Pacific Gas and Electric Company

Environmental Remediation
4325 S. Higuera Street
San Luis Obispo, CA 93401

Mr. Greg Issinghoff
California Regional Water Quality Control Board, Central Valley Region
1685 E Street
Fresno, CA 93706-2020

July 18, 2013

Subject: **Addendum to the Groundwater Characterization and Water Supply Well Destruction Work Plan, Water Supply Well Status Summary and Destruction Procedures, Kern Power Plant, Bakersfield, California**

Dear Mr. Issinghoff:

Please find enclosed the above-referenced document for the Pacific Gas and Electric Company (PG&E) Kern Power Plant, located in Bakersfield, California. This document was prepared by Jacobson James & Associates, Inc., on behalf of PG&E, to describe the current status and the proposed destruction methods for the remaining on-site water supply wells. Please provide any comments by Thursday, August 15, 2013.

Well destruction field activities are anticipated to occur in late September or October, pending California Regional Water Quality Control Board, Central Valley Region (CVRWQCB) approval of this work plan addendum; completion of required permitting; and coordination with ongoing site demolition activities. CVRWQCB staff will be notified at least 5 business days before well destruction field activities begin.

An electronic copy of this document will be uploaded to the GeoTracker website. If you have any questions, please feel free to contact me at Redacted.

Sincerely,

Redacted

Digitally signed by Redacted
Date: 2013.07.15 08:19:31 -07'00'

cc: Redacted

Enclosures: (1)

July 18, 2013

Redacted

Pacific Gas and Electric Company

Redacted

Subject: Addendum to the Groundwater Characterization and Water Supply Well Destruction Work Plan, Water Supply Well Status Summary and Destruction Procedures Kern Power Plant, Bakersfield, California

Dear Redacted

Jacobson James & Associates, Inc. (JJ&A), has prepared this addendum to the *Groundwater Characterization and Water Supply Well Destruction Work Plan* (Groundwater Work Plan)[1] to provide additional detail on the proposed destruction of five water supply wells at the Kern Power Plant (KPP), located at 2401 Coffee Road in Bakersfield, California (the Site) (see Figure 1). The setting, history, and previous environmental work at the Site are described in detail in the Groundwater Work Plan.

PURPOSE

The Groundwater Work Plan identifies seven water supply wells at the Site and provides general information about the destruction methods for the three water supply wells that were understood to still exist. The purposes of this addendum are to:

1. Describe the current status of the water supply wells, including information obtained since submittal of the Groundwater Work Plan; and,
2. Present the proposed method for how the water supply wells will be destroyed.

REASON FOR WELL DESTRUCTION

Water well standards established by the California Department of Water Resources[2] state:

> *A well that is no longer useful (including exploration and test holes) must be destroyed in order to: 1. Assure that the groundwater supply is protected and preserved for further use. 2. Eliminate the potential physical hazard.*

Five water supply wells (WS1, WS2, WS3, WS4, and WS6) remain at the Site and are no longer in use (see Figure 2). Therefore, in consideration of California well standards and Kern County ordinance (see Attachment 1), these five water supply wells are proposed for destruction.

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[1] JJ&A, 2012. *Groundwater Characterization and Water Supply Well Destruction Work Plan, Kern Power Plant, Bakersfield, California*. March 27.

[2] California Department of Water Resources, Southern District, 1991. California Well Standards. Bulletin 74-90 (Supplement to Bulletin 74-81). Part III. Destruction of Wells, Section 20. Purpose of Destruction. Accessed at: http://wwwdpla.water.ca.gov/sd/groundwater/california_well_standards/wws/wws_combined_sec20-22.html on March 16.

WATER SUPPLY WELLS' CURRENT CONDITIONS

New information regarding the water supply wells has been obtained since the submittal of the Groundwater Work Plan, at which time wells WS1, WS6, and WS7 were understood to be abandoned but not properly destroyed, and wells WS2, WS3, WS4, and WS5 were understood to have already been destroyed. The paragraphs below describe the location and status of the seven water supply wells.

Well Location Confirmation

JJ&A confirmed the existence of water supply wells WS1 and WS6 in March 2012 by identifying well casings that matched the available construction details at the locations shown on historical Site figures. At that time, a pump and discharge pipe remained on top of the casing of well WS1; well WS6 was an open 16-inch diameter steel casing covered by a large concrete block. The JJ&A field team did not observe above-ground evidence of well WS7 at the location shown on historical Site figures. The team did not attempt to locate wells WS2, WS3, WS4, or WS5 in March 2012, as these wells had reportedly been destroyed.

During facility demolition activities in early April 2012, the demolition team identified two open vertical pipes beneath temporary covers in the eastern portion of the Site (see Figure 2). JJ&A and its underground utility location subcontractor investigated these features on April 12, 2012, and concluded the two vertical pipes were water supply wells WS3 and WS4 based on their location and construction (16-inch diameter steel casing). The demolition team also identified water supply well WS2 while dismantling the fence and foundation pad around nearby well WS1.

In February 2013, JJ&A measured the total depth and depth to water in water supply wells WS1, WS2, WS3, WS4, and WS6. The February 2013 measurements are presented in Table 1, along with the reported construction details for the wells. The measured total depths ranged from approximately 89 to 275 feet below ground surface (bgs); the difference between reported and measured well total depths is interpreted as collapse of the well and caving of the surrounding formation, blocking the well. The measured total depths in all five wells did not correlate with the expected total depth based on the available records. Two of the five wells (WS1 and WS3) extended below the apparent water table. A vertical turbine pump was found to remain within well WS1.

JJ&A attempted to locate wells WS5 and WS7 on several occasions. On April 11, 2012, the areas where WS5 and WS7 were thought to be located were inspected by a JJ&A-contracted subsurface utility location specialist. The search area was determined by historical data reference points from database and graphics files from the *Phase II Environmental Site Assessment*[3] (see Figure 3). The search resulted in magnetic anomalies in the area of WS7. However, no evidence of a water supply well was found near the interpreted location of well WS5. A shovel was used to pothole for wells WS5 and WS7 on May 10, 2012; again, no field evidence of either well was identified.

On August 16, 2012, the demolition team provided a tracked loader and operator to assist JJ&A with locating well WS7. Soil was carefully removed approximately 1 foot at a time from where WS7 was suspected to be located, based on the historical maps and the magnetic anomaly (see Photographs 1

[3] IT Corporation, 2000. *Phase II Environmental Site Assessment, Kern Power Plant, 2401 Coffee Road, Bakersfield, California*. August 10.

through 4 in Attachment 2). A block of cement was found at approximately 5 feet bgs and is believed to be the former well WS7, which appears to have been cut below grade and backfilled with cement grout (consistent with Kern County well destruction requirements). Based on these findings, well WS7 appears to have been properly destroyed.

On March 12, 2013, JJ&A conducted an investigation to locate well WS5. Two possible locations for the well (based on historical maps and graphics files) were measured from a known, surveyed reference point and were marked on the ground with paint. Using a backhoe (see Photographs 5 through 8 in Attachment 2), the possible areas were excavated to approximately 8 feet bgs. No evidence of a well was identified in either location. The area was checked by a utility location subcontractor on April 16, 2013, again with no anomalies indicative of a well identified.

Pump Removal from WS1

The Groundwater Work Plan specifies removal of pumps or other down-hole equipment from the water supply wells before they are destroyed. JJ&A attempted to remove the vertical turbine pump from well WS1 on April 16 through 19, 2013 (see Photographs 9 through 15 in Attachment 2). Using a hydraulic jack table, the 10-inch diameter pump casing and 3-inch diameter drive shaft were slowly lifted from their static position to approximately 6 feet above grade. Once the casing and drive shaft were sufficiently above ground level, the casing was attached to a large excavator to assist the lifting process.

The casing was carefully lifted and secured as 20-foot sections were disconnected at the threaded joints and removed. After the second 20-foot section was removed, the pump became stuck and separated at the third threaded joint. Several attempts were made to free the pump without success. The team made the decision to cut the remaining pump assembly free and let it fall back into the well. Ultimately, approximately 60 feet of pump casing and 50 feet of driveshaft were removed from the well. Figure 4 shows a conceptual configuration of a vertical turbine pump inside well WS1 prior to and following the attempted removal.

The vertical turbine pump is lodged below the ground surface inside well WS1. The top of the 10-inch diameter pump discharge pipe is stuck inside the 16-inch diameter well casing at approximately 21 feet bgs, leaving an estimated 238 feet of discharge pipe, drive shaft, and turbine pump (assembly) inside the 16-inch well casing. The top of the pump driveshaft is approximately 11 feet bgs. The current condition of the pump assembly will not allow sampling or measurements of the well. Though water is present within the pump casing, it is not believed to be directly connected to the surrounding water-bearing zone, and, therefore, is not representative of the formation. Centralizers holding the pump shaft within the 10-inch diameter pump casing prevent use of down-hole monitoring and sampling equipment inside the pump casing. JJ&A discussed the pump removal attempt and result with staff from the Kern County Environmental Health Services Department, who approved in-place destruction of the vertical turbine pump[4].

[4] JJ&A, 2013. Record of Telephone Conversation Regarding Water Supply Well WS1 Pump Status and Destruction Requirements. Between Redacted Project Manager, and Tom Hardy (Kern County Environmental Health Services Department). May 1.

Video Logging

Video logging of wells WS2, WS3, WS4, and WS6 was conducted on April 15 and 16, 2013, in accordance with the Groundwater Work Plan. The video logs showed the steel casings remain intact, confirmed the reported screened intervals of the wells, and showed sandy sediment at the total depth measured in February 2013. Well WS3 is partially obstructed at approximately 118 feet bgs by what appears to be a block of concrete. The video logs from wells WS2, WS3, WS4, and WS6 can be found in Attachment 3. Video logging was not performed in well WS1 because the camera will not fit between the 16-inch diameter well casing and 10-inch diameter pump casing, and there is no benefit to video logging inside the pump casing.

Well Sampling, Analysis, and Data Validation

In accordance with the Groundwater Work Plan, a grab groundwater sample was collected from well WS3 on May 17, 2013. Groundwater samples were not collected from wells WS2, WS4, and WS6 because the wells are dry. The pump lodged inside well WS1 prevents collection of a representative groundwater sample, as discussed in a separate addendum to the Groundwater Work Plan[5]. Therefore, with the approval of California Regional Water Quality Control Board, Central Valley Region (CVRWQCB) staff[6], a sample was not collected from well WS1.

The grab groundwater sample from well WS3 was collected using a submersible pump and a modified low-flow purging procedure that was discussed with CVRWQCB staff in advance of sample collection[7]. The pump intake was placed near the middle of the water column and approximately 50 gallons of water were purged from the well at approximately 2.5 gallons per minute. Field sampling forms are included in Attachment 4. The water level inside the well was monitored during the purging process to determine whether water was being drawn from the formation. Based on the measured drawdown, formation water was sampled. Field parameters were recorded using a flow-through cell during the purging process, as described in the Groundwater Work Plan.

The groundwater sample from well WS3 was analyzed for the same constituents as Site-wide monitoring wells:

- Dissolved California Assessment Manual (CAM) 17 metals plus calcium, iron, magnesium, manganese, potassium, and sodium;
- Dissolved hexavalent chromium;
- Alkalinity (carbonate, bicarbonate, hydroxide, and total);
- Chloride; and,
- Sulfate.

[5] JJ&A, 2013. *Addendum to the Groundwater Characterization and Water Supply Well Destruction Work Plan, Water Supply Well WS1 Status and Sampling Plan, Kern Power Plant, Bakersfield, California*. May 23.

[6] CVRWQCB, 2013. Letter Regarding Addendum to Groundwater Characterization and Water Supply Well Destruction Work Plan, Water Supply Well WS1 Status and Sampling Plan, Pacific Gas & Electric Company – Kern Power Plant, 2401 Coffee Road, Bakersfield, Kern County. From Russell Walls, Senior Engineer, to Redacted (PG&E). June 20.

[7] JJ&A, 2013. Record of Telephone Conversation Regarding WS1 Pump Removal Efforts and WS3 Sample Collection. Between Redacted Project Manager, and Redacted May 1.

Laboratory analytical results for metals are presented in Table 2, along with the preliminary screening criteria established in the Groundwater Work Plan. The preliminary screening criteria represent the lower of the federal or California primary or secondary Maximum Contaminant Levels (MCL), or the lower of the Regional Screening Levels or Environmental Screening Levels for chemicals that do not have an MCL. The final screening criteria for groundwater will be identified after the background screening thresholds for metals in groundwater are developed. Review of groundwater sample results against the preliminary screening criteria shows that metals concentrations are below the screening criteria. Table 2 also includes summary statistics for groundwater samples collected from on-Site monitoring wells from 2000 through February 2013[8]. Field parameters and laboratory analytical results for alkalinity, chloride, and sulfate are presented in Table 3. The laboratory analytical reports and the data validation report are provided in Attachments 5 and 6, respectively.

An equipment rinsate sample collected from the sampling pump and tubing (as specified in the Groundwater Work Plan) contained detectable concentrations of barium, calcium, total chromium, copper, magnesium, manganese, nickel, potassium, sodium, and zinc (see Table 2). A source blank sample was collected of the purified water provided by the laboratory for equipment rinsate sampling was found to contain similar concentrations of these metals. The detections in the equipment blank and source blank resulted in qualification of data during the data validation process (see Attachment 6). The source water appears to be the cause of metals detections in the equipment rinsate sample; an alternate source of water for rinsate sample collection will be used during future sampling events.

The laboratory analytical results do not indicate an impact to groundwater associated with Site-related activities; therefore PG&E believes the down-hole flow monitoring requested by CVRWQCB is not considered necessary.

WATER SUPPLY WELL DESTRUCTION SCOPE OF WORK

The paragraphs below describe the process through which water supply wells WS1, WS2, WS3, WS4, and WS6 will be destroyed. Table 1 provides construction details for the water supply wells that will be destroyed.

Permitting, Approvals, and Preparations

JJ&A has reviewed the well destruction process and requirements from the Kern County Environmental Health Services Department (see Attachment 1) and will obtain permits prior to mobilization. JJ&A will coordinate with the demolition team and subcontractors to prepare the Site, equipment, and personnel for the destruction of the wells.

Well Destruction

The five water supply wells will be destroyed under the direction of a California Professional Geologist, in accordance with Kern County guidelines (see Attachment 1), and consistent with information provided by Kern County Environmental Health Services Department[4]. JJ&A staff will excavate around each water supply well and cut the casing to at least 5 feet bgs. A casing perforator (Mills knife) will be

[8] Summary statistics are from Attachment 1 of the *Data Transmittal: Groundwater Monitoring Well Installation and February 2013 Sampling, Kern Power Plant, Bakersfield, California*. Submitted by JJ&A on April 17, 2013.

used to cut casings of WS2, WS3, WS4, and WS6 from the current total depth to 50 feet above the screen, but not higher than 25 feet bgs. The water supply wells will then be backfilled to overflow with neat cement grout using a tremie pipe. The casing of well WS1 will not be perforated before destruction due to the vertical turbine pump remaining inside the well. As advised by Kern County Environmental Health Services Department, well WS1 will be destroyed by placing a tremie pipe inside the 10-inch pump casing and pumping in a lean cement grout mixture to overflow the 10-inch pump casing into the 16-inch well casing, then backfilling the well to overflow. The inspector from the Kern County Environmental Health Department will be contacted in advance of the work so that they may oversee well destruction, if desired.

DOCUMENTATION AND REPORTING

All information pursuant to water supply well destruction will be documented for the project file. Water supply well destruction activities will be reported in a stand-alone deliverable or an interim transmittal associated with the KPP groundwater monitoring program (see Section 3.5 of the Groundwater Work Plan).

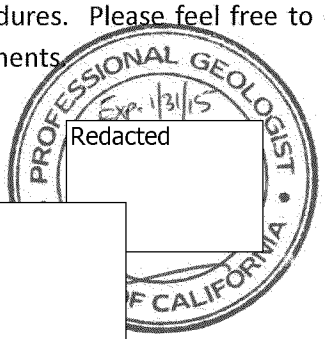
ANTICIPATED SCHEDULE

Destruction of the five water supply wells is anticipated to occur in September or October of 2013. The exact date will be determined based on completion of permitting and the availability of the Kern County inspector, CVRWQCB staff approval of this Groundwater Work Plan Addendum, and coordination with the Site demolition activities.

This concludes the addendum to the Groundwater Work Plan for water supply well status summary and destruction procedures. Please feel free to call the undersigned at (916) 367-5111 ext. 125 with any questions or comments.

Sincerely,

JJ&A



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Tables

Figures

Attachments

TABLES

Tables

TABLE 1
WATER SUPPLY WELL CONSTRUCTION DETAILS
Addendum to the Groundwater Work Plan
Water Supply Well Status Summary and Destruction Procedures
Kern Power Plant
Bakersfield, California

Well Name	Well Status	Well Completion Date	Reported Construction Details			Field Measurements, February 2013			Casing Diameter (inches)
			Screen Interval		Total Depth (feet bgs)	Total Depth (feet bgs)	Apparent Backfill (feet)	Depth to Water (feet below top of casing)	
			Depth (feet bgs)	Length (feet)					
WS1[a]	Inactive; pump in place	1946	123 - 499	376	502	275	227	125	16
	After attempted pump removal					238	264	130	
WS2	Inactive; no pump	1946	30 - 117	87	120	89	31	Dry	16
WS3[b]	Inactive; no pump	1946	160 - 500	340	504	164	340	119	16
WS4	Inactive; no pump	1956	39 - 117	78	120	102	18	Dry	16
WS5	Assumed destroyed	1956	NM	NM	120	NM	NM	NM	NM
WS6	Inactive; no pump	1956	140 - 500	360	500	100	400	Dry	16
WS7	Destroyed	6/23/1961	580 - 970	390	970	NM	NM	NM	NM
Total footage for wells WS1, WS2, WS3, WS4, and WS6 (April 2013)				**1,241**	**1,746**	**693**	**1,053**		

Notes:

[a] Field measurements were taken within the remnants of the 10-inch diameter vertical turbine pump casing. Pump removal was attempted on April 16-18, 2013. An attempt was made to measure the depth to water and total depth of the well between the outside of the pump casing and the inside of the well casing, but there was insufficient clearance for the measuring tape. The total depth, apparent backfill, and depth to water within the WS1 well casing is unknown.

[b] During video logging in April 2013, a partial obstuction was identified at 118.2 feet bgs inside the 16-inch diameter well casing.

bgs = below ground surface

NM = not measured

TABLE 2
METALS RESULTS FOR GROUNDWATER SAMPLE FROM WELL WS3, MAY 17, 2013
Addendum to the Groundwater Work Plan
Water Supply Well Status Summary and Destruction Procedures
Kern Power Plant
Bakersfield, California

Sample Description	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium, Total	Chromium, Hexavalent	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Preliminary Screening Criteria[a]	6	10	1000	4	5	--	50	0.031	3	1000	300	15	--	50	2	35	100	--	50	100	--	2	15	5000
Number of Samples Analyzed[b]	61	151	61	61	61	24	190	188	61	61	37	61	37	37	56	61	61	37	61	61	24	61	61	61
Number of Detections[b]	10	56	61	9	3	24	50	97	20	11	13	12	37	24	2	42	23	37	7	1	24	9	34	20
Number of Detections Above Preliminary Screening Criteria[b]	1	7	1	0	0	--	3	95	6	0	9	1	--	12	0	0	0	--	0	0	--	8	9	0
Frequency of Detections Above Preliminary Screening Criteria[b]	2%	5%	2%	0%	0%	--	2%	51%	10%	0%	24%	2%	--	32%	0%	0%	0%	--	0%	0%	--	13%	15%	0%
Maximum Detection[b]	37.3	120	1250	3.27	--	93900	109	71	32	58	10200	16	26600	2940	0.238	21.6	36.6	6590	--	6.3	84600	10	112	428
Well 'WS3	**0.155 Jo**	**<1.0**	**45.5**	<1.0	<1.0	**34100**	<1.27 U	<0.20	**0.102 Jo**	<0.560 U	<28.3 U	<1.0	**5360**	<2.86 U	<0.50	**2.83**	**3.58**	**1810**	<1.0	<1.0	**26600**	<1.0	**1.16**	<5.79 U
Equipment Blank	<1.0	<1.0	**0.499 Jo**	<1.0	<1.0	**227**	**0.737 Jo**	<0.20	<1.0	**0.284 Jo**	<50.0	<1.0	**24.5 Jo**	**0.814 Jo**	<0.50	<1.0	**0.535 Jo**	**11.7 Jo**	<1.0	<1.0	**211**	<1.0	<1.0	**1.41 Jo**
Source Blank	<1.0	<1.0	**0.616 Jo**	<1.0	<1.0	**97.1 Jo**	**0.739 Jo**	<1.0	<1.0	**0.230 Jo**	**20.2 Jo**	<1.0	**12.7 Jo**	**0.652 Jo**	<0.50	<1.0	<1.0	<100	<1.0	<1.0	**186**	<1.0	<1.0	**6.38**

Notes:

[a] Preliminary screening criteria were selected in the following manner: select the lower of the federal or California primary or secondary Maximum Contaminant Level (MCL); if no MCL is available, then select the lower of the Regional Screening Level or Environmental Screening Level values. Final screening criteria will not be less than background concentrations, and is to be determined during the groundwater characterization project.

[b] Summary statistical data based on groundwater samples through February 2013, as presented in Attachment 1 of the *Data Transmittal: Groundwater Monitoring Well Installation and February 2013 Sampling, Kern Power Plant, Bakersfield, California,* dated April 17, 2013.

-- = not applicable or not relevant

Detections are **bolded.**

All sample data are in micrograms per liter (µg/L).

See Attachment 6 for data qualifier definitions.

TABLE 3
FIELD PARAMETERS AND GENERAL CHEMISTRY FROM WELL WS3, MAY 17, 2013
Addendum to the Groundwater Work Plan
Water Supply Well Status Summary and Destruction Procedures
Kern Power Plant
Bakersfield, California

	Field Parameters							General Chemistry (mg/L)					
Sample Location	pH	Electrical Conductivity (µs/cm)	Turbidity (NTU)	Temperature (°C)	Oxygen Reduction Potential (mV)	Depth to Water (feet bgs)	Dissolved Oxygen (mg/L)	Alkalinity (as $CaCO^3$)	Alkalinity, Bicarbonate	Alkalinity, Carbonate (as $CaCO^3$)	Alkalinity, Hydroxide	Chloride	Sulfate
WS3	7.68	404.8	4.46	22	141.5	121.55	9.17	118	118	<1.00	<1.00	14	35

Notes:
bgs = below ground surface
$CaCO_3$ = calcium carbonate
mg/L = milligrams per liter
mV = milliVolts
NTU = nephelometric turbidity unit
µs/cm = microSiemen per centimeter
°C = degree Celsius

FIGURES

Figures

C:\GIS\PGE_KERN\Basemap\Figure 1 Kern Site Loc.mxd

SOURCE:NATIONAL GEOGRAPHIC CALIFORNIA TOPO VERSION 4.2

JACOBSON | JAMES
& associates, inc

PACIFIC GAS & ELECTRIC COMPANY
KERN POWER PLANT
BAKERSFIELD, CALIFORNIA

PROJECT NO.	DATE	DRAWN BY	APPR. BY
02.KPP.004	05/14/13	DPG	TJ

FIGURE 1

SITE LOCATION MAP

SB_GT&S_0762342

AERIAL SOURCE: NATIONAL AGRICULTURE IMAGERY PROGRAM, FEBRUARY 2011

Path: J:\GIS\PGE_KERN\Reports\MWDestAdd4\Figure 2 Kern Well Network.mxd

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- FORMER SUNLAND OIL REFINERY
- DEMOLITION AREA BOUNDARY
- (D) Zone 1A or 1B Well, Measured or inferred to be dry on February 4, 2013
- Zone 1A or 1B Well (up to 192 feet bgs)
- (C) Zone 1C Well (below 192 feet bgs)
- Water Supply Well

NOTES:

Well locations are approximate; the distance between clustered wells is exaggerated for figure legibility.

The A, B, and C zone designations are from World Oil Corporation's groundwater monitoring program for the adjacent Sunland Oil Refinery.

0 400

SCALE IN FEET

JACOBSON | JAMES & associates, inc

TITLE

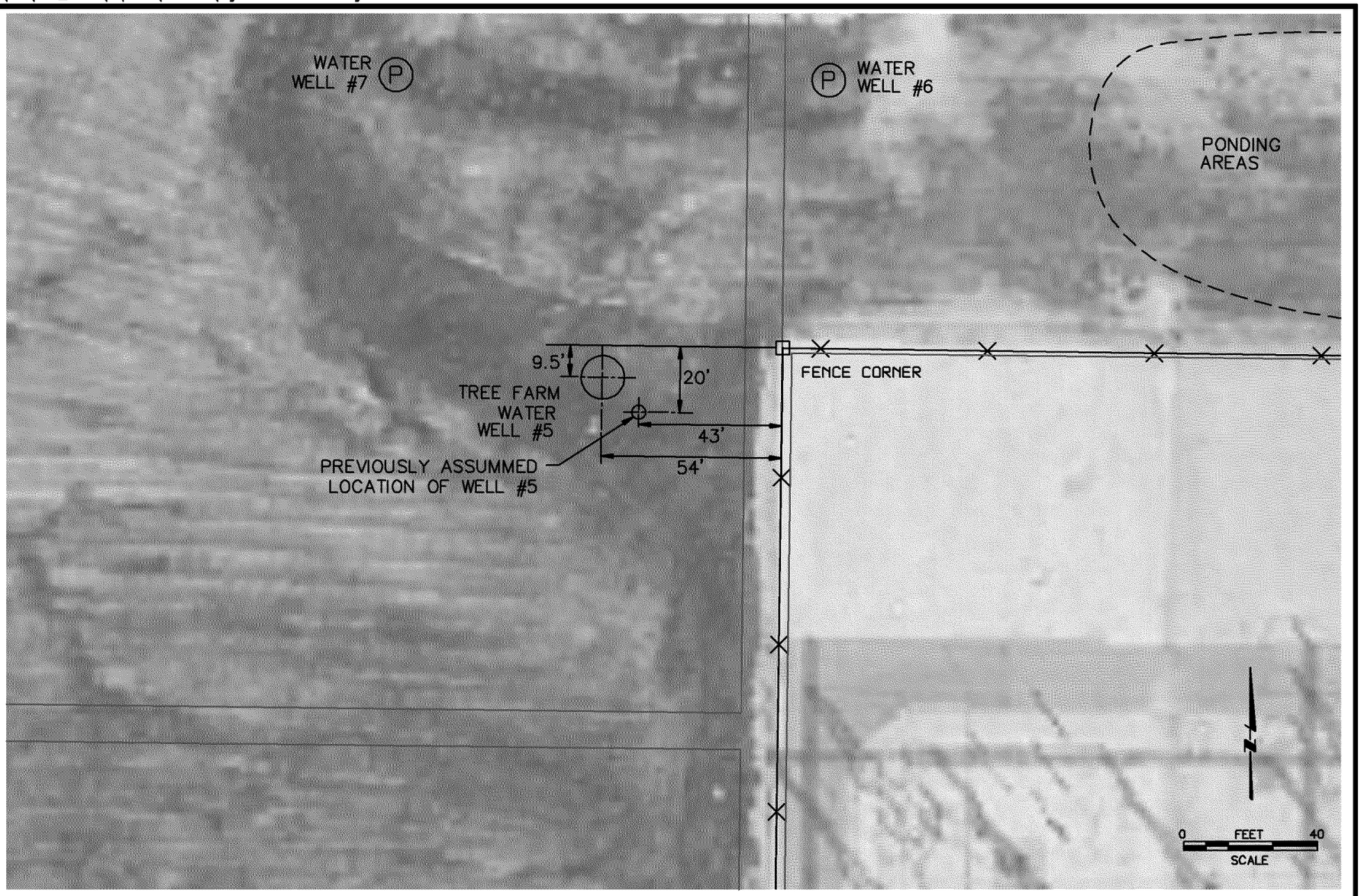
WELL NETWORK

PACIFIC GAS & ELECTRIC COMPANY
KERN POWER PLANT
2401 COFFEE ROAD
BAKERSFIELD, CALIFORNIA

DRAWN BY	APPROVED BY	DATE	FIGURE
PEM	JB	06/21/13	2

SB_GT&S_0762343

J:\GIS\PGE_KERN\Reports\Ad-Hoc\Figure 3 Lost WS5.dwg



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& associates, inc

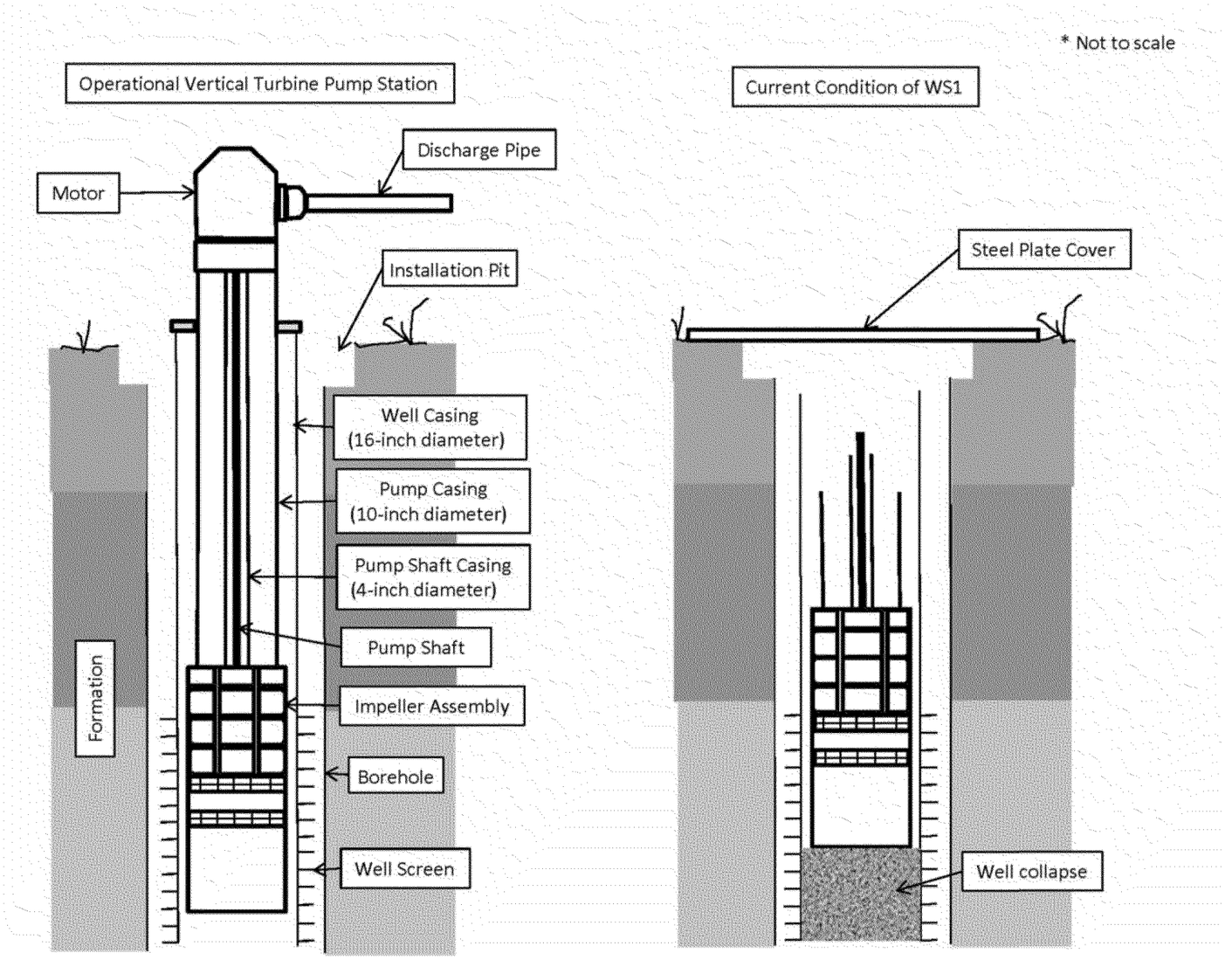
PACIFIC GAS & ELECTRIC COMPANY
KERN POWER PLANT
BAKERSFIELD, CALIFORNIA

PROJECT NO.	DATE	DRAWN BY	APPROVED BY
02.KPP.004	06/21/13	DPG	JB

FIGURE 3

WATER SUPPLY WELL WS5 , WS6 AND WS7 LOCATION MAP

J:\GIS\PGE_KERN\Reports\Ad-Hoc\Figure 4 Sch Turbine Pump.dwg



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& associates, inc

PACIFIC GAS & ELECTRIC COMPANY
KERN POWER PLANT
BAKERSFIELD, CALIFORNIA

PROJECT NO.	DATE	DRAWN BY	APPROVED BY
02.KPP.004	06/21/13	PEM	JB

FIGURE 4

VERTICAL TURBINE PUMP SCHEMATIC DIAGRAM

ATTACHMENT 1

KERN COUNTY WELL DESTRUCTION REQUIREMENTS

WATER WELL DESTRUCTIONS

Water wells that are no longer in use (abandoned) or are no longer producing adequate supplies of water are required by state law and county ordinance to be destroyed according to established procedures.

Abandoned water wells can act as conduits for surface and subsurface pollution to enter groundwater supplies. Once polluted, groundwater is no longer drinkable.

Abandoned wells can also be illegally used for the disposal of liquid and solid wastes, causing further degradation of the groundwater quality.

The following guidelines will enable you to destroy your well in compliance with those regulations:

1. An application for a permit to destroy the well must be submitted to the Kern County Public Health Services Department, Environmental Health Division, for review prior to the well destruction.

2. The contractor submitting an application must have a C-57 license and be registered with the Department.

3. A fee at the rate of $100 per hour will be charged for the travel and inspection time.

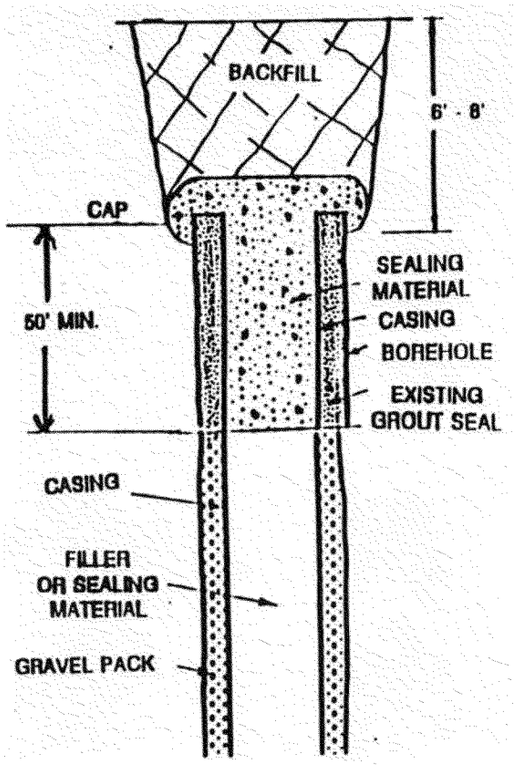
4. Cut off casing six to eight feet (6'-8') below grade if in an urban area.

5. Sealing material shall consist of neat cement, sand cement, concrete, bentonite or other approved material. Cuttings from drilling, or drilling mud, shall not be used for any part of the sealing material.

6. With an aid of a tremie pipe, cement, concrete, or sand-cement grout in top 50 feet, spilling over to form a mushroom cap.

7. Placement of the 50-foot cement seal must be witnessed by a representative of this Division.

WELL DESTRUCTION



W117

DESTRUCTION OF WELL WITH REGIONAL CONFINING CLAY

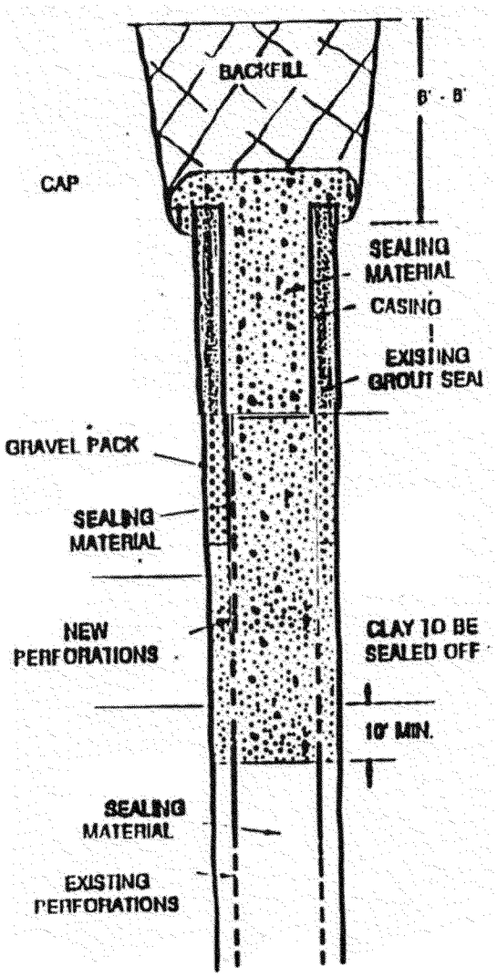
For wells that penetrate a regional confining clay, additional requirements are as follows:

1. Depth of the annular seal will be determined at the time the application is submitted or after the application is submitted to the Kern County Water Agency for review.

2. Casing may be required to be perforated across the regional confining clay with a mills knife or wire line casing shot.

3. The casing is to be immediately pumped full of approved sealing material with the aid of a tremie pipe from 10' below the regional confining clay to the top of the well casing.

4. The destruction procedures for the upper seal are the same as for the shallow well destruction.



WELL DESTRUCTION

PROCEDURES

DEPARTMENT OF PUBLIC HEALTH SERVICES,
ENVIRONMENTAL HEALTH DIVISION
2700 M STREET, SUITE 300
BAKERSFIELD, CA 93301

(661) 862-8700

October 2006

KERN COUNTY WATER SUPPLY SYSTEMS ORDINANCE

Well Destruction
Approved Sealing Material

Sealing material shall consist of neat cement, sand cement, concrete, or bentonite. Cuttings from drilling, or drilling mud, shall not be used for any part of the sealing material.

1. **Cement-based Sealing Material**:

    a. **Neat Cement.** For Types I or II Portland cement, neat cement shall be mixed at a ratio of one 94-pound sack of Portland cement 5 to 6 gallons of clean water.

    b. **Sand Cement**. Sand-cement shall be mixed at a ratio of not more than 188 pounds of sand to one 94-pound sack of Portland cement (2 parts sand to 1 part cement, by weight) and about 7 gallons of clean water, where Type I or Type II Portland cement is used. This is equivalent to a '10.3 sack mix.' Less water shall be used if less sand than 2 parts sand per one part cement by weight is used.

    c. **Concrete.** Concrete shall consist of Portland cement and aggregate mixed at a ratio of at least six-94 pound sacks of Portland cement per cubic yard of aggregate. A popular concrete mix consists of eight-94 pound sacks of Type I or Type II Portland cement per cubic yard of uniform 3/8-inch aggregate.

2. **Bentonite Sealing Material**

    Bentonite used shall be commercially prepared, powdered, granulated, pelletized, or chipped/crushed sodium montmorillonite clay. The largest dimension of pellets or chips shall be less than 1/5 the radial thickness of the annular space into which they are placed.

    Bentonite clay mixtures shall be thoroughly mixed with clean water prior to placement. A sufficient amount of water shall be added to bentonite to allow proper hydration. Depending on the bentonite sealing mixture used, 1 gallon of water should be added to about every 2 pounds of bentonite. Water added to bentonite for hydration shall be of suitable quality and free of pollutants and contaminants.

    Bentonite preparations normally require ½ to 1 hour to adequately hydrate. Actual hydration time is a function of site conditions and the form of bentonite used. Finely divided forms of bentonite generally require less time for hydration, if properly mixed.

Dry bentonite pellets or chips may be placed directly into the casing space below water, where a short section of casing space, up to 10 feet in length, is to be sealed. Care shall be taken to prevent bridging during the placement of bentonite seal material.

Unamended bentonite clay seals should not be used where structural strength of the seal is required, or where it will dry. Bentonite seals may have a tendency to dry, shrink and crack in arid and semi-arid areas of California where subsurface moisture levels can be low. Bentonite clay seals can be adversely affected by subsurface chemical conditions, as can cement-based materials.

Bentonite clay shall not be used as a sealing material if roots from trees and other deep rooted plants might invade and disrupt the seal, and/or damage the well casing. Roots may grow in an interval containing a bentonite seal depending on surrounding soil conditions and vegetation.

Bentonite-based sealing material shall not be used for sealing intervals of fractured rock or sealing intervals of highly unstable, unconsolidated material that could collapse and displace the sealing material, unless otherwise approved by the enforcing agency. Bentonite clay shall not be used as a sealing material where flowing water might erode it.

3. Other Approved Sealing Material

Well proportioned mixes of silts, sands, and clays (or cement), and native soils that have a coefficient of permeability of less than 10 feet per year.

ATTACHMENT 2

PHOTOGRAPHIC LOG

Photo 1. Search area of WS7. Flags and paint mark probable WS7 location. Looking south. July 24, 2012.

Photo 2. Attempting to locate WS7. Looking southwest. August 16, 2012.

[redacted]

Photo 3. Cement grout found approximately 5 feet below ground surface at WS7 search area. Looking north. August 16, 2012.

Photo 4. Cement grout seal of WS7. Looking north. August 16, 2012.

Photo 5. Beginning excavation to find WS5 at location 1. Looking northwest. March 12, 2013.

Photo 6. Reaching final depth of approximately 8 feet below ground surface in location 1. Looking northwest. March 12, 2013.

Photo 7. Excavation of location 2 for WS5. Looking southeast. March 12, 2013.

Photo 8. Reaching final depth of approximately 9 feet below ground surface at location 2. Looking northwest. March 12, 2013.

Photo 9. WS1 prior to pump removal attempt. Visible is the 10-inch diameter pump casing and interior oil tube/driveshaft. Looking north. April 16, 2013.

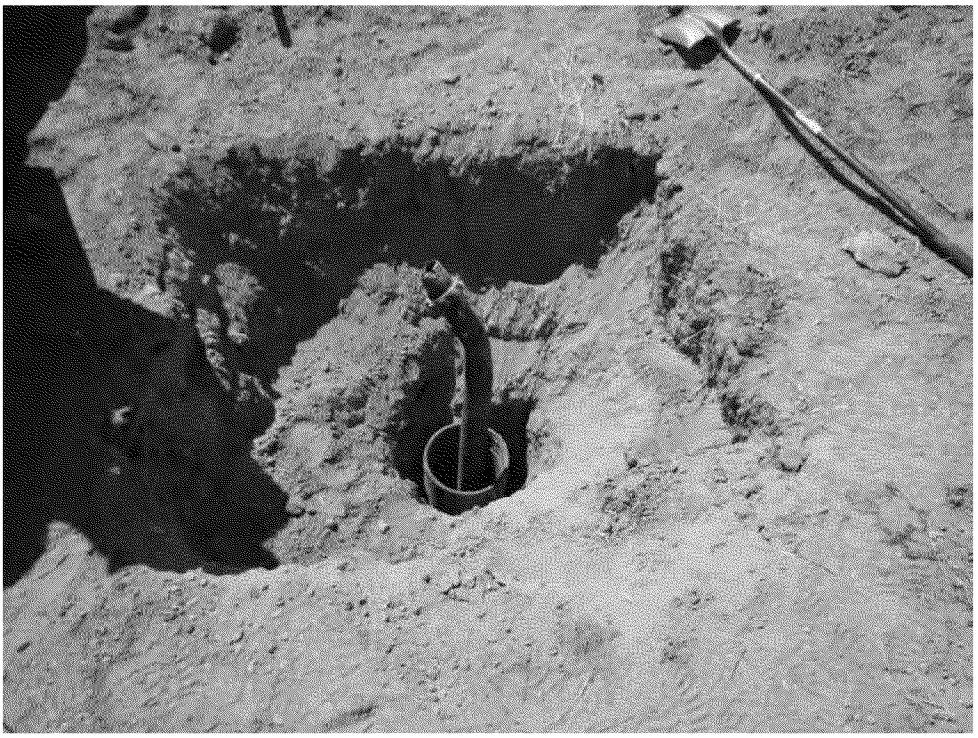


Photo 10. Preparing for pump removal. Looking south. April 16, 2013.

Photo 12. Pump removal by excavator. Looking southeast. April 18, 2013.

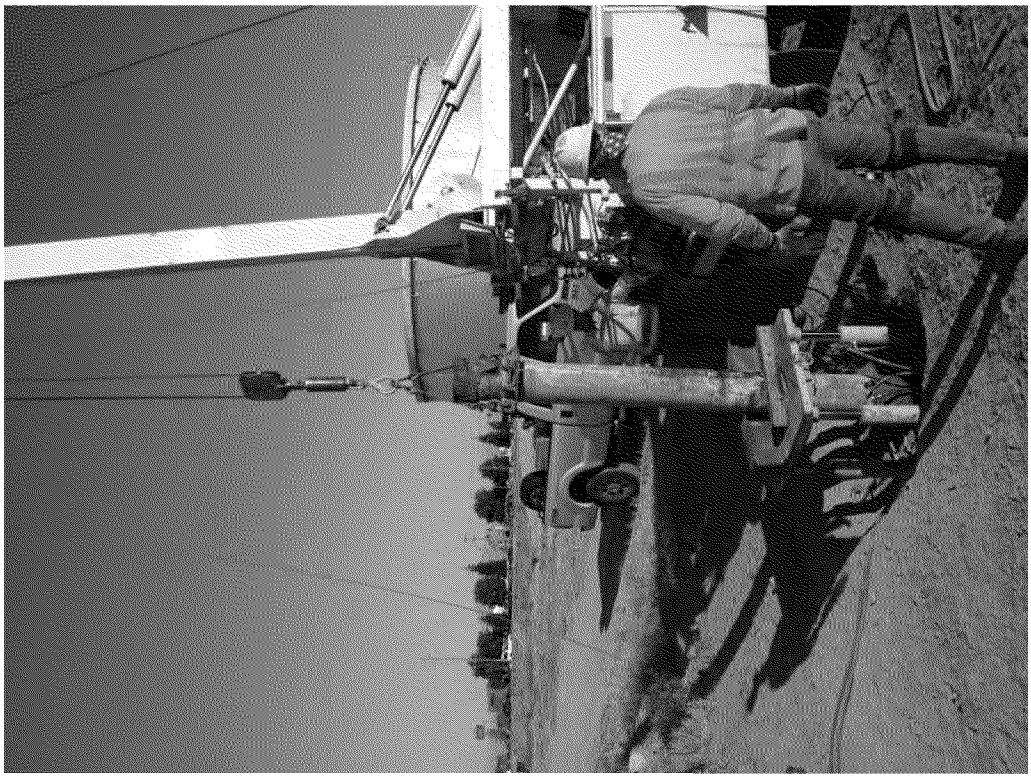


Photo 11. Hydraulic jack table beginning extraction of WS1 pump. Looking east. April 17, 2013.

Photo 13. Removed pump casing and driveshaft from WS1. Attempting to free remaining pump from the well. Looking east. April 18, 2013.

Photo 14. Sixty feet of pump casing removed from WS1. Looking west. April 18, 2013.

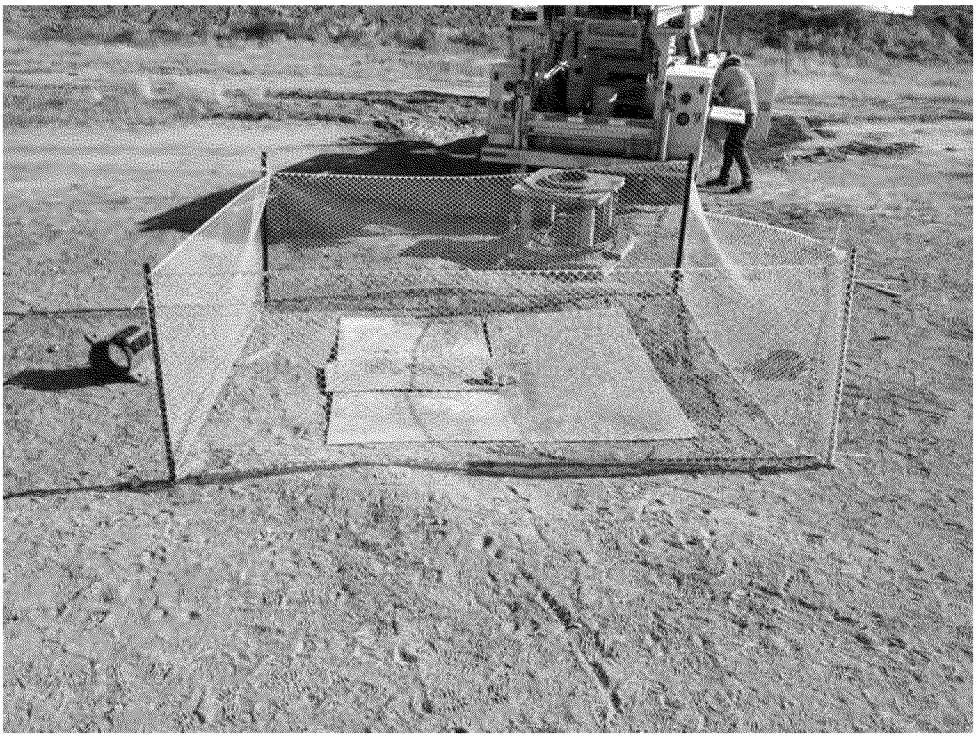


Photo 15. Safety fence and cover for WS1. Looking south. April 18, 2013.

ATTACHMENT 3

VIDEO LOGS

(INCLUDED IN ELECTRONIC FORMAT ON COMPACT DISC)

ATTACHMENT 4

FIELD FORMS

Groundwater Monitoring Well
Field Sampling Form

PROJECT NAME: Kern Power Plant

PROJECT NO.: 02-KPP-004-0103

WELL ID: WS-3

INITIAL DTW (ft btoc): 121.31

DEPTH TO BOTTOM (ft btoc):

WELL DIAMETER (in): 16"

WATER COLUMN HEIGHT (ft): 140

MINIMUM CALCULATED PURGE VOLUME (gallons): 50 gal

EQUIPMENT DECON		
Water Lev Meter		Sampler
✓	Soap water wash	✓
✓	Tap water rinse	✓
✓	Purified/DI water rinse	✓

PUMP/TUBING INTAKE (relative to water column): near top / (near middle) / near bottom / Custom(ft): water column 140'

PURGE DATE:

PERSONNEL:

TUBING SIZE: 1/4" x 3/8" 3/8" x 1/2" 1/2" x 5/8" Other:

SAMPLE ID	SAMPLE DATE	SAMPLE TIME
WS3-140-A/AF	5/17/13	0805

METER TYPE: Myron Turbidity DO Meter (Other (specify))

FLOW THROUGH CELL?: (Yes) No

PURGE LOG

Time (24 hr)	Cumulative Purge Vol (mL / gallon)	pH	EC (µS/cm)	Turbidity (NTU)	Temperature (°C)	ORP (mV)	DTW* (ft)	DO (mg/L)	Other Observations (Color, Odor, Sheen, ...)
0732	0								
0737	12.5	8.35	400.2	6.18	22.1	125.5	121.57	8.94	
0740	20.0	8.14	401.1	5.59	22.1	128.8	121.55	8.91	
0743	27.5	7.87	404.1	5.31	22.1	137.8	121.55	9.0	
0746	35.0	7.83	404.2	6.04	21.9	136.7	121.55	9.07	
0749	42.5	7.73	404.3	4.65	22.1	137.8	121.55	9.16	
0752	50.0	7.68	404.8	4.46	22.1	141.5	121.55	9.17	

Total Volume Purged: 54 gal Average Purge Rate: 2.5 gal/min 80% Rechage =

Purging Method: (2" Submersible Pump) 12 Volt Pump Peristaltic Pump Bailer Waterra Bladder pump

Pump Settings (speed, pneumatic pressure, cycle time/frequency, etc.)

SAMPLING DETAILS

DTW at Time of Sampling: 121.55 Filtered Sample? (YES) / NO

Sampling Method: 2" Submersible Pump 12 Volt Pump Peristaltic Pump Bailer Waterra Bladder Pump

REQUESTED ANALYSES: CAM17 metals by EPA 6020/7470A, Chromium (VI) by EPA 218.6, Ca, Fe, Mg, Mn, K, Na by EPA 6020, Alkalinity (carb, bicarb, OH, Total) by SM2320B, Cl-, SO4-2 by EPA 300.0

SAMPLE CONTAINERS:

WAS QA/QC SAMPLE COLLECTED FOR THIS WELL? (YES) / NO

IF YES, QC SAMPLE ID: TYPE: Rinsate Blank (MS/MSD) Duplicate

COMMENTS:

50 gal Purge + 1L filter flush + 3gal extra

Buffered Samples pH = 9.8

Notes:

Casing Volume: 1" = 0.041 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.5 gal/ft

Tubing Volume: 3/16" ID = 5.4 ml/ft; 1/4" ID = 9.6 ml/ft; 3/8" ID = 21.7 ml/ft; 1/2" ID = 38.6 ml/ft

WELL REPAIR (check if needed):

New lock ☐ New Bolts ☐ Cracked or Damaged PVC ☐ Other (specify):

Confluence Environmental, Inc

Equipment Calibration Log

Equipment make/model	Equipment ID/ serial number	Date	Time	Calibration Standards	Equipment Reading	Equipment Calibrated	Temp (°C / °F)	Tech init.	Comments
YSI Pro Series	11B100249	5-17-13	0630	pH 4.0/7.0/10.0	4.0/7.0/10.0	✓	19.6	JK	
″	″	″	″	1413 cond	1401	✓	19.2	JK	
″	″	″	″	D.O. 100%	99.4	✓	—	JK	
″	″	″	″	ORP 237.5	237.5	✓	20.0	JK	
Ultrameter	62037764	5-17-13	0645	pH 7.0/10.0	7.0/10.0	✓	20.1	JK	

Notes/comments:

ATTACHMENT 5

LABORATORY ANALYTICAL REPORT

Calscience Environmental Laboratories, Inc.

CALSCIENCE

WORK ORDER NUMBER: 13-05-1367

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Jacobson James & Associates

Client Project Name: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Attention: Redacted

Redacted

Approved for release on 05/28/2013 by:

Redacted

Project Manager

ResultLink

Email your PM

Calscience Environmental Laboratories, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

Calscience Environmental Laboratories, Inc.

Contents

Client Project Name: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103
Work Order Number: 13-05-1367

Calscience Environmental Laboratories, Inc.

CASE NARRATIVE

Calscience Work Order No.: 13-05-1367
PG&E – Kern Power Plant May SW Sampling/ 02-KPP-004/0103

Hexavalent Chromium by EPA Method 218.6:

Per differing analytical methods, the holding time for hexavalent chromium in an aqueous matrix is 24 hours from collection. Per 40CFR, Part 136.3, Table II, footnote 20, the analytical holding time for wastewaters may be extended to 28 days if both a filtration step and a buffering step, to alter the pH to between 9.3 – 9.7, are performed within the firs t 24 hours from collection. EPA Method 218.6 requires that the sample pH be adjusted to between 9.0 and 9.5 prior to analysis. The footnote requirements supercede the method requirements when samples are being analyzed for compliance with 40CFR.

Four aqueous samples were received for this project on May 17 , 2013 . Two samples were analyzed for Hexavalent Chromium by EPA Method 218.6. According to the client (and noted on the COC), the EPA 218.6 Hexavalent Chromium sample s were field filtered and collected in lab-provided preserved containers May 17, 2013 in accordance with the allowance in footnote 20 to Table II of Part 136.3.

The pH recorded in the field was noted on the COC. U pon receipt at the lab, the pH recorded for the samples were as follows:

CEL Sample ID	pH
13-05-1367-1	9.15
13-05-1367-3	9.42

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Calscience Environmental Laboratories, Inc.

Work Order Narrative

Work Order: 13-05-1367 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain of Custody (COC) on 05/17/13. They were assigned to Work Order 13-05-1367.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with an immediate holding time (HT </= 15 minutes --40CFR-136.3 Table II footnote 4), is considered a "field" test and reported samples results are not flagged unless the analysis is performed beyond 24 hours of the time of collection.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Additional Comments:

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

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Calscience Environmental Laboratories, Inc.

Sample Summary

Client: Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Attn: Redacted

Work Order: 13-05-1367
Project Name: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103
PO Number:
Date Received: 05/17/13

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
WS3-140-AF	13-05-1367-1	05/17/13 08:05	4	Aqueous
WS3-140-A	13-05-1367-2	05/17/13 08:05	2	Aqueous
ER-051713-AF	13-05-1367-3	05/17/13 09:25	2	Aqueous
SB-051713-A	13-05-1367-4	05/17/13 09:30	2	Aqueous

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Calscience Environmental Laboratories, Inc.

Analytical Report

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 3005A Filt.
Method: EPA 6020
Units: mg/L

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
WS3-140-AF	**13-05-1367-1-A**	**05/17/13 08:05**	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 21:19**	**130522L03A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Antimony	0.000155	0.00100	0.0000995	1	J
Arsenic	ND	0.00100	0.000386	1	
Barium	0.0455	0.00100	0.0000986	1	
Beryllium	ND	0.00100	0.000290	1	
Cadmium	ND	0.00100	0.000128	1	
Chromium	0.00127	0.00100	0.000402	1	
Cobalt	0.000102	0.00100	0.0000919	1	J
Copper	0.000560	0.00100	0.000140	1	J
Lead	ND	0.00100	0.0000898	1	
Molybdenum	0.00283	0.00100	0.000127	1	
Nickel	0.00358	0.00100	0.000132	1	
Selenium	ND	0.00100	0.000168	1	
Silver	ND	0.00100	0.000111	1	
Thallium	ND	0.00100	0.000101	1	
Vanadium	0.00116	0.00100	0.000149	1	
Zinc	0.00579	0.00500	0.000479	1	
Calcium	34.1	0.100	0.00665	1	
Iron	0.0283	0.0500	0.00926	1	J
Magnesium	5.36	0.100	0.00278	1	
Manganese	0.00286	0.00100	0.000139	1	
Potassium	1.81	0.100	0.00744	1	
Sodium	26.6	0.100	0.00303	1	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Calscience Environmental Laboratories, Inc.

Analytical Report

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 3005A Filt.
Method: EPA 6020
Units: mg/L

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ER-051713-AF	**13-05-1367-3-A**	**05/17/13 09:25**	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 21:22**	**130522L03A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Antimony	ND	0.00100	0.0000995	1	
Arsenic	ND	0.00100	0.000386	1	
Barium	0.000499	0.00100	0.0000986	1	J
Beryllium	ND	0.00100	0.000290	1	
Cadmium	ND	0.00100	0.000128	1	
Chromium	0.000737	0.00100	0.000402	1	J
Cobalt	ND	0.00100	0.0000919	1	
Copper	0.000284	0.00100	0.000140	1	J
Lead	ND	0.00100	0.0000898	1	
Molybdenum	ND	0.00100	0.000127	1	
Nickel	0.000535	0.00100	0.000132	1	J
Selenium	ND	0.00100	0.000168	1	
Silver	ND	0.00100	0.000111	1	
Thallium	ND	0.00100	0.000101	1	
Vanadium	ND	0.00100	0.000149	1	
Zinc	0.00141	0.00500	0.000479	1	J
Manganese	0.000814	0.00100	0.000139	1	J

ER-051713-AF	**13-05-1367-3-A**	**05/17/13 09:25**	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 19:55**	**130522L03A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Calcium	0.227	0.100	0.00665	1	
Iron	ND	0.0500	0.00926	1	
Magnesium	0.0245	0.100	0.00278	1	J
Potassium	0.0117	0.100	0.00744	1	J
Sodium	0.211	0.100	0.00303	1	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Calscience Environmental Laboratories, Inc.

Analytical Report

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 3005A Filt.
Method: EPA 6020
Units: mg/L

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-051713-A	**13-05-1367-4-A**	**05/17/13 09:30**	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 21:45**	**130522L03A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Antimony	ND	0.00100	0.0000995	1	
Arsenic	ND	0.00100	0.000386	1	
Barium	0.000616	0.00100	0.0000986	1	J
Beryllium	ND	0.00100	0.000290	1	
Cadmium	ND	0.00100	0.000128	1	
Chromium	0.000739	0.00100	0.000402	1	J
Cobalt	ND	0.00100	0.0000919	1	
Copper	0.000230	0.00100	0.000140	1	J
Lead	ND	0.00100	0.0000898	1	
Molybdenum	ND	0.00100	0.000127	1	
Nickel	ND	0.00100	0.000132	1	
Selenium	ND	0.00100	0.000168	1	
Silver	ND	0.00100	0.000111	1	
Thallium	ND	0.00100	0.000101	1	
Vanadium	ND	0.00100	0.000149	1	
Zinc	0.00638	0.00500	0.000479	1	
Manganese	0.000652	0.00100	0.000139	1	J

SB-051713-A	**13-05-1367-4-A**	**05/17/13 09:30**	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 19:57**	**130522L03A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Calcium	0.0971	0.100	0.00665	1	J
Iron	0.0202	0.0500	0.00926	1	J
Magnesium	0.0127	0.100	0.00278	1	J
Potassium	ND	0.100	0.00744	1	
Sodium	0.186	0.100	0.00303	1	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Calscience Environmental Laboratories, Inc.

Analytical Report

Jacobson James & Associates		Date Received:	05/17/13
9083 Foothills Blvd., Suite 370		Work Order:	13-05-1367
Roseville, CA 95747-7190		Preparation:	EPA 3005A Filt.
		Method:	EPA 6020
		Units:	mg/L
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103			Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-693-180**	**N/A**	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 20:20**	**130522L03A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Antimony	ND	0.00100	0.0000995	1	
Arsenic	ND	0.00100	0.000386	1	
Barium	ND	0.00100	0.0000986	1	
Beryllium	ND	0.00100	0.000290	1	
Cadmium	ND	0.00100	0.000128	1	
Chromium	ND	0.00100	0.000402	1	
Cobalt	ND	0.00100	0.0000919	1	
Copper	ND	0.00100	0.000140	1	
Lead	ND	0.00100	0.0000898	1	
Molybdenum	ND	0.00100	0.000127	1	
Nickel	ND	0.00100	0.000132	1	
Selenium	ND	0.00100	0.000168	1	
Silver	ND	0.00100	0.000111	1	
Thallium	ND	0.00100	0.000101	1	
Vanadium	ND	0.00100	0.000149	1	
Zinc	ND	0.00500	0.000479	1	
Calcium	ND	0.100	0.00665	1	
Iron	ND	0.0500	0.00926	1	
Magnesium	ND	0.100	0.00278	1	
Manganese	ND	0.00100	0.000139	1	
Potassium	ND	0.100	0.00744	1	
Sodium	ND	0.100	0.00303	1	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Calscience Environmental Laboratories, Inc.

Analytical Report

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 7470A Filt.
Method: EPA 7470A
Units: mg/L

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
WS3-140-AF	**13-05-1367-1-B**	**05/17/13 08:05**	**Aqueous**	**Mercury**	**05/20/13**	**05/20/13 16:21**	**130520L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.000500	0.0000453	1	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
ER-051713-AF	**13-05-1367-3-A**	**05/17/13 09:25**	**Aqueous**	**Mercury**	**05/20/13**	**05/20/13 16:27**	**130520L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.000500	0.0000453	1	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SB-051713-A	**13-05-1367-4-A**	**05/17/13 09:30**	**Aqueous**	**Mercury**	**05/20/13**	**05/20/13 16:29**	**130520L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.000500	0.0000453	1	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-763-102**	**N/A**	**Aqueous**	**Mercury**	**05/20/13**	**05/20/13 16:16**	**130520L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.000500	0.0000453	1	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

Calscience Environmental Laboratories, Inc.

Analytical Report

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix
WS3-140-AF	**13-05-1367-1**	**05/17/13 08:05**	**Aqueous**

Comment(s): (24) - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Results	RL	MDL	DF	Qualifiers	Units	Date Prepared	Date Analyzed	Method
Chromium, Hexavalent (24)	ND	0.20	0.041	1		ug/L	05/17/13	05/17/13	EPA 218.6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix
WS3-140-A	**13-05-1367-2**	**05/17/13 08:05**	**Aqueous**

Comment(s): (24) - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Results	RL	MDL	DF	Qualifiers	Units	Date Prepared	Date Analyzed	Method
Chloride (24)	14	1.0	0.12	1		mg/L	N/A	05/17/13	EPA 300.0
Sulfate (24)	35	1.0	0.19	1		mg/L	N/A	05/17/13	EPA 300.0
Alkalinity, Total (as CaCO3) (24)	118	5.00	0.848	1		mg/L	N/A	05/21/13	SM 2320B
Bicarbonate (as CaCO3) (24)	118	5.00	0.848	1		mg/L	N/A	05/21/13	SM 2320B
Carbonate (as CaCO3) (24)	ND	1.0	0.85	1		mg/L	N/A	05/21/13	SM 2320B
Hydroxide (as CaCO3) (24)	ND	1.0	0.85	1		mg/L	N/A	05/21/13	SM 2320B

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix
ER-051713-AF	**13-05-1367-3**	**05/17/13 09:25**	**Aqueous**

Comment(s): (24) - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Results	RL	MDL	DF	Qualifiers	Units	Date Prepared	Date Analyzed	Method
Chromium, Hexavalent (24)	ND	0.20	0.041	1		ug/L	05/17/13	05/17/13	EPA 218.6

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix
SB-051713-A	**13-05-1367-4**	**05/17/13 09:30**	**Aqueous**

Comment(s): (24) - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Results	RL	MDL	DF	Qualifiers	Units	Date Prepared	Date Analyzed	Method
Chromium, Hexavalent (24)	ND	1.0	0.067	1		ug/L	N/A	05/17/13	EPA 7199

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix
Method Blank		**N/A**	**Aqueous**

Comment(s): (24) - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Results	RL	MDL	DF	Qualifiers	Units	Date Prepared	Date Analyzed	Method
Chromium, Hexavalent (24)	ND	0.20	0.041	1		ug/L	05/17/13	05/17/13	EPA 218.6
Chloride (24)	ND	1.0	0.12	1		mg/L	N/A	05/17/13	EPA 300.0
Sulfate (24)	ND	1.0	0.19	1		mg/L	N/A	05/17/13	EPA 300.0
Chromium, Hexavalent (24)	ND	1.0	0.067	1		ug/L	N/A	05/17/13	EPA 7199
Alkalinity, Total (as CaCO3) (24)	ND	1.0	0.85	1		mg/L	N/A	05/21/13	SM 2320B
Bicarbonate (as CaCO3) (24)	ND	1.0	0.85	1		mg/L	N/A	05/21/13	SM 2320B
Carbonate (as CaCO3) (24)	ND	1.0	0.85	1		mg/L	N/A	05/21/13	SM 2320B
Hydroxide (as CaCO3) (24)	ND	1.0	0.85	1		mg/L	N/A	05/21/13	SM 2320B

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: Filtered
Method: EPA 218.6

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
WS3-140-AF	**Aqueous**	**IC 14**	**05/17/13**	**05/17/13 19:28**	**130517S02B**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Chromium, Hexavalent	ND	50.00	47.71	95	48.86	98	85-121	2	0-4	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	N/A
	Method:	EPA 300.0
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 2 of 5

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
WS3-140-A	**Aqueous**	**IC 7**	**N/A**	**05/17/13 23:30**	**130517S02**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Chloride	13.89	5000	4984	99	4987	99	80-120	0	0-20	
Sulfate	35.39	5000	5009	99	5011	100	80-120	0	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: N/A
Method: EPA 7199

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
SB-051713-A	**Aqueous**	**IC 14**	**N/A**	**05/17/13 19:42**	**130517S03**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Chromium, Hexavalent	ND	50.00	48.36	97	48.50	97	70-130	0	0-25	

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 3005A Filt.
Method: EPA 6020

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
WS3-140-AF	**Aqueous**	**ICP/MS 03**	**05/22/13**	**05/22/13 21:04**	**130522S03A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Antimony	ND	0.1000	0.1070	107	0.1078	108	85-133	1	0-11	
Arsenic	ND	0.1000	0.1125	112	0.1116	112	73-127	1	0-11	
Barium	0.04555	0.1000	0.1514	106	0.1514	106	74-128	0	0-10	
Beryllium	ND	0.1000	0.1086	109	0.1112	111	56-122	2	0-11	
Cadmium	ND	0.1000	0.1035	104	0.1042	104	84-114	1	0-8	
Chromium	0.001270	0.1000	0.1110	110	0.1099	109	73-133	1	0-11	
Cobalt	ND	0.1000	0.1084	108	0.1090	109	79-121	1	0-10	
Copper	ND	0.1000	0.1093	109	0.1089	109	72-108	0	0-10	3
Lead	ND	0.1000	0.1077	108	0.1074	107	79-121	0	0-10	
Molybdenum	0.002833	0.1000	0.1119	109	0.1118	109	83-137	0	0-10	
Nickel	0.003575	0.1000	0.1107	107	0.1108	107	68-122	0	0-10	
Selenium	ND	0.1000	0.1064	106	0.1055	105	59-125	1	0-12	
Silver	ND	0.05000	0.05179	104	0.05233	105	68-128	1	0-14	
Thallium	ND	0.1000	0.1045	105	0.1035	104	73-121	1	0-11	
Vanadium	0.001160	0.1000	0.1053	104	0.1046	103	77-137	1	0-15	
Zinc	0.005792	0.1000	0.1129	107	0.1109	105	43-145	2	0-39	
Calcium	34.07	0.1000	32.41	4X	34.17	4X	80-120	4X	0-20	Q
Iron	ND	0.1000	0.1385	138	0.1389	139	27-201	0	0-24	
Magnesium	5.359	0.1000	5.867	4X	5.836	4X	63-123	4X	0-32	Q
Manganese	0.002860	0.1000	0.1101	107	0.1089	106	72-126	1	0-42	
Potassium	1.812	1.000	2.611	80	2.710	90	80-120	4	0-20	
Sodium	26.58	1.000	30.68	4X	31.08	4X	80-120	4X	0-20	Q

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	EPA 7470A Filt.
	Method:	EPA 7470A
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 5 of 5

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
WS3-140-AF	**Aqueous**	**Mercury**	**05/20/13**	**05/20/13 16:23**	**130520S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	ND	0.01000	0.01040	104	0.01037	104	57-141	0	0-10	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - PDS/PDSD

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 3005A Filt.
Method: EPA 6020

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
WS3-140-AF	**Aqueous**	**ICP/MS 03**	**05/22/13 00:00**	**05/22/13 21:10**	**130522S03A**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Antimony	ND	0.1000	0.1174	117	75-125	
Arsenic	ND	0.1000	0.1202	120	75-125	
Barium	0.04555	0.1000	0.1596	114	75-125	
Beryllium	ND	0.1000	0.1158	116	75-125	
Cadmium	ND	0.1000	0.1107	111	75-125	
Chromium	0.001270	0.1000	0.1183	117	75-125	
Cobalt	ND	0.1000	0.1192	119	75-125	
Copper	ND	0.1000	0.1182	118	75-125	
Lead	ND	0.1000	0.1167	117	75-125	
Molybdenum	0.002833	0.1000	0.1205	118	75-125	
Nickel	0.003575	0.1000	0.1215	118	75-125	
Selenium	ND	0.1000	0.1125	112	75-125	
Silver	ND	0.05000	0.05170	103	75-125	
Thallium	ND	0.1000	0.1139	114	75-125	
Vanadium	0.001160	0.1000	0.1132	112	75-125	
Zinc	0.005792	0.1000	0.1247	119	75-125	
Calcium	34.07	5.000	37.89	4X	75-125	Q
Iron	ND	0.1000	0.1465	147	75-125	5
Magnesium	5.359	5.000	10.83	109	75-125	
Manganese	0.002860	0.1000	0.1189	116	75-125	
Potassium	1.812	1.000	2.733	92	75-125	
Sodium	26.58	1.000	30.72	4X	75-125	Q

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Sample Duplicate

Jacobson James & Associates		Date Received:	05/17/13
9083 Foothills Blvd., Suite 370		Work Order:	13-05-1367
Roseville, CA 95747-7190		Preparation:	N/A
		Method:	SM 2320B
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103			Page 1 of 4

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
WS3-140-A	**Aqueous**	**PH1/BUR03**	**N/A**	**05/21/13 09:30**	**D0521ALKD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Alkalinity, Total (as CaCO3)	118.0	119.0	1	0-25	

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Sample Duplicate

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	N/A
	Method:	SM 2320B
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 2 of 4

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
WS3-140-A	**Aqueous**	**PH1/BUR03**	**N/A**	**05/21/13 09:30**	**D0521HCOD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Bicarbonate (as CaCO3)	118.0	119.0	1	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Sample Duplicate

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	N/A
	Method:	SM 2320B
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 3 of 4

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
WS3-140-A	**Aqueous**	**PH1/BUR03**	**N/A**	**05/21/13 09:30**	**D0521CO3D1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Carbonate (as CaCO3)	ND	ND	N/A	0-25	

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - Sample Duplicate

Jacobson James & Associates		Date Received:	05/17/13
9083 Foothills Blvd., Suite 370		Work Order:	13-05-1367
Roseville, CA 95747-7190		Preparation:	N/A
		Method:	SM 2320B
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103			Page 4 of 4

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
WS3-140-A	**Aqueous**	**PH1/BUR03**	**N/A**	**05/21/13 09:30**	**D0521OHD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Hydroxide (as CaCO3)	ND	ND	N/A	0-25	

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	Filtered
	Method:	EPA 218.6
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 1 of 6

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-05-124-1577	**Aqueous**	**IC 14**	**05/17/13 18:05**	**130517L02**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Chromium, Hexavalent	50.00	49.24	98	95-107	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	N/A
	Method:	EPA 300.0
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 2 of 6

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-12-906-3689	**Aqueous**	**IC 7**	**05/17/13 20:07**	**130517L02**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Chloride	50.00	49.11	98	90-110	
Sulfate	50.00	49.49	99	90-110	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Jacobson James & Associates	Date Received:	05/17/13
9083 Foothills Blvd., Suite 370	Work Order:	13-05-1367
Roseville, CA 95747-7190	Preparation:	N/A
	Method:	EPA 7199
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103		Page 3 of 6

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-05-123-3350	**Aqueous**	**IC 14**	**05/17/13 18:05**	**130517L03**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Chromium, Hexavalent	50.00	50.18	100	80-120	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCSD

Jacobson James & Associates	Date Received: 05/17/13
9083 Foothills Blvd., Suite 370	Work Order: 13-05-1367
Roseville, CA 95747-7190	Preparation: N/A
	Method: SM 2320B
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103	Page 4 of 6

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-859-69	Aqueous	PH1/BUR03	N/A	05/21/13 09:30	D0521ALKB1

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Alkalinity, Total (as CaCO3)	100.0	96.00	96	97.00	97	80-120	1	0-20	

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Jacobson James & Associates
9083 Foothills Blvd., Suite 370
Roseville, CA 95747-7190

Date Received: 05/17/13
Work Order: 13-05-1367
Preparation: EPA 3005A Filt.
Method: EPA 6020

Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-15-693-180	Aqueous	ICP/MS 03	05/22/13 20:26	130522L03A

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	ME CL	Qualifiers
Antimony	0.1000	0.1065	106	80-120	73-127	
Arsenic	0.1000	0.1036	104	80-120	73-127	
Barium	0.1000	0.1074	107	80-120	73-127	
Beryllium	0.1000	0.1112	111	80-120	73-127	
Cadmium	0.1000	0.1056	106	80-120	73-127	
Chromium	0.1000	0.1071	107	80-120	73-127	
Cobalt	0.1000	0.1041	104	80-120	73-127	
Copper	0.1000	0.1099	110	80-120	73-127	
Lead	0.1000	0.1065	106	80-120	73-127	
Molybdenum	0.1000	0.09917	99	80-120	73-127	
Nickel	0.1000	0.1068	107	80-120	73-127	
Selenium	0.1000	0.1051	105	80-120	73-127	
Silver	0.05000	0.05062	101	80-120	73-127	
Thallium	0.1000	0.1034	103	80-120	73-127	
Vanadium	0.1000	0.1085	108	80-120	73-127	
Zinc	0.1000	0.1088	109	80-120	73-127	
Calcium	5.000	5.008	100	80-120	73-127	
Iron	0.1000	0.1170	117	80-120	73-127	
Magnesium	5.000	4.848	97	80-120	73-127	
Manganese	0.1000	0.1032	103	80-120	73-127	
Potassium	1.000	1.049	105	80-120	73-127	
Sodium	1.000	0.9932	99	80-120	73-127	

Total number of LCS compounds: 22
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Quality Control - LCS

Jacobson James & Associates		Date Received:	05/17/13
9083 Foothills Blvd., Suite 370		Work Order:	13-05-1367
Roseville, CA 95747-7190		Preparation:	EPA 7470A Filt.
		Method:	EPA 7470A
Project: PG&E-Kern Power Plant May SW sampling/02-KPP-004/0103			Page 6 of 6

Quality Control Sample ID	Matrix	Instrument	Date Analyzed	LCS Batch Number
099-15-763-102	**Aqueous**	**Mercury**	**05/20/13 16:18**	**130520L01F**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	0.01000	0.01047	105	85-121	

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RPD: Relative Percent Difference. CL: Control Limits

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order: 13-05-1367 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported without further clarification.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS/LCSD Recovery Percentage is within Marginal Exceedance (ME) Control Limit range.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	For any analysis identified as a "field" test with a holding time (HT) </= 15 minutes where the sample is received outside of HT, Calscience will adhere to its internal HT of 24 hours. In cases where sample analysis does not meet Calscience's internal HT, results will be appropriately qualified.

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Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1427
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE: 5/17/13
PAGE: 1 OF 1

LABORATORY CLIENT: Jacobson James & Associates
ADDRESS: 9083 Foothills Blvd., Suite 370
CITY: Roseville STATE: CA ZIP: 95747
TEL: 916-367-5111 FAX: 916-367-5110
Redacted

CLIENT PROJECT NAME / NUMBER: PG&E - Kern Power Plant May SW sampling/02-KPP-004/0103
P.O. NO.: 2013CEL_001
PROJECT CONTACT: Redacted
LAB CONTACT OR QUOTE NO.:
LAB USE ONLY: 13-05-1367

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS:
Report to MDL with qualifiers as appropriate
Check pH of Cr6 samples upon receipt and adjust preservation as needed
24hr hold time on Cr^6 by 7199

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Groundwater (field filtered)	CAM 17 Metals by EPA 6020/7470A	Chromium (VI) by EPA 218.6	Ca, Fe, Mg, Mn, K, Na by EPA 6020	Alkalinity (carb, bicarb, OH, total) by SM2320B	Cl^-, SO_4^{-2} by EPA 300.0	Cr^6 by EPA 7199			Field pH of Cr6 sample with buffer solution	Extra volume of Cr6 buffer solution added (mL)					MS/MSD				
1	WS3-140-AF		5/17/13	0805	W	2 250 poly Prs	X	X	X	X						9.8	0					X				
2	WS3-140-A		5/17/13	0805	W	2 500 poly					X	X										X				
3	ER-051713-AF		5/17/13	0925	W	2 250 poly Prs	X	X	X	X						9.7	0									
4	SB-051713-A		5/17/13	0930	W	1250 PUB 1 250 UPS		X		X			X													

Redacted

Relinquished by: (Signature)
Received by: (Signature)

Date: 05/17/13 Time: 12.00 PM
Date: 5/17/13 Time: 1720
Date: Time:

02/24/10 Revision

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Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-05-1 3 6 7

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: Redacted

DATE: 05/17/13

TEMPERATURE: Thermometer ID: SC1 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 3.1 °C - 0.2 °C (CF) = 2.9 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter Initial: DEE

CUSTODY SEALS INTACT:

☐ Cooler ☐_____ ☐ No (Not Intact) ☑ Not Present ☐ N/A Initial: DEE

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present Initial: WL

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑ WL 05-1713	☑	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Water: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☐1AGB**na$_2$** ☐1AGB**s**

☐500AGB ☐500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐1PB**na** ☑500PB

☑250PB ☑250PB**n** ☐125PB ☐125PB**znna** ☐100PJ ☐100PJ**na$_2$** ☑250PB buffer ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** WL

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar **B:** Bottle **Z:** Ziploc/Resealable Bag **E:** Envelope **Reviewed by:** WL

Preservative: **h:** HCL **n:** HNO_3 **na$_2$:**$Na_2S_2O_3$ **na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **u:** Ultra-pure **znna:** $ZnAc_2$+NaOH **f:** Filtered **Scanned by:**_____

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 13-05-1367

SAMPLE ANOMALY FORM

SAMPLES - CONTAINERS & LABELS:

Comments:

- ☐ **Sample(s) NOT RECEIVED but listed on COC**
- ☐ **Sample(s) received but NOT LISTED on COC**
- ☐ **Holding time expired** – list sample ID(s) and test
- ☐ **Insufficient quantities for analysis** – list test
- ☐ **Improper container(s) used** – list test
- ☐ **Improper preservative used** – list test
- ☐ **No preservative noted on COC or label** – list test & notify lab
- ☐ **Sample labels illegible** – note test/container type
- ☑ **Sample label(s) do not match COC** – Note in comments
  - ☐ **Sample ID**
  - ☐ **Date and/or Time Collected**
  - ☐ **Project Information**
  - ☑ **# of Container(s)**
  - ☐ **Analysis**
- ☐ **Sample container(s) compromised** – Note in comments
  - ☐ **Water present in sample container**
  - ☐ **Broken**
- ☐ **Sample container(s) not labeled**
- ☐ **Air sample container(s) compromised** – Note in comments
  - ☐ **Flat**
  - ☐ **Very low in volume**
  - ☐ **Leaking (Not transferred - duplicate bag submitted)**
  - ☐ **Leaking (transferred into Calscience Tedlar® Bag*)**
  - ☐ **Leaking (transferred into Client's Tedlar® Bag*)**
- ☐ **Other:** _____

Comments: 1) received 4 containers

HEADSPACE – Containers with Bubble > 6mm or ¼ inch:

Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Cont. received	Analysis

Comments: _____

*Transferred at Client's request.

Initial / Date: WS 05/17/13

SOP T100_090 (08/31/11)

ATTACHMENT 6

DATA VALIDATION REPORT

AQA SERVICES
Analytical Quality Assurance

Environmental & Chemistry Consulting
www.aqaservices.com

Kern Power Plant
Bakersfield, California

May 2013 Water Supply Well Sampling Event
Data Validation Report

Calscience Environmental Laboratories, Inc.
Work Order Number: 13-05-1367

June 12, 2013

Prepared for:

Jacobson James & Associates, Inc.

9083 Foothills Boulevard, Suite 370

Roseville, CA 95747

Prepared by:

AQA Services

4005 Manzanita Avenue, Suite 6, #101

Carmichael, CA 95608

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Introduction

This quality assurance review is based upon an examination of the data generated from the analyses of samples that were collected as part of the May 2013 Water Supply Well Sampling Event for the Kern Power Plant Project. The samples were collected on May 17, 2013. The samples were submitted to Calscience Environmental Laboratories, Inc. for analysis. The samples included in this quality assurance review are presented in Table 1.

This review has been performed in accordance with the "National Functional Guidelines for Inorganic Data Review" (U.S. EPA, January 2010) and with guidance from the Region 9 Data Quality Indicator Tables for EPA Methods 200.8 (U.S. EPA, March 2001), 245.1 (U.S. EPA, March 2001), 300.0 (U.S. EPA, August 1993), and 7196A (U.S. EPA, January 2000) and from the Region 9 Data Quality Indicator Tables for Standard Methods Method 2320 (U.S. EPA, November 1999).

The Level II data deliverables were examined to determine the usability of the analytical results and compliance relative to requirements specified by the reported methodology. Qualifier codes have been placed into the electronic files, where necessary, so that the data user can quickly assess the qualitative and/or quantitative reliability of any result based on the criteria evaluated.

This critical QA review identifies data quality issues for specific samples and specific evaluation criteria. The data qualifications allow the data end-user to best understand the usability of the analytical results. Data that have not been qualified in this report should be considered valid based on the QC criteria that have been applied.

TABLE 1

SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

Sample Identification	Laboratory Sample ID	Laboratory Work Order Number	Date Sampled	Parameter(s) Examined
WS3-140-AF	13-05-1367-1	13-05-1367	05/17/2013	Cr^{6+}, M^{D}
WS3-140-AFMS (Matrix Spike)	13-05-1367-1MS	13-05-1367	05/17/2013	Cr^{6+}, M^{D}
WS3-140-AFMSD (Matrix Spike Duplicate)	13-05-1367-1MSD	13-05-1367	05/17/2013	Cr^{6+}, M^{D}
WS3-140-AFPDS (Post-Digestion Spike)	13-05-1367-1PDS	13-05-1367	05/17/2013	M^{D}
WS3-140-A	13-05-1367-2	13-05-1367	05/17/2013	ALK, ANIONS
WS3-140-AMS (Matrix Spike)	13-05-1367-2MS	13-05-1367	05/17/2013	ANIONS
WS3-140-AMSD (Matrix Spike Duplicate)	13-05-1367-2MSD	13-05-1367	05/17/2013	ANIONS
WS3-140-ALD (Laboratory Duplicate)	13-05-1367-2LD	13-05-1367	05/17/2013	ALK
ER-041512-0-AF (Equipment Blank)	13-05-1367-3	13-05-1367	05/17/2013	Cr^{6+}, M^{D}
SB-051713-A (Source Blank)	13-05-1367-4	13-05-1367	05/17/2013	Cr^{6+*}, M^{T}
SB-051713-AMS (Matrix Spike)	13-05-1367-4MS	13-05-1367	05/17/2013	Cr^{6+*}
SB-051713-AMSD (Matrix Spike Duplicate)	13-05-1367-4MSD	13-05-1367	05/17/2013	Cr^{6+*}

Notes:

ALK - Alkalinity (Total Alkalinity, Bicarbonate, Carbonate, and Hydroxide) by Standard Methods SM2320B.

ANIONS - Chloride and Sulfate by EPA Methods 300.0.

Cr^{6+} - Hexavalent Chromium by EPA Method 218.6.

Cr^{6+*} - Hexavalent Chromium by EPA Method 7199.

M^{D} - Dissolved Minerals (Ca, Fe, K, Mg, Mn, Na) and Dissolved CAM 17 Metals by EPA Methods 6020/7470A.

M^{T} - Total Minerals (Ca, Fe, K, Mg, Mn, Na) and Total CAM 17 Metals by EPA Method 6020/7470A.

Quality Assurance Review

This report summarizes the findings of the Level II data validation of the twelve (12) samples (including project-specific laboratory QC samples) summarized in Table 1. The samples were collected on May 17, 2013, as part of the Water Supply Well Sampling Event for the Kern Power Plant Project located in Bakersfield, California. The samples reviewed were collectively analyzed for Alkalinity (Total Alkalinity, Bicarbonate, Carbonate, and Hydroxide) by Standard Methods SM 2320B, Chloride and Sulfate by EPA Method 300.0, Dissolved and Total CAM 17 Metals by EPA Methods 6020/7470A, Dissolved and Total Minerals (Ca, Fe, K, Mg, Mn, and Na) by EPA Method 6020, and Hexavalent Chromium by EPA Methods 218.6/7199. The sample parameters reviewed are specified in Table 1. The analytical methods validated were reviewed in the following areas to determine any impact to data quality and usability.

- Data Completeness
- Analytical Holding Times and Sample Preservation
- Laboratory and Field Blank Samples
- Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)
- Laboratory Duplicate (LD) Samples
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples
- Post-Digestion Spike (PDS) Samples
- Comparison of Hexavalent Chromium and Dissolved/Total Chromium Sample Results
- Analyte Identification and Quantification
- Verification of Client Database Reports

1.0 Summary of Data Validation

This section presents results of the validation of the sample data with respect to each of the areas of review listed above. Where appropriate, data have been qualified based on the guidance provided in the U.S. EPA National Functional Guidelines. These data qualifier flags indicate a bias in the reported data and should be considered during all project evaluations.

1.1 Data Completeness

Sample aliquots for one (1) water supply well, one (1) equipment blank, and one (1) source blank were submitted for analysis. All sample analyses were performed as requested on the Chain-of-Custody Records (COCs).

On the MS/MSD and PDS summary forms, the laboratory did not include sample concentrations less than the RL on the form or in the recovery calculations as required. The data reviewer manually corrected the MS/MSD results for dissolved iron. All other recoveries were not significantly impacted (<1%).

On the COC, the Location/Description field was not completed for all samples.

1.2 Analytical Holding Times and Sample Preservation

The samples submitted to the laboratory for analysis were properly preserved according to guidelines established by the U.S. EPA with the exception of the hexavalent chromium aliquots of the sample listed below. Upon receipt at the laboratory, the pH of the aliquots for this sample was outside the range of 9.3 - 9.7 as required by the EPA Method 218.6. According to the associated case narratives, the laboratory adjusted the pH of this sample to be within the acceptable range. Since the pH was adjusted to between 9.0 and 9.5 prior to analysis (if necessary), qualification of the data was not warranted on this basis.

Laboratory Work Order	Sample	pH upon Receipt
13-05-1367	**WS3-140-AF**	9.15

All samples analyzed were analyzed within the recommended holding times for the applicable methods.

1.3 Laboratory and Field Blank Samples

Laboratory method blanks were analyzed for all methods with each batch of samples. All associated laboratory method blanks were free of contamination. The equipment blank submitted was analyzed for dissolved metals and hexavalent chromium. The source blank submitted was analyzed for total metals and hexavalent chromium. Reportable levels of the metals summarized below were detected in the associated equipment blank and source blank.

Equipment Blank

Sample	Work Order Number	Contaminant	Concentration
ER-051713-0-AF	13-05-1367	Dissolved Barium	0.000499 mg/L
		Dissolved Calcium	0.227 mg/L
		Dissolved Chromium	0.000737 mg/L
		Dissolved Copper	0.000284 mg/L
		Dissolved Magnesium	0.0245 mg/L
		Dissolved Manganese	0.000814 mg/L
		Dissolved Nickel	0.000535 mg/L
		Dissolved Potassium	0.0117 mg/L
		Dissolved Sodium	0.211 mg/L
		Dissolved Zinc	0.00141 mg/L

Source Blank

Sample	Work Order Number	Contaminant	Concentration
SB-051713-0-A	13-05-1367	Total Barium	0.000616 mg/L
		Total Calcium	0.0971 mg/L
		Total Chromium	0.000739 mg/L

Source Blank

Sample	Work Order Number	Contaminant	Concentration
SB-051713-0-A	13-05-1367	Total Copper	0.000230 mg/L
		Total Iron	0.0202 mg/L
		Total Magnesium	0.0127 mg/L
		Total Manganese	0.000652 mg/L
		Total Nickel	0.000535 mg/L
		Total Sodium	0.186 mg/L
		Total Zinc	0.00638 mg/L

Due to the presence of these analytes in the aforementioned blanks, the reported positive results in the following associated sample should be considered not detected (U) at or above the associated adjusted reporting limit. In addition, a less than symbol has been added to the results in the electronic file. It should be noted that dilution factors and sample volumes were taken into consideration when evaluating blank contamination.

Analyte	Work Order	Sample With Anomalous Results (U)
Dissolved Chromium	13-05-1367	**WS3-140-AF**
Dissolved Copper	13-05-1367	**WS3-140-AF**
Dissolved Iron	13-05-1367	**WS3-140-AF**
Dissolved Manganese	13-05-1367	**WS3-140-AF**
Dissolved Zinc	13-05-1367	**WS3-140-AF**

1.4 Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

LCS or LCS/LCSD were prepared and analyzed with each batch of samples for all appropriate methods. The LCS/LCSD results (recoveries and RPDs) were within acceptance criteria for accuracy and precision established by the laboratory and the appropriate guidance documents.

1.5 Laboratory Duplicate (LD) Samples

All project samples used for the LD analyses are included in Table 1. As designated on the associated COCs, sample **WS3-140-A** (13-05-1367) was utilized for the LD analyses. Acceptable precision was demonstrated by all project samples used for the LD analyses.

1.6 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

All project samples used for the MS/MSD analyses are included in Table 1. As designated on the associated COC, samples **WS3-140-A/WS3-140-AF** was utilized for the MS/MSD analyses. In the sample listed below, the source results exceeded 4-times the spike level; consequently, the recoveries for the following MS/MSD analyses were not evaluated for the analytes listed below.

Sample	Work Order	Analyte
WS3-140-AF	13-05-1367	Calcium, Magnesium, Sodium

Acceptable precision and accuracy were demonstrated for all of the analytes by the project sample used for the MS/MSD analyses.

The source blank (**SB-051713-A)** was selected by the laboratory for the hexavalent chromium (EPA Method 7199) MS/MSD analyses. Although acceptable precision and accuracy were demonstrated, this blank matrix is not representative of the project-specific sample matrix and the results were not directly used in the assessment of precision for the respective test methods. Instead, the assessment of precision and accuracy were performed using the LCD/LCSD results. (See Section 1.4.)

1.7 Post-Digestion Spike (PDS) Samples

All project samples used for the post-digestion spike analyses are included in Table 1. In the sample listed below, the source results exceeded 4-times the spike level; consequently, the recoveries for the following PDS analyses were not evaluated for the analytes listed below.

Sample	Work Order	Analyte
WS3-140-AF	13-05-1367	Calcium, Sodium

Acceptable precision and accuracy were demonstrated for all other analytes by the project sample used for the PDS analyses.

1.8 Comparison of Hexavalent Chromium and Chromium Results

The results for hexavalent chromium and dissolved/total chromium are summarized in the following tables. The reported results for hexavalent chromium and dissolved/total chromium demonstrated acceptable agreement for all samples.

Comparison of Hexavalent Chromium and Dissolved Chromium Results

Sample	Hexavalent Chromium	Dissolved Chromium
WS3-140-AF	<0.20 µg/L	1.27 µg/L*
ER-051713-AF	<0.20 µg/L	0.737 µg/L

Note:
* - Result previously qualified as not detected (see Section 1.3).

Comparison of Hexavalent Chromium and Total Chromium Results

Sample	Hexavalent Chromium	Total Chromium
SB-051713-AF	<1.0 µg/L	0.739 µg/L*

1.9 Compound Identification and Qualification

All samples were properly quantitated without dilution.

As per reporting requirements, the results for all analytes reported at concentrations less than the sample-specific reporting limits (adjusted for sample volume) should be considered estimated (J).

1.10 Verification of EDD/Database

The sample data in the database files provided matched the sample data reported in the final hardcopy laboratory reports except for the sample location for the source blank and the depth of the equipment blank and source blank associated with the mercury results. The data reviewer made corrections to these fields.

2.0 Conclusions

This QA review has identified aspects of the analytical data that required qualification due to blank contamination and results reported at concentrations less than the associated reporting limit; no data warranted rejection. To confidently use any of the analytical data within this sample set, the data user should understand the qualifications and limitations of the results.

DATA QUALIFIER DEFINITIONS

U	The analyte was detected above the laboratory reported sample quantitation limit. However, due to contamination from an outside source such as laboratory or field equipment, the analyte should be considered not detected at or above the adjusted sample quantitation limit.
J	The analyte was positively identified but the associated numerical value may not represent the actual concentration of the analyte in the sample due to an analytical bias in precision or accuracy, or because the resulting concentration has been reported at a confidence level of less than 99%.
J_0	A subset of the "J" flag described above. The analyte was positively identified but the associated estimated numerical value reported by the laboratory was less than the sample-specific reporting limit for this analyte. Consequently, there is a lower confidence in the accuracy in the result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified and data are not usable.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
+	The result is biased high.
-	The result is biased low.
NA	Not analyzed.
µg/L	micrograms per liter.
mg/L	milligrams per liter.