CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OFJANUARY 8-9, 2014
BARSTOW

ITEM: **3**

SUBJECT: **WORKSHOP – DISCUSSION OF TENTATIVE WASTE DISCHARGE REQUIREMENTS (WDRS) FOR AGRICULTURAL TREATMENT UNITS, PACIFIC GAS AND ELECTRIC COMPANY'S HINKLEY COMPRESSOR STATION, SAN BERNARDINO COUNTY**

CHRONOLOGY:

July 17, 2013	The Water Board adopted a resolution certifying an Environmental Impact Report (EIR) for comprehensive cleanup of chromium in groundwater at Hinkley, and discussed approaches for developing comprehensive cleanup requirements.
October 8, 2013	At the Water Board's regular meeting in Barstow, Water Board staff outlined options to develop waste discharge requirements for agricultural treatment unit expansion.

BACKGROUND: During its October 2013 meeting, the Water Board expressed support for developing waste discharge requirements (WDRs) to authorize discharges to additional agricultural treatment units (ATUs) in the Hinkley Valley. Public and Board member comments indicated that a gradual approach to expanding ATUs was preferred, and that early detection of impacts such as groundwater drawdown and degraded water quality in domestic wells was important.

DISCUSSION: <u>Scope of WDRs</u>
Tentative WDRs were circulated for public comment on December 13, 2013, proposing to authorize up to 500 total acres of ATUs, including 236 acres of existing ATUs in the Hinkley Valley. PG&E has outlined an initial expansion of up to 155 acres of ATUs, so by authorizing up to 500 acres, there will be roughly an additional 100 acres of ATUs that could be authorized under these WDRs. This is a reasonable amount to ensure flexibility to adaptively manage remediation and assess impacts.

For context, the EIR evaluated the impacts of up to 1,400 acres of ATUs (almost a 500 percent increase over existing ATUs).

EIR Mitigations as WDR Requirements

The WDRs require PG&E to conduct extensive monitoring and modeling as outlined in the EIR to determine impacts to domestic wells for remediation byproducts (e.g., total dissolved solids, nitrate, uranium), chromium plume bulging, and groundwater drawdown. EIR mitigation measures are required if the monitoring or modeling indicates impacts have or are likely to occur. The key mitigation measure for domestic wells is alternate water supply for both water quality and quantity impacts due to remediation. This mitigation measure is required in WDRs section I.E, and the specific mitigation measure requirements are outlined in Attachment F of the WDRs.

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, as a condition of the WDRs, PG&E will annually report to the Water Board its implementation of and compliance with all applicable mitigation measures for agricultural treatment units, including those required under the authority of another agency or entity.

ISSUES:

Total Dissolved Solids (TDS) Increases

Discharges authorized by the WDRs may degrade existing water quality for TDS (or salts). In OUs 1 and 3, where TDS concentrations are generally below the secondary TDS maximum contaminant levels (MCLs) of 1,500 mg/L, 1,000 mg/L or 500 mg/L, respectively, this Order requires that where the discharge of waste causes a 20 percent increase in TDS concentrations, the Discharger must submit an action plan to reduce those exceedances to the extent feasible, considering chromium remediation goals. Actions could include blending of irrigation water to reduce TDS concentrations applied to fields, participation in a Salt and Nutrient Management Plan, or by proposing a plan to implement EIR mitigation measure WTR-MM-4 involving a "basin-wide approach" to reducing TDS. This 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.

Further, the WDRs require application of irrigation water at agronomic rates as a best management practice to minimize TDS buildup in soils to the extent feasible.

Where the upper limit secondary TDS MCL of 1,500 mg/L is already exceeded (for example, throughout much of OU2, where levels of TDS are up to 5,900 mg/L), agricultural treatment may result in further degradation. The EIR recognizes the potential increase in concentrations of TDS as a significant and unavoidable impact for the duration of the Project; therefore, a statement of overriding considerations will be included in the proposed WDRs. Further, the WDRs acknowledge EIR mitigation measure WTR-MM-4, which requires the PG&E to restore the Hinkley Valley aquifer to pre-remedial conditions following completion of the chromium remediation project. This mitigation measure will be imposed in Cleanup and Abatement Orders issued to PG&E

Chromium Plume Bulge

One consequence of operating additional agricultural treatment units may be chromium plume "bulging". The discharge of extracted groundwater to land within or on the edges of the plume may result in groundwater mounding that pushes the chromium plume laterally, creating a bulge on the plume boundary (the EIR identified this issue as a significant and unavoidable impact during remediation).

Chromium plume bulging is authorized under these WDRs to accommodate remediation goals; however, Cleanup and Abatement Order R6V-2008-0002A2 (as amended) must be amended prior to authorize any additional plume bulging. The WDRs acknowledge this, and authorize plume bulging limited to no more than 3,000 feet from the eastern boundary of OU1 as needed to accommodate remediation goals, contingent on amendment of the CAO.

RECOMMENDA-TION: This is an informational item only; however, the Water Board may provide direction to staff.

ENCLOSURE:

Enclosure	Item	Bates Number
1	Board Order R6V-2014-Tentative	**3-7**
	Board Order Attachments: A. Map of Project Area and Location of Operable Units B. Map of Existing Agricultural Treatment Units C. Standard Provisions for Waste Discharge Requirements D. General Provisions for Monitoring and Reporting E. WDRs Monitoring, Modeling and Reporting Program F. EIR Mitigation Monitoring and Reporting Program G. State Water Board Resolution 68-16 Analysis	

ENCLOSURE 1

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6V-2014-(TENTATIVE)

WASTE DISCHARGE REQUIREMENTS
FOR
PACIFIC GAS AND ELECTRIC COMPANY
GROUNDWATER REMEDIATION PROJECT

AGRICULTURAL TREATMENT UNITS

WDID NO. 6B360303001

_____San Bernardino County_____

The California Regional Water Quality Control Board, Lahontan Region (Water Board), finds:

1. Discharger

Pacific Gas and Electric Company (PG&E) is the owner and operator of the natural gas compressor station in Hinkley where hexavalent chromium was discharged from historical waste water releases to groundwater. For the purposes of this Order, PG&E is referred to as the "Discharger."

This Water Board Order (Order) supersedes and rescinds the previous Order No. R6V-2004-0034 and amendments, and Investigative Order R6V-2011-0078.

2. Groundwater Contamination

The compressor station began operating in 1952 and discharged untreated cooling tower water containing hexavalent chromium to unlined ponds until 1964. Wastewater then percolated through soil to the water table, approximately 80 feet below, creating a chromium plume in groundwater.

Since 1991, PG&E has implemented various interim remediation projects to clean up chromium in groundwater at different locations within and outside of the plume boundaries. In August 2010, PG&E submitted a Feasibility Study in compliance with Cleanup and Abatement Order (CAO) R6V-2008-0002, evaluating options for comprehensive (Project Area-wide) cleanup of groundwater to background concentrations of chromium.

3. Project Area and Operable Units

The Project Area regulated under this Order is approximately 50 square miles (32,159 acres) in size and includes all areas within the chromium plume boundaries containing more than the maximum background levels of 3.1 micrograms per liter (µg/L) hexavalent chromium or 3.2 µg/L total chromium (based on the Discharger's fourth quarter 2012 groundwater monitoring report) and approximately 1 mile beyond. The chromium plume extends approximately 9 miles generally north from the compressor station to the Harper Dry Lake Valley. For the purposes of this Order, the Project Area includes the chromium plume and areas approximately 1 mile beyond the plume boundary and is shown in Attachment A.

Remediation activities addressed in this Order may be implemented throughout the Project Area. The Project Area is divided into three Operable Units (OUs) where remediation and monitoring have been or will be taking place, and where impacts from the remediation project may occur. OUs are shown on Attachment A. 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 50 µg/L hexavalent chromium groundwater concentration contour, at approximately Ashwood Road.

b. OU2 extends from the northern boundary of OU1 northward to Salinas Road and contains most of the 10 µg/L hexavalent chromium groundwater plume (that is outside of the 50 µg/L plume area).

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 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.

4. Project Area Location

The Project Area is located in the Centro Subarea of the Mojave River Groundwater Basin, in the Mojave Hydrologic Unit 628.00, about 8 miles east of Barstow. In general, the Project Area is located on the north side of the Mojave River, to north of Brown Ranch Road in the Harper Dry Lake Valley, west of Hinkley Road, and east of Lenwood Road. State Highway 58 and the Burlington-Northern-Santa Fe railroad bisect the southern Project Area in a southeast to northwest direction. The PG&E compressor station is located southeast of the community of Hinkley in San Bernardino County at 35863 Fairview Road (APN 0488-112-52).

The Project Area is shown on Attachment A, which is made a part of this Order. Most of the remediation actions will take place on parcels owned by the Discharger. However, project activities could potentially occur on parcels not owned by the Discharger. In which case, the Discharger will acquire access when possible to implement remediation activities. The Order does not allow discharges to properties outside of the Project Area.

5. History of Previous Regulation by the Water Board

This Order establishes new Waste Discharge Requirements (WDRs) for existing and new discharges related to agricultural treatment. Previous WDRs have been issued to the Discharger for the operation of agricultural or land treatment of chromium in groundwater.

The Discharger had conducted groundwater remediation using agricultural treatment at the East Land Treatment Unit (LTU) from 1991 to 2001 under the WDRs set forth in Board Order No. 6-91-917, which were rescinded and replaced by Board Order No. 6-97-81. In addition, the Ranch LTU operated from 1997 to 2001 under WDRs set forth in Board Order No. 6-97-81. Also, since August 2004, the Discharger has operated groundwater remediation consisting of agricultural treatment units at the Desert View Dairy under the WDRs set forth in Board Order No. R6V-2004-034 and revisions. In November 28, 2007, the Water Board issued Board Order No. R6V-2004-0034A1 for the Desert View Dairy Optimization Project and allows the use of off-site extraction wells for containing plume migration. Finally, Amended WDRs for the Desert View Dairy (Board Order No. R6V-2004-0034A2) were issued on July 14, 2010 allowing for increased discharges to agricultural crops to contain the migrating chromium plume in groundwater.

6. Enforcement History

On August 6, 2008, the Water Board Executive Officer issued CAO No. R6V-2008-0002 (2008 CAO) to the Discharger, ordering the cleanup of chromium and abatement of the effects of chromium in soil and groundwater from historical discharges at the PG&E compressor station. In compliance with the CAO, PG&E submitted a Feasibility Study and addenda in 2010 and 2011, identifying strategies for implementing final site cleanup for achieving background conditions of chromium.

The Water Board Executive Officer amended the 2008 CAO on November 12, 2008, which incorporated the following chromium background values: maximum and average values for hexavalent chromium of 3.1 and 1.2 µg/L, respectively; and maximum and average values for total chromium of 3.2 and 1.5 µg/L, respectively. The maximum background chromium values are used to delineate the chromium plume in groundwater. The Water Board Executive Officer issued a second amendment to the 2008 CAO on April 7, 2009 allowing for the lateral migration of the 4 µg/L hexavalent chromium eastern plume boundary during implementation of remedial actions. The Water Board Executive Officer issued a third amendment to the 2008 CAO on March 14, 2012, replacing plume containment requirements in the

original 2008 CAO. The Water Board Executive Officer issued a fourth amendment to the 2008 CAO on January 8, 2013 requiring PG&E to conduct further investigations to fully define the chromium boundary in groundwater to the 3.1 µg/L hexavalent chromium and 3.2 µg/L total chromium levels.

7. Feasibility Study

Haley & Aldrich prepared a Feasibility Study on behalf of PG&E, dated August 31, 2010. The Feasibility Study was submitted in compliance with Order No. 5 of the 2008 CAO, as amended. The Feasibility Study evaluates cleanup options to hydraulically contain and remediate the known extent of the chromium plume in groundwater to background concentrations.

Feasibility Study Addenda 1, 2 and 3, dated January 31, 2011, March 3, 2011 and September 15, 2011, respectively, were prepared to address Water Board staff and other reviewing agencies' comments to optimize the proposed remedial alternatives to reduce the overall final cleanup times. The Feasibility Study and addenda collectively are referred to in this Board Order as the “Feasibility Study".

The Feasibility Study evaluated different combinations and intensities of four cleanup methods: 1) agricultural treatment units, 2) in-situ remediation, 3) freshwater injection, and 4) ex-situ treatment in an above-ground facility. The first three methods are already in limited-scale use in the Project Area; however, ex-situ treatment has not been employed to date.

The Feasibility Study also describes an agricultural treatment unit "contingency plan", in case extreme weather, crop disease, or other unforeseen events prevent groundwater extraction and irrigation of fields for an extended period such that hydraulic containment of the plume cannot be maintained. The contingency plan involves several tiers of actions, ultimately resulting (if needed) in alternate treatment and disposal options of extracted groundwater. Alternate treatment options described in the Feasibility Study include ex-situ treatment or carbon amendment and infiltrating or injecting the treated groundwater back into the aquifer.

8. Reason for Action

CAOs issued by the Water Board Executive Officer require the Discharger to clean up and abate the effects of historic discharges of chromium from the PG&E compressor station to the soil and groundwater of the Project Area. The Discharger has been implementing interim or limited-scale cleanup actions at the site since 1991. These ongoing interim actions are not sufficient to remediate the full known extent of chromium in groundwater; therefore, remediation efforts must be expanded in scale and intensity throughout the Project Area.

This Order authorizes discharges to agricultural treatment units in the Project Area. All existing and future agricultural treatment units (including existing land treatment units [LTUs] at the Desert View Dairy) will be covered under this Order.

9. Legal Authorities

a. Water Code section 13263
This Order is issued pursuant to Water Code section 13263, which authorizes the Water Board, after any necessary hearing, to prescribe requirements as to the nature of any proposed discharge, existing discharge, or material change in an existing discharge. The requirements shall implement the relevant water quality control plans and shall take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance and the provisions of Water Code section 13241.This Order implements the requirements of Section 13263, prevents nuisance, and considers the provisions of Section 13241 as further described herein.

b. Water Code section 13267
Monitoring and reporting are required under this Order, pursuant to Water Code section 13267, which authorizes a regional board to require persons who has discharged, discharges or is suspected of having discharged, or who proposes to discharge waste within its region to furnish technical or monitoring reports. The burden, including costs of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the report.

Technical reports are necessary to evaluate Discharger compliance with the terms and conditions of this Order, and to assure protection of waters of the state. Consistent with Water Code section 13267, this Order requires implementation of a monitoring and reporting program that is intended to determine the effects of the waste discharges on water quality, and to verify the adequacy and effectiveness of the Order's conditions. Monitoring and reporting is also required to ensure that relevant mitigation measures identified in the California Environmental Quality Act documentation are implemented. The burden of the monitoring and reporting is outweighed by the need for information gained by the monitoring and reporting requirements because the monitoring is not more than is necessary to meet the requirements of the Order.

10. Site Geology

The soils underlying the Project Area are comprised of interbedded sands, gravels, silts, and clays. The depth to bedrock ranges from about 300 feet below ground surface in the southern Project Area to cropping out (bedrock comes to the ground surface) in the northern and western portions of the Project Area. In general, the thickness of sediments overlying the bedrock becomes thinner and the sediment grain size becomes smaller to the north and to the west. The nearest active fault is the northwest-southeast trending Lockhart fault located 200 feet southwest of the compressor station in the southern Project Area. In addition, the northwest-trending Mt. General Fault is located in the central portion of the Project Area on the southwestern slope of Mt. General.

11. Site Hydrogeology and Hydrology

The hydrogeology at the compressor station and northwards consists of an upper, unconfined aquifer and a lower, confined aquifer separated by a lacustrine clay that forms a regional aquitard. The hydrogeology in the northwestern project area consists of just the upper, unconfined aquifer, as the lower aquifer and clay aquitard pinch out (terminated against the upward sloping bedrock). In general, groundwater flow at the compressor station is primarily to the northwest in the southern project area and then north towards the Harper Dry Lake, with an average gradient of 0.004 feet per foot. Depth to groundwater in the Hinkley Valley ranges from 75 to 95 feet below ground surface.

The Mojave River is located approximately one mile south of the compressor station, in the southeast portion of the Project Area. Essentially all groundwater in the Hinkley Valley originates from the Mojave River while little to no groundwater originates from surrounding topographic high points, such as Mt. General. The chromium plume resides primarily in the floodplain-derived aquifer sediments originating from the Mojave River and extends north to the Harper Dry Lake Valley. Some of the northern plume fringes extend to alluvial sediments eroded from local mountains. The closest surface water is an unnamed ephemeral stream, located about 1,000 feet northeast of the plume's northern boundary.

12. Climate

The precipitation in the area is less than four inches annually. The evaporation rate is approximately 74 inches annually. Thus, essentially no local precipitation percolates to the groundwater, which is fed by the Mojave River from runoff originating in the San Bernardino Mountains. The area has hot summers and mild winters. Winds are pervasive in the high desert and typically occur during the afternoon.

13. Constituents of Concern

The discharge of extracted groundwater to agricultural treatment units contains waste chromium originating from the compressor station. Extracted groundwater also contains total dissolved solids, nitrate, naturally-occurring uranium and other radionuclides, and naturally-occurring dissolved metals, such as arsenic, manganese, and iron.

This Order authorizes the discharge of extracted groundwater to agricultural treatment units. Additionally, the use of well rehabilitation compounds, process chemicals and groundwater flow tracers is authorized by this Order. Specific chemicals or compounds are listed in Attachment E, WDRs Monitoring and Reporting Program for this Order. The Water Board's Executive Officer may amend the list to add chemicals or compounds for which the Discharger has provided the following documentation:

a) the proposed chemical or compound results in similar or less effects on water quality as compared to those previously approved;
b) the proposed chemical or compound is NSF-certified or registered for use as a drinking water treatment chemical or nonfood registered compound; and
c) the Material Safety Data Sheet for the proposed chemical or compound.

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 a, above.

14. Groundwater Quality

Groundwater quality in the Project Area, including the occurrence of high quality waters, is described in detail in Attachment G, State Water Board Resolution 68-16 Anti-degradation Analysis.

15. Project Description

The Project consists of issuing new WDRs authorizing, as set forth below, the discharge of waste to existing agricultural treatment units and to new agricultural treatment units for the remediation of chromium-contaminated groundwater in the Project Area, to discharge waste associated with ex-situ treatment, and to discharge waste associated with related activities. The WDRs specify, in part, discharge and receiving water limits, and contain requirements to implement the mitigation measures and monitoring identified in the Environmental Impact Report (EIR) certified by the Lahontan Water Board for the Project. The EIR is discussed in Findings 28 through 30, below.

The WDRs authorize the following activities:

a. Extraction and land application of groundwater using non-spray irrigation techniques (drag-drip lines or equivalent methods to prevent aerial spraying of groundwater). The extracted groundwater will be applied untreated to the ground surface for growing agricultural crops.
b. Operation of ex-situ treatment as a contingency to maintain extraction rates needed to prevent the chromium plume from migrating with groundwater flow, in the event agricultural treatment units cannot be operated for a period greater than 90 days which would result in reduction of extraction rates needed to maintain year-round plume capture. If construction of ex-situ treatment facilities involves more than one acre of land disturbance, or dredge/fill in surface waters, then additional permitting may be required such as a National Pollutant Discharge Elimination System permit, Clean Water Act section 404 permit and Clean Water Act section 401 Water Quality Certification, or waste discharge requirements. The Discharger is responsible for applying in a timely manner for any additional permits required.

c. Associated activities, including well construction, rehabilitation and maintenance including the use of well rehabilitation chemicals; soil and groundwater sampling; groundwater flow tracing.

Agricultural treatment of hexavalent chromium involves extracting groundwater within the chromium plume, and applying it to fields used to grow crops, typically forage crops for livestock such as alfalfa or sudan grass, although other agricultural products may be proposed. The toxic, soluble hexavalent chromium in the extracted groundwater applied to the fields is chemically "reduced" in the soils and root zones to the less toxic and insoluble trivalent chromium, where it remains immobilized. Based on analysis of almost nineteen years of data using this remediation technology at the site, agricultural treatment removes, through reduction, approximately 95 percent of the hexavalent chromium contained in the extracted groundwater. Extracting the groundwater to irrigate crops also provides hydraulic containment to limit the migration of the chromium plume in groundwater.

The Project also includes a contingency plan in the event agricultural treatment units must be shut down due to severe and extended storm activity that would preclude infiltration; crop disease; or other unforeseen events that would preclude agricultural unit operations for any substantial duration of time. The contingency plan identifies potential use of ex-situ treatment to maintain extraction rates needed to prevent the chromium plume from migrating with groundwater flow. Ex-situ treatment involves extracting contaminated groundwater and removing all forms of chromium from the water in an above-ground (ex-situ) treatment system, disposing of the removed chromium off-site, and injecting the treated water directly into the aquifer, either through injection wells or infiltration galleries. For the purposes of this Order, treated groundwater is defined as groundwater that is treated via an above-ground system such that any chemical or biological reagents, or other constituents introduced in the treatment facility are discharged at levels which do not cause degradation of the existing receiving water quality.

This Order does not authorize the discharge of chemical or biological reagents (such as carbon, ethanol, lactate or other compounds) to receiving waters; for example, to promote a reducing environment for in-situ treatment. It does authorize the use of well rehabilitation compounds or chemicals as described in Finding 13.

16. Chromium Plume Bulging

One consequence of operating additional agricultural treatment units may be chromium plume "bulging". The discharge of extracted groundwater to land within or on the edges of the plume may result in groundwater mounding that pushes the chromium plume laterally, creating a bulge on the boundary. Temporary, localized bulging of the chromium plume may be authorized by the Water Board to

accommodate remedial goals[1]. This Order authorizes plume bulging, limited to the eastern boundary of OU1, and not more than 3,000 feet from the eastern boundary of OU1.

Should lateral spreading of the chromium plume boundary occur, the Discharger must demonstrate, such as with a groundwater model, that chromium will be captured or remediated in the downgradient flow direction and not be allowed to leave the Project Area. This Order requires the Discharger to provide alternate water supplies to domestic wells affected by plume bulging.

17. Previous Soil, Vadose and Plant Tissue Monitoring; Basis for Monitoring

In compliance with previous Board Orders regulating agricultural treatment at the East, Ranch, and Desert View Dairy Land Treatment Units (described in Finding 5), the Discharger has conducted monitoring of soil, vadose (unsaturated) zone and plant tissue to determine the effectiveness of agricultural treatment in reducing hexavalent chromium concentrations in groundwater, and to determine the potential for accumulation of chromium in soil and plants in the agricultural treatment units. Maximum concentrations of hexavalent chromium in irrigation water historically applied to agricultural (or land) treatment units by the Discharger ranged from 42 µg/L (Ranch Land Treatment Unit) to 740 µg/L (East Land Treatment Unit). Maximum concentrations at the Desert View Dairy are similar to or less than the Ranch Land Treatment Unit.

a. Chromium Soil Monitoring Data

The Discharger characterized soils during remediation at the former East and Ranch Land Treatment Units, and has collected soil samples at the Desert View Dairy since 2005. This soil monitoring to date has not indicated a pattern of increasing accumulation of total chromium in soils. Hexavalent chromium has not been reported above reporting limits of 0.4 to 0.5 mg/kg with the exception of one sample at 0.97 mg/kg, collected from 5 to 5.5 feet below ground surface at the Desert View Dairy in third quarter 2013.

Previous Chromium Soil Limits

Board Order No. R6V-2004-034 2004 (Desert View Dairy WDRs) contained a soil compliance limit for hexavalent chromium of 30 mg/kg, based on 2002 U.S. EPA Region IX Preliminary Remediation Goals (PRGs) for Residential Soils. U.S. EPA no longer uses PRGs, and now uses Regional Screening Levels (RSLs). RSLs are developed using risk assessment guidance from the U.S. EPA Superfund program. The RSL for hexavalent chromium in soil has been updated from the former PRG value of 30 mg/kg to 0.29 mg/kg, which is lower than the reporting limit for hexavalent chromium of 0.4 to 0.5 mg/kg and may be lower than site background values (the uncertainty results from the RSL being slightly less than the reporting

[1] In order to authorize additional plume bulging in OU1 under this Order, an amendment to CAO R6V-2008-0002A4 would be required. Plume bulging is currently restricted to an area of up to 1,000 feet on the southeastern plume boundary, authorized in CAO R6V-2008-0002A2, dated April 7, 2009.

limit used to evaluate hexavalent chromium soil levels previously). Therefore, the RSL for hexavalent chromium is not proposed as a screening level in this Order. The RSL for trivalent chromium is 120,000 mg/kg.

Other Soil Screening Levels for Chromium in California
The Human Health Screening Level for hexavalent chromium in soils developed by the California Office of Environmental Health Hazard Assessment (OEHHA, January 2005) for residential soils is 17 mg/kg; for trivalent chromium the level is 100,000 mg/kg. The San Francisco Bay Regional Water Quality Control Board (updated May 2013) developed Environmental Screening Levels (ESLs), which provide conservative screening levels for over 100 chemicals commonly found at sites with contaminated soil and groundwater. The ESL for hexavalent chromium in shallow soils (depths less than or equal to 3 meters) for direct exposure concerns such as incidental ingestion, dermal contact and dust inhalation is 21 mg/kg; for trivalent chromium it is 120,000 mg/kg.

The range of screening levels for hexavalent chromium in California is 17 to 21 mg/kg; and for trivalent chromium the range is 100,000 to 120,000 mg/kg. These ranges will be used to compare to sampling results for chromium in soils required by this Order. Results will also be compared to background values of chromium, required to be established prior to discharging to new ATUs, to investigate the potential for accumulation of chromium in soils.

b. Plant Tissue Monitoring Data
Semi-annual plant tissue monitoring previously conducted shows that samples from crops grown in agricultural treatment units have been below detection limits for total and hexavalent chromium (detection limit of 1 mg/kg) with one exception, where total chromium was detected in plant tissue sample at 1.01 mg/kg. The compliance criterion for plant tissue was 100 mg/kg.

c. Vadose Monitoring Data
Vadose monitoring is conducted quarterly, and results from third quarter 2012 indicate all results were well below compliance limits of 50 µg/L total chromium and 21 µg/L hexavalent chromium (the average concentration of total chromium from vadose samples were 1.4 µg/L and hexavalent chromium was 1.3 µg/L). Comparison of hexavalent chromium concentrations in the applied irrigation water with the concentrations in the pore water collected from 5 feet below ground surface indicates hexavalent chromium removal rates generally greater than 95 percent across the majority of agricultural treatment units.

d. Basis for Monitoring Required by this Order
This Order authorizes discharges at agricultural treatment units in locations where hexavalent chromium in irrigation water may exceed historically applied values. Further, agricultural treatment may occur in areas co-located with existing in-situ treatment operations, where elevated concentrations of remediation byproducts such as iron, arsenic and manganese would be present. Therefore, this Order requires continued soil and plant tissue to verify hexavalent chromium removal efficiencies

and investigate any accumulation of chromium and other constituents in soils and plants. Nitrate monitoring in plant tissue is also required to verify plant uptake of nitrates in irrigation water.

This Order also requires monitoring of uranium and other radionuclides to determine the potential for these constituents to be transported or mobilized due to pumping for remediation purposes. Uranium and other radionuclides are naturally-occurring in Mojave Desert soils and rocks, and are not present in the aquifer as a result of the Discharger's remedial actions or compressor station operations. As described in the EIR, an increase in bicarbonate concentrations in the soil zone or an increase in the rate of downward groundwater flow due to groundwater pumping for agricultural use could increase the mobilization of uranium. In addition, uranium and radionuclide levels are generally found to be higher in groundwater closer to bedrock strata since they originate in bedrock. As a result, uranium may be extracted and deposited in agricultural treatment unit soils. Therefore, monitoring of extracted groundwater for uranium and other radionuclides is needed to determine the potential for this to occur. Where extracted groundwater used for irrigation contains uranium above the MCL, soil and plant tissue monitoring are required.

Vadose zone sampling is not required by this Order, as monitoring data indicate that vadose zone samples have been well below compliance limits for the period of record (over seven years of sampling).

18. Applicability of Title 27 Requirements; Exemption

California Code of Regulations, title 27, Division 2, (Title 27) specifies regulatory and design criteria for discharges of solid wastes to land for treatment, storage, or disposal. Agricultural treatment units do not store solid waste, nor do they store wastewater, but they do function to treat wastewater, as described in Finding 15. Section 20090 of Title 27 specifies exemptions for discharges of wastewater to land if the following conditions are met:

1. The applicable Water Board has issued WDRs, reclamation requirements, or waived such issuance;
2. The discharge is in compliance with the applicable water quality control plan; and
3. The wastewater does not need to be managed according to Chapter 11, Division 4.5, title 22 of this code as a hazardous waste.

Agricultural treatment authorized under this Order satisfies the conditions for exemption from Title 27 because 1)this Order constitutes WDRs; 2) this Order requires the discharges to be in compliance with the applicable water quality control plan; and 3) the wastewater does not need to be managed as a hazardous waste, as described below:

Total chromium is designated as hazardous waste at concentrations greater than or equal to 5,000 µg/L. As of second quarter 2013, the maximum concentration of total chromium detected in monitoring wells in the Project Area is 4,900 µg/L. As described in Findings 15 and 17, documented treatment efficiency for chromium using agricultural fields is 95 percent, resulting in theoretical maximum concentrations of total chromium in wastewater percolating to the receiving groundwaters of 245 µg/L, far less than hazardous waste levels. However, two factors indicate that these theoretical maximum concentrations are unlikely to occur: 1) irrigation water is typically blended from several extraction well sources, so that the maximum amounts of chromium detected in monitoring wells would be greatly diluted in irrigation effluent as a result of blending and, 2) the larger pumping volumes from extraction wells also results in significant dilution compared to monitoring wells concentrations. Even if treatment efficiency were to be less than 95 percent, chromium in water percolating to groundwater following agricultural treatment will not approach or exceed hazardous waste levels. Lastly, this Order prohibits the discharge of wastes exceeding hazardous levels.

Therefore, discharges authorized by this Order meet the exemption requirements of title 27, section 20090.

19. Authorized Agricultural Treatment Locations

Extracted groundwater for agricultural treatment of chromium may be applied to fields within the Project Area only, shown on Attachment A.

20. Land Uses

Land use for the compressor station is designated as public facilities. The land uses within the Project Area consist of residential, commercial, agricultural, public facilities and open desert land, including wildlife habitat and endangered species habitat for the desert tortoise. The nearest residences and domestic wells are located within and adjacent to the plume core west of the compressor station. No domestic wells containing more than 50 µg/L total chromium, the existing drinking water standard, are currently in use. However, hexavalent chromium has been detected in domestic and community wells at concentrations greater than the Public Health Goal of 0.02 µg/L and the maximum background level of 3.1 µg/L.

21. Receiving Waters

The receiving waters are the groundwaters of the Harper Valley Hydrologic Subarea of the Mojave Hydrologic Unit. The California Department of Water Resources designation for the Harper Valley Hydrologic Area is 628.42.

The groundwater aquifer within the limits of the Project Area is also referred to in this Order as the "Hinkley Valley aquifer", defined in the Project's EIR as the portion of the Harper Valley Hydrologic Subarea north of the Mojave River, between Iron Mountain in the southwest and Mount General in the northeast, extending north

through the Hinkley Valley to the approximate location of Red Hill. The Hinkley Valley aquifer is contained within the Centro Subarea of the Mojave Hydrologic Unit, as defined by the Mojave Water Agency.

22. Lahontan Basin Plan

The Water Board adopted a Water Quality Control Plan for the Lahontan Basin (Basin Plan), which has been occasionally amended. This Order implements the Basin Plan, as amended. The Basin Plan designates the beneficial uses of waters of the state within the Lahontan Basin, specifies the water quality objectives to protect those beneficial uses, and incorporates implementation programs to achieve the water quality objectives. The Basin Plan also identifies State Water Resources Control Board (State Water Board) plans and policies applicable within the Lahontan Basin.

23. Beneficial Groundwater Uses

The beneficial uses of the groundwater of the Centro Subarea of the Mojave River Groundwater Basin as set forth in the Basin Plan are:

a. MUN - municipal and domestic supply;
b. AGR - agricultural supply;
c. IND - industrial supply;
d. FRSH - freshwater replenishment; and
e. AQUA - aquaculture.

24. Maintenance of High Quality Waters in California, State Water Board Resolution No. 68-16 Anti-Degradation Analysis

State Water Board Resolution No. 68-16 ("Statement of Policy With Respect to Maintaining High Quality of Waters in California") (hereafter Resolution 68-16) requires the Regional Board in regulating the discharge of waste to maintain high quality waters of the State This Order is consistent with Resolution 68-16. In accordance with Resolution 68-16 and the Basin Plan, water quality degradation may be allowed if the following conditions are met: (1) any change in water quality must be consistent with maximum benefit to the people of the State; (2) the degradation will not unreasonably affect present and anticipated beneficial uses; (3) the degradation will not result in water quality less than that prescribed in the Basin Plan and other applicable policies. In addition, for any activity that results in discharges of waste to existing high quality waters, the discharge must meet waste discharge requirements that will result in the best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Implementation of the Project will result in the discharges of wastes to land and groundwater which could potentially degrade receiving water quality. While the Project is designed to remove hexavalent chromium from the extracted groundwater, other constituents present in the discharged irrigation water such as total dissolved solids, nitrate, naturally occurring uranium and other radionuclides, and naturally occurring soluble metals could accumulate over time in groundwater beneath discharge points (agricultural treatment units). Where discharges authorized by this Order could degrade the quality of existing high quality waters (waters whose quality is better than that needed to fully support the most sensitive designated beneficial use), that discharge is subject to State Water Board Resolution 68-16.

As described in Attachment G, Resolution 68-16 Analysis, which is incorporated into this Order, the discharges authorized by this Order are consistent with Resolution 68-16 and the Basin Plan. The Project involves the extraction of groundwater containing chromium and the application of the extracted groundwater to agricultural treatment units to reduce the hexavalent chromium to trivalent chromium, thereby cleaning up the polluted aquifer. The application of the extracted groundwater to the agricultural treatment units may result in some degradation of high quality groundwater within the Project Area. Such degradation is consistent with Resolution 68-16 because as described in Attachment G, this Order requires the use of best practicable treatment or control of the discharge. The discharges will not result in exceedances of applicable water quality objectives over time. The limited term degradation is consistent with the maximum benefit to the people of the State because the Project will result in removal of hexavalent chromium from the groundwater and restoring the contaminated groundwater to its beneficial uses. In addition, use of agricultural treatment units will result in a more expeditious cleanup of the contaminated groundwater than other remediation methods that have been evaluated.

25. Evaluation of Water Code Section 13241

Pursuant to Water Code section 13241 the requirements of this Order take into consideration:

a. Past, present, and probable future beneficial uses of water.

Past, present, and probable future beneficial uses of water in the Project Area are designated in the Basin Plan to include municipal (MUN) and agricultural (AGR) supply. The purpose of the Project is to restore the MUN use to the aquifer, which is impaired due to the existing chromium pollution. Requirements, including mitigation measures identified in the environmental documentation, are contained in this Order to protect current and future MUN users whose wells are affected by the remediation actions authorized by this Order. As described in Paragraph b. below, this Order requires the Discharger to provide current and future MUN users whose wells are affected by remediation activities with alternate water supplies. Additionally, the Discharger will be required to restore the aquifer to pre-project conditions for remediation byproducts following Project

completion, or to implement a basin-wide approach to managing agricultural treatment remediation byproducts that avoids the need for post-chromium remediation activities to address these remedial byproducts.

This Order authorizes discharges to agricultural treatment units, which function in the same manner as existing non-remedial agricultural activities in the Hinkley Valley. Further, the extracted groundwater is put to beneficial use (AGR) and is suitable for that purpose. Therefore, this Order considers and provides for the beneficial uses of groundwater in the Hinkley Valley, including MUN and AGR, which are specified as the first and second highest uses of water in California Water Code section 106.

b. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

The hydrographic unit subject to discharges authorized by this Order has designated MUN and AGR beneficial uses. The depth to groundwater in the Hinkley Valley is generally 75 to 95 feet below ground surface. The depth to groundwater provides adequate separation and contact time for removal of residual chromium in percolating irrigation return water through the unsaturated zone, indicating that the Discharger's proposed remedial strategy is appropriate for the environment characteristics of the hydrographic unit.

As a condition of this Order the Discharger must provide documentation that it has obtained adequate water rights to ensure that groundwater extracted for remediation purposes authorized by this Order does not result in regional groundwater depletion.

As a condition of this Order, the Discharger must provide alternate water supplies to well owners whose water quality (or quantity) has been adversely affected by the Discharger's remedial actions. The quality of alternate water is specified as follows:

- For chromium, alternative water supply shall be equal to or less than Water Board established maximum background levels.
- Alternative water supply shall meet all primary and secondary Maximum Contaminant Levels for any constituent, other than chromium, that is affected by remedial activities as defined in this Order.
- For constituents not affected by remedial activities, the alternative water supply shall be consistent with pre-project water quality.

These requirements are specified in Attachment F, which is made a part of this Order. Therefore, this Order considers the water quality of the hydrologic unit by requiring that alternate water quality is consistent with background values for chromium.

The agricultural treatment proposed by the Discharger to remediate chromium in groundwater is consistent with historical and existing land use characteristics of the Hinkley Valley, and provides a valuable commodity (e.g., alfalfa) for local use. Therefore, the activities authorized by this Order are appropriate for the characteristics of the hydrographic unit.

c. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

See Attachment G, Resolution 68-16 Analysis, for a discussion of the existing water quality conditions, including the occurrence of high quality waters in the Project Area, and the water quality conditions which will be achieved and maintained through the requirements of this Order.

Water Quality Objectives specified in the Basin Plan for total dissolved solids (TDS) and nitrate in the Project Area are currently exceeded in certain portions of the Project Area, as described in Attachment F. Water quality monitoring data indicates that active dairy operations account for the greatest increases in TDS, followed by former dairies, and irrigated lands. Nitrate exceedances are primarily due to dairy operations as well. Therefore, requiring nitrate and TDS control at dairies, and in future salt and nutrient management plans, would limit future degradation of water quality in the Project Area.

The agricultural treatment authorized by this Order is anticipated to improve water quality related to nitrates, as vadose zone monitoring data from existing agricultural treatment units indicate that nitrates in extracted groundwater are taken up in the soil and root zone of the fields. Additional monitoring is required by this Order to verify that nitrate concentrations do not increase due to the application of nitrate-containing water on agricultural fields.

Discharges authorized by this Order may degrade existing water quality for TDS. In OUs 1 and 3, where TDS concentrations are generally below the secondary TDS MCLs of 1,500 mg/L and 500 mg/L, respectively, this Order requires that where the discharge of waste causes a 20 percent increase in TDS concentrations, the Discharger must submit an action plan to reduce those exceedances to the extent feasible, considering remediation goals. Actions could include blending of irrigation water to reduce TDS concentrations applied to fields, participation in a Salt and Nutrient Management Plan, or by proposing a plan to implement EIR mitigation measure WTR-MM-4, described below. Further, this Order requires application of irrigation water at agronomic rates as a best management practice to minimize TDS buildup in soils to extent feasible.

Where the upper limit secondary MCL of 1,500 mg/L is already exceeded (for example, throughout much of OU2, where levels of TDS are up to 5,900 mg/L), agricultural treatment may result in further degradation. The EIR completed for the Project recognizes the potential increase in concentrations of TDS as a significant and unavoidable impact for the duration of the Project; therefore, a

statement of overriding considerations is included in Attachment H. In addition, EIR mitigation measure WTR-MM-4 specifies that the Discharger will restore the Hinkley Valley aquifer to pre-remedial conditions following completion of the chromium remediation project, described below:

- No later than 10 years prior to the conclusion of the proposed chromium remediation project, this Order requires, consistent with the EIR, that the Discharger 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 actions, and that these constituents are likely to be present upon the conclusion of remedial actions, the Discharger will propose aquifer restoration through direct treatment of water; and/or basin-wide approaches to managing remedial agricultural treatment TDS and nitrate byproducts that may avoid the need for direct treatment to address these remedial byproducts.
- 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.
- 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.

The requirements of mitigation measure WTR-MM-4 will be contained in Cleanup and Abatement Orders issued to the Discharger.

d. Economic considerations

The Discharger's proposed remediation strategy to use agricultural treatment results is an economic benefit by growing a commodity that can be used by the nearby community (e.g., alfalfa) and by restoring the groundwater to MUN use. In addition, the use of agricultural treatment units as a remediation methodology is expected to be a more expeditious method of cleanup of the contaminated aquifer, which will assist in reducing adverse impacts associated with the presence of contamination.

e. The need for developing housing within the region.

The EIR completed for the Project analyzed the potential for remediation actions, including those addressed by this Order, to impact population and housing in the Project Area. Based on the analysis in the EIR, the impact on population and housing was determined to be less than significant. By implementing agricultural treatment in the Project Area, the Discharger may acquire existing rural residential properties, resulting in displacement of some existing housing. However, land acquisition for agricultural treatment would occur only through voluntary agreements between the Discharger and landholder, and be done on a willing-seller basis. Given the areas of likely acquisition, mostly in OU3, and the low density of residences, the number of homes acquired to facilitate remedial actions authorized by this Order is expected to be low. Therefore, the discharges authorized under this Order will not affect housing development within the region.

f. The need to develop and use recycled water

There are no community wastewater systems within the Project Area to produce or provide recycled water. The discharges authorized under this Order will not affect the development or use of recycled water.

26. Consideration of California Water Code section 106.3

Water Code section 106.3 establishes a state policy that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes, and directs state agencies to consider this policy when adopting regulations pertinent to water uses described in the section, including the use of water for domestic purposes.

The primary purpose of agricultural treatment of chromium in extracted groundwater and the discharges associated with this Order is to restore groundwater quality to background conditions for chromium. The discharges for agricultural treatment authorized by this Order may also improve water quality related to nitrate. The EIR identifies mitigation measures, including that the Discharger provide alternate water supplies for those domestic wells users whose wells are affected or potentially affected by remediation activities; that the Discharger bears all costs associated with the supply of alternate water; and that the Discharger conduct quarterly monitoring of wells within one mile cross gradient or downgradient of the plume and annual modeling of chromium and byproduct plume movement and groundwater drawdown. The monitoring and modeling results will provide sufficient information to determine whether wells might be affected by chromium, remediation byproducts, or groundwater drawdown within the following year. The annual modeling (forecasted out to a three-year period) will be used to plan for either changing remediation activities and/or the provision of alternative water supplies in advance of effects on domestic wells. These mitigation measures are incorporated into this Order in Section I.E and Attachments E and F.

Therefore, the consideration of access to safe, clean and affordable water has been met in this Order.

27. California Environmental Quality Act

The Project is a new project for purposes of the California Environmental Quality Act (CEQA) and is subject to the provisions of CEQA (Public Resources Code, section 21000 et seq.). The Water Board is the lead agency for this Project. Prior to adoption of previous WDRs issued to the Discharger (described in Finding 5) and pursuant to CEQA, the Water Board conducted environmental analyses to address the impacts of implementing those WDRs by preparing and certifying respective Mitigated Negative Declarations (MNDs) and addenda in 2004, 2006, 2007, 2008 and 2010. Although many of the same technologies that were analyzed in those MNDs and are currently being implemented (agricultural treatment, in-situ remediation, plume containment, freshwater injection) will continue, the intensity and geographical extent of these methods will be increased to address the full extent of chromium in groundwater, and above-ground treatment facilities may be added. The potential environmental impacts of these expanded and new activities were not evaluated in the previous environmental documentation.

The Water Board determined that the preparation of an EIR was necessary to evaluate the potential environmental impacts of proposed expanded and new remediation activities.

28. 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. Public scoping meetings were held during December 2010 and January 2011 to ask for input on remedial alternatives analyzed in the Feasibility Study and on environmental issues to be evaluated in the Environmental Impact Report. A Draft EIR, prepared by ICF International on behalf of the Water Board, was circulated under State Clearinghouse No. 2008011097 for a 76-day comment period beginning on August 21, 2012.

The EIR analyzed five "action" alternatives at an equal level of detail. No Preferred Alternative was identified. Agricultural treatment units are a component of all the alternatives analyzed, and the activities authorized under this Order are within the range of actions analyzed in the EIR alternatives. Therefore, the EIR identified and analyzed the potential environmental impacts of this Order.

29. EIR Mitigation Measures

The EIR analyzed potential environmental impacts associated with various cleanup methods, including agricultural treatment. The EIR concluded, in part, that temporary, localized decreases in groundwater quality will result from the Project due to the application of the extracted groundwater to agricultural treatment units,

and that those impacts are significant and unavoidable during the remediation without mitigation. The EIR identifies mitigation measures to minimize these impacts to the extent feasible during remediation, and contains a mitigation measure requiring the Discharger restore water quality to pre-remedial reference conditions following the remedial activities. Mitigation measures specified in the EIR are contained in Attachment F, EIR Mitigation Monitoring and Reporting Program, which is made a part of this Order. Certain EIR mitigation measures contained in Attachment F 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, as a condition of this Order, the Discharger must submit reports to the Water Board documenting implementation of and compliance with all applicable mitigation measures for agricultural treatment units.

30. Certification of Final EIR; Identification of Potentially Significant and Unavoidable Impacts

In a public meeting on July 17, 2013, the Water Board adopted Resolution R6V-2013-0060, certifying the EIR which describes potentially significant environmental impacts from the Project. Potentially significant and unavoidable impacts were identified in the EIR for the following water quality and biological resources:

a. Impacts to water quality in the Hinkley Valley aquifer due to remedial actions:
- Temporary chromium plume bulging;
- Temporary increase in remedial byproducts, including those related to agricultural treatment units:
  - Total dissolved solids
  - Uranium and other radionuclides

b. Impacts to biological resources due to construction of agricultural units:
- Conflicts with wildlife movement (desert tortoise)

This Order authorizes discharges of extracted groundwater to agricultural treatment units in the Project Area which may result in one or more significant and unavoidable impacts described above. Findings required by CEQA sections 15091 through 15093, regarding any significant environmental effects of the project, including a statement of overriding considerations before adopting a project which may result in unavoidable significant impacts, are included in Attachment H.

31. Notification of Interested Persons

The Water Board has notified the Discharger and all known interested persons of its intent to adopt new WDRs for the Project.

32. Consideration of Interested Parties

The Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the Discharger shall comply with the following:

I. DISCHARGES AUTHORIZED BY THIS ORDER

A. Existing Agricultural Treatment Units

All existing agricultural treatment units (ATUs) are subject to this Order. The locations of these units are shown on Attachment B. Requirements contained in this Order are imposed on these existing ATUs, as applicable.

B. Additional Agricultural Treatment Units

1. To be authorized to discharge to new ATUs under this Order, the Discharger must submit a Report of Waste Discharge (RWD) and a Monitoring and Reporting Plan no later than 60 days before the construction of any new ATU.

2. Upon receipt of the RWD, the Executive Officer shall determine the applicability of this Order to such a discharge and the completeness of the RWD. If the discharge is eligible and the RWD is complete, the Executive Officer shall notify the Discharger that the discharge is authorized under the terms and conditions of this Order.

3. The RWD must contain essential project description information that describes the operational objectives of the proposed ATU(s), characteristics of the discharge, and the location and volume of discharge. A Monitoring and Reporting Plan shall be included, which includes all applicable information required in Attachments E and F.

4. RWD elements shall include, but not be limited to:
    a. A description and map of the locations and acreages of all proposed ATUs, shown with chromium plume boundaries of 3.1, 10, 50, and 1,000 µg/L concentration contours;
    b. Location of all existing and proposed groundwater extraction points and discharge areas;
    c. Estimated monthly and annual average groundwater extraction rates and volumes, tabulated separately by extraction point for each ATU proposed, and cumulatively for all existing and proposed ATUs;
    d. Documentation of adequate water rights and Free Production Allowance possessed by the Discharger for all existing and proposed ATUs;

e. A description of the crop(s) to be cultivated in proposed ATUs. If crop(s) are different from those grown previously (i.e., forage crops.), provide information that the proposed crop(s) will provide the similar remedial benefits as previous forage crops, and will not result in exposing the crop's consumers to unsafe levels of constituents.
f. Constituents in the irrigation (effluent) water, including but not limited to predicted annual average and maximum concentrations of:
    i. Total and hexavalent chromium
    ii. Total dissolved solids
    iii. Nitrate as N
    iv. Uranium and other radionuclides
    v. Any other remediation byproducts predicted to exceed water quality objectives in the effluent, such as iron, manganese, or arsenic.
g. Existing receiving water concentrations for the constituents listed in 4.e, above;
h. Maps showing the locations of all potentially and actually affected domestic and agricultural supply wells, forecasted out three years;
i. Maps showing predicted groundwater drawdown, forecasted out three years;
j. A discussion of the potentially significant impacts due to remediation byproducts, chromium plume bulging and/or groundwater drawdown, as defined by the criteria listed in Section I.E.1 of this Order;
k. A plan to address all potentially significant impacts described in 4.i, above, including any feasibility studies and water supply plans as necessary; and
l. Proposed monitoring, mitigation and reporting plans that comply with Attachments E and F of this Order.

5. All site maps and figures must comply with mapping requirements according to Water Board Orders for connecting monitoring wells having concentrations of chromium at or above background levels of total or hexavalent chromium and must show the chromium plume boundaries indicating 3.1, 10, 50, and 1,000 µg/L concentration contours.

6. The signature and stamp of a California licensed geologist and civil engineer, if geologic and engineering interpretations are included.

7. Other relevant information required by the Executive Officer.

Discharge Limitations

1. The discharge will be limited to the Project Area with boundaries as described in Finding 3 and shown in Attachment A.

2. The maximum acreage of agricultural treatment units authorized under these WDRs is 500 acres. This includes 236 acres of existing ATUs as of March 2014, shown in Attachment B, and allows for the construction and operation of up to 264 additional acres.

3. This Order does not authorize groundwater extraction exceeding the Discharger's annual water rights allowance (Free Production Allowance for the Centro subarea), as determined by the Mojave Water Agency.

4. The maximum volume of discharge to land surface must not create significant ponding conditions that exceed infiltration capacities of the soil for more than a 24-hour period. This limitation does not apply to ponding from natural precipitation.

5. Irrigation water shall be applied to fields at agronomic rates. The term “agronomic rate” refers to a rate of irrigation water applied that provides the needed amount of water and nutrient loading which grasses/crops require while minimizing excess water or nutrients percolating beyond the root zone. The agronomic rate is the rate of application of irrigation water necessary for plant evapotranspiration, to prevent salinization of the root zone, for plant germination, for frost protection, and to account for distribution uniformity. All reasonable efforts must be taken to ensure uniform distribution of irrigation water. Demonstration of agronomic rate application shall be met by submitting the information outlined in Attachment E, Section III, or equivalent.

6. The concentration of hexavalent chromium in discharged irrigation water shall not exceed 20 times the concentration of hexavalent chromium in the groundwater below the discharge point, unless it can be demonstrated by the Discharger that percolated irrigation water exceeding that limit will be captured in downgradient extraction wells or other remedial facilities before leaving the Operable Unit of origin. This discharge limit is based on the 95 percent hexavalent chromium removal rate of agricultural treatment units demonstrated to date, as described in Findings 15 and 17.

7. Any discharge of irrigation water containing concentrations of chromium greater than 20 times the receiving water chromium concentration at the point of discharge shall not be allowed to "actually affect" a domestic or agricultural supply wells, as defined in Section I. E.1 of this Order.

8. Any discharge of irrigation water shall not be allowed to cause bulging of the chromium plume unless specifically authorized by the Water Board. This Order does not authorize chromium plume bulging exceeding the limits contained in

CAO R6V-2008-0002A2, dated April 7, 2009 unless and until an amendment to that CAO (as amended) is adopted by the Water Board, specifically authorizing additional temporary, localized plume bulging to accommodate remediation goals.

9. Groundwater that is treated via an above-ground (ex-situ) system shall be treated such that any chemical or biological reagents, or other constituents introduced in the treatment facility are discharged at levels which do not cause degradation of the existing receiving water quality.

10. The discharge of hazardous waste, as defined in California Water Code section 13173 and Title 23 CCR section 2521(a), respectively, is prohibited.

C. Receiving Water Limitations

The discharge of waste shall not cause a violation of any applicable water quality standards for receiving water adopted by the Water Board or the State Water Board; for example, narrative or numeric water quality objectives identified in the Basin Plan, except where specifically authorized by this Order.

The discharge shall not cause the presence of the following substances or conditions in groundwaters as described.

1. Chemical Constituents - Groundwaters shall not contain concentrations of chemical constituents in excess of the maximum contaminant level (MCL) or secondary maximum contaminant level (SMCL) based upon drinking water standards specified in the following provisions of Title 22 of the CCR[2]: Table 64431-A of Section 64431 (Inorganic Chemicals), Table 6444-A of Section 64444 (Organic Chemicals), Table 64449-A of Section 64449 (SMCLs - Consumer Acceptance Limits), and Table 64449-B of Section 64449 (SMCLs - Ranges). This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect. Groundwaters shall not contain concentrations of chemical constituents that adversely affect the water for beneficial uses.

2. Taste and Odors - Groundwaters shall not contain taste or odor-producing substances in concentrations that cause nuisance or that adversely affect beneficial uses, except where authorized by this Order for TDS.

3. In OU1 and OU3, if the discharge of waste causes a 20 percent increase in TDS concentrations, the Discharger shall submit an action plan described in Section II of this Order, within 60 days of such exceedances.

[2]Except where specifically authorized by this Order for TDS (see Receiving Water Limitation 3), and in OU2, where TDS concentrations already greatly exceed this standard, concentrations may further degrade due to agricultural treatment to accomplish remediation goals.

4. Toxic substances in concentrations that individually, collectively, or cumulatively cause detrimental physiological response in humans, plants, animals, or aquatic life are prohibited.

5. The discharge of wastes shall not cause the pH of the receiving groundwater to be depressed below 6.5 pH units, nor raised above 8.5.

6. The discharge of waste outside the Project Area, identified in Attachment A, is prohibited.

7. The discharge of waste shall not cause concentrations of chromium to exceed 10 µg/L in areas where chromium concentrations are less than 10 µg/L, and only in OU1 along the eastern boundary. This limitation is intended to allow for temporary, localized chromium bulging in OU1 of up to 3,000 feet from the eastern boundary of OU1 if proposed by the Discharger and accepted by the Water Board to accommodate remediation goals. Such chromium plume bulging may occur under this Order only if CAO R6V-2008-0002A is amended to specially authorize such discharges.

D. Conditions Triggering Environmental Impact Report Mitigation Measures

This Order requires implementation of mitigation measures related to water resources contained in the Project's EIR for affected water supply wells[3]. Criteria are described to determine if water quality or quantity in water supply wells have been affected, either "actually" or "potentially", by remediation activities authorized by the Order. If a water supply well is "affected" according to the criteria outlined in this section, then mitigation measures specified in the EIR, and included in Attachment F of this Order, will be required.

There are different mitigation measures that apply depending if a well is determined to be actually or potentially affected. These requirements are described in Section I.E.2 and I.E.3, below and in more detail in Attachment F. Mitigation measures are referred to by alpha-numeric identifiers; for example, WTR-MM-1 (Water Resources Mitigation Measure #1), consistent with the format used in the EIR.

1. Criteria Defining Affected Wells

a. Domestic Supply Wells

Affected by Remedial Byproducts (TDS, Nitrate, Uranium, other Radionuclides)

[3] 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, extraction wells used for remedial purposes, or monitoring wells.

Actually affected domestic wells are defined as any domestic water supply well with remedial byproduct concentrations that exceed any of the following criteria due to activities authorized by this Order:

- Concentrations above California primary or secondary Maximum Contaminant Levels or water quality objectives specified in Table 1 if, prior to discharges authorized by this Order or prior to 2014, the well contains concentrations that are less than California primary or secondary Maximum Contaminant Levels or water quality objectives; or
- A 10% increase above pre-remedial reference levels if the well has concentrations that, prior to discharges authorized by this Order or prior to 2014, exceed a California primary Maximum Contaminant Level; or
- A 20% increase above pre-remedial reference levels if the well has concentrations that, prior to discharges authorized by this Order or prior to 2014, exceed a California secondary Maximum Contaminant Level or water quality objective; or
- A 20% increase above pre-remedial reference levels if the well has concentrations that, prior to discharges authorized by this Order or prior to 2014, are less a California primary or secondary Maximum Contaminant Level or water quality objective.

Table 1. Maximum Contaminant Levels for Byproducts in Groundwater

Constituent	Primary State MCL	Secondary State MCL
Uranium	20 pCi/L	NA
Gross Alpha	15 pCi/L	NA
Total Dissolved Solids (TDS)	NA	500 mg/L [4] 1,000 [5] 1,500 mg/L [6]
Nitrate as Nitrogen	10 mg/L	

Potentially affected domestic wells are 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 (see Section I.E.1.c for definition of affected monitoring well).
- All wells predicted to be within one-half mile downgradient or one-quarter mile cross gradient of an actually affected domestic well or an

[4] Recommended limit
[5] Upper limit
[6] Short-term limit

affected monitoring well in the next twelve months by groundwater flow and transport modeling.

Monitoring and groundwater flow modeling to determine if these criteria are exceeded will be conducted by the Discharger as specified in WTR-MM-2b, described in the WDR Monitoring, Modeling and Reporting Program (Attachment E). Exceedances of these criteria require implementation of WTR-MM-2.

i. Affected by Groundwater Drawdown

Actually affected domestic wells are defined as follows:

- All wells where groundwater drawdown of more than 25% of the wetted screen depth within the saturated zone has occurred due to activities authorized by this Order, 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.

Potentially affected domestic wells are defined as follows:

- All wells where any of the above conditions are predicted to occur through groundwater modeling within twelve months.

Monitoring and groundwater flow modeling to determine if these limits are exceeded will be conducted by the Discharger as specified in WTR-MM-2c, described in the WDR Monitoring, Modeling and Reporting Program (Attachment E). Exceedances of these criteria require implementation of WTR-MM-2.

ii. Affected by Chromium Plume Movement

Actually affected domestic wells will be defined any domestic water supply well with chromium (hexavalent or total) concentrations that exceed any of the following criteria due to activities authorized by this Order:

- Maximum background levels (if pre-remedial reference levels were below maximum background levels), or
- Concentrations increase by 10% or more (if pre-remedial reference levels 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 twelve months as indicated by groundwater modeling.

Monitoring and groundwater flow modeling to determine if these criteria are exceeded will be conducted by the Discharger as specified in WTR-MM-2a, described in the WDR Monitoring, Modeling and Reporting Program (Attachment E). Exceedances of these criteria require implementation of WTR-MM-2.

b. Non-Remedial Agricultural Supply Wells

i. Affected by Remedial Byproducts

Actually affected agricultural wells will be defined as an agricultural well where activities authorized by this Order caused an increase in TDS or otherwise affected water quality such that:

- Agricultural products are 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. Substantial reduction in quantity means that agricultural yields are predicted to be reduced by at least 25 percent over pre-remedial yields.

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 twelve months.

Monitoring and groundwater flow modeling to determine if these criteria are exceeded will be conducted by the Discharger as specified in WTR-MM-2b, described in the WDR Monitoring, Modeling and Reporting Program (Attachment E). Exceedances of these criteria require implementation of WTR-MM-2.

ii. Affected by Groundwater Drawdown

Actually affected agricultural wells will be defined as follows:

- Agricultural wells where groundwater drawdown of more than 25% of the wetted well screen depth has occurred due to activities authorized by this Order, compared to pre-remedial reference levels.

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 twelve months.

Monitoring and groundwater flow modeling to determine if these criteria are exceeded will be conducted by the Discharger as specified in WTR-MM-2c, described in the WDR Monitoring, Modeling and Reporting Program (Attachment E). Exceedances of these criteria require implementation of WTR-MM-2.

c. Monitoring Wells

i. If a monitoring well within one-half mile upgradient or one-quarter cross gradient of a water supply well exceeds mitigation trigger criteria for **actually affected** domestic supply wells for remediation byproducts (described in Section I.E.1.a, above), WTR-MM-2, WTR-MM-2b are required for the water supply well.

Monitoring and reporting to determine if this limit is exceeded will be conducted by the Discharger as specified in the WDR Monitoring, Modeling and Reporting Program (Attachment E).

d. Regional Aquifer: Mojave Groundwater Basin, Centro Subarea

i. The Discharger will provide documentation that it possesses adequate water rights and Free Production Allowance that meet or exceed the current expected agricultural treatment water use.

ii. If the Discharger fails to acquire adequate water rights and Free Production Allowance to support proposed agricultural treatment, the Discharger will be required to implement above-ground treatment or modify existing remedial activities to adequately compensate for any loss in planned agricultural treatment, as required by WTR-MM-1.

Reporting of the Discharger's annual Free Production Allowance will be conducted as required by WTR-MM-1.

2. Actually Affected Well Mitigation Requirements

If a domestic or agricultural water supply well is determined to be an actually affected well, then the Discharger will provide alternative water supply meeting the requirements of Mitigation Measure WTR-MM-2, described in the EIR Mitigation Monitoring and Reporting Program (Attachment F).

3. Potentially Affected Well Mitigation Requirements

If a domestic or agricultural water supply well is determined to be potentially affected well, then the Discharger 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 consistent with the requirements of Mitigation Measure WTR-MM-2 such that actual impacts do not occur.

If the Discharger chooses to remediate the triggering condition, it must 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, the Discharger 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 twelve months, this provides adequate advanced warning to feasibly provide the alternative water supply before impacts to supply wells occur.

4. Monitoring and Mitigation Measures Details

Monitoring required to determine pre-remedial reference levels or existing conditions, and to determine if impacts to receptors (e.g., water supply wells, regional aquifer) have occurred or may occur, is described in Attachment E, WDR Monitoring, Modeling and Reporting Program. Specific mitigation measure requirements are contained in Attachment F, 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, as a condition of this Order, the Discharger must submit an annual report to the Water Board documenting implementation of and compliance with all applicable mitigation measures for agricultural treatment units, including those required under the authority of another agency or entity. EIR mitigation measures are specified in Attachment F.

E. General Requirements and Prohibitions

The discharge of waste shall not cause a violation of the following General Requirements and Prohibitions.

1. The discharge of wastes other than those described in Section I (Discharges Authorized by this Order) is prohibited unless the Discharger obtains coverage under a general permit or an individual permit that regulates the discharge of such wastes.

2. Surface flow or visible discharge of waste to surface waters, or surface water drainage courses is prohibited.

3. Creation of pollution, contamination, or nuisance, as defined in section 13050 of the Water Code, is prohibited, except where specifically authorized by this Order.

4. The discharge of waste, except to authorized ATU locations described in Finding 19, is prohibited.

5. Where any numeric or narrative WQO contained in the Basin Plan is already being violated, the discharge of waste that causes further degradation or pollution is prohibited, except where specifically authorized by this Order.

6. The Discharger shall remove and relocate or otherwise address any wastes that are discharged not in accordance with this Order.

7. Hazardous waste, as defined under article 1, chapter 11, division 4.5 (§66261.3 et seq.) of title 22, CCR, shall not be disposed and/or treated at the Project Area, outside the scope of these waste discharge requirements.

8. The discharge to the ground of any chemicals stored in tanks at the Project Area is prohibited.

9. The discharge of solid waste to the Project Area is prohibited.

II. ACTION PLAN FOR TDS

1. In Operable Units (OUs) 1 and 3, if the discharge of waste causes a 20 percent increase in TDS concentrations, the Discharger shall submit an action plan **within 60 days** of identifying such exceedances.

2. Exceedances of the above limits will be determined by evaluating the annual average TDS concentrations for the shallow zone and deep zone of the upper aquifer for each ATU in OU1 and OU3, using appropriate monitoring wells associated with each ATU.

3. The action plan shall describe and show on maps the extent of TDS exceedances and propose actions to minimize TDS loading to receiving waters to the extent feasible, considering remediation goals. The action plan shall also describe any effects on the pace of chromium remediation due to implementing the action plan. Actions could include blending of irrigation water to reduce TDS concentrations applied to fields, participation in or development of a Salt and Nutrient Management Plan, or by proposing a plan to implement EIR mitigation measure WTR-MM-4 including basin-wide approaches to TDS management, described in Attachment F. The action plan must include a schedule for implementing proposed actions.

III. MONITORING AND REPORTING

1. Pursuant to Water Code section 13267, subdivision (b), the Water Board prescribes monitoring, modeling, and reporting requirements in Attachment E. Mitigation Measures Monitoring and Reporting relevant to the proposed remediation project are also prescribed, as specified in Attachment F.

2. 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. Adoption of these WDRs does not relieve the Discharger from requirements to submit technical reports required in previous Board Orders unless or until stated so in writing from the Executive Officer, except that reports required by those Board Orders that are rescinded by this Order will no longer be required.

IV. PROVISIONS

A. Standard Provisions

The Discharger shall comply with the “Standard Provisions for Waste Discharge Requirements,” dated September 1, 1994, in Attachment C, which is made a part of this Order.

B. General Provisions for Monitoring and Reporting

The Discharger shall comply with the “General Provisions for Monitoring and Reporting,” dated September 1, 1994, in Attachment D, which is made a part of this Order.

C. Other Permits

This Order 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 Order. This Order does not prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.

This Order 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 Order, 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 Order.

D. Claim of Copyright or Other Protection

Any and all reports and other documents submitted to the Water Board pursuant to this request will need to be copied for some or all of the following reasons: (1) normal internal use of the document, including staff copies, record copies, copies for Board members and agenda packets, (2) any further proceedings of the Water Board and the State Water Board, (3) any court proceeding that may involve the document, and (4) any copies requested by members of the public pursuant to the Public Records Act or other legal proceeding.

If the Discharger or its contractor claims any copyright or other protection, the submittal must include a notice, and the notice will accompany all documents copied for the reasons stated above. If copyright protection for a submitted document is claimed, failure to expressly grant permission for the copying stated above will render the document unusable for the Water Board's purposes, and will result in the document being returned to the Discharger as if the task had not been completed.

E. Rescission of Board Orders

Board Order Nos. R6V-2004-0034, R6V-2004-0034A1, R6V-2004-0034A2 and Investigative Order R6V-2011-0078 are hereby rescinded.

E. Expiration

These waste discharge requirements do not expire.

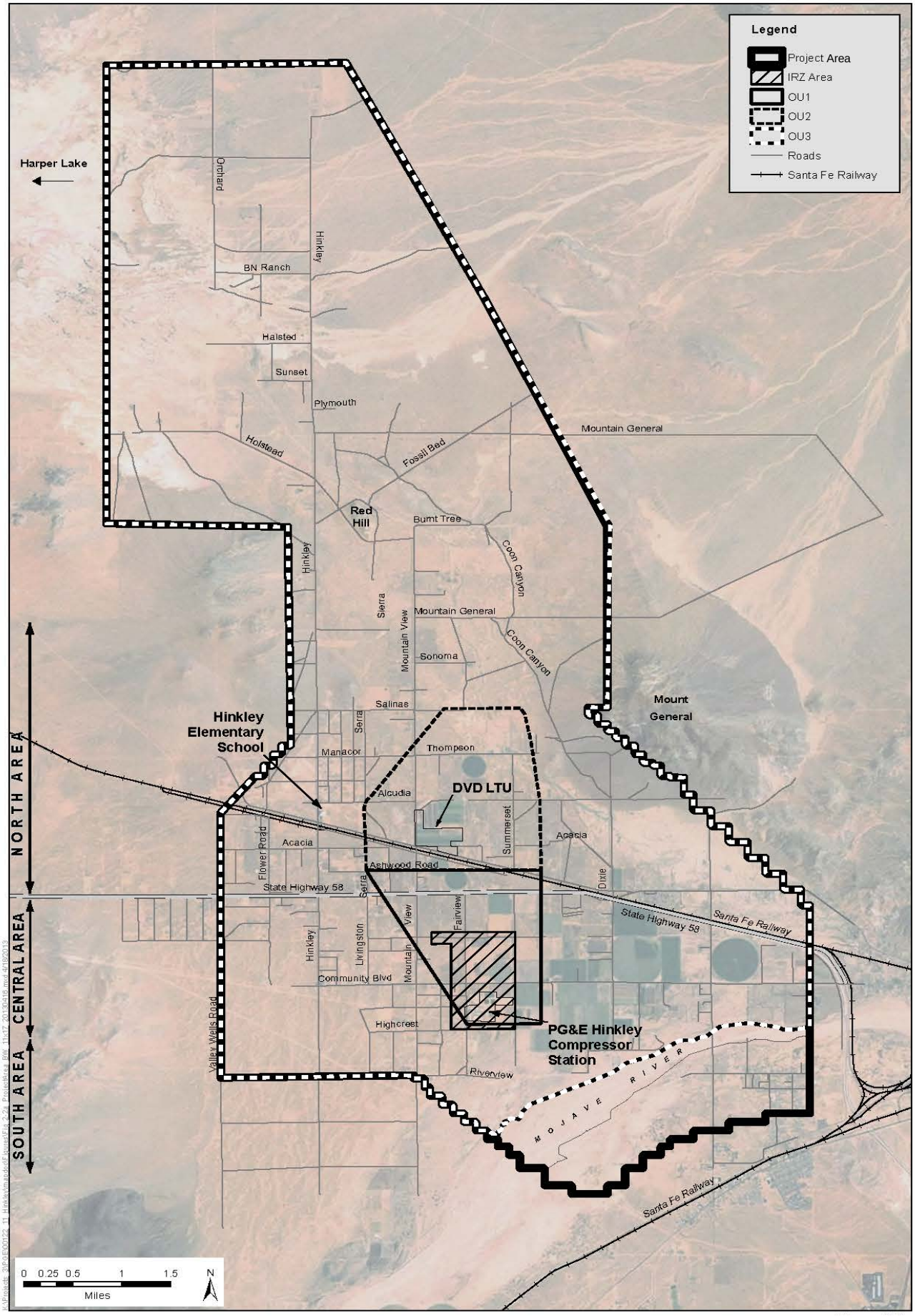
I, Patty Z. Kouyoumdjian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on March 14, 2014.

_____
PATTY Z. KOUYOUMDJIAN
EXECUTIVE OFFICER

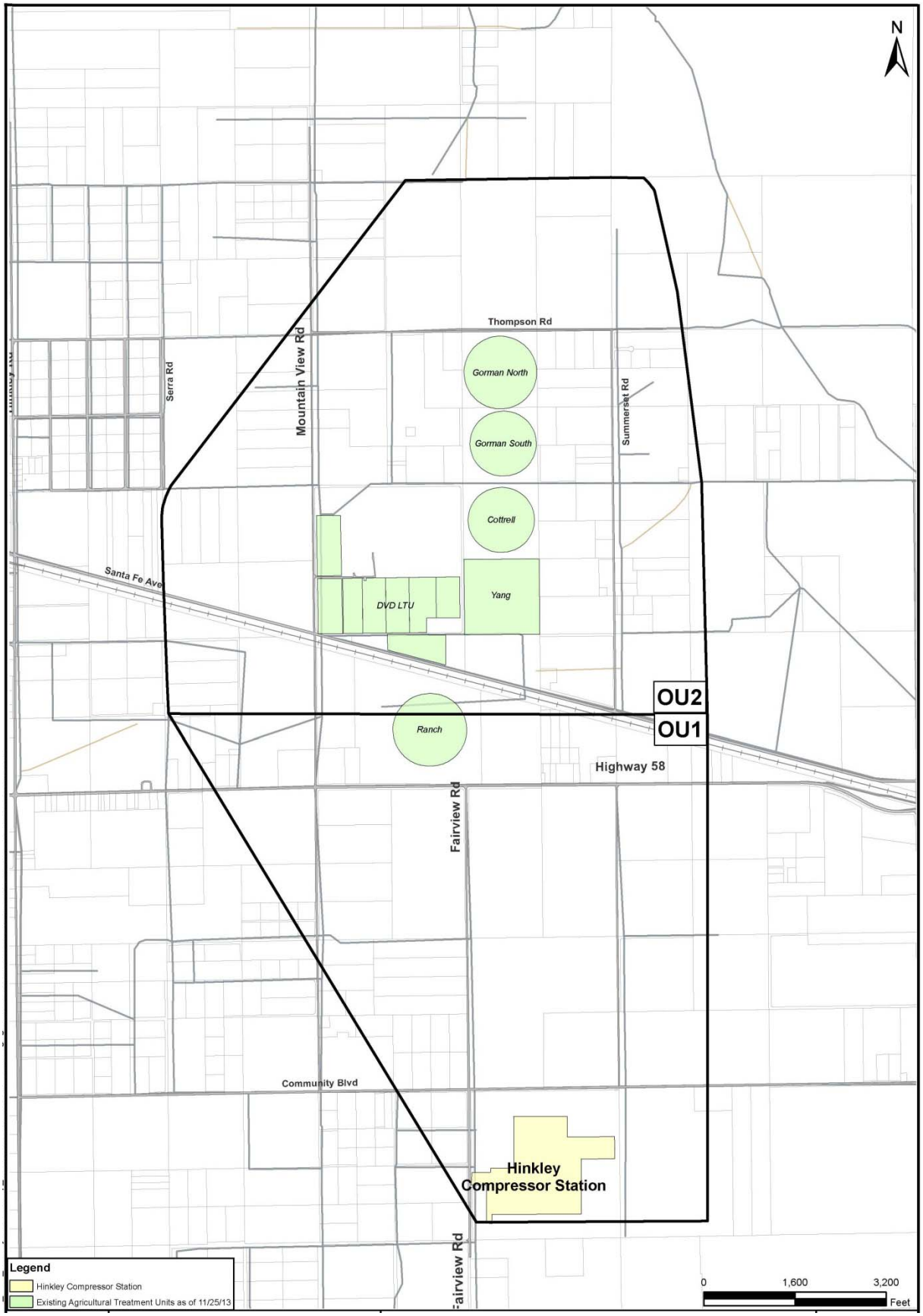
Attachments:

A. Map of Project Area and Location of Operable Units
B. Map of Existing Agricultural Treatment Units
C. Standard Provisions for Waste Discharge Requirements
D. General Provisions for Monitoring and Reporting
E. WDRs Monitoring, Modeling and Reporting Program
F. EIR Mitigation Monitoring and Reporting Program
G. State Water Board Resolution 68-16 Analysis
H. Findings of Fact and Statement of Overriding Considerations **(not included in Tentative WDRs, but will be circulated with Proposed WDRs)**

Attachment A. Map of Project Area and Operable Units



Attachment B. Map of Existing Agricultural Treatment Units



Attachment C

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

STANDARD PROVISIONS
FOR WASTE DISCHARGE REQUIREMENTS

1. Inspection and Entry

The Discharger shall permit Regional Board staff:

a. to enter upon premises in which an effluent source is located or in which any required records are kept;

b. to copy any records relating to the discharge or relating to compliance with the Waste Discharge Requirements (WDRs);

c. to inspect monitoring equipment or records; and

d. to sample any discharge.

2. Reporting Requirements

a. Pursuant to California Water Code 13267(b), the Discharger shall immediately notify the Regional Board by telephone whenever an adverse condition occurred as a result of this discharge; written confirmation shall follow within two weeks. An adverse condition includes, but is not limited to, spills of petroleum products or toxic chemicals, or damage to control facilities that could affect compliance.

b. Pursuant to California Water Code Section 13260 (c), any proposed material change in the character of the waste, manner or method of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Regional Board at least 120 days in advance of implementation of any such proposal. This shall include, but not be limited to, all significant soil disturbances.

c. The Owners/Discharger of property subject to WDRs shall be considered to have a continuing responsibility for ensuring compliance with applicable WDRs in the operations or use of the owned property. Pursuant to California Water Code Section 13260(c), any change in the ownership and/or operation of property subject to the WDRs shall be reported to the Regional Board. Notification of applicable WDRs shall be furnished in writing to the new owners and/or operators and a copy of such notification shall be sent to the Regional Board.

d. If a Discharger becomes aware that any information submitted to the Regional Board is incorrect, the Discharger shall immediately notify the Regional Board, in writing, and correct that information.

e. Reports required by the WDRs, and other information requested by the Regional Board, must be signed by a duly authorized representative of the Discharger. Under Section 13268 of the California Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation.

f. If the Discharger becomes aware that their WDRs (or permit) are no longer needed (because the project will not be built or the discharge will cease) the Discharger shall notify the Regional Board in writing and request that their WDRs (or permit) be rescinded.

3. Right to Revise WDRs

The Regional Board reserves the privilege of changing all or any portion of the WDRs upon legal notice to and after opportunity to be heard is given to all concerned parties.

4. Duty to Comply

Failure to comply with the WDRs may constitute a violation of the California Water Code and is grounds for enforcement action or for permit termination, revocation and re-issuance, or modification.

5. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of the WDRs which has a reasonable likelihood of adversely affecting human health or the environment.

6. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the WDRs. Proper operation and maintenance includes adequate laboratory control, where appropriate, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the Discharger, when necessary to achieve compliance with the conditions of the WDRs.

7. Waste Discharge Requirement Actions

The WDRs may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for waste discharge requirement modification, revocation and re-issuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any of the WDRs conditions.

8. Property Rights

The WDRs do not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

9. Enforcement

The California Water Code provides for civil liability and criminal penalties for violations or threatened violations of the WDRs including imposition of civil liability or referral to the Attorney General.

10. Availability

A copy of the WDRs shall be kept and maintained by the Discharger and be available at all times to operating personnel.

11. Severability

Provisions of the WDRs are severable. If any provision of the requirements is found invalid, the remainder of the requirements shall not be affected.

12. Public Access

General public access shall be effectively excluded from treatment and disposal facilities.

13. Transfers

Providing there is no material change in the operation of the facility, this Order may be transferred to a new owner or operation. The owner/operator must request the transfer in writing and receive written approval from the Regional Board's Executive Officer.

14. Definitions

a. "Surface waters" as used in this Order, include, but are not limited to, live streams, either perennial or ephemeral, which flow in natural or artificial water courses and natural lakes and artificial impoundments of waters. "Surface waters" does not include artificial water courses or impoundments used exclusively for wastewater disposal.

b. "Ground waters" as used in this Order, include, but are not limited to, all subsurface waters being above atmospheric pressure and the capillary fringe of these waters.

15. Storm Protection

All facilities used for collection, transport, treatment, storage, or disposal of waste

shall be adequately protected against overflow, washout, inundation, structural damage or a significant reduction in efficiency resulting from a storm or flood having a recurrence interval of once in 100 years.

x: PROVISIONS WDR (File: standard prov3)

ATTACHMENT D

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

GENERAL PROVISIONS
FOR MONITORING AND REPORTING

1. SAMPLING AND ANALYSIS

a. All analyses shall be performed in accordance with the current edition(s) of the following documents:

i. Standard Methods for the Examination of Water and Wastewater

ii. Methods for Chemical Analysis of Water and Wastes, EPA

b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board Executive Officer. Specific methods of analysis must be identified on each laboratory report.

c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board prior to use.

d. The Discharger shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.

e. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.

f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. OPERATIONAL REQUIREMENTS

a. Sample Results

Pursuant to California Water Code Section 13267(b), the Discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

3. REPORTING

a. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and shall submit a timetable for correction.

b. Pursuant to California Water Code Section 13267(b), all sampling and analytical results shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

c. The Discharger shall provide a brief summary of any operational problems and maintenance activities to the Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.

d. Monitoring reports shall be signed by:

i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;

ii. In the case of a partnership, by a general partner;

iii. In the case of a sole proprietorship,by the proprietor; or

iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

e. Monitoring reports are to include the following:

i. Name and telephone number of individual who can answer questions about the report.

ii. The Monitoring and Reporting Program Number.

iii. WDID Number.

f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation under Section 13268 of the Water Code.

x:PROVISONS WDRS

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ATTACHMENT E

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM
NO. R6V-2014-TENTATIVE

FOR

PACIFIC GAS AND ELECTRIC COMPANY
GROUNDWATER REMEDIATION PROJECT

AGRICULTURAL TREATMENT UNITS

WDID NO. 6B360303001

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 monitoring and reporting requirements consistent with the California Water Code. This MRP applies to all agricultural treatment units (ATUs) covered under this Board Order. It includes monitoring and reporting as described in the California Environmental Quality Act (CEQA) Environmental Impact Report prepared for the PG&E Hinkley groundwater remediation project (State Clearinghouse No. 2008011097), as well as other monitoring required by this Order. Pursuant to Water California Water Code section 13223, this MRP may be amended by the Water Board Executive Officer.

I. MONITORING

1. Environmental Impact Report (EIR) Monitoring

Table E-1 describes the monitoring (or modeling) constituents, monitoring areas, frequency of monitoring, and frequency of reporting. These requirements are needed to monitor the mitigation measures for water resources impacts described in the Project's EIR. Specific monitoring areas and wells will also be proposed by the Discharger in individual Reports of Waste Discharge, and accepted by the Water Board Executive Officer in writing.

Details on all EIR mitigation measures, including implementation timing, responsibility, and standards for compliance, are included in Attachment F. 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, as a condition of this Order, the Discharger must submit an annual report to the Water Board documenting implementation of and compliance with all applicable mitigation measures for agricultural treatment units.

Table E-1. EIR Mitigation Monitoring for Water Resources Impacts				
A. Pre-remedial Reference Level Monitoring for Water Supply Wells (WTR-MM-2b and 2c)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• TDS • Nitrate as N • Uranium • Other Radionuclides	One year prior to or concurrent with operation of new ATUs.	Water supply wells one mile downgradient and cross-gradient of any proposed new agricultural treatment unit.	Quarterly for one year.	Quarterly
• Groundwater Elevations and wetted screen depth	One year prior to or concurrent with operation of new ATUs.	Water supply wells one-half mile downgradient and cross-gradient of any proposed new agricultural treatment unit.	Quarterly for one year, including monitoring in March and October.	Quarterly
• Total Chromium • Hexavalent Chromium	One year prior to or concurrent with operation of new ATUs.	Water supply wells one-half mile downgradient and cross-gradient of any proposed new agricultural treatment unit, when Cr data is not available for a water supply well.	Quarterly for one year.	Quarterly
B. ATU Operations Monitoring for Water Supply Wells (WTR-MM-2a, 2b, 2c)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• TDS • Nitrate as N • Uranium • Other Radionuclides	Concurrent with ATU operation.	Water supply wells one-half mile downgradient and one-quarter mile cross-gradient of any proposed new ATU.	Twice yearly for duration of operation of ATU.	Twice yearly
• TDS • Nitrate as N • Uranium • Other Radionuclides	If water supply well is "actually affected" (see WDRs section I.E.1 for criteria to determine affected wells).	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 nearly monitoring wells exist.	Monthly, or twice yearly
• TDS • Nitrate as N • Uranium • Other Radionuclides	If water supply well is "actually affected" (see WDRs section I. E.1).	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

Total and Hexavalent Chromium	Concurrent with remediation activities.	Water supply wells one mile downgradient and cross-gradient of previously defined chromium plume boundary.	Quarterly for duration of remediation project.	Quarterly
Groundwater Elevations	Concurrent with ATU operations in monitoring area.	Water supply wells one-quarter mile from any ATU extraction point. If groundwater levels cannot be measured in water supply wells, monitoring wells between supply wells and area of remedial action may be substituted.	Twice yearly including monitoring in March and October. Continuing for duration of remedial pumping until groundwater levels have stabilized for a minimum of two years following commencement of groundwater extraction.	Twice yearly
Uranium and Gross alpha	If well is actually or potentially affected by drawdown (loss of greater than 25% of wetted screen depth, see WDRs section I.E.1).	Affected well, and water supply wells within one-quarter mile of affected well.	Twice yearly in October and March until groundwater levels have stabilized for a minimum of two years following commencement of groundwater extraction.	Twice yearly
C. Groundwater Flow, Drawdown and Contaminant Transport Modeling (WTR-MM-2a, 2b, 2c)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
Chromium and remediation byproduct plume movement for the following three years.	Concurrent with remediation.	Project area.	Annually for duration of remediation project.	Annually Report due Jan 31
Groundwater levels in water supply wells for the following three years.	Concurrent with remediation.	Project area. Modeling based on month with greatest well water use.	Annually for duration of remediation project.	Annually Report due Jan 31

D. ATU Byproduct Investigation (WTR-MM-5)				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• TDS • Uranium • Other Radionuclides • Nitrate as N	Complete investigation within one year of WDRs approval.	Monitoring wells associated with existing ATUs. See Table E-2 for specific monitoring wells. Extraction wells associated with existing ATUs. Grab sample of combined extracted groundwater to characterize quarterly water quality for each constituent at each ATU.	At a minimum, quarterly sampling data collected for one year. Any existing data that has been collected at least quarterly for a minimum of one year may be used for investigation purposes.	Within three months of investigation completion. Report must provide an analysis of the effects of existing ATUs on concentrations of byproducts in groundwater.
E. 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.	Upon expansion of ATUs over 2013 acreages.	Centro subarea, Mojave Groundwater Basin.	Annually for duration of remedial activities that involve groundwater extraction.	Annually: December 31

2. Groundwater Monitoring Well Sampling

a. Existing ATUs

i. For existing ATUs, monitoring wells listed in Table E-2 shall be sampled quarterly. Constituents to be monitored are total and hexavalent chromium, nitrate (as N), and TDS. Uranium and other radionuclides may be required pending results of the investigation described in Table E-1, row D. Locations of existing ATUs are shown in Attachment B.

ii. For the purposes of the investigation required by EIR mitigation measure **WTR-MM-5** (described in Table E-1, row D, above), where uranium and other radionuclide data do not exist for the monitoring wells in Table E-2, those data shall be collected quarterly for a minimum of one year, and reported as specified in Table E-1, row D.

iii. For the North and South Gorman ATUs, two new monitoring wells are required by this Order at the locations described in Table E-2. These wells shall be installed and sampled **no later than 3 months** following the date of this Order.

iv. When new monitoring wells are installed to evaluate the effects upon water quality from the existing ATUs, they will be added to this monitoring program.

Table E-2. Quarterly Groundwater Monitoring for Existing ATUs									
Desert View Dairy		**North & South Gorman**		**Cottrell**		**Yang**		**Ranch**	
Well ID#	**Location**	**Well ID#**	**Location**	**Well ID#**	**Location**	**Well ID#**	**Location**	**Well ID#**	**Location**
DW-02	Downgradient	MW-69S/D	Cross gradient	MW-68S/D	Downgradient	MW-21A/B1	Cross gradient	MW-09	Upgradient
DW-03	Downgradient	MW-70S	Mid-field	MW-55A/B	Downgradient	MW-32B1/B2	Downgradient	MW-14A/B/S	Upgradient
MW-29	DVD	MW-84S	Downgradient					MW-22A/B	Downgradient
MW-31	DVD	MW-85S/D	Downgradient					MW-24A/B	Downgradient
MW-42B1/B2	Upgradient	**New well** north of MW-85 and Thompson Rd	Downgradient					MW-56	Downgradient
MW-43	DVD	**New well** between MW-84 & MW-85 on Thompson Rd	Downgradient						
MW-62A	Downgradient								
MW-63	DVD								
MW-71S	Downgradient								
MW-83S	Downgradient								
MW-89S	Downgradient								
MW-127S1/S2	Downgradient								
MW-170S	Downgradient								

b. New ATUs

i. Groundwater monitoring locations for new ATUs shall be proposed by the Discharger in its Report of Waste Discharge. Groundwater monitoring well locations shall be proposed to characterize water quality mid-field and in the downgradient flow direction of new ATUs.

ii. Monitoring constituents shall be total and hexavalent chromium, nitrate (as N), TDS, uranium and other radionuclides.

3. Monitoring of Irrigation Water Applied to ATUs

i. Irrigation water applied to ATUs shall be monitored monthly or quarterly, as specified in Table E-3. Samples shall be collected as grab samples of combined extracted groundwater to characterize monthly or quarterly concentrations of constituents applied to ATUs.

ii. Groundwater volumes shall be recorded in a permanent log book at the frequency and duration specified in Table E-3, and reported quarterly.

Table E-3. ATU Irrigation Water Monitoring

Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Total Hexavalent and Chromium	Concurrent with remediation.	All ATUs. Grab sample of combined extracted groundwater to characterize monthly chromium concentration applied at each ATU.	Monthly	Quarterly
• Arsenic • Iron • Manganese • Total Organic Carbon	Concurrent with remediation.	ATUs in OU1 where irrigation water is extracted from within footprint of IRZ byproduct plumes. Grab sample of combined extracted	Quarterly	Quarterly

Table E-3. ATU Irrigation Water Monitoring				
Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
		groundwater to characterize quarterly water quality applied at each ATU.		
• Uranium • Total Dissolved Solids • Nitrate as N	Concurrent with remediation.	All ATUs. Grab sample of combined extracted groundwater to characterize quarterly water quality applied at each ATU.	Quarterly	Quarterly
Volume of Extracted Groundwater: Tabulate: • Monthly and quarterly volumes in gallons per minute per extraction well • Cumulative quarterly volumes in gpm for each ATU • Total yearly volumes of extracted groundwater in acre-feet per year.	Concurrent with remediation.	All ATUs, for each extraction well and ATU as specified.	As specified (quarterly, monthly, yearly)/Project duration	Quarterly

4. Soil Monitoring

i. Soil monitoring is required for existing and new ATUs, as specified in Table E-4. For existing fields, sample collection shall be at a rate of one sample per every 20 acres or less. For new ATUs, the Discharger shall propose soil sampling locations and numbers of samples sufficient to establish background concentrations of the constituents in Table E-4, and to investigation the accumulation (loading) of constituents in ATU soils. Sample analysis methods shall be proposed in the Report of Waste Discharge.

Table E-4. ATU Soil Monitoring

Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Trivalent Chromium (insoluble salts) • Hexavalent Chromium	Prior to application of irrigation water to ATUs in **OU1** for new ATUs, and concurrent with remediation for new and existing ATUs.	One-half foot and five feet below surface in existing and new ATUs in **OU1**.	Yearly	Yearly
• Trivalent Chromium (insoluble salts) • Hexavalent Chromium	Prior to application of irrigation water to ATUs in **OU2** for new ATUs, and concurrent with remediation for new and existing ATUs.	One-half foot and five feet below surface in existing and new ATUs in **OU2**.	Once every two years	Once every two years.
• Arsenic, inorganic • Manganese	Prior to application of irrigation water to ATUs in OU1, and concurrent with remediation.	One-half foot below surface in ATUs in OU1 where irrigation water is extracted from within footprint of IRZ byproduct plumes.	Yearly	Yearly
• Uranium (soluble salts)	Prior to application of irrigation water to ATUs, and concurrent with remediation.	One-half foot below surface in all ATUs where uranium exceeds 20 pico curies per liter (state MCL) in irrigation water based on results of quarterly sampling.	Yearly	Yearly

5. Plant Tissue Monitoring.

i. Representative samples of plant or crop tissue irrigated by extracted groundwater shall be collected and analyzed as described below. For existing fields, sample collection shall be at a rate of one sample per every 20 acres or less. A sufficient number of samples shall be proposed for new ATUs to characterize plant uptake of constituents of listed in Table E-5.

ii. Plant tissue sampling results shall be reported in milligrams per kilogram (mg/kg) dry weight of plant tissue.

Table E-5. ATU Plant Tissue Monitoring

Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Trivalent Chromium • Hexavalent Chromium	Concurrent with remediation.	All ATUs in OU1.	Twice Yearly	Twice Yearly
• Uranium • Arsenic	Concurrent with remediation.	ATUs where quarterly U or As exceeds MCLs in irrigation water.	Twice Yearly	Twice Yearly
• Nitrate as N	Concurrent with remediation.	All ATUs	Yearly	Yearly

6. Aquifer Characteristics

For each groundwater monitoring well sampled pursuant to this Order, the following data shall be collected and reported quarterly.

Table E-6. Aquifer Characteristics

Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Static groundwater level (feet above mean sea level) • Depth to groundwater (feet below ground surface) • Specific Conductance (micro Siemens per centimeter) • pH • Eh/ORP (millivolts) • Temperature (degrees C)	Concurrent with remediation.	Monitoring wells in project area, as specified in Table E-2 and to be determined by annual workplans and modeling.	Quarterly.	Quarterly

7. ATU Condition Monitoring

On a twice-weekly basis, each ATU shall be visually inspected and the following information recorded in a permanent log book.

Table E-7. ATU Condition Monitoring

Parameter/Constituent	Timing	Monitoring Area	Frequency/Duration	Reporting
• Runoff/drainage control facilities • Perimeter site fencing • Signs of runoff leaving ATU • Presence of ponded water	Concurrent with remediation.	All ATUs.	Twice weekly for duration of ATU operation.	Twice yearly, include a summary of issues noted, and description of actions taken to address.

II. AUTHORIZED WELL REHABILITATION CHEMICALS, COMPOUNDS AND TRACERS

a) Well Chemicals and Compounds

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 which 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 viii, above.
ix. Commercial mixtures of rehabilitation compounds that carry the following certifications/registrations valid in the state of California by the NSF may be used:
- 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).
- 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.

The Material Safety Data Sheet must be provided for any proposed chemical or compound.

Monitoring

i. Monitoring for well rehabilitation chemicals and compounds is required for the appropriate marker constituent for any chemical or compound used.

ii. 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.

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

b) Groundwater Flow Tracers

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

Monitoring

Specific monitoring for groundwater flow tracers shall be proposed in any tracer study plan submitted by the Discharger.

III. NUTRIENT AND IRRIGATION WATER APPLICATION AT AGRONOMIC RATES

This Order requires application of irrigation water to ATUs at an "agronomic rate". Agronomic rate refers to a rate of irrigation water applied that provides the needed amount of water and nutrient loading which grasses/crops require while minimizing excess water or nutrients percolating beyond the root zone.

Demonstration of agronomic rate application shall include the following considerations for each ATU:

i. Irrigation Water
- Maximizing irrigation system efficiency (for example, maximizing distribution uniformity to reach 0.85 or higher)
- Scheduling of irrigation (amount and timing, both daily and seasonally)
- Soil moisture and root zone water holding capacity
- Evapotranspiration rates

ii. Nutrients
- Soil and irrigation water nutrient testing to determine amount of fertilizer needed
- Plant tissue testing for nutrient uptake

IV. NOTIFICATIONS

The Discharger shall notify the Water Board of any significant change in remedial operations within 14 days of such change. Significant change means when more than 50 percent of the extraction and discharge locations are shut down, or when the total system flow rate is decreased by greater than 50 percent, or when data shows that an ATU is not being maintained by at least 50 percent in area.

A significant change in operations also includes changes which trigger ATU contingency planning to maintain hydraulic containment, in case extreme weather, crop disease, or other unforeseen events prevent groundwater extraction and irrigation of fields for an extended period such that hydraulic containment of the plume cannot be maintained.

V. REPORTING

1. General Requirements

   a. All reports shall include a transmittal letter summarizing the essential points in each report. The letter shall include a discussion of any requirement violations 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 violations of the WDRs and a description 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.

   b. 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 the next monitoring report.

   c. 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.

2. Reports

Annual Reports

The Discharger shall submit the following reports annually:

a. EIR Mitigation Measures Compliance Report

A report documenting compliance with all applicable EIR mitigation measures described in Attachment F. It is recognized that not all mitigation measures contained in Attachment F will apply to discharges or activities covered under this Order.

Compliance with the following mitigation measures must be documented in the annual report as described in Attachment F 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.

Table E-8. Applicable 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, 2c	HAZ-MM-3	AIR-MM-3	**Traffic**
WTR-MM-5		AIR-MM-4	TRA-MM-1
WTR-MM-6		AIR-MM-5	
		AIR-MM-6	
		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-1i	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

b. Agronomic Rate Performance Report

An agronomic rate performance report, containing, at a minimum, the information outlined in section III, above.

Monthly, Quarterly, and Twice-yearly Reports

1. Groundwater monitoring for existing and new ATUs shall be reported quarterly. Refer to Tables E-1, E-2 and E-4 through E-8 for reporting frequencies for those monitoring requirements.

The reports shall contain, at a minimum, the following information:

a. Description of and as-built maps and designs for new fields, structures, etc. Describe acreage, number of extraction wells, and manner and method of irrigation. Describe when irrigation began and rate of application. State whether ponding occurred on fields and, if so, length of time of ponding.

b. Overall description of all operating fields. Provide the range and total volume of effluent discharged as irrigation.

c. Description of aquifer characteristics and state changes or variations from the previous monitoring event.

d. Description of and tabulation of monthly discharge volume for each agricultural treatment units for that quarter and over the previous 12 months. The new information shall be added to a table of historical data. Cite changes or variations from previous monitoring event. If fields operated at less than 50 percent of normal, provide reasoning and corrective measures. State how reduced operation affected effective of chromium plume containment and chromium remediation.

e. Description of other discharges to agricultural treatment units, such as tracers or well rehabilitation chemicals. Provide the volume, duration, and location of discharge, and manner of application.

f. Description of sampling conducted and laboratory analytical results of samples collected from the agricultural treatment units during the reporting period. The results of sample analysis of monitoring parameters for the effluent water samples shall be described and reported in tabular and graphic form. 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.

g. The results of soil and plant tissue sampling conducted at the frequency and in accordance with Tables E-4 and E-5, above. Describe analytical results, whether results are changes from the previous monitoring event, and comparison to historical data. The new information shall be added to a table of historical data.

h. The table containing analytical results for groundwater monitoring wells shall show the range and average concentrations of total chromium, hexavalent chromium, nitrate (as N), and TDS 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.

i. All site maps shall have a font size of no less than 9 points and show the following information: scale, legend, field names, all well locations (monitoring, extraction, domestic, etc.), other sampling locations, street names, and chromium plume lines for hexavalent and total chromium out to 3.1/3.2 µg/L, 10 µg/L, 50 µg/L, 100 µg/L, and 1,000 µg/L. The following maps shall be included in each report:
    - Potentiometric map for upper aquifer.
    - Groundwater sampling results from monitoring and other wells. Draw isoconcentration lines for nitrate (as N), TDS, and uranium.
    - Soil sampling locations (when soil samples are collected).

Ordered by:

_____ _____

Patty Z. Kouyoumdjian Date
EXECUTIVE OFFICER

Attachment F

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

December 2013

ICF International. 2013. Mitigation Monitoring and Reporting Program. *Comprehensive Groundwater Cleanup Strategy for Historical Chromium Discharges from PG&E's Hinkley Compressor Station, San Bernardino County.* December. (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
Email: aholden@waterboards.ca.gov

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	Monitoring Responsibility	Applicable Remedial Action[1]				
				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	Monitoring Responsibility	Applicable Remedial Action[1]				
				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	Monitoring Responsibility	Applicable Remedial Action[1]				
				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 or their contractor	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility	Monitoring Responsibility	Applicable Remedial Action[1]				
				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 or their contractor	Water Board	X				
AIR-MM-3: Implement Emission-Reduction Measures during Construction	Prior to and during construction	PG&E or their contractor	Water Board	X				
AIR-MM-4: Implement Dust Control Measures during Construction and Operations	During construction and operation	PG&E or their contractor	Water Board with MDAQMD	X				
AIR-MM-5: Utilize Clean Diesel-Powered Equipment for Operation of Agricultural Treatment	During operation	PG&E or their contractor	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 or their contractor	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 or their contractor 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 or their contractor	Water Board with County	X				

Mitigation Measure	Timing	Implementation Responsibility	Monitoring Responsibility	Applicable Remedial Action[1]				
				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, authorized biologist, 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, construction contractor 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 and authorized biologist	Authorized biologist Water Board	X				
BIO-MM-1e: Minimize Potential Construction Hazards to Special-Status Species	During construction	PG&E or contractor with authorized biologist or environmental monitor	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 or contractor with authorized biologist or environmental monitor	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	Monitoring Responsibility	Applicable Remedial Action[1]				
				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, 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 or contractor 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 and USFWS (if listed plants)	Qualified biologist Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility	Monitoring Responsibility	Applicable Remedial Action[1]				
				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 and CDFW	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 and possibly USFWS and 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, and 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, 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	Monitoring Responsibility	Applicable Remedial Action[1]				
				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 or contractor with County Coroner	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 appropriate qualified personnel (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 or contractor	Water Board	X				
3.11 Aesthetics								
AES-MM-1: Screen Above-Ground Treatment Facilities from Surrounding Areas	During construction	PG&E or contractor	Water Board	X				
AES-MM-2: Use Low-Sheen and Non-Reflective Surface Materials on Visible Remediation Facilities and Infrastructure	During construction	PG&E or contractor	Water Board	X				
AES-MM-3: Apply Light Reduction Measures for Exterior Lighting	During construction	PG&E or contractor	Water Board	X				

Mitigation Measure	Timing	Implementation Responsibility	Monitoring Responsibility	Applicable Remedial Action[1]				
				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] 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 and 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 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 .
- 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.

[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.

"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. Groundwater elevations and 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 and 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 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.

"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.

[6] Ibid.

Monitoring

Groundwater Drawdown Monitoring

- PG&E will conduct an initial monitoring of groundwater levels and water quality 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:	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
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:	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
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
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 issuance of permits
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.
- 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
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 or their contractor
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 Final or cleaner engine, 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 (or their contractor)
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 (or their contractor)
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)
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 (or their contractor)
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 (or their contractor)
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. PG&E or its contractor will do the following:

- Implement a County-approved Coating Restriction Plan.
- 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 or their contractor (with San Bernardino County Planning)
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.

- 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 or their contractor
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:	Prior to construction: PG&E (with CDFW and USFWS) During construction: PG&E (with CDFW and USFWS-authorized biologist)
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 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 issuance of Section 7, 10, and or 2081 permits. Securing compensatory land to be done by timeframe established in Section 7, 10 or 2081 permits. At a minimum, required compensation shall be acquired/implemented within 3 years of corresponding habitat disturbance.
Implementation Responsibility:	PG&E (with USFWS and CDFW)
Monitoring Responsibility:	CDFW, USFWS and 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. Confirmation from CDFW and/or USFWS that the compensatory requirements for the current phase of remediation have been satisfied should be provided to the Water Board. 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
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 and 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 and 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)
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 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, 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, 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, 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, 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
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 with contractor
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 with contractor
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 with contractor
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

Appendix A
Monitoring and Reporting Record

Monitoring and Reporting Record:

Mitigation Measure:			
Date	**Action**	**Compliance**	
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___Not Acceptable
Notes:			

Monitoring and Reporting Record:

Mitigation Measure:			
Date	**Action**	**Compliance**	
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			

Monitoring and Reporting Record:

Mitigation Measure:			
Date	**Action**	**Compliance**	
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			
		___ Acceptable	___ Not Acceptable
Notes:			

EXAMPLE

Monitoring and Reporting Record:

<table>
<tr><td colspan="4">WTR-MM-1: Purchase of Water Rights to Comply with Basin Adjudication</td></tr>
<tr><td>Date</td><td>Action</td><td colspan="2">Compliance</td></tr>
<tr><td rowspan="2">2/15/2014</td><td rowspan="2">Compared PG&E's January 31, 2014 report on its total water rights and FPA for 2013 with the December 31, 2013 total projected water use for agricultural treatment in 2014 (X acre-feet per year) to ensure PG&E has adequate water rights for the upcoming year.</td><td>_X_ Acceptable</td><td>___ Not Acceptable</td></tr>
<tr><td colspan="2">Monitor:

(Name/Title)</td></tr>
<tr><td colspan="4">Notes:
Total 2013 water rights and FPA = X acre-feet per year
Total 2014 projected water use for agricultural treatment = X acre-feet per year</td></tr>
<tr><td rowspan="2">3/2/2014</td><td rowspan="2">Compared PG&E's total 2013 project treatment water use in the Annual Summary Monitoring Report (received on February 23, 2014) and compared to PG&E's January 31, 2014 report on its total water rights and FPA for 2013 to ensure that the PG&E's water use volume did not exceed its FPA for 2013.</td><td>_X_ Acceptable</td><td>___ Not Acceptable</td></tr>
<tr><td colspan="2">Monitor:

(Name/Title)</td></tr>
<tr><td colspan="4">Notes:
Total 2013 project treatment water use = X acre-feet per year
Total 2013 water rights and FPA = X acre-feet per year</td></tr>
<tr><td rowspan="2">3/15/2014</td><td rowspan="2">Verified PG&E's 2013 FPA in the PG&E's January 31, 2014 report with their FPA in the 2012-2013 MWA Watermaster Report.</td><td>_X_ Acceptable</td><td>___ Not Acceptable</td></tr>
<tr><td colspan="2">Monitor:

(Name/Title)</td></tr>
<tr><td colspan="4">Notes:
Total 2013 water rights and FPA = X acre-feet per year
2012-2013 MWA Water Master Report FPA for PG&E = X acre-feet per year
The MWA FPA was slightly lower than PG&E's FPA due to the fact that it did not include recent water rights acquired from land purchases as part of the PG&E Buyout Program. The MWA FPA should be updated in the Watermaster report for next year.</td></tr>
</table>

EXAMPLE

Monitoring and Reporting Record:

WTR-MM-2a: Mitigation Program for Water Supply Wells Affected by the Chromium Plume Expansion due to Remedial Activities			
Date	**Action**	**Compliance**	
10/8/2013	*Reviewed PG&E's Q2 2013 monitoring report which identified 1 actually and 1 potentially affected well (see attached summary).*	___ Acceptable	_X_ Not Acceptable
Notes: *Actually affected wells: Increase of 10% or more to previously Background-exceeded well. In DOM-XX, Cr6 increased 18% from 3.40 ppb (Q1 2013) to 4.02 ppb (Q2 2013).* *Potentially affected wells: Increase in CrT concentrations near chromium plume. In DOM-YY, CrT increased from 1.4 ppb (Q1 2013) to 2.8 ppb (Q2 2013). DOM-YY is located X (< 1) mile from the chromium plume at lat/long location shown in Figure X of quarterly monitoring report.*			
02/15/2014	*Reviewed PG&E's 2013 annual summary report. Provided activities implemented to address potential and actual affected wells from the previous year (see attached summary).*	_X_ Acceptable	___Not Acceptable
Notes: *Actually affected wells: PG&E began providing alternative water supply (storage tank and hauled water option) to residential users of DOM-XX on October 15, 2013, and is continuing to do so until Cr6 reaches levels below 3.1 ppb (Cr6 MCL). PG&E will continue to report DOM-XX concentrations on a quarterly basis.* *Potentially affected wells: PG&E conducted targeted IRZ-injections near DOM-YY. Q3 2013 monitoring report showed CrT concentration of 1.02 ppb (which is below the originally-detected concentration of 1.4ppb).*			
02/15/2014	*Reviewed PG&E's 2013 annual groundwater modeling report. Two domestic wells were identified as being potentially affected (see attached maps and modeling results).*	_X_ Acceptable	___Not Acceptable
Notes: *DOM-XX and DOM-YY showed predicted increases in Cr6 from <3.1ppb to>3.1ppb and <10ppb within the following year based maps and modeling results. PG&E submitted a plan for provision of alternative water supply for domestic well users via the bottle water option, as requested by homeowners (names, addresses).*			

Appendix B
Summary Tables with Impacts, Alternatives, and Mitigation Measures

This appendix includes summary tables with the impact of the proposed project, the alternative(s) to which the impact applies, and mitigation measures identified to avoid, minimize or reduce the impact. There summary 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 3.1. Summary of Water Resource Impacts and Mitigation Measures

Impact	Applicable Alternative	Mitigation Measures
Groundwater Drawdown		
WTR-1a: Groundwater Drawdown Effects on the Regional Water Supply	No Project Alternative	N/A
	All Action Alternatives	WTR-MM-1: Purchase of New Water Rights to Comply with Basin Adjudication
WTR-1b: Groundwater Drawdown Effects on the Local Water Supply	No Project Alternative	N/A
	All Action Alternatives	WTR-MM-2: Water Supply Program for Wells that are Affected by Remedial Activities
WTR-1c: Groundwater Drawdown Effects on Aquifer Compaction	No Project Alternative	N/A
	All Action Alternatives	N/A
Water Quality		
WTR-2a: Containment and Treatment of Existing Chromium Contamination	All Alternatives	N/A
WTR-2b: Conversion of Hexavalent Chromium to Trivalent Chromium	All Alternatives	N/A
WTR-2c: Water Quality Effects due to use of Tracer Compounds	All Alternatives	N/A
WTR-2d: Temporary Localized Chromium Plume Expansion ("Bulging") due to Remedial Activities	No Project Alternative	N/A
	All Action Alternatives	WTR-MM-2 (see above)
		WTR-MM-3: Incorporate Measures to Prevent, Reduce and Control Potential Temporary Localized Chromium Plume Bulging Into Overall Plume Control and Monitoring
WTR-2e: Increase in Total Dissolved Solids, Uranium and other Radionuclides due to Agricultural Treatment	All Alternatives	WTR-MM-2 (see above)
	All Action Alternatives	WTR-MM-4: Restoration of the Hinkley Aquifer Affected by Remedial Activities for Beneficial Uses
		WTR-MM-5: Investigate and Monitor Total Dissolved Solids, Uranium and Other Radionuclide levels in relation to Agricultural Treatment and Take Contingency Actions
WTR-2f: Change in Nitrate Levels due to Agricultural Treatment	No Project Alternative	N/A
	All Action Alternatives	
		WTR-MM-6: Monitor Nitrate Levels and Manage Agricultural Treatment to Avoid Significant Increases in Nitrate Levels

Table 3.2. Summary of Land Use, Agriculture, and Population and Housing Impacts and Mitigation Measures

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

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
			BIO-MM-1h: Compensate Impacts to Desert Tortoise and Mohave Ground Squirrel BIO-MM-1i: Integrated Pest Management and Adaptive Management Plan for Agricultural Treatment Units BIO-MM-1j: Reduction of Night Light Spillover BIO-MM-1k: Other Measures Required to Minimize, Reduce, or Mitigate Impacts to Mohave Ground Squirrel BIO-MM-1l: Other Measures Required to Minimize, Reduce, or Mitigate Impacts to Burrowing Owl BIO-MM-1m: Minimize Impacts to American Badger Natal Dens and Desert Kit Fox Occupied Dens BIO-MM-1n: Avoid Impacts to Nesting Loggerhead Shrike, Northern Harrier, and Other Migratory Birds BIO-MM-1o: Implement Measures Required to Minimize, Reduce, or Mitigate Impacts to Special-Status Plants BIO-MM-1p: If Remedial Actions Affect Mojave Fringe-toed Lizard Habitat, then Compensate for Habitat Losses BIO-MM-4: Implement West Mojave Plan Measures to Impacts to DWMAs on BLM Land	
LU-2: Conversion of Agricultural Land to Non-Agricultural Use, Including FMMP-Designated and Williamson Act Lands	No Project Alternative	Less than Significant	None Required	–
	All Action Alternatives	Potentially Significant	LU-MM-2: Acquire Agricultural Conservation Easements for Important Farmland; WTR-MM-2 (see above)	Less than Significant
LU-3: Population and Housing Changes due to Remedial Activities	All Alternatives	Less than Significant	None Required	–

Table 3.3. Summary of Hazards and Hazardous Materials Impacts and Mitigation Measures

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

Table 3.4. Summary of Geology and Soils Impacts and Mitigation Measures

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

Table 3.5. Summary of Significant Air Quality and GHGs Impacts and Mitigation Measures

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

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

Table 3.6. Summary of Noise Impacts and Mitigation Measures

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

Table 3.7. Summary of Biological Resources Impacts and Mitigation Measures

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
BIO-1a: Disturbance, Mortality, and Loss of Habitat for Desert Tortoise	All Alternatives	Significant	BIO-MM-1a: Implement Measures Required to Minimize, Reduce, or Mitigate Impacts on Desert Tortoise during Construction BIO-MM-1b: Limit Footprint of Disturbance Areas within Special-Status Species Habitats BIO-MM-1c: Implement Pre-Construction and Ongoing Awareness and Training Program BIO-MM-1d: Conduct Ongoing Biological Monitoring during Construction BIO-MM-1e: Minimize Potential Construction Hazards to Special-Status Species BIO-MM-1f: Implement Measures to Minimize and Prevent Attraction of Predators during Construction and Operation BIO-MM-1g: Reduction of Project-Related Spread of Invasive Plant Species BIO-MM-1h: Compensate Impacts on Desert Tortoise and Mohave Ground Squirrel Habitat BIO-MM-1i: Integrated Pest Management and Adaptive Management Plan for Agricultural Treatment Units BIO-MM-1j: Reduction of Night Light Spillover	Less than Significant (other than desert tortoise movement) Less than Significant (No Project Alternative, desert tortoise movement) Potentially Significant (all action alternatives, desert tortoise movement)
BIO-1b: Disturbance, Mortality, and Loss of Habitat for Mohave Ground Squirrel	All Alternatives	Potentially Significant	BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-1h, BIO-MM-1i, BIO-MM-1j, BIO-MM-1k: Implement Other Measures to Minimize, Reduce, or Mitigate Impacts on Mohave Ground Squirrel	Less than Significant
BIO-1c: Disturbance, Mortality, and Loss of Habitat for Burrowing Owl and American Badger, and Mortality of Desert Kit Fox	All Alternatives	Potentially Significant	BIO-MM-1b, BIO-MM-1c, BIO-MM-1d, BIO-MM-1e, BIO-MM-1f, BIO-MM-1g, BIO-MM-1h, BIO-MM-1i, BIO-MM-1j, BIO-MM-1l: Implement Other Measures to Minimize, Reduce, or Mitigate Impacts on Burrowing Owl BIO-MM-1m: Minimize Impacts on American Badger and Desert Kit Fox Occupied Dens	Less than Significant

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

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

Table 3.8. Summary of Significant Cultural Resources Impacts and Mitigation Measures

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
CUL-1: Change in Significance of Historical Architectural Resources	No Project Alternative	Less than Significant	None required	—
	All Action Alternatives	Potentially Significant	CUL-MM-1: Determine Presence of Historical Resources as Defined by CEQA CUL-MM-2: Avoid Damage to Historical Resources Located in Project Areas through Project Modification CUL-MM-3: Record Historical Resources	Less than Significant
CUL-2: Change in Significance of Archaeological Resources	All Alternatives	Potentially Significant	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 the Proposed Areas of Disturbance CUL-MM-5: Avoid Damaging Archaeological Resources through Redesign of Specific Project Elements or Project Modification CUL-MM-6: Evaluate Archaeological Resources and, if Necessary, Develop and Implement a Recovery Plan	Less than Significant
CUL-3: Potential Disturbance of Buried Human Remains	All Alternatives	Potentially Significant	CUL-MM-7: Comply with State and County Procedures for the Treatment of Human Remains Discoveries	Less than Significant
CUL-4: Direct or Indirect Destruction a Unique Paleontological Resource	All Alternatives	Potentially Significant	CUL-MM-8: Conduct Preconstruction Paleontological Resource Evaluation, Monitoring, Resource Recovery, and Curation	Less than Significant

Table 3.9. Summary of Utilities and Public Services Impacts

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

Table 3.10. Summary of Transportation and Traffic Impacts and Mitigation Measures

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

Table 3.11. Summary of Aesthetics Impacts and Mitigation Measures

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

Table 3.12. Summary of Socioeconomic Impacts and Mitigation Measures

Impact	Applicable Alternative	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
SE-1: Secondary Physical Impacts due to Project-Related Socioeconomic Effects	No Project Alternative	Less than significant	None Required	Less than Significant
	All Action Alternatives	Potentially Significant	SE-MM-1: Manage Vacant Lands, Residences, and Structures to Avoid Physically Blighted Conditions WTR-MM-2 to 8	Less than Significant

Attachment G

Maintenance of High Quality Waters in California, State Water Board Resolution 68-16 Anti-Degradation Analysis

Introduction

State Water Resources Control Board (State Water Board) Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California* (Resolution 68-16) establishes the state policy that the discharge of waste should be regulated to achieve the highest water quality of waters of the state consistent with the maximum benefit to the people of the State. Waste discharge requirements issued by a regional board must be consistent with Resolution 68-16. This Attachment evaluates the application of Resolution 68-16 to the discharge authorized by the Order and describes how the various provisions and requirements of this Order and the Monitoring and Reporting Program (MRP) implement Resolution 68-16.

In summary, this Order meets the requirements of Resolution 68-16 through a combination of discharge and receiving water limitations, monitoring, and other requirements, including mitigation measures identified in the Environmental Impact Report (EIR) prepared pursuant to the California Environmental Quality Act for the Project. These requirements ensure that any degradation of existing high quality waters in the Project Area is limited in spatial extent, magnitude, and duration as feasible for the remediation project. The EIR analyzed potential environmental impacts associated with various cleanup methods, including agricultural treatment. The EIR concluded that temporary, localized decreases in groundwater quality will result from the Project due to the application of the extracted groundwater containing chromium to agricultural treatment units, and that those impacts are significant and unavoidable during the remediation without mitigation. The EIR identifies mitigation measures to minimize these impacts to the extent feasible, and requires that the Discharger restore water quality to pre-remedial reference conditions following the remedial activities. Therefore, the requirements of this Order, which include the water resources mitigation measures specified in the EIR, ensure that compliance with Resolution 68-16 is achieved.

Maintenance of High Quality Waters in California, State Water Board Resolution 68-16

Resolution 68-16 establishes the state policy that where waters of the state are of quality higher than that required by state policies, such higher quality "shall be maintained to the maximum extent possible".

As set forth in Resolution 68-16, water quality degradation may be allowed if the following conditions are met: (1) any change in water quality must be consistent

with maximum benefit to the people of the State; (2) the degradation will not unreasonably affect present and anticipated beneficial uses; (3) the degradation will not result in water quality less than that prescribed in the Basin Plan and other applicable policies. In addition, for any activity that results in discharges of waste to existing high quality waters, the discharge must meet waste discharge requirements that will result in the best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur and the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Determining High Quality Waters

Resolution 68-16 applies to high quality surface and groundwaters; that is, waters of the state with existing background quality of better quality than that necessary to protect beneficial uses. The California Water Code directs the State Water Board and Regional Water Boards to establish beneficial uses and to set water quality objectives, which are limits or levels of constituents or characteristics established for the reasonable protection of the beneficial uses. Where waters contain levels of constituents or characteristics that are better than the established water quality objectives (such as maximum contaminant levels for drinking water) as of the date of adoption of Resolution 68-16, such waters are considered high quality waters. High quality waters are determined based on specific properties or characteristics. Therefore, waters can be of high quality for some constituents, but not for others.

In order to determine whether a water body is high quality water with regard to a given constituent, the background quality of the water body unaffected by the discharge must be compared to the water quality objectives. If the quality of a water body has declined since the adoption of Resolution 68-16 and that subsequent lowering was not a result of regulatory action consistent with the Resolution, a baseline representing the historically higher water quality may be an appropriate representation of background.

The next section describes where high quality waters are located within the Project Area. A map of the Project Area, including locations of Operable Units (OUs) referred to in this Attachment, is shown in Attachment A. The Hinkley Valley aquifer, as referred to in this Order, is defined as the groundwater aquifer within the Project Area. The Hinkley Valley aquifer is located within the Harper Valley Hydrologic Subarea of the Mojave Hydrologic Unit.

Occurrence of High Quality Waters for Constituents Regulated Under this Order

Chromium

California has established a primary maximum contaminant level (MCL) in drinking water for total chromium of 50 μg/L. Hexavalent chromium is currently regulated by the total chromium MCL. In August 2013, the California Department

of Public Health released for public comment a proposed draft MCL of 10 μg/L for hexavalent chromium. Because this draft MCL is not finalized as a regulatory standard, this analysis compares water quality in the Project Area to the total chromium MCL of 50 μg/L to identify existing high quality waters.

In general, existing water quality in the Hinkley Valley groundwater aquifer is considered high quality for chromium, with the exception of the area of the waste chromium plume which exceeds the MCL for total chromium (generally, all of OU1 and much of OU2). The plume "core", containing total chromium concentrations at and above 50 μg/L extends from the compressor station to just north of Santa Fe Avenue, a distance of 2 miles. Therefore, groundwater in the plume core of the Project Area does not presently support the beneficial use of a municipal and domestic supply, and is not considered high quality water. The majority of the Project Area outside the plume core (the northern portion of OU2 and all of OU3) represents high quality waters for chromium. The lower aquifer is considered high quality water for chromium, as chromium exceeding MCLs has not been detected in the lower aquifer.

The entire Hinkley Valley groundwater quality prior to the discharge of waste chromium in the 1950s and 1960s consisted of high quality waters for chromium. Groundwater sampling conducted in 2006 to determine background (pre-discharge) chromium groundwater concentrations determined that the maximum and average values for total and hexavalent chromium were 3.2/3.1 μg/L and 1.5/1.2 μg/L, respectively, well below the total chromium MCL of 50 μg/L, and the proposed MCL for hexavalent chromium of 10 μg/L.

Total Dissolved Solids (TDS)

The secondary MCL for TDS in drinking water is 500 milligrams per liter (mg/L) for a lower limit, 1,000 mg/L as an upper limit, and 1,500 mg/L as a short-term limit. TDS concentrations in groundwater are lower in the southern Project Area nearest the recharge area along the Mojave River, and in the southwest portion of the project area. Sampling conducted in 2006 found very low TDS levels (90 mg/L) near the Mojave River. Agricultural activities, primarily dairy operations and irrigated crops, are the major causes of increased TDS in the Hinkley Valley groundwater.

In general, western OU1 contains high quality waters for TDS, with limited concentrations between 1,000 and 1,500 mg/L in eastern OU1. Much of western and central OU2 is not considered high quality water for TDS, with concentrations up to 5,900 mg/L TDS, primarily beneath and downgradient of the Desert View Dairy near Thompson Road. The majority of OU3 is high quality for TDS with concentrations below 500 mg/L, with the exception of groundwater below existing agricultural fields just east of OU1.

While groundwater in the vicinity of irrigation or dairy operations may not meet secondary MCLs for TDS, the groundwater is generally suitable for irrigation of alfalfa and other fodder crops which can tolerate higher salt levels.

Nitrate

The primary MCL for nitrate (as nitrogen) in California drinking water is 10 mg/L. Nitrate concentrations in groundwater in the Hinkley Valley are generally less than a few parts per million, where not affected by dairy or confined-animal operations. As mentioned above in the section discussing TDS, the quality of water entering the Hinkley groundwater basin from the Mojave River is considered to be high water quality.

Groundwater sampling in the Project Area conducted in 2006 found nitrate levels to range from less than 0.5 mg/L (equal to the method detection level) up to 21 mg/L. Five out of forty-seven wells sampled had one or more detections of nitrate greater than 10 mg/L. These five wells, however, were located near former or active dairies and an active heifer ranch, which were likely sources of nitrate pollution rather than reflective of naturally-occurring conditions. In general, upper aquifer groundwaters in OU1 are mostly high quality water for nitrate, with concentrations predominately less than the MCL, although detections up to 20 mg/L have been reported. OU2 is dominated by nitrate concentrations greater than the MCL, with detections greater than 40 mg/L downgradient of the Desert View Dairy; therefore OU2 is not considered to contain high quality waters for nitrate. Groundwaters in OU3 are generally high quality for nitrate, with the exception of the southeastern portion of the OU, where concentrations of nitrate up to 20 mg/L have been reported.

Arsenic

The federal and state MCL for arsenic is 10 µg/L. The US Geological Survey conducted sampling for various constituents in wells in the Mojave Water Agency management area from 1991 to 1997, including wells in the Hinkley area. The study found arsenic in wells (up to 200 feet in depth) ranging from less than 1 µg/L to 12 µg/L with most concentrations under 10 µg/L. Approximately four miles north of Highway 58, the study found arsenic in one well at a concentration of 52 µg/L. While the USGS study was conducted after the release of chromium from the Hinkley Compressor Station, sampling occurred before the use of carbon-amendment injections to groundwater, and thus reflects levels prior to in-situ remediation in OU1.

Three compressor station supply wells (PGE-14, FW-01, FW-02) located south (upgradient) of the plume, contain naturally-occurring arsenic at levels greater than 10 µg/L.

In August 2012, community-collected samples from wells west of the chromium plume (in southwestern OU3) indicated arsenic levels ranging from non-detect up to 170 µg/L, with 8 wells having concentrations above the MCL of 10 µg/L. Water

Board staff collected follow-up samples from wells in that same area, and found arsenic levels ranging from non-detect up to 51 µg/L, with 5 wells having concentrations above the 10 µg/L MCL.

In summary, background levels of arsenic throughout the Project Area are predominately below the arsenic MCL, and therefore represent high quality waters, but certain areas show higher background arsenic concentrations: upgradient of the compressor in southern OU1, and in the southwestern portion of OU3.

Manganese

The state secondary MCLfor manganese is 50 µg/L. The 2007 Background Study Report found dissolved manganese levels in areas outside the defined chromium plume to range from less than 1 µg/L (method detection level of 1 µg/L) up to 48 µg/L. The Discharger tested manganese levels in the in-situ area prior to initiating in-situ pilot testing and found manganese levels up to a maximum of 210 µg/L in the Central Area in-situ zone. Pre in-situ remediation monitoring in the Source Area had identified concentrations up to 34 µg/L in one part of the Source Area and up to 55 µg/L north of the Source Area.

In August 2012, Hinkley residents collected samples at domestic wells west of the in-situ remediation in response to complaints of "black water" in some residents' water supply. Results ranged from non-detect (below method detection levels) to over 1,000 µg/L with the highest concentration of 140,000 µg/L. Water Board samples from the same wells with the highest concentrations (> 1,000 µg/L) uniformly found much lower levels of manganese than found in community collected samples. Of the 17 manganese samples collected and analyzed by the Water Board, 8 were below method detection levels; and others ranged from 12 to 146 µg/L with one sample containing 789 µg/L manganese. Water Board samples in the southeastern and southwestern portion of the study area were all below method detection levels. The source of elevated manganese is unknown at this time.

In general, groundwaters in the Project Area are high quality for manganese, with the exception of limited data indicating that background concentrations of manganese exceed the MCL in the central portion of OU1, and in the southwestern portion of OU3.

Iron

The secondary MCL for iron is 300 µg/L. Sampling results from monitoring wells throughout the Project Area indicate that iron concentrations are typically less than 100 µg/L. The maximum baseline concentration in OU1 measured prior to starting in-situ remediation pilot testing was 377 µg/L, above the MCL. This information indicates that generally, groundwaters in the Project Area are high quality water for iron.

Summary of High Quality Waters in Project Area

Table G-1 summarizes the occurrences of high quality waters in the upper aquifer of the Project Area, by Operable Unit and constituent. In general, the lower aquifer of the Project Area is considered high quality for constituents of concern regulated by this Order.

Table G-1: Summary of High Quality Upper Aquifer Groundwaters in Project Area, by Operable Unit (OU) and Constituent.

Constituent	OU1	OU2	OU3
	High Quality Waters[1] Predominate?		
Chromium	Yes, prior to 1952. Not currently due to waste discharge.	Yes, prior to 1952. Currently, northern portion is high quality but southern portion affected by waste discharge.	Yes.
TDS	Yes.	No, affected by waste discharge.	Yes, except southeastern portion is affected by waste discharge.
Nitrate as N	Yes.	No, affected by waste discharge.	Yes.
Arsenic	Yes, except southern portion. Detections over MCLs a combination of waste discharge and naturally-occurring levels.	Yes.	Yes, except southwestern portion with detections above MCLs due to naturally-occurring levels.
Manganese	No. Detections over MCLs likely a combination of waste discharge and naturally-occurring levels.	Yes	Yes, except southwestern portion with detections above MCLs likely due to naturally-occurring levels.
Iron	Yes	Yes	Yes

Applicability of Resolution 68-16 to this Order

Resolution 68-16 applies to high quality waters. The above analysis indicates that groundwaters of the Project Area have been degraded by historical and ongoing waste discharges, such as historical chromium discharges from the compressor station, historical and ongoing dairy and agricultural activities affecting TDS and nitrate concentrations. Also for some constituents in the Project Area, naturally-occurring levels exceed MCLs (arsenic and likely manganese in the southern Project Area). However, in general, available data

[1] An Operable Unit's groundwaters are considered high quality waters if they generally have background concentrations of constituents **less** than applicable primary or secondary MCLs. For hexavalent chromium, groundwaters with less than the total chromium MCL of 50 µg/L are considered high quality for the purposes of this analysis.

suggests that pre-waste discharge concentrations of constituents of concern represent high quality waters, and those concentrations should be maintained or restored in compliance with 68-16.

Compliance with Resolution 68-16

Chromium

The primary purpose of agricultural treatment of chromium in extracted groundwater and the discharges associated with this Order is to restore groundwater quality to background conditions for chromium. However, temporary, localized chromium plume movement (called "bulging") could occur where agricultural treatment units are located on the plume margins. Plume bulging would result in increases of chromium above background concentrations in areas where the chromium was previously below background concentrations or MCLs (that is, areas of high quality waters). These increases are expected to be short-term and occur only at the eastern boundary of OU1 for up to 3,000 feet in distance if authorized by the Water Board[2].

Mitigation measures and monitoring are described in the EIR and required by this Order to ensure that such degradation will not unreasonably affect beneficial uses, and high quality water will be restored or maintained, as described below.

Mitigation measure WTR-MM-2a requires that the Discharger provide alternate water supplies for those domestic wells users whose wells are impacted by chromium plume bulging due to remediation activities. Quarterly monitoring of wells within one mile of the plume, and annual modeling of chromium plume movement will provide advance warning for wells that may become affected within the following year. The annual modeling (forecasted out to a three-year period) will be used to plan for either changing remediation activities and/or the provision of alternative water supplies in advance of effects on domestic wells. These mitigation measures are incorporated into this Order in Section I.E and Attachments E and F (WDRs Monitoring and Reporting Program, and EIR Mitigation Monitoring Program, respectively).

The overall goal of the actions authorized by this Order is to decrease chromium concentrations in groundwater to background levels and ultimately restore beneficial uses to the aquifer, consistent with the best interests of the people of the state. The Project incorporates best practicable treatment or control measures of groundwater extraction and treatment, includes the monitoring and mitigation measures identified in the EIR and required by this Order. Current beneficial uses are protected by implementation of mitigation measures, and any

[2] [2] In order to authorize additional plume bulging in OU1 under this Order, an amendment to CAO R6V-2008-0002A4 would be required. Plume bulging is currently restricted to an area of up to 1,000 feet on the southeastern plume boundary, authorized in CAO R6V-2008-0002A2, dated April 7, 2009.

degradation of high quality water will be minimized during project implementation and restored following project completion.

Nitrate, Uranium, and Total Dissolved Solids

Nitrate
Agricultural treatment has the potential to reduce the nitrate concentration in the aquifer as the nitrate in irrigation water is taken up by crops as a nutrient. Data from existing agricultural treatment units shows nitrate concentrations in extracted groundwater have been reduced by up to 90%. The overall effect of agricultural treatment will be removal of nitrate from groundwater, which will be a beneficial effect for the aquifer as a whole.

There is, however, potential for localized nitrate increases to still occur due to movement of water during remediation. If groundwater were extracted from an area of higher nitrate concentrations and then discharged in an area with lower nitrate concentrations, it is possible that nitrate concentrations could increase in those areas due to percolation if plant uptake of nitrate was incomplete.

In order to determine if this is occurring, **Mitigation measure WTR-MM-6** requires the Discharger to 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 mg/L (as N), or 2) by more than 10% compared to existing levels (if current levels are already above 10 mg/L as N), or 3) by more than 20% compared to existing levels (if current levels are less than 10 mg/L as N) then no further action, other than monitoring, will be required.

If monitoring indicates that nitrate levels are approaching 10 mg/L (as N) or increasing by more than the criteria noted above, the Discharger 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 increase nitrate levels at any domestic well.
- Extraction source water will be blended before application to agricultural treatment units so as to avoid exceeding 10 mg/L as N and avoid increases in existing levels that exceed the criteria noted above.

This Order requires the implementation of the above mitigation measure. Restoration of aquifer water quality for nitrate increases due to the Project, as required by **Mitigation measure WTR-MM-4**, is discussed below in the TDS section.

Uranium and Other Radionuclides
Uranium and other radionuclides are naturally occurring in Mojave Desert soils and rocks. Uranium is a constituent of concern for this Order because the Discharger's pumping for remediation could transport or mobilize background uranium and other radionuclides concentrations. Agricultural treatment for chromium plume remediation works by exposing chromium-contaminated irrigation water to subsurface root zone conditions that contain a reducing environment that converts soluble hexavalent chromium to relatively immobile trivalent chromium. Uranium chemistry is similar to that of chromium in which the oxidized form (U-6) is much more mobile than the reduced form. Like hexavalent chromium, U-6 can be changed to its reduced form (U-4) by microbial action in low oxygen, reducing conditions. Thus, background uranium in agricultural treatment water should also be immobilized by the reducing environment, and remain bound to soil particles. This Order requires monitoring for uranium and other radionuclides to confirm this.

Further, this Order requires monitoring and contingency actions in the event that agricultural treatment units have the potential to increase background uranium or other radionuclides in groundwater, as required in **Mitigation measure WTR-MM-5.** For affected or potentially affected water supply wells, alternative water supplies will be required to be provided per **Mitigation measure WTR-MM-2**. **Mitigation measure WTR-MM-4** require restoration of the drinking water aquifer from all substantial water quality impairments resultant from remedial activity within a timely manner (to be determined by the Water Board). WTR-MM-4 is discussed in the TDS section, below.

Total Dissolved Solids
Discharges authorized by this Order may degrade existing water quality for TDS. In OUs 1 and 3, where TDS concentrations are generally below the secondary TDS MCLs of 1,500 mg/L, 1,000 mg/L and 500 mg/L, respectively, this Order requires that where the discharge of waste causes a 20 percent increase in TDS concentrations, the Discharger must submit an action plan to reduce those exceedances to the extent feasible, considering remediation goals. Actions could include blending of irrigation water to reduce TDS concentrations applied to fields, participation in a Salt and Nutrient Management Plan, or by proposing a plan to implement EIR mitigation measure WTR-MM-4, described below. Further, this Order requires application of irrigation water at agronomic rates as a best management practice to minimize TDS buildup in soils to extent feasible.

Where the upper limit secondary MCL of 1,500 mg/L is already exceeded (for example, throughout much of OU2, where levels of TDS are up to 5,900 mg/L), agricultural treatment may result in further degradation. The EIR completed for the Project recognizes the potential increase in concentrations of TDS as a significant and unavoidable impact for the duration of the Project; therefore, a statement of overriding considerations is included in Attachment H. In addition,

EIR mitigation measure WTR-MM-4, specifies that the Discharger will restore the Hinkley Valley aquifer to pre-remedial conditions following completion of the chromium remediation project, described below:

For drinking water wells affected by TDS increases due to remedial actions, this Order incorporates the requirements of **Mitigation measure WTR-MM-2b,** requiring alternative water supplies for all affected or potentially affected wells.

This analysis recognizes that high quality water within the aquifer related to TDS exists and may be degraded by agricultural treatment. While alternate water supply can address water supply wells impacts, there would remain the potential for longer-term degradation of aquifer water quality, even after completion of remediation of the chromium plume. **Mitigation measure WTR-MM-4** holds the Discharger responsible for restoring water quality in the Hinkley Valley aquifer back to pre-remedial reference conditions (defined as conditions prior to the initiation of remedial actions included in the Project defined in the EIR ,and including baseline concentrations defined in previous Orders that have been superseded by this Order). The requirements of Mitigation Measure WTR-MM-4 are recognized in this Order in Finding 25c, and will be incorporated into an upcoming Cleanup and Abatement Order issued to the Discharger.

Mitigation measure WTR-MM-4 specifies that no later than 10 years prior to the conclusion of the proposed Project, the Discharger 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, the Discharger will propose cleanup actions to restore the aquifer for beneficial uses. 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.

Every year following preparation of the assessment and approval of restoration timeframes, the Discharger must submit a status report of actions to restore the aquifer for beneficial uses related to agricultural treatment unit byproducts, including TDS, nitrate and uranium. 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.

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.

The implementation of a basin-wide approach is limited to the Project Area for this EIR at this time. If in the future, PG&E proposes basin-wide approaches involving farms outside the Project Area, analysis under CEQA may be required.

Mitigation measure WTR-MM-4 is limited to addressing the effects of the Discharger's remedial actions that cause changes above pre-remedial reference conditions. It is possible that water quality or groundwater baseline levels may be affected by actions not authorized by this Order (such as other agricultural or dairy activity not controlled by the Discharger) during chromium remediation. The Discharger will only be responsible to remediate the effects that it causes, not those that are due to the actions of third-parties. Because prior dairy activities have resulted in elevated TDS levels in the project area, it is important to determine separately the effect of agricultural treatment authorized by this Order,

compared to existing or future degradation from non-remedial agricultural operations. **Mitigation measure WTR-MM-5** requires investigation and monitoring of TDS levels to identify pre-remedial reference conditions and where and when remedial actions result in significant impacts for determining when replacement water and/or aquifer restoration are warranted.

The extraction and land application of groundwater are designed to be the equivalent of Best Practicable Treatment or Control measures, as required by Resolution No. 68-16. The Discharger uses a specialized irrigation system called "drag-drip" irrigation, where the water is applied directly to the ground surface rather than sprayed into the air. This approach reduces the evaporation rate of the irrigation water, and less water is needed to grow crops. This reduces the mass of TDS that is left in the soils that could percolate back down to groundwater. Further, this Order requires application of irrigation water at agronomic rates as a best management practice to minimize TDS buildup in soils to extent feasible.

The agricultural treatment approach authorized by this Order is one of the primary methods proposed for chromium remediation that results in the shortest cleanup times. It also puts the extracted groundwater to beneficial use, using the water to grow forage crops, consistent with the current and historic agricultural nature of the Hinkley Valley. Therefore, the use of agricultural treatment authorized by this Order represents the best practicable treatment or control to maintain the highest water quality consistent with the maximum benefit to the people of the State in compliance with Resolution 68-16.

Arsenic and Manganese

Where agricultural treatment units are co-located or in proximity to in-situ remediation zones, the extracted groundwater may contain arsenic and manganese in concentrations greater than naturally-occurring levels. As described above, arsenic and manganese occur at concentrations above their respective MCLs in parts of the Project Area. The primary water quality concern would be the potential leaching of arsenic and manganese from soils to groundwater due to irrigation.

The discharge of untreated groundwater to land surface will convert soluble hexavalent chromium to solid trivalent chromium under reducing conditions in soil. The same conversion is expected of other soluble metals or elements that may be present in groundwater, such as manganese, iron, arsenic, and uranium. Converted metals will accumulate in the upper five feet of soil when applied to land surface. The mass or concentration of such converted metals was determined to be a less-than-significant impact in the EIR, compared to naturally-occurring concentrations in soils in the Project Area.

The Project incorporates best practicable treatment or control measures, including the monitoring and mitigation measures specified in the EIR and

required by this Order. Therefore, any temporary groundwater degradation related to arsenic or manganese in irrigation or treated water due to Project activities is consistent with Resolution 68-16.

Other Constituents of Concern

The use of acids and compounds to remove biofouling from screens in monitoring and extraction wells will alter pH in groundwater and increase the concentration of total organic carbon. Both effects, however, will be localized to the vicinity of the well screen due to the strong buffering capability of the aquifer, as demonstrated by previous sampling. Baseline sampling shows that bicarbonate alkalinity averaged 300 milligrams per liter (mg/L) and pH is neutral to slightly alkaline. These groundwater characteristics will confine acid and other reactions to the point of injection. Therefore, since groundwater pH will return to background conditions before reaching the Project Area boundaries, there will be no adverse impacts to beneficial uses following the injection of well rehabilitation compounds.

The discharge of tracers, including bromide and fluorescent dyes, will provide better information about aquifer conditions and the fate and transport of discharges. The injection of fluorescent tracers will cause a coloration of groundwater. Fluorescent and bromide tracers will become diluted in the aquifer during groundwater recirculation and/or natural mixing. Coloration will dissipate to undetectable levels prior to reaching the Project Area Boundary. There are no established standards for fluorescent tracers, such as fluorescein or eosine. The Basin Plan, however, does require compliance with narrative objectives, which includes nuisance. Coloration of groundwater from the disposal of wastes would fall under the definition of "nuisance." Since groundwater outside the Project Area boundaries is not expected to contain any color, there will be no adverse impacts to beneficial uses following the tracer test.

Conclusion

The Project involves the extraction of groundwater containing chromium and the application of the extracted groundwater to agricultural treatment units to reduce the hexavalent chromium to trivalent chromium, thereby cleaning up the polluted aquifer. The application of the extracted groundwater to the agricultural treatment units may result in some degradation of high quality groundwater within the Project Area. Such degradation is consistent with Resolution 68-16 because as described in this Attachment, the waste discharge requirements require the use of best practicable treatment or control of the discharge. The discharges will not result in exceedances of applicable water quality objectives over time. The limited term degradation is consistent with the maximum benefit to the people of the State because the Project will result in removal of hexavalent chromium from the groundwater and restoring the polluted groundwater to its beneficial uses.