CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6V-2004-0034A2
WDID NO. 6B360303001

AMENDED WASTE DISCHARGE REQUIREMENTS

FOR

PACIFIC GAS AND ELECTRIC COMPANY
DESERT VIEW DAIRY REVISED OPTIMIZATION PROJECT

San Bernardino County

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

1. Original Project

   The Lahontan Water Board adopted Waste Discharge Requirements (WDRs) (Board Order No. R6V-2004-0034) at a public hearing on July 27, 2004, for the Pacific Gas and Electric Company (PG&E) to operate an interim plume containment and hexavalent chromium treatment project on the Desert View Dairy (DVD) in Hinkley. The WDRs allow the discharge to land of pumped groundwater containing hexavalent chromium for growing grass crops at a land treatment unit (LTU). The soils and vegetation in the eight areas that comprise the LTU convert hexavalent chromium [Cr(VI)] to trivalent chromium [Cr(III)] via a drip irrigation system. The WDRs allowed up to 345 gallons per minute (gpm) annual average pumping from the DVD property.

2. First Amended Project

   On November 28, 2007, the Lahontan Water Board adopted Amended WDRs (Board Order No. R6V-2004-0034A1) to add extracted groundwater from six wells located on PG&E-owned property to the southwest of the DVD (the six wells are referred to as "the non-DVD wells). The additional non-DVD wells are designed to enhance hydraulic control of the northwestern portion of the plume. The total extraction rate from all ten wells after optimization continued to be limited to 345 gpm annual average. With the exception of chromium concentrations, the discharge from this other property consisted of water quality that contained lesser concentrations of other constituents such as nitrate and total dissolved solids (TDS), than water at the DVD. The first amended project is known as the DVD Optimization Project. In addition, an updated Monitoring and Reporting Program (MRP) was adopted for the project.

3. Discharger

PG&E owns and operates the Desert View Dairy Land Treatment Unit (DVD LTU) located in Hinkley, San Bernardino County. The original 2004 project was designed to provide containment of the northern portion of the Hinkley groundwater chromium plume using extraction wells on the DVD. In 2007, the project was amended to add up to six extraction wells on PG&E-owned property located south of the DVD to provide containment of the northwestern portion of the groundwater chromium plume.

PG&E has submitted correspondence to modify the existing Amended WDRs. PG&E proposes to add additional extraction well(s) on the DVD and on property it owns adjacent to the DVD, and increase the discharge to land by 50 percent for the purpose of capturing the migrating chromium plume boundary to the north. The correspondence consists of transmittals dated March 23, April 5, May 3, May 24, and May 26, 2010. An Application Form 200 was received on May 17, 2010. The correspondence and Application represents the necessary information to complete proposed amended WDRs. For the purposes of this Water Board Order (Order), PG&E is referred to as the "Discharger."

4. Facility

Extracted groundwater containing hexavalent chromium is discharged to the LTU on the DVD. The LTU comprises 80 of the 150 acres of the DVD property. The Discharger proposes to install new groundwater extraction well(s) on the northern portion of the property and on adjacent properties owned by PG&E to the north and west. For the purposes of this Order, the DVD LTU and the extraction wells located off-site of the DVD are referred to as the "Facility." The discharge area at the Facility is an active Class II Land Treatment Unit.

5. Facility Location

The Facility is located east of the community of Hinkley in San Bernardino County in the Harper Valley Subarea of the Mojave Hydrologic Unit on County Assessor Parcel Numbers 0494-211-01, 0494-211-02, 0494-221-12, 0494-221-13, 0494-221-14, 0494-041-22, and 0495-041-25, as shown on Attachment A, which is made a part of this Order.

6. Enforcement History

On August 6, 2008, the Executive Officer issued Cleanup and Abatement Order (CAO) No. R6V-2008-0002 directing PG&E to contain chromium plume migration, continue full-scale operation of in-situ remediation projects, submit semi-annual site-wide groundwater monitoring reports, and submit a feasibility study proposing a final cleanup strategy. An amended CAO was issued on November 28, 2008 that adopted average and maximum background levels for hexavalent and total

chromium in groundwater in the Hinkley Valley. Another amended CAO was issued in July 2009 that adopted a revised chromium plume boundary line to allow remediation at the South-Central Re-injection Area Project.

The amended project has been proposed for the purpose of returning the site to compliance with order No. 3 in CAO R6V-2008-0002 for achieving containment of the chromium plume in groundwater near the northern DVD boundary.

7. DVD Monitoring Reports

In accordance with MRP No. R6V-2004-0034A1, the Discharger submits quarterly monitoring reports describing discharges to the DVD LTU. During 2008 and 2009, monitoring reports demonstrate three deficiencies in the project. First, LTU field W1 located on the western property boundary is outside the capture zone of extraction wells to contain migration of potential LTU discharges to groundwater. Second, lysimeters installed in the LTU have become less effective with time. According to the First Quarter 2010 Report, 88 percent of the 5-foot lysimeters and only 38 percent of the 20-foot lysimeters are operational. Lastly, there exists an inadequate number of monitoring wells in the northwestern portion of the Facility to effectively monitor potential affects to groundwater downgradient of the LTU.

8. Reason for Action

The Water Board is amending WDRs to add extraction wells on the DVD and adjacent properties to the north and east and increase the discharge to land by 50 percent for the purpose of capturing the migrating chromium plume boundary to the north and treating the extracted groundwater. The Discharger conducted field-scale pilot testing at the Facility starting in April 2009, under WDRs set forth in Board Order No. R6V-2004-0034A1. The pilot test results are documented in the March 23, 2010 *Action Plan for Monitoring Well MW-62A Area (Action Plan), PG&E's Response to Comments* dated April 5, 2010, and the May 3, 2010 *Application Rate for the DVD LTU.* The Action Plan and subsequent documents state that the pilot study results support the conclusion that a 50 percent increase in the drip irrigation application rate above the 345 gpm annual average will not cause exceedance of numerical limits for chromium or salts established in the Board Order No. R6V-2004-0034. In addition, the Discharger has submitted estimated drawdown maps showing the "worst-case" scenarios for extent of groundwater drawdown to the east and north of the DVD (Attachments B and C). The predicted changes in water level are not anticipated to result in adverse impacts to private supply wells. The current project is referred to as the "Desert View Dairy Revised Optimization Project."

9. Groundwater Quality

The groundwater in the upper aquifer below the Facility contains constituents from past dairy and agricultural activities on the DVD and in the vicinity, chromium from the PG&E compressor station plume, and naturally occurring constituents. Data

from monitoring wells on the DVD property show that nitrate, chloride, sulfate, and TDS increase in concentrations from the upgradient groundwater flow direction (in the south) to the downgradient flow direction (in the north). Samples collected from wells DW-02 and EX-13 in 2008 show the highest concentrations for these constituents: 420 milligrams per liter (mg/L) nitrate as NO_3, 1,200 mg/L chloride, 1,600 mg/L sulfate, and 4,800 mg/L TDS. This information indicates that the DVD property is a source of pollution to groundwater quality.

The three most significant constituents in groundwater are chromium, nitrate, and TDS. During baseline sampling prior to initial 2004 discharge to the LTU, total chromium [Cr(T)] concentrations were estimated to range from 1 microgram per liter (µg/L) to 295 µg/L and hexavalent chromium concentrations ranged from 83.6 µg/L to 325 µg/L. Nitrate as NO_3 concentrations ranged from less than 0.1 mg/L to a maximum of 280 mg/L. TDS ranged from 997 mg/L to a maximum of 3,884 mg/L. Board Order R6V-2004-0034 contains water quality limits for groundwater of 1,400 mg/L TDS and 9.5 mg/L nitrate as N. The water quality limit for TDS allowed for an increase of 400 mg/L over the estimated site average of 1,000 mg/L due to discharges to the DVD LTU and salt tolerance of crops expected to be grown in the area.

After the initial Order was adopted and prior to full-scale discharge to the DVD LTU in March 2005, background TDS and nitrate concentrations in groundwater were measured to be higher than previously estimated. February 2005 groundwater monitoring data showed an average TDS concentration of 1,312 mg/L and nitrate as N concentration of 9.9 mg/L. These concentrations are more reflective of water quality conditions prior to LTU full-scale start up and therefore justify adjusting water quality limits.

The primary Maximum Contaminant Level (MCL) for total chromium is 50 µg/L. The MCL for nitrate as NO_3 is 45 µg/L, or for nitrate as nitrogen is 10 µg/L. Concentrations detected in groundwater exceed the secondary MCL for chloride and sulfate at 500 mg/L each, and for TDS at 500 mg/L recommended, 1,000 mg/L upper, and 1,500 mg/L short term. Guidance on water quality for agriculture indicate sensitive crops may be adversely affected at TDS levels above 450 mg/L and chloride levels above approximately 100 mg/L. Therefore, groundwater in the upper aquifer at the Facility does not presently support the beneficial use of a municipal and domestic supply. Groundwater also does not fully support the beneficial use of agricultural supply, though the groundwater beneath the Facility is suitable for moderately salt and chloride tolerable crops. There is no standard for hexavalent chromium.

10. Anticipated Discharge Water Quality

The Discharger submitted information in various correspondences regarding the anticipated quality of discharge water to the LTU. With the exception of chromium, extracted water from the proposed extraction wells contains constituents at higher

concentrations than does extracted water from extraction wells located at the LTU. Despite these higher concentrations, it is anticipated that nitrate will significantly decrease in concentration with time, and chloride and sulfate will decrease somewhat with time, due to uptake by vegetation at the LTU. Only TDS has the potential to adversely degrade water quality above values previously identified at the LTU.

In First Quarter 2010, the average TDS concentration in water applied to the LTU was 1,320 mg/L. The anticipated combined TDS concentration in water from the current and new extraction wells is expected to range from 1,800 mg/L to 2,200 mg/L. As nitrate concentrations are reduced in time from plant uptake, and because nitrate is a component of TDS, TDS values may also decline. By extrapolating TDS concentrations from 20-foot lysimeters since the project start in 2004, it is expected that TDS concentrations from new extraction wells will not exceed the 20,000 mg/L trigger level set in Board Order No. R6V-2004-0034. Furthermore, the proposed project is not expected to exceed the adjusted TDS water quality limit of 1,712 mg/L in groundwater beneath the LTU at project completion.

11. California Environmental Quality Act

The Lahontan Water Board is the lead agency for this project under the California Environmental Quality Act (Public Resources Code section 21000 et seq.). In public meetings on July 24, 2004 and November 28, 2007, the Lahontan Water Board adopted Resolution Nos. R6V-2004-0033 and R6V-2007-0033, respectively, certifying environmental documents stating that the effects on the environment from the initial and amended Project are not significant as mitigated. Mitigated Negative Declarations and Mitigation Monitoring and Reporting Plans were adopted to satisfy CEQA.

Under California Code of Regulations, title 14, section 15162 (Subsequent EIR and Negative Declarations), a lead agency shall prepare a subsequent EIR or negative declaration if substantial changes are proposed in the project that will require major revisions of the previous environmental document due to the involvement of new significant environmental effects. As described in the *Addendum to the Negative Declarations for Pacific Gas and Electric Company's Desert View Dairy Land Treatment Unit*, the project and Amended WDRs result in less than significant environmental effects. Therefore, the Water Board finds that none of the conditions described in California Code of Regulations, title 14, section 15162 are met.

Under California Code of Regulations, title 14, section 15164 (Addendum to an EIR or Negative Declaration), a lead agency is required to prepare an addendum to the previous environmental document if minor changes are proposed in the project that do not require a subsequent EIR or negative declaration. As stated above, the Water Board prepared the *Addendum to the Negative Declarations for Pacific Gas and Electric Company's Desert View Dairy Land Treatment Unit* and finds the

Addendum is appropriate to address the potential environmental impacts resulting from the project and the Amended WDRs.

12. Public Notification

The Lahontan Water Board has notified the Discharger and all known interested agencies and parties of its intent to adopt amended WDRs for the project. The Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that Findings, Requirements and Prohibitions, of Board Order No. R6V-2004-0034 and R6V-2004-0034A1, be revised, amended, or inserted as follows:

[Revise as follows]

I. DISCHARGE SPECIFICATIONS

[Replace Discharge Limitations, A.1., A.2. and B (third paragraph) with the following:]

A. Discharge Limitations

1. The Discharge to the DVD LTU will be limited to the extracted groundwater from existing and new extraction wells located on the DVD, existing non-DVD extraction wells EX-05, EX-07, EX-15, EX-16, EX-17 and EX-20, located south of the DVD property, and new extraction wells located on parcel 0494-211-02, east of the DVD, and on parcel 0494-041-25, north of the DVD.

2. The maximum volume of discharge to the LTU must not exceed 520 gallons per minute (gpm) or 0.745 million gallons per day (MGD) on an annual average daily volume basis.

B. Receiving Water Limitation

The ground water quality, as a result of the discharge, shall not exceed the following:

1. TDS of 1,713 mg/L and
2. Nitrate (as N) of 9.9 mg/L.

These limits are based on an average of all monitoring samples beneath and downgradient of the LTU analyzed in a 12-month period.

[Revise as follows]

II. PROVISIONS

[Replace Provision B with the following:]

B. Monitoring and Reporting

Pursuant to Water Code section 13267 subdivision (b), the Discharger must comply with Monitoring and Reporting Program No. R6V-2004-0034A2 as specified by the Executive Officer.

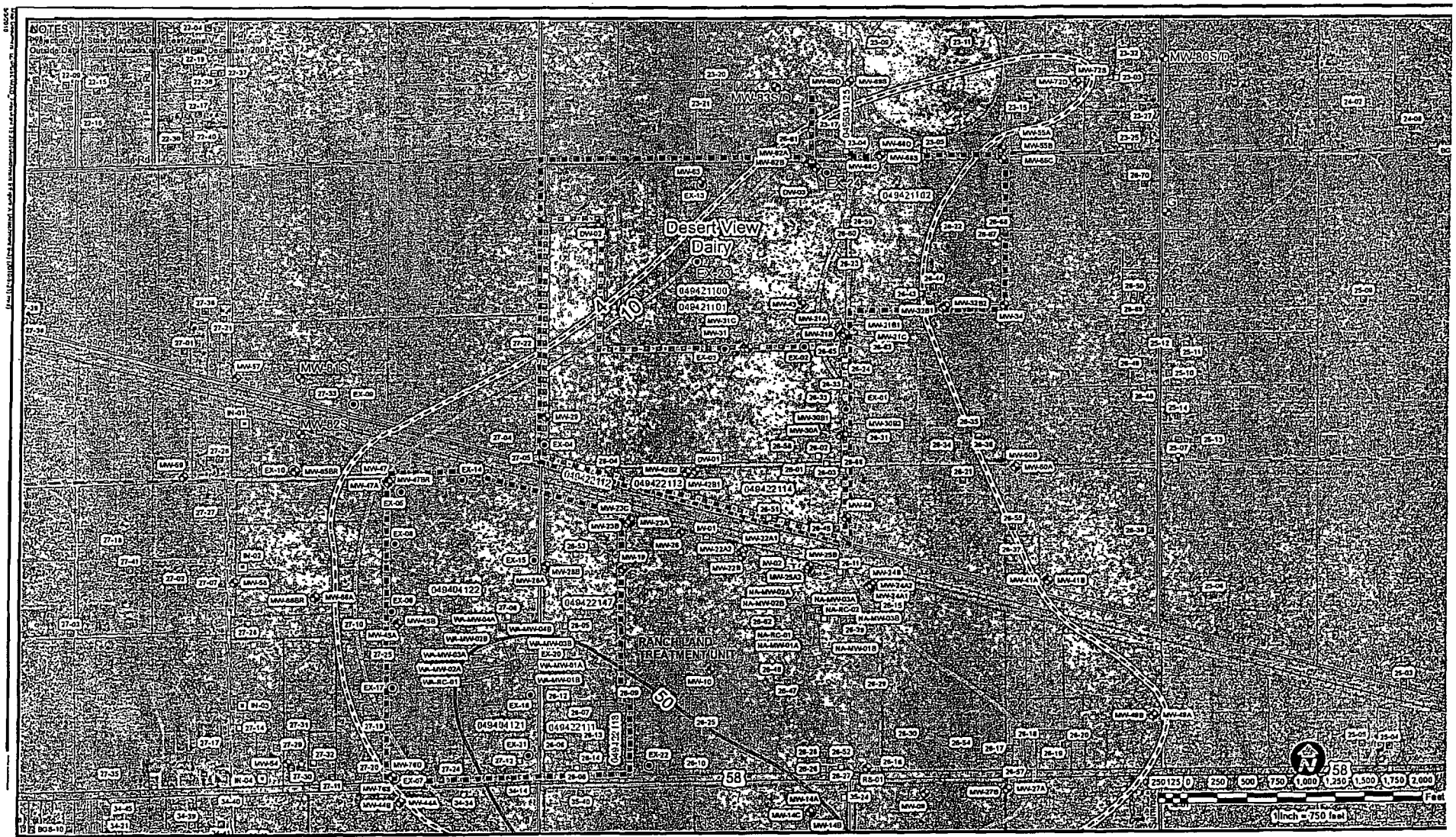
I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on July 14, 2010.

Harold J. Singer

HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments: A. Location Map
B. Map of Estimated Well Drawdown to the east
C. Map of Estimated Well Drawdown to the north

ATTACHMENT A



Wells by Well Type

- Monitoring Wells
- Extraction Wells
- Other Wells
- Other Wells (Destroyed)
- Conceptual Nested Well
- Conceptual Extraction Well
- PGE Property Boundaries
- Project Area for Groundwater Pumping
- WDR Permitted Area for DVD LTU Sub-Surface Drip Irrigation

Concentration of Hexavalent Chromium (ug/l)
February 2010

- 50 ug/l
- 10 ug/l
- 4 ug/l

Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-8300 FAX: (925) 299-8302

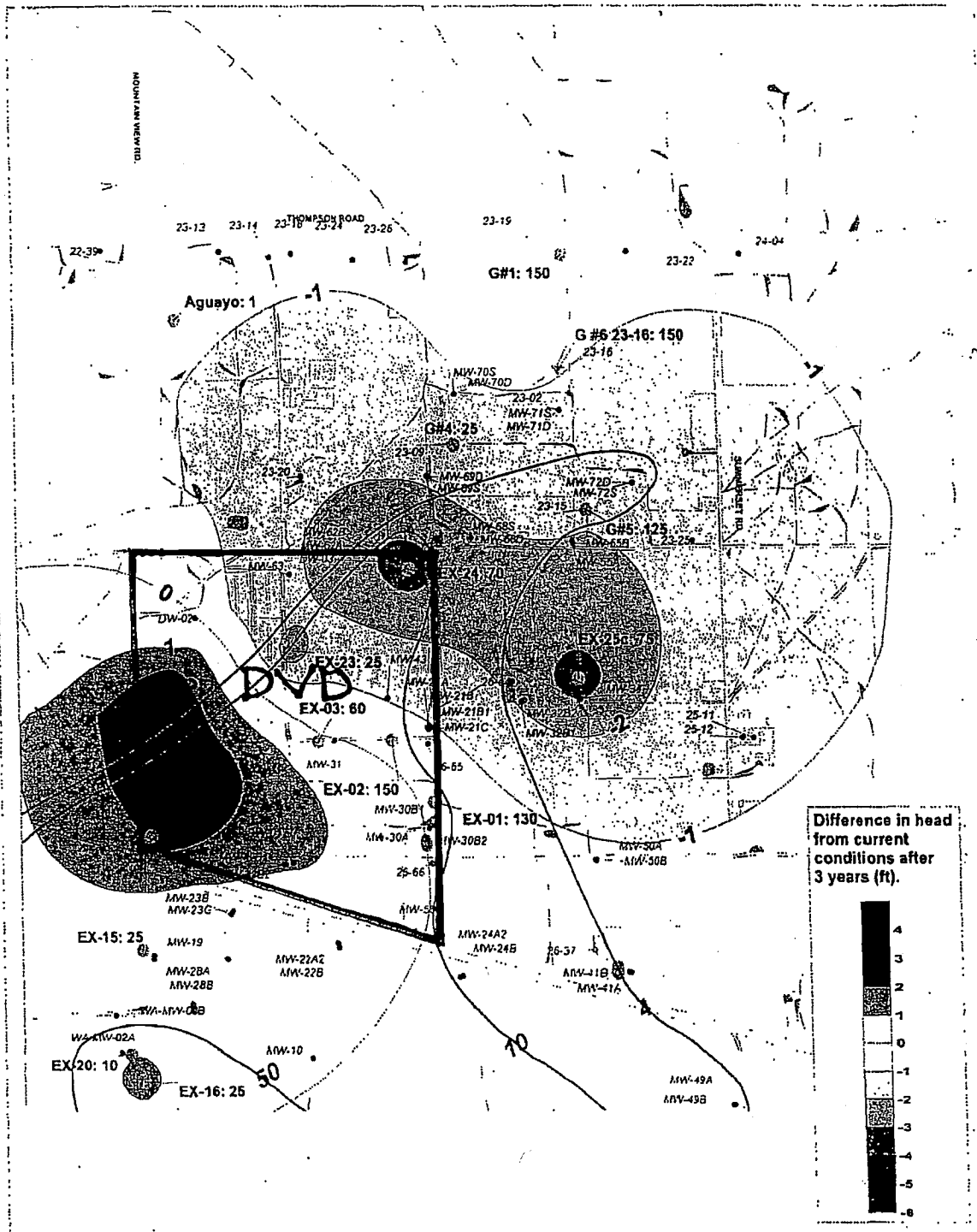
FOR: Pacific Gas & Electric Groundwater Remediation Project Hinkley, California

ATTACHMENT B
ACTION PLAN PROJECT AREA

FIGURE:

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702221	TF	CM	DRAFT	05/21/1

ATTACHMENT B



LEGEND

- EX-15: 20 — Extraction Well Location and Yearly Average Rate (gpm).
- G#6: 150 — Lower Aquifer Well and Yearly Average Rate (gpm).
- IN-2: -20 — Injection Well Location and Yearly Average Rate (gpm).
- MW-10 — Monitoring Well or Domestic Well
- Feb. 2010 Cr(VI) Plume 4, 10 & 50 ppb contours

Notes:
Negative values indicate additional drawdown compared to projected current operational conditions after 3 years operation.
Positive values indicate increases in water level

Scenario S66m Drawdown
Calculated as difference from simulated current conditons (SmBase) at year 3, shown with S66m wells.

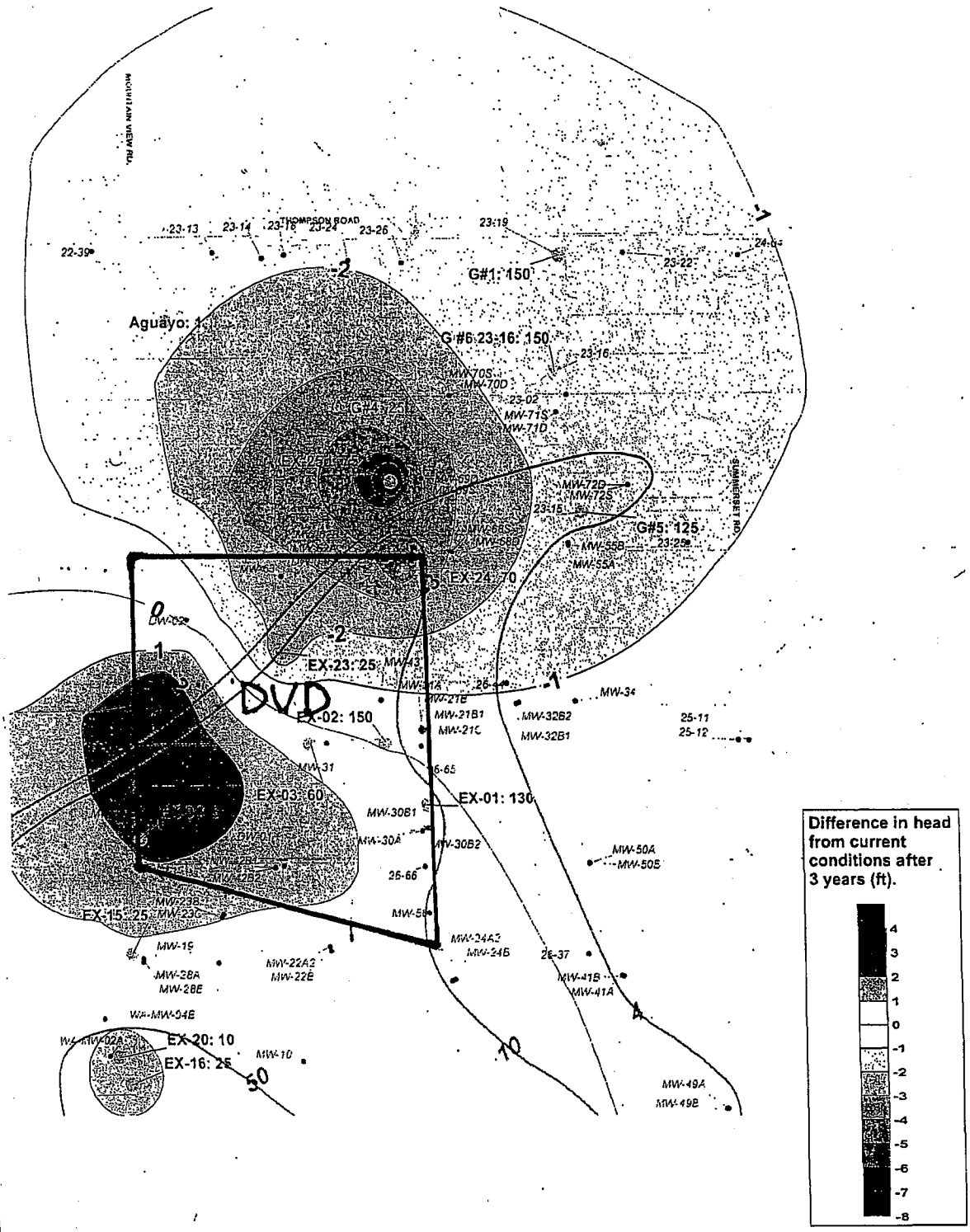
Water Budget Details.
Extraction from 3 new wells (EX-23, EX-24, EX-25c) applied to DVD LTU.
DVD LTU: 520 gpm
Full Gorman farming: 300 gpm from G#1, G#4 and G#5.
SCRIA pumping dosed and reinjected: 110 GPM.
80 gpm western injection (IN-2, IN-3, IN-4) supplied by PGE-14.
Desert View Dairy supply from G#6

0 ft 500 ft 1000 ft

PG&E COMPRESSOR STATION, HINKLEY, CA
May 4, 2010

CH2MHILL

ATTACHMENT C



LEGEND

- EX-15: 20 — Extraction Well Location and Yearly Average Rate (gpm).
- G#6: 150 — Lower Aquifer Well and Yearly Average Rate (gpm).
- IN-2: -20 — Injection Well Location and Yearly Average Rate (gpm)
- MW-10 — Monitoring Well or Domestic Well
- Feb. 2010 Cr(VI) Plume 4, 10 & 50 ppb contours

Notes:
Negative values indicate additional drawdown compared to projected current operational conditions after 3 years operation.
Positive values indicate increases in water level.

0 ft 500 ft 1000 ft

Scenario S67m Drawdown
Calculated as difference from simulated current conditons (SmBase) at year 3, shown with S67m wells.

Water Budget Details:
Extraction from 3 new wells (EX-23, EX-24, EX-25d) applied to DVD LTU
DVD LTU 520 gpm
Full Gorman farming: 300 gpm from G#1, G#4 and G#5
SCRIA pumping dosed and reinjected 110 GPM,
80 gpm western injection (IN-2, IN-3, IN-4) supplied b
Desert View Dairy supply from G#6.

PG&E COMPRESSOR STATION, HINKLEY, CA
May 26, 2010
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