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Issuance of a New Notice of Applicability of General Waste Discharge Requirements for In-Situ Remediation Zones and the Northwest Freshwater Injection System (Board Order No. R6V-2008-0014), Pacific Gas and Electric Company's Hinkley Compressor Station, San Bernardino County

This is a new Notice of Applicability (NOA) authorizing discharges from three in-situ remediation zones (IRZs) currently operated by PG&E to remediate chromium-contaminated groundwater due to historical waste discharges from PG&E's natural gas compressor station in Hinkley, California. This NOA also includes discharges to the northwest freshwater injection system (NWFI) which acts, along with the northern groundwater extraction system, to block westward migration of the chromium plume. These discharges are covered under the General Waste Discharge Requirements for In-Situ Remediation Zones and the Northwest Freshwater Injection System (Board Order R6V-2008-0014) (referred to hereafter as “General WDRs”) referenced in the subject line, and will be referred to in this NOA collectively as the “Project." PG&E is referred to as the "Discharger."

During 2013 into 2015, the Discharger submitted several documents in response to Water Board orders regarding IRZ operations. Those documents are:

1) *Manganese Investigation Technical Report,* dated November 19, 2013
2) *Manganese Mitigation Plan,* dated March 14, 2014
3) *Response to Comments and Additional Information on Manganese Mitigation Plan,* dated January 26, 2015, and supplemental information email dated March 5, 2015.

Documents #2 and #3 above propose changes to the existing in-situ remediation project, including an expansion of the area of by-product migration, which prompted the need for this new NOA. Based on the above information submitted by the Discharger, it is our determination that the Project (including changes) continues to be eligible for coverage under the General WDRs but monitoring and reporting must be updated. All requirements contained in the General WDRs apply to the Project.

I. Purpose of and Need for New NOA

a) The purpose of this NOA is to:

1. Incorporate the July 2013 Environmental Impact Report (EIR) mitigation measures and monitoring requirements into Project operations, including replacing previous byproduct mitigation requirements with the 2013 EIR mitigation measures.
2. Update monitoring for Project activities to incorporate EIR monitoring requirements, revise existing groundwater monitoring requirements, set new byproduct contingency thresholds, and remove redundant sampling.
3. Revise Project reporting due dates.
4. Revoke three previous NOAs dated April 7, 2009; August 17, 2009, and July 7, 2010, related to the subject line WDRs[1].

b) Need for NOA

IRZs are a key component of PG&E's chromium remediation in Hinkley. However, in response to manganese detections over threshold levels at certain contingency monitoring wells identified in previous NOAs, the Discharger has scaled back ethanol injections and installed a manganese mitigation system[2]. For example, ethanol injections in the Central Area IRZ have been reduced from an average monthly injection volume of 733 gallons per month during 2007 to 2011, to a monthly average of 175 gallons from 2012 to 2014. Reducing the amount of ethanol injected into groundwater reduces concentrations of byproducts in groundwater, but also diminishes the efficiency of the IRZ remediation system to convert hexavalent chromium to trivalent chromium. This is not ideal to optimize cleanup progress. Also, foreseeable future remediation actions involve shifting agricultural treatment unit (ATU) groundwater extraction efforts southward as plume containment and remediation progresses near Thompson Road. This sets up an inherent conflict between limiting byproduct plume migration to south of Highway 58 and continuing to enhance ATU remediation and plume containment by shifting extraction efforts to the area north of Highway 58, which will eventually pull groundwater and byproducts northward past previous contingency well boundaries.

In 2013, the Water Board prepared an Environmental Impact Report to allow expanded, comprehensive cleanup activities to remediate chromium-contaminated groundwater as quickly as possible while protecting environment resources. The 2013 EIR describes robust mitigation measures to mitigate potentially significant environmental impacts from

[1] One other previous NOA dated December 5, 2014, is still in effect for a bioreactor pilot study. That December 5, 2014 NOA will terminate 60 days subsequent to the completion of the pilot study, upon submittal of a final report.

[2] The Discharger has operated a manganese mitigation system since November 2012, which consists of two extraction wells and three infiltration dry wells, centered on Fairview Road in the "300" and "400" series row of monitoring wells. The purpose of the system is to oxidize manganese in extracted groundwater resulting in precipitation in the dry wells. These actions are done to comply with a mitigation requirement from the 2008 Mitigated Negative Declaration, which required that the Discharger limit downgradient byproduct plume migration to within the boundaries set in the July 10, 2010 NOA, defined by the contingency monitoring well "500" series, located about 1,250 feet south of Highway 58. Expansion of the Project area would allow the Discharger to terminate operation of this mitigation system.

the remediation activities. The 2013 EIR provides the Water Board flexibility to allow byproduct plume migration as long as 1) actual and potential impacts to domestic wells are either abated or mitigated, and 2) the aquifer will be restored to pre-remedial conditions. In order to impose these updated mitigation measures and to optimize IRZ operations, this new NOA is needed.

II. Project Description

The project must be implemented as described in the documents described on page 1 of this NOI. Project features include:

a) In-situ Remediation Zones

There are three existing in-situ remediation zones known as the Source Area IRZ, South Central Re-injection Area and the Central Area IRZ. These currently operating IRZs are located at and near the compressor station to treat the higher concentration plume core area south of Highway 58 (concentrations of chromium greater than 50 parts per billion [ppb]).

IRZs involve injecting carbon-containing compounds (e.g., ethanol) into the groundwater via injection wells. The carbon provides a food source that stimulates microbial and chemical processes to convert soluble, toxic hexavalent chromium to solid, low-toxicity trivalent chromium through a chemical reaction known as “reduction.” The solid trivalent chromium remains bound to aquifer sediments as a mineral solid. The carbon-source injections that create the reducing environment in the aquifer also result in dissolving naturally-occurring metals in the aquifer sediments, such as manganese, arsenic, and iron.

Monitoring data from over six years of operation, including a byproducts investigation conducted in 2012-13, indicates that byproducts generated in the IRZ: 1) travel in the direction of groundwater flow (generally northward); 2) have not impacted nearby domestic wells, and 3) lessen or attenuate with distance back to threshold concentrations. Of the three dissolved metal byproducts, monitoring data indicates that manganese typically travels the farthest in groundwater compared to iron or arsenic. Groundwater movement tracer tests related to the 2012-13 investigation are still ongoing, but preliminary data from those tests support the conclusion that manganese and other dissolved byproducts are not impacting nearby domestic wells.

b) Northwest Freshwater Injection System

The NWFI system is one component of the overall hydraulic capture system that prevents westerly plume movement to where sensitive receptors, such as the Hinkley School wells and other domestic wells, are located. The NWFI began operation in March 2010. The NWFI system was supplied from freshwater wells PGE-14, FW-01, and FW-02, all located south of the compressor station. Water from supply well PGE-14 was filtered through a granular ferric hydroxide media system to remove naturally-occurring arsenic and meet drinking water standards. Beginning in December 2014, groundwater is now extracted from newly installed freshwater supply wells FW-03 and

FW-04, located southeast of the compressor station (i.e., cross-gradient of the plume). Water from these new wells is conveyed about two miles north through an underground pipeline, and re-injected into injection wells along Serra Road. The system includes seven injection wells, with six wells operated at any one time. Design re-injection rates are up to 80 gallons per minute (this is an operational description and not a regulatory limit on re-injection rates). Water from FW-03 and FW-04 meets state and federal drinking water standards. Freshwater supply wells FW-01 and FW-02 are now kept in standby mode for backup supply, if needed.

III. Project Area and Operable Units

All remediation and impacts related to the remediation must be confined to the Project Area. The Project Area is identified in the General WDRs in attachment A, which is divided into three Operable Units (OUs), which are shown on attachment A of this NOA. The OUs are defined in relation to the concentration of hexavalent chromium in groundwater represented by the plume concentration contours as of fourth quarter 2012.

a) OU1 extends from the source area, located in the southern Project Area on PG&E compressor station property, to the approximate northern extent of the 2012 50 ppb hexavalent chromium groundwater concentration contour, at approximately Ashwood Road. Existing IRZ injection and monitoring wells are located in OU1.
b) OU2 extends from the northern boundary of OU1 northward to Salinas Road and contains most of the 2012 10 ppb hexavalent chromium groundwater plume (that is outside of the 50 ppb plume area). OU2 currently does not contain IRZ injection wells, but does contain numerous monitoring wells for IRZ activities.
c) OU3 encompasses the part of the Project Area that is outside of and adjacent to OU1 and OU2, and extends northward to about 2 miles north of BN (aka Brown Ranch Road), eastward to 1 mile east of Lenwood Road, and westward to Valley Wells Road in the southern Project Area and about 1 mile west of Orchard Road in the northern Project Area. The southern boundary of OU3 is the north edge of the Mojave River. IRZ activities in OU3 are currently limited to monitoring wells located where the southwest corner of OU1 meets OU3.

IV. IRZ Locations and Areas of Discharge

a) <u>IRZ Locations and Authorized Discharge Areas</u>

The PG&E compressor station is located at 35863 Fairview Road, Hinkley, in the Harper Valley Subunit of the Mojave Hydrologic Unit. The Project location includes the Source Area IRZ located on the compressor station property, the South Central Re-injection Area (SCRIA), located on the north side of Community Boulevard, and the Central Area IRZ, located on the north side of Frontier Road.

IRZ discharges may occur throughout OU1 and in areas of south-central OU3. Monitoring and IRZ byproduct remediation may occur in throughout OUs 1 and 2 and areas of southern OU3.

b) NWFI System Location and Authorized Discharge Areas

The six injection wells (discharge areas) making up the NWFI system are located along Serra Road between Highway 58 and Santa Fe Avenue, in the far western edge of OU2, extending slightly south into OU3. The supply wells for the NWFI system are located southeast of the compressor station, upgradient of the chromium plume originating at the compressor station, in southeastern OU3.

Project locations and discharge areas discussed above are shown in Attachment A.

V. Authorized Well Rehabilitation Chemicals, Compounds and Tracers

a) Well Chemicals and Compounds

The following well chemicals and compounds are authorized to be used for the Project:

i. Acetic acid
ii. Citric acid
iii. Hydrochloric acid
iv. Hydrogen peroxide
v. Sodium hydroxide
vi. Phosphoric acid
vii. Carbon dioxide (Aqua Gard and Aqua Freed are technologies for applying carbon dioxide for well rehabilitation)
viii. Chemicals or compounds that result in similar or less effects on water quality as compared to those previously approved. A pilot study or additional monitoring may be required for chemicals or compounds that do not have a previous history of use under similar conditions to demonstrate water quality effects.
ix. Commercial mixtures of rehabilitation compounds that carry the following certifications/registrations valid in the state of California by the NSF may be used:

1. NSF/ANSI 60-2005 (Drinking Water Treatment Chemicals –Health Effects): compounds with this certification are routinely used for rehabilitation of drinking water wells in California under the California Waterworks Standard (California Code of Regulations Title 22, Section 64590: Direct Additives).
2. NSF Nonfood Registered Compound: Compounds on this registry are acceptable for use as an ingredient in cleaning products to be used in and around food processes where not intended for direct food contact.
3. The Material Safety Data Sheet must be provided for any proposed chemical or compound.

b) Groundwater Flow Tracers

The following groundwater tracers are authorized to be used for the Project:

i. Bromide
ii. Fluorescein
iii. Eosine
iv. Additional fluorescent tracers

VI. California Environmental Quality Act

a) Previous Environmental Analysis

This NOA is a discretionary action taken by the Water Board, subject to the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code, section 21000 et seq). The Water Board is the lead agency for this Project. In support of previous WDRs and NOAs issued to the Discharger for discharges related to IRZ remediation activities, and pursuant to CEQA, the Water Board analyzed impacts related to the IRZ remediation in Mitigated Negative Declarations and addenda adopted in 2004, 2006, 2007, 2008 and 2010. Those environmental documents outlined mitigation measures that the Discharger must implement to reduce all impacts to less-than-significant levels.

In 2010 and 2011, the Discharger submitted a Feasibility Study and addenda in compliance with Water Board Orders, evaluating comprehensive, long-term cleanup strategies for chromium in groundwater. The Water Board determined that implementation of the Feasibility Study strategies could result in significant impacts to the environment that were not analyzed in the previous Mitigated Negative Declarations, triggering the preparation of an EIR as specified in CEQA guidelines section 15162(a):

> "Substantial changes are proposed in the Project which will require major revisions of the EIR or Negative Declaration due to the involvement of new significant environmental effects or a substantial increase in severity of previously identified significant effects."

b) 2013 Environmental Impact Report

A Notice of Preparation was published in November 2010 notifying the public of the Water Board's intent, as lead agency, to prepare an EIR. The EIR analyzed five "action" alternatives at an equal level of detail, based on the information provided in the Discharger's Feasibility Study described above. In-situ remediation and freshwater injection are authorized under this NOA, and are within the range of actions analyzed in the EIR alternatives. The Lahontan Water Board certified the final EIR at a public meeting on July 17, 2013 (Resolution R6V-2013-0060). The final EIR identified significant impacts and outlined mitigation measures to reduce those impacts to less-than-significant levels. Significant and unavoidable impacts were identified to several water quality and biological resources. For this NOA, one is applicable:

Impact WTR-2g: Impacts to water quality in the Hinkley Valley aquifer due to remedial actions - temporary increase in remedial byproducts related to in-situ remediation (arsenic, iron, and manganese).

Board Order No. R6V-2014-0023, Agricultural Treatment Unit Waste Discharge Requirements, was the first order authorizing discharges that was issued following the adoption of the EIR. In attachment H of Board Order No. R6V-2014-0023, the Water Board adopted findings required by CEQA sections 15091 through 15093, regarding all significant environmental impacts of remediation actions analyzed in the EIR. The findings included a statement of overriding considerations, due to significant and unavoidable impacts for which mitigation measures are not available to fully reduce the impacts to levels of insignificance, including Impact WTR-2g above. The findings adopted in Board Order No. R6V-2014-0023 are incorporated by reference into this NOA.

The Discharger is required to comply with all mitigation measures that are applicable to this Project. Mitigation measures specified in the EIR are contained in attachment C, EIR Mitigation Monitoring and Reporting Program, which is made a part of this NOA. These mitigation measures replace the mitigation requirements imposed in previous environmental documents and NOAs issued for the project. Consistent with the requirements of this NOA and the MRP, the Discharger must report on compliance with all applicable mitigation measures.

VII. Mitigation Requirements for Water Quality Impacts

The Discharger is required to conduct monitoring, as specified in the MRP. Monitoring is required to establish baseline conditions prior to the implementation of the Project, and will be used to identify impacts from Project implementation. The Discharger is required to mitigate impacts from the Project to water supply wells, as set forth in attachment C, and briefly described below.

a) Mitigation for Impacts to Water Supply Wells from Byproduct Migration

A key change in this NOA compared to previous NOAs is that byproduct plumes are authorized to travel farther than previously allowed to facilitate a timelier cleanup. Mitigation measures to reduce potential impacts to domestic wells from allowing the byproduct plumes from the in-situ remediation to travel farther were identified in the 2013 EIR. This NOA replaces the 2008 mitigation measures that required scaling back injections to the in-situ remediation system with the option of either scaling back operations to avoid impacts or mitigating those impacts by supplying replacement water.

The Discharger is required to conduct monitoring and modeling consistent with the MRP and the EIR mitigation measures to evaluate if domestic wells may be impacted by remedial byproduct migration. If potential impacts to water supply wells are identified, the Discharger is required to either limit byproduct plume migration consistent with the requirements in the MRP, and avoid actual impacts to the wells, or mitigate actual

impacts to water supply wells.[3] Whether a well is considered "potentially" or "actually" affected well is defined in the 2013 EIR and set forth in attachment C. Once a domestic well is potentially affected, the Discharger must submit an action plan describing the actions to be taken to prevent the supply well from becoming actually affected. In developing the action plan, the Discharger should consider actions that may include adjusting the IRZ flow rates, installing additional sentry wells, or providing replacement water, among other possible actions.

To facilitate cleanup in the IRZ, the Discharger also has the option to continue the discharge instead of implementing an action plan, and if a well becomes actually affected, as defined in the 2013 EIR and attachment C, provide replacement water. Any replacement water provided must be reported, as required in the MRP. These replacement water requirements are distinct from the requirements in Cleanup and Abatement Order R6V-2015-0068, which focused on providing replacement water to wells affected by the historic discharge. Instead, these mitigation requirements focus on the effects of the remediation activities, and the need to mitigate impacts to water quality including the State Water Board's anti-degradation policy.

b) Mitigation for Impacts to Water Supply Wells from Chromium

The Project has the potential to cause the hexavalent chromium plume to bulge or move in such a way that could cause water supply wells to experience increases in hexavalent or total chromium.[4] The 2013 EIR considered such potential impacts, and identified mitigation measures for "potentially" and "actually" affected wells. The Discharger is required to monitor for potential impacts to domestic wells from increases in hexavalent and total chromium due to remediation activities, and to take action to remediate or avoid those impacts, or provide replacement water if wells become actually affected, as defined in the 2013 EIR and attachment C.

c) Mitigation for Impacts to the Aquifer

To ensure that aquifer water quality is restored following the Project, the Discharger may be required in a future Water Board Order to remediate any remaining IRZ byproducts following completion of the Project.

EIR mitigation measure WTR-MM-4 specifies that no later than 10 years prior to the conclusion of the remediation project, the Discharger shall conduct an assessment to evaluate adverse impacts or potential adverse impacts to the Hinkley aquifer from its

[3] Water supply wells are those that provide water for domestic or industrial uses, and include those that are used for water supply for freshwater injections. Water supply wells do not include IRZ injection wells, extraction wells used for remedial purposes, or monitoring wells.

[4] In determining whether the increase in chromium is or is not related to remedial actions, the Water Board must consider the trend of chromium detections in the water supply well, the duration of the increase, groundwater flow directions, plume dynamics at the time of the change in chromium levels, data on chromium levels in other nearby monitoring or domestic wells, and any other relevant information in making the determination. For remediation byproducts, the Project's EIR did not explicitly state the need to determine if increases in remediation byproducts are related to remediation activities because remediation byproducts are by definition only related to remediation.

remedial actions. If the assessment finds that the aquifer contains constituents exceeding pre-remedial reference conditions that are due to the remedial actions, and that these constituents are likely to be present upon the conclusion of remedial actions, the Discharger will propose cleanup actions to restore the aquifer to background conditions. The assessment can include an analysis of the potential for natural attenuation to return the aquifer to pre-remedial reference conditions within an acceptable timeframe, as determined by the Water Board. Restoration of aquifer water quality to pre-remedial reference conditions will occur as soon as possible after completion of chromium remediation. The recommended timeframe for restoration is within 10 years of completion of chromium remediation, but the Water Board retains its authority to determine the required duration for completion.

VIII. Monitoring and Reporting Program

a) Consistent with the requirements of the Monitoring and Reporting Program (MRP), which is included as attachment B to this NOA, PG&E is required to track the performance of the in-situ remediation system and the migration of the remediation by-products. The Discharger is required, consistent with the requirements of the MRP, to submit an action plan for reducing byproduct migration if monitoring indicates that byproducts exceed thresholds set out in Table A-4 of the MRP at specified monitoring wells.
b) PG&E is required to monitor the supply wells used for freshwater injection to ensure that concentrations of constituents in the source water do not cause impacts to the aquifer. If the Discharger proposes to use any supply wells as part of the NWFI system different than those described in II.b, above, it must provide the Water Board with information that the water meets state and federal drinking water standards. Similarly, water that is extracted for remediation in the western area must be tested before it is discharged to land to ensure that such discharges do not impact the aquifer. If hexavalent chromium concentrations in extracted groundwater are less than 3.1 ppb, then water can be used for irrigation and/or dust control. Water with concentrations of hexavalent chromium at or greater than 3.1 ppb may be used on lands controlled by PG&E, as long as it does not cause or contribute to exceedances of receiving water limitations, and the groundwater is within an area that is being monitored for hexavalent chromium.
c) Pursuant to Water Code section 13267, subdivision (b), the Water Board's Executive Officer prescribes monitoring, modeling, and reporting requirements in attachment B. EIR Mitigation Measures Monitoring and Reporting requirements relevant to the proposed remediation project are also prescribed, as specified in attachment C.
d) The Discharger must file with the Water Board technical reports for self-monitoring conducted according to the Monitoring and Reporting Program and the Mitigation Measures Monitoring and Reporting requirements specified by the Executive Officer and submit other reports as requested by the Water Board.

IX. General Requirements

a) Reductions in corrective actions covered under this NOA of more than 10 percent on a monthly basis as compared to annual operational plans[5] shall require notification to Water Board staff prior to implementation.
b) Any planned design changes, i.e., construction of extraction or injection locations, must be reported to the Water Board at least 14 calendar days before such change.
c) The Discharger must implement, monitor and report on all EIR mitigation measures applicable to this Project, consistent with this NOA and attachments B and C.
d) This NOA does not alleviate the responsibility of the Discharger to obtain other necessary local, state, and/or federal permits to construct or operate facilities or take actions necessary for compliance with this NOA. This NOA does not prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.
e) This NOA does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). If a "take" will result from any act authorized or required by this NOA, the Discharger must obtain authorization for an incidental take from appropriate authorities prior to taking action. The Discharger is responsible for meeting all requirements of the applicable Endangered Species Act for the discharge authorized by this NOA.
f) The required annual fee (as specified in the annual billing you will receive from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially revoked.
g) Provide to domestic well owners results of the sampling of their domestic well monitoring, including where applicable, clear comparisons of recent results to: 1) pre-remedial reference levels; 2) State and Federal MCLs; 3) criteria to determine actually affected wells for remedial byproducts, chromium, and groundwater drawdown. Letters must include a clear tabulation of analytical results of current and historical data.
h) One hard copy of technical or monitoring reports must be submitted to the Water Board's South Lake Tahoe office. Please include the subject line WDID on all reports and correspondence related to the Project.
i) All technical reports and other documents (e.g., correspondence, workplans, and proposals) must be uploaded to Geotracker by the due date, or no later than one day following the document date.
j) Failure to abide by the conditions of the General WDRs and this NOA may result in an enforcement action as authorized by provisions of the California Water Code.

[5] Annual operational plans are required for the IRZ and NWFI systems under Cleanup and Abatement Order No. R6V-2015-0068 (see page 6 of the CAO's Monitoring and Reporting Program).

VIII. Revocation of Previous NOAs and Completion of Investigative Orders

This NOA revokes the previous NOAs for in-situ remediation dated April 7, 2009; August 17, 2009, and July 7, 2010. Previous monitoring programs associated with those NOAs are also rescinded. Investigative Orders R6V-2011-0053, R6V-2011-0084, R6V-2012-0060 and R6V-2013-0026 will be marked "completed" in the State Water Board's CIWQS database, as the requirements contained in those orders are replaced or revised by this NOA and its associated monitoring and reporting program.

Please contact me at (530) 542-5412 (patty.kouyoumdjian@waterboards.ca.gov) or Lisa Dernbach at 530-542-5424 (lisa.dernbach@waterboards.ca.gov) or Anne Holden at 530-542-5450 (anne.holden@waterboards.ca.gov) with any questions regarding the General WDRs or this NOA.

Patty Z. Kouyoumdjian

PATTY Z. KOUYOUMDJIAN
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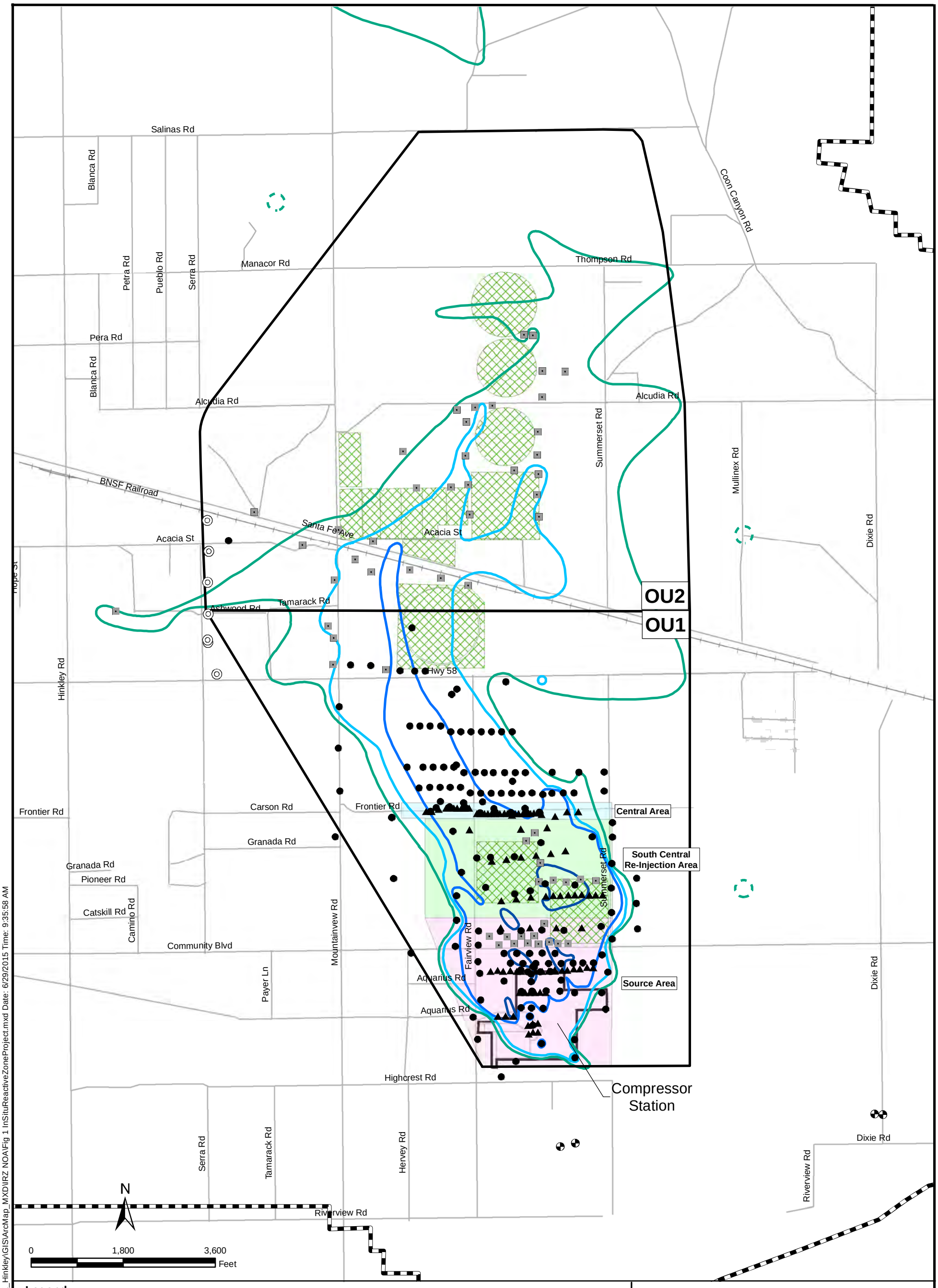
Enclosures: Attachment A: Project Area Map
Attachment B: IRZ Monitoring and Reporting Program
Attachment C: EIR Mitigation Monitoring and Reporting Program

AH/ma/T: PGE NOA r6v2008 0014 (2016 final)
File Under: Geotracker SL0607111288

Attachment A: Project Location Map



Legend

- OU3
- Agricultural Treatment Units

Remedy Infrastructure as of June 2015

- IRZ Monitoring Wells
- IRZ Remedial Wells
- Groundwater Extraction Remedial Wells
- Freshwater Injection Wells
- Freshwater Supply Wells

Chromium Plume First Quarter 2015

- Approximate outline of Cr(VI) or Cr(T) in the Upper Aquifer exceeding 3.1 and 3.2 µg/L, respectively, First Quarter 2015
- Approximate 10-µg/L outline of Cr(VI) or Cr(T) concentrations in the Upper Aquifer, First Quarter 2015
- Approximate 50-µg/L outline of Cr(VI) or Cr(T) concentrations in the Upper Aquifer, First Quarter 2015
- Approximate 1000-µg/L outline of Cr(VI) or Cr(T) concentrations in the Upper Aquifer, First Quarter 2015

Attachment A

PACIFIC GAS AND ELECTRIC COMPANY
HINKLEY, CALIFORNIA

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Drafter: BCG Path: G:\GIS\RC000699.0001_PGE_Hinkley\GIS\ArcMap_MXD\IRZ NOA\Fig 1 InSituReactiveZoneProject.mxd Date: 6/29/2015 Time: 9:35:58 AM

ATTACHMENT B: MONITORING AND REPORTING PROGRAM

PACIFIC GAS AND ELECTRIC COMPANY GROUNDWATER REMEDIATION PROJECT

GENERAL SITE-WIDE WASTE DISCHARGE REQUIREMENTS
BOARD ORDER NO. R6V-2008-0014
WDID NO. 6B360804007

San Bernardino County

California Water Code section 13267 authorizes the Regional Water Quality Control Board (Water Board) to require technical and monitoring reports. This Monitoring and Reporting Program (MRP) establishes requirements consistent with the California Water Code, and applies to activities conducted by Pacific Gas and Electric Company ("the Discharger") under the Notice of Applicability (NOA) of General Waste Discharge Requirements, Board Order No. R6V-2008-0014 (General WDRs). It includes monitoring and reporting as described in the California Environmental Quality Act (CEQA) Environmental Impact Report prepared for the Hinkley groundwater remediation project (State Clearinghouse No. 2008011097), as well as monitoring to track the progress of the chromium remediation and the migration of by-products related to the in-situ remediation allowed under the General WDRs. Pursuant to California Water Code section 13223, this MRP may be amended by the Water Board Executive Officer.

I. MONITORING

A. Environmental Impact Report (EIR) Monitoring

1. Table A-1 describes EIR monitoring, modeling and reporting requirements. These requirements are needed to monitor the potential impacts from the in-situ remediation activities and the Northwest Freshwater Injection System (NWFI) and identify when mitigation measures for water resources impacts described in the Hinkley groundwater remediation project's EIR are required to be implemented. Pre-remediation monitoring is required in those shown in Figure 2 of PG&E's January 26, 2015 *Response to Comments and Additional Information on Manganese Mitigation Plan* to establish baseline levels of constituents listed in Table A-1. Updated monitoring areas and wells shall be proposed by the Discharger in annual mitigation monitoring reports and must be accepted by the Water Board Executive Officer in writing.

2. Details on all EIR mitigation measures, including implementation timing, responsibility, and standards for compliance, are included in NOA attachment C, *EIR Mitigation Monitoring and Reporting Program*. Certain EIR mitigation measures are not within the Water Board's authority to require (for example, those mitigation measures related to air quality, cultural resources and biological resources); however, as CEQA lead agency the Water Board is responsible for monitoring that the Discharger has or will implement those mitigation measures that another agency should require. Therefore, the Discharger must submit an annual report to the Water Board documenting implementation of, and compliance with, all applicable mitigation measures for the Project, as described in section IV.B of this MRP.

Table A-1. EIR Mitigation Monitoring for Water Resources Impacts				
A. Pre-remedial Reference Level Monitoring for Water Supply Wells (WTR-MM-2a and 2b)				
Parameter/Constituent[1]	Timing	Monitoring Area	Frequency/Duration	Reporting
• Dissolved Arsenic • Dissolved Iron • Dissolved Manganese • Total Organic Carbon	One year prior to or concurrent with operation of new or existing IRZs.	Water supply wells one mile downgradient and cross-gradient of IRZs.	Quarterly for one year.	Quarterly. Submit information in quarterly reporting to Water Board and by letter notification to individual well owners.
• Total Chromium • Hexavalent Chromium	One year prior to or concurrent with operation of new or existing IRZs.	Water supply wells one mile downgradient and cross-gradient of IRZs.	Quarterly for one year.	Quarterly. Submit information in quarterly reporting to Water Board and by letter notification to individual well owners.
B. IRZ Operations Monitoring for Water Supply Wells (WTR-MM-2a and 2b)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Dissolved Arsenic • Dissolved Iron • Dissolved Manganese • Total Organic Carbon	Concurrent with IRZ operation.	Water supply wells one-half mile downgradient and one-quarter mile cross-gradient of IRZs.	Twice yearly for duration of operation of IRZ.	Twice yearly. Submit information in reporting to Water Board and by letter notification to individual well owners.
• Dissolved Arsenic • Dissolved Iron • Dissolved Manganese • Total Organic Carbon	If water supply well is "actually affected" (see attachment C, WTR-MM-2b).	Actually affected water supply well.	Once per month, until alternate water supply is provided to the satisfaction of the Water Board. Then, twice yearly if nearby monitoring wells exist.	Monthly, or twice yearly. Submit information in reporting to Water Board and by letter notification to individual well owners.
• Dissolved Arsenic • Dissolved Iron • Dissolved Manganese • Total Organic Carbon	If water supply well is "potentially affected" (see attachment C, WTR-MM-2b).	Water supply wells within one-half mile downgradient and one-quarter mile cross-gradient of "actually affected" well.	Quarterly for the following two years of identification of actually affected well.	Quarterly. Submit information in reporting to Water Board and by letter notification to individual well owners.
• Total and Hexavalent Chromium	Concurrent with IRZ operation.	Water supply wells one mile downgradient and cross-gradient of the	Quarterly for duration of remediation project.	Quarterly. Submit information in reporting to Water Board and by letter

[1] The parameters listed shall be analyzed using the methods listed in Table A-3.

		previously defined chromium plume.		notification to individual well owners.
C. Groundwater Flow and Contaminant Transport Modeling (WTR-MM-2a and 2b)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
Model chromium and remediation byproduct plume movement for the following three years.	Concurrent with IRZ operation.	Project area.	Annually for duration of remediation project.	Annually Report due Feb 20
D. Water Rights Documentation (WTR-MM-1)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
Water rights: Discharger-owned Free Production Allowance meets or exceeds annual net remedial use. Estimated annual net remedial use and discharger-owned FPA.	Annually.	Centro subarea, Mojave Groundwater Basin.	Annually for duration of remedial activities that involve groundwater extraction subject to adjudication by the Mojave Water Agency.	Annually: Report due Feb 20
E. Northwest Freshwater Injection Water Quality Monitoring (WTR-MM-8)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Total and Hexavalent Chromium • Arsenic • Iron • Manganese • TDS • Nitrate as N • Sulfate • Uranium and gross alpha • pH, temperature, dissolved oxygen, specific conductance, ORP (field measurements)	Prior to using new sources of water for freshwater injection and twice per year during operation for all sources.	Grab samples from individual freshwater supply wells.	Twice yearly for duration of NWFI operation.	Twice yearly, in quarterly reports.

B. Groundwater Monitoring Well Sampling for IRZs

1. Monitoring wells listed in Table A-2 shall be sampled as indicated. "Twice yearly" means two times per year.

2. Within 60 days from issuance of this NOA, provide a written evaluation (using Best Professional Judgment as defined in CAO R6V-2015-0068) of the need for new multi-depth monitoring wells at two locations in the Source Area: between SA-MW-18S/D and SA-MW-06S/D, and upgradient of PMW-02. The first new monitoring well cluster may be needed to reduce the gap between SA-MW-18S/D and SA-MW-06S/D (typical monitoring well spacing in this area is 250 feet) and for evaluating the effectiveness of new IRZ injection wells recently installed in the upgradient flow direction. The latter new monitoring well may be needed in the upgradient direction at the compressor station to verify that the IRZ remediation being proposed is addressing all areas of the chromium plume. Currently, the IRZ maps show a color contour representing 10 to 50 ppb hexavalent chromium upgradient of PMW-2. Yet, there is no data from a monitoring well within 1,000 feet to verify the concentration in this area. The actual concentration would provide more data for the IRZ maps.

3. If any monitoring well required to be sampled under this MRP has been dry for one year or more upon issuance of the NOA, such wells must be either re-developed or replaced such that a water sample can be collected within one-quarter's time. As of third quarter 2015, the following monitoring wells have been dry for four or more quarters, and must be re-developed or replaced because no other monitoring wells are located such that the monitoring objectives of these wells can be met: **CA-MW-313, CA-MW-412S, MW-61, MW-74S, and SA-SM-03S.**

4. Following issuance of this NOA, if any monitoring well required to be sampled under this MRP has been dry for two or more consecutive sampling events, an evaluation shall be submitted for each monitoring well that has gone dry regarding the potential need to replace that well in order to meet monitoring objectives. The evaluation should use Best Professional Judgment as defined in CAO R6V-2015-0068 to assess the likely causes for the well going dry and the proposed measures to meet monitoring objectives into the future.

5. When new monitoring wells are installed to evaluate the effects upon water quality from IRZs, they will be added to this monitoring program and sampled on a quarterly basis unless otherwise specified by the Water Board's Executive Officer.

6. During each monitoring event, all **performance monitoring wells and sentry wells** to be sampled shall be analyzed for the constituents listed in and using the methods in Table A-3. **Ethanol response wells** (indicated as **bolded, asterisked** [*****] wells in the second column of Table A-2) shall be sampled for total and hexavalent chromium, dissolved manganese and nitrate as nitrogen using the methods in Table A-3.

7. If the sampling frequencies at monitoring wells required in this MRP are different from those in other Water Board Orders (e.g., Board Order No. R6V-2014-0023, or Cleanup and Abatement Order R6V-2015-0068), the more stringent frequency applies.

Table A-2. IRZ Monitoring Wells and Sampling Frequencies

Sentry Monitoring Wells For Water Quality Impacts (Quarterly)	Ethanol Response*and IRZ Performance Monitoring Wells (Quarterly)	IRZ Performance Monitoring Wells (Twice-Yearly)	IRZ Performance Monitoring Wells (Annually)
CA-MW-312D	**CA-MW-101D***	CA-MW-101D	CA-MW-109S
CA-MW-412S	**CA-MW-107D***	CA-MW-102D	CA-MW-201
CA-MW-412D	**CA-MW-108D***	CA-MW-103D	CA-MW-202
CA-MW-510D	**CA-MW-109D***	CA-MW-104D	CA-MW-203
CA-MW-511	CA-MW-301	CA-MW-104S	CA-MW-204S
CA-MW-601	CA-MW-313	CA-MW-105	CA-MW-305
CA-MW-602	CA-MW-501S	CA-MW-105D	CA-MW-306S
CA-MW-603	CA-MW-501D	CA-MW-106D	CA-MW-307S
	CA-MW-506S	CA-MW-108S	CA-MW-307D
MW-03A		CA-MW-110	CA-MW-308
MW-17	**PMW-03***	CA-MW-204D	CA-MW-309
MW-36	**PMW-05***	CA-MW-302S	CA-MW-311
MW-37		CA-MW-302D	CA-MW-314
MW-38B	**SA-SM-01S***	CA-MW-303S	CA-MW-315S
MW-39D	**SA-SM-01D***	CA-MW-303D	CA-MW-316
MW-67A	**SA-SM-02S***	CA-MW-304	CA-MW-317S
MW-67B	**SA-SM-08D***	CA-MW-306D	CA-MW-402D
MW-73S		CA-MW-310S	CA-MW-403S
MW-73D	MW-11B	CA-MW-310D	CA-MW-403D
MW-74S	MW-20	CA-MW-315D	CA-MW-404D
MW-75S	MW-178S	CA-MW-317D	CA-MW-405S
MW-75D	MW-178D	CA-MW-401	CA-MW-407
MW-78S	MW-180RS	CA-MW-402S	CA-MW-409S
MW-155S	MW-180RD	CA-MW-404S	CA-MW-411D
MW-155D		CA-MW-405D	CA-MW-503D
MW-177S	PT1-MW-04	CA-MW-406	CA-MW-508S
MW-177D	PT2-MW-10	CA-MW-408	CA-MW-509
MW-179D		CA-MW-409D	CA-MW-510S
MW-182S	SA-MW-01S	CA-MW-410	
MW-182D	SA-MW-02S	CA-MW-411S	MW-01
MW-183S	SA-MW-05D	CA-MW-502	MW-06
MW-183D	SA-MW-06S	CA-MW-503S	MW-11A
	SA-MW-07S	CA-MW-504	MW-12B
SA-MW-16S	SA-MW-07D	CA-MW-505	MW-13

Table A-2. IRZ Monitoring Wells and Sampling Frequencies			
Sentry Monitoring Wells For Water Quality Impacts (Quarterly)	**Ethanol Response*and IRZ Performance Monitoring Wells (Quarterly)**	**IRZ Performance Monitoring Wells (Twice-Yearly)**	**IRZ Performance Monitoring Wells (Annually)**
SA-MW-16D	SA-MW-08D	CA-MW-506D	MW-16
SA-MW-17S	SA-MW-09S	CA-MW-507	
SA-MW-25S	SA-MW-10D	CA-MW-508D	PMW-06
SA-MW-25D	SA-MW-11S		
SA-MW-26S	SA-MW-12S	MW-04	PT2-MW-08
SA-MW-26D	SA-MW-13S	MW-14A	
SA-MW-27S	SA-MW-18S	MW-14S	SA-MW-02D
SA-MW-27D	SA-MW-20D	MW-17D	SA-MW-03S
	SA-MW-28D	MW-18	SA-MW-03D
SC-MW-01S		MW-38A	SA-MW-05S
SC-MW-01D	SA-SM-02S	MW-39	SA-MW-09D
SC-MW-02S	SA-SM-08D	MW-46	SA-MW-13D
SC-MW-02D		MW-61	SA-MW-15S
SC-MW-03S	SC-MW-09D	MW-78D	SA-MW-21S
SC-MW-03D	SC-MW-13S	MW-179S	SA-MW-22S
SC-MW-04S	SC-MW-13D	MW-181S	SA-MW-22D
SC-MW-04D		MW-181D	
SC-MW-05D	X-13		SA-SM-01D
SC-MW-06S		PMW-02	SA-SM-02D
SC-MW-06D		PMW-04	SA-SM-03S
SC-MW-07S			SA-SM-03D
SC-MW-07D		PT1-MW-01	SA-SM-04S
SC-MW-10S		PT2-MW-09	SA-SM-05S
SC-MW-10D		PT2-MW-11	SA-SM-06D
SC-MW-11S			SA-SM-07S
SC-MW-11D		SA-MW-01D	SA-SM-07D
SC-MW-12S		SA-MW-04S	SA-SM-08S
SC-MW-12D		SA-MW-04D	SA-SM-09D
		SA-MW-06D	SA-SM-10S
		SA-MW-08S	SA-SM-10D
		SA-MW-10S	SA-SM-11S
		SA-MW-11D	
		SA-MW-12D	SC-MW-17S
		SA-MW-14S	SC-MW-21D
		SA-MW-14D	SC-MW-22S
		SA-MW-15D	SC-MW-22D
		SA-MW-17D	SC-MW-23S
		SA-MW-18D	SC-MW-23D
		SA-MW-20S	SC-MW-26S
		SA-MW-21D	SC-MW-32S

Table A-2. IRZ Monitoring Wells and Sampling Frequencies			
Sentry Monitoring Wells For Water Quality Impacts (Quarterly)	**Ethanol Response*and IRZ Performance Monitoring Wells (Quarterly)**	**IRZ Performance Monitoring Wells (Twice-Yearly)**	**IRZ Performance Monitoring Wells (Annually)**
		SA-MW-24S SA-MW-24D SA-SM-06S SA-SM-09S SA-SM-11D SC-MW-05S SC-MW-08S SC-MW-08D SC-MW-09S SC-MW-14S SC-MW-14D SC-MW-15S SC-MW-15D SC-MW-16S SC-MW-16D SC-MW-17D SC-MW-21S SC-MW-32D SC-MW-38D X-10 X-12 X-17	SC-MW-38S X-11 X-15 X-16

Table A-3. Constituents Sampled at IRZ Performance Monitoring Wells and Sentry Wells	
Constituents	**Recommended Analytical Methods**
Total Dissolved Chromium	EPA 6020A
Hexavalent Chromium	EPA 218.6
Total Organic Carbon	EPA SM 5310C
Nitrate (as N)	EPA 300
Dissolved Iron	EPA 6010B
Dissolved Manganese	EPA 6020A
Dissolved Arsenic	EPA 6020A
pH, Temperature, Dissolved Oxygen, Specific Conductance, Oxidation-reduction Potential	Field measurements

Table A-4. Threshold Concentrations for IRZ Byproducts, Well Rehabilitation Compounds, and Tracers in Groundwater			
IRZ Byproduct	**Regulatory Concentration (Basis)**	**Maximum Baseline Concentration**	**Threshold Concentration[2]**
Dissolved Iron	0.3 ppm (Secondary MCL)	0.377 parts per million (ppm)	0.471 ppm
Dissolved Manganese	0.05 ppm (Secondary MCL)	0.210 ppm[3]	0.26 ppm
Dissolved Arsenic	0.01 ppm (Primary MCL)	0.01 ppm	0.013 ppm
Chloride	250 ppm (Secondary MCL)	231 ppm	289 ppm
Sulfate	250 ppm (Secondary MCL)	409 ppm	511 ppm
Eosine	0.1 ppm (Color detection)	<0.1 ppm	0.1 ppm
Fluorescein	0.1 ppm (Color detection)	<0.1 ppm	0.1 ppm

[2] Threshold concentrations are based on either the regulatory concentration or a 25 percent increase over the maximum baseline concentration, whichever is greater.

[3] The July 7, 2010 Notice of Applicability contained a maximum baseline concentration for manganese of 0.312 ppm. However, updated information contained in the July 2013 EIR completed for the project lists a background value of manganese in the Central Area as 0.210 ppm (see Final EIR, Chapter 3, p. 3.1-39).

C. IRZ Byproduct Migration Contingency Monitoring

1. Tier I Contingency Monitoring

a) Tier I contingency monitoring wells and their associated sampling frequencies are listed in Table A-5. If IRZ byproducts in Tier I monitoring wells are detected at or above the threshold concentrations listed in Table A-4 for the first time, the Discharger must:

i. Re-sample that well within 30 days of receiving laboratory results indicating the exceedance.

ii. If re-sampling confirms the byproduct exceedance, the Discharger must conduct expanded (Tier II) monitoring during the next quarterly sampling event.

Table A-5. Tier I Byproduct Monitoring Wells

East Area Wells	**Sampling Frequency**
CA-MW-508D	Twice Yearly
CA-MW-508S	Annually
CA-MW-509	Annually
CA-MW-510D	Quarterly
CA-MW-510S	Annually
CA-MW-511	Quarterly
CA-MW-601	Quarterly
CA-MW-602	Quarterly
CA-MW-603	Quarterly
MW-14A	Twice Yearly
MW-14S	Twice Yearly
West Area Wells	**Sampling Frequency**
MW-182D	Quarterly
MW-182S	Quarterly
MW-183D	Quarterly
MW-183S	Quarterly

2. Tier II Contingency Monitoring

a) Tier II monitoring wells and their associated sampling frequencies are listed in Table A-6. Tier II monitoring shall be conducted in locations that correspond to the area(s) of Tier I exceedance(s); that is, at east or west area monitoring wells shown in Table A-6. If IRZ byproducts in Tier II monitoring wells are detected at or above the threshold concentrations listed in Table A-4 for the first time, the Discharger must:

i. Re-sample that well within 30 days of receiving laboratory results indicating the exceedance.

ii. If re-sampling confirms the byproduct exceedance, the Discharger must:

1) Notify Water Board staff via e-mail within 7 days of receiving laboratory results indicating confirmation of the exceedance;
2) Evaluate whether the byproduct exceedance is related to the Discharger's remedial activities, and if the relation is determined, then conduct additional monitoring, evaluation, and reporting as specified in the Action Plan for Byproduct Migration, section I.D, below.

Table A-6. Tier II Byproduct Monitoring Wells	
East Area Wells	**Sampling Frequency**
MW-09	Quarterly
MW-10	Quarterly
MW-22A1	Quarterly
MW-22A2	Quarterly
MW-22B	Quarterly
MW-24A1	Quarterly
MW-24A2	Quarterly
MW-24B	Quarterly
MW-25A2	Quarterly
MW-25B	Quarterly
NA-MW-03A	Quarterly
NA-MW-03B	Quarterly
MW-41A	Quarterly
MW-41B	Quarterly
MW-41S	Quarterly
West Area Wells	**Frequency**
MW-44A	Quarterly
MW-44B	Quarterly
MW-45A	Quarterly
MW-45B	Quarterly
MW-64A	Quarterly
MW-64B	Quarterly
MW-76S	Quarterly
MW-76D	Quarterly

Table A-7. Tier III Byproduct Monitoring Wells	
East Area Wells	**Sampling Frequency**
MW-21A	Quarterly
MW-21B	Quarterly
MW-21B1	Quarterly
MW-26	Quarterly
MW-30A	Quarterly
MW-30B1	Quarterly
MW-30B2	Quarterly
MW-31	Quarterly
MW-42B1	Quarterly

Table A-7. Tier III Byproduct Monitoring Wells	
MW-42B2	Quarterly
West Area Wells	**Sampling Frequency**
MW-168D	Quarterly
MW-168S	Quarterly
MW-169D	Quarterly
MW-169S1	Quarterly
MW-169S2	Quarterly
MW-58	Quarterly
MW-66	Quarterly
MW-66BR	Quarterly

D. Action Plan for Byproduct Migration

1. West Area Action Plan

a) If west area Tier II monitoring wells indicate byproduct exceedances at or above the threshold levels listed in Table A-4, the Discharger shall conduct west area Tier III monitoring. West area Tier III monitoring wells are listed in Table A-7.

b) If west area Tier II monitoring wells indicate byproduct exceedances at or above the threshold levels listed in Table A-4**,** the Discharger must:

i. Propose actions to reduce byproduct migration to Tier II west area monitoring wells, such as increased operation of the NWFI system (if operating at less than full permitted capacity), increased extraction, or other effective measures. A proposal shall be submitted to the Water Board within 60 days of receiving laboratory results of Tier II monitoring well threshold exceedance(s) for Water Board's acceptance. The proposal shall contain a schedule for implementation.

ii. Submit a report within 60 days documenting the actions that have been implemented.

c) If any west area Tier III well contains byproduct concentrations at or exceeding thresholds listed in Table A-4, the Discharger shall:

i. Propose actions to reduce byproduct migration in groundwater west of the NWFI system. A proposal shall be submitted to the Water Board within 60 days of receiving laboratory results of Tier III monitoring well threshold exceedance(s) for Water Board's acceptance. The proposal shall contain a schedule for implementation.

ii. Submit a report within 60 days documenting the actions that have been implemented.

2. East Area Action Plan

a) If east area Tier II monitoring wells indicate byproduct exceedances at or above the threshold levels listed in Table A-4, the Discharger shall:

i. Conduct east area Tier III monitoring. East area Tier III monitoring wells are listed in Table A-7.

ii. Evaluate whether current remedial system operations are hydraulically containing byproducts within extraction wells along and upgradient of Santa Fe Avenue. The evaluation shall provide data from pump tests, particle track modeling, potentiometric maps, etc., to verify hydraulic capture or lack thereof. If byproducts are not hydraulically contained by extraction wells along and upgradient of Santa Fe Avenue, propose actions to reduce byproduct migration in groundwater north of Santa Fe Avenue. Such actions may include but are not limited to:
   1) Restarting extraction wells EX-21 and EX-22;
   2) Increasing extraction rates in extraction wells IW-01, IW-02, and/or IW-03;
   3) Installation of additional extraction wells, such as between EX-22 and IW-01.

iii. Data evaluation and an action plan proposal, if warranted, shall be submitted to the Water Board within 60 days of receiving laboratory results of Tier II monitoring well threshold exceedance(s) for Water Board's acceptance. Any action plan proposal shall contain a schedule for implementation.

iv. Submit a report within 60 days documenting the actions that have been implemented.

b) If east area Tier III monitoring wells indicate byproduct exceedances at or above the threshold levels listed in Table A-4, the Discharger shall:

i. Propose actions to reduce byproduct migration and concentrations below threshold levels in groundwater north of Santa Fe Avenue. The proposal shall contain a schedule for implementation and achieving remediation goals. Submit the action plan proposal to the Water Board within 60 days of receiving laboratory results of Tier III monitoring well threshold exceedance(s) for Water Board acceptance. The proposal must contain a schedule for implementation.

ii. Propose contingency wells to verify containment of byproduct migration.

iii. Submit a report within 60 days documenting the actions that have been implemented.

E. Freshwater Supply Well Monitoring for Northwest Freshwater Injection Area

1. All supply wells used for freshwater injection sources shall be sampled as specified in Table A-1, Row E.

2. Concentrations of all constituents in freshwater injected for plume control must either be 1) less than the applicable primary or secondary Maximum Contaminant Level or 2) if the concentrations of certain constituents at the injection point already exceed a Maximum Contaminant Level, then the injection water must have concentrations of the constituent equal to or less than that in the ambient groundwater at the injection point.

3. The Discharger will identify to the Water Board the filtration or pretreatment necessary to meet the water quality levels described above, if applicable. After approval of the water source for use for freshwater injection, the Discharger will sample the treated water on a semi-annual basis (twice per year) at a minimum to demonstrate that the water source will not degrade the aquifer. Currently approved water sources for freshwater injection include supply wells FW-01, FW-02, FW-03 and FW-04. Changes to freshwater sources require notice to the Water Board and demonstration that any new source meets water quality requirements, identified above (E.2)

F. Western Area Remediation Groundwater Extraction Monitoring

When groundwater is extracted for remediation purposes in the Western area, it shall be sampled prior to disposal to land for every Baker tank capacity of 20,000 gallons when the average daily pumping rate is 6 gallons per minute (gpm) or less. When the average daily pumping rate is greater than 6 gpm, water samples shall be collected for every 40,000 gallons. Samples shall be analyzed for hexavalent chromium. If hexavalent chromium concentrations in extracted groundwater are less than 3.1 ppb, then water can be used for irrigation and/or dust control. Water with concentrations of hexavalent chromium at or greater than 3.1 ppb may be used on lands controlled by PG&E, as long as it does not cause or contribute to exceedances of receiving water limitations, and the groundwater is within an area that is being monitored for hexavalent chromium.

G. Well Rehabilitation Chemical Monitoring

1. Monitoring for well rehabilitation chemicals and compounds is required for the appropriate marker constituent for any chemical or compound used; for example, sulfate, chloride, or orthophosphate. When carbon dioxide agents are used (e.g., Aqua Gard or Aqua Freed), monitor pH and electrical conductivity (EC) before, during and following well rehabilitation and purging. Monitoring must continue until pH and EC stabilize.

2. Monitoring wells shall be sampled for the marker constituent if they are located within 500 feet cross gradient or downgradient of a well where rehabilitation

chemicals or compounds have been injected. If no monitoring wells exist within 500 feet, the closest applicable monitoring wells will be sampled instead.

3. If the marker constituent is not detected in two consecutive quarterly sampling events, sampling for that constituent is no longer required.

H. Groundwater Flow Tracer Monitoring

1. Specific monitoring for groundwater flow tracers shall be proposed in any tracer study plan submitted by the Discharger and conducted within one thousand (1,000) feet of all wells having tracer detections above threshold concentrations (Table A-4) from past tracer tests. Reports submitted by PG&E have shown that tracers are detected in groundwater at concentrations above background levels for more than five years.

2. Where tracers have been detected from 2013 tracer injections (injection details are contained in *Response to Investigative Order No. R6V-2012-0060 and R6V-2013-0026: Manganese Investigation Technical Report. Pacific Gas and Electric Company's Hinkley Compressor Station, Hinkley, California*, dated November 19, 2013), tracers must continue to be monitored in subsequent sampling events, until the concentrations decline below 10 micrograms per liter for at least two consecutive quarterly sampling events.

II. NOTIFICATIONS

A. Reductions in corrective actions covered under this NOA of more than 10 percent on a monthly basis as compared to annual operational plans[4] shall require notification to Water Board staff prior to implementation. Such changes in operations shall also be reported in the quarterly monitoring reports.

   The Discharger shall also notify Water Board staff of any planned design changes, i.e., construction of extraction or injection locations, at least 14 calendar days before such change.

B. The Discharge shall notify the Water Board of identification of any Tier II contingency monitoring re-sampling result that indicates exceedance of a byproduct threshold concentration listed in Table A-4. Notification shall be made by e-mail correspondence within 7 days of receiving laboratory results indicating such exceedance.

C. The Discharger shall notify the Water Board prior to any proposed changes to freshwater sources for the NWFI system, and provide demonstration that any new source meets water quality requirements, identified in I.E.2, above.

[4] Annual operational plans are required for the IRZ and NWFI systems under Cleanup and Abatement Order No. R6V-2015-0068 (see page 6 of the CAO's Monitoring and Reporting Program).

D. Within 10 days of any confirmation sampling, the Discharger shall notify the Water Board of any domestic wells “actually” affected by chromium or remedial by-products caused by the in-situ remediation activities allowed under this NOA and General WDRs and demonstrate interim replacement water has been provided.

III. REPORTING

A. General Requirements

1. All reports shall include a transmittal letter summarizing the essential points in each report. The letter shall include a discussion of any violations of the General Waste Discharge Requirements (Board Order No. R6V-2008-0014) or the Notice of Applicability found since the last report was submitted, and shall describe actions taken or planned for correcting those violations. The transmittal letter shall also include a discussion of any ongoing violations of the General WDRs or the Notice of Applicability noted in past reports, and a description and status of action(s) taken to correct those violations. If no violations have occurred since the last report, this shall be stated in the transmittal letter.

2. The results of any analysis taken more frequently than required for the parameters and locations specified in this monitoring and reporting program shall be submitted to the Water Board in monitoring reports. This includes data collected at monitoring or domestic water wells at greater frequencies than required under this MRP and also required under other Water Board Orders.

3. All reports shall include the signature and stamp of a California licensed professional geologist or civil engineer verifying statements in the report, laboratory and other sampling results, and work conducted at the site.

4. All site maps and figures must comply with mapping requirements according to CAO R6V-2015-0068.

5. Describe fully in the text portion of monitoring reports data and information in tables and figures.

6. The Discharger shall upload all technical documents, such as workplans, reports, letters, memorandums, etc., to the State Water Resources Control Board’s Geotracker database, within **one** business day of the document date, so that they can be viewed by the public at the link: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0607111288

B. Reports

1. Annual EIR Mitigation Measures Compliance Report (Due February 20 of each year).

a) The Discharge must submit a report documenting compliance with all applicable EIR mitigation measures described in NOA attachment C and shown in Table

A-9. It is recognized that not all mitigation measures contained in attachment C will apply to discharges or activities conducted under the General WDRs. The EIR Mitigation Measures Compliance report may be combined with reporting required by Board Order No. R6V-2014-0023, WDRs for Agricultural Treatment Units.

b) Compliance with the following mitigation measures must be documented in the annual report for each mitigation measure listed below. Documentation may include separate, stand-alone memoranda or reports of verification from responsible agencies, in which case the agency's receipt of those reports can be documented. If a mitigation measure listed in Table A-9 is not applicable to the activities conducted under these General WDRs, describe the rationale or condition why such mitigation measure does not apply.

Table A-9. EIR Mitigation Measures

Water Resources	**Hazardous Materials**	**Air Quality**	**Noise**
WTR-MM-1	HAZ-MM-1	AIR-MM-1	NOI-MM-1
WTR-MM-2	HAZ-MM-2	AIR-MM-2	
WTR-MM-2a, 2b	HAZ-MM-3	AIR-MM-3	**Traffic**
WTR-MM-3		AIR-MM-4	TRA-MM-1
WTR-MM-7		AIR-MM-6	
WTR-MM-8		AIR-MM-7	
Geology/Soils	**Land Use**	**Socioeconomics**	**Aesthetics**
GEO-MM-2	LU-MM-1	SE-MM-1	AES-MM-1
	LU-MM-2		AES-MM-2
			AES-MM-3
Biological Resources	**Biological Resources**	**Biological Resources**	**Cultural Resources**
BIO-MM-1a		BIO-MM-2	CUL-MM-1
BIO-MM-1b	BIO-MM-1j	BIO-MM-3	CUL-MM-2
BIO-MM-1c	BIO-MM-1k	BIO-MM-4	CUL-MM-3
BIO-MM-1d	BIO-MM-1l		CUL-MM-4
BIO-MM-1e	BIO-MM-1m		CUL-MM-5
BIO-MM-1f	BIO-MM-1n		CUL-MM-6
BIO-MM-1g	BIO-MM-1o		CUL-MM-7
BIO-MM-1h	BIO-MM-1p		CUL-MM-8

2. Quarterly Reports (**Due 30 days following the end of each quarter: January 30; April 30; July 30, and October 30 of each year**)

a) Monitoring for IRZs shall be reported as specified in Tables A-1 through A-3 in quarterly reports. The reports shall contain, but not be limited to, the following information where applicable:

i. Description of the effectiveness of in-situ remediation in converting hexavalent chromium to trivalent chromium in both the upper and deep zones of the upper aquifer.

ii. Descriptions of contingency monitoring conducted, results, and proposed step-out contingency monitoring if thresholds are met or exceeded.

iii. If replacement water is required to be provided under this MRP, provide the well number and general location (e.g., cross streets) for all recipients. Discuss the conditions which led to providing replacement water, and the method by which replacement water is provided, or if it was not accepted by the well user, provide documentation that replacement water was declined.

iv. Description of aquifer characteristics, including changes or variations from the previous monitoring event.

v. Description of and tabulation of monthly discharge volumes[5] for each IRZ for that quarter and over the previous 12 months. The new information shall be added to a table of historical data. Cite decreases in volumes of greater than 10 percent on a monthly basis in comparison to the IRZ and NWFI annual operational plan.

vi. Description of other discharges to IRZs, such as tracers or well rehabilitation chemicals. Provide the volume, duration, and location of discharge, and manner of application. For all tracers or well rehabilitation chemicals, state the appropriate marker constituent(s), monitoring plans and results. When carbon dioxide agents are used for well rehabilitation (e.g., Aqua Gard or Aqua Freed), report results of pH and electrical conductivity (EC) analyses taken before, during and following well rehabilitation and purging.

vii. Description of sampling conducted and laboratory analytical results (including data sheets) of samples collected from IRZs and the NWFI area during the reporting period. The results of sample analysis shall be described and reported in tabular form. Data will be presented in graphic form as needed for illustration of results. When needed, each graph prepared for ground water data shall be plotted with raw data at a scale appropriate to show trends or variations in water quality. For graphs showing the trends of similar constituents, the scale shall be the same.

viii. Describe byproducts, well rehabilitation compounds and tracers in groundwater. Include a description of the extent of these chemicals and compounds in groundwater and note any changes over time. Provide a table listing detections of total organic carbon in monitoring wells. State if

[5] "Discharge volumes" includes all constituents discharged to groundwater related to IRZs including ethanol or other authorized reagents.

extraction wells or domestic wells are actually affected or potentially affected by byproducts, well rehabilitation compounds, or tracers.

ix. For domestic well monitoring specified in Table A-1, rows A and B, include copies of notification letters of results provided to well owners, including where applicable, clear comparisons of recent results to pre-remedial reference levels. Current results must also be compared to State and Federal MCLs, and criteria to determine actually affected wells for remedial byproducts, chromium, and groundwater drawdown. Notification letters must include a clear tabulation of analytical results of current and historical data.

x. The table containing analytical results for groundwater monitoring wells shall show the range and average concentrations of constituents listed in Table A-3 from all required groundwater monitoring wells for that quarter and over the previous 12 months. The new information shall be added to a table of historical data. Data should be summarized by IRZ system (e.g., Source Area, Central Area, SCRIA).

xi. A summary table of NWFI system operations, including but not limited to extraction and injection volumes, average injection rates, and percentage of operating time for each injection well during the reporting period.

xii. Consistent with the requirements of section VI.C.1.a.i of the CAO R6V-2015-0068, corrective actions conducted in the western area shall be fully discussed and described. At a minimum, include a full and complete description of the disposal of groundwater extracted, including volume extracted, volume disposed, laboratory results of water samples, dates and location of disposal. Include a site map displaying the disposal location(s). Describe what other options for disposing the extracted water were considered any why the disposal method used was chosen.

b) Map Contents

i. Map contents shall be consistent between each map, including color, symbols, and where possible, base map information.

ii. All maps shall have a font size of no less than 9 points and show the following information: scale, legend, all well locations (monitoring, extraction, domestic, etc.), other sampling locations, and street names.

iii. Chromium plume lines for hexavalent and total chromium out to 3.1/3.2 parts per billion (ppb), 10 ppb, 50 ppb, 100 ppb, and 1,000 ppb shall be shown on all maps depicting chromium sampling locations and results (e.g., figures showing monitoring locations for general groundwater quality compliance monitoring, IRZ monitoring well locations and domestic well monitoring). Potentiometric maps do not need to depict chromium plume boundaries.

iv. All freshwater supply wells for the NWFI system shall be shown on maps that depict the NWFI system.

v. Maps shall show the approximate location of the Lockhart Fault.

vi. At a minimum, the following maps shall be included in each report:
1) Potentiometric maps for shallow and deep zones of the upper aquifer.
2) Hexavalent chromium and manganese groundwater sampling results from monitoring and other wells. Manganese byproduct contours shall be drawn around all monitoring wells in Table A-2 that meet or exceed the manganese threshold concentration. Include maps showing the extent of well rehabilitation compounds and tracers in groundwater, if applicable.
3) Sampling areas and results for EIR mitigation groundwater monitoring for domestic wells.
4) Map of all active and inactive domestic or community supply wells, including those wells on PG&E-owned property and used that quarter for any purpose. Chromium concentrations shall be shown next to each water supply well sampled.

Ordered by:

Patty Z. Kouyoumdjian

PATTY Z. KOUYOUMDJIAN
EXECUTIVE OFFICER

4/20/16
Date

Attachment C

Mitigation Monitoring and Reporting Program

Comprehensive Groundwater Cleanup Strategies for Historical Chromium Discharges from PG&E's Hinkley Compressor Station

(SCH# 2008011097)

California Regional Water Quality Control Board, Lahontan Region

Prepared March 2014

ICF International. 2014. Mitigation Monitoring and Reporting Program. *Comprehensive Groundwater Cleanup Strategy for Historical Chromium Discharges from PG&E's Hinkley Compressor Station, San Bernardino County.* March. (SCH #2008011097) (ICF 00122.11.) San Francisco, CA. Prepared for California Regional Water Quality Control Board, Lahontan Region, South Lake Tahoe, CA.

Contents

Introduction

The California Regional Water Quality Control Board, Lahontan Region (Water Board), as Lead Agency under the California Environmental Quality Act (CEQA) and State CEQA Guidelines, has prepared and certified the Final Environmental Impact Report (EIR) for the Comprehensive Groundwater Cleanup Strategy for Historical Chromium Discharges from Pacific Gas & Electric Company's (PG&E's) Hinkley Compressor Station (proposed project) (SCH #2008011097). When a lead agency approves a project and makes findings on significant effects identified in an EIR, it must also adopt a program for reporting or monitoring mitigation measures that were adopted or made conditions of project approval (Public Resources Code [PRC] Section 21081.6[a]; State CEQA Guidelines Sections 15091[d], 15097).

CEQA requires the monitoring or reporting program to ensure implementation of the mitigation measures, but CEQA does not define the terms "reporting" or "monitoring" and does not specify how this should be done, instead leaving the format, contents, and complexity of the program to the interpretation of the lead agency.

As lead agency, the Water Board has developed this Mitigation Monitoring and Reporting Program (MMRP) to ensure implementation of the mitigation measures. "Monitoring" is the ongoing process of project oversight to ensure the mitigation measures are implemented, and "reporting" is the written review of mitigation activities. To facilitate mitigation monitoring and reporting, this MMRP includes a worksheet for each mitigation measure that identifies: 1) Mitigation measure, 2) Implementation timing, 3) Implementation responsibility, 4) Monitoring responsibility, 5) Monitoring requirements, 6) Frequency of monitoring or reporting, 7) Standards for completion or compliance, and 8) Agency verification of compliance ("sign off"). **Appendix A** includes a Monitoring and Reporting Record form, as well as a completed example, where monitoring and reporting notes can be documented. Some mitigation measures require separate, stand-alone memoranda or reports of verification, in which case the agency's receipt of those reports can be documented.

This MMRP includes all measures required to reduce potentially significant environmental impacts to a less-than-significant level, as well as measures that reduce impacts but not necessarily to a less-than-significant level.

Questions should be directed to Anne Holden, EIR Project Manager.

Lahontan Water Board
2501 Lake Tahoe Boulevard,
South Lake Tahoe, CA 96150
Phone: 530-542-5450
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Summary of Mitigation Measures

The mitigation measures, implementation timing, and responsible parties are summarized in **Table 1**. Additionally, **Appendix B** includes summary tables with the mitigation measures, the impacts they are addressing, and the applicable project alternatives.

The mitigation measures in the Table 1, Appendix B, and the Mitigation Measure Worksheets are presented by resource area as follows, using the same numerical order as presented in the Final EIR (Volume II).

- 3.1 Water Resources and Water Quality
- 3.2 Land Use, Agriculture, Population and Housing
- 3.3 Hazards and Hazardous Materials
- 3.4 Geology and Soils
- 3.5 Air Quality and Climate Change
- 3.6 Noise
- 3.7 Biological Resources
- 3.8 Cultural Resources
- 3.9 Utilities and Public Services (no mitigation measures)
- 3.10 Transportation and Traffic
- 3.11 Aesthetics
- 3.12 Socioeconomics

Table 1. Summary of Mitigation Measures with Responsible Parties

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
3.1 Water Resources and Water Quality								
WTR-MM-1: Purchase of Water Rights to Comply with Basin Adjudication	Annually	PG&E	Water Board			X		
WTR-MM-2: Mitigation Program for Water Supply Wells Affected by Remedial Activities, including Impacts Due to Chromium Plume Expansion, Remediation Byproducts and Groundwater Drawdown	During operation	PG&E	Water Board		X	X		
WTR-MM-2a: Mitigation Program for Water Supply Wells Affected by the Chromium Plume Expansion due to Remedial Activities	During operation	PG&E	Water Board		X	X		
WTR-MM-2b: Water Supply Program for Water Supply Wells Affected by Remedial Activity Byproducts	One year prior to operation and during operation	PG&E	Water Board		X	X		
WTR-MM-2c: Water Supply Program for Wells Affected by Groundwater Drawdown due to Remedial Activities	One year prior to operation and during operation	PG&E	Water Board			X		
WTR-MM-3: Incorporate Measures to Prevent, Reduce and Control Potential Temporary Localized Chromium Plume Bulging Into Overall Plume Control and Monitoring	Prior to issuance of permits	Water Board and PG&E	Water Board		X			
WTR-MM-4: Mitigation Program for Restoring the Hinkley Aquifer Affected by Remedial Activities for Beneficial Uses	No later than 10 years prior conclusion of remediation project	PG&E	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
WTR-MM-5: Investigate and Monitor Total Dissolved Solids, Uranium, and Other Radionuclide Levels in relation to Agricultural Treatment and Take Contingency Actions	Prior to issuance of permits	Water Board and PG&E	Water Board			X		
WTR-MM-6: Monitor Nitrate Levels and Manage Agricultural Treatment to Avoid Significant Increases in Nitrate Levels and Provide Alternative Water Supplies As Needed	Prior to issuance of permits	Water Board and PG&E	Water Board			X		
WTR-MM-7: Construction and Operation of Additional Extraction Wells to Control Carbon Amendment In-situ Byproduct Plumes	Prior to issuance of permits	Water Board and PG&E	Water Board		X			
WTR-MM-8: Ensure Freshwater Injection Water Does Not Degrade Water Quality	Prior to issuance of permits	Water Board and PG&E	Water Board					X
3.2 Land Use								
LU-MM-1: Obtain Bureau of Land Management Permits in Compliance with California Desert Conservation Area Plan and the West Mojave Plan	Prior to remedial activities on federal land	PG&E with BLM	Water Board	X				
Note: Potential remediation actions on BLM land have not been specifically identified, but are likely to include monitoring wells, extraction wells, piping and access roads. Agricultural treatment units are not likely to be proposed on federal lands given AUs can be more efficiently placed in central locations on private lands.								
LU-MM-2: Acquire Agricultural Conservation Easements for any Important Farmland If Water Rights Are Acquired for Remediation	Prior to remedial activities on important farmland	PG&E	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
3.3 Hazards and Hazardous Materials								
HAZ-MM-1: Implement Contingency Actions if Contaminated Soil is Encountered During Ground Disturbance	During excavation activities	PG&E with qualified Professional Engineer or Professional Geologist	Water Board	X				
HAZ-MM-2: Implement Spill Prevention, Control, and Countermeasures Plan During Construction	Prior to and during construction activities	PG&E with San Bernardino County Fire Department	Water Board	X				
HAZ-MM-3: Implement Building Materials Survey and Abatement Practices	Prior to structure demolition or modification activities	PG&E with registered environmental assessor or California-registered professional engineer	Water Board	X				
3.4 Geology and Soils								
GEO-MM-1: Land Subsidence Monitoring, Investigation, and Repair (Recommended only)	Prior to and during remedial-induced groundwater drawdown	PG&E with landowner and qualified expert approved by Water Board	Water Board	X				
GEO-MM-2: Emergency Response Plan for Potential Remedial Pipeline or Storage Tank Rupture	Prior to operation of remedial pipeline or storage tank	PG&E	Water Board	X				
3.5 Air Quality and Climate Change								
AIR-MM-1: Utilize Clean Diesel-Powered Equipment during Construction	During construction	PG&E	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
AIR-MM-2: Ensure Fleet Modernization for On-Road Material Delivery and Haul Trucks during Construction	During construction	PG&E	Water Board	X				
AIR-MM-3: Implement Emission-Reduction Measures during Construction	Prior to and during construction	PG&E	Water Board	X				
AIR-MM-4: Implement Dust Control Measures during Construction and Operations	During construction and operation	PG&E with MDAQMD	Water Board with MDAQMD	X				
AIR-MM-5: Utilize Clean Diesel-Powered Equipment for Operation of Agricultural Treatment (Alternative 4C-4 only)	During operation	PG&E	Water Board			X		
Note: This mitigation applies only to Alternative 4C-4 because it has substantially more agricultural units and thus diesel-related exhaust (diesel particulate matter), exceeding the MDAQMD cancer risk threshold, whereas the other alternatives do not.								
AIR-MM-6: Implement San Bernardino County GHG Construction Standards during Construction	During construction	PG&E with San Bernardino County	Water Board with San Bernardino County	X				
AIR-MM-7: Implement San Bernardino County GHG Operational Standards for Operations	During operation of remedial activities	PG&E with San Bernardino County	Water Board	X				
AIR-MM-8: Implement San Bernardino County GHG Design Standards	Prior to operation of remedial facilities	PG&E with San Bernardino County	Water Board with San Bernardino County				X	
3.6 Noise								
NOI-MM-1: Prepare a Noise/Vibration Control Plan and Employ Noise/Vibration-Reducing Construction Practices to Comply with County Noise Standards	Prior to and during construction	PG&E	Water Board with County	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
3.7 Biological Resources								
BIO-MM-1a: Implement Measures to Minimize, Reduce, or Mitigate Impacts on Desert Tortoise during Construction	Prior to and during construction	PG&E with authorized biologist, CDFW, USFWS	Authorized biologist Water Board	X				
BIO-MM-1b: Limit Footprint of Disturbance Areas within Special-Status Species Habitats	Prior to construction During construction	PG&E with authorized biologist or environmental monitor	Authorized biologist/ environmental monitor Water Board	X				
BIO-MM-1c: Implement Pre-Construction and Ongoing Awareness and Training Program	Prior to construction During construction	PG&E r with authorized biologist or environmental monitor	Authorized biologist/ environmental monitor Water Board	X				
BIO-MM-1d: Conduct Ongoing Biological Monitoring during Construction	During construction	PG&E with authorized biological monitors	Authorized biologist Water Board	X				
BIO-MM-1e: Minimize Potential Construction Hazards to Special-Status Species	During construction	PG&E	Authorized biologist/environmental monitor Water Board	X				
BIO-MM-1f: Implement Measures to Minimize and Prevent Attraction of Predators during Construction and Operation	Prior to and during construction and operation	PG&E	Authorized biologist/environmental monitor Water Board	X				
BIO-MM-1g: Reduction of Project-Related Spread of Invasive Plant Species	After construction	PG&E with qualified biologist	Qualified biologist Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
BIO-MM-1h: Compensate Impacts on Desert Tortoise and Mohave Ground Squirrel Habitat	Prior to ESA permits Within 3 years of disturbance or earlier as defined in ESA permits	PG&E with CDFW, USFWS	Water Board, CDFW, USFWS	X				
BIO-MM-1i: Integrated Pest Management and Adaptive Management Plan for Agricultural Treatment Units	Prior to operation of agricultural units	PG&E	PG&E, Water Board	X				
BIO-MM-1j: Reduction of Night Light Spillover	Prior to operation of remedial activities with exterior lighting	PG&E with qualified biologist	Qualified biologist, Water Board	X				
BIO-MM-1k: Implement Other Measures to Minimize, Reduce, or Mitigate Impacts on Mohave Ground Squirrel	Prior to and during construction	PG&E with authorized biologist	Authorized biologist, Water Board	X				
BIO-MM-1l: Implement Other Measures to Minimize, Reduce, or Mitigate Impacts on Burrowing Owl	Prior to and during construction	PG&E with qualified biologist, CDFW	Qualified biologist Water Board	X				
BIO-MM-1m: Minimize Impacts on American Badger and Desert Kit Fox Occupied Dens	Prior to and during construction	PG&E with qualified biologist	Qualified biologist Water Board	X				
BIO-MM-1n: Avoid Impacts on Nesting Loggerhead Shrike, Northern Harrier, and Other Migratory Birds (including Raptors and excluding Burrowing Owls)	Prior to and during construction	PG&E with qualified biologist	Qualified biologist Water Board	X				
BIO-MM-1o: Implement Measures Required to Minimize, Reduce, or Mitigate Impacts on Special-Status Plants	Prior to and during construction	PG&E with qualified biologist, CDFW, USFWS (if listed plants)	Qualified biologist Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
BIO-MM-1p: If Remedial Actions Affect Mojave Fringe-toed Lizard Habitat, than Compensate for Habitat Losses	Prior to and during construction	PG&E with qualified biologist	Qualified biologist Water Board	X				
BIO-MM-2: Habitat Compensation for Loss of Sensitive Natural Communities	Prior to and during construction	PG&E with qualified biologist, USFWS, CDFW (if listed species)	Qualified biologist Water Board	X				
BIO-MM-3: Measures Required to Minimize, Reduce, or Mitigate Impacts on Waters and/or Wetlands under the Jurisdiction of the State	Prior to and during construction	PG&E with qualified biologist, USACE, CDFW, Water Board	Qualified biologist Water Board	X				
BIO-MM-4: Implement West Mojave Plan Measures to Impacts on DWMAs on BLM Land	Prior to and during construction	PG&E with authorized biologist, BLM	Authorized biologist BLM Water Board	X				
3.8 Cultural Resources								
CUL-MM-1: Determine Presence of Historic Resources as Defined by CEQA	Prior to construction	PG&E with qualified architectural historian	Water Board	X				
CUL-MM-2: Avoid Damage to Historic Resources Located in Project Areas through Project Modification	Prior to construction	PG&E with qualified architectural historian	Water Board and BLM	X				
CUL-MM-3: Record Historic Resources	Prior to construction	PG&E with qualified architectural historian	Water Board	X				
CUL-MM-4: Conduct an Archaeological Resource Survey to Determine if Historical Resources under CEQA or Unique Archaeological Resources under PRC 21083.2 are Present in Proposed Areas of Disturbance	Prior to construction	PG&E with qualified archaeologist	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
CUL-MM-5: Avoid Damaging Archaeological Resources through Redesign of Specific Project Elements or Project Modification	Prior to construction	PG&E with qualified archaeologist	Water Board	X				
CUL-MM-6: Evaluate Archaeological Resources and, if Necessary, Develop and Implement a Recovery Plan	Prior to and during construction	PG&E with qualified archaeologist	Water Board	X				
CUL-MM-7: Comply with State and County Procedures for the Treatment of Human Remains Discoveries	During construction	PG&E with qualified archaeologist	Water Board	X				
CUL-MM-8: Conduct Preconstruction Paleontological Resource Evaluation, Monitoring, Resource Recovery, and Curation	Prior, during and potentially after construction	PG&E with qualified paleontologist and/or geologist	Water Board	X				
3.9 Utilities and Public Services								
No mitigation measures required	--	--	--					
3.10 Transportation and Traffic								
TRA-MM-1: Implement Traffic Control Measures during Construction	During construction	PG&E, San Bernardino County, Caltrans	Water Board	X				
3.11 Aesthetics								
AES-MM-1: Screen Above-Ground Treatment Facilities from Surrounding Areas	During construction	PG&E	Water Board	X				
AES-MM-2: Use Low-Sheen and Non-Reflective Surface Materials on Visible Remediation Facilities and Infrastructure	During construction	PG&E	Water Board	X				
AES-MM-3: Apply Light Reduction Measures for Exterior Lighting	During construction	PG&E	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility[1]	Monitoring Responsibility	Applicable Remedial Action[2]				
				ALL	IRZ	AU	ATF	FWI
3.12 Socioeconomics								
SE-MM-1: Manage Vacant Lands, Residences, and Structures to Avoid Physically Blighted Conditions	During construction and/or operation	PG&E	Water Board	X				

[1] When PG&E is responsible for construction-related mitigation, it will be implemented by PG&E or their construction contractor.

[2] Applicable Remedial Action:

ALL – All remedial activities (including ATF, AU, FWI, IRZ and monitoring wells)

ATF – Above ground treatment facility

AU – Agricultural (land) treatment units

FWI – Freshwater injection

IRZ – In-situ reduction zones (below ground treatment)

Mitigation Measure Worksheets

WTR-MM-1: Purchase of Water Rights to Comply with Basin Adjudication

Implementation Timing:	Annually
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board (with the Mojave Water Agency)
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

Because regional groundwater drawdown from the project may reduce the availability of regional and state water supplies in the Centro Subarea, the Water Board will include requirements in the new CAO and/or associated WDRs issued for the remediation as follows:

- By January 31 of every year, PG&E will document its total water rights and its Free Production Allowance (FPA) for groundwater pumping relative to the remedial project to the Water Board.
- By December 31 of every year, PG&E will document the expected total amount of net agricultural treatment water use for the following year.
- At all times, PG&E will possess adequate water rights and FPA that meet or exceed the current expected agricultural treatment water use.
- If PG&E fails to acquire adequate water rights and FPA to support proposed agricultural treatment, PG&E will be required to implement above-ground treatment or modify existing remedial activities to adequately compensate for any loss in planned agricultural treatment.

WTR-MM-2: Mitigation Program for Water Supply Wells Affected by Remedial Activities, including Impacts Due to Chromium Plume Expansion, Remediation Byproducts and Groundwater Drawdown

Implementation Timing:	During operation
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

PG&E will implement a comprehensive program to determine residences and agricultural land owners whose wells may be adversely affected by remedial actions in relation to chromium plume expansion, remediation byproducts, or groundwater drawdown.

Implementation of the program described below is designed to provide advance warning before water supply well impairment occurs. Such a program will be designed to either expedite remediation before a water supply well becomes affected, or provide reliable water supply for the entire duration of well impairment due to remedial activities. For the purposes of the project and this EIR, water supply wells are those that provide water for agricultural, domestic, or industrial uses, and include those that are used for water supply for freshwater injections. Water supply wells do not include IRZ injection wells or monitoring wells.

The Mitigation Program will determine all "actually affected" and all "potentially affected" wells (defined for each sub-mitigation measure, WTR-MM-2a through 2c, below).

If a water supply well is determined to be an "actually affected" well, then PG&E will provide alternative water supply meeting the requirements described below.

If a water supply well is determined to be "potentially affected" well, then PG&E will either 1) expedite remediation of the conditions causing the well to be potentially affected such that actual impacts do not occur; or 2) provide alternative water supply. If PG&E chooses to remediate the triggering condition, it will provide a feasibility study and plan to the Water Board demonstrating feasible means to avoid actually affecting any domestic or agricultural well.

If expedited remediation is not feasible, PG&E will provide alternative water supply to all "potentially affected" wells prior to the wells being actually affected by chromium plume expansion, remedial byproducts or substantial groundwater drawdown. Because the definition of a "potentially affected" well includes any well that is projected to be affected in the next year, this provides adequate advanced warning to feasibly provide the alternative water supply before impacts to supply wells occur.

Water Quality Requirements for Alternative Water Supply

- Domestic Wells—For domestic wells affected by remedial activities, the alternative water supply will meet the following water quality requirements for interior household uses:
    - For chromium, alternative water supply shall be equal to or less than Water Board established maximum background levels.
    - Alternative water supply will meet all primary and secondary Maximum Contaminant Levels for any constituent, other than chromium, that is affected by remedial activities as defined in this mitigation.
    - For constituents not affected by remedial activities, the alternative water supply will be consistent with pre-project water quality.
    - California and federal requirements for public water systems will apply if the replacement water supply is defined as a public water system. Where the requirements in the three prior bullets are e stricter than public water system requirements, then the more restrictive requirement shall apply.[1]
- Domestic Wells—For domestic wells affected by remedial activities, PG&E will provide replacement water for outside non-potable household uses in an amount and quality sufficient to support existing outdoor non-potable water uses. Such outside non-potable uses include, but are not limited to, the following: irrigation for landscaping, gardening, provision of water for pets and livestock, and washing.
- Agricultural Wells—PG&E will provide replacement water suitable for agricultural use (including livestock) to all potentially affected agricultural wells, as defined below, in an amount and quality sufficient to support existing agricultural use.

Water Supply Options

In advance of implementing the project PG&E will provide a feasibility study and plan to provide alternative water supplies. Provision of alternative water supplies may be through one or more of the following methods:

- Deeper Well Option—PG&E may opt to drill supply wells deeper if the deeper well is shown to have sufficient water supply yield and to meet the water quality requirements (defined above) or be treatable to such levels through on-site treatment provided by PG&E. The Water Board will not allow the use of deeper wells if there is a potential to spread chromium from the upper aquifer to the lower aquifer. Although PG&E has indicated that it is no longer offering the deeper well option as part of the current whole house water replacement program due to the inability to meet the Water Board order's standard for Cr[VI] of 0.06 ppb, the EIR mitigation standard for Cr[VI] is the maximum background level of Cr[VI] (currently 3.1 ppb), thus the deeper well option remains a feasible option for EIR mitigation.
- Storage Tank and Hauled Water Option—PG&E may opt to provide water storage tanks and haul water to the affected location provided water meets the water quality requirements (defined above)

[1] The federal Safe Drinking Water Act and derivative legislation define public water system as an entity that provides "water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year.

or be treatable to such levels through on-site treatment provided by PG&E. If a homeowner rejects this option for their residence, PG&E must offer them an alternative.

- Well Head Treatment Option—PG&E may opt to provide treatment systems at the well head to provide water that meets the water quality requirements.
- Well Modification—For wells only affected by groundwater drawdown due to remediation, existing wells may be modified to provide water, such as by lowering the well pump, provided that the modification provides adequate water supply and water quality to support domestic or agricultural use, as appropriate.
- Alternative Supply Option—PG&E may opt to provide an alternative water supply that draws water from a source of water that is not affected by the chromium plume, such as a community water system. This option can only be provided such that the water source is not projected to be affected by plume expansion, remedial byproducts, or groundwater drawdown for the lifetime of remediation and can meet the water quality requirements. There are several different options for a water supply system as follows:
    - Use of wells upgradient or otherwise unaffected by the chromium plume or remediation, combined with a system of pipelines to water recipients. For example, wells near the Mojave River are upgradient of the chromium plume, are consistently productive, and could be potential candidates for a well source. Based on experience with freshwater injection using PG&E's wells south of the Compressor Station, there may be naturally-occurring constituents, such as arsenic, that might require pre-treatment before providing as a drinking water system.
    - Use of a connection to Golden State Water Company which could involve an estimated 12-mile pipeline to tie in to the existing water treatment system.
    - Use of a connection to the MWA recharge pipeline located along Community Blvd. The MWA recharge pipeline derives water from the California aqueduct and MWA would have to acquire adequate rights to water to provide it as local water supply. If this water is unable to meet drinking water standards in its original state, it may require treatment before distribution as a water source.
    - As described below under Mitigation Measure WTR-MM-5, as the specifics of proposed water systems are developed, additional project-level CEQA analysis may be necessary.
- Bottled Water Option—If requested by the homeowner, PG&E may provide bottled water for consumptive uses. However, the provision of bottled water does not meet the full intent of this mitigation because full well water replacement would not be provided for all indoor and outside water uses. Therefore, bottled water would need to be supplemented with one of the other options described above to provide full well water replacement. If the homeowner only wants bottled water and not full well water replacement by the proposed methods, then PG&E shall document this to the Water Board.

Regarding a community water system, while technically feasible, there may be challenges to implementing such a system in Hinkley.

- According to the EPA, very small systems (those serving 25 to 500 people) have the largest number of violations (mostly monitoring/reporting violations), and they experience one maximum Contaminant Level Violation for every 80 people serve, which is the highest ratio of all system

service population categories. By comparison, large urban systems (serving more than 100,000 people) experience one Maximum Contaminant Level violation for every 200,000 people service (EPA 2012b)[2].

- The California Department of Public Health (CDPH) has regulatory authority over community water systems. Under the provisions of Section 116330 of the California Health and Safety Code, CDPH has delegated approval of small water systems with less than 200 connections to local primary agencies, which in this case would be the San Bernardino County Public Health Department, Division of Environmental Health Services. A permit application for a community water system would require comprehensive technical, managerial, and financial assessments to gain CDPH (if more than 200 connections) or San Bernardino County (if less than 200 connections) approval. In order to be approved, small water systems must demonstrate that they can be sustainable for the long term.
- An additional concern is the long lead time to implement a community water system, given the approval and review process, and more extensive construction activities than other options, which could take as long as 5 years.
- Hinkley is dominated by rural residences, many of which are highly dispersed, which increases the amount of piping, pumping, and associated cost and construction.
- Some individuals in Hinkley may prefer a community water system, but other individuals may prefer the independence of their own well, which may complicate the implementation of this option.

Monitoring

Water Quality Monitoring and Groundwater Modeling

- PG&E will monitor water quality and model groundwater conditions as required by Mitigation Measures WTR-MM-2a, -2b, and -2c below.

Reporting

- PG&E will incorporate reporting on water supply program implementation into annual reporting to the Water Board. Reporting will include descriptions of all completed and planned expedited remediation actions and alternative water supplies for the following year.

[2] See http://www.epa.gov/nrmrl/wswrd/dw/smallsystems/regulations.html.

WTR-MM-2a: Mitigation Program for Water Supply Wells Affected by the Chromium Plume Expansion due to Remedial Activities

Implementation Timing:	During operation
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

Defining Actually and Potentially Affected Domestic Supply Wells

"Actually affected domestic wells" will be defined as any domestic water supply well with chromium (hexavalent or total) concentrations that exceed any of the following criteria due to remedial actions:

- Maximum background levels (if the well previously had concentrations below maximum background levels); or
- concentrations increase by 10% or more (if the well previously had concentrations that exceed maximum background levels).
- "Potentially affected domestic wells" will be defined as domestic supply wells that have an increase in chromium concentrations due to remedial actions and which:
- are located within one-mile of the defined chromium plume; or
- are predicted to have any of the above conditions for an "actually affected domestic well" within one year as indicated by groundwater modeling.

Monitoring

Water Quality Monitoring

- PG&E will monitor Cr[VI] and Cr[T] in domestic wells (wherever allowed by well owners) within one mile down gradient or cross gradient of the previously defined chromium plume, on a quarterly basis.
- Monitoring requirements may be adjusted by the Water Board's Executive Officer based on contaminant concentration trends, plume geometry changes, or other factors.

Water Quality and Groundwater Modeling

- PG&E will annually model the movement of the chromium plume and will provide maps and descriptions of estimated plume movement for the following three years. The modeling effort will be provided to the Water Board by January 31 of each year.
- The results of the modeling will include predictions for wells that may become affected within the following year and such predictions will be used to plan for either changing remediation activities and/or the provision of alternative water supplies in advance of effects on domestic.
- The report will also define the down gradient and cross gradient monitoring program areas under this section for the following year. Monitoring areas may be modified over the course of the year as described in the water quality monitoring section above.

WTR-MM-2b: Water Supply Program for Water Supply Wells Affected by Remedial Activity Byproducts

Implementation Timing:	One year prior to operation, where possible without delaying planned remediation, and during operation (initial monitoring may be concurrent with remediation efforts if such monitoring would otherwise delay remediation efforts)
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

Defining Actually Affected and Potentially Affected Wells

"Actually affected domestic wells" will be defined as any domestic water supply well with remediation byproduct concentrations that exceed any of the following criteria due to remedial actions:

- concentrations above a California primary or secondary Maximum Contaminant Levels if the well currently contains concentrations that are less than California primary or secondary Maximum Contaminant Level or water quality objective; or
- a 10% increase above current levels if the well has concentrations that currently exceed a California primary Maximum Contaminant Level [3]; or
- a 20% increase above current levels if the well has concentrations that currently exceed a California secondary Maximum Contaminant Level or water quality objective[4]; or
- a 20% increase above current levels if the well has concentrations that currently are less a California primary or secondary Maximum Contaminant Level or water quality objective.[5]

"Potentially affected domestic wells" will be defined as wells that meet any of the following criteria:

- All wells located within one-half mile downgradient or one-quarter mile cross gradient of an "actually affected domestic well" or an affected monitoring well .

[3] As noted in the significance criteria, the discharger may submit evidence if it believes the increase in a specific instance is not statistically significant.

[4] Ibid.

[5] Ibid.

- All wells predicted to be within one-half mile downgradient or one-quarter mile cross gradient of an "actually affected domestic well" or an affected monitoring well in the next year by groundwater flow and transport modeling.

"Actually affected monitoring wells" will be defined using the criteria above for "actually affected domestic wells".

"Actually affected agricultural wells" will be defined as an agricultural well where the following has occurred:

- remedial action has caused an increase in TDS or otherwise affected water quality such that (1) agricultural yields are predicted to be reduced by at least 25% or (2) agricultural product is predicted to have substantial or likely reduction in quality or quantity. Examples of substantial changes in quality include changes in palatability, appearance, or other factors that would impede the ability to sell crops at prevailing crop prices.

"Potentially affected agricultural wells" will be defined as wells that meet any of the following criteria:

- Agricultural wells within one-half mile downgradient or one-quarter mile cross gradient of an "actually affected agricultural well" or an affected monitoring well (when no agricultural well exist within these intervals);
- All wells where any of the above conditions is predicted to occur through groundwater flow and transport modeling within one year.

Monitoring

Water Quality Monitoring

- PG&E will conduct an initial monitoring of domestic and agricultural wells within one-mile downgradient or cross-gradient of any proposed in-situ remediation or agricultural treatment unit commencing upon approval of a new order allowing expanded remediation. Where possible without delaying planned remediation efforts, initial monitoring will be done before operation of new in-situ remediation areas and agricultural treatment units for a minimum of one year on a quarterly basis. Where initial monitoring cannot be done for one year prior to operations without delaying planned remediation efforts, then initial monitoring can be done concurrently with commencement of operations of new in-situ remediation areas and agricultural treatment units. Constituents analyzed will include all potential remedial activity byproducts to ensure that pre-remediation water quality is defined, and that definition is approved by the Water Board, for all domestic and agricultural wells for which well owners provide permission for sampling.
- PG&E will monitor for remedial activity byproducts in domestic and agricultural wells (wherever the Water Board deems appropriate) within one-half mile down gradient and one-quarter-mile cross gradient of any in-situ or agricultural treatment unit, on a twice-yearly (semi-annual) basis.
- If any domestic or agricultural wells are found to be actually affected by remedial byproducts (as described above), PG&E will increase monitoring of the affected well to once per month until alternate water supply is provided to the satisfaction of the Water Board, after which monitoring can be reduced to twice yearly if nearby monitoring wells exist.

- In addition, if any domestic or agricultural wells are found to be actually affected by remedial byproducts (as described above), PG&E will further monitor for that byproduct in all domestic and agricultural wells (wherever the Water Board deems appropriate) within one-half mile downgradient/one-quarter mile cross gradient of that impacted well for the following two years on a quarterly basis. This program is intended to expand the area of monitoring in advance of any potential byproduct plume, and to expand and contract the monitoring area in response to the observed byproducts and remedial progress.
- In-situ treatment byproduct monitoring will consist of iron, manganese, arsenic and total organic carbon.
- Agricultural treatment unit byproduct monitoring will consist of TDS, nitrates, uranium, and radionuclides. If the investigation required by Mitigation Measure WTR-MM-5 identifies that agricultural treatment would significantly affect or have the potential to affect uranium or gross-alpha levels in groundwater, then agricultural treatment unit byproduct monitoring will also include uranium, gross-alpha, and any other applicable radionuclide, such as radium, in addition to soil and plant samples. Additional monitoring for agricultural inputs may be required by the Water Board, if the Water board determines it is warranted.
- Monitoring requirements may be adjusted by the Water Board's Executive Officer based on contaminant concentration trends, byproduct plume geometry, or other factors.

Groundwater Flow and Transport Modeling

- PG&E will annually model the movement of any byproduct plumes and will provide maps and descriptions of estimated plume movement and groundwater level changes for the following three years. The modeling effort will be provided to the Water Board by January 31 of each year.
- The results of the modeling will include predictions for water supply wells that may be impacted within the following year and such predictions will be used to plan for either changing remediation activities and/or the provision of alternative water supplies in advance of effects on domestic and agricultural wells.
- The report will also define and confirm the down gradient and cross gradient monitoring program areas under this section for the following year. If there are insufficient wells within the monitoring areas, as determined by the Water Board in its review of the yearly reporting, then quarterly monitoring of areas of insufficiency will be required.

WTR-MM-2c: Water Supply Program for Wells Affected by Groundwater Drawdown due to Remedial Activities

Implementation Timing:	One year prior to operation, where possible without delaying planned remediation, and during operation (initial monitoring may be concurrent with remediation efforts if such monitoring would otherwise delay remediation efforts)
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

Defining Actually and Potentially Affected Wells

"Actually affected domestic wells" will be defined as follows:

- All wells where groundwater drawdown of more than 25% of the potentially affected wetted screen depth within the saturated zone has occurred due to remedial pumping compared to the pre-remedial reference levels, unless it can be demonstrated that the well remains capable of providing an adequate flow rate for domestic supply and the well owner concurs that the flow rate is adequate for their use.
- All wells where groundwater drawdown of at least 10 feet occurs and water quality sampling shows at least a 10% increase over pre-remedial reference conditions of arsenic, manganese, uranium, or gross alpha.[6]

"Potentially affected domestic wells" will be defined as follows:

- All wells where any of the above conditions is predicted to occur through groundwater modeling within one year.

"Actually affected agricultural wells" will be defined as follows:

- Agricultural wells where groundwater drawdown of more than 25% of the potentially affected wetted well screen depth has occurred due to remedial pumping, compared to the pre-remedial reference levels, unless it can be demonstrated that the well remains capable of providing an adequate flow rate for agricultural supply and the well owner concurs that the flow rate is adequate for their use.

[6] Ibid.

"Potentially affected agricultural wells" will be defined as follows:

- All wells where any of the above conditions is predicted to occur through groundwater modeling within one year.

Monitoring

Groundwater Drawdown Monitoring

- PG&E will conduct an initial monitoring of groundwater levels in all domestic and agricultural wells (wherever allowed by well owners) within one-half mile downgradient or cross-gradient of any existing or proposed groundwater extraction well upon approval of a new order allowing expanded remediation. Initial monitoring will be for a minimum of one year, will be done quarterly, and will include monitoring in March and October, if possible. Initial monitoring will be done prior to operation of groundwater extraction wells, where feasible, without unreasonably delaying planned remediation. Where initial monitoring cannot be done for a full year without delaying planned remediation, then monitoring may be done concurrently with extraction commencement.
- PG&E will monitor the groundwater levels in all domestic and agricultural wells (wherever allowed by well owners) within one-quarter mile of any groundwater extraction point for the duration of remedial pumping until groundwater levels have stabilized for a minimum of two years following commencement of groundwater extraction. If groundwater levels cannot be measured in domestic or agricultural wells, then monitoring wells located between water supply wells and the area of remedial action can be substituted.
- In addition, if any domestic or agricultural wells are found to be affected or potentially affected by excessive drawdown as described below, PG&E will (1) conduct byproduct monitoring (for arsenic, manganese, uranium and gross alpha) and (2) measure the groundwater levels in or adjacent to domestic and agricultural wells (wherever allowed by well owners) within one-quarter mile of that well until groundwater levels have stabilized for a minimum of two years. This program is intended to expand the area of monitoring in advance of any excessive drawdown, and to expand and contract the monitoring area in response to the observed drawdown.
- PG&E will monitor groundwater levels semi-annually in October (after peak irrigation months) and March (after winter rains and before peak irrigation months).
- Monitoring requirements may be adjusted by the Water Board's Executive Officer based on groundwater level conditions or other factors.

Groundwater Modeling

- PG&E will annually model predicted groundwater levels based upon the month with the greatest well water use and will provide maps and descriptions of estimated groundwater level changes for the following three years. The modeling effort will be provided to the Water Board by January 31 of each year.
- The results of the modeling will include predictions for wells that will be impacted within the following year and plans for the provision of alternative water supplies in advance of effects on domestic and agricultural wells.
- The report will also define the monitoring program area under this section for the following year.

WTR-MM-3: Incorporate Measures to Prevent, Reduce and Control Potential Temporary Localized Chromium Plume Bulging Into Overall Plume Control and Monitoring

Implementation Timing:	Prior to issuance of permits
Implementation Responsibility:	Water Board and PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs/CAO
Frequency of Reporting:	See reporting requirements in applicable WDRs/CAO
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs/CAO
Agency Verification of Completion or Compliance:	As specified in applicable WDRs/CAO

Mitigation Measure:

The Water Board shall include requirements in the new CAO and associated WDRs to address potential chromium plume bulging due to remedial activities. These requirements shall be incorporated into the overall plume boundary monitoring and hydraulic capture requirements. These requirements will be flexible to allow for expansion and contraction of the plume (only as authorized by the Water Board) over time as the entirety of the plume is addressed and remediated. The following minimum requirements shall be incorporated into the overall plume boundary monitoring and hydraulic capture requirements:

- Monitoring of plume boundaries in areas with new remedial injections or withdrawals for the potential for bulging.
- Measures to limit chromium plume bulges during operations. This can be achieved by maintaining hydraulic control and inward gradients by pumping of extraction wells. The plume can be allowed to move toward these extraction wells but not beyond the wells.
- Until the Water Board determines otherwise, PG&E will operate and maintain the existing groundwater extraction system to achieve and maintain hydraulic capture within targeted areas on a year-round basis consistent with CAO R6V-2008-0002A3, (Lahontan Regional Water Quality Control Board 2012). The Water Board may periodically modify hydraulic capture requirements as appropriate to address remedial priorities over time.
- Agricultural treatment units and/or treated water from above-ground treatment facilities can be used to assist with inward hydraulic gradients, plume water balance, and water quality restoration of the aquifer.
- PG&E will implement the Contingency Plan for AU Operations as described in the Feasibility Study Addendum No. 3 (Pacific Gas and Electric Company 2011c).

If the Water Board determines that alternative measures are more effective at control of plume bulging, the Water Board may modify the requirements mentioned above.

WTR-MM-4: Mitigation Program for Restoring the Hinkley Aquifer Affected by Remedial Activities for Beneficial Uses

Implementation Timing:	No later than 10 years prior conclusion of remediation project
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs/CAO
Frequency of Reporting:	See reporting requirements in applicable WDRs/CAO
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs/CAO
Agency Verification of Completion or Compliance:	As specified in applicable WDRs/CAO

Mitigation Measure:

This requirement holds PG&E responsible for restoring the Hinkley aquifer back to pre-remedial reference conditions (defined as conditions prior to the initiation of remedial actions included in the project defined in this EIR).

As described in **Mitigation Measure WTR-MM-5 and WTR-MM-6**, PG&E may implement two different approaches to meet this requirement:

- aquifer restoration through direct treatment of water; and/or
- basin-wide approaches to managing agricultural treatment remedial TDS and nitrate byproducts that may avoid the need for post-chromium remediation activities to address these remedial byproducts.
- No later than 10 years prior to the conclusion of the proposed chromium remediation project, PG&E shall conduct an assessment to evaluate adverse impacts or potential adverse impacts to the Hinkley aquifer from its remedial actions.
- If the assessment finds that the aquifer contains constituents exceeding pre-remedial reference conditions and are due to remedial action, and that these constituents are likely to be present upon the conclusion of remedial actions, PG&E will propose cleanup actions to restore the aquifer for beneficial uses as soon as possible, as approved by the Water Board. Aquifer water quality restoration to pre-remedial reference conditions will occur as soon as possible after completion of chromium remediation. The recommended timeframe for restoration is within 10 years of completion of chromium remediation but the Water Board will retain authority to determine the required duration for completion.
- If the assessment finds that the aquifer includes groundwater drawdown due to remedial actions such that domestic or agricultural wells were still experiencing water supply shortages and require alternative water supplies, and these excess levels are likely to exist upon the conclusion of remedial actions, PG&E will propose actions (which could include contributing to MWA's groundwater recharge program; temporary purchase of water allocations to help accelerate water level recovery,

or other measures) to restore the aquifer for beneficial uses as soon as possible, as approved by the Water Board or Mojave Water Agency. These actions will likely require future environmental analyses as the details of the action are defined. Groundwater levels will be restored to pre-remedial reference conditions as soon as possible after the completion of chromium remediation. The recommended timeframe for restoration of groundwater levels is within 10 years of chromium remediation, but Water Board will retain authority to determine the required duration for completion.

- Every year following preparation of the assessment and approval of restoration timeframes, PG&E must submit a status report of actions to restore the aquifer for beneficial uses. The status report will describe all actions taken over the course of the year and list proposed actions for implementation during the following year. An updated schedule will be provided predicting fulfillment of aquifer restoration.

The assessment described above can include analysis of the potential for natural attenuation to return pre-remedial reference conditions within an acceptable timeframe, as determined by the Water Board. This measure is limited to addressing the effects of PG&E remedial actions that cause changes above pre-remedial reference conditions. It is possible that water quality or groundwater baseline levels may be affected by non-PG&E actions (such as other agricultural or dairy activity not controlled by PG&E) during chromium remediation. PG&E will only be responsible to remediate the effects that it causes, not those that are due to the actions of other third-parties.

- Several options exist for treatment of agricultural treatment byproducts (TDS, nitrate, uranium and other radionuclides) if necessary:
    - *Aboveground Treatment*: Treatment technologies, including reverse osmosis, electrochemical treatment (such as electrocoagulation), ion exchange and possibly other methods can be used to remove TDS, nitrate and uranium from water.
    - *In-Situ Remediation*: In-situ remediation using carbon amendment, like that proposed in the high concentration portion of the chromium plume, has been used to remediate elevated uranium levels in groundwater.
    - *Basin-Wide Approach to TDS and Nitrate*: A basin-wide approach to reducing TDS and nitrate could involve fallowing of, or changes in farming practices at other agricultural fields within the basin that are not used for agricultural unit treatment and at area dairies. Since the project will increase agricultural fields and production of animal feed, a basin-wide approach may include an option to implement a "farm swap" to allow fallowing of other local agricultural fields to reduce TDS levels in the groundwater basin. There may also be options to improve irrigation techniques by using drag-drip irrigation instead of broadcast irrigation techniques (thus lowering irrigation amounts and TDS loading), and crop rotation (which may lower water demand). There may also be options to work with local Hinkley dairies to lower TDS and nitrate inputs through better site management practices of manure and runoff. Participation by owners/operators of other agricultural land and dairies would be voluntary and would be subject to private negotiation between PG&E and willing participants. While these approaches could lower overall loading of TDS and nitrate into the Hinkley groundwater aquifer, long-term use of agricultural treatment units for chromium treatment may still result in localized increases of TDS and nitrate. If a basin-wide approach is proposed by PG&E, the Water Board shall require the following:

- A basin-wide approach must show a benefit to the Hinkley Valley aquifer that equals or exceeds the impairment caused by remedial activities compared to pre-remedial reference conditions. For example, the basin-wide approach must avoid or remove an equal amount of TDS as the increased TDS loading resultant from agricultural treatment units. Potential ways of measuring the benefit and impairment can be in terms of the number of impaired wells due to TDS and/or nitrate, the area of aquifer impairment due to TDS and/or nitrate, and the overall annual TDS and/or nitrate loading. The discharger may proposed the means of measuring for Water Board review and approval.
- If the basin-wide benefit above is demonstrated to be equal to or greater than the remedial impairment, then the Water Board will require maintenance of the basin-wide actions for the benefit for the Hinkley aquifer until all areas significantly impaired by TDS and/or nitrate due to remedial actions return to pre-remedial reference conditions.
- If the basin-wide benefit above is demonstrated to be equal to or greater than the remedial impairment, then the Water Board may decide to not require PG&E to specifically remediate localized TDS and/or nitrate increases due to remedial actions provided that all affected domestic and agricultural wells are provided replacement water (per **Mitigation Measure WTR-MM-2**) until pre-remedial reference conditions return.
- The implementation of a basin-wide approach is limited to the project study area for this EIR at this time. If in the future, PG&E proposes basin-wide approaches involving farms outside the project study area, the Water Board will need to comply with CEQA and may need supplemental CEQA evaluation prior to inclusion of additional actions outside the current project study area.

- Several options also exist for treatment of IRZ byproducts (manganese, iron and arsenic) if necessary:
  - As necessary, manganese mitigation may be through the methods proposed in the manganese mitigation plan, such as extraction and capture of manganese-affected groundwater, aboveground aeration, and/or infiltration galleries or other measures determined to be effective by the Water Board. These methods can also be used for mitigation of iron levels, if necessary.
  - As necessary, arsenic mitigation may be through aboveground treatment using precipitation/coprecipitation, ion-exchange units, membrane filtration, electrochemical methods (such as electrocoagulation) or other means determined to be effective by the Water Board.

WTR-MM-5: Investigate and Monitor Total Dissolved Solids, Uranium, and Other Radionuclide Levels in relation to Agricultural Treatment and Take Contingency Actions

Implementation Timing:	Investigation plan within 3 months and investigation completed within 1 year of Water Board approval of WDRs allowing new AUs. Monitoring for one year prior to establishing new AUs (or concurrent if necessary to avoid remediation delay) and during operation per monitoring requirements.
Implementation Responsibility:	Water Board and PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

The Water Board will include requirements in the new CAO and/or associated WDRs issued for the remediation as follows:

- PG&E will submit an investigation plan to the Water Board concerning TDS, uranium, and other radionuclides levels in relation to existing agricultural treatment by sampling water used for agricultural treatment and in groundwater upgradient, beneath and downgradient of agricultural treatment units. PG&E will submit the investigation plan within three months of Water Board approval of WDRs allowing new agricultural treatment units.
- After approval of the investigation plan by the Water Board, PG&E will conduct the investigation and provide the results to the Water Board along with an analysis of whether agricultural treatment is affecting uranium levels. The investigation shall be completed within one year of Water Board approval of WDRs allowing new agricultural treatment units.
- PG&E will monitor all new agricultural treatment units by establishing pre-remedial reference levels for TDS, uranium, and other radionuclides levels at the outset agricultural treatment and during operation. Monitoring data will be conducted for one year prior to establishment of new agricultural treatment units wherever feasible (if not feasible without undue remediation delay, monitoring will be done concurrently with startup of agricultural treatment units).
- If TDS, uranium, and other radionuclides levels are determined to increase due to agricultural treatment associated with remedial actions, then PG&E will monitor these levels in and adjacent to all agricultural treatment units for the duration of operation and propose remedial methods for Water Board approval to restore the aquifer to pre-remedial reference conditions.
- If the monitoring of agricultural units indicates that TDS, uranium, and other radionuclide concentrations increase due to agricultural treatment associated with remedial actions then

corrective actions (which could include aboveground treatment, carbon amendment, or other methods) per **Mitigation Measure WTR-MM-4** will be implemented to restore aquifer beneficial uses after remediation is complete. Alternative water supplies will be provided per **Mitigation Measure WTR-MM-2** for any significantly affected water wells until beneficial uses are restored.

WTR-MM-6: Monitor Nitrate Levels and Manage Agricultural Treatment to Avoid Significant Increases in Nitrate Levels and Provide Alternative Water Supplies As Needed

Implementation Timing:	Monitoring for one year before creating new AUs (or concurrent if necessary to avoid remediation delay), at start of agricultural treatment, and as needed during operation of new AUs per monitoring requirements.
Implementation Responsibility:	Water Board and PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

Agricultural treatment will likely reduce nitrate levels in the groundwater aquifer overall. However, if groundwater is extracted from an area of higher nitrate concentrations and then treated in an area with much lower nitrate concentrations, it is possible that nitrate concentrations could increase in those localized areas. The Water Board will include requirements in the new CAO and/or associated WDRs issued for the remediation as follows:

- Given that prior agricultural treatment at the Desert View Dairy has been shown to reduce nitrate levels substantially, it is possible that use of irrigation water with higher nitrate levels may not result in increased nitrate levels in groundwater beneath new agricultural treatment locations. In order to confirm if this is occurring, PG&E will monitor nitrate levels for one year before creating new agricultural treatment units (as feasible without delaying remediation), monitor at the start of new agricultural treatment, and continue monitoring nitrate levels during implementation of all new agricultural treatment units. If nitrate levels do not: 1) increase above 10 ppm (as N), or 2) by more than 10% (if current levels are already above 10 ppm as N), or 3) by more than 20% compared to existing levels (if current levels are less than 10 ppm as N) then no further action, other than monitoring, will be required.
- If monitoring indicates that nitrate levels exceed 10 ppm (as N) or increasing by more than the criteria noted above, then PG&E will implement a contingency plan for managing nitrate levels which may include some combination of the following:
    - Extraction source water will be shifted from application where it would raise concentrations substantially to locations with existing higher concentrations of nitrate, provided it would not cause an exceedance of nitrate levels at any domestic well.

- Extraction source water will be blended before application to agricultural treatment units so as to avoid exceedance of 10 ppm as N and avoid increases in existing levels that exceed the criteria noted above.
- Above-ground treatment may be used as necessary to meet the concentration levels described above.
- If control of nitrate cannot meet these requirements, PG&E may request permission from the Water Board to allow temporary increases in nitrate conditions at certain agricultural treatment units, if and only if, the following can be demonstrated:
    - no domestic wells will contain nitrate concentrations above 10 ppm or an increase in nitrate levels exceeding the criteria above; or
    - PG&E will provide replacement water for any affected domestic well until such a time as nitrate concentrations return to existing concentrations at the affected well, and
    - PG&E will be held accountable for implementing remedial methods to restore the aquifer to pre-remedial reference conditions after remediation is complete.
- PG&E will estimate the duration of nitrate impairment of water quality due to remedial activities and will identify how long before affected groundwater nitrate levels will return to pre-remedial reference conditions. The duration of nitrate impairment due to remedial activities may possibly extend beyond the time necessary to remediate the chromium plume; the goal of remedial operation in the later stages of the cleanup should be to minimize the duration of all impacts.
- The Water Board will retain the authority to approve or deny temporary impairment of the aquifer due to nitrate contamination and will make determinations on a case by case basis taking into account information on remedial progress, the affected wells and community, the certainty of returning affected groundwater to pre-remedial reference water quality conditions over time and any other relevant considerations.

Alternatively this mitigation measure may be met through basin-wide approaches described in **Mitigation Measure WTR-MM-4**.

WTR-MM-7: Construction and Operation of Additional Extraction Wells to Control Carbon Amendment In-situ Byproduct Plumes

Implementation Timing:	Prior to issuance of permits, if needed based on byproduct concentrations in monitoring wells
Implementation Responsibility:	Water Board and PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

Increased in-situ remediation could result in increased levels of byproducts, such as dissolved arsenic, iron, and manganese in the groundwater compared to current levels.

The Water Board will include requirements in the new CAO and/or associated WDRs issued for the remediation as follows:

- PG&E will monitor secondary byproducts in groundwater as required by **Mitigation Measure WTR-MM-2**.
- PG&E shall complete an investigation of manganese and arsenic in the area west of the defined chromium plume (as of Q4/2012) and demonstrate to the satisfaction of the Water Board that the detection of these constituents in domestic wells is not related to IRZ operations. This demonstration shall occur before the Water Board will allow further expansion of IRZ operations.
- If arsenic, iron, or manganese concentrations at designated monitoring wells increase to more than 20 percent above the maximum pre-remedial reference monitoring well concentration, PG&E will construct and operate additional extraction wells or implement an equally effective mitigation measure along or upgradient of the IRZ treatment boundary to intercept or reduce reagent concentrations and secondary byproducts to prevent effects to domestic water supply wells.
    - Extraction wells may be used to intercept elevated concentrations of byproducts and prevent downgradient migration.
    - As necessary, manganese mitigation may be through the methods proposed in the current manganese mitigation plan, such as extraction and capture of manganese-affected groundwater, aboveground aeration, and/or infiltration galleries or other measures determined to be effective by the Water Board. These methods can also be used for mitigation of iron levels, if necessary.
    - As necessary, arsenic mitigation may be through aboveground treatment using precipitation/coprecipitation, ion-exchange units, membrane filtration, electrochemical

methods (such as electrocoagulation) or other means determined to be effective by the Water Board.

- If control of byproduct plumes cannot be achieved without compromising the pace of cleanup such that domestic wells may be affected by byproduct plumes, then PG&E will request permission from the Water Board to allow byproduct plume migration provided the following are implemented:
  - PG&E will provide fate and transport modeling of byproduct plume migration, in absence of complete boundary control, including identification of all affected domestic and agricultural wells.
  - PG&E will demonstrate the duration of byproduct plume impairment of water quality and will identify how/when affected groundwater will return back to pre-remedial reference conditions. The duration of byproduct plume impairment may possibly extend beyond the time necessary to remediate the chromium plume. The goal of remedial operation in the later stages of the cleanup should be to minimize the duration of all impacts.
  - PG&E will provide alternative water supplies to all wells proposed to be affected, per **Mitigation Measure WTR-2**.
  - The Water Board will retain the authority to approve or deny temporary impairment of the aquifer due to byproduct generation and will make determinations on a case by case basis taking into account information on remedial progress, the affected wells and community, the certainty of returning affected groundwater to pre-remedial reference water quality over time and any other relevant considerations.

WTR-MM-8: Ensure Freshwater Injection Water Does Not Degrade Water Quality

Implementation Timing:	Prior to using new sources of water for freshwater injection and then twice per year during operation
Implementation Responsibility:	Water Board and PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	See monitoring requirements in applicable WDRs
Frequency of Reporting:	See reporting requirements in applicable WDRs
Standard for Completion or Compliance:	Mitigation incorporated into applicable WDRs
Agency Verification of Completion or Compliance:	As specified in applicable WDRs

Mitigation Measure:

The Water Board will include requirements in the new CAO and/or associated WDRs issued for the remediation as follows:

- PG&E will sample all water sources proposed for use in freshwater injection for all basic water quality parameters and will specifically monitor for chromium (total and hexavalent chromium), TDS, uranium, other radionuclides (including gross alpha), nitrate, arsenic, manganese, iron and sulfate. Data will be provided to the Water Board for review. Means must happen before use new water
- Concentrations of all constituents in freshwater injected for plume control must either be 1) less than the applicable primary or secondary Maximum Contaminant Level or 2) if the concentrations of certain constituents at the injection point already exceed a Maximum Contaminant Level, then the injection water must have concentrations of the constituent equal to or less than that in the ambient groundwater at the injection point.
- PG&E will identify to the Water Board the filtration or pretreatment necessary to meet the water quality levels described above. After approval of the water source for use for freshwater injection, PG&E will sample the treated water on a semi-annual basis (twice per year) at a minimum to demonstrate that the water source is still acceptable for use for freshwater injection. If it is found that the water source is not acceptable for use for freshwater injection, freshwater may need to draw from different area where water quality levels are met.

LU-MM-1: Obtain Bureau of Land Management Permits in Compliance with California Desert Conservation Area Plan and the West Mojave Plan

Implementation Timing:	Prior to remedial activities on federal land
Implementation Responsibility:	PG&E with BLM
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	As needed prior to remedial activities on federal land
Frequency of Reporting:	Before remedial activities on federal land
Standard for Completion or Compliance:	Copies of BLM submittals, approvals, and permits
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will obtain any required approvals from BLM for any proposed remedial activities on federal land. PG&E will provide copies of BLM submittals and approvals to the Water Board to keep them informed of any proposed remedial activities on federal land.

LU-MM-2: Acquire Agricultural Conservation Easements for any Important Farmland If Water Rights Are Acquired for Remediation

Implementation Timing:	Within one year of acquiring water rights from important farmland
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	As part of annual monitoring
Frequency of Reporting:	As part of annual reporting
Standard for Completion or Compliance:	Record of agricultural conservation easement
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

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

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

HAZ-MM-1: Implement Contingency Actions if Contaminated Soil is Encountered During Ground Disturbance

Implementation Timing:	During soil excavation and grading activities
Implementation Responsibility:	PG&E with qualified Professional Engineer or Professional Geologist
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	As needed, to be determined by PE or PG
Frequency of Reporting:	As needed, to be determined by PE or PG g
Standard for Completion or Compliance:	Annually: Annual Report As needed: A memorandum of evidence that PG&E consulted with an approved PE or PG regarding the risk of encountering contaminated soils and committing to be available for consultation during soil excavation and grading. If potentially contaminated soil is unearthed, a report with the recommended course of action will be prepared by the PE or PG and provided to the Water Board (and to San Bernardino County if remediation is required). Annually: Annual Report with memorandum of evidence
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will work with an experienced and qualified Professional Engineer or Professional Geologist, subject to approval by the Water Board, who will be available for consultation during soil excavation and grading activities.

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

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist will have the authority to temporarily suspend further activity at that location for the protection of workers or the public. If, in the opinion of the Professional Engineer or Professional Geologist, significant remediation may be required, the PG&E will contact the Water Board and representatives of the Hazardous Materials Division of San Bernardino County's Environmental Health Services Department for guidance and possible oversight.

HAZ-MM-2: Implement Spill Prevention, Control, and Countermeasures Plan During Construction

Implementation Timing:	Prior to and during construction activities triggering the requirement of a SPCC or equivalent
Implementation Responsibility:	PG&E with San Bernardino County Fire Department
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Before construction: Ensure SPCC Plan or equivalent completed and approved During construction: Periodically as identified in SPCC Plan or equivalent
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Annually: Annual Report Before construction: Approval of SPCC Plan or equivalent Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

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

- Hazardous materials storage and usage will be in accordance with the requirements of the San Bernardino County Fire Code, Articles 79 and 80. A Business Contingency/Emergency Plan will be prepared in accordance with San Bernardino County Fire Department requirements for chemicals stored on-site for more than 30 days in excess of the regulatory thresholds (55 gallons, 500 pounds, or 200 standard cubic feet of gas). It is anticipated the plan will list hazardous materials handled and include procedures for emergency response, training, and inspections. Hazardous wastes will be managed in accordance with the requirements of Title 22, California Code of Regulations, Division 4.5.
- All spills and corrective actions will be recorded in the field log by the site manager.
- Any accidental spill that releases hazardous materials to soil outside the spill containment pads in amounts exceeding reportable quantities will be reported to the appropriate regulatory agency.

- Treatment plants will be constructed on a concrete foundation and provided with secondary containment to contain drips and spills and tanker offloading areas as necessary.

HAZ-MM-3: Implement Building Materials Survey and Abatement Practices

Implementation Timing:	Prior to structure demolition or modification activities
Implementation Responsibility:	PG&E with registered environmental assessor or California-registered professional engineer
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to demolition/modification of any structure
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Prior to structure demolition/modification: Signed report or documentation by registered environmental assessor or California-registered professional engineer. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

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

GEO-MM-1: Land Subsidence Monitoring, Investigation, and Repair

The Final EIR identifies this as a recommended, but not required, measure. The Water Board recommends that PG&E implement this measure, but is not mandating its implementation as the source impact was identified as less than significant in the EIR. If PG&E chooses to implement this measure, the Water Board would request reporting as described below.

Implementation Timing:	Prior to and during remedial-induced groundwater drawdown
Implementation Responsibility:	PG&E with landowner and qualified expert approved by Water Board
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Recommended at least every three years
Frequency of Reporting:	Recommended annually: Annual Report
Standard for Completion or Compliance:	Not Applicable/Measure is voluntary
Agency Verification of Completion or Compliance:	Not Applicable/Measure is voluntary

Mitigation Measure:

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

Where changes in ground surface elevations greater than 1 foot are identified or where structural damage is identified by PG&E or reported by a landowner, PG&E should investigate site structures for subsidence-related damage. If damage is identified by PG&E and/or landowners, PG&E should retain a qualified expert approved by the Water Board to evaluate whether the damage is due to remedial-induced groundwater drawdown. If the expert determines that the damage is due to remedial-induced groundwater drawdown, then PG&E should identify proposed remedial actions to the Water Board and, once approved by the Water Board, should repair, replace, and/or reimburse for any damaged structures (e.g., buildings, garages, barns) or infrastructure (e.g., pipelines, septic systems, supply wells).

GEO-MM-2: Emergency Response Plan for Potential Remedial Pipeline or Storage Tank Rupture

Implementation Timing:	Prior to operation of remedial pipeline or storage tank
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to operation of remedial pipeline or storage tank
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Prior to operation of remedial pipeline or storage tank: Completion of Emergency Response Plan, as a section in the treatment system operation & maintenance manual and/or Health and Safety Plan. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will prepare a section in the treatment system operation and maintenance (O&M) manual and/or Health and Safety Plan (HASP) that describes the specific procedures to be followed in a major seismic event, including:

- Shut-down of remedial pumping.
- Visual inspection of project pipelines and above-ground tanks to determine if any leakage has occurred.
- Spill containment and recovery procedures for any chemicals that may have spilled from project pipelines or aboveground tanks.
- Pressure test of project pipelines or above-ground storage tanks to determine integrity prior to resuming system operation.
- Communication requirements for notifying the Water Board of spills and releases will be specified in the Water Board's Waste Discharge Requirements (WDRs) for the project.

AIR-MM-1: Utilize Clean Diesel-Powered Equipment during Construction

Implementation Timing:	During construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Monthly when construction equipment is operating
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	During construction: Field report confirming appropriate equipment is being used. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or their contractor will ensure that all off-road diesel-powered equipment used during construction will be equipped with an EPA Tier 4 Interim engine, and an EPA Tier 4 Final or cleaner engine when available, except for specialized construction equipment in which an EPA Tier 4 engine is not available. This will achieve the emission reductions compared to an average Tier 2 engine shown in Table 3.5-18 (South Coast Air Quality Management District 2010). For purposes of a conservative analysis, mitigated reductions assume the lowest of the NO_X Final (93%), reactive organic gases (42%), and particulate matter (90%) reductions applied to all off-road equipment. Note that Tier 4 standards for carbon monoxide are unchanged from Tier 2. Therefore, there will be no carbon monoxide reductions associated with Tier 4 standards herein.

Table 3.5-18. Off-Road Engine Emission Rates, Percent Reductions from Tier 2 to Tier 4 Interim and Tier 4 Final Engines

Engine Size (horsepower)	Percent Emissions Reduction Tier 2 to Tier 4 Interim and Tier 4 Final			
	NO_X (Interim)	NO_X (Final)	ROG	PM
75–99	53	94	50	95
100–174	46	94	43	93
175–299	68	94	43	90
300–600	67	93	42	90

Source: South Coast Air Quality Management District 2010.

Italic values indicate the percent reductions assumed in the mitigated analysis.

Note that the off-road engine reductions shown herein are summarized by SCAQMD, but are based on ARB and EPA standards for diesel equipment. Therefore, while the proposed project area is not within SCAQMD jurisdiction, the reductions herein are applicable to the proposed project alternatives.

AIR-MM-2: Ensure Fleet Modernization for On-Road Material Delivery and Haul Trucks during Construction

Implementation Timing:	During construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Monthly when construction equipment is operating
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	During construction: Field report confirming appropriate equipment is being used. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will ensure that all on-road heavy-duty diesel trucks used during construction with a gross vehicle weight rating (GVWR) 19,500 pounds or greater, including those for all material deliveries and soil hauling, will comply with EPA 2007 on-road emission standards for PM10 and NO_X (0.01 grams per brake horsepower-hour [g/bhp-hr] and 0.20 g/bhp-hr, respectively).

The above EPA Standards measures will be met, unless one of the following circumstances exists, and the contractor is able to provide proof that any of these circumstances exists:

- A piece of specialized equipment is unavailable in a controlled form within the state of California, including through a leasing agreement. ("Controlled form" refers to an equipment piece that has emission-control technology included.)
- A contractor has applied for necessary incentive funds to put controls on a piece of uncontrolled equipment planned for use on the proposed project, but the application is not yet approved, or the application has been approved, but funds are not yet available.
- A contractor has ordered a control device for a piece of equipment planned for use on the proposed project, or the contractor has ordered a new piece of controlled equipment to replace the uncontrolled equipment, but that order has not been completed by the manufacturer or dealer. In addition, for this exemption to apply, the contractor must attempt to lease controlled equipment to avoid using uncontrolled equipment, but no dealer within 200 miles of the proposed project has the controlled equipment available for lease.

AIR-MM-3: Implement Emission-Reduction Measures during Construction

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Before construction: Upon completion of construction specifications During construction: Monthly when construction equipment is operating
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Complete construction specifications. During construction: Field report confirming appropriate equipment is being used. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will include the following emission-reducing measures in the construction specifications to ensure implementation during construction.

- Haul and delivery truck idling times will be minimized either by shutting equipment off when not in use or reducing the maximum idling time to less than 3 minutes (greater than that required by the California airborne toxics control measure, 13 CCR 2485). Clear signage will be provided for construction workers at all access points.
- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified mechanic and determined to be running in proper condition prior to operation.

AIR-MM-4: Implement Dust Control Measures during Construction and Operations

Implementation Timing:	Prior to and during construction and operation
Implementation Responsibility:	PG&E or their contractor with MDAQMD
Monitoring Responsibility:	Water Board with MDAQMD
Frequency of Monitoring:	Before construction: Upon completion of construction specifications Before operation: Upon completion of Operations & Maintenance manual During construction: Monthly During operation: Annually
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Approved construction specifications Before operation: Approved Operations & Maintenance manual During construction and operation: Field report confirming appropriate measures are being implemented Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will include the following dust control measures per MDAQMD Rule 403.2 in the construction specifications to ensure implementation during construction and in the Operations & Maintenance manual to ensure implementation during operation.

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. For purposes of this rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes will be considered sufficient to maintain compliance.
- Take actions sufficient to prevent project-related trackout onto paved surfaces.
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces.
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is attributable to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions.
- Cleanup project-related trackout or spills on publicly maintained paved surfaces within 24 hours.

- Reduce nonessential earth-moving activity under high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces from wind erosion will be considered sufficient to maintain compliance.

Additionally, projects disturbing more than 100 acres per day will comply with the following rules, also to be included in the construction specifications and the Operations & Maintenance manual.

- Prepare and submit to the MDAQMD, prior to commencing earth-moving activity, a dust control plan that describes all applicable dust control measures that will be implemented at the project. With respect to the proposed project, it was assumed that specific dust control measures would include limiting travel speeds to 15 miles per hour on unpaved roads, watering exposed surfaces three times daily, and applying soil stabilizers to inactive areas.
- Provide stabilized access route(s) to the project site as soon as is feasible. For purposes of this rule, as soon as is feasible will mean prior to the completion of construction/demolition activity.
- Maintain natural topography to the extent possible.
- Construct parking lots and paved roads first, where feasible.
- Construct upwind portions of project first, where feasible.

AIR-MM-5: Utilize Clean Diesel-Powered Equipment for Operation of Agricultural Treatment (Alternative 4C-4 only)

Implementation Timing:	During operations
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	During operation: Annually to ensure appropriate equipment in use
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	During operation: Field report confirming appropriate equipment is being used. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will ensure that all off-road diesel-powered equipment used during operations of agricultural land treatment (Alternative 4C-4 only) will be equipped with an EPA Tier 4 Interim or Final or cleaner engine, except for specialized construction equipment in which an EPA Tier 4 engine is not available. This will be included in the construction specifications.

AIR-MM-6: Implement San Bernardino County GHG Construction Standards during Construction

Implementation Timing:	During construction
Implementation Responsibility:	PG&E with San Bernardino County
Monitoring Responsibility:	Water Board with San Bernardino County
Frequency of Monitoring:	Monthly
Frequency of Reporting:	Prior to construction: submittal of compliance plan Monthly during construction Annually: Annual Report
Standard for Completion or Compliance:	Prior to construction: Submittal of agreement to condition contracts. During construction: Report or memorandum of evidence documenting that all applicable GHG performance standards have been installed and implemented properly, and that specified performance objectives are being met to the satisfaction of County Planning and County Building and Safety. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will submit a signed letter to San Bernardino County and the Water Board agreeing to include as a condition of all construction contracts/subcontracts requirements to reduce GHG emissions and submit documentation of results for all action alternatives. PG&E or its contractor will do the following:

- Implement a County-approved Coating Restriction Plan, as applicable.
- Select construction equipment based on low GHG emissions factors and high-energy efficiency. Where feasible, diesel-/gasoline-powered construction equipment will be replaced, with equivalent electric or compressed natural gas (CNG) equipment.
- Because it may not be feasible to use electric or CNG equipment per the County performance standard, the project will use biodiesel fuel if the following applies:
    - Biodiesel fuel becomes available within 20 miles of the project site.
    - The California Air Resources Board has certified that the locally available biodiesel results in reduction of GHG emissions.
    - Biodiesel fuel is approved by the manufacturer for use in diesel trucks or equipment used for remedial activities, including farm equipment and construction equipment.

  - The cost of biodiesel is not more than 125% above the price of regular diesel fuel, then
  - As biodiesel comes in blended amounts (B5 = 5% biodiesel; B20 = 20% biodiesel; B100 = 100% biodiesel), PG&E will use the highest biodiesel blend that is approved for use in site trucks or equipment, available, and within the price limitation noted above.
- Grading contractor will implement the following when possible:
  - Training operators to use equipment more efficiently.
  - Identifying the proper size equipment for a task can also provide fuel savings and associated reductions in GHG emissions.
  - Replacing older, less fuel-efficient equipment with newer models.
  - Using global positioning system (GPS) for grading to maximize efficiency.
- Grading plans will include the following statements:
  - "All construction equipment engines will be properly tuned and maintained in accordance with the manufacturers specifications prior to arriving on site and throughout construction duration."
  - "All construction equipment (including electric generators) will be shut off by work crews when not in use and will not idle for more than 5 minutes."
- Recycle and reuse construction and demolition waste (e.g., soil, vegetation, concrete, lumber, metal, and cardboard) per County Solid Waste procedures.
- Educate all construction workers about the required waste reduction and the availability of recycling services.

PG&E or its contractor will submit for review and obtain approval from County Planning of evidence that all applicable GHG performance standards have been installed and implemented properly, and that specified performance objectives are being met to the satisfaction of County Planning and County Building and Safety.

AIR-MM-7: Implement San Bernardino County GHG Operational Standards for Operations

Implementation Timing:	During operation of remedial activities
Implementation Responsibility:	PG&E with San Bernardino County
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Periodically, as determined by County Planning
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Periodically: Report or memorandum of evidence, reviewed and approved by County Planning, that all applicable GHG performance standards are being employed, and that specified performance objectives are being met to the satisfaction of County Planning and County Building & Safety. Annually: Annual Report with memorandum of evidence.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will implement the following as GHG mitigation during the operation of the approved project for all action alternatives.

- Waste Stream Reduction. PG&E will provide to all employees County-approved informational materials about methods and the need to reduce the solid waste stream, with a list of available recycling services. The education and publicity materials/program will be submitted to County Planning for review and approval.
- Landscape Equipment. If landscaping is added for the above-ground treatment facilities, PG&E will require that a minimum of 20% of the landscape maintenance equipment will be electric-powered.
- Biodiesel Fuel. Because there are limited to no options to reduce vehicle emissions given the remote location of the site, PG&E will use biodiesel in operations when the following conditions apply as an alternative means to reduce GHG emissions:
    - Biodiesel fuel becomes available within 20 miles of the project site.
    - The California Air Resources Board has certified that the locally available biodiesel results in reduction of GHG emissions.
    - Biodiesel fuel is approved by the manufacturer for use in diesel trucks or equipment used for remedial activities, including farm equipment and construction equipment.
    - The cost of biodiesel is not more than 125% above the price of regular diesel fuel, then
    - As biodiesel comes in blended amounts (B5 = 5% biodiesel; B20 = 20% biodiesel; B100 = 100% biodiesel), PG&E will use the highest biodiesel blend that is approved for use in site trucks or equipment, available, and within the price limitation noted above.

PG&E will submit for review and obtain approval from the San Bernardino County Planning Department of evidence that all applicable GHG performance standards are being employed, and that specified performance objectives are being met to the satisfaction of County Planning and County Building and Safety.

AIR-MM-8: Implement San Bernardino County GHG Design Standards

Implementation Timing:	Prior to operation of aboveground treatment plants
Implementation Responsibility:	PG&E with San Bernardino County
Monitoring Responsibility:	Water Board with San Bernardino County
Frequency of Monitoring:	Prior to the operation of aboveground treatment plants
Frequency of Reporting:	Once prior to operation
Standard for Completion or Compliance:	Only applies to aboveground treatment plants, if proposed. Prior to operation: Report or memorandum of evidence that all applicable GHG performance standards have been installed and implemented properly, and that specified performance objectives are being met to the satisfaction of County Planning and County Building and Safety. If any alternative is confirmed to be more than 3,000 MTCO2e per year, report or memorandum of evidence that emissions are being reduced by required amounts (anticipated to be at least 31%).
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will submit for review and obtain approval from County Planning that the following measures have been incorporated into the design of the project, as applicable. These are intended to reduce potential project GHGs emissions. Proper installation of the approved design features and equipment will be confirmed by County Building and Safety prior to final inspection of each structure.

1. Title 24 + 5%. PG&E will document that the design of the proposed above-ground treatment structures exceed the current Title 24 energy-efficiency requirements by a minimum of 5%. County Planning will coordinate this review with County Building and Safety. Any combination of the following design features may be used to fulfill this mitigation, provided that the total increase in efficiency meets or exceeds the cumulative goal (105%+ of Title 24) for the entire project (Title 24, Part 6 of the California Code of Regulations; Energy Efficiency Standards for Residential and Non Residential Buildings, as amended October 1, 2005; Cool Roof Coatings performance standards as amended September 11, 2006):
    a. Incorporate dual paned or other energy efficient windows.
    b. Incorporate energy efficient space heating and cooling equipment.
    c. Incorporate energy efficient light fixtures, photocells, and motion detectors.
    d. Incorporate energy efficient appliances.
    e. Incorporate solar panels into the electrical system.
    f. Incorporate cool roofs/light colored roofing.

g. Incorporate other measures that will increase energy efficiency.

h. Increase insulation to reduce heat transfer and thermal bridging.

i. Limit air leakage throughout the structure and within the heating and cooling distribution system to minimize energy consumption.

2. Plumbing. All plumbing will incorporate the following:

3. All showerheads, lavatory faucets, and sink faucets will comply with the California Energy Conservation flow rate standards.

a. Low flush toilets will be installed where applicable as specified in California State Health and Safety Code Section 17921.3.

b. All hot water piping and storage tanks will be insulated. Energy efficient boilers will be used.

4. Lighting. Lighting design for building interiors will support the use of the following:

a. Compact fluorescent light bulbs or equivalently efficient lighting.

b. Natural day lighting through site orientation and the use of reflected light.

c. Skylight/roof window systems.

d. Light colored building materials and finishes that reflect natural and artificial light with greater efficiency and less glare.

e. A multi-zone programmable dimming system to control lighting and maximize the energy efficiency of lighting requirements at various times of the day.

f. Onsite solar panels that provide a minimum of 2.5% of the project's electricity needs.

5. Building Design. Building design and construction will incorporate the following elements:

a. Orient building locations to best utilize natural cooling/heating with respect to the sun and prevailing winds/natural convection to take advantage of shade, day lighting, and natural cooling opportunities.

b. Utilize natural, low maintenance building materials that do not require finishes and regular maintenance.

c. Install roofing materials that have a solar reflectance index of 78 or greater.

d. Seal and leak test all supply duct work. Use oval or round ducts for at least 75% of the supply duct work, excluding risers.

e. Install Energy Star or equivalent appliances.

f. Control heating, vent, and air conditioning units with a building automation system that includes outdoor temperature/humidity sensors.

6. Landscaping. If landscaping is used at the above-ground treatment facilities, PG&E will submit for review and obtain approval from County Planning landscape and irrigation plans that are designed to include drought tolerant and smog tolerant trees, shrubs, and groundcover to ensure their long-term viability and to conserve water and energy. If the above-ground treatment facilities are heated

or cooled, then the landscape plans will include shade trees around main buildings, particularly along southern and western elevations, if practical.

7. Irrigation. PG&E will limit irrigation used for agricultural treatment to the minimum necessary to support remedial action.
8. Recycling. Exterior storage areas for recyclables and green waste will be provided. Where recycling pickup is available, adequate recycling containers will be located in public areas. Construction and operation waste will be collected for reuse and recycling.

PG&E will work with County Planning and submit any required reports for evidence that all applicable GHG performance standards have been installed and implemented properly, and that specified performance objectives are being met to the satisfaction of County Planning and County Building and Safety.

If any alternative is confirmed to be more than 3,000 $MTCO_2e$ per year, then instead of the requirements above in **Mitigation Measure AIR-MM-7** and the requirements described above, PG&E will be responsible to reduce emissions by at least 31 percent. In this case, PG&E will work with County Planning and submit any required evidence that emissions will be reduced by required amounts, anticipated to be a minimum of 31 percent.

NOI-MM-1: Prepare a Noise/Vibration Control Plan and Employ Noise/Vibration-Reducing Construction Practices to Comply with County Noise Standards

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Before construction: Once, prior to the initiation of construction activities. During construction: Monthly
Frequency of Reporting:	Annually: Annual Report Prior to construction: Once prior to the initiation of construction activities
Standard for Completion or Compliance:	Before construction: Construction specifications with measures submitted to Water Board During construction: Periodic field review verifying control measures are being implemented to reduce noise and vibration to a level that is in compliance with County noise standards. Annually: Annual Report with annual summary of monitoring and reporting activities, including all field reports or a final summary report.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E or its contractor will ensure that noise/vibration-reducing construction practices are implemented so that construction noise does not exceed applicable County standards. As part of the construction specifications, the project contractor will identify feasible measures that can be employed to reduce construction noise/vibration. These may include the measures listed below.

- Scheduling substantial noise-generating/vibration activity during exempt daytime hours
- Requiring construction equipment to be equipped with factory-installed muffling devices and all equipment to be operated and maintained in good working order to minimize noise generation
- Locating noise/vibration-generating equipment as far as practical from noise-sensitive uses including avoiding vibration-generation within 25 feet of any residence, wherever feasible
- Using temporary noise/vibration-reducing enclosures around noise-generating equipment
- Placing temporary barriers between noise/vibration sources and noise-sensitive land uses or taking advantage of existing barrier features (e.g., terrain, structures, edge of trench) to block sound transmission

Per the construction specifications, control measures will be implemented to reduce noise and vibration to a level that is in compliance with County noise standards.

BIO-MM-1a: Implement Measures to Minimize, Reduce, or Mitigate Impacts on Desert Tortoise during Construction

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with authorized biologist, CDFW, USFWS
Monitoring Responsibility:	Field: Authorized biologist (hired by PG&E) Overall: Water Board
Frequency of Monitoring:	Daily
Frequency of Reporting:	Before construction: Survey Reports During construction: Immediate reporting of sightings/injuries/mortalities Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Submittals of desert tortoise focused survey results report; desert tortoise preconstruction clearance survey result letter report; desert tortoise translocation plan report, if required, to be approved by CDFW and USFWS; documentation where desert tortoise fencing was installed, if required. During construction: Map and immediate reporting (within 24 hours) of desert tortoise sightings and any injuries/fatalities plus an annual report summary; daily biological construction monitoring by a USFWS and CDFW authorized biologist and submittal for reporting would consist of a daily monitoring log. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

The following measures shall be implemented to reduce construction impacts to the desert tortoise. These measures shall be implemented in a manner consistent with any incidental take authorization issued by CDFW and USFWS. If the requirements below exceed those required by CDFW or USFWS, they shall still be implemented unless they directly conflict with or impede the requirements of CDFW or USFWS.

- Protocol-level surveys for desert tortoise will occur prior to construction either in April through May or September through October per the most recent protocol issued by the USFWS (U.S. Fish and Wildlife Service 2010b). The surveys will be conducted in the area proposed to be disturbed by the project and 1,500 meters from the edge of the proposed disturbance area to confirm the use of that area by desert tortoise. Any variation from this protocol would require approval by USFWS and CDFW. A report will be prepared at the end of each survey period.

- A preconstruction clearance survey will be completed for desert tortoise within each project area to ensure that all tortoise are absent, or that any tortoises that present are moved off site and out of harm's way per the most recent protocol issued by the USFWS (currently this is USFWS 2009). The protocol (USFWS 2009) states that two consecutive surveys would be conducted immediately prior to surface disturbance at each site within the project area.
- Desert tortoise found within the construction areas will be either allowed to move passively away or be physically relocated by an authorized handler to a location out of harm's way, but within their home range (defined by USFWS 2009 as less than 1,000 feet). If relocating desert tortoise, a translocation plan will need to be approved by CDFW and USFWS.
- Where possible, desert tortoise exclusion fencing will be placed along the perimeter of the proposed work areas prior to surface disturbance to prevent encounters with desert tortoise during construction activities. The specifications of the desert tortoise exclusion fencing will follow USFWS (Desert Tortoise Field Manual: Chapter 8. Desert Tortoise Exclusion Fence 2009c). Daily preconstruction sweeps within the proposed project area will be conducted before construction to ensure that desert tortoise are absent from the project area. Desert tortoise exclusion fencing will also be placed around all permanent buildings and structures where entrapment or negative interactions with tortoises could occur.
- All desert tortoise sighted within the proposed project area must be immediately reported and construction activity jeopardizing the tortoise must be halted until the approved USFWS and CDFW biologist is able to relocate the animal. If a desert tortoise is injured or killed, the authorized biologist must be notified, the injury or death documented, and the animal taken to a qualified veterinarian or the carcass removed by the biologist.
- An annual report submitted to CDFW and USFWS will document desert tortoise seen, injured, killed, excavated, and/or handled, along with all pertinent details.
- Ongoing construction monitoring will ensure that desert tortoise observed within 100 feet of construction are actively monitored for a negative qualitative response from vibration.
- Any authorized biologist needs to be approved by USFWS and CDFW, and any monitors need to be approved by CDFW.

BIO-MM-1b: Limit Footprint of Disturbance Areas within Special-Status Species Habitats

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with authorized biologist or environmental monitor
Monitoring Responsibility:	Field: Authorized biologist or environmental monitor Overall: Water Board
Frequency of Monitoring:	Before construction: Documentation of project footprint review and delineated work areas During construction: Daily biological monitoring logs
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Documentation of the biologist working with the design/construction team showing that project footprints were reduced to avoid special-status species habitat or moved to overlap previously disturbed areas; this will include original draft work areas as submitted and finalized, field verified, work areas. Other documentation shall be in the form of focused survey reports that show that work areas were delineated in the field to avoid any environmentally sensitive areas. During construction: Biological monitoring logs that show work occurred within delineated areas and environmentally sensitive areas were avoided. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

The area of disturbance will be confined to the smallest practical area, considering topography, placement of facilities, location of occupied desert tortoise, Mohave ground squirrel, and burrowing owl habitat, public health and safety, and other limiting factors, and will be located in previously disturbed areas to the extent possible. An Authorized Biologist or Environmental Monitor will assist the project foreman in locating such areas to avoid desert tortoise, Mohave ground squirrel, and burrowing owl mortality, minimize impacts to habitat, and ensure compliance with this measure and other pertinent regulatory documents. In areas where the project sponsor is unable to install exclusionary fencing, work area boundaries and access roads will be delineated with flagging or other marking to minimize surface disturbance outside of the approved work area. All disturbance limits need to be confirmed by the construction monitor. Special habitat features, such as burrows, identified by the Authorized Biologist will be avoided to the extent possible.

BIO-MM-1c: Implement Pre-Construction and Ongoing Awareness and Training Program

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with authorized biologist or environmental monitor
Monitoring Responsibility:	Field: Authorized biologist or environmental monitor Overall: Water Board
Frequency of Monitoring:	Before and during construction as needed: Training log documenting new contractors on site received training (may be as frequently as daily).
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before construction and as needed: Training log documenting that any new contractors on site received the standard Awareness and Training Program presented by a biologist and including the sign-in sheet. A hard hat sticker will be worn to verify the work has completed training. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

All employees, subcontractors, and others who work on-site will participate in a desert tortoise, Mohave ground squirrel, burrowing owl, American badger, Mojave River vole, desert kit fox, and sensitive plant species awareness program prior to initiation of construction activities. PG&E is responsible for ensuring that the awareness program is presented prior to conducting activities. Hard hat stickers to identify personnel who have attended the training and wallet-sized cards listing key best management practices are required. At a minimum, the awareness program will emphasize the following information relative to these species: (a) distribution on the job site; (b) general behavior and ecology; (c) sensitivity to human activities; (d) legal protection; (e) penalties for violating State or federal laws; (f) reporting requirements; and (g) project protective mitigation measures. The Authorized Biologist and/or Environmental Monitor will work with the project proponent to ensure that all workers have received the awareness program and understand the various components. Interpretation will be provided for non-English speaking construction workers.

BIO-MM-1d: Conduct Ongoing Biological Monitoring during Construction

Implementation Timing:	During construction
Implementation Responsibility:	PG&E with authorized biological monitors
Monitoring Responsibility:	Field: Authorized biological monitors Overall: Water Board
Frequency of Monitoring:	Before and during construction: Daily during ground disturbance and Weekly after clearing/grubbing
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before and during construction: All biological construction monitoring shall be documented with the completion and submittal of a standard daily biological monitoring log. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Biological monitors approved by CDFW will conduct daily construction monitoring of the desert tortoise exclusion fencing, as well as during clearing and grubbing (initial ground disturbance) of the work area. Biological monitors will be familiar with desert tortoise, Mohave ground squirrel, and burrowing owl, as well as nesting birds. Once clearing and grubbing is complete, a biological monitor will conduct, at minimum, weekly spot checks to document compliance with the mitigation measures presented in this EIR and elsewhere. An on-call desert tortoise handler will be available should desert tortoise be encountered during construction activities.

BIO-MM-1e: Minimize Potential Construction Hazards to Special-Status Species

Implementation Timing:	During construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Field: Authorized biologist or environmental monitor Overall: Water Board
Frequency of Monitoring:	During construction: Daily biological monitoring log
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	During construction: The measures below will be included as check boxes on the standard daily biological monitoring log. Completion and submittal of these logs will show whether compliance with these measures was achieved. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to minimize construction hazards to special-status species:[7]

- No hazards to special-status species, particularly desert tortoise, such as open trenches and holes, will be left overnight without fencing or covering,
- No firearms or pets will be allowed at the work area. Firearms carried by authorized security and law enforcement personnel are exempt from this term and condition.
- Dust will be controlled. If water trucks are to be used, pooling of water will be avoided so to minimize the potential to attracting common ravens or potential predators of the desert tortoise.
- Except on paved roads with posted speed limits, vehicle speeds will not exceed 10 miles per hour through desert tortoise and Mohave ground squirrel habitat during travel associated with the authorized activity.

[7] Introductory text in italics added after Final EIR.

BIO-MM-1f: Implement Measures to Minimize and Prevent Attraction of Predators during Construction and Operation

Implementation Timing:	Prior to and during construction and operation
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Field: Authorized biologist or environmental monitor Overall: Water Board
Frequency of Monitoring:	Before and during construction and operation: Daily
Frequency of Reporting:	Prior to construction: Raven Management Plan During construction and operation: Daily biological monitoring log Annually: Annual Report
Standard for Completion or Compliance:	Before construction: A Raven Management Plan, which includes the measures listed below, must be prepared and approved. During construction and operation: The daily biological monitoring log will include the measures identified in the Raven Management Plan as check boxes. Completion and submittal of these logs will show whether compliance with these measures was achieved. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to minimize and prevent attraction of predators:[8]

- Litter control measures will be implemented. Trash and food items will be contained in closed containers and removed daily to reduce the attractiveness or the area to opportunistic predators such as common ravens (*Corvus corax*), coyotes (*Canis latrans*), and feral dogs.
- If water trucks are to be used, pooling of water will be avoided so to minimize the potential to attracting common ravens or other potential predators.
- Potential perches and nest substrates for the common raven will be reduced to the greatest extent practicable within permanent project facilities.
- A raven management plan will be developed by the project proponent that will include at a minimum establishing a common raven population pre-remedial reference level, with ongoing and post-construction monitoring of common raven populations, and triggers for adaptive management

[8] Introductory text in italics added after Final EIR.

actions if ravens are occurring above pre-remedial conditions and observed to be utilizing facilities and structures built as part of this project.

BIO-MM-1g: Reduction of Project-Related Spread of Invasive Plant Species

Implementation Timing:	After construction
Implementation Responsibility:	PG&E with qualified biologist
Monitoring Responsibility:	Plan Review: Qualified biologist Overall: Water Board
Frequency of Monitoring:	Periodically, with each submittal of seeding, planting, and/or landscape plans
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Periodically: With each submittal of seeding, planting and/or landscape plans, a biologist will submit a memorandum of evidence that the plans were reviewed and indicate if the review was satisfactory. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If reseeding of temporary disturbance areas or ornamental landscaping is proposed, the proposed seed palette will be reviewed by a biologist to ensure it does not contain plants that are considered invasive in California (based on the California Invasive Plant Inventory Database).

BIO-MM-1h: Compensate Impacts on Desert Tortoise and Mohave Ground Squirrel Habitat

Implementation Timing:	Mitigation amount determined prior to disturbance of habitat. . At a minimum, required compensation shall be acquired/implemented within 3 years of corresponding habitat disturbance or as required by any necessary permits.
Implementation Responsibility:	PG&E with USFWS, CDFW
Monitoring Responsibility:	CDFW, USFWS, Water Board
Frequency of Monitoring:	Before construction: Confirm mitigation amounts and timing During construction: Keep mitigation amounts current
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before and during construction: This mitigation can be implemented in phases corresponding to the phasing of disturbance due to remedial activities. PG&E shall provide confirmation that mitigation credits have been purchased, or that restoration, enhancement, and/or creation credits have been secured or provided no later than 36 months after corresponding habitat disturbance. If permitting is required, then the CDFW and/or USFWS shall provide this confirmation. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Compensatory mitigation for the loss of desert tortoise and Mohave ground squirrel habitat will be determined through consultation with CDFW and USFWS. The minimum compensation ratios for moderate to high quality habitat suitable to desert tortoise and Mohave ground squirrel are 3:1 for permanent impacts and 1:1 for temporary impacts (although no temporary impacts have been identified). For impacts to low quality desert tortoise and Mohave ground squirrel habitat, the minimum compensation ratio is 1:1 for permanent impacts. The minimum compensation ratio for impacts within a Desert Wildlife Management Area (DWMA) is 5:1 for permanent impacts. Final mitigation ratios will be determined during consultation with the appropriate resource agency, in accordance with the requirements of a Section 7 or Section 10 permit and/or a Section 2081 permit. Mitigation may include purchase, restoration, enhancement, and/or creation of desert tortoise and Mohave ground squirrel habitat.

Lands provided as mitigation for desert tortoise and Mohave ground squirrel may also be used to provide mitigation for any loss of burrowing owl habitat, if the land in question includes suitable habitat for the burrowing owl.

BIO-MM-1i: Integrated Pest Management and Adaptive Management Plan for Agricultural Treatment Units

Implementation Timing:	Prior to operation of agricultural units (AU)
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Field: PG&E Overall: Water Board
Frequency of Monitoring:	To be determined in the IPM/AM Plan
Frequency of Reporting:	Before new AU construction (IPM/AM Plan) Annually: Annual Report
Standard for Completion or Compliance:	Before new AU construction: Completion, approval, and implementation of an Integrated Pest Management and Adaptive Management Plan (IPM/AU Plan). A checklist or standard form should be made of the implementable elements of the IPM/AU Plan so that compliance monitoring can be completed. Updates of the IPM/AU Plan need to be made for new AUs as appropriate (if conditions or contingencies differ from AU to AU). Annually: Annual Report with copy or verification of IPM/AU Plan
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

An agricultural unit integrated pest management (IPM) plan will be developed and implemented for all new (and existing) agricultural units, and will be compliant with the California Statewide IPM year-round program for alfalfa and any other crops that may be proposed for use. The plan will explicitly detail an integrated pest management plan to ensure that risks of any proposed use of herbicides, pesticides, or rodenticides will pose a negligible risk to wildlife species. Herbicides, pesticides, or rodenticides will only be used at new agricultural units if specifically authorized by USFWS and CDFW in the take permits for the desert tortoise and the Mohave ground squirrel. The adaptive management plan will detail the predicted harvest of the agricultural crops and how harvest will be conducted in such a manner to reduce potential impacts to nesting birds. The adaptive management plan will provide other population monitoring guidelines for predatory species such as brown-headed cowbird, with management actions that will be required if fields are found to be supporting these species. The adaptive management plan will also outline irrigation control to avoid pooled water.

BIO-MM-1j: Reduction of Night Light Spillover

Implementation Timing:	Prior to design of any night lighting for the operation of remedial activities.
Implementation Responsibility:	PG&E with qualified biologist
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	Prior to operation: A plan check that shows the amount of night lighting spillover (Lighting Plan)
Frequency of Reporting:	Prior to operation: Lighting Plan Annually: Annual Report
Standard for Completion or Compliance:	Prior to operation: For remedial activities with exterior lighting, a biologist will confirm that the light plans have been inspected and that night lighting spillover has been minimized and is not expected to result in indirect impacts to special-status species. This can be a memorandum of evidence prepared by the biologist. Annually: Annual Report with memorandum of evidence
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Exterior light fixtures and standards will be designed to be fully shielded, directing light downward below the horizontal plane of the fixture height. A detailed lighting plan will be inspected by a biologist to ensure that the expected light spillover has no potential to impact special-status species.

BIO-MM-1k: Implement Other Measures to Minimize, Reduce, or Mitigate Impacts on Mohave Ground Squirrel

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with authorized biologist
Monitoring Responsibility:	Field: Authorized biologist Overall: Water Board
Frequency of Monitoring:	As needed
Frequency of Reporting:	Before construction: Survey Reports During construction: Documentation of Occurrences Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Submittal of Survey Report with Mohave ground squirrel focused survey results. If greater than 180 acres is to be disturbed, documentation of special survey protocols agreed upon by the agencies is required. During construction: Document occurrences with map/report (within 24 hours) of Mohave ground squirrel sightings and any injuries/fatalities, plus an annual report summary. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to minimize, reduce and mitigate impacts on Mohave ground squirrel:[9]

- A Mohave ground squirrel focused protocol survey will be completed prior to construction in the project study area where construction is proposed following protocol established by CDFW (2003). For habitat loss of greater than 180 acres, the Department requires special survey protocol(s) to be developed through its consultation with either the project proponent or the local lead agency (if appropriate) or both entities.
- If any Mohave ground squirrels are uncovered by excavation during construction, work must stop in the immediate area and the project biologist will be immediately notified.
- If any Mohave ground squirrels are injured or killed during the course of construction, work must stop in the immediate area and the project biologist will be immediately notified. Only the authorized biologist will handle, and transport injured animal to a qualified veterinarian.

[9] Introductory text in italics added after Final EIR.

BIO-MM-1l: Implement Other Measures to Minimize, Reduce, or Mitigate Impacts on Burrowing Owl

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified biologist for preconstruction survey and with CDFW for avian protection plan
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	Daily and periodic depending on activity
Frequency of Reporting:	Before construction: Survey Reports, Avian Protection Plan During construction: Daily monitoring logs Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Submittal of Survey Reports with burrowing owl focused survey results report. If burrowing owls are present, an Avian Protection Plan will be developed in consultation with CDFW to address burrowing owl avoidance, minimization, and relocation measures as needed. During construction: Daily biological monitoring logs will be used to document the establishment of minimum construction buffers around occupied burrows. Annually: Annual Report with annual summary of monitoring and reporting activities.

Mitigation Measure:

PG&E will ensure the following measures are implemented to minimize, reduce and mitigate impacts on burrowing owl:[10]

- To confirm the current existing condition for burrowing owls in the project study area, a focused nesting season survey for burrowing owl will be completed for all potential disturbance limits and a minimum 400 feet buffer area, where accessible, prior to construction. This focused survey will utilize the most recent CDFW protocol (including any variations in that protocol that may be approved by CDFW for the survey).
- A preconstruction survey for burrowing owls will occur no greater than 14 days and a second preconstruction survey will occur 24 hours prior to commencing ground disturbing or construction activities. The limits of this preconstruction survey will include the disturbance area and a 400-foot buffer.
- Avoid disturbing occupied burrows during the nesting period, from February 1 through August 31 unless it is verified that the birds have not begun egg-laying. Work may only commence when it is

[10] Introductory text in italics added after Final EIR.

determined that juvenile owls from those burrows are foraging independently and capable of independent survival.

- Avoid impacting burrows occupied during the non-breeding season (September 1–January 31) by migratory or non-migratory resident burrowing owls.
- An avian protection plan will be developed in consultation with CDFW to address burrowing owls or signs of burrowing owls should they be found on site during the focused nesting or preconstruction surveys. Unless otherwise approved by CDFW, the minimum no construction buffers will be 160 feet for occupied burrows during the non-breeding season of September 1 through January 31 and 250 feet during the breeding season of February 1 through August 31.
- If burrowing owls and their habitat can be protected in place on or adjacent to a project area, the use of buffer zones, visual screens (such as hay bales) or other feasible measures while project activities are occurring will be used to minimize disturbance impacts. These will be outlined in the avian protection plan.
- On-site passive relocation will be avoided to the greatest extent practicable, and only implemented if avoidance cannot be met. Passive relocation is defined as encouraging owls to move from occupied burrows to alternate natural or artificial burrows. A passive relocation plan will be detailed in the avian protection plan.
- Compensation provided for desert tortoise and Mohave ground squirrel will also provide habitat for burrowing owls should there be an unavoidable impact to this species.

BIO-MM-1m: Minimize Impacts on American Badger and Desert Kit Fox Occupied Dens

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified biologist
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	Daily biological monitoring logs
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Before and during construction: Submittal of preconstruction reports will document the presence of badger and/or kit fox burrows for avoidance. Avoidance of burrows would be documented in the daily biological monitoring logs. If a burrow requires removal, coordination and agreements with CDFW will be documented. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If there is evidence that a burrow may be occupied by a badger or a kit fox during preconstruction surveys (see **Mitigation Measure BIO-MM-1a**), all construction activities will cease within a 100-foot buffer of the burrow during the natal season (February–July) unless otherwise authorized by CDFW. Removal of an occupied American badger or desert kit fox burrow at any time of the year will require coordination with CDFW.

BIO-MM-1n: Avoid Impacts on Nesting Loggerhead Shrike, Northern Harrier, and Other Migratory Birds (including Raptors and excluding Burrowing Owls)

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified biologist
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	As needed during nesting season (February 1–August 31), but as often as daily
Frequency of Reporting:	Before construction: Survey Report During construction: Daily biological monitoring log Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Submittals of nesting bird preconstruction survey results letter report to document nests. Monitoring will occur when construction occurs near nests. Appropriate flagging and avoidance of nests would be documented with biological construction daily monitoring logs. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Pursuant to the federal Migratory Bird Treaty Act and CDFW code, impacts to bird nests will be avoided. To avoid any impacts on migratory birds, resulting from construction activities that may occur during the nesting season, February 1 through August 31, the following measure will be implemented:

- A qualified biologist will conduct a preconstruction survey of the proposed construction site and 250 foot buffer area around the site. This preconstruction survey will commence no more than 7 days prior to the onset of construction, such as clearing and grubbing and initial ground disturbance.
- If a nest is observed, an appropriate buffer will be established. For nesting passerine birds the minimum buffer will be 50-feet. For nesting raptors, the minimum buffer will be 250 feet. These minimum buffers could be reduced with approval by CDFW based on the field conditions and disturbance tolerance of each species.
- All no-construction activity buffer areas will be clearly demarcated in the field with stakes and flagging that are visibility to construction personnel.

BIO-MM-1o: Implement Measures Required to Minimize, Reduce, or Mitigate Impacts on Special-Status Plants

Implementation Timing:	Prior to and during to construction
Implementation Responsibility:	PG&E with qualified biologist, USFWS, CDFW (if listed plants)
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	As needed in blooming season (March-July) in allscale and creosote scrub habitats, desert dune habitat, and the Mojave River wash habitat, but as frequently as daily.
Frequency of Reporting:	Before construction: Survey Reports During construction: Daily biological monitoring logs, Mitigation Plan (as needed) Annually: Annual Report
Standard for Completion or Compliance:	Before and during construction: Submittals of special-status plant survey results report to document any locations. Monitoring will occur when construction occurs near identified plant locations. Appropriate flagging and avoidance of special-status plant would be documented with biological construction daily monitoring logs. If any listed plants cannot be avoided, consultation with the agencies will occur. If non-listed CRPR rank 1A, 1B, or 2 plant species cannot be avoided, a brief analysis will be completed and submitted to determine if any additional mitigation is warranted based on the overall status of the plant in the region. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to minimize, reduce and mitigate impacts on special status plants:[11]

- To confirm the presence/absence and quantify of special-status plant species populations (such as Lane Mountain milk-vetch, Mojave monkeyflower, Clokey's cryptantha, desert cymopterus, Barstow woolly sunflower, Mojave menodora, creamy blazing star, beaver dam breadroot, and Parish's phacelia) in specific areas where remedy facilities may be constructed, a special-status plant survey will be completed prior to construction in the limits of disturbance and a 100-foot buffer that are proposed in allscale and creosote scrub habitats, desert dune habitat, and the Mojave River wash habitat. The focused survey for these species should be conducted by a qualified biologist during the

appropriate blooming period (approximately March–July), or when the plant is readily identifiable, prior to the initiation of construction.

- If any listed plant species are observed during focused surveys of the work areas, the extent of the population will be clearly demarcated in the field by protective fencing, lath stakes, and/or flagging, as appropriate, for avoidance and the regulatory agencies will be notified. If project related impacts to a listed plant species will occur, initiation of consultation with CDFW and or USFWS will be required. Avoidance of listed species is the first priority; disturbance shall only be approved if the Water Board, CDFW and/or USFWS all determine that complete avoidance is infeasible.
- If any plant species that are not listed under CESA or ESA but are identified as special-status species ("non-listed plant species") are observed during focused surveys of the work areas, the extent of the population will be clearly demarcated in the field by protective fencing, lath stakes, and/or flagging, as appropriate, for avoidance. Avoidance will occur to the maximum extent feasible. If impacts are proposed to non-listed CRPR rank 1A, 1B, or 2 plant species, a brief analysis will be completed to determine the appropriate mitigation. Additional measures as a result of this analysis may be required, such as seeding, transplanting, collection of seeds to be used for the future conservation of the species, and/or compensatory mitigation habitat. Avoidance of non-listed, but rare species is the first priority; disturbance shall only be approved if the Water Board and CDFW both determine that complete avoidance is infeasible.
- A biological monitor who has observed the location of the listed and non-listed plant species to be avoided will conduct a tailgate session, informing the work crew of the appearance and location of the plant species prior to initiation of work activities.

[11] Introductory text in italics added after Final EIR.

BIO-MM-1p: If Remedial Actions Affect Mojave Fringe-toed Lizard Habitat, than Compensate for Habitat Losses

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified biologist
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	As needed prior to construction activities
Frequency of Reporting:	Before and during construction: Habitat/Impact Assessment, Mitigation Plan (if needed) Annually: Annual Report
Standard for Completion or Compliance:	Before and during construction: An analysis of whether final work areas overlap Mojave fringe-toed lizard habitat (wind-blown sand areas) will be completed and submitted by a biologist. If unavoidable impacts are to occur, quantification of impacts will be required and CDFW must be consulted. Documentation of the satisfaction of this measure from CDFW will be required. Compensation (Mitigation Plan) must be provided within no more than 3 years of habitat disturbance. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to mitigate impacts on Mojave fringe-toed lizard habitat:[12]

- Compensatory mitigation for the loss of Mojave fringe-toed lizard habitat will be determined through consultation with CDFW. The minimum compensation ratio for Mojave fringe-toed lizard habitat will be 3:1.

[12] Introductory text in italics added after Final EIR

BIO-MM-2: Habitat Compensation for Loss of Sensitive Natural Communities

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified biologist, CDFW, USFWS (if listed species issues)
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	As needed prior to construction activities
Frequency of Reporting:	Before construction: Habitat/Impact Assessment, Mitigation Plan (if needed) Annually: Annual Report
Standard for Completion or Compliance:	Before and during construction: PG&E's biologist shall complete an analysis of whether final work areas overlap California joint fir scrub, desert dune habitat and dune land soils that will be submitted to CDFW and the Water Board. If unavoidable impacts are to occur, PG&E's biologist shall provide a quantification of impacts and a proposal for compensatory mitigation (Mitigation Plan) to CDFW and the Water Board. Documentation of the satisfaction of this measure from CDFW will be required. Annually: Annual Report, with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to mitigate impacts on sensitive natural communities:[13]

Avoidance of California joint fir scrub, desert dune habitat and dune land soils is the first priority; encroachment shall only occur if the Lahontan Water Board, USFWS, and CDFW all concur that complete avoidance is infeasible. If new remediation activities result in the permanent removal and loss of sensitive natural communities such as the California joint fir scrub and desert dunes habitat and dune land soils, a compensatory mitigation program or plan will be developed and implemented through consultation with the USFWS, CDFW, and the Lahontan Water Board. Compensatory mitigation may include a fee-based program and/or direct habitat replacement on a minimum 1:1 basis and in accordance with those agencies' recommendations.

Lands provided as mitigation for desert tortoise, Mohave ground squirrel, Mojave fringe-toed lizard, and burrowing owls may also be used to provide mitigation for any loss of sensitive nature community habitat, if the land in question includes sensitive natural communities.

[13] Introductory text in italics added after Final EIR

BIO-MM-3: Measures Required to Minimize, Reduce, or Mitigate Impacts on Waters and/or Wetlands under the Jurisdiction of the State

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified biologist, USACE, CDFW, Water Board
Monitoring Responsibility:	Field: Qualified biologist Overall: Water Board
Frequency of Monitoring:	As needed prior to construction activities.
Frequency of Reporting:	Before construction: Wetland/Water Impact Identification, Relevant permits (as needed), Harper Lake playa mitigation plan (as needed) Annually: Annual Report
Standard for Completion or Compliance:	Before construction: An analysis of whether final work areas overlap jurisdiction of the U.S. Army Corps of Engineers (USACE), Lahontan Water Board, and/or CDFW (including the Harper Lake playa) must be completed and submitted by a biologist/regulatory specialist. If unavoidable impacts are to occur, appropriate permits from USACE, Lahontan Water Board, and/or CDFW must be received prior to construction in these areas. Annually: Annual Report with annual summary of monitoring and reporting activities.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure the following measures are implemented to minimize, reduce and mitigate impacts on waters or wetlands under the jurisdiction of the state:[14]

- Construction activity and access roads will be avoided in all drainages, streams, dry lake beds, pools, or other features that could be under the jurisdiction of the U.S. Army Corps of Engineers (USACE), Lahontan Water Board, and/or CDFW, if feasible. If impacts to these features are identified, a formal jurisdictional delineation for submittal to the agencies may be required.
- If impacts to USACE, RWQCB, and/or CDFW jurisdiction waters or wetlands are identified, the project applicant will comply with the permitting requirements imposed by USACE, Lahontan Water Board, and/or CDFW, as appropriate.
- Remedial actions shall avoid encroachment on the Harper Lake playa itself to the maximum extent feasible. If encroachment is necessary on the playa, PG&E shall demonstrate the rationale why encroachment is unavoidable to the Water Board and CDFW. If the Water Board and CDFW determine that the encroachment is necessary, PG&E shall mitigate for all temporary or permanent

[14] Introductory text in italics added after Final EIR

disturbance on a minimum 3:1 ratio (3 acres mitigation to 1 acre impact). Plans for mitigation must be approved by RWQCB and CDFW.

BIO-MM-4: Implement West Mojave Plan Measures to Impacts on DWMAs on BLM Land

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with authorized biologist, BLM
Monitoring Responsibility:	Field: BLM Overall: Water Board
Frequency of Monitoring:	As needed prior to construction activities in DWMAs on BLM Land
Frequency of Reporting:	Before construction in BLM areas: BLM concurrence with DWMA measures Within 3 years of initial disturbance in BLM areas: Compensatory mitigation Annually: Annual Report
Standard for Completion or Compliance:	Before construction in BLM areas: Record of coordination and agreement with BLM for work in DWMAs to satisfy the measures below to Water Board including submittals of desert tortoise, burrowing owl, and plant focused and preconstruction survey results reports to BLM. Within 3 years of initial disturbance: Documentation of satisfaction of the compensatory requirements for DWMAs on BLM Land. Anytime: Map and immediate reporting (within 24 hours) of desert tortoise sightings and any injuries/fatalities plus any non-compliance issues to BLM. Annually: Annual Report, with daily monitoring logs and any records of coordination/agreement with BLM and with any mapped sightings
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Pertinent measures contained within the Final Environmental Impact Report and Statement for the West Mojave Plan (BLM 2005) will be implemented to minimize potential impacts to special-status species within conservation areas located on federal land, if and where project activities would infringe on their suitable habitat. Consultation with BLM will be required prior to implementation of any activities. According to the FEIR for the West Mojave Plan, these activities will generally include the following (the detailed list of mitigation measures can be found in the FEIR for the West Mojave Plan):

- Avoid construction activities (particularly linear projects through Tortoise Survey Areas) when tortoises are most likely to be active, which generally occurs between February 15 and November 15.
- Conduct pre-construction surveys (according to approved BLM guidelines [2005] and USFWS' Guidelines for Handling Desert Tortoises [USFWS 2009]) for presence or absence of species and

monitor and report any violations of protective stipulations. Only authorized biologists may conduct surveys and handling of any live individuals.

- Authorize biologists and environmental monitors will monitor and report any violations of protective stipulations, record and report any instances where tortoises or other covered species were encountered, upon completion of construction activities report on the effectiveness and practicality of mitigation measures (including information on collected, killed or injured individuals) and the acres of habitat that were removed or disturbed.
- Pay compensatory fee. Within the Habitat Conservation Areas on BLM land, the compensatory fee will be based on a ratio of 5:1 (five times the average value of an acre of land within the habitat conservation area).
- Conduct burrowing owl survey. For burrowing owl habitat within the DWMAs, a burrowing owl survey utilizing the four-visit CDFW protocol will be conducted. The applicant will provide to all construction personnel an informational brochure with an illustration of a burrowing owl, a description of its burrows and how they can be recognized, and a summary of the bird's life history. If at any time prior to grading the applicant becomes aware of burrowing owls on the site, he will be instructed to call a number where a biologist can respond quickly by instituting the minimization measures.
- Conduct botanical surveys. For Desert cymopterus, if disturbance within suitable habitat located within the Superior Cronese DWMA is proposed, the Applicant will be required to perform botanical surveys for this species, and if the plant is located, to avoid all occurrences to the maximum extent practicable. Incidental take will be limited to 50 acres.

CUL-MM-1: Determine Presence of Historic Resources as Defined by CEQA

Implementation Timing:	Prior to construction
Implementation Responsibility:	PG&E with qualified architectural historian
Monitoring Responsibility:	Field: Qualified Architectural Historian Overall: Water Board
Frequency of Monitoring:	After construction activities are designed: Historical Resource Survey
Frequency of Reporting:	After construction activities are designed: Historical Resource Survey Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Historic Resources Survey report(s) and memorandum of evidence that the Water Board (and BLM for federal lands) accepts the findings of the report. Historic resources surveys should be prepared according to National Register Bulletin 24, *Guidelines for Local Surveys: A Basis for Preservation Planning* and the *Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation*. Directions for completing DPR 523 forms are found in Instructions for Recording Historical Resources. Annually: Annual Report
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Prior to construction and potential future construction activities, PG&E will retain a qualified architectural historian to conduct surveys in areas where construction will occur to determine if historical resources, as definite in State CEQA Guidelines Section 15064.5, exist within the project area. The survey will be conducted and written according to standards set forth in the Historic Structures Report Format from the Office of Historic Preservation (Office of Historic Preservation 2003). The survey will be provided to the Water Board (and to the BLM for federal lands if required by BLM) for review prior to construction.

The qualified architectural historian also will evaluate the resources identified during the Architectural Resources Survey and will consult with the Water Board to determine if they are eligible for the CRHR or otherwise meet the definition of a historical resource under CEQA. If it meets the definition, the architectural historian will determine if the construction or operation of the proposed remediation activities would affect the qualities of the resource that contribute to the eligibility for listing on the CRHR, and will evaluate if the potential change(s) to the resource is considered significant. The evaluation will be documented in a report will be written according to standards set forth in the Historic Structures Report Format from the Office of Historic Preservation (Office of Historic Preservation 2003). The report will be provided to the Water Board for review prior to construction.

CUL-MM-2: Avoid Damage to Historic Resources Located in Project Areas through Project Modification

Implementation Timing:	Prior to construction
Implementation Responsibility:	PG&E with qualified architectural historian
Monitoring Responsibility:	Water Board, BLM (if federal lands)
Frequency of Monitoring:	Prior to construction
Frequency of Reporting:	Prior to construction Annually: Annual Report
Standard for Completion or Compliance:	After remediation activities are designed, reviewed, and/or modified: Letter Report(s) by qualified architectural historian will summarize potential damage proposed by the PG&E-designed remediation elements (including construction and staging) and include any suggestions for project modifications. If there are project modifications, a follow-up Letter Report will be prepared to summarize the effectiveness of the design changes. All Letter Reports will be submitted to the Water Board (and to the BLM for federal lands if required by BLM) for review and concurrence. Annually: Annual Report, with Letter Reports
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If the PG&E-designed remediation elements (including construction and staging) are likely to significantly impact qualities of a historical resource as identified by a professionally qualified architectural historian (per **Mitigation Measure CUL-MM-1**), PG&E will consult with a qualified architectural historian to redesign, reroute, or relocate the proposed elements in such a way that will not result in significant impacts to the resource. Barrier fencing or another visual cue may be installed around identified resources as required to protect against inadvertent damage during construction. PG&E will document the avoidance measures prior to construction and submit the report to the Water Board (and to the BLM for federal lands if required by BLM) to demonstrate compliance.

CUL-MM-3: Record Historic Resources

Implementation Timing:	Prior to construction
Implementation Responsibility:	PG&E with qualified architectural historian
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	If historic resources are identified, prior to construction
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	If historic resources are identified, preparation of documentation to the Historic American Building Survey (HABS)/Historic American Engineering Record (HAER) standards. Documentation will be submitted to the Water Board (and to the BLM for federal lands if required by BLM) for review and then to the National Park Service HABS/HAER historian for review and acceptance into the nationwide recordation program. In accordance with National Park Service standards, archival final submissions will be sent to the National Park Service HABS/HAER historian for final acceptance and sent to the Library of Congress HABS Collection for inclusion. Two copies of the document, including archival prints, will be submitted to regional historical repositories for inclusion in their research collection. If preservation or reuse measures are identified in Documentation a Preservation Plan shall be prepared. If preservation or reuse are pursued, PG&E will consult with a qualified architectural historian to write a Preservation Plan for submittal to the Water Board (and to the BLM for federal lands if required by BLM) for review and acceptance. If interpretive or educational measures are identified in Documentation: Mitigation Report. If interpretive and educational mitigation measures are pursued, then a Mitigation Report will be written and submitted to the Water Board (and to the BLM for federal lands if required by BLM) for review and acceptance. Annually: Annual Report, with all relevant documentation
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If historical resources are identified and cannot be avoided through **Mitigation Measure CUL-MM-2**, PG&E will retain a professionally qualified architectural historian to conduct research and to adequately record the resources to Historic American Building Survey (HABS)/Historic American Engineering Record (HAER) standards. Adequate recordation of a built environment resource will include:

- Development of site-specific history and appropriate contextual information regarding the particular resource, in addition to archival research and comparative studies;

- Accurate mapping of the noted resources, scaled to indicated size and proportion of the structures;
- Architectural descriptions of the structures;
- Photo documentation of designated resources; and
- Recordation utilizing measured architectural drawings.

Mitigation of a built environment resource may also take place in the form of preservation or reuse of a building or structure. The preservation and/or reuse of an eligible structure will include abiding by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

If the architectural historic resource is eligible for the CRHR under Criteria 1 (association with important events in history), 2 (association with important people in history), 3 (an important example of historic architecture), or 4 (has yielded or may be likely to yield information important in prehistory or history), PG&E will attempt to physically retain the building or structure. If the building or structure cannot physically be retained, then PG&E, in coordination with a qualified architectural historian, will pursue measures to retain and make easily available the historic memory of the resource. To this end, educational resources such as web media, static displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement HABS/HAER. PG&E will submit a mitigation report to the Water Board upon complete implementation of the approved mitigation measures to document compliance.

CUL-MM-4: Conduct an Archaeological Resource Survey to Determine if Historical Resources under CEQA or Unique Archaeological Resources under PRC 21083.2 are Present in Proposed Areas of Disturbance

Implementation Timing:	Prior to construction
Implementation Responsibility:	PG&E with qualified archaeologist
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to construction: Once in each area to be disturbed
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Prior to construction: Archaeological Survey Report (ASR) and record of Water Board's acceptance of the ASR findings Annually: Annual Report, with ASR and record of acceptance
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Prior to the start of construction or future construction activities, PG&E will retain qualified archaeologists to conduct a pedestrian archaeological survey to determine the prehistoric, ethnographic, and historic archaeological resources within areas proposed for disturbance within the project area. The survey and report will be conducted and written according to standards set forth by the Office of Historic Preservation (Office of Historic Preservation 2003). The report will be provided to the Water Board for review prior to construction.

If prehistoric, ethnographic, and/or historic archaeological resources are identified within the proposed disturbance areas within the project area, then the evaluation and treatment of such resources will be conducted according to the measures set forth in **Mitigation Measures CUL-MM-5, CUL-MM-6, and CUL-MM-7**.

CUL-MM-5: Avoid Damaging Archaeological Resources through Redesign of Specific Project Elements or Project Modification

Implementation Timing:	Prior to construction
Implementation Responsibility:	PG&E with qualified archaeologist
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Once for each remedial activity
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Once for each remedial activity: Documentation by qualified archaeologist identifying the resource anticipated to be disturbed and any avoidance and/or protection measures Annually: Annual Report, with any documentation
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If the PG&E-designed remediation elements (including construction and staging) disturb prehistoric, ethnographic, or historic-era archaeological resources as identified by the qualified archaeologist (per **Mitigation Measure CUL-MM-4**), PG&E will consult with a professionally qualified archaeologist to determine if the proposed remediation activities would affect the qualities of the archaeological historical resource that contribute to the eligibility for listing in the CRHR. If the proposed activities are likely to significantly impact those qualities, PG&E will consult with a professionally qualified archaeologist to redesign, reroute or relocate the proposed element in such a way that will not result in significant impacts to the resource, because preservation in place is the preferred manner of mitigating impacts to archaeological sites under CEQA. Barrier fencing or another visual cue will be installed around identified resources to protect against inadvertent damage during construction if the resources cannot be seen from at least 5 feet away or heavy machinery will be used within 15 feet of the resources. PG&E will document the avoidance measures prior to construction and submit the report to the Water Board (and to the BLM for federal land) to demonstrate compliance.

CUL-MM-6: Evaluate Archaeological Resources and, if Necessary, Develop and Implement a Recovery Plan

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with qualified archaeologist
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Once for each remedial activity
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Once for each remedial activity: Archaeological Evaluation and Data Recovery Report Annually: Annual Report, with any documentation
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If archaeological resources cannot be avoided (per **Mitigation Measure CUL-MM-5**), PG&E will retain a professionally qualified archaeologist to evaluate the resource for its eligibility on the NRHP and CRHR. Evaluation of an archaeological resource will likely consist of historical research and/or physical excavations of the site to determine site content and integrity. Evaluations will be documented in a report written according to standards set forth by the Office of Historic Preservation (Office of Historic Preservation 2003). PG&E will submit this document to the Water Board for concurrence on eligibility determinations.

If the resource is determined to be a historical resource, a data recovery plan (California Code of Regulations, Title 14, Section 15126.4(b)(3)(C)), will be developed and implemented. The data recovery plan will include background research, physical excavation, lab analysis, and a report summarizing results. This mitigation measure will minimize loss of information by procuring, processing, and analyzing a suitable sample of materials from the affected portions of the sites. It will also address the impacts of damage to the sites hindering or eliminating the resources' potential to yield information about the prehistory and history of the Hinkley area. PG&E is responsible for implementing the physical excavation portion of the data recovery program prior to construction.

In some cases, data recovery excavation might not provide an adequate mitigation measure to reduce impacts to a less than significant level and might not be an appropriate mitigation measure for some resources, particularly when the archaeological historic resource is eligible for the CRHR under Criteria 1 (association with important events in history), 2 (association with important people in history), or 3 (embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values). Mitigation will capture the history of a resource and share it with the public so that the public can continue to feel a connection with common heritage. If the archaeological site cannot physically be retained, then PG&E, in coordination with a qualified archaeologist, will pursue ways that the memory of the resource is retained and made easily available. To this end, educational resources such as web media, static

displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement data recovery excavations.

If the archaeological resource qualifies as a unique archaeological site but does not qualify as a historical resource under CEQA, the site will be treated in accordance with the provisions of Section 21083.2. Other than avoidance, mitigation measures will include deeding archaeological sites into permanent conservation easements, capping or covering archaeological sites with a layer of soil before building on the sites, or planning parks, green space, or other open space to incorporate archaeological sites.

PG&E will submit all mitigation plans to the Water Board for concurrence prior to mitigation implementation. PG&E will submit a Mitigation Report to the Water Board upon complete implementation of the approved mitigation measures to document compliance.

CUL-MM-7: Comply with State and County Procedures for the Treatment of Human Remains Discoveries

Implementation Timing:	During construction
Implementation Responsibility:	PG&E with qualified archaeologist
Monitoring Responsibility:	Field: County Coroner and qualified archaeologist (if human remains are found) Overall: Water Board (and BLM if on BLM land)
Frequency of Monitoring:	Daily (if human remains are found)
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Daily (if human resources are found): Memorandum of evidence that required procedures have been followed Annually: Annual Report, with any documentation
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If human remains are found as a result of ground disturbance, in a project location other than a dedicated cemetery, PG&E will notify the Water Board and the San Bernardino County Coroner (and BLM if on federal land). If human remains are discovered, State Health and Safety Code 7050.5 states that further disturbances and activities will cease in the area and nearby areas, and the County Coroner will be contacted immediately. Pursuant to PRC 5097.98, if the coroner determines that the remains are of Native American origin, the coroner must contact the NAHC within 24 hours (California Health and Safety Code 7050(c)).

The NAHC will identify and notify the most likely descendants (MLDs) of the interred individuals, who then will make a recommendation for means of treating or removing, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code 5097.98. Further provisions of Public Resources Code 5097.98 will be implemented as applicable. Under these provisions, MLDs will have at least 48 hours from completing their examination of the remains in which to make recommendations for the disposition of the remains. If the NAHC is unable to identify an MLD, if the identified MLD fails to make a recommendation, or if the landowner rejects the MLD's recommendation, the landowner will inter the human remains and associated grave goods with appropriate dignity on the property in a location not subject to further and future subsurface disturbance.

In the event that human remains are discovered, a PG&E qualified archaeologist and the Water Board will be contacted immediately. If the discovery is on federal land, BLM will also be notified upon discovery and included in any determinations for the disposition of remains.

CUL-MM-8: Conduct Preconstruction Paleontological Resource Evaluation, Monitoring, Resource Recovery, and Curation

Implementation Timing:	Prior to, during and potentially after construction
Implementation Responsibility:	PG&E with qualified paleontologist and/or geologist
Monitoring Responsibility:	Field: Qualified paleontologist Overall: Water Boar
Frequency of Monitoring:	Once for each remedial activity
Frequency of Reporting:	Before construction: Once for each ground-disturbing remedial activity Annually: Annual Report
Standard for Completion or Compliance:	Before construction: Paleontological Resource Evaluation report, prepared by qualified paleontologist and/or geologist, that identifies site-specific measures for monitoring, avoiding, protecting, recovering, and/or curating resources. Annually: Annual Report
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

Prior to construction and future construction activities, PG&E will confirm all geologic units potentially affected by each segment of the project, including Quaternary and bedrock units. This information will be used to guide mitigation requirements on a site-specific basis during construction and during maintenance activities that require ground disturbance.

All ground-disturbing construction and maintenance activities will require Measure 8a (although this measure will likely only need to be implemented once during project design), and Measures 8b, 8c, 8d, and 8e.

All ground-disturbing construction activities that affect geologic units identified as highly sensitive for paleontological resources and all maintenance activities that involve new or extended ground disturbance in highly sensitive units will require Mitigation Measure CUL-MM-8f.

Measure 8a: Further Evaluation of Geologic Units with "Undetermined" Sensitivity. Before ground-disturbing activities begin, PG&E will retain a qualified paleontologist as defined by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) or other appropriate personnel (e.g., California licensed professional geologist with appropriate experience and expertise) to conduct further literature review and discussion with subject area experts to resolve the paleontological sensitivity of the geologic units identified in Table 3.8-5 as "undetermined." If site-specific geologic or geotechnical studies for the project identify additional units likely to be affected by project construction and not included in Table 3.8-5, they will also be evaluated for paleontological sensitivity under this measure. The results of the evaluation conducted for this mitigation measure will

be used to guide the application of mitigation during project construction and maintenance activities. The evaluation will be provided to the Water Board (and to BLM for federal lands) prior to construction.

Measure 8b: Evaluation of Site-Specific Impact Potential in Areas of Holocene Substrate. PG&E will retain appropriately qualified and licensed personnel (e.g., California licensed professional geologist with appropriate experience and expertise) to evaluate the potential for impacts on paleontologically sensitive strata across the project area. The evaluation will be based on available geologic and geotechnical information; project design; proposed construction and/or maintenance methods, including anticipated depth of disturbance; and existing site conditions, including pre-existing disturbance, if any. In areas where highly sensitive strata will be involved in project-related ground disturbance, Measures 8c, 8d, 8e, and 8f will apply and will be implemented. The evaluation will be provided to the Water Board (and to BLM for federal lands) prior to construction.

Measure 8c: Preconstruction Meeting and Worker Awareness Training. PG&E will ensure that all construction and maintenance personnel receive paleontological resources awareness training that includes information on the possibility of encountering fossils during construction; the types of fossils likely to be seen, based on finds in the site vicinity; and proper procedures in the event fossils are encountered. Worker training will be prepared and presented by a qualified paleontologist as defined by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) or other appropriate personnel (e.g., California licensed professional geologist with appropriate experience and expertise) experienced in teaching non-specialists. It may be delivered at the same time as other pre-planned construction worker education, or it may be presented separately.

Measure 8d: Paleontological Monitoring. Paleontological monitoring will be conducted for all ground-disturbing activities in portions of the proposed disturbance with substrate materials identified as highly sensitive for paleontological resources (see Table 3.8-5). Monitoring may also be required where Holocene materials overlie highly sensitive strata and site-specific investigations have identified the potential for project activities to involve the underlying sensitive strata. A trained paleontological monitor will oversee all ground-disturbing activities that affect highly sensitive substrate materials, including vegetation removal, site preparation, construction grading and excavation. Monitoring may be required for any initial land clearing or grading for well installation in sensitive areas but is not required for well drilling itself. Paleontological monitoring will consist of observing operations and periodically inspecting disturbed, graded, and excavated surfaces. The monitor will have authority to divert grading or excavation away from exposed surfaces temporarily in order to examine disturbed areas more closely, and/or recover fossils. The responsible paleontologist will coordinate with the construction manager to ensure that monitoring is thorough but does not result in unnecessary delays. If additional personnel are needed for effective monitoring, the responsible paleontologist may train other consultant or in-house staff in paleontological monitoring. Once training is complete, individuals trained by the qualified paleontologist may then monitor the proposed project construction independently, and will have the same responsibilities as described above. Annual reporting will be provided to Water Board (and to BLM for federal lands, if required by BLM) documenting compliance with this measure.

Measure 8e: Stop Work Requirement. If fossil materials are discovered during any project-related activity, including but not limited to project grading and excavation, all ground-disturbing work in the vicinity of the find will stop immediately until the responsible paleontologist can assess the nature and importance of the find and recommend appropriate treatment. Assessment will occur in a timely manner, and recommendations for treatment will be consistent with SVP guidelines (Society of

Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). Treatment may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, and may also include preparation of a report for publication describing the finds. If no report is required, PG&E will nonetheless ensure that information on the nature, location, and depth of all finds is readily available to the scientific community. The responsible paleontologist and all paleontological monitors will be empowered to temporarily halt or redirect the excavation equipment away from fossils to be salvaged.

Measure 8f: Fossil Recovery and Curation. If fossil materials are discovered during project-related activities, the responsible paleontologist will determine whether recovery and curation is warranted, and will be empowered to confer with local area experts as needed to arrive at a determination. All materials warranting recovery will be stabilized on the site and then salvaged consistent with currently accepted procedures and the prevailing standard of care for paleontological excavations. The responsible paleontologist will coordinate with the construction manager to ensure that specimen recovery proceeds in a timely manner. Recovered fossils will be prepared for identification consistent with currently accepted procedures and the prevailing standard of care. They will then be identified by competent specialists, potentially including, but not necessarily limited to, the responsible paleontologist. If possible, identification will include genus, species, and, if applicable, subspecies. If species-level identification is not feasible, the maximum feasible level of specificity will be provided. The fossil assemblage will then be analyzed by stratigraphic occurrence and any other applicable parameters (size, taxa present, and/or taphonomic conditions). A faunal list will be developed.

Any specimens (fossils) of paleontological significance found during construction will be temporarily housed in an appropriate museum or university collection. If curation is required, the responsible paleontologist will develop appropriate curation agreements, consistent with applicable protocols and the prevailing standard of care.

The responsible paleontologist will prepare a final report that includes at least the following components:

- information on site geology and stratigraphy, including a stratigraphic column;
- a description of field and laboratory methods;
- a faunal list, with stratigraphy ranges/occurrences for each taxon;
- a concise discussion of the significance of the site and its and relationship to other nearby and/or similar fossil localities;
- a list of references consulted during the project, including published geologic maps for the site and vicinity; and
- a complete set of field notes, field photographs, and any new geologic maps developed for or during the project.

Full copies of the final report, including any appended materials, will be put on file with any repository institution(s). Depending on the nature of the materials recovered, it may also be appropriate to prepare a report for publication in an appropriate peer-reviewed professional journal. Such publication will be at the discretion of the responsible paleontologist.

TRA-MM-1: Implement Traffic Control Measures during Construction

Implementation Timing:	Prior to and during construction
Implementation Responsibility:	PG&E with contractor, San Bernardino County, Caltrans
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to construction During construction: Periodic
Frequency of Reporting:	Prior to construction During construction: Periodic Annually: Annual Report
Standard for Completion or Compliance:	Prior to construction: Documentation of proposed access routes in construction specifications or requirements. During construction: Construction monitoring logs Annually: Annual Report
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

To minimize impacts on traffic along SR 58 and surface streets in the project area, PG&E will ensure that construction contractors implement the following traffic control measures during construction of the remediation facilities and associated infrastructure. These measures include:

- Re-route delivery trucks with materials or equipment to use the signalized intersection at Lenwood Road to access project area roads from and to SR 58 wherever feasible. To the southern part of the project area, access can be from Lenwood Road to Community Road and then to other local roadways. To the northern part of the project area, access can be from Lenwood Road to Santa Fe Road to Mountain View Road and other local roadways.
- Notify emergency personnel, including the San Bernardino County Sheriff-Coroner's Department (Barstow Station) and the San Bernardino County Fire Department (North Desert Division), of the construction schedule when it involves vehicles that could slow or block traffic.
- Use personnel as necessary to direct traffic and prevent vehicles from lining up on county roads and highways during construction.

AES-MM-1: Screen Above-Ground Treatment Facilities from Surrounding Areas

Implementation Timing:	Prior to and after construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to and after construction
Frequency of Reporting:	Prior to and after construction
Standard for Completion or Compliance:	Documentation that security fencing, landscaping and architectural features meet measure requirements. Prior to construction: Submission of design documents for aboveground treatment plants (and any other facilities with new sources of light and glare) demonstrating compliance. After construction: Photodocumentation of aboveground treatment plant (and any other facilities with new sources of light and glare) demonstrating compliance
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will install security fencing with privacy slats, as currently proposed, and/or landscaping around the major above-ground treatment facilities, included as part of Alternatives 4C-3 and 4C-5 and as a contingency for all alternatives. The privacy slates will be neutral shades of brown to minimize landscape intrusion from remediation infrastructure. Any landscaping would be drought-tolerant, native and in adequate abundance to screen the facility from distant views. Additionally, PG&E will design structures to include architectural features that reduce the bulk and scale.

AES-MM-2: Use Low-Sheen and Non-Reflective Surface Materials on Visible Remediation Facilities and Infrastructure

Implementation Timing:	Prior to and after construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to and after construction
Frequency of Reporting:	Prior to and after construction
Standard for Completion or Compliance:	Documentation of light and glare treatments that meet measure requirements. Prior to construction: Submission of design documents for aboveground treatment plants (and any other facilities with new sources of light and glare) demonstrating compliance. After construction: Photodocumentation of aboveground treatment plant (and any other facilities with new sources of light and glare) demonstrating compliance.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will ensure that visible, above-ground remediation facilities and infrastructure (e.g., a 35-foot tall process building) will be designed and constructed to use a low-sheen and non-reflective surface material. Wall finishes will have low-sheen and non-reflective surfaces to reduce potential for glare. The use of smooth-trowelled surfaces and glossy paint will be avoided. At a minimum, infrastructure materials will be non-reflective, such as earth-toned concrete or galvanized steel that would naturally oxidize a short time after installation and would not cause reflective daytime glare. The paint type will have a dull, flat, or satin finish only and will ensure long-term durability of the painted surfaces to the extent practicable. The paint color will be two to three shades darker than the general surrounding area. PG&E will maintain the paint color over time. (This measure does not apply to the agricultural irrigation infrastructure that is consistent with existing uses and aesthetics in the Hinkley area.)

AES-MM-3: Apply Light Reduction Measures for Exterior Lighting

Implementation Timing:	Prior to and after construction
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Prior to and after construction
Frequency of Reporting:	Prior to and after construction
Standard for Completion or Compliance:	Documentation of light treatments that meet measure requirements. Prior to construction: Submission of design documents for aboveground treatment plants (and any other facilities with new sources of light) demonstrating compliance. After construction: Photodocumentation of aboveground treatment plant (and any other facilities with new sources of light) demonstrating compliance.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

PG&E will apply the following light reduction measures.

- Exterior lights will be installed at the lowest allowable height and will use the low-pressure sodium lamps with the lowest allowable wattage (less than 2,000 lumens [150 watts]).
- Exterior lights will be shielded and directed downward.
- The amount and duration of nighttime light use will be minimized to the greatest degree possible (i.e., minimal amount needed to provide required security).

SE-MM-1: Manage Vacant Lands, Residences, and Structures to Avoid Physically Blighted Conditions

Implementation Timing:	Within one year of acquisition of lands containing aboveground structures
Implementation Responsibility:	PG&E
Monitoring Responsibility:	Water Board
Frequency of Monitoring:	Annually
Frequency of Reporting:	Annually: Annual Report
Standard for Completion or Compliance:	Annual reporting will describe any properties acquired that contain aboveground structures and measures taken by PG&E to secure properties and avoid physically blighted conditions. PG&E will document annually any new actions (such as structural removal) on properties purchased to support remedial actions that contain structures.
Agency Verification of Completion or Compliance:	_____

Mitigation Measure:

If properties are acquired as part of project implementation, PG&E will ensure that existing buildings on these properties will be razed or maintained along with other properties in the project area as part of the normal operations and maintenance activities. Retained structures will be secured to prevent unauthorized access. Litter and debris will be removed from vacant properties acquired by PG&E. PG&E will monitor structures to ensure that they are not used by trespassers or wildlife. Prior to proposed demolition of structures, PG&E will assess the structures for cultural resource significance (see Section 3.8, *Cultural Resources*, in Final EIR Volume II) and follow all procedures for protection of significant cultural resources accordingly. For demolitions, PG&E will follow all state and federal requirements for addressing lead-based paint, asbestos, or other hazardous materials, including proper containment and disposal. PG&E will work with property sellers to ensure that all pets are removed from the property upon acquisition. If pets are abandoned on vacant properties, PG&E will work with San Bernardino County Animal Care & Control to remove such animals from the properties accordingly and place in animal shelters, where appropriate.

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Acronyms and Abbreviations

af	acre-feet
afy	acre-feet per year
AG	Agriculture
ARB	California Air Resources Board
AU	agricultural units
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CAO	Cleanup and Abatement Order
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNG	compressed natural gas
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
County	San Bernardino County
Cr	chromium
Cr[T]	total chromium
Cr[VI]	hexavalent chromium
CRHR	California Register of Historic Resources
CRPR	California Rare Plant Rank
CWA	Clean Water Act
DEHP	di 2-ethylhexyl phthalate
DWMAs	Desert Wildlife Management Areas
EC	electrocoagulation
EIR	Environmental Impact Report
EPA	United States Environmental Protection Agency
ESA	federal Endangered Species Act
FPA	free production allowance

g/bhp-hr	grams per brake horsepower-hour
GHG	greenhouse gas
GPS	global positioning system
GVWR	gross vehicle weight rating
HASP	Health and Safety Plan
IBC	International Building Code
IPM	integrated pest management
IRZ	in-situ reduction zones
MDAQMD	Mojave Desert Air Quality Management District
MLDs	most likely descendants
MMRP	mitigation monitoring and reporting program
MT	metric tons
MWA	Mojave Water Agency
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
O&M	operation and maintenance
PCB	polychlorinated biphenyls
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM10	PM 10 microns in diameter or less
PM2.5	PM 2.5 microns in diameter or less
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PRC	Public Resources Code
ROGs	reactive organic gases
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SR	State Route
State Water Board	State Water Resources Control Board
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
Water Board	California Regional Water Quality Control Board, Lahontan Region
WDRs	waste discharge requirements