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April 24, 2006

Robert Perdue
Executive Officer
California Regional Water Quality Control Board
Colorado River Basin Region
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260

**Subject: Contingency Plan
Floodplain Reductive Zone In Situ Pilot Test
Board Order R7-2006-0008
PG&E Topock Compressor Station, Needles, California**

Dear Mr. Perdue:

Enclosed is the Contingency Plan for the floodplain reductive zone in situ pilot test at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station. This plan is being submitted in compliance with provision V.C.1 of the Waste Discharge Requirements (WDRs) issued by the Colorado River Basin Regional Water Quality Control Board (Water Board) under Board Order R7-2006-0008. WDRs under Board Order R7-2006-0008 apply to the floodplain reductive zone in situ pilot test only.

If you have any questions regarding this plan, please call me at (805) 546-5243.

Sincerely,

Yvonne Meeks
Topock Project Manager

Enclosures:

Contingency Plan for the Floodplain Reductive Zone In Situ Pilot Test, Board Order R7-2006-0008

cc: José Cortez, Water Board
Liann Chavez, Water Board
Tom Vandenberg, Water Board
Norman Shopay, DTSC

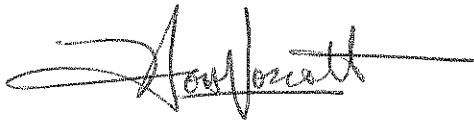
Pacific Gas & Electric Company

Contingency Plan

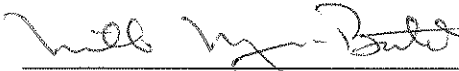
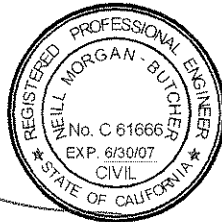
Floodplain In-Situ Pilot Test
Order No. R7-2006-0008
Topock Compressor Station
Needles, California

24 April 2006

ARCADIS



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Contingency Plan

Floodplain In-Situ Pilot Test
Order No. R7-2006-0008
Topock Compressor Station
Needles, California

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Pacific Gas & Electric Company

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RC000689.0001.00007

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1. Introduction

Pacific Gas and Electric (PG&E) is implementing a floodplain in-situ pilot test (ISPT) to address chromium concentrations in floodplain groundwater at the Topock Compressor Station near Needles, California. The purpose of the floodplain ISPT is to evaluate the efficacy of using a food grade reagent mixture to remove hexavalent chromium (CrVI) from groundwater to form stable, insoluble trivalent chromium.

On March 23, 2006, the California Regional Water Quality Control Board, Colorado River Basin Region (RWQCB) issued Waste Discharge Requirements (WDRs) under Order No. R7-2006-0008 (Order), which authorized PG&E to inject 6,000 gallons of blended groundwater and reagent mixture into the shallow, middle and deep depths of injection well cluster PTI-1S/M/D located in the Colorado River floodplain. Injection of the reagent mixture may occur one to four times during the ISPT period of six months. The floodplain ISPT also consists of monitoring at the injection well cluster (PTI-1S/M/D) and at six three-level well nests (wells PT-1 through PT-6).

In accordance with provision V.C.1 of the Order, PG&E is providing this contingency plan within 30 days of adoption of the Order. The contingency plan is used during the design phase to anticipate potential problems and to plan appropriate responses to mitigate them. The plan details mitigation measures for specific ISPT contingencies. This plan provides an analysis of potential causes of the contingency, the effect of the contingency, and the proposed course of corrective action. This analysis is presented in the subsequent section and Table 1.

2. Contingency Analysis

On the basis of the Order and project experience, the following potential contingencies have been identified in the floodplain ISPT contingency plan:

- Loss of hydraulic control of the injected reagents
- Well clogging
- Excessive migration of reductant or by-products
- Well damage and inundation
- Insufficient observation of tracer or reductant effects in monitoring wells

Table 1 provides a detailed discussion of these contingencies and their respective potential causes, related observable conditions, effects of the unmitigated condition, and mitigation actions. In addition, Table 1 includes maintenance activities that may be conducted in response to observation of noted conditions.

Table 1
Contingency Mode Effect Analysis
PG&E Topock Floodplain In Situ Pilot Test

Event or Condition	Potential Cause	Observable Condition	Effect of Unmitigated Condition	Potential Mitigation Actions	
Loss of hydraulic control in the in situ pilot test (ISPT) area	§ Insufficient hydraulic control with extraction wells TW-2D and TW-3D	§ Appearance of reductant (measured as total organic carbon [TOC]) in “upgradient” monitoring well PT-5	§ Pilot test residuals may not be captured by the extraction system	§ Evaluate the hydraulic gradients throughout the ISPT area	
	§ Excessive extraction from well PE-1	§ Gradient reversal toward the Colorado River			§ Monitor concentrations of observed constituents in well PT-5 for increasing trends
Well or aquifer clogging	§ Elevated levels of reductant or residuals remaining in or near injection wells	§ Reduced flow rates or increase pressures during injection events	§ May reduce effectiveness of the injection wells for delivery of the reductant in future injections, or reduce usefulness of monitoring wells, as applicable	§ Clean injection or monitoring well and redevelop to increase permeability	
	§ Significantly reduced well hydraulic productivity	§ Sustained TOC or tracer concentrations in injection wells			§ Consider future injections at more diluted reductant strength
		§ Reduced purge flow rates in monitoring wells			§ Eliminate injection of yeast extract
Excessive migration of reductant	§ Reductant concentration may be too high	§ Excessive increase in TOC concentrations in downgradient well PT-2 or extraction wells	§ May affect capture or lead to excessive loading of reductant on the Interim Measure 3 (IM-3) treatment plant	§ Future injections conducted with more dilute reductant solution	
	§ Groundwater microbial community not acclimated to the reductant				§ Cease reductant injections

**Table 1
Contingency Mode Effect Analysis
PG&E Topock Floodplain In Situ Pilot Test**

Failure Mode	Potential Cause	Observable Condition	Effect of Unmitigated Condition	Potential Mitigation Actions
Excessive migration of by-products	§ By-products such as metals may be mobilized under the reducing conditions created by the ISPT	§ Excessive increase in by-product concentrations in the downgradient ISPT wells and extraction wells	§ May temporarily increase unwanted by-products in groundwater, if not attenuated	§ Monitor for by-products § Determine sorption and re-precipitation characteristics of mobilized by-products
Well damage	§ Physical damage from vehicles, human error, etc.	§ Wells are observed to be damaged	§ Wells are not usable for intended purposes (monitoring, injection, etc.)	§ Repair well § Replace, if irreparable
Well inundation	§ Flooding of the floodplain ISPT area	§ Wells are damaged or inaccessible. § Washout and erosion of covering material, etc.	§ Wells are not usable for intended purposes (monitoring, injection, etc.)	§ Repair well § Replace, if irreparable
Insufficient observation of tracer or reductant effects in monitoring wells	§ Insufficient amount of tracer or reductant during injections § Misinterpretation of flow field	§ No significant increase in tracer or reductant concentrations in the monitoring wells	§ Inadequate data to assess hydrogeology/flow field, interpretation of pilot test data may be limited	§ Future injections at higher tracer or reductant concentrations § Reevaluate flow field § Revise monitoring program to reflect groundwater direction