California Regional Water Quality Control Board

Colorado River Basin Region

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Alan C. Lloyd, Ph.D.
Agency Secretary

Arnold Schwarzenegger
Governor

ORDER NO. R7-2006-0008

The following Discharger is authorized to discharge in accordance with the conditions set forth in this Order:

Discharger	Pacific Gas and Electric Company
Name of Facility	PG&E Topock Compressor Station – Floodplain Reductive Zone In-situ Pilot Test
Facility Address	15 miles Southeast of Needles, CA
	San Bernardino County Assessors Parcel Number 0650-161-12
	San Bernardino County
Facility Contact and Phone Number	Curt Russell (760) 326-5582
Type of Facility	Industrial
Agency Mailing Address	Pacific Gas and Electric Company
	77 Beale Street
	San Francisco, CA 94105
Agency Contact and Phone Number	Yvonne Meeks (805) 546-5243

The Discharger is authorized to discharge from the following discharge points as set forth below:

Discharge Point	Effluent Quality	Discharge Point Latitude	Discharge Point Longitude	Hydrologic Unit
PTI-1S/M/D	Reducing Reagent	34° 43’ 10.2” N	114° 29’ 25.4” W	Piute

This Order was adopted by the Regional Water Board on:	January 18, 2005
This Order shall become effective on:	January 18, 2005

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
REGION 7, COLORADO RIVER BASIN REGION

ORDER NO. R7-2006-0008

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
REGION 7, COLORADO RIVER BASIN REGION

WASTE DISCHARGE REQUIREMENTS

ORDER NO. R7-2006-0008

I. FACILITY INFORMATION

The following Discharger is authorized to discharge in accordance with the conditions set forth in this Order:

Discharger	Pacific Gas and Electric Company
Name of Facility	PG&E Topock Compressor Station – Floodplain Reductive Zone In-situ Pilot Test
Facility Address	15 miles Southeast of Needles, CA
	San Bernardino County Assessors Parcel Number 0650-161-12
	San Bernardino County
Facility Contact, Title, and Phone	Curt Russell, Chief Plant Operator (760) 326-5582
Mailing Address	Pacific Gas and Electric Company 77 Beale Street San Francisco, CA 94105
Type of Facility	Industrial
Facility Design Flow	6,000 gallons per injection well

II. FINDINGS

The California Regional Water Quality Control Board, Colorado River Basin Region (hereinafter Regional Water Board), finds:

A. Background and Description of Existing Board Orders.

1. Pacific Gas and Electric Company (hereinafter, Discharger) submitted a Report of Waste Discharge (ROWD), dated June 21, 2005**,** applying for a new Board Order to discharge 6,000 gallons of a blended groundwater and reagent mixture into each of three borings drilled to shallow, middle and deep depths in an injection well cluster (PTI-S/M/D) for an in-situ pilot test to be conducted in the Colorado River floodplain. Injection of the mixture will occur one to four times during the pilot test period of six months. The application was deemed complete on July 21, 2005. An addendum to the ROWD was submitted on December 8, 2005, which proposed refinements and minor modifications to the floodplain in-situ pilot study activities described in the ROWD. These refinements and minor modifications are incorporated in this draft Board Order.

2. From 1951 to 1964, PG&E discharged untreated wastewater containing hexavalent chromium from the compressor station cooling tower to percolation beds in Bat Cave Wash, an ephemeral stream bed draining into the Colorado River.

3. In 1964, PG&E began treatment of blow down water by reduction of hexavalent chromium to trivalent chromium (Chrome III) prior to discharge to the percolation beds. On August 14, 1969, the Regional Water Board adopted Resolution No. 69-25 prohibiting PG&E from discharging wastewater containing hexavalent chromium. At approximately the same time, PG&E began disposing of the treated blow down water by subsurface injection at well PGE8.

4. On November 6, 1970, PG&E submitted a ROWD for disposal of 0.030 million gallons per day (mgd) of industrial wastewater from cooling tower operations into one on-site lined basin designed by a California registered civil engineer.

5. On December 10, 1970, the Regional Water Board adopted Resolution No. 70-72 to regulate the proposed discharge of cooling tower wastewater into the one on-site lined basin.

6. On September 11, 1975, the Regional Water Board rescinded Resolution No. 70-72 and adopted Board Order No. 75-52.

7. Board Order No. 75-52 permitted a maximum of 0.030 mgd of industrial wastewater containing chromate to be discharged to four lined evaporative basins. Also, the Board Order prohibited the discharge of wastewater to the Colorado River or to any channel draining to the Colorado River. In addition, the Board Order specified that chemical residues obtained by chemical flocculation or evaporation of process wastewater shall be discharged only at a solid waste disposal site approved to receive these wastes.

8. On October 2, 1985, the Regional Water Board rescinded Board Order No. 75-52 and adopted Board Order No. 85-99.

9. Board Order No. 85-99, allowed the Discharger to replace the hazardous chromate-based cooling tower water treatment process with phosphate-based inhibitors. Phosphate-based inhibitors are in use today.

10. On January 27, 1988, the Regional Water Board rescinded Board Order No. 85-99 and adopted Board Order No. 88-30, which was revised on March 23, 1988.

11. Revised Board Order No. 88-30 permitted discharge to four new Class II surface impoundments. PG&E closed the four existing lined evaporative basins along with all hazardous waste facilities at the Topock Compressor Station. Closure was done in compliance with closure requirements of 40 CFR Part 265 and Subchapter 15, Chapter 3, Title 23 of the California Code of Regulations.

12. On May 14, 1998, Board Order No. 88-30 was rescinded and Board Order No. 98-050 was adopted. Board Order No. 98-050 allowed discharge of cooling tower blowdown to the Class II surface impoundments.

13. On May 10, 1995, PG&E notified the Regional Water Board that the results of analyses of groundwater samples collected from two abandoned production wells at Topock located approximately 2000 feet northeast of the former percolation ponds and 1700 feet southwest of the Colorado River, indicated concentrations of 2,300 parts per billion (ppb) and 2,850 ppb total chromium and concentrations of 1,480 ppb and 2,340 ppb hexavalent chromium for the two wells respectively. The samples were collected from a depth of approximately 120 feet below ground surface (bgs). The source of pollution is believed to be historical discharges to the Bat Cave Wash and is not associated with the current evaporation basins.

14. The California Department of Health Services has set the Maximum Contaminant Level (MCL) for total chromium in drinking water at 50 ppb.

15. On February 26, 1996, the Department of Toxic Substances Control (DTSC) and PG&E entered into a Corrective Action Consent Agreement (CACA) at the Topock Gas Compressor Station due to hazardous levels of chromium found in the groundwater. DTSC is the lead agency in the Resource Conservation and Recovery Act (RCRA) Facility investigation under the CACA.

16. Under the terms of the CACA, PG&E agreed to conduct a RCRA Facility Investigation (RFI), and to implement appropriate corrective action measures. The draft RFI was first submitted in April 2000, a second draft was submitted in February 2004. A third RFI draft was prepared in February 2005. Results of the RFI indicated hexavalent chromium in a groundwater plume at concentrations of 13,000 ppb located 600 feet from the Colorado River at monitoring well cluster MW-20.

17. On June 30, 2004, DTSC directed PG&E to prepare and immediately implement Interim Measure No. 3 to expand existing groundwater extraction and management facilities to address hydraulic control of the chromium (VI) plume at the Topock site.

18. On June 30, 2004, DTSC issued a Notice of Exemption (NOE) for the proposed project summarized in Interim Measure No. 3. The NOE addresses the California Environmental Quality Act (CEQA) exemption requirements for an Emergency Project, California Code of Regulations, Title 14, Section 15269(c) which provides for actions necessary to prevent an emergency. The NOE states, in part: "In February 2004, [DTSC] directed [PG&E] to initiate immediate pumping, transport, and disposal of groundwater at the Topock site to ensure that groundwater containing chromium does not reach the Colorado River. Due to the influence of the Colorado River stage on groundwater levels . . . , extracting groundwater at higher rates will be necessary to maintain the stated goal of hydraulic control." The NOE further describes the project as follows: "The critical elements for this proposed project are the piping, conveyance of groundwater, construction of temporary treatment facilities, and development of a disposal method for the treated water."

19. On July 8, 2004, PG&E submitted a Summary of Proposed Project for Interim Measures No. 3 – Revision 1 that provided a general summary of the proposed project. The proposal describes the method of treatment to be used and the means of disposal of treated water and waste products as follows:

a. Discharge to Land – Subsurface injection to one or more of three proposed injection well fields. Up to ten injection wells are proposed.

b. Discharge to Topock Compressor Station Class II surface impoundments – Reuse of treated groundwater in the Compressor Station cooling tower.

c. Discharge to Surface Water – Discharge of treated groundwater to the Colorado River under the National Pollutant Discharge Elimination System (NPDES).

20. On July 29, 2004, PG&E submitted to the Regional Water Board applications and ROWD for permits to discharge treated groundwater by the three methods of disposal described in Finding No. 19. A separate application was submitted for each method.

21. On October 13, 2004, the Regional Water Board adopted Board Orders No. R7-2004-0080, R7-2004-0100, and R7-2004-0103.

    a. Board Order No. 98-050 was rescinded and R7-2004-0080 was adopted. Board Order No. R7-2004-0080 allows for the reuse of treated groundwater from the IM-3 treatment facility in the Compressor Station cooling tower and disposal of brine to the Class II surface impoundments.

    b. Board Order No. R7-2004-0100 permits discharge of treated groundwater to the Colorado River under the National Pollutant Discharge Elimination System (NPDES). Prohibitions No. 1 of Board Order No. R7-2004-0100 states: "The Discharger shall not activate the use of this Board Order for discharge to the Colorado River without first obtaining prior written determination from the Executive Officer that sufficient and satisfactory evidence has been submitted demonstrating that other wastewater disposal options are not reasonable and feasible. …"

    c. Board Order No. R7-2004-0103 allows for subsurface injection to one or more of three injection well fields. Discharge to groundwater under this Order began July 31, 2005.

22. In adopting Board Orders No. R7-2004-0080, R7-2004-0100, and R7-2004-0103, the Regional Water Board reviewed the NOE prepared by DTSC and concurred that an emergency condition existed because the flow of groundwater to the Colorado River had not yet been contained. For each of the orders, the Regional Water Board determined that it was necessary and desirable to have in place alternative disposal options to accommodate increased extraction and treatment rates (resulting in the need for increased disposal capacity) that may be required to contain the groundwater flow to the river. While the duration of the Interim Measures was not determined at the time the Orders were adopted, the Regional Water Board found that it was appropriate to limit the term of those Orders. The Orders will expire on January 31, 2007, by which time, the Regional Water Board found, it is reasonable to conclude that DTSC will have undertaken an environmental analysis of all disposal alternatives.

23. The Discharger currently operates a treatment facility for implementation of Interim Measures No. 3 to address hydraulic control of the contaminated groundwater plume boundaries and prevent contaminated groundwater from entering the Colorado River. The treatment facility has a design of 135 gallons per minute (gpm), and a maximum flow capacity of 150 gpm.

24. The Discharger is currently discharging a maximum of 135 (gpm) of treated groundwater under Board Order R7-2004-0103 into one or more of three injection well fields located on San Bernardino County Assessor's parcel No. 650-151-06. The final effluent is composed of RO permeate that may be blended with Reverse Osmosis (RO) concentrate or microfilter water from the treatment facility. It is discharged to the groundwater on the west side of Parcel 650-151-06.

25. In accordance with Board Order R7-2004-0103, prior to injection, the extracted groundwater is treated with chemical reduction, precipitation, and solids removal by gravity or clarifier. Ferrous chloride is used to reduce Cr (VI) to Cr (III). The precipitated solids containing Cr (III) and Fe (III) are removed by gravity settling and microfiltration. RO is used as a polishing step for the treated water to reduce Total Dissolved Solids (TDS). Under Board Order R7-2004-0103, RO concentrate and liquids may be discharged directly to the lined ponds owned and operated by PG&E at the Topock Compressor Station or to an appropriate disposal facility. Residual solids will be disposed according to federal and state regulations.

B. Project Description.

1. The purpose of the proposed pilot test is to evaluate in-situ treatment of Hexavalent Chromium [Cr(VI)] in the aquifer. The Discharger proposes to inject a combination of food-grade sodium lactate and yeast extract into the groundwater. Microorganisms that use these substances as food sources deplete the groundwater of oxygen and other naturally occurring electron acceptors to temporarily create a reducing environment in the aquifer and promote reduction of Cr(VI) to trivalent chromium [Cr(III)]. Cr(III) is a less soluble form of chromium that precipitates and becomes immobile in the aquifer media. Effects on water quality will be localized in the pilot study treatment zone by maintaining control of the injectate within the capture zone of the IM-3 extraction wells.

2. The proposed pilot test will be conducted in the Colorado River floodplain, as shown in Attachment A, in an area located approximately 120 feet north of monitoring wells MW-39 and approximately 200 feet east of extraction well TW-2. The injection well cluster PTI-1 will be constructed within three separate borings, PTI-1S, PTI-1M, and PTI-1D, screened at 10-foot intervals corresponding with the shallow, medium, and deep portions of the aquifer. Six three-level monitoring well nests, PT-1, PT-2, PT-3, PT-4, PT-5, and PT-6, will be installed around the injection well in the approximate locations shown in Attachment B. Each monitoring well nest will have three individual well casings screened across 10-foot intervals to correspond with the injection intervals.

3. A tracer test will be initiated concurrently with the pilot test to better understand the flow conditions in the pilot test area. Each of the injection well triplets will be injected with a distinct non-toxic tracer. PTI-1S will be tested with flourescein, PTI-1M will be tested with bromide, and PTI-1D will be tested with iodide. Flourescein will be injected at

approximately 5 mg/L in the reagent solution while bromide and iodide will be injected at approximately 2000 mg/L in the reagent solution. The concentrations are equivalent to 0.25 lbs of fluorescein and 100 lbs each of bromide and iodide. The results of the tracer test will be used to track the injected solution migration and verify the gradient influenced by extraction wells TW-2 and PE-1.

4. The test area for the pilot project is approximately 10,000 square feet across the full saturated thickness of the aquifer. The reagents will be mixed and blended in an aboveground transportable batch tank and brought to the site in three tanker truck trips (one for each tracer) during each injection event. The reagent solution will be pumped into each of three individual injection wells in the PTI-1 cluster through a flexible hose. No permanent aboveground equipment will be used for the injection.

5. The Discharger proposes using treated and blended groundwater from IM No. 3 treatment facility as the carrier for the reagents. The reagent volumes proposed for the pilot test are 6,000 gallons of solution containing 500 lbs of sodium lactate and 14 lbs of yeast extract per well (PTI-1S/M/D) for a total of 18,000 gallons of reagent per application. If the initial reduction efficiency of Cr(VI) is insufficient, a second injection may be performed at a higher lactate concentration.

C. Legal Authorities.

This Order serves as Waste Discharge Requirements (WDRs) pursuant to Division7, Chapter 4, Article 4, of the California Water Code (CWC) for discharges that are not subject to regulation under Clean Water Act (CWA) Section 402 (33 U.S.C. Section 1342).

D. Background and Rationale for Requirements.

The Regional Water Board developed the requirements in this Order based on information submitted as part of the application, the addendum to the application, through monitoring and reporting programs, and through special studies. Attachments A through D, which contain background information and rationale for Order requirements, are hereby incorporated into this Order and thus, constitute part of the Findings for this Order.

E. California Environmental Quality Act (CEQA).

In accordance with the California Environmental Quality Act (CEQA) (Section 21000 et seq., California Public Resources Code) and implementing Guidelines (Section 15000 et seq., Title 14, California Code of Regulations), DTSC, acting as the lead agency, prepared an Initial Study and Negative Declaration for the floodplain in-situ pilot project at Pacific Gas and Electric Company, Topock Compressor Station. DTSC circulated the Initial Study and proposed Negative Declaration for a public comment period beginning October 19, 2005 and ending November 18, 2005. On December 14, 2005 DTSC filed a Notice of Determination (NOD, SCH#2005101087) with the State Clearing House regarding it's approval of the proposed Negative Declaration. DTSC concludes in the NOD that the proposed project will not have a significant effect on the environment.

The Regional Water Board has considered the Initial Study and the NOD filed by DTSC. Compliance with these Waste Discharge Requirements will prevent any adverse impacts on water quality.

F. Water Quality Control Plans.

The Regional Water Board adopted a Water Quality Control Plan for the Colorado River Basin (hereinafter, Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. In addition, State Water Resources Control Board (State Water Board) Resolution No. 88-63 requires that, with certain exceptions, the Regional Water Board assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in the Basin Plan. The discharge for the proposed in-situ floodplain pilot project is located within the Piute hydrologic unit.

The Basin Plan states at page 2-19 that the beneficial uses of ground waters in the Piute hydrologic unit are as follows:

Discharge Point	Hydrologic Unit	Beneficial Use(s)
PTI-1	Piute	Existing: Municipal and domestic water supply (MUN) Industrial Supply (IND) Agricultural Supply (AGR)

Requirements of this Order specifically implement the Basin Plan.

G. Antidegradation Policy.

The State Water Board established California's antidegradation policy in State Water Board Resolution 68-16. Resolution 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The permitted discharge is consistent with the antidegradation provision of State Water Board Resolution 68-16. The discharge is necessary to prevent potential water quality impacts on the Colorado River (the main water supply to Southern California) and prevent and mitigate further impacts on groundwater. Further, this water supply is of key economic importance to the State.

H. Monitoring and Reporting.

Section 13267 of the CWC authorizes the Regional Water Boards to require technical and monitoring reports. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. This Monitoring and Reporting Program is provided in Attachment C.

I. Notification of Interested Parties.

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations.

J. Consideration of Public Comment.

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

IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted therein, the Discharger shall comply with the requirements in this Order.

III. DISCHARGE PROHIBITIONS

A. Prohibitions

1. Discharge of waste classified as 'hazardous' under Section 2521, Chapter 15 of Title 23 of the California Code of Regulations, or 'designated', as defined in CWC Section 13173 is prohibited.

2. The Discharger shall prohibit public access to the injection wells through such means as well locks or other alternatives acceptable to the Regional Board's Executive Officer.

3. The direct discharge of any wastewater to any surface waters or surface drainage courses is prohibited.

4. Discharge of treated wastewater at a location or in a manner different from that described in Finding No. II.B above, or as otherwise authorized by the Regional Water Board, is prohibited.

5. Bypass or overflow of untreated or partially treated wastewater is prohibited.

6. The discharge of waste to land not owned by or authorized for such use to the Discharger is prohibited.

7. The discharge shall not cause degradation of any water supply, as required by State Water Board Resolution No. 68-16.

8. The treatment or disposal of wastes from the facility shall not cause pollution or nuisance as defined in CWC Section 13050(l) – (m).

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Land Discharge Specifications

1. The Discharger shall maintain hydraulic control of the pilot study treatment zone using the existing extraction well TW-2 and proposed extraction well PE-1, or any alternative extraction wells designated by DTSC.

2. The Discharger shall not cause the permeability of the aquifer, either inside or outside of the reagent pilot test treatment area, to be affected to such a degree that the Discharger is unable to effectively operate extraction wells for the purpose of containing the reagent or its byproducts.

3. The Discharger shall not cause the groundwater to contain concentrations of chemical constituents, including the injected substance, and any breakdown products or by-products of the in-situ treatment process, in amounts that adversely affect beneficial uses.

4. No changes in the type or amount of treatment chemicals added to the process water as described in this Board Order shall be made without the prior written approval of the Regional Water Board's Executive Officer.

V. PROVISIONS

A. Regional Water Board Standard Provisions

1. The Discharger shall comply with the following provisions:

   a. The Discharger shall comply with all conditions of the Board Order. Noncompliance constitutes a violation of the Porter-Cologne Water Quality Control Act, and is grounds for enforcement action, for Order termination, revocation and reissuance, or modification of Waste Discharge Requirements; or denial of an Order renewal application.

   b. The pilot test treatment area, injection wells, and monitoring wells, shall be protected from any washout or erosion of wastes or covering material, and from inundation, which should occur as a result of floods having a predicted frequency of once in 100 years.

   c. The Discharger shall ensure that all site-operating personnel are familiar with the contents of this Board Order, and shall maintain a copy of this Board Order on site.

   d. Consistent with CWC Section 13267(c), the Discharger shall allow the Regional Water Board, or an authorized representative, upon presentation of credentials and other documents as may be required by law to:

      i. Enter upon the premises regulated by this Board Order, or the place where records must be kept under the conditions of this Board Order;

      ii. Have access to and copy, at reasonable times, any records that shall be kept under the conditions of this Board Order;

iii. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required by this Board Order;

iv. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Board Order or as otherwise authorized by the California Water Code, any substances or parameters at this location.

e. Prior to any change of ownership or management of this operation, the Discharger shall transmit a copy of this Board Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Water Board.

f. Prior to any modifications in this facility, which would result in material change in the quality or, quantity of wastewater treated or discharged, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Regional Water Board and obtain revised requirements before modifications are implemented.

g. Adequate measures shall be taken to assure that flood or surface drainage waters do not erode or otherwise render portions of the facilities inoperable.

h. This Board Order does not authorize violation of any federal, state, or local laws or regulations.

i. This Board Order does 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.

j. This Board Order may be modified, rescinded and reissued, for cause. The filing of a request by the Discharger for a Board Order modification, rescission and reissuance, or a notification of planned changes or anticipated noncompliance does not stay any Board Order condition. Causes for modification include the promulgation of new regulations, modifications of land application plans, or modification in sludge use or disposal practices, or adoption of new regulations by the State Water Board or the Regional Water Board, including revisions to the Basin Plan.

B. Monitoring and Reporting Program Requirements

1. The Discharger shall comply with Monitoring and Reporting Program R7-2006-0008, and future revisions thereto, in Attachment C of this Order.

2. The monitoring and reporting requirements in Monitoring and Reporting Program R7-2006-0008 are necessary to determine compliance and to determine the in-situ pilot project's impacts, if any, on groundwater.

3. The Discharger is the responsible party for the waste discharge requirements and the monitoring and reporting program for the in-situ pilot project. The Discharger shall comply with all conditions of these waste discharge requirements. Violations may result in enforcement actions, including Regional Water Board Orders or court orders, requiring

corrective action or imposing civil monetary liability, or in modification or revocation of these Waste Discharge Requirements by the Regional Water Board.

4. The Discharger shall furnish, under penalty or perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the specification prepared by the Regional Water Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

5. Pursuant to the CWC Section 13267, samples taken for Total Chromium shall be analyzed with a method having a method detection limit (MDL) of 1.0 ppb and samples taken for Chromium VI shall be analyzed with a method having a MDL of 0.2 ppb. The analytical results shall be reported consistent with actual observations by a California certified laboratory, and shall be reported in terms of the practical quantitation limit (PQL), if the MDL cannot be achieved. These requirements are necessary to ensure compliance with the Waste Discharge Requirements set forth in Board Order R7-2006-0008, determine the impact on the receiving groundwater, and confirm that the discharge of treated ground water does not violate Waste Discharge Requirements.

C. Special Provisions

1. Should the evaluation of the pilot test data reveal adverse effects on groundwater quality due to reagent injection, the Discharger shall notify the Regional Water Board within 24 hours, followed by a written summary within two weeks. The Discharger shall clean up and abate these effects, including extraction of any byproducts. The Discharger shall provide a status summary report within two months detailing activities to implement the contingency plan.

2. Special Studies, Technical Reports, and Additional Monitoring Requirements:

   a. The Discharger shall develop an operation and maintenance plan for the management of the subsurface injection wells and submit a copy of the plan to the Regional Water Board's Executive Officer, or his designee, for review and approval at least 30 days prior to any discharge.

   b. The Discharger shall construct a representative groundwater monitoring system, acceptable to the Regional Water Board's Executive Officer, in the vicinity of the pilot study injection wells (approximate locations shown on Attachment B), which shall enable groundwater samples to be collected and analyzed as specified in Monitoring and Reporting Program R7-2006-0008 and revisions thereto prior to the injection of treatment reagent. The Discharger shall begin construction within 60 days of approval of the design plans, barring any extenuating circumstances reported to the Regional Water Board's Executive officer.

   c. The design plans for the wells within the groundwater monitoring system referred to above in Section V.C.3.b. and shown on Attachment B, shall be submitted to the Regional Water Board's Executive Officer for approval within 45 days of adoption of this Board Order. Either a Professional Engineer (PE), Professional Geologist (PG), Certified Engineering Geologist (CEG), or a Certified Hydro Geologist (CHG) must certify the design plans.

d. The Discharger shall report any noncompliance that may endanger human health or the environment. The Discharger shall provide a verbal report of the noncompliance to the Regional Water Board office ((760) 346-7491) and the Office of Emergency Services ((800) 852-7550 or (916) 845-8911) as soon as: (1) the Discharger has knowledge of the discharge; (2) notification is possible; and (3) notification can be provided without substantially impeding cleanup or other emergency measures. During non-business hours, the Discharger shall leave a message on the Regional Water Board voice recorder. A written report to the Regional Water Board shall also be provided within five (5) business days of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. The Discharger shall report all intentional or unintentional spills in excess of one thousand (1,000) gallons occurring within the facility or collection system to the Regional Water Board offices in accordance with the above time limits.

e. The Discharger shall provide adequate notice to the Regional Water Board's Executive Officer of the following:

i. Any introduction of pollutants into any of the treatment facilities described in the Findings of this Board Order from an indirect discharger which would be subject to Section 301 and 306 of the Clean Water Act, if it were directly discharging the pollutants.

ii. Any substantial change in the volume or character of pollutants being introduced into any of the treatment facilities described in the Findings of this Board Order by an existing or new source.

iii. Any planned physical alterations or additions to the facilities described in this Board Order, or changes planned in the discharger's disposal practices, where such alterations, additions, or changes may justify the application of Board Order conditions that are different or absent in the existing Board Order, including notification of additional disposal sites not reported during the Board Order application process, or not reported pursuant to an approved land application plan.

f. The Discharger shall report all instances of noncompliance. Reports of noncompliance shall be submitted with the Discharger's next scheduled Self-Monitoring Report or earlier if requested by the Regional Water Board's Executive Officer.

3. Best Management Practices and Pollution Prevention

a. Storm water

i. Federal regulations for storm water discharges require specific categories of facilities which discharge storm water associated with industrial activity (storm water) to obtain National Pollutant Discharge Elimination System (NPDES) permits and to

implement Best Conventional Pollutant Technology (BCT) and Best Available Technology Economically Achievable (BAT) to reduce or eliminate industrial storm water pollution.

ii. In the event that there are storm water discharges associated with industrial activities, the Discharger shall submit a Notice of Intent and/or maintain coverage under the General Storm Water Permit.

4. Construction, Operation and Maintenance Specifications

a The Discharger shall at all times properly operate and maintain systems and components of the treatment system which are installed or used by the Discharger to achieve compliance with the conditions of this Board Order. Proper operation and maintenance includes effective performance, adequate process controls and appropriate quality assurance procedures. This provision requires the operation of backup auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of this Board Order. All systems, both in service and reserved, shall be inspected and maintained on a regular basis. Records shall be kept of the inspection results and maintenance performed and made available to the Regional Water Board upon demand.

5. Other Special Provisions

a. The Discharger shall obtain any and all prior approvals required by the Bureau of Land Management, and obtain prior written approval from the US Department of the Interior, prior to discharge.

I, Robert Perdue**,** Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Colorado River Region, on January 18, 2005.

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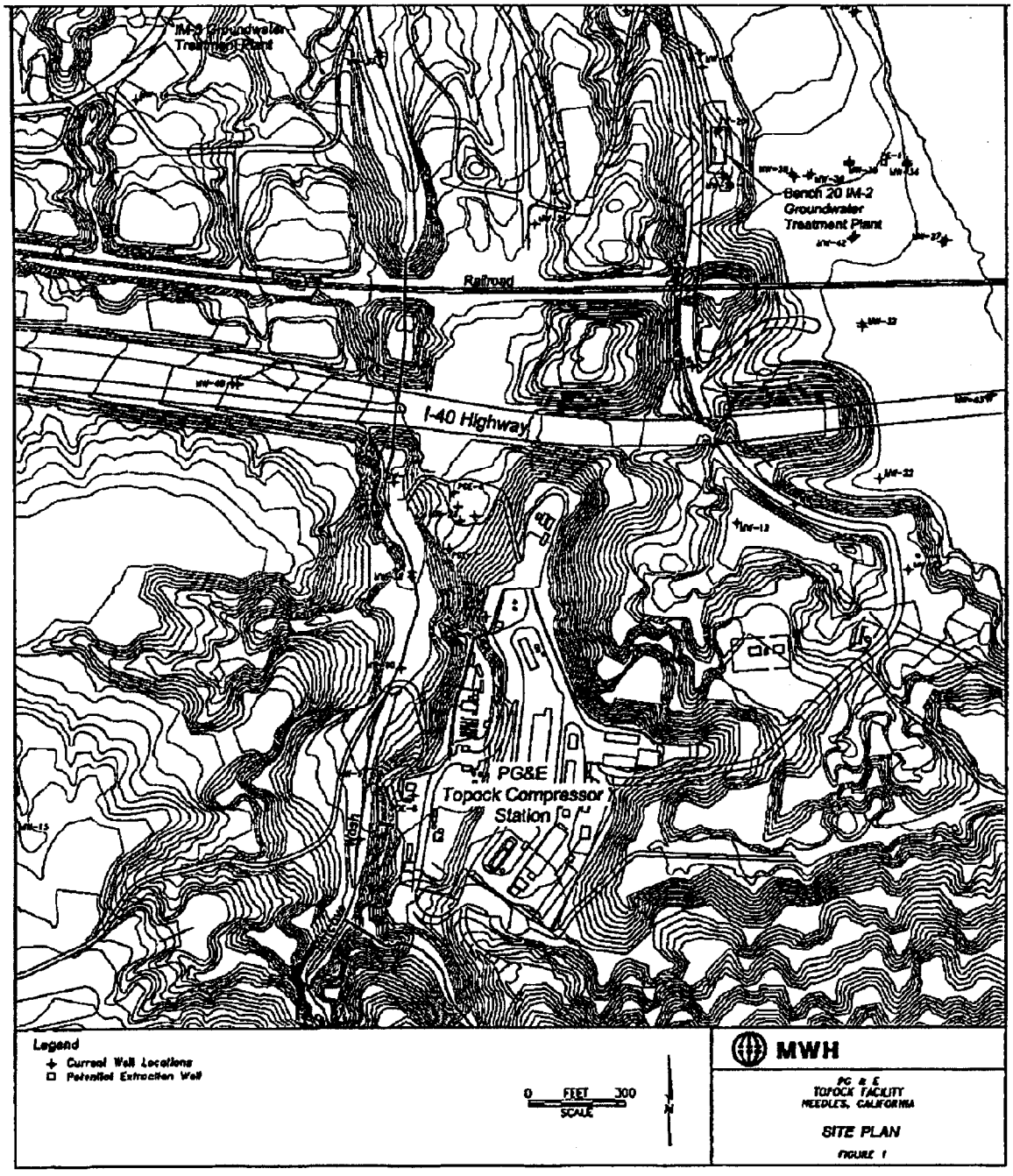
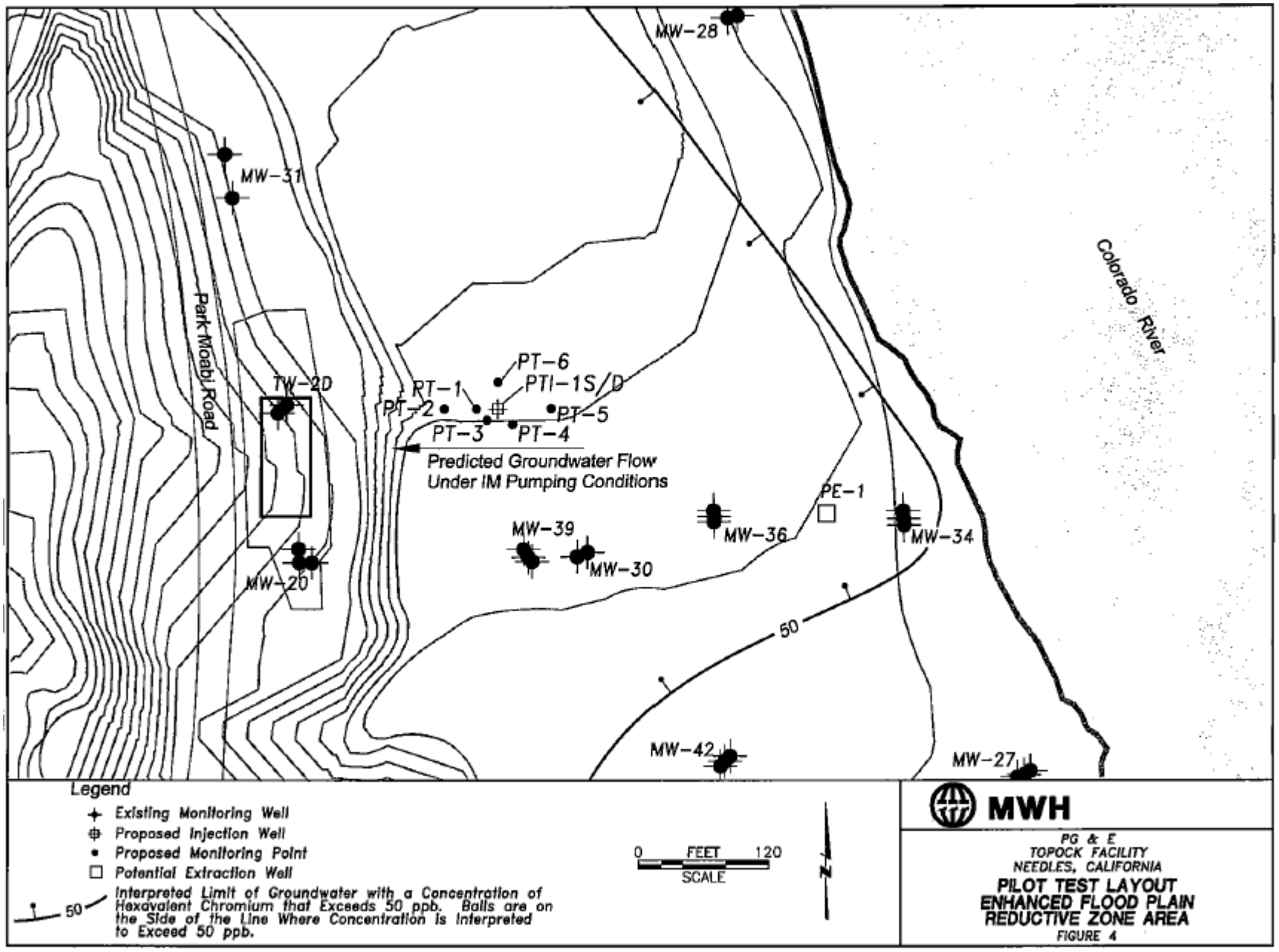
ROBERT PERDUE
Executive Officer

California Regional Water Quality Control Board
Colorado River Basin Region



Pacific Gas and Electric Company
Floodplain Reductive Zone In-situ Pilot Test
Needles – San Bernardino County
Project Location - 34° 43' 10.2" N Latitude and 114° 29' 25.4" W Longitude
Board Order No. R7-2006-0008


MW-28
MW-31
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MW-34
MW-30
MW-20
50
MW-42
MW-27
Legend
Existing Monitoring Well
Proposed Injection Well
Proposed Monitoring Point
Potential Extraction Well
50
Interpreted Limit of Groundwater with a Concentration of Hexavalent Chromium that Exceeds 50 ppb. Balls are on the Side of the Line Where Concentration is Interpreted to Exceed 50 ppb.
0 FEET 120
SCALE
N
MWH
PG & E
TOPOCK FACILITY
NEEDLES, CALIFORNIA
PILOT TEST LAYOUT
ENHANCED FLOOD PLAIN
REDUCTIVE ZONE AREA
FIGURE 4

Attachment C – Monitoring and Reporting Program – Table of Contents

ATTACHMENT C – MONITORING AND REPORTING PROGRAM (MRP)

CWC Sections 13267 and 13383 authorize the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements to implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. Monitoring Provisions

1. The Discharger shall notify the Regional Water Board a minimum of two weeks prior to the start of injection of treatment reagent.

2. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the approximate monitoring locations specified below. Monitoring locations shall not be changed without notification to, and having the approval of the Regional Water Board's Executive Officer.

3. Unless otherwise approved by the Regional Water Boards Executive Officer, all analysis shall be conducted at a laboratory certified for such analysis by the State Department of Health Services. All analysis shall be conducted in accordance with the latest edition of "Guidelines Establishing Test Procedures for Analysis of Pollutants", (40 CFR Part 136) promulgated by the United States Environmental Protection Agency (USEPA).

4. The collection, preservation and holding times of all samples shall be in accordance with USEPA approved procedures.

5. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated at least once per year to ensure continued accuracy of the devices.

6. Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this Monitoring and Reporting Program.

7. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Board Order, and records of all data used to complete the application for this Board Order, for a period of at least 5 years from the date of the sample, measurement, report or application.

c. Records of monitoring information shall include:

i. The individual(s) who performed the sampling or measurements.
ii. The date(s) analyses were performed.
iii. The individual(s) who performed the analysis.
iv. The analytical techniques or methods used; and
v. The results of such analysis.

8. If the facility is not in operation, or there is no discharge during a required reporting period, the Discharger shall forward a letter to the Regional Water Board indicating that there has been no activity during the required reporting period.

9. Each report shall contain the following statement:

"I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations".

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table C-1: Monitoring Locations

Monitoring Location Name	Monitoring Location Description	Monitoring Location Latitude	Monitoring Location Longitude
PTI-1	Floodplain Pilot Test Injection Well	34° 43’ 10.2” N	114° 29’ 25.4” W
PT-1	Approximately 20 feet west of PTI-1		
PT-2	Approximately 50 feet west of PTI-1		
PT-3	Approximately 15 feet south west of PTI-1		
PT-4	Approximately 20 feet south east of PTI-1		
PT-5	Approximately 50 feet west of PTI-1		
PT-6	Approximately 25 feet north of PTI-1		
TW-2	Extraction Well		
PE-1	Extraction Well		
TW-3	Extraction Well		

III. GROUNDWATER MONITORING REQUIREMENTS

A. Monitoring Requirements

1. Field instruments and test kits will be used to monitor for the arrival of the tracer compounds in the pilot test monitoring well network. Samples will be collected for laboratory analysis of all parameters listed in Table C-3 after the tracer is detected in field measurements or if field measurements of CrVI concentration differ by more than 20 percent from the baseline sample results.

Table C-2: Field Parameters

Parameter	Units	Sample Type	Minimum Sampling Frequency	Reporting Frequency
Groundwater Elevation	Feet	Measurement	See Attachment D	Monthly
Cr(VI)	µg/L	Grab	See Attachment D	Monthly
Bromide	µg/L	Grab	See Attachment D	Monthly
Fluorescein	µg/L	Grab	See Attachment D	Monthly
Iodide	µg/L	Grab	See Attachment D	Monthly
pH	s.u.	Grab	See Attachment D	Monthly
Temperature	°F	Grab	See Attachment D	Monthly
Specific Conductance	µmhos/cm	Grab	See Attachment D	Monthly

2. The Discharger shall monitor groundwater for the following parameters:

Table C-3: Baseline Parameters

Parameter	Units	Sample Type	Minimum Sampling Frequency	Reporting Frequency
Cr(VI)	µg/L[1]	Grab	See Attachment D	Monthly
Cr(Total)	µg/L	Grab	See Attachment D	Monthly
Arsenic	µg/L	Grab	See Attachment D	Monthly
Calcium	mg/L	Grab	See Attachment D	Monthly
Iron (ferric)	mg/L	Grab	See Attachment D	Monthly
Iron (ferrous)	mg/L	Grab	See Attachment D	Monthly
Magnesium	µg/L	Grab	See Attachment D	Monthly
Manganese	µg/L	Grab	See Attachment D	Monthly
Potassium	mg/L	Grab	See Attachment D	Monthly
Sodium	mg/L	Grab	See Attachment D	Monthly
Chloride	mg/L	Grab	See Attachment D	Monthly
Nitrate	mg/L	Grab	See Attachment D	Monthly
Nitrite	mg/L	Grab	See Attachment D	Monthly
Phosphorous (as phosphate)	mg/L	Grab	See Attachment D	Monthly
Sulfate	mg/L	Grab	See Attachment D	Monthly
Sulfide	mg/L	Grab	See Attachment D	Monthly
Carbonate/bicarbonate alkalinity	mg/L	Grab	See Attachment D	Monthly
Total organic carbon	mg/L	Grab	See Attachment D	Monthly

[1] µg/L – micrograms per liter

IV. ADDITIONAL MONITORING REQUIREMENTS

A. Operation and Maintenance

The Discharger shall report the following:

Table C-4: Operation and Maintenance / Calibration Requirements

Activity		Reporting Frequency
Inspect and document any operation/maintenance problems by inspecting each unit process	Monthly	Monthly during test phase, Quarterly thereafter
Calibration log of field monitoring instruments	Weekly or prior to each use, whichever is less frequent	Monthly during test phase, Quarterly thereafter

V. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. The results of any analysis taken more frequently than required at the locations specified in this Monitoring and Reporting Program shall be reported to the Regional Water Board.

2. Within **90 days** after start of injection of pilot study, the Discharger shall submit a report summarizing the results of the first 60 days of the pilot test, including an assessment of reagent injection distribution. At a minimum, the report shall include:

   a. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative report shall be sufficiently detailed to verify compliance with the WDRs, the attached MRPs, and the Standard Provisions and Reporting Requirements. The report narrative shall be supported by documenting flow rates, and total volume of reagent injected, and parameters measured.

   b. An assessment of reagent discharge to the aquifer, and results of all sampling;

   c. Copies of all laboratory analytical report(s);

   d. A calibration log verifying weekly calibration of any field monitoring instruments (e.g., pH, dissolved oxygen meter, etc) used to obtain data;

   e. An evaluation of the changes in aquifer geochemistry including the extent of hexavalent chromium reduction, assessment of changes in mobility of other metals including arsenic, iron, and;

   f. An analysis of whether the injected reagent and any breakdown or by products is being captured by the extraction system or is continuing to spread;

   g. Cumulative data tables containing the water quality analytical results.

3. Quarterly reports shall be submitted to the Board by the **15th day of the following month following the end of each calendar quarter (i.e., by January 15, April 15, July 15, and October 15**) to assess longterm effects of injected substances on aquifer geochemistry until such time as the Executive Officer determines that the reports are no longer necessary. Each quarterly report shall include the following minimum information:

    a. A description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants and groundwater elevations in the wells, how and when samples were collected;

    b. Field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc.;

    c. Groundwater contour maps for all groundwater zones, if applicable;

    d. A table showing well construction details such as well number, groundwater zone being monitored, coordinates (longitude and latitude), ground surface elevation, reference elevation, elevation of screen, elevation of bentonite, elevation of filter pack, and elevation of well bottom;

    e. A copy of the laboratory analytical data report;

    f. If applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.

4. A Final Report shall be submitted to the Regional Water Board within **90 Days** of completion of Pilot Study. This report shall contain an evaluation of the long-term effects on the aquifer of the injected material, effectiveness and progress of the investigation and remediation. The Final Report shall contain the following minimum information:

    a. Both tabular and graphical summaries of all data obtained during the pilot study;

    b. Groundwater contour maps and pollutant concentration maps containing all data obtained;

    c. A discussion of long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;

    d. An analysis of whether the injected plume, and any breakdown or byproducts is being captured by an extraction system or is continuing to spread;

    e. An identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program and the anticipated date for an effectiveness evaluation of the pilot study;

    f. If applicable, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.

B. Self-Monitoring Reports

1. The Discharger shall submit monthly and quarterly Self-Monitoring Reports (SMRs) including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order. Monthly reports shall be due on the 15th day of the month following the end of each calendar month; Quarterly reports shall be due on January 15th, April 15th, July 15th, and October 15th following each calendar quarter.

2. The Discharger shall report with each sample result the applicable Minimum Level (ML) and the current Method Detection Limit (MDL), as determined by the procedure in 40 CFR Part 136.

3. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with discharge specifications.

4. The Discharger shall attach a cover letter to the SMRs. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

5. SMRs must be submitted to the Regional Water Board, signed and certified as required by the MRPs (Attachment C), to the address listed below:

Submit monitoring reports to:
California Regional Water Quality Control Board Colorado River Basin Region 73-720 Fred Waring, Suite 100 Palm Desert, CA 92260

ATTACHMENT D – MONITORING PARAMETERS AND MONITORING FREQUENCY

Table D-1

Monitoring Locations	Parameters	Prior to Injection (Minimum of two samples)	Day 3 after injection	Daily 6 days following Injection	Weekly Weeks 2-4 after Injection	Monthly Months 2-6 after Injection	Quarterly Months 6-Final
PTI-1, Shallow, Middle and Deep Casings	Field Parameters	X	X	X	X	X	X
	Baseline Parameters	X	X				X
PT-1, Shallow, Middle, and Deep Casings	Field Parameters	X	X	X	X	X	X
	Baseline Parameters	X	X			X	X
PT-2, Shallow, Middle, and Deep Casings	Field Parameters	X				X	X
	Baseline Parameters	X				X	X
PT-3, Shallow, Middle, and Deep Casings	Field Parameters	X	X	X	X	X	X
	Baseline Parameters	X	X			X	X
PT-4, Shallow, Middle, and Deep Casings	Field Parameters	X	X	X	X	X	X
	Baseline Parameters	X	X			X	X
PT-5, Shallow, Middle, and Deep Casings	Field Parameters	X				X	X
	Baseline Parameters	X				X	X
PT-6, Shallow, Middle, and Deep Casings	Field Parameters	X			X	X	X
	Baseline Parameters	X				X	X
TW-2	Field Parameters	X				X	X
	Baseline Parameters	X				X	X
PE-1	Field Parameters	X				X	X
	Baseline Parameters	X				X	X
TW-3 (If installed)	Field Parameters	X				X	X
	Baseline Parameters	X				X	X