D.10 Public Health and Safety

This section addresses two issues. Sections D.10.1 through D.10.10 address the environmental setting and impacts related to the construction and operation of the Proposed Project and alternatives involving the issues of environmental contamination and hazardous materials. Sections D.10.11 through D.10.12 address concerns about electric and magnetic fields and other electric field issues. Section D.10.13 presents the mitigation monitoring program for all topics covered in this section.

D.10.1 Regional Setting and Approach to Data Collection

This section addresses the environmental setting and impacts related to the construction and operation of the Proposed Project and alternatives involving the issues of environmental contamination and hazardous materials. Sites with known and potential contamination along or near the proposed transmission line route were researched 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. Where encountered, contaminated soil may qualify as hazardous waste, thus requiring handling and disposal according to local, State, and federal regulations.

The proposed route traverses land with a variety of uses, including: open-space recreation and preserve, agricultural, rural and suburban residential housing, and commercial businesses. Existing and past land use activities are used as 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 and orchards, and contaminated groundwater plumes that may exist along the transmission line route. However, review of online environmental databases indicates there are no known active hazardous waste sites within 1,000 feet of or within the project right-of-way (ROW). Online databases reviewed are as follows:

- Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) databases (U.S. EPA, 2006)
- California State Water Resources Control Board (SWRCB) Geotracker (SWRCB, 2006)
- California Department of Toxic Substance Control (DTSC) databases (DTSC, 2006)
- Arizona Department of Environmental Quality (ADEQ) Interactive GIS database, which includes Superfund, Underground Storage Tanks (UST), Leaking Underground Storage Tanks (LUST), Brownfield, and other hazardous material site locations and data (ADEQ, 2006).

D.10.2 Environmental Setting for the Proposed Project – Devers-Harquahala

Based on the limited environmental database review described above, there are no known hazardous release sites within the Proposed Project ROW. However, unknown contamination could be present within the ROW due to past and current property uses in the vicinity. The sections below provide general descriptions of the existing uses in the vicinity of the proposed ROW as related to the potential for

environmental contamination. The majority of the proposed ROW is located adjacent to existing power and natural gas transmission line ROWs.

D.10.2.1 Harquahala to Kofa National Wildlife Refuge

The Harquahala to Kofa National Wildlife Refuge (NWR) segment traverses primarily undeveloped open space and a small amount of agricultural property. The transmission line ROW traverses agricultural land from the Harquahala switchyard to approximately Milepost (MP) E2.3. The remainder of the segment (to MP E53.3) passes through open desert land consisting primarily of flat to gently sloping terrain with sparse scrub vegetation and numerous small washes and local arroyos (ephemeral stream channels) dissecting the surface. This segment of the route crosses Interstate 10 (I-10) at MPs E7.4 and E31.0. It also crosses numerous small rural paved and unpaved roads. Based on the land uses present, in particular the lack of commercial and industrial uses, the Harquahala to Kofa NWR segment has a low potential to encounter contaminated soil except for the 2.3 miles of agricultural land that may have residual pesticide and herbicide in the soil.

D.10.2.2 Kofa National Wildlife Refuge

The Kofa NWR segment traverses wilderness open space preserve. This segment of the route continues through open desert land with sparse vegetation and numerous small washes and arroyos. The segment crosses the hilly, rocky terrain of the New Water Mountains at approximately MPs E60–E73. The segment then traverses a gently sloping dissected alluvial fan with very sparse scrub vegetation. The alignment parallels and crosses unpaved access roads (i.e., for DPV1 and the El Paso Natural Gas Company gas pipeline) and other unpaved roads. Based on the land uses present in the Kofa NWR segment and the lack of commercial, industrial, and agricultural activities, there is a very low potential to encounter contaminated soil along this segment.

D.10.2.3 Kofa National Wildlife Refuge to Colorado River

The Kofa NWR to Colorado River proposed route segment traverses undeveloped open space with desert and mountain terrain. This segment traverses a gently sloping dissected alluvial fan with very sparse scrub vegetation from the western edge of the Kofa National Wildlife Refuge to the eastern edge of the Dome Rock Mountains at approximately MP E86. The route then crosses through the gently to steeply sloping hilly terrain of the Dome Rock Mountains at MPs E86–E93, and from MP E93 the route crosses gently sloping alluvial fans dissected by numerous small washes and arroyos. At MP E101.5, the route enters the Colorado River flood plain and then crosses the Colorado River at approximately MPs E102.2–E102.3. The segment parallels and crosses unpaved access roads (i.e., for DPV1 and El Paso Natural Gas Company gas pipeline), other small rural paved and unpaved roads, and crosses Highway 95 at MP E80.3. Based on the land uses along the Kofa NWR to Colorado River segment and the lack of commercial, industrial, and agricultural activities, this segment has a very low potential to encounter contaminated soil or groundwater.

D.10.2.4 Palo Verde Valley (Colorado River to Midpoint Substation)

The Palo Verde Valley segment of the proposed transmission line route primarily traverses active agricultural land, with a small amount of undeveloped open space at the western end. The segment starts at the Colorado River (approximately MP E102.2) and traverses agricultural fields with a mix of alfalfa, miscellaneous vegetable and melon row crops, cotton, and other field crops to approximately MP

E112.6. From this point the proposed segment crosses onto the Palo Verde Mesa, an undeveloped gently sloping to flat alluvial plain with sparse vegetation and remains on the Mesa for the remainder of the segment (to MP E 113.7). This segment parallels and crosses existing paved and unpaved rural farm roads, and several irrigation canals. Based on the land uses present, the Palo Verde Valley segment has a moderate potential to encounter contaminated soil, especially along the approximately 10 miles of agricultural land that may have residual pesticide and herbicide in the soil.

Midpoint Substation

The proposed Midpoint Substation would be constructed at approximately MP E113.7 on undeveloped desert land consisting of a nearly flat alluvial plain with sparse vegetation. The Midpoint Substation site has a very low potential for environmental contamination because current and past land uses are not associated with the use of hazardous materials.

D.10.2.5 Midpoint Substation to Cactus City Rest Area

The Midpoint Substation to Cactus City Rest Area segment traverses primarily undeveloped open space. The proposed route for this segment passes through open desert land consisting primarily of flat to moderately sloping terrain with sparse scrub vegetation and numerous small washes and local arroyos that skirt the northern edge of the Chuckwalla and Orocopia Mountains. The segment then continues west across a sparsely vegetated and dissected alluvial fan and to the southeastern edge of the Little San Bernardino Mountains at MP E188.2 (just north of the Cactus City Rest Area along I-10). This segment crosses I-10 at approximately MP E185.6 and most of the route runs parallel to and crosses an existing unpaved powerline access road and crosses numerous other paved and unpaved roadways. Based on the land uses present, in particular the lack of commercial, industrial, and agricultural uses, the Midpoint to Cactus City Rest Area segment has a very low potential to encounter contaminated soil.

D.10.2.6 Cactus City Rest Area to Devers Substation

The Cactus City Rest Area to Devers Substation segment traverses primarily undeveloped open space and some rural residential, ranch, and light industrial/warehouse properties. From the Cactus City Rest Area the segment passes across undeveloped alluvial fans and the base and foothills of the Indio Hills. The route segment crosses an active gravel quarry site at approximately MPs E205.5–E206.4. The segment then continues along primarily undeveloped land near the southern edge of the Indio Hills, where it crosses a small semi-abandoned orchard at MPs E208.1–E208.7, and passes just north of a new housing development at approximately MP E209.

West of MP E209, this segment of the proposed route traverses and crosses near interfingering areas of undeveloped land, including low-density residential, rural residential, nearby quarries, and miscellaneous industrial/warehouse facilities, before entering Devers Substation at approximately MP E228. This segment parallels and crosses existing unpaved powerline access roads, crosses numerous other paved residential and rural streets, and crosses some unpaved dirt roads.

Based on the land uses present and the low-density of commercial and industrial activities, the Cactus City Rest Area to Devers Substation segment has a low potential to encounter contaminated soil. The orchard noted on aerial photographs (MPs E208.1–E208.7) may contain residual pesticide and herbicide in the soil.

Devers Substation

Devers Substation was constructed in 1967 and expanded in 1982. It is located in an unincorporated area of Riverside County, between the Cities of Desert Hot Springs to the north and Palm Springs to the south. The area surrounding the substation is mostly undeveloped, with scattered rural residences and other energy related facilities. The Devers Substation stores and uses a small quantity of hazardous materials that may have resulted in soil contamination after nearly 50 years of use. However, the substation is not shown on public databases as a recognized contamination sink.

D.10.3 Environmental Setting for the Proposed Project – West of Devers

Environmental Contamination

Based on the online environmental database review described in Section D.10.1, there are no known hazardous release sites within the Proposed Project ROW in the West of Devers segment. However, unknown contamination could be present within the ROW due to past and current property uses in the vicinity. The sections below provide general descriptions of the existing uses in the vicinity of the proposed ROW as related to the potential for environmental contamination. All of the proposed West of Devers alignment segments would be constructed within existing SCE ROW and easements.

D.10.3.1 Devers Substation to East Border of Banning

The Devers Substation to East Border of Banning segment of the proposed route crosses a mix of undeveloped land and scattered rural residential areas. This segment of the proposed route crosses State Route 62 at MP W1.2, parallels and crosses unpaved powerline access roads, and crosses numerous paved and unpaved rural roads. As the route leaves the Devers Substation, it passes land occupied by wind energy farms and a pocket of scattered rural residences to about MP W3.2. The Whitewater River is crossed between MPs W3.3 and W3.5, and the western edge of the river floodplain is occupied by a gravel quarrying operation. Continuing west, the alignment passes primarily undeveloped alluvial plains with scattered vegetation and local arroyos and washes, and pockets of low-density rural residential uses to the eastern edge of Banning. Based on land uses along the Devers Substation to East Border of Banning segment, particularly the lack of commercial, industrial, and agricultural uses, there is low potential for the project to encounter contaminated soil.

D.10.3.2 Banning and Beaumont

The Banning and Beaumont segment of the proposed route crosses through a mix of undeveloped land, low-density residential development, and more dense residential areas. Construction in this segment would be the same as in the segment discussed above. Within the City of Banning, about MPs W14.3–W22, the route segment traverses undeveloped hills and alluvial fans of the San Bernardino Mountains with pockets of residential developments located south of the route at about MPs W17.7 and W20.5; within this portion of the segment the alignment also crosses an active gravel quarry between MPs W16.6 and W17.1. The proportion of residential development to undeveloped land in the City of Beaumont is higher, with the route segment crossing through or adjacent to five residential developments, at about MPs W22.5, W23–W24, W24.5, W26, and W26.5, and across or adjacent to several golf courses. The undeveloped land consists of alluvial fans and hills of the San Bernardino Mountain foothills with small stream drainages and washes. This segment of the alignment crosses Interstate 10 at MP W26.4, parallels and crosses

unpaved transmission line access roads, and crosses paved residential streets and unpaved rural roads. Based on the land uses present, in particular the lack of commercial, industrial, and agricultural uses, the Banning and Beaumont segment has a low potential to encounter contaminated soil. The route segment crosses a gravel quarry at the east edge of Banning where no known contamination exists.

D.10.3.3 Calimesa and San Timoteo Canyon

The Calimesa and San Timoteo segment of the transmission line route crosses primarily through undeveloped open space land, some undergoing development of large residential subdivisions, with a few scattered rural residential and farm properties. This segment crosses San Timoteo Road at about MP W29.6, parallels and crosses unpaved powerline access roads, and crosses paved residential streets and unpaved rural roads. The eastern portion of the proposed route segment primarily runs along the slopes and hills above the north side of San Timoteo Canyon, east of the San Timoteo Road crossing. West of San Timoteo Canyon Road the route segment is on the south side of the canyon. West of Redlands Boulevard (MP W34.5), developed land uses along the project alignment increase, primarily consisting of ranches and ranch facilities, groves, and other farmland. The intervening land consists of undeveloped grassy hill slopes and ridges. Although there are orchards and farmland in the Calimesa and San Timoteo Canyon segment, the planned tower sites are on ridge tops that avoid the agricultural areas, hence there is no potential for residual pesticide and herbicide in soil. The remaining parts of this segment are free of land use activities that would potentially result in soil or groundwater contamination.

D.10.3.4 San Bernardino Junction to Vista Substation

The San Bernardino Junction to Vista Substation route segment crosses primarily undeveloped open space and passes adjacent to several residential developments. The proposed route segment passes through undeveloped brush and grass covered hills and valleys to approximately MP V1.9, where it then passes just to the north of several residential developments (MPs V1.9–V3.2). Between MP V 3.5 and Mount Vernon Avenue (MP V4.4), the transmission line route would pass through and adjacent to older residential neighborhoods. The route segment then crosses the State Route 215 ROW before entering Vista Substation. In addition to crossing State Route 215, the route segment crosses unpaved roads in the hills and some paved residential streets. Based on the open space and residential land uses along the San Bernardino Junction to Vista Substation segment, there is very low potential to encounter contaminated soil.

D.10.3.5 San Bernardino Junction to San Bernardino Substation

The segment from San Bernardino Junction to San Bernardino Substation traverses a mix of undeveloped open space, agricultural land, residential properties, and industrial/warehouse properties. Based on the agricultural and local industrial land use activities, there is a potential for soil containing pesticides, herbicides and previously unknown industrial contaminants (solvents, hydrocarbons, heavy metals) and this route segment.

D.10.4 Applicable Regulations, Plans, and Standards

Hazardous substances are defined by federal and State 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 would be excavated from a site containing hazardous materials would be considered to be a hazardous waste if it exceeds specific CCR Title 22 criteria, or on federal/Kofa WLR 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 would be 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.

Bureau of Land Management

The BLM engages in hazardous material emergency response actions, site evaluations, and prioritization of cleanups in accordance with laws and regulations. This involves working with the EPA, State environmental quality departments, counties, and potentially responsible parties (both public and private) to fund and expedite the cleanup of hazardous sites. Those sites that are an imminent threat to public health and safety, as well as those sites that are under a consent order and can therefore generate penalties and fines, are a priority for BLM.

State of Arizona

The Arizona Department of Environmental Quality (ADEQ) was established by the Arizona Environmental Quality Act in 1985 to serve as a separate, cabinet-level agency to administer all of Arizona's environmental protection programs. The same legislation established a comprehensive groundwater protection program and the State's Water Quality Assurance Revolving Fund (WQARF), to identify, assess, and remediate contaminated sites with the potential to impact public health or groundwater. The ADEQ supports a wide range of environmental programs that protect the quality of air, water, and land in Arizona. Four divisions (i.e., Air Quality, Water Quality, Tank Programs, and Waste Programs) carry out ADEQ's core responsibilities, which are: pollution control; monitoring and assessment; compliance management; site cleanups; education, outreach, and financial assistance; and policy development.

ADEQ Waste Programs Division

The mission of the Waste Programs Division is to protect and enhance public health and the environment by reducing the risk associated with waste management, contaminated sites, and regulated substances. Under RCRA and State statutes and codes that are modeled on the federal law, the ADEQ has the authority to monitor and direct businesses that may generate, transport, or dispose of hazardous waste in Arizona.

Remedial Projects Section. The Remedial Projects Section is responsible for oversight and management of State and federal superfund sites in Arizona. The Section identifies, assesses and cleans up soil, groundwater, and surface water contaminated with hazardous substances. The Section conducts these efforts throughout Arizona with support from State and federal funds. The Section also oversees privately funded cleanup efforts. The program identifies sites that are most in need of cleanup and adds them to the WQARF registry. Sites on the registry receive first consideration for distribution of funds.

State of California

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

DTSC is a department of CALEPA and is the primary agency in California that regulates hazardous waste, administers clean-ups of existing contamination, and looks for ways to reduce the hazardous waste pro-

duced in California. DTSC regulates hazardous waste in California primarily under the authority of RCRA 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.

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

Maricopa County

The Water and Waste Management Division of the Maricopa County Environmental Services Department has a wide range of environmental responsibilities. Responsibilities related to preventing environmental contamination includes overseeing the investigation of illegal dumping in incorporated areas, overseeing permits on refuse haulers & non-hazardous liquid waste haulers, and institutes procedures to help minimize environmental impacts and to reduce polluted stormwater runoff. The Water and Waste Management Division utilizes the Maricopa County Health Code and the Arizona Administrative Code to provide for the needed inspections and approvals related to the above mentioned functions.

La Paz County

The La Paz County Department of Emergency responds to Hazardous Material (HAZMAT) spills throughout the County and ensures cleanup compliance as directed by the Arizona Department of Emergency Management (ADEM) and the ADEQ.

Riverside County

The Riverside Community Health Agency Department of Environmental Health, Hazardous Materials Management Division is responsible for overseeing hazardous waste minimization, training, permitting and inspection through several programs. Programs include the following:

- Environmental Health (EH) personnel working with businesses seek ways to significantly reduce the amount of hazardous waste produced by way of education and technical assistance.
- EH personnel, in conjunction with County Fire Department, respond to hazardous materials incidents. Assists the County District Attorney in the investigation of environmental crimes and responds to illegal hazardous waste disposal complaints.
- Local Oversight Underground Storage Tank (UST) Program – Responsible for monitoring the remediation of sites contaminated by petroleum products as a result of leaking UST.
- Underground Storage Tank (UST) Program – Regulates all non-exempt USTs which contain hazardous substances located within Riverside County.
- Waste Generator Permit – Regulates facilities in the community which generate a hazardous waste.

- Hazardous Materials Handlers Program – Regulates facilities that handle and store onsite specified types and quantities of hazardous and acutely/extremely hazardous materials through permitting, routine facility inspections and development of detailed site plans indicating where hazardous materials are stored.
- Environmental Crimes Task Force – Department staff serve jointly with the District Attorney's Office to investigate environmental crimes.

San Bernardino County

The San Bernardino County Fire Department, Hazardous Materials Division, protects the health and safety of the public and the environment of the County of San Bernardino by assuring that hazardous materials are properly handled and stored. The Division accomplishes this through inspection, emergency response, site remediation, and hazardous waste management services. Specific responsibilities include:

- Inspecting hazardous material handlers and hazardous waste generators to ensure full compliance with laws and regulations. Implementing CUPA programs for the development of accident prevention and emergency plans, proper installation, monitoring, and closure of underground tanks, and the handling, storage, transportation, and disposal of hazardous wastes.
- Providing 24-hour response to emergency incidents involving hazardous materials or wastes in order to protect the public and the environment from accidental releases and illegal activities.
- Overseeing the investigation and remediation of environmental contamination due to releases from underground storage tanks, hazardous waste containers, chemical processes, or the transportation of hazardous materials.
- Conducting investigations and taking enforcement action as necessary against anyone who disposes of hazardous waste illegally or otherwise manages hazardous materials or wastes in violation of federal, State, or local laws and regulations.

D.10.5 Significance Criteria and Approach to Impact Assessment

This section explains how impacts related to contamination and hazardous materials are assessed. Section D.10.5.1 presents the significance criteria on which impact determinations are based. Section D.10.5.2 lists the Applicant Proposed Measures relevant to contamination, and Section D.10.5.3 lists all impacts identified for the Proposed Project and alternatives.

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 (e.g., 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. 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 would be a hazardous waste if it exceeds 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. 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 with jurisdictional authority. Cleanup requirements are determined on a case-by-case basis by the agency taking lead jurisdiction.

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 agricultural, 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.

D.10.5.1 Significance Criteria

Environmental Contamination

An impact would be considered significant and require additional mitigation if project construction or operation would:

- Result 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
- Result in mobilization of contaminants currently existing in the soil, creating potential pathways of exposure to humans or other sensitive receptors that would result in exposure to contaminants at levels that would be expected to be harmful
- Result in the presence of contaminated soils or groundwater within the project area, and as a result, expose workers and/or the public to contaminated or hazardous materials during transmission line construction activities, 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.

D.10.5.2 Applicant Proposed Measures

Applicant Proposed Measures (APMs) were identified by SCE in its CPCN Application to the CPUC. Table D.10-1 presents the APMs that are relevant to hazardous materials. Impact analysis assumes that all APMs will be implemented as defined in the table; additional mitigation measures are recommended in this section if it is determined that APMs do not fully mitigate the impacts for which they are presented.

Table D.10-1. Applicant Proposed Measures – Public Health & Safety

APM No.	Description
APM W-3, APM W-11	Erosion control and hazardous material plans will be incorporated into the construction bidding specifications to ensure compliance.

D.10.5.3 Impacts Identified

Table D.10-2 lists the impacts identified for the Proposed Project and alternatives, along with the significance of each impact. All impacts related to hazardous materials are mitigated to less than significant levels. Detailed discussions of each impact and the specific locations where each is identified are presented in the following sections. Impacts are classified as Class I (significant, cannot be mitigated to a level that is less than significant), Class II (significant, can be mitigated to a level that is less than significant), Class III (adverse, but less than significant), and Class IV (beneficial).

Table D.10-2. Impacts Identified – Public Health & Safety

Impact No.	Description	Impact Significance
Proposed Project		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
P-2	Residual pesticides and or herbicides could be encountered during grading or excavation in agricultural areas	Class II
P-3	Previously unknown contamination could be encountered during grading or excavation	Class II
P-4	Soil contamination could result from accidental spill or release of hazardous materials during operations and maintenance	Class II
SCE Harquahala-West Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
P-2	Residual pesticides and or herbicides could be encountered during grading or excavation in agricultural areas	Class II
SCE Palo Verde Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
P-3	Previously unknown contamination could be encountered during grading or excavation	Class II
P-4	Soil contamination could result from accidental spill or release of hazardous materials during operations and maintenance	Class II
Harquahala Junction Switchyard Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
P-4	Soil contamination could result from accidental spill or release of hazardous materials during operations and maintenance	Class II
Desert Southwest Transmission Project Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
P-4	Soil contamination could result from accidental spill or release of hazardous materials during operations and maintenance	Class II

Table D.10-2. Impacts Identified – Public Health & Safety

Impact No.	Description	Impact Significance
Alligator Rock–North of Desert Center Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
Alligator Rock–Blythe Energy Transmission Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
Alligator Rock–South of I-10 Frontage Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
Devers-Valley No. 2 Alternative		
P-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities	Class II
P-2	Residual pesticides and or herbicides could be encountered during grading or excavation in agricultural areas	Class II
P-4	Soil contamination could result from accidental spill or release of hazardous materials during operations and maintenance	Class II

D.10.6 Environmental Impacts and Mitigation Measures for the Proposed Project – Devers-Harquahala

This section presents discussion of impacts and mitigation measures for contamination for the 500 kV portion of the Proposed Project. The discussion is divided into six geographic areas, three in Arizona and three in California. Within each area, both construction impacts and operational impacts are addressed.

D.10.6.1 Harquahala to Kofa National Wildlife Refuge

Construction Impacts

Impact P-1: Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities (Class II)

During construction, 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 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 contamination. In SCE's Application, it indicated that it would prepare of Hazardous Substance Control and Emergency Response Plan to reduce this impact. However, to formalize the preparation of this plan as a project requirement and to adequately ensure that potential impacts would be reduced to less than significant levels (Class II), implementation of Mitigation Measures P-1a and P-1b are required. This impact is the same for all of the proposed and alternative route segments as well as for the substation and switchyards, and therefore is not addressed further under the other route segment, substation, or switchyard discussions.

Mitigation Measures for Impact P-1: Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities

P-1a **Develop Hazardous Substance Control and Emergency Response Plan.** A Hazardous Substance Control and Emergency Response Plan shall be prepared for the project, and a copy shall be kept on site (or in vehicles) during construction and maintenance of the project. SCE shall document compliance by submitting the plan to the CPUC or BLM, as appropriate, for review and approval at least 60 days before the start of construction.

P-1b **Conduct environmental training and monitoring program.** An environmental training program shall 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 field personnel prior to the start of construction. The training program shall emphasize site-specific physical conditions to improve hazard prevention (e.g., identification of potentially hazardous substances) and shall include a review of all site-specific plans, including but not limited to, the project's Storm Water Pollution Prevention Plan and the Hazardous Substances Control and Emergency Response Plan. SCE shall document compliance by (a) submitting to the CPUC or BLM, as appropriate, for review and approval an outline of the proposed Environmental Training and Monitoring Program, and (b) maintaining for monitor review a list of names of all construction personnel who have completed the training program.

Best Management Practices, as identified in the project Storm Water Pollution Prevention Plan and the Hazardous Substances Control and Emergency Response Plan, shall be implemented during the construction of the project to minimize the risk of an accidental release and provide the necessary information for emergency response.

P-1c **Ensure 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, shall be removed to a hazardous waste facility permitted or otherwise authorized to treat, store, or dispose of such materials.

P-1d **Maintain emergency spill supplies and equipment.** Hazardous material spill kits shall be maintained at all construction sites 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 shall be kept adjacent to all work areas and staging areas, and shall be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials shall be provided in the project's Hazardous Substances Control and Emergency Response Plan.

Impact P-2: Residual pesticides and/or herbicides could be encountered during grading or excavation in agricultural areas (Class II)

The presence of residual pesticide and herbicide contamination of the soil and/or groundwater in the agricultural areas along the route represents a potentially significant impact due to the potential health hazards associated with exposure of construction workers and the public to contaminated soil. Implementation of APMs W-3 and W-11 in conjunction with Mitigation Measure P-2a would reduce this impact to less than significant (Class II).

Mitigation Measure for Impact P-2: Residual Pesticides and/or Herbicides could be encountered during grading or excavation in agricultural areas

P-2a **Identify pesticide/herbicide contamination.** Soil samples shall be collected in construction areas where the land has historically or is currently being farmed to identify the possibility of and to delineate the extent of pesticide and/or herbicide contamination. Excavated materials containing elevated levels of pesticide or herbicide will require special handling and disposal procedures. Standard dust suppression procedures (as defined in Mitigation Measure AQ-1a) shall be used in construction areas to reduce airborne emissions of these contaminants and reduce the risk of exposure to workers and the public. Regulatory agencies for the states of Arizona or California (as appropriate) and the appropriate county shall be contacted to provide oversight regarding the handling, treatment, and/or disposal options.

Impact P-3: Encountering unknown preexisting contamination during excavation or grading (Class II)

Previously unknown soil contamination associated with industrial contamination (e.g., solvents, hydrocarbons, heavy metals, etc.) could be encountered during grading or excavation, particularly at or near the Harquahala Generating Station switchyard. Mitigation Measure P-3a would reduce to a less than significant level (Class II) the potential that encountering previously unknown contamination would affect the health of workers or the public.

Mitigation Measure for Impact P-3: Encountering unknown preexisting soil and or groundwater contamination during excavation or grading

P-3a **Observe exposed soil for evidence of contamination.** During grading or excavation work, the construction 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. Additionally, 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 or BLM, describing proposed actions. A weekly report listing encounters with contaminated soils and describing actions taken shall be submitted to the CPUC or BLM.

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the proposed Harquahala Switchyard and/or the proposed series capacitor bank during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a would reduce potential impacts to workers and the public to less than significant levels (Class II).

Mitigation Measure for Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance

P-4a **Prepare Spill Prevention, Countermeasure, and Control Plans.** To minimize, avoid, and/or clean up unforeseen spill of hazardous materials during operation of the proposed facilities, SCE shall update or prepare, if necessary, the Spill Prevention, Countermeasure, and Control plan for each substation, series capacitors, and the switchyard. SCE shall document compliance by providing a copy of the Spill Prevention, Control, and Countermeasures plans to the CPUC or BLM, as appropriate, for review and approval at least 60 days before the start of operation.

D.10.6.2 Kofa National Wildlife Refuge

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.6.3 Kofa National Wildlife Refuge to Colorado River

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.6.4 Palo Verde Valley (Colorado River to Midpoint Substation)

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this segment because the segment would not include the operation of a substation, series capacitor, or switchyard (see Section D.10.6.5 for impacts related to the proposed Midpoint Substation).

Impact P-2: Residual pesticides and/or herbicides could be encountered during grading or excavation in agricultural areas (Class II)

The presence of residual pesticide and herbicide contamination of the soil and/or groundwater in the agricultural areas along this segment represents a potential significant impact due to the potential health hazards associated with exposure of construction workers and the public to contaminated soil and or groundwater. Implementation of APMs W-3 and W-11 in conjunction with Mitigation Measure P-2a (Identify pesticide/herbicide contamination) would reduce this impact to less than significant (Class II).

D.10.6.5 Midpoint Substation

Construction Impacts

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur at the proposed substation site because the site is not in an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses.

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the proposed Midpoint Substation during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a would reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.6.6 Midpoint Substation to Cactus City Rest Area

Construction Impacts

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this route segment because the segment does not pass through an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses.

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the proposed series capacitor bank during facility operations. This could potentially result in exposure of facility and

maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a would reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.6.7 Cactus City Rest Area to Devers Substation

Construction Impacts

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II).

Impact P-2: Residual Pesticides and/or Herbicides could be encountered during grading or excavation in agricultural areas (Class II)

The presence of residual pesticide and herbicide contamination of the soil and/or groundwater in the orchard area between MPs E208.1 and E208.7 of this route segment represents a potential significant impact due to the potential health hazards associated with exposure of construction workers and the public to contaminated soil and or groundwater. Implementation of APMs W-3 and W-11 in conjunction with Mitigation Measure P-2a (Identify pesticide/herbicide contamination) would reduce this impact to less than significant (Class II).

Impact P-3: Encountering unknown preexisting contamination during excavation or grading (Class II)

Previously unknown soil contamination associated with industrial contaminants could be encountered during grading or excavation at the Devers Substation. Mitigation Measure P-3a should be implemented to reduce the potential impact of encountering previously unknown contamination to a less than significant level (Class II).

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the Devers Substation during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.7 Environmental Impacts and Mitigation Measures for the Proposed Project – West of Devers

This section presents discussion of impacts and mitigation measures for the portion of the DPV2 Project west of the Devers Substation. The discussion is divided into five geographic areas, three between Devers Substation and San Bernardino Junction, and the two segments west of San Bernardino Junction. Within each area, both construction impacts and operational impacts are addressed.

D.10.7.1 Devers Substation to East Border of Banning

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this segment because the segment would not include the operation of a substation, series capacitor, or switchyard (see Section D.10.7.1 for potential impacts related to Devers Substation).

D.10.7.2 Banning and Beaumont

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.7.3 Calimesa and San Timoteo Canyon

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this segment because the proposed tower sites are on ridge tops that avoid existing agricultural areas. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.7.4 San Bernardino Junction to Vista Substation

Construction Impacts

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this route segment because the segment does not pass through an agricultural area. Impacts related to

encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this segment because the segment does not include any industrial or commercial uses.

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the Vista Substation during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.7.5 San Bernardino Junction to San Bernardino Substation

Construction Impacts

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same along the entire route and is addressed under Section D.10.6.1 above.

Impact P-2: Residual pesticides and/or herbicides could be encountered during grading or excavation in agricultural areas (Class II)

The presence of residual pesticide and herbicide contamination of the soil in the agricultural areas of this route segment represents a potential significant impact due to the potential health hazards associated with exposure of construction workers and the public to contaminated soil. Implementation of APMs W-3 and W-11 in conjunction with Mitigation Measure P-2a (Identify pesticide/herbicide contamination) would reduce this impact to less than significant (Class II).

Impact P-3: Encountering unknown preexisting contamination during excavation or grading (Class II)

Previously unknown soil contamination associated with industrial contaminants could be encountered during grading or excavation near the industrial/warehouse properties along the segment and at the San Bernardino Substation. Mitigation Measure P-3a would reduce the potential impact of encountering previously unknown contamination to a less than significant level (Class II).

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the San Bernardino Substation during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.8 Alternatives for Devers-Harquahala

D.10.8.1 SCE Harquahala-West Alternative

Environmental Setting

The Harquahala-West Alternative traverses agricultural land west of the Harquahala Switchyard, then crosses undeveloped open space to the existing El Paso Natural Gas pipeline utility corridor, which it parallels for 10.5 miles until rejoining the proposed route. This alternative has a very low potential to for environmental contamination that is typically associated with commercial and industrial land use activities, but it does have a potential for contamination related to residual pesticides and herbicides. Based on the environmental database review, there are no known hazardous release sites along this alternative route segment.

Impacts and Mitigation Measures

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same as the proposed route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this alternative route segment because the segment does not include any industrial or commercial uses. Impact P-4 (contamination at substations or other facilities during operation) could occur in this segment because there would be modifications to the Harquahala Switchyard required with this alternative (see Section D.10.6.1 for impacts related to the Harquahala Switchyard).

Impact P-2: Residual pesticides and/or herbicides could be encountered during grading or excavation in agricultural areas (Class II)

The presence of residual pesticide and herbicide contamination of the soil in the agricultural areas along this alternative route segment represents a potentially significant impact due to the potential health hazards associated with exposure of construction workers and the public to contaminated soil. Implementation of APMs W-3 and W-11 in conjunction with Mitigation Measure P-2a (Identify pesticide/herbicide contamination) would reduce this impact to less than significant (Class II).

D.10.8.2 SCE Palo Verde Alternative

Environmental Setting

The SCE Palo Verde Alternative traverses undeveloped open space within an existing transmission line corridor until it reaches the Palo Verde Nuclear Generating Station (PVNGS) Switchyard. The SCE Palo Verde Alternative route has a very low potential to encounter environmental contamination associated with commercial, industrial, or agricultural land use activities. However, there is some potential for soil contamination within the PVNGS Switchyard. Based on the limited environmental database review, there are no known hazardous release sites within this alternative route segment.

Impacts and Mitigation Measures

The potential for Impact P-1 (contamination as a result of improper handling or storage) to occur is the same as the proposed route and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a

through P-1d are required to reduce impacts to less than significant levels (Class II). Impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not likely occur along this alternative route segment because the segment does not have any agricultural uses.

Impact P-3: Encountering unknown preexisting contamination during excavation or grading (Class II)

Previously unknown soil contamination associated with industrial contaminants could be encountered during grading or excavation at the PVNGS Switchyard. Mitigation Measure P-3a is recommended to reduce the potential for encountering previously unknown contamination to a less than significant level (Class II).

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the PVNGS Switchyard during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.8.3 Harquahala Junction Switchyard Alternative

Environmental Setting

The Harquahala Junction Switchyard Alternative would be constructed on an approximately 40-acre undeveloped site adjacent to an existing transmission line corridor. This alternative has no potential to encounter environmental contamination. Based on an environmental database review, there are no known hazardous release sites in the immediate vicinity of this alternative location.

Construction Impacts

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same as that for the Proposed Project and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur under this alternative because the site is not in an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur under this alternative because the site does not have any industrial or commercial uses.

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the Harquahala Junction Switchyard during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure

P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.8.4 Desert Southwest Transmission Project Alternative

Environmental Setting

The DSWTP Alternative includes construction of a new 500 kV transmission line from Blythe to the Devers Substation. In addition, it would include three new substation/switching stations (Keim, Midpoint, and Dillon Road) and two relatively short transmission line segments that differ from the Proposed Project in the Blythe and Desert Center areas. The Keim Substation would be located in a low-density commercial and light industrial area of western Blythe. The Midpoint and Dillon Road Substations would be constructed in an undeveloped open space area. The transmission line reroute west of Blythe would traverse undeveloped open space and the reroute close to I-10 near Desert Center would parallel existing gravel utility access roads in existing utility corridors. In general the DSWTP Alternative would have a very low potential to encounter environmental contamination typically associated with commercial and industrial land use activities. Based on the limited environmental database review, there are no known hazardous release sites within the proposed alternative.

Construction Impacts

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same as that for the Proposed Project and is addressed under Section D.10.6.1 above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur under this alternative because the substation/switchyard sites and reroute segments do not occur in agricultural areas. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur under this alternative because the substation/switchyard sites and reroute segments are not adjacent to any industrial or commercial uses.

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the alternative substation/switchyards during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.8.5 Alligator Rock–North of Desert Center Alternative

Environmental Setting

This alternative would cross I-10 and traverse undeveloped open space east, north and west of Desert Center, before again crossing I-10 and rejoining the Proposed Project route. This alternative has a very low potential to encounter environmental contamination associated with commercial, industrial, or

agricultural land use activities. Based on the review of online environmental databases, there are no known hazardous release sites along this alternative route segment.

Impacts and Mitigation Measures

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same as that for the Proposed Project and is addressed under Section D.10.6.1, above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this alternative route segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this alternative route segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this alternative route segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.8.6 Alligator Rock–Blythe Energy Transmission Alternative

Environmental Setting

This alternative would parallel an existing El Paso natural gas pipeline corridor. The alternative has a very low potential to encounter environmental contamination associated with commercial, industrial, or agricultural land use activities. Based on the review of online environmental databases, there are no known hazardous release sites within or adjacent to this alternative route segment.

Impacts and Mitigation Measures

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same as that for the Proposed Project and is addressed under Section D.10.6.1, above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this alternative route segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this alternative route segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this alternative route segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.8.7 Alligator Rock–South of I-10 Frontage Alternative

Environmental Setting

The Alligator Rock–South of I-10 Alternative would follow the frontage roads south of I-10 and partly parallel an existing El Paso natural gas pipeline corridor. This alternative has a very low potential to encounter environmental contamination associated with commercial, industrial, or agricultural land use activities. Based on the review of online environmental databases, there are no known hazardous release sites within or adjacent to the alternative route segment.

Impacts and Mitigation Measures

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same as that for the Proposed Project and is addressed under Section D.10.6.1, above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Construction impacts related to encountering residual pesticides and/or herbicides (Impact P-2) would not occur along this alternative route segment because the segment would not cross an agricultural area. Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this alternative route segment because the segment does not include any industrial or commercial uses. There would be no impacts related to soil contamination during project operations and maintenance (Impact P-4) along this alternative route segment because the segment would not include the operation of a substation, series capacitor, or switchyard.

D.10.9 Alternatives for West of Devers

D.10.9.1 Devers-Valley No. 2 Alternative

Environmental Setting

The Devers-Valley Alternative traverses primarily undeveloped open space and a small amount of agricultural land uses within an existing 500 kV transmission line corridor. Between MPs DV27 and DV28 the alternative route passes between 500 to 1,000 feet north and west of the Riverside County Landfill, an active municipal waste landfill. The alternative route traverses agricultural land across San Jacinto Valley (San Jacinto River) from approximately MPs DV30–DV32.5. Undeveloped and rural low-density residential areas extend from MP DV32.5 to the terminus at MP DV41.3. The alternative route has a very low potential to encounter environmental contamination typically associated with commercial and industrial land use activities. Based on the limited environmental database review, there are no known hazardous release sites within or adjacent to this alternative route.

Construction Impacts

The potential for occurrence of Impact P-1 (contamination as a result of improper handling or storage) is the same as that for the Proposed Project and is addressed under Section D.10.6.1, above. Mitigation Measures P-1a through P-1d are required to reduce impacts to less than significant levels (Class II). Impacts related to encountering unknown preexisting industrial contamination (Impact P-3) would not likely occur along this alternative route segment because the segment does not include any industrial or commercial uses.

Impact P-2: Residual Pesticides and/or Herbicides could be encountered during grading or excavation in agricultural areas (Class II)

The presence of residual pesticide and herbicide contamination of the soil in the agricultural areas along this alternative route segment represents a potential significant impact due to the potential health hazards associated with exposure of construction workers and the public to contaminated soil. Implementation of APMs W-3 and W-11 in conjunction with Mitigation Measure P-2a (Identify pesticide/herbicide contamination) is recommended to reduce this impact to less than significant (Class II).

Operational Impacts

Impact P-4: Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II)

Soil contamination could result from accidental spills or releases of hazardous materials at the Devers and/or Valley Substations during facility operations. This could potentially result in exposure of facility and maintenance workers and the public to hazardous materials. Implementation of Mitigation Measure P-4a is recommended to reduce potential impacts to workers and the public to less than significant levels (Class II).

D.10.10 Environmental Impacts of the No Project Alternative

Under the No Project Alternative, the proposed transmission line would not be constructed; therefore, no direct or cumulative construction related or operational impacts related to contamination would occur. The No Project Alternative scenario could result in construction of additional power plants or transmission lines, resulting in potential contamination related impact. Specific potential impacts would have to be assessed at the time other projects were proposed.

D.10.11 Electric and Magnetic Fields and Other Field-Related Concerns

Recognizing that there is a great deal of public interest and concern regarding potential health effects from exposure to electric and magnetic fields (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 decisionmakers.

Additional concerns regarding the Proposed Project related to power line fields include: corona and audible noise; radio, television, electronic equipment interference; induced currents and shock hazards; and effects on cardiac pacemakers. Environmental impacts are defined for these issues, and mitigation measures are recommended. These field issues are addressed in Section D.10.11.2 and D.10.12.

Defining EMF

Electric and magnetic fields are separate phenomena and occur both naturally and as a result of human activity across a broad electrical spectrum. Naturally occurring electric and magnetic fields 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 electric and magnetic fields 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 will 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.

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.

Unlike magnetic fields, which penetrate almost everything and are unaffected by buildings, trees, and other obstacles, electric fields are distorted by any object that is within the electric field including the human body. Even trying to measure an electric field with electronic instruments is difficult because the devices themselves will alter the levels recorded. Determining an individual's exposure to electric fields requires the understanding of many variables, one of which is the electric field itself.

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.

D.10.11.1 EMF in the Proposed Project Area

Magnetic Field – Devers-Harquahala 500 kV Segment

The Devers-Harquahala section of the Proposed Project consists of the installation of a new 500 kV transmission line immediately adjacent to the existing Devers–Palo Verde 500 kV transmission line. The proposed Devers-Harquahala section would pass through both undeveloped and developed lands. In undeveloped and natural areas measurable Electric and Magnetic Fields (EMFs) are not present except in the vicinity of the existing 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. In developed areas public exposure to EMFs is much more widespread and encompasses a very broad range of field intensities and durations. In the developed areas of the Devers-Harquahala section of the Proposed Project there are a number of additional electric transmission lines. In developed areas, EMFs are also 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.

This portion of the Proposed Project consists of the installation of a new 230-mile 500 kV transmission line adjacent to the existing 500 kV Devers–Palo Verde No. 1 (DPV1) transmission line. For the purpose of examining electric and magnetic fields, SCE divided the project into 18 areas considering changes in characteristics of the transmission corridor (i.e., changes in the number of transmission lines in the corridor). Areas 10 through 18 cover the Devers-Harquahala portion of the project, and are illustrated in Figures D.10-4 through D.10-12.

The 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 200 feet each side of the right-of-way. For these graphs the Proposed Project is shown to the right of the existing DPV1 line.

Based on the information provided by SCE for 2008 loads, Table D.10-3 identifies the environmental setting as the magnetic field at the edge of the ROW for the existing DPV1 500 kV transmission line (Areas 10 through 18).

Figures D.10-1 through D.10-3 illustrate the locations of each area shown in Table D.10-3.

Magnetic Field – West of Devers

The West of Devers section of the Proposed Project consists of reconfiguring and upgrading of a number of existing 230 kV and 66 kV transmission lines within an existing power line corridor. The proposed West of Devers section passes through mostly developed lands. The developed areas include significant residential and commercial 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.

For the purpose of examining electric and magnetic fields, SCE divided the project into 18 areas considering changes in characteristics of the transmission corridor (i.e., changes in the location of transmission lines in the corridor). Areas 1 through 9 cover the West of Devers portion of the project; they are identified in Table D.10-3 and on Figures D.10-13 through D.10-21.

Existing Substations

At existing substations, 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. However, the most significant contributors to the EMFs are the transmission and distribution lines. Therefore, the transmission line magnetic fields described above would also apply in the immediate area of substations.

D.10.11.2 Other Field-Related Public Concerns

Other public concerns related to electric power facility projects, are both safety and nuisance issues, and include: radio/television/electronic equipment interference; induced currents and shock hazards; and potential effects on cardiac pacemakers. Each of these issues is described below.

Table D.10-3. Existing Magnetic Field Levels at Edge of ROW (mG)

Area ID	Approx Location	Left Side	Right Side
Harquahala Switchyard to Devers Substation			
18	All alternative routes in new ROW	0.0	0.0
17	Copper Bottom Pass of Dome Rock Mtns, AZ	72.9	41.4
16	Blythe	64.8	15.6
15	Coachella	56.1	13.6
14	Indio	24.6	13.5
13	Riverside County near Palm Desert	11.0	13.6
12	Riverside County near Thousand Palms	8.3	13.5
11	Riverside County near Cathedral City	11.1	14.0
10	North Palm Springs	7.2	14.0
Devers to San Bernardino Junction (looking west)			
9	Banning	32.4	9.0
8	Beaumont	8.8	23.7
San Bernardino Junction to San Bernardino Substation (looking north)			
7	Lawton and Nelson, Loma Linda	27.5	31.3
6	Mission and Pepper, Loma Linda	29.6	38.5
5	Redlands and Enterprise, Loma Linda	20.0	17.8
4	Redlands	20.2	7.6
San Bernardino Junction to Vista Substation (looking west)			
3	Pardo and South Chase Canyon, Colton	14.1	7.3
2	Washington and RV Center, Colton	17.6	23.0
1	Grand Terrace	28.2	4.1

Source: Application for CPCN, Appendix B, Field Management Plan

Note: The magnetic field computer modeling results graph the calculated field strength without the Proposed Project and with the Proposed Project for an area 200 feet each side of the right-of-way. Based on the information provided by SCE for 2008 loads, Table D.10-3 also identifies the existing magnetic field at the edge of the ROW for the three main segments of existing transmission corridor West of Devers (230 kV Upgrade).Source: Application for CPCN, Appendix B, Field Management

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 (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.

Figure D.10-1. Locations of EMF Modeling in Arizona
CLICK HERE TO VIEW

Figure D.10-2. Locations of EMF Modeling - Colorado River to Devers Substation
CLICK HERE TO VIEW

Figure D.10-3. Locations of EMF Modeling - West of Devers
CLICK HERE TO VIEW

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.

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.

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.

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.

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).

D.10.11.3 Scientific Background and Regulations Applicable to EMF

EMF Research

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 several decades; 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.[1]

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.

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

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 D.10-4 and D.10-5. These tables indicate typical sources and levels of electric and magnetic field exposure the general public experiences from appliances.

Table D.10-4. 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.

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.

Table D.10-5. Magnetic Field from Household Appliances

	Magnetic Field (mG)	
Appliance	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

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, 1990) 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 California Public Utilities Commission (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.

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 D.10-6 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).

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

Table D.10-6. 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

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.

California Department of Education's (CDE) Standards for Siting New Schools Adjacent to Electric Power Lines Rated 50 kV and Above[2]

The California Department of Education (CDE) evaluates potential school sites under a range of criteria, including environmental and safety issues. There are no EMF guidelines that apply to existing school sites; this information is presented in order to demonstrate the range of existing guidelines that address EMF.

Exposures to power-frequency electric and magnetic fields (EMF) are one of the criteria. CDE has established the following "setback" limits for locating any part of a school site property line near the edge of easements for any electrical power lines rated 50 kV and above:

- 100 feet for lines from 50 to 133 kV
- 150 feet for lines from 220 to 230 kV
- 350 feet for lines from 500 to 550 kV

School districts that have sites which do not meet the California Department of Education setbacks may still obtain construction approval from the State by submitting an EMF mitigation plan. The mitigation plan should consider possible reductions of EMF from all potential sources, including power lines, internal wiring, office equipment and mechanical equipment.

CPUC Guidelines

In 1991, the CPUC initiated an investigation into electric and magnetic fields 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.[3] The decision directed the utilities to use a 4% 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.

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.

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[2] From SCE's EMF Design Guidelines for Electrical Facilities (SCE, 2004). Taken from "School Site Selection and Approval Guide" *by* School Facilities Planning Division of the California Department of Education.

[3] 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."

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.

D.10.11.4 Consideration of Electric and Magnetic Fields (EMFs)

As discussed in Section D.10.11.3, 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 is presented. This information is presented to allow understanding of the issue by the public and decisionmakers.

Proposed Project

Devers-Harquahala 500 kV Segment

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 some permanent increase in the level of EMFs in the existing environment. These effects are anticipated to be localized.

The magnetic field levels calculated by SCE have been reviewed and are considered to be accurate. Table D.10-7 presents the estimated magnetic field along the Proposed Project, assuming that the new lines are operational. The existing and future magnetic fields for Devers-Harquahala segment are illustrated in Areas 10 through 18 in this table, and are identified on Figures D.10-4 through D.10-12.

Table D.10-7. Comparison of Magnetic Field Levels (mG) – Existing vs. with DPV2 Project

		Left Side of ROW			Right Side of ROW		
Area ID	Approx. Location	Existing	Proposed	Change	Existing	Proposed	Change
Devers-Harquahala							
18	All alternative routes in new ROW	0.0	46.5	+46.5	0.0	11.3	+11.3
17	Copper Bottom Pass of Dome Rock Mtns, AZ	72.9	35.0	-37.9	41.4	41.5	0
16	Blythe	64.8	39.1	-25.7	15.6	45.6	+30.0
15	Coachella	56.1	33.6	-22.5	13.6	39.3	+25.7
14	Indio	24.6	11.9	-12.7	13.5	39.3	+25.8
13	Riverside County near Palm Desert	11.0	10.2	-0.8	13.6	39.3	+25.7
12	Riverside County near Thousand Palms	8.3	7.3	-1.0	13.5	39.6	+26.1
11	Riverside County near Cathedral City	11.1	7.5	-3.6	14.0	39.6	+25.6
10	North Palm Springs	7.2	5.1	-2.1	14.0	39.6	+25.6
Devers to SB Junction							
9	Banning	32.4	15.6	-16.8	9.0	2.6	-6.4
8	Beaumont	8.8	1.0	-7.8	23.7	15.1	-8.6
SB Junction to SB Substation							
7	Lawton and Nelson, Loma Linda	27.5	18.0	-9.5	31.3	15.4	-15.9
6	Mission and Pepper, Loma Linda	29.6	20.4	-9.2	38.5	20.4	-18.1
5	Redlands and Enterprise, Loma Linda	20.0	6.2	-13.8	17.8	11.4	-6.4
4	Redlands	20.2	6.2	-14.0	7.6	0.5	-7.1
SB Junction to Vista Substation							
3	Pardo and South Chase Canyon, Colton	14.1	6.3	-7.8	7.3	3.0	-4.3
2	Washington and RV Center, Colton	17.6	11.5	-6.1	23.0	18.3	-4.7
1	Grand Terrace	28.2	20.9	-7.3	4.1	3.1	-1.0

Figure D.10-4. Magnetic Field Profiles – Area 18 (Alternatives in New ROW)

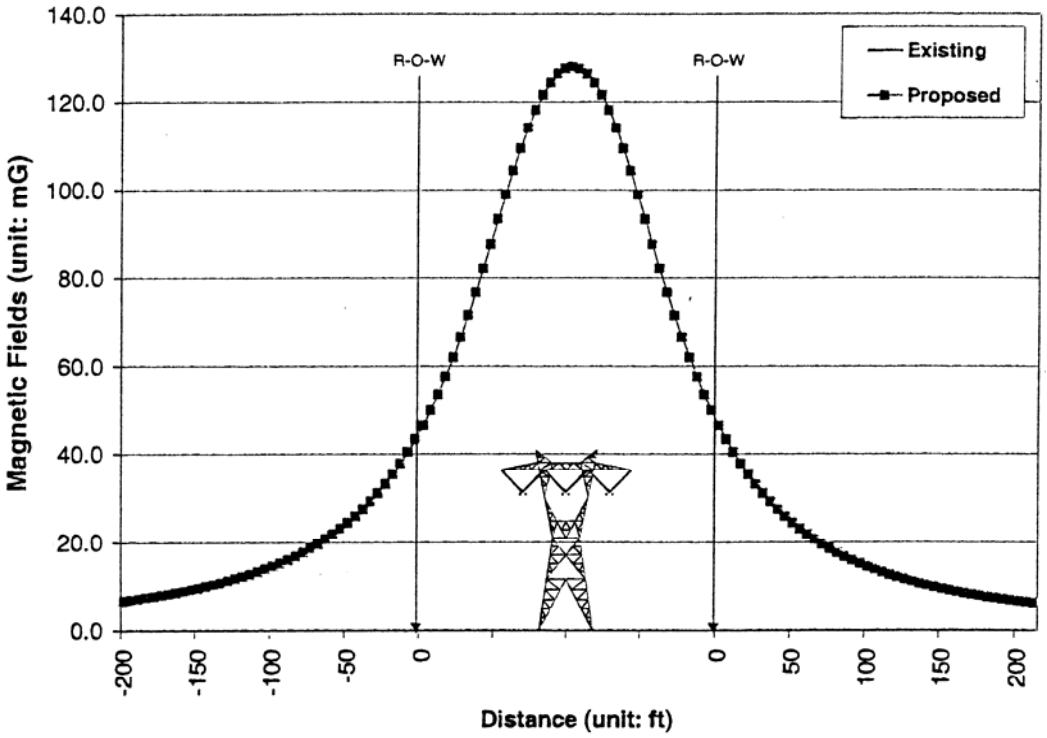


Figure D.10-5. Magnetic Field Profiles – Area 17 (Copper Bottom Pass)

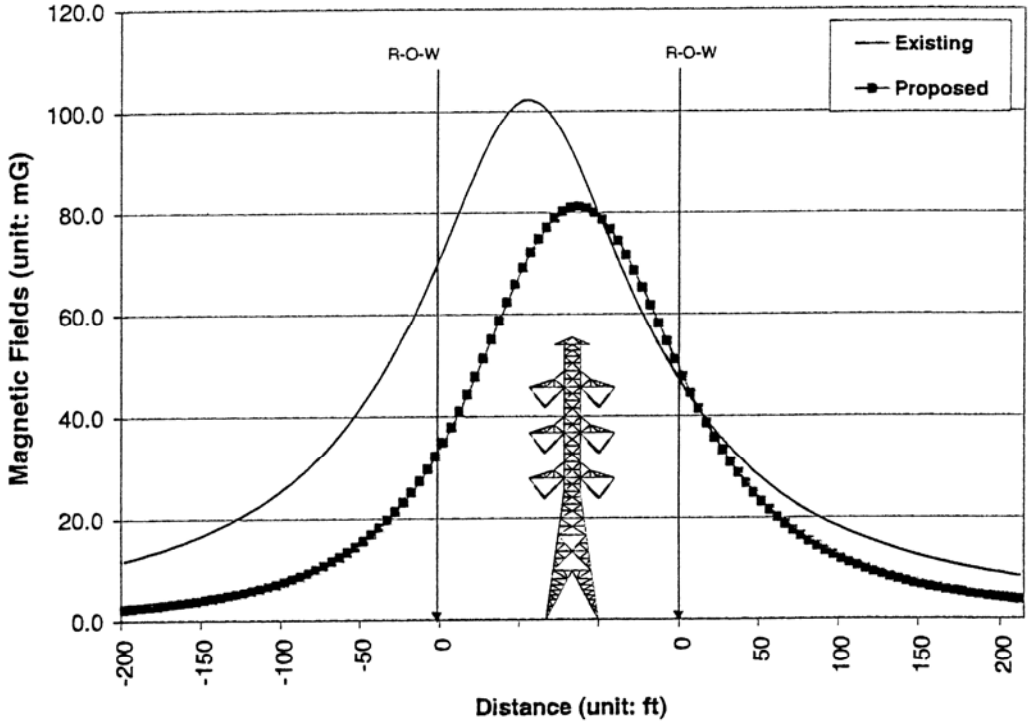


Figure D.10-6. Magnetic Field Profiles – Area 16 (Blythe)

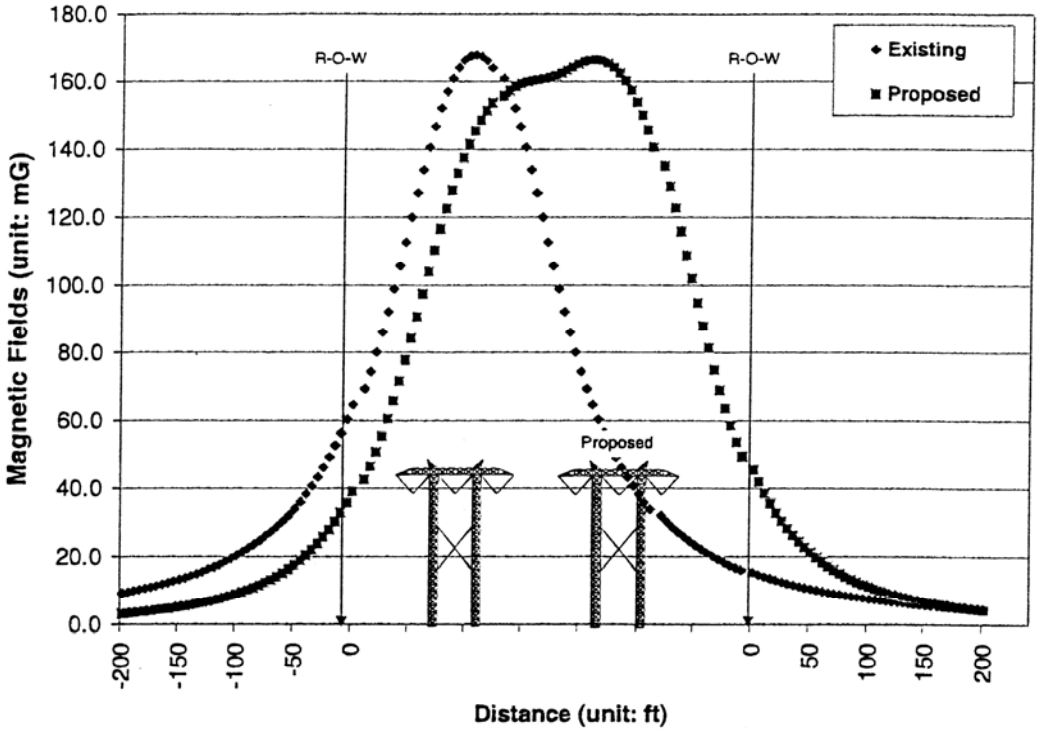


Figure D.10-7. Magnetic Field Profiles – Area 15 (Coachella)

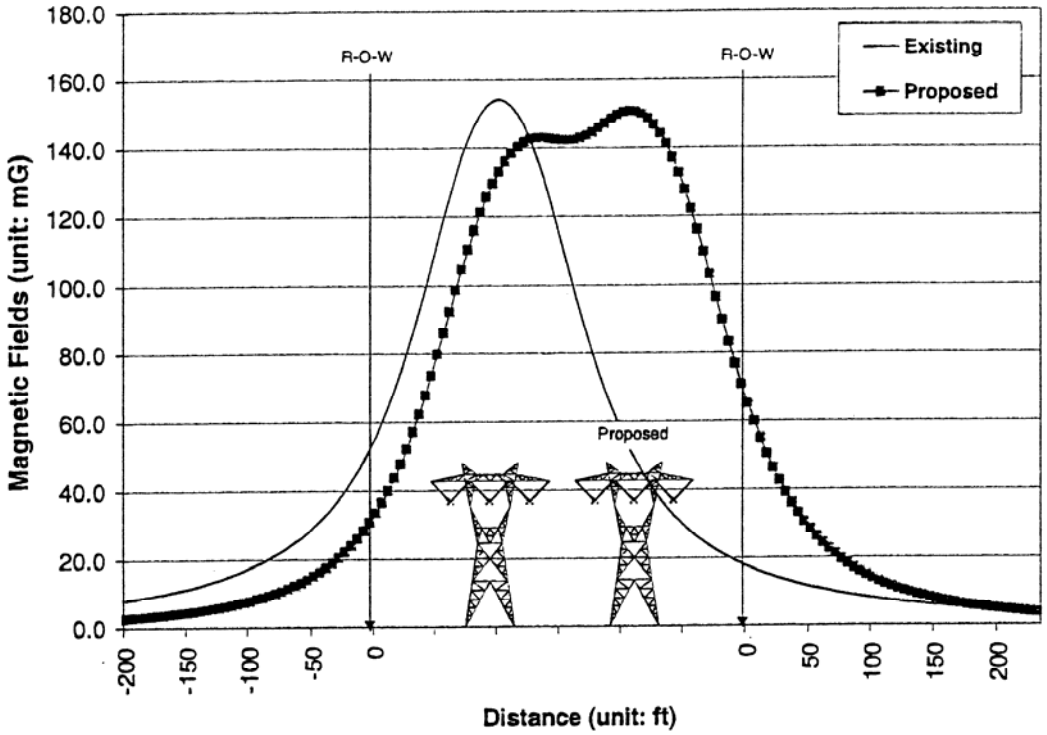


Figure D.10-8. Magnetic Field Profiles – Area 14 (Indio)

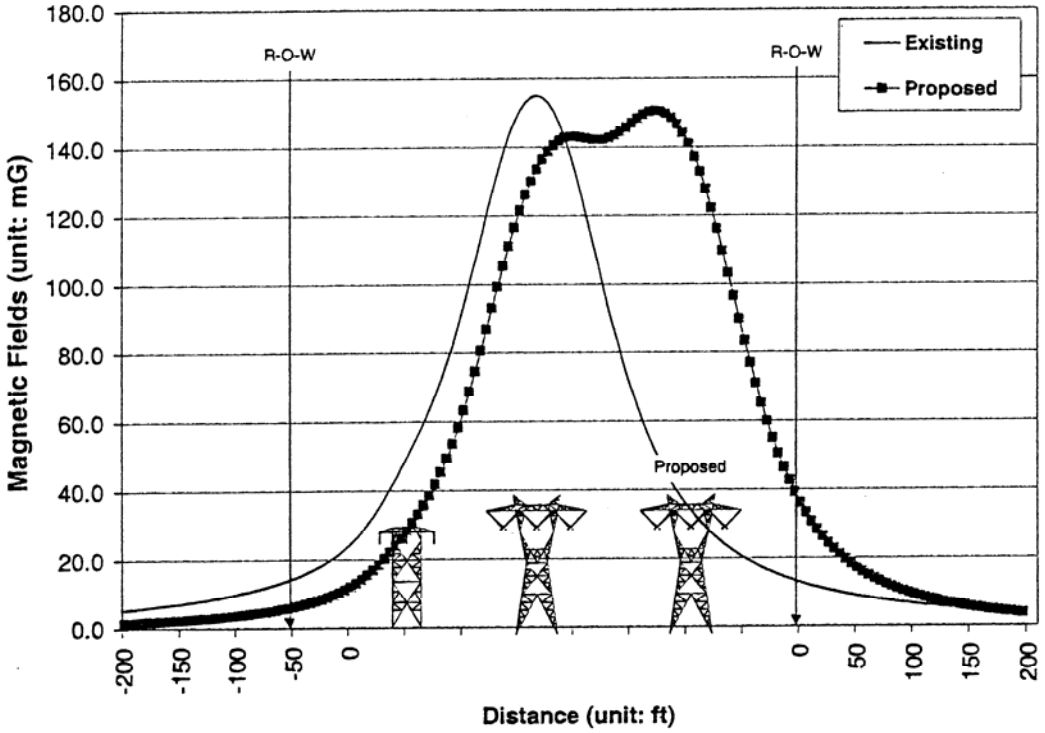


Figure D.10-9. Magnetic Field Profiles – Area 13 (Riverside County near Palm Desert)

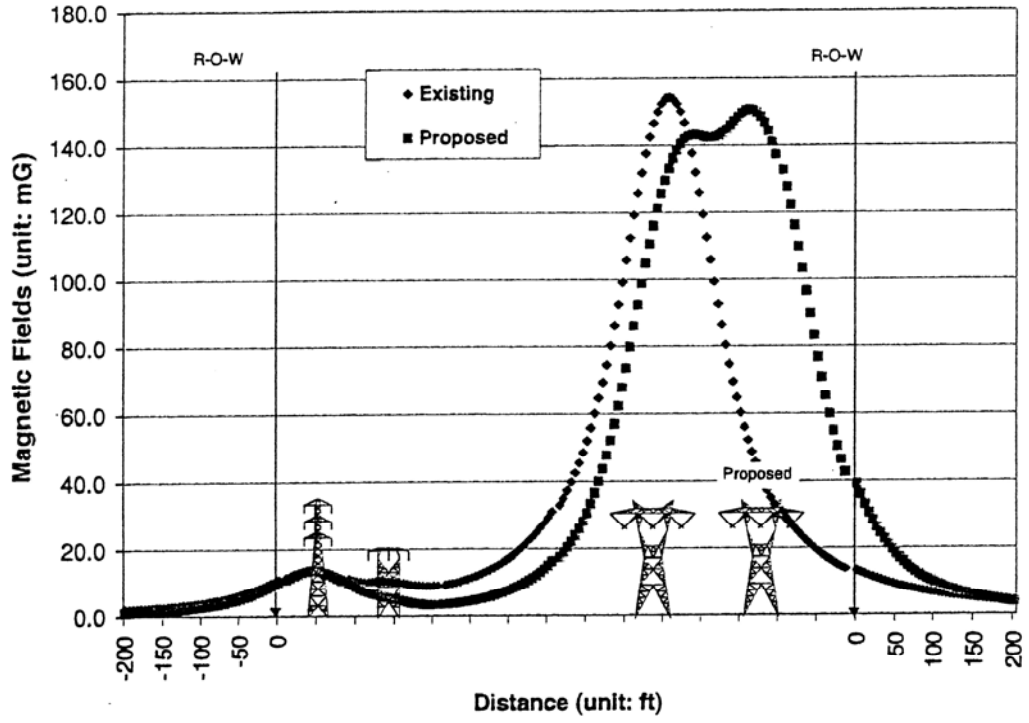


Figure D.10-10. Magnetic Field Profiles – Area 12 (Riverside County near Thousand Palms)

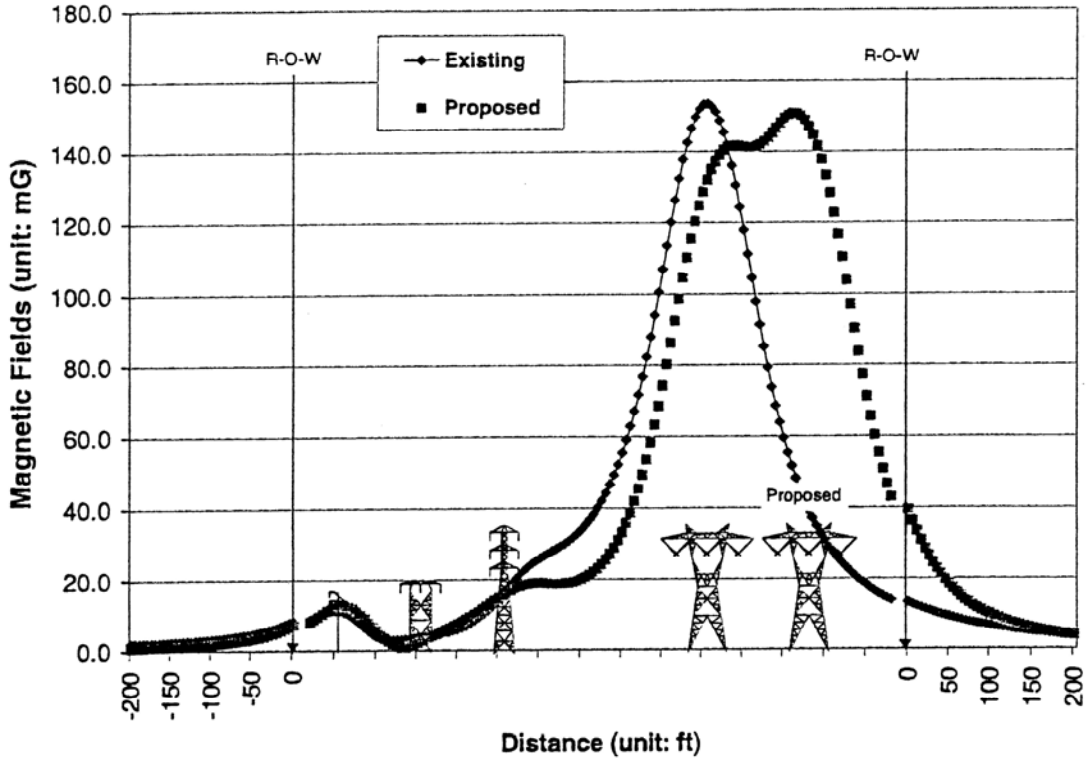


Figure D.10-11. Magnetic Field Profiles – Area 11 (Riverside County near Cathedral City)

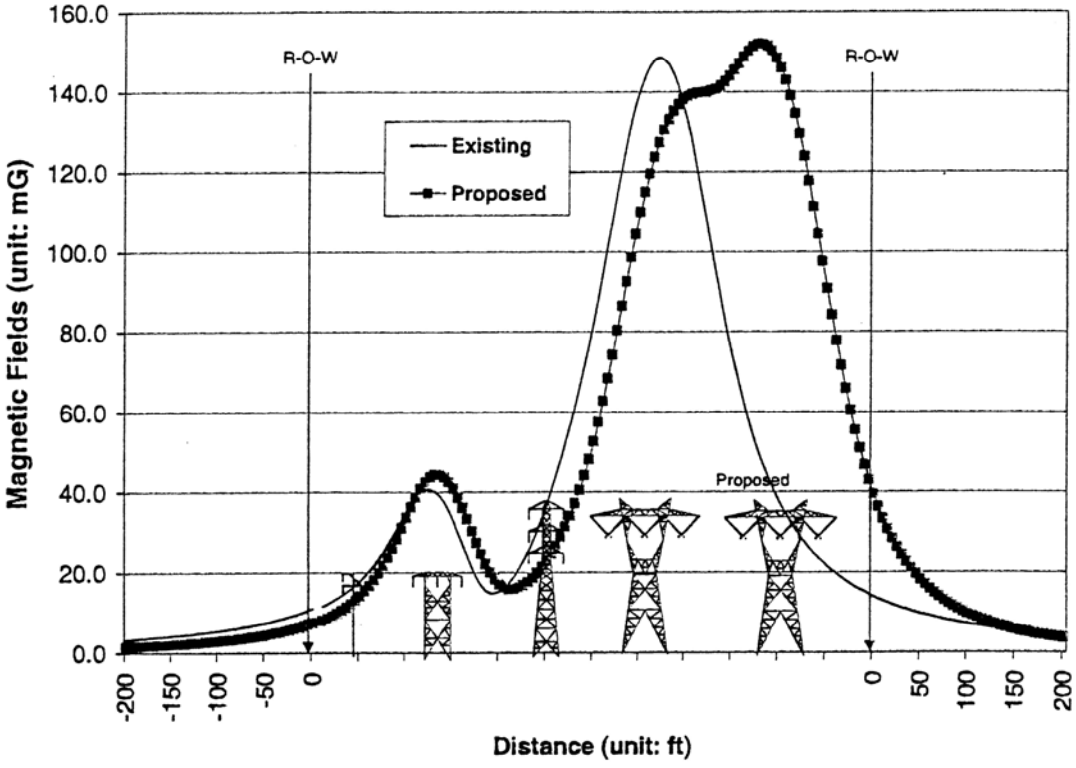


Figure D.10-12. Magnetic Field Profiles – Area 10 (North Palm Springs)

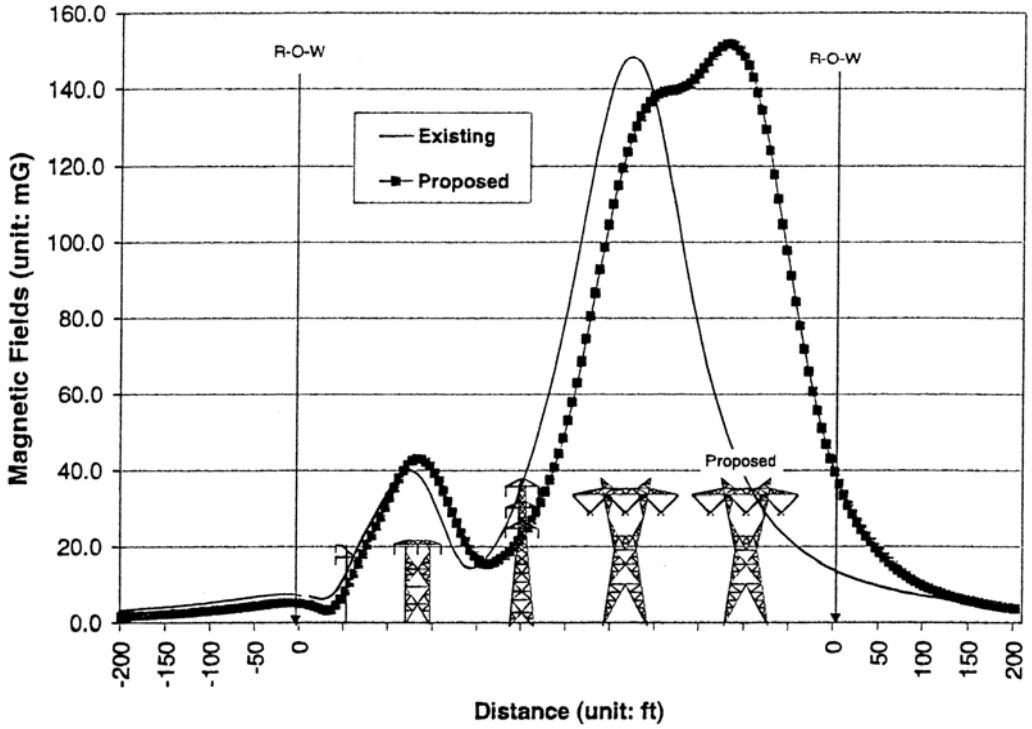


Figure D.10-13. Magnetic Field Profiles – Area 9 (Banning)

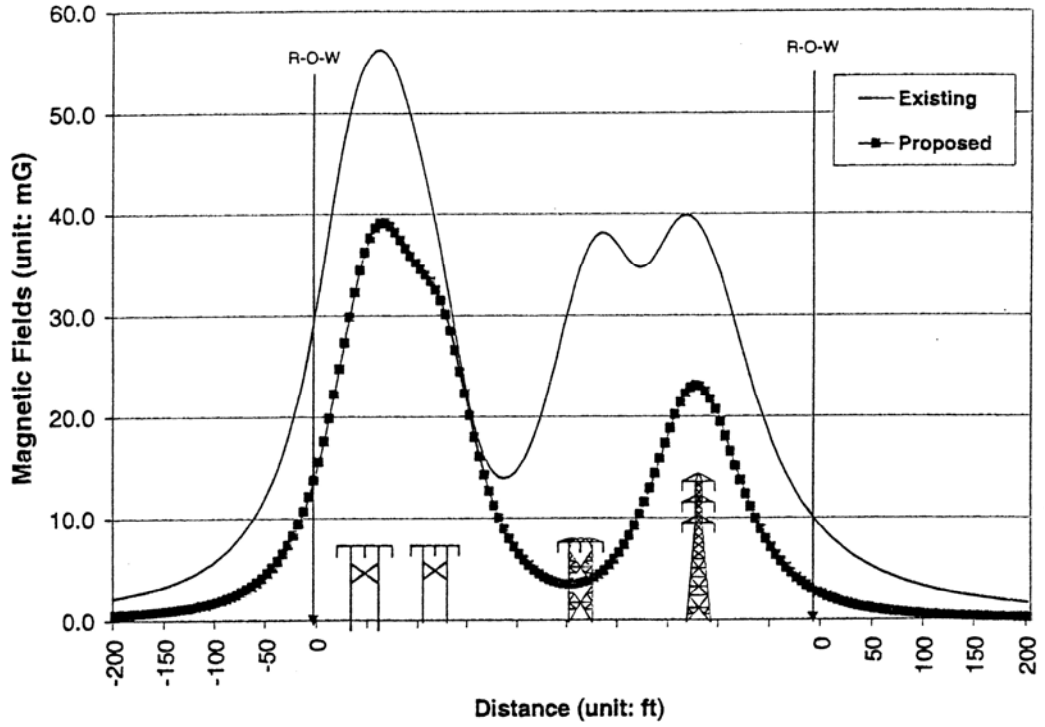


Figure D.10-14. Magnetic Field Profiles – Area 8 (Beaumont)

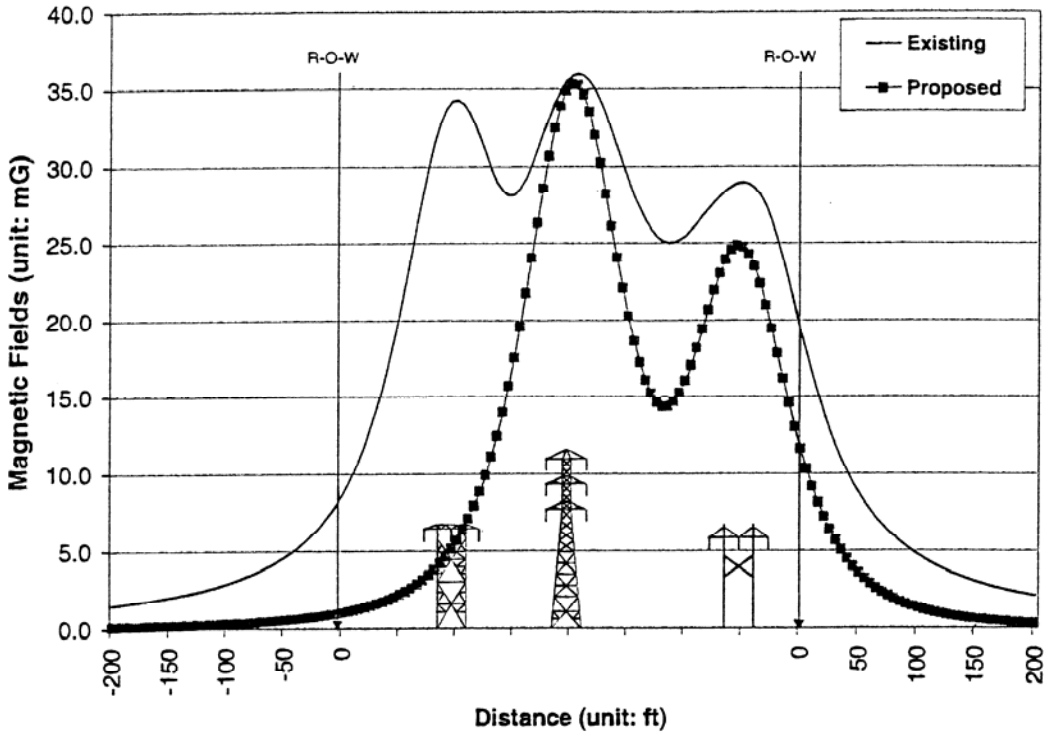


Figure D.10-15. Magnetic Field Profiles – Area 7 (Lawton and Nelson, Loma Linda)

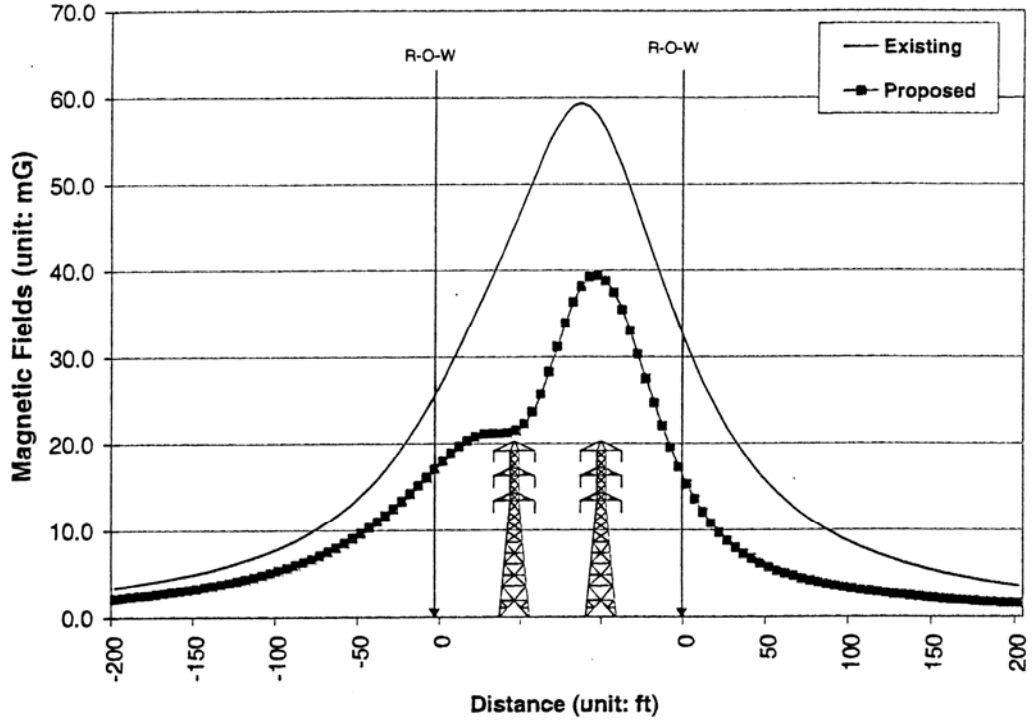


Figure D.10-16. Magnetic Field Profiles – Area 6 (Mission and Pepper, Loma Linda)

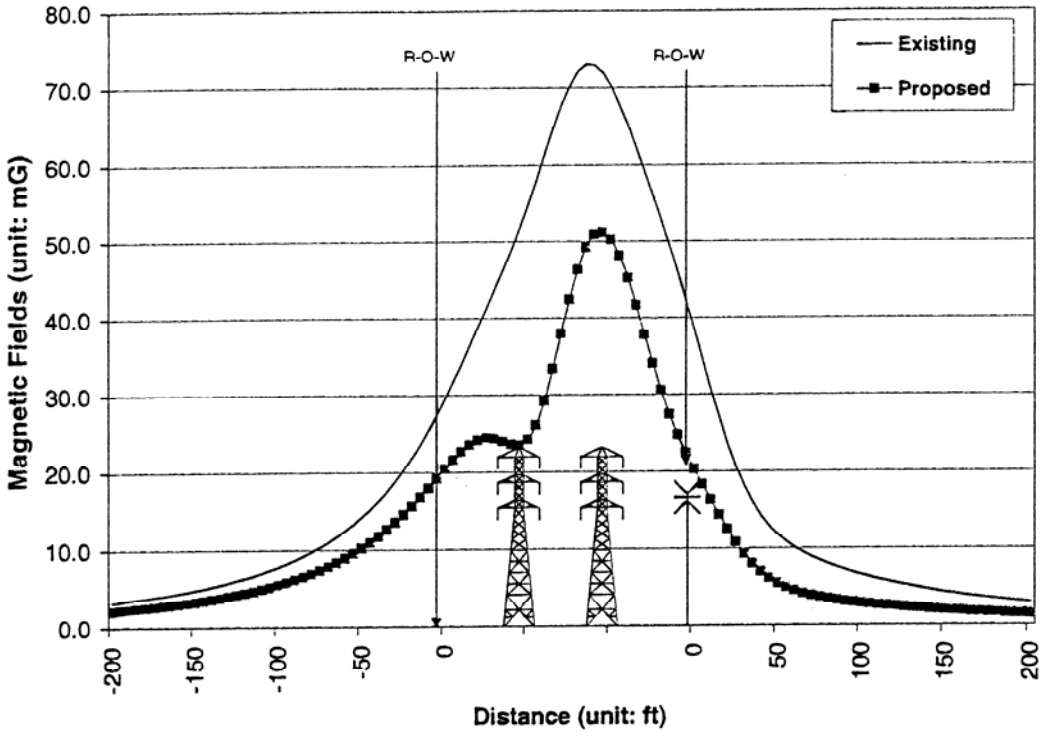


Figure D.10-17. Magnetic Field Profiles – Area 5 (Redlands and Enterprise, Loma Linda)

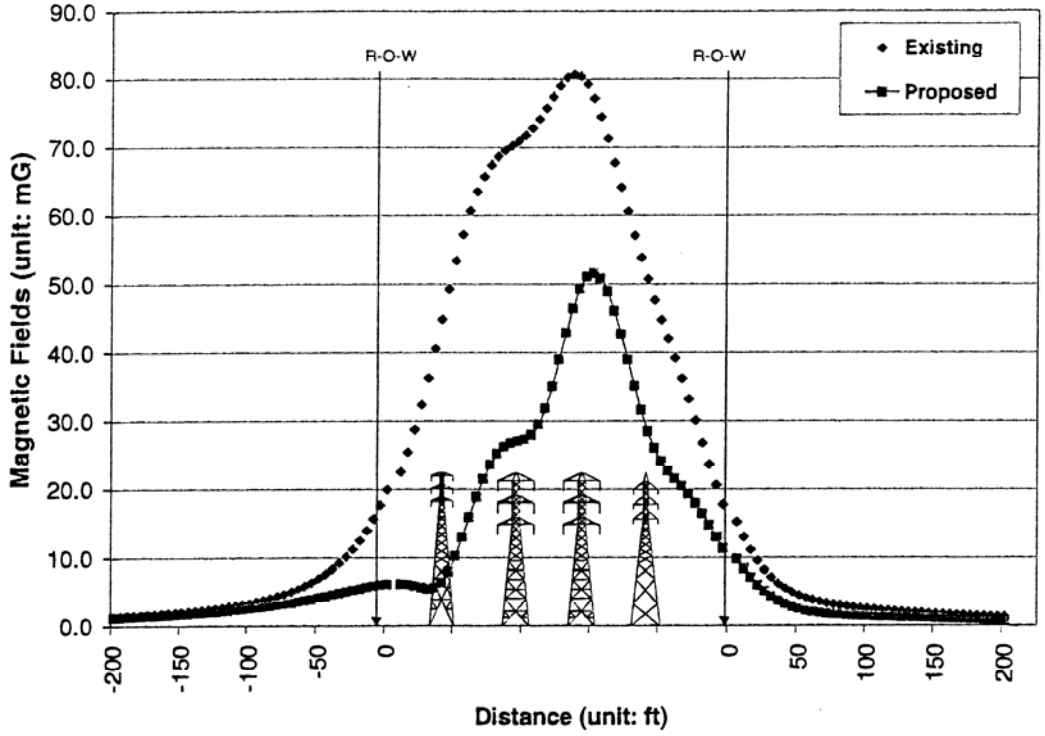


Figure D.10-18. Magnetic Field Profiles – Area 4 (Redlands)

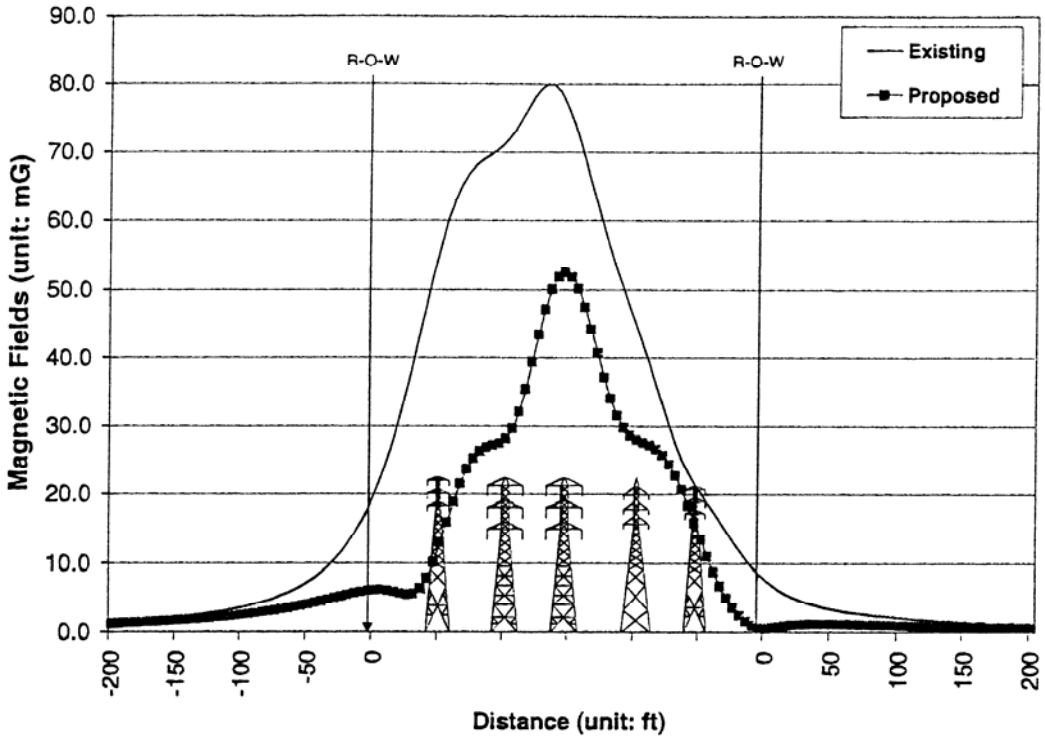


Figure D.10-19. Magnetic Field Profiles – Area 3 (Pardo and S. Chase Canyon, Colton)

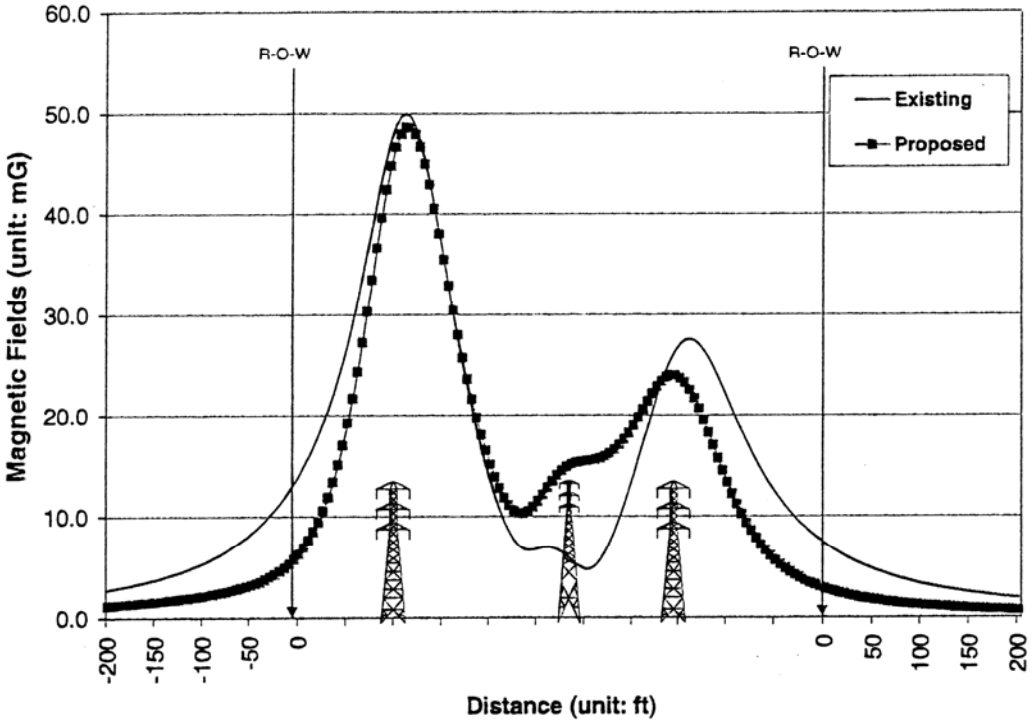


Figure D.10-20. Magnetic Field Profiles – Area 2 (Washington and RV Center, Colton)

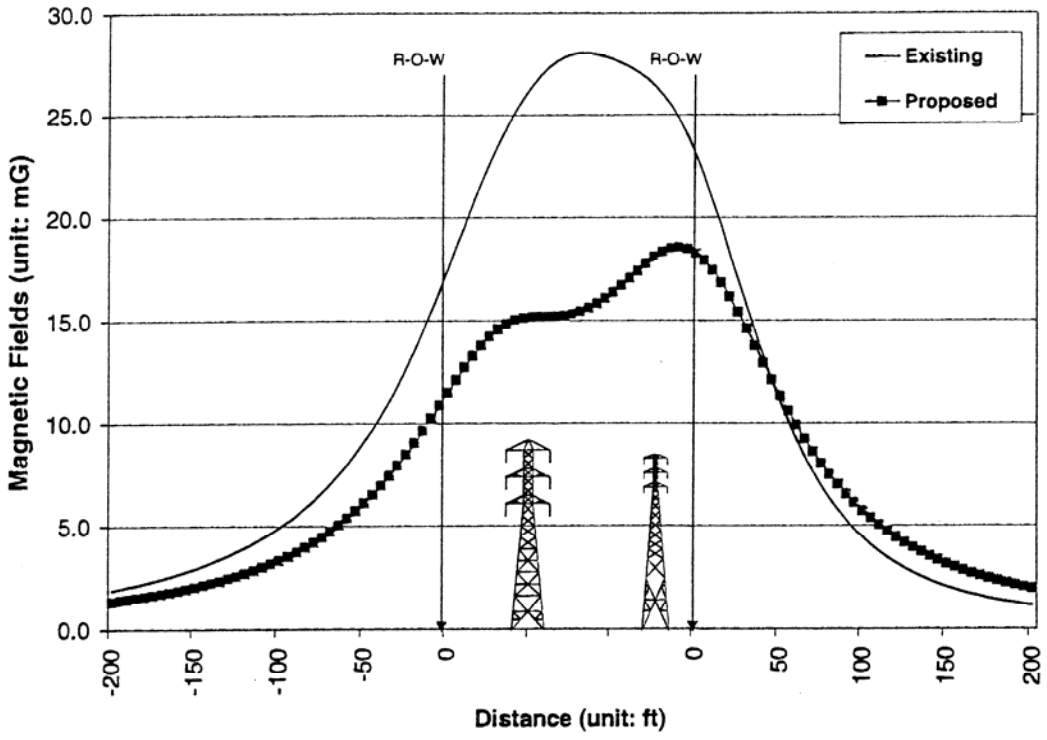
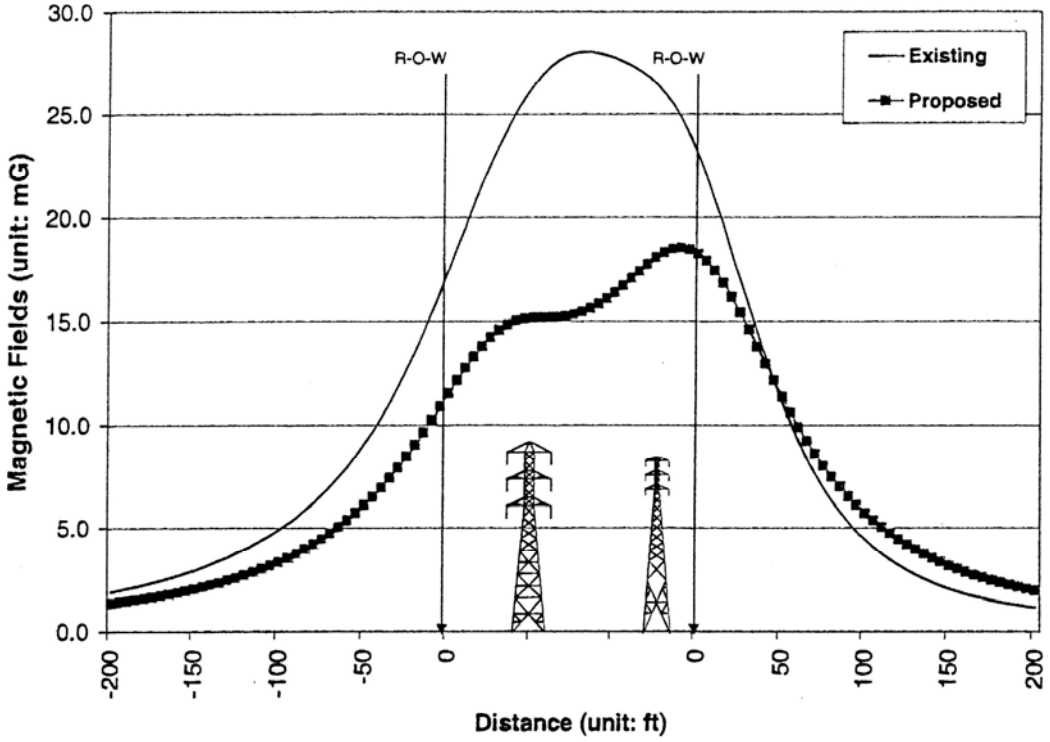


Figure D.10-21. Magnetic Field Profiles – Area 1 (Grand Terrace)



West of Devers—230 kV Transmission Line Upgrade Segment

In the West of Devers segment of the Proposed Project, the magnetic field would go down after construction of the Proposed Project. This would occur because the project combines several existing circuits that are currently on separate structures on to double-circuit transmission line structures. This results in much closer circuit spacing thereby increasing magnetic field cancellation. Table D.10-7, in Areas 1 through 9, illustrates the reduction in magnetic field after the Proposed Project is operational. Areas 1 through 9 cover the West of Devers portion, shown in Figure D.10-3; their modeling results appear in Figures D.10-13 through D.10-21.

EMF Issues Applicable to Alternatives

The alternatives evaluated in this EIR/EIS are all 500 kV alternatives, so would involve similar levels of EMFs to those described above for the Proposed Project's Devers-Harquahala segment depending upon whether the alternative is adjacent to existing transmission circuits.

SCE Harquahala-West Alternative

This alternative would involve construction of a new 500 kV transmission line in a corridor where no line currently exists. The magnetic fields would be similar to those illustrated in Figure D.10-4 and would result in the magnetic field changes described for Area 18 in Table D.10-7.

SCE Palo Verde Alternative

This alternative would involve construction of a new 500 kV transmission line in an existing corridor between Harquahala Junction and the PVNGS, adjacent to the DPV1 line. Magnetic fields for this alternative would be similar to those illustrated in Figure D.10-7, and would result in the magnetic field changes described for Area 15 in Table D.10-7.

Harquahala Junction Switchyard Alternative

This alternative would require construction of a switchyard at the intersection of the existing DPV1 transmission line and the existing 500 kV line between the Harquahala Generating Station Switchyard and the PVNGS. The DPV2 line would still be installed up to the switchyard, entering from the north. The magnetic field for this alternative in the area of the switchyard would be similar to that of the DPV2 line alone, as described in Table D.10-7, Area 15.

Desert Southwest Transmission Project Alternative

This alternative would require construciton of a new 500 kV transmission line line in or adjacent to the DPV corridor. As a result, the magnetic field would be the same as that for the Proposed Project.

Alligator Rock Alternatives

This alternative would involve construction of a new 500 kV transmission line in a corridor where no line currently exists. The magnetic fields would be similar to those illustrated in Figure D.10-4 and would result in the magnetic field changes described for Area 18 in Table D.10-7.

Devers-Valley No. 2 Alternative

This alternative would require the construction of a new 41 mile 500 kV line adjacent to the existing Devers-Valley No. 1 transmission line between the Devers and Valley Substations, as described in Appendix 1, Section 4.3.1. SCE provided EMF modeling results for two segments along this alternative. The segments represent the two different types of towers used in the existing Devers-Valley No. 1 transmission line. Table D.10-8 presents the estimated magnetic field on each side of the corridor as it is now ("existing") and as it would be if the Devers-Valley No. 2 Alternative were constructed ("with alt.").

Table D.10-8. Comparison of Magnetic Field Levels (mG) – Existing vs. with Devers-Valley No. 2 Alternative

		Left Side of ROW			Right Side of ROW		
Area ID	Approximate Location	Existing	With Alt.	Change	Existing	With Alt.	Change
1	Devers Substation to San Jacinto	49.5	33.7	- 16.2	12.0	33.7	+ 21.7
2	San Jacinto to Valley Substation	62.7	43.2	- 19.5	14.5	43.2	+ 28.7

Figures D.10-22 and D.10-23 illustrate the profiles of the existing magnetic field and that which would occur if the alternative were constructed. In both cases, the "Option 1" profile illustrated in the figures shows the magnetic field that would result if the new towers were made 10 feet taller.

Figure D.10-22. Magnetic Field Profiles – Devers-Valley No. 2 Alternative (Devers Substation to San Jacinto)

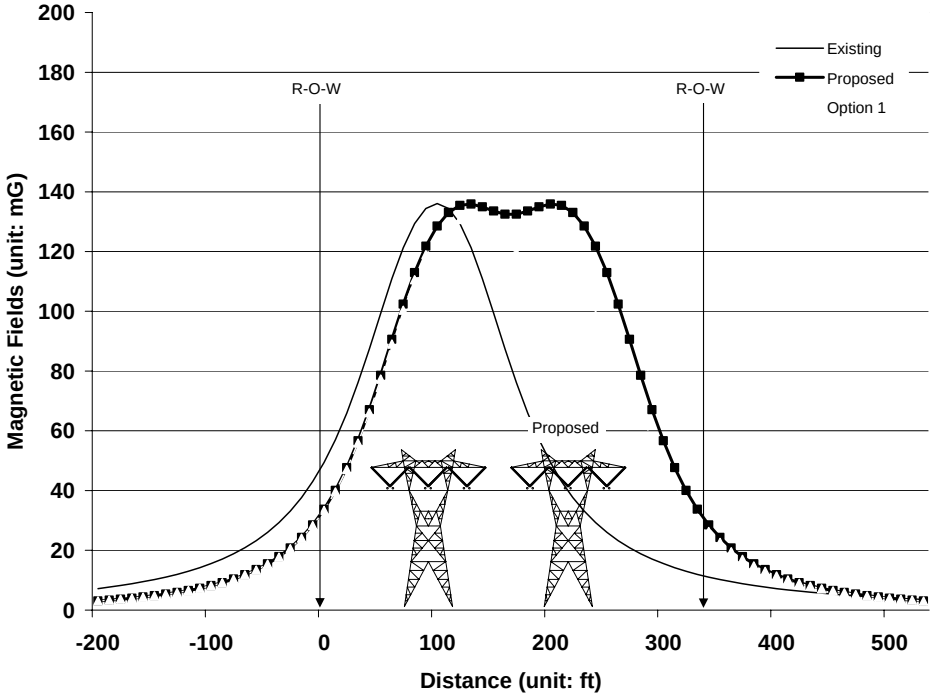
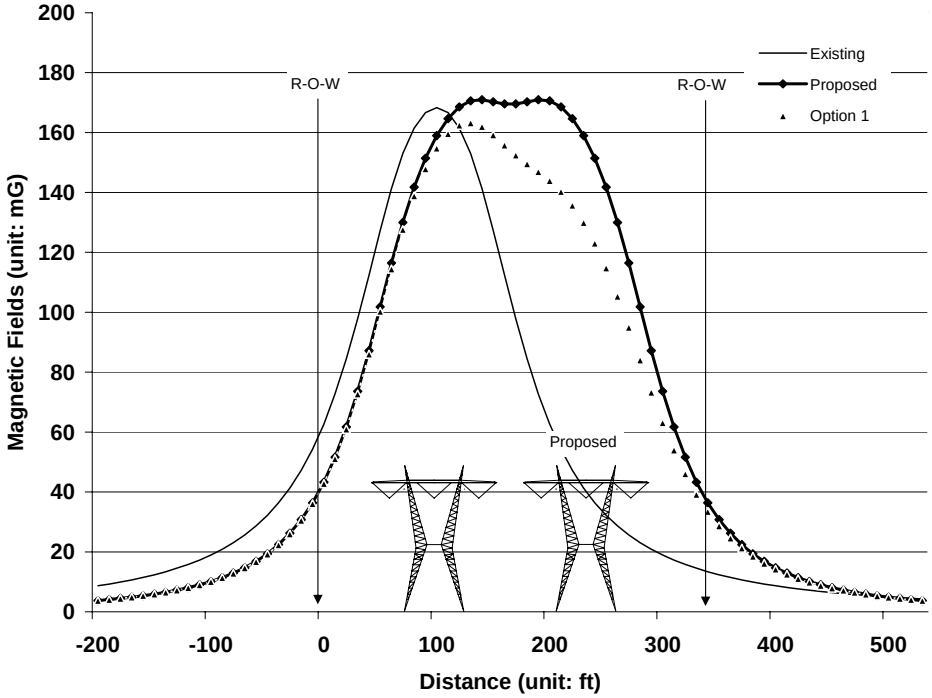


Figure D.10-23. Magnetic Field Profiles – Devers-Valley No. 2 Alternative (San Jacinto to Valley Substation)



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. Appendix 3 presents the plan proposed by SCE.

SCE proposed specific measures to reduce EMF in its September 30, 2005 submittal of additional information to the CPUC regarding the project's Field Management Plan. Following are the measures that would reduce magnetic fields:

- **Devers-Harquahala.** Optimal phasing of 500 kV (a no-cost magnetic Field Reduction Measure)
- **San Bernardino–San Bernardino Junction.** Optimal phasing of 230 kV (a no-cost magnetic Field Reduction Measure)
- **San Bernardino–San Bernardino Junction.** Optimal phasing of 66 kV (low-cost magnetic Field Reduction Measure)
- **Vista–San Bernardino Junction.** Optimal phasing of 230 kV, no-cost magnetic Field Reduction Measure
- **San Bernardino Junction–Devers.** Optimal phasing of 230 kV (no-cost magnetic Field Reduction Measure)
- **Devers–San Bernardino Junction.** Locate less loaded 230 kV lines furthest from Beaumont High School (no-cost magnetic Field Reduction Measure)

SCE's "EMF Design Guidelines for Electrical Facilities" (see Appendix 6) 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 rights-of-way
- 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% of the total cost of the project
- Total field reduction must be 15% 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 an optimized phase configuration for the Devers to Harquahala 500 kV segment, and optimized the phase configurations for the multiple 230 kV and 66 kV circuits in the West of Devers segments as a no-cost design measure to mitigate EMF levels. In addition, SCE reduced conductor phase spacing, by placing circuits on double-circuit structures, as a no-cost EMF reduction measure for the West of Devers segments.

In the vicinity of Beaumont High School in the West of Devers segment SCE proposes locating less loaded 230 kV line furthest from the school as a no-cost EMF reduction measure.

Summary Regarding EMF

After several decades of study regarding potential public health risks from exposure to power line EMF, research results remains 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 International Agency for Research on Cancer (IARC) and the California Department of Health Services (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 decisionmakers in reviewing the Proposed Project.

D.10.12 Environmental Impacts and Mitigation Measures for the Proposed Project – Non-EMF Electric Power Field Issues

This section focuses on the following environmental impacts from the proposed DPV2 Project: corona; induced current; electronic equipment interference; wind, fire, and earthquake hazards; and effects on cardiac pacemakers.

D.10.12.1 Definition and Use of Significance Criteria

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. In addition SCE employs standards of practice for grounding metallic objects within its transmission line rights-of-way as outlined below (from SCE Response to Data Request, 2/10/06):

> *Electrical grounding of metallic objects installed by third parties under license, lease or easement from SCE is performed as directed by the third party's engineer. There are no requirements for electrical grounding outside of the SCE controlled property. SCE's process for responding to concerns from the public about nuisance shocks is provided below.*

Grounding

- *All wire fences (except electric) on SCE ROWs which are occupied by lines of 220 kV and above, shall be securely grounded. Fences shall be considered to include gates, metallic guard rails, grape wires, wire clothes lines and other large metallic objects that are on nonconductive supports. A fence shall be considered grounded when it is securely connected to a conductive support which is in contact with the earth or encased in concrete which is in contact with the earth.*
- *Where a fence crosses the transmission line at an angle of 60° to 90°, one ground shall be placed on the fence at the center of the transmission line.*
- *Where a fence crosses the transmission line at an angle of 30° to 60°, a ground shall be placed on the fence on each side of the transmission line where the fence enters and leaves the ROW.*
- *Where the fence parallels the transmission line on the property line or within the ROW or crosses at an angle of less than 30° on the property line, a ground shall be placed on each half mile of fence or where the fence enters or leaves the ROW with no less than two grounds provided.*
- *Each side of gates or other discontinuities in the fence shall be considered as creating a separate fence and shall be grounded accordingly.*
- *Fences are considered as already grounded when a new line is constructed on a ROW adjacent to existing lines of 220 kV or more. However, when a gate is installed in an existing fence on nonconductive supports, the gate and the fence on both sides of the gate shall be grounded.*

Nuisance Shocks

The following is from SCE's internal guidelines regarding our process for responding to concerns from the public about nuisance shocks. The actions taken are dependent upon the facts of the incident and the customer's request.

Shock Calls

Customer contact is required on all shock calls. A troubleman will be dispatched at the Supervisor's discretion or if unable to make customer contact.

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.

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.

D.10.12.2 Environmental Impacts and Mitigation Measures for the Proposed Transmission Line

Impact PS-1: Radio and Television Interference (Class II)

Corona or gap discharges related to high frequency radio and television interference impacts are dependent upon several factors including the strength of broadcast signals and are anticipated to be very localized if it occurs. Individual sources of adverse radio/television interference impacts 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 at the monitor location. Mitigation Measures PS-1a and PS-1b are recommended to reduce the potential impacts of interference (Class II).

Mitigation Measures for Impact PS-1

PS-1a **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.

PS-1b **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.

Impact PS-2: Induced Currents and Shock Hazards in Joint Use Corridors (Class II)

Induced currents and voltages on conducting objects near the proposed transmission lines represent a potential significant impact that can be mitigated. These impacts do not pose a threat in the environment if the conducting objects are properly grounded, and Mitigation Measure PS-2a is recommended to reduce the potential impacts of induced currents (Class II).

Mitigation Measure for Impact PS-2

PS-2a **Implement 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) within and near the right-of-way that have the potential for induced voltages and shall implement electrical grounding of metallic objects in accordance with SCE's standards. The identification of objects shall document the threshold electric field strength and metallic object size at which grounding becomes necessary.

Impact PS-3: Effects on Cardiac Pacemakers (Class III)

The electric fields associated with the Proposed Project's transmission lines may be of sufficient magnitude to impact operation of a few older model pacemakers resulting in them reverting 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 is of short duration and is not considered significant or harmful (Class III). No mitigation measures are required or recommended.

Impact PS-4: Wind, Earthquake, and Fire Hazards (Class III)

As described in Section D.10.11.2, these hazards are addressed in project design. SCE is required to design the transmission line in accordance with safety requirements of the CPUC's G.O.95 and other applicable requirements, so safety impacts from these causes would be less than significant (Class III).

D.10.12.3 Environmental Impacts and Mitigation Measures for Alternatives

For the field-related concerns (radio and television interference, induced currents and shock hazards, effects on cardiac pacemakers, and other hazards), the impacts and mitigation measures presented in Section D.10.12.2 would apply equally to all alternatives.

D.10.12.4 Environmental Impacts of the No Project Alternative

The No Project Alternative is defined in Section C.6. The No Project Alternative includes the assumption that existing transmission lines and power plants would continue to operate. The effects that these facilities cause on the existing environment would not change, so no new impacts would occur from continuing operation of the existing transmission lines and power plants. Also, under the No Project Alternative, the proposed DPV2 project would not be constructed, so the impacts associated with construction and operation of the project would not occur. These potential impacts avoided would include: soil contamination from improper handling and spills, encountering residual pesticides and other unknown pre-existing contamination, radio and TV interference, induced currents, effects on pacemakers, and fire hazards.

The first component of the No Project Alternative is the continuation of ongoing demand-side actions, including energy conservation and distributed generation. These actions would result in limited or no impacts related to public health and safety.

The second component of the No Project Alternative is the continuation of supply-side actions, resulting in potentially increased generation within California or increased transmission into California to serve anticipated growth in electricity consumption. The impacts of new power plants and new transmission lines related to public health and safety would be approximately the same, depending on the locations of the projects, as those that would occur under the Proposed Project.

D.10.13 Mitigation Monitoring, Compliance, and Reporting Table

Table D.10-9 presents a summary of impacts of the Proposed Project and the Mitigation Monitoring Program recommended for mitigating public health and safety, including both contamination and electric field measures. This program outlines the location, responsible party, required monitoring activities, effectiveness criteria, and timing of each monitoring activity.

Table D.10-9. Mitigation Monitoring Program – Public Health and Safety

IMPACT PS-1	Soil contamination as a result of improper handling and/or storage of hazardous materials during construction activities (Class II)
MITIGATION MEASURE	P-1a: Develop Hazardous Substance Control and Emergency Response Plan. A Hazardous Substance Control and Emergency Response Plan shall be prepared for the project, and a copy shall be kept on site (or in vehicles) during construction and maintenance of the project. SCE shall document compliance by submitting the plan to the CPUC or BLM, as appropriate, for review and approval at least 60 days before the start of construction.
Location	All locations along the proposed and alternative routes.
Monitoring / Reporting Action	Review and approve plan, observe construction activities.
Effectiveness Criteria	Contamination is cleaned up as required.
Responsible Agency	CPUC, BLM
Timing	Prior to construction
MITIGATION MEASURE	P-1b: Conduct environmental training and monitoring program. An environmental training program shall 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 field personnel prior to the start of construction. The training program shall emphasize site-specific physical conditions to improve hazard prevention (e.g., identification of potentially hazardous substances) and shall include a review of all site-specific plans, including but not limited to, the project's Storm Water Pollution Prevention Plan and the Hazardous Substances Control and Emergency Response Plan. SCE shall document compliance by (a) submitting to the CPUC or BLM, as appropriate, for review and approval an outline of the proposed Environmental Training and Monitoring Program, and (b) maintaining for monitor review a list of names of all construction personnel who have completed the training program. Best Management Practices, as identified in the project Storm Water Pollution Prevention Plan and the Hazardous Substances Control and Emergency Response Plan, shall be implemented during the construction of the project to minimize the risk of an accidental release and provide the necessary information for emergency response.
Location	All locations along the proposed and alternative routes.
Monitoring / Reporting Action	Review documentation of training
Effectiveness Criteria	Training and monitoring programs educate project staff and workers regarding all regulatory plan requirements.
Responsible Agency	CPUC, BLM
Timing	Prior to and during construction
MITIGATION MEASURE	P-1c: Ensure 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, shall be removed to a hazardous waste facility permitted or otherwise authorized to treat, store, or dispose of such materials.
Location	All locations along the proposed and alternative routes.
Monitoring / Reporting Action	Observe construction activities for compliance
Effectiveness Criteria	Construction wastes are disposed of properly

Table D.10-9. Mitigation Monitoring Program – Public Health and Safety

Responsible Agency	CPUC, BLM
Timing	During construction
MITIGATION MEASURE	P-1d: Maintain emergency spill supplies and equipment. Hazardous material spill kits shall be maintained at all construction sites 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 shall be kept adjacent to all work areas and staging areas, and shall be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials shall be provided in the project's Hazardous Substances Control and Emergency Response Plan.
Location	All locations along the proposed and alternative routes.
Monitoring / Reporting Action	Observe construction sites and activities for compliance
Effectiveness Criteria	Emergency spill supplies are available at the construction sites
Responsible Agency	CPUC, BLM
Timing	During construction
IMPACT P-2	Residual Pesticides and/or Herbicides could be encountered during grading or excavation in agricultural areas (Class II)
MITIGATION MEASURE	P-2a: Identify pesticide/herbicide contamination. Soil samples shall be collected in construction areas where the land has historically or is currently being farmed to identify the possibility of and to delineate the extent of pesticide and/or herbicide contamination. Excavated materials containing elevated levels of pesticide or herbicide will require special handling and disposal procedures. Standard dust suppression procedures (as defined in Mitigation Measure AQ-1a shall be used in construction areas to reduce airborne emissions of these contaminants and reduce the risk of exposure to workers and the public. Regulatory agencies for the states of Arizona or California (as appropriate) and the appropriate county shall be contacted to provide oversight regarding the handling, treatment, and/or disposal options.
Location	All proposed and alternative route segments that are within or immediately adjacent to agricultural uses.
Monitoring / Reporting Action	Observe construction sites and activities for compliance
Effectiveness Criteria	Excavated soils containing pesticides and herbicides are properly handled and disposed of.
Responsible Agency	CPUC, BLM, appropriate local and State regulatory agencies.
Timing	Prior to construction
IMPACT P-3	Encountering unknown preexisting contamination during excavation or grading (Class II)
MITIGATION MEASURE	P-3a: Observe exposed soil for evidence of contamination. During grading or excavation work, the construction 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. Additionally, 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 or BLM, describing proposed actions. A weekly report listing encounters with contaminated soils and describing actions taken shall be submitted to the CPUC or BLM.
Location	All proposed and alternative route segments that are within or immediately adjacent to industrial and/or commercial land use areas.
Monitoring / Reporting Action	Observe construction sites and activities for compliance and review weekly reports.
Effectiveness Criteria	Excavated soils containing industrial contaminants are properly handled and disposed of.
Responsible Agency	CPUC, BLM.
Timing	During construction

Table D.10-9. Mitigation Monitoring Program – Public Health and Safety

IMPACT P-4	Soil contamination from accidental spill or release of hazardous materials during project operations and maintenance (Class II).
MITIGATION MEASURE	P-4a: Prepare Spill Prevention, Countermeasure, and Control Plans. To minimize, avoid, and/or clean up unforeseen spill of hazardous materials during operation of the proposed facilities, SCE shall update or prepare, if necessary, the Spill Prevention, Countermeasure, and Control plan for each substation, series capacitors, and the switchyard. SCE shall document compliance by providing a copy of the Spill Prevention, Control, and Countermeasures plans to the CPUC or BLM, as appropriate, for review and approval at least 60 days before the start of operation.
Location	All proposed, as well and existing, and alternative substations, switching stations, and series compositor banks.
Monitoring / Reporting Action	Review and approve plans and observe construction sites and activities for compliance
Effectiveness Criteria	Excavated soils containing industrial contaminants are properly handled and disposed of.
Responsible Agency	CPUC, BLM.
Timing	During construction
IMPACT PS-1	Radio and Television Interference (Class II)
MITIGATION MEASURE	PS-1a: 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.
Location	Along the overhead route segment
Monitoring / Reporting Action	Review construction design plans to ensure consistency with IEEE Radio Noise Design Guide.
Effectiveness Criteria	The potential for magnetic field interference of electronic equipment is reduced.
Responsible Agency	CPUC
Timing	Prior to construction.
MITIGATION MEASURE	PS-1b: 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.
Location	Along the overhead route segment
Monitoring / Reporting Action	Review documentation provided.
Effectiveness Criteria	All radio/television/equipment interference disputes are resolved.
Responsible Agency	CPUC
Timing	During the operations of the project.
IMPACT PS-2	Induced Currents and Shock Hazards in Joint Use Corridors (Class II)
MITIGATION MEASURE	PS-2a: Implement 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) within and near the right-of-way that have the potential for induced voltages and shall implement electrical grounding of metallic objects in accordance with SCE's standards. The identification of objects shall document the threshold electric field strength and metallic object size at which grounding becomes necessary.
Location	Along the entire transmission line route
Monitoring / Reporting Action	Review documentation provided; verify that necessary grounding measures are installed.

Table D.10-9. Mitigation Monitoring Program – Public Health and Safety

Effectiveness Criteria	The potential for impacts associated with induced currents and voltages on objects near the energized transmission line are reduced.
Responsible Agency	CPUC
Timing	Prior to energizing the transmission line.

D.10.14 References

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