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Hazardous Waste Bureau

Mr. John E. Kieling, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 E. Rodeo Park Dr. Bldg. 1
Santa Fe, New Mexico 87505-6303

Subject: Transmittal of the Waste Isolation Pilot Plant 2013 Annual Culebra Groundwater Report

Dear Mr. Kieling:

The purpose of this letter is to submit the Waste Isolation Pilot Plant 2013 Annual Culebra Groundwater Report. This report is required by Permit Part 5, Section 5.10.2 of the Hazardous Waste Facility Permit No. NM4890139088-TSDF.

We certify under penalty of law that this document and all attachments were prepared under our direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Please contact Mr. George T. Basabilvazo at (575) 234-7488, if you have any questions regarding this data transmittal.

Sincerely,

Jose R. Franco, Manager
Carlsbad Field Office

M. F. Sharif, Project Manager
Nuclear Waste Partnership LLC

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UNITED STATES DEPARTMENT OF ENERGY

WASTE ISOLATION PILOT PLANT

CARLSBAD, NEW MEXICO

WIPP HAZARDOUS WASTE FACILITY

NEW MEXICO ENVIRONMENT DEPARTMENT

PERMIT NUMBER NM4890139088-TSDF

ANNUAL CULEBRA GROUNDWATER REPORT

WLMP Data Collection, March-August 2013

2013 DMP Sampling and Analysis

SUBMITTED TO THE

NEW MEXICO ENVIRONMENT DEPARTMENT

NOVEMBER 2013

This report has been reviewed and approved by:

//Original Signature on File//
R. A. Salness, Mgr. EM&H

10/30/13
Date

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List of Abbreviations, Acronyms, and Units

Ag	Silver
AIS	Air Intake Shaft
ASTM	American Society for Testing and Materials (formerly). Now ASTM International
Ba	Barium
Be	Beryllium
Ca	Calcium
CCV	calibration check verification
Cd	Cadmium
Cr	Chromium
DMP	Detection Monitoring Program
DMW	detection monitoring well(s)
EM&H	Environmental Monitoring and Hydrology
EPA	U.S. Environmental Protection Agency
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
HEAL	Hall Environmental Analysis Laboratory
Hg	Mercury
ICP	inductively coupled plasma spectroscopy
ICP/MS	inductively coupled plasma spectroscopy/mass spectrometry
ICV	initial calibration verification
K	Potassium
km	kilometers
LCS/D	laboratory control sample/ duplicate
LWB	Land Withdrawal Boundary
m	meters
MAPEP	Mixed Analyte Performance Evaluation Program
m/yr	meters per year
Mg	Magnesium
MS/D	matrix spike/ duplicate
µg	micrograms per Liter
mg/L	milligrams per Liter
MDL	method detection limit
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
Na	Sodium
ND	not detected
Ni	Nickel
NMED	New Mexico Environment Department
NELAC	National Environmental Laboratory Accreditation Conference
Pb	Lead
PEST	Parameter Estimation Tool
pH	hydrogen ion potential
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
SM	Standard Methods for the Examination of Water and Wastewater
SNL	Sandia National Labs
SOP	standard operating procedure
SOW	statement of work
SVOC	semivolatile organic compound
TDS	total dissolved solids

TOC	total organic carbon
TSS	total suspended solids
TRU	transuranic
UTLV	upper tolerance limit value
V	Vanadium
V&V	verification and validation
VOC	volatile organic compound
WIPP	Waste Isolation Pilot Plant
WLMP	Water Level Monitoring Program

Executive Summary

The Permittees at the Waste Isolation Pilot Plant (WIPP) facility perform groundwater sampling and monitoring in accordance with the Hazardous Waste Facility Permit (Permit) issued by the New Mexico Environment Department (NMED). This is the annual groundwater monitoring report required by the Permit. This report includes results from the Water Level Monitoring Program (WLMP) and Detection Monitoring Program (DMP) for groundwater wells completed in the Culebra Member (Culebra) of the Rustler Formation (Rustler).

Water levels are measured in 43 Culebra wells monthly and in 6 redundant wells on the H-19 pad quarterly. Fluid density is measured in the Culebra wells annually. Maintenance activities were performed on wells SNL-10, and SNL-18 to remove broken tubing from near the bottom of the well. SNL-1 was brushed to remove scale buildup in the screen.

Water level trends over the past year show a generally decreasing equivalent freshwater head across the Culebra monitoring network. There were no unknown changes to the DMP wells over two feet during the last year. The Culebra flow model and potentiometric map show the water particle predicted path from the WIPP Waste Handling Shaft to the land withdrawal boundary (LWB). Flow rate was calculated to have an average velocity of 0.69 meters per year (m/yr) and take 5,964 years to reach the LWB.

The baseline sample set is used to determine whether statistically significant changes in groundwater chemistry have occurred at any well. The data in this report are presented in both table and graph formats to show the Round 35 results with respect to the established baseline and Permit background values, as applicable.

The Round 35 groundwater analysis results indicate no evidence of groundwater contamination resulting from the disposal and management of transuranic (TRU) mixed waste at the WIPP facility. Examination of time-trend plots for the analytical parameters revealed no changes in overall groundwater chemistry or the development of concentration trends.

During Round 35, the Permittees used a contract analytical laboratory for analysis of the required parameters. Analytical results were reviewed in accordance with WIPP facility data verification and validation (V&V) procedures and U.S. Environmental Protection Agency (EPA) technical guidance.

Combined Report Introduction

This Annual Culebra Groundwater Report combines the 2013 Culebra groundwater sampling and analysis results from the DMP with data collected monthly from the Water Level Monitoring Program (WLMP). The reporting requirements are outlined in the Permit, Part 5, Section 5.10.2 and Attachment L, Section L-5b&c.

This report is presented in two sections. Part 1 contains the WLMP information including well inventory, fluid density, Culebra groundwater trends, changes to DMP wells greater than two feet during a year, annotated hydrographs and the potentiometric surface map for the previous year. Part 2 contains the information related to the DMP including sampling results, data validation, and analytical discussions. The appendices contain the annotated hydrographs, water levels, and DMP sample results.

Part 1 – Water Level Monitoring Program

1.0 Introduction

The Culebra is the most transmissive hydrologic unit in the WIPP site area and is considered the most significant potential hydrologic pathway for a release of hazardous waste to the accessible environment. The transmissivity of the Culebra varies spatially over ten orders of magnitude from east to west in the vicinity of the WIPP site. Transmissivities have been calculated at 1×10^{-7} square feet per day (1×10^{-13} square meters per second) at well SNL-15 east of the WIPP site to 1×10^{3} square feet per day (1×10^{-3} square meters per second) at the H-07 pad wells in Nash Draw (see Amended Renewal Application Addendum L1, Section L1-2a(3)(a)(ii) (DOE, 2009)). The regional flow direction of groundwater in the Culebra is generally south. Figure 1 shows a map of the current Culebra monitoring well locations.

2.0 Summary of Groundwater Activities

Permit required routine groundwater level monitoring activities include groundwater level monitoring and the fluid density survey. Table 1 contains a list of the active Culebra wells monitored through August 2013. Water level data collected from March 2013 to August 2013 are presented in Appendix 2.

Monthly groundwater level data and yearly fluid density data were gathered from 43 Culebra wells across the WIPP region. Well C-2737(PIP) is equipped with a production-injection packer (PIP) to allow groundwater level surveillance of different hydrologic zones within the same well. The 6 redundant wells on the H-19 pad are measured quarterly for water level and annually for fluid density. Monthly water levels were not taken where access was poor or in certain wells when testing equipment was present, blocking access to the well.

Table 1 – Active Culebra Monitoring Wells as of August 2013

AEC-7	C-2737(PIP)	ERDA-9	H-02b2	H-03b2	H-04bR	H-05b
H-06bR	H-07b1	H-09bR	H-10c	H-11b4R	H-12	H-15R
H-16	H-17	H-19b0	H-19b2[1]	H-19b3[1]	H-19b4[1]	H-19b5[1]
H-19b6[1]	H-19b7[1]	I-461	SNL-01	SNL-02	SNL-03	SNL-05
SNL-06	SNL-08	SNL-09	SNL-10	SNL-12	SNL-13	SNL-14
SNL-15	SNL-16	SNL-17	SNL-18	SNL-19	WIPP-11	WIPP-13
WIPP-19	WQSP-1	WQSP-2	WQSP-3	WQSP-4	WQSP-5	WQSP-6
1: Redundant wells on H-19 pad, measured quarterly						

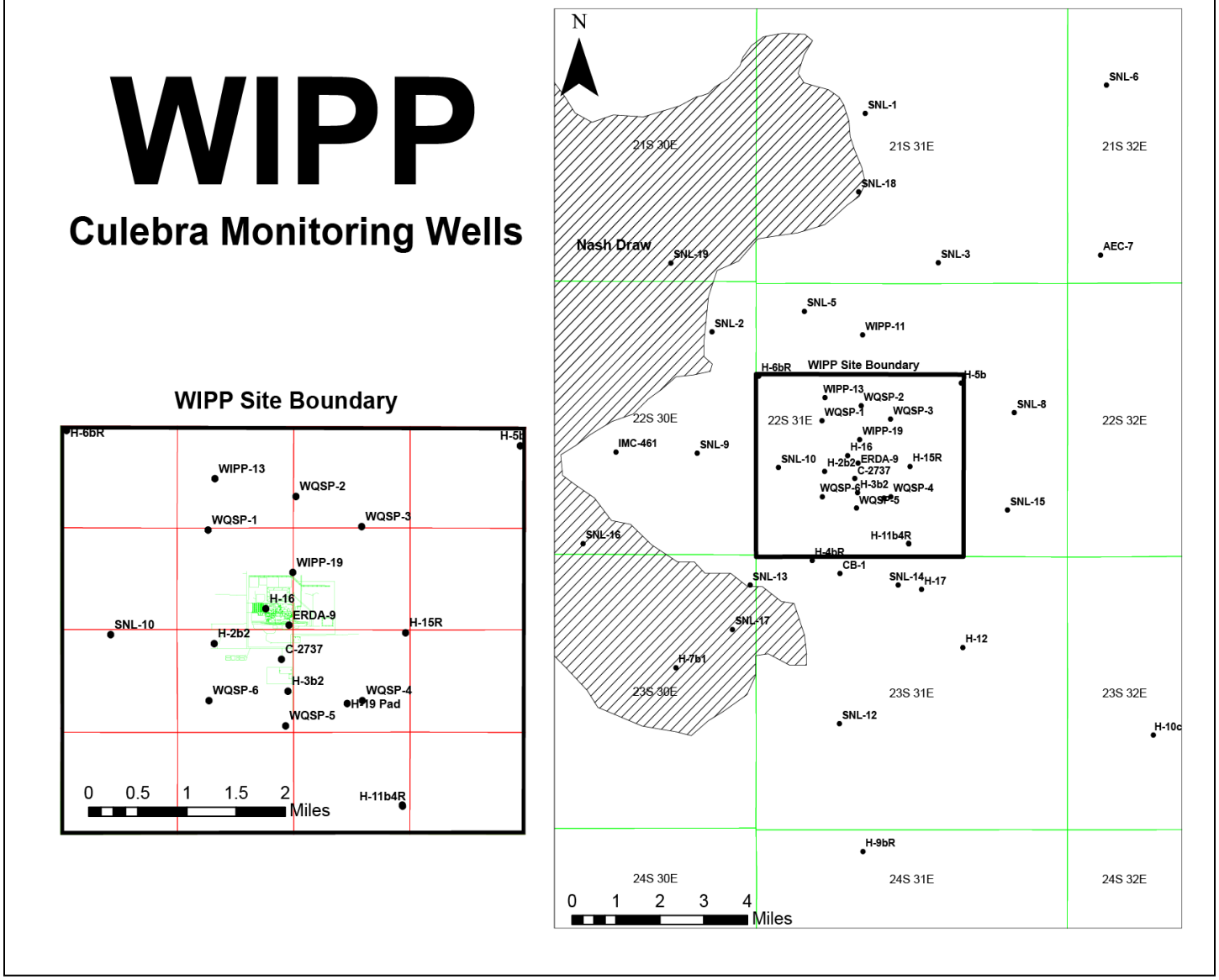

Figure 1 - Culebra Monitoring Wells

2.1 Plugging and Abandonment, Drilling, and Well Maintenance

Drilling of a replacement well for AEC-7 was started in August 2013 and completed in early September. Final completion details and plugging and abandonment details of AEC-7 will be presented in the next report and forthcoming basic data report. Wells SNL-10 and SNL-18 were found to have pieces of plastic tubing limiting access to the well screens. This tubing was discovered during video logging of the wells and was later removed. SNL-1 was brushed and bailed to remove scale buildup on the screen.

2.2 Pumping/Testing and Other Activities that Impacted Culebra Water Levels

Monitor wells in the southern part of the network have been affected by large volume pumping of oil/gas water supply wells in the area. This is evident in the hydrographs of H-9bR and SNL-12 and continues as far north as H-4bR. Well H-7b has been affected by pumping of a BLM water well on the same pad. Also, SNL-13 continues to recover from nearby oil/gas drilling disturbance.

3.0 Fluid Density Survey

Around the WIPP facility, both temporal and spatial differences in total dissolved solids (TDS) concentrations in groundwater result in variability in groundwater fluid density. The Permittees measure the density of well-bore fluids in Culebra monitoring wells to adjust water levels to their equivalent freshwater head values. This allows more accurate determination of relative heads between wells. In 2012, fluid densities were derived from 49 wells, as shown in Table 2. The six redundant wells on the H-19 pad serve as backup wells to H-19b0 when used to produce the annual potentiometric map.

Prior to 2007 pressure density was obtained using a mobile trailer-mounted system that obtained data from each well. In 2007, Sandia National Laboratories (SNL) installed a dedicated pressure transducer in each well. This allows for continuous pressure monitoring during the year from which fluid densities are calculated. For the detection monitoring wells (DMWs) that are sampled (WQSP wells in Table 1), field hydrometer measurements are used. Fluid densities have been adjusted thermally since 2009, when it was determined that the average Culebra water temperature is 70°F.

Fluid densities for previous years are also shown in Table 2 for comparison. When historical fluid densities are plotted back to the beginning of SNL continuous measurements in 2007, no apparent overall trends exist between years. In general, wells to the south and west (i.e. H-9bR and SNL-16) of the WIPP facility tend to have lower fluid densities compared to eastern wells (i.e. H-12 and SNL-15).

4.0 Groundwater Trends

Over the last year (September 2012 – August 2013) Culebra water levels have generally been decreasing across the monitoring region. There were no unexplained changes in DMWs greater than 2 feet over the course of the year.

A few individual wells have shown interesting trends over the past year. SNL-13 has shown the most notable change due to increased oil/gas drilling nearby in the past two years. The well has been stabilizing back to normal water elevations in the last year (see hydrograph). H-16 has shown a trend of water level decrease and increase cycles each year since it was reconfigured to a Culebra-only well in 2008. This may be attributed to its close proximity to the WIPP Air Intake Shaft (AIS). The water level decrease has started in the winter months and the well recovers by mid spring each year.

Appendix 1 contains annotated hydrographs as required by the Permit. Groundwater data and equivalent freshwater heads recorded for the period of March – August 2013 are in Appendix 2.

Table 2 – Fluid Density Survey for 2012

Well I.D.	2010 Fluid Density Survey Result Density (g/cc)	2010 Conversion to Specific Gravity at 70° F Density (g/cc)	2011 Fluid Density Survey Result Density (g/cc)	2011 Conversion to Specific Gravity at 70° F Density (g/cc)	2012 Fluid Density Survey Result Density (g/cc)	2012 Conversion to Specific Gravity at 70° F Density (g/cc)	Notes for 2010-2012 Fluid Density Survey
AEC-7	1.076	1.078	1.069	1.071	1.065	1.067	
C-2737	1.025	1.027	1.025	1.027	1.021	1.023	
ERDA-9	1.070	1.072	1.071	1.073	1.071	1.073	
H-02b2	1.011	1.013	1.010	1.012	1.010	1.012	
H-03b2	1.041	1.043	1.039	1.041	1.034	1.036	
H-04bR	1.016	1.018	1.015	1.017	1.015	1.017	
H-05b	1.091	1.093	1.095	1.097	1.093	1.095	
H-06bR	1.035	1.037	1.036	1.038	1.036	1.038	
H-07b1	1.004	1.006	1.004	1.006	1.005	1.007	
H-09c	1.004	1.006	NA	NA	NA	NA	Plugged back to Magenta only in October 2010
H-9bR	NA	NA	1.000*	1.000*	1.000*	1.000*	Replacement well for H-09c-Culebra, drilled in 2010, * Rounded up to 1.000 for 2011 & 2012
H-10c	1.089	1.091	1.092	1.094	1.092	1.094	
H-11b4	1.049	1.051	1.039	1.041	NA	NA	Plugged and abandoned in Nov. 2011
H-11b4R	NA	NA	NA	NA	1.074	1.076	New replacement well to H-11b4 drilled in 2011
H-12	1.105	1.107	1.105	1.107	1.111	1.113	
H-15R	1.117	1.119	1.117	1.119	1.116	1.118	
H-16	1.035	1.037	1.035	1.037	1.035	1.037	
H-17	1.134	1.136	1.134	1.136	1.131	1.133	
H-19b0	1.066	1.068	1.064	1.066	1.064	1.066	
H-19b2	1.068	1.070	1.059	1.061	1.060	1.062	
H-19b3	1.069	1.071	1.052	1.054	1.064	1.066	
H-19b4	1.063	1.065	1.054	1.056	1.065	1.067	
H-19b5	1.066	1.068	1.062	1.064	1.067	1.069	
H-19b6	1.073	1.075	1.061	1.063	1.068	1.070	
H-19b7	1.071	1.073	1.062	1.064	1.070	1.072	
I-461	1.003	1.005	1.000*	1.000*	1.000*	1.000*	* Rounded up to 1.000 for 2011 & 2012
SNL-01	1.026	1.028	1.029	1.031	1.027	1.029	
SNL-02	1.007	1.009	1.007	1.009	1.007	1.009	
SNL-03	1.026	1.028	1.026	1.028	1.026	1.028	
SNL-05	1.006	1.008	1.007	1.009	1.007	1.009	
SNL-06	1.231	1.233	1.239	1.241	1.241	1.243	
SNL-08	1.092	1.094	1.092	1.094	1.092	1.094	
SNL-09	1.016	1.018	1.016	1.018	1.016	1.018	
SNL-10	1.007	1.009	1.007	1.009	1.007	1.009	
SNL-12	1.003	1.005	1.003	1.005	1.004	1.006	
SNL-13	1.021	1.023	1.023	1.025	1.016	1.018	
SNL-14	1.044	1.046	1.045	1.047	1.044	1.046	
SNL-15	1.226	1.228	1.230	1.232	1.227	1.229	
SNL-16	1.007	1.009	1.006	1.008	1.007	1.009	
SNL-17	1.002	1.004	1.004	1.006	1.003	1.005	
SNL-18	1.004	1.006	1.005	1.007	1.003	1.005	
SNL-19	1.004	1.006	1.004	1.006	1.005	1.007	
WIPP-11	1.035	1.037	1.036	1.038	1.036	1.038	
WIPP-13	1.042	1.044	1.041	1.043	1.039	1.041	
WIPP-19	1.049	1.051	1.050	1.052	1.050	1.052	
WQSP-1	1.047	1.049	1.047	1.049	1.049	1.051	Average Round 34, field hydrometer
WQSP-2	1.045	1.047	1.046	1.048	1.046	1.048	Average Round 34, field hydrometer
WQSP-3	1.144	1.146	1.143	1.146	1.145	1.147	Average Round 34, field hydrometer
WQSP-4	1.076	1.078	1.074	1.076	1.075	1.077	Average Round 34, field hydrometer
WQSP-5	1.026	1.028	1.025	1.027	1.025	1.027	Average Round 34, field hydrometer
WQSP-6	1.014	1.016	1.015	1.017	1.013	1.015	Average Round 34, field hydrometer

NA: no available measurement

g/cc: grams per cubic centimeter

5.0 Potentiometric Surface Map

The potentiometric map was produced using data from the 2012 calendar year. The schedule for this report was approved after the Permit modifications were made in order to provide a cut off point for the data and allow time to produce the map. Following a review of hydrographs and data from each Culebra well, February 2012 data was selected to produce a potentiometric map for this report. This month had the fewest wells behaving contrary to the site-wide water level trends and not disturbed by any man-made effects such as pumping or well maintenance activities. A June 2012 water level was used for well H-16 since this well was affected by a seasonal change in February due to its location near the Air Intake Shaft.

Modeled freshwater head contours for February 2012 for the model domain are shown in Figure 2. These contours were generated using the results of the Culebra MODFLOW 2K (Harbaugh et al., 2000) run utilizing ensemble average distributed aquifer parameters from the SNL Culebra flow model, which was calibrated as part of the performance assessment baseline calculation for the 2009 *Compliance Recertification Application* (DOE, 2009). Because that model was calibrated to both a snapshot of assumed steady-state water levels (May, 2007) and to transient multi-well responses observed during large-scale pumping tests throughout the domain, the boundary conditions were adjusted to improve the match between the model and the observed February 2012 Culebra freshwater heads. The portion of the flow domain of interest to the site is extracted as shown on Figure 3.

The freshwater head values for February 2012 were computed using 2011 densities. The base transmissivity fields and the 100 calibrated model realizations derived from them for the performance assessment baseline calculation, embody the hydrologic and geologic understanding of the Culebra behavior in the vicinity of the WIPP site. Using the ensemble average of these 100 realizations, therefore, captures the mean flow behavior of the system, and allows straightforward contouring of results from a single-flow model.

The Culebra flow model is a single-layer groundwater flow model. The boundary conditions of the flow model are of two types. First are the geologic or hydrologic type boundary conditions, which include the specified head along the eastern boundary and the no-flow boundary along the northwestern boundary of the domain. The second type of boundary condition is specified head. The northern and southern boundaries are of this type, along with the southern portion of the west boundary. The no-flow constant head boundary defined in Figure 3 is due to the low transmissivity for this area defined by such wells as SNL-8 and SNL-15 (Figure 1). The second type of boundary condition was determined using the parameter estimation code PEST (Doherty, 2002) to systematically adjust and optimize the boundary conditions to maximize the fit between modeled and observed heads at wells.

The illustrated particle in Figure 3 (heavy blue line) shows the predicted path a water particle would take through the Culebra from the coordinates corresponding to the WIPP Waste Handling shaft to the land withdrawal boundary (LWB) (a computed path length of 4.089 kilometers [km]). Assuming a thickness of 4 meters (m) for the transmissive portion of the Culebra and a constant porosity of 16 percent, the travel time to the WIPP LWB is 5,964 years, for an average velocity of 0.69 m/yr. Since the flow model has the ensemble hydraulic conductivity and anisotropy fields as inputs, the freshwater head contours and particle tracks take into account the variability of known aquifer conditions across the site.

The scatter plot in Figure 4 shows measured and modeled freshwater heads at the observation locations used in the PEST calibration. The observations are divided into three groups based on proximity to the WIPP site. Wells within the LWB are represented by red crosses, wells outside but within 3 km of the LWB are represented with green "x"s, and other wells within the MODFLOW model domain but distant from the WIPP site are shown by blue asterisks. These groupings were used in the PEST calibration; higher weights (2.5) were given to wells inside the LWB, lower weights (0.4) were given to wells distant to the WIPP site, and wells in the middle received an intermediate weight (1.0). Additional observations representing the average heads north of the LWB and south of the LWB were used to help prevent over-smoothing of the estimated results across the LWB. This allowed PEST to improve the fit of the model to

observed heads inside the area contoured in Figure 3, at the expense of fitting wells closer to the boundary conditions (i.e., wells shown in Figure 2).

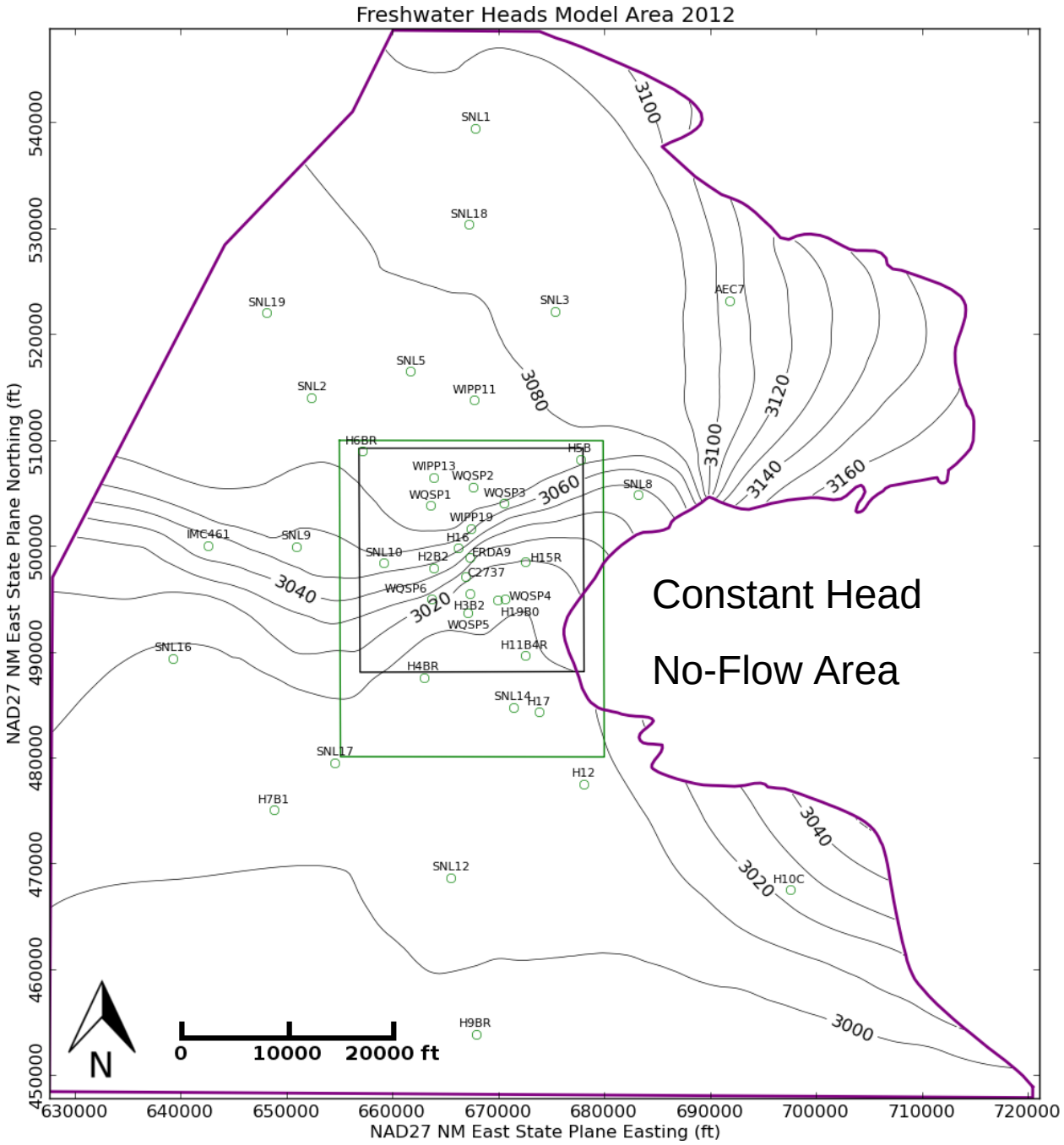

Figure 2 – Model Generated February 2012 Freshwater Head Contours in the Model Domain (contour interval in feet amsl)

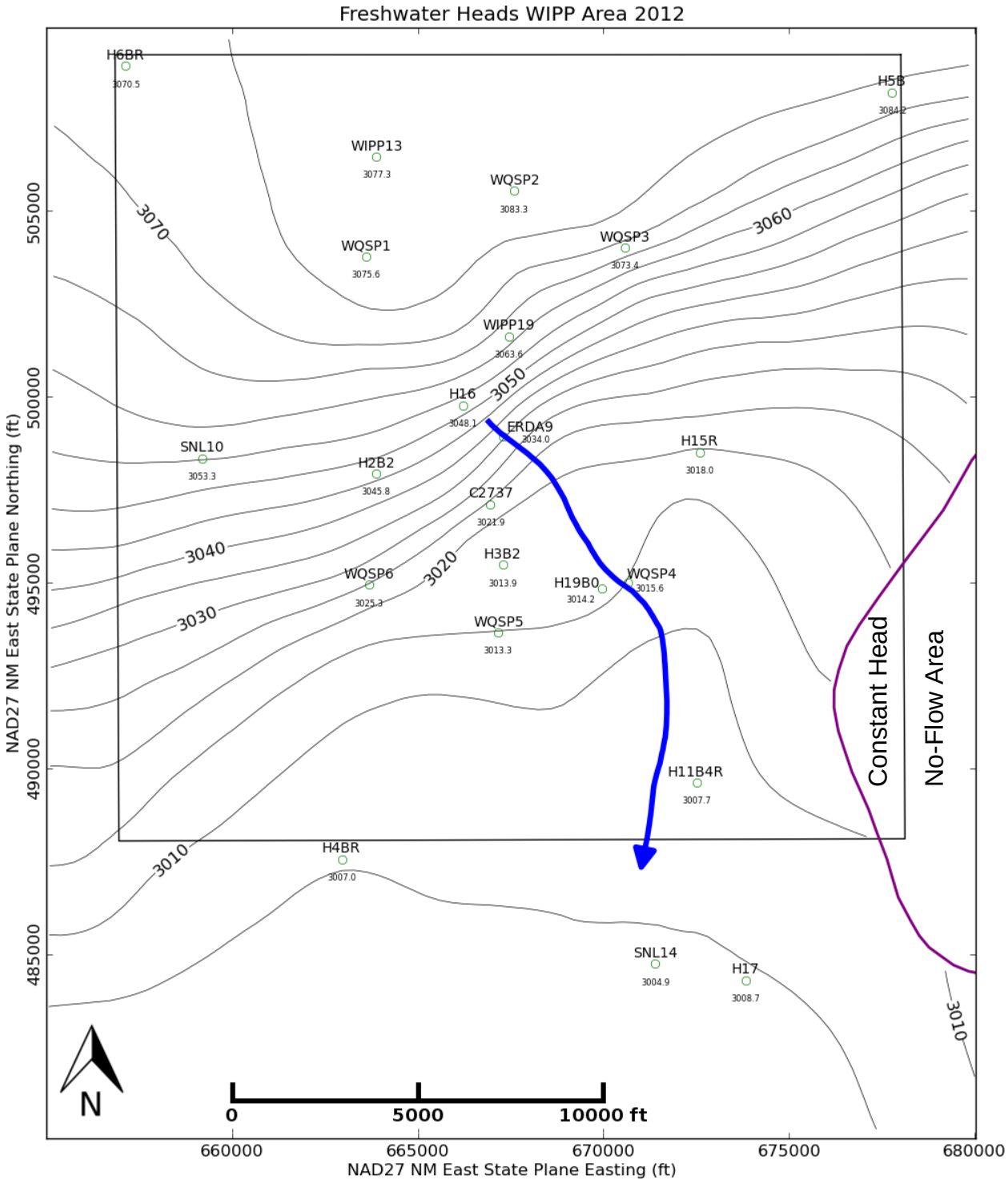

Figure 3 – Model-generated February 2012 Freshwater Head Contours (5-foot Contour Interval) in the WIPP Vicinity with Blue Water Particle Track from Waste Handling Shaft to WIPP Land Withdrawal Boundary (contour interval in feet amsl)

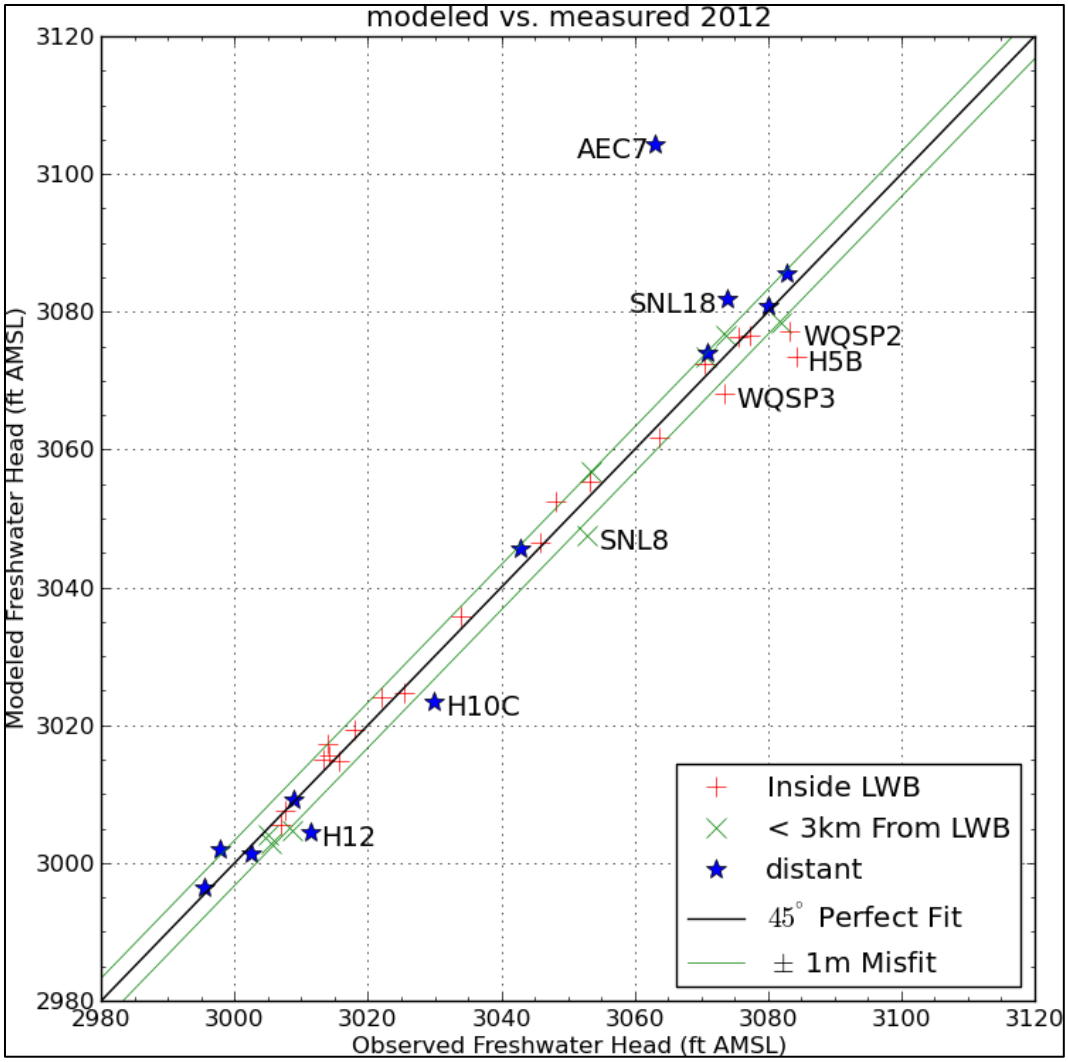

Figure 4 – Measured Versus Modeled Scatter Plot for PEST-calibrated MODFLOW 2000 Generated Heads and February 2012 Observed Freshwater Heads

The central diagonal line in Figure 4 represents a perfect model fit (1:1 or 45-degree slope). The two lines on either side of the central line represent a 1-m misfit above or below the perfect fit. Wells more than 1.5 m from the 1:1 line are labeled. AEC-7 has a large misfit for two reasons. First, this well has historically had an anomalously low freshwater head elevation, lower than all wells surrounding it. Second, this well was undergoing well reconfiguration activities during May 2007 and was not measured. Therefore, AEC-7 was not included as a calibration target in the SNL Performance Assessment MODFLOW model calibration. The ensemble-average transmissivity, anisotropy, and recharge fields used here were not calibrated to accommodate this observation. This well is situated in a low-transmissivity region, and near the constant-head boundary associated with the halite margin; therefore, PEST will not be able to improve this fit solely through adjustment of the second type boundary conditions along the edges of the domain (Figure 2).

Figures 5 and 6 show the distribution of errors resulting from the PEST-adjusted fit to observed data. The distribution in Figure 5 is roughly symmetric, indicating there is not a strong bias. Aside from AEC-7, the model fit to the February 2012 observations is very good. The averaged MODFLOW model captures the bulk Culebra flow behavior, while the PEST calibration improved the model fit to the specific February 2012 observations.

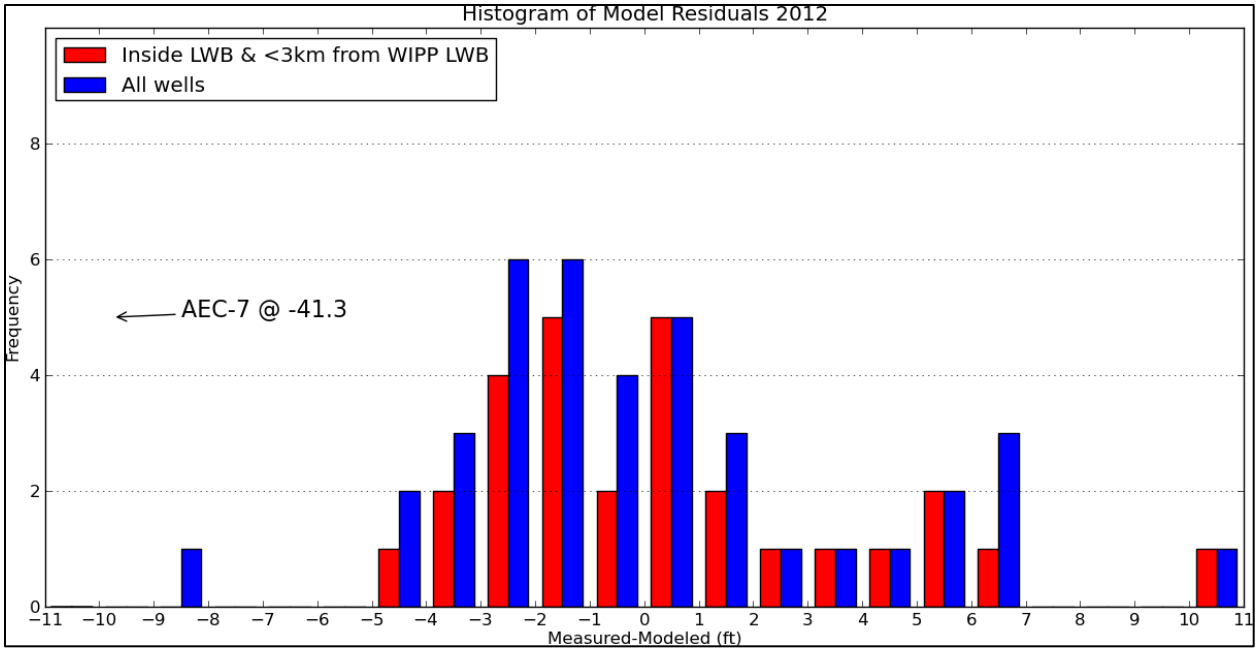

Figure 5 – Frequency of Modeled Freshwater Head Residuals

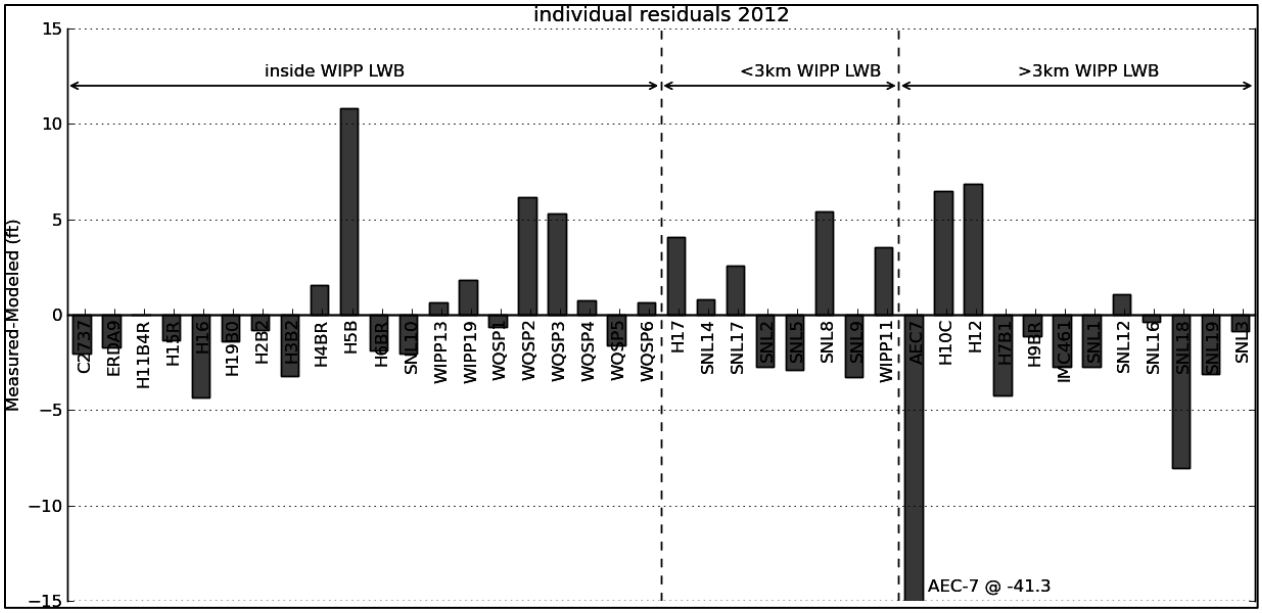

Figure 6 – Modeled Residual Freshwater Head at Each Well

6.0 References for Part 1

Doherty, J. 2002. *PEST: Model Independent Parameter Estimation*. Watermark Numerical Computing, Brisbane, Australia.

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Part 2 – Detection Monitoring Program

1.0 Introduction

The Permittees collect groundwater quality data annually in accordance with the Permit, which was originally issued by the NMED on October 27, 1999. Sampling for this reporting period was performed under a Permit modification effective on March 1, 2012. References to specific sections in the Permit regarding sampling and reporting are relative to the Permit in effect at the time. This report documents groundwater quality based upon the chemical analysis results of sampling conducted from March 2013 to May 2013 (Sampling Round 35) and compares the data to the baseline water quality data and Permit background values, as applicable.

The DMP prescribed by the Permit requires the sampling of six DMWs (WQSP-1 through WQSP-6) completed in the Culebra. Figure 1 shows the locations of the monitoring wells. The DMP statistical baseline includes data from the first 10 sampling rounds. These sampling events provided groundwater quality data prior to the first receipt of mixed waste at the WIPP facility on September 9, 2000. The data collected during Round 35 were compared with the analytical parameter concentration ranges measured during the baseline study. The concentrations of the analytical parameters were evaluated to determine whether statistically significant changes in water quality have occurred or are occurring compared with the baseline.

The analytical results for Round 35 indicate no evidence of groundwater contamination resulting from the disposal and management of TRU mixed waste at the WIPP facility. However, toluene was detected during analysis of WQSP-5 groundwater at concentrations of 141 ug/L in the primary sample and 82.1 ug/L in the duplicate sample. The assessment indicated the source of toluene in the WQSP-5 samples was not the regulated unit; rather it was introduced into the well while replacing the pump prior to sampling. The source was electrical tape used to secure the electrical wire harness supplying electricity to the pump motor to the sample line (DOE, 2013). No other VOCs were detected at concentrations above the method reporting limit (MRL).

The analysis data showed the detection of a few trace metals in some of the wells. The data were typical of previous sampling rounds and generally included barium (Ba), beryllium (Be) and vanadium (V).

2.0 Background Water Quality Analyses

Sampling of the DMWs first began in August 1995. The WIPP Permittees completed five rounds of background sampling in September 1997. However, TRU mixed waste was not received at the WIPP facility until September 2000. Therefore, five additional rounds of background samples were collected and analyzed. The Permittees performed a groundwater quality background baseline analysis for each of the DMWs using data from these 10 initial sampling rounds. Based on this sampling and the statistical baseline developed by the Permittees, the NMED has specified the background water quality values in the Permit Part 5, Table 5.6.

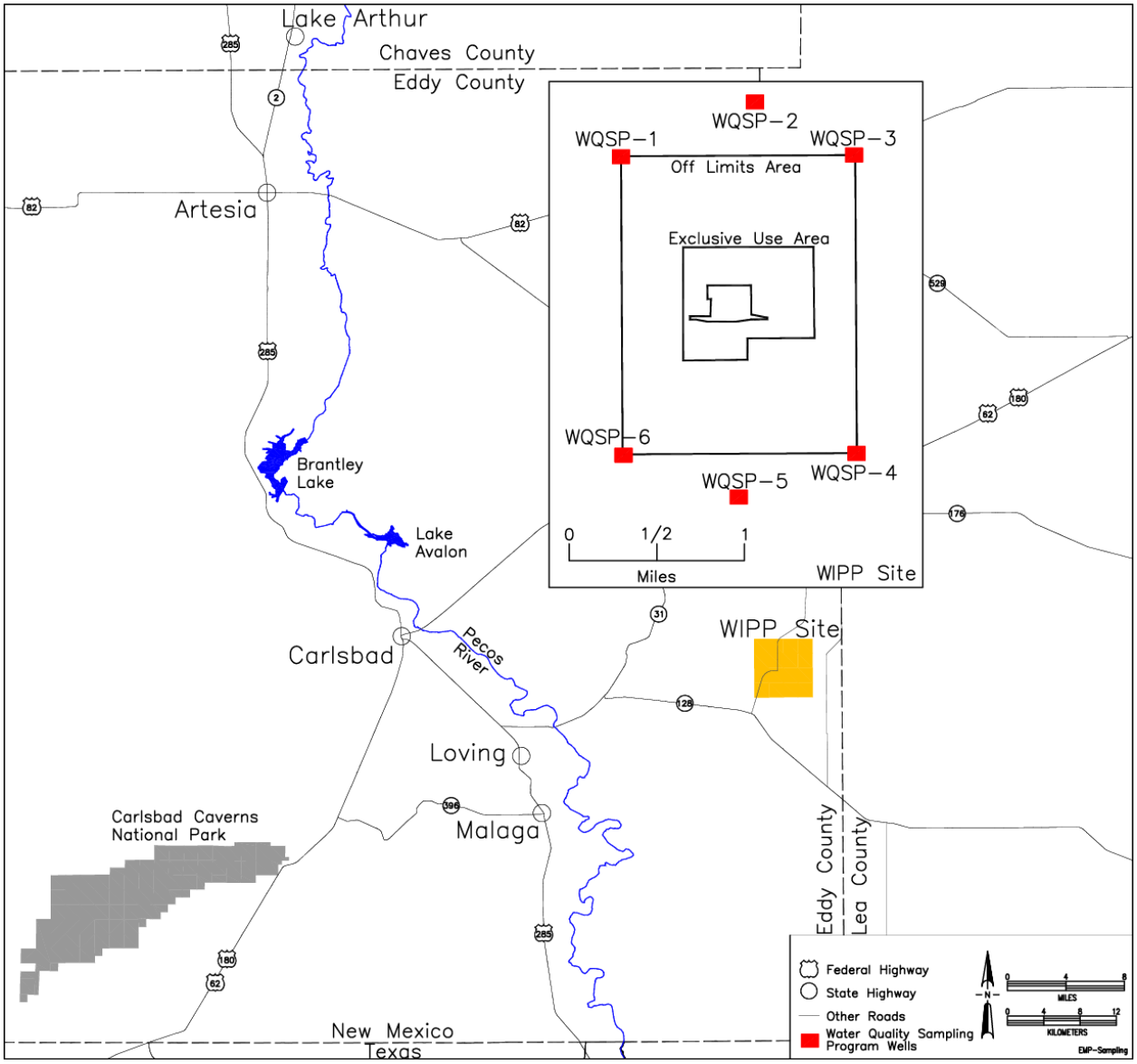


Figure 1 – Location of DMP wells

3.0 Round 35 Groundwater Analyses

In accordance with Permit requirements, the Permittees sampled the six Culebra DMWs for the analytical constituents and parameters listed in Table 1. In addition to the Permit required analytical constituents and parameters listed in Table 1, the samples were analyzed for alkalinity; sodium (major cation), sulfate (major anion); and nitrate (anion).

Table 2 lists the volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and the trace metal constituents measured in the Round 35 samples along with the corresponding method reporting limits (MRLs) specified in the contract laboratory statement of work (SOW). Round 35 samples were analyzed for groundwater parameters in accordance with Permit requirements. On August 31, 2001, the Permit added trans-1, 2- dichloroethylene (VOC) and vanadium (trace metal) to the constituent list. Rounds 13 through 16 were used to establish the statistical baseline concentration of 1.0 microgram per liter (µg/L) for trans-1, 2- dichloroethylene, and Rounds 1-10 were used to establish the vanadium

baseline concentration for each DMP well. Recently, the Permit modification effective March 1, 2012 reduced the number of required constituents and parameters from 53 to 52.

Chemical synonyms used by the current analytical laboratory, Hall Environmental Analysis Laboratory (HEAL), which deviate from the Permit-listed organic compound nomenclature, are provided in parentheses (Table 2) and will be used for subsequent discussions of analyses results. The chemical name of an organic compound (i.e., volatile and semivolatile) may vary between laboratories because of the use of various chemical synonyms.

Table 3 summarizes the analytical results for analytical parameters and constituents (excluding VOCs and semivolatile organic compounds (SVOCs)) measured in the Round 35 samples along with their baseline distribution types, the baseline 95th Upper Tolerance Limit Value (UTLV) or 95th percentile concentrations (DOE, 2000), and the Permit background values (Permit Table 5.6), as applicable. Results with parameter concentrations higher than the 95th UTLV, 95th percentile, or Permit background values (hereinafter referred as baseline) are shown in bold type and will be discussed in this report. The analytical parameters with concentrations between the method detection limit (MDL) and the MRL/ practical quantitation limit (PQL) are J-flagged as estimated concentrations. The actual lab MDLs and lab MRL/PQLs are presented in the Groundwater Concentration and Precision Summary Sheets (which also include any detected VOC/SVOCs) in the appendices for each DMW. These same summaries show the SOW-prescribed MRL, the concentrations of the parameters measured in the primary and duplicate samples, the average concentration of the primary and duplicate samples, and the relative percent difference (RPD).

The analytical results from Round 35 are discussed in Sections 3.1 through 3.4 by parameter and constituent type including VOCs, SVOCs, trace metals, major cations, and general chemistry indicator parameters along with the cation-anion balances.

The DMW samples were collected in the order of WQSP-1 first followed by WQSP-2, WQSP-3, WQSP-4, WQSP-6, and WQSP-5 last. WQSP-5 was sampled last due to the need to replace the pump prior to sampling. The pump replacement activities resulted in the introduction of toluene in the well as discussed above.

The DMW groundwater samples were used as the sample matrix for matrix spike (MS) and matrix spike duplicate (MSD) where required. The two groundwater samples taken from each well are referred to as the “primary” groundwater sample and the “duplicate” groundwater sample. The primary groundwater samples were used for the MS/MSD.

Individual appendices for each well (Appendices 3 through 8) contain the Groundwater Concentration and Precision Summary spreadsheets discussed above along with the lab’s Case Narrative, data summary reports, and the quality assurance/quality control (QA/QC) data summaries. Additional items in the appendices include a summary narrative of the groundwater sampling and mobile lab (serial sample) analysis results; data verification and validation narratives and checklists for all the laboratory and QA/QC data from each DMW; and time-trend charts comparing the Round 35 chemical analysis results for the metals and the general chemistry parameters along with the historical baseline data and concentrations measured during previous rounds.

Table 1 - Permit Required Indicator Parameters and Hazardous Constituents List

Hazardous Constituents: Volatile and Semivolatile Organic Compounds	Indicator Parameters: General Chemistry and Major Cations/Anions	Hazardous Constituents Total Trace Metals
VOCs**:* Isobutanol Carbon tetrachloride Chlorobenzene Chloroform 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethylene Trans-1,2-Dichloroethylene Methyl ethyl ketone Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethylene 1,1,1-Trichloroethane 1,1,2-Trichloroethane Toluene Trichloroethylene Trichlorofluoromethane Vinyl chloride Xylenes ***SVOCs: 1,2-Dichlorobenzene 1,4-Dichlorobenzene 2,4-Dinitrophenol 2,4-Dinitrotoluene Hexachlorobenzene Hexachloroethane Cresols (2-, 3-, & 4-Methylphenols) Nitrobenzene Pentachlorophenol Pyridine	***General Chemistry**:* Density (measured as Specific Gravity) pH Specific conductance TOC (Total organic carbon) TDS (Total dissolved solids) TSS (Total suspended solids) ***Major Cations:*** Calcium (Ca^{++}) Magnesium (Mg^{++}) Potassium (K^{+}) ***Major Anions:*** Chloride (Cl^{-})	***Trace Metals:*** Antimony (Sb) Arsenic (As) Barium (Ba) Beryllium (Be) Cadmium (Cd) Chromium (Cr) Lead (Pb) Mercury (Hg) Nickel (Ni) Selenium (Se) Silver (Ag) Thallium (Tl) Vanadium (V)

pH= hydrogen ion potential (measure of alkalinity or acidity)

SVOC = semivolatile organic compound

VOC= volatile organic compound

Table 2 - VOC, SVOC, and Metal Constituents and Their Associated SOW-Prescribed MRLs

Compound[a]	MRL, µg/L		Trace Metal	MRL, mg/L
VOCs				
Isobutanol (Isobutyl Alcohol)	5.0		Antimony	0.025
Carbon tetrachloride	1.0		Arsenic	0.050
Chlorobenzene	1.0		Barium	0.020
Chloroform	1.0		Beryllium	0.010
1,1-Dichloroethane	1.0		Cadmium	0.010
1,2-Dichloroethane	1.0		Chromium	0.025
1,1-Dichloroethylene (1,1-Dichloroethene)	1.0		Lead	0.020
trans-1,2-Dichloroethylene (trans-1,2-DCE)	1.0		Mercury	0.0002
Methyl ethyl ketone (2-Butanone)	5.0		Nickel	0.025
Methylene chloride	5.0		Selenium	0.025
1,1,2,2-Tetrachloroethane	1.0		Silver	0.013
Tetrachloroethylene (Tetrachloroethene)	1.0		Thallium	0.025
1,1,1-Trichloroethane	1.0		Vanadium	0.025
1,1,2-Trichloroethane	1.0			
Toluene	1.0			
Trichloroethylene (Trichloroethene)	1.0			
Trichlorofluoromethane	1.0			
Vinyl chloride	1.0			
Xylenes (Xylenes, Total)	1.0			
SVOCs				
1,2-Dichlorobenzene	5.0			
1,4-Dichlorobenzene	5.0			
2,4-Dinitrophenol	5.0			
2,4-Dinitrotoluene	5.0			
Hexachlorobenzene	5.0			
Hexachloroethane	5.0			
2-Methylphenol [b]	5.0			
3-Methylphenol [b]	5.0			
4-Methylphenol [b]	5.0			
Nitrobenzene	5.0			
Pentachlorophenol	5.0			
Pyridine	5.0			

[a]: Chemical synonyms used by the current analytical laboratory, HEAL, are noted in parentheses.

[b]: 2-, 3-, and 4-methylphenol, are listed collectively as Cresols in the Permit

µg/L = microgram(s) per liter

mg/L = milligrams per liter

SVOC = semivolatile organic compound

VOC = volatile organic compound

MRL = method reporting limit

Table 3 - Round 35 Analytical Data Summary

WQSP-1 Culebra					
Chemical	**Concentration (mg/L)**		**Distribution Type[a]**	**95th UTLV or 95th Percentile**	**Permit Table 5.6**
	Primary Sample	**Duplicate**			
WQSP-1 General Chemistry					
Specific Gravity[b]	1.039	1.038	Normal	1.07	N/A
pH (SU)	7.05	7.07	Lognormal	5.6 – 8.8	N/A
Specific Conductance (μmhos/cm)	115,000	113,000	Lognormal	175,000	N/A
Total Dissolved Solids	61,800	64,700	Lognormal	80,700	N/A
Total Organic Carbon	0.78 J	0.81 J	Nonparametric	<5.0	N/A
Total Suspended Solids	**39**	**40**	Nonparametric	**33.3**	N/A
WQSP-1 Total Trace Metals					
Antimony	ND (0.020)	ND (0.020)	Nonparametric	0.33	0.33
Arsenic	ND (0.020)	ND (0.020)	Nonparametric	<0.1	0.10
Barium	0.031 J	0.029 J	Nonparametric	<1.0	1.00
Beryllium	0.0047 J	0.0028 J	Nonparametric	<0.02	0.02
Cadmium	ND (0.0020)	ND (0.0020)	Nonparametric	<0.2	0.20
Chromium	ND (0.0080)	ND (0.0080)	Nonparametric	<0.5	0.50
Lead	ND (0.026)	ND (0.026)	Nonparametric	0.105	0.11
Mercury	ND (0.00012)	ND (0.00012)	Nonparametric	<0.002	0.002
Nickel	ND (0.0060)	ND (0.0060)	Nonparametric	0.490	0.50
Selenium	ND (0.020)	ND (0.020)	Nonparametric	0.150	0.15
Silver	ND (0.0020)	ND (0.0020)	Nonparametric	<0.5	0.50
Thallium	ND (0.020)	ND (0.020)	Nonparametric	0.98	1.00
Vanadium	0.034 J	0.026 J	Nonparametric	<0.1	0.10
WQSP-1 Major Cations, Dissolved					
Calcium	1,850	1,840	Normal	2,087	N/A
Magnesium	1,130	1,120	Normal	1,247	N/A
Potassium	515	534	Lognormal	799	N/A
WQSP-1 Major Anions					
Chloride	36,200	39,500	Normal	40,472	N/A

[a,b]Refer to footnotes at end of table.

Table 3 - Round 35 Analytical Data Summary *(Continued)*

WQSP-2 Culebra					
Chemical	**Concentration (mg/L)**		**Distribution Type[a]**	**95th UTLV Or 95th Percentile**	**Permit Table 5.6**
	Primary Sample	**Duplicate**			
WQSP-2 General Chemistry					
Specific Gravity[b]	1.044	1.041	Lognormal	1.06	N/A
pH (SU)	7.18	7.20	Normal	7.0–7.6	N/A
Specific Conductance (μmhos/cm)	116,000	119,000	Lognormal	124,000	N/A
Total Dissolved Solids	63,000	63,000	Normal	80,500	N/A
Total Organic Carbon	0.28 J	0.29 J	Nonparametric	7.97	N/A
Total Suspended Solids	35	34	Nonparametric	43.0	N/A
WQSP-2 Total Trace Metals					
Antimony	ND (0.020)	ND (0.020)	Nonparametric	<0.5	0.50
Arsenic	ND (0.020)	ND (0.020)	Nonparametric	0.062	0.06
Barium	0.021 J	0.027 J	Nonparametric	<1.0	1.00
Beryllium	ND (0.0025)	0.0060 J	Nonparametric	<1.0	1.00
Cadmium	ND (0.0040)	ND (0.0040)	Nonparametric	<0.5	0.50
Chromium	ND (0.0075)	ND (0.0075)	Nonparametric	<0.5	0.50
Lead	ND (0.017)	ND (0.017)	Nonparametric	0.163	0.17
Mercury	ND (0.00009)	ND (0.00009)	Nonparametric	<0.002	0.002
Nickel	ND (0.0070)	ND (0.0070)	Nonparametric	0.37	0.50
Selenium	ND (0.020	ND (0.020)	Nonparametric	0.150	0.15
Silver	ND (0.0055)	ND (0.0055)	Nonparametric	<0.5	0.50
Thallium	ND (0.020)	ND (0.020)	Nonparametric	0.980	1.00
Vanadium	0.020 J	0.031 J	Nonparametric	<0.1	0.10
WQSP-2 Major Cations, Dissolved					
Calcium	1,400	1,450	Lognormal	1,827	N/A
Magnesium	1,020	1,060	Normal	1,244	N/A
Potassium	463	485	Lognormal	845	N/A
WQSP-2 Major Anions					
Chloride	36,100	32,100	Normal	39,670	N/A

[a,b]Refer to footnotes at end of table.

Table 3 - Round 35 Analytical Data Summary *(Continued)*

WQSP-3 Culebra					
Chemical	**Concentration (mg/L)**		**Distribution Type[a]**	**95th UTLV Or 95th Percentile**	**Permit Table 5.6**
	Primary Sample	**Duplicate**			
WQSP-3 General Chemistry					
Specific Gravity[b]	1.133	1.034	Normal	1.17	N/A
pH (SU)	6.83	6.84	Lognormal	6.6 – 7.2	N/A
Specific Conductance (μmhos/cm)	383,000	385,000	Normal	517,000	N/A
Total Dissolved Solids	220,000	211,000	Lognormal	261,000	N/A
Total Organic Carbon	0.42 J	0.44 J	Nonparametric	<5.0	N/A
Total Suspended Solids	**123**	**168**	Nonparametric	**107**	N/A
WQSP-3 Total Trace Metals					
Antimony	ND (0.020)	ND (0.020)	Nonparametric	<1.0	1.00
Arsenic	ND (0.020)	ND (0.020)	Nonparametric	<1.0	0.21
Barium	0.040 J	0.046 J	Nonparametric	<1.0	1.00
Beryllium	0.019 J	0.019 J	Nonparametric	<0.1	0.10
Cadmium	ND (0.020)	ND (0.020)	Nonparametric	<0.5	0.50
Chromium	ND (0.038)	ND (0.038)	Nonparametric	<2.0	2.00
Lead	ND (0.085)	ND (0.085)	Nonparametric	0.8	0.80
Mercury	ND (0.00035)	ND (0.00035)	Nonparametric	<0.002	0.002
Nickel	ND (0.035)	ND (0.035)	Nonparametric	<5.0	5.00
Selenium	ND (0.020)	ND (0.020)	Nonparametric	<2.0	2.00
Silver	ND (0.028)	ND (0.028)	Nonparametric	0.31	0.31
Thallium	ND (0.020)	ND (0.020)	Nonparametric	5.8	5.80
Vanadium	0.16 J	0.16 J	Nonparametric	<5.0	5.00
WQSP-3 Major Cations, Dissolved					
Calcium	1,440	1,380	Normal	1,680	N/A
Magnesium	2,300	2,190	Lognormal	2,625	N/A
Potassium	1,510	1,410	Lognormal	3,438	N/A
WQSP-3 Major Anions					
Chloride	127,000	129,000	Lognormal	149,100	N/A

[a,b]Refer to footnotes at end of table.

Table 3 - Round 35 Analytical Data Summary *(Continued)*

WQSP-4 Culebra					
Chemical	**Concentration (mg/L)**		**Distribution Type[a]**	**95th UTLV Or 95th Percentile**	**Permit Table 5.6**
	Primary Sample	**Duplicate**			
WQSP-4 General Chemistry					
Specific Gravity[b]	1.062	1.059	Lognormal	1.09	N/A
pH (SU)	7.20	7.21	Lognormal	6.8 – 7.6	N/A
Specific Conductance (μmhos/cm)	193,000	182,000	Lognormal	319,800	N/A
Total Dissolved Solids	108,000	101,000	Normal	123,500	N/A
Total Organic Carbon	0.37 J	ND (0.23)	Nonparametric	<5.0	N/A
Total Suspended Solids	51	**64**	Nonparametric	**57.0**	N/A
WQSP-4 Total Trace Metals					
Antimony	ND (0.020)	ND (0.020)	Nonparametric	<10.0	0.80
Arsenic	ND (0.020)	ND (0.020)	Nonparametric	<0.5	0.50
Barium	0.033 J	0.037 J	Nonparametric	1.00	1.00
Beryllium	0.0053 J	0.0046 J	Nonparametric	0.25	0.25
Cadmium	ND (0.0040)	ND (0.0040)	Nonparametric	<0.5	0.50
Chromium	ND (0.0075)	ND (0.0075)	Nonparametric	<2.0	2.00
Lead	ND (0.017)	ND (0.017)	Nonparametric	0.525	0.53
Mercury	ND (0.00035)	ND (0.00035)	Nonparametric	<0.002	0.002
Nickel	ND (0.0070)	ND (0.0070)	Nonparametric	<5.0	5.00
Selenium	ND (0.020)	ND (0.020)	Nonparametric	2.009	2.00
Silver	ND (0.0055)	ND (0.0055)	Nonparametric	0.519	0.52
Thallium	ND (0.020)	ND (0.020)	Nonparametric	1.00	1.00
Vanadium	0.043 J	0.038 J	Nonparametric	<5.0	5.00
WQSP-4 Major Cations, Dissolved					
Calcium	1,630	1,630	Lognormal	1,834	N/A
Magnesium	1,150	1,180	Lognormal	1,472	N/A
Potassium	701	717	Lognormal	1,648	N/A
WQSP-4 Major Anions					
Chloride	62,900	56,100	Normal	63,960	N/A

[a,b]Refer to footnotes at end of table.

Table 3 - **Round 35 Analytical Data Summary** *(Continued)*

WQSP-5 Culebra					
Chemical	**Concentration (mg/L)**		**Distribution Type[a]**	**95th UTLV Or 95th Percentile**	**Permit Table 5.6**
	Primary Sample	**Duplicate**			
WQSP-5 General Chemistry					
Specific Gravity[b]	1.020	1.019	Normal	1.04	N/A
pH (SU)	7.32	7.43	Normal	7.4 – 7.9	N/A
Specific Conductance (μmhos/cm)	62,000	61,300	Lognormal	67,700	N/A
Total Dissolved Solids	31,600	31,800	Nonparametric	43,950	N/A
Total Organic Carbon	0.38 J	0.38 J	Nonparametric	<5.0	N/A
Total Suspended Solids	5.0	ND (1.5)	Nonparametric	<10	N/A
WQSP-5 Total Trace Metals					
Antimony	ND (0.010)	ND (0.010)	Nonparametric	0.073	0.07
Arsenic	ND (0.010)	ND (0.010)	Nonparametric	<0.5	0.50
Barium	0.018 J	0.017 J	Nonparametric	<1.0	1.00
Beryllium	0.0015 J	0.0017 J	Nonparametric	<0.02	0.02
Cadmium	ND (0.00080)	ND (0.00080)	Nonparametric	<0.05	0.05
Chromium	ND (0.0015)	ND (0.0015)	Nonparametric	<0.5	0.50
Lead	ND(0.0034)	ND (0.0034)	Nonparametric	<0.05	0.05
Mercury	ND (0.00044)	ND (0.00044)	Nonparametric	<0.002	0.002
Nickel	ND (0.0014)	ND (0.0014)	Nonparametric	<0.1	0.10
Selenium	ND (0.010)	ND (0.010)	Nonparametric	<0.1	0.10
Silver	ND (0.0011)	ND (0.0011)	Nonparametric	<0.5	0.50
Thallium	ND (0.010)	ND (0.010)	Nonparametric	0.209	0.21
Vanadium	0.011 J	0.012 J	Nonparametric	2.70	2.70
WQSP-5 Major Cations, Dissolved					
Calcium	1,010	1,040	Lognormal	1,303	N/A
Magnesium	424	427	Nonparametric	547	N/A
Potassium	313	337	Lognormal	622	N/A
WQSP-5 Major Anions					
Chloride	14,300	14,700	Lognormal	18,100	N/A

[a,b]Refer to footnotes at end of table.

Table 3 - Round 35 Analytical Data Summary *(Continued)*

WQSP-6 Culebra					
Chemical	**Concentration (mg/L)**		**Distribution Type[a]**	**95th UTLV Or 95th Percentile**	**Permit Table 5.6**
	Primary Sample	**Duplicate**			
WQSP-6 General Chemistry					
Specific Gravity[b]	1.007	1.007	Normal	1.02	N/A
pH (SU)	7.66	7.71	Normal	7.5 – 7.9	N/A
Specific Conductance (μmhos/cm)	25,000	24,000	Lognormal	27,660	N/A
Total Dissolved Solids	15,000	14,600	Lognormal	22,500	N/A
Total Organic Carbon	0.61 J	0.60 J	Nonparametric	10.14	N/A
Total Suspended Solids	9.0	10	Nonparametric	14.8	N/A
WQSP-6 Total Trace Metals					
Antimony	ND (0.020)	ND (0.020)	Nonparametric	0.140	0.14
Arsenic	ND (0.020)	ND (0.020)	Nonparametric	<0.5	0.50
Barium	0.011 J	0.010 J	Nonparametric	<1.0	1.00
Beryllium	0.00064 J	0.00053 J	Nonparametric	<0.02	0.02
Cadmium	ND (0.00080)	ND (0.00080)	Nonparametric	<0.05	0.05
Chromium	ND (0.0015)	ND (0.0015)	Nonparametric	<0.5	0.50
Lead	ND (0.0034)	ND (0.0034)	Nonparametric	0.150	0.15
Mercury	ND (0.00009)	ND (0.00009)	Nonparametric	<0.002	0.002
Nickel	ND (0.0014)	ND (0.0014)	Nonparametric	<0.5	0.50
Selenium	ND (0.020)	ND (0.020)	Nonparametric	0.10	0.10
Silver	ND (0.0011)	ND (0.0011)	Nonparametric	<0.5	0.50
Thallium	ND (0.020)	ND (0.020)	Nonparametric	0.560	0.56
Vanadium	0.0051 J	0.0040 J	Nonparametric	0.070	0.10
WQSP-6 Major Cations, Dissolved					
Calcium	675	671	Normal	796	N/A
Magnesium	199	201	Lognormal	255	N/A
Potassium	147	150	Lognormal	270	N/A
WQSP-6 Major Anions					
Chloride	5,010	4,720	Nonparametric	15,800	N/A

[a,b]Refer to footnotes at end of table.

Table 3 - Round 34 Analytical Data Summary *(Continued)*

Footnotes:
Note: Values (concentrations) in **bold** exceed, or are outside of the baseline range for the 95th UTLV, 95th percentile, or Permit background value. In these cases, the UTLVs are also shown in **bold** for ease of comparison.

[a]Baseline sample distribution type based upon Rounds 1 through 10. The 95th UTLV is used in cases where the sample distribution type is either normal or lognormal. The 95th percentile value is used in cases where the sample distribution type is nonparametric or had greater than 15 percent non-detects.

[b]Specific gravity is compared to density (g/mL) as presented in Addendum 1 (DOE, 2000).

J = Estimated concentration. The concentration is between the laboratory's MDL and the MRL/PQL for the particular sample.

N/A = Not applicable

ND = The analytical parameter was analyzed, but not detected in sample. The trace metals were analyzed by ICP. Antimony, As, Se, and Tl were analyzed by ICP/MS. The MDLs are shown in parentheses.

pH (SU) = Potential of hydrogen (measure of alkalinity or acidity) standard unit.

95th UTLV = Upper tolerance limit value in mg/L (coverage and tolerance coefficient value of 95 percent).

3.1 Volatile and Semivolatile Organic Compounds

The MRLs for VOCs and SVOCs (Table 2) are used as background values in Permit Table 5.6 and are used in this report to evaluate possible groundwater contamination. The Round 35 VOC concentrations reported for man-made organic compounds were less than the Permit background values and less than the MRL/PQLs in the groundwater samples except for the initial sampling of WQSP-5 which contained toluene due to use of electrical tape when installing a new pump. The well was subsequently purged and re-sampled twice. The first re-sampling resulted in the detection of toluene at concentrations of 7.6 ug/L in the primary sample and 8.1 ug/L in the duplicate sample. During the second re-sampling toluene was detected above the MRL at 2.9 ug/L in both the primary and duplicate sample.

As shown in the Groundwater Concentration and Precision Summary Sheets in the appendices for each DMW, there were no other detections of VOCs in any of the groundwater samples at concentrations above the MRL. The laboratory reported the detection of isobutyl alcohol in the duplicate sample from WQSP-3 at a concentration below the 5.0-ug/L MRL for the compound at 4.3 ug/L. The compound was not detected in the primary sample. The author reviewed the raw GC/MS data from the lab and concluded that the compound could not be firmly identified in the duplicate sample.

The groundwater samples were analyzed for SVOCs, but none were detected in any of the Round 35 groundwater samples. No target SVOCs have ever been detected in groundwater samples during any of the 35 Rounds.

The Verification and Validation narratives in the appendices discuss the VOC and SVOC analyses in more detail including the results of analysis of field blank and trip blank samples (VOCs) as well as the results of analysis of the quality assurance samples (method blanks, field blanks, trip blanks, laboratory control samples and duplicates, and matrix spikes and duplicates). The QC sample analyses demonstrated that the analyses were in control and that nearly all the quality assurance objectives for

blank cleanliness, spike recoveries, and precision of duplicate samples were met. The small number of QC samples in which the quality assurance objectives were not met is discussed in Section 4.0.

The VOC and SVOC data were also searched for the presence of non-target compounds that may have been present in the samples. In contrast to Round 34 where methyl bromide was detected in the samples from WQSP-6, no non-target compounds were detected in the samples. The detection of some VOC and SVOC artifact compounds is discussed in the Verification and Validation narratives in Section 3.5.

3.2 Trace Metals

Groundwater samples were analyzed for a suite of trace metals as required by the Permit. Historically, most of these metals have not been detected in the DMW samples although the detection limits have varied. The updated baseline analysis results (DOE, 2000) show nonparametric distributions for all trace metals, based upon the small number of samples analyzed and the high percentage of non-detects.

Analytical results for trace metals in the DMWs are shown in Table 3. The specific SOW-prescribed MRLs, the laboratory's MRL/PQLs, and the laboratory's MDLs for each metal parameter are listed on the Groundwater Concentration and Precision Summary spreadsheets in the appendices for each DMW. Note that acid preserved and non-acid preserved field blanks are analyzed with the first and last well of a round (i.e. WQSP-1 and 6).

The Round 35 trace metals were reported as not detected (ND) with the exception of barium, beryllium, and vanadium. In most cases the metals detected and their concentrations were very similar to previous rounds. In addition the concentrations of the recoverable cations (Ca, Mg, and K) as well as the dissolved cations (used for ion balance calculations) were very similar to the concentrations measured in previous rounds.

The Verification and Validation narratives in the appendices discuss the metals analyses in more detail including the results of analysis of the quality assurance samples (method blanks, field blanks, laboratory control samples and duplicates, and matrix spikes and matrix spike duplicates). The QC sample analyses demonstrated that the analyses were in control and that the quality assurance objectives for blank cleanliness, spike recoveries, and precision of duplicate samples were generally met. The small number of QC samples in which the metals quality assurance objectives were not met is discussed in Section 4.0.

3.3 General Chemistry Parameters Including Major Cations and Anions

In addition to the 52 analytical parameters listed in Table 1, the concentrations of the major cation, sodium, and the anions sulfate and nitrate were measured in the DMW groundwater samples for inclusion in the ion balance calculations. Sodium is the most abundant ion in the groundwater samples and sulfate is the second most abundant anion following chloride. Nitrate has not been detected in any of the DMW groundwater samples. The analytical parameter concentrations in Round 35, including those of the major cations, were all below the concentrations from the baseline studies with the following exceptions:

- WQSP-1: The concentrations of TSS in the primary and duplicate groundwater samples were 39 mg/L and 40 mg/L, respectively, which are higher than the 95th percentile concentration of 33.3 mg/L.

- WQSP-3: The TSS concentrations of 123 mg/L in the primary groundwater sample and 168 mg/L in the duplicate sample were higher than the 95th percentile concentration of 107 mg/L.

- WQSP-4: The TSS concentrations of 64 mg/L in the duplicate groundwater sample was higher than the 95th percentile concentration of 57.0 mg/L. The primary sample concentration was lower than the 95th percentile concentration at 51 mg/L but the average of 58 mg/L was just above the 95th percentile.

TSS is the only general chemistry parameter that yielded any concentrations higher than the baseline concentrations. Analyses for TSS are affected by the high salt content of the groundwater samples and the results can depend on how long the samples are allowed to stand following shaking and before filtering. The particle size of the TSS is likely very close to the pore size of the filters used to collect the suspended solids, making it challenging to achieve accurate and reproducible results for TSS measurements.

3.4 Cation-Anion Balance Analyses

Calcium, magnesium, potassium, sodium, chloride, sulfate, and bicarbonate ions generally comprise the majority of dissolved solids in groundwater. The sum of the cation equivalent weights (mass/ionic charge) should be close to or equal to the anion equivalent weights. The comparison of the two values (i.e. charge balance) indicates the general quality and reliability of the general chemistry indicator parameter analysis data. Standard Method 1030 E (SM, 2005) was used by HEAL to evaluate the charge balance for DMWs WQSP-1 through WQSP-6. The percent difference between the total cations and anions was calculated from the absolute value of the difference between the total cation milli-equivalents per liter (meq/L) and the total anion meq/L and dividing the absolute value of the difference by the sum of the two meq/L concentrations and multiplying by 100.

Table 4 presents the results of these evaluations for the primary samples of the current sampling round. Round 34 values are shown in parentheses for comparison. The cation-anion charge balances for the duplicate samples are provided on the individual cation-anion balance calculation sheets located in the summary data packets in the appendices to this report.

Table 4 - Summary of Analytical Cation-Anion Balances for Round 35 Samples[a]

Well	Total Cations meq/L[b,c]	Total Anions meq/L[b,c]	Percent Difference[c]
WQSP-1 Culebra	1055.39 (1159.08)	1123.76 (1150.93)	3.14 (0.353)
WQSP-2 Culebra	1033.87 (1140.04)	1133.79 (1047.60)	4.61 (4.23)
WQSP-3 Culebra	3575.11 (3758.16)	3751.60 (4258.74)	2.41 (6.24)
WQSP-4 Culebra	1703.27 (1763.83)	1920.01 (1896.41)	5.98 (3.62)
WQSP-5 Culebra	513.48 (577.58)	508.40 (590.83)	0.50 (1.13)
WQSP-6 Culebra	239.12 (261.92)	238.90 (271.22)	0.046 (1.74)

[a]HEAL, Albuquerque, NM data. Individual cation-anion balance calculation sheets are provided in the summary data packets for each DMW in the appendices to this report. The cation-anion data for the duplicate samples are also included on the sheets.

[b]meq/L = milliequivalents per liter in filtered samples analyzed for cations and anions.

[c]Round 34 cation-anion results are in parentheses for comparison.

The Round 35 percent differences for the cation-anion balance concentrations were quite precise considering the multiple chemical analyses used to generate the sample concentrations. The Round 35 total anion and cation concentrations agree quite well with the Round 34 concentrations although the Round 35 concentrations were all lower than Round 34 concentrations except for WQSP-2. With respect to the precision of the cation and anion concentrations three of the six percent differences were higher for Round 35 and three of the percent differences were lower for Round 35. The precision of the WQSP-5 and WQSP-6 cation-anion analysis results were particularly precise with RPDs less than one.

A 10-percent difference in cation-anion balance is generally acceptable for the analyses of potable water with low TDS. All the Round 35 cation-anion percent differences were well below 10 percent in the high-TDS groundwater samples suggesting that the analytical results used to calculate the cation-anion balances were accurate and reliable.

The cation-anion percent differences were also calculated for the duplicate samples. The good precision also applied to the duplicate samples with percent differences of 4.98 for WQSP-1; 1.60 for WQSP-2; 3.61 for WQSP-3; 0.54 for WQSP-4; 0.11 for WQSP-5; and 2.12 for WQSP-6.

Except for the TSS analyses discussed above all the QC analysis results for the general chemistry parameter samples that were analyzed met the quality assurance objectives. There were a few cases in which the lab used a sample from another client rather than a DMW sample as the QC sample matrix as discussed in QA Section 4.1.

3.5 Search for Tentatively Identified Compounds (TICs):

The VOC and SVOC gas chromatography/mass spectrometry (GC/MS) data was searched for the presence of any TICs that may be present in the groundwater samples. The mass spectra and mass spectral library search results for all peaks in the total ion chromatogram, including trace peaks greater than about one percent of the nearest internal standard, were printed and reviewed during data validation.

Some trace VOC and SVOC peaks were observed in the groundwater samples but they were also present in the method blank (MB) samples. Some of the peaks were attributed to column bleed from the gas chromatography columns used to separate the compounds. For example, two TIC VOC peaks appeared in most of the primary and duplicate groundwater samples. The peaks do not appear in the method blank samples but do sometimes appear in field blank and trip blank samples. During this round the lab's mass spectral library identified one of the compounds as trimethylsilylfluoride, a likely column bleed artifact. The other peak is also a likely artifact from the GC column that is released when analyzing the groundwater samples. It is tentatively identified as trimethylsilanol.

The compound methyl bromide (bromomethane) appeared in both the primary and duplicate samples from WQSP-6 during Round 34. However, the compound did not appear in the 2013 Round 35 groundwater samples from WQSP-6 or any of the other wells.

The only other VOC reported in the groundwater data was isobutyl alcohol in the duplicate sample from WQSP-3. However, during data verification and validation, it was determined that the compound was not present based on review of the mass spectral data.

The SVOC TIC data showed the detection of some readily identifiable compounds in the groundwater extract samples including toluene, xylenes, C3- and C4-alkyl benzenes, triethyl phosphate, and triphenylphosphine oxide. However, these same compounds generally appeared at similar concentrations in lab method blank samples and thus are known to not be components of the groundwater. One compound that appeared in some of the groundwater samples that did not appear in the method blank sample was bisphenol A (phenol, 4,4'-(1-methylethylidene) bis-). The compound is a common antioxidant and is often seen as an artifact in SVOC GC/MS data. The source of the compound is not known, but it is not likely to be an actual component of the groundwater.

4.0 Quality Assurance

Hall Environmental Analysis Laboratory (HEAL) was awarded the groundwater analysis contract in February 2008 and performed the chemical analyses for the sampling in 2013 (Round 35). HEAL followed Standard Operating Procedures (SOPs) based on standard analytical methods from EPA and from *Standard Methods for the Examination of Water and Wastewater.*

The remainder of this section provides a general discussion of the QA data requirements associated with each DMW sampled in Round 35. Quality control (QC) samples were prepared and analyzed with each analytical batch (termed Sample Delivery Group [SDG] by the analytical laboratory). The purpose of the QC samples was to measure the accuracy and precision of the analyses and thus their overall reliability.

4.1 Completeness

Six DMP monitoring wells were sampled during March through May 2013, to complete Round 35. The completeness objective was met as analytical results were received for all the samples submitted (100 percent completeness).

A few QC samples were not analyzed by the laboratory. The WQSP-3 sample set did not include a duplicate analysis of the primary groundwater sample for conductivity and for pH; the WQSP-4 sample set did not include MS/MSD samples for alkalinity, but did analyze 4 LCS samples; and the WQSP-6 sample set did not include MS/MSD for alkalinity, a duplicate for conductivity, and a duplicate for pH. In all these cases the lab did analyze the missing QC samples but used a sample from a different client rather than a WQSP groundwater sample. Since a large body of QC data was generated that met the quality assurance objectives, this small amount of missing QC data does not adversely affect the overall quality or usability of the Round 35 analytical data.

4.2 Precision

The term precision is a measure of the agreement between a set of analysis measurements and is expressed as the relative percent difference (RPD) for a set of duplicate measurements. RPDs were calculated taking the difference between the two sample concentrations and dividing by the average of the two concentrations times and multiplying by 100. The laboratories provided precision data for the analyses of LCS/LCSD pairs, MS/MSD pairs, and analysis of single primary groundwater samples in duplicate. The quality assurance objective for the precision of the LCS/LCSD, MS/MSD, and duplicate sample concentrations is ≤20 RPD for all constituents and general chemistry parameters.

In addition the data validator calculated the precision of the analysis results for each detected analyte in the primary and duplicate groundwater samples. Since the primary and duplicate groundwater samples are separate samples, there are no particular precision requirements for the analysis results. However, the duplicate samples are taken consecutively from continuously flowing water, and the composition of the samples is expected to be consistent.

The LCS/LCSD and MS/MSD samples generally contained all the target constituents and general chemistry parameters for precision measurement. Duplicate samples were analyzed for general chemistry parameters in cases where LCS/LCSD and MS/MSD samples are not applicable such as pH, specific gravity, TSS, and specific conductance.

The duplicate groundwater precision measurements were calculated for the detectable concentrations of the major cations including calcium, magnesium, potassium, and sodium; some detected trace metals including Ba, Be, and V; and general chemistry parameters detected in all the groundwater samples including chloride, total organic carbon (TOC), specific gravity, TDS, total suspended solids (TSS), pH, specific conductance, TOC, and alkalinity. The precision would not be expected to be as good for constituents and general chemistry parameters with concentrations between the method detection limit (MDL) and MRL.

The RPDs for the primary and duplicate sample analysis results for all the samples are shown on the Groundwater Concentration and Precision Summary sheets in the appendices of this report for each DMW. Table 5 shows the groundwater samples for which the analysis of the primary and duplicate groundwater sample yielded RPDs >20. The precision objective was sometimes not met during the analyses for analytes for which the analytical methods are challenged by the high-brine groundwater samples such as TSS. Other cases where the duplicate groundwater sample RPD was >20 was for analytes, especially the trace metals, that were detected at low concentrations between the MDL and the MRL where the concentrations were J-flagged as estimated.

LCS samples were prepared by spiking the target constituent (VOCs, SVOCs, and trace metals) and general chemistry parameter target analytes into clean water and preparing and analyzing the samples. LCSD samples were only analyzed for analytical methods involving an instrumental analysis step and

simply involved the reanalysis of the LCS sample so that only the variability in the instrumental analysis step is measured. MS and MSD samples were generated by spiking the target constituents and general chemistry indicator parameter analytes into separate portions of the primary groundwater samples. The samples were analyzed, and the recoveries of the VOCs, SVOCs, and metals and general chemistry indicator parameters were measured and reported.

Table 5 shows those cases where the precision objective was not met for the duplicate groundwater samples, MS/MSD samples, and duplicate samples when applicable. Note that all LCS/LCSD measurements met the precision objective.

Table 5 - Individual Cases Where the Round 35 Groundwater RPDs were >20 for the Primary and Duplicate Groundwater Samples, MS/MSD Pairs, and Laboratory Duplicate QA/QC Samples

DMW	Parameter or Constituent	Primary Sample, Conc. (or as noted)	Duplicate Sample, Conc. (or as noted)	RPD
WQSP-1	Be	0.0047 ug/L J	0.0028 ug/L J	51
WQSP-1	V	0.034 ug/L J	0.026 ug/L J	27
WQSP-1	2,4-dinitrophenol	23.7 ug/L (MS)	49.1 ug/L (MSD)	70
WQSP-1	2-methylphenol	55.0 ug/L (MS)	68.7 ug/L (MSD)	22
WQSP-1	3- + 4-methylphenol	55.1 ug/L (MS)	67.9 ug/L (MSD)	21
WQSP-1	Nitrobenzene	54.2 ug/L (MS)	67.7 ug/L (MSD)	22
WQSP-1	Pentachlorophenol	37.9 ug/L (MS)	59.9 ug/L (MSD)	45
WQSP-1	Pyridine	32.2 ug/L (MS)	17.1 ug/L (MSD)	61
WQSP-2	Ba	0.021 ug/L J	0.027 ug/L J	25
WQSP-2	V	0.020 ug/L J	0.031 ug/L J	43
WQSP-2	2,4-dinitrophenol	16.5 ug/L (MS)	20.4 ug/L (MSD)	21
WQSP-2	Pentachlorophenol	12.7 ug/L (MS)	16.9 ug/L (MSD)	28
WQSP-2	TSS	35 mg/L	24 mg/L (dup)	37
WQSP-3	TSS	123 mg/L	168 mg/L	31
WQSP-4	TSS	51 mg/L	64 mg/L	23
WQSP-5	Toluene (initial sampling)	141 ug/L	82.1 ug/L	53
WQSP-5	Pyridine	50.9 ug/L (MS)	40.9 ug/L (MSD)	22
WQSP-6	V	0.0051 mg/L	0.0040 mg/L	24

Table 5 contains five entries for trace metals at concentrations between the MDL and MRL; three sample sets where the recoveries of some of the SVOCs were higher in one of the matrix spike samples compared to the other; and three cases where TSS was higher in one of the groundwater samples compared to the other or in one of the duplicates compared to the other.

Considering the hundreds of groundwater sample data points and QA/QC sample data points that were generated during Round 35, the number of duplicate groundwater samples and QA samples that did not meet the precision quality assurance objective was very low, at less than three percent.

4.3 Accuracy

The accuracy of the analyses was checked by analyzing initial calibration verification (ICV) and CCV standards, MB, LCS/LCSD, MS/MSD as specified in the standard methods and in the corresponding lab SOPs. The daily calibration standards were used to confirm that the instrument or analytical response measured during analysis of the daily standard closely matched the corresponding analytical response measured during the initial calibration. Method blanks were used to confirm that the accuracy of the sample analyses was not adversely affected by the presence of any of the analytical parameters as background contaminants that may have been introduced during sample preparation and analysis. The LCS was analyzed to check that the analytical method was in control by measuring the percent recoveries of the analytical parameters spiked into clean water. The LCS samples from applicable

instrumental measurement methods were analyzed in duplicate to check the precision of the instrument measurement portion of the analytical method without the sample preparation steps taken into account.

The MS and MSD samples were prepared and analyzed to check the effect of the groundwater sample matrix on the accuracy of the analytical measurements as percent recovery. The MS and MSD samples were generated by spiking portions of the primary groundwater samples with the target analytical parameters. The samples were analyzed, and the recoveries of the analytes measured and reported. Every groundwater sample and associated QC sample analyzed by GC/MS also served as a surrogate spike sample in that the surrogate recovery compounds were spiked into the samples prior to analysis and their recoveries were reported as a measure of the accuracy of the analyses.

Table 6 summarizes the QA/QC samples for which the accuracy objective, as measured by percent recovery, was not met during Round 35. None of the target analytes were detected at any significant concentrations in the method blank samples as contaminants, and thus accuracy was not adversely affected by contamination. The recoveries of analytes from samples that contained native concentrations greater than about four times the matrix spike concentration, such as the major cations and chloride are not generally included in Table 6 since MS/MSD recovery data are not applicable per EPA guidance for samples with high native concentrations of a given analyte. However, in most cases, even when the spike concentration was relatively small compared to the native concentration, the matrix spike recoveries met the recovery objective.

The objective for recovery varies from 70 – 130 percent for VOCs in LCS samples and MS samples; 90 – 110 percent for chloride and sulfate in LCS samples, 80 – 120 percent for mercury and recoverable metals in LCS samples and 75 – 125 percent for mercury and recoverable metals in MS samples; 90 – 110 or 80 – 120 percent for general chemistry parameters in LCS samples and 80 – 120 percent or 75 – 125 percent for general chemistry parameters in MS samples; and varies widely according to the lab's historical control chart range for SVOCs. The EPA guidance for SVOC recovery was 40-140 percent for base/neutral SVOCs and 30-130 percent for acidic SVOCs. However, the lab's historical control chart recovery range was generally wider than the EPA guidance.

Table 6 - Individual Cases Where the Round 35 Accuracy Objectives Were Not Met

DMW	Constituent or Parameter	Sample	% Rec.	Sample	% Rec.
WQSP-1	Isobutyl alcohol	MS	146	MSD	156
WQSP-1	Pyridine	MS	32.2 (a)	MSD	17.1
WQSP-2	Isobutyl alcohol	MS	138	MSD	147
WQSP-2	Pentachlorophenol	MS	12.7	MSD	16.9
WQSP-2	Nickel	MS	77.0 (a)	MSD	74.6
WQSP-3	Isobutyl alcohol	MS	377	MSD	411
WQSP-3	2-butanone	MS	292	MSD	299
WQSP-3	1,1,2,2-tetrachloroethane	MS	199	MSD	183
WQSP-4	Isobutyl alcohol	MS	202	MSD	213
WQSP-4	2-butanone	MS	152	MSD	163
WQSP-5	Isobutyl alcohol	MS	152	MSD	145

(a) Accuracy recovery objective was met.

Table 6 primarily contains entries for high matrix spike recoveries of VOCs from groundwater samples with high TDS. The VOC compounds 2-butanone and isobutyl alcohol generally yielded high recoveries due to higher purging efficiencies from the high-TDS groundwater than from the clean calibration standards or LCS/LCSD samples. The only other entries were for a low pentachlorophenol recovery and a nickel recovery just below the low objective of 75 percent recovery. The recoveries of the SVOCs pentachlorophenol and 2,4-dinitrophenol are adversely affected by the high-TDS groundwater, and the two compounds generally show lower recoveries than the other SVOCs.

Not shown in Table 6 are negative recoveries for toluene from WQSP-5 MS/MSD samples due to the high native concentrations of toluene in the samples.

Overall, the quality of the accuracy QA/QC data was excellent, with nearly all the spiked LCS/LCSD and MS/MSD data meeting the quality assurance objectives.

4.4 Comparability

The Permit requires that groundwater analytical results be comparable by reporting data in consistent units and collecting and analyzing samples using consistent methodology. These comparability requirements were met through the use of consistent, approved SOPs for sample collection and analyses. The normal reporting units for metals and general chemistry parameters were mg/L, and the normal reporting limits for organics were micrograms per liter (µg/L).

HEAL and its subcontract laboratory are certified by several states and by the National Environmental Laboratory Accreditation Conference (NELAC) through Oregon for HEAL and Anatek. HEAL's state certifications include Oregon, Utah, Texas, New Mexico, and Arizona. As such, the labs participate in inter-laboratory evaluation programs, including on-site NELAC QA audits. The labs also regularly analyze performance evaluation samples provided by a NELAC accredited Proficiency Standard Vendor such as Wibby Environmental. HEAL also analyzed Mixed Analyte Performance Evaluation Program (MAPEP) performance evaluation samples as part of the Department of Energy (DOE) performance evaluation program. The Wibby Water Supply performance evaluation samples included chloride, nitrate, sulfate, trace metals, mercury, pH, TOC, regulated VOCs, unregulated VOCs, and the Wibby Water Pollution performance evaluation samples included chloride, sulfate, TDS, TSS, nitrate, TKN, alkalinity, trace metals, mercury, specific conductance, pH, VOCs, SVOCs (acids and base-neutrals), and the MAPEP performance evaluation samples included SVOCs.

The most recent performance evaluation (PE) sample results are for 2012. HEAL analyzed four sets of PE samples, including the Wibby Water Pollution Proficiency Testing, the Wibby Water Supply Proficiency Testing, the Phenova Water Pollution Proficiency Testing, and the Phenova Water Supply Proficiency Testing. The Wibby Water Supply performance evaluation samples included chloride, nitrate, sulfate, trace metals, mercury, pH, TOC, regulated VOCs, and unregulated VOCs. The Wibby Water Pollution performance evaluation samples included chloride, TDS, TSS, nitrate, TKN, alkalinity, trace metals, mercury, specific conductance, pH, VOCs, and SVOCs (acids and base-neutrals). The Phenova PE samples basically included the same list of analytes as the Wibby PE samples. The PE samples covered all of the WIPP target analytes except for isobutyl alcohol. Most of the WIPP target analytes were included in all four sample sets. The sample sets also included a large number of analytes that are not WIPP analytes.

HEAL scored a very high percentage of acceptable results analyzing the PE samples. The percentage of acceptable results and description of results that were not acceptable are summarized in Table 7.

Table 7 – Performance Evaluation Sample Analysis Results for HEAL, 2012

PE Source	No. Results	No. Passing	Percent	Missed[a]	Assigned	Reported
Wibby WPPT[b]	240	238	99.2	Alkalinity TSS	51.6 mg/L 40.7 mg/L	62.2 mg/L 29.0 mg/L
Wibby WSPT[c]	100	96	96.0	Ba Cr V	20.0 mg/L 46.7 mg/L 417 mg/L	23.3 mg/L 54.5 mg/L 481 mg/L
Wibby RRPT[d]	2 Alkalinity TSS	2	100	None	— 64.1 mg/L 25.0 mg/L	— 64.4 mg/L 21.0 mg/L
Phenova WPPT[c]	275	275	100	None	—	—
Phenova WSPT[c]	101	98	97.0	1,2-dichloroethane 1,1-dichloroethylene	17.9 µg/L 11.6 µg/L	21.9 µg/L 15.3 µg/L

(a) WIPP analytes

(b) WPPT = Water Pollution Proficiency Testing

(c) WSPT = Water Supply Proficiency Testing

(d) RRPT = Rapid Return Proficiency Testing (retest of missed results)

Table 7 shows that HEAL had passing results for 238 out of 240 Wibby Water Pollution Proficiency Testing samples. The two misses were for WIPP analytes alkalinity and TSS. HEAL requested another PE sample (Wibby Rapid Return Proficiency Testing) with those analytes, and both results were acceptable. HEAL provided somewhat high results for the three WIPP metals Ba, Cr, and V in the Wibby Water Supply Proficiency Testing PE sample. None of these metals were detected at concentrations above the MRL in the WIPP groundwater samples. The other missed metal analyte was Mn, which is not a WIPP analyte.

HEAL had passing results for 275 out of 275 Phenova Water Pollution Proficiency Testing PE samples, which included all the WIPP analytes except isobutyl alcohol. HEAL reported slightly high results for the compounds 1,2-dichloroethane and 1,1-dichloroethylene in the Phenova Water Supply Proficiency Testing PE samples.

Overall, HEAL PE sample analysis results were accurate, confirming their ability to provide accurate and reliable environmental analysis results for the WIPP samples.

4.5 Representativeness

The groundwater DMP is designed so that representative groundwater samples are collected from specific monitoring well locations. Prior to collecting the final samples from each well, field parameters were analyzed using an in-line flow-through cell within an on-site mobile laboratory to help determine whether the water being pumped from the monitoring wells was stable and representative of the natural groundwater at each well. The parameters analyzed in the mobile laboratory included temperature, pH, specific gravity, and specific conductance. The final samples for analysis of VOCs, SVOCs, metals and general chemistry parameters were collected only when it had been determined from serial sampling and analysis that the water being pumped was representative of the natural groundwater at each location. The entire set of mobile laboratory data generated for each well is presented in the appendices of this report.

4.6 Data Verification and Validation

The quality and usability of the groundwater data were rigorously evaluated against a checklist contained in WP 02-EM3003, Revision 10, "Data Validation and Verification of RCRA Constituents" (WIPP, 2013). The information and data that were reviewed included sample preservation, preparation and analysis procedures; the associated calibration standards; laboratory documentation; chain of custody procedures; and the QC data generated during analysis of the samples.

The checklist items were taken from various standard analytical methods as well as from guidance provided in USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (1991) and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (1988). Later versions of both of these documents have since been published and incorporated into procedure, WP 02-EM3003, Revision 10, "Data Validation and Verification of RCRA Constituents". The data review process provides information on analytical limitations of the data based on specific QC criteria specified in the laboratory methods used to analyze the samples. In cases where a QA objective may not have been met, the guidelines prescribe that the reviewer should use professional judgment to determine if data are acceptable or need to be qualified or rejected. Data validation was performed by the Permittees staff. The data were evaluated against the QA objectives established in the standard methods used to analyze the samples as well as HEAL's Standard Operating Procedures (SOPs).

Table 8 shows the standard analytical methods that were used for each of the analytical parameters in Round 35. The general chemistry parameters were analyzed using standard methods from a variety of sources including those published by the EPA, ASTM International (ASTM) and methods published in *Standard Methods for the Examination of Water and Wastewater* (Standard Methods or SM). The EPA methods were from Methods for Chemical Analysis of Water and Wastes (EPA, 1986) and from SW-846, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* HEAL contracted the analysis of some trace metals (Tl, As, Se, and Sb) to another laboratory, Anatek Labs Inc., where the samples were analyzed by ICP-MS according to EPA SW-846 Method 6020-A in order to achieve the required SOW-prescribed MRLs.

Table 8 - Summary of Analytical Methods Used for the DMP Samples

Analytical Parameter(s)	Standard Analytical Method
Volatile Organic Compounds	EPA SW-846 Method 8260B
Semivolatile Organic Compounds	EPA SW-846 Method 8270C
Trace Metals and Cation Metals	EPA SW-846 Method 6010B
Mercury	EPA SW-846 Method 7470A
ICP/MS Metals (Sb, As, Se, and Tl)	EPA SW-846 Method 6020A
pH	SM 4500-H^+ B
Total Organic Carbon	SM 5310B
Total Dissolved Solids	SM 2540C
Total Suspended Solids	SM 2540D
Alkalinity	SM 2320B
Anions	EPA Method 300.0
Specific Conductance (Conductivity)	EPA Method 120.1
Specific Gravity	SM 2710F
Cation-Anion Charge Balance	SM 1030E

4.7 Additional QA/QC Information

The sampling and analysis of the six Culebra DMWs was successful for Round 35 with the generation of high quality accurate and precise data with only a few minor issues. All samples were received at 4 $\pm$2

degrees C during Round 35; and no samples were lost during Round 35. There were no other issues with the data other than a few missed QA objectives as discussed in this section of the report.

Although not a QC issue, toluene was detected in WQSP-5 due to the use of electrical tape to attach electrical cables to the well pipe following pump replacement. The well was subsequently purged and re-sampled two different times with concentrations of toluene detected at less than 10 ug/L during the first re-sampling and at less than 3.0 ug/L during the second re-sampling.

5.0 Groundwater Chemistry Analytical Results and Concentration Plots in the Appendices

The WIPP DMP requires that a primary and duplicate sample be collected from each DMW and analyzed for each analytical parameter. All the analytical results received from HEAL for each of the samples from WQSP-1 through WQSP-6 are presented as individual appendices (Appendices 3 through 8) at the end of this report. The appendices are divided into sections which include the following information:

- Analytical Results, consisting of the groundwater sample analysis data summarized in this report as well as the field parameter measurements generated in the mobile laboratory.

- Selected sections of the HEAL and Anatek laboratory submittals containing the cover sheet as well as sample concentrations and associated QA/QC data for each parameter in each DMW including:

    - Sample collection and analysis dates
    - WIPP and laboratory sample numbers
    - Reporting Limits
    - Analyst's initials
    - A list of any data qualifiers

- The Chain of Custody Forms for each sample

- The Data Verification and Validation Report consisting of:

    - Data Verification and Validation Narrative
    - Verification and Validation Checklists
    - Groundwater concentration data including duplicate groundwater analysis results and associated precision as RPD for trace metals, dissolved cations, and general chemistry indicator parameters along with MRL/PQLs, MDLs, and any data flags

- The plots of the concentrations of the metals and the general chemistry parameters for each sampling round.

- A data validation narrative was prepared for each DMW, which in part described any situations where a QC objective was not met, situations when a metal(s) MRL/PQL or MDL could not be met; and discussions of whether there may have been an associated impact on the overall quality and usability of the DMP data. The data validation narratives are included in the appendices and are not repeated in this Annual Culebra Groundwater Report.

6.0 Test for Outliers

An external outlier test was performed on the groundwater monitoring data from the WIPP DMWs. In this external test, a newly obtained sample result for a selected groundwater analytical constituent is simply compared with the established 10 rounds of baseline (background) data to determine whether the suspected outlier is greater than, less than, or equal to the 95th UTLV or 95th percentile. The 95th UTLV is used for parameters with normal or lognormal distributions, while the 95th percentile is used for nonparametric distributions. This external test also compared results with the Permit background values, as applicable. The chemical analysis data from Round 35 showed that the constituent, toluene, initially

yielded concentrations higher than the 95th percentile concentration of 1.0 ug/L as shown in Table 8. The general chemistry parameters, TSS and chloride, also exceeded the 95th UTLV or 95th percentile in a limited number of cases as shown in Table 9.

Table 9 - Summary of Round 35 General Chemistry Parameters Exceeding the 95th UTLV or 95th Percentile

DMW	Analytical Parameter(s)	Primary Sample, Conc.	Duplicate Sample, Conc.	Avg., Conc.	Applicable 95th UTLV or 95th Percentile, Conc.
WQSP-1	TSS	39 mg/L	40 mg/L	40 mg/L	33.3 mg/L (percentile)
WQSP-3	TSS	123 mg/L	168 mg/L	146 mg/L	107 mg/L (percentile)
WQSP-4	TSS	51 mg/L	64 mg/L	58 mg/L	57.0 mg/L (percentile)
WQSP-5	Toluene	141 ug/L	82.1 ug/L	112 ug/L	1.0 ug/L (percentile)
WQSP-5 (1st re-sample)	Toluene	7.6	8.1	7.8	1.0 ug/L (percentile)
WQSP-5 (2nd re-sample)	Toluene	2.9	2.9	2.9	1.0 ug/L (percentile)

7.0 Summary

The WIPP DMP annual groundwater sampling of six DMWs of the Culebra was performed from March - May 2013 (Sampling Round 35). Groundwater samples were submitted to HEAL in Albuquerque, New Mexico, for the chemical analyses. HEAL subcontracted the analyses of four metals, Sb, As, Se, and Tl to Anatek Labs Inc. in order to achieve the requisite SOW prescribed MRL/PQLs for four trace metals. Sampling and analysis were performed in accordance with requirements specified in the modified Permit issued by the NMED effective March 1, 2012.

The groundwater analysis results from Round 35 were compared with the baseline water quality statistics to determine whether any measurable or statistically significant changes indicating a release of a constituent from the WIPP repository. The Permit requires analytical constituents in Round 35, including VOCs, SVOCs, and metals to be evaluated against the established baseline statistics for each DMW.

Toluene was detected in the WQSP-5 groundwater samples during Round 35 without a corresponding detection in the field blank or trip blank associated with the samples. Laboratory experiments demonstrated that the source of the toluene was the electrical tape used in the well during replacement of the pump. The well was purged and re-sampled two times to confirm that the residual concentration in the well was significantly reduced (DOE, 2013).

Evaluation of the resulting water quality data indicates no evidence of groundwater contamination associated with the disposal and management of radioactive mixed waste at the WIPP facility. However, toluene was introduced directly into WQSP-5 during pump replacement activities. The GC/MS data was also searched for non-target VOCs and SVOCs that may be present in the groundwater and none were present.

8.0 References for Part 2

Crawley, M.E., and M. Nagy, April 1998, “Waste Isolation Pilot Plant RCRA Background Groundwater Quality Baseline Report,” DOE/WIPP 98-2285, prepared by IT Corporation for Westinghouse Electric Corporation, Waste Isolation Pilot Plant, Carlsbad, New Mexico.

DOE, see U.S. Department of Energy.

EPA, see U.S. Environmental Protection Agency.

New Mexico Environment Department, 2010. *Waste Isolation Pilot Plant Hazardous Waste Facility Permit*, NM4890139088-TSDF, Santa Fe, New Mexico.

U.S. Department of Energy (DOE), November 2000, "Waste Isolation Pilot Plant RCRA Background Groundwater Quality Baseline Report, Addendum 1" DOE/WIPP 98-2285, prepared by IT Corporation for Westinghouse Electric Corporation, WIPP, Carlsbad, NM.

U.S. Department of Energy (DOE), September 2013, "Detection Monitoring Well WQSP-5 Demonstration of Outside Contamination Report, Carlsbad, NM.

U.S. Environmental Protection Agency (EPA), 2004, "EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," OSWER 9240.1-45, EPA 540-R-04-004, Office of Superfund Remediation and Technology Innovation, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), 1999, "EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," OSWER 9240.1-05A-P, PB99-963506, EPA 540/R-99/008, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), March 2009, "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities Unified Guidance," EPA/530-R- 09-007 , Waste Management Division, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), November 1986, "Test Methods for Evaluating Solid Waste," 3rd ed., Update 3, SW-846, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

Waste Isolation Pilot Plant (WIPP), 2013, "Data Validation and Verification of RCRA Constituents," WP 02-EM3003, Revision 10, Waste Isolation Pilot Plant, Carlsbad, NM.

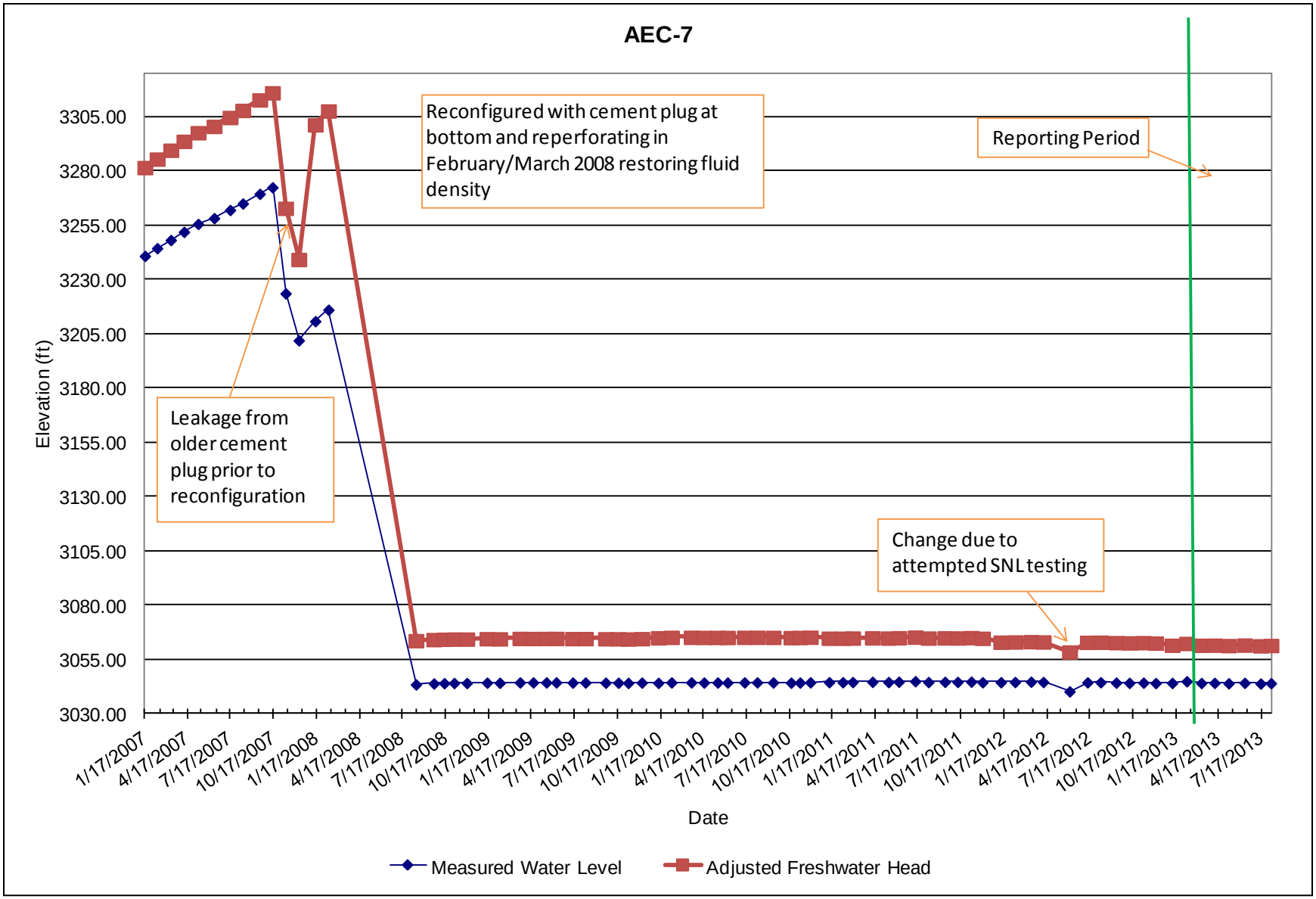
Standard Methods (SM) for the Examination of Water and Wastewater; 21st Edition; American Water Works Association, 2005, ISBN: 0875530478

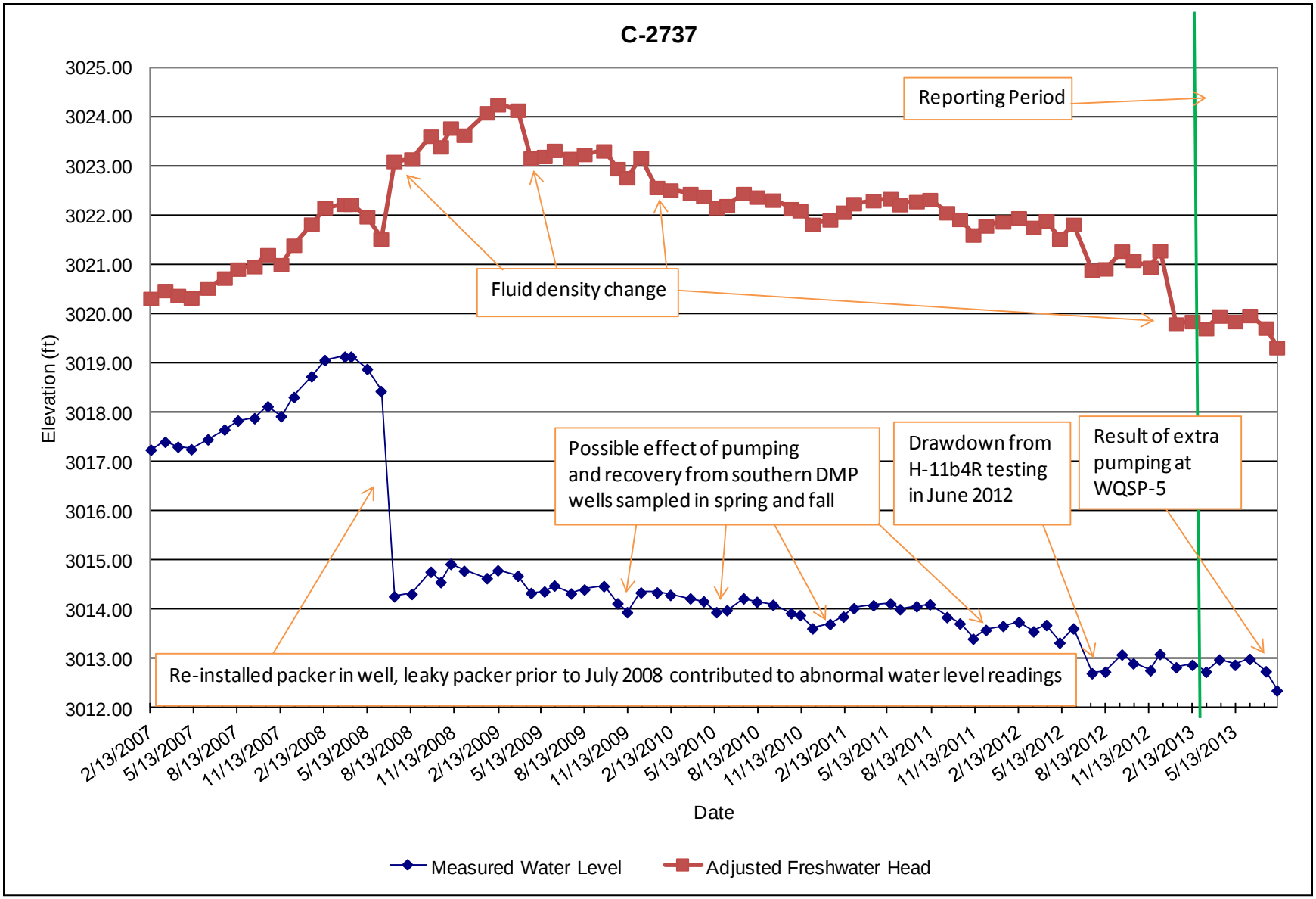
Methods for Chemical Analysis of Water and Wastes; U.S. Environmental Protection Agency. Office of Research and Development, Environmental and Support Laboratory. ORD Publication Offices of Center for Environmental Research Information; Cincinnati, OH, 1983; EPA-600/4-79-020

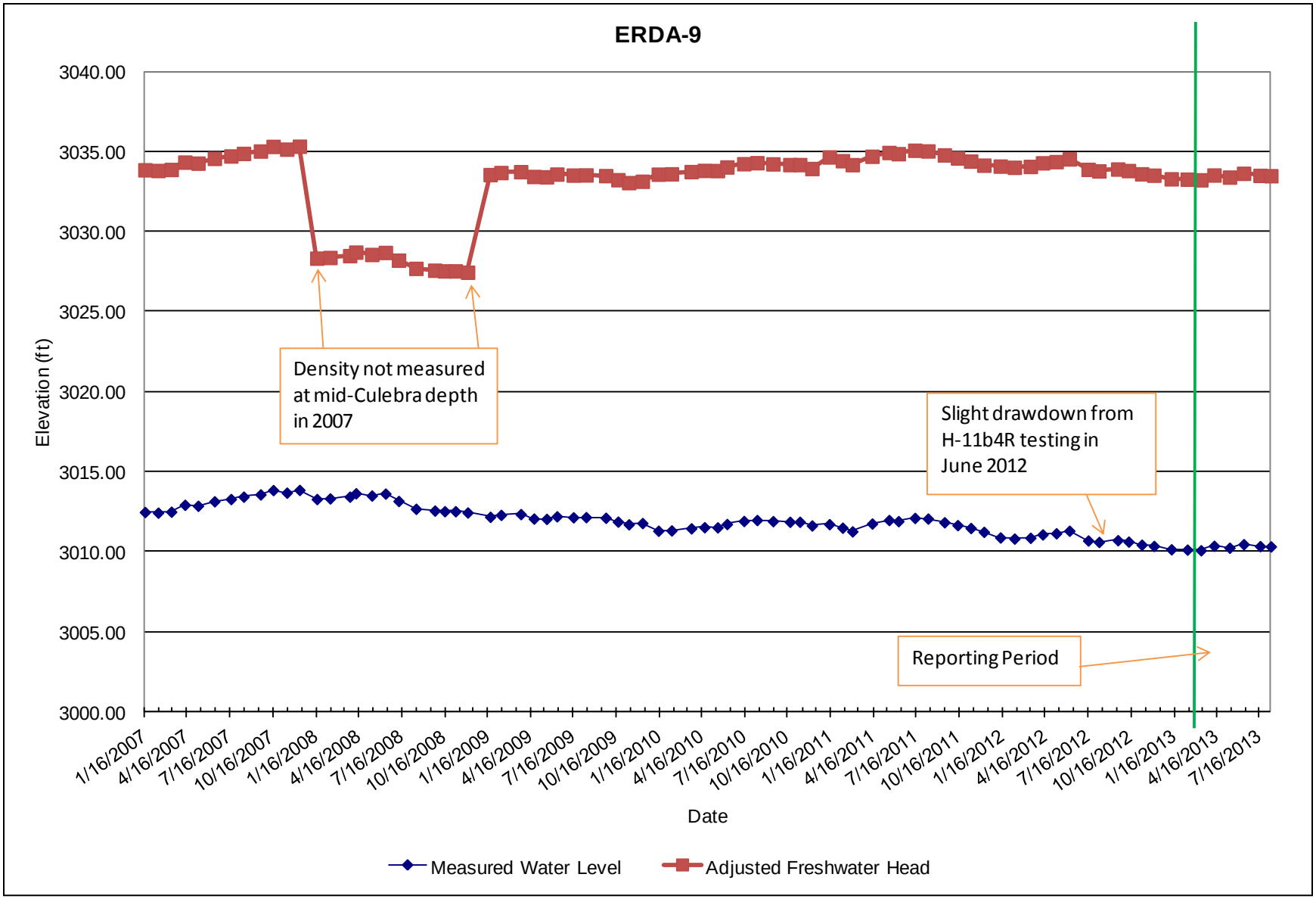
WIPP, see Waste Isolation Pilot Plant.

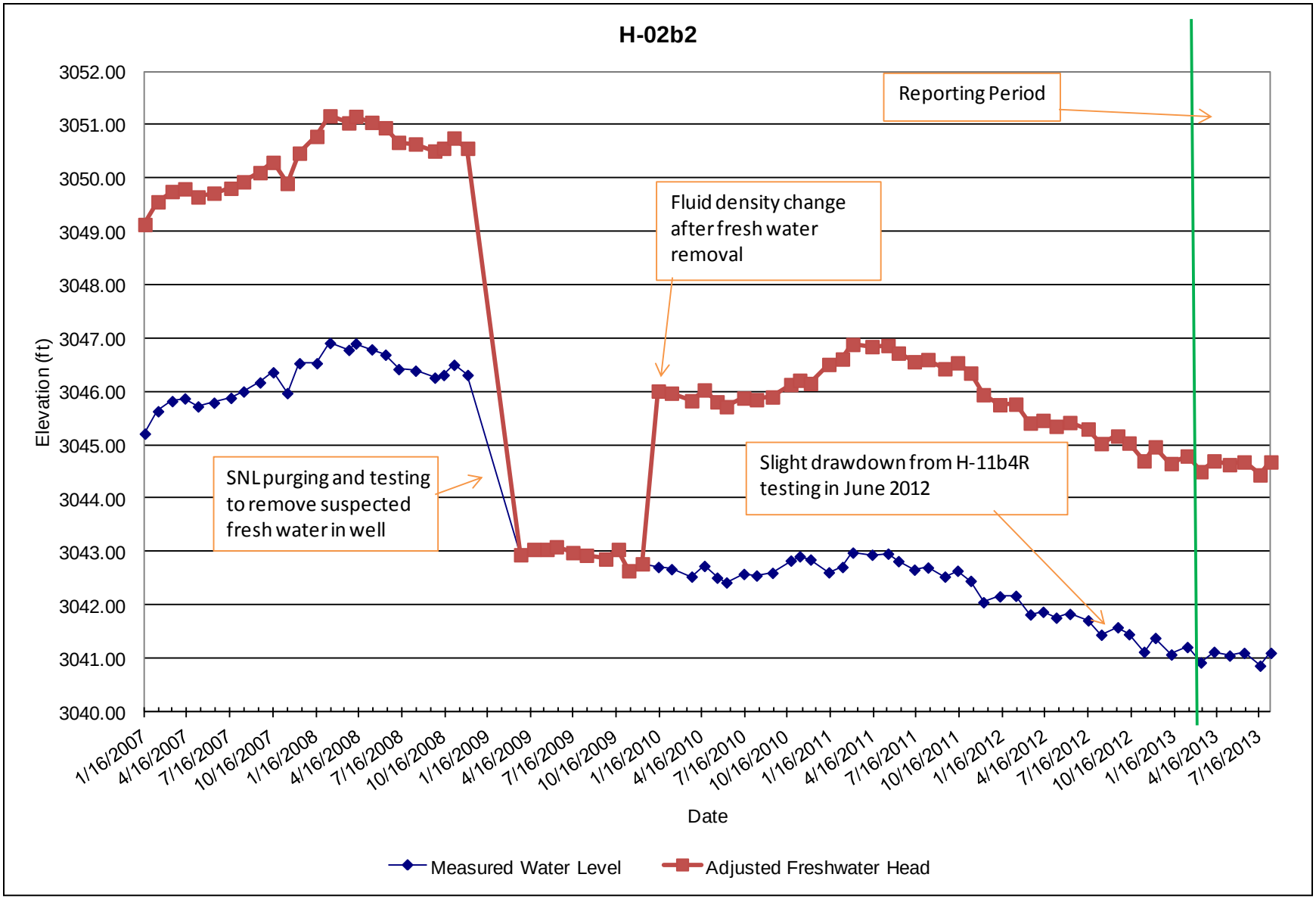
Appendix 1

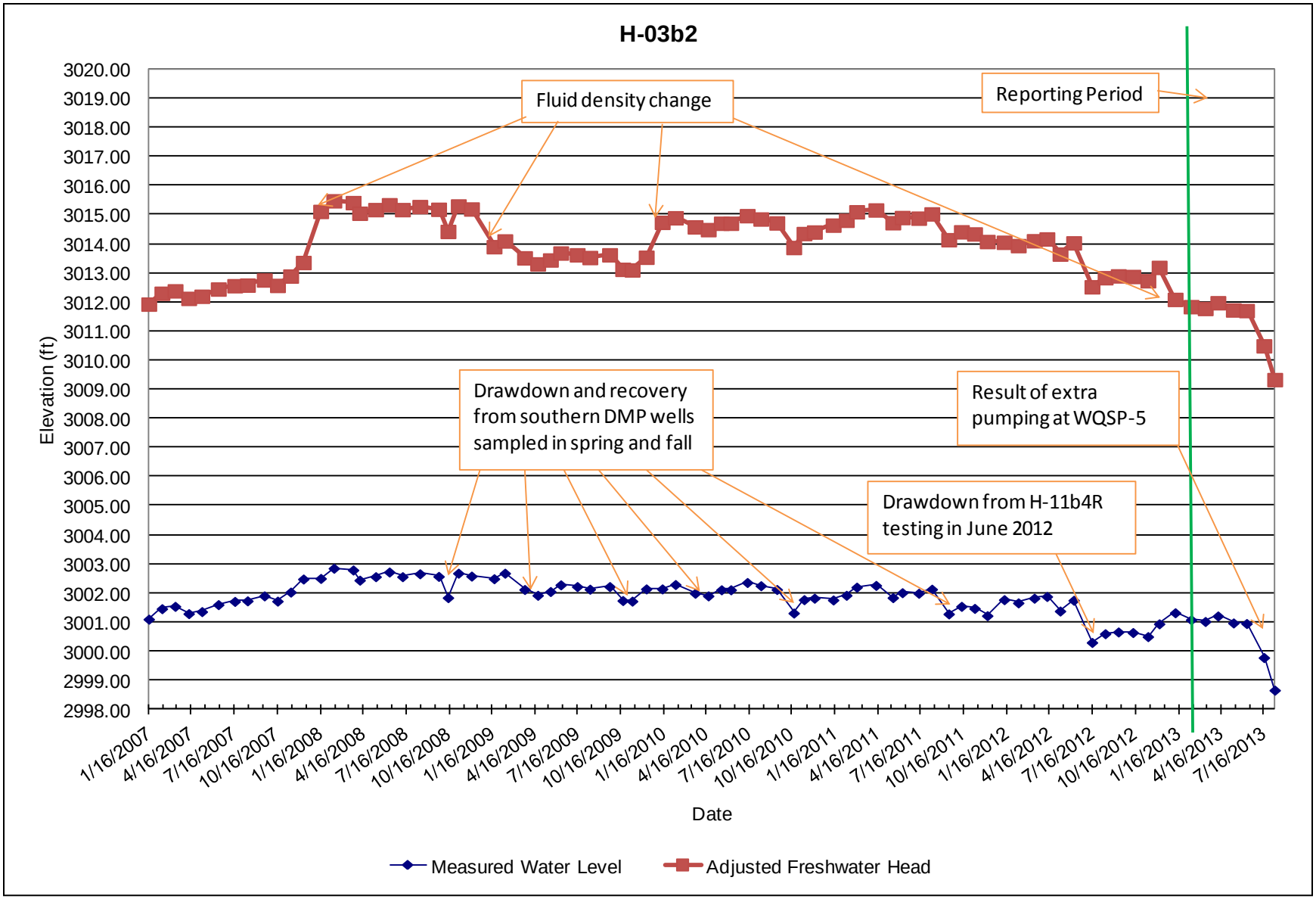
Annotated Hydrographs

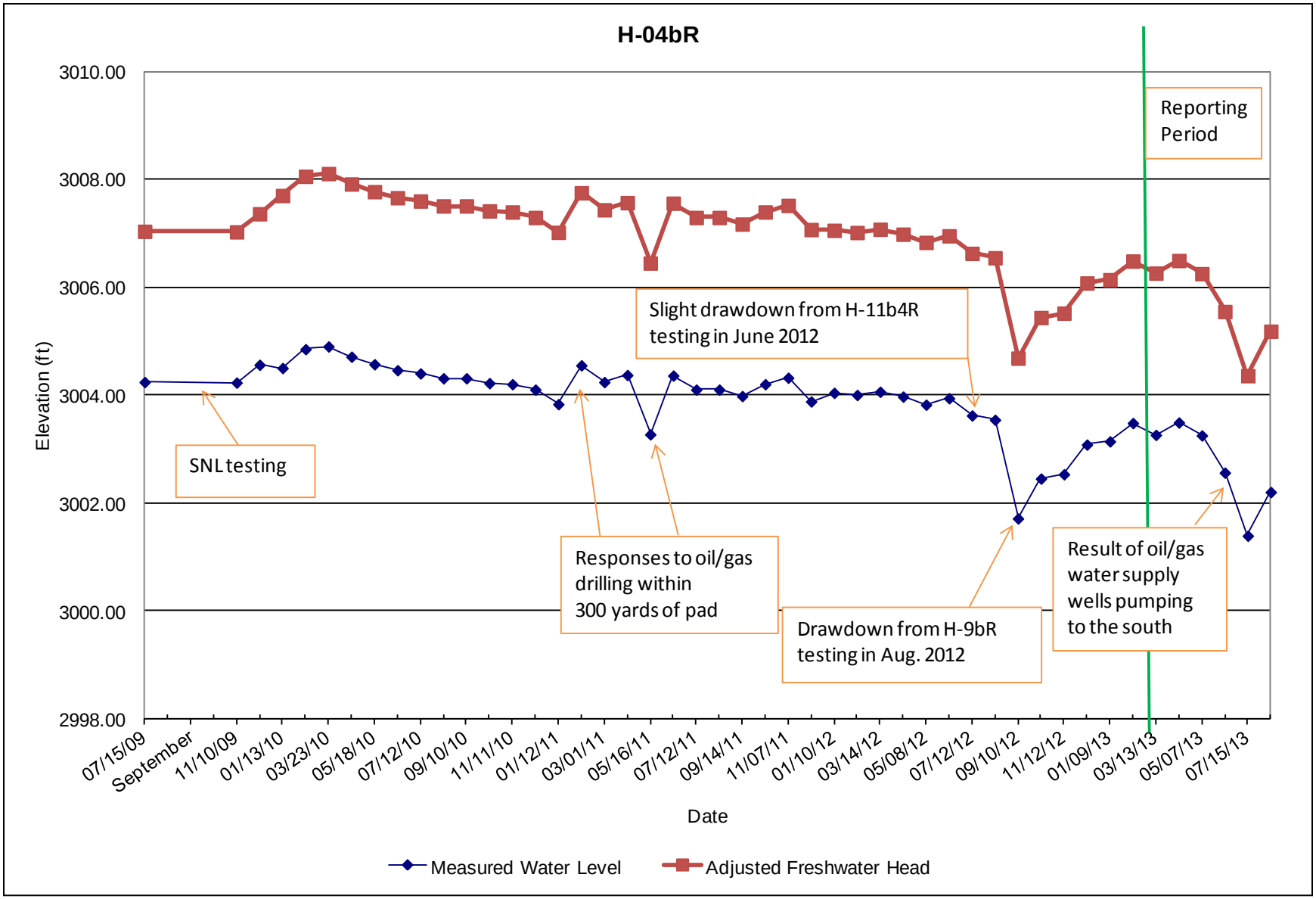

AEC-7
Reconfigured with cement plug at bottom and reperforating in February/March 2008 restoring fluid density
Reporting Period
Leakage from older cement plug prior to reconfiguration
Change due to attempted SNL testing
Elevation (ft)
3305.00
3280.00
3255.00
3230.00
3205.00
3180.00
3155.00
3130.00
3105.00
3080.00
3055.00
3030.00
1/17/2007
4/17/2007
7/17/2007
10/17/2007
1/17/2008
4/17/2008
7/17/2008
10/17/2008
1/17/2009
4/17/2009
7/17/2009
10/17/2009
1/17/2010
4/17/2010
7/17/2010
10/17/2010
1/17/2011
4/17/2011
7/17/2011
10/17/2011
1/17/2012
4/17/2012
7/17/2012
10/17/2012
1/17/2013
4/17/2013
7/17/2013
Date
Measured Water Level
Adjusted Freshwater Head

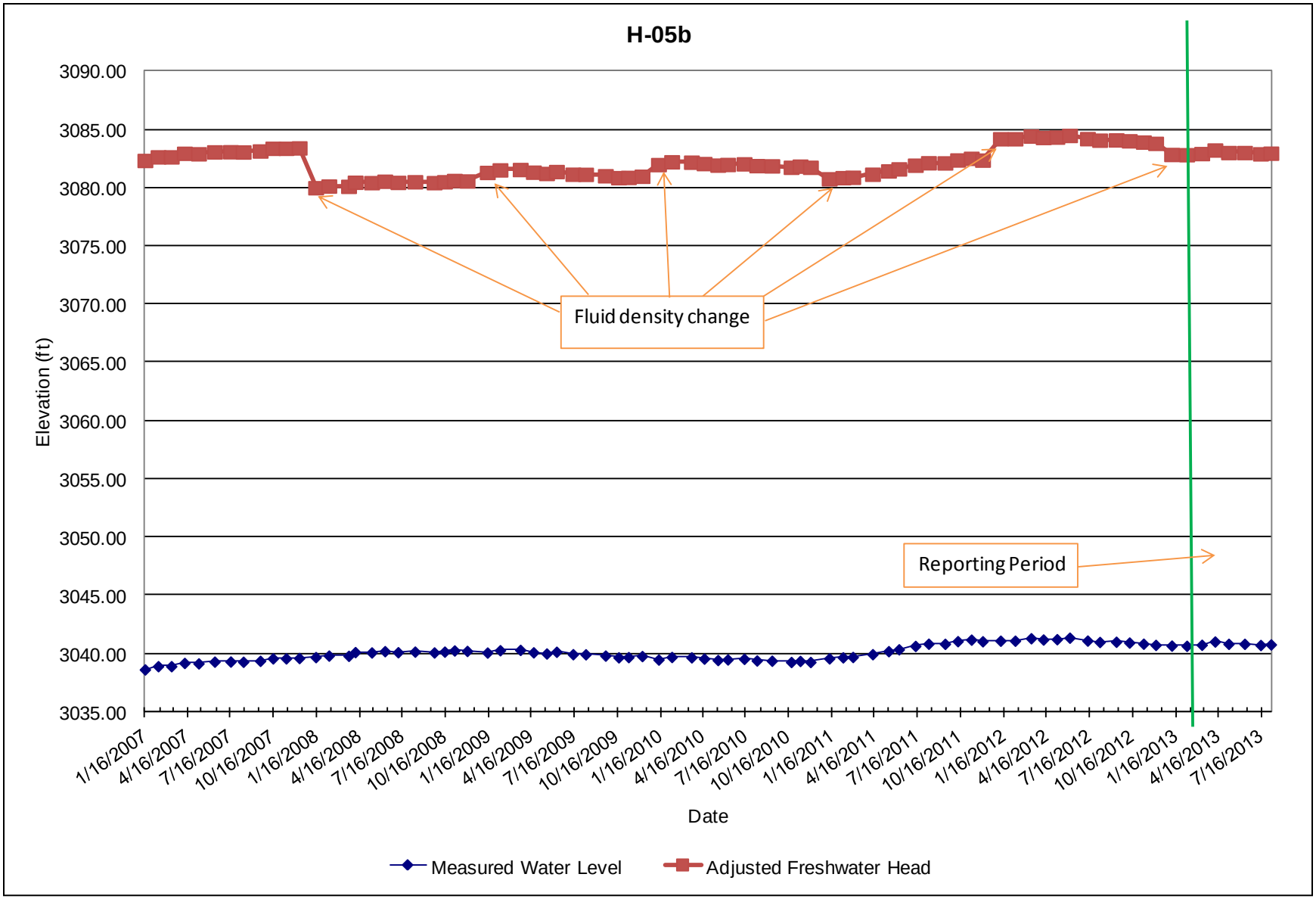

C-2737
Reporting Period
Fluid density change
Possible effect of pumping and recovery from southern DMP wells sampled in spring and fall
Drawdown from H-11b4R testing in June 2012
Result of extra pumping at WQSP-5
Re-installed packer in well, leaky packer prior to July 2008 contributed to abnormal water level readings
Elevation (ft)
3025.00
3024.00
3023.00
3022.00
3021.00
3020.00
3019.00
3018.00
3017.00
3016.00
3015.00
3014.00
3013.00
3012.00
2/13/2007
5/13/2007
8/13/2007
11/13/2007
2/13/2008
5/13/2008
8/13/2008
11/13/2008
2/13/2009
5/13/2009
8/13/2009
11/13/2009
2/13/2010
5/13/2010
8/13/2010
11/13/2010
2/13/2011
5/13/2011
8/13/2011
11/13/2011
2/13/2012
5/13/2012
8/13/2012
11/13/2012
2/13/2013
5/13/2013
Date
Measured Water Level
Adjusted Freshwater Head

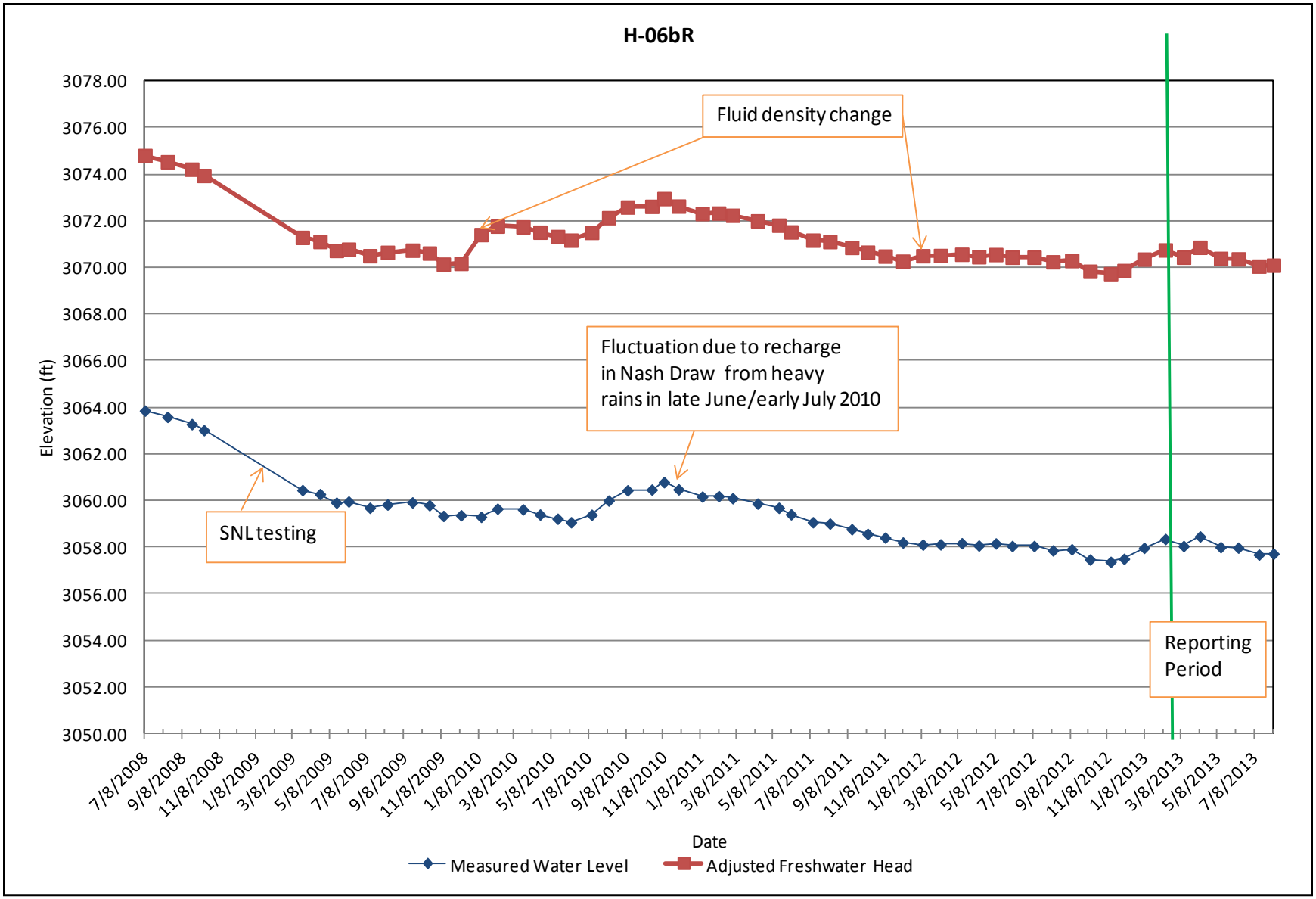

ERDA-9
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
Elevation (ft)
Density not measured at mid-Culebra depth in 2007
Slight drawdown from H-11b4R testing in June 2012
Reporting Period
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head

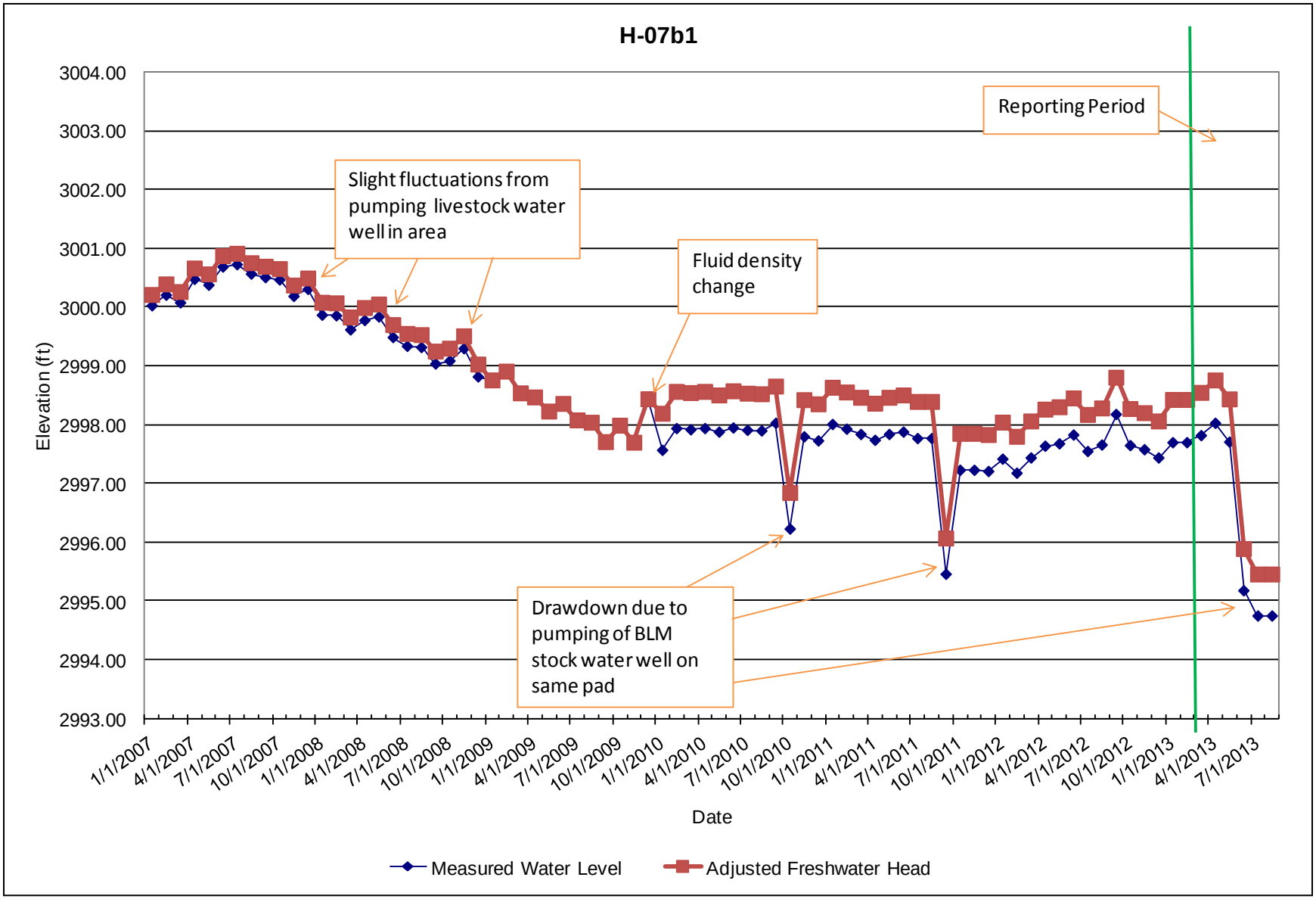

H-02b2
Reporting Period
Fluid density change after fresh water removal
SNL purging and testing to remove suspected fresh water in well
Slight drawdown from H-11b4R testing in June 2012
Elevation (ft)
3052.00
3051.00
3050.00
3049.00
3048.00
3047.00
3046.00
3045.00
3044.00
3043.00
3042.00
3041.00
3040.00
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head

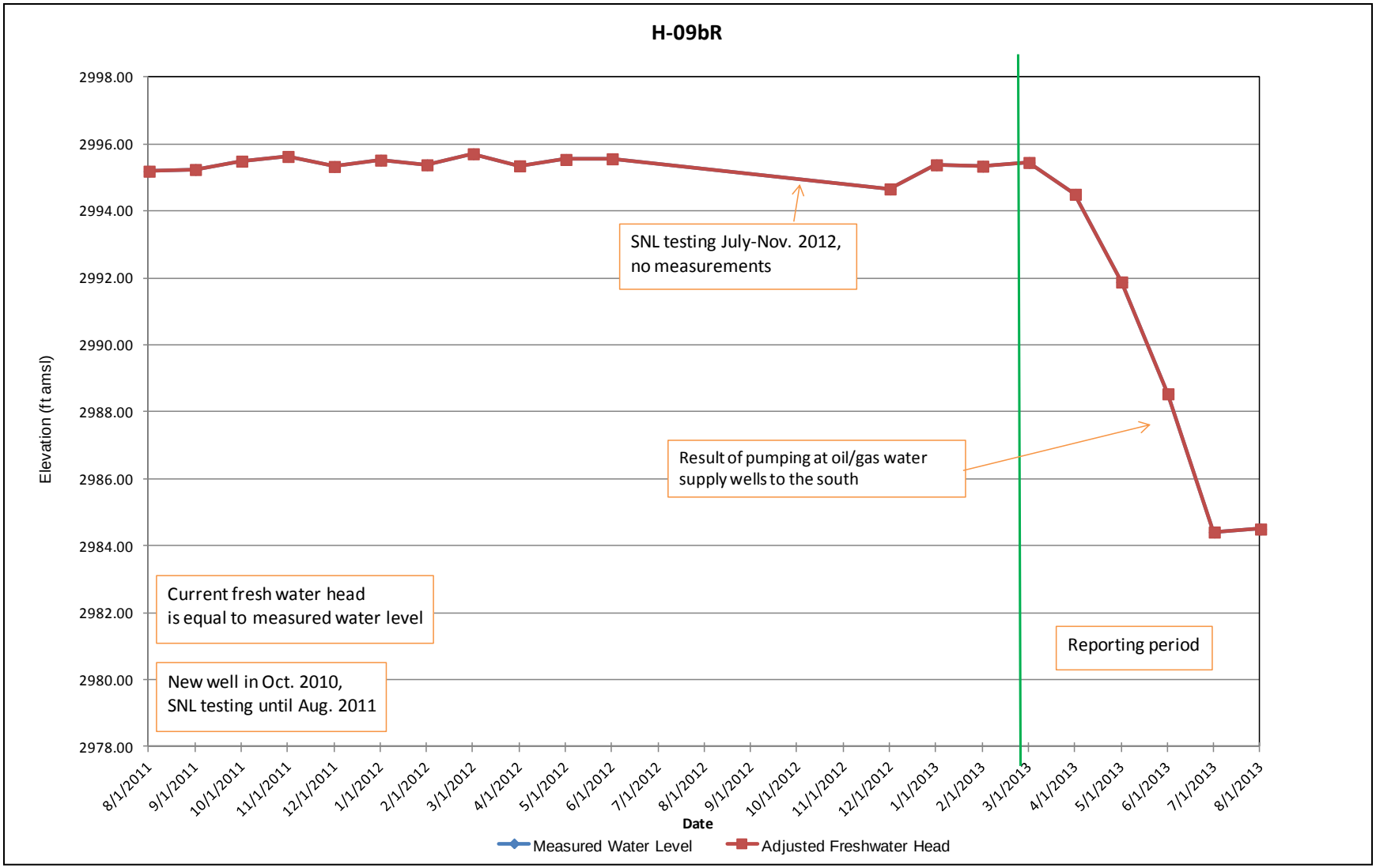

H-03b2
Fluid density change
Reporting Period
Drawdown and recovery from southern DMP wells sampled in spring and fall
Result of extra pumping at WQSP-5
Drawdown from H-11b4R testing in June 2012
Elevation (ft)
Date
Measured Water Level
Adjusted Freshwater Head


H-04bR
3010.00
3008.00
3006.00
3004.00
3002.00
3000.00
2998.00
Elevation (ft)
Reporting Period
Slight drawdown from H-11b4R testing in June 2012
SNL testing
Responses to oil/gas drilling within 300 yards of pad
Drawdown from H-9bR testing in Aug. 2012
Result of oil/gas water supply wells pumping to the south
07/15/09
September
11/10/09
01/13/10
03/23/10
05/18/10
07/12/10
09/10/10
11/11/10
01/12/11
03/01/11
05/16/11
07/12/11
09/14/11
11/07/11
01/10/12
03/14/12
05/08/12
07/12/12
09/10/12
11/12/12
01/09/13
03/13/13
05/07/13
07/15/13
Date
Measured Water Level
Adjusted Freshwater Head


H-05b
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
3050.00
3045.00
3040.00
3035.00
Elevation (ft)
Fluid density change
Reporting Period
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-06bR
Fluid density change
Fluctuation due to recharge in Nash Draw from heavy rains in late June/early July 2010
SNL testing
Reporting Period
Elevation (ft)
3078.00
3076.00
3074.00
3072.00
3070.00
3068.00
3066.00
3064.00
3062.00
3060.00
3058.00
3056.00
3054.00
3052.00
3050.00
7/8/2008
9/8/2008
11/8/2008
1/8/2009
3/8/2009
5/8/2009
7/8/2009
9/8/2009
11/8/2009
1/8/2010
3/8/2010
5/8/2010
7/8/2010
9/8/2010
11/8/2010
1/8/2011
3/8/2011
5/8/2011
7/8/2011
9/8/2011
11/8/2011
1/8/2012
3/8/2012
5/8/2012
7/8/2012
9/8/2012
11/8/2012
1/8/2013
3/8/2013
5/8/2013
7/8/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-07b1
Reporting Period
Slight fluctuations from pumping livestock water well in area
Fluid density change
Drawdown due to pumping of BLM stock water well on same pad
Elevation (ft)
3004.00
3003.00
3002.00
3001.00
3000.00
2999.00
2998.00
2997.00
2996.00
2995.00
2994.00
2993.00
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-09bR
2998.00
2996.00
2994.00
2992.00
2990.00
2988.00
2986.00
2984.00
2982.00
2980.00
2978.00
Elevation (ft amsl)
SNL testing July-Nov. 2012, no measurements
Result of pumping at oil/gas water supply wells to the south
Current fresh water head is equal to measured water level
New well in Oct. 2010, SNL testing until Aug. 2011
Reporting period
8/1/2011
9/1/2011
10/1/2011
11/1/2011
12/1/2011
1/1/2012
2/1/2012
3/1/2012
4/1/2012
5/1/2012
6/1/2012
7/1/2012
8/1/2012
9/1/2012
10/1/2012
11/1/2012
12/1/2012
1/1/2013
2/1/2013
3/1/2013
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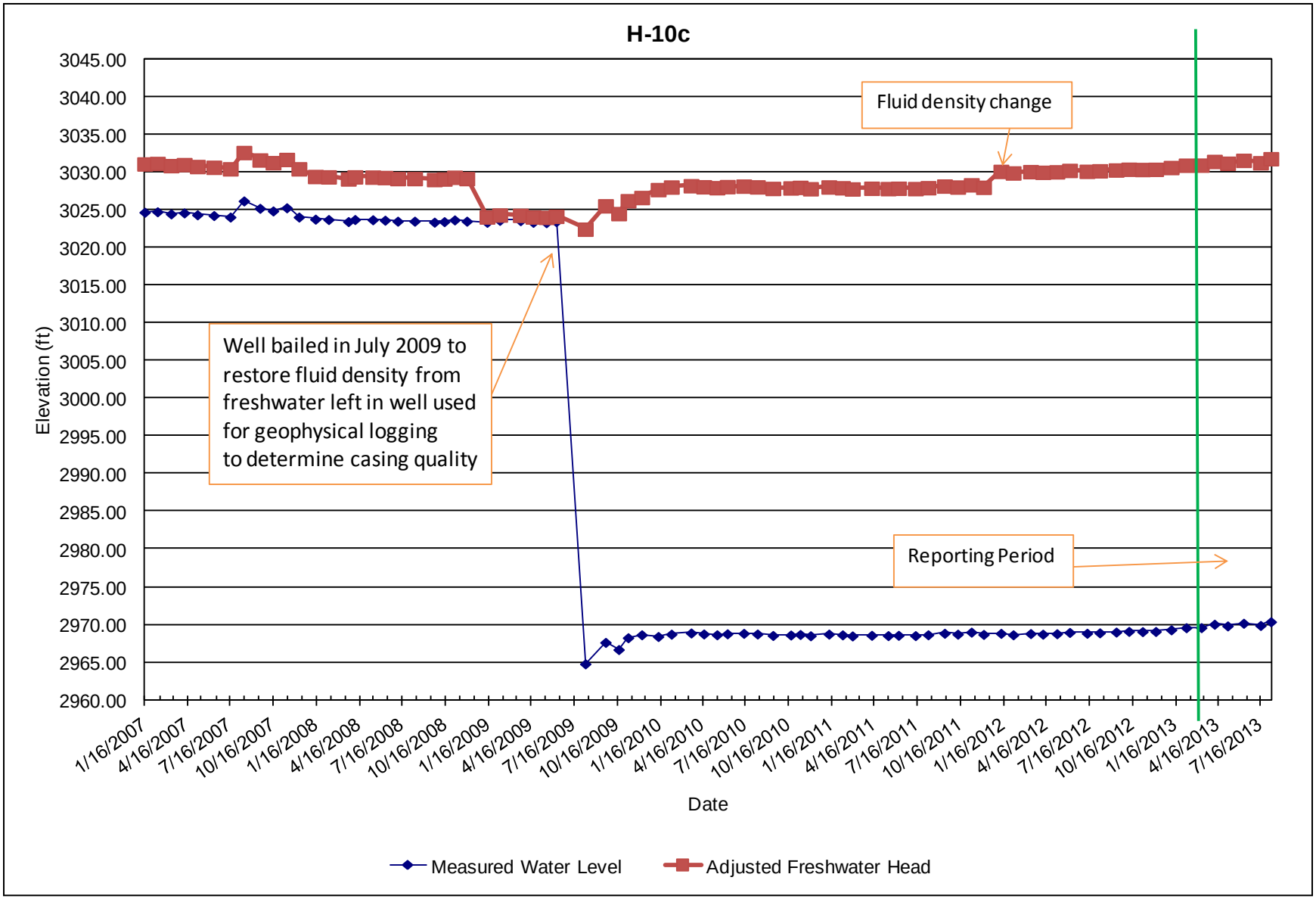
5/1/2013
6/1/2013
7/1/2013
8/1/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-10c
Elevation (ft)
3045.00
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
Fluid density change
Well bailed in July 2009 to restore fluid density from freshwater left in well used for geophysical logging to determine casing quality
Reporting Period
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
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7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
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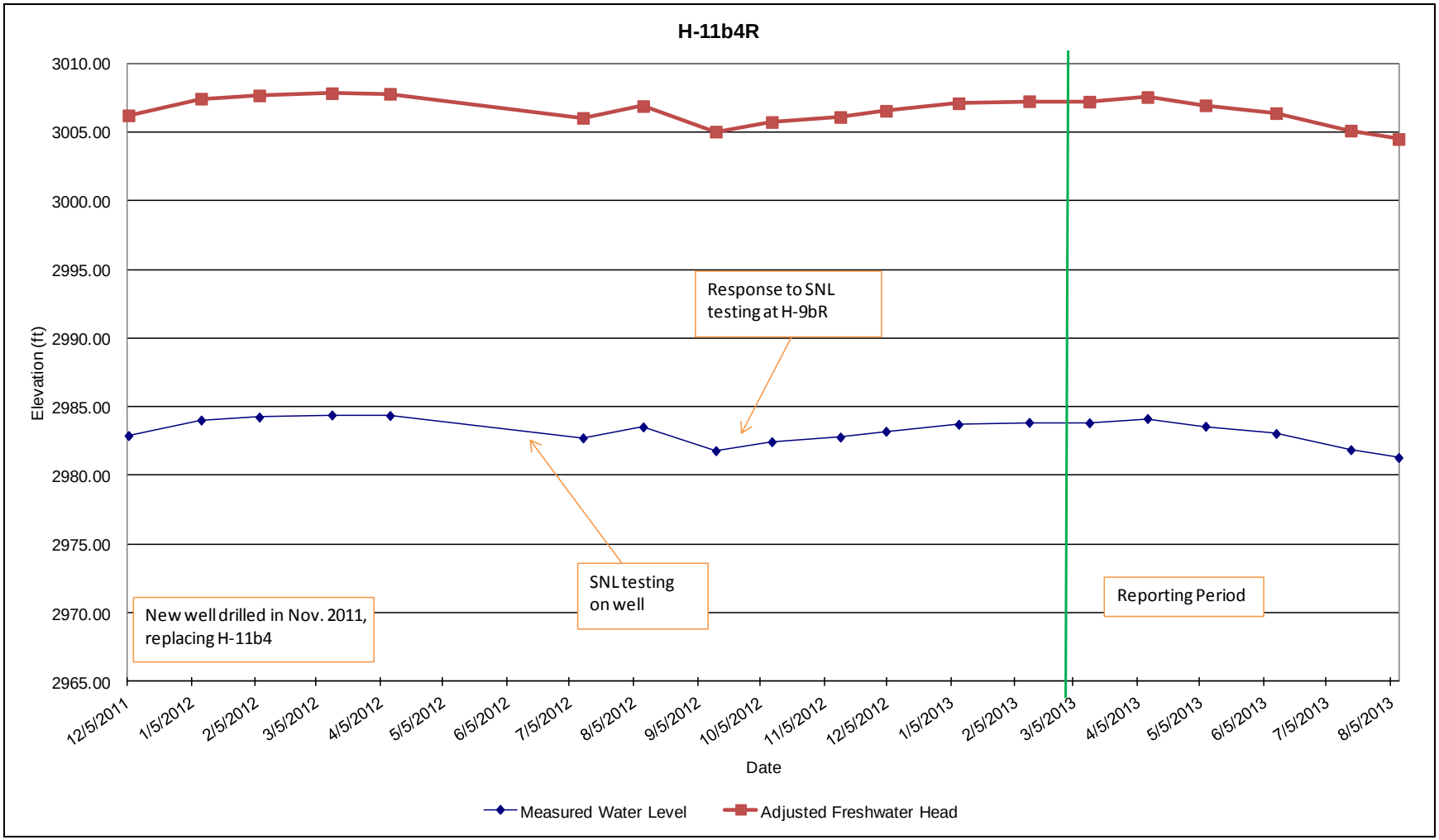
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-11b4R
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
Elevation (ft)
Response to SNL testing at H-9bR
SNL testing on well
New well drilled in Nov. 2011, replacing H-11b4
Reporting Period
12/5/2011
1/5/2012
2/5/2012
3/5/2012
4/5/2012
5/5/2012
6/5/2012
7/5/2012
8/5/2012
9/5/2012
10/5/2012
11/5/2012
12/5/2012
1/5/2013
2/5/2013
3/5/2013
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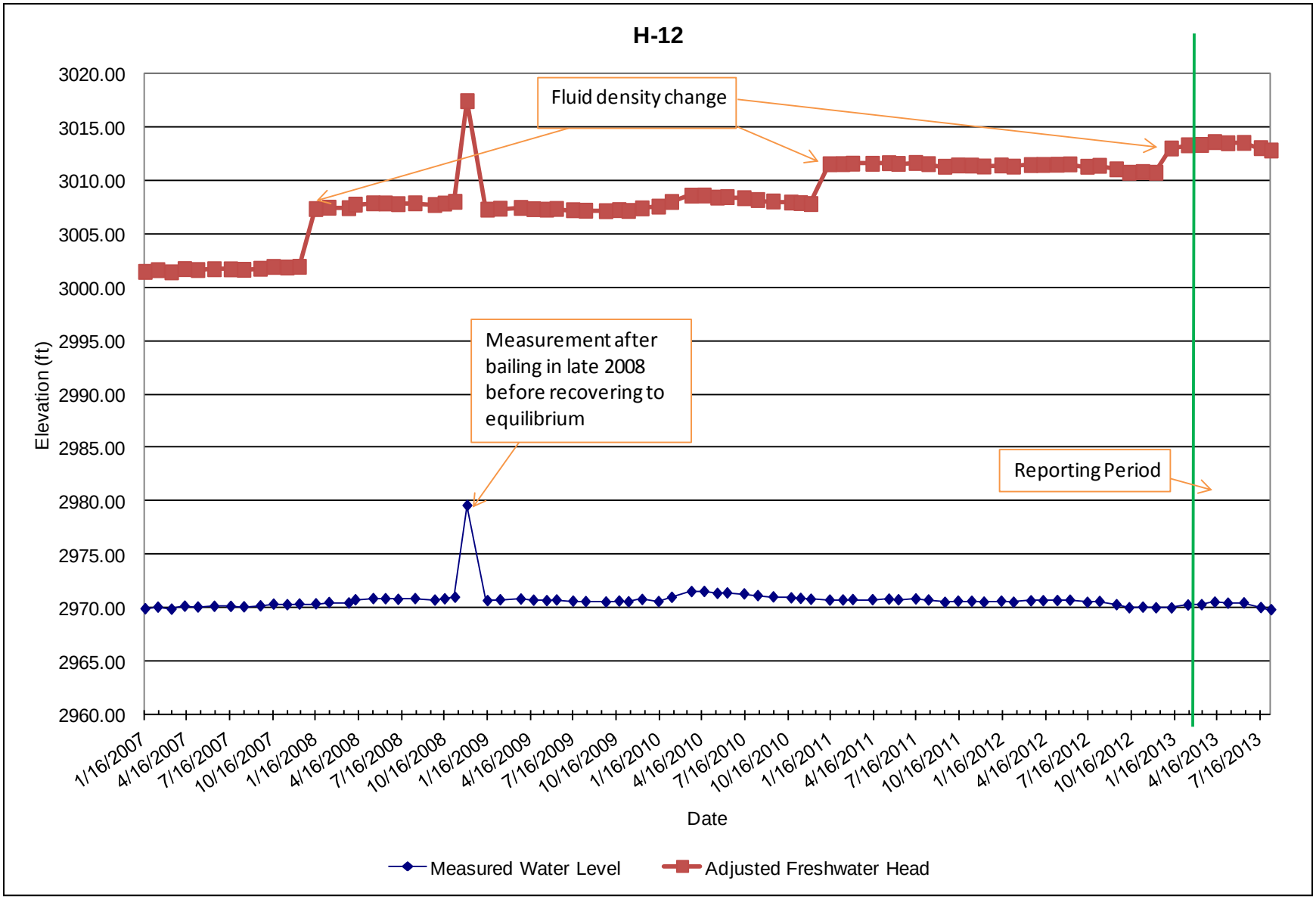
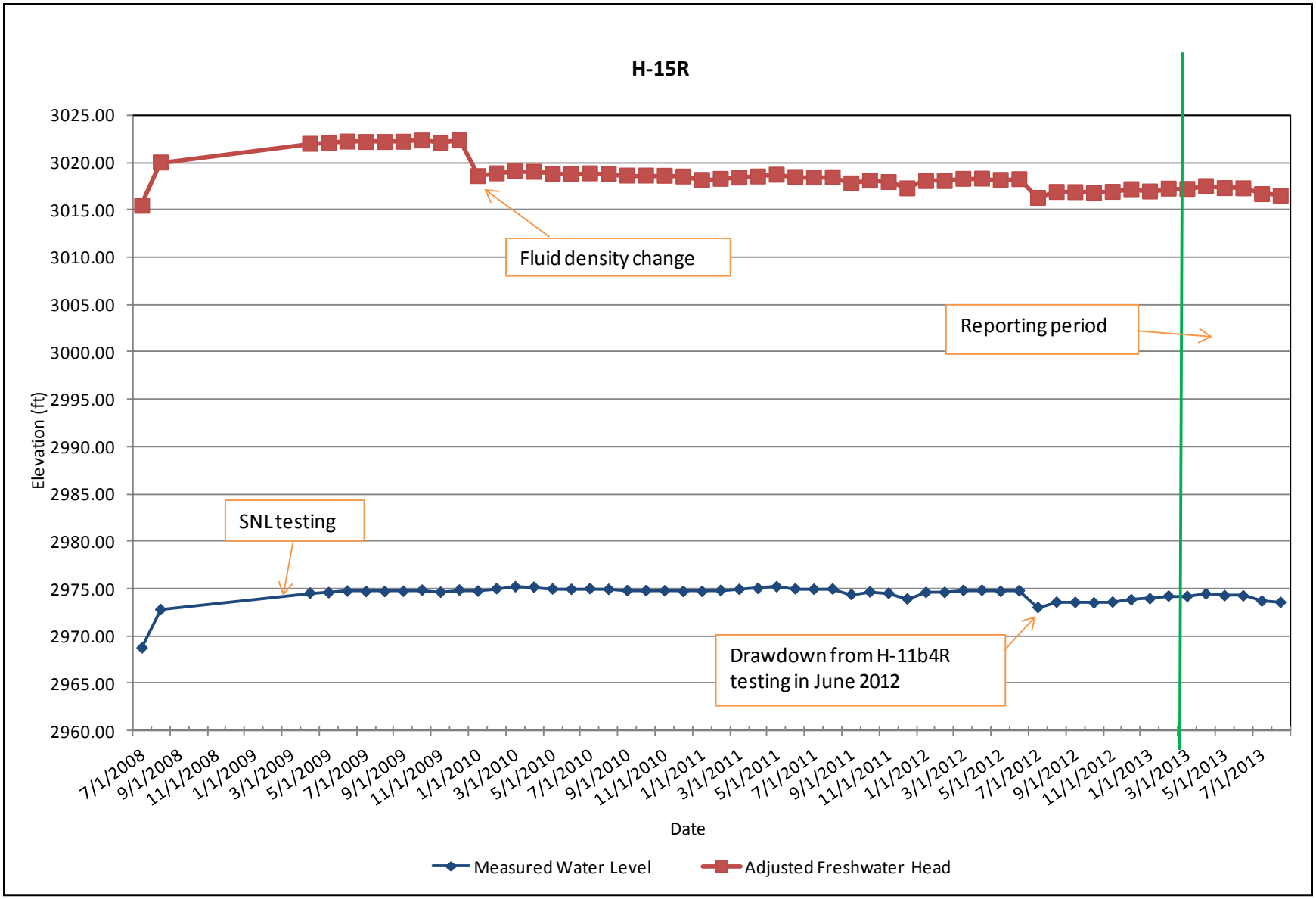
5/5/2013
6/5/2013
7/5/2013
8/5/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-12
Fluid density change
Measurement after bailing in late 2008 before recovering to equilibrium
Reporting Period
Elevation (ft)
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head


H-15R
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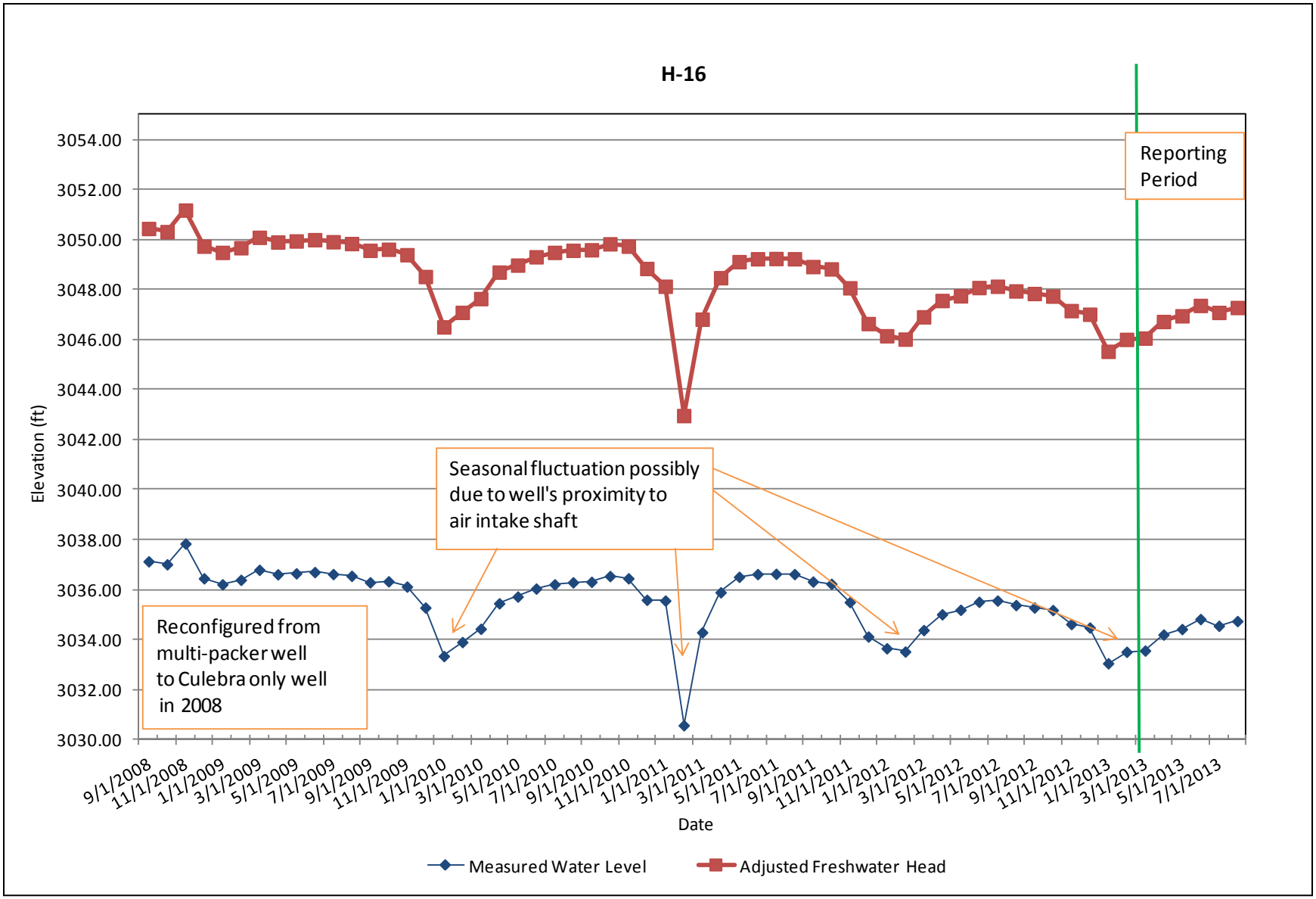
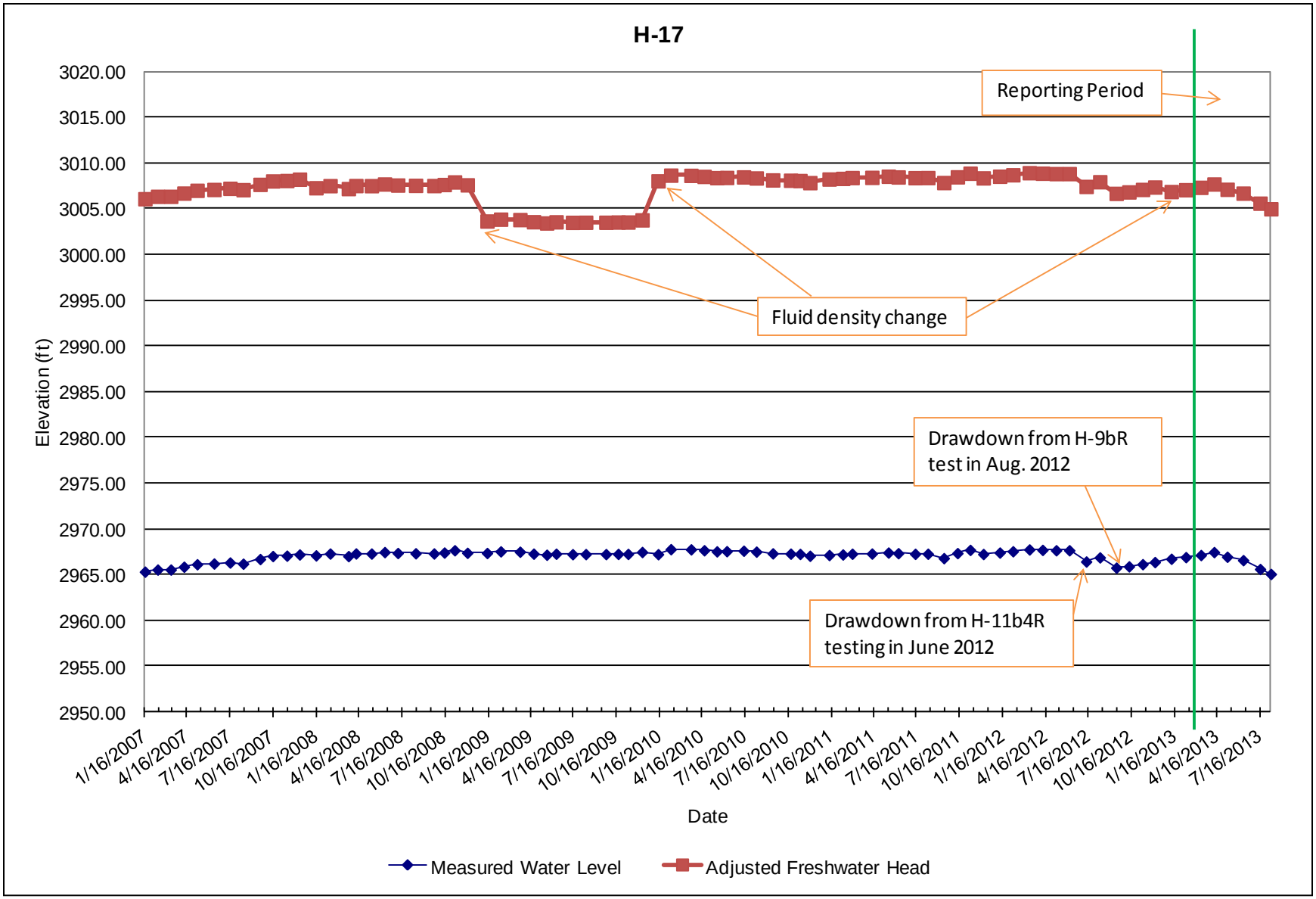
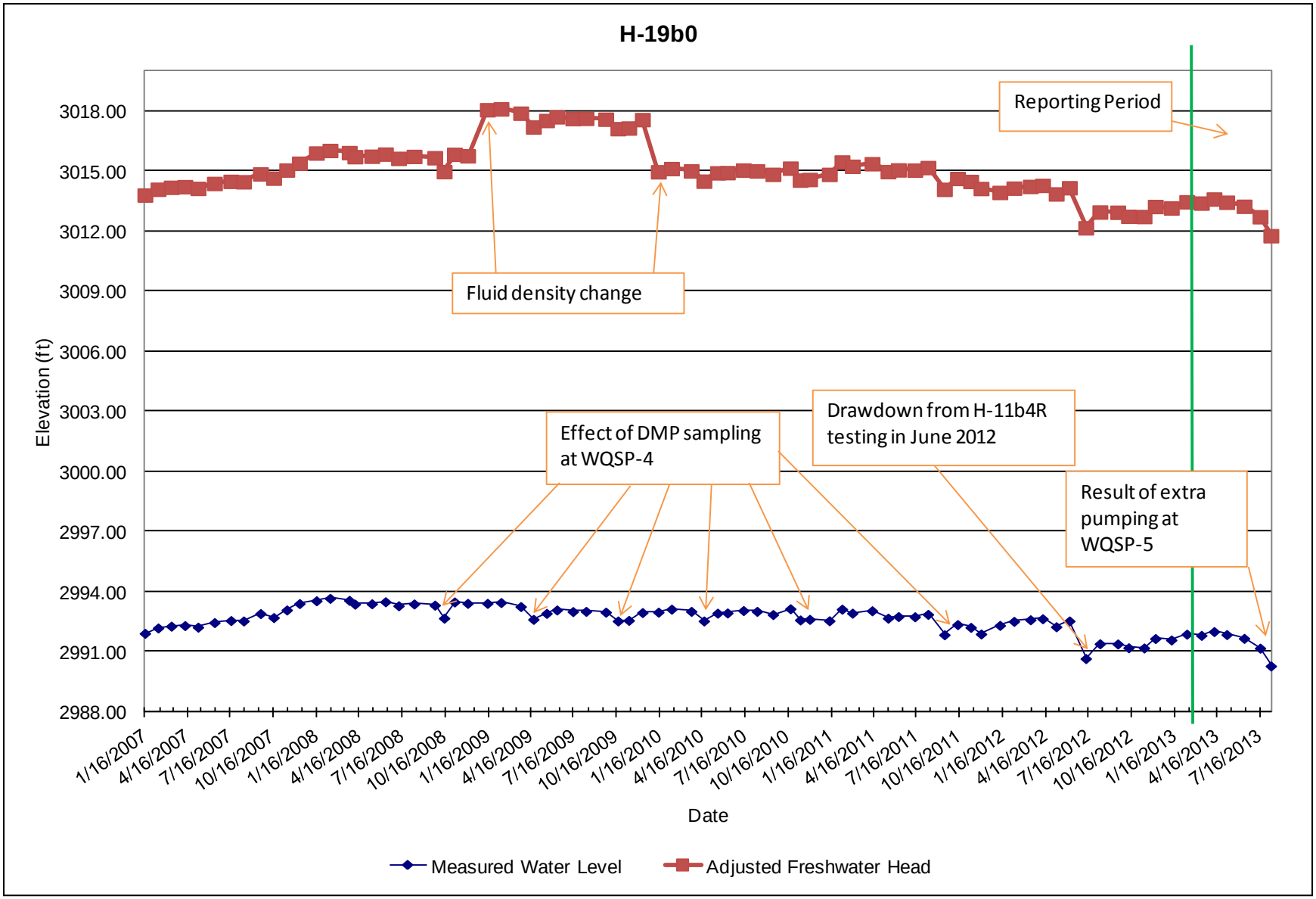
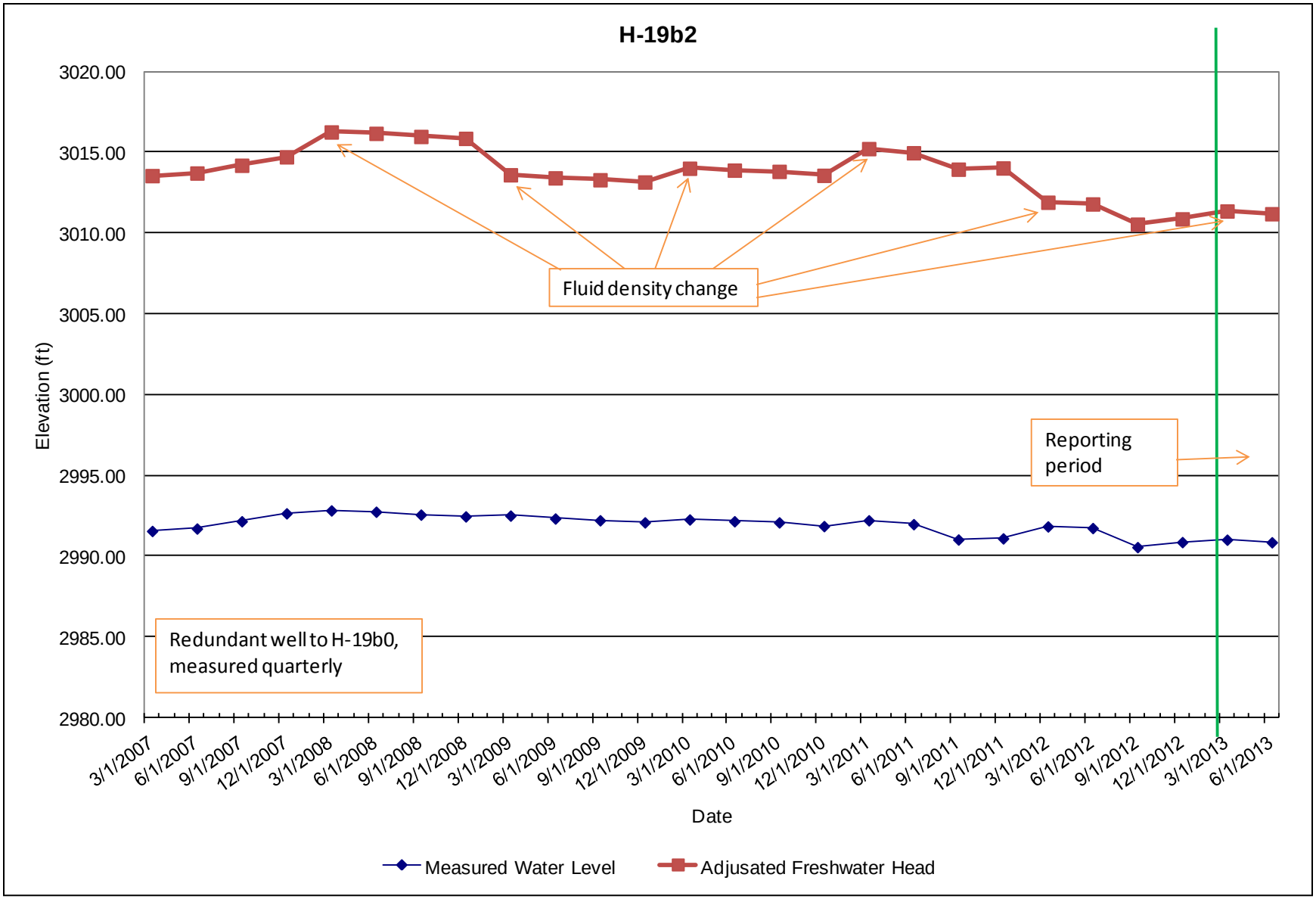
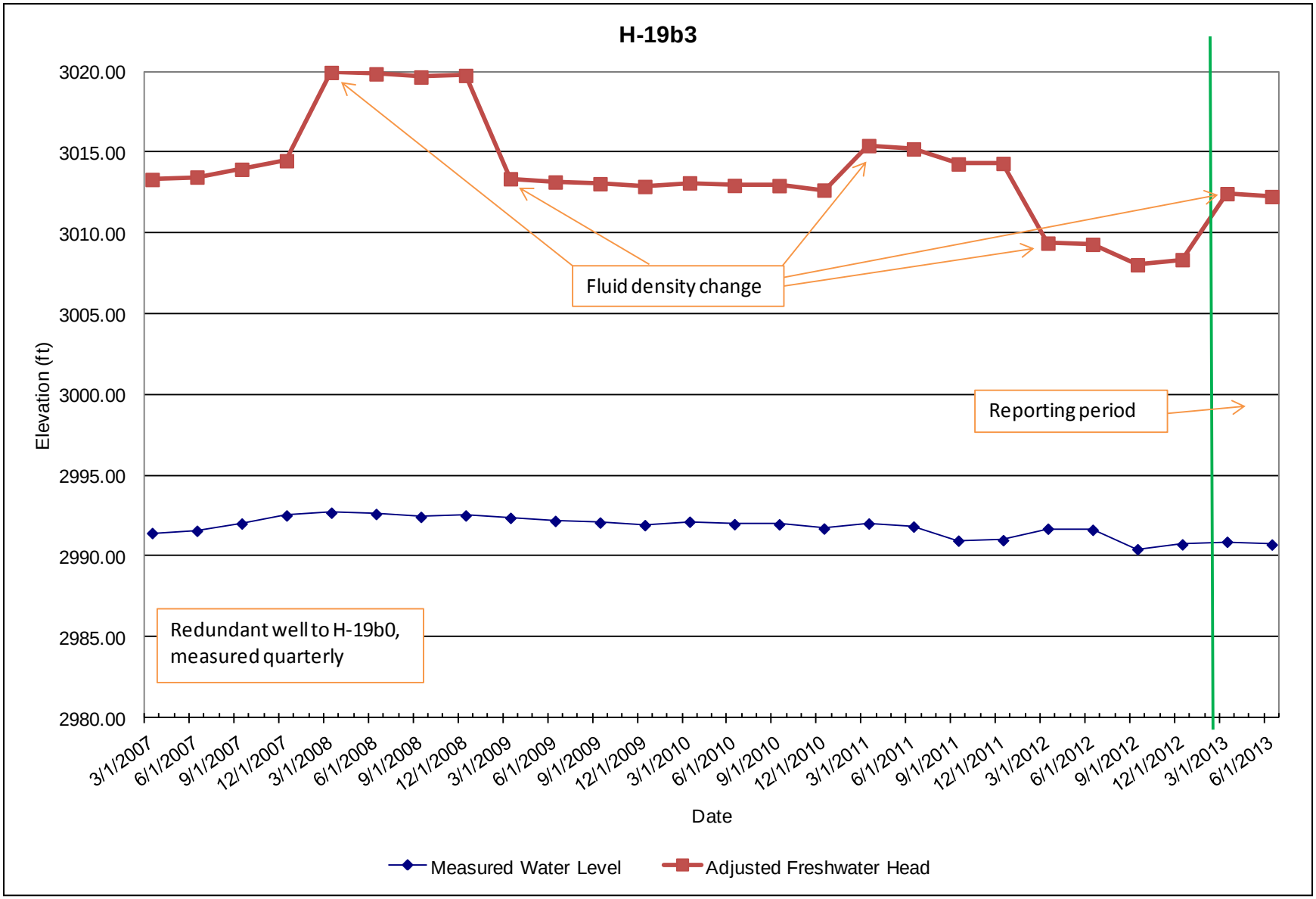
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
Elevation (ft)
Fluid density change
Reporting period
SNL testing
Drawdown from H-11b4R testing in June 2012
7/1/2008
9/1/2008
11/1/2008
1/1/2009
3/1/2009
5/1/2009
7/1/2009
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
9/1/2011
11/1/2011
1/1/2012
3/1/2012
5/1/2012
7/1/2012
9/1/2012
11/1/2012
1/1/2013
3/1/2013
5/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

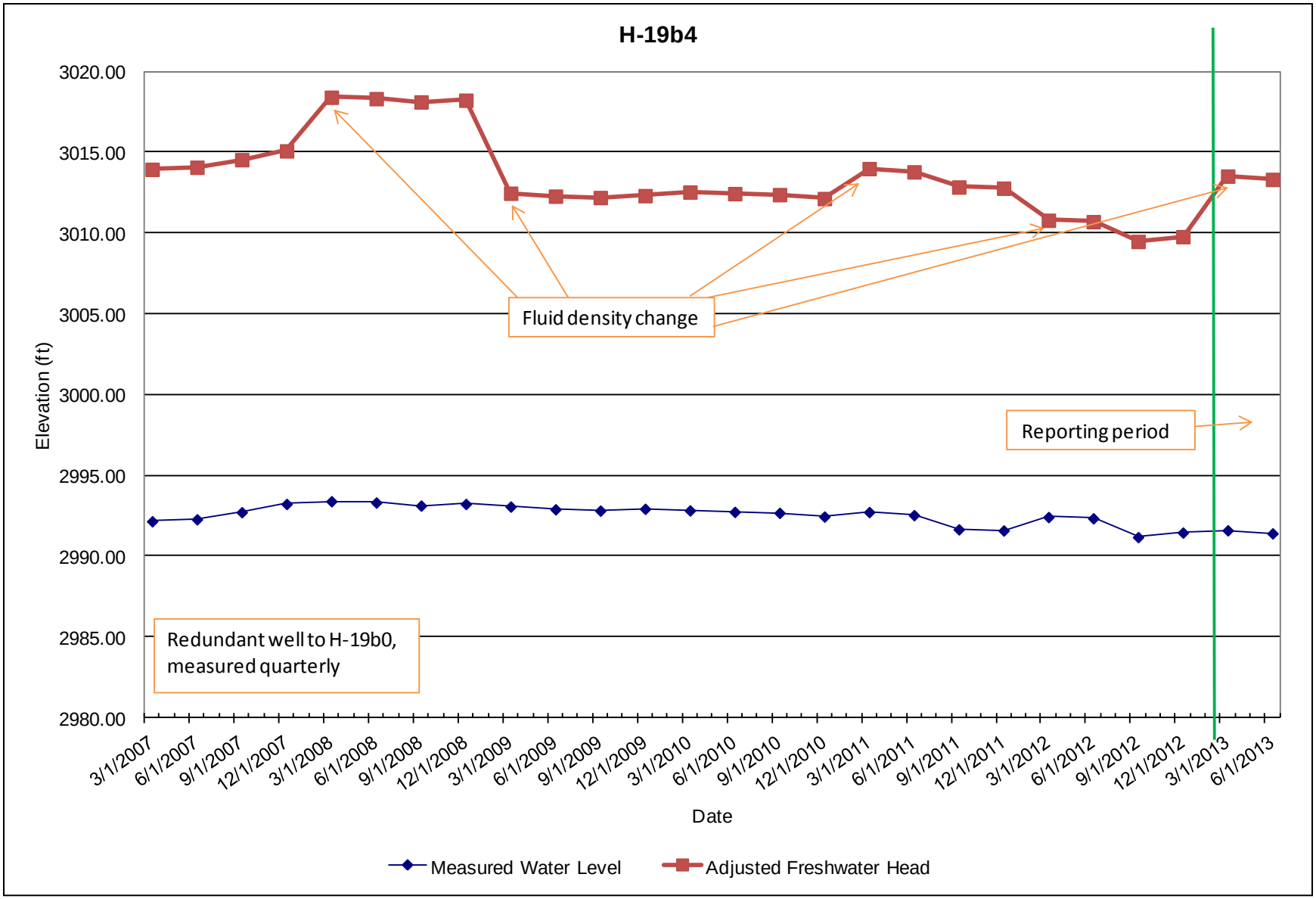

H-16
Reporting Period
Seasonal fluctuation possibly due to well's proximity to air intake shaft
Reconfigured from multi-packer well to Culebra only well in 2008
Elevation (ft)
3054.00
3052.00
3050.00
3048.00
3046.00
3044.00
3042.00
3040.00
3038.00
3036.00
3034.00
3032.00
3030.00
9/1/2008
11/1/2008
1/1/2009
3/1/2009
5/1/2009
7/1/2009
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
9/1/2011
11/1/2011
1/1/2012
3/1/2012
5/1/2012
7/1/2012
9/1/2012
11/1/2012
1/1/2013
3/1/2013
5/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

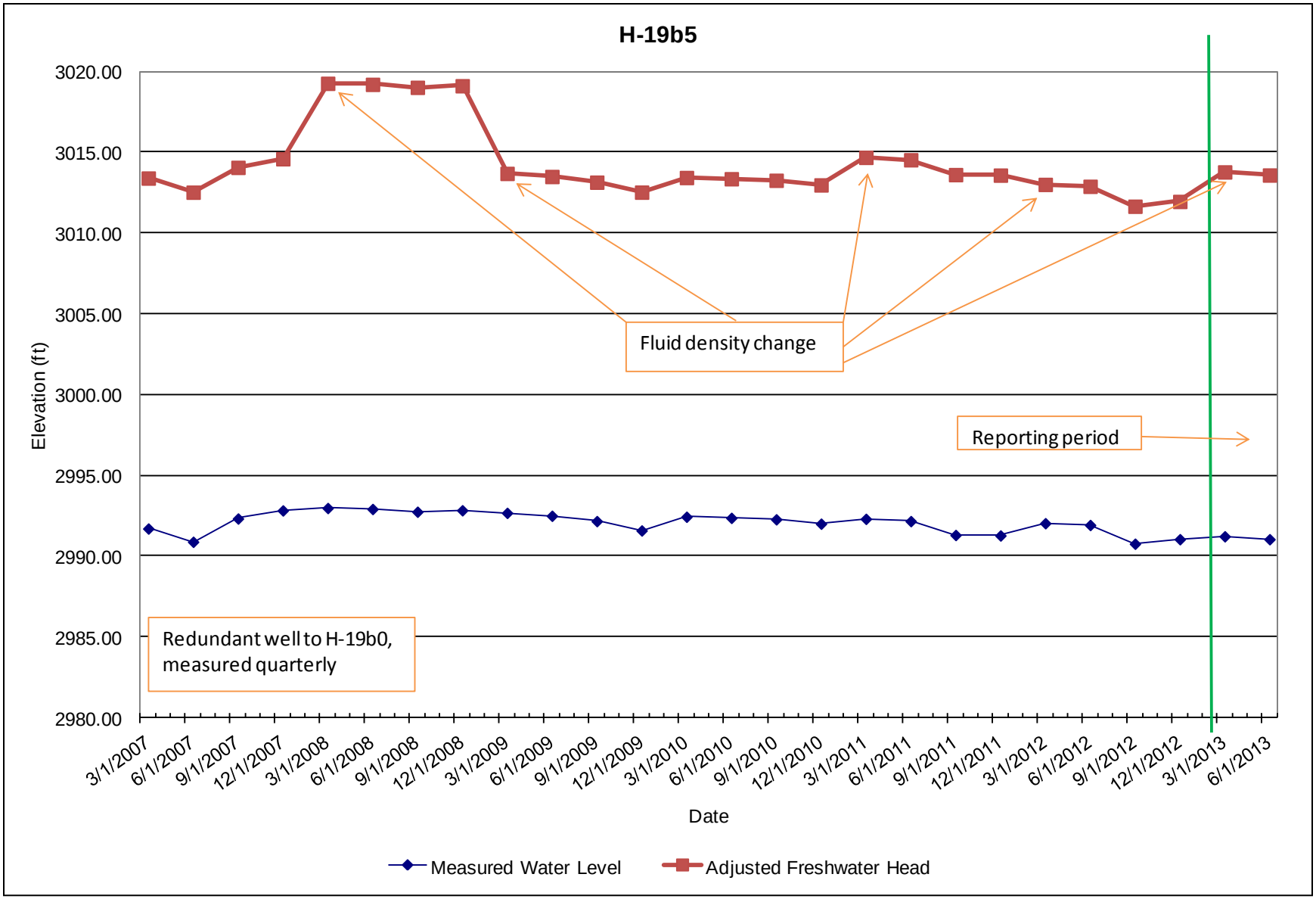

H-17
Reporting Period
Fluid density change
Drawdown from H-9bR test in Aug. 2012
Drawdown from H-11b4R testing in June 2012
Elevation (ft)
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
2950.00
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head

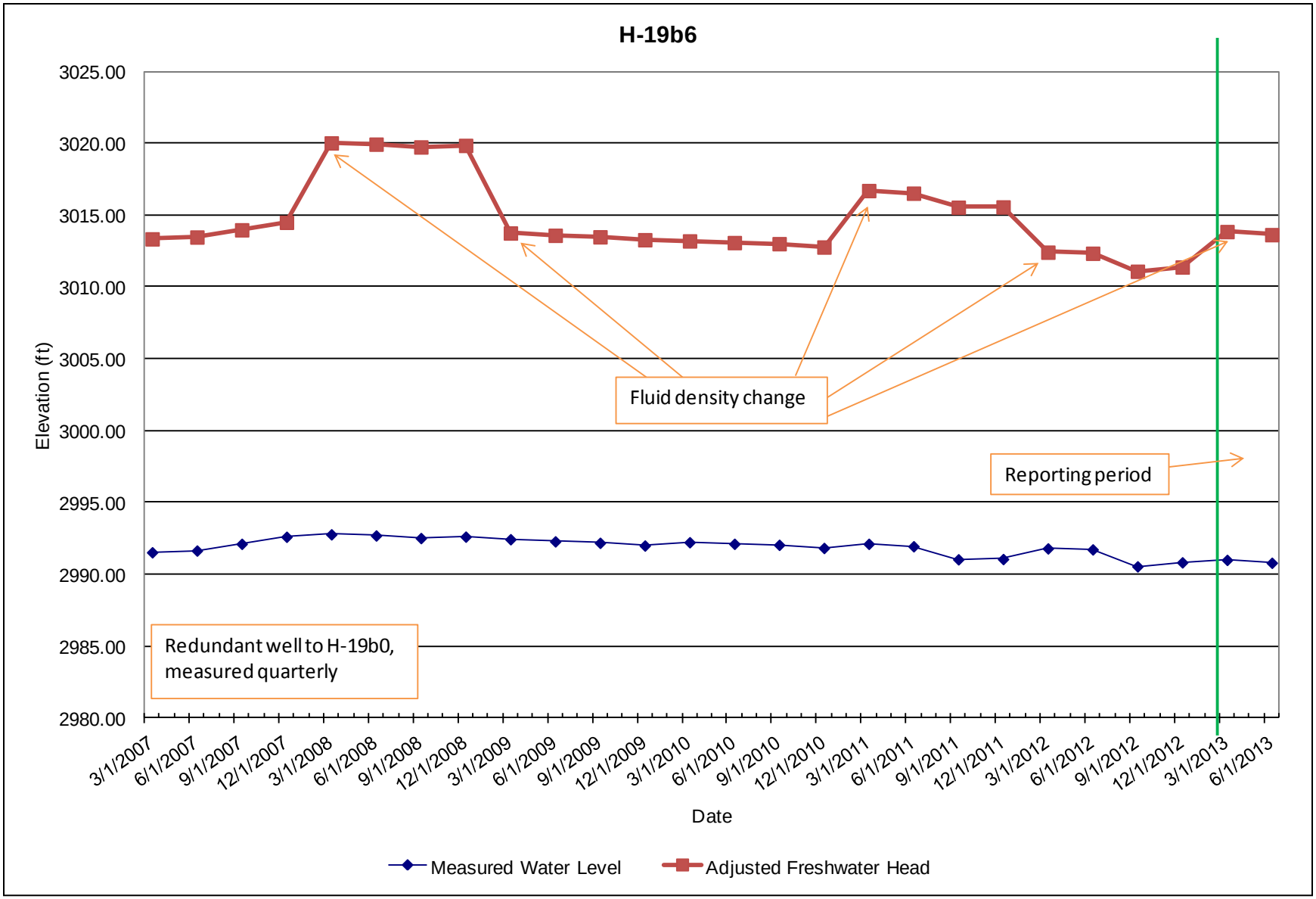

H-19b0
Reporting Period
Fluid density change
Effect of DMP sampling at WQSP-4
Drawdown from H-11b4R testing in June 2012
Result of extra pumping at WQSP-5
Elevation (ft)
3018.00
3015.00
3012.00
3009.00
3006.00
3003.00
3000.00
2997.00
2994.00
2991.00
2988.00
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head

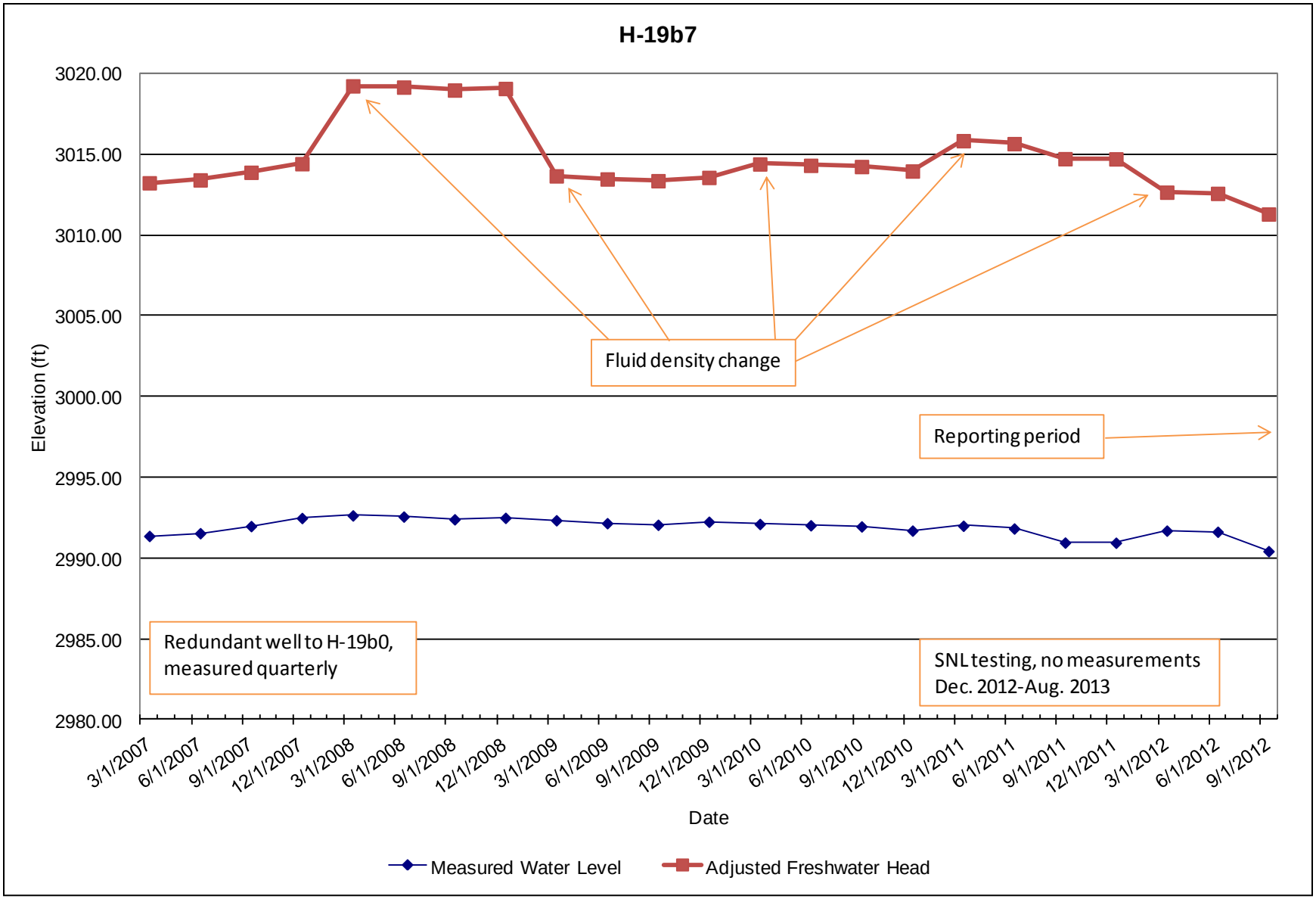

H-19b2
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
Fluid density change
Reporting period
Redundant well to H-19b0, measured quarterly
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
Date
Measured Water Level
Adjusated Freshwater Head

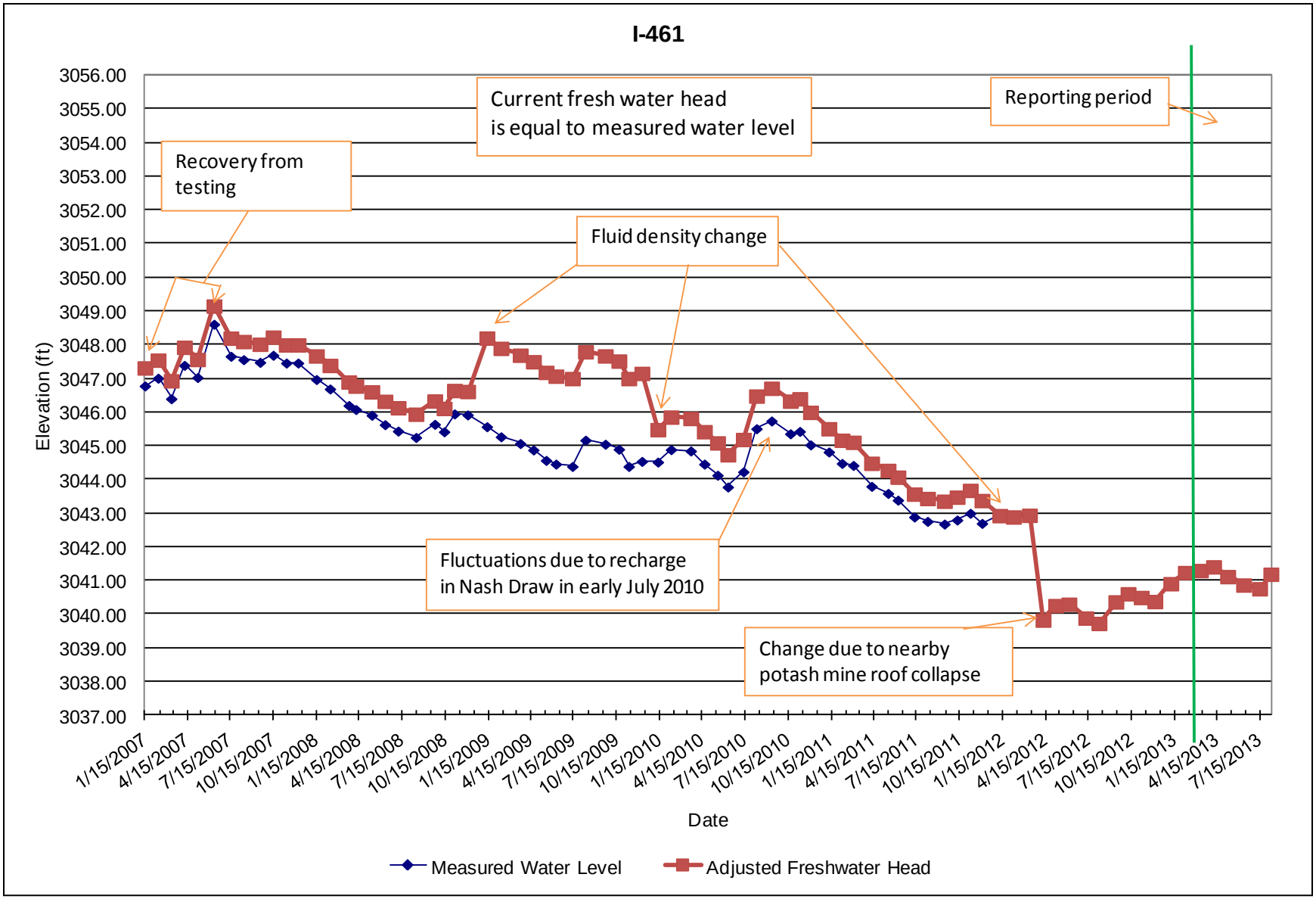

H-19b3
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
Fluid density change
Reporting period
Redundant well to H-19b0, measured quarterly
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

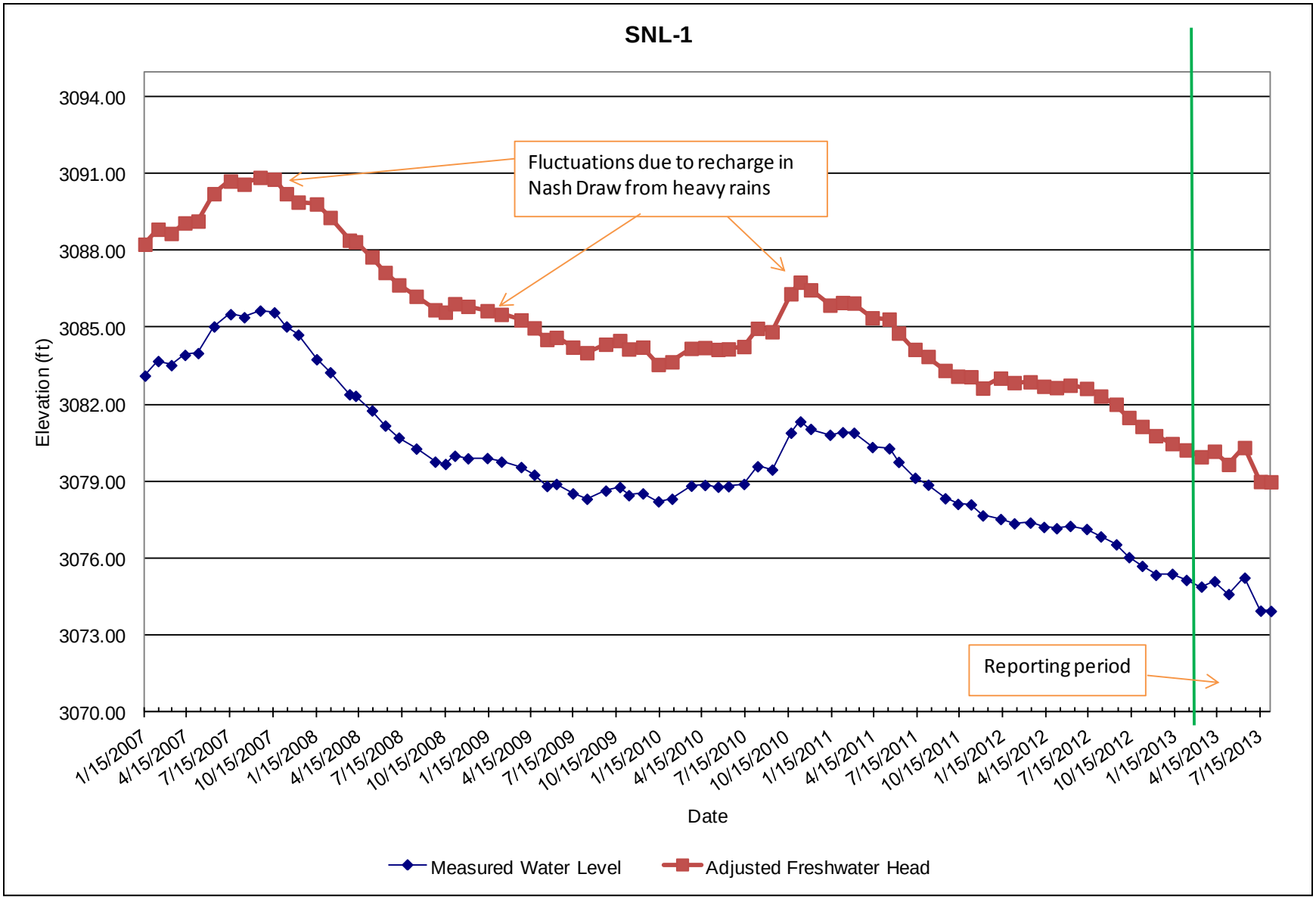

H-19b4
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
Fluid density change
Reporting period
Redundant well to H-19b0, measured quarterly
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

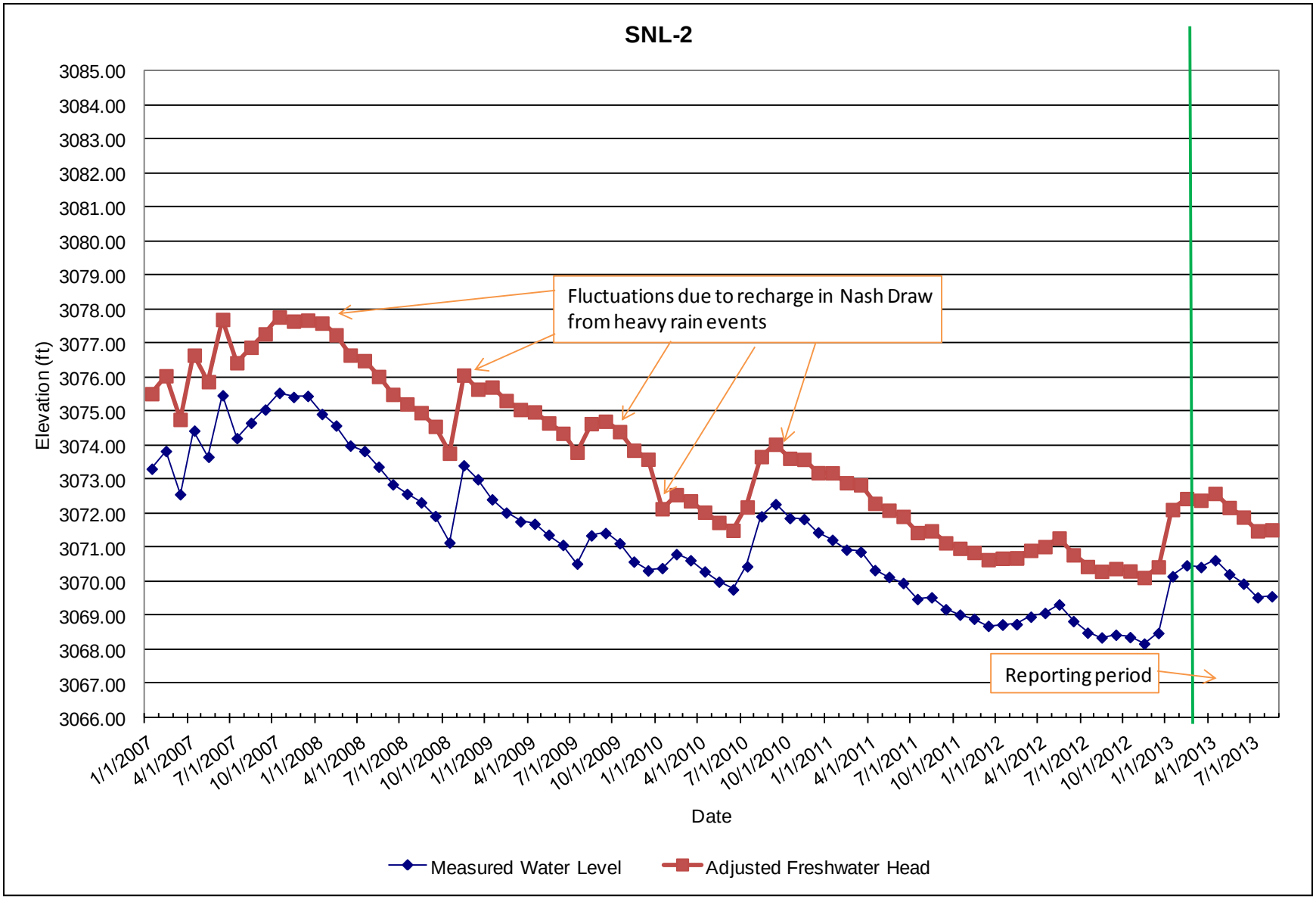

H-19b5
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
Fluid density change
Reporting period
Redundant well to H-19b0, measured quarterly
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

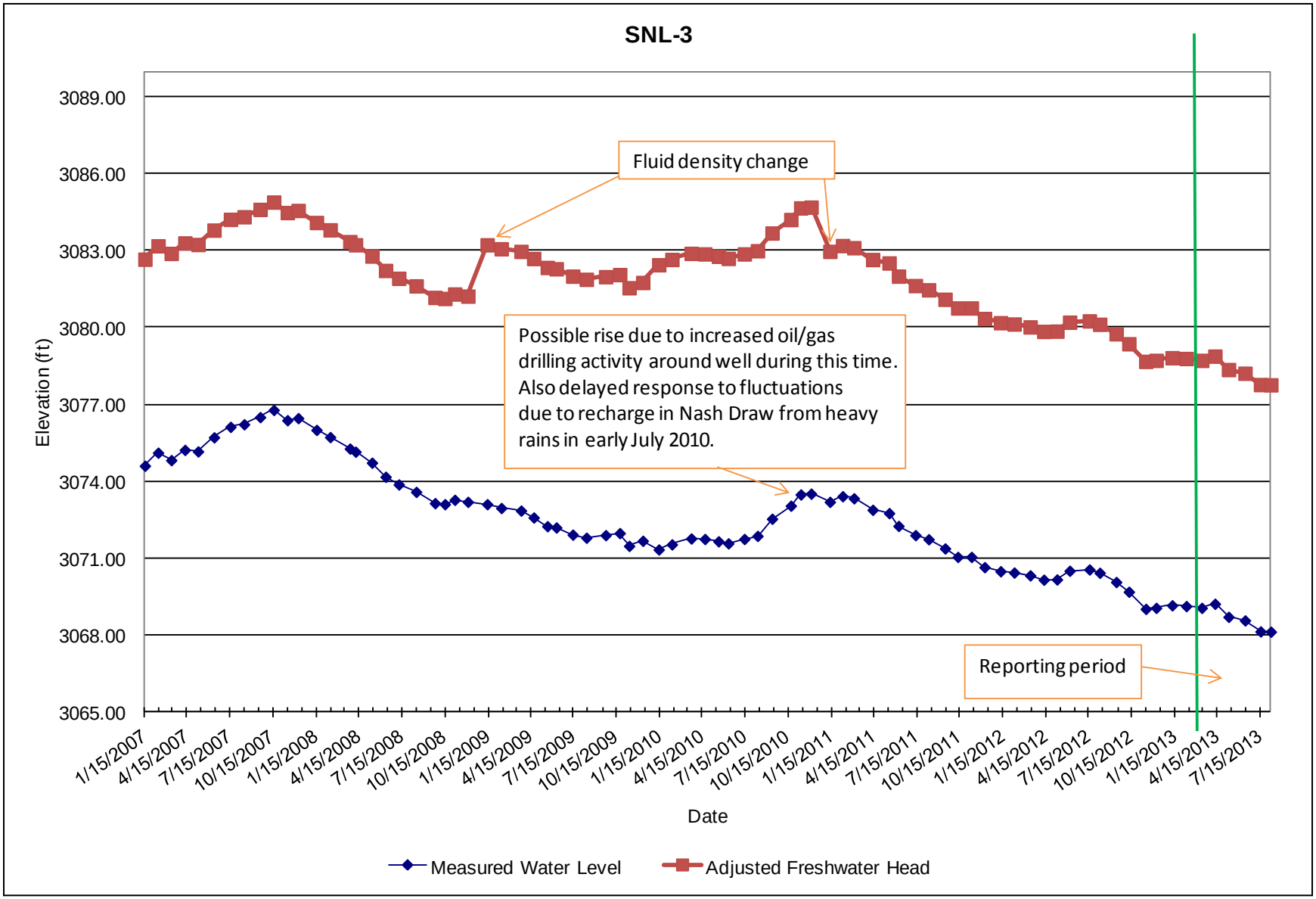

H-19b6
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
Fluid density change
Reporting period
Redundant well to H-19b0, measured quarterly
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

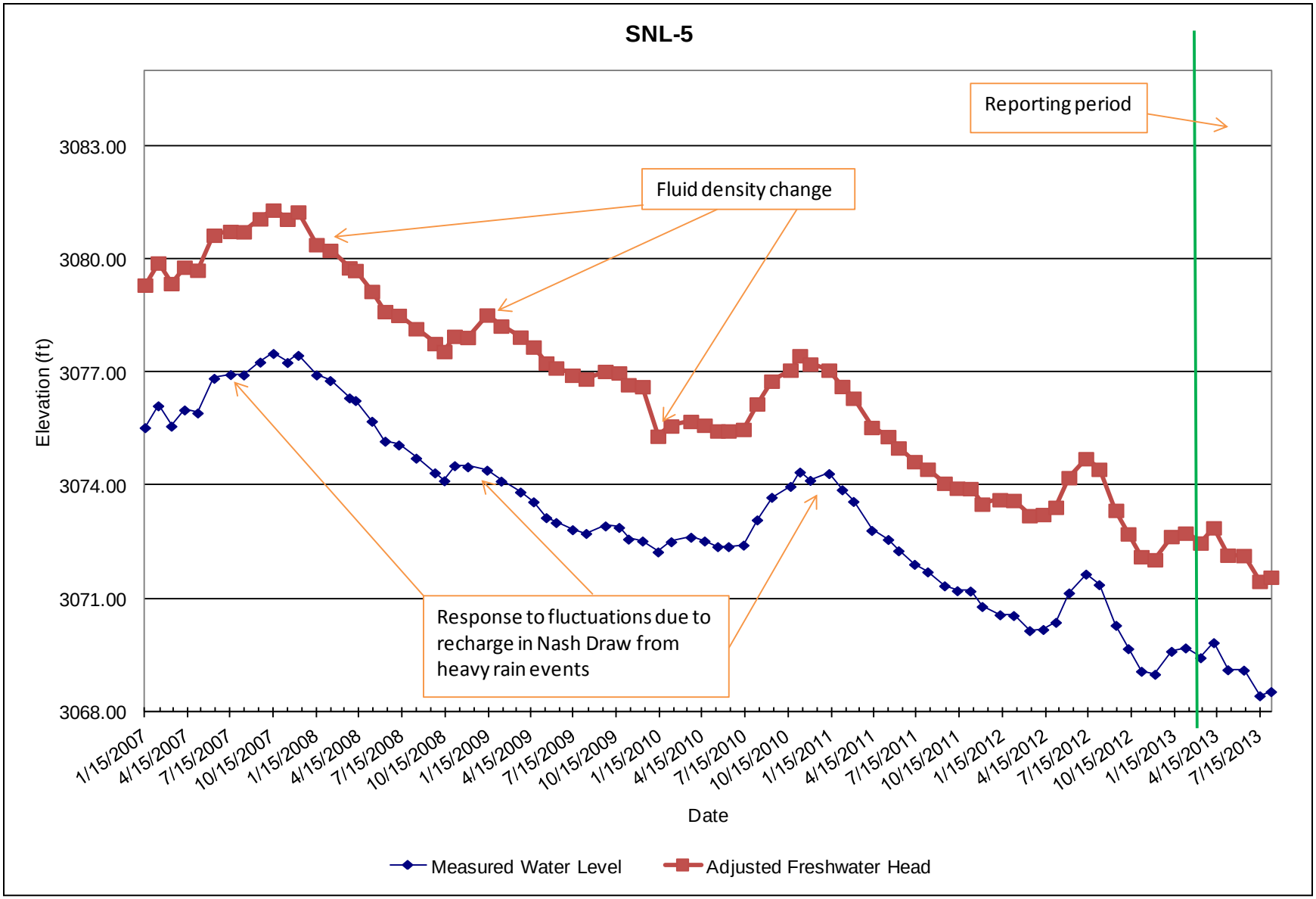

H-19b7
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
Fluid density change
Reporting period
Redundant well to H-19b0, measured quarterly
SNL testing, no measurements Dec. 2012-Aug. 2013
3/1/2007
6/1/2007
9/1/2007
12/1/2007
3/1/2008
6/1/2008
9/1/2008
12/1/2008
3/1/2009
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
Date
Measured Water Level
Adjusted Freshwater Head

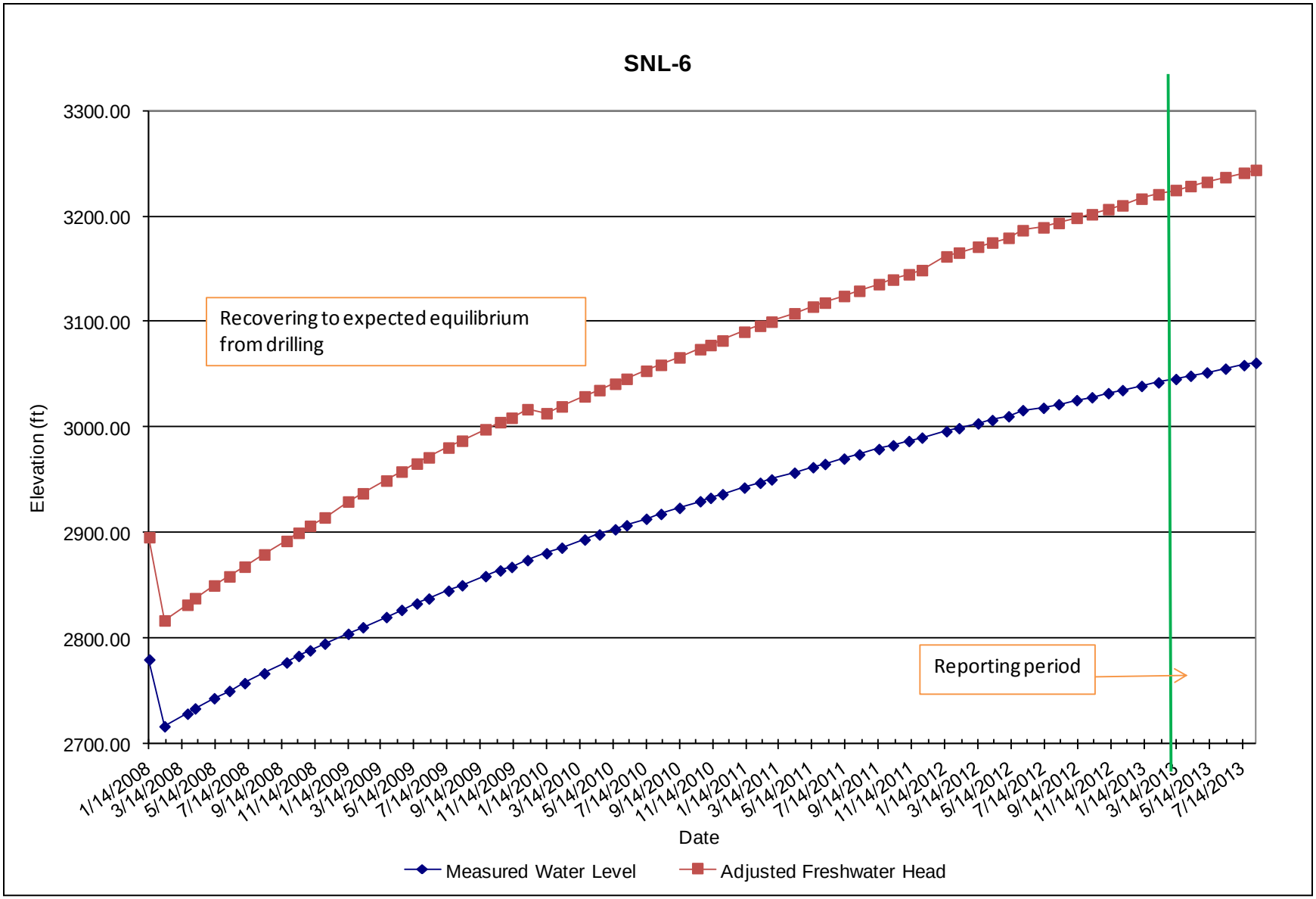

I-461
Current fresh water head is equal to measured water level
Reporting period
Recovery from testing
Fluid density change
Fluctuations due to recharge in Nash Draw in early July 2010
Change due to nearby potash mine roof collapse
Elevation (ft)
3056.00
3055.00
3054.00
3053.00
3052.00
3051.00
3050.00
3049.00
3048.00
3047.00
3046.00
3045.00
3044.00
3043.00
3042.00
3041.00
3040.00
3039.00
3038.00
3037.00
1/15/2007
4/15/2007
7/15/2007
10/15/2007
1/15/2008
4/15/2008
7/15/2008
10/15/2008
1/15/2009
4/15/2009
7/15/2009
10/15/2009
1/15/2010
4/15/2010
7/15/2010
10/15/2010
1/15/2011
4/15/2011
7/15/2011
10/15/2011
1/15/2012
4/15/2012
7/15/2012
10/15/2012
1/15/2013
4/15/2013
7/15/2013
Date
Measured Water Level
Adjusted Freshwater Head

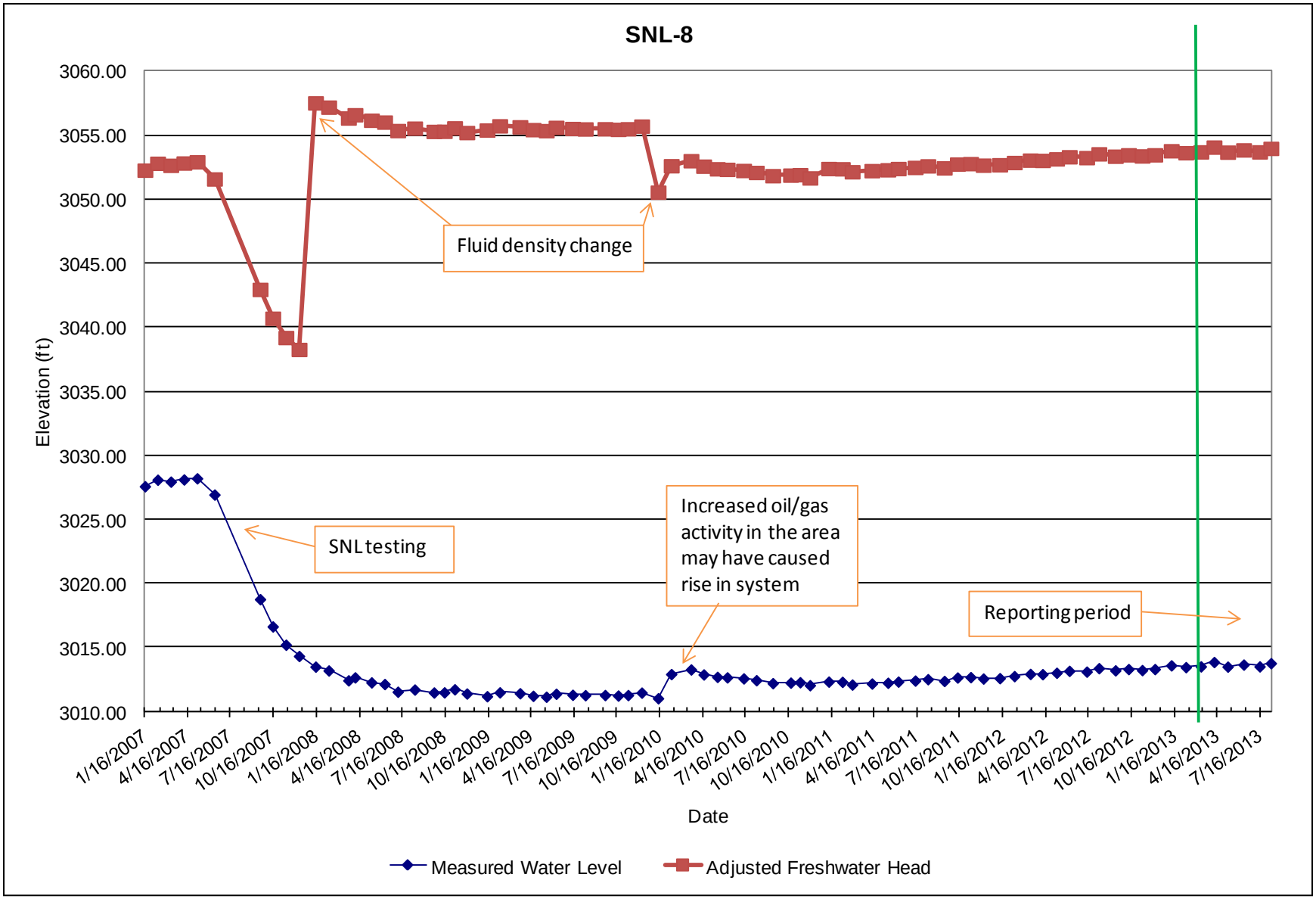

SNL-1
3094.00
3091.00
3088.00
3085.00
3082.00
3079.00
3076.00
3073.00
3070.00
Elevation (ft)
Fluctuations due to recharge in Nash Draw from heavy rains
Reporting period
1/15/2007
4/15/2007
7/15/2007
10/15/2007
1/15/2008
4/15/2008
7/15/2008
10/15/2008
1/15/2009
4/15/2009
7/15/2009
10/15/2009
1/15/2010
4/15/2010
7/15/2010
10/15/2010
1/15/2011
4/15/2011
7/15/2011
10/15/2011
1/15/2012
4/15/2012
7/15/2012
10/15/2012
1/15/2013
4/15/2013
7/15/2013
Date
Measured Water Level
Adjusted Freshwater Head

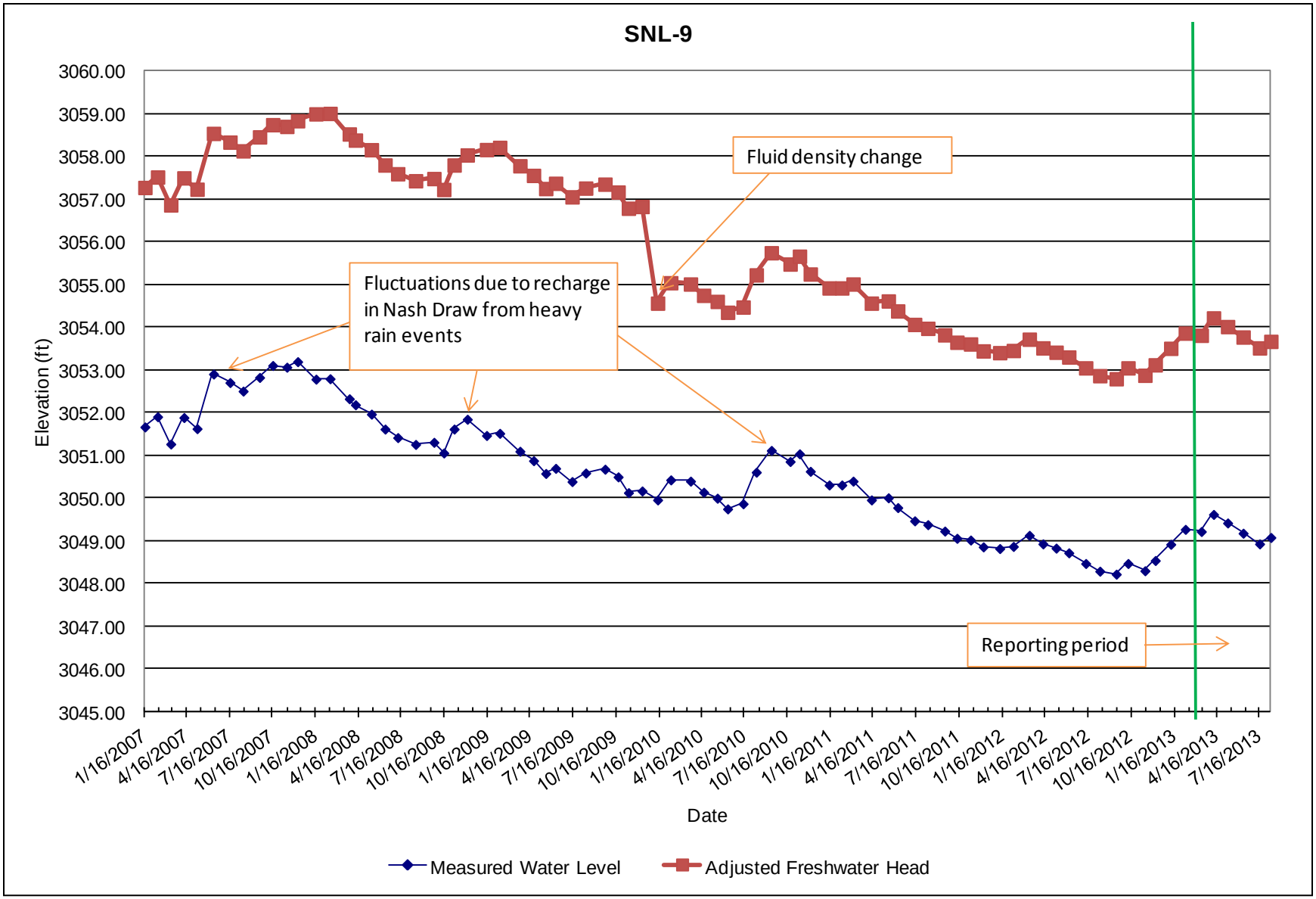

SNL-2
Elevation (ft)
3085.00
3084.00
3083.00
3082.00
3081.00
3080.00
3079.00
3078.00
3077.00
3076.00
3075.00
3074.00
3073.00
3072.00
3071.00
3070.00
3069.00
3068.00
3067.00
3066.00
Fluctuations due to recharge in Nash Draw from heavy rain events
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

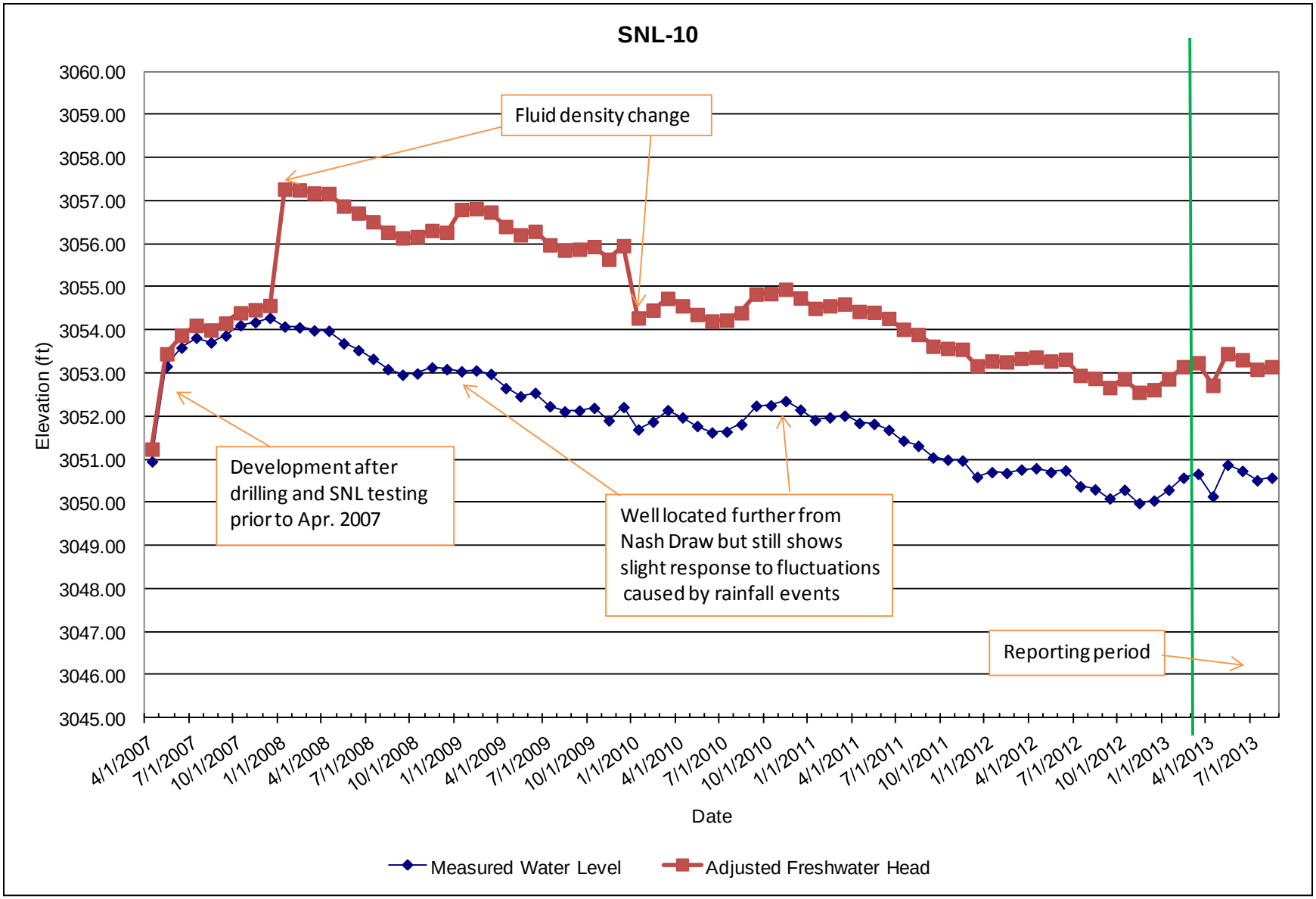

SNL-3
3089.00
3086.00
3083.00
3080.00
3077.00
3074.00
3071.00
3068.00
3065.00
Elevation (ft)
Fluid density change
Possible rise due to increased oil/gas drilling activity around well during this time. Also delayed response to fluctuations due to recharge in Nash Draw from heavy rains in early July 2010.
Reporting period
1/15/2007
4/15/2007
7/15/2007
10/15/2007
1/15/2008
4/15/2008
7/15/2008
10/15/2008
1/15/2009
4/15/2009
7/15/2009
10/15/2009
1/15/2010
4/15/2010
7/15/2010
10/15/2010
1/15/2011
4/15/2011
7/15/2011
10/15/2011
1/15/2012
4/15/2012
7/15/2012
10/15/2012
1/15/2013
4/15/2013
7/15/2013
Date
Measured Water Level
Adjusted Freshwater Head

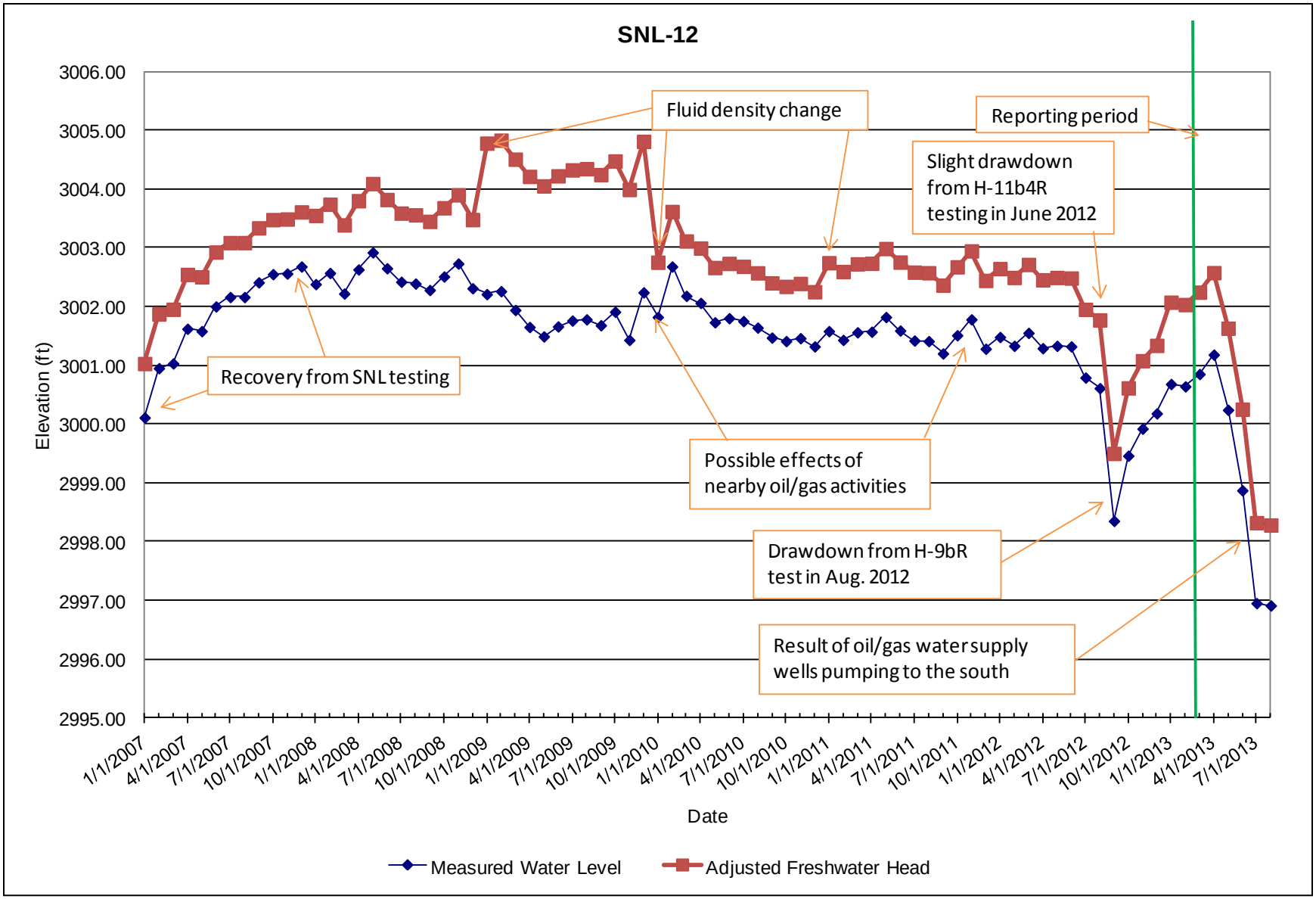

SNL-5
Reporting period
Fluid density change
Response to fluctuations due to recharge in Nash Draw from heavy rain events
Elevation (ft)
3083.00
3080.00
3077.00
3074.00
3071.00
3068.00
1/15/2007
4/15/2007
7/15/2007
10/15/2007
1/15/2008
4/15/2008
7/15/2008
10/15/2008
1/15/2009
4/15/2009
7/15/2009
10/15/2009
1/15/2010
4/15/2010
7/15/2010
10/15/2010
1/15/2011
4/15/2011
7/15/2011
10/15/2011
1/15/2012
4/15/2012
7/15/2012
10/15/2012
1/15/2013
4/15/2013
7/15/2013
Date
Measured Water Level
Adjusted Freshwater Head

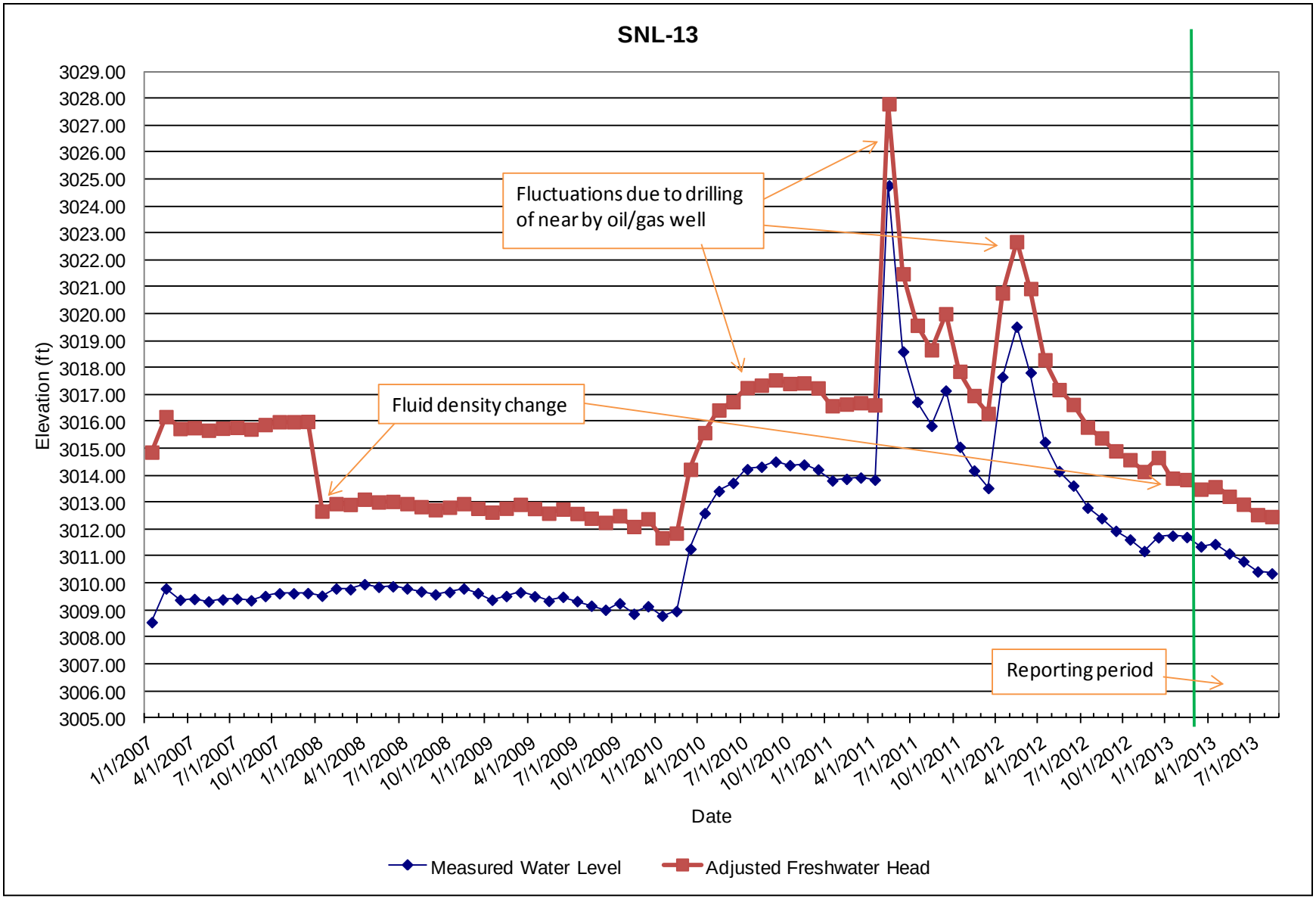

SNL-6
3300.00
3200.00
3100.00
3000.00
2900.00
2800.00
2700.00
Elevation (ft)
Recovering to expected equilibrium from drilling
Reporting period
1/14/2008
3/14/2008
5/14/2008
7/14/2008
9/14/2008
11/14/2008
1/14/2009
3/14/2009
5/14/2009
7/14/2009
9/14/2009
11/14/2009
1/14/2010
3/14/2010
5/14/2010
7/14/2010
9/14/2010
11/14/2010
1/14/2011
3/14/2011
5/14/2011
7/14/2011
9/14/2011
11/14/2011
1/14/2012
3/14/2012
5/14/2012
7/14/2012
9/14/2012
11/14/2012
1/14/2013
3/14/2013
5/14/2013
7/14/2013
Date
Measured Water Level
Adjusted Freshwater Head

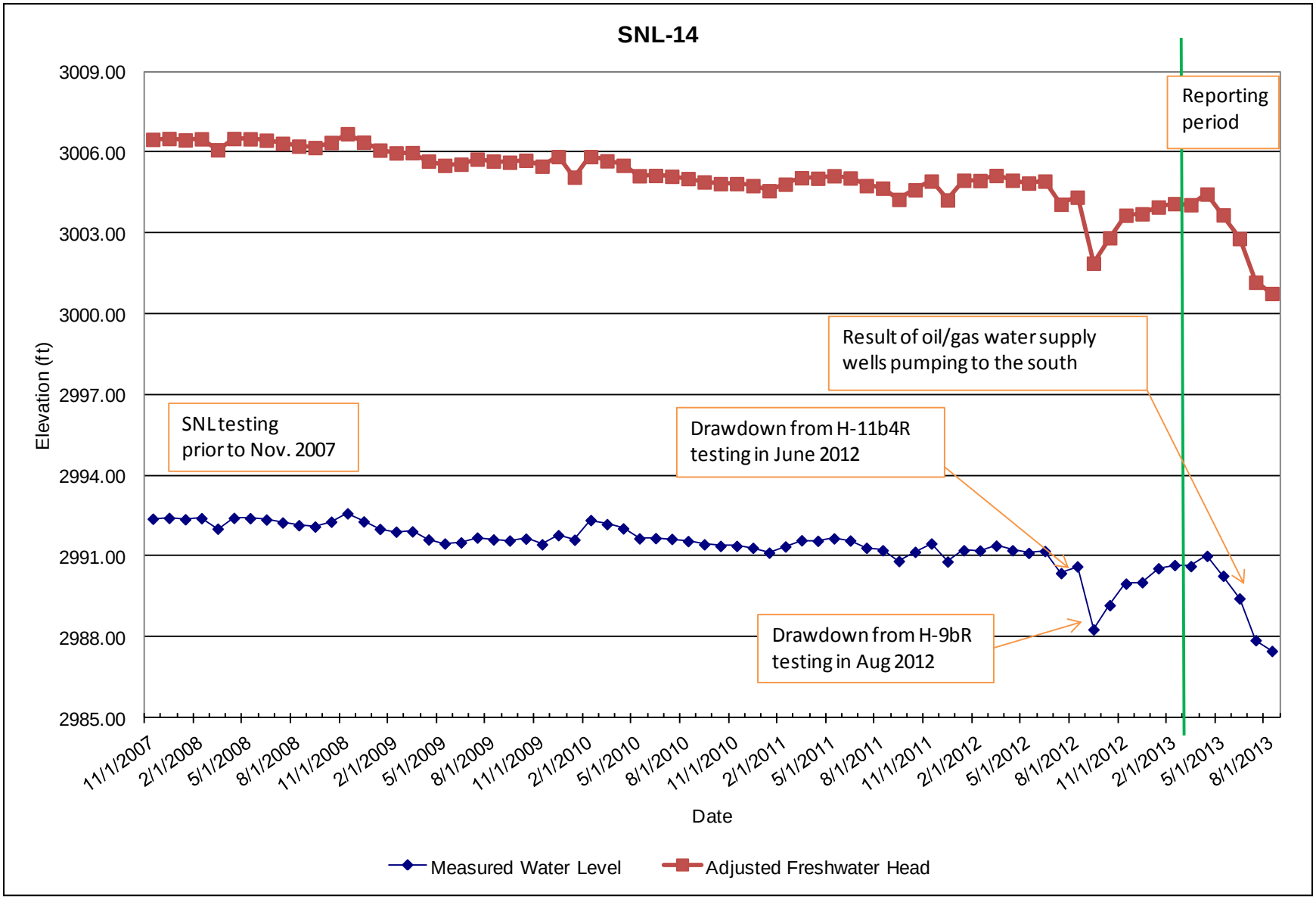

SNL-8
3060.00
3055.00
3050.00
3045.00
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
Elevation (ft)
Fluid density change
SNL testing
Increased oil/gas activity in the area may have caused rise in system
Reporting period
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head

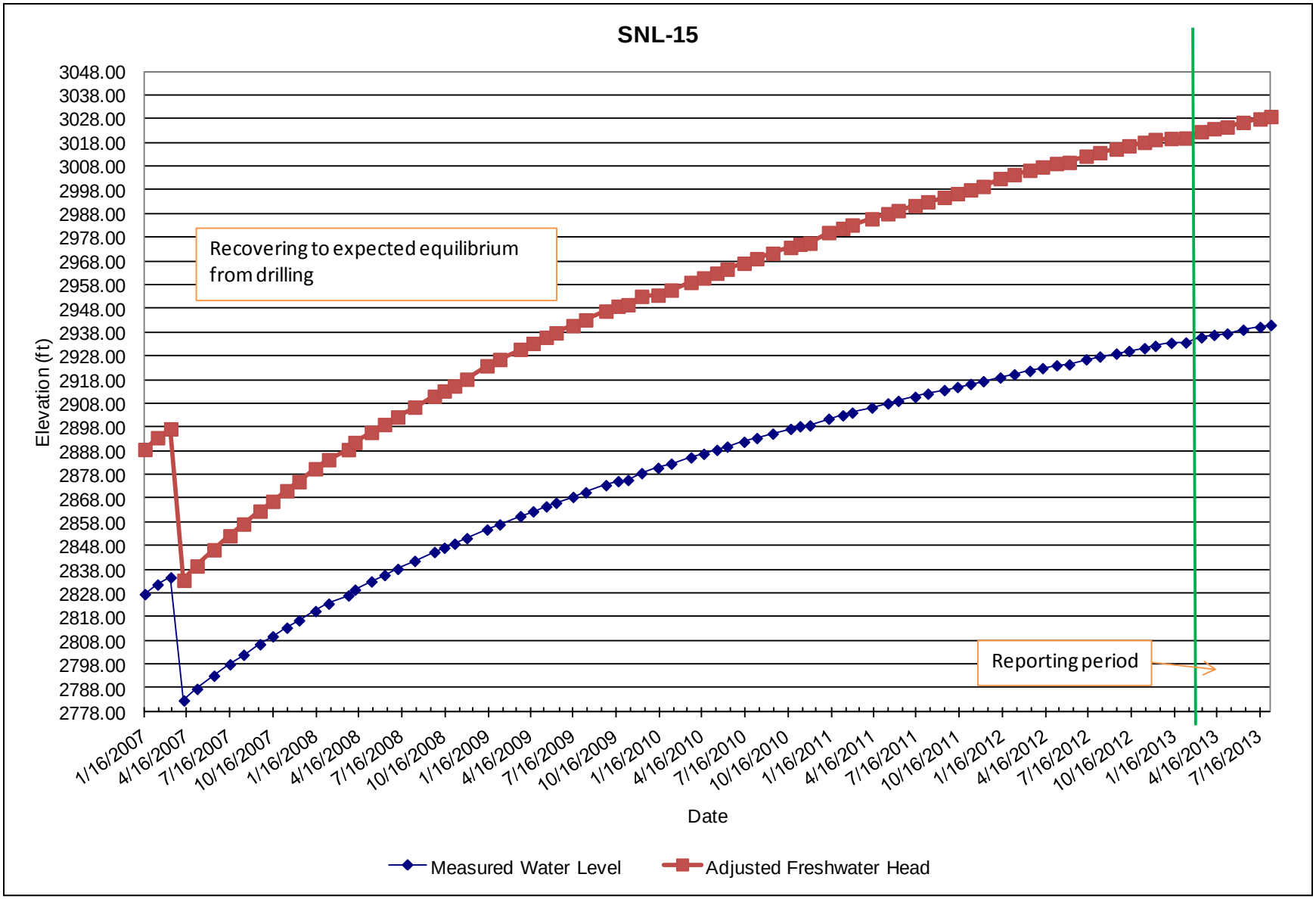

SNL-9
Fluid density change
Fluctuations due to recharge in Nash Draw from heavy rain events
Reporting period
Elevation (ft)
Date
Measured Water Level
Adjusted Freshwater Head

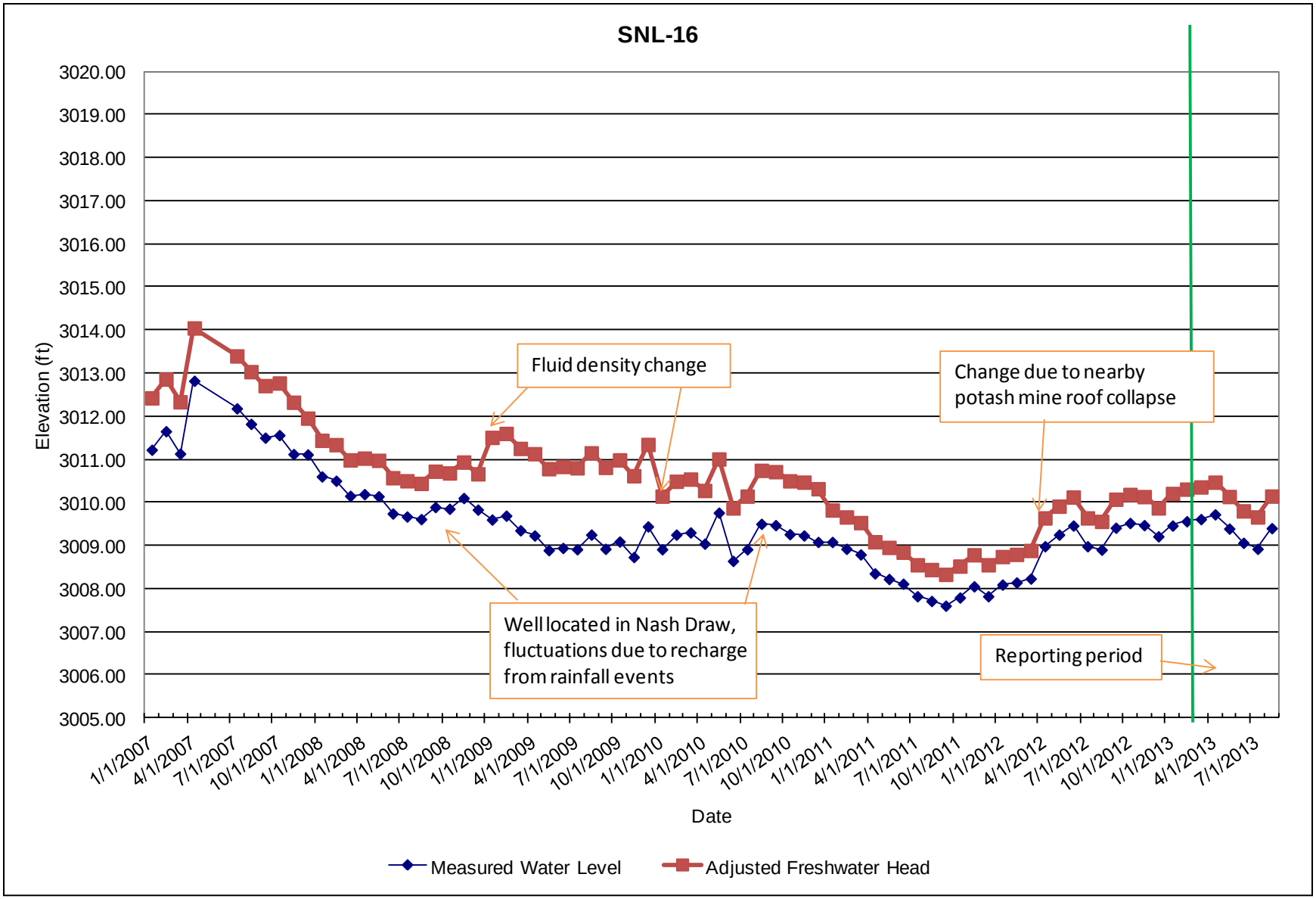

SNL-10
Elevation (ft)
3060.00
3059.00
3058.00
3057.00
3056.00
3055.00
3054.00
3053.00
3052.00
3051.00
3050.00
3049.00
3048.00
3047.00
3046.00
3045.00
Fluid density change
Development after drilling and SNL testing prior to Apr. 2007
Well located further from Nash Draw but still shows slight response to fluctuations caused by rainfall events
Reporting period
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

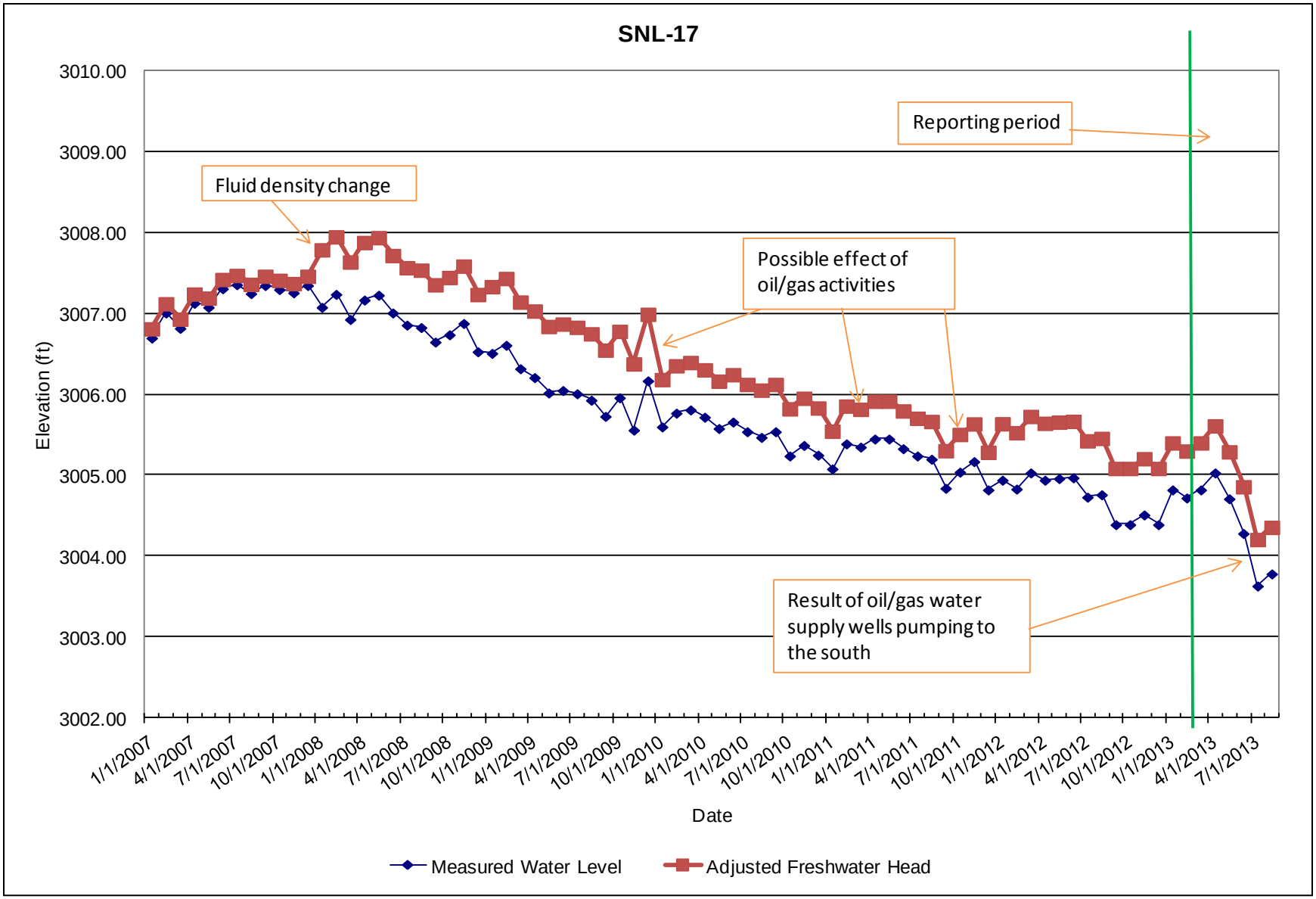

SNL-12
Elevation (ft)
3006.00
3005.00
3004.00
3003.00
3002.00
3001.00
3000.00
2999.00
2998.00
2997.00
2996.00
2995.00
Fluid density change
Reporting period
Slight drawdown from H-11b4R testing in June 2012
Recovery from SNL testing
Possible effects of nearby oil/gas activities
Drawdown from H-9bR test in Aug. 2012
Result of oil/gas water supply wells pumping to the south
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

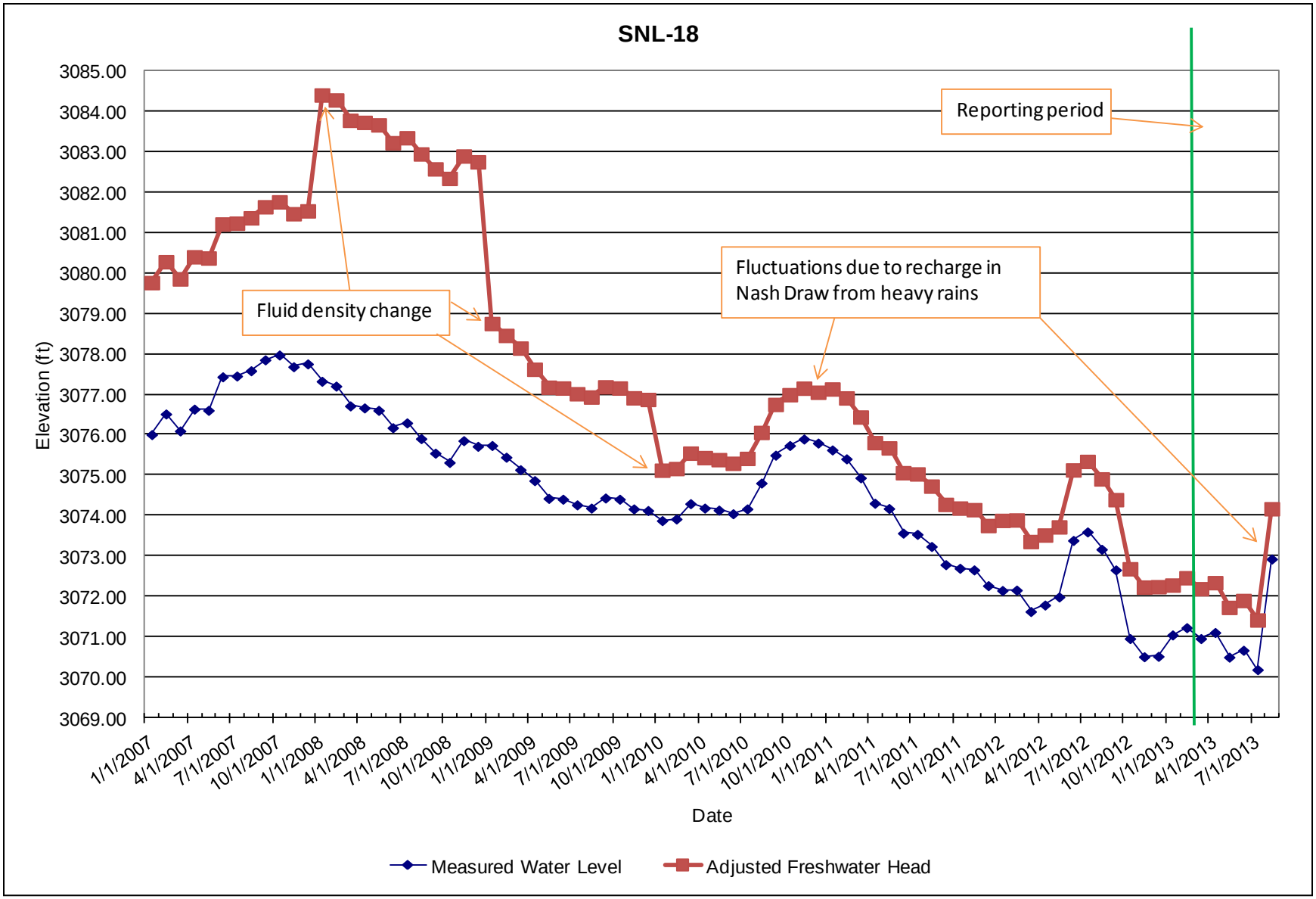

SNL-13
Elevation (ft)
3029.00
3028.00
3027.00
3026.00
3025.00
3024.00
3023.00
3022.00
3021.00
3020.00
3019.00
3018.00
3017.00
3016.00
3015.00
3014.00
3013.00
3012.00
3011.00
3010.00
3009.00
3008.00
3007.00
3006.00
3005.00
Fluctuations due to drilling of near by oil/gas well
Fluid density change
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

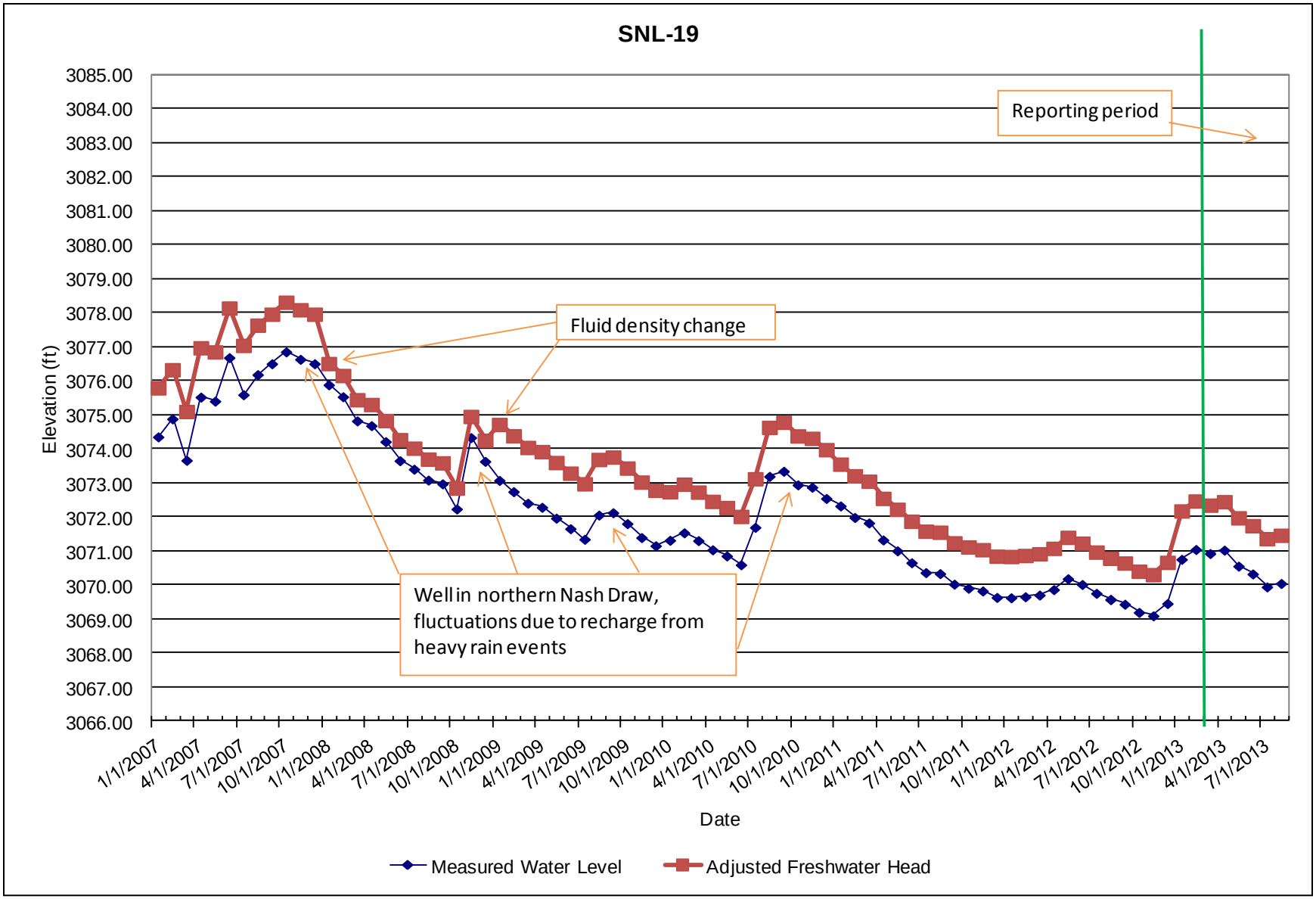

SNL-14
3009.00
3006.00
3003.00
3000.00
2997.00
2994.00
2991.00
2988.00
2985.00
Elevation (ft)
Reporting period
Result of oil/gas water supply wells pumping to the south
SNL testing prior to Nov. 2007
Drawdown from H-11b4R testing in June 2012
Drawdown from H-9bR testing in Aug 2012
11/1/2007
2/1/2008
5/1/2008
8/1/2008
11/1/2008
2/1/2009
5/1/2009
8/1/2009
11/1/2009
2/1/2010
5/1/2010
8/1/2010
11/1/2010
2/1/2011
5/1/2011
8/1/2011
11/1/2011
2/1/2012
5/1/2012
8/1/2012
11/1/2012
2/1/2013
5/1/2013
8/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

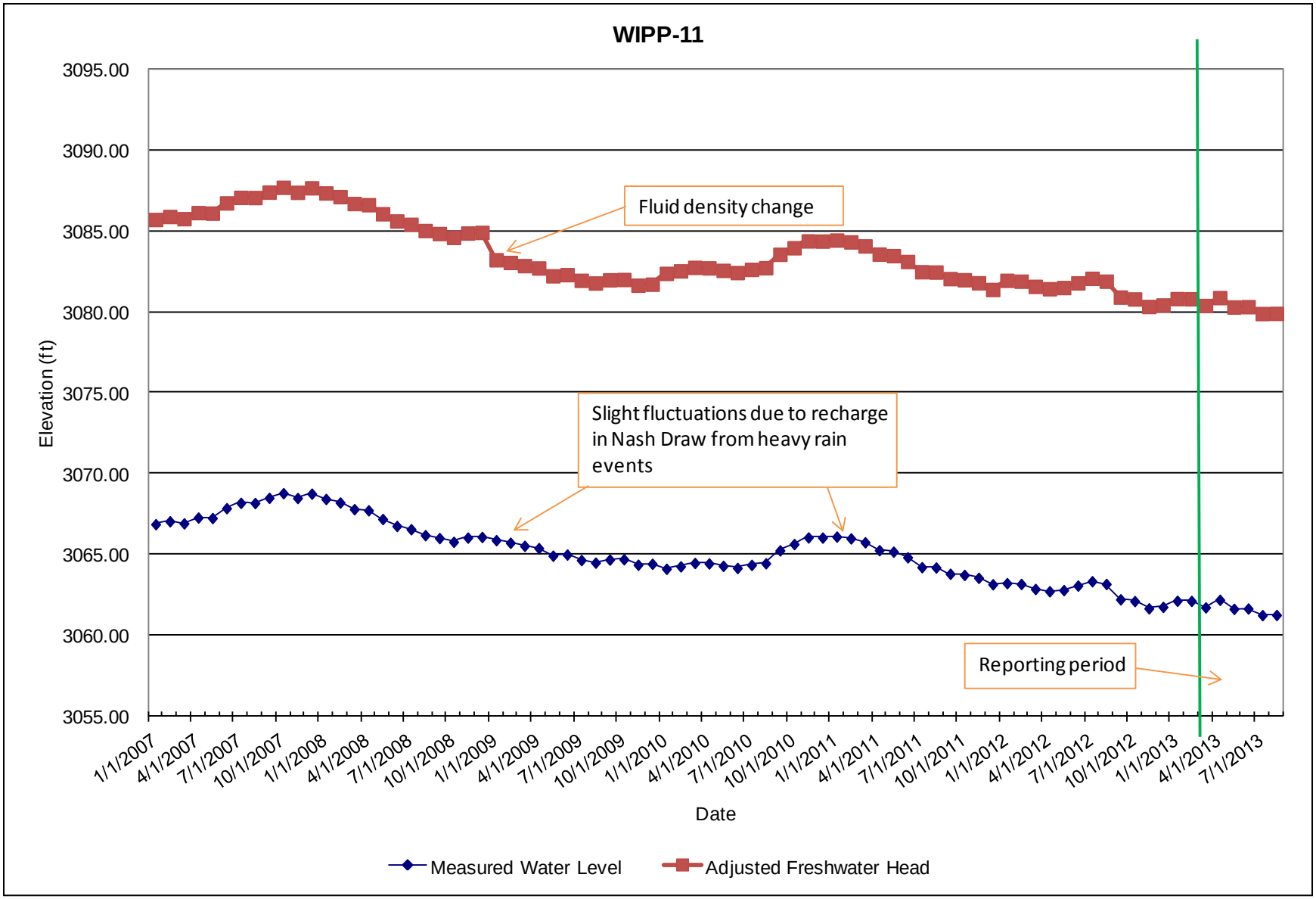

SNL-15
Recovering to expected equilibrium from drilling
Reporting period
Elevation (ft)
3048.00
3038.00
3028.00
3018.00
3008.00
2998.00
2988.00
2978.00
2968.00
2958.00
2948.00
2938.00
2928.00
2918.00
2908.00
2898.00
2888.00
2878.00
2868.00
2858.00
2848.00
2838.00
2828.00
2818.00
2808.00
2798.00
2788.00
2778.00
1/16/2007
4/16/2007
7/16/2007
10/16/2007
1/16/2008
4/16/2008
7/16/2008
10/16/2008
1/16/2009
4/16/2009
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
Date
Measured Water Level
Adjusted Freshwater Head

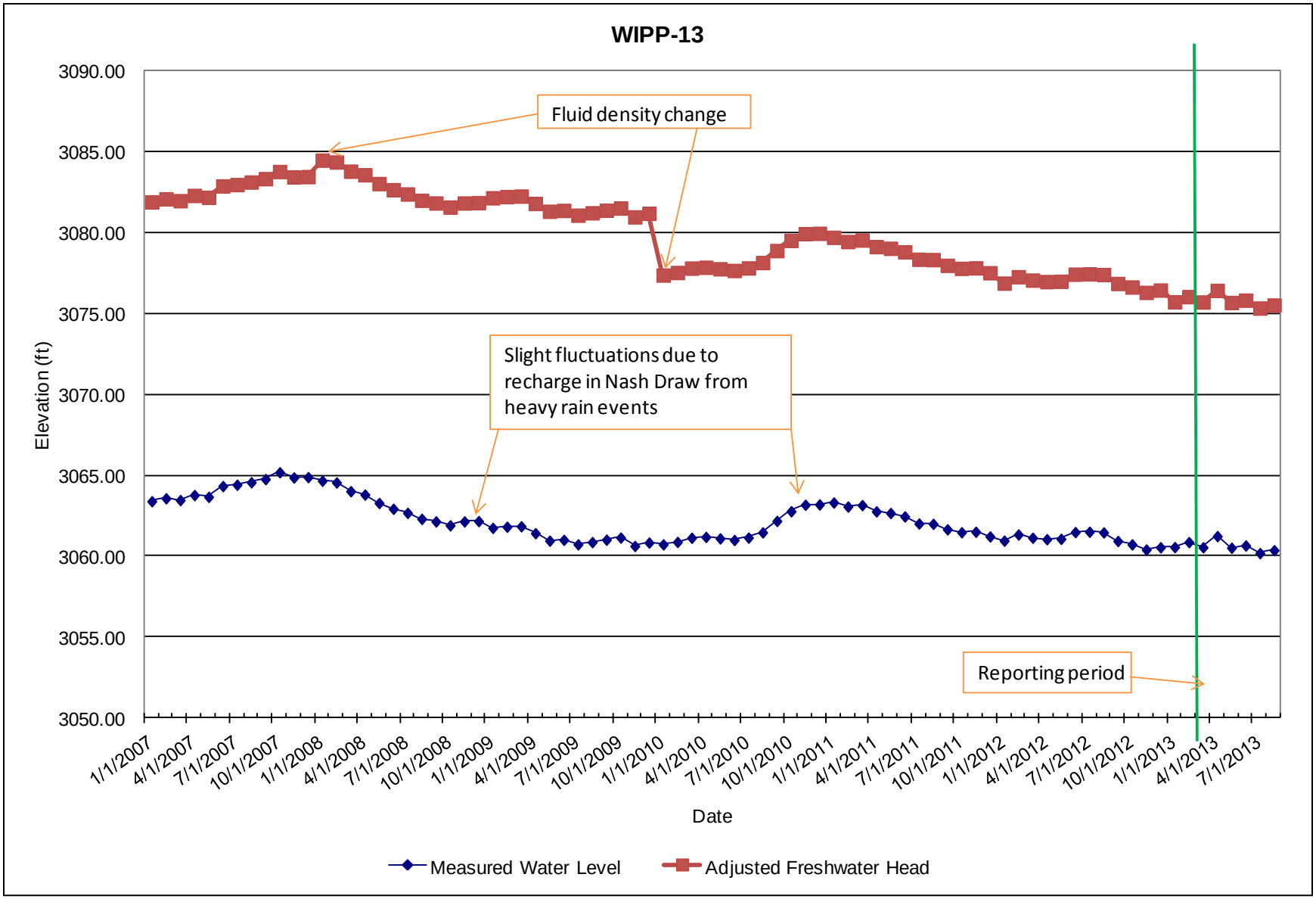

SNL-16
Elevation (ft)
3020.00
3019.00
3018.00
3017.00
3016.00
3015.00
3014.00
3013.00
3012.00
3011.00
3010.00
3009.00
3008.00
3007.00
3006.00
3005.00
Fluid density change
Change due to nearby potash mine roof collapse
Well located in Nash Draw, fluctuations due to recharge from rainfall events
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

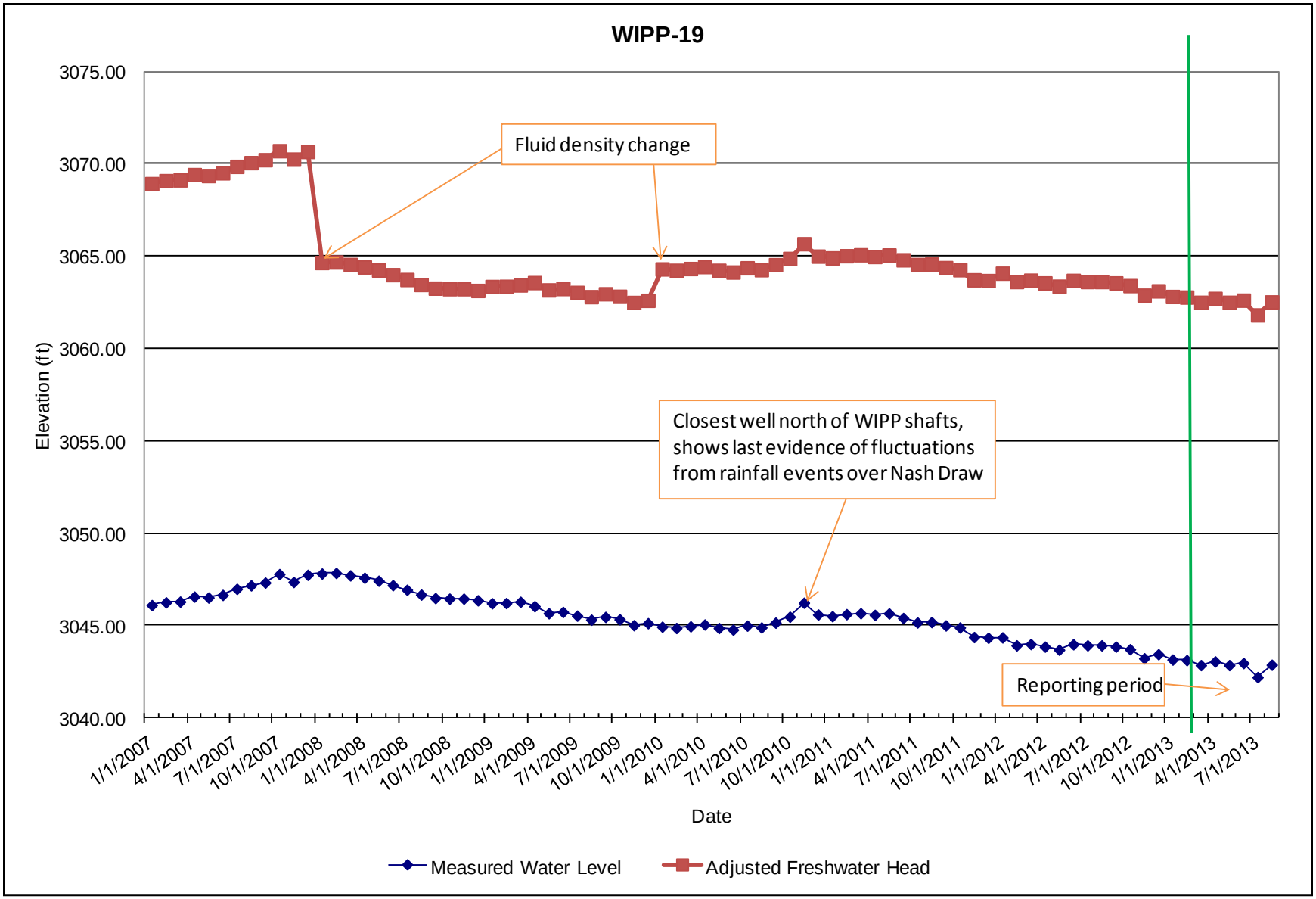

SNL-17
3010.00
3009.00
3008.00
3007.00
3006.00
3005.00
3004.00
3003.00
3002.00
Elevation (ft)
Reporting period
Fluid density change
Possible effect of oil/gas activities
Result of oil/gas water supply wells pumping to the south
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

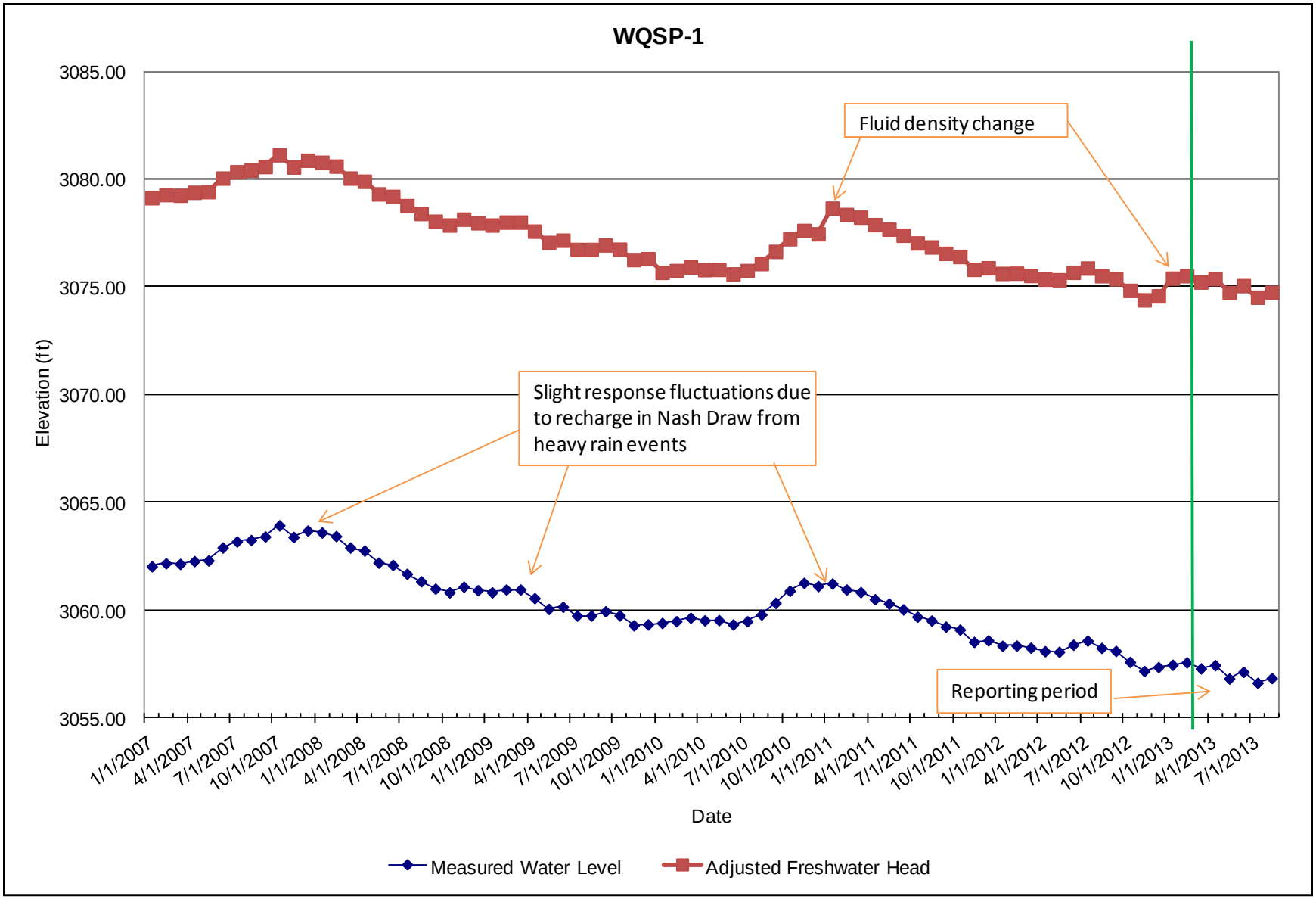

SNL-18
Reporting period
Fluctuations due to recharge in Nash Draw from heavy rains
Fluid density change
Elevation (ft)
3085.00
3084.00
3083.00
3082.00
3081.00
3080.00
3079.00
3078.00
3077.00
3076.00
3075.00
3074.00
3073.00
3072.00
3071.00
3070.00
3069.00
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

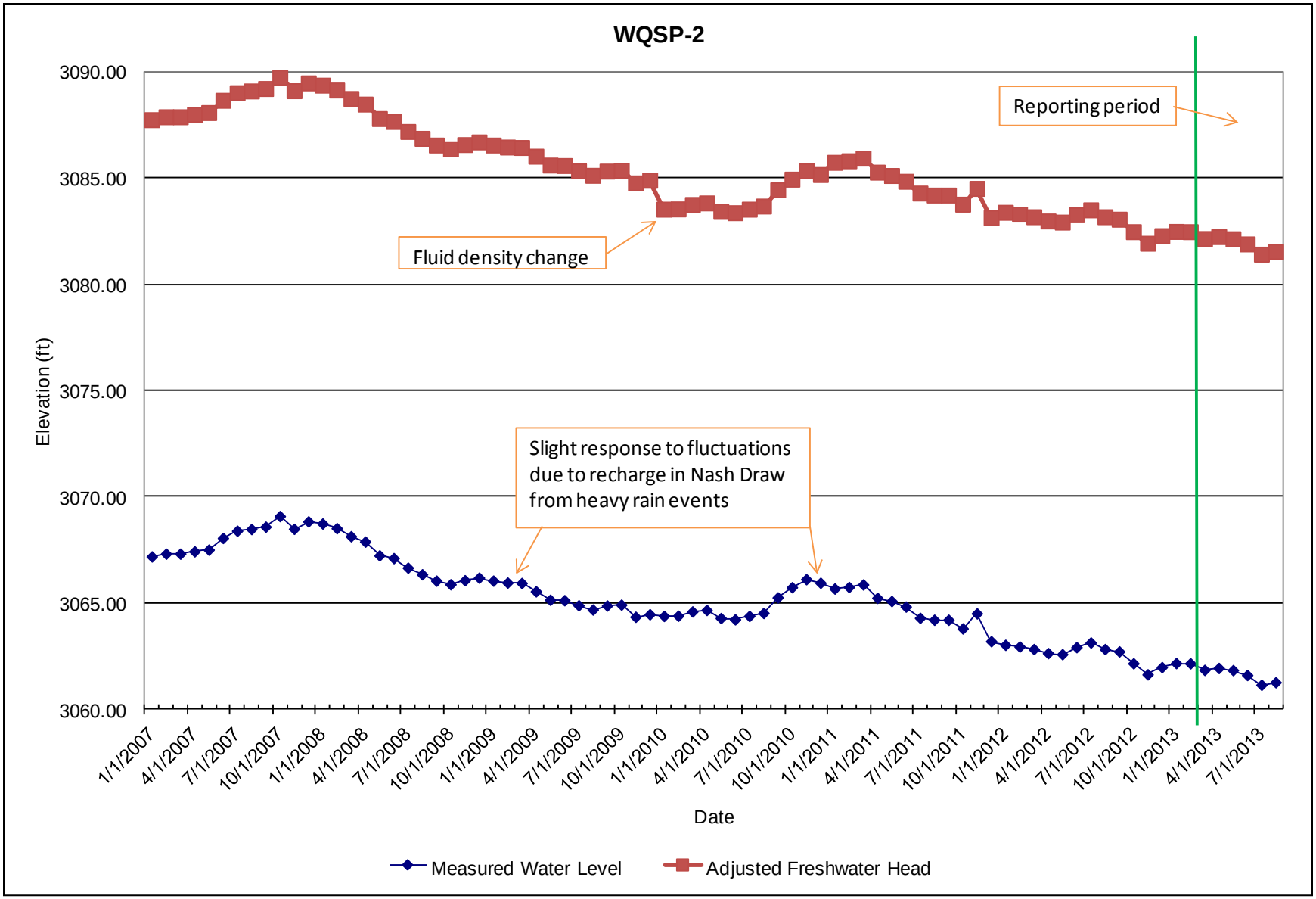

SNL-19
Reporting period
Fluid density change
Well in northern Nash Draw, fluctuations due to recharge from heavy rain events
Elevation (ft)
3085.00
3084.00
3083.00
3082.00
3081.00
3080.00
3079.00
3078.00
3077.00
3076.00
3075.00
3074.00
3073.00
3072.00
3071.00
3070.00
3069.00
3068.00
3067.00
3066.00
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

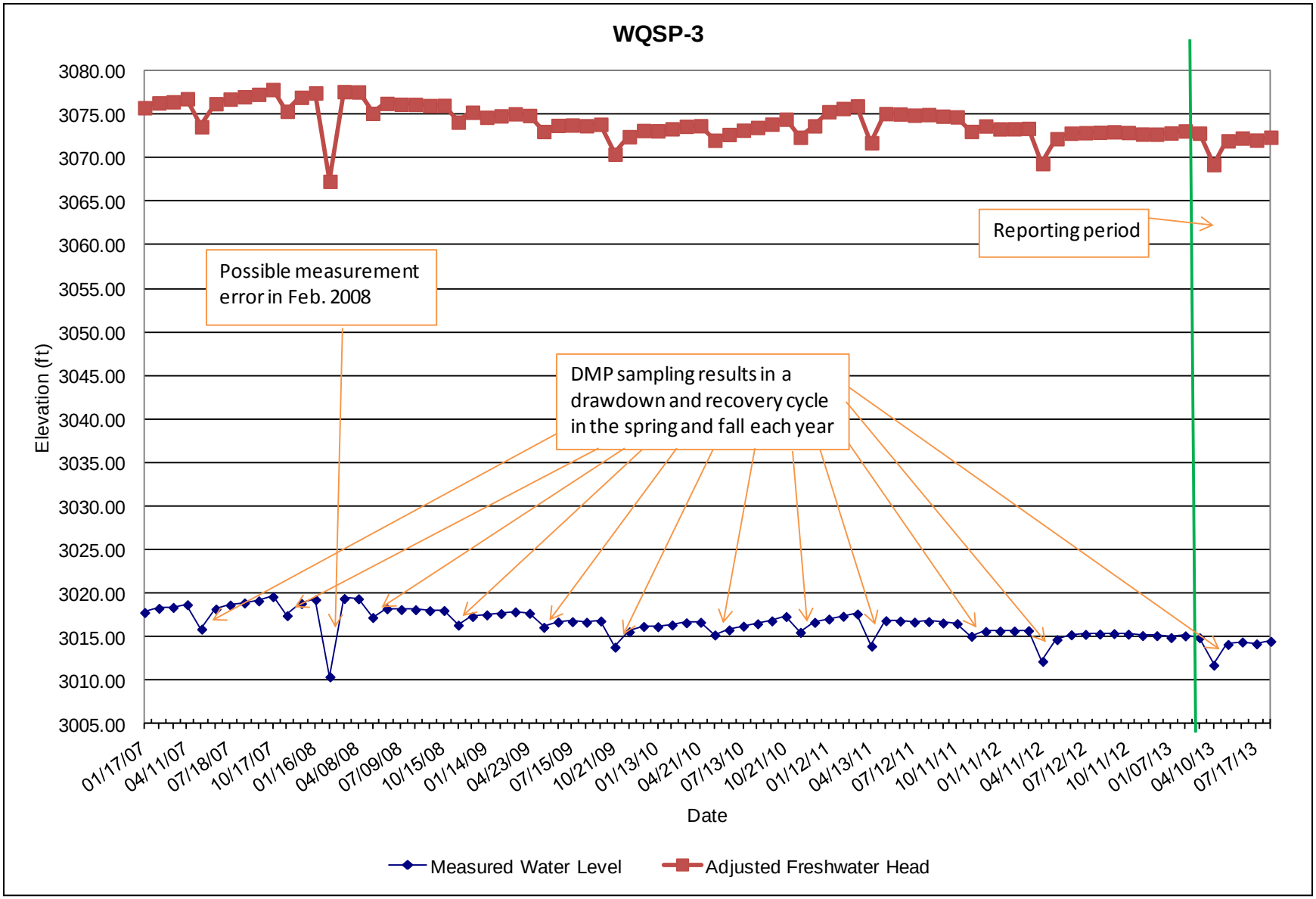

WIPP-11
3095.00
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
Elevation (ft)
Fluid density change
Slight fluctuations due to recharge in Nash Draw from heavy rain events
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

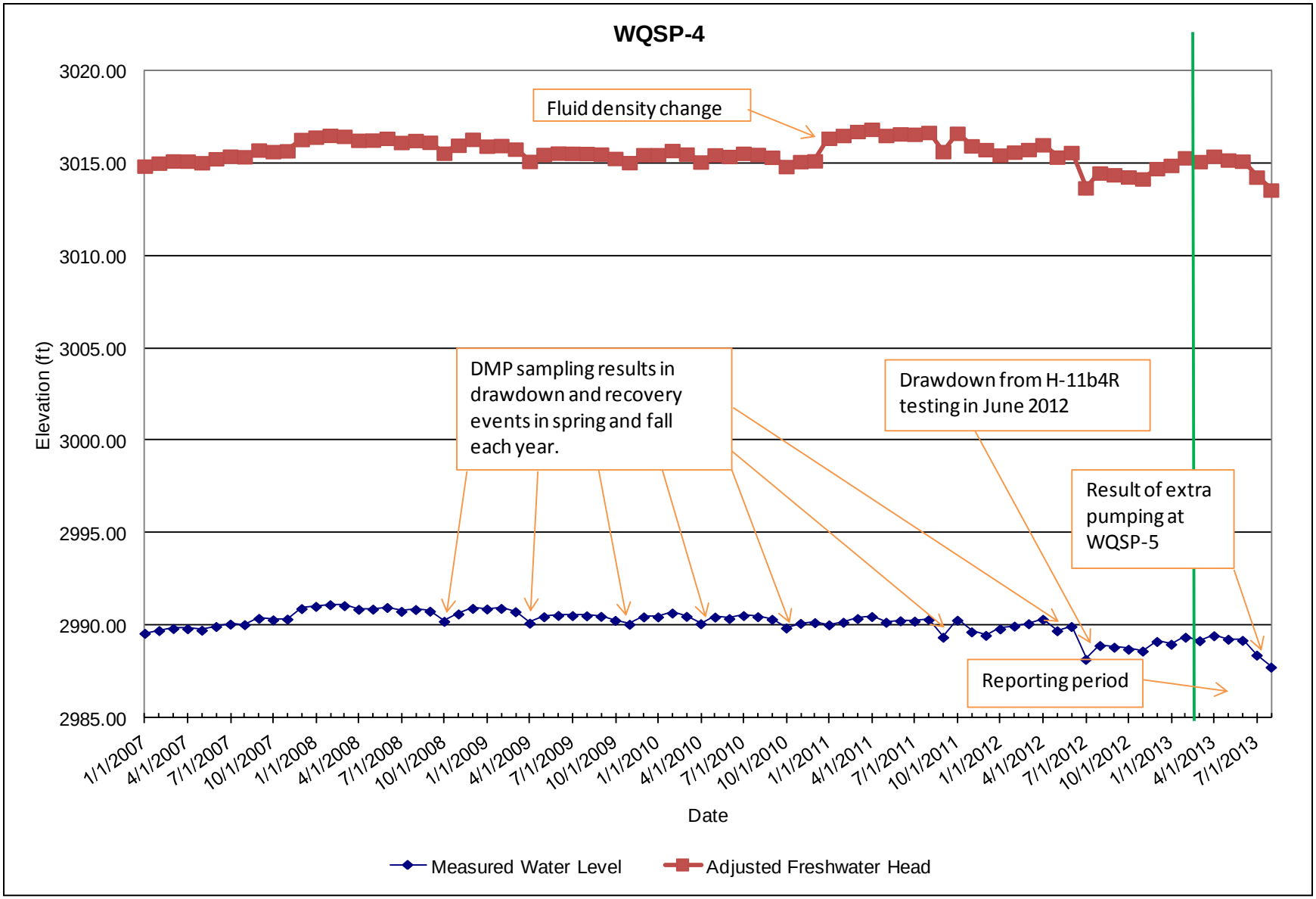

WIPP-13
Fluid density change
Slight fluctuations due to recharge in Nash Draw from heavy rain events
Reporting period
Elevation (ft)
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
3050.00
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

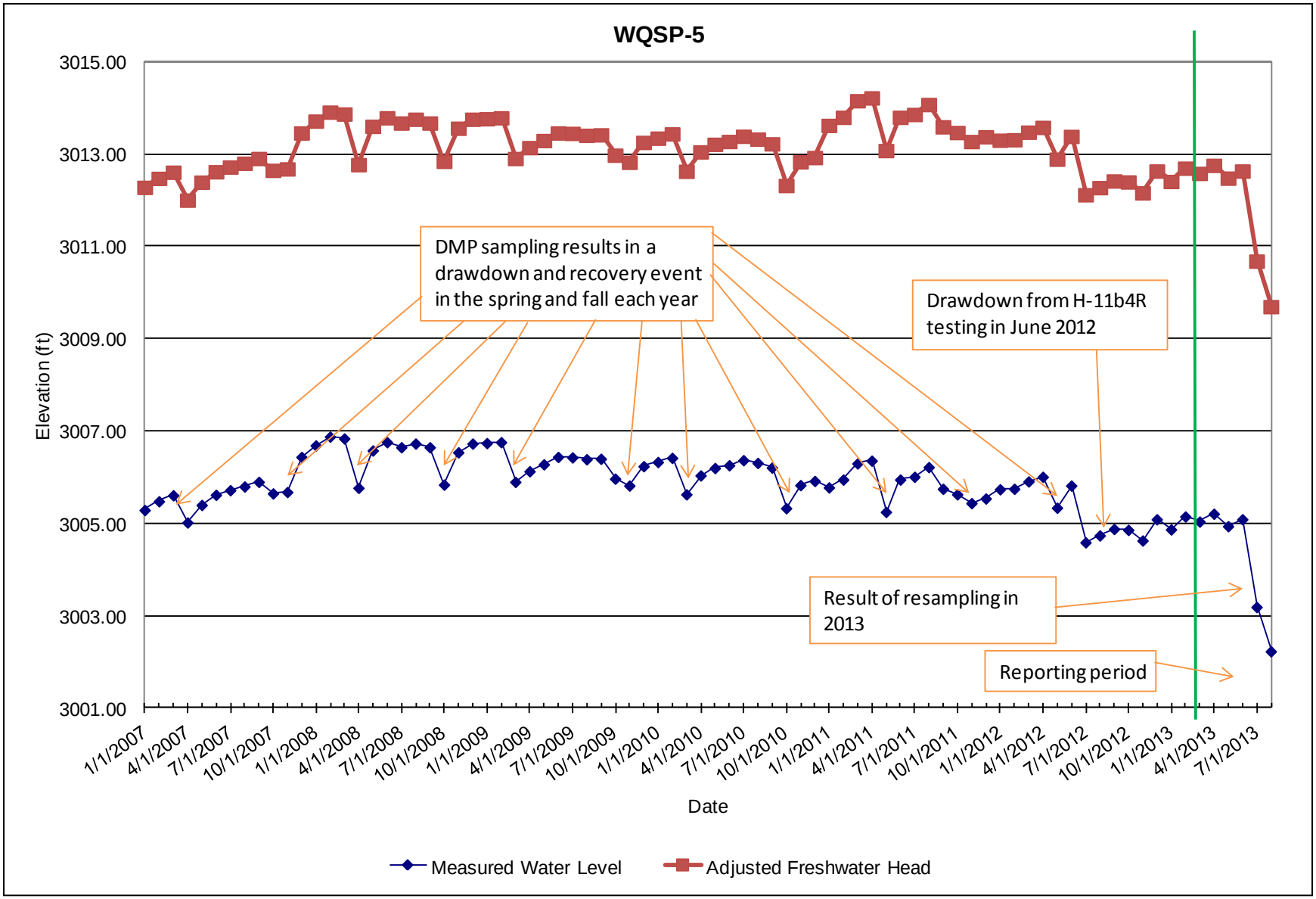

WIPP-19
3075.00
3070.00
3065.00
3060.00
3055.00
3050.00
3045.00
3040.00
Elevation (ft)
Fluid density change
Closest well north of WIPP shafts, shows last evidence of fluctuations from rainfall events over Nash Draw
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

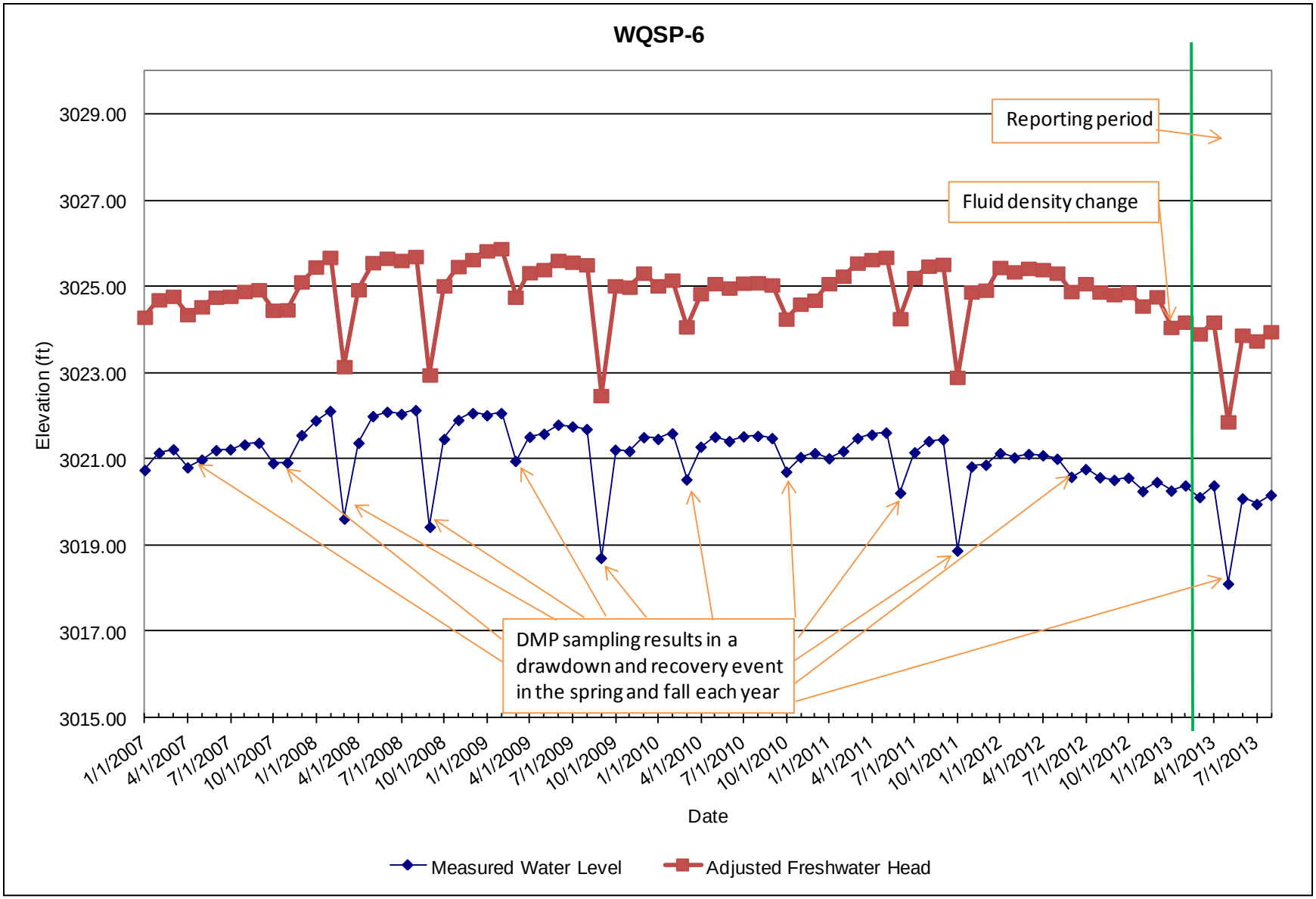

WQSP-1
Elevation (ft)
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
Fluid density change
Slight response fluctuations due to recharge in Nash Draw from heavy rain events
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head


WQSP-2
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
Elevation (ft)
Reporting period
Fluid density change
Slight response to fluctuations due to recharge in Nash Draw from heavy rain events
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head


WQSP-3
Elevation (ft)
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
3050.00
3045.00
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
3005.00
Reporting period
Possible measurement error in Feb. 2008
DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
01/17/07
04/11/07
07/18/07
10/17/07
01/16/08
04/08/08
07/09/08
10/15/08
01/14/09
04/23/09
07/15/09
10/21/09
01/13/10
04/21/10
07/13/10
10/21/10
01/12/11
04/13/11
07/12/11
10/11/11
01/11/12
04/11/12
07/12/12
10/11/12
01/07/13
04/10/13
07/17/13
Date
Measured Water Level
Adjusted Freshwater Head


WQSP-4
Fluid density change
DMP sampling results in drawdown and recovery events in spring and fall each year.
Drawdown from H-11b4R testing in June 2012
Result of extra pumping at WQSP-5
Reporting period
Elevation (ft)
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head


WQSP-5
3015.00
3013.00
3011.00
3009.00
3007.00
3005.00
3003.00
3001.00
Elevation (ft)
DMP sampling results in a drawdown and recovery event in the spring and fall each year
Drawdown from H-11b4R testing in June 2012
Result of resampling in 2013
Reporting period
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head


WQSP-6
Reporting period
Fluid density change
DMP sampling results in a drawdown and recovery event in the spring and fall each year
Elevation (ft)
3029.00
3027.00
3025.00
3023.00
3021.00
3019.00
3017.00
3015.00
1/1/2007
4/1/2007
7/1/2007
10/1/2007
1/1/2008
4/1/2008
7/1/2008
10/1/2008
1/1/2009
4/1/2009
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
Date
Measured Water Level
Adjusted Freshwater Head

Appendix 2

Culebra Groundwater Levels

March – August 2013

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl*	ADJUSTED FRESHWATER HEAD ft amsl
AEC-7	CUL	03/11/13	613.00	3044.06	3061.44
AEC-7	CUL	04/08/13	612.96	3044.10	3061.49
AEC-7	CUL	05/08/13	613.14	3043.92	3061.29
AEC-7	CUL	06/11/13	612.93	3044.13	3061.52
AEC-7	CUL	07/15/13	613.25	3043.81	3061.18
AEC-7	CUL	08/06/13	613.10	3043.96	3061.34
C-2737 (PIP)	CUL	03/13/13	388.03	3012.73	3019.70
C-2737 (PIP)	CUL	04/10/13	387.78	3012.98	3019.96
C-2737 (PIP)	CUL	05/13/13	387.89	3012.87	3019.84
C-2737 (PIP)	CUL	06/13/13	387.77	3012.99	3019.97
C-2737 (PIP)	CUL	07/17/13	388.02	3012.74	3019.71
C-2737 (PIP)	CUL	08/09/13	388.41	3012.35	3019.31
ERDA-9	CUL	03/13/13	400.09	3010.08	3033.23
ERDA-9	CUL	04/10/13	399.81	3010.36	3033.53
ERDA-9	CUL	05/13/13	399.93	3010.24	3033.40
ERDA-9	CUL	06/12/13	399.71	3010.46	3033.63
ERDA-9	CUL	07/17/13	399.83	3010.34	3033.51
ERDA-9	CUL	08/09/13	399.85	3010.32	3033.48
H-02b2	CUL	03/13/13	337.44	3040.92	3044.50
H-02b2	CUL	04/10/13	337.24	3041.12	3044.70
H-02b2	CUL	05/13/13	337.31	3041.05	3044.63
H-02b2	CUL	06/13/13	337.26	3041.10	3044.68
H-02b2	CUL	07/17/13	337.50	3040.86	3044.44
H-02b2	CUL	08/09/13	337.26	3041.10	3044.68
H-03b2	CUL	03/14/13	388.88	3001.03	3011.79
H-03b2	CUL	04/10/13	388.69	3001.22	3011.98
H-03b2	CUL	05/13/13	388.93	3000.98	3011.74
H-03b2	CUL	06/10/13	388.95	3000.96	3011.72
H-03b2	CUL	07/17/13	390.12	2999.79	3010.50
H-03b2	CUL	08/09/13	391.24	2998.67	3009.34
H-04bR	CUL	03/13/13	331.38	3003.26	3006.26
H-04bR	CUL	04/10/13	331.15	3003.49	3006.49
H-04bR	CUL	05/07/13	331.39	3003.25	3006.25
H-04bR	CUL	06/12/13	332.08	3002.56	3005.55
H-04bR	CUL	07/15/13	333.25	3001.39	3004.36
H-04bR	CUL	08/09/13	332.44	3002.20	3005.18
H-05b	CUL	03/12/13	466.04	3040.74	3082.94
H-05b	CUL	04/09/13	465.76	3041.02	3083.25
H-05b	CUL	05/08/13	465.96	3040.82	3083.03
H-05b	CUL	06/11/13	465.96	3040.82	3083.03
H-05b	CUL	07/15/13	466.06	3040.72	3082.92
H-05b	CUL	08/06/13	466.01	3040.77	3082.98
H-06bR	CUL	03/13/13	291.17	3058.05	3070.44
H-06bR	CUL	04/09/13	290.76	3058.46	3070.87
H-06bR	CUL	05/13/13	291.22	3058.00	3070.39
H-06bR	CUL	06/11/13	291.24	3057.98	3070.37
H-06bR	CUL	07/15/13	291.54	3057.68	3070.06
H-06bR	CUL	08/08/13	291.50	3057.72	3070.10

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
H-07b1	CUL	03/11/13	165.91	2997.81	2998.54
H-07b1	CUL	04/08/13	165.70	2998.02	2998.75
H-07b1	CUL	05/08/13	166.02	2997.70	2998.43
H-07b1	CUL	06/12/13	168.55	2995.17	2995.88
H-07b1	CUL	07/16/13	168.98	2994.74	2995.45
H-07b1	CUL	08/06/13	168.98	2994.74	2995.45
H-09bR	CUL	03/12/13	412.89	2995.45	2995.45
H-09bR	CUL	04/08/13	413.84	2994.50	2994.50
H-09bR	CUL	05/07/13	416.46	2991.88	2991.88
H-09bR	CUL	06/10/13	419.80	2988.54	2988.54
H-09bR	CUL	07/16/13	423.93	2984.41	2984.41
H-09bR	CUL	08/07/13	423.84	2984.50	2984.50
H-10c	CUL	03/12/13	718.79	2969.61	3031.02
H-10c	CUL	04/09/13	718.34	2970.06	3031.51
H-10c	CUL	05/07/13	718.56	2969.84	3031.27
H-10c	CUL	06/10/13	718.21	2970.19	3031.66
H-10c	CUL	07/16/13	718.50	2969.90	3031.34
H-10c	CUL	08/07/13	718.01	2970.39	3031.87
H-11b4R	CUL	03/12/13	428.05	2983.82	3007.21
H-11b4R	CUL	04/09/13	427.74	2984.13	3007.55
H-11b4R	CUL	05/07/13	428.30	2983.57	3006.94
H-11b4R	CUL	06/10/13	428.83	2983.04	3006.37
H-11b4R	CUL	07/16/13	430.01	2981.86	3005.10
H-11b4R	CUL	08/08/13	430.58	2981.29	3004.49
H-12	CUL	03/12/13	457.08	2970.25	3013.34
H-12	CUL	04/09/13	456.84	2970.49	3013.61
H-12	CUL	05/07/13	456.94	2970.39	3013.50
H-12	CUL	06/10/13	456.91	2970.42	3013.53
H-12	CUL	07/16/13	457.35	2969.98	3013.04
H-12	CUL	08/07/13	457.55	2969.78	3012.82
H-15R	CUL	03/14/13	507.86	2974.16	3017.21
H-15R	CUL	04/10/13	507.59	2974.43	3017.52
H-15R	CUL	05/13/13	507.78	2974.24	3017.30
H-15R	CUL	06/13/13	507.80	2974.22	3017.28
H-15R	CUL	07/17/13	508.35	2973.67	3016.67
H-15R	CUL	08/08/13	508.49	2973.53	3016.51
H-16	CUL	03/14/13	376.50	3033.56	3046.06
H-16	CUL	04/10/13	375.86	3034.20	3046.73
H-16	CUL	05/14/13	375.64	3034.42	3046.96
H-16	CUL	06/11/13	375.24	3034.82	3047.37
H-16	CUL	07/17/13	375.51	3034.55	3047.09
H-16	CUL	08/09/13	375.32	3034.74	3047.29
H-17	CUL	03/12/13	418.12	2967.12	3007.33
H-17	CUL	04/09/13	417.80	2967.44	3007.69
H-17	CUL	05/07/13	418.31	2966.93	3007.11
H-17	CUL	06/10/13	418.68	2966.56	3006.69
H-17	CUL	07/16/13	419.65	2965.59	3005.60
H-17	CUL	08/08/13	420.19	2965.05	3004.98

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
H-19b0	CUL	03/14/13	426.52	2991.81	3013.42
H-19b0	CUL	04/10/13	426.33	2992.00	3013.62
H-19b0	CUL	05/07/13	426.48	2991.85	3013.46
H-19b0	CUL	06/13/13	426.67	2991.66	3013.26
H-19b0	CUL	07/17/13	427.16	2991.17	3012.74
H-19b0	CUL	08/09/13	428.05	2990.28	3011.79
H-19b2	CUL	03/14/13	427.91	2991.02	3011.36
H-19b2	CUL	06/13/13	428.07	2990.86	3011.19
H-19b3	CUL	03/14/13	428.13	2990.89	3012.44
H-19b3	CUL	06/13/13	428.30	2990.72	3012.26
H-19b4	CUL	03/14/13	427.38	2991.60	3013.52
H-19b4	CUL	06/13/13	427.57	2991.41	3013.32
H-19b5	CUL	03/14/13	427.35	2991.23	3013.78
H-19b5	CUL	06/13/13	427.53	2991.05	3013.59
H-19b6	CUL	03/14/13	428.03	2990.99	3013.85
H-19b6	CUL	06/13/13	428.23	2990.79	3013.64
H-19b7	CUL	03/14/13	SNL Testing		
H-19b7	CUL	06/13/13	SNL Testing		
I-461	CUL	03/11/13	242.31	3041.30	3041.30
I-461	CUL	04/08/13	242.20	3041.41	3041.41
I-461	CUL	05/08/13	242.49	3041.12	3041.12
I-461	CUL	06/11/13	242.74	3040.87	3040.87
I-461	CUL	07/15/13	242.85	3040.76	3040.76
I-461	CUL	08/08/13	242.42	3041.19	3041.19
SNL-01	CUL	03/11/13	437.96	3074.88	3079.95
SNL-01	CUL	04/08/13	437.75	3075.09	3080.17
SNL-01	CUL	05/08/13	438.25	3074.59	3079.65
SNL-01	CUL	06/11/13	437.61	3075.23	3080.31
SNL-01	CUL	07/15/13	438.90	3073.94	3078.98
SNL-01	CUL	08/06/13	438.91	3073.93	3078.97
SNL-02	CUL	03/11/13	252.63	3070.43	3072.39
SNL-02	CUL	04/08/13	252.43	3070.63	3072.59
SNL-02	CUL	05/08/13	252.84	3070.22	3072.18
SNL-02	CUL	06/11/13	253.12	3069.94	3071.90
SNL-02	CUL	07/15/13	253.52	3069.54	3071.50
SNL-02	CUL	08/06/13	253.49	3069.57	3071.53
SNL-03	CUL	03/12/13	421.30	3069.05	3078.72
SNL-03	CUL	04/09/13	421.14	3069.21	3078.88
SNL-03	CUL	05/08/13	421.65	3068.70	3078.36
SNL-03	CUL	06/12/13	421.79	3068.56	3078.21
SNL-03	CUL	07/15/13	422.22	3068.13	3077.77
SNL-03	CUL	08/06/13	422.23	3068.12	3077.76
SNL-05	CUL	03/11/13	310.55	3069.43	3072.48
SNL-05	CUL	04/08/13	310.15	3069.83	3072.88
SNL-05	CUL	05/08/13	310.87	3069.11	3072.15
SNL-05	CUL	06/11/13	310.88	3069.10	3072.14
SNL-05	CUL	07/15/13	311.56	3068.42	3071.46
SNL-05	CUL	08/06/13	311.45	3068.53	3071.57

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
SNL-06	CUL	03/12/13	600.45	3045.66	3224.94
SNL-06	CUL	04/08/13	597.40	3048.71	3228.73
SNL-06	CUL	05/08/13	594.24	3051.87	3232.65
SNL-06	CUL	06/11/13	590.63	3055.48	3237.14
SNL-06	CUL	07/15/13	587.30	3058.81	3241.28
SNL-06	CUL	08/06/13	585.09	3061.02	3244.03
SNL-08	CUL	03/12/13	542.20	3013.53	3053.72
SNL-08	CUL	04/09/13	541.86	3013.87	3054.09
SNL-08	CUL	05/08/13	542.22	3013.51	3053.70
SNL-08	CUL	06/11/13	542.06	3013.67	3053.87
SNL-08	CUL	07/15/13	542.20	3013.53	3053.72
SNL-08	CUL	08/08/13	541.95	3013.78	3053.99
SNL-09	CUL	03/13/13	311.74	3049.22	3053.82
SNL-09	CUL	04/08/13	311.34	3049.62	3054.22
SNL-09	CUL	05/08/13	311.54	3049.42	3054.02
SNL-09	CUL	06/10/13	311.78	3049.18	3053.78
SNL-09	CUL	07/15/13	312.03	3048.93	3053.52
SNL-09	CUL	08/08/13	311.88	3049.08	3053.68
SNL-10	CUL	03/11/13	326.93	3050.66	3053.24
SNL-10	CUL	04/08/13	327.45	3050.14	3052.71
SNL-10	CUL	05/08/13	326.72	3050.87	3053.45
SNL-10	CUL	06/12/13	326.86	3050.73	3053.31
SNL-10	CUL	07/16/13	327.08	3050.51	3053.09
SNL-10	CUL	08/06/13	327.02	3050.57	3053.15
SNL-12	CUL	03/12/13	338.61	3000.85	3002.24
SNL-12	CUL	04/08/13	338.28	3001.18	3002.58
SNL-12	CUL	05/07/13	339.22	3000.24	3001.63
SNL-12	CUL	06/10/13	340.59	2998.87	3000.25
SNL-12	CUL	07/16/13	342.51	2996.95	2998.32
SNL-12	CUL	08/07/13	342.55	2996.91	2998.28
SNL-13	CUL	03/11/13	282.75	3011.36	3013.49
SNL-13	CUL	04/08/13	282.66	3011.45	3013.58
SNL-13	CUL	05/08/13	283.01	3011.10	3013.22
SNL-13	CUL	06/12/13	283.30	3010.81	3012.93
SNL-13	CUL	07/15/13	283.68	3010.43	3012.54
SNL-13	CUL	08/06/13	283.75	3010.36	3012.47
SNL-14	CUL	03/12/13	377.78	2990.63	3004.05
SNL-14	CUL	04/09/13	377.40	2991.01	3004.45
SNL-14	CUL	05/07/13	378.14	2990.27	3003.67
SNL-14	CUL	06/10/13	378.98	2989.43	3002.79
SNL-14	CUL	07/16/13	380.53	2987.88	3001.17
SNL-14	CUL	08/08/13	380.93	2987.48	3000.75
SNL-15	CUL	03/13/13	544.08	2935.85	3022.58
SNL-15	CUL	04/09/13	543.05	2936.88	3023.85
SNL-15	CUL	05/07/13	542.48	2937.45	3024.55
SNL-15	CUL	06/10/13	540.88	2939.05	3026.52
SNL-15	CUL	07/16/13	539.70	2940.23	3027.97
SNL-15	CUL	08/08/13	538.87	2941.06	3028.99

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
SNL-16	CUL	03/11/13	123.39	3009.61	3010.36
SNL-16	CUL	04/08/13	123.28	3009.72	3010.47
SNL-16	CUL	05/08/13	123.61	3009.39	3010.13
SNL-16	CUL	06/10/13	123.94	3009.06	3009.80
SNL-16	CUL	07/16/13	124.08	3008.92	3009.66
SNL-16	CUL	08/06/13	123.60	3009.40	3010.14
SNL-17	CUL	03/11/13	233.24	3004.82	3005.40
SNL-17	CUL	04/08/13	233.03	3005.03	3005.61
SNL-17	CUL	05/08/13	233.35	3004.71	3005.29
SNL-17	CUL	06/10/13	233.78	3004.28	3004.86
SNL-17	CUL	07/15/13	234.43	3003.63	3004.21
SNL-17	CUL	08/06/13	234.28	3003.78	3004.36
SNL-18	CUL	03/11/13	304.48	3070.96	3072.19
SNL-18	CUL	04/08/13	304.33	3071.11	3072.34
SNL-18	CUL	05/08/13	304.94	3070.50	3071.73
SNL-18	CUL	06/11/13	304.77	3070.67	3071.90
SNL-18	CUL	07/15/13	305.25	3070.19	3071.42
SNL-18	CUL	08/06/13	302.51	3072.93	3074.17
SNL-19	CUL	03/11/13	151.71	3070.94	3072.36
SNL-19	CUL	04/08/13	151.61	3071.04	3072.46
SNL-19	CUL	05/08/13	152.08	3070.57	3071.99
SNL-19	CUL	06/11/13	152.31	3070.34	3071.76
SNL-19	CUL	07/15/13	152.69	3069.96	3071.38
SNL-19	CUL	08/06/13	152.59	3070.06	3071.48
WIPP-11	CUL	03/13/13	366.07	3061.71	3080.39
WIPP-11	CUL	04/09/13	365.60	3062.18	3080.88
WIPP-11	CUL	05/13/13	366.16	3061.62	3080.30
WIPP-11	CUL	06/12/13	366.14	3061.64	3080.32
WIPP-11	CUL	07/16/13	366.55	3061.23	3079.90
WIPP-11	CUL	08/08/13	366.54	3061.24	3079.91
WIPP-13	CUL	03/13/13	345.12	3060.55	3075.73
WIPP-13	CUL	04/09/13	344.43	3061.24	3076.45
WIPP-13	CUL	05/13/13	345.15	3060.52	3075.70
WIPP-13	CUL	06/12/13	345.01	3060.66	3075.84
WIPP-13	CUL	07/17/13	345.48	3060.19	3075.36
WIPP-13	CUL	08/08/13	345.30	3060.37	3075.54
WIPP-19	CUL	03/13/13	392.26	3042.85	3062.50
WIPP-19	CUL	04/10/13	392.06	3043.05	3062.71
WIPP-19	CUL	05/13/13	392.26	3042.85	3062.50
WIPP-19	CUL	06/13/13	392.15	3042.96	3062.61
WIPP-19	CUL	07/17/13	392.91	3042.20	3061.81
WIPP-19	CUL	08/08/13	392.24	3042.87	3062.52
WQSP-1	CUL	03/13/13	361.96	3057.29	3075.23
WQSP-1	CUL	04/10/13	361.81	3057.44	3075.38
WQSP-1	CUL	05/13/13	362.43	3056.82	3074.73
WQSP-1	CUL	06/13/13	362.12	3057.13	3075.06
WQSP-1	CUL	07/17/13	362.63	3056.62	3074.52
WQSP-1	CUL	08/08/13	362.41	3056.84	3074.75

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
WQSP-2	CUL	03/13/13	402.04	3061.83	3082.14
WQSP-2	CUL	04/10/13	401.95	3061.92	3082.23
WQSP-2	CUL	05/13/13	402.05	3061.82	3082.12
WQSP-2	CUL	06/13/13	402.28	3061.59	3081.88
WQSP-2	CUL	07/17/13	402.74	3061.13	3081.40
WQSP-2	CUL	08/08/13	402.62	3061.25	3081.53
WQSP-3	CUL	03/13/13	465.24	3014.90	3072.91
WQSP-3	CUL	04/10/13	468.39	3011.75	3069.29
WQSP-3	CUL	05/13/13	466.01	3014.13	3072.02
WQSP-3	CUL	06/13/13	465.73	3014.41	3072.34
WQSP-3	CUL	07/17/13	465.94	3014.20	3072.10
WQSP-3	CUL	08/08/13	465.65	3014.49	3072.44
WQSP-4	CUL	03/13/13	443.92	2989.17	3015.12
WQSP-4	CUL	04/10/13	443.65	2989.44	3015.41
WQSP-4	CUL	05/07/13	443.84	2989.25	3015.20
WQSP-4	CUL	06/12/13	443.90	2989.19	3015.14
WQSP-4	CUL	07/17/13	444.70	2988.39	3014.28
WQSP-4	CUL	08/09/13	445.35	2987.74	3013.58
WQSP-5	CUL	03/14/13	379.34	3005.04	3012.58
WQSP-5	CUL	04/10/13	379.17	3005.21	3012.76
WQSP-5	CUL	05/13/13	379.44	3004.94	3012.48
WQSP-5	CUL	06/12/13	379.29	3005.09	3012.63
WQSP-5	CUL	07/15/13	381.19	3003.19	3010.68
WQSP-5	CUL	08/05/13	382.15	3002.23	3009.70
WQSP-6	CUL	03/13/13	344.60	3020.12	3023.91
WQSP-6	CUL	04/10/13	344.33	3020.39	3024.18
WQSP-6	CUL	05/07/13	346.61	3018.11	3021.87
WQSP-6	CUL	06/13/13	344.63	3020.09	3023.88
WQSP-6	CUL	07/17/13	344.76	3019.96	3023.75
WQSP-6	CUL	08/09/13	344.55	3020.17	3023.96

Notes:
amsl: Above Mean Sea Level
SNL Testing: water levels were not taken when testing equipment was blocking access to well
PIP: Production Injection Packer
TOC: Top of Casing

APPENDIX 3

WELL WQSP-1

ANALYTICAL RESULTS

WQSP-1

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-1, Culebra, Round 35

DMW Characteristics

WQSP-1 is located 101 feet FNL and 1422 feet FWL in sec. 20, T.22 S, R.31 E in Eddy County, New Mexico. This location is approximately 1-mile NNW from the center of the WIPP Site and upgradient of the shaft area. The ground elevation at WQSP-1 is 3416.053 feet above mean sea level (ft_{amsl}) and the top of casing (TOC) elevation is 3419.248 ft_{amsl}[1]. This DMW well, drilled for surveillance monitoring of groundwater quality and water level elevation monitoring between September 13 and 16, 1994, is located in the Culebra Member of the Rustler Formation. The total depth of WQSP-1 is 737 feet below ground surface (ft_{bgs}). The well is cased with a fiberglass casing (5 inch od, 0.28 inch wall thickness) to 702 ft_{bgs} and screened with slotted fiberglass (0.020 inch) from 702 to 727 ft_{bgs}. A 10-foot blank casing is located below the screened interval from 727 to 737 ft_{bgs} and acts as a sediment sump to prevent clogging of the lower screen slots. The actual interval of the Culebra at WQSP-1 is 699 to 722 ft_{bgs} based on interpretation of the core logs[2].

According to the well construction and pre-pumping static water level (swl) measured in feet from below the TOC (ft_{btoc}), the sampling team used the following formula to calculate well bore volume (wbv).

$$wbv,\ gallons = [C \times ((\pi \times D^2/4) \times L)]$$

where:

C = conversion factor for pounds water/gallon (US liquid) to pounds of water/ft^3
D = inside diameter of fiberglass casing, ft
L = depth of water in column, ft
$Factor = [C \times (\pi \times D^2/4)]$

given:

total depth of well, ft_{btoc} = [*installation depth,* ft_{bgs} + (*top of casing,* ft_{amsl} - *ground surface elevation,* ft_{amsl})]
depth of water in column, ft (L) = (total depth of well, ft_{btoc} – *swl,* ft_{btoc})

More specifically, the wbv for WQSP-1 is calculated as follows:

wbv, gallons = (*Factor* x L) = (0.804 x L)

Prior to beginning the pumping process for Round 35, the static water level was 362.02 ft_{btoc}. One wbv for WQSP-1 was determined to be 304.1 gallons.

Field Sampling System

A dedicated sampling-system was installed in WQSP-1 on September 20, 1999. The system consists of a Grundfos 3-hp submersible pump (model 10S30-34) retrofitted with Kynar seals and a 3-phase, 230 volt (ac), 5-hp submersible motor. Prior to Round 20 sampling (2005), the pump/motor assembly was lowered an additional 18 feet from its original installation depth (699 ft_{bgs}), placing the pump intake near the center of the well screen (approximately 717 ft_{bgs}). A sampling line was installed above the pump discharge and a bubbler system installed 5 feet above the top of the pump. This bubbler system previously enabled formation pressure monitoring in the well bore column during sampling and is no longer a Permit requirement.

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[1] Elevations (Ground and TOC) obtained from December 13, 2006 survey.
[2] DOE/WIPP 95-2154, *Basic Data Report for WQSP 1* and Culebra Mid-Depths – Revision 2 (R. Salness).

Round 35 pumping of WQSP-1 began on 3/5/2013 at 09:05 and ended on 3/6/2012 at 14:25. The well purged for 29.3 hours with an average flow rate of 0.31 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 545 gallons.

Measurement of Field Parameters and Well Stability Criteria

Field measurements were obtained using an in-line, multi-probe flow cell sampling system (Geotech Environmental Equipment, Inc.) with a capacity of 40 mL. Groundwater measurements were collected at 5-minute intervals directly from the sample stream passing through this system for specific conductance (SC), temperature and pH. Specific gravity (SG) was determined using classical hydrometer techniques. The flow cell was purged for at least 15 minutes prior to beginning sequential measurements.

The flow cell exchange rate was calculated periodically to verify measurements were obtained on fresh-flowing groundwater and not from stagnant groundwater in the well column. Exchange rate (cell volumes per minute) was determined by measuring the volume of groundwater (mL) passed through the sampling system during a one-minute interval and dividing that value by the volume of the cell (40 mL).

Stability of the DMW, as defined in the PMR, states that each well will be purged no more than three wbv, or until field parameters stabilize, whichever occurs first. Parameters are stable when individual values for all parameters were within 5% for three consecutive measurements. At that point, purged water from the DMW is considered representative of the undisturbed groundwater found in the formation and DMP sampling for hazardous constituents is allowed.

Detection Monitoring Program Sampling

Samples for DMP hazardous constituents were collected on 3/6/2012 after approximately 459.8 gallons of groundwater (≈ 1.5 WBV) had been purged from WQSP-1 and field measurements indicated that the well was stable. Removal of the in-line flow cell occured prior to DMP sampling and a clean, dedicated filter holder assembly was installed at the end of the dedicated sample line. Samples (filtered or unfiltered) were collected using techniques described in the DMP and placed under Chain of Custody. Samples for hazardous constituent analysis were shipped via FedEx to Hall Environmental Analysis Laboratory, Inc., in Albuquerque, NM. Samples for radionuclide analysis were collected and hand-delivered to the URS-PS WIPP Laboratory located at Carlsbad Environmental Monitoring Research Center in Carlsbad, NM. A retain sample, preserved with nitric acid (to pH < 2), was collected and placed under Chain of Custody in the event that additional metals or radionuclide analyses were required. The final sample checklist summarized the samples collected, laboratory destination, preservatives used, sample quantities, container type, sampling times, and sample team members. This checklist and other records related to the integrity of the DMP sampling event are located in the DMW data package.

Results and Discussion

Table 1 provides the pumping characteristics and field parameter results for WQSP-1. The pumping speed was identical and groundwater flow rates similar to those observed in previous rounds. Approximately 290 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 7.2 cell volumes per minute; thus, approximately 36 volumes of groundwater (1,450 mL) passed through the in-line flow cell between measurements. Table 1 provides the initial and final measurements obtained on each field-indicating parameter. Field parameters were consistently less than 5% over the last 3 measurements within 15 minutes (for SC, pH and temperature) and approximately 1 hour (for SG) after measurements began on day 1. The sampling team continued to obtain readings for an additional 110 minutes to ensure that the purged groundwater's chemistry was indeed stable.

Based on results observed for day 1, the sample team concluded that WQSP-1 was stable. Sampling for DMP hazardous and radiological constituents was conducted on day 2.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-1 DMW, Round 35[a,b,c].

Item	Day 1		Day 2		Day 3	
Date	3/5/2013		3/6/2013		NR	
Pump Speed, Hz	38.3		38.3		NR	
Average Flow Rate, gpm	0.31		0.31		NR	
Rate of Exchange, no. cell	7.2		NR		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	86,100	88,900	NR	NR	NR	NR
Temperature, °C	19.8	21.0	NR	NR	NR	NR
pH, SU	7.11	7.08	NR	NR	NR	NR
Specific Gravity	1.046	1.047	NR	NR	NR	NR
Time to Parameter Stability, hr:min	1:55		NR		NR	

[a]Data represent the first and last measurement taken within each respective day.
[b]DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c]NR = measurements not taken; not required.

From a historical perspective, indicating parameters measured in Round 35 were compared to the average results from the previous 34 rounds (Table 2). Note that Round 35 values for SG, temperature and pH (1.047, 21.0, and 7.08 S.U. respectively) were within the lower and upper limits calculated for the previous 34 rounds. The SC result for Round 35 exceeded the average and upper limit previously observed.

Table 2. Comparison of Round 35 DMW Measurements to Historical Results from Rounds (1-34) for WQSP-1.

Field-analyzed Parameter	Historical Data (Rounds 1 – 34)[a,b]			Measurement Results, Round 35[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	81,887	77,793	85,981	88,900
Temperature, °C	21.3	20.2	22.4	21.0
pH, S.U.	7.15	6.79	7.51	7.08
Specific Gravity	1.048	0.996	1.100	1.047

[a] Historical data obtained from serial samples collected on day 3 for each round.

[b] Historical limits calculated from the mean ($\bar{x}$) ± 5 percent.

[c] Current data represent the final measurement taken when well stability confirmed by sampling team.

Abbreviations, Acronyms and Units

ac	alternating current
ft_{amsl}	feet above mean sea level
ft_{bgs}	feet below ground surface
ft_{btoc}	feet below top of casing
DMP	Detection Monitoring Program
DMW	detection monitoring well
FEL	from east line
FNL	from north line
FSL	from south line
FWL	from west line
gpm	gallons per minute
hp	horsepower
od	outside diameter
NNW	north-northwest
PMR	Permit Modification Request
swl	static water level
URS-PS	URS-Professional Solutions
wbv	well bore volume
WIPP	Waste Isolation Pilot Plant
WQSP	Water Quality Sampling Program, well ID

WQSP-1

LABORATORY DATA AND QA/QC SUMMARY REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

April 23, 2013

Greg Jungclaus
WIPP
P.O. Box 2078
Carlsbad, NM 88221-2078
TEL: (575) 234-8615
FAX

RE: WIPP DMP

OrderNo.: 1303283

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 6 sample(s) on 3/7/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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Albuquerque, NM 87109
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Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1303283**
01-May-13

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1303283-001	WQ1-C-R35		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-001	WQ1-C-R35		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-001	WQ1-C-R35		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-001	WQ1-C-R35		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-001	WQ1-C-R35		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-001	WQ1-C-R35		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-002	WQ1-C-R35 Duplicate		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-002	WQ1-C-R35 Duplicate		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-002	WQ1-C-R35 Duplicate		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-002	WQ1-C-R35 Duplicate		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-002	WQ1-C-R35 Duplicate		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-002	WQ1-C-R35 Duplicate		3/6/2013 9:55:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-003	WQ6-C-R34-FIELD BLANK		3/6/2013 10:09:56 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-004	WQ6-C-R34-TRIP BLANK		3/6/2013 10:09:56 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-005	WQ1-C-R35-METALS BLANK PRES		3/6/2013 10:47:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-005	WQ1-C-R35-METALS BLANK PRES		3/6/2013 10:47:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-006	WQ6-C-R34-METALS BLANK UNPRES		3/6/2013 10:48:00 AM	3/7/2013 10:09:56 AM	Aqueous
1303283-006	WQ6-C-R34-METALS BLANK UNPRES		3/6/2013 10:48:00 AM	3/7/2013 10:09:56 AM	Aqueous

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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Website: www.hallenvironmental.com

DATES REPORT

WO#: **1303283**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1303283-001A	WQ1-C-R35	3/6/2013 9:55:00 AM	Aqueous	EPA Method: 8260B			3/8/2013 2:49:41 PM
1303283-001B				SM 5310B: TOC			3/11/2013 12:45:47 PM
1303283-001C				EPA Method 8270C: Semivolatiles		3/8/2013 5:42:11 AM	3/8/2013 1:15:30 PM
1303283-001D				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 2:49:57 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 2:35:36 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 11:28:54 AM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:59:47 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:10:36 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 11:37:37 AM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:13:35 PM
				EPA Method 7470: Mercury		3/12/2013 8:11:44 AM	3/12/2013 11:13:51 AM
				EPA Method 7470: Mercury		3/12/2013 8:11:44 AM	3/12/2013 11:24:34 AM
1303283-001F				EPA Method 300.0: Anions			3/7/2013 3:59:31 PM
				EPA Method 300.0: Anions			3/7/2013 3:47:06 PM
				EPA Method 300.0: Anions			3/7/2013 3:09:52 PM
				EPA Method 6010B: Dissolved Metals			3/14/2013 1:23:11 PM
				EPA Method 6010B: Dissolved Metals			3/14/2013 1:27:08 PM
				EPA Method 6010B: Dissolved Metals			3/14/2013 1:20:55 PM
				SM 2540 C: Total Dissolved Solids		3/12/2013 6:54:00 AM	3/13/2013 3:50:00 PM
				SM 2540D: TSS		3/13/2013 5:46:09 AM	3/13/2013 3:34:00 PM
				SM2320B: Alkalinity			3/7/2013 1:45:34 PM
				SM2510B: Specific Conductance			3/7/2013 1:45:34 PM
				SM2510B: Specific Conductance			3/7/2013 4:35:32 PM

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DATES REPORT

WO#: **1303283**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1303283-001F	WQ1-C-R35	3/6/2013 9:55:00 AM	Aqueous	SM4500-H+B: pH			3/7/2013 1:45:34 PM
				Specific Gravity			3/11/2013 11:10:00 AM
1303283-002A	WQ1-C-R35 Duplicate			EPA Method: 8260B			3/8/2013 4:48:13 PM
1303283-002B				SM 5310B: TOC			3/11/2013 1:36:59 PM
1303283-002C				EPA Method 8270C: Semivolatiles		3/8/2013 5:42:11 AM	3/8/2013 2:46:15 PM
1303283-002D				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 2:55:38 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 2:52:42 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 11:52:10 AM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 11:49:10 AM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:19:21 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:16:22 PM
				EPA Method 7470: Mercury		3/12/2013 8:11:44 AM	3/12/2013 11:19:11 AM
1303283-002F				EPA Method 300.0: Anions			3/7/2013 4:24:21 PM
				EPA Method 300.0: Anions			3/7/2013 5:01:34 PM
				EPA Method 300.0: Anions			3/7/2013 4:11:56 PM
				EPA Method 6010B: Dissolved Metals			3/14/2013 1:29:19 PM
				EPA Method 6010B: Dissolved Metals			3/14/2013 1:33:54 PM
				EPA Method 6010B: Dissolved Metals			3/14/2013 1:31:37 PM
				SM 2540 C: Total Dissolved Solids		3/12/2013 6:54:00 AM	3/13/2013 3:50:00 PM
				SM 2540D: TSS		3/13/2013 5:46:09 AM	3/13/2013 3:34:00 PM
				SM2320B: Alkalinity			3/7/2013 2:11:23 PM
				SM2510B: Specific Conductance			3/7/2013 2:11:23 PM
				SM2510B: Specific Conductance			3/7/2013 4:39:52 PM

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DATES REPORT

WO#: **1303283**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1303283-002F	WQ1-C-R35 Duplicate	3/6/2013 9:55:00 AM	Aqueous	SM4500-H+B: pH			3/7/2013 2:11:23 PM
				Specific Gravity			3/11/2013 11:10:00 AM
1303283-003A	WQ6-C-R34-FIELD BLANK	3/6/2013 10:09:56 AM		EPA Method: 8260B			3/8/2013 5:17:26 PM
1303283-004A	WQ6-C-R34-TRIP BLANK			EPA Method: 8260B			3/8/2013 5:46:23 PM
1303283-005A	WQ1-C-R35-METALS BLANK PRES	3/6/2013 10:47:00 AM		EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 2:58:26 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:11:53 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:22:06 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:14:40 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:36:59 PM
				EPA Method 7470: Mercury		3/12/2013 8:11:44 AM	3/12/2013 11:20:59 AM
1303283-006A	WQ6-C-R34-METALS BLANK UNPRES	3/6/2013 10:48:00 AM		EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 3:01:11 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:17:25 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:20:11 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:39:45 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:42:31 PM
				EPA Method 7470: Mercury		3/12/2013 8:11:44 AM	3/12/2013 11:22:46 AM

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Case Narrative

WO#: **1303283**
Date: **4/23/2013**

CLIENT: WIPP
Project: WIPP DMP

All analytes reported are associated with passing CCVs.

METHOD: 8260B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 5030
Analysis: 8260B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: Isobutyl alcohol has eleveated %recoveries in the MS/MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 8270C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3510
Analysis: 8270C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.

5. Spikes: The % RPD was high for Pentachlorophenol and the %recovery was low for the MS/MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 6010B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3005
Analysis: 6010B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Duplicates: All acceptance criteria were met.
5. Spikes: The recovery for Ni was low in the MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 7470
Analysis: 7470

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

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Case Narrative

WO#: **1303283**
Date: **4/23/2013**

CLIENT: WIPP
Project: WIPP DMP

METHOD: 300.0

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 300.0

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Spikes: All acceptance criteria were met.
5. Samples: All acceptance criteria were met.

METHOD: SM5310C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM5310C
Analysis: SM5310C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 120.1

HOLDING TIMES: All holding times for Preparation and Analysis were met.

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Website: www.hallenvironmental.com

Case Narrative

WO#: **1303283**
Date: **4/23/2013**

CLIENT: WIPP
Project: WIPP DMP

METHOD: Preparations: none
Analysis: 120.1
PREPARATION: none

ANALYSIS:
1. Samples: All acceptance criteria were met.
2. Duplicates: All acceptance criteria were met.

METHOD: SM 2320B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM 2320B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540C
Analysis: SM2540C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.

4. Samples: All acceptance criteria were met.

METHOD: SM2540D
HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540D
Analysis: SM2540D

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: The RPD was elevated for the duplicate. All other acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM4500H+ B

HOLDING TIMES: The most recent method lists the pH holding time as 15 minutes. All samples will be flagged with an "H".

METHOD: Preparations: none
Analysis: SM4500H+ B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM2710F

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM2710F

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Case Narrative

WO#: **1303283**
Date: **4/23/2013**

CLIENT: WIPP
Project: WIPP DMP

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM4500 NorgC

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM4500 NorgC
Analysis: SM4500 NorgC

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303283-001
Matrix: AQUEOUS
Client Sample ID: WQ1-C-R35
Collection Date: 3/6/2013 9:55:00 AM
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS							Analyst: **JRR**
Chloride	36200	400	1000		mg/L	2000	3/7/2013 3:59:31 PM
Nitrogen, Nitrite (As N)	ND	10.0	20.0		mg/L	200	3/7/2013 3:47:06 PM
Nitrogen, Nitrate (As N)	ND	2.50	5.00		mg/L	50	3/7/2013 3:09:52 PM
Sulfate	4880	15.1	100		mg/L	200	3/7/2013 3:47:06 PM
EPA METHOD 7470: MERCURY							Analyst: **TMG**
Mercury	ND	0.000443	0.00100		mg/L	5	3/12/2013 11:24:34 AM
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**
Calcium	1850	0.825	50.0		mg/L	50	3/14/2013 1:23:11 PM
Magnesium	1130	0.665	50.0		mg/L	50	3/14/2013 1:23:11 PM
Potassium	515	0.681	10.0		mg/L	10	3/14/2013 1:20:55 PM
Sodium	19700	11.8	500		mg/L	500	3/14/2013 1:27:08 PM
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**
Barium	0.0306	0.0130	0.200	J	mg/L	10	3/25/2013 12:59:47 PM
Beryllium	0.00470	0.00100	0.0300	J	mg/L	10	3/25/2013 12:59:47 PM
Cadmium	ND	0.00200	0.0200		mg/L	10	3/25/2013 12:59:47 PM
Calcium	1570	2.52	50.0		mg/L	50	3/25/2013 1:10:36 PM
Chromium	ND	0.00800	0.0600		mg/L	10	3/25/2013 12:59:47 PM
Iron	0.399	0.118	0.500	J	mg/L	10	3/25/2013 12:59:47 PM
Lead	ND	0.0260	0.0500		mg/L	10	3/25/2013 12:59:47 PM
Magnesium	1100	0.805	50.0		mg/L	50	3/29/2013 2:35:36 PM
Nickel	ND	0.00600	0.100		mg/L	10	3/25/2013 12:59:47 PM
Potassium	472	1.28	50.0		mg/L	50	3/29/2013 2:35:36 PM
Silver	ND	0.00200	0.0500		mg/L	10	3/25/2013 12:59:47 PM
Sodium	20400	14.8	500		mg/L	500	3/29/2013 2:49:57 PM
Vanadium	0.0335	0.00400	0.500	J	mg/L	10	3/25/2013 12:59:47 PM
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**
1,2-Dichlorobenzene	ND	2.69	5.00		µg/L	1	3/8/2013 1:15:30 PM
1,4-Dichlorobenzene	ND	2.87	5.00		µg/L	1	3/8/2013 1:15:30 PM
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	3/8/2013 1:15:30 PM
2,4-Dinitrotoluene	ND	2.82	5.00		µg/L	1	3/8/2013 1:15:30 PM
Hexachlorobenzene	ND	2.92	5.00		µg/L	1	3/8/2013 1:15:30 PM
Hexachloroethane	ND	2.85	5.00		µg/L	1	3/8/2013 1:15:30 PM
2-Methylphenol	ND	2.82	5.00		µg/L	1	3/8/2013 1:15:30 PM
3+4-Methylphenol	ND	2.88	5.00		µg/L	1	3/8/2013 1:15:30 PM
Nitrobenzene	ND	2.58	5.00		µg/L	1	3/8/2013 1:15:30 PM
Pentachlorophenol	ND	1.63	5.00		µg/L	1	3/8/2013 1:15:30 PM
Pyridine	ND	2.39	5.00		µg/L	1	3/8/2013 1:15:30 PM
Surr: 2,4,6-Tribromophenol	72.7	0	42.9-124		%REC	1	3/8/2013 1:15:30 PM
Surr: 2-Fluorobiphenyl	66.4	0	40-108		%REC	1	3/8/2013 1:15:30 PM
Surr: 2-Fluorophenol	55.9	0	23.6-94.8		%REC	1	3/8/2013 1:15:30 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH greater than 2
RL	Reporting Detection Limit
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ1-C-R35
Project: WIPP DMP
Collection Date: 3/6/2013 9:55:00 AM
Lab ID: 1303283-001
Matrix: AQUEOUS
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**
Surr: 4-Terphenyl-d14	70.5	0	41.9-103		%REC	1	3/8/2013 1:15:30 PM
Surr: Nitrobenzene-d5	72.0	0	42.6-114		%REC	1	3/8/2013 1:15:30 PM
Surr: Phenol-d5	52.1	0	20.3-74.7		%REC	1	3/8/2013 1:15:30 PM
EPA METHOD: 8260B							Analyst: **RAA**
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/8/2013 2:49:41 PM
Benzene	ND	0.517	1.00		µg/L	1	3/8/2013 2:49:41 PM
Toluene	ND	0.441	1.00		µg/L	1	3/8/2013 2:49:41 PM
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/8/2013 2:49:41 PM
2-Butanone	ND	1.00	5.00		µg/L	1	3/8/2013 2:49:41 PM
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/8/2013 2:49:41 PM
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/8/2013 2:49:41 PM
Chloroform	ND	0.469	1.00		µg/L	1	3/8/2013 2:49:41 PM
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/8/2013 2:49:41 PM
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/8/2013 2:49:41 PM
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/8/2013 2:49:41 PM
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/8/2013 2:49:41 PM
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/8/2013 2:49:41 PM
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/8/2013 2:49:41 PM
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/8/2013 2:49:41 PM
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/8/2013 2:49:41 PM
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/8/2013 2:49:41 PM
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/8/2013 2:49:41 PM
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/8/2013 2:49:41 PM
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/8/2013 2:49:41 PM
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/8/2013 2:49:41 PM
Surr: 1,2-Dichloroethane-d4	92.0	0	70-130		%REC	1	3/8/2013 2:49:41 PM
Surr: 4-Bromofluorobenzene	102	0	69.5-130		%REC	1	3/8/2013 2:49:41 PM
Surr: Dibromofluoromethane	93.6	0	70-130		%REC	1	3/8/2013 2:49:41 PM
Surr: Toluene-d8	95.2	0	70-130		%REC	1	3/8/2013 2:49:41 PM
SM 5310B: TOC							Analyst: **LRW**
Organic Carbon, Total	0.785	0.227	1.00	J	mg/L	1	3/11/2013 12:45:47 PM
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**
Total Dissolved Solids	61800	503	1000	*	mg/L	1	3/13/2013 3:50:00 PM
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**
Conductivity	115000	0.500	0.500		µmhos/c	50	3/7/2013 4:35:32 PM
SM4500-H+B: PH							Analyst: **JML**
pH	7.05	0.100	1.68	H	pH units	1	3/7/2013 1:45:34 PM
SM2320B: ALKALINITY							Analyst: **JML**
Bicarbonate (As CaCO3)	50.3	5.00	20.0		mg/L CaC	1	3/7/2013 1:45:34 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ1-C-R35
Project: WIPP DMP
Collection Date: 3/6/2013 9:55:00 AM
Lab ID: 1303283-001
Matrix: AQUEOUS
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
SM2320B: ALKALINITY							Analyst: **JML**
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	3/7/2013 1:45:34 PM
Total Alkalinity (as CaCO3)	50.3	5.00	20.0		mg/L CaC	1	3/7/2013 1:45:34 PM
SPECIFIC GRAVITY							Analyst: **TAF**
Specific Gravity	1.039	0	0			1	3/11/2013 11:10:00 AM
SM 2540D: TSS							Analyst: **KS**
Suspended Solids	39.0	1.53	4.00		mg/L	1	3/13/2013 3:34:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303283-002
Matrix: AQUEOUS
Client Sample ID: WQ1-C-R35 Duplicate
Collection Date: 3/6/2013 9:55:00 AM
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS							Analyst: **JRR**
Chloride	39500	400	1000		mg/L	2000	3/7/2013 4:24:21 PM
Nitrogen, Nitrite (As N)	ND	10.0	20.0		mg/L	200	3/7/2013 5:01:34 PM
Nitrogen, Nitrate (As N)	ND	2.50	5.00		mg/L	50	3/7/2013 4:11:56 PM
Sulfate	4910	15.1	100		mg/L	200	3/7/2013 5:01:34 PM
EPA METHOD 7470: MERCURY							Analyst: **TMG**
Mercury	ND	0.0000886	0.000200		mg/L	1	3/12/2013 11:19:11 AM
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**
Calcium	1840	0.825	50.0		mg/L	50	3/14/2013 1:31:37 PM
Magnesium	1120	0.665	50.0		mg/L	50	3/14/2013 1:31:37 PM
Potassium	534	0.681	10.0		mg/L	10	3/14/2013 1:29:19 PM
Sodium	19500	11.8	500		mg/L	500	3/14/2013 1:33:54 PM
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**
Barium	0.0287	0.00650	0.100	J	mg/L	5	3/25/2013 11:52:10 AM
Beryllium	0.00280	0.000500	0.0150	J	mg/L	5	3/25/2013 11:52:10 AM
Cadmium	ND	0.00100	0.0100		mg/L	5	3/25/2013 11:52:10 AM
Calcium	1540	2.52	50.0		mg/L	50	3/25/2013 1:16:22 PM
Chromium	ND	0.00400	0.0300		mg/L	5	3/25/2013 11:52:10 AM
Iron	0.320	0.0590	0.250		mg/L	5	3/25/2013 11:52:10 AM
Lead	ND	0.0130	0.0250		mg/L	5	3/25/2013 11:52:10 AM
Magnesium	1060	0.805	50.0		mg/L	50	3/29/2013 2:52:42 PM
Nickel	ND	0.00300	0.0500		mg/L	5	3/25/2013 11:52:10 AM
Potassium	469	0.128	5.00		mg/L	5	3/25/2013 11:52:10 AM
Silver	ND	0.00100	0.0250		mg/L	5	3/25/2013 11:52:10 AM
Sodium	18700	14.8	500		mg/L	500	3/29/2013 2:55:38 PM
Vanadium	0.0262	0.00200	0.250	J	mg/L	5	3/25/2013 11:52:10 AM
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**
1,2-Dichlorobenzene	ND	2.69	5.00		µg/L	1	3/8/2013 2:46:15 PM
1,4-Dichlorobenzene	ND	2.87	5.00		µg/L	1	3/8/2013 2:46:15 PM
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	3/8/2013 2:46:15 PM
2,4-Dinitrotoluene	ND	2.82	5.00		µg/L	1	3/8/2013 2:46:15 PM
Hexachlorobenzene	ND	2.92	5.00		µg/L	1	3/8/2013 2:46:15 PM
Hexachloroethane	ND	2.85	5.00		µg/L	1	3/8/2013 2:46:15 PM
2-Methylphenol	ND	2.82	5.00		µg/L	1	3/8/2013 2:46:15 PM
3+4-Methylphenol	ND	2.88	5.00		µg/L	1	3/8/2013 2:46:15 PM
Nitrobenzene	ND	2.58	5.00		µg/L	1	3/8/2013 2:46:15 PM
Pentachlorophenol	ND	1.63	5.00		µg/L	1	3/8/2013 2:46:15 PM
Pyridine	ND	2.39	5.00		µg/L	1	3/8/2013 2:46:15 PM
Surr: 2,4,6-Tribromophenol	71.9	0	42.9-124		%REC	1	3/8/2013 2:46:15 PM
Surr: 2-Fluorobiphenyl	52.5	0	40-108		%REC	1	3/8/2013 2:46:15 PM
Surr: 2-Fluorophenol	62.1	0	23.6-94.8		%REC	1	3/8/2013 2:46:15 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303283-002
Matrix: AQUEOUS
Client Sample ID: WQ1-C-R35 Duplicate
Collection Date: 3/6/2013 9:55:00 AM
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**
Surr: 4-Terphenyl-d14	60.9	0	41.9-103		%REC	1	3/8/2013 2:46:15 PM
Surr: Nitrobenzene-d5	66.3	0	42.6-114		%REC	1	3/8/2013 2:46:15 PM
Surr: Phenol-d5	52.6	0	20.3-74.7		%REC	1	3/8/2013 2:46:15 PM
EPA METHOD: 8260B							Analyst: **RAA**
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/8/2013 4:48:13 PM
Benzene	ND	0.517	1.00		µg/L	1	3/8/2013 4:48:13 PM
Toluene	ND	0.441	1.00		µg/L	1	3/8/2013 4:48:13 PM
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/8/2013 4:48:13 PM
2-Butanone	ND	1.00	5.00		µg/L	1	3/8/2013 4:48:13 PM
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/8/2013 4:48:13 PM
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/8/2013 4:48:13 PM
Chloroform	ND	0.469	1.00		µg/L	1	3/8/2013 4:48:13 PM
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/8/2013 4:48:13 PM
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/8/2013 4:48:13 PM
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/8/2013 4:48:13 PM
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/8/2013 4:48:13 PM
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/8/2013 4:48:13 PM
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/8/2013 4:48:13 PM
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/8/2013 4:48:13 PM
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/8/2013 4:48:13 PM
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/8/2013 4:48:13 PM
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/8/2013 4:48:13 PM
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/8/2013 4:48:13 PM
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/8/2013 4:48:13 PM
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/8/2013 4:48:13 PM
Surr: 1,2-Dichloroethane-d4	92.9	0	70-130		%REC	1	3/8/2013 4:48:13 PM
Surr: 4-Bromofluorobenzene	108	0	69.5-130		%REC	1	3/8/2013 4:48:13 PM
Surr: Dibromofluoromethane	94.9	0	70-130		%REC	1	3/8/2013 4:48:13 PM
Surr: Toluene-d8	95.1	0	70-130		%REC	1	3/8/2013 4:48:13 PM
SM 5310B: TOC							Analyst: **LRW**
Organic Carbon, Total	0.810	0.227	1.00	J	mg/L	1	3/11/2013 1:36:59 PM
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**
Total Dissolved Solids	64700	503	1000	*	mg/L	1	3/13/2013 3:50:00 PM
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**
Conductivity	113000	0.500	0.500		µmhos/c	50	3/7/2013 4:39:52 PM
SM4500-H+B: PH							Analyst: **JML**
pH	7.07	0.100	1.68	H	pH units	1	3/7/2013 2:11:23 PM
SM2320B: ALKALINITY							Analyst: **JML**
Bicarbonate (As CaCO3)	50.6	5.00	20.0		mg/L CaC	1	3/7/2013 2:11:23 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303283-002

Client Sample ID: WQ1-C-R35 Duplicate
Collection Date: 3/6/2013 9:55:00 AM
Matrix: AQUEOUS **Received Date:** 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
SM2320B: ALKALINITY							Analyst: **JML**
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	3/7/2013 2:11:23 PM
Total Alkalinity (as CaCO3)	50.6	5.00	20.0		mg/L CaC	1	3/7/2013 2:11:23 PM
SPECIFIC GRAVITY							Analyst: **TAF**
Specific Gravity	1.038	0	0			1	3/11/2013 11:10:00 AM
SM 2540D: TSS							Analyst: **KS**
Suspended Solids	40.0	1.53	4.00		mg/L	1	3/13/2013 3:34:00 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303283-003
Matrix: AQUEOUS
Client Sample ID: WQ6-C-R34-FIELD BLANK
Collection Date: 3/6/2013 10:09:56 AM
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD: 8260B							Analyst: **RAA**
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/8/2013 5:17:26 PM
Benzene	ND	0.517	1.00		µg/L	1	3/8/2013 5:17:26 PM
Toluene	ND	0.441	1.00		µg/L	1	3/8/2013 5:17:26 PM
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/8/2013 5:17:26 PM
2-Butanone	2.77	1.00	5.00	J	µg/L	1	3/8/2013 5:17:26 PM
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/8/2013 5:17:26 PM
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/8/2013 5:17:26 PM
Chloroform	0.511	0.469	1.00	J	µg/L	1	3/8/2013 5:17:26 PM
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/8/2013 5:17:26 PM
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/8/2013 5:17:26 PM
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/8/2013 5:17:26 PM
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/8/2013 5:17:26 PM
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/8/2013 5:17:26 PM
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/8/2013 5:17:26 PM
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/8/2013 5:17:26 PM
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/8/2013 5:17:26 PM
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/8/2013 5:17:26 PM
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/8/2013 5:17:26 PM
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/8/2013 5:17:26 PM
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/8/2013 5:17:26 PM
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/8/2013 5:17:26 PM
Surr: 1,2-Dichloroethane-d4	90.8	0	70-130		%REC	1	3/8/2013 5:17:26 PM
Surr: 4-Bromofluorobenzene	103	0	69.5-130		%REC	1	3/8/2013 5:17:26 PM
Surr: Dibromofluoromethane	93.4	0	70-130		%REC	1	3/8/2013 5:17:26 PM
Surr: Toluene-d8	94.1	0	70-130		%REC	1	3/8/2013 5:17:26 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303283-004

Client Sample ID: WQ6-C-R34-TRIP BLANK
Collection Date: 3/6/2013 10:09:56 AM
Matrix: AQUEOUS **Received Date:** 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD: 8260B							Analyst: **RAA**
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/8/2013 5:46:23 PM
Benzene	ND	0.517	1.00		µg/L	1	3/8/2013 5:46:23 PM
Toluene	ND	0.441	1.00		µg/L	1	3/8/2013 5:46:23 PM
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/8/2013 5:46:23 PM
2-Butanone	ND	1.00	5.00		µg/L	1	3/8/2013 5:46:23 PM
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/8/2013 5:46:23 PM
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/8/2013 5:46:23 PM
Chloroform	ND	0.469	1.00		µg/L	1	3/8/2013 5:46:23 PM
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/8/2013 5:46:23 PM
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/8/2013 5:46:23 PM
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/8/2013 5:46:23 PM
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/8/2013 5:46:23 PM
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/8/2013 5:46:23 PM
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/8/2013 5:46:23 PM
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/8/2013 5:46:23 PM
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/8/2013 5:46:23 PM
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/8/2013 5:46:23 PM
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/8/2013 5:46:23 PM
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/8/2013 5:46:23 PM
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/8/2013 5:46:23 PM
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/8/2013 5:46:23 PM
Surr: 1,2-Dichloroethane-d4	89.1	0	70-130		%REC	1	3/8/2013 5:46:23 PM
Surr: 4-Bromofluorobenzene	103	0	69.5-130		%REC	1	3/8/2013 5:46:23 PM
Surr: Dibromofluoromethane	93.6	0	70-130		%REC	1	3/8/2013 5:46:23 PM
Surr: Toluene-d8	95.6	0	70-130		%REC	1	3/8/2013 5:46:23 PM

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ1-C-R35-METALS BLANK
Project: WIPP DMP
Collection Date: 3/6/2013 10:47:00 AM
Lab ID: 1303283-005
Matrix: AQUEOUS
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 7470: MERCURY							Analyst: **TMG**
Mercury	ND	0.0000886	0.000200		mg/L	1	3/12/2013 11:20:59 AM
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**
Barium	ND	0.00130	0.0200		mg/L	1	3/25/2013 12:11:53 PM
Beryllium	0.000120	0.000100	0.00300	J	mg/L	1	3/25/2013 12:11:53 PM
Cadmium	ND	0.000200	0.00200		mg/L	1	3/25/2013 12:11:53 PM
Calcium	0.0953	0.0504	1.00	J	mg/L	1	3/25/2013 12:11:53 PM
Chromium	ND	0.000800	0.00600		mg/L	1	3/25/2013 12:11:53 PM
Iron	ND	0.0118	0.0500		mg/L	1	3/25/2013 12:11:53 PM
Lead	ND	0.00260	0.00500		mg/L	1	3/25/2013 12:11:53 PM
Magnesium	0.0428	0.0161	1.00	J	mg/L	1	3/25/2013 12:11:53 PM
Nickel	ND	0.000600	0.0100		mg/L	1	3/25/2013 12:11:53 PM
Potassium	0.190	0.0257	1.00	J	mg/L	1	3/25/2013 12:11:53 PM
Silver	ND	0.000200	0.00500		mg/L	1	3/25/2013 12:11:53 PM
Sodium	ND	0.0295	1.00		mg/L	1	3/29/2013 2:58:26 PM
Vanadium	0.000670	0.000400	0.0500	J	mg/L	1	3/25/2013 12:11:53 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	WQ1-C-R35 1303283-01		wQ1-C-R35 Duplicate 1303283-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	19700	856.89	19500	848.19							
Potassium	515	13.17	534	13.66							
Calcium	1850	92.32	1840	91.82							
Magnesium	1130	93.00	1120	92.18							
Total Cations		1055.39		1045.85							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	4880	101.60	4910	102.23							
Chloride	36200	1021.16	39500	1114.25							
Bicarbonate (CaCO3)	50.3	1.01	50.6	1.01							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		1123.76		1217.48							
Elect. Cond. (µMhos/cm)	115000		113000								
CATION/ANION RATIO		0.94		0.86							
% Difference		3		8							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	61800		64700								
TDS (calculated)	64305		67434								
Ratio meas TDS:calc TDS		1.0		1.0							
Ratio Meas. TDS:EC		0.54		0.57							
Ratio Calc. TDS:EC		0.56		0.60							
Ratio of anion sum:EC		1.0		1.1							
Ratio of cation sum:EC		0.9		0.9							

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC -- 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1. Ratio of cation sum:EC -- 0.9-1.1

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ6-C-R34-METALS BLANK
Project: WIPP DMP
Collection Date: 3/6/2013 10:48:00 AM
Lab ID: 1303283-006
Matrix: AQUEOUS
Received Date: 3/7/2013 9:29:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 7470: MERCURY							Analyst: **TMG**
Mercury	ND	0.0000886	0.000200		mg/L	1	3/12/2013 11:22:46 AM
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**
Barium	ND	0.00130	0.0200		mg/L	1	3/25/2013 12:17:25 PM
Beryllium	ND	0.000100	0.00300		mg/L	1	3/25/2013 12:17:25 PM
Cadmium	ND	0.000200	0.00200		mg/L	1	3/25/2013 12:17:25 PM
Calcium	0.0957	0.0504	1.00	J	mg/L	1	3/25/2013 12:17:25 PM
Chromium	ND	0.000800	0.00600		mg/L	1	3/25/2013 12:17:25 PM
Iron	ND	0.0118	0.0500		mg/L	1	3/25/2013 12:17:25 PM
Lead	ND	0.00260	0.00500		mg/L	1	3/25/2013 12:17:25 PM
Magnesium	0.0415	0.0161	1.00	J	mg/L	1	3/25/2013 12:17:25 PM
Nickel	ND	0.000600	0.0100		mg/L	1	3/25/2013 12:17:25 PM
Potassium	0.177	0.0257	1.00	J	mg/L	1	3/25/2013 12:17:25 PM
Silver	ND	0.000200	0.00500		mg/L	1	3/25/2013 12:17:25 PM
Sodium	ND	0.0295	1.00		mg/L	1	3/29/2013 3:01:11 PM
Vanadium	0.000400	0.000400	0.0500	J	mg/L	1	3/25/2013 12:17:25 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

CASE NARRATIVE April 11, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1303283
Anatek Batch: 130311002

Project Summary: Four (4) water samples were received on 3/8/2013 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 6.0C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1303283-001E / WQ1-C-R35	130311002-001	EPA 6020A
1303283-002E / WQ1-C-R35 Duplicate	130311002-002	EPA 6020A
1303283-005B / WQ1-C-R35-METALS BLANK PRES	130311002-003	EPA 6020A
1303283-006B / WQ6-C-R34-METALS BLANK UNPRES	130311002-004	EPA 6020A

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	Y	NA
Internal Standard Responses Valid?	Y	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

No problems encountered.

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

No problems encountered.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

Samples -001 and -002 required dilution due to matrix.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Cobb

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130311002
Project Name: 1303283

Analytical Results Report

Sample Number 130311002-001 **Sampling Date** 3/6/2013 **Date/Time Received** 3/8/2013 10:42 AM
Client Sample ID 1303283-001E / WQ1-C-R35 **Sampling Time** 9:55 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	

Sample Number 130311002-002 **Sampling Date** 3/6/2013 **Date/Time Received** 3/8/2013 10:42 AM
Client Sample ID 1303283-002E / WQ1-C-R35 DUPLICATE **Sampling Time** 9:55 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	4/9/2013	ETL	EPA 6020A	

Sample Number 130311002-003 **Sampling Date** 3/6/2013 **Date/Time Received** 3/8/2013 10:42 AM
Client Sample ID 1303283-005B / WQ1-C-R35-METALS BLANK PRES **Sampling Time** 10:47 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	
Selenium	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	
Thallium	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130311002
Project Name: 1303283

Analytical Results Report

Sample Number 130311002-004 **Sampling Date** 3/6/2013 **Date/Time Received** 3/8/2013 10:42 AM
Client Sample ID 1303283-006B / WQ6-C-R34-METALS BLANK UNPRES **Sampling Time** 10:48 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	
Selenium	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	
Thallium	ND	mg/L	0.001	4/9/2013	ETL	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130311002
Project Name: 1303283

Analytical Results Report
Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0475	mg/L	0.05	95.0	80-120	3/20/2013	4/9/2013
Selenium	0.0475	mg/L	0.05	95.0	80-120	3/20/2013	4/9/2013
Arsenic	0.0493	mg/L	0.05	98.6	80-120	3/20/2013	4/9/2013
Antimony	0.0476	mg/L	0.05	95.2	80-120	3/20/2013	4/9/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0484	mg/L	0.05	96.8	1.9	0-20	3/20/2013	4/9/2013
Selenium	0.0478	mg/L	0.05	95.6	0.6	0-20	3/20/2013	4/9/2013
Arsenic	0.0505	mg/L	0.05	101.0	2.4	0-20	3/20/2013	4/9/2013
Antimony	0.0507	mg/L	0.05	101.4	6.3	0-20	3/20/2013	4/9/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130311002-001	Thallium	ND	0.458	mg/L	0.5	91.6	75-125	3/20/2013	4/9/2013
130311002-001	Selenium	ND	0.524	mg/L	0.5	104.8	75-125	3/20/2013	4/9/2013
130311002-001	Arsenic	ND	0.536	mg/L	0.5	107.2	75-125	3/20/2013	4/9/2013
130311002-001	Antimony	ND	0.534	mg/L	0.5	106.8	75-125	3/20/2013	4/9/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.447	mg/L	0.5	89.4	2.4	0-20	3/20/2013	4/9/2013
Selenium	0.515	mg/L	0.5	103.0	1.7	0-20	3/20/2013	4/9/2013
Arsenic	0.517	mg/L	0.5	103.4	3.6	0-20	3/20/2013	4/9/2013
Antimony	0.537	mg/L	0.5	107.4	0.6	0-20	3/20/2013	4/9/2013

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	3/20/2013	4/9/2013
Arsenic	ND	mg/L	0.001	3/20/2013	4/9/2013

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	130311002
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1303283
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Selenium	ND	mg/L	0.001	3/20/2013	4/9/2013
Thallium	ND	mg/L	0.001	3/20/2013	4/9/2013

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6434**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **6434**	RunNo: **9165**
Prep Date: **3/12/2013**	Analysis Date: **3/13/2013**	SeqNo: **260650** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	18.0	20.0								J

Sample ID **LCS-6434**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **6434**	RunNo: **9165**
Prep Date: **3/12/2013**	Analysis Date: **3/13/2013**	SeqNo: **260651** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1040	20.0	1000	18.00	102	80	120			

Sample ID **1303283-001FMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ1-C-R35**	Batch ID: **6434**	RunNo: **9165**
Prep Date: **3/12/2013**	Analysis Date: **3/13/2013**	SeqNo: **260654** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	115000	1000	50000	61800	106	80	120			

Sample ID **1303283-001FMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ1-C-R35**	Batch ID: **6434**	RunNo: **9165**
Prep Date: **3/12/2013**	Analysis Date: **3/13/2013**	SeqNo: **260655** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	117000	1000	50000	61800	110	80	120	1.86	5	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258033** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258034** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.8	0.50	5.000	0	96.1	90	110			
Nitrogen, Nitrite (As N)	0.91	0.10	1.000	0	91.4	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	102	90	110			
Sulfate	9.7	0.50	10.00	0	97.2	90	110			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS02**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258035** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.9	0.50	5.000	0	98.0	90	110	1.98	20	
Nitrogen, Nitrite (As N)	0.94	0.10	1.000	0	93.6	90	110	2.37	20	
Nitrogen, Nitrate (As N)	2.6	0.10	2.500	0	104	90	110	2.10	20	
Sulfate	9.8	0.50	10.00	0	98.4	90	110	1.28	20	

Sample ID **1303283-001FMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ1-C-R35**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258037** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	126	5.00	125.0	0	101	90.4	113			

Sample ID **1303283-001FMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ1-C-R35**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258038** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	128	5.00	125.0	0	103	90.4	113	2.02	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258056** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258068** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9051**	RunNo: **9051**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258080** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrite (As N)	ND	0.10								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **5ml rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258912** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	ND	5.0								
Benzene	ND	1.0								
Toluene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
2-Butanone	ND	5.0								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroform	ND	1.0								
cis-1,2-DCE	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
Methylene Chloride	ND	3.0								
1,1,2,2-Tetrachloroethane	ND	1.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.0								
Surr: 1,2-Dichloroethane-d4	8.8		10.00		88.1	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		102	69.5	130			
Surr: Dibromofluoromethane	9.2		10.00		92.3	70	130			
Surr: Toluene-d8	9.3		10.00		93.2	70	130			

Sample ID **100ng lcs 624 std**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258913** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	55	5.0	60.00	0	92.3	70	130			
Benzene	20	1.0	20.00	0	101	70	130			
Toluene	20	1.0	20.00	0	99.6	70	130			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	105	70	130			
2-Butanone	40	5.0	40.00	0	101	70	130			
Carbon Tetrachloride	21	1.0	20.00	0	103	70	130			
Chlorobenzene	20	1.0	20.00	0	99.3	70	130			
Chloroform	22	1.0	20.00	0	108	70	130			
cis-1,2-DCE	20	1.0	20.00	0	100	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs 624 std**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258913** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	20	1.0	20.00	0	100	70	130			
1,1-Dichloroethene	24	1.0	20.00	0	119	70	130			
Methylene Chloride	22	3.0	20.00	0	110	70	130			
1,1,2,2-Tetrachloroethane	19	1.0	20.00	0	95.5	70	130			
Tetrachloroethene (PCE)	21	1.0	20.00	0	104	70	130			
trans-1,2-DCE	22	1.0	20.00	0	109	70	130			
1,1,1-Trichloroethane	21	1.0	20.00	0	106	70	130			
1,1,2-Trichloroethane	20	1.0	20.00	0	100	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	103	70	130			
Trichlorofluoromethane	22	1.0	20.00	0	109	70	130			
Vinyl chloride	20	1.0	20.00	0	99.2	70	130			
Xylenes, Total	61	1.0	60.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	30		30.00		101	70	130			
Surr: 4-Bromofluorobenzene	29		30.00		98.1	69.5	130			
Surr: Dibromofluoromethane	31		30.00		102	70	130			
Surr: Toluene-d8	29		30.00		96.5	70	130			

Sample ID **100ng lcsd**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258914** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	57	5.0	60.00	0	95.2	70	130	3.09	20	
Benzene	20	1.0	20.00	0	101	70	130	0.760	20	
Toluene	19	1.0	20.00	0	93.6	70	130	6.24	20	
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	107	70	130	2.03	20	
2-Butanone	41	5.0	40.00	0	103	70	130	2.08	20	
Carbon Tetrachloride	20	1.0	20.00	0	98.4	70	130	5.07	20	
Chlorobenzene	19	1.0	20.00	0	96.5	70	130	2.87	20	
Chloroform	22	1.0	20.00	0	110	70	130	2.16	20	
cis-1,2-DCE	21	1.0	20.00	0	103	70	130	3.25	20	
1,1-Dichloroethane	19	1.0	20.00	0	94.8	70	130	5.69	20	
1,1-Dichloroethene	22	1.0	20.00	0	111	70	130	7.60	20	
Methylene Chloride	22	3.0	20.00	0	109	70	130	0.778	20	
1,1,2,2-Tetrachloroethane	18	1.0	20.00	0	87.6	70	130	8.64	20	
Tetrachloroethene (PCE)	20	1.0	20.00	0	98.5	70	130	5.58	20	
trans-1,2-DCE	21	1.0	20.00	0	106	70	130	2.41	20	
1,1,1-Trichloroethane	21	1.0	20.00	0	103	70	130	2.37	20	
1,1,2-Trichloroethane	19	1.0	20.00	0	96.1	70	130	3.99	20	
Trichloroethene (TCE)	20	1.0	20.00	0	102	70	130	1.71	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1303283**

Hall Environmental Analysis Laboratory, Inc.

06-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **100ng lcsd**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258914** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Trichlorofluoromethane	20	1.0	20.00	0	102	70	130	6.52	20	
Vinyl chloride	19	1.0	20.00	0	94.3	70	130	4.99	20	
Xylenes, Total	57	1.0	60.00	0	95.8	70	130	5.21	20	
Surr: 1,2-Dichloroethane-d4	31		30.00		103	70	130	0	0	
Surr: 4-Bromofluorobenzene	28		30.00		92.3	69.5	130	0	0	
Surr: Dibromofluoromethane	30		30.00		100	70	130	0	0	
Surr: Toluene-d8	28		30.00		93.2	70	130	0	0	

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258915** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	55	5.0	60.00	0	91.7	60	140			
Benzene	20	1.0	20.00	0	101	70	130			
Toluene	20	1.0	20.00	0	102	80	120			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	103	70	130			
2-Butanone	41	5.0	40.00	0	101	60	140			
Carbon Tetrachloride	21	1.0	20.00	0	103	70	130			
Chlorobenzene	21	1.0	20.00	0	104	70	130			
Chloroform	22	1.0	20.00	0	108	80	120			
cis-1,2-DCE	20	1.0	20.00	0	98.5	70	130			
1,1-Dichloroethane	19	1.0	20.00	0	94.1	70	130			
1,1-Dichloroethene	20	1.0	20.00	0	100	80	120			
Methylene Chloride	21	3.0	20.00	0	103	70	130			
1,1,2,2-Tetrachloroethane	20	1.0	20.00	0	102	70	130			
Tetrachloroethene (PCE)	21	1.0	20.00	0	106	70	130			
trans-1,2-DCE	21	1.0	20.00	0	104	70	130			
1,1,1-Trichloroethane	20	1.0	20.00	0	101	70	130			
1,1,2-Trichloroethane	21	1.0	20.00	0	106	70	130			
Trichloroethene (TCE)	20	1.0	20.00	0	98.3	70	130			
Trichlorofluoromethane	21	1.0	20.00	0	106	70	130			
Vinyl chloride	19	1.0	20.00	0	97.2	80	120			
Xylenes, Total	63	1.0	60.00	0	104	70	130			
Surr: 1,2-Dichloroethane-d4	9.6		10.00		96.0	70	130			
Surr: 4-Bromofluorobenzene	8.8		10.00		87.7	70	130			
Surr: Dibromofluoromethane	9.2		10.00		91.9	70	130			
Surr: Toluene-d8	9.2		10.00		92.1	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1303283-001a ms**	SampType: **MS4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ1-C-R35**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258920** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	87.3	5.00	60.00	0	146	70	130			S
Benzene	20.6	1.00	20.00	0	103	70	130			
Toluene	19.5	1.00	20.00	0	97.4	70	130			
1,2-Dichloroethane (EDC)	21.0	1.00	20.00	0	105	70	130			
2-Butanone	50.9	5.00	40.00	0	127	70	130			
Carbon Tetrachloride	20.3	1.00	20.00	0	101	70	130			
Chlorobenzene	19.7	1.00	20.00	0	98.4	70	130			
Chloroform	20.3	1.00	20.00	0	101	70	130			
cis-1,2-DCE	21.3	1.00	20.00	0	107	70	130			
1,1-Dichloroethane	18.9	1.00	20.00	0	94.5	70	130			
1,1-Dichloroethene	22.4	1.00	20.00	0	112	70	130			
Methylene Chloride	21.2	3.00	20.00	0	106	70	130			
1,1,2,2-Tetrachloroethane	24.0	1.00	20.00	0	120	70	130			
Tetrachloroethene (PCE)	20.7	1.00	20.00	0	103	70	130			
trans-1,2-DCE	20.7	1.00	20.00	0	103	70	130			
1,1,1-Trichloroethane	19.9	1.00	20.00	0	99.7	70	130			
1,1,2-Trichloroethane	22.2	1.00	20.00	0	111	70	130			
Trichloroethene (TCE)	19.3	1.00	20.00	0	96.3	70	130			
Trichlorofluoromethane	21.2	1.00	20.00	0	106	70	130			
Vinyl chloride	20.0	1.00	20.00	0	99.8	70	130			
Xylenes, Total	60.2	1.00	60.00	0	100	70	130			
Surr: 1,2-Dichloroethane-d4	31.6		30.00		105	70	130			
Surr: 4-Bromofluorobenzene	29.8		30.00		99.3	69.5	130			
Surr: Dibromofluoromethane	29.6		30.00		98.8	70	130			
Surr: Toluene-d8	29.1		30.00		96.9	70	130			

Sample ID **1303283-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ1-C-R35**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258921** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	93.5	5.00	60.00	0	156	70	130	6.83	20	S
Benzene	19.2	1.00	20.00	0	96.1	70	130	7.08	20	
Toluene	18.8	1.00	20.00	0	94.0	70	130	3.53	20	
1,2-Dichloroethane (EDC)	21.5	1.00	20.00	0	107	70	130	2.14	20	
2-Butanone	51.5	5.00	40.00	0	129	70	130	1.23	20	
Carbon Tetrachloride	18.7	1.00	20.00	0	93.6	70	130	7.86	20	
Chlorobenzene	18.9	1.00	20.00	0	94.6	70	130	3.89	20	
Chloroform	20.7	1.00	20.00	0	104	70	130	2.20	20	
cis-1,2-DCE	21.0	1.00	20.00	0	105	70	130	1.47	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1303283**

Hall Environmental Analysis Laboratory, Inc.

06-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **1303283-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ1-C-R35**	Batch ID: **R9062**	RunNo: **9062**
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **258921** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	18.3	1.00	20.00	0	91.4	70	130	3.39	20	
1,1-Dichloroethene	21.2	1.00	20.00	0	106	70	130	5.16	20	
Methylene Chloride	20.2	3.00	20.00	0	101	70	130	4.75	20	
1,1,2,2-Tetrachloroethane	23.5	1.00	20.00	0	118	70	130	1.82	20	
Tetrachloroethene (PCE)	19.1	1.00	20.00	0	95.3	70	130	8.22	20	
trans-1,2-DCE	20.3	1.00	20.00	0	101	70	130	1.80	20	
1,1,1-Trichloroethane	19.1	1.00	20.00	0	95.7	70	130	4.10	20	
1,1,2-Trichloroethane	21.7	1.00	20.00	0	108	70	130	2.08	20	
Trichloroethene (TCE)	18.3	1.00	20.00	0	91.6	70	130	4.98	20	
Trichlorofluoromethane	19.2	1.00	20.00	0	96.1	70	130	9.95	20	
Vinyl chloride	18.1	1.00	20.00	0	90.6	70	130	9.72	20	
Xylenes, Total	56.9	1.00	60.00	0	94.8	70	130	5.61	20	
Surr: 1,2-Dichloroethane-d4	31.0		30.00		103	70	130	0		
Surr: 4-Bromofluorobenzene	28.6		30.00		95.3	69.5	130	0		
Surr: Dibromofluoromethane	28.8		30.00		96.1	70	130	0		
Surr: Toluene-d8	28.0		30.00		93.3	70	130	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **R9066**	RunNo: **9066**							
Prep Date:	Analysis Date: **3/8/2013**	SeqNo: **259209**	Units: **%REC**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	46		40.00		115	60	140			
Surr: 2-Fluorobiphenyl	41		40.00		103	60	140			
Surr: 2-Fluorophenol	42		40.00		105	60	140			
Surr: 4-Terphenyl-d14	45		40.00		111	60	140			
Surr: Nitrobenzene-d5	42		40.00		104	60	140			
Surr: Phenol-d5	38		40.00		95.3	60	140			

Sample ID **mb-6387**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **PBW**	Batch ID: **6387**	RunNo: **9066**							
Prep Date: **3/8/2013**	Analysis Date: **3/8/2013**	SeqNo: **259211**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	5.00								
1,4-Dichlorobenzene	ND	5.00								
2,4-Dinitrophenol	ND	5.00								
2,4-Dinitrotoluene	ND	5.00								
Hexachlorobenzene	ND	5.00								
Hexachloroethane	ND	5.00								
2-Methylphenol	ND	5.00								
3+4-Methylphenol	ND	5.00								
Nitrobenzene	ND	5.00								
Pentachlorophenol	ND	5.00								
Pyridine	ND	5.00								
Surr: 2,4,6-Tribromophenol	179		200.0		89.3	42.9	124			
Surr: 2-Fluorobiphenyl	67.3		100.0		67.3	40	108			
Surr: 2-Fluorophenol	127		200.0		63.5	23.6	94.8			
Surr: 4-Terphenyl-d14	83.5		100.0		83.5	41.9	103			
Surr: Nitrobenzene-d5	71.4		100.0		71.4	42.6	114			
Surr: Phenol-d5	87.1		200.0		43.5	20.3	74.7			

Sample ID **lcs-6387**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **6387**	RunNo: **9066**							
Prep Date: **3/8/2013**	Analysis Date: **3/8/2013**	SeqNo: **259214**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	71.6	5.00	100.0	0	71.6	27.4	101			
1,4-Dichlorobenzene	67.8	5.00	100.0	0	67.8	32.6	91.5			
2,4-Dinitrophenol	79.6	5.00	100.0	0	79.6	23.1	118			
2,4-Dinitrotoluene	86.5	5.00	100.0	0	86.5	44.7	112			
Hexachlorobenzene	91.5	5.00	100.0	0	91.5	30	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-6387**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6387**	RunNo: **9066**
Prep Date: **3/8/2013**	Analysis Date: **3/8/2013**	SeqNo: **259214** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	68.8	5.00	100.0	0	68.8	23.2	97.8			
2-Methylphenol	88.2	5.00	100.0	0	88.2	36.1	105			
3+4-Methylphenol	88.6	5.00	100.0	0	88.6	35.7	92.5			
Nitrobenzene	84.4	5.00	100.0	0	84.4	30.9	125			
Pentachlorophenol	92.1	5.00	100.0	0	92.1	20.2	93			
Pyridine	64.6	5.00	100.0	0	64.6	5.14	87.1			
Surr: 2,4,6-Tribromophenol	106		100.0		106	42.9	124			
Surr: 2-Fluorobiphenyl	87.4		100.0		87.4	40	108			
Surr: 2-Fluorophenol	64.0		100.0		64.0	23.6	94.8			
Surr: 4-Terphenyl-d14	92.6		100.0		92.6	41.9	103			
Surr: Nitrobenzene-d5	89.2		100.0		89.2	42.6	114			
Surr: Phenol-d5	50.4		100.0		50.4	20.3	74.7			

Sample ID **lcsd-6387**	SampType: **LCSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6387**	RunNo: **9066**
Prep Date: **3/8/2013**	Analysis Date: **3/8/2013**	SeqNo: **259215** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	68.5	5.00	100.0	0	68.5	27.4	101	4.40	20	
1,4-Dichlorobenzene	69.0	5.00	100.0	0	69.0	32.6	91.5	1.70	20	
2,4-Dinitrophenol	84.2	5.00	100.0	0	84.2	23.1	118	5.59	20	
2,4-Dinitrotoluene	87.6	5.00	100.0	0	87.6	44.7	112	1.26	20	
Hexachlorobenzene	89.3	5.00	100.0	0	89.3	30	130	2.43	20	
Hexachloroethane	66.3	5.00	100.0	0	66.3	23.2	97.8	3.64	20	
2-Methylphenol	88.1	5.00	100.0	0	88.1	36.1	105	0.113	20	
3+4-Methylphenol	85.1	5.00	100.0	0	85.1	35.7	92.5	4.10	20	
Nitrobenzene	81.2	5.00	100.0	0	81.2	30.9	125	3.82	20	
Pentachlorophenol	92.7	5.00	100.0	0	92.7	20.2	93	0.693	20	
Pyridine	61.0	5.00	100.0	0	61.0	5.14	87.1	5.67	20	
Surr: 2,4,6-Tribromophenol	104		100.0		104	42.9	124	0		
Surr: 2-Fluorobiphenyl	92.2		100.0		92.2	40	108	0		
Surr: 2-Fluorophenol	66.2		100.0		66.2	23.6	94.8	0		
Surr: 4-Terphenyl-d14	86.9		100.0		86.9	41.9	103	0		
Surr: Nitrobenzene-d5	85.3		100.0		85.3	42.6	114	0		
Surr: Phenol-d5	46.4		100.0		46.4	20.3	74.7	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1303283-001Cms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ1-C-R35**	Batch ID: **6387**	RunNo: **9066**
Prep Date: **3/8/2013**	Analysis Date: **3/8/2013**	SeqNo: **259219** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	46.3	5.00	100.0	0	46.3	20.9	103			
1,4-Dichlorobenzene	43.9	5.00	100.0	0	43.9	32.6	91.5			
2,4-Dinitrophenol	23.7	5.00	100.0	0	23.7	11	112			
2,4-Dinitrotoluene	58.7	5.00	100.0	0	58.7	44.7	112			
Hexachlorobenzene	61.7	5.00	100.0	0	61.7	30.3	126			
Hexachloroethane	44.6	5.00	100.0	0	44.6	19.5	96.4			
2-Methylphenol	55.0	5.00	100.0	0	55.0	28.7	108			
3+4-Methylphenol	55.1	5.00	100.0	0	55.1	24.2	136			
Nitrobenzene	54.2	5.00	100.0	0	54.2	28.8	119			
Pentachlorophenol	37.9	5.00	100.0	0	37.9	20.2	93			
Pyridine	32.2	5.00	100.0	0	32.2	19.3	82.8			
Surr: 2,4,6-Tribromophenol	61.7		100.0		61.7	42.9	124			
Surr: 2-Fluorobiphenyl	56.2		100.0		56.2	40	108			
Surr: 2-Fluorophenol	44.3		100.0		44.3	23.6	94.8			
Surr: 4-Terphenyl-d14	63.4		100.0		63.4	41.9	103			
Surr: Nitrobenzene-d5	53.4		100.0		53.4	42.6	114			
Surr: Phenol-d5	40.6		100.0		40.6	20.3	74.7			

Sample ID **1303283-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ1-C-R35**	Batch ID: **6387**	RunNo: **9066**
Prep Date: **3/8/2013**	Analysis Date: **3/8/2013**	SeqNo: **259220** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	56.2	5.00	100.0	0	56.2	20.9	103	19.3	20	
1,4-Dichlorobenzene	53.4	5.00	100.0	0	53.4	32.6	91.5	19.5	20	
2,4-Dinitrophenol	49.1	5.00	100.0	0	49.1	11	112	69.7	20	R
2,4-Dinitrotoluene	65.0	5.00	100.0	0	65.0	44.7	112	10.1	20	
Hexachlorobenzene	69.2	5.00	100.0	0	69.2	30.3	126	11.6	20	
Hexachloroethane	49.9	5.00	100.0	0	49.9	19.5	96.4	11.2	20	
2-Methylphenol	68.7	5.00	100.0	0	68.7	28.7	108	22.2	20	R
3+4-Methylphenol	67.9	5.00	100.0	0	67.9	24.2	136	20.9	20	R
Nitrobenzene	67.7	5.00	100.0	0	67.7	28.8	119	22.1	20	R
Pentachlorophenol	59.9	5.00	100.0	0	59.9	20.2	93	45.0	20	R
Pyridine	17.1	5.00	100.0	0	17.1	19.3	82.8	61.5	20	SR
Surr: 2,4,6-Tribromophenol	71.2		100.0		71.2	42.9	124	0		
Surr: 2-Fluorobiphenyl	63.6		100.0		63.6	40	108	0		
Surr: 2-Fluorophenol	51.0		100.0		51.0	23.6	94.8	0		
Surr: 4-Terphenyl-d14	67.1		100.0		67.1	41.9	103	0		
Surr: Nitrobenzene-d5	67.9		100.0		67.9	42.6	114	0		
Surr: Phenol-d5	45.0		100.0		45.0	20.3	74.7	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303283-002f dup**	SampType: **DUP**		TestCode: **SM2510B: Specific Conductance**					
Client ID:	**WQ1-C-R35 Duplica**	Batch ID: **R9056**		RunNo: **9056**					
Prep Date:		Analysis Date: **3/7/2013**		SeqNo: **258302**		Units: **µmhos/cm**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	115000	0.500						1.58	20	

Sample ID	**ec 100us ccv**	SampType: **CCV**		TestCode: **SM2510B: Specific Conductance**					
Client ID:	**CCV**	Batch ID: **R9056**		RunNo: **9056**					
Prep Date:		Analysis Date: **3/7/2013**		SeqNo: **258306**		Units: **µmhos/cm**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	100	0.010	100.0	0	104	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-6435**	SampType:	**MBLK**		TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**PBW**	Batch ID:	**6435**		RunNo:	**9173**				
Prep Date:	**3/12/2013**	Analysis Date:	**3/12/2013**		SeqNo:	**260857**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	**LCS-6435**	SampType:	**LCS**		TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**LCSW**	Batch ID:	**6435**		RunNo:	**9173**				
Prep Date:	**3/12/2013**	Analysis Date:	**3/12/2013**		SeqNo:	**260858**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00487	0.000200	0.005000	0	97.5	80	120			

Sample ID	**LCSD-6435**	SampType:	**LCSD**		TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**LCSS02**	Batch ID:	**6435**		RunNo:	**9173**				
Prep Date:	**3/12/2013**	Analysis Date:	**3/12/2013**		SeqNo:	**260859**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00524	0.000200	0.005000	0	105	80	120	7.15	20	

Sample ID	**1303283-001DMSD**	SampType:	**MSD**		TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**WQ1-C-R35**	Batch ID:	**6435**		RunNo:	**9173**				
Prep Date:	**3/12/2013**	Analysis Date:	**3/12/2013**		SeqNo:	**260869**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00578	0.00100	0.005000	0	116	75	125	5.65	20	

Sample ID	**1303283-001DMS**	SampType:	**MS**		TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**WQ1-C-R35**	Batch ID:	**6435**		RunNo:	**9173**				
Prep Date:	**3/12/2013**	Analysis Date:	**3/12/2013**		SeqNo:	**260870**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00546	0.00100	0.005000	0	109	75	125			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1303283**

Hall Environmental Analysis Laboratory, Inc.

06-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260952** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Potassium	0.079	1.0								J
Sodium	ND	1.0								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260953** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	102	80	120			
Magnesium	51	1.0	50.00	0	102	80	120			
Potassium	49	1.0	50.00	0.07853	98.7	80	120			
Sodium	50	1.0	50.00	0	101	80	120			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260954** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.6	80	120	3.34	20	
Magnesium	49	1.0	50.00	0	98.9	80	120	3.06	20	
Potassium	48	1.0	50.00	0.07853	95.8	80	120	2.98	20	
Sodium	49	1.0	50.00	0	97.8	80	120	2.95	20	

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260962** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.820	-100	99			
Magnesium	ND	1.0	1.000	0	0.106	-100	99			
Potassium	0.068	1.0	1.000	0	6.84	-100	99			
Sodium	ND	1.0	1.000	0	5.02	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260963** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.1	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260963** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	49	1.0	50.00	0	97.6	90	110			
Potassium	47	1.0	50.00	0	94.4	90	110			
Sodium	48	1.0	50.00	0	96.1	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260974** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.689	-100	99			
Magnesium	ND	1.0	1.000	0	0.0420	-100	99			
Potassium	0.11	1.0	1.000	0	11.1	-100	99			
Sodium	0.15	1.0	1.000	0	14.6	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R9178**	RunNo: **9178**
Prep Date:	Analysis Date: **3/14/2013**	SeqNo: **260975** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	53	1.0	50.00	0	107	90	110			
Magnesium	50	1.0	50.00	0	101	90	110			
Potassium	49	1.0	50.00	0	97.0	90	110			
Sodium	49	1.0	50.00	0	97.4	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH greater than 2
RL	Reporting Detection Limit
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1303283**

Hall Environmental Analysis Laboratory, Inc.

06-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **MB-6593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268271** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	0.012	1.0								J
Chromium	ND	0.0060								
Iron	0.013	0.050								J
Lead	ND	0.0050								
Magnesium	ND	1.0								
Nickel	ND	0.010								
Potassium	ND	1.0								
Silver	ND	0.0050								
Sodium	ND	1.0								
Vanadium	ND	0.050								

Sample ID **LCS-6593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268272** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.44	0.020	0.5000	0	88.2	80	120			
Beryllium	0.47	0.0030	0.5000	0	94.5	80	120			
Cadmium	0.44	0.0020	0.5000	0	88.7	80	120			
Calcium	50	1.0	50.00	0.01186	100	80	120			
Chromium	0.45	0.0060	0.5000	0	89.2	80	120			
Iron	0.45	0.050	0.5000	0.01275	87.6	80	120			
Lead	0.44	0.0050	0.5000	0	88.8	80	120			
Magnesium	49	1.0	50.00	0	98.6	80	120			
Nickel	0.43	0.010	0.5000	0	85.2	80	120			
Potassium	47	1.0	50.00	0	94.3	80	120			
Silver	0.089	0.0050	0.1000	0	89.2	80	120			
Sodium	48	1.0	50.00	0	95.8	80	120			
Vanadium	0.46	0.050	0.5000	0	91.6	80	120			

Sample ID **1303283-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ1-C-R35**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268312** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.485	0.200	0.5000	0.03060	90.9	75	125			
Beryllium	0.465	0.0300	0.5000	0.004700	92.0	75	125			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303283-001DMS**	SampType: **MS**		TestCode: **EPA 6010B: Total Recoverable Metals**					
Client ID:	**WQ1-C-R35**	Batch ID: **6593**		RunNo: **9398**					
Prep Date:	**3/21/2013**	Analysis Date: **3/25/2013**		SeqNo: **268312**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.434	0.0200	0.5000	0	86.8	75	125			
Chromium	0.445	0.0600	0.5000	0	88.9	75	125			
Iron	0.785	0.500	0.5000	0.3993	77.0	75	125			
Lead	0.448	0.0500	0.5000	0	89.6	75	125			
Nickel	0.416	0.100	0.5000	0	83.2	75	125			
Silver	0.0887	0.0500	0.1000	0	88.7	75	125			
Vanadium	0.512	0.500	0.5000	0.03350	95.8	75	125			

Sample ID	**1303283-001DMSD**	SampType: **MSD**		TestCode: **EPA 6010B: Total Recoverable Metals**					
Client ID:	**WQ1-C-R35**	Batch ID: **6593**		RunNo: **9398**					
Prep Date:	**3/21/2013**	Analysis Date: **3/25/2013**		SeqNo: **268313**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.455	0.200	0.5000	0.03060	84.9	75	125	6.36	20	
Beryllium	0.437	0.0300	0.5000	0.004700	86.5	75	125	6.10	20	
Cadmium	0.408	0.0200	0.5000	0	81.6	75	125	6.13	20	
Chromium	0.403	0.0600	0.5000	0	80.5	75	125	9.89	20	
Iron	0.752	0.500	0.5000	0.3993	70.4	75	125	4.30	20	S
Lead	0.383	0.0500	0.5000	0	76.6	75	125	15.7	20	
Nickel	0.387	0.100	0.5000	0	77.4	75	125	7.12	20	
Silver	0.0780	0.0500	0.1000	0	78.0	75	125	12.8	20	
Vanadium	0.477	0.500	0.5000	0.03350	88.6	75	125	7.24	20	J

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303283-002f dup**	SampType: **DUP**		TestCode: **SM4500-H+B: pH**					
Client ID:	**WQ1-C-R35 Duplica**	Batch ID: **R9056**		RunNo: **9056**					
Prep Date:		Analysis Date: **3/7/2013**		SeqNo: **258331**		Units: **pH units**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.07	1.68	0	7.070	0	0	0			H

Sample ID	**ph 4.00 ccv**	SampType: **CCV**		TestCode: **SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID: **R9056**		RunNo: **9056**					
Prep Date:		Analysis Date: **3/7/2013**		SeqNo: **258334**		Units: **pH units**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	4.01	1.68								

Sample ID	**ph 7.00 ccV**	SampType: **CCV**		TestCode: **SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID: **R9056**		RunNo: **9056**					
Prep Date:		Analysis Date: **3/7/2013**		SeqNo: **258338**		Units: **pH units**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.99	1.68								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **mb-1**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R9056**	RunNo: **9056**							
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258242**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R9056**	RunNo: **9056**							
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258243**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	99.8	90	110			

Sample ID **lcs-1 dup**	SampType: **LCSD**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSS02**	Batch ID: **R9056**	RunNo: **9056**							
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258244**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	101	90	110	0.947	20	

Sample ID **1303283-001f ms**	SampType: **MS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **WQ1-C-R35**	Batch ID: **R9056**	RunNo: **9056**							
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258246**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	125	20.0	80.00	50.28	93.8	65.3	113			

Sample ID **1303283-001f msd**	SampType: **MSD**	TestCode: **SM2320B: Alkalinity**							
Client ID: **WQ1-C-R35**	Batch ID: **R9056**	RunNo: **9056**							
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258247**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	127	20.0	80.00	50.28	95.4	65.3	113	1.02	10	

Sample ID **mb-2**	SampType: **MBLK**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R9056**	RunNo: **9056**							
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258262**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R9056**	RunNo: **9056**
Prep Date:	Analysis Date: **3/7/2013**	SeqNo: **258263** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	99.2	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH greater than 2
RL	Reporting Detection Limit
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**
Client ID: **PBW**	Batch ID: **R9101**	RunNo: **9101**
Prep Date:	Analysis Date: **3/11/2013**	SeqNo: **259124** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.00								

Sample ID **LCS ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R9101**	RunNo: **9101**
Prep Date:	Analysis Date: **3/11/2013**	SeqNo: **259125** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.97	1.00	4.850	0	102	90	110			

Sample ID **LCSD ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R9101**	RunNo: **9101**
Prep Date:	Analysis Date: **3/11/2013**	SeqNo: **259126** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.10	1.00	4.850	0	105	90	110	2.68	0	

Sample ID **1303283-001BMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**
Client ID: **WQ1-C-R35**	Batch ID: **R9101**	RunNo: **9101**
Prep Date:	Analysis Date: **3/11/2013**	SeqNo: **259128** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.40	1.00	4.650	0.7851	99.4	75	125			

Sample ID **1303283-001BMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**
Client ID: **WQ1-C-R35**	Batch ID: **R9101**	RunNo: **9101**
Prep Date:	Analysis Date: **3/11/2013**	SeqNo: **259129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.46	1.00	4.650	0.7851	101	75	125	1.05	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303283-001FDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**WQ1-C-R35**	Batch ID:	**R9095**	RunNo:	**9095**					
Prep Date:		Analysis Date:	**3/11/2013**	SeqNo:	**259040**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.040	0						0.154	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303283**

06-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6455**	SampType: **MBLK**	TestCode: **SM 2540D: TSS**							
Client ID: **PBW**	Batch ID: **6455**	RunNo: **9168**							
Prep Date: **3/13/2013**	Analysis Date: **3/13/2013**	SeqNo: **260749**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	ND	4.00								

Sample ID **LCS-6455**	SampType: **LCS**	TestCode: **SM 2540D: TSS**							
Client ID: **LCSW**	Batch ID: **6455**	RunNo: **9168**							
Prep Date: **3/13/2013**	Analysis Date: **3/13/2013**	SeqNo: **260750**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	91.0	4.00	96.60	0	94.2	85.8178	113.8716			

Sample ID **1303283-001FDUP**	SampType: **DUP**	TestCode: **SM 2540D: TSS**							
Client ID: **WQ1-C-R35**	Batch ID: **6455**	RunNo: **9168**							
Prep Date: **3/13/2013**	Analysis Date: **3/13/2013**	SeqNo: **260753**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	40.0	4.00						2.53	15	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

WQSP-1

DATA VERIFICATION AND VALIDATION REPORTS

Round 35

WQSP-1

SDG 1303283

Groundwater Concentration and Precision Summary

General Chemistry Parameter	Units	SOW MRL	Lab MDL	Lab PQL	Primary Sample	Flag	Duplicate Sample	Flag	Avg	RPD	Applicable 95th UTLV or 95th %
Chloride	mg/L	0.5	400	1,000	36,200		39,500		37,850	8.7	40,472
TOC	mg/L	1.0	0.23	1.0	0.78	J	0.81	J	0.80	3.8	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	5.0	20	50.3		50.6		50.5	0.59	55.8
Specific Conductance	umhos/cm	NA	0.50	0.50	115,000		113,000		114,000	1.8	175,000
pH	pH units	NA	0.10	1.68	7.05		7.07		7.06	0.28	5.6 - 8.8
Specific Gravity	NA	NA	0.0	0.0	1.039		1.038		1.039	0.10	1.07
TDS	mg/L	10	500	1,000	61,800		64,700		63,250	4.6	80,700
TSS	mg/L	1.0	1.5	4.0	**39**		**40**		**40**	2.5	**33.3**
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	0.82	50	1,850		1,840		1,845	0.54	2,087
Mg (Diss)	mg/L	0.5	0.67	50	1,130		1,120		1,125	0.89	1,247
K (Diss)	mg/L	0.5	0.7	10	515		534		525	3.6	799
Na (Diss)	mg/L	0.5	12	500	19,700		19,500		19,600	1.0	22,090
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL**	**Lab PQL**	**Primary Sample**	**Flag**	**Duplicate Sample**	**Flag**	**Avg**	**RPD**	
Hg (CVAAS)	mg/L	0.00020	0.00012	0.0010	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.013	0.20	0.031	J	0.029	J	0.030	6.7	<1.0
Be	mg/L	0.010	0.0010	0.030	0.0047	J	0.0028	J	0.0038	51	<0.02
Cd	mg/L	0.010	0.0020	0.020	ND		ND		NA	NA	<0.2
Ca	mg/L	0.500	2.5	50	1,570		1,540		1,555	1.9	NA
Cr	mg/L	0.025	0.0080	0.060	ND		ND		NA	NA	<0.5
Pb (a)	mg/L	0.020	0.026	0.050	ND		ND		NA	NA	0.105
Mg	mg/L	0.50	0.80	50	1,100		1,060		1,080	3.7	NA
Ni	mg/L	0.025	0.0060	0.10	ND		ND		NA	NA	0.490
K	mg/L	0.50	1.3	50	472		469		471	0.64	NA
Ag	mg/L	0.013	0.0020	0.050	ND		ND		NA	NA	<0.5
Na	mg/L	0.50	15	500	20,400		18,700		19,550	8.7	NA
V	mg/L	0.025	0.0040	0.50	0.034	J	0.026	J	0.030	27	<0.1
ICP/MS Metals											
Sb	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.33
As	mg/L	0.050	0.020	0.020	ND		ND		NA	NA	<0.1
Se	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.15
Tl	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.98

Method Reporting Limit (MRL) and lab's Practical Quantitation Level (PQL) generally equivalent for a given sample.
Lab's PQL corresponds to low calibration standard adjusted for the dilution factor as necessary for high-brine samples.
J Flag indicates concentration was below the lab's PQL but above the Method Detection Limit (MDL) for the analyte.
NA - Not Applicable
ND - Not Detected
CVAAS - cold vapor atomic absorption spectroscopy.
ICP - inductively coupled plasma emission spectroscopy.
ICP/MS - ICP combined with mass spectrometry.
(a) MDL higher than SOW-prescribed MRL.

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 35
WQSP-1

Sample Summary

Date:	July 22, 2013
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	March 6, 2013
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	May 6, 2013
Date Samples Shipped/Method	March 6, 2013 by FedEx
Date Samples Received by lab:	March 7, 2013
Sample Receipt Condition:	3.0 deg. C. Some VOA vials broken
SDG:	1303283
WIPP Chain of Custody/Request for Analysis:	1024
Analysis Results Reviewed:	Volatile and semivolatile organics; total and dissolved metals; general chemistry indicator parameters
Analyses Verified, Validated, and Reported in this Document:	See table of all target analytes and methods in the Annual Culebra Groundwater Monitoring Report
VOC Analysis Date(s):	March 8, 2013 (meets holding time)
SVOC Extraction Date:	March 7, 2013 (meets holding time)
SVOC Analysis Date(s):	March 8, 2013 (meets holding time)
Total Trace Metals Analysis Date:	March 25, 29, 2013 (meets holding time)
Dissolved Cation Metals Analysis Date:	March 14, 2013 (meets holding time)
Mercury Analysis Date(s):	March 12, 2013 (meets holding time)
General Chemistry Parameters analysis dates	Dates are summarized on data summary reports from laboratory in the appendices. All holding times were met and pH was measured on March 7, 2013, the day of sample receipt.
Verification and Validation Checklist	Completed and attached to this narrative

Sample Numbers and Analytes for SDG 1303283

WTS Sample No.	Analytes
WQ1CR35N1, WQ1CR35N1D	VOCs
WQ1CR35N2, WQ1CR35N3	VOCs (Field Blank and Trip Blank)
WQ1CR35N4, WQ1CR35N4D	TOC
WQ1CR35N5, WQ1CR35N5D	SVOCs
WQ1CR35N6, WQ1CR35N6D	Total Trace Metals (including "total" cation metals)
WQ1CR35N7, WQ1CR35N7D	General Parameters (including "dissolved" cations)
WQ1CR35N12, WQ1CR35N13	Total Trace Metals (including "total" cations, preserved and unpreserved)

Results Summary

No VOCs were detected in the groundwater samples. The field blank contained "J-flagged" concentrations of 2-butanone at 2.8 ug/L and chloroform at 0.51 ug/L. No VOCs were detected in the trip blank sample.

No SVOCs were detected in the groundwater samples.

Low concentrations of Ba, Be, and V were detected in the primary and duplicate groundwater samples by ICP. These metals were also detected in Round 33 and 34. Trace Pb was not detected as it had been in round 34. All the measured concentrations of the trace metals were between the lab's MDL and MRL and are J-flagged as estimated.

The concentrations of trace metals and dissolved cations in the groundwater samples were similar to previous rounds. The precision of the primary and duplicate groundwater sample analyses was good except for Be with a RPD of 51 based on concentrations of 0.0047 mg/L in the primary sample and 0.0028 mg/L in the duplicate sample.

Measurements were made on all the general chemistry parameters at concentrations above the MRL except for TOC, which was detected with good precision at 0.78 mg/L in the primary sample and 0.81 mg/L in the duplicate sample. All other general chemistry parameter concentrations were above the MRL.

The general chemistry parameter concentrations were all lower than the applicable 95th UTLV or 95th percentile except for TSS with concentrations of 39 mg/L in the primary sample and 40 mg/L in the duplicate sample and a 95th percentile concentration of 33.3 mg/L.

The RPDs for the precision of the general chemistry parameter analysis results for the primary and duplicate groundwater samples were all less than 20. No firm precision objective applies to the analysis of duplicate field samples, but the composition of the samples should be the same since the groundwater samples are collected simultaneously.

The concentrations of all detected constituents and parameters other than TSS were within the 95th UTLV or 95th percentile, and all the RPDs were less than 20.

Summary for Volatile Organics Analysis

The groundwater samples were purged and analyzed for 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, benzene, carbon tetrachloride, chlorobenzene, chloroform, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, isobutanol, methyl ethyl ketone (2-butanone), methylene chloride, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, and xylenes (o-, m-, and p-).

The samples were analyzed according to the laboratory's SOP S-8260-11 based on EPA's SW-846 Method 8260B.

No VOCs were detected in the groundwater or in the trip blank and only 2-butanone and chloroform were detected in the field blank. No RPDs are applicable since no VOCs were detected in duplicate samples.

The QC data for the VOC analyses showed no VOCs detected in method blank samples, all LCS and LCSD recoveries within 80 – 120 percent, and all LCS/LCSD RPDs were less than 20. Recoveries of isobutyl alcohol were higher than the 70 – 130 percent objective in the MS and MSD at 146 percent and 156 percent, respectively. The high-TDS sample matrix generally causes isobutyl alcohol and 2-butanone to purge more efficiently from the spiked groundwater samples than from the calibration standards and LCSs and yield high recoveries. The MS/MSD RPDs were also <20.

All other quality assurance objectives were met for the VOC analyses.

Summary for Semivolatile Organic Compound Analysis

The groundwater samples were analyzed for 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, 2, 4-dinitrophenol, 2,4-dinitrotoluene, 2-methylphenol (o-cresol), 3+4-methylphenol (m-, p-methyl phenol), hexachlorobenzene, hexachloroethane, nitrobenzene, pentachlorophenol, and pyridine.

The samples were analyzed according to the laboratory's SOP S-8270C-11 based on EPA's SW-846 Method 8270C. No SVOCs were detected in the groundwater samples.

The QC data for the SVOC analyses showed no SVOCs were detected in method blank sample, all LCS and LCSD recoveries met the variable recovery acceptance criteria, and all LCS/LCSD RPDs were less than 20.

The MS/MSD recoveries all met Hall's historical control chart recovery ranges except for pyridine which yielded a recovery of 17.1 percent in the MSD compared to the low recovery limit of 19.3 percent recovery. The RPD objective for the MS/MSD recoveries was not met for several of the compounds including 2,4-dinitrophenol (69.7), 2-methylphenol (22.2), 3+4-methylphenol (20.9), nitrobenzene (22.1), pentachlorophenol (45.0), and pyridine (61.5) due to the MS recoveries being significantly higher than the MSD recoveries.

All other quality assurance objectives were met for the SVOC QA/QC data.

Summary for Metals Analysis

The groundwater samples were prepared and analyzed for Barium (Ba), Beryllium (Be), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Iron (Fe), Lead (Pb), Magnesium (Mg), Nickel (Ni), Potassium (K), Silver (Ag), Sodium (Na), and Vanadium (V) by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) according to Hall's SOP S-610-8 based on EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed according to Anatek's SOP ALI-A-315.03 for ICP/MS Method 6020B from EPA SW-846. Mercury (Hg) was analyzed according to the Hall's S-245.1_7470-3 using automated cold-vapor atomic absorption (CVAA) spectroscopy. The SOP is based on EPA's SW-846 Method 7470A.

The lab's achievable MDL was lower than the SOW-prescribed MRL for all of the trace metals in the WQSP-1 groundwater samples except for Pb where the MDL was 0.026 mg/L and the SOW-prescribed MRL is 0.020 mg/L. Pb was not detected in the groundwater samples.

The precision of the concentrations in the primary and duplicate groundwater samples was 51 for the trace Be and 27 for trace vanadium as discussed above, but there are no firm QA objectives for the precision of duplicate groundwater field samples.

All the lab's quality assurance objectives for recovery and precision were met for the target trace metals, dissolved cations, and mercury during analysis of QC samples including recoveries of 80 – 120 percent for LCS/LCSD samples, recoveries of 75 -125 percent for MS/MSD samples, and RPDs of <20 for both types of samples.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), alkalinity, and the anions chloride and sulfate. The standard analytical methods and the corresponding SOPs are shown in the table below.

Standard Analytical Method	Corresponding Contract Lab SOP
Method 2710F – Specific Gravity from Standard Methods	S-SM2710F-Rev. 1
Standard Methods SM 4500-H^+ (pH)	S-SM4500-H^+-7
EPA Method 120.1 Specific Conductance (Conductivity)	S-120.1-7
Standard Methods SM 2540C (TDS)	S-SM2540C-6
Standard Methods SM 2540D (TSS)	S-SM2540D-4
Standard Methods SM 5310B (TOC)	S-TOC-6
Standard Methods SM 2320B (Alkalinity)	S-SM2320-7
EPA Method 300.0 (Anions)	S-300.0-10

The types of QC samples analyzed for the general chemistry parameters include the following:

- Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted.

- LCS samples were analyzed for the anions chloride and sulfate to obtain recovery information. MS/MSD samples were not analyzed because of the high native concentrations of chloride and sulfate. All LCS recoveries were within 90 – 110 percent recovery.

- The primary groundwater sample was analyzed in duplicate for pH, specific gravity, and specific conductance to obtain precision information. The RPDs of the duplicate analyses were all <2 indicating good precision for the analyses.

- A LCS samples and a duplicate sample were analyzed for TSS to obtain recovery and precision information. MS/MSD samples are not applicable. The LCS recovery was 94.2 percent and the RPD of the duplicate sample analysis was 2.5.

- LCS/LCSD and MS/MSD QC samples were analyzed for TDS, alkalinity and TOC to obtain recovery and precision information. The recoveries were within 90 – 110 percent, and the RPDs <3.

The concentrations of all the detected constituents and parameters except for TSS as discussed above were within the 95th UTLV or 95th percentile.

Overall Data Package Summary

In summary, the data and information contained in this data packet is of high quality and meets the data quality objectives for accuracy and precision with only a few minor exceptions as detailed above and in the Annual Culebra Groundwater Monitoring Report. There is no indication of any target DMP target VOCs or SVOCs or any other organic compounds being present in the samples at a concentration above the concentration of concern and the metals and general chemistry parameters analysis data do not indicate any observable changes in the composition of the groundwater.

The data are usable and meet the needs of the DMP.

Attachment 2 – Preliminary Review

SECTION A

Sample Location: WQSP-1
Laboratory Name: Hall Environmental
Laboratory Work Order #: 1303283
Sample Number(s): GW-WQ1-C-R35-N1-N8D, N12, N13
Reviewer Name (print): Greg Jungclaus
Reviewer Signature:

SECTION B	YES	NO
Is the SDG narrative present and certification page signed by an authorized representative of the laboratory?	✓	
Does the SDG narrative explain problems associated with processing and analysis of the samples?	✓	
Were the original or copy of the Chain of Custody/Request for Analysis (CofC/RFA) complete?	✓	
Are the sample analysis summary tables present?	✓	
Were sufficient data as required by the Statement of Work (SOW) available to evaluate the analysis results?	✓	
Was an electronic data package received for preliminary review of the data?	✓	

SECTION C GENERAL VERIFICATION AND VALIDATION	YES	NO
Were data entries free of transcription error?	✓	
Were calculations correct?	✓	
Were the correct number of significant figures applied to reported data?	✓	
Were trip (VOC only), field and laboratory method blanks (MB) free of contaminants?	✓	
Note: The consistent detection of any anthropogenic compounds should be reported to the EM&H Manager, as well as documented and discussed in the Verification and Validation Report.		
Were any anthropogenic compounds starting to appear consistently in the samples?		✓
Were concentrations consistently reported in units of micrograms per liter (ug/L) for organics and milligrams per Liter (mg/L) for applicable general chemistry parameters and constituents?	✓	
Were the applicable standard methods used for all the analyses?	✓	
Note: The EM&H Manager should be contacted if the data completeness objective of 100% is not met for any Verification and Validation Report since resampling and/or reanalysis of Detection Monitoring Program (DMP) samples may be required.		
Was 100% of the sample analysis data usable and valid?	✓	

Data Validator 9-10-13 Date
Completeness Reviewer 9/17/13 Date

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CofC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with hydrochloric acid?	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 3.0°C	✓	
Was the analysis holding time of 14 days met for all samples? 3/8 vs 3/6	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact, e.g., no air bubbles in the vials?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a 4-bromofluorobenze (BFB) tuning compound analysis performed at the beginning and every 12 hours during VOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z (mass per unit charge) 95?	✓	
Were the ion abundance criteria listed in Method 8260 met?	✓	

INITIAL CALIBRATION	YES	NO
Were a minimum of 5 calibration standards used for the initial calibration?	✓	
Did the calibration standards contain all the target VOC compounds?	✓	
Was the low standard at or below the concentration of the MRL, e.g., 5.0 µg/L?	✓	
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓	
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓ (a)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to be within 20% of the expected concentration?	✓	

(a) vinyl chloride 21.4
trans-1,2-DCE 20.0
methylene chloride 22.0
1,1-dichloroethane 22.6
2-butanone 21.2

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the VOCs in the CCVs agree to within 20% difference (bias) of the standard CCV concentration? Note that the CCV concentration may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory MB analyzed for each 12-hour period of GC/MS instrument operation?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Was a trip blank (one per DMP sample set) analyzed?	✓	
Was a field blank analyzed (one per DMP sample set)	✓	
Were the concentrations of any VOCs detected in the laboratory method blank samples < MRL?	✓	
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL? <MRL 2-butanone, chloroform	✓	

SYSTEM MONITORING COMPOUNDS (SURROGATES)	YES	NO
Note: Flag the data if System Monitoring Compound (SMC) recoveries are outside the recovery objective with no evidence of sample reanalysis.		
Were a minimum of three (3) SMCs added to all samples and blanks prior to GC/MS analysis?	✓	
Were the SMC recoveries reported on the SMC recovery form consistent with the raw data?	✓	
Did the SMC recoveries meet the 70-130% recovery objective or the QC recovery chart limits established historically by the laboratory?	✓	
Did the lab need to reanalyze any samples because the SMC recovery objective was not met?		✓

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS sample prepared and analyzed with each DMP sample set?	✓	
Was the LCS sample spiked with all the DMP target VOCs?	✓	
Did the LCS recoveries for all the target VOCs meet the 70-130% recovery objective?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and MSD prepared and analyzed with each DMP sample set?	✓	
Were the MS/MSD samples spiked with all the DMP target VOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for target DMP target VOCs meet the accuracy objective specified in the EPA Functional Guidelines? (60-140% recovery) or the QC recovery control chart limits established historically by the laboratory?		✓ (a)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were the retention times of the internal standards (IS) in the samples within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS in the samples within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the Relative Retention Times (RRTs) of any target VOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) Lab uses 70-130% recovery objective. Recoveries of isobutyl alcohol were 146% and 156%

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO
Was a forward search of the VOC mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓	
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.		
Were any VOC Tentatively Identified Compounds (TICs) detected in the trip blank and field blank samples?		✓
Were any VOC TICs detected in the groundwater samples?		✓ (a)

[signature] 8-21-13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

(a) The usual artifact peaks were observed. They are silicone degradation peaks from the GC column.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C?	✓	
Were the samples extracted within 7 days of sample collection? 3/8 vs 3/6	✓	
Were the extracts analyzed within 40 days of sample extraction?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a DFTPP (decafluorotriphenylphosphine) tuning compound analysis performed at the beginning and every 12 hours during SVOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z 198?	✓	
Were the ion abundance criteria listed in Method 8270C met?	✓	

INITIAL CALIBRATION	YES	NO
Were a minimum of five (5) calibration standards used for the initial calibration?	✓	
Did the calibration standards contain all the target SVOCs?	✓	
Was the low standard at or below the MRL for the method, e.g., ≤ 5.0 ug/mL in the standard?	✓	
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓	
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓ (a)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to within 20% of the expected concentration?	✓	

(a) 2,4- dinitrophenol 35.8% RSD (0.999 corr. coeff.)

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the SVOCs in the CCVs agree to within 20% difference (bias) of the average of the CCV standard concentration? Note that CCV concentrations may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory method blank extracted along with each SDG batch?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Were the concentrations of any SVOCs detected in the laboratory method blank sample < MRL?	✓	

SURROGATE SPIKES	YES	NO
Were three (3) base-neutral and three (3) acid surrogate spike recovery compounds spiked into the groundwater and QC samples prior to extraction?	✓	
Were the surrogate recoveries reported on the surrogate recovery form consistent with the raw data?	✓	
Note: Flag the data if surrogate recoveries are outside the objective range with no evidence of sample re-injection or re-extraction.		
Did the surrogates meet the EPA Functional Guidelines accuracy objective of 15-110% recovery for acid surrogates and 30-130% recovery for base neutral surrogates?	✓	
Alternatively, were the surrogate recoveries within the historical control chart limits established by the laboratory for aqueous samples?	✓	
Did the laboratory need to re-inject or re-extract any samples because the surrogate recovery objective was not met?		✓

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS prepared and analyzed for each batch of DMP samples?	✓	
Was the LCS sample spiked with all the target SVOCs?	✓	
Did the LCS recoveries meet the EPA guidance accuracy objectives of 40-140% recovery for base neutral compounds and 30-130% recovery for acidic compounds?	✓	
Alternatively, were the LCS recoveries within the laboratory's historical control chart limits?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤ 20 RPD for each compound?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO	
Were a MS and a MSD prepared and analyzed for each batch of DMP samples?	✓		
Were the MS/MSD samples spiked with all the DMP target SVOCs?	✓		
Was a DMP sample used to generate the MS/MSD samples?	✓		
Did the MS/MSD recoveries for the DMP target SVOCs meet the EPA Functional Guidelines accuracy objective of 40-140% recovery for base neutral compounds and 30-130% recovery for acid compounds?		✓	(a)
Alternatively, were the matrix spike recoveries within the laboratory's historical control chart limits?	✓		
Was the precision of the MS/MSD recoveries calculated and reported?	✓		
Did the MS/MSD recoveries meet the precision objective of ≤30 RPD?		✓	(b)

INTERNAL STANDARDS	YES	NO
Were a minimum of six (6) IS spiked into extracts of samples and blanks prior to GC/MS analysis?	✓	
Were the retention times of the IS within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the RRTs of any target SVOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) 2,4-dinitrophenol: 23.7% rec MS
Pyridine 32.2% rec MS, 17.1% rec. MSD

(b) 2,4-dinitrophenol 70 RPD
Pentachlorophenol 45 RPD
Pyridine 62 RPD

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO	
Was a forward search of the mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓		
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.			
Were any SVOC TICs detected in the laboratory method blank sample?		✓	(a)
Were any SVOC TICs detected in the groundwater samples?		✓	(b)

Data Validator 8-21-13 Date

Completeness Reviewer 9/17/13 Date

(a) A few trace hydrocarbons were present in the method blank including toluene and higher alkylbenzenes. Trace bisphenol A was also detected.

(b) The same trace compounds detected in the method blank were detected in the groundwater samples. No additional compounds were detected in the groundwater.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with nitric acid?	✓	
Were holding times met for all sample digestions and analyses? Maximum holding time is 28 days for Mercury and 6 months for the other metals.	✓	
Was the integrity of each sample intact?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	

(a)

INDUCTIVELY COUPLED PLASMA (ICP) CALIBRATION, EPA SW-846 6010B	YES	NO
Was the correlation coefficient (R^2) of the initial calibration ≥0.995 for each metal?	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples?	✓	
Was the initial ICV analyzed immediately after calibration and prior to sample analysis?	✓	
Was the ICV prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue?	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	

ICP BLANKS	YES	NO
Was an ICB analyzed immediately after the ICV?	✓	
Were CCBs analyzed in the sample queue every 10 samples and immediately after the CCVs to evaluate drift, sensitivity, and contamination?	✓	
Were the ICB and CCB analysis results all <MRL for each metal?	✓	

(a) Sampled 3/6; Analyzed: Hg 3/12; Total 3/25 & 3/24; Dissol. 3/14
Prep 3/21

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP INTERFERENCE CHECK SAMPLE	YES	NO
Were Interference Check Standards (ICS & ICS Element) analyzed daily prior to sample analysis?	✓	
Were the concentrations of all the target trace metals (not including Ca and Mg) < two times the MRL in the ICS?	✓	
Did the recoveries of the trace metals in the ICS Element standards meet the accuracy objective of 80-120% recovery?	✓	

ANALYSIS QUEUE	YES	NO	
Did the sample set include a LCS, LCSD, MS, and MSD along with the requisite QC blanks and check standards (MB, ICV, ICB, CCB, ICS, and ICS Element)?	✓		
Was a DMP sample used for the MS and MSD?	✓		(a)

METHOD PERFORMANCE	YES	NO
Were the concentrations of any metals detected in the method blanks at a concentration < MRL?	✓	
Did the metals in the LCS meet the accuracy objective of 80-120% recovery?	✓	
Did the metals in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	✓	

(a) MS/MSD using DMP sample only analyzed in 1st run; not on T. Metals Reruns nor Dissolved Metals

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A C P/A	YES	NO	
Were the samples digested within 28 days of sample collection? 3/6 3/12	✓		
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank? (5)	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓		
Did the ICV analysis meet the accuracy objective of 90-110% recovery? 101.6%	✓		(a)
Were CCV standards analyzed at a frequency of once every 10 samples and at the end of the sample queue?	✓		
Did the CCV analyses meet the accuracy objective of 80-120% recovery? 106.6%	✓		(b)
Did the sample set contain a MB, LCS, MS, and MSD?	✓		
Was a DMP Sample used for the MS/MSD?	✓		
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓		
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓		
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		

(a) $\%\ \text{Recovery} = \left(\frac{3.3544}{3.3}\right) \times 100 = 101.6\%$

(b) $\%\ \text{Recovery} = \left(\frac{3.5162}{3.3}\right) \times 100 = 106.6\%$

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP/MS Analysis for Selected Trace Metals, e.g., As, Sb, Se, and Tl, by EPA SW-846 6020A C P A	YES	NO
Was the holding time met for the ICP/MS analysis? 3/6 3/20 4/9	✓	
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Was an ICV analyzed after the initial calibration?	✓	
Were a CCB and CCV analyzed during the sample queue?	✓	(a)
Did the CCV meet the accuracy objective of 90-110% recovery?	✓	
Was the concentration of any metals detected in the CCB at < 0.001 mg/L?	✓	
Did the metals in the LCS and LCSD meet the accuracy objective of 85-115% recovery? 95.0 → 101.4%	✓	
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery? 89.4 → 107.4%	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓	

Robbin Myers 8/22/13
Data Validator Date

D Stevenson 9/17/13
Completeness Reviewer Date

(a) Frequent rinse used as well as CCB/CCV throughout run.

Attachment 6 – Anions (Chloride and Sulfate) Data Review, EPA Method 300.0

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 3.0°C	✓	
Were the samples analyzed within 28 days of collection for analysis of chloride and sulfate? (Note that sulfate concentrations are not reported but are needed for cation/anion balance calculations.) 3/6 collected; 3/7 analyzed	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions? (9)	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue?	✓	
Were Continuing Calibration Verification (CCV) standards of differing concentrations analyzed periodically throughout the sample set? A4→A6	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO	
Was the laboratory method blank concentration of the anions <MRL (Method Reporting Limit)?	✓		
Did the ICV and CCV analyses meet the accuracy objective of 90-110% recovery?	✓		
Did the LCS meet the accuracy objective of 90-110% recovery?	✓		
NOTE: If the normal MS spike concentration is < 25% of the native sample concentration (i.e., high native sample concentration) the MS and MSD recoveries and precision are not applicable.			
Did the MS and MSD analyses of applicable anions meet the accuracy objective of 80-120% recovery?	N/A		(a)
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	N/A		

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument?	✓	
Were the appropriate dilution factors applied to the results?	✓	

Robbin Hipsom 8/23/13
Data Validator Date

D Alexander 9/17/13
Completeness Reviewer Date

(a) The MS/MSD were prepared & analyzed "neat"; they were not reanalyzed at proper DF. The MS/MSD are N/A for Cl^- & SO_4^- because of high concentrations; Spike concentration is ≤ 25% of native sample.

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 3.0°C	✓	
Were the samples analyzed within 14 days of collection? C-3/6 A3/7	✓	

REAGENTS	YES	NO
Was the pH meter standardized prior to analysis of the samples using the SOP for pH measurement?	✓	
Was 0.02 N standardized sulfuric acid used as the titrant?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a laboratory method blank, Laboratory Control Sample (LCS), Matrix Spike (MS), and Matrix Spike Duplicate (MSD)?	✓	
Was the starting pH of the sample ≤8.30? 7.05 + 7.07	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 3.08	✓		
Did the LCS recovery meet the accuracy objective of 80-120% recovery?	✓		(a)
Did the MS and MSD meet the accuracy objective of 80-120% recovery?	✓		(c)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)?	✓		(b)
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓		(b)

Robbin Alpers 8/23/13
Data Validator Date

D Stevens 9/17/13
Completeness Reviewer Date

(a) LCS-1 101% / 80.60 > 0.947% RPD
LCS 99.8 / 79.84

(b) $\frac{A \times N \times 50,000}{S \times Vol}$ A = mL Titrant, N = Normality Titrant, 50,000 = meq/Mole

MS AlK = $\left[\frac{6.266\,mL \times 0.02 \times 50,000}{50}\right]$ = 125.32 mg/L

MSD AlK = $\left[\frac{6.330 \times 0.02 \times 50,000}{50}\right]$ = 126.60 mg/L

(c) Recovery

MS $\left[\frac{(125.32 - 50.28)}{80}\right] 100 = 93.8\%$

MSD $\left[\frac{(126.6 - 50.28)}{80}\right] 100 = 95.4\%$

% RPD = 1.02%

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 3/6; A 3/7	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? IK only	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration?	✓	
Was the proper Temperature Correction Factor applied to the conductivity measurements? ATC used	✓	

ANALYSIS QUEUE	YES	NO
Was a second source mid-range ICV conductivity standard analyzed prior to the samples?	✓	
Was a CCV conductivity standard analyzed within and at the end of the sample queue (rotate between 10, 100, 1000, and 10,000 µmhos/cm conductivity standards)?	✓	
Was one of the samples analyzed in duplicate?	✓	

METHOD PERFORMANCE	YES	NO	
Did the ICV analysis yield a concentration within 90-110% of the standard concentration?	✓		(b)
Did the CCV analyses yield a concentration within 90-110% of the standard concentration?	✓		(c)
Did the duplicate sample meet the precision objective of ≤20 RPD?	✓		(d)

Kathleen Alpers 3/23/13
Data Validator Date

[signature] 9/18/13
Completeness Reviewer Date

(b) $\left(\frac{1347}{1411}\right)100 = 95.5\%$ $\left(\frac{1360}{1411}\right)100 = 96.4\%$

(c) $\left(\frac{104.4}{100}\right)100 = 104.4\%$ $\left(\frac{106}{100}\right)100 = 106.0$

(d) $\%\ RPD = \left|\frac{113,100 - 114,900}{114,000}\right|$

$= 1.58$

$\left(\frac{957.1}{995}\right)100 = 96.2\%$

Attachment 9 – pH Data Review, SM 4500-H+

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°?	✓	
Were the samples analyzed within five (5) days of receipt? C 3/6; A 3/7	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument?	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.8	✓	

SAMPLE ANALYSIS	YES	NO	
Did the standard buffers bracket the pH range of the samples?	✓		
Was a CCV analyzed within and at the end of the sample batch?	✓		
Was the sample analysis temperature within 2°C of the buffer analysis temperature? Buffer: 19.8–20.9 ; Sx: 17.9–18.5	✓		(a)
Was the pH recorded to the nearest 0.1 pH unit?	✓		
Was the pH of one of the samples measured in duplicate?	✓		

METHOD PERFORMANCE	YES	NO	
Did the ICV read within ±0.1 pH unit of the assigned value?	✓		
Did the CCV read within ±0.1 pH unit of the assigned value?	✓		
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓		(b)

Robin Alpers 8/23/13
Data Validator Date

D. Anderson 9/17/13
Completeness Reviewer Date

(a) pH buffer 3 = 7.00 = 19.8°C
pH buffer 4 = 10.000 = 20.0°C
pH buffer 2 = 4.00 = 19.9°C
1° Sx = 18.2°C
1° Sx Dup = 18.3°C

(b) 1° Sx = 7.05
2° Sx = 7.04
2° Sx Dup = 7.07

Attachment 10 – Specific Gravity Data Review, SM 2710F

SAMPLE ANALYSIS	YES	NO
Were the samples allowed to warm to near room temperature prior to measurement of specific gravity? 19.0°C	✓	
Was the temperature of the specific gravity measurements recorded?	✓	
Was the mass of at least 5.0 mL of the water sample measured? 10.0 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 1.5°C		✓ (a)
Was the Temperature Correction Factor recorded? 0.9982	✓	

Robin Nyporn 8/23/13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

(a) DI-H_2O was at 1.5°C; supposed to be 3-5°C.

$$SG = \frac{Sx\ wt,g}{DI\ wt,g} \times TCF$$

$$1^0\ Sx = \left(\frac{10.3799}{9.9934}\right) \times 0.9982 = 1.0389$$

RM 8/23/13

$$1^0\ Sx\ Dup = \left(\frac{10.3965}{9.9734}\right) \times 0.9982 = 1.0405$$

$$2^0\ Sx = \left(\frac{10.3693}{9.9734}\right) \times 0.9982 = 1.0378$$

Attachment 11 – Total Organic Carbon Data Review, SM 5310B

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 3/6; A 3/11	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve?	✓	
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set?	✓	
Did the sample set include an Initial Calibration Blank (ICB), laboratory method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓	
Were quadruplicate measurements taken for each sample? Qund – Quint	✓	
Were both the average and the range reported for the quadruplicate measurements?	✓	

METHOD PERFORMANCE	YES	NO
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)? $r^2 = 0.9998$	✓	
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓	
Were the results for the laboratory method blank, the ICB and CCB < MRL?	✓	
Did the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓	

Robin Alpern 8/23/13
Data Validator Date

[illegible] 9/17/13
Completeness Reviewer Date

[Spk] = 4.85

% RPD
2.681%

LCS 4.968 mg/L
LCSD 5.103 "

Recoveries
(4.968/4.85)100 = 102.47%
(5.103/4.85)100 = 105.29%

[Spk] = 4.65

% RPD
1.049

MS 5.405 mg/L
MSD 5.462 mg/L
10Sx 0.7851 mg/L

Recoveries
((5.405 − 0.7851)/4.65) × 100 = 99.4%
((5.462 − 0.7851)/4.65) × 100 = 100.6%

Attachment 12 – Total Dissolved Solids Data Review, SM 2540C

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? C 3/6; A 3/13	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the initial volume of each sample 100 mL? 2 mL ↑ 100 mL	✓	
Were any DMP samples diluted prior to processing?	✓	
Were the samples dried twice at 180°C?	✓	
Was the MS/MSD spike concentration higher than 25% of the native sample concentration and thus usable for recovery determination? 50K vs 61.8K	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)?	✓	
Did the LCS analysis meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓	
If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD?	✓	

Robin Alper 8/23/13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

MB 18

LCS 1037 → $100\left(\frac{1037-18}{1018}\right) = 1.02\%$ Recovery

LCSD 1036 → $100\left(\frac{1036-18}{1018}\right) = 1.02\%$

[SpK] = 1000

%RPD = 0.096%

Sx 61,800

MS 114,700

MSD 116,850

[SpK] = 50,000

%RPD 1.857%

$\left(\frac{114,700-61800}{50,000}\right)100 = 105.8\%$ rec

$\left(\frac{116,850-61,800}{50000}\right)100 = 110.1\%$ rec

Attachment 13 – Total Suspended Solids Data Review, SM 2540D

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? C 3/6 ; A 3/11	✓	
Were the samples allowed to warm to room temperature prior to filtration?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, and duplicate sample?	✓	
Was the volume of each sample 100 mL?	✓	
Were the samples dried twice at approximately 104°C?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights <0.0005 g (0.5 mg)?	✓	
Was the MB result <5.0 mg/L? 1.0 mg/L	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? 2.53%	✓	

Robbin Alpor 8/23/13
Data Validator Date

D Hansen 9/18/13
Completeness Reviewer Date

1° Sx = 40 mg/L
1° Sx Dup = 39 mg/L
> % RPD = 2.53%

2° Sx = 40 mg/L

LCS 91
LCSD 93
% RPD = 2.17%

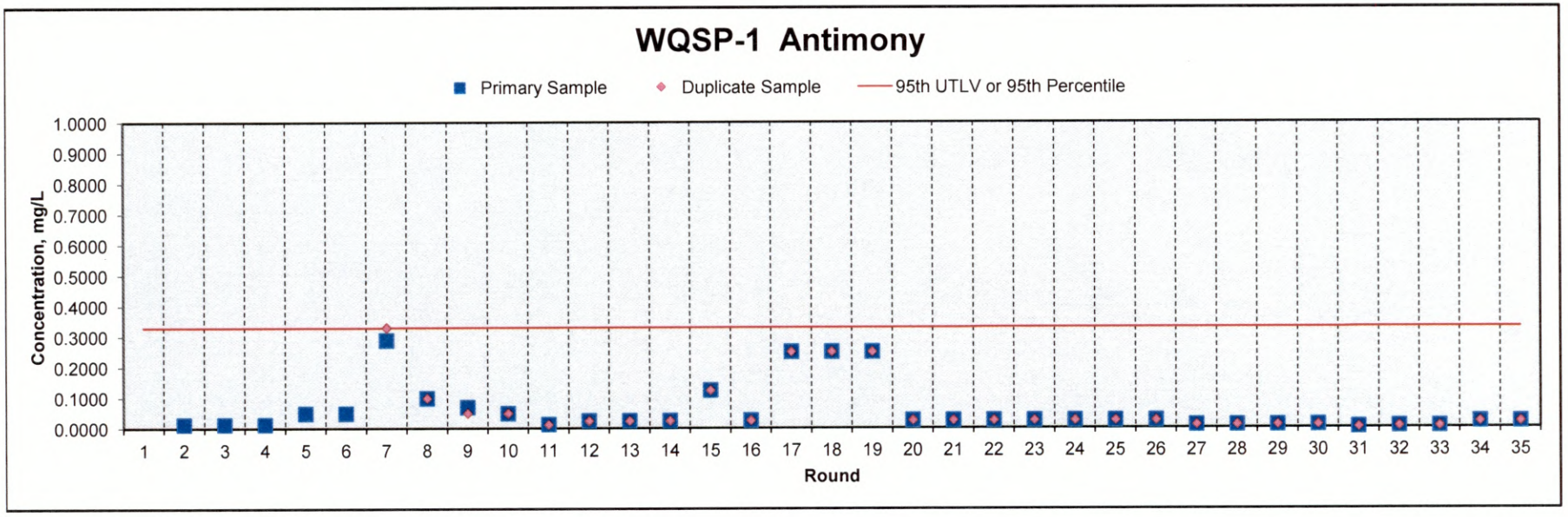
mB = 1

WQSP-1

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

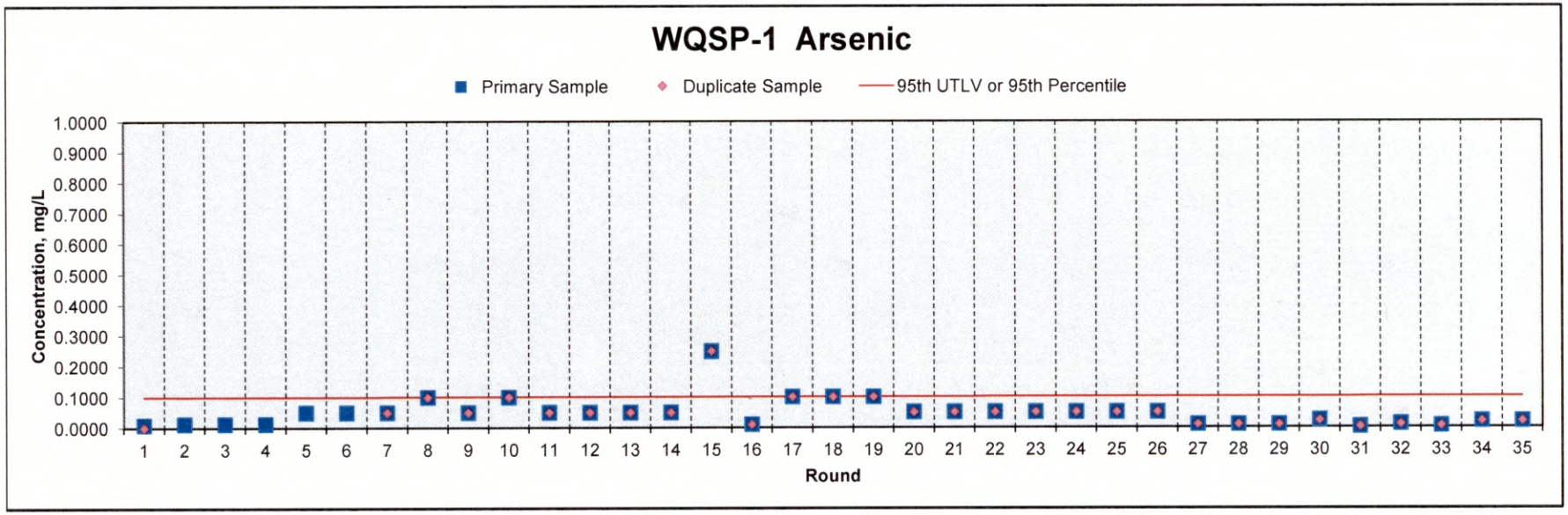
WQSP-1 Antimony

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Antimony	1					mg/L		0.33
Antimony	2	11/07/96	11/19/96	< 0.0130		mg/L	0.0130	0.33
Antimony	3	07/25/96	07/30/96	< 0.0130		mg/L	0.0130	0.33
Antimony	4	04/24/97	05/02/97	< 0.0130		mg/L	0.0130	0.33
Antimony	5	07/24/97	08/15/97	< 0.0500		mg/L	0.0500	0.33
Antimony	6	03/05/98	03/19/98	< 0.0500		mg/L	0.0500	0.33
Antimony	7	07/15/98	08/17/98	0.2900	0.3300	mg/L	0.0500	0.33
Antimony	8	03/03/99	03/08/99	< 0.1000	< 0.1000	mg/L	0.1000	0.33
Antimony	9	09/01/99	09/16/99	0.0700	< 0.0500	mg/L	0.0500	0.33
Antimony	10	03/02/00	06/19/00	< 0.0500	< 0.0500	mg/L	0.0500	0.33
Antimony	26	05/21/08	06/04/08	< 0.0250	< 0.0250	mg/L	0.0250	0.33
Antimony	27	11/12/08	12/08/08	< 0.0100	< 0.0100	mg/L	0.0250	0.33
Antimony	28	05/13/09	06/04/09	< 0.0100	< 0.0100	mg/L	0.0100	0.33
Antimony	29	11/04/09	11/16/09	< 0.0100	< 0.0100	mg/L	0.0100	0.33
Antimony	30	05/12/10	06/04/10	< 0.0100	< 0.0100	mg/L	0.0100	0.33
Antimony	31	11/17/10	12/14/10	< 0.0020	< 0.0020	mg/L	0.0020	0.33
Antimony	32	03/09/11	03/28/11	< 0.0050	< 0.0050	mg/L	0.0050	0.33
Antimony	33	11/15/12	12/01/11	< 0.0050	< 0.0050	mg/L	0.0050	0.33
Antimony	34	03/07/12	03/27/12	< 0.020	< 0.020	mg/L	0.020	0.33
Antimony	35	03/06/13	04/09/13	< 0.020	< 0.020	mg/L	0.020	0.33



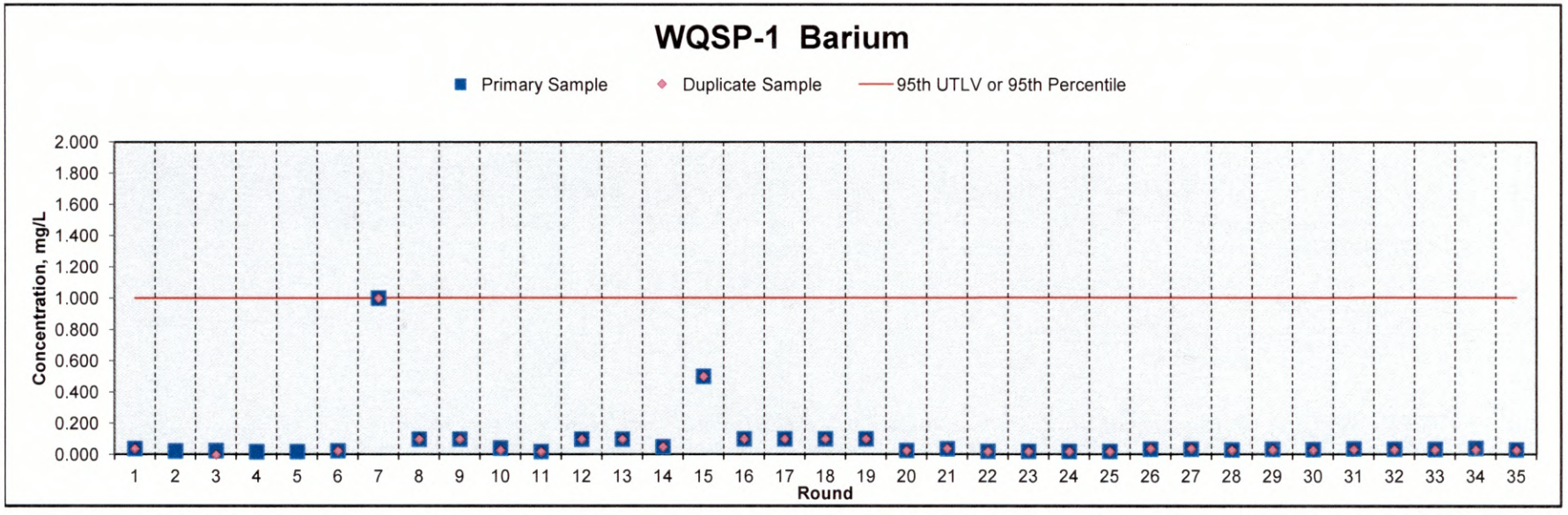
WQSP-1 Arsenic

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Arsenic	1	08/17/95	09/29/95	< 0.0100	< 0.0010	mg/L	0.0010	< 0.1
Arsenic	2	11/07/96	11/19/96	< 0.0130		mg/L	0.0130	< 0.1
Arsenic	3	07/25/96	07/30/96	< 0.0130		mg/L	0.0130	< 0.1
Arsenic	4	04/24/97	05/02/97	< 0.0130		mg/L	0.0130	< 0.1
Arsenic	5	07/24/97	08/15/97	< 0.0500		mg/L	0.0500	< 0.1
Arsenic	6	03/05/98	03/19/98	< 0.0500		mg/L	0.0500	< 0.1
Arsenic	7	07/15/98	08/17/98	< 0.0500	< 0.0500	mg/L	0.0500	< 0.1
Arsenic	8	03/03/99	03/08/99	< 0.1000	< 0.1000	mg/L	0.1000	< 0.1
Arsenic	9	09/01/99	09/16/99	< 0.0500	< 0.0500	mg/L	0.0500	< 0.1
Arsenic	10	06/19/00	06/19/00	< 0.1000	< 0.1000	mg/L	0.1000	< 0.1
Arsenic	26	05/21/08	06/04/08	< 0.0500	< 0.0500	mg/L	0.0500	< 0.1
Arsenic	27	11/12/08	12/08/08	< 0.0100	< 0.0100	mg/L	0.0500	< 0.1
Arsenic	28	05/13/09	06/04/09	< 0.0100	< 0.0100	mg/L	0.0100	< 0.1
Arsenic	29	11/04/09	11/16/09	< 0.0100	< 0.0100	mg/L	0.0100	< 0.1
Arsenic	30	05/12/10	06/04/10	0.0238	0.0224	mg/L	0.0100	< 0.1
Arsenic	31	11/17/10	12/14/10	< 0.0020	0.0023	mg/L	0.0020	< 0.1
Arsenic	32	03/09/11	03/28/11	0.011	0.010	mg/L	0.0050	< 0.1
Arsenic	33	11/15/11	12/01/11	< 0.0050	< 0.0050	mg/L	0.0050	< 0.1
Arsenic	34	03/07/12	03/27/12	< 0.020	< 0.020	mg/L	0.020	< 0.1
Arsenic	35	03/06/13	04/09/13	< 0.020	< 0.020	mg/L	0.020	< 0.1



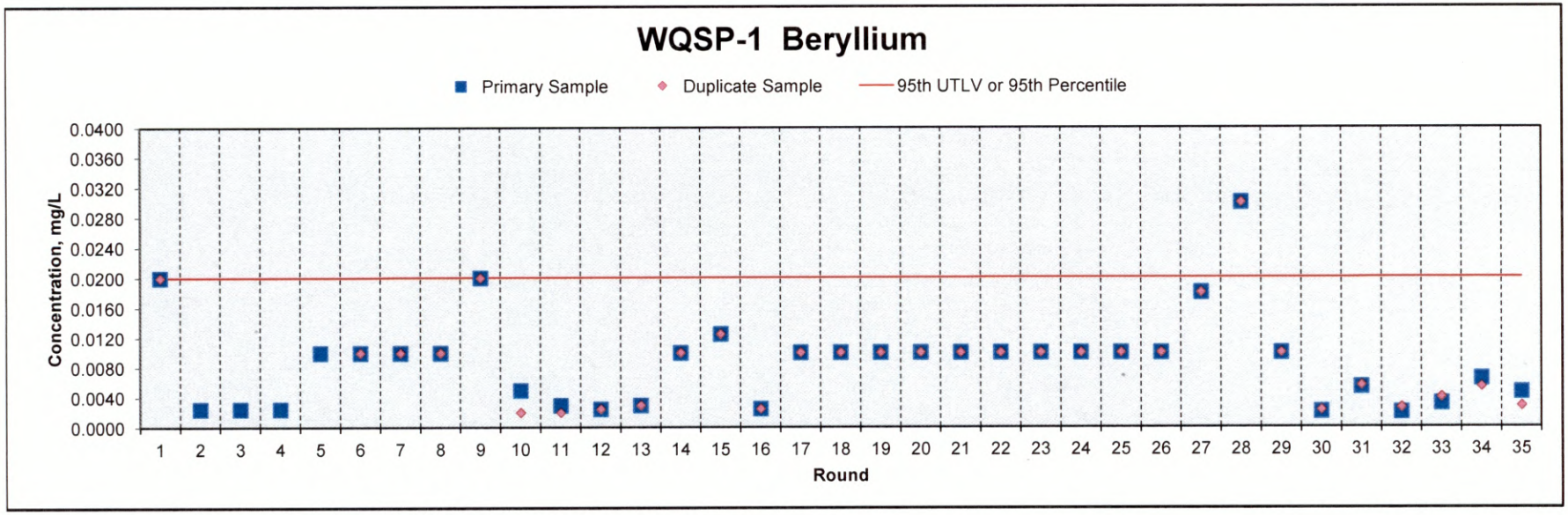
WQSP-1 Barium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Barium	1	08/17/95	08/28/95	< 0.040	< 0.040	mg/L	0.0400	< 1.0
Barium	2	11/07/96	11/19/96	0.024	**Not reported**	mg/L	0.0050	< 1.0
Barium	3	07/25/96	07/30/96	0.026	0.0000	mg/L	0.0050	< 1.0
Barium	4	04/24/97	05/02/97	0.018	**Not reported**	mg/L	0.0050	< 1.0
Barium	5	07/24/97	08/15/97	< 0.020	**Not reported**	mg/L	0.0200	< 1.0
Barium	6	03/05/98	03/19/98	0.025	0.025	mg/L	0.0200	< 1.0
Barium	7	07/15/98	08/17/98	< 1.000	< 1.000	mg/L	1.0000	< 1.0
Barium	8	03/03/99	03/08/99	< 0.100	< 0.100	mg/L	0.1000	< 1.0
Barium	9	09/01/99	09/16/99	< 0.100	< 0.100	mg/L	0.1000	< 1.0
Barium	10	03/02/00	03/06/00	0.042	0.030	mg/L	0.0200	< 1.0
Barium	26	05/21/08	06/04/08	0.034	0.037	mg/L	0.0200	< 1.0
Barium	27	11/12/08	12/08/08	0.034	0.038	mg/L	0.0200	< 1.0
Barium	28	05/13/09	06/17/09	0.030	0.029	mg/L	0.1000	< 1.0
Barium	29	11/04/09	12/04/09	0.034	0.031	mg/L	0.1000	< 1.0
Barium	30	05/12/10	06/04/10	0.032	0.029	mg/L	0.0020	< 1.0
Barium	31	11/17/10	12/14/10	0.036	0.032	mg/L	0.0040	< 1.0
Barium	32	03/09/11	04/07/11	0.034	0.031	mg/L	0.0040	< 1.0
Barium	33	11/15/11	11/23/11	0.033	0.031	mg/L	0.0094	< 1.0
Barium	34	03/07/12	03/24/12	0.040	0.031	mg/L	0.013	< 1.0
Barium	35	03/06/13	03/25/13	0.031	0.029	mg/L	0.013	< 1.0



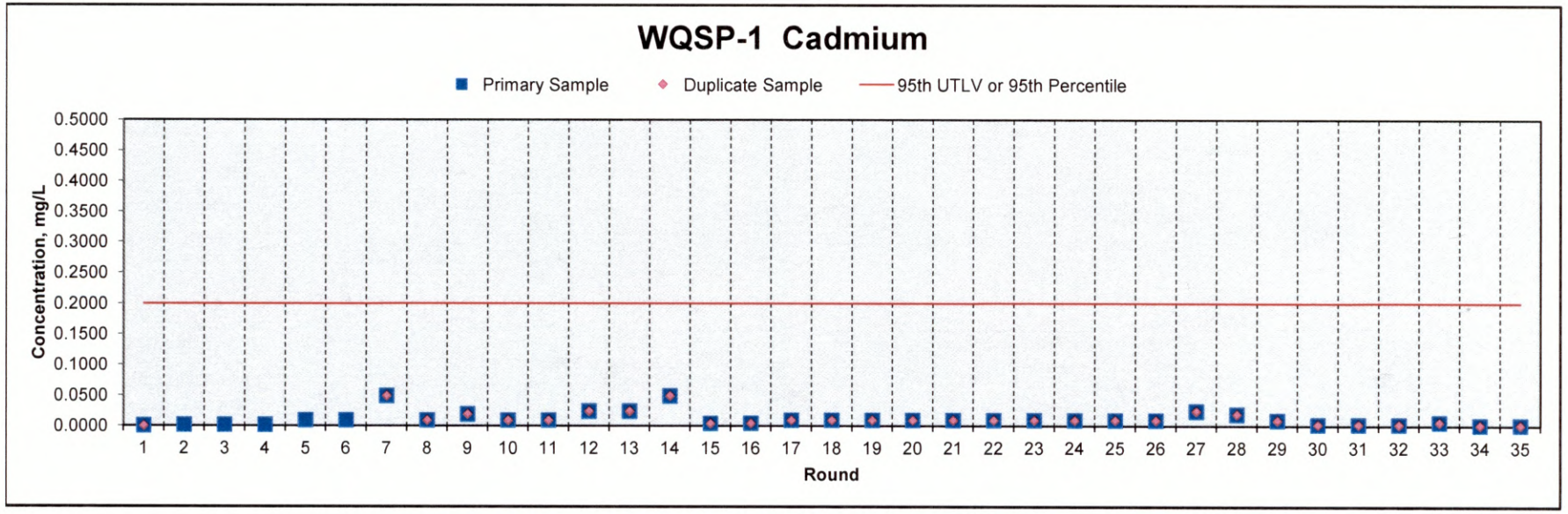
WQSP-1 Beryllium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Beryllium	1	08/17/95	08/28/95	< 0.0200	< 0.0200	mg/L	0.0200	< 0.02
Beryllium	2	11/07/96	11/19/96	< 0.0025		mg/L	0.0025	< 0.02
Beryllium	3	07/25/96	07/30/96	< 0.0025		mg/L	0.0025	< 0.02
Beryllium	4	04/24/97	05/02/97	< 0.0025		mg/L	0.0025	< 0.02
Beryllium	5	07/24/97	08/15/97	< 0.0100		mg/L	0.0100	< 0.02
Beryllium	6	03/05/98	03/19/98	< 0.0100	< 0.0100	mg/L	0.0100	< 0.02
Beryllium	7	07/15/98	08/17/98	< 0.0100	< 0.0100	mg/L	0.0010	< 0.02
Beryllium	8	03/03/99	03/08/99	< 0.0100	< 0.0100	mg/L	0.0100	< 0.02
Beryllium	9	09/01/99	09/16/99	< 0.0200	< 0.0200	mg/L	0.0200	< 0.02
Beryllium	10	03/02/00	03/06/00	0.0050	0.0020	mg/L	0.0200	< 0.02
Beryllium	26	05/21/08	06/04/08	< 0.0100	< 0.0100	mg/L	0.0100	< 0.02
Beryllium	27	11/12/08	12/08/08	< 0.0180	< 0.0180	mg/L	0.0100	< 0.02
Beryllium	28	05/13/09	06/17/09	< 0.0300	< 0.0300	mg/L	0.0300	< 0.02
Beryllium	29	11/04/09	12/04/09	< 0.0100	< 0.0100	mg/L	0.0100	< 0.02
Beryllium	30	05/12/10	06/04/10	0.0021	0.0023	mg/L	0.0010	< 0.02
Beryllium	31	11/17/10	12/14/10	0.0054	0.0056	mg/L	0.0020	< 0.02
Beryllium	32	03/09/11	04/07/11	< 0.0020	0.0026	mg/L	0.0020	< 0.02
Beryllium	33	11/15/11	11/23/11	0.0032	0.0040	mg/L	0.0017	< 0.02
Beryllium	34	03/07/12	03/24/12	0.0065	0.0054	mg/L	0.0010	< 0.02
Beryllium	35	03/06/13	03/25/13	0.0047	0.0028	mg/L	0.0010	< 0.02



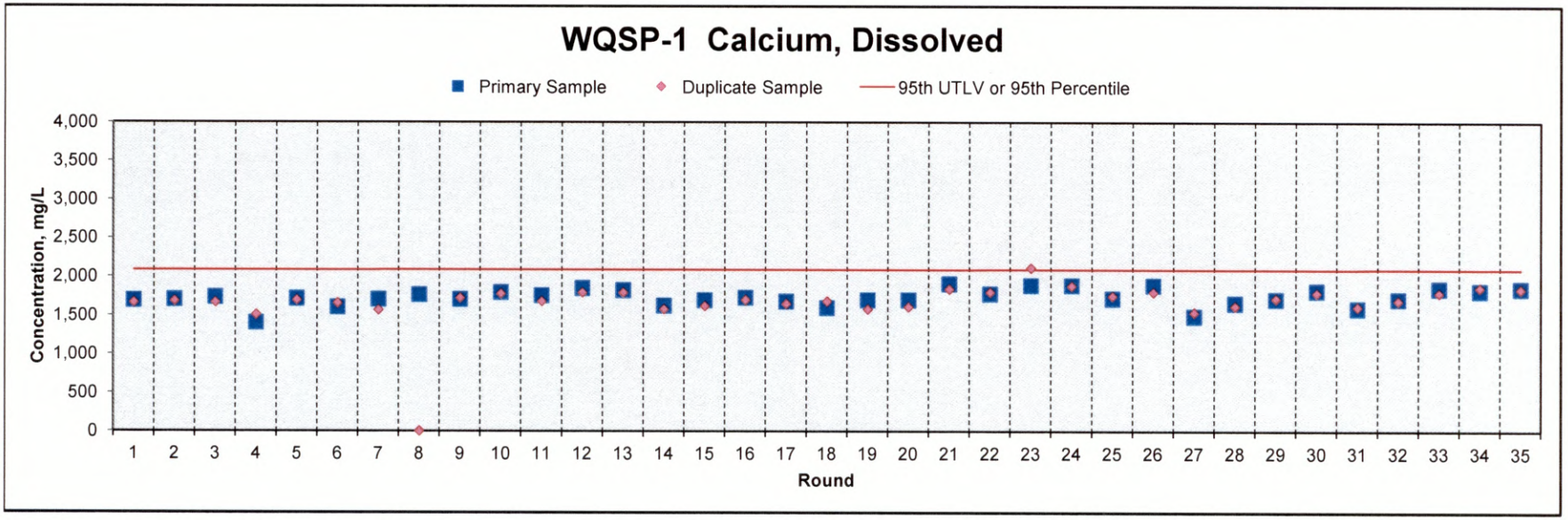
WQSP-1 Cadmium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Cadmium	1	08/17/95	09/13/95	< 0.0013	< 0.0013	mg/L	0.0013	< 0.2
Cadmium	2	11/07/96	11/19/96	< 0.0025		mg/L	0.0025	< 0.2
Cadmium	3	07/25/96	07/30/96	< 0.0025		mg/L	0.0025	< 0.2
Cadmium	4	04/24/97	05/02/97	< 0.0025		mg/L	0.0025	< 0.2
Cadmium	5	07/24/97	08/15/97	< 0.0100		mg/L	0.0100	< 0.2
Cadmium	6	03/05/98	03/19/98	< 0.0100		mg/L	0.0100	< 0.2
Cadmium	7	07/15/98	08/17/98	< 0.0500	< 0.0500	mg/L	0.0050	< 0.2
Cadmium	8	03/03/99	03/08/99	< 0.0100	< 0.0100	mg/L	0.0100	< 0.2
Cadmium	9	09/01/99	09/16/99	< 0.0200	< 0.0200	mg/L	0.0200	< 0.2
Cadmium	10	03/02/00	03/06/00	< 0.0100	< 0.0100	mg/L	0.0100	< 0.2
Cadmium	26	05/21/08	06/04/08	< 0.0100	< 0.0100	mg/L	0.0100	< 0.2
Cadmium	27	11/12/08	12/08/08	< 0.0250	< 0.0250	mg/L	0.0100	< 0.2
Cadmium	28	05/13/09	06/17/09	< 0.0200	< 0.0200	mg/L	0.0200	< 0.2
Cadmium	29	11/04/09	12/04/09	< 0.0100	< 0.0100	mg/L	0.0100	< 0.2
Cadmium	30	05/12/10	06/04/10	< 0.0030	< 0.0030	mg/L	0.0030	< 0.2
Cadmium	31	11/17/10	12/14/10	< 0.0030	< 0.0030	mg/L	0.0030	< 0.2
Cadmium	32	03/09/11	04/07/11	< 0.0030	< 0.0030	mg/L	0.0030	< 0.2
Cadmium	33	11/15/11	11/23/11	< 0.0066	< 0.0066	mg/L	0.0066	< 0.2
Cadmium	34	03/07/12	03/24/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.2
Cadmium	35	03/06/13	03/25/13	< 0.0020	< 0.0020	mg/L	0.0020	< 0.2



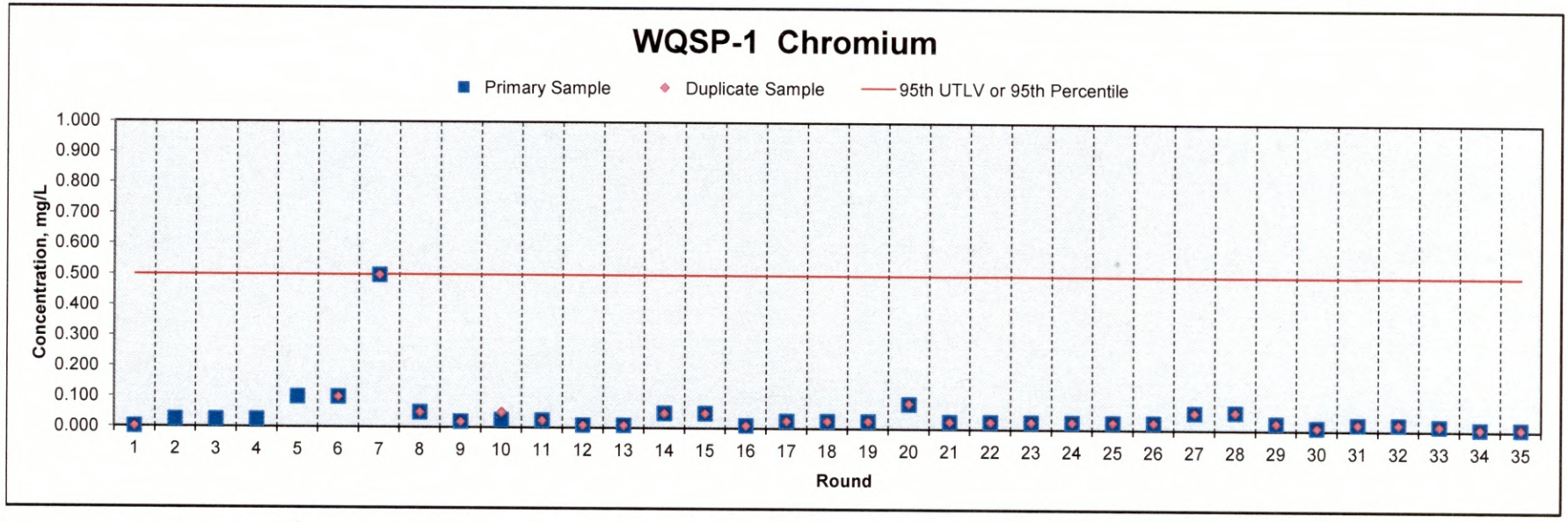
WQSP-1 Calcium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Calcium	1	08/17/95	08/28/95	1,700	1,670	mg/L	2.0	2,087
Calcium	2	04/11/96	05/07/96	1,710	1,690	mg/L	2.0	2,087
Calcium	3	07/25/96	07/30/96	1,740	1,670	mg/L	2.0	2,087
Calcium	4	04/24/97	05/02/97	1,410	1,510	mg/L	2.0	2,087
Calcium	5	07/24/97	08/15/97	1,720	1,700	mg/L	2.0	2,087
Calcium	6	03/05/98	03/19/98	1,610	1,660	mg/L	2.0	2,087
Calcium	7	07/15/98	08/17/98	1,710	1,570	mg/L	0.5	2,087
Calcium	8	03/03/99	03/15/99	1,770	< 1	mg/L	0.5	2,087
Calcium	9	09/01/99	09/16/99	1,710	1,726	mg/L	0.5	2,087
Calcium	10	03/02/00	03/06/00	1,800	1,780	mg/L	5.0	2,087
Calcium	26	05/21/08	06/09/08	1,890	1,800	mg/L	0.5	2,087
Calcium	27	11/12/08	12/05/08	1,490	1,540	mg/L	0.5	2,087
Calcium	28	05/13/09	06/17/09	1,660	1,620	mg/L	0.5	2,087
Calcium	29	11/04/09	12/03/09	1,710	1,720	mg/L	0.5	2,087
Calcium	30	05/12/10	05/18/10	1,820	1,790	mg/L	0.5	2,087
Calcium	31	11/17/10	12/17/10	1,590	1,610	mg/L	2.0	2,087
Calcium	32	03/09/11	04/11/11	1,710	1,690	mg/L	2.0	2,087
Calcium	33	11/15/11	11/23/11	1,850	1,790	mg/L	1.1	2,087
Calcium	34	03/07/12	03/27/12	1,820	1,860	mg/L	0.82	2,087
Calcium	35	03/06/13	03/14/13	1,850	1,840	mg/L	0.82	2,087



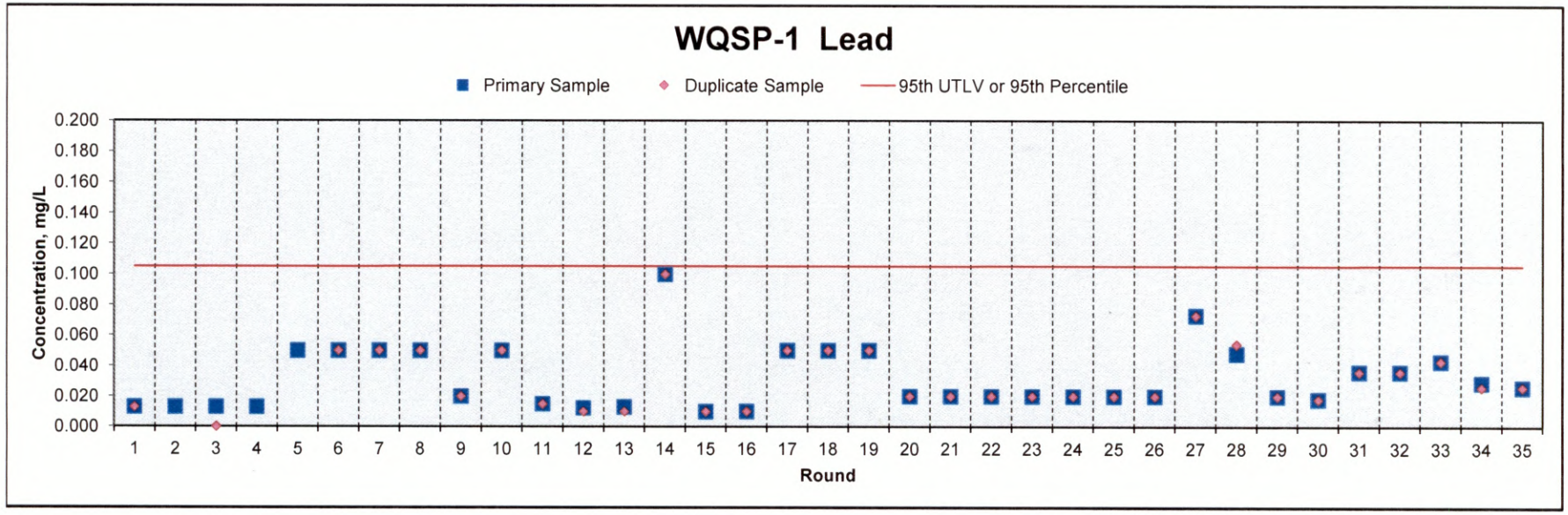
WQSP-1 Chromium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chromium	1	08/17/95	09/13/95	< 0.003	< 0.003	mg/L	0.003	< 0.5
Chromium	2	11/07/96	11/19/96	< 0.025		mg/L	0.025	< 0.5
Chromium	3	07/25/96	07/30/96	< 0.025		mg/L	0.025	< 0.5
Chromium	4	04/24/97	05/02/97	< 0.025		mg/L	0.025	< 0.5
Chromium	5	07/24/97	08/15/97	< 0.100		mg/L	0.100	< 0.5
Chromium	6	03/05/98	03/19/98	< 0.100	< 0.100	mg/L	0.100	< 0.5
Chromium	7	07/15/98	08/17/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Chromium	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Chromium	9	09/01/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	< 0.5
Chromium	10	03/02/00	03/06/00	0.026	< 0.050	mg/L	0.050	< 0.5
Chromium	26	05/21/08	06/04/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	27	11/12/08	12/08/08	< 0.058	< 0.058	mg/L	0.025	< 0.5
Chromium	28	05/13/09	06/17/09	< 0.060	< 0.060	mg/L	0.025	< 0.5
Chromium	29	11/04/09	12/04/09	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	30	05/12/10	06/04/10	< 0.011	< 0.011	mg/L	0.011	< 0.5
Chromium	31	11/17/10	12/14/10	< 0.022	< 0.022	mg/L	0.022	< 0.5
Chromium	32	03/09/11	04/07/11	< 0.022	< 0.022	mg/L	0.022	< 0.5
Chromium	33	11/15/11	11/23/11	< 0.017	< 0.017	mg/L	0.017	< 0.5
Chromium	34	03/07/12	03/24/12	< 0.0080	< 0.0080	mg/L	0.0080	< 0.5
Chromium	35	03/06/13	03/25/13	< 0.0080	< 0.0080	mg/L	0.0080	< 0.5



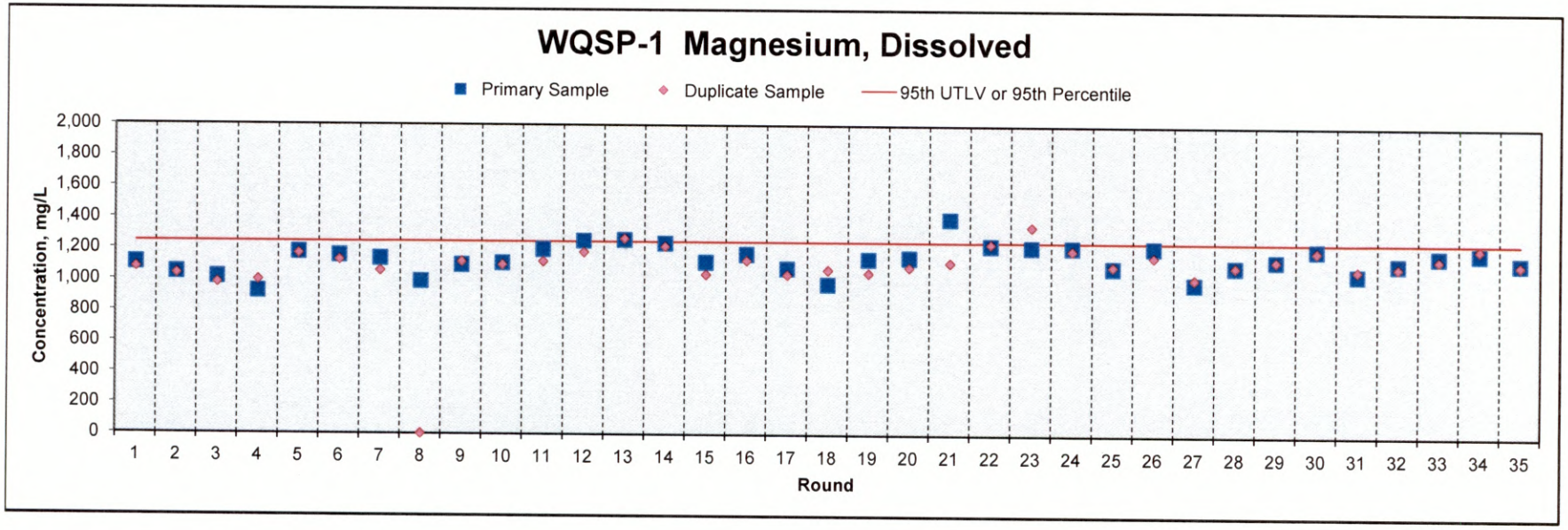
WQSP-1 Lead

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Lead	1	08/17/95	09/13/95	< 0.013	< 0.013	mg/L	0.01	0.105
Lead	2	11/07/96	11/19/96	< 0.013		mg/L	0.01	0.105
Lead	3	07/25/96	07/30/96	< 0.013		mg/L	0.01	0.105
Lead	4	04/24/97	05/02/97	< 0.013		mg/L	0.01	0.105
Lead	5	07/24/97	08/15/97	< 0.050		mg/L	0.05	0.105
Lead	6	03/05/98	03/19/98	< 0.050	< 0.050	mg/L	0.05	0.105
Lead	7	07/15/98	08/17/98	< 0.050	< 0.050	mg/L	0.01	0.105
Lead	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.05	0.105
Lead	9	09/01/99	09/16/99	< 0.020	< 0.020	mg/L	0.02	0.105
Lead	10	06/19/00	06/19/00	< 0.050	< 0.050	mg/L	0.05	0.105
Lead	26	05/21/08	06/04/08	< 0.020	< 0.020	mg/L	0.02	0.105
Lead	27	11/12/08	12/08/08	< 0.073	< 0.073	mg/L	0.02	0.105
Lead	28	05/13/09	06/17/09	< 0.048	< 0.054	mg/L	0.05	0.105
Lead	29	11/04/09	12/04/09	< 0.020	< 0.020	mg/L	0.02	0.105
Lead	30	05/12/10	06/04/10	< 0.018	< 0.018	mg/L	0.018	0.105
Lead	31	11/17/10	12/14/10	< 0.036	< 0.036	mg/L	0.036	0.105
Lead	32	03/09/11	04/07/11	< 0.036	< 0.036	mg/L	0.036	0.105
Lead	33	11/15/11	11/23/11	< 0.043	< 0.043	mg/L	0.043	0.105
Lead	34	03/07/12	03/24/12	0.029	< 0.026	mg/L	0.026	0.105
Lead	35	03/06/13	03/25/13	< 0.026	< 0.026	mg/L	0.026	0.105



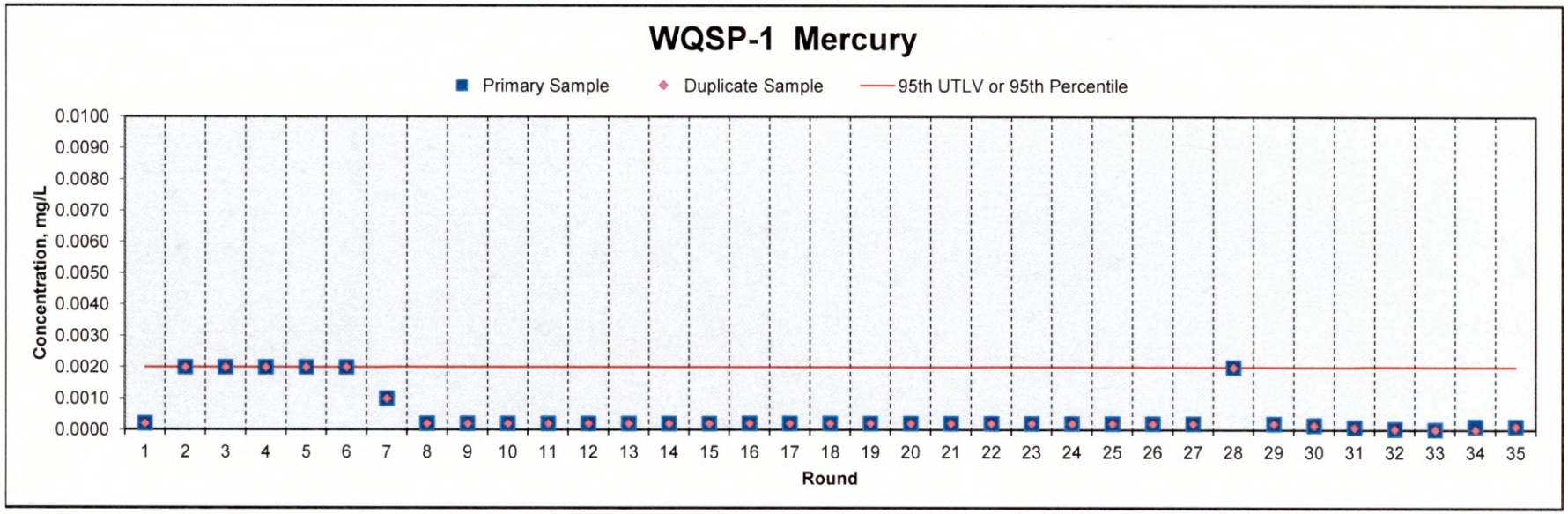
WQSP-1 Magnesium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Magnesium	1	08/17/95	08/28/95	1,110	1,080	mg/L	1.0	1,247
Magnesium	2	04/11/96	05/07/96	1,050	1,040	mg/L	0.5	1,247
Magnesium	3	07/25/96	07/30/96	1,020	982	mg/L	0.5	1,247
Magnesium	4	04/24/97	05/02/97	928	1,000	mg/L	1.0	1,247
Magnesium	5	07/24/97	08/15/97	1,180	1,170	mg/L	0.5	1,247
Magnesium	6	03/05/98	03/19/98	1,160	1,130	mg/L	0.5	1,247
Magnesium	7	07/15/98	08/17/98	1,140	1,060	mg/L	0.5	1,247
Magnesium	8	03/03/99	03/15/99	993	< 1	mg/L	0.5	1,247
Magnesium	9	09/01/99	09/16/99	1,100	1,120	mg/L	0.5	1,247
Magnesium	10	03/02/00	03/06/00	1,112	1,100	mg/L	5.0	1,247
Magnesium	26	05/21/08	06/09/08	1,220	1,160	mg/L	0.5	1,247
Magnesium	27	11/12/08	12/05/08	989	1,020	mg/L	0.5	1,247
Magnesium	28	05/13/09	06/17/09	1,100	1,100	mg/L	0.5	1,247
Magnesium	29	11/04/09	12/03/09	1,140	1,140	mg/L	0.5	1,247
Magnesium	30	05/12/10	05/18/10	1,210	1,200	mg/L	0.82	1,247
Magnesium	31	11/17/10	12/17/10	1,050	1,080	mg/L	1.6	1,247
Magnesium	32	03/09/11	04/11/11	1,120	1,100	mg/L	1.6	1,247
Magnesium	33	11/15/11	11/23/11	1,170	1,150	mg/L	1.1	1,247
Magnesium	34	03/07/12	03/27/12	1,190	1,220	mg/L	0.67	1,247
Magnesium	35	03/06/13	03/14/13	1,130	1,120	mg/L	0.67	1,247



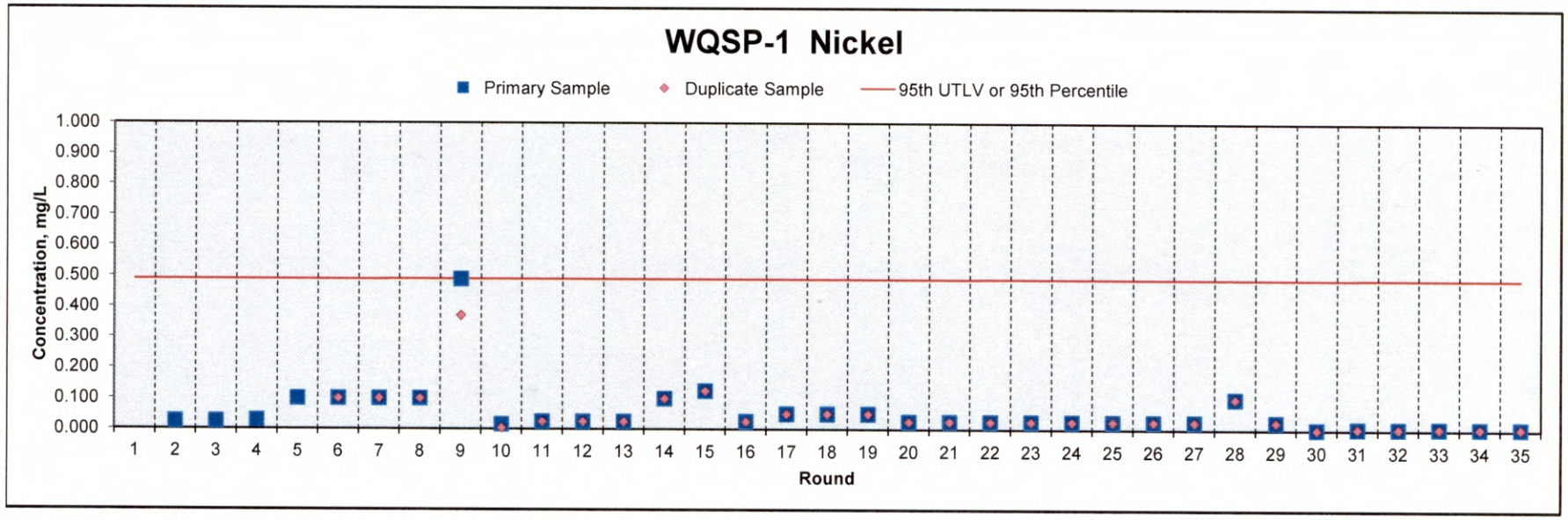
WQSP-1 Mercury

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Mercury	1	08/17/95	08/28/95	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	2	11/07/96	11/11/96	< 0.0020	< 0.0020	mg/L	0.0020	< 0.002
Mercury	3	07/25/96	07/31/96	< 0.0020	< 0.0020	mg/L	0.0020	< 0.002
Mercury	4	04/24/97	04/29/97	< 0.0020	< 0.0020	mg/L	0.0020	< 0.002
Mercury	5	07/24/97	07/29/97	< 0.0020	< 0.0020	mg/L	0.0020	< 0.002
Mercury	6	03/05/98	03/18/98	< 0.0020	< 0.0020	mg/L	0.0020	< 0.002
Mercury	7	07/15/98	08/03/98	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	8	03/03/99	03/09/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	9	09/01/99	09/03/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	10	03/02/00	3/16/000	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	26	05/21/08	05/28/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	27	11/12/08	11/18/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	28	05/13/09	05/20/09	< 0.0020	< 0.0020	mg/L	0.0002	< 0.002
Mercury	29	11/04/09	11/12/09	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	30	05/12/10	05/27/10	< 0.00015	< 0.00015	mg/L	0.00015	< 0.002
Mercury	31	11/17/10	12/13/10	< 0.000080	< 0.000080	mg/L	0.000080	< 0.002
Mercury	32	03/09/11	03/21/11	< 0.000032	< 0.000032	mg/L	0.000032	< 0.002
Mercury	33	11/15/11	11/21/11	< 0.000016	< 0.000016	mg/L	0.000016	< 0.002
Mercury	34	03/07/12	03/12/12	< 0.00012	< 0.000016	mg/L	0.00012	< 0.002
Mercury	35	03/06/13	03/12/13	< 0.00012	< 0.00012	mg/L	0.00012	< 0.002



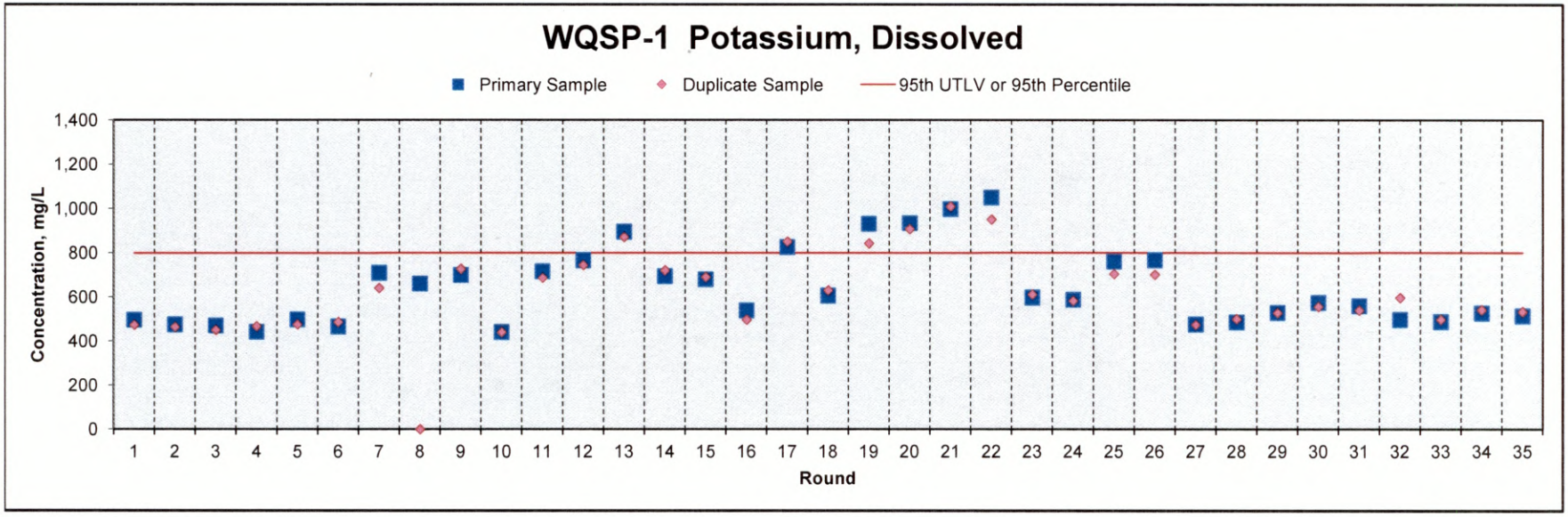
WQSP-1 Nickel

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Nickel	1					mg/L		0.490
Nickel	2	11/07/96	11/19/96	< 0.025		mg/L	0.025	0.490
Nickel	3	07/25/96	07/30/96	< 0.025		mg/L	0.025	0.490
Nickel	4	04/24/97	05/02/97	0.029		mg/L	0.025	0.490
Nickel	5	07/24/97	08/15/97	< 0.100		mg/L	0.100	0.490
Nickel	6	03/05/98	03/19/98	< 0.100	< 0.100	mg/L	0.100	0.490
Nickel	7	07/15/98	08/17/98	< 0.100	< 0.100	mg/L	0.100	0.490
Nickel	8	03/03/99	03/08/99	< 0.100	< 0.100	mg/L	0.100	0.490
Nickel	9	09/01/99	09/16/99	0.490	0.370	mg/L	0.050	0.490
Nickel	10	03/02/00	03/06/00	0.016	0.004	mg/L	0.040	0.490
Nickel	26	05/21/08	06/04/08	< 0.025	< 0.025	mg/L	0.025	0.490
Nickel	27	11/12/08	12/08/08	< 0.025	< 0.025	mg/L	0.025	0.490
Nickel	28	05/13/09	06/17/09	< 0.100	< 0.100	mg/L	0.100	0.490
Nickel	29	11/04/09	12/04/09	< 0.025	< 0.025	mg/L	0.025	0.490
Nickel	30	05/12/10	06/04/10	< 0.0025	< 0.0025	mg/L	0.0025	0.490
Nickel	31	11/17/10	12/14/10	< 0.0050	< 0.0050	mg/L	0.0050	0.490
Nickel	32	03/09/11	04/07/11	< 0.0050	< 0.0050	mg/L	0.0050	0.490
Nickel	33	11/15/11	11/23/11	< 0.0062	< 0.0062	mg/L	0.0062	0.490
Nickel	34	03/07/12	03/24/12	< 0.0060	< 0.0060	mg/L	0.0060	0.490
Nickel	35	03/06/13	03/25/13	< 0.0060	< 0.0060	mg/L	0.0060	0.490



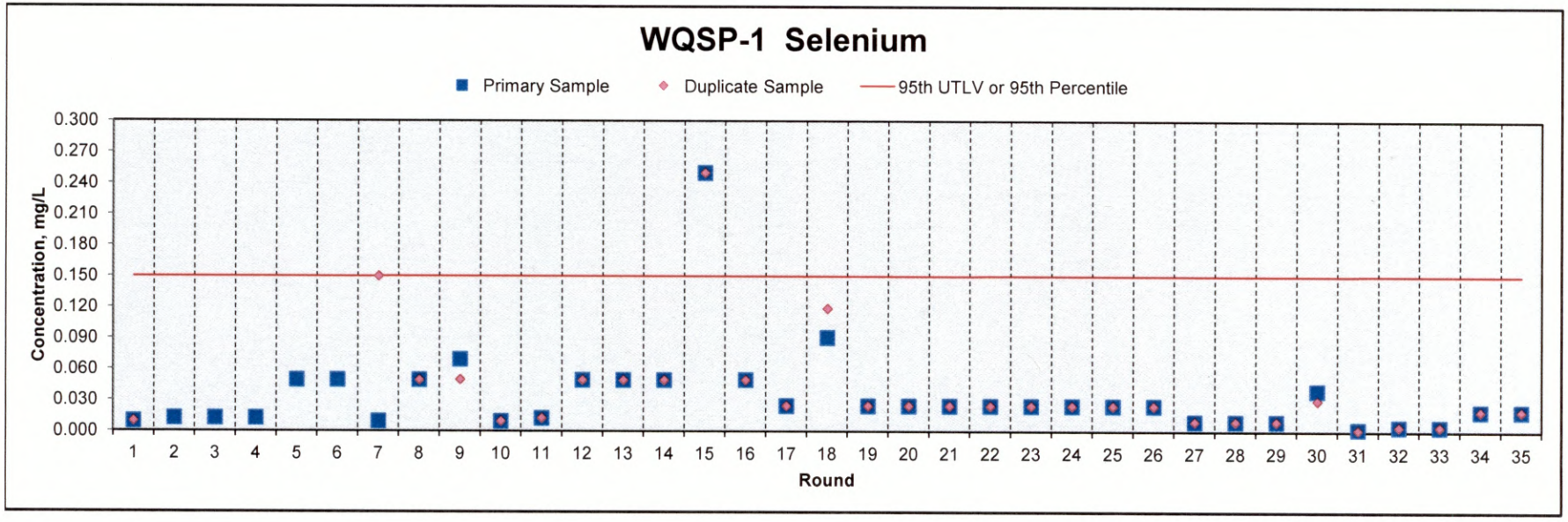
WQSP-1 Potassium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Potassium	1	08/17/95	08/28/95	497	474	mg/L	0.2	799
Potassium	2	04/11/96	04/25/96	476	465	mg/L	10.0	799
Potassium	3	07/25/96	07/30/96	471	451	mg/L	2.0	799
Potassium	4	04/24/97	05/01/97	443	468	mg/L	2.0	799
Potassium	5	07/24/97	07/29/97	499	476	mg/L	2.0	799
Potassium	6	03/05/98	03/19/98	467	487	mg/L	2.0	799
Potassium	7	07/15/98	08/17/98	710	640	mg/L	0.5	799
Potassium	8	03/03/99	03/15/99	661	< 1	mg/L	1.0	799
Potassium	9	09/01/99	09/16/99	700	728	mg/L	0.5	799
Potassium	10	03/02/00	03/06/00	442	441	mg/L	5.0	799
Potassium	26	05/21/08	06/09/08	767	701	mg/L	0.5	799
Potassium	27	11/12/08	12/05/08	477	475	mg/L	0.5	799
Potassium	28	08/17/95	08/28/95	487	501	mg/L	0.5	799
Potassium	29	11/04/09	12/03/09	530	529	mg/L	0.5	799
Potassium	30	05/12/10	05/18/10	575	557	mg/L	2.6	799
Potassium	31	11/17/10	12/17/10	560	540	mg/L	5.2	799
Potassium	32	03/09/11	04/11/11	498	596	mg/L	5.2	799
Potassium	33	11/15/11	11/23/11	489	499	mg/L	8.4	799
Potassium	34	03/07/12	03/27/12	528	542	mg/L	3.4	799
Potassium	35	03/06/13	03/14/13	515	534	mg/L	0.7	799



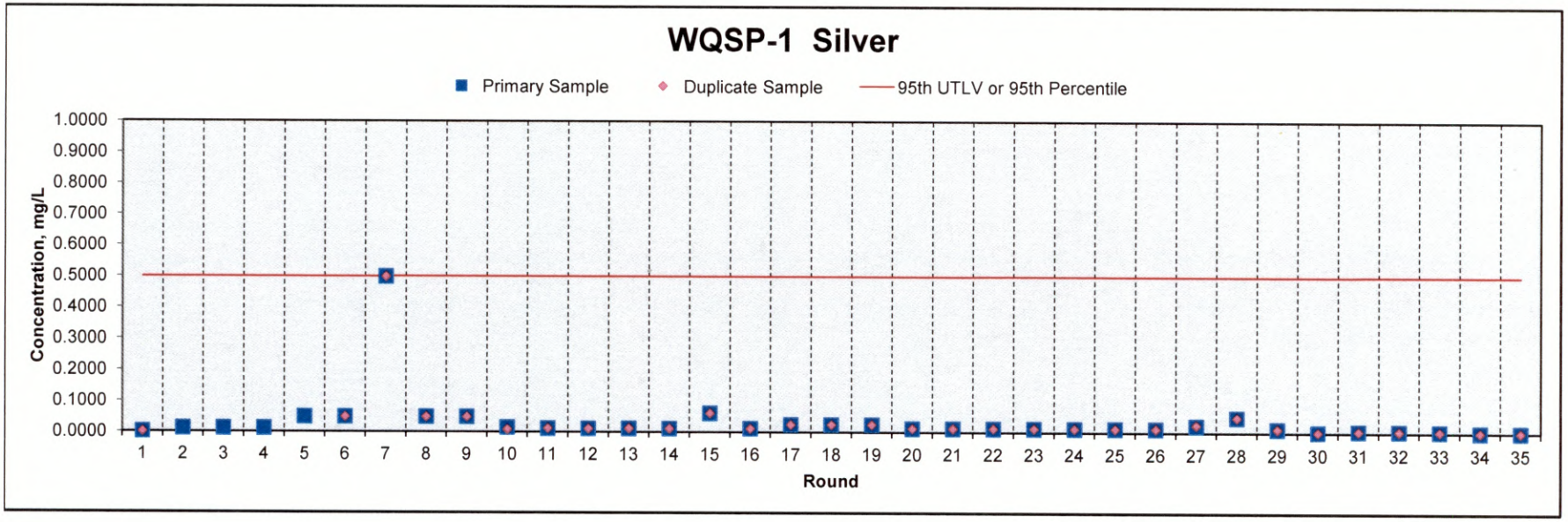
WQSP-1 Selenium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Selenium	1	08/17/95	10/06/95	< 0.010	< 0.010	mg/L	0.0100	0.15
Selenium	2	11/07/96	11/19/96	< 0.013		mg/L	0.0130	0.15
Selenium	3	07/25/96	07/30/96	< 0.013		mg/L	0.0130	0.15
Selenium	4	04/24/97	05/02/97	< 0.013		mg/L	0.0130	0.15
Selenium	5	07/24/97	08/15/97	< 0.050		mg/L	0.0500	0.15
Selenium	6	03/05/98	03/19/98	< 0.050		mg/L	0.0500	0.15
Selenium	7	07/15/98	08/17/98	< 0.010	0.150	mg/L	0.0100	0.15
Selenium	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.0500	0.15
Selenium	9	09/01/99	09/16/99	0.070	< 0.050	mg/L	0.0500	0.15
Selenium	10	03/02/00	03/06/00	< 0.010	< 0.010	mg/L	0.0100	0.15
Selenium	26	05/21/08	06/04/08	< 0.025	< 0.025	mg/L	0.0250	0.15
Selenium	27	11/12/08	12/08/08	< 0.010	< 0.010	mg/L	0.0250	0.15
Selenium	28	05/13/09	06/04/09	< 0.010	< 0.010	mg/L	0.0100	0.15
Selenium	29	11/04/09	11/16/09	< 0.010	< 0.010	mg/L	0.0100	0.15
Selenium	30	05/12/10	05/18/10	0.0398	0.0301	mg/L	0.0100	0.15
Selenium	31	11/17/10	12/14/10	0.0026	0.0020	mg/L	0.0020	0.15
Selenium	32	03/09/11	03/28/11	< 0.0050	< 0.0050	mg/L	0.0050	0.15
Selenium	33	11/15/11	12/01/11	< 0.0050	< 0.0050	mg/L	0.0050	0.15
Selenium	34	03/07/12	03/27/12	< 0.020	< 0.020	mg/L	0.020	0.15
Selenium	35	03/06/13	04/09/13	< 0.020	< 0.020	mg/L	0.020	0.15



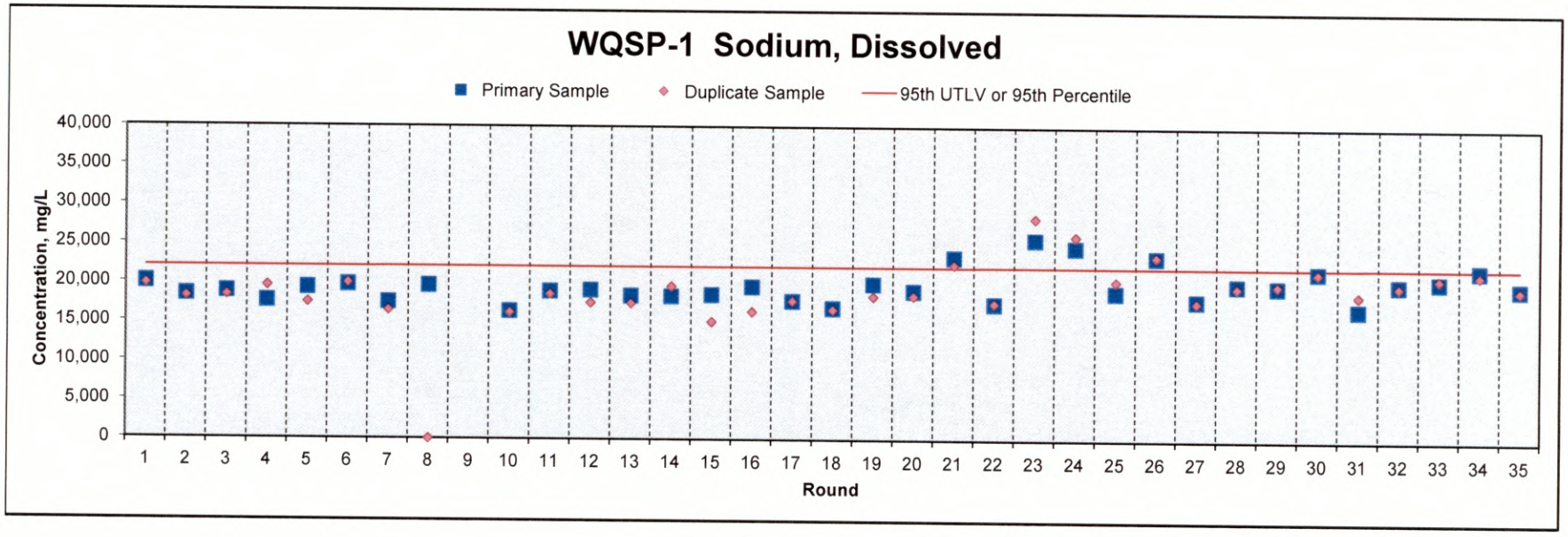
WQSP-1 Silver

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Silver	1	08/17/95	09/13/95	< 0.0025	< 0.0025	mg/L	0.0025	< 0.5
Silver	2	11/07/96	11/19/96	< 0.0130		mg/L	0.0130	< 0.5
Silver	3	07/25/96	07/30/96	< 0.0130		mg/L	0.0130	< 0.5
Silver	4	04/24/97	05/02/97	< 0.0130		mg/L	0.0130	< 0.5
Silver	5	07/24/97	08/15/97	< 0.0500		mg/L	0.0500	< 0.5
Silver	6	03/05/98	03/19/98	< 0.0500	< 0.0500	mg/L	0.0500	< 0.5
Silver	7	07/15/98	08/17/98	< 0.5000	< 0.5000	mg/L	0.0500	< 0.5
Silver	8	03/03/99	03/08/99	< 0.0500	< 0.0500	mg/L	0.0500	< 0.5
Silver	9	09/01/99	09/17/99	< 0.0500	< 0.0500	mg/L	0.0500	< 0.5
Silver	10	03/02/00	03/06/00	0.0160	< 0.0100	mg/L	0.0100	< 0.5
Silver	26	05/21/08	06/04/08	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	27	11/12/08	12/08/08	< 0.023	< 0.026	mg/L	0.013	< 0.5
Silver	28	05/13/09	06/17/09	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	29	11/04/09	12/04/09	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	30	05/12/10	06/04/10	< 0.0030	< 0.0030	mg/L	0.0030	< 0.5
Silver	31	11/17/10	12/14/10	< 0.0060	< 0.0060	mg/L	0.0060	< 0.5
Silver	32	03/09/11	04/07/11	< 0.0060	< 0.0060	mg/L	0.0060	< 0.5
Silver	33	11/15/11	11/23/11	< 0.0050	< 0.0050	mg/L	0.0050	< 0.5
Silver	34	03/07/12	03/24/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.5
Silver	35	03/06/13	03/25/13	< 0.0020	< 0.0020	mg/L	0.0020	< 0.5



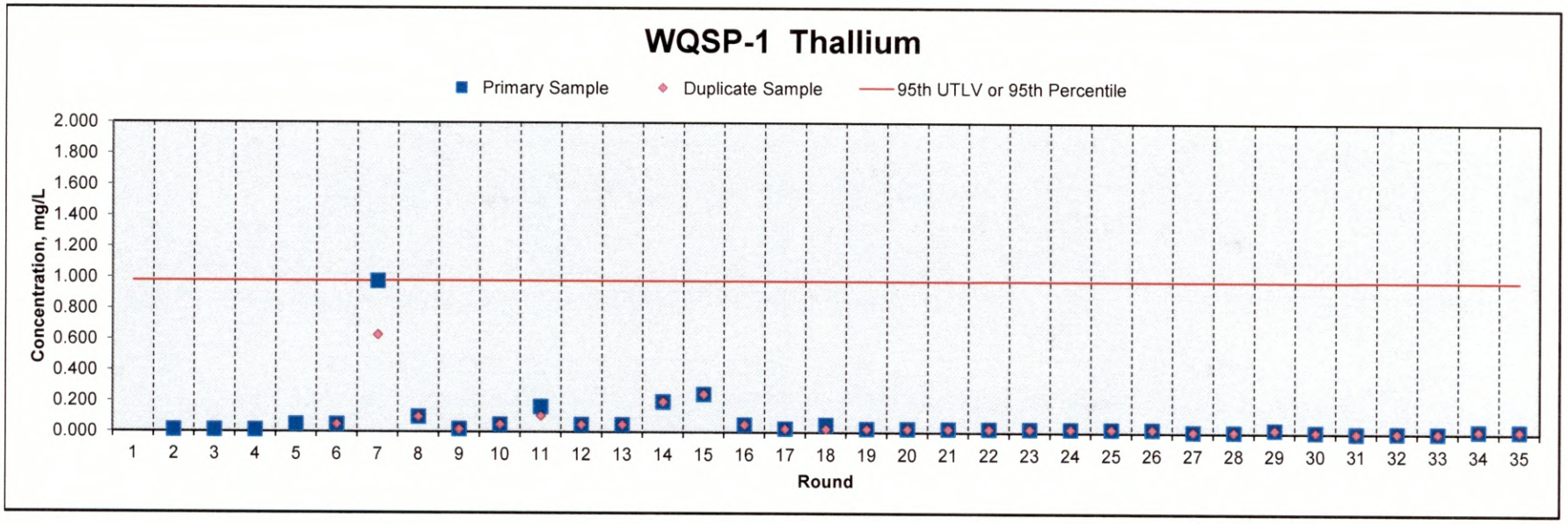
WQSP-1 Sodium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sodium	1	08/17/95	08/28/95	20,100	19,800	mg/L	5.0	22,090
Sodium	2	04/11/96	04/25/96	18,500	18,200	mg/L	25.0	22,090
Sodium	3	07/25/96	07/30/96	18,900	18,400	mg/L	25.0	22,090
Sodium	4	04/24/97	05/01/97	17,700	19,600	mg/L	10.0	22,090
Sodium	5	07/24/97	07/29/97	19,400	17,500	mg/L	10.0	22,090
Sodium	6	03/05/98	03/19/98	19,800	20,000	mg/L	4.0	22,090
Sodium	7	07/15/98	08/17/98	17,550	16,500	mg/L	0.5	22,090
Sodium	8	03/03/99	03/15/99	19,700	< 1	mg/L	1.0	22,090
Sodium	9	09/01/99	N/A			mg/L	N/A	22,090
Sodium	10	03/02/00	03/06/00	16,446	16,234	mg/L	5.0	22,090
Sodium	26	05/21/08	06/09/08	23,500	23,600	mg/L	0.5	22,090
Sodium	27	11/12/08	12/05/08	18,000	17,800	mg/L	0.5	22,090
Sodium	28	05/13/09	06/17/09	20,000	19,700	mg/L	0.5	22,090
Sodium	29	11/04/09	12/03/09	19,800	20,000	mg/L	0.5	22,090
Sodium	30	05/12/10	05/18/10	21,700	21,600	mg/L	0.5	22,090
Sodium	31	11/17/10	12/17/10	16,900	18,700	mg/L	14	22,090
Sodium	32	03/09/11	04/11/11	20,100	19,900	mg/L	27	22,090
Sodium	33	11/15/11	11/23/11	20,500	20,900	mg/L	64	22,090
Sodium	34	03/07/12	03/27/12	22,000	21,400	mg/L	12	22,090
Sodium	35	03/06/13	03/14/13	19,700	19,500	mg/L	12	22,090



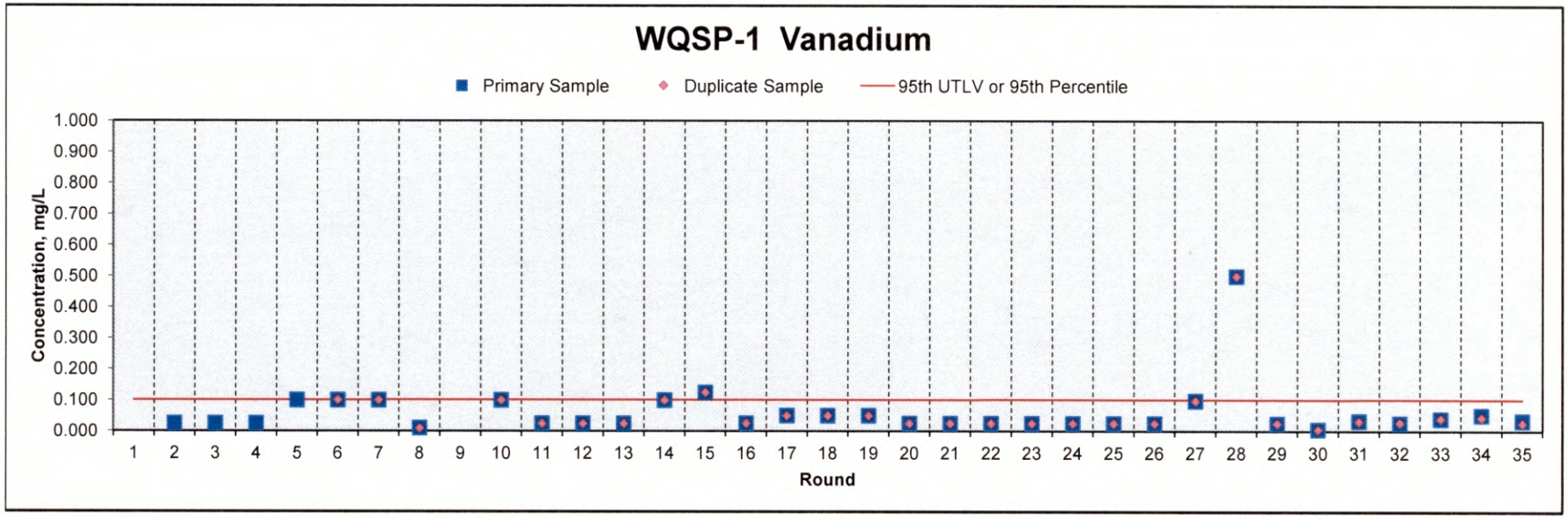
WQSP-1 Thallium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Thallium	1					mg/L		0.98
Thallium	2	11/07/96	11/19/96	< 0.013		mg/L	0.013	0.98
Thallium	3	07/25/96	07/30/96	< 0.013		mg/L	0.013	0.98
Thallium	4	04/24/97	05/02/97	< 0.013		mg/L	0.013	0.98
Thallium	5	07/24/97	08/15/97	< 0.050		mg/L	0.050	0.98
Thallium	6	03/05/98	03/19/98	< 0.050	< 0.050	mg/L	0.050	0.98
Thallium	7	07/15/98	08/17/98	0.980	0.630	mg/L	0.005	0.98
Thallium	8	03/03/99	03/08/99	< 0.100	< 0.100	mg/L	0.100	0.98
Thallium	9	09/01/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	0.98
Thallium	10	06/19/00	06/19/00	< 0.050	< 0.050	mg/L	0.050	0.98
Thallium	26	05/21/08	06/04/08	< 0.025	< 0.025	mg/L	0.025	0.98
Thallium	27	11/12/08	12/08/08	< 0.010	< 0.010	mg/L	0.025	0.98
Thallium	28	05/13/09	06/04/09	< 0.010	< 0.010	mg/L	0.025	0.98
Thallium	29	11/04/09	11/16/09	< 0.025	< 0.025	mg/L	0.025	0.98
Thallium	30	05/12/10	06/04/10	< 0.010	< 0.010	mg/L	0.010	0.98
Thallium	31	11/17/10	12/14/10	< 0.0020	< 0.0020	mg/L	0.002	0.98
Thallium	32	03/09/11	03/28/11	< 0.0050	< 0.0050	mg/L	0.0050	0.98
Thallium	33	11/15/11	12/01/11	< 0.0050	< 0.0050	mg/L	0.0050	0.98
Thallium	34	03/07/12	03/27/12	< 0.020	< 0.020	mg/L	0.020	0.98
Thallium	35	03/06/13	04/09/13	< 0.020	< 0.020	mg/L	0.020	0.98



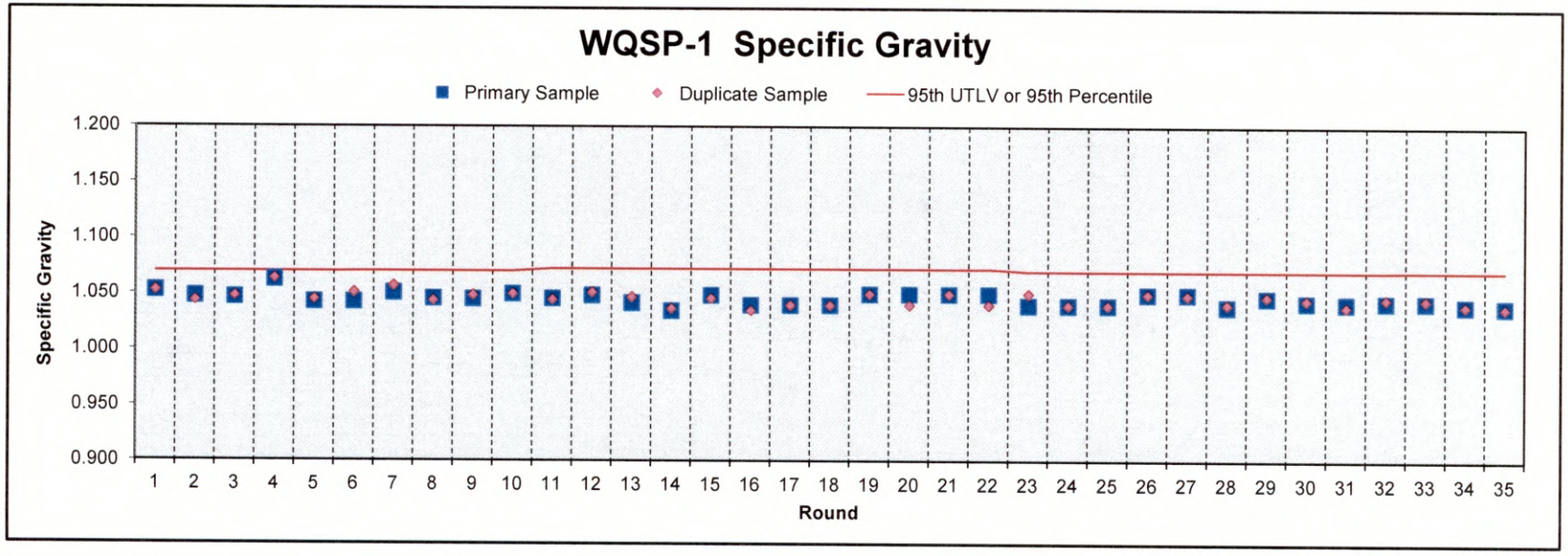
WQSP-1 Vanadium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Vanadium	1					mg/L		< 0.1
Vanadium	2	11/07/96	11/19/96	< 0.025		mg/L	0.025	< 0.1
Vanadium	3	07/25/96	07/30/96	< 0.025		mg/L	0.025	< 0.1
Vanadium	4	04/24/97	05/02/97	< 0.025		mg/L	0.025	< 0.1
Vanadium	5	07/24/97	08/15/97	< 0.100		mg/L	0.100	< 0.1
Vanadium	6	03/05/98	03/19/98	< 0.100	< 0.100	mg/L	0.100	< 0.1
Vanadium	7	07/15/98	09/17/98	< 0.100	< 0.100	mg/L	0.100	< 0.1
Vanadium	8	03/03/99	03/08/99	< 0.010	< 0.010	mg/L	0.010	< 0.1
Vanadium	9					mg/L		< 0.1
Vanadium	10	03/02/00	03/06/00	< 0.100	< 0.100	mg/L	0.100	< 0.1
Vanadium	26	05/21/08	06/04/08	< 0.025	< 0.025	mg/L	0.025	< 0.1
Vanadium	27	11/12/08	12/08/08	< 0.098	< 0.098	mg/L	0.025	< 0.1
Vanadium	28	05/13/09	06/17/09	< 0.500	< 0.500	mg/L	0.500	< 0.1
Vanadium	29	11/04/09	12/04/09	< 0.025	< 0.025	mg/L	0.025	< 0.1
Vanadium	30	05/12/10	06/04/10	< 0.0055	< 0.0055	mg/L	0.0055	< 0.1
Vanadium	31	11/17/10	12/14/10	0.033	0.031	mg/L	0.011	< 0.1
Vanadium	32	03/09/11	04/07/11	0.026	0.028	mg/L	0.011	< 0.1
Vanadium	33	11/15/11	11/23/11	0.040	0.041	mg/L	0.0044	< 0.1
Vanadium	34	03/07/12	03/24/12	0.052	0.044	mg/L	0.0040	< 0.1
Vanadium	35	03/06/13	03/25/13	0.034	0.026	mg/L	0.0040	< 0.1



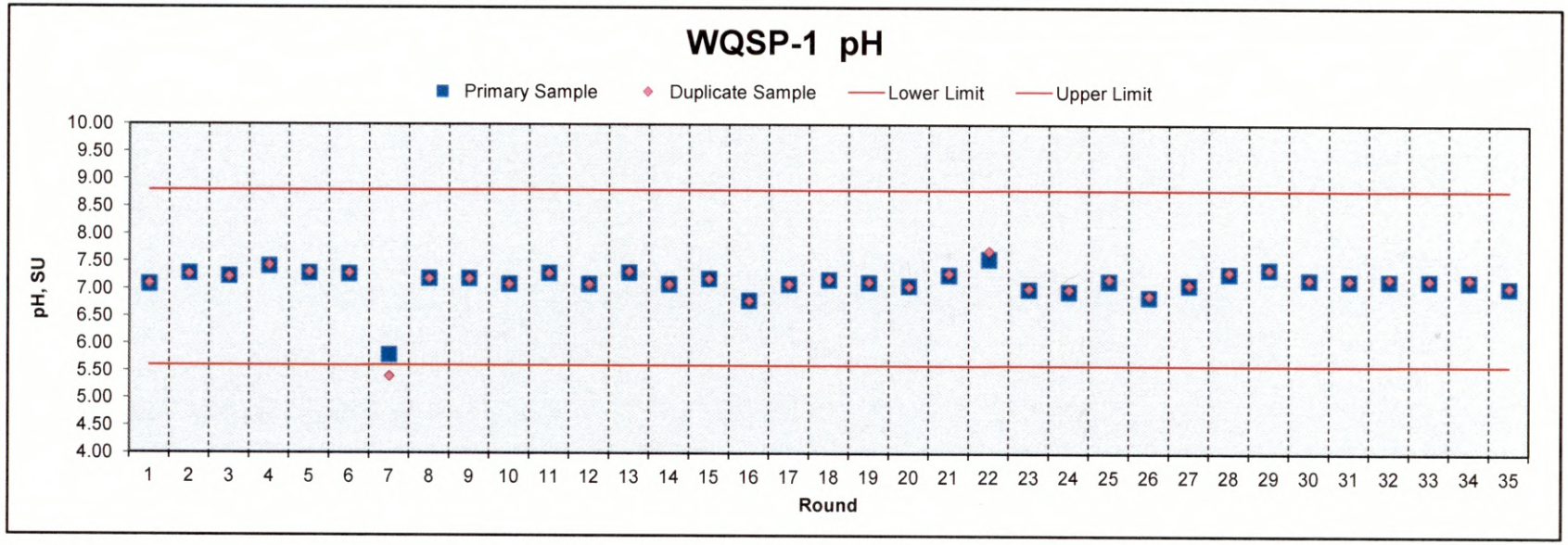
WQSP-1 Specific Gravity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Density	1	08/17/95	08/22/95	1.053	1.053	g/mL	0.00	1.07
Density	2	04/11/96	04/18/96	1.048	1.044	g/mL	0.00	1.07
Density	3	07/25/96	08/08/96	1.047	1.048	g/mL	0.00	1.07
Density	4	04/24/97	05/02/97	1.063	1.064	g/mL	0.00	1.07
Density	5	07/24/97	09/02/97	1.043	1.045	g/mL	0.00	1.07
Density	6	03/05/98	03/06/98	1.043	1.051	g/mL	0.00	1.07
Density	7	07/15/98	07/22/98	1.051	1.057	g/mL	0.00	1.07
Density	8	03/03/99	03/05/99	1.046	1.044	g/mL	0.00	1.07
Density	9	09/01/99	09/03/99	1.045	1.049	g/mL	0.00	1.07
Density	10	03/02/00	03/21/00	1.050	1.050	g/mL	0.00	1.07
Density	26	05/21/08	05/22/08	1.050	1.050	unitless	0.00	1.07
Specific Gravity	27	11/12/08	12/09/08	1.050	1.049	unitless	0.00	1.07
Specific Gravity	28	05/13/09	05/18/09	1.039	1.041	unitless	0.00	1.07
Specific Gravity	29	11/04/09	11/10/09	1.047	1.048	unitless	0.00	1.07
Specific Gravity	30	05/12/10	05/26/10	1.043	1.045	unitless	0.00	1.07
Specific Gravity	31	11/17/10	11/23/10	1.042	1.039	unitless	0.00	1.07
Specific Gravity	32	03/09/11	03/14/11	1.043	1.046	unitless	0.00	1.07
Specific Gravity	33	11/15/11	11/19/11	1.043	1.045	unitless	0.00	1.07
Specific Gravity	34	03/07/12	03/28/12	1.040	1.040	unitless	0.00	1.07
Specific Gravity	35	03/06/13	03/11/13	1.039	1.038	unitless	0.00	1.07



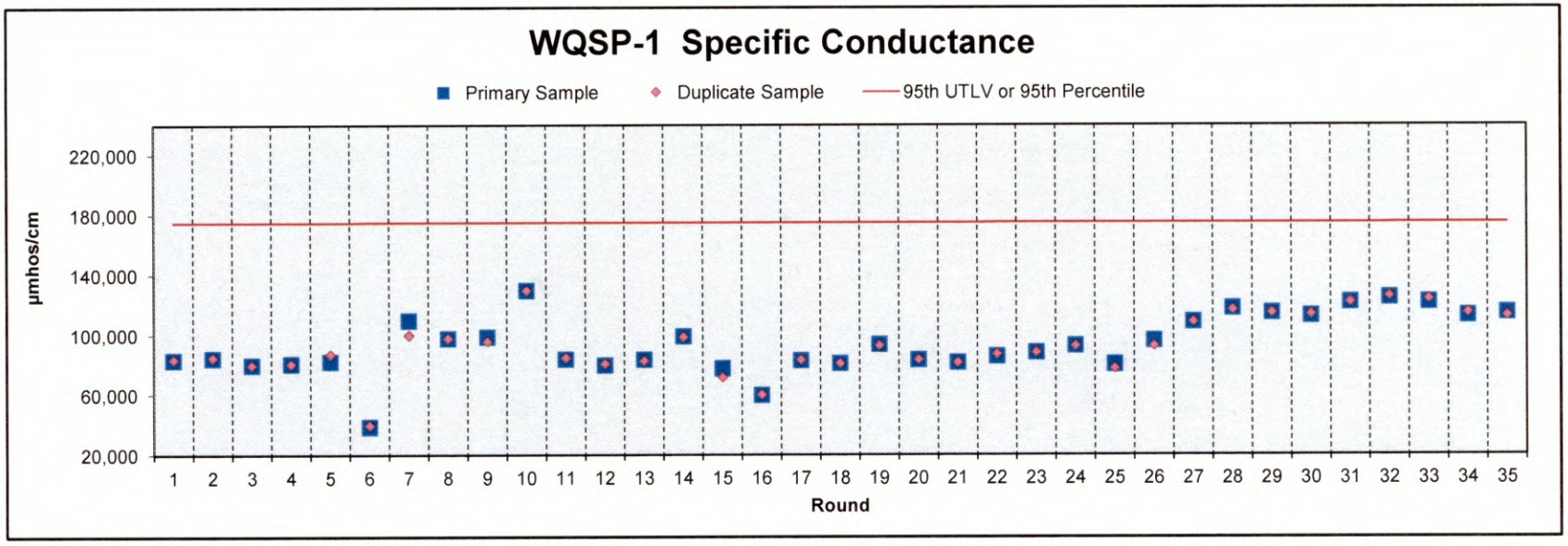
WQSP-1 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile	
								Lower Limit	Upper Limit
pH	1	08/17/95	08/18/95	7.09	7.11	SU	0	5.6	8.8
pH	2	04/11/96	04/12/96	7.29	7.28	SU	0	5.6	8.8
pH	3	07/25/96	07/26/96	7.24	7.23	SU	0	5.6	8.8
pH	4	04/24/97	04/28/97	7.42	7.44	SU	N/A	5.6	8.8
pH	5	07/24/97	07/25/97	7.30	7.32	SU	N/A	5.6	8.8
pH	6	03/05/98	03/06/98	7.28	7.30	SU	N/A	5.6	8.8
pH	7	07/15/98	07/15/98	5.80	5.40	SU	N/A	5.6	8.8
pH	8	03/03/99	03/03/99	7.20	7.20	SU	N/A	5.6	8.8
pH	9	09/01/99	09/01/99	7.20	7.20	SU	N/A	5.6	8.8
pH	10	03/02/00	03/07/00	7.10	7.10	SU	N/A	5.6	8.8
pH	26	05/21/08	05/22/08	6.87	6.90	SU	N/A	5.6	8.8
pH	27	11/12/08	11/13/08	7.09	7.10	SU	N/A	5.6	8.8
pH	28	05/13/09	05/15/09	7.30	7.33	SU	0.0	5.6	8.8
pH	29	11/04/09	11/06/09	7.38	7.38	SU	0.0	5.6	8.8
pH	30	05/12/10	05/14/10	7.19	7.20	SU	0.0	5.6	8.8
pH	31	11/17/10	11/24/10	7.17	7.19	SU	0.0	5.6	8.8
pH	32	03/09/11	03/11/11	7.17	7.22	SU	0.0	5.6	8.8
pH	33	11/15/11	11/18/11	7.17	7.19	SU	0.0	5.6	8.8
pH	34	03/07/12	03/12/12	7.16	7.21	SU	0.1	5.6	8.8
pH	35	03/06/13	03/07/13	7.05	7.07	SU	0.1	5.6	8.8



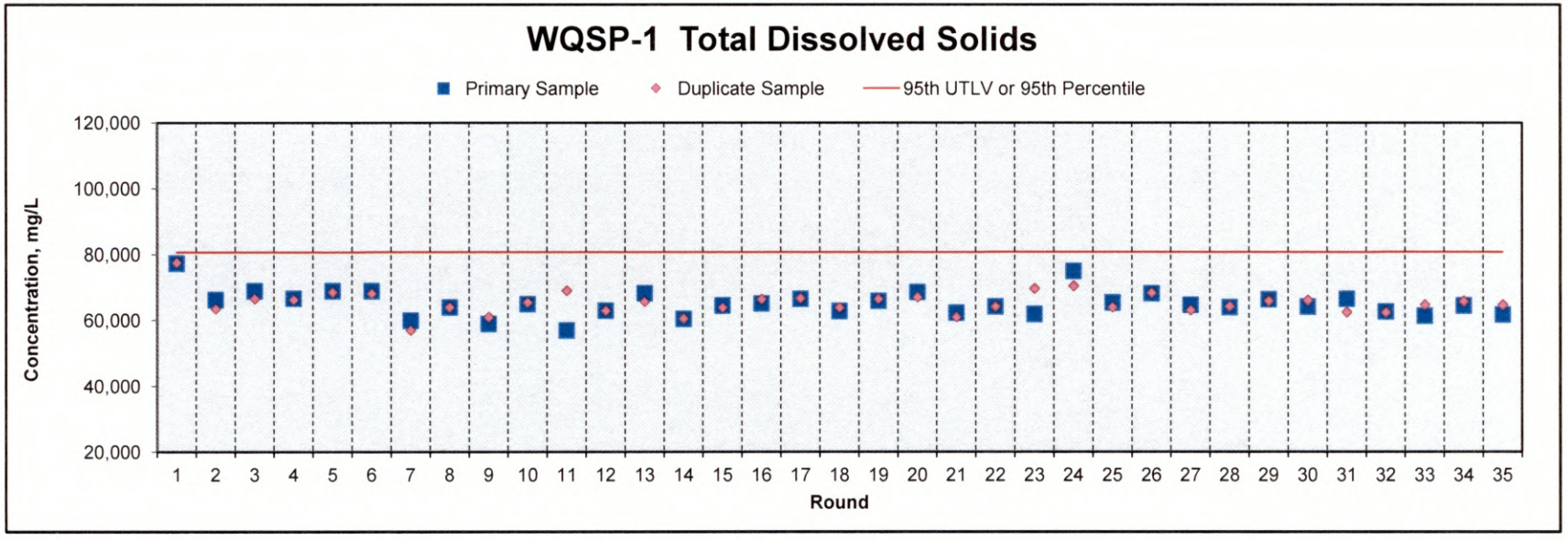
WQSP-1 Specific Conductance

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Specific Conductance	1	08/17/95	08/18/95	83,400	83,800	µmhos/cm	1.0	175,000
Specific Conductance	2	04/11/96	04/18/96	84,700	85,100	µmhos/cm	1.0	175,000
Specific Conductance	3	07/25/96	08/20/96	80,100	80,100	µmhos/cm	3.0	175,000
Specific Conductance	4	04/24/97	05/02/97	80,950	80,900	µmhos/cm	3.0	175,000
Specific Conductance	5	07/24/97	08/29/97	82,500	87,300	µmhos/cm	3.0	175,000
Specific Conductance	6	03/05/98	03/23/98	38,700	39,900	µmhos/cm	3.0	175,000
Specific Conductance	7	07/15/98	07/27/98	110,000	100,000	µmhos/cm	0.0	175,000
Specific Conductance	8	03/03/99	03/05/99	98,000	98,000	µmhos/cm	0.0	175,000
Specific Conductance	9	09/01/99	09/03/99	99,000	96,000	µmhos/cm	0.0	175,000
Specific Conductance	10	03/02/00	03/07/00	130,000	130,000	µmhos/cm	0.0	175,000
Specific Conductance	26	05/21/08	05/29/08	96,500	92,800	µmhos/cm	0.0	175,000
Specific Conductance	27	11/12/08	11/14/08	109,000	109,000	µmhos/cm	0.0	175,000
Specific Conductance	28	05/13/09	05/18/09	118,000	117,000	µmhos/cm	0.0	175,000
Specific Conductance	29	11/04/09	11/10/09	115,000	115,000	µmhos/cm	0.0	175,000
Specific Conductance	30	05/12/10	05/14/10	113,000	114,000	µmhos/cm	0.0	175,000
Specific Conductance	31	11/17/10	11/24/10	122,000	122,000	µmhos/cm	0.0	175,000
Specific Conductance	32	03/09/11	03/11/11	125,000	126,000	µmhos/cm	0.0	175,000
Specific Conductance	33	11/15/11	11/18/11	122,000	124,000	µmhos/cm	0.5	175,000
Specific Conductance	34	03/07/12	03/14/12	113,000	115,000	µmhos/cm	0.25	175,000
Specific Conductance	35	03/06/13	03/07/13	115,000	113,000	µmhos/cm	0.50	175,000



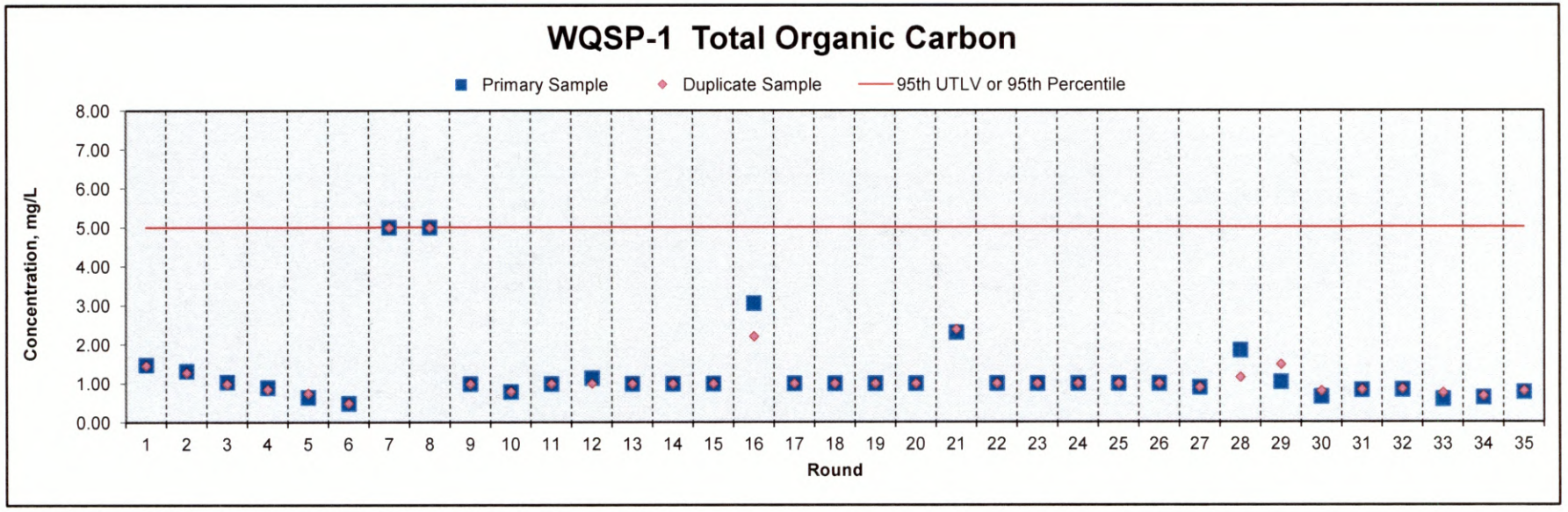
WQSP-1 Total Dissolved Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Dissolved Solids	1	08/17/95	08/24/95	77,400	77,600	mg/L	10	80,700
Total Dissolved Solids	2	04/11/96	04/19/96	66,300	63,500	mg/L	2000	80,700
Total Dissolved Solids	3	07/25/96	08/01/96	69,000	66,600	mg/L	200	80,700
Total Dissolved Solids	4	04/24/97	04/30/97	66,700	66,300	mg/L	10	80,700
Total Dissolved Solids	5	07/24/97	07/31/97	69,000	68,600	mg/L	200	80,700
Total Dissolved Solids	6	03/05/98	03/17/98	69,000	68,200	mg/L	400	80,700
Total Dissolved Solids	7	07/15/98	07/22/98	60,000	57,000	mg/L	10	80,700
Total Dissolved Solids	8	03/03/99	03/03/99	64,000	64,000	mg/L	10	80,700
Total Dissolved Solids	9	09/01/99	09/02/99	59,000	61,000	mg/L	10	80,700
Total Dissolved Solids	10	03/02/00	06/20/00	65,000	65,500	mg/L	10	80,700
Total Dissolved Solids	26	05/21/08	06/02/08	68,200	68,400	mg/L	10	80,700
Total Dissolved Solids	27	11/12/08	11/20/08	64,700	63,100	mg/L	10	80,700
Total Dissolved Solids	28	05/13/09	05/18/09	64,000	64,300	mg/L	10	80,700
Total Dissolved Solids	29	11/04/09	11/06/09	66,400	66,000	mg/L	10	80,700
Total Dissolved Solids	30	05/12/10	05/14/10	64,200	66,100	mg/L	10	80,700
Total Dissolved Solids	31	11/17/11	11/22/11	66,500	62,500	mg/L	270	80,700
Total Dissolved Solids	32	03/09/11	03/16/11	62,700	62,400	mg/L	270	80,700
Total Dissolved Solids	33	11/15/11	11/23/11	61,400	64,700	mg/L	560	80,700
Total Dissolved Solids	34	03/07/12	03/14/12	64,500	65,800	mg/L	270	80,700
Total Dissolved Solids	35	03/06/13	03/13/13	61,800	64,700	mg/L	500	80,700



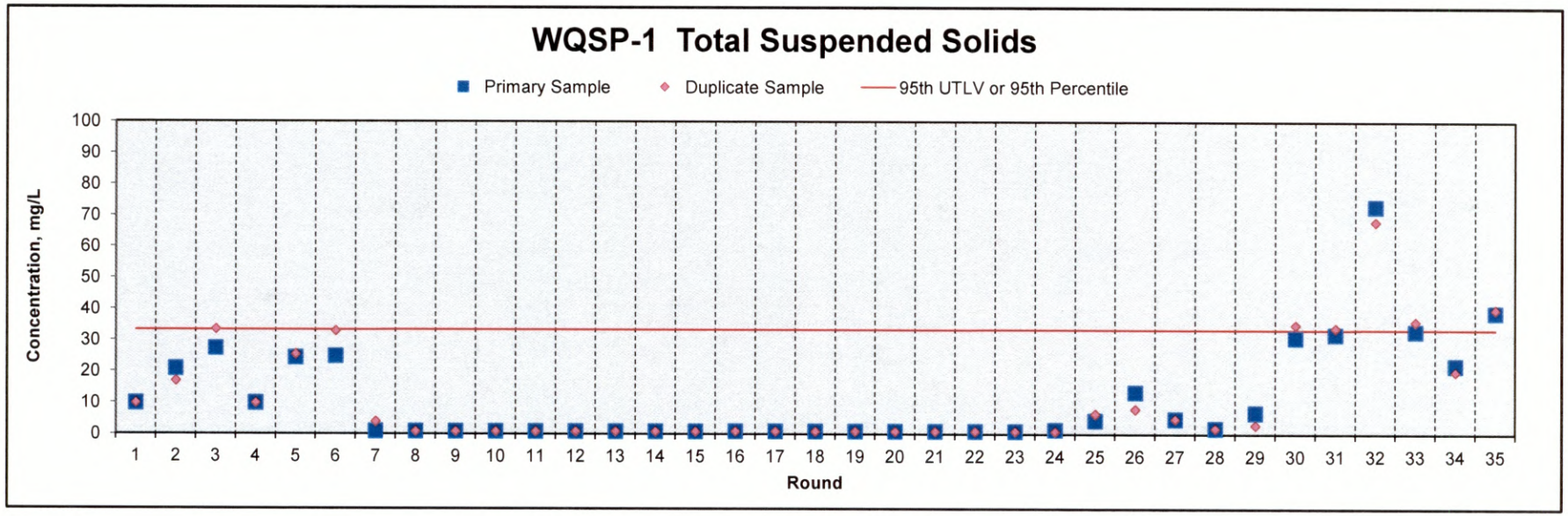
WQSP-1 Total Organic Carbon

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Organic Carbon	1	08/17/95	08/18/95	1.49	1.47	mg/L	0.50	< 5.0
Total Organic Carbon	2	04/11/96	04/17/96	1.33	1.29	mg/L	0.50	< 5.0
Total Organic Carbon	3	07/25/96	08/06/96	1.05	1.00	mg/L	0.50	< 5.0
Total Organic Carbon	4	04/24/97	05/05/97	0.91	0.86	mg/L	0.50	< 5.0
Total Organic Carbon	5	07/24/97	08/13/97	0.65	0.75	mg/L	0.50	< 5.0
Total Organic Carbon	6	03/05/98	03/12/98	< 0.50	< 0.50	mg/L	0.50	< 5.0
Total Organic Carbon	7	07/15/98	07/23/98	< 5.00	< 5.00	mg/L	5.00	< 5.0
Total Organic Carbon	8	03/03/99	03/11/99	< 5.00	< 5.00	mg/L	5.00	< 5.0
Total Organic Carbon	9	09/01/99	09/13/99	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	10	03/02/00	03/13/00	0.80	0.80	mg/L	1.00	< 5.0
Total Organic Carbon	26	05/21/08	06/13/08	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	27	11/12/08	12/10/08	0.90	0.90	mg/L	1.00	< 5.0
Total Organic Carbon	28	05/13/09	05/20/09	< 1.85	1.15	mg/L	1.00	< 5.0
Total Organic Carbon	29	11/04/09	11/09/09	1.04	1.48	mg/L	1.00	< 5.0
Total Organic Carbon	30	05/12/10	05/20/10	0.66	0.80	mg/L	0.056	< 5.0
Total Organic Carbon	31	11/17/10	11/30/10	0.83	0.84	mg/L	0.056	< 5.0
Total Organic Carbon	32	03/09/11	03/18/11	0.84	0.86	mg/L	0.056	< 5.0
Total Organic Carbon	33	11/15/11	11/29/11	0.60	0.75	mg/L	0.072	< 5.0
Total Organic Carbon	34	03/07/12	03/26/12	0.64	0.68	mg/L	0.25	< 5.0
Total Organic Carbon	35	03/06/13	03/11/13	0.78	0.81	mg/L	0.23	< 5.0



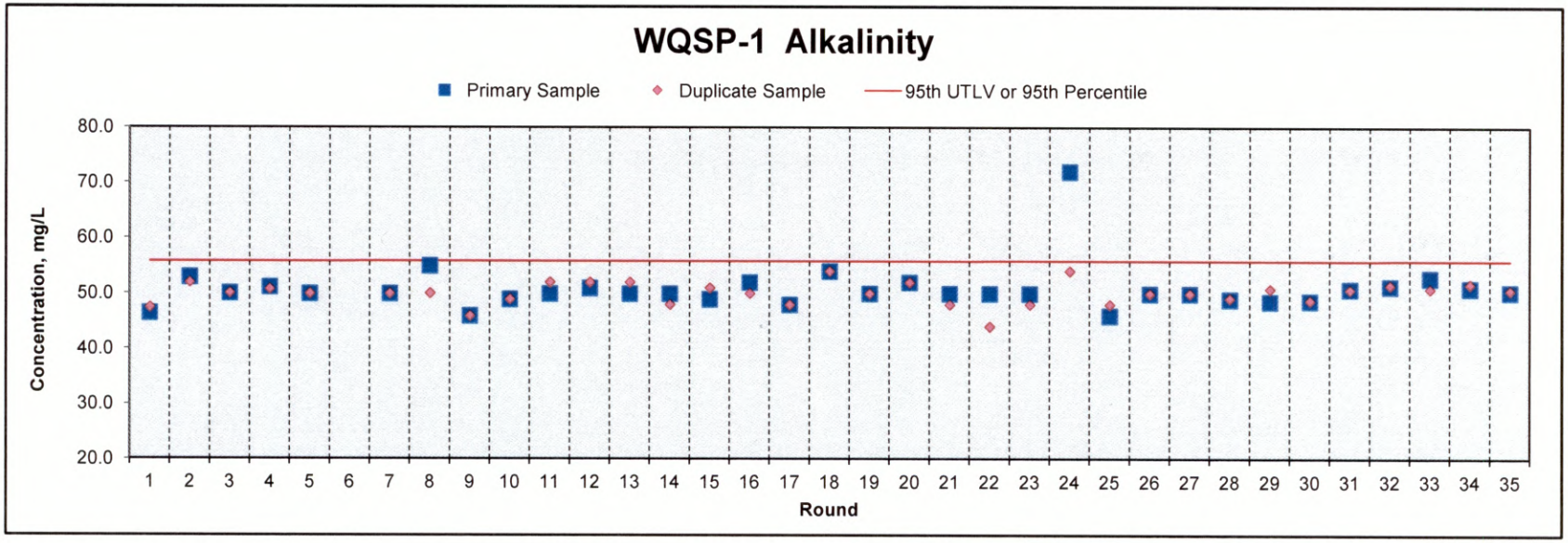
WQSP-1 Total Suspended Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Suspended Solids	1	08/17/95	08/22/95	< 10	< 10	mg/L	10.0	33.3
Total Suspended Solids	2	04/11/96	04/17/96	21	17	mg/L	10.0	33.3
Total Suspended Solids	3	07/25/96	08/01/96	28	34	mg/L	10.0	33.3
Total Suspended Solids	4	04/24/97	04/30/97	< 10	< 10	mg/L	10.0	33.3
Total Suspended Solids	5	07/24/97	07/31/97	25	26	mg/L	10.0	33.3
Total Suspended Solids	6	03/19/98	03/05/98	25	33	mg/L	10.0	33.3
Total Suspended Solids	7	07/15/98	07/20/98	< 1	4	mg/L	1.0	33.3
Total Suspended Solids	8	03/03/99	03/10/99	< 1	< 1	mg/L	1.0	33.3
Total Suspended Solids	9	09/01/99	09/03/99	< 1	< 1	mg/L	1.0	33.3
Total Suspended Solids	10	03/02/00	03/08/00	< 1	< 1	mg/L	1.0	33.3
Total Suspended Solids	26	05/21/08	05/27/08	14	8	mg/L	1.0	33.3
Total Suspended Solids	27	11/12/08	11/14/08	< 5	< 5	mg/L	1.0	33.3
Total Suspended Solids	28	05/13/09	05/19/09	2	2	mg/L	1.0	33.3
Total Suspended Solids	29	11/04/09	11/11/09	7	3	mg/L	1.0	33.3
Total Suspended Solids	30	05/12/10	05/17/10	31	35	mg/L	1.0	33.3
Total Suspended Solids	31	11/17/10	11/30/10	32	**34**	mg/L	0.0	**33.3**
Total Suspended Solids	32	03/09/11	03/15/11	**73**	**68**	mg/L	0.0	**33.3**
Total Suspended Solids	33	11/15/11	11/22/11	33	**36**	mg/L	2.8	**33.3**
Total Suspended Solids	34	03/07/12	03/13/12	22	20	mg/L	2.8	33.3
Total Suspended Solids	35	03/06/13	03/13/13	**39**	**40**	mg/L	1.5	**33.3**



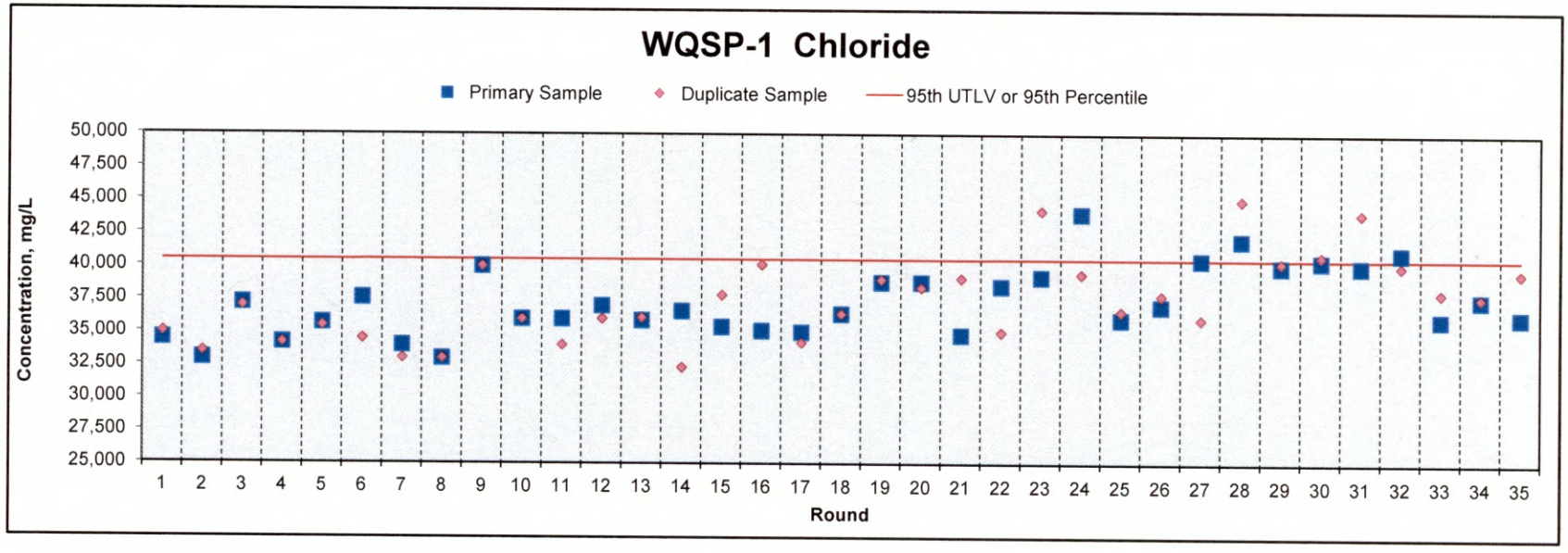
WQSP-1 Alkalinity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Alkalinity	1	08/17/95	08/29/95	46.5	47.5	mg/L	5.0	55.8
Alkalinity	2	04/11/96	04/25/96	53.0	52.0	mg/L	5.0	55.8
Alkalinity	3	07/25/96	08/06/96	50.1	50.1	mg/L	5.0	55.8
Alkalinity	4	04/24/97	04/30/97	51.2	50.8	mg/L	5.0	55.8
Alkalinity	5	07/24/97	08/26/97	50.0	50.0	mg/L	5.0	55.8
Alkalinity	6	03/05/98	N/A		**Analysis not performed**			55.8
Alkalinity	7	07/15/98	07/29/98	50.0	50.0	mg/L	1.0	55.8
Alkalinity	8	03/03/99	03/05/99	55.0	50.0	mg/L	4.0	55.8
Alkalinity	9	09/01/99	09/08/99	46.0	46.0	mg/L	4.0	55.8
Alkalinity	10	03/02/00	03/15/00	49.0	49.0	mg/L	4.0	55.8
Alkalinity	26	05/21/08	05/22/08	50.0	50.0	mg/L	4.0	55.8
Alkalinity	27	11/12/08	11/18/08	50.0	50.0	mg/L	4.0	55.8
Alkalinity	28	05/13/09	05/15/09	49.0	49.2	mg/L	4.0	55.8
Alkalinity	29	11/04/09	11/06/09	48.6	50.8	mg/L	4.0	55.8
Alkalinity	30	05/12/10	05/14/10	48.7	48.8	mg/L	4.0	55.8
Alkalinity	31	11/17/10	11/24/10	50.8	50.7	mg/L	5.0	55.8
Alkalinity	32	03/09/11	03/11/11	51.3	51.5	mg/L	5.0	55.8
Alkalinity	33	11/15/11	11/18/11	52.8	50.8	mg/L	2.4	55.8
Alkalinity	34	03/07/12	03/12/12	51.0	51.7	mg/L	5.0	55.8
Alkalinity	35	03/06/13	03/07/13	50.3	50.6	mg/L	5.0	55.8



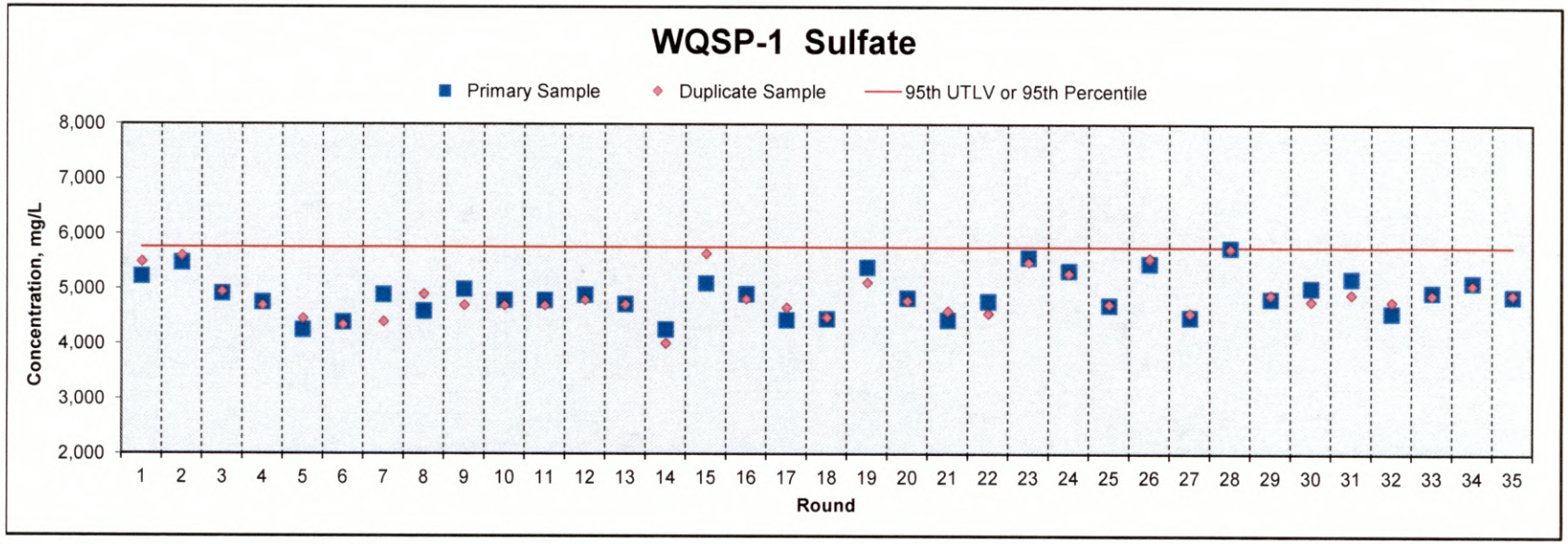
WQSP-1 Chloride

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chloride	1	08/17/95	08/23/95	34,500	35,000	mg/L	5.0	40,472
Chloride	2	04/11/96	04/22/96	33,000	33,500	mg/L	5,000.0	40,472
Chloride	3	07/25/96	08/06/96	37,200	37,000	mg/L	5.0	40,472
Chloride	4	04/24/97	05/01/97	34,200	34,200	mg/L	250.0	40,472
Chloride	5	07/24/97	08/29/97	35,700	35,500	mg/L	2,500.0	40,472
Chloride	6	03/05/98	03/19/98	37,600	34,500	mg/L	2,500.0	40,472
Chloride	7	07/15/98	07/26/98	34,000	33,000	mg/L	0.5	40,472
Chloride	8	03/03/99	03/03/99	33,000	33,000	mg/L	0.5	40,472
Chloride	9	09/01/99	09/07/99	40,000	40,000	mg/L	0.5	40,472
Chloride	10	03/02/00	03/06/00	36,000	36,000	mg/L	0.5	40,472
Chloride	26	05/21/08	06/11/08	37,000	37,800	mg/L	0.5	40,472
Chloride	27	11/12/08	11/13/08	40,500	36,000	mg/L	0.5	40,472
Chloride	28	05/13/09	05/19/09	42,000	45,000	mg/L	0.5	40,472
Chloride	29	11/04/09	11/10/09	40,000	40,300	mg/L	0.5	40,472
Chloride	30	05/12/10	05/14/10	40,400	40,800	mg/L	0.5	40,472
Chloride	31	11/17/10	12/11/10	40,000	**44,000**	mg/L	210	**40,472**
Chloride	32	03/09/11	03/18/11	**41,000**	40,000	mg/L	320	**40,472**
Chloride	33	11/15/11	11/18/11	36,000	38,000	mg/L	420	40,472
Chloride	34	03/07/12	03/12/12	37,500	37,700	mg/L	1,000	40,472
Chloride	35	03/06/13	03/07/13	36,200	39,500	mg/L	400	40,472



WQSP-1 Sulfate

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sulfate	1	08/17/95	08/29/95	5,230	5,490	mg/L	10.0	5,757
Sulfate	2	04/11/96	04/25/96	5,480	5,600	mg/L	2,500.0	5,757
Sulfate	3	07/25/96	08/21/96	4,920	4,950	mg/L	1,000.0	5,757
Sulfate	4	04/24/97	05/01/97	4,760	4,700	mg/L	10.0	5,757
Sulfate	5	07/24/97	09/03/97	4,260	4,460	mg/L	2,500.0	5,757
Sulfate	6	03/05/98	03/11/98	4,400	4,350	mg/L	1,000.0	5,757
Sulfate	7	07/15/98	07/26/98	4,900	4,400	mg/L	0.5	5,757
Sulfate	8	03/03/99	03/03/99	4,600	4,900	mg/L	0.5	5,757
Sulfate	9	09/01/99	09/07/99	5,000	4,700	mg/L	0.5	5,757
Sulfate	10	03/02/00	03/06/00	4,800	4,700	mg/L	0.5	5,757
Sulfate	26	05/21/08	06/11/08	5,470	5,560	mg/L	0.5	5,757
Sulfate	27	11/12/08	11/13/08	4,490	4,570	mg/L	0.5	5,757
Sulfate	28	05/13/09	05/14/09	5,760	5,740	mg/L	0.5	5,757
Sulfate	29	11/04/09	11/10/09	4,830	4,900	mg/L	0.5	5,757
Sulfate	30	05/12/10	05/14/10	5,030	4,780	mg/L	0.5	5,757
Sulfate	31	11/17/10	12/11/10	5,200	4,910	mg/L	14	5,757
Sulfate	32	03/09/11	03/18/11	4,570	4,770	mg/L	235	5,757
Sulfate	33	11/15/11	11/16/11	4,950	4,900	mg/L	14	5,757
Sulfate	34	03/07/12	03/12/12	5,130	5,080	mg/L	45.6	5,757
Sulfate	35	03/06/13	03/07/13	4,880	4,910	mg/L	15.1	5,757



WQSP-1

CHAIN OF CUSTODY FORMS

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130311002
Order Date: 3/11/2013

Contact Name: ANDY FREEMAN
Project Name: 1303283
Comment:

Sample #: 130311002-001 **Customer Sample #:** 1303283-001E / WQ1-C-R35

Recv'd: ☑ **Collector:** **Date Collected:** 3/6/2013
Quantity: 1 **Matrix:** Water **Date Received:** 3/8/2013 10:42:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***

Sample #: 130311002-002 **Customer Sample #:** 1303283-002E / WQ1-C-R35 DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 3/6/2013
Quantity: 1 **Matrix:** Water **Date Received:** 3/8/2013 10:42:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***

Sample #: 130311002-003 **Customer Sample #:** 1303283-005B / WQ1-C-R35-METALS BLANK PRES

Recv'd: ☑ **Collector:** **Date Collected:** 3/6/2013
Quantity: 1 **Matrix:** Water **Date Received:** 3/8/2013 10:42:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130311002
Order Date: 3/11/2013

Contact Name: ANDY FREEMAN

Project Name: 1303283

Comment:

SELENIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***

Sample #: 130311002-004 **Customer Sample #:** 1303283-006B / WQ6-C-R34-METALS BLANK UNPRES

Recv'd: ☑ **Collector:** **Date Collected:** 3/6/2013
Quantity: 1 **Matrix:** Water **Date Received:** 3/8/2013 10:42:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	3/20/2013	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	6.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP Work Order Number: 1303283

Received by/date: AT 03/07/13

Logged By: Anne Thorne 3/7/2013 9:29:00 AM Anne Thorne

Completed By: Anne Thorne 3/7/2013 Anne Thorne

Reviewed By: AT 03/07/13

Chain of Custody

1. Were seals intact?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	FedEx		

Log In

4. Coolers are present? (see 19. for cooler specific information)	Yes ☑	No ☐	NA ☐
5. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
7. Sample(s) in proper container(s)?	Yes ☑	No ☐	
8. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
9. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
10. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
11. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
12. Were any sample containers received broken?	Yes ☐	No ☑	
13. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
14. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
15. Is it clear what analyses were requested?	Yes ☑	No ☐	
16. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 5

(<2 or >12 unless noted)

Adjusted?

Checked by: AT 03/07/13

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

18. Additional remarks: 2 x 1hr Ambers arrived broken/AT 03/07/13

19. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
2	3.0	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1024

Page 1 of 1

Project Number:	Project Name:
T-409304-1	WIPP/DMP

Sampler(s): R. Jimenez, RA Spoon

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry	Analytical Laboratory / Comments
3/6/13	11:22	GW	GW-WQ1-C-R35-N1	~~5~~ 6	X					HEAL Albq., NM ~~HEAL #~~ 1303283 use for MS/MSD ** -001
"	11:39	"	-N1D	4	X					-002
"	10:56	DI	-N2	~~3~~ 4	X					Field Blanks ** -003
N/A	N/A	"	-N3	4	X					Trip Blanks, HEAL provided -00
3/6/13	11:04	GW	-N4	4		X				use for MS/MSD -001
"	11:18	"	-N4D	2		X				-002
"	10:15	"	-N5	6			X			use for MS/MSD -001
"	10:37	"	-N5D	2			X			-002
"	10:09	"	-N6	2				X		use for MS/MSD -001
"	"	"	-N6D	2				X		-002
"	09:55	"	-N7	1					X	use for MS/MSD -001
"	"	GW	-N7D	1					X	-002
"	10:47	DI	-N12	1				X		AD 3/07/13 -005 -001
"	10:48	"	-N13	1				X		-006 ~~-005~~ AL -006 03/07/13

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
Robin Hoon 3/6/13 14:30			
Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received at Laboratory: (Signature, Date/Time) 03/07/13 0929

Requested Turnaround Time: Report due 4/11/13

☒ Routine ☐ Rush _____

Sample Receipt Remarks: 3.0°

Special Instructions:
Analyze LCS in duplicate.
Use primary GW sample for MS/MSD on all parameters.
48hr. Nitrate holding

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.:
Fed Ex 8768 1881 2028
8768 1881 2039

Results To:
Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8615 FAX: 575-234-6003
EDD: gregory.jungclaus@urs.com

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater

YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)

PINK – Record Copy
SE – Sediment
SO – Soil

SW – Surface Water
VG – Vegetation

** – 1 VOA broke RA 3/6/13 for each parameter

Form CofC/RFA, Rev. 0 – NICHOLS PRINTING, INC.

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APPENDIX 4

WELL WQSP-2

ANALYTICAL RESULTS

WQSP-2

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-2, Culebra, Round 35

DMW Characteristics

WQSP-2 is located 1,646 feet FSL and 142 feet FWL in sec. 16, T.22 S, R.31 E in Eddy County, New Mexico. This location is approximately 1-mile north from the center of the WIPP Site and upgradient of the shaft area. The ground elevation at WQSP-2 is 3460.85 feet above mean sea level (ft_{amsl}) and the top of casing (TOC) elevation is 3463.87 ft_{amsl}[1]. This DMW well, drilled for surveillance monitoring of groundwater quality and water level elevation monitoring between September 6 and 10, 1994, is located in the Culebra Member of the Rustler Formation. The total depth of WQSP-2 is 846 feet below ground surface (ft_{bgs}). The well is cased with a fiberglass casing (5 inch od, 0.28 inch wall thickness) to 811 ft_{bgs} and screened with slotted fiberglass (0.020 inch) from 811 to 836 ft_{bgs}. A 10-foot blank casing is located below the screened interval from 836 to 834 ft_{bgs} and acts as a sediment sump to prevent clogging of the lower screen slots. The actual interval of the Culebra at WQSP-2 is 810 to 834 ft_{bgs} based on interpretation of the core logs[2].

According to the well construction and pre-pumping static water level (swl) measured in feet from below the TOC (ft_{btoc}), the sampling team used the following formula to calculate well bore volume (wbv).

$$wbv,\ gallons = [C \times ((\pi \times D^2/4) \times L)]$$

where:
C = conversion factor for pounds water/gallon (US liquid) to pounds of water/ft^3
D = inside diameter of fiberglass casing, ft
L = depth of water in column, ft
$Factor = [C \times (\pi \times D^2/4)]$

given:
total depth of well, ft_{btoc} = [*installation depth,* ft_{bgs} + (*top of casing,* ft_{amsl} - *ground surface elevation,* ft_{amsl})]
depth of water in column, ft (L) = (total depth of well, ft_{btoc} *– swl,* ft_{btoc}*)*

More specifically, the wbv for WQSP-2 is calculated as follows:

wbv, gallons = (*Factor* x L) = (0.804 x L)

Prior to beginning the pumping process for Round 35, the static water level was 401.75 ft_{btoc}. One wbv for WQSP-2 was determined to be 359.6 gallons.

Field Sampling System

A dedicated sampling-system was installed in WQSP-2 on September 27, 1999. The system consists of a Grundfos 3-hp submersible pump (model 10S30-34) retrofitted with Kynar seals and a 3-phase, 230 volt (ac), 5-hp submersible motor. Prior to Round 20 sampling (2005), the pump/motor assembly was lowered an additional 21 feet from its original installation depth (803 ft_{bgs}), placing the pump intake near the center of the well screen (approximately 824 ft_{bgs}). A separate sampling line was installed just above the pump discharge and a bubbler system installed 5 feet above the top of the pump that previously enabled formation pressure monitoring in the well bore column during sampling. The bubbler system was eliminated in the recent PMR and formation pressures are no longer monitored during the pumping event.

---

[1] Elevations (Ground and TOC) obtained from December 13, 2006 survey.
[2] DOE/WIPP 95-2154, *Basic Data Report for WQSP 1* and Culebra Mid-Depths – Revision 2 (R. Salness).

Round 35 pumping of WQSP-2 began on 3/18/2013 at 09:05 and ended on 3/19/2013 at 11:20. The well was purged for 26.3 hours with an average flow rate of 0.38 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 592 gallons.

Measurement of Field Parameters and Well Stability Criteria

Field measurements were obtained using an in-line, multi-probe flow cell sampling system (Geotech Environmental Equipment, Inc.) with a capacity of 40 mL. Groundwater measurements were obtained directly from the sample stream that passes through this system at 5-minute intervals for specific conductance (SC), temperature and pH. Specific gravity (SG) was determined using classical hydrometer techniques. The flow cell was purged for at least 15 minutes prior to beginning sequential measurements.

Flow cell exchange rates were calculated periodically to verify measurements were obtained on fresh-flowing groundwater and not from stagnant groundwater in the well column. Exchange rates (cell volumes per minute) were determined by measuring the volume of groundwater (mL) passed through the sampling system during a one-minute interval and dividing that value by the volume of the cell (40 mL).

Stability of the DMW, as defined in the PMR, states that each well will be purged no more than three wbv, or until field parameters stabilize, whichever occurs first. Parameters are stable when individual values for all parameters were within 5% for three consecutive measurements. At that point, purged water from the DMW is considered representative of the undisturbed groundwater found in the formation and DMP sampling for hazardous constituents is allowed.

Detection Monitoring Program Sampling

Samples for DMP hazardous constituents were collected on 3/19/2013 after approximately 527 gallons of groundwater (≈ 1.5 wbv) had been purged from WQSP-2 and field measurements indicated that the well was stable. Removal of the in-line flow cell occured prior to DMP sampling and a clean, dedicated filter holder assembly was installed at the end of the dedicated sample line. Samples (filtered or unfiltered) were collected using techniques described in the DMP and placed under Chain of Custody. Samples for hazardous constituent analysis were shipped via FedEx to Hall Environmental Analysis Laboratory, Inc., in Albuquerque, NM. Samples for radionuclide analysis were collected and hand-delivered to the URS-PS WIPP Laboratory located at Carlsbad Environmental Monitoring Research Center in Carlsbad, NM. A retain sample, preserved with nitric acid (to pH < 2), was collected and placed under Chain of Custody in the event that additional metals or radionuclide analyses were required. The final sample checklist summarized the samples collected, laboratory destination, preservatives used, sample quantities, container type, sampling times, and sample team members. This checklist and other records related to the integrity of the DMP sampling event are located in the DMW data package.

Results and Discussion

Table 1 provides the pumping characteristics and field parameter results for WQSP-2. The pumping speed was identical and groundwater flow rates similar to those observed in previous rounds. Approximately 430 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 10.75 cell volumes per minute; thus, approximately 54.0 volumes of groundwater (2,150 mL) passed through the in-line flow cell between measurements. Table 1 provides the initial and final measurements obtained on each field-indicating parameter. Field parameters were consistently less than 5% over the last 3 measurements within 15 minutes (for SC, pH and temperature) and approximately 1 hour (for SG) after measurements began on day 1. The sampling team continued to obtain readings for an additional 45 minutes to ensure that the purged groundwater's chemistry was stable.

Based on day-results observed for day 1, the sample team concluded that WQSP-2 was stable. Sampling for DMP hazardous and radiological constituents was conducted on day 2.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-2 DMW, Round 35[a,b,c].

Item	Day 1		Day 2		Day 3	
Date	3/18/2013		3/19/2013		NR	
Pump Speed, Hz	41.0		41.0		NR	
Average Flow Rate, gpm	0.38		0.38		NR	
Rate of Exchange, no. cell	10.8		NR		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	83,900	84,300	NR	NR	NR	NR
Temperature, °C	21.5	21.6	NR	NR	NR	NR
pH, SU	7.43	7.16	NR	NR	NR	NR
Specific Gravity	1.042	1.046	NR	NR	NR	NR
Time to Parameter Stability, hr:min	1:00		NR		NR	

[a]Data represent the first and last measurement taken within each respective day.
[b]DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c]NR = no measurement taken; not required.

From a historical perspective, indicating parameters currently measured in Round 35 were compared to the average results from the previous 34 rounds (Table 2). Note the current value for SG (1.046) and temperature (21.6°C) were similar to the average results from the previous 34 samplings (1.047 and 21.4°C, respectively). The pH (7.16 S.U.) was lower when compared to the previous rounds (7.25 S.U.) The SC result for Round 35 was higher than the average observed during the previous 34 rounds (84,300 µmhos/cm vs. 79,725 µmhos/cm) and was greater than the historical upper limit for WQSP-2. All other indicating field parameters (temperature, pH and SG) were within the normal limits observed for WQSP-2 over the past 16.5 years.

Table 2. Comparison of Round 35 DMW Measurements to Historical Results from Rounds (1-34) for WQSP-2.

Field-analyzed Parameter	Historical Data (Rounds 1 – 34)[a,b]			Measurement Results, Round 35[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	79,725	75,739	83,711	84,300
Temperature, °C	21.4	20.3	22.5	21.6
pH, S.U.	7.25	6.89	7.61	7.16
Specific Gravity	1.047	0.995	1.099	1.046

[a] Historical data obtained from serial samples collected on day 3 for each round.
[b] Historical limits calculated from the mean ($\bar{x}$) ± 5 percent.
[c] Current data represent the final measurement taken when well stability confirmed by sampling team.

Abbreviations, Acronyms and Units

ac	alternating current
ft_{amsl}	feet above mean sea level
ft_{bgs}	feet below ground surface
ft_{btoc}	feet below top of casing
DMP	Detection Monitoring Program
DMW	detection monitoring well
FEL	from east line
FNL	from north line
FSL	from south line
FWL	from west line
gpm	gallons per minute
hp	horsepower
od	outside diameter
NNW	north-northwest
PMR	Permit Modification Request
swl	static water level
URS-PS	URS-Professional Solutions
wbv	well bore volume
WIPP	Waste Isolation Pilot Plant
WQSP	Water Quality Sampling Program, well ID

WQSP-2

LABORATORY DATA AND QA/QC SUMMARY REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

May 23, 2013

Greg Jungclaus
WIPP
P.O. Box 2078
Carlsbad, NM 88221-2078
TEL: (575) 234-8615
FAX

RE: WIPP DMP

OrderNo.: 1303753

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 3/20/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1303753**

23-May-13

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1303753-001	WQ2-C-R35		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-001	WQ2-C-R35		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-001	WQ2-C-R35		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-001	WQ2-C-R35		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-001	WQ2-C-R35		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-001	WQ2-C-R35		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-002	WQ2-C-R35-Duplicate		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-002	WQ2-C-R35-Duplicate		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-002	WQ2-C-R35-Duplicate		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-002	WQ2-C-R35-Duplicate		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-002	WQ2-C-R35-Duplicate		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-002	WQ2-C-R35-Duplicate		3/19/2013 8:27:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-003	WQ2-C-R35-Field Blank		3/19/2013 9:47:00 AM	3/20/2013 9:15:00 AM	Aqueous
1303753-004	WQ2-C-R35-Trip Blank			3/20/2013 9:15:00 AM	Trip Blank

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1303753**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1303753-001A	WQ2-C-R35	3/19/2013 8:27:00 AM	Aqueous	EPA Method: 8260B			3/20/2013 5:30:45 PM
1303753-001B				SM 5310B: TOC			3/25/2013 2:16:32 PM
1303753-001C				EPA Method 8270C: Semivolatiles		3/21/2013 4:44:22 AM	3/21/2013 2:37:36 PM
1303753-001D				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 2:19:34 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:28:25 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:37:07 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 2:02:58 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 3:03:56 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 3:08:32 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 1:54:04 PM
				EPA Method 7470: Mercury		3/25/2013 9:15:35 AM	3/25/2013 2:56:06 PM
				EPA Method 7470: Mercury		3/25/2013 9:15:35 AM	3/25/2013 3:23:44 PM
1303753-001F				EPA Method 300.0: Anions			3/20/2013 6:38:15 PM
				EPA Method 300.0: Anions			3/20/2013 7:15:30 PM
				EPA Method 300.0: Anions			3/20/2013 7:27:55 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:20:44 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:22:56 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:00:20 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:07:37 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:04:52 PM
				SM 2540 C: Total Dissolved Solids		3/22/2013 6:53:40 PM	3/25/2013 5:45:00 AM
				SM 2540D: TSS		3/26/2013 6:57:51 AM	3/26/2013 8:56:00 AM
				SM2320B: Alkalinity			3/20/2013 1:46:37 PM

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1303753**
07-Aug-13

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1303753-001F	WQ2-C-R35	3/19/2013 8:27:00 AM	Aqueous	SM2510B: Specific Conductance			3/20/2013 1:46:37 PM
				SM2510B: Specific Conductance			3/20/2013 2:49:04 PM
				SM4500-H+B: pH			3/20/2013 1:46:37 PM
				Specific Gravity			3/27/2013 4:00:00 PM
				EPA Method: 8260B			3/20/2013 5:58:33 PM
1303753-002A	WQ2-C-R35-Duplicate			SM 5310B: TOC			3/25/2013 1:25:24 PM
1303753-002B				EPA Method 8270C: Semivolatiles		3/21/2013 4:44:22 AM	3/21/2013 4:12:28 PM
1303753-002C				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 3:14:11 PM
1303753-002D				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 3:17:12 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/29/2013 3:11:19 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:56:55 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 2:22:18 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 2:25:14 PM
				EPA 6010B: Total Recoverable Metals		3/21/2013 4:24:15 AM	3/25/2013 12:53:56 PM
				EPA Method 7470: Mercury		3/25/2013 9:15:35 AM	3/25/2013 3:01:38 PM
				EPA Method 300.0: Anions			3/20/2013 7:40:20 PM
1303753-002F				EPA Method 300.0: Anions			3/20/2013 7:52:45 PM
				EPA Method 300.0: Anions			3/20/2013 8:05:10 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:24:40 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:21:54 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:27:24 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:18:56 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:25:07 PM

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1303753**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1303753-002F	WQ2-C-R35-Duplicate	3/19/2013 8:27:00 AM	Aqueous	SM 2540 C: Total Dissolved Solids		3/22/2013 6:53:40 PM	3/25/2013 5:45:00 AM
				SM 2540D: TSS		3/26/2013 6:57:51 AM	3/26/2013 8:56:00 AM
				SM2320B: Alkalinity			3/20/2013 1:58:42 PM
				SM2510B: Specific Conductance			3/20/2013 1:58:42 PM
				SM2510B: Specific Conductance			3/20/2013 2:59:18 PM
				SM4500-H+B: pH			3/20/2013 1:58:42 PM
				Specific Gravity			3/27/2013 4:00:00 PM
1303753-003A	WQ2-C-R35-Field Blank	3/19/2013 9:47:00 AM		EPA Method: 8260B			3/20/2013 6:26:26 PM
1303753-004A	WQ2-C-R35-Trip Blank		Trip Blank	EPA Method: 8260B			3/20/2013 6:54:26 PM

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Case Narrative

WO#: **1303753**
Date: **5/23/2013**

CLIENT: WIPP
Project: WIPP DMP

All analytes reported are associated with passing CCVs.

METHOD: 8260B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 5030
Analysis: 8260B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: Isobutyl alcohol has eleveated %recoveries in the MS/MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 8270C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3510
Analysis: 8270C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.

5. Spikes: Pentachlorophenol recovery was low in the MS/MSD. 2,4-Dinitrophenol and pentachlorophenol had elevated RPD's in the MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 6010B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3005
Analysis: 6010B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Duplicates: All acceptance criteria were met.
5. Spikes: Nickel recovery was slightly low in the MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 7470
Analysis: 7470

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

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Case Narrative

WO#: **1303753**
Date: **5/23/2013**

CLIENT: WIPP
Project: WIPP DMP

METHOD: 300.0

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 300.0

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Spikes: All acceptance criteria were met.
5. Samples: All acceptance criteria were met.

METHOD: SM5310C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM5310C
Analysis: SM5310C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 120.1

HOLDING TIMES: All holding times for Preparation and Analysis were met.

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Case Narrative

WO#: **1303753**
Date: **5/23/2013**

CLIENT: WIPP
Project: WIPP DMP

METHOD: Preparations: none
Analysis: 120.1
PREPARATION: none

ANALYSIS:
1. Samples: All acceptance criteria were met.
2. Duplicates: All acceptance criteria were met.

METHOD: SM 2320B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM 2320B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540C
Analysis: SM2540C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.

4. Samples: All acceptance criteria were met.

METHOD: SM2540D
HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540D
Analysis: SM2540D

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: RPD was elevated. All other acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM4500H+ B

HOLDING TIMES: The most recent method lists the pH holding time as 15 minutes. All samples will be flagged with an "H".

METHOD: Preparations: none
Analysis: SM4500H+ B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM2710F

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM2710F

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Website: www.hallenvironmental.com

Case Narrative

WO#: **1303753**
Date: **5/23/2013**

CLIENT: WIPP
Project: WIPP DMP

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM4500 NorgC

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM4500 NorgC
Analysis: SM4500 NorgC

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-001
Client Sample ID: WQ2-C-R35
Collection Date: 3/19/2013 8:27:00 AM
Matrix: AQUEOUS
Received Date: 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	36100	132	1000		mg/L	2000	3/20/2013 7:27:55 PM	R9313
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	3/20/2013 6:38:15 PM	R9313
Sulfate	5500	46.7	100		mg/L	200	3/20/2013 7:15:30 PM	R9313
EPA METHOD 7470: MERCURY							Analyst: **TMG**	
Mercury	ND	0.000443	0.00100		mg/L	5	3/25/2013 3:23:44 PM	6636
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1400	5.58	100		mg/L	100	5/6/2013 3:20:44 PM	R10423
Magnesium	1020	0.829	100		mg/L	100	5/6/2013 3:20:44 PM	R10423
Potassium	463	4.97	100		mg/L	100	5/6/2013 3:20:44 PM	R10423
Sodium	20400	40.2	500		mg/L	500	5/6/2013 3:22:56 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0207	0.00250	0.100	J	mg/L	5	3/25/2013 12:37:07 PM	6593
Beryllium	ND	0.00250	0.0150		mg/L	5	3/25/2013 12:37:07 PM	6593
Cadmium	ND	0.00400	0.0100		mg/L	5	3/25/2013 12:37:07 PM	6593
Calcium	1380	0.455	50.0		mg/L	50	3/25/2013 2:02:58 PM	6593
Chromium	ND	0.00750	0.0300		mg/L	5	3/25/2013 12:37:07 PM	6593
Iron	ND	0.0515	0.250		mg/L	5	3/25/2013 12:37:07 PM	6593
Lead	ND	0.0170	0.0250		mg/L	5	3/25/2013 12:37:07 PM	6593
Magnesium	958	0.475	50.0		mg/L	50	3/29/2013 3:03:56 PM	6593
Nickel	ND	0.00700	0.0500		mg/L	5	3/25/2013 12:37:07 PM	6593
Potassium	427	10.9	50.0		mg/L	50	3/29/2013 3:03:56 PM	6593
Silver	ND	0.00550	0.0250		mg/L	5	3/25/2013 12:37:07 PM	6593
Sodium	19100	255	500		mg/L	500	3/29/2013 3:08:32 PM	6593
Vanadium	0.0202	0.0175	0.250	J	mg/L	5	3/25/2013 12:37:07 PM	6593
PA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
Hexachloroethane	ND	2.91	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
2-Methylphenol	ND	2.71	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
Nitrobenzene	ND	2.91	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
Pentachlorophenol	ND	1.44	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
Pyridine	ND	3.53	5.00		µg/L	1	3/21/2013 2:37:36 PM	6594
Surr: 2,4,6-Tribromophenol	80.2	0	42.9-124		%REC	1	3/21/2013 2:37:36 PM	6594
Surr: 2-Fluorobiphenyl	84.0	0	40-108		%REC	1	3/21/2013 2:37:36 PM	6594

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-001
Matrix: AQUEOUS
Client Sample ID: WQ2-C-R35
Collection Date: 3/19/2013 8:27:00 AM
Received Date: 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	71.0	0	23.6-94.8		%REC	1	3/21/2013 2:37:36 PM	6594
Surr: 4-Terphenyl-d14	85.2	0	41.9-103		%REC	1	3/21/2013 2:37:36 PM	6594
Surr: Nitrobenzene-d5	93.7	0	42.6-114		%REC	1	3/21/2013 2:37:36 PM	6594
Surr: Phenol-d5	58.2	0	20.3-74.7		%REC	1	3/21/2013 2:37:36 PM	6594
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Benzene	ND	0.517	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Toluene	ND	0.441	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
2-Butanone	ND	1.00	5.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Chloroform	ND	0.469	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/20/2013 5:30:45 PM	R9293
Surr: 1,2-Dichloroethane-d4	91.8	0	70-130		%REC	1	3/20/2013 5:30:45 PM	R9293
Surr: 4-Bromofluorobenzene	102	0	69.5-130		%REC	1	3/20/2013 5:30:45 PM	R9293
Surr: Dibromofluoromethane	95.1	0	70-130		%REC	1	3/20/2013 5:30:45 PM	R9293
Surr: Toluene-d8	93.9	0	70-130		%REC	1	3/20/2013 5:30:45 PM	R9293
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.278	0.227	1.00	J	mg/L	1	3/25/2013 2:16:32 PM	R9404
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	63000	503	1000	*	mg/L	1	3/25/2013 5:45:00 AM	6625
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	116000	0.500	0.500		µmhos/c	50	3/20/2013 2:49:04 PM	R9316
SM4500-H+B: PH							Analyst: **JML**	
pH	7.18	0.100	1.68	H	pH units	1	3/20/2013 1:46:37 PM	R9316

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-001
Matrix: AQUEOUS
Client Sample ID: WQ2-C-R35
Collection Date: 3/19/2013 8:27:00 AM
Received Date: 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	47.2	5.00	20.0		mg/L CaC	1	3/20/2013 1:46:37 PM	R9316
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	3/20/2013 1:46:37 PM	R9316
Total Alkalinity (as CaCO3)	47.2	5.00	20.0		mg/L CaC	1	3/20/2013 1:46:37 PM	R9316
SPECIFIC GRAVITY							Analyst: **IDC**	
Specific Gravity	1.044	0	0			1	3/27/2013 4:00:00 PM	R9480
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	35.0	1.53	4.00		mg/L	1	3/26/2013 8:56:00 AM	6654

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-002 **Matrix:** AQUEOUS

Client Sample ID: WQ2-C-R35-Duplicate
Collection Date: 3/19/2013 8:27:00 AM
Received Date: 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	32100	132	1000		mg/L	2000	3/20/2013 8:05:10 PM	R9313
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	3/20/2013 7:40:20 PM	R9313
Sulfate	5190	46.7	100		mg/L	200	3/20/2013 7:52:45 PM	R9313
EPA METHOD 7470: MERCURY							Analyst: **TMG**	
Mercury	ND	0.0000886	0.000200		mg/L	1	3/25/2013 3:01:38 PM	6636
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1450	5.58	100		mg/L	100	5/6/2013 3:25:07 PM	R10423
Magnesium	1060	0.829	100		mg/L	100	5/6/2013 3:25:07 PM	R10423
Potassium	485	4.97	100		mg/L	100	5/6/2013 3:25:07 PM	R10423
Sodium	20100	40.2	500		mg/L	500	5/6/2013 3:27:24 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0274	0.00250	0.100	J	mg/L	5	3/25/2013 12:56:55 PM	6593
Beryllium	0.00595	0.00250	0.0150	J	mg/L	5	3/25/2013 12:56:55 PM	6593
Cadmium	ND	0.00400	0.0100		mg/L	5	3/25/2013 12:56:55 PM	6593
Calcium	1530	0.455	50.0		mg/L	50	3/25/2013 2:22:18 PM	6593
Chromium	ND	0.00750	0.0300		mg/L	5	3/25/2013 12:56:55 PM	6593
Iron	ND	0.0515	0.250		mg/L	5	3/29/2013 3:11:19 PM	6593
Lead	ND	0.0170	0.0250		mg/L	5	3/25/2013 12:56:55 PM	6593
Magnesium	1010	0.475	50.0		mg/L	50	3/29/2013 3:14:11 PM	6593
Nickel	ND	0.00700	0.0500		mg/L	5	3/25/2013 12:56:55 PM	6593
Potassium	461	1.09	5.00		mg/L	5	3/29/2013 3:11:19 PM	6593
Silver	ND	0.00550	0.0250		mg/L	5	3/25/2013 12:56:55 PM	6593
Sodium	20400	255	500		mg/L	500	3/29/2013 3:17:12 PM	6593
Vanadium	0.0308	0.0175	0.250	J	mg/L	5	3/25/2013 12:56:55 PM	6593
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
Hexachloroethane	ND	2.91	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
2-Methylphenol	ND	2.71	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
Nitrobenzene	ND	2.91	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
Pentachlorophenol	ND	1.44	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
Pyridine	ND	3.53	5.00		µg/L	1	3/21/2013 4:12:28 PM	6594
Surr: 2,4,6-Tribromophenol	73.4	0	42.9-124		%REC	1	3/21/2013 4:12:28 PM	6594
Surr: 2-Fluorobiphenyl	73.1	0	40-108		%REC	1	3/21/2013 4:12:28 PM	6594

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-002
Matrix: AQUEOUS
Client Sample ID: WQ2-C-R35-Duplicate
Collection Date: 3/19/2013 8:27:00 AM
Received Date: 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	67.2	0	23.6-94.8		%REC	1	3/21/2013 4:12:28 PM	6594
Surr: 4-Terphenyl-d14	88.2	0	41.9-103		%REC	1	3/21/2013 4:12:28 PM	6594
Surr: Nitrobenzene-d5	88.4	0	42.6-114		%REC	1	3/21/2013 4:12:28 PM	6594
Surr: Phenol-d5	55.8	0	20.3-74.7		%REC	1	3/21/2013 4:12:28 PM	6594
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Benzene	ND	0.517	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Toluene	ND	0.441	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
2-Butanone	ND	1.00	5.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Chloroform	ND	0.469	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/20/2013 5:58:33 PM	R9293
Surr: 1,2-Dichloroethane-d4	91.8	0	70-130		%REC	1	3/20/2013 5:58:33 PM	R9293
Surr: 4-Bromofluorobenzene	103	0	69.5-130		%REC	1	3/20/2013 5:58:33 PM	R9293
Surr: Dibromofluoromethane	94.1	0	70-130		%REC	1	3/20/2013 5:58:33 PM	R9293
Surr: Toluene-d8	96.6	0	70-130		%REC	1	3/20/2013 5:58:33 PM	R9293
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.288	0.227	1.00	J	mg/L	1	3/25/2013 1:25:24 PM	R9404
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	63000	503	1000	*	mg/L	1	3/25/2013 5:45:00 AM	6625
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	119000	0.500	0.500		µmhos/c	50	3/20/2013 2:59:18 PM	R9316
SM4500-H+B: PH							Analyst: **JML**	
pH	7.20	0.100	1.68	H	pH units	1	3/20/2013 1:58:42 PM	R9316

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-002

Client Sample ID: WQ2-C-R35-Duplicate
Collection Date: 3/19/2013 8:27:00 AM
Matrix: AQUEOUS **Received Date:** 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	47.6	5.00	20.0		mg/L CaC	1	3/20/2013 1:58:42 PM	R9316
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	3/20/2013 1:58:42 PM	R9316
Total Alkalinity (as CaCO3)	47.6	5.00	20.0		mg/L CaC	1	3/20/2013 1:58:42 PM	R9316
SPECIFIC GRAVITY							Analyst: **IDC**	
Specific Gravity	1.041	0	0			1	3/27/2013 4:00:00 PM	R9480
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	34.0	1.53	4.00		mg/L	1	3/26/2013 8:56:00 AM	6654

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-003
Matrix: AQUEOUS
Client Sample ID: WQ2-C-R35-Field Blank
Collection Date: 3/19/2013 9:47:00 AM
Received Date: 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Benzene	ND	0.517	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Toluene	ND	0.441	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
2-Butanone	10.9	1.00	5.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Chloroform	ND	0.469	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/20/2013 6:26:26 PM	R9293
Surr: 1,2-Dichloroethane-d4	91.6	0	70-130		%REC	1	3/20/2013 6:26:26 PM	R9293
Surr: 4-Bromofluorobenzene	96.0	0	69.5-130		%REC	1	3/20/2013 6:26:26 PM	R9293
Surr: Dibromofluoromethane	94.8	0	70-130		%REC	1	3/20/2013 6:26:26 PM	R9293
Surr: Toluene-d8	95.1	0	70-130		%REC	1	3/20/2013 6:26:26 PM	R9293

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1303753-004

Client Sample ID: WQ2-C-R35-Trip Blank
Collection Date:
Matrix: TRIP BLANK **Received Date:** 3/20/2013 9:15:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Benzene	ND	0.517	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Toluene	ND	0.441	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
2-Butanone	ND	1.00	5.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Chlorobenzene	ND	0.486	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Chloroform	ND	0.469	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
1,1-Dichloroethane	ND	0.486	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Methylene Chloride	ND	0.423	3.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Vinyl chloride	ND	0.333	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Xylenes, Total	ND	1.44	1.00		µg/L	1	3/20/2013 6:54:26 PM	R9293
Surr: 1,2-Dichloroethane-d4	83.7	0	70-130		%REC	1	3/20/2013 6:54:26 PM	R9293
Surr: 4-Bromofluorobenzene	103	0	69.5-130		%REC	1	3/20/2013 6:54:26 PM	R9293
Surr: Dibromofluoromethane	90.5	0	70-130		%REC	1	3/20/2013 6:54:26 PM	R9293
Surr: Toluene-d8	93.2	0	70-130		%REC	1	3/20/2013 6:54:26 PM	R9293

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	WQ2-C-R35 1303753-01		WQ2-C-R35 duplicate 1303753-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	20000	869.94	20000	869.94							
Potassium	460	11.76	480	12.28							
Calcium	1400	69.86	1500	74.85							
Magnesium	1000	82.30	1100	90.53							
Total Cations		1033.87		1047.60							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	5500	114.51	5190	108.06							
Chloride	36100	1018.34	32100	905.50							
Bicarbonate (CaCO3)	47	0.94	47.6	0.95							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		1133.79		1014.51							
Elect. Cond. (µMhos/cm)	116000		119000								
CATION/ANION RATIO		0.91		1.03							
% Difference		5		2							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	63000		63000								
TDS (calculated)	64488		60399								
Ratio meas TDS:calc TDS		1.0		1.0							
Ratio Meas. TDS:EC		0.54		0.53							
Ratio Calc. TDS:EC		0.56		0.51							
Ratio of anion sum:EC		1.0		0.9							
Ratio of cation sum:EC		0.9		0.9							

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC -- 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.

Ratio of cation sum:EC -- 0.9-1.1

CASE NARRATIVE April 23, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1303753
Anatek Batch: 130322016

Project Summary: Two (2) water samples were received on 3/22/2013 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 1.0C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1303753-001E / WQ2-C-R35	130322016-001	EPA 6020A
1303753-002E / WQ2-C-R35 DUPLICATE	130322016-002	EPA 6020A

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	Y	NA
Internal Standard Responses Valid?	Y	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. **Holding Time Requirements**

   No problems encountered.

2. **GC/MS Tune Requirements**

   No problems encountered.

3. **Calibration Requirements**

   No problems encountered.

4. **Surrogate Recovery Requirements**

   No problems encountered.

5. **QC Sample (LCS/MS/MSD) Recovery Requirements**

   No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

Samples -001 and -002 required dilution due to matrix.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Collette

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130322016
Project Name: 1303753

Analytical Results Report

Sample Number 130322016-001 **Sampling Date** 3/19/2013 **Date/Time Received** 3/22/2013 12:14 PM
Client Sample ID 1303753-001E / WQ2-C-R35 **Sampling Time** 8:27 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	
Arsenic	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	
Selenium	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	
Thallium	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	

Sample Number 130322016-002 **Sampling Date** 3/19/2013 **Date/Time Received** 3/22/2013 12:14 PM
Client Sample ID 1303753-002E / WQ2-C-R35 DUPLICATE **Sampling Time** 8:27 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	
Arsenic	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	
Selenium	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	
Thallium	ND	mg/L	0.02	4/12/2013	ETL	EPA 200.8	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130322016
Project Name: 1303753

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0461	mg/L	0.05	92.2	85-115	4/10/2013	4/12/2013
Selenium	0.0480	mg/L	0.05	96.0	85-115	4/10/2013	4/12/2013
Arsenic	0.0482	mg/L	0.05	96.4	85-115	4/10/2013	4/12/2013
Antimony	0.0485	mg/L	0.05	97.0	85-115	4/10/2013	4/12/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0465	mg/L	0.05	93.0	0.9	0-20	4/10/2013	4/12/2013
Selenium	0.0485	mg/L	0.05	97.0	1.0	0-20	4/10/2013	4/12/2013
Arsenic	0.0482	mg/L	0.05	96.4	0.0	0-20	4/10/2013	4/12/2013
Antimony	0.0462	mg/L	0.05	92.4	4.9	0-20	4/10/2013	4/12/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130322016-001	Thallium	ND	0.426	mg/L	0.5	85.2	70-130	4/10/2013	4/12/2013
130322016-001	Selenium	ND	0.486	mg/L	0.5	97.2	70-130	4/10/2013	4/12/2013
130322016-001	Arsenic	ND	0.502	mg/L	0.5	100.4	70-130	4/10/2013	4/12/2013
130322016-001	Antimony	ND	0.517	mg/L	0.5	103.4	70-130	4/10/2013	4/12/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.433	mg/L	0.5	86.6	1.6	0-20	4/10/2013	4/12/2013
Selenium	0.485	mg/L	0.5	97.0	0.2	0-20	4/10/2013	4/12/2013
Arsenic	0.504	mg/L	0.5	100.8	0.4	0-20	4/10/2013	4/12/2013
Antimony	0.499	mg/L	0.5	99.8	3.5	0-20	4/10/2013	4/12/2013

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130322016
Project Name: 1303753

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	4/10/2013	4/12/2013
Arsenic	ND	mg/L	0.001	4/10/2013	4/12/2013
Selenium	ND	mg/L	0.001	4/10/2013	4/12/2013
Thallium	ND	mg/L	0.001	4/10/2013	4/12/2013

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

QC SUMMARY REPORT

WO#: **1303753**

Hall Environmental Analysis Laboratory, Inc.

05-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID **MB-6625**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **6625**	RunNo: **9388**
Prep Date: **3/22/2013**	Analysis Date: **3/25/2013**	SeqNo: **268015** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	19.0	20.0								J

Sample ID **LCS-6625**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **6625**	RunNo: **9388**
Prep Date: **3/22/2013**	Analysis Date: **3/25/2013**	SeqNo: **268016** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	20.0	1000	19.00	101	80	120			

Sample ID **1303753-001FMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ2-C-R35**	Batch ID: **6625**	RunNo: **9388**
Prep Date: **3/22/2013**	Analysis Date: **3/25/2013**	SeqNo: **268019** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	113000	1000	50000	63050	99.3	80	120			

Sample ID **1303753-001FMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ2-C-R35**	Batch ID: **6625**	RunNo: **9388**
Prep Date: **3/22/2013**	Analysis Date: **3/25/2013**	SeqNo: **268020** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	115000	1000	50000	63050	105	80	120	2.32	5	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265575** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265576** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.63	0.500	5.000	0	92.6	90	110			
Nitrogen, Nitrate (As N)	2.43	0.100	2.500	0	97.0	90	110			
Sulfate	9.40	0.500	10.00	0	94.0	90	110			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS02**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265577** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.63	0.500	5.000	0	92.6	90	110	0.0583	20	
Nitrogen, Nitrate (As N)	2.43	0.100	2.500	0	97.1	90	110	0.0783	20	
Sulfate	9.37	0.500	10.00	0	93.7	90	110	0.250	20	

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265586** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265598** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1303753**

Hall Environmental Analysis Laboratory, Inc.

05-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID **1303753-001FMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ2-C-R35**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265600** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	121	5.00	125.0	0	96.8	90.4	113			

Sample ID **1303753-001FMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ2-C-R35**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265601** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	123	5.00	125.0	0	98.0	90.4	113	1.25	20	

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9313**	RunNo: **9313**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265608** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **5ml-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265426** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	ND	5.00								
Benzene	ND	1.00								
Toluene	ND	1.00								
1,2-Dichloroethane (EDC)	ND	1.00								
2-Butanone	ND	5.00								
Carbon Tetrachloride	ND	1.00								
Chlorobenzene	ND	1.00								
Chloroform	ND	1.00								
cis-1,2-DCE	ND	1.00								
1,1-Dichloroethane	ND	1.00								
1,1-Dichloroethene	ND	1.00								
Methylene Chloride	ND	3.00								
1,1,2,2-Tetrachloroethane	ND	1.00								
Tetrachloroethene (PCE)	ND	1.00								
trans-1,2-DCE	ND	1.00								
1,1,1-Trichloroethane	ND	1.00								
1,1,2-Trichloroethane	ND	1.00								
Trichloroethene (TCE)	ND	1.00								
Trichlorofluoromethane	ND	1.00								
Vinyl chloride	ND	1.00								
Xylenes, Total	ND	1.00								
Surr: 1,2-Dichloroethane-d4	8.60		10.00		86.0	70	130			
Surr: 4-Bromofluorobenzene	10.3		10.00		103	69.5	130			
Surr: Dibromofluoromethane	9.45		10.00		94.5	70	130			
Surr: Toluene-d8	9.68		10.00		96.8	70	130			

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265427** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	45.6	5.00	60.00	0	76.0	60	140			
Benzene	21.5	1.00	20.00	0	108	70	130			
Toluene	19.9	1.00	20.00	0	99.3	80	120			
1,2-Dichloroethane (EDC)	20.2	1.00	20.00	0	101	70	130			
2-Butanone	37.3	5.00	40.00	0	93.2	60	140			
Carbon Tetrachloride	21.3	1.00	20.00	0	106	70	130			
Chlorobenzene	19.6	1.00	20.00	0	98.1	70	130			
Chloroform	22.6	1.00	20.00	0	113	80	120			
cis-1,2-DCE	20.7	1.00	20.00	0	103	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265427** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	19.0	1.00	20.00	0	95.0	70	130			
1,1-Dichloroethene	21.3	1.00	20.00	0	107	80	120			
Methylene Chloride	20.2	3.00	20.00	0	101	70	130			
1,1,2,2-Tetrachloroethane	19.5	1.00	20.00	0	97.3	70	130			
Tetrachloroethene (PCE)	20.8	1.00	20.00	0	104	70	130			
trans-1,2-DCE	21.0	1.00	20.00	0	105	70	130			
1,1,1-Trichloroethane	21.4	1.00	20.00	0	107	70	130			
1,1,2-Trichloroethane	20.1	1.00	20.00	0	101	70	130			
Trichloroethene (TCE)	20.0	1.00	20.00	0	100	70	130			
Trichlorofluoromethane	21.8	1.00	20.00	0	109	70	130			
Vinyl chloride	18.6	1.00	20.00	0	92.8	80	120			
Xylenes, Total	60.1	1.00	60.00	0	100	70	130			
Surr: 1,2-Dichloroethane-d4	9.12		10.00		91.2	70	130			
Surr: 4-Bromofluorobenzene	9.42		10.00		94.2	70	130			
Surr: Dibromofluoromethane	9.75		10.00		97.5	70	130			
Surr: Toluene-d8	9.29		10.00		92.9	70	130			

Sample ID **100ng lcs**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265428** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	60.0	5.00	60.00	0	100	70	130			
Benzene	22.1	1.00	20.00	0	110	70	130			
Toluene	19.6	1.00	20.00	0	98.1	70	130			
1,2-Dichloroethane (EDC)	21.0	1.00	20.00	0	105	70	130			
2-Butanone	41.3	5.00	40.00	0	103	70	130			
Carbon Tetrachloride	21.0	1.00	20.00	0	105	70	130			
Chlorobenzene	19.8	1.00	20.00	0	98.8	70	130			
Chloroform	23.1	1.00	20.00	0	116	70	130			
cis-1,2-DCE	21.5	1.00	20.00	0	107	70	130			
1,1-Dichloroethane	19.3	1.00	20.00	0	96.4	70	130			
1,1-Dichloroethene	23.5	1.00	20.00	0	117	70	130			
Methylene Chloride	21.2	3.00	20.00	0	106	70	130			
1,1,2,2-Tetrachloroethane	18.7	1.00	20.00	0	93.5	70	130			
Tetrachloroethene (PCE)	20.6	1.00	20.00	0	103	70	130			
trans-1,2-DCE	22.2	1.00	20.00	0	111	70	130			
1,1,1-Trichloroethane	21.7	1.00	20.00	0	109	70	130			
1,1,2-Trichloroethane	19.8	1.00	20.00	0	98.9	70	130			
Trichloroethene (TCE)	20.8	1.00	20.00	0	104	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1303753**

Hall Environmental Analysis Laboratory, Inc.

05-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID **100ng lcs**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265428** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Trichlorofluoromethane	21.9	1.00	20.00	0	109	70	130			
Vinyl chloride	19.5	1.00	20.00	0	97.7	70	130			
Xylenes, Total	59.7	1.00	60.00	0	99.5	70	130			
Surr: 1,2-Dichloroethane-d4	30.9		30.00		103	70	130			
Surr: 4-Bromofluorobenzene	28.0		30.00		93.3	69.5	130			
Surr: Dibromofluoromethane	30.8		30.00		103	70	130			
Surr: Toluene-d8	30.2		30.00		101	70	130			

Sample ID **100ng lcsd**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265429** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	57.4	5.00	60.00	0	95.6	70	130	4.47	20	
Benzene	20.9	1.00	20.00	0	104	70	130	5.55	20	
Toluene	18.9	1.00	20.00	0	94.3	70	130	3.92	20	
1,2-Dichloroethane (EDC)	20.0	1.00	20.00	0	99.8	70	130	5.25	20	
2-Butanone	40.9	5.00	40.00	0	102	70	130	1.00	20	
Carbon Tetrachloride	20.4	1.00	20.00	0	102	70	130	2.92	20	
Chlorobenzene	18.6	1.00	20.00	0	93.1	70	130	5.85	20	
Chloroform	21.6	1.00	20.00	0	108	70	130	6.94	20	
cis-1,2-DCE	20.3	1.00	20.00	0	102	70	130	5.38	20	
1,1-Dichloroethane	18.0	1.00	20.00	0	89.8	70	130	7.09	20	
1,1-Dichloroethene	21.9	1.00	20.00	0	110	70	130	6.78	20	
Methylene Chloride	20.5	3.00	20.00	0	102	70	130	3.61	20	
1,1,2,2-Tetrachloroethane	19.8	1.00	20.00	0	98.8	70	130	5.54	20	
Tetrachloroethene (PCE)	19.8	1.00	20.00	0	99.2	70	130	3.52	20	
trans-1,2-DCE	21.4	1.00	20.00	0	107	70	130	3.90	20	
1,1,1-Trichloroethane	20.9	1.00	20.00	0	104	70	130	4.00	20	
1,1,2-Trichloroethane	18.8	1.00	20.00	0	93.9	70	130	5.17	20	
Trichloroethene (TCE)	19.6	1.00	20.00	0	98.0	70	130	6.09	20	
Trichlorofluoromethane	20.2	1.00	20.00	0	101	70	130	7.74	20	
Vinyl chloride	19.8	1.00	20.00	0	99.0	70	130	1.35	20	
Xylenes, Total	57.3	1.00	60.00	0	95.6	70	130	4.02	20	
Surr: 1,2-Dichloroethane-d4	29.5		30.00		98.2	70	130	0	0	
Surr: 4-Bromofluorobenzene	30.0		30.00		99.9	69.5	130	0	0	
Surr: Dibromofluoromethane	29.7		30.00		99.1	70	130	0	0	
Surr: Toluene-d8	28.5		30.00		94.8	70	130	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1303753-001a ms** SampType: **MS4** TestCode: **EPA Method: 8260B**

Client ID: **WQ2-C-R35** Batch ID: **R9293** RunNo: **9293**

Prep Date: Analysis Date: **3/20/2013** SeqNo: **265434** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	82.6	5.00	60.00	0	138	70	130			S
Benzene	20.8	1.00	20.00	0	104	70	130			
Toluene	18.4	1.00	20.00	0	91.9	70	130			
1,2-Dichloroethane (EDC)	20.5	1.00	20.00	0	102	70	130			
2-Butanone	50.2	5.00	40.00	0	125	70	130			
Carbon Tetrachloride	19.7	1.00	20.00	0	98.5	70	130			
Chlorobenzene	18.2	1.00	20.00	0	91.1	70	130			
Chloroform	21.7	1.00	20.00	0	109	70	130			
cis-1,2-DCE	19.7	1.00	20.00	0	98.4	70	130			
1,1-Dichloroethane	18.2	1.00	20.00	0	90.8	70	130			
1,1-Dichloroethene	21.7	1.00	20.00	0	108	70	130			
Methylene Chloride	20.1	3.00	20.00	0	101	70	130			
1,1,2,2-Tetrachloroethane	23.7	1.00	20.00	0	119	70	130			
Tetrachloroethene (PCE)	18.7	1.00	20.00	0	93.7	70	130			
trans-1,2-DCE	20.2	1.00	20.00	0	101	70	130			
1,1,1-Trichloroethane	20.2	1.00	20.00	0	101	70	130			
1,1,2-Trichloroethane	20.6	1.00	20.00	0	103	70	130			
Trichloroethene (TCE)	18.8	1.00	20.00	0	93.9	70	130			
Trichlorofluoromethane	20.4	1.00	20.00	0	102	70	130			
Vinyl chloride	18.7	1.00	20.00	0	93.7	70	130			
Xylenes, Total	54.8	1.00	60.00	0	91.3	70	130			
Surr: 1,2-Dichloroethane-d4	31.4		30.00		105	70	130			
Surr: 4-Bromofluorobenzene	27.5		30.00		91.8	69.5	130			
Surr: Dibromofluoromethane	29.7		30.00		99.2	70	130			
Surr: Toluene-d8	28.4		30.00		94.8	70	130			

Sample ID **1303753-001a msd** SampType: **MSD4** TestCode: **EPA Method: 8260B**

Client ID: **WQ2-C-R35** Batch ID: **R9293** RunNo: **9293**

Prep Date: Analysis Date: **3/20/2013** SeqNo: **265435** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	88.1	5.00	60.00	0	147	70	130	6.46	20	S
Benzene	19.0	1.00	20.00	0	95.1	70	130	8.68	20	
Toluene	17.2	1.00	20.00	0	85.9	70	130	6.72	20	
1,2-Dichloroethane (EDC)	19.8	1.00	20.00	0	98.9	70	130	3.55	20	
2-Butanone	51.9	5.00	40.00	0	130	70	130	3.42	20	
Carbon Tetrachloride	18.1	1.00	20.00	0	90.4	70	130	8.58	20	
Chlorobenzene	17.8	1.00	20.00	0	88.9	70	130	2.47	20	
Chloroform	20.3	1.00	20.00	0	101	70	130	6.92	20	
cis-1,2-DCE	19.0	1.00	20.00	0	95.0	70	130	3.55	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1303753-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ2-C-R35**	Batch ID: **R9293**	RunNo: **9293**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265435** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	17.2	1.00	20.00	0	85.8	70	130	5.67	20	
1,1-Dichloroethene	19.7	1.00	20.00	0	98.5	70	130	9.64	20	
Methylene Chloride	19.0	3.00	20.00	0	94.9	70	130	5.85	20	
1,1,2,2-Tetrachloroethane	22.2	1.00	20.00	0	111	70	130	6.47	20	
Tetrachloroethene (PCE)	17.9	1.00	20.00	0	89.7	70	130	4.39	20	
trans-1,2-DCE	19.2	1.00	20.00	0	95.9	70	130	5.34	20	
1,1,1-Trichloroethane	18.5	1.00	20.00	0	92.6	70	130	8.60	20	
1,1,2-Trichloroethane	20.0	1.00	20.00	0	100	70	130	2.71	20	
Trichloroethene (TCE)	17.9	1.00	20.00	0	89.5	70	130	4.83	20	
Trichlorofluoromethane	18.4	1.00	20.00	0	92.1	70	130	10.4	20	
Vinyl chloride	17.9	1.00	20.00	0	89.4	70	130	4.70	20	
Xylenes, Total	51.8	1.00	60.00	0	86.4	70	130	5.56	20	
Surr: 1,2-Dichloroethane-d4	30.4		30.00		101	70	130	0		
Surr: 4-Bromofluorobenzene	26.5		30.00		88.2	69.5	130	0		
Surr: Dibromofluoromethane	28.5		30.00		95.0	70	130	0		
Surr: Toluene-d8	27.4		30.00		91.3	70	130	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R9393**	RunNo: **9393**
Prep Date:	Analysis Date: **3/21/2013**	SeqNo: **268166** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	40		40.00		100	60	140			
Surr: 2-Fluorobiphenyl	36		40.00		91.0	60	140			
Surr: 2-Fluorophenol	40		40.00		99.7	60	140			
Surr: 4-Terphenyl-d14	38		40.00		94.2	60	140			
Surr: Nitrobenzene-d5	35		40.00		87.9	60	140			
Surr: Phenol-d5	36		40.00		90.0	60	140			

Sample ID **mb-6594**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **6594**	RunNo: **9393**
Prep Date: **3/21/2013**	Analysis Date: **3/21/2013**	SeqNo: **268167** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	5.00								
1,4-Dichlorobenzene	ND	5.00								
2,4-Dinitrophenol	ND	5.00								
2,4-Dinitrotoluene	ND	5.00								
Hexachlorobenzene	ND	5.00								
Hexachloroethane	ND	5.00								
2-Methylphenol	ND	5.00								
3+4-Methylphenol	ND	5.00								
Nitrobenzene	ND	5.00								
Pentachlorophenol	ND	5.00								
Pyridine	ND	5.00								
Surr: 2,4,6-Tribromophenol	164		200.0		82.0	42.9	124			
Surr: 2-Fluorobiphenyl	58.3		100.0		58.3	40	108			
Surr: 2-Fluorophenol	131		200.0		65.7	23.6	94.8			
Surr: 4-Terphenyl-d14	79.2		100.0		79.2	41.9	103			
Surr: Nitrobenzene-d5	77.8		100.0		77.8	42.6	114			
Surr: Phenol-d5	88.3		200.0		44.2	20.3	74.7			

Sample ID **lcs-6594**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6594**	RunNo: **9393**
Prep Date: **3/21/2013**	Analysis Date: **3/21/2013**	SeqNo: **268171** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	56.2	5.00	100.0	0	56.2	27.4	101			
1,4-Dichlorobenzene	55.6	5.00	100.0	0	55.6	32.6	91.5			
2,4-Dinitrophenol	70.6	5.00	100.0	0	70.6	23.1	118			
2,4-Dinitrotoluene	73.4	5.00	100.0	0	73.4	44.7	112			
Hexachlorobenzene	83.5	5.00	100.0	0	83.5	30	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-6594**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6594**	RunNo: **9393**
Prep Date: **3/21/2013**	Analysis Date: **3/21/2013**	SeqNo: **268171** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	51.8	5.00	100.0	0	51.8	23.2	97.8			
2-Methylphenol	70.0	5.00	100.0	0	70.0	36.1	105			
3+4-Methylphenol	66.0	5.00	100.0	0	66.0	35.7	92.5			
Nitrobenzene	75.1	5.00	100.0	0	75.1	30.9	125			
Pentachlorophenol	73.6	5.00	100.0	0	73.6	20.2	93			
Pyridine	52.2	5.00	100.0	0	52.2	5.14	87.1			
Surr: 2,4,6-Tribromophenol	91.9		100.0		91.9	42.9	124			
Surr: 2-Fluorobiphenyl	77.7		100.0		77.7	40	108			
Surr: 2-Fluorophenol	50.7		100.0		50.7	23.6	94.8			
Surr: 4-Terphenyl-d14	77.5		100.0		77.5	41.9	103			
Surr: Nitrobenzene-d5	74.0		100.0		74.0	42.6	114			
Surr: Phenol-d5	39.3		100.0		39.3	20.3	74.7			

Sample ID **lcsd-6594**	SampType: **LCSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6594**	RunNo: **9393**
Prep Date: **3/21/2013**	Analysis Date: **3/21/2013**	SeqNo: **268172** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	57.9	5.00	100.0	0	57.9	27.4	101	3.05	20	
1,4-Dichlorobenzene	56.5	5.00	100.0	0	56.5	32.6	91.5	1.46	20	
2,4-Dinitrophenol	76.1	5.00	100.0	0	76.1	23.1	118	7.61	20	
2,4-Dinitrotoluene	77.2	5.00	100.0	0	77.2	44.7	112	5.07	20	
Hexachlorobenzene	84.1	5.00	100.0	0	84.1	30	130	0.644	20	
Hexachloroethane	53.4	5.00	100.0	0	53.4	23.2	97.8	3.04	20	
2-Methylphenol	69.8	5.00	100.0	0	69.8	36.1	105	0.200	20	
3+4-Methylphenol	69.5	5.00	100.0	0	69.5	35.7	92.5	5.11	20	
Nitrobenzene	76.1	5.00	100.0	0	76.1	30.9	125	1.40	20	
Pentachlorophenol	77.0	5.00	100.0	0	77.0	20.2	93	4.52	20	
Pyridine	55.7	5.00	100.0	0	55.7	5.14	87.1	6.60	20	
Surr: 2,4,6-Tribromophenol	92.0		100.0		92.0	42.9	124	0		
Surr: 2-Fluorobiphenyl	72.6		100.0		72.6	40	108	0		
Surr: 2-Fluorophenol	55.5		100.0		55.5	23.6	94.8	0		
Surr: 4-Terphenyl-d14	88.2		100.0		88.2	41.9	103	0		
Surr: Nitrobenzene-d5	73.7		100.0		73.7	42.6	114	0		
Surr: Phenol-d5	38.8		100.0		38.8	20.3	74.7	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1303753-001Cms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ2-C-R35**	Batch ID: **6594**	RunNo: **9393**
Prep Date: **3/21/2013**	Analysis Date: **3/21/2013**	SeqNo: **268190** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	75.8	5.00	100.0	0	75.8	20.9	103			
1,4-Dichlorobenzene	75.0	5.00	100.0	0	75.0	32.6	91.5			
2,4-Dinitrophenol	16.5	5.00	100.0	0	16.5	11	112			
2,4-Dinitrotoluene	70.8	5.00	100.0	0	70.8	44.7	112			
Hexachlorobenzene	78.2	5.00	100.0	0	78.2	30.3	126			
Hexachloroethane	70.8	5.00	100.0	0	70.8	19.5	96.4			
2-Methylphenol	79.1	5.00	100.0	0	79.1	28.7	108			
3+4-Methylphenol	78.0	5.00	100.0	0	78.0	24.2	136			
Nitrobenzene	84.0	5.00	100.0	0	84.0	28.8	119			
Pentachlorophenol	12.7	5.00	100.0	0	12.7	20.2	93			S
Pyridine	51.5	5.00	100.0	0	51.5	19.3	82.8			
Surr: 2,4,6-Tribromophenol	72.2		100.0		72.2	42.9	124			
Surr: 2-Fluorobiphenyl	80.9		100.0		80.9	40	108			
Surr: 2-Fluorophenol	70.1		100.0		70.1	23.6	94.8			
Surr: 4-Terphenyl-d14	91.8		100.0		91.8	41.9	103			
Surr: Nitrobenzene-d5	82.8		100.0		82.8	42.6	114			
Surr: Phenol-d5	62.3		100.0		62.3	20.3	74.7			

Sample ID **1303753-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ2-C-R35**	Batch ID: **6594**	RunNo: **9393**
Prep Date: **3/21/2013**	Analysis Date: **3/21/2013**	SeqNo: **268191** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	80.9	5.00	100.0	0	80.9	20.9	103	6.56	20	
1,4-Dichlorobenzene	78.1	5.00	100.0	0	78.1	32.6	91.5	4.00	20	
2,4-Dinitrophenol	20.4	5.00	100.0	0	20.4	11	112	21.3	20	R
2,4-Dinitrotoluene	82.0	5.00	100.0	0	82.0	44.7	112	14.6	20	
Hexachlorobenzene	90.5	5.00	100.0	0	90.5	30.3	126	14.5	20	
Hexachloroethane	74.4	5.00	100.0	0	74.4	19.5	96.4	5.07	20	
2-Methylphenol	85.5	5.00	100.0	0	85.5	28.7	108	7.83	20	
3+4-Methylphenol	82.2	5.00	100.0	0	82.2	24.2	136	5.34	20	
Nitrobenzene	86.9	5.00	100.0	0	86.9	28.8	119	3.39	20	
Pentachlorophenol	16.9	5.00	100.0	0	16.9	20.2	93	28.1	20	SR
Pyridine	62.3	5.00	100.0	0	62.3	19.3	82.8	18.9	20	
Surr: 2,4,6-Tribromophenol	79.4		100.0		79.4	42.9	124	0		
Surr: 2-Fluorobiphenyl	92.9		100.0		92.9	40	108	0		
Surr: 2-Fluorophenol	68.2		100.0		68.2	23.6	94.8	0		
Surr: 4-Terphenyl-d14	89.8		100.0		89.8	41.9	103	0		
Surr: Nitrobenzene-d5	84.3		100.0		84.3	42.6	114	0		
Surr: Phenol-d5	61.3		100.0		61.3	20.3	74.7	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303753-001f dup**	SampType:	**dup**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**WQ2-C-R35**	Batch ID:	**R9316**		RunNo:	**9316**				
Prep Date:		Analysis Date:	**3/20/2013**		SeqNo:	**265831**	Units:	**µmhos/cm**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	119000	0.500						2.25	20	

Sample ID	**ec 100us ccv**	SampType:	**ccv**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**CCV**	Batch ID:	**R9316**		RunNo:	**9316**				
Prep Date:		Analysis Date:	**3/20/2013**		SeqNo:	**265833**	Units:	**µmhos/cm**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	110	0.010	100.0	0	109	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-6636**	SampType: **MBLK**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID: **6636**		RunNo: **9407**					
Prep Date:	**3/25/2013**	Analysis Date: **3/25/2013**		SeqNo: **268555**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	**LCS-6636**	SampType: **LCS**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID: **6636**		RunNo: **9407**					
Prep Date:	**3/25/2013**	Analysis Date: **3/25/2013**		SeqNo: **268556**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00557	0.000200	0.005000	0	111	80	120			

Sample ID	**LCSD-6636**	SampType: **LCSD**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSS02**	Batch ID: **6636**		RunNo: **9407**					
Prep Date:	**3/25/2013**	Analysis Date: **3/25/2013**		SeqNo: **268557**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00469	0.000200	0.005000	0	93.7	80	120	17.2	20	

Sample ID	**1303753-001DMS**	SampType: **MS**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**WQ2-C-R35**	Batch ID: **6636**		RunNo: **9407**					
Prep Date:	**3/25/2013**	Analysis Date: **3/25/2013**		SeqNo: **268577**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00547	0.00100	0.005000	0	109	75	125			

Sample ID	**1303753-001DMSD**	SampType: **MSD**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**WQ2-C-R35**	Batch ID: **6636**		RunNo: **9407**					
Prep Date:	**3/25/2013**	Analysis Date: **3/25/2013**		SeqNo: **268578**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00572	0.00100	0.005000	0	114	75	125	4.38	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294877** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00								
Magnesium	0.0143	1.00								J
Potassium	ND	1.00								
Sodium	ND	1.00								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294878** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.7	1.00	50.00	0	101	80	120			
Magnesium	51.8	1.00	50.00	0	104	80	120			
Potassium	51.0	1.00	50.00	0	102	80	120			
Sodium	51.6	1.00	50.00	0	103	80	120			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294879** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	52.1	1.00	50.00	0	104	80	120	2.69	20	
Magnesium	53.0	1.00	50.00	0	106	80	120	2.34	20	
Potassium	52.3	1.00	50.00	0	105	80	120	2.49	20	
Sodium	52.7	1.00	50.00	0	105	80	120	2.13	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6593**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268271** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0200								
Beryllium	ND	0.00300								
Cadmium	ND	0.00200								
Calcium	0.0119	1.00								J
Chromium	ND	0.00600								
Iron	0.0128	0.0500								J
Lead	ND	0.00500								
Magnesium	ND	1.00								
Nickel	ND	0.0100								
Potassium	ND	1.00								
Silver	ND	0.00500								
Sodium	ND	1.00								
Vanadium	ND	0.0500								

Sample ID **LCS-6593**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268272** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.441	0.0200	0.5000	0	88.2	80	120			
Beryllium	0.473	0.00300	0.5000	0	94.5	80	120			
Cadmium	0.444	0.00200	0.5000	0	88.7	80	120			
Calcium	50.2	1.00	50.00	0.01186	100	80	120			
Chromium	0.446	0.00600	0.5000	0	89.2	80	120			
Iron	0.451	0.0500	0.5000	0.01275	87.6	80	120			
Lead	0.444	0.00500	0.5000	0	88.8	80	120			
Magnesium	49.3	1.00	50.00	0	98.6	80	120			
Nickel	0.426	0.0100	0.5000	0	85.2	80	120			
Potassium	47.1	1.00	50.00	0	94.3	80	120			
Silver	0.0892	0.00500	0.1000	0	89.2	80	120			
Sodium	47.9	1.00	50.00	0	95.8	80	120			
Vanadium	0.458	0.0500	0.5000	0	91.6	80	120			

Sample ID **1303753-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ2-C-R35**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268325** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.446	0.100	0.5000	0.02070	85.0	75	125			
Beryllium	0.440	0.0150	0.5000	0	88.0	75	125			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1303753-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ2-C-R35**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268325** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.417	0.0100	0.5000	0	83.4	75	125			
Chromium	0.413	0.0300	0.5000	0	82.6	75	125			
Iron	0.467	0.250	0.5000	0	93.5	75	125			
Lead	0.404	0.0250	0.5000	0	80.9	75	125			
Nickel	0.385	0.0500	0.5000	0	77.0	75	125			
Silver	0.0860	0.0250	0.1000	0	86.0	75	125			
Vanadium	0.474	0.250	0.5000	0.02020	90.7	75	125			

Sample ID **1303753-001DMSD**	SampType: **MSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ2-C-R35**	Batch ID: **6593**	RunNo: **9398**
Prep Date: **3/21/2013**	Analysis Date: **3/25/2013**	SeqNo: **268326** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.433	0.100	0.5000	0.02070	82.4	75	125	2.98	20	
Beryllium	0.426	0.0150	0.5000	0	85.3	75	125	3.09	20	
Cadmium	0.412	0.0100	0.5000	0	82.4	75	125	1.13	20	
Chromium	0.406	0.0300	0.5000	0	81.2	75	125	1.75	20	
Iron	0.452	0.250	0.5000	0	90.4	75	125	3.31	20	
Lead	0.402	0.0250	0.5000	0	80.3	75	125	0.695	20	
Nickel	0.373	0.0500	0.5000	0	74.6	75	125	3.27	20	S
Silver	0.0834	0.0250	0.1000	0	83.4	75	125	3.13	20	
Vanadium	0.460	0.250	0.5000	0.02020	87.9	75	125	3.01	20	

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294888** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	-0.00800	-100	99			
Magnesium	ND	1.00	1.000	0	-0.0520	-100	99			
Potassium	ND	1.00	1.000	0	-4.73	-100	99			
Sodium	ND	1.00	1.000	0	1.86	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294889** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.9	1.00	50.00	0	102	90	110			
Magnesium	48.9	1.00	50.00	0	97.8	90	110			
Potassium	47.5	1.00	50.00	0	95.0	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294889** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	47.8	1.00	50.00	0	95.7	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294905** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	-0.0200	-100	99			
Magnesium	ND	1.00	1.000	0	0.234	-100	99			
Potassium	ND	1.00	1.000	0	7.33	-100	99			
Sodium	ND	1.00	1.000	0	4.58	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294906** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	46	1.0	50.00	0	91.4	90	110			
Magnesium	50	1.0	50.00	0	99.6	90	110			
Potassium	49	1.0	50.00	0	98.9	90	110			
Sodium	51	1.0	50.00	0	101	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294919** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48	1.0	50.00	0	95.6	90	110			
Potassium	47	1.0	50.00	0	94.3	90	110			
Sodium	49	1.0	50.00	0	98.1	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294931** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	0.205	-100	99			
Potassium	ND	1.0	1.000	0	5.28	-100	99			
Sodium	ND	1.0	1.000	0	-1.59	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303753-001f dup**	SampType:	**dup**	TestCode:	**SM4500-H+B: pH**					
Client ID:	**WQ2-C-R35**	Batch ID:	**R9316**	RunNo:	**9316**					
Prep Date:		Analysis Date:	**3/20/2013**	SeqNo:	**265836**	Units:	**pH units**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.20	1.68								H

Sample ID	**ph 4.00 ccv**	SampType:	**ccv**	TestCode:	**SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID:	**R9316**	RunNo:	**9316**					
Prep Date:		Analysis Date:	**3/20/2013**	SeqNo:	**265840**	Units:	**pH units**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	4.01	1.68								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **mb-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**
Client ID: **PBW**	Batch ID: **R9316**	RunNo: **9316**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265817** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.0								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R9316**	RunNo: **9316**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265818** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.2	20.0	80.00	0	100	90	110			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSS02**	Batch ID: **R9316**	RunNo: **9316**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265819** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.0	20.0	80.00	0	100	90	110	0.250	20	

Sample ID **1303753-002f ms**	SampType: **ms**	TestCode: **SM2320B: Alkalinity**
Client ID: **WQ2-C-R35-Duplica**	Batch ID: **R9316**	RunNo: **9316**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265822** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	124	20.0	80.00	47.60	95.2	65.3	113			

Sample ID **1303753-002f msd**	SampType: **msd**	TestCode: **SM2320B: Alkalinity**
Client ID: **WQ2-C-R35-Duplica**	Batch ID: **R9316**	RunNo: **9316**
Prep Date:	Analysis Date: **3/20/2013**	SeqNo: **265823** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	125	20.0	80.00	47.60	96.3	65.3	113	0.709	10	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**
Client ID: **PBW**	Batch ID: **R9404**	RunNo: **9404**
Prep Date:	Analysis Date: **3/25/2013**	SeqNo: **268473** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.00								

Sample ID **LCS ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R9404**	RunNo: **9404**
Prep Date:	Analysis Date: **3/25/2013**	SeqNo: **268474** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.95	1.00	4.850	0	102	90	110			

Sample ID **LCSD ST9060-12006**	SampType: **LCSD**	TestCode: **SM 5310B: TOC**
Client ID: **LCSS02**	Batch ID: **R9404**	RunNo: **9404**
Prep Date:	Analysis Date: **3/25/2013**	SeqNo: **268475** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.87	1.00	4.850	0	100	90	110	1.57	20	

Sample ID **1303753-002BMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**
Client ID: **WQ2-C-R35-Duplica**	Batch ID: **R9404**	RunNo: **9404**
Prep Date:	Analysis Date: **3/25/2013**	SeqNo: **268477** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.02	1.00	4.650	0.2884	102	75	125			

Sample ID **1303753-002BMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**
Client ID: **WQ2-C-R35-Duplica**	Batch ID: **R9404**	RunNo: **9404**
Prep Date:	Analysis Date: **3/25/2013**	SeqNo: **268478** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.12	1.00	4.650	0.2884	104	75	125	2.05	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1303753-001FDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**WQ2-C-R35**	Batch ID:	**R9480**	RunNo:	**9480**					
Prep Date:		Analysis Date:	**3/27/2013**	SeqNo:	**270624**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.042	0						0.249	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1303753**

05-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6654**	SampType: **MBLK**	TestCode: **SM 2540D: TSS**							
Client ID: **PBW**	Batch ID: **6654**	RunNo: **9428**							
Prep Date: **3/26/2013**	Analysis Date: **3/26/2013**	SeqNo: **269134**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	ND	4.00								

Sample ID **LCS-6654**	SampType: **LCS**	TestCode: **SM 2540D: TSS**							
Client ID: **LCSW**	Batch ID: **6654**	RunNo: **9428**							
Prep Date: **3/26/2013**	Analysis Date: **3/26/2013**	SeqNo: **269135**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	93.0	4.00	96.60	0	96.3	85.8178	113.8716			

Sample ID **1303753-001FDUP**	SampType: **DUP**	TestCode: **SM 2540D: TSS**							
Client ID: **WQ2-C-R35**	Batch ID: **6654**	RunNo: **9428**							
Prep Date: **3/26/2013**	Analysis Date: **3/26/2013**	SeqNo: **269143**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	24.0	4.00						37.3	15	R

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

WQSP-2

DATA VERIFICATION AND VALIDATION REPORTS

Round 35
WQSP-2
SDG 1303753
Groundwater Concentration and Precision Summary

General Chemistry Parameter	Units	SOW MRL	Lab MDL[a]	Lab PQL[b]	Primary Sample	Flag	Duplicate Sample	Flag	Avg	RPD	Applicable 95th UTLV or 95th %
Chloride	mg/L	0.5	130	1,000	36,100		32,100		34,100	12	39,670
TOC	mg/L	1.0	0.23	1.0	0.28	J	0.29	J	0.29	3.5	7.97
Alkalinity (Bicarbonate)	mg/L	4.0	5.0	20	47.2		47.6		47.4	0.84	70.3
Specific Conductance	umhos/cm	NA	0.50	0.50	116,000		119,000		117,500	2.6	124,000
pH	pH units	NA	0.10	1.68	7.18		7.20		7.19	0.28	7.0 - 7.6
Specific Gravity	NA	NA	0.0	0.0	1.044		1.041		1.043	0.29	1.06
TDS	mg/L	10	500	1,000	63,000		63,000		63,000	0.0	80,500
TSS	mg/L	1.0	1.5	4.0	35		34		35	2.9	43.0
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	5.60	100	1,400		1,450		1,425	3.5	1,827
Mg (Diss)	mg/L	0.5	0.83	100	1,020		1,060		1,040	3.8	1,244
K (Diss)	mg/L	0.5	5.0	100	463		485		474	4.6	845
Na (Diss)	mg/L	0.5	40	500	20,400		20,100		20,250	1.5	21,900
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL[a]**	**Lab PQL[a]**	**Primary Sample**	**Flag**	**Duplicate Sample**	**Flag**	**Avg**	**RPD**	**95th UTLV or 95th %**
Hg (CVAAS)	mg/L	0.0002	0.000089	0.00020	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.0025	0.10	0.021	J	0.027	J	0.024	25	<1.0
Be	mg/L	0.010	0.0025	0.015	ND		0.0060	J	NA	NA	<1.0
Cd	mg/L	0.010	0.0040	0.010	ND		ND		NA	NA	<0.50
Ca	mg/L	0.500	0.46	50	1,380		1,530		1,455	10	NA
Cr	mg/L	0.025	0.0075	0.030	ND		ND		NA	NA	<0.50
Pb	mg/L	0.020	0.017	0.025	ND		ND		NA	NA	0.163
Mg	mg/L	0.50	0.48	50	958		1,010		984	5.3	NA
Ni	mg/L	0.025	0.0070	0.050	ND		ND		NA	NA	0.37
K	mg/L	0.50	11	50	427		461		444	7.7	NA
Ag	mg/L	0.013	0.0055	0.025	ND		ND		NA	NA	<0.5
Na	mg/L	0.50	260	500	19,100		20,400		19,750	6.6	NA
V	mg/L	0.025	0.0175	0.25	0.020	J	0.031	J	0.026	43	<0.1
ICP/MS Metals											
Sb	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	<0.5
As	mg/L	0.050	0.020	0.020	ND		ND		NA	NA	0.062
Se	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.150
Tl	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.980

Method Reporting Limit (MRL) and lab's Practical Quantitation Level (PQL) generally equivalent for a given sample
Lab's PQL corresponds to low calibration standard adjusted for the dilution factor as necessary for high-brine samples
J Flag indicates concentration was below the lab's PQL but above the Method Detection Limit (MDL) for the analyte
NA - Not Applicable
ND - Not Detected
CVAAS - cold vapor atomic absorption spectroscopy
ICP - inductively coupled plasma emission spectroscopy
ICP/MS - ICP combined with mass spectrometry
(a) MDL - method detection limit
(b) PQL - practical quantitation limit eqivalent to method reporting limit (MRL)

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 35
WQSP-2

Sample Summary

Date:	July 24, 2013
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	March 19, 2013
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 27, 2013
Date Samples Shipped/Method	March 19, 2013 by FedEx
Date Samples Received by lab:	March 20, 2013
Sample Receipt Condition:	Intact at 1.5 deg. C (two trip blanks with bubbles)
SDG:	1303753
WIPP Chain of Custody/Request for Analysis:	1027
Analysis Results Reviewed:	Volatile and semivolatile organics; total and dissolved metals; general chemistry indicator parameters
Analyses Verified, Validated, and Reported in this Document:	See table of all target analytes and methods in the Annual Culebra Groundwater Monitoring Report
VOC Analysis Date(s):	March 20, 2013 (meets holding time)
SVOC Extraction Date:	March 21, 2013 (meets holding time)
SVOC Analysis Date(s):	March 21, 2013 (meets holding time)
Total Trace Metals Analysis Date:	March 25, 29, 2013 (meets holding time)
Dissolved Cation Metals Analysis Date:	May 6, 2013 (meets holding time)
Mercury Analysis Date(s):	March 25, 2013 (meets holding time)
General Chemistry Parameters analysis dates	Dates are summarized on data summary reports from laboratory in the appendices. All holding times were met.
Verification and Validation Checklist	Completed and attached to this narrative

Sample Numbers and Analytes for SDG 1303753

WTS Sample No.	Analytes
WQ2CR35N1, WQ2CR35N1D	VOCs
WQ2CR35N2, WQ2CR35N3	VOCs (Field Blank and Trip Blank)
WQ2CR35N4, WQ2CR35N4D	TOC
WQ2CR35N5, WQ2CR35N5D	SVOCs
WQ2CR35N6, WQ2CR35N6D	Total Trace Metals (including "total" cation metals)
WQ2CR35N7, WQ2CR35N7D	General Parameters (including "dissolved" cations)

Results Summary

No VOCs were detected in the primary or duplicate WQSP-2 groundwater samples.

The field blank sample contained 2-butanone above the MRL at 10.9 ug/L, but the compound was not detected in the groundwater samples. No VOCs were detected in the trip blank sample.

No SVOCs were detected in the groundwater samples.

Low concentrations of Ba, Be (duplicate sample only), and V were detected in the duplicate groundwater samples by ICP. All the measured concentrations of the trace metals were between the lab's MDL and MRL and are J-flagged as estimated.

Measurements were made on all the general chemistry parameters at concentrations above the MRL except for TOC where the concentrations were between the MDL and MRL at 0.28 mg/L and 0.29 mg/L in the primary and duplicate sample, respectively, and are J-flagged as estimated. All other general chemistry parameter concentrations were above the MRL.

The general chemistry parameter concentrations were all lower than the applicable 95th UTLV or 95th percentile.

The RPDs for the precision of the analysis results for the primary and duplicate groundwater samples were all less than 20 except for J-flagged trace metal concentrations for Ba and V. The Ba RPD was 25, and the V RPD was 43. No firm precision objective applies to the analysis of duplicate field samples, but the composition of the samples should be the same since the groundwater samples are collected simultaneously.

The concentrations of all other detected constituents and parameters in the duplicate groundwater samples were within the 95th UTLV or 95th percentile, and all the RPDs were less than 20.

Summary for Volatile Organics Analysis

The groundwater samples were purged and analyzed for 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, benzene, carbon tetrachloride, chlorobenzene, chloroform, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, isobutanol, methyl ethyl ketone (2-butanone), methylene chloride, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, and xylenes (o-, m-, and p-).

The samples were analyzed according to the laboratory's SOP S-8260-11 based on EPA's SW-846 Method 8260B.

No VOCs were detected in the primary or duplicate groundwater samples. Methylethyl ketone (2-butanone) was detected in the field blank sample at 10.9 ug/L, and no compounds were detected in the trip blank sample. The water used for the field blank was commercially available Culligan water. It is not known if the 2-butanone was originally present in the commercial water or if it is from an ambient source in the mobile laboratory. The concentration was significantly lower in the WQSP-2 field blank than the WQSP-1 field blank.

Recoveries of isobutyl alcohol were higher than the 130 percent recovery objective in the MS and MSD with recoveries of 138 percent in the MS and 147 percent in the MSD. The recoveries of 2-butanone were 125 percent and 130 percent in the MS and MSD, respectively. The high-TDS sample matrix generally causes isobutyl alcohol and 2-butanone to purge more efficiently from the spiked groundwater samples than from the calibration standards and LCSs and to yield high recoveries.

All other quality assurance objectives were met for the VOC analyses.

Summary for Semivolatile Organic Compound Analysis

The groundwater samples were analyzed for 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, 2, 4-dinitrophenol, 2,4-dinitrotoluene, 2-methylphenol (o-cresol), 3+4-methylphenol (m-, p-methyl phenol), hexachlorobenzene, hexachloroethane, nitrobenzene, pentachlorophenol, and pyridine.

The samples were analyzed according to the laboratory's SOP S-8270C-11 based on EPA's SW-846 Method 8270C. No SVOCs were detected in the groundwater samples.

All the LCS/LCSD recoveries met the historical laboratory recovery ranges and all RPDs were <20. The MS/MSD recoveries of pentachlorophenol were less than the lab's historical control charge minimum of 20.2 percent recovery with recoveries of 12.7

percent in the MS and 16.9 percent in the MSD. The RPDs of 2,4-dinitrophenol and pentachlorophenol were higher than the 20 RPD objective with RPDs of 21.3 and 28.1, respectively.

All other quality assurance objectives were met for the SVOC QA/QC data.

Summary for Metals Analysis

The groundwater samples were prepared and analyzed for Barium (Ba), Beryllium (Be), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Lead (Pb), Magnesium (Mg), Nickel (Ni), Potassium (K), Silver (Ag), Sodium (Na), and Vanadium (V) by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) according to Hall's SOP S-610-8 based on EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed according to Anatek's SOP ALI-A-315.03 for ICP/MS Method 6020B from EPA SW-846. Mercury (Hg) was analyzed according to the Hall's S-245.1_7470-3 using automated cold-vapor atomic absorption (CVAA) spectroscopy. The SOP is based on EPA's SW-846 Method 7470A.

Low concentrations of Ba, Be (duplicate sample only), and V were detected in the duplicate groundwater samples by ICP. All the measured concentrations of the trace metals were between the lab's MDL and MRL and are J-flagged as estimated.

The lab's achievable MDL was lower than the SOW-prescribed MRL for all of the trace metals in the WQSP-2 groundwater samples.

All the lab's quality assurance objectives for recovery and precision were met for the ICP and ICP/MS trace metals, dissolved cations, and mercury during analysis of QC samples. The recovery objective for the LCS/LCSD samples is 80-120 percent, and the recovery objective for the MS/MSD samples is 75-125 percent. The RPD objective is <20 percent for all samples.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), alkalinity, and the anions chloride and sulfate. The standard analytical methods and the corresponding SOPs are shown in the table below.

Standard Analytical Method	Corresponding Contract Lab SOP
Method 2710F – Specific Gravity from Standard Methods	S-SM2710F-Rev. 1
Standard Methods SM 4500-H^+ (pH)	S-SM4500-H^+-7
EPA Method 120.1 Specific Conductance (Conductivity)	S-120.1-7
Standard Methods SM 2540C (TDS)	S-SM2540C-6
Standard Methods SM 2540D (TSS)	S-SM2540D-4
Standard Methods SM 5310B (TOC)	S-TOC-6
Standard Methods SM 2320B (Alkalinity)	S-SM2320-7
EPA Method 300.0 (Anions)	S-300.0-10

The types of QC samples analyzed for the general chemistry parameters include the following:

- Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted.

- LCS samples were analyzed for the anions chloride and sulfate to obtain recovery information. MS/MSD samples were not analyzed because of the high native concentrations of chloride and sulfate. All LCS recoveries were within 90 – 110 percent recovery.

- The primary groundwater sample was analyzed in duplicate for pH and specific gravity to obtain precision information. The RPDs of the duplicate analyses were <1 indicating good precision.

- A LCS sample and a duplicate sample were analyzed for TSS to obtain recovery and precision information. MS/MSD samples are not applicable. The recovery of the LCS sample was 96.3 percent. The duplicate of the primary sample for TSS analysis yielded a result of 24 mg/L compared to 35 mg/L in the primary sample for a RPD of 37 percent. Thus the precision objective was not met. The primary and duplicate groundwater sample analyses for TSS yielded a RPD of 2.9.

- A duplicate sample was not analyzed for specific conductance. The only QA/QC sample was a CCV.

- A duplicate sample was not analyzed for specific gravity. However, the samples were analyzed with the WQSP-1 samples, and a duplicate was analyzed for WQSP-1.

- LCS and MS/MSD QC samples were analyzed for TDS, alkalinity and TOC to obtain recovery and precision information. A LCSD was also analyzed for alkalinity and TOC. All the recoveries were within 90 – 110 percent, and the RPDs were <20.

The concentrations of all detected constituents and parameters were within the 95th UTLV or 95th percentile.

Overall Data Package Summary

In summary, the data and information contained in this data packet is of high quality and meets the data quality objectives for accuracy and precision with only a few minor exceptions as detailed above and in the Annual Culebra Groundwater Monitoring Report. There is no indication of any target DMP target VOCs or SVOCs or any other organic compounds being present in the samples at a concentration above the concentration of concern and the metals and general chemistry parameters analysis data do not indicate any observable changes in the composition of the groundwater.

The data are usable and meet the needs of the DMP.

Attachment 2 – Preliminary Review

SECTION A

Sample Location: WQSP-2
Laboratory Name: Hall Environmental
Laboratory Work Order #: 1303753
Sample Number(s): GW-WQ2-C-R35-N1-N8D
Reviewer Name (print): Greg Jungclaus
Reviewer Signature: G Jungclaus

SECTION B	YES	NO
Is the SDG narrative present and certification page signed by an authorized representative of the laboratory?	✓	
Does the SDG narrative explain problems associated with processing and analysis of the samples?	✓	
Were the original or copy of the Chain of Custody/Request for Analysis (CofC/RFA) complete?	✓	
Are the sample analysis summary tables present?	✓	
Were sufficient data as required by the Statement of Work (SOW) available to evaluate the analysis results?	✓	
Was an electronic data package received for preliminary review of the data?	✓	

SECTION C GENERAL VERIFICATION AND VALIDATION	YES	NO
Were data entries free of transcription error?	✓	
Were calculations correct?	✓	
Were the correct number of significant figures applied to reported data?	✓	
Were trip (VOC only), field and laboratory method blanks (MB) free of contaminants?		✓
Note: The consistent detection of any anthropogenic compounds should be reported to the EM&H Manager, as well as documented and discussed in the Verification and Validation Report.		
Were any anthropogenic compounds starting to appear consistently in the samples?		✓
Were concentrations consistently reported in units of micrograms per liter (ug/L) for organics and milligrams per Liter (mg/L) for applicable general chemistry parameters and constituents?	✓	
Were the applicable standard methods used for all the analyses?	✓	
Note: The EM&H Manager should be contacted if the data completeness objective of 100% is not met for any Verification and Validation Report since resampling and/or reanalysis of Detection Monitoring Program (DMP) samples may be required.		
Was 100% of the sample analysis data usable and valid?	✓	

G Jungclaus 9-10-13
Data Validator Date

D Winchester 9/17/13
Completeness Reviewer Date

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CofC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with hydrochloric acid?	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 1.5°C	✓	
Was the analysis holding time of 14 days met for all samples? 3/20 vs. 3/19	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact, e.g., no air bubbles in the vials?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a 4-bromofluorobenze (BFB) tuning compound analysis performed at the beginning and every 12 hours during VOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z (mass per unit charge) 95?	✓	
Were the ion abundance criteria listed in Method 8260 met?	✓	

INITIAL CALIBRATION	YES	NO	
Were a minimum of 5 calibration standards used for the initial calibration?	✓		
Did the calibration standards contain all the target VOC compounds?	✓		
Was the low standard at or below the concentration of the MRL, e.g., 5.0 µg/L?	✓		(a)
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓	
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓		
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓	(b)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to be within 20% of the expected concentration?	✓		

(a) 2.0ng/50mL = 0.4µg/L
(b) Avg RRFs not used.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the VOCs in the CCVs agree to within 20% difference (bias) of the standard CCV concentration? Note that the CCV concentration may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory MB analyzed for each 12-hour period of GC/MS instrument operation?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Was a trip blank (one per DMP sample set) analyzed?	✓	
Was a field blank analyzed (one per DMP sample set)	✓	
Were the concentrations of any VOCs detected in the laboratory method blank samples < MRL?	✓	
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?		✓ (a)

SYSTEM MONITORING COMPOUNDS (SURROGATES)	YES	NO
Note: Flag the data if System Monitoring Compound (SMC) recoveries are outside the recovery objective with no evidence of sample reanalysis.		
Were a minimum of three (3) SMCs added to all samples and blanks prior to GC/MS analysis?	✓	
Were the SMC recoveries reported on the SMC recovery form consistent with the raw data?	✓	
Did the SMC recoveries meet the 70-130% recovery objective or the QC recovery chart limits established historically by the laboratory?	✓	
Did the lab need to reanalyze any samples because the SMC recovery objective was not met?		✓

(a) The field blank contained 10.9 µg/L 2-butanone. The compound was not detected in the groundwater.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS sample prepared and analyzed with each DMP sample set?	✓	
Was the LCS sample spiked with all the DMP target VOCs?	✓	
Did the LCS recoveries for all the target VOCs meet the 70-130% recovery objective?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and MSD prepared and analyzed with each DMP sample set?	✓	
Were the MS/MSD samples spiked with all the DMP target VOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for target DMP target VOCs meet the accuracy objective specified in the EPA Functional Guidelines? (60-140% recovery) or the QC recovery control chart limits established historically by the laboratory?		✓ (a)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were the retention times of the internal standards (IS) in the samples within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS in the samples within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the Relative Retention Times (RRTs) of any target VOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) Lab uses 70-130% recovery objective for MS/MSD. The isobutyl alcohol recovery was 138% in the MS and 147% in the MSD.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO
Was a forward search of the VOC mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓	
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.		
Were any VOC Tentatively Identified Compounds (TICs) detected in the trip blank and field blank samples?		✓ (a)
Were any VOC TICs detected in the groundwater samples?		✓

Data Validator 8/22/13 Date

Completeness Reviewer 9/17/13 Date

(a) The ground water contained the GC column silicone artifacts. The field blank contained 2-butanone along with traces of some higher ketones.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C?	✓	
Were the samples extracted within 7 days of sample collection? 3/21 vs 3/19	✓	
Were the extracts analyzed within 40 days of sample extraction? 3/21 (both)	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a DFTPP (decafluorotriphenylphosphine) tuning compound analysis performed at the beginning and every 12 hours during SVOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z 198?	✓	
Were the ion abundance criteria listed in Method 8270C met?	✓	

INITIAL CALIBRATION	YES	NO
Were a minimum of five (5) calibration standards used for the initial calibration?	✓	
Did the calibration standards contain all the target SVOCs?	✓	
Was the low standard at or below the MRL for the method, e.g., ≤ 5.0 ug/mL in the standard?	✓	
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓	
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓ (a)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to within 20% of the expected concentration?	✓	

(a) Avg RRFs not used.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the SVOCs in the CCVs agree to within 20% difference (bias) of the average of the CCV standard concentration? Note that CCV concentrations may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory method blank extracted along with each SDG batch?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Were the concentrations of any SVOCs detected in the laboratory method blank sample < MRL?	✓	

SURROGATE SPIKES	YES	NO
Were three (3) base-neutral and three (3) acid surrogate spike recovery compounds spiked into the groundwater and QC samples prior to extraction?	✓	
Were the surrogate recoveries reported on the surrogate recovery form consistent with the raw data?	✓	
Note: Flag the data if surrogate recoveries are outside the objective range with no evidence of sample re-injection or re-extraction.		
Did the surrogates meet the EPA Functional Guidelines accuracy objective of 15-110% recovery for acid surrogates and 30-130% recovery for base neutral surrogates?	✓	
Alternatively, were the surrogate recoveries within the historical control chart limits established by the laboratory for aqueous samples?	✓	
Did the laboratory need to re-inject or re-extract any samples because the surrogate recovery objective was not met?		✓

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS prepared and analyzed for each batch of DMP samples?	✓	
Was the LCS sample spiked with all the target SVOCs?	✓	
Did the LCS recoveries meet the EPA guidance accuracy objectives of 40-140% recovery for base neutral compounds and 30-130% recovery for acidic compounds?	✓	
Alternatively, were the LCS recoveries within the laboratory's historical control chart limits?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤ 20 RPD for each compound?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and a MSD prepared and analyzed for each batch of DMP samples?	✓	
Were the MS/MSD samples spiked with all the DMP target SVOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for the DMP target SVOCs meet the EPA Functional Guidelines accuracy objective of 40-140% recovery for base neutral compounds and 30-130% recovery for acid compounds?		✓ (c)
Alternatively, were the matrix spike recoveries within the laboratory's historical control chart limits?		✓
Was the precision of the MS/MSD recoveries calculated and reported?	✓	
Did the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were a minimum of six (6) IS spiked into extracts of samples and blanks prior to GC/MS analysis?	✓	
Were the retention times of the IS within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the RRTs of any target SVOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(c) The MS recovery of 2,4-dinitrophenol was 16.5%; the MS recovery of pentachlorophenol was 12.7%. The MSD recovery of 2,4-dinitrophenol was 20.4%; the MSD recovery of pentachlorophenol was 16.9%

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO	
Was a forward search of the mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓		
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.			
Were any SVOC TICs detected in the laboratory method blank sample?	✓		(a)
Were any SVOC TICs detected in the groundwater samples?	✓		

D Jenkins 8/22/13 — Data Validator — Date

D Alvarez 9/17/13 — Completeness Reviewer — Date

(a) Several non-target compounds appeared in both the method blank and groundwater sample extracts. The compounds include toluene and higher alkyl benzenes, bis-phenol A, triethyl phosphate, and triphenyl phosphate. The compounds are not components of the groundwater.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with nitric acid?	✓	
Were holding times met for all sample digestions and analyses? Maximum holding time is 28 days for Mercury and 6 months for the other metals.	✓	(a)
Was the integrity of each sample intact?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	

INDUCTIVELY COUPLED PLASMA (ICP) CALIBRATION, EPA SW-846 6010B	YES	NO
Was the correlation coefficient (R^2) of the initial calibration ≥0.995 for each metal? Pg 446→	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples?	✓	
Was the initial ICV analyzed immediately after calibration and prior to sample analysis?	✓	
Was the ICV prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery for all target metals? Pg 459→460	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue? Pg 444→445	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals? Pg 467, 469-470, 476-477, 482-483, 490-491, 496	✓	

ICP BLANKS	YES	NO
Was an ICB analyzed immediately after the ICV?	✓	
Were CCBs analyzed in the sample queue every 10 samples and immediately after the CCVs to evaluate drift, sensitivity, and contamination?	✓	
Were the ICB and CCB analysis results all <MRL for each metal?		✓ (b)

(a) Sx'd 3/19; Prep 3/21 (T), 3/25 (Hg); Analyzed 3/25 (T, Hg), 3/29 (T) & 5/3 (Diss) + 5/6.

(b) ICB & initial CCB passed (all analytes < MRL). Following CCBs Failed (Seq# 43-44, 58-59, 74-75, 90-91 & 98-99) due to ↑ Na^+ (range 1.49 → 5.82 ppm).

Similar problems w/ ccvs failing – ↑ Na^+ & ↑ K^+.

*Need to ↑ rinse time between Sx's with matrix rinse (suggest 5% HCl, 1% HNO_3 + 0.02% Triton X-100) to prevent carryover w/ Brines

↑ Back Press suggest Neb clogging. Hg Alignment too frequent.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP INTERFERENCE CHECK SAMPLE pg 461-462	YES	NO
Were Interference Check Standards (ICS & ICS Element) analyzed daily prior to sample analysis?	✓	
Were the concentrations of all the target trace metals (not including Ca and Mg) < two times the MRL in the ICS?	✓	
Did the recoveries of the trace metals in the ICS Element standards meet the accuracy objective of 80-120% recovery? pg 461-462	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a LCS, LCSD, MS, and MSD along with the requisite QC blanks and check standards (MB, ICV, ICB, CCB, ICS, and ICS Element)?	✓	
Was a DMP sample used for the MS and MSD?	✓	

METHOD PERFORMANCE	YES	NO	
Were the concentrations of any metals detected in the method blanks at a concentration < MRL? ~~pg 464~~ KM 8/20/13 Mg - 0.0143, Ca 0.0119 + Fe 0.01	✓		
Did the metals in the LCS meet the accuracy objective of 80-120% recovery?	✓		
Did the metals in the MS and MSD meet the accuracy objective of 75-125% recovery?		✓	(a)
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	✓		(b)

(a) Total Metals, Ni @ 74.6% recovery

(b) Dissolved Metals

RPD = 2.13 → 2.69%

Total Metals

RPD = 0.695 → 3.31%

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

pg 638 — 7 RM 8/27/13

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO	
Were the samples digested within 28 days of sample collection? C 3/19; P 3/25	✓		
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank?	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓		
Did the ICV analysis meet the accuracy objective of 90-110% recovery? 97.6	✓		(a)
Were CCV standards analyzed at a frequency of once every 10 samples and at the end of the sample queue?	✓		
Did the CCV analyses meet the accuracy objective of 80-120% recovery?	✓		(b)
Did the sample set contain a MB, LCS, MS, and MSD?	✓		
Was a DMP Sample used for the MS/MSD?	✓		
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓		
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓		
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		(c)

$R^2 = 0.9999$

(a) ICV Recovery $= \left(\frac{3.2213}{3.3}\right) \times 100 = 97.6\%$

(b) CCV Recovery $= \left(\frac{3.4064}{3.3}\right) \times 100 = 103.2\%$

$\left(\frac{3.4562}{3.3}\right) \times 100 =$ 104.7% ~~104.77~~ RM 8/27/13

(c) RPD = 4.47%

$\left(\frac{0.00572 - 0.00547}{0.005595}\right) \times 100 = 4.47\%$

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP/MS Analysis for Selected Trace Metals, e.g., As, Sb, Se, and Tl, by EPA SW-846 6020A	YES	NO
Was the holding time met for the ICP/MS analysis? C 3/19 A 4/12	✓	
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Was an ICV analyzed after the initial calibration?	✓	
Were a CCB and CCV analyzed during the sample queue?	✓	
Did the CCV meet the accuracy objective of 90-110% recovery?	✓	(a)
Was the concentration of any metals detected in the CCB at < 0.001 mg/L?	✓	
Did the metals in the LCS and LCSD meet the accuracy objective of 85-115% recovery?	✓	
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓	

Robin Ahrens 8/29/13 — Data Validator — Date

[signature] 9/17/13 — Completeness Reviewer — Date

a) $\left(\frac{47.965 - 0.114}{50}\right) 100 = 95.7\%$ recovery (CCV)

Attachment 6 – Anions (Chloride and Sulfate) Data Review, EPA Method 300.0

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 28 days of collection for analysis of chloride and sulfate? (Note that sulfate concentrations are not reported but are needed for cation/anion balance calculations.) C 3/19; A 3/20	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions? (9)	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue?	✓	
Were Continuing Calibration Verification (CCV) standards of differing concentrations analyzed periodically throughout the sample set? A4→A6	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Was the laboratory method blank concentration of the anions <MRL (Method Reporting Limit)?	✓	
Did the ICV and CCV analyses meet the accuracy objective of 90-110% recovery?	✓	
Did the LCS meet the accuracy objective of 90-110% recovery?	✓	
NOTE: If the normal MS spike concentration is < 25% of the native sample concentration (i.e., high native sample concentration) the MS and MSD recoveries and precision are not applicable.		
Did the MS and MSD analyses of applicable anions meet the accuracy objective of 80-120% recovery?	N/A. (a)	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	N/A	

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument?	✓	
Were the appropriate dilution factors applied to the results?	✓	

Robin Alpom 8/27/13
Data Validator Date

Completeness Reviewer 9/17/13
Completeness Reviewer Date

(a) MS/MSD analyzed for nitrate only (DF50) because of the high concentrations of Cl^- + SO_4^- in the native sample.

Attachment 7 – Alkalinity Data Review, SM 2320B

pg 690 →

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 14 days of collection? C 3/19, A 3/20	✓	

REAGENTS	YES	NO
Was the pH meter standardized prior to analysis of the samples using the SOP for pH measurement?	✓	
Was 0.02 N standardized sulfuric acid used as the titrant?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a laboratory method blank, Laboratory Control Sample (LCS), Matrix Spike (MS), and Matrix Spike Duplicate (MSD)?	✓	
Was the starting pH of the sample ≤8.30? 7.18 & 7.20	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 3.08 mg/L	✓	✓ RM 8/27/13
Did the LCS recovery meet the accuracy objective of 80-120% recovery?	✓	(a)
Did the MS and MSD meet the accuracy objective of 80-120% recovery?	✓	(b)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)?	✓	(b)
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓	(b)

Robin Alpers 8/27/13
Data Validator Date

D Halverson 9/17/13
Completeness Reviewer Date

(a) LCS – 80.2 mg/L | 100% Rec
LCSD – 80.0 mg/L | 100% Rec
→ %RPD 0.250

(b) $\frac{A \times N \times 50000}{5 \times Vol}$ A = mL titrant, N = Normality of titration, 50K = meq/mole

MS Alk = $\frac{(6.188)(0.020)(50{,}000)}{50} = 123.76$

MSD Alk = $\frac{(6.232)(0.020)(50{,}000)}{50} = 124.64$

Recovery MS/MSD

$\frac{123.76 - 47.60}{80} = 95.2\%$

$\frac{124.64 - 47.60}{80} = 96.3\%$

%RPD = $\left(\frac{124.64 - 123.76}{124.2}\right)100$

= 0.709%

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES (pg 690 →)	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 3/19; A 3/20	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards?	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration?	✓	
Was the proper Temperature Correction Factor applied to the conductivity measurements? ATC used	✓	

ANALYSIS QUEUE	YES	NO
Was a second source mid-range ICV conductivity standard analyzed prior to the samples?	✓	
Was a CCV conductivity standard analyzed within and at the end of the sample queue (rotate between 10, 100, 1000, and 10,000 µmhos/cm conductivity standards)?	✓	
Was one of the samples analyzed in duplicate?	✓	

METHOD PERFORMANCE	YES	NO	
Did the ICV analysis yield a concentration within 90-110% of the standard concentration?	✓		(a)
Did the CCV analyses yield a concentration within 90-110% of the standard concentration?	✓		(b)
Did the duplicate sample meet the precision objective of ≤20 RPD? 2.25%	✓		(c)

Robbin Alpers — Data Validator — 8/27/13 — Date

D Patterson — Completeness Reviewer — 9/17/13 — Date

(a) $ICV\,1 = \left(\frac{1405}{1411}\right) \times 100 = 99.6\%$

(b) $CCV\,2 = \left(\frac{109}{100}\right) \times 100 = 109.\%$

(c) $\left|\frac{^{10}Dup - ^{10}\bar{x}}{\bar{x}}\right| \times 100 = \left|\frac{119,050 - 116,500}{117,825}\right| \times 100 = 2.25\%\ RPD$

$^{10}\bar{x}$

Attachment 9 – pH Data Review, SM 4500-H+

Pg 693—7

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°?	✓	
Were the samples analyzed within five (5) days of receipt? C 3/19; A 3/20	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument?	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.3	✓	

SAMPLE ANALYSIS	YES	NO	
Did the standard buffers bracket the pH range of the samples?	✓		
Was a CCV analyzed within and at the end of the sample batch?	✓		
Was the sample analysis temperature within 2°C of the buffer analysis temperature?	✓		(a)
Was the pH recorded to the nearest 0.1 pH unit?	✓		
Was the pH of one of the samples measured in duplicate?	✓		

METHOD PERFORMANCE	YES	NO	
Did the ICV read within ±0.1 pH unit of the assigned value? 7 vs 7	✓		
Did the CCV read within ±0.1 pH unit of the assigned value? 4.00 vs 4.01	✓		
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓		(b)

Robbin Akpom 8/27/13 — Data Validator — Date

[signature] 9/17/13 — Completeness Reviewer — Date

(a) Temps

10 Sx — 21.1°C

10 Sx Dup — 21.1°C

20 Sx — 20.6°C

pH 4 — 20.3°C

pH 7 — 19.9°C

pH 10 — 19.4°C

(b)

10 Sx — 7.18

10 Sx Dup — 7.20

20 Sx — 7.20

% RPD = 0.28

Attachment 10 – Specific Gravity Data Review, SM 2710F

pg 720-721

SAMPLE ANALYSIS	YES	NO
Were the samples allowed to warm to near room temperature prior to measurement of specific gravity?	✓	
Was the temperature of the specific gravity measurements recorded? 22.6°C	✓	
Was the mass of at least 5.0 mL of the water sample measured? 10.0 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 3.4°C	✓	
Was the Temperature Correction Factor recorded? 0.9975	✓	

Robbin Alpers 8/27/13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

$$SG = \frac{\text{wt of Sx (10.0 mL)}}{\text{wt of DI-H}_2\text{O (10.0 mL)}} \times TCF$$

$$1^0\ Sx = \left(\frac{10.4751\text{g}}{10.0077\text{g}}\right) \times 0.9975 = 1.0441$$

1^0 Sx = 1.0441 % RPD = 0.25%

1^0 Sx Dup = 1.0415

Attachment 11 – Total Organic Carbon Data Review, SM 5310B

pg 723 -

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C/ 3/19; A 3/25	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? 0-(5) 10.0	✓	
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set? Only ICV5 used w/sample set.	~~✓~~ 9/4/13	✓
Did the sample set include an Initial Calibration Blank (ICB), laboratory method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓	
Were quadruplicate measurements taken for each sample?	✓	
Were both the average and the range reported for the quadruplicate measurements?	✓	

METHOD PERFORMANCE	YES	NO	
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)? r^2=1.00	✓		
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓		(a)
Were the results for the laboratory method blank, the ICB and CCB < MRL?	✓		
Did the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓		(b)
Did the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		(c)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		⊥

Robin Upton 8/27/13
Data Validator Date

D Anderson 9/17/13
Completeness Reviewer Date

(a)
ICVS = $\left(\frac{4.582}{5.000}\right)$ x100 = 91.64% Rec.

= $\left(\frac{4.620}{5.000}\right)$ x100 = 92.40% rec

(b)
LCS = (4.947/4.850) x 100 = 102% rec

%RPD = 1.57%

LCSD = (4.870/4.850) x 100 = 100.4% rec

(c)
MS = $\left(\frac{(5.021 - 0.2884)}{4.650}\right)$ x100 = 101.8%

%RPD = 2.05%

MSD = $\left(\frac{(5.125 - 0.2884}{4.650}\right)$ x100 = 104.0%

Attachment 12 – Total Dissolved Solids Data Review, SM 2540C

pgs 111, 720-721

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? C 3/19; A 3/25	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the initial volume of each sample 100 mL? 10 mL		✓
Were any DMP samples diluted prior to processing? 2mL ↑ 100mL	✓	
Were the samples dried twice at 180°C?	✓	
Was the MS/MSD spike concentration higher than 25% of the native sample concentration and thus usable for recovery determination? ≈50 K vs 63 K	✓	

METHOD PERFORMANCE	YES	NO	
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)?	✓		
Did the LCS analysis meet the accuracy objective of 80-120% recovery?	✓		(a)
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓		(b)
If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD?	✓		(c)

Robbin Nyon 8/26/13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

MB = 19.0

LCS = 1030

[Spk] = 1K

(a) LCS = $\left[\frac{1030 - 19}{1000}\right] \times 100 = 101.1\%$ rec

Sx = 63,050

MS = 112,700

(b) $\left(\frac{112700 - 63050}{50000}\right) \times 100 = 99.3\%$ rec.

(c) %RPD = 2.32

MSD = 115,350

$\left(\frac{115,350 - 63050}{50000}\right) \times 100 = 104.6\%$ rec

$\simeq 105\%$

Attachment 13 – Total Suspended Solids Data Review, SM 2540D

pgs 132; 749-750

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? C 3/19; A 3/26	✓	
Were the samples allowed to warm to room temperature prior to filtration?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, and duplicate sample?	✓	
Was the volume of each sample 100 mL?	✓	
Were the samples dried twice at approximately104°C?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights <0.0005 g (0.5 mg)?	✓	
Was the MB result <5.0 mg/L?	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? 37.3%		✓ (a)

Robbin Nipon 8/26/13
Data Validator Date

D Ottaviano 9/17/13
Completeness Reviewer Date

1° Sx = 35 mg/L

1° Sx Dup = 24 mg/L

2° Sx = 34 mg/L

(a)

$\left(\frac{35-24}{29.5}\right) \times 100 = 37.3\%$ RPD

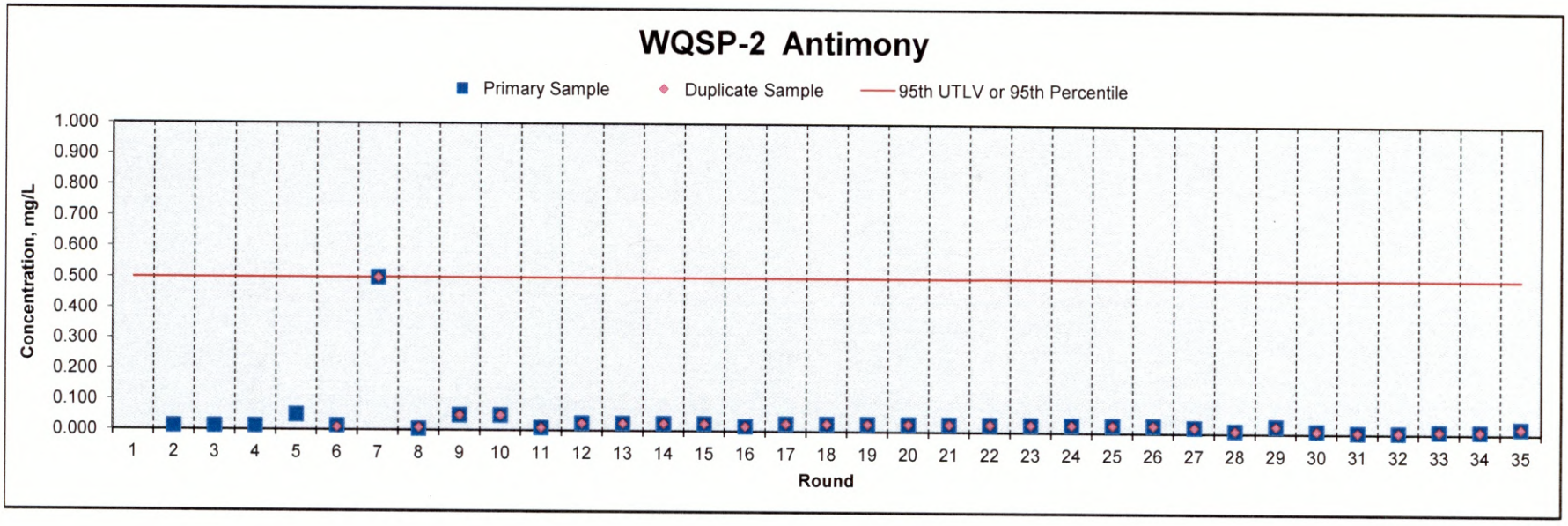
%RPD between duplicate analyses exceed the ≤15 precision objective

WQSP-2

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

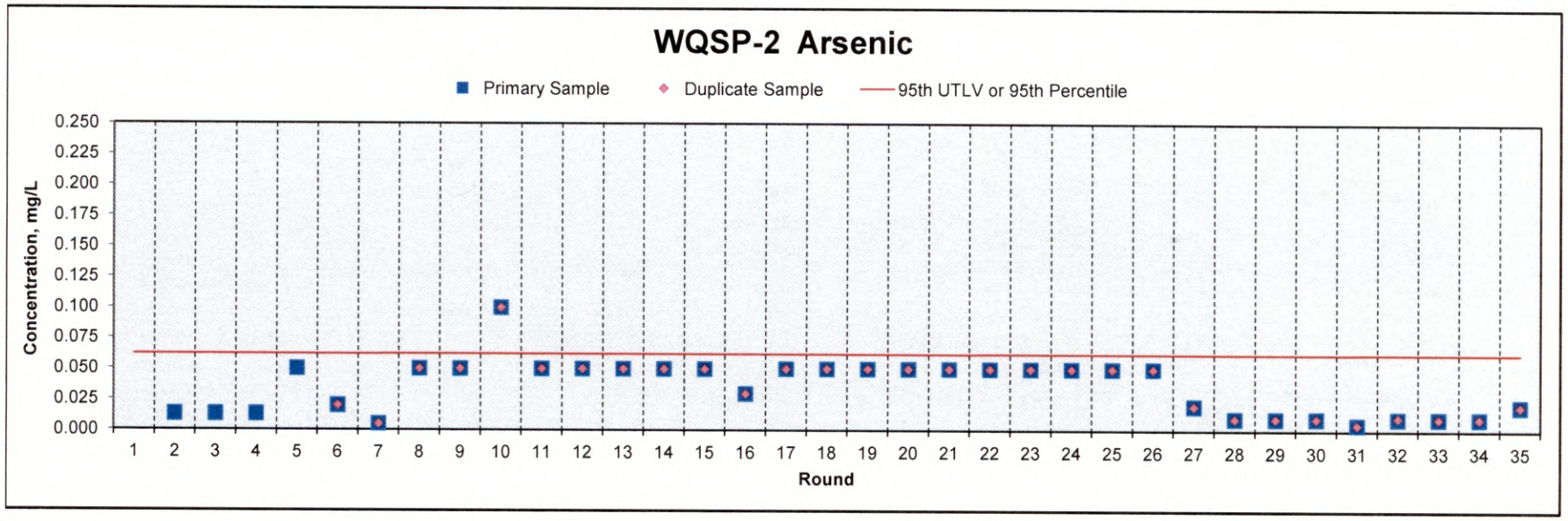
WQSP-2 Antimony

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Antimony	1					mg/L		< 0.5
Antimony	2	04/25/96	05/14/96	< 0.013		mg/L	0.013	< 0.5
Antimony	3	08/08/96	08/21/96	< 0.013		mg/L	0.013	< 0.5
Antimony	4	05/08/97	05/21/97	< 0.013		mg/L	0.013	< 0.5
Antimony	5	08/07/97	08/15/97	< 0.050		mg/L	0.050	< 0.5
Antimony	6	04/15/98	05/13/98	0.015	0.010	mg/L	0.001	< 0.5
Antimony	7	08/12/98	09/16/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Antimony	8	03/17/99	03/18/99	< 0.005	< 0.010	mg/L	0.010	< 0.5
Antimony	9	09/15/99	09/16/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Antimony	10	06/19/00	06/19/00	< 0.050	< 0.050	mg/L	0.050	< 0.5
Antimony	26	05/07/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Antimony	27	10/27/08	12/02/08	< 0.020	< 0.020	mg/L	0.025	< 0.5
Antimony	28	05/06/09	05/21/09	< 0.010	< 0.010	mg/L	0.010	< 0.5
Antimony	29	10/28/09	11/10/09	< 0.025	< 0.025	mg/L	0.025	< 0.5
Antimony	30	05/05/10	05/24/10	< 0.010	< 0.010	mg/L	0.010	< 0.5
Antimony	31	11/03/10	11/11/10	< 0.005	< 0.005	mg/L	0.005	< 0.5
Antimony	32	03/23/11	04/11/11	< 0.0050	< 0.0050	mg/L	0.0050	< 0.5
Antimony	33	11/02/11	11/17/11	< 0.010	< 0.010	mg/L	0.010	< 0.5
Antimony	34	03/20/12	03/22/12	< 0.010	< 0.010	mg/L	0.010	< 0.5
Antimony	35	03/19/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	< 0.5



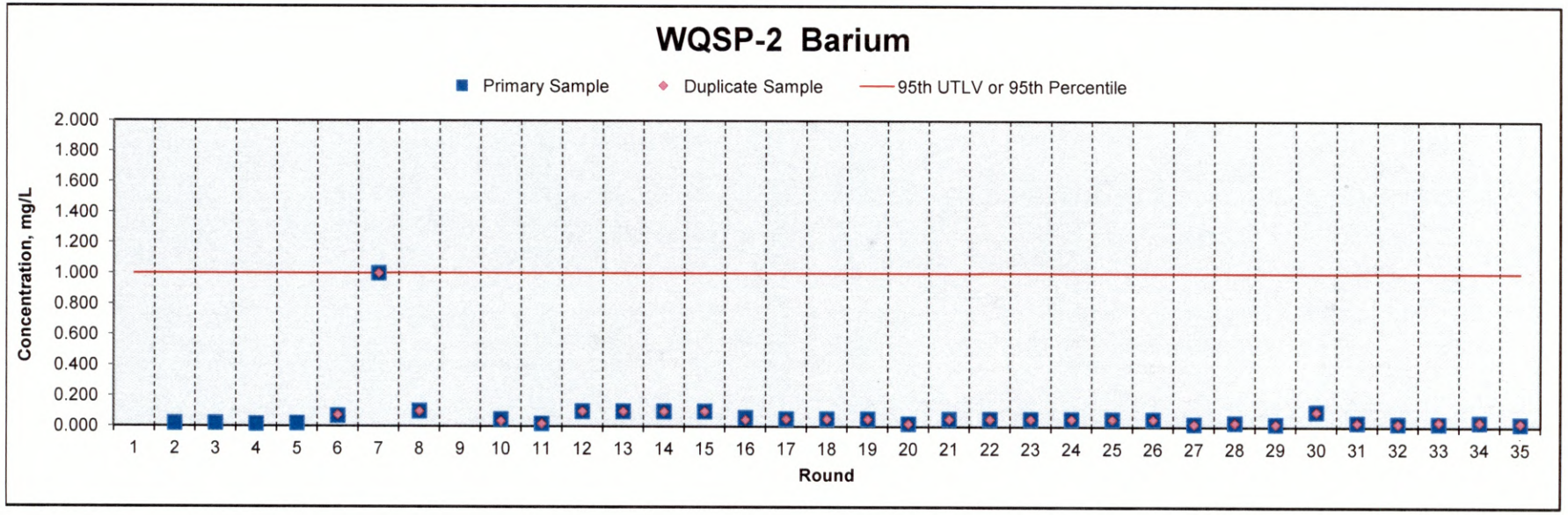
WQSP-2 Arsenic

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Arsenic	1					mg/L		0.062
Arsenic	2	04/25/96	05/14/96	< 0.013		mg/L	0.013	0.062
Arsenic	3	08/08/96	08/21/96	< 0.013		mg/L	0.013	0.062
Arsenic	4	05/08/97	05/21/97	< 0.013		mg/L	0.013	0.062
Arsenic	5	08/07/97	08/15/97	< 0.050		mg/L	0.050	0.062
Arsenic	6	04/15/98	04/30/98	< 0.020	< 0.020	mg/L	0.010	0.062
Arsenic	7	08/12/98	09/16/98	< 0.005	< 0.005	mg/L	0.050	0.062
Arsenic	8	03/17/99	03/18/99	< 0.050	< 0.050	mg/L	0.050	0.062
Arsenic	9	09/15/99	09/16/99	< 0.050	< 0.050	mg/L	0.050	0.062
Arsenic	10	06/19/00	06/19/00	< 0.100	< 0.100	mg/L	0.100	0.062
Arsenic	26	05/07/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	0.062
Arsenic	27	10/27/08	12/02/08	< 0.020	< 0.020	mg/L	0.050	0.062
Arsenic	28	05/06/09	05/21/09	< 0.010	< 0.010	mg/L	0.010	0.062
Arsenic	29	10/28/09	11/10/09	< 0.010	< 0.010	mg/L	0.010	0.062
Arsenic	30	05/05/10	05/24/10	< 0.010	< 0.010	mg/L	0.010	0.062
Arsenic	31	11/03/10	11/11/10	< 0.005	< 0.005	mg/L	0.005	0.062
Arsenic	32	03/23/11	04/11/11	0.010	0.011	mg/L	0.0050	0.062
Arsenic	33	11/02/11	11/17/11	< 0.010	< 0.010	mg/L	0.010	0.062
Arsenic	34	03/20/12	03/22/12	< 0.010	< 0.010	mg/L	0.010	0.062
Arsenic	35	03/19/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	0.062



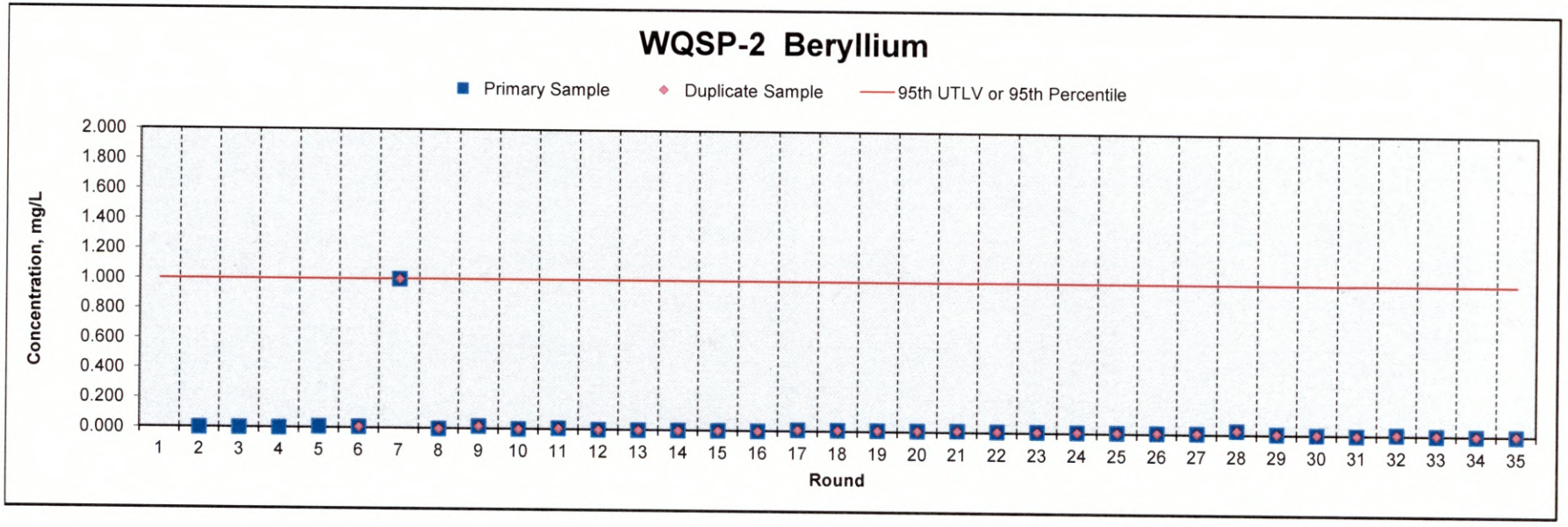
WQSP-2 Barium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Barium	1					mg/L		< 1.0
Barium	2	04/25/96	05/14/96	0.020		mg/L	0.005	< 1.0
Barium	3	08/08/96	08/21/96	0.021		mg/L	0.005	< 1.0
Barium	4	05/08/97	05/21/97	0.016		mg/L	0.005	< 1.0
Barium	5	08/07/97	08/15/97	< 0.020		mg/L	0.020	< 1.0
Barium	6	04/15/98	05/05/98	0.070	0.075	mg/L	0.004	< 1.0
Barium	7	08/12/98	09/16/98	< 1.000	< 1.000	mg/L	0.020	< 1.0
Barium	8	03/19/99	03/18/99	< 0.100	< 0.100	mg/L	0.100	< 1.0
Barium	9					mg/L		< 1.0
Barium	10	03/15/00	03/16/00	0.047	0.037	mg/L	0.200	< 1.0
Barium	26	05/07/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	< 1.0
Barium	27	10/27/08	12/02/08	< 0.020	< 0.020	mg/L	0.020	< 1.0
Barium	28	05/06/09	05/28/09	0.029	0.028	mg/L	0.100	< 1.0
Barium	29	10/28/09	01/07/10	< 0.020	< 0.020	mg/L	0.020	< 1.0
Barium	30	05/05/10	05/12/10	< 0.10	< 0.10	mg/L	0.010	< 1.0
Barium	31	11/03/10	12/03/10	0.029	0.029	mg/L	0.002	< 1.0
Barium	32	03/23/11	04/11/11	0.023	0.022	mg/L	0.020	< 1.0
Barium	33	11/02/11	11/09/11	< 0.023	0.034	mg/L	0.023	< 1.0
Barium	34	03/20/12	03/26/12	0.032	0.034	mg/L	0.013	< 1.0
Barium	35	03/19/13	03/25/13	0.021	0.027	mg/L	0.0025	< 1.0



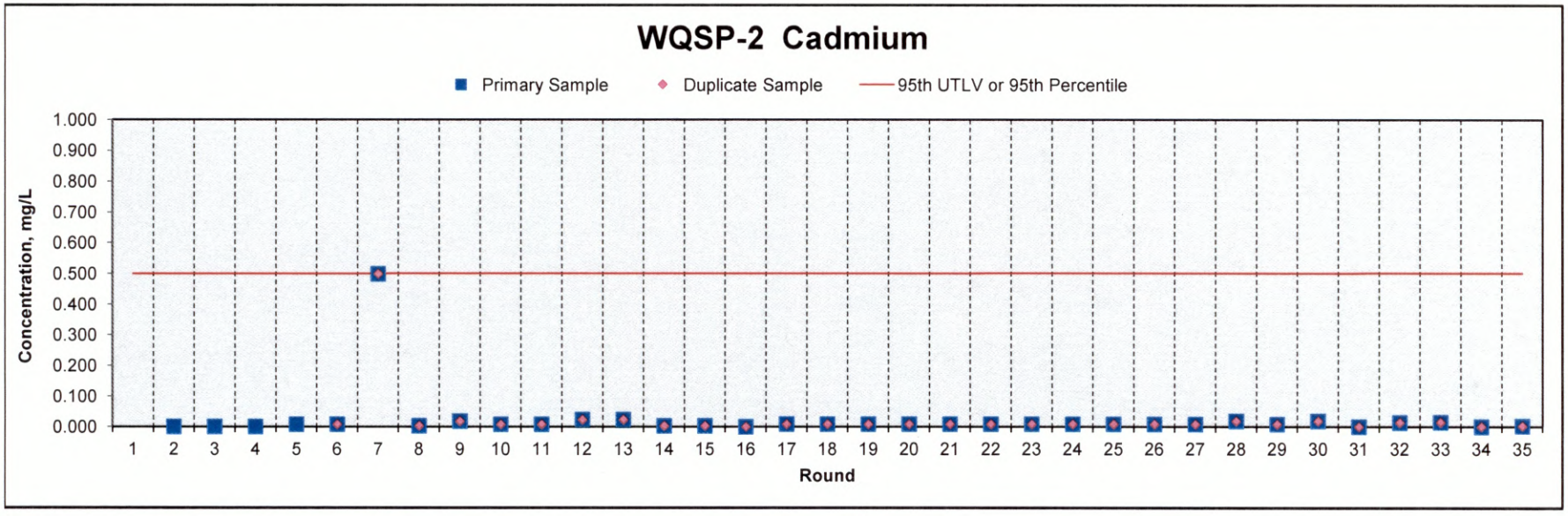
WQSP-2 Beryllium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Beryllium	1					mg/L		< 1.0
Beryllium	2	04/25/96	05/14/96	< 0.003		mg/L	0.003	< 1.0
Beryllium	3	08/08/96	08/21/96	< 0.003		mg/L	0.003	< 1.0
Beryllium	4	05/08/97	05/21/97	< 0.003		mg/L	0.003	< 1.0
Beryllium	5	08/07/97	08/15/97	< 0.010		mg/L	0.010	< 1.0
Beryllium	6	04/15/98	05/05/98	< 0.010	< 0.010	mg/L	0.001	< 1.0
Beryllium	7	08/12/98	09/16/98	< 1.000	< 1.000	mg/L	0.010	< 1.0
Beryllium	8	03/17/99	03/18/99	< 0.001	< 0.001	mg/L	0.001	< 1.0
Beryllium	9	09/15/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	< 1.0
Beryllium	10	03/15/00	03/16/00	0.003	0.003	mg/L	0.005	< 1.0
Beryllium	26	05/07/08	05/21/08	< 0.010	< 0.010	mg/L	0.010	< 1.0
Beryllium	27	10/27/08	12/02/08	< 0.010	< 0.010	mg/L	0.010	< 1.0
Beryllium	28	05/06/09	05/28/09	< 0.030	< 0.030	mg/L	0.030	< 1.0
Beryllium	29	10/28/09	01/07/10	< 0.010	< 0.010	mg/L	0.010	< 1.0
Beryllium	30	05/05/10	05/12/10	0.005	0.006	mg/L	0.030	< 1.0
Beryllium	31	11/03/10	12/03/10	0.0021	0.0023	mg/L	0.001	< 1.0
Beryllium	32	03/23/11	04/25/11	< 0.010	< 0.010	mg/L	0.010	< 1.0
Beryllium	33	11/02/11	11/09/11	0.0043	0.0071	mg/L	0.0042	< 1.0
Beryllium	34	03/20/12	03/26/12	0.0027	0.0029	mg/L	0.0010	< 1.0
Beryllium	35	03/19/13	03/25/13	< 0.0025	0.0060	mg/L	0.0025	< 1.0



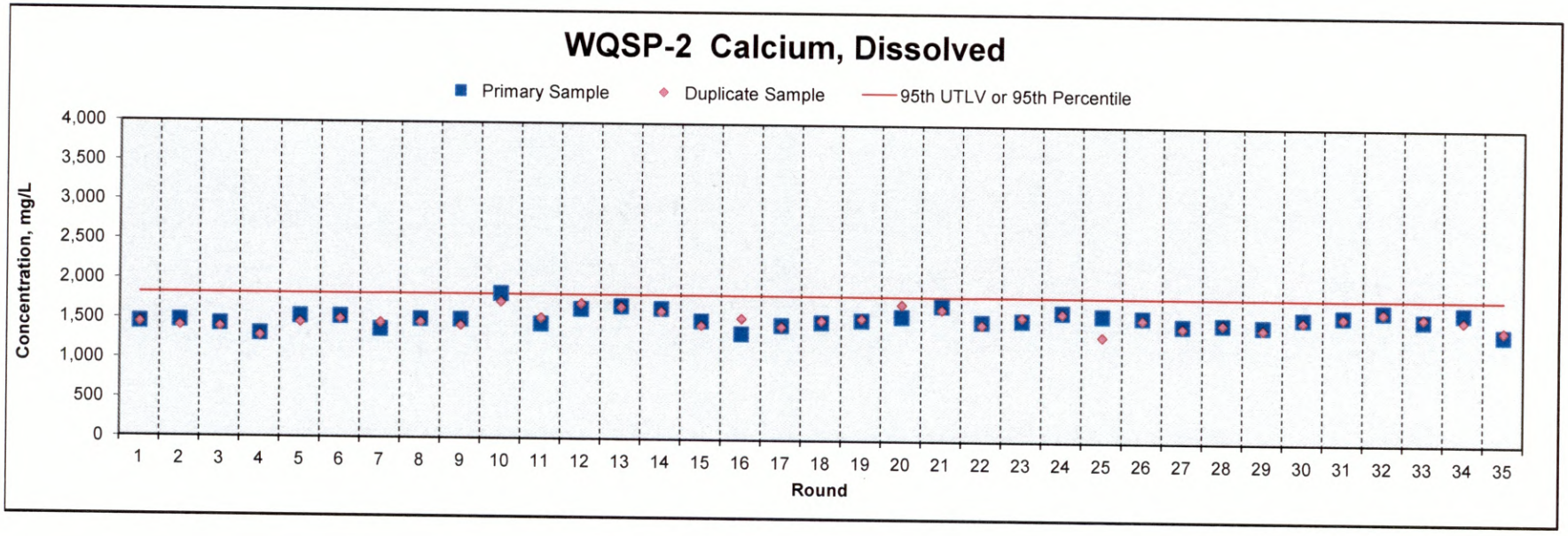
WQSP-2 Cadmium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Cadmium	1					mg/L		< 0.50
Cadmium	2	04/25/96	05/14/96	< 0.003		mg/L	0.003	< 0.50
Cadmium	3	08/08/96	08/21/96	< 0.003		mg/L	0.003	< 0.50
Cadmium	4	05/08/97	05/21/97	< 0.003		mg/L	0.003	< 0.50
Cadmium	5	08/07/97	08/15/97	< 0.010		mg/L	0.010	< 0.50
Cadmium	6	04/15/98	05/13/98	< 0.010	< 0.010	mg/L	0.010	< 0.50
Cadmium	7	08/12/98	09/16/98	< 0.500	< 0.500	mg/L	0.010	< 0.50
Cadmium	8	03/17/99	03/18/99	< 0.005	< 0.005	mg/L	0.005	< 0.50
Cadmium	9	09/15/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	< 0.50
Cadmium	10	03/15/00	03/16/00	< 0.010	< 0.010	mg/L	0.010	< 0.50
Cadmium	26	05/07/08	05/21/08	< 0.010	< 0.010	mg/L	0.010	< 0.50
Cadmium	27	10/27/08	12/02/08	< 0.010	< 0.010	mg/L	0.010	< 0.50
Cadmium	28	05/06/09	05/28/09	< 0.020	< 0.020	mg/L	0.010	< 0.50
Cadmium	29	10/28/09	01/07/10	< 0.010	< 0.010	mg/L	0.010	< 0.50
Cadmium	30	05/05/10	05/12/10	< 0.020	< 0.020	mg/L	0.020	< 0.50
Cadmium	31	11/03/10	12/03/10	< 0.0015	< 0.0015	mg/L	0.0015	< 0.50
Cadmium	32	03/23/11	04/25/11	< 0.015	< 0.015	mg/L	0.015	< 0.50
Cadmium	33	11/02/11	11/09/11	< 0.016	< 0.016	mg/L	0.016	< 0.50
Cadmium	34	03/20/12	03/26/12	< 0.002	< 0.002	mg/L	0.002	< 0.50
Cadmium	35	03/19/13	03/25/13	< 0.0040	< 0.0040	mg/L	0.0040	< 0.50



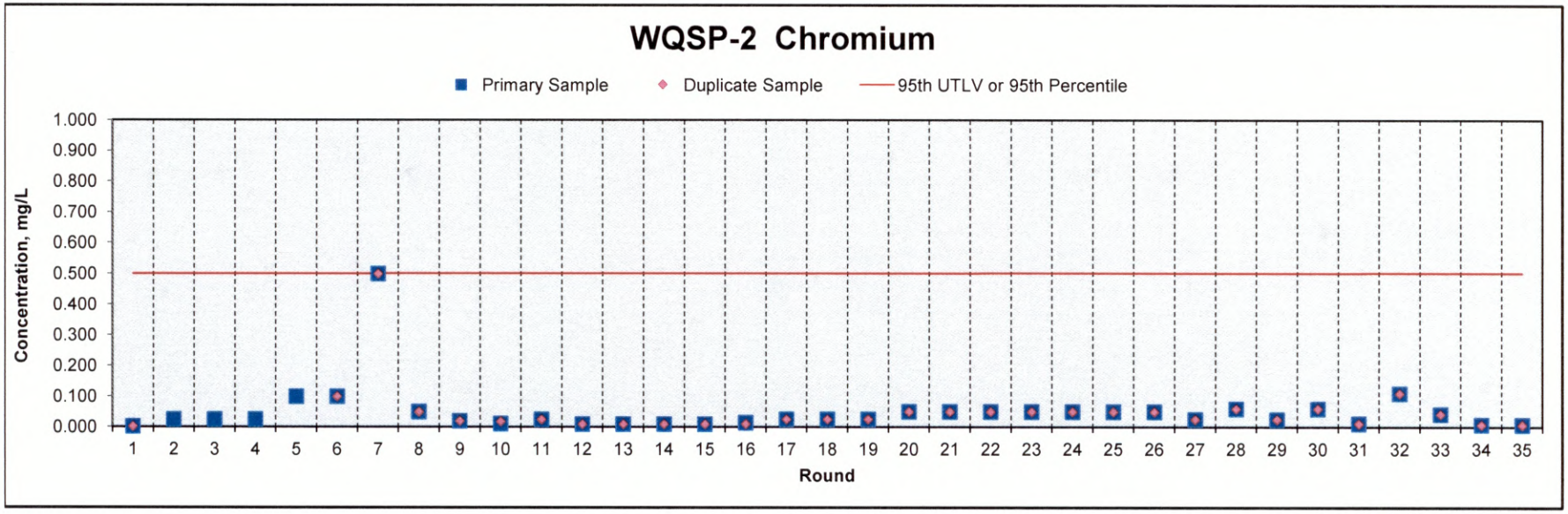
WQSP-2 Calcium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Calcium	1	08/31/95	09/12/95	1,460	1,450	mg/L	2.000	1,827
Calcium	2	04/25/96	05/10/96	1,480	1,410	mg/L	2.000	1,827
Calcium	3	08/08/96	08/21/96	1,440	1,400	mg/L	2.000	1,827
Calcium	4	05/08/97	05/21/97	1,320	1,290	mg/L	2.000	1,827
Calcium	5	08/07/97	08/15/97	1,540	1,460	mg/L	2.000	1,827
Calcium	6	04/15/98	05/05/98	1,540	1,505	mg/L	12.000	1,827
Calcium	7	08/12/98	09/16/98	1,380	1,460	mg/L	2.000	1,827
Calcium	8	03/17/99	03/19/99	1,510	1,470	mg/L	0.500	1,827
Calcium	9	09/15/99	09/16/99	1,509	1,428	mg/L	0.500	1,827
Calcium	10	06/19/00	06/19/00	1,840	1,730	mg/L	5.000	1,827
Calcium	26	05/07/08	05/21/08	1,590	1,560	mg/L	0.500	1,827
Calcium	27	10/27/08	12/19/08	1,490	1,460	mg/L	0.500	1,827
Calcium	28	05/06/09	05/28/09	1,510	1,510	mg/L	0.500	1,827
Calcium	29	10/28/09	12/01/09	1,490	1,450	mg/L	0.500	1,827
Calcium	30	05/05/10	05/12/10	1,590	1,550	mg/L	0.500	1,827
Calcium	31	11/03/10	12/03/10	1,620	1,600	mg/L	0.40	1,827
Calcium	32	03/23/11	05/02/11	1,690	1,670	mg/L	2.0	1,827
Calcium	33	11/02/11	11/10/11	1,580	1,610	mg/L	1.1	1,827
Calcium	34	03/20/12	04/12/12	1,670	1,570	mg/L	0.82	1,827
Calcium	35	03/19/13	05/06/13	1,400	1,450	mg/L	5.60	1,827



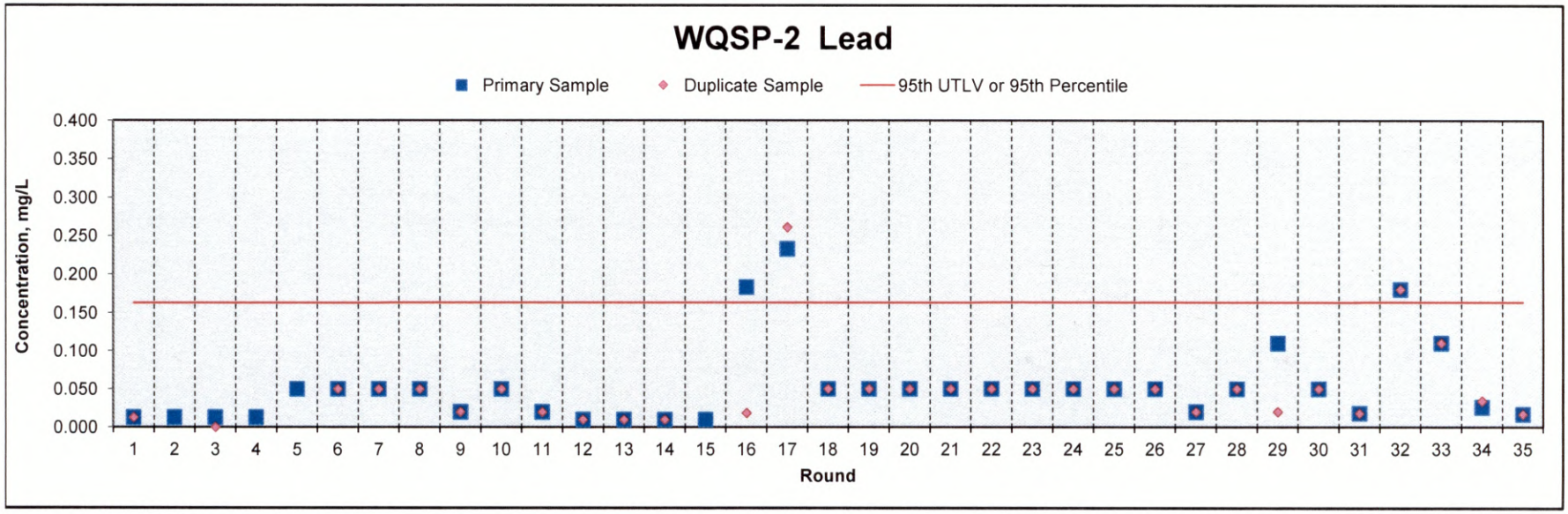
WQSP-2 Chromium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chromium	1	08/17/95	09/13/95	< 0.003	< 0.003	mg/L	0.003	< 0.50
Chromium	2	11/07/96	11/19/96	< 0.025		mg/L	0.025	< 0.50
Chromium	3	07/25/96	07/30/96	< 0.025		mg/L	0.025	< 0.50
Chromium	4	04/24/97	05/02/97	< 0.025		mg/L	0.025	< 0.50
Chromium	5	07/24/97	08/15/97	< 0.100		mg/L	0.100	< 0.50
Chromium	6	03/05/98	03/19/98	< 0.100	< 0.100	mg/L	0.100	< 0.50
Chromium	7	07/15/98	08/17/98	< 0.500	< 0.500	mg/L	0.050	< 0.50
Chromium	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.050	< 0.50
Chromium	9	09/01/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	< 0.50
Chromium	10	03/15/00	03/16/00	0.011	0.018	mg/L	0.010	< 0.50
Chromium	26	05/07/08	05/21/08	< 0.050	< 0.050	mg/L	0.025	< 0.50
Chromium	27	10/27/08	12/02/08	< 0.025	< 0.025	mg/L	0.025	< 0.50
Chromium	28	05/06/09	05/28/09	< 0.060	< 0.060	mg/L	0.025	< 0.50
Chromium	29	10/28/09	01/07/10	< 0.025	< 0.025	mg/L	0.025	< 0.50
Chromium	30	05/05/10	05/12/10	< 0.060	< 0.060	mg/L	0.060	< 0.50
Chromium	31	11/03/10	12/03/10	< 0.011	< 0.011	mg/L	0.011	< 0.50
Chromium	32	03/23/11	04/25/11	< 0.11	< 0.11	mg/L	0.11	< 0.50
Chromium	33	11/02/11	11/09/11	< 0.042	< 0.042	mg/L	0.042	< 0.50
Chromium	34	03/20/12	03/26/12	< 0.0080	< 0.0080	mg/L	0.0080	< 0.50
Chromium	35	03/19/13	03/25/13	< 0.0075	< 0.0075	mg/L	0.0075	< 0.50



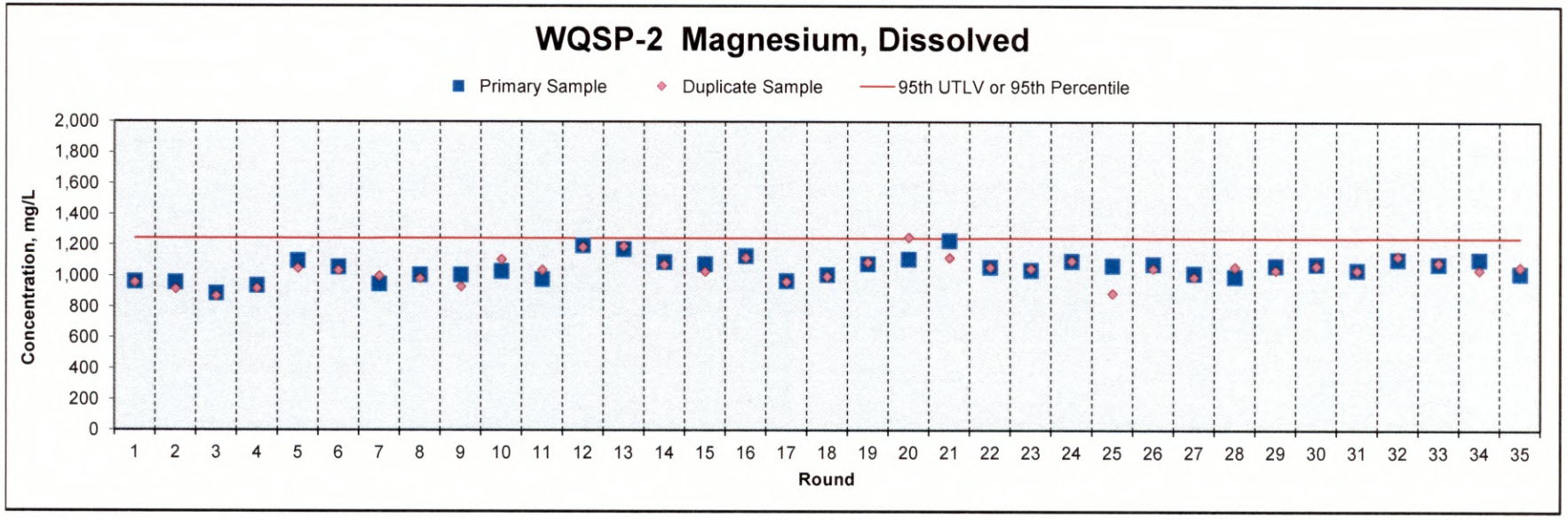
WQSP-2 Lead

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Lead	1	08/17/95	09/13/95	< 0.013	< 0.013	mg/L	0.013	0.163
Lead	2	11/07/96	11/19/96	< 0.013		mg/L	0.013	0.163
Lead	3	07/25/96	07/30/96	< 0.013		mg/L	0.013	0.163
Lead	4	04/24/97	05/02/97	< 0.013		mg/L	0.013	0.163
Lead	5	07/24/97	08/15/97	< 0.050		mg/L	0.050	0.163
Lead	6	03/05/98	03/19/98	< 0.050	< 0.050	mg/L	0.050	0.163
Lead	7	07/15/98	08/17/98	< 0.050	< 0.050	mg/L	0.005	0.163
Lead	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.050	0.163
Lead	9	09/01/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	0.163
Lead	10	06/19/00	06/19/00	< 0.050	< 0.050	mg/L	0.050	0.163
Lead	26	05/07/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	0.163
Lead	27	10/27/08	12/02/08	< 0.020	< 0.020	mg/L	0.020	0.163
Lead	28	05/06/09	05/28/09	< 0.050	< 0.050	mg/L	0.020	0.163
Lead	29	10/28/09	01/07/10	0.110	< 0.020	mg/L	0.020	0.163
Lead	30	05/05/10	05/12/10	< 0.050	< 0.050	mg/L	0.050	0.163
Lead	31	11/03/10	12/03/10	< 0.018	< 0.018	mg/L	0.018	0.163
Lead	32	03/23/11	04/25/11	< 0.18	< 0.18	mg/L	0.18	0.163
Lead	33	11/02/11	11/09/11	< 0.11	< 0.11	mg/L	0.11	0.163
Lead	34	03/20/12	03/26/12	< 0.026	< 0.034	mg/L	0.026	0.163
Lead	35	03/19/13	03/25/13	< 0.017	< 0.017	mg/L	0.017	0.163



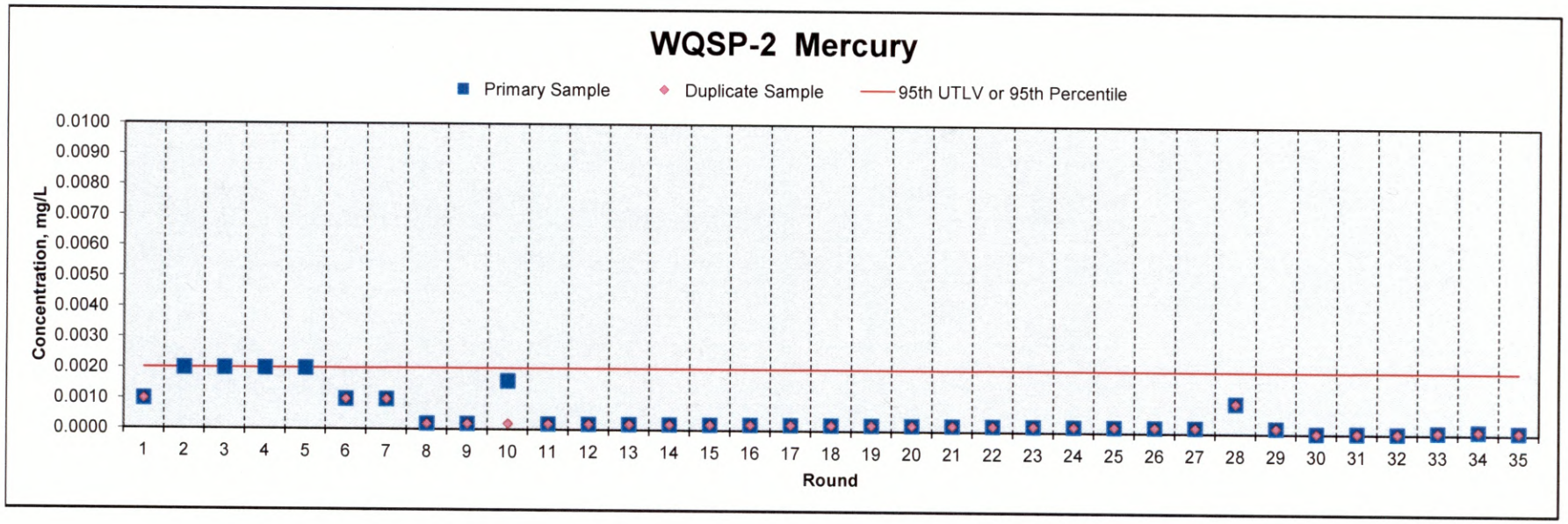
WQSP-2 Magnesium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Magnesium	1	08/17/95	08/28/95	966	960	mg/L	1.000	1,244
Magnesium	2	04/11/96	05/07/96	960	916	mg/L	0.500	1,244
Magnesium	3	07/25/96	07/30/96	889	871	mg/L	0.500	1,244
Magnesium	4	04/24/97	05/02/97	940	921	mg/L	1.000	1,244
Magnesium	5	07/24/97	08/15/97	1,100	1,050	mg/L	0.500	1,244
Magnesium	6	03/05/98	03/19/98	1,060	1,038	mg/L	0.500	1,244
Magnesium	7	07/15/98	08/17/98	950	1,000	mg/L	0.500	1,244
Magnesium	8	03/03/99	03/15/99	1,010	986	mg/L	0.500	1,244
Magnesium	9	09/01/99	09/16/99	1,010	931	mg/L	0.500	1,244
Magnesium	10	03/15/00	03/16/00	1,033	1,107	mg/L	5.000	1,244
Magnesium	26	05/07/08	05/21/08	1,080	1,050	mg/L	0.500	1,244
Magnesium	27	10/27/08	12/19/08	1,020	996	mg/L	0.500	1,244
Magnesium	28	05/06/09	05/28/09	999	1,060	mg/L	0.500	1,244
Magnesium	29	10/28/09	12/01/09	1,070	1,040	mg/L	0.500	1,244
Magnesium	30	05/05/10	05/12/10	1,080	1,070	mg/L	0.500	1,244
Magnesium	31	11/03/10	12/03/10	1,040	1,040	mg/L	0.33	1,244
Magnesium	32	03/23/11	05/02/11	1,110	1,130	mg/L	1.60	1,244
Magnesium	33	11/02/11	11/10/11	1,080	1,090	mg/L	1.1	1,244
Magnesium	34	03/20/12	04/12/12	1,110	1,040	mg/L	0.66	1,244
Magnesium	35	03/19/13	05/06/13	1,020	1,060	mg/L	0.83	1,244



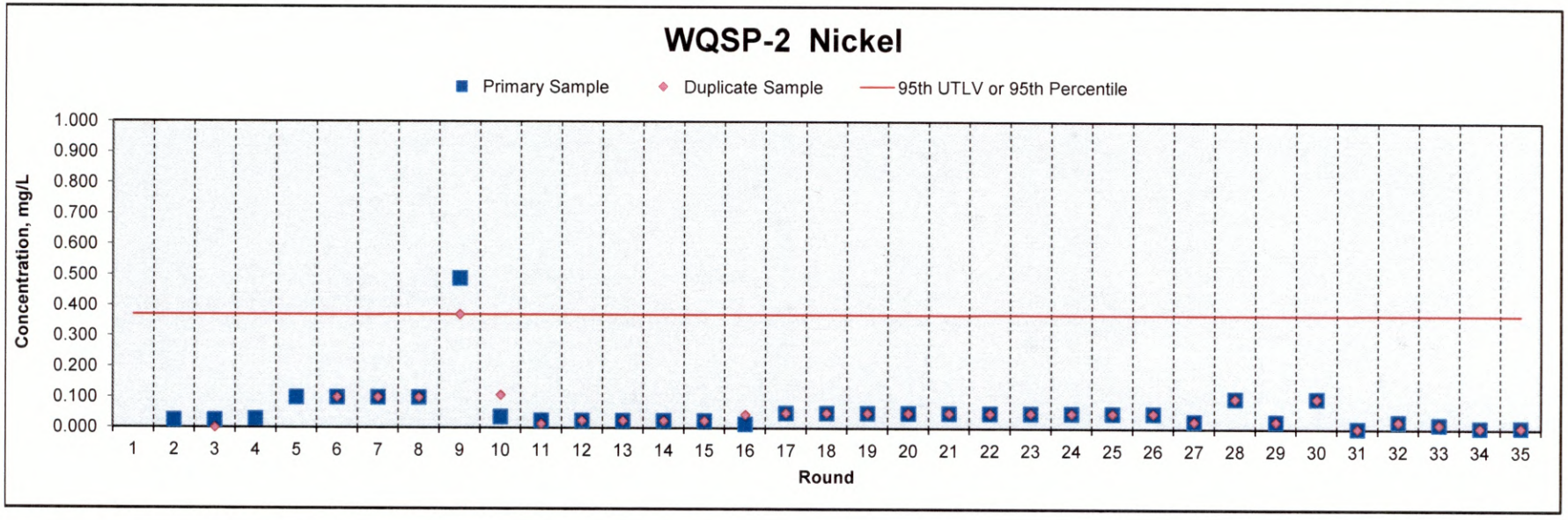
WQSP-2 Mercury

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Mercury	1	09/19/95	09/20/95	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	2	05/09/96	05/14/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	3	08/22/96	08/26/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	4	05/22/97	05/30/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	5	08/21/97	08/28/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	6	04/22/98	04/24/98	< 0.0010	< 0.0010	mg/L	0.0001	< 0.002
Mercury	7	08/26/98	09/02/98	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	8	04/08/99	04/15/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	9	10/06/99	10/07/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	10	03/23/00	04/06/00	0.0016	< 0.0002	mg/L	0.0002	< 0.002
Mercury	26	04/30/08	05/06/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	27	10/22/08	11/09/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	28	04/29/09	05/11/09	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	29	10/28/09	11/12/09	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	30	05/05/10	05/12/10	< 0.000030	< 0.000030	mg/L	0.000030	< 0.002
Mercury	31	11/03/10	11/10/10	< 0.000037	< 0.000037	mg/L	0.000037	< 0.002
Mercury	32	03/23/11	04/19/11	< 0.000032	< 0.000032	mg/L	0.000032	< 0.002
Mercury	33	11/02/11	11/16/11	< 0.000080	< 0.000080	mg/L	0.000080	< 0.002
Mercury	34	03/20/12	03/23/12	< 0.00012	< 0.00012	mg/L	0.00012	< 0.002
Mercury	35	03/19/13	03/25/13	< 0.000089	< 0.000089	mg/L	0.000089	< 0.002



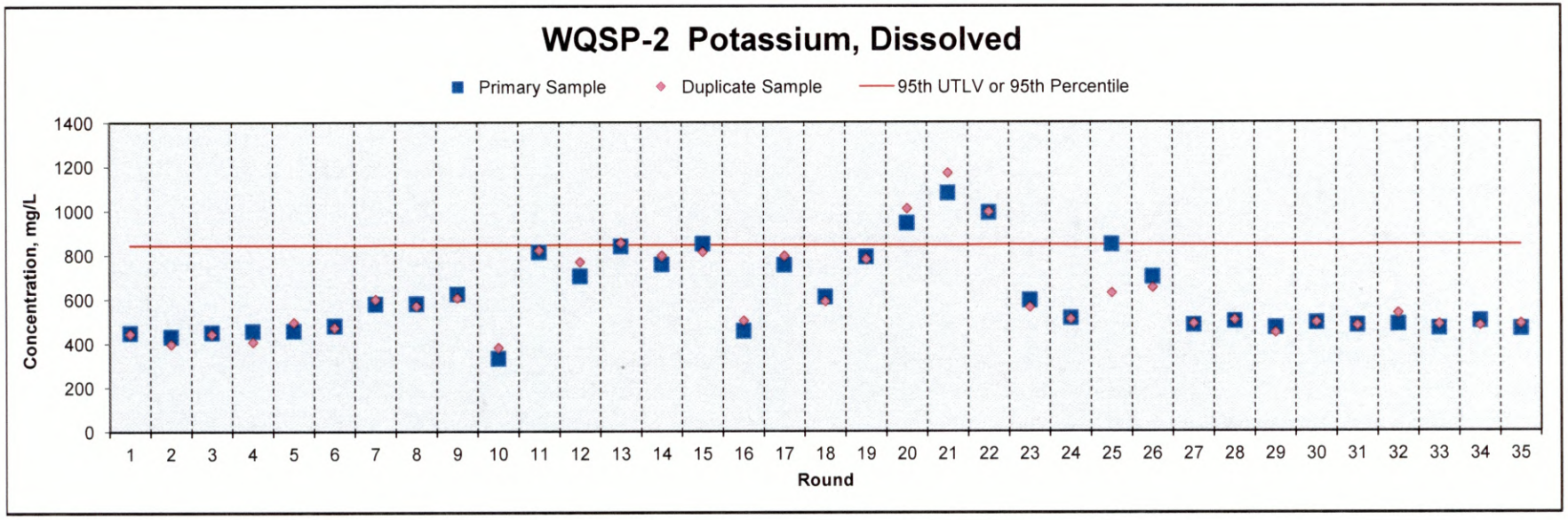
WQSP-2 Nickel

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Nickel	1					mg/L		0.37
Nickel	2	11/07/96	11/19/96	< 0.025		mg/L	0.025	0.37
Nickel	3	07/25/96	07/30/96	< 0.025		mg/L	0.025	0.37
Nickel	4	04/24/97	05/02/97	0.029		mg/L	0.025	0.37
Nickel	5	07/24/97	08/15/97	< 0.100		mg/L	0.100	0.37
Nickel	6	03/05/98	03/19/98	< 0.100	< 0.100	mg/L	0.100	0.37
Nickel	7	07/15/98	08/17/98	< 0.100	< 0.100	mg/L	0.100	0.37
Nickel	8	03/03/99	03/08/99	< 0.100	< 0.100	mg/L	0.100	0.37
Nickel	9	09/01/99	09/16/99	0.490	0.370	mg/L	0.050	0.37
Nickel	10	03/15/00	03/16/00	0.037	0.107	mg/L	0.001	0.37
Nickel	26	05/07/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	0.37
Nickel	27	10/27/08	12/02/08	< 0.025	< 0.025	mg/L	0.025	0.37
Nickel	28	05/06/09	05/28/09	< 0.100	< 0.100	mg/L	0.025	0.37
Nickel	29	10/28/09	01/07/10	< 0.025	< 0.025	mg/L	0.025	0.37
Nickel	30	05/05/10	05/12/10	< 0.100	< 0.100	mg/L	0.100	0.37
Nickel	31	11/03/10	12/03/10	< 0.0025	< 0.0025	mg/L	0.0025	0.37
Nickel	32	03/23/11	04/25/11	< 0.025	< 0.025	mg/L	0.025	0.37
Nickel	33	11/02/11	11/09/11	< 0.016	< 0.016	mg/L	0.016	0.37
Nickel	34	03/20/12	03/26/12	< 0.0060	< 0.0060	mg/L	0.0060	0.37
Nickel	35	03/19/13	03/25/13	< 0.0070	< 0.0070	mg/L	0.0070	0.37



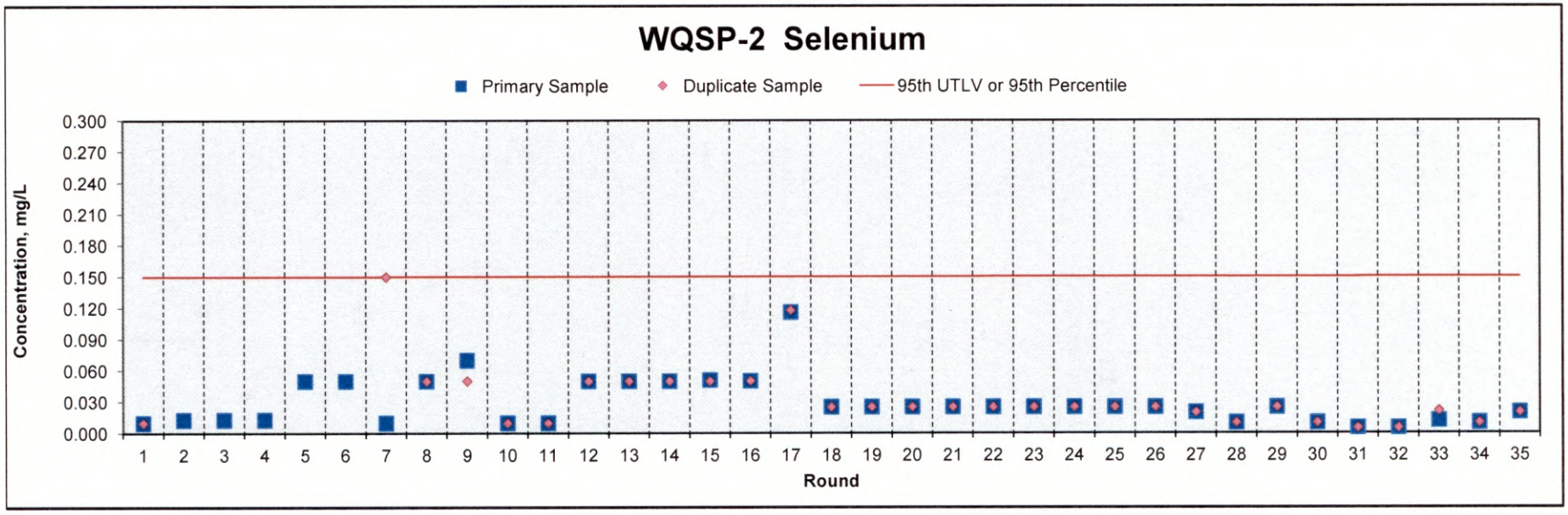
WQSP-2 Potassium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Potassium	1	08/17/95	08/28/95	450	446	mg/L	0.20	845
Potassium	2	04/11/96	04/25/96	433	398	mg/L	10.0	845
Potassium	3	07/25/96	07/30/96	451	444	mg/L	2.0	845
Potassium	4	04/24/97	05/01/97	457	408	mg/L	2.0	845
Potassium	5	07/24/97	07/29/97	458	496	mg/L	2.0	845
Potassium	6	03/05/98	03/19/98	481	473	mg/L	2.0	845
Potassium	7	07/15/98	08/17/98	580	600	mg/L	0.50	845
Potassium	8	03/03/99	03/15/99	581	570	mg/L	0.50	845
Potassium	9	09/01/99	09/16/99	625	606	mg/L	0.50	845
Potassium	10	03/15/00	03/16/00	333	380	mg/L	0.040	845
Potassium	26	05/07/08	05/21/08	701	651	mg/L	0.50	845
Potassium	27	10/27/08	12/19/08	482	487	mg/L	0.50	845
Potassium	28	05/06/09	05/28/09	499	504	mg/L	0.50	845
Potassium	29	10/28/09	12/01/09	470	446	mg/L	0.50	845
Potassium	30	05/05/10	05/06/10	492	493	mg/L	0.50	845
Potassium	31	11/03/10	12/03/10	480	477	mg/L	1.0	845
Potassium	32	03/23/11	05/02/11	484	533	mg/L	5.2	845
Potassium	33	11/02/11	11/10/11	465	483	mg/L	8.4	845
Potassium	34	03/20/12	04/12/12	499	477	mg/L	3.4	845
Potassium	35	03/19/13	05/06/13	463	485	mg/L	5.0	845



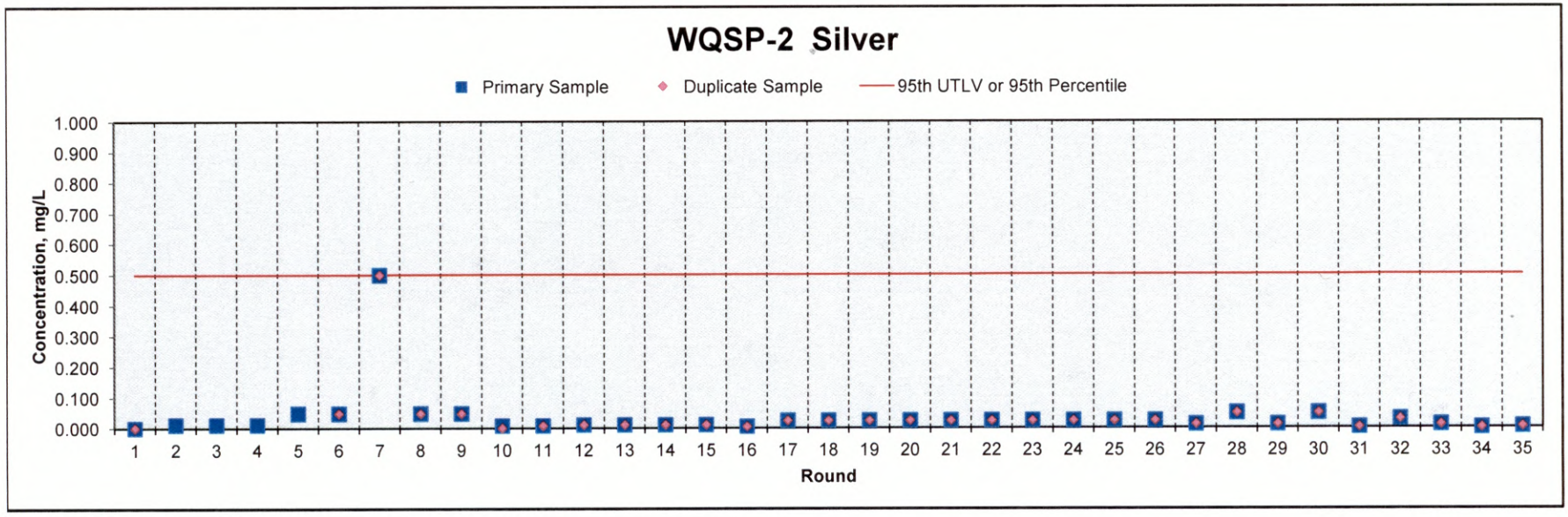
WQSP-2 Selenium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Selenium	1	08/17/95	10/06/95	< 0.010	< 0.010	mg/L	0.010	0.150
Selenium	2	11/07/96	11/19/96	< 0.013		mg/L	0.013	0.150
Selenium	3	07/25/96	07/30/96	< 0.013		mg/L	0.013	0.150
Selenium	4	04/24/97	05/02/97	< 0.013		mg/L	0.013	0.150
Selenium	5	07/24/97	08/15/97	< 0.050		mg/L	0.050	0.150
Selenium	6	03/05/98	03/19/98	< 0.050		mg/L	0.050	0.150
Selenium	7	07/15/98	08/17/98	< 0.010	0.150	mg/L	0.010	0.150
Selenium	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.010	0.150
Selenium	9	09/01/99	09/16/99	0.070	< 0.050	mg/L	0.050	0.150
Selenium	10	03/15/00	03/16/00	< 0.010	< 0.010	mg/L	0.010	0.150
Selenium	26	05/07/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	0.150
Selenium	27	10/27/08	12/02/08	< 0.020	< 0.020	mg/L	0.025	0.150
Selenium	28	05/06/09	05/21/09	< 0.010	< 0.010	mg/L	0.010	0.150
Selenium	29	10/28/09	11/10/09	< 0.025	< 0.025	mg/L	0.025	0.150
Selenium	30	05/05/10	05/24/10	< 0.010	< 0.010	mg/L	0.010	0.150
Selenium	31	11/03/10	11/11/10	< 0.005	< 0.005	mg/L	0.005	0.150
Selenium	32	03/23/11	04/11/11	< 0.0050	< 0.0050	mg/L	0.0050	0.150
Selenium	33	11/02/11	11/17/11	0.012	0.021	mg/L	0.010	0.150
Selenium	34	03/20/12	03/22/12	< 0.010	< 0.010	mg/L	0.010	0.150
Selenium	35	03/19/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	0.150



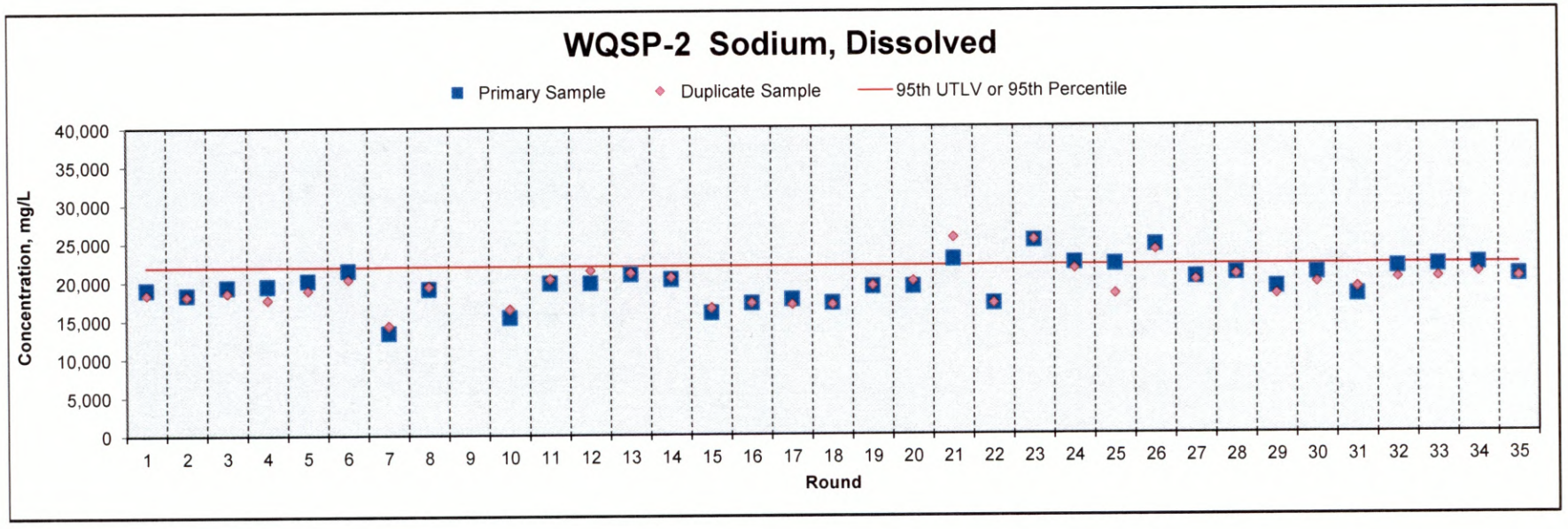
WQSP-2 Silver

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Silver	1	08/17/95	09/13/95	< 0.003	< 0.003	mg/L	0.003	< 0.5
Silver	2	11/07/96	11/19/96	< 0.013		mg/L	0.013	< 0.5
Silver	3	07/25/96	07/30/96	< 0.013		mg/L	0.013	< 0.5
Silver	4	04/24/97	05/02/97	< 0.013		mg/L	0.013	< 0.5
Silver	5	07/24/97	08/15/97	< 0.050		mg/L	0.050	< 0.5
Silver	6	03/05/98	03/19/98	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	7	07/15/98	08/17/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Silver	8	03/03/99	03/08/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	9	09/01/99	09/17/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	10	03/15/00	03/16/00	< 0.010	0.002	mg/L	0.010	< 0.5
Silver	26	05/07/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Silver	27	10/27/08	12/02/08	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	28	05/06/09	05/28/09	< 0.050	< 0.050	mg/L	0.013	< 0.5
Silver	29	10/28/09	01/07/10	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	30	05/05/10	05/12/10	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	31	11/03/10	12/03/10	< 0.0030	< 0.0030	mg/L	0.0030	< 0.5
Silver	32	03/23/11	04/25/11	< 0.030	< 0.030	mg/L	0.030	< 0.5
Silver	33	11/02/11	11/09/11	< 0.012	< 0.012	mg/L	0.012	< 0.5
Silver	34	03/20/12	03/26/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.5
Silver	35	03/19/13	03/25/13	< 0.0055	< 0.0055	mg/L	0.0055	< 0.5



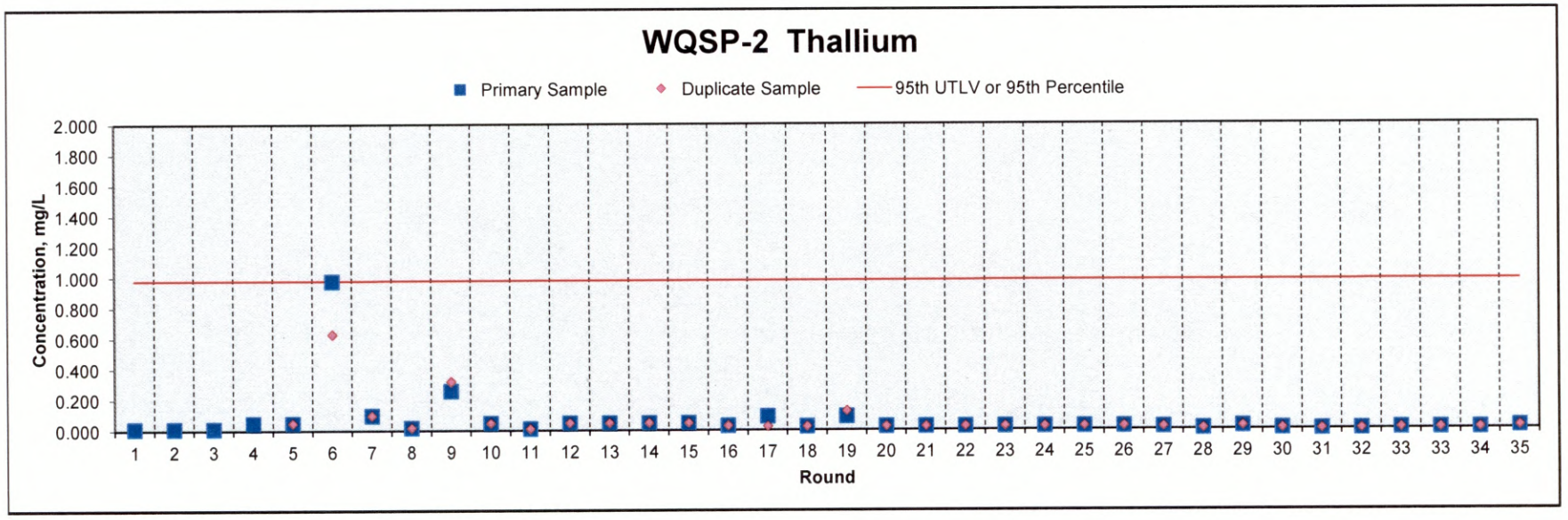
WQSP-2 Sodium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sodium	1	08/17/95	08/28/95	19,100	18,400	mg/L	5.000	21,900
Sodium	2	04/11/96	04/25/96	18,400	18,200	mg/L	25.000	21,900
Sodium	3	07/25/96	07/30/96	19,400	18,600	mg/L	25.000	21,900
Sodium	4	04/24/97	05/01/97	19,500	17,700	mg/L	10.000	21,900
Sodium	5	07/24/97	07/29/97	20,200	18,900	mg/L	10.000	21,900
Sodium	6	03/05/98	03/19/98	21,498	20,299	mg/L	4.000	21,900
Sodium	7	07/15/98	08/17/98	13,400	14,300	mg/L	0.500	21,900
Sodium	8	03/03/99	03/15/99	19,100	19,400	mg/L	1.000	21,900
Sodium	9					mg/L		21,900
Sodium	10	03/15/00	03/16/00	15,374	16,396	mg/L	5.000	21,900
Sodium	26	05/07/08	05/21/08	24,500	23,800	mg/L	0.500	21,900
Sodium	27	10/27/08	12/19/08	20,300	19,900	mg/L	0.500	21,900
Sodium	28	05/06/09	05/28/09	20,800	20,600	mg/L	0.500	21,900
Sodium	29	10/28/09	12/02/09	19,000	18,000	mg/L	0.500	21,900
Sodium	30	05/05/10	05/06/10	20,800	19,500	mg/L	0.500	21,900
Sodium	31	11/03/10	12/03/10	17,900	18,800	mg/L	14	21,900
Sodium	32	03/23/11	04/27/11	21,500	20,000	mg/L	27	21,900
Sodium	33	11/02/11	11/09/11	21,700	20,100	mg/L	64	21,900
Sodium	34	03/20/12	04/12/12	21,900	20,700	mg/L	12	21,900
Sodium	35	03/19/13	05/06/13	20,400	20,100	mg/L	40	21,900



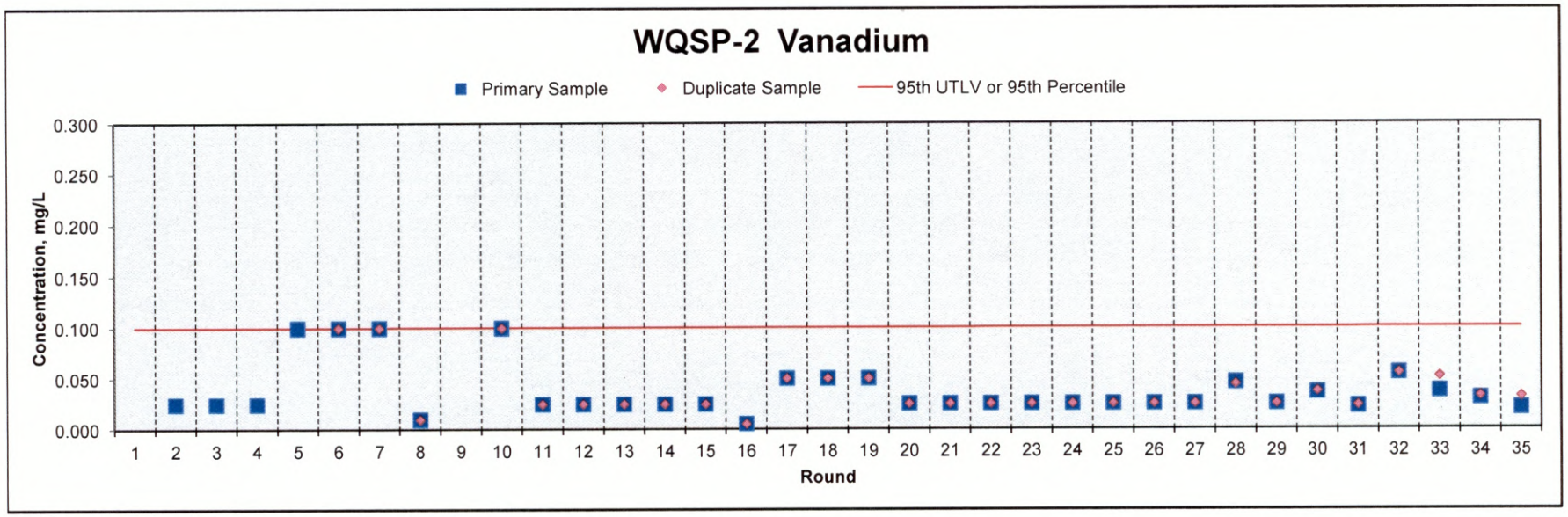
WQSP-2 Thallium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Thallium	1	11/07/96	11/19/96	< 0.013		mg/L	0.013	0.980
Thallium	2	07/25/96	07/30/96	< 0.013		mg/L	0.013	0.980
Thallium	3	04/24/97	05/02/97	< 0.013		mg/L	0.013	0.980
Thallium	4	07/24/97	08/15/97	< 0.050		mg/L	0.050	0.980
Thallium	5	03/05/98	03/19/98	< 0.050	< 0.050	mg/L	0.050	0.980
Thallium	6	07/15/98	08/17/98	0.980	0.630	mg/L	0.005	0.980
Thallium	7	03/03/99	03/08/99	< 0.100	< 0.100	mg/L	0.100	0.980
Thallium	8	09/01/99	09/16/99	< 0.020	< 0.020	mg/L	0.020	0.980
Thallium	9	03/15/00	03/16/00	0.262	0.321	mg/L	0.010	0.980
Thallium	10	06/19/00	06/19/00	< 0.050	< 0.050	mg/L	0.050	0.980
Thallium	26	05/07/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	0.980
Thallium	27	10/27/08	12/02/08	< 0.020	< 0.020	mg/L	0.025	0.980
Thallium	28	05/06/09	05/21/09	< 0.010	< 0.010	mg/L	0.010	0.980
Thallium	29	10/28/09	11/10/09	< 0.025	< 0.025	mg/L	0.025	0.980
Thallium	30	05/05/10	05/24/10	< 0.010	< 0.010	mg/L	0.010	0.980
Thallium	31	11/03/10	11/11/10	< 0.005	< 0.005	mg/L	0.005	0.980
Thallium	32	03/23/11	04/11/11	< 0.0050	< 0.0050	mg/L	0.0050	0.980
Thallium	33	11/02/11	11/17/11	< 0.010	< 0.010	mg/L	0.010	0.980
Thallium	33	11/02/11	11/17/11	< 0.010	< 0.010	mg/L	0.010	0.980
Thallium	34	03/20/12	03/22/12	< 0.010	< 0.010	mg/L	0.010	0.980
Thallium	35	03/19/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	0.980



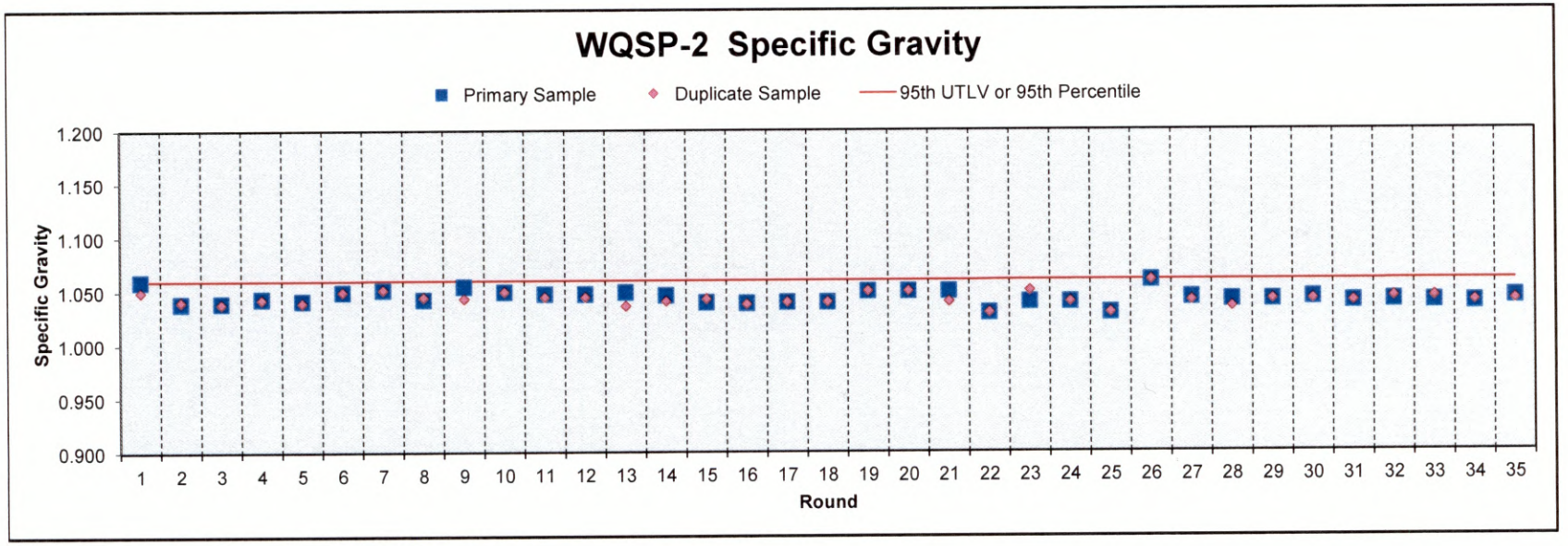
WQSP-2 Vanadium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Vanadium	1					mg/L		< 0.1
Vanadium	2	11/07/96	11/19/96	< 0.025		mg/L	0.025	< 0.1
Vanadium	3	07/25/96	07/30/96	< 0.025		mg/L	0.025	< 0.1
Vanadium	4	04/24/97	05/02/97	< 0.025		mg/L	0.025	< 0.1
Vanadium	5	07/24/97	08/15/97	< 0.100		mg/L	0.100	< 0.1
Vanadium	6	03/05/98	03/19/98	< 0.100	< 0.100	mg/L	0.100	< 0.1
Vanadium	7	07/15/98	09/17/98	< 0.100	< 0.100	mg/L	0.100	< 0.1
Vanadium	8	03/03/99	03/08/99	< 0.010	< 0.010	mg/L	0.010	< 0.1
Vanadium	9					mg/L		< 0.1
Vanadium	10	03/15/00	03/16/00	< 0.100	< 0.100	mg/L	0.100	< 0.1
Vanadium	26	05/07/08	05/21/08	< 0.025	< 0.025	mg/L	0.050	< 0.1
Vanadium	27	10/27/08	12/02/08	< 0.025	< 0.025	mg/L	0.025	< 0.1
Vanadium	28	05/06/09	05/28/09	0.046	0.044	mg/L	0.500	< 0.1
Vanadium	29	10/28/09	12/01/09	< 0.025	< 0.025	mg/L	0.025	< 0.1
Vanadium	30	05/05/10	05/12/10	0.036	0.037	mg/L	0.025	< 0.1
Vanadium	31	11/03/10	12/03/10	0.022	0.023	mg/L	0.0055	< 0.1
Vanadium	32	03/23/11	04/25/11	< 0.055	< 0.055	mg/L	0.055	< 0.1
Vanadium	33	11/02/11	11/09/11	0.037	0.051	mg/L	0.011	< 0.1
Vanadium	34	03/20/12	03/26/12	0.030	0.032	mg/L	0.0040	< 0.1
Vanadium	35	03/19/13	03/25/13	0.020	0.031	mg/L	0.0175	< 0.1



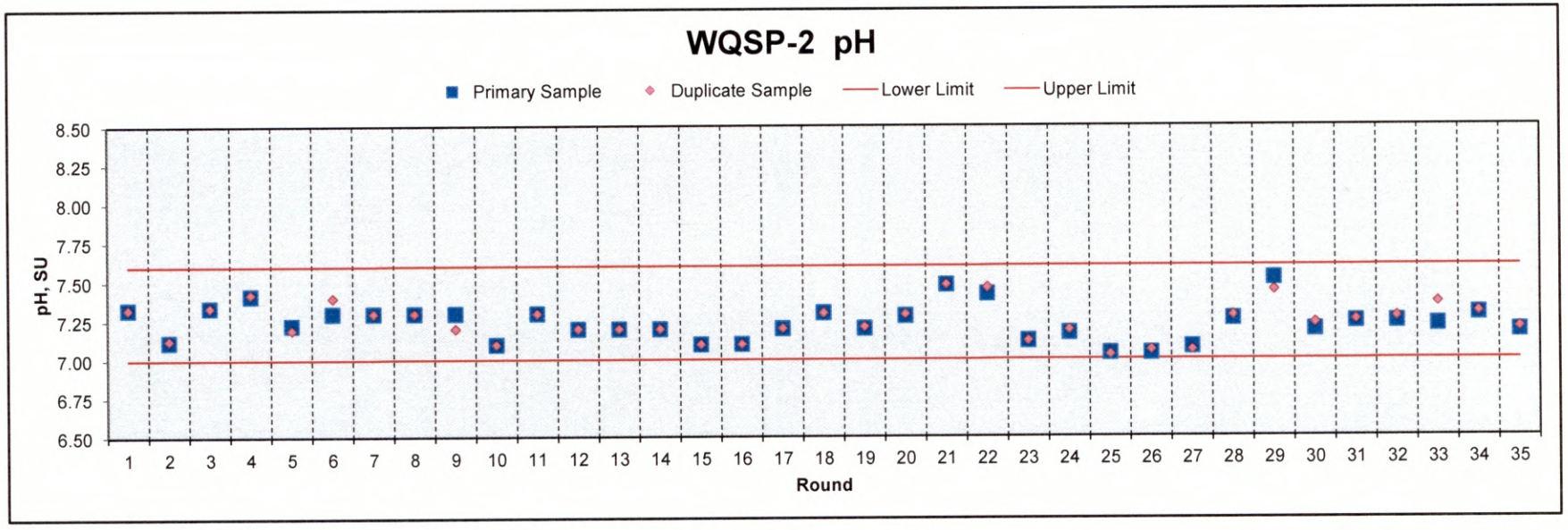
WQSP-2 Specific Gravity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Density	1	08/31/95	09/08/95	1.060	1.050	g/mL	0.0	1.06
Density	2	04/25/96	05/08/96	1.040	1.041	g/mL	0.0	1.06
Density	3	08/08/96	08/15/96	1.040	1.039	g/mL	0.0	1.06
Density	4	05/08/97	06/09/97	1.044	1.043	g/mL	0.0	1.06
Density	5	08/07/97	09/02/97	1.042	1.040	g/mL	0.0	1.06
Density	6	04/15/98	05/12/98	1.050	1.050	g/mL	0.0	1.06
Density	7	08/12/98	08/26/98	1.052	1.052	g/mL	0.0	1.06
Density	8	03/17/99	03/19/99	1.043	1.045	g/mL	0.0	1.06
Density	9	09/15/99	09/16/99	1.055	1.043	g/mL	0.0	1.06
Density	10	03/15/00	03/21/00	1.050	1.050	g/mL	0.0	1.06
Density	26	05/07/08	05/22/08	1.060	1.060	unitless	0.0	1.06
Specific Gravity	27	10/27/08	11/14/08	1.044	1.041	unitless	0.0	1.06
Specific Gravity	28	05/06/09	05/18/09	1.042	1.035	unitless	0.0	1.06
Specific Gravity	29	10/28/09	11/01/09	1.042	1.042	unitless	0.0	1.06
Specific Gravity	30	05/05/10	05/25/10	1.044	1.042	unitless	0.0	1.06
Specific Gravity	31	11/03/10	11/14/10	1.040	1.040	unitless	0.0	1.06
Specific Gravity	32	03/23/11	03/28/11	1.041	1.044	unitless	0.0	1.06
Specific Gravity	33	11/02/11	11/08/11	1.040	1.044	unitless	0.0	1.06
Specific Gravity	34	03/20/12	03/28/12	1.039	1.040	unitless	0.0	1.06
Specific Gravity	35	03/19/13	03/27/13	1.044	1.041	unitless	0.0	1.06



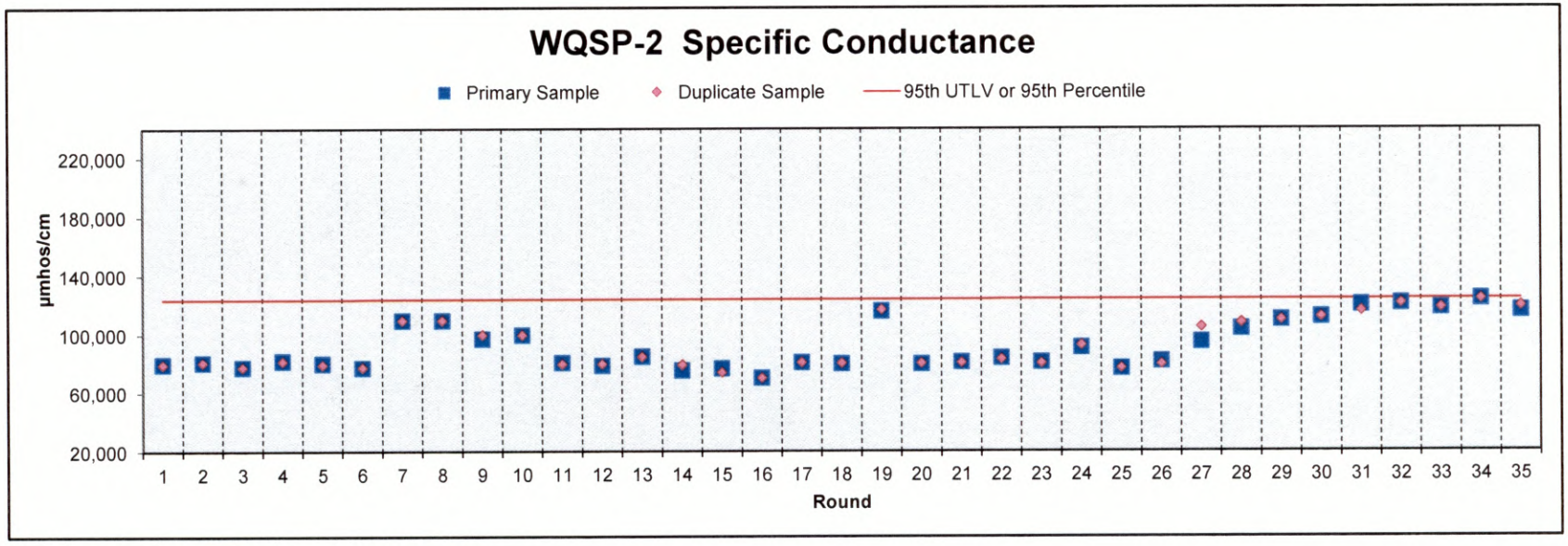
WQSP-2 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile	
								Lower Limit	Upper Limit
pH	1	08/31/95	09/01/95	7.33	7.33	SU	0.0	7.0	7.6
pH	2	04/25/96	04/26/96	7.12	7.13	SU	0.0	7.0	7.6
pH	3	08/08/96	08/09/96	7.34	7.34	SU	0.0	7.0	7.6
pH	4	05/08/97	05/09/97	7.42	7.43	SU	0.0	7.0	7.6
pH	5	08/07/97	08/12/97	7.23	7.20	SU	0.0	7.0	7.6
pH	6	04/15/98	04/16/98	7.30	7.40	SU	0.0	7.0	7.6
pH	7	08/12/98	08/12/98	7.30	7.30	SU	0.0	7.0	7.6
pH	8	03/17/99	03/19/99	7.30	7.30	SU	0.0	7.0	7.6
pH	9	09/15/99	09/15/99	7.30	7.20	SU	0.0	7.0	7.6
pH	10	03/15/00	03/15/00	7.10	7.10	SU	0.0	7.0	7.6
pH	26	05/07/08	05/08/08	7.04	7.06	SU	0.0	7.0	7.6
pH	27	10/27/08	10/31/08	7.08	7.06	SU	0.0	7.0	7.6
pH	28	05/06/09	05/08/09	7.26	7.28	SU	0.0	7.0	7.6
pH	29	10/28/09	11/02/09	7.52	7.44	SU	0.0	7.0	7.6
pH	30	05/05/10	05/06/10	7.19	7.23	SU	0.0	7.0	7.6
pH	31	11/03/10	11/11/10	7.24	7.25	SU	0.0	7.0	7.6
pH	32	03/23/11	03/24/11	7.24	7.27	SU	0.0	7.0	7.6
pH	33	11/02/11	11/07/11	7.22	7.36	SU	0.0	7.0	7.6
pH	34	03/20/12	03/23/12	7.29	7.30	SU	0.1	7.0	7.6
pH	35	03/19/13	03/20/13	7.18	7.20	SU	0.1	7.0	7.6



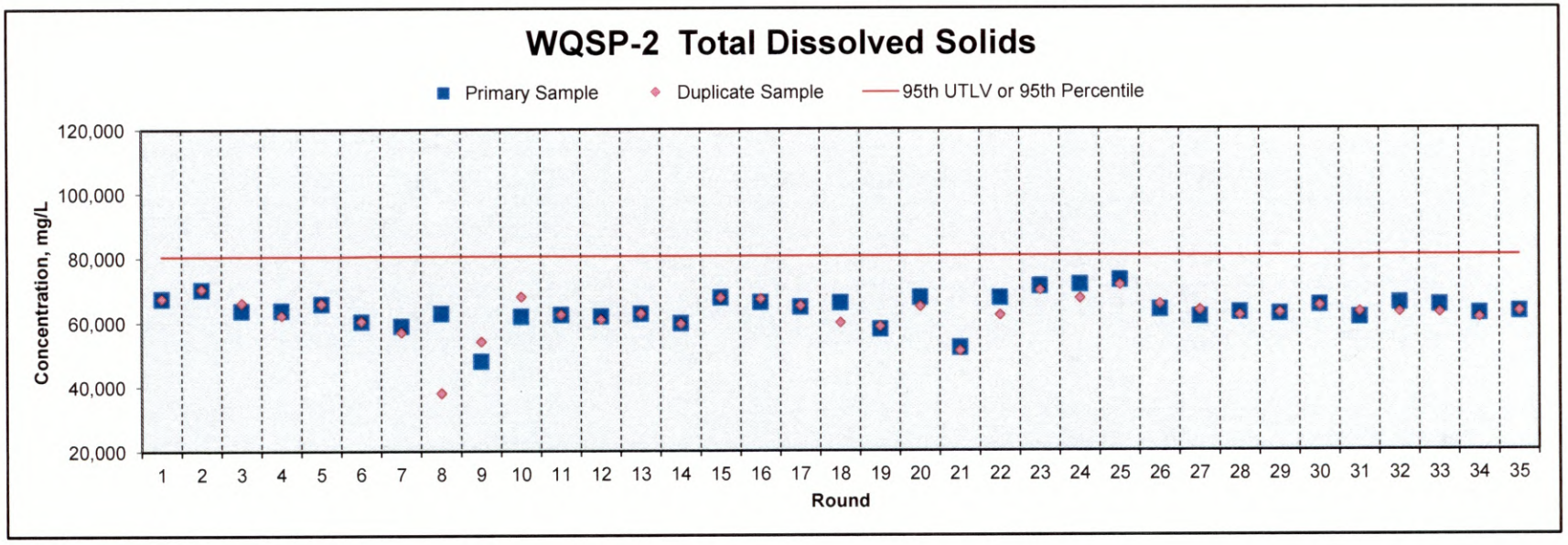
WQSP-2 Specific Conductance

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Specific Conductance	1	08/31/95	09/06/95	80,100	79,900	µmhos/cm	1.0000	124,000
Specific Conductance	2	04/25/96	05/08/96	81,200	81,300	µmhos/cm	1.0000	124,000
Specific Conductance	3	08/08/96	08/20/96	78,000	78,000	µmhos/cm	3.0000	124,000
Specific Conductance	4	05/08/97	05/22/97	82,400	82,000	µmhos/cm	3.0000	124,000
Specific Conductance	5	08/07/97	08/29/97	80,500	79,650	µmhos/cm	3.0000	124,000
Specific Conductance	6	04/15/98	05/13/98	77,600	77,700	µmhos/cm		124,000
Specific Conductance	7	08/12/98	08/17/98	110,000	110,000	µmhos/cm	3.0000	124,000
Specific Conductance	8	03/17/99	03/19/99	110,000	110,000	µmhos/cm		124,000
Specific Conductance	9	09/15/99	09/24/99	97,428	100,004	µmhos/cm		124,000
Specific Conductance	10	03/15/00	03/17/00	100,000	100,000	µmhos/cm		124,000
Specific Conductance	26	05/07/08	05/08/08	81,700	79,600	µmhos/cm		124,000
Specific Conductance	27	10/27/08	11/03/08	94,900	105,000	µmhos/cm		124,000
Specific Conductance	28	05/06/09	05/11/09	103,900	108,000	µmhos/cm		124,000
Specific Conductance	29	10/28/09	11/04/09	110,000	110,000	µmhos/cm		124,000
Specific Conductance	30	05/05/10	05/06/10	112,000	112,000	µmhos/cm		124,000
Specific Conductance	31	11/03/10	11/11/10	120,000	116,000	µmhos/cm	0.0	124,000
Specific Conductance	32	03/23/11	03/24/11	121,000	121,000	µmhos/cm	0.0	124,000
Specific Conductance	33	11/02/11	11/07/11	118,000	118,000	µmhos/cm	0.50	124,000
Specific Conductance	34	03/20/12	03/27/12	**124,000**	**124,000**	µmhos/cm	1.00	**124,000**
Specific Conductance	35	03/19/13	03/20/13	116,000	119,000	µmhos/cm	0.50	124,000



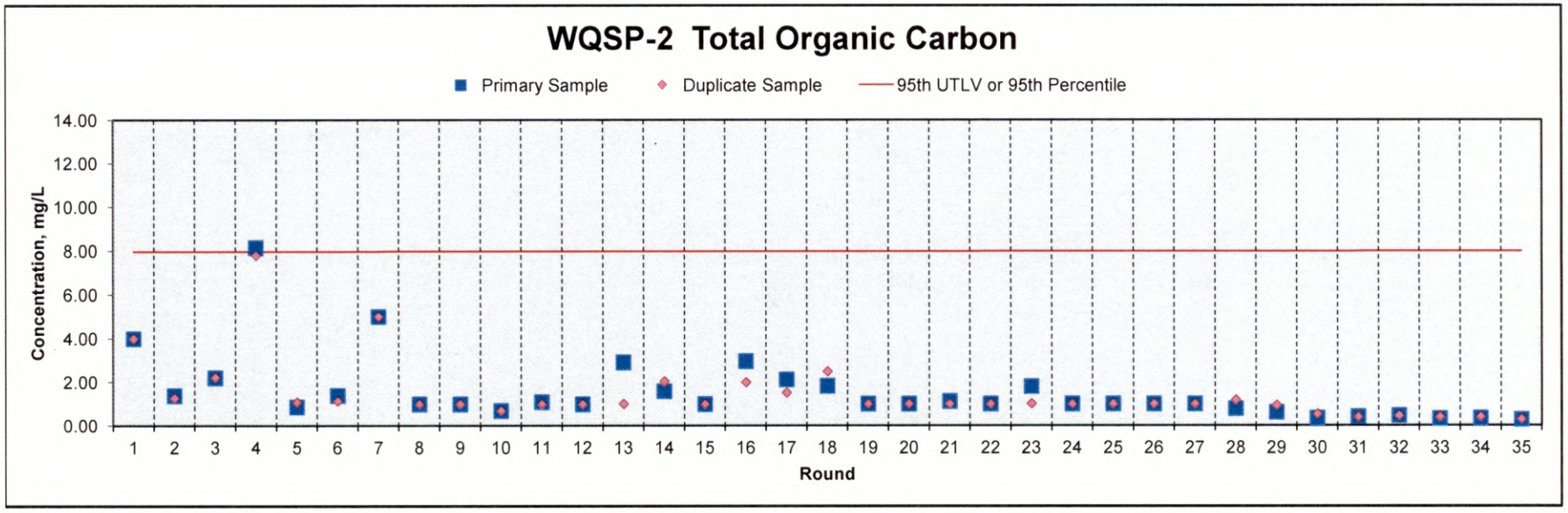
WQSP-2 Total Dissolved Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Dissolved Solids	1	08/31/95	09/05/95	67,600	67,600	mg/L	10	80,500
Total Dissolved Solids	2	04/25/96	04/30/96	70,400	70,600	mg/L	200	80,500
Total Dissolved Solids	3	08/08/96	08/15/96	63,800	66,200	mg/L	200	80,500
Total Dissolved Solids	4	05/08/97	05/14/97	63,900	62,300	mg/L	200	80,500
Total Dissolved Solids	5	08/07/97	08/26/97	65,900	66,000	mg/L	200	80,500
Total Dissolved Solids	6	04/15/98	04/22/98	60,400	60,500	mg/L	20	80,500
Total Dissolved Solids	7	08/12/98	08/18/98	59,000	57,000	mg/L	200	80,500
Total Dissolved Solids	8	03/17/99	03/18/99	63,000	38,000	mg/L	10	80,500
Total Dissolved Solids	9	09/15/99	09/16/99	48,000	54,000	mg/L	10	80,500
Total Dissolved Solids	10	09/15/99	09/16/99	62,000	68,000	mg/L	10	80,500
Total Dissolved Solids	26	05/07/08	05/09/08	63,800	65,400	mg/L	10	80,500
Total Dissolved Solids	27	10/27/08	11/03/08	61,600	63,500	mg/L	10	80,500
Total Dissolved Solids	28	05/06/09	05/11/09	62,900	61,900	mg/L	10	80,500
Total Dissolved Solids	29	10/28/09	11/03/09	62,400	62,700	mg/L	10	80,500
Total Dissolved Solids	30	05/05/10	05/12/10	65,200	64,900	mg/L	10	80,500
Total Dissolved Solids	31	11/03/10	11/11/10	61,200	62,900	mg/L	270	80,500
Total Dissolved Solids	32	03/23/11	03/30/11	65,700	62,800	mg/L	270	80,500
Total Dissolved Solids	33	11/02/11	11/09/11	65,100	62,600	mg/L	560	80,500
Total Dissolved Solids	34	03/20/12	03/23/12	62,400	61,100	mg/L	270	80,500
Total Dissolved Solids	35	03/19/13	03/25/13	63,000	63,000	mg/L	500	80,500



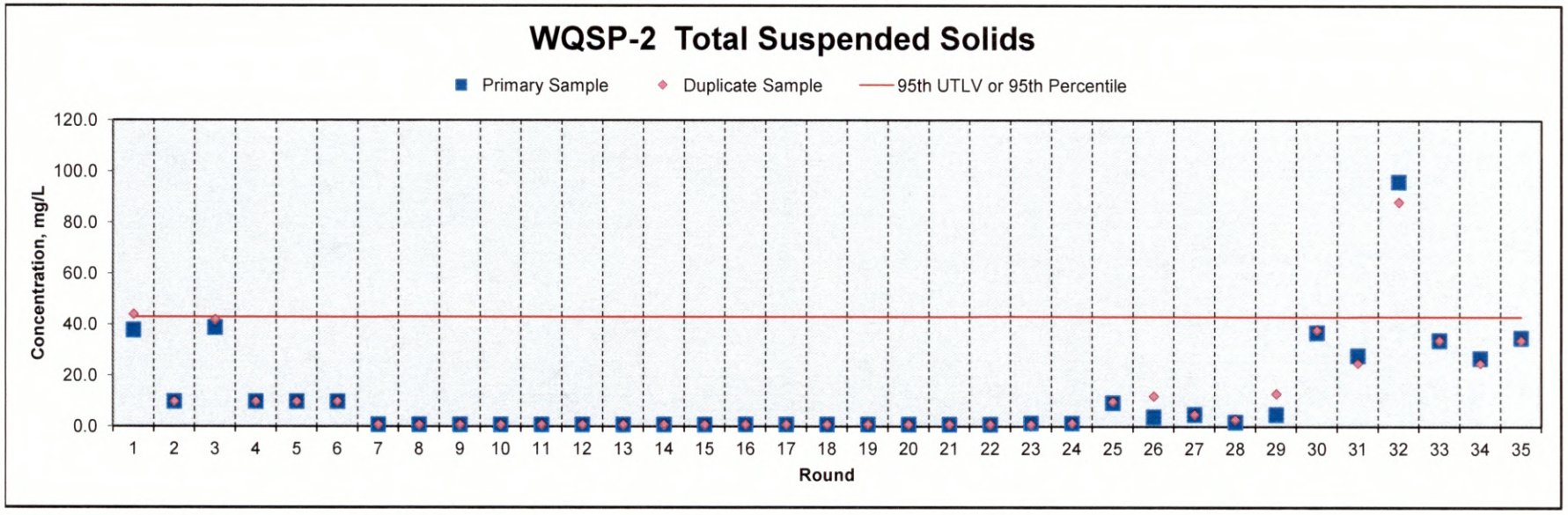
WQSP-2 Total Organic Carbon

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Organic Carbon	1	08/31/95	09/22/95	< 4.00	< 4.00	mg/L	4.00	7.97
Total Organic Carbon	2	04/25/96	05/01/96	1.40	1.28	mg/L	0.50	7.97
Total Organic Carbon	3	08/08/96	08/29/96	2.21	2.23	mg/L	0.50	7.97
Total Organic Carbon	4	05/08/97	05/16/97	8.16	7.80	mg/L	0.50	7.97
Total Organic Carbon	5	08/07/97	08/13/97	0.87	1.09	mg/L	0.50	7.97
Total Organic Carbon	6	04/15/98	05/13/98	1.40	1.14	mg/L	0.20	7.97
Total Organic Carbon	7	08/12/98	08/19/98	< 5.00	< 5.00	mg/L	0.50	7.97
Total Organic Carbon	8	03/17/99	03/31/99	< 1.00	< 1.00	mg/L	1.00	7.97
Total Organic Carbon	9	09/15/99	10/03/99	< 1.00	< 1.00	mg/L	1.00	7.97
Total Organic Carbon	10	03/15/00	03/27/00	< 0.70	< 0.70	mg/L	0.70	7.97
Total Organic Carbon	26	05/07/08	05/27/08	< 1.00	< 1.00	mg/L	1.00	7.97
Total Organic Carbon	27	10/27/08	11/03/08	< 1.00	< 1.00	mg/L	1.00	7.97
Total Organic Carbon	28	05/06/09	05/11/09	0.79	1.16	mg/L	1.00	7.97
Total Organic Carbon	29	10/28/09	11/02/09	0.62	0.93	mg/L	1.00	7.97
Total Organic Carbon	30	05/05/10	05/20/10	0.34	0.53	mg/L	0.056	7.97
Total Organic Carbon	31	11/03/10	11/15/10	0.41	0.39	mg/L	0.056	7.97
Total Organic Carbon	32	03/23/11	03/24/11	0.46	0.45	mg/L	0.056	7.97
Total Organic Carbon	33	11/02/11	11/29/11	0.32	0.39	mg/L	0.072	7.97
Total Organic Carbon	34	03/20/12	03/26/12	0.34	0.40	mg/L	0.250	7.97
Total Organic Carbon	35	03/19/13	03/25/13	0.28	0.29	mg/L	0.23	7.97



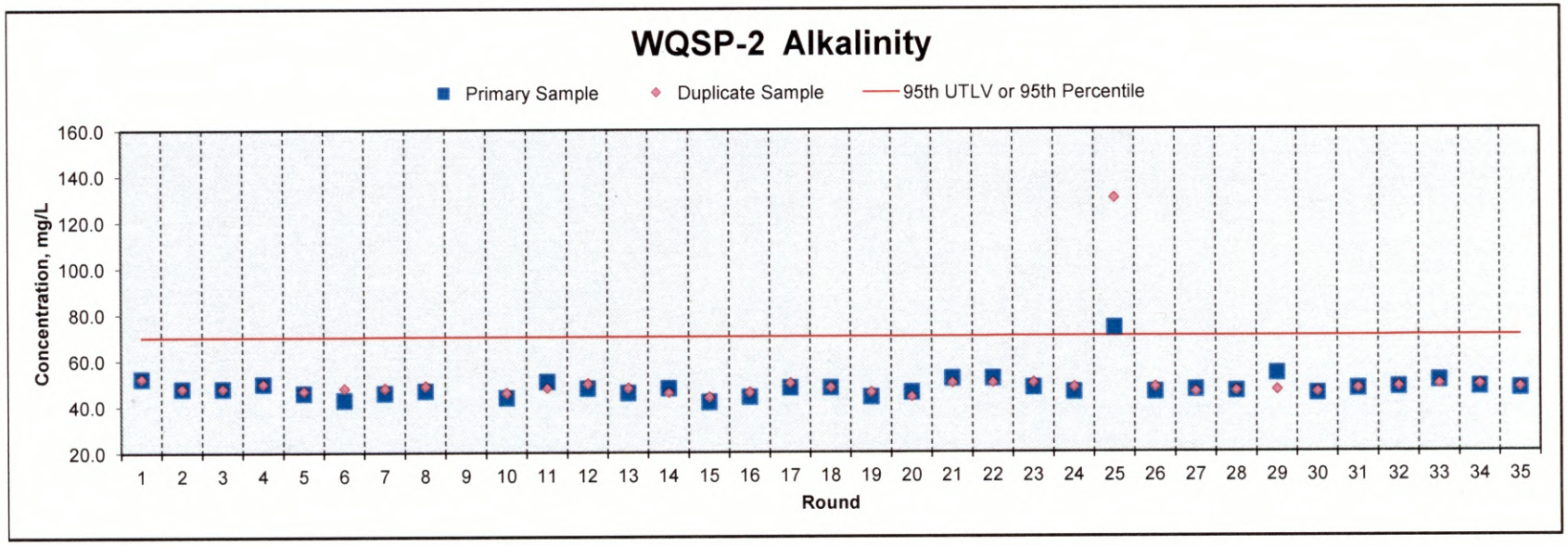
WQSP-2 Total Suspended Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Suspended Solids	1	08/31/95	09/07/95	38.0	44.0	mg/L	10.0	43.0
Total Suspended Solids	2	04/25/96	4/59/96	< 10.0	< 10.0	mg/L	10.0	43.0
Total Suspended Solids	3	08/08/96	08/15/96	39.0	42.0	mg/L	10.0	43.0
Total Suspended Solids	4	05/08/97	05/14/97	< 10.0	< 10.0	mg/L	10.0	43.0
Total Suspended Solids	5	08/07/97	08/25/97	< 10.0	< 10.0	mg/L	10.0	43.0
Total Suspended Solids	6	04/15/98	04/22/98	< 10.0	< 10.0	mg/L	10.0	43.0
Total Suspended Solids	7	08/12/98	08/18/98	< 1.0	< 1.0	mg/L	10.0	43.0
Total Suspended Solids	8	03/17/99	03/19/99	< 1.0	< 1.0	mg/L	1.0	43.0
Total Suspended Solids	9	09/15/99	09/17/99	< 1.0	< 1.0	mg/L	1.0	43.0
Total Suspended Solids	10	03/15/00	03/20/00	< 1.0	< 1.0	mg/L	1.0	43.0
Total Suspended Solids	26	05/07/08	05/08/08	4.0	12.0	mg/L	1.0	43.0
Total Suspended Solids	27	10/27/08	11/08/08	5.0	5.0	mg/L	1.0	43.0
Total Suspended Solids	28	05/06/09	05/08/09	< 2.0	3.0	mg/L	1.0	43.0
Total Suspended Solids	29	10/28/09	11/04/09	5.0	13.0	mg/L	1.0	43.0
Total Suspended Solids	30	05/05/10	05/11/10	37	38	mg/L	1.0	43.0
Total Suspended Solids	31	11/03/10	11/10/10	28	25	mg/L	0.0	43.0
Total Suspended Solids	32	03/23/11	03/28/11	**96**	**88**	mg/L	0.0	**43.0**
Total Suspended Solids	33	11/02/11	11/08/11	34	34	mg/L	2.8	43.0
Total Suspended Solids	34	03/20/12	03/22/12	27	25	mg/L	2.8	43.0
Total Suspended Solids	35	03/19/13	03/25/13	35	34	mg/L	1.5	43.0



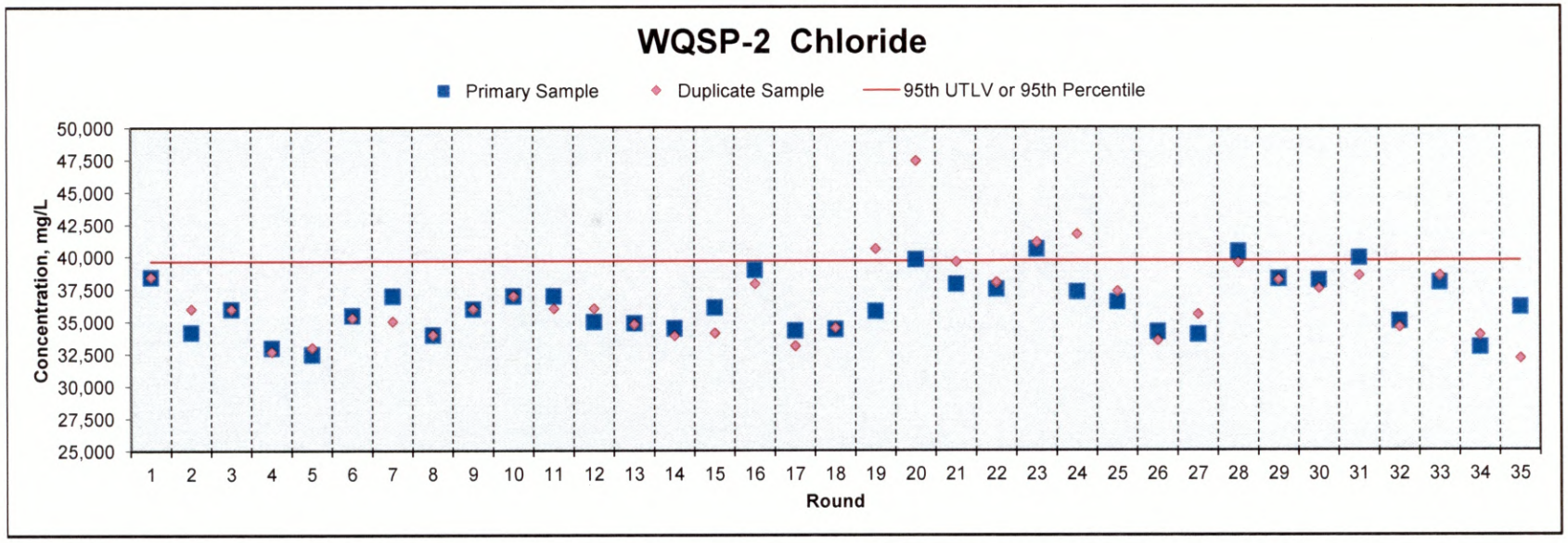
WQSP-2 Alkalinity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Alkalinity	1	08/31/95	09/07/95	52.5	52.5	mg/L	5.0	70.3
Alkalinity	2	04/25/96	05/08/96	48.1	48.1	mg/L	5.0	70.3
Alkalinity	3	08/08/96	08/15/96	48.1	48.1	mg/L	5.0	70.3
Alkalinity	4	05/08/97	05/14/97	50.1	50.1	mg/L	5.0	70.3
Alkalinity	5	08/07/97	08/26/97	46.0	47.0	mg/L	5.0	70.3
Alkalinity	6	04/15/98	04/16/98	43.0	48.0	mg/L	5.0	70.3
Alkalinity	7	08/12/98	08/18/98	46.0	48.0	mg/L	5.0	70.3
Alkalinity	8	03/17/99	03/18/99	47.0	49.0	mg/L		70.3
Alkalinity	9					mg/L		70.3
Alkalinity	10	03/15/00	03/17/00	44.0	46.0	mg/L		70.3
Alkalinity	26	05/07/08	05/16/08	46.0	48.0	mg/L	4.0	70.3
Alkalinity	27	10/27/08	11/06/08	47.0	46.0	mg/L	4.0	70.3
Alkalinity	28	05/06/09	05/08/09	46.3	46.4	mg/L	4.0	70.3
Alkalinity	29	10/28/09	11/02/09	54.0	46.6	mg/L	4.0	70.3
Alkalinity	30	05/05/10	05/06/10	45.3	45.8	mg/L	4.0	70.3
Alkalinity	31	11/03/10	11/11/10	47.2	47.3	mg/L	5.0	70.3
Alkalinity	32	03/23/11	03/24/11	47.8	48.0	mg/L	5.0	70.3
Alkalinity	33	11/02/11	11/07/11	50.7	49.1	mg/L	2.4	70.3
Alkalinity	34	03/20/12	03/23/12	47.8	48.8	mg/L	5.0	70.3
Alkalinity	35	03/19/13	03/20/13	47.2	47.6	mg/L	5.0	70.3



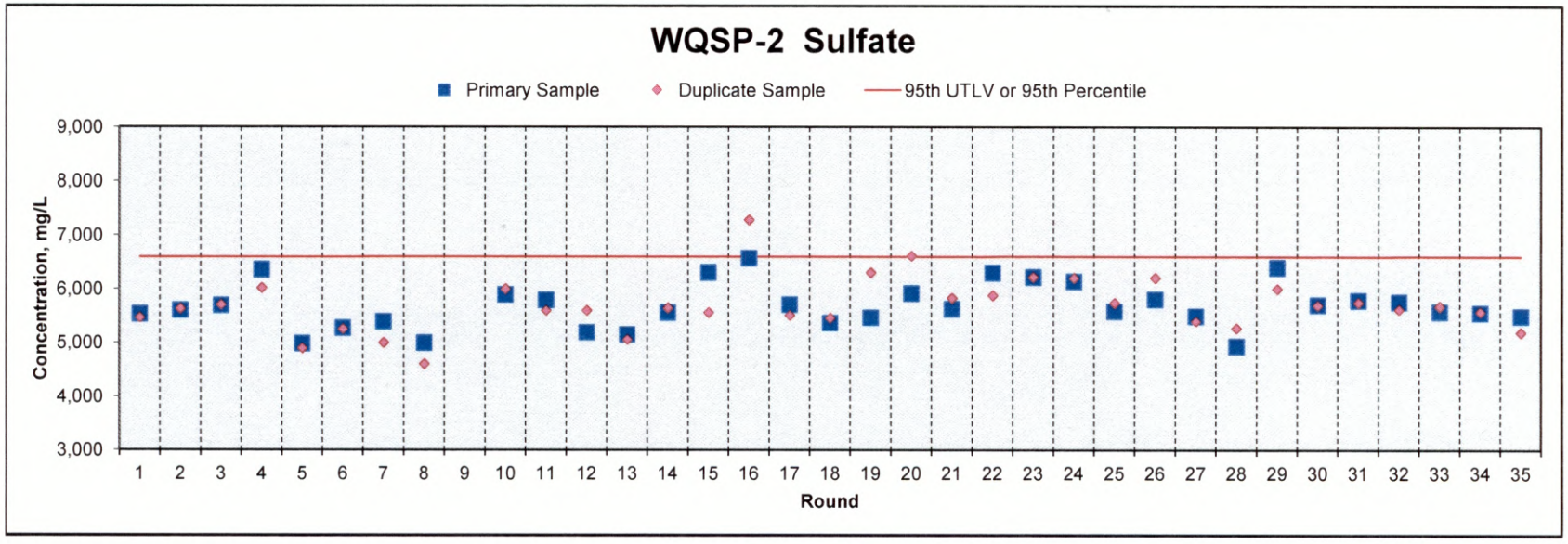
WQSP-2 Chloride

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chloride	1	08/31/95	09/08/95	38,500	38,500	mg/L	5.0	39,670
Chloride	2	04/25/96	05/01/96	34,200	36,000	mg/L	2500.0	39,670
Chloride	3	08/08/96	08/20/96	36,000	36,000	mg/L	2500.0	39,670
Chloride	4	05/08/97	05/17/97	33,000	32,700	mg/L	2500.0	39,670
Chloride	5	08/07/97	08/29/97	32,500	33,000	mg/L	2500.0	39,670
Chloride	6	04/15/98	04/16/98	35,500	35,300	mg/L	0.2	39,670
Chloride	7	08/12/98	08/17/98	37,000	35,000	mg/L	2500.0	39,670
Chloride	8	03/17/99	03/19/99	34,000	34,000	mg/L	0.5	39,670
Chloride	9	09/15/99	09/15/99	36,000	36,000	mg/L	0.5	39,670
Chloride	10	03/15/00	03/21/00	37,000	37,000	mg/L	0.5	39,670
Chloride	26	05/07/08	05/13/08	34,200	33,500	mg/L	0.5	39,670
Chloride	27	10/27/08	11/24/08	34,000	35,500	mg/L	0.5	39,670
Chloride	28	05/06/09	05/12/09	**40,400**	39,500	mg/L	0.5	**39,670**
Chloride	29	10/28/09	10/31/09	38,300	38,200	mg/L	0.5	39,670
Chloride	30	05/05/10	05/07/10	38,200	37,500	mg/L	0.5	39,670
Chloride	31	11/03/10	01/04/10	**39,900**	38,500	mg/L	160	**39,670**
Chloride	32	03/23/11	03/28/11	35,000	34,500	mg/L	160	39,670
Chloride	33	11/02/11	11/04/11	38,000	38,500	mg/L	83	39,670
Chloride	34	03/20/12	03/22/12	33,000	33,900	mg/L	1,000	39,670
Chloride	35	03/19/13	03/20/13	36,100	32,100	mg/L	130	39,670



WQSP-2 Sulfate

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sulfate	1	08/31/95	09/06/95	5,540	5,470	mg/L	10.0	6,590
Sulfate	2	04/25/96	05/08/96	5,610	5,640	mg/L	2500.0	6,590
Sulfate	3	08/08/96	08/21/96	5,700	5,710	mg/L	1000.0	6,590
Sulfate	4	05/08/97	05/19/97	6,360	6,020	mg/L	2500.0	6,590
Sulfate	5	08/07/97	09/03/97	4,990	4,900	mg/L	2500.0	6,590
Sulfate	6	04/15/98	04/16/98	5,280	5,260	mg/L	0.2	6,590
Sulfate	7	08/12/98	08/18/98	5,400	5,000	mg/L	2500.0	6,590
Sulfate	8	03/17/99	03/22/99	5,000	4,600	mg/L	0.5	6,590
Sulfate	9	09/15/99	NR			mg/L	NR	6,590
Sulfate	10	03/15/00	03/15/00	5,900	6,000	mg/L	0.5	6,590
Sulfate	26	05/07/08	05/13/08	5,810	6,200	mg/L	0.5	6,590
Sulfate	27	10/27/08	11/06/08	5,500	5,400	mg/L	0.5	6,590
Sulfate	28	05/06/09	05/07/09	4,940	5,270	mg/L	0.5	6,590
Sulfate	29	10/28/09	11/02/09	6,400	6,000	mg/L	0.5	6,590
Sulfate	30	05/05/10	05/07/10	5,710	5,700	mg/L	0.5	6,590
Sulfate	31	11/03/10	01/04/10	5,790	5,750	mg/L	47	6,590
Sulfate	32	03/23/11	03/24/11	5,760	5,620	mg/L	120	6,590
Sulfate	33	11/02/11	11/04/11	5,580	5,680	mg/L	14	6,590
Sulfate	34	03/20/12	03/21/12	5,560	5,580	mg/L	46	6,590
Sulfate	35	03/19/13	03/20/13	5,500	5,190	mg/L	47	6,590



WQSP-2

CHAIN OF CUSTODY FORMS

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130322016
Order Date: 3/22/2013

Contact Name: ANDY FREEMAN
Project Name: 1303753
Comment:

Sample #: 130322016-001 **Customer Sample #:** 1303753-001E / WQ2-C-R35

Recv'd: ☑ **Collector:** **Date Collected:** 3/19/2013
Quantity: 1 **Matrix:** Water **Date Received:** 3/22/2013 12:14:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***
ARSENIC	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***
SELENIUM	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***
THALLIUM	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***

Sample #: 130322016-002 **Customer Sample #:** 1303753-002E / WQ2-C-R35 DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 3/19/2013
Quantity: 1 **Matrix:** Water **Date Received:** 3/22/2013 12:14:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***
ARSENIC	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***
SELENIUM	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***
THALLIUM	M	EPA 200.8	4/3/2013	***Normal (6-10 Days)***

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB			**Order ID:**	130322016
	4901 HAWKINS NE SUITE D			**Order Date:**	3/22/2013
	ALBUQUERQUE	NM	87109		
Contact Name:	ANDY FREEMAN			**Project Name:**	1303753
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	1.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP Work Order Number: 1303753 RcptNo: 1

Received by/date: MG 03/20/13

Logged By: Michelle Garcia 3/20/2013 9:15:00 AM

Completed By: 03/20/13

Reviewed By:

Chain of Custody

1.	Is Chain of Custody complete?	Yes ✔	No	Not Present
2.	How was the sample delivered?	FedEx		

Log In

3.	Coolers are present? (see 19. for cooler specific information)	Yes ✔	No	NA
4.	Shipping container/cooler in good condition?	Yes ✔	No	
	Custody seals intact on shipping container/cooler?	Yes ✔	No	Not Present
	No. Seal Date:	Signed By:		
5.	Was an attempt made to cool the samples?	Yes ✔	No	NA
6.	Were all samples received at a temperature of >0° C to 6.0°C	Yes ✔	No	NA
7.	Custody seals intact on sample bottles?	Yes	No	Not Present ✔
8.	Sample(s) in proper container(s)?	Yes ✔	No	
9.	Sufficient sample volume for indicated test(s)?	Yes ✔	No	
10.	Are samples (except VOA and ONG) properly preserved?	Yes ✔	No	
11.	Was preservative added to bottles?	Yes	No ✔	NA
12.	VOA vials have zero headspace?	Yes ✔	No	No VOA Vials
13.	Were any sample containers received broken?	Yes	No ✔	
14.	Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ✔	No	# of preserved bottles checked for pH: 4
15.	Are matrices correctly identified on Chain of Custody?	Yes ✔	No	(<2 or >12 unless noted)
16.	Is it clear what analyses were requested?	Yes ✔	No	Adjusted? NO
17.	Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ✔	No	Checked by: MG

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	No ✔	NA

Person Notified: Date:

By Whom: Via: eMail Phone Fax In Person

Regarding:

Client Instructions:

19. Additional remarks:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP Work Order Number: 1303753 RcptNo: 1

20. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.5	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1027

Page 1 of 1

Project Number:	Project Name:	Total Number of Containers	Requested Analyses								Analytical Laboratory
T409304-1	WIPP/DMP		VOC	TOC	SVOC	Metals	General Chemistry				HEAL
Sampler(s): RJimenez, RA Spoon											Albq. NM
											1303753

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry				Comments
3/A/13	09:10	GW	GW-WQ2-C-R35-N1	6	X								use for MS/MSD -001
⊥	09:35	⊥	-N1D	4	X								-002
⊥	09:47	DI	-N2	4	X								Field Blanks -003
N/A	N/A	⊥	-N3	4	X							-004	Trip Blanks; HEAL provided **
3/19/13	09:03 ~~08:59~~	GW	-N4	4		X						-001	use for MS/MSD (Sx Time=09:03
	3/14/13 09:07		-N4D	2		X						-002	
	08:27		-N5	6			X					-001	use for MS/MSD
	08:43		-N5D	2			X					-002	
	08:52		-N6	2				X				-001	use for MS/MSD
	08:56		-N6D	2				X				-002	
	08:47		-N7	1					X			-001	use for MS/MSD
⊥	⊥	GW	-N7D	1					X			-002	
							N/A						

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
3/19/13 / 14:30			
Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received at Laboratory: (Signature, Date/Time)
			Michelle Gonzales 03/20/13 0915

Requested Turnaround Time: Report due 4/23/2013

☒ Routine ☐ Rush _____

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: FedEx 8768 1881 2040
8768 1881 2175

Sample Receipt Remarks: 1.5°C

Results To:
Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8615 FAX: 575-234-6003
EDD: gregory.jungclaus@urs.com

Special Instructions:
Analyze LCS in duplicat
use primary GW sample for MS/MSD on all parameters.
48hr holdtime Nitrate

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater
YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)
PINK – Record Copy
SE – Sediment
SO – Soil
SW – Surface Water
VG – Vegetation

** 2 Trip Blank received w/ air bubbles RA 3/19/13

Form CofC/RFA, Rev. 0 – NICHOLS PRINTING, INC.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory

130322 016 HALL Last Due 4/3/2013

1st SAMP 3/19/2013 1st RCVD 3/22/2013

1303753

SUB CONTRACTOR: ESC	COMPANY: ESC	PHONE: (800) 767-5859	FAX: (615) 758-5859
ADDRESS: 12065 Lebanon Rd		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Mt. Juliet, TN 37122			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1303753-001E	WQ2-C-R35	500HDPEHNO3	Aqueous	3/19/2013 8:27:00 AM	1	TOTAL As, Sb, Se & Tl
2	1303753-002E	WQ2-C-R35-Duplicate	500HDPEHNO3	Aqueous	3/19/2013 8:27:00 AM	1	TOTAL As, Sb, Se & Tl

MW BS

ANATEK LABS RECEIVING LIST

- [x] RECEIVED INTACT — TEMP 1.0 °C
- [x] LABELS & CHAINS AGREE
- [ ] NO HEADSPACE
- [x] ICE / ICE PACKS PRESENT
- [x] CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3

NUMBER OF CONTAINERS: 2 SHIPPED VIA: F

DATE & TIME: 3/22/13 12:14 INSPECTED BY: BT

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 3/21/2013	Time: 3:00 PM	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ✓ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:

☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples _____ °C Attempt to Cool ? _____

Comments: _____

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

130311 002 HALL Last Due 3/20/2013
1st SAMP 3/6/2013 1st RCVD 3/8/2013
1303283

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1303283-001E	WQ1-C-R35	500HDPEHN 03	Aqueous	3/6/2013 9:55:00 AM	1	TOTAL As, Sb, Se & Tl
2	1303283-002E	WQ1-C-R35 Duplicate	500HDPEHN 03	Aqueous	3/6/2013 9:55:00 AM	1	TOTAL As, Sb, Se & Tl
3	1303283-005B	WQ1-C-R35-METALS BLANK PRES	500HDPEHN 03	Aqueous	3/6/2013 10:47:00 AM	1	TOTAL As, Sb, Se & Tl
4	1303283-006B	WQ6-C-R34-METALS BLANK UNPRES	500HDPEHN 03	Aqueous	3/6/2013 10:48:00 AM	1	DO NOT PRESERVE-TOTAL As, Sb, Se & Tl
5						0	
6						0	MW/BS
7						0	
8						0	
9						0	
10						0	

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE BY METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. MS/MSD ON 1303283-001E. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LCS REPLICATE. SAMPLE MAY HAVE HIGH TDS.

Relinquished By:	Date: 3/7/2013	Time: 1:28 PM	Rece
Relinquished By:	Date:	Time:	Rece
Relinquished By:	Date:	Time:	Rece

TAT: Standard RUSH

ANATEK LABS RECEIVING LIST

- [x] RECEIVED INTACT — TEMP: 6.0 °C
- [x] LABELS & CHAINS AGREE
- [ ] NO HEADSPACE
- [x] ICE / ICE-PACKS PRESENT
- [x] CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3
NUMBER OF CONTAINERS: 4 SHIPPED VIA: F
DATE & TIME: 3/8/13 1642 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:
cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
_____ °C Attempt to Cool ? _____

Printed on: 11 April 2013 13:49:33

APPENDIX 5

WELL WQSP-3

ANALYTICAL RESULTS

WQSP-3

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-3, Culebra, Round 35

DMW Characteristics

WQSP-3 is located 96 feet FSL and 2,162 feet FEL in sec. 16, T.22 S, R.31 E in Eddy County, New Mexico. This location is approximately 1-mile NNE from the center of the WIPP Site and upgradient of the shaft area. The ground elevation at WQSP-3 is 3477.47 feet above mean sea level (ft_{amsl}) and the top of casing (TOC) elevation is 3480.14 ft_{amsl}[1]. This DMW well, drilled for surveillance monitoring of groundwater quality and water level elevation monitoring between October 20 and 26, 1994, is located in the Culebra Member of the Rustler Formation. The total depth of WQSP-3 is 880 feet below ground surface (ft_{bgs}). The well is cased with a fiberglass casing (5 inch od, 0.28 inch wall thickness) to 844 ft_{bgs} and screened with slotted fiberglass (0.020 inch) from 844 to 869 ft_{bgs}. A 10-foot blank casing is located below the screened interval from 869 to 880 ft_{bgs} and acts as a sediment sump to prevent clogging of the lower screen slots. The actual interval of the Culebra at WQSP-3 is 844 to 870 ft_{bgs} based on interpretation of the core logs[2].

According to the well construction and pre-pumping static water level (swl) measured in feet from below the TOC (ft_{btoc}), the sampling team used the following formula to calculate well bore volume (wbv).

$$wbv,\ gallons = [C \times ((\pi \times D^2/4) \times L)]$$

where:
C = conversion factor for pounds water/gallon (US liquid) to pounds of water/ft^3
D = inside diameter of fiberglass casing, ft
L = depth of water in column, ft
$Factor = [C \times (\pi \times D^2/4)]$

given:
total depth of well, ft_{btoc} = [*installation depth,* ft_{bgs} + (*top of casing,* ft_{amsl} - *ground surface elevation,* ft_{amsl})]
depth of water in column, ft (L) = (total depth of well, ft_{btoc} – *swl,* ft_{btoc})

More specifically, the wbv for WQSP-3 is calculated as follows:

wbv, gallons = (*Factor* x L) = (0.804 x L)

Prior to beginning the pumping process for Round 35, the static water level was 465.05 ft_{btoc}. One wbv for WQSP-3 was determined to be 335.8 gallons.

Field Sampling System

A dedicated sampling-system was installed in WQSP-3 on September 28, 1999. The system consists of a Grundfos 3-hp submersible pump (model 10S30-34) retrofitted with Kynar seals and a 3-phase, 230 volt (ac), 5-hp submersible motor. Prior to Round 20 sampling (2005), the pump/motor assembly was lowered an additional 21 feet from its original installation depth (838 ft_{bgs}), placing the pump intake near the center of the well screen (approximately 859 ft_{bgs}). A separate sampling line was installed just above the pump discharge and a bubbler system installed 5 feet above the top of the pump that previously enabled formation pressure monitoring in the well bore column during sampling. The bubbler system was eliminated in the recent permit modification request (PMR) and formation pressures are no longer monitored during the pumping event.

---

[1] Elevations (Ground and TOC) obtained from December 13, 2006 survey.
[2] DOE/WIPP 95-2154, *Basic Data Report for WQSP 1* and Culebra Mid-Depths – Revision 2 (R. Salness).

Round 35 pumping of WQSP-3 began on 4/1/2013 at 10:02 and ended on 4/3/2013 at 11:00. The well was purged for 49.2 hours with an average flow rate of 0.37 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 1,092 gallons.

Measurement of Field Parameters and Well Stability Criteria

Field measurements were obtained using an in-line, multi-probe flow cell sampling system (Geotech Environmental Equipment, Inc.) with a 40-mL cell volume. This self-contained sampling system is capable of handling flow rates between 100 mL/min to one gpm (3.8 liters/min). Measurements were obtained directly from the groundwater sample stream that passes through this system at 5-minute intervals for specific conductance (SC), temperature and pH. Specific gravity (SG) was determined in samples collected from the flow-cell discharge stream and analyzed using classical hydrometer techniques. The flow cell was purged for at least 15 minutes prior to beginning sequential measurements.

Flow cell exchange rates were calculated periodically to verify measurements were obtained on fresh-flowing groundwater and not from stagnant groundwater in the well column. Exchange rates (cell volumes per minute) were determined by measuring the volume of groundwater (mL) passed through the sampling system during a one-minute interval and dividing that value by the volume of the cell (40 mL).

Changes to the field-testing methodology also led to new well stability criteria being established. Well stability was determined using data provided from field measurements. Stability of the DMW, as defined in the PMR, states that each well will be purged no more than three wbv, or until field parameters stabilize, whichever occurs first. The main purpose for collecting sequential measurements is to determine when the groundwater chemistry stabilizes. Parameters are stable when individual values for all parameters were within 5% for three consecutive measurements. At that point, purged water from the DMW is considered representative of the undisturbed groundwater found in the formation and DMP sampling for hazardous constituents is allowed.

Detection Monitoring Program Sampling

Samples for DMP hazardous constituents were collected on 4/3/2012 after approximately 1,027 gallons of groundwater (≈ 3.1 wbv) had been purged from WQSP-3 and all field measurements except SC suggested that the well was stable. Removal of the in-line flow cell occured prior to DMP sampling and a clean, dedicated filter holder assembly was installed at the end of the dedicated sample line. Samples (filtered or unfiltered) were collected using techniques described in the DMP and placed under Chain of Custody. Samples for hazardous constituent analysis were shipped via FedEx to Hall Environmental Analysis Laboratory, Inc., in Albuquerque, NM. Samples for radionuclide analysis were collected and hand-delivered to the URS-PS WIPP Laboratory located at Carlsbad Environmental Monitoring Research Center in Carlsbad, NM. A retain, preserved with nitric acid (to pH < 2), was collected and placed under Chain of Custody in the event that additional metals or radionuclide analyses were required. The final sample checklist summarized the samples collected, laboratory destination, preservatives used, sample quantities, container type, sampling times, and sample team members. This checklist and other records related to the integrity of the DMP sampling event are located in the DMW data package.

Results and Discussion

Table 1 provides the pumping characteristics and field parameter results for WQSP-3. Pump speeds were identical and groundwater flow rates similar to those observed in previous rounds. On day 1, approximately 940 mL of groundwater passed through the in-line flow cell every minute as field-indicating parameters were monitored. The observed rate of exchange was 23.5 cell volumes per minute; thus, approximately 117.5 volumes of groundwater (4,700 mL) passed through the in-line flow cell between measurements. Table 1 provides the initial and final measurements obtained on each

field-indicating parameter. On day 1, the percent change between temperature and pH measurements was consistently less than 5% within 15 minutes. Specific gravity was stable after the third measurement (approximately 1.2 hours). Specific conductance did not stabilize on day 1 after 28 measurements (approximately 2.4 hours).

On day 2, approximately 140 mL of groundwater passed through the in-line flow cell every minute during field-indicating parameters monitoring. The observed rate of exchange was 3.5 cell volumes per minute; thus, approximately 17.5 volumes of groundwater (700 mL) passed through in-line flow cell between measurements. Temperature, pH and SG remained stable throughout the measurement period. Specific conductance continued to fluctuate in and out of stability during the measurement period and the decision to stop monitoring field parameters was made by the sample team. Due to the slower flow rate and diminished cell volume rate exchange, the sample team increased the pump speed to 54.0 Hz after 12 measurements were obtained (1 hour). Increasing the pumping rate to maintain the flow rate is a standard practice at DMW WQSP-3, and is necessary because of the higher concentrations of dissolved solids in the groundwater at this location.

Based on the results from day 2, the sample team proceeded to collect samples for the DMP hazardous and radiological constituents at WQSP-3 on day 3. A decision to forego field measurements prior to final sampling on day 3 was made since the three wbv-limit stability criteria, as defined in the PMR, was exceeded.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-3 DMW, Round 35[a,b,c].

Item	Day 1		Day 2		Day 3	
Date	4/1/2013		4/2/2013		4/3/2013	
Pump Speed, Hz	50.0		50.0 / 54.0		54.0	
Average Flow Rate, gpm	0.64		0.56		0.36	
Rate of Exchange, no. cell	23.5		3.5		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	188,50	218,400	168,60	196,700	NR	NR
Temperature, °C	22.3	24.8	18.3	17.1	NR	NR
pH, SU	7.25	6.67	6.82	6.80	NR	NR
Specific Gravity	1.144	1.142	1.146	1.146	NR	NR
Time to Parameter Stability, hr	N/A		N/A		NR	

[a]Data represent the first and last measurement taken within each respective day.
[b]DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c]NR = no measurement taken; not required.

From a historical perspective, comparisons between indicating-parameters measured during Round 35 and the average results from the previous 34 rounds were conducted (Table 2). The current value for SG (1.146) was similar to the average from the previous samplings (1.146). Specific conductance was slightly greater compared to the average of previous rounds (196,700 µmhos/cm vs. 192,200 µmhos/cm, respectively). Groundwater pH and temperature were slightly lower during Round 35 than the previously observed averages. Most indicating parameters were within the normal limits observed for WQSP-3 over the past 18 years with the exception of temperature, which was below the historical lower limit.

Table 2. Comparison of Round 35 DMW Measurements to Historical Results from Rounds (1-34) for WQSP-3.

Field-analyzed Parameter	Historical Data (Rounds 1 – 34)[a,b]			Measurement Results, Round 35[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	192,200	185,526	205,056	196,700
Temperature, °C	23.4	20.6	22.8	17.1
pH, S.U.	6.83	6.64	7.34	6.80
Specific Gravity	1.144	1.088	1.202	1.146

[a] Historical data obtained from serial samples collected on day 3 for each round.
[b] Historical limits calculated from the mean ($\bar{x}$) ± 5 percent.
[c] Current data represent the final measurement taken when well stability confirmed by sampling team.

Abbreviations, Acronyms and Units

ac	alternating current
ft_{amsl}	feet above mean sea level
ft_{bgs}	feet below ground surface
ft_{btoc}	feet below top of casing
DMP	Detection Monitoring Program
DMW	detection monitoring well
FEL	from east line
FNL	from north line
FSL	from south line
FWL	from west line
gpm	gallons per minute
hp	horsepower
od	outside diameter
NNE	north-northeast
PMR	permit modification request
swl	static water level
URS-PS	URS-Professional Solutions
wbv	well bore volume
WIPP	Waste Isolation Pilot Plant
WQSP	Water Quality Sampling Program, well ID

WQSP-3

LABORATORY DATA AND QA/QC SUMMARY REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

May 22, 2013

Greg Jungclaus
WIPP
P.O. Box 2078
Carlsbad, NM 88221-2078
TEL: (575) 234-8615
FAX

RE: WIPP DMP

OrderNo.: 1304185

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 4/4/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. All samples are reported as received unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1304185**

22-May-13

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1304185-001	WQ3-C-R35		4/3/2013 8:30:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-001	WQ3-C-R35		4/3/2013 8:30:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-001	WQ3-C-R35		4/3/2013 8:30:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-001	WQ3-C-R35		4/3/2013 8:30:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-001	WQ3-C-R35		4/3/2013 8:30:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-001	WQ3-C-R35		4/3/2013 8:30:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-002	WQ3-C-R35-Duplicate		4/3/2013 8:42:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-002	WQ3-C-R35-Duplicate		4/3/2013 8:42:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-002	WQ3-C-R35-Duplicate		4/3/2013 8:42:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-002	WQ3-C-R35-Duplicate		4/3/2013 8:42:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-002	WQ3-C-R35-Duplicate		4/3/2013 8:42:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-002	WQ3-C-R35-Duplicate		4/3/2013 8:42:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-003	WQ32-C-R35-Field Blank		4/3/2013 9:22:00 AM	4/4/2013 11:03:50 AM	Aqueous
1304185-004	WQ3-C-R35-Trip Blank			4/4/2013 11:03:50 AM	Trip Blank

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1304185**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304185-001A	WQ3-C-R35	4/3/2013 8:30:00 AM	Aqueous	EPA Method: 8260B			4/4/2013 2:41:46 PM
1304185-001B				SM 5310B: TOC			4/8/2013 10:21:53 AM
1304185-001C				EPA Method 8270C: Semivolatiles		4/7/2013 11:32:52 AM	4/9/2013 1:12:58 PM
1304185-001D				EPA 6010B: Total Recoverable Metals		4/8/2013 6:20:00 AM	4/16/2013 11:34:54 AM
				EPA 6010B: Total Recoverable Metals		4/8/2013 6:20:00 AM	4/16/2013 11:47:11 AM
				EPA Method 7470: Mercury		4/24/2013 1:13:00 PM	4/25/2013 1:54:09 PM
1304185-001F				EPA Method 300.0: Anions			4/4/2013 1:11:26 PM
				EPA Method 300.0: Anions			4/4/2013 1:23:50 PM
				EPA Method 300.0: Anions			4/4/2013 3:40:19 PM
				EPA Method 300.0: Anions			4/4/2013 12:34:12 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:27:25 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:30:21 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:33:07 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:35:39 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:37:56 PM
				EPA Method 6010B: Dissolved Metals			5/7/2013 11:07:08 AM
				SM 2540 C: Total Dissolved Solids		4/10/2013 7:25:21 AM	4/11/2013 11:19:00 AM
				SM 2540D: TSS		4/10/2013 7:27:25 AM	4/10/2013 2:54:00 PM
				SM2320B: Alkalinity			4/4/2013 3:28:49 PM
				SM2510B: Specific Conductance			4/4/2013 3:28:49 PM
				SM2510B: Specific Conductance			4/5/2013 2:27:24 PM
				SM4500-H+B: pH			4/4/2013 3:28:49 PM
				Specific Gravity			4/9/2013 12:18:00 PM

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1304185**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304185-002A	WQ3-C-R35-Duplicate	4/3/2013 8:42:00 AM	Aqueous	EPA Method: 8260B			4/4/2013 3:10:49 PM
1304185-002B				SM 5310B: TOC			4/8/2013 1:39:13 PM
				SM 5310B: TOC			4/8/2013 12:55:01 PM
				SM 5310B: TOC			4/8/2013 11:12:25 AM
1304185-002C				EPA Method 8270C: Semivolatiles		4/7/2013 11:32:52 AM	4/9/2013 2:44:54 PM
1304185-002D				EPA 6010B: Total Recoverable Metals		4/8/2013 6:20:00 AM	4/16/2013 11:49:57 AM
				EPA 6010B: Total Recoverable Metals		4/8/2013 6:20:00 AM	4/16/2013 11:53:00 AM
				EPA Method 7470: Mercury		4/24/2013 1:13:00 PM	4/25/2013 1:59:39 PM
1304185-002F				EPA Method 300.0: Anions			4/4/2013 1:36:14 PM
				EPA Method 300.0: Anions			4/4/2013 1:48:39 PM
				EPA Method 300.0: Anions			4/4/2013 2:25:53 PM
				EPA Method 300.0: Anions			4/4/2013 3:52:43 PM
				EPA Method 300.0: Anions			4/4/2013 4:05:08 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:42:23 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:40:07 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:41:44 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:38:57 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:35:58 PM
				EPA Method 6010B: Dissolved Metals			5/7/2013 11:14:06 AM
				SM 2540 C: Total Dissolved Solids		4/10/2013 7:25:21 AM	4/11/2013 11:19:00 AM
				SM 2540D: TSS		4/10/2013 7:27:25 AM	4/10/2013 2:54:00 PM
				SM2320B: Alkalinity			4/4/2013 3:35:53 PM
				SM2510B: Specific Conductance			4/5/2013 2:31:54 PM

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DATES REPORT

WO#: **1304185**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304185-002F	WQ3-C-R35-Duplicate	4/3/2013 8:42:00 AM	Aqueous	SM2510B: Specific Conductance			4/4/2013 3:35:53 PM
				SM4500-H+B: pH			4/4/2013 3:35:53 PM
				Specific Gravity			4/9/2013 12:18:00 PM
1304185-003A	WQ32-C-R35-Field Blank	4/3/2013 9:22:00 AM		EPA Method: 8260B			4/4/2013 3:39:40 PM
1304185-004A	WQ3-C-R35-Trip Blank		Trip Blank	EPA Method: 8260B			4/4/2013 4:08:36 PM

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Case Narrative

WO#: **1304185**
Date: **5/22/2013**

CLIENT: WIPP
Project: WIPP DMP

All analytes reported are associated with passing CCVs.

METHOD: 8260B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 5030
Analysis: 8260B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: Isobutyl alcohol, MEK and 1,1,2,2-Tetrachloroethane have elevated %recoveries in the MS/MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 8270C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3510
Analysis: 8270C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.

5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 6010B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3005
Analysis: 6010B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Duplicates: All acceptance criteria were met.
5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 7470
Analysis: 7470

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: The MS/MSD spike recoveries were low. All other acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 300.0

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 300.0

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Spikes: All acceptance criteria were met.
5. Samples: All acceptance criteria were met.

METHOD: SM5310C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM5310C
Analysis: SM5310C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 120.1

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none

Analysis: 120.1
PREPARATION: none

ANALYSIS:
1. Samples: All acceptance criteria were met.
2. Duplicates: All acceptance criteria were met.

METHOD: SM 2320B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM 2320B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540C
Analysis: SM2540C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540D
HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540D
Analysis: SM2540D

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM4500H+ B

HOLDING TIMES: The most recent method lists the pH holding time as 15 minutes. All samples will be flagged with an "H".

METHOD: Preparations: none
Analysis: SM4500H+ B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM2710F

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM2710F

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Case Narrative

WO#: **1304185**
Date: **5/22/2013**

CLIENT: WIPP
Project: WIPP DMP

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM4500 NorgC

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM4500 NorgC
Analysis: SM4500 NorgC

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-001
Matrix: AQUEOUS
Client Sample ID: WQ3-C-R35
Collection Date: 4/3/2013 8:30:00 AM
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	127000	662	5000		mg/L	1E+0	4/4/2013 3:40:19 PM	R9672
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	4/4/2013 12:34:12 PM	R9672
Sulfate	8090	46.7	100		mg/L	200	4/4/2013 1:11:26 PM	R9672
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.000354	0.000800		mg/L	1	4/25/2013 1:54:09 PM	7137
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1440	5.58	100		mg/L	100	5/7/2013 11:07:08 AM	R10449
Magnesium	2300	0.829	100		mg/L	100	5/6/2013 3:35:39 PM	R10423
Potassium	1510	4.97	100		mg/L	100	5/6/2013 3:35:39 PM	R10423
Sodium	75300	80.4	1000		mg/L	1000	5/6/2013 3:37:56 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0405	0.0125	0.500	J	mg/L	5	4/16/2013 11:34:54 AM	6857
Beryllium	0.0190	0.0125	0.0750	J	mg/L	5	4/16/2013 11:34:54 AM	6857
Cadmium	ND	0.0200	0.0500		mg/L	5	4/16/2013 11:34:54 AM	6857
Calcium	1530	0.228	25.0		mg/L	5	4/16/2013 11:34:54 AM	6857
Chromium	ND	0.0375	0.150		mg/L	5	4/16/2013 11:34:54 AM	6857
Iron	0.450	0.258	1.25	J	mg/L	5	4/16/2013 11:34:54 AM	6857
Lead	ND	0.0850	0.125		mg/L	5	4/16/2013 11:34:54 AM	6857
Magnesium	2390	0.238	25.0		mg/L	5	4/16/2013 11:34:54 AM	6857
Nickel	ND	0.0350	0.250		mg/L	5	4/16/2013 11:34:54 AM	6857
Potassium	1690	5.43	25.0		mg/L	5	4/16/2013 11:34:54 AM	6857
Silver	ND	0.0275	0.125		mg/L	5	4/16/2013 11:34:54 AM	6857
Sodium	81900	509	1000		mg/L	200	4/16/2013 11:47:11 AM	6857
Vanadium	0.158	0.0875	1.25	J	mg/L	5	4/16/2013 11:34:54 AM	6857
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
Hexachloroethane	ND	2.91	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
2-Methylphenol	ND	2.71	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
Nitrobenzene	ND	2.91	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
Pentachlorophenol	ND	1.44	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
Pyridine	ND	3.53	5.00		µg/L	1	4/9/2013 1:12:58 PM	6856
Surr: 2,4,6-Tribromophenol	89.6	0	42.9-124		%REC	1	4/9/2013 1:12:58 PM	6856
Surr: 2-Fluorobiphenyl	72.9	0	40-108		%REC	1	4/9/2013 1:12:58 PM	6856

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ3-C-R35
Project: WIPP DMP
Collection Date: 4/3/2013 8:30:00 AM
Lab ID: 1304185-001
Matrix: AQUEOUS
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	73.4	0	23.6-94.8		%REC	1	4/9/2013 1:12:58 PM	6856
Surr: 4-Terphenyl-d14	80.5	0	41.9-103		%REC	1	4/9/2013 1:12:58 PM	6856
Surr: Nitrobenzene-d5	86.6	0	42.6-114		%REC	1	4/9/2013 1:12:58 PM	6856
Surr: Phenol-d5	77.2	0	20.3-74.7	S	%REC	1	4/9/2013 1:12:58 PM	6856
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Benzene	ND	0.517	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Toluene	ND	0.441	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
2-Butanone	ND	1.00	5.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Chloroform	ND	0.469	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/4/2013 2:41:46 PM	R9686
Surr: 1,2-Dichloroethane-d4	96.0	0	70-130		%REC	1	4/4/2013 2:41:46 PM	R9686
Surr: 4-Bromofluorobenzene	114	0	69.5-130		%REC	1	4/4/2013 2:41:46 PM	R9686
Surr: Dibromofluoromethane	97.3	0	70-130		%REC	1	4/4/2013 2:41:46 PM	R9686
Surr: Toluene-d8	99.4	0	70-130		%REC	1	4/4/2013 2:41:46 PM	R9686
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.415	0.227	1.00	J	mg/L	1	4/8/2013 10:21:53 AM	R9704
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	220000	503	1000	*	mg/L	1	4/11/2013 11:19:00 AM	6902
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	383000	0.500	0.500		µmhos/c	50	4/5/2013 2:27:24 PM	R9700
SM4500-H+B: PH							Analyst: **JML**	
pH	6.83	0.100	1.68	H	pH units	1	4/4/2013 3:28:49 PM	R9675

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-001
Matrix: AQUEOUS
Client Sample ID: WQ3-C-R35
Collection Date: 4/3/2013 8:30:00 AM
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	32.8	5.00	20.0		mg/L CaC	1	4/4/2013 3:28:49 PM	R9675
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/4/2013 3:28:49 PM	R9675
Total Alkalinity (as CaCO3)	32.8	5.00	20.0		mg/L CaC	1	4/4/2013 3:28:49 PM	R9675
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.133	0	0			1	4/9/2013 12:18:00 PM	R9728
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	123	1.53	4.00		mg/L	1	4/10/2013 2:54:00 PM	6904

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-002 **Matrix:** AQUEOUS

Client Sample ID: WQ3-C-R35-Duplicate
Collection Date: 4/3/2013 8:42:00 AM
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	129000	662	5000		mg/L	1E+0	4/4/2013 3:52:43 PM	R9672
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	4/4/2013 1:36:14 PM	R9672
Sulfate	8100	46.7	100		mg/L	200	4/4/2013 4:05:08 PM	R9672
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.000354	0.000800		mg/L	1	4/25/2013 1:59:39 PM	7137
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1380	5.58	100		mg/L	100	5/7/2013 11:14:06 AM	R10449
Magnesium	2190	0.829	100		mg/L	100	5/6/2013 3:40:07 PM	R10423
Potassium	1410	4.97	100		mg/L	100	5/6/2013 3:40:07 PM	R10423
Sodium	76600	80.4	1000		mg/L	1000	5/6/2013 3:42:23 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0465	0.0125	0.500	J	mg/L	5	4/16/2013 11:49:57 AM	6857
Beryllium	0.0190	0.0125	0.0750	J	mg/L	5	4/16/2013 11:49:57 AM	6857
Cadmium	ND	0.0200	0.0500		mg/L	5	4/16/2013 11:49:57 AM	6857
Calcium	1450	0.228	25.0		mg/L	5	4/16/2013 11:49:57 AM	6857
Chromium	ND	0.0375	0.150		mg/L	5	4/16/2013 11:49:57 AM	6857
Iron	0.613	0.258	1.25	J	mg/L	5	4/16/2013 11:49:57 AM	6857
Lead	ND	0.0850	0.125		mg/L	5	4/16/2013 11:49:57 AM	6857
Magnesium	2250	0.238	25.0		mg/L	5	4/16/2013 11:49:57 AM	6857
Nickel	ND	0.0350	0.250		mg/L	5	4/16/2013 11:49:57 AM	6857
Potassium	1600	5.43	25.0		mg/L	5	4/16/2013 11:49:57 AM	6857
Silver	ND	0.0275	0.125		mg/L	5	4/16/2013 11:49:57 AM	6857
Sodium	74900	509	1000		mg/L	200	4/16/2013 11:53:00 AM	6857
Vanadium	0.156	0.0875	1.25	J	mg/L	5	4/16/2013 11:49:57 AM	6857
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
Hexachloroethane	ND	2.91	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
2-Methylphenol	ND	2.71	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
Nitrobenzene	ND	2.91	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
Pentachlorophenol	ND	1.44	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
Pyridine	ND	3.53	5.00		µg/L	1	4/9/2013 2:44:54 PM	6856
Surr: 2,4,6-Tribromophenol	91.3	0	42.9-124		%REC	1	4/9/2013 2:44:54 PM	6856
Surr: 2-Fluorobiphenyl	77.0	0	40-108		%REC	1	4/9/2013 2:44:54 PM	6856

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-002
Matrix: AQUEOUS
Client Sample ID: WQ3-C-R35-Duplicate
Collection Date: 4/3/2013 8:42:00 AM
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	79.2	0	23.6-94.8		%REC	1	4/9/2013 2:44:54 PM	6856
Surr: 4-Terphenyl-d14	85.7	0	41.9-103		%REC	1	4/9/2013 2:44:54 PM	6856
Surr: Nitrobenzene-d5	90.2	0	42.6-114		%REC	1	4/9/2013 2:44:54 PM	6856
Surr: Phenol-d5	84.1	0	20.3-74.7	S	%REC	1	4/9/2013 2:44:54 PM	6856
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	4.30	2.04	5.00	J	µg/L	1	4/4/2013 3:10:49 PM	R9686
Benzene	ND	0.517	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Toluene	ND	0.441	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
2-Butanone	ND	1.00	5.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Chloroform	ND	0.469	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/4/2013 3:10:49 PM	R9686
Surr: 1,2-Dichloroethane-d4	93.6	0	70-130		%REC	1	4/4/2013 3:10:49 PM	R9686
Surr: 4-Bromofluorobenzene	113	0	69.5-130		%REC	1	4/4/2013 3:10:49 PM	R9686
Surr: Dibromofluoromethane	95.8	0	70-130		%REC	1	4/4/2013 3:10:49 PM	R9686
Surr: Toluene-d8	99.3	0	70-130		%REC	1	4/4/2013 3:10:49 PM	R9686
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.441	0.227	1.00	J	mg/L	1	4/8/2013 12:55:01 PM	R9704
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	211000	503	1000	*	mg/L	1	4/11/2013 11:19:00 AM	6902
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	385000	0.500	0.500		µmhos/c	50	4/5/2013 2:31:54 PM	R9700
SM4500-H+B: PH							Analyst: **JML**	
pH	6.84	0.100	1.68	H	pH units	1	4/4/2013 3:35:53 PM	R9675

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-002
Matrix: AQUEOUS
Client Sample ID: WQ3-C-R35-Duplicate
Collection Date: 4/3/2013 8:42:00 AM
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	32.0	5.00	20.0		mg/L CaC	1	4/4/2013 3:35:53 PM	R9675
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/4/2013 3:35:53 PM	R9675
Total Alkalinity (as CaCO3)	32.0	5.00	20.0		mg/L CaC	1	4/4/2013 3:35:53 PM	R9675
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.034	0	0			1	4/9/2013 12:18:00 PM	R9728
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	168	1.53	4.00		mg/L	1	4/10/2013 2:54:00 PM	6904

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-003
Matrix: AQUEOUS

Client Sample ID: WQ32-C-R35-Field Blank
Collection Date: 4/3/2013 9:22:00 AM
Received Date: 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Benzene	ND	0.517	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Toluene	ND	0.441	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
2-Butanone	5.58	1.00	5.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Chloroform	0.598	0.469	1.00	J	µg/L	1	4/4/2013 3:39:40 PM	R9686
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/4/2013 3:39:40 PM	R9686
Surr: 1,2-Dichloroethane-d4	90.9	0	70-130		%REC	1	4/4/2013 3:39:40 PM	R9686
Surr: 4-Bromofluorobenzene	96.0	0	69.5-130		%REC	1	4/4/2013 3:39:40 PM	R9686
Surr: Dibromofluoromethane	97.2	0	70-130		%REC	1	4/4/2013 3:39:40 PM	R9686
Surr: Toluene-d8	92.1	0	70-130		%REC	1	4/4/2013 3:39:40 PM	R9686

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304185-004

Client Sample ID: WQ3-C-R35-Trip Blank
Collection Date:
Matrix: TRIP BLANK **Received Date:** 4/4/2013 9:20:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Benzene	ND	0.517	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Toluene	ND	0.441	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
2-Butanone	ND	1.00	5.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Chloroform	ND	0.469	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/4/2013 4:08:36 PM	R9686
Surr: 1,2-Dichloroethane-d4	88.6	0	70-130		%REC	1	4/4/2013 4:08:36 PM	R9686
Surr: 4-Bromofluorobenzene	94.4	0	69.5-130		%REC	1	4/4/2013 4:08:36 PM	R9686
Surr: Dibromofluoromethane	94.0	0	70-130		%REC	1	4/4/2013 4:08:36 PM	R9686
Surr: Toluene-d8	95.2	0	70-130		%REC	1	4/4/2013 4:08:36 PM	R9686

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	WQ3-C-R35 1304185-01		WQ3-C-R35 duplicate 1304185-02									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	
Sodium	75300	3275.34	74900	3257.94								
Potassium	1510	38.62	1410	36.06								
Calcium	1440	71.86	1380	68.86								
Magnesium	2300	189.30	2190	180.25								
Total Cations		3575.11		3543.11								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	
Sulfate	8090	168.44	8100	168.64								
Chloride	127000	3582.51	129000	3638.93								
Bicarbonate (CaCO3)	33	0.66	32	0.64								
Carbonate (CaCO3)												
Phosphate (P)												
Nitrite (N)												
Nitrate (N)												
Fluoride												
Bromide												
Total Anions		3751.60		3808.21								
Elect. Cond. (µMhos/cm)	383000		385000									
CATION/ANION RATIO		0.95		0.93								
% Difference		2		4								
TOTAL DISSOLVED SOLIDS RATIOS												
TDS (measured)	220000		211000									
TDS (calculated)	215660		216999									
Ratio meas TDS:calc TDS		1.0		1.0								
Ratio Meas. TDS:EC		0.57		0.55								
Ratio Calc. TDS:EC		0.56		0.56								
Ratio of anion sum:EC		1.0		1.0								
Ratio of cation sum:EC		0.9		0.9								

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC -- 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.

Ratio of cation sum:EC -- 0.9-1.1

CASE NARRATIVE April 23, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1304185
Anatek Batch: 130405031

Project Summary: Two (2) water samples were received on 4/5/2013 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 2.0C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1304185-001E / WQ3-C-R35	130405031-001	EPA 6020A
1304185-002E / WQ3-C-R35 DUPLICATE	130405031-002	EPA 6020A

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	Y	NA
Internal Standard Responses Valid?	Y	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

No problems encountered.

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

No problems encountered.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

Samples -001 and -002 required dilution due to matrix.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John A. Coll

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130405031
Project Name: 1304185

Analytical Results Report

Sample Number 130405031-001 **Sampling Date** 4/3/2013 **Date/Time Received** 4/5/2013 12:12 PM
Client Sample ID 1304185-001E / WQ3-C-R35 **Sampling Time** 8:30 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	

Sample Number 130405031-002 **Sampling Date** 4/3/2013 **Date/Time Received** 4/5/2013 12:12 PM
Client Sample ID 1304185-002E / WQ3-C-R35-DUPLICATE **Sampling Time** 8:42 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	4/12/2013	ETL	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130405031
Project Name: 1304185

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0461	mg/L	0.05	92.2	80-120	4/10/2013	4/12/2013
Selenium	0.0480	mg/L	0.05	96.0	80-120	4/10/2013	4/12/2013
Arsenic	0.0482	mg/L	0.05	96.4	80-120	4/10/2013	4/12/2013
Antimony	0.0485	mg/L	0.05	97.0	80-120	4/10/2013	4/12/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0465	mg/L	0.05	93.0	0.9	0-20	4/10/2013	4/12/2013
Selenium	0.0485	mg/L	0.05	97.0	1.0	0-20	4/10/2013	4/12/2013
Arsenic	0.0482	mg/L	0.05	96.4	0.0	0-20	4/10/2013	4/12/2013
Antimony	0.0462	mg/L	0.05	92.4	4.9	0-20	4/10/2013	4/12/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130405031-001	Thallium	ND	0.413	mg/L	0.5	82.6	75-125	4/10/2013	4/12/2013
130405031-001	Selenium	ND	0.489	mg/L	0.5	97.8	75-125	4/10/2013	4/12/2013
130405031-001	Arsenic	ND	0.519	mg/L	0.5	103.8	75-125	4/10/2013	4/12/2013
130405031-001	Antimony	ND	0.544	mg/L	0.5	108.8	75-125	4/10/2013	4/12/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.407	mg/L	0.5	81.4	1.5	0-20	4/10/2013	4/12/2013
Selenium	0.488	mg/L	0.5	97.6	0.2	0-20	4/10/2013	4/12/2013
Arsenic	0.495	mg/L	0.5	99.0	4.7	0-20	4/10/2013	4/12/2013
Antimony	0.520	mg/L	0.5	104.0	4.5	0-20	4/10/2013	4/12/2013

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130405031
Project Name: 1304185

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	4/10/2013	4/12/2013
Arsenic	ND	mg/L	0.001	4/10/2013	4/12/2013
Selenium	ND	mg/L	0.001	4/10/2013	4/12/2013
Thallium	ND	mg/L	0.001	4/10/2013	4/12/2013

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6902**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **6902**	RunNo: **9804**
Prep Date: **4/10/2013**	Analysis Date: **4/11/2013**	SeqNo: **279255** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-6902**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **6902**	RunNo: **9804**
Prep Date: **4/10/2013**	Analysis Date: **4/11/2013**	SeqNo: **279256** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1040	20.0	1000	0	104	80	120			

Sample ID **1304185-001FMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ3-C-R35**	Batch ID: **6902**	RunNo: **9804**
Prep Date: **4/10/2013**	Analysis Date: **4/11/2013**	SeqNo: **279260** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	267000	1000	50000	220200	94.4	80	120			

Sample ID **1304185-001FMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ3-C-R35**	Batch ID: **6902**	RunNo: **9804**
Prep Date: **4/10/2013**	Analysis Date: **4/11/2013**	SeqNo: **279261** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	276000	1000	50000	220200	111	80	120	3.06	5	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275619** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275620** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275621** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	93.2	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	97.2	90	110			
Sulfate	9.4	0.50	10.00	0	94.0	90	110			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS02**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275622** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	92.6	90	110	0.648	20	
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.7	90	110	0.565	20	
Sulfate	9.3	0.50	10.00	0	93.4	90	110	0.602	20	

Sample ID **1304185-001FMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ3-C-R35**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275624** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	120	5.00	125.0	0	96.1	90.4	113			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	1304185-001FMSD	SampType:	MSD		TestCode:	EPA Method 300.0: Anions				
Client ID:	WQ3-C-R35	Batch ID:	R9672		RunNo:	9672				
Prep Date:		Analysis Date:	4/4/2013		SeqNo:	275625	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	119	5.00	125.0	0	95.5	90.4	113	0.660	20	

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R9672		RunNo:	9672				
Prep Date:		Analysis Date:	4/4/2013		SeqNo:	275631	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R9672		RunNo:	9672				
Prep Date:		Analysis Date:	4/4/2013		SeqNo:	275645	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R9672		RunNo:	9672				
Prep Date:		Analysis Date:	4/4/2013		SeqNo:	275662	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R9672		RunNo:	9672				
Prep Date:		Analysis Date:	4/4/2013		SeqNo:	275676	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/5/2013**	SeqNo: **275688** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/5/2013**	SeqNo: **275693** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/5/2013**	SeqNo: **275694** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.7	0.50	5.000	0	94.6	90	110			
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	98.3	90	110			
Sulfate	9.5	0.50	10.00	0	94.8	90	110			

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/5/2013**	SeqNo: **275700** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R9672**	RunNo: **9672**
Prep Date:	Analysis Date: **4/5/2013**	SeqNo: **275718** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **5ml-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275977** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	ND	5.0								
Benzene	ND	1.0								
Toluene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
2-Butanone	ND	5.0								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroform	ND	1.0								
cis-1,2-DCE	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
Methylene Chloride	ND	3.0								
1,1,2,2-Tetrachloroethane	ND	1.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.0								
Surr: 1,2-Dichloroethane-d4	8.5		10.00		84.7	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		103	69.5	130			
Surr: Dibromofluoromethane	9.3		10.00		92.9	70	130			
Surr: Toluene-d8	9.4		10.00		93.6	70	130			

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275978** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	53	5.0	60.00	0	88.1	60	140			
Benzene	21	1.0	20.00	0	106	70	130			
Toluene	19	1.0	20.00	0	93.3	80	120			
1,2-Dichloroethane (EDC)	20	1.0	20.00	0	97.8	70	130			
2-Butanone	42	5.0	40.00	0	104	60	140			
Carbon Tetrachloride	21	1.0	20.00	0	104	70	130			
Chlorobenzene	19	1.0	20.00	0	94.1	70	130			
Chloroform	20	1.0	20.00	0	98.8	80	120			
cis-1,2-DCE	21	1.0	20.00	0	103	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275978** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	18	1.0	20.00	0	90.0	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	111	80	120			
Methylene Chloride	20	3.0	20.00	0	102	70	130			
1,1,2,2-Tetrachloroethane	20	1.0	20.00	0	100	70	130			
Tetrachloroethene (PCE)	19	1.0	20.00	0	97.0	70	130			
trans-1,2-DCE	20	1.0	20.00	0	101	70	130			
1,1,1-Trichloroethane	21	1.0	20.00	0	104	70	130			
1,1,2-Trichloroethane	19	1.0	20.00	0	96.2	70	130			
Trichloroethene (TCE)	18	1.0	20.00	0	92.3	70	130			
Trichlorofluoromethane	21	1.0	20.00	0	103	70	130			
Vinyl chloride	22	1.0	20.00	0	108	80	120			
Xylenes, Total	58	1.0	60.00	0	97.5	70	130			
Surr: 1,2-Dichloroethane-d4	9.7		10.00		97.2	70	130			
Surr: 4-Bromofluorobenzene	8.5		10.00		85.4	70	130			
Surr: Dibromofluoromethane	9.6		10.00		95.9	70	130			
Surr: Toluene-d8	8.8		10.00		88.0	70	130			

Sample ID **100ng lcs l4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275979** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	62	5.0	60.00	0	104	70	130			
Benzene	21	1.0	20.00	0	106	70	130			
Toluene	19	1.0	20.00	0	95.3	70	130			
1,2-Dichloroethane (EDC)	19	1.0	20.00	0	95.6	70	130			
2-Butanone	42	5.0	40.00	0	104	70	130			
Carbon Tetrachloride	21	1.0	20.00	0	107	70	130			
Chlorobenzene	19	1.0	20.00	0	94.5	70	130			
Chloroform	21	1.0	20.00	0	103	70	130			
cis-1,2-DCE	20	1.0	20.00	0	100	70	130			
1,1-Dichloroethane	18	1.0	20.00	0	89.1	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	110	70	130			
Methylene Chloride	20	3.0	20.00	0	102	70	130			
1,1,2,2-Tetrachloroethane	20	1.0	20.00	0	102	70	130			
Tetrachloroethene (PCE)	20	1.0	20.00	0	101	70	130			
trans-1,2-DCE	20	1.0	20.00	0	100	70	130			
1,1,1-Trichloroethane	21	1.0	20.00	0	103	70	130			
1,1,2-Trichloroethane	19	1.0	20.00	0	97.3	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	96.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs l4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275979** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Trichlorofluoromethane	21	1.0	20.00	0	107	70	130			
Vinyl chloride	20	1.0	20.00	0	100	70	130			
Xylenes, Total	57	1.0	60.00	0	95.3	70	130			
Surr: 1,2-Dichloroethane-d4	29		30.00		95.3	70	130			
Surr: 4-Bromofluorobenzene	30		30.00		98.5	69.5	130			
Surr: Dibromofluoromethane	29		30.00		97.0	70	130			
Surr: Toluene-d8	29		30.00		97.6	70	130			

Sample ID **100ng lcsd l4**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275980** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	60	5.0	60.00	0	100	70	130	0	20	
Benzene	21	1.0	20.00	0	106	70	130	0.703	20	
Toluene	19	1.0	20.00	0	93.2	70	130	2.19	20	
1,2-Dichloroethane (EDC)	19	1.0	20.00	0	94.8	70	130	0.800	20	
2-Butanone	43	5.0	40.00	0	107	70	130	2.32	20	
Carbon Tetrachloride	19	1.0	20.00	0	96.5	70	130	10.5	20	
Chlorobenzene	19	1.0	20.00	0	93.5	70	130	1.05	20	
Chloroform	20	1.0	20.00	0	98.2	70	130	4.36	20	
cis-1,2-DCE	20	1.0	20.00	0	99.1	70	130	1.28	20	
1,1-Dichloroethane	17	1.0	20.00	0	86.2	70	130	3.36	20	
1,1-Dichloroethene	20	1.0	20.00	0	102	70	130	6.97	20	
Methylene Chloride	20	3.0	20.00	0	101	70	130	0.931	20	
1,1,2,2-Tetrachloroethane	20	1.0	20.00	0	100	70	130	2.04	20	
Tetrachloroethene (PCE)	20	1.0	20.00	0	98.4	70	130	2.83	20	
trans-1,2-DCE	20	1.0	20.00	0	98.2	70	130	1.80	20	
1,1,1-Trichloroethane	20	1.0	20.00	0	101	70	130	2.44	20	
1,1,2-Trichloroethane	19	1.0	20.00	0	96.3	70	130	1.04	20	
Trichloroethene (TCE)	19	1.0	20.00	0	92.8	70	130	3.63	20	
Trichlorofluoromethane	19	1.0	20.00	0	96.5	70	130	10.0	20	
Vinyl chloride	19	1.0	20.00	0	96.5	70	130	3.71	20	
Xylenes, Total	57	1.0	60.00	0	94.7	70	130	0.714	20	
Surr: 1,2-Dichloroethane-d4	29		30.00		98.0	70	130	0	0	
Surr: 4-Bromofluorobenzene	29		30.00		96.8	69.5	130	0	0	
Surr: Dibromofluoromethane	29		30.00		96.7	70	130	0	0	
Surr: Toluene-d8	29		30.00		95.6	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304185-001a ms**	SampType: **MS4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ3-C-R35**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275985** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	226	5.00	60.00	0	377	70	130			S
Benzene	23.3	1.00	20.00	0	116	70	130			
Toluene	20.0	1.00	20.00	0	100	70	130			
1,2-Dichloroethane (EDC)	22.8	1.00	20.00	0	114	70	130			
2-Butanone	117	5.00	40.00	0	292	70	130			S
Carbon Tetrachloride	21.6	1.00	20.00	0	108	70	130			
Chlorobenzene	20.2	1.00	20.00	0	101	70	130			
Chloroform	23.1	1.00	20.00	0	116	70	130			
cis-1,2-DCE	22.0	1.00	20.00	0	110	70	130			
1,1-Dichloroethane	19.1	1.00	20.00	0	95.3	70	130			
1,1-Dichloroethene	21.9	1.00	20.00	0	109	70	130			
Methylene Chloride	20.6	3.00	20.00	0	103	70	130			
1,1,2,2-Tetrachloroethane	39.7	1.00	20.00	0	199	70	130			S
Tetrachloroethene (PCE)	20.4	1.00	20.00	0	102	70	130			
trans-1,2-DCE	20.5	1.00	20.00	0	103	70	130			
1,1,1-Trichloroethane	22.1	1.00	20.00	0	110	70	130			
1,1,2-Trichloroethane	25.1	1.00	20.00	0	126	70	130			
Trichloroethene (TCE)	19.9	1.00	20.00	0	99.3	70	130			
Trichlorofluoromethane	22.1	1.00	20.00	0	110	70	130			
Vinyl chloride	21.4	1.00	20.00	0	107	70	130			
Xylenes, Total	58.3	1.00	60.00	0	97.1	70	130			
Surr: 1,2-Dichloroethane-d4	33.9		30.00		113	70	130			
Surr: 4-Bromofluorobenzene	31.8		30.00		106	69.5	130			
Surr: Dibromofluoromethane	32.2		30.00		107	70	130			
Surr: Toluene-d8	29.6		30.00		98.5	70	130			

Sample ID **1304185-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ3-C-R35**	Batch ID: **R9686**	RunNo: **9686**
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275986** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	247	5.00	60.00	0	411	70	130	8.65	20	S
Benzene	21.8	1.00	20.00	0	109	70	130	6.49	20	
Toluene	18.7	1.00	20.00	0	93.5	70	130	6.77	20	
1,2-Dichloroethane (EDC)	22.4	1.00	20.00	0	112	70	130	1.90	20	
2-Butanone	120	5.00	40.00	0	299	70	130	2.33	20	S
Carbon Tetrachloride	20.0	1.00	20.00	0	99.9	70	130	7.78	20	
Chlorobenzene	18.8	1.00	20.00	0	94.1	70	130	6.94	20	
Chloroform	22.0	1.00	20.00	0	110	70	130	4.87	20	
cis-1,2-DCE	20.9	1.00	20.00	0	104	70	130	4.94	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304185-001a msd** SampType: **MSD4** TestCode: **EPA Method: 8260B**

Client ID: **WQ3-C-R35** Batch ID: **R9686** RunNo: **9686**

Prep Date: Analysis Date: **4/4/2013** SeqNo: **275986** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	17.9	1.00	20.00	0	89.5	70	130	6.20	20	
1,1-Dichloroethene	21.2	1.00	20.00	0	106	70	130	3.26	20	
Methylene Chloride	19.7	3.00	20.00	0	98.5	70	130	4.53	20	
1,1,2,2-Tetrachloroethane	36.7	1.00	20.00	0	183	70	130	7.90	20	S
Tetrachloroethene (PCE)	18.4	1.00	20.00	0	92.0	70	130	10.5	20	
trans-1,2-DCE	19.5	1.00	20.00	0	97.3	70	130	5.20	20	
1,1,1-Trichloroethane	20.4	1.00	20.00	0	102	70	130	8.18	20	
1,1,2-Trichloroethane	24.4	1.00	20.00	0	122	70	130	3.17	20	
Trichloroethene (TCE)	18.3	1.00	20.00	0	91.4	70	130	8.29	20	
Trichlorofluoromethane	20.3	1.00	20.00	0	101	70	130	8.41	20	
Vinyl chloride	19.9	1.00	20.00	0	99.7	70	130	7.11	20	
Xylenes, Total	54.8	1.00	60.00	0	91.4	70	130	6.08	20	
Surr: 1,2-Dichloroethane-d4	32.9		30.00		110	70	130	0		
Surr: 4-Bromofluorobenzene	29.3		30.00		97.5	69.5	130	0		
Surr: Dibromofluoromethane	30.9		30.00		103	70	130	0		
Surr: Toluene-d8	29.1		30.00		97.0	70	130	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **50ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R9754**	RunNo: **9754**
Prep Date:	Analysis Date: **4/9/2013**	SeqNo: **277946** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	55		50.00		110	60	140			
Surr: 2-Fluorobiphenyl	50		50.00		100	60	140			
Surr: 2-Fluorophenol	54		50.00		108	60	140			
Surr: 4-Terphenyl-d14	48		50.00		95.5	60	140			
Surr: Nitrobenzene-d5	52		50.00		105	60	140			
Surr: Phenol-d5	49		50.00		97.7	60	140			

Sample ID **mb-6856**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277947** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	5.0								
1,4-Dichlorobenzene	ND	5.0								
2,4-Dinitrophenol	ND	5.0								
2,4-Dinitrotoluene	ND	5.0								
Hexachlorobenzene	ND	5.0								
Hexachloroethane	ND	5.0								
2-Methylphenol	ND	5.0								
3+4-Methylphenol	ND	5.0								
Nitrobenzene	ND	5.0								
Pentachlorophenol	ND	5.0								
Pyridine	ND	5.0								
Surr: 2,4,6-Tribromophenol	170		200.0		83.3	42.9	124			
Surr: 2-Fluorobiphenyl	70		100.0		70.1	40	108			
Surr: 2-Fluorophenol	130		200.0		65.7	23.6	94.8			
Surr: 4-Terphenyl-d14	86		100.0		86.2	41.9	103			
Surr: Nitrobenzene-d5	77		100.0		77.0	42.6	114			
Surr: Phenol-d5	91		200.0		45.7	20.3	74.7			

Sample ID **lcs-6856**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277948** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	77	5.0	100.0	0	77.0	27.4	101			
1,4-Dichlorobenzene	73	5.0	100.0	0	73.0	32.6	91.5			
2,4-Dinitrophenol	39	5.0	100.0	0	38.8	23.1	118			
2,4-Dinitrotoluene	73	5.0	100.0	0	72.9	44.7	112			
Hexachlorobenzene	91	5.0	100.0	0	90.9	30	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-6856**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277948** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	72	5.0	100.0	0	72.3	23.2	97.8			
2-Methylphenol	82	5.0	100.0	0	81.6	36.1	105			
3+4-Methylphenol	79	5.0	100.0	0	79.0	35.7	92.5			
Nitrobenzene	81	5.0	100.0	0	81.2	30.9	125			
Pentachlorophenol	44	5.0	100.0	0	44.3	20.2	93			
Pyridine	60	5.0	100.0	0	59.7	5.14	87.1			
Surr: 2,4,6-Tribromophenol	63		100.0		62.7	42.9	124			
Surr: 2-Fluorobiphenyl	87		100.0		87.1	40	108			
Surr: 2-Fluorophenol	50		100.0		49.7	23.6	94.8			
Surr: 4-Terphenyl-d14	85		100.0		84.7	41.9	103			
Surr: Nitrobenzene-d5	83		100.0		82.5	42.6	114			
Surr: Phenol-d5	57		100.0		56.7	20.3	74.7			

Sample ID **lcsd-6856**	SampType: **LCSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277949** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	80	5.0	100.0	0	79.5	27.4	101	3.30	20	
1,4-Dichlorobenzene	75	5.0	100.0	0	75.3	32.6	91.5	3.05	20	
2,4-Dinitrophenol	41	5.0	100.0	0	41.1	23.1	118	5.61	20	
2,4-Dinitrotoluene	75	5.0	100.0	0	75.5	44.7	112	3.40	20	
Hexachlorobenzene	91	5.0	100.0	0	91.2	30	130	0.286	20	
Hexachloroethane	76	5.0	100.0	0	75.6	23.2	97.8	4.43	20	
2-Methylphenol	86	5.0	100.0	0	86.3	36.1	105	5.53	20	
3+4-Methylphenol	82	5.0	100.0	0	81.6	35.7	92.5	3.19	20	
Nitrobenzene	88	5.0	100.0	0	88.1	30.9	125	8.16	20	
Pentachlorophenol	44	5.0	100.0	0	44.2	20.2	93	0.181	20	
Pyridine	64	5.0	100.0	0	64.0	5.14	87.1	6.95	20	
Surr: 2,4,6-Tribromophenol	62		100.0		62.3	42.9	124	0		
Surr: 2-Fluorobiphenyl	89		100.0		88.9	40	108	0		
Surr: 2-Fluorophenol	52		100.0		51.6	23.6	94.8	0		
Surr: 4-Terphenyl-d14	86		100.0		85.8	41.9	103	0		
Surr: Nitrobenzene-d5	90		100.0		90.0	42.6	114	0		
Surr: Phenol-d5	58		100.0		57.9	20.3	74.7	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-6856**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277950** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	73	10	100.0	0	73.0	30.8	80.6			
2,4-Dinitrotoluene	73	10	100.0	0	72.9	46.1	117			
Pentachlorophenol	44	20	100.0	0	44.3	32.2	95.7			
Surr: 2,4,6-Tribromophenol	63		100.0		62.7	42.9	124			
Surr: 2-Fluorobiphenyl	87		100.0		87.1	40	108			
Surr: 2-Fluorophenol	50		100.0		49.7	23.6	94.8			
Surr: 4-Terphenyl-d14	85		100.0		84.7	41.9	103			
Surr: Nitrobenzene-d5	83		100.0		82.5	42.6	114			
Surr: Phenol-d5	57		100.0		56.7	20.3	74.7			

Sample ID **1304185-001Cms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ3-C-R35**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277958** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	80.8	5.00	100.0	0	80.8	20.9	103			
1,4-Dichlorobenzene	77.4	5.00	100.0	0	77.4	32.6	91.5			
2,4-Dinitrophenol	40.3	5.00	100.0	0	40.3	11	112			
2,4-Dinitrotoluene	79.6	5.00	100.0	0	79.6	44.7	112			
Hexachlorobenzene	95.8	5.00	100.0	0	95.8	30.3	126			
Hexachloroethane	74.5	5.00	100.0	0	74.5	19.5	96.4			
2-Methylphenol	87.0	5.00	100.0	0	87.0	28.7	108			
3+4-Methylphenol	86.5	5.00	100.0	0	86.5	24.2	136			
Nitrobenzene	82.5	5.00	100.0	0	82.5	28.8	119			
Pentachlorophenol	54.0	5.00	100.0	0	54.0	20.2	93			
Pyridine	62.2	5.00	100.0	0	62.2	19.3	82.8			
Surr: 2,4,6-Tribromophenol	93.7		100.0		93.7	42.9	124			
Surr: 2-Fluorobiphenyl	86.1		100.0		86.1	40	108			
Surr: 2-Fluorophenol	78.6		100.0		78.6	23.6	94.8			
Surr: 4-Terphenyl-d14	85.5		100.0		85.5	41.9	103			
Surr: Nitrobenzene-d5	87.7		100.0		87.7	42.6	114			
Surr: Phenol-d5	77.1		100.0		77.1	20.3	74.7			S

Sample ID **1304185-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ3-C-R35**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277959** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	81.0	5.00	100.0	0	81.0	20.9	103	0.346	20	
1,4-Dichlorobenzene	80.2	5.00	100.0	0	80.2	32.6	91.5	3.58	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304185-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ3-C-R35**	Batch ID: **6856**	RunNo: **9754**
Prep Date: **4/7/2013**	Analysis Date: **4/9/2013**	SeqNo: **277959** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrophenol	40.6	5.00	100.0	0	40.6	11	112	0.593	20	
2,4-Dinitrotoluene	83.5	5.00	100.0	0	83.5	44.7	112	4.86	20	
Hexachlorobenzene	95.7	5.00	100.0	0	95.7	30.3	126	0.0836	20	
Hexachloroethane	77.4	5.00	100.0	0	77.4	19.5	96.4	3.79	20	
2-Methylphenol	90.4	5.00	100.0	0	90.4	28.7	108	3.90	20	
3+4-Methylphenol	90.0	5.00	100.0	0	90.0	24.2	136	3.90	20	
Nitrobenzene	79.5	5.00	100.0	0	79.5	28.8	119	3.70	20	
Pentachlorophenol	58.6	5.00	100.0	0	58.6	20.2	93	8.17	20	
Pyridine	70.2	5.00	100.0	0	70.2	19.3	82.8	12.1	20	
Surr: 2,4,6-Tribromophenol	99.3		100.0		99.3	42.9	124	0		
Surr: 2-Fluorobiphenyl	87.3		100.0		87.3	40	108	0		
Surr: 2-Fluorophenol	79.6		100.0		79.6	23.6	94.8	0		
Surr: 4-Terphenyl-d14	88.5		100.0		88.5	41.9	103	0		
Surr: Nitrobenzene-d5	84.9		100.0		84.9	42.6	114	0		
Surr: Phenol-d5	81.0		100.0		81.0	20.3	74.7	0		S

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R9756**	RunNo: **9756**
Prep Date:	Analysis Date: **4/10/2013**	SeqNo: **278019** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	41		40.00		104	60	140			
Surr: 2-Fluorobiphenyl	37		40.00		92.3	60	140			
Surr: 2-Fluorophenol	41		40.00		101	60	140			
Surr: 4-Terphenyl-d14	40		40.00		98.9	60	140			
Surr: Nitrobenzene-d5	38		40.00		95.2	60	140			
Surr: Phenol-d5	38		40.00		94.3	60	140			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**ec 9992us ccv**	SampType:	**ccv**	TestCode:	**SM2510B: Specific Conductance**					
Client ID:	**CCV**	Batch ID:	**R9700**	RunNo:	**9700**					
Prep Date:		Analysis Date:	**4/5/2013**	SeqNo:	**276513**	Units:	**µmhos/cm**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	9500	0.010	9992	0	94.8	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP
Project: WIPP DMP

Sample ID	**MB-7137**	SampType: **mblk**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID: **7137**		RunNo: **10112**					
Prep Date:	**4/24/2013**	Analysis Date: **4/25/2013**		SeqNo: **288145**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-7137**	SampType: **lcs**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID: **7137**		RunNo: **10112**					
Prep Date:	**4/24/2013**	Analysis Date: **4/25/2013**		SeqNo: **288146**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0052	0.00020	0.005000	0	103	80	120			

Sample ID	**LCSD-7137**	SampType: **lcsd**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSS02**	Batch ID: **7137**		RunNo: **10112**					
Prep Date:	**4/24/2013**	Analysis Date: **4/25/2013**		SeqNo: **288147**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0052	0.00020	0.005000	0	104	80	120	0.895	20	

Sample ID	**1304185-001DMS**	SampType: **ms**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**WQ3-C-R35**	Batch ID: **7137**		RunNo: **10112**					
Prep Date:	**4/24/2013**	Analysis Date: **4/25/2013**		SeqNo: **288149**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0127	0.000800	0.02000	0	63.7	75	125			S

Sample ID	**1304185-001DMSD**	SampType: **msd**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**WQ3-C-R35**	Batch ID: **7137**		RunNo: **10112**					
Prep Date:	**4/24/2013**	Analysis Date: **4/25/2013**		SeqNo: **288150**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0138	0.000800	0.02000	0	69.2	75	125	8.24	20	S

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1304185**

Hall Environmental Analysis Laboratory, Inc.

22-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294877** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	0.014	1.0								J
Potassium	ND	1.0								
Sodium	ND	1.0								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294878** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	52	1.0	50.00	0	104	80	120			
Potassium	51	1.0	50.00	0	102	80	120			
Sodium	52	1.0	50.00	0	103	80	120			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294879** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	53	1.0	50.00	0	106	80	120	2.34	20	
Potassium	52	1.0	50.00	0	105	80	120	2.49	20	
Sodium	53	1.0	50.00	0	105	80	120	2.13	20	

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295315** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295316** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.5	80	120			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295317** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP
Project: WIPP DMP

Sample ID	LCSD	SampType:	LCSD	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSS02	Batch ID:	R10449	RunNo:	10449					
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295317	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	96.2	80	120	2.39	20	

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R10449	RunNo:	10449					
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295326	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	2.85	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R10449	RunNo:	10449					
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295327	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	103	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R10449	RunNo:	10449					
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295335	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.781	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R10449	RunNo:	10449					
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295336	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	95.9	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R10449	RunNo:	10449					
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295347	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.609	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**CCV CAT**	SampType:	**CCV_CAT**	TestCode:	**EPA Method 6010B: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID:	**R10449**	RunNo:	**10449**					
Prep Date:		Analysis Date:	**5/7/2013**	SeqNo:	**295348**	Units:	**mg/L**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium		50	1.0	50.00	0	99.5	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6857**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **6857**	RunNo: **9755**
Prep Date: **4/8/2013**	Analysis Date: **4/10/2013**	SeqNo: **277976** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.020								
Beryllium	ND	0.0030								
Cadmium	ND	0.0020								
Calcium	0.026	1.0								J
Chromium	ND	0.0060								
Iron	ND	0.050								
Lead	ND	0.0050								
Magnesium	ND	1.0								
Nickel	ND	0.010								
Potassium	ND	1.0								
Silver	ND	0.0050								
Sodium	ND	1.0								
Vanadium	ND	0.050								

Sample ID **LCS-6857**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **6857**	RunNo: **9755**
Prep Date: **4/8/2013**	Analysis Date: **4/10/2013**	SeqNo: **277977** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.53	0.020	0.5000	0	105	80	120			
Beryllium	0.53	0.0030	0.5000	0	106	80	120			
Cadmium	0.49	0.0020	0.5000	0	98.4	80	120			
Calcium	50	1.0	50.00	0.02644	101	80	120			
Chromium	0.50	0.0060	0.5000	0	101	80	120			
Iron	0.53	0.050	0.5000	0	107	80	120			
Lead	0.49	0.0050	0.5000	0	97.5	80	120			
Magnesium	49	1.0	50.00	0	98.5	80	120			
Nickel	0.48	0.010	0.5000	0	95.6	80	120			
Potassium	47	1.0	50.00	0	94.0	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			
Sodium	48	1.0	50.00	0	96.1	80	120			
Vanadium	0.54	0.050	0.5000	0	108	80	120			

Sample ID **1304185-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ3-C-R35**	Batch ID: **6857**	RunNo: **9897**
Prep Date: **4/8/2013**	Analysis Date: **4/16/2013**	SeqNo: **281501** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	12.0	0.500	12.50	0.04050	95.8	75	125			
Beryllium	12.5	0.0750	12.50	0.01900	99.8	75	125			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304185-001DMS** SampType: **MS** TestCode: **EPA 6010B: Total Recoverable Metals**

Client ID: **WQ3-C-R35** Batch ID: **6857** RunNo: **9897**

Prep Date: **4/8/2013** Analysis Date: **4/16/2013** SeqNo: **281501** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	12.3	0.0500	12.50	0	98.3	75	125			
Chromium	11.9	0.150	12.50	0	95.3	75	125			
Iron	12.7	1.25	12.50	0.4498	97.6	75	125			
Lead	11.9	0.125	12.50	0	95.0	75	125			
Nickel	11.4	0.250	12.50	0	91.6	75	125			
Silver	2.54	0.125	2.500	0	102	75	125			
Vanadium	12.7	1.25	12.50	0.1575	100	75	125			

Sample ID **1304185-001DMSD** SampType: **MSD** TestCode: **EPA 6010B: Total Recoverable Metals**

Client ID: **WQ3-C-R35** Batch ID: **6857** RunNo: **9897**

Prep Date: **4/8/2013** Analysis Date: **4/16/2013** SeqNo: **281502** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	12.7	0.500	12.50	0.04050	101	75	125	5.22	20	
Beryllium	13.3	0.0750	12.50	0.01900	106	75	125	6.35	20	
Cadmium	12.9	0.0500	12.50	0	103	75	125	4.70	20	
Chromium	12.5	0.150	12.50	0	100	75	125	5.04	20	
Iron	13.0	1.25	12.50	0.4498	100	75	125	2.41	20	
Lead	12.5	0.125	12.50	0	99.8	75	125	4.97	20	
Nickel	12.1	0.250	12.50	0	96.6	75	125	5.32	20	
Silver	2.68	0.125	2.500	0	107	75	125	5.31	20	
Vanadium	13.5	1.25	12.50	0.1575	107	75	125	6.11	20	

Sample ID **LCS-6857** SampType: **LCS** TestCode: **EPA 6010B: Total Recoverable Metals**

Client ID: **LCSW** Batch ID: **6857** RunNo: **10015**

Prep Date: **4/8/2013** Analysis Date: **4/22/2013** SeqNo: **285541** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.45	0.020	0.5000	0	90.6	80	120	14.9	0	
Beryllium	0.48	0.0030	0.5000	0	96.2	80	120	9.79	0	
Cadmium	0.46	0.0020	0.5000	0	92.2	80	120	6.52	0	
Calcium	45	1.0	50.00	0	89.4	80	120	11.8	0	
Chromium	0.45	0.0060	0.5000	0	90.7	80	120	10.7	0	
Iron	0.46	0.050	0.5000	0	91.5	80	120	15.2	0	
Lead	0.45	0.0050	0.5000	0	89.7	80	120	8.27	0	
Magnesium	46	1.0	50.00	0	92.6	80	120	6.25	0	
Nickel	0.43	0.010	0.5000	0	86.9	80	120	9.54	0	
Potassium	47	1.0	50.00	0	93.1	80	120	0.970	0	
Silver	0.095	0.0050	0.1000	0	95.1	80	120	7.22	0	
Sodium	48	1.0	50.00	0	95.8	80	120	0.304	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	LCS-6857	SampType:	LCS	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	LCSW	Batch ID:	6857	RunNo:	10015					
Prep Date:	4/8/2013	Analysis Date:	4/22/2013	SeqNo:	285541	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vanadium	0.47	0.050	0.5000	0	94.4	80	120	13.2	0	

Sample ID	CCB	SampType:	CCB	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	CCB	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294888	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	-0.0520	-100	99			
Potassium	ND	1.0	1.000	0	-4.73	-100	99			
Sodium	ND	1.0	1.000	0	1.86	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	BatchQC	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294889	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	49	1.0	50.00	0	97.8	90	110			
Potassium	47	1.0	50.00	0	95.0	90	110			
Sodium	48	1.0	50.00	0	95.7	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	CCB	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294905	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	0.234	-100	99			
Potassium	ND	1.0	1.000	0	7.33	-100	99			
Sodium	ND	1.0	1.000	0	4.58	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	BatchQC	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294906	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	99.6	90	110			
Potassium	49	1.0	50.00	0	98.9	90	110			
Sodium	51	1.0	50.00	0	101	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

WO#: **1304185**

Hall Environmental Analysis Laboratory, Inc.

22-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **CCB** SampType: **CCB** TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB** Batch ID: **R10423** RunNo: **10423**
Prep Date: Analysis Date: **5/6/2013** SeqNo: **294918** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	0.159	-100	99			
Potassium	ND	1.0	1.000	0	9.18	-100	99			
Sodium	ND	1.0	1.000	0	1.91	-100	99			

Sample ID **CCV CAT** SampType: **CCV_CAT** TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC** Batch ID: **R10423** RunNo: **10423**
Prep Date: Analysis Date: **5/6/2013** SeqNo: **294919** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48	1.0	50.00	0	95.6	90	110			
Potassium	47	1.0	50.00	0	94.3	90	110			
Sodium	49	1.0	50.00	0	98.1	90	110			

Sample ID **CCB** SampType: **CCB** TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB** Batch ID: **R10423** RunNo: **10423**
Prep Date: Analysis Date: **5/6/2013** SeqNo: **294931** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	0.205	-100	99			
Potassium	ND	1.0	1.000	0	5.28	-100	99			
Sodium	ND	1.0	1.000	0	-1.59	-100	99			

Sample ID **CCV CAT** SampType: **CCV_CAT** TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC** Batch ID: **R10423** RunNo: **10423**
Prep Date: Analysis Date: **5/6/2013** SeqNo: **294932** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48	1.0	50.00	0	95.5	90	110			
Potassium	47	1.0	50.00	0	94.3	90	110			
Sodium	49	1.0	50.00	0	98.2	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**ph 7.00 ccv**	SampType:	**ccv**	TestCode:	**SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID:	**R9675**	RunNo:	**9675**					
Prep Date:		Analysis Date:	**4/4/2013**	SeqNo:	**275779**	Units:	**pH units**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.00	1.68								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP
Project: WIPP DMP

Sample ID **mb-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R9675**	RunNo: **9675**							
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275744**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R9675**	RunNo: **9675**							
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275745**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	78	20	80.00	0	97.4	90	110			

Sample ID **lcs-1 dup**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R9675**	RunNo: **9675**							
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275746**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	98.4	90	110	1.12	0	

Sample ID **1304185-002f ms**	SampType: **ms**	TestCode: **SM2320B: Alkalinity**							
Client ID: **WQ3-C-R35-Duplica**	Batch ID: **R9675**	RunNo: **9675**							
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275753**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	106	20.0	80.00	32.04	92.9	65.3	113			

Sample ID **1304185-002f msd**	SampType: **msd**	TestCode: **SM2320B: Alkalinity**							
Client ID: **WQ3-C-R35-Duplica**	Batch ID: **R9675**	RunNo: **9675**							
Prep Date:	Analysis Date: **4/4/2013**	SeqNo: **275754**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	106	20.0	80.00	32.04	92.8	65.3	113	0.113	10	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID	**MB**	SampType:	**MBLK**	TestCode:	**SM 5310B: TOC**					
Client ID:	**PBW**	Batch ID:	**R9704**	RunNo:	**9704**					
Prep Date:		Analysis Date:	**4/8/2013**	SeqNo:	**277453**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.0								

Sample ID	**LCS ST9060-12006**	SampType:	**LCS**	TestCode:	**SM 5310B: TOC**					
Client ID:	**LCSW**	Batch ID:	**R9704**	RunNo:	**9704**					
Prep Date:		Analysis Date:	**4/8/2013**	SeqNo:	**277454**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.8	1.0	4.850	0	99.2	90	110			

Sample ID	**LCSD ST9060-12006**	SampType:	**LCS**	TestCode:	**SM 5310B: TOC**					
Client ID:	**LCSW**	Batch ID:	**R9704**	RunNo:	**9704**					
Prep Date:		Analysis Date:	**4/8/2013**	SeqNo:	**277455**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.9	1.0	4.850	0	101	90	110	2.12	0	

Sample ID	**1304185-001BMS**	SampType:	**MS**	TestCode:	**SM 5310B: TOC**					
Client ID:	**WQ3-C-R35**	Batch ID:	**R9704**	RunNo:	**9704**					
Prep Date:		Analysis Date:	**4/8/2013**	SeqNo:	**277457**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.35	1.00	4.650	0.4149	84.6	75	125			

Sample ID	**1304185-001BMSD**	SampType:	**MSD**	TestCode:	**SM 5310B: TOC**					
Client ID:	**WQ3-C-R35**	Batch ID:	**R9704**	RunNo:	**9704**					
Prep Date:		Analysis Date:	**4/8/2013**	SeqNo:	**277458**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.88	1.00	4.650	0.4149	96.1	75	125	11.7	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304185-001FDUP**	SampType: **DUP**			TestCode: **Specific Gravity**						
Client ID: **WQ3-C-R35**	Batch ID: **R9728**			RunNo: **9728**						
Prep Date:	Analysis Date: **4/9/2013**			SeqNo: **277265**		Units:				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.133	0						0.0618	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304185**

22-May-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-6904**	SampType: **MBLK**	TestCode: **SM 2540D: TSS**							
Client ID: **PBW**	Batch ID: **6904**	RunNo: **9773**							
Prep Date: **4/10/2013**	Analysis Date: **4/10/2013**	SeqNo: **278332**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	ND	4.0								

Sample ID **LCS-6904**	SampType: **LCS**	TestCode: **SM 2540D: TSS**							
Client ID: **LCSW**	Batch ID: **6904**	RunNo: **9773**							
Prep Date: **4/10/2013**	Analysis Date: **4/10/2013**	SeqNo: **278333**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	93	4.0	96.60	0	96.3	85.8178	113.8716			

Sample ID **1304185-001FDUP**	SampType: **DUP**	TestCode: **SM 2540D: TSS**							
Client ID: **WQ3-C-R35**	Batch ID: **6904**	RunNo: **9773**							
Prep Date: **4/10/2013**	Analysis Date: **4/10/2013**	SeqNo: **278336**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	128	4.00						3.98	15	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

WQSP-3

DATA VERIFICATION AND VALIDATION REPORTS

Round 35

WQSP-3

SDG 1304185

Groundwater Concentration and Precision Summary

General Chemistry					Primary		Duplicate				Applicable 95th UTLV
Parameter	**Units**	**SOW MRL**	**Lab MDL[a]**	**Lab PQL[b]**	**Sample**	**Flag**	**Sample**	**Flag**	**Avg**	**RPD**	**or 95th %**
Chloride	mg/L	0.5	660	5,000	127,000		129,000		128,000	-1.6	149,100
TOC	mg/L	1.0	0.23	1.0	0.42	J	0.44	J	0.43	4.7	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	5.0	20	32.8		32.0		32.4	2.5	54.5
Specific Conductance	umhos/cm	NA	0.50	0.50	383,000		385,000		384,000	0.52	517,000
pH	pH units	NA	0.10	1.68	6.83		6.84		6.84	0.15	6.6 - 7.2
Specific Gravity	NA	NA	0.0	0.0	1.133		1.034		1.084	9.1	1.17
TDS	mg/L	10	500	1,000	220,000		211,000		215,500	4.2	261,000
TSS	mg/L	1.0	1.5	4.0	**123**		**168**		**146**	31	**107**
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	5.60	100	1,440		1,380		1,410	4.3	1,680
Mg (Diss)	mg/L	0.5	0.83	100	2,300		2,190		2,245	4.9	2,625
K (Diss)	mg/L	0.5	5.0	100	1,510		1,410		1,460	6.8	3,438
Na (Diss)	mg/L	0.5	80	1,000	75,300		76,600		75,950	1.7	140,400
					Primary		Duplicate				
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL**	**Lab PQL**	**Sample**	**Flag**	**Sample**	**Flag**	**Avg**	**RPD**	
Hg (CVAAS) (c)	mg/L	0.0002	0.00035	0.00080	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.013	0.50	0.040	J	0.046	J	0.043	14	<1.0
Be (c)	mg/L	0.010	0.012	0.075	0.019	J	0.019	J	0.0190	0.0	<0.1
Cd (c)	mg/L	0.010	0.020	0.050	ND		ND		NA	NA	<0.5
Ca	mg/L	0.500	0.23	25	1,530		1,450		1,490	5.4	NA
Cr (c)	mg/L	0.025	0.038	0.15	ND		ND		NA	NA	<2.0
Pb (c)	mg/L	0.020	0.085	0.12	ND		ND		NA	NA	0.8
Mg	mg/L	0.50	0.24	25	2,390		2,250		2,320	6.0	NA
Ni (c)	mg/L	0.025	0.035	0.25	ND		ND		NA	NA	<5.0
K	mg/L	0.50	5.4	25	1,690		1,600		1,645	5.5	NA
Ag (c)	mg/L	0.013	0.028	0.12	ND		ND		NA	NA	0.31
Na	mg/L	0.50	510	1,000	81,900		74,900		78,400	8.9	NA
V (c)	mg/L	0.025	0.087	1.25	0.16	J	0.16	J	0.16	0.0	<5.0
ICP/MS Metals											
Sb	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	<1.0
As	mg/L	0.050	0.020	0.020	ND		ND		NA	NA	<1.0
Se	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	<2.0
Tl	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	5.8

Method Reporting Limit (MRL) and lab's Practical Quantitation Level (PQL) generally equivalent for a given sample.

Lab's PQL corresponds to low calibration standard adjusted for the dilution factor as necessary for high-brine samples.

J Flag indicates concentration was below the lab's PQL but above the Method Detection Limit (MDL) for the analyte.

NA - Not Applicable

ND - Not Detected

Bold concentrations higher than 95th UTLV or 95th percentile (for 16 - 95 percent baseline non-detects).

CVAAS - cold vapor atomic absorption spectroscopy.

ICP - inductively coupled plasma emission spectroscopy.

ICP/MS - ICP combined with mass spectrometry.

(a) MDL - method detection limit

(b) PQL - practical quantitation limit eqivalent to method reporting limit (MRL)

(c) MDL higher than SOW-prescribed MRL.

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 35
WQSP-3

Sample Summary

Date:	July 24, 2013
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	April 3, 2013
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 27, 2013
Date Samples Shipped/Method	April 3, 2013 by FedEx
Date Samples Received by lab:	April 4, 2013
Sample Receipt Condition:	Intact at 2.1 deg. C
SDG:	1304185
WIPP Chain of Custody/Request for Analysis:	1030
Analysis Results Reviewed:	Volatile and semivolatile organics; total and dissolved metals; general chemistry indicator parameters
Analyses Verified, Validated, and Reported in this Document:	See table of all target analytes and methods in the Annual Culebra Groundwater Monitoring Report
VOC Analysis Date(s):	April 4, 2013 (meets holding time)
SVOC Extraction Date:	April 8, 2013 (meets holding time)
SVOC Analysis Date(s):	April 9, 2013 (meets holding time)
Total Trace Metals Analysis Date:	April 16, 2013 (meets holding time)
Dissolved Cation Metals Analysis Date:	May 6 and 7, 2013 (meets holding time)
Mercury Analysis Date(s):	April 25, 2013 (meets holding time)
General Chemistry Parameters analysis dates	Dates are summarized on the Dates Report and on the data summary reports from the lab in the appendices. All holding times were met.
Verification and Validation Checklist	Completed and attached to this narrative

Sample Numbers and Analytes for SDG 1304185

WTS Sample No.	Analytes
GW-WQ3CR35N1, GW-WQ3CR35N1D	VOCs
GW-WQ3CR35N2, GW-WQ3CR35N3	VOCs (Field Blank and Trip Blank)
GW-WQ3CR35N4, GW-WQ3CR35N4D	TOC
GW-WQ3CR35N5, GW-WQ3CR35N5D	SVOCs
GW-WQ3CR35N6, GW-WQ3CR35N6D	Total Trace Metals (including "total" cation metals)
GW-WQ3CR35 N7, GW-WQ3CR35 N7D	General Parameters (including "dissolved" cations)

No VOCs were detected above the MRL in the duplicate groundwater samples. The laboratory reported detection of isobutyl alcohol in the duplicate sample only at a concentration just below the MRL at 4.3 ug/L. The data reviewer reviewed the mass spectrometric data and could not confirm the presence of the compound. The compound is not listed on the Groundwater Concentration and Precision Summary.

The field blank showed detection of 2-butanone just above the MRL at 5.6 ug/L and chloroform below the MRL at 0.60 ug/L (J-flagged). The trip blank did not show detection of any VOCs.

No SVOCs were detected in the WQSP-3 groundwater samples.

The trace metals detected included Ba at 0.040 mg/L in the primary sample and 0.046 mg/L in the duplicate sample; Be at 0.019 mg/L in the primary sample and 0.019 mg/L in the duplicate sample; and V at 0.060 mg/L in the primary and duplicate sample. All the concentrations are J-flagged as estimated, and all the concentrations are all well below the Permit background concentrations of concern.

Measurements were made on all the general chemistry parameters at concentrations above the MRL except for TOC, which was detected between the MDL and MRL at 0.42 mg/L in the primary sample and 0.44 mg/L in the duplicate sample. The TOC concentrations were J-flagged as estimated. The sulfate concentrations were higher than the 95 UTLV at 8,090 mg/L in the primary sample and 8,100 mg/L in the duplicate sample for an average of 8,095 mg/L compared to the 95th UTLV concentration of 8,015 mg/L. The TSS concentrations were above the 95th percentile concentration of 107 mg/L at 168 mg/L in the primary sample and 146 mg/L in the duplicate sample for an average of 125 mg/L. The Round 35 data for the general chemistry parameters are very close to the concentrations measured in Round 34.

Summary for Volatile Organics Analysis

The groundwater samples were purged and analyzed for 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, benzene, carbon tetrachloride, chlorobenzene, chloroform, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, isobutanol, methyl ethyl ketone (2-butanone), methylene chloride, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, and xylenes (o-, m-, and p-).

The samples were analyzed according to the laboratory's SOP S-8260-11 based on EPA's SW-846 Method 8260B.

No VOCs were detected above the MRL in the duplicate groundwater samples. The laboratory reported detection of isobutyl alcohol in the duplicate sample only at a concentration just below the MRL at 4.3 ug/L. The data reviewer reviewed the mass spectrometric data and could not confirm the presence of the compound. The compound is not listed on the Groundwater Concentration and Precision Summary.

The field blank showed detection of 2-butanone just above the MRL at 5.6 ug/L and chloroform below the MRL at 0.60 ug/L (J-flagged). The trip blank did not show detection of any VOCs.

Recoveries of isobutyl alcohol, 2-butanone, and 1,1,2,2-tetrachloroethane were all higher than the 130 percent recovery objective as typically observed in the high-TDS WQSP-3 groundwater. The recoveries in the MS and MSD were 377 percent and 411 percent for isobutyl alcohol; 292 percent and 299 percent for 2-butanone, and 199 percent and 183 percent for 1,1,2,2-tetrachloroethane.

The high-TDS sample matrix causes 2-butanone to purge more efficiently from the spiked samples than from the calibration standards and LCS samples, and 1,1,2,2-tetrachloroethane is produced in small quantities from degradation of other spiked chlorinated organic compounds such as the dichloroethylenes and trichloroethylene in the high-chloride aqueous matrix spiked with VOCs.

All other quality assurance objectives were met for the VOC analyses.

Summary for Semivolatile Organic Compound Analysis

The groundwater samples were analyzed for 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, 2,4-dinitrophenol, 2,4-dinitrotoluene, 2-methylphenol (o-cresol), 3+4-methylphenol (m-, p-methyl phenol), hexachlorobenzene, hexachloroethane, nitrobenzene, pentachlorophenol, and pyridine.

No SVOCs were detected in the groundwater samples. The samples were analyzed according to the laboratory's SOP S-8270C-11 based on EPA's SW-846 Method 8270C.

The recoveries of the acidic compound 2,4-dinitrophenol at 14.5 percent and 12.4 percent from the MS/MSD were lower than the 30-percent objective, but they did meet the lab's historical recovery range. The recoveries of pentachlorophenol were higher at 35.1 percent and 31.0 percent in the MS and MSD, respectively. The recovery of the two compounds is adversely affected by the groundwater matrix since the recoveries are higher from the LCS/LCSD samples. The precision objective of <20 RPD was met for all the compounds.

None of the SVOC compounds were detected in the groundwater samples, and there was no adverse impact on the quality or usability of the data. All other quality assurance objectives were met for the SVOC data.

Summary for Metals Analysis

The groundwater samples were prepared and analyzed for Barium (Ba), Beryllium (Be), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Lead (Pb), Magnesium (Mg), Nickel (Ni), Potassium (K), Silver (Ag), Sodium (Na), and Vanadium (V) by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) according to Hall's SOP S-610-8 based on EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed according to Anatek's SOP ALI-A-315.03 for ICP/MS Method 6020 from SW-846. Mercury (Hg) was analyzed according to the Hall's S-245.1_7470A-3 using automated cold-vapor atomic absorption (CVAA) spectroscopy. The SOP is based on EPA's SW-846 Method 7470A.

The trace metals Ba, Be, and V were detected in the samples. The concentrations of the three metals are similar to those detected in previous rounds and are all J-flagged as estimated. The Ba concentrations were 0.040 mg/L in the primary sample and 0.046 mg/L in the duplicate sample; the Be concentrations were 0.019 mg/L in the primary and duplicate samples, respectively; and the V concentrations were 0.16 mg/L in both the primary and duplicate samples.

The high-TDS WQSP-3 groundwater samples were diluted by a factor of five to analyze the samples for the trace metals. As a result the MDLs were higher than the SOW-prescribed MRLs for Be, Cd, Cr, Pb, Ni, Ag, and V. Be and V were detected in the groundwater samples, and the other metals typically are not detected.

All quality assurance objectives for recovery and precision were met for the trace metals, the dissolved cations, mercury, and ICP/MS analysis data.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), alkalinity, and the anions chloride and sulfate. The standard analytical methods and the corresponding SOPs are shown in the table below.

Standard Analytical Method	Current Hall Lab SOP
Method 2710F – Specific Gravity from Standard Methods	S-SM2710F - Rev. 1
Standard Methods SM 4500-H^+ (pH)	S-4500-H^+- 7
EPA Method 120.1 Specific Conductance (Conductivity)	S-120.1 - 7
Standard Methods SM 2540C (TDS)	S-SM2540C – 6
Standard Methods SM 2540D (TSS)	S-SM2540D – 4
Standard Methods SM 5310B (TOC)	S-TOC – 6
Standard Methods 2320B (Alkalinity)	S-SM2320 – 7
EPA Method 300.0 (Anions)	S-300.0 – 10

Measurements were made on all the target general chemistry parameters. The TOC concentrations were J-flagged as estimated with concentrations between the MDL and MRL at 0.42 mg/L in the primary sample and 0.44 mg/L in the duplicate sample.

The types of QC samples analyzed for the general chemistry parameters include the following:

- Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted.

- LCS samples were analyzed for the anions chloride and sulfate to obtain recovery information. MS/MSD samples were not analyzed because of the high native concentrations of chloride and sulfate. The LCS recoveries were within the 90 – 110 percent recovery objective. A LCSD was not analyzed to measure precision.

- The primary groundwater sample was analyzed in duplicate for specific gravity to obtain precision information. The RPD of the duplicate analysis was <1 indicating good precision. However, the lab failed to analyze a duplicate sample for pH and for specific conductance. The only QC data for these two analytes is a CCV.

- A LCS sample and a duplicate sample were analyzed for TSS to obtain recovery and precision information. MS/MSD samples are not applicable. The LCS recovery was 96.3 percent and the RPD of the duplicate sample analysis was 4.0.

- LCS and MS/MSD QC samples were analyzed for TDS, alkalinity and TOC to obtain recovery and precision information. In addition LCSD samples were analyzed for alkalinity and TOC. The LCS and LCSD recoveries were within 90 – 110 percent. The MS/MSD recoveries were 94.4 and 111, respectively for TDS with a RPD of 3.1. The MS/MSD recoveries for alkalinity were 92.9 and 92.8 percent, respectively, for a RPD of 0.11 and the MS/MSD recoveries for TOC were 84.6 and 96.1 percent, respectively, for a RPD of 12.

The TSS concentrations were 123 mg/L in the primary sample and 168 mg/L in the duplicate sample for an average of 146 mg/L. All three concentrations are higher than the 95th percentile concentration of 107 mg/L. The RPD for these analyses was 31, although field duplicates do

not have firm precision objectives. The duplicate analysis of the primary sample yielded 128 mg/L for a RPD of only 4.0, which did meet the precision objective of <20 RPD. The particle size of the TSS is likely very close to the pore size of the filters, making it challenging to achieve accurate and reproducible results for TSS measurements, especially in the high-TDS WQSP-3 groundwater.

All other quality assurance objectives were met for the general chemistry indicator parameter analyses.

Overall Data Package Summary

In summary, the data and information contained in this data packet is of high quality and meets the data quality objectives for accuracy and precision with only a few minor exceptions as detailed above and in the Annual Culebra Groundwater Monitoring Report. WQSP-3 contains the highest concentration of TDS of any of the WQSP wells, which challenges the metal analyses and some of the general chemistry parameter analyses.

The data are usable and meet the needs of the DMP.

Attachment 2 – Preliminary Review

SECTION A

Sample Location: WQSP-3

Laboratory Name: Hall Environmental

Laboratory Work Order #: 1304185

Sample Number(s): GW-WQ3-C-R35-N1-N8D

Reviewer Name (print): Greg Jungclaus

Reviewer Signature: G Jungclaus

SECTION B	YES	NO
Is the SDG narrative present and certification page signed by an authorized representative of the laboratory?	✓	
Does the SDG narrative explain problems associated with processing and analysis of the samples?	✓	
Were the original or copy of the Chain of Custody/Request for Analysis (CofC/RFA) complete?	✓	
Are the sample analysis summary tables present?	✓	
Were sufficient data as required by the Statement of Work (SOW) available to evaluate the analysis results?	✓	
Was an electronic data package received for preliminary review of the data?	✓	

SECTION C GENERAL VERIFICATION AND VALIDATION	YES	NO
Were data entries free of transcription error? Metals DF was 25, not 5		✓
Were calculations correct?	✓	
Were the correct number of significant figures applied to reported data?	✓	
Were trip (VOC only), field and laboratory method blanks (MB) free of contaminants?		✓
Note: The consistent detection of any anthropogenic compounds should be reported to the EM&H Manager, as well as documented and discussed in the Verification and Validation Report.		
Were any anthropogenic compounds starting to appear consistently in the samples?		✓
Were concentrations consistently reported in units of micrograms per liter (ug/L) for organics and milligrams per Liter (mg/L) for applicable general chemistry parameters and constituents?	✓	
Were the applicable standard methods used for all the analyses?	✓	
Note: The EM&H Manager should be contacted if the data completeness objective of 100% is not met for any Verification and Validation Report since resampling and/or reanalysis of Detection Monitoring Program (DMP) samples may be required.		
Was 100% of the sample analysis data usable and valid?	✓	

G Jungclaus 9-11-13

Data Validator Date

D Hawsorth 9/17/13

Completeness Reviewer Date

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CofC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with hydrochloric acid?	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 2.1°C	✓	
Was the analysis holding time of 14 days met for all samples? 4/4 vs 4/3	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact, e.g., no air bubbles in the vials?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a 4-bromofluorobenze (BFB) tuning compound analysis performed at the beginning and every 12 hours during VOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z (mass per unit charge) 95?	✓	
Were the ion abundance criteria listed in Method 8260 met?	✓	

INITIAL CALIBRATION	YES	NO	
Were a minimum of 5 calibration standards used for the initial calibration?	✓		
Did the calibration standards contain all the target VOC compounds?	✓		
Was the low standard at or below the concentration of the MRL, e.g., 5.0 µg/L?	✓		(a)
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓	
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓		
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓	(b)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to be within 20% of the expected concentration?	✓		

(a) $\frac{2.0\ ng}{5.0\ mL} = 0.4\ \mu g/L$

(b) Avg RRFs not used.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the VOCs in the CCVs agree to within 20% difference (bias) of the standard CCV concentration? Note that the CCV concentration may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory MB analyzed for each 12-hour period of GC/MS instrument operation?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Was a trip blank (one per DMP sample set) analyzed?	✓	
Was a field blank analyzed (one per DMP sample set)	✓	
Were the concentrations of any VOCs detected in the laboratory method blank samples < MRL?	✓	
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?		✓ (a)

SYSTEM MONITORING COMPOUNDS (SURROGATES)	YES	NO
Note: Flag the data if System Monitoring Compound (SMC) recoveries are outside the recovery objective with no evidence of sample reanalysis.		
Were a minimum of three (3) SMCs added to all samples and blanks prior to GC/MS analysis?	✓	
Were the SMC recoveries reported on the SMC recovery form consistent with the raw data?	✓	
Did the SMC recoveries meet the 70-130% recovery objective or the QC recovery chart limits established historically by the laboratory?	✓	
Did the lab need to reanalyze any samples because the SMC recovery objective was not met?		✓

(a) 2-butanone was detected in the Field Blank at 5.58 µg/L (5.0 µg/L MRL)

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS sample prepared and analyzed with each DMP sample set?	✓	
Was the LCS sample spiked with all the DMP target VOCs?	✓	
Did the LCS recoveries for all the target VOCs meet the 70-130% recovery objective?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and MSD prepared and analyzed with each DMP sample set?	✓	
Were the MS/MSD samples spiked with all the DMP target VOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for target DMP target VOCs meet the accuracy objective specified in the EPA Functional Guidelines? (60-140% recovery) or the QC recovery control chart limits established historically by the laboratory?		✓ (a)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were the retention times of the internal standards (IS) in the samples within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS in the samples within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the Relative Retention Times (RRTs) of any target VOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) The MS recovery of isobutyl alcohol was 377%; MSD recovery 411%
The MS recovery of 2-butanone was 292%; MSD recovery 299%.
The MS recovery of 1,1,2,2-tetrachloroethane was 199%; MSD recovery 183%.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO
Was a forward search of the VOC mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓	
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.		
Were any VOC Tentatively Identified Compounds (TICs) detected in the trip blank and field blank samples?		✓ (a)
Were any VOC TICs detected in the groundwater samples?		✓

Data Validator 8/22/13 Date

Completeness Reviewer 9/17/13 Date

(a) The field blank, trip blank, and groundwater samples contained various concentrations of the silicone degradation products from the GC column.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 2.1°C	✓	
Were the samples extracted within 7 days of sample collection? 4/7 vs 4/3	✓	
Were the extracts analyzed within 40 days of sample extraction? 4/9 vs 4/7	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a DFTPP (decafluorotriphenylphosphine) tuning compound analysis performed at the beginning and every 12 hours during SVOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z 198?	✓	
Were the ion abundance criteria listed in Method 8270C met?	✓	

INITIAL CALIBRATION	YES	NO
Were a minimum of five (5) calibration standards used for the initial calibration?	✓	
Did the calibration standards contain all the target SVOCs?	✓	
Was the low standard at or below the MRL for the method, e.g., ≤ 5.0 ug/mL in the standard? 2.0 µg/mL	✓	
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓	
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓ (a)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to within 20% of the expected concentration?	✓	

(a) Avg RRFs not used. NA

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the SVOCs in the CCVs agree to within 20% difference (bias) of the average of the CCV standard concentration? Note that CCV concentrations may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO	
Was a laboratory method blank extracted along with each SDG batch?	✓		
Note: Review shall include both forms and raw data chromatograms.			
Were the concentrations of any SVOCs detected in the laboratory method blank sample < MRL?	✓		(a)

SURROGATE SPIKES	YES	NO	
Were three (3) base-neutral and three (3) acid surrogate spike recovery compounds spiked into the groundwater and QC samples prior to extraction?	✓		
Were the surrogate recoveries reported on the surrogate recovery form consistent with the raw data?	✓		
Note: Flag the data if surrogate recoveries are outside the objective range with no evidence of sample re-injection or re-extraction.			
Did the surrogates meet the EPA Functional Guidelines accuracy objective of 15-110% recovery for acid surrogates and 30-130% recovery for base neutral surrogates?	✓		(b)
Alternatively, were the surrogate recoveries within the historical control chart limits established by the laboratory for aqueous samples?	✓		(b)
Did the laboratory need to re-inject or re-extract any samples because the surrogate recovery objective was not met?		✓	

(a) Method blank contained traces of toluene and higher alkyl benzenes

(b) The recovery of the D-5 phenol surrogate was higher than the lab's historical control chart range.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS prepared and analyzed for each batch of DMP samples?	✓	
Was the LCS sample spiked with all the target SVOCs?	✓	
Did the LCS recoveries meet the EPA guidance accuracy objectives of 40-140% recovery for base neutral compounds and 30-130% recovery for acidic compounds?	✓	
Alternatively, were the LCS recoveries within the laboratory's historical control chart limits?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤ 20 RPD for each compound?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO	
Were a MS and a MSD prepared and analyzed for each batch of DMP samples?	✓		
Were the MS/MSD samples spiked with all the DMP target SVOCs?	✓		
Was a DMP sample used to generate the MS/MSD samples?	✓		
Did the MS/MSD recoveries for the DMP target SVOCs meet the EPA Functional Guidelines accuracy objective of 40-140% recovery for base neutral compounds and 30-130% recovery for acid compounds?	✓		(a)
Alternatively, were the matrix spike recoveries within the laboratory's historical control chart limits?	✓		
Was the precision of the MS/MSD recoveries calculated and reported?	✓		
Did the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓		

INTERNAL STANDARDS	YES	NO
Were a minimum of six (6) IS spiked into extracts of samples and blanks prior to GC/MS analysis?	✓	
Were the retention times of the IS within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the RRTs of any target SVOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) The high TDS of WQSP-3 appears to improve the extraction efficiencies of the phenolic compounds.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO
Was a forward search of the mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓	
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.		
Were any SVOC TICs detected in the laboratory method blank sample?	✓	
Were any SVOC TICs detected in the groundwater samples?	✓	(a)

[signature] 8-22-13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

(a) The groundwater TICs generally appeared in the method blank and consisted primarily of alkyl benzenes and triethyl phosphate. The artifacts bis-phenol A and triphenyl phosphine oxide appeared in the groundwater samples. These compounds occasionally appear in the method blanks also.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with nitric acid?	✓	
Were holding times met for all sample digestions and analyses? Maximum holding time is 28 days for Mercury and 6 months for the other metals.	✓	(a)
Was the integrity of each sample intact?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? multiple runs	✓	

INDUCTIVELY COUPLED PLASMA (ICP) CALIBRATION, EPA SW-846 6010B	YES	NO
Was the correlation coefficient (R^2) of the initial calibration ≥0.995 for each metal?	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples?	✓	(b)
Was the initial ICV analyzed immediately after calibration and prior to sample analysis?	✓	
Was the ICV prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery for all target metals? 4/10 -↑; 4/16 - OK; 4/22 OK; 5/3 OK	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue?	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals? pg 589-590	✓	

ICP BLANKS	YES	NO
Was an ICB analyzed immediately after the ICV?	✓	
Were CCBs analyzed in the sample queue every 10 samples and immediately after the CCVs to evaluate drift, sensitivity, and contamination?	✓	
Were the ICB and CCB analysis results all <MRL for each metal?	✓	✓ CH 9/6/13

(a) Collected 4/3/13; Hg Prep 4/24; Total Metals Prep 4/8

(b) Several CCV/CCBs failed during sequences

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP INTERFERENCE CHECK SAMPLE	YES	NO
Were Interference Check Standards (ICS & ICS Element) analyzed daily prior to sample analysis?	✓	
Were the concentrations of all the target trace metals (not including Ca and Mg) < two times the MRL in the ICS? pg 584-585	✓	
Did the recoveries of the trace metals in the ICS Element standards meet the accuracy objective of 80-120% recovery? pg 584	✓	

ANALYSIS QUEUE	YES	NO	
Did the sample set include a LCS, LCSD, MS, and MSD along with the requisite QC blanks and check standards (MB, ICV, ICB, CCB, ICS, and ICS Element)?		✓	(a)
Was a DMP sample used for the MS and MSD? 4/16/13 Total Metals only	✓		

METHOD PERFORMANCE	YES	NO	
Were the concentrations of any metals detected in the method blanks at a concentration < MRL?	✓		
Did the metals in the LCS meet the accuracy objective of 80-120% recovery?	✓		(b)
Did the metals in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		(c)
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	✓		

(a) Total metals 4/16/13 run did not include LCS/LCSD.
Dissolved metals runs were complete
5/4/13 NO WIPP MS/MSD used
5/6/13 - NO WIPP MS/MSD used
5/7/13 - NO MS/MSD from WIPP

(b) 4/10/13 Total metals run

(c) 4/16/13 Total metals run

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO	
Were the samples digested within 28 days of sample collection?	✓		(a)
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank?	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		(b)
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓		
Did the ICV analysis meet the accuracy objective of 90-110% recovery? 92.5%	✓		
Were CCV standards analyzed at a frequency of once every 10 samples and at the end of the sample queue? 29 721	✓		
Did the CCV analyses meet the accuracy objective of 80-120% recovery?	✓		
Did the sample set contain a MB, LCS, MS, and MSD?	✓		
Was a DMP Sample used for the MS/MSD?	✓		
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓		
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery? 103 vs 104	✓		
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery? low recovery		✓	(c)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD? 8.24%	✓		

(a) Collected 4/3/13; Prepped 4/24/13; Analyzed 4/25/13

(b) $r^2 = 0.999378$

(c) MS Hg recovery = 63.7%

MSD Hg recovery = 69.2%

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP/MS Analysis for Selected Trace Metals, e.g., As, Sb, Se, and Tl, by EPA SW-846 6020A C P A	YES	NO
Was the holding time met for the ICP/MS analysis? 4/3 4/10 4/12	✓	
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Was an ICV analyzed after the initial calibration?	✓	
Were a CCB and CCV analyzed during the sample queue?	✓	
Did the CCV meet the accuracy objective of 90-110% recovery?	✓	(a)
Was the concentration of any metals detected in the CCB at < 0.001 mg/L?	✓	
Did the metals in the LCS and LCSD meet the accuracy objective of 85-115% recovery? 92.2→97.0 92.4→97.0	✓	
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery? 82.6→108.8 / 81.4→104.0	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓	

Robbin Akpom 9/6/13
Data Validator Date

Completeness Reviewer 9/17/13
Completeness Reviewer Date

(a) As = (47.965/50) 100 = 95.9% rec

Sb = (49.341/50) 100 = 98.7% rec

Se = (48.293/50) 100 = 96.6% rec

Tl = (45.918/50) 100 = 91.8% rec

Attachment 6 – Anions (Chloride and Sulfate) Data Review, EPA Method 300.0

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 2.1°C	✓	
Were the samples analyzed within 28 days of collection for analysis of chloride and sulfate? (Note that sulfate concentrations are not reported but are needed for cation/anion balance calculations.) C-4/3/13 A-4/4/13	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions?	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue? 3-26-13 Cal.	✓	
Were Continuing Calibration Verification (CCV) standards of differing concentrations analyzed periodically throughout the sample set?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Was the laboratory method blank concentration of the anions <MRL (Method Reporting Limit)?	✓	
Did the ICV and CCV analyses meet the accuracy objective of 90-110% recovery? 18745, 752	✓	
Did the LCS meet the accuracy objective of 90-110% recovery?	✓	
NOTE: If the normal MS spike concentration is < 25% of the native sample concentration (i.e., high native sample concentration) the MS and MSD recoveries and precision are not applicable.		
Did the MS and MSD analyses of applicable anions meet the accuracy objective of 80-120% recovery?	N/A (a)	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	N/A	

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument?	✓	
Were the appropriate dilution factors applied to the results?	✓	

Data Validator — 9/6/13 Date

Completeness Reviewer — 9/17/13 Date

(a) The MS/MSD were prepared & analyzed "neat", but were not reanalyzed at the proper DF. The MS/MSD are N/A for Cl^- + SO_4^- because of high native concentrations; spike conc. is < 25% of native sample.

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 2.1°C	✓	
Were the samples analyzed within 14 days of collection? C-4/3 A-4/4	✓	

REAGENTS	YES	NO
Was the pH meter standardized prior to analysis of the samples using the SOP for pH measurement?	✓	
Was 0.02 N standardized sulfuric acid used as the titrant?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a laboratory method blank, Laboratory Control Sample (LCS), Matrix Spike (MS), and Matrix Spike Duplicate (MSD)?	✓	
Was the starting pH of the sample ≤8.30? 6.83 vs 6.84	✓	
Was a DMP sample used for the MS/MSD? duplicate	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 1.92 mg/L	✓		
Did the LCS recovery meet the accuracy objective of 80-120% recovery?	✓		(a)
Did the MS and MSD meet the accuracy objective of 80-120% recovery?	✓		(c)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)?	✓		(b)
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓	PM ✓ 9/16/13	(d)

Robbin Alyson 9/6/13
Data Validator Date

DD Vanderson 9/17/13
Completeness Reviewer Date

(a)

	recovery	T. Alk	
LCS-1	97.4%	77.9	> 1.12% RPD
LCS-1dup	98.4%	78.8	

(b) $\frac{A \times N \times 50{,}000}{S \times Vol, mL}$

A = mL T. titrant
N = Normality T. titrant
50,000 = Meq/mole

(c)

$MS\left[\frac{(106.36 - 32.04)}{80}\right] = 92.9\%$ rec

$MSD\left[\frac{(106.24 - 32.04)}{80}\right] = 92.8\%$ rec

*MS Alk = 106.36 mg/L

% RPD = 0.113%

*MSD Alk = 106.24 mg/L (d) * Note: can't hand calculate raw Alk. raw data missing.

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 4/3 A 4/5	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards?	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration? 1413	✓	
Was the proper Temperature Correction Factor applied to the conductivity measurements? ATC Used	✓	

ANALYSIS QUEUE	YES	NO
Was a second source mid-range ICV conductivity standard analyzed prior to the samples? 1411 uS	✓	
Was a CCV conductivity standard analyzed within and at the end of the sample queue (rotate between 10, 100, 1000, and 10,000 µmhos/cm conductivity standards)? 9992 uS	✓	
Was one of the samples analyzed in duplicate?		✓

METHOD PERFORMANCE	YES	NO	
Did the ICV analysis yield a concentration within 90-110% of the standard concentration?	✓		(a)
Did the CCV analyses yield a concentration within 90-110% of the standard concentration?	✓		(b)
Did the duplicate sample meet the precision objective of ≤20 RPD?		✓	(c)

Robin Nguyen 9/6/13
Data Validator Date

D Stevenson 9/17/13
Completeness Reviewer Date

(a) $\left(\frac{1409}{1411}\right) 100 = 99.9\%$ rec (ICV)

(b) $\left(\frac{9472}{9992}\right) 100 = 94.8\%$ rec (CCV)

$1^{o} S_x = 7662 \times 50 = 383,100$

$2^{o} S_x = 7707 \times 50 = 385,350$

$\%RPD = \left(\frac{385,350 - 383,100}{384225}\right) \times 100 = 0.59$

(c) NO SAMPLE ANALYZED IN duplicate. RPD between 1° & Duplicate sample

Attachment 9 – pH Data Review, SM 4500-H+

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°?	✓	
Were the samples analyzed within five (5) days of receipt? C 4/3 A 4/4	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument?	✓	
Was the slope of the pH calibration curve recorded and greater than 95%?	✓		(a)

SAMPLE ANALYSIS	YES	NO
Did the standard buffers bracket the pH range of the samples?	✓	
Was a CCV analyzed within and at the end of the sample batch?	✓	
Was the sample analysis temperature within 2°C of the buffer analysis temperature?	✓		(b)
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate?		✓

METHOD PERFORMANCE	YES	NO
Did the ICV read within ±0.1 pH unit of the assigned value?	✓	
Did the CCV read within ±0.1 pH unit of the assigned value?	✓	
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓		(c)

[signature] 9/6/13 [signature] 9/18/13

Data Validator Date Completeness Reviewer Date

(a) Slope = 100.1%

(b) pH Buffer 2 = 4.00 = 22.5°C
pH Buffer 3 = 7.00 = 22.0°C
pH Buffer 4 = 10.00 = 21.9°C

2.4°C diff

1° Sx = 20.1°C
2° Sx = 20.1°C

(c) 1° Sx = 6.83
2° Sx = 6.84
2° Sx Dup = Not tested

Attachment 10 – Specific Gravity Data Review, SM 2710F

SAMPLE ANALYSIS	YES	NO
Were the samples allowed to warm to near room temperature prior to measurement of specific gravity? 18.7°C	✓	
Was the temperature of the specific gravity measurements recorded?	✓	
Was the mass of at least 5.0 mL of the water sample measured? 10.0 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 10°C		✓
Was the Temperature Correction Factor recorded?	✓	

Robin Akpom 9/6/13
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

$$SG = \frac{Sx\ wt.,g}{DI\ wt.,g} \times TCF$$

$$1^0 Sx = \frac{11.4460}{10.0816} \times 0.9982 = 1.1333$$

Attachment 11 – Total Organic Carbon Data Review, SM 5310B

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 4/3 A 4/8	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve?	✓	
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set? ICV 5 mg/L only		✓
Did the sample set include an Initial Calibration Blank (ICB), laboratory method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓	
Were quadruplicate measurements taken for each sample?	✓	
Were both the average and the range reported for the quadruplicate measurements?	✓	

METHOD PERFORMANCE	YES	NO
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)? $r^2 = 1.000$	✓	
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓	
Were the results for the laboratory method blank, the ICB and CCB < MRL?	✓	
Did the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓	

Robin Alpers 9/9/13
Data Validator Date

D Patterson 9/17/13
Completeness Reviewer Date

[Sp K] = 4.850

RPD 2.12%

LCS 4.810 mg/L

LCSD 4.913 mg/L

Recovery

LCS = (4.810/4.850) x 100 = 99.2% rec

LCSD = (4.913/4.850) x 100 = 101.3% rec

[Sp K] = 4.650

RPD 11.6%

MS = 4.347 mg/L

MSD = 4.885 mg/L

[Sx] = 0.4149 mg/L

Recovery

MS = [(4.347 - 0.4149)/4.65] x 100 = 84.6% rec

MSD = [(4.885 - 0.4149/4.65] x 100 = 96.1% rec

Attachment 12 – Total Dissolved Solids Data Review, SM 2540C

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? C 4/3 A 4/11	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the initial volume of each sample 100 mL? 2mL ↑ 100	✓	
Were any DMP samples diluted prior to processing? see above	✓	
Were the samples dried twice at 180°C?	✓	
Was the MS/MSD spike concentration higher than 25% of the native sample concentration and thus usable for recovery determination? 23.2% spk vs Sx	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)?	✓	
Did the LCS analysis meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓	
If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD?	✓	

Robin Alpers 9/9/13
Data Validator Date

DLWatrous 9/17/13
Completeness Reviewer Date

MB = 7 mg/L
LCS = 1035
LCSRR = 1035
[Spk] = 1000

Recovery

$\frac{1035-7}{1000} = 102.8\%$

~~1040~~ ~~1007~~ 1028 9/9/13

%RPD = 0.00

Sx = 220,200
%RPD MSD = 276,000
3.3% MS = 267,000
[Spk] = 50,000

$MS = \left(\frac{267,000-220,200}{50,000}\right) \times 100 = 93.6\%$

$MSD = \left(\frac{276,000-220,200}{50,000}\right) \times 100 = 111.6\%$

Attachment 13 – Total Suspended Solids Data Review, SM 2540D

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? C 4/3 A 4/10	✓	
Were the samples allowed to warm to room temperature prior to filtration?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, and duplicate sample?	✓	
Was the volume of each sample 100 mL?	✓	
Were the samples dried twice at approximately104°C?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights <0.0005 g (0.5 mg)?	✓	
Was the MB result <5.0 mg/L? MB= 1.0 mg/L	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? 3.98%	✓	

Robbin Alpaw 9/9/13 (EM 9/4/13)
Data Validator Date

[signature] 9/17/13
Completeness Reviewer Date

$10^0 S_x = \left(\frac{2.7766 - 2.7643}{100}\right) \times 10^6 = 123$ mg/L

$10^0 S_x DUP = \left(\frac{2.8000 - 2.7872}{100}\right) \times 10^6 = 128$ mg/L

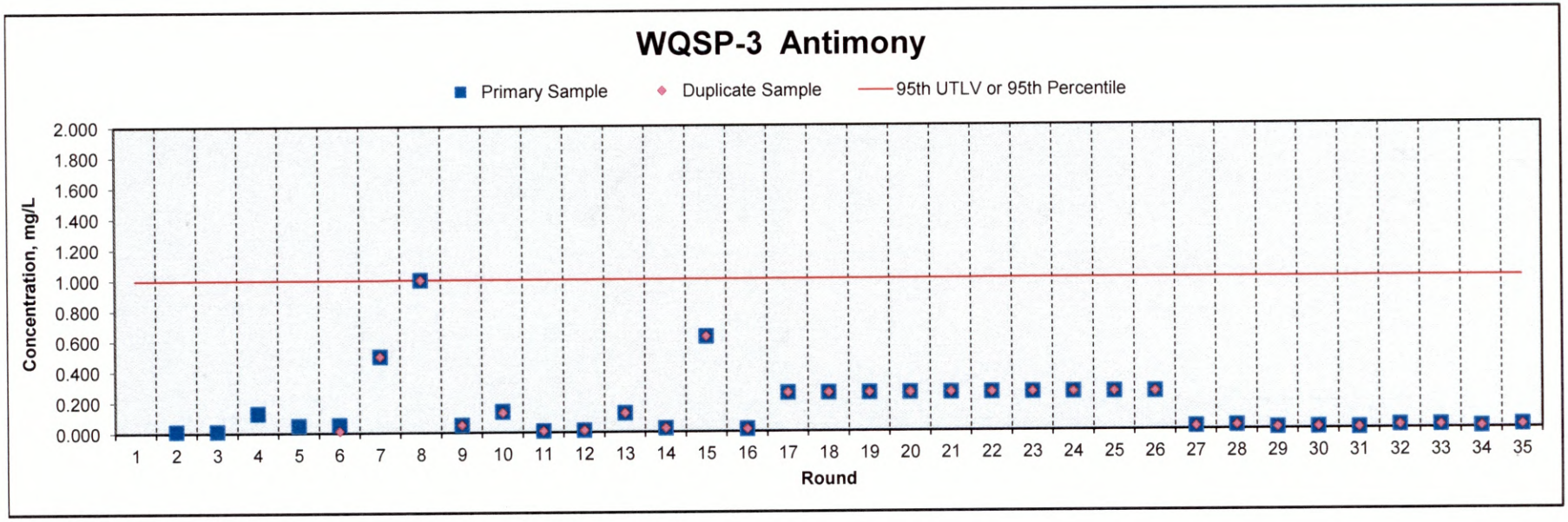
% RPD $100\left(\frac{128-123}{125.5}\right) = 3.98$

WQSP-3

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

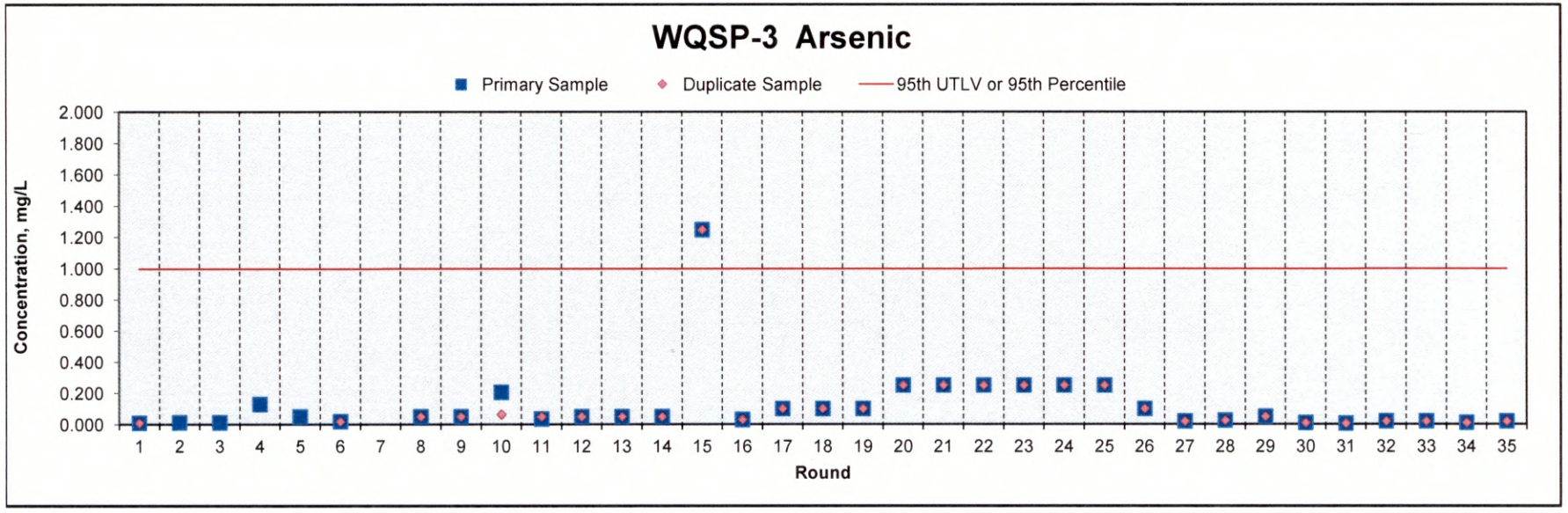
WQSP-3 Antimony

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Antimony	1					mg/L	0.013	< 1.0
Antimony	2	05/09/96	06/03/96	< 0.013		mg/L	0.013	< 1.0
Antimony	3	08/22/96	08/29/96	< 0.013		mg/L	0.013	< 1.0
Antimony	4	05/22/97	06/13/97	< 0.130		mg/L	0.130	< 1.0
Antimony	5	08/21/97	09/05/97	< 0.050		mg/L	0.050	< 1.0
Antimony	6	04/22/98	04/24/98	0.053	0.014	mg/L	0.001	< 1.0
Antimony	7	08/26/98	09/29/98	< 0.500	< 0.500	mg/L	0.500	< 1.0
Antimony	8	04/08/99	04/15/99	< 1.000	< 1.000	mg/L	1.000	< 1.0
Antimony	9	10/06/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 1.0
Antimony	10	03/23/00	04/06/00	0.137	< 0.130	mg/L	0.130	< 1.0
Antimony	26	04/30/08	05/21/08	< 0.250	< 0.250	mg/L	0.250	< 1.0
Antimony	27	10/22/08	11/12/08	< 0.020	< 0.020	mg/L	0.025	< 1.0
Antimony	28	04/29/09	05/15/09	< 0.025	< 0.025	mg/L	0.025	< 1.0
Antimony	29	10/14/09	11/04/09	< 0.010	< 0.010	mg/L	0.025	< 1.0
Antimony	30	04/28/10	05/18/10	< 0.010	< 0.010	mg/L	0.010	< 1.0
Antimony	31	10/27/10	11/24/10	< 0.005	< 0.005	mg/L	0.0050	< 1.0
Antimony	32	04/06/11	04/28/11	< 0.020	< 0.020	mg/L	0.020	< 1.0
Antimony	33	10/19/11	11/10/11	< 0.020	< 0.020	mg/L	0.020	< 1.0
Antimony	34	04/04/12	04/19/12	< 0.010	< 0.010	mg/L	0.010	< 1.0
Antimony	35	04/03/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	< 1.0



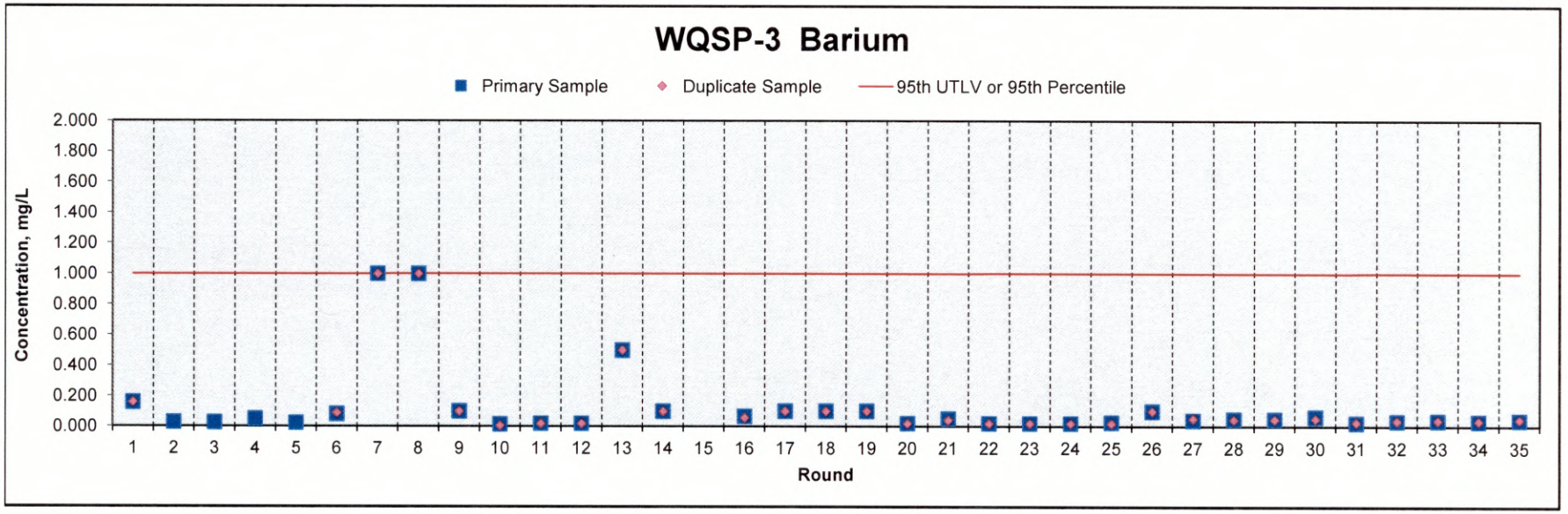
WQSP-3 Arsenic

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Arsenic	1	09/19/95	09/29/95	< 0.010	< 0.010	mg/L	0.010	< 1.0
Arsenic	2	05/09/96	06/03/96	< 0.013		mg/L	0.013	< 1.0
Arsenic	3	08/22/96	08/29/96	< 0.013		mg/L	0.013	< 1.0
Arsenic	4	05/22/97	06/13/97	< 0.130		mg/L	0.130	< 1.0
Arsenic	5	08/21/97	09/05/97	< 0.050		mg/L	0.050	< 1.0
Arsenic	6	04/22/98	04/24/98	< 0.020	< 0.020	mg/L	0.001	< 1.0
Arsenic	7	08/26/98	09/29/98	< 5.000	< 5.000	mg/L	5.000	< 1.0
Arsenic	8	04/08/99	04/15/99	< 0.050	< 0.050	mg/L	0.050	< 1.0
Arsenic	9	10/06/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 1.0
Arsenic	10	03/23/00	04/06/00	< 0.207	0.064	mg/L	0.010	< 1.0
Arsenic	26	04/30/08	05/21/08	< 0.100	< 0.100	mg/L	0.100	< 1.0
Arsenic	27	10/22/08	11/12/08	< 0.020	< 0.020	mg/L	0.050	< 1.0
Arsenic	28	04/29/09	05/15/09	< 0.025	< 0.025	mg/L	0.025	< 1.0
Arsenic	29	10/14/09	11/04/09	< 0.050	< 0.050	mg/L	0.050	< 1.0
Arsenic	30	04/28/10	05/18/10	< 0.010	< 0.010	mg/L	0.010	< 1.0
Arsenic	31	10/27/10	11/24/10	< 0.005	< 0.005	mg/L	0.0050	< 1.0
Arsenic	32	04/06/11	04/28/11	< 0.020	< 0.020	mg/L	0.020	< 1.0
Arsenic	33	10/19/11	11/10/11	< 0.020	< 0.020	mg/L	0.020	< 1.0
Arsenic	34	04/04/12	04/19/12	< 0.010	< 0.010	mg/L	0.010	< 1.0
Arsenic	35	04/03/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	< 1.0



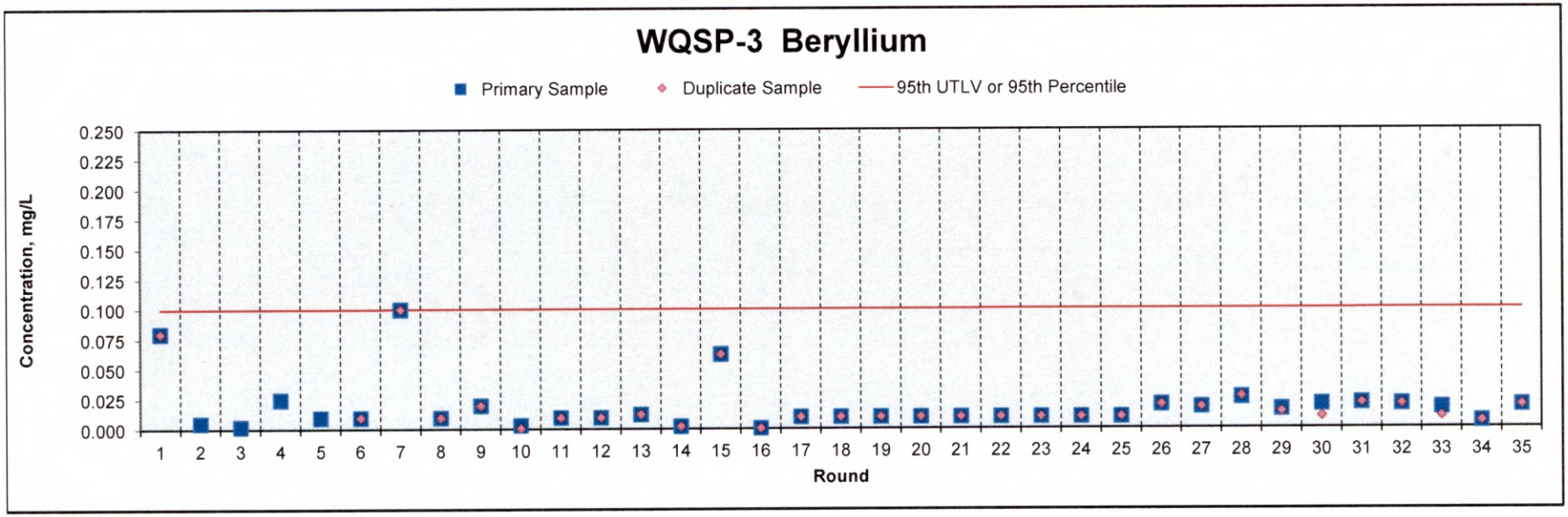
WQSP-3 Barium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Barium	1	09/19/95	10/20/95	< 0.160	< 0.160	mg/L	0.160	< 1.0
Barium	2	05/09/96	06/03/96	0.028		mg/L	0.005	< 1.0
Barium	3	08/22/96	08/29/96	0.026		mg/L	0.005	< 1.0
Barium	4	05/22/97	06/13/97	< 0.050		mg/L	0.050	< 1.0
Barium	5	08/21/97	09/05/97	0.023		mg/L	0.020	< 1.0
Barium	6	04/22/98	04/24/98	0.082	0.089	mg/L	0.004	< 1.0
Barium	7	08/26/98	09/29/98	< 1.000	< 1.000	mg/L	1.000	< 1.0
Barium	8	04/08/99	04/15/99	< 1.000	< 1.000	mg/L	1.000	< 1.0
Barium	9	10/06/99	11/25/99	< 0.100	< 0.100	mg/L	0.100	< 1.0
Barium	10	03/23/00	04/06/00	0.015	0.006	mg/L	0.001	< 1.0
Barium	26	04/30/08	05/21/08	< 0.100	< 0.100	mg/L	0.100	< 1.0
Barium	27	10/22/08	11/12/08	0.040	0.052	mg/L	0.020	< 1.0
Barium	28	04/29/09	05/15/09	0.049	0.045	mg/L	0.020	< 1.0
Barium	29	10/14/09	11/10/09	0.049	0.047	mg/L	0.020	< 1.0
Barium	30	04/28/10	05/03/10	0.063	0.051	mg/L	0.500	< 1.0
Barium	31	10/27/10	11/24/10	0.022	0.027	mg/L	0.010	< 1.0
Barium	32	04/06/11	04/28/11	0.034	0.037	mg/L	0.020	< 1.0
Barium	33	10/19/11	10/28/11	0.037	0.040	mg/L	0.023	< 1.0
Barium	34	04/04/12	04/24/12	0.032	0.036	mg/L	0.013	< 1.0
Barium	35	04/03/13	04/16/13	0.040	0.046	mg/L	0.013	< 1.0



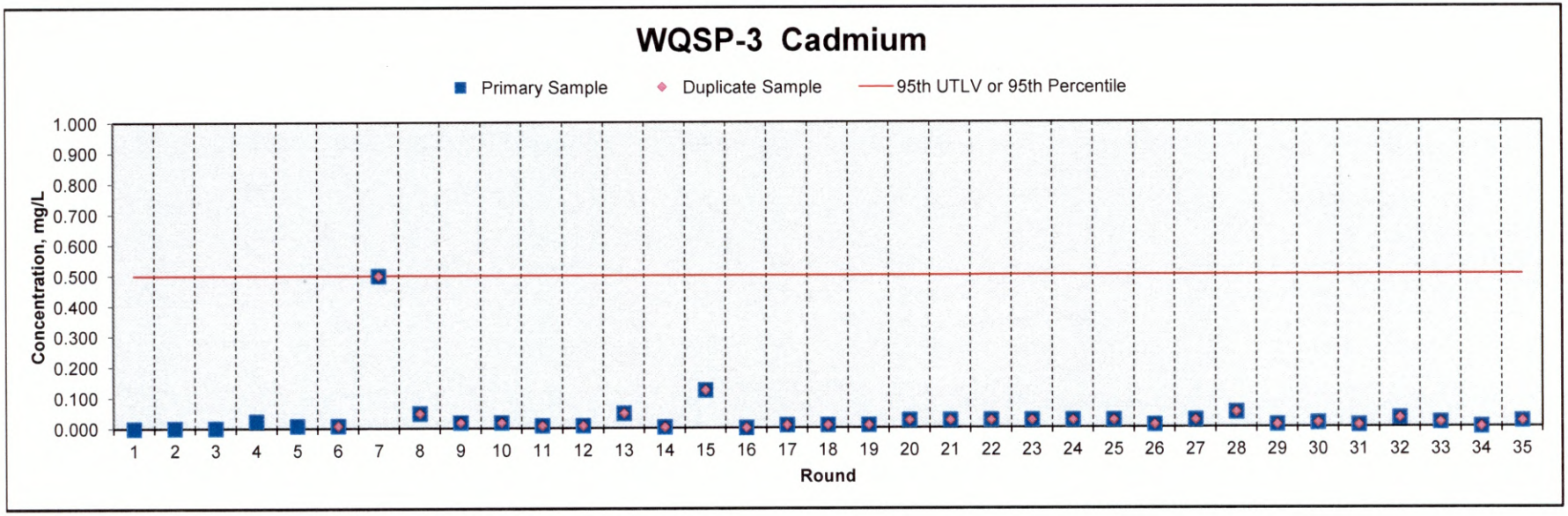
WQSP-3 Beryllium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Beryllium	1	09/19/95	10/20/95	< 0.080	< 0.080	mg/L	0.080	< 0.1
Beryllium	2	05/09/96	06/03/96	0.005		mg/L	0.003	< 0.1
Beryllium	3	08/22/96	08/29/96	< 0.003		mg/L	0.003	< 0.1
Beryllium	4	05/22/97	06/13/97	< 0.025		mg/L	0.025	< 0.1
Beryllium	5	08/21/97	09/05/97	< 0.010		mg/L	0.010	< 0.1
Beryllium	6	04/22/98	04/24/98	< 0.010	< 0.010	mg/L	0.001	< 0.1
Beryllium	7	08/26/98	09/29/98	< 0.100	< 0.100	mg/L	0.100	< 0.1
Beryllium	8	04/08/99	04/15/99	< 0.010	< 0.010	mg/L	0.010	< 0.1
Beryllium	9	10/06/99	11/25/99	< 0.020	< 0.020	mg/L	0.020	< 0.1
Beryllium	10	03/23/00	04/06/00	0.004	0.001	mg/L	0.001	< 0.1
Beryllium	26	04/30/08	05/21/08	< 0.020	< 0.020	mg/L	0.020	< 0.1
Beryllium	27	10/22/08	11/12/08	< 0.018	< 0.018	mg/L	0.010	< 0.1
Beryllium	28	04/29/09	05/15/09	0.026	0.027	mg/L	0.010	< 0.1
Beryllium	29	10/14/09	11/10/09	0.016	0.014	mg/L	0.010	< 0.1
Beryllium	30	04/28/10	05/03/10	0.020	< 0.010	mg/L	0.010	< 0.1
Beryllium	31	10/27/10	11/24/10	0.021	0.021	mg/L	0.0050	< 0.1
Beryllium	32	04/06/11	04/25/11	< 0.020	< 0.020	mg/L	0.020	< 0.1
Beryllium	33	10/19/11	10/28/11	0.017	0.0097	mg/L	0.0042	< 0.1
Beryllium	34	04/04/12	04/24/12	0.0056	0.0057	mg/L	0.0010	< 0.1
Beryllium	35	04/03/13	04/16/13	0.019	0.019	mg/L	0.012	< 0.1



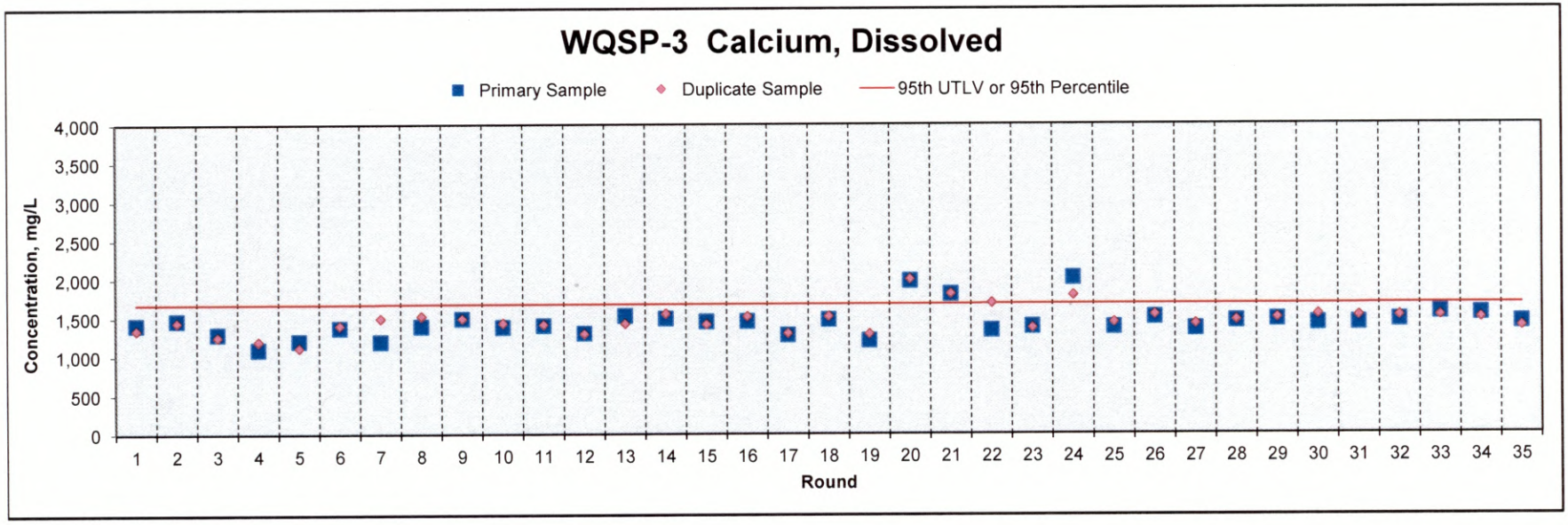
WQSP-3 Cadmium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Cadmium	1	09/19/95	10/16/95	< 0.001		mg/L	0.001	< 0.5
Cadmium	2	05/09/96	06/03/96	< 0.003		mg/L	0.003	< 0.5
Cadmium	3	08/22/96	08/29/96	< 0.003		mg/L	0.003	< 0.5
Cadmium	4	05/22/97	06/13/97	< 0.025		mg/L	0.025	< 0.5
Cadmium	5	08/21/97	09/05/97	< 0.010		mg/L	0.010	< 0.5
Cadmium	6	04/22/98	04/24/98	< 0.010	< 0.010	mg/L	0.001	< 0.5
Cadmium	7	08/26/98	09/29/98	< 0.500	< 0.500	mg/L	0.500	< 0.5
Cadmium	8	04/08/99	04/15/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Cadmium	9	10/06/99	11/25/99	< 0.020	< 0.020	mg/L	0.020	< 0.5
Cadmium	10	03/23/00	06/19/00	< 0.020	< 0.020	mg/L	0.200	< 0.5
Cadmium	26	04/30/08	05/21/08	< 0.010	< 0.010	mg/L	0.010	< 0.5
Cadmium	27	10/22/08	11/12/08	< 0.025	< 0.025	mg/L	0.010	< 0.5
Cadmium	28	04/29/09	05/15/09	< 0.050	< 0.050	mg/L	0.050	< 0.5
Cadmium	29	10/14/09	11/10/09	< 0.010	< 0.010	mg/L	0.010	< 0.5
Cadmium	30	04/28/10	05/03/10	< 0.015	< 0.015	mg/L	0.015	< 0.5
Cadmium	31	10/27/10	11/24/10	< 0.0075	< 0.0075	mg/L	0.0075	< 0.5
Cadmium	32	04/06/11	04/25/11	< 0.030	< 0.030	mg/L	0.030	< 0.5
Cadmium	33	10/19/11	10/28/11	< 0.016	< 0.016	mg/L	0.016	< 0.5
Cadmium	34	04/04/12	04/24/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.5
Cadmium	35	04/03/13	04/16/13	< 0.020	< 0.020	mg/L	0.020	< 0.5



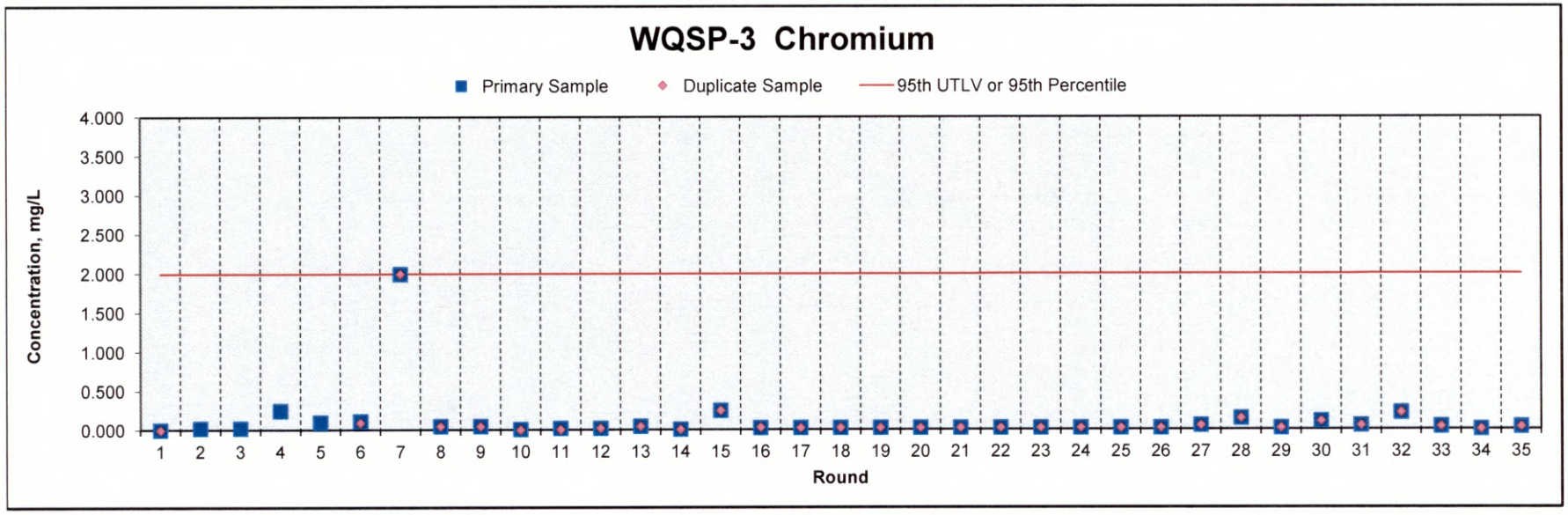
WQSP-3 Calcium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Calcium	1	09/19/95	10/20/95	1,420	1,350	mg/L	8.000	1,680
Calcium	2	05/09/96	06/03/96	1,480	1,450	mg/L	2.000	1,680
Calcium	3	08/22/96	08/29/96	1,300	1,260	mg/L	2.000	1,680
Calcium	4	05/22/97	06/13/97	1,100	1,200	mg/L	2.000	1,680
Calcium	5	08/21/97	09/05/97	1,210	1,120	mg/L	2.000	1,680
Calcium	6	04/22/98	04/24/98	1,380	1,409	mg/L	0.012	1,680
Calcium	7	08/26/98	09/29/98	1,200	1,500	mg/L	0.100	1,680
Calcium	8	04/08/99	04/15/99	1,400	1,530	mg/L	1.000	1,680
Calcium	9	10/06/99	11/25/99	1,500	1,500	mg/L	1.000	1,680
Calcium	10	03/23/00	04/06/00	1,390	1,440	mg/L	5.000	1,680
Calcium	26	04/30/08	05/21/08	1,510	1,540	mg/L	0.500	1,680
Calcium	27	10/22/08	11/07/08	1,360	1,420	mg/L	0.500	1,680
Calcium	28	04/29/09	05/15/09	1,460	1,470	mg/L	0.500	1,680
Calcium	29	10/14/09	11/16/09	1,480	1,500	mg/L	0.500	1,680
Calcium	30	04/28/10	04/30/10	1,430	1,540	mg/L	0.500	1,680
Calcium	31	10/27/10	12/03/10	1,430	1,520	mg/L	2.0	1,680
Calcium	32	04/06/11	05/06/11	1,470	1,520	mg/L	2.0	1,680
Calcium	33	10/19/11	11/02/11	1,570	1,520	mg/L	1.1	1,680
Calcium	34	04/04/12	04/12/12	1,550	1,490	mg/L	0.82	1,680
Calcium	35	04/03/13	05/07/13	1,440	1,380	mg/L	5.60	1,680



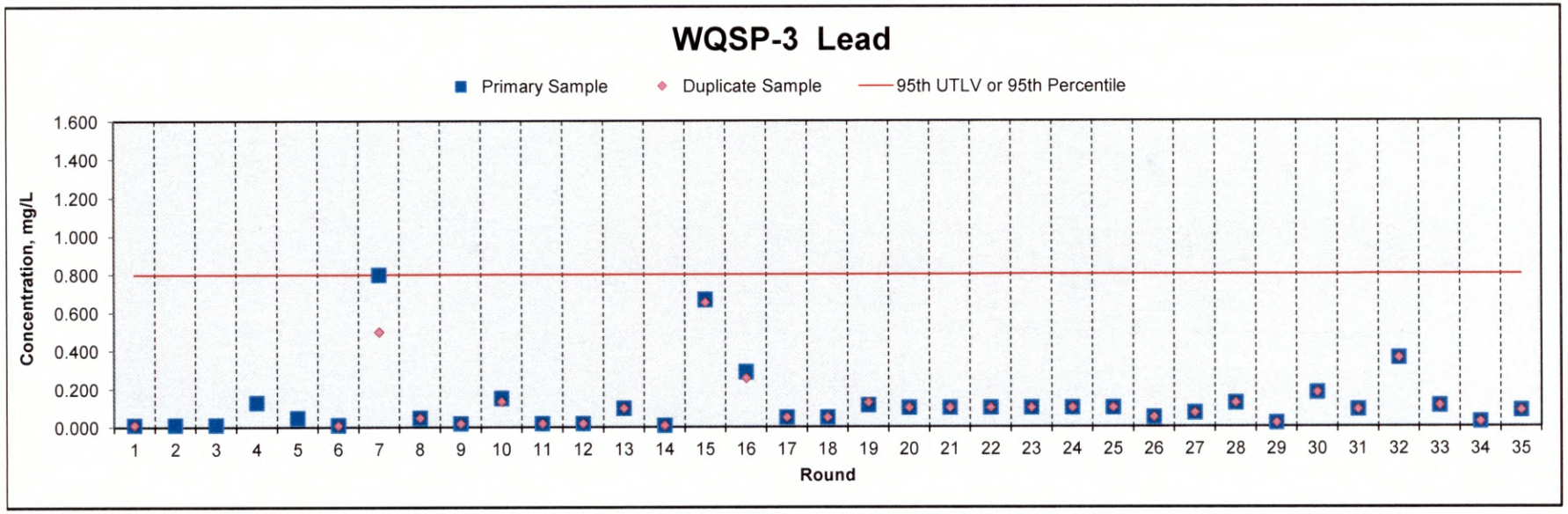
WQSP-3 Chromium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chromium	1	09/19/95	10/16/95	0.003	< 0.003	mg/L	0.003	< 2.0
Chromium	2	05/09/96	06/03/96	< 0.025		mg/L	0.025	< 2.0
Chromium	3	08/22/96	08/29/96	< 0.025		mg/L	0.025	< 2.0
Chromium	4	05/22/97	06/13/97	< 0.250		mg/L	0.250	< 2.0
Chromium	5	08/21/97	09/05/97	< 0.100		mg/L	0.100	< 2.0
Chromium	6	04/22/98	04/24/98	0.114	0.095	mg/L	0.001	< 2.0
Chromium	7	08/26/98	09/29/98	< 2.000	< 2.000	mg/L	2.000	< 2.0
Chromium	8	04/08/99	04/15/99	< 0.050	< 0.050	mg/L	0.050	< 2.0
Chromium	9	10/06/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 2.0
Chromium	10	03/23/00	04/06/00	0.012	0.006	mg/L	0.010	< 2.0
Chromium	26	04/30/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	< 2.0
Chromium	27	10/22/08	11/12/08	< 0.058	< 0.058	mg/L	0.025	< 2.0
Chromium	28	04/29/09	05/15/09	0.150	0.150	mg/L	0.150	< 2.0
Chromium	29	10/14/09	11/10/09	< 0.025	< 0.025	mg/L	0.025	< 2.0
Chromium	30	04/28/10	05/03/10	< 0.11	< 0.11	mg/L	0.11	< 2.0
Chromium	31	10/27/10	11/24/10	< 0.055	< 0.055	mg/L	0.055	< 2.0
Chromium	32	04/06/11	04/25/11	< 0.22	< 0.22	mg/L	0.22	< 2.0
Chromium	33	10/19/11	10/28/11	< 0.042	< 0.042	mg/L	0.042	< 2.0
Chromium	34	04/04/12	04/24/12	< 0.0080	< 0.0080	mg/L	0.0080	< 2.0
Chromium	35	04/03/13	04/16/13	< 0.038	< 0.038	mg/L	0.038	< 2.0



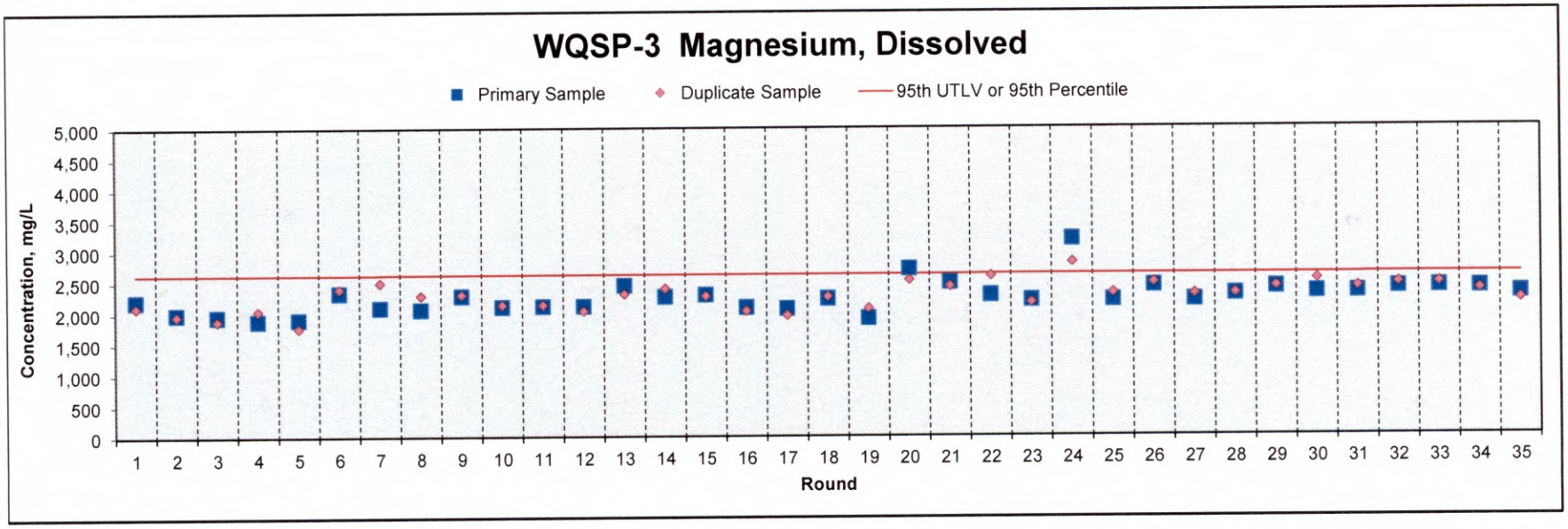
WQSP-3 Lead

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Lead	1	09/19/95	10/16/95	< 0.013	< 0.013	mg/L	0.013	0.8
Lead	2	05/09/96	06/03/96	< 0.013		mg/L	0.013	0.8
Lead	3	08/22/96	08/29/96	< 0.013		mg/L	0.013	0.8
Lead	4	05/22/97	06/13/97	< 0.130		mg/L	0.130	0.8
Lead	5	08/21/97	09/05/97	< 0.050		mg/L	0.050	0.8
Lead	6	04/22/98	04/24/98	0.012	< 0.010	mg/L	0.001	0.8
Lead	7	08/26/98	09/29/98	0.800	< 0.500	mg/L	0.500	0.8
Lead	8	04/08/99	04/15/99	< 0.050	< 0.050	mg/L	0.050	0.8
Lead	9	10/06/99	11/25/99	< 0.020	< 0.020	mg/L	0.020	0.8
Lead	10	03/23/00	04/06/00	0.153	0.135	mg/L	0.003	0.8
Lead	26	04/30/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	0.8
Lead	27	10/22/08	11/12/08	< 0.073	< 0.073	mg/L	0.020	0.8
Lead	28	04/29/09	05/15/09	< 0.125	< 0.125	mg/L	0.125	0.8
Lead	29	10/14/09	11/10/09	< 0.020	< 0.020	mg/L	0.020	0.8
Lead	30	04/28/10	05/03/10	< 0.18	< 0.18	mg/L	0.18	0.8
Lead	31	10/27/10	11/24/10	< 0.090	< 0.090	mg/L	0.090	0.8
Lead	32	04/06/11	04/25/11	< 0.36	< 0.36	mg/L	0.36	0.8
Lead	33	10/19/11	10/28/11	< 0.11	< 0.11	mg/L	0.11	0.8
Lead	34	04/04/12	04/24/12	< 0.026	< 0.026	mg/L	0.026	0.8
Lead	35	04/03/13	04/16/13	< 0.085	< 0.085	mg/L	0.085	0.8



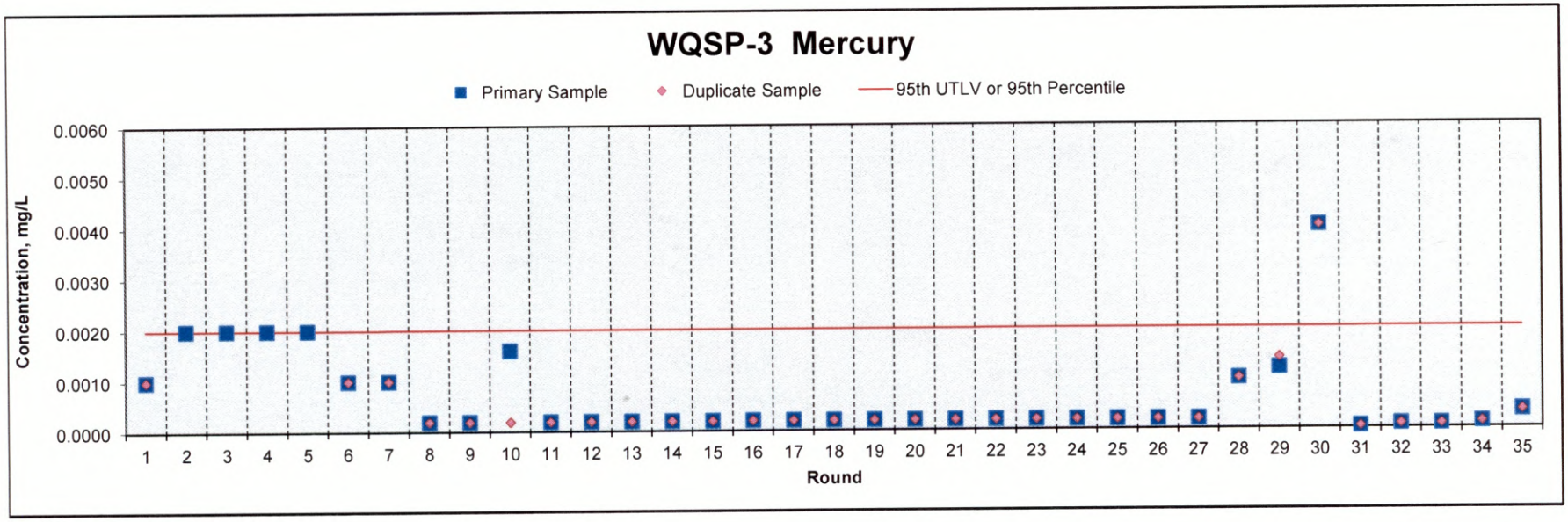
WQSP-3 Magnesium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Magnesium	1	09/19/95	10/20/95	2,210	2,110	mg/L	4.000	2,625
Magnesium	2	05/09/96	06/03/96	2,000	1,970	mg/L	0.500	2,625
Magnesium	3	08/22/96	08/29/96	1,960	1,890	mg/L	0.500	2,625
Magnesium	4	05/22/97	06/13/97	1,890	2,050	mg/L	1.000	2,625
Magnesium	5	08/21/97	09/05/97	1,910	1,770	mg/L	1.000	2,625
Magnesium	6	04/22/98	04/24/98	2,340	2,404	mg/L	0.072	2,625
Magnesium	7	08/26/98	09/29/98	2,100	2,500	mg/L	0.100	2,625
Magnesium	8	04/08/99	04/15/99	2,070	2,290	mg/L	1.000	2,625
Magnesium	9	10/06/99	11/25/99	2,290	2,310	mg/L	0.500	2,625
Magnesium	10	03/23/00	04/06/00	2,110	2,140	mg/L	5.000	2,625
Magnesium	26	04/30/08	05/21/08	2,430	2,480	mg/L	0.500	2,625
Magnesium	27	10/22/08	11/07/08	2,200	2,290	mg/L	0.500	2,625
Magnesium	28	04/29/09	05/15/09	2,290	2,300	mg/L	0.500	2,625
Magnesium	29	10/14/09	11/16/09	2,400	2,410	mg/L	0.500	2,625
Magnesium	30	04/28/10	04/30/10	2,320	2,530	mg/L	0.500	2,625
Magnesium	31	10/27/10	12/03/10	2,320	2,400	mg/L	1.6	2,625
Magnesium	32	04/06/11	05/06/11	2,390	2,460	mg/L	1.6	2,625
Magnesium	33	10/19/11	11/02/11	2,400	2,460	mg/L	1.1	2,625
Magnesium	34	04/04/12	04/12/12	2,390	2,350	mg/L	0.66	2,625
Magnesium	35	04/03/13	05/06/13	2,300	2,190	mg/L	0.83	2,625



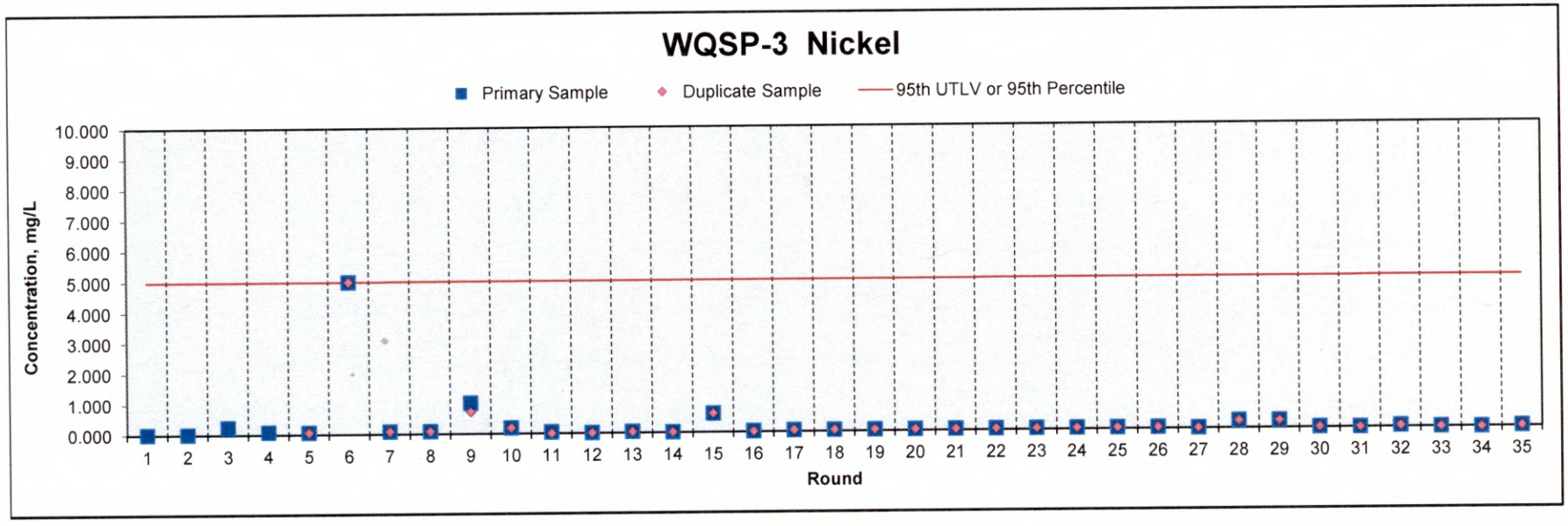
WQSP-3 Mercury

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Mercury	1	09/19/95	09/20/95	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	2	05/09/96	05/14/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	3	08/22/96	08/26/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	4	05/22/97	05/30/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	5	08/21/97	08/28/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	6	04/22/98	04/24/98	< 0.0010	< 0.0010	mg/L	0.0001	< 0.002
Mercury	7	08/26/98	09/02/98	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	8	04/08/99	04/15/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	9	10/06/99	10/07/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	10	03/23/00	04/06/00	0.0016	< 0.0002	mg/L	0.0002	< 0.002
Mercury	26	04/30/08	05/06/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	27	10/22/08	11/09/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	28	04/29/09	05/11/09	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	29	10/14/09	11/06/09	0.0012	0.0014	mg/L	0.0002	< 0.002
Mercury	30	04/28/10	05/18/10	< 0.0040	< 0.0040	mg/L	0.0040	< 0.002
Mercury	31	10/27/10	11/03/10	< 0.000037	< 0.000037	mg/L	0.000037	< 0.002
Mercury	32	04/06/11	05/02/11	< 0.000080	< 0.000080	mg/L	0.000080	< 0.002
Mercury	33	10/19/11	11/15/11	< 0.000080	< 0.000080	mg/L	0.000080	< 0.002
Mercury	34	04/04/12	04/17/12	< 0.000120	< 0.000120	mg/L	0.000120	< 0.002
Mercury	35	04/03/13	04/25/13	< 0.00035	< 0.00035	mg/L	0.00035	< 0.002



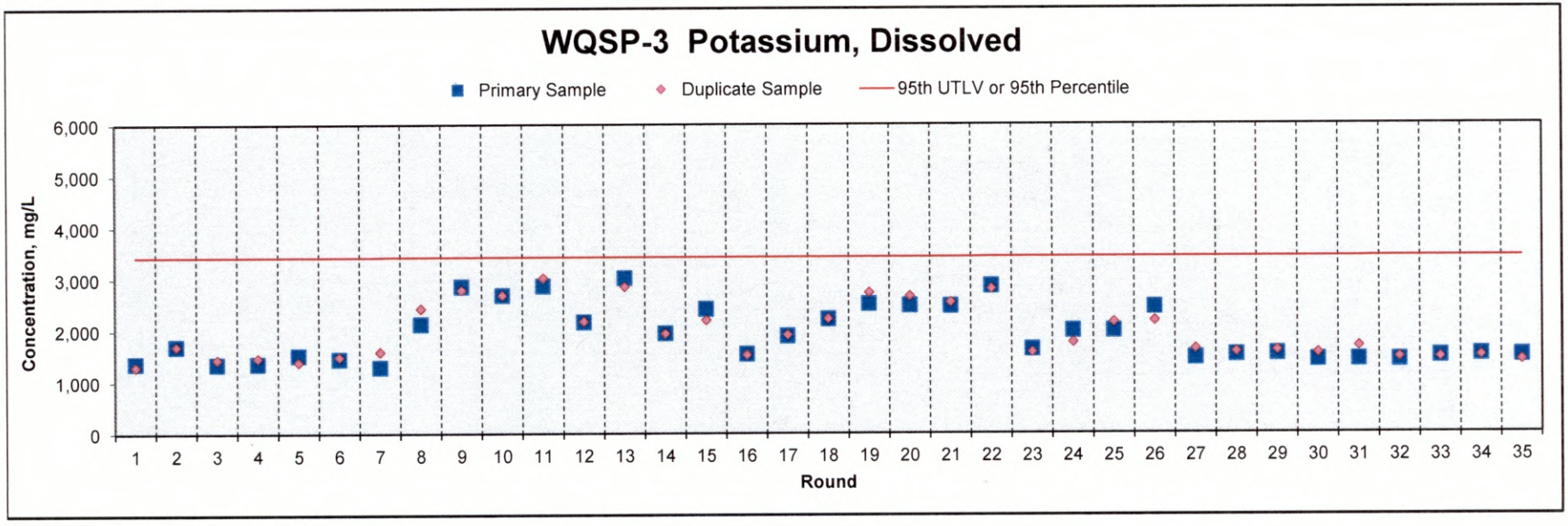
WQSP-3 Nickel

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Nickel	1	05/09/96	06/03/96	< 0.025		mg/L	0.025	< 5.0
Nickel	2	08/22/96	08/29/96	< 0.025		mg/L	0.025	< 5.0
Nickel	3	05/22/97	06/13/97	< 0.250		mg/L	0.250	< 5.0
Nickel	4	08/21/97	09/05/97	< 0.100		mg/L	0.100	< 5.0
Nickel	5	04/22/98	04/24/98	< 0.080	< 0.080	mg/L	0.008	< 5.0
Nickel	6	08/26/98	09/29/98	< 5.000	< 5.000	mg/L	5.000	< 5.0
Nickel	7	04/08/99	04/15/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Nickel	8	10/06/99	11/25/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Nickel	9	03/23/00	04/06/00	1.020	0.731	mg/L	0.000	< 5.0
Nickel	10	03/23/00	06/19/00	< 0.200	< 0.200	mg/L	0.200	< 5.0
Nickel	26	04/30/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	< 5.0
Nickel	27	10/22/08	11/12/08	< 0.025	< 0.025	mg/L	0.025	< 5.0
Nickel	28	04/29/09	05/15/09	< 0.250	< 0.250	mg/L	0.025	< 5.0
Nickel	29	10/14/09	11/10/09	< 0.250	< 0.250	mg/L	0.025	< 5.0
Nickel	30	04/28/10	05/03/10	< 0.025	< 0.025	mg/L	0.025	< 5.0
Nickel	31	10/27/10	11/24/10	< 0.012	< 0.012	mg/L	0.012	< 5.0
Nickel	32	04/06/11	04/25/11	< 0.050	< 0.050	mg/L	0.050	< 5.0
Nickel	33	10/19/11	10/28/11	< 0.016	< 0.016	mg/L	0.016	< 5.0
Nickel	34	04/04/12	04/24/12	< 0.0060	< 0.0060	mg/L	0.0060	< 5.0
Nickel	35	04/03/13	04/16/13	< 0.035	< 0.035	mg/L	0.035	< 5.0



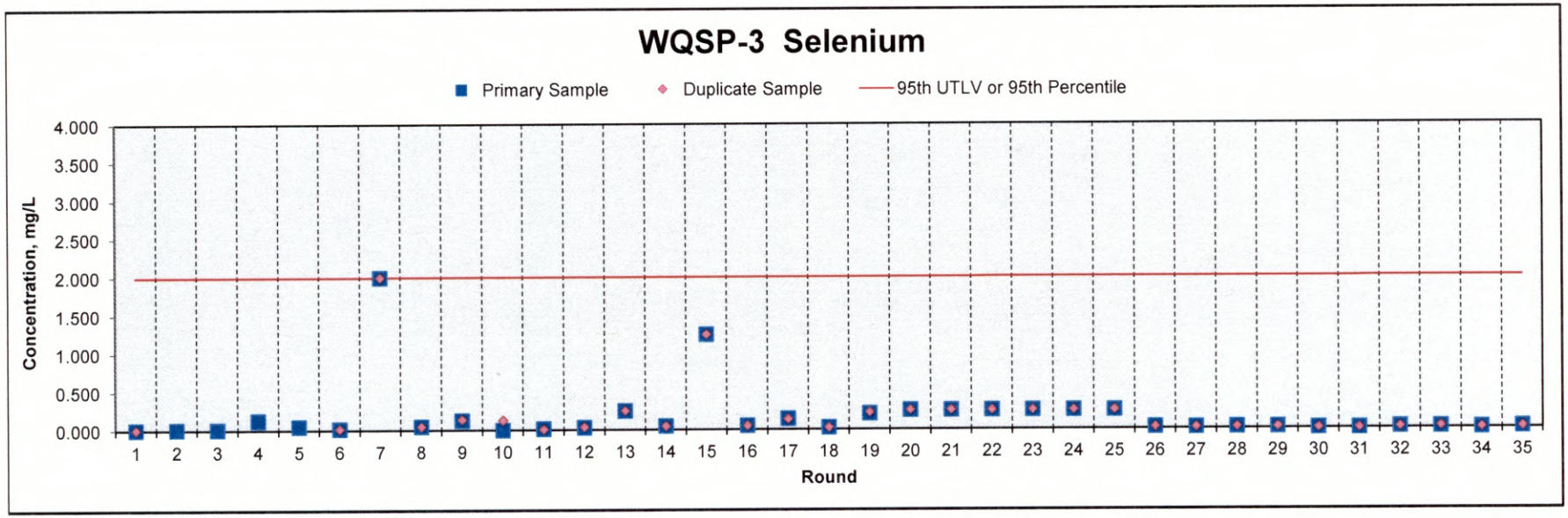
WQSP-3 Potassium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Potassium	1	09/19/95	10/20/95	1,380	1,310	mg/L	8.000	3,438
Potassium	2	05/09/96	05/29/96	1,710	1,710	mg/L	0.200	3,438
Potassium	3	08/22/96	08/29/96	1,360	1,450	mg/L	2.000	3,438
Potassium	4	05/22/97	05/29/97	1,370	1,480	mg/L	2.000	3,438
Potassium	5	08/21/97	08/28/97	1,530	1,400	mg/L	2.000	3,438
Potassium	6	04/22/98	04/24/98	1,460	1,502	mg/L	0.074	3,438
Potassium	7	08/26/98	09/29/98	1,300	1,600	mg/L	0.100	3,438
Potassium	8	04/08/99	04/15/99	2,140	2,440	mg/L	1.000	3,438
Potassium	9	10/07/99	11/25/99	2,870	2,800	mg/L	0.500	3,438
Potassium	10	03/23/00	04/06/00	2,700	2,700	mg/L	5.000	3,438
Potassium	26	04/30/08	05/21/08	2,460	2,190	mg/L	0.500	3,438
Potassium	27	10/22/08	11/07/08	1,470	1,640	mg/L	0.500	3,438
Potassium	28	04/29/09	05/15/09	1,530	1,580	mg/L	0.500	3,438
Potassium	29	10/14/09	11/16/09	1,550	1,610	mg/L	0.500	3,438
Potassium	30	04/28/10	04/30/10	1,430	1,560	mg/L	0.500	3,438
Potassium	31	10/27/10	12/03/10	1,430	1,690	mg/L	5.2	3,438
Potassium	32	04/06/11	05/06/11	1,420	1,470	mg/L	5.2	3,438
Potassium	33	10/19/11	11/02/11	1,500	1,470	mg/L	8.4	3,438
Potassium	34	04/04/12	04/12/12	1,530	1,500	mg/L	3.4	3,438
Potassium	35	04/03/13	05/06/13	1,510	1,410	mg/L	5.0	3,438



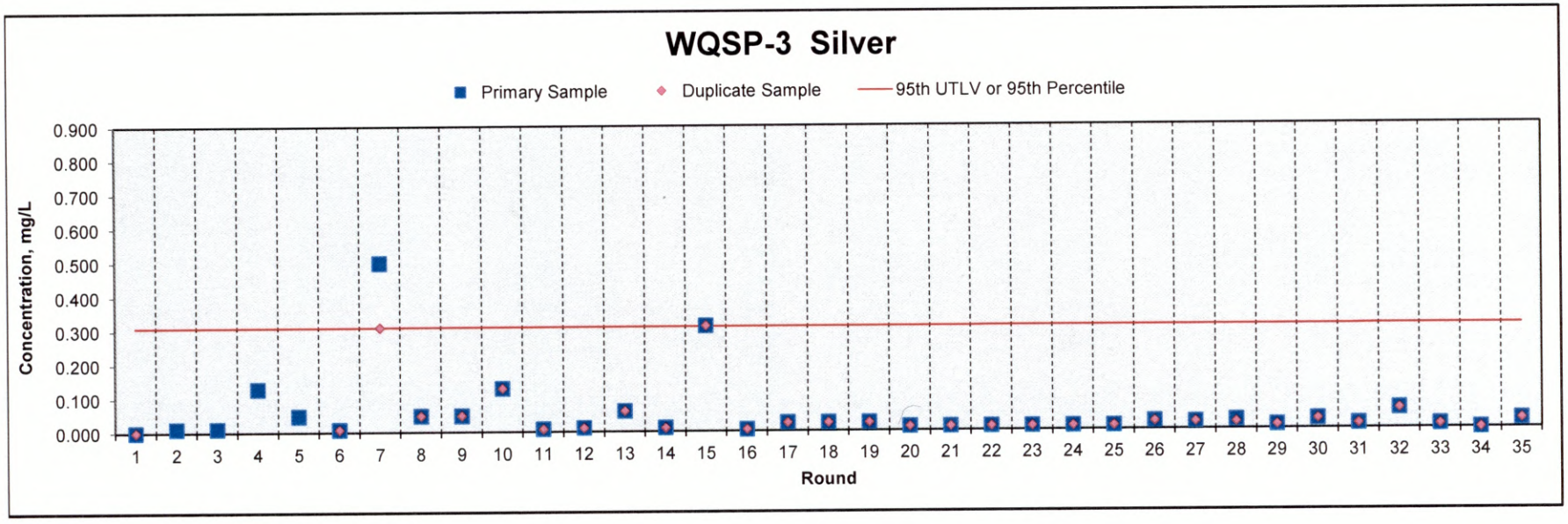
WQSP-3 Selenium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Selenium	1	09/19/95	10/06/95	< 0.010	< 0.010	mg/L	0.010	< 2.0
Selenium	2	05/09/96	06/03/96	< 0.013		mg/L	0.013	< 2.0
Selenium	3	08/02/96	08/29/96	< 0.013		mg/L	0.013	< 2.0
Selenium	4	05/22/97	06/13/97	< 0.130		mg/L	0.130	< 2.0
Selenium	5	08/21/97	09/05/97	< 0.050		mg/L	0.050	< 2.0
Selenium	6	04/22/98	04/24/98	< 0.020	< 0.020	mg/L	0.001	< 2.0
Selenium	7	08/26/98	09/29/98	< 2.000	< 2.000	mg/L	2.000	< 2.0
Selenium	8	04/08/99	04/15/99	< 0.050	< 0.050	mg/L	0.050	< 2.0
Selenium	9	10/07/99	11/25/99	0.129	0.141	mg/L	0.050	< 2.0
Selenium	10	03/23/00	04/06/00	0.002	< 0.130	mg/L	0.130	< 2.0
Selenium	26	04/30/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	< 2.0
Selenium	27	10/22/08	11/12/08	< 0.020	< 0.020	mg/L	0.025	< 2.0
Selenium	28	04/29/09	05/15/09	< 0.025	< 0.025	mg/L	0.025	< 2.0
Selenium	29	10/14/09	11/04/09	< 0.025	< 0.025	mg/L	0.025	< 2.0
Selenium	30	04/28/10	05/18/10	< 0.010	< 0.010	mg/L	0.010	< 2.0
Selenium	31	10/27/10	11/24/10	< 0.005	< 0.005	mg/L	0.005	< 2.0
Selenium	32	04/06/11	04/28/11	< 0.020	< 0.020	mg/L	0.020	< 2.0
Selenium	33	10/19/11	11/10/11	< 0.020	0.027	mg/L	0.020	< 2.0
Selenium	34	04/04/12	04/19/12	< 0.010	< 0.010	mg/L	0.010	< 2.0
Selenium	35	04/03/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	< 2.0



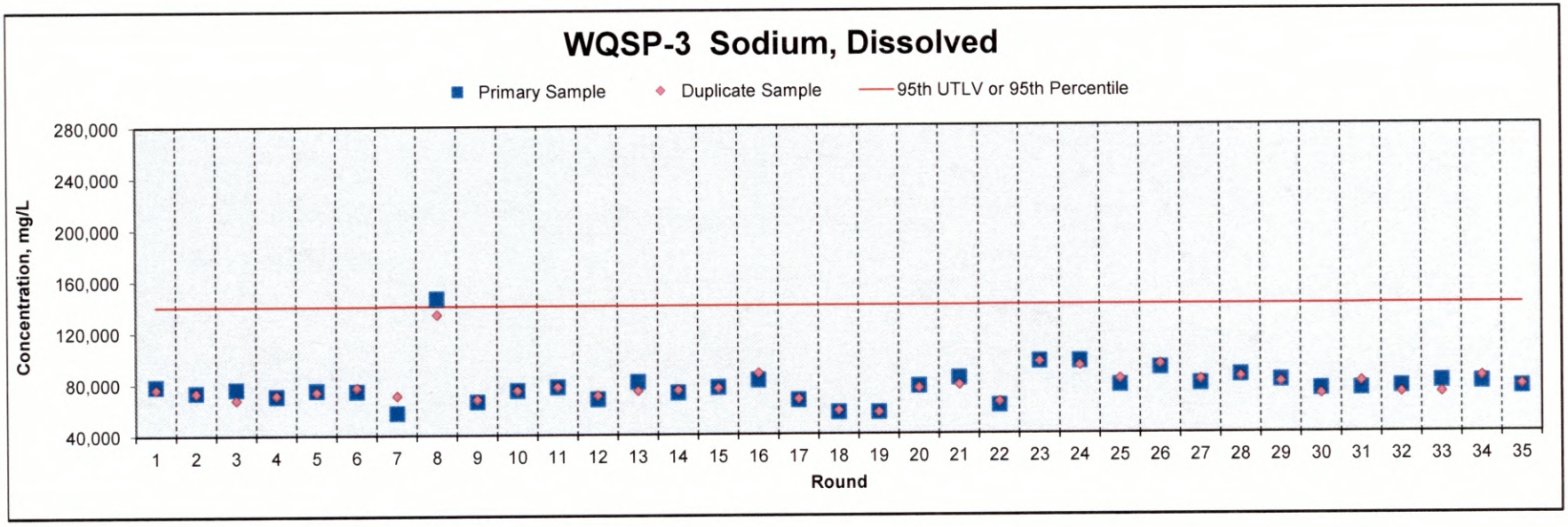
WQSP-3 Silver

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Silver	1	09/19/95	10/16/95	< 0.003	< 0.003	mg/L	0.003	0.31
Silver	2	05/09/96	06/03/96	< 0.013		mg/L	0.013	0.31
Silver	3	08/22/96	08/29/96	< 0.013		mg/L	0.013	0.31
Silver	4	05/22/97	06/13/97	< 0.130		mg/L	0.130	0.31
Silver	5	08/21/97	09/05/97	< 0.050		mg/L	0.050	0.31
Silver	6	04/22/98	04/24/98	< 0.010	< 0.010	mg/L	0.001	0.31
Silver	7	08/26/98	09/29/98	< 0.500	0.310	mg/L	0.500	0.31
Silver	8	04/08/99	04/15/99	< 0.050	< 0.050	mg/L	0.050	0.31
Silver	9	10/06/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	0.31
Silver	10	03/23/00	04/06/00	< 0.130	< 0.130	mg/L	0.130	0.31
Silver	26	04/30/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	0.31
Silver	27	10/22/08	11/12/08	< 0.023	< 0.023	mg/L	0.025	0.31
Silver	28	04/29/09	05/15/09	0.028	0.022	mg/L	0.125	0.31
Silver	29	10/14/09	11/10/09	< 0.013	< 0.013	mg/L	0.013	0.31
Silver	30	04/28/10	05/03/10	< 0.030	< 0.030	mg/L	0.030	0.31
Silver	31	10/27/10	11/24/10	< 0.015	< 0.015	mg/L	0.0150	0.31
Silver	32	04/06/11	04/25/11	< 0.060	< 0.060	mg/L	0.060	0.31
Silver	33	10/19/11	10/28/11	< 0.0125	< 0.0125	mg/L	0.0125	0.31
Silver	34	04/04/12	04/24/12	< 0.0020	< 0.0020	mg/L	0.0020	0.31
Silver	35	04/03/13	04/16/13	< 0.028	< 0.028	mg/L	0.028	0.31



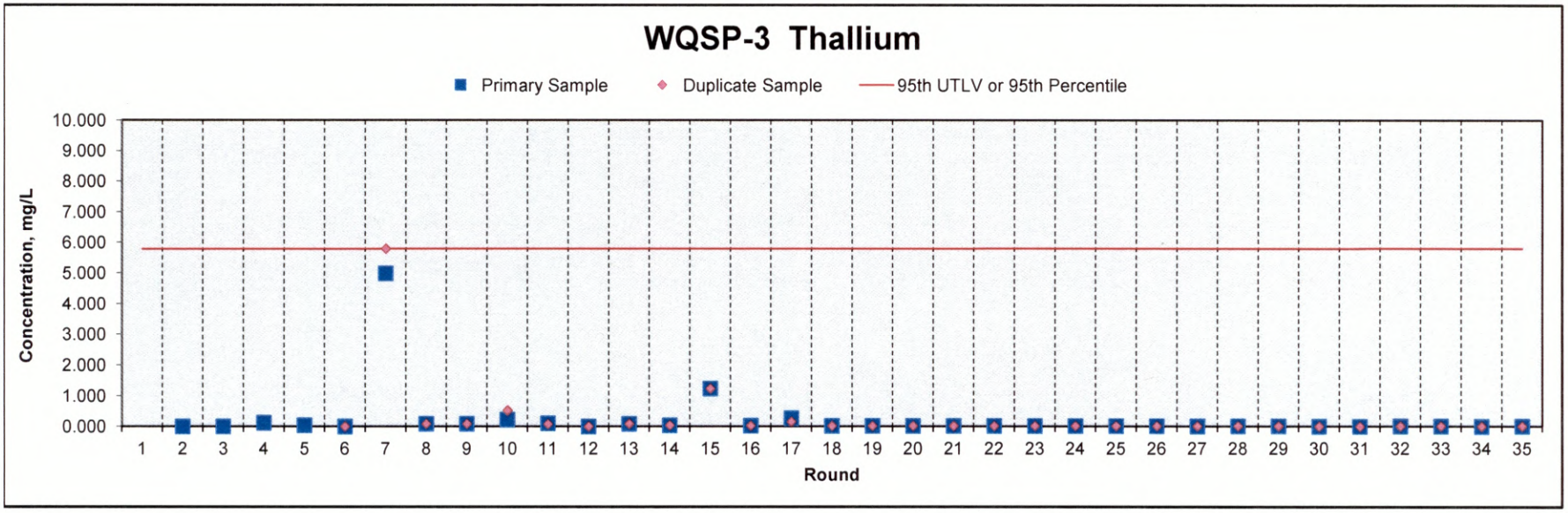
WQSP-3 Sodium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sodium	1	09/19/95	10/20/95	79,100	76,700	mg/L	100.000	140,400
Sodium	2	05/09/96	05/29/96	74,200	73,700	mg/L	50.000	140,400
Sodium	3	08/22/96	08/29/96	76,700	68,200	mg/L	50.000	140,400
Sodium	4	05/22/97	05/29/97	71,200	71,800	mg/L	25.000	140,400
Sodium	5	08/21/97	08/28/97	75,700	74,200	mg/L	25.000	140,400
Sodium	6	04/22/98	04/24/98	74,900	77,660	mg/L	0.033	140,400
Sodium	7	08/26/98	09/29/98	58,000	71,000	mg/L	0.100	140,400
Sodium	8	04/08/99	04/15/99	146,800	134,000	mg/L	1.000	140,400
Sodium	9	10/06/99	11/25/99	66,600	68,300	mg/L	1.000	140,400
Sodium	10	03/23/00	04/06/00	75,200	75,200	mg/L	5.000	140,400
Sodium	26	04/30/08	05/21/08	91,100	93,900	mg/L	0.500	140,400
Sodium	27	10/22/08	11/07/08	78,800	81,900	mg/L	0.500	140,400
Sodium	28	04/29/09	05/15/09	85,500	84,100	mg/L	0.500	140,400
Sodium	29	10/14/09	11/16/09	81,200	79,700	mg/L	0.500	140,400
Sodium	30	04/28/10	04/30/10	74,400	70,300	mg/L	0.500	140,400
Sodium	31	10/27/10	11/30/10	74,400	79,700	mg/L	27	140,400
Sodium	32	04/06/11	05/06/11	76,000	71,000	mg/L	27	140,400
Sodium	33	10/19/11	11/03/11	80,000	71,000	mg/L	130	140,400
Sodium	34	04/04/12	04/12/12	79,200	83,300	mg/L	47	140,400
Sodium	35	04/03/13	05/06/13	75,300	76,600	mg/L	80	140,400



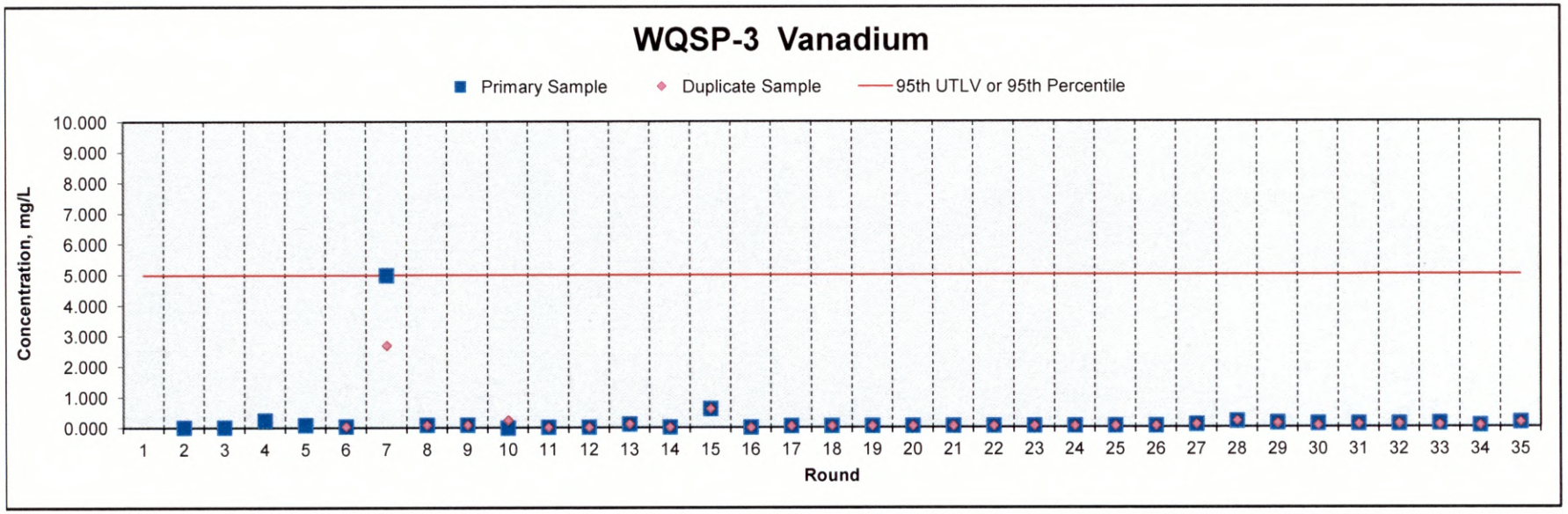
WQSP-3 Thallium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Thallium	1					mg/L		5.8
Thallium	2	05/09/96	06/03/96	< 0.013		mg/L	0.013	5.8
Thallium	3	08/22/96	08/29/96	< 0.013		mg/L	0.013	5.8
Thallium	4	05/22/97	06/13/97	< 0.130		mg/L	0.130	5.8
Thallium	5	08/21/97	09/05/97	< 0.050		mg/L	0.050	5.8
Thallium	6	04/22/98	04/24/98	< 0.010	< 0.010	mg/L	0.001	5.8
Thallium	7	08/26/98	09/29/98	< 5.000	5.800	mg/L	5.000	5.8
Thallium	8	04/08/99	04/15/99	< 0.100	< 0.100	mg/L	0.100	5.8
Thallium	9	10/07/99	11/25/99	< 0.100	< 0.100	mg/L	0.100	5.8
Thallium	10	03/23/00	04/06/00	0.232	0.523	mg/L	0.010	5.8
Thallium	26	04/30/08	05/21/08	< 0.025	< 0.025	mg/L	0.025	5.8
Thallium	27	10/22/08	11/12/08	< 0.020	< 0.020	mg/L	0.025	5.8
Thallium	28	04/29/09	05/15/09	< 0.025	< 0.025	mg/L	0.025	5.8
Thallium	29	10/14/09	11/04/09	< 0.025	< 0.025	mg/L	0.025	5.8
Thallium	30	04/28/10	05/18/10	< 0.010	< 0.010	mg/L	0.010	5.8
Thallium	31	10/27/10	11/24/10	< 0.005	< 0.005	mg/L	0.0050	5.8
Thallium	32	04/06/11	04/28/11	< 0.020	< 0.020	mg/L	0.020	5.8
Thallium	33	10/19/11	11/10/11	< 0.020	< 0.020	mg/L	0.020	5.8
Thallium	34	04/04/12	04/19/12	< 0.010	< 0.010	mg/L	0.010	5.8
Thallium	35	04/03/13	04/12/13	< 0.020	< 0.020	mg/L	0.020	5.8



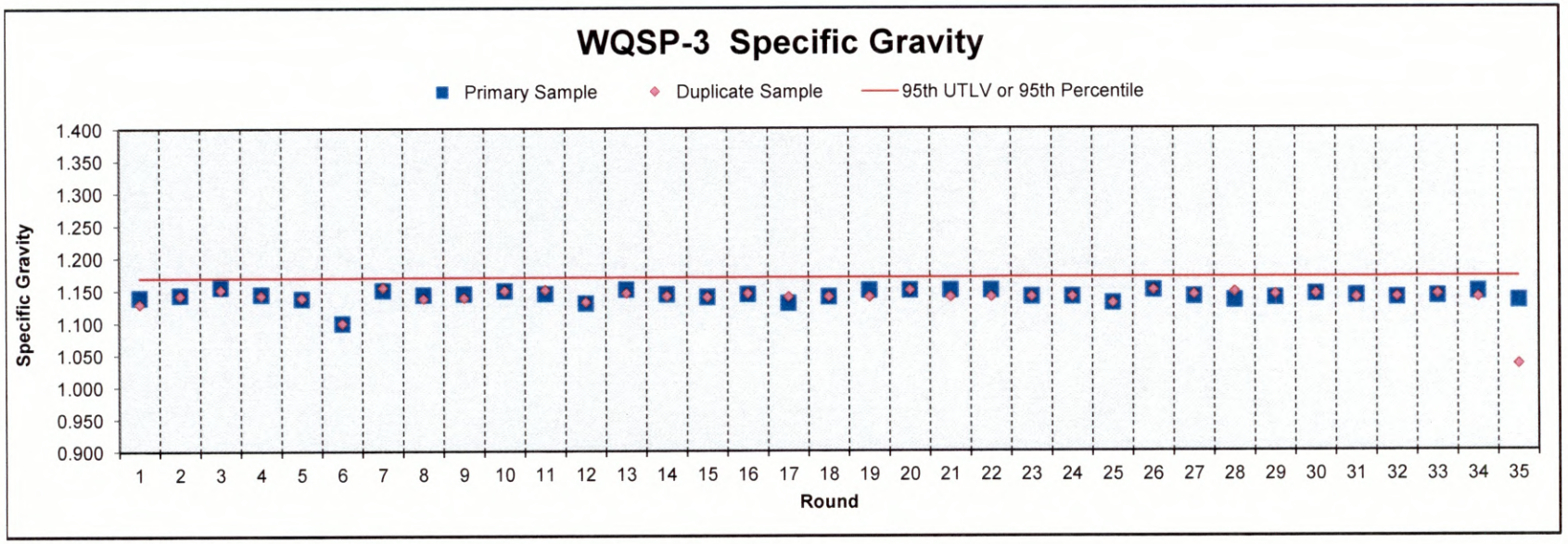
WQSP-3 Vanadium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Vanadium	1					mg/L		< 5.0
Vanadium	2	05/09/96	06/03/96	< 0.025		mg/L	0.025	< 5.0
Vanadium	3	08/22/96	08/29/96	< 0.025		mg/L	0.025	< 5.0
Vanadium	4	05/22/97	06/13/97	< 0.250		mg/L	0.250	< 5.0
Vanadium	5	08/21/97	09/05/97	< 0.100		mg/L	0.100	< 5.0
Vanadium	6	04/22/98	04/24/98	< 0.050	< 0.050	mg/L	0.005	< 5.0
Vanadium	7	08/26/98	09/29/98	< 5.000	< 2.700	mg/L	5.000	< 5.0
Vanadium	8	04/08/99	04/15/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Vanadium	9	10/07/99	11/25/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Vanadium	10	03/23/00	04/06/00	0.000	< 0.250	mg/L	0.010	< 5.0
Vanadium	26	04/30/08	05/21/08	< 0.050	< 0.050	mg/L	0.050	< 5.0
Vanadium	27	10/22/08	11/12/08	< 0.098	< 0.098	mg/L	0.025	< 5.0
Vanadium	28	04/29/09	05/15/09	0.200	0.210	mg/L	1.250	< 5.0
Vanadium	29	10/14/09	11/10/09	0.15	0.13	mg/L	0.025	< 5.0
Vanadium	30	04/28/10	05/03/10	0.12	0.067	mg/L	0.055	< 5.0
Vanadium	31	10/27/10	11/24/10	0.110	0.096	mg/L	0.027	< 5.0
Vanadium	32	04/06/11	04/25/11	< 0.11	< 0.11	mg/L	0.11	< 5.0
Vanadium	33	10/19/11	10/28/11	0.13	0.082	mg/L	0.011	< 5.0
Vanadium	34	04/04/12	04/24/12	0.060	0.060	mg/L	0.0040	< 5.0
Vanadium	35	04/03/13	04/16/13	0.16	0.16	mg/L	0.087	< 5.0



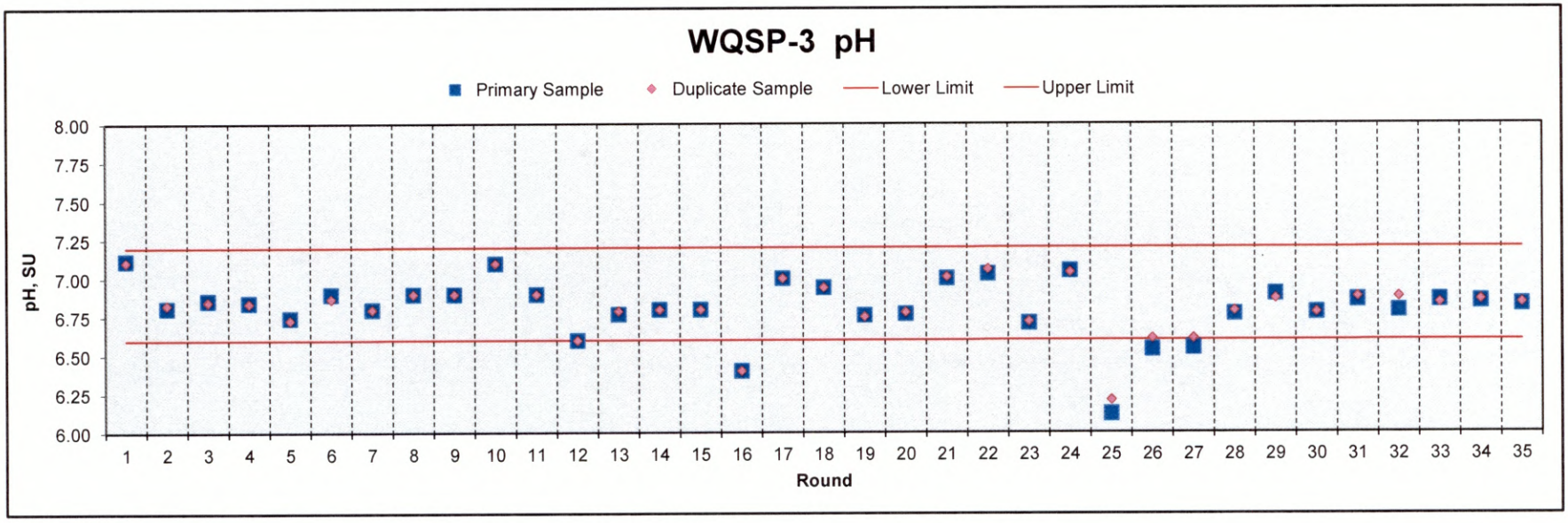
WQSP-3 Specific Gravity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Density	1	09/19/95	10/12/95	1.140	1.130	g/mL		1.17
Density	2	05/09/96	05/15/96	1.144	1.143	g/mL	0.0	1.17
Density	3	08/22/96	09/19/96	1.156	1.152	g/mL	0.0	1.17
Density	4	05/22/97	06/09/97	1.145	1.143	g/mL	N/A	1.17
Density	5	08/21/97	09/02/97	1.138	1.139	g/mL	N/A	1.17
Density	6	04/21/98	04/24/98	1.100	1.100	g/mL		1.17
Density	7	08/26/98	09/09/98	1.151	1.155	g/mL	---	1.17
Density	8	04/08/99	04/12/99	1.144	1.138	g/mL		1.17
Density	9	10/06/99	10/11/99	1.145	1.139	g/mL		1.17
Density	10	03/23/00	03/28/00	1.150	1.150	g/mL		1.17
Density	26	04/30/08	05/05/08	1.150	1.150	unitless		1.17
Specific Gravity	27	10/22/08	10/27/08	1.140	1.143	unitless	0.0	1.17
Specific Gravity	28	04/29/09	05/06/09	1.134	1.147	unitless	0.0	1.17
Specific Gravity	29	10/14/09	11/01/09	1.138	1.143	unitless	0.0	1.17
Specific Gravity	30	04/28/10	05/10/10	1.144	1.144	unitless	0.0	1.17
Specific Gravity	31	10/27/10	11/14/10	1.141	1.138	unitless	0.0	1.17
Specific Gravity	32	04/06/11	04/13/11	1.138	1.139	unitless	0.0	1.17
Specific Gravity	33	10/19/11	11/08/11	1.140	1.143	unitless	0.0	1.17
Specific Gravity	34	04/04/12	04/09/12	1.147	1.138	unitless	0.0	1.17
Specific Gravity	35	04/03/13	04/09/13	1.133	1.034	unitless	0.0	1.17



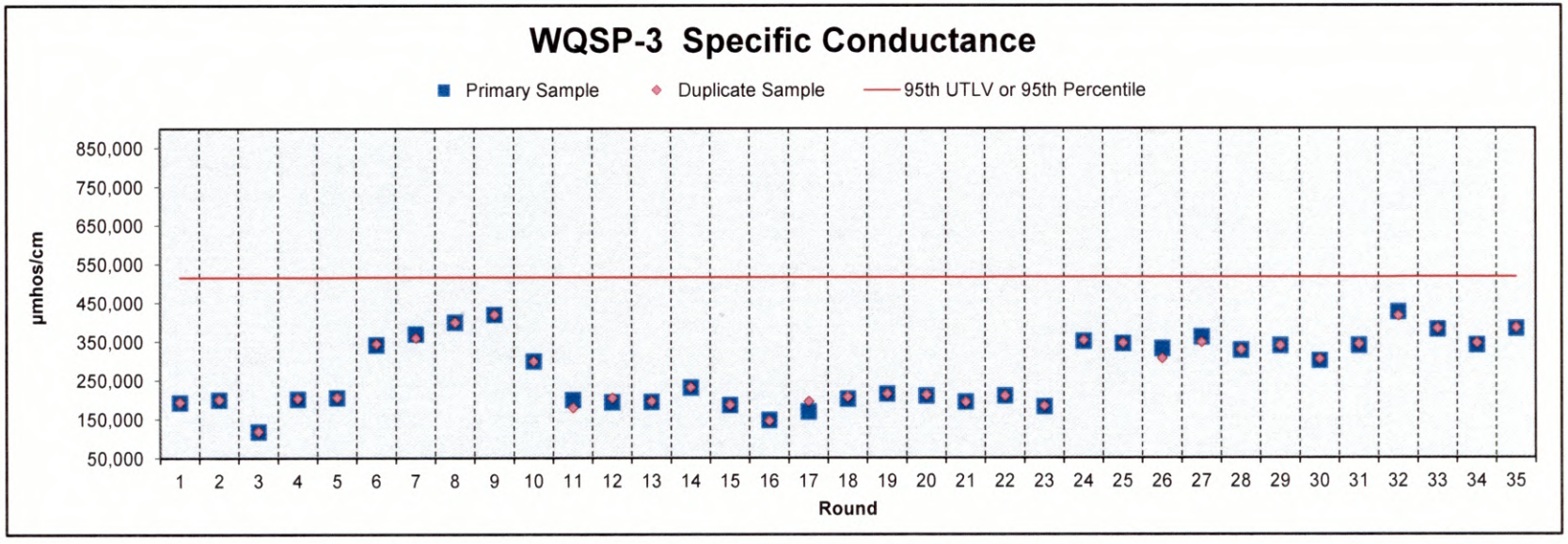
WQSP-3 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile	
								Lower Limit	Upper Limit
pH	1	09/19/95	10/12/95	7.12	7.11	SU	0.0	6.6	7.2
pH	2	05/09/96	05/15/96	6.81	6.83	SU	0.0	6.6	7.2
pH	3	08/22/96	09/19/96	6.86	6.85	SU	0.0	6.6	7.2
pH	4	05/22/97	06/09/97	6.85	6.84	SU	0.0	6.6	7.2
pH	5	08/21/97	09/02/97	6.75	6.73	SU	0.0	6.6	7.2
pH	6	04/21/98	04/24/98	6.90	6.87	SU	0.0	6.6	7.2
pH	7	08/26/98	09/09/98	6.80	6.80	SU	0.0	6.6	7.2
pH	8	04/08/99	04/12/99	6.90	6.90	SU	0.0	6.6	7.2
pH	9	10/06/99	10/11/99	6.90	6.90	SU	0.0	6.6	7.2
pH	10	03/23/00	03/28/00	7.10	7.10	SU	0.0	6.6	7.2
pH	26	04/30/08	05/05/08	6.54	6.61	SU	0.0	6.6	7.2
pH	27	10/22/08	10/27/08	6.55	6.61	SU	0.0	6.6	7.2
pH	28	04/29/09	05/06/09	6.77	6.79	SU	0.0	6.6	7.2
pH	29	10/14/09	11/01/09	6.90	6.87	SU	0.0	6.6	7.2
pH	30	04/28/10	04/29/10	6.78	6.78	SU	0.0	6.6	7.2
pH	31	10/27/10	11/04/10	6.86	6.88	SU	0.0	6.6	7.2
pH	32	04/06/11	04/07/11	6.79	6.88	SU	0.0	6.6	7.2
pH	33	10/19/11	10/28/11	6.86	6.84	SU	0.0	6.6	7.2
pH	34	04/04/12	04/11/12	6.85	6.86	SU	0.10	6.6	7.2
pH	35	04/03/13	04/04/13	6.83	6.84	SU	0.10	6.6	7.2



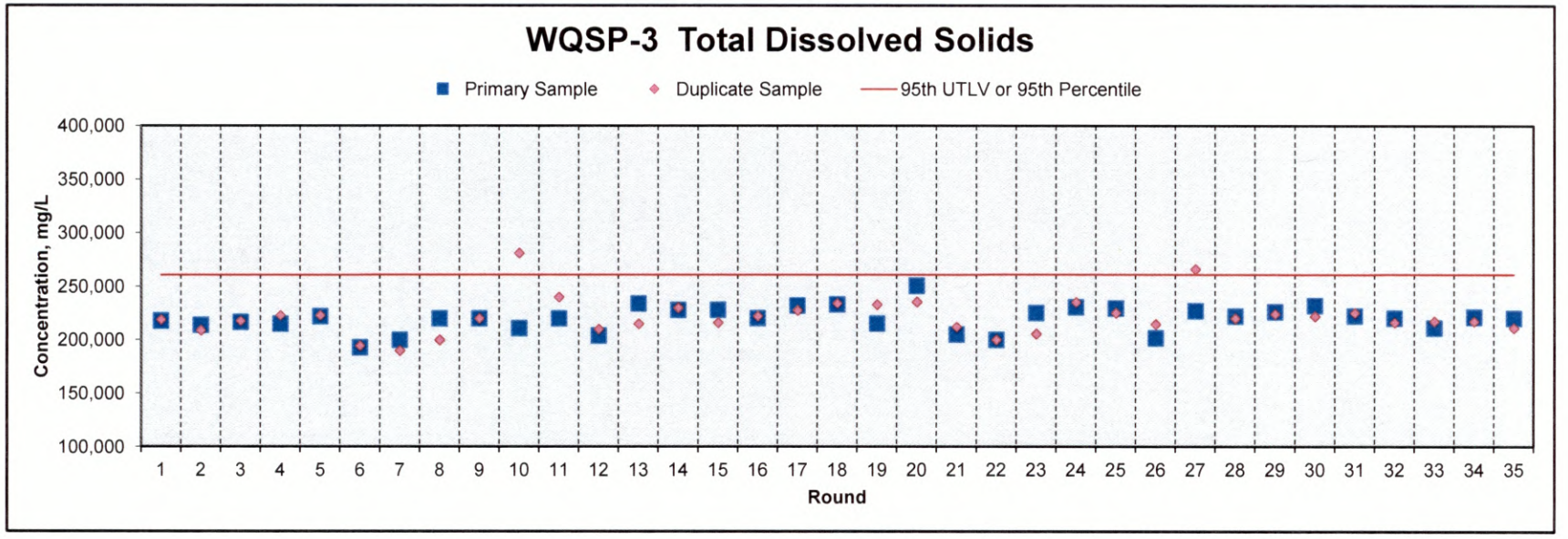
WQSP-3 Specific Conductance

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Specific Conductance	1	09/19/95	10/12/95	193,000	194,000	µmhos/cm	1.0	517,000
Specific Conductance	2	05/09/96	05/15/96	200,000	201,000	µmhos/cm	1.0	517,000
Specific Conductance	3	08/22/96	09/19/96	118,000	119,000	µmhos/cm	3.0	517,000
Specific Conductance	4	05/22/97	06/09/97	202,000	204,000	µmhos/cm	3.0	517,000
Specific Conductance	5	08/21/97	09/02/97	205,500	206,500	µmhos/cm	3.0	517,000
Specific Conductance	6	04/21/98	04/24/98	342,000	345,000	µmhos/cm		517,000
Specific Conductance	7	08/26/98	09/09/98	370,000	360,000	µmhos/cm		517,000
Specific Conductance	8	04/08/99	04/12/99	400,000	400,000	µmhos/cm		517,000
Specific Conductance	9	10/06/99	10/11/99	420,000	420,000	µmhos/cm		517,000
Specific Conductance	10	03/23/00	03/28/00	300,000	300,000	µmhos/cm		517,000
Specific Conductance	26	04/30/08	05/05/08	332,000	307,000	µmhos/cm		517,000
Specific Conductance	27	10/22/08	10/27/08	362,000	348,000	µmhos/cm		517,000
Specific Conductance	28	04/29/09	05/06/09	328,000	329,000	µmhos/cm		517,000
Specific Conductance	29	10/14/09	11/01/09	340,000	340,000	µmhos/cm	0.0	517,000
Specific Conductance	30	04/28/10	04/29/10	301,000	305,000	µmhos/cm	0.0	517,000
Specific Conductance	31	10/27/10	11/05/10	340,000	343,000	µmhos/cm	0.0	517,000
Specific Conductance	32	04/06/11	04/08/11	426,000	416,000	µmhos/cm	0.0	517,000
Specific Conductance	33	10/19/11	10/28/11	381,000	383,000	µmhos/cm	0.50	517,000
Specific Conductance	34	04/04/12	04/11/12	341,000	346,000	µmhos/cm	0.50	517,000
Specific Conductance	35	04/03/13	04/05/13	383,000	385,000	µmhos/cm	0.50	517,000



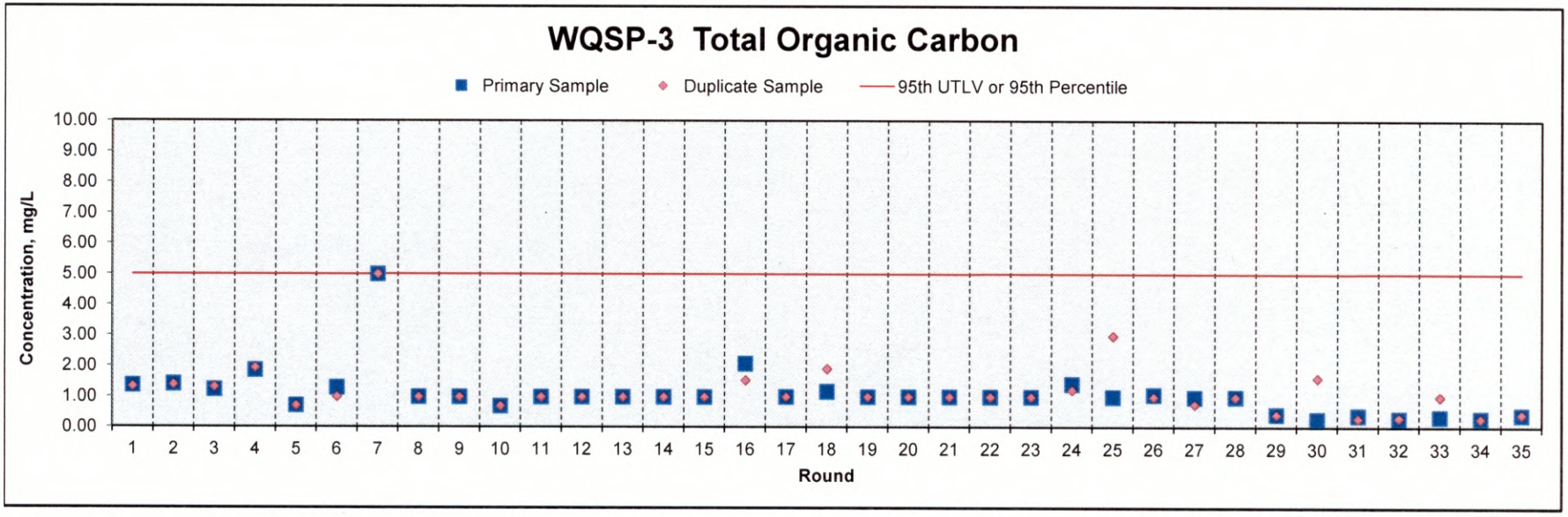
WQSP-3 Total Dissolved Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Dissolved Solids	1	09/19/95	10/12/95	218,000	219,000	mg/L	10	261,000
Total Dissolved Solids	2	05/09/96	05/15/96	214,000	209,000	mg/L	200	261,000
Total Dissolved Solids	3	08/22/96	09/19/96	216,690	217,720	mg/L	200	261,000
Total Dissolved Solids	4	05/22/97	06/09/97	215,000	223,000	mg/L	200	261,000
Total Dissolved Solids	5	08/21/97	09/02/97	222,000	223,000	mg/L	200	261,000
Total Dissolved Solids	6	04/21/98	04/24/98	193,000	194,600	mg/L	200	261,000
Total Dissolved Solids	7	08/26/98	09/09/98	200,000	190,000	mg/L	10	261,000
Total Dissolved Solids	8	04/08/99	04/12/99	220,000	200,000	mg/L	10	261,000
Total Dissolved Solids	9	10/06/99	10/11/99	220,000	220,000	mg/L	10	261,000
Total Dissolved Solids	10	03/23/00	03/28/00	211,000	281,000	mg/L	10	261,000
Total Dissolved Solids	26	04/30/08	05/05/08	201,500	214,500	mg/L	10	261,000
Total Dissolved Solids	27	10/22/08	10/27/08	227,000	266,000	mg/L	10	261,000
Total Dissolved Solids	28	04/29/09	05/06/09	222,000	220,000	mg/L	10	261,000
Total Dissolved Solids	29	10/14/09	11/01/09	226,000	224,000	mg/L	10	261,000
Total Dissolved Solids	30	04/28/10	05/06/10	232,000	222,000	mg/L	10	261,000
Total Dissolved Solids	31	10/27/10	11/03/10	222,000	225,000	mg/L	270	261,000
Total Dissolved Solids	32	04/06/11	04/13/11	220,000	216,000	mg/L	270	261,000
Total Dissolved Solids	33	10/19/11	10/27/11	211,000	217,000	mg/L	560	261,000
Total Dissolved Solids	34	04/04/12	04/11/12	221,000	217,000	mg/L	270	261,000
Total Dissolved Solids	35	04/03/13	04/11/13	220,000	211,000	mg/L	500	261,000



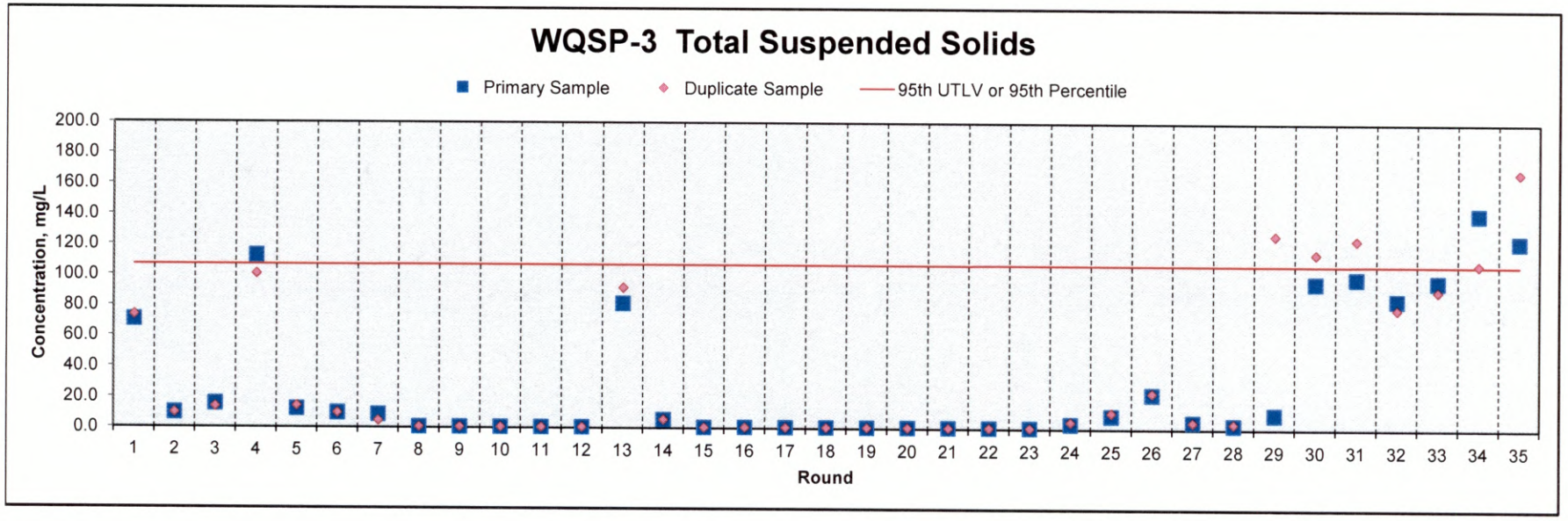
WQSP-3 Total Organic Carbon

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Organic Carbon	1	09/19/95	10/12/95	1.38	1.34	mg/L	0.50	< 5.0
Total Organic Carbon	2	05/09/96	05/15/96	1.42	1.40	mg/L	0.50	< 5.0
Total Organic Carbon	3	08/22/96	09/19/96	1.24	1.32	mg/L	0.50	< 5.0
Total Organic Carbon	4	05/22/97	06/09/97	1.87	1.95	mg/L	0.50	< 5.0
Total Organic Carbon	5	08/21/97	09/02/97	0.72	0.71	mg/L	0.50	< 5.0
Total Organic Carbon	6	04/21/98	04/24/98	1.30	1.00	mg/L		< 5.0
Total Organic Carbon	7	08/26/98	09/09/98	< 5.00	< 5.00	mg/L	5.00	< 5.0
Total Organic Carbon	8	04/08/99	04/12/99	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	9	10/06/99	10/11/99	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	10	03/23/00	03/28/00	0.70	< 0.70	mg/L		< 5.0
Total Organic Carbon	26	04/30/08	05/05/08	1.07	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	27	10/22/08	10/27/08	0.99	0.76	mg/L	1.00	< 5.0
Total Organic Carbon	28	04/29/09	05/06/09	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	29	10/14/09	11/01/09	0.44	0.43	mg/L	1.00	< 5.0
Total Organic Carbon	30	04/28/10	05/05/10	0.28	1.61	mg/L	0.056	< 5.0
Total Organic Carbon	31	10/27/10	11/03/10	0.40	0.30	mg/L	0.056	< 5.0
Total Organic Carbon	32	04/06/11	04/19/11	0.30	0.32	mg/L	0.25	< 5.0
Total Organic Carbon	33	10/19/11	10/25/11	0.36	1.0	mg/L	0.07	< 5.0
Total Organic Carbon	34	04/04/12	04/16/12	0.31	0.30	mg/L	0.25	< 5.0
Total Organic Carbon	35	04/03/13	04/08/13	0.42	0.44	mg/L	0.23	< 5.0



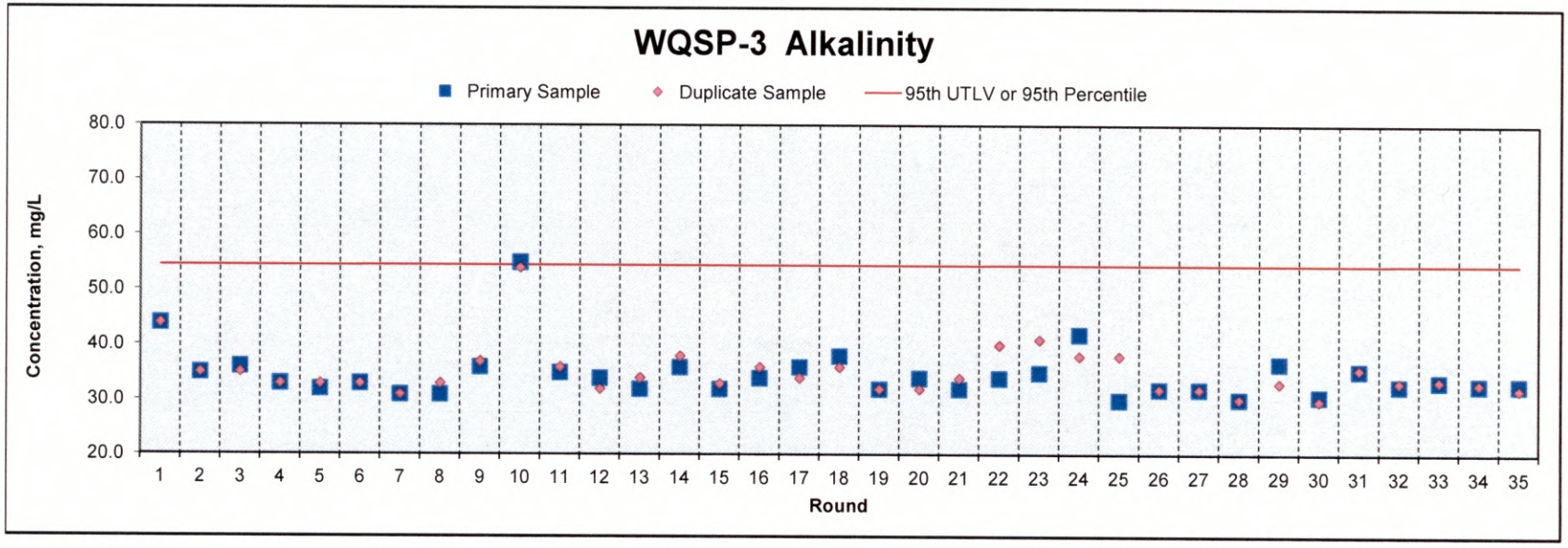
WQSP-3 Total Suspended Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Suspended Solids	1	09/19/95	10/12/95	71.0	74.0	mg/L	10.0	107
Total Suspended Solids	2	05/09/96	05/15/96	< 10.0	< 10.0	mg/L	10.0	107
Total Suspended Solids	3	08/22/96	09/19/96	16.0	14.0	mg/L	10.0	107
Total Suspended Solids	4	05/22/97	06/09/97	113.0	101.0	mg/L	10.0	107
Total Suspended Solids	5	08/21/97	09/02/97	12.5	14.5	mg/L	10.0	107
Total Suspended Solids	6	04/21/98	04/24/98	< 10.0	< 10.0	mg/L	10.0	107
Total Suspended Solids	7	08/26/98	09/09/98	9.0	< 5.0	mg/L	1.0	107
Total Suspended Solids	8	04/08/99	04/12/99	< 1.0	< 1.0	mg/L	1.0	107
Total Suspended Solids	9	10/06/99	10/11/99	< 1.0	< 1.0	mg/L	1.0	107
Total Suspended Solids	10	03/23/00	03/28/00	< 1.0	< 1.0	mg/L	1.0	107
Total Suspended Solids	26	04/30/08	05/05/08	23.0	24.0	mg/L	1.0	107
Total Suspended Solids	27	10/22/08	10/27/08	< 5.0	< 5.0	mg/L	1.0	107
Total Suspended Solids	28	04/29/09	05/06/09	3.0	4.0	mg/L	1.0	107
Total Suspended Solids	29	10/14/09	11/01/09	10	127	mg/L	1.0	107
Total Suspended Solids	30	04/28/10	05/03/10	96	115	mg/L	1.0	107
Total Suspended Solids	31	10/27/10	11/02/10	99	**124**	mg/L	0.0	**107**
Total Suspended Solids	32	04/06/11	04/13/11	85	79	mg/L	0.0	107
Total Suspended Solids	33	10/19/11	10/26/11	97	91	mg/L	2.8	107
Total Suspended Solids	34	04/04/12	04/10/12	**141**	**108**	mg/L	2.8	**107**
Total Suspended Solids	35	04/03/13	04/10/13	**123**	**168**	mg/L	1.5	**107**



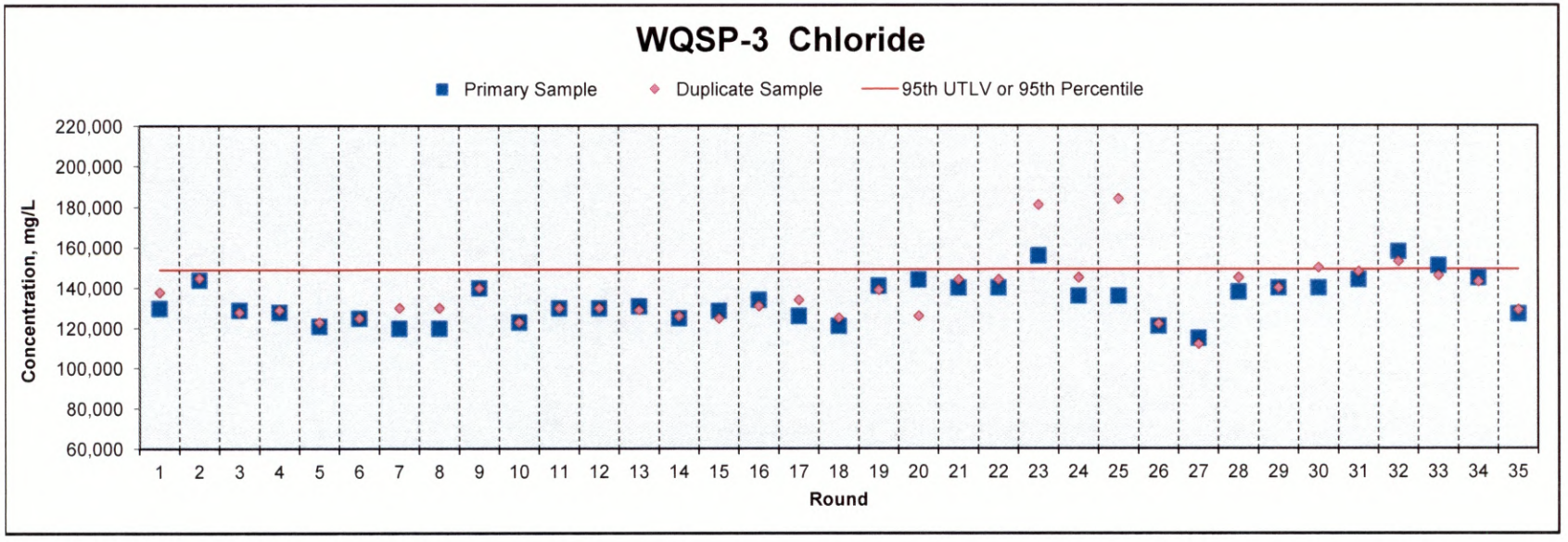
WQSP-3 Alkalinity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Alkalinity	1	09/19/95	10/12/95	44.0	44.0	mg/L	5.0	54.5
Alkalinity	2	05/09/96	05/15/96	35.0	35.0	mg/L	5.0	54.5
Alkalinity	3	08/22/96	09/19/96	36.1	35.1	mg/L	5.0	54.5
Alkalinity	4	05/22/97	06/09/97	33.0	33.0	mg/L	5.0	54.5
Alkalinity	5	08/21/97	09/02/97	32.0	33.0	mg/L	5.0	54.5
Alkalinity	6	04/21/98	04/24/98	33.0	33.0	mg/L		54.5
Alkalinity	7	08/26/98	09/09/98	31.0	31.0	mg/L	1.0	54.5
Alkalinity	8	04/08/99	04/12/99	31.0	33.0	mg/L		54.5
Alkalinity	9	10/06/99	10/11/99	36.0	37.0	mg/L		54.5
Alkalinity	10	03/23/00	03/28/00	55.0	54.0	mg/L		54.5
Alkalinity	26	04/30/08	05/05/08	32.0	32.0	mg/L	4.0	54.5
Alkalinity	27	10/22/08	10/27/08	32.0	32.0	mg/L	4.0	54.5
Alkalinity	28	04/29/09	05/06/09	30.2	30.2	mg/L	4.0	54.5
Alkalinity	29	10/14/09	11/01/09	36.7	33.1	mg/L	4.0	54.5
Alkalinity	30	04/28/10	04/29/10	30.7	29.9	mg/L	4.0	54.5
Alkalinity	31	10/27/10	11/04/10	35.4	35.6	mg/L	5.0	54.5
Alkalinity	32	04/06/11	04/07/11	32.6	33.2	mg/L	5.0	54.5
Alkalinity	33	10/19/11	10/28/11	33.4	33.5	mg/L	2.4	54.5
Alkalinity	34	04/04/12	04/11/12	32.8	33.0	mg/L	5.0	54.5
Alkalinity	35	04/03/13	04/04/13	32.8	32.0	mg/L	5.0	54.5



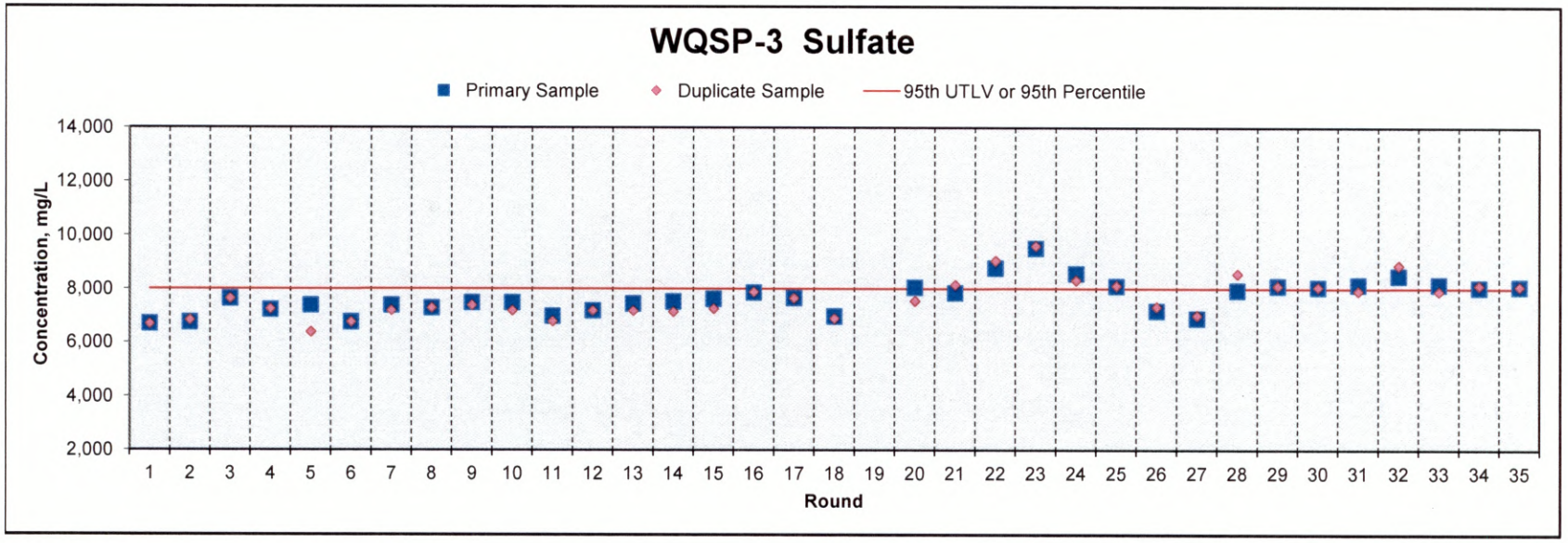
WQSP-3 Chloride

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chloride	1	09/19/95	10/12/95	130,000	138,000	mg/L	5.0	149,100
Chloride	2	05/09/96	05/15/96	144,000	145,000	mg/L	5000.0	149,100
Chloride	3	08/22/96	09/19/96	129,000	128,000	mg/L	5000.0	149,100
Chloride	4	05/22/97	06/09/97	128,000	129,000	mg/L	5000.0	149,100
Chloride	5	08/21/97	09/02/97	121,000	123,000	mg/L	5000.0	149,100
Chloride	6	04/21/98	04/24/98	125,000	125,000	mg/L	0.0	149,100
Chloride	7	08/26/98	09/09/98	120,000	130,000	mg/L	0.5	149,100
Chloride	8	04/08/99	04/12/99	120,000	130,000	mg/L	0.5	149,100
Chloride	9	10/06/99	10/11/99	140,000	140,000	mg/L	0.5	149,100
Chloride	10	03/23/00	03/28/00	123,000	123,000	mg/L	0.5	149,100
Chloride	26	04/30/08	05/05/08	121,000	122,000	mg/L	0.5	149,100
Chloride	27	10/22/08	10/27/08	115,000	112,000	mg/L	0.5	149,100
Chloride	28	04/29/09	05/06/09	138,000	145,000	mg/L	0.5	149,100
Chloride	29	10/14/09	11/01/09	140,000	140,000	mg/L	0.5	149,100
Chloride	30	04/28/10	04/30/10	140,000	150,000	mg/L	0.5	149,100
Chloride	31	10/27/10	11/01/10	144,000	148,000	mg/L	650	149,100
Chloride	32	04/06/11	04/09/11	**158,000**	**153,000**	mg/L	320	**149,100**
Chloride	33	10/19/11	10/24/11	**151,000**	146,000	mg/L	420	**149,100**
Chloride	34	04/04/12	04/06/12	145,000	143,000	mg/L	2,000	149,100
Chloride	35	04/03/13	04/04/13	127,000	129,000	mg/L	660	149,100



WQSP-3 Sulfate

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sulfate	1	09/19/95	10/12/95	6,710	6,700	mg/L	10.0	8,015
Sulfate	2	05/09/96	05/15/96	6,760	6,840	mg/L	2.5	8,015
Sulfate	3	08/22/96	09/19/96	7,650	7,650	mg/L	2.5	8,015
Sulfate	4	05/22/97	06/09/97	7,230	7,260	mg/L	2.5	8,015
Sulfate	5	08/21/97	09/02/97	7,400	6,400	mg/L	2.5	8,015
Sulfate	6	04/21/98	04/24/98	6,770	6,769	mg/L	0.0	8,015
Sulfate	7	08/26/98	09/09/98	7,400	7,200	mg/L	0.5	8,015
Sulfate	8	04/08/99	04/12/99	7,300	7,300	mg/L	0.5	8,015
Sulfate	9	10/06/99	10/11/99	7,500	7,400	mg/L	0.5	8,015
Sulfate	10	03/23/00	03/28/00	7,500	7,200	mg/L	0.5	8,015
Sulfate	26	04/30/08	05/05/08	7,190	7,340	mg/L	0.5	8,016
Sulfate	27	10/22/08	10/27/08	6,910	7,020	mg/L	0.5	8,015
Sulfate	28	04/29/09	05/06/09	7,950	8,570	mg/L	0.5	8,015
Sulfate	29	10/14/09	11/01/09	8,120	8,120	mg/L	0.5	8,015
Sulfate	30	04/28/10	04/30/10	8,070	8,080	mg/L	0.5	8,015
Sulfate	31	10/27/10	11/29/10	**8,160**	7,930	mg/L	47	**8,015**
Sulfate	32	04/06/11	04/07/11	**8,490**	**8,880**	mg/L	47	**8,015**
Sulfate	33	10/19/11	10/20/11	**8,170**	7,920	mg/L	14	**8,015**
Sulfate	34	04/04/12	04/05/12	**8,060**	**8,140**	mg/L	46	**8,015**
Sulfate	35	04/03/13	04/04/13	**8,090**	**8,100**	mg/L	47	**8,015**



WQSP-3

CHAIN OF CUSTODY FORMS

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130405031
Order Date: 4/5/2013

Contact Name: ANDY FREEMAN
Project Name: 1304185
Comment:

Sample #: 130405031-001 **Customer Sample #:** 1304185-001E / WQ3-C-R35

Recv'd: ☑ **Collector:** **Date Collected:** 4/3/2013
Quantity: 1 **Matrix:** Water **Date Received:** 4/5/2013 12:12:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***

Sample #: 130405031-002 **Customer Sample #:** 1304185-002E / WQ3-C-R35-DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 4/3/2013
Quantity: 1 **Matrix:** Water **Date Received:** 4/5/2013 12:12:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/17/2013	***Normal (6-10 Days)***

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB	**Order ID:**	130405031
	4901 HAWKINS NE SUITE D	**Order Date:**	4/5/2013
	ALBUQUERQUE NM 87109		
Contact Name:	ANDY FREEMAN	**Project Name:**	1304185
Comment:			

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	2.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP | Work Order Number: 1304185 | RcptNo: 1

Received by/date: AT 04/04/13

Logged By: **Anne Thorne** 4/4/2013 9:20:00 AM

Completed By: **Anne Thorne** 4/4/2013

Reviewed By: AT 04/04/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?			

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 4 (<2 or >12 unless noted)

Adjusted? _____

Checked by: AT 04/04/13

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
2	2.1	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1030

Page 1 of 1

Project Number:	Project Name:	Total Number of Containers	Requested Analyses								Analytical Laboratory
T409304-1	WIPP/DMP		VOC	TOC	SVOC	Metals	General Chemistry				HEAL
Sampler(s): R. Jimenez, RASpoon											Albq. NM
											HEAL # 1304185
Sample Date	Sample Time	Matrix	Sample Number								Comments
4/3/13	09:12	GW	GW-WQ3-CR35-N1	6	X						use for MS/MSD -001
"	09:18	"	-N1D	4	X						-002
"	09:22	DI	-N2	4	X						Field Blanks -003
N/A	N/A	"	-N3	4	X						Trip Blanks; HEAL provided -004
4/3/13	09:28	GW	-N4	4		X					use for MS/MSD -001
"	09:34	"	-N4D	2		X					-002
"	08:47	"	-N5	*1			X				use for MS/MSD -001
"	09:00	"	-N5D	2			X				-002
"	08:38	"	-N6	2				X			use for MS/MSD -001
"	08:42	"	-N6D	2				X			-002
"	08:30	"	-N7	1					X		use for MS/MSD -001
"	"	GW	-N7D	1					X		-002
								N/A			

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
R. Jimenez 4/3/13, 13:00			
Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received at Laboratory: (Signature, Date/Time) 0930 04/04/13

Requested Turnaround Time: Report due 5/7/2013

☒ Routine ☐ Rush

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: Fed Ex 8768 1881 2186, 8768 1881 2201

Sample Receipt Remarks: 2.1°

Results To: Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8615 FAX: 575-234-6003
EDD: gregory.jungclaus@urs.com

Special Instructions:
Analyze RES in duplicate.
Use primary GW sample for MS/MSD on all Parameters.
48hr. holdtime nitrates

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater
YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)
PINK – Record Copy
SE – Sediment
SO – Soil
SW – Surface Water
VG – Vegetation

Form CofC/RFA, Rev. 0 – NICHOLS PRINTING, INC.

* 1 SVOC Bottle broken upon receipt from Lab.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

130405 031 HALL Last Due 4/17/2013
1st SAMP 4/3/2013 1st RCVD 4/5/2013
1304185

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1304185-001E	WQ3-C-R35	500HDPEHNO3	Aqueous	4/3/2013 8:30:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC
2	1304185-002E	WQ3-C-R35-Duplicate	500HDPEHNO3	Aqueous	4/3/2013 8:42:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC

MWBS

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb, Se ,Tl by METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. MUST DO MS/MSD ON 1304185-001E. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LCS REPLICATE. SAMPLE MAY HAVE HIGH TDS.

Relinquished By:	Date:	Time:	Received By:
	4/4/2013	11:27 AM	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

TAT: Standard ☒ RUSH Next BD

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 2.0 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3

NUMBER OF CONTAINERS: 2 SHIPPED VIA: F

DATE & TIME: 4/5/13 1212 INSPECTED BY: BT

TRANSMITTAL DESIRED:
☐ FAX ☐ EMAIL ☐ ONLINE

R LAB USE ONLY

___ °C Attempt to Cool ? _____

APPENDIX 6

WELL WQSP-4

ANALYTICAL RESULTS

WQSP-4

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-4, Culebra, Round 35

DMW Characteristics

WQSP-4 is located 1632 feet FSL and 2136 feet FEL in sec. 28, T.22 S, R.31E in Eddy County, New Mexico. This location is approximately 1-mile southeast from the center of the WIPP Site and down gradient of the shaft area. The ground elevation at WQSP-4 is 3430.39 feet above mean sea level (ft_{amsl}) and the top of casing (TOC) elevation is 3433.09 ft_{amsl}[1]. This DMW well, drilled for surveillance monitoring of groundwater quality and water level elevation monitoring between October 5 and 10, 1994, is completed in the Culebra Member of the Rustler Formation. The total depth of WQSP-4 is 800 feet below ground surface (ft_{bgs}). The well is cased with a fiberglass casing (5 inch od, 0.28 inch wall thickness) to 764 ft_{bgs} and screened with slotted fiberglass (0.020 inch) from 764 to 789 ft_{bgs}. A 11-foot blank casing is located below the screened interval from 789 to 800 ft_{bgs} and acts as a sediment sump to prevent clogging of the lower screen slots. The actual interval of the Culebra at WQSP-4 is 766 to 791 ft_{bgs} based on interpretation of the core logs[2].

According to the well construction and pre-pumping static water level (swl) measured in feet from below the TOC (ft_{btoc}), the sampling team used the following formula to calculate well bore volume (wbv).

$$wbv,\ gallons = [C \times ((\pi \times D^2/4) \times L)]$$

where:
C = conversion factor for pounds water/gallon (US liquid) to pounds of water/ft^3
D = inside diameter of fiberglass casing, ft
L = depth of water in column, ft
$Factor = [C \times (\pi \times D^2/4)]$

given:
total depth of well, ft_{btoc} = [*installation depth,* ft_{bgs} + (*top of casing,* ft_{amsl} - *ground surface elevation,* ft_{amsl})]
depth of water in column, ft (L) = (total depth of well, ft_{btoc} – *swl,* ft_{btoc})

More specifically, the wbv for WQSP-4 is calculated as follows:

wbv, gallons = (*Factor* x L) = (0.804 x L)

Prior to beginning the pumping process for Round 35, the static water level was 443.43 ft_{btoc}. One wbv for WQSP-4 was determined to be 288.9 gallons.

Field Sampling System

A dedicated sampling-system was installed in WQSP-4 on August 30, 1999. The system consists of a Grundfos 3-hp submersible pump (model 10S30-34) retrofitted with Kynar seals and a 3-phase, 230 volt (ac), 5-hp submersible motor. Prior to Round 20 sampling (2005), the pump/motor assembly was lowered an additional 21 feet from its original installation depth (758 ft_{bgs}), placing the pump intake near the center of the well screen (approximately 779 ft_{bgs}). A separate sampling line was installed just above the pump discharge and a bubbler system installed 5 feet above the top of the pump that previously enabled formation pressure monitoring in the well bore column during sampling. The bubbler system was eliminated in the recent PMR and formation pressures are no longer monitored during the pumping event.

---

[1] Elevations (Ground and TOC) obtained from December 13, 2006 survey.
[2] DOE/WIPP 95-2154, *Basic Data Report for WQSP 1* and Culebra Mid-Depths – Revision 2 (R. Salness).

Round 35 pumping of WQSP-4 began on 4/15/2013 at 09:47 and ended on 4/16/2013 at 11:02. The well was purged for 25.3 hours with an average flow rate of 0.50 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 766 gallons.

Measurement of Field Parameters and Well Stability Criteria

Field measurements were obtained using an in-line, multi-probe flow cell sampling system (Geotech Environmental Equipment, Inc.) with a 40-mL cell volume. This self-contained sampling system is capable of handling flow rates between 100 mL/min to one gpm (3.8 liters/min). Measurements were obtained directly from the groundwater sample stream that passes through this system at 5-minute intervals for specific conductance (SC), temperature and pH. Specific gravity (SG) was determined in samples collected from the flow-cell discharge stream and analyzed using classical hydrometer techniques. The flow cell was purged for at least 15 minutes prior to beginning sequential measurements.

Flow cell exchange rates were calculated periodically to verify measurements were obtained on fresh-flowing groundwater and not from stagnant groundwater in the well column. Exchange rates (cell volumes per minute) were determined by measuring the volume of groundwater (mL) passed through the sampling system during a one-minute interval and dividing that value by the volume of the cell (40 mL).

Changes to the field-testing methodology also led to new well stability criteria being established. Well stability was determined using data provided from field measurements. Stability of the DMW, as defined in the PMR, states that each well will be purged no more than three wbv, or until field parameters stabilize, whichever occurs first. The main purpose for collecting sequential measurements is to determine when the groundwater chemistry stabilizes. Parameters are stable when individual values for all parameters were within 5% for three consecutive measurements. At that point, purged water from the DMW is considered representative of the undisturbed groundwater found in the formation and DMP sampling for hazardous constituents is allowed.

Detection Monitoring Program Sampling

Samples for DMP hazardous constituents were collected on 4/16/2013 after approximately 706 gallons of groundwater (≈ 2.4 wbv) had been purged from WQSP-4 and all field measurements suggested the well was stable. Removal of the in-line flow cell occured prior to DMP sampling and a clean, dedicated filter holder assembly was installed at the end of the dedicated sample line. Samples (filtered or unfiltered) were collected using techniques described in the DMP and placed under Chain of Custody. Samples for hazardous constituent analysis were shipped via FedEx to Hall Environmental Analysis Laboratory, Inc., in Albuquerque, NM. Samples for radionuclide analysis were collected and hand-delivered to the URS-PS WIPP Laboratory located at Carlsbad Environmental Monitoring Research Center in Carlsbad, NM. A sample retain, preserved with nitric acid (to pH < 2), was collected and placed under Chain of Custody in the event that additional metals or radionuclide analyses were required. The final sample checklist summarized the samples collected, laboratory destination, preservatives used, sample quantities, container type, sampling times, and sample team members. This checklist and other records related to the integrity of the DMP sampling event are located in the DMW data package.

Results and Discussion

Table 1 provides the pumping characteristics and field parameter results for WQSP-4. Pump speeds were identical and groundwater flow rates similar to those observed in previous rounds. On day 1, approximately 665 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 16.62 cell volumes per minute; thus, approximately 83.1 volumes of groundwater (3,325 mL) passed through the in-line flow cell between measurements. Table 1 provides the initial and final measurements obtained on each

field-indicating parameter. On day 1, SC, temperature and pH were consistently less than 5% over the last three measurements within 15 minutes. Specific gravity was stable after the third measurement (approximately 60 minutes).

Based on results observed for day 1, the sample team concluded that WQSP-4 was stable. Sampling for DMP hazardous and radiological constituents was conducted on day 2.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-4 DMW, Round 35[a,b,c].

Item	Day 1		Day 2		Day 3	
Date	4/15/2013		4/16/2013		NR	
Pump Speed, Hz	44.0		44.0		NR	
Average Flow Rate, gpm	0.51		0.51		NR	
Rate of Exchange, no. cell	16.62		NR		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	123,000	125,100	NR	NR	NR	NR
Temperature, °C	21.9	22.4	NR	NR	NR	NR
pH, SU	7.45	7.23	NR	NR	NR	NR
Specific Gravity	1.075	1.074	NR	NR	NR	NR
Time to Parameter Stability hr:min	1:00		NR		NR	

[a]Data represent the first and last measurement taken within each respective day.
[b]DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c]NR = no measurement taken; not required.

From a historical perspective, indicating parameters currently measured in Round 35 were compared to the average results from the previous 34 rounds (Table 2). The current values for SG (1.074) and pH (7.23 S.U.) were identical to the average results from the previous 34 samplings. The results for SC and temperature (125,100 µmhos/cm and 22.4°C, respectively) were greater compared to the previous rounds (120,800 µmhos/cm and 21.9°C for SC and temperature, respectively). All indicating parameters were within the normal limits observed for WQSP-4 over the past 16.5 years.

Table 2. Comparison of Round 35 DMW Measurements to Historical Results from Rounds (1-34) for WQSP-4.

Field-analyzed Parameter	Historical Data (Rounds 1 – 34)[a,b]			Measurement Results, Round 35[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	121,543	115,466	127,620	125,100
Temperature, °C	21.9	20.8	23.0	22.4
pH, S.U.	7.23	6.87	7.59	7.23
Specific Gravity	1.074	1.020	1.128	1.074

[a] Historical data obtained from serial samples collected on day 3 for each round.
[b] Historical limits calculated from the mean ($\bar{x}$) ± 5 percent.
[c] Current data represent the final measurement taken when well stability confirmed by sampling team.

Abbreviations, Acronyms and Units

ac	alternating current
ft_{amsl}	feet above mean sea level
ft_{bgs}	feet below ground surface
ft_{btoc}	feet below top of casing
DMP	Detection Monitoring Program
DMW	detection monitoring well
FEL	from east line
FNL	from north line
FSL	from south line
FWL	from west line
gpm	gallons per minute
hp	horsepower
od	outside diameter
NNE	north-northeast
PMR	Permit Modification Request
swl	static water level
URS-PS	Universal Research Services-Professional Solutions
wbv	well bore volume
WIPP	Waste Isolation Pilot Plant
WQSP	Water Quality Sampling Program, well ID

WQSP-4

LABORATORY DATA AND QA/QC SUMMARY REPORTS

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

June 27, 2013

Greg Jungclaus
WIPP
P.O. Box 2078
Carlsbad, NM 88221-2078
TEL: (575) 234-8615
FAX

RE: WIPP DMP

OrderNo.: 1304689

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 4/17/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1304689**

27-Jun-13

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1304689-001	WQ4-C-R35		4/16/2013 9:00:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-001	WQ4-C-R35		4/16/2013 9:00:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-001	WQ4-C-R35		4/16/2013 9:00:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-001	WQ4-C-R35		4/16/2013 9:00:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-001	WQ4-C-R35		4/16/2013 9:00:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-001	WQ4-C-R35		4/16/2013 9:00:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-002	WQ4-C-R35-Duplicate		4/16/2013 9:13:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-002	WQ4-C-R35-Duplicate		4/16/2013 9:13:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-002	WQ4-C-R35-Duplicate		4/16/2013 9:13:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-002	WQ4-C-R35-Duplicate		4/16/2013 9:13:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-002	WQ4-C-R35-Duplicate		4/16/2013 9:13:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-002	WQ4-C-R35-Duplicate		4/16/2013 9:13:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-003	WQ4-C-R35-Field Blank		4/16/2013 9:37:00 AM	4/17/2013 12:55:03 PM	Aqueous
1304689-004	WQ4-C-R35-Trip Blank			4/17/2013 12:55:03 PM	Trip Blank

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DATES REPORT

WO#: **1304689**

07-Aug-13

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304689-001A	WQ4-C-R35	4/16/2013 9:00:00 AM	Aqueous	EPA Method: 8260B			4/18/2013 12:34:53 PM
1304689-001B				SM 5310B: TOC			4/25/2013 12:58:46 PM
1304689-001C				EPA Method 8270C: Semivolatiles		4/23/2013 5:51:59 AM	4/25/2013 1:02:09 PM
1304689-001D				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/6/2013 3:06:53 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/18/2013 3:29:36 PM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	4/29/2013 9:01:22 AM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/3/2013 5:30:13 PM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/3/2013 5:42:37 PM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/22/2013 11:41:44 AM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/22/2013 9:24:50 AM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/22/2013 9:11:37 AM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/6/2013 3:03:59 PM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/19/2013 10:48:40 AM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:27:37 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/18/2013 3:06:02 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:55:18 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:30:46 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:19:01 PM
				EPA Method 7470: Mercury		4/24/2013 1:13:00 PM	4/25/2013 2:14:08 PM
1304689-001F				EPA Method 300.0: Anions			4/17/2013 4:26:24 PM
				EPA Method 300.0: Anions			4/17/2013 4:38:48 PM
				EPA Method 300.0: Anions			4/17/2013 3:49:10 PM
				EPA Method 300.0: Anions			4/19/2013 11:07:44 PM

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1304689**

07-Aug-13

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304689-001F	WQ4-C-R35	4/16/2013 9:00:00 AM	Aqueous	EPA Method 6010B: Dissolved Metals			5/3/2013 7:58:36 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:01:23 PM
				EPA Method 6010B: Dissolved Metals			5/7/2013 11:17:04 AM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:44:33 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:46:50 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 7:55:39 PM
				SM 2540 C: Total Dissolved Solids		4/22/2013 5:17:58 PM	4/23/2013 4:21:00 PM
				SM 2540D: TSS		4/22/2013 4:50:48 PM	4/22/2013 5:13:00 PM
				SM2320B: Alkalinity			4/17/2013 9:13:03 PM
				SM2510B: Specific Conductance			4/19/2013 4:21:19 PM
				SM2510B: Specific Conductance			4/17/2013 9:48:44 PM
				SM2510B: Specific Conductance			4/17/2013 9:13:03 PM
				SM4500-H+B: pH			4/17/2013 9:13:03 PM
				Specific Gravity			4/26/2013 6:15:00 PM
1304689-002A	WQ4-C-R35-Duplicate	4/16/2013 9:13:00 AM		EPA Method: 8260B			4/18/2013 1:03:42 PM
1304689-002B				SM 5310B: TOC			4/25/2013 1:48:49 PM
1304689-002C				EPA Method 8270C: Semivolatiles		4/23/2013 5:51:59 AM	4/25/2013 2:40:33 PM
1304689-002D				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:36:23 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:33:33 PM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/6/2013 3:13:54 PM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:39:25 PM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/19/2013 10:58:32 AM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/6/2013 3:09:40 PM

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DATES REPORT

WO#: **1304689**
07-Aug-13

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304689-002D	WQ4-C-R35-Duplicate	4/16/2013 9:13:00 AM	Aqueous	EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/3/2013 5:48:27 PM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/22/2013 9:39:55 AM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	5/3/2013 5:45:28 PM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/22/2013 11:45:03 AM
				EPA 6010B: Total Recoverable Metals		4/25/2013 6:17:32 AM	4/29/2013 9:11:55 AM
				EPA 6010B: Total Recoverable Metals		4/18/2013 6:05:10 AM	4/22/2013 9:36:40 AM
				EPA 6010B: Total Recoverable Metals		6/14/2013 6:11:22 AM	6/17/2013 3:52:26 PM
				EPA Method 7470: Mercury		4/24/2013 1:13:00 PM	4/25/2013 2:19:26 PM
1304689-002F				EPA Method 300.0: Anions			4/17/2013 4:51:12 PM
				EPA Method 300.0: Anions			4/17/2013 5:03:37 PM
				EPA Method 300.0: Anions			4/19/2013 11:20:09 PM
				EPA Method 300.0: Anions			4/17/2013 5:40:50 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:49:05 PM
				EPA Method 6010B: Dissolved Metals			5/7/2013 11:20:04 AM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:51:22 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:11:30 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:08:44 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:04:08 PM
				SM 2540 C: Total Dissolved Solids		4/22/2013 5:17:58 PM	4/23/2013 4:21:00 PM
				SM 2540D: TSS		4/22/2013 4:50:48 PM	4/22/2013 5:13:00 PM
				SM2320B: Alkalinity			4/17/2013 9:41:38 PM
				SM2510B: Specific Conductance			4/17/2013 9:52:56 PM
				SM2510B: Specific Conductance			4/17/2013 9:41:38 PM

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DATES REPORT

WO#: **1304689**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1304689-002F	WQ4-C-R35-Duplicate	4/16/2013 9:13:00 AM	Aqueous	SM4500-H+B: pH			4/17/2013 9:41:38 PM
				Specific Gravity			4/26/2013 6:15:00 PM
1304689-003A	WQ4-C-R35-Field Blank	4/16/2013 9:37:00 AM		EPA Method: 8260B			4/18/2013 1:32:44 PM
1304689-004A	WQ4-C-R35-Trip Blank		Trip Blank	EPA Method: 8260B			4/18/2013 2:01:28 PM

All analytes reported are associated with passing CCVs.

METHOD: 8260B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 5030
Analysis: 8260B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: Isobutyl alcohol, MEK have elevated %recoveries in the MS/MSD. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 8270C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3510
Analysis: 8270C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.

5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 6010B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3005
Analysis: 6010B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Duplicates: All acceptance criteria were met.
5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 7470
Analysis: 7470

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 300.0

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 300.0

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Spikes: All acceptance criteria were met.
5. Samples: All acceptance criteria were met.

METHOD: SM5310C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM5310C
Analysis: SM5310C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 120.1

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none

Analysis: 120.1
PREPARATION: none

ANALYSIS:
1. Samples: All acceptance criteria were met.
2. Duplicates: All acceptance criteria were met.

METHOD: SM 2320B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM 2320B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540C
Analysis: SM2540C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540D
HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540D
Analysis: SM2540D

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM4500H+ B

HOLDING TIMES: The most recent method lists the pH holding time as 15 minutes. All samples will be flagged with an "H".

METHOD: Preparations: none
Analysis: SM4500H+ B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM2710F

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM2710F

CLIENT: WIPP
Project: WIPP DMP

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM4500 NorgC

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM4500 NorgC
Analysis: SM4500 NorgC

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ4-C-R35
Project: WIPP DMP
Collection Date: 4/16/2013 9:00:00 AM
Lab ID: 1304689-001
Matrix: AQUEOUS
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	62900	331	2500		mg/L	5000	4/19/2013 11:07:44 PM	R10019
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	4/17/2013 3:49:10 PM	R9958
Sulfate	6960	46.7	100		mg/L	200	4/17/2013 4:26:24 PM	R9958
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.000354	0.000800		mg/L	1	4/25/2013 2:14:08 PM	7137
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1630	5.58	100		mg/L	100	5/7/2013 11:17:04 AM	R10449
Magnesium	1150	0.829	100		mg/L	100	5/6/2013 3:44:33 PM	R10423
Potassium	701	4.97	100		mg/L	100	5/6/2013 3:44:33 PM	R10423
Sodium	34700	80.4	1000		mg/L	1000	5/6/2013 3:46:50 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0334	0.00250	0.100	J	mg/L	5	6/17/2013 3:19:01 PM	7921
Beryllium	0.00530	0.00250	0.0150	J	mg/L	5	6/17/2013 3:19:01 PM	7921
Cadmium	ND	0.00400	0.0100		mg/L	5	6/18/2013 3:06:02 PM	7921
Calcium	1670	4.55	500		mg/L	500	6/17/2013 3:30:46 PM	7921
Chromium	ND	0.00750	0.0300		mg/L	5	6/17/2013 3:19:01 PM	7921
Iron	0.335	0.0515	0.250		mg/L	5	6/17/2013 3:19:01 PM	7921
Lead	ND	0.0170	0.0250		mg/L	5	6/18/2013 3:06:02 PM	7921
Magnesium	1250	4.75	500		mg/L	500	6/17/2013 3:30:46 PM	7921
Nickel	ND	0.00700	0.0500		mg/L	5	6/17/2013 3:19:01 PM	7921
Potassium	831	2.17	10.0		mg/L	10	6/17/2013 3:27:37 PM	7921
Silver	ND	0.00550	0.0250		mg/L	5	6/18/2013 3:06:02 PM	7921
Sodium	34800	255	500		mg/L	500	6/17/2013 3:30:46 PM	7921
Vanadium	0.0428	0.0175	0.250	J	mg/L	5	6/17/2013 3:19:01 PM	7921
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
Hexachloroethane	ND	2.91	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
2-Methylphenol	ND	2.71	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
Nitrobenzene	ND	2.91	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
Pentachlorophenol	ND	1.44	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
Pyridine	ND	3.53	5.00		µg/L	1	4/25/2013 1:02:09 PM	7105
Surr: 2,4,6-Tribromophenol	76.0	0	41.5-117		%REC	1	4/25/2013 1:02:09 PM	7105
Surr: 2-Fluorobiphenyl	67.6	0	29.1-112		%REC	1	4/25/2013 1:02:09 PM	7105

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ4-C-R35
Project: WIPP DMP
Collection Date: 4/16/2013 9:00:00 AM
Lab ID: 1304689-001
Matrix: AQUEOUS
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	62.6	0	11.9-98.6		%REC	1	4/25/2013 1:02:09 PM	7105
Surr: 4-Terphenyl-d14	82.4	0	46-111		%REC	1	4/25/2013 1:02:09 PM	7105
Surr: Nitrobenzene-d5	71.5	0	34.9-112		%REC	1	4/25/2013 1:02:09 PM	7105
Surr: Phenol-d5	60.6	0	17.5-88.3		%REC	1	4/25/2013 1:02:09 PM	7105
EPA METHOD: 8260B							Analyst: **DAM**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Benzene	ND	0.517	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Toluene	ND	0.441	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
2-Butanone	ND	1.00	5.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Chloroform	ND	0.469	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/18/2013 12:34:53 PM	R9970
Surr: 1,2-Dichloroethane-d4	93.9	0	70-130		%REC	1	4/18/2013 12:34:53 PM	R9970
Surr: 4-Bromofluorobenzene	92.5	0	69.5-130		%REC	1	4/18/2013 12:34:53 PM	R9970
Surr: Dibromofluoromethane	93.3	0	70-130		%REC	1	4/18/2013 12:34:53 PM	R9970
Surr: Toluene-d8	91.7	0	70-130		%REC	1	4/18/2013 12:34:53 PM	R9970
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.367	0.227	1.00	J	mg/L	1	4/25/2013 12:58:46 PM	R10111
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	108000	503	1000	*	mg/L	1	4/23/2013 4:21:00 PM	7099
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	193000	0.500	0.500		µmhos/c	50	4/17/2013 9:48:44 PM	R9963
SM4500-H+B: PH							Analyst: **JML**	
pH	7.20	0.100	1.68	H	pH units	1	4/17/2013 9:13:03 PM	R9963

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Qualifiers:

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E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304689-001
Matrix: AQUEOUS
Client Sample ID: WQ4-C-R35
Collection Date: 4/16/2013 9:00:00 AM
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	38.7	5.00	20.0		mg/L CaC	1	4/17/2013 9:13:03 PM	R9963
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/17/2013 9:13:03 PM	R9963
Total Alkalinity (as CaCO3)	38.7	5.00	20.0		mg/L CaC	1	4/17/2013 9:13:03 PM	R9963
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.062	0	0			1	4/26/2013 6:15:00 PM	R10157
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	51.0	1.53	4.00		mg/L	1	4/22/2013 5:13:00 PM	7098

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Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304689-002
Matrix: AQUEOUS
Client Sample ID: WQ4-C-R35-Duplicate
Collection Date: 4/16/2013 9:13:00 AM
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	56100	331	2500		mg/L	5000	4/19/2013 11:20:09 PM	R10019
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	4/17/2013 4:51:12 PM	R9958
Sulfate	7010	46.7	100		mg/L	200	4/17/2013 5:03:37 PM	R9958
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.000354	0.000800		mg/L	1	4/25/2013 2:19:26 PM	7137
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1630	5.58	100		mg/L	100	5/7/2013 11:20:04 AM	R10449
Magnesium	1180	0.829	100		mg/L	100	5/6/2013 3:49:05 PM	R10423
Potassium	717	4.97	100		mg/L	100	5/6/2013 3:49:05 PM	R10423
Sodium	34800	80.4	1000		mg/L	1000	5/6/2013 3:51:22 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0368	0.00250	0.100	J	mg/L	5	6/17/2013 3:33:33 PM	7921
Beryllium	0.00460	0.00250	0.0150	J	mg/L	5	6/17/2013 3:33:33 PM	7921
Cadmium	ND	0.00400	0.0100		mg/L	5	6/17/2013 3:33:33 PM	7921
Calcium	1670	4.55	500		mg/L	500	6/17/2013 3:39:25 PM	7921
Chromium	ND	0.00750	0.0300		mg/L	5	6/17/2013 3:33:33 PM	7921
Iron	0.302	0.0515	0.250		mg/L	5	6/17/2013 3:33:33 PM	7921
Lead	ND	0.0170	0.0250		mg/L	5	6/17/2013 3:33:33 PM	7921
Magnesium	1210	4.75	500		mg/L	500	6/17/2013 3:39:25 PM	7921
Nickel	ND	0.00700	0.0500		mg/L	5	6/17/2013 3:33:33 PM	7921
Potassium	794	2.17	10.0		mg/L	10	6/17/2013 3:36:23 PM	7921
Silver	ND	0.00550	0.0250		mg/L	5	6/17/2013 3:33:33 PM	7921
Sodium	31700	255	500		mg/L	500	6/17/2013 3:39:25 PM	7921
Vanadium	0.0384	0.0175	0.250	J	mg/L	5	6/17/2013 3:33:33 PM	7921
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
Hexachloroethane	ND	2.91	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
2-Methylphenol	ND	2.71	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
Nitrobenzene	ND	2.91	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
Pentachlorophenol	ND	1.44	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
Pyridine	ND	3.53	5.00		µg/L	1	4/25/2013 2:40:33 PM	7105
Surr: 2,4,6-Tribromophenol	68.6	0	41.5-117		%REC	1	4/25/2013 2:40:33 PM	7105
Surr: 2-Fluorobiphenyl	66.7	0	29.1-112		%REC	1	4/25/2013 2:40:33 PM	7105

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304689-002
Matrix: AQUEOUS
Client Sample ID: WQ4-C-R35-Duplicate
Collection Date: 4/16/2013 9:13:00 AM
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	54.4	0	11.9-98.6		%REC	1	4/25/2013 2:40:33 PM	7105
Surr: 4-Terphenyl-d14	84.2	0	46-111		%REC	1	4/25/2013 2:40:33 PM	7105
Surr: Nitrobenzene-d5	78.8	0	34.9-112		%REC	1	4/25/2013 2:40:33 PM	7105
Surr: Phenol-d5	53.5	0	17.5-88.3		%REC	1	4/25/2013 2:40:33 PM	7105
EPA METHOD: 8260B							Analyst: **DAM**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Benzene	ND	0.517	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Toluene	ND	0.441	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
2-Butanone	ND	1.00	5.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Chloroform	ND	0.469	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/18/2013 1:03:42 PM	R9970
Surr: 1,2-Dichloroethane-d4	95.4	0	70-130		%REC	1	4/18/2013 1:03:42 PM	R9970
Surr: 4-Bromofluorobenzene	91.1	0	69.5-130		%REC	1	4/18/2013 1:03:42 PM	R9970
Surr: Dibromofluoromethane	91.1	0	70-130		%REC	1	4/18/2013 1:03:42 PM	R9970
Surr: Toluene-d8	91.4	0	70-130		%REC	1	4/18/2013 1:03:42 PM	R9970
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	ND	0.227	1.00		mg/L	1	4/25/2013 1:48:49 PM	R10111
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	101000	503	1000	*	mg/L	1	4/23/2013 4:21:00 PM	7099
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	182000	0.500	0.500		µmhos/c	50	4/17/2013 9:52:56 PM	R9963
SM4500-H+B: PH							Analyst: **JML**	
pH	7.21	0.100	1.68	H	pH units	1	4/17/2013 9:41:38 PM	R9963

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304689-002
Matrix: AQUEOUS
Client Sample ID: WQ4-C-R35-Duplicate
Collection Date: 4/16/2013 9:13:00 AM
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	39.0	5.00	20.0		mg/L CaC	1	4/17/2013 9:41:38 PM	R9963
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/17/2013 9:41:38 PM	R9963
Total Alkalinity (as CaCO3)	39.0	5.00	20.0		mg/L CaC	1	4/17/2013 9:41:38 PM	R9963
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.059	0	0			1	4/26/2013 6:15:00 PM	R10157
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	64.0	1.53	4.00		mg/L	1	4/22/2013 5:13:00 PM	7098

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304689-003
Matrix: AQUEOUS
Client Sample ID: WQ4-C-R35-Field Blank
Collection Date: 4/16/2013 9:37:00 AM
Received Date: 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **DAM**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Benzene	ND	0.517	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Toluene	ND	0.441	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
2-Butanone	4.95	1.00	5.00	J	µg/L	1	4/18/2013 1:32:44 PM	R9970
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Chloroform	ND	0.469	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/18/2013 1:32:44 PM	R9970
Surr: 1,2-Dichloroethane-d4	85.4	0	70-130		%REC	1	4/18/2013 1:32:44 PM	R9970
Surr: 4-Bromofluorobenzene	88.6	0	69.5-130		%REC	1	4/18/2013 1:32:44 PM	R9970
Surr: Dibromofluoromethane	90.2	0	70-130		%REC	1	4/18/2013 1:32:44 PM	R9970
Surr: Toluene-d8	94.0	0	70-130		%REC	1	4/18/2013 1:32:44 PM	R9970

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1304689-004

Client Sample ID: WQ4-C-R35-Trip Blank
Collection Date:
Matrix: TRIP BLANK **Received Date:** 4/17/2013 9:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **DAM**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Benzene	ND	0.517	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Toluene	ND	0.441	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
2-Butanone	ND	1.00	5.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Chlorobenzene	ND	0.486	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Chloroform	ND	0.469	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Methylene Chloride	ND	0.423	3.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Vinyl chloride	ND	0.333	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Xylenes, Total	ND	1.44	1.00		µg/L	1	4/18/2013 2:01:28 PM	R9970
Surr: 1,2-Dichloroethane-d4	85.1	0	70-130		%REC	1	4/18/2013 2:01:28 PM	R9970
Surr: 4-Bromofluorobenzene	93.7	0	69.5-130		%REC	1	4/18/2013 2:01:28 PM	R9970
Surr: Dibromofluoromethane	90.9	0	70-130		%REC	1	4/18/2013 2:01:28 PM	R9970
Surr: Toluene-d8	92.4	0	70-130		%REC	1	4/18/2013 2:01:28 PM	R9970

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	WQ4-C-R35 1304689-01		WQ4-C-R35 Duplicate 1304689-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	34700	1509.35	34800	1513.70							
Potassium	701	17.93	717	18.34							
Calcium	1630	81.34	1630	81.34							
Magnesium	1150	94.65	1180	97.12							
Total Cations		1703.27		1710.50							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	6960	144.91	7010	145.95							
Chloride	62900	1774.33	56100	1582.51							
Bicarbonate (CaCO3)	38.7	0.77	39.0	0.78							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		1920.01		1729.24							
Elect. Cond. (µMhos/cm)	193000		182000								
CATION/ANION RATIO		0.89		0.99							
% Difference		6		1							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	108000		101000								
TDS (calculated)	108064		101460								
Ratio meas TDS:calc TDS		1.0		1.0							
Ratio Meas. TDS:EC		0.56		0.55							
Ratio Calc. TDS:EC		0.56		0.56							
Ratio of anion sum:EC		1.0		1.0							
Ratio of cation sum:EC		0.9		0.9							

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS – 1.0-1.2. Ratio Calculated TDS:EC – 0.55-0.7. Ratio Measured TDS:EC–0.55-0.7. Ratio of anion sum:EC -- 0.9-1.1.

Ratio of cation sum:EC – 0.9-1.1

CASE NARRATIVE May 13, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1304689
Anatek Batch: 130418023

Project Summary: Two (2) water samples were received on 4/18/2013 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 1.0C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1304689-001E / WQ4-C-R35	130418023-001	EPA 6020A
1304689-002E / WQ4-C-R35-Duplicate	130418023-002	EPA 6020A

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	Y	NA
Internal Standard Responses Valid?	Y	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

No problems encountered.

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

No problems encountered.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

Samples -001 and -002 required dilution due to matrix.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130418023
Project Name: 1304689

Analytical Results Report

Sample Number 130418023-001 **Sampling Date** 4/16/2013 **Date/Time Received** 4/18/2013 10:42 AM
Client Sample ID 1304689-001E / WQ4-C-R35 **Sampling Time** 9:00 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	

Sample Number 130418023-002 **Sampling Date** 4/16/2013 **Date/Time Received** 4/18/2013 10:42 AM
Client Sample ID 1304689-002E / WQ4-C-R35-DUPLICATE **Sampling Time** 9:13 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.02	5/1/2013	ALS	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130418023
Project Name: 1304689

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0494	mg/L	0.05	98.8	80-120	4/26/2013	5/1/2013
Selenium	0.0523	mg/L	0.05	104.6	80-120	4/26/2013	5/1/2013
Arsenic	0.0505	mg/L	0.05	101.0	80-120	4/26/2013	5/1/2013
Antimony	0.0521	mg/L	0.05	104.2	80-120	4/26/2013	5/1/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0478	mg/L	0.05	95.6	3.3	0-20	4/26/2013	5/1/2013
Selenium	0.0500	mg/L	0.05	100.0	4.5	0-20	4/26/2013	5/1/2013
Arsenic	0.0483	mg/L	0.05	96.6	4.5	0-20	4/26/2013	5/1/2013
Antimony	0.0514	mg/L	0.05	102.8	1.4	0-20	4/26/2013	5/1/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130418023-001	Thallium	ND	0.0441	mg/L	0.05	88.2	75-125	4/26/2013	5/1/2013
130418023-001	Selenium	ND	0.0570	mg/L	0.05	114.0	75-125	4/26/2013	5/1/2013
130418023-001	Arsenic	ND	0.0569	mg/L	0.05	113.8	75-125	4/26/2013	5/1/2013
130418023-001	Antimony	ND	0.0550	mg/L	0.05	110.0	75-125	4/26/2013	5/1/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0437	mg/L	0.05	87.4	0.9	0-20	4/26/2013	5/1/2013
Selenium	0.0551	mg/L	0.05	110.2	3.4	0-20	4/26/2013	5/1/2013
Arsenic	0.0580	mg/L	0.05	116.0	1.9	0-20	4/26/2013	5/1/2013
Antimony	0.0537	mg/L	0.05	107.4	2.4	0-20	4/26/2013	5/1/2013

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	130418023
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1304689
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	4/26/2013	5/1/2013
Arsenic	ND	mg/L	0.001	4/26/2013	5/1/2013
Selenium	ND	mg/L	0.001	4/26/2013	5/1/2013
Thallium	ND	mg/L	0.001	4/26/2013	5/1/2013

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID	MB-7099	SampType:	MBLK	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	PBW	Batch ID:	7099	RunNo:	10071					
Prep Date:	4/22/2013	Analysis Date:	4/23/2013	SeqNo:	286859	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	16.0	20.0								J

Sample ID	LCS-7099	SampType:	LCS	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	LCSW	Batch ID:	7099	RunNo:	10071					
Prep Date:	4/22/2013	Analysis Date:	4/23/2013	SeqNo:	286860	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Sample ID	1304689-001FMS	SampType:	MS	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	WQ4-C-R35	Batch ID:	7099	RunNo:	10071					
Prep Date:	4/22/2013	Analysis Date:	4/23/2013	SeqNo:	286864	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	159000	1000	50000	107700	103	80	120			

Sample ID	1304689-001FMSD	SampType:	MSD	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	WQ4-C-R35	Batch ID:	7099	RunNo:	10071					
Prep Date:	4/22/2013	Analysis Date:	4/23/2013	SeqNo:	286865	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	157000	1000	50000	107700	97.7	80	120	1.65	5	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID	ccb	SampType:	CCB	TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R9958	RunNo:	9958				
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283578	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions				
Client ID:	PBW	Batch ID:	R9958	RunNo:	9958				
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283579	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 300.0: Anions				
Client ID:	LCSW	Batch ID:	R9958	RunNo:	9958				
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283580	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.37	0.100	2.500	0	95.0	90	110			
Sulfate	9.22	0.500	10.00	0	92.2	90	110			

Sample ID	LCSD	SampType:	LCSD	TestCode:	EPA Method 300.0: Anions				
Client ID:	LCSS02	Batch ID:	R9958	RunNo:	9958				
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283581	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.38	0.100	2.500	0	95.1	90	110	0.147	20	
Sulfate	9.23	0.500	10.00	0	92.3	90	110	0.167	20	

Sample ID	1304689-001FMS	SampType:	MS	TestCode:	EPA Method 300.0: Anions				
Client ID:	WQ4-C-R35	Batch ID:	R9958	RunNo:	9958				
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283583	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	125	5.00	125.0	0	99.6	90.4	113			

Sample ID	1304689-001FMSD	SampType:	MSD	TestCode:	EPA Method 300.0: Anions				
Client ID:	WQ4-C-R35	Batch ID:	R9958	RunNo:	9958				
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283584	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	123	5.00	125.0	0	98.4	90.4	113	1.22	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: 1304689

Hall Environmental Analysis Laboratory, Inc.

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID ccb	SampType: CCB	TestCode: EPA Method 300.0: Anions							
Client ID: CCB	Batch ID: R9958	RunNo: 9958							
Prep Date:	Analysis Date: 4/17/2013	SeqNo: 283590	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID ccb	SampType: CCB	TestCode: EPA Method 300.0: Anions							
Client ID: CCB	Batch ID: R9958	RunNo: 9958							
Prep Date:	Analysis Date: 4/17/2013	SeqNo: 283602	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID ccb	SampType: CCB	TestCode: EPA Method 300.0: Anions							
Client ID: CCB	Batch ID: R9958	RunNo: 9958							
Prep Date:	Analysis Date: 4/17/2013	SeqNo: 283614	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID ccb	SampType: CCB	TestCode: EPA Method 300.0: Anions							
Client ID: CCB	Batch ID: R9958	RunNo: 9958							
Prep Date:	Analysis Date: 4/18/2013	SeqNo: 283626	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID ccb	SampType: CCB	TestCode: EPA Method 300.0: Anions							
Client ID: CCB	Batch ID: R9958	RunNo: 9958							
Prep Date:	Analysis Date: 4/18/2013	SeqNo: 283636	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID MB	SampType: MBLK	TestCode: EPA Method 300.0: Anions							
Client ID: PBW	Batch ID: R10019	RunNo: 10019							
Prep Date:	Analysis Date: 4/19/2013	SeqNo: 285267	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	LCS	SampType:	LCS		TestCode:	EPA Method 300.0: Anions				
Client ID:	LCSW	Batch ID:	R10019		RunNo:	10019				
Prep Date:		Analysis Date:	4/19/2013		SeqNo:	285268	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.64	0.500	5.000	0	92.8	90	110			

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R10019		RunNo:	10019				
Prep Date:		Analysis Date:	4/19/2013		SeqNo:	285278	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R10019		RunNo:	10019				
Prep Date:		Analysis Date:	4/19/2013		SeqNo:	285290	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R10019		RunNo:	10019				
Prep Date:		Analysis Date:	4/19/2013		SeqNo:	285302	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R10019		RunNo:	10019				
Prep Date:		Analysis Date:	4/20/2013		SeqNo:	285314	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R10019		RunNo:	10019				
Prep Date:		Analysis Date:	4/20/2013		SeqNo:	285326	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **CCB**	Batch ID: **R10019**	RunNo: **10019**							
Prep Date:	Analysis Date: **4/20/2013**	SeqNo: **285336**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1304689**

Hall Environmental Analysis Laboratory, Inc.

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID **5ml rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283988** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
sobutyl alcohol	ND	5.00								
Benzene	ND	1.00								
Toluene	ND	1.00								
1,2-Dichloroethane (EDC)	ND	1.00								
2-Butanone	ND	5.00								
Carbon Tetrachloride	ND	1.00								
Chlorobenzene	ND	1.00								
Chloroform	ND	1.00								
cis-1,2-DCE	ND	1.00								
1,1-Dichloroethane	ND	1.00								
1,1-Dichloroethene	ND	1.00								
Methylene Chloride	ND	3.00								
1,1,2,2-Tetrachloroethane	ND	1.00								
Tetrachloroethene (PCE)	ND	1.00								
trans-1,2-DCE	ND	1.00								
1,1,1-Trichloroethane	ND	1.00								
1,1,2-Trichloroethane	ND	1.00								
Trichloroethene (TCE)	ND	1.00								
Trichlorofluoromethane	ND	1.00								
Vinyl chloride	ND	1.00								
Xylenes, Total	ND	1.00								
Surr: 1,2-Dichloroethane-d4	8.55		10.00		85.5	70	130			
Surr: 4-Bromofluorobenzene	9.30		10.00		93.0	69.5	130			
Surr: Dibromofluoromethane	8.79		10.00		87.9	70	130			
Surr: Toluene-d8	9.00		10.00		90.0	70	130			

Sample ID **100ng ccv4**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283989** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
sobutyl alcohol	44.4	5.00	60.00	0	74.0	60	140			
Benzene	18.8	1.00	20.00	0	93.8	70	130			
Toluene	17.7	1.00	20.00	0	88.7	80	120			
1,2-Dichloroethane (EDC)	18.6	1.00	20.00	0	92.8	70	130			
2-Butanone	34.0	5.00	40.00	0	84.9	60	140			
Carbon Tetrachloride	17.9	1.00	20.00	0	89.5	70	130			
Chlorobenzene	17.8	1.00	20.00	0	89.1	70	130			
Chloroform	19.7	1.00	20.00	0	98.6	80	120			
cis-1,2-DCE	18.2	1.00	20.00	0	91.2	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv4** SampType: **CCV_HIGH** TestCode: **EPA Method: 8260B**

Client ID: **BatchQC** Batch ID: **R9970** RunNo: **9970**

Prep Date: Analysis Date: **4/18/2013** SeqNo: **283989** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
,1-Dichloroethane	17.4	1.00	20.00	0	87.0	70	130			
,1-Dichloroethene	18.8	1.00	20.00	0	94.1	80	120			
Methylene Chloride	15.9	3.00	20.00	0	79.5	70	130			
,1,2,2-Tetrachloroethane	15.9	1.00	20.00	0	79.4	70	130			
etrachloroethene (PCE)	17.9	1.00	20.00	0	89.6	70	130			
rans-1,2-DCE	19.1	1.00	20.00	0	95.5	70	130			
,1,1-Trichloroethane	18.3	1.00	20.00	0	91.3	70	130			
,1,2-Trichloroethane	16.4	1.00	20.00	0	81.8	70	130			
richloroethene (TCE)	18.8	1.00	20.00	0	94.2	70	130			
richlorofluoromethane	18.6	1.00	20.00	0	93.1	70	130			
inyl chloride	18.7	1.00	20.00	0	93.6	80	120			
ylenes, Total	51.8	1.00	60.00	0	86.3	70	130			
Surr: 1,2-Dichloroethane-d4	9.66		10.00		96.6	70	130			
Surr: 4-Bromofluorobenzene	8.57		10.00		85.7	70	130			
Surr: Dibromofluoromethane	9.33		10.00		93.3	70	130			
Surr: Toluene-d8	8.99		10.00		89.9	70	130			

Sample ID **100ng lcs4** SampType: **LCS4** TestCode: **EPA Method: 8260B**

Client ID: **BatchQC** Batch ID: **R9970** RunNo: **9970**

Prep Date: Analysis Date: **4/18/2013** SeqNo: **283990** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
sobutyl alcohol	50.1	5.00	60.00	0	83.4	70	130			
enzene	18.5	1.00	20.00	0	92.7	70	130			
oluene	17.3	1.00	20.00	0	86.4	70	130			
,2-Dichloroethane (EDC)	18.7	1.00	20.00	0	93.4	70	130			
-Butanone	35.8	5.00	40.00	0	89.5	70	130			
arbon Tetrachloride	18.0	1.00	20.00	0	89.8	70	130			
hlorobenzene	17.6	1.00	20.00	0	88.1	70	130			
hloroform	17.2	1.00	20.00	0	86.2	70	130			
is-1,2-DCE	17.6	1.00	20.00	0	87.8	70	130			
,1-Dichloroethane	17.1	1.00	20.00	0	85.5	70	130			
,1-Dichloroethene	18.5	1.00	20.00	0	92.4	70	130			
Methylene Chloride	16.3	3.00	20.00	0	81.4	70	130			
,1,2,2-Tetrachloroethane	16.4	1.00	20.00	0	82.0	70	130			
Tetrachloroethene (PCE)	17.6	1.00	20.00	0	87.8	70	130			
rans-1,2-DCE	19.5	1.00	20.00	0	97.6	70	130			
,1,1-Trichloroethane	18.6	1.00	20.00	0	92.8	70	130			
,1,2-Trichloroethane	16.6	1.00	20.00	0	83.2	70	130			
Trichloroethene (TCE)	19.1	1.00	20.00	0	95.6	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- O RSD is greater than RSDlimit
- P Sample pH greater than 2 for VOA and TOC only.
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283990** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Trichlorofluoromethane	19.2	1.00	20.00	0	96.1	70	130			
Vinyl chloride	18.1	1.00	20.00	0	90.5	70	130			
Xylenes, Total	51.6	1.00	60.00	0	86.0	70	130			
Surr: 1,2-Dichloroethane-d4	27.2		30.00		90.6	70	130			
Surr: 4-Bromofluorobenzene	25.6		30.00		85.4	69.5	130			
Surr: Dibromofluoromethane	28.6		30.00		95.4	70	130			
Surr: Toluene-d8	28.0		30.00		93.3	70	130			

Sample ID **100ng lcsd4**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283991** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	48.9	5.00	60.00	0	81.5	70	130	2.34	20	
Benzene	16.9	1.00	20.00	0	84.6	70	130	9.12	20	
Toluene	15.7	1.00	20.00	0	78.4	70	130	9.77	20	
1,2-Dichloroethane (EDC)	17.0	1.00	20.00	0	85.1	70	130	9.34	20	
2-Butanone	31.4	5.00	40.00	0	78.6	70	130	13.0	20	
Carbon Tetrachloride	15.8	1.00	20.00	0	78.9	70	130	12.9	20	
Chlorobenzene	16.0	1.00	20.00	0	79.9	70	130	9.77	20	
Chloroform	16.4	1.00	20.00	0	82.2	70	130	4.73	20	
cis-1,2-DCE	16.0	1.00	20.00	0	80.2	70	130	9.11	20	
1,1-Dichloroethane	15.3	1.00	20.00	0	76.4	70	130	11.2	20	
1,1-Dichloroethene	16.1	1.00	20.00	0	80.6	70	130	13.6	20	
Methylene Chloride	14.2	3.00	20.00	0	70.9	70	130	13.8	20	
1,1,2,2-Tetrachloroethane	15.5	1.00	20.00	0	77.4	70	130	5.76	20	
Tetrachloroethene (PCE)	15.9	1.00	20.00	0	79.7	70	130	9.70	20	
trans-1,2-DCE	17.2	1.00	20.00	0	85.9	70	130	12.7	20	
1,1,1-Trichloroethane	16.5	1.00	20.00	0	82.7	70	130	11.5	20	
1,1,2-Trichloroethane	14.9	1.00	20.00	0	74.7	70	130	10.8	20	
Trichloroethene (TCE)	16.3	1.00	20.00	0	81.3	70	130	16.1	20	
Trichlorofluoromethane	17.1	1.00	20.00	0	85.6	70	130	11.6	20	
Vinyl chloride	16.2	1.00	20.00	0	80.8	70	130	11.4	20	
Xylenes, Total	46.5	1.00	60.00	0	77.5	70	130	10.4	20	
Surr: 1,2-Dichloroethane-d4	25.7		30.00		85.7	70	130	0	0	
Surr: 4-Bromofluorobenzene	25.3		30.00		84.4	69.5	130	0	0	
Surr: Dibromofluoromethane	26.6		30.00		88.6	70	130	0	0	
Surr: Toluene-d8	25.5		30.00		85.0	70	130	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304689-001a ms**	SampType: **MS4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ4-C-R35**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283992** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
sobutyl alcohol	121	5.00	60.00	0	202	70	130			S
Benzene	18.8	1.00	20.00	0	93.9	70	130			
Toluene	16.8	1.00	20.00	0	84.1	70	130			
1,2-Dichloroethane (EDC)	20.2	1.00	20.00	0	101	70	130			
2-Butanone	60.8	5.00	40.00	0	152	70	130			S
Carbon Tetrachloride	17.8	1.00	20.00	0	88.8	70	130			
Chlorobenzene	17.2	1.00	20.00	0	86.1	70	130			
Chloroform	17.4	1.00	20.00	0	86.9	70	130			
cis-1,2-DCE	18.2	1.00	20.00	0	91.2	70	130			
1,1-Dichloroethane	16.7	1.00	20.00	0	83.6	70	130			
1,1-Dichloroethene	16.8	1.00	20.00	0	83.9	70	130			
Methylene Chloride	15.6	3.00	20.00	0	78.0	70	130			
1,1,2,2-Tetrachloroethane	25.6	1.00	20.00	0	128	70	130			
Tetrachloroethene (PCE)	17.5	1.00	20.00	0	87.6	70	130			
trans-1,2-DCE	18.4	1.00	20.00	0	91.8	70	130			
1,1,1-Trichloroethane	18.4	1.00	20.00	0	92.1	70	130			
1,1,2-Trichloroethane	19.8	1.00	20.00	0	98.9	70	130			
Trichloroethene (TCE)	18.5	1.00	20.00	0	92.6	70	130			
Trichlorofluoromethane	18.5	1.00	20.00	0	92.3	70	130			
Vinyl chloride	18.4	1.00	20.00	0	92.1	70	130			
Xylenes, Total	50.7	1.00	60.00	0	84.5	70	130			
Surr: 1,2-Dichloroethane-d4	29.4		30.00		97.9	70	130			
Surr: 4-Bromofluorobenzene	26.9		30.00		89.7	69.5	130			
Surr: Dibromofluoromethane	29.4		30.00		98.2	70	130			
Surr: Toluene-d8	27.1		30.00		90.4	70	130			

Sample ID **1304689-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ4-C-R35**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283993** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	128	5.00	60.00	0	213	70	130	5.34	20	S
Benzene	17.2	1.00	20.00	0	86.1	70	130	8.63	20	
Toluene	16.2	1.00	20.00	0	80.8	70	130	4.05	20	
1,2-Dichloroethane (EDC)	19.5	1.00	20.00	0	97.5	70	130	3.66	20	
2-Butanone	65.4	5.00	40.00	0	163	70	130	7.29	20	S
Carbon Tetrachloride	16.0	1.00	20.00	0	79.8	70	130	10.7	20	
Chlorobenzene	16.6	1.00	20.00	0	83.0	70	130	3.65	20	
Chloroform	18.1	1.00	20.00	0	90.5	70	130	4.06	20	
cis-1,2-DCE	17.6	1.00	20.00	0	88.0	70	130	3.52	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304689-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ4-C-R35**	Batch ID: **R9970**	RunNo: **9970**
Prep Date:	Analysis Date: **4/18/2013**	SeqNo: **283993** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	15.7	1.00	20.00	0	78.7	70	130	5.95	20	
1,1-Dichloroethene	16.2	1.00	20.00	0	81.0	70	130	3.44	20	
Methylene Chloride	15.1	3.00	20.00	0	75.6	70	130	3.21	20	
1,1,2,2-Tetrachloroethane	25.0	1.00	20.00	0	125	70	130	2.63	20	
Tetrachloroethene (PCE)	16.7	1.00	20.00	0	83.7	70	130	4.54	20	
trans-1,2-DCE	17.7	1.00	20.00	0	88.7	70	130	3.45	20	
1,1,1-Trichloroethane	17.3	1.00	20.00	0	86.4	70	130	6.33	20	
1,1,2-Trichloroethane	18.7	1.00	20.00	0	93.3	70	130	5.81	20	
Trichloroethene (TCE)	17.4	1.00	20.00	0	87.0	70	130	6.21	20	
Trichlorofluoromethane	17.2	1.00	20.00	0	86.0	70	130	7.02	20	
Vinyl chloride	17.7	1.00	20.00	0	88.4	70	130	4.09	20	
Xylenes, Total	47.8	1.00	60.00	0	79.6	70	130	5.92	20	
Surr: 1,2-Dichloroethane-d4	29.1		30.00		96.9	70	130	0		
Surr: 4-Bromofluorobenzene	25.7		30.00		85.5	69.5	130	0		
Surr: Dibromofluoromethane	27.4		30.00		91.4	70	130	0		
Surr: Toluene-d8	26.2		30.00		87.2	70	130	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **80ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R10109**	RunNo: **10109**
Prep Date:	Analysis Date: **4/25/2013**	SeqNo: **287977** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	86.4		80.00		108	60	140			
Surr: 2-Fluorobiphenyl	79.9		80.00		99.9	60	140			
Surr: 2-Fluorophenol	74.2		80.00		92.7	60	140			
Surr: 4-Terphenyl-d14	88.9		80.00		111	60	140			
Surr: Nitrobenzene-d5	74.0		80.00		92.6	60	140			
Surr: Phenol-d5	76.5		80.00		95.6	60	140			

Sample ID **mb-7105**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **7105**	RunNo: **10109**
Prep Date: **4/23/2013**	Analysis Date: **4/25/2013**	SeqNo: **287994** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	5.00								
1,4-Dichlorobenzene	ND	5.00								
2,4-Dinitrophenol	ND	5.00								
2,4-Dinitrotoluene	ND	5.00								
Hexachlorobenzene	ND	5.00								
Hexachloroethane	ND	5.00								
2-Methylphenol	ND	5.00								
3+4-Methylphenol	ND	5.00								
Nitrobenzene	ND	5.00								
Pentachlorophenol	ND	5.00								
Pyridine	ND	5.00								
Surr: 2,4,6-Tribromophenol	170		200.0		84.9	41.5	117			
Surr: 2-Fluorobiphenyl	69.4		100.0		69.4	29.1	112			
Surr: 2-Fluorophenol	96.7		200.0		48.4	11.9	98.6			
Surr: 4-Terphenyl-d14	77.6		100.0		77.6	46	111			
Surr: Nitrobenzene-d5	70.6		100.0		70.6	34.9	112			
Surr: Phenol-d5	74.5		200.0		37.3	17.5	88.3			

Sample ID **lcs-7105**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7105**	RunNo: **10109**
Prep Date: **4/23/2013**	Analysis Date: **4/25/2013**	SeqNo: **288004** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	69.2	5.00	100.0	0	69.2	27.4	101			
1,4-Dichlorobenzene	66.9	5.00	100.0	0	66.9	32.6	91.5			
2,4-Dinitrophenol	38.2	5.00	100.0	0	38.2	23.1	118			
2,4-Dinitrotoluene	67.7	5.00	100.0	0	67.7	44.7	112			
Hexachlorobenzene	75.5	5.00	100.0	0	75.5	30	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1304689**

Hall Environmental Analysis Laboratory, Inc.

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID	lcs-7105	SampType:	LCS4	TestCode:	EPA Method 8270C: Semivolatiles				
Client ID:	BatchQC	Batch ID:	7105	RunNo:	10109				
Prep Date:	4/23/2013	Analysis Date:	4/25/2013	SeqNo:	288004	Units:	µg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
lexachloroethane	68.4	5.00	100.0	0	68.4	23.2	97.8			
-Methylphenol	71.4	5.00	100.0	0	71.4	36.1	105			
+4-Methylphenol	66.8	5.00	100.0	0	66.8	35.7	92.5			
litrobenzene	66.4	5.00	100.0	0	66.4	30.9	125			
entachlorophenol	43.2	5.00	100.0	0	43.2	20.2	93			
yridine	61.3	5.00	100.0	0	61.3	5.14	87.1			
Surr: 2,4,6-Tribromophenol	65.2		100.0		65.2	41.5	117			
Surr: 2-Fluorobiphenyl	72.7		100.0		72.7	29.1	112			
Surr: 2-Fluorophenol	53.2		100.0		53.2	11.9	98.6			
Surr: 4-Terphenyl-d14	81.9		100.0		81.9	46	111			
Surr: Nitrobenzene-d5	70.7		100.0		70.7	34.9	112			
Surr: Phenol-d5	58.1		100.0		58.1	17.5	88.3			

Sample ID	lcsd-7105	SampType:	LCSD4	TestCode:	EPA Method 8270C: Semivolatiles				
Client ID:	BatchQC	Batch ID:	7105	RunNo:	10109				
Prep Date:	4/23/2013	Analysis Date:	4/25/2013	SeqNo:	288011	Units:	µg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
,2-Dichlorobenzene	68.0	5.00	100.0	0	68.0	27.4	101	1.81	20	
,4-Dichlorobenzene	66.5	5.00	100.0	0	66.5	32.6	91.5	0.660	20	
,4-Dinitrophenol	40.1	5.00	100.0	0	40.1	23.1	118	4.96	20	
,4-Dinitrotoluene	68.1	5.00	100.0	0	68.1	44.7	112	0.589	20	
lexachlorobenzene	75.3	5.00	100.0	0	75.3	30	130	0.239	20	
lexachloroethane	71.0	5.00	100.0	0	71.0	23.2	97.8	3.79	20	
-Methylphenol	70.3	5.00	100.0	0	70.3	36.1	105	1.52	20	
+4-Methylphenol	62.9	5.00	100.0	0	62.9	35.7	92.5	5.95	20	
litrobenzene	72.2	5.00	100.0	0	72.2	30.9	125	8.34	20	
entachlorophenol	47.0	5.00	100.0	0	47.0	20.2	93	8.46	20	
yridine	61.4	5.00	100.0	0	61.4	5.14	87.1	0.130	20	
Surr: 2,4,6-Tribromophenol	60.4		100.0		60.4	41.5	117	0		
Surr: 2-Fluorobiphenyl	70.8		100.0		70.8	29.1	112	0		
Surr: 2-Fluorophenol	52.7		100.0		52.7	11.9	98.6	0		
Surr: 4-Terphenyl-d14	78.5		100.0		78.5	46	111	0		
Surr: Nitrobenzene-d5	74.1		100.0		74.1	34.9	112	0		
Surr: Phenol-d5	57.5		100.0		57.5	17.5	88.3	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304689-001Cms** SampType: **MS4** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **WQ4-C-R35** Batch ID: **7105** RunNo: **10109**

Prep Date: **4/23/2013** Analysis Date: **4/25/2013** SeqNo: **288025** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
,2-Dichlorobenzene	60.3	5.00	100.0	0	60.3	20.9	103			
,4-Dichlorobenzene	61.2	5.00	100.0	0	61.2	32.6	91.5			
,4-Dinitrophenol	29.4	5.00	100.0	0	29.4	11	112			
,4-Dinitrotoluene	66.8	5.00	100.0	0	66.8	44.7	112			
lexachlorobenzene	72.3	5.00	100.0	0	72.3	30.3	126			
lexachloroethane	59.8	5.00	100.0	0	59.8	19.5	96.4			
-Methylphenol	64.3	5.00	100.0	0	64.3	28.7	108			
+4-Methylphenol	62.6	5.00	100.0	0	62.6	24.2	136			
litrobenzene	66.5	5.00	100.0	0	66.5	28.8	119			
'entachlorophenol	33.6	5.00	100.0	0	33.6	20.2	93			
'yridine	49.0	5.00	100.0	0	49.0	19.3	82.8			
Surr: 2,4,6-Tribromophenol	81.0		100.0		81.0	41.5	117			
Surr: 2-Fluorobiphenyl	68.5		100.0		68.5	29.1	112			
Surr: 2-Fluorophenol	60.8		100.0		60.8	11.9	98.6			
Surr: 4-Terphenyl-d14	83.5		100.0		83.5	46	111			
Surr: Nitrobenzene-d5	66.6		100.0		66.6	34.9	112			
Surr: Phenol-d5	63.2		100.0		63.2	17.5	88.3			

Sample ID **1304689-001Cmsd** SampType: **MSD4** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **WQ4-C-R35** Batch ID: **7105** RunNo: **10109**

Prep Date: **4/23/2013** Analysis Date: **4/25/2013** SeqNo: **288174** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
,2-Dichlorobenzene	71.1	10.0	100.0	0	71.1	20.9	103	16.4	20	
,4-Dichlorobenzene	70.0	10.0	100.0	0	70.0	32.6	91.5	13.5	20	
,4-Dinitrophenol	34.3	20.0	100.0	0	34.3	11	112	15.6	20	
,4-Dinitrotoluene	71.5	10.0	100.0	0	71.5	44.7	112	6.82	20	
lexachlorobenzene	78.7	10.0	100.0	0	78.7	30.3	126	8.48	20	
lexachloroethane	69.3	10.0	100.0	0	69.3	19.5	96.4	14.7	20	
-Methylphenol	74.9	10.0	100.0	0	74.9	28.7	108	15.3	20	
+4-Methylphenol	69.8	10.0	100.0	0	69.8	24.2	136	11.0	20	
litrobenzene	73.2	10.0	100.0	0	73.2	28.8	119	9.62	20	
'entachlorophenol	38.9	20.0	100.0	0	38.9	20.2	93	14.7	20	
'yridine	58.6	10.0	100.0	0	58.6	19.3	82.8	17.7	20	
Surr: 2,4,6-Tribromophenol	76.0		100.0		76.0	41.5	117	0		
Surr: 2-Fluorobiphenyl	76.4		100.0		76.4	29.1	112	0		
Surr: 2-Fluorophenol	63.8		100.0		63.8	11.9	98.6	0		
Surr: 4-Terphenyl-d14	86.8		100.0		86.8	46	111	0		
Surr: Nitrobenzene-d5	68.9		100.0		68.9	34.9	112	0		
Surr: Phenol-d5	61.7		100.0		61.7	17.5	88.3	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	ec 9992us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R9963		RunNo:	9963				
Prep Date:		Analysis Date:	4/17/2013		SeqNo:	283776	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	9300	0.010	9992	0	93.3	80	120			

Sample ID	ec 995us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R9963		RunNo:	9963				
Prep Date:		Analysis Date:	4/17/2013		SeqNo:	283782	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	1000	0.0100	995.0	0	100	80	120			

Sample ID	1304689-001f dup	SampType:	dup		TestCode:	SM2510B: Specific Conductance				
Client ID:	WQ4-C-R35	Batch ID:	R10017		RunNo:	10017				
Prep Date:		Analysis Date:	4/19/2013		SeqNo:	285343	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	180000	0.50						7.37	20	

Sample ID	ec 9992us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R10017		RunNo:	10017				
Prep Date:		Analysis Date:	4/19/2013		SeqNo:	285344	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	9100	0.010	9992	0	91.0	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID	MB-7137	SampType:	mblk	TestCode:	EPA Method 7470: Mercury				
Client ID:	PBW	Batch ID:	7137	RunNo:	10112				
Prep Date:	4/24/2013	Analysis Date:	4/25/2013	SeqNo:	288145	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	LCS-7137	SampType:	lcs	TestCode:	EPA Method 7470: Mercury				
Client ID:	LCSW	Batch ID:	7137	RunNo:	10112				
Prep Date:	4/24/2013	Analysis Date:	4/25/2013	SeqNo:	288146	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00517	0.000200	0.005000	0	103	80	120			

Sample ID	LCSD-7137	SampType:	lcsd	TestCode:	EPA Method 7470: Mercury				
Client ID:	LCSS02	Batch ID:	7137	RunNo:	10112				
Prep Date:	4/24/2013	Analysis Date:	4/25/2013	SeqNo:	288147	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00522	0.000200	0.005000	0	104	80	120	0.895	20	

Sample ID	1304689-001DMS	SampType:	ms	TestCode:	EPA Method 7470: Mercury				
Client ID:	WQ4-C-R35	Batch ID:	7137	RunNo:	10112				
Prep Date:	4/24/2013	Analysis Date:	4/25/2013	SeqNo:	288160	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0190	0.000800	0.02000	0	95.2	75	125			

Sample ID	1304689-001DMSD	SampType:	msd	TestCode:	EPA Method 7470: Mercury				
Client ID:	WQ4-C-R35	Batch ID:	7137	RunNo:	10112				
Prep Date:	4/24/2013	Analysis Date:	4/25/2013	SeqNo:	288161	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0181	0.000800	0.02000	0	90.4	75	125	5.17	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	PBW	Batch ID:	R10423	RunNo:	10423				
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294877	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	0.0143	1.00								J
Potassium	ND	1.00								
Sodium	ND	1.00								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	LCSW	Batch ID:	R10423	RunNo:	10423				
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294878	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	51.8	1.00	50.00	0	104	80	120			
Potassium	51.0	1.00	50.00	0	102	80	120			
Sodium	51.6	1.00	50.00	0	103	80	120			

Sample ID	LCSD	SampType:	LCSD	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	LCSS02	Batch ID:	R10423	RunNo:	10423				
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294879	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	53.0	1.00	50.00	0	106	80	120	2.34	20	
Potassium	52.3	1.00	50.00	0	105	80	120	2.49	20	
Sodium	52.7	1.00	50.00	0	105	80	120	2.13	20	

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	PBW	Batch ID:	R10449	RunNo:	10449				
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295315	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	LCSW	Batch ID:	R10449	RunNo:	10449				
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295316	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49.2	1.00	50.00	0	98.5	80	120			

Sample ID	LCSD	SampType:	LCSD	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	LCSS02	Batch ID:	R10449	RunNo:	10449				
Prep Date:		Analysis Date:	5/7/2013	SeqNo:	295317	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295317** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48.1	1.00	50.00	0	96.2	80	120	2.39	20	

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295326** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	2.85	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295327** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	103	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295335** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.781	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295336** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	95.9	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295347** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.609	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**CCV CAT**	SampType: **CCV_CAT**		TestCode: **EPA Method 6010B: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID: **R10449**		RunNo: **10449**					
Prep Date:		Analysis Date: **5/7/2013**		SeqNo: **295348**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.5	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	CCB	SampType:	CCB	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	CCB	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294888	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00	1.000	0	-0.0520	-100	99			
Potassium	ND	1.00	1.000	0	-4.73	-100	99			
Sodium	ND	1.00	1.000	0	1.86	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	BatchQC	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294889	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48.9	1.00	50.00	0	97.8	90	110			
Potassium	47.5	1.00	50.00	0	95.0	90	110			
Sodium	47.8	1.00	50.00	0	95.7	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	CCB	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294905	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00	1.000	0	0.234	-100	99			
Potassium	ND	1.00	1.000	0	7.33	-100	99			
Sodium	ND	1.00	1.000	0	4.58	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	BatchQC	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294906	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	99.6	90	110			
Potassium	49	1.0	50.00	0	98.9	90	110			
Sodium	51	1.0	50.00	0	101	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	CCB	Batch ID:	R10423	RunNo:	10423					
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294918	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00	1.000	0	0.159	-100	99			
Potassium	ND	1.00	1.000	0	9.18	-100	99			
Sodium	ND	1.00	1.000	0	1.91	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	BatchQC	Batch ID:	R10423	RunNo:	10423
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294919
Units:	mg/L				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	47.8	1.00	50.00	0	95.6	90	110			
Potassium	47.1	1.00	50.00	0	94.3	90	110			
Sodium	49.1	1.00	50.00	0	98.1	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	CCB	Batch ID:	R10423	RunNo:	10423
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294931
Units:	mg/L				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	0.205	-100	99			
Potassium	ND	1.0	1.000	0	5.28	-100	99			
Sodium	ND	1.0	1.000	0	-1.59	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	BatchQC	Batch ID:	R10423	RunNo:	10423
Prep Date:		Analysis Date:	5/6/2013	SeqNo:	294932
Units:	mg/L				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48	1.0	50.00	0	95.5	90	110			
Potassium	47	1.0	50.00	0	94.3	90	110			
Sodium	49	1.0	50.00	0	98.2	90	110			

Sample ID	MB-7921	SampType:	MBLK	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	PBW	Batch ID:	7921	RunNo:	11350
Prep Date:	6/14/2013	Analysis Date:	6/17/2013	SeqNo:	320597
Units:	mg/L				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0200								
Beryllium	ND	0.00300								
Cadmium	ND	0.00200								
Calcium	0.252	1.00								J
Chromium	ND	0.00600								
Iron	0.0126	0.0500								J
Lead	ND	0.00500								
Magnesium	ND	1.00								
Nickel	ND	0.0100								
Potassium	ND	1.00								
Silver	ND	0.00500								
Sodium	ND	1.00								
Vanadium	ND	0.0500								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- O RSD is greater than RSDlimit
- P Sample pH greater than 2 for VOA and TOC only.
- R RPD outside accepted recovery limits
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	LCS-7921	SampType:	LCS	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	LCSW	Batch ID:	7921	RunNo:	11350
Prep Date:	6/14/2013	Analysis Date:	6/17/2013	SeqNo:	320598
				Units:	mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.458	0.0200	0.5000	0	91.6	80	120			
Beryllium	0.492	0.00300	0.5000	0	98.5	80	120			
Cadmium	0.457	0.00200	0.5000	0	91.3	80	120			
Calcium	49.0	1.00	50.00	0	98.0	80	120			
Chromium	0.453	0.00600	0.5000	0	90.6	80	120			
Iron	0.458	0.0500	0.5000	0	91.7	80	120			
Lead	0.441	0.00500	0.5000	0	88.3	80	120			
Magnesium	48.3	1.00	50.00	0	96.7	80	120			
Nickel	0.431	0.0100	0.5000	0	86.1	80	120			
Potassium	47.0	1.00	50.00	0	93.9	80	120			
Silver	0.0966	0.00500	0.1000	0	96.6	80	120			
Sodium	47.3	1.00	50.00	0	94.6	80	120			
Vanadium	0.482	0.0500	0.5000	0	96.5	80	120			

Sample ID	1304689-001DMS	SampType:	MS	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	WQ4-C-R35	Batch ID:	7921	RunNo:	11350
Prep Date:	6/14/2013	Analysis Date:	6/17/2013	SeqNo:	320612
				Units:	mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.511	0.100	0.5000	0.03335	95.5	75	125			
Beryllium	0.523	0.0150	0.5000	0.005300	103	75	125			
Chromium	0.445	0.0300	0.5000	0	89.0	75	125			
Iron	0.801	0.250	0.5000	0.3353	93.1	75	125			
Nickel	0.443	0.0500	0.5000	0	88.7	75	125			
Vanadium	0.560	0.250	0.5000	0.04285	104	75	125			

Sample ID	1304689-001DMSD	SampType:	MSD	TestCode:	EPA 6010B: Total Recoverable Metals
Client ID:	WQ4-C-R35	Batch ID:	7921	RunNo:	11350
Prep Date:	6/14/2013	Analysis Date:	6/17/2013	SeqNo:	320613
				Units:	mg/L

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.535	0.100	0.5000	0.03335	100	75	125	4.61	20	
Beryllium	0.539	0.0150	0.5000	0.005300	107	75	125	3.06	20	
Chromium	0.465	0.0300	0.5000	0	92.9	75	125	4.34	20	
Iron	0.813	0.250	0.5000	0.3353	95.5	75	125	1.48	20	
Nickel	0.462	0.0500	0.5000	0	92.3	75	125	4.01	20	
Vanadium	0.582	0.250	0.5000	0.04285	108	75	125	3.78	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1304689-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**	
Client ID: **WQ4-C-R35**	Batch ID: **7921**	RunNo: **11376**	
Prep Date: **6/14/2013**	Analysis Date: **6/18/2013**	SeqNo: **321492**	Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.520	0.0100	0.5000	0	104	75	125			
Lead	0.457	0.0250	0.5000	0	91.4	75	125			
Silver	0.122	0.0250	0.1000	0	122	75	125			

Sample ID **1304689-001DMSD**	SampType: **MSD**	TestCode: **EPA 6010B: Total Recoverable Metals**	
Client ID: **WQ4-C-R35**	Batch ID: **7921**	RunNo: **11376**	
Prep Date: **6/14/2013**	Analysis Date: **6/18/2013**	SeqNo: **321493**	Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.470	0.0100	0.5000	0	93.9	75	125	10.2	20	
Lead	0.412	0.0250	0.5000	0	82.5	75	125	10.3	20	
Silver	0.111	0.0250	0.1000	0	111	75	125	9.81	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID	ph 10.00 ccv	SampType:	ccv	TestCode:	SM4500-H+B: pH					
Client ID:	CCV	Batch ID:	R9963	RunNo:	9963					
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283802	Units:	pH units			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.96	1.68								

Sample ID	1304689-001f dup	SampType:	dup	TestCode:	SM4500-H+B: pH					
Client ID:	WQ4-C-R35	Batch ID:	R9963	RunNo:	9963					
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283804	Units:	pH units			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.20	1.68						0	NA	H

Sample ID	ph 7.00 ccv	SampType:	ccv	TestCode:	SM4500-H+B: pH					
Client ID:	CCV	Batch ID:	R9963	RunNo:	9963					
Prep Date:		Analysis Date:	4/17/2013	SeqNo:	283806	Units:	pH units			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.00	1.68								

9-10-13

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **mb-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**
Client ID: **PBW**	Batch ID: **R9963**	RunNo: **9963**
Prep Date:	Analysis Date: **4/17/2013**	SeqNo: **283729** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R9963**	RunNo: **9963**
Prep Date:	Analysis Date: **4/17/2013**	SeqNo: **283730** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	99.0	90	110			

Sample ID **lcs-1 dup**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R9963**	RunNo: **9963**
Prep Date:	Analysis Date: **4/17/2013**	SeqNo: **283731** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79	20	80.00	0	99.0	90	110	0.0505	0	

Sample ID **mb-2**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**
Client ID: **PBW**	Batch ID: **R9963**	RunNo: **9963**
Prep Date:	Analysis Date: **4/17/2013**	SeqNo: **283751** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.0								

Sample ID **lcs-2**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R9963**	RunNo: **9963**
Prep Date:	Analysis Date: **4/17/2013**	SeqNo: **283752** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79.3	20.0	80.00	0	99.2	90	110			

Sample ID **lcs-2 dup**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R9963**	RunNo: **9963**
Prep Date:	Analysis Date: **4/17/2013**	SeqNo: **283753** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	79.2	20.0	80.00	0	99.0	90	110	0.101	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	MB	SampType:	MBLK	TestCode:	SM 5310B: TOC					
Client ID:	PBW	Batch ID:	R10111	RunNo:	10111					
Prep Date:		Analysis Date:	4/25/2013	SeqNo:	288056	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.00								

Sample ID	LCS ST9060-12006	SampType:	LCS	TestCode:	SM 5310B: TOC					
Client ID:	LCSW	Batch ID:	R10111	RunNo:	10111					
Prep Date:		Analysis Date:	4/25/2013	SeqNo:	288057	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.91	1.00	4.850	0	101	90	110			

Sample ID	LCSD ST9060-12006	SampType:	LCSD	TestCode:	SM 5310B: TOC					
Client ID:	LCSS02	Batch ID:	R10111	RunNo:	10111					
Prep Date:		Analysis Date:	4/25/2013	SeqNo:	288058	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.00	1.00	4.850	0	103	90	110	1.74	20	

Sample ID	1304689-001BMS	SampType:	MS	TestCode:	SM 5310B: TOC					
Client ID:	WQ4-C-R35	Batch ID:	R10111	RunNo:	10111					
Prep Date:		Analysis Date:	4/25/2013	SeqNo:	288060	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.94	1.00	4.650	0.3670	98.3	75	125			

Sample ID	1304689-001BMSD	SampType:	MSD	TestCode:	SM 5310B: TOC					
Client ID:	WQ4-C-R35	Batch ID:	R10111	RunNo:	10111					
Prep Date:		Analysis Date:	4/25/2013	SeqNo:	288061	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.06	1.00	4.650	0.3670	101	75	125	2.48	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	1304689-001FDUP	SampType:	DUP	TestCode:	Specific Gravity					
Client ID:	WQ4-C-R35	Batch ID:	R10157	RunNo:	10157					
Prep Date:		Analysis Date:	4/26/2013	SeqNo:	289472	Units:				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.060	0						0.198	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1304689**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	MB-7098	SampType:	MBLK	TestCode:	SM 2540D: TSS				
Client ID:	PBW	Batch ID:	7098	RunNo:	10057				
Prep Date:	4/22/2013	Analysis Date:	4/22/2013	SeqNo:	286477	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	ND	4.00								

Sample ID	LCS-7098	SampType:	LCS	TestCode:	SM 2540D: TSS				
Client ID:	LCSW	Batch ID:	7098	RunNo:	10057				
Prep Date:	4/22/2013	Analysis Date:	4/22/2013	SeqNo:	286478	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	86.0	4.00	96.60	0	89.0	85.8178	113.8716			

Sample ID	1304689-001FDUP	SampType:	DUP	TestCode:	SM 2540D: TSS				
Client ID:	WQ4-C-R35	Batch ID:	7098	RunNo:	10057				
Prep Date:	4/22/2013	Analysis Date:	4/22/2013	SeqNo:	286481	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	57.0	4.00						11.1	15	

Duplicate of the 51 mg/L value

MJ 7-1-13

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

WQSP-4

DATA VERIFICATION AND VALIDATION REPORTS

Round 35
WQSP-4
SDG 1304689
Groundwater Concentration and Duplicate Precision Summary

General Chemistry Parameter	Units	SOW MRL	Lab MDL[a]	Lab PQL[b]	Primary Sample	Flag	Duplicate Sample	Flag	Avg	RPD	Applicable 95th UTLV or 95th %
Chloride	mg/L	0.5	330	2,500	62,900		56,100		59,500	11	63,960
TOC	mg/L	1.0	0.23	1.0	0.37	J	ND		NA	NA	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	5.0	20	38.7		39.0		38.9	0.77	47.1
Specific Conductance	umhos/cm	NA	0.50	0.50	193,000		182,000		187,500	5.9	319,800
pH	pH units	NA	0.10	1.68	7.20		7.21		7.21	0.14	6.8 - 7.6
Specific Gravity	NA	NA	0.0	0.0	1.062		1.059		1.061	0.28	1.09
TDS	mg/L	10	500	1,000	108,000		101,000		104,500	6.7	123,500
TSS	mg/L	1.0	1.5	4.0	51		**64**		**58**	23	**57.0**
Dissolved Metals											
Ca (Diss)	mg/L	0.5	5.6	100	1,630		1,630		1,630	0.00	1,834
Mg (Diss)	mg/L	0.5	0.83	100	1,150		1,180		1,165	2.6	1,472
K (Diss)	mg/L	0.5	5.0	100	701		717		709	2.3	1,648
Na (Diss)	mg/L	0.5	80	1000	34,700		34,800		34,750	0.29	38,790
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL**	**Lab PQL**	**Primary Sample**	**Flag**	**Duplicate Sample**	**Flag**	**Avg**	**RPD**	
Hg (CVAAS) (c)	mg/L	0.0002	0.00035	0.00080	ND		ND		NA	NA	<0.002
Ba (a)	mg/L	0.020	0.0025	0.10	0.033	J	0.037	J	0.035	11	1.00
Be	mg/L	0.010	0.0025	0.015	0.0053	J	0.0046	J	0.005	14	0.25
Cd	mg/L	0.010	0.0040	0.010	ND		ND		NA	NA	<0.5
Ca	mg/L	0.500	4.6	500	1,670		1,670		1,670	0.0	NA
Cr	mg/L	0.025	0.0075	0.030	ND		ND		NA	NA	<2.0
Pb	mg/L	0.020	0.017	0.025	ND		ND		NA	NA	0.525
Mg	mg/L	0.50	4.8	500	1,250		1,210		1,230	3.3	NA
Ni	mg/L	0.025	0.0070	0.050	ND		ND		NA	NA	<5.0
K	mg/L	0.50	2.2	10	831		794		813	4.6	NA
Ag	mg/L	0.013	0.0055	0.025	ND		ND		NA	NA	0.519
Na	mg/L	0.50	260	500	34,800		31,700		33,250	9.3	NA
V	mg/L	0.025	0.018	0.25	0.043	J	0.038	J	0.041	12	<5.0
ICP/MS Metals											
Sb	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	<10.0
As	mg/L	0.050	0.020	0.020	ND		ND		NA	NA	<0.5
Se	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	2.009
Tl	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	1.00

Method Reporting Limit (MRL) and lab's Practical Quantitation Level (PQL) generally equivalent for a given sample.
Lab's PQL corresponds to low calibration standard adjusted for the dilution factor as necessary for high-brine samples.
J Flag indicates concentration was below the lab's PQL but above the Method Detection Limit (MDL) for the analyte.
H Flag indicates holding time for sample preparation or analysis was exceeded.
NA - Not Applicable
ND - Not Detected
Bold concentrations higher than the baseline 95th UTLV or 95th percentile (16 - 95 percent non-detects).
CVAAS - cold vapor atomic absorption spectroscopy.
ICP - inductively coupled plasma emission spectroscopy.
ICP/MS - ICP combined with mass spectrometry.
(a) MDL - method detection limit
(b) PQL - practical quantitation limit eqivalent to method reporting limit (MRL)
(c) MDL higher than the SOW-prescribed MRL.

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 35
WQSP-4

Sample Summary

Date:	July 25, 2013
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	April 16, 2013
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 28, 2013
Date Samples Shipped/Method	April 16, 2013 by FedEx
Date Samples Received by lab:	April 17, 2013
Sample Receipt Condition:	Intact at 2.5 deg. C
SDG:	1304689
WIPP Chain of Custody/Request for Analysis:	1033
Analysis Results Reviewed:	Volatile and semivolatile organics; total and dissolved metals; general chemistry indicator parameters
Analyses Verified, Validated, and Reported in this Document:	See table of all target analytes and methods in the Annual Culebra Groundwater Monitoring Report
VOC Analysis Date(s):	April 18, 2013 (meets holding time)
SVOC Extraction Date:	April 23, 2013(meets holding time)
SVOC Analysis Date(s):	April 25, 2013 (meets holding time)
Total Trace Metals Analysis Date:	June 17, 2013 (meets holding time)
Dissolved Cation Metals Analysis Date:	May 6, 7, 2013 (meets holding time)
Mercury Analysis Date(s):	April 25, 2013 (meets holding time)
General Chemistry Parameters analysis dates	Dates are summarized on the Dates Report and on the data summary reports from the lab in the appendices. All holding times were met.
Verification and Validation Checklist	Completed and attached to this narrative

Sample Numbers and Analytes for SDG 1304689

WTS Sample No.	Analytes
GW-WQ4CR35N1, GW-WQ4CR35N1D	VOCs
GW-WQ4CR35N2, GW-WQ4CR35N3	VOCs (Field Blank and Trip Blank)
GW-WQ4CR35N4, GW-WQ4CR35N4D	TOC
GW-WQ4CR35N5, GW-WQ4CR35N5D	SVOCs
GW-WQ4CR35N6, GW-WQ4CR35N6D	Total Trace Metals (including "total" cation metals)
GW-WQ4CR35 N7, GW-WQ4CR35 N7D	General Parameters (including "dissolved" cations)

Results Summary

No VOCs were detected in either the primary or duplicate groundwater samples. The field blank showed detection of 2-butanone just below the MRL at 4.9 ug/L (value J-flagged. No VOCs were detected in the trip blank sample.

No SVOCs were detected in the WQSP-4 groundwater samples.

The trace metals detected included Ba at 0.033 mg/L in the primary sample and 0.037 mg/L in the duplicate sample; Be at 0.0053 mg/L in the primary sample and 0.0046 mg/L in the duplicate sample; and V at 0.043 mg/L in the primary sample and 0.038 mg/L in the duplicate sample. All the concentrations below the MRL and are J-flagged as estimated, and all the concentrations are all well below the Permit background concentrations of concern.

Measurements were made on all the general chemistry parameters at concentrations above the reporting limit except for TOC, which was detected at 0.37 mg/L in the primary sample but was not detected in the duplicate sample.

The TSS concentrations of 64 mg/L in the primary sample and 58 mg/L in the duplicate sample were higher than the 95th percentile concentration (used for 16 - 95 percent baseline non-detects) of 57.0 mg/L.

Summary for Volatile Organics Analysis

The groundwater samples were purged and analyzed for 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, benzene, carbon tetrachloride, chlorobenzene, chloroform, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, isobutanol, methyl ethyl ketone (2-butanone),

methylene chloride, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, and xylenes (o-, m-, and p-).

The samples were analyzed according to the laboratory's SOP S-8260-11 based on EPA's SW-846 Method 8260B.

As discussed above the only detection of any VOC in the groundwater, field blank, and trip blank samples was 2-butanone at 4.9 ug/L in the field blank.

Recoveries of isobutyl alcohol and 2-butanone were higher than the 130 percent recovery objective in the MS at 202 and 152 percent, respectively, and in the MSD at 213 and 163 percent, respectively. The compounds were not detected in the samples. The high-TDS sample matrix causes isobutyl alcohol and 2-butanone to purge more efficiently from the spiked samples than from the calibration standards and LCS samples. The recoveries of 1,1,2,2-tetrachloroethane were just below the high acceptance limit at 128 and 125 percent recovery. The compound appears to be produced in small quantities from degradation of other spiked chlorinated organic compounds such as the dichloroethylenes and trichloroethylene in the high-chloride aqueous matrix spiked with VOCs.

All other quality assurance objectives were met for the VOC analyses.

Summary for Semivolatile Organic Compound Analysis

The groundwater samples were analyzed for 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, 2,4-dinitrophenol, 2,4-dinitrotoluene, 2-methylphenol (o-cresol), 3+4-methylphenol (m-, p-methyl phenol), hexachlorobenzene, hexachloroethane, nitrobenzene, pentachlorophenol, and pyridine.

The samples were analyzed according to the laboratory's SOP S-8270C-11 based on EPA's SW-846 Method 8270C.

No SVOCs were detected in the groundwater samples.

The QC data for the SVOCs showed no compounds detected in the method blank samples, acceptable recoveries of the target compounds and surrogate compounds for the LCS/LCSD samples, acceptable RPDs for the LCS/LCSD samples, and acceptable recoveries and RPDs for the SVOC target compounds from the MS/MSD samples. Thus all QC objectives were met for the SVOCs.

Summary for Metals Analysis

The groundwater samples were prepared and analyzed for Barium (Ba), Beryllium (Be), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Iron (Fe), Lead (Pb), Magnesium (Mg), Nickel (Ni), Potassium (K), Silver (Ag), Sodium (Na), and Vanadium (V) by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) according to Hall's SOP S-610-10 based on EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and

Thallium (Tl) were analyzed according to Anatek's SOP ALI-A-315.03 for ICP/MS Method 6020 from SW-846. Mercury (Hg) was analyzed according to the Hall's S-245.1_7470A-3 using automated cold-vapor atomic absorption (CVAA) spectroscopy. The SOP is based on EPA's SW-846 Method 7470A.

The trace metals Ba, Be, and V were detected in the primary and duplicate groundwater samples. The Ba concentrations were 0.033 mg/L in the primary sample and 0.037 mg/L in the duplicate sample; the Be concentrations were 0.0053 mg/L and 0.0046 mg/L in the primary and duplicate samples, respectively; and the V concentrations were 0.043 mg/L and 0.038 mg/L in the primary and duplicate samples, respectively.

The MDLs for all the metals were lower than the MRLs specified in the SOW.

The QC data showed that the method blank samples did not contain the trace metals detected in the groundwater samples. The LCS recoveries for the trace metals, the ICP/MS metals, the four cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. The lab analyzed a LCSD for Hg but not for the trace metals. All the metals met the 75 – 125 percent recovery objective in the MS/MSD samples, and all the RPDs were all less than the 20 RPD limit.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), alkalinity, and the anions chloride, nitrate, and sulfate. The standard analytical methods and the corresponding SOPs are shown in the table below.

Standard Analytical Method	Current Hall Lab SOP
Method 2710F – Specific Gravity from Standard Methods	S-SM2710F - Rev. 1
Standard Methods SM 4500-H^+ (pH)	S-4500-H^+- 7
EPA Method 120.1 Specific Conductance (Conductivity)	S-120.1 - 7
Standard Methods SM 2540C (TDS)	S-SM2540C – 6
Standard Methods SM 2540D (TSS)	S-SM2540D – 4
Standard Methods SM 5310B (TOC)	S-TOC – 6
Standard Methods 2320B (Alkalinity)	S-SM2320 – 7
EPA Method 300.0 (Anions)	S-300.0 – 10

The types of QC samples analyzed for the general chemistry parameters include the following:

- Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted.

- LCS samples were analyzed for the anions chloride and sulfate to obtain recovery information. MS/MSD samples were not analyzed because of the high native concentrations of chloride and sulfate. All LCS recoveries were within 90 – 110 percent.

- The primary groundwater sample was analyzed in duplicate for pH yielding a result of 7.20 and a RPD of 0.0.

- A LCS sample and a duplicate sample were analyzed for TSS to obtain recovery and precision information. MS/MSD samples are not applicable. The LCS recovery met the accuracy objective with 89.0% recovery, and the duplicate sample concentration was 57 mg/L for a RPD of 11. The TSS concentrations were 51 mg/L in the primary sample and 64 mg/L in the duplicate sample for an average of 58 mg/L in Round 35 compared to an average of 59 mg/L in Round 34 and an average of 60 mg/L during Round 33. The duplicate sample and average sample concentrations were higher than the 95th percentile baseline concentration of 57.0 mg/L. The RPD for these analyses was 23, slightly higher than the quality assurance objective for precision of 20 RPD.

- LCS and MS/MSD QC samples were analyzed for TDS with all recoveries between 90 – 110 percent and a RPD of 1.7 for the MS/MSD.

- LCS/LCSD and MS/MSD samples were analyzed for TOC to obtain recovery and precision information. The recoveries were within 90 – 110 percent and the RPDs 1.7 for the LCS/LCSD and 2.5 for the MS/MSD. TOC was detected in the primary sample but not the duplicate groundwater sample during Round 35. Both the primary and duplicate groundwater samples were ND during Round 34.

- A duplicate sample was analyzed for specific gravity with the RPD of 0.20.

- The lab analyzed two sets of LCS/LCSD samples for alkalinity with a RPDs <1 but did not analyze a MS/MSD using a groundwater sample. Instead a sample from another client was used for the batch MS/MSD.

All other quality assurance objectives were met for the general chemistry indicator parameter analyses.

Overall Data Package Summary

In summary, the data and information contained in this data packet is of high quality and meets the data quality objectives for accuracy and precision with only a few minor exceptions as detailed above and in the Annual Culebra Groundwater Monitoring Report. The lab did not use a DMP sample for some of the QC samples such as the MS/MSD for alkalinity. The lab was requested to always use a DMP sample for future wells.

There is no indication of any target DMP target VOCs or SVOCs or any other organic compounds being present in the samples, and the metals and general chemistry parameters analysis data do not indicate any observable changes in the composition of the groundwater.

The data are usable and meet the needs of the DMP.

Attachment 2 – Preliminary Review

SECTION A

Sample Location: WQSP-4
Laboratory Name: Hall Environmental
Laboratory Work Order #: 1304689
Sample Number(s): GW-WQ4-C-R35-N1-N8D
Reviewer Name (print): Greg Jungclaus
Reviewer Signature: G Jungclaus

SECTION B	YES	NO
Is the SDG narrative present and certification page signed by an authorized representative of the laboratory?	✓	
Does the SDG narrative explain problems associated with processing and analysis of the samples?	✓	
Were the original or copy of the Chain of Custody/Request for Analysis (CofC/RFA) complete?	✓	
Are the sample analysis summary tables present?	✓	
Were sufficient data as required by the Statement of Work (SOW) available to evaluate the analysis results?	✓	
Was an electronic data package received for preliminary review of the data?	✓	

SECTION C GENERAL VERIFICATION AND VALIDATION	YES	NO
Were data entries free of transcription error?	✓	
Were calculations correct?	✓	
Were the correct number of significant figures applied to reported data?	✓	
Were trip (VOC only), field and laboratory method blanks (MB) free of contaminants?		✓
Note: The consistent detection of any anthropogenic compounds should be reported to the EM&H Manager, as well as documented and discussed in the Verification and Validation Report.		
Were any anthropogenic compounds starting to appear consistently in the samples?		✓
Were concentrations consistently reported in units of micrograms per liter (ug/L) for organics and milligrams per Liter (mg/L) for applicable general chemistry parameters and constituents?	✓	
Were the applicable standard methods used for all the analyses?	✓	
Note: The EM&H Manager should be contacted if the data completeness objective of 100% is not met for any Verification and Validation Report since resampling and/or reanalysis of Detection Monitoring Program (DMP) samples may be required.		
Was 100% of the sample analysis data usable and valid?	✓	

G Jungclaus 9-11-13
Data Validator Date

Completeness Reviewer 9/17/13
Completeness Reviewer Date

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CofC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with hydrochloric acid?	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 2.5°C	✓	
Was the analysis holding time of 14 days met for all samples? 4/18 vs 4/16	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact, e.g., no air bubbles in the vials?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a 4-bromofluorobenze (BFB) tuning compound analysis performed at the beginning and every 12 hours during VOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z (mass per unit charge) 95?	✓	
Were the ion abundance criteria listed in Method 8260 met?	✓	

INITIAL CALIBRATION	YES	NO	
Were a minimum of 5 calibration standards used for the initial calibration?	✓		
Did the calibration standards contain all the target VOC compounds?	✓		
Was the low standard at or below the concentration of the MRL, e.g., 5.0 µg/L?	✓		(a)
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓	
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓		
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓	(b)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to be within 20% of the expected concentration?	✓		

(a) 2.0ng / 5.0mL = 0.4µg/L

(b) NA - Avg RRFs not used.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the VOCs in the CCVs agree to within 20% difference (bias) of the standard CCV concentration? Note that the CCV concentration may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory MB analyzed for each 12-hour period of GC/MS instrument operation?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Was a trip blank (one per DMP sample set) analyzed?	✓	
Was a field blank analyzed (one per DMP sample set)	✓	
Were the concentrations of any VOCs detected in the laboratory method blank samples < MRL?	✓	
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?	✓	

SYSTEM MONITORING COMPOUNDS (SURROGATES)	YES	NO
Note: Flag the data if System Monitoring Compound (SMC) recoveries are outside the recovery objective with no evidence of sample reanalysis.		
Were a minimum of three (3) SMCs added to all samples and blanks prior to GC/MS analysis?	✓	
Were the SMC recoveries reported on the SMC recovery form consistent with the raw data?	✓	
Did the SMC recoveries meet the 70-130% recovery objective or the QC recovery chart limits established historically by the laboratory?	✓	
Did the lab need to reanalyze any samples because the SMC recovery objective was not met?		✓

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS sample prepared and analyzed with each DMP sample set?	✓	
Was the LCS sample spiked with all the DMP target VOCs?	✓	
Did the LCS recoveries for all the target VOCs meet the 70-130% recovery objective?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO	
Were a MS and MSD prepared and analyzed with each DMP sample set?	✓		
Were the MS/MSD samples spiked with all the DMP target VOCs?	✓		
Was a DMP sample used to generate the MS/MSD samples?	✓		
Did the MS/MSD recoveries for target DMP target VOCs meet the accuracy objective specified in the EPA Functional Guidelines? (60-140% recovery) or the QC recovery control chart limits established historically by the laboratory?		✓	(a)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓		

INTERNAL STANDARDS	YES	NO
Were the retention times of the internal standards (IS) in the samples within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS in the samples within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the Relative Retention Times (RRTs) of any target VOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) MS recoveries: isobutyl alcohol at 202%, 2-butanone at 152%; MSD recoveries: isobutyl alcohol at 213%, 2-butanone at 163%

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO	
Was a forward search of the VOC mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓		
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.			
Were any VOC Tentatively Identified Compounds (TICs) detected in the trip blank and field blank samples?	✓		(a)
Were any VOC TICs detected in the groundwater samples?	✓		(b)

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(a) A C7 ketone was detected in the field blank along with the 4.95 µg/L 2-butanone. The trip blank appeared to contain difluoroethane.

(b) The groundwater samples contained the GC column degradation products trimethyl silyl fluoride, methoxytrimethyl silane, and trimethyl silanol

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 2.5°C	✓	
Were the samples extracted within 7 days of sample collection? 4/23 vs 4/16	✓	
Were the extracts analyzed within 40 days of sample extraction? 4/25 vs 4/23	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a DFTPP (decafluorotriphenylphosphine) tuning compound analysis performed at the beginning and every 12 hours during SVOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z 198?	✓	
Were the ion abundance criteria listed in Method 8270C met?	✓	

INITIAL CALIBRATION	YES	NO	
Were a minimum of five (5) calibration standards used for the initial calibration?	✓		
Did the calibration standards contain all the target SVOCs?	✓		
Was the low standard at or below the MRL for the method, e.g., ≤ 5.0 ug/mL in the standard?	✓		(a)
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓	
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓		
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD?		✓	(b)
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to within 20% of the expected concentration?	✓		

(a) 2.0 µg/mL
(b) NA Avg RRFs not used.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the SVOCs in the CCVs agree to within 20% difference (bias) of the average of the CCV standard concentration? Note that CCV concentrations may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory method blank extracted along with each SDG batch?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Were the concentrations of any SVOCs detected in the laboratory method blank sample < MRL?	✓	

SURROGATE SPIKES	YES	NO
Were three (3) base-neutral and three (3) acid surrogate spike recovery compounds spiked into the groundwater and QC samples prior to extraction?	✓	
Were the surrogate recoveries reported on the surrogate recovery form consistent with the raw data?	✓	
Note: Flag the data if surrogate recoveries are outside the objective range with no evidence of sample re-injection or re-extraction.		
Did the surrogates meet the EPA Functional Guidelines accuracy objective of 15-110% recovery for acid surrogates and 30-130% recovery for base neutral surrogates?	✓	
Alternatively, were the surrogate recoveries within the historical control chart limits established by the laboratory for aqueous samples?	✓	
Did the laboratory need to re-inject or re-extract any samples because the surrogate recovery objective was not met?		✓

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS prepared and analyzed for each batch of DMP samples?	✓	
Was the LCS sample spiked with all the target SVOCs?	✓	
Did the LCS recoveries meet the EPA guidance accuracy objectives of 40-140% recovery for base neutral compounds and 30-130% recovery for acidic compounds?	✓	
Alternatively, were the LCS recoveries within the laboratory's historical control chart limits?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤ 20 RPD for each compound?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and a MSD prepared and analyzed for each batch of DMP samples?	✓	
Were the MS/MSD samples spiked with all the DMP target SVOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for the DMP target SVOCs meet the EPA Functional Guidelines accuracy objective of 40-140% recovery for base neutral compounds and 30-130% recovery for acid compounds?		✓ (a)
Alternatively, were the matrix spike recoveries within the laboratory's historical control chart limits?	✓	
Was the precision of the MS/MSD recoveries calculated and reported?	✓	
Did the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were a minimum of six (6) IS spiked into extracts of samples and blanks prior to GC/MS analysis?	✓	
Were the retention times of the IS within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the RRTs of any target SVOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) The 2,4-dinitrophenol recovery was 29.4% in the MS.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO	
Was a forward search of the mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓		
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.			
Were any SVOC TICs detected in the laboratory method blank sample?	✓		(a)
Were any SVOC TICs detected in the groundwater samples?	✓		(b)

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(a) Trace concentrations of toluene, higher alkylbenzenes and triphenyl phosphine oxide detected in MB.

(b) The groundwater samples bis-phenol A and triethyl phosphate. These compounds are artifacts that appear in some MBs.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with nitric acid?	✓	
Were holding times met for all sample digestions and analyses? Maximum holding time is 28 days for Mercury and 6 months for the other metals.	✓	
Was the integrity of each sample intact?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	

INDUCTIVELY COUPLED PLASMA (ICP) CALIBRATION, EPA SW-846 6010B	YES	NO
Was the correlation coefficient (R^2) of the initial calibration ≥0.995 for each metal?	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples?	✓	
Was the initial ICV analyzed immediately after calibration and prior to sample analysis?	✓	
Was the ICV prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue?	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	

ICP BLANKS	YES	NO
Was an ICB analyzed immediately after the ICV?	✓	
Were CCBs analyzed in the sample queue every 10 samples and immediately after the CCVs to evaluate drift, sensitivity, and contamination?	✓	
Were the ICB and CCB analysis results all <MRL for each metal?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP INTERFERENCE CHECK SAMPLE	YES	NO
Were Interference Check Standards (ICS & ICS Element) analyzed daily prior to sample analysis?	✓	
Were the concentrations of all the target trace metals (not including Ca and Mg) < two times the MRL in the ICS?	✓	
Did the recoveries of the trace metals in the ICS Element standards meet the accuracy objective of 80-120% recovery?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a LCS, LCSD, MS, and MSD along with the requisite QC blanks and check standards (MB, ICV, ICB, CCB, ICS, and ICS Element)?	✓	
Was a DMP sample used for the MS and MSD?	✓	

METHOD PERFORMANCE	YES	NO
Were the concentrations of any metals detected in the method blanks at a concentration < MRL?	✓	
Did the metals in the LCS meet the accuracy objective of 80-120% recovery?	✓	
Did the metals in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO
Were the samples digested within 28 days of sample collection? 4/24 vs 9/16	✓	
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank?	✓	
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓	
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery?	✓	
Were CCV standards analyzed at a frequency of once every 10 samples and at the end of the sample queue?	✓	
Did the CCV analyses meet the accuracy objective of 80-120% recovery?	✓	
Did the sample set contain a MB, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓	
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery? (103, 104)	✓	
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery? (95.2, 90.4)	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD? (5.2)	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP/MS Analysis for Selected Trace Metals, e.g., As, Sb, Se, and Tl, by EPA SW-846 6020A	YES	NO
Was the holding time met for the ICP/MS analysis?	✓	
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Was an ICV analyzed after the initial calibration?	✓	
Were a CCB and CCV analyzed during the sample queue?	✓	
Did the CCV meet the accuracy objective of 90-110% recovery?	✓	
Was the concentration of any metals detected in the CCB at < 0.001 mg/L?	✓	
Did the metals in the LCS and LCSD meet the accuracy objective of 85-115% recovery?	✓	
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓	

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Attachment 6 – Anions (Chloride and Sulfate) Data Review, EPA Method 300.0

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 28 days of collection for analysis of chloride and sulfate? (Note that sulfate concentrations are not reported but are needed for cation/anion balance calculations.) 4/17 vs 4/16	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions?	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue?	✓	
Were Continuing Calibration Verification (CCV) standards of differing concentrations analyzed periodically throughout the sample set?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Was the laboratory method blank concentration of the anions <MRL (Method Reporting Limit)?	✓	
Did the ICV and CCV analyses meet the accuracy objective of 90-110% recovery?	✓	
Did the LCS meet the accuracy objective of 90-110% recovery?	✓	
NOTE: If the normal MS spike concentration is < 25% of the native sample concentration (i.e., high native sample concentration) the MS and MSD recoveries and precision are not applicable.		
Did the MS and MSD analyses of applicable anions meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	✓	

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument?	✓	
Were the appropriate dilution factors applied to the results?	✓	

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Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 14 days of collection? 4/17 vs 4/14	✓	

REAGENTS	YES	NO
Was the pH meter standardized prior to analysis of the samples using the SOP for pH measurement?	✓	
Was 0.02 N standardized sulfuric acid used as the titrant?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a laboratory method blank, Laboratory Control Sample (LCS), Matrix Spike (MS), and Matrix Spike Duplicate (MSD)?		✓ (a)
Was the starting pH of the sample ≤8.30?	✓	
Was a DMP sample used for the MS/MSD?		✓

METHOD PERFORMANCE	YES	NO
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 3.12 mg/L	✓	
Did the LCS recovery meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 80-120% recovery?		NA
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)?		NA
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?		NA

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(a) The lab failed to use a DMP sample for the MS and MSD in the sample batch.

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? 4/17 vs 4/16	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards?	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration?	✓	
Was the proper Temperature Correction Factor applied to the conductivity measurements? Automatic	✓	

ANALYSIS QUEUE	YES	NO
Was a second source mid-range ICV conductivity standard analyzed prior to the samples?	✓	
Was a CCV conductivity standard analyzed within and at the end of the sample queue (rotate between 10, 100, 1000, and 10,000 µmhos/cm conductivity standards)?	✓	
Was one of the samples analyzed in duplicate?	✓	

METHOD PERFORMANCE	YES	NO
Did the ICV analysis yield a concentration within 90-110% of the standard concentration?	✓	
Did the CCV analyses yield a concentration within 90-110% of the standard concentration?	✓	
Did the duplicate sample meet the precision objective of ≤20 RPD? (7.4)	✓	

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Attachment 9 – pH Data Review, SM 4500-H+

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°?	✓	
Were the samples analyzed within five (5) days of receipt? 4/17 vs 4/17	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument?	✓	
Was the slope of the pH calibration curve recorded and greater than 95%?	✓	

SAMPLE ANALYSIS	YES	NO
Did the standard buffers bracket the pH range of the samples?	✓	
Was a CCV analyzed within and at the end of the sample batch?	✓	
Was the sample analysis temperature within 2°C of the buffer analysis temperature? (20.1 °C vs 20.9 °C)	✓	
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate?	✓	

METHOD PERFORMANCE	YES	NO
Did the ICV read within ±0.1 pH unit of the assigned value?	✓	
Did the CCV read within ±0.1 pH unit of the assigned value?	✓	
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓	

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Attachment 10 – Specific Gravity Data Review, SM 2710F

SAMPLE ANALYSIS	YES	NO
Were the samples allowed to warm to near room temperature prior to measurement of specific gravity?	✓	
Was the temperature of the specific gravity measurements recorded?	✓	
Was the mass of at least 5.0 mL of the water sample measured? (10.0mL)	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? (0.8°C)		✓
Was the Temperature Correction Factor recorded? (0.9975)	✓	

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Primary Sample : 1.062
Primary Sample dup 1.060 RPD = 0.20

Attachment 11 – Total Organic Carbon Data Review, SM 5310B

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? 4/25 vs 4/16	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve?	✓	
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set?		✓ (a)
Did the sample set include an Initial Calibration Blank (ICB), laboratory method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓	
Were quadruplicate measurements taken for each sample?	✓	
Were both the average and the range reported for the quadruplicate measurements?	✓	

METHOD PERFORMANCE	YES	NO
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)?	✓	
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓	
Were the results for the laboratory method blank, the ICB and CCB < MRL?	✓	
Did the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD? (2.5)	✓	

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(a) ICV of 5.0 mg/L analyzed twice. More appropriate because of low sample concentrations.

Attachment 12 – Total Dissolved Solids Data Review, SM 2540C

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? (4/22 vs 4/16)	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the initial volume of each sample 100 mL?		✓
Were any DMP samples diluted prior to processing? (10 mL to 100 mL)	✓	
Were the samples dried twice at 180°C?	✓	
Was the MS/MSD spike concentration higher than 25% of the native sample concentration and thus usable for recovery determination?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)?	✓	
Did the LCS analysis meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓	
If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD? (1.7)	✓	

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Attachment 13 – Total Suspended Solids Data Review, SM 2540D

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? 4/22 vs 4/16	✓	
Were the samples allowed to warm to room temperature prior to filtration?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, and duplicate sample?	✓	
Was the volume of each sample 100 mL?	✓	
Were the samples dried twice at approximately104°C?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights <0.0005 g (0.5 mg)?	✓	
Was the MB result <5.0 mg/L?	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? (11)	✓	

Data Validator 9-10-13 Date

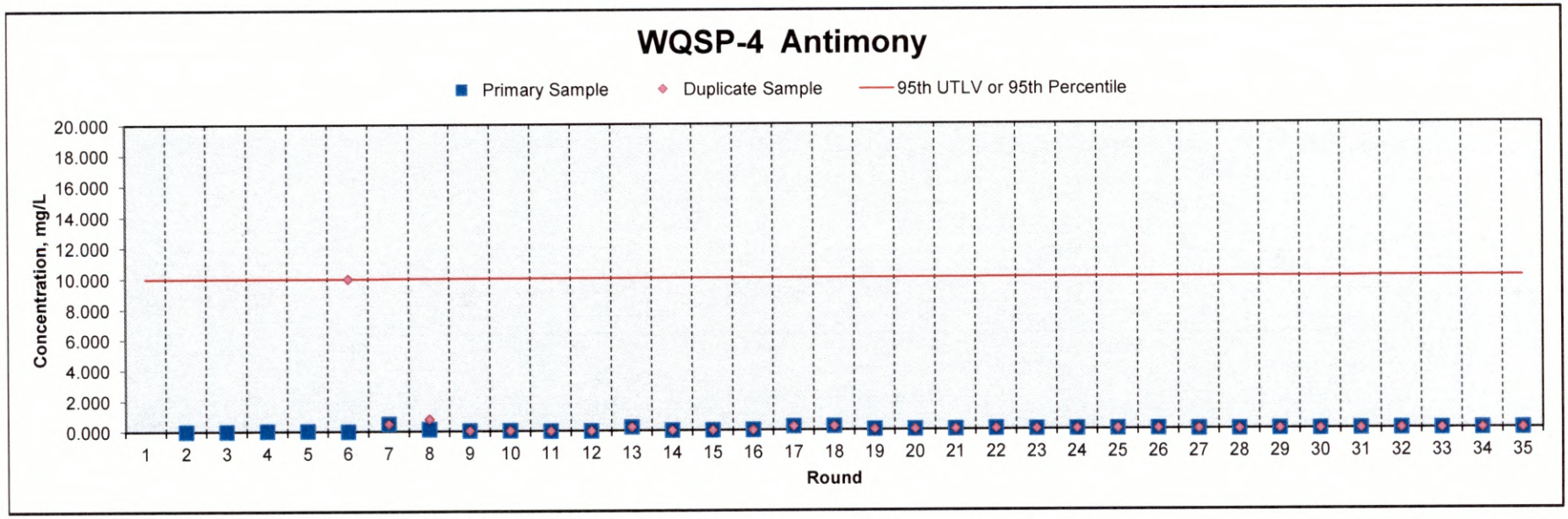
Completeness Reviewer 9/17/13 Date

WQSP-4

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

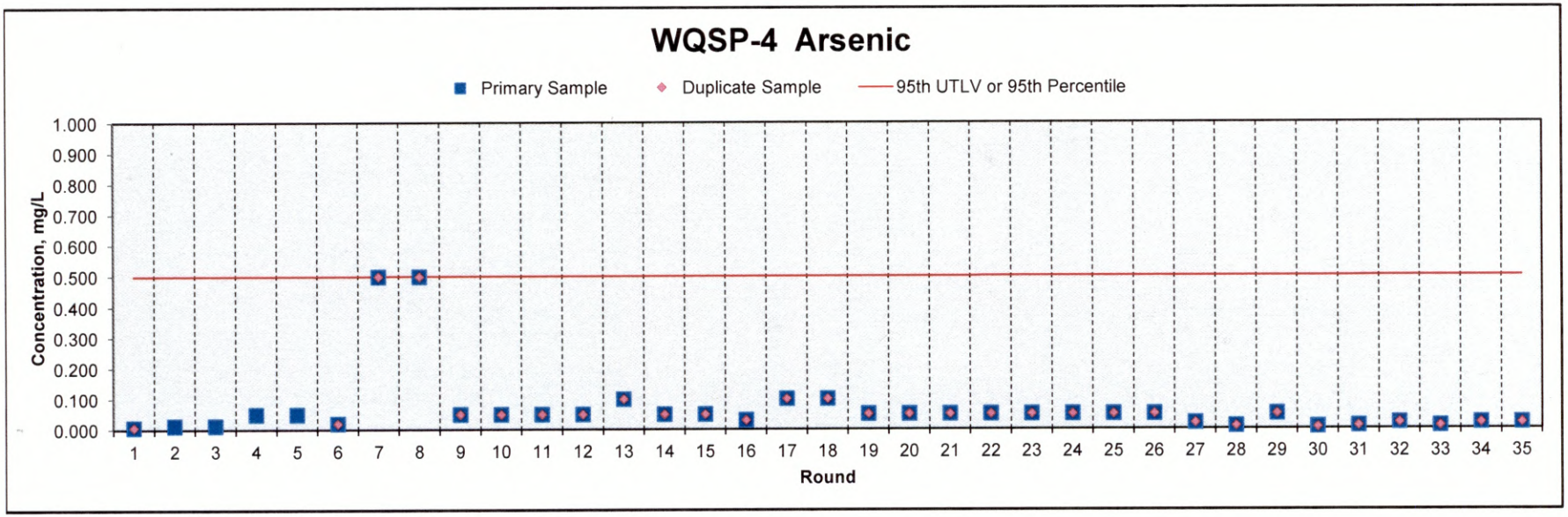
WQSP-4 Antimony

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Antimony	1							< 10.0
Antimony	2	05/23/96	06/18/96	< 0.013		mg/L	0.013	< 10.0
Antimony	3	09/12/96	09/18/96	< 0.013		mg/L	0.013	< 10.0
Antimony	4	06/05/97	06/17/97	< 0.050		mg/L	0.130	< 10.0
Antimony	5	09/11/97	09/30/97	< 0.050		mg/L	0.050	< 10.0
Antimony	6	05/06/98	05/12/98	0.014	< 10.000	mg/L	0.001	< 10.0
Antimony	7	09/23/98	09/28/98	< 0.500	< 0.500	mg/L	0.050	< 10.0
Antimony	8	04/21/99	04/27/99	0.150	0.800	mg/L	0.050	< 10.0
Antimony	9	10/13/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 10.0
Antimony	10	04/12/00	06/19/00	< 0.050	< 0.050	mg/L	0.050	< 10.0
Antimony	26	04/16/08	04/24/08	< 0.050	< 0.050	mg/L	0.050	< 10.0
Antimony	27	10/08/08	10/27/08	< 0.020	< 0.020	mg/L	0.025	< 10.0
Antimony	28	04/15/09	04/21/09	< 0.010	< 0.010	mg/L	0.010	< 10.0
Antimony	29	10/07/09	10/27/09	< 0.025	< 0.025	mg/L	0.025	< 10.0
Antimony	30	04/14/10	04/21/10	< 0.0050	< 0.0050	mg/L	0.005	< 10.0
Antimony	31	10/07/10	10/18/10	< 0.010	< 0.010	mg/L	0.010	< 10.0
Antimony	32	04/20/11	05/09/11	< 0.020	< 0.020	mg/L	0.020	< 10.0
Antimony	33	09/08/11	09/13/11	< 0.010	< 0.010	mg/L	0.010	< 10.0
Antimony	34	04/17/12	05/07/12	< 0.020	< 0.020	mg/L	0.020	< 10.0
Antimony	35	04/16/13	05/01/13	< 0.020	< 0.020	mg/L	0.020	< 10.0



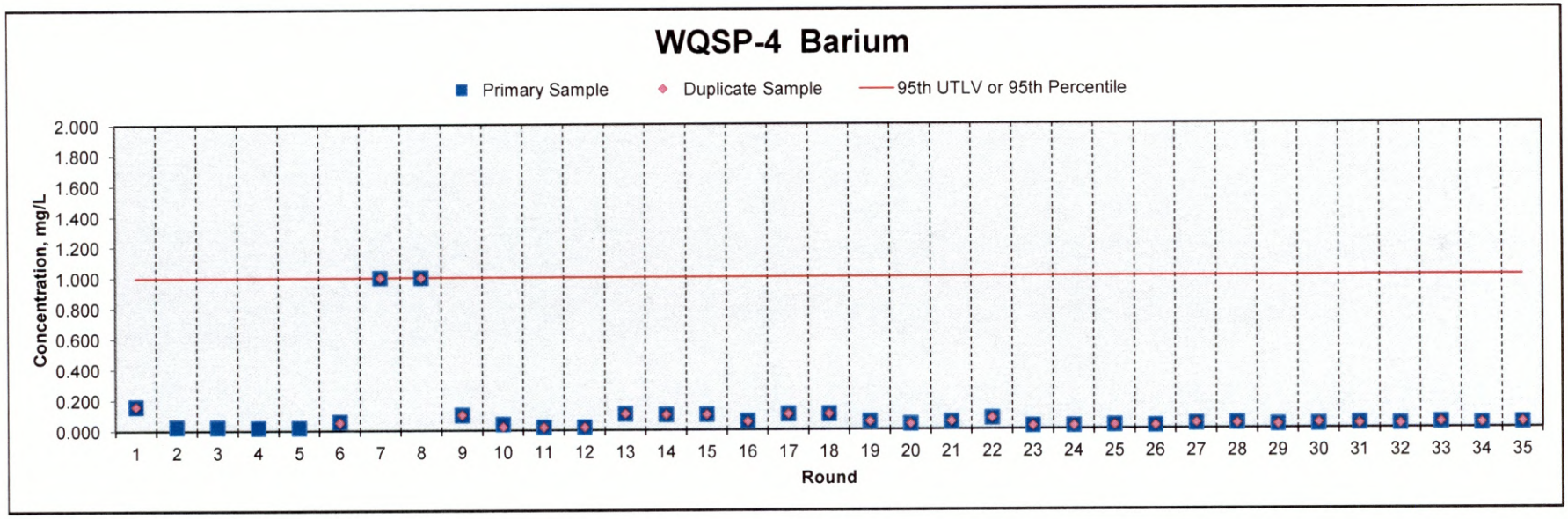
WQSP-4 Arsenic

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Arsenic	1	09/28/95	11/02/95	< 0.008	< 0.008	mg/L	0.008	< 0.5
Arsenic	2	05/23/96	09/18/96	< 0.013		mg/L	0.013	< 0.5
Arsenic	3	09/12/96	09/18/09	< 0.013		mg/L	0.013	< 0.5
Arsenic	4	06/05/97	06/17/97	< 0.050		mg/L	0.050	< 0.5
Arsenic	5	09/11/97	09/30/97	< 0.050		mg/L	0.050	< 0.5
Arsenic	6	05/06/98	05/12/98	< 0.020	< 0.020	mg/L	0.001	< 0.5
Arsenic	7	09/23/98	09/28/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Arsenic	8	04/21/99	04/27/99	< 0.500	< 0.500	mg/L	0.050	< 0.5
Arsenic	9	10/13/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	10	04/12/00	04/24/00	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	26	04/16/08	04/24/08	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	27	10/08/08	10/27/08	< 0.020	< 0.020	mg/L	0.050	< 0.5
Arsenic	28	04/15/09	04/21/09	< 0.010	< 0.010	mg/L	0.050	< 0.5
Arsenic	29	10/07/09	10/27/09	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	30	04/14/10	04/21/10	0.0067	0.0055	mg/L	0.005	< 0.5
Arsenic	31	10/07/10	10/18/10	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	32	04/20/11	05/09/11	< 0.020	< 0.020	mg/L	0.020	< 0.5
Arsenic	33	09/08/11	09/13/11	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	34	04/17/12	05/07/12	< 0.020	< 0.020	mg/L	0.020	< 0.5
Arsenic	35	04/16/13	05/01/13	< 0.020	< 0.020	mg/L	0.020	< 0.5



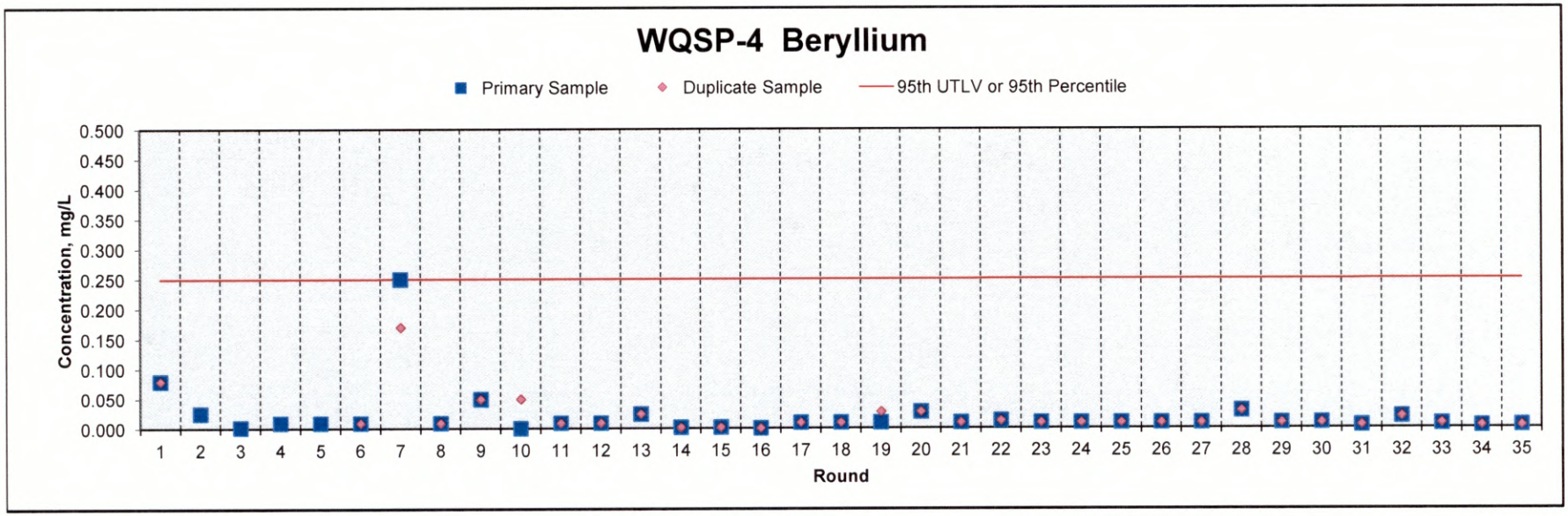
WQSP-4 Barium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Barium	1	09/28/95	10/20/95	< 0.160	< 0.160	mg/L	0.160	1.00
Barium	2	05/23/96	06/18/96	0.026		mg/L	0.005	1.00
Barium	3	09/12/96	09/18/96	0.024		mg/L	0.005	1.00
Barium	4	06/05/97	06/17/97	< 0.020		mg/L	0.020	1.00
Barium	5	09/11/97	09/30/97	< 0.020		mg/L	0.020	1.00
Barium	6	05/06/98	05/12/98	0.059	0.052	mg/L	0.004	1.00
Barium	7	09/23/98	09/28/98	< 1.000	1.000	mg/L	1.000	1.00
Barium	8	04/21/99	04/27/99	< 1.000	< 1.000	mg/L	1.000	1.00
Barium	9	10/13/99	11/25/99	< 0.100	< 0.100	mg/L	0.100	1.00
Barium	10	04/12/00	04/24/00	0.040	0.023	mg/L	0.100	1.00
Barium	26	04/16/08	04/24/08	< 0.020	< 0.020	mg/L	0.020	1.00
Barium	27	10/08/08	10/27/08	0.033	0.036	mg/L	0.020	1.00
Barium	28	04/15/09	04/30/09	0.036	0.033	mg/L	0.010	1.00
Barium	29	10/07/09	11/04/09	0.026	0.026	mg/L	0.020	1.00
Barium	30	04/14/10	04/26/10	0.028	0.036	mg/L	0.020	1.00
Barium	31	10/07/10	10/18/10	0.033	0.028	mg/L	0.004	1.00
Barium	32	04/20/11	05/09/11	0.029	0.027	mg/L	0.020	1.00
Barium	33	09/08/11	09/19/11	0.035	0.038	mg/L	0.023	1.00
Barium	34	04/17/12	04/24/12	0.029	0.033	mg/L	0.013	1.00
Barium	35	04/16/13	06/17/13	0.033	0.037	mg/L	0.0025	1.00



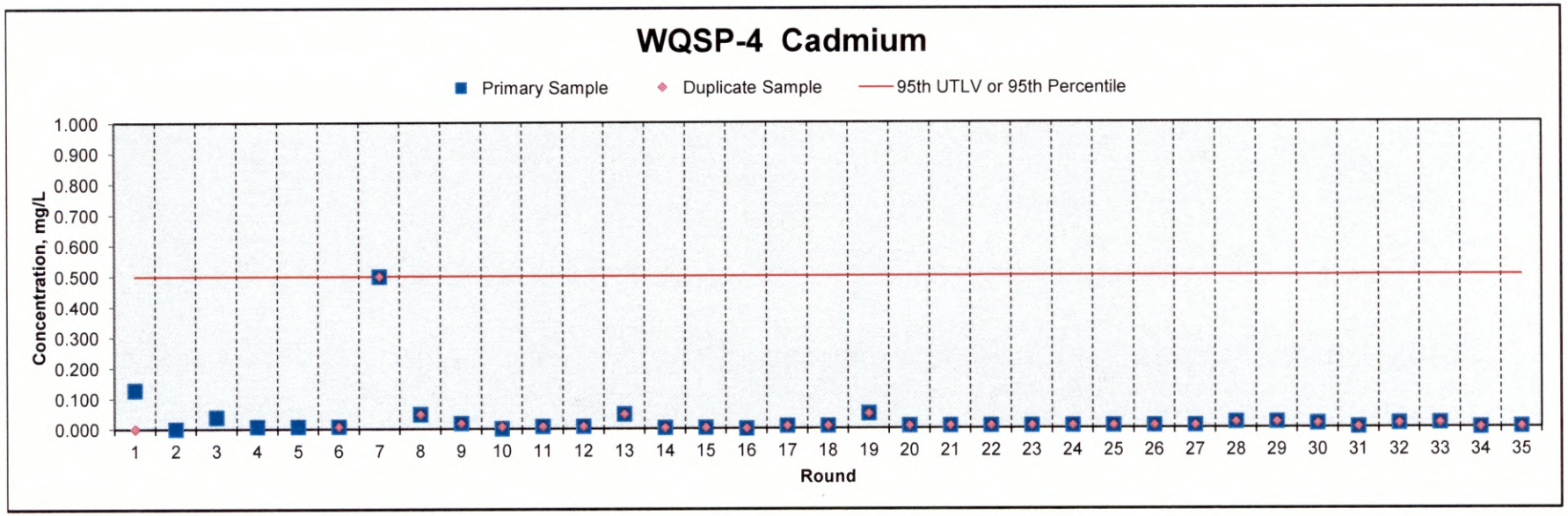
WQSP-4 Beryllium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Beryllium	1	09/28/95	10/20/95	< 0.080	< 0.080	mg/L	0.080	0.25
Beryllium	2	05/23/96	06/18/96	< 0.026		mg/L	0.003	0.25
Beryllium	3	09/12/96	09/18/96	< 0.003		mg/L	0.003	0.25
Beryllium	4	06/05/97	06/17/97	< 0.010		mg/L	0.010	0.25
Beryllium	5	09/11/97	09/30/97	< 0.010		mg/L	0.010	0.25
Beryllium	6	05/06/98	05/12/98	< 0.010	< 0.010	mg/L	0.001	0.25
Beryllium	7	09/23/98	09/28/98	< 0.250	< 0.170	mg/L	0.001	0.25
Beryllium	8	04/21/99	04/27/99	< 0.010	< 0.010	mg/L	0.010	0.25
Beryllium	9	10/13/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	0.25
Beryllium	10	04/12/00	04/24/00	0.001	< 0.050	mg/L	0.050	0.25
Beryllium	26	04/16/08	04/24/08	< 0.010	< 0.010	mg/L	0.010	0.25
Beryllium	27	10/08/08	10/27/08	< 0.010	< 0.010	mg/L	0.010	0.25
Beryllium	28	04/15/09	04/30/09	< 0.030	< 0.030	mg/L	0.030	0.25
Beryllium	29	10/07/09	11/04/09	< 0.010	< 0.010	mg/L	0.010	0.25
Beryllium	30	04/14/10	04/26/10	< 0.010	< 0.010	mg/L	0.010	0.25
Beryllium	31	10/07/10	10/18/10	0.0051	0.0056	mg/L	0.002	0.25
Beryllium	32	04/20/11	05/09/11	< 0.020	< 0.020	mg/L	0.020	0.25
Beryllium	33	09/08/11	09/19/11	0.0076	0.0087	mg/L	0.0042	0.25
Beryllium	34	04/17/12	04/24/12	0.0043	0.0049	mg/L	0.0010	0.25
Beryllium	35	04/16/13	06/17/13	0.0053	0.0046	mg/L	0.0025	0.25



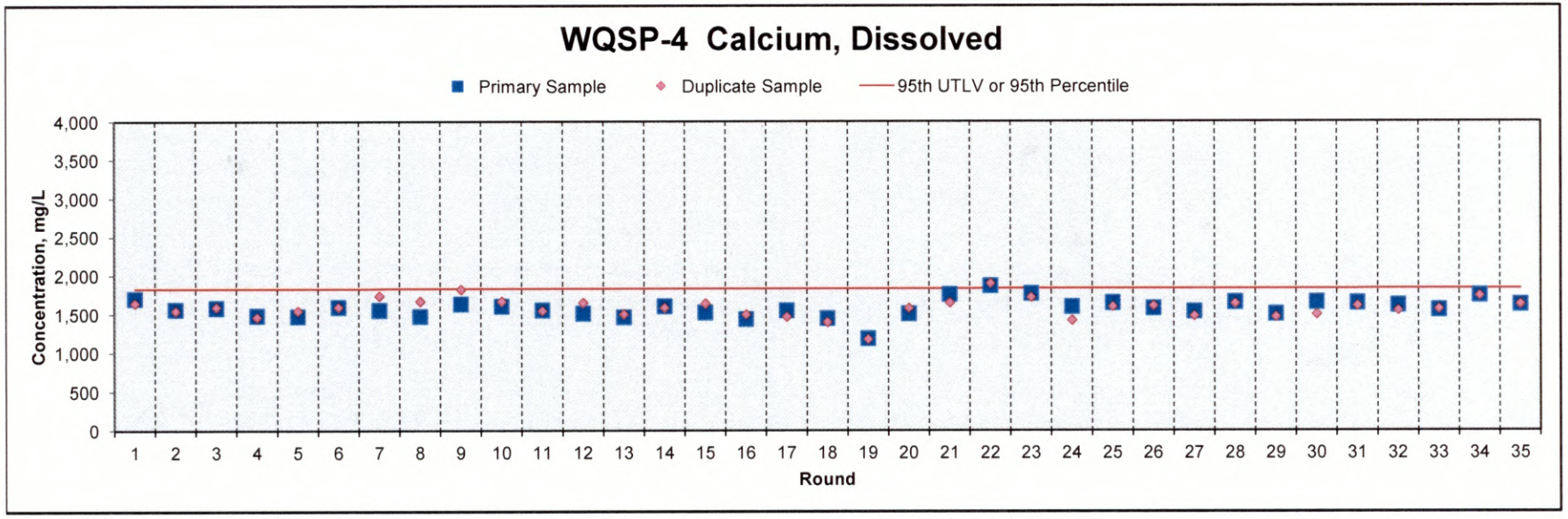
WQSP-4 Cadmium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Cadmium	1	09/28/95	10/16/95	< 0.130	< 0.001	mg/L	0.001	< 0.5
Cadmium	2	05/23/96	06/18/96	< 0.003		mg/L	0.003	< 0.5
Cadmium	3	09/12/96	09/18/96	0.041		mg/L	0.003	< 0.5
Cadmium	4	06/05/97	06/17/97	< 0.010		mg/L	0.025	< 0.5
Cadmium	5	09/11/97	09/30/97	< 0.010		mg/L	0.010	< 0.5
Cadmium	6	05/06/98	05/12/98	< 0.010	< 0.010	mg/L	0.001	< 0.5
Cadmium	7	09/23/98	09/28/98	< 0.500	< 0.500	mg/L	0.005	< 0.5
Cadmium	8	04/21/99	04/27/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Cadmium	9	10/13/99	11/25/99	< 0.020	< 0.020	mg/L	0.020	< 0.5
Cadmium	10	04/12/00	04/24/00	0.003	0.009	mg/L	0.050	< 0.5
Cadmium	26	04/16/08	04/24/08	< 0.010	< 0.010	mg/L	0.010	< 0.5
Cadmium	27	10/08/08	10/27/08	< 0.010	< 0.010	mg/L	0.010	< 0.5
Cadmium	28	04/15/09	04/30/09	< 0.020	< 0.020	mg/L	0.020	< 0.5
Cadmium	29	10/07/09	11/04/09	< 0.020	< 0.020	mg/L	0.020	< 0.5
Cadmium	30	04/14/10	04/26/10	< 0.015	< 0.015	mg/L	0.015	< 0.5
Cadmium	31	10/07/10	10/18/10	< 0.003	< 0.003	mg/L	0.003	< 0.5
Cadmium	32	04/20/11	05/04/11	< 0.015	< 0.015	mg/L	0.015	< 0.5
Cadmium	33	09/08/11	09/19/11	< 0.016	< 0.016	mg/L	0.016	< 0.5
Cadmium	34	04/17/12	04/24/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.5
Cadmium	35	04/16/13	06/18/13	< 0.0040	< 0.0040	mg/L	0.0040	< 0.5



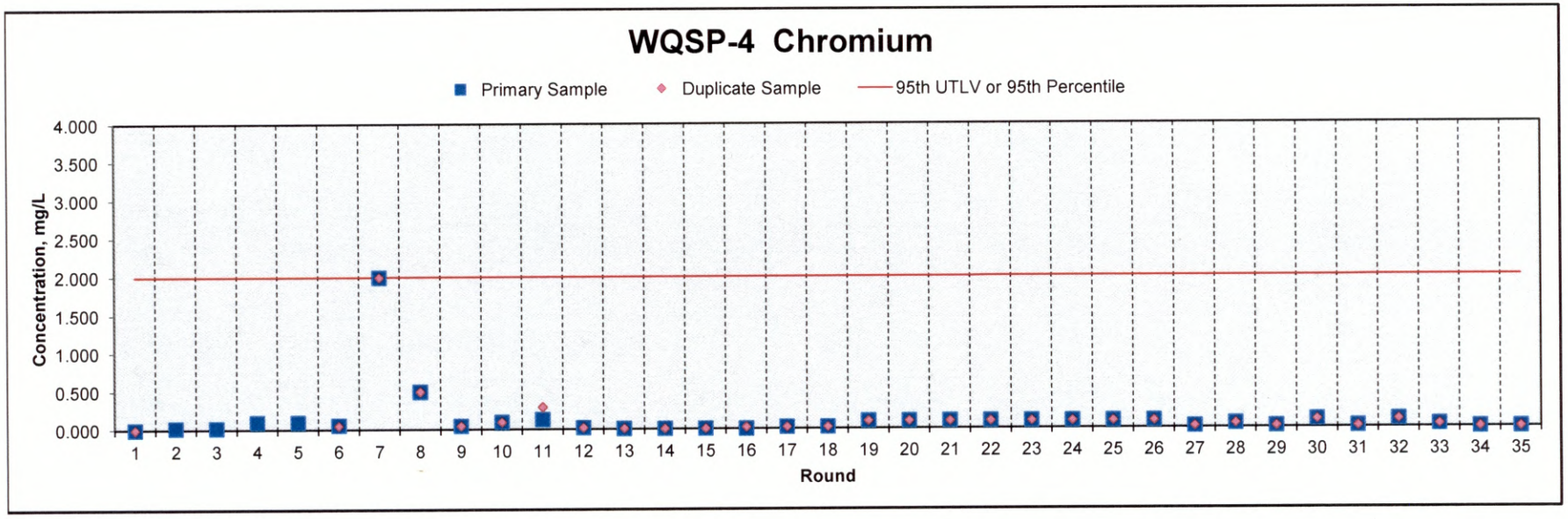
WQSP-4 Calcium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Calcium	1	09/28/95	10/20/95	1,710	1,650	mg/L	40.000	1,834
Calcium	2	05/23/96	06/18/96	1,570	1,550	mg/L	2.000	1,834
Calcium	3	09/12/96	09/18/96	1,590	1,600	mg/L	2.000	1,834
Calcium	4	06/05/97	06/17/97	1,490	1,470	mg/L	2.000	1,834
Calcium	5	09/11/97	09/30/97	1,480	1,550	mg/L	2.000	1,834
Calcium	6	05/06/98	05/12/98	1,600	1,600	mg/L	0.012	1,834
Calcium	7	09/23/98	09/28/98	1,560	1,740	mg/L	0.500	1,834
Calcium	8	04/21/99	04/27/99	1,480	1,670	mg/L	1.000	1,834
Calcium	9	11/25/99	12/01/99	1,640	1,824	mg/L	0.050	1,834
Calcium	10	04/12/00	04/24/00	1,610	1,670	mg/L	0.050	1,834
Calcium	26	04/16/08	04/24/08	1,580	1,610	mg/L	0.500	1,834
Calcium	27	10/08/08	10/23/08	1,540	1,480	mg/L	0.500	1,834
Calcium	28	04/15/09	04/30/09	1,660	1,640	mg/L	0.500	1,834
Calcium	29	10/07/09	11/05/09	1,510	1,470	mg/L	0.500	1,834
Calcium	30	04/14/10	04/20/10	1,660	1,500	mg/L	1.20	1,834
Calcium	31	10/07/10	11/09/10	1,650	1,610	mg/L	0.40	1,834
Calcium	32	04/20/11	05/17/11	1,620	1,550	mg/L	1.1	1,834
Calcium	33	09/08/11	09/19/11	1,560	1,570	mg/L	0.54	1,834
Calcium	34	04/17/12	04/27/12	1,750	1,740	mg/L	0.82	1,834
Calcium	35	04/16/13	05/07/13	1,630	1,630	mg/L	5.60	1,834



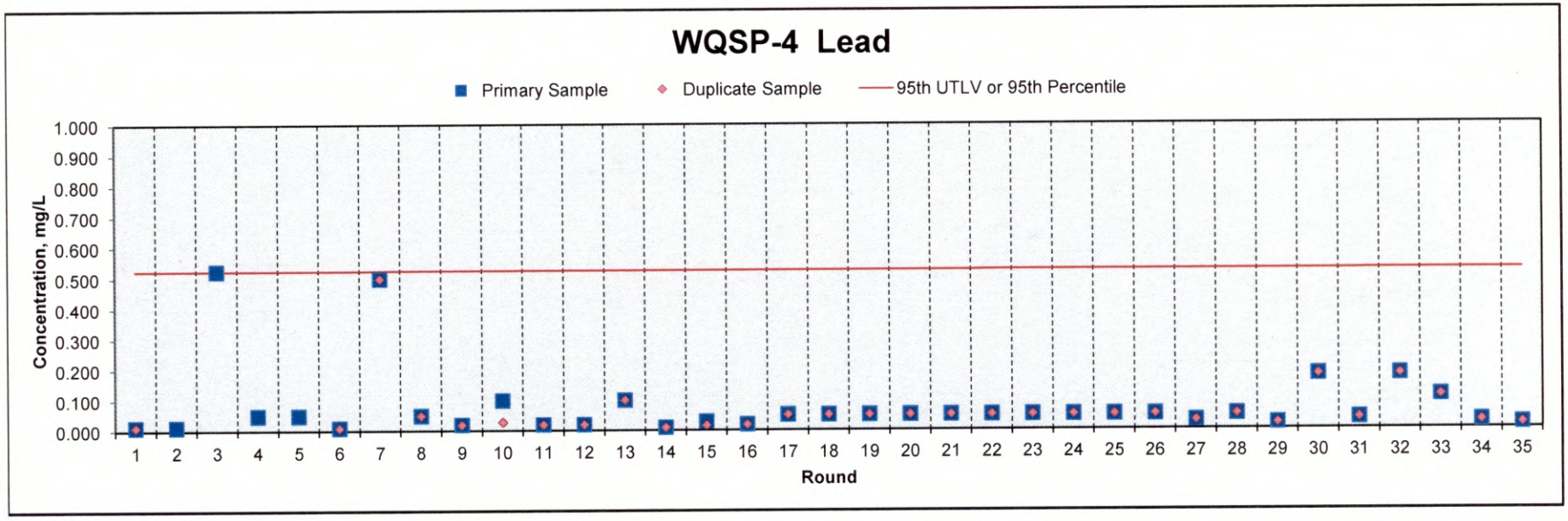
WQSP-4 Chromium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chromium	1	09/28/95	10/16/95	< 0.003	< 0.003	mg/L	0.003	< 2.0
Chromium	2	05/23/96	06/18/96	< 0.025		mg/L	0.025	< 2.0
Chromium	3	09/12/96	09/18/96	< 0.025		mg/L	0.025	< 2.0
Chromium	4	06/05/97	06/17/97	< 0.100		mg/L	0.100	< 2.0
Chromium	5	09/11/97	09/30/97	< 0.100		mg/L	0.100	< 2.0
Chromium	6	05/06/98	05/12/98	0.062	0.055	mg/L	0.001	< 2.0
Chromium	7	09/23/98	09/28/98	< 2.000	< 2.000	mg/L	0.050	< 2.0
Chromium	8	04/21/99	04/27/99	< 0.500	< 0.500	mg/L	0.500	< 2.0
Chromium	9	10/13/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 2.0
Chromium	10	04/12/00	04/24/00	< 0.100	< 0.100	mg/L	0.050	< 2.0
Chromium	26	04/16/08	04/24/08	< 0.100	< 0.100	mg/L	0.1	< 2.0
Chromium	27	10/08/08	10/27/08	< 0.025	< 0.025	mg/L	0.025	< 2.0
Chromium	28	04/15/09	04/30/09	< 0.060	< 0.060	mg/L	0.060	< 2.0
Chromium	29	10/07/09	11/04/09	< 0.025	< 0.025	mg/L	0.025	< 2.0
Chromium	30	04/14/10	04/26/10	< 0.11	< 0.11	mg/L	0.11	< 2.0
Chromium	31	10/07/10	10/18/10	< 0.022	< 0.022	mg/L	0.022	< 2.0
Chromium	32	04/20/11	05/04/11	< 0.11	< 0.11	mg/L	0.11	< 2.0
Chromium	33	09/08/11	09/19/11	< 0.042	< 0.042	mg/L	0.042	< 2.0
Chromium	34	04/17/12	04/24/12	< 0.0080	< 0.0080	mg/L	0.0080	< 2.0
Chromium	35	04/16/13	06/17/13	< 0.0075	< 0.0075	mg/L	0.0075	< 2.0



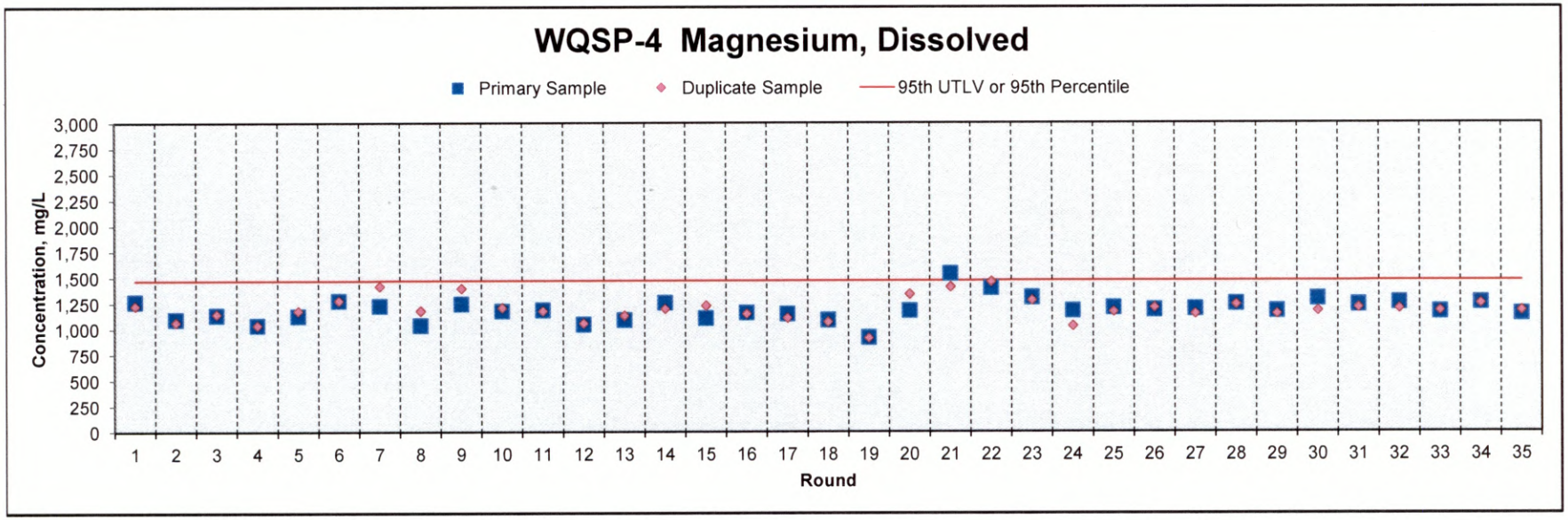
WQSP-4 Lead

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Lead	1	09/28/95	10/16/95	< 0.013	< 0.013	mg/L	0.013	0.525
Lead	2	05/23/96	06/18/96	< 0.013		mg/L	0.013	0.525
Lead	3	09/12/96	09/18/96	0.525		mg/L	0.013	0.525
Lead	4	06/05/97	06/17/97	< 0.050		mg/L	0.050	0.525
Lead	5	09/11/97	09/30/97	< 0.050		mg/L	0.050	0.525
Lead	6	05/06/98	05/12/98	0.010	< 0.010	mg/L	0.001	0.525
Lead	7	09/23/98	09/28/98	< 0.500	< 0.500	mg/L	0.005	0.525
Lead	8	04/21/99	04/27/99	< 0.050	< 0.050	mg/L	0.050	0.525
Lead	9	10/13/99	11/25/99	< 0.020	< 0.020	mg/L	0.020	0.525
Lead	10	04/12/00	04/24/00	< 0.100	0.028	mg/L	0.050	0.525
Lead	26	04/16/08	04/24/08	< 0.050	< 0.050	mg/L	0.050	0.525
Lead	27	10/08/08	10/27/08	< 0.029	< 0.029	mg/L	0.500	0.525
Lead	28	04/15/09	04/30/09	< 0.050	< 0.050	mg/L	0.050	0.525
Lead	29	10/07/09	11/04/09	< 0.020	< 0.020	mg/L	0.020	0.525
Lead	30	04/14/10	04/26/10	< 0.18	< 0.18	mg/L	0.107	0.525
Lead	31	10/07/10	10/18/10	< 0.036	< 0.036	mg/L	0.036	0.525
Lead	32	04/20/11	05/09/11	< 0.18	< 0.18	mg/L	0.18	0.525
Lead	33	09/08/11	09/19/11	< 0.11	< 0.11	mg/L	0.11	0.525
Lead	34	04/17/12	04/24/12	< 0.026	< 0.026	mg/L	0.026	0.525
Lead	35	04/16/13	06/18/13	< 0.017	< 0.017	mg/L	0.017	0.525



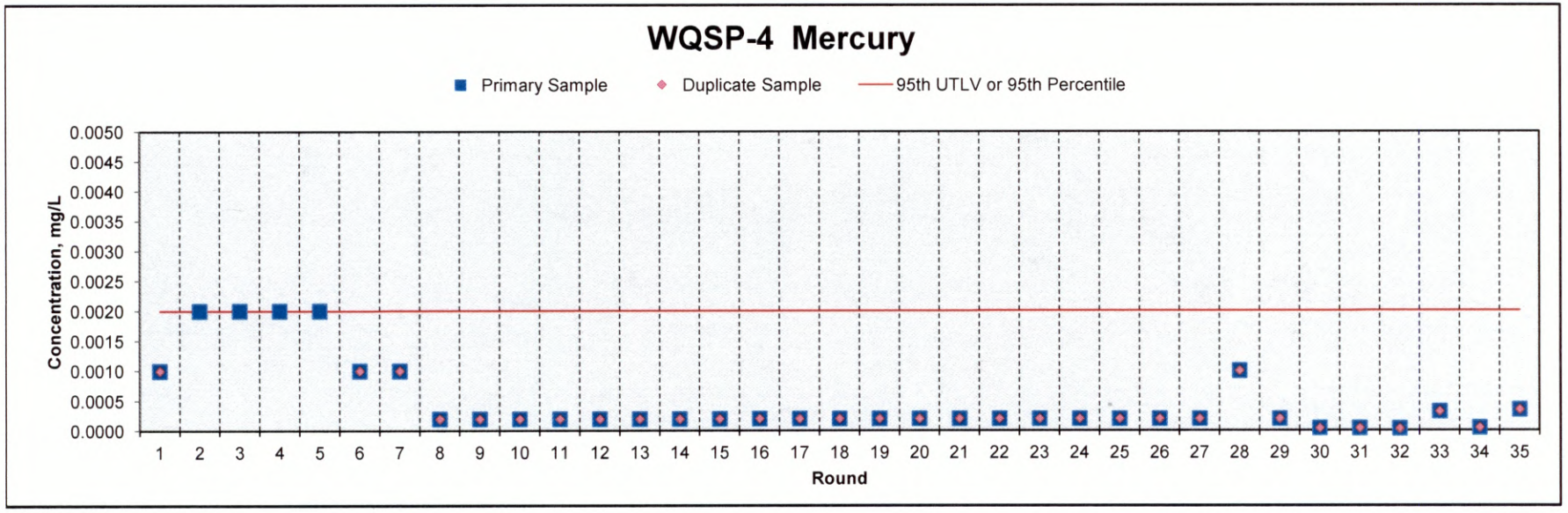
WQSP-4 Magnesium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Magnesium	1	09/28/95	10/20/95	1,270	1,230	mg/L	4.000	1,472
Magnesium	2	05/23/96	06/18/96	1,100	1,070	mg/L	0.500	1,472
Magnesium	3	09/12/96	09/18/96	1,140	1,150	mg/L	0.500	1,472
Magnesium	4	06/05/97	06/17/97	1,040	1,040	mg/L	1.000	1,472
Magnesium	5	09/11/97	09/30/97	1,130	1,180	mg/L	1.000	1,472
Magnesium	6	05/06/98	05/12/98	1,280	1,280	mg/L	0.072	1,472
Magnesium	7	09/23/98	09/28/98	1,230	1,420	mg/L	0.500	1,472
Magnesium	8	04/21/99	04/27/99	1,040	1,180	mg/L	1.000	1,472
Magnesium	9	10/13/99	12/01/99	1,249	1,397	mg/L	0.500	1,472
Magnesium	10	04/12/00	04/24/00	1,180	1,210	mg/L	0.050	1,472
Magnesium	26	04/16/08	04/24/08	1,190	1,210	mg/L	0.500	1,472
Magnesium	27	10/08/08	10/23/08	1,200	1,150	mg/L	0.500	1,472
Magnesium	28	04/15/09	04/30/09	1,250	1,240	mg/L	0.500	1,472
Magnesium	29	10/07/09	11/05/09	1,180	1,150	mg/L	0.500	1,472
Magnesium	30	04/14/10	04/20/10	1,300	1,180	mg/L	0.82	1,472
Magnesium	31	10/07/10	11/09/10	1,240	1,210	mg/L	0.33	1,472
Magnesium	32	04/20/11	05/17/11	1,260	1,200	mg/L	1.1	1,472
Magnesium	33	09/08/11	09/19/11	1,170	1,180	mg/L	0.5	1,472
Magnesium	34	04/17/12	04/27/12	1,260	1,250	mg/L	0.66	1,472
Magnesium	35	04/16/13	05/06/13	1,150	1,180	mg/L	0.83	1,472



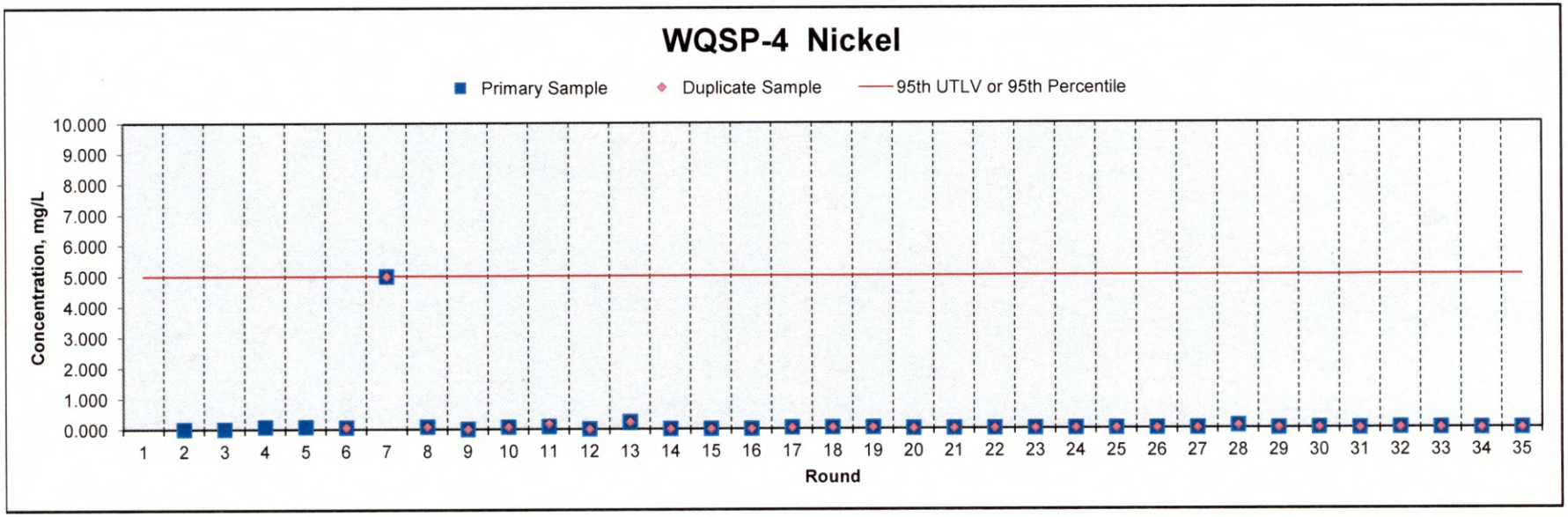
WQSP-4 Mercury

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Mercury	1	09/28/95	10/05/95	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	2	05/23/96	05/28/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	3	09/12/96	09/18/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	4	06/05/97	06/10/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	5	09/11/97	09/17/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	6	05/06/98	05/12/98	< 0.0010	< 0.0010	mg/L	0.0001	< 0.002
Mercury	7	09/23/98	09/28/98	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	8	04/21/99	04/26/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	9	10/13/99	11/01/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	10	04/12/00	04/19/00	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	26	04/16/08	04/21/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	27	10/08/08	10/24/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	28	04/15/09	05/01/09	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	29	10/07/09	10/29/09	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	30	04/14/10	04/15/10	< 0.00004	< 0.00004	mg/L	0.00004	< 0.002
Mercury	31	10/07/10	10/19/10	< 0.000037	< 0.000037	mg/L	0.000037	< 0.002
Mercury	32	04/20/11	05/18/11	< 0.000032	< 0.000032	mg/L	0.000032	< 0.002
Mercury	33	09/08/11	09/12/11	< 0.00032	< 0.00032	mg/L	0.00032	< 0.002
Mercury	34	04/17/12	05/01/12	0.000047	0.000048	mg/L	0.000020	< 0.002
Mercury	35	04/16/13	04/25/13	< 0.00035	< 0.00035	mg/L	0.00035	< 0.002



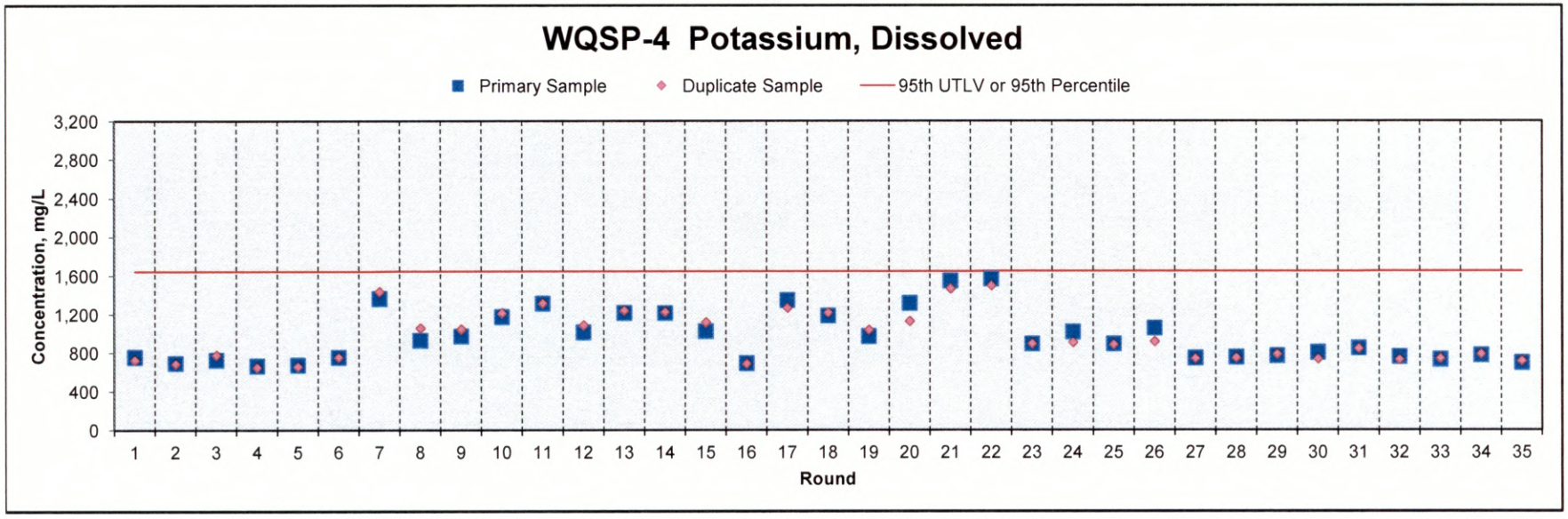
WQSP-4 Nickel

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Nickel	1					mg/L		< 5.0
Nickel	2	05/23/96	06/18/96	< 0.025		mg/L	0.025	< 5.0
Nickel	3	09/12/96	09/18/96	< 0.025		mg/L	0.025	< 5.0
Nickel	4	06/05/97	06/17/97	< 0.100		mg/L	0.100	< 5.0
Nickel	5	09/11/97	09/30/97	< 0.100		mg/L	0.100	< 5.0
Nickel	6	05/06/98	05/12/98	< 0.080	< 0.080	mg/L	0.008	< 5.0
Nickel	7	09/23/98	09/28/98	< 5.000	< 5.000	mg/L	0.100	< 5.0
Nickel	8	04/21/99	04/27/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Nickel	9	10/13/99	11/25/99	< 0.020	< 0.020	mg/L	0.020	< 5.0
Nickel	10	04/12/00	04/24/00	0.091	0.091	mg/L	0.100	< 5.0
Nickel	26	04/16/08	04/24/08	< 0.025	< 0.025	mg/L	0.025	< 5.0
Nickel	27	10/08/08	10/27/08	< 0.025	< 0.025	mg/L	0.025	< 5.0
Nickel	28	04/15/09	04/30/09	< 0.100	< 0.100	mg/L	0.100	< 5.0
Nickel	29	10/07/09	11/04/09	0.016	0.026	mg/L	0.025	< 5.0
Nickel	30	04/14/10	04/26/10	< 0.025	< 0.025	mg/L	0.025	< 5.0
Nickel	31	10/07/10	10/18/10	< 0.005	< 0.005	mg/L	0.005	< 5.0
Nickel	32	04/20/11	05/04/11	< 0.025	< 0.025	mg/L	0.025	< 5.0
Nickel	33	09/08/11	09/19/11	< 0.016	< 0.016	mg/L	0.016	< 5.0
Nickel	34	04/17/12	04/24/12	< 0.0060	< 0.0060	mg/L	0.0060	< 5.0
Nickel	35	04/16/13	06/17/13	< 0.0070	< 0.0070	mg/L	0.0070	< 5.0



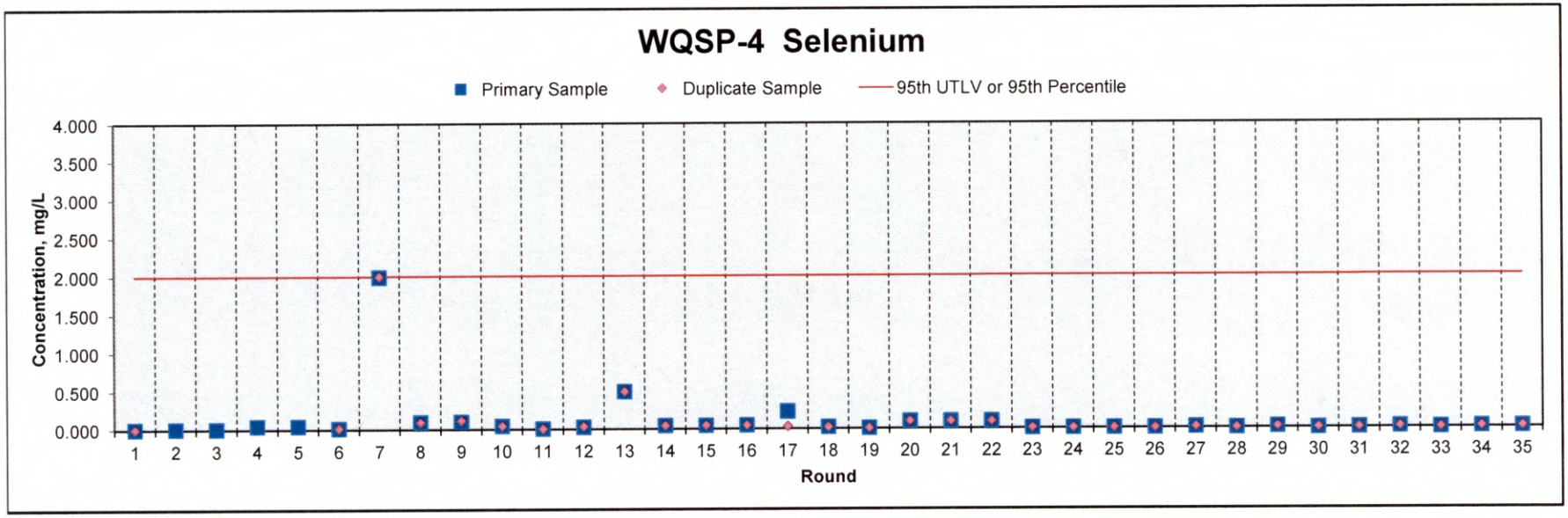
WQSP-4 Potassium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Potassium	1	09/28/95	10/20/95	764	732	mg/L	40.000	1,648
Potassium	2	05/23/96	05/29/96	700	691	mg/L	2.000	1,648
Potassium	3	09/12/96	09/20/96	733	782	mg/L	2.000	1,648
Potassium	4	06/05/97	06/13/97	672	654	mg/L	2.000	1,648
Potassium	5	09/11/97	09/19/97	681	664	mg/L	2.000	1,648
Potassium	6	05/06/98	05/12/98	760	760	mg/L	0.074	1,648
Potassium	7	09/23/98	09/28/98	1,370	1,440	mg/L	0.500	1,648
Potassium	8	04/21/99	04/27/99	935	1,060	mg/L	1.000	1,648
Potassium	9	10/13/99	12/01/99	980	1,049	mg/L	0.500	1,648
Potassium	10	04/12/00	04/24/00	1,180	1,217	mg/L	0.050	1,648
Potassium	26	04/16/08	04/24/08	1,060	916	mg/L	0.500	1,648
Potassium	27	10/08/08	10/23/08	750	744	mg/L	0.500	1,648
Potassium	28	04/15/09	04/30/09	760	751	mg/L	0.500	1,648
Potassium	29	10/07/09	10/27/09	775	788	mg/L	0.500	1,648
Potassium	30	04/14/10	04/20/10	808	739	mg/L	2.6	1,648
Potassium	31	10/07/10	11/09/10	851	845	mg/L	1.0	1,648
Potassium	32	04/20/11	05/17/11	763	731	mg/L	8.4	1,648
Potassium	33	09/08/11	09/19/11	734	743	mg/L	4.2	1,648
Potassium	34	04/17/12	04/27/12	780	789	mg/L	3.4	1,648
Potassium	35	04/16/13	05/06/13	701	717	mg/L	5.0	1,648



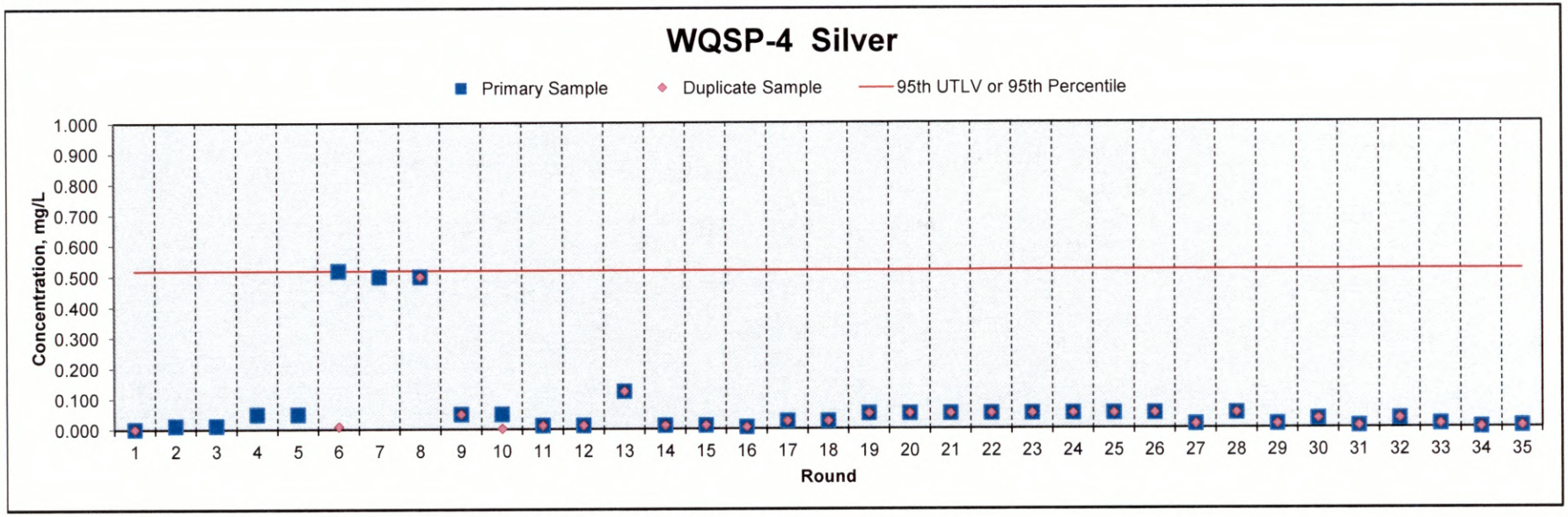
WQSP-4 Selenium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Selenium	1	09/28/95	11/06/95	< 0.010	< 0.010	mg/L	0.010	2.009
Selenium	2	05/23/96	06/18/96	< 0.013		mg/L	0.013	2.009
Selenium	3	09/12/96	09/18/96	< 0.013		mg/L	0.013	2.009
Selenium	4	06/05/97	06/17/97	< 0.050		mg/L	0.050	2.009
Selenium	5	09/11/97	09/30/97	< 0.050		mg/L	0.050	2.009
Selenium	6	05/06/98	05/12/98	< 0.020	< 0.020	mg/L	0.001	2.009
Selenium	7	09/23/98	09/28/98	< 2.000	2.009	mg/L	0.010	2.009
Selenium	8	04/21/99	04/27/99	< 0.100	< 0.100	mg/L	0.100	2.009
Selenium	9	10/13/99	11/25/99	0.106	0.122	mg/L	0.050	2.009
Selenium	10	04/12/00	04/24/00	< 0.050	< 0.050	mg/L	0.050	2.009
Selenium	26	04/16/08	04/24/08	< 0.010	< 0.010	mg/L	0.010	2.009
Selenium	27	10/08/08	10/27/08	< 0.020	< 0.020	mg/L	0.025	2.009
Selenium	28	04/15/09	04/30/09	< 0.010	< 0.010	mg/L	0.010	2.009
Selenium	29	10/07/09	10/27/09	< 0.025	< 0.025	mg/L	0.025	2.009
Selenium	30	04/14/10	04/21/10	0.0062	0.0083	mg/L	0.005	2.009
Selenium	31	10/07/10	10/18/10	< 0.010	< 0.010	mg/L	0.010	2.009
Selenium	32	04/20/11	05/09/11	< 0.020	< 0.020	mg/L	0.020	2.009
Selenium	33	09/08/11	09/13/11	< 0.010	< 0.010	mg/L	0.010	2.009
Selenium	34	04/17/12	05/07/12	< 0.020	< 0.020	mg/L	0.020	2.009
Selenium	35	04/16/13	05/01/13	< 0.020	< 0.020	mg/L	0.020	2.009



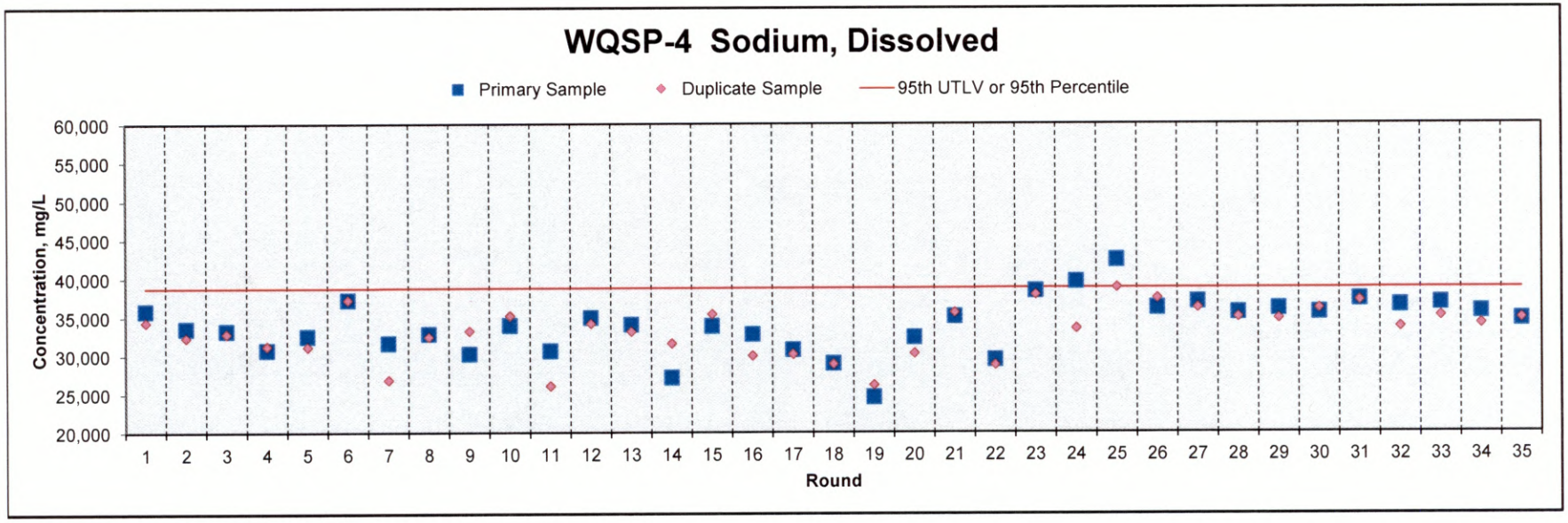
WQSP-4 Silver

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Silver	1	09/28/95	10/16/95	< 0.003	< 0.003	mg/L	0.003	0.519
Silver	2	05/23/96	06/18/96	< 0.013		mg/L	0.013	0.519
Silver	3	09/12/96	09/18/96	< 0.013		mg/L	0.013	0.519
Silver	4	06/05/97	06/17/97	< 0.050		mg/L	0.050	0.519
Silver	5	09/11/97	09/30/97	< 0.050		mg/L	0.050	0.519
Silver	6	05/06/98	05/12/98	0.519	< 0.010	mg/L	0.001	0.519
Silver	7	09/23/98	09/28/98	< 0.500		mg/L	0.050	0.519
Silver	8	04/21/99	04/27/99	< 0.500	< 0.500	mg/L	0.500	0.519
Silver	9	10/13/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	0.519
Silver	10	04/12/00	04/24/00	< 0.050	0.002	mg/L	0.050	0.519
Silver	26	04/16/08	04/24/08	< 0.050	< 0.050	mg/L	0.050	0.519
Silver	27	10/08/08	10/27/08	< 0.013	< 0.013	mg/L	0.013	0.519
Silver	28	04/15/09	04/30/09	< 0.050	< 0.050	mg/L	0.050	0.519
Silver	29	10/07/09	11/04/09	< 0.013	< 0.013	mg/L	0.013	0.519
Silver	30	04/14/10	04/26/10	< 0.030	< 0.030	mg/L	0.030	0.519
Silver	31	10/07/10	10/18/10	< 0.006	< 0.006	mg/L	0.006	0.519
Silver	32	04/20/11	05/04/11	< 0.030	< 0.030	mg/L	0.030	0.519
Silver	33	09/08/11	09/16/11	< 0.012	< 0.012	mg/L	0.012	0.519
Silver	34	04/17/12	04/24/12	< 0.0020	< 0.0020	mg/L	0.0020	0.519
Silver	35	04/16/13	06/18/13	< 0.0055	< 0.0055	mg/L	0.0055	0.519



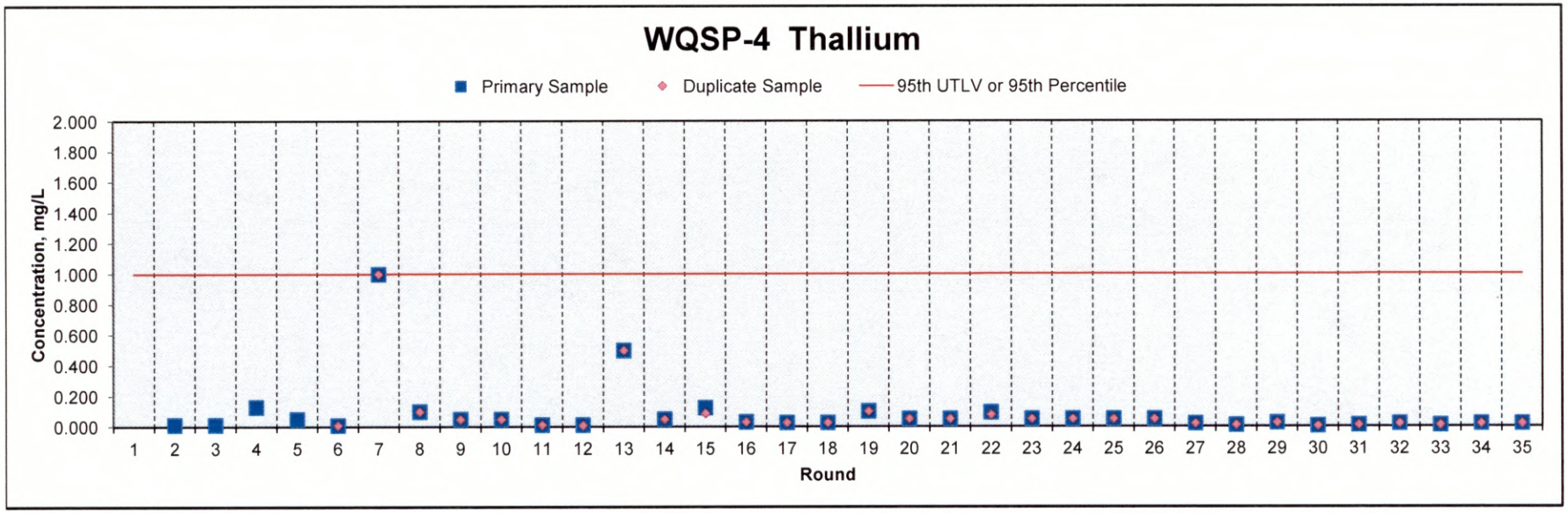
WQSP-4 Sodium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sodium	1	09/28/95	10/20/95	35,900	34,400	mg/L	100.0	38,790
Sodium	2	05/23/96	05/29/96	33,600	32,400	mg/L	25.0	38,790
Sodium	3	09/12/96	09/20/96	33,300	32,900	mg/L	5.0	38,790
Sodium	4	06/05/97	06/13/97	30,800	31,300	mg/L	25.0	38,790
Sodium	5	09/11/97	09/19/97	32,600	31,200	mg/L	25.0	38,790
Sodium	6	05/06/98	05/12/98	37,300	37,300	mg/L	0.0	38,790
Sodium	7	09/23/98	09/28/98	31,700	26,900	mg/L	0.5	38,790
Sodium	8	04/21/99	04/27/99	32,900	32,500	mg/L	1.0	38,790
Sodium	9	10/13/99	12/01/99	30,310	33,250	mg/L	0.5	38,790
Sodium	10	04/12/00	04/24/00	34,000	35,200	mg/L	0.1	38,790
Sodium	26	04/16/08	04/24/08	36,200	37,400	mg/L	0.5	38,790
Sodium	27	10/08/08	10/23/08	37,000	36,200	mg/L	0.5	38,790
Sodium	28	04/15/09	04/30/09	35,600	35,000	mg/L	0.5	38,790
Sodium	29	10/07/09	11/05/09	36,100	34,800	mg/L	0.5	38,790
Sodium	30	04/14/10	04/20/10	35,600	36,100	mg/L	14	38,790
Sodium	31	10/07/10	11/09/10	37,300	37,100	mg/L	27	38,790
Sodium	32	04/20/11	05/17/11	36,500	33,700	mg/L	64	38,790
Sodium	33	09/08/11	09/19/11	36,800	35,100	mg/L	64	38,790
Sodium	34	04/17/12	05/01/12	35,700	34,100	mg/L	12	38,790
Sodium	35	04/16/13	05/06/13	34,700	34,800	mg/L	80	38,790



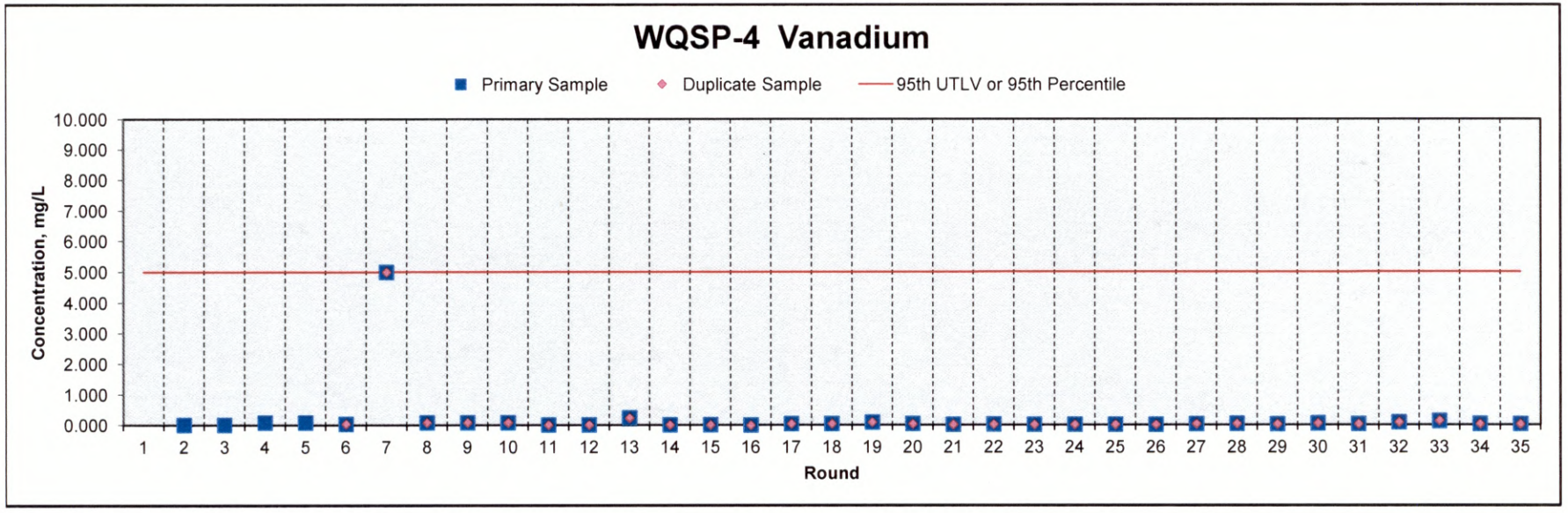
WQSP-4 Thallium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Thallium	1					mg/L		1.00
Thallium	2	05/23/96	06/18/96	< 0.013		mg/L	0.013	1.00
Thallium	3	09/12/96	09/18/96	< 0.013		mg/L	0.013	1.00
Thallium	4	06/05/97	06/17/97	< 0.130		mg/L	0.130	1.00
Thallium	5	09/11/97	09/30/97	< 0.050		mg/L	0.050	1.00
Thallium	6	05/06/98	05/12/98	< 0.010	< 0.010	mg/L	0.001	1.00
Thallium	7	09/23/98	09/28/98	< 1.000	1.000	mg/L	0.005	1.00
Thallium	8	04/21/99	04/27/99	< 0.100	< 0.100	mg/L	0.100	1.00
Thallium	9	10/13/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	1.00
Thallium	10	04/12/00	04/24/00	< 0.050	< 0.050	mg/L	0.050	1.00
Thallium	26	04/16/08	04/24/08	< 0.050	< 0.050	mg/L	0.050	1.00
Thallium	27	10/08/08	10/27/08	< 0.020	< 0.020	mg/L	0.025	1.00
Thallium	28	04/15/09	04/30/09	< 0.010	< 0.010	mg/L	0.010	1.00
Thallium	29	10/07/09	10/27/09	< 0.025	< 0.025	mg/L	0.025	1.00
Thallium	30	04/14/10	04/21/10	< 0.005	< 0.0050	mg/L	0.005	1.00
Thallium	31	10/07/10	10/18/10	< 0.010	< 0.010	mg/L	0.010	1.00
Thallium	32	04/20/11	05/09/11	< 0.020	< 0.020	mg/L	0.020	1.00
Thallium	33	09/08/11	09/13/11	< 0.010	< 0.010	mg/L	0.010	1.00
Thallium	34	04/17/12	05/07/12	< 0.020	< 0.020	mg/L	0.020	1.00
Thallium	35	04/16/13	05/01/13	< 0.020	< 0.020	mg/L	0.020	1.00



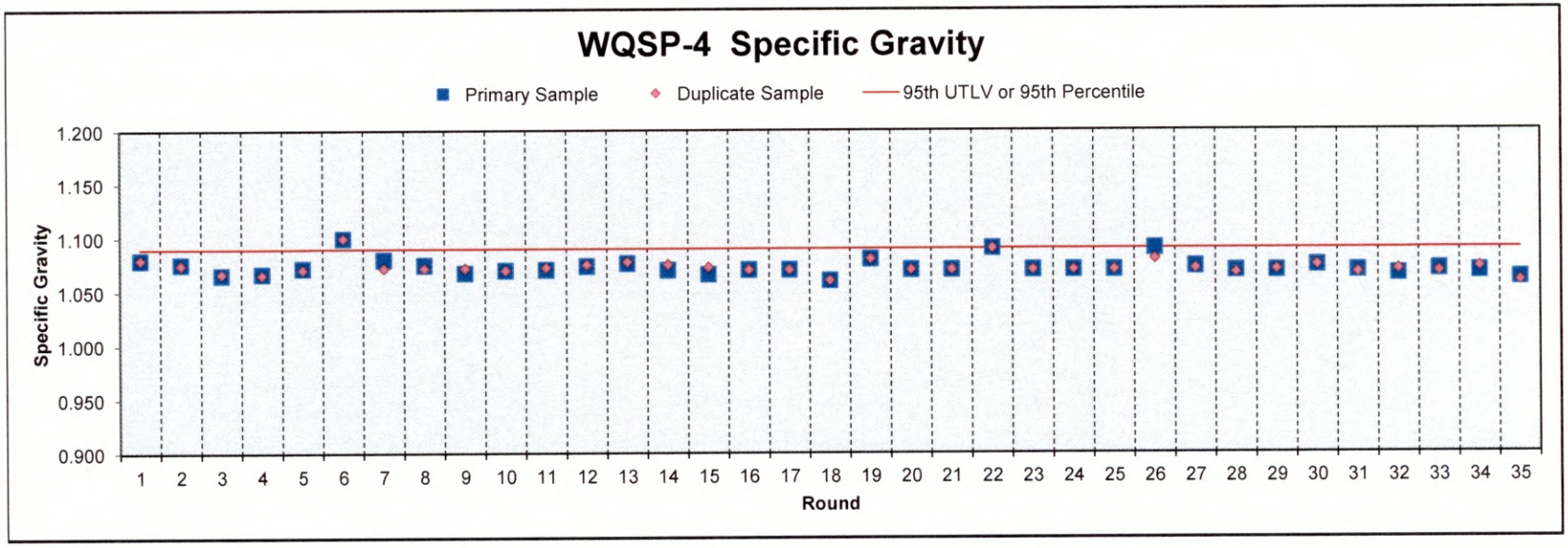
WQSP-4 Vanadium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Vanadium	1					mg/L		< 5.0
Vanadium	2	05/23/96	06/18/96	< 0.025		mg/L	0.025	< 5.0
Vanadium	3	09/12/96	09/18/96	< 0.025		mg/L	0.025	< 5.0
Vanadium	4	06/05/97	06/17/97	< 0.100		mg/L	0.100	< 5.0
Vanadium	5	09/11/97	09/30/97	< 0.100		mg/L	0.100	< 5.0
Vanadium	6	05/06/98	05/12/98	< 0.050	< 0.050	mg/L	0.005	< 5.0
Vanadium	7	09/23/98	09/28/98	< 5.000	< 5.000	mg/L	0.100	< 5.0
Vanadium	8	04/21/99	04/27/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Vanadium	9	10/13/99	11/25/99	< 0.100	< 0.100	mg/L	0.100	< 5.0
Vanadium	10	04/12/00	04/24/00	< 0.100	< 0.100	mg/L	0.050	< 5.0
Vanadium	26	04/16/08	04/24/08	< 0.025	< 0.025	mg/L	0.025	< 5.0
Vanadium	27	10/08/08	10/27/08	< 0.043	< 0.046	mg/L	0.025	< 5.0
Vanadium	28	04/15/09	04/30/09	0.055	0.055	mg/L	0.500	< 5.0
Vanadium	29	10/07/09	11/04/09	0.042	0.039	mg/L	0.025	< 5.0
Vanadium	30	04/14/10	04/26/10	0.066	0.066	mg/L	0.055	< 5.0
Vanadium	31	10/07/10	10/18/10	0.040	0.042	mg/L	0.011	< 5.0
Vanadium	32	04/20/11	05/09/11	< 0.10	< 0.10	mg/L	0.10	< 5.0
Vanadium	33	09/08/11	09/16/11	0.14	0.15	mg/L	0.011	< 5.0
Vanadium	34	04/17/12	04/24/12	0.045	0.046	mg/L	0.0040	< 5.0
Vanadium	35	04/16/13	06/17/13	0.043	0.038	mg/L	0.018	< 5.0



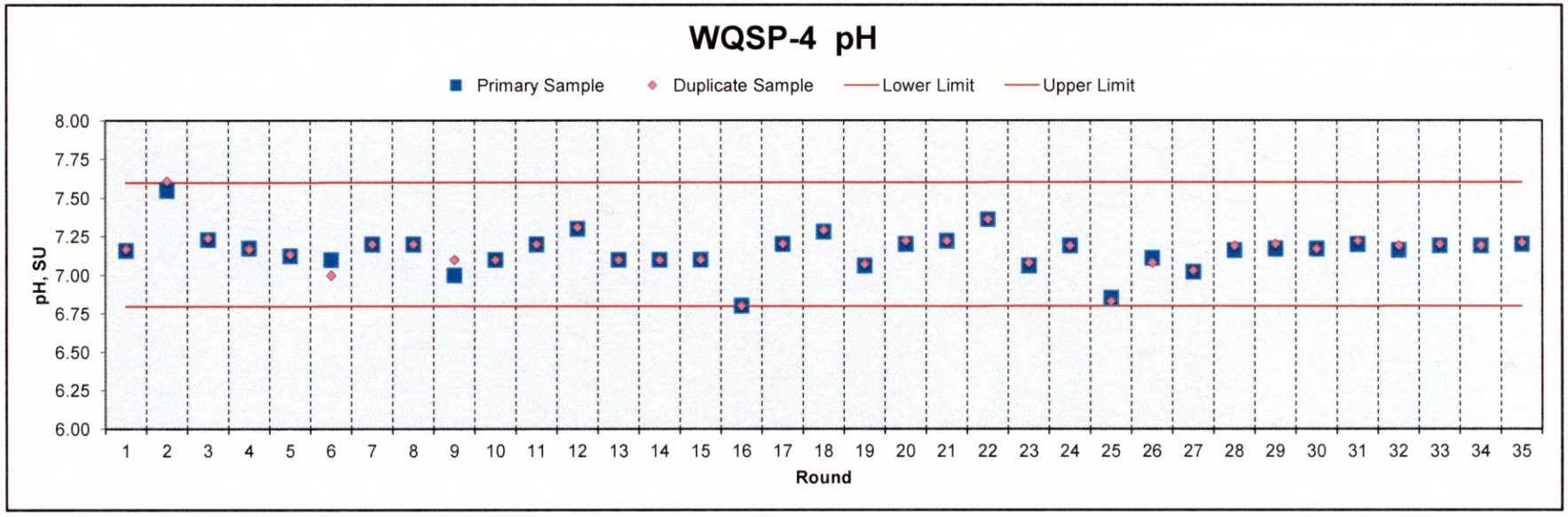
WQSP-4 Specific Gravity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Density	1	09/28/95	10/12/95	1.080	1.080	g/mL	0.0	1.09
Density	2	05/23/96	05/31/96	1.076	1.075	g/mL	0.0	1.09
Density	3	09/12/96	09/26/96	1.066	1.067	g/mL	0.0	1.09
Density	4	06/05/97	06/09/97	1.067	1.066	g/mL	0.0	1.09
Density	5	09/11/97	09/26/97	1.072	1.071	g/mL	0.0	1.09
Density	6	05/06/98	05/12/98	1.100	1.100	g/mL	0.0	1.09
Density	7	09/23/98	09/30/98	1.080	1.072	g/mL	0.0	1.09
Density	8	04/21/99	04/26/99	1.075	1.072	g/mL	0.0	1.09
Density	9	10/13/99	10/20/99	1.068	1.072	g/mL	0.0	1.09
Density	10	04/12/00	04/24/00	1.070	1.070	g/mL	0.0	1.09
Density	26	04/16/08	05/05/08	1.090	1.080	unitless	0.0	1.09
Specific Gravity	27	10/08/08	10/27/08	1.073	1.071	unitless	0.0	1.09
Specific Gravity	28	04/15/09	04/20/09	1.069	1.067	unitless	0.0	1.09
Specific Gravity	29	10/07/09	10/15/09	1.069	1.070	unitless	0.0	1.09
Specific Gravity	30	04/14/10	04/30/10	1.074	1.074	unitless	0.0	1.09
Specific Gravity	31	10/07/10	10/13/10	1.069	1.067	unitless	0.0	1.09
Specific Gravity	32	04/20/11	05/02/11	1.066	1.070	unitless	0.0	1.09
Specific Gravity	33	09/08/11	09/15/11	1.070	1.068	unitless	0.0	1.09
Specific Gravity	34	04/17/12	04/30/12	1.068	1.072	unitless	0.0	1.09
Specific Gravity	35	04/16/13	04/26/13	1.062	1.059	unitless	0.0	1.09



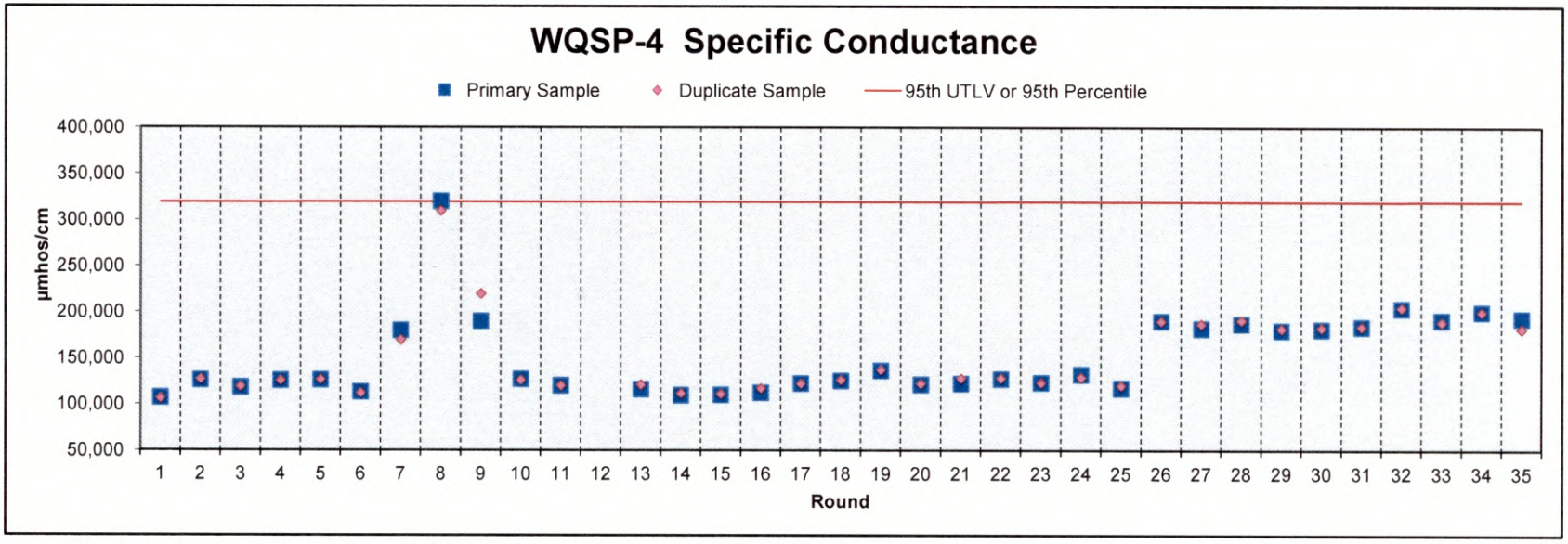
WQSP-4 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile Lower Limit	95th UTLV or 95th Percentile Upper Limit
pH	1	09/28/95	09/29/95	7.16	7.17	SU	0.0	6.8	7.6
pH	2	05/23/96	05/25/96	7.55	7.61	SU	0.0	6.8	7.6
pH	3	09/12/96	09/13/96	7.23	7.24	SU	0.0	6.8	7.6
pH	4	06/05/97	06/06/97	7.18	7.17	SU	0.0	6.8	7.6
pH	5	09/11/97	09/15/97	7.13	7.14	SU	0.0	6.8	7.6
pH	6	05/06/98	05/06/98	7.10	7.00	SU	0.0	6.8	7.6
pH	7	09/23/98	09/23/98	7.20	7.20	SU	0.0	6.8	7.6
pH	8	04/21/99	04/21/99	7.20	7.20	SU	0.0	6.8	7.6
pH	9	10/13/99	10/13/99	7.00	7.10	SU	0.0	6.8	7.6
pH	10	04/12/00	04/12/00	7.10	7.10	SU	0.0	6.8	7.6
pH	26	04/16/08	04/17/08	7.11	7.08	SU	0.0	6.8	7.6
pH	27	10/08/08	10/10/08	7.02	7.03	SU	0.0	6.8	7.6
pH	28	04/15/09	04/20/09	7.16	7.19	SU	0.0	6.8	7.6
pH	29	10/07/09	10/19/09	7.17	7.20	SU	0.0	6.8	7.6
pH	30	04/14/10	04/16/10	7.17	7.17	SU	0.0	6.8	7.6
pH	31	10/07/10	10/14/10	7.20	7.22	SU	0.0	6.8	7.6
pH	32	04/20/11	04/21/11	7.16	7.19	SU	0.0	6.8	7.6
pH	33	09/08/11	09/15/11	7.19	7.20	SU	0.0	6.8	7.6
pH	34	04/17/12	04/18/12	7.19	7.19	SU	0.10	6.8	7.6
pH	35	04/16/13	04/17/13	7.20	7.21	SU	0.10	6.8	7.6



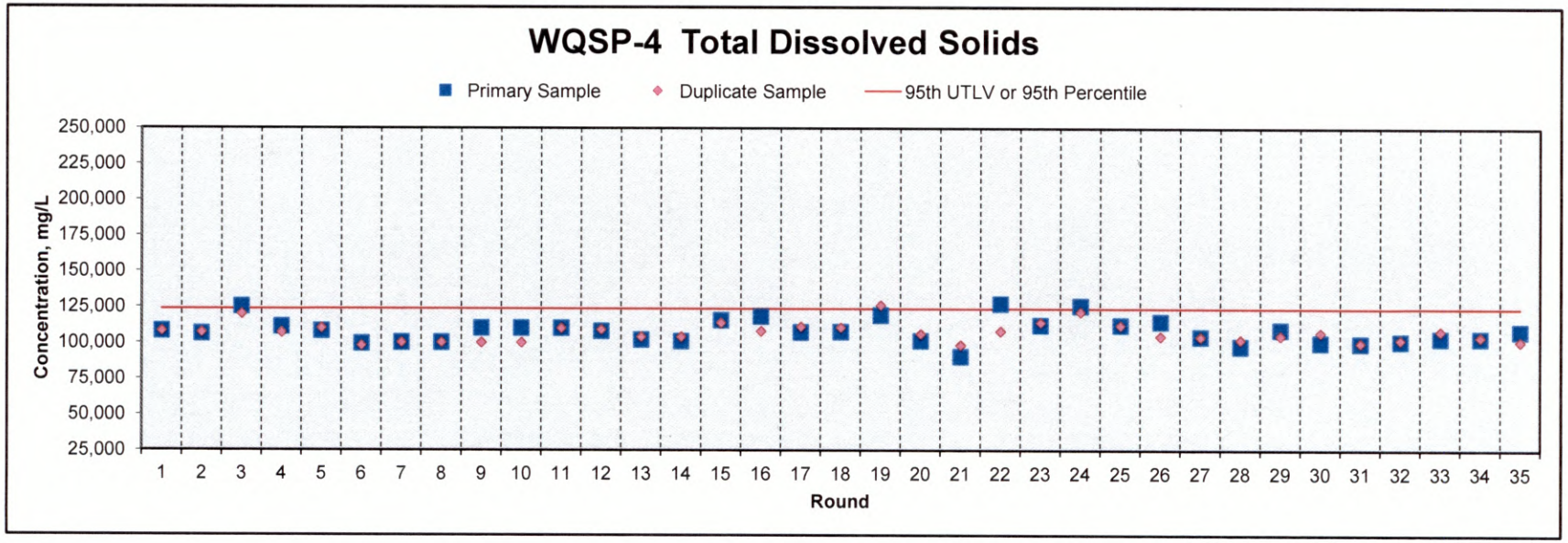
WQSP-4 Specific Conductance

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Specific Conductance	1	09/28/95	10/10/95	107,000	106,000	µmhos/cm	1.0	319,800
Specific Conductance	2	05/23/96	05/31/96	126,000	127,000	µmhos/cm	3.0	319,800
Specific Conductance	3	09/12/96	09/19/66	118,000	119,000	µmhos/cm	3.0	319,800
Specific Conductance	4	06/05/97	06/09/97	125,500	125,500	µmhos/cm	3.0	319,800
Specific Conductance	5	09/11/97	09/30/97	126,000	126,500	µmhos/cm	3.0	319,800
Specific Conductance	6	05/06/98	05/12/98	113,000	112,000	µmhos/cm		319,800
Specific Conductance	7	09/23/98	10/09/98	180,000	170,000	µmhos/cm	---	319,800
Specific Conductance	8	04/21/99	04/21/99	320,000	310,000	µmhos/cm		319,800
Specific Conductance	9	10/13/99	10/13/99	190,000	220,000	µmhos/cm		319,800
Specific Conductance	10	04/12/00	04/21/00	127,000	126,000	µmhos/cm		319,800
Specific Conductance	26	04/16/08	04/22/08	190,000	190,000	µmhos/cm		319,800
Specific Conductance	27	10/08/08	10/10/08	182,000	187,000	µmhos/cm		319,800
Specific Conductance	28	04/15/09	04/22/09	187,000	191,000	µmhos/cm		319,800
Specific Conductance	29	10/07/09	10/20/09	180,000	182,000	µmhos/cm	0.0	319,800
Specific Conductance	30	04/14/10	04/16/10	181,000	183,000	µmhos/cm	0.0	319,800
Specific Conductance	31	10/07/10	10/20/10	184,000	184,000	µmhos/cm	0.0	319,800
Specific Conductance	32	04/20/11	04/21/11	204,000	205,000	µmhos/cm	0	319,800
Specific Conductance	33	09/08/11	09/09/11	191,000	189,000	µmhos/cm	0.5	319,800
Specific Conductance	34	04/17/12	04/18/12	200,000	200,000	µmhos/cm	1.0	319,800
Specific Conductance	35	04/16/13	04/17/13	193,000	182,000	µmhos/cm	0.5	319,800



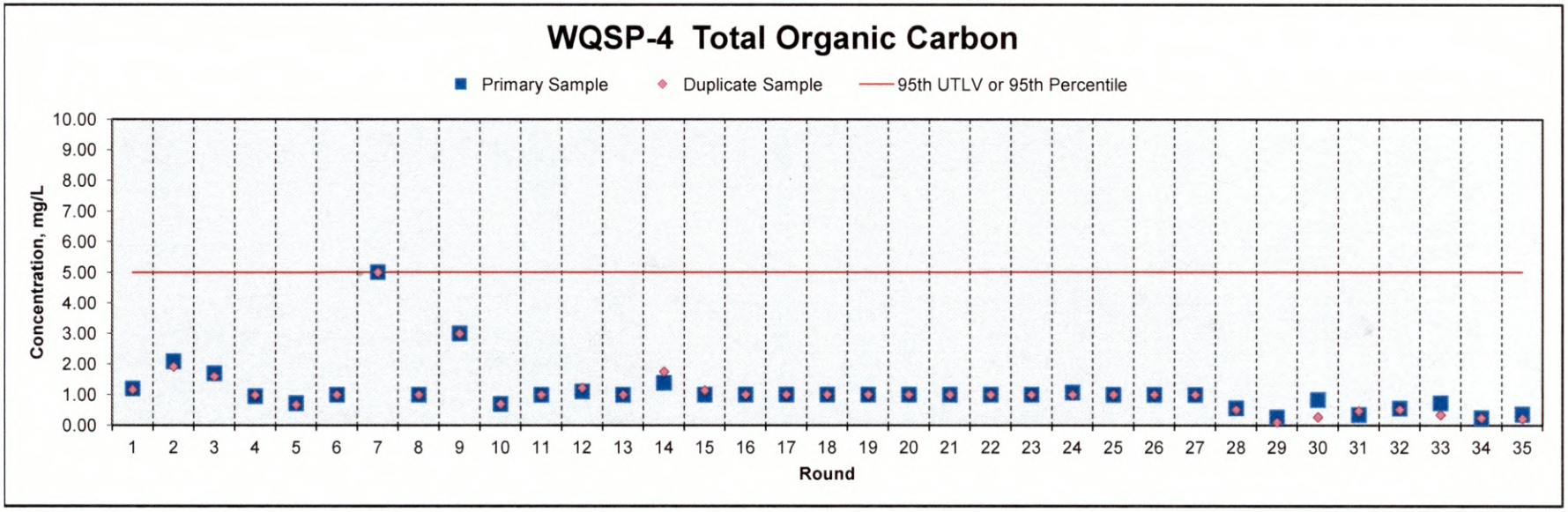
WQSP-4 Total Dissolved Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Dissolved Solids	1	09/28/95	10/06/95	108,000	108,000	mg/L	10.0	123,500
Total Dissolved Solids	2	05/23/96	05/31/09	106,000	107,000	mg/L	200.0	123,500
Total Dissolved Solids	3	09/12/96	09/19/96	125,000	120,000	mg/L	200.0	123,500
Total Dissolved Solids	4	06/05/97	06/10/97	111,000	107,000	mg/L	200.0	123,500
Total Dissolved Solids	5	09/11/97	09/18/97	108,000	110,000	mg/L	200.0	123,500
Total Dissolved Solids	6	05/06/98	05/12/98	99,300	97,900	mg/L		123,500
Total Dissolved Solids	7	09/23/98	09/28/98	100,000	100,000	mg/L	10.0	123,500
Total Dissolved Solids	8	04/21/99	04/22/99	100,000	100,000	mg/L	10.0	123,500
Total Dissolved Solids	9	10/13/99	10/13/99	110,000	100,000	mg/L	10.0	123,500
Total Dissolved Solids	10	04/12/00	04/14/00	110,000	100,000	mg/L	10.0	123,500
Total Dissolved Solids	26	04/16/08	04/21/08	114,500	104,500	mg/L	10.0	123,500
Total Dissolved Solids	27	10/08/08	10/10/08	104,000	104,000	mg/L	10.0	123,500
Total Dissolved Solids	28	04/15/09	04/23/09	97,300	102,000	mg/L	10.0	123,500
Total Dissolved Solids	29	10/07/09	10/14/09	109,000	105,000	mg/L	10.0	123,500
Total Dissolved Solids	30	04/14/10	04/16/10	100,000	107,000	mg/L	10	123,500
Total Dissolved Solids	31	10/07/10	10/14/10	99,400	99,900	mg/L	270	123,500
Total Dissolved Solids	32	04/20/11	04/27/11	101,000	102,000	mg/L	270	123,500
Total Dissolved Solids	33	09/08/11	09/14/11	103,000	108,000	mg/L	270	123,500
Total Dissolved Solids	34	04/17/12	04/23/12	103,000	104,000	mg/L	270	123,500
Total Dissolved Solids	35	04/16/13	04/23/13	108,000	101,000	mg/L	500	123,500



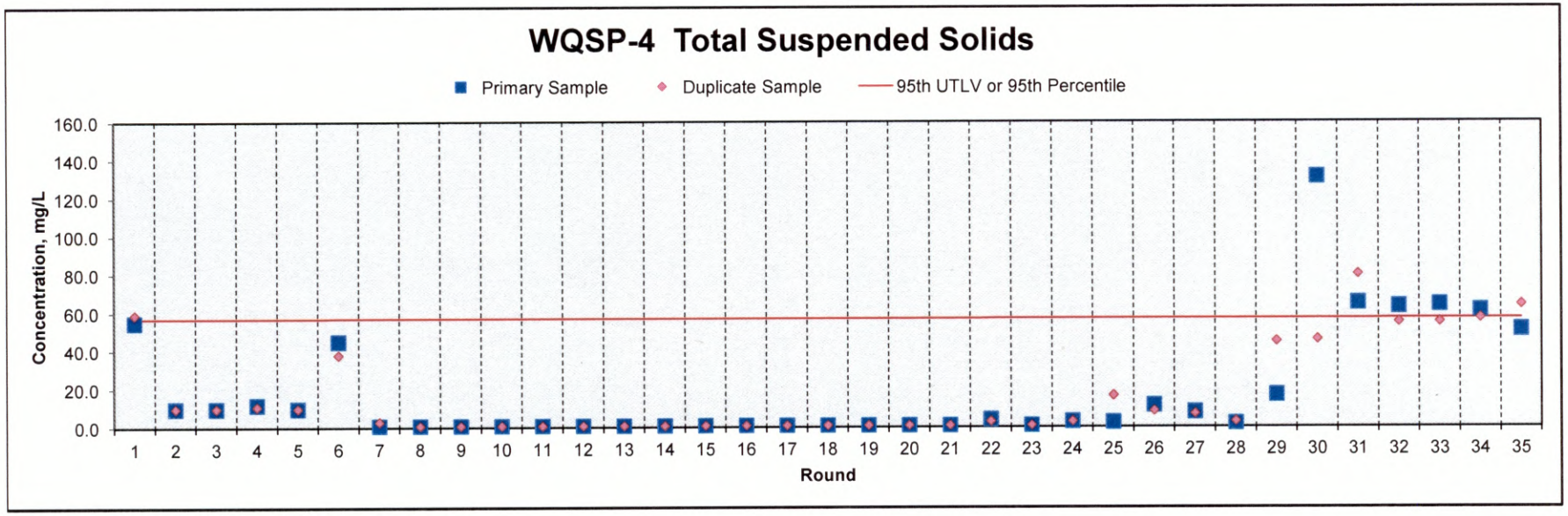
WQSP-4 Total Organic Carbon

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Organic Carbon	1	09/28/95	10/12/95	1.20	1.17	mg/L	0.50	< 5.0
Total Organic Carbon	2	05/23/96	05/31/96	2.09	1.92	mg/L	0.50	< 5.0
Total Organic Carbon	3	09/12/96	09/16/96	1.70	1.60	mg/L	0.50	< 5.0
Total Organic Carbon	4	06/05/97	06/19/97	0.95	0.99	mg/L	0.50	< 5.0
Total Organic Carbon	5	09/11/97	09/25/97	0.72	0.68	mg/L	0.50	< 5.0
Total Organic Carbon	6	05/06/98	05/12/98	< 1.00	< 1.00	mg/L	0.10	< 5.0
Total Organic Carbon	7	09/23/98	09/27/98	< 5.00	< 5.00	mg/L	5.00	< 5.0
Total Organic Carbon	8	04/21/99	04/27/99	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	9	10/13/99	10/25/99	< 3.00	< 3.00	mg/L	3.00	< 5.0
Total Organic Carbon	10	04/12/00	04/19/00	< 0.70	< 0.70	mg/L	0.70	< 5.0
Total Organic Carbon	26	04/16/08	04/21/08	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	27	10/08/08	10/21/08	< 1.00	< 1.00	mg/L	1.00	< 5.0
Total Organic Carbon	28	04/15/09	04/20/09	0.57	0.52	mg/L	1.00	< 5.0
Total Organic Carbon	29	10/07/09	10/08/09	0.27	0.11	mg/L	1.00	< 5.0
Total Organic Carbon	30	04/14/10	04/20/10	0.84	0.28	mg/L	0.056	< 5.0
Total Organic Carbon	31	10/07/10	10/12/10	0.36	0.48	mg/L	0.056	< 5.0
Total Organic Carbon	32	04/20/11	05/04/11	0.56	0.52	mg/L	0.25	< 5.0
Total Organic Carbon	33	09/08/11	09/26/11	0.73	0.35	mg/L	0.25	< 5.0
Total Organic Carbon	34	04/17/12	04/26/12	< 0.25	< 0.25	mg/L	0.25	< 5.0
Total Organic Carbon	35	04/16/13	04/25/13	0.37	< 0.23	mg/L	0.23	< 5.0



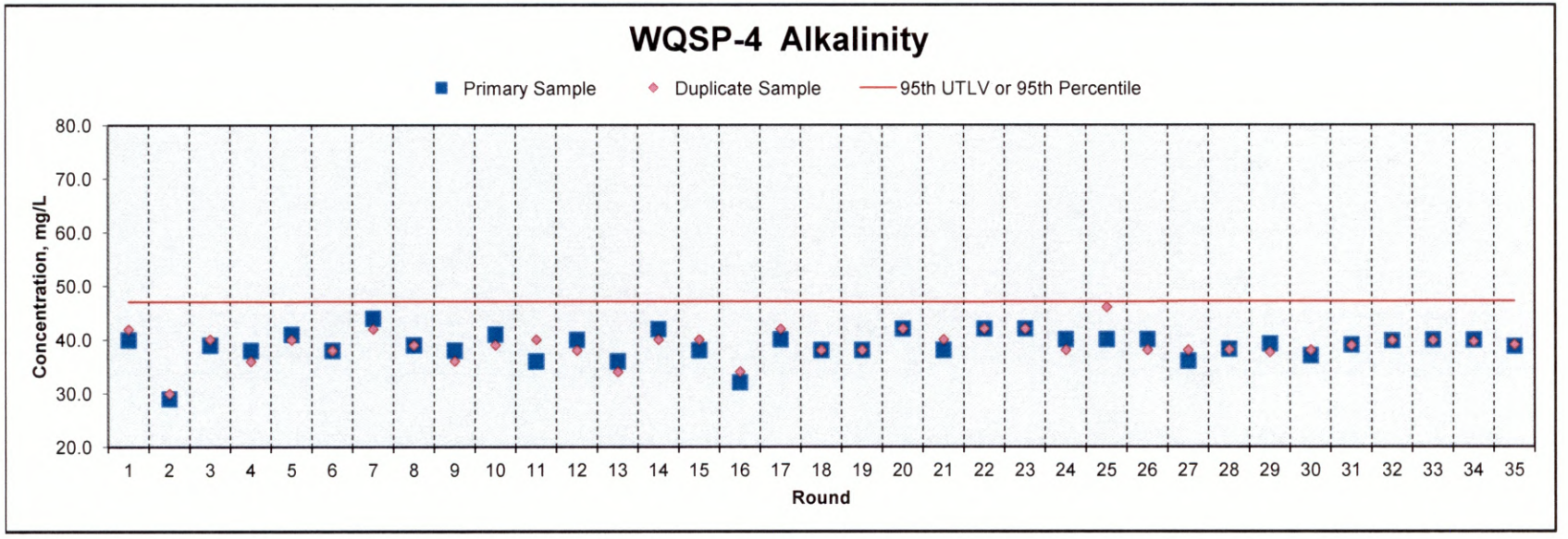
WQSP-4 Total Suspended Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Suspended Solids	1	09/28/95	10/02/95	55.0	59.0	mg/L	10.0	57.0
Total Suspended Solids	2	05/23/96	05/31/96	< 10.0	< 10.0	mg/L	10.0	57.0
Total Suspended Solids	3	09/12/96	09/19/96	< 10.0	< 10.0	mg/L	10.0	57.0
Total Suspended Solids	4	06/05/97	06/10/97	12.0	11.0	mg/L	10.0	57.0
Total Suspended Solids	5	09/11/97	09/16/97	< 10.0	< 10.0	mg/L	10.0	57.0
Total Suspended Solids	6	05/06/98	05/12/98	45.0	38.0	mg/L	10.0	57.0
Total Suspended Solids	7	09/23/98	09/24/98	< 1.0	3.0	mg/L	1.0	57.0
Total Suspended Solids	8	04/21/99	04/22/99	< 1.0	< 1.0	mg/L	1.0	57.0
Total Suspended Solids	9	10/13/99	10/15/99	< 1.0	< 1.0	mg/L	1.0	57.0
Total Suspended Solids	10	04/12/00	04/17/00	< 1.0	< 1.0	mg/L	1.0	57.0
Total Suspended Solids	26	04/16/08	04/24/08	11.5	8.5	mg/L	1.0	57.0
Total Suspended Solids	27	10/08/08	10/13/08	8.0	7.0	mg/L	1.0	57.0
Total Suspended Solids	28	04/15/09	04/20/09	< 2.0	3.0	mg/L	1.0	57.0
Total Suspended Solids	29	10/07/09	10/14/09	17	45	mg/L	1.0	57.0
Total Suspended Solids	30	04/14/10	04/21/10	**131**	46	mg/L	1.0	**57.0**
Total Suspended Solids	31	10/07/10	10/13/10	**65**	**80**	mg/L	0	**57.0**
Total Suspended Solids	32	04/20/11	04/27/11	**63**	55	mg/L	0	**57.0**
Total Suspended Solids	33	09/08/11	09/14/11	**64**	55	mg/L	2.8	**57.0**
Total Suspended Solids	34	04/17/12	04/24/12	**61**	**57**	mg/L	2.8	**57.0**
Total Suspended Solids	35	04/16/13	04/22/13	51	**64**	mg/L	1.5	**57.0**



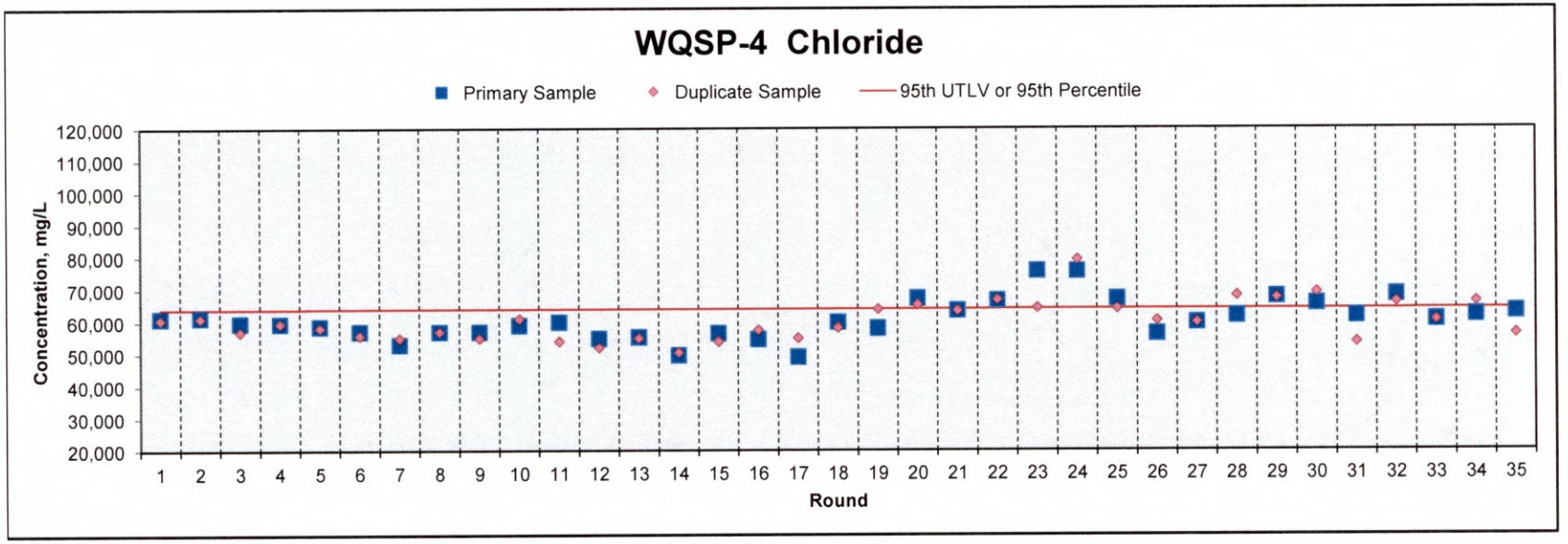
WQSP-4 Alkalinity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Alkalinity	1	09/28/95	10/02/95	40.0	42.0	mg/L	5.0	47.1
Alkalinity	2	05/23/96	05/31/96	29.0	30.0	mg/L	5.0	47.1
Alkalinity	3	09/12/96	09/26/96	39.0	40.1	mg/L	5.0	47.1
Alkalinity	4	06/05/97	06/09/97	38.0	36.0	mg/L	5.0	47.1
Alkalinity	5	09/11/97	09/26/97	41.0	40.0	mg/L	5.0	47.1
Alkalinity	6	05/06/98	05/12/98	38.0	38.0	mg/L	5.0	47.1
Alkalinity	7	09/23/98	09/30/98	44.0	42.0	mg/L	1.0	47.1
Alkalinity	8	04/21/99	04/22/99	39.0	39.0	mg/L	4.0	47.1
Alkalinity	9	10/13/99	10/22/99	38.0	36.0	mg/L	4.0	47.1
Alkalinity	10	04/12/00	04/17/00	41.0	39.0	mg/L	4.0	47.1
Alkalinity	26	04/16/08	04/24/08	40.0	38.0	mg/L	4.0	47.0
Alkalinity	27	10/08/08	10/16/08	36.0	38.0	mg/L	4.0	47.1
Alkalinity	28	04/15/09	04/20/09	38.2	38.1	mg/L	4.0	47.1
Alkalinity	29	10/07/09	10/19/09	39.2	37.6	mg/L	4.0	47.1
Alkalinity	30	04/14/10	04/16/10	37.0	38.0	mg/L	4.0	47.1
Alkalinity	31	10/07/10	10/14/10	39.0	38.9	mg/L	5.0	47.1
Alkalinity	32	04/20/11	04/21/11	39.8	39.8	mg/L	5.0	47.1
Alkalinity	33	09/08/11	09/09/11	39.9	39.8	mg/L	2.4	47.1
Alkalinity	34	04/17/12	04/18/12	39.9	39.6	mg/L	5.0	47.1
Alkalinity	35	04/16/13	04/17/13	38.7	39.0	mg/L	5.0	47.1



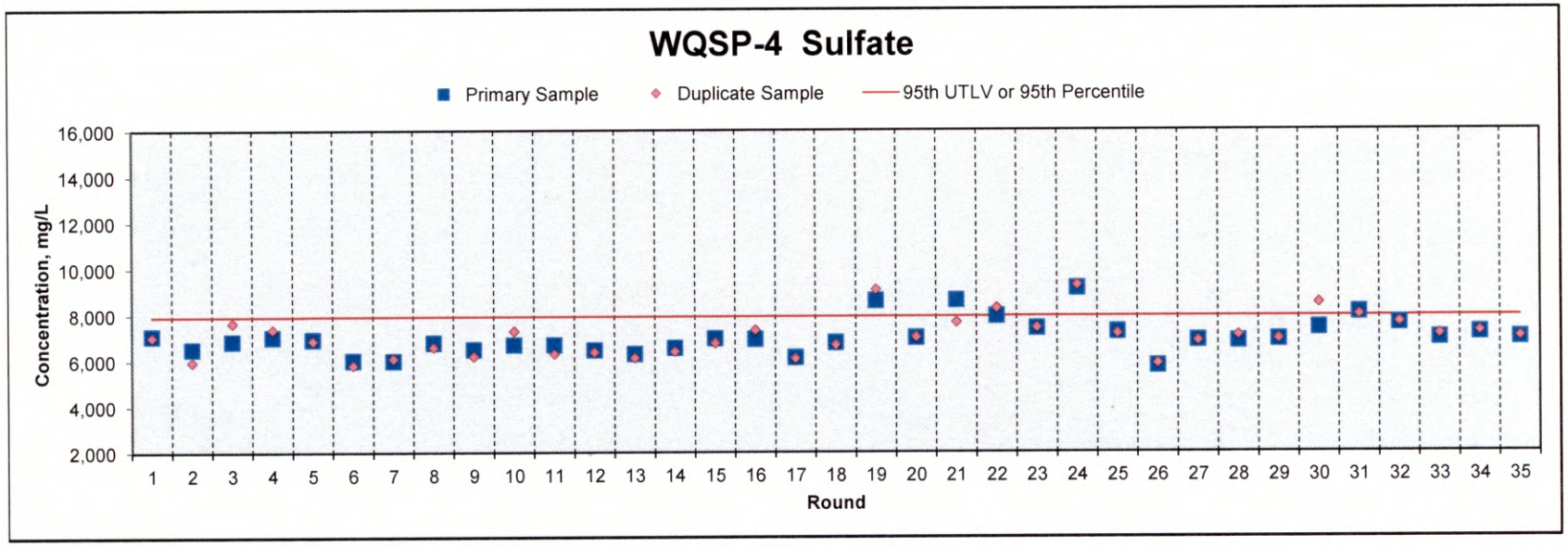
WQSP-4 Chloride

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chloride	1	09/28/95	10/13/95	61,200	60,700	mg/L	5.0	63,960
Chloride	2	05/23/96	05/29/96	61,500	61,200	mg/L	2,500.0	63,960
Chloride	3	09/12/96	09/18/09	59,700	57,000	mg/L	2,500.0	63,960
Chloride	4	06/05/97	06/18/97	59,500	59,500	mg/L	5,000.0	63,960
Chloride	5	09/11/97	09/26/97	58,700	58,200	mg/L	5,000.0	63,960
Chloride	6	05/06/98	05/12/98	57,100	55,800	mg/L	0.0	63,960
Chloride	7	09/23/98	09/28/98	53,000	55,000	mg/L	0.5	63,960
Chloride	8	04/21/99	04/22/99	57,000	57,000	mg/L	0.5	63,960
Chloride	9	10/13/99	10/13/99	57,000	55,000	mg/L	0.5	63,960
Chloride	10	04/12/00	04/18/00	59,000	61,000	mg/L	0.5	63,960
Chloride	26	04/16/08	05/01/08	56,200	60,300	mg/L	0.5	63,960
Chloride	27	10/08/08	10/09/08	59,700	59,700	mg/L	0.5	63,960
Chloride	28	04/15/09	05/07/09	61,700	**68,000**	mg/L	0.5	**63,960**
Chloride	29	10/07/09	10/10/09	**67,700**	**67,300**	mg/L	0.5	**63,960**
Chloride	30	04/14/10	04/15/10	**65,500**	**69,000**	mg/L	0.5	**63,960**
Chloride	31	10/07/10	10/21/10	61,700	53,600	mg/L	320	63,960
Chloride	32	04/20/11	04/28/11	**68,300**	**66,000**	mg/L	160	**63,960**
Chloride	33	09/08/11	09/12/11	60,400	60,300	mg/L	210	63,960
Chloride	34	04/17/12	04/26/12	61,900	**66,000**	mg/L	1,000	**63,960**
Chloride	35	04/16/13	04/19/13	62,900	56,100	mg/L	331	63,960



WQSP-4 Sulfate

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sulfate	1	09/28/95	10/13/95	7,100	7,050	mg/L	10.0	7,927
Sulfate	2	05/23/96	05/29/09	6,520	5,960	mg/L	2500.0	7,927
Sulfate	3	09/12/96	08/18/96	6,860	7,660	mg/L	2500.0	7,927
Sulfate	4	06/05/97	06/18/97	7,040	7,380	mg/L	2500.0	7,927
Sulfate	5	09/11/97	09/30/97	6,940	6,880	mg/L	2500.0	7,927
Sulfate	6	05/06/98	05/12/98	6,020	5,820	mg/L	0.0	7,927
Sulfate	7	09/23/98	10/01/98	6,000	6,100	mg/L	0.5	7,927
Sulfate	8	04/21/99	04/22/99	6,800	6,600	mg/L	0.5	7,927
Sulfate	9	10/13/99	10/13/99	6,500	6,200	mg/L	0.5	7,927
Sulfate	10	04/12/00	04/18/00	6,700	7,300	mg/L	0.5	7,927
Sulfate	26	04/16/08	05/01/08	5,750	5,850	mg/L	0.5	7,927
Sulfate	27	10/08/08	10/09/08	6,870	6,840	mg/L	0.5	7,927
Sulfate	28	04/15/09	05/07/09	6,830	7,090	mg/L	0.5	7,927
Sulfate	29	10/07/09	10/09/09	6,900	6,930	mg/L	0.5	7,927
Sulfate	30	04/14/10	04/15/10	7,410	8,490	mg/L	0.5	7,927
Sulfate	31	10/07/10	10/12/11	**8,080**	**7,970**	mg/L	47	**7,927**
Sulfate	32	04/20/11	04/21/11	7,610	7,650	mg/L	47	7,927
Sulfate	33	09/08/11	09/09/11	6,950	7,120	mg/L	14	7,927
Sulfate	34	04/17/12	04/18/12	7,180	7,250	mg/L	46	7,927
Sulfate	35	04/16/13	04/17/13	6,960	7,010	mg/L	47	7,927



WQSP-4

CHAIN OF CUSTODY FORMS

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130418023
Order Date: 4/18/2013

Contact Name: ANDY FREEMAN
Project Name: 1304689
Comment:

Sample #: 130418023-001 **Customer Sample #:** 1304689-001E / WQ4-C-R35

Recv'd: ☑ **Collector:** **Date Collected:** 4/16/2013
Quantity: 1 **Matrix:** Water **Date Received:** 4/18/2013 10:42:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***

Sample #: 130418023-002 **Customer Sample #:** 1304689-002E / WQ4-C-R35-DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 4/16/2013
Quantity: 1 **Matrix:** Water **Date Received:** 4/18/2013 10:42:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/30/2013	***Normal (6-10 Days)***

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB			**Order ID:**	130418023
	4901 HAWKINS NE SUITE D			**Order Date:**	4/18/2013
	ALBUQUERQUE	NM	87109		
Contact Name:	ANDY FREEMAN			**Project Name:**	1304689
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	1.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP **Work Order Number:** 1304689 **RcptNo:** 1

Received by/date: AG 04/17/13

Logged By: Anne Thorne 4/17/2013 9:40:00 AM

Completed By: Anne Thorne 4/17/2013

Reviewed By: AT 04/17/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	FedEx		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 4 (<2 or >12 unless noted)

Adjusted? _____

Checked by: AT 04/17/13

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
2	2.5	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1033

Page 1 of 1

Project Number:	Project Name:
T409304-1	WIPP/DMP

Sampler(s): R. Jimenez, R. Aspoon

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry	Comments
4/16/13	09:46	GW	GW-WQ4-C-R35-N1	6	X					use for MS/MSD -001
"	10:06	"	-N1D	4	X					-002
"	09:37	DI	-N2	4	X					Field Blanks -003
N/A	N/A	"	-N3	3	X					Trip Blanks, HEAL provided* -004
4/16/13	09:28	GW	-N4	4		X				use for MS/MSD -001
"	09:34	"	-N4D	2		X				-002
"	09:00	"	-N5	6			X			use for MS/MSD -001
"	09:13	"	-N5D	2			X			-002
"	09:20	"	-N6	2				X		use for MS/MSD -001
"	09:23	"	-N6D	2				X		-002
"	09:16	"	-N7	1					X	use for MS/MSD -001
"	09:18	GW	-N7D	1					X	-002
						N/A				

Analytical Laboratory: HEAL, Albq, NM, HEAL # 1304689

Relinquished By: (Signature, Date/Time) Robin Upson 4/16/13 14:00

Received By: (Signature, Date/Time) 04/17/13 0940

Relinquished By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Relinquished By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Relinquished By: (Signature, Date/Time)

Received at Laboratory: (Signature, Date/Time)

Requested Turnaround Time: Report due 5/21/2013

☒ Routine ☐ Rush

Sample Receipt Remarks: 2.5°C

Special Instructions: Analyze LCS's in duplicate. Use primary GW sample for MS/MSD on all parameters. 48hr Hold on Nitrate

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: Fed Ex 8768 1881 2212, 8768 1881 2223

Results To:
Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8615 FAX: 575-234-6003
EDD: gregory.jungclaus@urs~~.us~~.com

RA 4/3/13

* Note! 1 Field Blank broken upon receipt. RA 4/16/13

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater

YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)

PINK – Record Copy
SE – Sediment
SO – Soil

SW – Surface Water
VG – Vegetation

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

130418 023 HALL Last Due 4/30/2013
1st SAMP 4/16/2013 1st RCVD 4/18/2013
1304689

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	#CONTAINERS	ANALYTICAL COMMENTS
1	1304689-001E	WQ4-C-R35	500HDPEHN 03	Aqueous	4/16/2013 9:00:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC
2	1304689-002E	WQ3-C-R35-Duplicate	500HDPEHN 03	Aqueous	4/16/2013 9:13:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC

MWBS

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SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE DO MS/MSD ON 1304689-001E. PLSE ANALYZE BY METHOD 6020. REPORT TO 0.001 mg/l. IF POSSIBLE PLEASE INCLUDE LCS LCS REPLICATE. SAMPLE MAY HAVE HIGH TDS.

Relinquished By:	Date:	Time:
	4/17/2013	2:17 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard X RUSH

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 1.0 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3

NUMBER OF CONTAINERS: 2 SHIPPED VIA: F

DATE & TIME: 4/18/13 10:42 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:
(extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

_____ °C Attempt to Cool ? _____

APPENDIX 7

WELL WQSP-5

ANALYTICAL RESULTS

WQSP-5

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-5, Culebra, Round 35

DMW Characteristics

WQSP-5 is located 330 feet FSL and 340 feet FEL in sec. 29, T.22 S, R.31E in Eddy County, New Mexico. This location is approximately 1-mile south from the center of the WIPP Site and downgradient of the shaft area. The ground elevation at WQSP-5 is 3381.67 feet above mean sea level (ft_{amsl}) and the top of casing (TOC) elevation is 3384.38 ft_{amsl}[1]. This DMW well, drilled for surveillance monitoring of groundwater quality and water level elevation monitoring between October 12 and 13, 1994, is located in the Culebra Member of the Rustler Formation. The total depth of WQSP-5 is 681 feet below ground surface (ft_{bgs}). The well is cased with a fiberglass casing (5 inch od, 0.28 inch wall thickness) to 646 ft_{bgs} and screened with slotted fiberglass (0.020 inch) from 646 to 671 ft_{bgs}. A 10-foot blank casing is located below the screened interval from 671 to 681 ft_{bgs} and acts as a sediment sump to prevent clogging of the lower screen slots. The actual interval of the Culebra at WQSP-5 is 648 to 674 ft_{bgs} based on interpretation of the core logs[2].

According to the well construction and pre-pumping static water level (swl) measured in feet from below the TOC (ft_{btoc}), the sampling team used the following formula to calculate well bore volume (wbv).

$$wbv,\ gallons = [C \times ((\pi \times D^2/4) \times L)]$$

where:
C = conversion factor for pounds water/gallon (US liquid) to pounds of water/ft^3
D = inside diameter of fiberglass casing, ft
L = depth of water in column, ft
$Factor = [C \times (\pi \times D^2/4)]$

given:
$total\ depth\ of\ well,\ ft_{btoc} = [installation\ depth,\ ft_{bgs} + (top\ of\ casing,\ ft_{amsl} - ground\ surface\ elevation,\ ft_{amsl})]$
$depth\ of\ water\ in\ column,\ ft\ (L) = (total\ depth\ of\ well,\ ft_{btoc} - swl,\ ft_{btoc})$

More specifically, the wbv for WQSP-5 is calculated as follows:

$$wbv,\ gallons = (Factor \times L) = (0.804 \times L)$$

Prior to beginning the pumping process for Round 35 (after pump replacement), the static water level was 379.25 ft_{btoc}. One wbv for WQSP-5 was determined to be 244.8 gallons.

Field Sampling System

A dedicated sampling-system was installed in WQSP-5 on October 1, 1999. The system consists of a Grundfos 1.5-hp submersible pump (model 5S15-26) retrofitted with Kynar seals and a 3-phase, 230 volt (ac), 3-hp submersible motor which was replaced during Round 31 (fall 2010) and again during the current (Round 35, 2013). Prior to Round 20 sampling (2005), the pump/motor assembly was lowered an additional 21 feet from its original installation depth (638 ft_{bgs}), placing the pump intake near the center of the well screen (approximately 659 ft_{bgs}). A separate sampling line was installed just above the pump discharge and a bubbler system installed 5 feet above the top of the pump that previously enabled formation pressure monitoring in the well bore column during sampling. The bubbler system was eliminated in the recent Permit and formation pressures are no longer monitored during the pumping event.

---

[1] Elevations (Ground and TOC) obtained from December 13, 2006 survey.
[2] DOE/WIPP 95-2154, *Basic Data Report for WQSP 1* and Culebra Mid-Depths – Revision 2 (R. Salness).

Purging and parameter monitoring for WQSP-5 (Round 35) was scheduled to begin on 4/29/2013. However, complete pump failure occurred between days 1 and 2 and all activities ceased at WQSP-5 until the well and its equipment status could be assessed. Environmental Monitoring & Hydrology (EM&H) personnel determined the pump at WQSP-5 was non-repairable, and a new identical pump/motor assembly was installed on 5/6/2013. EM&H personnel tested the new pump/motor assembly at WQSP-5 on 5/17/2013 and the decision was made to commence purging and sampling the following week.

Round 35 pumping of WQSP-5 began on 5/20/2013 at 09:40 and ended on 5/21/2013 at 11:20. The well was purged for 25.7 hours with an average flow rate of 0.65 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 1,002 gallons, of which approximately 200 gallons were from the initial attempt to purge the well (4/29/2013 through 5/1/2013).

Measurement of Field Parameters and Well Stability Criteria

Field measurements were obtained using an in-line, multi-probe flow cell sampling system (Geotech Environmental Equipment, Inc.) with a 40-mL cell volume. This self-contained sampling system is capable of handling flow rates between 100 mL/min to one gpm (3.8 liters/min). Measurements were obtained directly from the groundwater sample stream that passed through this system at 5-minute intervals for specific conductance (SC), temperature and pH. Specific gravity (SG) was determined in samples collected from the flow-cell discharge stream and analyzed using classical hydrometer techniques. The flow cell was purged for at least 15 minutes prior to beginning sequential measurements.

Flow cell exchange rates were calculated periodically to verify measurements were obtained on fresh-flowing groundwater and not from stagnant groundwater in the well column. Exchange rates (cell volumes per minute) were determined by measuring the volume of groundwater (mL) passed through the sampling system during a one-minute interval and dividing that value by the volume of the cell (40 mL).

Well stability was determined using data provided from field measurements. Stability of the DMW, as defined in the Permit, states that each well will be purged no more than three wbv, or until field parameters stabilize, whichever occurs first. The main purpose for collecting sequential measurements is to determine when the groundwater chemistry stabilizes. Parameters are stable when individual values for all parameters are within 5% for three consecutive measurements. At that point, purged water from the DMW is considered representative of the undisturbed groundwater found in the formation and DMP sampling for hazardous constituents is allowed.

Detection Monitoring Program Sampling

Samples for DMP hazardous constituent analyses were collected on 5/21/2012 after approximately 728 gallons of groundwater (≈ 3.0 wbv) had been purged from WQSP-5 (after new pump installation) and all field measurements suggested the well was stable. Removal of the in-line flow cell occured prior to DMP sampling and a clean, dedicated filter holder assembly was installed at the end of the dedicated sample line. Samples (filtered or unfiltered) were collected using techniques described in the DMP and placed under Chain of Custody. Samples for hazardous constituent analyses were shipped via FedEx to Hall Environmental Analysis Laboratory, Inc., Albuquerque, NM. Samples for radionuclide analyses were collected and hand-delivered to the URS-PS WIPP Laboratory located at Carlsbad Environmental Monitoring Research Center in Carlsbad, NM. A sample retain, preserved with nitric acid (to pH < 2), was collected and placed under Chain of Custody in the event that additional metals or radionuclide analyses were required. The final sample checklist summarized the samples collected, laboratory destination, preservatives used, sample quantities, container type, sampling times, and sample team members. This checklist and other records related to the integrity of the DMP sampling event are located in the DMW data package.

Results and Discussion from Original Sampling

Table 1 provides the pumping characteristics and field parameter results for WQSP-5 before and after pump replacement. Pump speeds were identical to those observed in previous rounds although groundwater flow rates were faster on day 1 after the new pump was installed. Discussion of field parameter results will be limited to those obtained after pump replacement.

On day 1 (new pump), approximately 300 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 7.5 cell volumes per minute; thus, approximately 37.5 volumes of groundwater (1,500 mL) passed through the in-line flow cell between measurements. These flow characteristics were approximately one-half of those observed during Round 34 (600 mL/min, 15.0 cell volumes per minute).

Table 1 provides the initial and final measurements obtained on each field-indicating parameter. On day 1 (new pump), SC, temperature and pH were less than 5% over the last three measurements within 15 minutes. Specific gravity was stable after the third measurement (approximately 50 minutes). Based on results observed, the sample team proceeded with DMP hazardous and radiological constituent sampling on day 2 after the new pump was installed.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-5 DMW, Round 35[a,b,c].

Item	Day 1 Old Pump		Day 1 New Pump		Day 2 New Pump	
Date	4/29/2013		5/20/2013		5/21/2013	
Pump Speed, Hz	52.0		52.0		52.0	
Average Flow Rate, gpm	0.52		0.61		0.48	
Rate of Exchange, cell volumes/min	19.5		7.5		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	46,900	46,900	48,900	48,800	NR	NR
Temperature, °C	22.0	22.5	23.4	23.5	NR	NR
pH, SU	7.81	7.60	7.60	7.47	NR	NR
Specific Gravity	1.025	1.026	1.025	1.025	NR	NR
Time to Parameter Stability, hr:min	0:50		0:25		NR	

[a]Data represent the first and last measurement taken within each respective day.
[b]DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c]NR = no measurement taken; not required.

From a historical perspective, indicating parameters currently measured in Round 35 were compared to the average results from the previous 34 rounds (Table 2). The current value for SG (1.025) was identical to the average results from the previous samplings (1.025). Results for SC (48,800 µmhos/cm) and temperature (23.5°C) were higher compared to the previous rounds (43,476 µmhos/cm and 22.2°C, respectively). Groundwater pH was slightly lower during Round 35 than the averages previously observed. Specific gravity and pH were within the normal limits observed for WQSP-5 over the past 16.5 years; however, SC and temperature were higher than the historic upper limit.

Table 2. Comparison of Round 35 DMW Measurements to Historical Results from Rounds (1-34) for WQSP-5.

Field-analyzed Parameter	Historical Data (Rounds 1 – 34)[a,b]			Measurement Results, Round 35[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	43,476	41,302	45,650	48,800
Temperature, °C	22.2	21.1	23.3	23.5
pH, S.U.	7.68	7.30	8.06	7.47
Specific Gravity	1.025	0.974	1.076	1.025

[a] Historical data obtained from serial samples collected on day 3 for each round.
[b] Historical limits calculated from the mean ($\bar{x}$) ± 5 percent.
[c] Current data represent the final measurement taken when well stability confirmed by sampling team.

Hazardous Constituent Results and Discussion from Original Sampling

The results of DMP hazardous constituent sampling found that the concentration of toluene exceeded the Permit allowances. The concentration of toluene detected in the primary groundwater sample was 141 micrograms per liter (µg/L) and the concentration in the duplicate sample was 82.1 µg/L. Since the toluene concentrations were greater than the Permit allowance, the Permittees were required to submit additional information to demonstrate whether the source of the toluene was the regulated unit, a source other than the regulated unit or was an artifact caused by an error in sampling and/or analysis.

An experimental test plan was conducted that demonstrated the source of contamination was due to electrical tape used during the pump replacement. The pump installed in WQSP-5 was pulled again on July 9, 2013 to remove the tape and thoroughly clean all down-hole components. After the pump was reinstalled, WQSP-5 was pumped extensively and sampled two additional times during Round 35 to remediate the well and remove any remaining contaminant toluene from the groundwater. Table 3 provides the initial and final measurements obtained for each field-indicating parameter from the original sampling and each resampling of WQSP-5.

Table 3. Pumping Characteristics and Measurement of Field Parameters for WQSP-5 DMW – All Samplings, Round 35[a,b,c].

Item	Day 1 New Pump		Day 1 Resample #1		Day 1 Resample #2	
Date	5/20/2013		7/15/2013		8/13/2013	
Pump Speed, Hz	52.0		52.0		52.0	
Average Flow Rate, gpm	0.61		0.56		0.47	
Rate of Exchange, cell volumes/min	7.5		NR		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	48,900	48,800	48,900	49,300	45,600	45,200
Temperature, °C	23.4	23.5	22.0	22.5	22.8	23.2
pH, SU	7.60	7.47	7.63	7.52	7.58	7.54
Specific Gravity	1.025	1.025	1.026	1.025	1.025	1.025
Time to Parameter Stability, hr:min	0:25		0:24		0:35	

[a] Data represent the first and last measurement taken within each respective day.
[b] DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c] NR = no measurement taken; not required.

The concentrations of toluene detected in the primary and duplicate groundwater samples were 7.57 and 8.13 µg/L in the first resampling and 2.88 and 2.87 µg/L in the second resampling. Remediation of WQSP-5 by additional pumping significantly reduced the concentrations of toluene. The Permittees submitted a recommendation to the New Mexico Environmental Department that continued monitoring and reporting per the Permit should be sufficient follow-up activities with respect to toluene detection in this well. Pumping for sampling, removal of the toluene source, and natural attenuation will likely decrease the concentration of toluene to background. Additional information can be found in RES 13-824 Detection Monitoring Well WQSP-5 - Demonstration of Outside Contamination Report.

Abbreviations, Acronyms and Units

ac	alternating current
ft_{amsl}	feet above mean sea level
ft_{bgs}	feet below ground surface
ft_{btoc}	feet below top of casing
DMP	Detection Monitoring Program
DMW	detection monitoring well
EM&H	Environmental Monitoring and Hydrology
FEL	from east line
FNL	from north line
FSL	from south line
FWL	from west line
gpm	gallons per minute
hp	horsepower
od	outside diameter
NNE	north-northeast
swl	static water level
URS-PS	Universal Research Services-Professional Solutions
wbv	well bore volume
WIPP	Waste Isolation Pilot Plant
WQSP	Water Quality Sampling Program, well ID

WQSP-5

LABORATORY DATA AND QA/QC SUMMARY REPORTS

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

June 27, 2013

Greg Jungclaus
WIPP
P.O. Box 2078
Carlsbad, NM 88221-2078
TEL: (575) 234-8615
FAX

RE: WIPP DMP

OrderNo.: 1305865

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 5/22/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1305865**
27-Jun-13

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1305865-001	WQ5-C-R35		5/21/2013 8:40:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-001	WQ5-C-R35		5/21/2013 8:40:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-001	WQ5-C-R35		5/21/2013 8:40:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-001	WQ5-C-R35		5/21/2013 8:40:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-001	WQ5-C-R35		5/21/2013 8:40:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-001	WQ5-C-R35		5/21/2013 8:40:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-002	WQ5-C-R35-Duplicate		5/21/2013 8:54:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-002	WQ5-C-R35-Duplicate		5/21/2013 8:54:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-002	WQ5-C-R35-Duplicate		5/21/2013 8:54:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-002	WQ5-C-R35-Duplicate		5/21/2013 8:54:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-002	WQ5-C-R35-Duplicate		5/21/2013 8:54:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-002	WQ5-C-R35-Duplicate		5/21/2013 8:54:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-003	WQ5-C-R35-Field Blank		5/21/2013 9:00:00 AM	5/22/2013 9:35:14 AM	Aqueous
1305865-004	WQ5-C-R35-Trip Blank			5/22/2013 9:35:14 AM	Trip Blank

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DATES REPORT

WO#: **1305865**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1305865-001A	WQ5-C-R35	5/21/2013 8:40:00 AM	Aqueous	EPA Method: 8260B			5/23/2013 3:57:09 PM
				EPA Method: 8260B			5/23/2013 6:21:28 PM
1305865-001B				SM 5310B: TOC			5/29/2013 2:16:48 PM
1305865-001C				EPA Method 8270C: Semivolatiles		5/24/2013 6:13:04 AM	5/28/2013 1:07:13 PM
1305865-001D				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:13:21 AM
				EPA 6010B: Total Recoverable Metals		5/30/2013 7:56:17 AM	5/31/2013 8:54:59 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/12/2013 12:02:34 PM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/12/2013 12:11:18 PM
				EPA 6010B: Total Recoverable Metals		5/30/2013 7:56:17 AM	5/31/2013 9:41:24 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:01:41 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:25:24 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:28:22 AM
				EPA 6010B: Total Recoverable Metals		5/30/2013 7:56:17 AM	5/31/2013 9:29:06 AM
				EPA Method 7470: Mercury		6/13/2013 8:14:01 AM	6/14/2013 1:12:02 PM
				EPA Method 7470: Mercury		6/13/2013 8:14:01 AM	6/14/2013 12:50:16 PM
1305865-001F				EPA Method 300.0: Anions			5/22/2013 1:08:36 PM
				EPA Method 300.0: Anions			5/22/2013 12:31:23 PM
				EPA Method 300.0: Anions			5/22/2013 1:21:01 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 1:13:40 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 1:08:19 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 1:10:57 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 1:55:35 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 3:46:35 PM

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DATES REPORT

WO#: **1305865**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1305865-001F	WQ5-C-R35	5/21/2013 8:40:00 AM	Aqueous	EPA Method 6010B: Dissolved Metals			6/3/2013 1:58:06 PM
				SM 2540 C: Total Dissolved Solids		5/24/2013 6:29:53 PM	5/28/2013 2:21:00 PM
				SM 2540D: TSS		5/22/2013 3:06:47 PM	5/22/2013 7:15:00 PM
				SM2320B: Alkalinity			5/22/2013 1:54:32 PM
				SM2510B: Specific Conductance			5/22/2013 1:54:32 PM
				SM2510B: Specific Conductance			5/22/2013 2:57:33 PM
				SM4500-H+B: pH			5/22/2013 1:54:32 PM
				Specific Gravity			5/29/2013 1:36:00 PM
1305865-002A	WQ5-C-R35-Duplicate	5/21/2013 8:54:00 AM		EPA Method: 8260B			5/23/2013 4:26:06 PM
				EPA Method: 8260B			5/23/2013 6:49:50 PM
1305865-002B				SM 5310B: TOC			5/29/2013 3:12:37 PM
1305865-002C				EPA Method 8270C: Semivolatiles		5/24/2013 6:13:04 AM	5/28/2013 12:34:20 PM
1305865-002D				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/12/2013 12:19:51 PM
				EPA 6010B: Total Recoverable Metals		5/30/2013 7:56:17 AM	5/31/2013 9:44:11 AM
				EPA 6010B: Total Recoverable Metals		5/30/2013 7:56:17 AM	5/31/2013 9:47:08 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:50:13 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:47:13 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:44:11 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/13/2013 9:41:21 AM
				EPA 6010B: Total Recoverable Metals		6/8/2013 10:14:30 AM	6/12/2013 12:22:41 PM
				EPA 6010B: Total Recoverable Metals		5/30/2013 7:56:17 AM	5/31/2013 9:26:05 AM
				EPA Method 7470: Mercury		6/13/2013 8:14:01 AM	6/14/2013 12:55:36 PM
				EPA Method 7470: Mercury		6/13/2013 8:14:01 AM	6/14/2013 1:17:27 PM

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DATES REPORT

WO#: **1305865**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1305865-002F	WQ5-C-R35-Duplicate	5/21/2013 8:54:00 AM	Aqueous	EPA Method 300.0: Anions			5/22/2013 1:33:25 PM
				EPA Method 300.0: Anions			5/22/2013 2:23:04 PM
				EPA Method 300.0: Anions			5/22/2013 1:45:50 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 3:48:49 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 2:03:20 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 1:47:16 PM
				EPA Method 6010B: Dissolved Metals			6/3/2013 1:39:21 PM
				SM 2540 C: Total Dissolved Solids		5/24/2013 6:29:53 PM	5/28/2013 2:21:00 PM
				SM 2540D: TSS		5/22/2013 3:06:47 PM	5/22/2013 7:15:00 PM
				SM2320B: Alkalinity			5/22/2013 2:21:48 PM
				SM2510B: Specific Conductance			5/22/2013 3:03:42 PM
				SM2510B: Specific Conductance			5/22/2013 2:21:48 PM
				SM4500-H+B: pH			5/22/2013 2:21:48 PM
				Specific Gravity			5/29/2013 1:36:00 PM
1305865-003A	WQ5-C-R35-Field Blank	5/21/2013 9:00:00 AM		EPA Method: 8260B			5/23/2013 5:23:50 PM
1305865-004A	WQ5-C-R35-Trip Blank		Trip Blank	EPA Method: 8260B			5/23/2013 5:52:57 PM

All analytes reported are associated with passing CCVs.

METHOD: 8260B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 5030
Analysis: 8260B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: Isobutyl alcohol has an have elevated %recovery in the MS/MSD. Toluene has low recovery in the MS and MSD. The low toluene recovery is due to the varying concentration of toluene in the sample. All other acceptance criteria were met.
6. Samples: The toluene results in both samples have been confirmed. All acceptance criteria were met.

METHOD: 8270C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3510
Analysis: 8270C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.

4. Surrogates: All acceptance criteria were met.
5. Spikes: The MSD %RPD for pyridine was slightly elevated. All other acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 6010B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3005
Analysis: 6010B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Duplicates: All acceptance criteria were met.
5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 7470
Analysis: 7470

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

CLIENT: WIPP
Project: WIPP DMP

METHOD: 300.0

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 300.0

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Spikes: All acceptance criteria were met.
5. Samples: All acceptance criteria were met.

METHOD: SM5310C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM5310C
Analysis: SM5310C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 120.1

HOLDING TIMES: All holding times for Preparation and Analysis were met.

CLIENT: WIPP
Project: WIPP DMP

METHOD: Preparations: none
Analysis: 120.1
PREPARATION: none

ANALYSIS:
1. Samples: All acceptance criteria were met.
2. Duplicates: All acceptance criteria were met.

METHOD: SM 2320B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM 2320B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540C
Analysis: SM2540C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.

4. Samples: All acceptance criteria were met.

METHOD: SM2540D
HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540D
Analysis: SM2540D

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM4500H+ B

HOLDING TIMES: The most recent method lists the pH holding time as 15 minutes. All samples will be flagged with an "H".

METHOD: Preparations: none
Analysis: SM4500H+ B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM2710F

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM2710F

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM4500 NorgC

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM4500 NorgC
Analysis: SM4500 NorgC

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305865-001
Matrix: AQUEOUS
Client Sample ID: WQ5-C-R35
Collection Date: 5/21/2013 8:40:00 AM
Received Date: 5/22/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	14300	132	1000		mg/L	2000	5/22/2013 1:21:01 PM	R10820
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	5/22/2013 12:31:23 PM	R10820
Sulfate	5000	46.7	100		mg/L	200	5/22/2013 1:08:36 PM	R10820
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.000443	0.00100		mg/L	5	6/14/2013 1:12:02 PM	7893
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1010	2.79	50.0		mg/L	50	6/3/2013 1:55:35 PM	R11042
Magnesium	424	0.0415	5.00		mg/L	5	6/3/2013 1:10:57 PM	R11042
Potassium	313	0.249	5.00		mg/L	5	6/3/2013 1:10:57 PM	R11042
Sodium	9660	16.1	200		mg/L	200	6/3/2013 3:46:35 PM	R11042
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0178	0.000500	0.0200	J	mg/L	1	6/13/2013 9:01:41 AM	7820
Beryllium	0.00148	0.000500	0.00300	J	mg/L	1	6/13/2013 9:01:41 AM	7820
Cadmium	ND	0.000800	0.00200		mg/L	1	6/13/2013 9:01:41 AM	7820
Calcium	1060	0.182	20.0		mg/L	20	6/13/2013 9:25:24 AM	7820
Chromium	ND	0.00150	0.00600		mg/L	1	6/13/2013 9:01:41 AM	7820
Iron	0.516	0.0103	0.0500		mg/L	1	6/13/2013 9:01:41 AM	7820
Lead	ND	0.00340	0.00500		mg/L	1	6/13/2013 9:01:41 AM	7820
Magnesium	442	0.190	20.0		mg/L	20	6/13/2013 9:25:24 AM	7820
Nickel	ND	0.00140	0.0100		mg/L	1	6/13/2013 9:01:41 AM	7820
Potassium	294	4.34	20.0		mg/L	20	6/13/2013 9:25:24 AM	7820
Silver	ND	0.00110	0.00500		mg/L	1	6/13/2013 9:01:41 AM	7820
Sodium	9460	102	200		mg/L	200	6/13/2013 9:28:22 AM	7820
Vanadium	0.0112	0.00350	0.0500	J	mg/L	1	6/13/2013 9:01:41 AM	7820
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
Hexachloroethane	ND	2.91	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
2-Methylphenol	ND	2.71	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
Nitrobenzene	ND	2.91	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
Pentachlorophenol	ND	1.44	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
Pyridine	ND	3.53	5.00		µg/L	1	5/28/2013 1:07:13 PM	7597
Surr: 2,4,6-Tribromophenol	51.6	0	41.5-117		%REC	1	5/28/2013 1:07:13 PM	7597
Surr: 2-Fluorobiphenyl	69.7	0	29.1-112		%REC	1	5/28/2013 1:07:13 PM	7597

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305865-001
Matrix: AQUEOUS
Client Sample ID: WQ5-C-R35
Collection Date: 5/21/2013 8:40:00 AM
Received Date: 5/22/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	43.1	0	11.9-98.6		%REC	1	5/28/2013 1:07:13 PM	7597
Surr: 4-Terphenyl-d14	87.0	0	46-111		%REC	1	5/28/2013 1:07:13 PM	7597
Surr: Nitrobenzene-d5	72.7	0	34.9-112		%REC	1	5/28/2013 1:07:13 PM	7597
Surr: Phenol-d5	43.4	0	17.5-88.3		%REC	1	5/28/2013 1:07:13 PM	7597
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Benzene	ND	0.458	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Toluene	141	4.41	10.0		µg/L	10	5/23/2013 6:21:28 PM	R10863
1,2-Dichloroethane (EDC)	ND	0.326	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
2-Butanone	ND	1.00	5.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Chloroform	ND	0.469	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
1,1-Dichloroethane	ND	0.335	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Methylene Chloride	ND	0.350	3.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
trans-1,2-DCE	ND	0.482	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Vinyl chloride	ND	0.303	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/23/2013 3:57:09 PM	R10863
Surr: 1,2-Dichloroethane-d4	90.5	0	70-130		%REC	1	5/23/2013 3:57:09 PM	R10863
Surr: 4-Bromofluorobenzene	95.5	0	69.5-130		%REC	1	5/23/2013 3:57:09 PM	R10863
Surr: Dibromofluoromethane	88.3	0	70-130		%REC	1	5/23/2013 3:57:09 PM	R10863
Surr: Toluene-d8	93.5	0	70-130		%REC	1	5/23/2013 3:57:09 PM	R10863
EPA 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.381	0.227	1.00	J	mg/L	1	5/29/2013 2:16:48 PM	R10947
EPA 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **JML**	
Total Dissolved Solids	31600	101	200	*	mg/L	1	5/28/2013 2:21:00 PM	7612
EPA2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	62000	0.500	0.500		µmhos/c	50	5/22/2013 2:57:33 PM	R10812
EPA4500-H+B: PH							Analyst: **JML**	
pH	7.32	0.100	1.68	H	pH units	1	5/22/2013 1:54:32 PM	R10812

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305865-001
Matrix: AQUEOUS
Client Sample ID: WQ5-C-R35
Collection Date: 5/21/2013 8:40:00 AM
Received Date: 5/22/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
M2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	45.5	5.00	20.0		mg/L CaC	1	5/22/2013 1:54:32 PM	R10812
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/22/2013 1:54:32 PM	R10812
Total Alkalinity (as CaCO3)	45.5	5.00	20.0		mg/L CaC	1	5/22/2013 1:54:32 PM	R10812
PECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.020	0	0			1	5/29/2013 1:36:00 PM	R10932
M 2540D: TSS							Analyst: **JML**	
Suspended Solids	5.00	1.53	4.00		mg/L	1	5/22/2013 7:15:00 PM	7569

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

LIENT: WIPP
roject: WIPP DMP
ab ID: 1305865-002

Client Sample ID: WQ5-C-R35-Duplicate
Collection Date: 5/21/2013 8:54:00 AM
Matrix: AQUEOUS **Received Date:** 5/22/2013 9:00:00 AM

nalyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
PA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	14700	132	1000		mg/L	2000	5/22/2013 2:23:04 PM	R10820
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	5/22/2013 1:33:25 PM	R10820
Sulfate	5030	46.7	100		mg/L	200	5/22/2013 1:45:50 PM	R10820
PA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.000443	0.00100		mg/L	5	6/14/2013 1:17:27 PM	7893
PA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	1040	5.58	100		mg/L	100	6/3/2013 2:03:20 PM	R11042
Magnesium	427	0.0415	5.00		mg/L	5	6/3/2013 1:47:16 PM	R11042
Potassium	337	0.249	5.00		mg/L	5	6/3/2013 1:47:16 PM	R11042
Sodium	9790	16.1	200		mg/L	200	6/3/2013 3:48:49 PM	R11042
PA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0167	0.000500	0.0200	J	mg/L	1	6/13/2013 9:41:21 AM	7820
Beryllium	0.00173	0.000500	0.00300	J	mg/L	1	6/13/2013 9:41:21 AM	7820
Cadmium	ND	0.000800	0.00200		mg/L	1	6/13/2013 9:41:21 AM	7820
Calcium	1010	0.182	20.0		mg/L	20	6/13/2013 9:47:13 AM	7820
Chromium	ND	0.00150	0.00600		mg/L	1	6/13/2013 9:41:21 AM	7820
Iron	0.497	0.0103	0.0500		mg/L	1	6/13/2013 9:41:21 AM	7820
Lead	ND	0.00340	0.00500		mg/L	1	6/13/2013 9:41:21 AM	7820
Magnesium	409	0.0475	5.00		mg/L	5	6/13/2013 9:44:11 AM	7820
Nickel	ND	0.00140	0.0100		mg/L	1	6/13/2013 9:41:21 AM	7820
Potassium	289	1.09	5.00		mg/L	5	6/13/2013 9:44:11 AM	7820
Silver	ND	0.00110	0.00500		mg/L	1	6/13/2013 9:41:21 AM	7820
Sodium	9330	102	200		mg/L	200	6/13/2013 9:50:13 AM	7820
Vanadium	0.0121	0.00350	0.0500	J	mg/L	1	6/13/2013 9:41:21 AM	7820
PA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
Hexachloroethane	ND	2.91	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
2-Methylphenol	ND	2.71	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
Nitrobenzene	ND	2.91	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
Pentachlorophenol	ND	1.44	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
Pyridine	ND	3.53	5.00		µg/L	1	5/28/2013 12:34:20 PM	7597
Surr: 2,4,6-Tribromophenol	59.2	0	41.5-117		%REC	1	5/28/2013 12:34:20 PM	7597
Surr: 2-Fluorobiphenyl	64.3	0	29.1-112		%REC	1	5/28/2013 12:34:20 PM	7597

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305865-002

Client Sample ID: WQ5-C-R35-Duplicate
Collection Date: 5/21/2013 8:54:00 AM
Matrix: AQUEOUS **Received Date:** 5/22/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	33.8	0	11.9-98.6		%REC	1	5/28/2013 12:34:20 PM	7597
Surr: 4-Terphenyl-d14	75.8	0	46-111		%REC	1	5/28/2013 12:34:20 PM	7597
Surr: Nitrobenzene-d5	72.7	0	34.9-112		%REC	1	5/28/2013 12:34:20 PM	7597
Surr: Phenol-d5	32.9	0	17.5-88.3		%REC	1	5/28/2013 12:34:20 PM	7597
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Benzene	ND	0.458	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Toluene	82.1	0.441	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
1,2-Dichloroethane (EDC)	ND	0.326	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
2-Butanone	ND	1.00	5.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Chloroform	ND	0.469	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
1,1-Dichloroethane	ND	0.335	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Methylene Chloride	ND	0.350	3.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
trans-1,2-DCE	ND	0.482	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Vinyl chloride	ND	0.303	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/23/2013 4:26:06 PM	R10863
Surr: 1,2-Dichloroethane-d4	89.8	0	70-130		%REC	1	5/23/2013 4:26:06 PM	R10863
Surr: 4-Bromofluorobenzene	95.0	0	69.5-130		%REC	1	5/23/2013 4:26:06 PM	R10863
Surr: Dibromofluoromethane	91.4	0	70-130		%REC	1	5/23/2013 4:26:06 PM	R10863
Surr: Toluene-d8	88.9	0	70-130		%REC	1	5/23/2013 4:26:06 PM	R10863
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.378	0.227	1.00	J	mg/L	1	5/29/2013 3:12:37 PM	R10947
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **JML**	
Total Dissolved Solids	31800	101	200	*	mg/L	1	5/28/2013 2:21:00 PM	7612
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	61300	0.500	0.500		µmhos/c	50	5/22/2013 3:03:42 PM	R10812
SM4500-H+B: PH							Analyst: **JML**	
pH	7.43	0.100	1.68	H	pH units	1	5/22/2013 2:21:48 PM	R10812

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

[all Environmental Analysis Laboratory, Inc.

LIENT: WIPP
roject: WIPP DMP
ab ID: 1305865-002
Matrix: AQUEOUS
Client Sample ID: WQ5-C-R35-Duplicate
Collection Date: 5/21/2013 8:54:00 AM
Received Date: 5/22/2013 9:00:00 AM

nalyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
M2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	45.6	5.00	20.0		mg/L CaC	1	5/22/2013 2:21:48 PM	R10812
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/22/2013 2:21:48 PM	R10812
Total Alkalinity (as CaCO3)	45.6	5.00	20.0		mg/L CaC	1	5/22/2013 2:21:48 PM	R10812
PECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.019	0	0			1	5/29/2013 1:36:00 PM	R10932
M 2540D: TSS							Analyst: **JML**	
Suspended Solids	ND	1.53	4.00		mg/L	1	5/22/2013 7:15:00 PM	7569

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305865-003
Matrix: AQUEOUS
Client Sample ID: WQ5-C-R35-Field Blank
Collection Date: 5/21/2013 9:00:00 AM
Received Date: 5/22/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Benzene	ND	0.458	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Toluene	ND	0.441	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
1,2-Dichloroethane (EDC)	ND	0.326	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
2-Butanone	15.1	1.00	5.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Chloroform	ND	0.469	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
1,1-Dichloroethane	ND	0.335	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Methylene Chloride	ND	0.350	3.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
trans-1,2-DCE	ND	0.482	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Vinyl chloride	ND	0.303	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/23/2013 5:23:50 PM	R10863
Surr: 1,2-Dichloroethane-d4	90.5	0	70-130		%REC	1	5/23/2013 5:23:50 PM	R10863
Surr: 4-Bromofluorobenzene	92.7	0	69.5-130		%REC	1	5/23/2013 5:23:50 PM	R10863
Surr: Dibromofluoromethane	89.4	0	70-130		%REC	1	5/23/2013 5:23:50 PM	R10863
Surr: Toluene-d8	90.5	0	70-130		%REC	1	5/23/2013 5:23:50 PM	R10863

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

[all Environmental Analysis Laboratory, Inc.

LIENT: WIPP
roject: WIPP DMP
ab ID: 1305865-004
Client Sample ID: WQ5-C-R35-Trip Blank
Collection Date:
Matrix: TRIP BLANK
Received Date: 5/22/2013 9:00:00 AM

nalyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
PA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Benzene	ND	0.458	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Toluene	ND	0.441	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
1,2-Dichloroethane (EDC)	ND	0.326	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
2-Butanone	ND	1.00	5.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Chloroform	ND	0.469	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
1,1-Dichloroethane	ND	0.335	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Methylene Chloride	ND	0.350	3.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
trans-1,2-DCE	ND	0.482	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Vinyl chloride	ND	0.303	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/23/2013 5:52:57 PM	R10863
Surr: 1,2-Dichloroethane-d4	88.0	0	70-130		%REC	1	5/23/2013 5:52:57 PM	R10863
Surr: 4-Bromofluorobenzene	93.6	0	69.5-130		%REC	1	5/23/2013 5:52:57 PM	R10863
Surr: Dibromofluoromethane	89.4	0	70-130		%REC	1	5/23/2013 5:52:57 PM	R10863
Surr: Toluene-d8	91.0	0	70-130		%REC	1	5/23/2013 5:52:57 PM	R10863

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	WQ5-C-R35 1305865-01		WQ5-C-R35 Duplicate 1305865-02									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	9660	420.18	9790	425.84								
Potassium	313	8.01	337	8.62								
Calcium	1010	50.40	1040	51.90								
Magnesium	424	34.90	427	35.14								
Total Cations		513.48		521.50								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	5000	104.10	5030	104.73								
Chloride	14300	403.39	14700	414.67								
Bicarbonate (CaCO3)	45.5	0.91	45.6	0.91								
Carbonate (CaCO3)												
Phosphate (P)												
Nitrite (N)												
Nitrate (N)												
Fluoride												
Bromide												
Total Anions		508.40		520.31								
Elect. Cond. (µMhos/cm)	62000		61300									
CATION/ANION RATIO		1.01		1.00								
% Difference		0		0								
TOTAL DISSOLVED SOLIDS RATIOS												
TDS (measured)	31600		31800									
TDS (calculated)	30734		31351									
Ratio meas TDS:calc TDS		1.0		1.0								
Ratio Meas. TDS:EC		0.51		0.52								
Ratio Calc. TDS:EC		0.50		0.51								
Ratio of anion sum:EC		0.8		0.8								
Ratio of cation sum:EC		0.8		0.9								

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC -- 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.1.

Ratio of cation sum:EC -- 0.9-1.1

CASE NARRATIVE June 10, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1305865
Anatek Batch: 130523025

Project Summary: Two (2) water samples were received on 5/23/2013 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 1.0 C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1305865-001E / WQ5-C-R35	130523025-001	EPA 6020A
1305865-002E / WQ5-C-R35-Duplicate	130523025-002	EPA 6020A

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	Y	NA
Internal Standard Responses Valid?	Y	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. Holding Time Requirements

No problems encountered.

2. GC/MS Tune Requirements

No problems encountered.

3. Calibration Requirements

No problems encountered.

4. Surrogate Recovery Requirements

No problems encountered.

5. QC Sample (LCS/MS/MSD) Recovery Requirements

No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

Samples -001 and -002 required dilution due to matrix.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John W. Coffey

Anatek Labs, Inc.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130523025
Project Name: 1305865

Analytical Results Report

Sample Number 130523025-001 **Sampling Date** 5/21/2013 **Date/Time Received** 5/23/2013 12:24 PM
Client Sample ID 1305865-001E / WQ5-C-R35 **Sampling Time** 8:40 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	

Sample Number 130523025-002 **Sampling Date** 5/21/2013 **Date/Time Received** 5/23/2013 12:24 PM
Client Sample ID 1305865-002E / WQ5-C-R35-DUPLICATE **Sampling Time** 8:54 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.01	5/30/2013	ALS	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095

Anatek Labs, Inc.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130523025
Project Name: 1305865

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0496	mg/L	0.05	99.2	80-120	5/29/2013	5/30/2013
Selenium	0.0512	mg/L	0.05	102.4	80-120	5/29/2013	5/30/2013
Arsenic	0.0496	mg/L	0.05	99.2	80-120	5/29/2013	5/30/2013
Antimony	0.0555	mg/L	0.05	111.0	80-120	5/29/2013	5/30/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0491	mg/L	0.05	98.2	1.0	0-20	5/29/2013	5/30/2013
Selenium	0.0492	mg/L	0.05	98.4	4.0	0-20	5/29/2013	5/30/2013
Arsenic	0.0493	mg/L	0.05	98.6	0.6	0-20	5/29/2013	5/30/2013
Antimony	0.0559	mg/L	0.05	111.8	0.7	0-20	5/29/2013	5/30/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130523025-001	Thallium	ND	0.0445	mg/L	0.05	89.0	75-125	5/29/2013	5/30/2013
130523025-001	Selenium	ND	0.0517	mg/L	0.05	103.4	75-125	5/29/2013	5/30/2013
130523025-001	Arsenic	ND	0.0508	mg/L	0.05	101.6	75-125	5/29/2013	5/30/2013
130523025-001	Antimony	ND	0.0608	mg/L	0.05	121.6	75-125	5/29/2013	5/30/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0463	mg/L	0.05	92.6	4.0	0-20	5/29/2013	5/30/2013
Selenium	0.0598	mg/L	0.05	119.6	14.5	0-20	5/29/2013	5/30/2013
Arsenic	0.0532	mg/L	0.05	106.4	4.6	0-20	5/29/2013	5/30/2013
Antimony	0.0600	mg/L	0.05	120.0	1.3	0-20	5/29/2013	5/30/2013

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	5/29/2013	5/30/2013
Arsenic	ND	mg/L	0.001	5/29/2013	5/30/2013

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130523025
Project Name: 1305865

Analytical Results Report
Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Selenium	ND	mg/L	0.001	5/29/2013	5/30/2013
Thallium	ND	mg/L	0.001	5/29/2013	5/30/2013

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00168; ID:WA00168; WA:C585; MT:Cert0085

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-7612**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **7612**	RunNo: **10963**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **310091** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID **LCS-7612**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **7612**	RunNo: **10963**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **310092** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	989	20.0	1000	0	98.9	80	120			

Sample ID **LCSD-7612**	SampType: **LCSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSS02**	Batch ID: **7612**	RunNo: **10963**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **310093** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	989	20.0	1000	0	98.9	80	120	0	5	

Sample ID **1305865-002FMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ5-C-R35-Duplica**	Batch ID: **7612**	RunNo: **10963**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **310096** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	41900	200	10000	31780	101	80	120			

Sample ID **1305865-002FMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ5-C-R35-Duplica**	Batch ID: **7612**	RunNo: **10963**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **310097** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	41200	200	10000	31780	93.9	80	120	1.73	5	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **CCB**	Batch ID: **R10820**	RunNo: **10820**							
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305826**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBW**	Batch ID: **R10820**	RunNo: **10820**							
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305827**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R10820**	RunNo: **10820**							
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305828**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.68	0.500	5.000	0	93.6	90	110			
Nitrogen, Nitrate (As N)	2.40	0.100	2.500	0	96.0	90	110			
Sulfate	9.42	0.500	10.00	0	94.2	90	110			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS02**	Batch ID: **R10820**	RunNo: **10820**							
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305829**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.71	0.500	5.000	0	94.2	90	110	0.624	20	
Nitrogen, Nitrate (As N)	2.42	0.100	2.500	0	96.6	90	110	0.598	20	
Sulfate	9.44	0.500	10.00	0	94.4	90	110	0.176	20	

Sample ID **1305865-001FMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **WQ5-C-R35**	Batch ID: **R10820**	RunNo: **10820**							
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305831**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	121	5.00	125.0	0	96.9	90.4	113			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305865-001FMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ5-C-R35**	Batch ID: **R10820**	RunNo: **10820**
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305832** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	122	5.00	125.0	0	97.5	90.4	113	0.572	20	

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10820**	RunNo: **10820**
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305838** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10820**	RunNo: **10820**
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305850** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10820**	RunNo: **10820**
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305862** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10820**	RunNo: **10820**
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305874** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **CCB**	Batch ID: **R10820**	RunNo: **10820**							
Prep Date:	Analysis Date: **5/22/2013**	SeqNo: **305880**	Units: **mg/L**						

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **5ml-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R10863**	RunNo: **10863**
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306984** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	ND	5.00								
Benzene	ND	1.00								
Toluene	ND	1.00								
1,2-Dichloroethane (EDC)	ND	1.00								
2-Butanone	ND	5.00								
Carbon Tetrachloride	ND	1.00								
Chlorobenzene	ND	1.00								
Chloroform	ND	1.00								
cis-1,2-DCE	ND	1.00								
1,1-Dichloroethane	ND	1.00								
1,1-Dichloroethene	ND	1.00								
Methylene Chloride	ND	3.00								
1,1,2,2-Tetrachloroethane	ND	1.00								
Tetrachloroethene (PCE)	ND	1.00								
trans-1,2-DCE	ND	1.00								
1,1,1-Trichloroethane	ND	1.00								
1,1,2-Trichloroethane	ND	1.00								
Trichloroethene (TCE)	ND	1.00								
Trichlorofluoromethane	ND	1.00								
Vinyl chloride	ND	1.00								
Xylenes, Total	ND	1.00								
Surr: 1,2-Dichloroethane-d4	8.74		10.00		87.4	70	130			
Surr: 4-Bromofluorobenzene	9.37		10.00		93.7	69.5	130			
Surr: Dibromofluoromethane	9.13		10.00		91.3	70	130			
Surr: Toluene-d8	9.11		10.00		91.1	70	130			

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R10863**	RunNo: **10863**
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306985** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	58.3	5.00	60.00	0	97.1	60	140			
Benzene	20.9	1.00	20.00	0	105	70	130			
Toluene	19.7	1.00	20.00	0	98.7	80	120			
1,2-Dichloroethane (EDC)	20.6	1.00	20.00	0	103	70	130			
2-Butanone	41.0	5.00	40.00	0	103	60	140			
Carbon Tetrachloride	20.5	1.00	20.00	0	103	70	130			
Chlorobenzene	19.8	1.00	20.00	0	99.2	70	130			
Chloroform	17.6	1.00	20.00	0	88.0	80	120			
cis-1,2-DCE	21.0	1.00	20.00	0	105	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R10863**	RunNo: **10863**							
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306985**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	18.9	1.00	20.00	0	94.5	70	130			
1,1-Dichloroethene	20.7	1.00	20.00	0	104	80	120			
Methylene Chloride	20.4	3.00	20.00	0	102	70	130			
1,1,2,2-Tetrachloroethane	19.2	1.00	20.00	0	95.9	70	130			
Tetrachloroethene (PCE)	20.2	1.00	20.00	0	101	70	130			
trans-1,2-DCE	21.6	1.00	20.00	0	108	70	130			
1,1,1-Trichloroethane	20.6	1.00	20.00	0	103	70	130			
1,1,2-Trichloroethane	19.5	1.00	20.00	0	97.3	70	130			
Trichloroethene (TCE)	20.4	1.00	20.00	0	102	70	130			
Trichlorofluoromethane	21.3	1.00	20.00	0	106	70	130			
Vinyl chloride	21.0	1.00	20.00	0	105	80	120			
Xylenes, Total	61.0	1.00	60.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	9.60		10.00		96.0	70	130			
Surr: 4-Bromofluorobenzene	9.86		10.00		98.6	70	130			
Surr: Dibromofluoromethane	9.23		10.00		92.3	70	130			
Surr: Toluene-d8	8.61		10.00		86.1	70	130			

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R10863**	RunNo: **10863**							
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306986**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	61.1	5.00	60.00	0	102	70	130			
Benzene	20.4	1.00	20.00	0	102	70	130			
Toluene	20.4	1.00	20.00	0	102	70	130			
1,2-Dichloroethane (EDC)	20.4	1.00	20.00	0	102	70	130			
2-Butanone	38.8	5.00	40.00	0	97.1	70	130			
Carbon Tetrachloride	20.5	1.00	20.00	0	103	70	130			
Chlorobenzene	19.6	1.00	20.00	0	98.0	70	130			
Chloroform	17.8	1.00	20.00	0	89.0	70	130			
cis-1,2-DCE	20.4	1.00	20.00	0	102	70	130			
1,1-Dichloroethane	19.0	1.00	20.00	0	94.8	70	130			
1,1-Dichloroethene	20.9	1.00	20.00	0	104	70	130			
Methylene Chloride	19.9	3.00	20.00	0	99.6	70	130			
1,1,2,2-Tetrachloroethane	18.1	1.00	20.00	0	90.4	70	130			
Tetrachloroethene (PCE)	20.9	1.00	20.00	0	104	70	130			
trans-1,2-DCE	20.9	1.00	20.00	0	105	70	130			
1,1,1-Trichloroethane	20.6	1.00	20.00	0	103	70	130			
1,1,2-Trichloroethane	20.0	1.00	20.00	0	99.9	70	130			
Trichloroethene (TCE)	20.0	1.00	20.00	0	100	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R10863**	RunNo: **10863**							
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306986**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Trichlorofluoromethane	21.3	1.00	20.00	0	106	70	130			
Vinyl chloride	21.3	1.00	20.00	0	106	70	130			
Xylenes, Total	58.8	1.00	60.00	0	98.0	70	130			
Surr: 1,2-Dichloroethane-d4	9.55		10.00		95.5	70	130			
Surr: 4-Bromofluorobenzene	9.17		10.00		91.7	69.5	130			
Surr: Dibromofluoromethane	9.21		10.00		92.1	70	130			
Surr: Toluene-d8	8.91		10.00		89.1	70	130			

Sample ID **100ng lcsd L4**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R10863**	RunNo: **10863**							
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306987**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	63.5	5.00	60.00	0	106	70	130	3.86	20	
Benzene	19.8	1.00	20.00	0	99.0	70	130	2.96	20	
Toluene	19.0	1.00	20.00	0	95.2	70	130	6.99	20	
1,2-Dichloroethane (EDC)	20.1	1.00	20.00	0	101	70	130	1.37	20	
2-Butanone	42.3	5.00	40.00	0	106	70	130	8.65	20	
Carbon Tetrachloride	19.3	1.00	20.00	0	96.3	70	130	6.28	20	
Chlorobenzene	19.8	1.00	20.00	0	98.8	70	130	0.774	20	
Chloroform	17.3	1.00	20.00	0	86.6	70	130	2.70	20	
cis-1,2-DCE	19.4	1.00	20.00	0	97.0	70	130	4.79	20	
1,1-Dichloroethane	18.1	1.00	20.00	0	90.7	70	130	4.42	20	
1,1-Dichloroethene	19.2	1.00	20.00	0	96.1	70	130	8.24	20	
Methylene Chloride	19.8	3.00	20.00	0	99.2	70	130	0.387	20	
1,1,2,2-Tetrachloroethane	20.0	1.00	20.00	0	100	70	130	10.1	20	
Tetrachloroethene (PCE)	19.9	1.00	20.00	0	99.3	70	130	4.92	20	
trans-1,2-DCE	19.9	1.00	20.00	0	99.3	70	130	5.25	20	
1,1,1-Trichloroethane	19.4	1.00	20.00	0	97.1	70	130	6.01	20	
1,1,2-Trichloroethane	20.0	1.00	20.00	0	100	70	130	0.362	20	
Trichloroethene (TCE)	19.3	1.00	20.00	0	96.3	70	130	3.82	20	
Trichlorofluoromethane	19.1	1.00	20.00	0	95.5	70	130	10.7	20	
Vinyl chloride	20.2	1.00	20.00	0	101	70	130	5.32	20	
Xylenes, Total	57.9	1.00	60.00	0	96.5	70	130	1.50	20	
Surr: 1,2-Dichloroethane-d4	9.28		10.00		92.8	70	130	0	0	
Surr: 4-Bromofluorobenzene	8.86		10.00		88.6	69.5	130	0	0	
Surr: Dibromofluoromethane	8.94		10.00		89.4	70	130	0	0	
Surr: Toluene-d8	8.82		10.00		88.2	70	130	0	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305865-001a ms**	SampType: **MS4**	TestCode: **EPA Method: 8260B**							
Client ID: **WQ5-C-R35**	Batch ID: **R10863**	RunNo: **10863**							
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306990**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	91.2	5.00	60.00	0	152	70	130			S
Benzene	21.3	1.00	20.00	0	107	70	130			
Toluene	99.9	1.00	20.00	129.6	-149	70	130			S
1,2-Dichloroethane (EDC)	21.2	1.00	20.00	0	106	70	130			
2-Butanone	51.3	5.00	40.00	0	128	70	130			
Carbon Tetrachloride	20.9	1.00	20.00	0	104	70	130			
Chlorobenzene	19.3	1.00	20.00	0	96.7	70	130			
Chloroform	19.0	1.00	20.00	0	94.8	70	130			
cis-1,2-DCE	21.9	1.00	20.00	0	110	70	130			
1,1-Dichloroethane	19.2	1.00	20.00	0	96.0	70	130			
1,1-Dichloroethene	20.7	1.00	20.00	0	103	70	130			
Methylene Chloride	20.4	3.00	20.00	0	102	70	130			
1,1,2,2-Tetrachloroethane	22.5	1.00	20.00	0	113	70	130			
Tetrachloroethene (PCE)	20.3	1.00	20.00	0	101	70	130			
trans-1,2-DCE	21.4	1.00	20.00	0	107	70	130			
1,1,1-Trichloroethane	20.9	1.00	20.00	0	104	70	130			
1,1,2-Trichloroethane	21.7	1.00	20.00	0	109	70	130			
Trichloroethene (TCE)	19.9	1.00	20.00	0	99.7	70	130			
Trichlorofluoromethane	21.8	1.00	20.00	0	109	70	130			
Vinyl chloride	22.0	1.00	20.00	0	110	70	130			
Xylenes, Total	59.4	1.00	60.00	0	99.1	70	130			
Surr: 1,2-Dichloroethane-d4	9.25		10.00		92.5	70	130			
Surr: 4-Bromofluorobenzene	8.72		10.00		87.2	69.5	130			
Surr: Dibromofluoromethane	9.32		10.00		93.2	70	130			
Surr: Toluene-d8	8.81		10.00		88.1	70	130			

Sample ID **1305865-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**							
Client ID: **WQ5-C-R35**	Batch ID: **R10863**	RunNo: **10863**							
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306991**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	87.0	5.00	60.00	0	145	70	130	4.72	20	S
Benzene	20.3	1.00	20.00	0	102	70	130	4.83	20	
Toluene	95.6	1.00	20.00	129.6	-170	70	130	4.41	20	S
1,2-Dichloroethane (EDC)	21.2	1.00	20.00	0	106	70	130	0.289	20	
2-Butanone	48.8	5.00	40.00	0	122	70	130	5.17	20	
Carbon Tetrachloride	19.9	1.00	20.00	0	99.3	70	130	5.09	20	
Chlorobenzene	19.4	1.00	20.00	0	97.1	70	130	0.369	20	
Chloroform	19.3	1.00	20.00	0	96.5	70	130	1.78	20	
cis-1,2-DCE	20.9	1.00	20.00	0	105	70	130	4.48	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305865-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **WQ5-C-R35**	Batch ID: **R10863**	RunNo: **10863**
Prep Date:	Analysis Date: **5/23/2013**	SeqNo: **306991** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	18.9	1.00	20.00	0	94.4	70	130	1.67	20	
1,1-Dichloroethene	19.2	1.00	20.00	0	96.0	70	130	7.33	20	
Methylene Chloride	20.0	3.00	20.00	0	99.8	70	130	2.13	20	
1,1,2,2-Tetrachloroethane	22.4	1.00	20.00	0	112	70	130	0.609	20	
Tetrachloroethene (PCE)	19.3	1.00	20.00	0	96.4	70	130	5.08	20	
trans-1,2-DCE	20.1	1.00	20.00	0	101	70	130	6.33	20	
1,1,1-Trichloroethane	19.7	1.00	20.00	0	98.3	70	130	6.03	20	
1,1,2-Trichloroethane	20.9	1.00	20.00	0	105	70	130	3.69	20	
Trichloroethene (TCE)	19.1	1.00	20.00	0	95.6	70	130	4.18	20	
Trichlorofluoromethane	19.4	1.00	20.00	0	96.8	70	130	11.9	20	
Vinyl chloride	20.5	1.00	20.00	0	103	70	130	6.98	20	
Xylenes, Total	56.3	1.00	60.00	0	93.9	70	130	5.39	20	
Surr: 1,2-Dichloroethane-d4	9.86		10.00		98.6	70	130	0		
Surr: 4-Bromofluorobenzene	9.14		10.00		91.4	69.5	130	0		
Surr: Dibromofluoromethane	9.18		10.00		91.8	70	130	0		
Surr: Toluene-d8	8.59		10.00		85.9	70	130	0		

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R10909**	RunNo: **10909**
Prep Date:	Analysis Date: **5/28/2013**	SeqNo: **308385** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	40.9		40.00		102	60	140			
Surr: 2-Fluorobiphenyl	38.5		40.00		96.2	60	140			
Surr: 2-Fluorophenol	35.6		40.00		89.1	60	140			
Surr: 4-Terphenyl-d14	43.6		40.00		109	60	140			
Surr: Nitrobenzene-d5	39.4		40.00		98.4	60	140			
Surr: Phenol-d5	36.3		40.00		90.8	60	140			

Sample ID **mb-7597**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **7597**	RunNo: **10909**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **308386** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	5.00								
1,4-Dichlorobenzene	ND	5.00								
2,4-Dinitrophenol	ND	5.00								
2,4-Dinitrotoluene	ND	5.00								
Hexachlorobenzene	ND	5.00								
Hexachloroethane	ND	5.00								
2-Methylphenol	ND	5.00								
3+4-Methylphenol	ND	5.00								
Nitrobenzene	ND	5.00								
Pentachlorophenol	ND	5.00								
Pyridine	ND	5.00								
Surr: 2,4,6-Tribromophenol	170		200.0		85.2	41.5	117			
Surr: 2-Fluorobiphenyl	63.0		100.0		63.0	29.1	112			
Surr: 2-Fluorophenol	90.9		200.0		45.4	11.9	98.6			
Surr: 4-Terphenyl-d14	83.0		100.0		83.0	46	111			
Surr: Nitrobenzene-d5	72.2		100.0		72.2	34.9	112			
Surr: Phenol-d5	87.6		200.0		43.8	17.5	88.3			

Sample ID **lcs-7597**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7597**	RunNo: **10909**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **308388** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	68.6	5.00	100.0	0	68.6	27.4	101			
1,4-Dichlorobenzene	65.5	5.00	100.0	0	65.5	32.6	91.5			
2,4-Dinitrophenol	72.4	5.00	100.0	0	72.4	23.1	118			
2,4-Dinitrotoluene	81.0	5.00	100.0	0	81.0	44.7	112			
Hexachlorobenzene	92.3	5.00	100.0	0	92.3	30	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-7597**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7597**	RunNo: **10909**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **308388** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	61.6	5.00	100.0	0	61.6	23.2	97.8			
2-Methylphenol	79.7	5.00	100.0	0	79.7	36.1	105			
3+4-Methylphenol	79.2	5.00	100.0	0	79.2	35.7	92.5			
Nitrobenzene	83.4	5.00	100.0	0	83.4	30.9	125			
Pentachlorophenol	81.3	5.00	100.0	0	81.3	20.2	93			
Pyridine	26.0	5.00	100.0	0	26.0	5.14	87.1			
Surr: 2,4,6-Tribromophenol	115		100.0		115	41.5	117			
Surr: 2-Fluorobiphenyl	88.5		100.0		88.5	29.1	112			
Surr: 2-Fluorophenol	50.2		100.0		50.2	11.9	98.6			
Surr: 4-Terphenyl-d14	105		100.0		105	46	111			
Surr: Nitrobenzene-d5	86.8		100.0		86.8	34.9	112			
Surr: Phenol-d5	46.6		100.0		46.6	17.5	88.3			

Sample ID **lcsd-7597**	SampType: **LCSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7597**	RunNo: **10909**
Prep Date: **5/24/2013**	Analysis Date: **5/28/2013**	SeqNo: **308389** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	71.7	5.00	100.0	0	71.7	27.4	101	4.45	20	
1,4-Dichlorobenzene	67.0	5.00	100.0	0	67.0	32.6	91.5	2.17	20	
2,4-Dinitrophenol	75.2	5.00	100.0	0	75.2	23.1	118	3.85	20	
2,4-Dinitrotoluene	80.2	5.00	100.0	0	80.2	44.7	112	0.968	20	
Hexachlorobenzene	87.8	5.00	100.0	0	87.8	30	130	5.06	20	
Hexachloroethane	62.7	5.00	100.0	0	62.7	23.2	97.8	1.71	20	
2-Methylphenol	83.1	5.00	100.0	0	83.1	36.1	105	4.18	20	
3+4-Methylphenol	80.4	5.00	100.0	0	80.4	35.7	92.5	1.43	20	
Nitrobenzene	86.4	5.00	100.0	0	86.4	30.9	125	3.51	20	
Pentachlorophenol	76.9	5.00	100.0	0	76.9	20.2	93	5.46	20	
Pyridine	26.0	5.00	100.0	0	26.0	5.14	87.1	0.154	20	
Surr: 2,4,6-Tribromophenol	108		100.0		108	41.5	117	0		
Surr: 2-Fluorobiphenyl	92.5		100.0		92.5	29.1	112	0		
Surr: 2-Fluorophenol	55.6		100.0		55.6	11.9	98.6	0		
Surr: 4-Terphenyl-d14	104		100.0		104	46	111	0		
Surr: Nitrobenzene-d5	85.6		100.0		85.6	34.9	112	0		
Surr: Phenol-d5	45.7		100.0		45.7	17.5	88.3	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305865-001Cms** SampType: **MS4** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **WQ5-C-R35** Batch ID: **7597** RunNo: **10909**

Prep Date: **5/24/2013** Analysis Date: **5/28/2013** SeqNo: **308395** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	82.8	5.00	100.0	0	82.8	20.9	103			
1,4-Dichlorobenzene	79.0	5.00	100.0	0	79.0	32.6	91.5			
2,4-Dinitrophenol	31.3	5.00	100.0	0	31.3	11	112			
2,4-Dinitrotoluene	91.5	5.00	100.0	0	91.5	44.7	112			
Hexachlorobenzene	95.2	5.00	100.0	0	95.2	30.3	126			
Hexachloroethane	76.6	5.00	100.0	0	76.6	19.5	96.4			
2-Methylphenol	85.8	5.00	100.0	0	85.8	28.7	108			
3+4-Methylphenol	81.9	5.00	100.0	0	81.9	24.2	136			
Nitrobenzene	93.4	5.00	100.0	0	93.4	28.8	119			
Pentachlorophenol	39.4	5.00	100.0	0	39.4	20.2	93			
Pyridine	50.9	5.00	100.0	0	50.9	19.3	82.8			
Surr: 2,4,6-Tribromophenol	121		100.0		121	41.5	117			S
Surr: 2-Fluorobiphenyl	101		100.0		101	29.1	112			
Surr: 2-Fluorophenol	56.3		100.0		56.3	11.9	98.6			
Surr: 4-Terphenyl-d14	114		100.0		114	46	111			S
Surr: Nitrobenzene-d5	102		100.0		102	34.9	112			
Surr: Phenol-d5	56.7		100.0		56.7	17.5	88.3			

Sample ID **1305865-001Cmsd** SampType: **MSD4** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **WQ5-C-R35** Batch ID: **7597** RunNo: **10909**

Prep Date: **5/24/2013** Analysis Date: **5/28/2013** SeqNo: **308396** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	77.2	5.00	100.0	0	77.2	20.9	103	6.95	20	
1,4-Dichlorobenzene	69.9	5.00	100.0	0	69.9	32.6	91.5	12.2	20	
2,4-Dinitrophenol	29.3	5.00	100.0	0	29.3	11	112	6.59	20	
2,4-Dinitrotoluene	78.8	5.00	100.0	0	78.8	44.7	112	15.0	20	
Hexachlorobenzene	94.5	5.00	100.0	0	94.5	30.3	126	0.738	20	
Hexachloroethane	70.0	5.00	100.0	0	70.0	19.5	96.4	9.01	20	
2-Methylphenol	75.9	5.00	100.0	0	75.9	28.7	108	12.3	20	
3+4-Methylphenol	72.5	5.00	100.0	0	72.5	24.2	136	12.1	20	
Nitrobenzene	76.7	5.00	100.0	0	76.7	28.8	119	19.6	20	
Pentachlorophenol	44.7	5.00	100.0	0	44.7	20.2	93	12.5	20	
Pyridine	40.9	5.00	100.0	0	40.9	19.3	82.8	21.6	20	R
Surr: 2,4,6-Tribromophenol	105		100.0		105	41.5	117	0		
Surr: 2-Fluorobiphenyl	89.1		100.0		89.1	29.1	112	0		
Surr: 2-Fluorophenol	45.4		100.0		45.4	11.9	98.6	0		
Surr: 4-Terphenyl-d14	105		100.0		105	46	111	0		
Surr: Nitrobenzene-d5	83.0		100.0		83.0	34.9	112	0		
Surr: Phenol-d5	41.3		100.0		41.3	17.5	88.3	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1305865-002f dup**	SampType:	**dup**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**WQ5-C-R35-Duplica**	Batch ID:	**R10812**		RunNo:	**10812**				
Prep Date:		Analysis Date:	**5/22/2013**		SeqNo:	**305537**	Units:	**µmhos/cm**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	61200	0.500						0.245	20	

Sample ID	**ec 100us ccv**	SampType:	**ccv**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**CCV**	Batch ID:	**R10812**		RunNo:	**10812**				
Prep Date:		Analysis Date:	**5/22/2013**		SeqNo:	**305539**	Units:	**µmhos/cm**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	110	0.010	100.0	0	106	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-7893**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**7893**	RunNo:	**11317**					
Prep Date:	**6/13/2013**	Analysis Date:	**6/14/2013**	SeqNo:	**319764**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	**LCS-7893**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**7893**	RunNo:	**11317**					
Prep Date:	**6/13/2013**	Analysis Date:	**6/14/2013**	SeqNo:	**319765**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00501	0.000200	0.005000	0	100	80	120			

Sample ID	**LCS-7893**	SampType:	**LCSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSS02**	Batch ID:	**7893**	RunNo:	**11317**					
Prep Date:	**6/13/2013**	Analysis Date:	**6/14/2013**	SeqNo:	**319766**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0050	0.00020	0.005000	0	100	80	120	0.165	20	

Sample ID	**1305865-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**WQ5-C-R35**	Batch ID:	**7893**	RunNo:	**11317**					
Prep Date:	**6/13/2013**	Analysis Date:	**6/14/2013**	SeqNo:	**319780**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00516	0.00100	0.005000	0	103	75	125			

Sample ID	**1305865-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**WQ5-C-R35**	Batch ID:	**7893**	RunNo:	**11317**					
Prep Date:	**6/13/2013**	Analysis Date:	**6/14/2013**	SeqNo:	**319781**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00512	0.00100	0.005000	0	102	75	125	0.764	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	PBW	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312302	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00								
Magnesium	ND	1.00								
Potassium	ND	1.00								
Sodium	ND	1.00								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSW	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312303	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.6	1.00	50.00	0	101	80	120			
Magnesium	50.6	1.00	50.00	0	101	80	120			
Potassium	50.5	1.00	50.00	0	101	80	120			
Sodium	49.9	1.00	50.00	0	99.9	80	120			

Sample ID	LCSD(ADOC1-JLF)	SampType:	LCSD	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSS02	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312304	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.8	1.00	50.00	0	102	80	120	0.474	20	
Magnesium	50.8	1.00	50.00	0	102	80	120	0.382	20	
Potassium	50.7	1.00	50.00	0	101	80	120	0.403	20	
Sodium	49.5	1.00	50.00	0	99.0	80	120	0.881	20	

Sample ID	ADOC2-JLF	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSW	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312305	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.6	1.00	50.00	0	101	80	120			
Magnesium	51.6	1.00	50.00	0	103	80	120			
Potassium	51.7	1.00	50.00	0	103	80	120			
Sodium	51.1	1.00	50.00	0	102	80	120			

Sample ID	ADOC3-JLF	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSW	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312306	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.3	1.00	50.00	0	101	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	ADOC3-JLF	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSW	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312306	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50.9	1.00	50.00	0	102	80	120			
Potassium	51.8	1.00	50.00	0	104	80	120			
Sodium	50.7	1.00	50.00	0	101	80	120			

Sample ID	ADOC4-JLF	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	LCSW	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312307	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49.3	1.00	50.00	0	98.7	80	120			
Magnesium	51.0	1.00	50.00	0	102	80	120			
Potassium	50.8	1.00	50.00	0	102	80	120			
Sodium	50.6	1.00	50.00	0	101	80	120			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312312	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.117	-100	99			
Magnesium	ND	1.00	1.000	0	-0.0190	-100	99			
Potassium	ND	1.00	1.000	0	-0.490	-100	99			
Sodium	0.367	1.00	1.000	0	36.7	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312313	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48.6	1.00	50.00	0	97.2	90	110			
Magnesium	48.4	1.00	50.00	0	96.9	90	110			
Potassium	49.9	1.00	50.00	0	99.8	90	110			
Sodium	49.5	1.00	50.00	0	99.1	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R11042	RunNo:	11042					
Prep Date:		Analysis Date:	6/3/2013	SeqNo:	312325	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.673	-100	99			
Magnesium	ND	1.00	1.000	0	-0.0610	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R11042**	RunNo: **11042**
Prep Date:	Analysis Date: **6/3/2013**	SeqNo: **312325** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	0.346	1.00	1.000	0	34.6	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R11042**	RunNo: **11042**
Prep Date:	Analysis Date: **6/3/2013**	SeqNo: **312326** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.2	1.00	50.00	0	100	90	110			
Magnesium	49.2	1.00	50.00	0	98.3	90	110			
Potassium	52.1	1.00	50.00	0	104	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R11042**	RunNo: **11042**
Prep Date:	Analysis Date: **6/3/2013**	SeqNo: **312333** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	ND	1.00	1.000	0	1.29	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R11042**	RunNo: **11042**
Prep Date:	Analysis Date: **6/3/2013**	SeqNo: **312334** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	49.9	1.00	50.00	0	99.7	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-7820**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **7820**	RunNo: **11267**
Prep Date: **6/8/2013**	Analysis Date: **6/12/2013**	SeqNo: **318283** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0200								
Beryllium	ND	0.00300								
Cadmium	ND	0.00200								
Calcium	ND	1.00								
Chromium	ND	0.00600								
Iron	ND	0.0500								
Lead	ND	0.00500								
Magnesium	0.0127	1.00								J
Nickel	ND	0.0100								
Potassium	ND	1.00								
Silver	ND	0.00500								
Sodium	ND	1.00								
Vanadium	ND	0.0500								

Sample ID **LCS-7820**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **7820**	RunNo: **11267**
Prep Date: **6/8/2013**	Analysis Date: **6/12/2013**	SeqNo: **318284** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.492	0.0200	0.5000	0	98.3	80	120			
Beryllium	0.523	0.00300	0.5000	0	105	80	120			
Cadmium	0.491	0.00200	0.5000	0	98.3	80	120			
Calcium	51.0	1.00	50.00	0	102	80	120			
Chromium	0.490	0.00600	0.5000	0	98.1	80	120			
Iron	0.497	0.0500	0.5000	0	99.5	80	120			
Lead	0.480	0.00500	0.5000	0	95.9	80	120			
Magnesium	50.4	1.00	50.00	0	101	80	120			
Nickel	0.469	0.0100	0.5000	0	93.8	80	120			
Potassium	48.7	1.00	50.00	0	97.5	80	120			
Silver	0.0934	0.00500	0.1000	0	93.4	80	120			
Sodium	49.4	1.00	50.00	0	98.7	80	120			
Vanadium	0.510	0.0500	0.5000	0	102	80	120			

Sample ID **LCS-7820**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **7820**	RunNo: **11267**
Prep Date: **6/8/2013**	Analysis Date: **6/12/2013**	SeqNo: **318285** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.477	0.0200	0.5000	0	95.4	80	120	3.06	0	
Beryllium	0.505	0.00300	0.5000	0	101	80	120	3.56	0	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **LCS-7820**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **7820**	RunNo: **11267**
Prep Date: **6/8/2013**	Analysis Date: **6/12/2013**	SeqNo: **318285** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.477	0.00200	0.5000	0	95.4	80	120	2.93	0	
Calcium	51.0	1.00	50.00	0	102	80	120	0.0392	0	
Chromium	0.477	0.00600	0.5000	0	95.4	80	120	2.79	0	
Iron	0.491	0.0500	0.5000	0	98.2	80	120	1.31	0	
Lead	0.472	0.00500	0.5000	0	94.3	80	120	1.65	0	
Magnesium	50.2	1.00	50.00	0	100	80	120	0.358	0	
Nickel	0.457	0.0100	0.5000	0	91.3	80	120	2.64	0	
Potassium	48.6	1.00	50.00	0	97.3	80	120	0.207	0	
Silver	0.0903	0.00500	0.1000	0	90.3	80	120	3.42	0	
Sodium	49.2	1.00	50.00	0	98.3	80	120	0.392	0	
Vanadium	0.493	0.0500	0.5000	0	98.5	80	120	3.38	0	

Sample ID **1305865-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ5-C-R35**	Batch ID: **7820**	RunNo: **11276**
Prep Date: **6/8/2013**	Analysis Date: **6/13/2013**	SeqNo: **318635** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.512	0.0200	0.5000	0.01779	98.9	75	125			
Beryllium	0.498	0.00300	0.5000	0.001480	99.3	75	125			
Cadmium	0.535	0.00200	0.5000	0	107	75	125			
Chromium	0.473	0.00600	0.5000	0	94.6	75	125			
Iron	0.976	0.0500	0.5000	0.5163	91.9	75	125			
Lead	0.458	0.00500	0.5000	0	91.6	75	125			
Nickel	0.439	0.0100	0.5000	0	87.8	75	125			
Silver	0.107	0.00500	0.1000	0	107	75	125			
Vanadium	0.528	0.0500	0.5000	0.01118	103	75	125			

Sample ID **1305865-001DMSD**	SampType: **MSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ5-C-R35**	Batch ID: **7820**	RunNo: **11276**
Prep Date: **6/8/2013**	Analysis Date: **6/13/2013**	SeqNo: **318636** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.511	0.0200	0.5000	0.01779	98.7	75	125	0.135	20	
Beryllium	0.500	0.00300	0.5000	0.001480	99.6	75	125	0.321	20	
Cadmium	0.530	0.00200	0.5000	0	106	75	125	0.935	20	
Chromium	0.472	0.00600	0.5000	0	94.4	75	125	0.169	20	
Iron	0.950	0.0500	0.5000	0.5163	86.8	75	125	2.67	20	
Lead	0.452	0.00500	0.5000	0	90.5	75	125	1.26	20	
Nickel	0.439	0.0100	0.5000	0	87.8	75	125	0.0615	20	
Silver	0.107	0.00500	0.1000	0	107	75	125	0.233	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1305865

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	1305865-001DMSD	SampType:	MSD	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	WQ5-C-R35	Batch ID:	7820	RunNo:	11276					
Prep Date:	6/8/2013	Analysis Date:	6/13/2013	SeqNo:	318636	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vanadium	0.528	0.0500	0.5000	0.01118	103	75	125	0.0265	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1305865-002f dup**	SampType:	**dup**		TestCode:	**SM4500-H+B: pH**				
Client ID:	**WQ5-C-R35-Duplica**	Batch ID:	**R10812**		RunNo:	**10812**				
Prep Date:		Analysis Date:	**5/22/2013**		SeqNo:	**305543**	Units:	**pH units**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.43	1.68								H

Sample ID	**ph 4.00 ccv**	SampType:	**ccv**		TestCode:	**SM4500-H+B: pH**				
Client ID:	**CCV**	Batch ID:	**R10812**		RunNo:	**10812**				
Prep Date:		Analysis Date:	**5/22/2013**		SeqNo:	**305546**	Units:	**pH units**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	4.02	1.68								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	mb-1	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R10812	RunNo:	10812					
Prep Date:		Analysis Date:	5/22/2013	SeqNo:	305522	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20.0								

Sample ID	lcs-1	SampType:	lcs	TestCode:	SM2320B: Alkalinity					
Client ID:	LCSW	Batch ID:	R10812	RunNo:	10812					
Prep Date:		Analysis Date:	5/22/2013	SeqNo:	305523	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.4	20.0	80.00	0	100	90	110			

Sample ID	lcs-1 dup	SampType:	lcsd	TestCode:	SM2320B: Alkalinity					
Client ID:	LCSS02	Batch ID:	R10812	RunNo:	10812					
Prep Date:		Analysis Date:	5/22/2013	SeqNo:	305524	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.4	20.0	80.00	0	101	90	110	0.0995	20	

Sample ID	1305865-001f ms	SampType:	ms	TestCode:	SM2320B: Alkalinity					
Client ID:	WQ5-C-R35	Batch ID:	R10812	RunNo:	10812					
Prep Date:		Analysis Date:	5/22/2013	SeqNo:	305527	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	123	20.0	80.00	45.48	96.5	65.3	113			

Sample ID	1305865-001f msd	SampType:	msd	TestCode:	SM2320B: Alkalinity					
Client ID:	WQ5-C-R35	Batch ID:	R10812	RunNo:	10812					
Prep Date:		Analysis Date:	5/22/2013	SeqNo:	305528	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	123	20.0	80.00	45.48	96.6	65.3	113	0.0652	10	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**
Client ID: **PBW**	Batch ID: **R10947**	RunNo: **10947**
Prep Date:	Analysis Date: **5/29/2013**	SeqNo: **309501** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.00								

Sample ID **LCS ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R10947**	RunNo: **10947**
Prep Date:	Analysis Date: **5/29/2013**	SeqNo: **309504** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.84	1.00	4.850	0	99.8	90	110			

Sample ID **LCSD ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R10947**	RunNo: **10947**
Prep Date:	Analysis Date: **5/29/2013**	SeqNo: **309505** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.88	1.00	4.850	0	101	90	110	0.885	0	

Sample ID **1305865-001BMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**
Client ID: **WQ5-C-R35**	Batch ID: **R10947**	RunNo: **10947**
Prep Date:	Analysis Date: **5/29/2013**	SeqNo: **309507** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.31	1.00	4.650	0.3812	106	75	125			

Sample ID **1305865-001BMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**
Client ID: **WQ5-C-R35**	Batch ID: **R10947**	RunNo: **10947**
Prep Date:	Analysis Date: **5/29/2013**	SeqNo: **309508** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.55	1.00	4.650	0.3812	111	75	125	4.40	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305865**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1305865-001FDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**WQ5-C-R35**	Batch ID:	**R10932**	RunNo:	**10932**					
Prep Date:		Analysis Date:	**5/29/2013**	SeqNo:	**309134**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.020	0						0.0588	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

WQSP-5

DATA VERIFICATION AND VALIDATION REPORTS

Round 35
WQSP-5
SDG 1305865
Groundwater Concentration and Precision Summary

General Chemistry Parameter	Units	SOW MRL	Lab MDL[a]	Lab PQL[b]	Primary Sample	Flag	Duplicate Sample	Flag	Avg	RPD	Applicable 95th UTLV or 95th %
Chloride	mg/L	0.5	130	1000	14,300		14,700		14,500	2.8	18,100
TOC	mg/L	1.0	0.23	1.0	0.38	J	0.38	J	0.38	0.0	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	5.0	20	45.5		45.6		45.6	0.22	56
Specific Conductance	umhos/cm	NA	0.5	0.5	62,000		61,300		61,650	1.1	67,700
pH	pH units	NA	0.10	1.68	7.32		7.43		7.38	1.5	7.4 - 7.9
Specific Gravity	NA	NA	0.0	0.0	1.020		1.019		1.020	0.10	1.04
TDS	mg/L	10	101	200	31,600		31,800		31,700	0.63	43,950
TSS	mg/L	1.0	1.5	4.0	5.0		ND		NA	NA	<10.0
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	2.80	50	1,010		1,040		1025	2.9	1,303
Mg (Diss)	mg/L	0.5	0.042	5.0	424		427		426	0.71	547
K (Diss)	mg/L	0.5	0.25	5.0	313		337		325	7.4	622
Na (Diss)	mg/L	0.5	16	200	9,660		9,790		9,725	1.3	11,190
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL**	**Lab PQL**	**Primary Sample**	**Flag**	**Duplicate Sample**	**Flag**	**Avg**	**RPD**	
Hg (CVAAS) (c)	mg/L	0.0002	0.00044	0.0010	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.00050	0.020	0.018	J	0.017	J	0.0175	5.7	<1.0
Be	mg/L	0.010	0.00050	0.0030	0.0015	J	0.0017	J	0.0016	13	<0.02
Cd	mg/L	0.010	0.00080	0.0020	ND		ND		NA	NA	<0.05
Ca	mg/L	0.500	0.18	20	1,060		1,010		1,035	4.8	NA
Cr	mg/L	0.025	0.0015	0.0060	ND		ND		NA	NA	<0.5
Pb (c)	mg/L	0.020	0.0034	0.0050	ND		ND		NA	NA	<0.05
Mg	mg/L	0.50	0.19	20	442		409		426	7.8	NA
Ni	mg/L	0.025	0.0014	0.01	ND		ND		NA	NA	<0.1
K	mg/L	0.50	4.3	20	294		289		292	1.7	NA
Ag	mg/L	0.013	0.0011	0.0050	ND		ND		NA	NA	<0.5
Na	mg/L	0.50	100	200	9,460		9,330		9,395	1.4	NA
V	mg/L	0.025	0.0035	0.050	0.011	J	0.012	J	0.012	8.7	2.7
ICP/MS Metals											
Sb	mg/L	0.025	0.010	0.010	ND		ND		NA	NA	0.073
As	mg/L	0.050	0.010	0.010	ND		ND		NA	NA	<0.5
Se	mg/L	0.025	0.010	0.010	ND		ND		NA	NA	<0.1
Tl	mg/L	0.025	0.010	0.010	ND		ND		NA	NA	0.209
VOCs											
Toluene	ug/L	1.0	4.41	10.0	141		82.1		112	53	<1.0

Lab's PQL corresponds to low calibration standard adjusted for the dilution factor as necessary for high-brine samples.
Method Reporting Limit (MRL) and lab's Practical Quantitation Level (PQL) generally equivalent for a given sample.
ND Not detected
NA Not applicable
J Flag indicates concentration was below the lab's PQL but above the Method Detection Limit (MDL) for the analyte at the dilution used for the analysis.
CVAAS - cold vapor atomic absorption spectroscopy.
ICP - inductively coupled plasma emission spectroscopy.
ICP/MS - ICP combined with mass spectrometry.
(a) MDL - method detection limit
(b) PQL - practical quantitation limit eqivalent to method reporting limit (MRL)
(c) MDL higher than the SOW-prescribed MRL.

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 35
WQSP-5

Sample Summary

Date:	July 29, 2013
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	May 21, 2013
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 28, 2013
Date Samples Shipped/Method	May 21, 2013 by FedEx
Date Samples Received by lab:	May 22, 2013
Sample Receipt Condition:	Intact at 2.4 deg. C
SDG:	1305865
WIPP Chain of Custody/Request for Analysis:	1036
Analysis Results Reviewed:	Volatile and semivolatile organics; total and dissolved metals; general chemistry indicator parameters
Analyses Verified, Validated, and Reported in this Document:	See table of all target analytes and methods in the Annual Culebra Groundwater Monitoring Report
VOC Analysis Date(s):	May 23, 2013 (meets holding time)
SVOC Extraction Date:	May 24, 2013 (meets holding time)
SVOC Analysis Date(s):	May 28, 2013 (meets holding time)
Total Trace Metals Analysis Date:	June 13, 2013 (meets holding time)
Dissolved Cation Metals Analysis Date:	June 3, 2013 (meets holding time)
Mercury Analysis Date(s):	June 14, 2013 (meets holding time)
General Chemistry Parameters analysis dates	Dates are summarized on the Dates Report and on the data summary reports from the lab in the appendices. All holding times were met.
Verification and Validation Checklist	Completed and attached to this narrative

Sample Numbers and Analytes for SDG 1305865

WTS Sample No.	Analytes
GW-WQ5CR35N1, GW-WQ5CR35N1D	VOCs
GW-WQ5CR35N2, GW-WQ5CR35N3	VOCs (Field Blank and Trip Blank)
GW-WQ5CR35N4, GW-WQ5CR35N4D	TOC
GW-WQ5CR35N5, GW-WQ5CR35N5D	SVOCs
GW-WQ5CR35N6, GW-WQ5CR35N6D	Total Trace Metals (including "total" cation metals)
GW-WQ5CR35N7, GW-WQ5CR35N7D	General Parameters (including "dissolved" cations)

Results Summary

Toluene was detected at concentrations above the MRL and above the Permit concentration of concern at 141 ug/L in the primary sample and 82.1 ug/L in the duplicate sample. The toluene was later confirmed to have been introduced during well pump replacement using a heavy duty electrical tape to bind the electrical wires to the well pipe. This detection of toluene resulting in removing the well pipe and reinstalling it with cable ties to bind the electrical wires to the pipe and subsequently purging and re-sampling the well twice. The field blank contained 2-butanone above the MRL at 15.1 ug/L, but the compound was not detected in the groundwater samples. No VOCs were detected in the trip blank sample.

No SVOCs were detected in the groundwater samples.

The chemical analysis data for the trace metals showed detections of Ba, Be, and V in the primary and duplicate groundwater samples. All the concentrations are below the MRL and are J-flagged as estimated.

The calcium, magnesium, potassium, and sodium were detected at concentrations very close to previous rounds with average concentrations ranging from 292 mg/L for K to 9,400 mg/L for Na.

Measurements were made on all the general chemistry parameters at concentrations above the MRL except for TOC which was detected at concentrations between the MDL and MRL at 0.38 mg/L in both the primary and duplicate groundwater samples. The concentrations are J-flagged as estimated.

All concentrations, except for toluene, were below the 95th UTLV or 95th percentile. Chloride, sulfate, and TSS concentrations have exceeded the limit in some samples during previous Rounds.

Summary for Volatile Organics Analysis

The groundwater samples were purged and analyzed for 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, benzene, carbon tetrachloride, chlorobenzene, chloroform, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, isobutanol, methyl ethyl ketone (2-butanone), methylene chloride, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, and xylenes (o-, m-, and p-). Starting with Round 33 HEAL calibrated for and analyzed for the isobutyl alcohol in separate analysis runs from the other VOC compounds.

The samples were analyzed according to the laboratory's SOP S-8260-11 based on EPA's SW-846 Method 8260B.

Toluene was detected at concentrations above the MRL and above the Permit concentration of concern at 141 ug/L in the primary sample and 82.1 ug/L in the duplicate sample. The toluene was later confirmed to have been introduced during well pump replacement using a heavy duty electrical tape to bind the electrical wires to the well pipe. This detection of toluene resulted in removing the well pipe and reinstalling it with cable ties to bind the electrical wires to the pipe and subsequently purging and re-sampling the well twice. During the first re-sampling the toluene concentrations were still above the MRL/concentration of concern at 7.6 ug/L in the primary sample and 8.1 ug/L in the duplicate sample. Following several days of additional purging of the well, the toluene was still detectable above 1.0 ug/L at 2.9 ug/L in both the primary and duplicate samples. The initial field blank contained 2-butanone above the MRL at 15.1 ug/L, but the compound was not detected in the groundwater samples. No VOCs were detected in the initial trip blank sample.

The QA/QC data met the accuracy objective for recovery and precision objective in both the LCS/LCSD and MS/MSD samples except for isobutyl alcohol and toluene. The recoveries for isobutyl alcohol were 152 percent and 145 percent, respectively, in the MS and MSD. The polar compound typically purges more efficiently from the MS/MSD samples than from the calibration standards and LCS/LCSD samples. The toluene yielded significant negative recoveries (-149%, -170%) in the MS/MSD due to the high native concentration of toluene in the samples during analysis of the initial batch of samples.

All other quality assurance objectives were met for the VOC analyses.

Summary for Semivolatile Organic Compound Analysis

The groundwater samples were analyzed for 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, 2,4-dinitrophenol, 2,4-dinitrotoluene, 2-methylphenol (o-cresol), 3+4-methylphenol (m-, p-methyl phenol), hexachlorobenzene, hexachloroethane, nitrobenzene, pentachlorophenol, and pyridine.

The samples were analyzed according to the laboratory's SOP S-8270C-11 based on EPA's SW-846 Method 8270C. No SVOCs were detected in any of the groundwater samples.

The quality assurance objectives for recovery and precision were met for the SVOC compounds in the LCS and LCSD samples and MS and MSD samples except that the precision of the recoveries for pyridine in the MS/MSD samples was just above the 20 RPD objective based on recoveries of 50.9% and 40.9%.

All other SVOC quality assurance objectives were met.

Summary for Metals Analysis

The groundwater samples were prepared and analyzed for Barium (Ba), Beryllium (Be), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Lead (Pb), Magnesium (Mg), Nickel (Ni), Potassium (K), Silver (Ag), Sodium (Na), and Vanadium (V) by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) according to Hall's SOP S-610-8 based on EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed according to Anatek's SOP ALI-A-315.06 for ICP/MS Method 6020 from SW-846. Mercury (Hg) was analyzed according to the Hall's S-245.1_7470A-3 using automated cold-vapor atomic absorption (CVAA) spectroscopy. The SOP is based on EPA's SW-846 Method 7470A.

The lab used a dilution factor of 1 for the trace metals analysis by ICP in the WQSP-5 samples to achieve the lowest possible detection limits (the samples were diluted for analysis of the four cations). The lab's MDL was lower than the SOW-prescribed MRLs for all the metals.

The chemical analysis data for the trace metals showed detections of Ba, Be, and V in the primary and duplicate groundwater samples. All the concentrations were below the MRL and are J-flagged as estimated. The concentrations were 0.018 mg/L and 0.017 mg/L for Ba, 0.0015 mg/L and 0.0017 mg/L for Be, and 0.011 mg/L and 0.12 mg/L for V.

The quality assurance objective for accuracy was met for Hg, the trace metals, the dissolved metals, and the four metals analyzed by ICP/MS in the LCS/LCSD and MS/MSD samples. In addition the precision objective of <20 RPD was met for the LCS/LCSD and MS/MSD samples.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), alkalinity, and the anions chloride and sulfate. The standard analytical methods and the corresponding SOPs are shown in the table below.

Standard Analytical Method	Current Hall Lab SOP
Method 2710F – Specific Gravity from Standard Methods	S-2710F - Rev. 1
Standard Methods SM 4500-H^+ (pH)	S-4500-H^+B-7
EPA Method 120.1 Specific Conductance (Conductivity)	S-120.1 – 7
Standard Methods SM 2540C (TDS)	S-SM2540C – 6
Standard Methods SM 2540D (TSS)	S-SM2540D – 4
Standard Methods SM 5310B (TOC)	S-TOC – 6
Standard Methods 2320B (Alkalinity)	S-SM2320 – 7
EPA Method 300.0 (Anions)	S-300.0 – 10

The types of QC samples analyzed for the general chemistry parameters include the following:

- Method blank samples were analyzed for all the general chemistry parameters. No contamination issues affecting accuracy were noted.

- LCS samples were analyzed for the anions chloride and sulfate to obtain recovery information. MS/MSD samples were not analyzed because of the high native concentrations of chloride and sulfate. All LCS recoveries were within 90 – 110 percent recovery and RPDs were <20.

- The primary groundwater sample was analyzed in duplicate for specific gravity to obtain precision information. The RPD of the duplicate analyses was <1 indicating good precision.

- The duplicate groundwater sample was analyzed in duplicate for pH. The two values were 7.43 and 7.43 for a RPD of 0.0 indicating good precision.

- The lab did not appear to analyze any QC samples for TSS. Normally the lab would analyze one of the samples in duplicate and also analyze a LCS sample.

- LCS/LCSD and MS/MSD QC samples were analyzed for TDS, alkalinity and TOC to obtain recovery and precision information. All the recoveries were within the 90 – 110 percent objective, and the RPDs were less than 10.

All other quality assurance objectives were met for the general chemistry indicator parameter analyses.

Overall Data Package Summary

In summary, the data and information contained in this data packet is of high quality and meets the data quality objectives for accuracy and precision with only a few minor exceptions as detailed above and in the Annual Culebra Groundwater Monitoring Report.

The data show that toluene was introduced into the well using electrical tape to secure the electrical cables to the pipe. The source of the toluene is known and it will be a matter of pumping several well bore volumes of groundwater out of the well and resampling to ensure that it has been removed. There is no indication of any DMP target SVOCs or any other organic compounds being present in the samples, and the metals and general chemistry parameters analysis data do not show any observable changes in the composition of the groundwater.

The data are usable and meet the needs of the DMP.

Attachment 2 – Preliminary Review

SECTION A

Sample Location: WQSP-5
Laboratory Name: Hall Environmental
Laboratory Work Order #: 1305865
Sample Number(s): GW-WQS-C-R35-N1-N8D
Reviewer Name (print): Greg Jungclaus
Reviewer Signature: G Jungclaus

SECTION B	YES	NO
Is the SDG narrative present and certification page signed by an authorized representative of the laboratory?	✓	
Does the SDG narrative explain problems associated with processing and analysis of the samples?	✓	
Were the original or copy of the Chain of Custody/Request for Analysis (CofC/RFA) complete?	✓	
Are the sample analysis summary tables present?	✓	
Were sufficient data as required by the Statement of Work (SOW) available to evaluate the analysis results?	✓	
Was an electronic data package received for preliminary review of the data?	✓	

SECTION C GENERAL VERIFICATION AND VALIDATION	YES	NO
Were data entries free of transcription error?	✓	
Were calculations correct?	✓	
Were the correct number of significant figures applied to reported data?	✓	
Were trip (VOC only), field and laboratory method blanks (MB) free of contaminants?		✓
Note: The consistent detection of any anthropogenic compounds should be reported to the EM&H Manager, as well as documented and discussed in the Verification and Validation Report.		
Were any anthropogenic compounds starting to appear consistently in the samples?	✓	
Were concentrations consistently reported in units of micrograms per liter (ug/L) for organics and milligrams per Liter (mg/L) for applicable general chemistry parameters and constituents?	✓	
Were the applicable standard methods used for all the analyses?	✓	
Note: The EM&H Manager should be contacted if the data completeness objective of 100% is not met for any Verification and Validation Report since resampling and/or reanalysis of Detection Monitoring Program (DMP) samples may be required.		
Was 100% of the sample analysis data usable and valid?	✓	

G Jungclaus 9-11-13
Data Validator Date

D Hall 9/18/13
Completeness Reviewer Date

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CofC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with hydrochloric acid?	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 2.4 °C	✓	
Was the analysis holding time of 14 days met for all samples? 5/23 vs 5/21	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact, e.g., no air bubbles in the vials?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a 4-bromofluorobenze (BFB) tuning compound analysis performed at the beginning and every 12 hours during VOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z (mass per unit charge) 95?	✓	
Were the ion abundance criteria listed in Method 8260 met?	✓	

INITIAL CALIBRATION	YES	NO	
Were a minimum of 5 calibration standards used for the initial calibration?	✓		
Did the calibration standards contain all the target VOC compounds?	✓		
Was the low standard at or below the concentration of the MRL, e.g., 5.0 µg/L?	✓		(a)
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓	
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓		
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD? NA Avg RRFs not used		✓	
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to be within 20% of the expected concentration?	✓		

(a) $\frac{2.0\ ng}{5.0\ mL} = 0.4\ \mu g/L$

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the VOCs in the CCVs agree to within 20% difference (bias) of the standard CCV concentration? Note that the CCV concentration may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory MB analyzed for each 12-hour period of GC/MS instrument operation?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Was a trip blank (one per DMP sample set) analyzed?	✓	
Was a field blank analyzed (one per DMP sample set)	✓	
Were the concentrations of any VOCs detected in the laboratory method blank samples < MRL?	✓	
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?		✓ (a)

SYSTEM MONITORING COMPOUNDS (SURROGATES)	YES	NO
Note: Flag the data if System Monitoring Compound (SMC) recoveries are outside the recovery objective with no evidence of sample reanalysis.		
Were a minimum of three (3) SMCs added to all samples and blanks prior to GC/MS analysis?	✓	
Were the SMC recoveries reported on the SMC recovery form consistent with the raw data?	✓	
Did the SMC recoveries meet the 70-130% recovery objective or the QC recovery chart limits established historically by the laboratory?	✓	
Did the lab need to reanalyze any samples because the SMC recovery objective was not met?		✓

(a) 2-butanone at 15.1 µg/L in Field Blank

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS sample prepared and analyzed with each DMP sample set?	✓	
Was the LCS sample spiked with all the DMP target VOCs?	✓	
Did the LCS recoveries for all the target VOCs meet the 70-130% recovery objective?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and MSD prepared and analyzed with each DMP sample set?	✓	
Were the MS/MSD samples spiked with all the DMP target VOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for target DMP target VOCs meet the accuracy objective specified in the EPA Functional Guidelines? (60-140% recovery) or the QC recovery control chart limits established historically by the laboratory?		✓ (a)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were the retention times of the internal standards (IS) in the samples within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS in the samples within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the Relative Retention Times (RRTs) of any target VOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) Isobutyl alcohol yielded high recoveries and toluene yielded low recoveries because of the high native sample concentration.

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO	
Was a forward search of the VOC mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓		
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.			
Were any VOC Tentatively Identified Compounds (TICs) detected in the trip blank and field blank samples?	✓		(a)
Were any VOC TICs detected in the groundwater samples?	✓		(b)

Data Validator 8-26-13 Date

Completeness Reviewer 9/18/13 Date

(a) The Field Blank contained some ketones (2-butanone, 2-hexanone, nonanone) and some other unidentified compounds, some of which are probably ketones also. The trip blank contained methylene chloride (also seen in method blank), another unknown also present in method blank, and a silicone also seen in groundwater samples.

(b) The groundwater samples contained isobutyl ketone, which was probably also from the electrical tape, like toluene.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 2.9°C	✓	
Were the samples extracted within 7 days of sample collection? 5/24 vs 5/21	✓	
Were the extracts analyzed within 40 days of sample extraction? 5/28 vs 5/24	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a DFTPP (decafluorotriphenylphosphine) tuning compound analysis performed at the beginning and every 12 hours during SVOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z 198?	✓	
Were the ion abundance criteria listed in Method 8270C met?	✓	

INITIAL CALIBRATION	YES	NO
Were a minimum of five (5) calibration standards used for the initial calibration?	✓	
Did the calibration standards contain all the target SVOCs?	✓	
Was the low standard at or below the MRL for the method, e.g., ≤ 5.0 ug/mL in the standard? 2.0 µg/mL	✓	
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓	
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD? NA Avg RRF not used.		✓
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to within 20% of the expected concentration?	✓	

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the SVOCs in the CCVs agree to within 20% difference (bias) of the average of the CCV standard concentration? Note that CCV concentrations may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory method blank extracted along with each SDG batch?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Were the concentrations of any SVOCs detected in the laboratory method blank sample < MRL?	✓	

SURROGATE SPIKES	YES	NO
Were three (3) base-neutral and three (3) acid surrogate spike recovery compounds spiked into the groundwater and QC samples prior to extraction?	✓	
Were the surrogate recoveries reported on the surrogate recovery form consistent with the raw data?	✓	
Note: Flag the data if surrogate recoveries are outside the objective range with no evidence of sample re-injection or re-extraction.		
Did the surrogates meet the EPA Functional Guidelines accuracy objective of 15-110% recovery for acid surrogates and 30-130% recovery for base neutral surrogates?	✓	
Alternatively, were the surrogate recoveries within the historical control chart limits established by the laboratory for aqueous samples?	✓	
Did the laboratory need to re-inject or re-extract any samples because the surrogate recovery objective was not met?		✓

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS prepared and analyzed for each batch of DMP samples?	✓	
Was the LCS sample spiked with all the target SVOCs?	✓	
Did the LCS recoveries meet the EPA guidance accuracy objectives of 40-140% recovery for base neutral compounds and 30-130% recovery for acidic compounds?	✓	
Alternatively, were the LCS recoveries within the laboratory's historical control chart limits?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤ 20 RPD for each compound?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and a MSD prepared and analyzed for each batch of DMP samples?	✓	
Were the MS/MSD samples spiked with all the DMP target SVOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for the DMP target SVOCs meet the EPA Functional Guidelines accuracy objective of 40-140% recovery for base neutral compounds and 30-130% recovery for acid compounds?		✓ (a)
Alternatively, were the matrix spike recoveries within the laboratory's historical control chart limits?	✓	
Was the precision of the MS/MSD recoveries calculated and reported?	✓	
Did the MS/MSD recoveries meet the precision objective of ≤30 RPD?		✓ (b)

INTERNAL STANDARDS	YES	NO
Were a minimum of six (6) IS spiked into extracts of samples and blanks prior to GC/MS analysis?	✓	
Were the retention times of the IS within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the RRTs of any target SVOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

(a) The recovery of 2,4-DNP was 29.3% in the MSD
(b) The pyridine RPD was 21.6 (50.9%, 40.9% recoveries)

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO	
Was a forward search of the mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓		
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.			
Were any SVOC TICs detected in the laboratory method blank sample?	✓		(a)
Were any SVOC TICs detected in the groundwater samples?	✓		(b)

[signature] 8/26/13 [signature] 9/18/13

Data Validator Date Completeness Reviewer Date

(a) The method blank contained a significant number of trace components including toluene and alkylbenzenes, phthalates, silicone bleed peaks, and triphenyl phosphine oxide.

(b) The samples contained the compounds detected in the method blank along with triethyl phosphate and bis-phenol A.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with nitric acid?	✓	
Were holding times met for all sample digestions and analyses? Maximum holding time is 28 days for Mercury and 6 months for the other metals.	✓	
Was the integrity of each sample intact?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	

INDUCTIVELY COUPLED PLASMA (ICP) CALIBRATION, EPA SW-846 6010B	YES	NO
Was the correlation coefficient (R^2) of the initial calibration ≥0.995 for each metal?	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples?	✓	
Was the initial ICV analyzed immediately after calibration and prior to sample analysis? P. 500	✓	
Was the ICV prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue?	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	

ICP BLANKS	YES	NO
Was an ICB analyzed immediately after the ICV?	✓	
Were CCBs analyzed in the sample queue every 10 samples and immediately after the CCVs to evaluate drift, sensitivity, and contamination?	✓	
Were the ICB and CCB analysis results all <MRL for each metal?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP INTERFERENCE CHECK SAMPLE	YES	NO
Were Interference Check Standards (ICS & ICS Element) analyzed daily prior to sample analysis?	✓	
Were the concentrations of all the target trace metals (not including Ca and Mg) < two times the MRL in the ICS?	✓	
Did the recoveries of the trace metals in the ICS Element standards meet the accuracy objective of 80-120% recovery?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a LCS, LCSD, MS, and MSD along with the requisite QC blanks and check standards (MB, ICV, ICB, CCB, ICS, and ICS Element)?	✓	
Was a DMP sample used for the MS and MSD?	✓	

METHOD PERFORMANCE	YES	NO
Were the concentrations of any metals detected in the method blanks at a concentration < MRL?	✓	
Did the metals in the LCS meet the accuracy objective of 80-120% recovery?	✓	
Did the metals in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO
Were the samples digested within 28 days of sample collection? 6/13 vs 5/21	✓	
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank?	✓	
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓	
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery?	✓	
Were CCV standards analyzed at a frequency of once every 10 samples and at the end of the sample queue?	✓	
Did the CCV analyses meet the accuracy objective of 80-120% recovery?	✓	
Did the sample set contain a MB, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓	
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓	
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP/MS Analysis for Selected Trace Metals, e.g., As, Sb, Se, and Tl, by EPA SW-846 6020A	YES	NO
Was the holding time met for the ICP/MS analysis?	✓	
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Was an ICV analyzed after the initial calibration?	✓	
Were a CCB and CCV analyzed during the sample queue?	✓	
Did the CCV meet the accuracy objective of 90-110% recovery?	✓	
Was the concentration of any metals detected in the CCB at < 0.001 mg/L?	✓	
Did the metals in the LCS and LCSD meet the accuracy objective of 85-115% recovery?	✓	
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓	

[signature] 9-9-13
Data Validator Date

[signature] 9/18/13
Completeness Reviewer Date

Attachment 6 – Anions (Chloride and Sulfate) Data Review, EPA Method 300.0

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 28 days of collection for analysis of chloride and sulfate? (Note that sulfate concentrations are not reported but are needed for cation/anion balance calculations.) 5/22 vs 5/21	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions?	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue?	✓	
Were Continuing Calibration Verification (CCV) standards of differing concentrations analyzed periodically throughout the sample set? A Stds	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Was the laboratory method blank concentration of the anions <MRL (Method Reporting Limit)?	✓	
Did the ICV and CCV analyses meet the accuracy objective of 90-110% recovery?	✓	
Did the LCS meet the accuracy objective of 90-110% recovery?	✓	
NOTE: If the normal MS spike concentration is < 25% of the native sample concentration (i.e., high native sample concentration) the MS and MSD recoveries and precision are not applicable.		
Did the MS and MSD analyses of applicable anions meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	✓	

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument?	✓	
Were the appropriate dilution factors applied to the results?	✓	

Data Validator — 9-9-13 Date

Completeness Reviewer — 9/18/13 Date

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 14 days of collection? 5/22 vs 5/21	✓	

REAGENTS	YES	NO
Was the pH meter standardized prior to analysis of the samples using the SOP for pH measurement?	✓	
Was 0.02 N standardized sulfuric acid used as the titrant?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a laboratory method blank, Laboratory Control Sample (LCS), Matrix Spike (MS), and Matrix Spike Duplicate (MSD)?	✓	
Was the starting pH of the sample ≤8.30?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 2.8 mg/L	✓	
Did the LCS recovery meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)?	✓	
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓	

Data Validator — 9-9-13 Date — Completeness Reviewer — 9/18/13 Date

$$\text{Alkalinity} = \frac{A \times N \times 50{,}000}{\text{mL sample}}$$

$$\text{MS \% Rec.} = \frac{\text{Measured Conc.} - \text{Native Conc.}}{\text{Conc. Spiked}} \times 100$$

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? 5/22 vs 5/22	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards?	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration?	✓	
Was the proper Temperature Correction Factor applied to the conductivity measurements? automatic	✓	

ANALYSIS QUEUE	YES	NO
Was a second source mid-range ICV conductivity standard analyzed prior to the samples?	✓	
Was a CCV conductivity standard analyzed within and at the end of the sample queue (rotate between 10, 100, 1000, and 10,000 µmhos/cm conductivity standards)?	✓	
Was one of the samples analyzed in duplicate?	✓	

METHOD PERFORMANCE	YES	NO
Did the ICV analysis yield a concentration within 90-110% of the standard concentration?	✓	
Did the CCV analyses yield a concentration within 90-110% of the standard concentration?	✓	
Did the duplicate sample meet the precision objective of ≤20 RPD?	✓	

D Jungclaus 9-9-13
Data Validator Date

[signature] 9/18/13
Completeness Reviewer Date

Attachment 9 – pH Data Review, SM 4500-H+

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°?	✓	
Were the samples analyzed within five (5) days of receipt? 5/22 vs 5/22	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument?	✓	
Was the slope of the pH calibration curve recorded and greater than 95%?	✓	

SAMPLE ANALYSIS	YES	NO
Did the standard buffers bracket the pH range of the samples?	✓	
Was a CCV analyzed within and at the end of the sample batch?	✓	
Was the sample analysis temperature within 2°C of the buffer analysis temperature? 21.5°C vs 21.3°C	✓	
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate? 7.43 vs 7.32	✓	

METHOD PERFORMANCE	YES	NO
Did the ICV read within ±0.1 pH unit of the assigned value?	✓	
Did the CCV read within ±0.1 pH unit of the assigned value?	✓	
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓	

D Angelone 9-9-13
Data Validator Date

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Completeness Reviewer Date

Attachment 10 – Specific Gravity Data Review, SM 2710F

SAMPLE ANALYSIS	YES	NO
Were the samples allowed to warm to near room temperature prior to measurement of specific gravity?	✓	
Was the temperature of the specific gravity measurements recorded? 21.1°C	✓	
Was the mass of at least 5.0 mL of the water sample measured? 10.0 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 0.3°C		✓
Was the Temperature Correction Factor recorded? 0.9982	✓	

9-9-13
Data Validator Date

9/18/13
Completeness Reviewer Date

Duplicate sample analyzed with RPD of 0.06.

Attachment 11 – Total Organic Carbon Data Review, SM 5310B

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? 5/24 vs 5/21	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve?	✓	
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set? Two 5 mg/L ICVs analyzed.		✓
Did the sample set include an Initial Calibration Blank (ICB), laboratory method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓	
Were quadruplicate measurements taken for each sample?	✓	
Were both the average and the range reported for the quadruplicate measurements?	✓	

METHOD PERFORMANCE	YES	NO
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)?	✓	
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓	
Were the results for the laboratory method blank, the ICB and CCB < MRL?	✓	
Did the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD? 4.4	✓	

D Douglas 9-9-13
Data Validator Date

D Halvorsen 9/18/13
Completeness Reviewer Date

Attachment 12 – Total Dissolved Solids Data Review, SM 2540C

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? 5/24 vs 5/21	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the initial volume of each sample 100 mL? 10mL diluted to 100		✓
Were any DMP samples diluted prior to processing?	✓	
Were the samples dried twice at 180°C?	✓	
Was the MS/MSD spike concentration higher than 25% of the native sample concentration and thus usable for recovery determination?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)?	✓	
Did the LCS analysis meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓	
If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD? 1.7	✓	

[signature] 9-9-13
Data Validator Date

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Completeness Reviewer Date

Attachment 13 – Total Suspended Solids Data Review, SM 2540D

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? 5/22 vs 5/21	✓	
Were the samples allowed to warm to room temperature prior to filtration?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, and duplicate sample? The lab did not use DMP sample for duplicate		✓
Was the volume of each sample 100 mL?	✓	
Were the samples dried twice at approximately104°C?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights <0.0005 g (0.5 mg)?	✓	
Was the MB result <5.0 mg/L?	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD?		NA

9-9-13
Data Validator Date

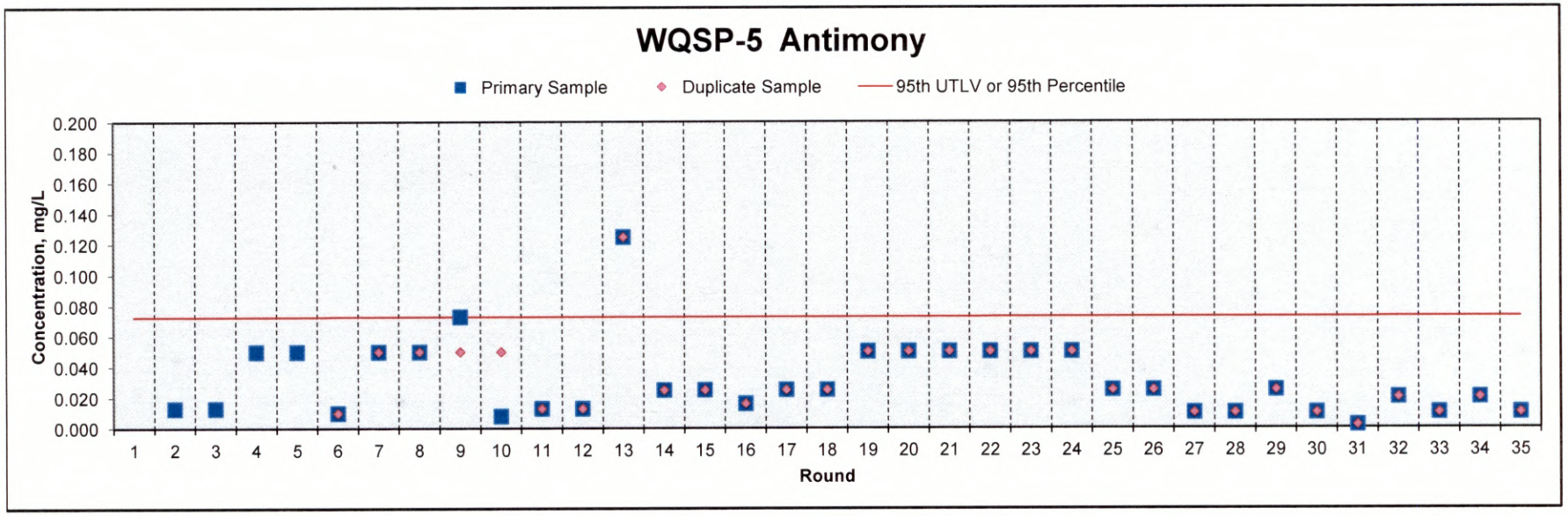
9/18/13
Completeness Reviewer Date

WQSP-5

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

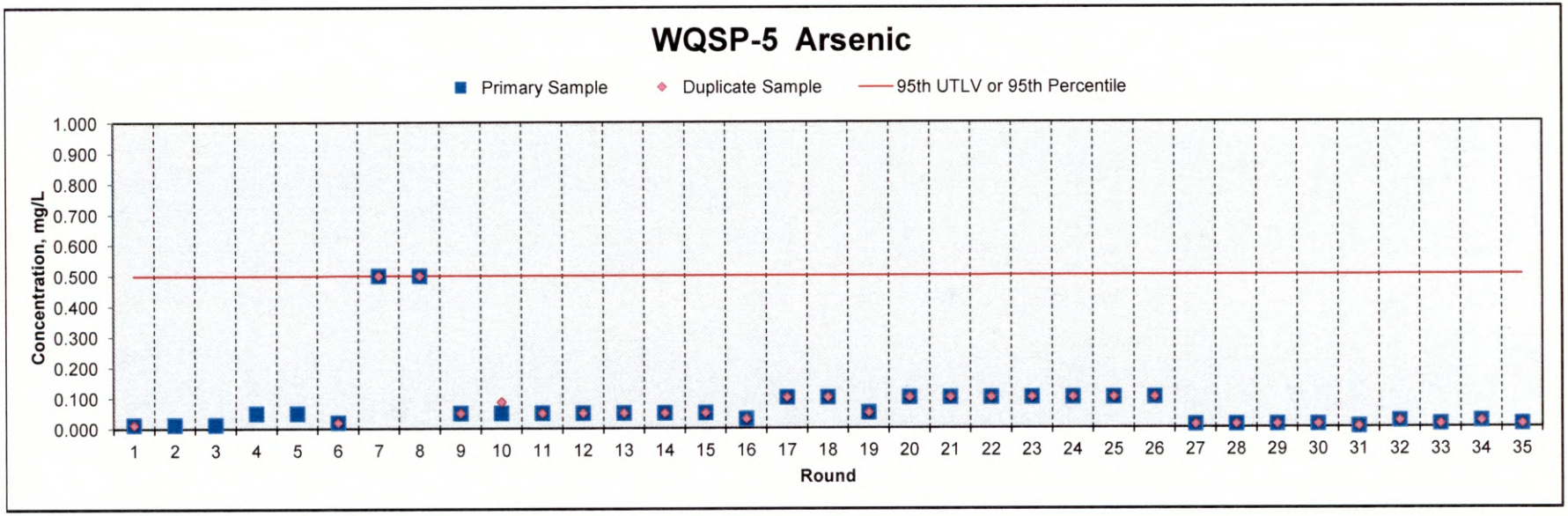
WQSP-5 Antimony

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Antimony	1							0.073
Antimony	2	06/06/96	06/18/96	< 0.013		mg/L	0.013	0.073
Antimony	3	09/26/96	10/01/96	< 0.013		mg/L	0.013	0.073
Antimony	4	06/19/97	06/26/97	< 0.050		mg/L	0.050	0.073
Antimony	5	09/25/97	10/28/97	< 0.050		mg/L	0.050	0.073
Antimony	6	05/20/98	05/22/98	< 0.010	< 0.010	mg/L	0.001	0.073
Antimony	7	10/07/98	11/27/98	< 0.050	< 0.050	mg/L	0.050	0.073
Antimony	8	05/05/99	05/12/99	< 0.050	< 0.050	mg/L	0.050	0.073
Antimony	9	10/27/99	11/15/99	0.073	< 0.050	mg/L	0.050	0.073
Antimony	10	04/26/00	05/24/00	0.008	< 0.050	mg/L	0.050	0.073
Antimony	26	04/02/08	04/07/08	< 0.025	< 0.025	mg/L	0.025	0.073
Antimony	27	10/01/08	10/27/08	< 0.010	< 0.010	mg/L	0.025	0.073
Antimony	28	03/18/09	04/06/09	< 0.010	< 0.010	mg/L	0.010	0.073
Antimony	29	09/30/09	10/20/09	< 0.025	< 0.025	mg/L	0.025	0.073
Antimony	30	03/16/10	03/26/10	< 0.010	< 0.010	mg/L	0.010	0.073
Antimony	31	10/13/10	10/22/10	< 0.002	< 0.002	mg/L	0.002	0.073
Antimony	32	05/11/11	05/25/11	< 0.020	< 0.020	mg/L	0.020	0.073
Antimony	33	09/21/11	10/07/11	< 0.010	< 0.010	mg/L	0.010	0.073
Antimony	34	05/01/12	05/13/12	< 0.020	< 0.020	mg/L	0.020	0.073
Antimony	35	05/21/13	05/30/13	< 0.010	< 0.010	mg/L	0.010	0.073



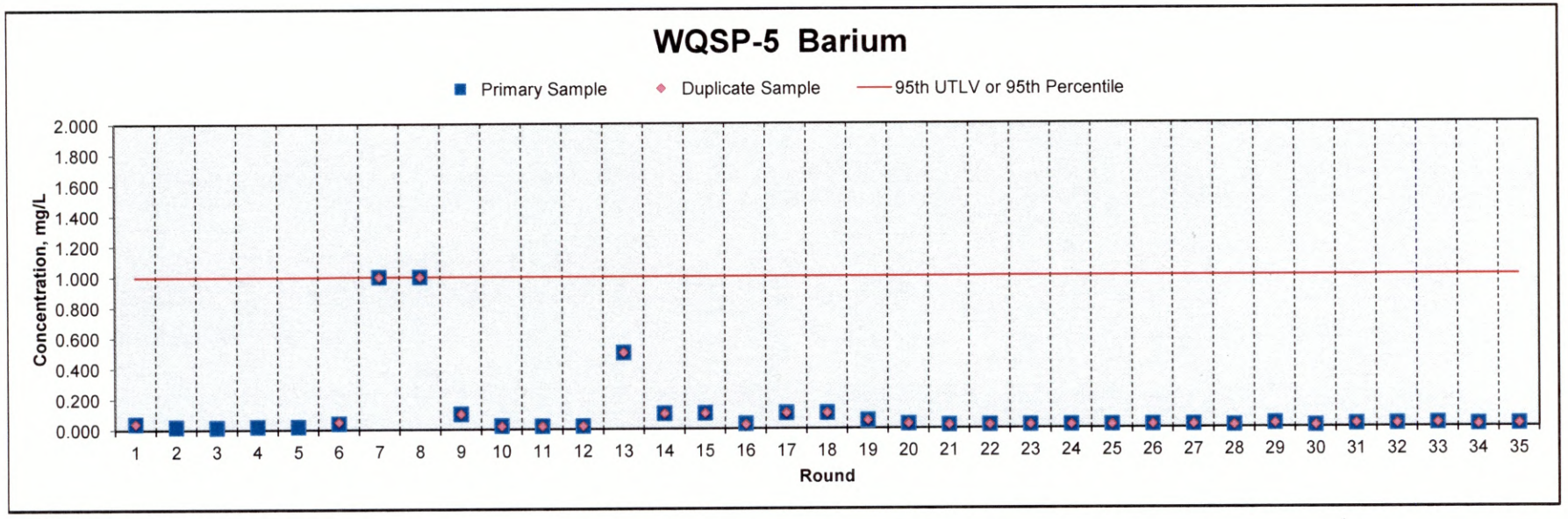
WQSP-5 Arsenic

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Arsenic	1	11/20/95	12/18/95	< 0.013	< 0.013	mg/L	0.013	< 0.5
Arsenic	2	06/06/96	06/18/96	< 0.013		mg/L	0.013	< 0.5
Arsenic	3	09/26/96	10/01/96	< 0.013		mg/L	0.013	< 0.5
Arsenic	4	06/19/97	06/26/97	< 0.050		mg/L	0.050	< 0.5
Arsenic	5	09/25/97	10/27/97	< 0.050		mg/L	0.050	< 0.5
Arsenic	6	05/20/98	05/22/98	< 0.020	< 0.020	mg/L	0.001	< 0.5
Arsenic	7	10/07/98	11/27/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Arsenic	8	05/05/99	05/12/99	< 0.500	< 0.500	mg/L	0.500	< 0.5
Arsenic	9	10/27/99	11/15/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	10	04/26/00	05/24/00	< 0.050	0.087	mg/L	0.050	< 0.5
Arsenic	26	04/02/08	04/07/08	< 0.100	< 0.100	mg/L	0.100	< 0.5
Arsenic	27	10/01/08	10/27/08	< 0.010	< 0.010	mg/L	0.050	< 0.5
Arsenic	28	03/18/09	04/06/09	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	29	09/30/09	10/20/09	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	30	03/16/10	03/26/10	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	31	10/13/10	10/22/10	0.0029	0.0026	mg/L	0.002	< 0.5
Arsenic	32	05/11/11	05/25/11	< 0.020	< 0.020	mg/L	0.020	< 0.5
Arsenic	33	09/21/11	10/07/11	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	34	05/01/12	05/13/12	< 0.020	< 0.020	mg/L	0.020	< 0.5
Arsenic	35	05/21/13	05/30/13	< 0.010	< 0.010	mg/L	0.010	< 0.5



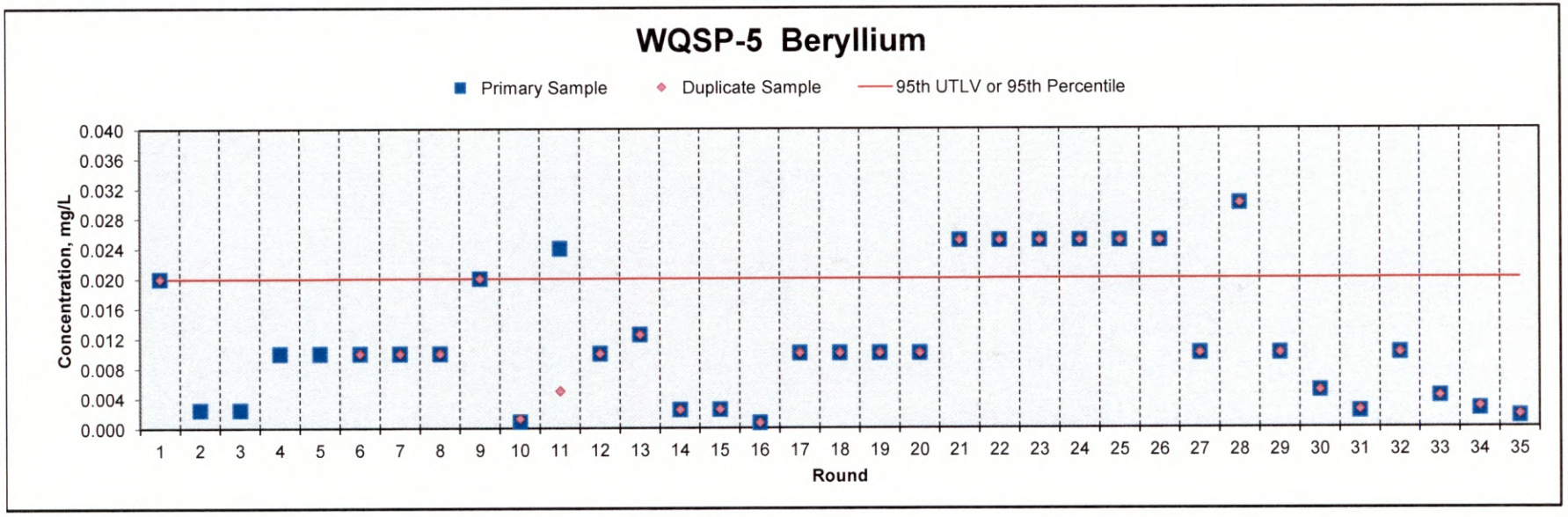
WQSP-5 Barium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Barium	1	11/20/95	12/15/95	< 0.040	< 0.040	mg/L	0.040	< 1.0
Barium	2	06/06/96	06/18/96	0.019		mg/L	0.005	< 1.0
Barium	3	09/26/96	10/01/96	0.015		mg/L	0.005	< 1.0
Barium	4	06/19/97	06/26/97	< 0.020		mg/L	0.020	< 1.0
Barium	5	09/25/97	10/27/97	< 0.020		mg/L	0.020	< 1.0
Barium	6	05/20/98	05/22/98	< 0.040	0.049	mg/L	0.004	< 1.0
Barium	7	10/07/98	11/27/98	< 1.000	< 1.000	mg/L	1.000	< 1.0
Barium	8	05/05/99	05/06/99	< 1.000	< 1.000	mg/L	1.000	< 1.0
Barium	9	10/27/99	11/15/99	< 0.100	< 0.100	mg/L	0.100	< 1.0
Barium	10	04/26/00	05/24/00	0.022	0.020	mg/L	0.200	< 1.0
Barium	26	04/02/08	04/07/08	< 0.020	< 0.020	mg/L	0.020	< 1.0
Barium	27	10/01/08	10/27/08	< 0.020	< 0.020	mg/L	0.020	< 1.0
Barium	28	03/18/09	03/31/09	0.014	0.013	mg/L	0.100	< 1.0
Barium	29	09/30/09	01/07/10	0.026	0.023	mg/L	0.020	< 1.0
Barium	30	03/16/10	03/29/10	< 0.010	< 0.010	mg/L	0.010	< 1.0
Barium	31	10/13/10	10/22/10	0.019	0.023	mg/L	0.004	< 1.0
Barium	32	05/11/11	05/18/11	< 0.020	< 0.020	mg/L	0.020	< 1.0
Barium	33	09/21/11	09/23/11	< 0.023	< 0.023	mg/L	0.023	< 1.0
Barium	34	05/01/12	05/10/12	0.016	< 0.013	mg/L	0.013	< 1.0
Barium	35	05/21/13	06/13/13	0.018	0.017	mg/L	0.00050	< 1.0



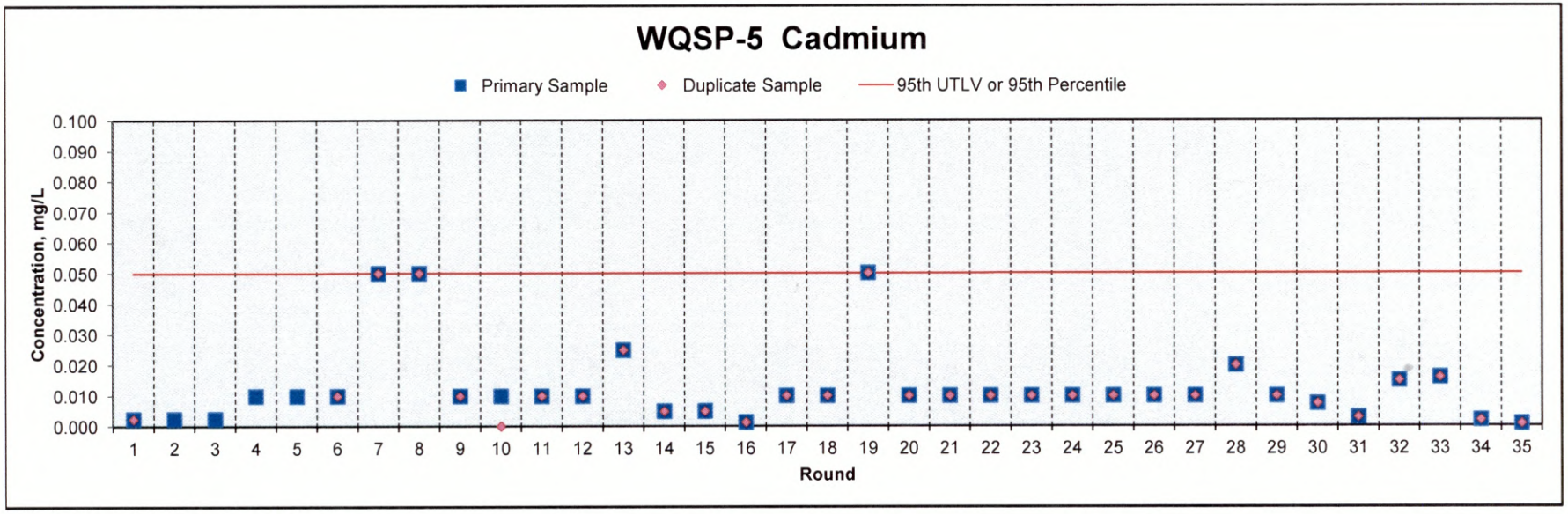
WQSP-5 Beryllium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Beryllium	1	11/20/95	12/15/95	< 0.020	< 0.020	mg/L	0.020	< 0.02
Beryllium	2	06/06/96	06/18/96	< 0.003		mg/L	0.003	< 0.02
Beryllium	3	09/26/96	10/01/96	< 0.003		mg/L	0.003	< 0.02
Beryllium	4	06/19/97	06/26/97	< 0.010		mg/L	0.010	< 0.02
Beryllium	5	09/25/97	10/27/97	< 0.010		mg/L	0.010	< 0.02
Beryllium	6	05/20/98	05/22/98	< 0.010	< 0.010	mg/L	0.001	< 0.02
Beryllium	7	10/07/98	11/27/98	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	8	05/05/99	05/20/99	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	9	10/27/99	11/15/99	< 0.020	< 0.020	mg/L	0.020	< 0.02
Beryllium	10	04/26/00	05/24/00	0.001	0.001	mg/L	0.005	< 0.02
Beryllium	26	04/02/08	04/07/08	< 0.025	< 0.025	mg/L	0.025	< 0.02
Beryllium	27	10/01/08	10/27/08	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	28	03/18/09	03/31/09	< 0.030	< 0.030	mg/L	0.030	< 0.02
Beryllium	29	09/30/09	01/07/10	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	30	03/16/10	03/29/10	< 0.0050	< 0.0050	mg/L	0.005	< 0.02
Beryllium	31	10/13/10	10/22/10	0.0022	0.0024	mg/L	0.0020	< 0.02
Beryllium	32	05/11/11	05/18/11	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	33	09/21/11	09/23/11	< 0.0042	< 0.0042	mg/L	0.0042	< 0.02
Beryllium	34	05/01/12	05/10/12	0.0025	0.0028	mg/L	0.0010	< 0.02
Beryllium	35	05/21/13	06/13/13	0.0015	0.0017	mg/L	0.00050	< 0.02



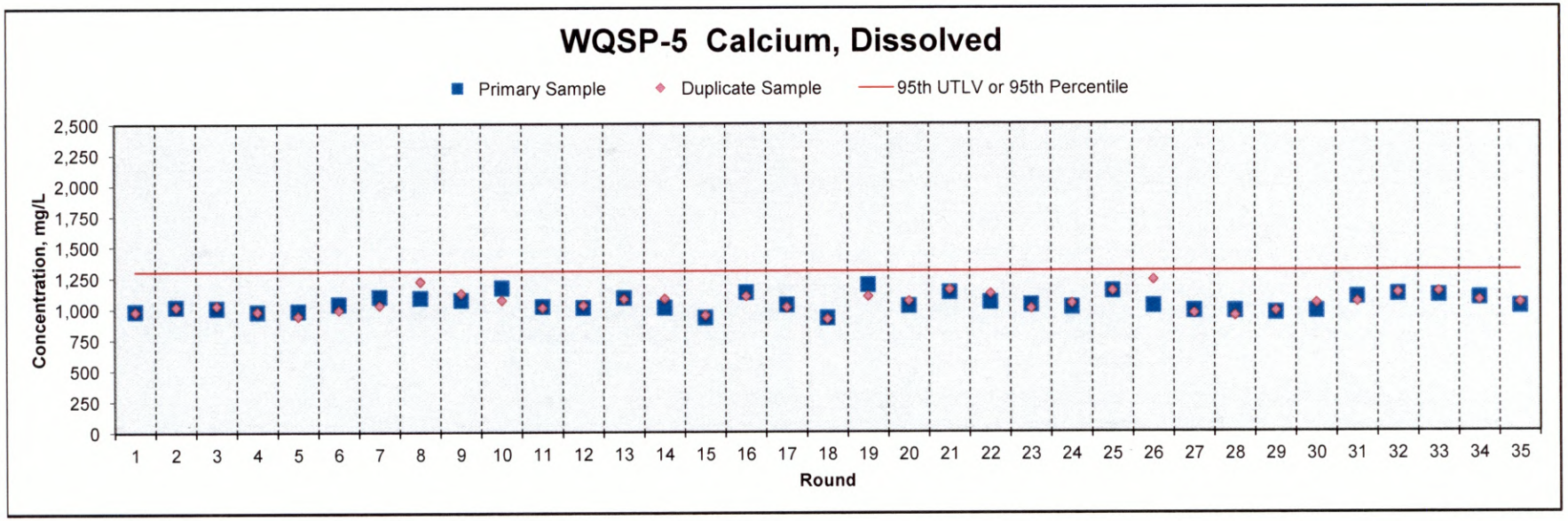
WQSP-5 Cadmium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Cadmium	1	11/20/95	12/18/95	< 0.003	< 0.003	mg/L	0.003	< 0.05
Cadmium	2	06/06/96	06/18/96	< 0.003		mg/L	0.003	< 0.05
Cadmium	3	09/26/96	10/01/96	< 0.003		mg/L	0.003	< 0.05
Cadmium	4	06/19/97	06/26/97	< 0.010		mg/L	0.010	< 0.05
Cadmium	5	09/25/97	10/27/97	< 0.010		mg/L	0.010	< 0.05
Cadmium	6	05/20/98	05/22/98	< 0.010	< 0.010	mg/L	0.001	< 0.05
Cadmium	7	10/07/98	11/27/98	< 0.050	< 0.050	mg/L	0.005	< 0.05
Cadmium	8	05/05/99	05/12/99	< 0.050	< 0.050	mg/L	0.050	< 0.05
Cadmium	9	10/27/99	11/15/99	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	10	04/26/00	05/24/00	< 0.010	0.000	mg/L	0.010	< 0.05
Cadmium	26	04/02/08	04/07/08	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	27	10/01/08	10/27/08	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	28	03/18/09	03/31/09	< 0.020	< 0.020	mg/L	0.020	< 0.05
Cadmium	29	09/30/09	01/07/10	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	30	03/16/10	03/29/10	< 0.0075	< 0.0075	mg/L	0.0075	< 0.05
Cadmium	31	10/13/10	10/22/10	< 0.003	< 0.003	mg/L	0.003	< 0.05
Cadmium	32	05/11/11	05/18/11	< 0.015	< 0.015	mg/L	0.015	< 0.05
Cadmium	33	09/21/11	09/23/11	< 0.016	< 0.016	mg/L	0.016	< 0.05
Cadmium	34	05/01/12	05/10/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.05
Cadmium	35	05/21/13	06/13/13	< 0.00080	< 0.00080	mg/L	0.00080	< 0.05



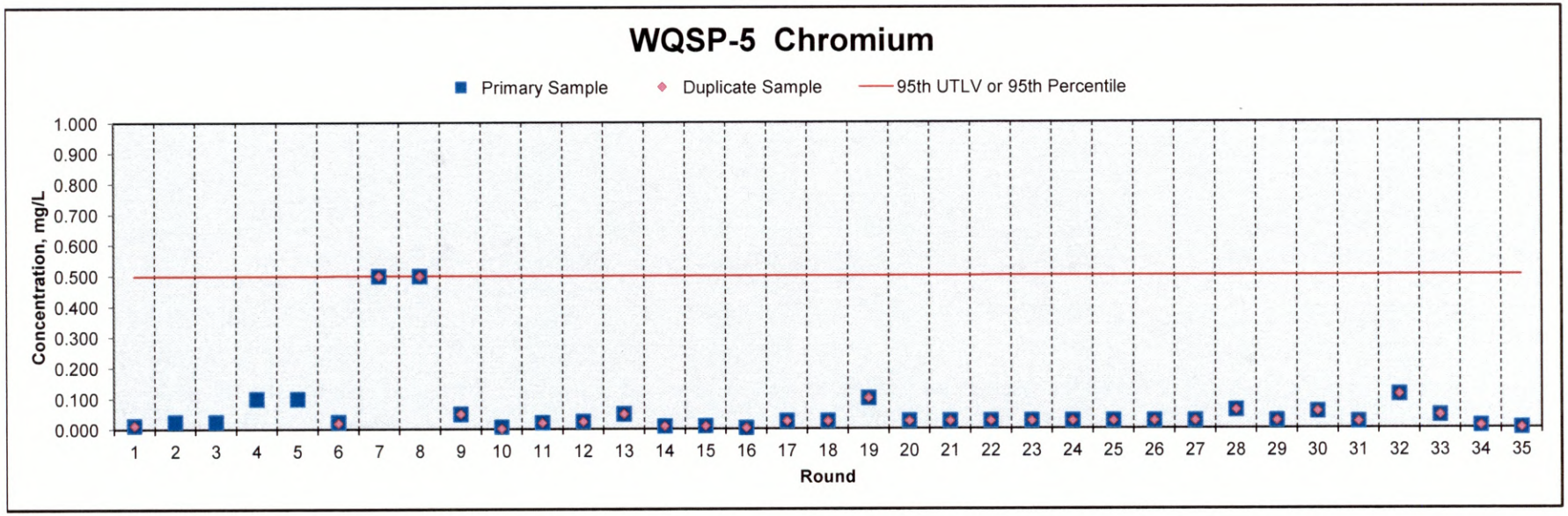
WQSP-5 Calcium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Calcium	1	11/20/95	12/15/95	987	982	mg/L	2.000	1,303
Calcium	2	06/06/96	06/18/96	1,020	1,020	mg/L	2.000	1,303
Calcium	3	09/26/96	10/01/96	1,010	1,030	mg/L	2.000	1,303
Calcium	4	06/19/97	06/26/97	980	982	mg/L	2.000	1,303
Calcium	5	09/25/97	10/27/97	986	945	mg/L	2.000	1,303
Calcium	6	05/20/98	05/22/98	1,040	992	mg/L	0.012	1,303
Calcium	7	10/07/98	11/27/98	1,100	1,030	mg/L	0.500	1,303
Calcium	8	05/05/99	05/12/99	1,090	1,220	mg/L	1.000	1,303
Calcium	9	10/27/99	12/01/99	1,071	1,126	mg/L	0.050	1,303
Calcium	10	06/19/00	06/19/00	1,170	1,070	mg/L	5.000	1,303
Calcium	26	04/02/08	04/09/08	1,020	1,230	mg/L	0.50	1,303
Calcium	27	10/01/08	10/23/08	980	960	mg/L	0.50	1,303
Calcium	28	03/18/09	03/31/09	978	940	mg/L	0.50	1,303
Calcium	29	09/30/09	11/03/09	964	977	mg/L	0.50	1,303
Calcium	30	03/16/10	03/29/10	977	1,040	mg/L	2.0	1,303
Calcium	31	10/13/10	11/11/10	1,090	1,050	mg/L	0.40	1,303
Calcium	32	05/11/11	05/23/11	1,110	1,120	mg/L	1.1	1,303
Calcium	33	09/21/11	09/30/11	1,100	1,130	mg/L	0.54	1,303
Calcium	34	05/01/12	05/14/12	1,080	1,060	mg/L	0.82	1,303
Calcium	35	05/21/13	06/03/13	1,010	1,040	mg/L	2.80	1,303



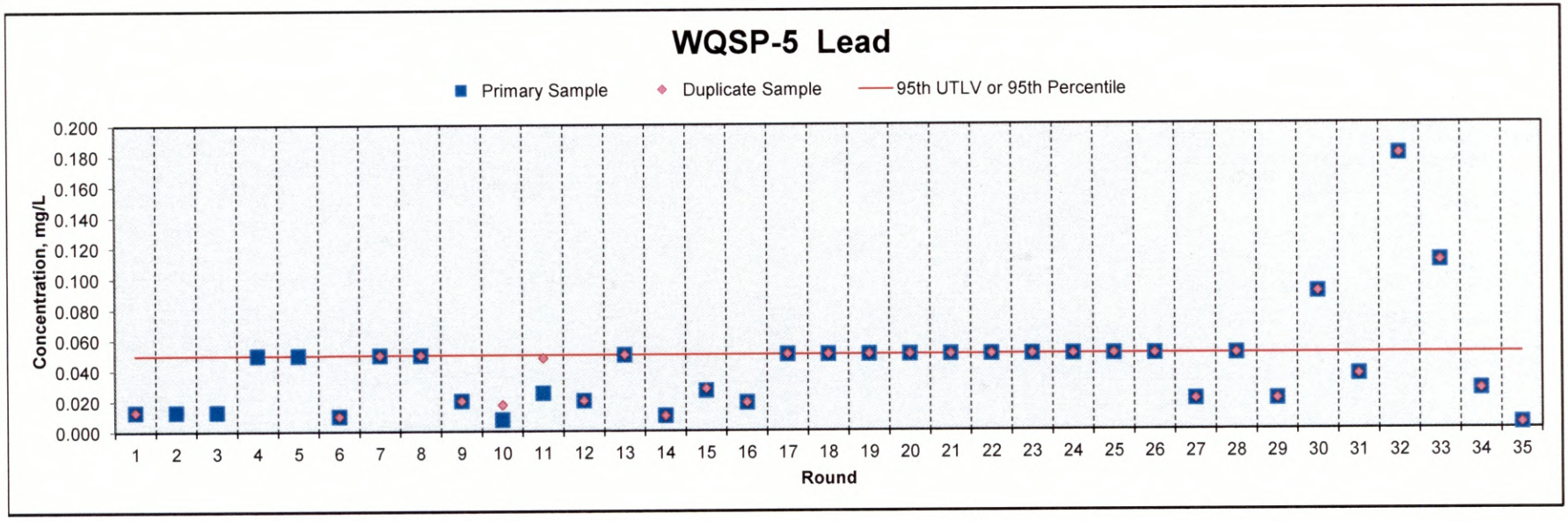
WQSP-5 Chromium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chromium	1	11/20/95	12/18/95	< 0.013	< 0.013	mg/L	0.013	< 0.5
Chromium	2	06/06/96	06/18/96	< 0.025		mg/L	0.025	< 0.5
Chromium	3	09/26/96	10/01/96	< 0.025		mg/L	0.025	< 0.5
Chromium	4	06/19/97	06/26/97	< 0.100		mg/L	0.100	< 0.5
Chromium	5	09/25/97	10/27/97	< 0.100		mg/L	0.100	< 0.5
Chromium	6	05/20/98	05/22/98	0.024	0.020	mg/L	0.001	< 0.5
Chromium	7	10/07/98	11/27/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Chromium	8	05/05/99	05/12/99	< 0.500	< 0.500	mg/L	0.500	< 0.5
Chromium	9	10/27/99	11/15/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Chromium	10	04/26/00	05/24/00	0.008	0.003	mg/L	0.050	< 0.5
Chromium	26	04/02/08	04/07/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	27	10/01/08	10/27/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	28	03/18/09	03/31/09	< 0.060	< 0.060	mg/L	0.060	< 0.5
Chromium	29	09/30/09	01/07/10	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	30	03/16/10	03/29/10	< 0.055	< 0.055	mg/L	0.055	< 0.5
Chromium	31	10/13/10	10/22/10	< 0.022	< 0.022	mg/L	0.022	< 0.5
Chromium	32	05/11/11	05/18/11	< 0.11	< 0.11	mg/L	0.11	< 0.5
Chromium	33	09/21/11	09/23/11	< 0.042	< 0.042	mg/L	0.042	< 0.5
Chromium	34	05/01/12	05/10/12	< 0.0080	< 0.0080	mg/L	0.0080	< 0.5
Chromium	35	05/21/13	06/13/13	< 0.0015	< 0.0015	mg/L	0.0015	< 0.5



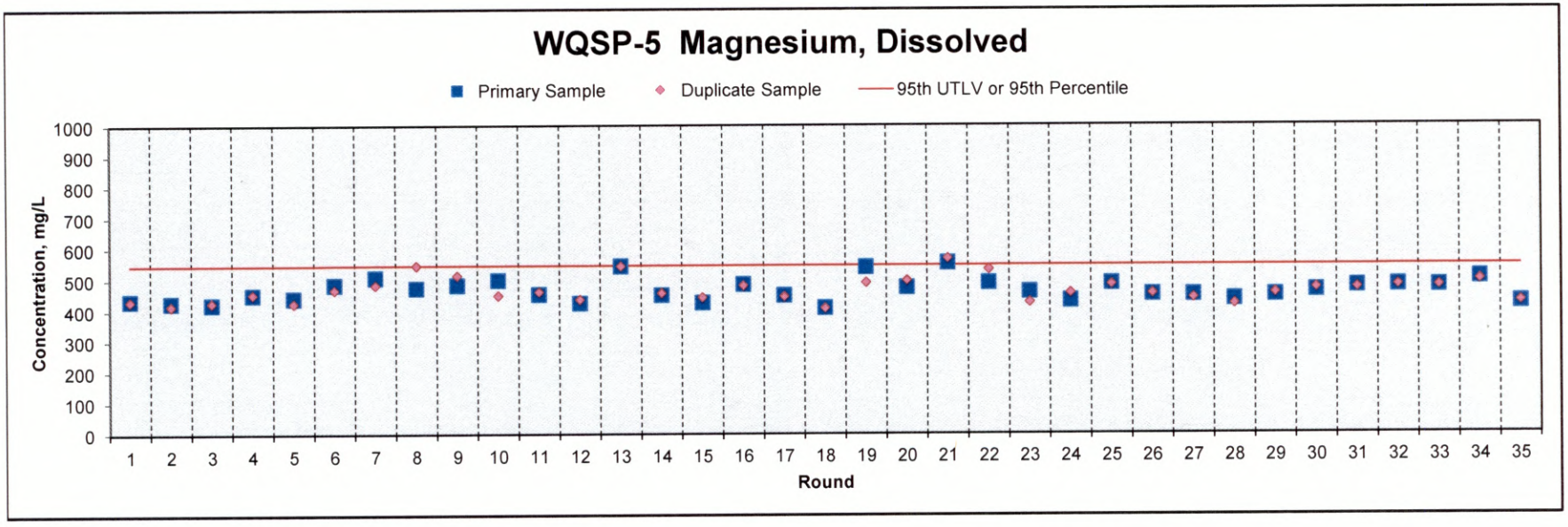
WQSP-5 Lead

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Lead	1	11/20/95	12/18/95	< 0.013	< 0.013	mg/L	0.013	< 0.05
Lead	2	06/06/96	06/18/96	< 0.013		mg/L	0.013	< 0.05
Lead	3	09/26/96	10/01/96	< 0.013		mg/L	0.013	< 0.05
Lead	4	06/19/97	06/26/97	< 0.050		mg/L	0.050	< 0.05
Lead	5	09/25/97	10/27/97	< 0.050		mg/L	0.050	< 0.05
Lead	6	05/20/98	05/22/98	< 0.010	< 0.010	mg/L	0.001	< 0.05
Lead	7	10/07/98	11/27/98	< 0.050	< 0.050	mg/L	0.005	< 0.05
Lead	8	05/05/99	05/12/99	< 0.050	< 0.050	mg/L	0.050	< 0.05
Lead	9	10/27/99	11/15/99	< 0.020	< 0.020	mg/L	0.020	< 0.05
Lead	10	04/26/00	05/24/00	0.008	0.017	mg/L	0.050	< 0.05
Lead	26	04/02/08	04/07/08	< 0.050	< 0.050	mg/L	0.050	< 0.05
Lead	27	10/01/08	10/27/08	< 0.020	< 0.020	mg/L	0.020	< 0.05
Lead	28	03/18/09	03/31/09	< 0.050	< 0.050	mg/L	0.050	< 0.05
Lead	29	09/30/09	01/07/10	< 0.020	< 0.020	mg/L	0.020	< 0.05
Lead	30	03/16/10	03/29/10	< 0.090	< 0.090	mg/L	0.090	< 0.05
Lead	31	10/13/10	10/22/10	< 0.036	< 0.036	mg/L	0.036	< 0.05
Lead	32	05/11/11	05/18/11	< 0.18	< 0.18	mg/L	0.18	< 0.05
Lead	33	09/21/11	09/23/11	< 0.11	< 0.11	mg/L	0.11	< 0.05
Lead	34	05/01/12	05/10/12	< 0.026	< 0.026	mg/L	0.026	< 0.05
Lead	35	05/21/13	06/13/13	< 0.0034	< 0.0034	mg/L	0.0034	< 0.05



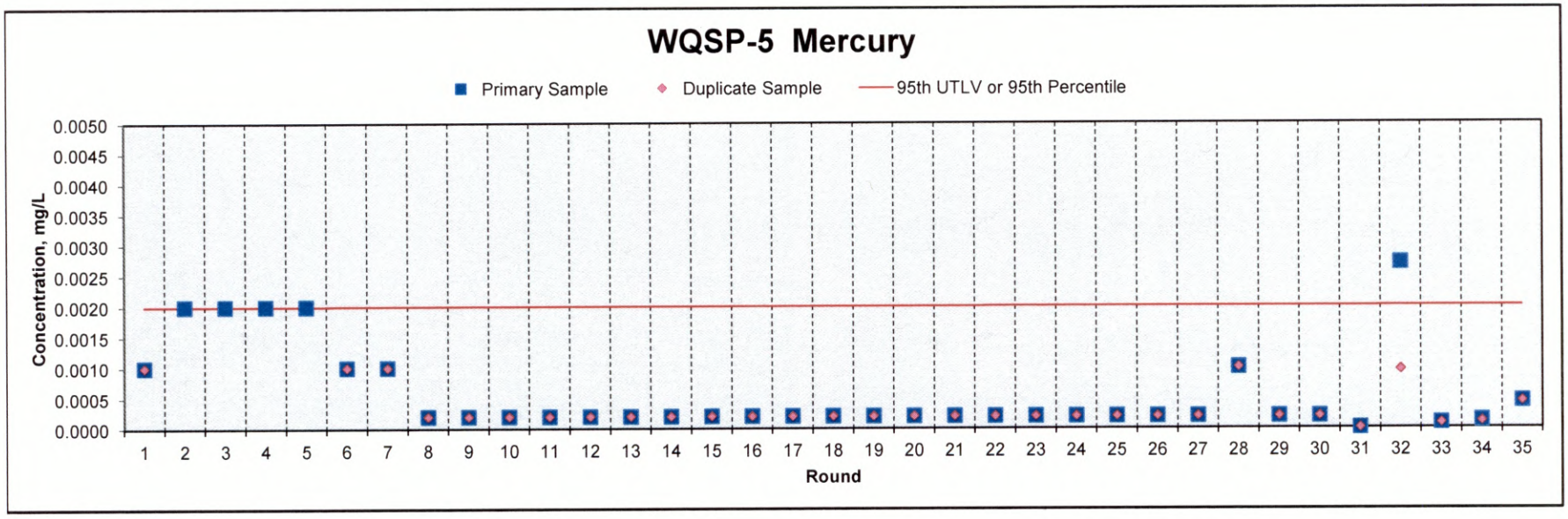
WQSP-5 Magnesium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Magnesium	1	11/20/95	12/15/95	434	432	mg/L	1.000	547
Magnesium	2	06/06/96	06/18/96	427	417	mg/L	0.500	547
Magnesium	3	09/26/96	10/01/96	421	427	mg/L	0.500	547
Magnesium	4	06/19/97	06/26/97	452	454	mg/L	1.000	547
Magnesium	5	09/25/97	10/27/97	441	425	mg/L	0.500	547
Magnesium	6	05/20/98	05/22/98	485	468	mg/L	0.072	547
Magnesium	7	10/07/98	11/27/98	508	484	mg/L	0.500	547
Magnesium	8	05/05/99	05/12/99	474	547	mg/L	1.000	547
Magnesium	9	10/27/99	12/01/99	484	515	mg/L	0.500	547
Magnesium	10	04/26/00	06/19/00	500	450	mg/L	5.000	547
Magnesium	26	04/02/08	04/09/08	451	454	mg/L	0.500	547
Magnesium	27	10/01/08	10/23/08	450	440	mg/L	0.500	547
Magnesium	28	03/18/09	03/31/09	436	420	mg/L	0.500	547
Magnesium	29	09/30/09	11/03/09	449	456	mg/L	0.500	547
Magnesium	30	03/16/10	04/05/10	464	472	mg/L	0.16	547
Magnesium	31	10/13/10	11/11/10	478	472	mg/L	0.16	547
Magnesium	32	05/11/11	05/23/11	480	480	mg/L	1.1	547
Magnesium	33	09/21/11	09/30/11	478	478	mg/L	0.54	547
Magnesium	34	05/01/12	05/14/12	505	497	mg/L	0.66	547
Magnesium	35	05/21/13	06/03/13	424	427	mg/L	0.042	547



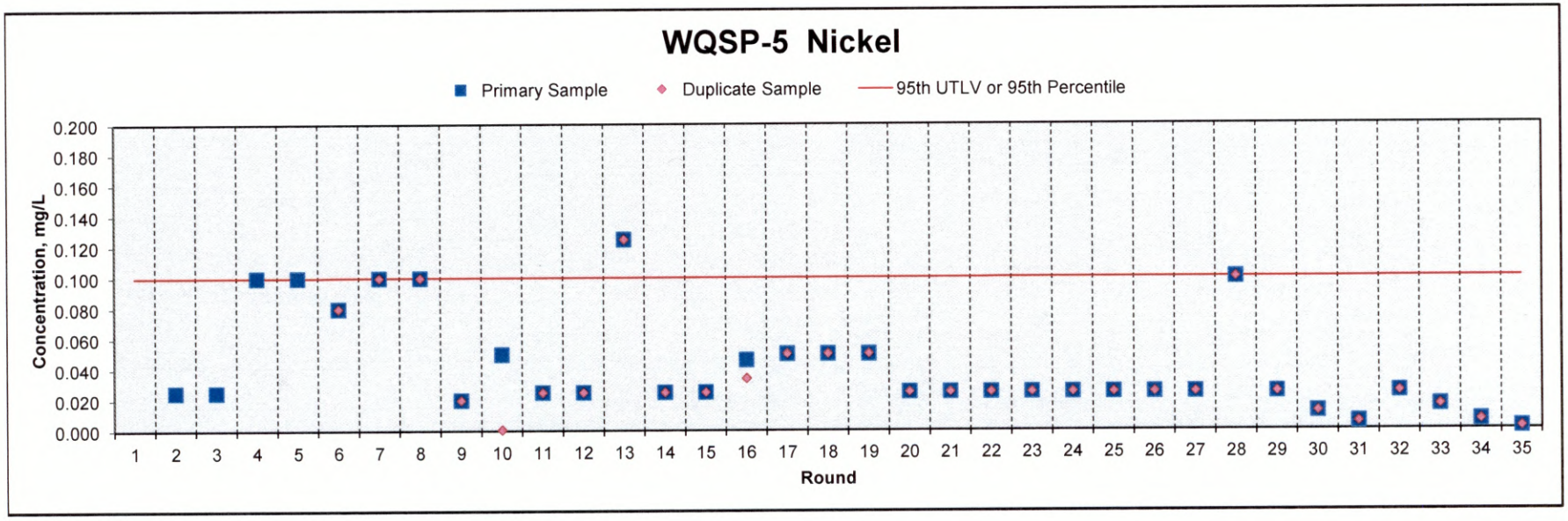
WQSP-5 Mercury

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Mercury	1	11/20/95	12/11/95	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	2	06/06/96	06/07/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	3	09/26/96	09/30/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	4	06/19/97	06/24/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	5	09/25/97	09/30/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	6	05/20/98	05/22/98	< 0.0010	< 0.0010	mg/L	0.0001	< 0.002
Mercury	7	10/07/98	10/11/98	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	8	05/05/99	05/06/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	9	10/27/99	11/01/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	10	04/26/00	05/02/00	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	26	04/02/08	04/08/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	27	10/01/08	10/12/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	28	03/18/09	04/06/09	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	29	09/30/09	10/09/09	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	30	03/16/10	04/01/10	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	31	10/13/10	10/19/10	< 0.0000074	< 0.0000074	mg/L	0.0000074	< 0.002
Mercury	32	05/11/11	05/25/11	0.0027	0.00096	mg/L	0.00032	< 0.002
Mercury	33	09/21/11	10/05/11	< 0.000081	< 0.000081	mg/L	0.000081	< 0.002
Mercury	34	05/01/12	05/15/12	< 0.00012	< 0.00011	mg/L	0.00010	< 0.002
Mercury	35	05/21/13	06/14/13	< 0.00044	< 0.00044	mg/L	0.00044	< 0.002



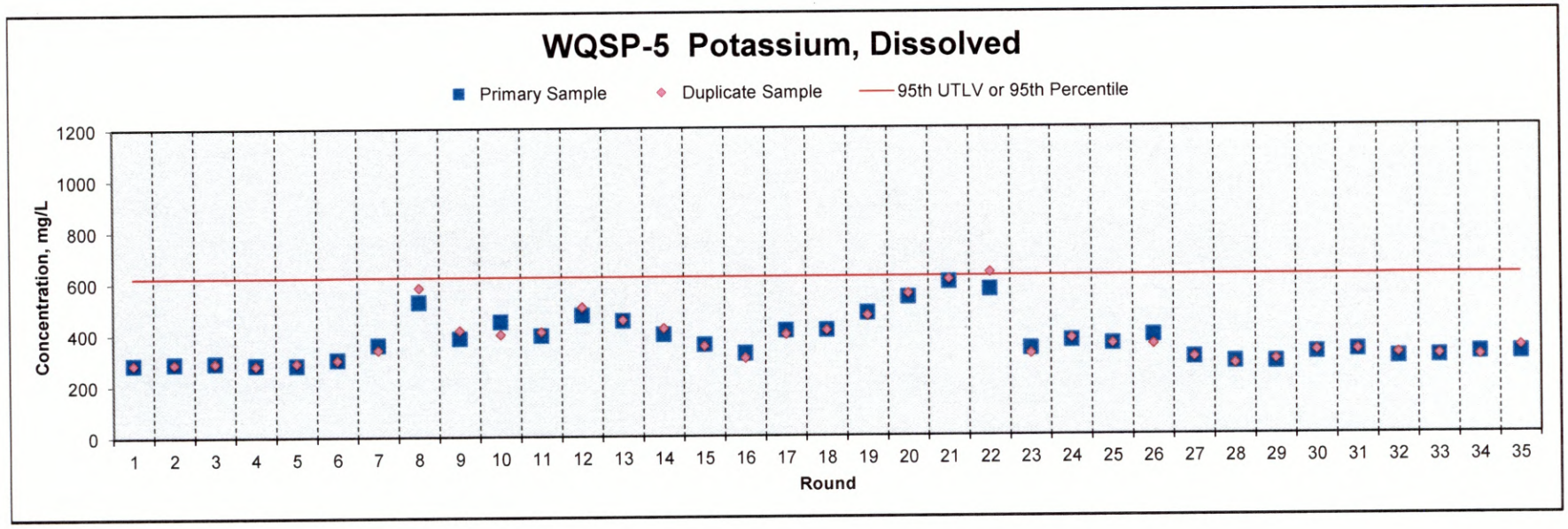
WQSP-5 Nickel

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Nickel	1							< 0.1
Nickel	2	06/06/96	06/18/96	< 0.025		mg/L	0.025	< 0.1
Nickel	3	09/26/96	10/01/96	< 0.025		mg/L	0.025	< 0.1
Nickel	4	06/19/97	06/26/97	< 0.100		mg/L	0.100	< 0.1
Nickel	5	09/25/97	10/27/97	< 0.100		mg/L	0.100	< 0.1
Nickel	6	05/20/98	05/22/98	< 0.080	< 0.080	mg/L	0.008	< 0.1
Nickel	7	10/07/98	11/27/98	< 0.100	< 0.100	mg/L	0.100	< 0.1
Nickel	8	05/05/99	05/12/99	< 0.100	< 0.100	mg/L	0.100	< 0.1
Nickel	9	10/27/99	11/15/99	< 0.020	< 0.020	mg/L	0.020	< 0.1
Nickel	10	04/26/00	05/24/00	< 0.050	0.001	mg/L	0.050	< 0.1
Nickel	26	04/02/08	04/07/08	< 0.025	< 0.025	mg/L	0.025	< 0.1
Nickel	27	10/01/08	10/27/08	< 0.025	< 0.025	mg/L	0.025	< 0.1
Nickel	28	03/18/09	03/31/09	< 0.100	< 0.100	mg/L	0.100	< 0.1
Nickel	29	09/30/09	01/07/10	< 0.025	< 0.025	mg/L	0.025	< 0.1
Nickel	30	03/16/10	03/29/10	< 0.012	< 0.012	mg/L	0.012	< 0.1
Nickel	31	10/13/10	10/22/10	< 0.005	< 0.005	mg/L	0.005	< 0.1
Nickel	32	05/11/11	05/18/11	< 0.025	< 0.025	mg/L	0.025	< 0.1
Nickel	33	09/21/11	09/23/11	< 0.016	< 0.016	mg/L	0.016	< 0.1
Nickel	34	05/01/12	05/10/12	< 0.0060	< 0.0060	mg/L	0.0060	< 0.1
Nickel	35	05/21/13	06/13/13	< 0.0014	< 0.0014	mg/L	0.0014	< 0.1



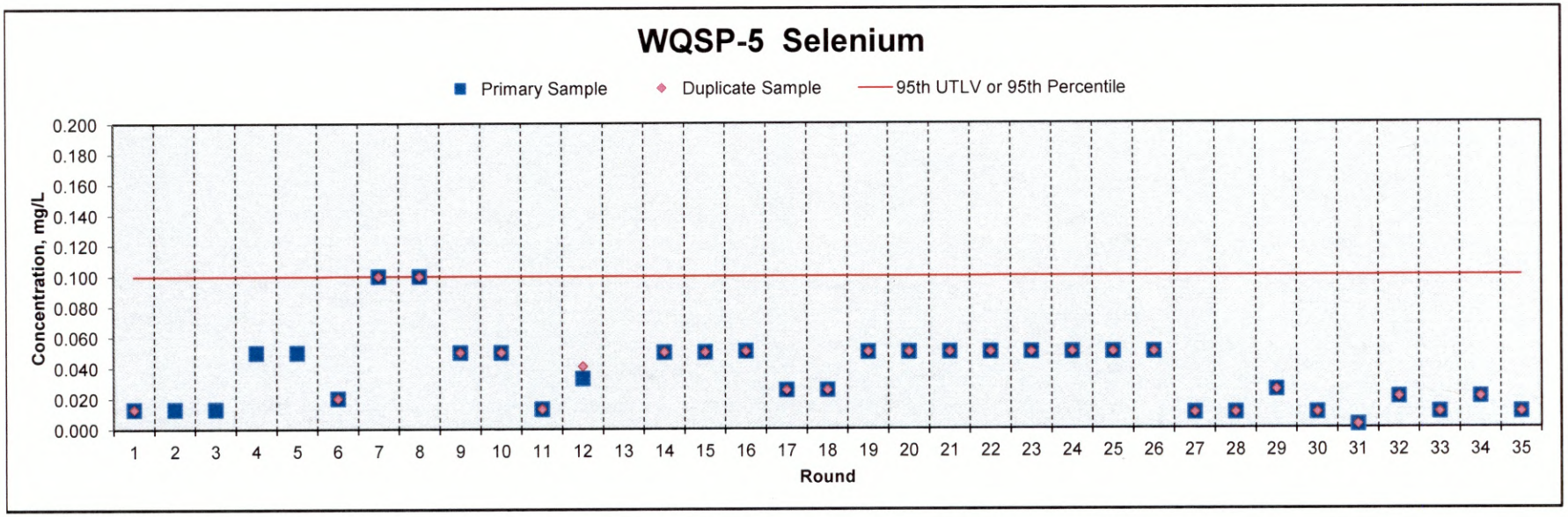
WQSP-5 Potassium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Potassium	1	11/20/95	12/15/95	286	286	mg/L	2.000	622
Potassium	2	06/06/96	06/13/96	290	288	mg/L	2.000	622
Potassium	3	09/26/96	10/02/96	292	291	mg/L	2.000	622
Potassium	4	06/19/97	06/25/97	284	281	mg/L	2.000	622
Potassium	5	09/25/97	10/21/97	282	290	mg/L	2.000	622
Potassium	6	05/20/98	05/22/98	304	301	mg/L	0.074	622
Potassium	7	10/07/98	11/27/98	360	340	mg/L	0.50	622
Potassium	8	05/05/99	05/12/99	527	582	mg/L	1.00	622
Potassium	9	10/27/99	12/01/99	385	416	mg/L	0.50	622
Potassium	10	06/19/00	06/19/00	450	400	mg/L	5.00	622
Potassium	26	04/02/08	04/09/08	387	352	mg/L	0.50	622
Potassium	27	10/01/08	10/23/08	300	300	mg/L	0.50	622
Potassium	28	03/18/09	03/31/09	282	274	mg/L	0.50	622
Potassium	29	09/30/09	11/03/09	281	290	mg/L	0.50	622
Potassium	30	03/16/10	04/05/10	317	324	mg/L	0.50	622
Potassium	31	10/13/10	11/11/10	326	326	mg/L	0.5	622
Potassium	32	05/11/11	05/23/11	297	312	mg/L	8.5	622
Potassium	33	09/21/11	09/30/11	300	306	mg/L	4.2	622
Potassium	34	05/01/12	05/14/12	313	302	mg/L	3.4	622
Potassium	35	05/21/13	06/03/13	313	337	mg/L	0.25	622



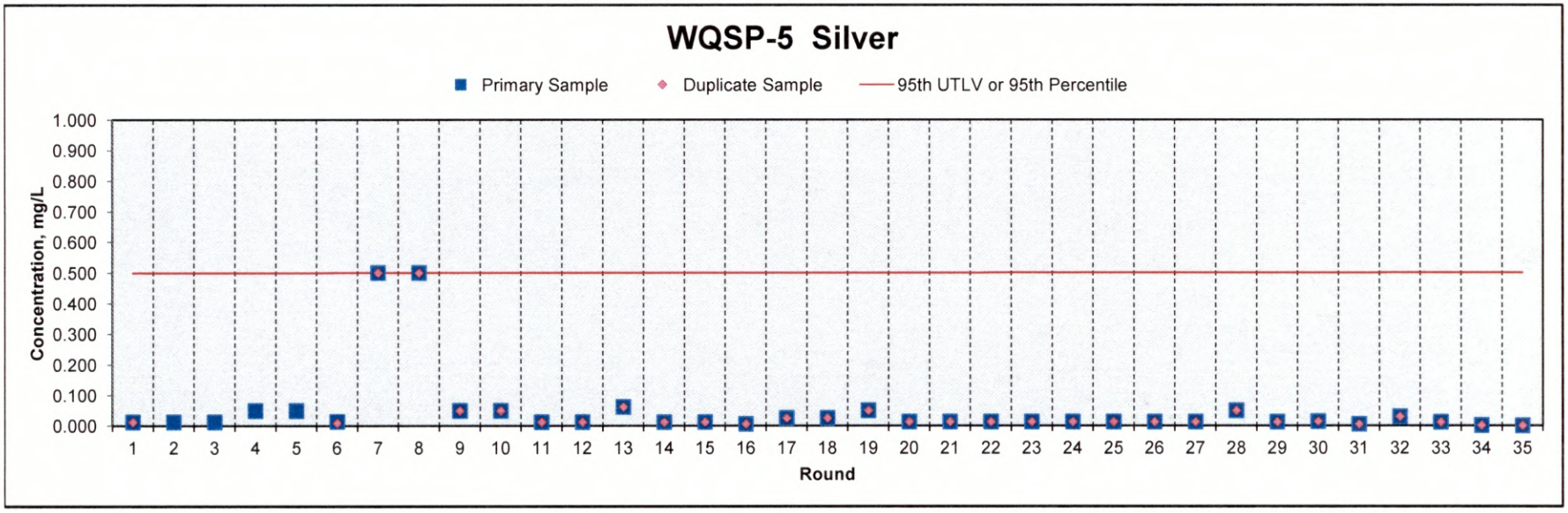
WQSP-5 Selenium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Selenium	1	11/20/95	12/18/95	< 0.013	< 0.013	mg/L	0.013	< 0.1
Selenium	2	06/06/96	06/18/96	< 0.013		mg/L	0.013	< 0.1
Selenium	3	09/26/96	10/01/96	< 0.013		mg/L	0.013	< 0.1
Selenium	4	06/19/97	06/26/97	< 0.050		mg/L	0.05	< 0.1
Selenium	5	09/25/97	10/27/97	< 0.050		mg/L	0.05	< 0.1
Selenium	6	05/20/98	05/22/98	< 0.020	< 0.020	mg/L	0.001	< 0.1
Selenium	7	10/07/98	11/27/98	< 0.100	< 0.100	mg/L	0.01	< 0.1
Selenium	8	05/05/99	05/12/99	< 0.100	< 0.100	mg/L	0.10	< 0.1
Selenium	9	10/27/99	11/15/99	< 0.050	< 0.050	mg/L	0.05	< 0.1
Selenium	10	04/26/00	05/24/00	< 0.050	< 0.050	mg/L	0.05	< 0.1
Selenium	26	04/02/08	04/07/08	< 0.050	< 0.050	mg/L	0.05	< 0.1
Selenium	27	10/01/08	10/27/08	< 0.010	< 0.010	mg/L	0.025	< 0.1
Selenium	28	03/18/09	03/31/09	< 0.010	< 0.010	mg/L	0.010	< 0.1
Selenium	29	09/30/09	10/20/09	< 0.025	< 0.025	mg/L	0.025	< 0.1
Selenium	30	03/16/10	03/26/10	< 0.010	< 0.010	mg/L	0.010	< 0.1
Selenium	31	10/13/10	10/22/10	< 0.002	< 0.002	mg/L	0.002	< 0.1
Selenium	32	05/11/11	05/25/11	< 0.020	< 0.020	mg/L	0.020	< 0.1
Selenium	33	09/21/11	10/07/11	< 0.010	< 0.010	mg/L	0.010	< 0.1
Selenium	34	05/01/12	05/13/12	< 0.020	< 0.020	mg/L	0.020	< 0.1
Selenium	35	05/21/13	05/30/13	< 0.010	< 0.010	mg/L	0.010	< 0.1



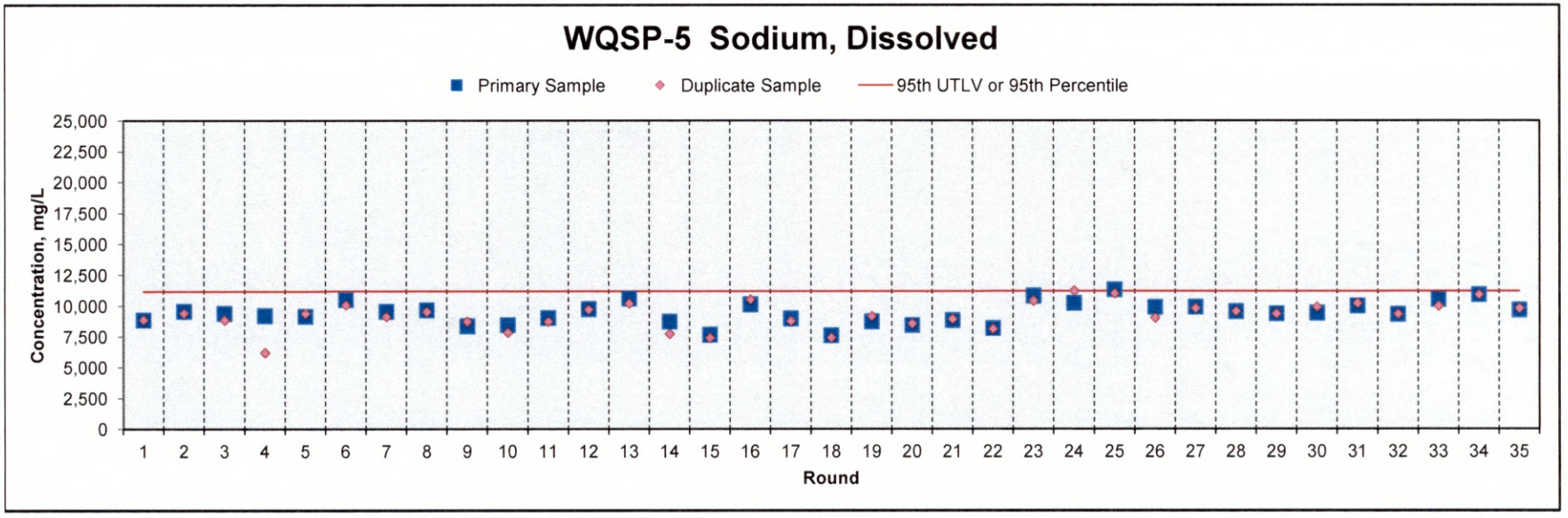
WQSP-5 Silver

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Silver	1	11/20/95	12/18/95	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	2	06/06/96	06/18/96	< 0.013		mg/L	0.013	< 0.5
Silver	3	09/26/96	10/01/96	< 0.013		mg/L	0.013	< 0.5
Silver	4	06/19/97	06/26/97	< 0.050		mg/L	0.050	< 0.5
Silver	5	09/25/97	10/27/97	< 0.050		mg/L	0.050	< 0.5
Silver	6	05/20/98	05/22/98	0.015	0.010	mg/L	0.001	< 0.5
Silver	7	10/07/98	11/27/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Silver	8	05/05/99	05/12/99	< 0.500	< 0.500	mg/L	0.500	< 0.5
Silver	9	10/27/99	11/15/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	10	04/26/00	05/24/00	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	26	04/02/08	04/07/08	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	27	10/01/08	10/27/08	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	28	03/18/09	03/31/09	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	29	09/30/09	01/07/10	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	30	03/16/10	03/26/10	< 0.015	< 0.015	mg/L	0.015	< 0.5
Silver	31	10/13/10	10/22/10	< 0.006	< 0.006	mg/L	0.006	< 0.5
Silver	32	05/11/11	05/18/11	< 0.030	< 0.030	mg/L	0.030	< 0.5
Silver	33	09/21/11	09/23/11	< 0.012	< 0.012	mg/L	0.012	< 0.5
Silver	34	05/01/12	05/10/12	< 0.0020	< 0.0020	mg/L	0.0020	< 0.5
Silver	35	05/21/13	06/13/13	< 0.0011	< 0.0011	mg/L	0.0011	< 0.5



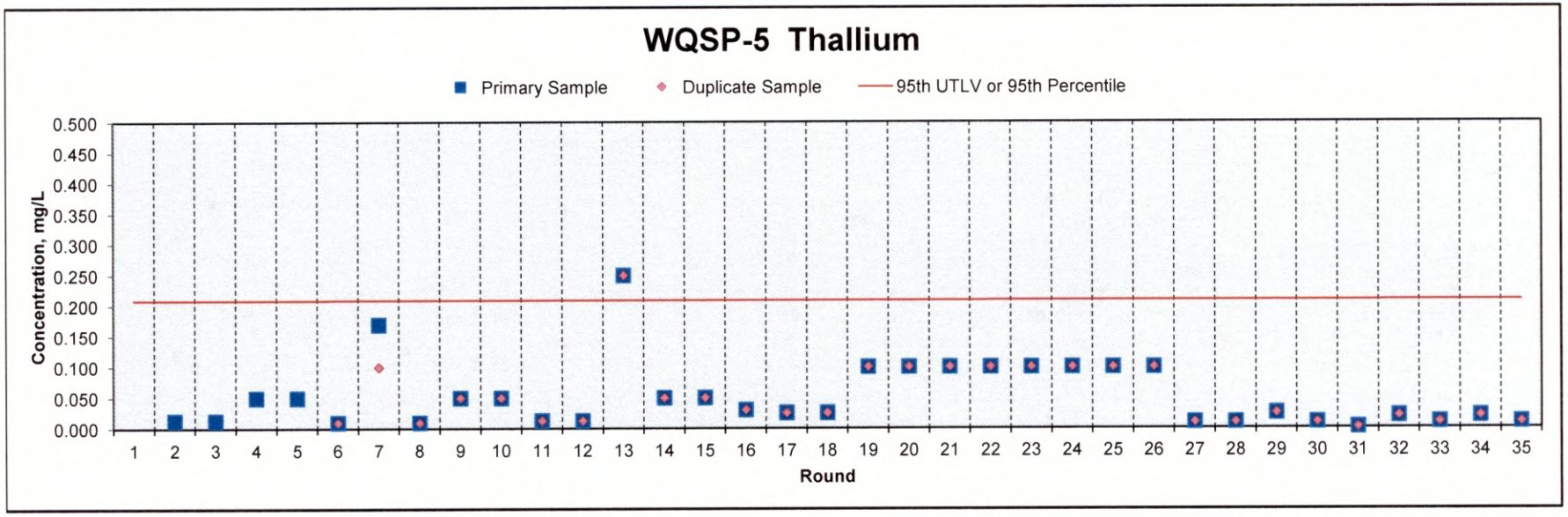
WQSP-5 Sodium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sodium	1	11/20/95	12/15/95	8,880	8,900	mg/L	5.000	11,190
Sodium	2	06/06/96	06/13/96	9,580	9,420	mg/L	25.000	11,190
Sodium	3	09/26/96	10/02/96	9,400	8,870	mg/L	25.000	11,190
Sodium	4	06/19/97	06/25/97	9,220	6,230	mg/L	25.000	11,190
Sodium	5	09/25/97	10/21/97	9,160	9,390	mg/L	10.000	11,190
Sodium	6	05/20/98	05/22/98	10,500	10,078	mg/L	0.033	11,190
Sodium	7	10/07/98	11/27/98	9,560	9,140	mg/L	0.500	11,190
Sodium	8	05/05/99	05/12/99	9,675	9,545	mg/L	1.000	11,190
Sodium	9	10/27/99	12/01/99	8,380	8,739	mg/L	0.500	11,190
Sodium	10	04/26/00	05/24/00	8,470	7,860	mg/L	0.010	11,190
Sodium	26	04/02/08	04/09/08	9,880	9,030	mg/L	0.50	11,190
Sodium	27	10/01/08	10/23/08	9,900	9,800	mg/L	0.50	11,190
Sodium	28	03/18/09	03/31/09	9,540	9,560	mg/L	0.50	11,190
Sodium	29	09/30/09	11/03/09	9,370	9,360	mg/L	0.50	11,190
Sodium	30	03/16/10	04/05/10	9,430	9,910	mg/L	2.70	11,190
Sodium	31	10/13/10	11/11/10	10,000	10,200	mg/L	5.5	11,190
Sodium	32	05/11/11	05/23/11	9,310	9,330	mg/L	6.4	11,190
Sodium	33	09/21/11	09/30/11	10,500	9,970	mg/L	32	11,190
Sodium	34	05/01/12	05/14/12	10,900	10,900	mg/L	12	11,190
Sodium	35	05/21/13	06/03/13	9,660	9,790	mg/L	16	11,190



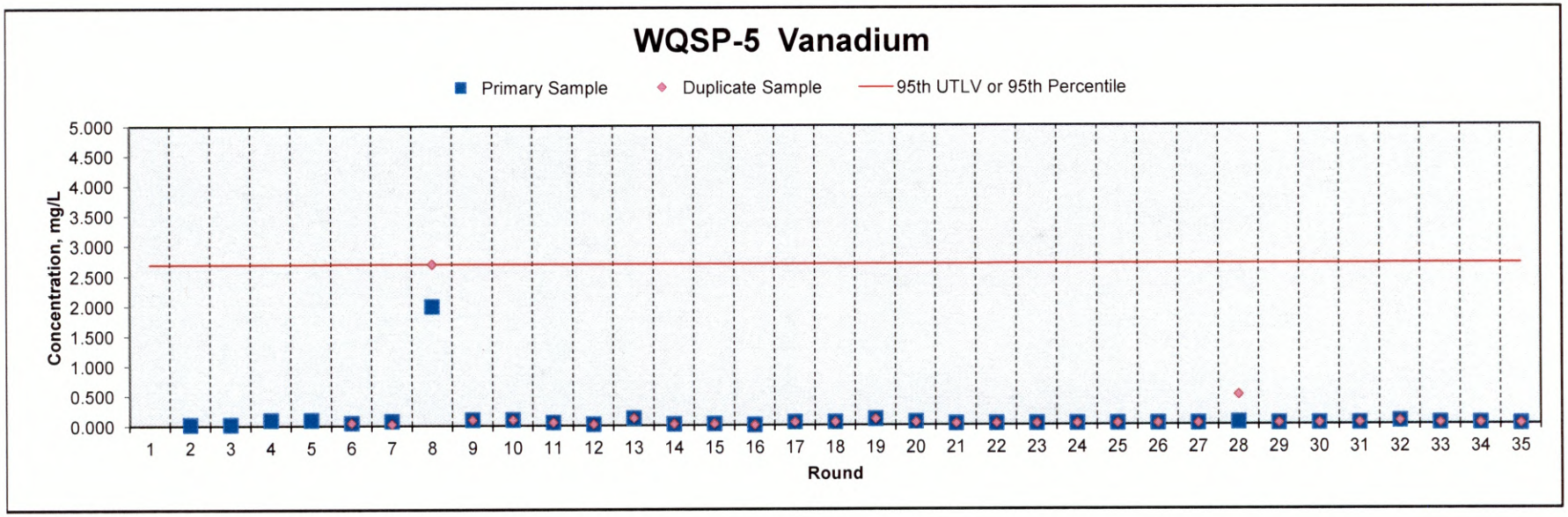
WQSP-5 Thallium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Thallium	1							0.209
Thallium	2	06/06/96	06/18/96	< 0.013		mg/L	0.013	0.209
Thallium	3	09/26/96	10/01/96	< 0.013		mg/L	0.013	0.209
Thallium	4	06/19/97	06/26/97	< 0.050		mg/L	0.050	0.209
Thallium	5	09/25/97	10/27/97	< 0.050		mg/L	0.050	0.209
Thallium	6	05/20/98	05/22/98	< 0.010	< 0.010	mg/L	0.001	0.209
Thallium	7	10/07/98	11/27/98	< 0.170	< 0.100	mg/L	0.005	0.209
Thallium	8	05/05/99	05/12/99	< 0.010	< 0.010	mg/L	0.010	0.209
Thallium	9	10/27/99	11/15/99	< 0.050	< 0.050	mg/L	0.050	0.209
Thallium	10	04/26/00	06/19/00	< 0.050	< 0.050	mg/L	0.050	0.209
Thallium	26	04/02/08	04/07/08	< 0.100	< 0.100	mg/L	0.100	0.209
Thallium	27	10/01/08	10/27/08	< 0.010	< 0.010	mg/L	0.025	0.209
Thallium	28	03/18/09	03/31/09	< 0.010	< 0.010	mg/L	0.010	0.209
Thallium	29	09/30/09	10/20/09	< 0.025	< 0.025	mg/L	0.025	0.209
Thallium	30	03/16/10	03/26/10	< 0.010	< 0.010	mg/L	0.010	0.209
Thallium	31	10/13/10	10/22/10	< 0.002	< 0.002	mg/L	0.002	0.209
Thallium	32	05/11/11	05/25/11	< 0.020	< 0.020	mg/L	0.020	0.209
Thallium	33	09/21/11	10/07/11	< 0.010	< 0.010	mg/L	0.010	0.209
Thallium	34	05/01/12	05/13/12	< 0.020	< 0.020	mg/L	0.020	0.209
Thallium	35	05/21/13	05/30/13	< 0.010	< 0.010	mg/L	0.010	0.209



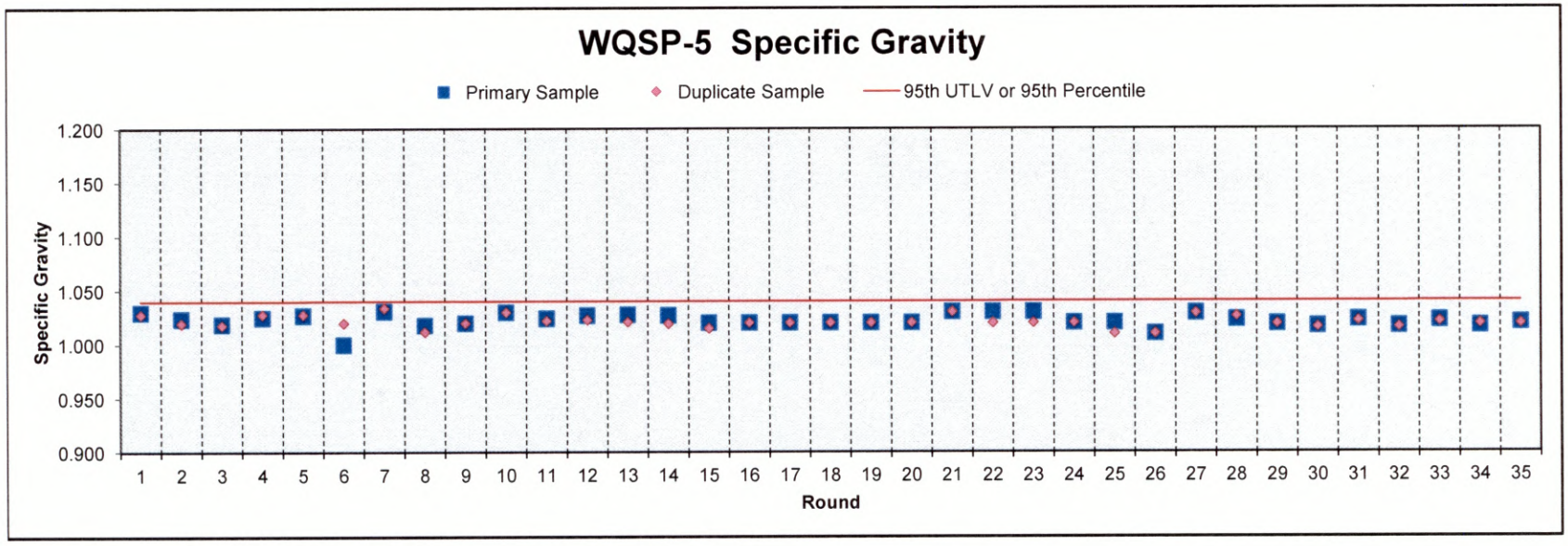
WQSP-5 Vanadium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Vanadium	1							2.7
Vanadium	2	06/06/96	06/18/96	< 0.025		mg/L	0.025	2.7
Vanadium	3	09/26/96	10/01/96	< 0.025		mg/L	0.025	2.7
Vanadium	4	06/19/97	06/26/97	< 0.100		mg/L	0.100	2.7
Vanadium	5	09/25/97	10/27/97	< 0.100		mg/L	0.100	2.7
Vanadium	6	05/20/98	05/22/98	< 0.050	< 0.050	mg/L	0.005	2.7
Vanadium	7	10/07/98	11/27/98	0.080	0.032	mg/L	0.100	2.7
Vanadium	8	05/05/99	05/13/99	2.000	2.700	mg/L	0.500	2.7
Vanadium	9	10/27/99	11/15/99	< 0.100	< 0.100	mg/L	0.100	2.7
Vanadium	10	04/26/00	05/24/00	< 0.100	< 0.100	mg/L	0.100	2.7
Vanadium	26	04/02/08	04/07/08	< 0.025	< 0.025	mg/L	0.025	2.7
Vanadium	27	10/01/08	10/27/08	< 0.025	< 0.025	mg/L	0.025	2.7
Vanadium	28	03/18/09	03/31/09	0.039	< 0.500	mg/L	0.500	2.7
Vanadium	29	09/30/09	01/07/10	< 0.025	< 0.025	mg/L	0.025	2.7
Vanadium	30	03/16/10	03/29/10	< 0.027	< 0.027	mg/L	0.027	2.7
Vanadium	31	10/13/10	10/22/10	0.028	0.032	mg/L	0.011	2.7
Vanadium	32	05/11/11	05/18/11	< 0.055	< 0.055	mg/L	0.055	2.7
Vanadium	33	09/21/11	09/23/11	0.024	0.024	mg/L	0.011	2.7
Vanadium	34	05/01/12	05/10/12	0.021	0.020	mg/L	0.0040	2.7
Vanadium	35	05/21/13	06/13/13	0.011	0.012	mg/L	0.0035	2.7



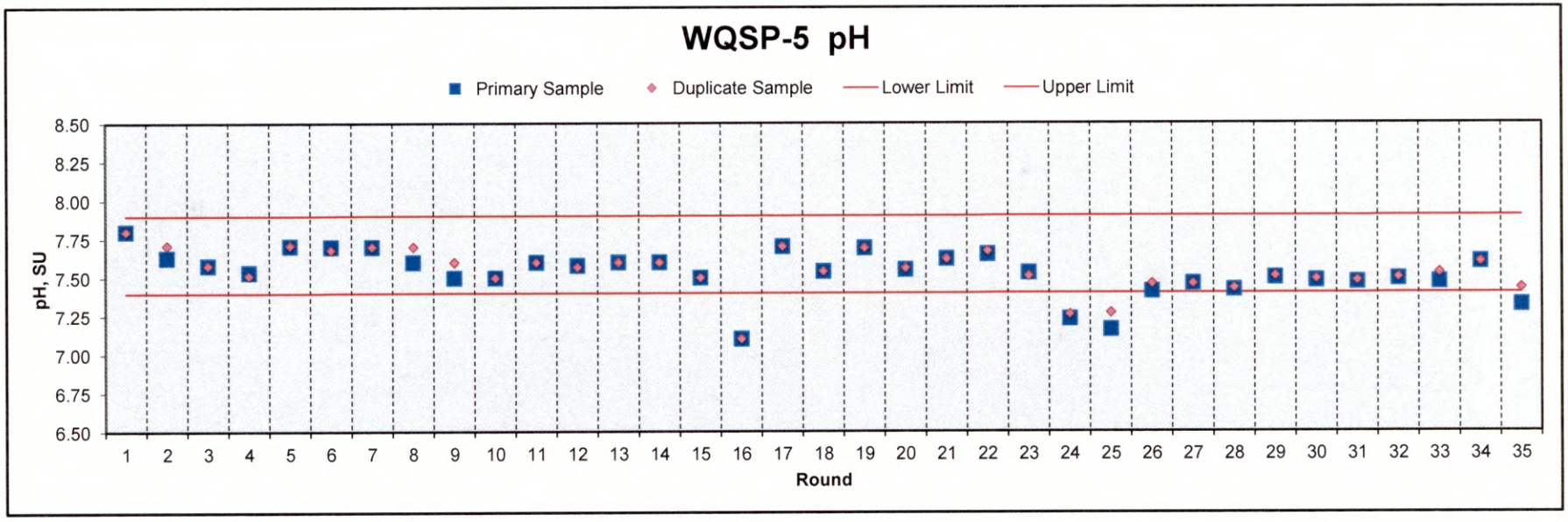
WQSP-5 Specific Gravity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Density	1	11/20/95	11/30/95	1.030	1.028	g/mL	0	1.04
Density	2	06/06/96	06/11/96	1.024	1.020	g/mL	0	1.04
Density	3	09/26/96	10/22/96	1.019	1.018	g/mL	0	1.04
Density	4	06/19/97	06/27/97	1.025	1.028	g/mL	0	1.04
Density	5	09/25/97	09/26/97	1.027	1.028	g/mL	0	1.04
Density	6	05/20/98	05/22/98	1.000	1.020	g/mL	0	1.04
Density	7	10/07/98	10/13/98	1.031	1.034	g/mL	0	1.04
Density	8	05/05/99	05/11/99	1.018	1.012	g/mL	0	1.04
Density	9	10/27/99	10/28/99	1.020	1.020	g/mL	0	1.04
Density	10	04/26/00	05/04/00	1.030	1.030	g/mL	0	1.04
Density	26	04/02/08	04/10/08	1.010	1.010	g/mL	0	1.04
Specific Gravity	27	10/01/08	10/16/08	1.029	1.029	unitless	0	1.04
Specific Gravity	28	03/18/09	03/24/09	1.023	1.026	unitless	0	1.04
Specific Gravity	29	09/30/09	10/11/09	1.019	1.019	unitless	0	1.04
Specific Gravity	30	03/16/10	03/22/10	1.017	1.016	unitless	0	1.04
Specific Gravity	31	10/13/10	11/13/10	1.023	1.022	unitless	0	1.04
Specific Gravity	32	05/11/11	05/22/11	1.017	1.016	unitless	0	1.04
Specific Gravity	33	09/21/11	09/28/11	1.022	1.021	unitless	0	1.04
Specific Gravity	34	05/01/12	05/07/12	1.017	1.019	unitless	0	1.04
Specific Gravity	35	05/21/13	05/29/13	1.020	1.019	unitless	0	1.04



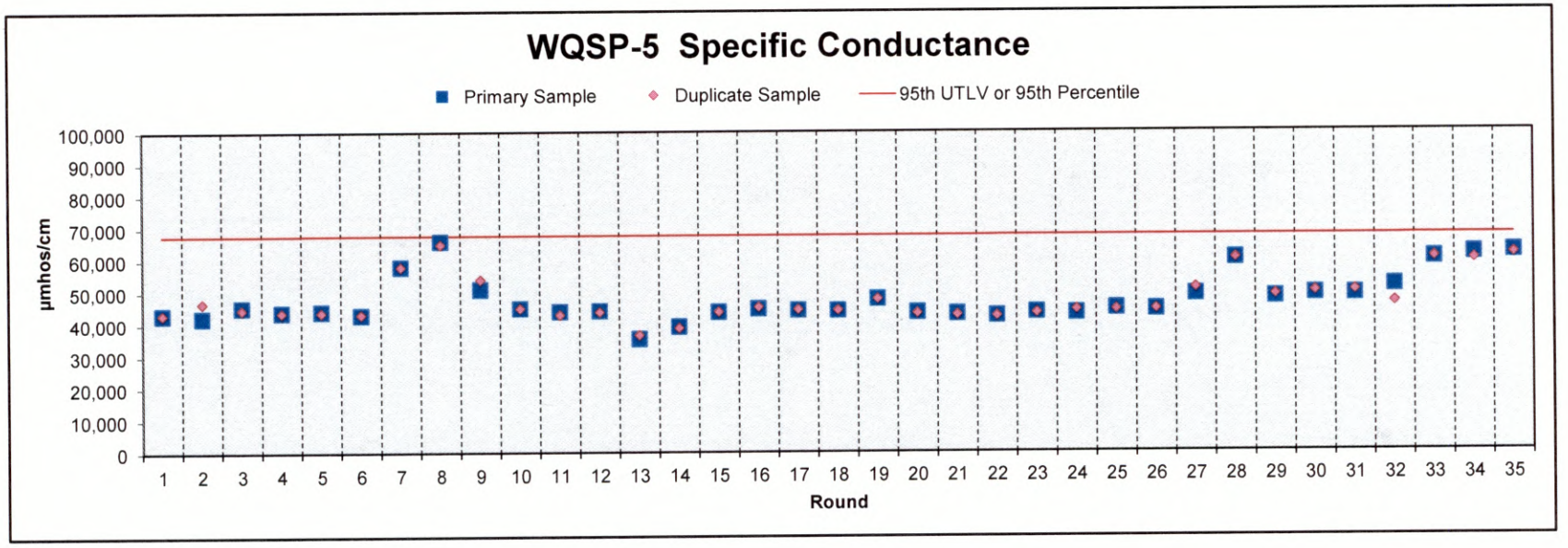
WQSP-5 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile	
								Lower Limit	Upper Limit
pH	1	11/20/95	11/21/95	7.80	7.80	SU	0.00	7.4	7.9
pH	2	06/06/96	06/07/96	7.63	7.71	SU	0.00	7.4	7.9
pH	3	09/26/96	09/27/96	7.58	7.58	SU	0.00	7.4	7.9
pH	4	06/19/97	06/20/97	7.535	7.515	SU	0.00	7.4	7.9
pH	5	09/25/97	09/26/97	7.705	7.710	SU	0.00	7.4	7.9
pH	6	05/20/98	05/22/98	7.70	7.68	SU	0.00	7.4	7.9
pH	7	10/07/98	10/07/98	7.70	7.70	SU	0.00	7.4	7.9
pH	8	05/05/99	05/05/99	7.60	7.70	SU	0.00	7.4	7.9
pH	9	10/27/99	10/27/99	7.50	7.60	SU	0.00	7.4	7.9
pH	10	04/26/00	04/26/00	7.50	7.50	SU	0.00	7.4	7.9
pH	26	04/02/08	04/02/08	7.41	7.46	SU	0.00	7.4	7.9
pH	27	10/01/08	10/03/08	7.46	7.46	SU	0.00	7.4	7.9
pH	28	03/18/09	03/20/09	7.42	7.43	SU	0.00	7.4	7.9
pH	29	09/30/09	10/02/09	7.50	7.51	SU	0.00	7.4	7.9
pH	30	3/16/10	03/18/10	7.48	7.49	SU	0.00	7.4	7.9
pH	31	10/13/10	10/20/10	7.47	7.48	SU	0.00	7.4	7.9
pH	32	05/11/11	05/12/11	7.49	7.50	SU	0.00	7.4	7.9
pH	33	09/21/11	09/22/11	7.47	7.53	SU	0.00	7.4	7.9
pH	34	05/01/12	05/09/12	7.60	7.60	SU	0.10	7.4	7.9
pH	35	05/21/13	05/22/13	7.32	7.43	SU	0.10	7.4	7.9



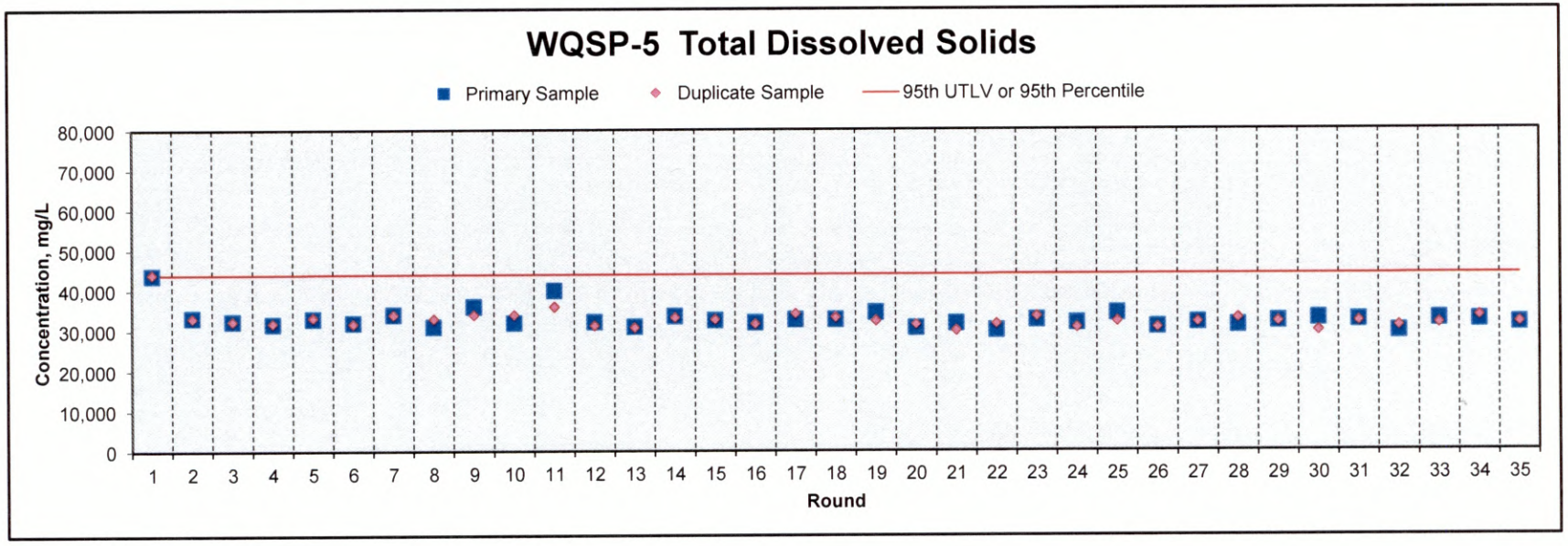
WQSP-5 Specific Conductance

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Specific Conductance	1	11/20/95	11/30/95	43,100	43,200	µmhos/cm	1.0	67,700
Specific Conductance	2	06/06/96	16/28/96	42,200	46,800	µmhos/cm	3.0	67,700
Specific Conductance	3	09/26/96	10/22/96	45,400	44,700	µmhos/cm	3.0	67,700
Specific Conductance	4	06/19/97	07/08/97	43,850	43,700	µmhos/cm	3.0	67,700
Specific Conductance	5	09/25/97	09/30/97	44,150	43,750	µmhos/cm	3.0	67,700
Specific Conductance	6	05/20/98	05/22/98	42,950	43,165	µmhos/cm	0.0	67,700
Specific Conductance	7	10/07/98	10/16/98	58,000	58,000	µmhos/cm	---	67,700
Specific Conductance	8	05/05/99	05/05/99	66,000	65,000	µmhos/cm		67,700
Specific Conductance	9	10/27/99	10/28/99	51,000	54,000	µmhos/cm		67,700
Specific Conductance	10	04/26/00	05/02/00	45,000	45,000	µmhos/cm		67,700
Specific Conductance	26	04/02/08	04/08/08	44,300	44,400	µmhos/cm		67,700
Specific Conductance	27	10/01/08	10/03/08	49,000	51,000	µmhos/cm		67,700
Specific Conductance	28	03/18/09	03/24/09	60,200	60,200	µmhos/cm		67,700
Specific Conductance	29	09/30/09	10/02/09	48,100	48,800	µmhos/cm		67,700
Specific Conductance	30	03/16/10	03/18/10	49,100	49,800	µmhos/cm		67,700
Specific Conductance	31	10/13/10	11/01/10	49,000	50,000	µmhos/cm	0	67,700
Specific Conductance	32	05/11/11	05/12/11	51,700	46,500	µmhos/cm	2.0	67,700
Specific Conductance	33	09/21/11	09/22/11	60,100	60,200	µmhos/cm	0.5	67,700
Specific Conductance	34	05/01/12	05/09/12	61,500	59,700	µmhos/cm	0.5	67,700
Specific Conductance	35	05/21/13	05/22/13	62,000	61,300	µmhos/cm	0.5	67,700



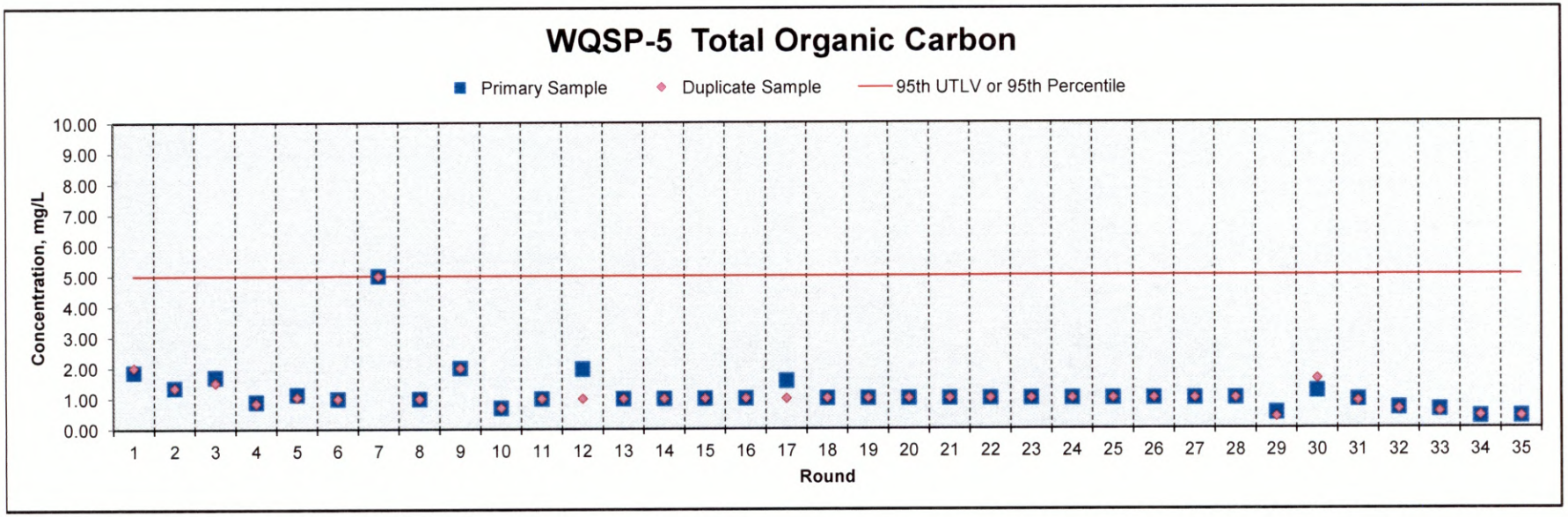
WQSP-5 Total Dissolved Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Dissolved Solids	1	11/20/95	11/21/95	43,800	44,100	mg/L	10	43,950
Total Dissolved Solids	2	06/06/96	06/11/96	33,300	33,200	mg/L	200	43,950
Total Dissolved Solids	3	09/26/96	10/02/96	32,400	32,400	mg/L	200	43,950
Total Dissolved Solids	4	06/19/97	06/26/97	31,700	31,900	mg/L	200	43,950
Total Dissolved Solids	5	09/25/97	09/30/97	33,000	33,300	mg/L	200	43,950
Total Dissolved Solids	6	05/20/98	05/22/98	32,000	31,760	mg/L	20	43,950
Total Dissolved Solids	7	10/07/98	10/12/98	34,000	34,000	mg/L	10	43,950
Total Dissolved Solids	8	05/05/99	05/05/99	31,000	33,000	mg/L	10	43,950
Total Dissolved Solids	9	10/27/99	10/29/99	36,000	34,000	mg/L	10	43,950
Total Dissolved Solids	10	04/26/00	05/02/00	32,000	34,000	mg/L	10	43,950
Total Dissolved Solids	26	04/02/08	04/09/08	30,850	30,650	mg/L	10	43,950
Total Dissolved Solids	27	10/01/08	10/03/08	31,900	32,000	mg/L	10	43,950
Total Dissolved Solids	28	03/18/09	03/23/09	31,200	33,000	mg/L	10	43,950
Total Dissolved Solids	29	09/30/09	10/06/09	32,200	32,100	mg/L	10	43,950
Total Dissolved Solids	30	03/16/10	03/18/10	32,900	29,900	mg/L	650	43,950
Total Dissolved Solids	31	10/13/10	10/20/10	32,500	32,200	mg/L	270	43,950
Total Dissolved Solids	32	05/11/11	05/19/11	29,700	31,000	mg/L	270	43,950
Total Dissolved Solids	33	09/21/11	09/27/11	32,700	31,600	mg/L	270	43,950
Total Dissolved Solids	34	05/01/12	05/08/12	32,400	33,400	mg/L	270	43,950
Total Dissolved Solids	35	05/21/13	05/28/13	31,600	31,800	mg/L	101	43,950



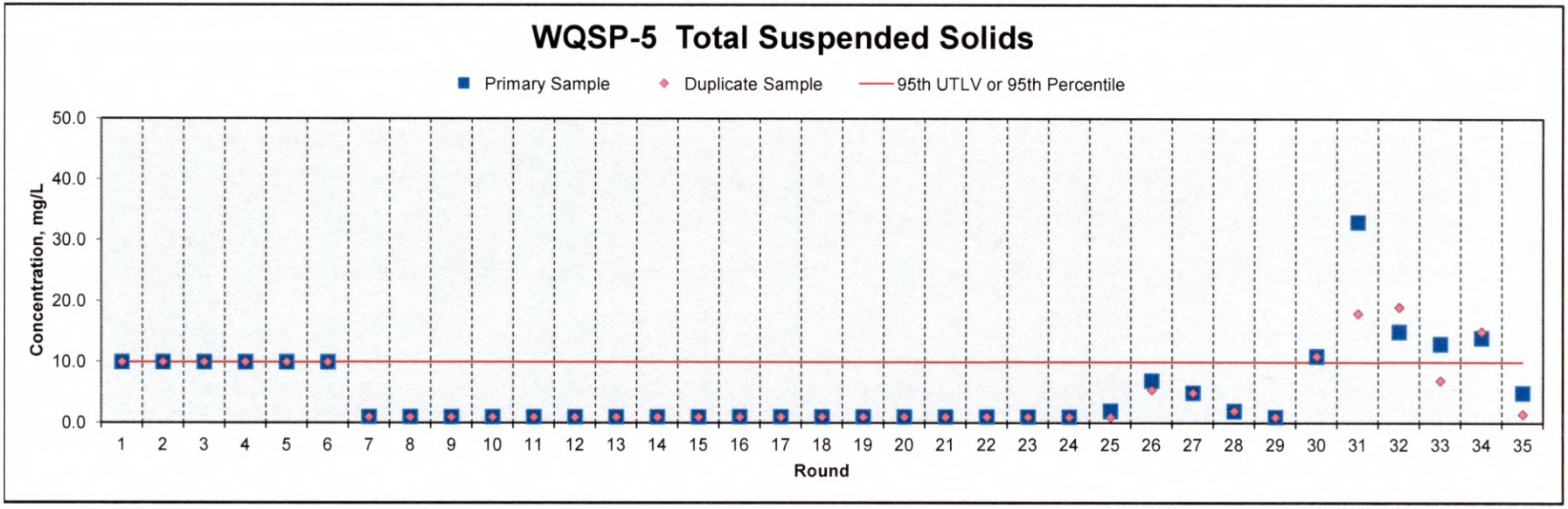
WQSP-5 Total Organic Carbon

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Organic Carbon	1	11/20/95	12/15/95	1.87	2.02	mg/L	0.5	< 5.0
Total Organic Carbon	2	06/06/96	06/28/96	1.36	1.36	mg/L	0.5	< 5.0
Total Organic Carbon	3	09/26/96	10/03/96	1.71	1.53	mg/L	0.5	< 5.0
Total Organic Carbon	4	06/19/97	06/27/97	0.90	0.85	mg/L	0.5	< 5.0
Total Organic Carbon	5	09/25/97	10/22/97	1.14	1.05	mg/L	0.5	< 5.0
Total Organic Carbon	6	05/20/98	05/22/98	1.00	1.00	mg/L	0.1	< 5.0
Total Organic Carbon	7	10/07/98	10/07/98	< 5.00	< 5.00	mg/L	5.0	< 5.0
Total Organic Carbon	8	05/05/99	05/09/99	< 1.00	< 1.00	mg/L	1.0	< 5.0
Total Organic Carbon	9	10/27/99	11/12/99	< 2.00	< 2.00	mg/L	2.0	< 5.0
Total Organic Carbon	10	04/12/00	05/02/00	< 0.70	< 0.70	mg/L		< 5.0
Total Organic Carbon	26	04/02/08	04/08/08	< 1.00	< 1.00	mg/L	1.0	< 5.0
Total Organic Carbon	27	10/01/08	10/08/08	< 1.00	< 1.00	mg/L	1.0	< 5.0
Total Organic Carbon	28	03/18/09	03/26/09	< 1.00	< 1.00	mg/L	1.0	< 5.0
Total Organic Carbon	29	09/30/09	10/05/09	0.51	0.38	mg/L	1.00	< 5.0
Total Organic Carbon	30	03/16/10	03/29/10	1.22	1.62	mg/L	0.056	< 5.0
Total Organic Carbon	31	10/13/10	10/20/10	0.94	0.89	mg/L	0.056	< 5.0
Total Organic Carbon	32	05/11/11	05/24/11	0.66	0.62	mg/L	0.250	< 5.0
Total Organic Carbon	33	09/21/11	09/26/11	0.60	0.53	mg/L	0.072	< 5.0
Total Organic Carbon	34	05/01/12	05/08/12	0.37	0.40	mg/L	0.25	< 5.0
Total Organic Carbon	35	05/21/13	05/29/13	0.38	0.38	mg/L	0.23	< 5.0



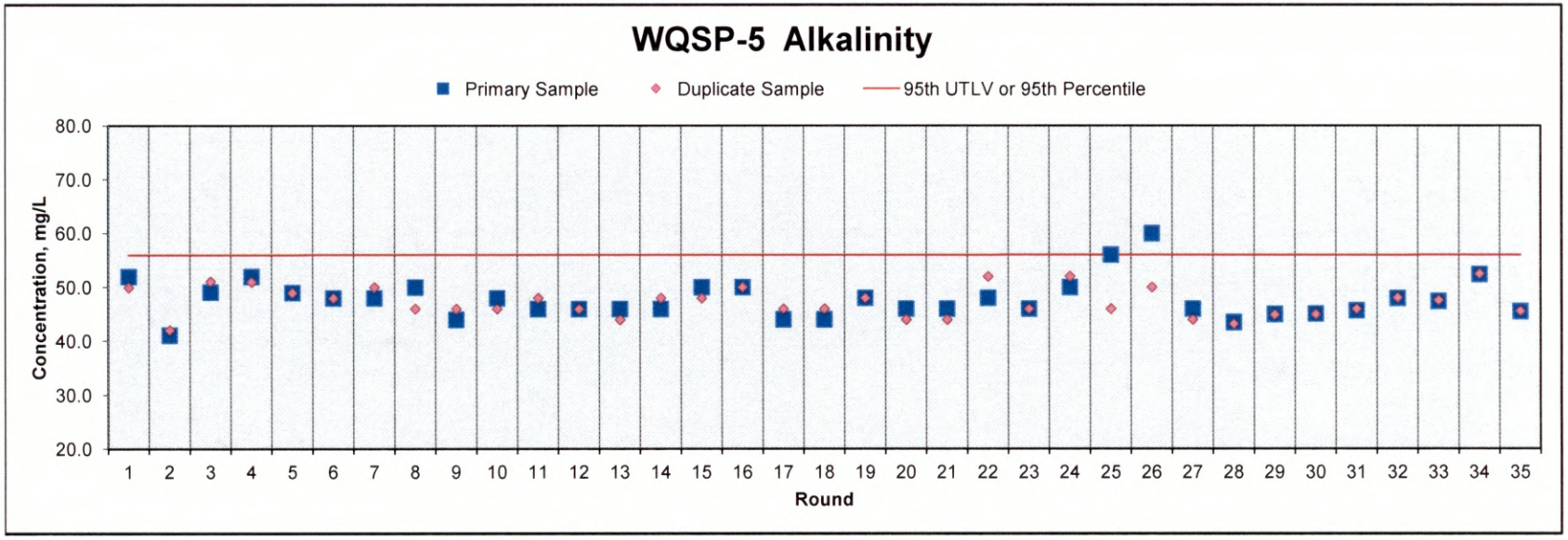
WQSP-5 Total Suspended Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Suspended Solids	1	11/20/95	11/22/95	< 10.0	< 10.0	mg/L	10.0	< 10
Total Suspended Solids	2	06/06/96	06/11/96	< 10.0	< 10.0	mg/L	10.0	< 10
Total Suspended Solids	3	09/26/96	10/02/96	< 10.0	< 10.0	mg/L	10.0	< 10
Total Suspended Solids	4	06/19/97	06/26/97	< 10.0	< 10.0	mg/L	10.0	< 10
Total Suspended Solids	5	09/25/97	09/30/97	< 10.0	< 10.0	mg/L	10.0	< 10
Total Suspended Solids	6	05/20/98	05/22/98	< 10.0	< 10.0	mg/L	10.0	< 10
Total Suspended Solids	7	10/07/98	10/08/98	< 1.00	< 1.00	mg/L	1.00	< 10
Total Suspended Solids	8	05/05/99	05/06/99	< 1.00	< 1.00	mg/L	1.00	< 10
Total Suspended Solids	9	10/27/99	11/02/99	< 1.00	< 1.00	mg/L	1.00	< 10
Total Suspended Solids	10	04/26/00	05/02/00	< 1.00	< 1.00	mg/L	1.00	< 10
Total Suspended Solids	26	04/02/08	04/08/08	7.00	5.50	mg/L	1.00	< 10
Total Suspended Solids	27	10/01/08	10/06/08	< 5.00	< 5.00	mg/L	1.00	< 10
Total Suspended Solids	28	03/18/09	03/23/09	2.00	2.00	mg/L	1.00	< 10
Total Suspended Solids	29	09/30/09	10/05/09	< 1.00	< 1.00	mg/L	1.00	< 10
Total Suspended Solids	30	03/16/10	03/24/10	**11**	**11**	mg/L	1.0	**< 10**
Total Suspended Solids	31	10/13/10	10/20/10	**33**	**18**	mg/L	0.0	**< 10**
Total Suspended Solids	32	05/11/11	05/18/11	**15**	**19**	mg/L	0.0	**< 10**
Total Suspended Solids	33	09/21/11	09/28/11	**13**	7	mg/L	2.8	**< 10**
Total Suspended Solids	34	05/01/12	05/07/12	**14**	**15**	mg/L	2.8	**< 10**
Total Suspended Solids	35	05/21/13	05/22/13	5	< 1.5	mg/L	1.5	< 10



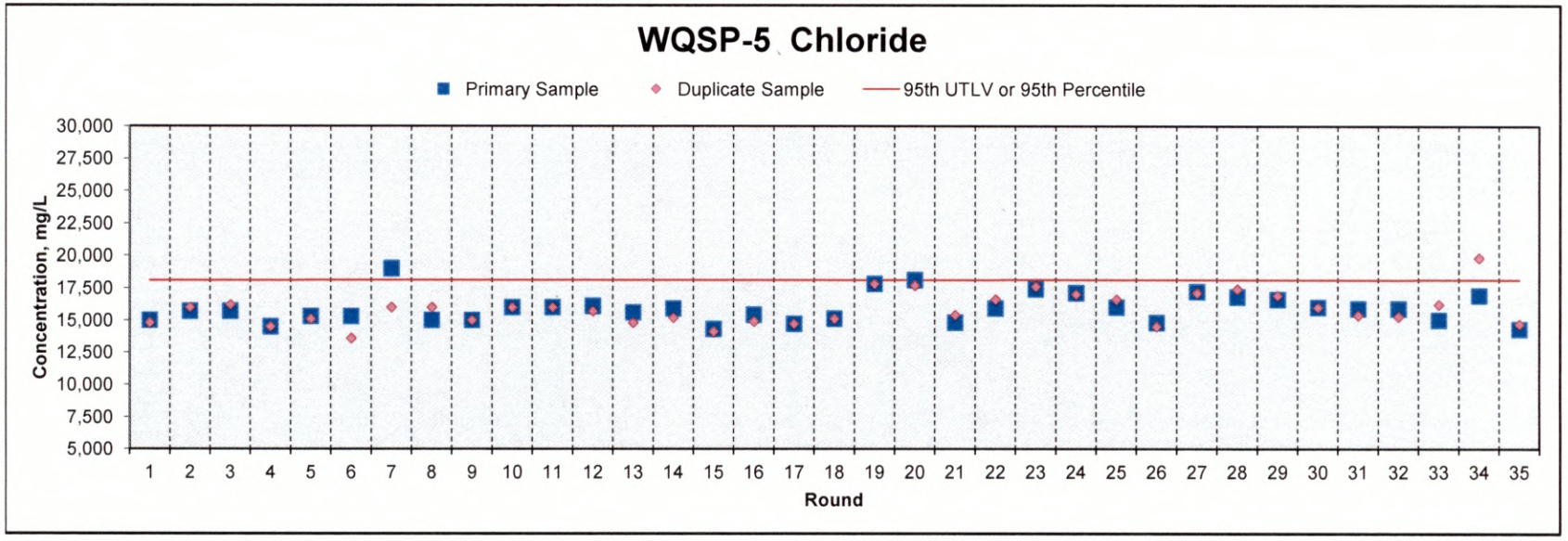
WQSP-5 Alkalinity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Alkalinity	1	11/20/95	11/27/95	52.0	50.0	mg/L	5.0	56
Alkalinity	2	06/06/96	06/11/96	41.1	42.1	mg/L	5.0	56
Alkalinity	3	09/26/96	10/03/96	49.1	51.1	mg/L	5.0	56
Alkalinity	4	06/19/97	06/27/97	52.0	51.0	mg/L	5.0	56
Alkalinity	5	09/25/97	09/26/97	49.0	49.0	mg/L	5.0	56
Alkalinity	6	05/20/98	05/22/98	48.0	48.0	mg/L		56
Alkalinity	7	10/07/98	10/09/98	48.0	50.0	mg/L	1.0	56
Alkalinity	8	05/05/99	05/11/99	50.0	46.0	mg/L	1.0	56
Alkalinity	9	10/27/99	11/02/99	44.0	46.0	mg/L		56
Alkalinity	10	04/26/00	05/02/00	48.0	46.0	mg/L		56
Alkalinity	26	04/02/08	04/08/08	60.0	50.0	mg/L	4.0	56
Alkalinity	27	10/01/08	10/13/08	46.0	44.0	mg/L	4.0	56
Alkalinity	28	03/18/09	03/20/09	43.5	43.2	mg/L	4.0	56
Alkalinity	29	09/30/09	10/02/09	45.0	44.9	mg/L	4.0	56
Alkalinity	30	03/16/10	03/18/10	45.1	45.0	mg/L	4.0	56
Alkalinity	31	10/13/10	10/20/10	45.7	46.0	mg/L	5.0	56
Alkalinity	32	05/11/11	05/12/11	48.0	48.1	mg/L	5.0	56
Alkalinity	33	09/21/11	09/22/11	47.4	47.6	mg/L	2.4	56
Alkalinity	34	05/01/12	05/09/12	52.4	52.5	mg/L	5.0	56
Alkalinity	35	05/21/13	05/22/13	45.5	45.6	mg/L	5.0	56



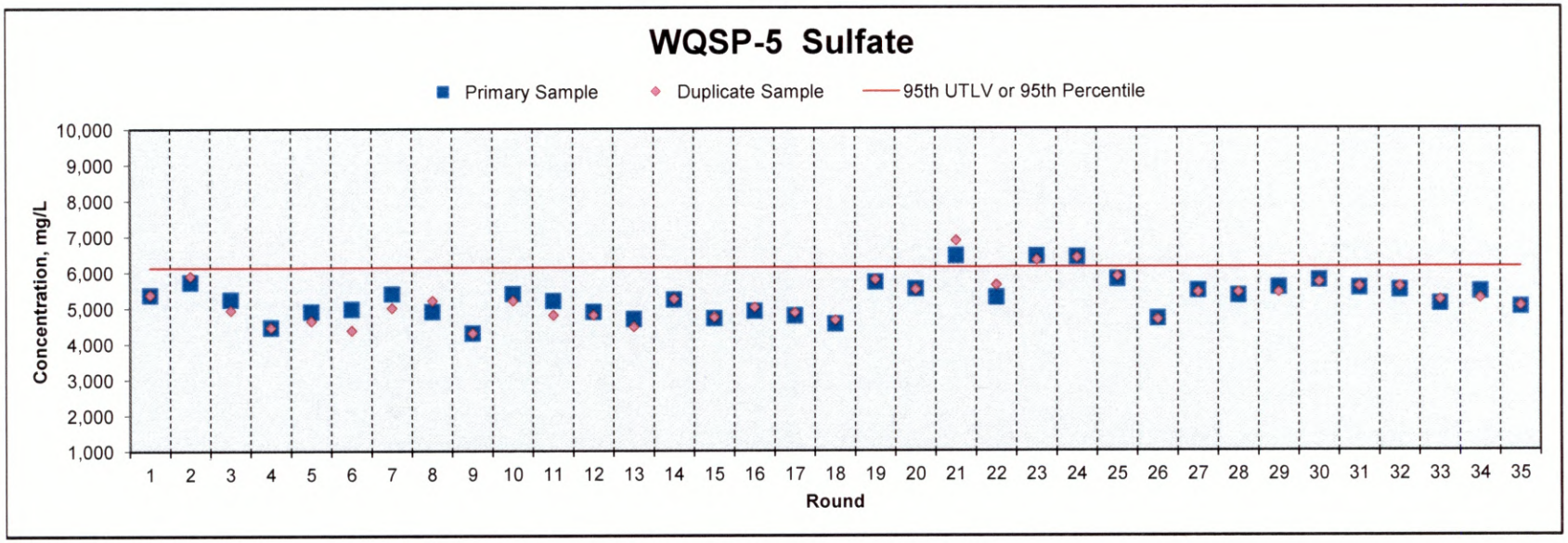
WQSP-5 Chloride

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chloride	1	11/20/95	11/27/95	15,000	14,800	mg/L	5.0	18,100
Chloride	2	06/06/96	06/28/96	15,700	16,000	mg/L	2500.0	18,100
Chloride	3	09/26/96	10/15/96	15,700	16,200	mg/L	2500.0	18,100
Chloride	4	06/19/97	07/07/97	14,500	14,500	mg/L	5000.0	18,100
Chloride	5	09/25/97	10/13/97	15,300	15,100	mg/L	1000.0	18,100
Chloride	6	05/20/98	05/22/98	15,300	13,591	mg/L	0.0	18,100
Chloride	7	10/07/98	10/13/98	19,000	16,000	mg/L	0.5	18,100
Chloride	8	05/05/99	05/05/99	15,000	16,000	mg/L	0.5	18,100
Chloride	9	10/27/99	10/28/99	15,000	15,000	mg/L	0.5	18,100
Chloride	10	04/26/00	05/04/00	16,000	16,000	mg/L	0.5	18,100
Chloride	26	04/02/08	04/10/08	14,800	14,500	mg/L	0.5	18,100
Chloride	27	10/01/08	10/02/08	17,200	17,100	mg/L	0.5	18,100
Chloride	28	03/18/09	04/10/09	16,800	17,400	mg/L	0.5	18,100
Chloride	29	09/30/09	10/05/09	16,600	16,900	mg/L	0.5	18,100
Chloride	30	03/16/10	03/18/10	16,000	16,000	mg/L	65	18,100
Chloride	31	10/13/10	10/21/10	15,900	15,400	mg/L	65	18,100
Chloride	32	05/11/11	05/27/11	15,900	15,300	mg/L	65	18,100
Chloride	33	09/21/11	09/26/11	15,000	16,200	mg/L	83	18,100
Chloride	34	05/01/12	05/02/12	16,900	**19,800**	mg/L	400	**18,100**
Chloride	35	05/21/13	05/22/13	14,300	14,700	mg/L	132	18,100



WQSP-5 Sulfate

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sulfate	1	11/20/95	11/27/95	5,370	5,380	mg/L	10.0	6,129
Sulfate	2	06/06/96	06/10/96	5,730	5,900	mg/L	2500.0	6,129
Sulfate	3	09/26/96	10/01/96	5,240	4,940	mg/L	2500.0	6,129
Sulfate	4	06/19/97	07/07/97	4,460	4,460	mg/L	2500.0	6,129
Sulfate	5	09/25/97	09/30/97	4,900	4,640	mg/L	2500.0	6,129
Sulfate	6	05/20/98	05/22/98	4,970	4,371	mg/L	0.0	6,129
Sulfate	7	10/07/98	10/13/98	5,400	5,000	mg/L	0.5	6,129
Sulfate	8	05/05/99	05/05/99	4,900	5,200	mg/L	0.5	6,129
Sulfate	9	10/27/99	10/28/99	4,300	4,300	mg/L	0.5	6,129
Sulfate	10	04/26/00	05/02/00	5,400	5,200	mg/L	0.5	6,129
Sulfate	26	04/02/08	04/10/08	4,690	4,660	mg/L	0.5	6,129
Sulfate	27	10/01/08	10/02/08	5,470	5,420	mg/L	0.5	6,129
Sulfate	28	03/18/09	04/10/09	5,330	5,420	mg/L	0.5	6,129
Sulfate	29	09/30/09	10/01/09	5,560	5,420	mg/L	0.5	6,129
Sulfate	30	03/16/10	03/18/10	5,760	5,700	mg/L	47	6,129
Sulfate	31	10/13/10	10/14/10	5,540	5,580	mg/L	47	6,129
Sulfate	32	05/11/11	05/12/11	5,480	5,580	mg/L	47	6,129
Sulfate	33	09/21/11	09/22/11	5,090	5,200	mg/L	14	6,129
Sulfate	34	05/01/12	05/02/12	5,430	5,240	mg/L	46	6,129
Sulfate	35	05/21/13	05/22/13	5,000	5,030	mg/L	47	6,129



WQSP-5

CHAIN OF CUSTODY FORMS

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130523025
Order Date: 5/23/2013

Contact Name: ANDY FREEMAN
Project Name: 1305865

Comment:

Sample #: 130523025-001 **Customer Sample #:** 1305865-001E / WQ5-C-R35

Recv'd: ☑ **Collector:** **Date Collected:** 5/21/2013
Quantity: 1 **Matrix:** Water **Date Received:** 5/23/2013 12:24:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)
ARSENIC BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)
SELENIUM BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)
THALLIUM BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)

Sample #: 130523025-002 **Customer Sample #:** 1305865-002E / WQ5-C-R35-DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 5/21/2013
Quantity: 1 **Matrix:** Water **Date Received:** 5/23/2013 12:24:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)
ARSENIC BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)
SELENIUM BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)
THALLIUM BY 6020A	M	EPA 6020A	6/4/2013	Normal (6-10 Days)

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB	**Order ID:**	130523025
	4901 HAWKINS NE SUITE D	**Order Date:**	5/23/2013
	ALBUQUERQUE NM 87109		
Contact Name:	ANDY FREEMAN	**Project Name:**	1305865
Comment:			

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	1.0
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP | Work Order Number: 1305865 | RcptNo: 1

Received by/date: AT 05/21/13

Logged By: Anne Thorne 5/22/2013 9:00:00 AM Anne Thorne

Completed By: Anne Thorne 5/22/2013 Anne Thorne

Reviewed By: AT 05/21/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	FedEx		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 4 (<2 or >12 unless noted)

Adjusted? _____

Checked by: AT 05/22/13

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
2	2.4	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1036

Page 1 of 1

Project Number:	Project Name:
T-409304-1	WIPP/DMP

Sampler(s): R. Jimenez, RA Spoon

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry	Comments
5/21/13	08:40	GW	GW-WQ5-C-R35-N1	6	X					use for MS/MSD -001
"	08:54	"	-N1D	4	X					-002
"	09:00	DI	-N2	4	X					Field Blanks -003
N/A	N/A	"	-N3	4	X					Trip Blanks, HEAL Provided -004 *
5/21/13	11:02	GW	-N4	4		X				use for MS/MSD -001
"	11:06	"	-N4D	2		X				-002
"	09:18	"	-N5	6			X			use for MS/MSD -001
"	09:38	"	-N5D	2			X			-002
"	09:07	"	-N6	2				X		use for MS/MSD -001
"	09:13	"	-N6D	2				X		-002
"	09:52	"	-N7	1					X	use for MS/MSD -001
"	09:54	"	-N7D	1					X	~~use~~ RMA 4/14/13 -002
						N/A				

Requested Analyses: VOC, TOC, SVOC, Metals, General Chemistry

Analytical Laboratory: HEAL-130585 Albuquerque, NM

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
Robin Alpon 5/21/13 14:30			
Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received at Laboratory: (Signature, Date/Time) 0900 5/22/13

Requested Turnaround Time: Report due ~~6/4/2013~~ 6/26/2013 5/21/13

☒ Routine ☐ Rush

Sample Receipt Remarks: 2 x 1 Ltr Ambers arrived broken at lab 2.4°C

Special Instructions: Analyze LCS in duplicate

Use primary GW Sample for MS/MSD on all parameters.

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: Fed Ex 8739 5711 7341, 8739 5711 7352

Results To:

Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8615 FAX: 575-234-6003
EDD: gregory.jungclaus@urs.com

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater

YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)

PINK – Record Copy
SE – Sediment
SO – Soil

SW – Surface Water
VG – Vegetation

* Note: 2 Trips blanks contained air bubbles

Form CofC/RFA, Rev. 0 – NICHOLS PRINTING, INC.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

Page 1 of 1

130523 025 HALL Last Due 6/4/2013
1st SAMP 5/21/2013 1st RCVD 5/23/2013
1305865

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1305865-001E	WQ5-C-R35	500HDPEHN 03	Aqueous	5/21/2013 8:40:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC
2	1305865-002E	WQ5-C-R35-Duplicate	500HDPEHN 03	Aqueous	5/21/2013 8:54:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC

MWBS

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 1.0 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3
NUMBER OF CONTAINERS: 2 SHIPPED VIA: F
DATE & TIME: 5/23/13 12:24 INSPECTED BY: BT

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb, Se, Tl BY METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. MUST DO MS/MSD ON 1305865-001E. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LCS REPLICATE. SAMPLE MAY HAVE HIGH TDS.

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
	5/23/2013	11:34 AM			
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ☒ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

REPORT TRANSMITTAL DESIRED:
☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY
Temp of samples ____ °C Attempt to Cool ? ____
Comments: ____

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APPENDIX 8

WELL WQSP-6

ANALYTICAL RESULTS

WQSP-6

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-6, Culebra, Round 35

DMW Characteristics

WQSP-6 is located 1627 feet FSL and 1461 feet FWL in sec. 29, T.22 S, R.31E in Eddy County, New Mexico. This location is approximately ¾-mile southwest from the center of the WIPP Site and downgradient of the shaft area. The ground elevation at WQSP-6 is 3361.61 feet above mean sea level (ft_{amsl}) and the top of casing (TOC) elevation is 3364.72 ft_{amsl}[1]. This DMW well, drilled for surveillance monitoring of groundwater quality and water level elevation monitoring between September 22 and October 4, 1994, is located in the Culebra Member of the Rustler Formation. The total depth of WQSP-6 is 617 feet below ground surface (ft_{bgs}). The well is cased with a fiberglass casing (5 inch od, 0.28 inch wall thickness) to 582 ft_{bgs} and screened with slotted fiberglass (0.020 inch) from 581 to 606 ft_{bgs}. An 11-foot blank casing is located below the screened interval from 606 to 617 ft_{bgs} and acts as a sediment sump to prevent clogging of the lower screen slots. The actual interval of the Culebra at WQSP-6 is 582 to 607 ft_{bgs} based on interpretation of the core logs[2].

According to the well construction and pre-pumping static water level (swl) measured in feet from below the TOC (ft_{btoc}), the sampling team used the following formula to calculate well bore volume (wbv).

$$wbv,\ gallons = [C \times ((\pi \times D^2/4) \times L)]$$

where:
C = conversion factor for pounds water/gallon (US liquid) to pounds of water/ft^3
D = inside diameter of fiberglass casing, ft
L = depth of water in column, ft
$Factor = [C \times (\pi \times D^2/4)]$

given:
total depth of well, ft_{btoc} = [*installation depth,* ft_{bgs} + (*top of casing,* ft_{amsl} - *ground surface elevation,* ft_{amsl})]
depth of water in column, ft (L) = (total depth of well, ft_{btoc} – *swl,* ft_{btoc})

More specifically, the wbv for WQSP-6 is calculated as follows:

wbv, gallons = (*Factor* x L) = (0.804 x L)

Prior to beginning the pumping process for Round 35, the static water level was 344.18 ft_{btoc}. One wbv for WQSP-6 was determined to be 221.9 gallons.

Field Sampling System

A dedicated sampling-system was installed in WQSP-6 on September 29, 1999. The system consists of a Grundfos 1.5-hp submersible pump (model 5S15-27) retrofitted with Kynar seals and a 3-phase, 230 volt (ac), 3-hp submersible motor. Prior to Round 20 sampling (2005), the pump/motor assembly was lowered an additional 18 feet from its original installation depth (578 ft_{bgs}), placing the pump intake near the center of the well screen (approximately 596 ft_{bgs}). A separate sampling line was installed just above the pump discharge and a bubbler system installed 5 feet above the top of the pump that previously enabled formation pressure monitoring in the well bore column during sampling. The bubbler system was eliminated in the recent PMR and formation pressures are no longer monitored during the pumping event.

---

[1] Elevations (Ground and TOC) obtained from December 13, 2006 survey.
[2] DOE/WIPP 95-2154, *Basic Data Report for WQSP 1* and Culebra Mid-Depths – Revision 2 (R. Salness).

Round 35 pumping of WQSP-6 began on 5/1/2013 at 09:23 and ended on 5/2/2013 at 11:53. The well was purged for 26.5 hours with an average flow rate of 0.29 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 461 gallons. The purging and sampling schedule for WQSP-6 was advanced 2-weeks due to a pump failure at another DMW.

Measurement of Field Parameters and Well Stability Criteria

Field measurements were obtained using an in-line, multi-probe flow cell sampling system (Geotech Environmental Equipment, Inc.) with a 40-mL cell volume. This self-contained sampling system is capable of handling flow rates between 100 mL/min to one gpm (3.8 liters/min). Measurements were obtained directly from the groundwater sample stream that passes through this system at 5-minute intervals for specific conductance (SC), temperature and pH. Specific gravity (SG) was determined in samples collected from the flow-cell discharge stream and analyzed using classical hydrometer techniques. The flow cell was purged for at least 15 minutes prior to beginning sequential measurements.

Flow cell exchange rates were calculated periodically to verify measurements were obtained on fresh-flowing groundwater and not from stagnant groundwater in the well column. Exchange rates (cell volumes per minute) were determined by measuring the volume of groundwater (mL) passed through the sampling system during a one-minute interval and dividing that value by the volume of the cell (40 mL).

Changes to the field-testing methodology also led to new well stability criteria being established. Well stability was determined using data provided from field measurements. Stability of the DMW, as defined in the PMR, states that each well will be purged no more than three wbv, or until field parameters stabilize, whichever occurs first. The main purpose for collecting sequential measurements is to determine when the groundwater chemistry stabilizes. Parameters are stable when individual values for all parameters were within 5% for three consecutive measurements. At that point, purged water from the DMW is considered representative of the undisturbed groundwater found in the formation and DMP sampling for hazardous constituents is allowed.

Detection Monitoring Program Sampling

Samples for DMP hazardous constituents were collected on 5/2/2013 after approximately 418 gallons of groundwater (≈ 1.9 wbv) had been purged from WQSP-6 and all field measurements suggested the well was stable. Removal of the in-line flow cell occured prior to DMP sampling and a clean, dedicated filter holder assembly was installed at the end of the dedicated sample line. Samples (filtered or unfiltered) were collected using techniques described in the DMP and placed under Chain of Custody. Samples for hazardous constituent analysis were shipped via FedEx to Hall Environmental Analysis Laboratory, Inc., in Albuquerque, NM. Samples for radionuclide analysis were collected and hand-delivered to the URS-PS WIPP Laboratory located at Carlsbad Environmental Monitoring Research Center in Carlsbad, NM. A sample retain, preserved with nitric acid (to pH < 2), was collected and placed under Chain of Custody in the event that additional metals or radionuclide analyses were required. The final sample checklist summarized the samples collected, laboratory destination, preservatives used, sample quantities, container type, sampling times, and sample team members. This checklist and other records related to the integrity of the DMP sampling event are located in the DMW data package.

Results and Discussion

Table 1 provides the pumping characteristics and field parameter results for WQSP-6. Pump speeds were identical and groundwater flow rates similar to those observed in previous rounds. On day 1, approximately 740 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 18.5 cell volumes per minute; thus, approximately 92.5 volumes of groundwater (3,700 mL) passed through the in-line flow cell between measurements. Table 1 provides the initial and final measurements obtained on each field-indicating parameter. On day 1, SC, temperature and pH were consistently less than 5% over the last three measurements within 15 minutes. Specific gravity was stable after the third measurement (approximately 53 minute). Based on results observed, the sample team proceeded with DMP hazardous and radiological constituents sampling at WQSP-6 on day 2.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-6 DMW, Round 35[a,b,c].

Item	Day 1		Day 2		Day 3	
Date	5/1/2013		5/2/2013		NR	
Pump Speed, Hz	50.0 / 52.0		52.0		NR	
Average Flow Rate, gpm	0.41		0.26		NR	
Rate of Exchange, no. cell	18.5		NR		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	23,800	25,150	NR	NR	NR	NR
Temperature, °C	25.0	25.2	NR	NR	NR	NR
pH, SU	7.83	7.96	NR	NR	NR	NR
Specific Gravity	1.013	1.013	NR	NR	NR	NR
Time to Parameter Stability, hr:min	0:25		NR		NR	

[a]Data represent the first and last measurement taken within each respective day.
[b]DMW considered stable (representative of undisturbed formation groundwater) when each parameter is within ±5 percent for three consecutive readings.
[c]NR = no measurement taken; not required.

From a historical perspective, indicating parameters currently measured in Round 35 were compared to the average results from the previous 34 rounds (Table 2). The current value for SG (1.013) was similar to the average results from the previous rounds (1.014). The results for SC (25,150 µmhos/cm), temperature (25.2°C) and pH (7.96 S.U.) were slightly higher compared to the previous rounds (21,529 µmhos/cm, 21.5°C and 7.85 S.U. for SC, temperature and pH, respectively). Specific gravity and pH were within the normal limits observed for WQSP-6 over the past 16.5 years; however, SC and temperature were outside these limits.

Table 2. Comparison of Round 35 DMW Measurements to Historical Results from Rounds (1-34) for WQSP-6.

Field-analyzed Parameter	Historical Data (Rounds 1 – 34)[a,b]			Measurement Results, Round 35[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	21,529	20,453	22,605	25,150
Temperature, °C	21.5	20.4	22.6	25.2
pH, S.U.	7.85	7.46	8.24	7.96
Specific Gravity	1.014	0.963	1.065	1.013

[a] Historical data obtained from serial samples collected on day 3 for each round.
[b] Historical limits calculated from the mean ($\bar{x}$) ± 5 percent.
[c] Current data represent the final measurement taken when well stability confirmed by sampling team.

Abbreviations, Acronyms and Units

ac	alternating current
ft_{amsl}	feet above mean sea level
ft_{bgs}	feet below ground surface
ft_{btoc}	feet below top of casing
DMP	Detection Monitoring Program
DMW	detection monitoring well
FEL	from east line
FNL	from north line
FSL	from south line
FWL	from west line
gpm	gallons per minute
hp	horsepower
od	outside diameter
NNE	north-northeast
PMR	Permit Modification Request
swl	static water level
URS-PS	Universal Research Services-Professional Solutions
wbv	well bore volume
WIPP	Waste Isolation Pilot Plant
WQSP	Water Quality Sampling Program, well ID

WQSP-6

LABORATORY DATA AND QA/QC SUMMARY REPORTS

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

June 27, 2013

Greg Jungclaus
WIPP
P.O. Box 2078
Carlsbad, NM 88221-2078
TEL: (575) 234-8615
FAX

RE: WIPP DMP

OrderNo.: 1305121

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 6 sample(s) on 5/3/2013 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1305121**

27-Jun-13

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1305121-001	WQ6-C-R35		5/2/2013 9:00:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-001	WQ6-C-R35		5/2/2013 9:00:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-001	WQ6-C-R35		5/2/2013 9:00:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-001	WQ6-C-R35		5/2/2013 9:00:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-001	WQ6-C-R35		5/2/2013 9:00:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-001	WQ6-C-R35		5/2/2013 9:00:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-002	WQ6-C-R35-Duplicate		5/2/2013 9:28:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-002	WQ6-C-R35-Duplicate		5/2/2013 9:28:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-002	WQ6-C-R35-Duplicate		5/2/2013 9:28:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-002	WQ6-C-R35-Duplicate		5/2/2013 9:28:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-002	WQ6-C-R35-Duplicate		5/2/2013 9:28:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-002	WQ6-C-R35-Duplicate		5/2/2013 9:28:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-003	WQ6-C-R35-Field Blank		5/2/2013 10:17:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-004	WQ6-C-R35-Trip Blank			5/3/2013 12:16:51 PM	Trip Blank
1305121-005	WQ6-C-R35-METALS BLANK PRESERVED		5/2/2013 9:20:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-005	WQ6-C-R35-METALS BLANK PRESERVED		5/2/2013 9:20:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-006	WQ6-C-R35-METALS BLANK UNPRESERVED		5/2/2013 9:20:00 AM	5/3/2013 12:16:51 PM	Aqueous
1305121-006	WQ6-C-R35-METALS BLANK UNPRESERVED		5/2/2013 9:20:00 AM	5/3/2013 12:16:51 PM	Aqueous

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

DATES REPORT

WO#: **1305121**

07-Aug-13

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1305121-001A	WQ6-C-R35	5/2/2013 9:00:00 AM	Aqueous	EPA Method: 8260B			5/3/2013 1:53:26 PM
1305121-001B				SM 5310B: TOC			5/8/2013 9:52:32 AM
1305121-001C				EPA Method 8270C: Semivolatiles		5/6/2013 9:23:26 AM	5/7/2013 12:49:42 PM
1305121-001D				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:47:38 PM
				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 12:51:21 PM
				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:22:38 PM
				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:44:38 PM
				EPA Method 7470: Mercury		5/20/2013 9:22:42 AM	5/21/2013 10:36:58 AM
1305121-001F				EPA Method 300.0: Anions			5/3/2013 3:47:48 PM
				EPA Method 300.0: Anions			5/3/2013 4:37:27 PM
				EPA Method 300.0: Anions			5/3/2013 4:25:02 PM
				EPA Method 6010B: Dissolved Metals			5/7/2013 11:23:01 AM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:55:52 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:17:03 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 3:53:33 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:14:16 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:19:49 PM
				SM 2540 C: Total Dissolved Solids		5/7/2013 10:24:57 AM	5/8/2013 5:20:00 PM
				SM 2540D: TSS		5/7/2013 2:54:09 PM	5/7/2013 3:21:00 PM
				SM2320B: Alkalinity			5/6/2013 4:49:21 PM
				SM2510B: Specific Conductance			5/7/2013 5:40:13 PM
				SM2510B: Specific Conductance			5/6/2013 4:49:21 PM
				SM4500-H+B: pH			5/6/2013 4:49:21 PM

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DATES REPORT

WO#: **1305121**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1305121-001F	WQ6-C-R35	5/2/2013 9:00:00 AM	Aqueous	Specific Gravity			5/14/2013 1:30:00 PM
1305121-002A	WQ6-C-R35-Duplicate	5/2/2013 9:28:00 AM		EPA Method: 8260B			5/3/2013 2:23:17 PM
1305121-002B				SM 5310B: TOC			5/8/2013 10:39:37 AM
1305121-002C				EPA Method 8270C: Semivolatiles		5/6/2013 9:23:26 AM	5/7/2013 1:20:40 PM
1305121-002D				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:50:25 PM
				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 2:11:08 PM
				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:31:34 PM
				EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:00:00 PM
				EPA Method 7470: Mercury		5/20/2013 9:22:42 AM	5/21/2013 10:42:20 AM
1305121-002F				EPA Method 300.0: Anions			5/3/2013 4:49:52 PM
				EPA Method 300.0: Anions			5/3/2013 5:02:16 PM
				EPA Method 300.0: Anions			5/3/2013 5:14:41 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:36:39 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:39:24 PM
				EPA Method 6010B: Dissolved Metals			5/3/2013 8:33:54 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 4:10:40 PM
				EPA Method 6010B: Dissolved Metals			5/6/2013 4:13:37 PM
				EPA Method 6010B: Dissolved Metals			5/7/2013 11:26:00 AM
				SM 2540 C: Total Dissolved Solids		5/7/2013 10:24:57 AM	5/8/2013 5:20:00 PM
				SM 2540D: TSS		5/7/2013 2:54:09 PM	5/7/2013 3:21:00 PM
				SM2320B: Alkalinity			5/6/2013 4:56:38 PM
				SM2510B: Specific Conductance			5/7/2013 5:44:23 PM
				SM2510B: Specific Conductance			5/6/2013 4:56:38 PM

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DATES REPORT

WO#: **1305121**

07-Aug-13

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1305121-002F	WQ6-C-R35-Duplicate	5/2/2013 9:28:00 AM	Aqueous	SM4500-H+B: pH			5/6/2013 4:56:38 PM
				Specific Gravity			5/14/2013 1:30:00 PM
1305121-003A	WQ6-C-R35-Field Blank	5/2/2013 10:17:00 AM		EPA Method: 8260B			5/3/2013 2:52:05 PM
1305121-004A	WQ6-C-R35-Trip Blank		Trip Blank	EPA Method: 8260B			5/3/2013 3:21:11 PM
1305121-005A	WQ6-C-R35-METALS BLANK PRESERVED	5/2/2013 9:20:00 AM	Aqueous	EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:02:53 PM
				EPA Method 7470: Mercury		5/20/2013 9:22:42 AM	5/21/2013 10:44:08 AM
1305121-006A	WQ6-C-R35-METALS BLANK UNPRESERVED			EPA 6010B: Total Recoverable Metals		5/7/2013 4:02:53 PM	5/9/2013 1:05:43 PM
				EPA Method 7470: Mercury		5/20/2013 9:22:42 AM	5/21/2013 10:45:56 AM

All analytes reported are associated with passing CCVs.

METHOD: 8260B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 5030
Analysis: 8260B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 8270C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3510
Analysis: 8270C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Surrogates: All acceptance criteria were met.
5. Spikes: All acceptance criteria were met.

6. Samples: All acceptance criteria were met.

METHOD: 6010B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 3005
Analysis: 6010B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Internal Standards: All acceptance criteria were met.
4. Duplicates: All acceptance criteria were met.
5. Spikes: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: 7470
Analysis: 7470

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 300.0

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 300.0

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Spikes: All acceptance criteria were met.
5. Samples: All acceptance criteria were met.

METHOD: SM5310C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM5310C
Analysis: SM5310C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Spikes: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: 120.1

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: 120.1

CLIENT: WIPP
Project: WIPP DMP

PREPARATION: none

ANALYSIS:
1. Samples: All acceptance criteria were met.
2. Duplicates: All acceptance criteria were met.

METHOD: SM 2320B

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM 2320B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Calibration: All acceptance criteria were met.
2. Blanks: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540C

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540C
Analysis: SM2540C

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM2540D
HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM2540D
Analysis: SM2540D

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

METHOD: SM4500H+ B

HOLDING TIMES: The most recent method lists the pH holding time as 15 minutes. All samples will be flagged with an "H".

METHOD: Preparations: none
Analysis: SM4500H+ B

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM2710F

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: none
Analysis: SM2710F

PREPARATION: Sample preparation proceeded normally.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Case Narrative

WO#: **1305121**
Date: **6/27/2013**

CLIENT: WIPP
Project: WIPP DMP

ANALYSIS:
1. Duplicates: All acceptance criteria were met.
2. Samples: All acceptance criteria were met.

METHOD: SM4500 NorgC

HOLDING TIMES: All holding times for Preparation and Analysis were met.

METHOD: Preparations: SM4500 NorgC
Analysis: SM4500 NorgC

PREPARATION: Sample preparation proceeded normally.

ANALYSIS:
1. Blanks: All acceptance criteria were met.
2. Spikes: All acceptance criteria were met.
3. Duplicates: All acceptance criteria were met.
4. Samples: All acceptance criteria were met.

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-001 **Matrix:** AQUEOUS

Client Sample ID: WQ6-C-R35
Collection Date: 5/2/2013 9:00:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	5010	132	1000		mg/L	2000	5/3/2013 4:37:27 PM	R10310
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	5/3/2013 3:47:48 PM	R10310
Sulfate	4640	46.7	100		mg/L	200	5/3/2013 4:25:02 PM	R10310
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.0000886	0.000200		mg/L	1	5/21/2013 10:36:58 AM	7507
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	675	0.558	10.0		mg/L	10	5/7/2013 11:23:01 AM	R10449
Magnesium	199	0.0829	10.0		mg/L	10	5/6/2013 3:53:33 PM	R10423
Potassium	147	0.497	10.0		mg/L	10	5/6/2013 3:53:33 PM	R10423
Sodium	4260	8.04	100		mg/L	100	5/6/2013 3:55:52 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0112	0.000500	0.0200	J	mg/L	1	5/9/2013 12:51:21 PM	7337
Beryllium	0.000640	0.000500	0.00300	J	mg/L	1	5/9/2013 12:51:21 PM	7337
Cadmium	ND	0.000800	0.00200		mg/L	1	5/9/2013 12:51:21 PM	7337
Calcium	648	0.0910	10.0		mg/L	10	5/9/2013 1:44:38 PM	7337
Chromium	ND	0.00150	0.00600		mg/L	1	5/9/2013 12:51:21 PM	7337
Iron	0.190	0.0103	0.0500		mg/L	1	5/9/2013 12:51:21 PM	7337
Lead	ND	0.00340	0.00500		mg/L	1	5/9/2013 12:51:21 PM	7337
Magnesium	189	0.0475	5.00		mg/L	5	5/9/2013 1:22:38 PM	7337
Nickel	ND	0.00140	0.0100		mg/L	1	5/9/2013 12:51:21 PM	7337
Potassium	149	1.09	5.00		mg/L	5	5/9/2013 1:22:38 PM	7337
Silver	ND	0.00110	0.00500		mg/L	1	5/9/2013 12:51:21 PM	7337
Sodium	4520	50.9	100		mg/L	100	5/9/2013 1:47:38 PM	7337
Vanadium	0.00509	0.00350	0.0500	J	mg/L	1	5/9/2013 12:51:21 PM	7337
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
Hexachloroethane	ND	2.91	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
2-Methylphenol	ND	2.71	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
Nitrobenzene	ND	2.91	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
Pentachlorophenol	ND	1.44	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
Pyridine	ND	3.53	5.00		µg/L	1	5/7/2013 12:49:42 PM	7300
Surr: 2,4,6-Tribromophenol	97.5	0	41.5-117		%REC	1	5/7/2013 12:49:42 PM	7300
Surr: 2-Fluorobiphenyl	76.2	0	29.1-112		%REC	1	5/7/2013 12:49:42 PM	7300

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ6-C-R35
Project: WIPP DMP
Collection Date: 5/2/2013 9:00:00 AM
Lab ID: 1305121-001
Matrix: AQUEOUS
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	59.9	0	11.9-98.6		%REC	1	5/7/2013 12:49:42 PM	7300
Surr: 4-Terphenyl-d14	90.9	0	46-111		%REC	1	5/7/2013 12:49:42 PM	7300
Surr: Nitrobenzene-d5	79.9	0	34.9-112		%REC	1	5/7/2013 12:49:42 PM	7300
Surr: Phenol-d5	44.7	0	17.5-88.3		%REC	1	5/7/2013 12:49:42 PM	7300
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Benzene	ND	0.517	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Toluene	ND	0.441	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
2-Butanone	ND	1.00	5.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Chloroform	ND	0.469	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Methylene Chloride	ND	0.423	3.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Vinyl chloride	ND	0.333	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/3/2013 1:53:26 PM	R10314
Surr: 1,2-Dichloroethane-d4	88.3	0	70-130		%REC	1	5/3/2013 1:53:26 PM	R10314
Surr: 4-Bromofluorobenzene	98.1	0	69.5-130		%REC	1	5/3/2013 1:53:26 PM	R10314
Surr: Dibromofluoromethane	91.8	0	70-130		%REC	1	5/3/2013 1:53:26 PM	R10314
Surr: Toluene-d8	91.7	0	70-130		%REC	1	5/3/2013 1:53:26 PM	R10314
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.612	0.227	1.00	J	mg/L	1	5/8/2013 9:52:32 AM	R10490
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	15000	503	1000	*	mg/L	1	5/8/2013 5:20:00 PM	7321
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	25000	0.050	0.050		µmhos/c	5	5/7/2013 5:40:13 PM	R10477
SM4500-H+B: PH							Analyst: **JML**	
pH	7.66	0.100	1.68	H	pH units	1	5/6/2013 4:49:21 PM	R10425

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-001
Matrix: AQUEOUS
Client Sample ID: WQ6-C-R35
Collection Date: 5/2/2013 9:00:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	48.2	5.00	20.0		mg/L CaC	1	5/6/2013 4:49:21 PM	R10425
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/6/2013 4:49:21 PM	R10425
Total Alkalinity (as CaCO3)	48.2	5.00	20.0		mg/L CaC	1	5/6/2013 4:49:21 PM	R10425
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.007	0	0			1	5/14/2013 1:30:00 PM	R10596
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	9.00	1.53	4.00		mg/L	1	5/7/2013 3:21:00 PM	7334

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-002
Matrix: AQUEOUS
Client Sample ID: WQ6-C-R35-Duplicate
Collection Date: 5/2/2013 9:28:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	4720	132	1000		mg/L	2000	5/3/2013 5:14:41 PM	R10310
Nitrogen, Nitrate (As N)	ND	1.13	5.00		mg/L	50	5/3/2013 4:49:52 PM	R10310
Sulfate	4610	46.7	100		mg/L	200	5/3/2013 5:02:16 PM	R10310
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.0000886	0.000200		mg/L	1	5/21/2013 10:42:20 AM	7507
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **JLF**	
Calcium	671	0.558	10.0		mg/L	10	5/7/2013 11:26:00 AM	R10449
Magnesium	201	0.0829	10.0		mg/L	10	5/6/2013 4:10:40 PM	R10423
Potassium	150	0.497	10.0		mg/L	10	5/6/2013 4:10:40 PM	R10423
Sodium	4280	8.04	100		mg/L	100	5/6/2013 4:13:37 PM	R10423
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.0103	0.000500	0.0200	J	mg/L	1	5/9/2013 1:00:00 PM	7337
Beryllium	0.000530	0.000500	0.00300	J	mg/L	1	5/9/2013 1:00:00 PM	7337
Cadmium	ND	0.000800	0.00200		mg/L	1	5/9/2013 1:00:00 PM	7337
Calcium	614	0.0910	10.0		mg/L	10	5/9/2013 1:50:25 PM	7337
Chromium	ND	0.00150	0.00600		mg/L	1	5/9/2013 1:00:00 PM	7337
Iron	0.166	0.0103	0.0500		mg/L	1	5/9/2013 1:00:00 PM	7337
Lead	ND	0.00340	0.00500		mg/L	1	5/9/2013 1:00:00 PM	7337
Magnesium	185	0.0475	5.00		mg/L	5	5/9/2013 1:31:34 PM	7337
Nickel	ND	0.00140	0.0100		mg/L	1	5/9/2013 1:00:00 PM	7337
Potassium	148	1.09	5.00		mg/L	5	5/9/2013 1:31:34 PM	7337
Silver	ND	0.00110	0.00500		mg/L	1	5/9/2013 1:00:00 PM	7337
Sodium	4330	50.9	100		mg/L	100	5/9/2013 2:11:08 PM	7337
Vanadium	0.00402	0.00350	0.0500	J	mg/L	1	5/9/2013 1:00:00 PM	7337
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	3.00	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
1,4-Dichlorobenzene	ND	3.57	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
2,4-Dinitrophenol	ND	3.20	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
2,4-Dinitrotoluene	ND	2.84	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
Hexachlorobenzene	ND	2.66	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
Hexachloroethane	ND	2.91	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
2-Methylphenol	ND	2.71	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
3+4-Methylphenol	ND	3.74	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
Nitrobenzene	ND	2.91	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
Pentachlorophenol	ND	1.44	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
Pyridine	ND	3.53	5.00		µg/L	1	5/7/2013 1:20:40 PM	7300
Surr: 2,4,6-Tribromophenol	81.4	0	41.5-117		%REC	1	5/7/2013 1:20:40 PM	7300
Surr: 2-Fluorobiphenyl	67.3	0	29.1-112		%REC	1	5/7/2013 1:20:40 PM	7300

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-002 **Matrix:** AQUEOUS

Client Sample ID: WQ6-C-R35-Duplicate
Collection Date: 5/2/2013 9:28:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorophenol	49.0	0	11.9-98.6		%REC	1	5/7/2013 1:20:40 PM	7300
Surr: 4-Terphenyl-d14	80.5	0	46-111		%REC	1	5/7/2013 1:20:40 PM	7300
Surr: Nitrobenzene-d5	66.5	0	34.9-112		%REC	1	5/7/2013 1:20:40 PM	7300
Surr: Phenol-d5	37.0	0	17.5-88.3		%REC	1	5/7/2013 1:20:40 PM	7300
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Benzene	ND	0.517	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Toluene	ND	0.441	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
2-Butanone	ND	1.00	5.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Chloroform	ND	0.469	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Methylene Chloride	ND	0.423	3.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Vinyl chloride	ND	0.333	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/3/2013 2:23:17 PM	R10314
Surr: 1,2-Dichloroethane-d4	88.8	0	70-130		%REC	1	5/3/2013 2:23:17 PM	R10314
Surr: 4-Bromofluorobenzene	100	0	69.5-130		%REC	1	5/3/2013 2:23:17 PM	R10314
Surr: Dibromofluoromethane	90.3	0	70-130		%REC	1	5/3/2013 2:23:17 PM	R10314
Surr: Toluene-d8	91.8	0	70-130		%REC	1	5/3/2013 2:23:17 PM	R10314
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.601	0.227	1.00	J	mg/L	1	5/8/2013 10:39:37 AM	R10490
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	14600	503	1000	*	mg/L	1	5/8/2013 5:20:00 PM	7321
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	24000	0.050	0.050		µmhos/c	5	5/7/2013 5:44:23 PM	R10477
SM4500-H+B: PH							Analyst: **JML**	
pH	7.71	0.100	1.68	H	pH units	1	5/6/2013 4:56:38 PM	R10425

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-002

Client Sample ID: WQ6-C-R35-Duplicate
Collection Date: 5/2/2013 9:28:00 AM
Matrix: AQUEOUS **Received Date:** 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	47.9	5.00	20.0		mg/L CaC	1	5/6/2013 4:56:38 PM	R10425
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/6/2013 4:56:38 PM	R10425
Total Alkalinity (as CaCO3)	47.9	5.00	20.0		mg/L CaC	1	5/6/2013 4:56:38 PM	R10425
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.007	0	0			1	5/14/2013 1:30:00 PM	R10596
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	10.0	1.53	4.00		mg/L	1	5/7/2013 3:21:00 PM	7334

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
E	Value above quantitation range
J	Analyte detected below quantitation limits
O	RSD is greater than RSDlimit
R	RPD outside accepted recovery limits
B	Analyte detected in the associated Method Blank
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
P	Sample pH greater than 2 for VOA and TOC only.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-003 **Matrix:** AQUEOUS

Client Sample ID: WQ6-C-R35-Field Blank
Collection Date: 5/2/2013 10:17:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Benzene	ND	0.517	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Toluene	ND	0.441	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
2-Butanone	7.70	1.00	5.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Chloroform	ND	0.469	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Methylene Chloride	ND	0.423	3.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Vinyl chloride	ND	0.333	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/3/2013 2:52:05 PM	R10314
Surr: 1,2-Dichloroethane-d4	91.0	0	70-130		%REC	1	5/3/2013 2:52:05 PM	R10314
Surr: 4-Bromofluorobenzene	97.1	0	69.5-130		%REC	1	5/3/2013 2:52:05 PM	R10314
Surr: Dibromofluoromethane	91.0	0	70-130		%REC	1	5/3/2013 2:52:05 PM	R10314
Surr: Toluene-d8	90.1	0	70-130		%REC	1	5/3/2013 2:52:05 PM	R10314

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ6-C-R35-Trip Blank
Project: WIPP DMP
Collection Date:
Lab ID: 1305121-004
Matrix: TRIP BLANK
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	2.04	5.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Benzene	ND	0.517	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Toluene	ND	0.441	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
1,2-Dichloroethane (EDC)	ND	0.379	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
2-Butanone	ND	1.00	5.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Carbon Tetrachloride	ND	0.458	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Chlorobenzene	ND	0.486	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Chloroform	ND	0.469	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
cis-1,2-DCE	ND	0.469	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
1,1-Dichloroethane	ND	0.485	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
1,1-Dichloroethene	ND	0.477	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Methylene Chloride	ND	0.423	3.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
1,1,2,2-Tetrachloroethane	ND	0.518	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Tetrachloroethene (PCE)	ND	0.488	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
trans-1,2-DCE	ND	0.365	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
1,1,1-Trichloroethane	ND	0.402	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
1,1,2-Trichloroethane	ND	0.415	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Trichloroethene (TCE)	ND	0.424	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Trichlorofluoromethane	ND	0.471	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Vinyl chloride	ND	0.333	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Xylenes, Total	ND	1.44	1.00		µg/L	1	5/3/2013 3:21:11 PM	R10314
Surr: 1,2-Dichloroethane-d4	83.9	0	70-130		%REC	1	5/3/2013 3:21:11 PM	R10314
Surr: 4-Bromofluorobenzene	99.3	0	69.5-130		%REC	1	5/3/2013 3:21:11 PM	R10314
Surr: Dibromofluoromethane	88.0	0	70-130		%REC	1	5/3/2013 3:21:11 PM	R10314
Surr: Toluene-d8	87.6	0	70-130		%REC	1	5/3/2013 3:21:11 PM	R10314

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-005 **Matrix:** AQUEOUS

Client Sample ID: WQ6-C-R35-METALS BLANK
Collection Date: 5/2/2013 9:20:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.0000886	0.000200		mg/L	1	5/21/2013 10:44:08 AM	7507
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	0.00102	0.000500	0.0200	J	mg/L	1	5/9/2013 1:02:53 PM	7337
Beryllium	ND	0.000500	0.00300		mg/L	1	5/9/2013 1:02:53 PM	7337
Cadmium	0.000900	0.000800	0.00200	J	mg/L	1	5/9/2013 1:02:53 PM	7337
Calcium	0.0883	0.00910	1.00	J	mg/L	1	5/9/2013 1:02:53 PM	7337
Chromium	ND	0.00150	0.00600		mg/L	1	5/9/2013 1:02:53 PM	7337
Iron	ND	0.0103	0.0500		mg/L	1	5/9/2013 1:02:53 PM	7337
Lead	0.00344	0.00340	0.00500	J	mg/L	1	5/9/2013 1:02:53 PM	7337
Magnesium	0.0369	0.00950	1.00	J	mg/L	1	5/9/2013 1:02:53 PM	7337
Nickel	ND	0.00140	0.0100		mg/L	1	5/9/2013 1:02:53 PM	7337
Potassium	ND	0.217	1.00		mg/L	1	5/9/2013 1:02:53 PM	7337
Silver	ND	0.00110	0.00500		mg/L	1	5/9/2013 1:02:53 PM	7337
Sodium	0.658	0.509	1.00	J	mg/L	1	5/9/2013 1:02:53 PM	7337
Vanadium	ND	0.00350	0.0500		mg/L	1	5/9/2013 1:02:53 PM	7337

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1305121-006 **Matrix:** AQUEOUS

Client Sample ID: WQ6-C-R35-METALS BLANK
Collection Date: 5/2/2013 9:20:00 AM
Received Date: 5/3/2013 9:00:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **IDC**	
Mercury	ND	0.0000886	0.000200		mg/L	1	5/21/2013 10:45:56 AM	7507
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **JLF**	
Barium	ND	0.000500	0.0200		mg/L	1	5/9/2013 1:05:43 PM	7337
Beryllium	ND	0.000500	0.00300		mg/L	1	5/9/2013 1:05:43 PM	7337
Cadmium	0.000860	0.000800	0.00200	J	mg/L	1	5/9/2013 1:05:43 PM	7337
Calcium	0.0826	0.00910	1.00	J	mg/L	1	5/9/2013 1:05:43 PM	7337
Chromium	ND	0.00150	0.00600		mg/L	1	5/9/2013 1:05:43 PM	7337
Iron	ND	0.0103	0.0500		mg/L	1	5/9/2013 1:05:43 PM	7337
Lead	0.00358	0.00340	0.00500	J	mg/L	1	5/9/2013 1:05:43 PM	7337
Magnesium	0.0389	0.00950	1.00	J	mg/L	1	5/9/2013 1:05:43 PM	7337
Nickel	ND	0.00140	0.0100		mg/L	1	5/9/2013 1:05:43 PM	7337
Potassium	ND	0.217	1.00		mg/L	1	5/9/2013 1:05:43 PM	7337
Silver	ND	0.00110	0.00500		mg/L	1	5/9/2013 1:05:43 PM	7337
Sodium	ND	0.509	1.00		mg/L	1	5/9/2013 1:05:43 PM	7337
Vanadium	ND	0.00350	0.0500		mg/L	1	5/9/2013 1:05:43 PM	7337

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

CATION/ANION BALANCE SHEET FOR WATER ANALYSES

HEAL LAB NUMBER	WQ6-C-R35 1305121-01		WQ6-C-R35 Duplicate 1305121-02									
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	4260	185.30	4280	186.17								
Potassium	147	3.76	150	3.84								
Calcium	675	33.68	671	33.48								
Magnesium	199	16.38	201	16.54								
Total Cations		239.12		240.03								
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	4640	96.61	4610	95.98								
Chloride	5010	141.33	4720	133.15								
Bicarbonate (CaCO3)	48.2	0.96	47.9	0.96								
Carbonate (CaCO3)												
Phosphate (P)												
Nitrite (N)												
Nitrate (N)												
Fluoride												
Bromide												
Total Anions		238.90		230.08								
Elect. Cond. (µMhos/cm)	25000		24000									
CATION/ANION RATIO		1.00		1.04								
% Difference		0		2								
TOTAL DISSOLVED SOLIDS RATIOS												
TDS (measured)	15000		14600									
TDS (calculated)	14960		14661									
Ratio meas TDS:calc TDS		1.0		1.0								
Ratio Meas. TDS:EC		0.60		0.61								
Ratio Calc. TDS:EC		0.60		0.61								
Ratio of anion sum:EC		1.0		1.0								
Ratio of cation sum:EC		1.0		1.0								

* Analyte not detected (below method detection limit).

** Values below 0.55 can be obtained in waters containing appreciable concentrations of free acid or alkalinity, or not within pH 6 to 9. Values much higher than 0.7 are possible in highly saline waters.

GENERALLY ACCEPTED RANGES

Cation/Anion balance: 0-3 meq/L- 0.2 meq/L, 3-10 meq/L- 2%, >10 meq/L - 5%

Ratio measured TDS:calculated TDS -- 1.0-1.2. Ratio Calculated TDS:EC – 0.55-0.7. Ratio Measured TDS:EC--0.55-0.7. Ratio of anion sum:EC -- 0.9-1.1.

Ratio of cation sum:EC – 0.9-1.1

CASE NARRATIVE May 31, 2013

Lab Name: Anatek Labs, Inc. 1282 Alturas Drive, Moscow, ID 83843 www.anateklabs.com *FL NELAP E87893, NV ID13-2004-31, WA DOE C126, OR ELAP ID200001, MT 0028, ID, CO, NM*

Project Tracking No.: 1305121
Anatek Batch: 130507043

Project Summary: Four (4) water samples were received on 5/7/2013 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 2.9C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1305121-001E / WQ6-C-R35	130507043-001	EPA 6020A
1305121-002E / WQ6-C-R35-Duplicate	130507043-002	EPA 6020A
1305121-005B / WQ6-C-R35-Metals Blank Preserved	130507043-003	EPA 6020A
1305121-006B / WQ6C-R35-Metals Blank Unpreserved	130507043-004	EPA 6020A

QA/QC Checks

Parameters	Yes / No	Exceptions / Deviations
Sample Holding Time Valid?	Y	NA
Surrogate Recoveries Valid?	NA	NA
QC Sample(s) Recoveries Valid?	Y	NA
Method Blank(s) Valid?	Y	NA
Tune(s) Valid?	Y	NA
Internal Standard Responses Valid?	Y	NA
Initial Calibration Curve(s) Valid?	Y	NA
Continuing Calibration(s) Valid?	Y	NA
Comments:	Y	NA

1. **Holding Time Requirements**

   No problems encountered.

2. **GC/MS Tune Requirements**

   No problems encountered.

3. **Calibration Requirements**

   No problems encountered.

4. **Surrogate Recovery Requirements**

   No problems encountered.

5. **QC Sample (LCS/MS/MSD) Recovery Requirements**

   No problems encountered.

6. Method Blank Requirements

The method blanks were non-detect (<MDL) for all analytes. No problems encountered.

7. Internal Standard(s) Response Requirements

N/A

8. Comments

Samples -001 and -002 required dilution due to matrix.

I certify that this data package is in compliance with the terms and conditions of the contract. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee.

Approved by: John. Coll

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130507043
Project Name: 1305121

Analytical Results Report

Sample Number 130507043-001 **Sampling Date** 5/2/2013 **Date/Time Received** 5/7/2013 12:10 PM
Client Sample ID 1305121-001E / WQ6-C-R35 **Sampling Time** 9:00 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	

Sample Number 130507043-002 **Sampling Date** 5/2/2013 **Date/Time Received** 5/7/2013 12:10 PM
Client Sample ID 1305121-002E / WQ6-C-R35-DUPLICATE **Sampling Time** 9:28 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.02	5/16/2013	ALS	EPA 6020A	

Sample Number 130507043-003 **Sampling Date** 5/2/2013 **Date/Time Received** 5/7/2013 12:10 PM
Client Sample ID 1305121-005B / WQ6-C-R35-METALS BLANK PRESERVED **Sampling Time** 9:20 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

Anatek Labs, Inc.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130507043
Project Name: 1305121

Analytical Results Report

Sample Number 130507043-004 **Sampling Date** 5/2/2013 **Date/Time Received** 5/7/2013 12:10 PM
Client Sample ID 1305121-006B / WQ6-C-R35-METALS BLANK UNPRESERVED **Sampling Time** 9:20 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	
Arsenic	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	
Selenium	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	
Thallium	ND	mg/L	0.001	5/16/2013	ALS	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Client: HALL ENVIRONMENTAL ANALYSIS LAB
Address: 4901 HAWKINS NE SUITE D
ALBUQUERQUE, NM 87109
Attn: ANDY FREEMAN

Batch #: 130507043
Project Name: 1305121

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0488	mg/L	0.05	97.6	80-120	5/15/2013	5/16/2013
Selenium	0.0490	mg/L	0.05	98.0	80-120	5/15/2013	5/16/2013
Arsenic	0.0490	mg/L	0.05	98.0	80-120	5/15/2013	5/16/2013
Antimony	0.0503	mg/L	0.05	100.6	80-120	5/15/2013	5/16/2013

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0486	mg/L	0.05	97.2	0.4	0-20	5/15/2013	5/16/2013
Selenium	0.0482	mg/L	0.05	96.4	1.6	0-20	5/15/2013	5/16/2013
Arsenic	0.0485	mg/L	0.05	97.0	1.0	0-20	5/15/2013	5/16/2013
Antimony	0.0503	mg/L	0.05	100.6	0.0	0-20	5/15/2013	5/16/2013

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
130507043-001	Thallium	ND	0.951	mg/L	1	95.1	75-125	5/15/2013	5/16/2013
130507043-001	Selenium	ND	0.990	mg/L	1	99.0	75-125	5/15/2013	5/16/2013
130507043-001	Arsenic	ND	1.01	mg/L	1	101.0	75-125	5/15/2013	5/16/2013
130507043-001	Antimony	ND	1.07	mg/L	1	107.0	75-125	5/15/2013	5/16/2013

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.959	mg/L	1	95.9	0.8	0-20	5/15/2013	5/16/2013
Selenium	0.971	mg/L	1	97.1	1.9	0-20	5/15/2013	5/16/2013
Arsenic	1.02	mg/L	1	102.0	1.0	0-20	5/15/2013	5/16/2013
Antimony	1.07	mg/L	1	107.0	0.0	0-20	5/15/2013	5/16/2013

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	5/15/2013	5/16/2013
Arsenic	ND	mg/L	0.001	5/15/2013	5/16/2013

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	130507043
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1305121
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Selenium	ND	mg/L	0.001	5/15/2013	5/16/2013
Thallium	ND	mg/L	0.001	5/15/2013	5/16/2013

AR	Acceptable Range
ND	Not Detected
PQL	Practical Quantitation Limit
RPD	Relative Percentage Difference

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; IN:C-ID-01; KY:90142; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095

QC SUMMARY REPORT

WO#: **1305121**

Hall Environmental Analysis Laboratory, Inc.

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID	MB-7321	SampType:	MBLK	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	PBW	Batch ID:	7321	RunNo:	10500					
Prep Date:	5/7/2013	Analysis Date:	5/8/2013	SeqNo:	296859	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID	LCS-7321	SampType:	LCS	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	LCSW	Batch ID:	7321	RunNo:	10500					
Prep Date:	5/7/2013	Analysis Date:	5/8/2013	SeqNo:	296860	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1020	20.0	1000	0	102	80	120			

Sample ID	1305121-001FMS	SampType:	MS	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	WQ6-C-R35	Batch ID:	7321	RunNo:	10500					
Prep Date:	5/7/2013	Analysis Date:	5/8/2013	SeqNo:	296863	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	66200	1000	50000	15050	102	80	120			

Sample ID	1305121-001FMSD	SampType:	MSD	TestCode:	SM 2540 C: Total Dissolved Solids					
Client ID:	WQ6-C-R35	Batch ID:	7321	RunNo:	10500					
Prep Date:	5/7/2013	Analysis Date:	5/8/2013	SeqNo:	296864	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	66400	1000	50000	15050	103	80	120	0.226	5	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293790** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293791** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								
Nitrogen, Nitrate (As N)	ND	0.100								
Sulfate	ND	0.500								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293792** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.75	0.500	5.000	0	95.0	90	110			
Nitrogen, Nitrate (As N)	2.49	0.100	2.500	0	99.5	90	110			
Sulfate	9.62	0.500	10.00	0	96.2	90	110			

Sample ID **LCSD**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293793** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.76	0.500	5.000	0	95.2	90	110			
Nitrogen, Nitrate (As N)	2.48	0.100	2.500	0	99.2	90	110			
Sulfate	9.58	0.500	10.00	0	95.8	90	110			

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293802** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305121-001FMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ6-C-R35**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293804** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	125	5.00	125.0	0	100	90.4	113			

Sample ID **1305121-001FMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ6-C-R35**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293805** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	126	5.00	125.0	0	101	90.4	113	0.335	20	

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293814** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293826** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R10310**	RunNo: **10310**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **293838** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								
Nitrogen, Nitrate (As N)	ND	0.10								
Sulfate	ND	0.50								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **5ml-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R10314**	RunNo: **10314**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294208** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	ND	5.00								
Benzene	ND	1.00								
Toluene	ND	1.00								
1,2-Dichloroethane (EDC)	ND	1.00								
2-Butanone	ND	5.00								
Carbon Tetrachloride	ND	1.00								
Chlorobenzene	ND	1.00								
Chloroform	ND	1.00								
cis-1,2-DCE	ND	1.00								
1,1-Dichloroethane	ND	1.00								
1,1-Dichloroethene	ND	1.00								
Methylene Chloride	ND	3.00								
1,1,2,2-Tetrachloroethane	ND	1.00								
Tetrachloroethene (PCE)	ND	1.00								
trans-1,2-DCE	ND	1.00								
1,1,1-Trichloroethane	ND	1.00								
1,1,2-Trichloroethane	ND	1.00								
Trichloroethene (TCE)	ND	1.00								
Trichlorofluoromethane	ND	1.00								
Vinyl chloride	ND	1.00								
Xylenes, Total	ND	1.00								
Surr: 1,2-Dichloroethane-d4	8.48		10.00		84.8	70	130			
Surr: 4-Bromofluorobenzene	10.1		10.00		101	69.5	130			
Surr: Dibromofluoromethane	9.24		10.00		92.4	70	130			
Surr: Toluene-d8	8.94		10.00		89.4	70	130			

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R10314**	RunNo: **10314**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294213** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	45.8	5.00	60.00	0	76.3	60	140			
Benzene	19.3	1.00	20.00	0	96.3	70	130			
Toluene	18.4	1.00	20.00	0	92.1	80	120			
1,2-Dichloroethane (EDC)	18.3	1.00	20.00	0	91.7	70	130			
2-Butanone	32.8	5.00	40.00	0	82.1	60	140			
Carbon Tetrachloride	19.9	1.00	20.00	0	99.5	70	130			
Chlorobenzene	17.8	1.00	20.00	0	89.0	70	130			
Chloroform	19.3	1.00	20.00	0	96.5	80	120			
cis-1,2-DCE	19.1	1.00	20.00	0	95.3	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R10314**	RunNo: **10314**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294213** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	17.5	1.00	20.00	0	87.5	70	130			
1,1-Dichloroethene	18.7	1.00	20.00	0	93.6	80	120			
Methylene Chloride	19.1	3.00	20.00	0	95.5	70	130			
1,1,2,2-Tetrachloroethane	17.3	1.00	20.00	0	86.4	70	130			
Tetrachloroethene (PCE)	18.5	1.00	20.00	0	92.3	70	130			
trans-1,2-DCE	19.2	1.00	20.00	0	96.0	70	130			
1,1,1-Trichloroethane	18.3	1.00	20.00	0	91.7	70	130			
1,1,2-Trichloroethane	16.3	1.00	20.00	0	81.6	70	130			
Trichloroethene (TCE)	19.1	1.00	20.00	0	95.5	70	130			
Trichlorofluoromethane	19.6	1.00	20.00	0	98.0	70	130			
Vinyl chloride	19.2	1.00	20.00	0	95.9	80	120			
Xylenes, Total	55.8	1.00	60.00	0	93.0	70	130			
Surr: 1,2-Dichloroethane-d4	8.62		10.00		86.2	70	130			
Surr: 4-Bromofluorobenzene	9.19		10.00		91.9	70	130			
Surr: Dibromofluoromethane	8.80		10.00		88.0	70	130			
Surr: Toluene-d8	8.64		10.00		86.4	70	130			

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R10314**	RunNo: **10314**
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294214** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	57.4	5.00	60.00	0	95.6	70	130			
Benzene	20.4	1.00	20.00	0	102	70	130			
Toluene	19.0	1.00	20.00	0	95.1	70	130			
1,2-Dichloroethane (EDC)	20.0	1.00	20.00	0	99.8	70	130			
2-Butanone	38.8	5.00	40.00	0	97.1	70	130			
Carbon Tetrachloride	20.9	1.00	20.00	0	104	70	130			
Chlorobenzene	18.1	1.00	20.00	0	90.4	70	130			
Chloroform	19.8	1.00	20.00	0	99.2	70	130			
cis-1,2-DCE	20.1	1.00	20.00	0	100	70	130			
1,1-Dichloroethane	18.9	1.00	20.00	0	94.6	70	130			
1,1-Dichloroethene	19.9	1.00	20.00	0	99.3	70	130			
Methylene Chloride	20.6	3.00	20.00	0	103	70	130			
1,1,2,2-Tetrachloroethane	18.2	1.00	20.00	0	90.8	70	130			
Tetrachloroethene (PCE)	19.7	1.00	20.00	0	98.7	70	130			
trans-1,2-DCE	20.8	1.00	20.00	0	104	70	130			
1,1,1-Trichloroethane	20.8	1.00	20.00	0	104	70	130			
1,1,2-Trichloroethane	16.7	1.00	20.00	0	83.7	70	130			
Trichloroethene (TCE)	21.2	1.00	20.00	0	106	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R10314**	RunNo: **10314**							
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294214**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Trichlorofluoromethane	20.4	1.00	20.00	0	102	70	130			
Vinyl chloride	20.1	1.00	20.00	0	101	70	130			
Xylenes, Total	54.9	1.00	60.00	0	91.5	70	130			
Surr: 1,2-Dichloroethane-d4	28.7		30.00		95.7	70	130			
Surr: 4-Bromofluorobenzene	30.7		30.00		102	69.5	130			
Surr: Dibromofluoromethane	28.9		30.00		96.3	70	130			
Surr: Toluene-d8	25.8		30.00		86.0	70	130			

Sample ID **100ng lcsd4**	SampType: **LCSD4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R10314**	RunNo: **10314**							
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294215**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	59.5	5.00	60.00	0	99.2	70	130	3.71	20	
Benzene	19.8	1.00	20.00	0	99.1	70	130	3.13	20	
Toluene	18.5	1.00	20.00	0	92.3	70	130	2.96	20	
1,2-Dichloroethane (EDC)	19.4	1.00	20.00	0	97.0	70	130	2.90	20	
2-Butanone	39.4	5.00	40.00	0	98.4	70	130	1.41	20	
Carbon Tetrachloride	20.1	1.00	20.00	0	101	70	130	3.58	20	
Chlorobenzene	18.3	1.00	20.00	0	91.6	70	130	1.36	20	
Chloroform	20.2	1.00	20.00	0	101	70	130	1.56	20	
cis-1,2-DCE	19.8	1.00	20.00	0	99.0	70	130	1.50	20	
1,1-Dichloroethane	17.9	1.00	20.00	0	89.6	70	130	5.39	20	
1,1-Dichloroethene	18.8	1.00	20.00	0	93.9	70	130	5.54	20	
Methylene Chloride	19.7	3.00	20.00	0	98.7	70	130	4.42	20	
1,1,2,2-Tetrachloroethane	18.5	1.00	20.00	0	92.5	70	130	1.91	20	
Tetrachloroethene (PCE)	19.2	1.00	20.00	0	95.9	70	130	2.79	20	
trans-1,2-DCE	19.4	1.00	20.00	0	96.8	70	130	7.01	20	
1,1,1-Trichloroethane	19.9	1.00	20.00	0	99.4	70	130	4.56	20	
1,1,2-Trichloroethane	16.4	1.00	20.00	0	82.2	70	130	1.71	20	
Trichloroethene (TCE)	20.0	1.00	20.00	0	100	70	130	5.83	20	
Trichlorofluoromethane	19.9	1.00	20.00	0	99.7	70	130	2.09	20	
Vinyl chloride	19.3	1.00	20.00	0	96.3	70	130	4.43	20	
Xylenes, Total	53.6	1.00	60.00	0	89.4	70	130	2.35	20	
Surr: 1,2-Dichloroethane-d4	27.9		30.00		92.9	70	130	0	0	
Surr: 4-Bromofluorobenzene	30.1		30.00		100	69.5	130	0	0	
Surr: Dibromofluoromethane	28.6		30.00		95.2	70	130	0	0	
Surr: Toluene-d8	26.4		30.00		87.9	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305121-001a ms**	SampType: **MS4**	TestCode: **EPA Method: 8260B**							
Client ID: **WQ6-C-R35**	Batch ID: **R10314**	RunNo: **10314**							
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294217**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	69.2	5.00	60.00	0	115	70	130			
Benzene	19.2	1.00	20.00	0	95.8	70	130			
Toluene	18.6	1.00	20.00	0	92.9	70	130			
1,2-Dichloroethane (EDC)	19.4	1.00	20.00	0	97.0	70	130			
2-Butanone	40.7	5.00	40.00	0	102	70	130			
Carbon Tetrachloride	19.0	1.00	20.00	0	95.2	70	130			
Chlorobenzene	18.4	1.00	20.00	0	92.1	70	130			
Chloroform	19.3	1.00	20.00	0	96.4	70	130			
cis-1,2-DCE	19.4	1.00	20.00	0	96.9	70	130			
1,1-Dichloroethane	17.7	1.00	20.00	0	88.5	70	130			
1,1-Dichloroethene	18.7	1.00	20.00	0	93.6	70	130			
Methylene Chloride	19.0	3.00	20.00	0	95.0	70	130			
1,1,2,2-Tetrachloroethane	20.1	1.00	20.00	0	101	70	130			
Tetrachloroethene (PCE)	18.9	1.00	20.00	0	94.3	70	130			
trans-1,2-DCE	19.2	1.00	20.00	0	95.8	70	130			
1,1,1-Trichloroethane	18.9	1.00	20.00	0	94.6	70	130			
1,1,2-Trichloroethane	17.8	1.00	20.00	0	89.0	70	130			
Trichloroethene (TCE)	19.4	1.00	20.00	0	97.2	70	130			
Trichlorofluoromethane	20.0	1.00	20.00	0	100	70	130			
Vinyl chloride	20.1	1.00	20.00	0	100	70	130			
Xylenes, Total	55.9	1.00	60.00	0	93.1	70	130			
Surr: 1,2-Dichloroethane-d4	28.8		30.00		96.1	70	130			
Surr: 4-Bromofluorobenzene	30.7		30.00		102	69.5	130			
Surr: Dibromofluoromethane	28.0		30.00		93.2	70	130			
Surr: Toluene-d8	27.3		30.00		91.1	70	130			

Sample ID **1305121-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**							
Client ID: **WQ6-C-R35**	Batch ID: **R10314**	RunNo: **10314**							
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294218**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	74.0	5.00	60.00	0	123	70	130	6.69	20	
Benzene	19.3	1.00	20.00	0	96.5	70	130	0.763	20	
Toluene	18.1	1.00	20.00	0	90.5	70	130	2.62	20	
1,2-Dichloroethane (EDC)	19.9	1.00	20.00	0	99.5	70	130	2.60	20	
2-Butanone	44.5	5.00	40.00	0	111	70	130	8.97	20	
Carbon Tetrachloride	18.8	1.00	20.00	0	93.9	70	130	1.35	20	
Chlorobenzene	17.4	1.00	20.00	0	87.2	70	130	5.42	20	
Chloroform	20.5	1.00	20.00	0	102	70	130	5.99	20	
cis-1,2-DCE	20.3	1.00	20.00	0	101	70	130	4.40	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305121-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**	
Client ID: **WQ6-C-R35**	Batch ID: **R10314**	RunNo: **10314**	
Prep Date:	Analysis Date: **5/3/2013**	SeqNo: **294218**	Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethane	17.7	1.00	20.00	0	88.5	70	130	0.0847	20	
1,1-Dichloroethene	17.7	1.00	20.00	0	88.3	70	130	5.85	20	
Methylene Chloride	19.2	3.00	20.00	0	96.0	70	130	1.05	20	
1,1,2,2-Tetrachloroethane	20.3	1.00	20.00	0	102	70	130	1.01	20	
Tetrachloroethene (PCE)	18.0	1.00	20.00	0	90.1	70	130	4.50	20	
trans-1,2-DCE	18.9	1.00	20.00	0	94.3	70	130	1.58	20	
1,1,1-Trichloroethane	19.1	1.00	20.00	0	95.6	70	130	1.07	20	
1,1,2-Trichloroethane	17.7	1.00	20.00	0	88.4	70	130	0.661	20	
Trichloroethene (TCE)	19.2	1.00	20.00	0	96.0	70	130	1.23	20	
Trichlorofluoromethane	18.5	1.00	20.00	0	92.4	70	130	7.96	20	
Vinyl chloride	20.0	1.00	20.00	0	100	70	130	0.197	20	
Xylenes, Total	52.2	1.00	60.00	0	87.0	70	130	6.78	20	
Surr: 1,2-Dichloroethane-d4	29.4		30.00		98.0	70	130	0		
Surr: 4-Bromofluorobenzene	29.1		30.00		97.1	69.5	130	0		
Surr: Dibromofluoromethane	28.1		30.00		93.6	70	130	0		
Surr: Toluene-d8	25.9		30.00		86.4	70	130	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R10459**	RunNo: **10459**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295572** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	40.1		40.00		100	60	140			
Surr: 2-Fluorobiphenyl	37.8		40.00		94.4	60	140			
Surr: 2-Fluorophenol	37.5		40.00		93.8	60	140			
Surr: 4-Terphenyl-d14	40.2		40.00		100	60	140			
Surr: Nitrobenzene-d5	38.6		40.00		96.6	60	140			
Surr: Phenol-d5	37.4		40.00		93.5	60	140			

Sample ID **mb-7300**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295573** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	ND	5.00								
1,4-Dichlorobenzene	ND	5.00								
2,4-Dinitrophenol	ND	5.00								
2,4-Dinitrotoluene	ND	5.00								
Hexachlorobenzene	ND	5.00								
Hexachloroethane	ND	5.00								
2-Methylphenol	ND	5.00								
3+4-Methylphenol	ND	5.00								
Nitrobenzene	ND	5.00								
Pentachlorophenol	ND	5.00								
Pyridine	ND	5.00								
Surr: 2,4,6-Tribromophenol	152		200.0		75.8	41.5	117			
Surr: 2-Fluorobiphenyl	56.8		100.0		56.8	29.1	112			
Surr: 2-Fluorophenol	87.5		200.0		43.8	11.9	98.6			
Surr: 4-Terphenyl-d14	77.6		100.0		77.6	46	111			
Surr: Nitrobenzene-d5	60.1		100.0		60.1	34.9	112			
Surr: Phenol-d5	68.4		200.0		34.2	17.5	88.3			

Sample ID **lcs-7300**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295574** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	58.2	5.00	100.0	0	58.2	27.4	101			
1,4-Dichlorobenzene	58.2	5.00	100.0	0	58.2	32.6	91.5			
2,4-Dinitrophenol	66.5	5.00	100.0	0	66.5	23.1	118			
2,4-Dinitrotoluene	71.8	5.00	100.0	0	71.8	44.7	112			
Hexachlorobenzene	73.5	5.00	100.0	0	73.5	30	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID **lcs-7300**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295574** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	55.3	5.00	100.0	0	55.3	23.2	97.8			
2-Methylphenol	63.2	5.00	100.0	0	63.2	36.1	105			
3+4-Methylphenol	61.3	5.00	100.0	0	61.3	35.7	92.5			
Nitrobenzene	70.6	5.00	100.0	0	70.6	30.9	125			
Pentachlorophenol	63.2	5.00	100.0	0	63.2	20.2	93			
Pyridine	49.4	5.00	100.0	0	49.4	5.14	87.1			
Surr: 2,4,6-Tribromophenol	98.1		100.0		98.1	41.5	117			
Surr: 2-Fluorobiphenyl	73.4		100.0		73.4	29.1	112			
Surr: 2-Fluorophenol	50.4		100.0		50.4	11.9	98.6			
Surr: 4-Terphenyl-d14	82.5		100.0		82.5	46	111			
Surr: Nitrobenzene-d5	72.5		100.0		72.5	34.9	112			
Surr: Phenol-d5	53.3		100.0		53.3	17.5	88.3			

Sample ID **lcs-7300**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295575** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	58.2	10.0	100.0	0	58.2	41.5	86.7			
2,4-Dinitrotoluene	71.8	10.0	100.0	0	71.8	57.5	102			
Pentachlorophenol	63.2	20.0	100.0	0	63.2	33.7	77.7			
Surr: 2,4,6-Tribromophenol	98.1		100.0		98.1	41.5	117			
Surr: 2-Fluorobiphenyl	73.4		100.0		73.4	29.1	112			
Surr: 2-Fluorophenol	50.4		100.0		50.4	11.9	98.6			
Surr: 4-Terphenyl-d14	82.5		100.0		82.5	46	111			
Surr: Nitrobenzene-d5	72.5		100.0		72.5	34.9	112			
Surr: Phenol-d5	53.3		100.0		53.3	17.5	88.3			

Sample ID **lcsd-7300**	SampType: **LCSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295576** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	60.9	5.00	100.0	0	60.9	27.4	101	4.60	20	
1,4-Dichlorobenzene	59.6	5.00	100.0	0	59.6	32.6	91.5	2.28	20	
2,4-Dinitrophenol	71.1	5.00	100.0	0	71.1	23.1	118	6.66	20	
2,4-Dinitrotoluene	72.3	5.00	100.0	0	72.3	44.7	112	0.639	20	
Hexachlorobenzene	74.7	5.00	100.0	0	74.7	30	130	1.59	20	
Hexachloroethane	58.4	5.00	100.0	0	58.4	23.2	97.8	5.59	20	
2-Methylphenol	66.4	5.00	100.0	0	66.4	36.1	105	5.03	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **lcsd-7300**	SampType: **LCSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295576** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
3+4-Methylphenol	64.4	5.00	100.0	0	64.4	35.7	92.5	5.00	20	
Nitrobenzene	65.3	5.00	100.0	0	65.3	30.9	125	7.74	20	
Pentachlorophenol	64.8	5.00	100.0	0	64.8	20.2	93	2.50	20	
Pyridine	54.3	5.00	100.0	0	54.3	5.14	87.1	9.34	20	
Surr: 2,4,6-Tribromophenol	96.0		100.0		96.0	41.5	117	0		
Surr: 2-Fluorobiphenyl	78.3		100.0		78.3	29.1	112	0		
Surr: 2-Fluorophenol	56.9		100.0		56.9	11.9	98.6	0		
Surr: 4-Terphenyl-d14	79.5		100.0		79.5	46	111	0		
Surr: Nitrobenzene-d5	73.0		100.0		73.0	34.9	112	0		
Surr: Phenol-d5	57.8		100.0		57.8	17.5	88.3	0		

Sample ID **1305121-001Cms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ6-C-R35**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295579** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	72.7	5.00	100.0	0	72.7	20.9	103			
1,4-Dichlorobenzene	72.1	5.00	100.0	0	72.1	32.6	91.5			
2,4-Dinitrophenol	38.5	5.00	100.0	0	38.5	11	112			
2,4-Dinitrotoluene	69.9	5.00	100.0	0	69.9	44.7	112			
Hexachlorobenzene	77.3	5.00	100.0	0	77.3	30.3	126			
Hexachloroethane	72.1	5.00	100.0	0	72.1	19.5	96.4			
2-Methylphenol	74.9	5.00	100.0	0	74.9	28.7	108			
3+4-Methylphenol	78.8	5.00	100.0	0	78.8	24.2	136			
Nitrobenzene	72.6	5.00	100.0	0	72.6	28.8	119			
Pentachlorophenol	34.2	5.00	100.0	0	34.2	20.2	93			
Pyridine	56.4	5.00	100.0	0	56.4	19.3	82.8			
Surr: 2,4,6-Tribromophenol	92.5		100.0		92.5	41.5	117			
Surr: 2-Fluorobiphenyl	83.4		100.0		83.4	29.1	112			
Surr: 2-Fluorophenol	61.5		100.0		61.5	11.9	98.6			
Surr: 4-Terphenyl-d14	86.5		100.0		86.5	46	111			
Surr: Nitrobenzene-d5	78.8		100.0		78.8	34.9	112			
Surr: Phenol-d5	66.4		100.0		66.4	17.5	88.3			

Sample ID **1305121-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ6-C-R35**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295580** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	66.3	5.00	100.0	0	66.3	20.9	103	9.20	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **1305121-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ6-C-R35**	Batch ID: **7300**	RunNo: **10459**
Prep Date: **5/6/2013**	Analysis Date: **5/7/2013**	SeqNo: **295580** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	62.3	5.00	100.0	0	62.3	32.6	91.5	14.6	20	
2,4-Dinitrophenol	35.2	5.00	100.0	0	35.2	11	112	9.01	20	
2,4-Dinitrotoluene	61.9	5.00	100.0	0	61.9	44.7	112	12.2	20	
Hexachlorobenzene	75.4	5.00	100.0	0	75.4	30.3	126	2.38	20	
Hexachloroethane	63.6	5.00	100.0	0	63.6	19.5	96.4	12.5	20	
2-Methylphenol	68.3	5.00	100.0	0	68.3	28.7	108	9.24	20	
3+4-Methylphenol	69.9	5.00	100.0	0	69.9	24.2	136	11.9	20	
Nitrobenzene	68.2	5.00	100.0	0	68.2	28.8	119	6.25	20	
Pentachlorophenol	33.6	5.00	100.0	0	33.6	20.2	93	1.71	20	
Pyridine	50.9	5.00	100.0	0	50.9	19.3	82.8	10.1	20	
Surr: 2,4,6-Tribromophenol	74.1		100.0		74.1	41.5	117	0		
Surr: 2-Fluorobiphenyl	73.7		100.0		73.7	29.1	112	0		
Surr: 2-Fluorophenol	54.8		100.0		54.8	11.9	98.6	0		
Surr: 4-Terphenyl-d14	78.9		100.0		78.9	46	111	0		
Surr: Nitrobenzene-d5	71.5		100.0		71.5	34.9	112	0		
Surr: Phenol-d5	60.0		100.0		60.0	17.5	88.3	0		

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	ec 995us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R10425		RunNo:	10425				
Prep Date:		Analysis Date:	5/6/2013		SeqNo:	295058	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	990	0.010	995.0	0	99.5	80	120			

Sample ID	ec 9992us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R10425		RunNo:	10425				
Prep Date:		Analysis Date:	5/7/2013		SeqNo:	295212	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	10000	0.010	9992	0	102	80	120			

Sample ID	ec 100us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R10425		RunNo:	10425				
Prep Date:		Analysis Date:	5/7/2013		SeqNo:	295218	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	120	0.010	100.0	0	118	80	120			

Sample ID	ec 995us ccv	SampType:	ccv		TestCode:	SM2510B: Specific Conductance				
Client ID:	CCV	Batch ID:	R10477		RunNo:	10477				
Prep Date:		Analysis Date:	5/7/2013		SeqNo:	296096	Units:	µmhos/cm		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	1000	0.010	995.0	0	104	80	120			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-7507**	SampType: **MBLK**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID: **7507**		RunNo: **10774**					
Prep Date:	**5/20/2013**	Analysis Date: **5/21/2013**		SeqNo: **304710**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	**LCS-7507**	SampType: **LCS**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID: **7507**		RunNo: **10774**					
Prep Date:	**5/20/2013**	Analysis Date: **5/21/2013**		SeqNo: **304711**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00514	0.000200	0.005000	0	103	80	120			

Sample ID	**LCSRR-7507**	SampType: **LCSD**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSS02**	Batch ID: **7507**		RunNo: **10774**					
Prep Date:	**5/20/2013**	Analysis Date: **5/21/2013**		SeqNo: **304712**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00512	0.000200	0.005000	0	102	80	120	0.366	20	

Sample ID	**1305121-001DMS**	SampType: **ms**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**WQ6-C-R35**	Batch ID: **7507**		RunNo: **10774**					
Prep Date:	**5/20/2013**	Analysis Date: **5/21/2013**		SeqNo: **304715**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00463	0.000200	0.005000	0	92.7	75	125			

Sample ID	**1305121-001DMSD**	SampType: **msd**		TestCode: **EPA Method 7470: Mercury**					
Client ID:	**WQ6-C-R35**	Batch ID: **7507**		RunNo: **10774**					
Prep Date:	**5/20/2013**	Analysis Date: **5/21/2013**		SeqNo: **304716**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00470	0.000200	0.005000	0	94.1	75	125	1.48	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294877** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	0.0143	1.00								J
Potassium	ND	1.00								
Sodium	ND	1.00								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294878** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	51.8	1.00	50.00	0	104	80	120			
Potassium	51.0	1.00	50.00	0	102	80	120			
Sodium	51.6	1.00	50.00	0	103	80	120			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294879** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	53.0	1.00	50.00	0	106	80	120	2.34	20	
Potassium	52.3	1.00	50.00	0	105	80	120	2.49	20	
Sodium	52.7	1.00	50.00	0	105	80	120	2.13	20	

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295315** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295316** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49.2	1.00	50.00	0	98.5	80	120			

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295317** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **LCSD**	SampType: **LCSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSS02**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295317** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48.1	1.00	50.00	0	96.2	80	120	2.39	20	

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295326** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	2.85	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295327** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	103	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295335** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.781	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295336** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	95.9	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R10449**	RunNo: **10449**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295347** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.609	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**CCV CAT**	SampType: **CCV_CAT**		TestCode: **EPA Method 6010B: Dissolved Metals**					
Client ID:	**BatchQC**	Batch ID: **R10449**		RunNo: **10449**					
Prep Date:		Analysis Date: **5/7/2013**		SeqNo: **295348**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.5	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294888** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00	1.000	0	-0.0520	-100	99			
Potassium	ND	1.00	1.000	0	-4.73	-100	99			
Sodium	ND	1.00	1.000	0	1.86	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294889** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48.9	1.00	50.00	0	97.8	90	110			
Potassium	47.5	1.00	50.00	0	95.0	90	110			
Sodium	47.8	1.00	50.00	0	95.7	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294905** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00	1.000	0	0.234	-100	99			
Potassium	ND	1.00	1.000	0	7.33	-100	99			
Sodium	ND	1.00	1.000	0	4.58	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294906** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	99.6	90	110			
Potassium	49	1.0	50.00	0	98.9	90	110			
Sodium	51	1.0	50.00	0	101	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **CCB**	Batch ID: **R10423**	RunNo: **10423**
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294918** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00	1.000	0	0.159	-100	99			
Potassium	ND	1.00	1.000	0	9.18	-100	99			
Sodium	ND	1.00	1.000	0	1.91	-100	99			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**CCV CAT**	SampType: **CCV_CAT**		TestCode: **EPA 6010B: Total Recoverable Metals**					
Client ID:	**BatchQC**	Batch ID: **R10423**		RunNo: **10423**					
Prep Date:		Analysis Date: **5/6/2013**		SeqNo: **294919**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	47.8	1.00	50.00	0	95.6	90	110			
Potassium	47.1	1.00	50.00	0	94.3	90	110			
Sodium	49.1	1.00	50.00	0	98.1	90	110			

Sample ID	**CCB**	SampType: **CCB**		TestCode: **EPA 6010B: Total Recoverable Metals**					
Client ID:	**CCB**	Batch ID: **R10423**		RunNo: **10423**					
Prep Date:		Analysis Date: **5/6/2013**		SeqNo: **294931**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.0	1.000	0	0.205	-100	99			
Potassium	ND	1.0	1.000	0	5.28	-100	99			
Sodium	ND	1.0	1.000	0	-1.59	-100	99			

Sample ID	**CCV CAT**	SampType: **CCV_CAT**		TestCode: **EPA 6010B: Total Recoverable Metals**					
Client ID:	**BatchQC**	Batch ID: **R10423**		RunNo: **10423**					
Prep Date:		Analysis Date: **5/6/2013**		SeqNo: **294932**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	48	1.0	50.00	0	95.5	90	110			
Potassium	47	1.0	50.00	0	94.3	90	110			
Sodium	49	1.0	50.00	0	98.2	90	110			

Sample ID	**MB-7337**	SampType: **MBLK**		TestCode: **EPA 6010B: Total Recoverable Metals**					
Client ID:	**PBW**	Batch ID: **7337**		RunNo: **10512**					
Prep Date:	**5/7/2013**	Analysis Date: **5/9/2013**		SeqNo: **297141**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	ND	0.0200								
Beryllium	ND	0.00300								
Cadmium	ND	0.00200								
Calcium	ND	1.00								
Chromium	ND	0.00600								
Iron	0.0161	0.0500								J
Lead	ND	0.00500								
Magnesium	ND	1.00								
Nickel	ND	0.0100								
Potassium	ND	1.00								
Silver	ND	0.00500								
Sodium	ND	1.00								
Vanadium	ND	0.0500								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **LCS-7337**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **7337**	RunNo: **10512**
Prep Date: **5/7/2013**	Analysis Date: **5/9/2013**	SeqNo: **297142** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.490	0.0200	0.5000	0	98.0	80	120			
Beryllium	0.528	0.00300	0.5000	0	106	80	120			
Cadmium	0.492	0.00200	0.5000	0	98.4	80	120			
Calcium	48.3	1.00	50.00	0	96.7	80	120			
Chromium	0.489	0.00600	0.5000	0	97.9	80	120			
Iron	0.494	0.0500	0.5000	0	98.8	80	120			
Lead	0.481	0.00500	0.5000	0	96.2	80	120			
Magnesium	47.4	1.00	50.00	0	94.7	80	120			
Nickel	0.462	0.0100	0.5000	0	92.4	80	120			
Potassium	45.6	1.00	50.00	0	91.2	80	120			
Silver	0.102	0.00500	0.1000	0	102	80	120			
Sodium	46.1	1.00	50.00	0	92.2	80	120			
Vanadium	0.516	0.0500	0.5000	0	103	80	120			

Sample ID **LCS-7337**	SampType: **LCSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSS02**	Batch ID: **7337**	RunNo: **10512**
Prep Date: **5/7/2013**	Analysis Date: **5/9/2013**	SeqNo: **297143** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.495	0.0200	0.5000	0	99.0	80	120	1.03	20	
Beryllium	0.543	0.00300	0.5000	0	109	80	120	2.74	20	
Cadmium	0.501	0.00200	0.5000	0	100	80	120	1.78	20	
Calcium	49.5	1.00	50.00	0	99.0	80	120	2.34	20	
Chromium	0.502	0.00600	0.5000	0	100	80	120	2.57	20	
Iron	0.503	0.0500	0.5000	0	101	80	120	1.82	20	
Lead	0.489	0.00500	0.5000	0	97.9	80	120	1.75	20	
Magnesium	48.3	1.00	50.00	0	96.6	80	120	2.00	20	
Nickel	0.476	0.0100	0.5000	0	95.1	80	120	2.91	20	
Potassium	46.4	1.00	50.00	0	92.7	80	120	1.59	20	
Silver	0.103	0.00500	0.1000	0	103	80	120	0.428	20	
Sodium	47.0	1.00	50.00	0	94.0	80	120	2.01	20	
Vanadium	0.520	0.0500	0.5000	0	104	80	120	0.736	20	

Sample ID **1305121-001DMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **WQ6-C-R35**	Batch ID: **7337**	RunNo: **10512**
Prep Date: **5/7/2013**	Analysis Date: **5/9/2013**	SeqNo: **297156** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.493	0.0200	0.5000	0.01115	96.4	75	125			
Beryllium	0.514	0.00300	0.5000	0.0006400	103	75	125			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	1305121-001DMS	SampType:	MS	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	WQ6-C-R35	Batch ID:	7337	RunNo:	10512					
Prep Date:	5/7/2013	Analysis Date:	5/9/2013	SeqNo:	297156	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.505	0.00200	0.5000	0	101	75	125			
Chromium	0.474	0.00600	0.5000	0	94.9	75	125			
Iron	0.658	0.0500	0.5000	0.1901	93.5	75	125			
Lead	0.464	0.00500	0.5000	0	92.8	75	125			
Nickel	0.451	0.0100	0.5000	0	90.2	75	125			
Silver	0.108	0.00500	0.1000	0	108	75	125			
Vanadium	0.526	0.0500	0.5000	0.005090	104	75	125			

Sample ID	1305121-001DMSD	SampType:	MSD	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	WQ6-C-R35	Batch ID:	7337	RunNo:	10512					
Prep Date:	5/7/2013	Analysis Date:	5/9/2013	SeqNo:	297157	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.485	0.0200	0.5000	0.01115	94.8	75	125	1.64	20	
Beryllium	0.505	0.00300	0.5000	0.0006400	101	75	125	1.76	20	
Cadmium	0.499	0.00200	0.5000	0	99.7	75	125	1.28	20	
Chromium	0.469	0.00600	0.5000	0	93.8	75	125	1.17	20	
Iron	0.645	0.0500	0.5000	0.1901	91.0	75	125	1.88	20	
Lead	0.451	0.00500	0.5000	0	90.2	75	125	2.81	20	
Nickel	0.443	0.0100	0.5000	0	88.5	75	125	1.92	20	
Silver	0.108	0.00500	0.1000	0	108	75	125	0	20	
Vanadium	0.519	0.0500	0.5000	0.005090	103	75	125	1.20	20	

Sample ID	1305121-001DMS	SampType:	MS	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	WQ6-C-R35	Batch ID:	7337	RunNo:	10512					
Prep Date:	5/7/2013	Analysis Date:	5/9/2013	SeqNo:	297165	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	234	5.00	50.00	189.5	89.6	75	125			
Potassium	198	5.00	50.00	149.2	97.4	75	125			

Sample ID	1305121-001DMSD	SampType:	MSD	TestCode:	EPA 6010B: Total Recoverable Metals					
Client ID:	WQ6-C-R35	Batch ID:	7337	RunNo:	10512					
Prep Date:	5/7/2013	Analysis Date:	5/9/2013	SeqNo:	297166	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	227	5.00	50.00	189.5	75.5	75	125	3.05	20	
Potassium	193	5.00	50.00	149.2	88.5	75	125	2.29	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**ph 7.00 ccv**	SampType: **ccv**		TestCode: **SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID: **R10425**		RunNo: **10425**					
Prep Date:		Analysis Date: **5/6/2013**		SeqNo: **295181**		Units: **pH units**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.98	1.68								

Sample ID	**ph 10.00 ccv**	SampType: **ccv**		TestCode: **SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID: **R10425**		RunNo: **10425**					
Prep Date:		Analysis Date: **5/7/2013**		SeqNo: **295202**		Units: **pH units**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.92	1.68								

Sample ID	**ph 4.00 ccv**	SampType: **ccv**		TestCode: **SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID: **R10425**		RunNo: **10425**					
Prep Date:		Analysis Date: **5/7/2013**		SeqNo: **295208**		Units: **pH units**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	4.02	1.68								

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **mb-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R10425**	RunNo: **10425**							
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294997**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R10425**	RunNo: **10425**							
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294998**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	90	110			

Sample ID **lcs-1 dup**	SampType: **lcsd**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSS02**	Batch ID: **R10425**	RunNo: **10425**							
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **294999**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	100	90	110	0	20	

Sample ID **mb-2**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R10425**	RunNo: **10425**							
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **295019**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-2**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R10425**	RunNo: **10425**							
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **295020**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	99.9	90	110			

Sample ID **lcs-2 dup**	SampType: **lcsd**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSS02**	Batch ID: **R10425**	RunNo: **10425**							
Prep Date:	Analysis Date: **5/6/2013**	SeqNo: **295021**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80	20	80.00	0	99.8	90	110	0.0501	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1305121**

Hall Environmental Analysis Laboratory, Inc.

27-Jun-13

Client: WIPP
Project: WIPP DMP

Sample ID **mb-3**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**
Client ID: **PBW**	Batch ID: **R10425**	RunNo: **10425**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295043** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	ND	20								

Sample ID **lcs-3**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**
Client ID: **LCSW**	Batch ID: **R10425**	RunNo: **10425**
Prep Date:	Analysis Date: **5/7/2013**	SeqNo: **295044** Units: **mg/L CaCO3**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81	20	80.00	0	102	90	110			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R10490**	RunNo: **10490**							
Prep Date:	Analysis Date: **5/8/2013**	SeqNo: **296543**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.00								

Sample ID **LCS ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R10490**	RunNo: **10490**							
Prep Date:	Analysis Date: **5/8/2013**	SeqNo: **296544**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.91	1.00	4.850	0	101	90	110			

Sample ID **LCSD ST9060-12006**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R10490**	RunNo: **10490**							
Prep Date:	Analysis Date: **5/8/2013**	SeqNo: **296545**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.01	1.00	4.850	0	103	90	110	1.92	0	

Sample ID **1305121-001BMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**							
Client ID: **WQ6-C-R35**	Batch ID: **R10490**	RunNo: **10490**							
Prep Date:	Analysis Date: **5/8/2013**	SeqNo: **296547**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.47	1.00	4.650	0.6119	104	75	125			

Sample ID **1305121-001BMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**							
Client ID: **WQ6-C-R35**	Batch ID: **R10490**	RunNo: **10490**							
Prep Date:	Analysis Date: **5/8/2013**	SeqNo: **296548**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.46	1.00	4.650	0.6119	104	75	125	0.256	20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID	**1305121-001FDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**WQ6-C-R35**	Batch ID:	**R10596**	RunNo:	**10596**					
Prep Date:		Analysis Date:	**5/14/2013**	SeqNo:	**299553**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.009	0						0.189	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Sample pH greater than 2 for VOA and TOC only.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1305121**

27-Jun-13

Client: WIPP

Project: WIPP DMP

Sample ID **MB-7334**	SampType: **MBLK**	TestCode: **SM 2540D: TSS**
Client ID: **PBW**	Batch ID: **7334**	RunNo: **10463**
Prep Date: **5/7/2013**	Analysis Date: **5/7/2013**	SeqNo: **295820** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	ND	4.00								

Sample ID **LCS-7334**	SampType: **LCS**	TestCode: **SM 2540D: TSS**
Client ID: **LCSW**	Batch ID: **7334**	RunNo: **10463**
Prep Date: **5/7/2013**	Analysis Date: **5/7/2013**	SeqNo: **295821** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	96.0	4.00	96.60	0	99.4	85.8178	113.8716			

Sample ID **1305121-001FDUP**	SampType: **DUP**	TestCode: **SM 2540D: TSS**
Client ID: **WQ6-C-R35**	Batch ID: **7334**	RunNo: **10463**
Prep Date: **5/7/2013**	Analysis Date: **5/7/2013**	SeqNo: **295824** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	10.0	4.00						10.5	15	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- P Sample pH greater than 2 for VOA and TOC only.
- RL Reporting Detection Limit

WQSP-6

DATA VERIFICATION AND VALIDATION REPORTS

Round 35
WQSP-6
SDG 1305121
Groundwater Concentration and Precision Summary

General Chemistry					Primary		Duplicate				Applicable 95th UTLV
Parameter	Units	SOW MRL	Lab MDL[a]	Lab PQL[b]	Sample	Flag	Sample	Flag	Avg	RPD	or 95th %
Chloride	mg/L	0.5	130	1000	5,010		4,720		4,865	6.0	15,800
TOC	mg/L	1.0	0.230	1.0	0.61	J	0.60	J	0.61	1.7	10.14
Alkalinity (Bicarbonate)	mg/L	4.0	5.0	20	48.2		47.9		48.1	0.62	55.8
Specific Conductance	umhos/cm	NA	0.05	0.05	25,000		24,000		24,500	4.1	27,660
pH	pH units	NA	0.10	1.68	7.66		7.71		7.69	0.65	7.5 - 7.9
Specific Gravity	NA	NA	0.0	0.0	1.007		1.007		1.007	0.0	1.02
TDS	mg/L	10	503	1,000	15,000		14,600		14,800	2.7	22,500
TSS	mg/L	1.0	1.5	4.0	9.0		10.0		9.5	11	14.8
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	0.56	10	675		671		673	0.59	796
Mg (Diss)	mg/L	0.5	0.083	10	199		201		200	1.0	255
K (Diss)	mg/L	0.5	0.50	10	147		150		149	2.0	270
Na (Diss)	mg/L	0.5	8.0	100	4,260		4,280		4,270	0.47	6,290
					Primary		Duplicate				
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL**	**Lab PQL**	**Sample**	**Flag**	**Sample**	**Flag**	**Avg**	**RPD**	
Hg (CVAAS)	mg/L	0.0002	0.000089	0.00020	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.00050	0.020	0.011	J	0.01	J	0.011	9.5	<1.0
Be	mg/L	0.010	0.00050	0.0030	0.00064	J	0.0005	J	0.0006	19	<0.02
Cd	mg/L	0.010	0.00080	0.0020	ND		ND		NA	NA	<0.05
Ca	mg/L	0.500	0.091	10	648		614		631	5.4	NA
Cr	mg/L	0.025	0.0015	0.0060	ND		ND		NA	NA	<0.5
Pb	mg/L	0.020	0.0034	0.0050	ND		ND		NA	NA	0.150
Mg	mg/L	0.50	0.048	5.0	189		185		187	2.1	NA
Ni	mg/L	0.025	0.0014	0.010	ND		ND		NA	NA	<0.5
K	mg/L	0.50	1.100	5.0	149		148		149	0.67	NA
Ag	mg/L	0.013	0.0011	0.0050	ND		ND		NA	NA	<0.5
Na	mg/L	0.50	51	100	4,520		4,330		4,425	4.3	NA
V	mg/L	0.025	0.0035	0.050	0.0051	J	0.0040	J	0.005	24	3.105
ICP/MS Metals											
Sb	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.140
As	mg/L	0.050	0.020	0.020	ND		ND		NA	NA	<0.5
Se	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.10
Tl	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.560

Lab's PQL corresponds to low calibration standard adjusted for the dilution factor as necessary for high-brine samples.
Method Reporting Limit (MRL) and lab's Practical Quantitation Level (PQL) generally equivalent for a given sample.
ND Not detected
NA Not applicable
J Flag indicates concentration was below the lab's PQL but above the Method Detection Limit (MDL) for the analyte at the dilution used for the analysis.
CVAAS - cold vapor atomic absorption spectroscopy.
ICP - inductively coupled plasma emission spectroscopy.
ICP/MS - ICP combined with mass spectrometry.
(a) MDL - method detection limit
(b) PQL - practical quantitation limit eqivalent to method reporting limit (MRL)

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 35
WQSP-6

Sample Summary

Date:	August 5,2013
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	May 2, 2013
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 28, 2013
Date Samples Shipped/Method	May 2, 2013 by FedEx
Date Samples Received by lab:	May 3, 2013
Sample Receipt Condition:	Intact at 1.0 deg. C
SDG:	1305121
WIPP Chain of Custody/Request for Analysis:	1040
Analysis Results Reviewed:	Volatile and semivolatile organics; total and dissolved metals; general chemistry indicator parameters
Analyses Verified, Validated, and Reported in this Document:	See table of all target analytes and methods in the Annual Culebra Groundwater Monitoring Report
VOC Analysis Date(s):	May 3, 2013 (meets holding time)
SVOC Extraction Date:	May 6, 2013(meets holding time)
SVOC Analysis Date(s):	May 7, 2013 (meets holding time)
Total Trace Metals Analysis Date:	May 9, 2013 (meets holding time)
Dissolved Cation Metals Analysis Date:	May 6, 7, 2013(meets holding time)
Mercury Analysis Date(s):	May 21, 2013(meets holding time)
General Chemistry Parameters analysis dates	Dates are summarized on the Dates Report and on the data summary reports from the lab in the appendices. All holding times were met.
Verification and Validation Checklist	Completed and attached to this narrative

Sample Numbers and Analytes for SDG 1305121

WTS Sample No.	Analytes
GW-WQ6CR35N1, GW-WQ6CR35N1D	VOCs
GW-WQ6CR35N2, GW-WQ6CR35N3	VOCs (Field Blank and Trip Blank)
GW-WQ6CR35N4, GW-WQ6CR35N4D	TOC
GW-WQ6CR35N5, GW-WQ6CR35N5D	SVOCs
GW-WQ6CR35N6, GW-WQ6CR35N6D	Total Trace Metals (including "total" cation metals)
GW-WQ6CR35N7, GW-WQ6CR35N7D	General Parameters (including "dissolved" cations)
WQCR35N12, WQ1CR35N13	Total Trace Metals (including "total" cations, preserved and unpreserved)

Results Summary

No VOCs were detected in the primary or duplicate groundwater samples or in the trip blank sample. The compound 2-butanone was detected in the field blank sample at 7.7 ug/L but was not detected in any of the samples.

No SVOCs were detected in the samples.

The chemical analysis data for the trace metals showed the typical detections of Ba, Be, and V in the primary and duplicate groundwater samples. All the concentrations are below the MRL and are J-flagged as estimated.

The calcium, magnesium, potassium, and sodium were detected at concentrations a little lower than previous rounds with average concentrations ranging from 149 mg/L for K to 4,270 mg/L for Na.

Measurements were made on all the general chemistry parameters at concentrations above the MRL except for TOC with concentrations of 0.61 mg/L in the primary sample and 0.60 mg/L in the duplicate sample. The concentrations are between the MDL and MRL and are J-flagged as estimated.

The concentrations of all the general chemistry parameters were below the 95th UTLV and 95th percentile including TSS with concentrations of 9.0 mg/L in the primary sample and 10 mg/L in the duplicate sample compared to the 95th percentile concentration of 14.8 mg/L.

Summary for Volatile Organics Analysis

The groundwater samples were purged and analyzed for 1,1,1-trichloroethane, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, 1,2-dichloroethane, benzene, carbon tetrachloride, chlorobenzene, chloroform, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, isobutanol, methyl ethyl ketone (2-butanone), methylene chloride, tetrachloroethylene, toluene, trichloroethylene, trichlorofluoromethane, vinyl chloride, and xylenes (o-, m-, and p-). Starting with Round 33 HEAL calibrated for and analyzed for the isobutyl alcohol in separate analysis runs from the other VOC compounds.

The samples were analyzed according to the laboratory's SOP S-8260-11 based on EPA's SW-846 Method 8260B.

No VOCs were detected in the primary or duplicate groundwater samples or in the trip blank sample. The compound 2-butanone was detected in the field blank sample at 7.7 ug/L but was not detected in any of the samples.

The QA/QC data met the quality assurance objective of 70 – 130 percent recovery in both the LCS/LCSD and MS/MSD samples for all compounds including isobutyl alcohol this round. The precision objective of less than 20 RPD was also met for all the compounds.

All other quality assurance objectives were met for the VOC analyses.

Summary for Semivolatile Organic Compound Analysis

The groundwater samples were analyzed for 1, 2-dichlorobenzene, 1, 4-dichlorobenzene, 2,4-dinitrophenol, 2,4-dinitrotoluene, 2-methylphenol (o-cresol), 3+4-methylphenol (m-, p-methyl phenol), hexachlorobenzene, hexachloroethane, nitrobenzene, pentachlorophenol, and pyridine.

The samples were analyzed according to the laboratory's SOP S-8270C-11 based on EPA's SW-846 Method 8270C.

No SVOCs were detected in the groundwater samples.

The quality assurance objective for recovery was met for all the SVOC compounds in the LCS/LCSD and MS/ MSD samples with no exceptions. The acceptable percent recoveries vary by compound based on the historical control chart ranges of the laboratory. The recoveries were all higher than the 30-percent EPA recovery objective for SVOC compounds. In addition the precision objective of less than 20 RPD was met for all the compounds in the LCS/LCSD and MS/MSD. This appears to be the first set of SVOC QC data in which the quality assurance objectives for met for all the SVOC compounds.

All other SVOC quality assurance objectives were met.

Summary for Metals Analysis

The groundwater samples were prepared and analyzed for Barium (Ba), Beryllium (Be), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Lead (Pb), Magnesium (Mg), Nickel (Ni), Potassium (K), Silver (Ag), Sodium (Na), and Vanadium (V) by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) according to Hall's SOP S-610-8 based on EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed according to Anatek's SOP ALI-A-315.06 for ICP/MS Method 6020 from SW-846. Mercury (Hg) was analyzed according to the Hall's S-245.1_7470A-3 using automated cold-vapor atomic absorption (CVAA) spectroscopy. The SOP is based on EPA's SW-846 Method 7470A.

The lab used a dilution factor of 1 for the trace metals analysis by ICP in the WQSP-6 samples to achieve maximum sensitivity. All MDLs were lower than the SOW-required reporting limits.

The trace metals detected in the groundwater samples were Ba, Be, and V. These three metals are typically detected in all six of the WQSP wells at concentrations between the MDL and MRL and are J-flagged as estimated. The concentrations of Ba were 0.011 mg/L in the primary sample and 0.010 mg/L in the duplicate sample; the Be concentrations were 0.00064 mg/L in the primary sample and 0.00053 mg/L in the duplicate sample; and the V concentrations were 0.0051 mg/L in the primary sample and 0.0040 mg/L in the duplicate sample.

The quality assurance objective of 80-120 percent recovery in the LCS/LCSD samples and 75 – 125 percent recovery in the MS/MSD samples was met for all the trace metals as well as the dissolved cation metals, Hg, and the ICP/MS metals.

All QC objectives were met for the metals analyses.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids (TDS), total suspended solids (TSS), total organic carbon (TOC), alkalinity, and the anions chloride and sulfate. The standard analytical methods and the corresponding SOPs are shown in the table below.

Standard Analytical Method	Current Hall Lab SOP
Method 2710F – Specific Gravity from Standard Methods	S-2710F - Rev. 1
Standard Methods SM 4500-H^+ (pH)	S-4500-H^+B-7
EPA Method 120.1 Specific Conductance (Conductivity)	S-120.1 – 7
Standard Methods SM 2540C (TDS)	S-SM2540C – 6
Standard Methods SM 2540D (TSS)	S-SM2540D – 4
Standard Methods SM 5310B (TOC)	S-TOC – 6
Standard Methods 2320B (Alkalinity)	S-SM2320 – 7
EPA Method 300.0 (Anions)	S-300.0 – 10

The various types of QC samples and results of the analyses are described below. The lab generated QC data meeting quality objectives, but failed to analyze a few requisite QC samples as discussed below.

- Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted.

- LCS samples were analyzed for the anions chloride and sulfate to obtain recovery information. MS/MSD samples were not analyzed because of the high native concentrations of chloride and sulfate. All LCS recoveries were within 90 – 110 percent recovery and RPDs were less than 20.

- The primary groundwater sample was analyzed in duplicate for specific gravity to obtain precision information. The RPD of the duplicate analysis was 0.2 indicating good precision.

- A LCS sample and a duplicate sample were analyzed for TSS to obtain recovery and precision information. MS/MSD samples are not applicable for TSS. The recovery of the LCS was 99.4 percent. The duplicate concentration was 10 mg/L for a RPD of 10.

- Duplicate samples were not analyzed for specific conductance. The only QA/QC sample was a CCV which met the accuracy requirement.

- A duplicate sample was not analyzed for pH. Three pH continuing calibration verification standards met the accuracy objective.

- Two sets of LCS/LCSD were analyzed for alkalinity but MS/MSD QC samples were not analyzed as is done for most sample sets. The LCS/LCSD recoveries were within two percent of 100 percent and the RPDs were much less than one.

- LCS/LCSD and MS/MSD samples were analyzed for TOC to obtain recovery and precision data. All recoveries were within 101 – 104 percent and the RPDs were 1.9 and 0.26, respectively.

- The TDS QC samples included a LCS and a MS/MSD pair. The recoveries were 102 – 103 percent and the MS/MSD RPD was 0.23.

All other quality assurance objectives were met for the general chemistry indicator parameter analyses.

Overall Data Package Summary

In summary, the data and information contained in this data packet is of high quality and meets the data quality objectives for accuracy and precision with only a few minor exceptions as detailed above and in the Annual Culebra Groundwater Monitoring Report.

Attachment 2 – Preliminary Review

SECTION A

Sample Location: WASP-6

Laboratory Name: Hall Environmental

Laboratory Work Order #: 1305121

Sample Number(s): GW-WQ6-C-R35-N1-N8D, N12, N13

Reviewer Name (print): Greg Jungclaus

Reviewer Signature: [signature]

SECTION B	YES	NO
Is the SDG narrative present and certification page signed by an authorized representative of the laboratory?	✓	
Does the SDG narrative explain problems associated with processing and analysis of the samples?	✓	
Were the original or copy of the Chain of Custody/Request for Analysis (CofC/RFA) complete?	✓	
Are the sample analysis summary tables present?	✓	
Were sufficient data as required by the Statement of Work (SOW) available to evaluate the analysis results?	✓	
Was an electronic data package received for preliminary review of the data?	✓	

SECTION C GENERAL VERIFICATION AND VALIDATION	YES	NO
Were data entries free of transcription error?	✓	
Were calculations correct?	✓	
Were the correct number of significant figures applied to reported data?	✓	
Were trip (VOC only), field and laboratory method blanks (MB) free of contaminants?		✓
Note: The consistent detection of any anthropogenic compounds should be reported to the EM&H Manager, as well as documented and discussed in the Verification and Validation Report.		
Were any anthropogenic compounds starting to appear consistently in the samples?		✓
Were concentrations consistently reported in units of micrograms per liter (ug/L) for organics and milligrams per Liter (mg/L) for applicable general chemistry parameters and constituents?	✓	
Were the applicable standard methods used for all the analyses?	✓	
Note: The EM&H Manager should be contacted if the data completeness objective of 100% is not met for any Verification and Validation Report since resampling and/or reanalysis of Detection Monitoring Program (DMP) samples may be required.		
Was 100% of the sample analysis data usable and valid?	✓	

[signature] 9-5-2013 [signature] 9/18/13

Data Validator Date Completeness Reviewer Date

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CofC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with hydrochloric acid?	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 1.0°C	✓	
Was the analysis holding time of 14 days met for all samples? 5/3 vs 5/2	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact, e.g., no air bubbles in the vials?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a 4-bromofluorobenze (BFB) tuning compound analysis performed at the beginning and every 12 hours during VOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z (mass per unit charge) 95?	✓	
Were the ion abundance criteria listed in Method 8260 met?	✓	

INITIAL CALIBRATION	YES	NO	
Were a minimum of 5 calibration standards used for the initial calibration?	✓		
Did the calibration standards contain all the target VOC compounds?	✓		
Was the low standard at or below the concentration of the MRL, e.g., 5.0 µg/L?	✓		(a)
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓	
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓		
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD? NA Avg RRF not used		✓	
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to be within 20% of the expected concentration?	✓		

2.0ng/5.0mL = 0.4µg/L

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the VOCs in the CCVs agree to within 20% difference (bias) of the standard CCV concentration? Note that the CCV concentration may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory MB analyzed for each 12-hour period of GC/MS instrument operation?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Was a trip blank (one per DMP sample set) analyzed?	✓	
Was a field blank analyzed (one per DMP sample set)	✓	
Were the concentrations of any VOCs detected in the laboratory method blank samples < MRL?	✓	
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL? Field Blank contained 7.7 µg/L 2-butanone		✓

SYSTEM MONITORING COMPOUNDS (SURROGATES)	YES	NO
Note: Flag the data if System Monitoring Compound (SMC) recoveries are outside the recovery objective with no evidence of sample reanalysis.		
Were a minimum of three (3) SMCs added to all samples and blanks prior to GC/MS analysis?	✓	
Were the SMC recoveries reported on the SMC recovery form consistent with the raw data?	✓	
Did the SMC recoveries meet the 70-130% recovery objective or the QC recovery chart limits established historically by the laboratory?	✓	
Did the lab need to reanalyze any samples because the SMC recovery objective was not met?		✓

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS sample prepared and analyzed with each DMP sample set?	✓	
Was the LCS sample spiked with all the DMP target VOCs?	✓	
Did the LCS recoveries for all the target VOCs meet the 70-130% recovery objective?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and MSD prepared and analyzed with each DMP sample set?	✓	
Were the MS/MSD samples spiked with all the DMP target VOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for target DMP target VOCs meet the accuracy objective specified in the EPA Functional Guidelines? (60-140% recovery) or the QC recovery control chart limits established historically by the laboratory?	✓	
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were the retention times of the internal standards (IS) in the samples within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS in the samples within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the Relative Retention Times (RRTs) of any target VOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

Attachment 3 – Volatile Organic Compounds Data Review, EPA SW-846 8260B and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO
Was a forward search of the VOC mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓	
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.		
Were any VOC Tentatively Identified Compounds (TICs) detected in the trip blank and field blank samples?	✓	(a)
Were any VOC TICs detected in the groundwater samples?		✓

Data Validator 8-27-13 Date

Completeness Reviewer 9/18/13 Date

(a) The field blank contained a series of ketones including acetone, 2-butanone, and higher ketones that were not detected in the groundwater. The trip blank contained trace methylene chloride and chloroform that were not detected in the groundwater.

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 1.0°C at receipt	✓	
Were the samples extracted within 7 days of sample collection? 5/6 vs 5/2	✓	
Were the extracts analyzed within 40 days of sample extraction? 5/7 vs 5/6	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical?	✓	
Was the integrity of each sample intact?	✓	

GC/MS INSTRUMENT PERFORMANCE CHECK	YES	NO
Was a DFTPP (decafluorotriphenylphosphine) tuning compound analysis performed at the beginning and every 12 hours during SVOC instrument operation?	✓	
Were the tuning mass assignments correct?	✓	
Was the ion abundance listing normalized to m/z 198?	✓	
Were the ion abundance criteria listed in Method 8270C met?	✓	

INITIAL CALIBRATION	YES	NO
Were a minimum of five (5) calibration standards used for the initial calibration?	✓	
Did the calibration standards contain all the target SVOCs?	✓	
Was the low standard at or below the MRL for the method, e.g., ≤ 5.0 ug/mL in the standard? 2.0 µg/mL	✓	
Were the samples quantified using the average relative response factors from the initial calibration curve?		✓
Alternatively were the samples quantified relative to the initial calibration standards using linear and/or quadratic regression curves yielding R^2 coefficients of > 0.990?	✓	
Did the calculated percent Relative Standard Deviations (RSDs) of the average Relative Response Factors (RRFs) meet the ≤ 15% RSD objective for all the compounds except for the Calibration Check Compounds (CCCs) where the % RSD requirement is ≤ 30% RSD? NA Avg RRF not used.		✓
Were all the samples analyzed within 12 hours of an instrument performance check Standard (ICV or CCV) which verified the accuracy of the selected quantitation technique to within 20% of the expected concentration?	✓	

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

CONTINUING CALIBRATION VERIFICATION	YES	NO
Were CCV standards analyzed prior to samples and every 12 hours thereafter during instrument operation?	✓	
Did the reported concentrations of the SVOCs in the CCVs agree to within 20% difference (bias) of the average of the CCV standard concentration? Note that CCV concentrations may be calculated using RRFs or linear regression.	✓	

BLANKS	YES	NO
Was a laboratory method blank extracted along with each SDG batch?	✓	
Note: Review shall include both forms and raw data chromatograms.		
Were the concentrations of any SVOCs detected in the laboratory method blank sample < MRL?	✓	

SURROGATE SPIKES	YES	NO
Were three (3) base-neutral and three (3) acid surrogate spike recovery compounds spiked into the groundwater and QC samples prior to extraction?	✓	
Were the surrogate recoveries reported on the surrogate recovery form consistent with the raw data?	✓	
Note: Flag the data if surrogate recoveries are outside the objective range with no evidence of sample re-injection or re-extraction.		
Did the surrogates meet the EPA Functional Guidelines accuracy objective of 15-110% recovery for acid surrogates and 30-130% recovery for base neutral surrogates?	✓	
Alternatively, were the surrogate recoveries within the historical control chart limits established by the laboratory for aqueous samples?	✓	
Did the laboratory need to re-inject or re-extract any samples because the surrogate recovery objective was not met?		✓

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

LABORATORY CONTROL SAMPLES	YES	NO
Was a LCS prepared and analyzed for each batch of DMP samples?	✓	
Was the LCS sample spiked with all the target SVOCs?	✓	
Did the LCS recoveries meet the EPA guidance accuracy objectives of 40-140% recovery for base neutral compounds and 30-130% recovery for acidic compounds?	✓	
Alternatively, were the LCS recoveries within the laboratory's historical control chart limits?	✓	
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤ 20 RPD for each compound?	✓	

MATRIX SPIKE/MATRIX SPIKE DUPLICATE	YES	NO
Were a MS and a MSD prepared and analyzed for each batch of DMP samples?	✓	
Were the MS/MSD samples spiked with all the DMP target SVOCs?	✓	
Was a DMP sample used to generate the MS/MSD samples?	✓	
Did the MS/MSD recoveries for the DMP target SVOCs meet the EPA Functional Guidelines accuracy objective of 40-140% recovery for base neutral compounds and 30-130% recovery for acid compounds?	✓	
Alternatively, were the matrix spike recoveries within the laboratory's historical control chart limits?	✓	
Was the precision of the MS/MSD recoveries calculated and reported?	✓	
Did the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓	

INTERNAL STANDARDS	YES	NO
Were a minimum of six (6) IS spiked into extracts of samples and blanks prior to GC/MS analysis?	✓	
Were the retention times of the IS within ±30 seconds of the retention times of the IS in the associated CCV?	✓	
Were the areas of the IS within -50% to +100% of the areas in the associated CCV?	✓	

TARGET COMPOUND IDENTIFICATION	YES	NO
Were the RRTs of any target SVOCs detected in the samples within ±0.06 RRT units of the RRT of the compounds in the nearest CCV?	✓	
Were all the major peaks in the GC/MS total ion chromatogram identified either on the chromatogram or on the associated quantitation report?	✓	

Attachment 4 – Semivolatile Organic Compounds Data Review, EPA SW-846 8270C and 8000B (or newer versions)

TENTATIVELY IDENTIFIED COMPOUNDS	YES	NO
Was a forward search of the mass spectral library performed on all samples and blanks to check for the presence of any non-target compounds?	✓	
Note: When a low-level non-target compound that is a common artifact or laboratory contaminant is detected in a sample, a thorough check of blank chromatograms may require looking for peaks that are less than 10% of the IS height, but present in the blank chromatogram at similar RRTs.		
Were any SVOC TICs detected in the laboratory method blank sample?	✓	
Were any SVOC TICs detected in the groundwater samples?	✓	(a)

Data Validator 8.27-13 Date

Completeness Reviewer 9/18/13 Date

(a) Bis-phenol A appeared in the groundwater samples but is a common antioxidant artifact.

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

HOLDING TIMES	YES	NO
Based on the CoC/RFA and/or SDG narrative, were aqueous samples preserved to pH≤2 with nitric acid?	✓	
Were holding times met for all sample digestions and analyses? Maximum holding time is 28 days for Mercury and 6 months for the other metals.	✓	
Was the integrity of each sample intact?	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? prep 5/7 Analysis 5/9	✓	

INDUCTIVELY COUPLED PLASMA (ICP) CALIBRATION, EPA SW-846 6010B	YES	NO
Was the correlation coefficient (R^2) of the initial calibration ≥0.995 for each metal?	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples?	✓	
Was the initial ICV analyzed immediately after calibration and prior to sample analysis?	✓	
Was the ICV prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓	
Did the ICV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue?	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals?	✓	

ICP BLANKS	YES	NO
Was an ICB analyzed immediately after the ICV?	✓	
Were CCBs analyzed in the sample queue every 10 samples and immediately after the CCVs to evaluate drift, sensitivity, and contamination?	✓	
Were the ICB and CCB analysis results all <MRL for each metal?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP INTERFERENCE CHECK SAMPLE	YES	NO
Were Interference Check Standards (ICS & ICS Element) analyzed daily prior to sample analysis?	✓	
Were the concentrations of all the target trace metals (not including Ca and Mg) < two times the MRL in the ICS?	✓	
Did the recoveries of the trace metals in the ICS Element standards meet the accuracy objective of 80-120% recovery? pp. 512-513	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a LCS, LCSD, MS, and MSD along with the requisite QC blanks and check standards (MB, ICV, ICB, CCB, ICS, and ICS Element)?	✓	
Was a DMP sample used for the MS and MSD?	✓	

METHOD PERFORMANCE	YES	NO
Were the concentrations of any metals detected in the method blanks at a concentration < MRL?	✓	
Did the metals in the LCS meet the accuracy objective of 80-120% recovery?	✓	
Did the metals in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	✓	

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO	
Were the samples digested within 28 days of sample collection? 5/20 vs 5/2	✓		
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank?	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		(a)
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve?	✓		
Did the ICV analysis meet the accuracy objective of 90-110% recovery?	✓		
Were CCV standards analyzed at a frequency of once every 10 samples and at the end of the sample queue?	✓		
Did the CCV analyses meet the accuracy objective of 80-120% recovery?	✓		
Did the sample set contain a MB, LCS, MS, and MSD?	✓		
Was a DMP Sample used for the MS/MSD?	✓		
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓		
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓		
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		

(a) p. 677

Attachment 5 – Metals Data Review, EPA SW-846 Methods 6010B, 6020A, and 7470A (or newer versions)

ICP/MS Analysis for Selected Trace Metals, e.g., As, Sb, Se, and Tl, by EPA SW-846 6020A	YES	NO
Was the holding time met for the ICP/MS analysis?	✓	
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓	
Was a DMP sample used for the MS/MSD?	✓	
Was an ICV analyzed after the initial calibration?	✓	
Were a CCB and CCV analyzed during the sample queue?	✓	
Did the CCV meet the accuracy objective of 90-110% recovery?	✓	
Was the concentration of any metals detected in the CCB at < 0.001 mg/L?	✓	
Did the metals in the LCS and LCSD meet the accuracy objective of 85-115% recovery?	✓	
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery?	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓	

[signature] 9-5-2013 [signature] 9/18/13

Data Validator Date Completeness Reviewer Date

Attachment 6 – Anions (Chloride and Sulfate) Data Review, EPA Method 300.0

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 28 days of collection for analysis of chloride and sulfate? (Note that sulfate concentrations are not reported but are needed for cation/anion balance calculations.) 5/3 vs 5/2	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions?	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue?	✓	
Were Continuing Calibration Verification (CCV) standards of differing concentrations analyzed periodically throughout the sample set?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD?	✓	

METHOD PERFORMANCE	YES	NO
Was the laboratory method blank concentration of the anions <MRL (Method Reporting Limit)?	✓	
Did the ICV and CCV analyses meet the accuracy objective of 90-110% recovery?	✓	
Did the LCS meet the accuracy objective of 90-110% recovery?	✓	
NOTE: If the normal MS spike concentration is < 25% of the native sample concentration (i.e., high native sample concentration) the MS and MSD recoveries and precision are not applicable.		
Did the MS and MSD analyses of applicable anions meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	✓	

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument?	✓	
Were the appropriate dilution factors applied to the results?	✓	

[signature] 9-5-2013
Data Validator Date

[signature] 9/18/13
Completeness Reviewer Date

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C?	✓	
Were the samples analyzed within 14 days of collection? 5/7 vs 5/2	✓	

REAGENTS	YES	NO
Was the pH meter standardized prior to analysis of the samples using the SOP for pH measurement?	✓	
Was 0.02 N standardized sulfuric acid used as the titrant?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set include a laboratory method blank, Laboratory Control Sample (LCS), Matrix Spike (MS), and Matrix Spike Duplicate (MSD)?		✓ (a)
Was the starting pH of the sample ≤8.30?	✓	
Was a DMP sample used for the MS/MSD?		✓

METHOD PERFORMANCE	YES	NO
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 4.2 mg/L	✓	
Did the LCS recovery meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 80-120% recovery?		NA
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)?		NA
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?		NA

Data Validator 9-5-13 Date

Completeness Reviewer 9/18/13 Date

(a) The lab analyzed MS/MSD using samples from another client. The results were not in the WQSP-6 data package.

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? 5/6, 5/7 vs. 5/2	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards?	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration?	✓	
Was the proper Temperature Correction Factor applied to the conductivity measurements?	✓	

ANALYSIS QUEUE	YES	NO
Was a second source mid-range ICV conductivity standard analyzed prior to the samples? 1411 µS	✓	
Was a CCV conductivity standard analyzed within and at the end of the sample queue (rotate between 10, 100, 1000, and 10,000 µmhos/cm conductivity standards)?	✓	
Was one of the samples analyzed in duplicate?		✓ (a)

METHOD PERFORMANCE	YES	NO
Did the ICV analysis yield a concentration within 90-110% of the standard concentration?	✓	
Did the CCV analyses yield a concentration within 90-110% of the standard concentration?	✓	
Did the duplicate sample meet the precision objective of ≤20 RPD?		NA

Data Validator 9-5-13 Date

Completeness Reviewer 9/18/13 Date

(a) The lab failed to analyze the duplicate QC sample.

Attachment 9 – pH Data Review, SM 4500-H+

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°?	✓	
Were the samples analyzed within five (5) days of receipt? 5/6 vs 5/3	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument?	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 101	✓	

SAMPLE ANALYSIS	YES	NO
Did the standard buffers bracket the pH range of the samples?	✓	
Was a CCV analyzed within and at the end of the sample batch?	✓	
Was the sample analysis temperature within 2°C of the buffer analysis temperature? 7.00 buffer 17.9°C; Sample 20.3°C		✓
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate?		✓ (a)

METHOD PERFORMANCE	YES	NO
Did the ICV read within ±0.1 pH unit of the assigned value? 6.97 vs 7.00	✓	
Did the CCV read within ±0.1 pH unit of the assigned value? 6.98 vs 7.00	✓	
Did the duplicate sample read within ±0.1 pH unit of the primary sample?		NA

[signature] 9-5-13
Data Validator Date

[signature] 9/18/13
Completeness Reviewer Date

(a) Lab failed to analyze a groundwater sample in duplicate.

Attachment 10 – Specific Gravity Data Review, SM 2710F

SAMPLE ANALYSIS	YES	NO
Were the samples allowed to warm to near room temperature prior to measurement of specific gravity?	✓	
Was the temperature of the specific gravity measurements recorded? 20.7°C	✓	
Was the mass of at least 5.0 mL of the water sample measured? 10.0 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 1.2°C		✓
Was the Temperature Correction Factor recorded? 0.9982	✓	

D Jenkins 9-5-13
Data Validator Date

D Ottaviano 9/18/13
Completeness Reviewer Date

QC duplicate sample was analyzed with a RPD of 0.19.

Attachment 11 – Total Organic Carbon Data Review, SM 5310B

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? 5/8 vs. 5/2	✓	

ANALYSIS QUEUE	YES	NO	
Was the instrument calibrated daily with a 5-point calibration curve?	✓		
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set?	✓		
Did the sample set include an Initial Calibration Blank (ICB), laboratory method blank, LCS, LCSD, MS, and MSD?	✓		
Was a DMP sample used for the MS/MSD?	✓		
Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓		(a)
Were quadruplicate measurements taken for each sample?	✓		
Were both the average and the range reported for the quadruplicate measurements?	✓		

METHOD PERFORMANCE	YES	NO
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)?	✓	
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓	
Were the results for the laboratory method blank, the ICB and CCB < MRL?	✓	
Did the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓	
Did the MS and MSD meet the accuracy objective of 75-125% recovery?	✓	
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓	

D Jungclaus 9-5-13
Data Validator Date

D Andersen 9/18/13
Completeness Reviewer Date

(a) CCV termed ICV on rm log.

Attachment 12 – Total Dissolved Solids Data Review, SM 2540C

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? 5/8 vs 5/2	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, MS, and MSD?	✓	
Was a DMP Sample used for the MS/MSD?	✓	
Was the initial volume of each sample 100 mL? 2.0 mL diluted to 100		✓
Were any DMP samples diluted prior to processing?	✓	
Were the samples dried twice at 180°C?	✓	
Was the MS/MSD spike concentration higher than 25% of the native sample concentration and thus usable for recovery determination?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)?	✓	
Did the LCS analysis meet the accuracy objective of 80-120% recovery?	✓	
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓	
If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD?	✓	

[signature] 9-5-13
Data Validator Date

[signature] 9/18/13
Completeness Reviewer Date

Attachment 13 – Total Suspended Solids Data Review, SM 2540D

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis?	✓	
Were the samples analyzed within 7 days of collection? 5/7 vs 5/2	✓	
Were the samples allowed to warm to room temperature prior to filtration?	✓	

ANALYSIS QUEUE	YES	NO
Did the sample set contain a laboratory method blank, LCS, and duplicate sample?	✓	
Was the volume of each sample 100 mL?	✓	
Were the samples dried twice at approximately104°C?	✓	

METHOD PERFORMANCE	YES	NO
Was the difference between consecutive dry weights <0.0005 g (0.5 mg)?	✓	
Was the MB result <5.0 mg/L?	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? 10.5	✓	

9-5-13
Data Validator Date

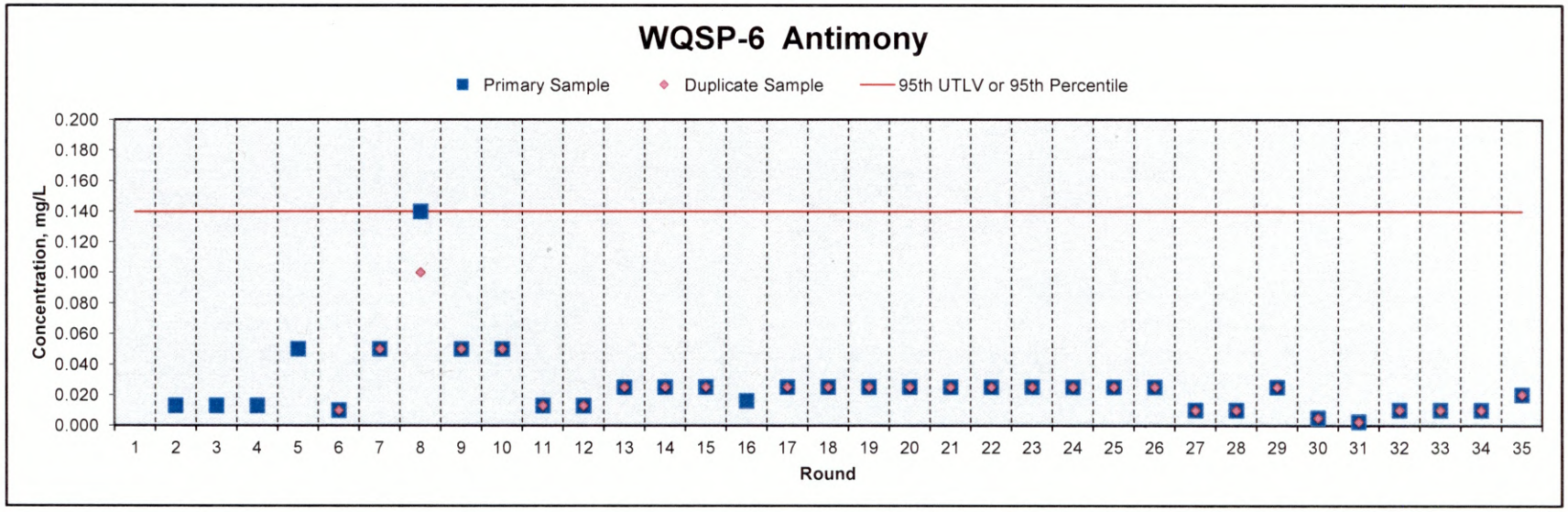
9/18/13
Completeness Reviewer Date

WQSP-6

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

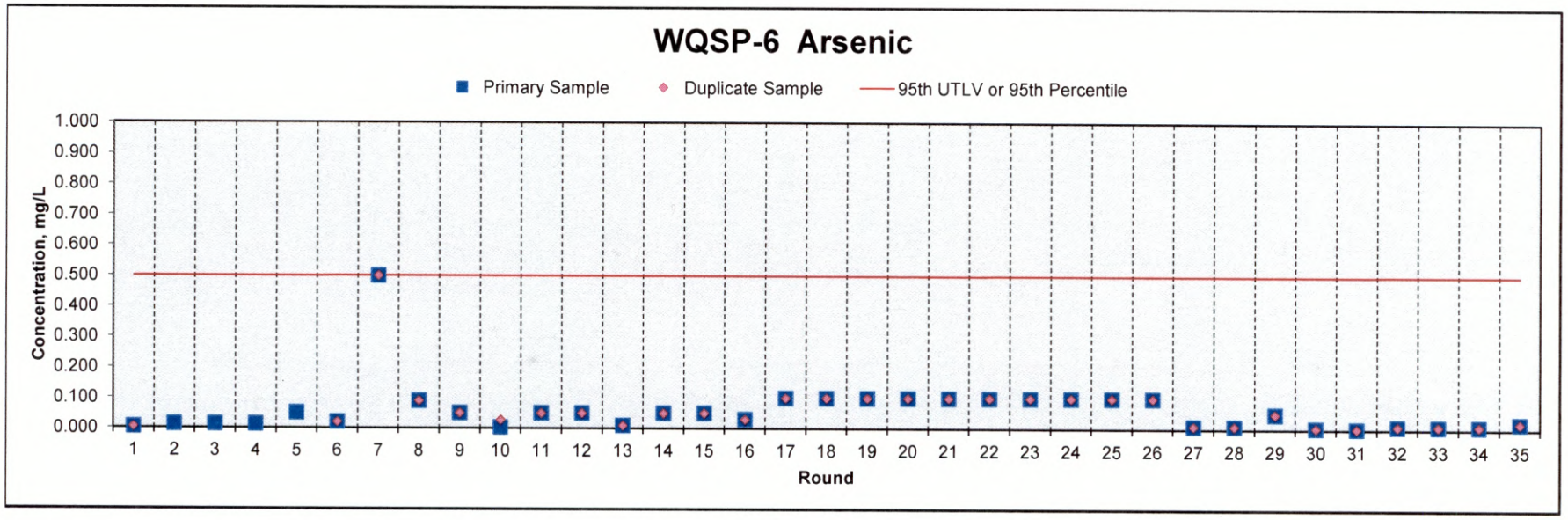
WQSP-6 Antimony

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Antimony	1							0.140
Antimony	2	10/10/96	10/15/96	< 0.013		mg/L	0.013	0.140
Antimony	3	06/27/96	07/27/96	< 0.013		mg/L	0.013	0.140
Antimony	4	04/03/97	04/11/97	< 0.013		mg/L	0.013	0.140
Antimony	5	06/25/97	07/11/97	< 0.050		mg/L	0.050	0.140
Antimony	6	06/03/98	06/05/98	< 0.010	< 0.010	mg/L	0.001	0.140
Antimony	7	10/21/98	11/27/98	< 0.050	< 0.050	mg/L	0.050	0.140
Antimony	8	05/19/99	05/29/99	0.140	0.100	mg/L	0.050	0.140
Antimony	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	0.140
Antimony	10	05/10/00	06/20/00	< 0.050	< 0.050	mg/L	0.050	0.140
Antimony	26	03/19/08	03/24/08	< 0.025	< 0.025	mg/L	0.025	0.140
Antimony	27	09/17/08	10/01/08	< 0.010	< 0.010	mg/L	0.025	0.140
Antimony	28	03/11/09	03/18/09	< 0.010	< 0.010	mg/L	0.010	0.140
Antimony	29	09/16/09	10/12/09	< 0.025	< 0.025	mg/L	0.025	0.140
Antimony	30	03/10/10	04/08/10	< 0.0050	< 0.0050	mg/L	0.0050	0.140
Antimony	31	09/29/10	10/08/10	< 0.0025	< 0.0025	mg/L	0.0025	0.140
Antimony	32	05/25/11	06/02/11	< 0.010	< 0.010	mg/L	0.010	0.140
Antimony	33	10/05/11	10/13/11	< 0.010	< 0.010	mg/L	0.010	0.140
Antimony	34	05/15/12	05/31/12	< 0.010	< 0.010	mg/L	0.010	0.140
Antimony	35	05/02/13	05/16/13	< 0.020	< 0.020	mg/L	0.020	0.140



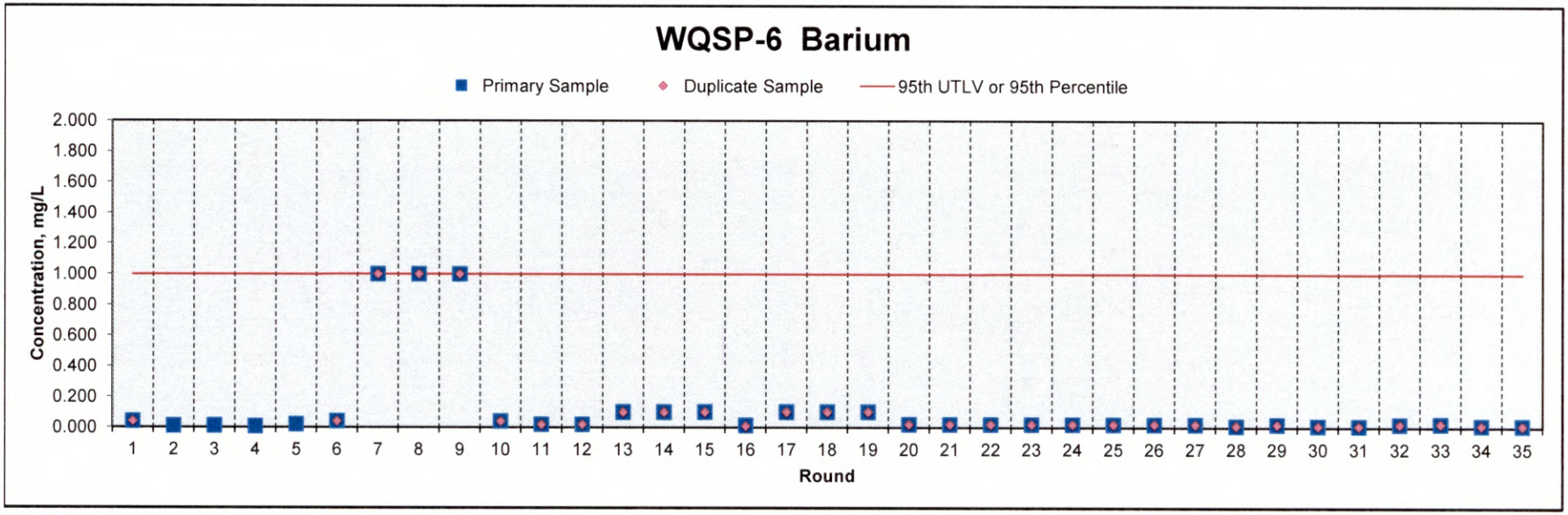
WQSP-6 Arsenic

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Arsenic	1	10/16/95	11/02/95	< 0.004	< 0.004	mg/L	0.004	< 0.5
Arsenic	2	10/10/96	10/15/96	< 0.013		mg/L	0.013	< 0.5
Arsenic	3	06/27/96	07/27/96	< 0.013		mg/L	0.013	< 0.5
Arsenic	4	04/03/97	04/11/97	< 0.013		mg/L	0.013	< 0.5
Arsenic	5	06/25/97	07/11/97	< 0.050		mg/L	0.050	< 0.5
Arsenic	6	06/03/98	06/05/98	< 0.020	< 0.020	mg/L	0.001	< 0.5
Arsenic	7	10/21/98	11/27/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Arsenic	8	05/19/99	05/29/99	0.090	0.090	mg/L	0.050	< 0.5
Arsenic	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	10	05/10/00	06/20/00	0.003	0.027	mg/L	0.050	< 0.5
Arsenic	26	03/19/08	03/24/08	< 0.100	< 0.100	mg/L	0.100	< 0.5
Arsenic	27	09/17/08	10/01/08	< 0.010	< 0.010	mg/L	0.100	< 0.5
Arsenic	28	03/11/09	03/18/09	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	29	09/16/09	10/12/09	< 0.050	< 0.050	mg/L	0.050	< 0.5
Arsenic	30	03/10/10	04/08/10	< 0.0050	< 0.0050	mg/L	0.0050	< 0.5
Arsenic	31	09/29/10	10/08/10	0.0032	0.0033	mg/L	0.0025	< 0.5
Arsenic	32	05/25/11	06/02/11	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	33	10/05/11	10/13/11	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	34	05/15/12	05/31/12	< 0.010	< 0.010	mg/L	0.010	< 0.5
Arsenic	35	05/02/13	05/16/13	< 0.020	< 0.020	mg/L	0.020	< 0.5



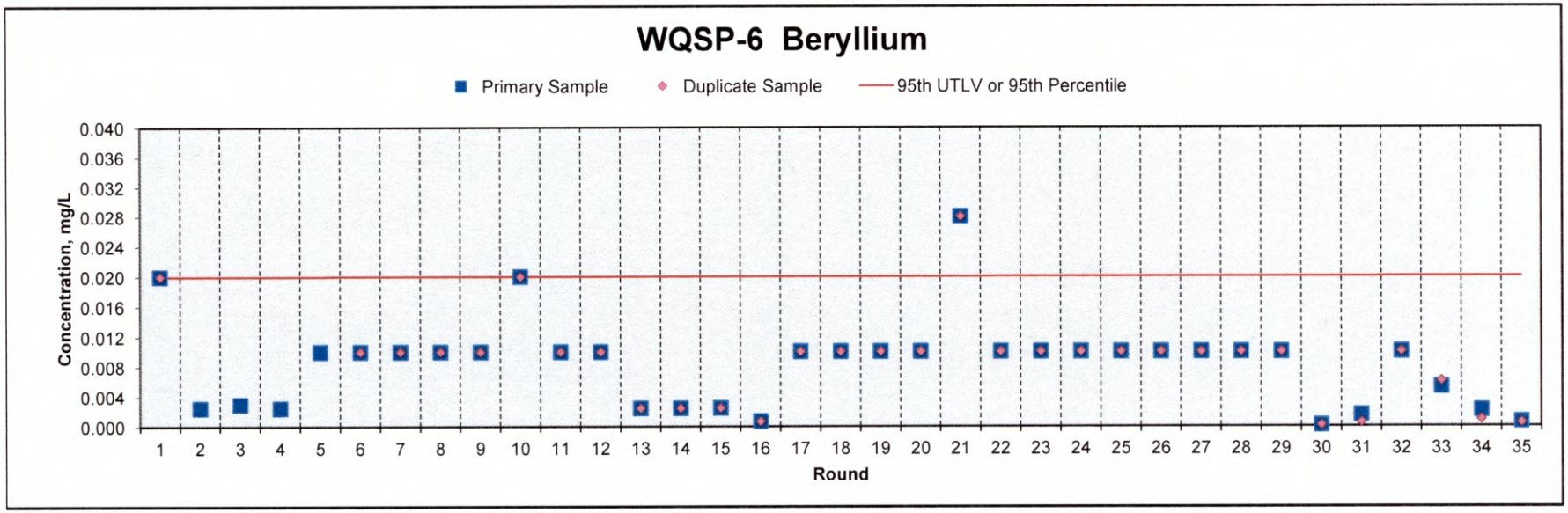
WQSP-6 Barium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Barium	1	10/16/95	10/25/95	< 0.040	< 0.040	mg/L	0.040	< 1.0
Barium	2	10/10/96	10/15/96	0.010		mg/L	0.005	< 1.0
Barium	3	06/27/96	07/27/96	0.011		mg/L	0.005	< 1.0
Barium	4	04/03/97	04/11/97	0.007		mg/L	0.005	< 1.0
Barium	5	06/25/97	07/11/97	< 0.020		mg/L	0.020	< 1.0
Barium	6	06/03/98	06/05/98	< 0.040	< 0.040	mg/L	0.004	< 1.0
Barium	7	10/21/98	11/27/98	< 1.000	< 1.000	mg/L	1.00	< 1.0
Barium	8	05/19/99	05/29/99	< 1.000	< 1.000	mg/L	1.00	< 1.0
Barium	9	11/03/99	11/25/99	< 1.000	< 1.000	mg/L	1.00	< 1.0
Barium	10	05/10/00	06/20/00	< 0.040	< 0.040	mg/L	0.04	< 1.0
Barium	26	03/19/08	03/24/08	< 0.020	< 0.020	mg/L	0.02	< 1.0
Barium	27	09/17/08	10/01/08	< 0.020	< 0.020	mg/L	0.02	< 1.0
Barium	28	03/11/09	03/18/09	< 0.010	< 0.011	mg/L	0.02	< 1.0
Barium	29	09/16/09	10/12/09	< 0.020	< 0.020	mg/L	0.02	< 1.0
Barium	30	03/10/10	03/19/10	0.0103	0.0105	mg/L	0.0004	< 1.0
Barium	31	09/29/10	10/08/10	0.0098	0.010	mg/L	0.0020	< 1.0
Barium	32	05/25/11	06/14/11	< 0.020	< 0.020	mg/L	0.020	< 1.0
Barium	33	10/05/11	10/24/11	< 0.023	< 0.023	mg/L	0.023	< 1.0
Barium	34	05/15/12	05/25/12	0.012	0.012	mg/L	0.0052	< 1.0
Barium	35	05/02/13	05/09/13	0.011	0.010	mg/L	0.00050	< 1.0



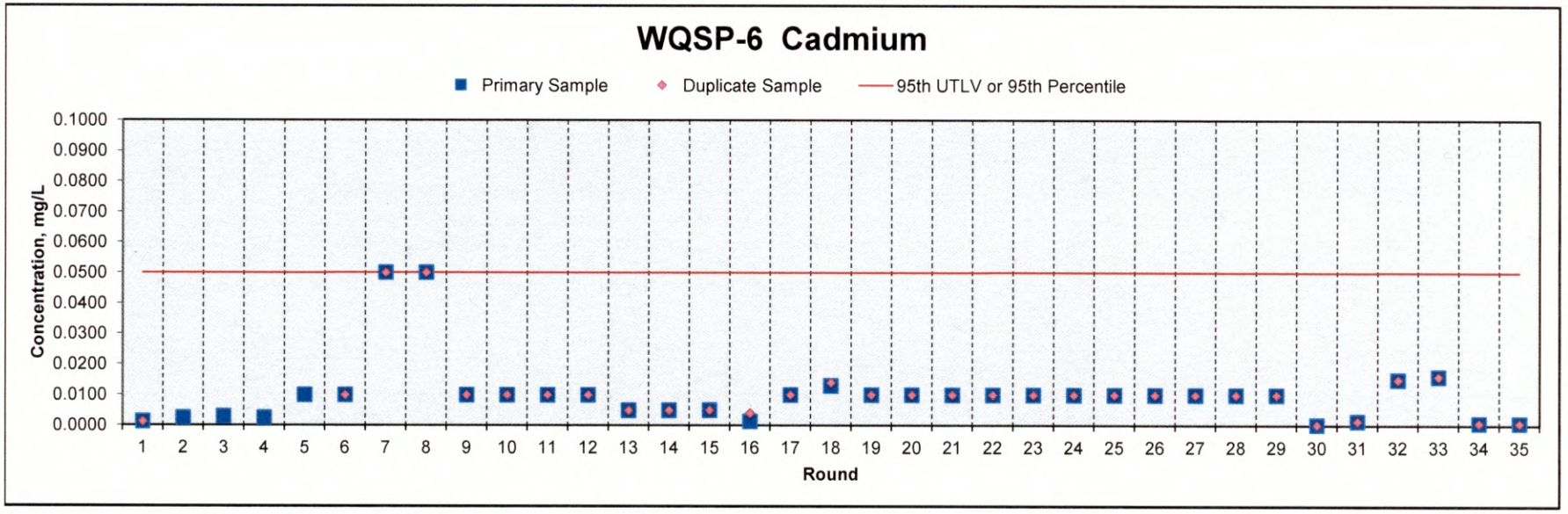
WQSP-6 Beryllium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Beryllium	1	10/16/95	10/25/95	< 0.020	< 0.020	mg/L	0.020	< 0.02
Beryllium	2	10/10/96	10/15/96	< 0.0025		mg/L	0.0025	< 0.02
Beryllium	3	06/27/96	07/27/96	< 0.0030		mg/L	0.0030	< 0.02
Beryllium	4	04/03/97	04/11/97	< 0.0025		mg/L	0.0025	< 0.02
Beryllium	5	06/25/97	07/11/97	< 0.010		mg/L	0.010	< 0.02
Beryllium	6	06/03/98	06/05/98	< 0.010	< 0.010	mg/L	0.001	< 0.02
Beryllium	7	10/21/98	11/27/98	< 0.010	< 0.010	mg/L	0.001	< 0.02
Beryllium	8	05/19/99	05/29/99	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	9	11/03/99	11/25/99	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	10	05/10/00	06/20/00	< 0.020	< 0.020	mg/L	0.020	< 0.02
Beryllium	26	03/19/08	03/24/08	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	27	09/17/08	10/01/08	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	28	03/11/09	03/18/09	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	29	09/16/09	10/12/09	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	30	03/10/10	03/19/10	< 0.00020	< 0.00020	mg/L	0.00020	< 0.02
Beryllium	31	09/29/10	10/08/10	0.0016	0.00059	mg/L	0.0010	< 0.02
Beryllium	32	05/25/11	06/14/11	< 0.010	< 0.010	mg/L	0.010	< 0.02
Beryllium	33	10/05/11	10/24/11	0.0053	0.0061	mg/L	0.0042	< 0.02
Beryllium	34	05/15/12	05/25/12	0.0022	0.0010	mg/L	0.00040	< 0.02
Beryllium	35	05/02/13	05/09/13	0.00064	0.00053	mg/L	0.00050	< 0.02



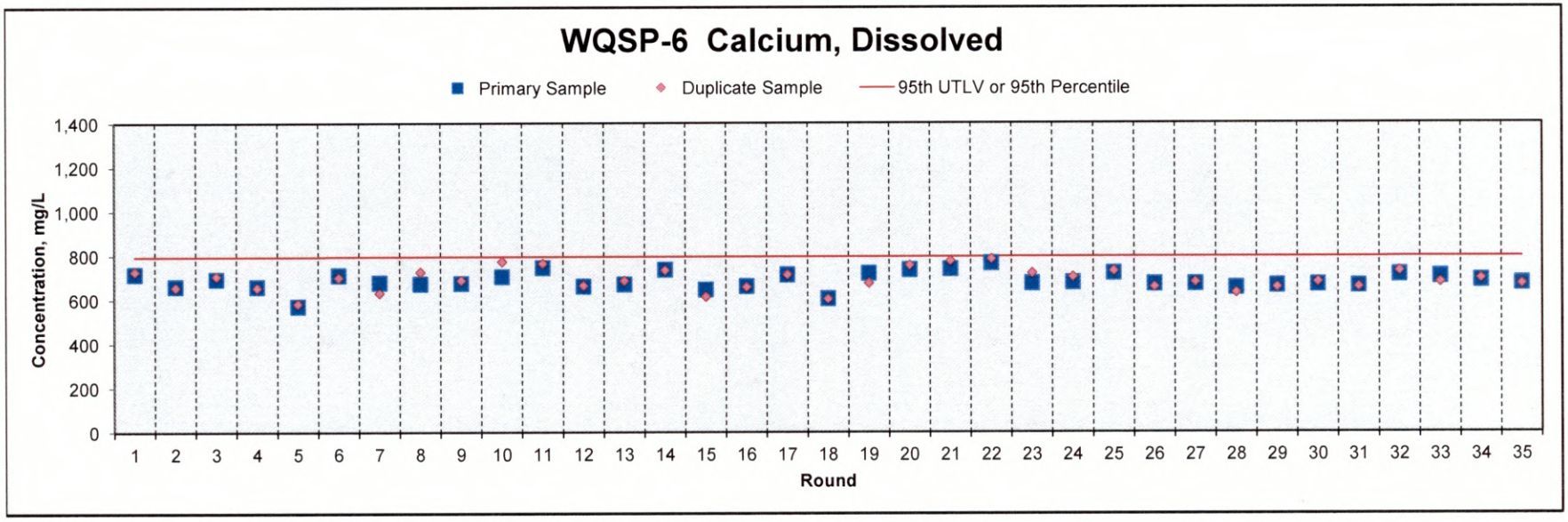
WQSP-6 Cadmium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Cadmium	1	10/16/95	11/14/95	< 0.0013	< 0.0013	mg/L	0.0013	< 0.05
Cadmium	2	10/10/96	10/15/96	< 0.0025		mg/L	0.0025	< 0.05
Cadmium	3	06/27/96	07/27/96	< 0.0030		mg/L	0.0030	< 0.05
Cadmium	4	04/03/97	04/11/97	< 0.0025		mg/L	0.0025	< 0.05
Cadmium	5	06/25/97	07/11/97	< 0.010		mg/L	0.010	< 0.05
Cadmium	6	06/03/98	06/05/98	< 0.010	< 0.010	mg/L	0.001	< 0.05
Cadmium	7	10/21/98	11/27/98	< 0.050	< 0.050	mg/L	0.005	< 0.05
Cadmium	8	05/19/99	05/29/99	< 0.050	< 0.050	mg/L	0.050	< 0.05
Cadmium	9	11/03/99	11/25/99	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	10	05/10/00	06/20/00	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	26	03/19/08	03/24/08	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	27	09/17/08	10/01/08	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	28	03/11/09	03/18/09	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	29	09/16/09	10/12/09	< 0.010	< 0.010	mg/L	0.010	< 0.05
Cadmium	30	03/10/10	03/19/10	< 0.0003	< 0.0003	mg/L	0.0003	< 0.05
Cadmium	31	09/29/10	10/08/10	< 0.0015	< 0.0015	mg/L	0.0015	< 0.05
Cadmium	32	05/25/11	06/14/11	< 0.015	< 0.015	mg/L	0.015	< 0.05
Cadmium	33	10/05/11	10/24/11	< 0.016	< 0.016	mg/L	0.016	< 0.05
Cadmium	34	05/15/12	05/25/12	< 0.00080	< 0.00080	mg/L	0.00080	< 0.05
Cadmium	35	05/02/13	05/09/13	< 0.00080	< 0.00080	mg/L	0.00080	< 0.05



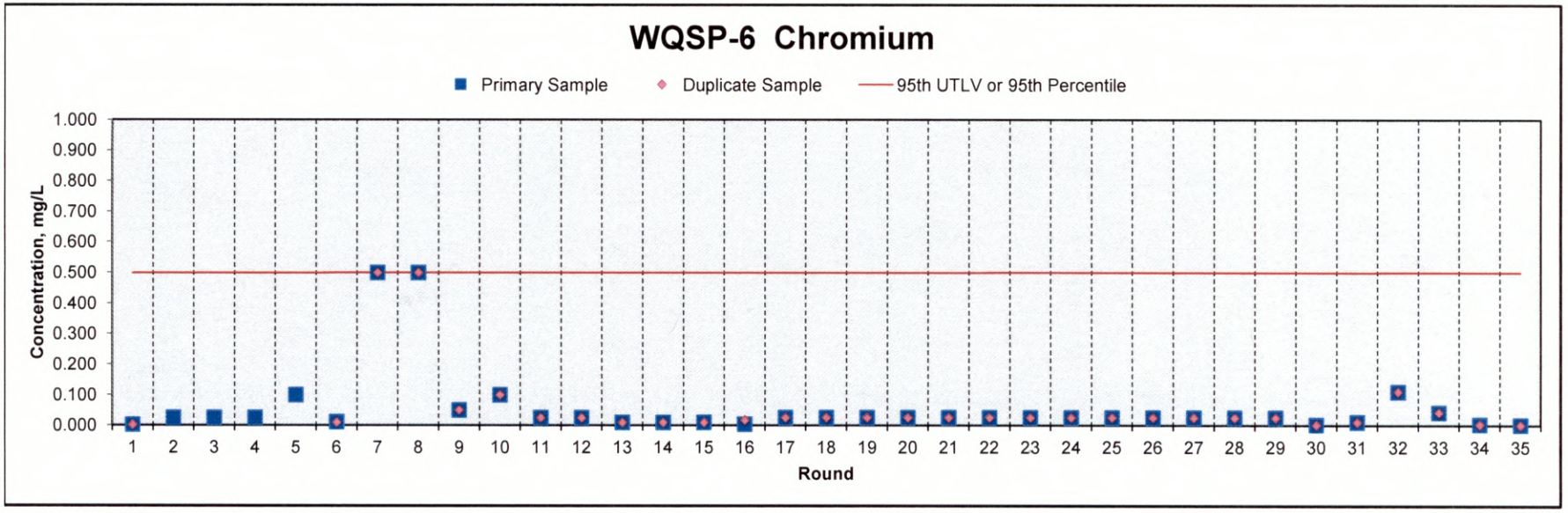
WQSP-6 Calcium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Calcium	1	10/16/95	10/25/95	719	731	mg/L	2.0	796
Calcium	2	03/12/96	03/27/96	663	659	mg/L	0.5	796
Calcium	3	06/27/96	07/26/96	696	709	mg/L	2.0	796
Calcium	4	04/03/97	04/11/97	662	657	mg/L	2.0	796
Calcium	5	06/25/97	07/11/97	572	584	mg/L	2.0	796
Calcium	6	06/03/98	06/05/98	714	704	mg/L	0.012	796
Calcium	7	10/21/98	11/27/98	680	633	mg/L	0.5	796
Calcium	8	05/19/99	05/29/99	675	728	mg/L	1.0	796
Calcium	9	11/03/99	12/09/99	677	690	mg/L	1.0	796
Calcium	10	05/10/00	06/20/00	707	774	mg/L	50.0	796
Calcium	26	03/19/08	04/02/08	672	659	mg/L	0.5	796
Calcium	27	09/17/08	10/21/08	673	680	mg/L	0.5	796
Calcium	28	03/11/09	03/18/09	656	633	mg/L	0.5	796
Calcium	29	09/16/09	10/12/09	666	657	mg/L	0.5	796
Calcium	30	03/10/10	04/05/10	670	681	mg/L	0.20	796
Calcium	31	09/29/10	10/26/10	665	659	mg/L	0.20	796
Calcium	32	05/25/11	06/08/11	714	730	mg/L	1.1	796
Calcium	33	10/05/11	10/25/11	706	680	mg/L	1.1	796
Calcium	34	05/15/12	05/23/12	688	696	mg/L	0.82	796
Calcium	35	05/02/13	05/07/13	675	671	mg/L	0.56	796



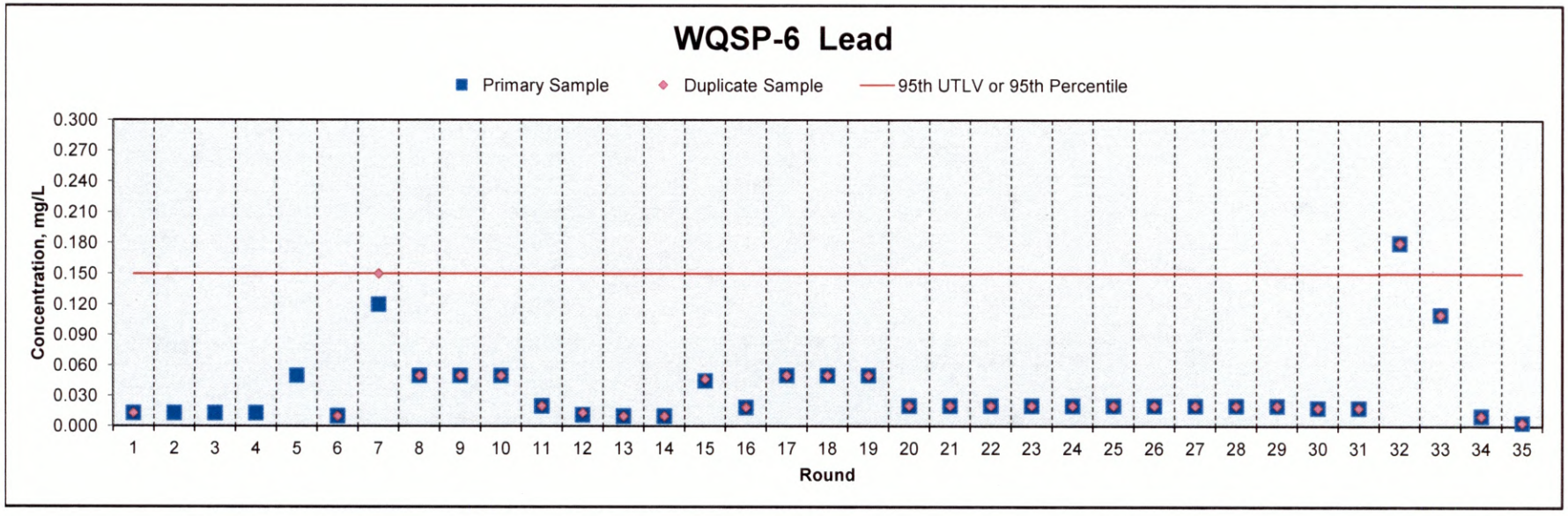
WQSP-6 Chromium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chromium	1	10/16/95	11/14/65	< 0.003	0.003	mg/L	0.0025	< 0.5
Chromium	2	10/10/96	10/15/96	< 0.025		mg/L	0.025	< 0.5
Chromium	3	06/27/96	07/27/96	< 0.025		mg/L	0.025	< 0.5
Chromium	4	04/03/97	04/11/97	< 0.025		mg/L	0.025	< 0.5
Chromium	5	06/25/97	07/11/97	< 0.100		mg/L	0.1	< 0.5
Chromium	6	06/03/98	06/05/98	0.012	< 0.010	mg/L	0.01	< 0.5
Chromium	7	10/21/98	11/27/98	< 0.500	< 0.500	mg/L	0.5	< 0.5
Chromium	8	05/19/99	05/29/99	< 0.500	< 0.500	mg/L	0.5	< 0.5
Chromium	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.05	< 0.5
Chromium	10	05/10/00	06/20/00	< 0.100	< 0.100	mg/L	0.1	< 0.5
Chromium	26	03/19/08	03/24/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	27	09/17/08	10/01/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	28	03/11/09	03/18/09	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	29	09/16/09	10/12/09	< 0.025	< 0.025	mg/L	0.025	< 0.5
Chromium	30	03/10/10	03/19/10	< 0.0022	< 0.0022	mg/L	0.0022	< 0.5
Chromium	31	09/29/10	10/08/10	< 0.011	< 0.011	mg/L	0.011	< 0.5
Chromium	32	05/25/11	06/14/11	< 0.11	< 0.11	mg/L	0.11	< 0.5
Chromium	33	10/05/11	10/24/11	< 0.042	< 0.042	mg/L	0.042	< 0.5
Chromium	34	05/15/12	05/25/12	< 0.0032	< 0.0032	mg/L	0.0032	< 0.5
Chromium	35	05/02/13	05/09/13	< 0.0015	< 0.0015	mg/L	0.0015	< 0.5



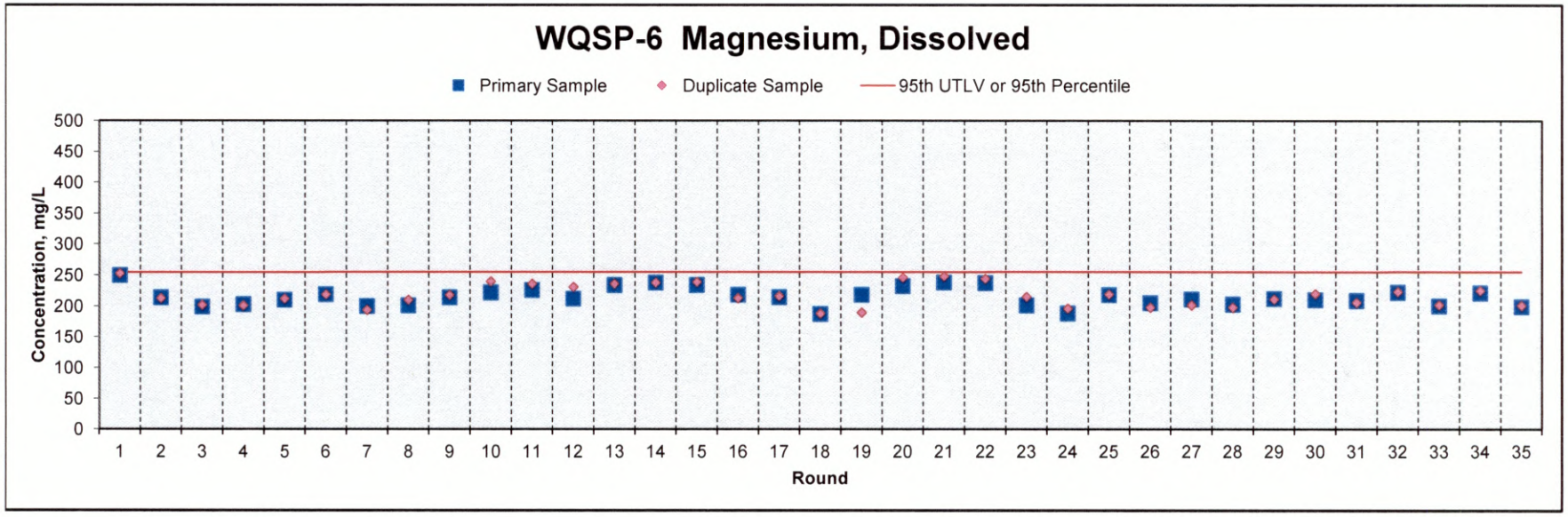
WQSP-6 Lead

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Lead	1	10/16/95	11/14/95	< 0.013	< 0.013	mg/L	0.013	0.150
Lead	2	10/10/96	10/15/96	< 0.013		mg/L	0.013	0.150
Lead	3	06/27/96	07/27/96	< 0.013		mg/L	0.013	0.150
Lead	4	04/03/97	04/11/97	< 0.013		mg/L	0.013	0.150
Lead	5	06/25/97	07/11/97	< 0.050		mg/L	0.05	0.150
Lead	6	06/03/98	06/05/98	< 0.010	< 0.010	mg/L	0.001	0.150
Lead	7	10/21/98	11/27/98	0.120	0.150	mg/L	0.005	0.150
Lead	8	05/19/99	05/29/99	< 0.050	< 0.050	mg/L	0.05	0.150
Lead	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.05	0.150
Lead	10	05/10/00	06/20/00	< 0.050	< 0.050	mg/L	0.05	0.150
Lead	26	03/19/08	03/24/08	< 0.020	< 0.020	mg/L	0.02	0.150
Lead	27	09/17/08	10/01/08	< 0.020	< 0.020	mg/L	0.02	0.150
Lead	28	03/11/09	03/18/09	< 0.020	< 0.020	mg/L	0.02	0.150
Lead	29	09/16/09	10/12/09	< 0.020	< 0.020	mg/L	0.02	0.150
Lead	30	03/10/10	03/19/10	< 0.018	< 0.018	mg/L	0.018	0.150
Lead	31	09/29/10	10/08/10	< 0.018	< 0.018	mg/L	0.018	0.150
Lead	32	05/25/11	06/14/11	< 0.18	< 0.18	mg/L	0.18	0.150
Lead	33	10/05/11	10/24/11	< 0.11	< 0.11	mg/L	0.11	0.150
Lead	34	05/15/12	05/25/12	< 0.010	< 0.010	mg/L	0.010	0.150
Lead	35	05/02/13	05/09/13	< 0.0034	< 0.0034	mg/L	0.0034	0.150



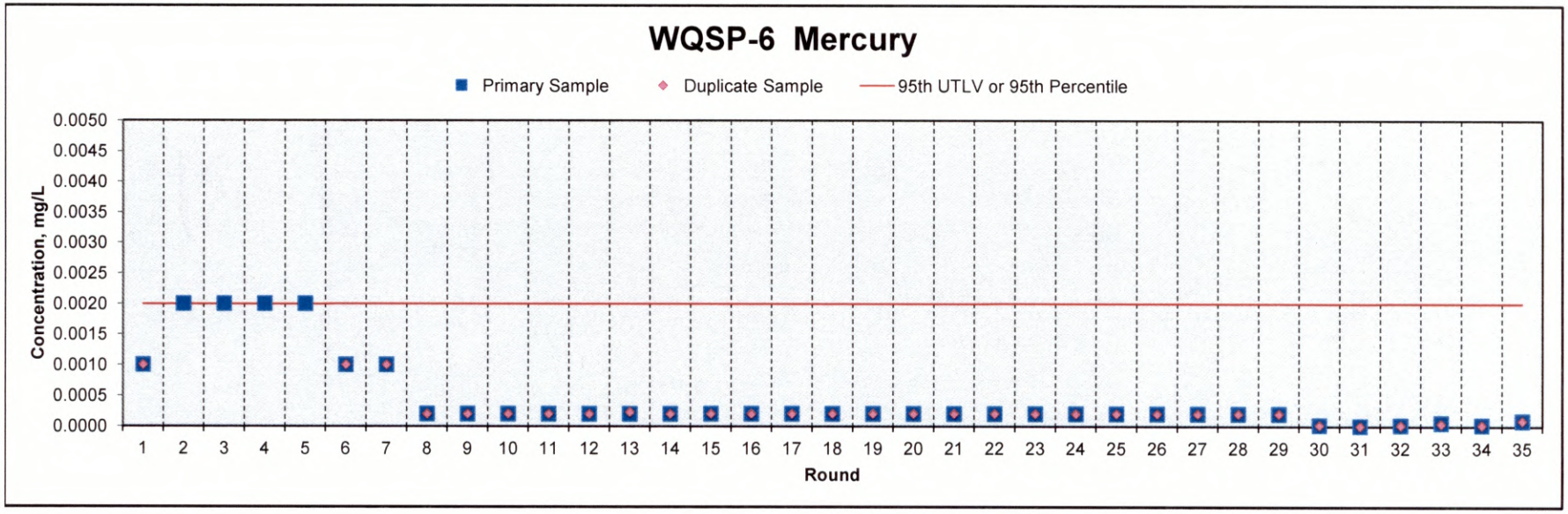
WQSP-6 Magnesium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Magnesium	1	10/16/95	10/25/95	250	253	mg/L	1.0	255
Magnesium	2	03/12/96	03/27/96	214	213	mg/L	0.13	255
Magnesium	3	06/27/96	07/26/96	199	202	mg/L	0.5	255
Magnesium	4	04/03/97	04/11/97	203	201	mg/L	1.0	255
Magnesium	5	06/25/97	07/11/97	210	212	mg/L	1.0	255
Magnesium	6	06/03/98	06/05/98	219	219	mg/L	0.0720	255
Magnesium	7	10/21/98	11/27/98	200	194	mg/L	0.5	255
Magnesium	8	05/19/99	05/29/99	201	210	mg/L	1.0	255
Magnesium	9	11/03/99	12/09/99	214	218	mg/L	1.0	255
Magnesium	10	05/10/00	06/20/00	222	240	mg/L	0.5	255
Magnesium	26	03/19/08	04/02/08	205	198	mg/L	0.5	255
Magnesium	27	09/17/08	10/21/08	211	202	mg/L	0.5	255
Magnesium	28	03/11/09	03/18/09	203	198	mg/L	0.5	255
Magnesium	29	09/16/09	10/12/09	212	211	mg/L	0.5	255
Magnesium	30	03/10/10	04/05/10	210	220	mg/L	0.2	255
Magnesium	31	09/29/10	10/26/10	209	206	mg/L	0.82	255
Magnesium	32	05/25/11	06/08/11	222	223	mg/L	1.1	255
Magnesium	33	10/05/11	10/17/11	200	202	mg/L	0.11	255
Magnesium	34	05/15/12	05/23/12	221	225	mg/L	0.66	255
Magnesium	35	05/02/13	05/06/13	199	201	mg/L	0.083	255



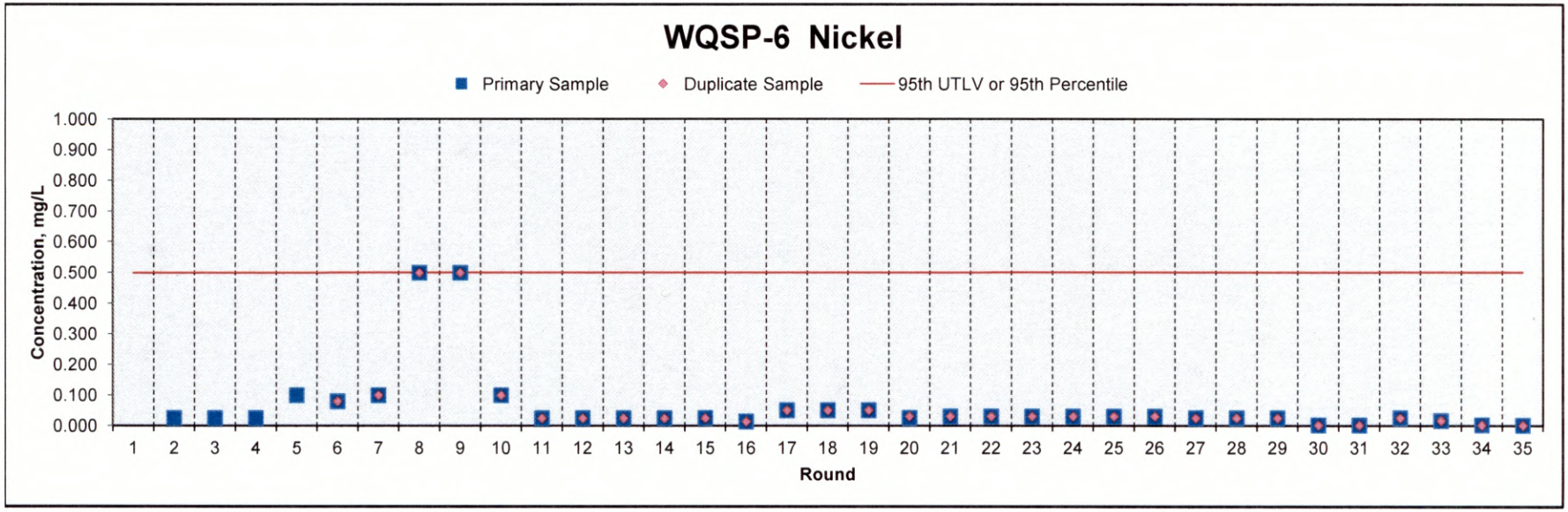
WQSP-6 Mercury

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Mercury	1	10/16/95	10/24/95	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	2	10/10/96	10/15/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	3	06/27/96	07/27/96	< 0.0020		mg/L	0.0020	< 0.002
Mercury	4	04/03/97	04/11/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	5	06/25/97	07/09/97	< 0.0020		mg/L	0.0020	< 0.002
Mercury	6	06/03/98	06/05/98	< 0.0010	< 0.0010		0.0001	< 0.002
Mercury	7	10/21/98	10/26/98	< 0.0010	< 0.0010	mg/L	0.0010	< 0.002
Mercury	8	05/26/99	05/27/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	9	11/03/99	11/08/99	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	10			< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	26	03/19/08	04/01/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	27	09/17/08	10/05/08	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	28	03/11/09	04/02/09	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	29	09/16/09	10/09/09	< 0.0002	< 0.0002	mg/L	0.0002	< 0.002
Mercury	30	03/10/10	04/01/10	< 0.00002	< 0.00002	mg/L	0.00002	< 0.002
Mercury	31	09/29/10	10/14/10	< 0.0000074	< 0.0000074	mg/L	0.0000074	< 0.002
Mercury	32	05/25/11	06/02/11	< 0.000016	< 0.000016	mg/L	0.000016	< 0.002
Mercury	33	10/05/11	11/02/11	0.000056	0.000041	mg/L	0.000016	< 0.002
Mercury	34	05/15/12	05/24/12	< 0.000020	< 0.000020	mg/L	0.000020	< 0.002
Mercury	35	05/02/13	05/21/13	< 0.000089	< 0.000089	mg/L	0.000089	< 0.002



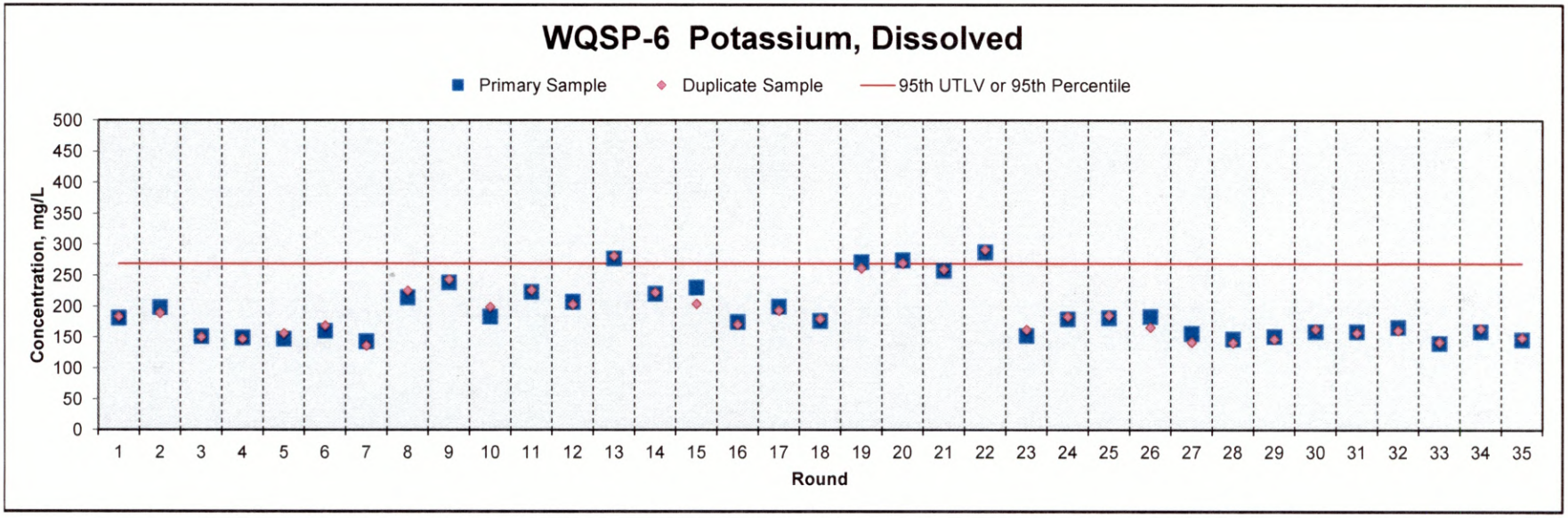
WQSP-6 Nickel

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Nickel	1							< 0.5
Nickel	2	10/10/96	10/15/96	< 0.025		mg/L	0.025	< 0.5
Nickel	3	06/27/96	07/27/96	< 0.025		mg/L	0.025	< 0.5
Nickel	4	04/03/97	04/11/97	< 0.025		mg/L	0.025	< 0.5
Nickel	5	06/25/97	07/11/97	< 0.100		mg/L	0.1	< 0.5
Nickel	6	06/03/98	06/05/98	< 0.080	< 0.080	mg/L	0.008	< 0.5
Nickel	7	10/21/98	11/27/98	< 0.100	< 0.100	mg/L	0.1	< 0.5
Nickel	8	05/19/99	05/29/99	< 0.500	< 0.500	mg/L	0.5	< 0.5
Nickel	9	11/03/99	11/25/99	< 0.500	< 0.500	mg/L	0.5	< 0.5
Nickel	10	05/10/00	06/20/00	< 0.100	< 0.100	mg/L	0.1	< 0.5
Nickel	26	03/19/08	03/24/08	< 0.030	< 0.030	mg/L	0.03	< 0.5
Nickel	27	09/17/08	10/01/08	< 0.025	< 0.025	mg/L	0.025	< 0.5
Nickel	28	03/11/09	03/18/09	< 0.025	< 0.025	mg/L	0.025	< 0.5
Nickel	29	09/16/09	10/12/09	< 0.025	< 0.025	mg/L	0.025	< 0.5
Nickel	30	03/10/10	03/19/10	< 0.0025	< 0.0025	mg/L	0.0025	< 0.5
Nickel	31	09/29/10	10/08/10	< 0.0025	< 0.0025	mg/L	0.0025	< 0.5
Nickel	32	05/25/11	06/14/11	< 0.025	< 0.025	mg/L	0.025	< 0.5
Nickel	33	10/05/11	10/24/11	< 0.016	< 0.016	mg/L	0.016	< 0.5
Nickel	34	05/15/12	05/25/12	< 0.0024	< 0.0024	mg/L	0.0024	< 0.5
Nickel	35	05/02/13	05/09/13	< 0.0014	< 0.0014	mg/L	0.0014	< 0.5



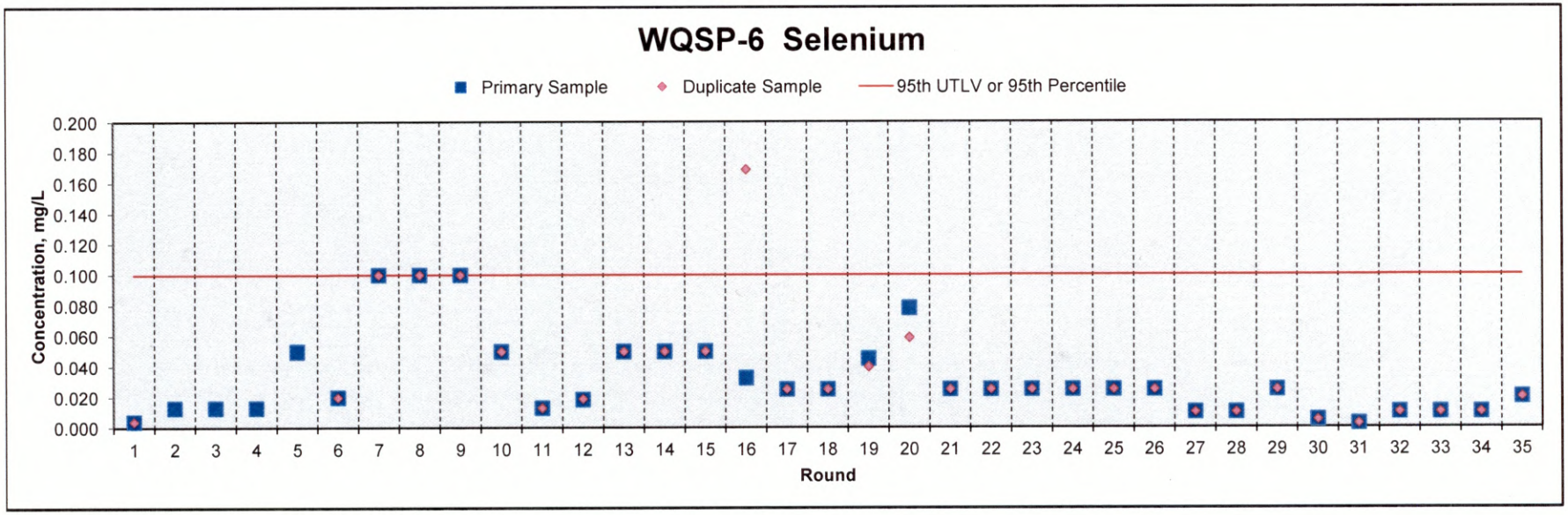
WQSP-6 Potassium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Potassium	1	10/16/95	10/25/95	182	184	mg/L	0.2	270
Potassium	2	03/12/96	03/27/96	199	190	mg/L	5.0	270
Potassium	3	06/27/96	07/29/96	152	151	mg/L	2.0	270
Potassium	4	04/03/97	04/11/97	150	148	mg/L	2.0	270
Potassium	5	06/25/97	07/10/97	148	157	mg/L	2.0	270
Potassium	6	06/03/98	06/05/98	161	170	mg/L	0.0740	270
Potassium	7	10/21/98	11/27/98	144	137	mg/L	0.5	270
Potassium	8	05/19/99	05/29/99	215	226	mg/L	1.0	270
Potassium	9	11/25/99	12/09/99	239	244	mg/L	1.0	270
Potassium	10	05/10/00	06/20/00	184	200	mg/L	0.5	270
Potassium	26	03/19/08	04/02/08	184	167	mg/L	0.5	270
Potassium	27	09/17/08	10/21/08	157	143	mg/L	0.5	270
Potassium	28	03/11/09	03/18/09	148	142	mg/L	0.5	270
Potassium	29	09/16/09	10/12/09	152	148	mg/L	0.5	270
Potassium	30	03/10/10	04/05/10	160	164	mg/L	0.5	270
Potassium	31	09/29/10	10/26/10	160	158	mg/L	0.26	270
Potassium	32	05/25/11	06/01/11	167	162	mg/L	8.5	270
Potassium	33	10/05/11	10/17/11	141	143	mg/L	0.84	270
Potassium	34	05/15/12	05/23/12	160	165	mg/L	3.4	270
Potassium	35	05/02/13	05/06/13	147	150	mg/L	0.50	270



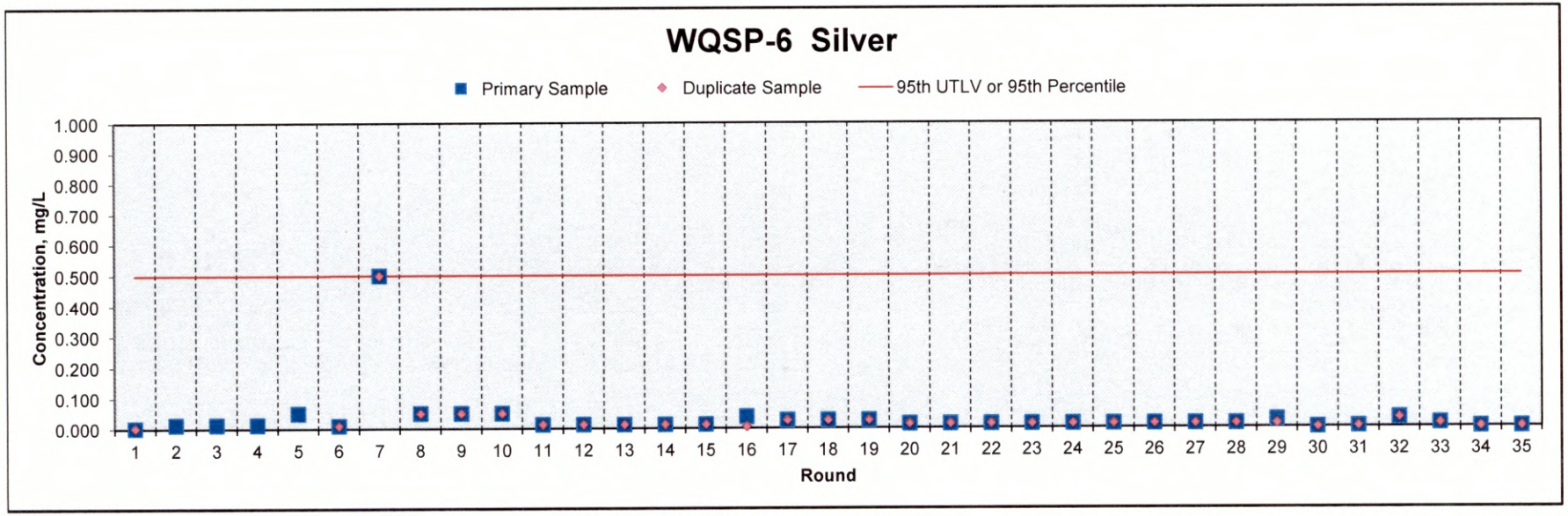
WQSP-6 Selenium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Selenium	1	10/16/95	11/06/95	< 0.004	< 0.004	mg/L	0.004	0.10
Selenium	2	10/10/96	10/15/96	< 0.013		mg/L	0.013	0.10
Selenium	3	06/27/96	07/27/96	< 0.013		mg/L	0.013	0.10
Selenium	4	04/03/97	04/11/97	< 0.013		mg/L	0.013	0.10
Selenium	5	06/25/97	07/11/97	< 0.050		mg/L	0.05	0.10
Selenium	6	06/03/98	06/05/98	< 0.020	< 0.020	mg/L	0.001	0.10
Selenium	7	10/21/98	11/27/98	< 0.100	0.100	mg/L	0.01	0.10
Selenium	8	05/19/99	05/29/99	< 0.100	< 0.100	mg/L	0.1	0.10
Selenium	9	11/03/99	11/25/99	< 0.100	< 0.100	mg/L	0.1	0.10
Selenium	10	05/10/00	06/20/00	< 0.050	< 0.050	mg/L	0.05	0.10
Selenium	26	03/19/08	03/24/08	< 0.025	< 0.025	mg/L	0.025	0.10
Selenium	27	09/17/08	10/01/08	< 0.010	< 0.010	mg/L	0.025	0.10
Selenium	28	03/11/09	03/18/09	< 0.010	< 0.010	mg/L	0.010	0.10
Selenium	29	09/16/09	10/12/09	< 0.025	< 0.025	mg/L	0.025	0.10
Selenium	30	03/10/10	04/08/10	< 0.0050	< 0.0050	mg/L	0.0050	0.10
Selenium	31	09/29/10	10/08/10	< 0.0025	< 0.0025	mg/L	0.0025	0.10
Selenium	32	05/25/11	06/02/11	< 0.010	< 0.010	mg/L	0.010	0.10
Selenium	33	10/05/11	10/13/11	< 0.010	< 0.010	mg/L	0.010	0.10
Selenium	34	05/15/12	05/31/12	< 0.010	< 0.010	mg/L	0.010	0.10
Selenium	35	05/02/13	05/16/13	< 0.020	< 0.020	mg/L	0.020	0.10



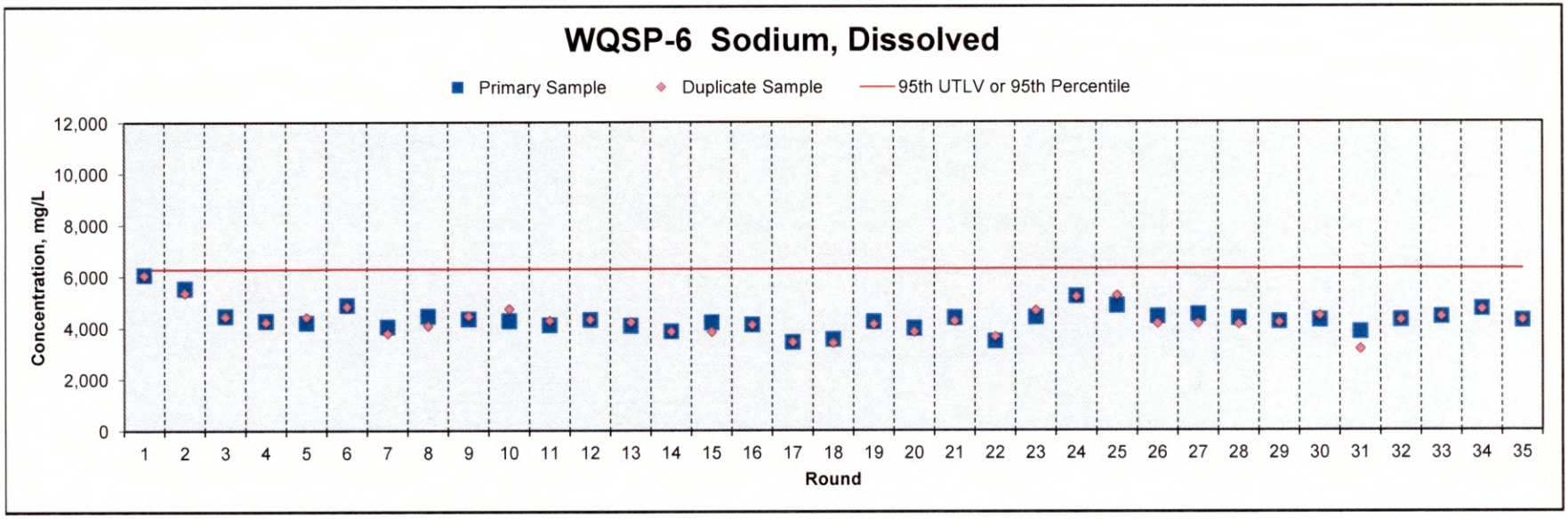
WQSP-6 Silver

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Silver	1	10/16/95	11/14/95	< 0.003	0.003	mg/L	0.003	< 0.5
Silver	2	10/10/96	10/15/96	< 0.013		mg/L	0.013	< 0.5
Silver	3	06/27/96	07/27/96	< 0.013		mg/L	0.013	< 0.5
Silver	4	04/03/97	04/11/97	< 0.013		mg/L	0.013	< 0.5
Silver	5	06/25/97	07/11/97	< 0.050		mg/L	0.050	< 0.5
Silver	6	06/03/98	06/05/98	< 0.010	< 0.010	mg/L	0.001	< 0.5
Silver	7	10/21/98	11/27/98	< 0.500	< 0.500	mg/L	0.050	< 0.5
Silver	8	05/19/99	06/11/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	10	05/10/00	06/20/00	< 0.050	< 0.050	mg/L	0.050	< 0.5
Silver	26	03/19/08	03/24/08	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	27	09/17/08	10/01/08	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	28	03/11/09	03/18/09	< 0.013	< 0.013	mg/L	0.013	< 0.5
Silver	29	09/16/09	10/12/09	0.025	< 0.013	mg/L	0.013	< 0.5
Silver	30	03/10/10	03/19/10	< 0.00060	< 0.00060	mg/L	0.0006	< 0.5
Silver	31	09/29/10	10/08/10	< 0.0030	< 0.0030	mg/L	0.0030	< 0.5
Silver	32	05/25/11	06/14/11	< 0.030	< 0.030	mg/L	0.030	< 0.5
Silver	33	10/05/11	10/24/11	< 0.012	< 0.012	mg/L	0.012	< 0.5
Silver	34	05/15/12	05/25/12	< 0.00080	< 0.00080	mg/L	0.00080	< 0.5
Silver	35	05/02/13	05/09/13	< 0.0011	< 0.0011	mg/L	0.0011	< 0.5



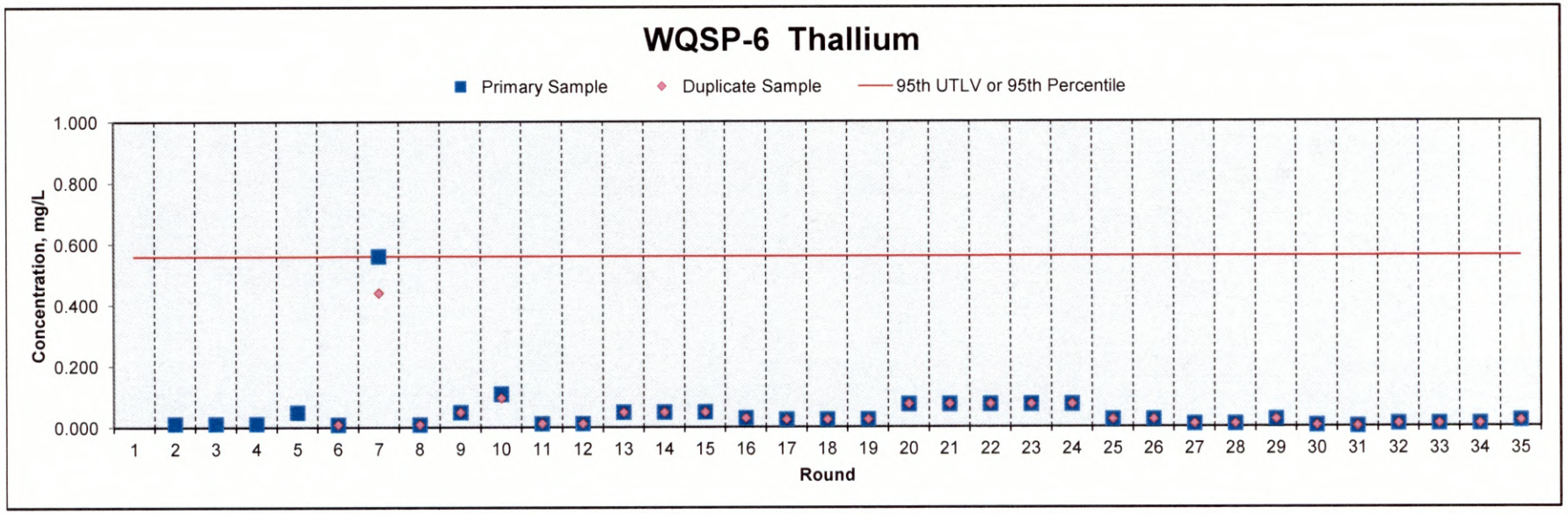
WQSP-6 Sodium, Dissolved

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sodium	1	10/16/95	10/25/95	6,070	6,050	mg/L	5.0	6,290
Sodium	2	03/12/96	03/27/96	5,540	5,370	mg/L	13.0	6,290
Sodium	3	06/27/96	07/29/96	4,470	4,450	mg/L	5.0	6,290
Sodium	4	04/03/97	04/11/97	4,280	4,230	mg/L	5.0	6,290
Sodium	5	06/25/97	07/10/97	4,210	4,430	mg/L	2.0	6,290
Sodium	6	06/03/98	06/05/98	4,890	4,835	mg/L	0.0330	6,290
Sodium	7	10/21/98	11/27/98	4,050	3,800	mg/L	0.5000	6,290
Sodium	8	05/19/99	06/11/99	4,460	4,090	mg/L	1.0	6,290
Sodium	9	11/03/99	12/09/99	4,350	4,470	mg/L	1.0	6,290
Sodium	10	05/10/00	06/20/00	4,280	4,740	mg/L	0.5	6,290
Sodium	26	03/19/08	04/02/08	4,430	4,150	mg/L	0.5	6,290
Sodium	27	09/17/08	10/21/08	4,510	4,160	mg/L	0.5	6,290
Sodium	28	03/11/09	03/18/09	4,360	4,130	mg/L	0.5	6,290
Sodium	29	09/16/09	10/12/09	4,230	4,190	mg/L	0.5	6,290
Sodium	30	03/10/10	04/05/10	4,290	4,460	mg/L	2.7	6,290
Sodium	31	09/29/10	10/26/10	3,840	3,170	mg/L	14	6,290
Sodium	32	05/25/11	06/08/11	4,290	4,280	mg/L	6.4	6,290
Sodium	33	10/05/11	10/25/11	4,410	4,420	mg/L	6.4	6,290
Sodium	34	05/15/12	05/23/12	4,720	4,700	mg/L	2.4	6,290
Sodium	35	05/02/13	05/06/13	4,260	4,280	mg/L	8.0	6,290



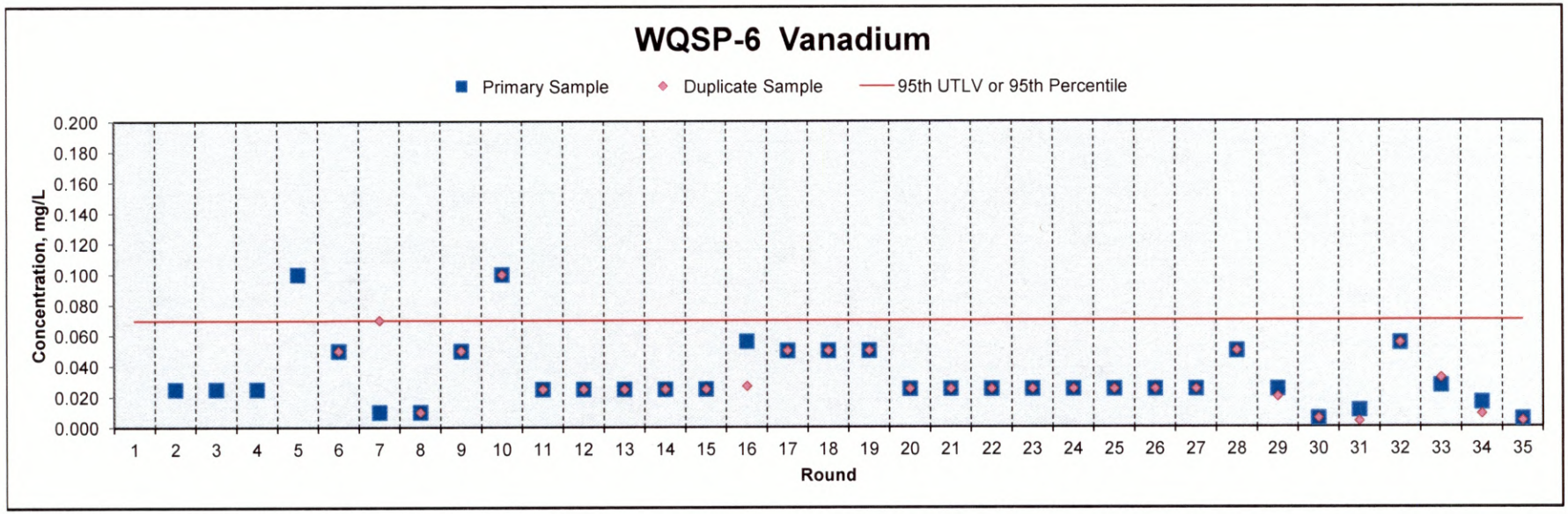
WQSP-6 Thallium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Thallium	1							0.560
Thallium	2	10/10/96	10/15/96	< 0.013		mg/L	0.013	0.560
Thallium	3	06/27/96	07/27/96	< 0.013		mg/L	0.013	0.560
Thallium	4	04/03/97	04/11/97	< 0.013		mg/L	0.013	0.560
Thallium	5	06/25/97	07/11/97	< 0.050		mg/L	0.050	0.560
Thallium	6	06/03/98	06/05/98	< 0.010	< 0.010	mg/L	0.001	0.560
Thallium	7	10/21/98	11/27/98	0.560	0.440	mg/L	0.005	0.560
Thallium	8	05/19/99	05/29/99	< 0.010	< 0.010	mg/L	0.010	0.560
Thallium	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	0.560
Thallium	10	05/10/00	06/20/00	0.110	0.097	mg/L	0.100	0.560
Thallium	26	03/19/08	03/24/08	< 0.025	< 0.025	mg/L	0.025	0.560
Thallium	27	09/17/08	10/01/08	< 0.010	< 0.010	mg/L	0.025	0.560
Thallium	28	03/11/09	03/18/09	< 0.010	< 0.010	mg/L	0.010	0.560
Thallium	29	09/16/09	10/12/09	< 0.025	< 0.025	mg/L	0.025	0.560
Thallium	30	03/10/10	04/08/10	< 0.0050	< 0.0050	mg/L	0.0050	0.560
Thallium	31	09/29/10	10/08/10	< 0.0025	< 0.0025	mg/L	0.0025	0.560
Thallium	32	05/25/11	06/02/11	< 0.010	< 0.010	mg/L	0.010	0.560
Thallium	33	10/05/11	10/13/11	< 0.010	< 0.010	mg/L	0.010	0.560
Thallium	34	05/15/12	05/31/12	< 0.010	< 0.010	mg/L	0.010	0.560
Thallium	35	05/02/13	05/16/13	< 0.020	< 0.020	mg/L	0.020	0.560



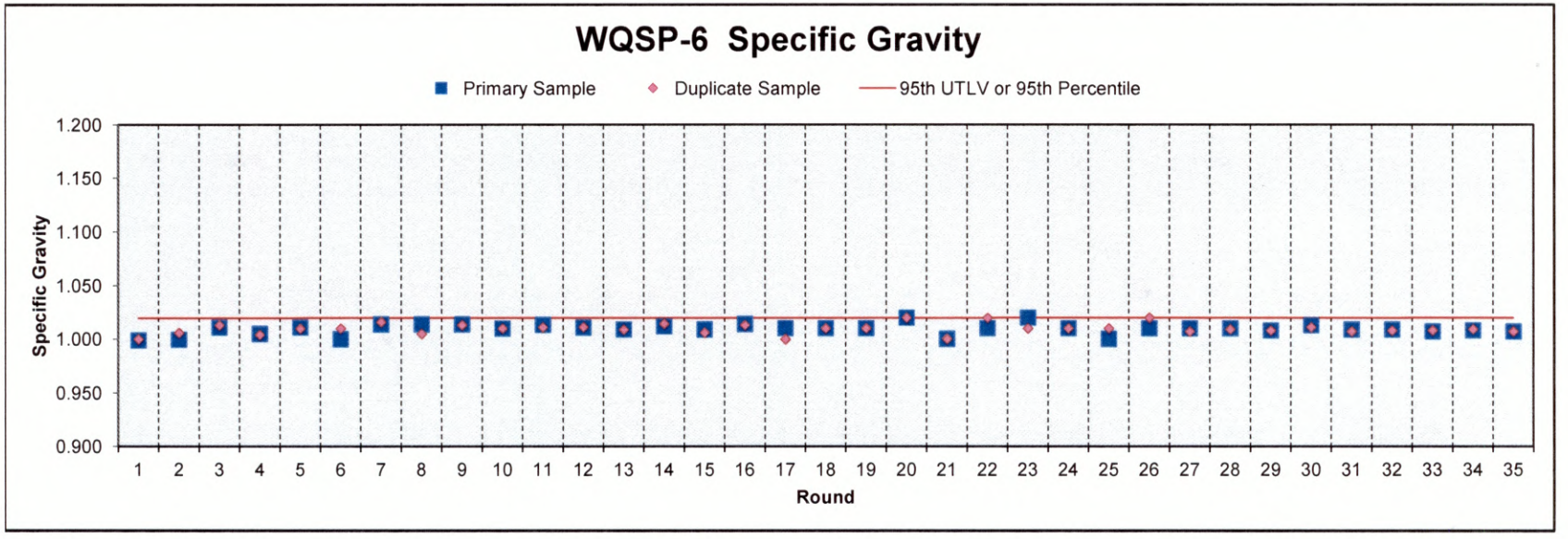
WQSP-6 Vanadium

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Vanadium	1							0.070
Vanadium	2	10/10/96	10/15/96	< 0.025		mg/L	0.025	0.070
Vanadium	3	06/27/96	07/27/96	< 0.025		mg/L	0.025	0.070
Vanadium	4	04/03/97	04/11/97	< 0.025		mg/L	0.025	0.070
Vanadium	5	06/25/97	07/11/97	< 0.100		mg/L	0.100	0.070
Vanadium	6	06/03/98	06/05/98	< 0.050	< 0.050	mg/L	0.005	0.070
Vanadium	7	10/21/98	11/27/98	< 0.010	0.070	mg/L	0.100	0.070
Vanadium	8	05/19/99	05/29/99	< 0.010	< 0.010	mg/L	0.010	0.070
Vanadium	9	11/03/99	11/25/99	< 0.050	< 0.050	mg/L	0.050	0.070
Vanadium	10	05/10/00	06/20/00	< 0.100	< 0.100	mg/L	0.100	0.070
Vanadium	26	03/19/08	03/24/08	< 0.025	< 0.025	mg/L	0.025	0.070
Vanadium	27	09/17/08	10/01/08	< 0.025	< 0.025	mg/L	0.025	0.070
Vanadium	28	03/11/09	03/18/09	< 0.050	< 0.050	mg/L	0.050	0.070
Vanadium	29	09/16/09	10/12/09	0.025	0.020	mg/L	0.025	0.070
Vanadium	30	03/10/10	03/19/10	0.0056	0.0057	mg/L	0.0011	0.070
Vanadium	31	09/29/10	10/08/10	0.011	0.0038	mg/L	0.0055	0.070
Vanadium	32	05/25/11	06/14/11	< 0.055	< 0.055	mg/L	0.055	0.070
Vanadium	33	10/05/11	10/24/11	0.027	0.032	mg/L	0.011	0.070
Vanadium	34	05/15/12	05/25/12	0.016	0.0084	mg/L	0.0016	0.070
Vanadium	35	05/02/13	05/09/13	0.0051	0.00400	mg/L	0.0035	0.070



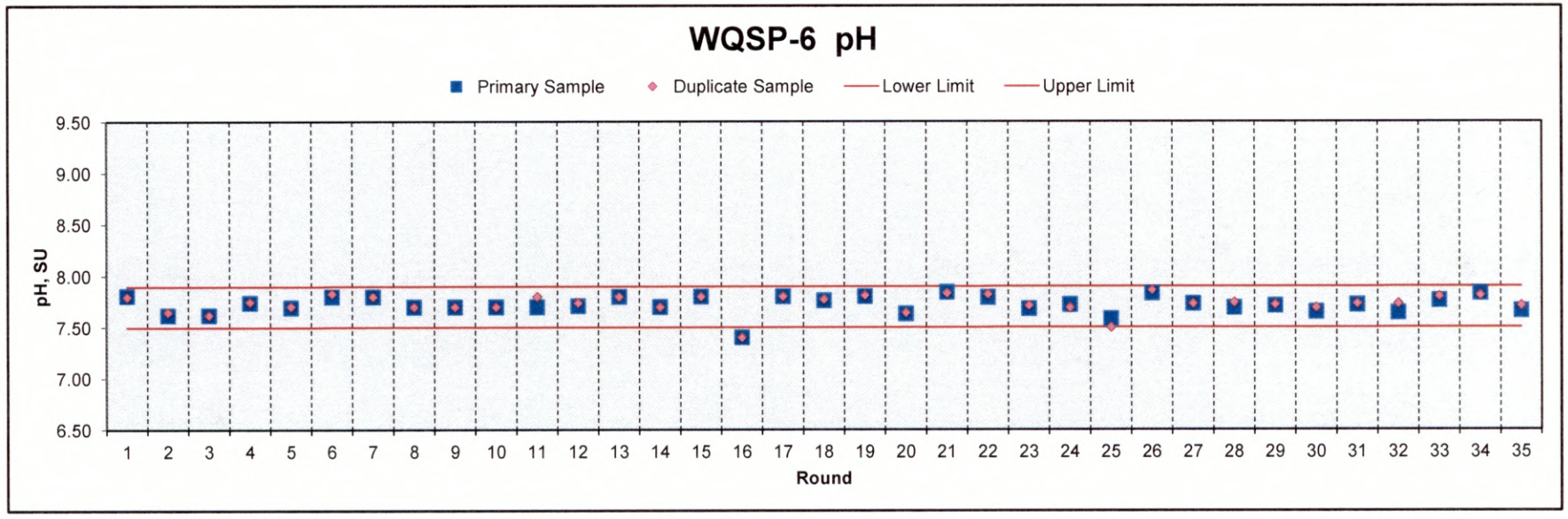
WQSP-6 Specific Gravity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Density	1	10/16/95	11/19/95	0.999	1.000	g/mL	0	1.02
Density	2	03/12/96	03/27/96	1.000	1.006	g/mL	0	1.02
Density	3	06/27/96	07/11/96	1.011	1.013	g/mL	0	1.02
Density	4	04/03/97	04/16/97	1.005	1.004	g/mL	0	1.02
Density	5	06/25/97	06/27/97	1.011	1.010	g/mL	0	1.02
Density	6	06/03/98	06/05/98	1.000	1.010	g/mL	0	1.02
Density	7	10/21/98	10/26/98	1.014	1.016	g/mL	---	1.02
Density	8	05/26/99	05/26/99	1.014	1.005	g/mL		1.02
Density	9	11/03/99	11/08/99	1.014	1.013	g/mL		1.02
Density	10	05/10/00	05/15/00	1.010	1.010	g/mL		1.02
Density	26	03/19/08	04/10/08	1.010	1.020	g/mL	0	1.02
Specific Gravity	27	09/17/08	10/01/08	1.010	1.007	unitless	0	1.02
Specific Gravity	28	03/11/09	04/03/09	1.010	1.009	unitless	0	1.02
Specific Gravity	29	09/16/09	10/11/09	1.008	1.008	unitless	0	1.02
Specific Gravity	30	03/10/10	03/12/10	1.013	1.011	unitless	0	1.02
Specific Gravity	31	09/29/10	11/13/10	1.009	1.007	unitless	0	1.02
Specific Gravity	32	05/25/11	06/14/11	1.009	1.008	unitless	0	1.02
Specific Gravity	33	10/05/11	10/12/11	1.007	1.008	unitless	0	1.02
Specific Gravity	34	05/15/12	05/18/12	1.008	1.009	unitless	0	1.02
Specific Gravity	35	05/02/13	05/14/13	1.007	1.007	unitless	0	1.02



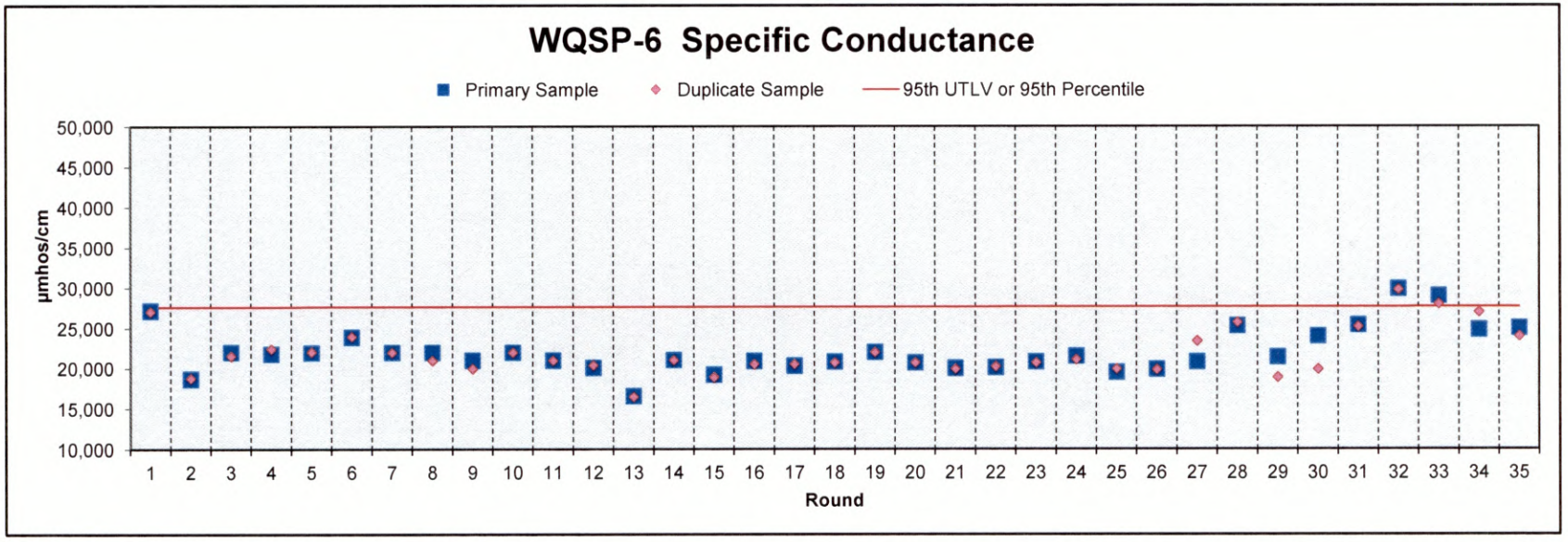
WQSP-6 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile	
								Lower Limit	Upper Limit
pH	1	10/16/95	10/17/95	7.81	7.80	S.U.	0	7.5	7.9
pH	2	03/12/96	03/13/96	7.62	7.65	S.U.	0	7.5	7.9
pH	3	06/27/96	07/26/96	7.62	7.62	S.U.	0	7.5	7.9
pH	4	04/03/97	04/04/97	7.74	7.75	S.U.		7.5	7.9
pH	5	06/25/97	06/26/97	7.70	7.71	S.U.	0	7.5	7.9
pH	6	06/03/98	06/05/98	7.80	7.83	S.U.	0	7.5	7.9
pH	7	10/21/98	10/22/98	7.80	7.80	S.U.	---	7.5	7.9
pH	8	05/19/99	05/19/99	7.70	7.70	S.U.	0	7.5	7.9
pH	9	11/03/99	11/03/99	7.70	7.70	S.U.	0	7.5	7.9
pH	10	05/10/00	05/10/00	7.70	7.70	S.U.	0	7.5	7.9
pH	26	03/19/08	03/20/08	7.83	7.86	S.U.	0	7.5	7.9
pH	27	09/17/08	09/19/08	7.73	7.73	S.U.	0	7.5	7.9
pH	28	03/11/09	03/13/09	7.69	7.74	S.U.	0	7.5	7.9
pH	29	09/16/09	09/17/09	7.71	7.72	S.U.	0	7.5	7.9
pH	30	03/10/10	03/11/10	7.65	7.69	SU	0	7.5	7.9
pH	31	09/29/10	10/15/10	7.72	7.73	SU	0	7.5	7.9
pH	32	05/25/11	05/27/11	7.64	7.73	SU	0	7.5	7.9
pH	33	10/05/11	10/06/11	7.76	7.80	SU	0	7.5	7.9
pH	34	05/15/12	05/24/12	7.83	7.81	SU	0.1	7.5	7.9
pH	35	05/02/13	05/06/13	7.66	7.71	SU	0.1	7.5	7.9



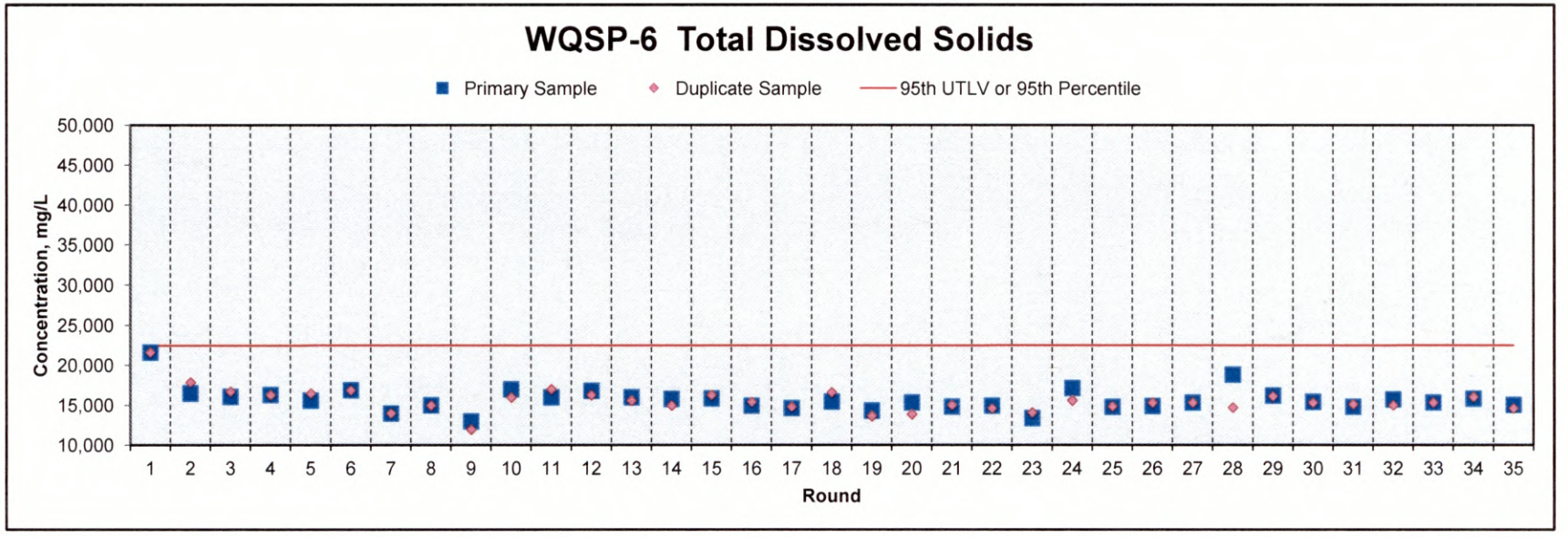
WQSP-6 Specific Conductance

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Specific Conductance	1	10/16/95	11/08/95	27,200	27,100	µmhos/cm	1.00	27,660
Specific Conductance	2	03/12/96	03/27/96	18,700	18,800	µmhos/cm	3.00	27,660
Specific Conductance	3	06/27/96	07/17/96	22,018	21,582	µmhos/cm	3.00	27,660
Specific Conductance	4	04/03/97	04/16/97	21,800	22,450	µmhos/cm	3.00	27,660
Specific Conductance	5	06/25/97	07/08/97	21,950	22,050	µmhos/cm	3.00	27,660
Specific Conductance	6	06/03/98	06/05/98	23,900	23,987	µmhos/cm	0.00	27,660
Specific Conductance	7	10/21/98	11/02/98	22,000	22,000	µmhos/cm	---	27,660
Specific Conductance	8	05/19/99	05/21/99	22,000	21,000	µmhos/cm	0	27,660
Specific Conductance	9	11/03/99	11/10/99	21,000	20,000	µmhos/cm	0	27,660
Specific Conductance	10	05/10/00	05/16/00	22,000	22,000	µmhos/cm	0	27,660
Specific Conductance	26	03/19/08	03/31/08	19,880	19,820	µmhos/cm	0	27,660
Specific Conductance	27	09/17/08	09/24/08	20,800	23,400	µmhos/cm	0	27,660
Specific Conductance	28	03/11/09	03/16/09	25,300	25,700	µmhos/cm	0	27,660
Specific Conductance	29	09/16/09	09/22/09	21,400	18,900	µmhos/cm	0	27,660
Specific Conductance	30	03/10/10	03/11/10	24,000	19,900	µmhos/cm	0	27,660
Specific Conductance	31	09/29/10	10/18/10	25,400	25,200	µmhos/cm	0	27,660
Specific Conductance	32	05/25/11	05/27/11	29,900	29,800	µmhos/cm	2.0	27,660
Specific Conductance	33	10/05/11	10/10/11	**29,000**	**28,000**	µmhos/cm	0.5	**27,660**
Specific Conductance	34	05/15/12	05/24/12	24,800	27,000	µmhos/cm	0.05	27,660
Specific Conductance	35	05/02/13	05/07/13	25,000	24,000	µmhos/cm	0.05	27,660



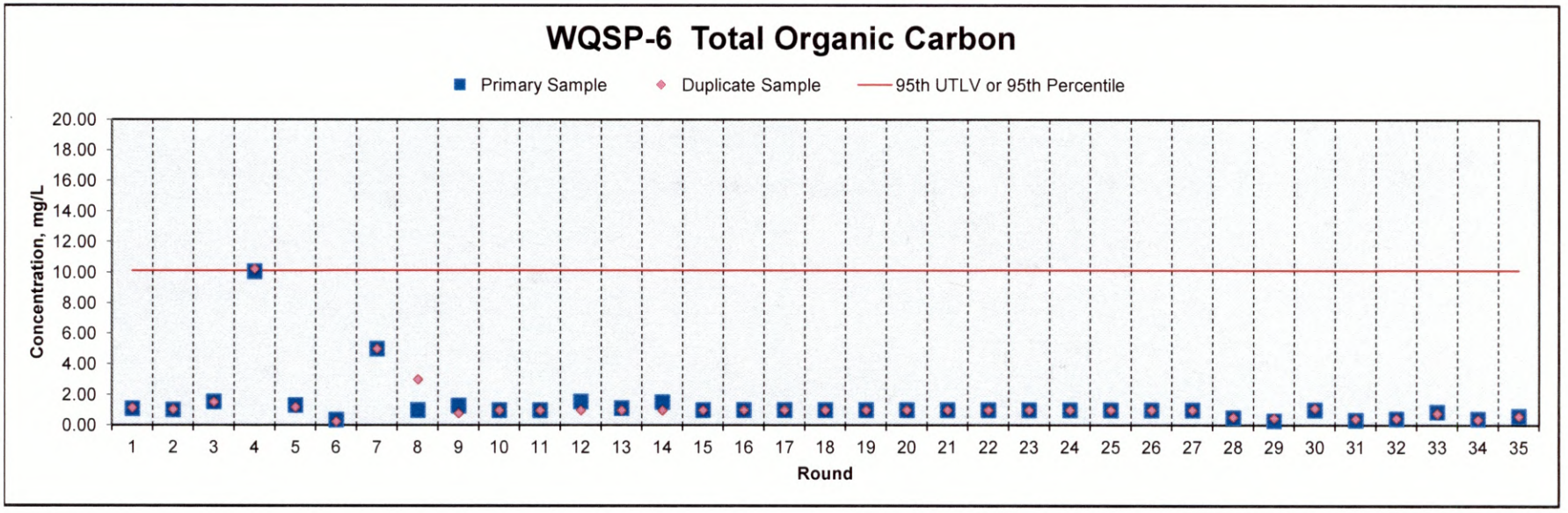
WQSP-6 Total Dissolved Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Dissolved Solids	1	10/16/95	10/19/95	21,600	21,600	mg/L	10	22,500
Total Dissolved Solids	2	03/12/96	03/19/96	16,500	17,900	mg/L	200	22,500
Total Dissolved Solids	3	06/27/96	07/05/96	16,080	16,720	mg/L	200	22,500
Total Dissolved Solids	4	04/03/97	04/09/97	16,300	16,300	mg/L	10	22,500
Total Dissolved Solids	5	06/25/97	06/26/97	15,600	16,500	mg/L	200	22,500
Total Dissolved Solids	6	06/03/98	06/05/98	16,900	16,860	mg/L	0	22,500
Total Dissolved Solids	7	10/21/98	10/27/98	14,000	14,000	mg/L	10	22,500
Total Dissolved Solids	8	05/19/99	05/20/99	15,000	15,000	mg/L	10	22,500
Total Dissolved Solids	9	11/03/99	11/08/99	13,000	12,000	mg/L	10	22,500
Total Dissolved Solids	10	05/10/00	05/16/00	17,000	16,000	mg/L	13	22,500
Total Dissolved Solids	26	03/19/08	03/31/08	14,880	15,300	mg/L	10	22,500
Total Dissolved Solids	27	09/17/08	09/22/08	15,300	15,300	mg/L	10	22,500
Total Dissolved Solids	28	03/11/09	03/19/09	18,800	14,700	mg/L	10	22,500
Total Dissolved Solids	29	09/16/09	09/18/09	16,200	16,100	mg/L	10	22,500
Total Dissolved Solids	30	03/10/10	03/16/10	15,400	15,300	mg/L	130	22,500
Total Dissolved Solids	31	09/29/10	10/08/10	14,800	15,100	mg/L	270	22,500
Total Dissolved Solids	32	05/25/11	06/01/11	15,700	15,000	mg/L	270	22,500
Total Dissolved Solids	33	10/05/11	10/07/11	15,300	15,300	mg/L	270	22,500
Total Dissolved Solids	34	05/15/12	05/22/12	15,800	16,000	mg/L	270	22,500
Total Dissolved Solids	35	05/02/13	05/08/13	15,000	14,600	mg/L	503	22,500



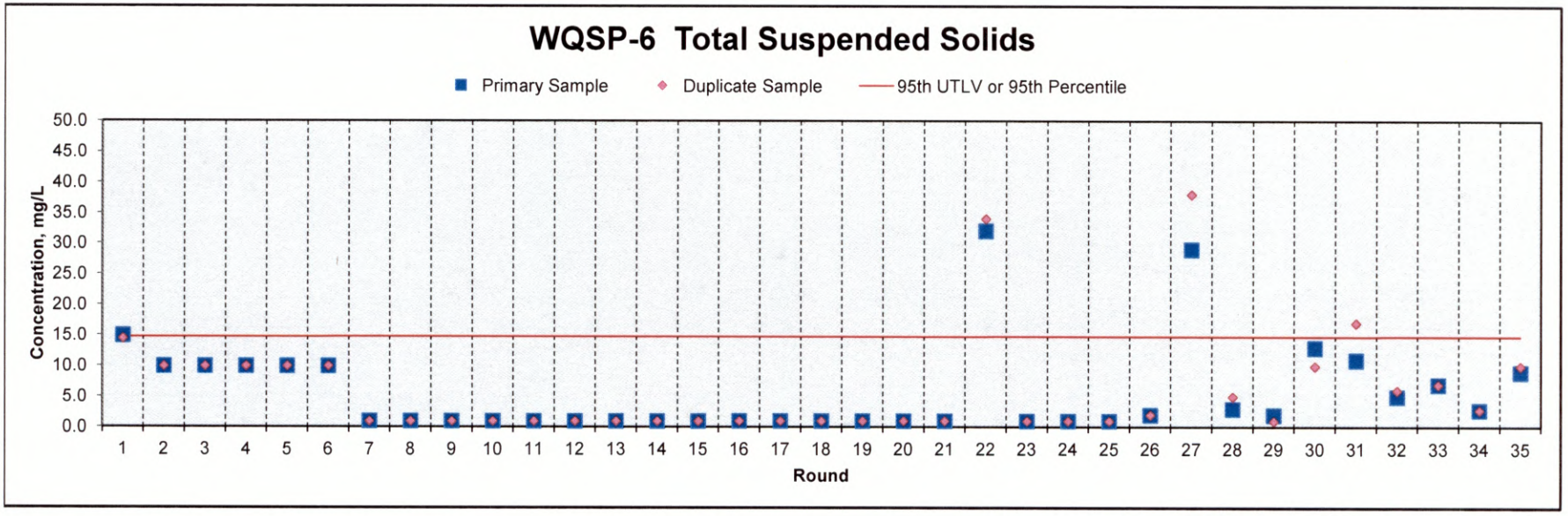
WQSP-6 Total Organic Carbon

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Organic Carbon	1	10/16/95	11/15/95	1.11	1.16	mg/L	0.5	10.14
Total Organic Carbon	2	03/12/96	03/21/96	1.03	1.06	mg/L	0.5	10.14
Total Organic Carbon	3	06/27/96	07/17/96	1.56	1.53	mg/L	0.5	10.14
Total Organic Carbon	4	04/03/97	04/11/97	10.05	10.22	mg/L	5.0	10.14
Total Organic Carbon	5	06/25/97	06/27/97	1.33	1.20	mg/L	0.5	10.14
Total Organic Carbon	6	06/03/98	06/05/98	0.37	0.27	mg/L	0.0	10.14
Total Organic Carbon	7	10/21/98	11/11/98	< 5.00	< 5.00	mg/L	5.0	10.14
Total Organic Carbon	8	05/19/99	06/14/99	< 1.00	3.00	mg/L	1.0	10.14
Total Organic Carbon	9	11/03/99	12/01/99	1.30	0.80	mg/L		10.14
Total Organic Carbon	10	05/10/00	05/10/00	< 1.00	< 1.00	mg/L	1.0	10.14
Total Organic Carbon	26	03/19/08	03/25/08	< 1.00	< 1.00	mg/L	1.0	10.14
Total Organic Carbon	27	09/17/08	09/23/08	< 1.00	< 1.00	mg/L	1.0	10.14
Total Organic Carbon	28	03/11/09	03/16/09	0.50	0.54	mg/L	1.0	10.14
Total Organic Carbon	29	09/16/09	09/22/09	0.31	0.48	mg/L	1.0	10.14
Total Organic Carbon	30	03/10/10	03/12/10	1.02	1.12	mg/L	0.056	10.14
Total Organic Carbon	31	09/29/10	10/12/10	0.35	0.44	mg/L	0.056	10.14
Total Organic Carbon	32	05/25/11	6/14/11	0.43	0.45	mg/L	0.250	10.14
Total Organic Carbon	33	10/05/11	10/24/11	0.88	0.78	mg/L	0.072	10.14
Total Organic Carbon	34	05/15/12	5/16/12	0.43	0.38	mg/L	0.250	10.14
Total Organic Carbon	35	05/02/13	5/8/13	0.61	0.60	mg/L	0.230	10.14



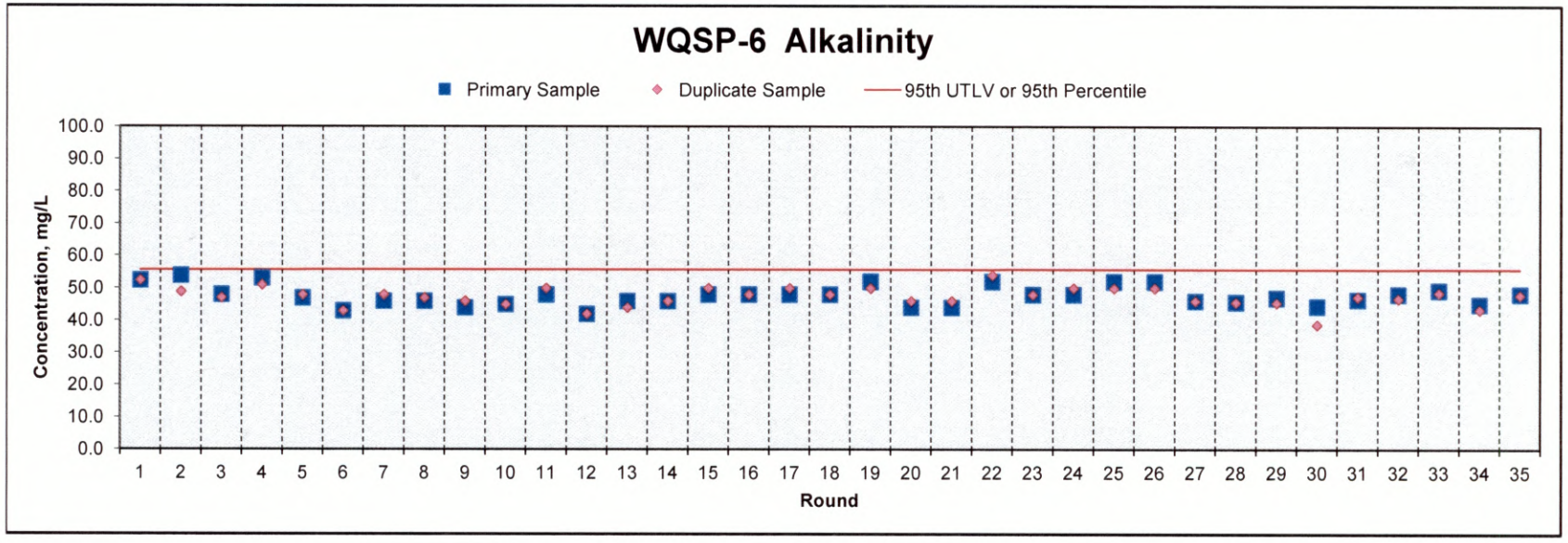
WQSP-6 Total Suspended Solids

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Total Suspended Solids	1	10/16/95	10/18/95	15.0	14.5	mg/L	10.0	14.8
Total Suspended Solids	2	03/12/96	03/14/96	< 10.0	< 10.0	mg/L	10.0	14.8
Total Suspended Solids	3	06/27/96	07/05/96	< 10.0	< 10.0	mg/L	10.0	14.8
Total Suspended Solids	4	04/03/97	04/08/97	< 10.0	< 10.0	mg/L	10.0	14.8
Total Suspended Solids	5	06/25/97	06/26/97	< 10.0	< 10.0	mg/L	10.0	14.8
Total Suspended Solids	6	06/03/98	06/05/98	< 10.0	< 10.0	mg/L	0.0	14.8
Total Suspended Solids	7	10/21/98	10/22/98	< 1.0	< 1.0	mg/L	1.0	14.8
Total Suspended Solids	8	05/19/99	05/21/99	< 1.0	< 1.0	mg/L	1.0	14.8
Total Suspended Solids	9	11/03/99	11/10/99	< 1.0	< 1.0	mg/L	1.0	14.8
Total Suspended Solids	10	05/10/00	05/17/00	< 1.0	< 1.0	mg/L	1.0	14.8
Total Suspended Solids	26	03/19/08	03/27/08	2.0	2.0	mg/L	1.0	14.8
Total Suspended Solids	27	09/17/08	09/22/08	29.0	38.0	mg/L	1.0	14.8
Total Suspended Solids	28	03/11/09	03/19/09	3.0	5.0	mg/L	1.0	14.8
Total Suspended Solids	29	09/16/09	09/22/09	2.0	< 1.0	mg/L	1.0	14.8
Total Suspended Solids	30	03/10/10	03/12/10	13	10	mg/L	2.0	14.8
Total Suspended Solids	31	09/29/10	10/06/10	11	**17**	mg/L	0.0	**14.8**
Total Suspended Solids	32	05/25/11	06/01/11	5.0	6.0	mg/L	0.0	14.8
Total Suspended Solids	33	10/05/11	10/12/11	7.0	7.0	mg/L	2.8	14.8
Total Suspended Solids	34	05/15/12	05/21/12	< 2.8	< 2.8	mg/L	2.8	14.8
Total Suspended Solids	35	05/02/13	05/07/13	9.0	10.0	mg/L	1.5	14.8



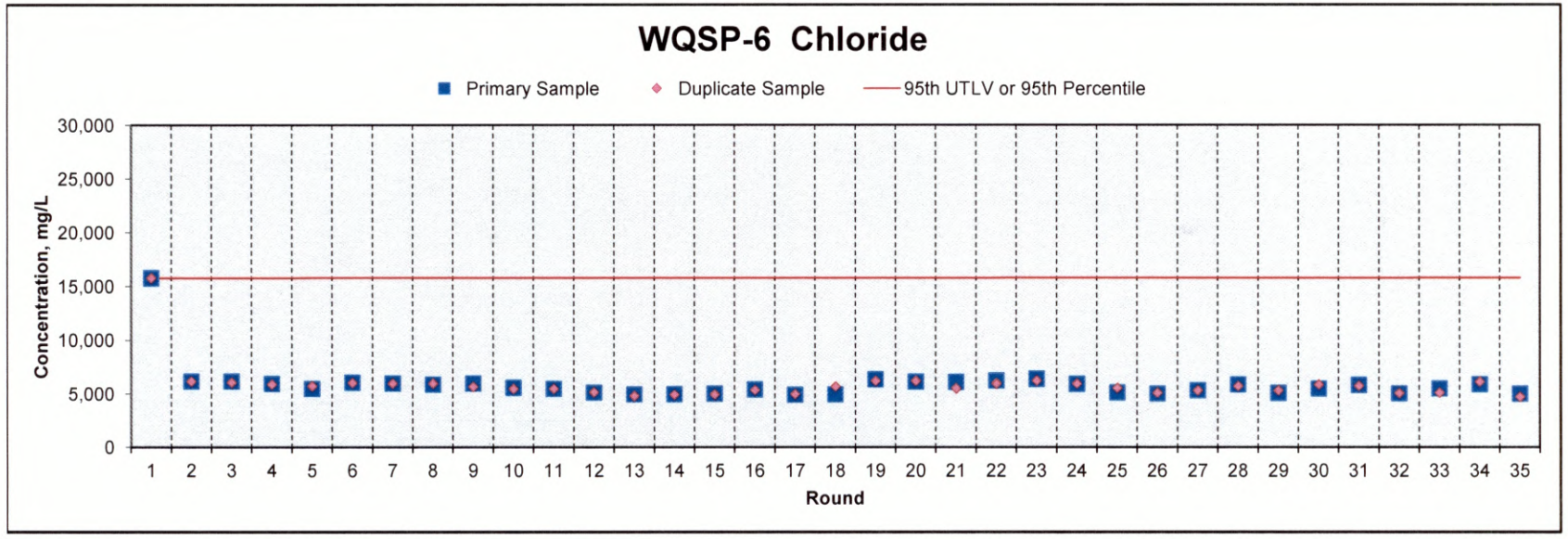
WQSP-6 Alkalinity

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Alkalinity	1	10/16/95	10/18/95	52.5	52.5	mg/L	5.0	55.8
Alkalinity	2	03/12/96	03/22/96	54.0	49.0	mg/L	5.0	55.8
Alkalinity	3	06/27/96	07/10/96	48.1	47.1	mg/L	5.0	55.8
Alkalinity	4	04/03/97	04/16/97	53.2	51.1	mg/L	5.0	55.8
Alkalinity	5	06/25/97	06/27/97	47.0	48.0	mg/L	5.0	55.8
Alkalinity	6	06/03/98	06/05/98	43.0	43.0	mg/L	1.0	55.8
Alkalinity	7	10/21/98	11/02/98	46.0	48.0	mg/L	1.0	55.8
Alkalinity	8	05/19/99	05/21/99	46.0	47.0	mg/L	0.1	55.8
Alkalinity	9	11/03/99	11/12/99	44.0	46.0	mg/L	1.0	55.8
Alkalinity	10	05/10/00	05/16/00	45.0	45.0	mg/L	4.0	55.8
Alkalinity	26	03/19/08	03/27/08	52.0	50.0	mg/L	4.0	55.8
Alkalinity	27	09/17/08	09/30/08	46.0	46.0	mg/L	4.0	55.8
Alkalinity	28	03/11/09	03/13/09	45.7	45.6	mg/L	4.0	55.8
Alkalinity	29	09/16/09	09/17/09	47.0	45.5	mg/L	4.0	55.8
Alkalinity	30	03/10/10	03/11/10	44.4	38.7	mg/L	4.0	55.8
Alkalinity	31	09/29/10	10/05/10	46.5	47.3	mg/L	5.0	55.8
Alkalinity	32	05/25/11	05/27/11	48.2	46.8	mg/L	5.0	55.8
Alkalinity	33	10/05/11	10/06/11	49.3	48.5	mg/L	2.4	55.8
Alkalinity	34	05/15/12	05/24/12	45.0	43.3	mg/L	5.0	55.8
Alkalinity	35	05/02/13	05/06/13	48.2	47.9	mg/L	5.0	55.8



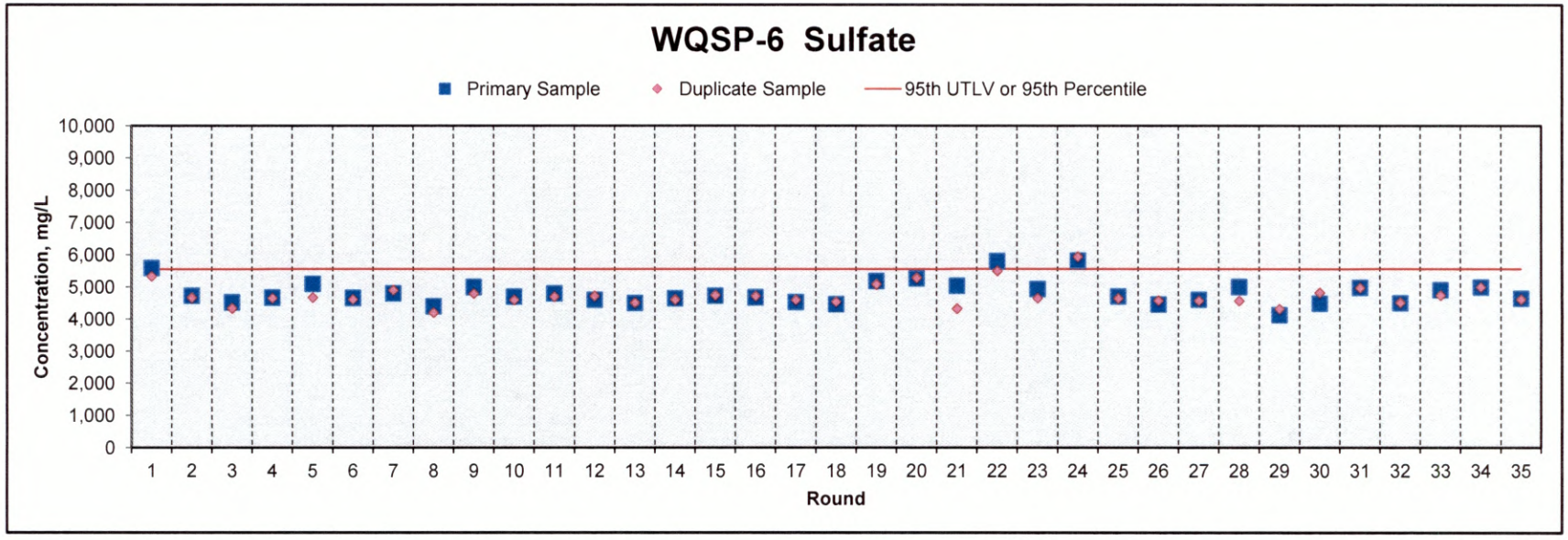
WQSP-6 Chloride

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Chloride	1	10/16/95	10/19/95	15,800	15,800	mg/L	5.0	15,800
Chloride	2	03/12/96	03/21/96	6,200	6,200	mg/L	1000.0	15,800
Chloride	3	06/27/96	07/10/96	6,198	6,098	mg/L	500.0	15,800
Chloride	4	04/03/97	04/14/97	5,973	5,923	mg/L	250.0	15,800
Chloride	5	06/25/97	07/07/97	5,500	5,750	mg/L	5000.0	15,800
Chloride	6	06/03/98	06/05/98	6,070	6,053	mg/L	0.0160	15,800
Chloride	7	10/21/98	10/22/98	6,000	6,000	mg/L	0.5	15,800
Chloride	8	05/19/99	05/20/99	5,900	6,000	mg/L	0.5	15,800
Chloride	9	11/03/99	11/03/99	6,000	5,700	mg/L	0.5	15,800
Chloride	10	05/10/00	05/19/00	5,600	5,500	mg/L	0.5	15,800
Chloride	26	03/19/08	04/03/08	5,030	5,100	mg/L	0.5	15,800
Chloride	27	09/17/08	09/18/08	5,340	5,340	mg/L	0.5	15,800
Chloride	28	03/11/09	03/13/09	5,900	5,760	mg/L	0.5	15,800
Chloride	29	09/16/09	09/17/09	5,100	5,330	mg/L	0.5	15,800
Chloride	30	03/10/10	03/12/10	5,510	5,890	mg/L	16.0	15,800
Chloride	31	09/29/10	10/07/10	5,850	5,770	mg/L	16.2	15,800
Chloride	32	05/25/11	05/26/11	5,060	5,080	mg/L	16.2	15,800
Chloride	33	10/05/11	10/06/11	5,500	5,120	mg/L	83	15,800
Chloride	34	05/15/12	05/19/12	5,900	6,140	mg/L	200	15,800
Chloride	35	05/02/13	05/03/13	5,010	4,720	mg/L	130	15,800



WQSP-6 Sulfate

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile
Sulfate	1	10/16/95	10/19/95	5,590	5,340	mg/L	10.0	5,557
Sulfate	2	03/12/96	03/21/96	4,730	4,670	mg/L	1000.0	5,557
Sulfate	3	06/27/96	07/10/96	4,523	4,337	mg/L	1000.0	5,557
Sulfate	4	04/03/97	04/15/97	4,670	4,650	mg/L	10.0	5,557
Sulfate	5	06/25/97	07/07/97	5,100	4,670	mg/L	2500.0	5,557
Sulfate	6	06/03/98	06/05/98	4,660	4,614	mg/L	0.04	5,557
Sulfate	7	10/21/98	10/22/98	4,800	4,900	mg/L	0.5	5,557
Sulfate	8	05/19/99	05/20/99	4,400	4,200	mg/L	0.5	5,557
Sulfate	9	11/03/99	11/03/99	5,000	4,800	mg/L	0.5	5,557
Sulfate	10	05/10/00	05/18/00	4,700	4,600	mg/L	0.5	5,557
Sulfate	26	03/19/08	04/03/08	4,450	4,580	mg/L	0.5	5,557
Sulfate	27	09/17/08	09/18/08	4,600	4,570	mg/L	0.5	5,557
Sulfate	28	03/11/09	03/16/09	5,000	4,570	mg/L	0.5	5,557
Sulfate	29	09/16/09	09/17/09	4,120	4,310	mg/L	0.5	5,557
Sulfate	30	03/10/10	03/12/10	4,480	4,820	mg/L	47	5,557
Sulfate	31	09/29/10	10/07/11	4,980	4,970	mg/L	47.1	5,557
Sulfate	32	05/25/11	05/26/11	4,490	4,510	mg/L	47.1	5,557
Sulfate	33	10/05/11	10/06/11	4,900	4,740	mg/L	14	5,557
Sulfate	34	05/15/12	05/16/12	4,990	4,990	mg/L	15	5,557
Sulfate	35	05/02/13	05/03/13	4,640	4,610	mg/L	47	5,557



WQSP-6

CHAIN OF CUSTODY FORMS

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130507043
Order Date: 5/7/2013

Contact Name: ANDY FREEMAN
Project Name: 1305121
Comment:

Sample #: 130507043-001 **Customer Sample #:** 1305121-001E / WQ6-C-R35

Recv'd: ☑ **Collector:** **Date Collected:** 5/2/2013
Quantity: 1 **Matrix:** Water **Date Received:** 5/7/2013 12:10:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***

Sample #: 130507043-002 **Customer Sample #:** 1305121-002E / WQ6-C-R35-DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 5/2/2013
Quantity: 1 **Matrix:** Water **Date Received:** 5/7/2013 12:10:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***

Sample #: 130507043-003 **Customer Sample #:** 1305121-005B / WQ6-C-R35-METALS BLANK PRESERVED

Recv'd: ☑ **Collector:** **Date Collected:** 5/2/2013
Quantity: 1 **Matrix:** Water **Date Received:** 5/7/2013 12:10:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***

Customer Name: HALL ENVIRONMENTAL ANALYSIS LAB
4901 HAWKINS NE SUITE D
ALBUQUERQUE NM 87109

Order ID: 130507043
Order Date: 5/7/2013

Contact Name: ANDY FREEMAN
Project Name: 1305121
Comment:

SELENIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***

Sample #: 130507043-004 **Customer Sample #:** 1305121-006B / WQ6-C-R35-METALS BLANK UNPRESERVED

Recv'd: ☑ **Collector:** **Date Collected:** 5/2/2013
Quantity: 1 **Matrix:** Water **Date Received:** 5/7/2013 12:10:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	5/17/2013	***Normal (6-10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	2.9
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

130507 043 HALL Last Due 5/17/2013
1st SAMP 5/2/2013 1st RCVD 5/7/2013
1305121

SUB CONTRATOR: Anatek Labs	COMPANY: Anatek Labs, Inc.	PHONE: (208) 883-2839	FAX: (208) 882-9246
ADDRESS: 1282 Alturas Dr		ACCOUNT #:	EMAIL:
CITY, STATE, ZIP: Moscow, ID 83843			

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	1305121-001E	WQ6-C-R35	500HDPEHNO3	Aqueous	5/2/2013 9:00:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC
2	1305121-002E	WQ6-C-R35-Duplicate	500HDPEHNO3	Aqueous	5/2/2013 9:28:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC
3	1305121-005B	WQ6-C-R35-METALS BLANK PRESERVED	1LHDPEHNO3	Aqueous	5/2/2012 9:20:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC
4	1305121-006B	WQ6-C-R35-METALS BLANK UNPRESERVED	1LHDPEHNO3	Aqueous	5/2/2013 9:20:00 AM	1	TOTAL As, Sb, Se & Tl LEVEL IV QA/QC

MWBS

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb, Se, Tl BY METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. MUST DO MS/MSD ON 1305121-01E. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LCS REPLICATE. SAMPLE MAY HAV

Relinquished By:	Date: 5/6/2013	Time: 1:04 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard ☑ RUSH

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 2.9 °C
- ☐ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3
NUMBER OF CONTAINERS: 4 SHIPPED VIA: F
DATE & TIME: 5/7/13 1210 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:
(extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

°C Attempt to Cool ?

CHAIN OF CUSTODY RECORD

№ 1040

Page 1 of 1

Project Number: T409304.1 **Project Name:** WIPP/DMP

Sampler(s): R. Jimenez, RASpoon

Analytical Laboratory: HEAL #130521 Albuquerque, NM

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry	Comments
5/2/13	10:02	GW	GW-WQ6-C-R35-N1		X					use for MS/MSD -001
↓	10:10	↓	-N1D		X					-002
↓	10:17	DI	-N2		X					field Blanks -003
N/A	N/A	↓	-N3		X					Trip Blanks, HEAL provided -004*
5/2/13	10:22	GW	-N4			X				use for MS/MSD -001
	10:27		-N4D			X				-002
	09:00		-N5				X			use for MS/MSD -001
	09:28 ~~5/2/13~~		-N5D				X			time = 09:28 -002
	09:50		-N6					X		use for MS/MSD -001
	09:56		-N6D					X		-002
	09:38		-N7						X	use for MS/MSD -001
	↓	↓	-N7D						X	-002
	09:20	DI	-N12					X		Metals Blank -005
↓	↓	↓	-N13					X		↓ -006

Relinquished By: (Signature, Date/Time) Kathleen Spoon 5/2/13 14:30

Received By: (Signature, Date/Time)

Relinquished By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Relinquished By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Received at Laboratory: (Signature, Date/Time) 05/03/13 0900

Requested Turnaround Time: Report due 6/7/2013 ~~5/2/13~~

☒ Routine ☐ Rush

Sample Receipt Remarks: TEMP: 1.0°C

Special Instructions: Analyze LCS's in duplicate.

Use primary GW sample for MS/MSD on all parameters.

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: FedEx 8768 1881 2245
8768 1881 2234

Results To:

Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8477 FAX: 575-234-6003
EDD: gregory.jungclaus@urs.com

*Note! 1 Trip BLK had

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater

YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)

PINK – Record Copy
SE – Sediment
SO – Soil

SW – Surface Water
VG – Vegetation

Form CofC/RFA, Rev. 0 – NICHOLS PRINTING, INC.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: WIPP | Work Order Number: 1305121 | RcptNo: 1

Received by/date: LM 05/03/13

Logged By: Anne Thorne 5/3/2013 9:00:00 AM Anne Thorne

Completed By: Anne Thorne 5/3/2013 Anne Thorne

Reviewed By: AT 05/03/13

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	FedEx		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: 5 (<2 or >12 unless noted)

Adjusted? —

Checked by: AT 05/03/13

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: ____ Date ____

By Whom: ____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: ____

Client Instructions: ____

17. Additional remarks:

18. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			