

**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

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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 ( $\mu\text{g/L}$ ) hexavalent chromium or 3.2  $\mu\text{g/L}$  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  $\mu\text{g/L}$  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  $\mu\text{g/L}$  hexavalent chromium groundwater plume (that is outside of the 50  $\mu\text{g/L}$  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<sup>1</sup>. 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

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<sup>1</sup> 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<sup>2</sup>: 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.

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<sup>2</sup>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<sup>3</sup>. 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)

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<sup>3</sup> 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**

<b>Constituent</b>	<b>Primary State MCL</b>	<b>Secondary State MCL</b>
Uranium	20 pCi/L	NA
Gross Alpha	15 pCi/L	NA
Total Dissolved Solids (TDS)	NA	500 mg/L <sup>4</sup> 1,000 <sup>5</sup> 1,500 mg/L <sup>6</sup>
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

<sup>4</sup> Recommended limit

<sup>5</sup> Upper limit

<sup>6</sup> 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.

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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)**