Executive Summary

Executive Summary

This Executive Summary is for the Draft Environmental Impact Report (EIR) prepared for the Comprehensive Groundwater Cleanup Strategy for Historical Chromium Discharges from Pacific Gas & Electric (PG&E)'s Hinkley Compressor Station (also referred to as the project or the proposed project). The project is located in the Mojave Desert near the town of Hinkley, approximately 6 miles west of the City of Barstow and 1 mile north of the Mojave River, in San Bernardino County, California (Figure ES-1).

PG&E has implemented remediation activities to clean the groundwater impacted by historical chromium discharges from the Hinkley Compressor Station, pursuant to existing California Regional Water Quality Control Board, Lahontan Region (Water Board) orders. In order to comprehensively contain and remediate the chromium plume, the Water Board has worked with PG&E to develop feasible remedial approaches. This EIR evaluates at an equal level of detail six project alternatives, each with different types and combinations of remediation activities.

The project area for the EIR analysis encompasses the chromium plume area, which is defined by monitoring wells containing more than 3.1 parts per billion (ppb) of hexavalent chromium as of the fourth quarter of 2011, adjacent areas to the north, east and west where the plume may be defined in the future (due to migration and additional investigation) and where monitoring activities may occur, as well as areas of potential effects due to groundwater pumping from the remediation alternatives (Figure ES-2).

This Executive Summary contains the following sections.

- Overview
- Project Goal and Objectives
- Project Alternatives
- Project Impacts and Mitigation Measures
- Key Areas of Controversy and Issues to be Resolved

The complete Draft EIR can be obtained at http://www.waterboards.ca.gov/lahontan and at:

- Hinkley Senior Center, 35997 Mountain View Road, Hinkley, CA
- PG&E Hinkley Community Building, 22999 Community Boulevard, Hinkley, CA
- San Bernardino County Barstow Branch Library, 304 East Buena Vista Street, Barstow, CA
- Water Board Offices
    - 14440 Civic Drive, Suite 200, Victorville, CA

      2501 Lake Tahoe Boulevard, South Lake Tahoe, CA

ES.1 Overview

The Water Board is the California Environmental Quality Act (CEQA) lead agency for the environmental investigation and chromium groundwater cleanup at the PG&E Hinkley Compressor Station. The Compressor Station is located about 3 miles southeast of the town of Hinkley in San Bernardino County, California.

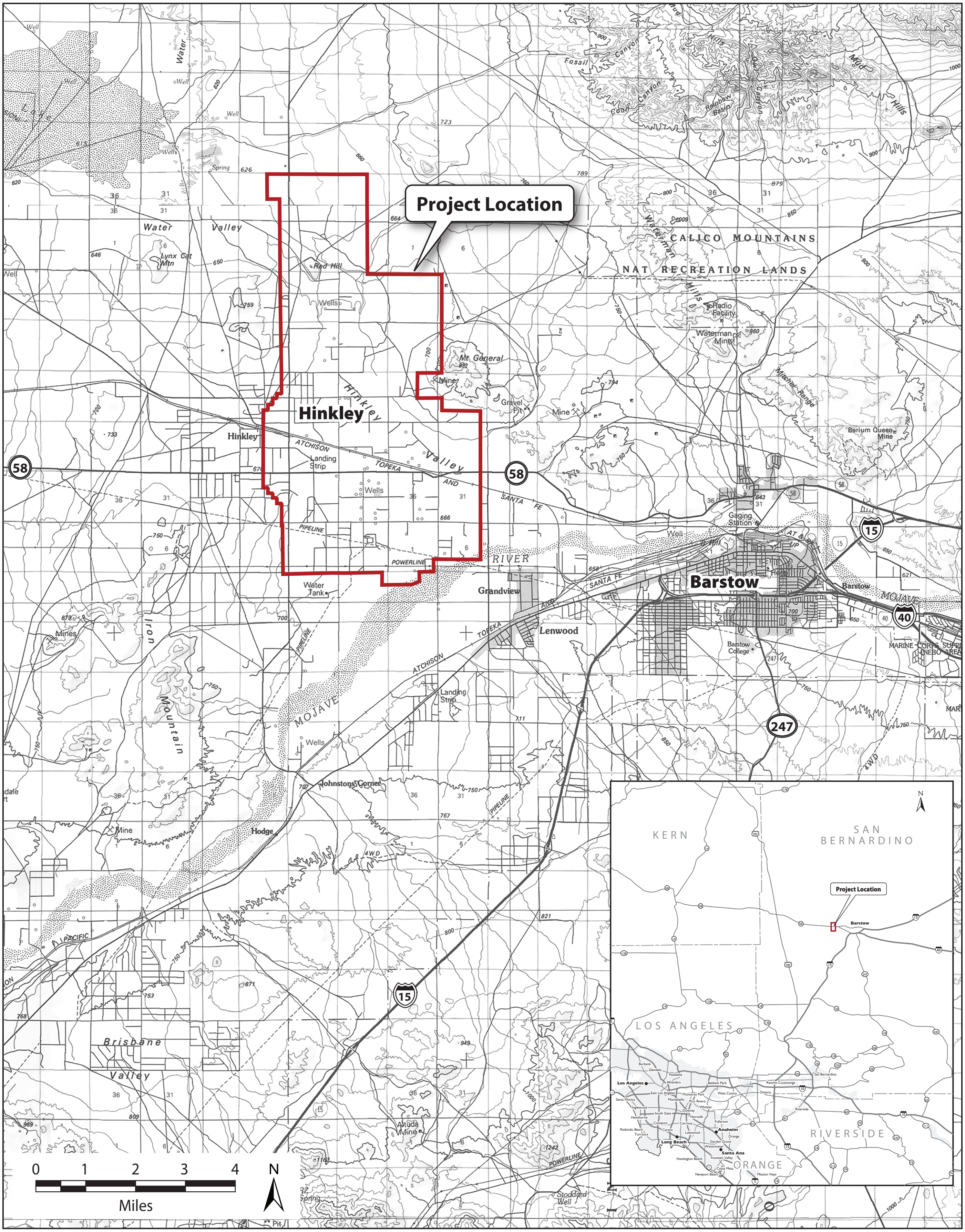
The Compressor Station facility is used to transport natural gas along pipelines from Texas to California. Between 1952 and 1964, cooling tower water was treated with a compound containing chromium to prevent corrosion, and the water was then discharged to unlined ponds which resulted in contamination of the soil and groundwater beneath the site with total and hexavalent chromium (Cr[T] and Cr[VI][1], respectively). As of 2008, this contamination created a plume of chromium in groundwater extending about two miles to the north of the Compressor Station and about 1.3 miles wide (Water Board 2008). As of late 2011, the plume was much larger than in 2008 and was approximately 5.4 miles in length and up to 2.4 miles wide at its widest point. The Water Board has required PG&E to take remedial actions to clean up the chromium contamination, and to slow and stop the plume from spreading (also referred to as containing the plume). These remedial actions to date have consisted of the following cleanup technologies:

- Groundwater extraction: contaminated groundwater is pumped from the subsurface (also called the *aquifer*) to contain the contamination plume.
- Agricultural re-use (also called *agricultural treatment, land treatment* or *agricultural units*): extracted groundwater is used to irrigate forage crops for livestock. Hexavalent chromium in the extracted groundwater is converted to trivalent chromium (Cr[III]) by contact with organic matter in the soil as it infiltrates through the soil. Hexavalent chromium is the toxic form of chromium; trivalent chromium has very low toxicity (OEHHA 2010).
- Subsurface treatment (also called *in-situ treatment* or *in-situ reactive zones*): carbon substances are injected into the groundwater aquifer to convert the hexavalent chromium into trivalent chromium.
- Subsurface freshwater injection: freshwater is injected within the aquifer along the western side of the plume to prevent the spread of contaminated groundwater to the Hinkley School and residential areas.

The Water Board adopted Cleanup and Abatement Order (CAO) No. R6V-2008-0002 in 2008, which required site-wide remediation of the contaminated groundwater, and adopted Waste Discharge Requirements (WDRs)[2] (Order No. R6V-2008-0014), also known as the General Permit, for the implementation of plume containment actions, in-situ remediation, and above-ground treatment. Although above-ground treatment was an approved action under the General Permit, this remedial method has not been used to date. Prior to adoption of the General Permit, PG&E was implementing plume containment, in-situ treatment, and agricultural treatment actions pursuant to prior Water Board orders and the associated WDRs on a limited basis. The General Permit allowed the expansion of remediation activities starting in 2008.

[1] In the context of the description of contamination in general, the term *chromium (Cr)* is used in place of the separate terms *total chromium (Cr[T])* or *hexavalent chromium (Cr[VI])*. Hexavalent chromium is a component of total chromium. When there is reference to only hexavalent chromium, then it is identified as such.

[2] WDRs are the permits that set operating, discharge and monitoring requirements for PG&E to conduct remediation activities. WDRs are also referred to by their Water Board Order number.



Graphics ... 00122.11 (8-14-2012)

ICF INTERNATIONAL

Figure ES-1
Project Location and Vicinity

Approximated Contours by Year

- 4th Quarter 2011, 3.1 ppb
- 4th Quarter 2011, 3.1 ppb (approximate)
- 3rd Quarter 2011, 3.1 ppb
- 1st Quarter 2011, 3.1 ppb
- 1st Quarter 2010, 4.0 ppb
- 3rd Quarter 2008, 4.0 ppb

- Project Study Area
- Roads
- Santa Fe Railway

Sunset
Plymouth
Holstead
Mountain General
Fossil Bed
Burnt Tree
Hinkley
Coon Canyon
Sierra
Mountain General
Mountain View
Sonoma
Coon Canyon
Salinas
Serra
Manacor
Thompson
Mount General
Hinkley Elementary School
Alcudia
NORTH AREA
Summerset
Acacia
Acacia
Serra
Dixie
State Highway 58
CENTRAL AREA
Fairview
View
Santa Fe Railway
State Highway 58
Hinkley
Livingston
Mountain
Community Blvd
SOUTH AREA
Highcrest
PG&E Hinkley Compressor Station
Riverview
MOJAVE RIVER
Santa Fe Railway

0 0.25 0.5 1 Miles

N

Sources: Based on information from PG&E quarterly monitoring reports available at www.geotracker.swrcb.ca.gov/.

K:\Projects_3\PGE\00898_10_Hinkley\mapdoc\Figures\Plumes\Fig_2-2b_Plume_4ppb.mxd 8/6/2012_PG

Figure ES-2

Expansion of 3.1/4.0 ppb Maximum Background Plume Area Contours

An additional WDR amendment was adopted in 2010 to additional in-situ and agricultural.[3] Prior to adoption of the WDRs and pursuant to CEQA, the Water Board conducted environmental analyses to address the impacts of implementing the WDRs by preparing and certifying respective mitigated negative declarations (MNDs) in 2004, 2006, 2007, and 2008.

The Water Board is now preparing to issue a new CAO that will set specific cleanup requirements including the cleanup levels and the time periods by which those levels must be met. A new site-wide General Permit will be adopted, specifying the operating, discharge and monitoring requirements for comprehensive cleanup of chromium in groundwater to meet the requirements set by the CAO. Although the Water Board is restricted by Water Code Section 13360 from specifying the method and manner of PG&E's compliance with the cleanup and abatement order, the cleanup levels will drive what remedial actions are taken, where they are taken, and at what intensity. Per the requirements of the 2008 CAO, PG&E submitted a Feasibility Study in 2010 that identified the technologies they would propose to use for cleanup along with an evaluation of a wide range of alternative technologies.

Many of the same technologies that are currently being implemented (agricultural treatment, in-situ treatment, plume containment, freshwater injection/extraction) under existing individual WDRs and the General Permit would continue to be implemented under the new General Permit; however, there may be new potentially significant environmental impacts because the various combinations of these technologies will be expanded substantially over those that were analyzed in prior MNDs. Therefore, the Water Board has determined that preparation of an EIR is necessary to disclose potentially significant impacts of adopting the new General Permit and implementing cleanup requirements prescribed in the CAO.

The EIR includes the following, pursuant to the requirements of CEQA:

- New project alternatives developed for comprehensive remediation of the chromium contamination.
- New information related to changes in physical conditions where remedial actions have been implemented, including changes in the contaminated area that have occurred since the previous CEQA MNDs were adopted (between 2004 and 2010) (Lahontan Regional Water Quality Control Board 2008).
- Potential significant direct and indirect environmental impacts resulting from implementation of the project alternatives, including, but not limited to:
    - Groundwater drawdown effects, including effects on regional and local water supplies.
    - Impairment of water quality from remedial actions,
    - Loss or disturbance of biological resources,
    - Loss or disturbance of cultural resources,
    - Increased noise and traffic,
    - Changes in visual aesthetics,
    - Permanent loss of residences through property buyouts, and

[3] A list of the current CAOs and WDRs being implemented can be accessed on the Water Board's project website at http://www.waterboards.ca.gov/rwqcb6/water_issues/projects/pge/index.shtml#wbo.

- Construction impacts on air quality, noise, and traffic.

- Mitigation measures proposed to reduce or avoid potential significant environmental impacts resulting from implementation of the project alternatives.

- Cumulative and growth-inducing impacts.

ES.2 Project Goal and Objectives

The following provides a brief context for the discussion of the project goal and objectives.

CAO No. R6V-2008-0002 required PG&E to submit a feasibility study by September 1, 2010, that assessed remediation strategies for chromium and proposed a final groundwater remediation proposal to achieve compliance with State Water Resources Control Board (SWRCB) Resolution 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304" (Resolution 92-49). Resolution 92-49 requires a discharger to:

- Develop a cleanup plan that evaluates multiple remedies and weighs them against numerous factors such as:
  - Ability to achieve background levels;[4]
  - Time frame to achieve background levels; and
  - Potentially significant impacts.
- Propose a cleanup plan that either targets groundwater cleanup to background levels or provides the appropriate justification for a higher standard; and
- Consider what is reasonable when evaluating a cleanup goal, taking into account the technical and economic feasibility of attaining background conditions, the projected time frame to achieve background conditions, and the maximum beneficial use of the resource being protected.

ES.2.1 Project Goal

The goal of the project is to restore groundwater quality to background levels of chromium in the minimum amount of time practicable, while limiting or mitigating environmental impacts associated with the cleanup activities to the extent feasible.

The Water Board has the authority to require cleanup of any groundwater affected by chromium discharged from PG&E's Hinkley Compressor Station. Groundwater is considered to be affected by PG&E's discharge if the levels of chromium are above naturally occurring background levels as a result of Compressor Station operations.

For this EIR, the analysis looks at cleanup to the chromium background levels set in CAO No. R6V-2008-002A1 because, in part, PG&E's Feasibility Study has considered cleanup to those levels and that analysis has generally shown that it is possible to meet those levels. In the future, the Water Board may identify a different background level and may set cleanup levels to meet that new background level. If PG&E is able to show that it is not feasible to restore water quality to background levels, the Water Board may require cleanup to the best water quality reasonably

[4] The term *background level* refers to the water quality that existed before the discharge.

achievable, after considering a number of factors identified in State Water Resources Control Board Resolution 92-49, subsection G. As long as the remedial activities that would be necessary to meet any new cleanup objectives and any associated environmental impacts do not exceed what had been analyzed in this EIR, the Water Board's consideration of the revised cleanup objectives and approval of new or amended WDRs can rely upon the evaluation in this document for future CEQA compliance.

ES.2.2 Project Objectives

The specific project objectives are to:

- Contain the contaminated groundwater plume horizontally and vertically immediately and continuously in the area described in the amended CAO No R6V-2008-0002A3.
- Contain the contaminated groundwater plume overall.
- Reduce maximum groundwater concentrations to 3.2 ppb Cr[T] and 3.1 ppb Cr[VI], as described in CAO No. R6V-2008-0002A1.
- Reduce average groundwater concentrations to 1.2 ppb Cr[VI] and 1.5 ppb Cr[T], as described in CAO No. R6V-2008-0002A1.
- Restore beneficial uses of the groundwater by achieving the cleanup levels noted above in the minimum time feasible.
- Limit or mitigate environmental impacts associated with the cleanup activities.

Overall, these objectives are intended to reduce chromium concentrations in groundwater to the cleanup targets and contain the groundwater plume.[5] Development of these objectives takes into consideration the available technologies, recovery of beneficial uses, short-term effectiveness, long-term effectiveness, and community concerns. Together, these objectives are intended to restore beneficial uses[6] to the groundwater aquifer.

ES.3 Project Alternatives

ES.3.1 Development of Project Alternatives

Development of the project alternatives by the Water Board was primarily based on the Water Board's independent review of information contained in PG&E's 2010 Feasibility Study[7] and its Addenda, the input and suggestions of the public (as described in Chapter 1*, Introduction*),

[5] Minor expansion of the chromium plume, incidental to the remediation, such as limited "bulging" due to injection of water associated with remediation activities would be consistent with these objectives similar to the minor expansion (up to 1,000 feet) allowed by Amended CAO No. R6V-2008-0002A2 provided that chromium will be captured by the groundwater extraction system in the down gradient flow direction.

[6] Designated beneficial uses for the Hinkley aquifer in the Basin Plan include: municipal and domestic supply; agricultural supply; industrial service supply; freshwater replenishment; and aquaculture. Refer to the discussion in Section 3.1, *Water Resources and Water Quality*, in Chapter 3 of this Draft EIR.

[7] A prior Feasibility Study was completed in 2002 and was also considered by Water Board staff, but the 2010 Feasibility Study (and its Addenda) is a more comprehensive evaluation of potential remedial approaches from 2002 through 2010 and is the primary source of information used to help define project alternatives.

independent review of the Feasibility Study by the U.S. Environmental Protection Agency (EPA) and the California Department of Toxic Substances Control (DTSC), as well as information based on previous and existing PG&E remedial pilot projects in Hinkley. The 2010 Feasibility Study and its Addenda provide extensive detail regarding the potential technologies, their effectiveness at meeting cleanup objectives, and logistical, technological, and economic feasibility.[8]

The 2010 Feasibility Study initially screened 36 chromium cleanup technologies/approaches with potential to be feasible and effective for containment and cleanup of the plume. These 36 technologies can generally be categorized into the following remedial approaches:

- **Plume Containment through Groundwater Extraction:** Extracting contaminated groundwater at the outer edge of the plume to prevent further spreading of the plume.
- **Plume Containment through Clean Water Injection:** Injecting clean (non-contaminated water) at the outer edge of the plume to create a hydraulic barrier to prevent further spreading of the plume.
- **Groundwater Extraction and Land Treatment (with Agricultural Reuse):** Extracting contaminated groundwater and applying it to land where soil microbial action will reduce[9] dissolved Cr[VI] to solid Cr[III].
- **Plume-wide In-Situ Treatment:** Throughout the plume, injecting biological and chemical reductants (food-grade carbon sources such as ethanol or lactate) directly into the contaminated groundwater to promote microbial reduction of Cr[VI] to Cr[III] within the aquifer. Cr[III] has very low toxicity and is an essential dietary nutrient. It is typically immobilized in soils and tends not to dissolve easily in groundwater.
- **Plume-core[10] Only In-Situ Treatment:** Only in the source area (i.e., Operable Unit [OU]1), injecting biological and chemical reductants directly into the contaminated groundwater to promote microbial reduction of Cr[VI] to Cr[III] within the aquifer. See Chapter 2, *Project Description*, for descriptions of the Operable Units defined for this EIR.
- **Ex-Situ (Above-ground) Treatment and Discharge to Land:** Extracting contaminated groundwater and physically separating Cr[VI] from the water, disposing of the precipitated Cr[VI] off site, and discharging the treated water to land. Alternatively, ex-situ treatment could use biological and chemical reductants to reduce Cr[VI] to Cr[III] in contaminated water and then discharge the treated water to land.
- **Ex-Situ (Above-ground) Treatment and Injection to Groundwater:** Extracting contaminated groundwater and physically separating Cr[VI] from the water, disposing of the precipitated Cr[VI] off site, and injecting the treated water directly into the aquifer. Alternatively, ex-situ treatment could use biological and chemical reductants to reduce Cr[VI] to Cr[III] in contaminated water and then inject the treated water directly into the aquifer.

[8] The 2010 Feasibility Study (and its Addenda) are available online at <http://www.swrcb.ca.gov/rwqcb6/water_issues/projects/pge/index.shtml>.

[9] *Reduce* in this context refers to a chemical reaction that adds electrons to a chemical species. A reduction of Cr[VI] to Cr[III] means that the chemical reaction adds 3 electrons to each Cr[VI] molecule, which reduces its oxidation state from +6 to +3, thereby converting hexavalent chromium to trivalent chromium.

[10] The term *plume-core* is only used to refer to the technologies consistent with the terminology used in the Feasibility Study.

Based on the review of the 2010 Feasibility Study (and Addenda), input from EPA and DTSC, public comment and review of remediation experiences of prior pilot tests and remediation activities at the site to date, the Water Board selected the most promising five project alternatives (in addition to the No Project Alternative required by CEQA) to analyze in this EIR.

ES.3.2 Alternatives Analyzed in EIR

As described above, the Water Board selected the most promising five project alternatives to analyze in this EIR, in addition to the CEQA-required analysis of the No Project Alternative. Table ES-1 identifies the key features of the five alternatives analyzed.

Refer to Section 2.8, *Project Alternatives*, in Chapter 2, *Project Description*, for detailed descriptions of each alternative.

ES.3.2.1 No Project Alternative

Under the No Project Alternative, the Water Board would not adopt a new CAO (and associated site-wide WDRs) and the prior authorizations would continue to be used for cleanup activities. The current remediation activities that would continue to be implemented under the No Project Alternative are described below.

- **Plume Containment.** Plume containment would continue via freshwater reinjection and agricultural treatment. Freshwater would be pumped from the three existing PG&E supply wells located south of the Compressor Station and piped to the five reinjection wells located northwest of the plume at the currently authorized volumes and rates (80 gpm). Land treatment via the Desert View Dairy and four agricultural units (described below) would continue as under existing conditions.
- **Land Treatment at the Desert View Dairy and Four Adjacent Parcels.** Extraction of low concentration Cr[VI] groundwater and land application at the Desert View Dairy and the four agricultural units (on the Gorman [north and south], Cottrell, and Ranch properties) within OU1/OU2 would continue at the current volumes and rates (1,100 gpm).
- **In-Situ Treatment.** In-situ treatment within the Source, Central, and South Central In-situ Reactive Zone (IRZ) areas near the southern portions of the plume using injection of reductants into the contaminated aquifer to convert dissolved Cr[VI] to solid Cr[III] would continue. In-situ operations would continue via pumping groundwater from extraction wells, mixing groundwater and reagents in mixing tanks, and injection of the mixture into injection wells. Biological (i.e., carbon-amended) and chemical reductants are injected by manual or semi-automated recirculation systems, or manually using temporary well points on direct injection methods. There are currently two IRZ compounds that include equipment, tanks, and wells, with footprint of no more than 100 by 200 feet in area and 20 feet in height surrounded by fences up to 12 feet high. Additionally, there are almost 30 smaller above-ground compounds (with approximately 20 by 20 feet footprint) for extraction wells, and 5 similar small compounds for injection wells dealing with the western bulge. All compounds have approximately 12-foot high fences with brown-colored slats. Also included are conveyance pipelines for in-situ treatment.
- **Monitoring Activities.** Monitoring wells and sampling of chromium and by-product concentrations would continue to occur as under existing conditions; these activities would not be limited to a specific OU area and could be implemented throughout the project area.

The No Project Alternative does not include remedial actions to address the expanded plume and thus would not actively remediate all of the existing (or potential future expanded) plume. As a result, the time to remediate chromium contamination within the entire plume would be closer to 1,000 years for areas outside the first quarter 2010 plume.

The No Project Alternative does not include a contingency plan in the event that agricultural units cannot be operated due to crop disease, extended storms, or other events.

ES.3.2.2 Alternative 4B

Alternative 4B expands the area, intensity, and duration of remediation activities over existing authorized and operating activities proposed under the No Project Alternative. The proposed treatment approach under this alternative would be similar to the general approach that PG&E is currently operating in the project area but on a greater scale.

Treatment methods for this alternative include in-situ treatment by extraction, carbon amendment of groundwater and reinjection in the IRZ areas in OU1 (as described in the description of the No Project Alternative), agricultural application within and adjacent to the northern diffuse portion of the plume in OU2, and freshwater injection in the northwest area of the plume adjacent to the western boundaries of OU1 and OU2. There would be more in-situ carbon injection/extraction wells and thus more above-ground IRZ well compounds (approximately 20 by 20 feet footprint) compared to the No Project Alternative. This alternative also includes expansion of agricultural treatment and groundwater pumping as necessary to address the revised plume area, including into OU3. For example, this alternative could include up to 446 acres and up to 2,395 gpm of extraction for agricultural treatment (compared to 182 acres and 1,100 gpm of extraction pumping for agricultural treatment with the No Project Alternative).

Implementation of this alternative is likely to require the acquisition of properties and/or easements within the project area. These acquisitions would be for installation and maintenance of supporting infrastructure for implementing remediation activities. All action alternatives would require acquisition of water rights because they propose agricultural water use that would exceed PG&E's current water allocation.

Overall, in comparison to the other project alternatives, Alternative 4B would:

- Have a smaller agricultural treatment operation than Alternatives 4C-2, 4C-3, 4C-4, and 4C-5;
- Have no winter agricultural operations/extraction;
- Have similar cleanup timeframes as other project alternatives;
- Have the same freshwater injection operations to maintain hydraulic control of the plume as all project alternatives; and
- Cost less than all other project alternatives.

Additionally, like the other action alternatives, Alternative 4B includes a contingency plan in the event that agricultural treatment cannot be implemented due to severe and extended storm activity that would preclude infiltration, crop disease, or other unforeseen events that would preclude agricultural treatment operations for any substantial duration of time.

Table ES-1. PG&E Hinkley Groundwater Remediation Alternatives Analyzed in the EIR

Alternatives	No Project[a]	4B	4C-2	4C-3	4C-4	4C-5
Source of Information	FS Addendum 3	FS Addendum 2	FS Addendum 3	FS Addendum 3	FS Addendum 3	FS Addendum 4
Plume FS analysis based on	Q1/2011	Q1/2010	Q1/2011	Q1/2011	Q1/2011	Q1/2011
OU1–Remedial Method for High Concentration Plume	In-Situ	In-Situ	In-Situ	In-Situ	In-Situ	Above-ground/ In-situ
Time to 50 ppb	6[b]	6	6	4	3	20
Time to 80% Cr[VI] Mass Conversion to Cr[III] or Removal	13[b]	10	7	6	6	15
OU 1/2/3–Remedial method for low concentration plume	IRZ/ AUs[c]	IRZ for 20 years AUs for 95 years	IRZ for 20 years AUs for 90 years	IRZ for 20 years AUs for 85 years	IRZ for 20 years AUs for 75 years	IRZ for 32 years AUs for 95 years
Time to 3.1 ppb cleanup	NA[c]	40	39	36	29	50
Time to 1.2 ppb cleanup	NA[c]	95	90	85	75	95
Fate of Cr3+ in the soil	Leaves	Leaves	Leaves	Leaves	Leaves	Removes from high concentration area
AU Pumping Rates[c]	1,100 gpm (FS)	1,270 gpm (FS) 2,395 gpm (total)	2,042 gpm (FS) 3,167 gpm (total)	2,829 gpm (FS) 4,388 gpm (total)	2,829 gpm (FS) 4,388 gpm (total)	2,042 gpm (FS) 3,167 gpm (total)
AUs[d, e]	182 acres	222 acres (FS)/ 446 acres (total)	351 acres (FS)/ 575 acres (total)	351 acres (FS)/ 575 acres (total)	895 acres (FS)/ 1,394 acres (total)	351 acres (FS)/ 575 acres (total)
FS Estimated Costs (NPV)[f]	N/A	$84.9M	$118M	$276M	$173M	$171M
Key Feature	Required by CEQA	Less groundwater pumping, AU acreage and lower cost.	Year round pumping for plume control (winter Crop).	Year round pumping for plume control (winter above-ground treatment).	Year round pumping for plume control. Fastest cleanup of all alternative.	Removal of chromium from the high concentration plume area.

Notes:

[a] No Project Alternative defined based on the No Project details provided for Alternative 4C-2 in FS Addendum No. 3.

[b] Based on FS Alternative No. 4 cleanup times because FS Addendum No. 3 did not identify cleanup times for No Project conditions.

[c] No Project Alternative limited to addressing the 2008–2010 plume. Thus, no duration for cleanup of entire plume is identified.

[d] Two pumping rates shown for action alternatives. First is highest pumping rate in the FS/Addenda marked with a (FS). Second is scaled up to account for expanded plume beyond that at the time of the FS/Addenda.

[e] Two acreages shown for agricultural units for action alternatives. First is from the FS/Addenda marked with a (FS). Second is scaled up to account for expanded plume beyond that at the time of the FS/Addenda.

[f] Costs are based on FS/Addenda costs to remediate to 1.2 ppb Cr[VI] level and only include the infrastructure described in the FS/Addenda and do not account for the additional cost for the infrastructure and activities to address the expanded plume.

AU = Agricultural Units
FS = Feasibility Study
gpm = gallons per minute
IRZ = In-Situ Remediation
NPV = Net present value
ppb = parts per billion

ES.3.2.3 Alternative 4C-2

Alternative 4C-2 uses much of the same general infrastructure and optimization as that proposed under Alternative 4B in relation to plume containment and IRZ treatment. Alternative 4C-2 differs from Alternative 4B by including more intensive groundwater extraction for agricultural treatment with the addition of winter crops (winter rye or a similar crop) at select agricultural treatment units. This expansion is proposed to achieve and maintain year-round extraction/hydraulic control of the plume movement to foster faster cleanup periods compared to Alternative 4B.

This alternative also includes expansion of agricultural treatment and groundwater pumping as necessary to address the revised plume area, including into OU3; for example this alternative could include up to 575 acres and up to 3,167 gpm of extraction for agricultural treatment (compared to 182 acres and 1,100 gpm of extraction pumping for agricultural treatment with the No Project Alternative).

Implementation of this alternative is likely to require the acquisition of properties and/or easements within the project area. These acquisitions would be for installation and maintenance of supporting infrastructure to implement remediation activities. All action alternatives would require acquisition of water rights because they propose agricultural water use that would exceed PG&E's current water allocation.

Overall, in comparison to the other project alternatives, Alternative 4C-2 would:

- Have a more extensive agricultural treatment approach (including winter operations) than the No Project Alternative and Alternative 4B;
- Have the same freshwater injection operations to maintain hydraulic control as all project alternatives; and
- Have a shorter period for achieving cleanup to average and maximum Cr[T] and Cr[VI] interim cleanup levels over the No Project Alternative and Alternative 4B only.

Additionally, like the other action alternatives, Alternative 4C-2 includes a contingency plan in the event that agricultural treatment cannot be implemented due to severe and extended storm activity that would preclude infiltration, crop disease, or other unforeseen events that would preclude agricultural treatment operations for any substantial duration of time.

ES.3.2.4 Alternative 4C-3

Alternative 4C-3 uses much of the same general infrastructure and optimization as that proposed under Alternatives 4B and 4C-2 in relation to plume containment, agricultural treatment via groundwater extraction and crop irrigation, and IRZ treatment. Alternative 4C-3 adds ex-situ treatment plants to provide year-round continuous pumping to treat excess winter water that cannot be treated by proposed agricultural treatment units in winter. The proposed ex-situ technology is extraction, treatment through chemical reduction/precipitation, and reinjection of treated water into the groundwater. This technology was selected based on similar operations that have been implemented by PG&E at its Topock site where the technology has been effective in the cleanup of water contaminated by Cr[VI]. There would be up to a total of two above-ground treatment facilities. One treatment facility would be located generally near the Compressor Station adjacent to the southern boundary of the Source Area IRZ in OU1, and one treatment facility would be located generally near the Desert View Dairy adjacent to the northwestern boundary of OU2.

This alternative also includes additional agricultural treatment and groundwater pumping as necessary to address the revised plume area including into OU3; for example this alternative could include up to 575 acres and up to 4,388 gpm of extraction (annual average) for agricultural treatment (compared to 182 acres and 1,100 gpm of extraction pumping for agricultural treatment with the No Project Alternative).

Implementation of this alternative is likely to require the acquisition of properties and/or easements within the project area. These acquisitions would be for the installation and maintenance of infrastructure that supports the implementation of remediation activities. All action alternatives would require acquisition of water rights because they propose agricultural water use that would exceed PG&E's current water allocation.

Overall, in comparison to the other project alternatives, Alternative 4C-3 would:

- Have a shorter time period to achieve cleanup to average and maximum Cr[T] and Cr[VI] interim cleanup levels than all other alternatives except Alternative 4C-4;
- Remove chromium mass from the aquifer due to the use of winter ex-situ treatment;[11]
- Require more expansive construction associated with the ex-situ treatment plants and supporting infrastructure;
- Have a greater amount of truck traffic as required by the operation of the ex-situ treatment plants;
- Have the same freshwater injection operations to maintain hydraulic control as all project alternatives; and
- Have the highest cost for implementation of all alternatives.

Additionally, like the other action alternatives, Alternative 4C-3 includes a contingency plan in the event that agricultural treatment cannot be implemented due to severe and extended storm activity that would preclude infiltration, crop disease, or other unforeseen events that would preclude agricultural treatment unit operations for any substantial duration of time. However, the two above-ground treatment plants included in this alternative already provide contingency options in the event that agricultural treatment is impaired for a short period of time. The above-ground treatment plants are being designed with more capacity than needed for expected average flows, which creates some built-in contingency. Also, since Alternative 4C-3 already relies on above-ground treatment in winter, it has a built-in contingency in the event of impairment of agricultural units due to winter storms.

ES.3.2.5 Alternative 4C-4

Alternative 4C-4 uses much of the same infrastructure and optimization as proposed under Alternatives 4B, 4C-2, and 4C-3 but significantly expands the area of agricultural treatment via operation of winter agricultural treatment pivots using continuous pumping instead of an ex-situ treatment plant as proposed under Alternative 4C-3.

This alternative also expands agricultural treatment and groundwater pumping as necessary to address the revised plume area, including into OU3; for example, this alternative could include up to

[11] Alternatives 4B, 4C-2, and 4C-4 would not remove chromium from the aquifer but instead convert the highly toxic Cr[VI] in groundwater to low toxicity solid Cr[III]. Alternative 4C-5 would remove chromium in the source area using ex-situ above-ground treatment.

1,394 acres and an annual extraction rate of up to 4,388 gpm for agricultural treatment (compared to 182 acres and 1,100 gpm of extraction pumping for agricultural treatment with the No Project Alternative).

Implementation of this alternative is likely to require the acquisition of properties and/or easements within the project area. These acquisitions would be for installation and maintenance of supporting infrastructure for implementing remediation activities. All action alternatives would require acquisition of water rights because they propose agricultural water use that would exceed PG&E's current water allocation.

Overall, in comparison to the other project alternatives, Alternative 4C-4 would:

- Have the fastest timeframes to achieve average and maximum Cr[T] and Cr[VI] interim cleanup levels over all project alternatives;
- Require construction of the largest area of agricultural treatment and associated pipeline conveyance systems of all project alternatives; and have the same freshwater injection operations to maintain hydraulic control as all alternatives; and
- Have the second highest cost of all alternatives.

Additionally, like the other action alternatives, Alternative 4C-4 includes a contingency plan in the event that agricultural treatment cannot be implemented due to severe and extended storm activity that would preclude infiltration, crop disease, or other unforeseen events that would preclude agricultural treatment unit operations for any substantial duration of time.

ES.3.2.6 Alternative 4C-5

Alternative 4C-5 is a combination of three remedial strategies: agricultural treatment, in-situ remediation, and ex-situ (above-ground) chemical treatment.

The primary difference in the configurations of Alternative 4C-5 and Alternative 4C-2 is that Alternative 4C-5 focuses in-situ treatment in the South Central Area and Central Area and includes ex-situ (above-ground) treatment in the Source Area instead of the in-situ treatment proposed for the Source Area under Alternative 4C-2. Therefore, compared to the No Project Alternative and the other action alternatives, there would fewer in-situ carbon injection/extraction wells and thus less above-ground IRZ well compounds (approximately 20 by 20 feet footprint). The primary difference between the configurations of Alternative 4C-5 and Alternative 4C-3 is that Alternative 4C-5 uses only one above-ground treatment plant for year-round ex-situ treatment of the high concentration plume, whereas Alternative 4C-3 uses two above-ground treatment plants for winter plume control only. The above-ground treatment plant would be located generally near the Compressor Station adjacent to the southern boundary of the Source Area IRZ in OU1.This alternative also expands agricultural treatment and groundwater pumping as necessary to address the revised plume area, including into OU3; for example, this alternative could include up to 575 acres and up to 3,167 gpm (annual average) of extraction for agricultural treatment (compared to 182 acres and 1,100 gpm of extraction pumping for agricultural treatment with the No Project Alternative).

Implementation of this alternative is likely to require the acquisition of properties and/or easements within the project area. These acquisitions would be for installation and maintenance of supporting infrastructure for implementing remediation activities. All action alternatives would require acquisition of water rights because they propose agricultural water use that would exceed PG&E's current water allocation.

Overall, in comparison to the other project alternatives, Alternative 4C-5 would:

- Take longer to achieve interim cleanup levels to meet the drinking water MCL for Cr[T] (below 50 ppb) than the other described alternatives;
- Take longer to achieve average and maximum Cr[T] and Cr[VI] interim cleanup levels compared to other alternatives;
- Use above-ground pump and treat in the Source Area IRZ instead of in-situ treatment resulting in removal of chromium from the from the overall site instead of conversion from Cr[VI] to Cr[III] thus resulting in the largest removal of chromium mass of all alternatives; and
- Have the same freshwater injection operations to maintain hydraulic control as all other described alternatives.

Additionally, like the other action alternatives, Alternative 4C-5 includes a contingency plan in the event that agricultural treatment cannot be implemented due to severe and extended storm activity that would preclude infiltration, crop disease, or other unforeseen events that would preclude agricultural treatment unit operations for any substantial duration of time.

ES.4 Project Impacts and Mitigation Measures

ES.4.1 Summary of Project Impacts

The impacts of each alternative are summarized in Tables ES-2a to ES-2l (presented at the end of this summary). For potentially significant impacts, mitigation measures are identified where feasible to reduce the impact to a less than significant level. Refer to Chapter 3, *Existing Conditions and Impacts*, for a detailed discussion of project impacts and detailed description of the mitigation measures.

ES.4.2 Significant and Unavoidable Impacts

The following impacts could not be reduced to a less than significant level with mitigation and therefore remain potentially significant and unavoidable.

- **Impact WTR-1c: Groundwater Drawdown Effects on Aquifer Compaction.** Groundwater extraction for plume containment and agricultural treatment is predicted to lower the water table substantially over time in the remedial area. There is a potential that lowering of the water table may result in compaction of sediments and the aquifer particularly in areas of fine sediments that are outside of areas that have experienced previous drawdown due to historic agricultural pumping. If compaction does occur, it is possible that aquifer storage capacity could be reduced. This is considered a potentially significant and unavoidable impact. Where this results in permanent effects to water supply wells, PG&E is required to provide permanent alternative water supplies (Refer to Section 3.1, *Water Resources and Water Quality*).
- **Impact WTR-2d: Temporary Localized Chromium Plume Spreading ("Bulging") Due to Remedial Activities.** With the implementation of increased agricultural treatment and in-situ remediation, compared to existing conditions, temporary localized spreading ("bulging") of the chromium plume in the upper aquifer could occur. Impacts to water supply wells can be

mitigated through provision of alternative water supplies, but the groundwater aquifer water quality could be temporarily impaired until the chromium plume is fully remediated (Refer to Section 3.1, *Water Resources and Water Quality*).

- **Impact WTR-2e: Increase in Total Dissolved Solids, Uranium, and Other Radionuclides due to Agricultural Treatment.** Agricultural treatment would result in increased total dissolved solids in the water that infiltrates back to the aquifer below the irrigated land as a result of increased concentrations of total dissolved solids in the root zone due to evaporation. Mitigation is required to control the spread of remedial byproducts and to ultimately return water quality to baseline conditions, but temporary degradation of the aquifer water quality is likely unavoidable in some locations in order to facilitate the chromium remediation. Increased groundwater pumping for agricultural treatment could also result in increased uranium and other radionuclide concentrations in groundwater but this impact requires further investigation in order to be fully characterized and thus temporary water quality degradation may also occur for these constituents as well (Refer to Section 3.1, *Water Resources and Water Quality*).
- **Impact WTR-2g: Increase in other Secondary Byproducts (Dissolved Arsenic, Iron and Manganese) due to In-Situ Remediation.** The project would increase in-situ remediation compared to existing conditions. Temporary degradation of the aquifer near carbon amendment injection points is unavoidable if in-situ remediation is to be employed. Mitigation is required to control the spread of remedial byproducts and to ultimately return water quality to baseline conditions, but temporary degradation of the aquifer water quality is likely unavoidable in some locations in order to facilitate the chromium remediation. (Refer to Section 3.1, *Water Resources and Water Quality*).
- **Impact BIO-4: Conflicts with Wildlife Movement (Desert Tortoise only).** With expansion of remedial infrastructure to address the expanded plume, all action alternatives could result in a nearly 2-mile contiguous area of new agricultural treatment units which may substantially impede east-west movement of desert tortoise in the Hinkley Valley. Aside from selecting the No Project Alternative or selecting alternatives (such as plume-wide pump and treat) previously rejected as not meeting the project's goal and objectives, feasible mitigation is not available for this impact. The agricultural treatment units need to be placed in central areas in Hinkley Valley in order to promote hydraulic control of the plume, and corridors between agricultural treatment units are unlikely to promote tortoise movement and would only increase habitat fragmentation, which is considered an inferior outcome for habitat conservation. Thus, this is considered a potentially significant and unavoidable impact depending on the ultimate configuration and extent of agricultural treatment units (refer to Section 3.7, *Biological Resources*).

ES.5 Comparison of Alternatives and the Environmentally Superior Alternative

As discussed in Chapter 4, *Other CEQA Analyses*, there is no single alternative that is clearly environmentally superior from all aspects. Different alternatives are environmentally superior to the other alternatives for specific subject areas.

The key areas of differentiation between alternatives are as follows:

- **Remediation of the Chromium Plume:** The No Project Alternative provides the least amount of remediation because it is limited to activities concerning roughly the 2008 to 2010 plume area and the plume is much larger than it was in the past. All action alternatives would meet the project objective and cleanup the aquifer to the currently defined background levels. Alternative 4B would take the longest to reach maximum and average background levels, and Alternative 4C-4 would take the least amount of time to reach these levels. Alternative 4C-2 would remediate the plume faster than Alternative 4B, but not as fast as Alternative 4C-4. Alternative 4C-3 and 4C-4 provide for winter treatment of the chromium plume through above-ground treatment (4C-3) or winter crop (4C-4) and thus provide year-round pumping for plume containment. Alternative 4C-5 would remove more chromium from the aquifer in the source area than any other alternative, as the other alternatives would convert hexavalent chromium to trivalent chromium, which would then remain in the aquifer sediments. However, since trivalent chromium is considered stable, this is not a shortcoming for this alternative in terms of remediation effectiveness. Overall, **Alternative 4C-4 is considered the environmentally superior alternative in terms of remediation of the chromium plume** because it would reach the cleanup levels the fastest and would provide for year-round containment pumping through use of a winter crop.

- **Groundwater Drawdown Effect on Local Water Supply:** Groundwater drawdown levels are a function of the amount of agricultural treatment water use. The No Project Alternative would have the least amount of groundwater drawdown of all alternatives as it would not include new agricultural water use above existing conditions and thus would have limited to no new effects on water supply wells. Alternative 4B would have the least amount of groundwater drawdown of the action alternatives, and Alternative 4C-4 would have the most amount of drawdown and affect the most water supply wells over time. Thus, the **No Project Alternative is identified as the environmentally superior alternative in terms of drawdown**. Because the No Project Alternative does not meet the project goal and objectives, **Alternative 4B is identified as the Environmentally Superior Alternative in terms of drawdown among the action alternatives**.

- **Water Quality Effects of Remedial Byproducts:** Remedial byproducts would be generated by both in-situ remediation and agricultural treatment. Thus the level of water quality effects due to remedial byproducts is a function of the amount of these two forms of remediation. The alternatives would have varying levels of agricultural treatment. All alternatives other than Alternative 4C-5 would have similar levels of in-situ remediation. Alternative 4C-5 would use above-ground treatment in the source area (the southernmost part of the plume) instead of in-situ remediation. The No Project Alternative would have the lowest water quality effects due to remedial byproducts as it would include no new agricultural treatment above existing levels and a similar level of in-situ remediation to the other alternatives. Alternative 4B would have the least amount of agricultural treatment of the action alternatives and thus would have the lowest amount of water quality effects due to remedial byproducts of the action alternatives. Alternative 4C-4 would have the most agricultural treatment and would have the highest amount of water quality effects due to remedial byproducts. While Alternative 4C-5 would generate less remedial byproducts in the source area than the other alternatives, the source area is at the most upgradient part of the plume, meaning that byproduct plumes from the source area are far less likely to affect downgradient water supply wells than byproduct plumes that are generated in parts of the plume north of the source area. Since all alternatives include the

same amount of in-situ remediation in the areas north of the source area, this is not considered a differentiator to Alternative 4C-5. Thus, the **No Project Alternative is considered the environmentally superior alternative in terms of water quality effects due to remedial byproducts**. Because the No Project Alternative does not meet the project goal and objectives, **Alternative 4B is identified as the Environmentally Superior Alternative in terms of water quality effects due to remedial byproducts among the action alternatives**.

- **Disturbance of Biological Resources:** Impacts on biological resources, including special status species, are a function of the amount of land disturbance, which is primarily a function of the area of agricultural treatment. The No Project Alternative would have no new agricultural water use above existing conditions and thus would have only have new effects on biological resources due to new monitoring wells and new in-situ remediation facilities. Alternative 4B would have the least amount of agricultural treatment of the action alternatives and Alternative 4C-4 would have the most. Thus, the **No Project Alternative would be the environmentally superior alternative in terms of new impacts on biological resources**. Because the No Project Alternative does not meet the project goal and objectives, **Alternative 4B is identified as the Environmentally Superior Alternative in terms of biological resources among the action alternatives**.

- **Change in Visual Character:** For the most part, the alternatives will not substantially change visual aesthetics in the Hinkley Valley as many of the remedial features are either similar to existing land use (agricultural fields) are limited in extent (new wells) or are buried (pipelines). However, there will be some above-ground facilities including above-ground compounds for storage of carbon amendment and pumps for in-situ remediation (all alternatives), above-ground treatment facilities (Alternatives 4C-3 and 4C-5) and alternative water supply facilities (all alternatives). The No Project Alternative would have the least amount of above-ground infrastructure of all alternatives as it would not include above-ground treatment facilities and also would require the least change to existing aesthetics as it has the least amount of agricultural treatment. Alternative 4B would not include above-ground treatment and would have the least amount of agricultural treatment of the action alternatives. Alternative 4C-3 would include two above-ground treatment facilities and Alternative 4C-5 would include one. Alternative 4C-4 would have no above-ground treatment facilities but would have the most agricultural treatment. All alternatives would have alternative water supply facilities due to the chromium plume, and the action alternatives would also likely require alternative water supply facilities due to remedial drawdown and/or water quality effects. Alternative water supply options include drilling deeper wells, wellhead treatment, storage tanks and trucked water, and/or alternative water supply systems (including a potential community water system). Thus, the **No Project Alternative would be the environmentally superior alternative in terms of changes in visual character** as it would have the least amount of above-ground facilities and aesthetic change. Because the No Project Alternative does not meet the project goal and objectives, **Alternative 4B is identified as the Environmentally Superior Alternative in terms of visual character as it would have the least amount of changes to existing visual aesthetics of the action alternatives**.

The alternatives also vary in terms of construction impacts on other subject areas, such as geology and soils, noise, air quality, greenhouse gas emissions, cultural resources and traffic. Construction impacts are similar between different alternatives in kind but differ in scale depending on the amount of remedial activities. The alternatives differ from one another in terms of the general amount of construction impact as follows:

- **No Project Alternative:** This alternative only requires new ground disturbance and construction activities for new in-situ remediation, monitoring wells, and replacement water supplies and thus has the least construction impacts related to geology and soils, noise, air quality, greenhouse gas emissions, cultural resources, and traffic.
- **Alternative 4B:** This alternative has the least amount of new ground disturbance of the action alternatives and thus, in general has lower construction impacts related to geology and soils, noise, air quality, greenhouse gas emissions, cultural resources, and traffic of the action alternatives.
- **Alternative 4C-2:** This alternative has the second least amount of new ground disturbance of the action alternatives and thus, in general has the second least amount of construction impacts related to geology and soils, noise, air quality, greenhouse gas emissions, cultural resources, and traffic.
- **Alternative 4C-3:** This alternative has the second most amount of construction activity of the action alternatives and thus, in general has the second most amount of construction impacts related to geology and soils, noise, cultural resources, and traffic. This alternative has the highest amount of construction air quality and greenhouse gas emissions impact due to construction activity for the two above-ground treatment facilities.
- **Alternative 4C-4:** This alternative has the most amount of new ground disturbance of the alternatives and thus has the highest construction impacts related to geology and soils, noise, cultural resources, and traffic. This alternative has the third highest impact on air quality and the second highest impact on greenhouse gas emissions during construction.
- **Alternative 4C-5:** This alternative has more new ground disturbance than Alternative 4B and 4C-2, but less ground disturbance than Alternatives 4C-3 and 4C-4 and thus has a middling amount of construction impacts related to geology and soils, noise, greenhouse gas emissions, cultural resources, and traffic compared to the other action alternatives. This alternative has the second highest amount of construction air quality impact due to construction activity because it includes one above-ground treatment facility.

Operational traffic impacts are minimal for all alternatives given the low level of traffic on project area roads. All alternatives have less than significant impacts related to utilities and public services and noise without mitigation. For land use, all alternatives (other than the No Project Alternative) would require compliance with BLM land use requirements for project elements on BLM land. Thus, for these impacts, there are no substantial differences between the alternatives.

Operational air quality and greenhouse gas emissions are highest with Alternative 4C-3 (due to the two above-ground treatment facilities), and lowest with the No Project Alternative. Alternatives 4B and 4C-2 have the lowest operational air quality and greenhouse gas emissions of the action alternatives.

Because the alternatives involved fundamental tradeoffs between different impacts, there is no objective way to determine a single environmentally superior alternative without making value judgments about different impacts. For example, Alternative 4C-4 would remediate the plume the fastest of all alternatives, but would also result in the highest level of groundwater drawdown, and the highest level of remedial byproducts and the largest amount of disturbance and loss of special-status species habitat. In contrast, the No Project Alternative would have the least groundwater drawdown, the lowest level of remedial byproducts, and the least new disturbance of special-status

species habitat, but it would also not remediate the entire chromium plume. Of the action alternatives, Alternative 4B would have the least groundwater drawdown, the lowest level of remedial byproducts, and the least new disturbance of special-status species habitat, but it would take much longer to reach the plume cleanup levels.

Different individuals may value one impact more than another impact and could identify different alternatives as the environmentally superior alternative. As such, this EIR does not identify a single environmentally superior alternative and instead provides a detailed comparison of the alternatives for all resources studied.

ES.6 Key Areas of Controversy and Issues to Be Resolved

This section includes a summary of key issues raised during the public scoping and outreach process. This is not an exhaustive list of public concerns or issues. The EIR analysis has been developed, to the fullest extent possible, to provide information on every one of the issues raised in scoping. A brief summary of these key issues is provided here. Greater detail is provided in Chapter 1*, Introduction.*

- *Definition of "background" chromium levels*—As discussed in Section 3.1, *Water Resources and Water Quality*, the Water Board is presently using the maximum and average background concentrations of total and hexavalent chromium from the 2007 Background Study Report as cleanup levels. A peer review ordered by the Water Board was completed in 2011 and raised certain issues questioning the 2007 study. Water Board staff, as directed by the Water Board in at its June 2012 meeting, is retaining the existing background values adopted in amended CAO R6V-2011-005A1 while reviewing PG&E's proposed new background study and considering the need for peer review and/or consultation with other experts, such as the U.S. Geological Survey, to ensure that any new study will yield a valid, credible and defensible result.
- *The long duration of cleanup*—The Water Board has required PG&E to consider additional alternatives that would result in shorter cleanup timeframes than those originally proposed in PG&E's 2010 Feasibility Study. Accordingly, three addenda and additional evaluations have been prepared by PG&E to evaluate methods to achieve cleanup goals more rapidly (see Chapter 2, *Project Description*, for a description of the alternatives analyzed in detail in this EIR as well as the alternatives considered and dismissed from further consideration). The technologies included in the alternatives analyzed in this EIR are those that have been shown to be effective at the project site.
- *The effectiveness of different remedial alternatives in containing and remediating the chromium plume*—Chapter 2, *Project Description*, and Section 3.1, Water Resources and Water Quality, both discuss the methods of remediation by alternative and the timeframe for remediation to the identified cleanup levels.
- *Reduced domestic water supply for potable and non-potable uses as a result of continued contamination and remediation/cleanup*—The Water Board has ordered PG&E to provide whole house water to domestic supply wells affected by the chromium contamination. The Water Board's web site provided information about planning for whole house water. Section 3.1, *Water Resources and Water Quality*, discusses the potential effects of proposed remediation activities

on domestic water supply wells and identified feasible mitigation measures to address identified significant effects.

- *Safety of well water for drinking, cooking, bathing, swimming, laundry, pet consumption, and use in swamp coolers*—The Office of Environmental Human Health Assessment published a Public Health Goal for hexavalent chromium in 2011 and the report associated with that goal discusses potential health risks associated with various routes of health exposure. Section 3.1, *Water Resources and Water Quality*, discussed drinking water standards and summarized potential health effects due to exposure to hexavalent chromium, as described by OEHHA and other sources.
- *PG&E's involvement in collecting data and developing alternatives*—The Porter-Cologne Water Quality Act section 13304 requires any person who has discharged or deposited waste where is, or probably will be, discharged into waters of the state, to clean up the waste or abate the effects of the waste upon order of the regional board. State Water Board Resolution 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code section 13304," sets out the procedural and substantive steps dischargers follow in the investigation and cleanup and abatement of discharges of waste. Therefore, PG&E, as the responsible party is required by law to implement remediation. Although the Water Code limits the Water Board's ability to specify the method and manner of compliance with its orders, the Water Board independently reviews the monitoring and investigation data and the feasibility studies. In addition, the Water Board solicited input from EPA and the California Department of Toxic Substances Control (DTSC) on the groundwater remediation alternatives during their development. The Water Board also requested independent peer review of the 2007 Background Study Report, and PG&E is presently considering a new background study in order to address the peer review results.
- *The cumulative effect of the chromium plume and the remediation on the socioeconomic well-being of Hinkley*—CEQA is limited to the evaluation of physical impacts on the environment and thus does not consider social or economic impacts on their own to be significant impacts under CEQA. However, the EIR has considered where socioeconomic conditions, such as abandoned properties due to property acquisition, might result in physical impacts to the environment and required mitigation to address such physical impacts, where significant.

This section includes a summary of the issues to be resolved:

- *Definition of "background" chromium levels*—As noted above, the Water Board is considering a new study of background chromium levels. If and when that study is complete, the Water Board will consider its findings and may decide to change the cleanup levels for the chromium plume. The methods used for cleanup are expected to be the same or similar to those studied in the EIR. However, the area of the defined chromium plume may differ from the currently defined plume, which may change the area or extent of remediation activity.
- *The precise methods for providing replacement water supplies both for the effects of the chromium plume as well as for the effects of remediation*—The Water Board is proceeding with evaluation of the methods for providing replacement water for domestic wells affected by the chromium contamination. This EIR includes multiple options for providing replacement water for water supply wells affected by the remediation.

ES.7 Intent of the EIR

This Draft EIR has been prepared in accordance with CEQA, which requires all state and local government agencies to consider the environmental consequences of projects over which they have discretionary authority before taking action on those projects (California Public Resources Code Section 21000 et seq.).

The intent of this Draft EIR is to:

- Identify potential direct, indirect, and cumulative environmental impacts associated with the project.
- Describe feasible mitigation measures intended to lessen or avoid potentially significant project impacts or reduce them to a less-than-significant level.
- Disclose potential project impacts and proposed mitigation measures for public review and comment.
- Discuss project alternatives that avoid or reduce identified significant project impacts.

This EIR evaluates six alternatives to achieve the final groundwater cleanup. All of the alternatives involve different combinations of several types and intensities of remediation technologies, including groundwater extraction and agricultural reuse; clean water injection; groundwater extraction, above ground treatment, and discharge; and in-situ treatment. The different combinations of these remediation technologies not only result in cleanup times ranging from 29 to 40 years, but they also result in differing kinds and severity of impacts. The scope of the alternatives chosen to be analyzed in this EIR was intended in part to demonstrate the tradeoffs between cleanup time and environmental impacts from the remedial activities. As remediation activities are intensified or accelerated to achieve cleanup more quickly, the severity of the environmental impacts potentially also increases. Rather than selecting one remediation alternative as the proposed project and providing a less detailed evaluation of other alternatives (as CEQA allows), this EIR provides a detailed analysis of all of the alternatives. The Water Board will use this EIR to support its adoption of WDRs for PG&E to implement the various remediation technologies throughout the project area and duration, and to support its adoption of a new CAO. The new CAO will establish specific cleanup objectives and timelines based on the analysis contained in the EIR and will require PG&E to take actions within the prescribed timelines to meet the cleanup objectives. Although the Water Board may decide to identify in its new CAO one of the alternatives analyzed in the EIR as the best method to achieve the prescribed objectives and timelines, the Water Board may only focus its Order on water quality outcomes based on implementation of one or more of the feasible alternatives analyzed in this EIR.

Table ES-2a. Summary of Water Resources and Water Quality Impacts

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Groundwater Drawdown				
WTR-1a: Groundwater Drawdown Effects on the Regional Water Supply	No Project Alternative	Less than Significant	N/A	--
	All Action Alternatives	Significant	WTR-MM-1: Purchase of New Water Rights to Comply with Basin Adjudication	Less than Significant
WTR-1b: Groundwater Drawdown Effects on the Local Water Supply	No Project Alternative	Less than Significant	N/A	--
	All Action Alternatives	Significant	WTR-MM-2: Water Supply Program for Wells that are Affected by Remedial Activities	Less than Significant
WTR-1c: Groundwater Drawdown Effects on Aquifer Compaction	No Project Alternative	Less than Significant	N/A	—
	All Action Alternatives	Potentially Significant	WTR-MM-2 (see above)	Potentially Significant and Unavoidable for the Aquifer Less than Significant for Water Supply Wells
Water Quality				
WTR-2a: Containment and Treatment of Existing Chromium Contamination	All Alternatives	Beneficial	N/A	--
WTR-2b: Conversion of Hexavalent Chromium to Trivalent Chromium	All Alternatives	Less than Significant	N/A	--
WTR-2c: Water Quality Effects due to use of Tracer Compounds	All Alternatives	Less than Significant	N/A	--
WTR-2d: Temporary Localized Chromium Plume Expansion ("Bulging") due to Remedial Activities	No Project Alternative	Less than Significant	N/A	--
	All Action Alternatives	Potentially Significant	WTR-MM-2 (see above)	Potentially Significant and Unavoidable for the Aquifer

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
			WTR-MM-3: Boundary Control Monitoring, Enhancement and Maintenance of Hydraulic Control and Plume Water Balance to Prevent or Reduce Temporary Localized Chromium Plume Bulging	Less than Significant for Water Supply Wells
WTR-2e: Increase in Total Dissolved Solids, Uranium and other Radionuclides due to Agricultural Treatment	All Alternatives	Significant (TDS)	WTR-MM-2 (see above)	Potentially Significant and Unavoidable for the Aquifer (TDS)
	All Action Alternatives	Potentially Significant (Uranium/ other Radionuclides)	WTR-MM-4: Restoration of the Hinkley Aquifer Affected by Remedial Activities for Beneficial Uses	Potentially Significant and Unavoidable for the Aquifer (Uranium/ Other Radionuclides)
			WTR-MM-5: Investigate and Monitor Total Dissolved Solids, Uranium and Other Radionuclide levels in relation to Agricultural Treatment and Take Contingency Actions	Less than Significant for Water Supply Wells
WTR-2f: Change in Nitrate Levels due to Agricultural Treatment	No Project Alternative	Less than significant	N/A	--
	All Action Alternatives	Beneficial for the Aquifer (removal of nitrate overall)		Beneficial for the Aquifer overall
		Potentially Significant (localized increases of nitrate due to injection)	WTR-MM-6: Monitor Nitrate Levels and Manage Agricultural Treatment to Avoid Significant Increases in Nitrate Levels	Less than Significant for Water Supply Wells

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
WTR-2g: Increase in Other Secondary Byproducts (Dissolved Arsenic, Iron and Manganese) due to In-Situ Remediation	No Project Alternative	Less than Significant	N/A	--
	All Action Alternatives	Significant	WTR-MM-2 (see above) WTR-MM-4 (see above) WTR-MM-7: Construction and Operation of Additional Extraction Wells to Control Carbon Amendment In-situ Byproduct Plumes	Temporarily Potentially Significant and Unavoidable for the Aquifer Less than Significant for Water Supply Wells
WTR-2h: Potential Degradation of Water Quality due to Freshwater Injection	All Alternatives	Potentially Significant	WTR-MM-8: Ensure Freshwater Injection Water Does not Degrade Water Quality	Less than Significant
WTR-2i: Taste and Odor Impacts due to Remedial Activities	No Project Alternative	Less than Significant	N/A	--
	All Action Alternatives	Significant	WTR-MM-2 (see above) WTR-MM-4 (see above)	Less than Significant
Drainage				
WTR-3: Impacts Related to Drainage Patterns and Runoff	All Alternatives	Less than Significant	N/A	--
Flooding				
WTR-4: Impacts Related to Flooding	All Alternatives	Less than Significant	N/A	--
Secondary Impacts of Water Supply Mitigation				
WTR-5: Secondary Impacts of Water Supply Mitigation	All Alternatives	Potentially Significant	Project Mitigation (see text)	Less than Significant

Note:
Table 3.1-2 in Section 3.1, *Water Resources and Water Quality*, provides an overall comparison of the No Project Alternative to Action Alternatives (Alternatives 4B, 4C-2 through 4C-5).

Table ES-2b. Summary of Land Use, Agriculture, 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	Less than Significant	None Required	–
	All Action Alternatives	Potentially Significant	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	Less than Significant	None Required	–
	All Action Alternatives	Potentially Significant	LU-MM-1: Obtain Bureau of Land Management Permits BIO-MM-1a to 1o, 4 (see Biological Resources below)	Less than Significant
LU-2: Conversion of Agricultural Land to Non-Agricultural Use, Including FMMP-Designated and Williamson Act Lands	No Project	Less than Significant	None Required	–
	All Action Alternatives	Potentially Significant	LU-MM-2: Acquire Agricultural Conservation Easements for Important Farmland; WTR-MM-2 (see Water Resources and Water Quality above)	Less than Significant
LU-3: Population and Housing Changes due to Remedial Activities	All Alternatives	Less than Significant	None Required	–

1 **Table ES-2c. 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: 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 during Remedial Operations	All Alternatives	Potentially Significant	HAZ-MM-2: Implement Spill Containment, Control, and Countermeasures Plan During Construction	Less than Significant
		Less than Significant	None required	–
HAZ-1c: Exposure to Hazardous Building Materials during Demolition	No Project Alternative	Less than Significant	None required	–
	All Action Alternatives	Potentially Significant	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	–

1 **Table ES-2d. 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	Potentially Significant	GEO-MM-1: Land Subsidence Monitoring, Investigation, and Repair WTR-MM-2 (see Water Resources and Water Quality above)	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 Pipeline Rupture	Less than Significant

Table ES-2e. Summary of Air Quality and Climate Change Impacts

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
AIR-1a: Conflict with or Obstruct Implementation of Mojave Desert Air Quality Management District Attainment Plans for Criteria Pollutants	All Alternatives	Less than Significant	None Required	--
AIR-1b: Exceed MDAQMD Threshold Levels for Criteria Pollutants during Project Construction	No Project, 4B, 4C-2, 4C-4	Less than Significant	AIR-MM-4: Dust Control Measures, MDAQMD Rule 403	Less than Significant
	4C-3, 4C-5	Potentially Significant	AIR-MM-1: Clean Diesel-Powered Construction Equipment AIR-MM-2: Modern Fleets for On-Road Material Delivery and Haul Trucks AIR-MM-3: Emission-Reduction Measures AIR-MM-4 (see above)	Less than Significant
AIR-1c: Exceed MDAQMD Threshold Levels for Criteria Pollutants from Project Operations	No Project, 4B, 4C-2, 4C-4	Less than Significant	AIR-MM-4 (see above)	Less than Significant
	4C-3, 4C-5	Potentially Significant	AIR-MM-4 (see above)	Less than Significant
AIR-2a: Expose Nearby Receptors to Increased Health Risk Associated with Toxic Air Contaminants during Construction	All Alternatives	Potentially Significant	AIR-MM-1 (see above) AIR-MM-2 (see above) AIR-MM-3 (see above)	Less than Significant
AIR-2b: Expose Nearby Receptors to Increased Health Risk Associated with Toxic Air Contaminants from Operations	No Project, 4B, 4C-2, 4C-3, 4C-5	Less than Significant	None Required	--
	4C-4	Potentially Significant	AIR-MM-5 (Clean Diesel-Powered Equipment for Operation)	Less than Significant
AIR-3a: Create Objectionable Odors at Nearby Receptors during Construction	All Alternatives	Less than Significant	None Required	--
AIR-3b: Create Objectionable Odors at Nearby Receptors during Operation	All Alternatives	Less than Significant	None Required	--

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
AIR-4a: Generate GHG Emissions, Either Directly or Indirectly, That May Have a Significant Impact on the Environment or Conflict with the Goals of AB 32	No Project	Less than Significant	None Required	--
	4B, 4C-2, 4C-4	Potentially Significant	AIR-MM-6: County GHG Construction Standards AIR-MM-7: County GHG Operational Standards	Less than Significant
	4C-3, 4C-5	Potentially Significant	AIR-MM-6 (see above) AIR-MM-7 (see above) AIR-MM-8: County GHG Design Standards	Less than Significant
AIR-4b: Expose Property or Persons to the Physical Effects of Climate change	All Alternatives	Less than Significant	None Required	--

Table ES-2f. Summary of Noise Impacts

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
NOI-1a: Exposure of Noise-Sensitive Land Uses to Excessive Construction Noise	No Project	Less than Significant	None Required	--
	All Action Alternatives	Potentially Significant	MM-NOI-1: Prepare a Noise/Vibration Control Plan and Employ Noise/ Vibration-Reducing Construction Practices	Less than Significant
NOI-1b: Exposure of Noise-Sensitive Land Uses to Excessive Ground Vibration from Construction Activities	All Alternatives	Potentially Significant	MM-NOI-1 (see above)	Less than Significant
NOI-2: Exposure of Noise-Sensitive Land Uses to Excessive Noise from Remediation Operations	All Alternatives	Less than Significant	None Required	--

1 **Table ES-2g. Summary of Biological Resources Impacts**

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
BIO-1a: Disturbance, Mortality, and Loss of Habitat for Desert Tortoise	All Alternatives	Significant	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 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	Less than significant (other than desert tortoise movement) Less than Significant (No Project Alternative, desert tortoise movement) Potentially Significant (all action alternatives, desert tortoise movement)
BIO-1b: Disturbance, Mortality, and Loss of Habitat for Mohave Ground Squirrel	All Alternatives	Potentially Significant	BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-1h, BIO-MM-1i, BIO-MM-1j, BIO-MM-1k: Other Measures Required to Minimize, Reduce, or Mitigate Impacts to Mohave Ground Squirrel	Less than Significant
BIO-1c: Disturbance, Mortality, and Loss of Habitat for Burrowing Owl and American Badger, and Mortality of Desert Kit Fox	All Alternatives	Potentially Significant	BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-1h, BIO-MM-1i, BIO-MM-1j, 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	Less than Significant

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
BIO-1d: Disturbance, Mortality, and Loss of Habitat to Loggerhead Shrike and Northern Harrier	No Project	Less than Significant	None Required	--
	All Action Alternatives	Potentially Significant	BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1i, BIO-MM-1n: Avoid Impacts to Loggerhead Shrike, Northern Harrier, and Other Nesting Migratory Birds (including Raptors)	Less than Significant
BIO-1e: Mortality and Loss of Habitat to Mojave River Vole	All Alternatives	Less than Significant	None Required	--
BIO-1f: Mortality and Loss of Habitat for Mojave Fringe-Toed Lizard	All Alternatives	Less than Significant	BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-2: Habitat Compensation for Loss of Sensitive Natural Communities	Less than Significant
BIO-1g: Loss of Other Special-Status Birds	All Alternatives	Potentially Significant	BIO-MM-1i, BIO-MM-1i, BIO-MM-1n (see above)	Less than Significant
BIO-1h: Loss of Individual Plants or Disturbance to Special-Status Plants	All Alternatives	Potentially Significant	BIO-MM-1g, BIO-MM-1o (see above)	Less than Significant
BIO-2: Reduction or Loss of Function of Riparian Habitat or Sensitive Natural Communities	All Alternatives	Potentially Significant	BIO-MM-2 (see above)	Less than Significant
BIO-3: Loss or Disturbance of Federal and/or State Jurisdictional Waters (including wetlands)	All Alternatives	Potentially Significant	BIO-MM-3: Measures Required to Minimize, Reduce, or Mitigate Impacts to Waters and/or Wetlands under the Jurisdiction of the State	Less than Significant
BIO-4: Conflicts with Wildlife Movement	No Project Alternative	Less than Significant	None Required	--
	All Action Alternatives	Potentially Significant	BIO-MM-1a, BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-1h, BIO-MM-1i, BIO-MM-1j, BIO-MM-1k, BIO-MM-1l BIO-MM-4: Implement Applicable Mitigation to Address Locations within the Project Area that Overlap DWMAs (or Conservation Areas) of the West Mojave Plan	Less than Significant Potentially Significant (desert tortoise only)

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
BIO-5: Removal of Protected Trees	All Alternatives	Less than Significant	None Required	--
BIO-6: Conflicts with West Mojave Plan Conservation Requirements on BLM Land	No Project Alternative	No Impact	None Required	--
	All Action Alternatives	Potentially Significant	BIO-MM-1a, BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-1h, BIO-MM-1i, BIO-MM-1j, BIO-MM-1k, BIO-MM-1l BIO-MM-4 (see above)	Less than Significant

Table ES-2h. Summary of Cultural Resources Impacts

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
CUL-1: Change in Significance of Historical Architectural Resources	No Project Alternative	Less than Significant	None required	—
	All Action Alternatives	Potentially Significant	CUL-MM-1: Determine Presence of Historical Resources; CUL-MM-2, Avoid Damage to Historical Resources; CUL-MM-3: Record Historical Resources	Less than Significant
Impact CUL-2: Change in Significance of Archaeological Resources	All Alternatives	Potentially Significant	CUL-MM-4: Evaluate Archaeological Resource; CUL-MM-5, Avoid Damaging Archaeological Resources; CUL-MM-6, Evaluate Archaeological Resources	Less than Significant
Impact CUL-3: Potential Disturbance of Buried Human Remains	All Alternatives	Potentially Significant	CUL-MM-7: Comply with State and County Procedures	Less than Significant
Impact CUL-4: Direct or Indirect Destruction a Unique Paleontological Resource	All Alternatives	Potentially Significant	CUL-MM-8: Preconstruction Paleontological Resource Evaluation, Monitoring, Resource Recovery, and Curation	Less than Significant

1 **Table ES-2i. Summary of Utilities and Public Services Impacts**

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
UPS-1a: Disruption to Utility Lines during Trenching, Excavation, and Earthwork	All Alternatives	Less than Significant	None Required	–
UPS-1b: Increased Electricity Consumption	All Alternatives	Less than Significant	None Required	–
UPS-1c: Increased Contributions to Local Landfills Beyond Allowable Capacity	All Alternatives	Less than Significant	None Required	–
UPS-2: Disruption to Emergency Services	All Alternatives	Less than Significant	None Required	–

2 **Table ES-2j. Summary of Transportation and Traffic Impacts**

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
TRA-1a: Increase in Traffic Volumes or Roadway Congestion from Construction	All Alternatives	Potentially Significant	TRA-MM-1: Implement Traffic Control Measures during Construction	Less than Significant
TRA-1b: Increase in Traffic Volumes or Roadway Congestion from Operations and Maintenance	All Alternatives	Less than Significant	None required	—
TRA-2a: Create Significant Roadway Hazards from Construction Truck Traffic	All Alternatives	Potentially Significant	TRA-MM-1 (see above)	Less than Significant
TRA-2b: Impede Emergency Access during Construction	All Alternatives	Potentially Significant	TRA-MM-1 (see above)	Less than Significant

Table ES-2k. Summary of Aesthetics Impacts

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
AES-1a: Degradation of Visual Character or Quality from Construction	All Alternatives	Less than Significant	None Required	–
AES-1b: Permanent Degradation of Visual Character or Quality from Wells, In-Situ Treatment, and Agricultural Treatment	All Alternatives	Less than Significant	None Required	–
AES-1c: Permanent Degradation of Visual Character or Quality from Above-ground Treatment Facility	Alternatives 4C-3 and 4C-5	Potentially Significant	AES-MM-1: Screen Above-Ground Treatment Facilities from Surrounding Areas AES-MM-2: Use Low-Sheen and Non-Reflective Surface Materials on Visible Remediation Facilities	Less than Significant
	All Other Alternatives	No Impact	None Required	–
AES-2: New Source of Light or Glare	All Alternatives	Potentially Significant	AES-MM-1 (see above) AES-MM-2 (see above) AES-MM-3: Apply Light Reduction Measures for Exterior Lighting	Less than Significant

Table ES-2l. Summary of Socioeconomics Impacts

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
SE-1: Secondary Physical Impacts due to Project-Related Socioeconomic Effects	No Project Alternative	Less than Significant	N/A	Less than Significant
	All Action Alternatives	Potentially Significant	SE-MM-1: Manage Vacant Lands, Residences, and Structures to Avoid Physically Blighted Conditions; WTR-MM-1 to 8 (see Water Resources and Water Quality above)	Less than Significant