Edison
2425 S. Blackstone Street
Tulare, California 93274-6953
(559) 685 - 3240
calvin.rossi@sce.com

LIST OF NEWSPAPER(S)
PUBLISHING THE NOTICE OF APPLICATION
FOR A PERMIT TO CONSTRUCT

Bakersfield Californian
1707 Eye Street
Bakersfield, CA 93301
(661) 395-7500

Tehachapi News
411 North Mill Street
Tehachapi, CA 93561
(661) 822-6828

Appendix E: CERTIFICATE OF SERVICE OF NOTICE OF APPLICATION FOR A PERMIT TO CONSTRUCT

CERTIFICATE OF SERVICE

I hereby certify that, pursuant to the Commission's Rules of Practice and Procedure, I have this day served a true copy of the **NOTICE OF APPLICATION OF SOUTHERN CALIFORNIA EDISON COMPANY (U-338-E) FOR A PERMIT TO CONSTRUCT ELECTRICAL FACILITIES WITH VOLTAGES BETWEEN 50 KV AND 200 KV: BANDUCCI SUBSTATION PROJECT** on the parties identified on the attached service lists(s).

[XX] Placing copies in properly addressed sealed envelopes and depositing such copies in the United States mail with first-class postage prepaid to all parties for those listed on the attached non-email list.

Executed this **Thursday, 15th day of November, 2012,** at Rosemead, California.

/s/ Alejandra Arzola

Alejandra Arzola
Project Analyst
SOUTHERN CALIFORNIA EDISON COMPANY

2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770

BANDUCCI SUBSTATION PROJECT AGENCY SERVICE LIST

Hon. Zack Scrivner Supervisor, 2nd District County of Kern 1115 Truxtun Avenue, 5th Floor Bakersfield, CA 93301	Mr. John Nilon County Administrative Officer County of Kern 1115 Truxtun Avenue, 5th Floor Bakersfield, CA 93301	Ms. Lorelei H. Oviatt AICP, Director Kern Co. Planning & Community Development Department Public Services Building 2700 "M" Street., Suite 100 Bakersfield, CA 93301-2370
Mr. Brandon Martin Chair, Kern County Planning Commission Public Services Building 2700 M Street, Suite 100 Bakersfield, CA 93301-2370	Robert Oglesby, Executive Director California Energy Commission 1516 Ninth Street Sacramento, CA 95814-5512	Karen Miller, CPUC Public Advisor California Public Utilities Commission 505 Van Ness Avenue San Francisco, CA 94102
Edward Randolph, Energy Division Director California Public Utilities Commission 505 Van Ness Avenue San Francisco, CA 94102	Malcolm Dougherty, Director California Department of Transportation PO Box 942873 Sacramento, CA 94273-0001	Jeff Brown, Division of Aeronautics Chief California Department of Transportation Division of Aeronautics, MS # 40 PO Box 942874 Sacramento, CA 94274-0001
John Laird, Secretary Natural Resources Agency 1416 Ninth St., Suite 1311 Sacramento, CA 95814	Charlton H. Bonham, Director California Department of Fish and Game Headquarters 1416 Ninth Street Sacramento, CA 95814	Toby Douglas, Director California Department of Health Services 1501 Capitol Ave., Suite 6001 Sacramento, CA 94234-7320
Thomas Howard, Executive Director State Water Resources Control Board 1001 “I” Street Sacramento, CA 95814	Mary D. Nichols, Board Chairman California Air Resources Board 1001 “I” Street PO Box 2815 Sacramento, CA 95812	David L. Jones Air Pollution Control Officer Eastern Kern Air Pollution Control District 2700 “M” Street, Suite 302 Bakersfield, California 93301-2370
Karl E. Longley, Chair Central Valley Regional Water Quality Control Board 1685 “E” Street Fresno, CA 93706-2007	Sharri Bender Ehlert, Director California Department of Transportation, District 6 1352 W. Olive Avenue Fresno, CA 93778-2616	Michael Jewell, Section Chief U.S. Army Corps of Engineers Regulatory Division 1325 J Street, Room 1350 Sacramento, California 95814

Tim Smith, Field Manager Bureau of Land Management Bakersfield Field Office 3801 Pegasus Drive Bakersfield, CA 93308	Susan L. Moore, Field Supervisor United States Fish & Wildlife Service, Sacramento Office 2800 Cottage Way Room W-2605 Sacramento, CA 95825	Matthew Cate, Secretary California Department of Corrections & Rehabilitation 1515 "S" Street Rm. 502 S Sacramento, CA 95814
Mr. Steve Minton Operations Manager Tehachapi-Cummings County Water District PO Box 326 Tehachapi, CA. 93581	Ben McFarland, Executive Director Kern County Farm Bureau 801 S. Mount Vernon Avenue Bakersfield, CA 93307	Ms. Sandy Janzen Interim General Manager Bear Valley Springs CSD 28999 South Lower Valley Road Tehachapi, CA 93561
Ms. Mary Beth Garrison General Manager Stallion Springs Community Services District 27800 Stallion Springs Drive Tehachapi, CA 93561	Mr. Greg Garrett, City Manager City of Tehachapi Tehachapi City Hall 115 S. Robinson St. Tehachapi, CA 93561	

BANDUCCI SUBSTATION 300' PROPERTY OWNERS SERVICE LIST

APN	OWNER NAME	MAILING ADDRESS	MAILING CITY	MAILING STATE	MAILING ZIP	SITUS ADDRESS	SITUS CITY/STATE/ZIP	SITUS_COUNTY
448-052-12	DOWNS,DAVID & CAROL	3770 WHITING MANOR LN	GLENDALE	CA	91208-1043	N/A	TEHACHAPI, CA 93501	KERN
448-052-19	GRIMMWAY ENTERPRISES INC	PO BOX 81498	BAKERSFIELD	CA	93380-1498	PELLISIER RD	TEHACHAPI, CA 93501	KERN
448-052-41	R & R PROPERTIES I LLC	P M B 1911 78	TEHACHAPI	CA	93581	N/A	TEHACHAPI, CA 93501	KERN
448-052-34	CRYSTAL ORGANIC FARMS LLC	PO BOX 81498	BAKERSFIELD	CA	93380-1498	26738 CHANAC RD	TEHACHAPI, CA 93501	KERN

Appendix F: FIELD MANAGEMENT PLAN

Banducci 66/12 kV Substation Project

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List of Terms

ACSR	Aluminum Conductor Steel Reinforced
CDHS	California Department of Health Services
C/L	center line
CPCN	Certificate of Public Convenience and Necessity
CPUC	California Public Utilities Commission
ELF	Extremely Low Frequency
EMF	electric and magnetic fields
FMP	field management plan
GO	General Order
IARC	International Agency for Research on Cancer
kV	Kilovolt
LWS	light weight steel
mG	milliGauss
MVA	megavolt-ampere
MW	Megawatt
NIEHS	National Institute of Environmental Health Sciences
NRPB	National Radiation Protection Board
PEA	Proponents Environmental Assessment
PTs	Potential Transformers
RAPID	Research and Public Information Dissemination
R-O-W	right-of-way
SCE	Southern California Edison
T/L	transmission line
TSP	tubular steel pole
WHO	World Health Organization

I. EXECUTIVE SUMMARY

This document is Southern California Edison Company's (SCE) Field Management Plan (FMP) for the proposed Banducci Substation Project (Proposed Project). SCE proposes to construct a new 66/12 kilovolt (kV) substation called Banducci Substation (Proposed Substation) and associated components to add capacity to meet forecasted electrical demand, maintain system reliability, resolve anticipated service delivery voltage problems, and enhance operational flexibility in the unincorporated Cummings Valley area of Kern County. The Proposed Project is planned to be operational by June 2016.

The Proposed Project includes the following major electrical components:

- Construction of a new Banducci 66/12 kV Substation. The proposed Banducci Substation would be an unstaffed, automated, 56 megavolt ampere (MVA), low-profile substation with a potential capacity of 112 MVA at final build out. The proposed 66/12 kV distribution substation would be located on approximately 6.3 acres in the unincorporated Cummings Valley area of Kern County.

- Construction of two new 66 kV subtransmission line segments that would loop the existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line: one that would enter and one that would exit the proposed Banducci Substation creating the new Banducci-Kern River 1 66 kV Subtransmission Line and the new Banducci-Correction-Cummings 66 kV Subtransmission Line.

- Construction of three new underground 12 kV distribution getaways.

- Installation of telecommunications facilities to connect the proposed Banducci Substation to SCE's existing telecommunications system.

SCE provides this FMP in order to inform the public, the California Public Utilities Commission (CPUC), and other interested parties of its evaluation of "no-cost and low-cost" magnetic field reduction design options for this project, and SCE's proposed plan to apply these design options to this project. This FMP has been prepared in accordance with CPUC Decision No. 93-11-013 and Decision No. 06-01-042 relating to extremely low frequency (ELF)[1] electric and magnetic fields (EMF). This FMP also provides background on the current status of scientific research related to possible health effects of EMF, and a description of the CPUC's EMF policy.

The "no-cost and low-cost" magnetic field reduction design options that are incorporated into the design of the Proposed Project are as follows:

- Utilizing subtransmission structure heights that meet or exceed SCE's preferred EMF design criteria

[1] The extremely low frequency is defined as the frequency range from 3 Hz to 3,000 Hz.

- Utilizing subtransmission line construction that reduces the space between conductors compared with other designs

- Placing major substation electrical equipment (such as transformers, switchracks, buses and underground duct banks) away from the substation property lines

- Configuring the transfer and operating buses with the transfer bus closest to the nearest property line

Table 1 summarizes "no-cost and low-cost" magnetic field reduction design options that SCE adopted for the Proposed Project.

SCE's plan for applying the above "no-cost and low-cost" magnetic field reduction design options for the Proposed Project is consistent with CPUC's EMF policy and with the direction of leading national and international health agencies. Furthermore, the plan complies with SCE's EMF Design Guidelines[2], and with applicable national and state safety standards for new electrical facilities.

[2] EMF Design Guidelines, August 2006.

Table 1. Summary of "No-cost and Low-cost" Magnetic Field Reduction Design Options

Area No.	Location[3]	Adjacent Land Use[4]	MF Reduction Design Options Considered	Estimated Cost to Adopt	Design Option(s) Adopted? (Yes/No)	Reason(s) if not adopted
Banducci Substation	Located on Pelliser Road in unincorporated Kern County, CA	6	• Placing major substation electrical equipment (such as transformers, switchracks, buses and underground duct banks) away from the substation property lines	• No-Cost[5]	• Yes	
			• Configuring the transfer and operating buses with the transfer bus closest to the nearest property line	• No-Cost[6]	• Yes	

[3] This column shows the major cross streets, existing subtransmission lines, or substation name as reference points.

[4] Land usage codes are as follows: 1) schools, licensed day-cares, and hospitals, 2) residential, 3) commercial/industrial, 4) recreational, 5) agricultural, and 6) undeveloped land.

[5] This option was included in the preliminary design and continues to be included in the design of the project.

[6] *Ibid.*

Area No.	Location[3]	Adjacent Land Use[4]	MF Reduction Design Options Considered	Estimated Cost to Adopt	Design Option(s) Adopted? (Yes/No)	Reason(s) if not adopted
66 kV Source sub-transmission line Segment 1	Banducci-Correction-Cummings Subtransmission Line loops into new substation: Located on the northwest corner of the preferred site of Proposed Substation near the intersection of Dale Road and Pelliser Road	5, 6	• Utilizing subtransmission structure heights that meet or exceed SCE's preferred EMF design criteria • Utilizing subtransmission line construction that reduces the space between conductors compared with other designs	• No-Cost[7] • No-Cost[8]	• Yes • Yes	

[7] This option was included in the preliminary design and continues to be included in the design of the project.

[8] *Ibid.*

Area No.	Location[3]	Adjacent Land Use[4]	MF Reduction Design Options Considered	Estimated Cost to Adopt	Design Option(s) Adopted? (Yes/No)	Reason(s) if not adopted
66 kV Source sub-transmission line Segment 2	Banducci-Kern River 1 Subtransmission Line loops into new substation: Located on the southwest corner of the Proposed Substation on Pelliser Road	5, 6	• Utilizing subtransmission structure heights that meet or exceed SCE's preferred EMF design criteria • Utilizing subtransmission line construction that reduces the space between conductors compared with other designs	• No-Cost[9] • No-Cost[10]	• Yes • Yes	

[9] *Ibid.*
[10] *Ibid.*

II. BACKGROUND REGARDING EMF AND PUBLIC HEALTH RESEARCH ON EMF

There are many sources of power frequency[11] electric and magnetic fields, including internal household and building wiring, electrical appliances, and electric power transmission and distribution lines. There have been numerous scientific studies about the potential health effects of EMF. After many years of research, the scientific community has been unable to determine if exposures to EMF cause health hazards. State and federal public health regulatory agencies have determined that setting numeric exposure limits is not appropriate.[12]

Many of the questions about possible connections between EMF exposures and specific diseases have been successfully resolved due to an aggressive international research program. However, potentially important public health questions remain about whether there is a link between EMF exposures and certain diseases, including childhood leukemia and a variety of adult diseases (e.g., adult cancers and miscarriages). As a result, some health authorities have identified magnetic field exposures as a possible human carcinogen. As summarized in greater detail below, these conclusions are consistent with the following published reports: the National Institute of Environmental Health Sciences (NIEHS) 1999,[13] the National Radiation Protection Board (NRPB) 2001,[14] the International Commission on non-Ionizing Radiation Protection (ICNIRP) 2001, the California Department of Health Services (CDHS) 2002,[15] and the International Agency for Research on Cancer (IARC) 2002.[16]

The federal government conducted EMF research as a part of a $45-million research program managed by the NIEHS. This program, known as the EMF RAPID (Research and

---

[11] In U.S., it is 60 Hertz (Hz).

[12] CPUC Decision 06-01-042, p. 6, footnote 10.

[13] National Institute of Environmental Health Sciences' Report on Health Effects from Exposures to Power-Line frequency Electric and Magnetic Fields, NIH Publication No. 99-4493, June 1999.

[14] National Radiological Protection Board, Electromagnetic Fields and the Risk of Cancer, Report of an Advisory Group on Non-ionizing Radiation, Chilton, U.K. 2001.

[15] California Department of Health Services, An Evaluation of the Possible Risks from Electric and Magnetic Fields from Power Lines, Internal Wiring, Electrical Occupations, and Appliances, June 2002.

[16] World Health Organization / International Agency for Research on Cancer, IARC Monographs on the evaluation of carcinogenic risks to humans (2002), Non-ionizing radiation, Part 1: Static and extremely low-frequency (ELF) electric and magnetic fields, IARC Press, Lyon, France: International Agency for Research on Cancer, Monograph, vol. 80, p. 338, 2002.

Public Information Dissemination), submitted its final report to the U.S. Congress on June 15, 1999. The report concluded that:

- "The scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak."[17]

- "The NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard."[18]

- "The NIEHS suggests that the level and strength of evidence supporting ELF-EMF exposure as a human health hazard are insufficient to warrant aggressive regulatory actions; thus, we do not recommend actions such as stringent standards on electric appliances and a national program to bury all transmission and distribution lines. Instead, the evidence suggests passive measures such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. NIEHS suggests that the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards."[19]

In 2001, Britain's NRPB arrived at a similar conclusion:

> "After a wide-ranging and thorough review of scientific research, an independent Advisory Group to the Board of NRPB has concluded that the power frequency electromagnetic fields that exist in the vast majority of homes are not a cause of cancer in general. However, some epidemiological studies do indicate a possible small risk of childhood leukemia associated with exposures to unusually high levels of power frequency magnetic fields."[20]

In 2002, three scientists for CDHS concluded:

> "To one degree or another, all three of the [C]DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's Disease, and miscarriage.
>
> They [CDHS] strongly believe that EMFs do not increase the risk of birth defects, or low birth weight.

---

[17] National Institute of Environmental Health Sciences, NIEHS Report on Health Effects from Exposures to Power-Frequency Electric and Magnetic Fields, p. ii, NIH Publication No. 99-4493, 1999.

[18] *Ibid.*, p. iii.

[19] *Ibid.*, p. 37 - 38.

[20] NRPB, NRPB Advisory Group on Non-ionizing Radiation Power Frequency Electromagnetic Fields and the Risk of Cancer, NRPB Press Release May 2001.

> They [CDHS] strongly believe that EMFs are not universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.
>
> To one degree or another they [CDHS] are inclined to believe that EMFs do not cause an increased risk of breast cancer, heart disease, Alzheimer's disease, depression, or symptoms attributed by some to a sensitivity to EMFs. However, all three scientists had judgments that were "close to the dividing line between believing and not believing" that EMFs cause some degree of increased risk of suicide.
>
> For adult leukemia, two of the scientists are 'close to the dividing line between believing or not believing' and one was 'prone to believe' that EMFs cause some degree of increased risk."[21]

Also in 2002, the World Health Organization's (WHO) IARC concluded:

> "ELF magnetic fields are possibly carcinogenic to humans",[22] based on consistent statistical associations of high-level residential magnetic fields with a doubling of risk of childhood leukemia...Children who are exposed to residential ELF magnetic fields less than 0.4 microTesla (4.0 milliGauss) have no increased risk for leukemia…. In contrast, "no consistent relationship has been seen in studies of childhood brain tumors or cancers at other sites and residential ELF electric and magnetic fields."[23]

In June of 2007, the WHO issued a report on their multi-year investigation of EMF and the possible health effects. After reviewing scientific data from numerous EMF and human health studies, they concluded:

> "Scientific evidence suggesting that everyday, chronic low-intensity (above 0.3-0.4 μT [3-4 mG]) power-frequency magnetic field exposure poses a health risk is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia."[24]
>
> "In addition, virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status. Thus, on balance, the evidence is not strong

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[21] CDHS, An Evaluation of the Possible Risks From Electric and Magnetic Fields (EMFs) From Power Lines, Internal Wiring, Electrical Occupations and Appliances, p. 3, 2002.

[22] IARC, Monographs, Part I, Vol. 80, p. 338.

[23] *Ibid*., p. 332 - 334.

[24] WHO, Environmental Health Criteria 238, EXTREMELY LOW FREQUENCY FIELDS, p. 11 - 13, 2007.

> enough to be considered causal, but sufficiently strong to remain a concern."[25]
>
> "A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in both children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease"[26]
>
> "Furthermore, given both the weakness of the evidence for a link between exposure to ELF magnetic fields and childhood leukemia, and the limited impact on public health if there is a link, the benefits of exposure reduction on health are unclear. Thus the costs of precautionary measures should be very low."[27]

III. APPLICATION OF THE CPUC'S "NO-COST AND LOW-COST" EMF POLICY TO THIS PROJECT

Recognizing the scientific uncertainty over the connection between EMF exposures and health effects, the CPUC adopted a policy that addresses public concern over EMF with a combination of education, information, and precaution-based approaches. Specifically, Decision 93-11-013 established a precautionary based "no-cost and low-cost" EMF policy for California's regulated electric utilities based on recognition that scientific research had not demonstrated that exposures to EMF cause health hazards and that it was inappropriate to set numeric standards that would limit exposure.

In 2006, the CPUC completed its review and update of its EMF Policy in Decision 06-01-042. This decision reaffirmed the finding that state and federal public health regulatory agencies have not established a direct link between exposure to EMF and human health effects,[28] and the policy direction that (1) use of numeric exposure limits was not appropriate

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[25] *Ibid.*, p. 12.

[26] *Ibid.*, p. 12.

[27] *Ibid.*, p. 13.

[28] CPUC Decision 06-01-042, Conclusion of Law No. 5, mimeo. p. 19 ("As discussed in the rulemaking, a direct link between exposure to EMF and human health effects has yet to be

in setting utility design guidelines to address EMF,[29] and (2) existing "no-cost and low-cost" precautionary-based EMF policy should be continued for proposed electrical facilities. The decision also reaffirmed that EMF concerns brought up during Certificate of Public Convenience and Necessity (CPCN) and Permit to Construct (PTC) proceedings for electric and transmission and substation facilities should be limited to the utility's compliance with the CPUC's "no-cost and low-cost" policies.[30]

The decision directed regulated utilities to hold a workshop to develop standard approaches for EMF Design Guidelines and such a workshop was held on February 21, 2006. Consistent design guidelines have been developed that describe the routine magnetic field reduction measures that regulated California electric utilities consider for new and upgraded transmission line and transmission substation projects. SCE filed its revised EMF Design Guidelines with the CPUC on July 26, 2006.

"No-cost and low-cost" measures to reduce magnetic fields would be implemented for this project in accordance with SCE's EMF Design Guidelines. In summary, the process of evaluating "no-cost and low-cost" magnetic field reduction measures and prioritizing within and between land usage classes considers the following:

1. SCE's priority in the design of any electrical facility is public and employee safety. Without exception, design and construction of an electric power system must comply with all applicable federal, state, and local regulations, applicable safety codes, and each electric utility's construction standards. Furthermore, transmission and subtransmission lines and substations must be constructed so that they can operate reliably at their design capacity. Their design must be compatible with other facilities in the area and the cost to operate and maintain the facilities must be reasonable.

2. As a supplement to Step 1, SCE follows the CPUC's direction to undertake "no-cost and low-cost" magnetic field reduction measures for new and upgraded electrical facilities. Any proposed "no-cost and low-cost" magnetic

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proven despite numerous studies including a study ordered by this Commission and conducted by DHS.").

[29] CPUC Decision 06-01-042, mimeo. p. 17 - 18 ("Furthermore, we do not request that utilities include non-routine mitigation measures, or other mitigation measures that are based on numeric values of EMF exposure, in revised design guidelines or apply mitigation measures to reconfigurations or relocations of less than 2,000 feet, the distance under which exemptions apply under GO 131-D. Non-routine mitigation measures should only be considered under unique circumstances.").

[30] CPUC Decision 06-01-042, Conclusion of Law No. 2, ("EMF concerns in future CPCN and PTC proceedings for electric and transmission and substation facilities should be limited to the utility's compliance with the Commission's low-cost/no-cost policies.").

field measures, must, however, meet the requirements described in Step 1 above. The CPUC defines "no-cost and low-cost" measures as follows:

- Low-cost measures, in aggregate, should:
    - Cost in the range of 4 percent of the total project cost.
    - Result in magnetic field reductions of "15% or greater at the utility ROW [right-of-way]…"[31]

The CPUC Decision stated,

> "We direct the utilities to use 4 percent as a benchmark in developing their EMF mitigation guidelines. We will not establish 4 percent as an absolute cap at this time because we do not want to arbitrarily eliminate a potential measure that might be available but costs more than the 4 percent figure. Conversely, the utilities are encouraged to use effective measures that cost less than 4 percent."[32]

3. The CPUC provided further policy direction in Decision 06-01-042, stating that, "[a]lthough equal mitigation for an entire class is a desirable goal, we will not limit the spending of EMF mitigation to zero on the basis that not all class members can benefit."[33] While Decision 06-01-042 directs the utilities to favor schools, day-care facilities and hospitals over residential areas when applying low-cost magnetic field reduction measures, prioritization within a class can be difficult on a project case-by-case basis because schools, day-care facilities, and hospitals are often integrated into residential areas, and many licensed day-care facilities are housed in private homes, and can be easily moved from one location to another. Therefore, it may be practical for public schools, licensed day-care centers, hospitals, and residential land uses to be grouped together to receive highest prioritization for low-cost magnetic field reduction measures. Commercial and industrial areas may be grouped as a second priority group, followed by recreational and agricultural areas as the third group. Low-cost magnetic field reduction measures will not be considered for undeveloped land, such as open space, state and national parks, and Bureau of Land Management and U.S. Forest Service lands. When spending for low-cost measures would otherwise disallow equitable magnetic field reduction for all areas within a single land-use class, prioritization can be achieved by considering location and/or density of permanently occupied structures on lands adjacent to the projects, as appropriate.

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[31] CPUC Decision 06-01-042, p. 10.

[32] CPUC Decision 93-11-013, § 3.3.2, p.10.

[33] CPUC Decision 06-01-042, p. 10.

This FMP contains descriptions of various magnetic field models and the calculated results of magnetic field levels based on those models. These calculated results are provided only for purposes of identifying the relative differences in magnetic field levels among various transmission or subtransmission line design alternatives under a specific set of modeling assumptions and determining whether particular design alternatives can achieve magnetic field level reductions of 15 percent or more. The calculated results are not intended to be predictors of the actual magnetic field levels at any given time or at any specific location if and when the project is constructed. This is because magnetic field levels depend upon a variety of variables, including load growth, customer electricity usage, and other factors beyond SCE's control. The CPUC affirmed this in D. 06-01-042 stating:

> "Our [CPUC] review of the modeling methodology provided in the utility [EMF] design guidelines indicates that it accomplishes its purpose, which is to measure the relative differences between alternative mitigation measures. Thus, the modeling indicates relative differences in magnetic field reductions between different transmission line construction methods, but does not measure actual environmental magnetic fields."[34]

IV. PROJECT DESCRIPTION

Southern California Edison proposes to construct the new 66/12 kV Banducci Substation (Proposed Substation). The Proposed Substation would be an unstaffed, automated, 56 megavolt amperes (MVA), low-profile substation with a potential capacity of 112 MVA at final build out. The proposed 66/12 kV distribution substation would be located on approximately 6.3 acres in the unincorporated Cummings Valley area of Kern County. Construction of two new 66 kV subtransmission line segments that would loop the existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line: one that would enter and one that would exit the proposed Banducci Substation creating the new Banducci-Kern River 1 66 kV Subtransmission Line and the new Banducci-Correction-Cummings 66 kV Subtransmission Line. Figure 1 shows the project area site and subtransmission line routes.

The existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line that parallels Highline Road would be looped into the Proposed Substation. To create the new Banducci-Correction-Cummings 66 kV Subtransmission Line, SCE would install two new wood poles in the existing right-of-way (ROW) on the east side of Pelliser Road north of the proposed Banducci Substation north block wall. The northernmost new wood pole would be installed approximately 30 feet north of the existing pole it is replacing to adjust and even out the span lengths. The first wood pole north of the new Banducci Substation would be installed approximately 75 feet north of the existing wood pole it is replacing to adjust and even out the span lengths. A tubular steel pole (TSP) self-supporting guy stub pole would be installed on

[34] CPUC Decision 06-01-042, p. 11.

the west side of Pelliser Road and west of this wood pole in franchise to support an approximate 15 degree angle on the wood pole. A steel stranded cable (span guy) would connect the TSP guy stub to the wood pole to support the side strain on the wood pole. The new wood poles would be installed to reconfigure the existing subtransmission and distribution conductors to accommodate a distribution riser. A new TSP would be installed on SCE property but outside of the fence line of the new Banducci Substation. It would be installed in the northwest corner of the SCE parcel. This TSP would accommodate an approximately 105 degree turn in the line from the existing alignment and start the loop to the rear of the new Banducci Substation. Approximately 200 feet east of the TSP, SCE would install a light weight steel (LWS) pole, the proposed line would continue east for approximately 200 feet to the north east corner of the proposed Banducci Substation where another TSP would be installed to accommodate a 90 degree turn and would continue south for approximately 115 feet to another TSP where the line would make another 90 degree turn and continue west to the substation switch rack.

In order to create the proposed Banducci-Kern River 1 66 kV Subtransmission Line, SCE would install two new wood poles in the existing ROW on the east side of Pelliser Road south of the proposed Banducci Substation south block wall. The two new wood replacement poles would be installed approximately 3 feet from the existing wood poles. A TSP self-supporting guy stub pole would be installed on the west side of Pelliser Road and west of the first wood pole south of the new Banducci Substation in franchise to support an approximate 15 degree angle on the wood pole. A steel span guy would connect the TSP guy stub to the wood pole to support the side strain on the wood pole. The new wood poles would be installed to reconfigure the existing subtransmission and distribution conductors to accommodate a distribution riser. SCE would then install one TSP at the south west corner of the proposed Banducci Substation in order to accommodate an approximate 105 degree turn in the line from the existing alignment and start the loop to the rear of the new Banducci Substation. Approximately 200 feet east of the TSP, SCE would install a LWS pole, the proposed line would continue east for approximately 200 feet to the south east corner of the proposed Banducci Substation where another TSP would be installed to accommodate a 90 degree turn and continue north approximately 200 feet north to another TSP where the line would make another 90 degree turn and continue west to the substation switchrack.

The proposed Banducci Substation would be a new 66/12 kV unstaffed, automated, 56 MVA low-profile substation. The dimensions of the walled substation would be approximately 440 feet by 346 feet. The substation capacity would have the potential to expand to 112 MVA as necessary. The enclosed substation footprint would encompass approximately 3.3 acres of an approximately 6.3 acre parcel located in the unincorporated Cummings Valley area of Kern County. The proposed Banducci Substation site would be located at the southeast corner of Pelliser Road and unimproved Dale Road.

SCE considers the California Building Code and the Institute of Electrical and Electronic Engineers (IEEE) 693, Recommended Practices for Seismic Design of Substations when designing substation structures and equipment. The proposed Banducci Substation components are described below.

The proposed 66 kV low-profile steel switchrack would be approximately 25 feet high, 82 feet wide, and 186 feet long and would have an operating and transfer bus. The switchrack would consist of eight 22-foot-wide positions:

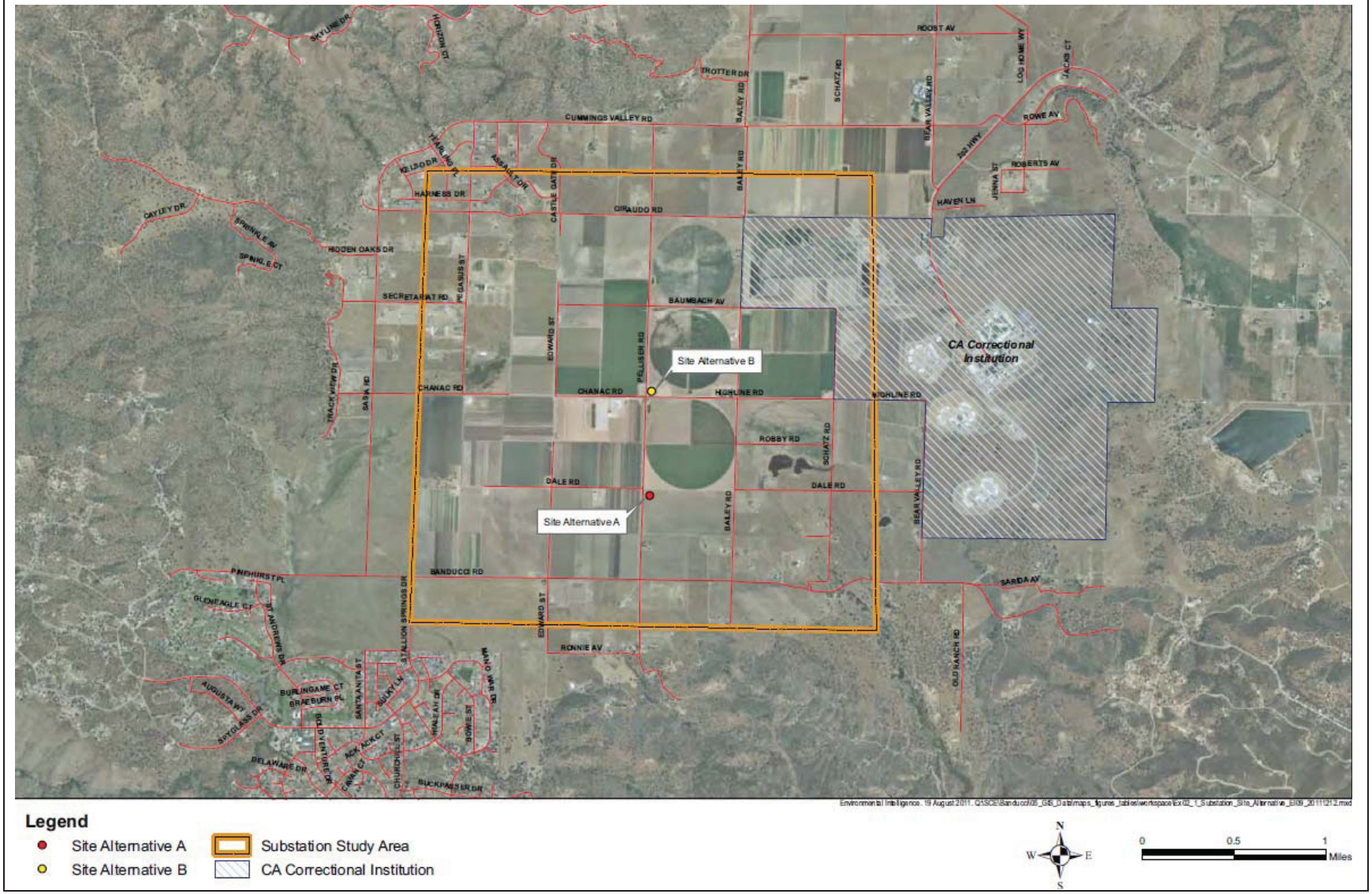
- One switchrack position would be used to terminate the newly created Banducci-Correction-Cummings 66 kV Subtransmission Line.
- One switchrack position would be used to terminate the newly created Banducci-Kern
- River 1 66 kV Subtransmission Line.
- Two switchrack positions would be used to terminate the 66/12 kV transformer banks (Bank No. 1 and Bank No. 2).
- One switchrack position would be used for the 66 kV bus tie position.
- Three switchrack positions would remain vacant for future needs.

The operating and transfer buses would each be approximately 186 feet long, and would consist of two 2,156 thousand circular mils (kcmils) Aluminum Conductor Steel Reinforced (ACSR) conductors for each of the three electrical phases.

The two 66 kV subtransmission line positions and the two 66 kV transformer bank positions would each be equipped with a circuit breaker and three group-operated horizontal mount disconnect switches. Surge arresters and 66 kV potential transformers (PTs) would be installed on the line positions only. The 66 kV bus tie position would be equipped with a circuit breaker and two group-operated horizontal mount disconnect switches. Three 66 kV bus PTs would be connected to the operating bus through a three-phase group-operated disconnect switch.

Banducci Substation would be a low-profile substation with a potential capacity of 112 MVA at final build out. Initial transformation would consist of two 28 MVA, 66/12 kV load tap changing (LTC) transformers with adjacent group-operated disconnect switches on the high voltage and low voltage side, surge arresters, and neutral current transformers. Two 12 kV underground power cables would connect the transformers to the 12 kV switchrack positions via two power cable trenches. The transformer equipment area dimensions would be approximately 25 feet high, 113 feet long, and 42 feet wide. Based on SCE's 2012-2021 peak demand forecast at the time of preparation of this report, SCE does not reasonably foresee adding additional transformer capacity at Banducci Substation in the 10-year planning horizon.

Figure 1. Project Area Site and Subtransmission Line Routes



V. EVALUATION OF "NO-COST AND LOW-COST" MAGNETIC FIELD REDUCTION DESIGN OPTION

Please note that the following magnetic field models and the calculated results of magnetic field levels are intended only for purposes of identifying the relative differences in magnetic field levels among various subtransmission line and subtransmission line design alternatives under a specific set of modeling assumptions (see §VII-Appendix A for more detailed information about the calculation assumptions and loading conditions) and determining whether particular design alternatives can achieve magnetic field level reductions of 15 percent or more. The calculated results are not intended to be predictors of the actual magnetic field levels at any given time or at any specific location when the Proposed Project is constructed.

For the purpose of evaluating "no-cost and low-cost" magnetic field reduction design options, the Proposed Project is divided into three parts for this report:

- Part 1: Proposed Banducci 66 kV Subtransmission Lines
- Part 2: Proposed Banducci 66/12 kV Substation
- Part 3: Project Alternatives

Part 1: Proposed Banducci 66 kV Subtransmission Lines

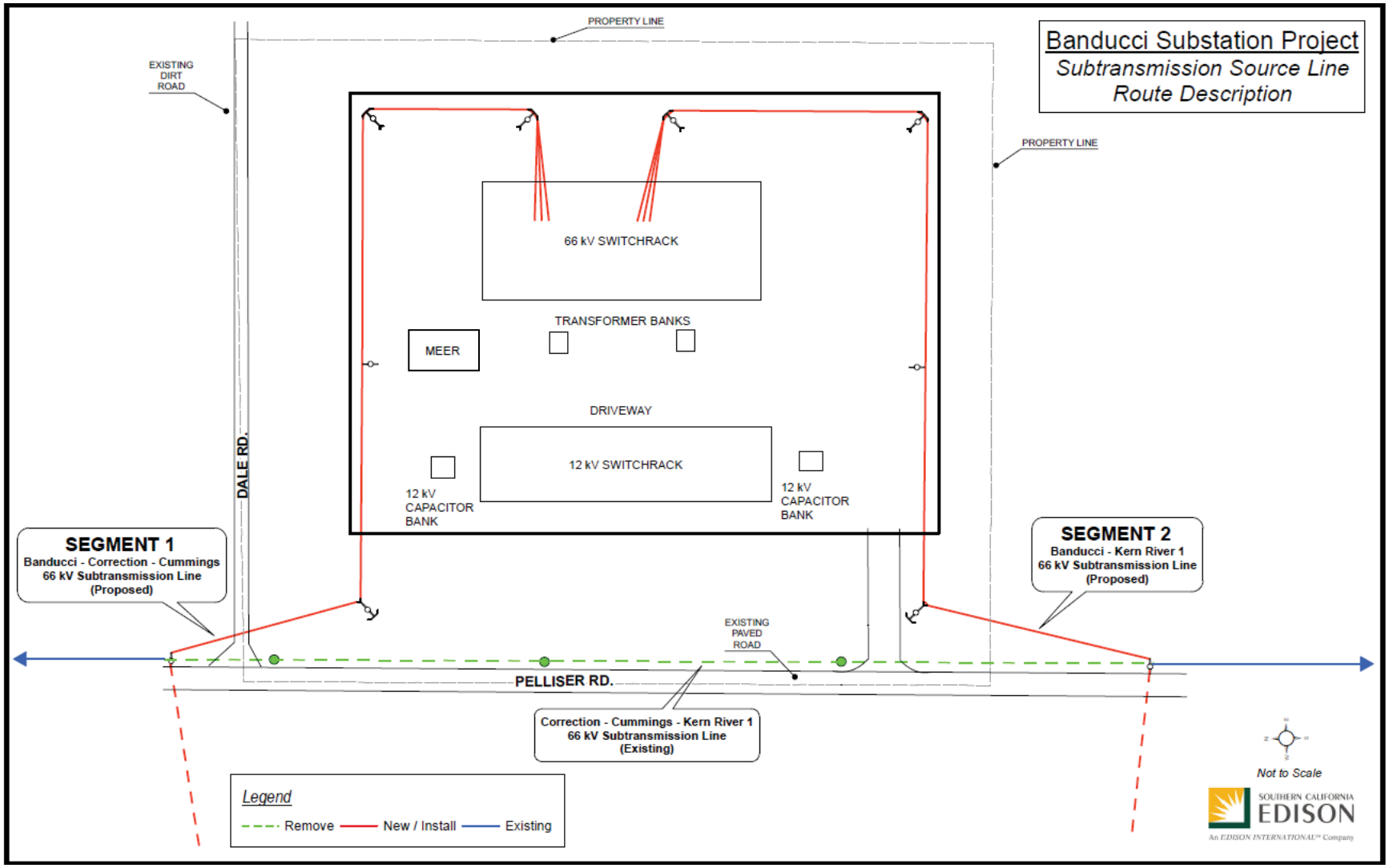
For the purpose of magnetic field reduction evaluation, the proposed subtransmission lines will be divided into two segments, as shown in Figure 2.

Segment 1 - Banducci-Correction-Cummings 66 kV Subtransmission Line

The proposed design used for Segment 1 is shown in Figure 3. The proposed Banducci-Correction-Cummings 66 kV Subtransmission Line would be constructed on single-circuit structures. Based on preliminary designs, the wood and LWS poles would be approximately 65-75 feet in height, and the TSPs would be approximately 50 to 65 feet in height. The poles would be located in a 45-foot minimum width existing utility franchise or easement. For magnetic field analysis, calculated field levels at the edges of easement located at 22.5 feet from the center line (C/L) of the structure will be evaluated. Currently, Segment 1 of the proposed 66 kV subtransmission line route would be located mostly in undeveloped land. The proposed route for Segment 1 would be located mostly inside the Proposed Substation property.

No-Cost Field Reduction Measures: The proposed design for Segment 1 includes the following no-cost field reduction measures:

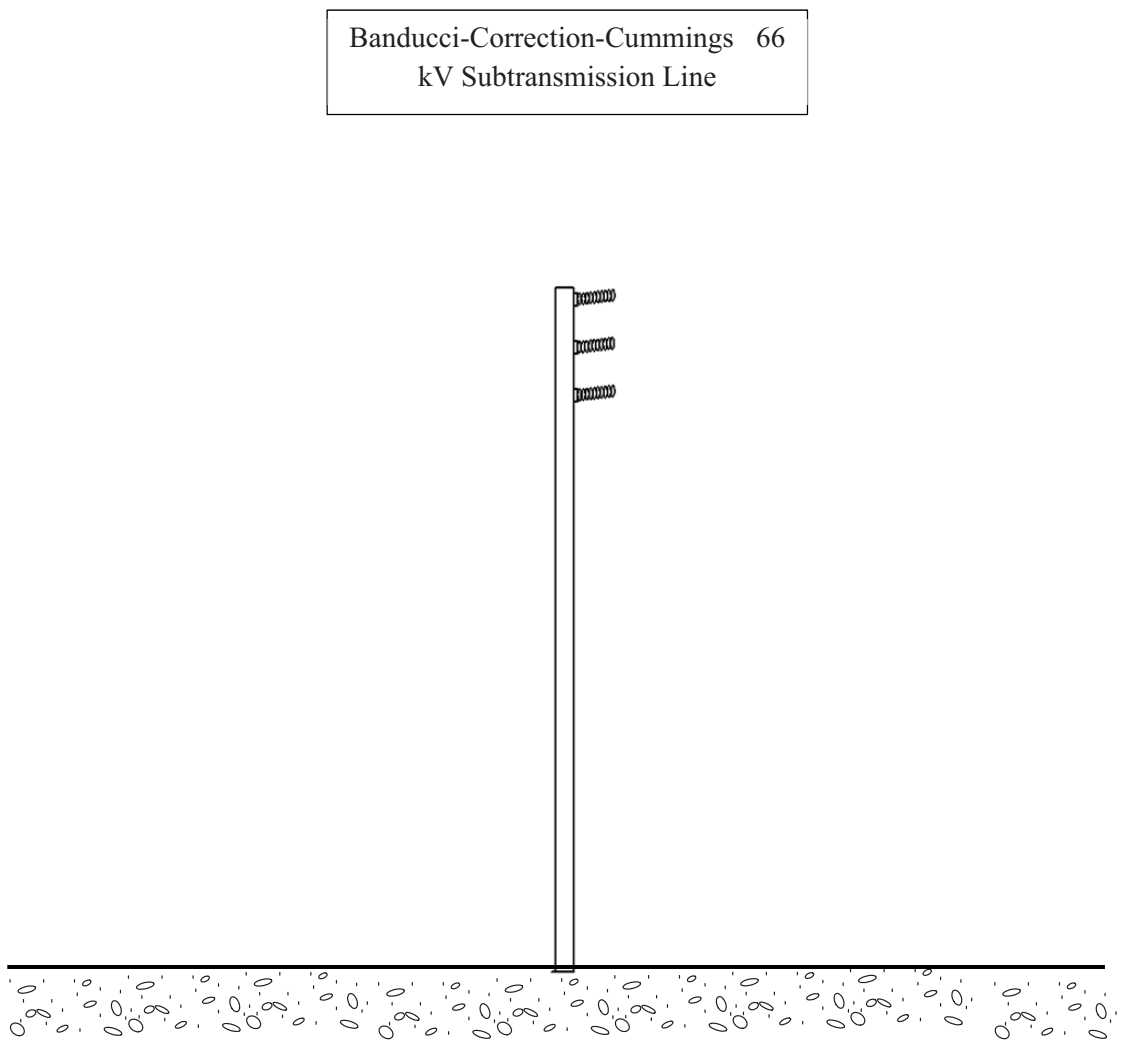
Figure 2. Source Lines Segments for Magnetic Field Analysis



1. Utilizing structure heights that meet or exceed SCE's EMF preferred design criteria.

2. Utilizing subtransmission line construction that reduces the space between conductors compared with other designs.

Figure 3. Proposed 66 kV Single Circuit Subtransmission Line - Segment 1 (Looking Northwest)

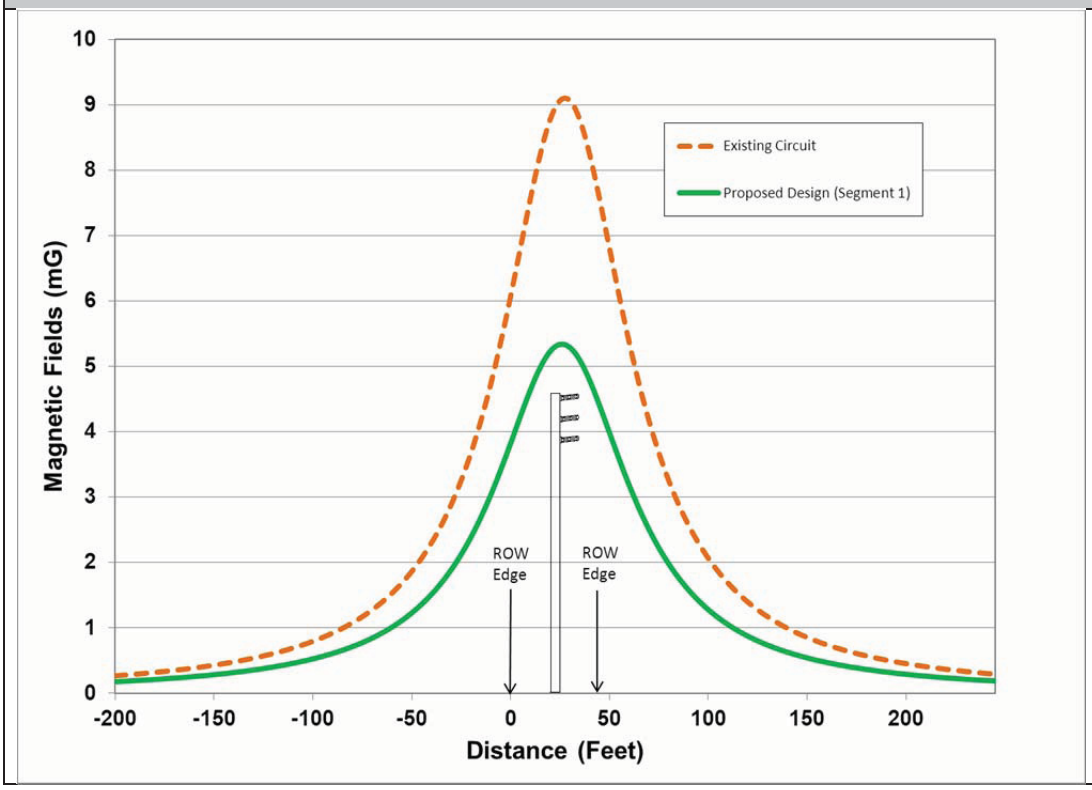


Low-Cost Field Reduction Options: Because the proposed design incorporates the above no-cost field reduction measures including structure heights that meet or exceed

SCE's EMF preferred design criteria, no further low-cost reduction measures such as utilizing taller structures were considered for this segment of the Proposed Project.

Magnetic Field Calculations: Figure 4 and Table 2 show the calculated magnetic field levels for proposed design. These calculations were made using the typical proposed structure height of 70 feet.

Figure 4. Calculated Magnetic Field Levels[35] for the Proposed 66 kV Subtransmission Line Segment 1 (Looking Northwest)



[35] This figure shows calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

Table 2. A Comparison of Calculated Magnetic Field Levels[36] for Segment 1				
Design Options	22.5 Feet Left of C/L (mG)	% Reduction	22.5 Feet Right of C/L (mG)	% Reduction
Existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line	6.1	N/A	7.6	N/A
Proposed Banducci -Correction-Cummings 66 kV Subtransmission Line	3.8	37.7	4.4	42.1

Recommendations for Segment 1: *The proposed design includes no-cost field reduction measures. Because the proposed design already incorporates structures with heights meeting or exceeding SCE's preferred design criteria, no further low-cost field reduction measures are recommended.*

Segment 2 - Banducci-Kern River 1 66 kV Subtransmission Line

The proposed design used for Segment 2 is shown in Figure 5. The proposed Banducci-Kern River 1 66 kV Subtransmission Line would be constructed on single circuit structures. Based on preliminary designs, the wood and LWS poles would be approximately 65 to 75 feet in height, and the TSPs would be approximately 50 to 65 feet in height. The poles would be located in utility franchise or easement. For magnetic field analysis, calculated field levels at the edges of easement located at 22.5 feet from the center line (C/L) of the structure will be evaluated. Currently, there are no schools along the Segment 2 of the proposed 66 kV subtransmission line route. The proposed route for Segment 2 would be located mostly inside the Proposed Substation property.

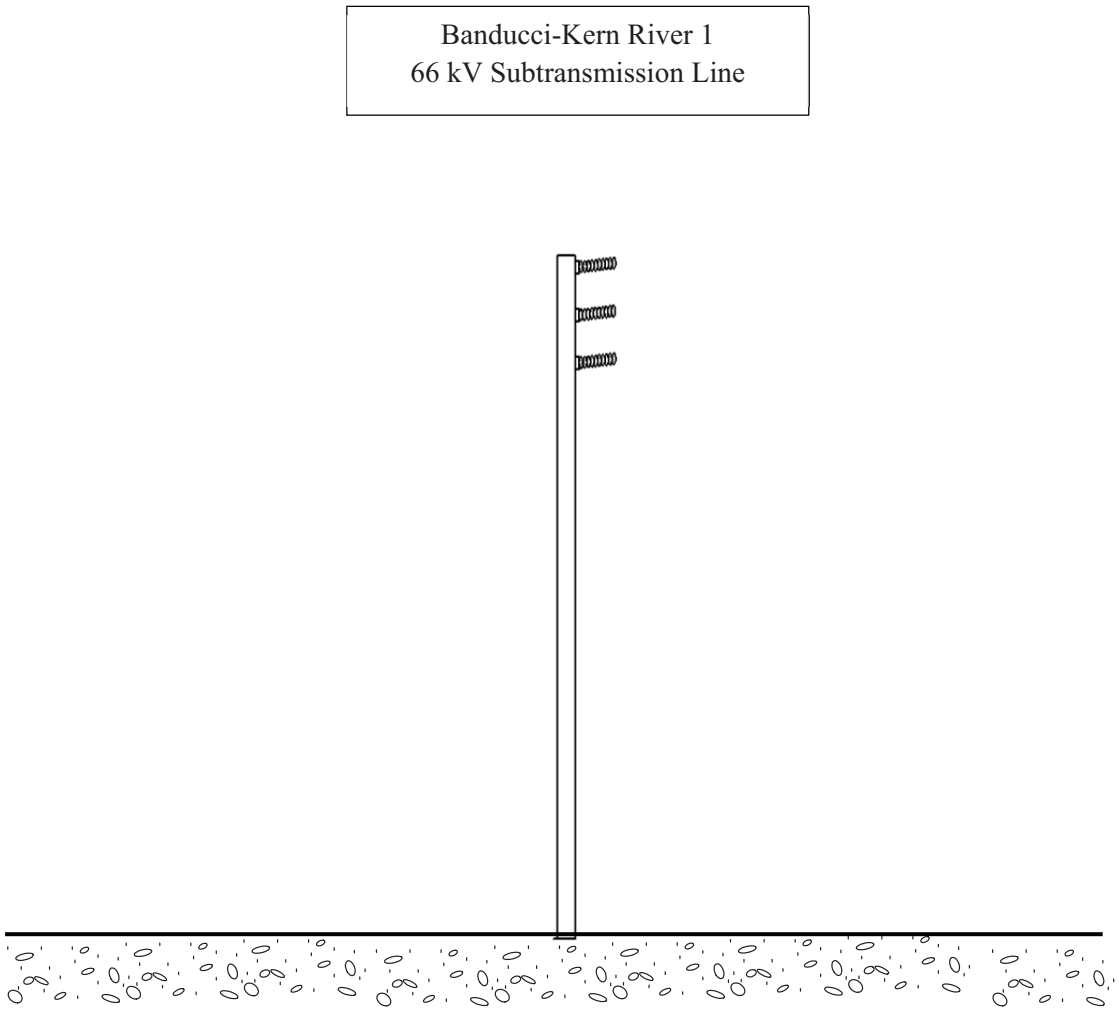
No-Cost Field Reduction Measures: The proposed design for Segment 2 includes the following no-cost field reduction measures:

1. Utilizing structure heights that meet or exceed SCE's EMF preferred design criteria.

2. Utilizing subtransmission line construction that reduces the space between conductors compared with other designs.

[36] This table lists calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

Figure 5. Proposed Single Circuit 66 kV Subtransmission Line - Segment 2 (Looking Northeast)



Low-Cost Field Reduction Options: Because the proposed design incorporates the above no-cost field reduction measures including structure heights that meet or exceed

SCE's EMF preferred design criteria, no further low-cost reduction measures such as utilizing taller structures were considered for this segment of the Proposed Project.

Magnetic Field Calculations: Figure 6 and Table 3 show the calculated magnetic field levels for proposed design. These calculations were made using the typical proposed structure height of 70 feet.

Figure 6. Calculated Magnetic Field Levels[37] for the Proposed 66 kV Subtransmission Line - Segment 2 (Looking North)

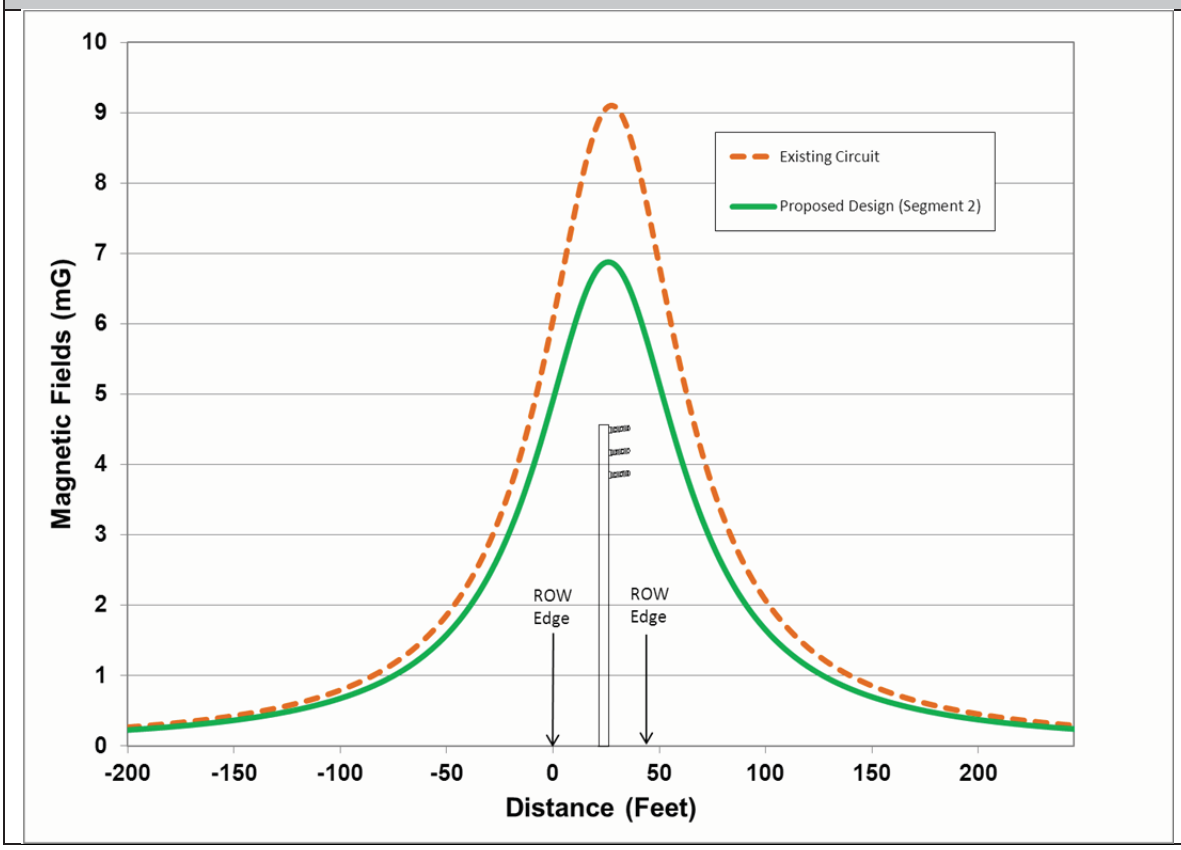


Table 3. Calculated Magnetic Field Levels[38] for Segment 2				
Design Options	22.5 Feet Left of C/L (mG)	% Reduction	22.5 Feet Right of C/L (mG)	% Reduction

[37] This figure shows calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

[38] This table lists calculated magnetic field levels for design comparison only and is not meant to predict actual magnetic field levels.

Existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line	6.1	N/A	7.6	N/A
Proposed Banducci-Kern River 1 66 kV Subtransmission Line	4.9	19.7	5.7	25.0

Recommendations for Segment 2: *The proposed design includes no-cost field reduction measures. Because the proposed design already incorporates structures with heights meeting or exceeding SCE's preferred design criteria, no further low-cost field reduction measures are recommended.*

Part 2: Banducci 66/12 kV Substation

Generally, magnetic field values along the substation perimeter are low compared to the substation interior because of the distance from the perimeter to the energized equipment. Normally, the highest magnetic field values around the perimeter of a substation result from overhead power lines and underground duct banks entering and leaving the substation, and are not caused by substation equipment. Therefore, the magnetic field reduction design options generally applicable to a substation project are as follows:

- Site selection for a new substation
- Setback of substation structures and major substation equipment (such as buses, transformers, and underground cable duct banks, etc.) from perimeter
- Configuring the transfer and operating buses with the transfer bus closest to the nearest property line

The Substation Checklist, as shown in Table 4, is used for evaluating the no-cost and low-cost design options considered for the substation project, the design options adopted, and reasons that certain design options were not adopted if applicable.

Table 4. Substation Checklist for Examining No-cost and Low-cost Magnetic Field Reduction Design Options			
No.	**No-Cost and Low-Cost Magnetic Field Reduction Design Options Evaluated for a Substation Project**	**Design Options Adopted? (Yes/No)**	**Reason(s) if not Adopted**
1	Are 66 kV rated transformer(s) 15 feet (or more) from the substation property line?	Yes	
	Are 66 kV rated switch-racks, capacitor banks & bus 8 feet (or more) from the substation property line?	Yes	
	Are 66 kV rated transfer & operating buses configured with the transfer bus facing the nearest property line?	Yes	
	Are underground cable duct banks greater than 12 feet from side of property line?	Yes	

Part 3: Project Alternatives

This FMP includes only "no-cost and low-cost" magnetic field reduction design options for SCE's proposed routes and Proposed Substation site. SCE's Proponent's Environmental Assessment (PEA) contains various alternative line routes and substation site(s). Comparable "no-cost and low-cost" magnetic field reduction options for the Proposed Project can be applied to all alternative subtransmission routes and substation sites. A Final FMP will be prepared should an alternative route be approved.

VI. FINAL RECOMMENDATIONS FOR IMPLEMENTING "NO-COST AND LOW-COST" MAGNETIC FIELD REDUCTION DESIGN OPTIONS

In accordance with the "EMF Design Guidelines", filed with the CPUC in compliance with CPUC Decisions 93-11-013 and 06-01-042, SCE would implement the following "no-cost and low-cost" magnetic field reduction design options for Proposed Project:

For Proposed Banducci 66 kV Subtransmission Line Route Segment 1:

- Utilizing structure heights that meet or exceed SCE's EMF preferred design criteria
- Utilizing subtransmission line construction that reduces the space between conductors compared with other designs

For Proposed Banducci 66 kV Subtransmission Line Route Segment 2:

- Utilizing structure heights that meet or exceed SCE's EMF preferred design criteria

- Utilizing subtransmission line construction that reduces the space between conductors compared with other designs

For Proposed Banducci 66/12 kV Substation:

- Placing major substation electrical equipment (such as transformers, switchracks, buses and underground duct banks) away from the substation property lines

- Configuring the transfer and operating buses with the transfer bus closest to the nearest property line

The recommended "no-cost or low-cost" magnetic field reduction design options listed above are based upon preliminary engineering designs, and therefore, they are subject to change during the final engineering designs. If the final engineering designs are different than preliminary engineering designs, SCE would implement comparable "no-cost and low-cost" magnetic field reduction design options to achieve similar EMF reductions. If the final engineering designs are significantly different (in the context of evaluating and implementing CPUC's "no-cost and low-cost" EMF Policy) than the preliminary designs, a Final FMP or an addendum to the FMP will be prepared to evaluate EMF and "no-cost and low-cost" EMF reduction options for the final engineering design.

SCE's plan for applying the above "no-cost or low-cost" magnetic field reduction design options uniformly for the Proposed Project is consistent with the CPUC's EMF Decisions No. 93-11-013 and No. 06-01-042, and also with recommendations made by the U.S. NIEHS. Furthermore, the recommendations above meet the CPUC approved EMF Design Guidelines as well as all applicable national and state safety standards for new electrical facilities.

VII. APPENDIX A: TWO-DIMENTIONAL MODEL ASSUMPTIONS AND YEAR 2016 FORECASTED LOADING CONDITIONS

Magnetic Field Assumptions:

SCE uses a computer program titled "MFields"[39] to model the magnetic field characteristics of various transmission designs options. All magnetic field models and the calculated results of magnetic field levels presented in this document are intended only for purposes of identifying the relative differences in magnetic field levels among various subtransmission line and subtransmission line design alternatives under a specific set of modeling assumptions and determining whether particular design alternatives can achieve magnetic field level reductions of 15 percent or more. The calculated results are not intended to be predictors of the actual magnetic field levels at any given time or at any specific location if and when the project is constructed.

Typical two-dimensional magnetic field modeling assumptions include:

- All subtransmission lines were modeled using forecasted peak loads (see Table 5, 6,7 and 8 below)
- All conductors were assumed to be straight and infinitely long
- Magnetic field strength was calculated at a height of three feet above ground
- Resultant magnetic fields values were presented in this FMP
- All line currents were assumed to be balanced (i.e. neutral or ground currents are not considered)
- Terrain was assumed to be flat
- Project dominant power flow directions were used.

[39] SCE, MFields for Excel, Version 2.0, 2007.

Table 5. Year 2016 Forecasted Loading Conditions for Proposed Banducci-Correction-Cummings 66 kV Subtransmission Line Segment 1	
Circuit Name	**Current (Amps)**
Proposed Banducci-Correction-Cummings 66 kV Subtransmission Line	163

Table 6. Year 2016 Forecasted Loading Conditions for Existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line without Proposed Project	
Circuit Name	**Current (Amps)**
Existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line	208

Table 7. Year 2016 Forecasted Loading Conditions for Proposed Banducci-Kern River 1 66 kV Subtransmission Line Segment 2	
Circuit Name	**Current (Amps)**
Proposed Banducci-Kern River 1 66 kV Subtransmission Line	210

Table 8. Year 2016 Forecasted Loading Conditions for Existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line without Proposed Project	
Circuit Name	**Current (Amps)**
Existing Correction-Cummings-Kern River 1 66 kV Subtransmission Line	208

Notes:

1. Forecasted loading data is based upon scenarios representing load forecasts for the second quarter of 2016. The forecasting data is subject to change depending upon availability of generations, load increase, changes in load demand, and by many other factors.
2. Load flow direction for Table 5 and 6 are assumed to be in the same direction.
3. Load flow direction for Table 7 and 8 are assumed to be in the same direction.