

Section 3.2  
Land Use, Agriculture, Population and Housing



## 3.2 Land Use, Agriculture, Population and Housing

### 3.2.1 Introduction

This section describes the affected environment and regulatory setting for land use (including planning and recreation), agriculture, and population and housing. It also describes the impacts on these resources that would result from implementation of the project, and mitigation measures that would reduce those impacts.

Socioeconomic impacts are discussed separately in Section 3.12, *Socioeconomics*. Growth-inducing and cumulative impacts are discussed separately in Chapter 4, *Other CEQA Analyses*.

#### 3.2.1.1 Summary of Impacts

Table 3.2-1 presents a summary of the impacts on land use, agriculture, and population and housing. See Section 3.2.6, *Impacts*, and Section 3.2.7, *Mitigation Measures*, for a detailed discussion of all impacts and mitigation measures.

**Table 3.2-1. Summary of Land Use, Agriculture, and Population and Housing Impacts**

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
LU-1a: Physically Divide a Community	All Alternatives	Less than Significant	None Required	–
Impact LU-1b: Disruption of Surrounding Land Uses during Construction	All Alternatives	Less than Significant	None Required	–
LU-1c: Incompatibility with or Substantial Disruption of Surrounding Land Uses during Operations	No Project Alternative All Action Alternatives	Less than Significant Potentially Significant	None Required WTR-MM-2: Water Supply Program for Wells that Are Affected by Remedial Activities	– Less than Significant
LU-1d: Potential Inconsistency with San Bernardino County Land Use/Zoning Designations and General Plan Policies	All Alternatives	Less than Significant	None Required	–
LU-1e: Potential Inconsistency with the California Desert Conservation Plan and/or the West Mojave Plan	No Project Alternative All Action Alternatives	Less than Significant Potentially Significant	None Required LU-MM-1: Obtain Bureau of Land Management Permits BIO-MM-1a: Construction Measures Required to Minimize, Reduce, or Mitigate Impacts to Desert Tortoise BIO-MM-1b: Limit Footprint of Disturbance Areas within Special-Status Species Habitats	– Less than Significant

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
			BIO-MM-1c: Implement Pre-Construction and Ongoing Awareness and Training Program BIO-MM-1d: Conduct Ongoing Biological Construction Monitoring BIO-MM-1e: Minimize Potential Construction Hazards to Special-Status Species BIO-MM-1f: Minimize Construction and/or Operational Practices and/or Facilities to Prevent Attraction of Project-Related Predators BIO-MM-1g: Reduction of Project-Related Spread of Invasive Plant Species BIO-MM-1h: Compensate Impacts to Desert Tortoise and Mohave Ground Squirrel BIO-MM-1i: Integrated Pest Management and Adaptive Management Plan for Agricultural Treatment Units BIO-MM-1j: Reduction of Night Light Spillover BIO-MM-1k: Other Measures Required to Minimize, Reduce, or Mitigate Impacts to Mohave Ground Squirrel BIO-MM-1l: Other Measures Required to Minimize, Reduce, or Mitigate Impacts to Burrowing Owl BIO-MM-1m: Minimize Impacts to American Badger Natal Dens and Desert Kit Fox Occupied Dens BIO-MM-1n: Avoid Impacts to Nesting Loggerhead Shrike, Northern Harrier, and Other Migratory Birds BIO-MM-1o: Implement Measures Required to Minimize, Reduce, or Mitigate Impacts to Special-Status Plants <u>BIO-MM-1p: If Remedial Actions Affect Mojave Fringe-toed Lizard Habitat, then Compensate for Habitat Losses</u> BIO-MM-4: Implement West	

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
			Mojave Plan Measures to Impacts to DWMAs on BLM Land	
LU-2: Conversion of Agricultural Land to Non-Agricultural Use, Including FMMP-Designated and Williamson Act Lands	No Project Alternative	Less than Significant	None Required	-
	All Action Alternatives	Potentially Significant	LU-MM-2: Acquire Agricultural Conservation Easements for Important Farmland; WTR-MM-2 (see above)	Less than Significant
LU-3: Population and Housing Changes due to Remedial Activities	All Alternatives	Less than Significant	None Required	-

1 The project could disrupt existing residential and commercial activities through groundwater  
2 drawdown and/or temporary water quality degradation in certain areas due to remediation  
3 byproducts. This impact could be mitigated through provision of alternative water supplies and/or  
4 centralized treatment systems for restoring water quality, to avoid disruption of residential and  
5 commercial land uses, as described in Section 3.1, *Water Resources and Water Quality*.

6 The project would not disrupt recreational opportunities or induce demand for new recreational  
7 facilities.

8 Most of the activities included in the project would be consistent with land use designations and  
9 zoning in the San Bernardino General Plan. However, the above-ground (ex-situ) treatment plants  
10 included in Alternative 4C-3 and Alternative 4C-5 would be inconsistent with current land use  
11 designations and zoning. PG&E would be required to obtain a General Plan amendment and  
12 complete associated permitting with San Bernardino County in order to implement the above-  
13 ground treatment plans if one of these alternatives is advanced. With compliance with the County  
14 land use planning process and permitting, the project's inconsistency with land use designations and  
15 zoning would be remedied and the associated environmental impact would be less than significant.

16 The project would have impacts on protected biological resources on federal lands under the  
17 jurisdiction of the West Mojave Plan; with mitigation identified in Section 3.7, *Biological Resources*,  
18 the project would be consistent with the West Mojave Plan.

19 The project would increase agricultural activities through the use of agricultural treatment as  
20 part of the remedial actions. Hinkley Valley has historically been used for agriculture. Although  
21 the project increases a use that is compatible with the land uses in Hinkley, the project could  
22 disrupt or interfere with other existing agricultural activities through either groundwater  
23 drawdown (affecting agricultural water supplies), acquisition of water rights by PG&E in order  
24 to comply with the Mojave River Basin Adjudication, and/or water quality degradation. Impacts  
25 on existing agricultural activities could be mitigated through the provision of alternative water  
26 supplies to affected agricultural operations and/or treatment systems for restoring water  
27 quality as described in Section 3.1, *Water Resources and Water Quality*. In addition, in order to  
28 avoid the potential for long-term conversion of agricultural land to other uses over the lifetime  
29 of the project due to use of water rights, mitigation is required to place conservation easements  
30 on agricultural land as necessary.

1 The project would not induce substantial population growth in the project area, and would not  
2 displace substantial numbers of existing housing or people, or necessitate the construction of  
3 replacement housing elsewhere.

## 4 **3.2.2 Regulatory Setting**

### 5 **3.2.2.1 Federal Regulations**

#### 6 **Farmland Protection Policy Act**

7 A National Agricultural Land Study conducted in the early 1980s found that millions of acres of  
8 farmland were being converted to other uses each year in the United States. As a result, Congress  
9 passed the Agriculture and Food Act of 1981, which contained the Farmland Protection Policy Act  
10 (FPPA). The purpose of the FPPA is to minimize the extent to which federal programs contribute to  
11 the irreversible conversion of farmland to non-agricultural uses, and to ensure that federal  
12 programs are administered in a manner that will be compatible with state, local, federal, and private  
13 programs and policies to protect farmland.

14 Because the groundwater remediation is not a federal program and there are no farmlands under  
15 jurisdiction of the act on the Bureau of Land Management (BLM) land included in the project area,  
16 the FPPA does not apply to the proposed project.

#### 17 **Bureau of Land Management California Desert Conservation Area Plan and the** 18 **West Mojave Plan**

19 There are approximately 4,382 ~~4,100~~ acres of federal land under the jurisdiction of the BLM in OU3  
20 and 4,944 ~~2,000~~ acres overall in the project study area (see Figure 3.2-1).

21 Subsequent to the Federal Land Policy and Management Act of 1976, the California Desert  
22 Conservation Area (CDCA) Plan was developed by BLM in response to direction by Congress:

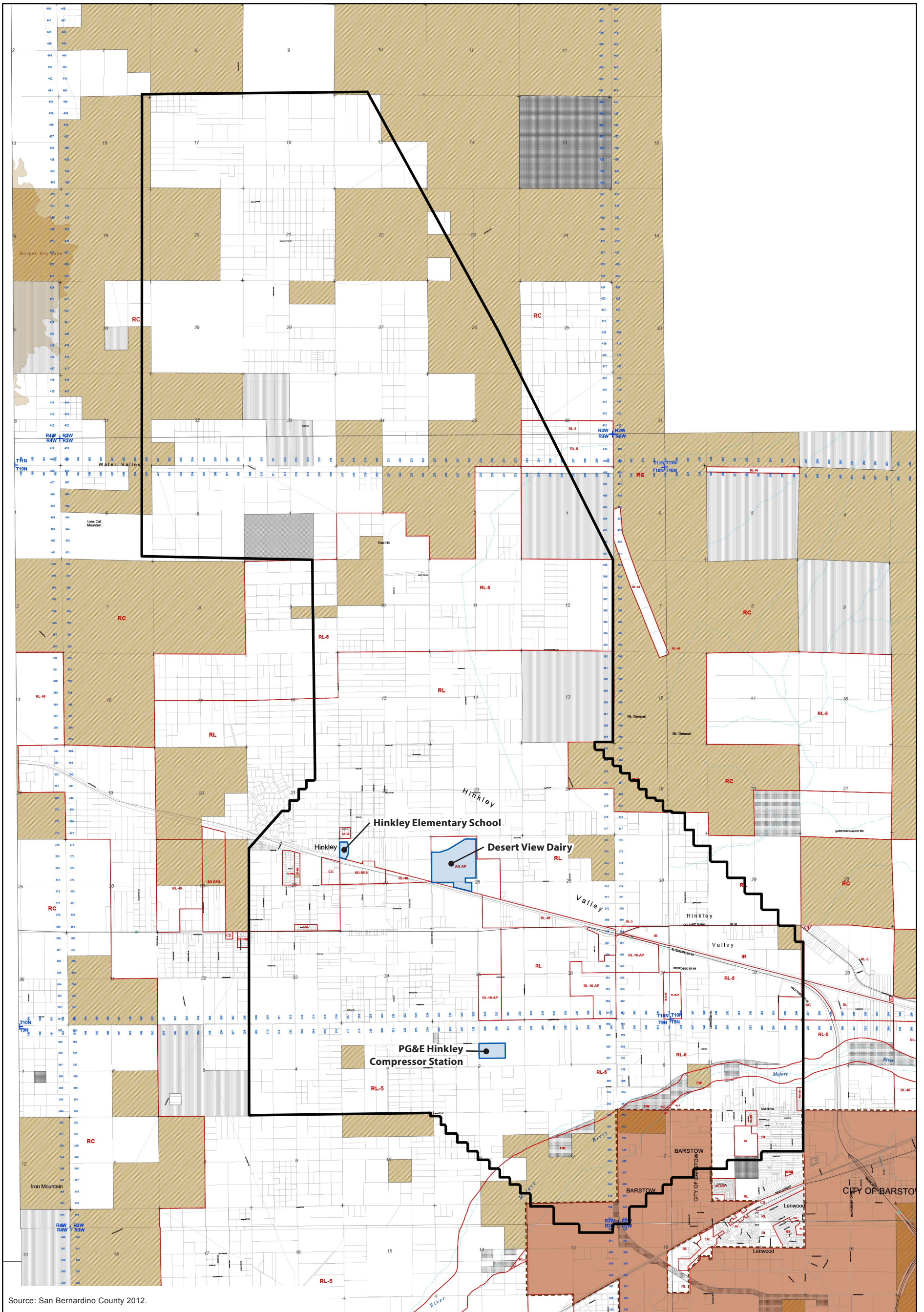
23 The use of all California desert resources can and should be provided for in a multiple use and  
24 sustained yield management plan to conserve these resources for future generations, and to provide  
25 present and future use and enjoyment, particularly outdoor recreation uses, including the use, where  
26 appropriate, of off-road recreational vehicles.

27 The CDCA Plan manages 25 million acres of land in southern California. About 10 million acres are  
28 administered by the BLM. CDCA Plan areas are managed under the California Desert Protection Act  
29 of 1994, the 1964 Wilderness Act, and BLM's national wilderness management policy, all of which  
30 mandate a high degree of protection and restrict access and use. The CDCA Plan establishes goals for  
31 protection and use of the desert and designates land with multiple use classes. The plan sets forth  
32 goals, specific actions, and management needs for each resource in the desert.

33 All of the public lands in the CDCA Plan under BLM management have been designated  
34 geographically into four multiple-use classes. The classification was based on the sensitivity of  
35 resources and the types of uses for each geographic area. Each multiple-use class describes a  
36 different type and level or degree of use which is permitted within that particular geographic area.  
37 Within the project area, the BLM lands are one of the two multiple use class-designations:

- 38 • Multiple-Use Class L (Limited Use): This Class protects sensitive, natural, scenic, ecological,  
39 and cultural resource values. Public lands designated as Class L are managed to provide for





Source: San Bernardino County 2012.

**Land Use Zoning Districts**

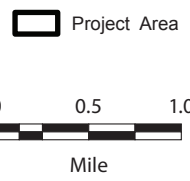
- |                              |                           |                            |
|------------------------------|---------------------------|----------------------------|
| AG – Agriculture             | CS – Service Commercial   | RC – Resource Conservation |
| CG – General Commercial      | FW – Floodway             | RL – Rural Living          |
| CH – Highway Commercial      | IC – Community Industrial | RM – Multiple Residential  |
| CN – Neighborhood Commercial | IN – Institutional        | RS – Single Residential    |
| CO – Office Commercial       | IR – Regional Industrial  | SD – Special Development   |
| CR – Rural Commercial        | OS – Open Space           | SP – Specific Plan         |

County designated Land Use Zoning Districts do not apply to Federal and State owned property, but are shown for informational purposes.

**Jurisdictional Control**

- |                 |                    |                        |
|-----------------|--------------------|------------------------|
| BLM             | State              | Private Unincorporated |
| National Park   | County             | Incorporated Land      |
| National Forest | Other Federal Land | Barstow City Limits    |
| Military        |                    |                        |

Jurisdictional Control data is for informational purposes only and is not part of the General Plan Land Use Zoning. The depiction of the various land ownership categories is the best available information but cannot be guaranteed accurate. For current land ownership information please contact the San Bernardino County Assessor's Office.



Graphics: 00122.11 (3-14-2013) tm



**Figure 3.2-1**  
**San Bernardino County General Plan Land Use Zoning Districts**







1 generally lower-intensity, carefully controlled multiple use of resources, while ensuring that  
2 sensitive values are not significantly diminished.

- 3 • Multiple-Use Class M (Moderate Use): This class is based upon a controlled balance between  
4 higher intensity use and protection of public lands. This class provides for a wide variety of  
5 present and future uses such as mining, livestock grazing, recreation, energy, and utility  
6 development. Class M management is also designed to conserve desert resources and to  
7 mitigate damage to those resources which permitted uses may cause.

8 The CDCA Plan has been amended since its adoption in 1980, including the 9,357,929-acre West  
9 Mojave Plan, which encompasses most of California's western Mojave Desert, including the project  
10 area. The West Mojave Plan is a federal land use plan that presents a comprehensive strategy to  
11 conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other sensitive  
12 plants and animals and the natural communities of which they are a part (Bureau of Land  
13 Management 2005). The West Mojave Plan originally started as a broader effort to establish a  
14 Habitat Conservation Plan that would cover activities on both private and public land throughout  
15 the western Mojave Desert. However, it was only adopted as a federal land management plan for  
16 federal lands under BLM jurisdiction.

17 The West Mojave Plan applies to limited areas of federal land, under the jurisdiction of the BLM,  
18 within the project area. The requirements of the West Mojave Plan, relevant to protection of  
19 biological resources, are discussed in additional detail in Section 3.7, *Biological Resources*.

## 20 **3.2.2.2 State Regulations**

### 21 **Farmland Mapping and Monitoring Program**

22 The purpose of the California Department of Conservation's Farmland Mapping and Monitoring  
23 Program (FMMP) is to provide consistent and impartial data to decision makers for use in assessing  
24 the status, reviewing trends, and planning for the future of agricultural land resources in California.  
25 The program, however, is not responsible for regulating farmland. FMMP rates agricultural land  
26 according to soil quality and irrigation status and updates maps every 2 years. The FMMP  
27 designated farmlands in the project area are described in Section 3.2.3.1 under *Project Area Zoning*  
28 *Designations and Allowable Uses*. The FMMP is not a regulatory program; it only provides  
29 information used for making decisions concerning agricultural land.

### 30 **Prime Farmland**

31 Prime farmland is land that has the best combination of physical and chemical characteristics for  
32 producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel,  
33 fertilizer, pesticides, and labor and without intolerable soil erosion.

### 34 **Unique Farmland**

35 Unique farmland is land other than prime farmland that is used for the production of specific high-  
36 value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables.

### 37 **Farmland of Statewide Importance**

38 Farmland of statewide importance is land of statewide or local importance identified by state or  
39 local agencies for agricultural use, but not of national significance.

### 1 **Farmland of Local Importance**

2 Farmland of local importance is land identified as important to the local agricultural economy by  
3 each county's board of supervisors and a local advisory committee.

### 4 **Grazing Land**

5 Grazing land is land on which the existing vegetation is suited to the grazing of livestock. This  
6 category was developed in cooperation with the California Cattlemen's Association, the University of  
7 California Cooperative Extension, and other groups interested in the extent of grazing activities.

### 8 **Urban and Built-Up Land**

9 Urban and built-up land is land occupied by structures with a building density of at least 1 unit to  
10 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential,  
11 industrial, commercial, construction, institutional, public administration, cemeteries, airports, golf  
12 courses, sanitary landfills, sewage treatment, water control structures, railroad and other  
13 transportation yards, and other developed purposes.

### 14 **Other Land**

15 Other land is land that is not included in any other mapping category. Common examples include  
16 low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock  
17 grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water  
18 bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban  
19 development and greater than 40 acres is mapped as other land.

### 20 **Williamson Act**

21 The California Land Conservation Act of 1965, commonly referred to as the Williamson Act,  
22 enables local governments to enter into contracts with private landowners for the purpose of  
23 restricting specific parcels of land to agricultural or related open-space use. In return,  
24 landowners receive property tax assessments that are much lower than normal because they  
25 are based on farming and open-space uses as opposed to full market value. Local governments  
26 receive an annual subvention of forgone property tax revenues from the state via the Open  
27 Space Subvention Act of 1971.

28 The Williamson Act was amended in August 1998 to establish Farmland Security Zones. Under this  
29 Farm Bureau-sponsored Super Williamson Act, landowners can receive an additional 35%  
30 reduction in the land's value for property tax purposes, only if farmers and ranchers keep their  
31 property in the conservation program for at least 20 years.

32 Of California's 58 counties, 52 have adopted the Williamson Act program. San Bernardino County is  
33 included in those that have adopted the act, and is part of the South Coast and Desert Region of the  
34 program. Williamson Act lands present in the project area are discussed in Table 3.2-2 in  
35 Section 3.2.3.2, *Agriculture*.

### 36 **3.2.2.3 San Bernardino County General Plan**

37 The project area is located in the Desert Region of San Bernardino County (County), which is one of  
38 three distinct regions discussed in the County's General Plan (San Bernardino County 2007b). Land  
39 use designations and zoning in the project area per the General Plan are discussed in Section 3.2.3.1,  
40 *Land Use*.

## 1       **General Plan Policies**

2       The County's General Plan has a set of countywide and region-specific goals and policies. Key goals  
3       and policies are listed below. In general, the county's policies apply to all land within the county's  
4       jurisdiction (i.e., lands outside city limits that are not state or federal lands). However, there is a  
5       preemption of local land use power for certain PG&E utility facilities.

6       Public Utilities Code Section 1007.5 establishes California Public Utility Commission (CPUC)  
7       authority over local jurisdictions for certain activities. The CPUC's General Order 131-D, Section XIV,  
8       "clarifies that local jurisdictions acting pursuant to local authority are preempted from regulating  
9       electric power line projects, distribution lines, substations, or electric facilities constructed by public  
10      utilities subject to the Commission's jurisdiction." Therefore, activities associated with the  
11      Compressor Station and associated gas pipelines are under CPUC authorization and exempt from  
12      local regulation. However, remedial actions associated with the chromium cleanup are not exempt,  
13      and the Water Board's regulatory authority over the cleanup does not automatically exempt the  
14      cleanup activities from exemption from local land use authority. As a state agency, the Water Board  
15      itself is not subject to local land use authority; however provided exercise of local land use  
16      regulations does not impede or hinder state exercise of authority over the remediation, remedial  
17      actions can be subject to applicable local land use requirements.

## 18      **Key Relevant Water Policies**

19      **GOAL CI 11:** The County will coordinate and cooperate with governmental agencies at all levels to  
20      ensure safe, reliable, and high quality water supply for all residents and ensure prevention of  
21      surface and ground water pollution.

22      **Policy CI 11.1:** Apply federal and state water quality standards for surface and groundwater and  
23      wastewater discharge requirements in the review of development proposals that relate to type,  
24      location and size of the proposed project to safeguard public health.

25      **Policy CI 11.2:** Support the safe management of hazardous materials to avoid the pollution of both  
26      surface and groundwater. Prohibit hazardous waste disposal facilities within any area known to  
27      be or suspected of supplying principal recharge to a regional aquifer.

28      **Policy CI 11.3:** Support the development of groundwater quality management plans with emphasis  
29      on protection of the quality of underground waters from non-point pollution sources.

30      **Policy CI 11.6:** Cooperate with state, regional, and responsible authorities to expand water  
31      sampling programs to determine ambient groundwater quality conditions affecting public,  
32      agricultural, and private wells. Identify the sources, extent, and types of organic and inorganic  
33      groundwater contaminants, and evaluate their impacts on groundwater resources.

34      **Program 1:** Establish setbacks from ephemeral and perennial streams regulating the location of  
35      septic systems, habitable structures, and other impervious or potentially polluting uses.

36      **Program 2:** Work with special districts and other water agencies responsible for delivery of water  
37      resources to develop a water resource information system regarding aquifer degradation. Monitor  
38      development and consumption trends to assess aquifer stability.

39      **Policy CI 11.13:** Prevent surface and groundwater pollution and continue the cleanup of  
40      contaminated waters and watersheds.

## 1       **Key Land Use Policies**

2       **Goal LU 1:** The County will have a compatible and harmonious arrangement of land uses by  
3       providing a type and mix of functionally well-integrated land uses that are fiscally viable and  
4       meet general social and economic needs of the residents.

5       **Policy LU 1.1:** Develop a well-integrated mix of residential, commercial, industrial, and public uses  
6       that meet the social and economic needs of the residents in the three geographic regions of the  
7       County: Valley, Mountain, and Desert.

8       **Policy LU 1.4:** Encourage preservation of the unique aspects of the rural communities and their  
9       rural character.

10       **Goal LU 8:** Beneficial facilities, such as schools, parks, medical facilities, sheriff and fire stations,  
11       libraries, and other public uses, as well as potentially hazardous sites, will be equitably  
12       distributed throughout the County.

13       **Policy LU 8.1:** Potentially polluting, hazardous, and other health risk facilities should be located no  
14       closer than one-quarter mile to a sensitive receptor and vice versa.

15       **Goal LU-11:** Promote mutually beneficial uses of land to address regional problems through  
16       coordination and cooperation among the County, the incorporated cities, Southern California  
17       Association of Governments (SCAG), San Bernardino Associated Governments (SANBAG), the  
18       various special districts and other local, state, and federal agencies.

19       **Policy LU 11.3:** Work with the Bureau of Land Management (BLM), U.S. Forest Service, the U.S. Park  
20       Service, and other public agencies to eliminate conflicts between public and private lands, and to  
21       designate and protect wilderness and restricted natural areas.

## 22       **Key Agriculture Policies**

23       **GOAL D/CO 4:** Protect agricultural lands from the effects of nonagricultural development.

24       **Policy D/CO 4.2:** The conversion of agricultural land to non-agricultural uses shall be discouraged  
25       unless the proposed use can be demonstrated to be preferable in terms of economic  
26       development, and resource availability and resource conservation.

27       **GOAL ED 6:** The County will promote agriculture as an economic activity in areas where production  
28       is viable.

29               **Policy ED 6.1:** Retain areas of the County that have long-term agricultural potential to  
30       contribute value to the overall economy.

## 31       **Key Population and Housing Policies**

32       **GOAL H 3:** Because property maintenance is desirable and can be promoted through information,  
33       training, and health and safety code enforcement programs, the following action programs will  
34       be taken.

35       **Policy H 3.10:** Contract with for-profit and non-profit developers and assist them in acquiring and  
36       rehabilitating vacant U.S. Housing and Urban Development (HUD) and Veterans Administration  
37       (VA) repossessed properties. These houses will be resold at affordable prices to first-time and  
38       other homebuyer families.



## 1       **Zoning**

2       The San Bernardino County General Plan also includes land use designations, zoning, and  
3       development codes that establish the allowable uses within different zoning districts and the  
4       development requirements for different allowable uses. The two key zoning districts that are  
5       relevant to the project area are summarized below

6       **Agriculture (AG)**—provides sites for commercial agricultural operations, agriculture support  
7       services, rural residential uses, and other compatible uses. Open space and recreational uses may  
8       occur on non-farmed lands within this AG land use zoning district. Areas designated as Agriculture  
9       with an Agricultural Preserve overlay (AG-AP) are designated for agriculture or conservation,  
10      including Williamson Act tracts. Industrial allowable uses include composting, recycling, industrial  
11      use and hazardous waste facilities. Hazardous waste facility uses are allowed with a special use  
12      permit.

13      **Rural Living (RL)**—allows for low-density, rural residences where agriculture and other  
14      compatible uses, such as hunting clubs, dude ranches, RV parks, etc., may be present. Other land  
15      uses allowed include mining and quarrying, energy production operations, and open space. These  
16      areas generally have partial public services and limited public improvements. The only allowable  
17      industrial uses are composting and recycling. Utility facilities are allowed with a conditional use  
18      permit. Hazardous waste facility uses are not allowed in this designation; a General Plan  
19      Amendment would be required to allow such use.

20      **Special Development (SD)**—allows for a combination of residential, commercial, industrial,  
21      agricultural, open space, and recreational uses, as well as other compatible uses. An “RES” suffix  
22      indicates that the focus of the land use is on residential development.

23      **Regional Industrial (IR)**—establishes areas suitable for major industrial centers or a single large  
24      industrial plant having 200,000 or more square feet of floor area, or more than 500 employees on  
25      any shift; provides sites for industrial uses that have severe potential for negative impacts on any  
26      uses that would locate relatively close by; and identifies areas intended eventually to be utilized for  
27      industrial purposes to support the public need for manufacturing uses and employment  
28      opportunities.

29      **Neighborhood Commercial (CN)**—provides suitable locations for retail and service commercial  
30      establishments intended to meet daily convenience needs of a residential area. Residential uses,  
31      except social care facilities, are not permitted in commercial districts.

32      **General Commercial (CG)**—provides appropriately located areas for stores, offices, service  
33      establishments, and amusements offering a wide range of commodities and services scaled to meet  
34      neighborhood and community needs. Residential uses, except social care facilities, are not permitted  
35      in commercial districts

36      **Single Residential (RS)**—provides areas for single-family homes on individual lots and for  
37      accessory and non-residential uses that complement single residential neighborhoods. Incompatible  
38      non-residential uses in single-family residential neighborhoods are discouraged. The Single  
39      Residential (RS) Land Use Zoning District is divided into sub districts based on minimum lot size.  
40      These sub districts are as follows: RS-1, which has a minimum lot size of 1 acre; RS-20M, which has a  
41      minimum lot size of 20,000 square feet, RS-14 M, which has a minimum lot size of 14,000 square  
42      feet; and RS 10, which has a minimum lot size of 10,000 square feet.

1 **Resource Conservation (RC)**—comprises the majority (approximately 56%) of the designated land  
2 uses in the County. Most of the land within this designation is publicly owned (federal and state) and  
3 includes national parks, military bases, conservation areas, and lands owned by other federal and  
4 state agencies.

### 5 **3.2.3 Environmental Setting**

6 This section discusses the existing physical conditions in the project area related to land use,  
7 agriculture, and population and housing.

#### 8 **3.2.3.1 Land Use**

##### 9 **Existing Land Uses**

10 The project area is a predominantly rural community, consisting of rural residences, farmland,  
11 ranchland, ~~federal land~~, roadways (including SR 58), a railroad, utility corridor for a major natural  
12 gas pipeline, and limited businesses. The majority of land within the project area is unincorporated  
13 and privately-owned; however, some portions are under the jurisdictional control of the BLM and  
14 other federal government entities.

15 Within the project study area, the main concentration of residences are in the west portion in  
16 Hinkley, an unincorporated community, and in the southeast just west of the City of Barstow (with a  
17 small portion within city limits) (Figure 3.2-1). Within the project study area, single-family and rural  
18 residences are also dispersed along roadways throughout. Agricultural areas are predominantly  
19 located in the southeast part of the study area near the Mojave River, with several scattered areas to  
20 the north (including existing PG&E agricultural treatment units) and to the west. Hinkley also has a  
21 mix of commercial, industrial, and institutional uses, including a grocery store, a post office, a bar, a  
22 mobile home park, a salvage yard, churches, the Hinkley Elementary school (~~west of Hinkley Road~~),  
23 a senior center, a San Bernardino County fire station, and a desert research facility, scattered  
24 throughout the project area. The project area also partially overlaps with federal lands under BLM  
25 jurisdiction that are designated for conservation in the West Mojave Plan.

26 The project area is used largely for agricultural purposes, with rural residences scattered  
27 throughout the area, as described above. The primary land uses in the project area are associated  
28 with operation of the Hinkley Compressor Station, agricultural treatment activities at the Desert  
29 View Dairy (both owned by PG&E), and other privately owned agricultural properties. The  
30 Compressor Station is located in the southern portion of the project area, and the Desert View Dairy  
31 and the other existing agricultural treatment units are located in the central portion of the project  
32 area.

33 Other land uses include ongoing in-situ remediation in the approximate area bound by SR 58 to the  
34 north, the Compressor Station to the south, Mountain View Road to the west, and Summerset Road  
35 to the east. In-situ remediation land use includes, monitoring wells, above-ground compounds (for  
36 carbon amendment storage and supplies), and underground vaults and piping. Associated sampling  
37 activities are also an active land use, located throughout the project area (see Figure 3.2-1 and  
38 figures and description of existing remedial activities in Chapter 2, *Project Description*).

39 Recreational opportunities in the county usually occur on open space lands and consist primarily of  
40 water sports, hiking, bicycling, equestrian activities, off-road vehicle recreation, fishing, camping,

1 and hunting (San Bernardino County 2007a). The project area has lands on which recreation is  
2 allowed, but there are no formal recreation facilities. The closest municipal parks are Jasper Park  
3 and Lenwood Park, located approximately 2 miles southeast of the project area in the city of  
4 Barstow. However, there are extensive federal lands under BLM jurisdiction located near Hinkley  
5 that can be used for recreation.

## 6 **Project Area Zoning Designations and Allowable Uses**

7 According to the Land Use Element of the San Bernardino County General Plan and as shown in  
8 Figure 3.2-1, a majority of the project area is zoned for Rural Living (including designations RL, RL-  
9 5, RL-40, and RL-10-AP), with an area north of Santa Fe Avenue designated for Agriculture with an  
10 Agricultural Preserve overlay (AG-AP). There are also limited areas with other zoning designations  
11 interspersed in the project area, including: a small area in the west designated as Special  
12 Development (SD-RES); a small area on the eastern boundary, just north of SR 58 designated as  
13 Regional Industrial (IR); two small areas located at the western boundary in Hinkley, just south of  
14 the rail line, one designated as General Commercial (CG) and one as Neighborhood Commercial  
15 (CN), and small areas in the southeastern corner of the project area, just south of the Mojave River,  
16 designated as Single Residential (RS) (San Bernardino County 2007b). In addition, the area north of  
17 Mountain General Road/Holstead Road is designated as Resource Conservation (RC). Allowed land  
18 uses in each of these zoning districts were described above.

### 19 **3.2.3.2 Agriculture**

20 Agriculture has historically been an important part of San Bernardino County's economy. According  
21 to its 2007 General Plan, the County consistently ranks in the top 15 agricultural-producing counties  
22 in the state. However, agricultural production value and use within the County has declined as a  
23 result of the effects of urban expansion and economic considerations. Most agricultural development  
24 is located in areas with relatively level terrain and stable soil conditions with access to water  
25 supplies. For similar reasons, these types of areas are also the most desirable (and economically  
26 valuable) for urban development. Within more urbanized parts of San Bernardino County, such as  
27 San Bernardino Valley and Victor Valley, urban conversion of agricultural lands has occurred. In  
28 addition, a number of agricultural areas within the County have been converted to other uses  
29 because of declining viability, decreasing air quality, and increasing water costs. As farmers relocate,  
30 agricultural uses often change to more specialized and high unit value crops that can be grown in  
31 less desirable (from the standpoint of urban development) terrain. The net result is that the amount  
32 of vacant land that can be converted to most agricultural uses is steadily diminishing. (San  
33 Bernardino County 2007b).

34 As shown in Figure 3.2-2, the majority of the project area is designated as grazing land. FMMP-  
35 designated prime farmlands and farmlands of statewide importance include agricultural treatment  
36 units located north of SR 58 and agricultural lands east of the Compressor Station. There are small  
37 portions designated as unique farmlands adjacent to Mountain View Road and Sonoma Road,  
38 associated with the northern most agricultural treatment unit (Gorman), and in the southeast  
39 portion of the project area. Williamson Act lands are associated with agricultural treatment units  
40 and other agricultural areas directly north of SR 58 and in the southeastern portion of the project  
41 area, respectively (Figure 3.2-3). Table 3.2-2 shows the acreage of FMMP- designated farmlands and  
42 Williamson Act lands in San Bernardino County and the project area. Overall, the project area  
43 comprises approximately 6% of the important farmland in the County and 2% of all types of  
44 farmland (including grazing).

1 **Table 3.2-2. FMMP-Designated Farmlands and Williamson Act Lands**

Farmland Designation	San Bernardino County (acres)	Project Area (acres)
Prime	14,089	1,232
Statewide importance	6,747	124
Local importance	1,160	--
Unique	2,661	116
<b>Subtotal Important Farmland</b>	<b>24,657</b>	<b>1,472</b>
Grazing	902,588	<del>28,390</del> 17,475
<b>Total Farmland</b>	<b>927,245</b>	<b>18,947</b>
Williamson Act	4,818	349

Source: California Department of Conservation 2010

2 **3.2.3.3 Population and Housing**

3 Hinkley is the primary population and residential center in the project area. U.S. Census data is  
4 typically used to identify population and housing characteristics of a geographic region or area. No  
5 census data are available for the Hinkley community, but it is part of the zip code tabulation area  
6 92347, which ~~includes the area northwest of the city of Barstow of which Hinkley is the only~~  
7 ~~community located in this area~~ is the zip code for the Hinkley community. The zip code tabulation  
8 area had a total population of ~~1,692~~ 1,915 and a total of ~~790~~ 802 housing units of which ~~588~~ 670  
9 were identified as occupied units in the year ~~2010~~ 2000 (U.S. Census Bureau ~~2010~~ 2000). Much of  
10 the project area contains scattered rural residences, some of which are associated with adjacent  
11 agricultural and ranch land.

12 The historic growth and trends of Hinkley's population and housing are described in Section 3.8,  
13 *Cultural Resources* (refer to 3.8.3.3, *Historic Setting*).

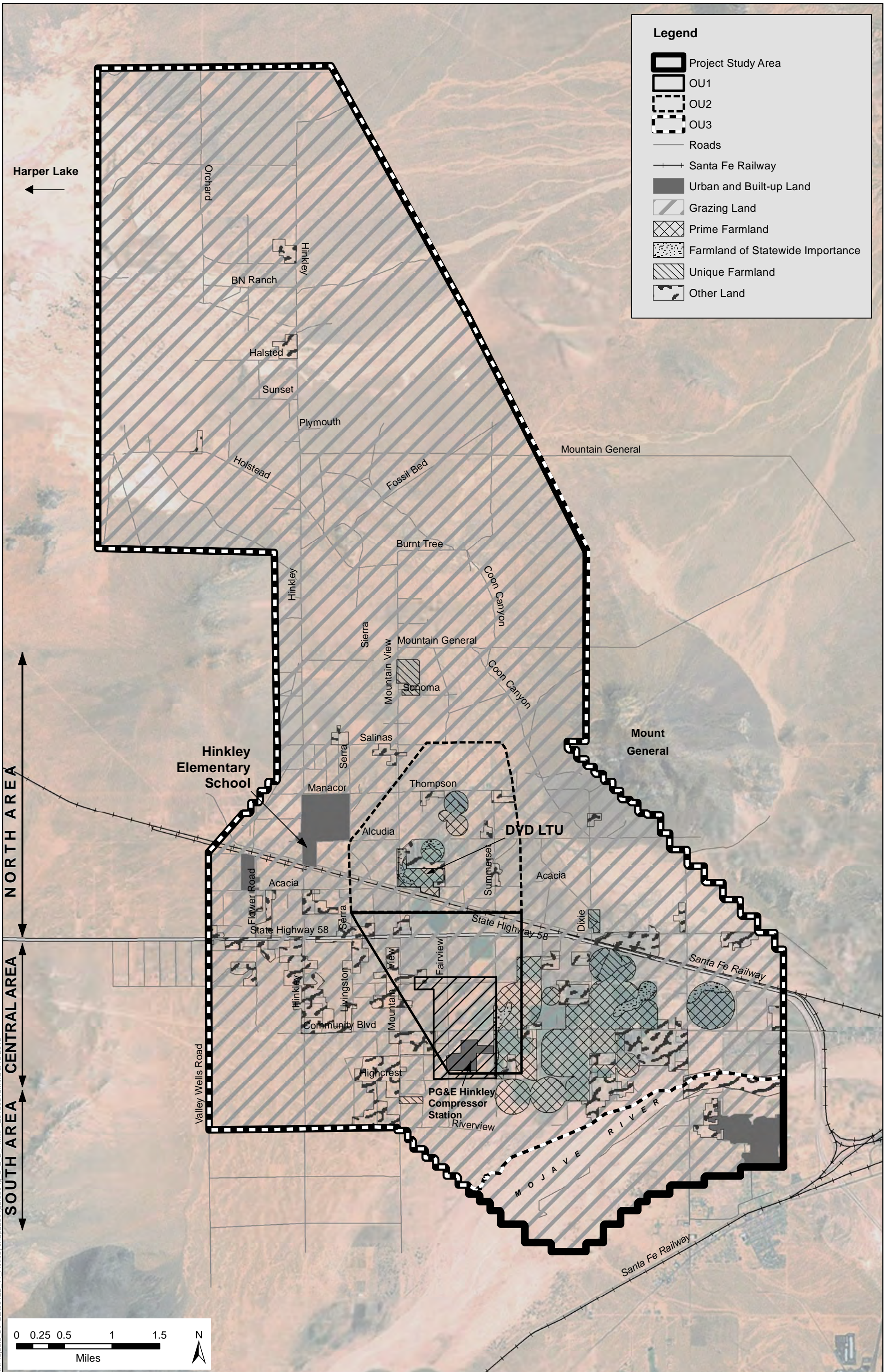
14 **3.2.4 Significance Criteria**

15 The State CEQA Guidelines, Appendix G (14 CCR 15000 et seq.), have identified significance criteria  
16 to be considered when determining whether a project could have significant effects on land use,  
17 agriculture, and population and housing.

18 For this analysis, an impact pertaining to land use was considered significant under CEQA if it  
19 would:

- 20 • Physically divide an established community.
- 21 • Be fundamentally incompatible to the point that adjacent land uses are substantially  
22 disrupted.
- 23 • Conflict with any applicable land use plan, policy, or regulation of an agency with  
24 jurisdiction over the project adopted for the purpose of avoiding or mitigating an  
25 environmental effect.
- 26 • Conflict with applicable habitat conservation plans or natural community conservation  
27 plans.





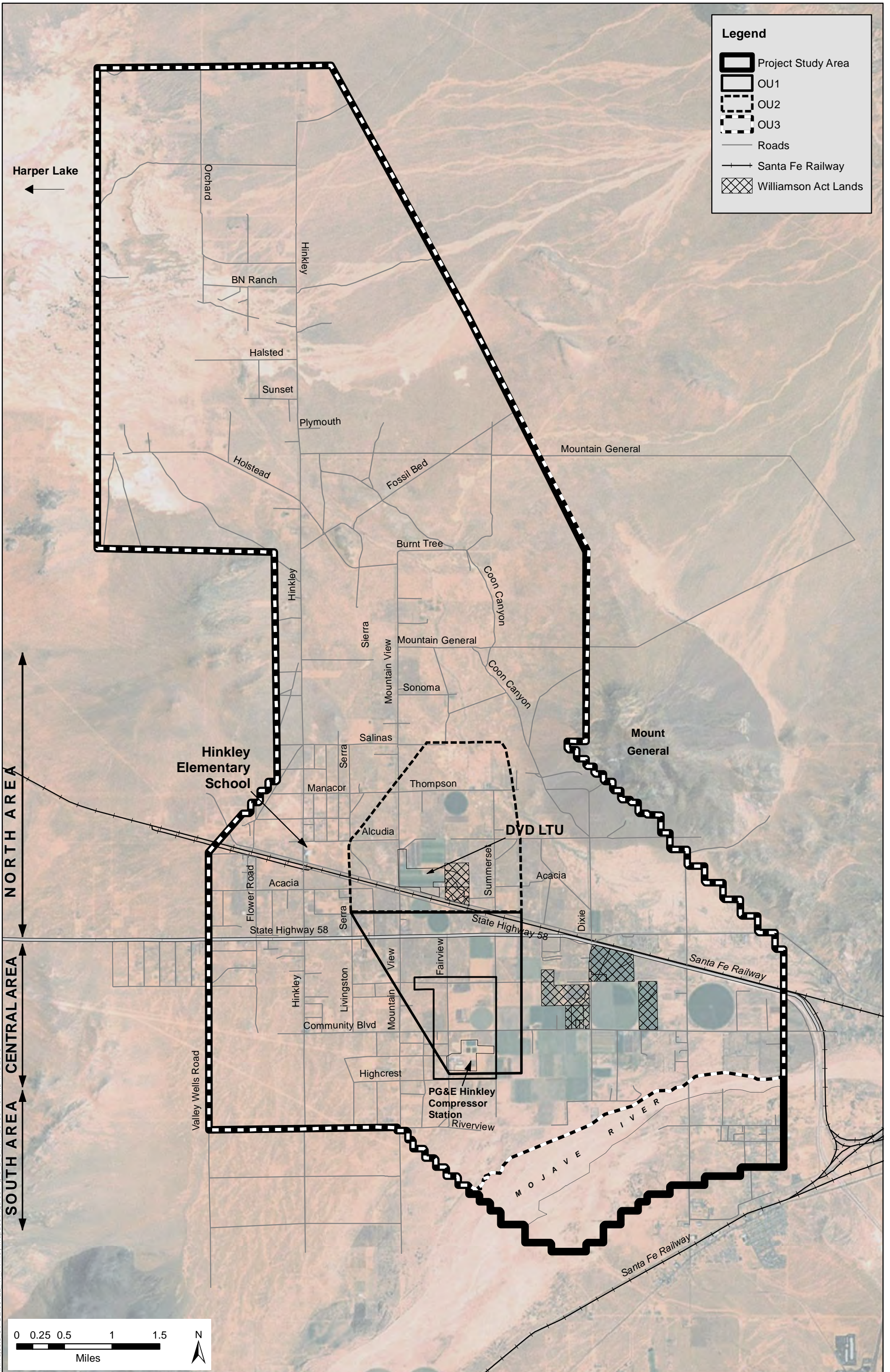
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**Figure 3.2-2**  
Project Area FMMP Farmland Designations



Source: Based on information from PG&E 2011c.;  
FMMP Designations - California Dept. of Conservation,  
Farmland Mapping and Monitoring Program, 2010





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**Figure 3.2-3**  
**Project Area Williamson Act Lands**



Source: Based on information from PG&E 2011c.;  
Williamson Act Lands - California Dept. of Conservation, 2004.



- 1           • Increase the use of parks or recreational facilities so that substantial physical deterioration  
2           of the facility would occur or be accelerated.
- 3           • Result in an adverse physical effect on the environment from construction or expansion of  
4           recreational facilities.

5           There are no recreation facilities in the project area, and none of the project alternatives include the  
6           construction, expansion, or elimination of recreation facilities. The project would not impede access  
7           to nearby BLM lands for recreation. In addition, as discussed in Section 3.2.6.3, the project would not  
8           result in a substantial increase in population, which would create demand for recreational facilities.  
9           Therefore, potential impacts on recreation are not analyzed further.

10          For this analysis, an impact pertaining to agriculture was considered significant under CEQA if it  
11          would:

- 12           • Convert prime farmland, unique farmland, or farmland of statewide importance.
- 13           • Conflict with existing zoning for agricultural use, or a Williamson Act contract.
- 14           • Involve other changes in the existing environment that, because of their location or nature,  
15           could result in conversion of farmland to non-agricultural use.

16          For this analysis, an impact pertaining to population and housing was considered significant under  
17          CEQA if it would:

- 18           • Induce substantial population growth in the project area.
- 19           • Displace substantial numbers of existing housing or people, or necessitate the construction  
20           of replacement housing elsewhere.

### 21    **3.2.5        Methodology**

22          Impacts on land use were evaluated based on a comparison of existing land uses to potential  
23          changes in land use that could result with project implementation. Consistency with zoning and land  
24          use plans and policies was assessed by reviewing the applicable information included in  
25          Section 3.2.2, *Regulatory Setting*. Impacts to agricultural resources were evaluated based on review  
26          of project maps and remedial activities to determine whether project implementation would result  
27          in the irreversible conversion of FMMP-designated farmlands and/or Williamson Act lands.  
28          Population and housing impacts were evaluated by comparing the relative changes between existing  
29          conditions and those that would occur with project implementation.

### 30    **3.2.6        Impacts**

31          This section provides the impact analysis and mitigation measures related to land use, agriculture,  
32          and population and housing. The impacts are organized by topic, which correspond with the  
33          significance criteria described in Section 3.2.4, *Significance Criteria*.

### 1 **3.2.6.1 Land Use**

#### 2 **Impact LU-1a: Physically Divide a Community (Less than Significant, All Alternatives)**

3 All alternatives would include construction and operation of wells and piping associated with in-situ  
4 remediation and plume containment and new access roadways, none of which would physically  
5 divide the existing community. All action alternatives would also include agricultural treatment  
6 units, and Alternatives 4C-3 and 4C-5 would also include above-ground treatment facilities near  
7 existing above-ground uses (Compressor Station and Desert View Dairy). Agriculture has a long  
8 history in Hinkley; as the dominant physical change associated with remediation, its expansion as  
9 part of remedial activities would not introduce a land use element that would physically separate  
10 the Hinkley community. For all alternatives, access between portions of Hinkley would remain  
11 unhindered, and no treatment facilities would physically divide the community. Thus, this impact  
12 would be less than significant for all alternatives.

#### 13 **Impact LU-1b: Disruption of Surrounding Land Uses during Construction (Less than** 14 **Significant, All Alternatives)**

15 Construction of new wells and all associated infrastructure (e.g., well pads, extraction pumps,  
16 underground vaults, transmission pipelines, in-situ treatment equipment such as pumps and dosing  
17 equipment, fencing to secure equipment areas), new access roads, above-ground treatment facilities,  
18 and new agricultural treatment units would require land clearance, trenching, paving, concrete  
19 laying, and crop planting (refer to Section 2.9, *Construction, Operation and Maintenance*, in  
20 Chapter 2). These activities would increase the temporary presence of construction workers,  
21 construction staging areas, and the use of large construction vehicles and equipment that could  
22 temporarily conflict with the existing and adjacent primarily rural/agricultural uses.

23 In general, construction-related impacts would be similar under all alternatives, but impacts of the  
24 action alternatives would have a greater intensity and scale than the No Project Alternative in  
25 comparison to existing conditions. The majority of construction impacts would occur during the  
26 initial buildout of wells, agricultural land treatment units, and above-ground treatment facilities, and  
27 could result in short-term inconvenience, but would not substantially disrupt surrounding land uses.  
28 Alternative 4C-4 involves the most extensive amount of agricultural treatment and associated  
29 infrastructure and thus would involve the largest amount of ground disturbance. Alternatives 4C-3  
30 and 4C-5 include above-ground treatment facilities, which would have longer construction periods  
31 than individual wells, roads, or pipelines. Continued construction of these components (in  
32 subsequent phases) would also result in the same impacts, but the amount of land that could be  
33 temporarily affected would be incremental in comparison to the initial buildout.

34 Further, upon completion of construction, all construction equipment would be removed, and  
35 construction staging areas and other areas that are temporarily disturbed would be restored to pre-  
36 project conditions. Construction related impacts of the project are thus considered less than  
37 significant for all alternatives.



1       **Impact LU-1c: Incompatibility with or Substantial Disruption of Surrounding Land Uses**  
2       **during Operations (Less than Significant, No Project Alternative; Less than Significant with**  
3       **Mitigation, All Action Alternatives)**

4       **No Project Alternative**

5       Under the No Project Alternative, when compared to existing conditions, no incompatibility with  
6       surrounding land uses is expected because this alternative would expand in-situ wells and piping  
7       and would not result in new agricultural treatment units or above-ground treatment facilities. The  
8       No Project Alternative represents only minor changes of land use from existing conditions and  
9       therefore would be considered compatible.

10       **Action Alternatives**

11       Under all action alternatives, long-term land use changes would be associated with agricultural  
12       treatment units, above-ground treatment units, access roads, and wells as described below.

13       The impact of new proposed uses on visual aesthetics and visual character are discussed separately  
14       in Section 3.11, *Aesthetics*.

15       **Land Use Compatibility**

16       Agricultural treatment units are the largest source of land use change associated with the  
17       remediation. As described in Chapter 2, *Project Description (Tables 2-4 to 2-8)*, in order to address  
18       the expanded plume area, there could be anywhere from 264 acres (Alternative 4B) to 1,212 acres  
19       (Alternative 4C-4) of new agricultural treatment units, depending on the alternative. While the  
20       addition of these treatment units would be a substantial expansion of agricultural activity in the  
21       area, the history of agricultural activity in Hinkley Valley dates to the 1930s and includes former  
22       agricultural activity in some of the areas currently used for agricultural treatment units, and in other  
23       portions of the project area. Agricultural use is a normal and expected land use within the Hinkley  
24       Valley. For all alternatives, the expansion of agriculture would not introduce new land uses that  
25       would be incompatible with the rural residences, existing agriculture, and other land uses present in  
26       the study area.

27       Above-ground treatment facilities, which are included only in Alternatives 4C-3 and 4C-5, would be  
28       quasi-industrial facilities located on PG&E-owned land within the chromium plume. The footprint of  
29       these facilities will be relatively small (<1 acre each) compared to the acreage of the agricultural  
30       treatment units and the expanse of the chromium plume. There are only limited industrial uses in  
31       the Hinkley Valley (including the Compressor Station and limited uses along Santa Fe Avenue west  
32       of Lenwood), so the addition of above-ground facilities would nominally be out of character with the  
33       predominately rural residential and agricultural use that dominates the Hinkley Valley. However,  
34       these facilities would be located adjacent to existing structures. In Alternative 4C-3, the southern  
35       above-ground treatment plant would be located next to the Compressor Station and thus would be  
36       consistent with the existing industrial use; and the northern plant would be located adjacent to the  
37       Desert View Dairy, which already has several buildings associated with it. In Alternative 4C-5, the  
38       above-ground treatment plant would be located next to the Compressor Station. Given their limited  
39       extent, the self-contained nature of activities, and their proposed locations, these facilities would be  
40       compatible adjacent land uses.

1 Pipelines would be buried and would not have a surficial presence. Wells would occupy small areas  
2 and infrequent access for sampling would not be incompatible with adjacent land uses. Access roads  
3 would be constructed to reach remedial activities, but would be similar to existing roads in the area  
4 and would also not be incompatible adjacent land uses.

5 In summary, the proposed uses would be compatible with surrounding land uses, and therefore the  
6 impact would be less than significant.

#### 7 **Operational Impacts on Neighboring Uses**

8 Under all alternatives, operations and maintenance activities for wells includes daily onsite system  
9 inspections, pumping and carbon injection, and other daily and periodic activities described in  
10 Section 2.9, *Construction, Operation, and Maintenance*, in Chapter 2. All action alternatives include  
11 additional irrigation and agricultural tilling for agricultural treatment with the most occurring in  
12 Alternative 4C-4. Additionally, Alternatives 4C-3 and 4C-5 include operation of above-ground  
13 treatment facilities. These activities would result in a small increase in local traffic during most of  
14 the year from deliveries, vehicle, and equipment access; but the increase would not be so substantial  
15 that it would disrupt neighboring uses. During and after harvesting of fodder crops in the fall, traffic  
16 would increase significantly, but it would be short-term and therefore not considered to  
17 substantially disrupt adjacent land uses.

18 However, there are two water resource impacts of remedial operations that could substantially disrupt  
19 adjacent land uses: groundwater drawdown and water quality degradation due to remedial byproducts.  
20 As discussed in Section 3.1, *Water Resources and Water Quality*, all action alternatives would result in  
21 groundwater drawdown due to agricultural treatment pumping that could disrupt domestic, water  
22 supply, and agricultural wells. The number of affected wells varies with each alternative according to the  
23 level of agricultural treatment and pumping proposed, with Alternative 4B having the least effect and  
24 Alternative 4C-4 having the greatest effect. Refer to Section 3.1 for the details.

25 Without mitigation, the loss of water supply could substantially disrupt adjacent residential,  
26 commercial, or agricultural land uses; such a disruption is considered a significant impact. Also, as  
27 described in Section 3.1, agricultural treatment and in-situ treatment could result in generation of  
28 remedial byproducts that could affect the water quality for certain domestic, commercial, or  
29 agricultural wells. If this effect were to occur, adjacent land uses could be substantially disrupted.  
30 Implementation of **Mitigation Measure WTR-MM-2**, which requires the provision of alternative  
31 water supplies and/or treatment systems for restoring water quality so that adjacent land uses are  
32 not substantially disrupted, would reduce this impact to a less-than-significant level.

#### 33 **Impact LU-1d: Potential Inconsistency with San Bernardino County Land Use/Zoning** 34 **Designations and General Plan Policies (Less than Significant, All Alternatives)**

35 As described in Section 3.2.2.3, *San Bernardino County General Plan*, some of PG&E's electric facilities  
36 (Compressor Station and associated gas pipeline) are not subject to the County's general plan policies,  
37 but remedial activities are subject to local land use regulation. As described below, most activities  
38 would be consistent; and the potential inconsistency associated with the proposed above-ground  
39 treatment facilities (Alternatives 4C-3 and 4C-5 only) is considered a less than significant impact.

## 1 Land Use/Zoning Designations

2 The majority of the project area where remedial action would occur (OU1, OU2, and OU3) is within  
3 San Bernardino County's land use zoning district for Rural Living (RL) which allows for low-density,  
4 rural residences and agricultural uses. There is also a designated Agricultural (AG) zoning district  
5 where the existing Desert View Dairy is located (Figure 3.2-1). The Agricultural (AG) zoning allows  
6 sites for commercial agricultural operations, agriculture support services, rural residential uses, and  
7 other compatible uses. Areas designated as Agricultural (AG-AP) are designated for agriculture or  
8 conservation, including Williamson Act tracts. All remedial activity is expected to be located within  
9 the Rural Living (RL) and Agricultural (AG) zoning districts, although it is possible that wells could  
10 be located on several outlying areas designated for other uses (see discussion below).

11 Other, smaller areas of non-rural zoning districts are located mostly in the outer peripheries of the  
12 project area and closer to existing urban uses, including the following: a small area designated  
13 Regional Industrial (IR) between Santa Fe Road and SR 58 west of Lenwood Ave; an area designated  
14 Special Development-Residential (SD-RES) along SR 58 east of Hinkley Road; an area designated  
15 General Commercial (CGC) south of SR 58 and west of Hinkley Road; an area designated  
16 Neighborhood Commercial (CN) along the north side of SR 58 just west of Hinkley Road; and an area  
17 designated Residential (RS-14M and RS-20M) along Mulberry Road south of the railroad and north  
18 of Acacia Street ~~in the western portion on the extreme west side~~ of the project area. Areas of existing  
19 industrial or commercial use are unlikely areas for new remedial facilities due to the availability of  
20 non-developed land throughout the project area that can more readily accommodate remedial  
21 facilities and would cost less for acquisition. In addition, the northern portion of the project area,  
22 from approximately Mountain General Road/Holstead Road, has a zoning designation of Resource  
23 Conservation (RC).

24 Under all project action alternatives, proposed remediation activities would be similar to existing  
25 activities but at a larger scale. There is no defined remediation land use in the San Bernardino  
26 Development Code; and thus each proposed remedial activity must be analyzed by reviewing land  
27 uses similar to the different remedial actions.

## 28 Agricultural Treatment

29 Under all action alternatives, the proposed agricultural treatment activities are agricultural land uses  
30 and, as such, are consistent with both the Rural Living (RL) and Agricultural (AG) zoning districts  
31 and would not require special or conditional use permits (San Bernardino County Code, Title 8-  
32 Development Code). Agricultural treatment units are not likely to be placed on areas currently used for  
33 residential, commercial or industrial use and thus are not expected to disrupt such uses.

## 34 In-Situ Treatment

35 Under all alternatives, the proposed in-situ treatment would include wells, buried pipelines, utilities,  
36 and small above-ground compounds for storing carbon amendment and supplies. Given the limited  
37 footprint of such facilities, in-situ treatment would be similar to water supply and infrastructure  
38 needed for agricultural and residential uses and is thus considered consistent with the Agricultural  
39 (AG) and Rural Living (RL) zoning districts in the project area. It is possible that wells, buried  
40 pipelines and utilities may need to cross areas designated for commercial or industrial use; but  
41 given their limited footprint and utility character, this infrastructure would be consistent with land  
42 use designations and would not substantially disrupt such existing uses.

### 1 **Ex-situ Treatment**

2 The above-ground (ex-situ) treatment facilities included in Alternatives 4C-3 and 4C-5 would likely  
3 be considered industrial uses (or possibly hazardous waste facilities) per the San Bernardino County  
4 Development Code.

5 The northern above-ground treatment plant would be in an area designated Agriculture (AG).  
6 Industrial facilities are allowed with a conditional-use permit in Agricultural (AG)-designated areas,  
7 and hazardous waste facilities require a special-use permit. Agricultural uses, such as uses occurring  
8 at the Desert View Dairy, are specifically prohibited from areas designated with a Hazardous Waste  
9 Overlay. If a Hazardous Waste Overlay is applied, it will need to be narrowly drawn for the northern  
10 above-ground treatment facility to avoid enclosing agricultural areas. Given that the proposed  
11 above-ground treatment use can be buffered from any adjacent residential use, the proposed  
12 placement of the northern above-ground treatment plant is considered a less-than-significant land  
13 use impact.

14 The southern above-ground treatment plant would be in an area designated Rural Living (RL)  
15 adjacent to the Compressor Station. The only industrial uses allowed in the Rural Living (RL) zoning  
16 districts are composting and recycling facilities; hazardous waste facilities are not allowed. A  
17 General Plan Amendment would be required for the southern above-ground treatment plant.  
18 Although an above-ground treatment plant near the Compressor Station is not an allowable use in  
19 the San Bernardino County General Plan and Development Code, given that these uses can be  
20 buffered from any adjacent residential uses and given the probability that San Bernardino County  
21 would be able to process amendments and permits to facilitate such uses, the inconsistency of this  
22 proposed use is considered a less-than-significant impact.

23 If the County determines that the above-ground treatment plants are hazardous waste facilities, the  
24 following permits or processes would be required: (1) a general plan amendment to apply a  
25 Hazardous Waste Overlay to the proposed site and respective buffer; (2) a conditional-use permit in  
26 compliance with Chapter 85.06 (Conditional Use Permit and Minor Use Permit); (3) a special-use  
27 permit issued by the San Bernardino County Fire Department; and (4) ministerial permits from the  
28 Building and Safety Division for building, grading, flood control, and similar activities.

### 29 **General Plan Policies**

30 The project would be generally consistent with the goals and policies of the County General Plan for  
31 water resources, land use, agriculture, and population and housing listed in Section 3.2.2.3. As noted  
32 above, the above-ground treatment facilities included in Alternatives 4C-3 and 4C-5 would be  
33 required to comply with all applicable County land use requirements which would be applied during  
34 permitting of these facilities.

### 35 **Impact LU-1e: Potential Inconsistency with the California Desert Conservation Plan and/or** 36 **the West Mojave Plan (Less than Significant, No Project Alternative; Less than Significant with** 37 **Mitigation, All Action Alternatives)**

38 There are no BLM lands within OU1 or OU2, but OU3 contains approximately ~~4,382,110~~ acres of  
39 BLM lands. Within the project study area there are approximately ~~4,944,200~~ acres of BLM land. As  
40 described above, the BLM lands in the project area are designated for limited or moderate use. The  
41 BLM areas on the east and northern sides of OU3 are Desert Wildlife Management Areas (which are  
42 also defined in BLM planning documents as Areas of Critical Environmental Concern) and are



1 designated in the West Mojave Plan for habitat conservation for several wildlife and plant species  
2 (see Section 3.7, *Biological Resources*). None of the BLM land is designated wilderness.

3 The bulk of remedial actions would occur within OU1 or OU2; actions in these areas would have no  
4 effect on BLM land. As shown in Figure 3.2-1, the BLM lands within OU3 are limited to areas in the  
5 northern portion, areas along the Mojave River, and a small area to the west of the Compressor  
6 Station. In addition, BLM lands are located on the western, eastern, and northern periphery of OU3,  
7 with the exception of a small area on the southwest part of the OU3 west of the PG&E Hinkley  
8 Compressor Station. At present, the potential remedial actions on the BLM have not been specifically  
9 identified, but are likely to include monitoring wells, extraction wells, piping, and access roads.  
10 Agricultural treatment units are not likely to be proposed on federal lands given that agricultural  
11 units can be more efficiently placed in central locations on private land within Hinkley Valley rather  
12 than on the periphery of the remedial area. PG&E would be required to obtain permits for any  
13 proposed used on BLM land and to comply with all applicable requirements of the CDCA Plan and  
14 supporting plans.

15 Under the No Project Alternative, future remedial activity would only occur on private land and not  
16 on federal land, and there would be no conflicts with the CDCA Plan or the West Mojave Plan.

17 For all action alternatives, where project activities could disturb BLM land, potential conflicts with  
18 the land management requirements of the CDCA Plan and/or with the conservation requirements of  
19 the West Mojave Plan could occur. However, implementation of **Mitigation Measure LU-MM-1** and  
20 **Mitigation Measures BIO-MM-1a through BIO-MM-1m, BIO-MM-1p and BIO-MM-46** (described  
21 in *Section 3.7, Biological Resources*) would minimize potential conflicts with BLM land management  
22 requirements or the conservation requirements of the West Mojave Plan on BLM land to a less-than-  
23 significant level.

### 24 3.2.6.2 Agriculture

#### 25 **Impact LU-2: Conversion of Agricultural Land to Non-Agricultural Use, Including FMMP-** 26 **Designated and Williamson Act Lands**

27 Overall, the agricultural lands within the project area encompass approximately 2% of the County's  
28 agricultural lands and approximately 6% of the County's important (prime, state importance, and  
29 unique) farmlands.

#### 30 **Direct Conversion of Agricultural Land to Non-Agricultural Use (Less than Significant, All** 31 **Alternatives)**

32 The No Project Alternative would not add new agricultural treatment areas; limited increases in  
33 remediation infrastructure would not affect agricultural areas; and groundwater drawdown would  
34 not be different from existing conditions. Therefore, the No Project Alternative would not have a  
35 significant impact on agriculture.

36 The action alternatives would add between 2642 acres (Alternative 4B) and 1,212 acres (Alternative  
37 4C-4) of new agricultural treatment units. As described in Section 3.2.3.3, agricultural production  
38 and agricultural lands decreased historically due to decreasing profit margins and challenges with  
39 water availability in the 1980s and early 1990s. Under all action alternatives, implementation of  
40 proposed remediation activities would largely support continued agricultural uses and proposed  
41 new agricultural lands would be used to grow livestock fodder crops (e.g., alfalfa, grass) that would

1 increase the acreage of land in San Bernardino County that is actively used for agricultural purposes.  
2 Any new agricultural treatment units would be located on lands that are either designated for  
3 agriculture (by zoning, FMMP designation, and Williamson Act) or are compatible with agricultural  
4 uses, and would create an increase in agricultural use and production in the area.

5 Under all alternatives, new in-situ remediation and agricultural treatment wells and supporting  
6 infrastructure would be installed on existing and new agricultural treatment units and in other  
7 locations throughout the project area, some of which could be on FMMP-designated farmlands or  
8 Williamson Act lands. Because pipelines and vaults would be buried and wells and small above-  
9 ground compounds (for storing carbon amendment and supplies) occupy very little space,  
10 installation of such infrastructure would not result in loss of significant agricultural lands.

11 There are no above-ground treatment facilities currently in operation, nor would any be constructed  
12 under the No Project Alternative or Alternatives 4B, 4C-2, and 4C-4. Under Alternative 4C-3, there  
13 would be two above-ground treatment plants: one in the north adjacent to the Desert View Dairy,  
14 and one in the south adjacent to the Compressor Station. Alternative 4C-5 would include a southern  
15 treatment plant in the same location as Alternative 4C-3.

16 The Desert View Dairy is designated prime farmland and farmland of statewide importance. The  
17 Desert View Dairy is also adjacent to two parcels that are under Williamson Act contracts (Figures  
18 3.2-2 and 3.2-3). However, the footprint area of the northern plant does not encroach onto these  
19 FMMP-designated or Williamson Act farmlands and operation of the treatment plant would not  
20 constrain the current agricultural uses at the Desert View Dairy, or the other adjacent agricultural  
21 lands that are both in use and currently not under agricultural production.

22 The permanent footprint of both the northern and the southern treatment plant would be located  
23 adjacent to, but not within, existing agricultural areas that are FMMP-designated prime farmland  
24 and farmland of statewide importance, and within proximity of lands under Williamson Act  
25 contracts. Similar to the northern treatment plant, operation of the southern treatment plant would  
26 not constrain existing agricultural uses or require the conversion of these lands to non-agricultural  
27 uses. This impact is considered less than significant for Alternative 4C-3 and 4C-5.

28 The majority of the future remedial activity area is on grazing lands rather than land currently being  
29 farmed for crops. ~~In the northern and southwestern future remedial activity areas, two small~~  
30 portions of land that are are designated unique farmland are located in the future remedial activity  
31 areas: an area to the east of Mountain View Road between Sonoma Road and Mountain General Road  
32 and an area to the southwest of the Compressor Station. in these areas, respectively; In addition,  
33 there is prime farmland and farmland of statewide importance to the east and northeast of the  
34 Compressor Station (Figure 3.2-2). Remedial activities are not likely to occur on the unique  
35 farmland-designated land southwest of the Compressor Station because this location is likely  
36 upgradient of the plume.

37 Remedial activities could affect the prime and important statewide farmland areas located along  
38 Mountain View ~~Road~~Avenue and Sonoma ~~Road~~Avenue, and east of the Compressor Station. Based on  
39 the current design, the only new known encroachments within FMMP-designated important  
40 farmland would be for an extraction well for Alternative 4C-3 and Alternative 4C-5, and for an  
41 agricultural treatment unit for Alternative 4C-4 (refer to Figures 2-6, 2-7, 2-8 and 3.2-2). However,  
42 as discussed in Chapter 2, *Project Description*, remedial activities would need to be expanded to  
43 address the current and potentially expanded plume. In-situ remediation is expected to be focused  
44 in the areas described in the Feasibility Study and Addenda, but agricultural treatment areas will be

1 expanded beyond that described in the Feasibility Study and treatment units and associated wells  
2 and pipelines might need to be installed in areas of designated important farmlands.

3 The installation of wells or pipelines for monitoring or remediation would not change agricultural  
4 lands to non-agricultural uses. Agricultural treatment units would continue agricultural use where  
5 proposed on areas already in agricultural use.

6 Overall, none of the alternatives would result in substantial conversion of agricultural lands to non-  
7 agricultural use. This impact is considered less than significant.

8 **Indirect Effects that Could Result in Conversion of Agricultural Land to Non-Agricultural Uses (Less than**  
9 **Significant, No Project Alternative; Less than Significant with Mitigation, All Action Alternatives)**

10 Remedial activities could indirectly result in disruption of agricultural use due to groundwater  
11 drawdown or changes in water quality.

12 Because the No Project Alternative would not increase agricultural treatment areas or pumping  
13 compared to existing conditions, it would not result in groundwater drawdown or changes in water  
14 quality related to total dissolved solids (TDS) greater than that ~~would occurring~~ with existing  
15 remedial infrastructure. As discussed in Section 3.1, *Water Resources and Water Quality*, agricultural  
16 treatment could also result in increased TDS ~~total dissolved solid~~ concentrations that could result in  
17 water quality degradation such that it could not be used for agriculture. However, the current  
18 requirements in the General Permit mandate that water quality standards cannot be exceeded or  
19 ~~increasing increased~~ more than 25 percent above current concentrations for TDS. If TDS exceeds  
20 these trigger levels, then PG&E is required to either: scale back groundwater extraction and  
21 discharge, halt groundwater extraction and discharge, or treat the groundwater to meet the trigger  
22 levels. With this control in place, the No Project Alternative would not have a significant water  
23 quality impact on existing agriculture. While the No Project Alternative would increase in-situ  
24 remediation carbon injection and pumping and thus byproduct formation, with the existing  
25 contingency plans in current permits, in-situ remediation activity is not expected to compromise  
26 existing agricultural land use due to changes in water quality.

27 All action alternatives would result in groundwater drawdown compared to existing conditions, as  
28 discussed in Section 3.1, *Water Resources and Water Quality*, remedial pumping for agricultural  
29 treatment. In general, this is not expected to affect agricultural wells because the dominant location  
30 of existing agricultural wells is east of the Compressor Station, which is an area that will be less  
31 affected by projected drawdown (see related figures in Section 3.1, *Water Resources and Water*  
32 *Quality*). Alternative 4C-4, which has the largest amount of agricultural treatment and associated  
33 pumping, is projected to affect at least one agricultural well, based on the Feasibility Study-levels of  
34 pumping, but other alternatives may also affect agricultural wells with increased pumping needed to  
35 address the expanded plume. **Mitigation Measure WTR-MM-2** would require provision of  
36 alternative water supplies if groundwater drawdown were to affect agricultural wells, which would  
37 prevent substantial disruption to existing agricultural activities.

38 As discussed in Section 3.1, *Water Resources and Water Quality*, PG&E will be required to acquire  
39 water rights in sufficient amounts to support proposed agricultural treatment pumping levels. In  
40 theory, those water rights could be acquired from existing agricultural landowners in the project  
41 area or adjacent to the project area. If willing sellers of existing agricultural land were to sell their  
42 water rights to PG&E (or to lease them for the duration of remediation), the ability to irrigate  
43 existing agricultural land may be reduced, and prime farmland could lose its prime designation as a

1 result (the prime designation requires irrigation). Because the remedial actions could range from 29  
2 to 50 years to reduce groundwater chromium concentrations to 3.1 ppb Cr[VI] and could range from  
3 75 to 95 years to reach 1.2 ppb, depending on the alternative, the loss of irrigation could result in  
4 agricultural land lying fallow for many decades. In the 1990s, large areas of former agricultural land  
5 were left fallow following the groundwater basin adjudication and the limitations on water use in  
6 the area and most of these areas in the Hinkley area have remained fallow since. However, in some  
7 other parts of the desert, some former agricultural land has been converted to other uses. One  
8 example of this is the Abengoa Mojave Solar project near Harper Lake, which in part is located on  
9 former agricultural land. Given past experience and land use patterns in the Hinkley area, it is  
10 probable that most of agricultural land that might be fallowed if their water rights are acquired by  
11 PG&E would not be converted to non-agricultural uses. However, given the duration of the project  
12 (75-95 years), it is possible that some other non-agricultural land uses could be established over  
13 time. Because water is a limited commodity and there are limited agriculturally suitable areas in the  
14 Mojave Desert, the potential loss of agricultural lands is considered a potentially significant impact.  
15 **Mitigation Measure LU-MM-2** would require PG&E to either avoid acquiring water rights from  
16 existing agricultural users or would require PG&E to acquire and record an agricultural easement  
17 over any important farmland (prime, unique, or statewide importance) from which it acquires water  
18 rights for remedial purposes, so that the land will not be converted to non-agricultural uses, and can  
19 be returned to agricultural use at the point that water is no longer used for remedial purposes. With  
20 this mitigation measure, the project would not result in a long-term indirect loss of important  
21 farmland, and the impact would be reduced to a less-than-significant level.

22 As discussed in Section 3.1, *Water Resources and Water Quality*, agricultural treatment could also  
23 result in increased total dissolved solid concentrations that could result in water quality  
24 degradation such that it could not be used for agriculture. **Mitigation Measure WTR-MM-2**  
25 (described in Section 3.1) requires the monitoring and provision of alternative water supplies  
26 and/or treatment systems for restoring water quality if remedial byproducts were to degrade water  
27 quality such that existing agriculture would be impeded. With this measure, this impact on  
28 agriculture would be less than significant.

### 29 3.2.6.3 Population and Housing

#### 30 **Impact LU-3: Population and Housing Changes due to Remedial Activities (Less than** 31 **Significant, All Alternatives)**

##### 32 **Population Growth**

33 Population growth impacts under CEQA occur when a project results in such substantial increases in  
34 population in an area that further development, beyond that included in the project itself, is  
35 necessary to provide housing, services, and supporting infrastructure.

36 The project includes construction activities that would temporarily increase local employment (and  
37 possibly population if workers decide to live in Hinkley); however, due to the temporary nature of  
38 construction, it is expected that workers would use existing housing and accommodation services in  
39 Hinkley, Barstow, and elsewhere during construction. Additional impacts are not anticipated to  
40 result from the temporary population increase related to project construction.

## 1        **Displacement of People or Housing**

2        The majority of the housing and population within the project area is located at the westernmost  
3        boundary of the project area. Remediation activities are unlikely to occur in areas with higher  
4        concentrations of houses because there is ample vacant land available throughout the project area  
5        and because the cost of land acquisition is much higher on areas with substantial development than  
6        on land with more limited or no development.

7        Under the No Project Alternative, new infrastructure would consist of remediation wells within  
8        areas where there are already existing remediation activities; new acquisition of land is not  
9        anticipated to be required. There would be no impact on housing or population under the No Project  
10        Alternative above existing conditions.

11        Implementation of the action alternatives, however, would have the potential to involve acquisition  
12        of existing rural residential properties in the largely open land areas within the project area,  
13        resulting in potential displacement of some population and housing. The most likely areas of  
14        property acquisition are within OU1 and OU2 (see Figure 3.2-4); however, PG&E already owns a  
15        good proportion of this land. Additional areas of property acquisitions could be in areas overlying  
16        the plume to the east and north of OU1/OU2 for agricultural treatment units to address the  
17        expanded area of groundwater contamination. If rural residential properties are acquired, there  
18        may be a loss in rural residential housing units and potential displacement of residents who occupy  
19        acquired housing units to move to another community.

20        Alternative 4B would have the least potential to result in acquisition of existing residences and  
21        displacement of people because all of the 264 new acres of agricultural treatment could be  
22        accommodated within PG&E-owned areas within OU1 and OU2, but it is possible that acquisition  
23        might allow some existing residents to sell their residences to PG&E. Alternatives 4C-2, 4C-3, and  
24        4C-5 could involve up to 3932 acres of new agricultural treatment, which could be largely  
25        accommodated on PG&E-owned lands, but could require acquisition of other lands that might have  
26        rural residences. Acquisition of properties would likely be the most significant under Alternative 4C-  
27        4 because it could require up to 1,212 acres of new agricultural treatment, all of which may not  
28        ~~might not all~~ be located within PG&E-owned areas.

29        Acquisition of land containing housing would occur only through voluntary agreement between  
30        PG&E and the landowner and would be done only on a willing-seller basis. Given the areas of likely  
31        acquisition and the very low density of residences, the number of homes acquired to facilitate  
32        remedial activities is expected to be low. The exact number cannot be estimated at this time because  
33        the location of future remedial actions is not precisely known, except for the locations of proposed  
34        actions described in the Feasibility Study and Addenda. Based on the known locations of remedial  
35        actions (see Chapter 2, *Project Description*), there would be no acquisition of properties, including  
36        residences, with any alternative except Alternative 4C-5, which could include acquisition of parcels  
37        containing perhaps 5 to 10 residences. However, as described in Chapter 2, remedial actions,  
38        including agricultural treatment, will need to expand from that described in the Feasibility Study  
39        and Addenda to address the expanded plume.

40        As a worst-case assumption, residential acquisitions are likely be limited to 50 or fewer properties  
41        based on the number of residences within and adjacent to OU1 and OU2 on the east and north where  
42        agricultural treatment units might be placed to address the expanded plume. Currently, housing  
43        vacancy rates in San Bernardino County are quite high. In 2011 the vacancy rate was 12.5% (The  
44        Community Foundation 2011). Thus it is probable that residents who desired to remain within the

1 County would likely buy or rent currently vacant housing in San Bernardino County. Vacancy rates  
2 across California are also elevated due to the recent recession. In the next few years (which is when  
3 new agricultural treatment units will be built), demand for up to 50 properties is not expected to  
4 change market conditions for new housing and is unlikely to contribute to construction of new  
5 housing.

6 In theory, if acquisition of residences in the Hinkley area actually resulted in new home construction  
7 elsewhere, it could result in impacts to biological resources, cultural resources, and farmland, as  
8 well as impacts related to traffic, air quality, and noise, and other impacts at the location of new  
9 residential development. Because the location of such development is not known, it is highly  
10 speculative to conclude exactly what kind of secondary physical impacts might occur and whether  
11 those impacts would be significant.

12 With the current housing market conditions noted above concerning vacancies combined with the  
13 limited potential number of residences actually affected, the likelihood of contributing to new  
14 housing construction elsewhere is considered to be very low; as a result, this impact is considered  
15 less than significant. Even if it could be determined that a demand for new housing would result  
16 from property acquisition related to remedial actions, it would be speculative to conclude that a  
17 significant physical impact would result given the inability to predict where residents who choose to  
18 sell their properties might move.

19 It should be noted that PG&E could make offers to willing sellers to purchase land over the  
20 chromium plume that might not be used for remedial activities. This action would be a private  
21 action unrelated to the remedial actions; PG&E's private land acquisition program is not part of the  
22 project analyzed in this EIR.

### 23 3.2.7 Mitigation Measures

#### 24 **Mitigation Measure LU-MM-1. Obtain Bureau of Land Management Permits in Compliance** 25 **with California Desert Conservation Area Plan and the West Mojave Plan**

26 PG&E will obtain any required all approvals from BLM for any proposed remedial activities on  
27 federal land ~~prior to implementing such actions~~. PG&E will ~~demonstrate consistency with all~~  
28 ~~relevant BLM policies for use of the subject land and provide evidence of such consistency~~  
29 copies of BLM submittals and approvals to the Water Board to keep them informed of any  
30 proposed remedial activities prior any construction on federal land.

#### 31 **Mitigation Measure LU-MM-2. Acquire Agricultural Conservation Easements for any** 32 **Important Farmland If Water Rights Are Acquired for Remediation**

33 PG&E will either avoid acquiring water rights from existing important farmland (prime, unique,  
34 statewide importance) or will acquire and record an agricultural conservation easement over  
35 such important farmland from which it acquires water rights for remedial purposes, if there has  
36 been a net loss of such important farmland that have occurred as a result of implementation of  
37 the project. The conservation easement will prohibit all future conversion of the land to non-  
38 agricultural land for the duration that PG&E retains water rights associated with such land. The  
39 agricultural conservation easement will be recorded within one year of purchase or acquisition  
40 of any water rights associated with the subject property. The easement will be revocable upon  
41 return of the water rights to the agricultural landowner.









1 Alternatively, PG&E may obtain an agricultural conservation easement on other important  
2 farmland in the project area, if it chooses not to obtain an easement over important farmland for  
3 which it acquires water rights. If this option is selected, PG&E shall obtain, on a 1:1 basis, an  
4 agricultural conservation easement on designated important farmland over an acreage that  
5 corresponds to the acreage from which it acquires water rights. This easement may be revocable  
6 upon return of the water rights to the original agricultural landowner, provided that there are  
7 no intervening impediments to the potential to return the original land to agricultural use.



Section 3.3  
Hazards and Hazardous Materials





## 3.3 Hazards and Hazardous Materials

### 3.3.1 Introduction

This section describes the affected environment and regulatory setting for hazards and hazardous materials. It also describes the hazards and hazardous materials impacts that would result from implementation of the project and alternatives and mitigation measures that would reduce those impacts.

#### 3.3.1.1 Summary of Impacts

Table 3.3-1 presents a summary of the hazards and hazardous materials impacts and mitigation measures. See the Section 3.3.6, *Impacts*, and Section 3.3.7, *Mitigation Measures*, sections for a detailed discussion of all impacts and mitigation measures.

Relative to this project, the project would involve the use and handling of hazardous materials and the generation of hazardous waste in the following ways:

- During construction, vehicles and equipment would use petroleum and vehicle/engine fluids and other materials that could be spilled due to accidents.
- During construction, ground excavation could encounter known or unknown petroleum or other hazardous materials or waste, if present in areas disturbed by the project for construction of remedial facilities.
- For the most part, the existing chromium plume, while ~~far~~ elevated above maximum background levels and in some areas far elevated above current drinking water standards, is mostly at concentrations below defined hazardous waste levels. However, chromium concentrations in the source area may still exceed defined hazardous waste levels. Thus, operations involving source area water may be handling contaminated groundwater that is defined as a hazardous waste.
- During remedial operations, acquisition of property for remedial purposes may require demolition of existing structures or buildings that may contain lead-based paint or asbestos or other materials.
- During remedial operations, alternatives that use ex-situ (above-ground) treatment would generate a hazardous waste in the form of concentrated chromium due to the filtration or precipitation of chromium from contaminated groundwater. Above-ground treatment would be used with Alternatives 4C-3 and 4C-5 under normal circumstances, and potentially other alternatives in the event of implementation of the contingency plan for agricultural treatment operations. Above-ground treatment would also involve the use of treatment chemicals in the treatment process that require special handling.

The concern in all of these cases is about potential human or environmental exposure to hazardous materials or waste. As discussed in this section, with the application of local, state, and federal regulations and the identified mitigation, that potential exposure can be mitigated to a less than significant level.

1 **Table 3.3-1. Summary of Hazards and Hazardous Materials Impacts**

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
HAZ-1a: Potential to Encounter Hazardous Materials in Soil and Groundwater during Construction	All Alternatives	Potentially Significant	HAZ-MM-1: <u>Implement</u> Contingency Actions if Contaminated Soil is Encountered During Ground Disturbance	Less than Significant
HAZ-1b: Potential Releases of Hazardous Materials or Waste Used or generated <u>from Construction Activities and during Remedial Operations</u>	All Alternatives	Potentially Significant	HAZ-MM-2: Implement <u>Spill Prevention/Containment, Control, and Countermeasures Plan</u> During Construction	Less than Significant
HAZ-1c: Exposure to Hazardous Building Materials during Demolition	No Project Alternative All Action Alternatives	Less than Significant Potentially Significant	None required HAZ-MM-3: Implement Building Materials Survey and Abatement Practices	- Less than Significant
HAZ-2: Conflict with or Impede Emergency Response Plan, Evacuation Plan or Access	All Alternatives	Less than Significant	None required	-
HAZ-3: Increased Risk of Fire Hazards during Construction and Operation and Maintenance	All Alternatives	Less than Significant	None required	-

2 **3.3.2 Regulatory Setting**

3 Hazardous materials, defined in Section 25501(h) of the California Health and Safety Code, are  
4 materials that, because of their quantity, concentration, or physical or chemical characteristics, pose  
5 a substantial present or potential hazard to human health and safety or to the environment if  
6 released to the workplace or environment. In accordance with Title 22 of the California Code of  
7 Regulations Chapter 11 (Section 66261.20 et seq.), a waste is considered hazardous if it is toxic  
8 (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe  
9 burns or damage to materials), or reactive (causes explosions or generates toxic gases) in  
10 accordance with the criteria established in Article 3. Article 4 lists specific hazardous wastes, and  
11 Article 5 identifies specific waste categories, including "hazardous wastes as defined by the federal  
12 Resource Conservation and Recovery Act of 1974 (RCRA), non-RCRA-defined hazardous wastes,  
13 extremely hazardous wastes, and special wastes.

14 Hazardous materials and hazardous wastes are subject to numerous federal, state, and local laws  
15 and regulations intended to protect health and safety and the environment. The major federal, state,  
16 regional, and local agencies enforcing these regulations include the federal Environmental

1 Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), the Water  
2 Board, and the local San Bernardino County Fire Department-Hazardous Materials Division. The  
3 regulatory framework is described below.

### 4 **3.3.2.1 Federal Regulations**

#### 5 **General Hazardous Materials**

6 The EPA is the lead agency responsible for enforcing federal regulations that affect public health or  
7 the environment. The primary federal laws and regulations concerning hazardous materials include  
8 RCRA, the Comprehensive Environmental Response, Compensation and Liability Act of 1980  
9 (CERCLA, commonly known as Superfund) and the Superfund Amendments and Reauthorization Act  
10 of 1986 (SARA). Federal statutes pertaining to hazardous materials and wastes are contained in  
11 Title 40 of the Code of Federal Regulations.

12 The RCRA was enacted to provide a general framework for the national hazardous waste  
13 management system, including the determination of whether hazardous wastes are being generated,  
14 techniques for tracking wastes to eventual disposal, and the design and permitting of hazardous  
15 waste management facilities. In 1984, the Hazardous and Solid Waste Amendment was enacted to  
16 better address hazardous waste; this amendment began the process of eliminating land disposal as  
17 the principal hazardous waste disposal method. Other specific areas covered by the amendment  
18 include the regulation of carcinogens, listing and delisting of hazardous wastes, permitting for  
19 hazardous waste facilities, and leaking underground storage tanks. RCRA applies to this project  
20 because Alternatives 4C-3 and 4C-5 would generate hazardous waste in the form of precipitates or  
21 filtrates of chromium during above-ground treatment.

22 CERCLA, also known as the Superfund, was enacted to ensure that a source of funds was available to  
23 address abandoned hazardous waste sites. The Hinkley site is not being addressed under Superfund,  
24 and thus this regulation is not discussed further.

25 In 1976, Congress passed the Toxic Substances Control Act, which was implemented in 1979. This  
26 act addresses the production, importation, use, and disposal of specific chemicals including  
27 polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint. The act provides the EPA  
28 with authority to require reporting, record-keeping and testing requirements, and restrictions  
29 relating to these chemicals.

#### 30 **Hazardous Materials Worker Safety Requirements**

31 The federal Occupational Safety and Health Administration (OSHA) is the agency responsible for  
32 ensuring worker safety in the handling and use of chemicals in the workplace. The federal  
33 regulations pertaining to worker safety are contained in the Code of Federal Regulations Title 29, as  
34 authorized in the Occupational Safety and Health Act of 1970. The regulations provide standards for  
35 safe workplaces and work practices, including standards relating to hazardous materials handling.  
36 In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace  
37 safety regulations; Cal-OSHA standards are generally more stringent than federal regulations.

## 1       **Other Federal Laws**

2       The federal laws listed here also regulate hazardous materials:

- 3       • Community Environmental Response Facilitation Act of 1992.
- 4       • Clean Water Act (addressed in Section 3.1, *Water Resources and Water Quality*).
- 5       • Clean Air Act (addressed in Section 3.5, *Air Quality and Climate Change*).
- 6       • Safe Drinking Water Act (addressed in Section 3.1, *Water Resources and Water Quality*).
- 7       • Federal Insecticide, Fungicide, and Rodenticide Act.

8       In addition, the federal Department of Transportation (DOT) regulations govern the required  
9       procedures for shipping flammable and hazardous materials. These DOT regulations, listed under  
10      Title 49 of the Code of Federal Regulations, Chapter 1, Subchapter C, Hazardous Material  
11      Regulations, govern packaging, labeling, and transport.

### 12      **3.3.2.2       State Regulations**

#### 13      **General Hazardous Materials**

14      The DTSC and the Water Board are the primary state agencies under the California Environmental  
15      Protection Agency (Cal-EPA) regulating hazardous materials in California. The DTSC is authorized by  
16      the Cal-EPA to regulate the management of hazardous substances, including the remediation of sites  
17      contaminated by hazardous substances. California hazardous materials laws incorporate federal  
18      standards but are often stricter than federal laws. The primary state laws include the California  
19      Hazardous Waste Control Law (HWCL), which is the state's equivalent of the RCRA, and the  
20      Carpenter-Presley-Tanner Hazardous Substances Account Act (HSAA), which is the state's  
21      equivalent of CERCLA. State hazardous materials and waste laws are contained in California Code of  
22      Regulations Titles 22 and 26.

- 23      • The HWCL, enacted in 1972 and administered by the DTSC, is the basic hazardous  
24      material/waste statute in California and has been amended several times to address evolving  
25      needs, including bringing the state law and regulations into conformance with federal laws. This  
26      act implements the RCRA “cradle-to-grave” waste management system in California, but it is  
27      more stringent in its regulation of non-RCRA-defined wastes, spent lubricating oil, small-  
28      quantity generators, transportation, and permitting requirements, as well as in its penalties for  
29      violations. The HWCL also exceeds federal requirements by mandating the recycling of certain  
30      wastes, requiring certain generators to document a hazardous waste source reduction plan,  
31      requiring permitting for federally exempt treatment of hazardous wastes by generators, and  
32      implementing stricter regulation of hazardous waste facilities. If and when hazardous waste is  
33      generated, handled, or transported due to remedial actions, it would be subject to this  
34      regulation.
- 35      • The HSAA, enacted in 1981, addresses concerns similar to those of CERCLA. This site is being  
36      addressed under water quality regulations, not the HSAA, so it does not apply to this site.
- 37      • The Above-Ground Petroleum Storage Act of 1989 requires the owner or operator of above-  
38      ground petroleum storage tanks to file a storage statement with the State Water Resources  
39      Control Board if tank storage exceeds 10,000 gallons and holds petroleum or petroleum  
40      product that is liquid at ambient temperatures. In addition, tanks must be registered if they

1 are subject to federal requirements; this registration requirement potentially expands the  
2 requirement for a storage statement to any tank more than 660 gallons or aggregate storage  
3 of 1,320 gallons.

#### 4 **Use and Storage of Hazardous Materials**

5 The DTSC has granted local agencies responsibility for implementing and enforcing most hazardous  
6 materials regulations in their jurisdiction under the Cal-EPA Unified Program. The Unified Program  
7 consolidates, coordinates, and makes consistent portions of the following hazardous materials  
8 programs:

- 9 • Hazardous materials business plans (Chapter 6.95 of the California Health and Safety Code  
10 Section 25501 et seq.).
- 11 • The California accidental release prevention program for acutely hazardous materials (Chapter  
12 6.95 of the California Health and Safety Code Section 25531 et seq.).
- 13 • State Uniform Fire Code requirements (Section 80.103 of the Uniform Fire Code, as adopted by  
14 the state fire marshal pursuant to the California Health and Safety Code Section 13143.9).
- 15 • Above-ground storage tanks (California Health and Safety Code Section 25270.5[c]).
- 16 • Underground storage tanks (Chapter 6.7 of the California Health and Safety Code Section 25280,  
17 et seq.).
- 18 • Hazardous waste generator requirements (Chapter 6.5 of the California Health and Safety Code  
19 Section 25100, et seq.).

20 The San Bernardino County Fire Department Hazardous Materials Division administers the agency  
21 certification for Unified Program.

#### 22 **Hazardous Materials Business Plans**

23 Businesses that handle specified quantities of chemicals are required to submit a hazardous  
24 materials business plan in accordance with federal and state community right-to-know laws. This  
25 plan allows local agencies to plan appropriately for a chemical release, fire, or other incident. The  
26 hazardous materials business plan must include the following:

- 27 • An inventory of hazardous materials with specific quantity data, storage or containment  
28 descriptions, ingredients of mixtures, and physical and health hazard information.
- 29 • Site and facility layouts that must be coded for chemical storage areas and other facility safety  
30 information.
- 31 • Emergency response procedures for a release or threatened release of hazardous materials.
- 32 • Procedures for immediate notification of releases to the administering agency.
- 33 • Evacuation plans and procedures for the facility.
- 34 • Descriptions of employee training in evacuation and safety procedures in the event of a release  
35 or threatened release of hazardous materials consistent with employee responsibilities, and  
36 proof of implementing such training on an annual basis.
- 37 • Identification of local emergency medical assistance appropriate for potential hazardous  
38 materials incidents.

- 1 • The hazardous materials business plan is filed with and administered by the Certified Unified  
2 Program Agency (CUPA), which ensures review by and distribution to other potentially affected  
3 agencies.

4 Hazardous materials business plans specify response procedures to be implemented in the event of  
5 a chemical emergency, in accordance with the applicable local regulations. These procedures include  
6 notification requirements in the event of a spill, measures to be taken to control and clean up a spill,  
7 procedures for coordination of emergency response personnel, and procedures to be followed  
8 should emergency evacuation be required. Plant personnel maintain a comprehensive inventory of  
9 emergency response equipment at the facilities concerned, and emergency response equipment is  
10 regularly inspected and maintained. In accordance with community right-to-know laws, a copy of  
11 the hazardous materials business plan is on file with local fire departments to assist them in  
12 responding to chemical emergencies. These emergency response procedures would apply to the  
13 proposed project.

#### 14 **Hazardous Materials Worker Safety Requirements**

15 The state regulations concerning the use of hazardous materials in the workplace are included in the  
16 California Code of Regulations (Title 8), which contains requirements for safety training, availability  
17 of safety equipment, accident and illness prevention programs, hazardous substance exposure  
18 warnings, and emergency action and fire prevention plan preparation. Cal-OSHA also enforces  
19 hazard communication program regulations, which contain worker safety training and hazard  
20 information requirements, such as procedures for identifying and labeling hazardous substances,  
21 communicating hazard information relating to hazardous substances and their handling, and  
22 preparation of health and safety plans to protect workers and employees.

#### 23 **Hazardous Building Materials**

24 Prior to the 1980s, building materials, including concrete structures, often contained asbestos fibers,  
25 which were added to provide structural strength or fire resistance. Asbestos is a known human  
26 carcinogen. Prior to 1978, lead compounds were commonly used in interior and exterior paints.  
27 Lead is a suspected human carcinogen, a known teratogen (i.e., causes birth defects), and a  
28 reproductive toxin. Other hazardous building materials can be found in electrical equipment  
29 containing polychlorinated biphenyls (PCBs), fluorescent tubes or thermostats containing mercury,  
30 and fluorescent light ballasts containing PCBs or di (2-ethylhexyl) phthalate (DEHP).

#### 31 **Wildland Fires**

32 State policies regarding wildland fire safety are administered by the Office of the State Fire Marshall  
33 and California Department of Forestry and Fire Protection (CAL FIRE). Construction contractors are  
34 required to comply with the following legal requirements during construction activities at sites  
35 classified by CAL FIRE as a “wildland area that may contain substantial forest fire risks and hazards”  
36 or a “very high fire hazard severity zone”:

- 37 • Earthmoving and portable equipment with internal combustion engines would be equipped  
38 with a spark arrestor to reduce the potential for igniting a wildland fire (Public Resources Code  
39 Section 4442).
- 40 • Appropriate fire suppression equipment would be maintained during the highest fire danger  
41 period—from April 1 to December 1 (Public Resources Code Section 4428).

- 1       ● On days when a burning permit is required, flammable materials would be removed to a  
2       distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the  
3       construction contractor would maintain the appropriate fire suppression equipment (Public  
4       Resources Code Section 4427).
- 5       ● On days when a burning permit is required, portable tools powered by gasoline-fueled internal  
6       combustion engines would not be used within 25 feet of any flammable materials (Public  
7       Resources Code Section 4431).

8       In addition, new buildings located in any Fire Hazard Severity Zone within State Responsibility  
9       Areas, any Very High Fire Hazard Severity Zone within Local Responsibility Areas, or any Wildland-  
10      Urban Interface Fire Areas must comply with the California Building Code minimum requirements  
11      for building materials and construction methods to improve exterior wildfire exposure protection.  
12      Fire Hazard Severity Zones are classified by the CAL FIRE director in accordance with Public  
13      Resources Code Sections 4201–4204 for State Responsibility Areas and in accordance with  
14      California Government Code Sections 51176–51189 in Local Responsibility Areas.

15      The potential for wildland fire hazards in the project area is described in Section 3.3.3,  
16      *Environmental Setting*.

### 17   **3.3.2.3      Local Regulations**

#### 18   **San Bernardino County Unified Program**

19      The San Bernardino County Fire Department is the Cal-EPA–designated local CUPA responsible for  
20      implementing and regulating federal and state hazardous materials usage, fire protection and other  
21      emergency services in the County including the project area. The San Bernardino County Fire  
22      Department includes the Office of Emergency Services which is responsible for disaster planning  
23      and emergency management coordination (San Bernardino County 2012a), the Community Safety  
24      Division which is responsible for community education, engineering, and fire code enforcement (San  
25      Bernardino County 2012b), and the Hazardous Materials Division which is responsible for  
26      inspection, hazardous materials emergency response, site remediation and hazardous waste  
27      management services (San Bernardino County 2012c).

28      The San Bernardino County Fire Department manages six programs under the Unified Program,  
29      which incorporates federal RCRA, CERCLA, and DOT requirements and all state regulatory  
30      requirements (as described above) within their permit processes under these programs. Any new or  
31      modified facilities (such as the proposed above-ground treatment plants under the project)  
32      proposed by a facility operator will require a Unified Program permit. San Bernardino County  
33      requires the preparation of a Business Emergency/Contingency Plan, the scope of which  
34      encompasses all procedures that must occur in the proper handling (use, storage, transport) of  
35      hazardous materials in order for issuance of permits.

36      The six programs managed under the Unified Program are:

- 37      ● Hazardous Materials Release Response Plans and Inventory (Business Plans).
- 38      ● California Accidental Release Plan.
- 39      ● Underground Storage Tanks (USTs).



- 1 • Above-Ground Petroleum Storage Act/Spill Prevention, Control and Countermeasure Plan (SPCC
- 2 Plan).
- 3 • Hazardous Waste Generation and Onsite Treatment.
- 4 • Hazardous Materials Management Plans and Inventory Statements under Uniform Fire Code
- 5 Article 80.

6 The San Bernardino County Fire Department also has an Investigations and Enforcement program  
7 that addresses facilities that engage in unlawful business practices. (San Bernardino County 2012e).

### 8 **San Bernardino County Fire Code**

9 Local requirements for storage and usage of flammable and hazardous materials are specified by the  
10 San Bernardino County Fire Code, Articles 79 and 80. Article 79 presents requirements for  
11 combustible and flammable liquids. Article 80 establishes hazardous materials storage thresholds,  
12 above which a permit is required.

### 13 **San Bernardino County Fire Hazard Abatement Program**

14 The San Bernardino County Fire Department provides fire and rescue services through five  
15 divisions. The project area is served by Division 3 (San Bernardino County 2012f). The county  
16 implements the San Bernardino County Fire Hazard Abatement Program in an effort to reduce the  
17 threat of wildfire hazards. The Fire Hazard Abatement program enforces the fire hazard  
18 requirements outlined in the San Bernardino County Code Sections 23.0301–23.0319. The Fire  
19 Hazard Abatement Program is intended to reduce the risk of fires within communities by  
20 establishing defensible space and reducing and removing flammable materials on properties. The  
21 Fire Hazard Abatement Program performs the following functions:

- 22 • Conducting surveys to identify weeds and other fire hazards throughout the year. In the Desert  
23 Region where the project area is located, the San Bernardino County Fire Department conducts  
24 surveys in spring and summer.
- 25 • Issuing notices to abate identified hazards(s) to property owners, who are required to abate the  
26 violations within 30 days (failure to abate could result in enforcement fees and recovery of costs  
27 for contractor/County crew clean-up).
- 28 • Responding to complaints year-round in unincorporated areas (such as the project area) (San  
29 Bernardino County 2012f).

30 The provisions of the Fire Hazard Abatement Program specific to the Desert Area (San Bernardino  
31 County Code Section 23.0305) are described below.

- 32 a) *Desert Area* means all portions of the unincorporated area of San Bernardino County north  
33 and east of the National Forest boundaries.
- 34 b) Flammable vegetation in the Desert Area means:
  - 35 1. Tumbleweeds (Russian Thistle).
  - 36 2. Limbs and debris of salt cedar (Tamarisk) within six feet of the ground.
  - 37 3. Plants, unless pruned to remove dead material.
  - 38 4. Grass over four inches high.

- 1 c) Fire Hazard in the Desert Area means:
- 2 1. Flammable vegetation within ten feet of a road.
- 3 2. Tumbleweeds regardless of distance from structures.
- 4 3. Combustible rubbish.
- 5 4. Flammable vegetation within 30 feet of all structures, including that portion of the
- 6 property within 30 feet of structures on adjacent properties.
- 7 5. Where neighboring persons or properties are especially vulnerable to the effects of a
- 8 fire, including, but not limited to schools, hospitals, mobile home parks, residential
- 9 occupancies or chapparal/development interfaces, flammable vegetation within 100
- 10 feet of all structures.

## 11 San Bernardino County General Plan Safety Element

12 The following policies from the San Bernardino County General Plan Safety Element apply to the

13 proposed project:

- 14 ● **Policy S 2.1:** Because reducing the amount of waste generated in the County is an effective
- 15 mechanism for reducing the potential impact of these wastes on the public health and safety and
- 16 the environment, and because legislation encourages the reduction, to the extent feasible, of
- 17 hazardous waste, this jurisdiction will encourage and promote practices that will, in order of
- 18 priority: (1) reduce the use of hazardous materials and the generation of hazardous wastes at
- 19 their source; (2) recycle the remaining hazardous wastes for reuse; and (3) treat those wastes
- 20 that cannot be reduced at the source or recycled. Only residuals from waste recycling and
- 21 treatment will be land disposed.
- 22 ● **Policy S 2.3:** Ensure that environmental review is conducted for projects proposed on sites that
- 23 have been identified as contaminated.
- 24 ○ **Program 1.** Require a conditional use permit and a General Plan Amendment from
- 25 applicants for hazardous waste facilities. The applicant will meet all provisions of the
- 26 specified hazardous waste facility overlay as well as other General Plan and Development
- 27 Code provisions.
- 28 ● **Policy S 3.1:** Continue the Fire Department's consolidation efforts to develop an integrated
- 29 approach to coordinate the County's present and future needs in fire protection services in
- 30 response to fire hazards and risks and to serve as a basis for program budgeting, identification,
- 31 and implementation of optimum cost-effective solutions with the goal of providing necessary
- 32 Service Levels and achieve Deployment Goals.
- 33 ○ **Program 7:** Require applicants for new land developments to prepare a site specific fire
- 34 protection plan, with special emphasis in areas of high and very high fire risk. (San
- 35 Bernardino County 2007).

### 3.3.3 Environmental Setting

#### 3.3.3.1 Past or Present Recorded Hazardous Waste Sites, Remediation Sites, and Underground Storage Tank Sites

Based on a review of EnviroStor, the DTSC's statewide database of recorded hazardous waste sites, the project area was not identified as being located on a hazardous wastes and substances site list (i.e., Federal Superfund, State Response, Voluntary Cleanup, School Cleanup, Evaluation, School Investigation, Military Evaluation) (per California Health & Safety Code section 65962.5).

A review of GeoTracker, the State Water Resources Control Board's database on groundwater cleanup and permitted sites, shows that a number of remediation, underground storage tank (UST), or leaking underground storage tank (LUST) sites exist within the project area, including:

- **PG&E Hinkley Remediation.** This is the chromium plume that is the subject of this project.
- **Desert View Dairy.** This site concerns dairy waste discharges that the Lahontan Water Board has determined have affected nitrate and other constituent levels in groundwater. The Water Board is continuing to regulate this site.
- **Hinkley Market LUST.** This site concerned a former leaking gasoline UST for which the case was closed in 2001.
- **Hinkley School UST.** This site concerned a former leaking diesel UST for which the case was closed in 1999.
- **PG&E Compressor Station LUST.** This site concerned a former gasoline LUST for which the case was closed in 1995.
- **LUZ Harper Lake LUST.** This site concerned a former diesel LUST for which the case was closed in 1993.
- **Hawes Radio Relay LUST.** This site concerned a former diesel LUST tank for which the case was closed in 1990.

#### 3.3.3.2 Existing Potential Contaminants in Soil and Groundwater

##### Chromium

The primary soil and groundwater contaminant in the project area is chromium. As described in Section 3.1, *Water Resources and Water Quality*, chromium is a metallic element in the periodic table. It is odorless and tasteless. Chromium is found naturally in rocks, plants, soil, volcanic dust, humans, and animals, and is also generated through human activities. The most common forms of chromium in the environment are Cr[III], Cr[VI], and the metallic form, Cr[0]. Cr[VI] is the soluble (i.e., dissolvable in water) form of chromium, which is relatively toxic, while the less-soluble Cr[III] has very low toxicity and is a required nutrient. Cr[III] occurs naturally in many vegetables, fruits, meats, grains, and yeast (U.S. Environmental Protection Agency 2010). Major sources of Cr[VI] in drinking water are discharges from steel and pulp mills, historic use of Cr[VI] as an anti-corrosion agent in the past (as at the Compressor Station), and erosion of natural deposits of Cr[III] (U.S. Environmental Protection Agency 2010).

1 Within the project area, the source of Cr[VI] contamination originated at the Compressor Station,  
2 which began operating in 1952 and added Cr[VI] to cooling tower water to prevent corrosion. The  
3 cooling towers are used to cool the compressed natural gas before returning the natural gas to the  
4 pipeline for transport. The untreated cooling tower water was discharged to unlined ponds until  
5 1964. In 1965, phosphate replaced Cr[VI] as the corrosion inhibitor. The ponds were taken out of  
6 service in 1966 and replaced with double-lined ponds in 1972. Chromium-contaminated soil has  
7 been excavated since from shallow depths in the area of the former unlined ponds and pipelines,  
8 and from beneath tanks (California Regional Water Quality Control Board, Lahontan Region 2008).  
9 In 1987, PG&E reported to the Water Board that off-site monitoring wells, located north of the  
10 Compressor Station, showed chromium concentrations in groundwater exceeding the California  
11 drinking water standard of 50 ppb. The highest concentrations of Cr[VI] are still almost directly  
12 below the previous unlined ponds at the Compressor Station more than 45 years after the Cr[VI]  
13 discharge (infiltration from ponds) was stopped in 1965.

14 As required by Water Board Cleanup and Abatement Order No. 6-87-160, initial site investigations  
15 and soil sampling were conducted by PG&E beginning in 1988 to determine the extent of chromium  
16 contamination. These investigations were focused on the areas where cooling water from the  
17 cooling towers and/or sludge containing Cr[VI] were discharged to the environment, including the  
18 former unlined ponds, and other impoundments or conveyances. Soil samples were collected at  
19 depths up to 80 feet below ground surface (Ecology and Environment, Inc. 1988). Based on results  
20 of that sampling, chromium-contaminated soil was excavated from shallow depths in some of the  
21 area of the former unlined ponds, discharge trench, and beneath tanks (California Regional Water  
22 Quality Control Board, Lahontan Region 2008). Amended CAO 6-87-160A1 found that the soil  
23 cleanup was successfully completed. Subsequent investigations were conducted in areas where  
24 wastewater or sludge containing chromium were discharged; process water containing chromium  
25 came in contact with soil; and chromium-containing chemicals were stored. Soil investigations were  
26 also performed when chemical sheds, cooling towers, or other structures were demolished.

27 Between 1998 and 2008, PG&E performed numerous major investigations and removal actions for  
28 contaminated soil within the source area at the Compressor Station and all surrounding locations  
29 where Cr[VI] releases occurred at or near known source areas. Based on these remediation activities,  
30 the highest levels of Cr[VI] contamination that could be present in surficial soils were removed and  
31 Cr[VI] contamination was reduced to levels that were below the acceptable EPA soluble threshold  
32 limit concentration of 5,000 ppb for industrial soils. The known source areas, considered the  
33 primary release points of Cr[VI], include the former evaporation ponds and Areas A, B, and C.<sup>1</sup>  
34 Surficial soils in the project area have been largely remediated to levels below EPA standards for  
35 industrial-grade soils. In 2003, the regulatory objective for soil remediation was updated to require  
36 excavation and removal of soils containing Cr(T) and Cr(VI) concentrations above the USEPA Region  
37 9 industrial soil preliminary remediation goals (PRGs), which are 450 mg/kg for Cr(T) and 64  
38 mg/kg for Cr(VI) (U.S. Environmental Protection Agency 2002). The following soil removals have  
39 taken place (Pacific Gas and Electric Company 2011):

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<sup>1</sup>Areas A, B, and C are associated with the Compressor Station. Area A is the former unlined ditch that was used to convey wastewater to the former unlined ponds; Area B is the area located north of the unlined ponds and south of Community Boulevard; Area C is a former unlined bermed pond. Appendix A, Table 4 of Feasibility Study Addendum 3 defines these areas in more detail and Figure A-6 shows the locations of these areas.

- 1       ● Compressor Station Area A: In 1992, soil was removed along the unlined ditch and oil and water  
2       separator to less than the USEPA PRG of 500 mg/kg for Cr[T] (field confirmation samples up to  
3       330 mg/kg).
- 4       ● Compressor Station Area B: In 1988, Cr[VI] was not detected in soils and Cr[T] was detected  
5       from non-detect (ND) to 30 mg/kg in 1988. Soil removal not warranted.
- 6       ● Compressor Station Area C: In 1988, most soil contained chromium in the Cr[III] form, not  
7       Cr[VI]. In 1992, soil was removed to less than USEPA PRG of 500 mg/kg for Cr[T] (field  
8       confirmation samples up to 370 mg/kg).
- 9       ● Lined Storage Ponds, 2, 3, 4, and 5: In 1991 and 1993 investigation, Cr[VI] in sludge and soil was  
10       found below detection limit and Cr[T] was found ranging up to 760 mg/kg. Chromium soluble  
11       threshold limit concentration (STLC) results were below 5 mg/l (hazardous waste level). Soil  
12       from dried ponds used to build Pond 8.
- 13       ● Former Debris Area: In 1996, approximately 50 cubic yards of soil were removed and  
14       transported to Class I landfill. Confirmation samples showed Cr[VI] up to 0.8 mg/kg and Cr[T]  
15       up to 18 mg/kg.
- 16       ● Rental Compressor Area (South of Area A): In 2001 – 2003 investigation, all samples showed  
17       CR[T] below 500 mg/kg (confirmation samples up to 110 mg/kg) and CR[VI] below detection  
18       limit. No soil was removed.
- 19       ● Former Cooling Towers A & B: No soil was removed as average soil concentration were below  
20       the STLC limit for Cr[VI] of 5 mg/l in 2002 investigation.
- 21       ● P-Unit Chemical Shed: In 2003, approx. 60 cubic yards of chromium contaminated soil was  
22       removed and transported to Class 1 landfill.
- 23       ● Former Oil and Water Separator: In 2003 investigation, all soil samples were below 500 mg/kg  
24       for Cr[T] (highest detection of Cr[T] at 9.9 mg/kg). No removals conducted.
- 25       ● Surge Tank: Approx. In 2005, 14.5 cubic yards of soil were excavated. Confirmation results  
26       below USEPA 2002 industrial soil PRGs for Cr[VI] of 69 mg/kg and Cr[t] of 450 mg/kg.
- 27       ● Property 12 – Debris Area: 2006 to 2008 investigation found asbestos-containing materials but  
28       no evidence of chromium contamination.
- 29       ● Concrete Pipelines Investigation and Removal: In a 2008 investigation, all samples were below  
30       residential PRGs for soil.

31       Using information gathered during site investigations, it was determined that the concentrations of  
32       Cr[T] and Cr[VI] still present in the aquifer are highest below these known sources of contamination or  
33       immediately downgradient, indicating that the primary sources/areas of contamination have been  
34       identified and have not changed since the initial releases of contaminated waters. Further, the highest  
35       concentrations in the groundwater are found in the deeper zone of the upper aquifer (i.e., 9,030 µg/L  
36       Cr[VI] found at SA-MW05D in August 2010), not the shallow subsurface, indicating that leaching from  
37       the vadose zone (if it is occurring at all) is not the primary driver of groundwater concentrations. In  
38       short, no conclusive evidence of a continuing source to groundwater is observed (Pacific Gas and  
39       Electric Company 2010).

40       If groundwater treatment residues contain concentrations of chromium that are high enough to  
41       trigger the definition of hazardous waste, they must be handled and disposed of in accordance with

1 the requirements of federal and state regulatory requirements. According to current threshold  
2 limits (per California Code of Regulations Title 22, Chapter 11, Section 66261.24-1), the soluble  
3 threshold limit concentration to be defined as a hazardous waste for Cr[VI] is 5,000 ppb in water  
4 and 50,000 ppm in soil. As of the fourth quarter of ~~2012~~2011, maximum Cr[VI] concentration levels  
5 present in groundwater are found immediately north of the Compressor Station at the source area  
6 (~~3,1004,100~~ 3,100 ppb in Well SA-MW-05D in Q4 2012~~1~~ sampling). ~~As recently as June 2011,~~  
7 ~~concentrations in one well in the source area (SA-MW-05D) and none of the concentrations in the~~  
8 ~~wells in the Fourth Quarter 2012 Monitoring Report~~ exceeded the hazardous waste concentration  
9 (5,000 ppb) for Cr[VI]. ~~indicating that~~ However, past quarterly monitoring reports have indicated  
10 that concentrations in the source area may fluctuate from above to under hazardous waste levels  
11 throughout the year. The most recent exceedance (5,400 ppb) was detected in June 2011 (according  
12 to the Fourth Quarter 2011 monitoring report) at Well SA-MW-05D.

### 13 **Agriculture-Related Contaminated Surface Soil**

14 The Hinkley Valley has had agricultural activity since the 1930s. Portions of the project area include  
15 active and/or historical agricultural fields that most likely have been sprayed with pesticides,  
16 herbicides, and other chemicals that are typically used for commercial agriculture. There is a large  
17 area of agricultural activity in the southeast corner of the project area, immediately east of the  
18 Compressor Station. In addition, existing active agricultural treatment units associated with  
19 remediation efforts include the two Gorman properties, the Cottrell and Ranch properties, and the  
20 Desert View Dairy, some of which were active in agriculture before their use in remediation. Large  
21 areas in the center of Hinkley Valley, roughly between the Mojave River and Thompson Road (with  
22 some fields further north) were historically farmed previously, but many agricultural fields were left  
23 fallow in the 1990s due to the water limits that came with the basin adjudication. Because these  
24 agricultural areas, both active and historical, exist in the project area, it is possible that that there  
25 could be low concentrations of agricultural chemicals in the surface soil. In addition, it is possible  
26 that isolated areas could have been used to store, blend, or load those same chemicals onto trucks or  
27 aircraft used for spraying. If so, leaks and spillages in those isolated loading areas might have caused  
28 surface soil concentrations of those same chemicals that could be higher than the regional  
29 concentrations in the fields that were routinely sprayed.

### 30 **Secondary By-Products of Prior Agricultural/Land Treatment Remediation**

31 Potential other agriculture-related contaminants that may be present in project area soils and  
32 groundwater include total dissolved solids, nitrate, and uranium.

33 Total dissolved solids are not considered toxic and are not considered a hazardous waste, regardless  
34 of concentration.

35 Nitrate is primarily a concern related to groundwater exposure and any discharges to land (as with  
36 dairy waste) are regulated to protect groundwater resources.

37 As discussed in Section 3.1, *Water Resources and Water Quality*, uranium has recently been detected  
38 in several agricultural treatment unit supply wells in the project area at elevated levels, but it has  
39 not been determined whether or not the elevated levels are related to agricultural treatment unit  
40 activity, natural levels, or other non-PG&E sources and is addressed in this document as a water  
41 quality concern for groundwater, not as a potential hazardous waste in soil. Naturally occurring  
42 radionuclides have been detected in rocks and groundwater throughout the southwestern United  
43 States. Naturally occurring radionuclides, including uranium and gross alpha, are high in volcanic

1 and granitic rocks (and sediments derived from them) throughout California (Churchill 2003). As  
2 described in Churchill (2003), uranium concentrations in the granitic rocks in the southern  
3 California Desert (Mojave Desert, Transverse Ranges, and Salton Trough) range from 0.325 parts  
4 per million (ppm) to 13 ppm (Larson and Gottfried 1961; John and Wooden 1990; Fox and Millar  
5 1990).

6 Potential project impacts related to total dissolved solids ~~and~~, nitrate and uranium in the project  
7 area are evaluated from a water quality perspective in Section 3.1, *Water Resources and Water*  
8 *Quality*; but total dissolved solids are not discussed further in this section because they are not  
9 expected to be encountered at hazardous waste levels in the project area. Potential nitrate and  
10 uranium impacts are discussed below in the impact analysis.

### 11 **Secondary By-Products of Prior In-Situ Remediation**

12 As described in the Feasibility Study Addendum #1 (January 2011), pilot and extended-scale in-situ  
13 remediation of the chromium plume has resulted in a temporary increase in arsenic in groundwater  
14 in parts of the plume area. Other potential groundwater contaminants that could exist in the project  
15 area are elevated concentrations of iron and manganese as secondary by-products resulting from  
16 current in-situ remediation. Iron ~~and manganese are~~ is not considered toxic and does not meet the  
17 definition of hazardous waste.

18 Manganese is a common element in soil and an essential nutrient in food at low doses, but chronic  
19 exposure to high doses or elevated levels could have toxic effects. Estimates of naturally-occurring  
20 manganese in soil range from 40 to 900 ppm in the United States (ATSDR Toxicological Profile for  
21 Manganese 2012). The USEPA Region IX Regional Screening level (which is a level for consideration  
22 of the potential need for remediation) for residential soil is 1,800 ppm (= 1,800,000 ppb). Health  
23 effects of manganese are discussed in Section 3.1 *Water Resources and Water Quality*. In the IRZ  
24 area, concentrations of manganese in groundwater can rise as high as 7,800 ppb (= 7.8 ppm) (Third  
25 Quarter, 2012 IRZ monitoring) during remedial operations, but such concentrations will later  
26 attenuate back to pre-IRZ reference levels between several months to one to two years after carbon  
27 amendment ceases.

28 Arsenic is toxic, but the concentrations in groundwater generated from in-situ remediation to date  
29 (maximum increase of up to 250 ppb per Feasibility Study Addendum #3; usually increases are  
30 much lower with only limited areas above 13 ppb) are far below hazardous waste levels in water  
31 (5,000 ppb); materials with concentrations that exceed hazardous waste levels require special  
32 handling and disposal of wastes containing concentrations. In-situ remediation does not involve  
33 discharge to soil, so arsenic concentration increases in soil are not an issue for in-situ remediation.

34 Potential project impacts related to byproduct generation including iron, manganese, and arsenic  
35 are evaluated from a water quality perspective in Section 3.1, *Water Resources and Water Quality*,  
36 but iron is ~~are~~ not discussed further in this section. Manganese and arsenic are discussed in the  
37 impact analysis below.

### 38 **3.3.3.3 Wildland Fire Hazards**

39 According to a review of the CAL FIRE Draft Fire Hazard Severity Zones State and Local  
40 Responsibility Area maps, the project area is considered a moderate wildland fire hazard. It is  
41 located outside a State Responsibility Area Fire Hazard Severity Zone, a Local Responsibility Area  
42 Very High Fire Hazard Severity Zone, and a Wildland-Urban Interface Fire Area. However, portions

1 of the project area are located in a Local Responsibility Area unzoned fire hazard severity zone  
2 (approximately the OU1 and OU2 areas including the Hinkley community, the Compressor Station,  
3 and areas to the east roughly to the eastern boundary of the project area) and Local Responsibility  
4 Area moderate or other moderate fire hazard severity zones (approximately the remainder of the  
5 project area surrounding the Local Responsibility Area unzoned area) (CAL FIRE 2007).

### 6 **3.3.3.4 Sensitive Receptors**

7 Sensitive receptors are members of the population that are most susceptible to be affected by  
8 exposure to hazards or hazardous materials. The primary sensitive receptors are residents that live  
9 in rural homes located throughout the project area. Construction workers and employees who  
10 perform operations and maintenance activities are also considered sensitive receptors. The closest  
11 school is Hinkley Elementary School, which is located approximately 1 mile west of the Desert View  
12 Dairy (east of Hinkley Road and south of Alcludia Road) in the western portion of the project area.  
13 The closest airport or airfield is Barstow Daggett Airport, located approximately 20 miles southeast  
14 of the project area.

### 15 **3.3.4 Significance Criteria**

16 The State CEQA Guidelines, Appendix G (California Code of Regulations Title 14, Section 15000, et  
17 seq.), have identified significance criteria to be considered when determining whether a project  
18 could cause significant effects to the public or the environment from hazards. For this analysis, an  
19 impact pertaining to hazards was considered significant under CEQA if it would result in any of the  
20 following:

- 21 • Create a significant hazard to the public or the environment through the routine transport, use,  
22 or disposal of hazardous materials.
- 23 • Create a significant hazard to the public or the environment through reasonably foreseeable  
24 upset and accident conditions involving the release of hazardous materials into the  
25 environment.
- 26 • Create hazardous emissions or handle hazardous or acutely hazardous materials, substances, or  
27 waste within 0.25 mile of an existing or proposed school.
- 28 • Be located on a site that is on a list of hazardous materials sites compiled pursuant to Section  
29 65962.5 of the California Health and Safety Code and create a significant hazard to the public or  
30 the environment.
- 31 • Be located within an airport land use plan or within 2 miles of a public airport or public use  
32 airport and result in a safety hazard for people residing or working in the project area.
- 33 • Be within the vicinity of a private airstrip and result in a safety hazard for people residing or  
34 working in the project area.
- 35 • Impair implementation of or physically interfere with an adopted emergency response plan or  
36 emergency evacuation plan.
- 37 • Expose people or structures to a significant risk of loss, injury, or death involving wildland fires.

38 Some of the significance criteria are not applicable to the project because there is no potential for  
39 the impact to occur or the applicable environmental resource does not occur within the project area.



1 Regarding the criteria associated with proximity to an existing or proposed school, the nearest  
2 school is located approximately 0.75 mile west of the existing remedial activity areas. The project is  
3 not expected to generate or handle hazardous waste within 0.25-mile of the school; therefore, this  
4 issue is not addressed further.

5 Regarding the criteria for locating a project on a site that is on a list of hazardous materials or waste  
6 sites, there are no identified hazardous materials sites within the project area (refer to Section  
7 3.3.3.1 above), therefore this issue is not addressed further.

8 Regarding interference with an emergency response plan, San Bernardino County has an emergency  
9 operations plan that describes the County's planned response to extraordinary emergencies  
10 associated with natural disasters, human-made technological incidents, and national security alerts.  
11 The project would not impair or physically interfere with implementation of this plan (potential  
12 impacts resulting from interference with emergency access are discussed under Impact HAZ-2).

13 Regarding the criteria related to airports and airstrips, the nearest public airport is the Barstow  
14 Daggett Airport, located approximately 20 miles southeast of the project area. There are no other  
15 private airports or airstrips within 2 miles of the project area. Therefore, the project would not  
16 result in a safety hazard within an airport land use area, and this impact is not discussed further.

### 17 3.3.5 Methodology

18 Available reports, maps, and public information sources were reviewed to identify the following  
19 potential hazards in the project area, including evaluation of potential short-term (construction-  
20 related) and long-term (operations-related impacts, that could occur from implementing  
21 remediation treatments included in the alternatives.

- 22 • Hazards to the Public or the Environment
  - 23 ○ The potential to encounter existing hazardous materials in soils and groundwater during
  - 24 project activities.
  - 25 ○ The potential for accidental release of hazardous materials due to remedial activities.
  - 26 ○ The potential for exposure to hazardous building materials during building demolition.
- 27 • Emergency Plans and Access
  - 28 ○ The potential to interfere with emergency access during remedial activities.
- 29 • Wildland Fires
  - 30 ○ The potential to increase or create new fire risks.

### 31 3.3.6 Impacts

32 This section provides the impact analysis and mitigation measures related to hazards and hazardous  
33 materials. The impacts are organized by topics that correspond with the significance criteria  
34 described in Section 3.3.4, *Significance Criteria*. For each impact, an overview with a general  
35 discussion of the impact is followed by the significance determination, and the discussion of how the  
36 impact differs for each alternative.

### 3.3.6.1 Hazards to the Public or the Environment

#### Impact HAZ-1a: Potential to Encounter Existing Hazardous Materials in Soil and Groundwater during Construction (Less than Significant with Mitigation, All Alternatives)

Project-related activities could occur in many different parts of Hinkley Valley given the current size of the plume (~~perhaps 6 to 9~~ 5 miles long by up to more than 2.5 miles wide). Given a long history of residential, agricultural use, along with roadways, railroads, and other uses there is the potential that there may be areas of petroleum or other contaminants to be present in soils in some portions of the valley. In addition, ground disturbance and extraction of contaminated groundwater in the chromium plume source area could have the potential to encounter chromium at hazardous waste concentrations.

Thus, project ground disturbance has the potential to result in exposure of hazardous materials that currently exist in soils within the project area, as well as chromium in groundwater in the source area. Worker health and safety and public safety are key issues when dealing with hazardous materials that might affect human health and the environment. Proper handling, storage, and disposal of hazardous material disturbed during project implementation are essential to reducing exposure potential.

For the portions of the project area where BLM lands are present, the potential to encounter hazardous materials is low due to the current lack of activities on BLM land that have the potential to release hazardous materials.

During construction of the project there is potential for disturbance of soils that could contain existing hazardous substances in the project area. This disturbance could result in exposure of hazardous substances to construction workers, nearby residents, and the environment in general.

#### Chromium Contamination in the Source Area

~~In accordance with Water Board Orders, soil investigations and remediation were performed by PG&E from the late 1980s through 2008 within the source area at the Compressor Station and all surrounding locations where Cr[VI] releases occurred. Based on these remediation activities, the highest levels of Cr[VI] contamination that could be present in surficial soils were removed and Cr[VI] contamination was reduced to levels that were below the acceptable EPA soluble threshold limit concentration of 5,000 ppb for industrial soils.~~

All alternatives include drilling new wells in the source area and possibly laying pipelines, which could result in exposure of contaminated soils. While exposure to soils with hazardous waste levels is unlikely due to the prior soil removals and remediation, groundwater with Cr[VI] exceeding hazardous waste levels has existed in the source area as recently as mid-2011. Therefore, groundwater handling in the source area continues to have the potential for worker exposure. PG&E would be required to meet all federal and state regulations that address the proper handling, storage, transportation, and disposal of hazardous wastes as administered through the San Bernardino County Fire Department's Unified Program. Therefore, since the areas with groundwater concentrations of Cr[VI] at hazardous waste levels are limited to the source area, which is on PG&E owned land, and given the application of federal and state regulatory requirements, the potential impacts associated with exposure of construction workers and the environment to Cr[VI] is considered less than significant.

## 1       **Historical Agriculture-Related and other non-Remedial Contaminants**

2       It is possible that surface soils in parts of the project area might contain low concentrations of  
3       residual pesticides and other agricultural chemicals resulting from long-term agricultural activity in  
4       the Hinkley Valley. Therefore, it is possible that ground disturbance at the new project sites could  
5       expose construction workers to these residual pesticides and the other chemicals. The relative  
6       concentrations of these substances would likely not be high enough to affect residents who may live  
7       adjacent to future remedial action areas, and would be well out of the range of area that could affect  
8       the Hinkley School.

9       In addition, it is possible that surface soils in parts of the project area might contain petroleum or  
10       other contaminants due to unrecorded spills given the long history of residence and agricultural,  
11       roadway, and railway use in the project area.

12       The No Project Alternative would include a limited amount of new ground disturbance. Because  
13       Alternative 4C-4 involves the most extensive amount of agricultural treatment and associated  
14       infrastructure, it would also involve the largest amount of ground disturbance and the highest  
15       potential for encountering past and current agriculture-related contaminants in soils. All action  
16       alternatives would have the same type of potential impacts, but vary in scale depending on the  
17       amount of ground disturbance.

18       In the event that construction excavation, grading, or trenching activities for the proposed project  
19       encounter potentially contaminated soils, **Mitigation Measure HAZ-MM-1** would be adequate to  
20       address any soil contamination contingency that may be encountered ~~during construction of the~~  
21       ~~project~~ and would ensure compliance with state and federal regulations and ~~would~~ reduce potential  
22       impacts to a less-than-significant level.

## 23       **Prior Remediation Residual By-Products**

24       Existing and past in-situ remediation activities are known to result in by-products, including  
25       dissolved metals such as manganese, iron, and arsenic, found in groundwater as a result of carbon  
26       injection. However, these byproducts are either non-toxic (like iron) or toxic but found in  
27       concentrations far below hazardous waste levels in groundwater to date (like arsenic) or toxic, but  
28       not being discharged to surface soils where they might be an exposure issue (like manganese).  
29       Thus, new remedial actions would not encounter hazardous levels of these byproducts and potential  
30       exposure would be less than significant from a hazardous waste perspective. Water quality effects of  
31       remedial byproducts are discussed separately in Section 3.1, *Water Resources and Water Quality*.

## 32       **Impact HAZ-1b: Potential Releases of Hazardous Materials or Waste Used or Generated from** 33       **Construction Activities and During Remedial Operations (Less than Significant with** 34       **Mitigation, All Alternatives)**

## 35       **Construction Impacts**

36       Fuel, oils, grease, solvents and other petroleum-based products are commonly used in construction  
37       activities, including those that would typically be used to construct new wells and all associated  
38       infrastructure. All alternatives involve new access roads with all alternatives, as well as for above-  
39       ground treatment facilities; and new agricultural treatment units. Some of these petroleum products  
40       also have the potential to be flammable. Ethanol, which will likely be used for new in-situ remedial  
41       actions, is also high flammable. Furthermore, chemicals used for maintenance actions involving well

1 screens, pipelines, etc., will be periodically brought to the project sites and stored until used. Such  
2 chemicals include solid acetic acid, hydrochloric acid, fungicides, and compounds used to stop root  
3 growth.

4 Accidental releases of these ~~contaminants~~ chemicals and compounds could pose a significant hazard  
5 from direct contact to construction workers, nearby residents, and the environment. In addition,  
6 accidental releases of these products could contaminate soils and degrade surface water and  
7 groundwater quality. Soil contamination could affect construction workers and construction  
8 personnel who engage in ground-disturbing activities associated with construction, while the  
9 degradation of surface water and groundwater quality could affect nearby residents who rely on this  
10 water for consumption. For all alternatives, this impact is considered potentially significant.  
11 Implementing **Mitigation Measure HAZ-MM-2** would reduce this impact to a less-than-significant  
12 level.

### 13 **Operation and Maintenance**

14 The project would require storage, use, treatment, and transport of hazardous materials to and from  
15 project sites during operations. As described below, the potential releases of hazardous materials  
16 or waste from remedial operations would be less than significant with implementation of mitigation  
17 measures.

### 18 **Wells, Agriculture Treatment, and In-Situ Remediation**

19 Under all alternatives, wells would require periodic cleaning, including handling of backwash water;  
20 cleaning of pipelines, tanks, and appurtenances; and removal, replacement, and cleaning or  
21 maintenance of downhole equipment such as pumps, pipes, and valves. As described above, the  
22 potential for exposure to hazardous waste levels of Cr[VI] through groundwater and soil exposure is  
23 limited to handling of groundwater extracted during well operations and/or well maintenance in the  
24 source area by workers. Potential impacts from this exposure can be avoided or significantly  
25 reduced through adherence to OSHA standards for remediation workers. Therefore, the potential for  
26 public or environmental exposure to Cr[VI]-contaminated soils or groundwater as a result of well  
27 operations and maintenance is considered less than significant.

28 Periodic cleaning and maintenance of pipelines and appurtenances used in agricultural treatment  
29 could involve mixing and injecting chemical solutions, citric acid, and hydrogen peroxide to control  
30 lime scaling and biological growth. However, no residue would remain from use of these chemicals  
31 because they are readily and completely degraded in soils to carbon dioxide, oxygen, and water.  
32 Using proper storage, handling, and disposal of such chemicals and compounds. The potential to  
33 expose workers or the environment to these substances is considered less than significant.

34 Agricultural treatment could require periodic use of chemicals to maintain crop health. Such  
35 treatment could involve pesticides, herbicides, and rodenticides that have the potential to be used,  
36 stored, transported or otherwise handled, ~~thereby~~ Such use could result in the potential to  
37 expose workers or the environment to hazards during handling of these substances and after these  
38 substances have been applied to crops. However, state and federal regulations strictly control the  
39 application and use of pesticides, herbicides, and rodenticides to control such exposures.

40 Agricultural treatment also involves the irrigation of fields using chromium laden water that also  
41 may contain elevated levels of nitrate and uranium. Since agricultural treatment could be  
42 operational for 75 to 95 years, an analysis was done of the potential for substantial increase in

1 chromium, nitrate, or uranium to occur in agricultural treatment soils that might become a health  
2 risk over time.

### 3 Chromium

- 4 ○ PG&E characterized soils at the former East and Ranch land treatment units following  
5 remedial actions and continues to collect soil samples at the DVD land treatment unit.
- 6 ● Sampling at the East Land Treatment during operation showed levels of total chromium  
7 up to 24 ppm from 1994 through 1997. From 1997 to 2001, total chromium levels up to  
8 34 ppm were found at both the East and Ranch Land Treatment Units, with the data not  
9 indicating a distinct pattern of deposition or trend of chromium increases (PG&E 2003).
- 10 ● Soil Sampling at the DVD in August 2005, approximately one year after startup,  
11 indicated soil total chromium levels ranging between 3 and 10 ppm with no detections  
12 of Cr[VI] (detection limit of < 0.5 ppm) (PG&E 2005). Soil sampling at the DVD in the  
13 third quarter of 2012 indicated total chromium between 3 and 13 ppm with no  
14 detections of Cr[VI] (detection limit of < 0.5 ppm) (PG&E 2012). Such information  
15 indicates no substantial change from 2005 to 2012 in soil chromium levels.
- 16 ○ Agricultural treatment is highly effective at converting dissolved Cr[VI] to solid Cr[III]. Any  
17 residual Cr[VI] remains in solution and infiltrates through the subsurface (vadose zone).  
18 Thus, the residual chromium near the ground surface is dominated by Cr[III], as evidenced  
19 by the non-detection of Cr[VI] in agricultural treatment soils noted above. All of the soil  
20 sampling to date at land treatment units has indicated concentrations of chromium far  
21 below the USEPA Region IX Soil Screening Level for residential soils of 120,000 ppm (for  
22 Cr[III]).
- 23 ○ Land treatment data to date has not indicated a pattern of accumulating chromium in soils,  
24 likely due to the low concentrations being applied. A rough estimate of potential  
25 accumulation was performed for Alternative 4C-4 (which has the fastest time to meet  
26 cleanup goals) and Alternative 4C-5 (which has the slowest time to meet cleanup goals).  
27 Calculations assumed that the average chromium concentration of the plume at the  
28 southernmost groundwater extraction point for agricultural treatment is 500 ppb for the  
29 initial treatment period (until cleanup goal of 50 ppb is met), 27 ppb for the next treatment  
30 period (until cleanup goal of 3.1 ppb is met), and 2.2 ppb for the final treatment period (until  
31 cleanup goal of 1.2 ppb is met). Assuming that 100% of Cr[III] in irrigation water remains in  
32 the top 12 inches (0.31 meter) of soil, potential final Cr[III] accumulation in soil is estimated  
33 as 22 ppm (Alternative 4C-4) to 65 ppm (Alternative 4C-5). These levels are far below the  
34 USEPA Region IX Soil Screening Level for residential soils of 120,000 ppm (for Cr[III]). This  
35 rough estimate does not take into account any soil leaching to groundwater, uptake by  
36 vegetation, or soil loss. Thus the actual impact may be overstated, especially in light of DVD  
37 monitoring results to date that don't show measurable change in soil chromium levels.
- 38 ○ As a result, potential accumulation of Cr[III] in soils due to agricultural treatment is not  
39 considered a significant impact, even in the worse-case scenario.
- 40 ○ Based on the non-detect concentration of chromium in plants samples collected at the  
41 Desert View Dairy semi-annually from 2005 to 2012, chromium accumulation in plants and  
42 fed to domestic animals is not considered a significant impact.

- 1           ○ Based on the calculations of potential Cr[III] accumulation in soils from agricultural  
2           treatment and the assumption that soils will be stabilized by plants at least 8 months or 75  
3           percent of the year, wind erosion of irrigated soil is not considered a significant impact.

#### 4           **Nitrate**

5           Available data for nitrogen in vadose zone soils indicate that concentrations range from elevated (up  
6           to 65 mg/kg) in areas where former dairy operations or intensive agriculture occurred to very low  
7           (1 to 11 mg/kg) levels in outlying areas. It is anticipated that the concentrations of nitrogen in soils  
8           will decrease over time as the AUs are operated and crops are established. Some vadose zone  
9           nitrogen may be mobilized with irrigation water that leaches through the vadose zone. Over time it  
10           is expected that there will be a significant net reduction of nitrogen in vadose zone soils (PG&E  
11           2011). As a result, potential accumulation of nitrate in soils due to agricultural treatment is not  
12           considered a significant impact.

#### 13           **Uranium**

14           As discussed in Section 3.1, *Water Resources and Water Quality*, the recent detection of elevated  
15           uranium in agricultural unit treatment water supply wells has not been fully evaluated to determine  
16           whether or not agricultural unit activity is influencing naturally occurring levels of uranium in  
17           groundwater or soil. PG&E did not use uranium in Compressor Station operations, but agricultural  
18           activities might have influenced naturally occurring levels of uranium in groundwater. If this is  
19           occurring, then the long-history of agricultural activity in Hinkley would have the same impact since  
20           the 1930s up to the present, as agricultural unit treatment units operate the same as any other  
21           agricultural field growing feed. As such, if agricultural irrigation is influencing agricultural soil  
22           concentrations of uranium, this is a widespread condition in the Hinkley area where prior and  
23           ongoing agricultural activity has occurred and is occurring. At this time, the uranium data do not  
24           support any conclusions about the relation of the detections of elevated uranium in groundwater  
25           and agricultural treatment units. Thus, pre-remediation reference uranium data will be required  
26           prior to the startup of future remediation projects. **Mitigation Measure WTR-MM-5** requires PG&E  
27           to investigate this issue further. The mitigation will also require investigation of agricultural soils,  
28           groundwater, plant uptake, and implementing other remedial actions, if necessary. Therefore, with  
29           mitigation applied, agricultural unit treatment would not have a significant impact on the  
30           environment.

31           In-situ treatment, which involves the injection of organic carbon substrates, is an effective  
32           technology for converting Cr[VI] in groundwater into Cr[III] solids, retained in aquifer sediments.  
33           Several organic compounds (including ethanol, lactate, and emulsified vegetable oil) were shown to  
34           be effective reagents (ethanol is now favored). Ethanol, which is flammable, would be stored,  
35           transported, and used, resulting in the potential to expose workers to risk. As discussed above, IRZ  
36           operations do not include discharge of treated water to surface soils, and thus no route of exposure  
37           exists for byproducts such as arsenic and manganese for IRZ operations.

38           However, some of the alternatives include agricultural units within the IRZ area, and water from  
39           within the IRZ (during IRZ operations) may be used for agricultural unit irrigation and could contain  
40           elevated amounts of arsenic and manganese. Such agricultural treatment could overlap with IRZ  
41           treatment for perhaps 20 years. An analysis was done evaluating the potential for increases in  
42           arsenic or manganese to occur in agricultural treatment unit soils in the southern part of the plume  
43           during the 20 year overlap of IRZ and agricultural treatment.

**Arsenic**

- No data on surface soil concentrations for arsenic in the IRZ area were located. In California, soils are estimated to have arsenic content in soils ranging from 0.6 to 11 ppm, with an average of 3.5 ppm (Bradford et al. 1996), representing general background levels.
- As discussed in Section 3.1, *Water Resources and Water Quality*, IRZ treatment can result in maximum elevated arsenic levels in groundwater up to 250 ppb at times (per PG&E Feasibility Study Addendum No.3), but most parts of the IRZ area have arsenic levels less than 5 ppb (per 4<sup>th</sup> Quarter 2012 IRZ Monitoring Data).
- A rough estimate of potential arsenic accumulation in soils for irrigation of agricultural treatment units co-located with IRZ operations for 20 years. Calculations assume that the average arsenic concentration in irrigation water is 7.5 ppb (for 20 years) and that 100% of arsenic in irrigation water remains in 12 inches (0.31 meter) of soil. Thus, potential arsenic accumulation is estimated at approximately 0.9 ppm. Assuming existing levels of arsenic in soils are 0.6 to 11 ppm (Bradford et al. 1996), total levels could be raised to perhaps to 1.5 to 11.9 ppm. The USEPA Region IX Soil Screening Levels for industrial soils (the IRZ area is controlled by PG&E with no residences immediately nearby) is 1.6 ppm. Total levels may exceed the soil screening levels, but the dominant source of arsenic may be pre-existing soil arsenic levels depending on existing soil levels, and the contribution from agricultural unit irrigation is well within the likely existing range. Calculation of the total potential loading of arsenic over 20 years is estimated as 2 kg per hectare. This amount is less than 10 percent of the USEPA regulatory limit for arsenic loading due to use of biosolids (sewage sludge) in agricultural land, which is 41 kg per hectare (40 CFR 503.12). As the contribution of arsenic from irrigation using water from the IRZ area during IRZ operations is likely within the range of existing levels for soil and below federal standards for metal loading for agricultural land, this is considered a less than significant impact.

**Manganese**

- No data on surface soil concentrations for manganese in the IRZ area soils were located. In California, soils are estimated to manganese content in soils ranging from 252 to 1,687 ppm, with an average of 646 ppm (Bradford et al. 1996), representing general background levels.
- As discussed in Section 3.1, *Water Resources and Water Quality*, IRZ treatment can result in elevated manganese levels up to 7,800 ppb at times, although average levels in the IRZ area are usually much lower and most areas in the IRZ area contain less than 390 ppb of manganese in groundwater.
- This provides a rough estimate of potential manganese accumulation in soils from irrigation of agricultural treatment units co-located with IRZ operations for 20 years. Calculations assume that the average manganese concentration in irrigation water is 390 ppb (for 20 years) and that 100% of manganese in irrigation water remains in the top 12 inches (0.31 meter) of soil. The potential maximum manganese accumulation is estimated as 46 ppm. Assuming existing levels of manganese in soil averages 646 ppm (Bradford et al. 1996), total levels could be raised to around 700 ppm. The USEPA Region IX Soil Screening Levels for industrial soils (the IRZ area is controlled by PG&E) is 23,000 ppm (the screening level for residential soil is 1,800 ppm). While accumulation of manganese in agricultural soils could occur during irrigation using IRZ area water, the accumulation would not likely result in

1 | concentrations of concern within agricultural treatment soils as total manganese levels  
2 | would be below soil screening levels.

3 PG&E would be required to comply with existing federal and state regulations (as described above  
4 and as administered through the San Bernardino County Fire Department's Unified Program)  
5 governing proper handling of hazardous materials and hazardous materials worker safety  
6 requirement procedures. Compliance with existing hazardous materials regulations and proper  
7 worker training are is mandatory; as a result, the potential to expose workers, residents, or the  
8 environment to hazardous waste is considered to be less than significant. This impact would be  
9 virtually the same for all alternatives, the only difference being increased intensity and scale  
10 between the No Project Alternative and all action alternatives, and between all alternatives in  
11 comparison to existing conditions.

## 12 **Above-Ground Treatment**

13 Although above-ground treatment has not been employed to date, it is allowed as a potential  
14 remediation approach in existing Waste Discharge Requirements (WDRs) and now has been  
15 included as a proposed remediation option under Alternatives 4C-3 and 4C-5 (and as a contingency  
16 for other alternatives). An above-ground treatment facility would involve extracting groundwater  
17 from the plume, removing the chromium from the water by a chemical and/or physical process in an  
18 ex-situ treatment facility, and injecting the treated water immediately upgradient of the  
19 source area and immediately downgradient of the high-concentration plume boundary. The  
20 treatment facilities included in Alternatives 4C-3 and 4C-5 would be quasi-industrial facilities  
21 located on PG&E-owned lands, and would likely be considered hazardous waste facilities due to the  
22 generation of Cr[VI] as a hazardous waste byproduct of above-ground treatment.

23 The handling, storage, and transport to a landfill of the Cr[VI] waste has the potential to introduce a  
24 new hazard from exposure of employees, the public, and the environment to hazardous waste as  
25 defined by federal and state laws. As described in Section 3.3.2.3, *Local Regulations*, PG&E, the  
26 facility operator, would be considered a hazardous waste generator and would be required to obtain  
27 permits from the San Bernardino County Fire Department to comply with federal and state  
28 hazardous materials requirements that are administered through the Unified Program. The Cr[VI]-  
29 contaminated waste residue would need to be transported and disposed of at a Class I landfill  
30 permitted to accept hazardous wastes as authorized under Title 27 of the California Code of  
31 Regulations (such as the Waste Management Kettleman Hills Facility). With mandated compliance  
32 with federal and state handling requirements, substantial exposure of workers or the public would  
33 not occur; therefore, this would be a less than significant impact.

34 Alternatives 4C-3 and 4C-5 (and other alternatives as a contingency) would include new above-  
35 ground treatment facilities, and chemical handling, which Such chemicals could result in accidental  
36 spills of treatment reagents, including ferrous chloride (for chromium removal), sulfuric acid (for pH  
37 control), sodium hydroxide (for pH control) to improve precipitation, an anionic polymer to  
38 facilitate particle settling, and an anti-scalant to reduce mineral buildup on reverse-osmosis  
39 membrane surfaces. Potential impacts would be the result of accidental spills of treatment reagents,  
40 some of which could be flammable alone or in combination.

41 In general, under all alternatives, the use of hazardous materials within the project area during  
42 operations and maintenance would be subject to existing hazardous materials laws, regulations, and  
43 programs, as described in Section 2.10.4.5 of Chapter 2, Project Description. and These would  
44 reduce the potential that an accidental release would occur. Additionally, the use and storage of



1 these substances are not anticipated to (and typically do not) include acutely hazardous materials<sup>2</sup>  
2 that can present a potentially catastrophic event at or above their threshold quantity, if released. For  
3 all future remediation activities, PG&E would be required to prepare and submit a Business  
4 Emergency/Contingency Plan as required by San Bernardino County that complies with all federal  
5 and state regulations. As a result, potential operations and maintenance impacts related to  
6 accidental releases of hazardous materials would be less than significant.

7 **Impact HAZ-1c: Exposure to Hazardous Building Materials during Demolition (Less than**  
8 **Significant, No Project Alternative; Less than Significant with Mitigation, All Action**  
9 **Alternatives)**

10 As described in Section 3.3.2, *Regulatory Setting*, buildings constructed prior to 1980 may  
11 potentially contain hazardous materials such as lead-based paint and asbestos. Proposed structural  
12 demolition (e.g., removal of old farm buildings, or houses) may be required in order to construct  
13 new wells (all alternatives), agricultural treatment units (all action alternatives), or above-ground  
14 treatment facilities (Alternatives 4C-3 and 4C-5 only). If any structures that would be removed  
15 contain hazardous building materials, there could be exposure to asbestos-containing materials and  
16 lead-based paint given the age of these structures and electrical equipment containing PCBs,  
17 fluorescent tubes containing mercury vapors, and fluorescent light ballasts containing di (2-  
18 ethylhexyl) phthalate (DEHP). Therefore, exposure to hazardous building materials as a result of  
19 structural demolitions could be a potentially significant impact. The degree of impact would vary  
20 among the alternatives depending on the land coverage and potential for structural demolition, with  
21 the No Project Alternative having no impact (no acquisition/no demolition) and Alternative 4C-4  
22 having the most because of the greatest extent of potential land acquisitions. Implementation of  
23 **Mitigation Measure HAZ-MM-3** would reduce this potential impact to a less-than-significant level,  
24 given that it requires hazardous building-material surveys prior to demolition or disturbance of  
25 existing buildings, and correspondingly appropriate containment and disposal of hazardous  
26 materials.

27 **3.3.6.2 Emergency Plans and Access**

28 **Impact HAZ-2: Conflict with or Impede Emergency Response Plan, Evacuation Plan, or Access**  
29 **(Less than Significant, All Alternatives)**

30 As described in Section 2.9 of Chapter 2, *Project Description*, routine operations and maintenance  
31 activities of remedial actions include for all alternatives include daily system checks, data collection,  
32 pumping and carbon injection, periodic cleaning and maintenance and other activities. All action  
33 alternatives also include irrigation and agricultural tilling. Alternatives 4C-3 and 4C-5 would also  
34 include operation of above-ground treatment facilities, which require 1-3 workers present at all  
35 times, working in 2-3 shifts per day; as well as scheduled deliveries and waste collection (other  
36 alternatives may have above-ground treatment facilities as a contingency). There would be a small  
37 increase in local traffic but deliveries, vehicle, and equipment access would not be so substantial that  
38 they would disrupt existing access in the project vicinity. In addition, as described in Section 3.10,  
39 *Transportation and Traffic*, the project would not result in significant impacts on levels of service on  
40 public roads and highways, and construction-vehicle and employee parking would be off public

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<sup>2</sup> Acutely hazardous materials are substances identified in Title 8 of the California Code of Regulations Section 5189, *Process Safety Management of Acutely Hazardous Materials*.

1 roads and on PG&E owned land or within undesignated locations along public streets. Emergency  
2 vehicle response times would not be adversely affected by slowed traffic or blocked streets.  
3 Roadway closures are not anticipated due to the large availability of secondary access roads off  
4 public streets that could be used by PG&E workers as alternative routes to access construction sites,  
5 and/or completed facilities. Because no complete roadway closures would take place under the  
6 project, there would be no disruption to emergency access. Therefore, for all alternatives, potential  
7 impacts related to conflicts with emergency access during construction and/or operations and  
8 maintenance of the project would be less than significant in comparison to existing conditions. In  
9 addition, PG&E would be required to comply with all federal, state and local regulations as described  
10 in Section 3.3.2, *Regulatory Setting*, that mandate preparation of emergency access planning  
11 procedures.

### 12 3.3.6.3 Wildland Fire

#### 13 **Impact HAZ-3: Increased Risk of Fire Hazards during Construction and Operation and** 14 **Maintenance (Less than Significant, All Alternatives)**

15 Under all alternatives, the use of construction equipment during construction and the use of other  
16 machinery, fuel, and potentially flammable remediation-related chemicals during project operation  
17 and maintenance have the potential to increase the risk of fire hazard. Portions of the project area  
18 are within a moderate severity zone of a Local Responsible Area for wildfire risk.

19 The risk of fire is low because PG&E would be required to comply with the provisions of San  
20 Bernardino County's Fire Code regulating use, storage or transport of flammable substances;  
21 provisions of the Fire Hazard Abatement Program to manage and prevent fire hazards and risks;  
22 Under all alternatives, compliance with these regulations would minimize or avoid potential project-  
23 related risk of fire hazards from construction or operations and maintenance activities and this  
24 impact would be considered less than significant. This impact would be the same under all  
25 alternatives in comparison to existing conditions.

### 26 3.3.7 Mitigation Measures

#### 27 **Mitigation Measure HAZ-MM-1: Implement Contingency Actions if Contaminated Soil is** 28 **Encountered During Ground Disturbance**

29 PG&E will work with ~~provide the resume of~~ an experienced and qualified Professional Engineer  
30 or Professional Geologist, subject to approval by the Water Board, who will be available for  
31 consultation during soil excavation and grading activities, ~~to the Water Board for review and~~  
32 ~~approval. The resume will demonstrate experience in remedial investigation and feasibility~~  
33 ~~studies.~~

34 If potentially contaminated soil is unearthed during excavation as evidenced by discoloration,  
35 odor, detection by handheld instruments, or other signs, the Professional Engineer or  
36 Professional Geologist will inspect the site, determine the need for sampling to confirm the  
37 nature and extent of contamination, and file a written report to the project owner and to the  
38 Water Board stating the recommended course of action.

39 Depending on the nature and extent of contamination, the Professional Engineer or Professional  
40 Geologist will have the authority to temporarily suspend further activity at that location for the

1 protection of workers or the public. If, in the opinion of the Professional Engineer or  
2 Professional Geologist, significant remediation may be required, the project owner will contact  
3 the Water Board and representatives of the Hazardous Materials Division of San Bernardino  
4 County's Environmental Health Services Department for guidance and possible oversight.

5 **Mitigation Measure HAZ-MM-2: Implement Spill Prevention-Containment, Control, and**  
6 **Countermeasures Plan During Construction**

7 To prevent accidental spills and contain spills of hazardous substances that might occur, PG&E  
8 will prepare a Spill Prevention, Control, and Countermeasure Plan (SPCC Plan) or equivalent if  
9 required, prior to commencement of construction activities for approval by the San Bernardino  
10 County Fire Department, prior to commencement of construction activities. The SPCC plan will  
11 be in accordance with all federal and state laws that addresses procedures to (1) properly  
12 handle, use, store, and/or transport potentially flammable and/or other chemical hazardous  
13 wastes, (2) emergency response protocols to contain these substances in the event of an  
14 accidental spill or release, (3) specific worker safety training and (4) reporting requirements in  
15 the event of an accidental spill or release. If

16 ~~The SPCC Plan is required, it is anticipated it will include the following features:~~

- 17 ● ~~Groundwater treatment chemicals will be brought to the site in totes (approximately~~  
18 ~~300 gallons) or smaller containers. All chemicals will be stored and shipped in accordance~~  
19 ~~with federal DOT regulations for hazardous materials. Totes and containers will be~~  
20 ~~offloaded in a paved/contained area only and stored and used only in a secondarily~~  
21 ~~contained area.~~
- 22 ● ~~Treatment reagent (biological/chemical reductants) tanker truck deliveries will be~~  
23 ~~offloaded in secondary containment areas with sufficient capacity (110% of the tanker~~  
24 ~~volume) to contain any spilled reagent.~~
- 25 ● ~~Reagent delivery vehicle speeds on site access roads and tanker truck turnarounds will be~~  
26 ~~limited to 10 miles per hour to reduce the potential for chemical releases to the~~  
27 ~~environment.~~
- 28 ● Hazardous materials storage and usage will be in accordance with the requirements of the  
29 San Bernardino County Fire Code, Articles 79 and 80. A Business Contingency/Emergency  
30 Plan will be prepared in accordance with San Bernardino County Fire Department  
31 requirements for chemicals stored on-site for more than 30 days in excess of the regulatory  
32 thresholds (55 gallons, 500 pounds, or 200 standard cubic feet of gas). It is anticipated ~~The~~  
33 ~~plan will list hazardous materials handled and include procedures for emergency response,~~  
34 ~~training, and inspections. Hazardous wastes will be managed in accordance with the~~  
35 ~~requirements of Title 22, California Code of Regulations, Division 4.5.~~
- 36 ● All spills and corrective actions will be recorded in the field log by the site manager.
- 37 ● Any accidental spill that releases hazardous materials to soil outside the spill containment  
38 pads in amounts exceeding reportable quantities will be reported to the appropriate  
39 regulatory agency.
- 40 ● Treatment plants will be constructed on a concrete foundation and provided with secondary  
41 containment to contain drips and spills and tanker offloading areas as necessary. ~~A~~  
42 ~~treatment system operations manual will be maintained at each treatment system. System~~

1 | ~~operators will be trained regarding system operation, maintenance, and emergency~~  
2 | ~~procedures.~~

3 | **Mitigation Measure HAZ-MM-3: Implement Building Materials Survey and Abatement**  
4 | **Practices**

5 | For activities involving demolition or modification of existing or future new facilities, PG&E will  
6 | retain a registered environmental assessor or a California-registered professional engineer to  
7 | perform a hazardous building materials survey prior to demolition or modification activities. If  
8 | any asbestos-containing materials, lead-containing materials, or hazardous components of  
9 | building materials are identified, adequate abatement practices, such as containment and/or  
10 | removal, will be implemented prior to demolition or renovation. Any components containing  
11 | PCBs, di (2-ethylhexyl) phthalate (DEHP), or mercury will also be removed and disposed of  
12 | properly.



Section 3.4  
Geology and Soils



# 3.4 Geology and Soils

## 3.4.1 Introduction

This section describes the affected environment and regulatory setting for geology, soils, and seismicity. It also describes the impacts related to geology, soils, and seismic activity that would result from implementation of the project and mitigation measures to reduce such impacts. Cumulative geology, soils, and seismicity impacts of the project are discussed separately in Chapter 4, *Other CEQA Analyses*.

### 3.4.1.1 Summary of Impacts

Table 3.4-1 presents a summary of the geology and soils impacts. Section 3.4.6, *Impacts*, and Section 3.4.7, *Mitigation Measures*, provide detailed impact analysis and describe applicable mitigation measures for those impacts found to be potentially significant.

**Table 3.4-1. Summary of Geology and Soils Impacts**

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
GEO-1a: Increased Soil Erosion or Loss of Topsoil during Construction	All Alternatives	Less than Significant	None Required	--
GEO-1b: Increased Soil Erosion or Loss of Topsoil from Operation and Maintenance	All Alternatives	Less than Significant	None Required	--
GEO-1c: Potential Risk of Structural Damage due to Land Subsidence from Remedial Groundwater Pumping	No Project	Less than Significant	None Required	--
	All Action Alternatives	<u>Less than Potentially Significant</u>	<u>Recommended Only:</u> GEO-MM-1: Land Subsidence Monitoring, Investigation, and Repair <del>WTR-MM-2: Water Supply Program for Wells that are Affected by Remedial Activities</del>	Less than Significant
GEO-2a: Increase Risk of Infrastructure Damage due to Seismic Activity	All Alternatives	Less than Significant	None Required	--
GEO-2b: Increase Risk of Human Exposure due to Seismic Activity	All Alternatives	Potentially Significant	GEO-MM-2: Emergency Response Plan for Potential <u>Remedial Pipeline or Storage Tank</u> Rupture	Less than Significant



1 As discussed in the impact analysis, the primary project impacts on erosion and loss of top soil  
 2 would occur during project construction at initial buildout, but compliance with the County's  
 3 erosion control ordinance would prevent significant impacts. Potential impacts on land subsidence  
 4 are difficult to predict, but are ~~conservatively~~ considered ~~potentially less than~~ significant under all  
 5 action alternatives ~~given the lack of evidence of prior subsidence with historic~~ because there would  
 6 be a substantial lowering of groundwater levels drawdown and the dominance of in areas that may  
 7 be susceptible to land subsidence coarse aquifer sediments less susceptible to subsidence.  
 8 Mitigation has been identified recommended (but not required) as a prudent measure in the event  
 9 that to address any potential structural damage were to actually occur that may occur due to land  
 10 subsidence from to remedial action. Although The risk of seismic activity is low in the project area,  
 11 because the Lenwood-Lockhart fault zone has a low slip rate and a long interval between major  
 12 ruptures (i.e., 3,000 to 5,000 years) and the Mount General fault is not considered to be an active  
 13 fault. However, the project would locate infrastructure and workers near ~~several~~ active faults in the  
 14 Lenwood-Lockhart zone and could result in increased risk during seismic events, but conformance  
 15 with building codes and identified emergency planning mitigation can reduce potential impacts to a  
 16 less-than-significant level.

## 17 3.4.2 Regulatory Setting

### 18 3.4.2.1 Federal Regulations

19 The only federal regulations pertaining to geology and soils concern erosion prevention during  
 20 construction.

#### 21 **Clean Water Act, Section 402 (Construction Stormwater Pollution Prevention Plan)**

22 Clean Water Act, Section 402 regulates discharge of pollutants to federal waters. The State Water  
 23 Resources Control Board has been delegated the authority to implement Section 402 in California.

24 Projects disturbing more than one acre are required to have coverage under the State General  
 25 Construction Permit issued by the State Water Resources Control Board and develop a Stormwater  
 26 Pollution Prevention Plan (SWPPP). Project proponents are required to abide by all requirements of  
 27 the General Construction Permit and to obtain a Waste Discharge Identification (WDID) number  
 28 prior to the issuance of grading permits when the disturbance is more than one acre.

29 As described in Section 3.1, *Water Resources and Water Quality*, the Mojave River is considered a  
 30 federal water and potential erosion of materials that could be deposited in the Mojave River is  
 31 regulated under Section 402. Since Harper Lake is not a federal water, drainage that heads  
 32 northward from the project area to Harper Lake is regulated under state authority under the Porter  
 33 Cologne Water Quality Control Act. As such the State Water Resources Control Board requires a  
 34 SWPPP for all construction projects that disturb more than 1 acre whether the projects drain to  
 35 federal waters or state waters.

### 36 3.4.2.2 State Regulations

#### 37 **Alquist-Priolo Act**

38 The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (California Public Resources  
 39 Code Section 2621 et seq.), passed in 1972 (and amended in 1994), was established to identify

1 active faults in California and prevent the construction of buildings used for human occupancy on  
2 the surface trace of active faults. The act directs the Department of Conservation's California  
3 Geological Survey to establish regulatory zones, called Alquist-Priolo Earthquake Fault Zones,  
4 around known surface traces of active faults and publish maps showing these zones. Within the  
5 zones, buildings designed for human occupancy<sup>1</sup> cannot be constructed across the surface trace of  
6 active faults. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the  
7 mapped fault trace because many active faults are complex and consist of more than one branch.  
8 There is the potential for ground surface rupture along any of the branches of the fault. The Alquist-  
9 Priolo Act further required cities and counties to regulate certain development projects within the  
10 zones. The California Geological Survey continually evaluates and updates potentially active faults  
11 for zoning consideration (Bryant and Hart 2007).

12 For purposes of establishing earthquake fault zones as described by the Alquist-Priolo Act, these  
13 faults can be classified as historically active, active, sufficiently active and well defined, or inactive,  
14 based on the criteria listed here (Bryant and Hart 2007):

- 15 • Faults that have generated earthquakes, accompanied by surface rupture during historic time  
16 (approximately the last 200 years) and faults that exhibit seismic fault creep<sup>2</sup>, are defined as  
17 *historically active*.
- 18 • Faults that show geologic evidence of movement within Holocene time (approximately the last  
19 11,000 years) are defined as *active*.
- 20 • Faults that show Holocene surface displacement (observed or inferred) with a clearly detectable  
21 trace "at or just below the ground surface" are defined as *sufficiently active and well defined*.
- 22 • Faults that show direct geologic evidence of inactivity during all of Quaternary time or longer  
23 are classified as *inactive*.

24 Although it is difficult to quantify the probability that an earthquake will occur on a specific fault, the  
25 underlying assumption of the Alquist-Priolo Act is that if a fault has ruptured during the past  
26 11,000 years, it is likely to rupture within a time period significant to California residents (Bryant  
27 and Hart 2007).

28 California Geologic Survey Special Publication 42 (Bryant and Hart 2007) states that, in the absence  
29 of a site-specific faulting study, the areas within 50 feet of the mapped fault should be considered to  
30 have the potential for surface faulting, and therefore, no structure for human occupancy should be in  
31 these areas. Construction of buildings intended for human occupancy within fault zone boundaries  
32 is strictly regulated, and site-specific faulting investigations are required.

33 According to the California Geologic Survey online index map that identifies all official maps of  
34 earthquake fault zones delineated by the California Geologic Survey through December 2010, only a  
35 portion of the project area is delineated. The Lenwood fault, which is an extension of the Lenwood-  
36 Lockhart Fault Zone, is a principal fault zone under the Alquist-Priolo Act (Figure 3.4-1). One other  
37 fault, the Mount General fault, crosses the project area. The Harper Fault Zone and several unnamed  
38 east-west trending faults north of the Mount General fault are located adjacent to, but outside the  
39 project area.

---

<sup>1</sup> In accordance with Title 14 of the California Code of Regulations, Section 3601(e), the Act applies only to buildings that would be inhabited for more than 2,000 person-hours per year.

<sup>2</sup> Fault creep is slow movement along a fault that does not result from earthquakes.

## 1       **Seismic Hazard Mapping Act**

2       The Seismic Hazard Mapping Act (PRC, Chapter 7.8, Sections 2690–2699.6) was passed in 1990  
3       following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize  
4       property damage caused by earthquakes. The Act directs the California Geological Survey to identify  
5       and map areas prone to the earthquake hazards of liquefaction, earthquake-induced landslides, and  
6       amplified groundshaking. For structures intended for human occupancy, the Act requires site-  
7       specific geotechnical investigations to identify potential seismic hazards and formulate mitigation  
8       measures prior to permitting most developments designed for human occupancy within the Zones  
9       of Required Investigation.

10       Seismic hazards maps cover 7.5-minute quadrangles, showing areas within each quadrangle that are  
11       subject to liquefaction and seismically induced landslides. As of July 2009, 159 cities have had all or  
12       some of their jurisdictions included in official seismic hazard zone maps (California Geological  
13       Survey 2012). Most of the mapping to date has been performed in Southern California and the San  
14       Francisco Bay Area. The California Geological Survey’s Seismic Hazard Mapping Program prioritizes  
15       mapping of California’s principal urban and major growth areas. Because the project area is not  
16       considered to be an urban or major growth area, it is currently not mapped and is not planned to be  
17       mapped as an affected area.

## 18       **California Building Code**

19       The 2010 California Building Code (CBC) is based on the 2009 International Building Code (IBC),  
20       with the addition of more extensive structural seismic provisions. The CBC is contained in Title 24 of  
21       the California Code of Regulations (CCR), known as the California Building Standards Code, and is a  
22       compilation of three types of building standards from three different origins:

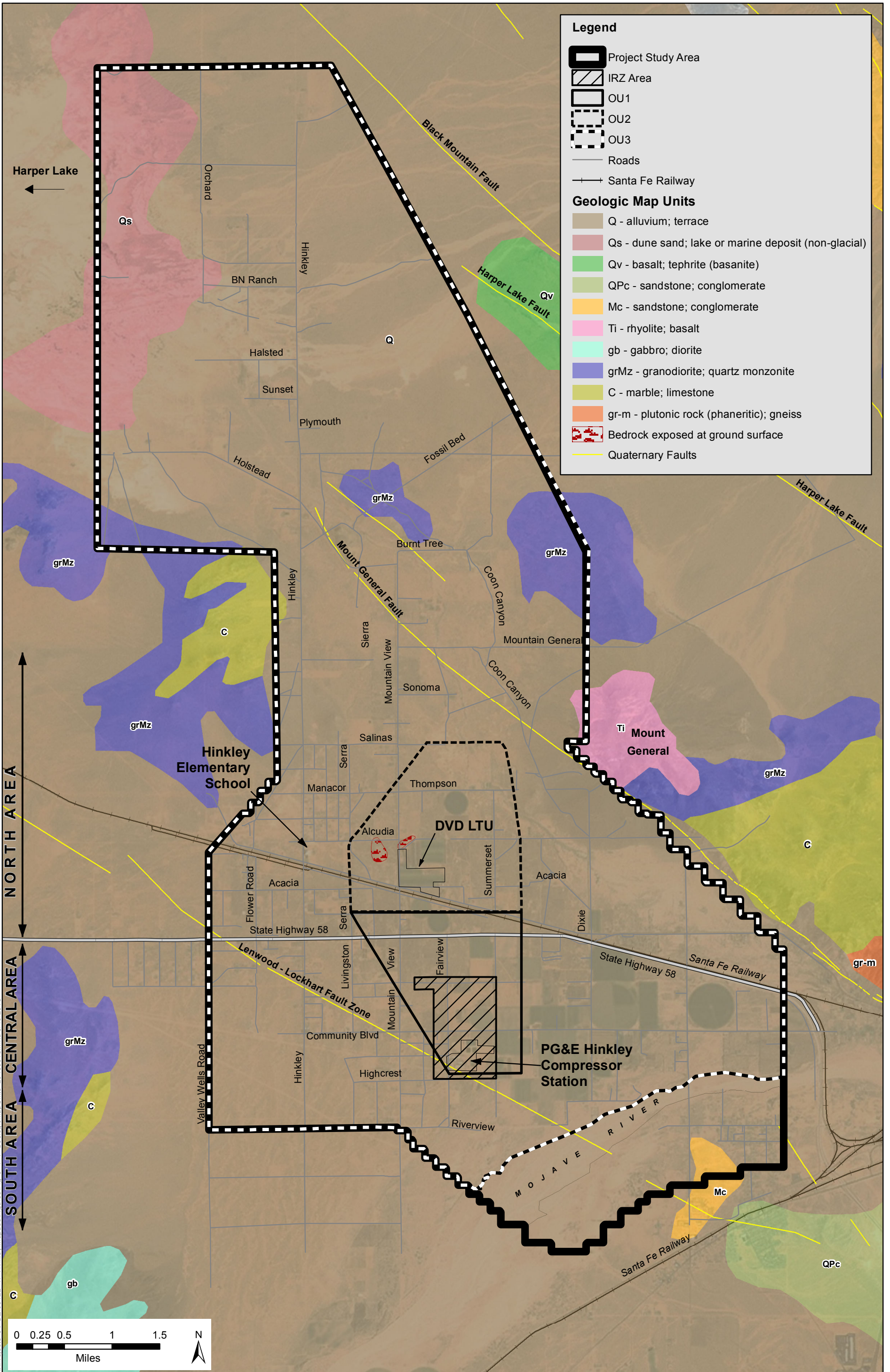
- 23       ● Building standards that have been adopted by state agencies without change from building  
24       standards contained in national model codes.
- 25       ● Building standards that have been adopted and adapted from the national model code standards  
26       to meet California conditions.
- 27       ● Building standards, authorized by the California legislature, that constitute extensive additions  
28       not covered by the model codes that have been adopted to address particular California  
29       concerns.

30       CCR Title 24, Part 2, Volume 2, Chapter 16 contains definitions of seismic sources and the procedure  
31       used to calculate seismic forces on structures. The CBC also covers grading and other geotechnical  
32       issues, building specifications, and non-building structures. The project would include these types of  
33       improvements, and the CBC would be applicable. However, the Building Seismic Safety Council  
34       (BSSC) acknowledges non-typical structures, which include buried structures, tanks, and electrical  
35       transmission, substation, and distribution structures. Such facilities are covered by other well-  
36       established industry design criteria, are not typically under the jurisdiction of local building officials,  
37       and require technical considerations beyond the scope of the CBC (BSSC 2003).

## 38       **Porter Cologne Water Quality Control Act**

39       Refer to discussion of applicability under *Clean Water Act, Section 402 (Construction Stormwater*  
40       *Pollution Prevention Plan)* above.





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Source: Faults - U.S. Geological Survey and California Geological Survey 2006;  
Geology - U.S. Geological Survey and California Geological Survey 2005

**Figure 3.4-1**  
**Geologic Map Units and**  
**Quaternary Faults in the Project Area**



### 1 **3.4.2.3 Local Regulations**

#### 2 **San Bernardino County General Plan**

3 The project area is located in the Desert Region of the County, one of three distinct regions discussed  
4 in the County's General Plan (San Bernardino County 2007a). The County's General Plan has a set of  
5 county-wide and region-specific goals and policies. Key goals and policies, listed below, are  
6 applicable to the project.

#### 7 **Erosion Control**

- 8 • **GOAL S 4:** The County will minimize damage due to wind and water erosion where possible.
  - 9 ○ **Policy S 4.2:** Apply the provisions of the Revised Erosion and Sediment Control Ordinance
10 countywide.
- 11 ○ **Policy S 4.3:** Tailor grading, land clearance, and grazing to prevent unnatural erosion in
12 erosion susceptible areas.- 13 ○ **Policy S 4.5:** Restrict use of off-road vehicles in areas susceptible to erosion.

#### 14 **Safety Element**

15 The purpose of the Safety Element is to reduce the potential risk of death, injuries, property damage,  
16 and economic and social dislocation resulting from fires, floods, earthquakes, landslides, and other  
17 hazards. The following Safety Element goal and policies are applicable to the project.

- 18 • **GOAL S 7:** The County will minimize exposure to hazards and structural damage from geologic  
19 and seismic conditions.
  - 20 ○ **Policy S 7.1:** Strive to mitigate the risks from geologic hazards through a combination of
21 engineering, construction, land use, and development standards.
- 22 ○ **Policy S 7.1, Program 2:** Require sites to be developed and all structures designed in
23 accordance with recommendations contained in any required geotechnical or geologic24 reports through conditioning, construction plans, and field inspections.- 25 ○ **Policy S 7.1, Program 3:** Require that all recommended mitigation measures be clearly
26 indicated on all grading and construction plans.- 27 ○ **Policy S 7.1, Program 4:** Require all facilities to meet appropriate geologic hazard
28 specifications as determined by the County Geologist for discretionary and ministerial29 authorizations.- 30 ○ **Policy S 7.1, Program 5:** Because of the potential for displacement along faults not
31 classified as active, the County will reserve the right to require site-specific geotechnical32 analysis and mitigation for development located contiguous to potentially active faults, if33 deemed necessary by the County Geologist.- 34 ○ **Policy S 7.3:** Coordinate with local, regional, state, federal, and other private agencies to
35 provide adequate protection against seismic hazards to County residents.



- 1           ○ **Policy S 7.3, Program 1:** Continue to work with public utilities, school districts, railroads,  
2 the state Department of Transportation, and other agencies supplying critical public  
3 services to ensure that they have incorporated structural safety and other measures to be  
4 adequately protected from seismic hazards for both existing and proposed facilities.
- 5           ○ **Policy S 7.4, Program 5.** Plan transportation facilities (i.e., roads, freeways, rail, rapid  
6 transit) and utility systems to cross active fault traces a minimum number of times and to be  
7 designed to accommodate fault displacement without major damage that would cause long-  
8 term and unacceptable disruption of service. Utility lines will be equipped with such  
9 mechanisms as flexible units, valving, redundant lines, or auto valves to shut off flows in the  
10 event of fault rupture.
- 11           ○ **Policy S 7.5:** Minimize damage cause by liquefaction, which can cause devastating structural  
12 damage; a high potential for saturation exists when the groundwater level is within the  
13 upper 50 feet of alluvial material.
- 14           ○ **Policy S 7.5, Program 1.** Require that each site located within the Liquefaction Hazard  
15 Overlay be evaluated by a licensed geologist prior to design, land disturbance, or  
16 construction for soil type, history of the water table's fluctuation, and adequacy of the  
17 structural engineering to withstand the effects of liquefaction.

### 18 **Land Use Element**

19 The Land Use Element is a guide for San Bernardino County's future development. It designates the  
20 distribution and general location of land uses and the allowable development activities that may  
21 occur within a specific land use area. The following Land Use Element policy related to geologic  
22 conditions is applicable to the project.

- 23           ○ **Policy LU 7.2:** Enact and enforce regulations that will limit development in environmentally  
24 sensitive areas, such as those adjacent to river or streamside areas, and hazardous areas,  
25 such as floodplains, steep slopes, high fire risk areas, and geologically hazardous areas.

### 26 **Revised Erosion and Sediment Control Ordinance (San Bernardino County Development Code 27 Section 85.11.030)**

28 The County's Erosion and Sediment Control Ordinance (Section 85.11.030 of the Development Code)  
29 requires implementation of Best Management Practices (BMPs) to prevent soil erosion at all land  
30 disturbance sites, regardless of the area of disturbance, and requires preparation and approval of a  
31 Soil Erosion Pollution Prevention Plan prior to any County authorization of land disturbing activity  
32 of more than one acre.

## 33 **3.4.3 Environmental Setting**

34 This section describes the existing conditions related to geology, soils, and seismicity in the project  
35 area and vicinity. For geologic resources, the project area is defined as the lands within boundary  
36 shown in Figure 2-2a. The study area may be affected by regional active or potentially active faults;  
37 accordingly, these faults are also considered part of the project area for purposes of this analysis.

### 1 3.4.3.1 Geology

#### 2 Regional Geomorphic and Geologic Setting

3 The project area is within the Mojave Desert geomorphic province which is characterized by  
4 isolated mountain ranges with expansive areas of alluvial deposits that terminate at dry lakebeds  
5 (playas). There are two major distinct topographic features within this province, a northwest-  
6 southeast trend controlled by the San Andreas fault on the southwest border of the province and the  
7 Garlock fault, which forms the northern boundary of the province.

#### 8 Local

9 The project area is located in Hinkley Valley (defined as from the Mojave River to Red Hill) and the  
10 northeastern part of Harper Lake Valley (defined as north and west of Red Hill including the areas  
11 around the lake), as shown in Figures 2-2a and 3.1-2. Hinkley Valley is a narrow valley  
12 approximately 6.8 miles long and 2.8 miles wide that extends northwest from the Mojave River  
13 toward Harper Valley (Pacific Gas and Electric Company 2011e). The Hinkley Valley is situated  
14 between uplifted ridges of Mesozoic or older igneous intrusive granitic rocks, Tertiary volcanics, and  
15 Precambrian sedimentary and metamorphic rocks (Pacific Gas and Electric Company 2011e). The  
16 Harper Lake Valley is characterized by large mountain ranges surrounding the basin where Harper  
17 Lake (dry) is situated, with outcrops of Quaternary volcanic rocks (basalt and scoriaceous tuff)  
18 exposed throughout the region (Laton et al 2007). Adjacent to the surrounding mountain fronts are  
19 low lying alluvial fans that extend into Harper Lake. The eastern portion of the Harper Lake Valley  
20 comprises Mesozoic granitic rocks, Quaternary alluvium and marine deposits, loosely consolidated  
21 deposits, sand deposits, volcanic flow rocks and tertiary intrusive rocks (U.S. Geological Survey  
22 2013).

23 Figure 3.4-1 shows the geology of the project area, and Table 3.4-2 shows the geologic units  
24 identified within the Hinkley Valley and northeast part of Harper Valley. The project area is  
25 primarily made up of different types of alluvium (Pacific Gas and Electric Company 2012a, 2012b)  
26 but is mostly composed of recent floodplain deposits closer to the Mojave River and older fan, ~~and~~  
27 lake deposits, and dune sand in the northern portion of the project area. Alluvium is loose,  
28 unconsolidated (not cemented together into a solid rock) soil or sediments, which has been eroded,  
29 reshaped by water, and redeposited (i.e., from river flooding events and flashfloods from the  
30 surrounding high bedrock features). It is typically made up of a variety of materials, including fine  
31 particles of silt and clay and larger particles of sand and gravel. Other sediments in the Hinkley  
32 Valley include semi-consolidated sediments, such as playa deposits and old lake deposits. The lake  
33 deposits originate from the ancient shoreline of Harper Lake, which extended well into the northern  
34 portion of the Hinkley Valley (Pacific Gas and Electric Company 2012a, 2012b). The northern  
35 portions of the valley also consist of rock consisting of quartz, marble and limestone, and sandstone  
36 is found in the southeastern portion of the valley.

1

**Table 3.4-2. Geologic Units Identified within the Project Area**

<u>Unit Label<sup>a</sup></u>	<u>Geologic Age</u>	<u>Unit Type</u>	<u>Geologic Age Key (million years ago)</u>
<u>Q</u>	<u>Pliocene to Holocene</u>	<u>alluvium; terrace</u>	<u>Quaternary (2.6 to present) Holocene (0.012 to present)</u>
<u>Qs</u>	<u>Quaternary</u>	<u>dune sand; lake or marine deposit (non-glacial)</u>	<u>Pleistocene (2.6 to 0.012)</u>
<u>Qv</u>	<u>Quaternary</u>	<u>basalt; tephrite (basanite)</u>	<u>Tertiary (65 to 2.6)</u>
<u>QPc</u>	<u>Miocene to Pleistocene</u>	<u>sandstone; conglomerate</u>	<u>Pliocene (5.3 to 2.6) Miocene (23 to 5.3)</u>
<u>Mc</u>	<u>Oligocene to Pleistocene</u>	<u>sandstone; conglomerate</u>	<u>Oligocene (34 to 23)</u>
<u>Ti</u>	<u>Tertiary</u>	<u>rhyolite; Basalt</u>	<u>Mesozoic (250 to 65)</u>
<u>gb</u>	<u>Triassic to Cretaceous</u>	<u>gabbro; diorite</u>	<u>Cretaceous (145 to 65) Triassic (250 to 200)</u>
<u>grMz</u>	<u>Permian to Tertiary; most Mesozoic</u>	<u>granodiorite; quartz monzonite</u>	<u>Permian (299 to 251)</u>
<u>C</u>	<u>Late Proterozoic to Pennsylvanian</u>	<u>marble; limestone</u>	<u>Pennsylvanian (318 to 299)</u>
<u>gr-m</u>	<u>Precambrian to Mesozoic</u>	<u>Plutonic rock (phaneritic); gneiss</u>	<u>Proterozoic (2,500 to 542)</u>

<sup>a</sup> Refer to Figure 3.4-1.

2

### 3.4.3.2 Faulting and Seismic Hazards

The project area is located in a seismically active area, as is most of southern California. Infrastructure, such as buildings, buried pipelines, and wells can be susceptible to two major types of seismic hazards: permanent ground deformation and wave propagation hazards (O'Rourke and Liu 1999). Permanent ground deformation hazards include the displacement of the ground across a fault, soil liquefaction, and landslides. Wave propagation hazards result from ground waves that are set in motion from an earthquake event; these waves may cause stress on underground infrastructure, such as a pipeline, and result in a rupture.

#### Faults

A fault is defined by the California Geological Survey (CGS) as "a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side." Most faults are the result of repeated displacement that may have taken place suddenly or by slow creep (Bryant and Hart 2007).

1

**Table 3.4-2. Geologic Units Identified within the Hinkley Valley**

Unit Label <sup>a</sup>	Geologic Age	Unit Type	Geologic Age Key (million years ago)
Q	Pliocene to Holocene	alluvium; terrace	Quaternary (2.6 to present) Holocene (0.012 to present)
Qs	Quaternary	dune sand; lake or marine deposit (non-glacial)	Pleistocene (2.6 to 0.012)
Qv	Quaternary	basalt; tephrite (basanite)	Tertiary (65 to 2.6)
QPc	Miocene to Pleistocene	sandstone; conglomerate	Pliocene (5.3 to 2.6) Miocene (23 to 5.3)
Me	Oligocene to Pleistocene	sandstone; conglomerate	Oligocene (34 to 23)
Ti	Tertiary	rhyolite; Basalt	Mesozoic (250 to 65)
gb	Triassic to Cretaceous	gabbro; diorite	Cretaceous (145 to 65) Triassic (250 to 200)
grMz	Permian to Tertiary; most Mesozoic	granodiorite; quartz monzonite	Permian (299 to 251)
G	Late Proterozoic to Pennsylvanian	marble; limestone	Pennsylvanian (318 to 299)
gr-m	Precambrian to Mesozoic	Plutonic rock (phaneritic); gneiss	Proterozoic (2,500 to 542)

<sup>a</sup> Refer to Figure 3.4-1.

2 A fault zone is similarly defined by the CGS as “a zone of related faults that commonly are braided  
3 and subparallel, but may be branching and divergent” (Bryant and Hart 2007). Such fault zones are  
4 not to be confused with fault hazard zoning as prescribed by the Alquist-Priolo Earthquake Fault  
5 Zoning Act (Alquist-Priolo Act; California Public Resources Code [PRC] 2621 et seq.), which is a  
6 regulatory designation described more fully in the *Regulatory Setting* section.

7 Faults ~~that traverse within the project area vicinity~~ include the Lenwood-Lockhart Fault Zone and  
8 Mount General fault, ~~within the project area and t~~The Harper Lake fault is just outside the project  
9 ~~area to the northeast,~~ and several small unnamed faults, ~~which are also within the general vicinity of~~  
10 ~~the project but outside the project area.~~ These faults are primarily right-lateral strike-slip faults of  
11 the Eastern California Shear Zone (ECSZ). The ECSZ is located east of the San Andreas fault and  
12 comprise northwest-southeast trending faults that cross the Mojave Block. The North and South  
13 Lockhart, Lenwood, and Mount General faults exhibit evidence of Holocene rupture, and thus  
14 represent active faults. The other faults show evidence of Quaternary surface rupture. Significant  
15 faults located in the vicinity of the project area are listed in Table 3.4-3 and shown in Figure 3.4-1.

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1 **Table 3.4-3. Significant Faults Located in the Vicinity of the Project Area**

Fault Name	Fault Type	Length (km)	Most Recent Surface Ruptures	Slip Rate (mm/year)	Interval between Major Ruptures (years)	Probable Maximum Magnitudes (Mw)
Lenwood	right-lateral strike-slip	75	Holocene	0.8	4,000–5,000	6.5–7.4
Lockhart	right-lateral strike-slip	70	Holocene-Late Quaternary	0.8	3,000–5,000	6.5–7.4 <sup>a</sup>
Harper Lake	right-lateral strike-slip	21	Late Quaternary	~0.9	No data	6.0–6.7
Mount General	right-lateral strike-slip	21	Holocene along middle section; otherwise, Quaternary	No data	No data	No data

Source: California Institute of Technology 2011.

<sup>a</sup> According to the 1996 California Seismic Hazard Map, the maximum credible earthquake on the Lockhart Fault Zone would be a 7.25-magnitude earthquake.

Mw = magnitude

2 As shown in Figure 3.4-1, the Mount General fault crosses the middle and northern portion of the  
3 project area. The Mount General fault is primarily from the Quaternary period; little else is known  
4 about the fault because it is not listed by California Geologic Survey as being an active fault.  
5 Currently, no existing project infrastructure is located in the area of the Mount General fault, but as  
6 shown in Figure 2-2a, it is located in a potential future remedial activity area (OU3) where project  
7 facilities, such as remedial wells, piping, and agricultural treatment units, could be placed.

8 The Lockhart fault cuts through the southwestern portion of the project area and extends into the  
9 unconsolidated rocks south of the Mojave River. The Lockhart fault is from the Holocene-Late  
10 Quaternary era, which suggests displacement within the last 0.7 million years or sooner. The fault  
11 has two sections: Lenwood and Lockhart. However, because there is insufficient data to differentiate  
12 the segments, the Lockhart and Lenwood faults are termed the Lenwood-Lockhart Fault Zone  
13 (Bryant 2000). An Alquist-Priolo Act map for the project area has not yet been completed by  
14 California Geologic Survey; however, referenced material describes the southeastern portion of the  
15 Lenwood-Lockhart Fault Zone as being active. In addition, according to the 1996 California Seismic  
16 Hazard Map, the anticipated maximum credible earthquake (MCE) magnitude on the Lenwood-  
17 Lockhart Fault Zone is a 7.25-magnitude earthquake.

18 A portion of the Lenwood-Lockhart Fault Zone crosses SR 58 near the intersection with Hinkley  
19 Road and extends southwest within 2,000 feet of the PG&E Hinkley Compressor Station (Pacific Gas  
20 & Electric 2011e). Several existing project facilities, such as remedial wells, roads, and pipelines, are  
21 located in this area. The Lenwood-Lockhart Fault Zone is also documented to impede and affect  
22 groundwater flow (Department of Water Resources 1967). This is evidenced by different  
23 groundwater elevations documented from wells located on opposite sides of the fault near Harper  
24 Lake (Laton et al. 2007). Not only can fault zones impede groundwater flow, but associated seismic  
25 activity can cause irreparable damage to well casings. As a result, few wells are located directly  
26 adjacent to the Lenwood-Lockhart Fault Zone (Laton et al. 2007).

## 1       **Seismic Hazards**

2       Seismic hazards include fault rupture, groundshaking, liquefaction, lateral spreading, land  
3       settlement, and landslides.

## 4       **Fault Rupture**

5       Fault rupture occurs as a result of displacement on the fault surface, associated with either an  
6       earthquake or a seismic creep. Fault rupture can occur at depth or propagate to the surface, where it  
7       poses specific risks to features that span the rupture. Fault rupture during an earthquake is more  
8       dangerous than fault rupture resulting from fault creep because the integrity of structures above the  
9       rupture is undermined simultaneously by the rupture itself and by the accompanying  
10      groundshaking. Surface fault rupture has been documented as having occurred along the southeast  
11      portion of the Lockhart fault during the Quaternary period (2.6 million years ago to present).  
12      Studies of several major faults in San Bernardino County have identified average recurrence  
13      intervals for large earthquakes on individual faults or fault segments that range from approximately  
14      105 years for the San Andreas Fault southwest of the project area near Wrightwood to several  
15      thousand years or more for faults in the eastern Mojave Desert (San Bernardino County 2007b).

## 16      **Groundshaking**

17      An earthquake is the ground motion that occurs when accumulated strain is suddenly released, as it  
18      is when a specific fault ruptures. The released energy propagates as waves through the earth or  
19      along the earth's surface, resulting in groundshaking.

20      The intensity of the groundshaking (also referred to as strong ground motion) during an earthquake  
21      is dependent on the distance between a site and the epicenter of the earthquake, the magnitude of  
22      the earthquake, and the geologic conditions underlying and surrounding the site.

23      Due to the large amount of alluvial soils in the project area, groundshaking could occur as a result of  
24      peak ground accelerations from earthquakes along nearby faults. Ground acceleration is the term  
25      used to measure the strength of groundshaking forces generated by an earthquake, and is expressed  
26      in units of gravity, or g force. In general, the greater the acceleration or g force, the stronger the  
27      groundshaking and more damaging the earthquake. The project area falls within the 0.6 gravity (g)  
28      peak bedrock acceleration contour on the 1996 California Seismic Hazard Map. The peak site  
29      acceleration would be in excess of 0.5 g. Perceived shaking from accelerations between 0.5 and 0.6 g  
30      is considered moderate to severe, depending on site conditions. Damage from acceleration in this  
31      range could break underground pipes, shift buildings off foundations, and cause partial building  
32      collapse. The seismic events that are likely to produce the greatest bedrock accelerations would be  
33      moderate or large events on the active Lenwood-Lockhart Fault Zone or large events on a more  
34      distant fault.

## 35      **Liquefaction**

36      Liquefaction is a secondary effect of groundshaking, whereby saturated granular sediments  
37      temporarily lose their strength and stiffness. The susceptibility of a site to liquefaction is a function  
38      of the thickness, depth below ground surface, density, and water content of the sediments and the  
39      intensity of groundshaking at the site. Loose saturated sediments near the ground surface are most  
40      susceptible to liquefaction. As sediments consolidate over time, they usually become less susceptible  
41      to liquefaction. For this reason, younger (i.e., Holocene-aged) alluvial sediments are more prone to  
42      liquefaction (Knudsen et al., 2000).



1 Liquefaction-susceptible sites in San Bernardino County are underlain by loose unconsolidated  
2 granular soils and shallow groundwater (typically 50 feet or less bgs) (San Bernardino County  
3 2007a). The potential for liquefaction is relatively low in the project area given the reported  
4 groundwater depths (75 feet and greater) and generally dense nature of the subsurface granular  
5 soils, as defined by standard penetration test (SPT) blow counts. In addition, the project area was  
6 not identified as being susceptible to liquefaction on the Geologic Hazard Overlaps map of Hinkley  
7 (San Bernardino County 2012).

### 8 **Lateral Spreading**

9 Lateral spreading is a secondary effect of liquefaction whereby large blocks of intact, non-liquefied  
10 soil move downslope on a liquefied substrate (Tinsley et al. 1985). Because the failure surface is  
11 liquefied and has no strength to resist movement, lateral spreading can occur on slope gradients as  
12 gentle as a few degrees. Because the project area is relatively flat and considered to be an area with  
13 a low potential for liquefaction, the potential for lateral spreading to occur is also considered low.

### 14 **Land Settlement**

15 Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an  
16 earthquake, settlement can occur as a result of the relatively rapid rearrangement and  
17 compaction of subsurface materials, causing the land surface to subside. Loose, uncompacted,  
18 sandy sediments are most prone to settlement; if this material is saturated and liquefies,  
19 settlement is typically greater. Settlement can occur both uniformly and differentially (i.e.,  
20 where adjoining areas settle at different rates). Areas are susceptible to differential settlement  
21 if underlain by compressible but non-homogeneous sediments, such as poorly engineered  
22 artificial fill. With even small amounts of differential settlement, overlying structures can be  
23 damaged. Because the project area does not contain large amounts of loose or liquefied sand or  
24 engineered fill, it is unlikely to experience seismically-induced land settlement. More  
25 information on non-seismic land settlement, or land subsidence, is described in Section 3.4.3.3,  
26 Soils-Section 3.4.3.2, Faulting and Seismic Hazards.

### 27 **Landslides**

28 A landslide (which is a mass of rock, soil, or debris that has been displaced by downslope sliding)  
29 can be triggered by a seismic event. Non-seismic landslides are described in Section 3.4.3.3,  
30 Soils-Section 3.4.3.2.

## 31 **3.4.3.3 Soils**

32 The characteristics of soil reflect the influences of climate, biological activity, time, and topography  
33 on the weathering of geological source material. This section describes surface and subsurface soils,  
34 as well as soil hazards and land subsidence within the project area.

### 35 **Surface Soil**

36 The primary surface soils present in the project area include a complex mixture of sand, fine sand,  
37 silty sand, silt, and clay. A map showing surface soil types present throughout the project area is  
38 provided in Appendix C (*Biological Resources Report*, Figure 5).

39 The project site contains several distinct soil types. The northern portion of the project area, in the  
40 vicinity of the Harper Lake Valley and northern Hinkley Valley, consists primarily of Cajon sands,

1 Cajon loamy sands, dune lands, Nebona Cuddeback Complex, Norob-Halloran Complex, Rosamond  
2 Loam, with some Victorville variant sands, and some Rock Outcrop-Lithic Torriorthents Complex. In  
3 the central portion (in OU2 and OU3), Cajon sands, Kimberlina loamy and fine Lovelace loamy sands,  
4 and Victorville variant sands are common, with Bryman loamy fine sand in and around the Desert  
5 View Dairy. The western and southwestern portions contains mainly Cajon sands, Cajon, Bryman,  
6 and Lovelace loamy sands, and Norob-Halloran Rosamond, and some Rock Outcrop-Lithic  
7 Torriorthents Complex loam and Victorville variant sand. Influenced by the Mojave River to the  
8 south, the southern portion of the project area contains dune land, Villa loamy sand, Joshua loam,  
9 riverwash, and water (USDA/NRCS 2013).

## 10 **Subsurface Sediments**

11 Sediments near the surface and upper aquifer consist primarily of sand and silt mixed with gravel  
12 and clay with the “brown clay” layer separating the upper and lower zones of the upper aquifer.  
13 Sediments underlying the “blue clay” layer in the lower aquifer consist primarily of sand, gravel, and  
14 weathered bedrock to a maximum depth of approximately 220 feet below ground surface (bgs),  
15 where it reaches consolidated bedrock (refer to the Hydrogeology discussion and Figure 3.1-3 in  
16 Section 3.1, *Water Resources and Water Quality*).

17 Based on soil boring data from PG&E monitoring reports, the upper aquifer of the Hinkley Valley  
18 groundwater basin is predominantly made up of unconsolidated fine to coarse grained sand, which  
19 is less vulnerable to compaction than are sediments dominated by smaller particles, such as thick  
20 semi-consolidated silt and clay layers.

21 A review of monitoring well bore logs from PG&E investigation wells was conducted to characterize  
22 the variability in aquifer sediments in the Hinkley Valley:

- 23 ● The upper zone of the Upper Aquifer (A1) is generally between 80 and 120 feet bgs. The brown  
24 clay layer that separates the A1 and A2 in the Upper Aquifer is generally located within 120 and  
25 140 feet bgs and the lower zone of the Upper Aquifer (A2) is generally between 140 and 160  
26 bgs.
- 27 ● In the southern Hinkley Valley near the Mojave River, soils are made up of mostly sand or mixed  
28 soils (interspersed sand/silt/clay layers).
- 29 ● In the central Hinkley Valley, there is a pronounced hydraulic depression in the lower zone of  
30 the Upper Aquifer (A2) beneath the Desert View Dairy and extending northward to the Gorman  
31 AU and eastward to the Cottrell AU. To the east of the depression, there is the exposed bedrock  
32 that differentiates the North and South Hinkley Valleys, and south of the depression, there is no  
33 brown clay layer present so there is no separation between the upper and lower zones (A1 and  
34 A2) of the Upper Aquifer.
- 35 ● In the northern part of the Hinkley Valley, along some transects, there are some discrete areas of  
36 the brown clay layer are thicker than some areas in the southern area, however the pattern is  
37 not consistent. Data also suggests that there is substantial thickness (greater than that of the  
38 brown clay layer) of A1 sandy deposits in the northern part of the valley. In some areas, sandy  
39 deposits have three to four times the thickness of the clay layer, indicating a dominance of  
40 course substrate in the northern part of the valley as well.
- 41 ● The confined lower aquifer is composed of more consolidated weathered granite, sands, and  
42 finer-grained sediments and may be less subject to compaction.

1 Based on the data review, the upper aquifer at Hinkley includes a mix of unconsolidated coarser-  
2 grained material (medium- to coarse-grained sand) and finer-grained (primarily silt with some clay)  
3 sediments. Throughout the aquifer, coarser-grained sediments are likely to be the primary water-  
4 bearing strata and are not likely to suffer permanent compaction and associated land subsidence.

5 In the northeast portion of the Harper Lake basin (which is east of Harper Lake and north of Red Hill  
6 and contains a portion of the project study area), aquifer sediments are described as predominately  
7 alluvium above the water table. The predominately water bearing strata (consisting of older  
8 alluvium consisting of unconsolidated to moderately consolidated deposits) are interbedded gravel,  
9 sand, silt, and clay (Laton et al. 2007). However the northern portion of the aquifer, further from the  
10 Mojave River, does contain areas of substrate containing greater fractions of silt with some clay  
11 compared to substrate areas closer to the Mojave River.

## 12 **Soil Hazards**

13 Soil hazards include unstable soil conditions (non-seismically induced) that can pose risks to life or  
14 property. These include risks due to expansive soils, erosion or loss of top soil, landslides, and land  
15 subsidence.

### 16 **Expansive Soils**

17 Expansive soils are characterized by their ability to undergo significant volume change (shrink and  
18 swell) due to variations in soil moisture content. Changes in soil moisture can result from rainfall,  
19 landscape irrigation, utility leakage, roof drainage, and/or perched groundwater. Expansive soils are  
20 typically very fine grained with a high to very high percentage of clay. The swelling and shrinking  
21 can cause problems with building foundations and underground facilities (e.g., septic tanks).  
22 According to soil maps of the project area, there are no surface clay soils located in the project area  
23 (Figure 5 in Appendix C).

### 24 **Erosion**

25 Erosion is the process by which soil and rock are removed from the Earth's surface by natural  
26 processes such as wind or stormwater runoff, and then transported and deposited in other locations  
27 Natural erosion may be accelerated by human activities such as agricultural or land development, as  
28 well as grading that may involve altering natural drainage patterns.

29 The project area is located in a relatively flat area, which is generally less susceptible to erosion than  
30 sloped areas. However, there is limited vegetation and soils with low moisture content; thus, high  
31 winds and infrequent high-intensity rainfall events, which are common in the Mojave Desert, can  
32 cause substantial soil erosion. Fallow or abandoned agricultural fields can also lead to unstable  
33 surfaces, which are subject to wind erosion. Such surfaces can lead to fugitive dust or even small  
34 dune formations that cause other indirect effects such as property damage or an over-covering of  
35 native vegetation (San Bernardino County 2007a). The Mojave River, located south of the project  
36 area, flows towards the east. The multiple desert washes that wind through the west part of the  
37 project area are dry year-round, except during moderate to heavy rainfall. The average annual  
38 precipitation in Barstow is 4.4 inches (Western Regional Climate Center 2012). The climatic  
39 conditions within the region are arid. Normally, precipitation is negligible; however, flash floods do  
40 occur and are unpredictable in their intensity. Therefore, localized wash scouring can occur in the  
41 project area.

## 1 **Landslide Susceptibility**

2 Landslide susceptibility increases with the degree of slope and the presence of weaker rocks.  
3 Landslide probability in the project area is low to negligible because of the lack of slope gradient, as  
4 documented in the map developed by California Geologic Survey on susceptibility to deep-seated  
5 landslides in California (California Geological Survey 2011). Additionally, the Geologic Hazard  
6 Overlays map of Hinkley from the San Bernardino County Land Use Plan indicates no susceptibility  
7 to landslides within the project area (San Bernardino County 2012).

## 8 **Land Subsidence**

9 Land subsidence occurs when settlement occurs in the subsurface area from sediment collapse and  
10 loss of pore space, resulting in a lowering of surface elevations. Subsidence can occur due to long-  
11 term groundwater drawdown (also called groundwater overdraft) where the pumping rate exceeds  
12 the recharge rate, resulting in subsurface voids and collapse. Settling of sediments and loss of pore  
13 space in the aquifer is permanent and not reversible.

14 Land subsidence can appear in the form of surface deformations, such as sink-like depressions,  
15 earth fissures, and cracks, which can have detrimental effects on roads and other infrastructure on  
16 the surface. In extreme cases, it can also damage building foundations and underground facilities,  
17 such as water pipelines and groundwater well screens and casings. Land subsidence in open spaces,  
18 such as beneath agricultural fields, is typically less noticeable with the exception of the potential for  
19 pooling of water in low areas. Land subsidence can also alter drainage patterns, particularly in flat  
20 desert surfaces, with the formation of new fissure erosion channels, which can cause a substantial  
21 alteration or even a reversal of the natural gradient (U.S. Geological Survey 2000). Land subsidence  
22 also has the potential to affect animal habitat due to collapse burrows and altering drainage patterns  
23 that animals rely on. Typical causes of land subsidence include groundwater withdrawal and severe  
24 vibrations from ground pounding, such as from pile driving.

25 The major elements necessary for land subsidence are (1) unconsolidated finer-grained soils such as  
26 silts and clays, and (2) ~~reduction-lowering~~ lowering of groundwater levels. The Mojave River Groundwater  
27 Basin is considered to be one of the major unconsolidated aquifers in the United States (U.S.  
28 Geological Survey 2000). However, as described above in Section 3.4.3.3, Soils ~~Section 3.4.3.2,~~  
29 Faulting and Seismic Hazards, and in Section 3.1, Water Resources and Water Quality, the  
30 unconsolidated sediments in the project area are mostly composed primarily of coarser sediments,  
31 such as sandy silts and gravels, which are not as prone to compaction as fine-grained sediments,  
32 such as silt and clay. ~~However, in the northern part of the project area, the substrate has greater~~  
33 ~~fractions of fine-grained silts and clays in certain locations due to greater distance of flood deposits~~  
34 ~~from the Mojave River. These northern areas may be more susceptible to subsidence than more~~  
35 ~~coarse-grained soils closer to the Mojave River.~~

36 The Hinkley Valley has historically been dominated by agricultural uses from the 1930s to the early  
37 1990s. ~~Based on a review of historic aerial photographs, extensive agricultural use extended from~~  
38 ~~the Mojave River to approximately Thompson Road in the center of the Valley, with a more limited~~  
39 ~~agricultural activity north of Thompson Road.~~ Historical agricultural pumping in the Hinkley Valley  
40 caused groundwater elevations to decline by as much as 90 to 100 feet or more from between 1930  
41 and the late 1980s. Although there has been partial recovery in recent years due to the MWA  
42 adjudication, groundwater elevations are still perhaps up to 50 feet or more below 1930s (Stamos et  
43 al 2001; Laton et al. 2007; Pacific Gas and Electric 2013). ~~(Stamos et al. 2001).~~ Thus, the areas from  
44 ~~the Mojave River to Thompson Road experienced substantial groundwater drawdown prior to the~~

1 ~~early 1990s when the Mojave River groundwater adjudication took force and started to allow~~  
 2 ~~groundwater levels to recover by reducing agricultural pumping. The northeast part of the Harper~~  
 3 ~~Lake Basin (north of Red Hill) experienced perhaps 50 or more feet of drawdown, and groundwater~~  
 4 ~~elevations were still perhaps 40 feet below 1930s levels in 2004 (Laton et. al 2007).~~

5 ~~Since 1993, pumping for irrigation in the region has been reduced and remained relatively stable~~  
 6 ~~due to the Mojave River Basin groundwater adjudication (MWA 2012).~~

7 It would be expected that land settling from subsidence would have had the opportunity to occur  
 8 during this historical period. Based on literature reviews, no evidence of historical significant land  
 9 subsidence was identified in the Hinkley Valley. It is possible that localized land subsidence may  
 10 have occurred due to prior agricultural pumping, but it has not been noted in literature about  
 11 groundwater use (such as Stamos et al. 2001; Laton et al. 2007) reviewed for this EIR. This lack of  
 12 reporting may be due to the rural setting and openness of the area, settling not being observed in  
 13 agricultural areas, and the local population either being unaware of settling that did occur or  
 14 indifference to it. Despite the lack of evidence for widespread subsidence in the Mojave Desert, with  
 15 increased groundwater pumping in the Hinkley Valley, subsidence is recognized as a potential  
 16 problem in parts of the Mojave Desert (Sneed et al. 2003).

17 Aquifer compaction due to groundwater overdraft can change the aquifer capacity as well and affect  
 18 water supplies. This potential impact is discussed separately in Section 3.1, *Water Resources and*  
 19 *Water Quality*.

### 20 **3.4.4 Significance Criteria**

21 The State CEQA Guidelines, Appendix G (Title 14 CCR Section 15000 et seq.), have identified  
 22 significance criteria to be considered when determining whether a project could have significant  
 23 effects on geology and soils within a project area.

24 For this analysis, an impact pertaining to geology and soils was considered significant under CEQA if  
 25 it would:

- 26 ● Result in substantial soil erosion or the loss of topsoil.
- 27 ● Result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse from  
 28 being located on a geologic unit or a soil that is unstable, or that would become unstable as a  
 29 result of the project.
- 30 ● Create substantial risks to life or property from being located on expansive soil, as defined in  
 31 Table 18-1-B of the Uniform Building Code<sup>3</sup>.
- 32 ● Involve soils that are incapable of adequately supporting septic tanks or alternative wastewater  
 33 disposal systems where sewers are not available for the disposal of wastewater.
- 34 ● Expose people or structures to potential substantial adverse effects, including the risk of loss,  
 35 injury, or death involving:
  - 36 ○ rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo  
 37 Earthquake Fault Zoning Map issued by the State Geologist for the area or other substantial  
 38 evidence of a known fault (refer to California Geologic Survey Special Publication 42),

<sup>3</sup> The California Building Code (CBC) is part of the UBC. This impact analysis compares the project to the CBC as it is the applicable part of the UBC in California.

- 1           ○ strong seismic groundshaking,
- 2           ○ seismically related ground failure, including liquefaction, or
- 3           ○ landslides.

4           Some of the significance criteria are not applicable to the project because there is no potential for  
5           the impact to occur or the applicable environmental resource does not occur within the project area.  
6           These are discussed below.

7           As described in Sections 3.4.3.1 and 3.4.3.2, the potential for landslides, liquefaction, and lateral  
8           spreading in the project area is low to negligible. Additionally, none of the proposed remediation  
9           activities would occur on or near sloped areas; therefore, the project would not result in on- or off-  
10          site landslides or expose people or structures to landslides. The surface soils within the project area  
11          are not considered expansive soils; therefore, there should be no risk to life, property, or septic  
12          tanks that may be constructed as part of above-ground treatment facilities from expansive soils.  
13          Further, all facilities would be constructed in accordance to the CBC. Therefore, the potential for  
14          impacts related to these issues is not addressed further.

15          Implementation of project alternatives will create minor impervious surfaces for supporting  
16          infrastructure, such as treatment system equipment pads, wellhead protection pads, etc. However,  
17          these impacts would be minimal compared to the overall project area, as it would cover a small area  
18          compared to ~~32,159~~ ~~21,093~~-acre project area, most of which consists of pervious land. Therefore,  
19          erosion as a result of impervious surfaces is not addressed further.

20          The impact analysis focuses on the potential for substantial soil erosion or loss of top soil and the  
21          potential for exposure of people or structures to adverse effects from land subsidence and seismic  
22          activity.

### 23    **3.4.5        Methodology**

24          The potential impacts associated with the proposed remediation activities under the project  
25          alternatives were evaluated by comparing the geologic, soils and seismic conditions and applicable  
26          regulatory compliance before and after implementation of the project. Available reports, maps, and  
27          public information sources were reviewed to identify geology, soils, and seismicity conditions in the  
28          project area (as described in Section 3.4.3, *Environmental Setting*).

29          The project's potential to increase soil erosion was evaluated for both construction and operation  
30          and maintenance activities by considering several factors, such as the type of proposed activity, the  
31          type of terrain, and the most likely cause of erosion in the project area (i.e., wind). The potential for  
32          increased exposure to soils containing toxins is described in Section 3.3, *Hazards and Hazardous*  
33          *Materials*.

34          The project was evaluated for its potential to result in an increased risk of soil instability (land  
35          subsidence) by considering related literature and previous assessments. Potential impacts related to  
36          aquifer compaction from groundwater withdrawal are addressed separately in Section 3.1, *Water*  
37          *Resources and Water Quality*.

38          The potential for the action alternatives to increase the risk of human exposure to and infrastructure  
39          damage from seismic activity was evaluated by considering related literature and previous  
40          assessments of active faults in and around the project area. Potential impacts to infrastructure are



1 evaluated based on the proximity of the new infrastructure to seismically active areas, such as the  
2 Lenwood-Lockhart fault zone. The increase in risk of human exposure to seismic activity is  
3 evaluated based on the number of workers present and frequency of their presence during a seismic  
4 event. The number of workers required for both construction and operation and maintenance  
5 activities are described in Chapter 2, *Project Description*.

## 6 **3.4.6 Impacts**

7 Impact discussions are organized by topics that correspond with the applicable significance criteria  
8 described in Section 3.4.4, *Significance Criteria*. For each impact, an overview is followed by a  
9 general discussion of the impact and the significance determination, and then a discussion of how  
10 the impact differs for each of the alternatives. In cases where an impact would not differ between all  
11 alternatives, a single discussion of the impact and the significance determination is presented.

### 12 **3.4.6.1 Soils**

#### 13 **Impact GEO-1a: Increased Soil Erosion or Loss of Topsoil during Construction (Less than** 14 **Significant, All Alternatives)**

#### 15 **Overview of Impact**

16 Under all alternatives, construction activities would require ground disturbance, including  
17 excavation, trenching, and earthwork (i.e., grading, land clearance, paving, concrete pouring) for  
18 installation of wells, pipelines, above-ground treatment structures, new utilities (i.e., septic,  
19 electrical, and telecommunications) and new access roads. These ground-disturbing activities have  
20 the potential to result in increased soil erosion or loss of topsoil. Once facilities are built and  
21 operating, ground-disturbing activities could be required for periodic maintenance of subsurface  
22 infrastructure to conduct repairs or replace infrastructure. Under all alternatives, construction of  
23 new infrastructure would involve excavation, trenching, and grading activities which would  
24 temporarily disturb soils and could cause erosion and loss of topsoil and vegetation. However, these  
25 areas would be minimal compared to the entire project area and soils would be replaced and re-  
26 stabilized post-construction. Under all alternatives, the greatest amount of land disturbance would  
27 occur during initial buildout because that is when the majority of new construction activities will  
28 occur.

29 Construction of new agricultural treatment units would require a substantial amount of land to be  
30 cleared for crops and irrigation systems and additional disturbance for conveyance piping,  
31 extraction wells, and new roads.

32 Construction for in-situ remediation would require land disturbance for conveyance pipelines,  
33 injection and extraction wells, treatment/storage compounds, utilities and new roads.

34 Construction of the above-ground treatment facilities would involve site preparation (i.e., grading  
35 and excavation), building foundations and paving for new access roads as well as installation of  
36 extraction and injection wells, conveyance pipelines, and utilities. Above-ground treatment facilities  
37 are included only with Alternative 4C-3 (two facilities) and Alternative 4C-5 (one facility).

38 The No Project Alternative would involve the least amount of new infrastructure, and therefore  
39 would result in the least amount of soil disturbance compared to the action alternatives.

1 All action alternatives would have similar impacts in character but would differ in scale. Alternative  
2 4C-4 would have the greatest potential impact on erosion because it would have the largest areas of  
3 agricultural treatment (1,212 acres compared to up to 2642 acres under Alternative 4B and up to  
4 3932 acres with Alternatives 4C-2, 4C-3, 4C-5) as well as far larger areas of disturbance for piping  
5 and wells for agricultural treatment, and new roads. Alternative 4B would have the least impact  
6 because it would include smaller areas of agricultural treatment compared to the other action  
7 alternatives.

8 Although the relatively flat terrain of the project area decreases the potential for erosion from  
9 rainfall or stormwater runoff compared with conditions along steeper slopes, the limited vegetation,  
10 low moisture content of the soils, and high desert winds can easily erode fine desert sediment on a  
11 flat disturbed surface. Increased soil erosion and loss of topsoil could result in sediment being  
12 washed to drainages (washes), some of which drain to the Mojave River and some of which drain to  
13 Harper Lake. However, construction of the Project would be conducted in compliance with San  
14 Bernardino County erosion control policies and ordinances (i.e., Erosion and Sediment Control  
15 Ordinance) as described in the County's General Plan and regulations under the Mojave Desert Air  
16 Quality Management District (MDAQMD). With compliance with the county ordinance and MDAQMD  
17 regulations and with the statewide construction stormwater permit requirements for land  
18 disturbance exceeding one acre, the potentially significant construction impacts from  
19 implementation of the project would be considered less than significant.

## 20 **Impact GEO-1b: Increased Soil Erosion or Loss of Topsoil from Operation and Maintenance** 21 **(Less than Significant, All Alternatives)**

### 22 **Overview of Impact**

23 Routine remediation activities under all alternatives that include soil disturbance include  
24 agricultural tilling, use of unpaved roads, and periodic pipeline and well maintenance. Operational  
25 activities that do not involve soil disturbance include pumping and carbon injection, operation of  
26 above-ground treatment facilities and well monitoring.

27 The No Project Alternative would involve no new agricultural treatment units. While this alternative  
28 would include a limited increase in travel along unpaved roads, such roads would be maintained in a  
29 graded fashion which would limit mobilization of unconsolidated soil, and any maintenance would  
30 need to comply with the County's erosion control ordinance. Thus, the No Project alternative would  
31 have a less than significant impact on erosion.

32 All action alternatives would have similar operational impacts on erosion character but would differ  
33 in scale. Alternative 4C-4 would have the greatest potential operational impact on erosion because it  
34 would have the largest areas of agricultural tillage (1,212 acres compared to up to 2642 acres under  
35 Alternative 4B and up to 3932 acres with Alternatives 4C-2, 4C-3, 4C-5). Additional erosion would  
36 likely occur when winds affect barren ground after harvest or to change out seasonal crops. Since  
37 the purpose of agricultural treatment is to maintain crop cover to provide the subsurface root  
38 complex that facilitates Cr[VI] reduction to Cr[III], basic agricultural practice is to retain topsoil in  
39 place to support crop development and retention. In addition, there are only ~~limited~~ sporadic rain  
40 events in Hinkley, which limits the potential for water-induced erosion and irrigation will only be  
41 done with drip irrigation, thus reducing the potential for overwatering to destabilize soil and make  
42 it more susceptible to erosion. Alternative 4C-2, involving two crops per field per year, would  
43 involve twice the potential erosion as alternatives having just one crop.

1 With all action alternatives, there will be an increase of traffic along unpaved roads for well  
 2 sampling, operational checks, and infrastructure maintenance. Additionally, periodic maintenance  
 3 and repair of pipelines and wells could also result in minor temporary land disturbance compared to  
 4 existing conditions. However, unpaved roads in the area are maintained in a graded condition which  
 5 prevents substantial erosion of unconsolidated soils and any additional excavations needed for  
 6 project maintenance would be subject to the County's erosion control ordinance. Further, Mojave  
 7 Desert AQMD rules prevent ground disturbance under extreme windy conditions (30 miles per hour  
 8 or greater), thereby reducing wind erosion from project activities.

9 Given the nature of operational disturbances and application of the County's and MDAQMD's erosion  
 10 control ordinance and rules, this impact is considered less-than-significant for all alternatives.

11 **Impact GEO-1c: Potential Risk of Structural Damage due to Land Subsidence from Remedial**  
 12 **Groundwater Pumping (Less than Significant, No Project Alternative; Less than Significant**  
 13 **with Mitigation, All Action Alternatives)**

14 **Overview of Impact**

15 As discussed in Section 3.1, *Water Resources and Water Quality*, the action alternatives would  
 16 substantially increase groundwater pumping due to agricultural treatment, which will result in  
 17 drawdown of the water table and could increase the risk of land subsidence if the groundwater  
 18 drawdown occurs in areas that 1) have not experienced substantial groundwater drawdown  
 19 historically; and 2) have dominant substrate soils susceptible to compaction.

20 As shown in Table 3.1-7 in Section 3.1, *Water Resources and Water Quality*, the No Project  
 21 Alternative would not increase agricultural extractions and irrigation pumping volumes above  
 22 existing conditions and, therefore, would not result in an increase in groundwater drawdown that  
 23 would be great enough to cause land subsidence.

24 As shown in Table 3.1-7 in Section 3.1, *Water Resources and Water Quality*, all of the action  
 25 alternatives would increase groundwater pumping above existing conditions and would result in  
 26 groundwater drawdown in portions of Hinkley Valley. The areas of expected groundwater  
 27 drawdown are shown in figures in Section 3.1, based on the Feasibility Study levels of  
 28 groundwater extraction and drawdown may affect additional areas with the potential levels of  
 29 groundwater extraction necessary to address the expanded plume.

30 As described in Section 3.4.3.3~~2~~ above, there has been historic groundwater drawdown due to  
 31 agricultural irrigation between the 1930s and early 1990s that reportedly resulted in up to 90 to  
 32 100 feet of groundwater drawdown in the Hinkley Valley and up to 50 feet in the northeast part of  
 33 the Harper Lake basin. The likely area of this drawdown is between the Mojave River and Thompson  
 34 Road based on historic areas of agricultural use over this period. In these areas, the substrate has  
 35 likely been "pre-stressed" by prior historic drawdown, such that any aquifer compaction and  
 36 associated land subsidence would have already occurred in the past. The project This area also  
 37 contains substrates that are dominated by sand that is less susceptible to compaction and associated  
 38 subsidence. ~~In these areas,~~ As discussed in Section 3.1, *Water Resources and Water Quality*,  
 39 substantial aquifer compaction due to new groundwater drawdown is not considered likely, and  
 40 thus associated land subsidence in these areas is also considered to be unlikely as well. However,  
 41 subsidence is often difficult to detect in active agricultural areas (due to frequent plowing which can  
 42 make localized subsidence difficult to observe). In addition, land subsidence may have occurred in  
 43 open desert areas and may not have been noticed or reported. Settling effects on infrastructure,

1 such as septic system or irrigation piping, may have been considered as “maintenance” rather than a  
2 result of subsidence. ~~The southern and central portions of the project area does contain more~~  
3 ~~localized areas containing the “brown clay” layer of fines, and thus there may be a limited potential~~  
4 ~~for land subsidence in the southern and central portions of the project area.~~

5  
6 ~~As discussed in Section 3.1, *Water Resources and Water Quality*, the northern portions of the project~~  
7 ~~area contains areas where the substrate has a higher percentage of fine silts and clays that may be~~  
8 ~~more susceptible to aquifer compaction and associated land subsidence. In addition, since the~~  
9 ~~historic areas of agriculture extended from the Mojave River to around Thompson Road, areas~~  
10 ~~further north of Thompson Road are less likely to have been “pre-stressed” by historic groundwater~~  
11 ~~drawdown compared to the southern and central portions of the project area. Although large areas~~  
12 ~~of the northern portion of the project area contain substrates dominated by sand (such as along~~  
13 ~~Mountain View Road between Sonoma Road and Mountain General Road), there are also some areas~~  
14 ~~where the substrate has large intervals of fines, such as near Burnt Tree Road where there are thick~~  
15 ~~brown clay lenses between 80 and 150 feet below ground surface level. Thus, there is a greater~~  
16 ~~potential for aquifer compaction to occur in the northern portion of the project area.~~

17 Given the available data about substrates in the project area and the prior historic groundwater  
18 drawdown, the overall potential for groundwater drawdown to result in substantial land subsidence  
19 is considered to be low, ~~but the data do not support a definitive conclusion that land subsidence~~  
20 ~~will not occur in the northern part of the project area or in localized other parts of the project areas~~  
21 ~~where fine substrates may be present in portions of the substrate. Aquifer compaction and land~~  
22 ~~subsidence can usually only be detected after they occur (due to changes in surface elevation, failure~~  
23 ~~of infrastructure, or changes in aquifer yield); it will be difficult to detect land subsidence due to~~  
24 ~~remedial action. Although there is the possibility of subsidence to occur, the historic record does not~~  
25 ~~support the probability of large-scale subsidence, and thus this impact is considered less than~~  
26 ~~significant. Given these facts, this is considered a potentially significant impact.~~

27 ~~If it were to occur,~~ The environmental impact of land subsidence is potential structural damage to  
28 buildings and other infrastructure (such as roads, pipelines, wells or septic systems). If aquifer  
29 compaction actually occurs with associated land subsidence, then structures and infrastructure in  
30 affected areas could experience substantial damage to settling. **Mitigation Measure GEO-MM-1 is**  
31 ~~recommended but would not required and would include~~ monitoring of surface elevations in  
32 conjunction with monitoring of groundwater drawdown (required by **Mitigation Measure WTR-**  
33 **MM-2**, see Section 3.1), surveying of building and infrastructure where surface elevation changes are  
34 observed (or reported by land owners), and structural repairs or cost reimbursement, if building or  
35 infrastructure damage is determined to be due to land subsidence caused by remedial-induced  
36 aquifer compaction.

### 37 **No Project Alternative**

38 As described above, the impact would be less than significant because the No Project Alternative  
39 would not increase agricultural extractions and irrigation pumping volumes above existing  
40 conditions and, therefore, it is unlikely that pumping would result in an increase in groundwater  
41 drawdown that would be great enough to cause land subsidence. Therefore, this impact is less-than-  
42 significant.

## All Action Alternatives

This impact would be ~~potentially less than~~ significant under all action alternatives.

All alternatives would require an increase in groundwater pumping above existing conditions and ~~potentially greater drawdown that historically experienced between 1930 and the late 1980s~~ the locations of groundwater drawdown would occur in areas that have historically not experienced substantial groundwater drawdown and may contain finer grained sediments in the substrate that could be susceptible to compaction and associated land subsidence. The alternative with the greatest potential for groundwater drawdown is Alternative 4C-4 because it involves the greatest increase in agricultural land treatment and the largest amount of expected groundwater drawdown (see Table 3.1-7 in Section 3.1, *Water Resources and Water Quality*). Alternative 4B would have the least potential groundwater drawdown of all the alternatives, but could still result in groundwater drawdown ~~greater than historic levels~~ in the northern part of the project area that is considered more susceptible to land subsidence. In addition, as described above, given that the historic data on groundwater drawdown and subsidence in the Hinkley Valley is not comprehensive enough to rule out subsidence, there may also be localized areas of fine substrates in the southern or central portions of the project area that might be susceptible to compaction as well.

Although large portions of the project area are undeveloped, there are residential structures, limited non-residential structures, as well as roadways in the project area that could suffer damage if subsidence actually occurred due to the project's groundwater drawdown. In the northern part of the project area (generally north of Thompson Road), there are more limited number of residential or non-residential structures and far fewer roads than in the southern and central parts of the project area. However, individual structures or roads might be affected, if land subsidence were to occur. As stated previously, the overall potential for groundwater drawdown to result in substantial land subsidence is considered to be low. Although there is the possibility of subsidence to occur, the historic record does not support the probability of large-scale subsidence, and thus this impact is considered less than significant.

It cannot be concluded that land subsidence will occur due to the project given the nature of this impact and the available data; thus, this is considered a potentially significant impact of all the action alternatives, with the greatest potential for effect due to Alternative 4C-4. If aquifer compaction and associated land subsidence actually occurs, then structures and infrastructure in affected areas could experience substantial damage to settling. **Mitigation Measure GEO-MM-1** is recommended (but not would required) and includes monitoring of surface elevations in conjunction with monitoring of groundwater drawdown (required by **Mitigation Measure WTR-MM-2**, see Section 3.1), surveying of building and infrastructure where surface elevation changes are observed (or reported by land owners), and structural repairs or cost reimbursement, if building or infrastructure damage is determined to be due to land subsidence caused by remedial-induced aquifer compaction.

~~With implementation of this mitigation, potential structural damage to buildings or infrastructure would be repaired or reimbursed, and this impact would be less than significant.~~

For potential impacts to the groundwater aquifer and water supply due to aquifer compaction, please see Section 3.1, *Water Resources and Water Quality*.

## 1 3.4.6.2 Seismicity

### 2 **Impact GEO-2a: Increase Risk of Infrastructure Damage due to Seismic Activity (Less than** 3 **Significant, All Alternatives)**

4 This impact ~~addressed~~addresses potential structural damage only. ~~The next impact~~ Geo-2b  
5 addresses potential human exposure due to seismic activity.

6 As shown in Table 3.4-3, the Lenwood-Lockhart fault zone has a low slip rate and a long interval  
7 between major ruptures (i.e., 3,000 to 5,000 years). The Mount General fault is not considered to be  
8 an active fault.

9 The project would locate new infrastructure near active faults in the Lenwood-Lockhart Fault Zone,  
10 as described in Section 3.4.3.2, *Faulting and Seismic Hazards*. Seismic groundshaking could result in  
11 damage to proposed infrastructure (e.g., wells, pipelines, roads, and above-ground treatment  
12 facilities). Infrastructure located closer to the Lenwood-Lockhart fault zone would be most  
13 susceptible to groundshaking. Agricultural treatment units themselves are not subject to damage  
14 from groundshaking (as they consist of agricultural fields), but supporting well and pipeline  
15 infrastructure could be damaged. Similarly, in-situ remediation infrastructure of wells and pipeline  
16 and storage compounds could also be damaged. New paved or unpaved roads could also suffer  
17 damage. However, wells, pipelines, storage compounds and roads would be readily repairable or  
18 replaceable given the nature of this infrastructure. The most substantial infrastructure susceptible  
19 to seismic damage would be the above-ground treatment facilities included in Alternatives 4C-3 and  
20 4C-5 and the above-ground ethanol tanks for additional in-situ remediation treatment in all  
21 alternatives.

22 The No Project Alternative would have the least amount of new infrastructure located near the  
23 Lenwood-Lockhart fault zone, limited to additional piping and wells for in-situ remediation. Given  
24 that piping and wells are readily replaceable if damaged due to seismic activity, this alternative  
25 would not result in substantial structural damage.

26 For the action alternatives, seismic activity could result in damage to remedial wells, pipelines,  
27 storage compounds, roads or above-ground treatment facilities. The southern ex-situ treatment  
28 facility (Alternatives 4C-3 and 4C-5) located at the PG&E Hinkley Compressor Station would be  
29 closest to the Lenwood-Lockhart Fault Zone and the northern ex-situ treatment facility would be  
30 approximately 1 to 1.5 miles from this zone. However, compliance with the CBC will require design  
31 of these structures to be resilient to predicted groundshaking.

32 Construction of all facilities during initial buildout and future phases of remediation would conform  
33 to applicable requirements of the CBC and San Bernardino County General Plan Safety Element goals  
34 and policies, which specifies design parameters to reduce seismic and other potential hazards to  
35 acceptable levels. This impact would be less than significant with compliance with required  
36 applicable building codes.

1       **Impact GEO-2b: Increase Risk of Human Exposure due to Seismic Activity (Less than**  
2       **Significant with Mitigation, All Alternatives)**

3       **Overview of Impact**

4       The potential for human exposure to risk from seismic activity would occur throughout the project  
5       area (described in Section 3.4.3.2, *Faulting and Seismic Hazards*). As shown in Table 3.4-3, the  
6       Lenwood-Lockhart fault zone has a low slip rate and a long interval between major ruptures  
7       (i.e., 3,000 to 5,000 years), and the Mount General fault is not considered to be an active fault. Thus,  
8       the overall risk of seismic-related human exposure to injury is low.

9       The project would increase the risk of human exposure to seismic activity because there would be  
10      additional workers in areas near active faults during construction and operation of remediation  
11      facilities. Risks to humans from structure failure would be less than significant for reasons described  
12      below. However, although potential risks of human exposure to chromium due to a seismic event  
13      pipeline rupture is a very remote possibility, there could be short-term exposure to contaminated  
14      groundwater if a pipeline ruptures or above-ground chemical (e.g., ethanol) storage tank ruptures  
15      from seismic activity. Health risks associated with exposure to chromium-contaminated  
16      groundwater are related to long-term exposure, not short-term exposure; and thus the potential for  
17      exposure to chromium in groundwater due to a pipeline rupture is considered a less than significant  
18      impact.

19      However, potential exposure to volatile chemicals (such as ethanol) This is considered potentially  
20      significant and requires implementation of **Mitigation Measure GEO-MM-2** to reduce it to a less  
21      than significant level for all alternatives.

22      **Construction Activities**

23      This impact would be incrementally greater depending on the number of temporary construction  
24      workers present and frequency of their presence during a seismic event. As described in Chapter 2,  
25      *Project Description*, approximately 3–6 workers would be required for installation and development  
26      of a well and approximately 15 workers required for pipeline installation per day during  
27      construction of new wells. During construction of above-ground treatment facilities, there would be  
28      approximately 5–19 workers on site. The number of workers would increase with an increased  
29      number in new infrastructure per alternative. Therefore, the No Project Alternative would have the  
30      least number of workers and frequency, whereas Alternatives 4C-3 to 4C-5 would have increased  
31      number of workers based on the greatest numbers of new wells, AUs, and or above-ground  
32      treatment plants.

33      The presence of workers during construction activities would be temporary. Nearly all construction  
34      would occur in open areas where contact with collapsing structures is minimal (with exception of  
35      the above-ground compounds and above-ground ex-situ treatment facilities). With compliance with  
36      all OSHA worker safety requirements and the low overall risk for seismic activity to occur in the  
37      project area, the potential increased risk of human exposure to seismic activities is considered to be  
38      less than significant for all alternatives during construction.



## 1       **Operation and Maintenance Activities**

2       This impact would be incrementally greater depending on the number of permanent operation and  
3       maintenance workers present and frequency of their presence during a seismic event (see  
4       Chapter 2, *Project Description*, for identification of number of workers per alternative).

5       Operational activities associated with agricultural treatment, in-site situ treatment, and freshwater  
6       injection would all happen outdoors and thus would not result in risks of structural failure that  
7       could affect workers during seismic events. However, flammability due to rupture of an above-  
8       ground ethanol storage tank would pose risk to workers during a severe seismic event. Since the  
9       above-ground treatment facilities (Alternatives 4C-3 and 4C-5 only) would be occupied by  
10      employees on a daily basis, there is greater potential for human exposure to seismic activity at the  
11      permanent above-ground treatment facilities than at other operational areas. However, compliance  
12      with the CBC will require design of these structures to be resilient to predicted groundshaking; thus,  
13      impacts related to human exposure to seismic risk at these facilities would be less than significant.

14      Failure of wells in an earthquake would not result in any hazardous conditions given they are  
15      underground and would not result in any human exposure to chromium in case of damage.  
16      However, pipelines installed as part of any of the alternatives could rupture in an earthquake which  
17      could result in chromium laden water (or containing elevated levels of remedial byproducts) being  
18      released at the surface. This is a low-probability event; ~~but if it occurs, the risk to humans is~~  
19      ~~substantial for all alternatives.~~ If it were to occur, the chance and duration of potential exposure  
20      would also be very low. The concern about exposure to contaminated groundwater is about long-  
21      term exposure, not acute exposure. Given the unlikely nature of this impact and the short duration  
22      of potential exposure to contaminated groundwater, this is not considered a significant impact.  
23      There would also be risk to humans if an above-ground chemical (e.g., ethanol) storage tank  
24      ruptures. Implementation of **Mitigation Measure GEO-MM-2** would reduce this impact to a less  
25      than significant level by ensuring that no exposure to ~~contaminated water or ethanol~~ occurs in the  
26      event of seismic-related damage to remedial infrastructure.

## 27      **No Project Alternative**

28      The No Project Alternative involves the least amount of new infrastructure, and therefore the least  
29      number of temporary construction workers present during construction. In addition, the No Project  
30      Alternative involves the least amount of new operational activities and would not include  
31      construction of new above-ground ex-situ treatment facilities.

32      With compliance with all OSHA worker safety requirements and the low overall risk for seismic  
33      activity to occur in the project area, the potential increased risk of human exposure to seismic  
34      activities is considered to be less than significant. Expanded in-situ remediation would require  
35      additional pipeline operations. As described above, in the low-~~event~~ probability event of a pipeline  
36      rupture, there is a very small potential of exposure to contaminated groundwater given that  
37      pipelines for this alternative are proposed in areas without residences. With implementation of  
38      **Mitigation Measure GEO-MM-2**, this impact would be less than significant.

## 39      **Alternatives 4B, 4C-2, and 4C-4**

40      Alternatives 4B, 4C-2 and 4C-4 would include construction of agricultural treatment units, new  
41      wells, above-ground compounds for in-situ remediation and associated infrastructure but would not  
42      include construction or operation of above-ground treatment facilities.

1 With compliance with all OSHA worker safety requirements and the low overall risk for seismic  
 2 activity to occur in the project area, the potential increased risk of human exposure to seismic  
 3 activities is considered to be less than significant. Expanded in-situ remediation would require  
 4 additional pipeline operations and possibly more above-ground chemical storage tanks. As described  
 5 above, in the ~~low-event~~ probability event of a pipeline or above-ground tank rupture, there is a small  
 6 potential of exposure to ~~contaminated groundwater or remedial~~ chemicals to nearby residential areas.  
 7 Implementation of **Mitigation Measure GEO-MM-2** would reduce this impact to less than significant.

### 8 **Alternatives 4C-3 and 4C-5**

9 Alternatives 4C-3 and 4C-5 would have similar impacts as described for the other action alternatives  
 10 above, but would also include above-ground treatment facilities.

11 With compliance with all OSHA worker safety requirements and the low overall risk for seismic  
 12 activity to occur in the project area, the potential increased risk of human exposure to seismic  
 13 activities during construction is considered to be less than significant. Expanded in-situ remediation  
 14 would require additional pipeline operations and possibly above-ground chemical storage tanks. As  
 15 described above, in the ~~low-event~~ probability event of a pipeline rupture or above-ground tank  
 16 rupture, there is a small potential of exposure to ~~contaminated groundwater or remedial~~ chemicals  
 17 to nearby residential areas. Implementation of **Mitigation Measure GEO-MM-2** would reduce this  
 18 impact to less than significant.

19 The above-ground ex-situ facilities would be occupied continually by employees on a daily basis, and  
 20 thus there is greater potential for human exposure to seismic activity at these locations. Compliance  
 21 with the CBC, which would require the design of these structures to be resilient to predicted  
 22 groundshaking, would reduce the potential human-exposure seismic risk to a less-than-significant  
 23 level.

## 24 **3.4.7 Mitigation Measures**

25 The following measures are either recommended or are proposed to mitigate (i.e., avoid, minimize,  
 26 rectify, reduce, eliminate, or compensate) potentially significant impacts of each action alternative.

### 27 **Mitigation Measure GEO-MM-1: Land Subsidence Monitoring, Investigation, and Repair** 28 **(~~If Warranted~~ Recommended only)**

29 It is recommended that PG&E ~~will~~ monitor groundwater drawdown per **Mitigation Measure**  
 30 **WTR-MM-2** (see Section 3.1). In all areas of predicted groundwater drawdown, PG&E ~~will~~  
 31 should document existing ground surface elevations prior to remedial-induced drawdown. As  
 32 drawdown occurs, PG&E ~~should~~ will monitor surface elevations every 3 years, at a minimum, in  
 33 order to document whether land subsidence may be occurring. Surveys ~~will~~ should be done on  
 34 all lands affected by groundwater drawdown of more than 10 feet wherever allowed by  
 35 landowners. Initial and periodic elevation surveys ~~will~~ should be provided to the Water Board  
 36 for review.

37 Where changes in ground surface elevations greater than 1 foot are identified or where  
 38 structural damage is identified by PG&E or reported by a landowner, PG&E ~~should~~ will  
 39 investigate site structures for subsidence-related damage. If damage is identified by PG&E  
 40 and/or landowners, PG&E should retain a qualified expert approved by the Water Board to  
 41 evaluate whether the damage is due to remedial-induced groundwater drawdown. If the expert

1 ~~determines that the damage is and is determined to be~~ due to remedial-induced groundwater  
2 ~~drawdown, then PG&E will should identify proposed remedial actions to the Water Board and,~~  
3 ~~once approved by the Water Board, should repair, replace, and/or reimburse for any damaged~~  
4 ~~structures (e.g., buildings, garages, barns) or infrastructure (e.g., pipelines, septic systems,~~  
5 ~~supply wells) to its baseline condition. PG&E will report all identified areas of structural damage~~  
6 ~~whether identified by PG&E and/or reported by landowners and identify proposed remedial~~  
7 ~~actions to the Water Board.~~

## 8 **Mitigation Measure GEO-MM-2: Emergency Response Plan for Potential Remedial** 9 **Pipeline or Storage Tank Rupture**

10 PG&E will prepare a ~~detailed emergency response plan section in the treatment system~~  
11 ~~operation and maintenance (O&M) manual and/or Health and Safety Plan (HASP) that describes~~  
12 ~~the specific procedures to be followed in a major seismic event, including the event of~~  
13 ~~earthquake-induced damage to project pipelines or above-ground storage tanks in order to~~  
14 ~~avoid all human exposures to contaminated groundwater or stored chemicals. The plan will~~  
15 ~~include, at a minimum, the following:~~

- 16 ● ~~Shut-down of remedial pumping of contaminated water in the event of a major seismic~~  
17 ~~event.~~
- 18 ● ~~Visual inspection of project pipelines and above-ground tanks to determine if any leakage~~  
19 ~~has occurred.~~
- 20 ● ~~Spill containment procedures to contain any contaminated groundwater or chemical that~~  
21 ~~has reached the surface or spilled onto the ground and to prevent human exposure.~~  
22 ~~Procedures to reinfiltrate or siphon contaminated groundwater or chemicals into~~  
23 ~~appropriate storage containers to prevent long-term exposure to workers or nearby~~  
24 ~~residents.~~
- 25 ● ~~Spill containment and recovery procedures for any chemicals that may have spilled from~~  
26 ~~project pipelines or aboveground tanks.~~
- 27 ● ~~Pressure test of project pipelines or above-ground storage tanks following a major seismic~~  
28 ~~event to determine pipeline and/or tank integrity prior to resuming system~~  
29 ~~operation putting these features back in service.~~
- 30 ● ~~Repair of any damaged pipelines or above-ground storage tanks prior to putting these~~  
31 ~~features back in service.~~
- 32 ● ~~Details of failed pipelines, tanks, or other structures resulting in rupture and exposure of~~  
33 ~~contaminated groundwater or chemicals to workers will be reported to the Water Board~~  
34 ~~either verbally or through electronic messaging within 3 working days and with a report~~  
35 ~~within 30 days. The report will cite appropriate information such as the cause of the release,~~  
36 ~~volume of the release, number of workers affected, whether surface waters were affected,~~  
37 ~~and the types of repairs or remedial actions planned.~~
- 38 ● ~~Communication requirements for notifying the Water Board of spills and releases will be~~  
39 ~~specified in the Water Board's Waste Discharge Requirements (WDRs) for the project. All~~  
40 ~~workers will be required to review the emergency plan annually, and a copy of the plan will~~  
41 ~~be kept at appropriate workstations used by the employees.~~

