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March 3, 2004

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Subject: Interim Measures Workplan Number 2
PG&E Topock Compressor Station, Needles, California

Dear Mr. Yue:

Enclosed is the Interim Measures Workplan Number 2 (Workplan) for the Topock project, which has been revised to reflect the final comments of the U. S. Department of the Interior/Bureau of Land Management (BLM) received this morning.

Copies of this revised Workplan will be delivered by overnight Federal Express to BLM for their use in preparing and approving the Action Memorandum.

If you have any questions, please do not hesitate to call me.

Sincerely,

Robert C. Doss

Enclosure:
Final Interim Measures Workplan No. 2

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Final Interim Measures Workplan No. 2 Topock Compressor Station Needles, California

Prepared for

Department of Toxic Substances Control

On behalf of

Pacific Gas and Electric Company

March 2, 2004

CH2MHILL

This document was prepared by CH2M HILL under the supervision of:

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March 2004

I certify that the information contained in or accompanying this submittal is true, accurate, and complete. As to those portions of this submittal for which I cannot personally verify the accuracy, I certify that this submittal and all attachments were prepared at my direction accordance with procedures designed to assure that qualified personnel properly gathered and evaluated the information submitted. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations

Robert C. Doss

Robert C. Doss, P. E.
Principal, Site Remediation
Pacific Gas & Electric Company
March 2, 2004

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Acronyms and Abbreviations

BLM	Bureau of Land Management
CACA	Corrective Action Consent Agreement
CMS	Corrective Measures Study
CCR	California Code of Regulations
CRBRWQCB	Colorado River Basin Regional Water Quality Control Board
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
CWG	Consultative Workgroup
DTSC	Department of Toxic Substances Control
gpm	gallons per minute
IDW	investigation-derived waste
IM	Interim measures
IMWP	Interim Measures Work Plan
mg/L	milligrams per liter
MWD	Metropolitan Water District
O&M	operations and maintenance
PG&E	Pacific Gas and Electric Company
RFI	RCRA Facility Investigation
ROW	right-of-way
STLC	Soluble threshold limit concentration
TDS	total dissolved solids
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is addressing chromium in groundwater at the Topock Compressor Station under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). In a letter dated February 9, 2004, DTSC directed PG&E to prepare immediately an Interim Measures Workplan Number (No.) 2 to address pumping, transport, and disposal of groundwater from existing monitoring wells at the MW-20 cluster. The DTSC determined that immediate action is required to prevent and/or mitigate potential impacts to the Colorado River pursuant to the Section IV.A. of the Corrective Action Consent Agreement (CACA) between DTSC and PG&E.

By Action Memorandum, Dated March 3, 2004, the Arizona State Director, United States Bureau of Land Management (BLM), has authorized PG&E to conduct a time-critical removal action encompassing this groundwater extraction and other specified activities on BLM-managed property pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

This Interim Measures Workplan (IMWP) No. 2 describes the components to implement the specific actions prescribed by the DTSC in the February 9, 2004 letter to PG&E, and authorized by the BLM Action Memorandum. Pumping of the MW-20 cluster is considered the first phase of interim remedial measures. Additional groundwater extraction, as defined in the IMWP No. 1 (submitted to the DTSC on February 11, 2004 [CH2M HILL, 2004]) will be initiated, subject to BLM review and authorization, if pumping from the MW-20 cluster does not meet the objectives of the interim measures.

This IMWP follows the guidelines provided in Chapter 4 of the DTSC Corrective Action Orientation Manual (DTSC, 1994). The IMWP includes the following main components: 1) project background and objectives of the IM; 2) the conceptual site model; 3) a description and rationale for the proposed IM; 4) project management and schedule; and 5) a description of required related activities, including additional data collection, waste management, required authorizations, and monitoring. An evaluation of IM alternatives is not included due to the specific nature of DTSC's directive. A complete evaluation of remedial alternatives will be performed as part of the Corrective Measures Study.

Assisting DTSC and PG&E with the planning and review of interim remedial measures are the members of the Topock Consultative Workgroup (CWG), constituted under California's Site Designation Process, and consisting of representatives of DTSC, the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB), Metropolitan Water District of Southern California (MWD) and the various federal agencies who own or manage land overlying the chromium plume. If required, further details necessary to implement IM activities will be submitted following review of this document by the CWG and DTSC and upon IMWP approval by the DTSC.

1.1 Project Background

The Topock Compressor Station is located in San Bernardino County, approximately 15 miles to the southeast of Needles, California (Figure 1-1). In February 1996, PG&E and DTSC entered into a CACA pursuant to Section 25187 of the California Health and Safety Code. Under the terms of the CACA, PG&E was directed to conduct a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and to implement corrective measures to address constituents of concern released in the Bat Cave Wash Area near the PG&E Topock Compressor Station. The primary constituents of concern at Topock are hexavalent chromium [Cr(VI)] and total chromium [Cr(T)]. The source was Cr(VI) salts used historically as a corrosion inhibitor in the station's cooling towers. DTSC is the lead administering agency for the project.

PG&E is currently proceeding with the corrective measures process to select and implement a long-term remedy for the site. PG&E submitted the Corrective Measures Study (CMS) Workplan in December 2002, pursuant to the RCRA corrective action process and in accordance with the DTSC CACA. The DTSC approved the CMS Workplan in June 2003.

Beginning in August 2003, DTSC and PG&E began working in a collaborative process with affected and interested agencies through a CWG. CWG members include:

- CRBRWQCB
- United States Fish and Wildlife Service (USFWS)
- BLM
- United States Bureau of Reclamation
- MWD
- United States Geological Survey (USGS).

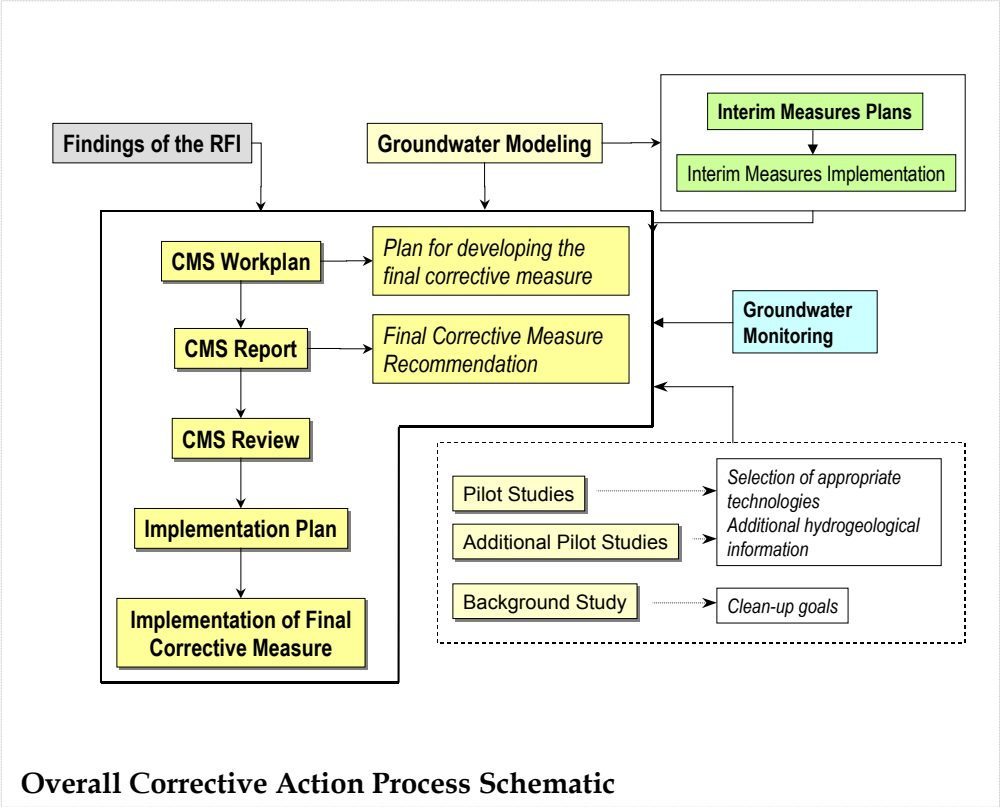
At the direction of DTSC and in accordance with recommendation of the CRBRWQCB, PG&E agreed in August 2003 to conduct a pilot study of groundwater extraction and treatment. The primary purpose of the pilot study is to initiate hydraulic control of the chromium plume. The secondary objectives of the pilot study are to gather information on the hydrogeologic properties of the shallow aquifer and to test the treatment system effectiveness (CH2M HILL, 2003). Startup of the pilot system is estimated to take place in early July 2004. In advance of startup of the pilot system and in compliance with the DTSC directive of February 9, 2004, PG&E will commence pumping, transport and disposal of groundwater from existing wells at the MW-20 cluster no later than February 27 2004, subject to approval of the BLM.

1.2 Overall Approach to Site Remediation

This IM is part of the overall corrective measures process for the site. It is a step in establishing a long-term approach for site remediation. The IMs and the results of the pilot study will be integrated into the long-term corrective measure for the site. A schematic of the corrective measures process is shown below.

The groundwater extraction/treatment pilot study is currently in the design phase, with permitting and procurement phases underway. Implementation of the pilot study on PG&E

property will be conducted concurrently with implementation of the IMs No. 1 and No. 2 on lands adjacent to the Colorado River. Components of these projects will occur in parallel, followed by the implementation of supplemental field studies. The results of the pilot study, the IMs, and supplemental field studies will be incorporated in the evaluation of the final remedy and in the preparation of the CMS report.



Overall Corrective Action Process Schematic

1.2.1 Interim Measures Objective and Target Zone

To ensure success of the IM, a clear objective is needed to guide implementation activities and to evaluate the performance of the IM. In defining the IM objective, it is critical to define the target area or zone that will be addressed during the implementation of the IM. This target zone will be used to monitor the effectiveness of the performance of the IM.

DTSC has determined that the objective of the IM is defined as follows:

> ***Initiate hydraulic control of the plume boundaries near the Colorado River to achieve a net reversal of gradient away from the Colorado River***

Hydraulic control will be initiated by pumping groundwater near the eastern edge of the plume to mitigate potential impacts to the Colorado River. If pumping from the MW-20 cluster does not achieve the objective of the IM, additional extraction wells will be sited, installed, tested, and pumped as a part of IM No. 1, subject to review and approval of BLM for those wells located on BLM-managed land. The process of implementing the interim

measures is designed to be iterative. This iterative process of bringing additional extraction wells online will continue until groundwater extraction is sufficient to hydraulically control the plume boundaries near the Colorado River. The target zone of capture for the IM has been identified based on the December 2003 groundwater-monitoring results. Figure 1-2 shows the Cr(VI) results from the December 2003 sampling event, the estimated extent of the plume, and the target zone of capture for the IM.

2.0 Conceptual Site Model

A conceptual site model has been developed to understand the flow patterns of the chromium plume. The model is a work in progress that is refined and updated as new information becomes available from the ongoing and future investigations. This section briefly describes the geological, hydrogeological, and geochemical conditions at the site based on the conceptual site model. The focus of this section is on the floodplain study area between Interstate 40 and the Colorado River, corresponding to the target zone of capture for the IM (Figure 1-2).

2.1 Geology and Hydrogeology

The site is characterized by arid conditions (with precipitation averaging less than 5 inches/year) and high temperatures. Vegetation is very sparse except in the river floodplain where dense stands of tamarisk and occasional mesquite trees occur. The local near-surface geology consists of recent and older river deposits in the flood plain area progressing westward to older alluvial deposits derived from the local mountains. The alluvial deposits and fluvial deposits in the flood plain comprise the principal groundwater aquifer at the site. The main surface water drainage into the Colorado River is from Bat Cave Wash, an ephemeral streambed that flows only briefly following rain events. The Bat Cave Wash drainage originates in the Chemehuevi Mountains west of the site and extends to the Colorado River. This north-tending wash received the original discharges of cooling water-containing chromium, as described below. Topography near the site is abrupt, rising from around 450 ft above mean sea level at the Colorado River to over 1,200 feet above mean sea level within a mile to the south and southwest.

Hydrogeologic cross-sections have been prepared for the locations shown on Figure 2-1. Figure 2-2 shows a north-south hydrogeologic cross-section parallel to the Colorado River and Figure 2-3 shows a southwest–northeast hydrogeologic cross-section perpendicular to the River.

Groundwater occurs primarily in unconsolidated alluvial sediments that underlie the study area north of the mountains. The saturated unconsolidated sediments are referred to as the Alluvial Aquifer. The main water-bearing zone of the subsurface is within sands and gravels associated with river and alluvial deposition.

Recent unconsolidated fluvial sediments consisting primarily of sand, silt, and clay occur along the floodplain area of the Colorado River. These sediments include Colorado River dredge materials blanketing the floodplain. The fluvial sediments are mostly saturated and are hydraulically connected to the Alluvial Aquifer.

The unconsolidated alluvial sediments cover the majority of the study area and consist of poorly-sorted sand and gravel with minor silt and clay deposits. The aquifer is highly heterogeneous, as is typical of most alluvial aquifers. The saturated thickness of the Alluvial Aquifer is approximately 100 feet near the River and thins to the west, pinching out along

the bedrock outcrops west and south. Sediments comprising the Alluvial Aquifer are very porous and permeable, with hydraulic conductivity ranging from 1.0×10^{-4} centimeters per second (cm/sec) to 1.0×10^{-2} cm/sec (0.3 to 30 feet per day).

On the basis of screen elevations from these well clusters, the alluvium may be divided into upper, middle, and lower subzones. The majority of site wells are in the upper alluvium subzone. These subzones do not represent distinct lithostratographic units, but rather provide a framework for understanding the three-dimensional aspects of the groundwater flow system and contaminant distributions at the site.

Underlying the alluvium at the Topock site is the Red Fanglomerate, a Miocene deposit of cemented sandy gravel (Ecology and Environment, 2003). The fanglomerate has been identified in several site wells, though the depth of the alluvium-fanglomerate contact varies. The Bouse Formation has been mapped nearby, and where present, it lies between the fanglomerate and the alluvium. It has not been positively identified in the boring logs of site wells, though distinction from the alluvium may not be apparent. The Bouse Formation was deposited in brackish or salt water and where present, may be a source of salts in site groundwater (see Section 2.2).

The basement bedrock of the area is composed of metadiorite and gneiss evident in the surrounding mountains. In both the fanglomerate and bedrock, groundwater occurs in secondary fractures. Local wells in these zones (PGE-7, PGE-8, MW-23, and MW-24BR) yield very little to moderate volumes of water.

Groundwater is encountered as little as 4 feet below ground surface in shallow wells in the current floodplain to over 200 feet at MW-16 in the western portion of the site. Horizontal groundwater gradients are slight, from 10^{-4} to 10^{-3}. The gradients suggest a north-northeast flow direction, and the distribution of chromium in groundwater samples supports these flow directions. Water levels in well clusters at MW-20, -24, -32, -33, and -34 all display upward gradients on the order of 10^{-2}, about 10 to 20 times the magnitude of the horizontal gradients. This is consistent with the typical conceptual model of regional groundwater flow systems in arid basins, where groundwater recharge occurs primarily at the margins of the basin and groundwater discharges to streams or springs near the center of the basins.

Interaction of groundwater with the Colorado River is complex. The daily fluctuations in river stage cause the surface water-groundwater interaction at this site to be very dynamic. Pressure transducers have been installed in newer wells close to the River to monitor more closely the changes in water levels and to define better the surface water-groundwater interaction.

2.2 Groundwater Geochemistry

Groundwater in the Needles-Topock vicinity has high total dissolved solids (TDS) concentrations. TDS concentrations in local groundwater can be over 40,000 milligrams per liter (mg/L). Samples collected from most of the monitoring wells have TDS in the range of 1,000 to 3,000 mg/L. However, groundwater sampled in bedrock/fanglomerate wells and deep alluvium wells displays higher values (8,000 to 12,000 mg/L). In contrast, water from the Colorado River has TDS concentrations ranging from 400 to 800 mg/L.

Sources of salts are connate water in bedrock, remnants of the Bouse Formation where it still exists, evaporite salts associated with recent fluvial sands, dredge spoils, salts exuded by tamarisk (*Tamarix* sp.), and potentially by historic PG&E cooling water discharges, reported to be about 6,600 mg/L (PG&E, 1997). As a result, the concentration of TDS in groundwater varies considerably across the site.

Results of groundwater sampling show major ions are dominated by sodium and chloride, with sulfate also significant in some wells (up to 1,300 mg/L). Indications of reduction-oxidation (redox) conditions reflect oxidizing conditions in which Cr(VI) is stable in the Alluvial Aquifer: dissolved oxygen concentrations range from 3.0 to 7.2 mg/L, nitrate is stable up to 77 mg/L and field oxidation reduction potential measurements up to 170 millivolts (indicative of oxidizing conditions). More reducing conditions are observed in monitoring wells in the floodplain. Under reducing conditions, Cr(VI) may convert to the relatively immobile trivalent Cr(III) state. It is important to note that the oxidation or reduction of chromium in water typically is dominated by the solid-phase aquifer material and soil structure, and not by the water itself. The hydrochemical nature of the groundwater and geochemical conditions of the site will be verified following further data collection during IM implementation and the pilot study.

2.3 Nature and Extent of Chromium in Groundwater

Routine sitewide monitoring of the Topock site began in 1997. Currently, there are approximately 35 wells from which groundwater samples are collected and analyzed for the constituents of concern. Monitoring wells have been installed near and along Bat Cave Wash and to the east of the wash to characterize the Cr(VI) distribution in groundwater. The most recent installations included five wells located parallel to, and within, the Colorado River floodplain to better define the leading edge and vertical extent of the chromium plume.

The majority of the monitoring wells are screened in the uppermost portion of the unconsolidated alluvium. In addition, seven nearby surface-water monitoring stations are located along the Colorado River and its tributaries. Figure 2-4 shows the locations of the wells and river stations. In accordance with the CACA, constituents of concern on the site are: Cr(T), Cr(VI), nickel, copper, zinc, pH, and electrical conductivity (DTSC, 1996). Groundwater and surface water are routinely monitored for these constituents. In addition, groundwater and surface water are sampled periodically for general chemistry parameters including iron, lead, manganese, and TDS.

Given the historic chromium disposal location near MW-10, the current distribution of Cr(VI) in groundwater at concentrations greater than the State of California maximum contaminant level for drinking water for Cr(T) of 0.05 mg/L is consistent with flow patterns suggested by groundwater elevation contours. Figure 2-4 illustrates this distribution with analytical results from the December 2003 sampling round (wells with orange symbols indicate concentrations greater than 0.05 mg/L Cr(VI)).

The reporting limit for analysis of Cr(VI) in groundwater used in the RFI and prior monitoring was 0.010 mg/L as specified in the approved RFI workplan (PG&E, 1997). Beginning in September 2003, as directed by the DTSC, a reporting limit of 0.002 mg/L is

being used for Cr(VI) analyses for all surface-water samples and groundwater samples collected from wells that historically have not reported detectable Cr(VI) concentrations above the reporting limit of 0.010 mg/L.

As described in the previous section, analytical results from site investigations and groundwater monitoring show that most of the chromium found in groundwater is in the hexavalent form. The highest concentrations of chromium in the groundwater are in the area of the MW-20 well cluster (Figure 2-4). Vertical profiles of Cr(VI) concentrations show variations at the MW-20 and MW-30 cluster. As seen from the cross-section in Figure 2-3, the highest concentration of Cr(VI) occurs in the upper aquifer subzone (at the water table).

3.0 Description of Interim Measure

This section presents the tasks and activities necessary to achieve the objective of this IM. The primary IM tasks include:

- Site preparation.
- Groundwater extraction from monitoring wells MW-20-70, MW-20-100 and MW-20-130.
- Onsite management of extracted groundwater.
- Transport and disposal of the extracted groundwater.

Figure 3-1 shows the location of the MW-20 bench where the IM will be staged. **Figure 3-2** schematically shows the components of the interim measure. A description of each component follows below.

3.1 Planning and Site Preparation

Planning and site preparation activities include the following:

- Obtain authorization from BLM to implement this IM on BLM-managed property as a time-critical removal action pursuant to Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).
- Inspect site to evaluate equipment placement and inspect transportation routes including the Red Rock Bridge.

The following activities will be conducted upon review and approval by BLM:

- Perform minor regrading to level ground as required for staging on-site holding tanks and to provide smooth ingress and egress for tanker trucks.
- Install new well pumps (if necessary), piping and appurtenances, and instrumentation.
- Site and install water holding facilities, secondary containment, power supply (portable diesel-generator equipped with an auxiliary fuel tank), and auxiliary lighting (if required).
- Install fencing to provide site security.

3.2 Groundwater Extraction

In compliance with the DTSC directive, existing monitoring wells MW-20-70, MW-20-100 and MW-20-130 will be used for groundwater extraction. Existing submersible pumps will be used if suitable. New pumps will be installed in each well, if necessary. The table below summarizes the anticipated sustainable pumping rates at each well based on previous hydraulic testing at the MW-20 well cluster.

Anticipated Sustainable Pumping Rates at MW-20 Cluster

Well	Well Screen Interval (ft bgs)	Anticipated Sustainable Pumping Rate[a] (gpm)
MW-20-70	50 to 70	2
MW-20-100	89.5 to 99.5	3
MW-20-130	121 to 131	7

NOTES:
ft bgs = feet below ground surface
gpm= gallons per minute
[a] E&E, 2002

Well MW-20-130 will be pumped at the highest sustainable rate (anticipated to be 7-8 gpm) until observed drawdown, if any, in nearby well cluster MW-30 has stabilized. This period is anticipated to take place for two to twelve hours. The pump in well MW-20-130 will then be shut off and the aquifer allowed to recover for a period of at least half of the pumping duration. Next, well MW-20-100 will be pumped using the same criteria for rate and duration as discussed above for well MW-20-130. The recovery duration will be at least half of the pumping period. After MW-20-100 has been tested, pumping and recovery for well MW-20-70 will be conducted using the same criteria. Following the aquifer tests using the wells individually, simultaneous pumping of the three MW-20 wells will be conducted. The combined pumping rate of the three wells will be adjusted to yield the maximum sustainable pumping rate (likely to be 8-12 gpm). Pumping at this rate will continue for at least one week, during which time pumping will be "pulsed" (shutting a well off for a period of 3-4 hours to allow for recovery) to allow a better observation of the hydraulic effects of pumping.

The combined pumping of the three wells will be maintained at that rate at which observed data and model output indicate the IM objectives are achieved (see discussion below). Well TW-2 (fully penetrating) will be located in the optimal location for this purpose as determined from data collected during the initial 5-10 days of pumping and model calculations, subject to BLM approval.

In the event that pumping from the Monitoring Well 20 cluster does not achieve the objectives of the IM, pumping from additional wells on the MW-20 bench or at other locations will be evaluated and implemented as necessary. Any such additional wells that are located on BLM-managed property must be approved by BLM prior to installation or use.

The groundwater model will be used to predict effects of planned pumping scenarios during the IM No. 2 operations at the MW-20 cluster. Groundwater levels in all nearby wells will be monitored during pumping with pressure transducers. Observed levels will be compared with model-predicted levels during the testing period, and alterations will be made to the model as necessary to match more closely the observed data. Other pumping scenarios will be run and the process will be repeated until the model matches observed data to a reasonable degree.

The extraction rates and well combinations will be determined based on observed effects of previous trials. When satisfactory agreement between modeled and observed response is achieved, the model will be used to set optimal pumping rates to achieve the IM objectives. Data will continue to be collected and compared with predicted values as extraction proceeds.

3.3 Onsite Management of Extracted Groundwater

3.3.1 Holding Tanks

Water pumped from the wells will be temporarily stored on site in steel 18,000-gallon holding tanks before transfer to trucks for transport to a permitted waste disposal or treatment facility. The holding tanks will be equipped with secondary containment consisting of lined berms in accordance with requirements in Title 22 of the California Code of Regulations (CCR). Initially, at least three to four tanks will be needed to provide sufficient holding capacity at the site. Pumping operations may require additional holding tanks. Up to eight tanks will be brought online if needed during operations.

3.3.2 Water Conveyance Piping and Appurtenances

Double wall piping or equivalent measures will convey extracted groundwater across any areas outside the secondary containment areas to prevent releases of extracted groundwater at the site. System appurtenances to monitor system operations will include:

- Flow meter/totalizers to measure flow rate and cumulative flow from each extraction well.
- In-line sample ports for each extraction well.
- Sample port (or equivalent location) for sampling combined flow stream.
- Electronic or visual indication of pipe leakage within the containment piping.

Piping and appurtenances will be sized to accommodate the anticipated system flow rates.

3.4 Transportation and Disposal

Groundwater in the holding tanks will be sampled and analyzed for Cr(VI), Cr(T), and other constituents, as yet unspecified, that may be required for waste profiling by the treatment or disposal facility. Groundwater will be disposed at a permitted waste disposal or treatment facility. Depending on pumping rates and truck capacities, as many as six 5,000-gallon trucks per day may be needed to haul water from the site.

During the initial phase of the pumping operations, and as described previously, PG&E will transport the extracted water by truck from the MW-20 cluster wells to an offsite disposal facility. To minimize long-term costs and risks associated with trucking hazardous wastes, PG&E is evaluating treatment of the water prior to trucking. Any proposed treatment of hazardous wastes occurring on BLM land is subject to review and prior approval by BLM and DTSC. The treatment method presently being considered is batch treatment by addition of ferrous chloride or ferrous sulfate to the holding tanks. Chromium would be removed

through precipitation, and would be separated from the water in a clarifier. The treated water could then be managed as non-hazardous waste or possibly reused at the PG&E plant site. Additional infrastructure needed for batch treatment would include a frame and plate clarifier to separate the precipitated chrome slurry from the water and a holding tank of up to 5,000-gallon capacity to contain the slurry. The clarifier and the holding tank would be located on a lined containment area.

The permitted treatment and disposal facility preliminarily selected to receive wastes from the IM processes, including extracted groundwater, is the U. S. Filter Recovery Service site located at 5375 South Boyle Avenue, Los Angeles, California. An alternate treatment and disposal facility is Romic Environmental Technologies located at 6760 West Allison Road, Chandler, Arizona.

A comprehensive Transportation Plan will be developed to route traffic to and from the site. A qualified traffic engineer visited the site on Tuesday, February 17, 2004 to identify any traffic-related issues prior to system start-up. The Transportation Plan will be submitted to DTSC and BLM for their review and approval as an addendum to this IMWP on March 1, 2004. Implementation of the IM will not commence until written approval of the Transportation Plan has been received from both DTSC and BLM.

PG&E will be responsible for complying with all applicable hazardous waste generator requirements, including the obtaining of generator identification numbers, manifesting, transportation, and disposal requirements.

3.5 Site Management

3.5.1 Operators

Site operators will be responsible for daily operation of the system. Each operator will be trained on proper operation of system equipment, field instruments, and monitoring equipment, and will be familiar with the normal operating ranges of system components. The operator will also have the necessary training for hazardous waste operations. The pumping and storage system will be equipped with automatic shutoffs to prevent tank overflow and pipe failures. The automatic shutoffs combined with site inspection will provide operational reliability and safety.

3.5.2 System Operations and Maintenance

System operations and maintenance (O&M) will be completed by the site operators. The site operator will record O&M activities in designated field log books, daily logs, and inspection forms.

Written operational procedures will include information on, or copies of (as applicable), the following:

- Procedures for system start-up, shutdown, and restart.
- The ranges for normal system operating parameters.

- A contact list of individuals to be notified in the event of a system malfunction or emergency.
- Troubleshooting guide.
- Equipment maintenance schedule.
- Spare parts list.
- Health and Safety Plan.
- Environmental Compliance Plan.

The Health and Safety Plan and Environmental Compliance Plan will be submitted to DTSC and BLM for their review and approval as addenda to this IMWP on March 1, 2004. Implementation of the IM will not commence until written approval of the Health and Safety Plan and the Environmental Compliance Plan has been received from both DTSC and BLM.

Scheduled maintenance activities include:

- System readings and measurements.
- System adjustments.
- System power (hour meters, power issues).
- Site conditions.
- Maintenance notes.
- Sample collection (e.g., waste characterization).
- Inspections and record keeping required for hazardous waste management.

Appendix A includes a set of preliminary set inspection forms for the system. These forms will be reviewed and revised to delete unnecessary data collection or to add new data as needed. Unscheduled maintenance and troubleshooting (e.g., pump failure, power failure) actions will be recorded on a troubleshooting and report form.

3.5.3 Site Security

Site security will be provided to safeguard against vandalism and injury. During implementation of this IM, all appropriate security measures will be implemented for the express purpose of providing safety to operators and the public. These measures include:

- Maintaining appropriate staffing during operations until security measures can be installed.
- Maintaining a visitor log to document person(s) accessing the property.
- Installing and maintaining site security fencing of 6-foot tall steel chain-link fabric and post construction which encloses completely all extraction, storage and treatment facilities and appurtenances. Access will be provided by locked truck and personnel gates in the fencing. Access for trucks will be provided 24 hours per day, although every effort will be made to schedule all truck loading and shipments to occur during daylight hours.

- Posting warning signs (*e.g.*, no trespassing, safety hazard signs) at several locations on each leg of the security fence.

The Environmental Compliance Plan, to be submitted as an addendum to this IMWP, will provide details on the language of warning signs, their number and specific placement on the fence, and the types, locations and sizes of gates and locks to be used. The site security measures will be inspected and maintained as necessary during system operation.

3.5.4 Emergency Response

Spill containment equipment (e.g., sorbent materials, shovels, etc.) will be maintained on-site at all times. As a contingency in the event of a leak from the storage tank or equipment (vacuum trucks, pumps, etc.), trained spill response personnel will be on call 24 hours per day. PG&E will retain the services of a spill response contractor who will have the capability to mobilize to the site within 2 hours, if needed. As an added contingency, the Topock Compressor Station is manned 24 hours per day. Emergency response procedures, including the identification of the on-call spill response contractor, will be provided in the Environmental Compliance Plan, submitted as an addendum to this IMWP.

The secondary containment at the tank storage area will be inspected continuously during extraction and at regular intervals thereafter. For any minor leaks, such as dripping from a valve or pump, the water will be contained in a pail and added to the storage tank. In the event of a significant leak (more than a drip), or a spill, within the secondary containment unit, the following steps will be taken: (1) the pumping operations and pump test will be ceased if it is occurring at the time the leak is discovered; (2) if the leak is small, an attempt will be made to stop or temporarily plug the leak if possible; and (3) the emergency response crew will be mobilized to (a) pump out the leaking tank and properly dispose of the liquid at an approved facility, (b) repair or replace the leaking tank, and (c) pump out and properly dispose of the liquid in the secondary containment unit.

Given the design of the storage tank, a major spill is not expected. However, in the event of a catastrophic failure of the storage tank, including breaching of the secondary containment berm, all efforts will be made to prevent the flow of water towards the Colorado River. Any water that was released from the containment area would likely infiltrate into the existing sand dunes immediately below the containment area. Cleanup operations will then be instituted to remediate any contaminated soil, as necessary.

In the event of any release or other event necessitating an emergency response at the tank area, PG&E will notify the BLM Lake Havasu Field Office and the U. S. Bureau of Reclamation Lower Colorado Regional Office.

3.6 Performance Monitoring

Hydraulic data including water levels and hydraulic parameters have been collected at wells across the site and adjacent to the Colorado River. Water levels are measured quarterly at over 50 locations and are measured more frequently at selected locations.

Data will be collected during pumping to understand the aquifer behavior and to gauge the success of the interim measure. The floodplain groundwater zone is complex, with river

elevations fluctuating approximately three feet per day affecting the groundwater levels. Eight locations (seven wells and one river station) currently are equipped with electronic pressure transducers for monitoring water levels.

Additional electronic transducers will be installed so that all of the following stations/wells are equipped with transducers: I-3, MW-10, -19, -20-70, -20-100, -20-130, -24A, -24B, -25, -26, -27, -28, -29, -30-30, -30-50, -31, -32-20, 32-35, -33-40, -33-90, 34-55, and -34-80.

The daily fluctuations in river stage cause the surface water-groundwater interaction at this site to be very dynamic. It is anticipated that assessing the effects of pumping at the MW-20 cluster on floodplain wells will be complicated by the river's influence, requiring that several methods be employed. In addition to evaluating the effect of pumping during constant rate discharge, it is proposed that the pumping well be periodically shut off, allowed to recover for a brief period, and then turned on again. This "pulsing" technique is intended to show a noticeable interference effect on the sinusoidal head pattern of the floodplain wells. In this way, a more clear comparison between floodplain well head data during and without pumping will be possible. The difference may be plotted in the form of a background-corrected groundwater drawdown map. This will provide firm evidence of pumping influence, whereas constant pumping may not.

In the event the background-corrected groundwater drawdown map does not provide sufficient evidence of pumping influence, PG&E will consider, subject to DTSC and BLM approval, constructing a line of wells between the river and the MW-20 cluster to measure pumping effects. Such wells would be perforated at the same altitude and water-level data from these wells would be used to determine if a flow reversal is created during pumping.

A combination of transducer head data and model output will be used to assess the success of the interim pumping measure. Though not the focus of this IMWP, PG&E proposes to collect additional hydraulic and hydrogeologic data to calibrate the groundwater model for long-term performance evaluation. The proposed data collection efforts were presented to DTSC in PG&E's February 11, 2004 submittal (IMWP No. 1).

Measurement of pumping effects will involve monitoring subtle changes in head from river-influenced data. Because of the hydrogeologic complexity, using chemical data as a primary means of assessing IM progress is not recommended. While hydraulic effects in semi-confined zones will be nearly instantaneous, chemical changes can require long periods of time to be discernable from natural variation, even with the most conservative (stable) constituents.

Prior to commencing pumping, cased-hole geophysical logging will be conducted in the MW-20 cluster wells. Logging will consist of induction logging and gamma-ray logging, and will be used to evaluate hydrostratigraphy in the vicinity of the wells.

In addition, baseline sampling will be conducted at the following wells prior to commencement of pumping at the MW-20 cluster: MW-20-70, MW-20-100, MW-20-130, MW-30-30, MW-30-50, MW-34-55, MW-34-80, MW-27, MW-28, MW-31, MW-25, MW-27, MW-26, MW-32-20, MW-32-35. Samples will be analyzed for Cr(T), Cr(VI), general chemistry, selected trace elements (boron, bromide, iodide), and the stable isotopes of oxygen and hydrogen. These results will provide baseline conditions that can be used to

compare against future sampling results. The current groundwater sampling program will continue to be performed throughout the IM period as determined necessary.

If testing results indicate incomplete capture, then additional measures (*e.g.*, install additional wells, modify pumping strategy) will be recommended and initiated following their approval to achieve the objective of the IM. Locations and depths of any additional extraction wells will be determined on the basis of the testing/pumping results at the MW-20 cluster.

3.7 Documentation and Reporting

The following documentation and reporting activities are proposed to effectively communicate the system operation and effectiveness of the IM.

- System operations documentation: Logs and forms will be used to record information on the operational status of the system, including system runtime(s), flow data, sampling/waste characterization data (as available), transportation and disposal information, system troubleshooting, site security, and maintenance activities. System operations notes and forms will be compiled and summaries made available monthly to DTSC as part of the performance monitoring reports (see below).
- Performance monitoring reports: These reports will summarize data collected and modeling activities used to evaluate the effectiveness of the IM. Performance evaluation will be presented using observed data and comparisons of that data against model output. The effects of rising and falling heads from the river's influence will be subtracted from the time trends so that drawdown maps may be produced to evaluate pumping effects. Recalibrated model output will be used to revise capture zone estimates of steady-state pumping. Recommendations for system modifications will be provided in each report to achieve the objective of the IM. Performance monitoring reports will be prepared bi-weekly and will be submitted to DTSC by the 1st and 15th of the following month, with the schedule subject to reevaluation and adjustment by DTSC.

3.8 Interim Measure Integration

The immediate IM described herein will eventually be integrated into the comprehensive IM for the site described in IMWP No. 1 (CH2M HILL, 2004). Modifications to system operations will be documented in performance monitoring reports to the DTSC, subject to DTSC approval. The comprehensive IM will include onsite treatment and discharge management, reducing or eliminating the need for transportation and offsite disposal.

Pumping from wells at or near the MW-20 bench (with the understanding that the installation and operation of any well or wells on BLM land will require the review and approval of BLM) is expected to continue until implementation of the final remedy at this site, in accordance with the RCRA Corrective Action process; depending on the final remedy chosen, pumping in this area may well be an integral part of that final remedy and may continue for several years.

Containment of extracted groundwater at the MW-20 bench location in tanks, and the shipment of that water from this location in trucks, will continue until adequate facilities, such as pipelines, are in place to allow the direct conveyance of extracted groundwater to holding and treatment facilities located elsewhere (such as on PG&E property), with the understanding that the construction and operation of any such facilities on BLM land will require the review and approval of BLM. At a minimum, the storage of extracted groundwater in tanks on the MW-20 bench, and the shipment of that groundwater by trucks, is anticipated to occur for 6-12 months.

3.9 Indemnity

PG&E agrees to indemnify and hold harmless BLM, its agents, and employees from any and all claims or causes of action arising from or on account of acts or omissions of PG&E, its employees, successors, agents, contractors, subcontractors, or other persons, in carrying out activities under this IMWP. PG&E further agrees that the United States, and its agencies and employees, shall not be held as a party to any contract entered into by PG&E in carrying out activities under this IMWP.

4.0 Project Management

CH2M HILL will manage the IM activities. The proposed project management approach is intended to:

- Ensure a direct, continuous line of communication among DTSC, the PG&E project team and all stakeholders in the CWG.
- Facilitate effective and efficient coordination and management of the various tasks.
- Implement this IM on time and in compliance with the requirements of the DTSC.

The progress and performance of the project will be monitored through:

- Monthly performance monitoring reports.
- Regular meetings with DTSC representatives.
- Regular meetings and conference calls with the CWG.
- Meetings specially convened by DTSC to resolve project issues and concerns, as applicable.

5.0 Project Schedule

The table below shows the proposed project schedule with estimated duration of many critical activities. System operations reports will be submitted as discussed in Section 3.7. Performance monitoring reports will be submitted on the 1st and 15th of each month. Future modifications of the groundwater extraction system for the comprehensive IM are not shown in this schedule. PG&E's ability to meet this schedule is dependent upon BLM's authorization of the IM through the issuance of an Action Memorandum as a time-critical removal action under CERCLA. Without this authorization, PG&E does not have permission to conduct any site preparation or installation activities.

Interim Measure No. 2 Project Schedule

Activity	Duration	Start	Finish
Interim Measure No. 2	**29 days**	**2/09/04**	**3/08/04**
DTSC Directive	1 day	2/09/04	2/09/04
PG&E Concurrence	1 day	2/09/04	2/09/04
IMWP No. 2	**18 days**	**2/10/04**	**2/26/04**
Prepare Draft	8 days	2/10/04	2/17/04
DTSC Review	6 days	2/18/04	2/23/04
BLM Review	7 days	2/18/04	2/24/04
Final to DTSC and BLM	3 days	2/24/04	2/26/04
System Installation	**11 days**	**2/27/04**	**3/08/04**
Obtain BLM Authorization	2 days	3/01/04	3/02/04
Site Inspection (equipment staging/transportation route)	1 day	2/27/04	2/27/04
Site Preparation	5 days	3/03/04	3/07/04
System Start-up	1 day	3/08/04	3/08/04

6.0 Waste Management Practices

This section describes the waste management practices for the waste streams anticipated for this IM.

6.1 Extracted Groundwater Management

The primary waste stream generated during project activities is extracted groundwater. The only constituent of concern that may exceed hazardous waste regulatory levels in the extracted groundwater is chromium, which may exceed the California soluble threshold limit concentration (STLC) for chromium, which is 5 mg/L[1].

Based on the anticipated pumping rates, up to 19,000 gallons of water is expected to be generated daily. Extracted groundwater will be pumped from the well(s) to aboveground holding tanks. The holding tanks and associated piping will meet state and federal requirements for storage of hazardous waste in tank systems (*e.g.*, secondary containment)[2]. Representative samples of the waste will be taken and analyzed at least weekly to determine chromium concentrations. As necessary, additional analyses will be performed to meet requirements of the receiving treatment/disposal facility.

The groundwater will be pumped to vacuum trucks for transportation offsite. If analytical results show that the groundwater exceeds the STLC, it will be transported offsite under a Uniform Hazardous Waste Manifest by a licensed hazardous waste hauler.

It is estimated that each holding tank will be emptied weekly. All hazardous waste generated on site, including the precipitated chromium slurry, will be removed for disposal within 90 days of generation.

Additional hazardous waste management practices include:

- Labeling of tanks to including the tank number, contents, designation as hazardous waste (if appropriate), and the National Fire Protection Association hazard warning "fire diamond."
- Daily inspections of the tank systems[3] which includes tanks, piping and pumps.
- Periodic inspections of emergency equipment[4].
- Training of personnel in hazardous waste management, commensurate with their responsibilities[5].
- Preparation of procedures for responding to unplanned releases, etc.[6]

---

[1] California Code of Regulations, Title 22, Division 4.5 (22CCR), Chapter 11, Section 66261.24(a)

[2] 22CCR Section 66262.34 and Section 66265.190 et seq.

[3] 22CCR Section 66262.34 and 66265.195

[4] 22CCR Section 66262.34 and 66265.33

[5] 22CCR Section 66262.34 and 66265.16

Details of the practices described/listed above will provided in the Environmental Compliance Plan that will be maintained onsite. This plan will include copies of permits, forms, and procedures for environmental practices at the site that ensure compliance with federal, state, and local requirements. The primary focus of the Environmental Compliance Plan is hazardous materials and waste management. It addresses the requirements of the Certified Unified Program Agency (San Bernardino County Fire Department) for a Business Plan, including spill prevention and response measures and manifesting of hazardous waste. The Environmental Compliance Plan will be maintained at the site for the purpose of training, recordkeeping, emergency response, and ongoing guidance related to environmental compliance (e.g., hazardous materials, hazardous waste).

A U. S. EPA Spill Prevention, Control and Countermeasure (SPCC) Plan is not required at the IM site because the oil storage capacity will not exceed the threshold of 1,320 gallons. Storage capacity for fuel to be used in the onsite generator is anticipated to be no more than four 55-gallon drums (located in a secondary tub). Fuel for the generator is the only oil that will be stored onsite. Spill prevention and control measures for the fuel is addressed in the (Hazardous Materials) Business Plan prepared in accordance with the requirements of the local Certified Unified Program Agency, the San Bernardino County Fire Department.

6.1.1 Other Wastes

Personal protective equipment and disposable sampling equipment designated as non-hazardous waste will be double-bagged and disposed of in dumpsters at the station. In the unlikely event that such equipment is ever designated as hazardous waste, it will be disposed of at a permitted facility in compliance with all hazardous waste regulatory requirements. Soil excavated during construction (*e.g.*, trenching, grading) will be placed in temporary stockpiles nearby and used as backfill. If soil is excavated from areas known or suspected to contain Cr(VI), then soil will be sampled and analyzed for Cr(VI) and will be disposed of according to the results of that analysis.

[6] 22CCR Section 66262.34 and 66265.30-37

7.0 Required Filings and Authorizations

The primary required filings and authorizations to implement the IM are listed in the table below.

Action	Responsible Agency
Facility/Generator Identification Number Issuance	U.S. Environmental Protection Agency
Hazardous Materials Business Plan approval	San Bernardino County Fire Department
Authorization of IMWP by an Action Memorandum as a time-critical removal action pursuant to CERCLA	U.S. Bureau of Land Management

8.0 Sampling and Monitoring

Sampling and monitoring activities planned for this IM include:

- Baseline sampling and geophysical logging prior to start-up of extraction system.
- Waste disposal profiling as required by the treatment/disposal facility.
- Discrete sampling from each extraction well to evaluate mass removal rates. Analyses for chromium species and total dissolved solids will be conducted as frequently as necessary until a concentration trend is established, and then at least weekly until DTSC determines that a reduced frequency of sampling is appropriate.
- Water level measurements (manual and continuous) from existing monitoring well locations near the MW-20 cluster and in floodplain wells. Electronic pressure transducers will measure water levels continuously.

Ongoing and planned sampling and monitoring activities at the site will also be valuable in assessing the effectiveness of the IM. These activities include:

- Low-flow/well-volume purging comparison testing.
- Characterization and isotopic analysis of transpirate on the floodplain.

Additional sampling or characterization may be conducted, as directed by DTSC and considering the input of the Consultative Workgroup. These measures may include:

- The collection of Colorado River groundwater flux data to help determine if the IM pumping and future pumping changes the quantity and direction of flux between the aquifer and the river.
- Installation of additional wells between the MW-20 bench and the Colorado River to provide additional water-level and chemical data to evaluate the effectiveness of the IM and any future remediation measures.

9.0 Mitigation Measures

The following restrictions and controls, at minimum, related to protection of biological and cultural resources, will be complied with in implementing this IM.

1. The Mojave population of the desert tortoise is federally protected as a threatened species under the Endangered Species Act of 1973 and is protected by California law. Prohibited actions include capture, handling, harassing, collecting, injuring, or destroying animals or their burrows. Any sightings of desert tortoise must be reported immediately to the BLM Lake Havasu Field Office Wildlife Biologist.

2. All personnel are to report any sightings of desert tortoise, bighorn sheep, other wildlife species and federally listed migratory birds (such as bald eagle, brown pelican, etc.) to the BLM Lake Havasu Field Office, Wildlife Biologist.

3. If a desert tortoise is endangered by any activity, that activity will cease until the desert tortoise moves out of harm's way on its own accord. A desert tortoise that needs to be handled, to prevent injury or death, must be handled by a certified/qualified handler only.

4. The area within the fence will be inspected at least every four hours during periods when the gates are open for desert tortoise that may become trapped inadvertently within the enclosure. All vehicles stationary for 15 minutes or longer will be inspected underneath for desert tortoise prior to moving. In the event that a tortoise is found within the fenced area or under a vehicle, that tortoise will be handled only by a certified handler.

5. All native riparian species (e.g., cactus, ocotillo, mesquite, Palo Verde, etc.) will be avoided at all times. California-listed sensitive species of plants can be trimmed but not removed.

6. All construction trash and/or debris will be removed.

7. All vehicles must stay on the existing and approved routes. No vehicles are authorized to drive in the existing washes.

8. PG&E will notify immediately the BLM Lake Havasu Field Manager (or his designated representative) of any cultural resources (prehistoric/historic sites or objects) and/or paleontological resources (fossils) encountered during permitted operations and will maintain the integrity of such resources pending subsequent investigation. All operations in the immediate area of the discovery must be suspended until written authorization from BLM to proceed is issued. An evaluation of the discovery shall be made by a qualified archaeologist or paleontologist to determine appropriate actions to prevent the loss of significant cultural or scientifically important paleontological values.

9. No permanent improvements that affect the integrity of the bridge/culvert over Bat Cave Wash on historic Route 66 will be implemented. This feature has been analyzed by a structural engineer to determine if there will be any adverse effects as a result of

transporting the pumped water from the MW-20 bench via truck. Caltrans maintenance records indicate that the structure has an operation rating that exceeds the anticipated load of the haul trucks.

10. Actions that result in impacts to archaeological or historical resources, are subject to the provisions of the Archaeological Resources Protection Act of 1979, as amended, and the Federal Land Policy and Management Act of 1976.

10.0 References

CH2M HILL, 2003. *Draft Technical Memorandum, Groundwater Pilot Study, Topock Compressor Site, Needles, California.* September.

_____, 2004. *Draft Interim Measures Workplan, Topock Compressor Station, Needles, California.* February 11.

Department of Toxic Substances Control (DTSC), 1994. Correction Action Orientation Manual, Cal-EPA – DTSC Draft Working Copy. June 1994.

_____, 1996. Corrective Action Consent Agreement, Docket HWCA 95/96-027. February 2.

Ecology and Environment Inc. (E&E), 2000. *Draft RCRA Facility Investigation (RFI) Report: Bat Cave Wash Area, PG&E Company's Topock Compressor Station*. April 17.

_____, 2002. *Hydrogeologic Testing Results, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California.* April 1.

Pacific Gas and Electric (PG&E), 1997. Letter to Mr. Robert M. Senga, Department of Toxic Substances Control, Region 4. "*RCRA Facility Investigation at Bat Cave Wash Area.*"

Figures

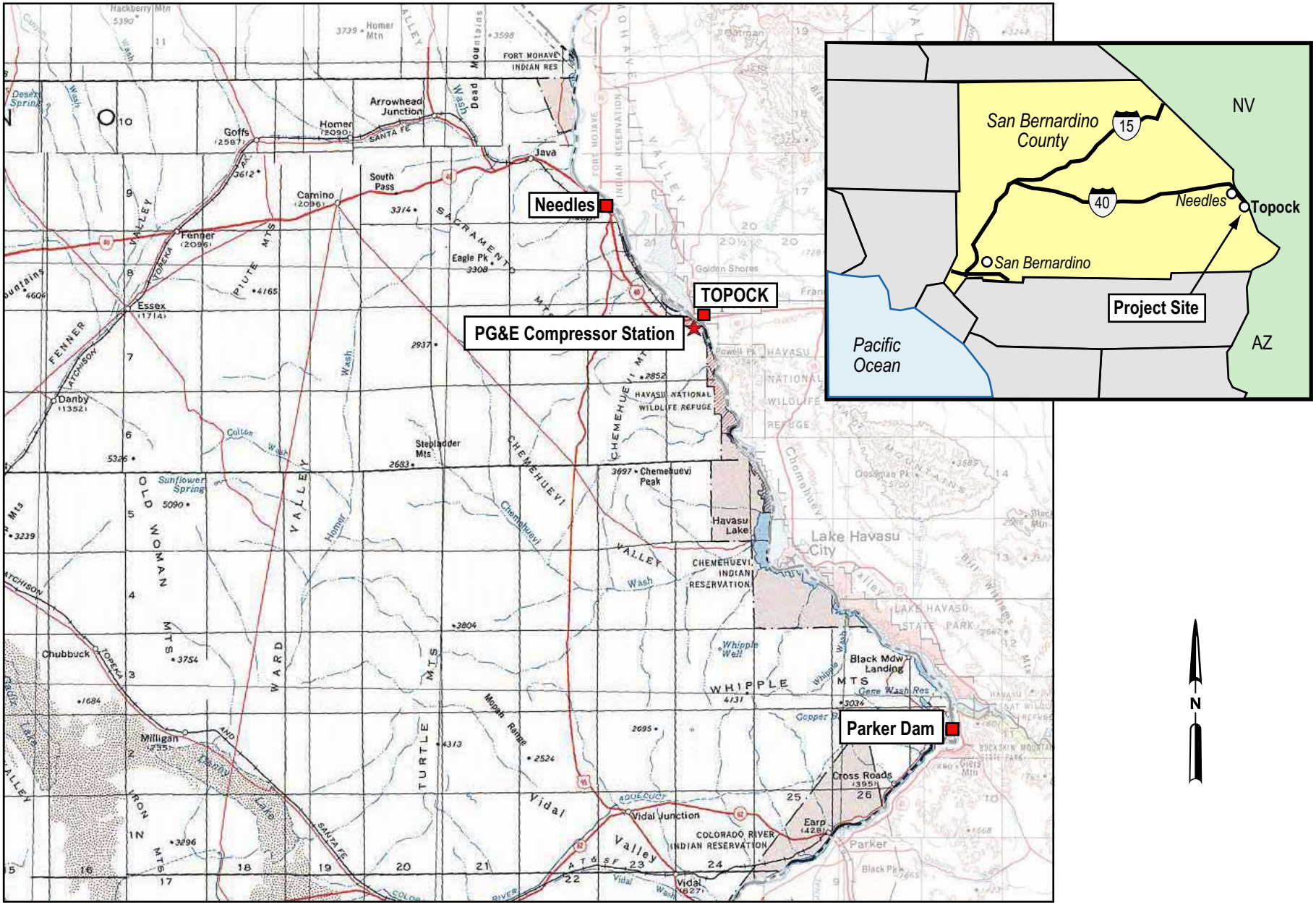


FIGURE 1-1
SITE LOCATION MAP
INTERIM MEASURES WORK PLAN NO. 2
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

184004.PS.06_E022004001SFO_Topock Site LocMap_2/13/04_ccc

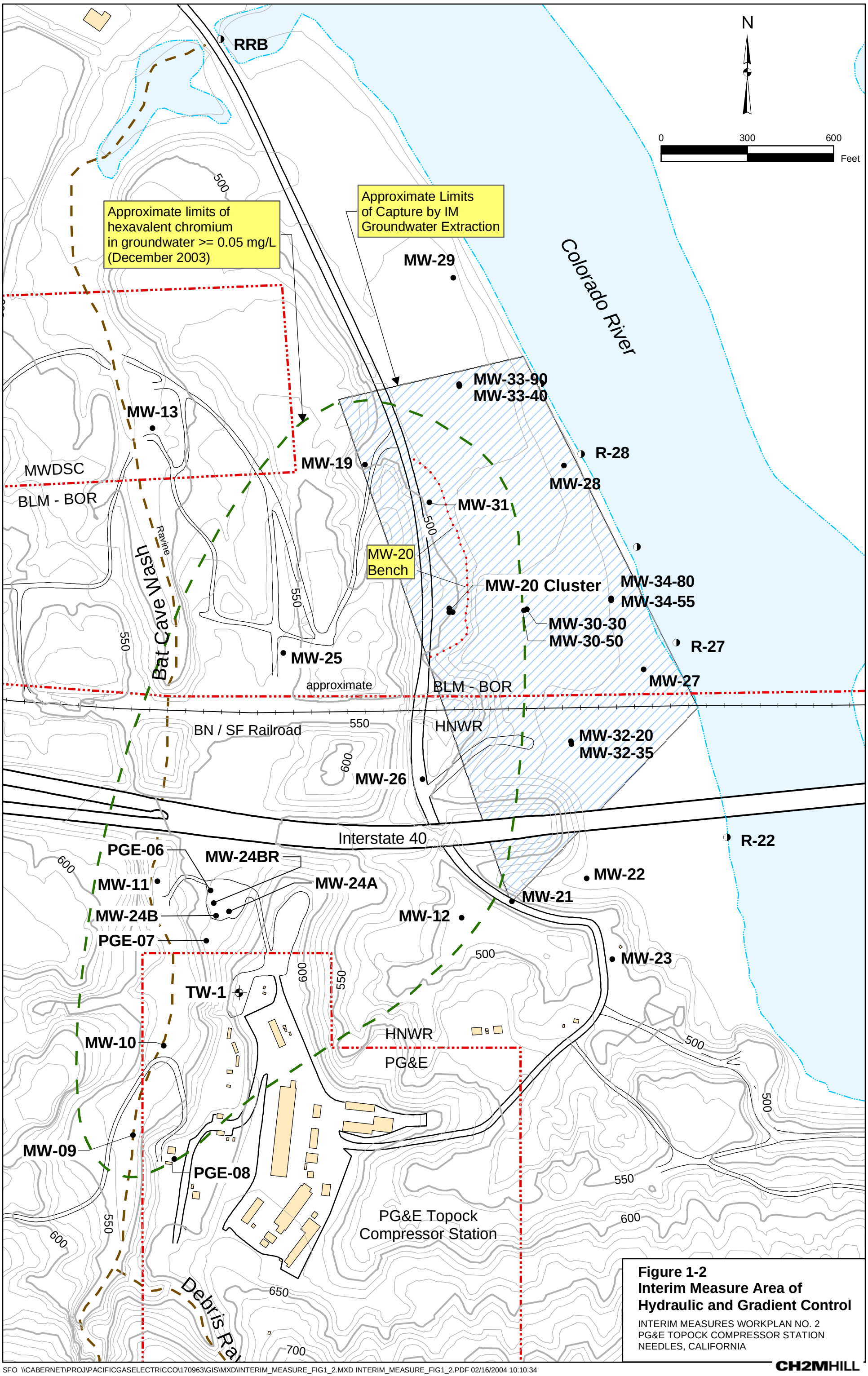


Figure 1-2
Interim Measure Area of Hydraulic and Gradient Control

INTERIM MEASURES WORKPLAN NO. 2
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

SFO \\CABERNET\PROJ\PACIFICGASELECTRICCO\170963\GIS\MXD\INTERIM_MEASURE_FIG1_2.MXD INTERIM_MEASURE_FIG1_2.PDF 02/16/2004 10:10:34

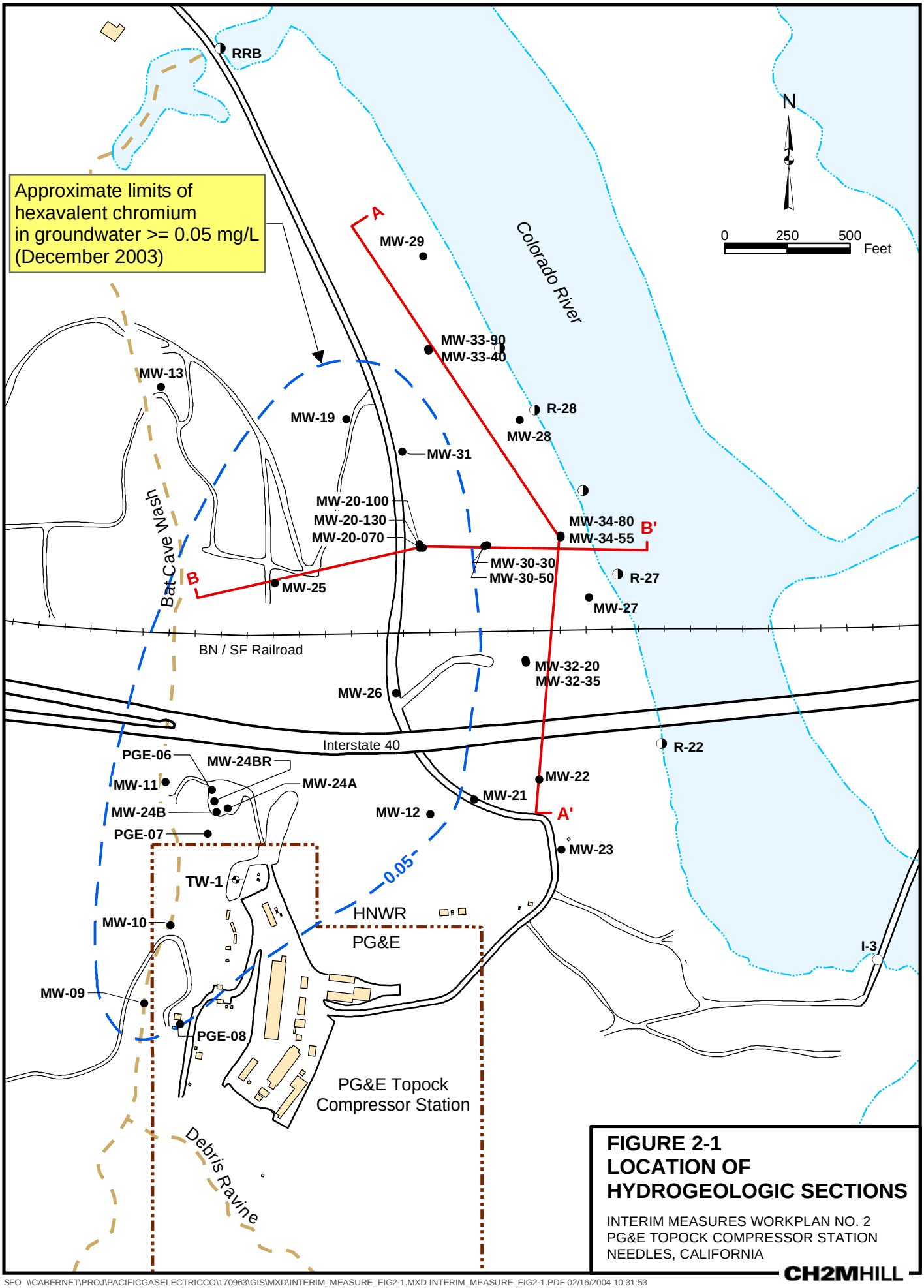


FIGURE 2-1
LOCATION OF HYDROGEOLOGIC SECTIONS

INTERIM MEASURES WORKPLAN NO. 2
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

North

A

South

A'

MW-29
proj. 120'

MW-33-40
MW-33-90

MW-28
proj. 150'

MW-30-30
MW-30-50
proj. 200'

MW-34-55
MW-34-80

MW-27
proj. 100'

MW-32-20
MW-32-35
proj. 100'

MW-22

ground surface

water table

approximate maximum depth of Colorado River

MW-29	MW-33-40 / MW-33-90	MW-28	MW-30-30 / MW-30-50	MW-34-55 / MW-34-80	MW-27	MW-32-20 / MW-32-35	MW-22
ND <0.01	ND <0.01 J	ND <0.01	ND <0.01	ND <0.01	ND <0.01	ND <0.01	ND <0.01
ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002
---	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002
ND <0.0002	---	ND <0.0002	2.77	ND <0.01		ND <0.01	
	ND <0.01 J		0.0906	ND <0.0002		ND <0.0002	
	ND <0.0002		ND <0.0002	ND <0.0002		ND <0.0002	
	ND <0.0002		ND <0.0002	ND <0.0002		ND <0.0002	

39	39	23	32	17	20	11	
	89		50	59	35		
			67		37		
	130		ND <0.01	83			
			ND <0.0002				
			ND <0.0002				
			0.0377				
				93			

Alluvial Aquifer
unconsolidated sand, gravel, silt, clay

Red Fanglomerate
cemented silt, gravel, sand

Red Fanglomerate

Elevation (Ft. MSL)

500
400
300

MW-29

water level

well screen
depth at bottom of well screen
total depth of boring

85
103

Hexavalent Chromium Sampling Results

Results in milligrams per liter (mg/L) for recent sampling events

Jun-03
Sep-03
Nov-03
Dec-03

ND = not detected at listed reporting limit
J = estimated result
(---) = not sampled

30 ft.
Vertical Scale
0
0 Horizontal Scale 300 ft.

FIGURE 2-2
HYDROGEOLOGIC SECTION A - A'
GROUNDWATER SAMPLING RESULTS
JUNE - DECEMBER 2003
INTERIM MEASURES WORK PLAN NO. 2
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Southwest

B

Northeast

B'

Bat Cave Wash

ground surface

MW-25
proj. 200'

MW-20-70
MW-20-100
MW-20-130

MW-30-30
MW-30-50

MW-34-55
MW-34-80

MW-27
proj. 200'

R-27

water table

Elev. 454

Colorado River

500

400

300

Elevation (Ft. MSL)

MW-25	MW-20-70	MW-30-30	MW-34-55	MW-27	R-27
2.48	11.90	ND <0.01	ND <0.01	ND <0.01	ND <0.01
2.35	9.69	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002
---	---	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002
2.21	9.87	ND <0.0002	ND <0.0002	ND <0.0002	ND <0.0002
85	70	32	55	17	
	2.77	2.77	ND <0.01		
	2.74	0.0906	ND <0.0002		
	---	ND <0.0002	ND <0.0002		
	2.79	ND <0.0002	ND <0.0002		
	100	50	ND <0.01		
	6.44		ND <0.0002		
	6.08		ND <0.0002		
	---		0.0377		
	5.94		83		
	132	67	93		

Alluvial Aquifer
unconsolidated sand, gravel, silt, clay

Red Fanglomerate

Red Fanglomerate
cemented silt, gravel, sand

Recent fluvial sediments and dredged sands

MW-25

water level

well screen

85 depth at bottom of well screen

103 total depth of boring

Hexavalent Chromium Sampling Results

Results in milligrams per liter (mg/L) for recent sampling events

Jun-03
Sep-03
Nov-03
Dec-03

ND = not detected at listed reporting limit

(---) = not sampled

40 ft.

Vertical Scale

0

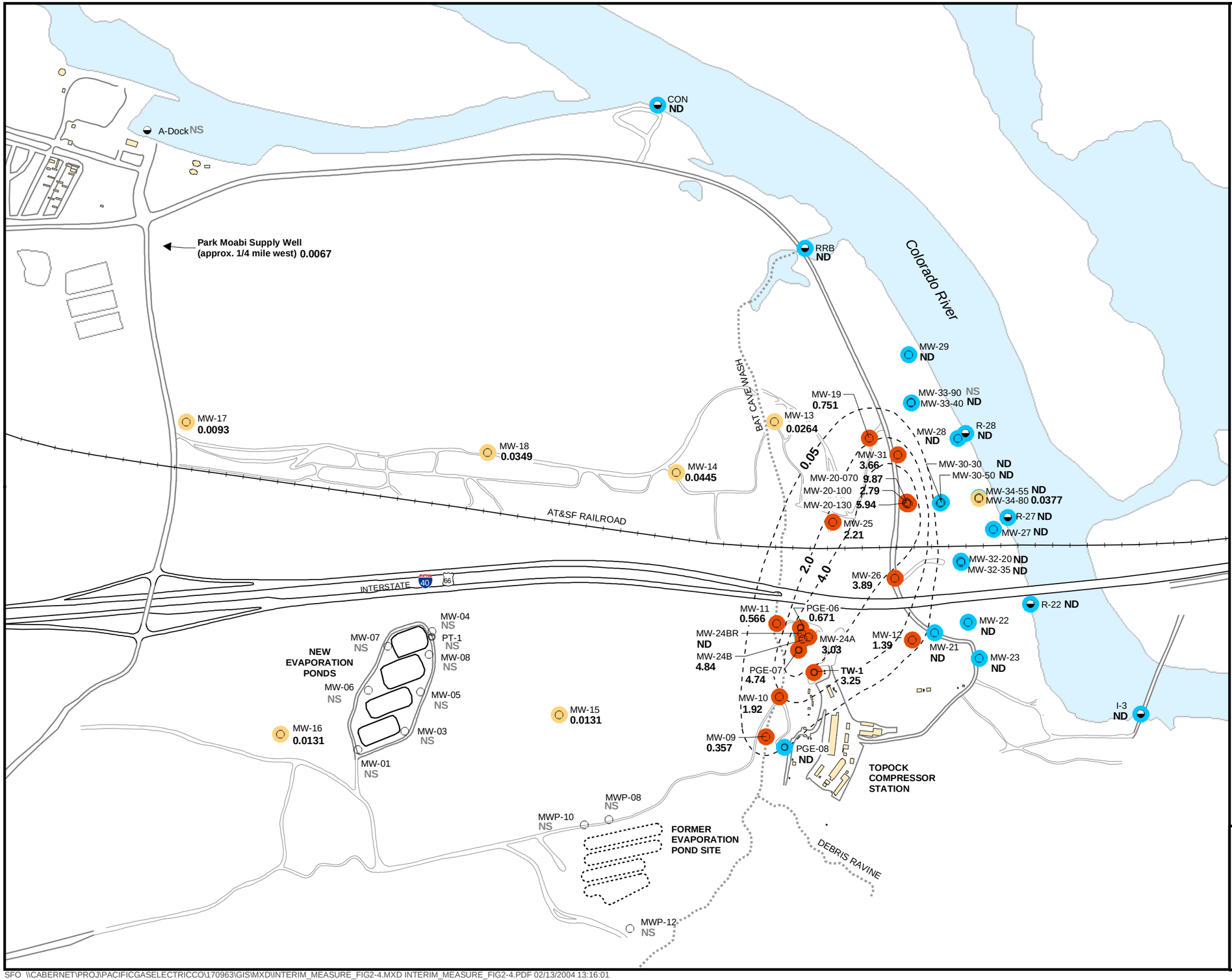
0 Horizontal Scale 200 ft.

FIGURE 2-3
HYDROGEOLOGIC SECTION B - B'
GROUNDWATER SAMPLING RESULTS
JUNE - DECEMBER 2003

INTERIM MEASURES WORK PLAN NO. 2
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

184004.PS.06_E022004001SFO_Fig 2-3 Jun-Dec CrG X-Sect B-B_2/13/04_ccc



Legend

- Groundwater Monitoring Well
- Groundwater Test Well or Supply Well (Inactive)
- Surface Water Monitoring Location

Sampling conducted December 9-12,16, 2003

3.47 Concentration of hexavalent chromium [Cr(VI)] in milligrams per liter (mg/L)
Results shown are maximum concentrations of primary and duplicate samples

ND Cr(VI) not detected, at 0.0002 mg/L detection limit using analytical method SW 7199

NS Not sampled

Cr(VI) Concentrations in Water Samples

- Not detected (<0.0002 mg/L)
- Concentration between 0.0002 and 0.05 mg/L
- Concentration greater than 0.05 mg/L

0.05 Cr(VI) isoconcentration contours in groundwater, at 0.5, 2.0, and 4.0 mg/L intervals. Contours are approximate and are based on 2003 sampling results and site conceptual model.

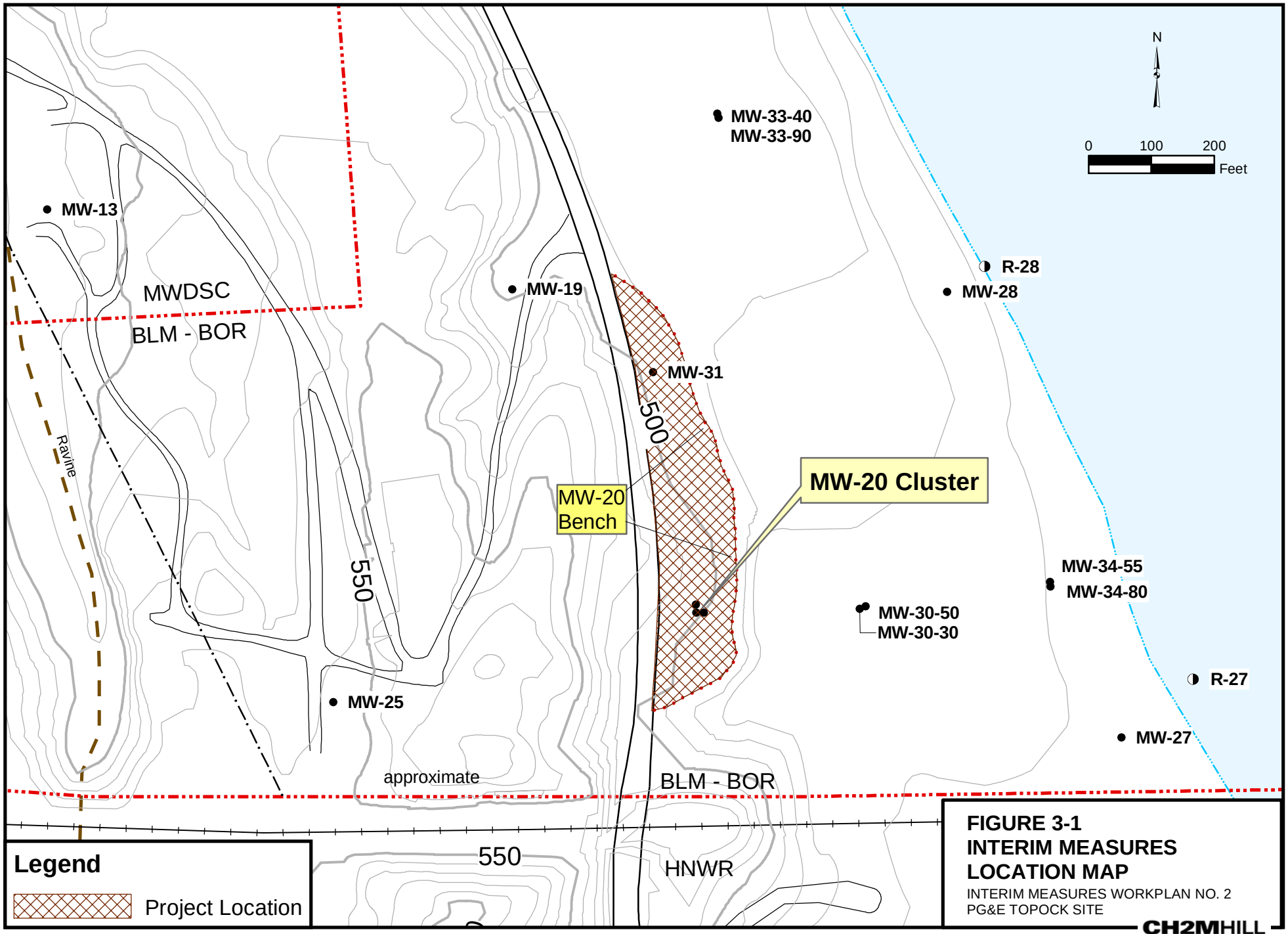
N

0 500 1,000 Feet

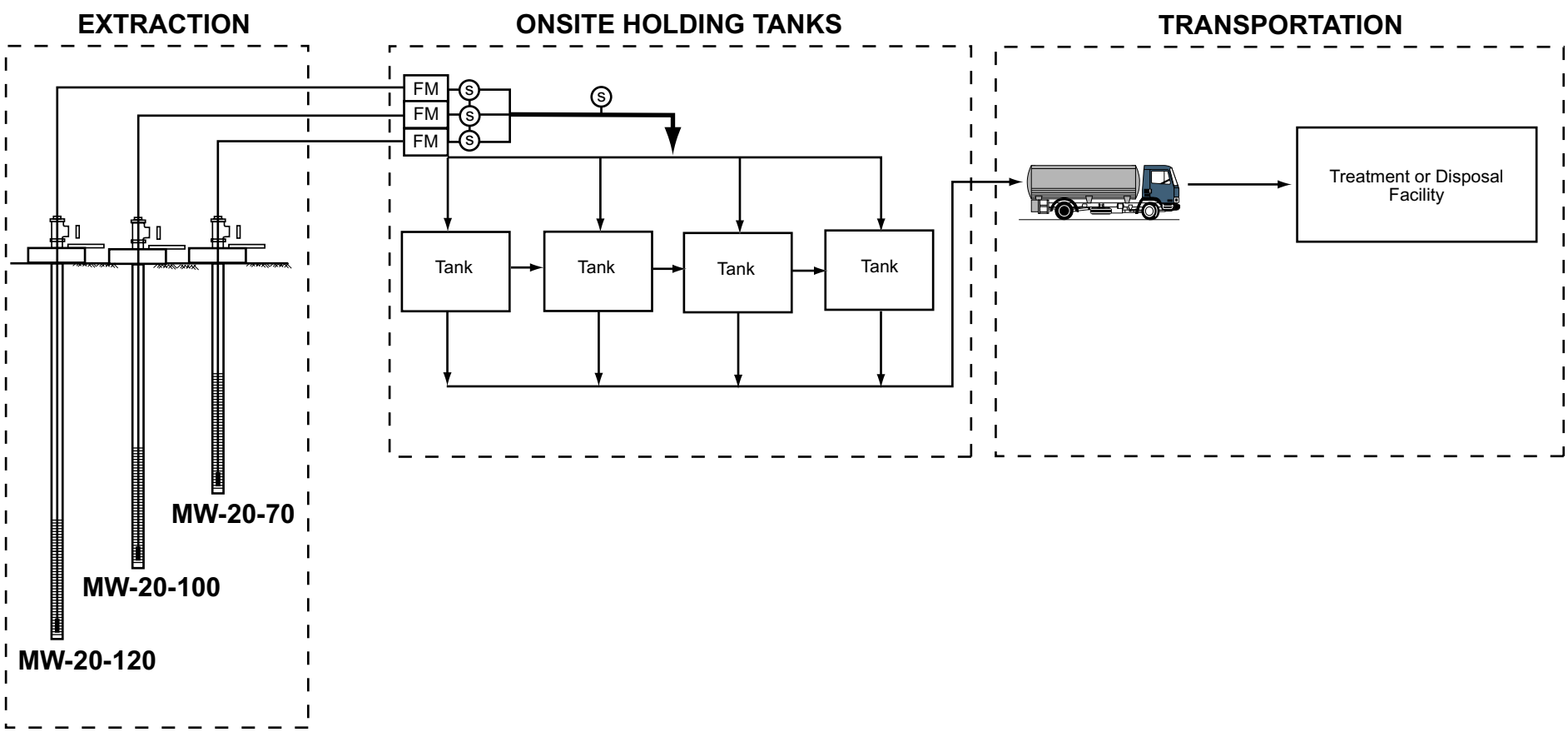
Figure 2-4
Hexavalent Chromium Sampling Results
December 2003
Groundwater and Surface Water Monitoring

INTERIM MEASURES WORKPLAN NO. 2
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

SFO \\CABERNET\PROJ\PACIFICGASELECTRICCO\170963\GIS\MXD\INTERIM_MEASURE_FIG2-4.MXD INTERIM_MEASURE_FIG2-4.PDF 02/13/2004 13:16:01



SFO \\CABERNET\PROJ\PACIFICGASELECTRICCO\170963\GIS\MXD\INTERIM_MEASURE_FIG3-1.MXD INTERIM_MEASURE_FIG3-1.PDF 02/13/2004 13:27:12



Legend:

FM Flow meter

S Sample port

Note: The number of tanks will be selected after evaluation of flow rates, required storage capacity, and available hauling capacity.

FIGURE 3-2
SCHEMATIC DIAGRAM OF INTERIM MEASURE AT MW-20 CLUSTER
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Appendix A
Preliminary Operations and Maintenance Inspection Forms

DAILY LOG

Report Date: _____ Weather Conditions: _____

Arrival Time: _____ Temperature: _____

Departure Time: _____ Wind (est. speed and dir.): _____

Inspector Name: _____

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Items to be checked upon arrival

Unit Identification	Yes	No	Unit Identification	Yes	No
Site Security Intact:			Secondary Containment Dry		
Compound Secure:			Leaks from Piping		
System Power On:					
MW-20-70 Online					
MW-20-100 Online					
MW-20-130 Online					
Holding Tank T-1 Online			MW-20-70 Flow Rate (gpm)		
Holding Tank T-2 Online			MW-20-100 Flow Rate (gpm)		
Holding Tank T-3 Online			MW-20-130 Flow Rate (gpm)		
Holding Tank T-4 Online					

General Description of Tasks Completed or Started:

Personnel On Site

Name	Company	Purpose of Visit

Items Rented or Purchased & Purpose

Comments/ Concerns/ Problems/ Variances

Issue	Recommendation	Priority

Material Disposal Information

Material	Quantity	Transporter / Disposal Location

Upon Departure (end of each day)

Unit Identification	Yes	No	Unit Identification	Yes	No
System Power on:			Compound Secure:		
MW-20-70 Online			Road Gate Secure:		
MW-20-100 Online					
MW-20-130 Online					

System Adjustments

Component ID	Status Upon Arrival (ON or OFF)	Description of Adjustment	Status Upon Departure (ON or OFF)

Additional Comments:

Reported By: **Date:**

SYSTEM INSPECTION LOG

Report Date: _____ Weather Conditions: _____

Arrival Time: _____ Temperature: _____

Departure Time: _____ Wind (est. speed and dir.): _____

Inspector Name: _____

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MW-20-70 EXTRACTION WELL (PUMP STATUS ON/OFF)

Unit Identification	Reading/ Status	Operating Range	Comments
Flow Rate (gpm)			
Flow Totalizer (gallons)			
Water level in well (ft btoc)			
Grab sample collected			

MW-20-100 EXTRACTION WELL (PUMP STATUS ON/OFF)

Unit Identification	Reading/ Status	Operating Range	Comments
Flow Rate (gpm)			
Flow Totalizer (gallons)			
Water level in well (ft btoc)			
Grab sample collected			

MW-20-130 EXTRACTION WELL (PUMP STATUS ON/OFF)

Unit Identification	Reading/ Status	Operating Range	Comments
Flow Rate (gpm)			
Flow Totalizer (gallons)			
Water level in well (ft btoc)			
Grab sample collected			

POWER SUPPLY

Unit Identification	Reading/ Status	Operating Range	Comments
Hour Meter Readings			
Voltage Reading			
Fuel Tank Level			

GROUNDWATER LEVEL DATA

Well	Water Level (ft btoc)	Comments

Additional comments: _____

TROUBLESHOOTING AND REPAIR ACTIVITIES
Groundwater Extraction System at MW-20 Cluster
PG&E Topock Compressor Station, Needles, CA

Date	Troubleshooting and Repair Activities