Pacific Gas and Electric Company®

Sheryl Bilbrey
Director
Chromium Remediation

111 Almaden Road
San Jose Ca 95113

Phone: (408) 621-7135
Mobile: (925) 551-1182
Fax: (415) 973-9052
S4BD@pge.com

February 22, 2013

Patty Kouyoumdjian
Executive Officer
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Blvd
So. Lake Tahoe, CA 96150

Re: Transmittal of Investigation Work Plan in Response to CAO R6V-2008-A4

Dear Executive Officer Kouyoumdjian

This letter transmits an investigation work plan as required by the January 8, 2013 Cleanup and Abatement Order R6V-2008-0002-A4 (the CAO), which directs Pacific Gas and Electric (PG&E) to undertake several additional plume investigation activities. As you are aware, PG&E has submitted a Petition to the State Board contesting several elements of the CAO. This letter and the attached document entitled "Work Plan to Address Provision I.A of Cleanup and Abatement Order R6V-2008-0002-A4" are being submitted to respond to the CAO while the Petition is considered.

If you have any questions on the attached, please feel free to contact me.

Sincerely,

Kevin Sullivan for

Sheryl Bilbrey
Director, Chromium Remediation

Work Plan to Address Provision I.A of Cleanup and Abatement Order R6V-2008-0002-A4 Pacific Gas and Electric Company's Hinkley Compressor Station

Stantec PN: 185702580

CH2MHILL®

February 22, 2013

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Prepared by:

Mason Albrecht, P.E.
Associate Engineer
Stantec

Prepared by:

John Lindquist, CHG #756
Senior Project Hydrogeologist
CH2MHILL

Prepared by:

Chris R. Maxwell, P.G.
Principal Geologist
Stantec

Prepared by:

Information, conclusions, and recommendations provided by Stantec and CH2MHILL in this document has been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.

Licensed Approver:

Chris R. Maxwell, P.G., #7269
Principal Geologist

REGISTERED GEOLOGIST
CHRIS R. MAXWELL
NO. 7269
REGISTERED GEOLOGIST
Exp 6/13
STATE OF CALIFORNIA

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List of Acronyms

CAC	Community Advisory Committee
CAO	Cleanup and Abatement Order
CSM	Conceptual Site Model
Cr(VI)	hexavalent chromium
Cr(T)	total chromium
ELAP	California Environmental Laboratory Accreditation Program
ft-bgs	feet below ground surface
HASP	health and safety plan
JSA	job safety analyses
µg/L	micrograms per liter
ppb	parts per billion
PG&E	Pacific Gas and Electric Company
PVC	polyvinyl chloride
RTC	Release to Construct
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USGS	United States Geological Survey
Water Board	California Regional Water Quality Control Board, Lahontan Region

1.0 Introduction

On January 8, 2013 the California Regional Water Quality Control Board Lahontan Region (Water Board) issued to Pacific Gas and Electric Company (PG&E) Cleanup and Abatement Order No. R6V-2008-0002-A4 (the CAO). On February 7, 2013, PG&E filed with the State Water Resources Control Board a Request for Immediate and Emergency Stay, Petition for Review and Memorandum of Points and Authorities in Support Thereof (the Petition).

PG&E is committed to the best science, engineering and remedial design for the Hinkley Groundwater Remediation Program. To that end, PG&E continues to work with Water Board and the Hinkley community to resolve issues through a technical dialogue. Important milestones, such as the background study implementation and the final remedy decision, must be considered when deciding the scope and timing of future investigation needs. PG&E filed the Petition because PG&E believes that the CAO's directives will not result in the development of scientifically valid data that could either affect the final remedial design or be used to better understand the levels of naturally occurring hexavalent chromium in Hinkley.

Any further investigation efforts in Hinkley must be based on solid science and legal precedent. While PG&E objects to the directives and methods required by the CAO, PG&E intends this Work Plan to present an opportunity for a collaborative, solution oriented approach to resolving issues raised by the Petition. While this Work Plan is intended to address the prescriptive requirements of the CAO, PG&E intends to simultaneously pursue resolution of issues raised by the Petition. PG&E continues to believe in and support all of the positions advanced in the Petition, and does not waive any position set out in the Petition. Those positions include:

1. The CAO requires investigation and plume delineation using an established background number for hexavalent chromium in areas outside of the 2007 background study area. Naturally occurring hexavalent chromium concentrations have been detected at varying levels outside of the original Hinkley background study area, and PG&E's proposed new background study work plan would be much broader than the original study and would require the installation of numerous new monitoring wells strategically placed throughout the Hinkley area, expanding beyond the original study area;

2. The CAO prohibits the use of data more than three years old in support of any argument that chromium data in groundwater is not related to PG&E's historic chromium discharges. Such a prohibition would exclude valid data critical to understanding the site and the significance of current data;

3. The CAO requires that plume boundaries depicting the hexavalent chromium plume at the site connect data points from monitoring wells that are 2,600 feet apart. This prescriptive mapping requirement would artificially expand the size of the plume depiction while precluding the use of relevant data and professional judgment based on site specific circumstances;

4. The CAO requires the placement of new monitoring wells based on chromium concentration trends using statistical trend analysis without regard for variability in naturally occurring chromium concentrations at levels below the existing established background level, or other relevant considerations; and,

5. The CAO requires the depiction of the chromium plume boundary by using data from domestic wells in addition to data from monitoring wells in locations where PG&E is unable to access to property in the vicinity to the domestic wells for installation of monitoring wells. Depiction of the plume boundaries using domestic well data in areas where property is inaccessible would result in artificial expansion of the depicted plume boundary without justification.

While PG&E remains committed to resolving these issues through ongoing technical dialogue with Water Board staff and other interested stakeholders, PG&E does not waive its right to have these issues considered and resolved on the merits based on the Petition currently pending. In the meantime, to facilitate ongoing technical dialogue, PG&E submits this Work Plan.

1.1 WORK PLAN ORGANIZATION

On behalf of PG&E, Stantec Consulting Services, Inc. (Stantec) and CH2MHILL are submitting this *Work Plan to Address Provision I.A of Cleanup and Abatement Order R6V-2008-0002-A4* (Work Plan). Section 1.3 below summarizes the requirements in Provision I.A of the CAO. This Work Plan is organized into the following sections:

- Section 1.0 – Introduction
- Section 2.0 – Background
- Section 3.0 – Domestic Well Sampling Scope of Work
- Section 4.0 – Upper Aquifer Monitoring Well Installation
- Section 5.0 – Reporting and Schedule
- Section 6.0 – Works Cited

1.2 BACKGROUND CHROMIUM

Maximum background levels for total dissolved chromium [Cr(T)] and hexavalent chromium [Cr(6)] in groundwater of the Hinkley Valley were proposed by PG&E in 2007 and adopted by the Water Board in 2008. The CAO requires installation of additional monitoring wells in the North Hinkley Valley and Water Valley, assuming these values are appropriate benchmarks in these areas to assess the presence of the chromium plume (i.e., the CAO presumes values over these levels indicate the presence of the plume).

Since the maximum background values were proposed and adopted, the Water Board and others have raised concerns regarding those values. Furthermore, the values were developed for groundwater in the Hinkley Valley south of Thompson Road (i.e., the South Hinkley Valley). The values were not intended to, and do not, represent conditions further to the north where monitoring wells are now being required by the CAO. The geologic and hydrologic conditions in the North Hinkley Valley and Water Valley differ from the southern areas where the prior studies were conducted. It is not appropriate to apply the results of the prior background studies to these northern areas.

As required by the CAO, in good faith, this Work Plan proposes the installation of additional monitoring wells in the North Hinkley Valley and Water Valley to assess water quality conditions. PG&E offers that it will be inappropriate to compare the chromium results from wells in these areas to the maximum background levels established for areas to the south. A more appropriate course of action would be to work collectively with the United States Geological Survey (USGS) and the community to conduct a timely update to the background study including:

- Installation of monitoring wells in appropriate locations and collection of appropriate data (geology, hydrology, water quality) to assess background conditions specific to the investigation areas including those required in the CAO (particularly the North Hinkley Valley and Water Valley); and,

- Collection of similar data from existing monitoring wells to assess conditions in these areas and the possible source(s) of chromium.

Based on results from existing monitoring and/or domestic wells in these areas, it is reasonable to conclude that chromium results in some of the new wells proposed in this Work Plan will likely be above the currently established background levels that were intended for areas to the south. These new results should not be used to draw the chromium plume boundaries. Instead the results should be incorporated into PG&E's on-going work with the USGS and the community to evaluate background levels.

1.2.1 2007 Background Study Report and Water Board Approval

On February 28, 2007 Pacific Gas and Electric Company (PG&E) submitted the *Groundwater Background Study Report, Hinkley Compressor Station, Hinkley, California* (Background Study Report - CH2MHILL, 2007). The Background Study Report concluded that the statistical background concentrations for Cr(T) and Cr(6) in groundwater of the Hinkley Valley are 3.23 micrograms per liter (µg/L) and 3.09 µg/L, respectively. On November 18, 2008 the Water Board adopted amended Cleanup and Abatement Order No. R6V-2008-0002A1 specifying the maximum background concentrations for Cr(T) and Cr(6) as 3.2 and 3.1 µg/L, respectively.

1.2.2 2011 Peer Review

In 2011, Water Board staff submitted the February 2007 Background Study Report to three individuals with expertise in the fields of hydrogeology, statistics, and laboratory analysis. Peer reviewer comments were provided to PG&E by Water Board staff on October 14, 2011. Many of the concerns raised by the reviewers are shared by PG&E.

1.2.3 On-Going Activities to Update the Background Study

On February 22, 2012, PG&E submitted to the Water Board the *Work Plan for Evaluation of Background Chromium in the Groundwater of the Upper Aquifer in the Hinkley Valley* (Updated Background Study Work Plan – Stantec, February 2012). The purpose of the Updated Background Study Work Plan was to address the peer reviewer comments and develop a complete scope of work to assess maximum chromium background values throughout the South and North Hinkley Valleys and, as necessary, Water Valley. PG&E is currently working with the Water Board staff, the USGS, and members of the community to refine the work plan and to develop area-specific site conceptual models (CSMs) for the site.

PG&E anticipates that the technical discussions will continue and that the resulting revised plan will be submitted in the near future and implementation will begin soon thereafter. PG&E believes that the most productive course of action would be a timely update of the background study in these areas using the best science available in cooperation with the USGS and the community.

1.3 SUMMARY OF CAO PROVISION 1.A AND WORK PLAN STRUCTURE

Provision I.A of the CAO requires that by February 22, 2013 PG&E submit a work plan proposing a sampling and analysis plan (SAP) for domestic wells and the installation of groundwater monitoring wells in specified target areas. The following summarizes the requirements of Provision 1A and the associated Work Plan structure.

- *Provision I.A.1 – Sampling and Analysis Plan for Domestic Wells*

Provision 1.A.1 requires the following: *"A sampling and analysis plan to immediately sample domestic wells in target areas of the northern-most plume area at the Hinkley Gap, the eastern boundary area near Dixie Road, and any other areas outside the currently identified primary contiguous plume boundary that may show anomalous or otherwise unexplained concentrations of chromium in domestic wells. The work plan must include a statistically based trend analysis methodology to determine positive or negative changes in groundwater chromium concentrations over the six month period, beginning in March 2013. The general vicinity of domestic wells exhibiting an increasing trend in chromium concentrations will be targeted for follow-up installation of a shallow groundwater monitoring well."*

Section 2 of this Work Plan includes background information regarding the sampling of domestic wells as required by the CAO. Section 3 provides a proposed scope of work for the sampling of domestic wells and statistical analysis of groundwater sample analytical data in the target areas specified in the CAO. Standard Operating Procedures (SOPs) for groundwater sampling are provided in Appendix A.

- *Provision I.A.2 – Installation of Groundwater Monitoring Wells*

Provision 1.A.2 requires the following: *"Groundwater monitoring well sampling locations in the upper aquifer in the following areas that will allow for the definition of the vertical and lateral extent of the chromium plume to at least maximum background concentrations of 3.1 ppb Cr(VI) and 3.2 ppb Cr(T) and to verify groundwater flow.*

a) Proposed monitoring well locations shall not exceed one-quarter mile distance from other monitoring wells in accessible areas.

b) Eastern boundary: east of wells MW-115 and MW-145 on Dixie Road.

c) Northern boundary: north of wells MW-154 and MW-130 to at least domestic well 21N-04 on Hinkley Road in the Harper Dry Lake Valley; west of Mountain View Road (north of Salinas Road);and east of Fairview Road extension (north of Sonoma Road).

The proposed sampling locations must be previously scoped to assure a reasonable probability of success in gaining access and likelihood of well installation or temporary groundwater sampling, such as within previously disturbed areas, such as right of ways. The work plan shall identify all properties owned by the Discharger, and discuss and mark on the map areas where previous attempts to gain access to private properties and desert tortoise habitat have been unsuccessful. Nothing in this Order authorizes the take of a federal or state listed endangered species."

Section 2 of this Work Plan contains background information regarding PG&E's monitoring well installation efforts including a discussion of the process to secure access. Section 4 contains a scope of work for installation and sampling of upper aquifer wells as required by the CAO. Table 1 identifies those wells proposed in this Work Plan where access is intended to be on public right-of-way and those which are planned for private property.

2.0 Background

The following provides background information for this Work Plan.

2.1 DOMESTIC WELL SAMPLING

The CAO requires monthly sampling of domestic wells in targeted areas north and east of the "primary contiguous plume boundary." The CAO does not explicitly define the specific domestic wells to be sampled or boundaries of the target areas for the required domestic well sampling. Finding 14 (under "Undefined Chromium Plume in Upper Aquifer") and Provision I.B of the CAO both provide general descriptions of the targeted areas:

- **Finding 14:** "*To fully define the plume, especially in the targeted northern-most area at the Hinkley Gap and the eastern area at Dixie Road, the CAO requires the Discharger to prepare a work plan to sample domestic wells in these areas once a month for a period of at least 6 months beginning in March 2013 to determine the levels of total and hexavalent chromium.*"
- **Provision 1.B:** "*The Discharger must begin sampling domestic wells in the north-most plume area at the Hinkley Gap and the eastern boundary area near Dixie Road monthly for a period of not less than 6 months for total and hexavalent chromium concentrations.*"

At the Water Board's January 16, 2013 public meeting in Barstow, Water Board staff presented graphics summarizing the requirements of the CAO (Water Board, 2013b). The presentation included a map illustrating the approximate target areas for domestic well sampling in the north and east. Figures 2 and 3 of this Work Plan show the approximate target areas in the north and east from the Water Board staff's presentation, and include the approximate boundaries of areas where Cr(VI) and Cr(T) exceed 3.1 and 3.2 µg/L respectively in Upper Aquifer monitoring wells based upon data presented for the Third Quarter of 2012 (CH2MHILL, January 2013).

2.2 STATUS OF UPPER AQUIFER MONITORING WELL INSTALLATIONS

Upper aquifer monitoring wells have been proposed to the Water Board in various documents. The following list identifies work plans prepared by Stantec for which monitoring wells continue to be installed as property access and biological/cultural clearance issues are resolved. PG&E's process for securing access is discussed in Section 2.3. Figure 4 illustrates the status of the on-going investigations. In summary, PG&E has conducted drilling operations and either installed monitoring wells (44 locations) or determined saturated alluvium is not present (2 locations) at 46 of the 54 locations discussed below.

- **Technical Report – Response to Investigation Order No. R6V-2011-0043 (Stantec, September 2011)** – presented information collected during investigations conducted to comply with the referenced Order, and proposed the installation of monitoring wells at 32 additional locations (Note: the Water Board requested an additional five (5) locations in response to PG&E's proposed well installation plan);

- **Work Plan for the Installation of Monitoring Wells to the West of Mountain View Road (Stantec, May 2012)** – proposed the installation of monitoring wells at nine (9) locations to evaluate groundwater gradients in the vicinity of the Lockhart Fault, collect groundwater samples for laboratory analysis, and initiate the installation of wells to be used in support of the *Work Plan for Evaluation of Background Chromium in the Groundwater of the Upper Aquifer in the Hinkley Valley* (Background Study Work Plan – Stantec, 2012); and,

- **Work Plan for Installation of Monitoring Wells North and East of Red Hill (Stantec, July 2012)** – proposed the installation of three (3) monitoring wells to the east of Red Hill and five (5) monitoring wells to the north of Red Hill (in Water Valley).

PG&E has presented information to the Water Board on progress and findings of these on-going investigations in the following reports:

- **Technical Memorandum – Update to Upper Aquifer Groundwater Investigation Activities (Stantec, February 2012)** – presents progress and findings for the installation of monitoring wells as proposed in the above-referenced September 2011 Technical Report;

- **Technical Memorandum – First Semester 2012 Update on Upper Aquifer Groundwater Investigation Activities (Stantec, July 2012)** – presents progress and findings for activities conducted during the 1st Semester 2012 including installation of seven (7) monitoring wells;

- **Preliminary Reporting of Geology and Hydrology for Investigations in the Western Area (Stantec, November 2012)** – presents the geology and hydrology information for the advancement of borings and installation of monitoring wells as proposed in the above-referenced May 2012 work plan for installation of nine (9) monitoring wells west of Mountain View Road; and,

- **Conceptual Site Model for Groundwater Flow and the Occurrence of Chromium in Groundwater of the Western Area (Stantec and CH2MHILL, January 2013)** – expands upon the above-referenced preliminary report, including historical land use and groundwater level information and chromium data for the newly installed monitoring wells.

Figure 4 illustrates the status of the on-going investigations. PG&E has installed or attempted to install monitoring wells at 46 of the 54 locations discussed above. The following discusses the locations where monitoring wells have not been installed.

- September 2011 Report - Monitoring wells have not been installed at four locations as shown on Figure 4 (C, W/X, and MW-141). As previously discussed with the Water Board, the property owner at Location C verbally agreed to access but neighboring properties that require overland travel to access the C location did not agree. Subsequent land disturbance actions on the property by an unknown party resulted in adverse impact to sensitive species habitat. Water Board staff and PG&E agreed that access to that property for well installation would not be inappropriate.

  The property owner for the W/X location(s) agreed to access and signed a formal access agreement, but later denied access when PG&E attempted to install a monitoring well. The owner of land at the MW-141 location has also denied PG&E access. PG&E has attempted to gain access to neighboring properties as alternatives to these two locations, but has been unable to secure either property access or biological clearance for each of the locations.

- West of Mountain View - Monitoring wells were attempted but not installed at two (2) of the locations because saturated upper aquifer alluvium was not present (Western 7 and Western 8). There are no outstanding access issues for this area.

- North and East of Red Hill – Monitoring wells have not been installed at four (4) locations as shown on Figure 4 (Red Hill A, Red Hill E, Red Hill G, and Red Hill H).

  The property owner for Red Hill A has agreed to access, but only for a one year period. A short-term agreement for well installation and future sampling is not appropriate. PG&E is currently in discussions with this owner to refine the access limitations.

  PG&E has been unable to identify and/or contact property owner(s) for the Red Hill E location, including efforts by private property owner identification specialists. PG&E continues to attempt to contact property owner(s) in this area.

  PG&E has been in contact with and provided a draft agreement to the property owner for the Red Hill G location, and is awaiting a response. To date the property owner has not indicated whether or not access will be allowed.

  PG&E has received verbal agreement for the Red Hill H location, and is awaiting return of the final signed access agreement. The property owner has been out of the United States, and has indicated the agreement will be signed and returned in the near future.

Note that wells at location MW-134 were abandoned and replaced at the same location by MW-154S1/S2 because the construction of the MW-134S1/S2 cluster was found to be faulty. Additionally, MW-132S has been completed but has not been developed or sampled due to the presence of desert tortoise habitat.

In summary, PG&E has installed monitoring wells at 44 of the 54 locations where wells were planned since submittal of the Technical Report in September 2011. Saturated alluvium was not present at two (2) of the locations; eight (8) locations remain where PG&E has been unable to attain access to date. PG&E has been successful at gaining access and conducting drilling activities at 85 percent of the 54 locations.

2.3 ACCESS PROCESS FOR MONITORING WELL INSTALLATIONS

As discussed in Section 2.2, PG&E over the last several years has been installing monitoring wells in locations where property access has been limited. Well installations south of and in the immediate vicinity of the DVD are considerably more accessible due to the presence of PG&E owned property and abundant public right of way (i.e., County of San Bernardino owned or maintained and non-maintained roadways). As PG&E's monitoring well installation program has expanded to the east, west, and north there have been increasing challenges, primarily related to:

- habitat for endangered species such as the desert tortoise and Mojave ground squirrel;
- limited right-of-way opportunities (i.e., where roadways are present they commonly do not extend across County owned property but instead are located on private land); and,
- property owners who are unwilling to provide access to PG&E.

With regards to the first item, as the Water Board is aware, PG&E is currently working with State and federal agencies to permit the appropriate take of habitat and/or species as part of the investigation and remedial activities. Until such time as permits are in place, PG&E is somewhat limited on drilling locations where there is desert habitat and no opportunities for access without impact to biological resources. However, PG&E expects that permits will be obtained over the next several years and is committed to revisiting drilling locations in the future as necessary to complete investigation and/or remedial decisions.

The third item above (property owners unwilling to provide access) has become increasingly challenging, as several homeowners have blocked access to their land on the actual day of drilling mobilization (after all permits, clearances and approvals have been obtained), resulting in sizeable effort being wasted and significant time delays.

As illustrated on Figure 4, PG&E has been successful in achieving access for well installation through a diligent process that requires extensive effort to address each of the above challenges. PG&E's 85 percent success rate is attributed to these efforts. The process followed by PG&E to achieve access is illustrated on Figure 5. The following sections summarize this process.

Steps 1 and 2 – Identify Target Well Area and Conduct Preliminary Feasibility Evaluation

Step 1 in the process is to identify the target drilling area. In the example of this Work Plan, the target area is identified by requirements of the CAO. In the past, target areas have also been identified by PG&E such as monitoring wells proposed in the September 2011 Report, the Western Investigation Work Plan, and the Red Hill Work Plan.

Step 2 is to conduct a preliminary review of the target area to identify property that may provide suitable access for well installation. The first preference is to identify a PG&E owned parcel or a right-of-way easement that can be readily accessed. In some cases, an easement may exist in a localized area that cannot be readily accessed through other easements or accessible private property. If an accessible easement is present, PG&E will target this location for a monitoring well and proceed to the biological clearance process [Release to Construct (RTC) – see Step 4 on attached Figure 5].

If PG&E owned land or an accessible right-of-way easement is not available, PG&E will conduct an initial review of habitat conditions on private property through a review of aerial photographs and a "drive by" of the area (as feasible). PG&E will also attempt to contact private property owners via telephone and/or mail. Key property features that suggest access may be suitable for well installation include existing roadways or open areas (such as shallow dry washes) where habitat conditions that support endangered species may not be present.

If through this initial screening process one or more properties are identified that may be suitable for well installation, and the property owner can be located and indicates access may be granted or considered, PG&E will conduct a field visit with a biologist upon verbal approval of the property owner. Note all property owners that would need to provide access for this location must grant approval to travel across their property. For example, if a second parcel exists between a public roadway and the first property where the owner has verbally indicated access will or may be provided, and this second parcel owner cannot be located or is unwilling to provide access, then PG&E cannot access the first parcel unless another route can be identified. Furthermore, if both property owners verbally allow access to their respective properties for a biology review and it is determined the second parcel adjacent to the right-of-way has no access due to habitat conditions, then the first parcel is also not accessible without finding another appropriate route.

Step 3 and 4 - Biology Review (RTC Process)

A biology and cultural review must be conducted once the preliminary process is complete and a candidate(s) property is identified. Step 3 in the process is to solicit verbal approval from the property owner(s) to visit the property for an initial "on the ground" review by a biologist. PG&E typically does not seek a formal signed access agreement from the property owner(s) at this point in the process, in case there are biological concerns that would result in the property not being appropriate for well installation at this time. PG&E must gain at a minimum verbal approval from each of the owners of property that must be accessed for the well installation.

Assuming the initial field review by the biologist indicates the property may be suitable for well installation, as necessary a qualified professional(s) will visit the property(ies) that will need to be accessed for well installation, including the drilling location and access route. For the candidate well location to be approved, the review must conclude that the drilling rig and support equipment can readily access and operate at the location without adversely impacting species or its habitat or any culturally significant items. That is, there can be no "take" of species or habitat or cultural resources as a result of the activity. Assuming the review concludes the drilling operations are appropriate from a cultural and biology perspective, a RTC will be prepared by PG&E (Step 4) and provided to the firm responsible for drilling oversight. The RTC will include mitigation measures, as appropriate, to ensure protection of species, habitat, and cultural resources identified.

During Steps 3 and 4, PG&E attempts to coordinate with the property owner(s) regarding travel routes and drilling locations. If the owner is currently a resident on the property, it is common for the person to have an opinion on location(s) that would be acceptable for a well considering PG&E will be accessing the property relatively frequently in the near future for sampling (at least quarterly). The PG&E representatives, including the biologist and geologist, must coordinate with the property owner to ensure each of the objectives is achieved in citing the locations (i.e., both habitat avoidance and appropriate location for the well to achieve the investigation objectives). PG&E works diligently with the property owner(s) to ensure issues are identified and worked through during Steps 3 and 4 to avoid misunderstandings once it is time to sign the final agreement (Step 5).

The drilling operations in themselves require adequate spatial clearance not only for the drill rig driving access (such as a roadway) but also for support vehicles. The vehicles must also have the ability to adequately maneuver the equipment (including the ability to turn around and exit the drilling area). Our experience is the simple existence of a narrow dirt roadway is not enough space for drilling operations. The roadway needs to be of adequate width and in fair enough condition for the equipment to travel overland and there needs to be adequate clearance in the drilling area for support equipment and personnel to safely conduct the drilling operations.

In the past, PG&E has attempted to conduct Step 5 (Signed Access Agreement) prior to the RTC process. Unfortunately, in some cases the signed agreement was obtained and subsequently the biologist(s) determined an RTC could not be granted as a result of the habitat conditions on the property or determined that the agreement required modification as a result of the RTC requirements. PG&E typically now provides the property owner(s) with the access agreement for review during Steps 3 and 4 to ascertain if there are any concerns with the document, and requests the owner(s) allow the RTC process to be completed before the agreement is finalized and signed.

Step 5 – Obtain Final Signed Access Agreement

Once the RTC is complete, PG&E will contact the property owner to discuss the agreement and request signature. The agreement includes access for the well installation, development, and future sampling. Once the signed agreement is received, PG&E will schedule the field activities. PG&E provides the property owner(s) with advance notice of the drilling schedule.

There are several challenges even when Step 5 is completed or nearly completed. On two recent occasions (MW-175 and W/X), PG&E has completed each of the steps and obtained signed access agreements only to have the owner not allow access. On one of these occasions (W/X) the owner signed the agreement and confirmed access the day prior to drilling only to turn PG&E away on the day field activities were planned. On a third occasion (MW-171 and MW-172), PG&E completed well installation but the owner then refused access to perform well development and sampling. PG&E has successfully worked through issues with one of these property owners (and MW-175), and has been able to complete the work as planned and agreed upon.

On a fourth occasion (Red Hill A), PG&E completed Steps 3 and 4 and the owner was prepared to allow access but indicated access could only be provided for one year at which time the agreement would need to be reconsidered. It is not reasonable for PG&E to complete a well under the auspice that access may be denied after one year. PG&E is continuing discussions with this owner.

Summary of Property Access Process

The monitoring well installation, development, and sampling program includes a well-defined process implemented by PG&E to secure locations in accordance with applicable laws and regulations. Over the last several years, PG&E has refined the process to identify candidate locations as quickly as possible and then work with property owners to evaluate the Site conditions with respect to equipment access, habitat, and possible cultural issues.

PG&E has now been successful at obtaining access and performing drilling operations at approximately 85 percent of the intended locations. PG&E is committing to continuing these efforts for the remaining locations, and will be providing the Water Board with periodic updates on progress.

As discussed in the following sections, PG&E is proposing the installation of monitoring wells at additional locations as part of this Work Plan. PG&E has followed the process outlined above in the preliminary citing of these well locations. Table 1 summarizes the current status of the access process. In several locations, right-of-way access appears to be viable and access to these locations will likely be successful. In other locations private property access is required.

PG&E has already completed Steps 1 to 3 (see Figure 5) for the locations proposed in this Work Plan. Steps 4 and 5 remain, and while preliminary efforts for the private property locations suggest access may be feasible a final determination is not certain until the access process is fully completed.

3.0 Domestic Well Sampling Scope of Work

The following discusses the scope of work for the domestic well sampling and statistical data analysis scope of work.

3.1 PRE-FIELD ACTIVITIES

Owners of active domestic supply wells designated for sampling will be contacted by PG&E representatives shortly after PG&E receives Water Board approval of this Work Plan to:

- Inform the owners of the requirements of the CAO; and,
- Request permission to access each well for monthly sampling for six months, beginning in March 2013 and ending in August or September 2013 (depending on the first sampling date for each domestic well).

Permission will be requested from the owners to inspect the wells prior to the first planned monthly sampling event and, if necessary to allow collection of representative groundwater samples, retrofit each wellhead with a new sampling port. Retrofit procedures are described in the "Well Survey" section of standard operating procedure (SOP) A7 from the *Fourth Quarter 2012 Groundwater Monitoring Report and Domestic Well Sampling Results, Site-wide Groundwater Monitoring Program, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California,* (CH2M HILL, 2013). This SOP, titled "Purging and Sampling of Active Domestic Wells with Dedicated Pumps," provides details regarding inspection and retrofitting of active domestic wellheads for sampling. SOP A7 is included in Appendix A of this Work Plan along with other relevant SOPs for domestic well sampling.

3.2 DOMESTIC WELL SAMPLING

In accordance with Ordering Paragraph I.A.1 of the CAO (the Ordering Paragraph), Figures 2 and 3 show areas where domestic wells will be sampled monthly for six months beginning in March 2013, assuming that the well owners provide PG&E and it's representatives permission to access the well for sampling and, if necessary, retrofitting the well with a suitable sample port.

Domestic wells in the areas of interest (designated on Figures 2 and 3 with the red outline) will be sampled if they are currently active. As the purpose of the Ordering Paragraph is to use domestic well data to potentially locate additional monitoring wells, PG&E plans to discuss with Water Board staff whether or not a domestic well needs to be sampled if it is already located

within a ¼ mile distance from an existing monitoring well and/or a new monitoring well location proposed in this Work Plan.

If a targeted well cannot be sampled during one or more of the six planned monthly sampling events PG&E will discuss with the Water Board options for obtaining additional samples during subsequent months, with the goal of obtaining a total of six samples from each targeted well. Such an extension of the sampling period, if allowed by the Water Board, may require a corresponding extension of the planned due date for the report of results, or the submittal of the report containing the results of all wells where six monthly samples could be obtained and a later submittal of an addendum containing the results for the remaining wells.

If fewer than six samples are obtained from the targeted wells, an explanation will be provided in the summary report, including discussion of potential impacts on the statistical analysis. Data obtained from all domestic wells sampled will be included in the summary report, whether or not a sufficient number of samples (six) have been obtained from each well to conduct a reliable statistical analysis using the Mann-Kendall test. [1]

SOPs for domestic-well sampling and related activities described in Appendix B of the *Fourth Quarter 2012 Groundwater Monitoring Report and Domestic Well Sampling Results, Site-wide Groundwater Monitoring Program, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California,* (CH2M HILL, 2013) will be followed. The relevant SOPs are attached to this work plan as Appendix A. Field duplicate quality control samples will be collected and analyzed to evaluate sampling precision. Field duplicates will be labeled and packaged in the same manner as other samples. Each duplicate will be taken using the same sampling and preservation method as other samples. Field duplicates will be collected at a minimum frequency of one in every 10 samples.

Samples will be delivered to a laboratory certified by the California Environmental Laboratory Accreditation Program (ELAP), under appropriate chain-of-custody procedures, and analyzed for both Cr(VI) using EPA Method 218.6 with a target reporting limit of 0.06 ppb and Cr(T) using US EPA Method 6010B with a reporting limit of 1 ppb.

[1] As set forth in the Petition, PG&E objects to the use of a statistical trend analysis to require placement of monitoring wells absent consideration of other relevant evidence and analysis.

4.0 Upper Aquifer Monitoring Well Installation

Three (3) separate investigation areas for upper aquifer monitoring well installations were identified based on the area requirements for upper aquifer monitoring wells in Provision I.A.2 of the CAO. The three investigation areas are shown on Figure 6.

The individual investigation areas and proposed new upper aquifer monitoring well locations (designated with blue stars) are shown on Figures 7A to 9. The following sections describe the target drilling areas and procedures for the monitoring well installations proposed herein.

4.1 TARGET AREAS FOR WELL INSTALLATION

As discussed in Section 1.3, there are three target areas for well installation specified in the CAO. Figures 7A and 7B illustrate two options for the wells requested in Water Valley (Investigation Area 1). Figures 8 and 9 illustrate existing and proposed wells in Investigation Areas 2 (North Hinkley Valley) and 3 (East of Dixie Road), respectively. The following discusses the well installation proposal for each of the three areas.

Figures 7A to 9 include information that was identified during the preliminary access activities described under Steps 1 to 3 (see Figure 5). As discussed in Section 2, there are numerous properties where access appears to be infeasible at this time because of biological habitat. PG&E expects that in the future permits will be obtained from appropriate State and federal agencies to conduct investigation and/or remediation activities in these areas. If necessary for assessment or remedial actions, PG&E can revisit areas in the future that are currently considered "off limits", and tasks such as well installation can be considered at that time as necessary to address critical investigation and/or remediation issues.

4.1.1 Water Valley

Figures 7A and 7B present two options to address the requirements of the CAO. Figure 7A represents PG&Es understanding of the literal reading of the current CAO language; Figure 7B includes an alternative proposal to meet the assumed technical intent of the CAO, based on current understanding of groundwater flow patterns and access issues in the investigation area.

The CAO requires the installation of monitoring wells north of existing wells MW-130 and MW-154, extending to domestic well 21N-04 approximately 3 ¼ miles to the north. The inferred target areas shown on Figures 7A and 7B covers over 3 square miles.

The well installation program shown on Figure 7A was intended to address the specific requirements of the CAO for this area. Monitoring wells are proposed on approximately ¼ mile spacing, as feasible based upon access limitations.

As shown on Figure 7A, much of the property within the target area is undisturbed desert land that would not allow for drilling operations under current field and permit conditions. The area along Hinkley Road is likely accessible for drilling under access from the County of San Bernardino, up to the point where the pavement ends as noted on both Figures 7A and 7B. From that point forward, there is no public access for monitoring well installation and private land must be accessed with the exception of a limited easement in the immediate vicinity of well 21N-04. Figure 7A of this Work Plan proposes drilling locations at the required ¼ mile spacing along Hinkley Road where public access is anticipated.

PG&E is in the process of contacting property owners in the area on either side of Hinkley Road along the approximately 1.0 mile section where a public access is not available, and has not been successful in identifying drilling locations as of the date of this Work Plan. PG&E will update the Water Board as more information is available.

In the southern portion of the investigation area PG&E previously proposed the installation of a monitoring well at Location E. As shown on Figures 7A and 7B, PG&E has been unable to locate property owners in the vicinity of this proposed well. Other nearby property is federally owned. PG&E will continue efforts to locate property owners for potential well installation.

Figure 7B provides an alternative approach for well installation in Water Valley, based on the anticipated direction of groundwater flow given the known local surface topography. This topography suggests that groundwater flow is likely to the west and northwest in this part of Water Valley rather than to the north as was assumed in developing the target area in Figure 7A. Conceptual monitoring well locations shown on Figure 7B are intended to evaluate groundwater flow and water quality conditions down-gradient of the existing chromium plume as currently depicted. PG&E proposes that the well installation program illustrated on Figure 7B is a more appropriate means of initial investigation to assess groundwater conditions in this area than the plan illustrated on Figure 7A.

4.1.2 North Hinkley Valley

Figure 8 illustrates the target investigation for the areas of the North Hinkley Valley specified in the CAO, as interpreted by PG&E. As discussed in Section 2 and shown on Figure 4, PG&E has been installing monitoring wells in these areas since 2011. PG&E has mostly recently completed the installation of wells MW-173S1/S2/D and MW-175 S1/S2/D and results from these new wells will be available in the near future.

As shown on Figure 8, PG&E has mostly completed investigations to the west of Mountain View Road within the confines of property and biology access limitations. Two new monitoring well locations are proposed where property and biology access may be feasible. Additional drilling locations may be completed in the future as property access becomes available and/or biological permitting is completed.

PG&E believes that there is no immediate technical purpose for further lateral (east and west) definition of plume boundaries in this area. The alluvial hydraulic system in this area is bounded on the east and west by the bedrock confines of the North Hinkley Valley. The current definition of the plume in this area has resulted in residents in this section of North Hinkley Valley being included in the whole house replacement water program. This program is designed to ensure that no exposure from potential groundwater impacts will occur. Further refinement of the lateral definition of the plume will not bring additional residences into this program. Therefore, the only possible technical justification for further refinement of the plume definition is for potential remedial action. This task can safely be deferred in the near term until the biological permitting process is completed.

PG&E continues efforts to secure access for well installation east of the Fairview Road extension. The majority of property in this area is either not accessible at this time due to habitat or PG&E has been unable to contact property owners. PG&E will continue efforts to locate property owners for well installation, including location H that was previously proposed in the work plan for installation of monitoring wells near Red Hill.

4.1.3 East of Dixie Road

Figure 9 illustrates the target area east of Dixie Road as specified in the CAO and as interpreted by PG&E. Public and private land access is somewhat available in this area, with the exception of the railroad and State Hwy 58. Access to both of these properties would be time consuming, and drilling and sampling operations on these properties also pose significant logistical and safety issues. Because other options appear available, PG&E is not pursuing well installations on these two properties at this time.

PG&E recently completed the installation of well MW-176S and results should be available in the near future. As shown on Figure 9, there is no access within the CAO specified ¼ mile distance between this new well and MW-115S to the west along Dixie Road. With this exception, as shown on Figure 9, this Work Plan proposes the installation of wells on a roughly ¼ mile spacing in the target area.

4.2 PRE-FIELD ACTIVITIES

Before starting field activities, Stantec will complete appropriate pre-construction activities for each of the proposed locations including local agency permitting, subsurface utility clearance, and both biological and cultural clearance. The Site-specific health and safety plan (HASP) will be updated as necessary to include task specific job safety analyses (JSA).

PG&E's property access process is detailed in Section 2.3. PG&E will follow this process for each of the drilling locations, and will obtain appropriate signed access agreements and complete biological and cultural clearance prior to drilling.

4.3 INSTALLATION OF MONITORING WELLS

Well installation activities will be completed by a C-57 licensed well driller, and overseen in the field by a qualified Stantec representative. The following describes the well borehole advancement and well installation procedures.

4.3.1 Borehole Advancement and Soil Logging

A pilot borehole will be completed at each location in advance of well installation activities, to profile the lithology. Pilot boreholes will be advanced using hollow-stem auger drilling methods, and will be terminated at bedrock, or at a maximum depth of 180 feet below grade (ft-bgs), whichever is encountered first. Soils from the pilot borehole will be described in the field according to the Unified Soil Classification System (USCS), by or under the direct supervision of a California Professional Geologist.

In the unsaturated zone, 18- to 24-inch long soil cores will be collected at not less than 5-foot intervals, using a split spoon sampler. Continuous split spoon or core barrel sampling will be performed in saturated zone soils from the water table (approximately 50 to 70 ft-bgs) to the total depth of the boring. All cores will be retained in boxes at the Site. This borehole will then be abandoned by backfilling with bentonite up to approximately 50 ft-bgs, and completing to grade with Portland cement.

Sieve analysis will be performed on select soil samples collected within the anticipated screen intervals of each monitoring well, and the sieve analysis data will be evaluated to determine an appropriate well design (filter pack sand and slot size).

4.3.2 Number of Wells at Each Location

As many as three wells may be installed at each location, depending on the thickness of the saturated upper aquifer alluvium and the presence or absence of low permeability confining layers. At all locations where groundwater is encountered, one well will be completed across the water table, and will be constructed with no more than 15-feet of well screen (see Figure 10). Additional wells may be installed where the upper aquifer is of sufficient thickness, and will be completed below the water table with 10-feet of well screen each (see Figure 11). All wells will be complete in individual boreholes. Boreholes for the monitoring wells will be advanced using hollow stem auger methods.

4.3.3 Well Construction

Wells installed at the water table will be completed in a 10-inch-diameter borehole, and will be constructed with 4-inch Schedule 40 polyvinyl-chloride (PVC) well casing. Wells installed deeper in the saturated zone will be constructed with 2.5-inch-diameter schedule 80 PVC in 8-inch-diameter boreholes.

Installation methods and construction design will be in accordance with the *Water Well Standards: State of California Bulletin 74-81*, *California Well Standards Bulletin 74-90,* San Bernardino County requirements, and industry standard practices. As noted on Figures 10 and 11, wells will be installed with centralizers, and well materials will be placed in the borehole using a tremie pipe. Filter pack sand will be placed in the well annulus from at least 6 inches below the bottom of the well casing to approximately 2 feet above the top of the screen interval. Hydrated bentonite and/or non-cement grout slurry will be placed from the top of the filter pack sand to a depth of approximately 40 to 50 ft-bgs. The remaining portion of the well annulus will be completed with cement grout slurry to 2 feet below grade. A flush-mounted locking well box, including a bolted steel cover and well identification label, will be installed at the ground surface.

4.3.4 Management of Drilling Materials

Water and soil cuttings generated during borehole advancement or well installation will be contained at the drill site and transported to the Ranch agricultural unit property for disposal.

4.4 WELL DEVELOPMENT AND SAMPLING

The following discusses the proposed development, sampling and laboratory analysis, and surveying methods for the proposed monitoring wells. These methods are consistent with other recent monitoring well development activities performed on-Site.

4.4.1 Well Development

Each of the new monitoring wells will be developed using mechanical surging, followed by bailing and/or pumping. Field parameters including water level, temperature, pH, conductivity, dissolved oxygen, oxygen reduction potential and turbidity will be monitored during pumping. A minimum of ten borehole volumes of water will be removed from each well during development, unless the well becomes dry and does not recharge at a rate which would facilitate the removal of additional water within a reasonable period of time. At these locations, bailing and pumping will be conducted as feasible within the confines of the well recharge rate. In some cases, more than ten borehole volumes of water may be removed in an effort to reduce turbidity. If more than one development event is conducted, multiple events for an individual well will be separated by no less than 48-hours, to allow aquifer equilibration.

Water generated during development will be transferred directly into a trailer-mounted holding tank and transported to the Ranch agricultural unit property for disposal.

4.4.2 Well Survey, Sampling, and Laboratory Analysis

Monitoring wells will be surveyed to a common datum, to record location (X,Y) and elevation above mean sea level (Z).

A minimum of two weeks after the completion of development activities, each of the new monitoring wells will be sampled by qualified PG&E representatives. Wells will be sampled according to the approved low-flow sampling procedures detailed in Appendix A of the *Second Semi-annual Monitoring Report – Year 2006, Hinkley Compressor Station, Hinkley, California* (CH2M HILL, February 28, 2007), or in accordance with the three-volume purge methods detailed in the *Purging and Sampling of Monitoring Wells with Temporary Submersible Pumps/Stabilized Drawdown Method, Standard Operating Procedure SOP-A2* (CH2M HILL, January 10, 2012). Both methodologies are summarized below.

- Wells will be sampled using either an air bladder pump or a portable electric submersible pump with dedicated tubing. The pump/tubing inlet will be set near the center point of the well screen;

- Wells purged and sampled using the low-flow, minimal-drawdown method, will follow U.S. Environmental Protection Agency guidelines (US EPA, 1996);

- Wells purged and sampled using a three-volume purge method will be purged until a minimum of three well casing volumes have been removed;

- Field water quality meters will be used to measure turbidity, pH, electrical conductivity, temperature, dissolved oxygen, and redox potential of the purge water. Each well will be purged until these parameters have stabilized;

- Prior to sampling, the static water level will be measured; and,

- Samples will be filtered in the field to remove fine sediment, prior to placement in the sample bottles.

Samples will be delivered to an independent, state-certified laboratory under appropriate chain-of-custody procedures, and analyzed for both Cr6 using EPA Method 218.6 and CrT using US EPA Method 6010B.

5.0 Reporting and Schedule

The following discusses reporting and schedule for the activities proposed in this Work Plan.

5.1 DOMESTIC WELL SAMPLING

Periodic Reporting to Home Owners

Analytical results for each domestic well sampled will be provided to the well owners monthly as soon as practicable after the results have been received from the laboratory and validated. Letter reports will be submitted to well owners per the existing domestic well sampling program.

Schedule for Implementation of Field Activities and Reporting to the Water Board

Following Water Board approval of this Work Plan:

- PG&E or its representatives make a first attempt to contact owners of the targeted active domestic wells to provide them notification of the requirements of the CAO and request permission for monthly sampling shortly after receiving Water Board approval of this Work Plan. A second attempt to contact the owner of each targeted active domestic well will be made within 14 days of Water Board approval of this Work Plan, if the first attempt did not elicit a response from the owner.

- Where permission has been granted by the owners, sampling of targeted active domestic wells will begin on March 15, 2013, with the precise sampling date for each well depending on scheduling discussions between well owners and the sampling event coordinator. Wells that have not been sampled during the previous 24 months will be inspected first and retrofitted for sampling, if necessary (assuming permission is granted by the owner). The last of the six monthly sampling events would occur during September 2013.

- In accordance with the CAO, a report of the domestic well monitoring conducted in accordance with this Work Plan will be submitted to the Water Board by October 30, 2013. The CAO requires that data obtained during the six-month period of monthly domestic-well sampling will be evaluated using a statistically based trend analysis methodology. PG&E believes that this approach by itself ignores other scientific lines of evidence that should be incorporated in determining the need for additional monitoring wells. Additionally, even if an increasing trend is found, it may not be indicative evidence of PG&E plume migration; for example, it is possible that natural chromium concentrations could vary over time.

As required in the CAO, a Mann-Kendall trend test will be performed on the data, following EPA's 2009 guidance on statistical analysis of groundwater monitoring data (U.S. Environmental Protection Agency, 2009).[2] The report will include investigation methods, data, findings, recommendations for installation of additional monitoring wells, as necessary.

5.2 UPPER AQUIFER MONITORING WELLS

This Work Plan proposes the installation of upper aquifer monitoring wells. As discussed above, PG&E has initiated the process of attaining access for well installations. PG&E intends to complete well installation, development, and sampling at the proposed locations and provide a report to the Water Board by October 30, 2013 as required in the CAO. Should access not be granted at one more locations, the report will provide a status update and indicate what efforts have been made to achieve access including a discussion of alternative well locations evaluated (if applicable).

[2] As set forth in the Petition, PG&E objects to the use of a statistical trend analysis to require placement of monitoring wells absent consideration of other relevant evidence and analysis. Absent a lower limit chromium concentration specified for the required magnitude of the increasing trend such an analysis may improperly attribute chromium to PG&E's release at levels identified by the Water Board as naturally occurring background chromium.

6.0 WORKS CITED

California Regional Water Quality Control Board, Lahontan Region (Water Board). 2013. *Amended Cleanup and Abatement Order No. R6V-2008-0002-A4, WDID No. 6B369107001, Requiring Pacific Gas & Electric Company to Clean Up and Abate Waste Discharges of Total and Hexavalent Chromium to the Groundwaters of the Mojave Hydrologic Unit.* January 8.

California Regional Water Quality Control Board, Lahontan Region (Water Board). 2013b. *Amended Cleanup and Abatement Order (CAO) R6V-2008-0002-A4.* PowerPoint presentation given at Water Board Meeting of January 16, 2013, in Barstow, CA, by Mike Plaziak, PG, Supervising Engineering Geologist for the Water Board.

CH2M HILL. 2013. *Fourth Quarter 2012 Groundwater Monitoring Report and Domestic Well Sampling Results, Site-wide Groundwater Monitoring Program, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California.* February 6.

CH2MHILL and Stantec, 2013. *Conceptual Site Model for Groundwater Flow and the Occurrence of Chromium in the Groundwater of the Western Area, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California.* January 14.

Stantec, 2011. *Technical Report – Response to Investigation Order No. R6V-2011-0043, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California.* Stantec, September 1.

Stantec, 2012. *Proposed Work Plan for Installation of Monitoring Wells North and East of Red Hill*, *Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California.* July 9.

Stantec, 2012. *Technical Memorandum – Update to Upper Aquifer Groundwater Investigation Activities, Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California.* February 8.

Stantec, 2012. *Work Plan for Evaluation of Background Chromium in the Groundwater of the Upper Aquifer in the Hinkley Valley*. February 22.

Stantec, 2012. *Work Plan for Installation of Upper Aquifer Monitoring Wells to the West of Mountain View Road*. May 8.

Stantec, 2012. *Technical Memorandum – First Semester 2012 Update on Upper Aquifer Groundwater Investigation Activities*, *Pacific Gas and Electric Company, Hinkley Compressor Station, Hinkley, California..* July.

Stantec, 2012. *Preliminary Reporting of Geology and Hydrology for Investigations in the Western Area, Pacific Gas and Electric Company, Hinkley, California.* November 19.

U.S. Environmental Protection Agency. 2009. *Statistical Analysis of Groundwater Monitoring Data At RCRA Facilities Unified Guidance.*

TABLES

Work Plan to Address Provision I.A of Cleanup and Abatement Order R6V-2008-0002-A4

Pacific Gas and Electric Company
Stantec PN: 185702482
February 22, 2013

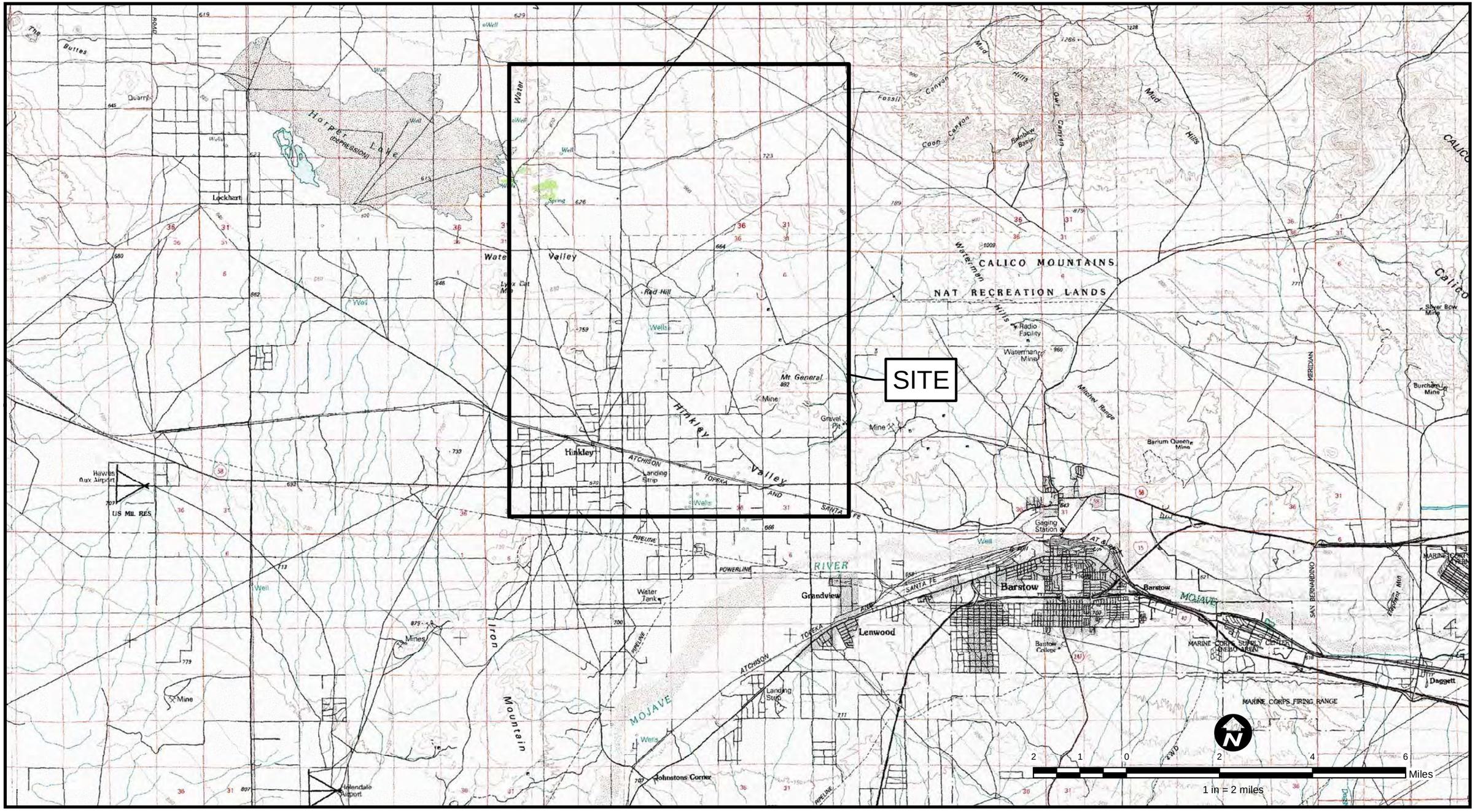
Table 1
Summary of Access to Proposed Monitoring Well Locations
Pacific Gas and Electric Company - Groundwater Remediation Project
Hinkley California

Proposed Well ID	Planned Access (ROW or Private)	Other Private Access Required for Transportation to Well Site? (Y/N)	Current Status
Investigation Area 1			
WV-1A	ROW	N	Preliminary Biological Clearance OK; County Easement and Transportation Route Available; Formal Biological Assessment Pending.
WV-1B	Private	N	Preliminary Biological Clearance OK; Property Owner Amenable to Well Installation; Transportation Route Available; Formal Biological Assessment Pending.
WV-2B	ROW	N	Preliminary Biological Clearance OK; County Easement and Transportation Route Available; Formal Biological Assessment Pending.
WV-2A/3B	ROW	N	Preliminary Biological Clearance OK; County Easement and Paved ROW Available; Formal Biological Assessment Pending.
WV-3A	ROW	N	Preliminary Biological Clearance OK; County Easement and Transportation Route Available; Formal Biological Assessment Pending.
WV-4A	ROW	N	Preliminary Biological Clearance OK; County Easement and Transportation Route Available; Formal Biological Assessment Pending.
WV-5A/4B	ROW	N	Preliminary Biological Clearance OK; Paved ROW Available; Formal Biological Assessment Pending.
WV-5B	Private	N	Preliminary Biological Clearance OK; Property Owner Amenable to Well Installation; Transportation Route Available; Formal Biological Assessment Pending.
WV-6A/6B	ROW	N	Preliminary Biological Clearance OK; Paved ROW Available; Formal Biological Assessment Pending.
WV-7A/7B	ROW	N	Preliminary Biological Clearance OK; Paved ROW Available; Formal Biological Assessment Pending.
Investigation Area 2			
WMV-1	Private	Y	Preliminary Biological Clearance OK; Property Owners not yet Contacted for Access; Transportation Route Available; Formal Biological Assessment Pending.
WMV-2	Private	Y	Preliminary Biological Clearance OK; Property Owners not yet Contacted for Access; Transportation Route Available; Formal Biological Assessment Pending.
Investigation Area 3			
EB-1	ROW	N	Preliminary Biological Clearance OK; County Easement and Transportation Route Available; Formal Biological Assessment Pending.
EB-2	ROW	N	Preliminary Biological Clearance OK; Paved ROW and Transportation Route Available; Formal Biological Assessment Pending.
EB-3	Private	N	Preliminary Biological Clearance OK; Transportation Route Available; Formal Biological Assessment Pending.
EB-4	Private	N	Preliminary Biological Clearance OK; Transportation Route Available; Formal Biological Assessment Pending.

FIGURES

Work Plan to Address Provision I.A of Cleanup and Abatement Order R6V-2008-0002-A4

Pacific Gas and Electric Company
Stantec PN: 185702482
February 22, 2013



Source: USGS, 1993

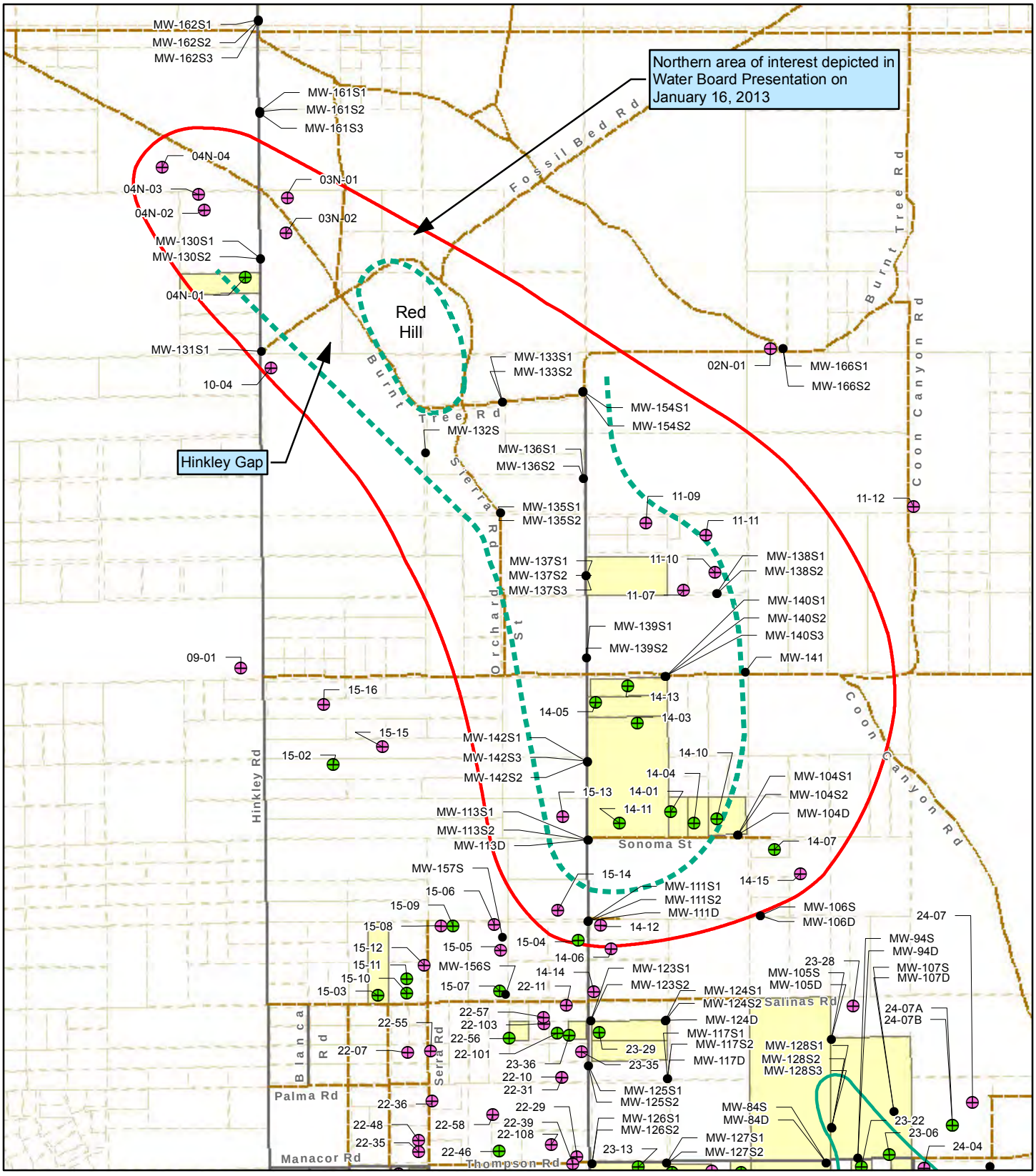
Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

SITE LOCATION MAP

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	BD	CM	02/19/13



LEGEND

- Active Domestic Supply Well
- Inactive Domestic Supply Well
- Monitoring Well
- Approximate outline of Cr(VI) or Cr(T) in Upper Aquifer exceeding 3.1 and 3.2 µg/L, respectively, Third Quarter 2012
- PG&E Owned Property (as of 2/4/13)

N

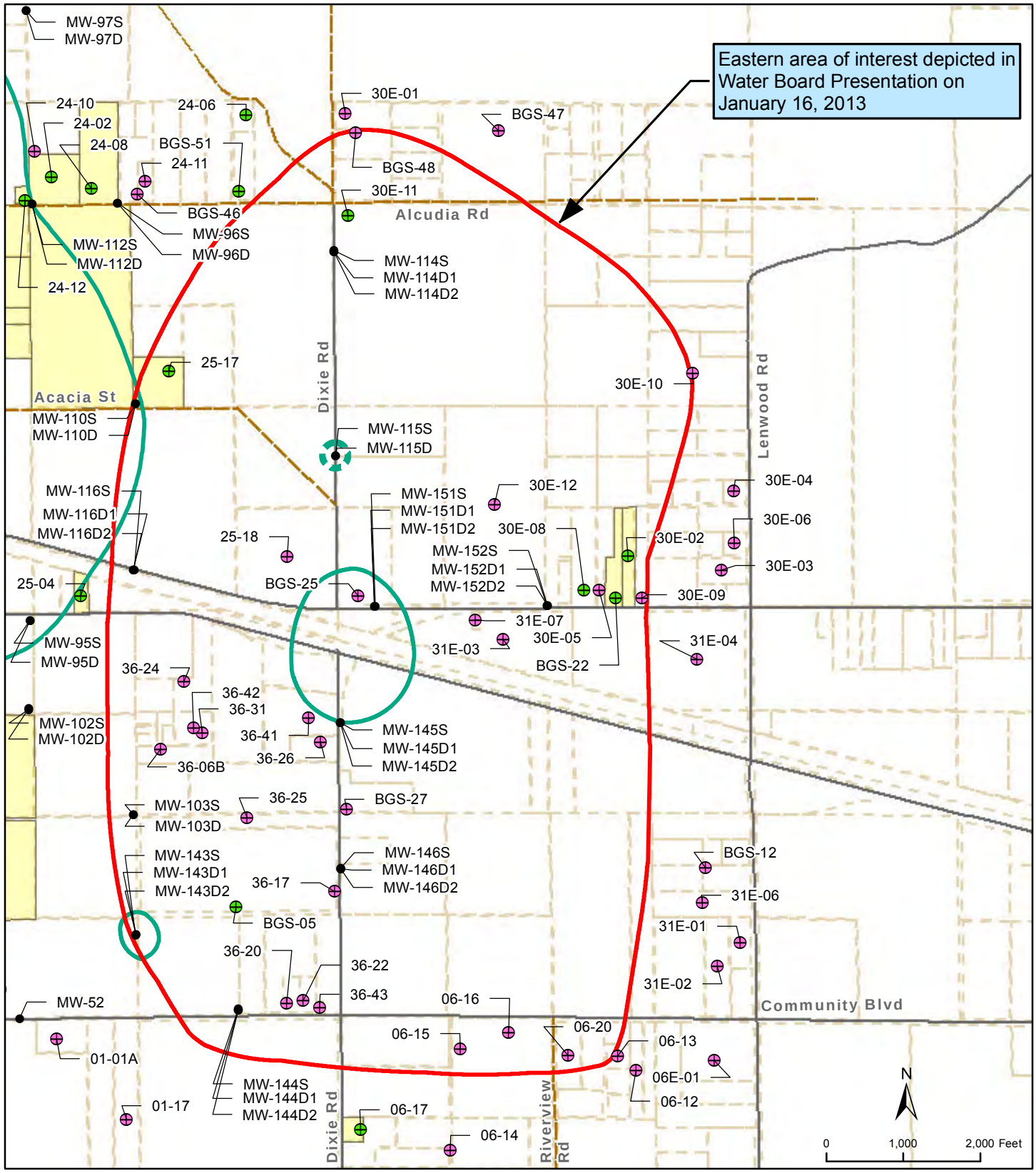
0 1,000 2,000 Feet

FIGURE 2
DOMESTIC WELLS IN NORTHERN AREA

PACIFIC GAS & ELECTRIC COMPANY
HINKLEY REMEDIATION PROJECT
HINKLEY, CALIFORNIA

CH2MHILL

BAO R:\PGEHINKLEY20000353\MAPFILES\2013\HYDRO_SUPPORT\DOM_WELL_WORKPLAN\DOM_WORKPLAN_NORTH.MXD GMOON 2/22/2013 4:17:25 PM



LEGEND

- Active Domestic Supply Well
- Inactive Domestic Supply Well
- Monitoring Well
- Approximate outline of Cr(VI) or Cr(T) in Upper Aquifer exceeding 3.1 and 3.2 µg/L, respectively, Third Quarter 2012
- PG&E Owned Property (as of 2/4/13)

FIGURE 3
DOMESTIC WELLS IN EASTERN AREA
PACIFIC GAS & ELECTRIC COMPANY
HINKLEY REMEDIATION PROJECT
HINKLEY, CALIFORNIA

CH2MHILL

V:\18571PG&E\MXD_Files\2nd Half 2012\Water Board Well Status\Figure 4 (Water Board Well Status2) (2013-2-22)11x17.mxd

Status of Wells Yet to be Completed

(1) No Access Agreement (NAA) - PG&E has been unable to secure private property access for the well installation and no county easements are present in the general area of the targeted well installation. PG&E is continuing discussions with property owners regarding access for well installation.

(2) Access Agreement Pending (AAP) - PG&E has been unable to secure private property access for the well installation and no county easements are present in the general area of the targeted well installation. PG&E has provided access agreements to property owners for their review and is currently awaiting signature of those agreements.

(3) Access Agreement Obtained (AAO) - PG&E has secured access to a property in the vicinity of the proposed well. Installation has begun or PG&E is currently reviewing the site for accesability and biological sensitivities. At some locations access agreements have been obtained but are not being honored by the property owner, these locations are denoted by an asterix (*).

Wells Completed to Date

MW-131 S1	Well Installed in Easement with County Encroachment Permit
MW-157 S	Well Installed on Private Land with Access Agreement
MW-123 S1/S2	Well on PG&E Owned Land
MW-174	Location Recently Installed - Well Installation not yet Reported

Sunset Rd
Holstead Rd
Roy Rd
Red Hill A (AAP)
MW-162 S1/S2/S3
MW-161 S1/S2/S3
MW-174 S1/S2/S3
Red Hill E (NAA)
MW-130 S1/S2
Burnt Tree Rd
MW-131 S1
MW-133 S1/S2
MW-166 S1/S2
MW-154 S1/S2
Red Hill G (AAP)
MW-132 S (Biological Hold)
MW-136 S1/S2
Red Hill H (AAP)
MW-135 S1/S2
MW-137 S1/S2/S3
MW-138 S1/S2
MW-175 S1/S2/D
MW-139 S1/S2
MW-141 (NAA)
Mountain View Rd
MW-140 S1/S2/S3
MW-173 S1/S2/D
MW-142 S1/S2/S3
MW-113 S1/S2/D
MW-104 S1/S2/D
Well C (NAA)
Well W/X (AAO) *
MW-111 S1/S2/D
MW-106 S/D
MW-157 S
MW-123 S1/S2
MW-156 S
MW-124 S1/S2
MW-105 S/D
MW-125 S1/S2
Coon Canyon Rd
MW-172 S1/S2
MW-117 S1/S2/D
MW-128 S1/S2/S3
MW-107 S/D
Hinkley Rd
MW-126 S1/S2
Thompson Rd
Santa Fe Ave
MW-171 S/D1/D2
MW-127 S1/S2
Mt. General Fault
Blanca Rd
Pera Rd
Petra Rd
Pueblo Rd
Serra Rd
MW-129 S
Dixie Rd
Alcudia Rd
MW-112 S/D
MW-114 S/D1/D2
Western 8
MW-118 S
Park Ave
120-SB-2
MW-119 S/D
120-SB-1
Lockhart Fault
MW-101 S/D
Mulberry Ave
Flower Rd
MW-147 S/D
MW-148 S
Acacia St
Summerset Rd
Mulinax Rd
MW-110 S/D
MW-176 S
MW-100C
MW-164 S/D
MW-168 S/D
Sycamore St
MW-99C
MW-115 S/D
MW-169 S1/S2/D
MW-98C
Santa Fe Ave
MW-153 S
PZ-01 A/B/BR
MW-116 S/D1/D2
MW-121 S/D
MW-151 S/D1/D2
MW-165 S/D
Old State Highway 58
MW-122 S/D
MW-152 S/D1/D2
Kinski Rd
Indian Wells Rd
Western 7
Rainbow Rd
MW-167 S1/S2/D
MW-158 S
MW-102 S/D
MW-145 S/D1/D2
Frontier Rd
Carson Rd
Granada Rd
MW-103 S/D
MW-146 S/D1/D2
Flower Rd
MW-159 S/D
Catskill Rd
Camino Rd
MW-160 S/D
MW-143 S/D1/D2
Valley Wells Rd
MW-163 S/D
MW-149 S
Community Blvd
MW-144 S/D1/D2
Aquarius Rd
MW-150 S1/S2
Highcrest Rd
Hervey Rd
Fairview Rd
Riverview Rd

NOTES:
Projection: CA State Plane NAD83 Feet Zone V
Outside Data Sources: Arcadis and CH2MHill, October 2012
Dibblee, Geologic map of the Barstow quadrangle, 1960
Lockhart Fault, USGS

0 1,500 3,000 6,000 Feet
1 inch = 3,000 feet

Wells by Well Type

- Wells required under Investigation Order #R6V-2011-0043
- Lower Aquifer Wells Proposed in April 12, 2011 Electronic Message
- Additional Wells Required by Board Staff
- Wells Proposed in PG&E's July 9, 2012 Proposed Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill
- Wells Proposed in PG&E's September 1, 2011 Technical Report Response to Investigation Order R6V-2011-0043, Delineation of Chromium in the Upper Aquifer
- Wells Proposed in PG&E's May 8, 2012 Work Plan for Installation of Upper Aquifer Monitoring Wells West of Mountain View Road

- Geologic Fault
- Dashed Where Indefinite
- Dotted Where Concealed

PGE Property Boundaries (02/04/13)

Chromium Plume (Fourth Quarter 2012)
Concentration of Hexavalent Chromium (ug/l)
3.1 ug/l

Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

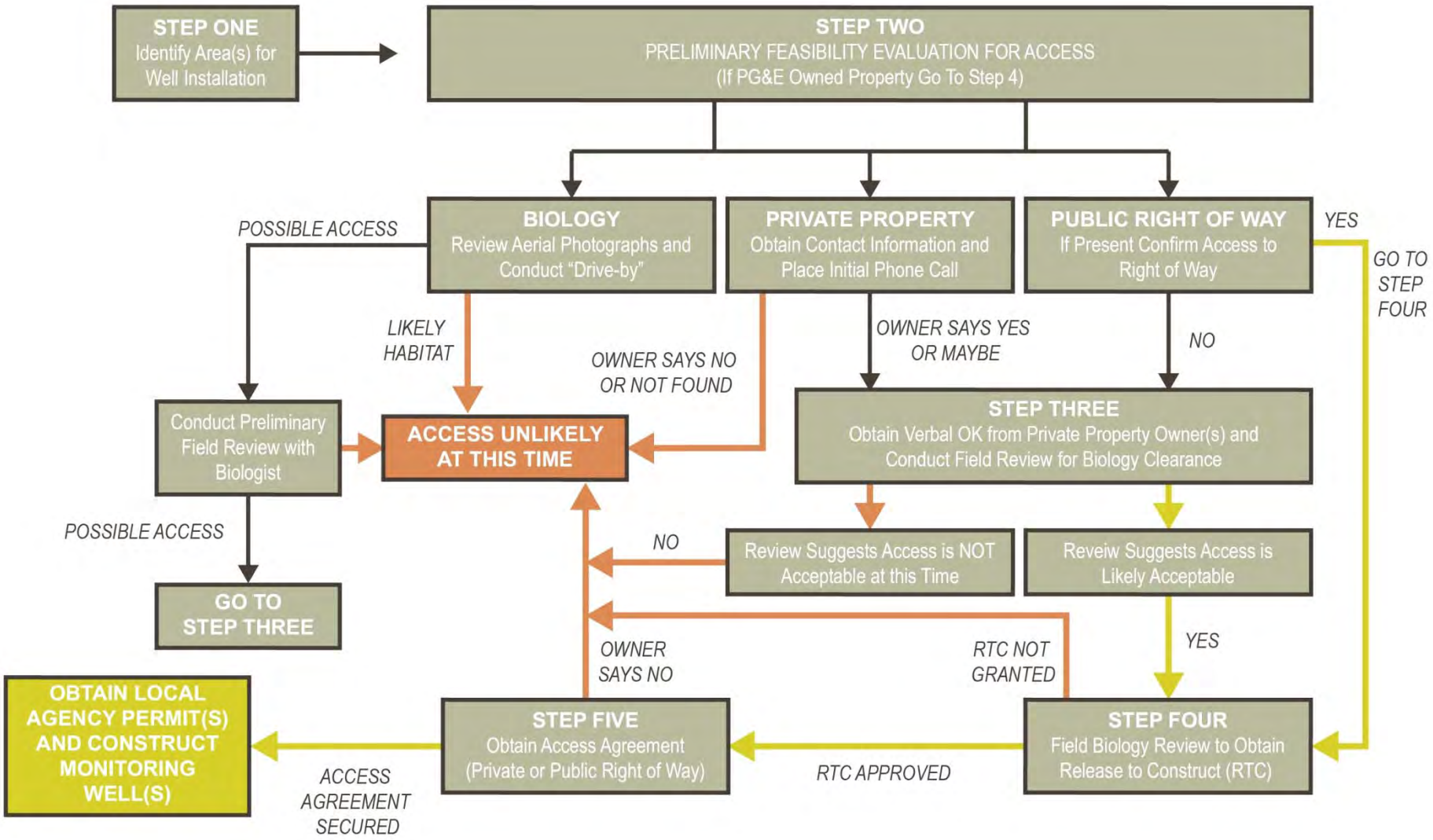
FOR: Pacific Gas & Electric Groundwater Remediation Project Hinkley, California

STATUS OF PROPOSED AND/OR REQUESTED MONITORING WELLS (FEBRUARY 22, 2013)

FIGURE: 4

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	BD	CM	02/22/13

V:\18571PG&E\MXD_Files\1st Half 2013\Figure 5 (Well Installation Flow Chart) (2013-2-19)8x11.mxd



N

0 300 600

Feet

Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

WELL INSTALLATION/SAMPLING ACCESS PROCESS FLOW CHART

FIGURE: 5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	CM	CM	02/19/13

V:\185702580\PG&E\MXD_Files\1st Half 2013\Water Valley Work Plan\Figure 6 (Site Location Map) (2013-1-31)11x17.mxd

INVESTIGATION AREA 1
WATER VALLEY
(FIGURES 7A & 7B)

INVESTIGATION AREA 2
NORTH HINKLEY
VALLEY (FIGURE 8)

INVESTIGATION AREA 3
EAST OF DIXIE ROAD
(FIGURE 9)

Harpers Way
Hinkley Rd
Halsted Rd
Roy Rd
Holstead Rd
Burnt Tree Rd
Mountain View Rd
Sonoma St
Salinas Rd
Blanca Rd
Petra Rd
Peublo Rd
Serra Rd
Mountain View Rd
Coon Canyon Rd
Thompson Rd
Santa Fe Ave
Pera Rd
Alcudia Rd
Park Ave
Ash St
Acacia St
Summerset Rd
Dixie Rd
Lenwood Rd
Sycamore St
Flower Rd
Locust Rd
Hope St
Valley Wells Rd
Old State Highway 58
Valley View Rd
Lake View Rd
Frontier Rd
Carson Rd
Granada Rd
Pioneer Rd
Catskill Rd
Community Blvd
Fairview Rd
Aquarius Rd
Highcrest Rd

2060 2080 2100 2120 2140 2160 2180 2200 2220 2240

0 2,000 4,000 8,000 Feet

NOTES:
Projection: CA State Plane NAD83 Feet Zone V
Outside Data Sources: Arcadis and CH2MHill, December 2012

PGE Property Boundaries (02/04/13)

Geologic Fault
Dashed Where Indefinite
Dotted Where Concealed

Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

**SITE PLAN WITH
UPPER AQUIFER MONITORING
WELL INVESTIGATION AREAS**

FIGURE: 6

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	CM	CM	01/31/13

V:\1857\PGE\EIMXD_Files\1st Half 2013\Water Valley Work Plan\Figure 7A-2 (North Boundary Water Valley) (2013-1-31)\size a.mxd

WV-1A

Grasshopper

Hinkley Rd

Brown Ranch Rd

Harpers Way

Halsted Rd

2060

WV-2A (WV-3B)

WV-3A

WV-4A

End of Pavement
(No Public Access on most of unpaved Portion of Hinkley Road to the North)

WV-5A (WV-4B)

Sunset Rd

WV-6A (WV-6B)

WV-7A (WV-7B)

MW-162S1
5 - 11/8/2012
MW-162S2
1.6 - 11/8/2012
MW-162S3
0.21 - 10/22/2012

Holstead Rd

Roy Rd

2080

A

MW-161S1
3.2 - 10/22/2012
MW-161S2
2.5 - 10/22/2012
MW-161S3
1.7 - 10/22/2012

MW-174 S1/S2/S3

Burnt Tree Rd

MW-130S1
3.9 - 10/16/2012

E

Red Hill

MW-131S1
2.8 - 10/9/2012

MW-133S1
7.1 - 11/1/2011
MW-133S2
0.34 - 10/15/2012

MW-132S

MW-135S1
3.4 - 10/15/2012
MW-135S2

Mountain View Rd

2200
2180
2160
2140
2120
2100

MW-166S1
0.22 - 12/6/2012
MW-166S2
0.06U - 12/6/2012

MW-154S1
22 - 11/9/2012
MW-154S2
1.6 - 10/16/2012
MW-136S1
2.7 - 10/15/2012
MW-136S2
0.06u - 10/9/2012

G

0 600 1,200 2,400 Feet

NOTES:
Projection: CA State Plane NAD83 Feet Zone V
Outside Data Sources: Arcadis and CH2MHill, December 2012
County Easements - http://gis.sbcounty.gov, County Shapefile

Wells by Well Type
- Monitoring Well

Preliminary Assessment of Parcel Access for Well Installation (See Figure 5 for Access Process)
- Owner not likely to Permit Access
- Owner has not been Contacted
- Owner Contact Unsuccessful
- Infeasible Based on Preliminary Biological Assessment (Aerial or Drive-by)
- Owner may Potentially Permit Access
- Easement or Paved Road is Present Adjacent to the Parcel
- Access Agreement in Place

Status of Installation for Previously Proposed Monitoring Wells
- Upper Aquifer Monitoring Wells not yet Installed due to Access Limitations. Wells were Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012)
- MW-166 Upper Aquifer Monitoring Wells Recently Installed and Sampled as Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012); MW-174 to be sampled initially in 1Q13
- Proposed Locations for new Upper Aquifer Monitoring Wells in Response to CAO No R6V-2008-0002-A4

PGE & Public Property Ownership
- PGE Property Boundaries (02/04/13)
- County Easement
- Federal Land

Chromium Data
Chromium Plume (Fourth Quarter 2012)
Concentration of Hexavalent Chromium (ug/l)
3.1 ug/l

Note:
Well ID
Cr6 - Date Sampled

Groundwater Flow
- Anticipated Groundwater Flow Direction based upon Site Topography

Other Features
- 1/4 mile x 1/4 mile well spacing (Specified by CAO No R6V-2008-0002-A4)
- Geologic Fault
- Dashed Where Indefinite
- Dotted Where Concealed

Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

INVESTIGATION AREA 1 - WATER VALLEY ALTERNATIVE A

FIGURE: 7A

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	CM	CM	01/31/13

V:\1857\PGE\EIMXD_Files\1st Half 2013\Water Valley Work Plan\Figure 7B-2 (North Boundary Water Valley) (2013-1-31).mxd

Grasshopper

Hinkley Rd

Brown Ranch Rd

Harpers Way

WV-1B

Halsted Rd

WV-2B

2060

WV-3B (WV-2A)

End of Pavement

(No Public Access on most of unpaved Portion of Hinkley Road to the North)

WV-4B (WV-5A)

Sunset Rd

WV-6B (WV-6A)

WV-5B

WV-7B (WV-7A)

MW-162S1
5 - 11/8/2012
MW-162S2
1.6 - 11/8/2012
MW-162S3
0.21 - 10/22/2012

Holstead Rd

Roy Rd

2080

A

Mountain View Rd

MW-161S1
3.2 - 10/22/2012
MW-161S2
2.5 - 10/22/2012
MW-161S3
1.7 - 10/22/2012

MW-174 S1/S2/S3

Burnt Tree Rd

Hinkley Rd

MW-130S1
3.9 - 10/16/2012

E

Red Hill

2100

2120

2140

2160

2180

2200

MW-166S1
0.22 - 12/6/2012
MW-166S2
0.06U - 12/6/2012

MW-131S1
2.8 - 10/9/2012

MW-133S1
7.1 - 11/1/2011
MW-133S2
0.34 - 10/15/2012

MW-154S1
22 - 11/9/2012
MW-154S2
1.6 - 10/16/2012

Burnt Tree Rd

G

MW-136S1
2.7 - 10/15/2012
MW-136S2
0.06u - 10/9/2012

MW-132S

MW-135S1
3.4 - 10/15/2012
MW-135S2

0 700 1,400 Feet

NOTES:
Projection: CA State Plane NAD83 Feet Zone V
Outside Data Sources: Arcadis and CH2MHill, December 2012
County Easements - http://gis.sbcounty.gov, County Shapefile

Wells by Well Type
- Monitoring Well

Preliminary Assessment of Parcel Access for Well Installation (See Figure 5 for Access Process)
- Owner not likely to Permit Access
- Owner may Potentially Permit Access
- Owner has not been Contacted
- Easement or Paved Road is Present Adjacent to the Parcel
- Owner Contact Unsuccessful
- Access Agreement in Place
- Infeasible Based on Preliminary Biological Assessment (Aerial or Drive-by)

Status of Installation for Previously Proposed Monitoring Wells
- Upper Aquifer Monitoring Wells not yet Installed due to Access Limitations. Wells were Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012)
- MW-166 Upper Aquifer Monitoring Wells Recently Installed and Sampled as Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012); MW-174 to be sampled initially in 1Q13
- Proposed Locations for new Upper Aquifer Monitoring Wells in Response to CAO No R6V-2008-0002-A4

PGE & Public Property Ownership
- PGE Property Boundaries (02/04/13)
- County Easement
- Federal Land

Chromium Data
Chromium Plume (Fourth Quarter 2012)
Concentration of Hexavalent Chromium (ug/l)
3.1 ug/l

Note:
Well ID
Cr6 - Date Sampled

Groundwater Flow
Anticipated Groundwater Flow Direction based upon Site Topography

Other Features
- 1/4 mile x 1/4 mile well spacing (Specified by CAO No R6V-2008-0002-A4)
- Geologic Fault
- Dashed Where Indefinite
- Dotted Where Concealed

Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

INVESTIGATION AREA 1 - WATER VALLEY ALTERNATIVE B

FIGURE: 7B

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	CM	CM	01/31/13

V:\1857\PG&E\MXD_Files\1st Half 2013\Water Valley Work Plan\Figure 8 (North Boundary west Mountain View) (2013-1-31)11x17.mxd

MW-132S
MW-135S1 3.4 / 3.4
MW-135S2 1.4 / 1.7
MW-136S1 2.7 / 3.3
MW-136S2 ND / ND
MW-137S1 4.1 / 4.4
MW-137S2 4 / 4.1
MW-137S3 1.7 / 1.9
MW-138S1 4.9 / 5.5
MW-138S2 4.2 / 5.1
WMV-1
WMV-2
MW-139S1 7.1 / 7.3
MW-139S2 0.47 / ND
MW-140S1 4.3 / 4.8
MW-140S2 3.6 / 4.2
MW-140S3 3 / 3.3
MW-141
Mt General Rd
MW-175S1/S2/D
MW-173S1/S2/D
MW-142S1 6.6 / 7.2
MW-142S2 1.8 / 1.9
MW-142S3 3.4 / 3.4
MW-104S1 3.6 / 3.4
MW-104S2 3.2 / 3.4
MW-104D ND / ND
MW-113S1 3 / 3
MW-113S2 3.2 / 3.3
MW-113D 0.07 / ND
Sonoma St
MW-111S1 2.7 / 2.7
MW-111S2 2.2 / 2.9
MW-111D ND / ND
MW-106S 2.5 / 2.7
MW-106D 0.11 / ND
Fairview Rd (Extention)
MW-157S 1.6 / 1.5
MW-156S 1 / 1
Salinas Rd
MW-123S1 1.9 / 2
MW-123S2 1.8 / 2.2
MW-124S1 2.1 / 2.5
MW-124S2 2.6 / 2.6
MW-124D ND / ND
MW-105S 2.5 / 2.6
MW-105D ND / ND
MW-125S1 2.1 / 2.4
MW-125S2 1.5 / 1.6
MW-117S1 0.7 / ND
MW-117S2 0.86 / 1
MW-117D ND / ND
MW-128S1 5.3 / 5.4
MW-128S2 2.9 / 3
MW-107S 1.9 / 2
MW-107D 0.51 / ND
Mountain View Rd
Pueblo Rd
Sierra Rd
Coon Canyon Rd
2120
2140
2160
H
W
X
C

0 500 1,000 2,000 Feet

NOTES:
Projection: CA State Plane NAD83 Feet Zone V
Outside Data Sources: Arcadis and CH2MHill, December 2012
County Easements - http://gis.sbcounty.gov, County Shapefile

Wells by Well Type
- Monitoring Well

Preliminary Assessment of Parcel Access for Well Installation (See Figure 5 for Access Process)
- Owner not likely to Permit Access
- Owner has not been Contacted
- Owner Contact Unsuccessful
- Infeasible Based on Preliminary Biological Assessment (Aerial or Drive-by)
- Owner may Potentially Permit Access
- Easement or Paved Road is Present Adjacent to the Parcel
- Access Agreement in Place

Other Features
- 1/4 mile x 1/4 mile well spacing (Specified by CAO No R6V-2008-0002-A4)
- Geologic Fault
- Dashed Where Indefinite
- Dotted Where Concealed

PGE & Public Property Ownership
- PGE Property Boundaries (02/04/13)
- County Easement
- Federal Land

Status of Installation for Previously Proposed Monitoring Wells
- Upper Aquifer Monitoring Wells not yet Installed due to Access Limitations. Wells were Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012)
- MW-166: Upper Aquifer Monitoring Wells Recently Installed and Sampled as Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012); MW-174 to be sampled initially in 1Q13
- Proposed Locations for new Upper Aquifer Monitoring Wells in Response to CAO No R6V-2008-0002-A4
- Upper Aquifer Monitoring Well not likely to be Installed Due to Biological Clearance Issues. Well was Proposed in PG&E's Technical Report – Response to Investigation Order R6V-2011-0043 – Delineation of Chromium in the Upper Aquifer (Stantec, September 2011) Location W/X was requested by Water Board staff in response to Stantec's September 2011 report.

Chromium Data
Chromium Plume (Fourth Quarter 2012)
Concentration of Hexavalent Chromium (ug/l)
3.1 ug/l

Note:
Well ID
Cr6 / CrT

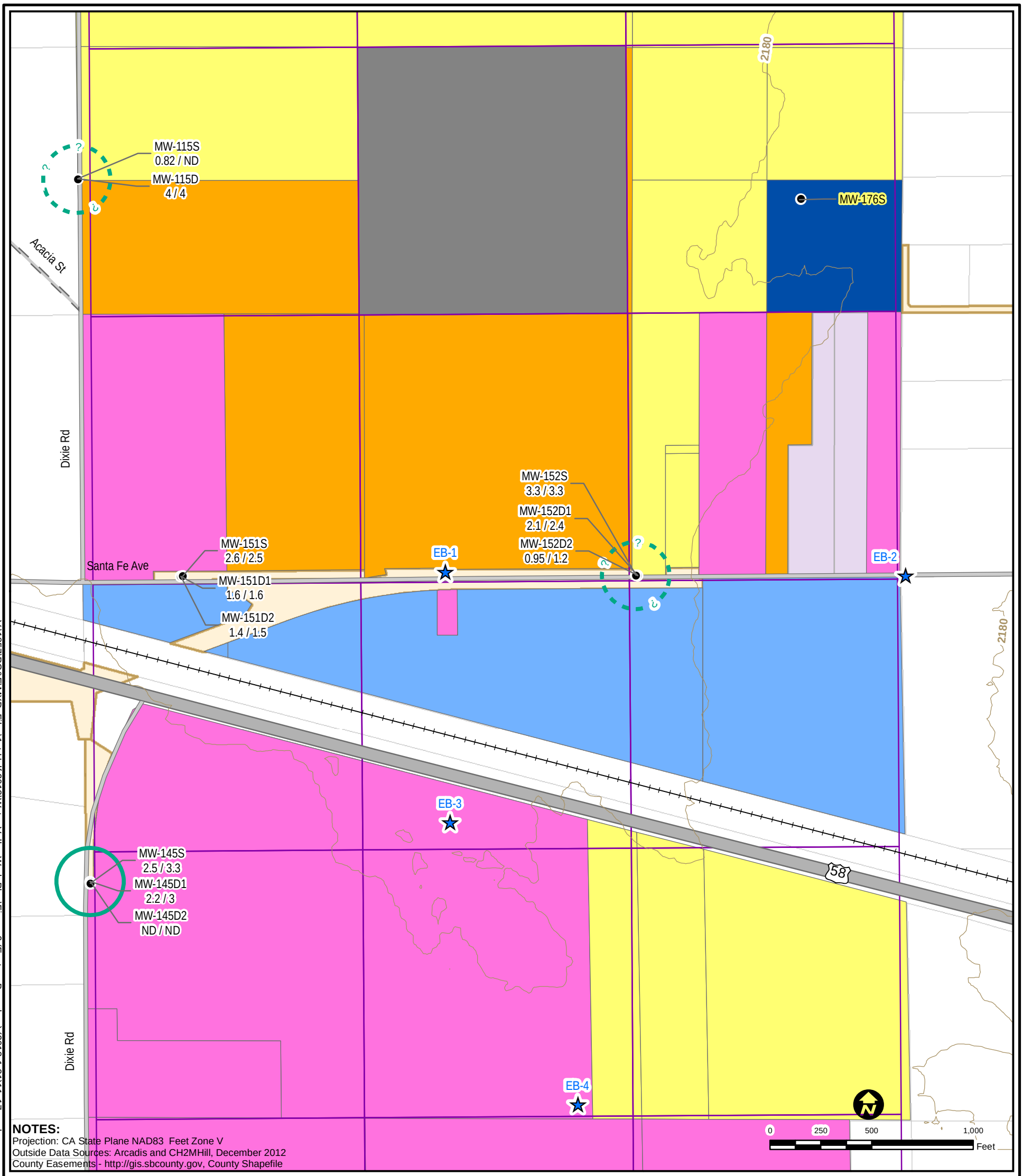
Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

INVESTIGATION AREA 2 - NORTH HINKLEY VALLEY - WEST OF MOUNTAIN VIEW ROAD AND EAST OF FAIRVIEW ROAD

FIGURE: 8

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	CM	CM	01/31/13



V:\18577\PG&E\MXD_Files\1st Half 2013\Water Valley Work Plan\Figure 9 (Eastern Boundary) (2013-1-31)11x17.mxd

Wells by Well Type
- Monitoring Well

PGE & Public Property Ownership
- PGE Property Boundaries (02/04/13)
- County Easement

Chromium Data
- Chromium Plume (Fourth Quarter 2012)
  Concentration of Hexavalent Chromium (ug/l)
  3.1 ug/l

Note:
Well ID
Cr6 / CrT

Preliminary Assessment of Parcel Access for Well Installation (See Figure 5 for Access Process)
- Owner not likely to Permit Access
- Owner has not been Contacted
- Owner Contact Unsuccessful
- Infeasible Based on Preliminary Biological Assessment (Aerial or Drive-by)
- Owner may Potentially Permit Access
- Easement or Paved Road is Present Adjacent to the Parcel
- Access Agreement in Place

Status of Installation for Previously Proposed Monitoring Wells
- Upper Aquifer Monitoring Wells not yet Installed due to Access Limitations. Wells were Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012)
- MW-166: Upper Aquifer Monitoring Wells Recently Installed and Sampled as Proposed in PG&E's Work Plan for Installation of Upper Aquifer Monitoring Wells North and East of Red Hill (Stantec, July 2012); MW-174 to be sampled initially in 1Q13
- Proposed Locations for new Upper Aquifer Monitoring Wells in Response to CAO No R6V-2008-0002-A4

Other Features
- 1/4 mile x 1/4 mile well spacing (Specified by CAO No R6V-2008-0002-A4)

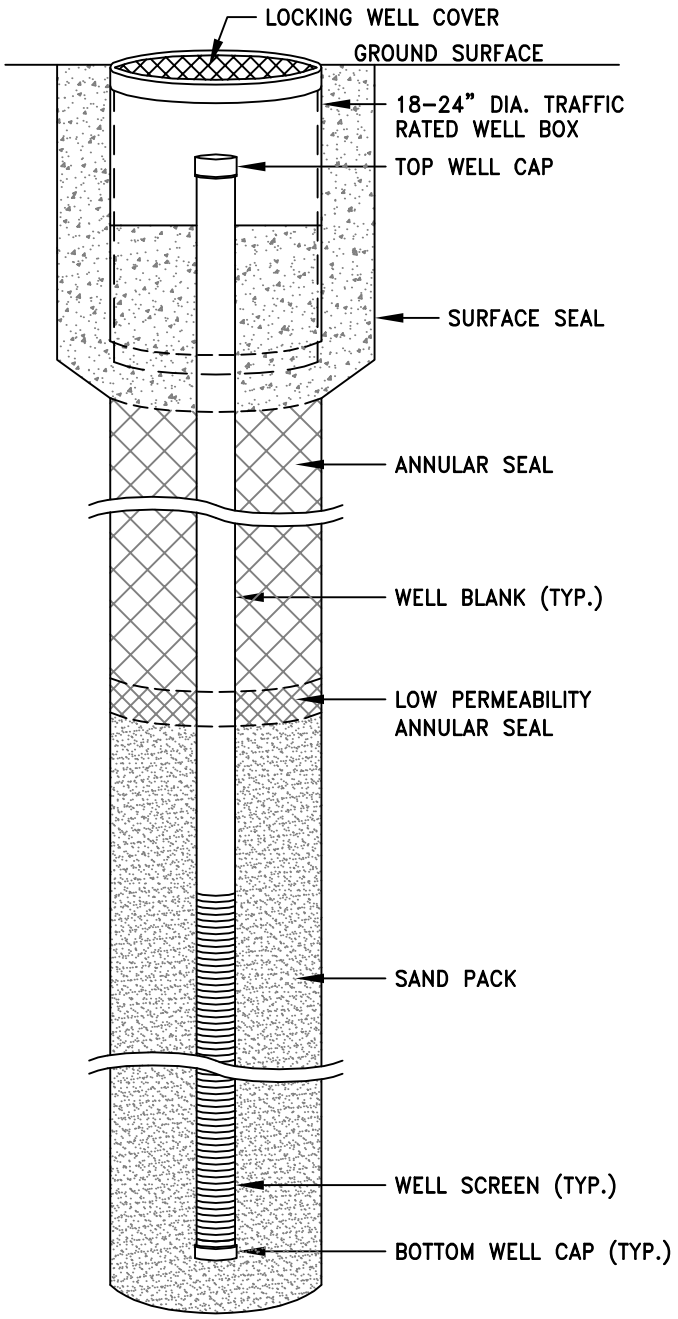
Stantec
57 LAFAYETTE CIRCLE, 2ND FLOOR
LAFAYETTE, CALIFORNIA
PHONE: (925) 299-9300 FAX: (925) 299-9302

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

INVESTIGATION AREA 3 - EAST OF DIXIE ROAD

FIGURE: 9

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702580	TF	CM	CM	01/31/13



ELEVATION OF REFERENCE POINT	To Be Surveyed
HEIGHT OF REFERENCE POINT ABOVE GROUND SURFACE	To Be Surveyed
SURFACE SEAL INTERVAL	0 - 2 ft
TYPE OF SURFACE SEAL	Concrete
ANNULAR SEAL INTERVAL	2 - 50 ft
TYPE OF ANNULAR SEAL	Portland Cement
INTERVAL OF LOW PERMEABLE ANNULAR SEAL	50 - 73 ft
TYPE OF LOW PERMEABILITY SEAL	Bentonite
DIAMETER OF WELL CASING	4 in
TYPE OF WELL CASING	SCH 40 PVC
SAND PACK INTERVAL	73 - 91 ft
TYPE OF SAND PACK	To Be Determined
SCREEN INTERVAL	75 - 90 ft
DESCRIPTION OF SCREEN	To Be Determined
DEPTH OF WELL	90 ft
DIAMETER OF BOREHOLE	10 in
DEPTH OF BOREHOLE	91 ft
DEPTH TO GROUNDWATER	To Be Determined

Notes:
1. Casing centralizers will be placed at the top and bottom of the well screen and at 50-foot intervals from the top of the screen to surface.
2. All well materials will be placed through tremie pipe.
3. Screen slot size and sand pack filter size to be determined based on sieve analysis

Stantec
57 Lafayette Circle, 2nd Floor
Lafayette, CA 94549
Ph: (925)299-9300 Fax: (925)299-9302

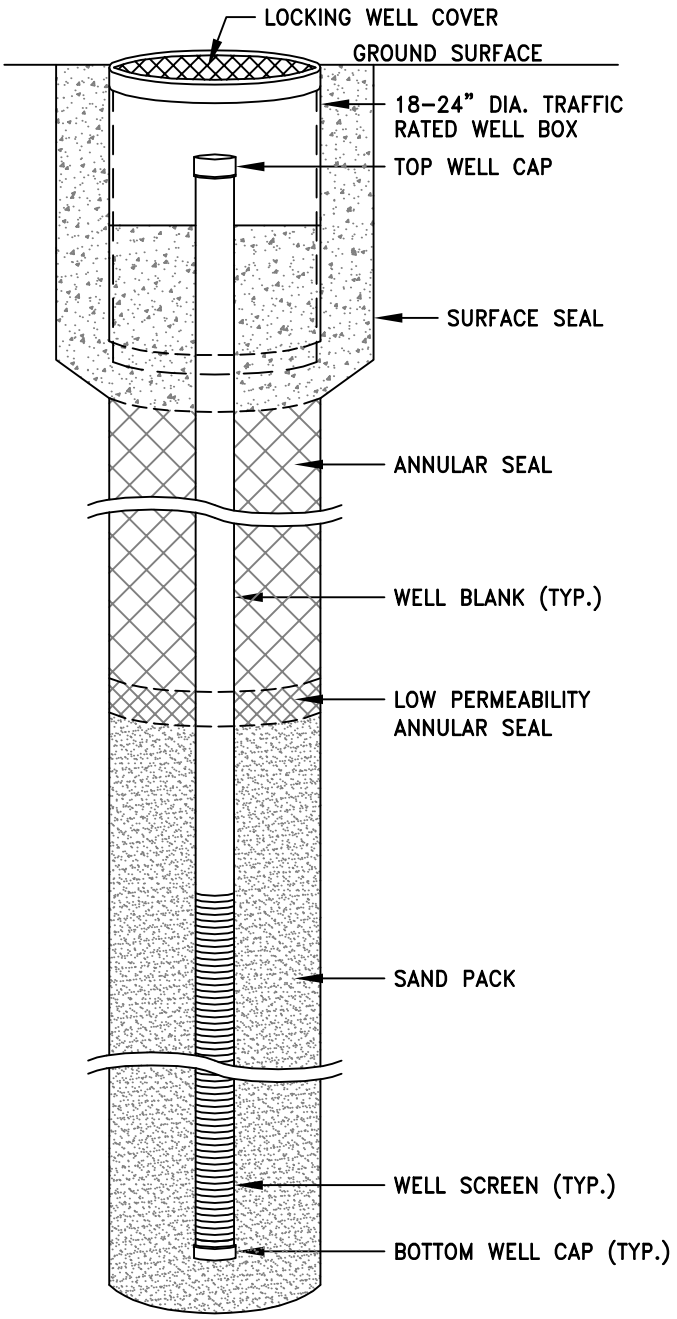
FOR:
Pacific Gas and Electric Company
Groundwater Remediation
Hinkley, CA

Conceptual Well Construction for Single Completion Monitoring Well at the Water Table Surface

FIGURE: 10

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	BD	CM	CM	2/19/13

FILEPATH:C:\Documents and Settings\jlieberman\Desktop\Hinkley\WC-1F.dwg|jlieberman|Feb 25, 2011 at 6:57|Layout: WC-1F



ELEVATION OF REFERENCE POINT	To Be Surveyed
HEIGHT OF REFERENCE POINT ABOVE GROUND SURFACE	To Be Surveyed
SURFACE SEAL INTERVAL	0 - 2 ft
TYPE OF SURFACE SEAL	Concrete
ANNULAR SEAL INTERVAL	2 - 50 ft
TYPE OF ANNULAR SEAL	Portland Cement
INTERVAL OF LOW PERMEABLE ANNULAR SEAL	50 - 113 ft
TYPE OF LOW PERMEABILITY SEAL	Bentonite
DIAMETER OF WELL CASING	2.5 in
TYPE OF WELL CASING	SCH 80 PVC
SAND PACK INTERVAL	113 - 126 ft
TYPE OF SAND PACK	To Be Determined
SCREEN INTERVAL	115 - 125 ft
DESCRIPTION OF SCREEN	To Be Determined
DEPTH OF WELL	125 ft
DIAMETER OF BOREHOLE	8 in
DEPTH OF BOREHOLE	126 ft
DEPTH TO GROUNDWATER	To Be Determined

Notes:
1. Casing centralizers will be placed at the top and bottom of the well screen and at 50-foot intervals from the top of the screen to surface.
2. All well materials will be placed through tremie pipe.
3. Screen slot size and sand pack filter size to be determined based on sieve analysis

Stantec
57 Lafayette Circle, 2nd Floor
Lafayette, CA 94549
Ph: (925)299-9300 Fax: (925)299-9302

FOR:
Pacific Gas and Electric Company
Groundwater Remediation
Hinkley, CA

Conceptual Well Construction for Single Completion Monitoring Well Below the Water Table Surface

FIGURE: 11

PROJECT NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
	BD	CM	CM	2/19/13

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APPENDIX A
Applicable Standard Operating Procedures (SOPs) for Groundwater Monitoring Program

Work Plan to Address Provision I.A of Cleanup and Abatement Order R6V-2008-0002-A4

Pacific Gas and Electric Company
Stantec PN: 185702482
February 22, 2013

SOP-A7

Purging and Sampling of Active Domestic Wells with Dedicated Pumps Standard Operating Procedure for PG&E Hinkley Groundwater Monitoring Program

---

This standard operating procedure (SOP) describes the procedures and equipment to be used for groundwater sampling of active domestic wells that are equipped with dedicated and functional well pumps at the PG&E Hinkley site.

Samples for water quality measurement and laboratory analysis are collected directly from existing or installed sampling ports at the well head/discharge piping. Samples are not collected from holding tanks.

The active domestic wells are typically larger in diameter and usually have long perforated/screen intervals when compared to monitoring wells. Therefore, the purging and sampling procedures for these wells are different from the procedures used for sampling conventional groundwater monitoring wells.

WELL SURVEY

Prior to sampling a domestic well for the first time, a well survey will be conducted to determine if the well is fit for sampling. The well survey process is outlined below and documented in the Well Survey Form.

1) Confirm and note the operation status (e.g., active) of the domestic well from wellhead meter (if present) or well owner information provided during the sampling appointments with the owners. When possible, inspect and/or confirm the condition of the well, wellhead, and associated aboveground piping.

2) Confirm the presence or absence of a sampling port (a.k.a. spigot or hose bib), pressure relief valve, holding tank, and backflow valve in the tank. Determine whether a well retrofit is needed for the installation of a sampling port before the holding tank.

3) If a well retrofit is necessary to for sample collection, the well owner will be consulted before modifying the well and pump system and request his/her consent. If needed, install a sampling port as close as possible to the wellhead. The most common procedure for this retrofit is to remove the pressure relief valve from the wellhead or pipe and install a small pipe extension with a sampling port and re-install the pressure relief valve at the end of the pipe extension.

DOMESTIC WELL SAMPLING

REQUIRED DOCUMENTS

- Event-specific "planned sampling and analysis table" (PST).
- Applicable project work plan or monitoring plan, and related Hinkley SOPs as needed.
- Hinkley Program Health and Safety Plan (HSP).
- If available, well construction and previous depth to water information will be included in the PST.

- Blank purge and sampling log sheets

PREPARATION AND SETUP

1) Review event-specific PST or event-specific field instructions and HSP.
2) Field-check and setup sampling equipment: water level (WL) meter, water quality (WQ) meters, flow-through cell, field filter, purge water container, health and safety equipment, etc. Inspect and calibrate field equipment prior to use according to SOP-A12, *Calibration of Field Instruments.*
3) Inventory sample bottles, review required analyses, confirm the lab courier schedule, and prepare groundwater sampling log.

PURGING AND SAMPLING PROCEDURES FOR DOMESTIC WELLS

4) If an access port is present in the wellhead seal, and consent has been given by the owner, a water level measurement will be taken from the domestic well. Measure initial static water level according to SOP-A10, *Water Level Measurements*. Record water level value on sampling log.
5) Install a flow-through cell to the sampling port and record a set of water quality parameters (pH, conductivity, temperature, turbidity, dissolved oxygen, temperature, and ORP). If it is not possible to connect the flow-through cell, a clean 5-gallon bucket may be used by filling the bucket with purge water and inserting the instrument probes directly into the bucket. If the bucket is used, turbulence in the bucket should be minimized and only pH, conductivity, ORP, and temperature need to be recorded. Record units and time for all measurements collected. Record on the purge form if any parameter readings are anomalous or unstable due to instrument problems. Re-calibrate instruments if needed.
6) Purge the well for **a minimum of five minutes** to ensure that water contained in the pump, riser pipe, and associated plumbing has been purged. <u>The final purged volume and purge time will depend on the specific well system and the dedicated pump flow rate. In any case, the sample should be collected after the well has been pumped long enough to remove standing water and to ensure that water from the producing formation/s has entered the well casing.</u>
7) Samples will be collected directly from the sampling port. A single set of field parameters should be recorded (collecting stabilized field parameters is not required). Record observations on sample appearance, clarity, and odors.
8) Collect samples for analyses according to the PST and/or event-specific field instructions. Sample containers are to be filled by transferring water directly from the sampling port to the appropriate sample container. If the PST calls for **filtered and/or preserved samples,** refer to SOP-A9, *Sample Field Filtration and Preservation for Metals*.
9) Complete the field sampling log, including description of samples collected, final WL, if possible, and estimated purge volume of discharge or purge. If the pump is equipped with a flow meter, record the flow rate as well. Close and secure the well including access gates or fences.

INVESTIGATION-DERIVED WASTE MANAGEMENT

Different types of potentially-contaminated investigation-derived waste (IDW) will be generated during groundwater sampling efforts. These may include:

- Used personal protective equipment (PPE).
- Disposable sampling equipment.
- Decontamination fluids.
- Purged groundwater and excess groundwater collected for sample container filling.

Used PPE and disposable equipment are not considered hazardous wastes and can be sent to a municipal landfill. These wastes should only be disposed of in approved dumpsters controlled by PG&E or their contractors. Any PPE and disposable equipment that is to be disposed of that could still be reused will be rendered inoperable before disposal in the refuse dumpster.

Regarding disposal of wastewater (decontamination wash water, and purge and excess groundwater):

- Typically, wastewater generated during sampling of domestic wells will be discharged directly to the ground at the well site. If a large volume of purge water will be generated, the property owner must be consulted to verify that the water can be applied to ground on their property. Otherwise, any wastewater removed from the well site must be contained and transported to an approved disposal location.

SOP-A9

Sample Field Filtration and Preservation for Metals Analyses
Standard Operating Procedure for
PG&E Hinkley Groundwater Monitoring Program

This standard operating procedure (SOP) describes the procedures and equipment to be used for collecting groundwater samples for field filtered metals analyses at the Hinkley site. Refer to SOP-A1 through SOP-A7 for specific groundwater sampling methods.

REQUIRED DOCUMENTS

- Event-specific "planned sampling and analysis table" (PST).
- Applicable project work plan or monitoring plan, and related Hinkley SOPs as needed.
- Hinkley Program Health and Safety Plan (HSP).
- Well construction and previous depth to water information in provided on the PST.
- Blank purge and sampling log sheets.

FIELD-FILTRATION AND SAMPLE COLLECTION PROCEDURES FOR GROUNDWATER FROM MONITORING AND SUPPLY WELLS

1) Follow SOP-A1 through SOP-A7.

Sample Collection

As discussed in Technical Memorandum "*Use of Dual In-line Filters to Mitigate Erroneous Results Associated with Elevated Turbidity*" (CH2M HILL January, 2011), due to high sample turbidity, all dissolved Hinkley Groundwater Monitoring samples will be filtered thru at least two inline 0.45 micron filters.

1) Once the required volume of purge water has been removed and the field parameters are stabilized, connect two previously unused inline 0.45 micron filters to the sampling port side of the splitter. Remember — do not change the speed of the pump. Filters must be certified and provided by CH2M HILL.

2) Purge 500 to 1000 milliliters (ml) of water through the inline filters before collecting any samples.

3) Collect a post filter turbidity sample and record on the purge form.

4) For hexavalent chromium and dissolved metals: fill a 1 liter non-preserved sample container to the bottom of the bottle neck and replace the lid, invert the bottle 2 or 3 times to ensure the sample is homogeneous and then transfer (decant) the sample into the pre-preserved bottles required by the PST.

   Dissolved Metals Method SW 6010B and SW 6020A (including Title 22 Metals)

   a) Fill a laboratory provided pre-preserved sample bottle (500 ml poly containing nitric acid [HNO_3]) with the sample to the top of the bottle neck. Care must be taken not to overfill the bottle.

   a) Seal, label, and place the sample on ice.

Hexavalent Chromium Method SM3500 and 218.6

a) Fill a laboratory provided pre-preserved sample bottle (250 ml poly containing $(NH_4)2SO_4/NH_4OH$ buffer solution) to the top of the bottle neck. Care must be taken not to overfill the bottle.

a) Seal, label, and place the sample on ice.

SOP-A10

Water Level Measurements
Standard Operating Procedure for
PG&E Hinkley Groundwater Monitoring Program

This standard operating procedure (SOP) addresses the procedures and equipment to be used for manually measuring the depth to water at surface water locations, groundwater monitoring wells, supply wells, and domestic wells.

REQUIRED DOCUMENTS

- Event-specific "planned sampling and analysis table" (PST).
- Applicable project work plan or monitoring plan, and related Hinkley SOPs as needed.
- Hinkley Program Health and Safety Plan (HSP).
- Well construction and previous depth to water information.
- Blank purge and sampling log sheets.

PREPARATION & SETUP

1) Review event-specific PST or event-specific field instructions and HSP.

2) Ensure that the water level meter has been decontaminated. If the water level meter is not noted as decontaminated in the field notes, decontaminate the lower five feet of the water level meter before using according to SOP-A13, *Decontamination of Water Sampling Equipment.*

3) Inspect all equipment and calibrate water level meters if multiple meters are being used according to SOP-A12, *Calibration of Field Instruments*.

4) If well is equipped with a transducer, and transducer removal is required for water level measurement/sampling, follow SOP-C1, *Temporary Removal and Replacement of Transducers*.

MEASUREMENT PROCEDURES

5) Place water level meter into well or and lower until sensor sounds. Shake the line to remove any retained water. Note depth to water (DTW) measurement to mark on well casing, if there is no mark on casing measure to the north. Repeat three times and record final DTW to the nearest hundredth of a foot on the sampling log. Record well identification, time, date, DTW, and water level meter number.

6) Compare DTW measurement with previous data and note discrepancies on the sampling form. Repeat step #5 if an unexpected discrepancy is noted.

7) Decontaminate the lower five feet of water level meter or any portion of the instrument that came in contact with water, by unwinding the tape of the meter and following SOP-A13, *Decontamination of Water Sampling Equipment*. Record decontamination procedures and the serial number of the water level meter in the field book.

SOP-A11

Field Water Quality Measurements Using a Flow-through Cell Standard Operating Procedure for PG&E Hinkley Groundwater Monitoring Program

This Standard Operating Procedure (SOP) provides general guidelines for using the YSI 556 or YSI Professional Plus Water Quality meter and flow-through cell or similar device for field measurements of pH, specific conductance, turbidity, dissolved oxygen, oxidation-reduction potential (ORP), and temperature of groundwater samples. The manufacturer's manual should be consulted for detailed calibration and operating procedures.

REQUIRED DOCUMENTS

- Event-specific "planned sampling and analysis table" (PST).
- Applicable project work plan or monitoring plan, and related Hinkley SOPs as needed.
- Hinkley Program Health and Safety Plan (HSP).
- Equipment Manufacturer Manuals
- Blank purge and sampling log sheets

PREPARATION & SETUP

1) Review event-specific PST or event-specific field instructions, HSP, Equipment Procedures Manual, and initiate sampling logs for sampling activity.
2) Inspect all equipment: YSI 556 or YSI Professional Plus Water Quality Meter with flow-through cell, or similar device; distilled water in squirt bottle.
3) Prior to each day's use, clean the probes and flow-through cell according to manufacturer's directions and calibrate the field water quality (WQ) meters according to SOP-A12, *Calibration of Field Instruments*.

The YSI 556 or YSI Professional Plus Water Quality Meter is capable of measuring the following parameters:

Parameter	Range of Measurement	Accuracy
pH	0 – 14 pH	+/- 0.2 pH units
Specific Conductivity	0 – 100 mS/cm	+/- 0.5 % of reading to 0.001mS/cm
Dissolved Oxygen	0 – 50 mg/l	+/- 0.2 mg/l Depending on DO probe
Temperature	-5 – 50 ^{o}C	+/- 0.15 ^{o}C
ORP	-999 mv - +999 mv	+/- 20 mV in redox solution
Salinity	0 – 70 ppt	+/- 1.0 % of reading or .1 ppt whichever is greater

SAMPLE MEASUREMENT PROCEDURES

1) Connect the discharge tubing from the pump to the inlet side (bottom port) of the flow-through cell.
2) Connect the discharge tubing to the outlet side (top port) of the flow-through cell.
3) Place the discharge tube in a purge water collection vessel.
4) Record the time and start the pump.
5) Establish a suitable discharge rate of the pump that is consistent with the PST and guidance.
6) Allow the well drawdown to stabilize and the temperature of the flow-through cell to equilibrate with the water temperature.
7) Turn the meter on to the measure mode.
8) Record water quality readings at regular intervals every three to five minutes. Keep in mind that the time interval between successive readings should not be shorter than the recharge time of the flow-through cell. For example, if the volume of the flow-through cell is 375 mL and the stabilized discharge rate is 137 mL/minute, the water quality readings should be at least 3 minutes apart.
9) Record the water quality information, volume of water discharged, the ending water quality characteristics, the ending water level, and the sample time and number in the field logbook and/or field sampling data sheet, if used.

Key Checks and Preventive Maintenance

- Calibrate meter according to SOP-A12, *Calibration of Field Instruments*.
- Clean probe with distilled water when done.
- If probes are dirty, rinse with a weak Alconox solution in the flow-through cell. If the device still does not calibrate, rinse with weak Alconox solution, isopropyl alcohol, Alconox, and rinse well with distilled or tap water.
- Store device using tap water. Use of deionized water will ruin the probes.
- Refer to operations manual for recommended maintenance.
- Check batteries, and have a replacement set on hand.

SOP-A12

Calibration of Field Instruments
Standard Operating Procedure for
PG&E Hinkley Groundwater Monitoring Program

This standard operating procedure (SOP) addresses the procedures and equipment to be used for calibration of field instruments at the Hinkley site. This SOP should be used for calibration of water level meters (Heron or Solinst), water quality meters (YSI 556 or YSI Professional Plus) with flow-through cell and HACH turbidity meters.

REQUIRED DOCUMENTS

- Event-specific "planned sampling and analysis table" (PST).
- Applicable project work plan or monitoring plan, and related Hinkley SOPs as needed.
- Hinkley Program Health and Safety Plan (HSP).
- Equipment Manufacturer Manuals
- Previous Calibration Records
- Field Equipment Binder (documents equipment servicing, calibration, etc..)
- Blank Calibration Sheets (see attached)

PREPARATION & SETUP

1) Review event-specific PST or event-specific field instructions and HSP.
2) Inspect all equipment necessary to carry out activities detailed in event-specific PST.
3) Calibration should be performed prior to initiating sampling each day. Always use fresh solutions for calibration
4) Review Field Equipment Binder equipment servicing records to anticipate next service.
5) All equipment and solutions are stored in an air-conditioned office onsite to maintain the integrity. Due to extreme temperature at the site, all calibrations are performed within this office.
6) The Heron or Solinst water level meters shall be used as the principal field instruments for measuring depth to water in wells.
7) The YSI 556 or YSI Professional Plus water quality meter shall be used as the principal field instruments for measuring water quality parameters during groundwater sampling.

EQUIPMENT NEEDED

Water Level Meter:

- Surveyor's tape measure

YSI 556 or YSI Professional Plus Water Quality Meter:

- Calibrating solutions
- Spare batteries
- DI water

HACH Turbidity Meter:

- Autocal solution
- Level II solution
- ORP check solution
- Spare batteries
- DI water

CALIBRATION PROCEDURES

Water Level Meters

When using a single water level meter:

1) Unroll and extend the water level meter tape to its full length

2) Extend a surveyor's tape measure (graduated in 0.01-ft increments) next to the water level meter tape

3) Starting from the zero-foot mark on both the water level meter and surveyor's tapes, compare the markings down the entire length of the two tapes at ten-foot increments. On the water level meter calibration sheet, note next to the water level tape distances what the corresponding distance is on the surveyor's tape (i.e., water level distance - 10 feet; surveyor's tape distance – 10.01 feet)

   When using multiple water level meters at the site it is necessary to calibrate each against each other at least once during the sampling event (usually the first day before the site-wide water level snapshot) using the following procedure:

4) Lower each water level meter into a specified well and record the reading to the nearest hundredth of a foot on the calibration sheet along with water level meter number, time, and date.

5) If there are two or more water level meters being used and they are reading different depths to water with a difference bigger than 0.01 of a foot:

   a) Repeat steps #1 through #3 for all the water level meters

b) If the measured distance between the water-level meters do not correspond with the measurements taken with the surveyor's measure tape (difference bigger than 0.01) then mark and affix a tag to the water level meter with the measurement calibrated offset distance in ft

Water Quality and Turbidity Meters

Check expiration date of calibration solution and discard if expired. For calibration instructions, please refer to specific Equipment Manufacturer Manuals

SOP-A13

Decontamination of Water Sampling Equipment
Standard Operating Procedure for
PG&E Hinkley Groundwater Monitoring Program

This standard operating procedure (SOP) describes the procedures and equipment to be used for decontamination of sampling equipment at the Hinkley site.

REQUIRED DOCUMENTS

- Event-specific "planned sampling and analysis table" (PST).
- Applicable project work plan or monitoring plan, and related Hinkley SOPs as needed.
- Hinkley Program Health and Safety Plan (HSP).

PREPARATION & SETUP

1) Initiate field log sampling book for activity.
2) Inspect all equipment necessary to carry out activities detailed in event-specific PST.
3) Review manufacturer decontamination guidelines for equipment necessary to carry out activities.

Equipment List:

1) Spay bottle with distilled water.
2) Spay bottle with 2.5 percent (W/W) Alconox and distilled water solution.
3) Large plastic pails, tubs and 5-gallon buckets for Alconox and distilled water, scrub brushes, squirt bottles for Alconox solution, distilled water, and clean plastic bags.
4) Trash pump to transfer used decontamination water from tubs to holding tank for disposal of waste.
5) Phthalate-free gloves.

GUIDELINES

Field Equipment

Any equipment used (temporary pump, dedicated pump power supply line, hose claps, etc.) will be decontaminated before use and between each sampling location.

Water Level Meters
Any portion of a water-level indicator (e.g. probe and/or cable) that contacts the groundwater must be decontaminated by washing with Alconox or Liquinox solution and rinse with distilled water after use.

Pumps/Probes/Cables
Sampling pumps, probes (e.g., pH or specific ion electrodes, geophysical probes, etc.) and/or cables that come into contact with groundwater will be decontaminated using the

procedures specified below unless manufacturer's instructions indicate otherwise. For probes that make no direct contact (e.g., OVM equipment), the probe will be wiped with paper towels.

PROCEDURES

Sampling Equipment Decontamination—Groundwater Sampling Pumps

Sampling pumps are decontaminated after each use as follows:

1) Don phthalate-free gloves.
2) Turn off pump after sampling. Remove pump from well and place pump in decontamination tub, making sure that tubing does not touch the ground.
3) Turn pump back on and pump 1 gallon of Alconox solution through the sampling pump.
4) Rinse with a minimum of 1 gallon of distilled water.
5) Keep decontaminated pump in decontamination tub or remove and wrap in clean plastic sheeting or clean plastic garbage bag.
6) Collect all rinsate and dispose of at the Central or Source IRZ holding tanks as instructed by PG&E.
7) Decontamination materials (e.g., plastic sheeting, tubing, etc.) that have come in contact with used decontamination fluids or sampling equipment will be placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of that could still be reused will be rendered inoperable before disposal in the refuse dumpster.

Sampling Equipment Decontamination—Other Equipment

Reusable sampling equipment is decontaminated after each use as follows.

1) Don phthalate-free gloves.
2) Wash all equipment surfaces that contacted the potentially contaminated soil/water with Alconox solution.
3) Rinse with distilled water or triple rinse with potable water.
4) Air dry and wrap exposed areas with plastic sheeting or a clean plastic garbage bag for transport and handling if equipment will not be used immediately.
5) Collect all rinsate and dispose of in a DOT-approved 55-gallon drum or holding tank.
6) Decontamination materials (e.g., plastic sheeting, tubing, etc.) that have come in contact with used decontamination fluids or sampling equipment will be disposed of in DOT-approved 55-gallon drums.

KEY CHECKS AND ITEMS

- Clean with solutions of Alconox and distilled water.
- If necessary, decontaminate the outside of filled sample bottles before relinquishing them to anyone.
- All materials generated during sampling (debris, PPE, decontamination liquids, etc.) will be placed in 55-gallon drums or rolloff bins for storage pending analysis and disposal off site.
- Document all decontamination procedures in the field log book. Prior to use of equipment during a sampling event, check log book to see that equipment was decontaminated, if not proceed with decontamination procedures prior to use. At the end of an event, tag equipment as decontaminated with initials and date. Remove the tag prior to use at the beginning of the next event. If at the beginning of a sampling event this tag is not visible or complete, proceed with decontamination of equipment.
- The effectiveness of field cleaning procedures will be monitored by rinsing decontaminated equipment (i.e. portable pump) with organic-free water and submitting the rinse water in standard sample containers for analysis. The minimum number of equipment blank samples will be at least one per team (per event), per piece of equipment decontaminated, during large-scale field sampling efforts.