# 4.7 HAZARDS AND HAZARDOUS MATERIALS

This Section describes the environmental setting and impacts related to hazards and hazardous materials. For the purposes of this analysis, the term "hazards" refers to risk associated with such issues as fires, explosions, exposure to hazardous materials and interference with emergency response plans, etc. Information in this Section is based on Environmental Site Assessments prepared by Hanover Environmental Services, Inc. in June and August 2008 (Appendix H-1 and H-2) and on the System Safety and Risk of Upset Report prepared by EDM Services, Inc. in April 2009 (Appendix H-3).

The term "hazardous material" is defined in different ways for different regulatory programs. For this analysis, "hazardous material" is defined by the California Health and Safety Code, section 25501: "because of their quantity, concentration, or physical or chemical characteristics, (they) pose a significant present or potential hazard to human health and safety or to the environment if release into the workplace or the environment."

"Hazardous waste" is a subset of hazardous materials. For this analysis, "hazardous waste" is defined by the California Health and Safety Code, section 25517, and in the California Code of Regulations, Title 22, section 66261.2: "because of their quantity, concentration, or physical or chemical characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed."

## 4.7.1 Environmental Setting

During construction of the Project, hazardous materials would be used, stored, handled, and disposed. Motorized vehicles would be used on the Project site. These vehicles contain numerous substances, that when released, could constitute a hazardous substance. They include gasoline, diesel, antifreeze, lubricants, and motor oil. The refueling and maintenance of these vehicles must also be considered during Project staging and operation.

The proposed Project pipeline would be located within one-half mile of 23 identified hazardous materials sites or underground storage locations (Appendix H-1). These sites are on lists compiled in accordance with Government Code section 65962.5 (PG&E 2007a). In addition, much of the proposed pipeline alignment is located along primarily cultivated agricultural fields. Due to the agricultural nature of the

area, several aboveground storage tanks containing diesel and/or gasoline are located along the route and appear to be used in conjunction with irrigation pumps. Several residences, grain storage facilities, and commercial land uses along the route also maintain aboveground diesel and/or gasoline tanks for equipment refueling, as well as small quantities of chemicals or other substances for cleaning or maintenance purposes.

Therefore, contaminated soil and/or ground water may be encountered during construction along the Project alignment. If these materials are removed, they may be reclassified as hazardous materials if chemical concentrations exceed State and Federal limits that characterize materials as hazardous substances. The hazardous materials sites and underground storage tank locations located nearest the proposed Project and the status of these sites are depicted in Tables 4.7-1 and 4.7-2.

**Table 4.7-1: Sites Identified within One-half Mile of Line 406**

| Identified Site | Status | Distance from Line 406 |
|---|---|---|
| David Hatanka Farming<br>13605 County Road 88<br>Esparto, CA 95627 | One permitted underground storage tank; no spills or releases reported | Approximately 0.25 mile south |
| Mast & Son<br>15455 Gottlob Mast Way<br>Esparto, CA 95627 | One permitted underground storage tank; no spills or releases reported | Approximately 0.06 mile south |
| Cache Creek High School<br>14320 2nd Street<br>Yolo, CA 95697 | One permitted underground storage tank; no spills or releases reported | Approximately 0.25 mile south |
| Half Moon Fruit & Produce<br>14260 Cacheville Road<br>Yolo, CA 95697 | One permitted underground storage tank; no spills or releases reported | Approximately 0.5 mile south |
| Clarks<br>14110 Cacheville Road<br>Yolo, CA 95697 | One permitted underground storage tank; no spills or releases reported | Approximately 0.5 mile south |
| Herr Jack<br>37493 Sacramento Street<br>Yolo, CA 95697 | One permitted underground storage tank; no spills or releases reported | Approximately 0.5 mile south |
| Gas Dehydration Station | Contains several above-ground storage tanks | Along County Road 17 |
| Source: Hanover 2008, PG&E 2007a, PG&E 2007b. | | |

1 **Table 4.7-2: Sites Identified within One-half Mile of Line 407**

| Identified Site | Status | Distance from Line 407 |
|---|---|---|
| 6405 Fiddyment Road<br>Roseville, CA 95678 | A diesel leak was reported in 1992 and affected soil only | Approximately 0.5 mile |
| Baseline Rd at Watt Ave.<br>Roseville, CA 95678 | A spill occurred on May 8, 1989 and cleaned up the same date | Within 0.125 mile |
| 6400 Baseline Road<br>Roseville, CA | Organic solid waste found and disposed at a landfill | Within 0.125 mile |
| 10550 Lowell Street<br>Roseville, CA | Remediation is currently in progress for Polyethylene Terephthalate, volatile organic compounds, Methyl Tertiary Butyl Ether, Toluene, and Xylene | Approximately 0.5 mile |
| Meyer Food Store<br>8000 Pleasant Grove Road<br>Elverta, CA 95626 | Site contains a 10,000-gallon unleaded fuel tank, which has been in place since 1992 | Within 0.125 mile |
| Farm Air Flying Service<br>4425 W. Riego Road<br>Sacramento, CA 95387 | 1.35 tons of organic solid have been disposed of in landfills. One active underground storage tank at this facility; seven total tanks recorded on property | Within 0.125 mile |
| North Side of Riego Road near Pacific Avenue<br>Pleasant Grove, CA 95668 | Two spill Incidents (unknown substance) in August 1988 and August 1989 | Within 0.125 mile |
| Cornelius Airstrip<br>Riego Road/Pacific Avenue<br>Pleasant Grove, CA 95668 | May have historical contamination and may require further investigation | Within 0.25 mile |
| Nextel Communications<br>8000 Crowder Lane<br>Roseville, CA 95747 | Listed by Placer County as a contaminated site | Approximately 0.33 mile |
| Verizon Wireless<br>8000 Crowder Lane<br>Roseville, CA 95747 | Listed by Placer County as a contaminated site | Approximately 0.33 mile |
| Surewest<br>8000 Crowder Lane<br>Roseville, CA 95747 | Listed by Placer County as a contaminated site | Approximately 0.33 mile |
| MCI Telecommunications<br>3387 Riego Road<br>Pleasant Grove, CA 95668 | Small quantity hazardous materials generator; one registered underground storage tank; no spills or releases reported | Within 0.25 mile |

| Identified Site | Status | Distance from Line 407 |
|---|---|---|
| El Rio Farms<br>5341 W. Riego Road<br>Sacramento, CA 95837 | Underground storage talk location; no spills or releases reported | Within 0.33 mile |
| County Rd 17 & County Rd 103<br>Woodland, CA | The site incurred a diesel spill in 1988 as a result of vandalism | Within 0.125 mile |
| Ashley Payne Farms<br>County Rd 102 & County Rd 17<br>Woodland, CA | One tank of regular fuel for farm use; no spills or releases reported | Approximately 0.5 mile |
| SMUD<br>Elverta/Power Line Roads<br>Sacramento, CA | One hydraulic oil spill in 1990. Groundwater was affected, and remediation action was taken | Within 0.125 mile |
| Source: Hanover 2008, PG&E 2007a, PG&E 2007b. | | |

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest potential hazard is an explosion within an enclosed space or fire following a major rupture in the pipeline. Methane, the primary component of natural gas, is colorless, odorless, and tasteless. Methane has an auto-ignition temperature of 1,166 degrees Fahrenheit ($^{o}$F) and is flammable at concentrations between 5 and 15 percent by volume in air. Flammable concentrations of methane within an enclosed space in the presence of an ignition source can explode. Methane is buoyant at atmospheric temperatures and disperses rapidly in air; as such, unconfined mixtures of methane in air are flammable but rarely explosive. The risk of leakage is the normal type of risk encountered with natural gas pipelines. Leaks may expose sensitive populations to methane. It is not toxic but is classified as a simple asphyxiant, posing a slight inhalation hazard. If inhaled in high concentration, oxygen deficiency can occur, resulting in serious injury or death. Proper design, construction, and maintenance of the pipeline would minimize leaks. The pipeline would be buried along its entire length, except at metering stations, regulation stations, and pressure limiting stations, which would be fenced to prevent access.

### Sensitive Receptors

People who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the California Air Resources Board (CARB) considers a sensitive receptor to be a location that houses or attracts children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Examples of sensitive

receptors include hospitals, residences, convalescent facilities, schools, and parks. No hospitals or convalescent facilities are located within one mile of the Project area.

Yolo County contains the largest section of the pipeline, which would pass within proximity (one-half mile) to multiple individual rural residences dispersed throughout the length of the Yolo County portion of the pipeline. Of specific note are the clusters of approximately 10 rural residences in the Hungry Hollow area located on CR-17 between CR-87 and CR-88A (Class 1); approximately six rural residences in the Dunnigan Hills area (Class 1); and approximately 15 rural residences northeast of the unincorporated community of Yolo (Class 2).

Within Sutter County there are approximately 10 rural residences on Riego Road (along which the pipeline would travel) between the Sacramento River and Natomas Road (Class 1). Further east on Riego Road, between Natomas Road and the Sutter/Placer County boundary, there is an area of multiple semi-rural residences (Class 2).

Within Sacramento County there are no identified sensitive receptors currently located along the Powerline Road Distribution Feeder Main (DFM) portion of the pipeline. The proposed Powerline Road DFM (Class 3) lies along the eastern edge of Sacramento Metropolitan Airport. The DFM is intended to serve commercial, light manufacturing, and traveler services at the Metro Air Park development when it is built.

Within Placer County there are approximately 24 residences along Baseline Road within one-half mile of the proposed pipeline route (Class 2). The pipeline's eastern terminus is located adjacent to areas consisting of suburban residences within the City of Roseville limits (Class 2). The Alpha School (historical) is approximately 0.5 mile north of Line 407 along Baseline Road, and the Coyote Ridge Elementary School is approximately 0.4 mile north-northeast of the eastern terminus of Line 407 at the intersection of Baseline Road and Fair Oaks Boulevard. The Line 407 is intended to serve the Placer Vineyards Specific Plan (approved by Placer County Board of Supervisors on July 16, 2007), the Sierra Vista Specific Plan (still in the planning stage), and the Curry Creek Community Plan (put on hold). Within the approved Placer Vineyards Specific Plan are residential uses and seven dedicated school sites that will be developed by the Center Joint Unified School District. The closest planned school sites to the pipeline include a high school site within the Placer Vineyards Specific Plan located adjacent to Baseline Road, within 50 feet south of the proposed Project pipeline, and an elementary school site located

approximately 1,400 feet south of the proposed Project pipeline. The Sierra Vista Specific Plan proposed land use plan includes five dedicated school sites that will be developed by the Center Joint Unified School District. The closest proposed schools sites to the proposed pipeline is an elementary school site within the Sierra Vista Specific Plan located approximately 1,500 feet north of the proposed Project pipeline.

**Release Probability**

This analysis uses data from reportable gas pipeline incidents nationwide to evaluate the causes and probability of accidents. Since February 9, 1970, 49 CFR Part 191 has required all operators of transmission and gathering systems to notify the U.S. Department of Transportation (DOT) of any reportable incident and to submit a report on form F7100.2 within 20 days. Reportable incidents have the following characteristics:

- Caused a death or personal injury requiring hospitalization;
- Required taking any segment of transmission line out of service;
- Resulted in gas ignition;
- Caused estimated damage to the property of the operator or others, of a total of $5,000 or more;
- Required immediate repair on a transmission line;
- Occurred while testing with gas or another medium; or
- In the judgment of the operator was significant, even though it did not meet the above criteria.

Since June 1984, the DOT requires operators only to report incidents that involve property damage of more than $50,000, injury, death, release of gas, or that are otherwise considered significant by the operator. Table 4.7-3 presents a summary of incident data for the periods from 1970 to 1984 and from 1986 to 2001, owing to the change in reporting requirements. The 14.5-year period from 1970 through June 1984 includes more basic report information than subsequent years, and as such has been subject to detailed analysis as discussed in the remainder of the analysis.

**Table 4.7-3: Industry Service Incidents by Cause per 1,000 Miles/Year (percentage)**

| Cause of Incident | 1970 to 1984 | 1986 to 2001 |
|---|---|---|
| Outside forces | 54% | 40% |
| Corrosion | 17% | 23% |
| Construction or material defect | 21% | 14% |
| Other | 8% | 23% |
| Source: Entrix, Inc. 2004. | | |

The dominant incident cause is outside forces, constituting 54 percent of all service incidents between 1970 and 1984. Outside forces include impact by mechanical equipment, such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geological hazards; weather effects, such as winds, storms, and thermal strains; and willful damage.

During this 14.5-year period, 5,862 service incidents were reported over approximately 300,000 total miles of natural gas transmission and gathering systems nationwide. Of the 5,862 incidents, 20 incidents resulted in fatalities, 191 incidents resulted in injuries, and 22 incidents involved both fatalities and injuries. While the total number of incidents equals more than one incident per day, the total number of deaths in this period was 74, and the total number of injuries was 438; or five deaths and 30 injuries per year during this period. Service incidents, defined as failures that occur during pipeline operation, remained nearly constant over this period with no clear upward or downward trend in annual totals.

During the next 15-year period between 1984 and 2001 there were 2,845 incidents resulting in 1,523 injuries and 340 fatalities. As in the earlier data, the primary cause of the incidents are similar, namely damage by outside forces, which accounted for nearly 60 percent of the incidents.

Since April 1982, operators have been required to participate in One-Call public utility programs in populated areas, to minimize unauthorized excavation activities in the vicinity of pipelines. The One-Call program is a service used by public utilities and some private sector companies, for example, oil pipelines and cable television, to provide pre-construction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts.

Older pipelines have a higher frequency of outside forces incidents, partly because their location may be less well known and less well marked than newer lines. In addition, the older pipelines contain a disproportionate number of smaller diameter pipelines, which have a greater rate of outside forces incidents. Small-diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

The frequency of service incidents strongly depends on pipeline age. While pipelines installed since 1950 exhibit a nearly constant level of service incident frequency, pipelines installed before that time have a significantly higher rate, partially due to corrosion. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. Further, more advanced coatings and cathodic protection to reduce corrosion potential are generally used on newer pipe.

Table 4.7-4 shows corrosion by level of control, and demonstrates the effectiveness of corrosion control in reducing the incidence of failures caused by external corrosion. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the rate of failure compared to unprotected or partially protected pipe. Although the data show that bare, cathodically protected pipe has a higher corrosion rate than unprotected pipe, this observation reflects the retrofitting of cathodic protection to actively corroding spots on pipes. The new pipe that would be installed by the Project would also have protective coating and a cathodic protection system.

**Table 4.7-4: External Corrosion by Level of Control (1970 to 1984)**

| Corrosion Control | Incidents per 1,000 miles/year |
|---|---|
| None - bare pipe | 0.42 |
| Cathodic protection only | 0.97 |
| Coated only | 0.40 |
| Coated and cathodic protection | 0.11 |
| Source: Entrix, Inc. 2004. | |

### Pipeline Accident Data

The service incidents summarized in Table 4.7-3 include pipeline failures of all magnitudes with widely varying consequences. About two-thirds of the incidents were classified as leaks; the remaining one-third was classified as ruptures, implying a more serious failure.

Most unintentional natural gas releases are small and do not cause injury or death. Only under the right conditions will leaks and ruptures result in fire and/or explosions causing injuries and/or fatalities. A fire could result when the natural gas has a sufficient mixture with air or combustible range, 5 to 15 percent methane in air. Another requirement is an ignition source with sufficient heat to ignite the air/natural gas mixture. In order for an explosion to occur the natural gas vapor cloud must be confined (EDM Services, Inc. 2009).

Between January 1, 2002 and December 31, 2007 there were 520 transmission pipeline incidents reported to the USDOT. Of those incidents 10.8 percent resulted in fires while 6.7 percent resulted in explosions (EDM Services, Inc. 2009).

Fatalities or injuries occurred in 4 percent of the service incidents reported in the 14.5-year period from 1970 through June 1984. Between 1984 and 2001 the total annual average fatalities were 3.1 per year for onshore pipeline. The simplified reporting requirements in effect after June 1984 do not differentiate between employees and non-employees.

Nevertheless, the average of 3.1 public fatalities per year is relatively small considering the approximately 300,000 miles of transmission and gathering lines in service nationwide, resulting in an annual risk of fatality by gas transmission and gathering lines of approximately $1 \times 10^{-5}$ (Entrix, Inc. 2007).

## 4.7.2 Regulatory Setting

The storage and use of hazardous materials and regulated substances are governed by Federal, State, and local laws. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination, and to protect facility workers and the surrounding community from exposure to hazardous and regulated substances.

## Federal

*Pipeline Regulations*

The DOT provides oversight for the nation's natural gas pipeline transportation system. Its responsibilities are promulgated under Title 49, United States Code (USC) Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline.

Two statutes provide the framework for the Federal pipeline safety program. The Natural Gas Pipeline Safety Act of 1968 as amended (NGPSA) authorizes the DOT to regulate pipeline transportation of natural (flammable, toxic, or corrosive) gas and other gases as well as the transportation and storage of liquefied natural gas (LNG).

Similarly, the Hazardous Liquid Pipeline Safety Act of 1979 (HLPSA), as amended, authorizes the DOT to regulate pipeline transportation of hazardous liquids (crude oil, petroleum products, anhydrous ammonia, and carbon dioxide). Both of these Acts have been recodified as 49 USC Chapter 601.

The OPS shares portions of this responsibility with State agency partners and others at the Federal, State, and local levels. The State of California is certified under 49 USC Subtitle VIII, Chapter 601, section 60105. The State has the authority to regulate intrastate natural and other gas pipeline facilities. The California Public Utilities Commission (CPUC) is the agency authorized to oversee intrastate gas pipeline facilities, including those proposed by PG&E. The CPUC has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems (General Order No. 112-E). The California State Fire Marshal has jurisdiction for hazardous liquid pipelines.

The Federal pipeline regulations are published in Title 49 of CFR 26, Parts 190 through 199. 49 CFR 192 specifically addresses natural and other gas pipelines. Many of these pipeline regulations are written as performance standards. These regulations set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve the desired result.

The proposed transmission pipeline and ancillary facilities would be designed, constructed, operated, and maintained in accordance with 49 CFR 192.

Since these are intrastate facilities, the CPUC would have the responsibility of enforcing the Federal and State requirements. 49 CFR 192 is comprised of 15 subparts, which are summarized below:

Subpart A, General - This subpart provides definitions, a description of the class locations used within the regulations, documents incorporated into the regulation by reference, conversion of service requirements, and other items of a general nature.

Subpart B, Materials - This subpart provides the requirements for the selection and qualification of pipe and other pipeline components. Generally, it covers the manufacture, marking, and transportation of steel, plastic, and copper pipe used in gas pipelines and distribution systems.

Subpart C, Pipe Design - This subpart covers the design (primarily minimum wall thickness determination) for steel, plastic, and copper pipe.

Subpart D, Design of Pipeline Components - This subpart provides the minimum requirements for the design and qualification of various components (e.g. valves, flanges, fittings, passage of internal inspection devices, taps, fabricated components, branch connections, extruded outlets, supports and anchors, compressor stations, vaults, overpressure protection, pressure regulators and relief devices, instrumentation and controls, etc.

Subpart E, Welding of Steel Pipelines - This subpart provides the minimum requirements for welding procedures, welder qualification, inspection, and repair/replacement of welds in steel pipeline systems.

Subpart F, Joining of Materials Other Than by Welding - This subpart covers the requirements for joining, personnel and procedure qualification, and inspection of cast iron, ductile iron, copper, and plastic pipe joints.

Subpart G, General Construction Requirements for Transmission Lines and Mains - This subpart provides the minimum construction requirements, including, but not limited to: inspection of materials, pipe repairs, bends and elbows, protection from hazards, installation in the ditch, installation in casings, underground clearances from other substructures, and minimum depth of cover.

Subpart H, Customer Meters, Service Regulators and Service Lines - This subpart prescribes the minimum requirements for these components.

Subpart I, Requirements for Corrosion Control - This subpart provides the minimum requirements for cathodic protection systems, required inspections and monitoring, remedial measures, and records maintenance.

Subpart J, Testing Requirements - This subpart prescribes the minimum leak and strength test requirements.

Subpart K, Uprating - This subpart provides the minimum requirements for increasing the maximum allowable operating pressure.

Subpart L, Operations - This subpart prescribes the minimum requirements for pipeline operation, including: procedure manuals, change in class locations, damage prevention programs, emergency plans, public awareness programs, failure investigations, maximum allowable operating pressures, odorization, tapping, and purging.

Subpart M, Maintenance - This subpart prescribes the minimum requirements for pipeline maintenance, including: line patrols, leakage surveys, line markers, record keeping, repair procedures and testing, compressor station pressure relief device inspection and testing, compressor station storage of combustible materials, compressor station gas detection, inspection and testing of pressure limiting and regulating devices, valve maintenance, prevention of ignition, etc.

Subpart N, Qualification of Pipeline Personnel - This subpart prescribes the minimum requirements for operator qualification of individuals performing covered tasks on a pipeline facility.

Subpart O, Pipeline Integrity Management - This subpart was promulgated on December 15, 2003. It requires operators to implement pipeline integrity management programs on the gas pipeline systems.

*High Consequence Areas*

In general, the requirements of the Federal regulations become more stringent as the human population density increases. To this end, 49 CFR 192 defines area classifications, based on population density in the vicinity of a pipeline and specifies more rigorous safety requirements for more heavily populated areas. The class location is an area that extends 660 feet (220 yards) on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined

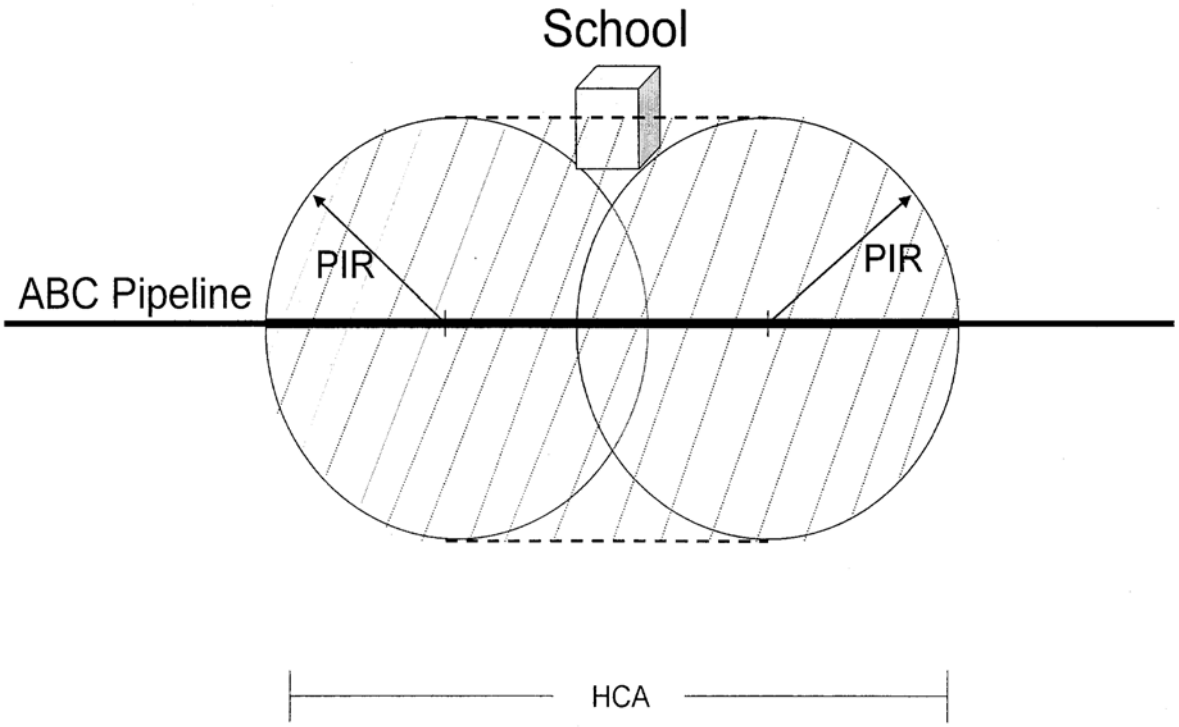
as follows, and also discussed and shown in Table 2-2 in Section 2.0, Project Description:

- **Class 1**: A location with ten or fewer buildings intended for human occupancy;
- **Class 2**: A location with more than ten but less than 46 buildings intended for human occupancy;
- **Class 3**: A location with 46 or more buildings intended for human occupancy or where the pipeline lies within 300 feet (100 yards) of any building or small well-defined outside area occupied by 20 or more people during normal use; and
- **Class 4**: A location where buildings with four or more stories aboveground are prevalent.

Pipeline facilities located within class locations representing more populated areas are required to have a more conservative design. For example, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches at public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4 locations). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure (MAOP), inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas.

# Determining High Consequence Area




Source: 49 CFR Part 192, Appendix E; PIR = Potential Impact Radius

The DOT (68 Federal Register 69778, 69 Federal Register 18228, and 69 Federal Register 29903) defines HCAs as they relate to the different class zones, potential impact circles, or areas containing an identified site as defined in 49 CFR 192.903. The OPS published a series of rules from August 6, 2002, to May 26, 2004 (69 Federal Register 69817 and 29904), that define HCAs where a gas pipeline accident could do considerable harm to people and their property. This definition satisfies, in part, the Congressional mandate in 49 USC 60109 for the OPS to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. Both methods are prescribed by 49 CFR 192.903. The first includes:

- Current Class 3 and 4 locations;

- Any area in Class 1 or 2 locations where the potential impact radius is greater than 660 feet (200 meters) and the area within a potential impact circle contains 20 or more buildings intended for human occupancy; or

- Any area in Class 1 or 2 locations where the potential impact circle includes an "identified site."

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy; or

- An "identified site."

"Identified sites" include areas such as beaches, playgrounds, recreational facilities, camp grounds, outdoor theaters, stadiums, recreational areas, religious facilities, and other areas where high concentrations of the public may gather periodically as defined by 49 CFR 192.903.

The "potential impact radius" is calculated as the product of 0.69 and the square root of the MAOP of the pipeline (in pounds per square inch gauge (psig), multiplied by the pipeline diameter in inches squared (R = 0.69*(MAOP*D*D)**0.5). The potential impact circle is a circle with a radius equal to the potential impact radius.

Once a pipeline operator has identified the HCAs along its pipeline(s), it must apply the elements of its integrity management program to those segments of the pipeline within the HCAs. The pipeline integrity management rule for HCAs requires inspection of the entire pipeline within HCAs every seven years. Using this calculation, the impact radii are 646 feet and 215 feet for the 30-inch and 10-inch segments respectively. These values are less than the 660-foot impact radius, which would require that additional portions be added to an HCA.

*Pipeline Integrity Management Regulations*

49 CFR 192 Subpart O, Pipeline Integrity Management was established following a series of pipeline incidents with severe consequences. This subpart requires operators of gas pipeline systems in High Consequence Areas (HCAs) to significantly increase their minimum required maintenance and inspection efforts. For example, all lines located within HCAs must be analyzed by conducting a baseline risk assessment. In general, the integrity of the lines must also be evaluated using an internal inspection device or a direct assessment, as prescribed

in the regulation. Two incidents in particular that are discussed below raised public concern regarding pipeline safety and necessitated these relatively new requirements.

**Bellingham, Washington, June 10, 1999.** According to the National Transportation Safety Board (NTSB) accident report, "about 3:28 p.m., Pacific daylight time, on June 10, 1999, a 16-inch diameter steel pipeline owned by Olympic Pipe Line Company ruptured and released about 237,000 gallons of gasoline into a creek that flowed through Whatcom Falls Park in Bellingham, Washington. About one and one half hours after the rupture, the gasoline ignited and burned approximately one and one half miles along the creek. Two 10-year-old boys and an 18-year-old young man died as a result of the accident. Eight additional injuries were documented. A single-family residence and the City of Bellingham's water treatment plant were severely damaged. As of January 2002, Olympic estimated that total property damages were at least $45 million."

The major safety issues identified during this investigation were excavations performed by IMCO General Construction, Inc., in the vicinity of Olympic's pipeline during a major construction project and the adequacy of Olympic Pipe Line Company's inspections thereof; the adequacy of Olympic Pipe Line Company's interpretation of the results of in-line inspections of its pipeline and its evaluation of all pipeline data available to it to effectively manage system integrity; the adequacy of Olympic Pipe Line Company's management of the construction and commissioning of the Bayview products terminal; the performance and security of Olympic Pipe Line Company's supervisory control and data acquisition system; and the adequacy of Federal regulations regarding the testing of relief valves used in the protection of pipeline systems" (NTSB 2002).

**Carlsbad, New Mexico, August 19, 2000.** Per the NTSB accident report, "At 5:26 a.m., mountain daylight time, on Saturday, August 19, 2000, a 30-inch diameter natural gas transmission pipeline operated by El Paso Natural Gas Company ruptured adjacent to the Pecos River near Carlsbad, New Mexico. The released gas ignited and burned for 55 minutes. Twelve persons who were camping under a concrete-decked steel bridge that supported the pipeline across the river were killed and their three vehicles destroyed. Two nearby steel suspension bridges for gas pipelines crossing the river were extensively damaged. According to El Paso Natural Gas Company, property and other damages or losses totaled $998,296."

The major safety issues identified in this investigation were the design and construction of the pipeline, the adequacy of El Paso Natural Gas Company's internal corrosion control program, the adequacy of Federal safety regulations for natural gas pipelines, and the adequacy of Federal oversight of the pipeline operator" (NTSB 2003).

As noted earlier, 49 CFR 192, Subpart O, Pipeline Integrity Management is relatively new and was developed in response to the two major pipeline incidents discussed above. To strengthen pipeline safety laws, the Pipeline Safety Improvement Act of 2002 (HR 3609) was passed by Congress on November 15, 2002, and was signed into law by the President in December 2002. As of December 17, 2004, gas transmission operators of pipelines in HCAs were required to develop and follow a written integrity management program, which contained all of the elements prescribed in 49 CFR 192.911 and addressed the risks on each covered transmission pipeline segment.

*Hazardous Materials*

Several Federal agencies regulate hazardous materials, including the U.S. Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the DOT. Applicable Federal regulations are contained primarily in Titles 10, 29, 40, and 49 of the CFR. Lead exposure guidelines are provided by the U.S. Department of Housing and Urban Development.

Worker Safety

The DOT requires that gas pipeline operators meet certain qualifications. For the proposed Project, construction crews are not required to meet these qualifications because they are not considered gas pipeline operators. However, when the proposed pipeline is connected to the main gas transmission system, PG&E's operators would be subject to the DOT qualifications.

Hazardous Materials Transportation

The DOT has developed regulations pertaining to the transport of hazardous materials and hazardous wastes by all modes of transportation. The DOT regulations specify packaging requirements for different types of materials. The EPA has also promulgated regulations for the transport of hazardous wastes. These more stringent requirements include tracking shipments with manifests to ensure that wastes are delivered to the intended destination.

## State

*Pipeline Regulations*

As noted earlier, intrastate pipeline facilities such as those that would be associated with the proposed Project would be under the jurisdiction of the CPUC, as a result of their certification by the OPS. (The State of California is certified under 49 USC Subtitle VIII, Chapter 601, section 60105.) The State requirements for designing, constructing, testing, operating, and maintaining gas piping systems are stated in CPUC General Order Number 112E. These rules incorporate the Federal regulations by reference.

*Other Pipeline Guidelines*

In addition to all other applicable Federal and State codes and regulations and industry standards for pipeline design, the CSLC requires that the pipeline design also meet the requirements of current seismological engineering standards such as the “Guidelines for the Design of Buried Steel Pipe” by American Lifeline Alliance and "The Guidelines for the Seismic Design and Assessment of Natural Gas and Liquid Hydrocarbon Pipelines" by the Pipeline Research Council International, Inc. The CSLC also requires that all engineered structures, including pipeline alignment drawings, profile drawings, buildings and other structures, and other appurtenances and associated facilities, to be designed, signed, and stamped by California registered professionals certified to perform such activities in their jurisdiction.

*Hazardous Materials*

The California Environmental Protection Agency (CalEPA) establishes regulations governing the use of hazardous materials in the State. The Office of Emergency Services (OES) coordinates State and local agencies and resources for educating, planning, and warning citizens of hazardous materials and hazardous materials emergencies, including organized response efforts in case of emergencies. The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) are the State enforcement agencies for hazardous materials transportation regulations. Transporters of hazardous materials and waste are responsible for complying with all applicable packaging, labeling, and shipping regulations.

Department of Toxic Substances Control

Within CalEPA, the Department of Toxic Substances Control (DTSC) has primary regulatory responsibility for hazardous waste management and cleanup. Requirements place "cradle-to-grave" responsibility for hazardous waste disposal on the shoulders of hazardous waste generators. Generators must ensure that their wastes are disposed of properly, and legal requirements dictate the disposal requirements for many waste streams (e.g., banning many types of hazardous wastes from landfills). Enforcement of regulations has been delegated to local jurisdictions that enter into agreements with the DTSC for the generation, transport, and disposal of hazardous materials under the authority of the Hazardous Waste Control Law. State regulations applicable to hazardous materials are contained in Title 22 of the California Code of Regulations (CCR). Title 26 of the CCR is a compilation of those sections or titles of the CCR that are applicable to hazardous materials management. Title 8 of the CCR contains Construction Safety Orders pertaining to lead.

Hazardous Materials Management Plans

In January 1996, the CalEPA adopted regulations implementing a "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program" (Unified Program). The six program elements of the Unified Program are: (1) hazardous waste generators and hazardous waste on-site treatment; (2) underground storage tanks; (3) aboveground storage tanks; (4) hazardous material release response plans and inventories; (5) risk management and prevention program; and (6) Uniform Fire Code hazardous materials management plans and inventories. The program is implemented at the local level by a local Certified Unified Program Agency (CUPA), which is responsible for consolidating the administration of the six program elements within its jurisdiction. The Yolo County Environmental Health Department, Sacramento County Environmental Management Department, Placer County Environmental Health Division, and Sutter County Environment Health Services are the CUPAs that serve the proposed Project area.

State and Federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law (number four from the list above), sometimes called the "Business Plan Act," aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials

emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

Worker Safety

Occupational safety standards exist in Federal and State laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The California Division of Occupational Safety and Health (CalOSHA) is responsible for developing and enforcing workplace safety standards and assuring worker safety in the handling and use of hazardous materials. Among other requirements, CalOSHA obligates many businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. The Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle. For example, manufacturers are to appropriately label containers, Material Safety Data Sheets are to be available in the workplace, and employers are to properly train workers.

Department of Forestry

The greatest potential for fire occurs with the use of internal combustion engines, including driving construction trucks and equipment on grass covered areas. The California Department of Forestry (CDF) requires the use of spark arrestors on all internal combustion engines.

In addition, work that involves flame, arcing, or sparking equipment, such as welding, at the construction staging areas during construction of the pipeline could potentially result in the combustion of native materials located close to the site. The CDF requires that PG&E would select a welding site that is void of native combustible material and/or clearing such material for 10 feet around the area where the work is to be performed.

**Local**

*Yolo County Environmental Health Department*

The Yolo County Environmental Health Department is responsible for identifying, assessing, mitigating, and preventing environmental hazards. It oversees the cleanup and removal of hazardous waste within the county and acts as the local CUPA. The Yolo County Environmental Health Hazmat Unit responds to industrial

and chemical spills, fuel spills resulting from vehicle accidents, chemical leaks due to natural disasters, terrorist acts, bomb threats, abandoned waste, and radiological releases. The Hazmat Unit responds to these emergencies along with local fire and law enforcement agencies.

*Yolo County General Plan*

The Yolo County General Plan includes the following policies:

**S-21 and S-23 Emergency Plan/Long-Term Recovery Actions:** These two policies establish the requirement for an Emergency Plan, together with the significant mitigation requirement that emergency recovery actions avoid development of long-term public problems by the application of short-term expedient measures.

**S-12 - S-14 Fire Protections Measures:** This series of policies establishes safety mitigation as a part of the environmental protection.

**S-18 Toxic or Hazardous Materials:** This policy specifically provides for mitigation through the development of emergency plans for implementation in the event of accident, fire, or flood involving toxic or hazardous materials.

*Sacramento County Environmental Management Department*

The Sacramento County Environmental Management Department (EMD) is responsible for promoting a safe and healthy environment in the county. It oversees the cleanup and removal of hazardous waste within the county and acts as the local CUPA. The EMD also provides the necessary permits required for hazardous materials storage and use, monitoring wells, removal of leaky underground storage tanks, and permits required for the collection, transport, use, or disposal of refuse. The EMD, local fire departments, Sacramento County Sheriff's Department, and the Department of General Services Emergency Operations Division are responsible for implementing various aspects of Sacramento County's emergency plan. The plan includes a "Hazardous Materials Incident Response Plan."

*Sacramento County General Plan*

The following Sacramento County General Plan goals and policies related to hazards and hazardous materials are applicable to the proposed Project and are found in the Hazardous Materials and Public Facilities elements (Sacramento County 1993 and 1997).

**HM-4.** The handling, storage, and transport of hazardous materials shall be conducted in a manner so as not to compromise public health and safety standards.

**HM-7.** Encourage the implementation of workplace safety programs and to the best extent possible ensure that residents who live adjacent to industrial or commercial facilities are protected from accidents and the mishandling of hazardous materials.

**HM-10.** Reduce the occurrences of hazardous material accidents and the subsequent need for incident response by developing and implementing effective prevention strategies.

**HM-11.** Protect residents and sensitive facilities from incidents which may occur during the transport of hazardous materials in the County.

Public Facilities Element

**PF-74.** Energy production and distribution facilities shall be designed and sited in a manner so as to protect the residents of Sacramento County from the effects of a hazardous materials incident.

*Sutter County*

Sutter County's Emergency Services Division prepares and maintains plans and conducts training programs. These programs include response to hazardous material releases. The Sutter County Fire Department includes a Hazardous Materials Response Team with equipment personnel trained to mitigate hazardous materials releases. Sutter County Environmental Health Services acts as the local CUPA.

*Sutter County General Plan*

The General Plan includes the following policies with regard to the treatment of hazardous materials.

**7.F-1.** The County shall ensure that the use and disposal of hazardous materials complies with appropriate Federal, State and local requirements.

**7.F-2.** The County shall maintain and implement a Sutter County Hazardous Waste Management Plan (SCHWMP) consistent with the requirements of state law.

**7.F-3.** Review of all proposed development projects that manufacture, use or transport hazardous materials shall be coordinated between the County and appropriate State and Federal agencies.

**7.F-4.** The County shall require that development proposals that will generate hazardous waste or utilize hazardous materials provide a hazardous waste business and emergency plan pursuant to state law.

*Placer County*

The Placer County Environmental Health Division acts as the local CUPA for all areas of the county except the City of Roseville. The Roseville Fire Department is the CUPA for the City of Roseville. The CUPA consolidates and coordinates administrative activities such as permits, inspections, and enforcement.

*Placer County General Plan*

The Placer County General Plan includes the following policies with regard to the treatment of hazardous materials.

**8.G.1.** The County shall ensure that the use and disposal hazardous materials in the County complies with local, state, and federal safety standards.

**8.G.3.** The County shall review all proposed development projects that manufacture, use, or transport hazardous materials for compliance with the County's Hazardous Waste Management Plan (CHWMP).

**8.G.7.** The County shall ensure that industrial facilities are constructed and operated in accordance with current safety and environmental protection standards.

**8.G.8.** The County shall require that new industries that store and process hazardous materials provide a buffer zone between the installation and the property boundaries sufficient to protect public safety. The adequacy of the buffer zone shall be determined by the County.

**8.G.10.** The County shall require that any business that handles a hazardous material prepare a plan for emergency response to a release or threatened release of a hazardous material.

**8.G.12.** The County shall identify sites that are inappropriate for hazardous material storage, maintenance, use, and disposal facilities due to potential impacts on adjacent land uses and the surrounding natural environment.

**8.G.13.** The County shall work with local fire protection and other agencies to ensure an adequate Countywide response capability to hazardous materials emergencies.

### 4.7.3 Significance Criteria

An adverse impact regarding hazards and hazardous materials is considered significant and would require mitigation if the Project would:

1. Expose people to an unacceptable risk of existing or potential hazards, including upset and accident conditions involving the risk for fires, explosions, or the release of hazardous materials into the environment;

2. Create significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

3. Create hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste that could adversely affect existing or proposed schools, residential areas, or other sensitive receptors;

4. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; significantly increase fire hazard in areas with flammable materials; or expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands;

5. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would create a significant hazard to the public or the environment; or

6. For a project located within an airport land use plan, or within two miles of a public airport or private airstrip, where the project would result in a safety hazard for people residing or working in the project area.

### 4.7.4 Applicant Proposed Measures

Applicant Proposed Measures (APMs) have been identified by PG&E in its Preliminary Environmental Analysis prepared for the CSLC. APMs that are relevant to this Section are presented below. This impact analysis assumes that all APMs would be implemented as defined below. Additional mitigation measures are recommended in this Section if it is determined that APMs do not fully mitigate the impacts for which they are presented.

**APM HAZ-1.** PG&E will establish an environmental training program to communicate environmental concerns and appropriate work practices, including spill prevention, emergency response measures, and proper 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, PG&E's Water Quality Construction Best Management Practices (BMP) Manual and the project's 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 construction. BMPs, as identified in the Water Quality Construction Best Management Practices Manual 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.

**APM HAZ-2.** 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 PG&E's Water Quality Construction Best Management Practices Manual.

**APM HAZ-3.** PG&E will use oil-absorbent material, tarps, and storage drums 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.

**APM HAZ-4.** PG&E will conduct soil sampling and potholing along the project route, as needed, before construction begins, and soil information will be provided to construction crews to inform them about soil conditions and potential hazards. Due to the agricultural nature of the area, soil sampling will include analysis for pesticides, including organochlorine pesticides such as DDT and malathion.

- 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.

- Prior to initiating excavation activities, 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.

- PG&E will conduct all soil sampling and hazardous-waste removal and handling in accordance with the project's Health and Safety Plan.

**APM HAZ-5.** If suspected contaminated groundwater is encountered in the depths of the project construction areas, PG&E will collect samples and submit them for laboratory analysis of petroleum hydrocarbons,

metals, volatile organic compounds, semi-volatile organic compounds, and pesticides. 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 discharged as described in Chapter 9—Hydrology and Water Quality.

- Appropriate personal protective equipment will be used during groundwater testing and water 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 Characterization and Management Plan.

**APM HAZ-6.** Prior to initiating construction, PG&E will prepare a Fire Risk Management Plan to outline the potential for fires occurring as a result of project construction, and to outline measures necessary to prevent fires. Additionally, fire-suppression materials 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 fires will be provided in the project's Fire Risk Management Plan.

- Information contained in the Fire Risk Management Plan and the location of fire-suppression materials and equipment will be included as part of the employee environmental training.

**APM HAZ-7.** On properties with a history of agricultural use, many underground pipelines may exist; these pipelines commonly contain asbestos. If any subsurface structures are encountered during site development or on-site excavation, care shall be exercised in determining whether or not the subsurface structures contain asbestos. If they contain asbestos, they shall be removed, handled, transported, and disposed of in accordance with applicable federal, state, and local regulations.

- If wells and/or septic tanks are uncovered during site development, they shall be abandoned and removed in accordance with federal, state, and local regulations.

**APM HAZ-8.** During operation, PG&E will prepare a Fire Risk Management Plan to outline the potential for fires occurring as a result of project operation, and to outline measures necessary to prevent fires. Additionally, regular inspections will be conducted of the gas pipeline to ensure activities in surrounding areas have not impacted the integrity of the pipeline or the pipeline easement. Detailed information for responding to fires will be provided in the project's Fire Risk Management Plan.

**APM BIO-13.** Spill Prevention/Containment and Refueling Precautions: PG&E will maintain all construction equipment to prevent leaks of fuels, lubricants, or other fluids into waterways. Appropriate materials will be on-site to prevent and manage spills. PG&E will take appropriate precaution when handling and/or storing chemicals (e.g., fuel and hydraulic fluid) near waterways and wetlands, and any and all applicable laws and regulations will be followed. Service and refueling procedures will take place at least 100 feet from waterways or in an upland area at least 100 feet from wetland boundaries to prevent spills from entering waterways or wetlands. These activities may be performed closer than 100 feet if a qualified biologist finds in advance that no reasonable alternative exists, and that PG&E and its contractors have taken the appropriate steps (including secondary containment) to prevent spills and provide prompt cleanup in the event of a spill. These measures will be outlined in a Hazardous Substance Control and Emergency Response Plan to be prepared by PG&E (See APM HAZ-2).

## 4.7.5 Impact Analysis and Mitigation

### Impact Discussion

*Contamination from Leaks, Spills, and/or the Routine Handling of Hazardous Materials*

The Project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would not create a significant hazard to the public or the environment. Impacts would be less than significant (Class III).

The Project passes within one-half mile or less of 77 sites listed under Government Code section 65962.5. However, APM HAZ-1 through APM HAZ-5 and APM HAZ-7 would ensure that impacts related to the proximity of the Project to these sites is less than significant (Class III).

Construction activities associated with the proposed Project would involve storage, transport, and handling of hazardous materials. The potential for accidental releases of hazardous materials could result from construction, operation, and maintenance activities including equipment fuel leaks, fuel spills, and other events. Construction and operation of the proposed Project would primarily occur in rural areas; however, several locations along the proposed pipeline route are within close proximity to residences and could pose a risk to public safety from exposure to any accidental releases of fuel or lubricants.

PG&E would prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) plan for the proposed Project as required by the Storm Water Pollution Prevention Plan (SWPPP) and would include action measures to minimize the potential for accidental releases of hazardous materials into the environment. The Central Valley Regional Water Quality Control Board would review and monitor the effectiveness of the SPCC and SWPPP through mandatory reporting by PG&E as required under those plans.

Although the construction areas and staging areas could contain hazardous materials, their use would be temporary and the hazardous materials used would not be considered acutely hazardous and would not be disposed of in the areas, nor would they result in hazardous emissions to any neighboring properties.

In addition, the implementation of Applicant Proposed Measures APM HAZ-1 through APM HAZ-5, as well as APM BIO-13, would reduce the risks for accidental

releases of hazardous materials into the environment. Potential impacts associated with contamination due to leaks, spills, and /or the handling or storage of hazardous materials would be less than significant (Class III).

*Airports*

The Project is located within the airport land use plan for Sacramento International Airport and within two miles of a public airport or private airstrip, but would not result in a safety hazard for people residing or working in the Project area based on the distance to the airport (1.49 miles). Impacts would be less than significant (Class III).

The Powerline Road Distribution Feeder Main lies on the eastern edge of the northernmost portion of the Sacramento International Airport property, over 1 mile north and east of the end of the runways. The pipeline is located far enough away from the airport so as not to interfere with operations or cause risk to workers. Impacts would be less than significant (Class III).

**Impact HAZ-1: Emergency Plans/Wildland Fires**

**The Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; but could expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands (Potentially significant, Class II).**

During the July 2007 NOP scoping period, fires were brought up that occurred in the area as a result of a PG&E facility. The CDF identifies communities at risk from wildfires. The most recent map shows that the proposed pipeline lies outside of any identified at-risk communities. In addition, mitigation measures are proposed during construction and operations to prevent grass fires as discussed below.

During pipeline construction, the greatest potential for fire hazard comes from welding activities and using internal combustion engines or sparking equipment in grass covered areas along the Project route. The CDF regulations and local ordinances would reduce to the risk of grass fires. APM HAZ-6 and APM HAZ-8 would not adequately reduce construction impacts to less than significant because there are insufficient details in APM HAZ-6 and APM HAZ-8 to ensure that potential impacts would be minimized. As a result, MM HAZ-1 is required to be implemented

during construction activities to reduce the impact of wildland fires to less than significant.

The operation phase includes a Public Safety Information Program with a Fire Response Plan. In addition, the design features that include burying the pipeline deeper than required, anti-corrosion measures, a 50-foot permanent right of way, and aboveground line markers would reduce operations phase impacts to less than significant (Class III).

Mitigation Measures for Impact HAZ-1: Emergency Plans/Wildland Fires

**MM HAZ-1.** **Minimize Risk of Fire.** During all construction activities, PG&E shall implement the following:

- Maintain all areas clear of vegetation and other flammable materials for at least a 50-foot-radius of any welding or grinding operations, or the use of an open flame;
- Spray nearby vegetation with water, using a water truck or other suitable equipment, prior to any welding or grinding operations or the use of an open flame;
- All equipment, gasoline-powered hand tools, and vehicles shall be equipped with spark arresters;
- Equip all vehicles entering the right-of-way, welding trucks or rigs with minimal fire suppression equipment (e.g., ax, bucket, 5-pound fire extinguisher, shovels, etc.);
- Park vehicles equipped with catalytic converters only in cleared areas;
- Maintain at least one half-full water truck or water tanker at each rural work site during all periods of work and for one-hour after all work has ceased for the day; and
- Require the contractor to use dedicated fire watch during all hot work within existing operational stations (e.g., Concord or Sacramento Station).

Rationale for Mitigation

Risk of fire would be reduced by the measures listed above beyond those measures covered under APM HAZ-6 and APM HAZ-8. The measures include vegetation clearance to reduce fuel during fires, use of spark arresters, use of fire suppression equipment in vehicles and equipment, parking limitations, adequate on-site water supply, and fire watch during hot work.

**Impact HAZ-2: System Safety and Risk of Serious Injuries and Fatalities Due to Project Upset**

**The Project would expose people to an unacceptable risk of existing or potential hazards, including upset and accident conditions involving the risk for fires, explosions, or the release of natural gas into the environment (Significant, Class I).**

Natural gas could be released from a leak or rupture. If the natural gas reached a combustible mixture and an ignition source was present, a fire and/or explosion could occur, result in possible injuries and/or deaths.

An unacceptable risk is defined as a one in a million (1:1,000,000) chance of a fatality (CDE 2007). During operation, there would be individual risks to building occupants, residential, commercial, and school sites, as well as to vehicle occupants. The risks would include the release of natural gas, which could reach a combustible mixture and if an ignition source was present, a fire and/or explosion could occur, resulting in possible injuries and/or deaths.

Natural gas is composed primarily of methane. If methane were to be released from the proposed Project, it would need to mix with enough oxygen to become combustible. Natural gas does not explode unless it is confined sufficiently within a specific range of mixtures with air and is ignited. Methane has an ignition temperature of 1,000 $^{o}$F and is flammable at concentrations between 5 percent and 15 percent in air. Many variables affect the size of an explosion, including rate of vapor cloud formation, size of the vapor cloud within the combustible range, concentration of vapors, degree of vapor cloud confinement, and other factors.

Individual Risk of Serious Injuries or Fatalities

In the following paragraphs, the impacts related to serious injuries and fatalities are described for individuals exposed to a fire or explosion. The risks associated with Line 406 were assessed using the existing conditions. The risks associated with

Line 407 and the DFM were assessed using existing conditions, plus the impacts of the proposed land developments within Placer County, including Sutter Pointe, Placer Vineyard, Sierra Vista, and Curry Creek.

Table 4.7-5 below summarizes the calculated risks for each segment of the Project as well as the total risk from the Project. As seen in Table 4.7-5 the risk to building occupants and vehicle occupants exceeds the 1:1,000,000 acceptable risk threshold. The anticipated individual frequency of serious injury or fatality from the proposed project is approximately $6.1 \times 10^{-5}$. This represents a 1:16,000 likelihood of a serious injury or fatality annually, which is roughly sixty times greater than the generally accepted criteria of 1:1,000,000. The individual risks posed by each of the individual line segments are also summarized. As noted, the risk for each of the individual line segments, except Line DFM, exceeds the individual risk significance criteria. As a result the individual risk posed by the proposed Project is considered significant (Class I).

**Table 4.7-5: Individual Risk Summary**

| | Line 406 | Line 407 E | Line 407 W | Line DFM | Total |
|---|---|---|---|---|---|
| Building Occupants | $1.05 \times 10^{-6}$ | $1.99 \times 10^{-5}$ | $4.54 \times 10^{-6}$ | $7.00 \times 10^{-7}$ | $2.62 \times 10^{-5}$ |
| Vehicle Occupants | $1.84 \times 10^{-6}$ | $2.94 \times 10^{-5}$ | $3.21 \times 10^{-6}$ | $2.06 \times 10^{-7}$ | $3.46 \times 10^{-5}$ |
| Probability of Serious Injury or Fatality | $2.89 \times 10^{-6}$ | $4.93 \times 10^{-5}$ | $7.75 \times 10^{-6}$ | $9.06 \times 10^{-7}$ | $6.08 \times 10^{-5}$ |
| Annual Likelihood of Serious Injury or Fatality | 1:350,000 | 1:27,000 | 1:130,000 | 1:1,100,000 | 1:16,000 |
| Percentage of Total Risk to Building Occupants | 4.8% | 81.1% | 12.7% | 1.4% | 100% |
| Source: EDM Services, Inc. 2009. | | | | | |

Table 4.7-6 provides a description of the distances to various impacts should an unintentional release of natural gas occur.

## Table 4.7-6: Consequence versus Distance Summary

| Distance to Impact (feet) | Description of Potential Consequence |
|---|---|
| 35 feet | 1.0 psig overpressure from 1-inch diameter release explosion, release 45° above horizon. Windows usually shattered and occasional damage to window frames. 1 percent probability of serious injury or fatality to occupants in reinforced concrete or reinforced masonry building from flying glass and debris. |
| 50 feet | 0.7 psig overpressure from 1-inch diameter release explosion, release 45° above horizon. Minor damage to residential structures. Some injuries to those indoors due to flying debris, but very unlikely to be serious. |
| 50 feet | 8,000 btu/hr-ft$^2$ heat flux from 1-inch diameter release torch fire, release 45° above horizon. 50 percent mortality anticipated to those exposed. |
| 70 feet | 3,500 btu/hr-ft$^2$ heat flux from 1-inch diameter release torch fire, release 45° above horizon. Second degree skin burns after ten seconds of exposure. |
| 90 feet | 1,600 btu/hr-ft$^2$ heat flux from 1-inch diameter release torch fire, release 45° above horizon. Second degree skin burns after thirty seconds of exposure. |
| 360 feet | Distance to lower flammability limit (flash fire boundary) from full bore release at 45° above horizon for flash fire. This would likely result in serious injury or death to those exposed to the ignited vapor cloud under typical conditions. |
| 380 feet | 1.0 psig overpressure from full bore release explosion, release 45° above horizon. Windows usually shattered and occasional damage to window frames. 1 percent probability of serious injury or fatality to occupants in reinforced concrete or reinforced masonry building from flying glass and debris. |
| 420 feet | 1.0 psig overpressure from full bore release explosion, horizontal release. Windows usually shattered and occasional damage to window frames. 1 percent probability of serious injury or fatality to occupants in reinforced concrete or reinforced masonry building from flying glass and debris. |
| 520 feet | 8,000 btu/hr-ft$^2$ heat flux from full bore release torch fire, release 45° above horizon. 50 percent mortality anticipated to those exposed. |
| 540 feet | 0.7 psig overpressure from full bore release explosion, release 45° above horizon. Minor damage to residential structures. Some injuries to those indoors due to flying debris, but very unlikely to be serious. |
| 600 feet | 0.7 psig overpressure from full bore release explosion, horizontal release. Minor damage to residential structures. Some injuries to those indoors due to flying debris, but very unlikely to be serious. |

| Distance to Impact (feet) | Description of Potential Consequence |
|---|---|
| 600 feet | 5,000 btu/hr-ft$^2$ heat flux from full bore release torch fire, release 45° above horizon. California Department of Education uses 1 percent mortality to those exposed. |
| 640 feet | Distance to lower flammability limit (flash fire boundary) from full bore release at horizontal for flash fire. This would likely result in serious injury or death to those exposed to the ignited vapor cloud under typical conditions. |
| 730 feet | 3,500 btu/hr-ft$^2$ heat flux from full bore release torch fire, release 45° above horizon. Second degree skin burns after ten seconds of exposure. |
| 800 feet | 8,000 btu/hr-ft$^2$ heat flux from full bore release torch fire, horizontal release. 50 percent mortality anticipated to those exposed. |
| 820 feet | 5,000 btu/hr-ft$^2$ heat flux from full bore release torch fire, horizontal release. California Department of Education uses 1 percent mortality to those exposed. |
| 820 feet | Distance to lower flammability limit (flash fire boundary) from full bore release at horizontal for flash fire. This would likely result in serious injury or death to those exposed to the ignited vapor cloud. This result is for the worst case modeling inputs, as defined by the United States Environmental Protection Agency. |
| 940 feet | 1,600 btu/hr-ft$^2$ heat flux from full bore release torch fire, release 45° above horizon. Second degree skin burns after thirty seconds of exposure. No fatalities anticipated for reasonable exposure duration. |
| 980 feet | 1,600 btu/hr-ft$^2$ heat flux from full bore release torch fire, horizontal release. Second degree skin burns after thirty seconds of exposure. No fatalities anticipated for reasonable exposure duration. |
| 1,260 feet | 0.3 psig overpressure from full bore release explosion, release 45° above horizon. 10 percent window glass breakage. No injuries. |
| 1,370 feet | 440 btu/hr-ft$^2$ heat flux from full bore release torch fire, horizontal release. Prolonged skin exposure causes no detrimental effect. |
| 1,540 feet | 440 btu/hr-ft$^2$ heat flux from full bore release torch fire, release 45° above horizon. Prolonged skin exposure causes no detrimental effect. |
| 1,890 feet | 0.2 psig overpressure from full bore release explosion, release 45° above horizon. Some window glass breakage, no injuries to building occupants. |

Notes:
Psig = pounds per square inch gauge
btu/hr-ft$^2$ = British thermal units /hour-square foot
Source: EDM Services, Inc. 2009.

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During operation, the greatest risk for injury and fatality occurs with a leak or unintentional release of natural gas. The most frequent causes of incidents include corrosion and outside forces. Outside forces include impact by mechanical equipment, such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geological hazards; weather effects, such as winds, storms, and thermal strains; and willful damage.

Regulations required for the proposed Project include a minimum 0.375-inch pipe wall thickness. PG&E would meet those requirements, and in some areas of the pipeline go beyond the required pipe thickness for the proposed Project. A large proportion of the proposed pipeline would consist of 0.375-inch-wall thickness steel pipe (Grade X-60) designed for a Maximum Allowable Operating Pressure (MAOP) of 975 pounds per square inch gauge (psig). The Project Class 2 locations would consist of 0.406- to 0.438-inch thickness steel pipe, Class 3 locations would consist of 0.500-inch-wall thickness steel pipe, and HDD sections would consist of 0.625-inch-wall thickness steel pipe, for added strength during the installation.

The DOT Code of Federal Regulations 49 Part 192.327 establishes minimum cover requirements at 30 inches for transmission pipelines in Class 1, and 36 inches in Classes 2, 3, and 4. PG&E has increased the cover beyond minimum requirements to 5 feet, which would provide increased protection from third party damage including agricultural operations.

PG&E proposes to “butt-weld” all pipeline sections (pipes are welded together without the ends overlapping). All welds (100 percent) would be x-rayed to ensure structural integrity and compliance with applicable DOT regulations. This goes beyond the DOT Code of Federal Regulations 49 Part 192.243 that requires a certain percentage of welds to be tested. Welds that do not meet American Petroleum Institute 1104 specifications would be repaired or removed. Once the welds are approved, the welded joints would be covered with a protective coating and the entire pipeline would be electronically and visually inspected for any faults, scratches, or other damage.

PG&E proposes to conduct the following inspections as a part of the proposed Project, meeting the DOT 49 CFR Part 192 requirements:

**Table 4.7-7: Pipeline Inspections and Frequency**

| Inspection/Testing | Frequency |
|---|---|
| Cathodic protection (Pipe to Soil Potential) | Annually |
| Cathodic protection (Rectifier Readings) | Six times per year |
| Valve testing | Annually |
| Pipeline patrols | Annually |
| Class 1 & 2 | Annually |
| Class 3 | Twice per year |
| Leak Surveys | Annually |
| High Consequence Area (HCA) Risk assessment | Every seven years |
| Source: PG&E 2008. | |

The required regulations, along with PG&E Project features that meet and exceed the minimum requirements, would reduce risks of project upset. However, additional measures are required to attempt to further reduce the proposed Project impacts.

Mitigation Measures for Impact HAZ-2: Unacceptable Risk of Existing or Potential Hazards

**MM HAZ-2a.** **Corrosion Mitigation.** The following shall be required:

- Line pipe shall be manufactured in the year 2000 or later;
- Before placing the pipeline into service, PG&E would perform post-construction geometry pig surveys, which would locate any construction related dents.
- PG&E shall prepare and implement an Operation and Maintenance Plan in accordance with the requirements in Title 49 CFR Part 192. Within the first 6 months of placing the pipeline into operation, PG&E shall conduct a baseline internal inspection with a high resolution instrument (smart pig) of the pipeline in order to obtain baseline data for the pipeline.
- Following the baseline inspection, internal inspections with a high resolution instrument (smart pig) would be conducted on a periodic basis, at a minimum of one inspection every 7 years, or sooner if the evidence suggests that significant corrosion or defects exist or if any new Federal or State regulations require more frequent or comparable inspections. The existing pipeline

system is monitored and controlled 24 hours a day for pressure drops in the pipeline that could indicate a leak or other operating problem through a Supervisory Control and Data Acquisition system, which is a computer system for gathering and analyzing real-time systems. The system is programmed to take appropriate immediate action when alarm conditions are present.

- PG&E shall prepare an Emergency Response Plan that would be coordinated and tested (through drills and exercises) with local fire/police departments and emergency management agencies.

**MM HAZ-2b Installation of Automatic Shutdown Valves.**

PG&E plans to install remote operated valves at the Capay Station and the Yolo Junction Station, which would help to control the flow of gas into Lines 406 and 407. PG&E shall install automatic shutdown valves in three locations: Power Line Road MLV Station No. 752+00 (which includes the Riego Road Regulating Station), Baseline Road/Brewer Road MLV Station No. 1107+00, and Baseline Road Pressure Regulating Station No. 1361+00. These automatic shut down valve locations would enhance public safety protection in the planned populated areas, which include schools and other existing and planned developments.

Rationale for Mitigation

Corrosion has been found to be one of the main causes of leaks or ruptures. Studies have shown that corrosion occurs more often in older pipes, therefore using pipe manufactured after 2000 would help reduce corrosion. In addition, corrosion can be slowed down by increasing the thickness of the coating on the outside of the pipe, increasing the thickness of the pipe, and by increased surveillance through cathodic protection. The corrosion mitigation measure would reduce the incidence of leaks and therefore would reduce the individual risk of serious injury or fatality. Increased wall thickness allows more time to pass before a leak may result. During that time inspections may be able to identify the potential leak and take precautionary measures. Close interval cathodic protection surveys can identify coating defects and potential metal loss before an incident occurs. Internal inspections using modern techniques can identify external corrosion and other possible causes for an incident.

Another cause of incidents has been outside forces, which accounted for 54 percent of the incidents (see Table 4.7-3 above). These included equipment operated by an outside party, equipment operated by or for the operator, earth movement, and weather. With implementation of the proposed mitigation measures, the incidence of leaks and possible explosion due to outside forces would be reduced, thereby reducing the individual risk of serious injury or fatality. Studies from western Europe have shown that increased wall thickness reduced the frequency of unintentional releases by third parties by 80 percent, increased depth of cover of 48 inches or more reduced third party-caused incidents by 30 percent, and pipelines protected by some form of warning device reduced third party-caused incidents by 10 percent (HSE 2001).

Residual Impacts

The Project design features and the proposed mitigation measures reduce the risk by 50 percent, however, the individual risk would still be approximately 1:30,000, which exceeds individual risk significance thresholds by a factor of thirty. In addition, the sensitive receptors located within certain distances described in this section along the proposed Project alignment would be significantly impacted due to risks of explosion, torch fires, and flash fires. Therefore, impacts remain significant (Class I).

Impacts of Alternatives

A No Project Alternative as well as twelve options have been proposed for the alignment in order to minimize or eliminate environmental impacts of the proposed Project and to respond to comments from nearby landowners. The twelve options, labeled A through L, have been analyzed in comparison to the portion of the proposed route that has been avoided as a result of the option. Descriptions of the options can be found in Section 3.0, Alternatives and Cumulative Projects, and are depicted in Figure 3-2A through Figure 3-2K APMs HAZ-1 through HAZ-8, as well as APM BIO-13, designed to reduce potential hazards and hazardous materials impacts from project construction and operation, would apply to all twelve options.

**No Project Alternative**

Under the No Project Alternative no new natural gas pipeline or above-ground stations would be constructed by PG&E in Yolo, Sutter, Sacramento, and Placer counties. Therefore, the hazards associated with the construction and operation of the Project would not occur.

**Option A**

Option A would realign a portion of Line 406 along CR-16 and CR-15B. This would increase the length of Line 406 which would pose an impact to existing residences and roadways. The annual likelihood of serious injury or fatality along Line 406 would increase by 22 percent, from $2.89 \times 10^{-6}$ to $3.52 \times 10^{-6}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would increase by 1 percent, from $6.08 \times 10^{-5}$ to $6.16 \times 10^{-5}$ (EDM Services, Inc. 2009). Option A would increase the risk but the impacts would be the same as for the proposed Project.

**Option B**

Similar to Option A, Option B would realign a portion of Line 406. This would increase the length of Line 406 which would pose an impact to existing residences and roadways. The annual likelihood of serious injury or fatality along Line 406 would increase by 29 percent, from $2.89 \times 10^{-6}$ to $3.72 \times 10^{-6}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would increase by 2 percent, from $6.08 \times 10^{-5}$ to $6.18 \times 10^{-5}$ (EDM Services, Inc. 2009). Option B would increase the risk but the impacts would be the same as for the proposed Project.

**Option C**

Option C would realign a portion of Line 406, but would not increase the length of Line 406, and therefore would not pose an impact to existing residences and roadways. The annual likelihood of serious injury or fatality along Line 406 would be the same for Option C as for the proposed Project. Therefore, impacts would be the same as for the proposed Project.

**Option D**

Option D would realign a portion of Line 406. The primary change would be to extend the portion along CR-17. This would increase the length of Line 406 which would pose an impact to existing residences and roadways. The annual likelihood of serious injury or fatality along Line 406 would increase by 30 percent, from $2.89 \times 10^{-6}$ to $3.75 \times 10^{-6}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would increase by 2 percent, from $6.08 \times 10^{-5}$ to $6.18 \times 10^{-5}$ (EDM Services, Inc. 2009). Option D would increase the risk but the impacts would be the same as for the proposed Project.

**Option E**

Option E would realign a portion of Line 406. The primary change would be to extend the portion along CR-19. This would increase the length of Line 406 which would pose an impact to existing residences and roadways. The annual likelihood of serious injury or fatality along Line 406 would increase by 24 percent, from $2.89 \times 10^{-6}$ to $3.57 \times 10^{-6}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would increase by 1 percent, from $6.08 \times 10^{-5}$ to $6.16 \times 10^{-5}$ (EDM Services, Inc. 2009). Option E would increase the risk but the impacts would be the same as for the proposed Project.

**Option F**

Option F would realign a portion of Line 407 West. The realignment would result in minimal changes to the risks posed to the public. The annual overall likelihood of serious injury or fatality along Line 407 would increase 3 percent, from $7.75 \times 10^{-6}$ to $7.99 \times 10^{-6}$ (EDM Services, Inc. 2000). However, the overall likelihood of serious injury or fatality for all of the proposed line segments would increase less than 1 percent from $6.08 \times 10^{-5}$ to $6.12 \times 10^{-5}$. Option F would increase the risk but the impacts would be the same as for the proposed Project.

**Option G**

Option G would realign a portion of Line 407 West, but would not increase the length of Line 407, and therefore would not pose an impact to existing residences and roadways. The annual likelihood of serious injury or fatality along Line 407 would be the same for Option G as for the proposed Project. Therefore, impacts would be the same as for the proposed Project.

**Option H**

Option H would realign a portion of Line 407. Option H would extent the Project through the Sacramento Metropolitan Airport property about 0.5 mile north of the northernmost runway. Should a leak or rupture and a fire occur in this Section of the pipeline, there is potential to disrupt air traffic at the airport. Option H would result in slight changes to the risks posed to the public. The annual likelihood of serious injury or fatality along Line 407 would increase 28 percent, from $7.75 \times 10^{-6}$ to $9.92 \times 10^{-6}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would increase less than 4 percent, from $6.08 \times 10^{-5}$ to $6.31 \times 10^{-5}$(EDM Services, Inc. 2009). Although the risk would increase under Option H, the impacts would be the same as for the proposed Project.

**Option I**

Option I would realign a portion of Line 407 to place the pipeline outside the 1,500-foot buffer zone around a planned high school (PG&E 2009). This alternative would:

- Add approximately 3,000 feet of pipe to the overall pipeline length.
- Remove one mile of line from potential impacts to vehicle occupants and planned commercial development along Baseline Road.
- Add 1,500 feet of potential impacts to vehicle occupants along both South Brewer and Country Acres Roads.
- Add impacts to existing rural residences.

The annual likelihood of serious injury or fatality along Line 407 would decrease 14 percent, from $1.99 \times 10^{-5}$ to $1.71 \times 10^{-5}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would decrease 5 percent, from $6.08 \times 10^{-5}$ to $5.80 \times 10^{-5}$ (EDM Services, Inc. 2009).

The California Education Code, section 17213 specifies that a school district may not approve a project involving the acquisition of a school site unless it determines that the property to be purchased or built upon does not contain a pipeline situated underground or aboveground that carries hazardous substances, acutely hazardous materials, or hazardous wastes, unless the pipeline is a natural gas line used only to supply that school or neighborhood. The California Code of Regulation, Title 5, section 14010(h) states that, "the site shall not be located near an above-ground water or fuel storage tank or within 1,500 feet of the easement of an above ground or underground pipeline that can pose a safety hazard as determined by a risk analysis study, conducted by a competent professional." This realignment would place the pipeline beyond the specified 1,500-foot school buffer.

Although the risk would decrease under Option I, the impacts would be the same as for the proposed Project.

**Option J**

Option J would realign a portion of Line 407 to place the pipeline outside the 1,500-foot buffer zone around a planned high school (PG&E 2009). This alternative would:

- Add approximately 5,200 feet of pipe to the overall pipeline length;

- Remove one mile of line from potential impacts to vehicle occupants and planned commercial development along Baseline Road;
- Add 2,600 feet of potential impacts to vehicle occupants along South Brewer Road; and
- Add roughly lineal feet of potential impacts to vehicle occupants along Country Acres Road.
- Add impacts to existing rural residences.

The annual likelihood of serious injury or fatality along Line 407 would decrease 10 percent, from $1.99x10^{-5}$ to $1.80x10^{-5}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would decrease 3 percent, from $6.08x10^{-5}$ to $5.89x10^{-5}$ (EDM Services, Inc. 2009). This realignment would place the pipeline line beyond the specified 1,500-foot school buffer.

Although the risk would decrease under Option J, the impacts would be the same as for the proposed Project.

**Option K**

This alternative would realign a portion of Line 407, Phase I approximately 150-feet further to the north, just beyond the 1,500-foot buffer of a planned elementary school. This alternative would reduce the length of line affecting vehicle occupants from the impacts of 1-inch diameter releases along Baseline Road. The annual likelihood of serious injury or fatality along Line 407, Phase I would decrease less than 2 percent, from $1.99x10^{-5}$ to $1.96x10^{-5}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would decrease less than 1 percent, from $6.08x10^{-5}$ to $6.05x10^{-5}$ (EDM Services, Inc. 2009).

Although this realignment would place the proposed natural gas line outside the 1,500-foot buffer, it is unlikely that serious risks would be posed to the student body from the applicant proposed pipeline location, which is approximately 1,350 feet from the school boundary. The distances to various impacts from the proposed pipeline are summarized below. As noted in above in Table 4.7-6 and in Appendix G-3, the impacts are very minor at distances greater than 800 to 1,000 feet.

It should be noted that the California Department of Education (CDE), Guidance Document for School Site Pipeline Risk Analysis (Guidance Document) considers 1 percent mortality (fatality probability of 1 percent) to be the reasonable estimate of

the boundary of serious harm. It is considered the demarcation between threat (1 percent mortality) and no-threat (0 percent mortality). Using this criterion, the following boundary distances could be established from the proposed Line 407 to proposed school sites:

- Explosion - 420 feet. This is the distance to the 1.0 psig overpressure level from a full bore, horizontal release. This level of overpressure is considered by some sources to result in a 1 percent probability of serious injury or fatality to occupants in reinforced concrete or reinforced masonry building from flying glass and debris. It should be noted that this is a conservative result. For reference, the CDE Guidance Document indicates that an overpressure level of up to 2.3 psig will not result in any fatalities to persons inside buildings or outdoors; the maximum anticipated peak overpressure level from the proposed pipeline is 1.5 psig at distances less than 420 feet from the source.

- Flash Fire - 640 feet. This is the downwind distance to the lower flammability limit of an unignited vapor cloud from a full bore horizontal release under the typical conditions outlined in Table 4.7-6 It should be noted that the size of the combustible vapor cloud can vary significantly depending on atmospheric and other conditions. For example, if the wind speed was decreased from 2.0 to 1.5 meters per second and the stability class was changed from D to F, the downwind distance to the lower flammability limit of the unignited vapor cloud would increase to 820 feet; these conditions are considered the worst case for off-site consequence modeling from stationary sources by the United States Environmental Protection Agency.

- Torch Fire - 820 feet. This is the distance to the 5,000 btu/hr-ft$^2$ heat flux which is considered by the CDE to be the level of exposure resulting in 1 percent mortality. For reference, the CDE Guidance Document provides charts for determining radiant heat from torch fires. Although these charts were developed using a different modeling software, they show a distance of 975 feet from the release to the 5,000 btu/hr-ft$^2$ heat flux. (CDE 2007)

Although the risk would decrease under Option K, the impacts would be the same as for the proposed Project.

**Option L**

Option L would involve installing the portion of Line 407, which is within the 1,500 foot buffer of a planned elementary school, using horizontal directional drilling

techniques. This would significantly reduce or eliminate the likelihood of the line being damaged by third parties, since the line would be installed well below normal excavation depths. The estimated baseline risk of unintentional release would be reduced roughly one-third, from $1.96x\ 10^{-4}$ to $1.2x10^{-4}$. The annual likelihood of serious injury or fatality along Line 407 would decrease less than 3 percent, from $1.99x10^{-5}$ to $1.94x10^{-5}$. The overall likelihood of serious injury or fatality for all of the proposed line segments would decrease less than 1 percent, from $6.08x10^{-5}$ to $6.03x10^{-5}$ (EDM Services, Inc. 2009). However, although the risk would decrease under Option I, the impacts would be the same as for the proposed Project.

**Table 4.7-8: Comparison of Alternatives for Hazards and Hazardous Materials**

| Alternative | Comparison with Proposed Project |
|---|---|
| No Project | No Impacts |
| Option A | Similar Impacts |
| Option B | Similar Impacts |
| Option C | Similar Impacts |
| Option D | Similar Impacts |
| Option E | Similar Impacts |
| Option F | Similar Impacts |
| Option G | Similar Impacts |
| Option H | Similar Impacts |
| Option I | Similar Impacts |
| Option J | Similar Impacts |
| Option K | Similar Impacts |
| Option L | Similar Impacts |
| Source: Michael Brandman Associates 2009. | |

### 4.7.6 Cumulative Projects Impact Analysis

The exact timing of construction for most of projects in proximity to the proposed Project is unknown but could possibly coincide with the proposed Project. Coinciding construction schedules could increase the risk of certain hazards, including environmental contamination, exposure to hazardous materials, and wildland fires. However, these risks would be temporary in nature, as construction

of the proposed Project is estimated to last three to four months. Cumulative impacts related to risk of environmental contamination, exposure to hazardous materials, and wildland fires would be less than significant (Class III).

### 4.7.7 Summary of Impacts and Mitigation Measures

The potential to interfere with emergency plans and the potential for wildland fires during construction activities would be reduced to a less than significant level through the implementation of Mitigation Measure HAZ-1.

Between 1970 and 1984 there were 5,862 reportable gas pipeline incidents resulting in 438 injuries and 74 deaths. From 1984 to 2004 there were 2,845 incidents causing 1,523 injuries and 340 deaths. The major causes of the incidents were corrosion and third party incidents. These two causes were responsible for 71 percent of the incidents between 1970 and 1984 and 63 percent of the incidents between 1986 to 2001.

The potential individual risk of serious injury or fatality attributed to the proposed Project has been estimated to be one in 16,000 (1:16,000) annually, roughly 60 times greater than the generally acceptable level of one in one million (1:1,000,000) per year. Mitigation measures HAZ-2a and HAZ-2b reduce the potential for leaks due to corrosion and serve to enhance public safety, but they do not reduce the risk of upset impact to a less than significant level. The impact is therefore considered significant and unavoidable (Class I). Table 4.7-9 summarizes the impacts and mitigation measures for hazards and hazardous materials.

**Table 4.7-9: Summary of Hazards and Hazardous Materials and Mitigation Measures**

| Impact | Mitigation Measure |
|---|---|
| **HAZ-1.** Emergency plans/Wildland fires. | **HAZ-1.** Minimize risk of fire. |
| **HAZ-2.** System Safety and Risk of Serious Injuries and Fatalities Due to Project Upset. | **HAZ-2a.** Corrosion mitigation.<br>**HAZ-2b.** Installation of automatic shut-down valves. |
| Source: Michael Brandman Associates 2009. | |