

Electric and Magnetic Fields Management Plan

Appendix G

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Suncrest Dynamic Reactive Power Support Project

NextEra Energy Transmission West, LLC

I. Executive Summary

NextEra Energy Transmission West, LLC (“NEET West”) provides this Field Management Plan (“FMP”) with its application requesting a certificate of public convenience and necessity (“Application”) for its proposed Suncrest Dynamic Reactive Power Support Project (“Suncrest SVC Project”). The Suncrest Project will be located in San Diego County. The Suncrest SVC Project consists of two primary components:

- A 230 kV, +300/-100 megavars (“Mvar”) dynamic reactive power support facility that will be interconnected to the San Diego Gas & Electric Company (“SDG&E”) 500/230 kV Suncrest Substation (“SVC Facility”); and
- An approximately one-mile, single-circuit, underground, 230 kV transmission line that will connect the SVC facility to the Suncrest Substation (“Underground Transmission Line”).

NEET West provides this FMP consistent with the California Public Utilities Commission (“CPUC” or “Commission”) General Order 131-D, Section X.A, which requires an application for a certificate of public convenience and necessity to “describe the measures taken or proposed by the utility to reduce the potential exposure to electric and magnetic fields [“EMF”] generated by the proposed facilities.”

As described below, because the Suncrest Project will be constructed in an undeveloped area, approximately 0.81 miles from the nearest residence, CPUC policy would require only “no-cost” design options to mitigate EMF exposure if the Commission’s EMF requirements applied to the project. However, the CPUC has approved EMF guidelines for utilities in California (the “Guidelines”), which exempt projects that are located exclusively adjacent to undeveloped land, including land under the jurisdiction of National Park Service, the State Department of Parks and

Recreation, U.S. Forest Service, or Bureau of Land Management, from the low- or no-cost mitigation evaluation.¹ The Suncrest Project is located on undeveloped, privately-owned land within the administrative boundary² of the United States Forest Service Cleveland National Forest, *i.e.*, is located exclusively adjacent to undeveloped land, and therefore is exempt under the Guidelines.

Notwithstanding NEET West's view about this exemption, and without waiving any arguments related to the applicability of the exemption to this or other projects, NEET West evaluated EMF mitigation measures in its design and construction plan and adopted certain no-cost mitigation options. The no-cost EMF mitigation design options that have been included in the Suncrest Project design are as follows:

- Locate high current devices, such as transformers, capacitors, and reactors near the center of the SVC Facility to the extent practicable.
- Locate the SVC Facility fencing so as to maximize the distance between the EMF generating equipment and the property fence to the extent practicable.
- Arrange the underground 230 kV transmission cables in a triangular configuration and install these cables at a minimum of 36 inches below grade where practicable.

NEET West's plan to incorporate the above design options is consistent with the CPUC's EMF policy and with all other applicable national and state standards for new electrical facilities.

¹ See, e.g., *Revised Electric and Magnetic Fields (EMF) Design Guidelines of San Diego Gas & Electric Company*, Advice Letter 1810-E, Section 3.4 (effective August 25, 2006).

² An area encompassing all the National Forest System lands administered by an administrative unit. The area encompasses private lands (over which the U.S. Forest Service has no jurisdiction), other governmental agency lands, and may contain National Forest System lands within the proclaimed boundaries of another administrative unit.

II. Project Description

The Suncrest SVC Project is located in an unincorporated portion of south central San Diego County approximately 3.78 miles southwest of the community of Descanso and approximately 3.36 miles southeast of the community of Alpine. The Suncrest SVC Project location is shown in the map attached to NEET West's Application as Appendix B.

The Suncrest SVC Project has two primary components, as described above: (1) the SVC Facility, which is a new +300/-100 Mvar SVC facility with a rated real power output of 0 MW, and a nominal terminal voltage of 230 kV, along with related equipment; and (2) the Underground Transmission Line, which is an approximately one-mile, 230 kV single-circuit, underground transmission line that will connect the SVC Facility to the existing Suncrest Substation. These two primary components will provide continuous reactive power response that improves and maintains the reliability of the transmission grid and increases the deliverability of renewable power.

Within the SVC Facility, NEET West's SVC consists of a thyristor-controlled reactor ("TCR"), thyristor-switched capacitors, and harmonic filters operating at medium-voltage. This configuration represents the topology most prevalent in large transmission SVC applications in the U.S. The TCR provides the Vernier (smooth) control of the SVC across its entire dynamic range. Because the TCR generates harmonics, harmonic filters are used to keep the harmonic generation of the SVC below the Institute of Electrical and Electronic Engineers - 519 specified guidelines. The harmonic filters continuously provide capacitive reactive power when energized, so the Mvar contribution of the filters must be absorbed by the TCR at or around zero Mvar output. The harmonic filters provide the flexibility to use a small portion of the SVC output to regulate steady-state voltage changes in the transmission system.

The SVC Facility will be located within an approximately six-acre parcel of privately owned land in the location shown in the map attached as Appendix B (“Project Site”). NEET West has entered into an option agreement to obtain the six-acre site to use for the Project Site and, prior to construction, will obtain fee ownership of the Project Site. The Project Site was previously disturbed. To NEET West’s knowledge, as early as 1953, the Project Site appears to have been cleared for livestock grazing purposes. From 1953 onward, the Project Site remained largely cleared of dense or woody vegetation, consisting predominantly of grasses and forbs, likely due to grazing activities. During construction of the Sunrise Powerlink Transmission Project (“Sunrise Powerlink Project”), the Project Site was used by SDG&E as a materials staging area and was completely cleared of vegetation. Following completion of construction of the Sunrise Powerlink Project, the Project Site has been in a process of being revegetated, including active planting and restoration activities by SDG&E, and has largely been undisturbed during such revegetation. Access to the SVC Facility will be via two new approximately 20-foot-wide by 70-foot-long access drives to facilitate construction, operation, and maintenance. These access drives will be located within the Project Site.

The Underground Transmission Line will consist of an approximately one-mile 230 kV transmission line that connects the SVC Facility to the Suncrest Substation. The transmission line will be installed underground within a private, existing paved road known as the Bell Bluff Truck Trail that is owned individually by SDG&E and a private landowner on parcels APN 523-030-130 and 523-040-080, respectively,³ and that provides access to the Suncrest Substation. An approximately 12-foot-wide permanent easement will be obtained from SDG&E and the private landowner to operate and maintain the Underground Transmission Line on their respective

³ Parcel APN 523-040-080 is the parcel on which the Project Site is located.

properties. The vast majority of construction activities will occur within the curbs of Bell Bluff Truck Trail, with a fraction of temporary disturbance outside the curbs. The location of the Underground Transmission Line is shown on the map in Appendix B. A detailed description of the Suncrest SVC Project is provided in Chapter 2 (Mayers) of the NEET West Testimony.

NEET West expects to complete construction and achieve operation of the Suncrest Project by May 30, 2017, which aligns with the California Independent System Operator Corporation's ("CAISO") required in-service date of June 1, 2017.

III. CPUC EMF Guidance

A. CPUC Policy on EMF

In 1993, the CPUC adopted an EMF policy for electric utility facilities and power lines.⁴ Because the Commission concluded there was no reliable scientific basis for adverse health effects from power frequency EMF, the Commission declined to adopt a specific numerical standard for EMF exposure.⁵ The Commission instead established a "no-cost and low-cost" EMF policy for California's regulated electric utilities that required new and upgraded facilities to implement no-cost or low-cost (meaning in the range of four percent of the total project cost) measures to mitigate EMF to the extent such measures were approved as part of the certification process.⁶ For a mitigation measure to be implemented, it would need to achieve a noticeable reduction in EMF exposure, although the Commission declined to specify a numerical standard.⁷

In 2004, the Commission opened a rulemaking docket to determine whether there were improvements that should be made to the EMF policy established in 1993. In 2006, the Commission issued Decision 06-01-042, which affirmed the prior finding that a direct link

⁴ Decision 93-11-013 *10-11.

⁵ *Id.* at *11.

⁶ *Id.* at *81.

⁷ *Id.* at *15.

between exposure to EMF and human health effects has yet to be proven, despite numerous studies, including a research program ordered by the Commission and conducted by the Department of Health Services.⁸ The Commission reaffirmed its existing policy of low-cost/no-cost principles to mitigating EMF exposure and set a target for low-cost EMF reductions (those that cost less than 4% of the total project cost) to show a 15% or greater reduction at the utility right-of-way.⁹ The decision also addressed the mitigation measures to be required in different land use contexts and determined that low-cost measures were not required in undeveloped areas.¹⁰ Only no-cost mitigation measures are required in undeveloped lands.¹¹

The Commission's 2006 order found that a utility workshop should be held to develop standard approaches for design guidelines, including the development of a standard table showing EMF mitigation measures and costs.¹² California utilities subsequently filed standardized EMF design Guidelines that the Commission approved as advice letters.¹³ The Guidelines describe CPUC EMF policy, describe methods for reducing magnetic fields, and outline the FMP process.

B. Applicability of EMF Mitigation Requirements to the Suncrest SVC Project

As described above, the Suncrest SVC Project is located on undeveloped, privately-owned land that is within the administrative boundary of the U.S. Forest Service Cleveland National Forest and approximately 0.81 miles from the nearest residence. Therefore, to the extent the EMF requirements were deemed to be applicable to the Suncrest SVC Project, only

⁸ Decision 06-01-042 at 19.

⁹ *Id.* at 1, 10, 19.

¹⁰ *Id.* at 9.

¹¹ *Id.* at 20.

¹² *Id.* at 21.

¹³ See, e.g., *Revised Electric and Magnetic Fields (EMF) Design Guidelines of San Diego Gas & Electric Company*, Advice Letter 1810-E (effective August 25, 2006); *Revised Electric and Magnetic Fields (EMF) Design Guidelines of Southern California Edison Company*, Advice Letter 2018-E (effective August 25, 2006).

no-cost mitigation measures would be required for the Suncrest SVC Project. However, the Guidelines provide an exemption for “Projects located exclusively adjacent to undeveloped land—including land under the jurisdiction of the National Park Service, the State Department of Parks and Recreation, U.S. Forest Service, or Bureau of Land Management” from the low- or no-cost mitigation evaluation.¹⁴ Because the Suncrest SVC Project is located on undeveloped privately-owned land and is exclusively adjacent to undeveloped land that is under the jurisdiction of the U.S. Forest Service, the Suncrest SVC Project would fall under this exemption and an FMP is not required for the project. Notwithstanding NEET West’s view about this exemption, and without waiving any arguments related to the applicability of the exemption to this or other projects, NEET West evaluated EMF mitigation measures in its design and construction plan and adopted certain no-cost mitigation options, as detailed below.

IV. Evaluation of Magnetic Field Reduction Design Options

NEET West evaluated methods to reduce the magnetic field strength levels and adopted the following measures in the project design:

1. Locate high current devices, such as transformers, capacitors, and reactors near the center of the SVC Facility to the extent practicable.
2. Locate the SVC Facility fencing so as to maximize the distance between the EMF generating equipment and the property fence to the extent practicable.
3. Arrange the underground 230 kV transmission cables in a triangular configuration and install these cables at a minimum of 36 inches below grade where practicable.

¹⁴ *Revised Electric and Magnetic Fields (EMF) Design Guidelines of San Diego Gas & Electric Company*, Advice Letter 1810-E, Section 3.4 (effective August 25, 2006).

The table below outlines all EMF measures evaluated by NEET West, whether the measure was adopted, and if not, why not.

No.	Magnetic Field Measures Evaluated for Suncrest SVC Project	Measure Adopted? (Yes/No)	Reason(s) if not Adopted?
No-Cost Measures			
1	Locate high-current devices such as transformers, capacitors, and reactors near the center of the SVC Facility to the extent practicable.	Yes	
2	Locate the SVC Facility fencing so as to maximize the distance between the EMF generating equipment and the property fence to the extent practicable.	Yes	
3	Arrange the cables in a triangular configuration and install these cables at a minimum of 36 inches below grade where practicable.	Yes*	*Certain in-ground obstacles along the route may require a flat configuration for the cables
Other Measures			
4	Purchase additional property to increase the setback distance from the property boundary.	No	Additional property cannot be obtained. Even if additional property were available, this is not a no-cost option
5	Increase the burial depth of the duct bank.	No	Due to existing rock conditions, increasing the burial depth is not a no-cost option
6	Decrease cable spacing with use of a special cable spacer.	No	Decreasing the cable spacing further would require a special concrete mix and/or additional thermal backfill and would therefore not be a no-cost option