



**Pacific Gas and
Electric Company®**

Yvonne J. Meeks
Site Remediation - Portfolio Manager
Environmental Affairs

6588 Ontario Road
San Luis Obispo, CA 93405
Mailing Address
4325 South Higuera Street
San Luis Obispo, CA 93401

805.546.5243
Internal: 664.5243
Fax: 805.546.5232
Internet: YJM1@pge.com

January 31, 2005

Mr. Norman Shopay
Project Manager
California Department of Toxic Substances Control
Geology and Corrective Action Branch
700 Heinz Avenue
Berkeley, California 94710

Subject: Final Phase 2 Monitoring Well Installation Work Plan
Pacific Gas and Electric Company, Topock Project

Dear Mr. Shopay:

This letter transmits the final *Phase 2 Monitoring Well Installation Work Plan* for the additional drilling and well installation planned for plume delineation at the Pacific Gas and Electric Company (PG&E) Topock site. The enclosed revised work plan incorporates comments on the draft work plan provided by DTSC on January 24, 2005.

Well drilling activities were initiated on January 26, 2005, in accordance with DTSC's approval to proceed concurrent with the preparation of the final work plan. A separate technical memorandum addressing the installation of temperature monitoring probes in the well boreholes, and field team instructions addressing the collection of anaerobic core samples, will be submitted by February 1, 2005. A separate work plan addressing the filtration comparison study will be submitted by February 4, 2005.

If you have any questions, please do not hesitate to contact me. I can be reached at (805) 546-5243.

Sincerely,

Tom Hanson

For Yvonne Meeks

cc: CWG Members

Phase 2 Monitoring Well Installation Work Plan PG&E Topock Compressor Station Needles, California

January 31, 2005

Prepared for
**California Department of Toxic Substances
Control**

on behalf of
Pacific Gas and Electric Company

CH2MHILL
155 Grand Avenue, Suite 1000
Oakland, CA 94612


**Phase 2 Monitoring Well Installation Work Plan
PG&E Topock Compressor Station
Needles, California**

Prepared for
California Department of Toxic Substances Control

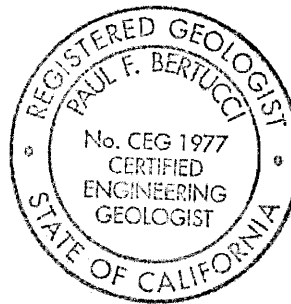
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Pacific Gas and Electric Company

January 31, 2005

This work plan was prepared under supervision of a
California Certified Engineering Geologist,



Paul Bertucci, C.E.G.
Project Hydrogeologist



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Acronyms and Abbreviations

µg/L	micrograms per liter
bgs	below ground surface
BLM	U.S. Bureau of Land Management
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
DTSC	California Department of Toxic Substances Control
HNWR	Havas National Wildlife Refuge
IDW	investigation-derived waste
IM	Interim Measure
PG&E	Pacific Gas and Electric Company
PVC	polyvinyl chloride
USGS	U.S. Geological Survey

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is addressing chromium in groundwater at the Topock Compressor Station in Needles, California, under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). PG&E's Draft Interim Measures Work Plan, dated February 2004, (CH2M HILL, 2004a) identified the general locations where new field investigations and groundwater monitoring and test wells were proposed for the Interim Measures program. The activities described in PG&E's Draft Interim Measures Work Plan are collectively referred to as Interim Measure (IM) No. 1. In a letter dated February 9, 2004, DTSC directed PG&E to implement IM No. 2 to begin pumping, transport, and disposal of groundwater. As part of IM No. 2, PG&E is required to conduct additional hydrogeologic investigations for further plume delineation and to support remediation activities.

The rationale, number, and locations for hydrogeologic investigations and wells for IM No. 1 and IM No. 2 were discussed, expanded, and agreed upon during subsequent meetings between representatives from PG&E, regulatory agencies, stakeholders, and consultants. The first phase of investigations involved installation of wells or well clusters at eight locations (MW-28, MW-31, and MW-35 through MW-40). Three of these well clusters were located in or near Bat Cave Wash. The other five were located on or near the Colorado River floodplain. During the planning for Phase 1, additional well locations were identified that might be drilled later, depending on the outcome of Phase 1. These locations were identified as step-out monitoring well locations. After the sampling results from the Phase 1 wells became available, additional data gaps were identified, and the number and locations of Phase 2 wells were modified to address these data gaps.

The Phase 2 drilling program described in this work plan involves the installation of monitoring wells or monitoring well clusters at five locations on the western floodplain of the Colorado River near the PG&E Topock Compressor Station. Locations for additional step-out monitoring wells, and a well identified as a contingency, are also presented in this work plan. Finally, this work plan identifies the locations of three potential extraction wells that could be installed if additional extraction capacity is needed. The decision to install these additional extraction wells will be based on the outcome of Phase 2 monitoring well installations and initial groundwater sampling efforts. If the groundwater chromium plume is found to extend beyond the hydraulic capture zone of extraction well TW-2, the installation and operation of the additional extraction wells will be evaluated to fully maintain hydraulic control. A work plan supplement would be submitted if it is determined that one or more of the additional extraction wells or the contingency-delineation monitoring wells are needed.

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; figures are located at the end of this work plan). In February 1996, PG&E and DTSC entered into a Corrective Action

Consent Agreement pursuant to Section 25187 of the California Health and Safety Code. Under the terms of that agreement, PG&E was directed to conduct a Resource Conservation and Recovery Act Facility Investigation and to implement corrective measures to address constituents of concern released in the Bat Cave Wash Area near the PG&E Topock Compressor Station. DTSC determined that immediate action was required and, recognizing the time-critical nature of its directive, prepared a California Environmental Quality Act Notice of Exemption on February 10, 2004. The primary constituents of concern at Topock are hexavalent chromium [Cr(VI)] and total chromium [Cr(T)]. The source was Cr(VI) salts historically used as a corrosion inhibitor in the station's cooling towers. DTSC is the lead administering agency for the project.

Assisting DTSC and PG&E with the planning and review of interim remedial measures are the members of the Topock Consultative Work Group, which was constituted under California's Site Designation Process. The Consultative Work Group consists of representatives from DTSC; the California Regional Water Quality Control Board, Colorado River Basin Region; the Metropolitan Water District of Southern California; the various federal agencies who own or manage adjacent property; and other project stakeholders.

As directed by the DTSC under IM No. 2, PG&E is currently pumping groundwater from one deep extraction well (TW-2D), located on a bench along the station access road and above the Colorado River floodplain. The bench, referred to as the monitoring well MW-20 bench, is owned by the U.S. Bureau of Reclamation and is managed by the U.S. Bureau of Land Management (BLM). PG&E began pumping from this location in March 2004, and is currently pumping at a rate of approximately 70 gallons per minute. The parcels on which these monitoring wells are slated to be installed are maintained by either BLM, located to the north, or the Havasu National Wildlife Refuge (HNWR), located to the south. Monitoring well installations described in this work plan will be completed under IM No. 2.

1.2 Project Objectives

The primary objective of the IM No. 2, Phase 2 drilling program is to provide additional monitoring wells to fill data gaps to further assess the hydrogeology and distribution of chromium in the floodplain area. This will involve the installation of monitoring wells or monitoring well clusters at five locations in the floodplain near the Colorado River. These locations (MW-27, MW-33, MW-34, SO-1, and SO-2) are shown on Figure 2.

Also shown on Figure 2 are the locations of two contingency wells, SO-4 and CW-1. The need for these wells will be determined based on the results from the Phase 2 drilling program and subsequent groundwater sampling. The details of how these wells would be designed and constructed would be provided in a subsequent work plan. The location of SO-4 has not been cleared for drilling because this well is near potential habitat for the Willow Flycatcher. Additional biological surveys would be needed to determine whether a well could be installed at the location of SO-4.

2.0 Phase 2 Drilling Program

2.1 Site Preparation

The proposed access routes shown on Figure 2 were surveyed on December 6, 2004, with representatives of BLM and HNWR. It was determined that the necessary clearing of vegetation to allow access for drilling equipment can be accomplished without damage to sensitive plant species. Prior to clearing vegetation or moving equipment onto BLM or HNWR land, additional surveys will be conducted to ensure that no nesting birds will be displaced by the drilling activities. All activities associated with the clearing and well drilling activities will be coordinated with BLM and HNWR to ensure the protection of cultural and biological resources. On December 22, 2004, PG&E submitted formal requests to BLM and HNWR for the proposed Phase 2 drilling sites and access routes shown on Figure 2 (PG&E, 2004a and 2004b). BLM approved the construction of wells at these sites on December 29 (BLM, 2004). Approval by HNWR for well location SO-2 and the associated access routes is anticipated prior to February 15, 2005.

Site preparation shall take place prior to execution of drilling and monitoring well installation tasks. Site preparation shall include identifying and avoiding biologically and/or culturally sensitive areas and site hazards, to the extent possible. The drill rig shall be cleaned before mobilization to each site and following completion of drilling at each site if visible grease, oil, or other contamination is evident on the equipment. After the drill rig has mobilized into place, short-term staging areas will be established. Visqueen will be laid on the ground surface in the staging areas to keep the drilling materials and equipment clean and to minimize impacts to the ground surface from the drilling materials and equipment. Materials to be stored at the well site include drilling equipment and well construction materials (e.g., casing, sand, bentonite, and grout).

2.2 Drilling Requirements

Drilling and well installations shall conform to state and local regulations. CH2M HILL will obtain all permits, applications, and other documents required by state and local authorities. Utility clearances will also be obtained prior to commencement of drilling. Boreholes will be 6 to 8 inches in diameter and straight enough to allow an installed monitoring well to be plumb in the soil boring, to allow passage of pumps or sampling devices down the well and to ensure sufficient thickness of annular materials outside the monitoring well casing.

Potable water may be added during drilling to assist with lifting cuttings from the well when advancing casing. The driller will keep the amount of water added to a minimum. The field geologist will record the volume of water added and ensure that this water volume, at a minimum, is removed from the well during development.

2.2.1 Rotosonic Method

Drilling will be accomplished using the rotosonic drilling technique, which involves advancing a rotating and vibrating drill head or core barrel through the subsurface. This method produces a continuous core from the land surface to target drilling depths (ranging from 40 to 150 feet below ground surface [bgs]), generates minimal drilling wastes, and typically can drill through gravel, cobble, and competent bedrock formations. The continuous core obtained from sonic drilling will facilitate the core logging, sampling, and core preservation requirements for the Interim Measures drilling program (CH2M HILL, 2004b).

2.2.2 All-terrain Rig with Rotosonic Method

The monitoring wells planned for the floodplain area will require use of track-mounted or balloon-tire all-terrain drilling equipment. A track-mounted sonic drilling rig of the same type that was used to construct the previous floodplain monitoring wells is already onsite for another activity; this rig will be used to drill the floodplain wells, as feasible.

To support the all-terrain drilling rig, a tracked or balloon-tired forklift and one or more all-terrain vehicles will be used to transport crew, equipment, and materials from staging areas near the roadways to the drill site on the floodplain. The forklift will also be used to transport cuttings and excess core generated from drilling the soil borings to lined, steel roll-off soil bins that will be temporarily staged on the MW-20 bench, on PG&E property, or, with permission of the property owners, in other suitable locations on BLM or HNWR property. Disposal procedures for the investigation-derived waste (IDW) are discussed in Section 3.0.

2.2.3 Core Logging and Preservation

Lithologic descriptions will be logged under the supervision of a California Registered Geologist at each soil boring based on visual inspection of the retrieved core. The field log will document the following information at each soil boring:

- Unique soil boring or well identification
- Purpose of the soil boring (e.g., monitoring well)
- Location in relation to an easily identifiable landmark
- Names of the drilling subcontractor and logger
- Start and finish dates and times
- Drilling method
- If applicable, types of drilling fluids and depths at which they were used
- Diameters of surface casing, casing type, and methods of installation
- Depth at which saturated conditions were first encountered
- Lithologic descriptions (based on the Unified Soil Classification System)
- Sampling-interval depths
- Zones of caving or heaving
- Depth at which drilling fluid was lost and the volume lost
- Changes in drilling fluid properties
- Drilling rate
- Drilling rig reactions, such as chatter, rod drops, and bouncing

As recommended by the Topock Consultative Work Group technical committee, a subset of core material from the saturated Alluvial Aquifer and Miocene conglomerate unit will be preserved in the field. At each of the deep boring locations, selected core samples will be collected at approximately 10-foot intervals within the saturated zone, sealed in aluminized Mylar sleeves, and archived for potential future testing or analysis. Core samples for preservation will be selected based on lithology, with zones that are different from the norm being targeted. Any obvious gray- or black-colored reducing zones will be sampled along with any obviously aerobic zones. This might result in some additional samples to those collected on 10-foot intervals. One core sample will also be preserved from the unsaturated zone at each well site in the densely vegetated areas (MW-34D, MW-27D, and SO-2). These samples might be useful in understanding the geochemistry of the root zone.

At the request of the U.S. Geological Survey (USGS), if wood fragments are encountered during drilling activities, the following protocol shall be followed for the handling and collection of wood samples:

1. If wood is found in core and/or drilling cuttings, transfer the material to a film canister using tweezers and/or spoons. This will avoid possible carbon contamination from organics present in the oil found on bare hands.
2. Label the sample and note the sampling location. Include a lithologic description of the deposits from which the sample was retrieved and describe any potential problems encountered while transferring the sample that may bias the analytical results.
3. As soon as possible, dry the sample in an oven at about 104 degrees Fahrenheit (40 degrees Celsius) for 24 hours. This will help prevent algae growth that could bias the analytical results.
4. Wrap the dried samples in aluminum foil, then insert the foil into a labeled resealable plastic bag. Store the resealable plastic bag and its contents in a cool, dry place until the samples can be transferred to the USGS for carbon-14 age dating.

The carbon-14 dating results will be used by the USGS in their studies of the geologic history of the lower Colorado River Basin. PG&E is collecting the samples at the request of the USGS, but is not responsible for analysis, reporting, or interpretation of sample results.

2.2.4 Groundwater Grab Sampling During Drilling

Groundwater grab samples will be collected during drilling of the deepest monitoring well at each of the five locations. The sampling interval for these grab samples will be approximately every 20 feet through the saturated zone. Grab samples will be obtained from an open section of borehole below the drive casing either by bailing or by pumping using a special sampling pump designed by the drilling contractor, ProSonic. The sampling pump incorporates a packer which is inflated in the bottom of the temporary casing to isolate the open hole below the casing. Attached below the packer is a submersible pump enclosed in a short section of well screen. By using a packer to hydraulically isolate the sampling interval from the water standing in the temporary casing above, the purge volumes can be minimized and representative samples can be obtained from a discrete section of the borehole.

Purging will involve pumping one to three casing volumes from the well and monitoring the field parameters (temperature, pH, electrical conductivity, and oxidation-reduction potential). After the field parameters have stabilized and at least one casing volume has been removed, groundwater samples will be collected for Cr(VI) analysis. Because these samples are considered screening level data, the Cr(VI) analyses will be conducted at the field laboratory currently set up at the batch treatment plant. A sufficient quantity of sample will be collected and filtered in the field so that confirmation samples can be sent to a certified laboratory if Cr(VI) is detected in any of the grab samples. The confirmation samples would be run for Cr(T) because they would not be analyzed within the 24 hour holding time for Cr(VI) analyses. All groundwater grab samples will be filtered in the field prior to preservation and analysis.

2.3 Monitoring Well Requirements

Monitoring wells will be installed and developed sequentially. Table 1 lists the target depths of each planned soil boring/monitoring well. The final well constructions will be based on conditions encountered in the field and might deviate from details listed in Table 1. Paired monitoring wells (shallow [S], middle [M], and deep [D] completions) are planned at three locations (MW-27, SO-1, and SO-2). At two locations (MW-33D and MW-34D), single-completion monitoring wells will be installed in the vicinity of existing monitoring wells MW-33-40, MW-33-90, MW-34-55, and MW-34-80 to monitor water conditions at the base of the Alluvial Aquifer at these locations.

Pending the results of core analyses and post-construction groundwater sampling, the IM No. 2, Phase 2 drilling program includes a contingency for installing additional monitoring wells near MW-29 and in lower Bat Cave Wash (Figure 2). The need and specifications for contingency wells will be evaluated as part of the step-out drilling program.

TABLE 1
 Planned Drilling Locations and Target Depths – Phase 2 Hydrogeologic Investigations
Phase 2 Monitoring Well Installation Work Plan, PG&E Topock Compressor Station, Needles, California

Location/ Property Owner	Drilling Site	Well ID	Well Type	Approximate Well Depth (ft bgs)	Approximate Screened Interval (ft bgs)
Floodplain/BLM	MW-33	MW-33D	Deep Monitoring Well	150	120 to 140
Floodplain/BLM	MW-34	MW-34D	Deep Monitoring Well	110	100 to 110
Floodplain/BLM	SO-1	MW-42S	Monitoring Well Cluster	30	10 to 30
		MW-42M		60	40 to 60
		MW-42D		110	80 to 100
Floodplain/BLM	MW-27	MW-27M	Monitoring Well Pair	60	40 to 60
		MW-27D		110	90 to 100
Floodplain/HNWR	SO-2	MW-43S	Monitoring Well Cluster	20	10 to 20
		MW-43M		50	30 to 40
		MW-43D		90	50 to 60

Notes:

All monitoring wells will be 2-inch Schedule 40 PVC completed within an above-ground casing monument.

All monitoring well screens will be 10 to 20 feet in length, made of 2-inch, slotted Schedule 40 PVC with 0.020-inch openings.

Recovered core will be sealed and preserved at 20-foot depth intervals through the saturated zone.

ft = feet

2.3.1 Casing Requirements

All monitoring wells are anticipated to be less than 150 feet in total depth, with 2-inch Schedule 40 PVC casings and screens. Casing requirements are as follows:

- All casing will be new, unused, and decontaminated.
- Glue will not be used to join casing, and casings will be joined only with compatible threads that will not interfere with the planned use of the well.
- All PVC will conform to ASTM Standard F 480-88A or the National Sanitation Foundation Standard 14 (Plastic Pipe System).
- The casing will be straight and plumb.

2.3.2 Well Screen Requirements

Well screen requirements are as follows:

- All requirements that apply to casing will also apply to well screen, except for strength requirements.
- Screens will be factory slotted.
- Screen slot size will be 0.020 inch.
- The bottom of the screen of the shallow- and middle-depth wells will be capped with a blank end cap (sediment trap) and the cap will be joined to the screen by thread; a 10-foot blank casing sump and end cap will be used on the deep monitoring wells.

2.3.3 Annular Space Requirements

The annular space will be filled with a filter pack, a bentonite seal, or casing grout between the well casing and the borehole wall. In middle- and shallow-depth wells more than 50 feet deep, at least two stainless steel centralizers will be used, one at the bottom and one at the top of the screen. Because centralizers interfere with electric logs, no centralizers will be used in the deep wells where borehole geophysics will be run.

2.3.4 Filter Pack Requirements

The filter pack will consist of No. 3 silica sand (consistent with other monitoring wells completed in the Alluvial Aquifer) and will extend from the bottom of the hole to approximately 2 feet above the top of the well screen. The top of the sand pack will be sounded to verify its depth during placement. Additional filter pack will be placed as required to return the level of the pack to 2 feet above the screen. A minimum 1-foot-thick layer of fine sand will be placed above the No. 3 sand filter pack to minimize the potential for the bentonite slurry (seal) material to invade the filter pack adjacent to the top of the well screen during well construction.

The contractor will record the volume of the filter pack emplaced in the well. With the approval of the field geologist, potable water may be used to emplace the filter pack, as long as no contaminants are introduced to the subsurface.

2.3.5 Bentonite Seal Requirements

The bentonite seal requirements are as follows:

- The bentonite seal will consist of at least 2 feet of bentonite between the filter pack and the casing grout.
- Only 100 percent sodium bentonite will be used.
- Bentonite chips or pellets will be hydrated with potable water if the transition seal is not below the water table; otherwise a bentonite slurry (1 gallon water for 2 pounds bentonite) will be used.

2.3.6 Casing Grout Requirements

The casing grout requirements are as follows:

- The casing grout will extend from the top of the bentonite seal to ground surface.
- The grout will be either a 30 percent solids bentonite grout or a cement mixture in the following proportions:
 - 94 pounds of neat Type I or II Portland or American Petroleum Institute Class A cement
 - Not more than 4 pounds of 100 percent sodium bentonite powder
 - Not more than 6.5 gallons of potable water

- All grout will be pumped into place using a tremmie pipe.
- The expected volume of each ingredient in the grout mixture will be pre-calculated and documented.
- No accelerator compounds will be used in the grout mixture.

San Bernardino County will be notified at least 2 hours prior to grouting to provide them the opportunity to have a representative onsite during grouting.

2.3.7 Surface Completion Requirements

Surface completions will consist of a steel, locking wellhead monument surface completion. A watertight expanding rubber seal type locking cap will be provided for each well. The wellhead monument (steel stovepipe) completion will be placed over the casing and cap and seated in a 3-foot by 3-foot by 4-inch-thick concrete pad. The ground surface will be freed of grass and scoured to a depth of 2 inches before setting the concrete pad. The diameter of the sleeve or stovepipe will be at least 4 inches greater than the diameter of the casing. The concrete pad will be sloped away from the well sleeve. The identity of the well will be permanently marked on the casing cap and the protective sleeve.

All wells will be secured as soon as possible after drilling by using corrosion-resistant locks. The locks will be keyed for opening with one master key.

2.3.8 Well Development and Geophysical Logging

Following well construction and annular seal placement, the monitoring wells will be developed using a combination of surge block, bailer, and pumping. Development will not begin until at least 48 hours after placement of the grout. During development, temperature, pH, specific conductance, and turbidity will be measured using field instruments. Well development will continue until field parameters stabilize and turbidity is reduced to less than 50 nephelometric turbidity units. The purge water produced during well development will be collected in portable tanks or drums at the drill site and transferred to cuttings bins or storage tanks in the staging area. Disposal procedures for the IDW are discussed in Section 3.0.

A cased-hole geophysical survey (natural gamma ray and induction) will be conducted in the deep monitoring well constructed at each of the Phase 2 well cluster locations (Figure 2). This type of geophysical survey has been run in other monitoring wells at the Topock site for hydrogeologic and water quality characterization.

2.3.9 Well Completion Diagrams

A completion diagram will be prepared for each monitoring well installed. It will include the following information:

- Well identification
- Drilling method
- Installation date(s)

- Elevations of ground surface and the measuring point
- Total boring depth
- Lengths and descriptions of the screen and casing
- Lengths and descriptions of the filter pack, bentonite seal, casing grout, and any back filled material
- Elevation of groundwater surface
- Summary of the material penetrated by the soil boring

2.3.10 Step-out and Contingency Wells

Depending on the results of the Phase 2 field activities, the need for additional (i.e., contingency) monitoring and extraction wells will be evaluated. If construction of the contingency wells is deemed necessary after completion of Phase 2 field activities, then the specifications and associated monitoring protocol will be addressed in a subsequent work plan. Figure 2 depicts proposed locations for the potential step-out well cluster (SO-4), contingency well (CW-1), and potential extraction well (PE-1, PE-2, and PE-3) locations.

2.4 Post-construction Groundwater Sampling

All Phase 2 monitoring wells shall be sampled within approximately 10 days after well development using a temporary adjustable-rate submersible pump. The purge rates and volumes for sampling these small-diameter wells will be selected to obtain representative groundwater samples from the aquifer zone.

Groundwater samples collected from the new monitoring wells will be analyzed for Cr(VI), Cr(T), total dissolved solids, specific conductance, and cations/anions (chloride, sulfate, alkalinity, carbonate/bicarbonate, nitrate, and general minerals). Field water quality parameters (temperature, pH, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity) will also be measured and recorded. The analytical data that result from the post-construction groundwater sampling efforts will be incorporated with the analytical data available from sampling efforts at nearby monitoring well clusters to support the water quality evaluations.

Post-construction groundwater sampling activities will follow the procedures, analytical methods, reporting limits, and quality control plan used for the Topock groundwater monitoring program, as described in the *Sampling and Analysis Plan, Groundwater and Surface Water Monitoring*, dated July 2004 (CH2M HILL, 2004c). The Cr(VI) and Cr(T) samples will be filtered in the laboratory before analysis consistent with prior IM field investigations and the groundwater monitoring program. General chemistry and other parameters will be included in subsequent sampling from all newly installed IM monitoring wells as part of the routine groundwater monitoring program.

3.0 Waste Management and Equipment Decontamination

3.1 Waste Management

Several types of waste materials will be generated during the drilling, development, and sampling of the new monitoring wells. IDW materials that will be generated include groundwater, drill cuttings, and incidental trash.

Water generated during drilling and development activity will be collected in drums or portable storage tanks temporarily located at each drilling site and transferred by forklift to storage tanks in a staging area for characterization, treatment, or disposal at a permitted waste disposal facility. Based on available data, it is anticipated that chromium concentrations in groundwater samples collected from planned monitoring wells will be low to nondetect. Therefore, it is not considered necessary to provide secondary containment berms for water storage tanks.

Drill cuttings include the fragments of rock and soil that are removed to create the borehole. The cuttings will be contained in lined roll-off bins at the staging area during the drilling and sampling activities. After sampling and characterization, all cuttings bins will be removed from the staging area for ultimate disposal by PG&E. The cuttings will be screened for chromium. If the cuttings are characterized as a hazardous waste, they will be transported offsite for disposal at a permitted hazardous waste disposal facility. It is estimated that the soil IDW bins temporarily staged at the drill sites will not remain in excess of 45 days.

Incidental trash will be collected at the end of each drilling shift and hauled off the drill site to an appropriate disposal facility.

3.2 Equipment Decontamination

The back of the drilling rig and all downhole drilling tools will be decontaminated prior to starting each new borehole. Decontamination will be accomplished by steam cleaning the core barrel, drill stem, drive casing, and back of the drilling rig. Steam cleaning will be conducted on a decontamination pad so that all rinsate can be contained and collected. Rinsate from the decontamination operation will be transferred to the cuttings bin or purge water tank that contains materials from the borehole last drilled by the rig. The decontamination rinsate will be managed along with the cuttings or purge water.

4.0 Schedule and Reporting

The schedule for the installation of the Phase 2 monitoring wells is provided in Table 2. This work will be conducted during daylight hours.

Following completion of the fieldwork, a summary report will be prepared to document the well installation and the results of sampling and testing of the monitoring wells. The report will include the drilling, well completion, well development, and post-construction groundwater sampling records and results. The investigation report will be submitted approximately 5 weeks after the completion of the fieldwork. The results of drilling, logging, and water quality analyses will also be provided to DTSC and project stakeholders in periodic interim data releases while well installation and testing program are performed.

TABLE 2
Phase 2 Field Schedule
Phase 2 Monitoring Well Installation Work Plan, PG&E Topock Compressor Station, Needles, California

Activity	Duration	Start	Finish
DTSC Review of Draft Work Plan	9 days	1/12/05	1/24/05
Revise Draft Work Plan and Submit Final to DTSC	5 days	1/24/05	1/31/05
Monitoring Well Drilling and Installation (five locations)	6.5 weeks	1/27/05	3/14/05
Phase 2 Fieldwork Summary Report	5 weeks	3/15/05	4/19/05

All wells near sensitive habitat must be installed by March 15, which is the start of the nesting season for one of the endangered species that may be present. This breeding season extends through the summer and possibly into the early fall. Thus, if any well near sensitive habitat cannot be completed by March 15, it is likely that the drilling of that well would be delayed until October 2005.

5.0 Required Permits and Approvals Required

Table 3 provides a listing of permits and approvals that have been identified as applicable to the installation of the Phase 2 monitoring wells on the BLM and HNWR land adjacent to the Colorado River, near the PG&E Topock Compressor Station. To expedite the schedule, permits, cultural and natural resource surveys, approvals have been obtained for the planned monitoring wells on BLM land. Approval for wells on HNWR property is still pending. All applicable and necessary permits and approvals will be documented prior to moving drilling equipment to the site.

TABLE 3
Permits, Approvals, and Certifications for Monitoring Wells
Phase 2 Monitoring Well Installation Work Plan, PG&E Topock Compressor Station, Needles, California

Agency	Permits, Approvals, Certifications, etc.
BLM	Action memorandum authorizing IM No. 2 activities on BLM land
DTSC	CEQA Notice of Exemption (emergency project)
State Water Resources Control Board/ Colorado River Basin Regional Water Quality Control Board	Notice of Intent and Storm Water Pollution Prevention Plan for construction activities; coverage under statewide general permit
U.S. Fish & Wildlife Service	Informal Consultation
California Department of Fish and Game	CDFG 1600 (emergency exemption)
State Historic Preservation Office	Section 106 Consultation
San Bernardino County	Well permits

6.0 References

- CH2M HILL. 2004a. *Draft Interim Measures Workplan, Topock Compressor Station*. February 3.
- _____. 2004b. *Sampling Plan Supplement, PG&E Topock Interim Measures Drilling Program*. April 13.
- _____. 2004c. *Sampling and Analysis Plan, Groundwater and Surface Water Monitoring, PG&E Topock Compressor Station, Needles, California*. July 14.
- Pacific Gas and Electric Company (PG&E). 2004a. Letter to BLM. "Request for BLM Approval, Well Installation and Construction Activities on BLM-Managed Land." December 22.
- _____. 2004b. Letter to Havasu National Wildlife Refuge (HNWR). "Field Activities Summary for Supplemental Interim Measures No. 2, Well Installation on HNWR." December 22.
- U.S. Bureau of Land Management (BLM). 2004. Letter to Yvonne Meeks, PG&E, from Patricia Taylor, BLM.

Figures

