C.6 Public Health and Safety

This section provides an introduction to public health and safety impacts associated with the construction and operation of the proposed Project and alternatives to the proposed Project. Specifically, this section addresses the following issues: environmental contamination and hazardous materials; electric and magnetic fields (EMFs); and non-EMF electric power field issues (radio/television/electronic equipment interference; induced currents and shock hazards; wind, earthquake, and fire hazards; and cardiac pacemakers).

Contamination and Hazardous Materials

No Phase I Environmental Site Assessments (ESAs) have been or were conducted as part of this study. However, SCE has committed to conduct Phase I ESA studies in areas of planned ground disturbance prior to project construction. To aid in evaluation of impacts from Project-related contamination, sites with known and potential contamination along or near the proposed transmission line route were researched by review of online environmental databases and identification of land uses associated with hazardous material use. The purpose of this review was to better define the areas where hazardous waste contaminated sites may impact construction activities. The primary reason to define potentially hazardous sites is to protect worker health and safety and to minimize public exposure to hazardous materials during construction and waste handling. If encountered, contaminated soil may qualify as hazardous waste, thus requiring handling and disposal according to local, State, and federal regulations.

Electric and Magnetic Fields

Recognizing that there is a great deal of public interest and concern regarding potential health effects from exposure to EMFs from power lines, this section provides information regarding EMF associated with electric utility facilities and the potential effects of the proposed Project related to public health and safety. Potential health effects from exposure to electric fields from power lines is typically not of concern since electric fields are effectively shielded by materials such as trees, walls, etc., therefore, the majority of the following information related to EMF focuses primarily on exposure to magnetic fields from power lines. However, this section does not consider magnetic fields in the context of CEQA/NEPA and determination of environmental impact, first because there is no agreement among scientists that EMF does create a potential health risk, and second because there are no defined or adopted CEQA/NEPA standards for defining health risk from EMF. As a result, EMF information is presented for the benefit of the public and decision-makers.

Defining EMF

EMFs are separate phenomena and occur both naturally and as a result of human activity across a broad electrical spectrum. Naturally occurring EMFs are caused by the weather and the earth's geomagnetic field. The fields caused by human activity result from technological application of the electromagnetic spectrum for uses such as communications, appliances, and the generation, transmission, and local distribution of electricity.

The frequency of a power line is determined by the rate at which EMFs change their direction each second. For power lines in the United States, the frequency of change is 60 times per second and is defined as 60 Hertz (Hz) power. In Europe and many other countries, the frequency of electric power is 50 Hz. Radio and communication waves operate at much higher frequencies: 500,000 Hz to 1,000,000,000 Hz. The information presented in this document is limited to the EMF from power lines at frequencies of 50 or 60 Hz.

Electric power flows across transmission systems from generating sources to serve electrical loads within the community. The apparent power flowing over a transmission line is determined by the transmission line's voltage and the current. The higher the voltage level of the transmission line, the lower the amount of current needed to deliver the same amount of power. For example, a 115-kV transmission line with 200 amps of current would transmit approximately 40,000 kilowatts (kW), and a 230-kV transmission line requires only 100 amps of current to deliver the same 40,000 kW.

Non-EMF Electric Power Field Issues

Other public concerns related to electric power facility projects are both safety and nuisance issues, including:

- Wind, earthquake, and fire hazards
- Radio/television/electronic equipment interference
- Induced currents and shock hazards
- Potential conflicts with cardiac pacemakers

Each of these potential non-EMF electric power field issues is described in Section C.6.1 (Affected Environment), below.

C.6.1 Affected Environment

C.6.1.1 Regional Overview

Contamination and Hazardous Materials

The proposed transmission line for the proposed Antelope-Pardee 500-kV Transmission Project traverses land utilized for a variety of uses including: open-space recreation and preserve, residential housing, recreational, and commercial businesses. Existing and past land use activities are potential indicators of hazardous material storage and use. For example, many industrial sites, historic and current, have soil or groundwater contamination by hazardous substances. Other hazardous materials sources include leaking underground tanks in commercial and rural areas, contaminated surface runoff from polluted sites orchards, and contaminated groundwater plumes that may exist along the transmission line route. However, a review of readily available online environmental databases, consisting of the California State Water Resources Control Board (SWRCB) Geotracker (SWRCB, 2005), the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) databases (USEPA, 2005), and the California Department of Toxic Substance Control (DTSC) databases (DTSC, 2005) indicate there are no known active hazardous waste sites within the Project right-of-way (ROW) or within 1,000 feet of the ROW.

Electric and Magnetic Fields

Public exposure to EMFs in developed areas is widespread and encompasses a very broad range of field intensities and durations. In developed areas, EMFs are prevalent from the use of electronic appliances or equipment and existing electric power lines. In general, distribution lines exist throughout developed portions of the community and represent the predominant source of public exposure to power line EMF. Transmission lines are much less prevalent in most developed areas and therefore they generally represent a much lower contribution to overall public exposure to power line EMF. In undeveloped and natural areas, only low level naturally occurring EMFs exist.

Electric Fields

Electric fields from power lines are created whenever the lines are energized, with the strength of the field dependent directly on the voltage of the line creating it. Electric field strength is typically described in terms of kilovolts per meter (kV/m). Electric field strength attenuates (reduces) rapidly as the distance from the source increases. Electric fields are reduced at many receptors because they are effectively shielded by most objects or materials such as trees or houses.

At reasonably close distances, electric fields of sufficient strength in the vicinity of power lines can cause the same phenomena as the static electricity experienced on a dry winter day, or with clothing just removed from a clothes dryer, and may result in electric discharges when touching long metal fences, pipelines, or large vehicles. An acknowledged potential impact to public health from electric transmission lines is the hazard of electric shock: electric shocks from transmission lines are generally the result of accidental or unintentional contact by the public with the energized wires.

Magnetic Fields

Magnetic fields from power lines are created whenever current flows through power lines at any voltage. The strength of the field is directly dependent on the current in the line. Magnetic field strength is typically measured in milliGauss (mG). Similar to electric fields, magnetic field strength attenuates rapidly with distance from the source. However, unlike electric fields, magnetic fields are not easily shielded by objects or materials.

The nature of a magnetic field can be illustrated by considering a household appliance. When the appliance is energized by being plugged into an outlet but not turned on so no current would be flowing through it, an electric field is generated around the cord and appliance, but no magnetic field is present. If the appliance is switched on, the electric field would still be present and a magnetic field would also be created. The electric field strength is directly related to the magnitude of the voltage from the outlet and the magnetic field strength is directly related to the magnitude of the current flowing in the cord and appliance.

Non-EMF Electric Power Field Issues

Wind, Earthquake, and Fire Hazards

Transmission line structures used to support overhead transmission lines must meet the requirements of the California Public Utilities Commission, General Order No. 95, Rules for Overhead Electric Line Construction. This design code and the National Electrical Safety Code include loading requirements related to wind conditions. Transmission support structures are designed to withstand different combinations of loading conditions including extreme winds. These design requirements include use of safety factors that consider the type of loading as well as the type of material used, e.g., wood, steel or concrete. Failures of transmission line support structures are extremely rare and are typically the result of anomalous loading conditions such as tornadoes or ice-storms.

Overhead transmission lines consist of a system of support structures and interconnecting wire that is inherently flexible. Industry experience has demonstrated that under earthquake conditions structure and member vibrations generally do not occur or cause design problems. Overhead transmission lines are designed for dynamic loading under variable wind conditions that generally exceed earthquake loads. Earthquake conditions could result in damage or faults to underground transmission lines. The underground transmission line considered for Alternative 1 uses solid dielectric cable, which does not present the environmental or fire hazards that may be associated with oil-filled cable types.

Electrical arcing from power lines can represent a fire hazard. This phenomenon is more prevalent for lower voltage distribution lines since these lines are typically on shorter structures and in much greater proximity to trees and vegetation. Fire hazards from high voltage transmission lines are greatly reduced through the use of taller structures and wider ROWs. Further, transmission line ROWs are cleared of trees to control this hazard. Fire hazards due to a fallen conductor from an overhead line are minimal due to system protection features. Overhead high voltage transmission lines include system protection designed to safeguard the public and line equipment. These protection systems consist of transmission line relays and circuit breakers that are designed to rapidly detect faults and cut-off power to avoid shock and fire hazards. This equipment is typically set to operate in 2 to 3 cycles, representing a time interval range from 2/60 of a second to 3/60 of a second.

Radio/Television/Electronic Equipment Interference

Although corona can generate high frequency energy that may interfere with broadcast signals or electronic equipment, this is generally not a problem for transmission lines. The Institute of Electrical and Electronic Engineers (IEEE) has published a design guide (IEEE, Radio Noise Subcommittee, 1971) that is used to limit conductor surface gradients so as to avoid electronic interference.

Gap discharges or arcs can also be a source of high frequency energy. Gap discharges occur when an arc forms across a gap in loose or worn line hardware. It is estimated that over 90 percent of interference problems for electric transmission lines are due to gap discharges. Line hardware is designed to be problem-free, but wind motion, corrosion, and other factors can create a gap discharge condition. When identified, gap discharges can be located and remedied by utilities.

Induced Currents and Shock Hazards

Power line fields can induce voltages and currents on conductive objects, such as metal roofs or buildings, fences, and vehicles. When a person or animal comes in contact with a conductive object a perceptible current or small secondary shock may occur. Secondary shocks cause no physiological harm; however, they may present a nuisance.

Cardiac Pacemakers

An area of concern related to electric fields from transmission lines has been the possibility of interference with cardiac pacemakers. There are two general types of pacemakers: asynchronous and synchronous. The asynchronous pacemaker pulses at a predetermined rate. It is generally immune to interference because it has no sensing circuitry and is not exceptionally complex. The synchronous pacemaker, however, pulses only when its sensing circuitry determines that pacing is necessary. Interference from transmission line electric field may cause a spurious signal on the pacemaker's sensing circuitry. However, when these pacemakers detect a spurious signal, such as a 60 Hz signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation, returning to synchronous operation within a specified time after the signal is no longer detected. Cardiovascular specialists do not consider prolonged asynchronous pacing a problem, since some pacemakers are designed to operate that way. Periods of operation in this mode are commonly induced by cardiologists to check pacemaker performance. So, while transmission line electric fields may interfere with the normal operation of some of the older model pacemakers, the result of the interference is generally not harmful, and is of short duration (EPRI, 1985 and 1979).

C.6.1.2 Proposed Antelope-Pardee 500-kV Transmission Alignment

Contamination and Hazardous Materials

Based on the online environmental database review, there are no known hazardous release sites within the proposed Project ROW. However, unknown contamination could be present within the ROW due to nearby past and current uses in the vicinity. Examples of past and current land uses that could have resulted in unknown contamination include the following: rural residences and farms that commonly have old or inactive underground fuel tanks (USTs); pesticide-polluted runoff from agricultural properties; commercial and industrial sites (historic and current) that could have soil or groundwater contamination from unreported hazardous substance spills. The paragraphs below provide general descriptions of the existing uses in the vicinity of the proposed ROW or designated Utility Corridor.

Antelope Substation to ANF Boundary (Mile 0 to 5.7)

From Mile 0 to 5.7, the proposed transmission alignment traverses rural residential, agricultural, and undeveloped land. The rural residential properties and agricultural land are primarily located between Avenue K (Mile 1.7) and the California Aqueduct (Mile 2.8) and in the Leona Valley (south of Mile 4.0).

Angeles National Forest (Mile 5.7 to 18.6)

The proposed transmission alignment would traverse undeveloped and open-space recreational land within the Angeles National Forest (ANF) from approximately Mile 5.7 to 18.6. The undeveloped and open-space land consists primarily of hill and valley terrain covered with scrub brush, grasses, and scattered trees.

ANF Boundary to Pardee Substation (Mile 18.6 to 25.6)

This portion of the proposed transmission alignment traverses undeveloped, residential, and light industrial areas. The alignment crosses primarily undeveloped hill and valley terrain from the ANF boundary (Mile 18.6) to approximately Mile 20.5. From Mile 20.5 to approximately 24.8, the alignment passes through hillside suburban developments within the existing Pardee-Vincent ROW. These suburban hillside developments consist primarily of single-family homes, some multi-family apartment and condominium complexes, and scattered parks and recreational areas. The final portion of the alignment, Mile 24.8 to 25.6, traverses a mix of multi-family residential, commercial, and light industrial uses.

Electric and Magnetic Fields

For the purpose of examining EMFs, SCE divided the Project into five areas considering changes in characteristics of the transmission corridor (i.e., changes in the number of transmission lines in the corridor, changes to tower type).

Area 1 – Antelope Substation to Angeles National Forest Boundary

In Area 1, the Antelope-Pardee 500-kV transmission line replaces the Antelope PS 74 66-kV transmission line. In this area the proposed Antelope-Pardee line would pass through generally undeveloped lands. Although undeveloped EMFs are present the vicinity of the existing 66-kV power line corridor. Public exposure to EMF in undeveloped areas would be limited primarily due to the absence of the public; however, periodic and transient uses of these areas for activities such as recreation or future development would result in public exposure to EMF when in the vicinity of existing electric transmission lines.

Area 2 – Angeles National Forest

In Area 2, the Antelope-Pardee 500-kV transmission line replaces the Antelope PS 74 66-kV transmission line. In this area the proposed Antelope-Pardee line would pass through National Forest lands which are undeveloped. Although undeveloped EMFs are present the vicinity of the existing 66-kV power line corridor. Public exposure to EMF in undeveloped areas would be limited primarily due to the absence of the public; however, periodic and transient uses of these areas for activities such as recreation would result in public exposure to EMF when in the vicinity of existing electric transmission lines.

Area 3 – Angeles National Forest Boundary (Mile 18.6) to Mile 20.3

In Area 3, the Antelope-Pardee 500-kV transmission line exits the National Forest onto a new right-of-way where there are no existing power lines. In this area the proposed Antelope-Pardee line would pass through undeveloped lands and no EMFs are present. Public exposure to EMF in undeveloped areas would be limited primarily due to the absence of the public; however, periodic and transient uses of these areas for activities such as recreation would result in public exposure to EMF when in the vicinity of existing electric transmission lines.

Area 4 – Mile 20.3 to Mile 22.3

In Area 4, the Antelope-Pardee 500-kV transmission line turns west onto an existing transmission line right-of-way and parallels the Pardee-Vincent No 1 500-kV line and the Pardee-Eagle Rock 220-kV line. In this area, the proposed Antelope-Pardee line would pass through mostly developed lands. The developed areas include significant residential development. In developed areas, EMFs are prevalent from the use of electronic appliances or equipment and existing electric power lines. In general, distribution lines exist throughout developed portions of the community and represent the predominant source of public exposure to power line EMF except in the immediate vicinity of transmission corridors.

Area 5 – Mile 22.3 to Pardee Substation (Mile 25.6)

In Area 5, the Antelope-Pardee 500-kV transmission line turns southwest and is constructed on double-circuit towers with the existing Pardee-Vincent 500-kV line within an existing transmission line right-of-way. In this right-of-way the proposed project parallels the Antelope-PS 74 66-kV line, the Saugus-Haskell-Solemint 66-kV line and the Orion 16-kV line. In this area the proposed Antelope-Pardee line would pass through mostly developed lands. The developed areas include significant residential development. In developed areas, EMFs are prevalent from the use of electronic appliances or equipment and existing electric power lines. In general, distribution lines exist throughout developed portions of the community and represent the predominant source of public exposure to power line EMF except in the immediate vicinity of transmission corridors.

Based on the information provided by SCE, Table C.6-1 identifies the environmental setting as the magnetic field at the edge of existing ROWs prior to development of the Antelope-Pardee 500-kV transmission line.

Table C.6-1. Existing Magnetic Field Levels at Edge of ROW, Prior to Proposed Project (mG)

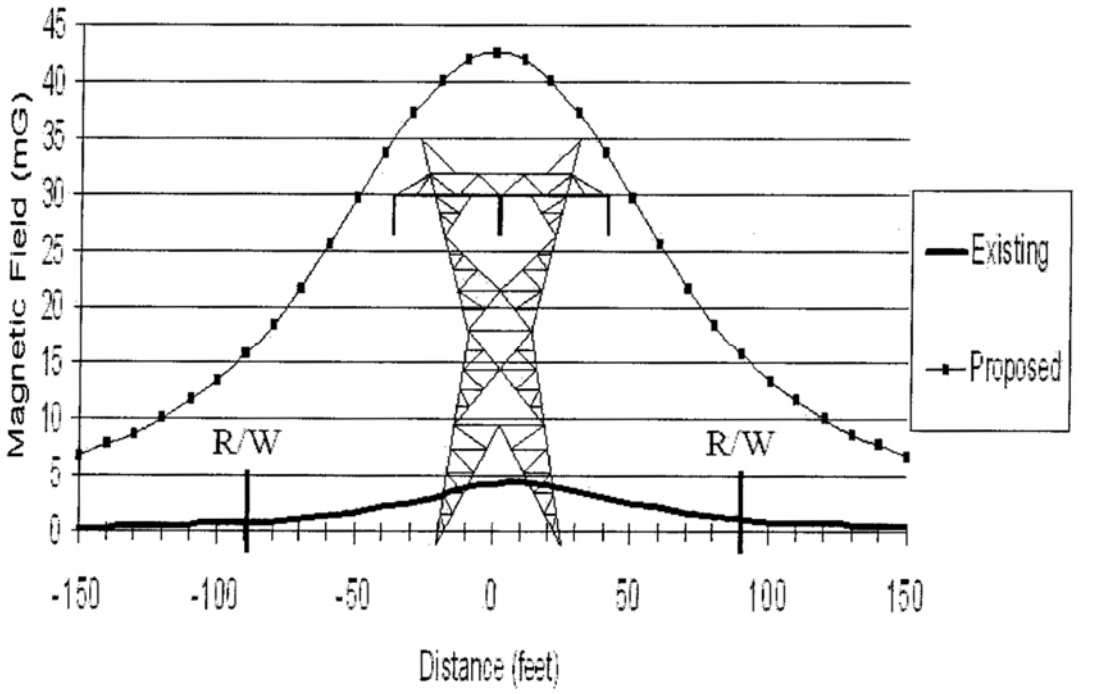
Area ID	Left Side	Right Side
1	0.8	1.2
2	0.2	0.2
3	0	0
4	2.0	11.7
5	23.0	12.5

Source: SCE, 2004b, Appendix B.

SCE's magnetic field computer modeling results graph the calculated magnetic field strength, without the proposed Project (existing conditions) and with the proposed Project, for an area extending 150 to 200 feet each side of the right-of-way. These results are shown in Figures C.6-1 through

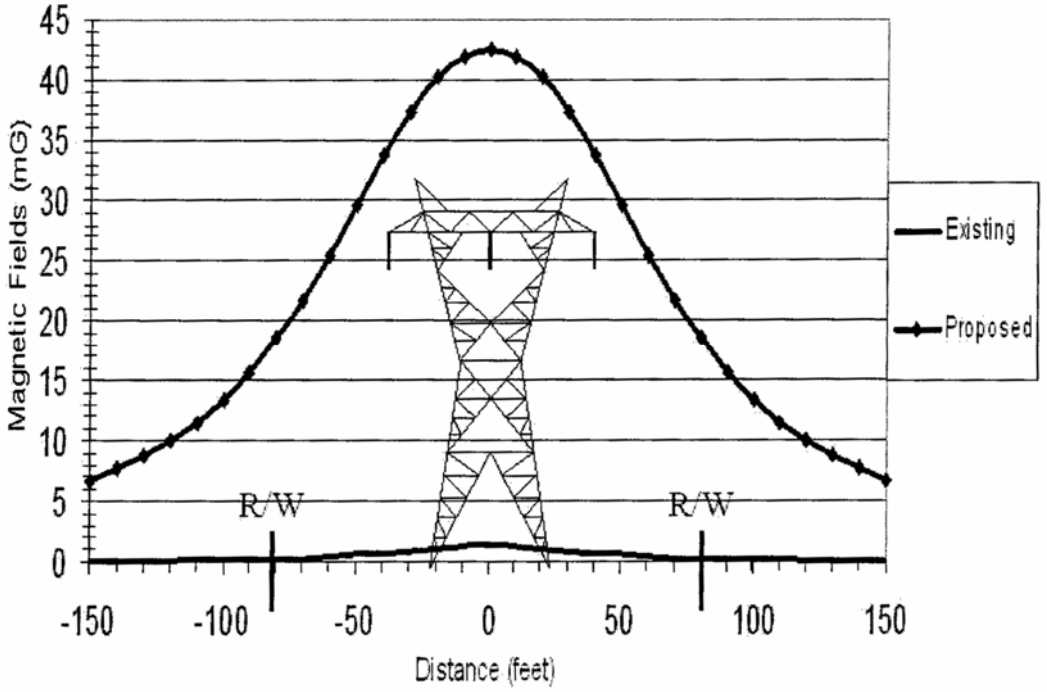
C.6.5.

Figure C.6-1. Mile 0 to Mile 5.7 (Area 1) – Calculated Magnetic Field Levels for Existing and Proposed Project Scenarios



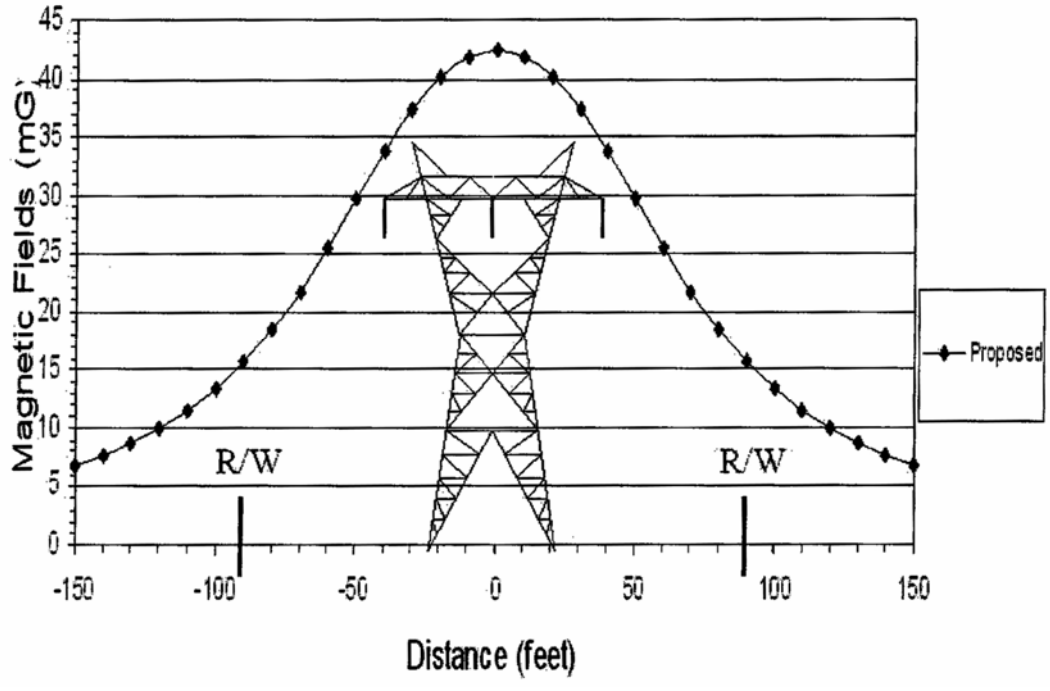
Source: SCE 2004b, Appendix B, Figure 11; Note: Not drawn to scale. ROW and tower location are approximate.

Figure C.6-2. Mile 5.7 to Mile 18.6 (Area 2) – Calculated Magnetic Field Levels for Existing and Proposed Project Scenarios



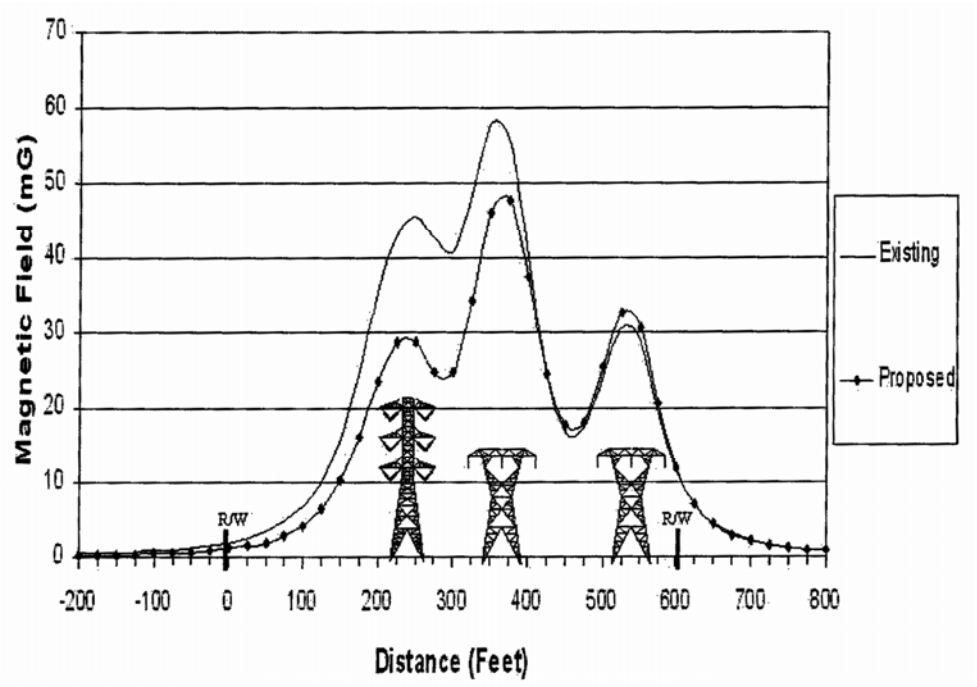
Source: SCE 2004b, Appendix B, Figure 12; Note: Not drawn to scale. ROW and tower location are approximate.

Figure C.6-3. Mile 18.6 to Mile 20.3 (Area 3) – Calculated Magnetic Field Levels for the Proposed Project Scenario



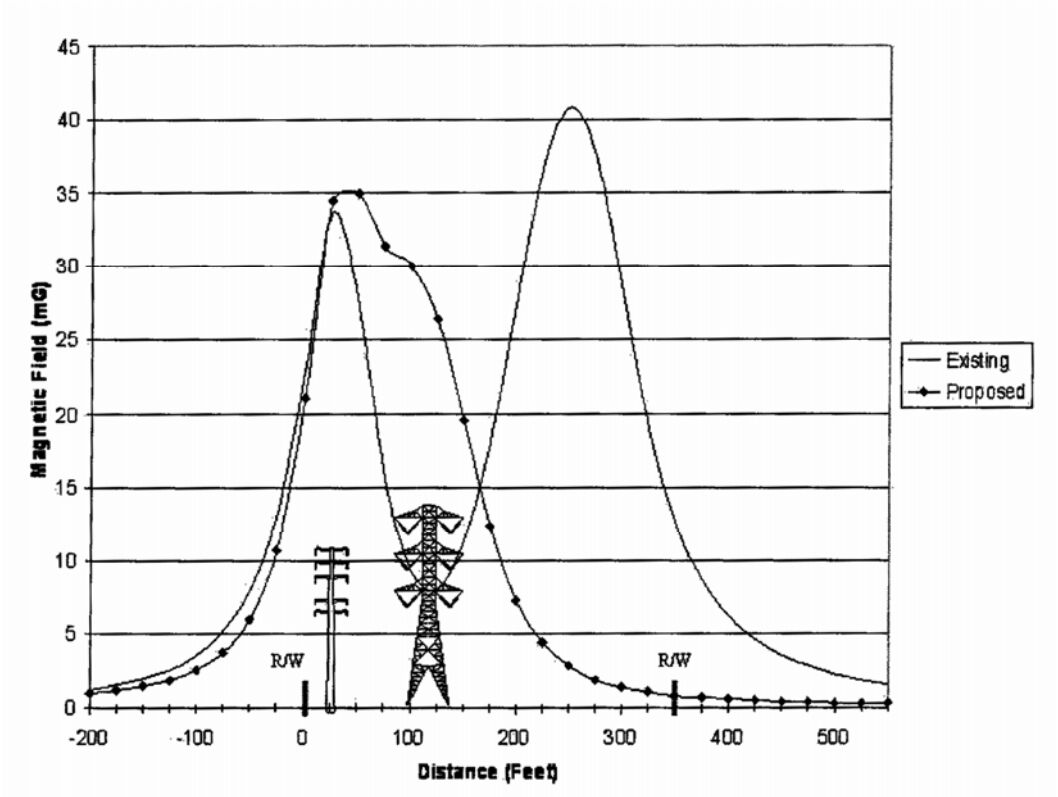
Source: SCE 2004b, Appendix B, Figure 13.; Note: Not drawn to scale. ROW and tower location are approximate.

Figure C.6-4. Mile 20.3 to Mile 22.3 (Area 4) – Calculated Magnetic Field Levels for Existing and Proposed Project Scenarios (Looking East)



Source: SCE 2004b, Appendix B, Figure 14; Note: Not drawn to scale. ROW and tower locations are approximate.

Figure C.6-5. Mile 22.3 to Mile 25.6 (Area 5) – Calculated Magnetic Field Levels for Existing and Proposed Project Scenarios



Source: SCE 2004b, Appendix B, Figure 15; Note: Not drawn to scale. ROW and tower locations are approximate.

Electric fields from power lines do not typically pose interference problems for electronic equipment in businesses since the equipment is shielded by buildings and walls. However, magnetic fields can penetrate buildings and walls thereby interacting with electronic equipment. Depending upon the sensitivity of equipment, the magnetic fields can interfere with equipment operation. Review of this phenomenon in regard to the sensitivity of electrical equipment identifies a number of thresholds for magnetic field interference. Interference with typical computer monitors can be detected at magnetic field levels of 10 mG and above, while large screen or high-resolution monitors can be susceptible to interference at levels as low as 5 mG. Other specialized equipment, such as medical equipment or testing equipment can be sensitive at levels below 5 mG. Equipment that may be susceptible to very low magnetic field strengths is typically installed in specialized and controlled environments, since even building wiring, lights, and other equipment can generate magnetic fields of 5 mG or higher.

The most common electronic equipment that can be susceptible to magnetic field interference is probably computer monitors. Magnetic field interference results in disturbances to the image displayed on the monitor, often described as screen distortion, "jitter," or other visual defects. In most cases, it is annoying and, at its worst, it can prevent use of the monitor. This type of interference is a recognized problem in the video monitor industry. As a result, there are manufacturers who specialize in monitor interference solutions and shielding equipment. Possible solutions to this problem include: relocation of the monitor, use of magnetic shield enclosures, software programs, and replacement of cathode ray tube monitors with liquid crystal displays that are not susceptible to magnetic field interference.

Non-EMF Electric Power Field Issues

The potential for non-EMF electric power field issues to occur in the area of the proposed Antelope-Pardee 500-kV transmission line route is the same as described for the Regional Overview in Section C.6.1.1, above. This includes the following non-EMF electric power field issues: radio/television/electronic equipment interference; induced currents and shock hazards, wind, earthquake, and fire hazards; potential conflicts with cardiac pacemakers.

C.6.1.3 Substations

Contamination and Hazardous Materials

Antelope Substation

The Antelope Substation is located in the outskirts of the City of Lancaster, in a rural area consisting primarily of undeveloped grasslands. An environmental investigation of the Antelope Substation was conducted by Southern California Edison (SCE) in September 2004 (SCE, 2004a) which included soil testing conducted by Advanced Technology Laboratories of Signal Hill, California. This investigation included soil sampling and testing at various locations proposed for the additions to the substation; soil samples were tested for Total Petroleum Hydrocarbons (TPH), polychlorinated biphenyls (PCBs), CAM (California Assessment Method) Metals, and Volatile Organic Compounds (VOCs). Low levels of CAM Metals, below the regulatory action levels, were detected in the soil samples. The presence of PCBs below the California Assessment Code Title 26 TTLC of 50 parts per million (ppm) and below the Preliminary Remediation Goals set by EPA Region 9 were detected in composite samples. All samples tested for TPH and VOCs were non-detect. This indicates that soils at the substation have not been adversely or significantly impacted by hazardous material use, handling, and storage practices.

Pardee Substation

The Pardee Substation is located near the northern edge of Santa Clarita in a primarily light industrial area. A review of the SWRCB Geotracker database revealed the presence of several sites with leaking underground storage tanks in the vicinity of the Pardee Substation (SWRCB, 2005). However, all of the identified tanks are located down gradient of the Pardee Substation and are not likely to have resulted in environmental contamination at the substation.

An environmental investigation was conducted by SCE in October 2003, for the Pardee Substation (SCE, 2003) which included soil testing conducted by Advanced Technology Laboratories of Signal Hill, California. This investigation included soil sampling and testing for TPH, PCBs, CAM Metals, and VOCs. Low levels of TPH that were well below the regulatory action level of 60 ppm were detected in two of the samples, and traces of CAM Metals that were below action levels were detected in one sample. All other constituents tested were non-detect. This indicates that soils at the substation have not been adversely or significantly impacted by hazardous material use, handling, and storage practices.

Electric and Magnetic Fields

The environment around the existing Antelope and Pardee Substations includes EMFs with magnetic fields that are predominated by the fields from the transmission and distribution lines that enter or exit the substations. While it is the case that station buswork, substation equipment, and transmission and distribution lines entering or exiting a station all contribute electromagnetic fields to the immediate environment of an existing substation, the most significant contributor to the EMFs are the transmission and distribution lines.

Non-EMF Electric Power Field Issues

The potential for non-EMF electric power field issues to occur at the either Antelope Substation or Pardee Substation is the same as described for the Regional Overview in Section C.6.1.1, above. This includes the following non-EMF electric power field issues: radio/television/electronic equipment interference; induced currents and shock hazards, wind, earthquake, and fire hazards; potential conflicts with cardiac pacemakers.

C.6.2 Regulatory Framework

Contamination and Hazardous Materials

Hazardous substances are defined by State and federal regulations to protect public health and the environment. Hazardous materials have certain chemical, physical, or infectious properties that cause them to be considered hazardous. Hazardous substances are defined in CERCLA Section 101(14), and also in the California Code of Regulations (CCR), Title 22, Chapter 11, Article 2, Section 66261, which provides the following definition:

> *A hazardous material is a substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed.*

For this analysis, soil that is excavated from a site containing hazardous materials would be considered to be a hazardous waste if it exceeded specific CCR Title 22 criteria, or, on National Forest System lands, if it exceeded criteria defined in CERCLA or other relevant federal regulations. Remediation (cleanup and safe removal/disposal) of hazardous wastes found at a site is required if excavation of these materials is performed;

it may also be required if certain other activities are proposed. Even if soils or groundwater at a contaminated site do not have the characteristics required to be defined as hazardous wastes, remediation of the site may be required by regulatory agencies subject to jurisdictional authority. Cleanup requirements are determined on a case-by-case basis by the agency taking lead jurisdiction.

Federal

The Federal Toxic Substances Control Act (1976) and the Resource Conservation and Recovery Act of 1976 (RCRA) established a program administered by the U.S. Environmental Protection Agency (EPA) for the regulation of the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA was amended in 1984 by the Hazardous and Solid Waste Act (HSWA), which affirmed and extended the "cradle to grave" system of regulating hazardous wastes. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by HSWA.

CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, and/or contaminants. The NCP also established the National Priorities List (NPL). CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) on October 17, 1986.

State

According to Title 22 (Chapter 11 Article 3, California Code of Regulations [CCR]), substances having a characteristic of toxicity, ignitability, corrosivity, or reactivity are considered hazardous. Hazardous wastes are hazardous substances that no longer have a practical use, such as material that has been abandoned, discarded, spilled, contaminated, or is being stored prior to proper disposal.

The California Environmental Protection Agency (CALEPA) was created in 1991, which unified California's environmental authority in a single Cabinet level agency and brought the Air Resources Board (ARB), State Water Resources Control Board (SWRCB), Regional Water Quality Control Boards (RWQCBs), Integrated Waste Management Board (IWMB), DTSC, Office of Environmental Health Hazard Assessment (OEHHA), and Department of Pesticide Regulation (DPR) under one agency. These agencies were placed within the Cal/EPA "umbrella" to create a cabinet level voice for the protection of human health and the environment and to assure the coordinated deployment of State resources. Their mission is to restore, protect and enhance the environment, to ensure public health, environmental quality, and economic vitality.

The California Hazardous Waste Control Law (HWCL) is administered by CALEPA to regulate hazardous wastes. While the HWCL is generally more stringent than RCRA, until the EPA approves the California program, both the State and federal laws apply in California. The HWCL lists 791 chemicals and about 300 common materials that may be hazardous; establishes criteria for identifying, packaging and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal and transportation; and identifies some wastes that cannot be disposed of in landfills.

Department of Toxic Substances Control

DTSC is a department of CALEPA and is the primary agency in California that regulates hazardous waste, cleans-up existing contamination, and looks for ways to reduce the hazardous waste produced in California. DTSC regulates hazardous waste in California primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning. DTSC operates programs to:

- Deal with the aftermath of improper hazardous waste management by overseeing site cleanups.
- Prevent releases of hazardous waste by ensuring that those who generate, handle, transport, store and dispose of wastes do so properly.
- Take enforcement actions against those who fail to manage hazardous wastes appropriately.
- Explore and promote means of preventing pollution, and encourage reuse and recycling.
- Evaluate soil, water and air samples taken at sites, and develop new analytical methods.
- Practice other environmental sciences, including toxicology, risk assessment, and technology development.
- Involve the public in DTSC's decision-making.

Hazardous Material Worker Safety

The California Occupational Safety and Health Administration (Cal/OSHA) is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. Cal/OSHA standards are generally more stringent than federal regulations. The employer is required to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR Sections 337-340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings.

Local

Los Angeles County

The County of Los Angeles Fire Department, Health Hazardous Materials Division is the agency responsible for regulating and monitoring hazardous material use and storage in unincorporated and most incorporated areas of Los Angeles County. Its mission is to protect the public health and the environment throughout Los Angeles County from accidental releases and improper handling, storage, transportation, and disposal of hazardous materials and wastes through coordinated efforts of inspections, emergency response, enforcement, and site mitigation oversight (LACFD, 2005).

The County of Los Angeles Department of Public Works, Environmental Programs Division oversees permitting and inspection of underground storage tanks and regulates all unauthorized releases from underground storage tanks. The Los Angeles County Underground Storage Tank Program was established in 1983, and its goal is to protect the public, the environment, and UST owners and operators by ensuring the UST facilities are permitted, designed/installed/modified, operating, and eventually closed in compliance with local, State, and federal requirements.

Electric and Magnetic Fields

Policies, Standards, and Regulations

A number of counties, states, and local governments have adopted or considered regulations or policies related to EMF exposure. The reasons for these actions have been varied; in general, however, the actions can be attributed to addressing public reaction to and perception of EMF as opposed to responding to the findings of any specific scientific research. Following is a brief summary of regulatory activity regarding EMF.

International Guidelines

The International Radiation Protection Association, in cooperation with the World Health Organization, has published recommended guidelines (INRC, 1998) for electric and magnetic field exposures. For the general public, the limits are 4.2 kV/m for electric fields, and 833 mG for magnetic fields. Neither of these organizations has any governmental authority nor recognized jurisdiction to enforce these guidelines. However, because they were developed by a broad base of scientists, these guidelines have been given merit and are considered by utilities and regulators when reviewing EMF levels from electric power lines.

National Guidelines

Although the U.S. EPA has conducted investigations into EMF related to power lines and health risks, no national standards have been established. The number of studies sponsored by the U.S. EPA, the Electric Power Research Institute (EPRI), and other institutions has increased in the past few years. Several bills addressing EMF have been introduced at the congressional level and have provided funding for research; however, no bill has been enacted that would regulate EMF levels.

The 1999 NIEHS report to Congress suggested that the evidence supporting EMF exposure as a health hazard was insufficient to warrant aggressive regulatory actions. The report did suggest passive measures to educate the public and regulators on means aimed at reducing exposures. NIEHS also suggested the power industry continue its practice of siting lines to reduce public exposure to EMF and to explore ways to reduce the creation of magnetic fields around lines.

State Guidelines

Several states have adopted limits for electric field strength within transmission line ROWs. Florida and New York are the only states that currently limit the intensity of magnetic fields from transmission lines. These regulations include limits within the ROW as well as at the edge of the ROW and cover a broad range of values. Table C.6-2 lists the states regulating EMF and their respective limits. The magnetic field limits were based on an objective of preventing field levels from increasing beyond levels currently experienced by the public and are not based upon any link between scientific data and health risks (Morgan, 1991).

Table C.6-2. EMF Regulated Limits (by State)

State	Electric Field (kV/M)	Magnetic Field (mG)	Location	Application
Florida (codified)				
500-kV Lines	10		In ROW	Single circuit
	2	200	Edge of ROW	Single circuit
	2	250	Edge of ROW	Double circuit
230-kV Lines or less	8		In ROW	

	2	150	Edge of ROW	230-kV lines or less
Minnesota	8		In ROW	>200 kV
Montana (codified)	1		Edge of ROW	>69 kV
	7		In ROW	Road crossings
New Jersey	3		Edge of ROW	Guideline for complaints
New York	1.6	200	Edge of ROW	>125 kV, >1 mile
	7		In ROW	Public roads
	11		In ROW	Public roads
	11.8		In ROW	Other terrain
North Dakota	9		In ROW	Informal
Oregon (codified)	9		In ROW	230 kV, 10 miles

Source: Public Utilities Commission of Texas, 1992.

Elsewhere in the United States, several agencies and municipalities have taken action regarding EMF policies. These actions have been varied and include requirements that the fields be considered in the siting of new facilities. The manner in which EMF is considered has taken several forms. In a few instances, a concept referred to as "prudent avoidance" has been formally adopted. Prudent avoidance, a concept proposed by Dr. Granger Morgan of Carnegie-Mellon University, is defined as ". . . limiting exposures which can be avoided with small investments of money and effort." (Morgan, 1991) Some municipalities or regulating agencies have proposed limitations on field strength, requirements for siting of lines away from residences and schools, and, in some instances, moratoria on the construction of new transmission lines. The origin of these individual actions has been varied, with some initiated by regulators at the time of new transmission line proposals within their community, and some by public grass-roots efforts.

CPUC Guidelines

In 1991, the CPUC initiated an investigation into EMFs associated with electric power facilities. This investigation explored the approach to potential mitigation measures for reducing public health impacts and possible development of policies, procedures or regulations. Following input from interested parties the CPUC implemented a decision (D.93-11-013) that requires that utilities use "low-cost or no-cost" mitigation measures for facilities requiring certification under General Order 131-D.[1] The decision directed the utilities to use a 4 percent benchmark on the low-cost mitigation. This decision also implemented a number of EMF measurement, research, and education programs, and provided the direction that led to the preparation of the DHS study described above. The CPUC did not adopt any specific numerical limits or regulation on EMF levels related to electric power facilities. Most recently the CPUC issued Decision D.06 01 042, on January 26, 2006, affirming the low-cost/no-cost policy to mitigate EMF exposure from new utility transmission and substation projects. This decision also adopted rules and policies to improve utility design guidelines for reducing EMF. The CPUC stated "at this time we are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences." The CPUC has not adopted any specific limits or regulation on EMF levels related to electric power facilities. Most recently the CPUC issued Decision D.06 01 042, on January 26, 2006, affirming the low-cost/no-cost policy to mitigate EMF exposure from new utility transmission and substation projects. This decision also adopted rules and policies to improve utility design guidelines for reducing EMF. The CPUC stated "at this time we

are unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences." The CPUC has not adopted any specific limits or regulation on EMF levels related to electric power facilities.

In Decision D.93-11-013, the CPUC addressed mitigation of EMF of utility facilities and implemented the following recommendations:

- No-cost and low-cost steps to reduce EMF levels
- Workshops to develop EMF design guidelines
- Uniform residential and workplace programs
- Stakeholder and public involvement
- A four-year education program
- A four-year non-experimental and administrative research program
- An authorization of federal experimental research conducted under the National Energy Policy Act of 1992.

Non-EMF Electric Power Field Issues

Wind, Earthquake, and Fire Hazards

Transmission line structures used to support overhead transmission lines must meet the requirements of the CPUC, General Order No. 95, Rules for Overhead Electric Line Construction. This design code and the National Electrical Safety Code include loading requirements related to wind conditions.

Radio/Television/Electronic Equipment Interference

There are no local, State, or federal regulations with specific limits on high frequency emissions from electric power facilities. Federal Communication Commission (FCC) regulations require that transmission lines be operated so that no harmful interference is produced (FCC regulations, Section 15.25).

Induced Currents and Shock Hazards

The National Electrical Safety Code (NESC) specifies that transmission lines be designed to limit short circuit current from vehicles or large objects near the line to no more than 5 milliampere (mA). CPUC General Order 95 and the NESC also address shock hazards to the public by providing guidelines on minimum clearances to be maintained for practical safeguarding of persons during the installation, operation, or maintenance of overhead transmission lines and their associated equipment.

Cardiac Pacemakers

It has been reported that synchronous pacemakers can be affected by electric fields between 2 and 9 kV/m (EPRI, 1985 and 1979). As described above, when a synchronous pacemaker is in a field in this range, a few older model pacemakers may revert to an asynchronous mode.

[1] General Order 131-D is entitled "Rules Relating to the Planning and Construction of Electric Generation, Transmission/Power/Distribution Line Facilities and Substations Located in California."

C.6.3 Significance Criteria

Contamination and Hazardous Materials

The principal environmental impact involving hazardous waste associated with the proposed Project would be related to the potential mobilization of contaminants resulting in exposure of workers and the general public (i.e., excavation and handling of contaminated soil). Hazardous materials in the construction area may require special handling as toxic substances and hazardous waste can create an exposure risk to workers and the general public due to spills or upset or from excavation and transport.

Toxic substances may cause short-term or long-lasting health effects, ranging from temporary effects to permanent disability, or death. For example, toxic substances can cause eye or skin irritation, disorientation, headache, nausea, allergic reactions, acute poisoning, chronic illness, or other adverse health effects if human exposure exceeds certain levels (the level depends on the substance involved). Carcinogens (substances known to cause cancer) are a special class of toxic substances. Examples of toxic substances include most heavy metals, pesticides, and benzene (a carcinogenic component of gasoline). Ignitable substances are hazardous because of their flammable properties. Gasoline, hexane, and natural gas are examples of ignitable substances. Corrosive substances are chemically active and can damage other materials or cause severe burns upon contact. Examples include strong acids and bases such as sulfuric (battery) acid or lye. Reactive substances may cause explosions or generate gases or fumes. Explosives, pressurized canisters, and pure sodium metal (which reacts violently with water) are examples of reactive materials.

Soil that is excavated from a site containing hazardous materials would be a hazardous waste if it exceeded specific CCR Title 22 criteria. Remediation (cleanup and safe removal/disposal) of hazardous wastes found at a site is required if excavation of these materials is performed; it may also be required if certain other activities are proposed. Contaminated soil exceeding regulatory limits for construction backfill would require onsite treatment or transport to offsite processing facilities. Contaminated soil removed from the construction area must be transported according to State and federal regulations and be replaced by import soil approved for backfill. Similar issues pertain to contaminated groundwater. Even if soil or groundwater at a contaminated site does not have the characteristics required to be defined as hazardous wastes, remediation of the site may be required by regulatory agencies subject to jurisdictional authority. Cleanup requirements are determined on a case-by-case basis by the agency taking lead jurisdiction.

Online government environmental databases, including SWRCB's Geotracker database and DTSC's Calsites database, and documents provided by the applicant were reviewed to identify sites with known contamination and a potential to contaminate the Project construction areas. Distance from the alignment and physical barriers, such as roads and other facilities provide buffers that limit surface migration of contaminants from the source. Active hazardous waste sites greater than 0.25 miles from the proposed transmission line route would have a low potential to cause contamination along the proposed transmission line route. Subsurface migration of contaminants within the unsaturated soil zone is predominantly vertically downward and is not likely to migrate horizontally.

Although no known contaminated sites with potential to impact the project were identified in this review, it is possible that other contaminated sites could be discovered during construction of the Project. Soil contamination may be encountered where no sites are currently designated or identified. Existing contamination of soils may exist in the commercial and light industrial land use areas of the project area due to offsite migration of pollutants, unauthorized dumping, and historic unreported hazardous materials spills.

An impact would be considered significant and require additional mitigation if Project construction or if maintenance of project facilities during operations would result in any of the following criteria being met.

- Criterion PHS1: Action results in soil contamination, including flammable or toxic gases, at levels exceeding federal, State, or local hazardous waste limits established by 40 CFR Part 261 and Title 22 CCR 66261.21, 66261.22, 66261.23, and 66261.24.
- Criterion PHS2: Action results in mobilization of contaminants currently existing in the soil, creating potential pathways of exposure to humans or other sensitive receptors.
- Criterion PHS3: Action causes the presence of contaminated soils or groundwater within the Project area during operation of the Project, resulting in exposure of workers and/or the public to contaminated or hazardous materials at levels in excess of those permitted by California Occupational Safety and Health Administration (CAL-OSHA) in CCR Title B and the Federal Occupational Safety and Health Administration (OSHA) in Title 29 CFR Part 1910.

Electric and Magnetic Fields

Scientific Panel Reviews

Numerous panels of expert scientists have convened to review the data relevant to the question of whether exposure to power-frequency EMF is associated with adverse health effects. These evaluations have been conducted in order to advise governmental agencies or professional standard-setting groups. These panels of scientists first evaluate the available studies individually, not only to determine what specific information they can offer, but also in terms of the validity of their experimental design, methods of data collection, analysis, and suitability of the authors' conclusions to the nature and quality of the data presented. Subsequently, the individual studies, with their previously identified strengths and weaknesses, are evaluated collectively in an effort to identify whether there is a consistent pattern or trend in the data that would lead to a determination of possible or probable hazards to human health resulting from exposure to these fields.

These reviews include those prepared by international agencies such as the World Health Organization (WHO, 1984, WHO, 1987, and WHO, 2001) and the international Non-Ionizing Radiation Committee of the International Radiation Protection Association (IRPA/INIRC, 1998) as well as governmental agencies of a number of countries, such as the U.S. EPA, the National Radiological Protection Board of the United Kingdom, the Health Council of the Netherlands, and the French and Danish Ministries of Health.

Many of these scientific panels have found that the scientific evidence suggesting that power frequency EMF exposures pose any health risk is weak.

In May 1999 the National Institute of Environmental Health Sciences (NIEHS) submitted to Congress its report titled, Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields, containing the following conclusion regarding EMF and health effects:

> *Using criteria developed by the International Agency for Research on Cancer (IARC), none of the Working Group considered the evidence strong enough to label ELF-EMF exposure as a known human carcinogen or probable human carcinogen. However, a majority of the members of this Working Group concluded that exposure to power-line frequency ELF-EMF is a possible carcinogen* [emphasis added].

In June 2001, a scientific working group of IARC (an agency of WHO) reviewed studies related to the carcinogenicity of EMF. Using standard IARC classification, magnetic fields were classified as "possibly carcinogenic to humans" based on epidemiological studies. "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals. Other agents identified as "possibly carcinogenic to humans" include gasoline exhaust, styrene, welding fumes, and coffee (WHO, 2001).

On behalf of the CPUC, the California Department of Health Services (DHS) recently completed a comprehensive review of existing studies related to EMF from power lines and potential health risks. This risk evaluation was undertaken by three staff scientists with the DHS, each of these scientists is identified in the review results as an epidemiologist, and their work took place from 2000 to 2002. The results of this review titled *An Evaluation of the Possible Risks From Electric and Magnetic Fields (EMFs) From Power Lines, Internal Wiring, Electrical Occupations, and Appliances*, were published in June 2002. The conclusions contained in the executive summary are provided below:

- To one degree or another, all three of the 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 strongly believe that EMFs do not increase the risk of birth defects, or low birth weight.
- They 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 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 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.
- The report indicates that the DHS scientists are more inclined to believe that EMF exposure increased the risk of the above health problems than the majority of the members of scientific committees that have previously convened to evaluate the scientific literature. With regard to why the DHS review's conclusions differ from those of other recent reviews, the report states:

  The three DHS scientists thought there were reasons why animal and test tube experiments might have failed to pick up a mechanism or a health problem; hence, the absence of much support from such animal and test tube studies did not reduce their confidence much or lead them to strongly distrust epidemiological evidence from statistical studies in human populations. They therefore had more faith in the quality of the epidemiological studies in human populations and hence gave more credence to them.

While the results of the DHS report indicate these scientists believe that EMF can cause some degree of increased risk for certain health problems, the report did not quantify the degree of risk.

In addition to the uncertainty regarding the level of health risk posed by EMF, individual studies and scientific panels have not been able to determine or reach consensus regarding what level of magnetic field exposure might constitute a health risk. In some early epidemiological studies, increased health risks were discussed for daily time-weighted average field levels greater than 2 mG. However, the IARC scientific working group indicated that studies with average magnetic field levels of 3 to 4 mG played a pivotal role in their classification of EMF as a possible carcinogen.

Scientific Background and Regulations Applicable to EMF

For more than 20 years, questions have been asked regarding the potential effects within the environment of EMFs from power lines, and research has been conducted to provide some basis for response. Earlier studies focused primarily on interactions with the electric fields from power lines. In the late 1970s, the subject of magnetic field interactions began to receive additional public attention and research levels have increased. A substantial amount of research investigating both electric and magnetic fields has been conducted over the past 20 years; however, much of the body of national and international research regarding EMF and public health risks remains contradictory or inconclusive.

Extremely low frequency (ELF) fields are known to interact with tissues by inducing electric fields and currents in these fields. However, the electric currents induced by ELF fields commonly found in our

environment are normally much lower than the strongest electric currents naturally occurring in the body such as those that control the beating of the heart.[2]

Research related to EMF can be grouped into three general categories: cellular level studies, animal and human experiments, and epidemiological studies. These studies have provided mixed results, with some studies showing an apparent relationship between magnetic fields and health effects while other similar studies do not.

Since 1979, public interest and concern specifically regarding magnetic fields from power lines has increased. This increase has generally been attributed to publication of the results of a single epidemiological study (Wertheimer and Leeper, 1979). This study observed an association between the wiring configuration on electric power lines outside of homes in Denver and the incidence of childhood cancer. Following publication of the Wertheimer and Leeper study, many epidemiological, laboratory, and animal studies regarding EMF have been conducted.

Research on ambient magnetic fields in homes and buildings in several western states found average magnetic field levels within most rooms to be approximately 1 mG, while in a room with appliances present, the measured values ranged from 9 to 20 mG (Severson et al., 1988, and Silva, 1988). Immediately adjacent to appliances (within 12 inches), field values are much higher, as illustrated in Tables C.6-3 and C.6-4. These tables indicate typical sources and levels of electric and magnetic field exposure the general public experiences from appliances

Table C.6-3. Typical Electric Field Values for Appliances, at 12 Inches

Appliance	Electric Field Strength (kV/m)
Electric Blanket	0.25*
Broiler	0.13
Stereo	0.09
Refrigerator	0.06
Iron	0.06
Hand Mixer	0.05
Phonographs	0.04
Coffee Pot	0.03

*1 to 10 kV/m next to blanket wires.
Source: Enertech, 1985.

[2] The power frequencies (50/60 Hz) are part of the ELF (3 Hz to 300 Hz) bandwidth.

Summary Regarding EMF Significance Criteria

After several decades of study regarding potential public health risks from exposure to power line EMF, research results remain inconclusive. Several national and international panels have conducted reviews of data from multiple studies and state that there is not sufficient evidence to conclude that EMF causes cancer. More recently the IARC and the DHS both classified EMF as a *possible* carcinogen. The information included in the preceding sections identifies existing EMF exposures within the community, which are widespread and cover a very broad range of field intensities and duration, and specific information on the EMF levels estimated for the proposed Project are provided. Presently there are no applicable regulations related to EMF levels from power lines; however, the CPUC has implemented, and recently re-confirmed, a decision requiring utilities to incorporate "low-cost" or "no-cost" measures for managing EMF from power lines. SCE's proposed Project does incorporate low-cost and no-cost measures as mitigation for magnetic fields. The preceding information and other potential additional mitigation measures are provided for the benefit of the public and decision makers in reviewing the proposed Project.

Table C.6-4. Magnetic Field from Household Appliances

Appliance	Magnetic Field (mG)	
	12" Distant	Maximum
Electric range	3–30	100–1,200
Electric oven	2–25	10–50
Garbage disposal	10–20	850–1,250
Refrigerator	0.3–3	4–15
Clothes washer	2–30	10–400
Clothes dryer	1–3	3–80
Coffee maker	0.8–1	15–250
Toaster	0.6–8	70–150
Crock pot	0.8–1	15–80
Iron	1–3	90–300
Can opener	35–250	10,000–20,000
Mixer	6–100	500–7,000
Blender, popper, processor	6–20	250–1,050
Vacuum cleaner	20–200	2,000–8,000
Portable heater	1–40	100–1,100
Fan/blower	0.4–40	20–300
Hair dryer	1–70	60–20,000
Electric shaver	1–100	150–15,000
Color TV	9–20	150–500
Fluorescent fixture	2–40	140–2,000
Fluorescent desk lamp	6–20	400–3,500
Circular saw	10–250	2,000–10,000
Electric drill	25–35	4,000–8,000

Source: Gauger, 1985

Non-EMF Electric Power Field Issues

The significance criteria used for non-EMF electric power field issues is based on the regulatory framework described above, in Section C.6.2.3.

- Criterion PHS4: Action introduces hazards related to wind, earthquakes, or fire, or fails to comply with applicable guidelines including: CPUC General Order No. 95 (Rules for Overhead Electric Line Construction) and National Electrical Safety Code requirements.
- Criterion PHS5: Action results in harmful interference with radio equipment, television equipment, or electronic equipment (FCC regulations, Section 15.25).
- Criterion PHS6: Action results in induced currents or shock hazards to the public which would not be in compliance with applicable regulations, including: the NESC specification that transmission lines be designed to limit short circuit current from nearby vehicles or large objects to no more than 5 mA; and CPUC General Order 95, which provides guidelines on minimum clearances to be maintained for practical safeguarding of persons during the installation, operation, or maintenance of overhead transmission lines and their associated equipment.
- Criterion PHS7: Action interferes with cardiac pacemakers.

Table C.6-5, below, provides a summary of the combined significance criteria associated with both environmental contamination and non-EMF power field issue.

Table C.6-5. Summary of Public Health and Safety Significance Criteria	
Criterion PHS1	Project construction results in soil contamination
Criterion PHS2	Project results in mobilization of existing soil contamination
Criterion PHS3	Project operation results in soil contamination
Criterion PHS4	Action introduces hazards related to wind, earthquake, or fire
Criterion PHS5	Project construction or operation results in harmful interference with radio/television/electronic equipment
Criterion PHS6	Project introduces induced currents or shock hazards to the public
Criterion PHS7	Project construction or operation interferes with cardiac pacemakers

C.6.4 Applicant-Proposed Measures

Contamination and Hazardous Materials

SCE has identified Applicant-Proposed Measure (APM) PHS-1, as described in Table C.6-6, which SCE plans to implement to reduce or eliminate impacts from existing environmental contamination along the alignment. This APM is considered part of the proposed Project and implementation of this measure would be monitored by the CPUC during construction if the proposed Project is approved.

Table C.6-6. Applicant-Proposed Measure - Public Health and Safety	
Measure Number	SCE-Proposed Measure
APM PHS-1	SCE would perform Phase I Environmental Site Assessments (ESAs) to assess all project-related areas of planned ground disturbance prior to the initiation of construction and avoid any identified hazards accordingly.

Electric and Magnetic Fields

As explained in Section C.6.3 (Significance Criteria), there are no applicable regulations related to EMF levels from power lines. Similarly, there are no significance criteria related to EMF levels from power lines, as applicable to the proposed Project and alternatives. Therefore, no impacts would occur from EMFs for the proposed Project or alternatives. However, the CPUC has implemented, and recently re-confirmed, a decision requiring utilities to incorporate "low-cost" or "no-cost" measures for managing EMF from power lines, which SCE has incorporated as mitigation for magnetic fields. Following is a summary of this proposed EMF mitigation. This information related to EMF is provided for the benefit of the public and decision-makers in reviewing the proposed Project.

Methods to Reduce EMF

EMF levels from transmission lines can be reduced in three primary ways: shielding, field cancellation, or increasing the distance from the source. Shielding, which primarily reduces exposure to electric fields, can be actively accomplished by placing trees or other physical barriers along the transmission line ROW. Shielding also results from existing structures the public may use or occupy along the line. Since electric fields can be blocked by most materials, shielding is effective for the electric fields but is of limited effectiveness for magnetic fields.

Magnetic fields can be reduced either by cancellation or by increasing distance from the source. Cancellation is achieved in two ways. A transmission line circuit consists of three "phases": three separate wires (conductors) on a transmission tower. The configuration of these three conductors can reduce magnetic fields. First, when the configuration places the three conductors closer together, the interference, or cancellation, of the fields from each wire is enhanced. This technique has practical limitations because of the potential for short circuits if the wires are placed too close together. There are also worker safety issues to consider if spacing is reduced.

Second, in instances where there are two circuits (more than three phase wires), such as in the proposed Project, cancellation can be accomplished by arranging phase wires from the different circuits near each other. In underground lines, the three phases are typically much closer together than in overhead lines because the cables are insulated (coated).

The distance between the source of fields and the public can be increased by either placing the wires higher above ground, burying underground cables deeper, or by increasing the width of the ROW. For transmission lines, these methods can prove effective in reducing fields because the reduction of the field strength drops rapidly with distance.

SCE's Proposed EMF Mitigation

In accordance with CPUC Decision D.93-11-013, SCE proposes to incorporate "no-cost" and "low-cost" magnetic field reduction steps in the proposed transmission and substation facilities. SCE proposed specific measures to reduce EMF in its Field Management Plan for the proposed Project. Appendix 3 presents the plan proposed by SCE. Following are the measures that would reduce magnetic fields:

- Utilize double-circuit 500-kV towers between miles 20.3 and 25.6 (Areas 4 & 5)
- Phase the Antelope-Pardee 500-kV transmission line and the existing Pardee-Vincent 500-kV transmission line for magnetic field reduction between miles 20.3 and 25.6 (Areas 4 & 5)
- Site the double-circuit 500-kV towers in the existing Pardee-Vincent transmission line position in the right-of-way to increase the distance of the new transmission line to the edge of the right-of-way between miles 20.3 to 22.3 (Area 4)
- Site the double-circuit 500-kV towers in the empty position in the right-of-way to increase the distance of the new Antelope-Pardee 500-kV transmission line and the existing Pardee-Vincent 500-kV transmission line to the edge of the right-of-way between miles 22.3 to 25.6 (Area 5)
- Modify and phase the existing Orion 16-kV line for magnetic field reduction between miles 22.3 to 25.6 (Area 5)
- Rebuild the relocated 66-kV lines near Antelope Substation using a compact pole head configuration and 70-foot steel poles
- Locate new equipment at Pardee and Antelope Substations to maintain distances away from the substation property lines as specified in SCE's "EMF Design Guidelines"
- Increase right-of-way width for portions of the transmission line route.

SCE's EMF Design Guidelines for Electric Facilities: Transmission, Subtransmission, Substation, Distribution (see Appendix 3) include the following methods that may be available to reduce the magnetic field strength levels from electric power lines:

- Increase distance from lines
- Reduce conductor (phase) spacing
- Optimize phasing in multi-circuit right-of-ways
- Convert single-phase to split-phase circuits
- Reduce current in the line(s)
- Shielding or active cancellation
- Undergrounding

SCE's EMF mitigation strategy is based on the following:

- Determine the number and size of areas to consider for EMF reduction
- Prioritize areas based on public input
- Cost of the reduction techniques determines the number of areas that can be mitigated

- Low-cost measures must be applied equitably
- Total cost of mitigation should not exceed 4 percent of the total cost of the project
- Total field reduction must be 15 percent or greater
- The solution should not downgrade reliability or operating characteristics and should not create a hazard to maintenance personnel or the public.

In the case of the proposed Project SCE has incorporated increased distance from the lines by increasing the width of right-of-ways or locating the transmission line in empty positions in existing right-of-ways. SCE has also used optimized phasing of the 500-kV line and reduced conductor phase spacing, by placing circuits on double circuit structures.

As described above, EMF is not evaluated as an environmental impact under CEQA/NEPA, so an analysis of alternatives is not presented for that issue.

Non-EMF Electric Power Field Issues

SCE has not identified APMs related to non-EMF electric power field issues.

C.6.5 Impact Analysis: Proposed Project/Action

Contamination and Hazardous Materials

The environmental contamination impacts of the proposed Project are discussed below under subheadings corresponding to each of the significance criterion presented in the preceding section. The analysis describes the impacts of the proposed Project related to environmental contamination and, for each criterion, determines whether implementation of the proposed Project would result in significant impacts.

Soil contamination resulting from construction (Criterion PHS1)

Impact PH-1: Soil or groundwater contamination results due to improper handling and/or storage of hazardous materials during construction activities.

During construction operations, hazardous materials such as vehicle fuels, oils, and other vehicle maintenance fluids would be used and stored in construction staging yards. There is potential for incidents involving release of gasoline, diesel fuel, oil, hydraulic fluid, and lubricants from vehicles or other equipment or the release of paints, solvents, adhesives, or cleaning chemicals from construction activities. Improperly maintained equipment could leak fluids during construction operation and while parked. Spills and leaks of hazardous materials during construction activities could potentially result in soil or groundwater contamination. SCE plans to minimize, avoid, and/or clean up unforeseen spill of hazardous materials by ensuring construction would be performed in accordance with SCE's Construction Storm Water Pollution Prevention Plan (SWPPP). Despite implementation of SCE's Construction SWPPP, accidental spills of hazardous materials could still occur.

Helicopters may be used in areas without adequate access roads or were access is limited for removal of the existing 66-kV towers, construction of poles and towers, and support trips to transport material and workers to tower sites and material and equipment staging areas. Helicopters would be used during wire installation for pulling and support trips. The operations area of the helicopter would be limited to helicopter staging areas (primary and secondary marshalling yards) and positions along the ROW which have previously been disturbed for other purposes and are considered to be safe locations for landing. Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor's fuel truck, and would be supervised by the

helicopter fuel service provider. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place. Spills and leaks of hazardous materials during helicopter construction activities due to improper handing and storage of helicopter fuel in staging areas could potentially result in soil or groundwater contamination, a significant impact.

Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment) would be implemented to adequately ensure that the potential Impact PH-1 would be reduced to less-than-significant levels (**Class II**),

Mitigation Measures for Impact PH-1

PH-1a **Environmental Training and Monitoring Program.** An environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention, emergency response measures, and proper Best Management Practice (BMP) implementation, to all construction and maintenance personnel. The training program will emphasize site-specific physical conditions to improve hazard prevention (e.g., identification of potentially hazardous substances) and will include a review of all site-specific plans, including but not limited to, the Project's SWPPP, Erosion Control and Sediment Transport Plan, Health and Safety Plan, Waste Characterization and Management Plan, and Hazardous Substances Control and Emergency Response Plan. Properly trained construction and maintenance staff are expected to prevent accidental hazardous materials spills and in the event of a spill would be able to quickly ascertain the best way to stop and mitigate the spill, thus limiting potential soil contamination.

A monitoring program will also be implemented to ensure that the plans are followed throughout the period of construction. Best Management Practices, as identified in the Project SWPPP and Erosion Control and Sediment Transport Plan, will also be implemented during the construction of the Project to minimize the risk of an accidental release and provide the necessary information for emergency response.

PH-1b **Hazardous Substance Control and Emergency Response Plan.** SCE will prepare a Hazardous Substance Control and Emergency Response Plan, which will include preparations for quick and safe cleanup of accidental spills. This plan will be submitted with the grading permit applications to the appropriate oversight agency based on grading location. It will prescribe hazardous-materials handling procedures for reducing the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted. These directions and requirements will also be reiterated in the Project SWPPP. SCE shall document compliance with this measure prior to the start of construction by submitting the plan to the CPUC and ANF for review.

PH-1c **Proper Disposal of Construction Waste.** All construction and demolition waste, including trash and litter, garbage, other solid waste, petroleum products and other potentially hazardous materials, will be removed to a hazardous waste facility permitted or otherwise authorized to treat, store, or dispose of such materials. Waste materials shall be removed from the project staging areas in a manner consistent with California Integrated Waste Management Board standards for transportation and disposal of hazardous materials, based on Title 27, Environmental Protection Division 2, Solid Waste.

PH-1d **Emergency Spill Supplies and Equipment.** Hazardous material spill kits will be maintained on-site for small spills. This shall include oil-absorbent material, tarps, and storage drums to be used to contain and control any minor releases. Emergency-spill supplies and equipment will be kept

adjacent to all areas of work and in staging areas, and will be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials will be provided in the Project's Hazardous Substances Control and Emergency Response Plan.

Mobilization of existing soil contamination (Criterion PHS2)

Impact PH-2: Project results in encountering known preexisting soil or groundwater contamination.

Excavation would be limited to areas at and near transmission structures and at the Antelope and Pardee substations where new equipment for the 500-kV lines would be installed. Based on the review conducted for this document, no known existing environmentally contaminated sites are located along the proposed Project alignment. In APM PHS-1, SCE commits to conducting Phase I ESAs to assess all Project-related areas of planned ground disturbance prior to the initiation of construction. If it is determined that there is the potential to encounter an existing environmental contamination site along the proposed Project route, disturbance of the site would be a significant impact. Mitigation Measure PH-2 (Conduct Phase II Investigation) would be implemented if a Phase I ESA reveals potential for environmental contamination. Implementation of APM PHS-1 and Mitigation Measure PH-2 (Conduct Phase II Investigation) would ensure that potential impacts would be reduced to less-than-significant levels (**Class II**).

Mitigation Measure for Impact PH -2

PH-2 **Conduct Phase II Investigation.** A Phase II investigation shall be conducted for any sites revealed to be potentially contaminated by the Phase I ESAs prior to commencement of construction activities. The Phase II investigation shall include a review of current status from agency files of known contaminated sites, including identification of the concentration and limits of contamination, type of release, and media affected; and collection of samples for laboratory analysis and quantification of contaminant levels within the proposed excavation and surface disturbance areas in areas of known and potential contamination. The scope of the field investigation shall be developed in accordance with the standard of practice for assessment of appropriate worker protection and material handling and disposal procedures. Soil sampling and laboratory testing shall be conducted at locations along the Project route where known contaminated sites are within 0.25 miles of the tower locations and substations or are determined to pose a threat to the Project based on the results of agency file review. The Phase II shall be conducted and recommendations completed prior to the start of construction.

Subsurface investigation shall determine appropriate worker protection and hazardous material handling and disposal procedures appropriate for the subject area. Areas with contaminated soil and/or groundwater determined to be hazardous waste shall be removed by personnel who have been trained through the OSHA recommended 40-hour safety program (29CFR1910.120) with an approved plan for groundwater extractions, soil excavation, control of contaminant releases to the air, and off-site transport or on-site treatment. Results of the agency file review and Phase II investigations shall be reviewed and approved by the County of Los Angeles Fire Department, Health Hazardous Materials Division and/or DTSC prior to construction. A copy of the DTSC or Health Hazardous Materials Division approval letter must be provided to the CPUC prior to start of construction.

Impact PH-3: Project results in encountering unknown preexisting soil or groundwater contamination.

Despite the implementation of APM PHS-1 and, if necessary, Mitigation Measure PH-2 (Conduct Phase II Investigation), previously unknown soil or groundwater contamination could be encountered during grading or

excavation, particularly at the substations or in other commercial and light industrial areas. This would be a significant impact. However, implementation of Mitigation Measure PH-3 (Observe Exposed Soil) would reduce the potential impact of encountering previously unknown contamination to a less-than-significant level (**Class II**).

Mitigation Measure for Impact PH-3

PH-3 **Observe Exposed Soil.** During grading, or excavation work for the Project, the contractor shall observe the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during construction, the contractor shall stop work until the material is properly characterized and appropriate measures are taken to protect human health and the environment. The contractor shall comply with all local, State, and federal requirements for sampling and testing, and subsequent removal, transport, and disposal of hazardous materials. In the event that evidence of contamination is observed, the contractor shall document the exact location of the contamination and shall immediately notify the CPUC's Environmental Monitor and propose actions for addressing the contamination. A weekly report listing encounters with contaminated soils and describing actions taken shall be submitted to the CPUC.

Soil contamination resulting from operation (Criterion PHS3)

Impact PH-4: Release of hazardous materials during operation at substations and transmission line maintenance.

Soil or groundwater contamination could result from accidental spill or release of hazardous materials at the substations during facility operation or along the transmission line during maintenance operations. This could potentially result in exposure of facility workers and the public to hazardous materials, a significant impact. SCE plans to minimize and/or avoid, unforeseen spills of hazardous materials during operation at the substations by updating and utilizing the Spill Prevention, Countermeasure, and Control (SPCC) plan for the Antelope Substation and by preparing and utilizing a SPCC plans for the Pardee Substation. Mitigation Measure PH-4a (Documentation of Compliance) is recommended to ensure that these plans are properly implemented. In addition, Mitigation Measure PH-4b (Emergency Spill Supplies and Equipment) would ensure that potential impacts from spills or leaks of hazardous materials during transmission line maintenance and operation are reduced to less than significant (**Class II)**.

Mitigation Measures for Impact PH-4

PH-4a **Documentation of Compliance.** SCE shall document compliance with updating and preparing the SPCC for this project by (a) submitting to the CPUC for review and approval an outline of the proposed Environmental Training and Monitoring Program, (b) providing a list of names of all operations personnel who have completed the training program, and (c) providing a copy of the SPCC plans to the CPUC for review and approval at least 60 days before the start of operation.

PH-4b **Emergency Spill Supplies and Equipment.** Hazardous material spill kits will be maintained in maintenance vehicles for small spills. This shall include oil-absorbent material, and spill kits to be used to contain and control any minor releases. During significant maintenance operations, emergency-spill supplies and equipment will be kept adjacent to all areas of work and in staging areas, and will be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials will be provided in the Project's Hazardous Substances Control and Emergency Response Plan.

Electric and Magnetic Fields

As discussed in Section C.6.1.3, there remains a lack of consensus in the scientific community in regard to public health impacts due to EMF at the levels expected from electric power facilities. Further, there are no federal or State standards limiting human exposure to EMFs from transmission lines or substation facilities in California. For those reasons, EMF is not considered in this EIR/EIS as a CEQA/NEPA issue and no impact significance criteria or impact statements are presented. This information is provided to allow understanding of the issue by the public and decision-makers.

EMF levels in the project area would not change during construction of the proposed Project, since the lines would not be energized during construction. When the transmission lines are energized, there would be permanent changes in the level of EMFs in the existing environment. In Areas 1, 2, and 3, the magnetic field strength at the edge of the right-of-way would go up after construction of the proposed Project. This would occur because the project replaces an existing lower current transmission line with a much higher current transmission line. In areas 4 and 5 the magnetic field strength would remain the same or be lower outside of the right-of-way after construction of the proposed Project. This occurs as a result of combining the new Antelope-Pardee 500-kV transmission line on a double circuit tower with the existing Pardee-Vincent 500-kV line which close spacing of circuits increases magnetic field cancellation. Table C.6-7 presents the estimated magnetic field along the proposed project, assuming that the new 500-kV line is operational.

Table C.6-7. Comparison of Magnetic Field Levels (mG): Existing vs. with the Proposed Project

	Left Side of ROW			Right Side of ROW		
Area ID	Existing	Proposed	Change	Existing	Proposed	Change
1	0.8	15.7	+14.9	1.2	15.7	+14.5
2	0.2	18.5	+18.3	0.2	18.5	+18.3
3	0	15.7	+15.7	0	15.7	+15.7
4	2.0	1.1	-0.9	11.7	11.9	+0.2
5	23.0	21.1	-1.9	12.5	0.8	-11.7

Source: SCE, 2004b, Appendix B

No impacts would occur from EMFs.

Non-EMF Electric Power Field Issues

The non-EMF electric power field impacts of the proposed Project are discussed below under subheadings corresponding to each of the significance criterion presented in the preceding section. The analysis describes the impacts of the proposed Project related to non-EMF electric power field issues and, for each criterion, determines whether implementation of the proposed Project would result in significant impacts.

Introduction of hazards related to wind, earthquake, or fire (Criterion PHS4)

As described in Section D.10.7.2, these hazards are addressed in project design. SCE is required to design the transmission line infrastructure in accordance with safety requirements of the CPUC's General Order 95 (Rules for Overhead Electric Line Construction) and other applicable requirements, including National Electrical Safety Code requirements. As a result, no design-related hazards would occur.

Harmful interference with radio/television/electronic equipment (Criterion PHS5)

Impact PH-5: Project would cause radio or television interference.

Corona or gap discharges related to high frequency radio and television interference impacts are dependent upon several factors, including the strength of broadcast signals. If these corona or gap discharges occur, they are anticipated to be very localized. If individual sources of adverse radio or television interference occur as a

result of the Project, they can be located and corrected on the power lines. Conversely, magnetic field interference with electronic equipment such as computer monitors can be corrected through the use of software, shielding, or changes in the monitor location. With the implementation of Mitigation Measures PH-5a (Limit the Conductor Surface Electric Gradient) and PH-5b (Document and Resolve Electronic Interference Complaints), described below, Impact PH-5 would be reduced to a less-than-significant level (**Class II**).

Mitigation Measures for Impact PH-5

PH-5a **Limit the Conductor Surface Electric Gradient.** As part of the design and construction process for the proposed Project, the Applicant shall limit the conductor surface electric gradient in accordance with the IEEE Radio Noise Design Guide.

PH-5b **Document and Resolve Electronic Interference Complaints.** After energizing the transmission line, SCE shall respond to and document all radio/television/equipment interference complaints received and the responsive action taken. These records shall be made available to the CPUC for review upon request. All unresolved disputes shall be referred by SCE to the CPUC for resolution.

Induced currents or shock hazards to the public (Criterion PHS6)

Impact PH-6: The Project would create induced currents and shock hazards in joint-use corridors.

Transmission lines constructed for the proposed Project would create induced currents and voltages on nearby conducting objects. However, this would not pose a threat in the environment if the conducting objects are properly grounded. Implementation of Mitigation Measure PH-6 (Determine Proper Grounding Measures) would reduce Impact PH-6 to a less-than-significant level (**Class II**).

Mitigation Measure for Impact PH-6

PH-6 **Determine Proper Grounding Measures**. As part of the siting and construction process for the proposed Project, SCE shall identify objects (such as fences, metal buildings, and pipelines) that have the potential for induced voltages and work with the affected parties to determine proper grounding procedures (CPUC G095 and the NESC do not have specific requirements for grounding). SCE shall install all necessary grounding measures prior to energizing the line. Thirty days prior to energizing the line, SCE shall notify in writing, subject to the review and approval of the CPUC, all property owners within and adjacent to the proposed Project ROW of the date the line is to be energized. The written notice shall provide a contact person and telephone number for answering questions regarding the line and guidelines on what activities should be limited or restricted within the ROW. SCE shall respond to and document all complaints received and the responsive action taken. These records shall be made available to the CPUC for review upon request. All unresolved disputes shall be deferred by SCE to the CPUC for resolution.

The written notice shall describe the nature and operation of the line, and the Applicant's responsibilities with respect to grounding all conducting objects. In addition, the notice shall describe the property owner's responsibilities with respect to notification for any new objects, which may require grounding and guidelines for maintaining the safety of the ROW.

Interference with synchronous pacemakers (Criterion PHS7)

Impact PH-7: Project operation would cause synchronous pacemakers to revert to an asynchronous mode.

The electric fields associated with the proposed Project's transmission lines may be of sufficient magnitude to impact operation of a few older-model synchronous pacemakers, thereby causing them to revert to an asynchronous pacing. Cardiovascular specialists do not consider prolonged asynchronous pacing to be a problem; periods of operation in this mode are commonly induced by cardiologists to check pacemaker performance. Therefore, while the transmission line's electric field may impact operation of some older model pacemakers, the result of the interference would be of short duration. Impact PH-7 would be less than significant with no mitigation recommended (**Class III**).

C.6.6 Alternative 1: Partial Undergrounding of Antelope-Pardee Transmission Line

C.6.6.1 Affected Environment

Alternative 1 would include two underground segments, northern and southern. The northern segment would be placed underground on Del Sur Ridge within the National Forest primarily along the existing gravel road and along the scrub and grass covered shoulder of the road. The southern segment would be constructed underground through Santa Clarita within Copper Hill Drive primarily through areas of new and planned residential housing developments.

Trenching within the soil and bedrock along Del Sur Ridge would have no potential to encounter contaminated soil or groundwater. Copper Hill Drive was constructed less than five years ago and passes through new residential and local commercial land use areas. A review of on-line regulatory databases revealed no known underground storage tanks, leaking underground fuel tanks or other contaminated sites that could impact the construction of Alternative 1.

C.6.6.2 Impacts and Mitigation Measures

Contamination and Hazardous Materials

Soil contamination resulting from construction (Criterion PHS1)

Construction activities for Alternative 1 would introduce the risk of hazardous materials releases of vehicle fuels, oils, and other vehicle maintenance fluids (Impact PH-1). Increased risk is associated with underground facilities construction than overhead construction because it is substantially more invasive. This would be a significant impact. However, the implementation of Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment) would reduce Impact PH-1 for Alternative 1 to a less-than-significant level (**Class II**).

Mobilization of existing soil contamination (Criterion PHS2)

There is substantially more land disturbance through excavation associated with the construction of underground facilities versus overhead facilities. However, the segments of Alternative 1 which would require underground excavation would occur in areas with no potential to encounter existing environmentally contaminated sites. The overhead portions of Alternative 1 would be exactly the same the proposed Project and

result in the same potential to encounter known preexisting soil or groundwater contamination (Impact PH-2) and previously unknown contamination (Impact PH-3). In addition, the implementation of Mitigation Measures PH-2 (Conduct Phase II Investigation) and PH-3 (Observe Exposed Soil), presented in Section C.6.5.1, would reduce Impacts PH-2 and PH-3 for Alternative 1 to less-than-significant levels **(Class II)**.

Soil contamination resulting from operation (Criterion PHS3)

Operation of the overhead portions of Alternative 1 is the same as the proposed Project, with regards to soil or groundwater contamination resulting from accidental spill or release of hazardous materials. Spills may occur during construction or operation and maintenance, either at the substation facilities or along the transmission line route (Impact PH-4), as discussed in Section C.6.5.1. The underground facilities for Alternative 1 have the potential to require more frequent repair or replacement of infrastructure than overhead facilities would. This would require re-trenching and excavation, thereby re-introducing the potential for the accidental release of hazardous materials during the operation and maintenance of Alternative 1. Despite this greater risk associated with underground infrastructure, the implementation of Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment) would reduce Impact PH-4 for Alternative 1. In addition, Mitigation Measures PH-4a (Documentation of Compliance) and PH-4b (Emergency Spill Supplies and Equipment) would be implemented to ensure that the Applicants plans to protect workers are properly implemented. With the use of all of these mitigation measures, Impact PH-4 for Alternative 1 would be less than significant (**Class II**).

Electric and Magnetic Fields

For the portions of transmission line for Alternative 1 that are overhead, the magnetic fields would be the same as for the proposed Project. For the underground portions of Alternative 1, the magnetic field depends greatly on the type of construction and burial depth. It is anticipated that the magnetic field would be higher for underground cables than for the overhead potions because immediately above the underground cables the field source is only a few feet from the surface. However, due to the close spacing of the underground cables, the magnetic field is more concentrated near underground transmission cables and decreases more rapidly with distance from the cable, resulting in a greatly reduced width of exposure to magnetic fields compared to overhead lines. No impacts would occur from EMFs.

Non-EMF Electric Power Field Issues

Introduction of hazards related to wind, earthquake, or fire (Criterion PHS4)

Construction of Alternative 1 would introduce the potential that project-related infrastructure would not meet loading requirements related to wind, earthquake, or fire. As described for the proposed Project, no design-related hazards would occur with the alternative.

Harmful interference with radio/television/electronic equipment (Criterion PHS5)

Alternative 1 would cause radio or television interference (Impact PH-5). This impact for Alternative 1 would be exactly the same as the proposed Project. Mitigation Measures PH-5a (Limit the Conductor Surface Electric Gradient) and PH-5b (Document and Resolve Electronic Interference Complaints) would be implemented to reduce Impact PH-5 for Alternative 1 to a less-than-significant level (**Class II**).

Induced currents or shock hazards to the public (Criterion PHS6)

Induced currents and shock hazards in joint-use corridors would be created through the construction and operation of Alternative 1 (Impact PH-6). This impact would be exactly the same as with the proposed Project. Mitigation Measure PH-6 (Determine Proper Grounding Measures) would be implemented to reduce Impact PH-6 for Alternative 1 to a less-than-significant level (**Class II**).

Interference with synchronous pacemakers (Criterion PHS7)

The operation of Alternative 1 would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7). This impact for Alternative 1 would be exactly the same as for the proposed Project. Impact PH-7 for Alternative 1 would be less than significant with no mitigation incorporated (**Class III**).

C.6.7 Alternative 2: Antelope-Pardee East Mid-Slope

C.6.7.1 Affected Environment

Alternative 2, the East Mid-Slope Alternative, would include the construction of new towers around the east side of Bouquet Reservoir and along a mid-slope area east of the proposed Project and west of Bouquet Canyon. This alternative would pass through National Forest System lands. The Alternative 2 alignment traverses undeveloped areas of Angeles National Forest with no significant potential for environmental contamination. Although the mid-slope area is located about 500 feet below the Bouquet Canyon Stone Quarry, no known contamination has been identified at this site.

C.6.7.2 Impacts and Mitigation Measures

Contamination and Hazardous Materials

Soil contamination resulting from construction (Criterion PHS1)

Alternative 2 would introduce the risk of hazardous materials releases of vehicle fuels, oils, and other vehicle maintenance fluids (Impact PH-1). This impact would be the same as the proposed Project, as discussed in Section C.6.5.1. To adequately ensure that potential construction impacts of Alternative 2 would be reduced to less-than-significant levels (**Class II**), implementation of Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment),as presented in Section C.6.5.1, are required.

Mobilization of existing soil contamination (Criterion PHS2)

Alternative 2 is the same as the proposed Project regarding the potential to encounter existing environmentally contaminated sites (Impact PH-2) or previously unknown contamination (Impact PH-3). As with the proposed Project, APM PHS-1 (Phase I ESA for planned ground disturbance areas), would be incorporated into the project description. In addition, Mitigation Measures PH-2 (Conduct Phase II Investigation) and PH-3

(Observe Exposed Soil) ensure that potential impacts would be reduced to less-than-significant levels (**Class II**) for Impact PH-2 and Impact PH-3.

Soil contamination resulting from operation (Criterion PHS3)

Operation of Alternative 2 is the same as the proposed Project, with regards to soil or groundwater contamination resulting from accidental spill or release of hazardous materials during operation and maintenance activities (Impact PH-4), as discussed in Section C.6.5.1. Mitigation Measures PH-4a (Documentation of Compliance) and PH-4b (Emergency Spill Supplies and Equipment) would be implemented to ensure that the Applicants plans to protect workers are properly implemented, and thereby reduce potential impacts to less-than-significant levels (**Class II**).

Electric and Magnetic Fields

Alternative 2 would introduce magnetic fields into an area that presently has no magnetic fields. The magnetic field strength would be the same as modeled by SCE for Area 3 of the proposed Project route. No impacts would occur from EMFs.

Non-EMF Electric Power Field Issues

Introduction of hazards related to wind, earthquake, or fire (Criterion PHS4)

Construction of Alternative 2 would introduce the potential that project-related infrastructure would not meet loading requirements related to wind, earthquake, or fire. As described for the proposed Project, no design-related hazards would occur with the alternative.

Harmful interference with radio/television/electronic equipment (Criterion PHS5)

Alternative 2 would cause radio or television interference (Impact PH-5). This impact for Alternative 2 would be exactly the same as the proposed Project. Mitigation Measures PH-5a (Limit the Conductor Surface Electric Gradient) and PH-5b (Document and Resolve Electronic Interference Complaints) would be implemented to reduce Impact PH-5 for Alternative 2 to a less-than-significant level (**Class II**).

Induced currents or shock hazards to the public (Criterion PHS6)

Induced currents and shock hazards in joint-use corridors would be created through the construction and operation of Alternative 2 (Impact PH-6). This impact would be exactly the same as with the proposed Project. Mitigation Measure PH-6 (Determine Proper Grounding Measures) would be implemented to reduce Impact PH-6 for Alternative 2 to a less-than-significant level (**Class II**).

Interference with synchronous pacemakers (Criterion PHS7)

The operation of Alternative 2 would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7). This impact for Alternative 2 would be exactly the same as for the proposed Project. Impact PH-7 for Alternative 2 would be less than significant with no mitigation incorporated (**Class III**).

C.6.8 Alternative 3: Antelope-Pardee Single-Circuit 500-kV Towers between Haskell Canyon and Pardee Substation

C.6.8.1 Affected Environment

The proposed alignment for Alternative 3 is identical to the proposed Project route and therefore has the same environmental setting as the proposed Project, with regards to Public Health and Safety, as described in Section C.6.1.

C.6.8.2 Impacts and Mitigation Measures

Contamination and Hazardous Materials

Soil contamination resulting from construction (Criterion PHS1)

Alternative 3 would have the same risk of hazardous materials releases of vehicle fuels, oils, and other vehicle maintenance fluids (Impact PH-1) as the proposed Project, as discussed in Section C.6.5.1. To adequately ensure that potential construction-related impacts of Alternative 3 would be reduced to less-than-significant levels (**Class II**), implementation of Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment), as presented are required.

Mobilization of existing soil contamination (Criterion PHS2)

The Alternative 3 alignment is identical to the proposed Project route and has the same potential to encounter existing environmentally contaminated sites (Impact PH-2) and previously unknown contamination (Impact PH-3), as discussed in Section C.6.5.1. APM PHS-1 (Phase I ESA for planned ground disturbance areas) would be incorporated into the project description for Alternative 3. Mitigation Mitigation Measures PH-2 (Conduct Phase II Investigation) and PH-3 (Observe Exposed Soil) ensures that potential impacts would be reduced to less-than-significant levels (**Class II**).

Soil contamination resulting from operation (Criterion PHS3)

Operation of Alternative 3 is the same as the proposed Project regarding soil or groundwater contamination resulting from accidental spill or release of hazardous materials during operation or maintenance (Impact PH-4) as discussed in Section C.6.5.1. Mitigation Measures PH-4a (Documentation of Compliance) and PH-4b (Emergency Spill Supplies and Equipment) are required to ensure that the Applicants plans to protect workers are properly implemented, and thereby reduce potential impacts to less-than-significant levels (**Class II**).

Electric and Magnetic Fields

This Alternative would result in increased magnetic fields in Areas 4 and 5 of the proposed Project route since the new line would be situated at the edge of the existing ROW. Field cancellation would not be as significant for this position along the edge of the ROW as for the closer spacing that occurs at other positions within the ROW. This alternative is routed in developed lands. No impacts would occur from EMFs.

Non-EMF Electric Power Field Issues

Introduction of hazards related to wind, earthquake, or fire (Criterion PHS4)

Construction of Alternative 3 would introduce the potential that project-related infrastructure would not meet loading requirements related to wind, earthquake, or fire. As described for the proposed Project, no design-related hazards would occur with the alternative.

Harmful interference with radio/television/electronic equipment (Criterion PHS5)

Alternative 3 would cause radio or television interference (Impact PH-5). This impact for Alternative 3 would be exactly the same as the proposed Project. Mitigation Measures PH-5a (Limit the Conductor Surface Electric Gradient) and PH-5b (Document and Resolve Electronic Interference Complaints) would be implemented to reduce Impact PH-5 for Alternative 3 to a less-than-significant level (**Class II**).

Induced currents or shock hazards to the public (Criterion PHS6)

Induced currents and shock hazards in joint-use corridors would be created through the construction and operation of Alternative 3 (Impact PH-6). This impact would be exactly the same as with the proposed Project. Mitigation Measure PH-6 (Determine Proper Grounding Measures) would be implemented to reduce Impact PH-6 for Alternative 3 to a less-than-significant level (**Class II**).

Interference with synchronous pacemakers (Criterion PHS7)

The operation of Alternative 3 would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7). This impact for Alternative 3 would be exactly the same as for the proposed Project. Impact PH-7 for Alternative 3 would be less than significant with no mitigation incorporated (**Class III**).

C.6.9 Alternative 4: Antelope-Pardee Re-Routing of New Right-of-Way along Haskell Canyon

C.6.9.1 Affected Environment

Alternative 4 would involve the construction of new transmission towers within the ANF and primarily undeveloped land east of Haskell Canyon. The hillside areas have sparse development along Blue Cloud Road. The largely undeveloped area along the proposed route for Alternative 4 has no potential for environmental contamination and there are no known contamination sites within 1,000 feet of the alignment.

C.6.9.2 Impacts and Mitigation Measures

Contamination and Hazardous Materials

Soil contamination resulting from construction (Criterion PHS1)

Alternative 4 would introduce the same risk of hazardous materials releases of vehicle fuels, oils, and other vehicle maintenance fluids (Impact PH-1) as the proposed Project, as discussed in Section C.6.5.1. To adequately ensure that potential construction-related impacts of Alternative 3 would be reduced to less-than-significant levels (**Class II**), implementation of Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment), as presented in Section C.6.5.1, are required.

Mobilization of existing soil contamination (Criterion PHS2)

Alternative 4 is the same as the proposed Project with regards to the potential to encounter existing environmentally contaminated sites (Impact PH-2) or previously unknown contamination (Impact PH-3). APM PHS-1 (Phase I ESA for planned ground disturbance areas) would be incorporated into the project description for Alternative 4. In addition, Mitigation Measures PH-2 (Conduct Phase II Investigation) and PH-3 (Observe Exposed Soil) would be implemented to ensure that potential impacts would be reduced to less-than-significant levels (**Class II**).

Soil contamination resulting from operation (Criterion PHS3)

Operation of Alternative 4 is the same as the proposed Project with regards to soil or groundwater contamination resulting from accidental spill or release of hazardous materials during operation or maintenance (Impact PH-4). Mitigation Measures PH-4a (Documentation of Compliance) and PH-4b (Emergency Spill Supplies and Equipment) are required to ensure that the Applicants plans to protect workers are properly implemented, and thereby reduce potential impacts to less than significant levels (**Class II**).

Electric and Magnetic Fields

The magnetic field strength for Alternative 4 would be the same as modeled by SCE for Area 3 of the proposed Project route. This alternative is routed in undeveloped lands. No impacts would occur from EMFs.

Non-EMF Electric Power Field Issues

Introduction of hazards related to wind, earthquake, or fire (Criterion PHS4)

Construction of Alternative 4 would introduce the potential that project-related infrastructure would not meet loading requirements related to wind, earthquake, or fire. As described for the proposed Project, no design-related hazards would occur with the alternative.

Harmful interference with radio/television/electronic equipment (Criterion PHS5)

Alternative 4 would cause radio or television interference (Impact PH-5). This impact for Alternative 4 would be exactly the same as the proposed Project. Mitigation Measures PH-5a (Limit the Conductor Surface Electric Gradient) and PH-5b (Document and Resolve Electronic Interference Complaints) would be implemented to reduce Impact PH-5 for Alternative 4 to a less-than-significant level (**Class II**).

Induced currents or shock hazards to the public (Criterion PHS6)

Induced currents and shock hazards in joint-use corridors would be created through the construction and operation of Alternative 4 (Impact PH-6). This impact would be exactly the same as with the proposed Project. Mitigation Measure PH-6 (Determine Proper Grounding Measures) would be implemented to reduce Impact PH-6 for Alternative 4 to a less-than-significant level (**Class II**).

Interference with synchronous pacemakers (Criterion PHS7)

The operation of Alternative 4 would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7). This impact for Alternative 4 would be exactly the same as for the proposed Project. Impact PH-7 for Alternative 4 would be less than significant with no mitigation incorporated (**Class III**).

C.6.10 Alternative 5: Antelope-Pardee Sierra-Pelona Re-Route

C.6.10.1 Affected Environment

This section describes the setting and land use related to public health and safety along Alternative 5. Alternative 5 traverses south from the Antelope Substation, across the Sierra Highway and the Antelope Valley Freeway, then turns west and enters the existing Pardee-Vincent corridor (at approximately Mile 18.8), and continues west to the Pardee Substation. Alternative 5 deviates from the proposed Project from the Antelope Substation (Mile 0.0) to Alternative 5 Mile 31.9 (Project Mile 20.3), at which point the alternative alignment rejoins the proposed Project route. Based on the online environmental database review, there are no known hazardous release sites within the proposed Project ROW. However, unknown contamination could be present within the ROW due to nearby past and current uses in the vicinity. Examples of past and current land uses that could have resulted in unknown contamination include rural residences and farms that commonly have old or inactive underground fuel tanks (USTs); pesticide polluted runoff from agricultural properties; and commercial and industrial sites, historic and current, could have soil or groundwater contamination from unreported hazardous substance spills. The paragraphs below provide general descriptions of the existing uses in the vicinity of the proposed ROW.

Land Use

Between the Antelope Pardee Substation at Mile 0.0 and approximately Mile 13, located at the northern edge of the Pelona Valley, Alternative 5 would traverse predominantly undeveloped grass and scrub land, and areas with scattered rural residences and small pockets of agricultural land. The Alternative 5 alignment crosses the California Aqueduct at approximately Mile 2.4. Additionally, approximately 0.5 miles of line was routed onto NFS lands in the ANF to avoid impacting residential homes in Leona Valley.

From approximately Mile 13 to approximately Mile 15 the Alternative 5 alignment passes through low density residential areas in Agua Dulce. Alternative 5 traverses primarily undeveloped open space land consisting of grass and scrub covered hill and valley terrain from approximately Mile 15 to Mile 18.8, where the alignment enters the existing ROW for the Pardee-Vincent transmission corridor. Two small NFS land properties located outside the Forest boundary would be crossed (1.0 miles) in Soledad Canyon (Mile 17.1 to Mile 17.4 and Mile 17.7 to Mile 18.4).

The route would continue in the Pardee-Vincent ROW from approximately Mile 18.8 to Mile 31.9, where the alignment merges with the proposed Project alignment. Land use along this portion of the alignment is primarily characterized by undeveloped open space grass and scrub land with pockets and scattered rural residences. The number and density of these rural residences increases as the alignment approaches the proposed Project Alignment. From Mile 31.9 the alignment is the same as the proposed Project, from Project Mile 20.3, and the setting is the same as that described in Section C.6.1.2.

Environmental Database Review

The closest known significantly contaminated site to the Alternative 5 alignment is the DTSC-monitored former Mint Canyon Space Ordnance Systems Facility (34854 Peterson Road, Canyon Country). However, this site is approximately 2.5 miles west of Mile 14 and 4.5 miles north of Mile 21.5 along the alignment and because of this large amount of separation for the alignment is not likely to result in contamination of the ROW.

Two leaking underground fuel tank (LUST) sites are located in the vicinity of the Alternative 5 alignment between Mile 30 and 31, near Bouquet Canyon Road. One site is located more than 1 mile north of the Alternative 5 alignment in Bouquet Canyon and is also located at a lower elevation than the alignment, and thus not result in environmental contamination within the Alternative 5 ROW. The second LUST site, at a Texaco Station on Bouquet Canyon Road, is located about 0.25 miles south of the alignment at approximately Mile 30.9. This site is located downstream of the Alternative 5 alignment and thus is not likely to cause contamination along the alignment ROW.

C.6.10.2 Impacts and Mitigation Measures

Contamination and Hazardous Materials

Soil contamination resulting from construction (Criterion PHS1)

Alternative 5 would introduce the same risk of hazardous materials releases of vehicle fuels, oils, and other vehicle maintenance fluids (Impact PH-1) as the proposed Project, as discussed in Section C.6.5.1. To adequately ensure that potential construction-related impacts of Alternative 5 would be reduced to less-than-significant levels (**Class II**), implementation of Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment), as presented in Section C.6.5.1, are required.

Mobilization of existing soil contamination (Criterion PHS2)

As with the proposed Project, excavation would be limited to areas at and near transmission structures and at Antelope and Pardee Substations where new equipment for the 500-kV lines would be installed. No significant impacts from known existing environmentally contaminated sites (Impact PH-2) are expected along the proposed Alternative 5 alignment. APM PHS-1 (Phase I ESA for planned ground disturbance areas) would be incorporated into the project description for Alternative 5. Through APM PHS-1, SCE would commit to conducting Phase I ESAs to assess all Project-related areas of planned ground disturbance prior to the initiation of construction. If it is determined that there is the potential to encounter an existing environmental contamination site along the proposed Project route, disturbance of the site would be a significant impact. Mitigation Measure PH-2 (Conduct Phase II Investigation) would need to be implemented to ensure that potential impacts would be reduced to less-than-significant levels (**Class II**).

Most of the proposed route for Alternative 5 would pass through undeveloped land, areas with scattered rural residences, and low density residential with little likelihood of unknown environmental contamination. Alternative 5 would introduce the potential to encounter unknown pre-existing soil or groundwater contamination (Impact PH-3). The eastern end of the alignment would pass through light industrial and commercial areas, with interspersed residential developments. Previously unknown soil or groundwater contamination could be encountered during grading or excavation, particularly at the substations or in other commercial or light industrial areas. As with Impact PH-2, APM PHS-1 (Phase I ESA for planned ground disturbance areas) would be incorporated into the project description for Alternative 5. Mitigation Measures PH-2 (Conduct Phase II Investigation) and PH-3 (Observe Exposed Soil) would also be implemented to reduce the Impact PH-3 for Alternative 5 to a less-than-significant level (**Class II**).

Soil contamination resulting from operation (Criterion PHS3)

Operation of Alternative 5 is the same as the proposed Project with regards to soil or groundwater contamination resulting from accidental spill or release of hazardous during operation or maintenance (Impact PH-4) as discussed in Section C.6.5.1. SCE would minimize unforeseen spills of hazardous materials during operation at the substations by updating and utilizing the Spill Prevention, Countermeasure, and Control (SPCC) plan for the Antelope Substation and by preparing and utilizing a SPCC plans for the Pardee Substation. Mitigation Measures PH-4a (Documentation of Compliance) and PH-4b (Emergency Spill Supplies and Equipment) are required to ensure that the Applicant's plans to protect workers are properly implemented, and thereby reduce potential impacts to less than significant levels (**Class II**).

Electric and Magnetic Fields

Alternative 5 would introduce magnetic fields into areas that presently do not have transmission lines and therefore no magnetic fields. The magnetic field strength would be the same as modeled by SCE for Area 3 of the proposed Project route. This alternative is routed in a mixture of developed and undeveloped lands. No impacts would occur from EMFs.

Non-EMF Electric Power Field Issues

Introduction of hazards related to wind, earthquake, or fire (Criterion PHS4)

Construction of Alternative 5 would introduce the potential that project-related infrastructure would not meet loading requirements related to wind, earthquake, or fire. As described for the proposed Project, no design-related hazards would occur with the alternative.

Harmful interference with radio/television/electronic equipment (Criterion PHS5)

Alternative 5 would cause radio or television interference (Impact PH-5). This impact for Alternative 5 would be exactly the same as the proposed Project. Mitigation Measures PH-5a (Limit the Conductor Surface Electric Gradient) and PH-5b (Document and Resolve Electronic Interference Complaints) would be implemented to reduce Impact PH-5 for Alternative 5 to a less-than-significant level (**Class II**).

Induced currents or shock hazards to the public (Criterion PHS6)

Induced currents and shock hazards in joint-use corridors would be created through the construction and operation of Alternative 5 (Impact PH-6). This impact would be exactly the same as with the proposed Project. Mitigation Measure PH-6 (Determine Proper Grounding Measures) would be implemented to reduce Impact PH-6 for Alternative 5 to a less-than-significant level (**Class II**).

Interference with synchronous pacemakers (Criterion PHS7)

The operation of Alternative 5 would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7). This impact for Alternative 5 would be exactly the same as for the proposed Project. Impact PH-7 for Alternative 5 would be less than significant with no mitigation incorporated (**Class III**).

C.6.11 No Project/Action Alternative

Under the No Project/Action Alternative, the proposed Project would not be implemented and, therefore, the impacts associated with the proposed Project and alternative described in Sections C.6.5 through C.6.11 above would not occur. The existing magnetic field due to existing transmission lines would remain unaltered.

Impacts related to induced current, cardiac pacemakers, electronic interference, and other hazards would remain as they are with the existing transmission lines in the corridors.

However, as identified in Section B.4.8.2, in the absence of the proposed Project, other actions would occur. Some wind projects would be postponed or cancelled, or alternatives developed that would meet the RPS goal by 2010. SCE would need to accommodate the power load by upgrading existing transmission infrastructure or building new transmission facilities along a different alignment. Operation and construction methods, resulting impacts, and regulatory requirements associated with other transmission projects would be similar to those identified for the proposed Project. In the circumstance of the No Project/Action Alternative, it is expected that actions with similar impacts to public health and safety as the proposed Project would take place.

C.6.12 Impact and Mitigation Summary

The following table (Table C.6-8) presents a summary of all impacts and associated significance classifications that would occur with the proposed Project and each of the alternatives to the proposed Project, with regards to public health and safety. Table C.6-8 also indicates the mitigation measures that would be implemented for each relevant impact. Only the mitigation measure numbers are displayed. Descriptions of the mitigation measures are provided in the preceding sections.

Table C.6-8. Impact and Mitigation Summary – Public Health and Safety

Impact	Impact Significance					
	Proposed Project	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
PH-1: Soil or groundwater contamination results due to improper handling and/or storage of hazardous materials during construction activities.	Class II PH-1a thru PH-1d	Class II PH-1a thru PH-1d	Class II PH-1a thru PH-1d	Class II PH-1a thru PH-1d	Class II PH-1a thru PH-1d	Class II PH-1a thru PH-1d
PH-2: Project results in encountering known preexisting soil or groundwater contamination.	Class II PH-2	Class II PH-2	Class II PH-2	Class II PH-2	Class II PH-2	Class II PH-2
PH-3: Project results in encountering unknown preexisting soil or groundwater contamination.	Class II PH-3	Class II PH-3	Class II PH-3	Class II PH-3	Class II PH-3	Class II PH-3
PH-4: Release of hazardous materials during operation at substations and transmission line maintenance.	Class II PH-4a, PH-4b	Class II PH-4a, PH-4b	Class II PH-4a, PH-4b	Class II PH-4a, PH-4b	Class II PH-4a, PH-4b	Class II PH-4a, PH-4b
PH-5: Project would cause radio or television interference.	Class II PH-5a, PH-5b	Class II PH-5a, PH-5b	Class II PH-5a, PH-5b	Class II PH-5a, PH-5b	Class II PH-5a, PH-5b	Class II PH-5a, PH-5b
PH-6: The Project would create induced currents and shock hazards in joint-use corridors.	Class II PH-6	Class II PH-6	Class II PH-6	Class II PH-6	Class II PH-6	Class II PH-6
PH-7: Project operation would cause synchronous pacemakers to revert to an asynchronous mode.	Class III None	Class III None	Class III None	Class III None	Class III None	Class III None

Class I = Significant and unavoidable impact; Class II = Significant but mitigated to a less-than-significant level; Class III = Less-than-significant impact; Class IV = Beneficial impact.

C.6.13 Cumulative Effects

C.6.13.1 Geographic Extent

A cumulative effect would occur if a public health and safety impact of the proposed Project or an alternative combines with a similar impact of a separate past, present, or future project. The impacts that would occur with public health and safety, as summarized in Table C.8-6, are expected to have the potential to combine only with the impacts of other projects located in the immediate vicinity. Therefore, the geographic extent for the analysis of cumulative impacts related to public health and safety, including environmental contamination, EMFs, and non-EMF power field issues, is limited to the area within one mile of the proposed Project and alternatives.

C.6.13.2 Existing Cumulative Conditions

This section discusses the past projects that have occurred in the cumulative analysis area, in addition to ongoing and future projects on NFS lands and non-NFS lands in the area, as related to public health and safety. Many different types of projects have the potential to combine with effects of other projects (including the proposed) related to environmental contamination, EMF, and non-EMF power field issues. Consideration of the projects identified in Section B.5 (Cumulative Impacts Scenario) was used to develop this analysis of cumulative effects for public health and safety, which includes environmental contamination, EMF issues, and non-EMF power field issues.

Past and Existing Projects

Urban sprawl throughout southern California has resulted in the widespread growth of community developments and residential areas. Within the cumulative analysis area (one mile surrounding the proposed Project and alternatives), such developments have introduced public health and safety effects in the established community areas of Lancaster and Santa Clarita, as well as other communities along the Alternative 5 route such as Leona Valley, Acton, and throughout unincorporated Los Angeles County. In addition to the homes, businesses, and roadways that have been constructed in these areas, a complex network of power generation, transmission, and distribution facilities has also been established to service the power load and needs of these expanding community areas.

A list of current projects located within five miles of the proposed Project route is provided in Table B.5-1 (Cumulative Projects List). The corresponding location of these projects is shown on Figures B.5-1a and B.5-1b. For the issue area of public health and safety, this five-mile radius includes projects within the cumulative analysis area for the proposed Project and Alternatives 1 through 4. In addition, it is reasonably assumed that the projects listed in Table B.5-1 are indicative of current projects located within the cumulative analysis area for Alternative 5, due to the fact that the vast majority of ongoing projects are characterized as residential development or expansion. The construction of most of the cumulative projects in Table B.5-1 could introduce public health and safety concerns in the areas of environmental contamination through land disturbance and the use of heavy machinery. In addition, the construction and operation of past and existing transmission line projects and power generation projects, including those listed in Tables B.5-1 and B.5-2, would introduce EMF issues and non-EMF power field issues.

Future Projects

As discussed above and demonstrated by Table B.5-1, ongoing development throughout the cumulative effects area for public health and safety is dominated by residential developments, clustered in and around community

developments on non-NFS lands. This trend in residential development is also representative of reasonably foreseeable future projects in the cumulative effects area, as supported by the aggressive population growth forecast shown in Table B.5-4. Therefore, the impacts to public health and safety from past and ongoing projects, as described above, are expected to continue and increase in the future.

Table B.5-3 (Recent and Future Projects on NFS Lands) lists ongoing and proposed projects on NFS lands in the Santa Clara/Mojave Rivers Ranger District, north of Highway 14. As with the future non-NFS projects, the past and ongoing NFS projects are representative of future NFS projects. Table B.5-3 indicates that most of these projects are focused on repairs, re-establishment, or rehabilitation of existing facilities. Due to the limited extent of the cumulative effects area, future projects would have to occur within one mile of the proposed Project or alternative in order to be considered cumulatively significant to public health and safety.

C.6.13.3 Cumulative Impact Analysis

The area along the route of the proposed Project alignment and the alternative alignments consist primarily of undeveloped and open space land, scattered rural residences, new residential developments, and minor light industrial and commercial properties. Based on this land use (versus heavier industrial or commercial use), there is little likelihood of significant soil or groundwater contamination. Although environmental contamination may exist at properties not crossed by the alignment, distance and separation of these sites from the alignment generally preclude contamination at these sites from directly affecting the alignment.

Any clean up and disposal of unexpected contaminated soil and/or groundwater resulting from construction of the proposed Project or an alternative and from other local and regional projects is a beneficial impact. Public health and safety impacts caused by the Project would be cumulatively considerable only if they occur at the same time as public health and safety impacts caused by other projects in the near vicinity. With regard to environmental contamination issues, impacts resulting from the proposed Project would only be considered cumulatively significant if concurrent construction of the proposed Project and other local projects results in significant volumes of contaminated soil that require off-site treatment and that, as a combined volume, exceeds the capacity of available treatment facilities. Based on the largely rural character of the Project alignment, no significant quantities of contaminated soil are expected to be encountered during construction of the proposed Project. Following is a discussion of the potential impacts that could potentially combine with similar impacts of other projects that occur within one mile of the proposed Project or an alternative.

- **Soil or groundwater contamination results due to improper handling and/or storage of hazardous materials during construction activities (Impact PH-1).** The accidental release of hazardous materials could occur during Project-related construction activities. The proposed Project would include implementation of four mitigation measures to reduce Impact PH-1 to a less-than-significant level: Mitigation Measures PH-1a (Environmental Training and Monitoring Program), PH-1b (Hazardous Substance Control and Emergency Response Plan), PH-1c (Proper Disposal of Construction Waste), and PH-1d (Emergency Spill Supplies and Equipment). This impact would not be cumulatively significant (**Class III**) and would be the same for all alternatives.
- **Project results in encountering known preexisting soil or groundwater contamination (Impact PH-2) or unknown preexisting soil or groundwater contamination (Impact PH-3).** If both the proposed Project or alternative and one or more cumulative projects in the cumulative analysis area results in the encountering of known or unknown preexisting soil or groundwater contamination, the end result will be that the contaminated material will be safely removed and disposed of. Any clean up and disposal of contaminated soil and/or groundwater resulting from construction of the proposed Project and from other projects is a beneficial impact. Clean up of contaminated sites related to other projects becomes an adverse impact when the combined volume of contaminated soil requiring treatment from the proposed Project and other projects exceeds the capacity of the available treatment facilities. However, no significant quantities of contaminated soil are expected to be encountered during construction of the proposed Project. Impacts PH-2 and PH-3 therefore would not be cumulatively significant (**Class III**) and would be the same for all alternatives.

- **Release of hazardous materials during operation at substations and transmission line maintenance (Impact PH-4).** The impact of the potential accidental release of hazardous materials associated with transmission line and infrastructure maintenance is not likely to combine with comparable cumulative events. Impact PH-4 would not be cumulatively significant (**Class III**) and would be the same for all alternatives.
- **Project would cause radio or television interference (Impact PH-5)**. If the cumulative projects in the vicinity of the proposed Project were to cause radio or television interference, particularly to sensitive receptors such as businesses and schools, the cumulative effect of Impact PH-5 would be significant and unavoidable. Given the rapid and widespread development in the Project area, it is possible that a cumulative project could occur within the cumulative analysis area for the proposed Project and could introduce radio or television interference, as with the proposed Project. Therefore, Impact PH-6 would be cumulatively significant and unavoidable (**Class I**) for all alternatives.
- **The Project would create induced currents and shock hazards in joint-use corridors (Impact PH-6).** This impact would not combine with similar impacts of other projects.
- **Project operation would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7).** This impact would not combine with similar impacts of other projects.

C.6.13.4 Cumulative Effects on National Forest System Lands

Past, present, and reasonably foreseeable projects located on NFS lands in the Project area are described in Section B.5.4 (Cumulative Projects on NFS Lands) and listed in Table B.5-3 (Recent and Future Projects on NFS Lands). This section addresses the potential impacts to public health and safety which are summarized in Section C.6.13 (Impact and Mitigation Summary) and discussed above in Section C.6.14.3 (Cumulative Impact Analysis) in terms of what their cumulative effects would be specifically on NFS lands. In order to determine which, if any, of these impacts would be cumulatively considerable on NFS lands, the incremental impacts of the proposed Project and alternatives are considered in combination with the existing cumulative conditions, including past, present, and reasonably foreseeable projects on NFS lands, as described in Section B.5.4.

- **Soil or groundwater contamination results due to improper handling and/or storage of hazardous materials during construction activities (Impact PH-1).** The accidental release of hazardous materials could occur during Project-related construction activities and during the construction of cumulative projects on NFS lands. As described inn Table B.5-3, the ongoing and planned projects located on NFS lands are mostly non-residential maintenance projects. Due to the limited extent of these projects, the unlikelihood that one of them would occur within one mile of the proposed Project on NFS lands, and the mitigation measures implemented as part of the proposed Project, Impact PH-1 would be less than significant with no mitigation recommended (**Class III**).
- **Project results in encountering known preexisting soil or groundwater contamination (Impact PH-2) or unknown preexisting soil or groundwater contamination (Impact PH-3).** If both the proposed Project or alternative and one or more cumulative projects in the cumulative analysis area on NFS lands results in the encountering of known or unknown preexisting soil or groundwater contamination, the end result will be that the contaminated material will be safely removed and disposed of. Any clean up and disposal of contaminated soil and/or groundwater resulting from construction of the proposed Project and from other projects is a beneficial impact. Due to the nature of land use on NFS lands being open space and recreation, with minimal other land uses, it is not expected that contaminated soils would be encountered. Therefore, Impacts PH-2 and PH-3 would be less than significant with no mitigation recommended (**Class III**).
- **Release of hazardous materials during operation at substations and transmission line maintenance (Impact PH-4).** As discussed, similar impacts of other projects would have to occur within one mile of the proposed Project or an alternative on NFS lands in order to be considered cumulatively significant. There are no substation facilities located on or planned for construction on NFS lands. There are other transmission line facilities located within the cumulative analysis area on NFS lands. However, the potential accidental release of hazardous materials associated with transmission line and infrastructure maintenance is not likely and Impact PH-4 would be cumulatively less than significant with no mitigation recommended (**Class III**) on NFS lands.

- **Project would cause radio or television interference (Impact PH-5)**. If the cumulative projects in the vicinity of the proposed Project were to cause radio or television interference, particularly to sensitive receptors such as businesses and schools, the cumulative effect of Impact PH-5 would be significant and unavoidable. However, given that land use on NFS lands is open space and recreational with minimal other uses, Impact PH-5 would be less than significant with no mitigation recommended (**Class I**) on NFS lands.
- **The Project would create induced currents and shock hazards in joint-use corridors (Impact PH-6).** This impact would not combine with similar impacts of other projects.
- **Project operation would cause synchronous pacemakers to revert to an asynchronous mode (Impact PH-7).** This impact would not combine with similar impacts of other projects.