

## D.8 Public Health and Safety

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 (Sections D.8.1 through D.8.6) and also addresses concerns about electric and magnetic fields and other electric field issues (Sections D.8.7 and D.8.8). Section D.8.9 presents the mitigation monitoring program for all topics covered in this section.

### D.8.1 Environmental Setting for the Proposed Project – Contamination and Hazardous Materials

Sites with known contamination along or near the proposed transmission line route were identified 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.

#### D.8.1.1 Regional Overview

The proposed and alternative transmission line routes traverse land that is and has been utilized for a variety of uses, including open-space recreation and preserve, residential housing, recreational, commercial businesses, and industrial activities. 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, are known to have soil or groundwater contamination by hazardous substances. Other hazardous materials sources include leaking underground tanks in commercial and industrial areas, surface runoff from contaminated sites, and migration of contaminated groundwater plumes.

#### D.8.1.2 Jefferson Substation to Ralston Substation

The Jefferson Substation to Ralston Substation segment of the proposed overhead route traverses primarily undeveloped open-space. This segment would consist of 27 new 230 kV transmission structures, consisting of lattice steel towers and tubular steel poles. From the Jefferson Substation to Edgewood Road the proposed alignment crosses through Edgewood County Park and Preserve, consisting primarily of open grasslands in the vicinity of the alignment. Between Edgewood Road and I-280 the alignment traverses a small area of the Pulgas Ridge Open Space Preserve consisting primarily of grasslands.

The alignment then crosses to the southwest side of I-280 where it traverses Peninsula Watershed, northeast of and approximately parallel to Cañada Road for a distance of approximately 3 miles before turning slightly more northerly and crossing the I-280 and Highway 92 interchange. The Upper Crystal Springs Reservoir is located just southwest of Cañada Road in this area. The Peninsula Watershed consists of open-space with areas of grassland, shrubs, and trees. After crossing Highway 92, this segment continues for approximately a quarter mile through undeveloped grassland with the Hillcrest Juvenile Home located immediately north of the alignment before reaching the Ralston Substation. No environmentally contaminated sites are listed in the Environmental Data Resources Area/Corridor environmental database dated April 26, 2002 (EDR Database) along this segment.

### D.8.1.3 Ralston Substation to Carolands Substation

The Ralston Substation to Carolands Substation segment of the proposed overhead route traverses primarily undeveloped land owned by the SFPUC between I-280 and residential developments. This segment would consist of 24 230 kV transmission structures, consisting of lattice steel towers and tubular steel poles. Single Family residential properties are located along or near the northeastern edge of the proposed alignment right-of-way (ROW), except in the areas near where the alignment crosses Bunker Hill Drive and Crystal Springs Road. In these areas undeveloped land is present on both sides of the proposed alignment. No environmentally contaminated sites are listed in the EDR Database along this segment.

### D.8.1.4 Carolands Substation to Transition Station

The Carolands Substation to Transition Station segment of the proposed overhead route traverses residential, recreational, commercial, and open-space land. This segment would consist of 46 new 230 kV transmission structures, consisting of tubular steel towers and lattice steel poles. Approximately one tenth of a mile past the Carolands Substation the alignment crosses to the southwest side of I-280 where it passes through the northwestern edge of the Crystal Springs Golf Course for a distance of approximately one mile. Near the northern end of the golf course the alignment again crosses to the northeastern side of I-280 for a short distance, approximately three quarters of a mile, passing through undeveloped land and along the southwest edge of a single family residential development.

Based on the information in PG&E’s Proponent’s Environmental Assessment (PEA) and EDR Database, there are four environmentally contaminated sites with significant potential to impact the proposed transmission alignment in the Carolands Substation to Transition Station segment, as shown in Table D.8-1.

**Table D.8-1. Contaminated Sites within 0.25 Miles of the Carolands to Transition Station Segment**

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
209	Union 76	2880 San Bruno Ave., San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Remediation Plan developed.
209	Skyline Mobile	2890 San Bruno Ave., San Bruno	LUST	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Pollution Characterization underway.
277	Steve’s Auto Center	1401 Millbrae Ave., Millbrae	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Preliminary Site Assessment workplan submitted.
280	Chevron	400 Skyline Blvd., Millbrae	LUST	Gasoline leak affecting other groundwater and soil. Post remedial action monitoring in progress.

Source: PG&E, 2002; and associated EDR Database.

### D.8.1.5 Underground Segment

**San Bruno Avenue.** The San Bruno Avenue segment of the underground alignment runs in road ROW along San Bruno Avenue from just east of Skyline Boulevard to the BART ROW. From Skyline Boulevard to I-280, the proposed alignment passes primarily through residential developments, with local commercial and light industrial properties located near Skyline Boulevard and I-280. Between 280 and El Camino Real, properties on the south side of the road are residential and on the north are commercial and light industrial, including the Bayhill Shopping Center and the U.S. Postal Service Western Regional Headquarters. The alignment traverses residential areas from El Camino Real to the BART ROW.

Based on the information in the PEA and EDR Database, there are ten environmentally contaminated sites with significant potential to impact the proposed transmission alignment along the San Bruno Avenue segment, as shown in Table D.8-2. Most of these sites are located near the western and eastern ends of the San Bruno Avenue segment.

**Table D.8-2. Contaminated Sites within 0.25 Miles of the San Bruno Avenue Segment**

EDR Map ID	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
191	European Car Service	900 El Camino Real, San Bruno	LUST Cortese	Gasoline leak affecting other groundwater and soil. Remedial action in progress.
191	Chevron 9-2759	801 El Camino Real, San Bruno	LUST	Gasoline leak affecting other groundwater and soil. MTBE detected. Remedial action in progress, including pumping and treating of groundwater.
191	Texaco	800 El Camino Real, San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Post remedial monitoring in progress.
191	Shell	798 El Camino Real, San Bruno	LUST Cortese	Unknown source, soil and groundwater affected. MTBE detected in groundwater. Pollution characterization underway.
191	Melody Toyota	750 El Camino Real, San Bruno	LUST	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Preliminary site assessment plan submitted.
191	Gootnick Property	732 El Camino Real, San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Preliminary site assessment plan submitted.
194	Robinson's Carpets	701 San Mateo Ave., San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Preliminary site assessment plan submitted.
206	Chevron	2102 San Bruno Ave., San Bruno	LUST	Unleaded gasoline release affecting soil and groundwater. MTBE detected in soil. Post remedial monitoring in progress.
209	Union 76	2880 San Bruno Ave., San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Remediation Plan developed.
209	Skyline Mobile	2890 San Bruno Ave., San Bruno	LUST	Leak of misc. motor vehicle fuels. Other groundwater affected, MTBE detected. Pollution Characterization underway.

Source: PG&E, 2002; and associated EDR Database.

**BART ROW.** The BART ROW segment of the underground alignment runs along a former railroad alignment that is now being utilized by the BART system. This alignment runs from San Bruno Avenue north to Lawndale Avenue through a variety of land uses, including residential, commercial, and light industrial. The residential properties consist of a mix of single family homes and apartments. Areas of light industrial use and warehousing are concentrated between Sneath Lane and Spruce Avenue. In addition to the small commercial businesses and strip malls near the alignment, the Tanforan Shopping Center is located along the western side of this segment between Highway 380 and Sneath Lane. A high school, South San Francisco High School, is located on the west side of the alignment between Spruce and Orange Avenues.

Based on the information in the PEA and associated EDR Database, there are 20 environmentally contaminated sites with significant potential to impact the proposed transmission alignment along the BART ROW segment, as shown in Table D.8-3.

**Colma to Martin Substation.** The Colma to Martin Substation segment of the proposed underground alignment is in road ROW from the intersection of Lawndale Avenue in Colma to the Martin Substation in Brisbane/Daly City. This segment traverses areas used for residential housing, cemeteries, and undeveloped and recreational open-space. Between the BART ROW and the beginning of Guadalupe Canyon Parkway the route passes a high school, El Camino High School, several cemeteries, a golf course, and several residential developments. The Hillside Landfill (1500 Hillside Boulevard) is approximately 1,100 feet east of

Table D.8-3. Contaminated Sites within 0.25 Miles of the BART ROW Segment

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
133	Autotech Autos, Inc.	45 Chestnut Ave., South San Francisco	LUST Cortese	Gasoline leak affecting soil only. Post remedial action monitoring in progress.
144	Shell Service Station	710 El Camino Real, South San Francisco	LUST	Gasoline affecting soil and groundwater. Post remedial action monitoring in progress.
144	Chevron Service Station #5669	698 El Camino Real, South San Francisco	LUST Cortese	Gasoline affecting soil and groundwater. Remedial investigation and feasibility completed.
144	Chevron Service Station	687 El Camino Real, South San Francisco	LUST Cortese	Motor fuels affecting soil and groundwater. Pollution characterization completed; no abatement action taken.
151	Coyne Cylinder Company	224 Ryan Way, South San Francisco	LUST Cortese	Motor fuels affecting soil and groundwater. Post remedial action monitoring in progress.
151	Meryatt Corp./ Maryatt Industries	290 South Maple Ave., South San Francisco	LUST CA SLIC	Tank leak affecting soil and groundwater. Leak being confirmed.
151	Pelligrini Bros. Wines, Inc.	272 South Maple Ave., South San Francisco	LUST Cortese	Gasoline affecting soil and groundwater. Leak confirmed; pollution characterization.
151	Hoffman Brothers	306 South Maple Ave., South San Francisco	LUST Cortese	Gasoline affecting soil and groundwater. No action taken.
151	Roetsch & Peterson Tanners	325 South Maple Ave., South San Francisco	LUST CA SLIC	Tanning sludge disposal pond. Soil removal completed. Status not reported.
155	Zellerbach Paper Co.	245 South Spruce Ave., South San Francisco	LUST Cortese	Diesel affecting soil and groundwater. Post remedial action monitoring in progress.
155	Spruce Car Wash	246 South Spruce Ave., South San Francisco	LUST Cortese	Motor fuels affecting soil and groundwater. Leak being confirmed.
155	Oroweat Bakeries	264 South Spruce Ave., South San Francisco	LUST Cortese	Diesel affecting soil and groundwater. Preliminary site assessment workplan submitted.
177	Will-Sta, Inc.	1276 Montgomery Ave., San Bruno	LUST Cortese	Motor vehicle fuels affecting soil and groundwater. Remedial action completed.
177	EFL Transportation	50 Tanforan, South San Francisco	LUST Cortese	Diesel affecting soil and groundwater. Remedial action completed.
177	Former Plating Shop	1245 Montgomery Street, San Bruno	LUST	Leaking tank affecting soil and groundwater. Preliminary site assessment underway.
177	Peninsula Tow Service	1071 Montgomery Ave., San Bruno	LUST Cortese	Gasoline affecting soil only. Post remedial action monitoring in progress.
177	Vince's Shellfish	1063 Montgomery Ave., San Bruno	LUST Cortese	Motor fuels impacting soil and groundwater. Preliminary site assessment workplan submitted.
177	HS Crocker Crocker Company	1000 San Mateo Ave., San Bruno	LUST	Motor fuels impacting soil and groundwater. No remedial action taken.
177	BP Oil Station #11200	717 East San Bruno Ave., San Bruno	LUST Cortese	Motor fuels affecting soil and groundwater. Post remedial action monitoring in progress.
177	Union Oil Service Station #3857	170 San Bruno Ave. San Bruno	LUST Cortese	Motor fuels affecting soil and groundwater. Post remedial action monitoring in progress.

Source: PG&E, 2002; and associated EDR Database.

the alignment and is listed as a Class III disposal site that currently accepts construction and demolition waste, green materials, inert materials, and metals. The proposed alignment is within the Guadalupe Canyon Parkway ROW for several miles, traversing undeveloped open-space and recreational and open-space of the San Bruno State and County Park. Near the intersection of Guadalupe Canyon Parkway and Bayshore Boulevard and along Bayshore Boulevard the area becomes a mix of undeveloped open-space and industrial properties. The industrial properties consist primarily of a mix of transportation and light manufacturing businesses. Some commercial businesses are also located in this area.

Based on the information in the PEA and associated EDR Database, there are seven environmentally contaminated sites with significant potential to impact the proposed transmission alignment along the Colma to Martin Substation segment, as shown in Table D.8-4. Also of environmental concern, but not included in the EDR database is the Hillside Landfill.

**Table D.8-4. Contaminated Sites within 0.25 Miles of the Colma to Martin Substation Segment**

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
29	V & A Auto Repair	2800 Bayshore Blvd. Daly City	LUST Cortese	Tank leak affecting soil and groundwater. Conducting remedial action plan.
29	Southern Pacific Transportation Co.	Geneva Ave./ Bayshore Boulevard Brisbane	Cal Sites	Confirmed groundwater contamination from 4 sources. Remediation continues.
37	Kessler & Kessler	250 Industrial Way Brisbane	LUST	Gasoline affecting soil and groundwater. Post remedial action monitoring in progress.
70	Kessler & Kessler	350 Industrial Way Brisbane	LUST Cortese	Leaking tank of solvents affecting soil only. Preliminary site assessment underway.
70	Hamdi Property Hillside Auto Service	1055 Hillside Blvd. Daly City	LUST Cortese	Motor fuels affecting soil only. Preliminary site assessment underway.
70	Hillside Unocal	1216 Hillside Colma	LUST Cortese	Motor fuels affecting soil and groundwater. Post remedial action monitoring in progress.
90	Serbian Cemetery	1801 Hillside Colma	LUST Cortese	Motor fuels affecting groundwater. Preliminary site assessment workplan submitted.

Source: PG&E, 2002; and associated EDR Database.

## **D.8.2 Applicable Regulations, Plans, and Standards – Contamination and Hazardous Materials**

### **D.8.2.1 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 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.

### D.8.2.2 State

The California Hazardous Waste Control Law (HWCL) is administered by the California Environmental Protection Agency (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.

Hazardous substances are defined by State and federal regulations to protect public health and the environment. Hazardous materials have certain chemical, physical or infectious properties that cause it to be considered hazardous. The California Code of Regulations (CCR), Title 22, Chapter 11, Article 2, Section 66261 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.

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

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

Other types of hazardous materials include radioactive and biohazardous materials. Radioactive materials and wastes contain radioisotopes, which are atoms with unstable nuclei that emit ionizing radiation to increase their stability. Radioactive waste mixed with chemical hazardous wastes is referred to as "mixed wastes." Biohazardous materials and wastes include anything derived from living organisms. They may be contaminated with disease-causing agents, such as bacteria or viruses.

Soil that is excavated from a site containing hazardous materials would be a hazardous waste if it exceeded specific CCR Title 22 criteria. Remediation (cleanup and safe removal/disposal) of hazardous wastes found at a site is required if excavation of the materials is performed; it may also be required if certain other activities are proposed. Even if soil or groundwater at a contaminated site does not have the characteristics required to be defined as hazardous wastes, remediation of the site may be required by regulatory agencies subject to jurisdictional authority. Cleanup requirements are determined on a case-by-case basis by the agency taking lead jurisdiction.

## **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.

### **D.8.2.3 Regional and Local**

#### **San Mateo County**

The San Mateo County Health Services Agency – Environmental Health Division is responsible for overseeing the County’s Groundwater Protection, Underground Storage Tank, and Hazardous Waste Generator programs. The County, in agreement with the Environmental Protection Agency (EPA) and the State Water Resources Control Board (SWRCB), provides guidelines and policies for pollution clean-up, inspection, and oversight of pollution caused by leaking underground tanks and chemical spills. Under the County’s Hazardous Waste Generator Program, the California Department of Toxic Substances Control (DTSC) has authorized the County to inspect and regulate non-permitted hazardous waste generators in San Mateo County. Environmental Health Division staff conducts annual inspections of over 1,900 facilities that generate hazardous waste and respond to complaints of illegal disposal of hazardous waste. The Environmental Health Division also conducts permitting and inspection of underground tanks that store hazardous materials.

### **D.8.3 Environmental Impacts and Mitigation Measures for the Proposed Project – Contamination and Hazardous Materials**

The principal environmental impacts involving hazardous waste are the excavation and handling of contaminated soil resulting in exposure to workers and the general public. A wide variety of contaminants, including petroleum hydrocarbons, solvents, polynuclear aromatic compounds (PNAs), heavy metals, and herbicides may be present along the proposed pipeline route. Contaminant types, concentrations, and locations cannot be accurately predicted without site specific information. Hazardous materials in the construction area may require special handling as hazardous waste and create an exposure risk to workers and the general public during excavation and transport. Contaminated soil exceeding regulatory limits for trench backfilling would require on-site treatment or transport to off-site 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 backfilling. Similar issues pertain to contaminated groundwater which may actually transport contamination from nearby sources to the Proposed Project alignment. Shallow groundwater and locally contaminated groundwater may be encountered at excavation depths in areas of the proposed route and alternative segments near water bodies.

The PEA in Chapter 11 (Hazards and Hazardous Materials) and Appendix E (Hazards and Hazardous Materials), and the associated Environmental Data Resources (EDR) Area/Corridor environmental database (dated April 26, 2002) were reviewed to identify sites with known contamination and a potential to contaminate the project construction area.

Distance from the alignment and physical barriers, such as roads or other facilities, provide a buffer that would restrict surface migration of contaminants from the source to the transmission line route. Active hazardous waste sites greater than 0.25 miles from the transmission line route would have a low potential to cause hazardous substances along the transmission line route. Subsurface migration of contaminants

within the unsaturated soil zone is predominantly vertical downward and is not likely to reach the transmission line route from buffered sites.

Subsurface migration of mobile contaminants within groundwater may provide a conduit to the project area. Shallow groundwater would likely be encountered near water bodies such as reservoirs, creeks, ponds, and the San Francisco Bay. In areas where the water table is below planned excavation depths of the proposed and alternative routes, contaminated groundwater would not be expected to impact construction.

In addition to the specific sites identified in the environmental databases, it is possible that other sites could be discovered during construction of the project. Sites could exist where soil contamination may be encountered during trench or tower foundation excavation, but where no sites are currently designated or identified. Offsite migration of contamination, unauthorized dumping, or historic, unreported hazardous materials spills may adversely impact the soil throughout much of the industrial land use areas.

### **D.8.3.1 Significance Criteria**

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; or
- 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.8.3.2 Applicant Proposed Measures**

Six measures were proposed by the Applicant to reduce or eliminate impacts from hazardous material use and storage, and existing environmental contamination along the alignment. As presented in Table D.8-5, five Applicant Proposed Measures (APMs) were presented for construction related impacts and one for operational related impacts. For the purpose of this analysis, it is assumed that PG&E has committed to implementation of the APMs; the implementation of the APMs would be monitored by the CPUC during construction in addition to mitigation measures. Three mitigation measures are presented in Sections D.8.3.3; these measures would supplement the APMs and would be required to ensure that all impacts would be reduced to less than significant levels.



**Table D.8-5. Applicant Proposed Measures – Public Health and Safety**

APM	Description
APM 11.1: Environmental Training and Monitoring Program	<p>An environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention, emergency response measures, and proper Best Management Practice (BMP) implementation, to all field personnel. The training program will emphasize site-specific physical conditions to improve hazard prevention (e.g. identification of potentially hazardous substances) and will include a review of all site-specific plans, including but not limited to, the Project's SWPPP, Erosion Control and Sediment Transport Plan, Health and Safety Plan, Waste Characterization and Management Plan, Fire Response Plan, and Hazardous Substances Control and Emergency Response Plan.</p> <p>A monitoring program will also be implemented to ensure that the plans are followed throughout the period of construction. Best Management Practices, as identified in the Project SWPPP and Erosion Control and Sediment Transport Plan, will also be implemented during the Project to minimize the risk of an accidental release and provide the necessary information for emergency response.</p>
APM 11.2: Hazardous Substance Control and Emergency Response Plan	<p>PG&amp;E will prepare a Hazardous Substance Control and Emergency Response Plan, which will include preparations for quick and safe cleanup of accidental spills. This plan will be submitted with the grading permit application. It will prescribe hazardous-materials handling procedures for reducing the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted. These directions and requirements will also be reiterated in the Project SWPPP.</p>
APM 11.3: Emergency Spill Supplies and Equipment	<p>Oil-absorbent material, tarps, and storage drums will be used to contain and control any minor releases. Emergency-spill supplies and equipment will be kept adjacent to all areas of work and in staging areas, and will be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials will be provided in the Project's Hazardous Substances Control and Emergency Response Plan.</p>
APM 11.4: Phase II Soil Sampling/Waste Characterization	<p>Soil sampling and potholing will be conducted along the Project route and in substations, as needed, before construction begins, and soil information will be provided to construction crews to inform them about soil conditions and potential hazards. If hazardous substances are unexpectedly encountered during trenching, grading, or excavating work, work will be stopped until the material is properly characterized and appropriate measures are taken to protect human health and the environment. If excavation of hazardous materials is required, they will be handled, transported, and disposed of in accordance with federal, State, and local regulations.</p> <p>Prior to initiating excavation activities and along the underground transmission-line routes, soil borings will be advanced to ensure that groundwater will not be encountered. The location, distribution, or frequency of such tests shall be determined to give adequate representation of the conditions in the construction area.</p> <p>All soil sampling and hazardous waste-removal and handling will be conducted in accordance with the Project's Health and Safety Plan.</p>
APM 11.5: Groundwater Characterization	<p>If suspected contaminated groundwater is encountered in the depths of the proposed construction areas, samples will be collected and submitted for laboratory analysis of petroleum hydrocarbons, metals, volatile organic compounds, and semi-volatile organic compounds. If necessary, groundwater will be collected during construction, contained, and disposed of in accordance with all applicable regulations. Appropriate personal protective equipment will be used and waste management will be performed in accordance with applicable regulations. Non-contaminated groundwater will be released to one of the cities' stormwater drainage systems (with prior approval) or contained, tested, and disposed of by methods described above.</p> <p>Appropriate personal protective equipment will be used during groundwater testing and dewater removal, and waste management and disposal will be performed in accordance with local, State, and federal regulations and per the Project's Health and Safety Plan and Waste Management Plan.</p>
APM 11.8: Spill Prevention, Control, and Countermeasures	<p>PG&amp;E will prepare or update current Spill Prevention, Control, and Countermeasures (SPCC) plans for the transition station and each substation as appropriate, as outlined in Title 40 of the Code of Federal Regulations, Part 112.</p> <p>With respect to the substations, PG&amp;E will also update, as needed, and submit a revised Hazardous Materials Business Plan in accordance with Chapter 6.95 of the California Health and Safety Code and Title 22, California Code of Regulations. The plan and forms will be submitted to the appropriate Certified Unified Protection Agency (CUPA). The transition station, along with the existing substations, will be operated in compliance with all applicable federal, State, and local regulations.</p>

### **D.8.3.3 230 kV/60 kV Overhead Transmission Line**

#### **Jefferson Substation to Ralston Substation**

Excavation would be limited to areas at and near transmission structures. No impacts from existing environmentally contaminated sites are expected along this segment. However, hazardous materials such as vehicle fuels and oils would be used and stored during construction activities. Impact HAZ-1 may affect the Jefferson Substation to Ralston Substation segment of the Proposed Project.

#### **Impact HAZ-1: Potential Hazardous Substance Spills During Construction**

During construction operations hazardous materials such as vehicle fuels, oils, and other vehicle maintenance fluids would be used and stored in construction staging yards. Spills of hazardous materials during construction activities could potentially cause soil or groundwater contamination. Improperly maintained equipment could leak fluids during construction operation and while parked, resulting in soil contamination. APM 11.1 (Environmental Training and Monitoring Program), APM 11.2 (preparation of Hazardous Substance Control and Emergency Response Plan), and APM 11.3 (onsite emergency spill supplies; see Table D.8-5) are designed to reduce this impact. However, implementation of Hydrology and Water Quality Mitigation Measure H-2a (see Section D.7.3), which requires the Hazardous Substance Control and Emergency Response Plan to be approved by the CPUC and the San Francisco Public Utilities Commission (SFPUC), also is recommended to ensure that impacts would be reduced to less than significant levels (Class II).

#### ***Mitigation Measure for Impact HAZ-1***

Water Quality Mitigation Measure H-2a (see Section D.7.3) is recommended to ensure that impacts associated with potential hazardous substance spills during construction would be reduced to less than significant levels. Implementation of APMs 11.1, 11.2, and 11.3 is also assumed.

#### **Ralston Substation to Carolands Substation**

The Ralston Substation to Carolands Substation segment traverses undeveloped open-space and undeveloped land adjacent to residential developments. No environmentally contaminated sites are listed in the EDR database along this segment. Excavation would be limited to areas at and near transmission structures. No impacts from existing environmentally contaminated sites are expected along this segment. Hazardous materials such as vehicle fuels and oils will be used and stored during construction activities. APMs 11.1, 11.2, and 11.3 would be required and implementation of those measures would be ensured by the CPUC. Impact HAZ-1 (hazardous substance spills during construction; see discussion above) may affect the Ralston Substation to Carolands Substation segment. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3).

#### **Carolands Substation to Transition Station**

As described above, Impact HAZ-1 (hazardous substance spills during construction; see above) may affect the Carolands Substation to Transition Station segment. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). In addition, the following impacts would apply to this segment:

## **Impact HAZ-2: Excavation Could Result in Mobilization of Existing Contamination**

The presence of the contaminated sites near the alignment results in a potential for contaminated soil and/or groundwater to be encountered during construction. APM 11.1 (Environmental Training and Monitoring Program), APM 11.4 (Phase II Soil Sampling/Waste Characterization), and APM 11.5 (Groundwater Characterization) were designed to reduce impacts associated with mobilization of existing soil and groundwater contamination. In APM 11.4, PG&E commits to conducting Phase II soil sampling/waste along the project route and in substations; however Mitigation Measure HAZ-2a (presented below) presents additional detail to ensure that potential impacts are reduced to less than significant levels (Class II).

### ***Mitigation Measure for Impact HAZ-2***

**HAZ-2a Conduct Phase II Investigation.** A Phase II investigation shall be conducted for the project prior to commencement of construction activities. The investigation shall include a review of current status of listed contaminated sites, including limits of contamination, and collection of samples for laboratory analysis and quantification of contaminant levels within the proposed excavation and surface disturbance areas of the project prior to the start of construction. Soil sampling and laboratory testing shall be conducted at locations along the project route, transition station site, and at substations where known contaminated sites are within 0.25 miles of the alignment. Subsurface investigation shall determine appropriate worker protection and hazardous material handling and disposal procedures appropriate for the subject area. Areas with contaminated soil and/or groundwater determined to be hazardous waste shall be removed by personnel who have been trained through the OSHA recommended 40-hour safety program (29CFR1910.120) with an approved plan for groundwater extractions, soil excavation, control of contaminant releases to the air, and off-site transport or on-site treatment. Results shall be reviewed and approved by the San Mateo County's Environmental Health Division and/or DTSC prior to construction. A copy of the DTSC or County Environmental Health Division approval letter must be provided to the CPUC prior to start of construction.

## **Impact HAZ-3: Previously Unknown Contamination Could Be Encountered During Construction**

Unexpected soil and or groundwater contamination could be encountered during grading or excavation. APM 11.1 (Environmental Training and Monitoring Program), APM-11.4 (Phase II Soil Sampling/Waste Characterization), and APM 11.5 (Groundwater Characterization) would reduce impacts associated with previously unknown contamination encountered during construction. In APM 11.4, PG&E commits to measures for soil sampling and protocol if unexpected contamination is encountered along the project route and in substations; however Mitigation Measures HAZ-3a and HAZ-3b (shown below) present additional detail to ensure that potential impacts are reduced to less than significant levels (Class II).

### ***Mitigation Measure for Impact HAZ-3***

**HAZ-3a Contaminated Groundwater or Soils.** The procedures described in APM 11.4 (soil sampling and characterization) shall be followed. In addition, the CPUC, SFPUC (for areas within the Peninsula Watershed), and the RWQCB shall be provided with all pre-construction soil and groundwater sampling and testing information prior to initiation of construction. In the event contaminated groundwater or soils are encountered, these same agencies shall be provided with the proposed extraction and disposal plans for approval prior to further construction in those areas.

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

#### **D.8.3.4 Transition Station**

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) may be applicable to the Transition Station. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, it is likely that Impact HAZ-2 (mobilization of existing contaminants, as identified in Table D.8-1) and Impact HAZ-3 (previously unknown contamination could be encountered) would occur, but these impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b. In addition, the following impact, HAZ-4, would apply to the transition station:

#### **Impact HAZ-4: Release of Hazardous Materials During Operation at Transition Station or Substations**

Soil or groundwater contamination could result from accidental spill or release of hazardous materials at the transition station or substations during facility operation. This could potentially result in exposure of facility workers and the public to hazardous materials. Implementation of APM 11.1 (Environmental Training and Monitoring Program) and APM 11.8 (Spill Prevention, Control, and Countermeasures) would reduce impacts to workers and the public to less than significant levels (Class II). Mitigation Measure HAZ-4a is required to ensure that these APMs are properly implemented.

**HAZ-4a Documentation of Compliance.** PG&E shall implement APMs 11.1 and 11.8 at the transition station and at substations, and shall document compliance by (a) submitting to the CPUC for review and approval an outline of the proposed Environmental Training and Monitoring Program, (b) providing a list of names of all construction personnel who have completed the training program, and (c) providing a copy of the Spill Prevention, Control, and Countermeasures Plan to the CPUC for review and approval at least 60 days before the start of construction.

#### **D.8.3.5 230 kV Underground Transmission Line**

##### **San Bruno Avenue, BART ROW, and Colma to Martin Substation Segments**

APMs 11.1 through 11.8 would be implemented along the underground segment. In addition, Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the construction of the underground segment. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-2 (mobilization of existing contaminants, as identified in Table D.8-4) and Impact HAZ-3 (previously unknown contamination could

be encountered) would be applicable, but would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

### **D.8.3.6 Substations, Switchyard, and Taps**

Modifications to the existing substations would require some excavation and/or grading at the facilities for the new structures, buildings, and equipment, while modifications at the tap locations would require limited excavation associated with pole foundation development. During construction activities hazardous materials such as vehicle fuels and oils would be used and stored. Miscellaneous hazardous materials would be stored and used on site during operation of the facility. APMs 11.1 through 11.8 would be implemented. In addition, the following impacts may affect construction at and/or operation of the substation facilities:

- Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to substation, switchyard, and tap modification construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3).
- Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable, but would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.
- Impact HAZ-4 (release of hazardous materials during operation) is considered to be less than significant (Class III).

## **D.8.4 Southern Area Alternatives – Contamination and Hazardous Materials**

### **D.8.4.1 PG&E Route Option 1B – Underground**

#### **Environmental Setting**

The southern portion of the Route Option 1B alignment lies primarily within SFPUC Watershed Lands along or within the Cañada Road ROW as it skirts the east side of Upper Crystal Springs Reservoir. There are no neighborhoods or businesses along this portion of the route. North of the intersection with Highway 92, the route is within Skyline Boulevard as it skirts the east side of Lower Crystal Springs Reservoir. At Hayne Road, the route goes under I-280 and then tracks along behind homes in Hillsborough within Skyline Boulevard until Trousdale Drive. The area is primarily residential except for the Carolands Substation and some water tanks.

The section between Skyline and El Camino Real along Trousdale Drive is entirely within the Trousdale ROW as it goes through a residential area. Near the base of the hill, Trousdale bounds a school and lies within a short block of a hospital. As the route approaches El Camino Real, the land use changes to offices and businesses.

The section of the line between Trousdale and San Bruno Avenue on El Camino Real would be placed within the road ROW. El Camino Real is a long-lived commercial area with numerous gas stations, automotive repair shops, dry cleaners, and other commercial businesses.

Based on the information in EDR Databases, there are 22 environmentally contaminated sites with significant potential to impact the PG&E Route Option 1B Underground Alternative, as shown in Table D.8-6.

## Environmental Impacts and Mitigation Measures

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the construction of the Route Option 1B Alternative. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, based on the presence of 22 contaminated sites along this alternative segment, Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable, but these impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

### Comparison to Proposed Route Segment

This alternative would replace the entire proposed overhead segment and part of the San Bruno Avenue segment of the proposed underground route. South of Trousdale Boulevard, the Route Option 1B Alternative and Proposed Route are similar in environmental impact due to the similar route and the lack of environmentally contaminated sites along this portion (both routes would be within the SFPUC Watershed Lands where there is little existing contamination). However, north of Trousdale Drive, the Route Option 1B Alternative has 22 listed contaminated sites, located along the El Camino portion of the alternative, as compared with 14 listed contaminated sites along the Carolands Substation to Transition Station and San Bruno Avenue segments.

### D.8.4.2 Partial Underground Alternative

#### Environmental Setting

The first four miles of this route would cross Watershed Land while paralleling Cañada Road. Once across Highway 92, the route goes adjacent to the Hillcrest Juvenile Home and the San Mateo County Belmont Fire Station before reaching the Ralston Substation. North of the substation the route is underground within the PG&E ROW behind houses on Lexington Avenue until the Hillsdale Junction Substation. The route crosses the San Mateo Creek Canyon overhead, then goes back underground behind the neighborhoods of Hillsborough along the PG&E ROW until the Carolands Substation. In this area, there is undeveloped land on the west, residential areas on the east.

The overhead portion from Carolands to approximately MP 11 first crosses I-280, then goes through the Crystal Springs Golf Course to about MP 10. From there, the route stays on the west side of the Interstate, crossing through watershed lands to where it joins the proposed route at MP 11. From MP 11 to the proposed transition station, this alternative would be identical to the proposed route.

The Partial Underground Alternative traverses undeveloped open-space and no environmentally contaminated sites are listed along this alignment. No impacts from existing environmentally contaminated sites are expected along this segment, ending at MP 11 where the alternative route joins the proposed route.

**Table D.8-6. Contaminated Sites within 0.25 Miles of the PG&E Route Option 1B - Underground Alternative**

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
191	European Car Service	900 El Camino Real, San Bruno	LUST Cortese	Gasoline affecting groundwater. Clean up in progress.
191	Chevron Station #9-2759	801 El Camino Real, San Bruno	LUST	Gasoline affecting groundwater. Remedial action in progress.
191	Exxon or Texaco	800 El Camino Real, San Bruno	LUST Cortese	Motor vehicle fuels affecting groundwater. Post remedial action monitoring in progress.
191	Shell Oil Co.	798 El Camino Real, San Bruno	LUST Cortese	Leaking underground fuel tank. Site assessment in progress.
191	Melody Toyota, Inc.	750 El Camino Real, San Bruno	LUST	Motor vehicle fuels affecting groundwater. Post remedial action monitoring in progress.
194	Robinson's Carpets	701 San Mateo Ave., San Bruno	LUST	Motor vehicle fuels affecting groundwater. Post remedial action monitoring in progress.
199	Olympian Oil Company	620 El Camino Real, San Bruno	LUST Cortese	Motor vehicle fuels affecting groundwater. Remediation plan developed.
199	San Bruno Ford	601 El Camino Real, San Bruno	LUST	Motor vehicle fuels affecting groundwater. Remediation plan developed.
199	San Bruno Fire Station	555 El Camino Real, San Bruno	LUST	Gasoline affecting groundwater. Preliminary site assessment workplan submitted.
199	San Bruno Car Wash	512 El Camino Real, San Bruno	LUST	Gasoline affecting groundwater. Preliminary site assessment underway.
199	San Bruno Inn (formerly Shell)	500 El Camino Real, San Bruno	LUST Cortese	Motor vehicle fuels affecting groundwater. Preliminary site assessment underway.
199	Unocal #0109	401 San Mateo Ave., San Bruno	LUST Cortese	Gasoline affecting groundwater. Post remedial action monitoring in progress.
213	Lawrence Franzella et al	180 El Camino Real, San Bruno	Cortese	Leaking underground storage tanks.
213	Al's Olympic Station	170 El Camino Real	LUST Cortese	Gasoline affecting groundwater. Preliminary site assessment workplan submitted.
223	Bridgestone/Fire stone	1201 El Camino Real, Millbrae	LUST Cortese	Leaking underground tank affecting groundwater. Preliminary site assessment.
223	Rob Baker's Olympic Service Station	1009 El Camino Real	LUST	Preliminary site assessment.
223	San Francisco Water Department	1000 El Camino Real, Millbrae	LUST	Motor vehicle fuels affecting groundwater. Site assessment in progress.
254	Oyster Shell Service	261 Millbrae, Millbrae	Cortese	Leaking underground storage tanks.
254	Chevron Station	320 Millbrae, Millbrae	Cortese	Leaking underground storage tanks.
254	Millbrae Corporation Yard	400 Millbrae, Millbrae	Millbrae	Leaking underground storage tanks.
256	Unocal Service Station #3798	1876 El Camino Real, Burlingame	LUST Cortese	Gasoline affecting groundwater. Post remedial action monitoring in progress.
256	Chevron Station #9-8165	1801 El Camino Real, Burlingame	LUST Cortese	Motor vehicle fuels affecting groundwater. Site assessment in progress.

Source: PG&E, 2002 and associated EDR Database.

## **Environmental Impacts and Mitigation Measures**

No existing hazardous sites have been identified. Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Partial Underground Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3).

### **Comparison to Proposed Route Segment**

Both the Proposed Alignment and the Partial Underground Alternative pass through primarily undeveloped open-space and adjacent to some residential developments with no known environmental contamination issues.

## **D.8.5 Northern Area Alternatives – Contamination and Hazardous Materials**

### **D.8.5.1 West of Skyline Transition Station**

#### ***Environmental Setting of the Alternative Transition Station***

The location of this alternative transition station site is near the top of Buri Buri Ridge on the SFPUC Watershed Lands. This alternative is located in an undeveloped area and no significant environmentally contaminated sites are listed within 0.25 miles.

#### ***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Proposed Project Jefferson to Ralston Substation segment) would be applicable to West of Skyline Transition Station construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-4 (Spill or Release of Hazardous Materials During Operation) is applicable to this alternative and is considered to be less than significant (Class III).

#### ***Comparison to Proposed Transition Station***

The West of Skyline Transition Station Alternative would be located in an undeveloped area, whereas the proposed Transition Station would be located in an area with a mix of commercial and residential uses. Two listed environmentally contaminated sites are located near the proposed Transition Station and no listed environmentally contaminated sites are located near the West of Skyline Alternative.

### **West of Skyline Transition Station with Proposed Underground Route**

#### ***Environmental Setting***

This portion of the route connects the alternative transition station with the proposed route on San Bruno Avenue on the opposite side of Skyline Boulevard. The route would go underground beneath Skyline to connect to the proposed route within San Bruno Avenue. There is no development west of Skyline in this area. There is a commercial area on the southeast corner of Skyline and San Bruno, and a vacant lot on the northeast side of the intersection (immediately west of the proposed transition station site). There are no significant environmentally contaminated sites listed within 0.25 miles of this alternative route.



***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to West of Skyline Transition Station with Proposed Underground Route construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). No existing contaminated sites have been identified.

**Comparison to Proposed Route Segment**

The West of Skyline Transition Station with Proposed Underground Route Alternative is located in a predominantly undeveloped area with a small amount of commercial use, whereas the alignment from the West of Skyline Transition Station to the proposed transition station traverses an area with a fairly even mix of undeveloped land, commercial, and residential uses. Two listed environmentally contaminated sites are located near the proposed Transition Station and no listed environmentally contaminated sites are located along West of Skyline with Proposed Underground Route Alternative.

**West of Skyline Transition Station with Sneath Lane Underground Route**

***Environmental Setting***

The beginning of this route connects to the alternative West of Skyline transition station then continues north along Skyline Boulevard within the ROW until Sneath Lane. A high school is located adjacent to the ROW at the southwest corner of the Skyline/Sneath Lane intersection. A fire station is located very near the southeast corner of the same intersection. The route turns east at Sneath Lane, passing a residential area and along a park. It crosses under I-280 and enters an area with high-density residential on the south and a cemetery on the north. East of Cherry Avenue, the south side of the road becomes more commercial. A large medical facility is located on the northern corner of the Sneath Lane/El Camino Real intersection. The remainder of the route goes through light and heavy commercial and industrial; this alternative ends at the BART ROW.

Based on the information in EDR Databases, there are three environmentally contaminated sites with significant potential to impact the West of Skyline Transition Station with Sneath Lane Underground Alternative, as shown in Table D.8-7.

**Table D.8-7. Hazardous Waste Sites Potentially Impacting West of Skyline Transition Station with Sneath Lane Underground Alternative**

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
133	Autotech Autos, Inc.	45 Chestnut Ave., South San Francisco	LUST Cortese	Gasoline leak affecting soil only. Post remedial action monitoring in progress.
209	Union 76	2880 San Bruno Ave., San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Remediation Plan developed.
209	Skyline Mobile	2890 San Bruno Ave., San Bruno	LUST	Leak of misc. motor vehicle fuels. Other groundwater affected, MTBE detected. Pollution Characterization underway.

Source: PG&E, 2002 and associated EDR Database.

### ***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the West of Skyline Transition Station with Sneath Lane Underground Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable, but would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

### ***Comparison to Proposed Route Segment***

Similar to the proposed route segment, the West of Skyline Transition Station with Sneath Lane Underground Alternative would pass through commercial and light industrial uses; however, it has fewer listed environmentally contaminated sites. The Proposed Route segment along San Bruno Avenue has a heavy commercial area near the intersection of San Bruno Avenue and El Camino Real with many contaminated sites. This alternative alignment has a similar character, but fewer potential sites than the comparable portion of the proposed San Bruno Segment. The comparable portion of the proposed San Bruno segment has ten environmentally contaminated sites near the alignment, whereas the alternative has only three environmentally contaminated sites along its alignment.

## **West of Skyline Transition Station with Westborough Boulevard Underground**

### ***Environmental Setting***

The beginning of this route would connect to the alternative West of Skyline transition station then continue north along Skyline Boulevard until Westborough Boulevard. A high school is located adjacent to the ROW at the southwest corner of the Skyline/Sneath Lane intersection. The Skyline part of the route tracks along the top of the ridge, beneath the road for about 2.1 miles. Very little development is present along the road here because of the Alquist-Priolo Earthquake Hazard Zone which restricts building within an identified active fault zone. Where Skyline turns to the west, away from the fault, a neighborhood lies adjacent to the west side of the road, while a park is on the east side. At the intersection with Westborough, the route turns east along Westborough Boulevard and descends the hill to join the BART ROW at the base of the hill. The western part of Westborough Boulevard goes through residential neighborhoods and past a middle school and park (on the north side). Light industrial and commercial businesses are present east of Buena Vista Road until I-280. East of I-280 the route goes past a golf course on the south and residential and a park on the north. Just before the intersection with Camino Real, the area becomes commercial and light industrial and remains so until intersecting with the BART ROW.

Based on the information in EDR Databases, there are seven environmentally contaminated sites with significant potential to impact the West of Skyline Transition Station with Westborough Boulevard Underground Alternative, as shown in Table D.8-8.

### ***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the West of Skyline Transition Station with Westborough Boulevard Underground Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-2 (mobilization of existing contaminants) and

Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable due to the existence of seven known contaminated sites. These impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

**Table D.8-8. Hazardous Waste Sites Potentially Impacting West of Skyline Transition Station with Westborough Boulevard Underground Alternative**

EDR Map ID <sup>1,2</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
<b>Sites Listed in the Supplemental PG&amp;E PEA and Associated EDR Area/Corridor Study</b>				
133	Autotech Autos, Inc.	45 Chestnut Ave., South San Francisco	LUST Cortese	Gasoline leak affecting soil only. Post remedial action monitoring in progress.
209	Union 76	2880 San Bruno Ave., San Bruno	LUST Cortese	Leak of misc. motor vehicle fuels. Other groundwater and soil affected, MTBE detected. Remediation Plan developed.
209	Skyline Mobile	2890 San Bruno Ave., San Bruno	LUST	Leak of misc. motor vehicle fuels. Other groundwater affected, MTBE detected. Pollution Characterization underway.
<b>Sites Listed in the Supplemental EDR Area/Corridor Study, Number 0977098.1s for the Transition Station Alternatives</b>				
<i>10</i>	ARCO Station #6073 / Prestige Stations #624	2300 Westborough Blvd., South San Francisco	Cortese LUST	Other groundwater affected, Remedial action underway, MTBE detected
<i>14,15</i>	Shell	3999 Skyline Blvd., San Bruno	LUST Cortese	Gasoline leak, soil and other groundwater affected, MTBE detected, Post remedial action monitoring
<i>17</i>	Skyline College	3300 College Drive, San Bruno	LUST Cortese	Diesel leak, soil only. Preliminary site assessment underway,
<i>18, Orphan</i>	San Francisco County Jail / City and County of San Francisco / San Francisco County Jail #3	"Unknown" Skyline Blvd / 1 Moreland Road / Sneath Lane and Moreland Drive, San Bruno	Cortese	Leaking USTs,

Source: PG&E, 2002, associated EDR Database, and EDR Area/Corridor Study, Number 0977098.1s.

<sup>1</sup> Focus map numbers and EDR Map ID numbers in italics are from supplemental EDR Area/Corridor Study, Number 0977098.1s.

<sup>2</sup> LUST databases include State, RWQCB and County agencies.

### ***Comparison to Proposed Route Segment***

The West of Skyline Transition Station with Westborough Boulevard Underground Alternative passes through commercial and light industrial uses as does the proposed route segment; however, the alternative has slightly fewer listed environmentally contaminated sites. This alternative alignment has similar, but fewer impacts than the comparable portion of the proposed San Bruno Avenue segment. The comparable portion of the proposed San Bruno Avenue segment has 10 environmentally contaminated sites near the alignment, whereas the alternative has seven environmentally contaminated sites along its alignment.

### **D.8.5.2 Sneath Lane Transition Station**

#### ***Environmental Setting of the Transition Station Alternative***

The location for this alternative transition station site is in a relatively flat area approximately 0.6 miles northwest of the West of Skyline Transition Station described above. There is no development immediately adjacent to this alternative site other than the existing substation because the location lies within an Alquist-Priolo Earthquake Hazard Zone and no significant environmentally contaminated sites are listed within 0.25 miles. To the north and west lie a high school and a residential area.

### ***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to Sneath Lane Transition Station construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-4 (spill or release of hazardous materials during operation) is applicable to this alternative and is considered to be less than significant (Class III).

### ***Comparison to Proposed Transition Station***

The Sneath Lane Transition Station Alternative would be located near primarily residential areas with some commercial businesses, whereas the proposed Transition Station would be located in an area with a fairly even mix of commercial and residential uses. Two listed environmentally contaminated sites are located near the proposed Transition Station and no listed environmentally contaminated sites are located near the Sneath Lane Alternative.

## **Sneath Lane Transition Station with Proposed Underground Route**

### ***Environmental Setting***

This route follows the top of the ridge along a relatively flat stretch of Skyline Boulevard for approximately one-half mile between the Skyline/San Bruno Avenue intersection and the Sneath Lane alternative transition station. As this route lies within an Alquist-Priolo Earthquake Hazard Zone, no development is present immediately adjacent to the road. The alternative transition station would be adjacent to the existing PG&E Sneath Lane Substation. No identified environmentally contaminated sites are listed within 0.25 miles.

### ***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Sneath Lane Transition Station with Proposed Underground Route construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, while no contaminated sites have been identified, Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable, but would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-3a and HAZ-3b.

### ***Comparison to Proposed Route Segment***

The Sneath Lane Transition Station with Proposed Underground Route Alternative would traverse primarily undeveloped areas, whereas the proposed Transition Station is located in an area with a mix of commercial and residential uses. Two listed environmentally contaminated sites are located near the proposed Transition Station and no listed environmentally contaminated sites are located along the Sneath Lane with Proposed Underground Route Alternative.

## Sneath Lane Transition Station with Sneath Lane Underground Route

### *Environmental Setting*

This segment is identical to that described above in “West of Skyline Transition Station with Sneath Lane Underground Route” except that this route would have no portion along Skyline Boulevard. Based on the information in EDR Databases, there is one environmentally contaminated site with significant potential to impact the Sneath Lane Transition Station with Sneath Lane Underground Alternative, as shown in Table D.8-9.

**Table D.8-9. Hazardous Waste Sites Potentially Impacting Sneath Lane Transition Station with Sneath Lane Underground Alternative**

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
184	Sears Automotive Center	1178 El Camino Real, San Bruno	LUST Cortese	Gasoline leak affecting soil and other groundwater. MTBE detected. Preliminary site assessment underway.

Source: PG&E, 2002 and associated EDR Database.

### *Environmental Impacts and Mitigation Measures*

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Sneath Lane Transition Station with Sneath Lane Underground Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable because of the one identified site, but impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

### *Comparison to Proposed Route Segment*

The Sneath Lane Transition Station with Sneath Lane Underground Alternative would pass through areas of commercial and light industrial use, however it has significantly fewer listed environmentally contaminated sites than the proposed route segment. The proposed route segment (San Bruno Avenue) has a heavy commercial area near the intersection of San Bruno Avenue and El Camino Real with many contaminated sites. The comparable portion of the proposed San Bruno Avenue segment has 10 environmentally contaminated sites near the alignment, whereas the alternative has only one contaminated site along its alignment.

## Sneath Lane Transition Station with Westborough Boulevard Underground

### *Environmental Setting*

This alternative is identical to the West of Skyline transition station with Westborough Boulevard underground alternative except that the portion along Skyline would be only from Sneath Lane to Westborough rather than from just south of San Bruno Avenue to Westborough.

Portions this alternative pass through commercial areas with listed hazardous material sites. Based on the information in the PEA and EDR Databases, there are five environmentally contaminated sites with significant potential to impact the Sneath Lane Transition Station with Westborough Boulevard Underground Alternative, as shown in Table D.8-10.

**Table D.8-10. Hazardous Waste Sites Potentially Impacting Sneath Lane Transition Station with Westborough Boulevard Underground Alternative**

EDR Map ID <sup>1,2</sup>	Site Name	Site Address	Database Lists <sup>3</sup>	Comments
<b>Sites listed in the Supplemental PG&amp;E PEA and associated EDR Area/Corridor Study</b>				
133	Autotech Autos, Inc.	45 Chestnut Ave. South San Francisco	LUST Cortese	Gasoline leak affecting soil only. Post remedial action monitoring in progress.
<b>Sites listed in the Supplemental EDR Area/Corridor Study, Number 0977098.1s for the Transition Station Alternatives</b>				
<i>10</i>	ARCO Station #6073/ Prestige Stations #624	2300 Westborough Blvd., South San Francisco	Cortese LUST	Other groundwater affected, Remedial action underway, MTBE detected
<i>14, 15</i>	Shell	3999 Skyline Blvd., San Bruno	LUST Cortese	Gasoline leak, soil and other groundwater affected, MTBE detected, Post remedial action monitoring
<i>17</i>	Skyline College	3300 College Drive, San Bruno	LUST Cortese	Diesel leak, soil only. Preliminary site assessment underway,
<i>18, Orphan</i>	San Francisco County Jail/ City and County of San Francisco / San Francisco County Jail #3	"Unknown" Skyline Blvd / 1 Moreland Road / Sneath Lane and Moreland Drive, San Bruno	Cortese	Leaking USTs,

Source: EDR Area/Corridor Study, Number 0977098.1s.

<sup>2</sup> Focus map numbers and EDR Map ID numbers in italics are from supplemental EDR Area/Corridor Study, Number 0977098.1s.

<sup>3</sup> LUST databases include State, RWQCB and County agencies.

### ***Environmental Impacts and Mitigation Measures***

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Sneath Lane Transition Station with Westborough Boulevard Underground Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable, but would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

### ***Comparison to Proposed Route Segment***

Similar to the proposed route segment, the Sneath Lane Transition Station with Westborough Boulevard Underground Alternative also passes through commercial and light industrial, however it has half of the listed environmentally contaminated sites that the Proposed Route segment has, five versus ten. This alignment would have similar types of impacts, but fewer known sites are identified than for comparable portion of the proposed San Bruno Avenue segment.

## **D.8.5.3 Cherry Avenue Alternative**

### **Environmental Setting**

This route would be located within Cherry Avenue as it crosses commercial areas north of San Bruno Avenue. It would cross underneath I-380 and then goes through high-density residential (apartment houses) before turning east onto Sneath Lane. The Golden Gate National Cemetery is located along the

north side of Sneath Lane and business and office complexes, with scattered commercial businesses, are located along the south side of Sneath Lane.

Although most of this alternative passes through commercial and business complex areas, only one environmentally contaminated site is located along this alternative. This site has significant potential to impact the Cherry Avenue Alternative, as shown in Table D.8-11.

**Table D.8-11. Contaminated Sites within 0.25 Miles of the Cherry Avenue Alternative**

EDR Map ID <sup>1</sup>	Site Name	Site Address	Database Lists <sup>2</sup>	Comments
184	Sears Automotive Center	1178 El Camino Real, San Bruno	LUST Cortese	Gasoline leak affecting soil and other groundwater. MTBE detected. Preliminary site assessment underway.

Source: PG&E, 2002; and associated EDR Database.

<sup>2</sup> LUST databases include State, RWQCB and County agencies.

### Environmental Impacts and Mitigation Measures

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Cherry Avenue Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Also, because of the existence of the single contaminated site identified above, Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable. Impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

### Comparison to Proposed Route Segment

The Cherry Avenue Alternative would pass through a slightly less commercial area by avoiding the commercial area near the intersection of San Bruno Avenue and El Camino Real. This alignment has similar but fewer impacts than the comparable portion of the proposed San Bruno Segment. The comparable portion of the proposed San Bruno segment has seven environmentally contaminated sites near the alignment, whereas the Cherry Avenue Alternative has only one environmentally contaminated site along its alignment.

#### D.8.5.4 PG&E's Route Option 4B – East Market Street

##### Environmental Setting

This route would lie within Hillside Boulevard and East Market Street. Both streets are lined with commercial and high density residential uses. Three secondary schools, an elementary school, a middle school, and a high school with playing fields, are located on the south side of East Market Street. Although this route passes through commercial areas with automotive shops and gas stations, no significant environmentally contaminated sites are listed within 0.25 miles of this short alternative. However, due to the presence of numerous automotive and gas stations along this alignment there is a high potential for unknown/unreported contamination of the soil and or groundwater.

## **Environmental Impacts and Mitigation Measures**

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Route Option 4B – East Market Street Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Given the existing land uses, Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable, but impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-3a and HAZ-3b.

### ***Comparison to Proposed Route Segment***

The East Market Street Alternative and the comparable segment of the proposed route, Hoffman and Orange Streets between Hillside Boulevard and Guadalupe Canyon Parkway, both have no listed significant environmentally contaminated sites. However, the East Market Street Alternative passes through commercial areas compared to all residential for the corresponding proposed segment, thus increasing the likelihood of encountering unknown contamination during excavation of the alternative alignment.

## **D.8.5.5 Junipero Serra Alternative**

### **Environmental Setting**

The first part of the route would be identical to the “Sneath Lane Transition Station Westborough Underground” option and to the “West of Skyline Transition Station Westborough Underground” option. From the intersection of Westborough Boulevard and Junipero Serra Boulevard, the route along Junipero Serra would lie within the road ROW. Residential neighborhoods lie to either side except at the southern end of Junipero Serra where commercial buildings and a mobile home court are on the west side. North of Shannon Road, there is one more block of residential before the route would pass between two cemeteries for about 1500 feet. The route would then turn east onto Serramonte Boulevard and pass between shopping centers and commercial buildings with large parking lots. East of Mission Road, another cemetery lies on the north side of the street, with more commercial/light industrial buildings on the south. The Junipero Serra alternative would end at the intersection of Serramonte and Hillside Boulevards.

No significant environmentally contaminated sites are listed within 0.25 miles of this alternative. However, due to the presence of numerous automotive and gas stations along this alignment in the commercial areas, there is a potential for unreported/unreported contamination of the soil and or groundwater.

### **Environmental Impacts and Mitigation Measures**

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Junipero Serra Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3). Since no contaminated sites have been identified, Impact HAZ-3 (previously unknown contamination) would be applicable, but would be mitigable to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-3a and HAZ-3b.



## Comparison to Proposed Route Segment

This alternative would replace the San Bruno Avenue, BART ROW, and the southern portion of the Colma to Martin Substation segments of the Proposed Route. No environmentally contaminated sites are listed for this alternative, while 31 contaminated sites are listed for the corresponding Proposed Project segments.

### D.8.5.6 Modified Existing 230 kV Underground ROW

#### Environmental Setting

The Modified Existing Underground 230 kV Alternative route would start at the intersection of the BART ROW and San Bruno Avenue and would end at the Martin Substation. The route primarily traverses industrial and commercial areas with small areas of residential use. The beginning of the route runs east in the San Bruno Avenue ROW for a short distance and then turns north onto Shaw Road. Along San Bruno Avenue the route would pass through primarily residential developments with scattered commercial businesses. The properties along Shaw Road are a mix of industrial and commercial. This alternative route would continue north past the end of Shaw Road and cross a tributary of Colma Creek. It would then pass through a large parking lot east of Golden Gate Produce Terminal before joining Produce Avenue. Businesses along Produce Avenue are primarily related to shipping with some interspersed commercial businesses.

Where Airport Boulevard crosses under the Highway, this route turns east and crosses below Highway 101, and then turns northeast onto Gateway Boulevard. Gateway Boulevard has primarily manufacturing and warehousing facilities along both sides of the road. Just past Oyster Point Boulevard the Modified Existing 230kV Underground Alternative crosses a vacant parcel before starting to follow the eastern edge of the UPRR for approximately to Sierra Point Parkway. The UPRR has undeveloped marsh land to the east and Highway 101 on the west.

At Sierra Point Parkway the route would cross below Highway 101, traverse under the railroad tracks into Van Waters and Rogers Road (private) before joining Bayshore Boulevard. Bayshore Boulevard has a mix of commercial, residential, and industrial land uses along its alignment to the Martin Substation.

Based on the information in the PEA and EDR Databases, there are 33 environmentally contaminated sites with significant potential to impact Modified Existing 230 kV Underground Alternative, as shown in Table D.8-12.

#### Environmental Impacts and Mitigation Measures

Impact HAZ-1 (hazardous substance spills during construction; see discussion under the Jefferson to Ralston Substation segment) would be applicable to the Modified Existing Underground 230 kV Alternative construction work. However, impacts would be reduced to less than significant levels with implementation of Hydrology and Water Quality Mitigation Measure H-2a (Class II; see Section D.7.3).

Due to the identification of 33 existing contaminated sites along this alternative, Impact HAZ-2 (mobilization of existing contaminants) and Impact HAZ-3 (previously unknown contamination could be encountered) would be applicable. These impacts would be mitigated to less than significant levels (Class II) with the implementation of Mitigation Measures HAZ-2a, HAZ-3a, and HAZ-3b.

**Table D.8-12. Hazardous Waste Sites Potentially Impacting the Modified Existing Underground 230 kV Alternative**

EDR Map ID <sup>2</sup>	Site Name	Site Address	Database Lists <sup>3</sup>	Comments
<b>Sites listed in the Supplemental PG&amp;E PEA and associated EDR Area/Corridor Study</b>				
29	V & A Auto Repair	2800 Bayshore Blvd., Daly City	LUST Cortese	Tank leak affecting soil and groundwater. Conducting remedial action plan.
29	Southern Pacific Transportation Co.	Geneva Ave./ Bayshore Boulevard, Brisbane	Cal Sites	Confirmed groundwater contamination from 4 sources. Remediation continues.
37	Kessler & Kessler	250 Industrial Way, Brisbane	LUST	Gasoline affecting soil and groundwater. Post remedial action monitoring in progress.
70	Kessler & Kessler	350 Industrial Way, Brisbane	LUST Cortese	Leaking tank of solvents affecting soil only. Preliminary site assessment underway.
64	DKL Trucking Co. or S.E. Rykoff & Co.	240 Valley Drive, Brisbane	LUST Cortese	Motor fuels and waste oil affecting groundwater.
80	Gili Olympic	1 San Bruno, Brisbane	Cortese	Leaking underground storage tank.
71	SFPP, LP	950 Tunnel, Brisbane	Cortese	Cleanup and abatement orders issued for discharge of hazardous waste.
87	Brisbane Corporate Yard	3795 Bayshore Blvd., Brisbane	LUST Cortese	Gasoline affecting groundwater. Post remedial action monitoring in progress.
171	RPM Rent A Car	410 South Airport Blvd., South San Francisco	LUST Cortese	Diesel fuel affecting groundwater.
171	Thompson Aircraft Tire Co.	160 Beacon Street, South San Francisco	LUST Cortese	Motor vehicle fuels affecting groundwater. Post remedial action monitoring in progress.
185	Deluxe Packages	205 Shaw Road South, South San Francisco	LUST	Isopropyl alcohol affecting soil only. Leak being confirmed.
190	Exxon Station	310 San Bruno Ave., East San Bruno	LUST Cortese	Motor vehicle fuel affecting groundwater. Remedial action in progress.
190	The Service Zone	265 San Bruno Ave., San Bruno	LUST	Preliminary site assessment.
<b>Sites listed in the Supplemental EDR Area/Corridor Study, Number 0977098.2s for the Existing 230 kV Alternative</b>				
<i>Orphan</i>	Unocal Brisbane Terminal	Old County Road and Tunnel Avenue, Brisbane	LUST Cortese	Diesel leak, soil and other groundwater affected, MTBE not tested, Preliminary Site Assessment Workplan submitted.
22,23	Sierra Point/ Nextel Site ID CA 0851	1000 Marina Blvd., Brisbane	WMUDS/S WAT CA WDS	Private landfill (non-public), Active Class III Solid Waste Landfill, Category C
29,31	Shell/ Equilon Enterprises LLC	899 Airport Blvd., South San Francisco	LUST Cortese	Gasoline leak, soil and other groundwater affected, MTBE detected, preliminary site assessment underway
31	Tosco – Facility #4524 / Unocal Service Station 4524	901 Airport Blvd., South San Francisco	LUST Cortese	Misc. motor vehicle fuels, other groundwater affected, MTBE detected, preliminary site assessment underway

**Table D.8-12. Hazardous Waste Sites Potentially Impacting the Modified Existing Underground 230 kV Alternative**

EDR Map ID <sup>2</sup>	Site Name	Site Address	Database Lists <sup>3</sup>	Comments
33	Chiltern Development Corp. (formerly US Steel Corp. Shearwater Project)	105 Oyster Point Blvd., South San Francisco	REF Cortese	Site Mitigation and Brownfields Reuse Program, referred to RWQCB, site sampling results indicated high Cr, Ni, Zn, and P
35,36, Orphan	Homart Development Corp. (former Bethlehem Steel and Edwards Wire Rope Co.)/US Steel Shearwater Site	Oyster Point Blvd and Gateway Blvd (also 430 and 480 Industrial Way), South San Francisco	DEED VCP CA Bond Exp. Plan CERC-NFRAP Cal-Sites	Deed restrictions, Voluntary Cleanup Program – Site Mitigation and Brownfields Reuse Program. Removed and disposed of equipment and above-ground structures, placed minimum 1-foot permeable clean compacted soils over affected parcels. Contamination consolidated onto fewer parcels and redevelopment took place on cleaned parcels, deed restrictions removed, remain on Parcels 4 and 5 of Lot 9 and Parcel 1 of Lot 1. (2000) Lots 1 and 9 contain slag and PCB concentrations less than 50 ppm.
37	Blue Line Transfer Station (San Mateo County Environmental Health?)	180 Oyster Point Blvd., South San Francisco	LUST SWF/LF	Gasoline leak, soil and other groundwater affected, MTBE detected, Preliminary Site Assessment underway. Large volume transfer/processing facility accepting the following types of waste: construction /demolition, industrial, mixed municipal, and tires
39	Oyster Point Inter(change) Area 1 / Caltrans Oyster Point Overcrossing	Highway 101 at Oyster Point Blvd., South San Francisco	NFA (DTSC) CHMIRS CA WDS	Site is about a half-mile stretch adjacent to Hwy 101. Onsite soil contaminated with lead, copper, zinc, and petroleum hydrocarbons. Caltrans removed contaminated soil from a ditch draining into SF Bay, soils were stockpiled and sampled. One pile contained lead just over 1000 ppm and petroleum hydrocarbons. Contaminated soils were removed offsite for disposal
41	Bressie & Company	600–790 Dubuque Ave., South San Francisco	Cortese	Leaking underground storage tanks, material and media affected not listed.
82	Budget Rent-A-Car Systems, Inc.	177 South Airport Blvd., South San Francisco	LUST Cortese	1993: Misc. Motor vehicle fuels leak, soil and other groundwater affected, MTBE detected, No Action Taken. 1994: Gasoline leak, soil and other groundwater affected, MTBE detected, leak being confirmed.
87	Shell Oil / Ron's Shell Service / Equilon Enterprises LLC	140 Produce Ave., South San Francisco	LUST Cortese	Diesel leak, soil and other groundwater affected, MTBE detected, Preliminary Site Assessment underway.
44	Federal Express	900 Gateway Blvd	LUST Cortese	Misc. motor vehicle fuels leak, soil and other groundwater affected, MTBE detected, approve Remedial Action Plan.
52	Gallo Sales Co. / Matagrano Inc.	440 Forbes Blvd., South San Francisco	LUST Cortese.	Misc. motor vehicle fuels leak, soil and other groundwater affected, MTBE detected, Remedial action underway.
63	Olympian Oil Co	190 East Grand Avenue, South San Francisco	LUST	Unknown type of leak, other groundwater affected, approve Remedial Action Plan.
64	Folmer Associates / South San Francisco Tire Service / Golden Gate Shell	114 Harbor Way, South San Francisco	LUST Cortese	1994: soil and other groundwater affected, Post Remedial Action monitoring. 1995, Gasoline leak, soil and other groundwater affected, MTBE detected, Remedial Action underway,

**Table D.8-12. Hazardous Waste Sites Potentially Impacting the Modified Existing Underground 230 kV Alternative**

EDR Map ID <sup>2</sup>	Site Name	Site Address	Database Lists <sup>3</sup>	Comments
66	(Proposed) Caltrans South San Francisco Maintenance Station / Vacant Lot (former Western Drum)	166 Harbor Way, South San Francisco	CHMIRS, Cortese, VCP	2.1-acre vacant lot formerly occupied by sheet steel mill and galvanizing plant, an insulating material manufacturer, and scrap car compacting yard. Soil contaminated with petroleum hydrocarbons, soluble lead, copper, mercury, and zinc. Groundwater detected arsenic, barium, and lead. Caltrans completing site investigation.
75	Gateway Texaco / Olympian Oil Co – Texaco Carwash	176 Gateway Blvd., South San Francisco	LUST.	Gasoline leak, soil and other groundwater affected, MTBE not tested, Preliminary Assessment Workplan submitted.
81	Avis Car Rental	230 Harbor Way, South San Francisco	LUST Cortese.	Waste oil leak, soil and other groundwater affected, MTBE detected, Preliminary Site Assessment underway.
86	South San Francisco Sewage Pump Station #4	249 Harbor Way, South San Francisco	LUST Cortese	Diesel leak, soil and other groundwater affected, MTBE detected, Preliminary Site Assessment underway.
89	Ken Funk Property / General Rent-A-Car (lessee) / Bayshore Self Serve	264 South Airport Blvd., South San Francisco	Cortese	Leaking UST, unknown material and media affected.

Source: PG&E, 2002; associated EDR Database; and EDR Area/Corridor Study, Number 0977098.2s.

<sup>1</sup> Focus map numbers and EDR Map ID numbers in italics are from supplemental EDR Area/Corridor Study, Number 0977098.2s.

<sup>2</sup> LUST databases include State, RWQCB and County agencies.

### Comparison to Proposed Route Segment

The corresponding segments of the Proposed Route would be the entire length of the BART ROW and the Colma to Martin Substation segment. The proposed segments would pass through a mix of residential, commercial and light industrial properties, whereas the Modified Existing 230 kV Underground Alternative passes through primarily industrial and commercial areas with small pockets of residential development. Along the Proposed Project segments, 27 environmentally contaminated sites are located within 0.25 miles, whereas 33 sites exist along the Modified Existing 230 kV Alternative route. While the contaminated sites along both the alignments are predominantly gasoline or motor vehicle fuel leaking from underground tanks, there are several severely contaminated sites along the alternative route that have been contaminated with various constituents, including petroleum products and heavy metals.

### D.8.6 Environmental Impacts of the No Project Alternative – Contamination and Hazardous Materials

Options under the No Project Alternative scenario that are related to energy management would not have any effect of environmental contamination. Installation of new generation facilities (four gas turbines proposed by the CCSF) could potentially result in excavation of contaminated soil and/or groundwater, resulting exposure of workers and the public to hazardous materials. Locations for the new turbines could have existing soil or groundwater contamination, which would be encountered during construction excavation. In addition, the planned removal of the Hunters Point Power Plant would require follow-up evaluation of the site for contamination. The amounts and types of contaminated soil and groundwater are difficult to anticipate without further evaluation of proposed new turbine locations, therefore comparison of the impacts of environmental contamination for the new generation facilities and the Proposed Project is difficult.

## D.8.7 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 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 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.8.7.2 and D.8.8.

### 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 am 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.

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.8.7.1 EMF in the Proposed Project Area**

The Proposed Project consists of the installation of a new 27-mile 230 kV transmission line with overhead and underground segments, a new transition station where the line would change from overhead to underground, and modifications to a number of existing substations. The proposed transmission line would pass through both developed and undeveloped lands. The developed areas include significant residential and commercial development while the undeveloped areas include open space or park lands such as the SFPUC's Peninsula Watershed.

Public exposure to EMFs in developed areas is widespread and encompasses a very broad range of field intensities and durations. In developed areas, EMFs are prevalent from the use of electronic appliances or equipment and existing electric power lines. In general distribution lines exist throughout developed portions of the community and represent the predominant source of public exposure to power line EMF. Transmission lines are much less prevalent in most developed areas and therefore they generally represent a much lower contribution to overall public exposure to power line EMF. In undeveloped and natural areas, only low level naturally occurring EMFs exist. Measurable EMFs are not present except in the vicinity of existing power line corridors.

As a baseline for comparison, electric and magnetic fields were modeled by PG&E for both the existing overhead 60 kV lines and the Proposed Project (see Appendix 3 for modeling results). The key inputs to modeling of EMF are the line voltage and the line current. This modeling used the amount of current projected to occur in 2006 under normal peak load conditions for calculations of the magnetic field levels. The modeling of EMF is used to identify the maximum field strength under a "peak current" scenario. The modeled currents are estimated to occur less than 100 hours a year (1% of the time). The modeling also presents the magnetic field where the conductor is closest to ground. As a result, in level terrain approximately two-thirds of the length of any given span between two towers would have a lower magnetic field level than the modeled figure (the field level being lowest at each tower where conductors are highest off the ground). Note that the results of EMF modeling are the instantaneous field strength

under specific voltage and current conditions, while much of the research related to EMF and public health effects uses an estimated Time Weighted Average (TWA) that considers the variation in field intensity and duration of exposure.

### **Overhead Transmission Line Segment**

The 14.7-mile overhead portion of the transmission line would be installed by rebuilding PG&E's existing 60 kV double-circuit line from Jefferson Substation to the transition station near San Bruno Avenue and Glenview Drive to include one 60 kV line and the new 230 kV line. Land use along the Proposed Project route is described in detail in Section D.2, Land Use. There are three main areas where the route of the proposed overhead segment passes immediately west of residential developments: from Ralston Substation to Hillsdale Junction Substation (adjacent to the unincorporated San Mateo area known as "The Highlands"), from San Mateo Creek to the Carolands Substation (adjacent to the Town of Hillsborough), and from the Transposition Tower, in the Crystals Springs Golf course, to the Millbrae Tap (adjacent to the City of Burlingame). Where the overhead transmission segment is proposed adjacent to residential areas the line generally follows the eastern edge of SFPUC Watershed Lands, along the western edge of residential lots.

In addition to these residential areas, the existing line (and proposed route) passes through undeveloped lands used for recreational purposes including the Crystal Springs Golf Course, along the bike/jogging path that is parallel to Cañada Road and Skyline Boulevard and within the watershed, and near the Sawyer Camp Trail. Two schools would be passed along the overhead route segment: Hillcrest Juvenile Detention (San Mateo County, east of the Ralston Substation) and Nueva School (in the Town of Hillsborough on the opposite side of I-280 from the route).

The existing environment in all of these areas includes EMFs from PG&E's existing double-circuit 60 kV line. Within residential developments the existing environment includes EMF from a number of sources including the use of electrical appliances and equipment, ground currents in residential water pipes and the electric distribution circuits that serve the residences. Power line fields are typically at the front of residential lots where overhead or underground distribution lines are routed. The EMF from distribution circuits can vary widely in the community depending upon the number of phases and whether the circuit is overhead or underground. A typical 12.5 kV overhead distribution line with 300 amps current can result in magnetic fields of 22 mG below the line dropping to 15 mG at 20 feet from the line and 8 mG at 40 feet. EMF from the same distribution line if placed underground will vary from 56 mG above the line dropping to 10 mG 20 feet from the line and 5 mG at 40 feet (Washington State Electric Transmission Research Needs Task Force, 1992).

### **Underground Transmission Line Segment**

The 12.4-mile underground portion of the transmission line would be installed in duct banks within BART right-of-way and below city streets. The existing environment within the BART right-of-way includes magnetic fields from the operation of the underground light rail system. These fields are highly dependent on the configuration of the train power system and are typically localized, transient, and associated with the passage of trains. City streets can be expected to have magnetic fields in areas directly above existing underground electric distribution lines or in the vicinity of existing overhead distribution lines. The majority of the underground portion of the transmission line would be located within major arterials that have limited other underground electric lines. The areas with existing underground electric

lines include short segments on San Bruno Avenue near the I-280 crossing, on Hillside from F Street to Hoffman, on Hoffman, and on Guadalupe from Orange to Bonnie. The existing environment is expected to include magnetic fields only in these areas with existing underground distribution lines. The field from underground distribution circuits will vary depending upon the line's current, arrangement of the phases, and the burial depth.

The majority of the underground route segment would pass through commercial areas. However, there are a few residential areas west of Hillside Drive in the Town of Colma, and along Hoffman Drive and Orange Avenue in Daly City. According to PG&E's PEA, the underground portion of the proposed route would also pass several schools:

- Day Care Center (San Bruno)
- El Camino High School (South San Francisco)
- South San Francisco High School (South San Francisco)
- Day Care Center (South San Francisco)
- John F. Kennedy Elementary School (Daly City)
- Pollicita Middle School (Daly City)
- Colma Elementary School (Daly City).

### **Existing Substations and Transition Station**

The environment around existing substations includes EMFs with magnetic fields that are predominated by the fields from the transmission and distribution lines that enter or exit the substations. The environment at the location of the new transition station includes minimal, if any, EMFs, as this site is currently a vacant lot without any overhead or underground power lines.

#### **D.8.7.2 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.

#### **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.

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. Underground transmission lines are susceptible to ground motion and displacements that may occur under earthquake loading. Earthquake conditions could result in damage or faults to underground transmission lines. The proposed underground transmission line segment uses solid dielectric cable, which does not present the environmental or fire hazards that may be associated with oil-filled cable types.

Electrical arcing from power lines can represent a fire hazard. This phenomenon is more prevalent for lower voltage distribution lines since these lines are typically on shorter structures and in much greater proximity to trees and vegetation. Fire hazards from high voltage transmission lines are greatly reduced through the use of taller structures and wider right-of-ways. Further, transmission line right-of-ways are cleared of trees to control this hazard. Fire hazards due to a fallen conductor from an overhead line or ruptured underground cable are minimal due to system protection features. Both overhead and underground 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.8.7.3 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 20 years; however, much of the body of national and international research regarding EMF and public health risks remains contradictory or inconclusive.

Extremely low frequency (ELF) fields are known to interact with tissues by inducing electric fields and currents in these fields. However, the electric currents induced by ELF fields commonly found in our environment are normally much lower than the strongest electric currents naturally occurring in the body such as those that control the beating of the heart<sup>1</sup>.

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.

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

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

Research on ambient magnetic fields in homes and buildings in several western states found average magnetic field levels within most rooms to be approximately 1 mG, while in a room with appliances present, the measured values ranged from 9 to 20 mG (Severson et al., 1988, and Silva, 1988). Immediately adjacent to appliances (within 12 inches), field values are much higher, as illustrated in Tables D.8-13 and D.8-14. These tables indicate typical sources and levels of electric and magnetic field exposure the general public experiences from appliances.

### 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 right of way (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.8-13. 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.

**Table D.8-14. Magnetic Field From Household Appliances**

Appliance	Magnetic Field (mG)	
	12" Distant	Maximum
Electric range	3 to 30	100 to 1,200
Electric oven	2 to 25	10 to 50
Garbage disposal	10 to 20	850 to 1,250
Refrigerator	0.3 to 3	4 to 15
Clothes washer	2 to 30	10 to 400
Clothes dryer	1 to 3	3 to 80
Coffee maker	0.8 to 1	15 to 250
Toaster	0.6 to 8	70 to 150
Crock pot	0.8 to 1	15 to 80
Iron	1 to 3	90 to 300
Can opener	35 to 250	10,000 to 20,000
Mixer	6 to 100	500 to 7,000
Blender, popper, processor	6 to 20	250 to 1,050
Vacuum cleaner	20 to 200	2,000 to 8,000
Portable heater	1 to 40	100 to 1,100
Fan/blower	0.4 to 40	20 to 300
Hair dryer	1 to 70	60 to 20,000
Electric shaver	1 to 100	150 to 15,000
Color TV	9 to 20	150 to 500
Fluorescent fixture	2 to 40	140 to 2,000
Fluorescent desk lamp	6 to 20	400 to 3,500
Circular saw	10 to 250	2,000 to 10,000
Electric drill	25 to 35	4,000 to 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 [*italics 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, 1990) for electric and magnetic field exposures. For the general public, the limits are 4.2 kV/m for electric fields, and 830 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 right-of-way (ROW) as well as at the edge of the ROW and cover a broad range of values. Table D.8-15 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 of these individual actions has been varied, with some initiated by regulators at the time of new transmission line proposals within their community, and some by public grass-roots efforts.

### ***CPUC Guidelines***

In 1991, the CPUC initiated an investigation into 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

**Table D.8-15. 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	Under consideration	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

or no-cost” mitigation measures for facilities requiring certification under General Order 131-D<sup>2</sup>. 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.

The no-cost/low-cost mitigation requirements were to be applied to new and reconstructed facilities and are applicable to the Jefferson-Martin 230 kV Transmission Project. (See Appendix 3, PG&E’s Preliminary Transmission EMF Management Plan.)

<sup>2</sup> 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.”

### D.8.7.4 Consideration of Electric and Magnetic Fields (EMFs)

As discussed in Section D.8.7.3, 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 as a CEQA issue and no impact significance is presented. This information is presented to allow understanding of the issue by the public and decisionmakers.

#### Proposed Project

##### *Overhead 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. For both the overhead and underground portions of the transmission line, these effects are anticipated to be localized.

The magnetic field levels calculated by PG&E have been reviewed and are considered to be accurate. These estimates are presented in Table D.8-16. Based on PG&E’s modeling data, Figures D.8-1a through D.8-1c illustrate how field strengths would vary with distance from the transmission line for the three line portions of the overhead segment listed in Table D.8-16. The comparison is of the magnetic fields from the existing 60 kV lines with those of the Proposed Project<sup>3</sup>.

Portions of the proposed overhead line segment would result in increased EMF at the edge of the 100-foot right-of-way. Along the residential areas to the east of the line between Ralston Substation and Hillsdale Junction Substation the maximum magnetic field increases by 1 mG (from 7 mG to 8 mG), between San Mateo Creek to Carolands Substation the maximum magnetic field increases by 10 mG (from 3 mG to 13 mG) and in the Burlingame area near Milepost (MP) 10, the maximum magnetic field increases 10 mG, from 5 mG to 15 mG.

**Table D.8-16. Baseline and Expected Magnetic Fields: Overhead Segment**

Geographic Area	Baseline Magnetic Fields			Magnetic Fields with Proposed Project		
	Maximum in ROW	50 feet from centerline		Maximum in ROW	50 feet from centerline	
		East side: 60 kV	West side: 60 kV		East side: 60 kV	West side: 230 kV
Ralston Substation To Hillsdale Junction Substation. (Towers 5/27 to 6/35)	22 mG	7 mG	3 mG	29 mG	8 mG	19 mG
San Mateo Creek to Carolands Substation (Towers 6/38 to 8/51)	16 mG	3 mG	6 mG	35 mG	13 mG	23 mG
Burlingame (Towers 9/62 to 10/69)	18 mG	5 mG	8 mG	42 mG	15 mG	27 mG

Source: January 2003 PG&E EMF Modeling.

Notes: Existing ROW is 50 feet wide; proposed ROW is 100 feet wide. Data is presented at 50 feet from centerline to allow comparison of the field levels for the existing line with proposed field levels. Maximum in ROW would be magnetic field levels in the center of the ROW.

<sup>3</sup> All data presented in these graphs is based on PG&E modeling of currents projected to occur at 2006 peak load.



Figure D.8-1a. Magnetic Field Levels: Ralston to Hillsdale

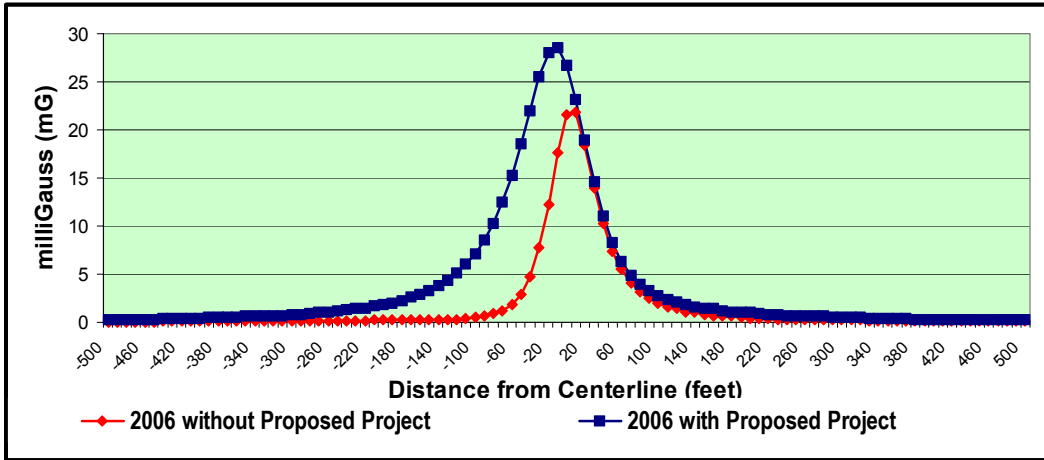


Figure D.8-1b. Magnetic Field Levels: Crystal Springs to Carolands

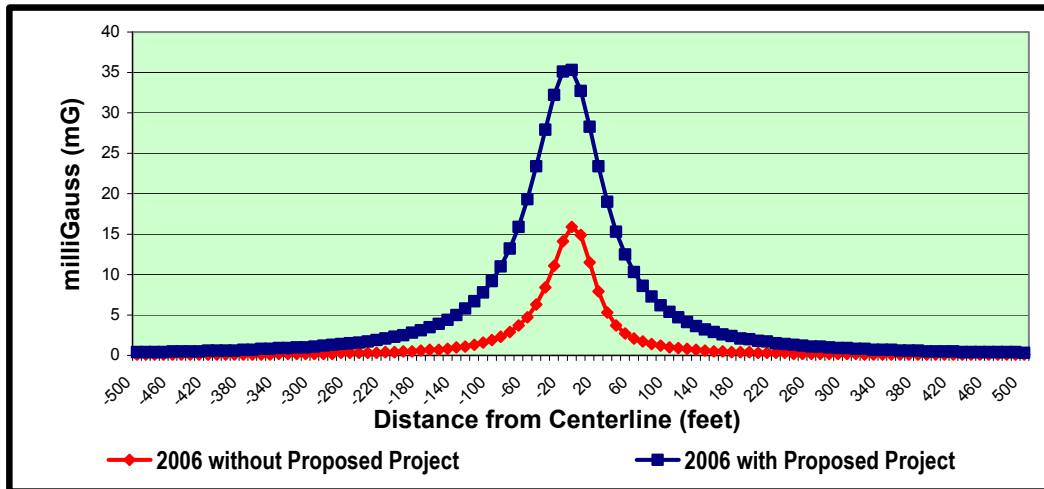
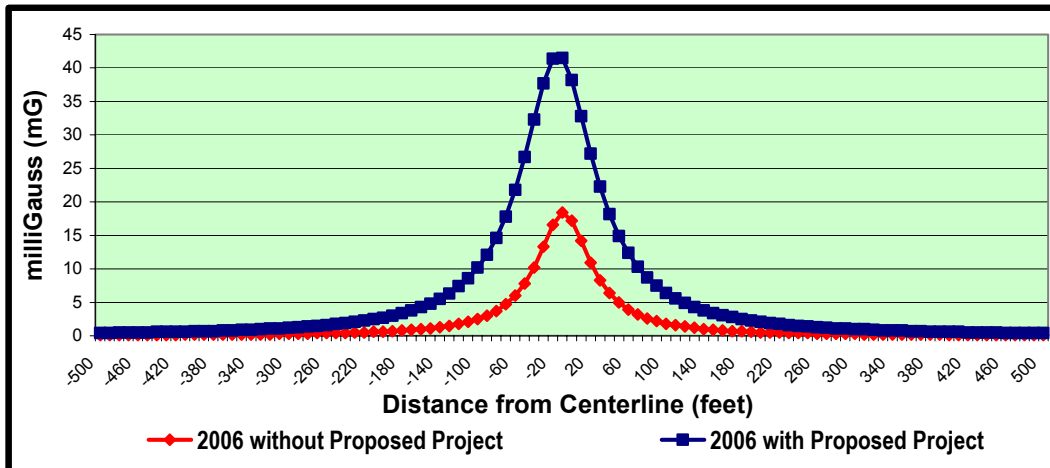


Figure D.8-1c. Magnetic Field Levels: Burlingame

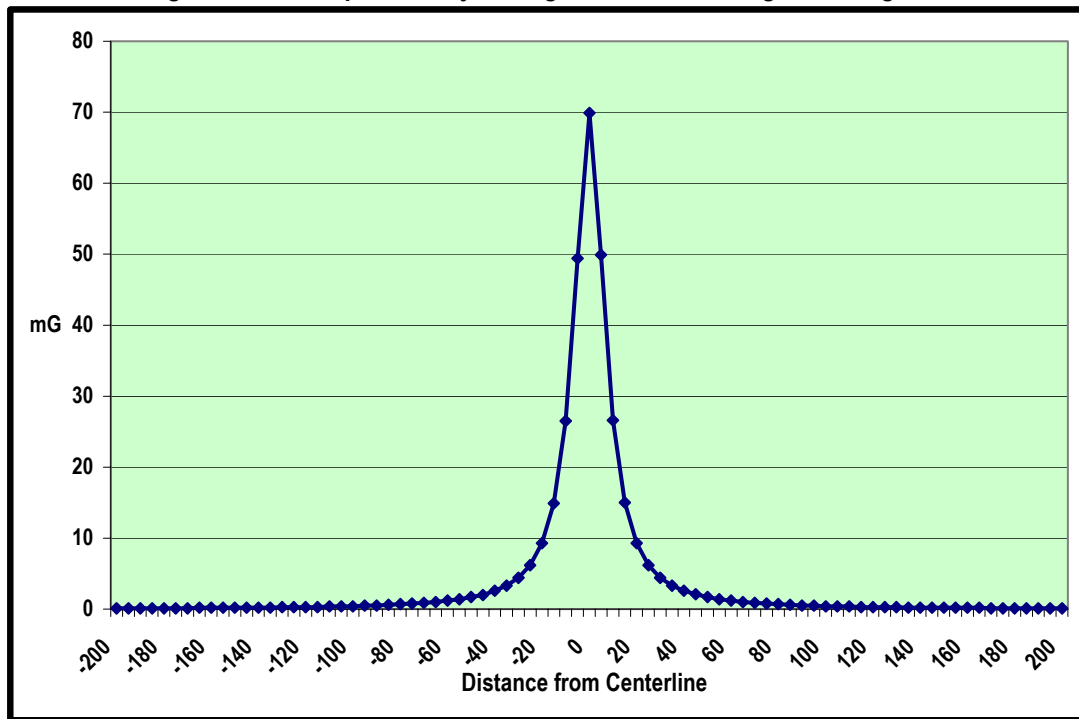


### Underground Segment

For the underground segment of the proposed transmission line, the EMF levels would also be variable depending on location. Figure D.8-2 illustrates generalized field strengths of an underground 230 kV transmission line.

The magnetic field from buried transmission lines depends greatly on the type of construction. As shown in Figure D.8-2, magnetic fields would be higher for underground cables than for overhead transmission lines, because immediately above the underground cable the field source is only a few feet from the ground surface. With overhead conductors, the conductors are much further from the ground surface. However, due to the close spacing of the underground cables, the magnetic field is more concentrated near underground transmission cables and decreases more rapidly with distance from the cable, resulting in a greatly reduced width of exposure to magnetic fields compared with overhead portions of the line.

Figure D.8-2. Proposed Project Magnetic Field: Underground Segment



As illustrated in Figure D.8-2, for the underground portion of the proposed transmission line, the magnetic field calculated by PG&E would vary from approximately 70 mG directly above the cables, diminishing to 15 mG at 15 feet from the line. The underground line would be placed in roadways and would generally be approximately 20 feet from the sidewalk. Since the majority of the existing environment along the underground route does not include EMF from power lines, the magnetic field exposure of the Proposed Project would be:

- Within roadways, the exposure of the driving public to magnetic fields would range from 70 mG to 15 mG depending on distance from the cable.
- On sidewalks, pedestrian exposure would be about 9 mG (assuming a 20-foot distance from the cable to the sidewalk).

### ***Proposed Transition Station***

The proposed transition station would be located at the corner of San Bruno Avenue and Glenview Drive in the City of San Bruno. The parcel is currently vacant, and there are no immediately adjacent land uses. EMF concerns would arise primarily from the underground cables leaving the transition parcel; as the cables cross the sidewalk and turn into San Bruno Avenue. Magnetic field levels at the sidewalk would be approximately 70 mG, as illustrated in Figure D.8-2. These levels could be reduced with deeper burial of the underground line, but this is not an area where PG&E has proposed implementation of no-cost/low-cost mitigation.

### **PG&E's Proposed EMF Mitigation**

In accordance with CPUC Decision D.93-11-013, PG&E 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 PG&E. PG&E's Transmission and Substation EMF Design Guidelines (see Appendix 3) include the following measures that may be available to reduce the magnetic field strength levels from electric power facilities:

- Increase distance from conductors and equipment
- Reduce conductor spacing
- Minimize current
- Optimize phase configuration

PG&E's EMF mitigation strategy prioritizes land uses based on their sensitivity, then allocates the CPUC's guideline of 4% of project cost to each land use type, until all potential mitigation funds are expended. PG&E applies these mitigation funds to transmission line projects based on the adjacent land uses, according to the following priority list:

- |                          |   |
|--------------------------|---|
| 1. School or Daycare     | 5. Agricultural/Rural                                 |
| 2. Residential           | 6. Undeveloped Land (zoned for residential)           |
| 3. Commercial/Industrial | 7. Undeveloped Land (zoned for commercial/industrial) |
| 4. Recreational          | 8. Unpopulated, Forested, Government Owned Land       |

In the case of the Jefferson-Martin 230 kV Project, for the proposed overhead segment PG&E has incorporated an optimized phase configuration as a no-cost design measure to mitigate EMF levels.

In the vicinity of schools in the overhead segment (Hillcrest Juvenile Detention, San Mateo, and Nueva School, Hillsborough), PG&E proposes installing 20-foot taller structures as a low-cost EMF mitigation measure. This would result in EMF levels being reduced from 30.6 mG to 17.3 mG. PG&E also proposes to optimize phase configuration along the overhead route. Phase optimization is a “no cost” mitigation in which the order of the three vertically stacked conductors (phases) making up each circuit would be reversed periodically along the route in order to reduce magnetic field emissions. This mitigation results in about a 43.5% reduction in magnetic field emissions.

In the underground segment, PG&E identified seven schools adjacent to the ROW (see list in Section D.8.7.1 above) and proposes burying the cables five feet deeper adjacent to each of these schools as a low-cost EMF mitigation measure. Phase configuration would also be optimized along the underground route segment.

The costs of mitigation near schools (the taller structures for the overhead segment and deeper burial for the underground segment) would use all of the available EMF mitigation funds based on the 4%

guideline. Therefore, no additional low-cost EMF mitigation is proposed by PG&E for residential, commercial, or recreational land uses along the proposed route. According to Section VII of PG&E's Transmission Line EMF Guidelines (see Appendix 3), the following additional options could be implemented:

- **Increase distance from conductors.** This can be accomplished by (a) locating lines further from receptors, (b) restricting access to rights-of-way, (c) increasing width of rights-of-way, (d) increasing the distance of the conductor from the ground (by using taller towers or by reducing conductor sag), and by increasing the burial depth of underground transmission lines. As described above, PG&E is proposing to implement (d) adjacent to schools as part of its low-cost mitigation.
- **Reduce conductor spacing.** The magnetic field from each of the three conductors making up one circuit cancels fields from the other conductors, resulting the total field strength. Underground conductors can be placed closer together than overhead lines (where spacing is also governed by reliability and safety considerations).
- **Minimize current.** Because magnetic field strength is directly proportional to the magnitude of the current flowing in the conductor, PG&E could reduce current in conductors. Current varies depending on demand, so reducing current and still providing required service is not always an option.
- **Change phase configuration.** Magnetic fields can be reduced by establishing "cross phasing" in which each of the two circuits on a double-circuit line. PG&E is proposing this configuration for the overhead transmission line.

### **EMF Issues Applicable to Alternatives**

The alternatives evaluated in this EIR would involve similar levels of EMFs to those described above for the Proposed Project. With the exception of the Partial Underground Alternative which would affect only the receptors already affected by the proposed route, all alternatives are underground. The EMF field levels illustrated in Figure D.8-2 would be relevant to all underground alternatives: field levels directly over the buried cables would be as high as 70 mG, dropping to about 8 or 9 mG at sidewalks (or at the edge of the roadway in the case of the portions of PG&E Route Option 1B Alternative where there are no sidewalks)

### **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. Most 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 California Public Utilities Commission has implemented a decision requiring utilities to incorporate "low-cost" or "no-cost" measures for managing EMF from power lines. PG&E's proposed project does incorporate low-cost and no-cost measures as mitigation for magnetic fields. The preceding information and other potential additional mitigation measures are provided for the benefit of the public and decision makers in reviewing the Proposed Project.

## **D.8.8 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 Jefferson-Martin 230 kV Transmission Project: corona; induced current; electronic equipment interference; wind, fire, and earthquake hazards; and effects on cardiac pacemakers.

### **D.8.8.1 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.

#### **Cardiac Pacemakers**

It has been reported that synchronous pacemakers can be affected by electric fields between 2 kV/m and 9 kV/m (EPRI, 1985; 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 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.

### **D.8.8.2 Environmental Impacts and Mitigation Measures for the Proposed Transmission Line**

#### **Impact PS-1: Radio and Television Interference**

Corona or gap discharges related to high frequency radio and television interference impacts are dependent upon several factors including the strength of broadcast signals and is 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** 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** After energizing the transmission line, PG&E 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 PG&E to the CPUC for resolution.

### **Impact PS-2: Induced Currents and Shock Hazards in Joint Use Corridors**

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

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

### **Impact PS-3: Effects on Cardiac Pacemakers**

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**

As described in Section D.8.7.2, these hazards are addressed in project design. PG&E 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.8.8.3 Environmental Impacts and Mitigation Measures for Alternatives**

As described above, EMF is not evaluated as an environmental impact under CEQA, so an analysis of alternatives is not presented for that issue. For the other 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.8.8.2 would apply equally to all alternatives.

### **D.8.8.4 Environmental Impacts of the No Project Alternative**

The No Project Alternative would involve upgrades to various existing PG&E facilities and the potential construction of new generation within the CCSF. Impacts related to induced current, cardiac pacemakers, electronic interference, and other hazards could also result from components of the No Project Alternative scenario. The impacts would be similar to those of the Proposed Project, but the location and magnitude would vary depending on the design of the No Project Alternative components.

## **D.8.9 Mitigation Monitoring, Compliance, and Reporting Table**

Tables D.8-17 present 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.8-17. Mitigation Monitoring Program - Public Health and Safety

Impact	Mitigation Measure	Location	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
PS-1: Radio and Television Interference (Class II)	PS-1a: 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.	Entire ROW	CPUC to review design	Design limits noise and interference with electrical equipment	CPUC	Before construction
	PS-1b: After energizing the transmission line, PG&E 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 PG&E to the CPUC for resolution.	Entire ROW	CPUC to review records	Complaint resolution eliminates interference problems	CPUC	During operation
PS-2: Induced Currents and Shock Hazards in Joint Use Corridors (Class II)	PS-2a: As part of the siting and construction process for the Proposed Project, PG&E shall identify objects (such as fences, conductors, and pipelines) that have the potential for induced voltages and work with the affected parties to determine proper grounding procedures (CPUC G095 and the NESC do not have specific requirements for grounding). PG&E shall install all necessary grounding measures prior to energizing the line. Thirty days prior to energizing the line, PG&E shall notify in writing, subject to the review and approval of the CPUC, all property owners within and adjacent to the Proposed Project ROW of the date the line is to be energized. The written notice shall provide a contact person and telephone number for answering questions regarding the line and guidelines on what activities should be limited or restricted within the ROW. PG&E shall respond to and document all complaints received and the responsive action taken. These records shall be made available to the CPUC for review upon request. All unresolved disputes shall be deferred by PG&E to the CPUC for resolution.  The written notice shall describe the nature and operation of the line, and the Applicant's responsibilities with respect to grounding all conducting objects. In addition, the notice shall describe the property owner's responsibilities with respect to notification for any new objects, which may require grounding and guidelines for maintaining the safety of the ROW.	Entire length of transmission line	Review notification	Notification allows negotiation to eliminate potential problems during operation	CPUC	Before operation



Table D.8-17. Mitigation Monitoring Program - Public Health and Safety (cont.)

Impact	Mitigation Measure	Location	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
HAZ-2: Contaminated soil and/or groundwater encountered during construction could result in exposure of workers or the public to hazardous materials (Class II)	<b>HAZ-2a: Conduct Phase II Investigation.</b> A Phase II investigation shall be conducted for the project prior to commencement of construction activities. The investigation shall include a review of current status of listed contaminated sites, including limits of contamination, and collection of samples for laboratory analysis and quantification of contaminant levels within the proposed excavation and surface disturbance areas of the project prior to the start of construction. Soil sampling and laboratory testing shall be conducted at locations along the project route, transition station site, and at substations where known contaminated sites are within 0.25 miles of the alignment. Subsurface investigation shall determine appropriate worker protection and hazardous material handling and disposal procedures appropriate for the subject area. Areas with contaminated soil and/or groundwater determined to be hazardous waste shall be removed by personnel who have been trained through the OSHA recommended 40-hour safety program (29CFR1910.120) with an approved plan for groundwater extractions, soil excavation, control of contaminant releases to the air, and off-site transport or on-site treatment. Results shall be reviewed and approved by the San Mateo County's Environmental Health Division and/or DTSC prior to construction. A copy of the DTSC or County Environmental Health Division approval letter must be provided to the CPUC prior to start of construction.	All contaminated sites as identified in Section D.8 tables.	Review environmental contamination report	Compare contaminant levels to appropriate threshold concentration levels and review adequacy of health and safety plan for existing contaminants.	CPUC, DTSC, and San Mateo County Environmental Health Division	Prior to construction
HAZ-2 (above)	<b>APM 11.1, Environmental Training and Monitoring Program:</b> An environmental training program will be established to communicate environmental concerns and appropriate work practices, including spill prevention, emergency response measures, and proper Best Management Practice (BMP) implementation, to all field personnel. The training program will emphasize site-specific physical conditions to improve hazard prevention (e.g. identification of potentially hazardous substances) and will include a review of all site-specific plans, including but not limited to, the Project's SWPPP, Erosion Control and Sediment Transport Plan, Health and Safety Plan, Waste Characterization and Management Plan, Fire Response Plan, and Hazardous Substances Control and Emergency Response Plan.  A monitoring program will also be implemented to ensure that the plans are followed throughout the period of construction. Best Management Practices, as identified in the Project SWPPP and	All contaminated sites as identified in Section D.8 tables.	Review environmental contamination report	Compare contaminant levels to appropriate threshold concentration levels and review adequacy of health and safety plan for existing contaminants.	CPUC, DTSC, and San Mateo County Environmental Health Division	Prior to and during construction

Table D.8-17. Mitigation Monitoring Program - Public Health and Safety (cont.)

Impact	Mitigation Measure	Location	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	Erosion Control and Sediment Transport Plan, will also be implemented during the Project to minimize the risk of an accidental release and provide the necessary information for emergency response.					
HAZ-2 (above)	<p><b>APM 11.4, Phase II Soil Sampling/Waste Characterization:</b> Soil sampling and potholing will be conducted along the Project route and in substations, as needed, before construction begins, and soil information will be provided to construction crews to inform them about soil conditions and potential hazards. If hazardous substances are unexpectedly encountered during trenching, grading, or excavating work, work will be stopped until the material is properly characterized and appropriate measures are taken to protect human health and the environment. If excavation of hazardous materials is required, they will be handled, transported, and disposed of in accordance with federal, State, and local regulations.</p> <p>Prior to initiating excavation activities and along the underground transmission-line routes, soil borings will be advanced to ensure that groundwater will not be encountered. The location, distribution, or frequency of such tests shall be determined to give adequate representation of the conditions in the construction area.</p> <p>All soil sampling and hazardous waste-removal and handling will be conducted in accordance with the Project's Health and Safety Plan.</p> <p><b>APM 11.8, Spill Prevention, Control, and Countermeasures:</b> PG&amp;E will prepare or update current Spill Prevention, Control, and Countermeasures (SPCC) plans for the transition station and each substation as appropriate, as outlined in Title 40 of the Code of Federal Regulations, Part 112.</p> <p>With respect to the substations, PG&amp;E will also update, as needed, and submit a revised Hazardous Materials Business Plan in accordance with Chapter 6.95 of the California Health and Safety Code and Title 22, California Code of Regulations. The plan and forms will be submitted to the appropriate Certified Unified Protection Agency (CUPA). The transition station, along with the existing substations, will be operated in compliance with all applicable federal, State, and local regulations.</p>	All contaminated sites as identified in Section D.8 tables.	Review environmental contamination report and observe construction activities.	Compare contaminant levels to appropriate threshold concentration levels and review adequacy of health and safety plan for existing contaminants.	CPUC, DTSC, and San Mateo County Environmental Health Division	Prior to and during construction

Table D.8-17. Mitigation Monitoring Program - Public Health and Safety (cont.)

Impact	Mitigation Measure	Location	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
HAZ-3: Unexpected soil and or ground-water contamination could be encountered during grading or excavation, resulting in exposure of workers or the public to hazardous materials (Class II)	<b>HAZ-3a: Contaminated Groundwater or Soils.</b> The procedures described in APM 11.4 (soil sampling and characterization) shall be followed. In addition, the CPUC, SFPUC (for areas within the Peninsula Watershed), and the RWQCB shall be provided with all pre-construction soil and groundwater sampling and testing information prior to initiation of construction. In the event contaminated groundwater or soils are encountered, these same agencies shall be provided with the proposed extraction and disposal plans for approval prior to further construction in those areas.	Along all alignments except the Jefferson Substation to Ralston Substation segment and the Ralston Substation to Carolands Substation segment.	Coordinate with monitoring personnel to confirm appropriate training and understanding of testing equipment, review weekly reports prepared by monitoring personnel.	Conduct periodic site visits during construction to confirm that proper procedures are being implemented.	CPUC, DTSC, and San Mateo County Environmental Health Division	During construction
	<b>HAZ-3b: Observe Exposed Soil.</b> During trenching, grading, or excavation work for the project, the contractor shall observe the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during construction, the contractor shall stop work until the material is properly characterized and appropriate measures are taken to protect human health and the environment. The contractor shall comply with the all local, State, and federal requirements for sampling and testing, and subsequent removal, transport, and disposal of hazardous materials.	Along all alignments except the Jefferson Substation to Ralston Substation segment and the Ralston Substation to Carolands Substation segment.	Coordinate with monitoring personnel to confirm appropriate training and understanding of testing equipment, review weekly reports prepared by monitoring personnel.	Conduct periodic site visits during construction to confirm that proper procedures are being implemented.	CPUC, DTSC, and San Mateo County Environmental Health Division	During construction
HAZ-3 (above)	<b>APM 11.2, Hazardous Substance Control and Emergency Response Plan:</b> PG&E will prepare a Hazardous Substance Control and Emergency Response Plan, which will include preparations for quick and safe cleanup of accidental spills. This plan will be submitted with the grading permit application. It will prescribe hazardous-materials handling procedures for reducing the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted. These directions and requirements will also be reiterated in the Project SWPPP.  <b>APM 11.3, Emergency Spill Supplies and Equipment:</b> Oil-absorbent material, tarps, and storage drums will be used to contain and control any minor releases. Emergency-spill supplies and equipment will be kept adjacent to all areas of work and in staging areas, and will be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials will be provided in the Project's Hazardous Substances Control and Emergency Response Plan.	In all construction areas	Review plans; ensure that appropriate equipment is maintained	Contamination is cleaned up as required.	CPUC, DTSC, and San Mateo County Environmental Health Division	Before and during construction

Table D.8-17. Mitigation Monitoring Program - Public Health and Safety (cont.)

Impact	Mitigation Measure	Location	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	<p><b>APM 11.5, Groundwater Characterization:</b> If suspected contaminated groundwater is encountered in the depths of the proposed construction areas, samples will be collected and submitted for laboratory analysis of petroleum hydrocarbons, metals, volatile organic compounds, and semi-volatile organic compounds. If necessary, groundwater will be collected during construction, contained, and disposed of in accordance with all applicable regulations. Appropriate personal protective equipment will be used and waste management will be performed in accordance with applicable regulations. Non-contaminated groundwater will be released to one of the cities' stormwater drainage systems (with prior approval) or contained, tested, and disposed of by methods described above.</p> <p>Appropriate personal protective equipment will be used during groundwater testing and dewater removal, and waste management and disposal will be performed in accordance with local, State, and federal regulations and per the Project's Health and Safety Plan and Waste Management Plan.</p>					
<p><b>HAZ-4:</b> Release of hazardous materials during operation at transition station or substations (Class II).</p>	<p><b>HAZ-4a: Documentation of Compliance.</b> PG&amp;E shall implement APMs 11.1 and 11.8 at the transition station and at substations, and shall document compliance by (a) submitting to the CPUC for review and approval an outline of the proposed Environmental Training and Monitoring Program, (b) providing a list of names of all construction personnel who have completed the training program, and (c) providing a copy of the Spill Prevention, Control, and Countermeasures Plan to the CPUC for review and approval at least 60 days before the start of construction.</p>	Substations and transition station	Review documentation provided; verify training of all construction personnel; review SPCCP	Personnel are trained and appropriately respond to accidents or discoveries of hazardous materials	CPUC, DTSC, and San Mateo County Environmental Health Division	Before and during construction