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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 2014 Annual Culebra Groundwater Report

Dear Mr. Kieling:

The purpose of this letter is to submit the Waste Isolation Pilot Plant 2014 Annual Culebra Groundwater Report. This report is required by Part 5, Permit Condition 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 feel free to 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

for

Robert L. McQuinn, 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
WATER LEVEL MONITORING PROGRAM DATA COLLECTION, MARCH – AUGUST 2014
2014 DETECTION MONITORING PROGRAM SAMPLING AND ANALYSIS

SUBMITTED TO THE
NEW MEXICO ENVIRONMENT DEPARTMENT

NOVEMBER 2014

This report has been reviewed and approved by:

//Original Signature on file//

R. A. Salness, Manager Environmental Monitoring and Hydrology

10/30/14

Date

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LIST OF ABBREVIATIONS, ACRONYMS, AND UNITS

AIS	Air Intake Shaft
DMP	Detection Monitoring Program
DMW	detection monitoring well(s)
EPA	U.S. Environmental Protection Agency
GC	gas chromatography
GC/MS	gas chromatography/mass spectrometry
HEAL	Hall Environmental Analysis Laboratory
km	kilometers
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LCSR	laboratory control sample replicate
LWB	land withdrawal boundary
m	meters
m/yr	meters per year
MDL	method detection limit
meq/L	milli-equivalents per Liter
µg/L	micrograms per Liter
mg/L	milligrams per Liter
mi	mile
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
NMED	New Mexico Environment Department
NELAC	National Environmental Laboratory Accreditation Conference
PE	performance evaluation
PEST	parameter estimation tool
pH	hydrogen ion potential
PIP	production-injection packer
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
RPD	relative percent difference
SNL	Sandia National Laboratories
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
VOC	volatile organic compound
WIPP	Waste Isolation Pilot Plant

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 and Detection Monitoring Program (DMP) for groundwater wells completed in the Culebra Dolomite 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. H-19b7 was not measured for this period due to Sandia National Laboratories (SNL) testing. AEC-7R was not included due to lack of survey information and SNL development activities. Fluid density is measured in the Culebra wells annually. 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). Travel time was calculated to have an average velocity of 0.65 meters per year (m/yr) and take 6,234 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 Sampling Round 36 results with respect to the established baseline and Permit background values, as applicable.

The Round 36 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 36, 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 procedures and U.S. Environmental Protection Agency (EPA) technical guidance.

The analytical results for Round 36 indicate no evidence of groundwater contamination resulting from the disposal and management of TRU mixed waste at the WIPP facility. The Round 36 data for WQSP-5 show that the toluene detected during Round 35, which was introduced into the well from electrical tape while replacing the pump, was no longer present in the well at a concentration above the method reporting limit (MRL). No volatile organic compounds (VOCs) were detected at concentrations above the MRL in any of the Round 36 groundwater samples.

The analytical 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, beryllium, and vanadium.

1.0 Introduction

This Annual Culebra Groundwater Report combines the 2014 Culebra groundwater sampling and analysis results from the Detection Monitoring Program (DMP) with data collected monthly from the Water Level Monitoring Program. The reporting requirements are outlined in the Permit, Part 5, Section 5.10.2, and Attachment L, Section L-5b and c (DOE, 2009).

The Culebra (Figure 1 shown in Section 2.1) 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 constituents 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 Addendum L1, Section L1-2a(3)(a)(ii) (DOE, 2009)). The regional flow direction of groundwater in the Culebra is generally south.

The Permittees collect groundwater quality data annually in accordance with the Permit, which was originally issued by the New Mexico Environment Department (NMED) on October 27, 1999. Sampling for this reporting period was performed under a Permit modification effective on February 2014. 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 April 2014 to June 2014 (Sampling Round 36) 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 detection monitoring wells (DMWs) (WQSP-1 through WQSP-6) completed in the Culebra. Figure 2 (shown in Section 2.2) 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 transuranic (TRU) mixed waste at the WIPP facility on September 9, 2000. The data collected during Round 36 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.

2.0 Water Level Monitoring Program

2.1 Site Hydrology

The hydrology at and surrounding the WIPP site has been studied extensively over the last 30 years. A summary of the hydrology in this area is contained in the following sections. Figure 1 illustrates the stratigraphy.

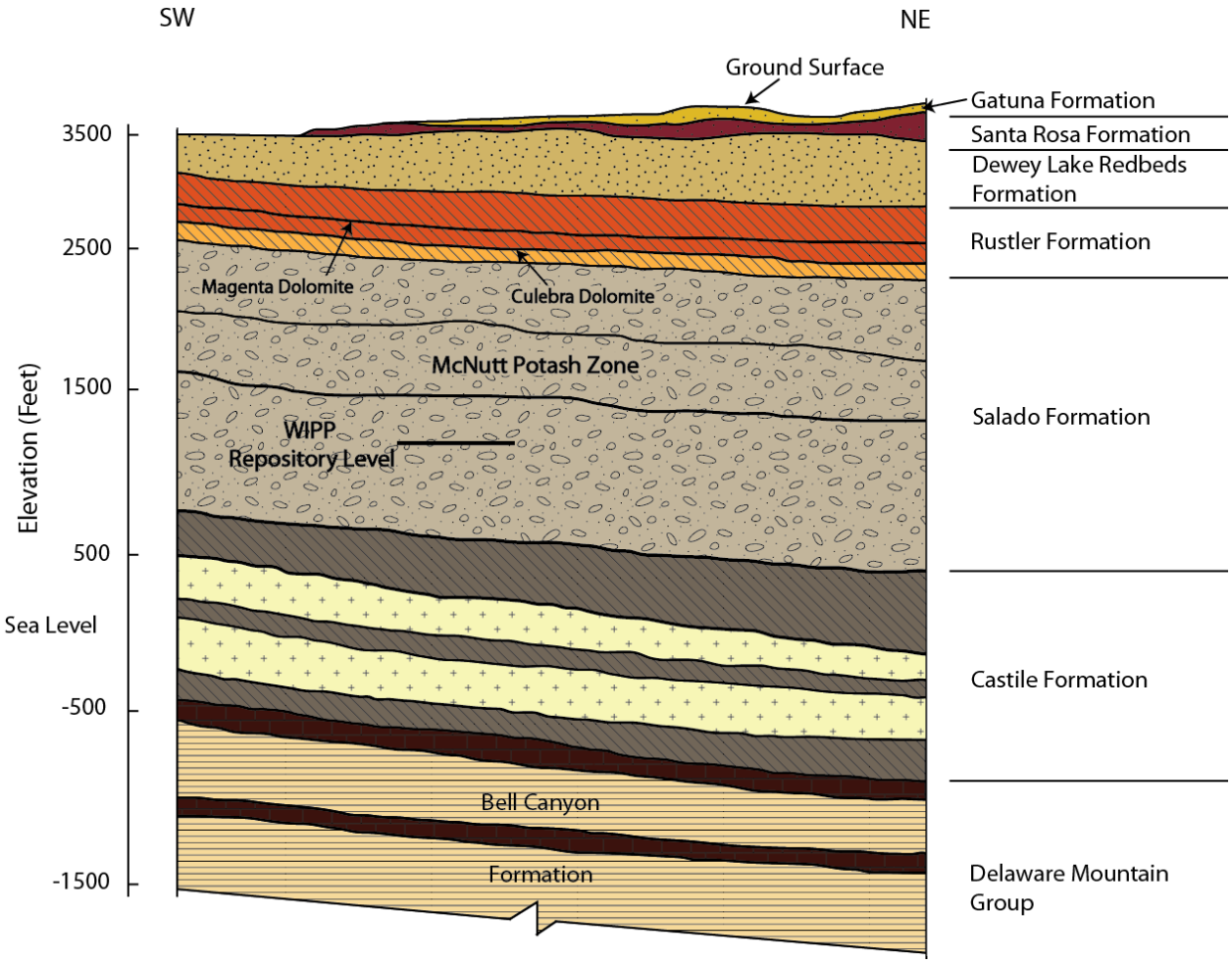

Figure 1 – WIPP Stratigraphy

2.1.1 Surface Hydrology

Surface water is absent at the WIPP site. The nearest significant surface water body, Laguna Grande de la Sal, is 8 miles (13 kilometers [km]) west-southwest of the center of the WIPP site in Nash Draw, where shallow brine ponds occur. Small, manmade livestock watering holes ("tanks") occur several kilometers from the WIPP site, but are not hydrologically connected to the formations overlying the WIPP repository.

2.1.2 Subsurface Hydrology

Several water-bearing zones have been identified and extensively studied at and near the WIPP site. Limited amounts of potable water are found in the middle Dewey Lake and the overlying Triassic Dockum group in the southern part of the WIPP land withdrawal boundary (LWB). Two water-bearing units, the Culebra and Magenta Dolomite Member (Magenta), occur in the Rustler Formation (Rustler) and produce brackish to saline water at and in the vicinity of the site. Another very low transmissivity, saline water-bearing zone is the Rustler-Salado contact.

2.2 Summary of Groundwater Activities

Permit required routine groundwater level monitoring activities include groundwater level monitoring and the fluid density survey. Table 1 lists the active Culebra wells monitored through August 2014. Water level data collected from March 2014 to August 2014 are presented in Appendix 2.

Table 1 – Active Culebra Monitoring Wells as of August 2014

AEC-7R	C-2737(PIP)	ERDA-9	H-02b2	H-03b2	H-04bR	H-05b
H-06bR	H-07b1	H-09bR	H-10c	H-11b4R	H-12R	H-15R
H-16	H-17	H-19b0	H-19b2*	H-19b3*	H-19b4*	H-19b5*
H-19b6*	H-19b7*	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

*Redundant wells on H-19 pad, measured quarterly.

Monthly groundwater level data and yearly fluid density data were gathered from 43 Culebra wells across the WIPP region (Figure 2). 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 six redundant wells on the H-19 pad are measured quarterly for water level and annually for fluid density. Monthly water levels are not taken where access were poor or in certain wells when testing equipment was present, blocking access to the well.

2.2.1 Plugging and Abandonment, Drilling, and Well Maintenance

Well H-12 was plugged and abandoned due to its deteriorating condition and replaced by H-12R. Drilling of well H-12R was started July 10, 2014, and a total depth of 865 feet below ground level was reached on July 24, 2014. Casing was set on July 26, 2014, with the screen interval in the Culebra at 846—822 feet below ground level. More information will be available in the forthcoming H-12R basic data report.

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

Beginning in September 2013, wells in the southern half of the monitoring network were influenced by a new industrial-use water well completed in the Culebra on Mills Ranch. SNL-12 was impacted the most with a decrease of 12.31 feet between March and August, 2014. Changes are being recorded as far north as SNL-9. This is marked on the hydrographs in

Appendix 1. H-7b1 was affected by pumping from a U.S. Bureau of Land Management well located on the same pad.

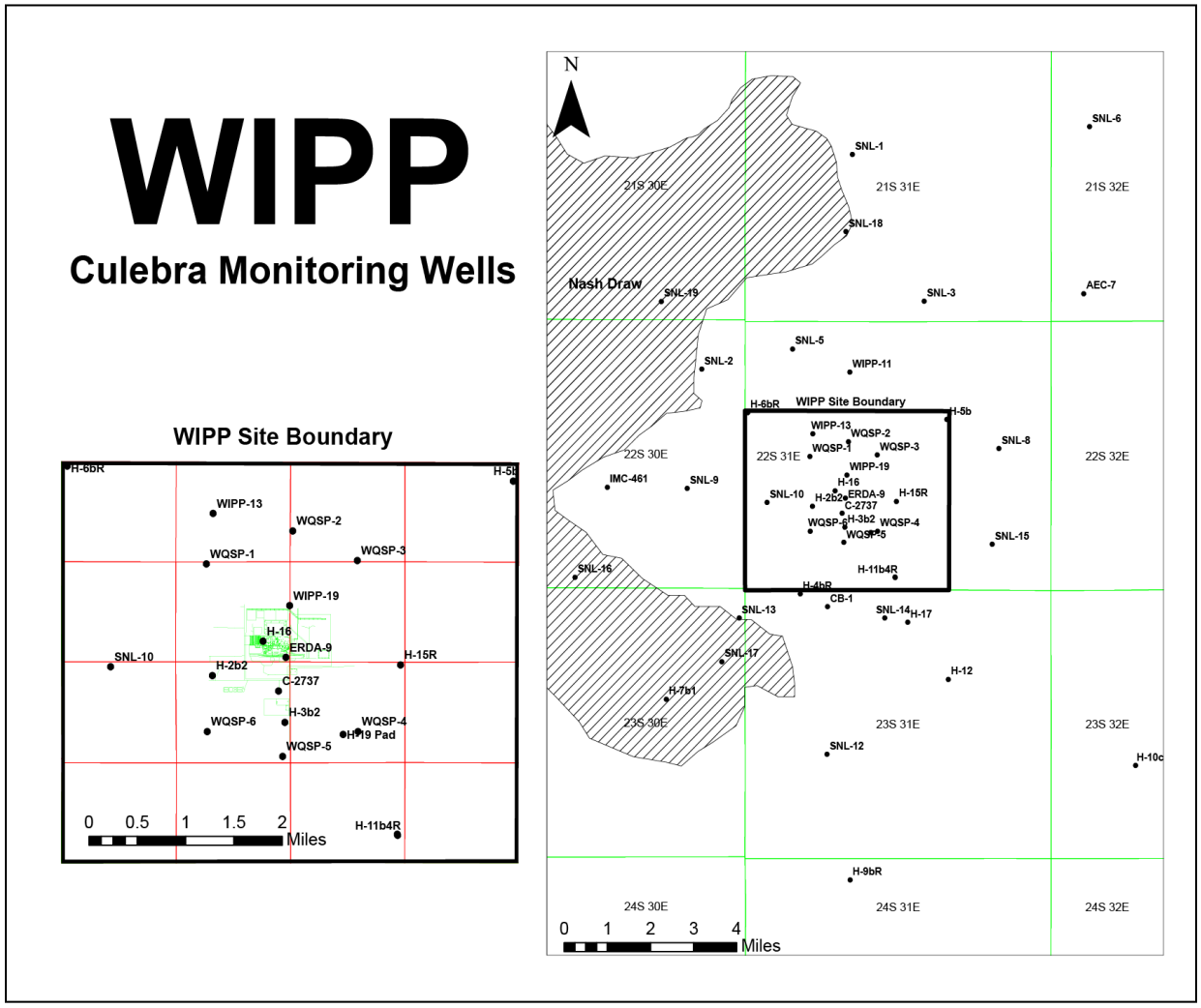

Figure 2 – Culebra Monitoring Wells

2.3 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 equivalent freshwater head values. This allows more accurate determination of relative heads between wells. In 2013, 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 DMWs that are sampled

(WQSP wells in Table 1), field hydrometer measurements are used. Fluid densities have been thermally adjusted since 2009, when it was determined by the scientific advisor (SNL), that the average Culebra water temperature is 70°F.

Fluid densities for previous years are 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).

Table 2 – Fluid Density Survey for 2013

Well	Density (g/cc)						Notes for 2011-2013 Fluid Density Survey
	2011 Fluid Density Survey Result	2011 Conversion to Specific Gravity at 70° F	2012 Fluid Density Survey Result	2012 Conversion to Specific Gravity at 70° F	2013 Fluid Density Survey Result	2013 Conversion to Specific Gravity at 70° F	
AEC-7	1.069	1.071	1.065	1.067	1.066	1.068	
C-2737	1.025	1.027	1.021	1.023	1.021	1.023	
ERDA-9	1.071	1.073	1.071	1.073	1.069	1.071	
H-02b2	1.010	1.012	1.010	1.012	1.011	1.013	
H-03b2	1.039	1.041	1.034	1.036	1.030	1.032	
H-04bR	1.015	1.017	1.015	1.017	1.015	1.017	
H-05b	1.095	1.097	1.093	1.095	1.090	1.092	
H-06bR	1.036	1.038	1.036	1.038	1.037	1.039	
H-07b1	1.004	1.006	1.005	1.007	1.005	1.007	
H-9bR	1.000*	1.000*	1.000*	1.000*	0.999	1.001	* Rounded up to 1.000 for 2011 & 2012
H-10c	1.092	1.094	1.092	1.094	1.093	1.095	
H-11b4	1.039	1.041	NA	NA	NA	NA	Plugged and abandoned in November 2011
H-11b4R	NA	NA	1.074	1.076	1.074	1.076	New replacement well to H-11b4 drilled in 2011
H-12	1.105	1.107	1.111	1.113	1.106	1.108	
H-15R	1.117	1.119	1.116	1.118	1.116	1.118	
H-16	1.035	1.037	1.035	1.037	1.034	1.036	
H-17	1.134	1.136	1.131	1.133	1.131	1.133	
H-19b0	1.064	1.066	1.064	1.066	1.064	1.066	
H-19b2	1.059	1.061	1.060	1.062	1.066	1.068	
H-19b3	1.052	1.054	1.064	1.066	1.064	1.066	
H-19b4	1.054	1.056	1.065	1.067	1.064	1.066	
H-19b5	1.062	1.064	1.067	1.069	1.067	1.069	
H-19b6	1.061	1.063	1.068	1.070	1.068	1.070	

Well	Density (g/cc)						Notes for 2011-2013 Fluid Density Survey
	2011 Fluid Density Survey Result	2011 Conversion to Specific Gravity at 70° F	2012 Fluid Density Survey Result	2012 Conversion to Specific Gravity at 70° F	2013 Fluid Density Survey Result	2013 Conversion to Specific Gravity at 70° F	
H-19b7	1.062	1.064	1.070	1.072	1.068	1.070	
I-461	1.000*	1.000*	1.000*	1.000*	1.000*	1.000*	* Rounded up to 1.000 for 2011-2013
SNL-01	1.029	1.031	1.027	1.029	1.028	1.030	
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	1.007	1.009	1.007	1.009	1.007	1.009	
SNL-06	1.239	1.241	1.241	1.243	1.241	1.243	
SNL-08	1.092	1.094	1.092	1.094	1.093	1.095	
SNL-09	1.016	1.018	1.016	1.018	1.016	1.018	
SNL-10	1.007	1.009	1.007	1.009	1.008	1.010	
SNL-12	1.003	1.005	1.004	1.006	1.004	1.006	
SNL-13	1.023	1.025	1.016	1.018	1.015	1.017	
SNL-14	1.045	1.047	1.044	1.046	1.044	1.046	
SNL-15	1.230	1.232	1.227	1.229	1.227	1.229	
SNL-16	1.006	1.008	1.007	1.009	1.006	1.008	
SNL-17	1.004	1.006	1.003	1.005	1.003	1.005	
SNL-18	1.005	1.007	1.003	1.005	1.007	1.009	
SNL-19	1.004	1.006	1.005	1.007	1.005	1.007	
WIPP-11	1.036	1.038	1.036	1.038	1.036	1.038	
WIPP-13	1.041	1.043	1.039	1.041	1.038	1.040	
WIPP-19	1.050	1.052	1.050	1.052	1.050	1.052	
WQSP-1	1.047	1.049	1.049	1.051	1.047	1.049	Average Round 35, field hydrometer
WQSP-2	1.046	1.048	1.046	1.048	1.045	1.047	Average Round 35, field hydrometer
WQSP-3	1.143	1.146	1.145	1.147	1.146	1.148	Average Round 35, field hydrometer
WQSP-4	1.074	1.076	1.075	1.077	1.074	1.076	Average Round 35, field hydrometer
WQSP-5	1.025	1.027	1.025	1.027	1.025	1.027	Average Round 35, field hydrometer
WQSP-6	1.015	1.017	1.013	1.015	1.013	1.015	Average Round 35, field hydrometer

NA = no available measurement

g/cc = grams per cubic centimeter

2.4 Groundwater Trends

Over the last year (September 2013 – August 2014) 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. Most of the decrease can be attributed to the new Mills Ranch well.

Appendix 1 contains annotated hydrographs as required by the Permit. Groundwater data and equivalent freshwater heads recorded for the period of March – August 2014 are in Appendix 2.

AEC-7R does not have a hydrograph as its reference elevation for top of casing is not complete.

2.5 Potentiometric Surface Map

The potentiometric map was produced using data from the 2013 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 2013 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 the wells were not disturbed by any man-made effects such as pumping or well maintenance activities.

Figure 3 shows modeled freshwater head contours for February 2013 for the model domain. These contours were generated using the results of the Culebra MODFLOW 2K (Harbaugh et al., 2000) run using 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 *WIPP Hazardous Waste Facility Permit Amended Renewal 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 2013 Culebra freshwater heads. The portion of the flow domain of interest to the site is extracted as shown on Figure 4.

The freshwater head values for February 2013 were computed using 2012 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 4 is due to the low transmissivity for this area defined by such wells as SNL-8 and SNL-15 (Figure 2). 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.

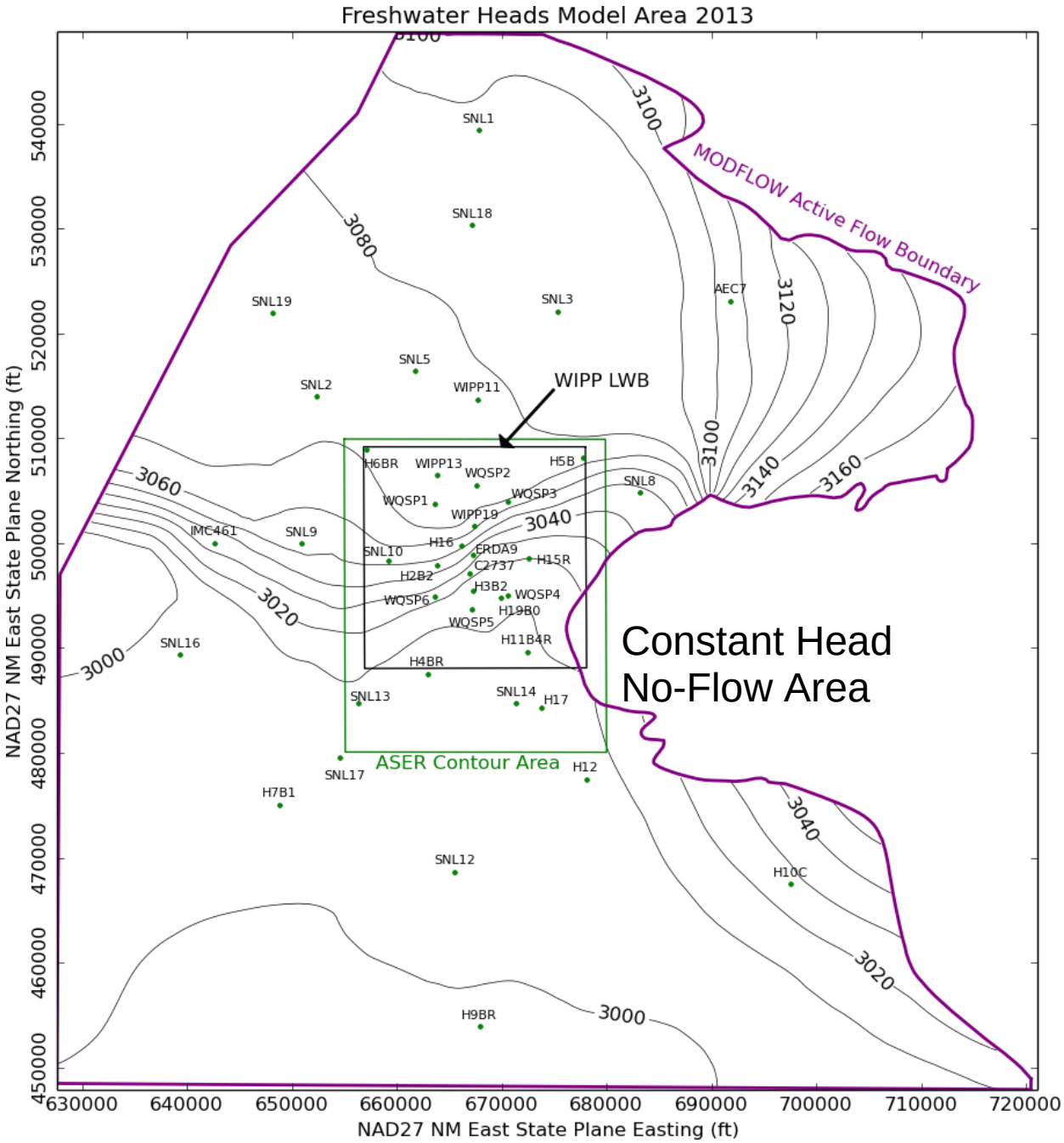

Figure 3 – Model Generated February 2013 Freshwater Head Contours in the Model Domain (contour interval in feet above mean sea level)

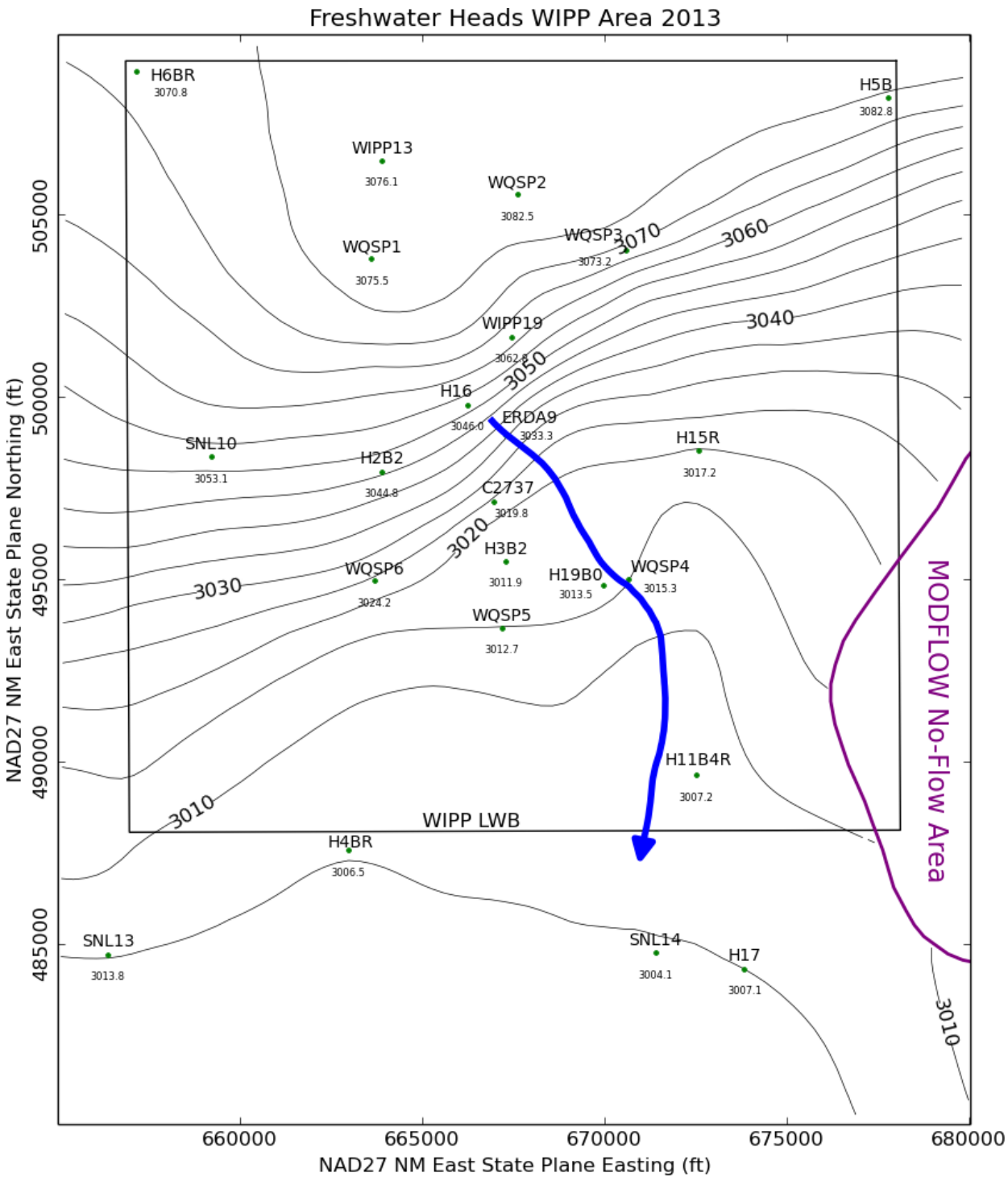

Figure 4 – Model Generated February 2013; Freshwater Head Contours (5-foot contour interval) in the WIPP Vicinity with Blue Water Particle Track from Waste Handling Shaft to WIPP Land Withdrawal Boundary (contour interval in feet above mean sea level)

The illustrated particle in Figure 4 (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 LWB (a computed path length of 4.073 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 6,234 years, for an average velocity of 0.65 meters per year (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 5 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 indicated with blue stars. AEC-7 was given a low weight (0.01), to prevent its large residual from dominating the optimization. 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 4, at the expense of fitting wells closer to the boundary conditions (i.e., wells not shown in Figure 3).

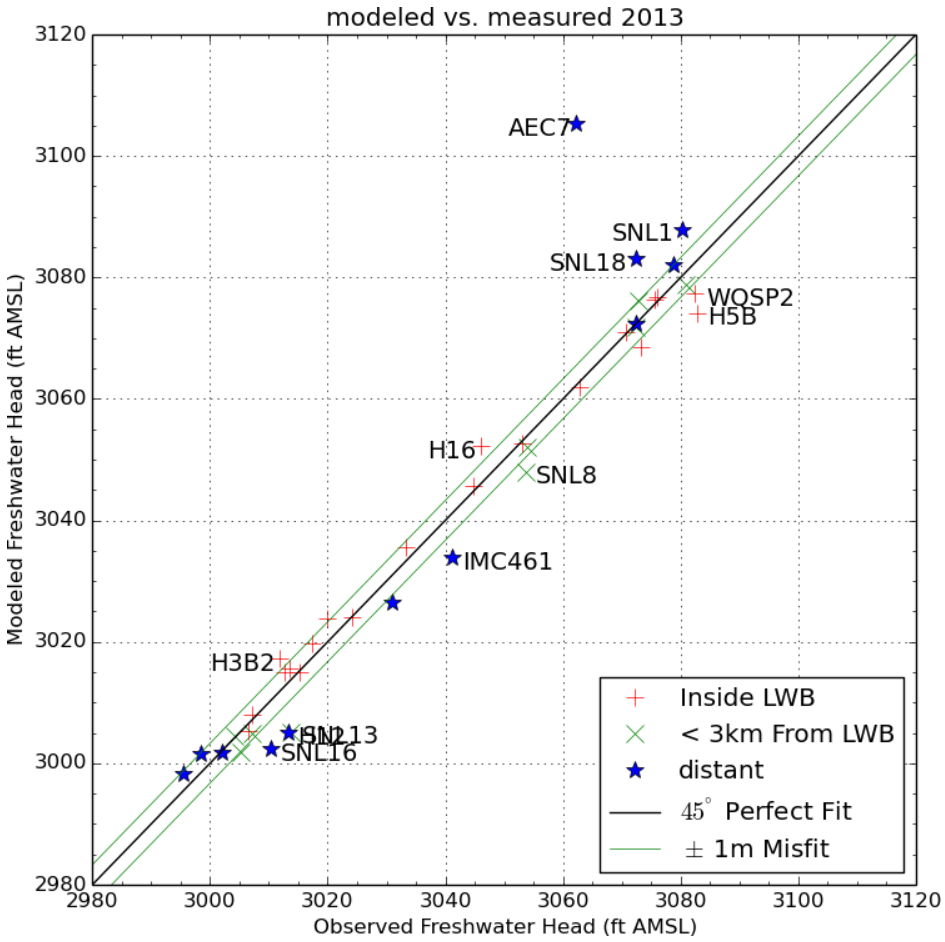

Figure 5 – Measured Versus Modeled Scatter Plot for Parameter Estimation Tool-Calibrated MODFLOW 2000 Generated Heads and February 2013 Observed Freshwater Heads

The central diagonal line in Figure 5 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 3).

Figures 6 and 7 show the distribution of errors resulting from the PEST-adjusted fit to observed data. The distribution in Figure 6 is roughly symmetric, indicating there is not a strong bias. Aside from AEC-7, the model fit to the February 2013 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 2013 observations.

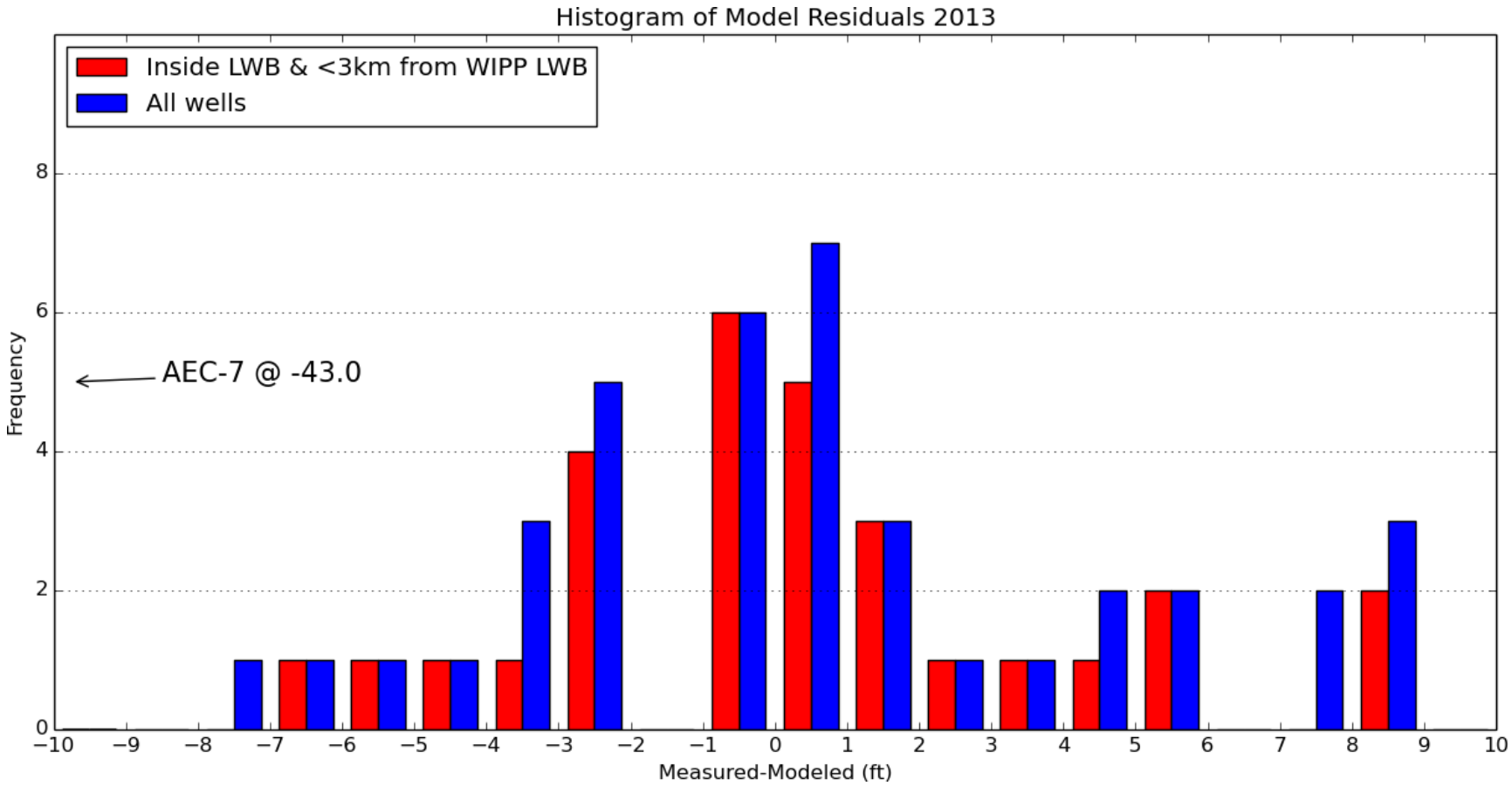

Figure 6 – Frequency of Modeled Freshwater Head Residuals

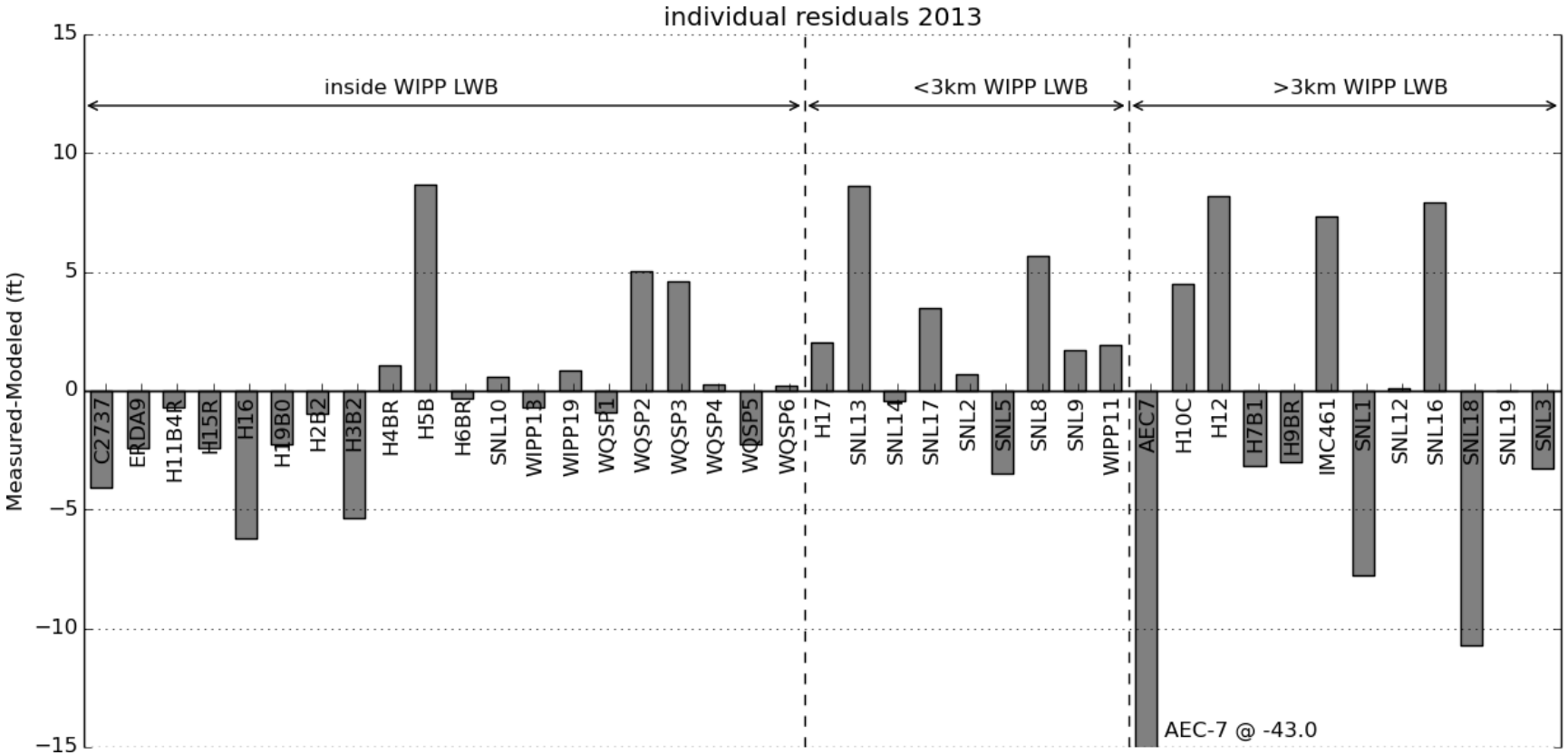

Figure 7 – Modeled Residual Freshwater Head at Each Well

3.0 Detection Monitoring Program

3.1 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 (DOE, 2009). DMWs are shown in Figure 8.

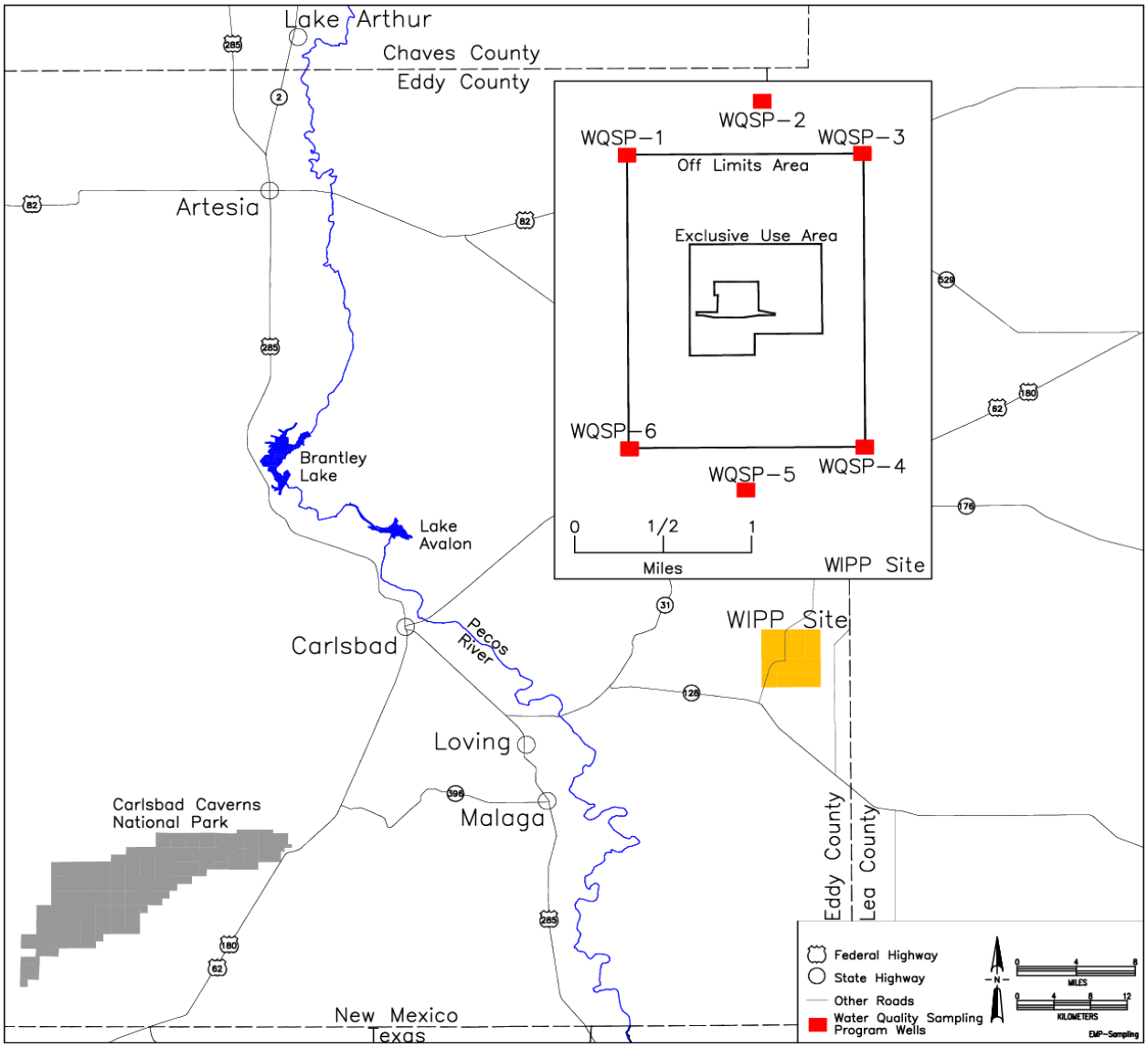

Figure 8 – Location of Detection Monitoring Program Wells

3.2 Round 36 Groundwater Analyses

In accordance with Permit requirements, the Permittees sampled the six Culebra DMWs for the hazardous constituents and indicator parameters listed in Table 3. In addition to the Permit required analytical constituents and parameters listed in Table 3, the samples were analyzed for alkalinity, sodium (major cation), sulfate (major anion), and nitrate (anion). The purpose for analyzing all the major cations and anions is the calculation of the cation-anion ratio, which provides additional insight into the accuracy of the cation and anion analyses.

Table 3 – 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)

Table 4 lists the VOCs, semivolatile organic compounds (SVOCs), and trace metal constituents measured in the Round 36 samples along with the corresponding MRLs specified in the statement of work (SOW) for the contract laboratory. Round 36 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. 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 contract analytical laboratory, Hall Environmental Analysis Laboratory (HEAL), which deviate from the Permit-listed organic compound nomenclature, are provided in parentheses (Table 4) 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 5 summarizes the analytical results for analytical parameters and constituents (excluding VOCs and SVOCs) measured in the Round 36 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 laboratory 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 (refer to Appendices 3 through 8). 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) of the primary and duplicate sample analyses.

The analytical results from Round 36 are discussed in Sections 3.2.1 through 3.2.4 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-4, followed by WQSP-5, WQSP-6, WQSP-1, WQSP-2, and WQSP-3 last. The reason WQSP-4, WQSP-5, and WQSP-6 were analyzed first was that these wells were the least likely to contain any radiological contamination following the WIPP release event on February 14, 2014. It was later established that there was no environmental contamination in the areas associated with the DMP wells. The DMW groundwater samples were used as the sample matrix for matrix spike (MS) and matrix spike duplicate (MSD) samples 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 Sheets discussed above along with the laboratory’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 laboratory (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 36 chemical analysis results for the metals and the general

chemistry parameters along with the historical baseline data and concentrations measured during previous rounds.

Table 4 – Volatile Organic Compound, Semivolatile Organic Compounds, and Metal Constituents, and their Associated Statement of Work-Prescribed Method Reporting Limits

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

Table 5 – Round 36 Analytical Data Summary

Chemical	Concentration (mg/L)		Distribution Type[a]	95th UTLV or 95th Percentile	Permit Table 5.6
	Primary Sample	Duplicate			
WQSP-1 Culebra					
WQSP-1 General Chemistry					
Specific Gravity[b]	1.041	1.044	Normal	1.07	N/A
pH (SU)	7.19	7.21	Lognormal	5.6 – 8.8	N/A
Specific Conductance (µmhos/cm)	91,100	92,900	Lognormal	175,000	N/A
Total Dissolved Solids	61,000	60,200	Lognormal	80,700	N/A
Total Organic Carbon	0.72 J	0.66 J	Nonparametric	<5.0	N/A
Total Suspended Solids	**61**	**40**	Nonparametric	**33.3**	N/A
WQSP-1 Total Trace Metals					
Antimony	ND (0.025)	ND (0.025)	Nonparametric	0.33	0.33
Arsenic	ND (0.025)	ND (0.025)	Nonparametric	<0.1	0.10
Barium	0.026 J	0.029 J	Nonparametric	<1.0	1.00
Beryllium	ND (0.0018)	0.0032 J	Nonparametric	<0.02	0.02
Cadmium	ND (0.0031)	ND (0.0031)	Nonparametric	<0.2	0.20
Chromium	ND (0.0084)	ND (0.0084)	Nonparametric	<0.5	0.50
Lead	ND (0.024)	ND (0.024)	Nonparametric	0.105	0.11
Mercury	ND (0.00044)	ND (0.000087)	Nonparametric	<0.002	0.002
Nickel	ND (0.0095)	ND (0.0095)	Nonparametric	0.490	0.50
Selenium	ND (0.025)	ND (0.025)	Nonparametric	0.150	0.15
Silver	ND (0.0026)	ND (0.0026)	Nonparametric	<0.5	0.50
Thallium	ND (0.025)	ND (0.025)	Nonparametric	0.98	1.00
Vanadium	ND (0.027) J	0.030 J	Nonparametric	<0.1	0.10
WQSP-1 Major Cations, Dissolved					
Calcium	1,790	1,790	Normal	2,087	N/A
Magnesium	1,140	1,140	Normal	1,247	N/A
Potassium	508	509	Lognormal	799	N/A
WQSP-1 Major Anions					
Chloride	37,200	38,600	Normal	40,472	N/A
WQSP-2 Culebra					
WQSP-2 General Chemistry					
Specific Gravity[b]	1.043	1.044	Lognormal	1.06	N/A
pH (SU)	7.23	7.25	Normal	7.0 – 7.6	N/A
Specific Conductance (µmhos/cm)	70,100	75,000	Lognormal	124,000	N/A
Total Dissolved Solids	64,500	60,800	Normal	80,500	N/A
Total Organic Carbon	0.26 J	0.21 J	Nonparametric	7.97	N/A

Total Suspended Solids	40	33	Nonparametric	43.0	N/A

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

Table 5 - Round 36 Analytical Data Summary (continued)

Chemical	Concentration (mg/L)		Distribution Type[a]	95th UTLV or 95th Percentile	Permit Table 5.6
	Primary Sample	Duplicate			
WQSP-2 Total Trace Metals					
Antimony	ND (0.025)	ND (0.025)	Nonparametric	<0.5	0.50
Arsenic	ND (0.025)	ND (0.025)	Nonparametric	0.062	0.06
Barium	0.023 J	0.023 J	Nonparametric	<1.0	1.00
Beryllium	0.0028 J	0.0020 J	Nonparametric	<1.0	1.00
Cadmium	ND (0.0031)	ND (0.0031)	Nonparametric	<0.5	0.50
Chromium	ND (0.0084)	ND (0.0084)	Nonparametric	<0.5	0.50
Lead	ND (0.024)	ND (0.024)	Nonparametric	0.163	0.17
Mercury	ND (0.000087)	ND (0.000087)	Nonparametric	<0.002	0.002
Nickel	ND (0.0095)	ND (0.0095)	Nonparametric	0.37	0.50
Selenium	ND (0.025)	ND (0.025)	Nonparametric	0.150	0.15
Silver	ND (0.0026)	ND (0.0026)	Nonparametric	<0.5	0.50
Thallium	ND (0.025)	ND (0.025)	Nonparametric	0.980	1.00
Vanadium	0.030 J	0.029 J	Nonparametric	<0.1	0.10
WQSP-2 Major Cations, Dissolved					
Calcium	1,600	1,550	Lognormal	1,827	N/A
Magnesium	1,060	1,040	Normal	1,244	N/A
Potassium	496	518	Lognormal	845	N/A
WQSP-2 Major Anions					
Chloride	34,400	34,400	Normal	39,670	N/A
WQSP-3 Culebra					
WQSP-3 General Chemistry					
Specific Gravity[b]	1.140	1.145	Normal	1.17	N/A
pH (SU)	6.83	6.82	Lognormal	6.6 – 7.2	N/A
Specific Conductance (μmhos/cm)	358,000	352,000	Normal	517,000	N/A
Total Dissolved Solids	206,000	202,000	Lognormal	261,000	N/A
Total Organic Carbon	0.20 J	0.17 J	Nonparametric	<5.0	N/A
Total Suspended Solids	**130**	**187**	Nonparametric	**107**	N/A

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

Table 5 - Round 36 Analytical Data Summary (continued)

Chemical	Concentration (mg/L)		Distribution Type[a]	95th UTLV or 95th Percentile	Permit Table 5.6
	Primary Sample	Duplicate			
WQSP-3 Total Trace Metals					
Antimony	ND (0.025)	ND (0.025)	Nonparametric	<1.0	1.00
Arsenic	ND (0.025)	ND (0.025)	Nonparametric	<1.0	0.21
Barium	0.041 J	0.032 J	Nonparametric	<1.0	1.00
Beryllium	ND (0.0035)	0.027 J	Nonparametric	<0.1	0.10
Cadmium	ND (0.0060)	ND (0.0060)	Nonparametric	<0.5	0.50
Chromium	ND (0.017)	ND (0.017)	Nonparametric	<2.0	2.00
Lead	ND (0.048)	ND (0.048)	Nonparametric	0.8	0.80
Mercury	ND (0.000087)	ND (0.000087)	Nonparametric	<0.002	0.002
Nickel	ND (0.019)	ND (0.019)	Nonparametric	<5.0	5.00
Selenium	ND (0.025)	ND (0.025)	Nonparametric	<2.0	2.00
Silver	ND (0.0052)	ND (0.0052)	Nonparametric	0.31	0.31
Thallium	ND (0.025)	ND (0.025)	Nonparametric	5.8	5.80
Vanadium	ND (0.055)	0.033 J	Nonparametric	<5.0	5.00
WQSP-3 Major Cations, Dissolved					
Calcium	1,390	1,360	Normal	1,680	N/A
Magnesium	2,310	2,230	Lognormal	2,625	N/A
Potassium	1,510	1,490	Lognormal	3,438	N/A
WQSP-3 Major Anions					
Chloride	114,000	111,000	Lognormal	149,100	N/A
WQSP-4 Culebra					
WQSP-4 General Chemistry					
Specific Gravity[b]	1.070	1.066	Lognormal	1.09	N/A
pH (SU)	7.09	7.11	Lognormal	6.8 – 7.6	N/A
Specific Conductance (μmhos/cm)	162,000	161,000	Lognormal	319,800	N/A
Total Dissolved Solids	104,000	101,000	Normal	123,500	N/A
Total Organic Carbon	0.35 J	0.25 J	Nonparametric	<5.0	N/A
Total Suspended Solids	**98**	**94**	Nonparametric	**57.0**	N/A

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

Table 5 - Round 36 Analytical Data Summary (continued)

Chemical	Concentration (mg/L)		Distribution Type[a]	95th UTLV or 95th Percentile	Permit Table 5.6
	Primary Sample	Duplicate			
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	0.025 J	0.027 J	Nonparametric	1.00	1.00
Beryllium	0.0039 J	ND (0.0035)	Nonparametric	0.25	0.25
Cadmium	ND (0.0063)	ND (0.0063)	Nonparametric	<0.5	0.50
Chromium	ND (0.017)	ND (0.017)	Nonparametric	<2.0	2.00
Lead	ND (0.048)	ND (0.048)	Nonparametric	0.525	0.53
Mercury	ND (0.00044)	ND (0.00044)	Nonparametric	<0.002	0.002
Nickel	0.058 J	0.050 J	Nonparametric	<5.0	5.00
Selenium	ND (0.020)	ND (0.020)	Nonparametric	2.009	2.00
Silver	ND (0.0052)	ND (0.0052)	Nonparametric	0.519	0.52
Thallium	ND (0.020)	ND (0.020)	Nonparametric	1.00	1.00
Vanadium	ND (0.055)	ND (0.055)	Nonparametric	<5.0	5.00
WQSP-4 Major Cations, Dissolved					
Calcium	1,630	1,570	Lognormal	1,834	N/A
Magnesium	1,200	1,180	Lognormal	1,472	N/A
Potassium	742	757	Lognormal	1,648	N/A
WQSP-4 Major Anions					
Chloride	56,300	59,400	Normal	63,960	N/A
WQSP-5 Culebra					
WQSP-5 General Chemistry					
Specific Gravity[b]	1.019	1.018	Normal	1.04	N/A
pH (SU)	7.49	**7.32**	Normal	7.4 – 7.9	N/A
Specific Conductance (μmhos/cm)	50,200	50,500	Lognormal	67,700	N/A
Total Dissolved Solids	35,100	33,400	Nonparametric	43,950	N/A
Total Organic Carbon	0.34 J	0.36 J	Nonparametric	<5.0	N/A
Total Suspended Solids	**24**	**29**	Nonparametric	**<10**	N/A

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

Table 5 - Round 36 Analytical Data Summary (continued)

Chemical	Concentration (mg/L)		Distribution Type[a]	95th UTLV or 95th Percentile	Permit Table 5.6
	Primary Sample	Duplicate			
WQSP-5 Total Trace Metals					
Antimony	ND (0.020)	ND (0.020)	Nonparametric	0.073	0.07
Arsenic	ND (0.020)	ND (0.020)	Nonparametric	<0.5	0.50
Barium	0.018 J	0.015 J	Nonparametric	<1.0	1.00
Beryllium	ND (0.0018)	ND (0.0018)	Nonparametric	<0.02	0.02
Cadmium	ND (0.0031)	ND (0.0031)	Nonparametric	<0.05	0.05
Chromium	ND (0.0084)	ND (0.0084)	Nonparametric	<0.5	0.50
Lead	ND(0.024)	ND (0.024)	Nonparametric	<0.05	0.05
Mercury	ND (0.00044)	ND (0.00044)	Nonparametric	<0.002	0.002
Nickel	ND (0.0095)	ND (0.0095)	Nonparametric	<0.1	0.10
Selenium	ND (0.020)	ND (0.020)	Nonparametric	<0.1	0.10
Silver	ND (0.0026)	ND (0.0026)	Nonparametric	<0.5	0.50
Thallium	ND (0.020)	ND (0.020)	Nonparametric	0.209	0.21
Vanadium	ND (0.027)	ND (0.027)	Nonparametric	2.70	2.70
WQSP-5 Major Cations, Dissolved					
Calcium	1,030	1,040	Lognormal	1,303	N/A
Magnesium	454	456	Nonparametric	547	N/A
Potassium	289	299	Lognormal	622	N/A
WQSP-5 Major Anions					
Chloride	14,000	14,000	Lognormal	18,100	N/A
WQSP-6 Culebra					
WQSP-6 General Chemistry					
Specific Gravity[b]	1.009	1.008	Normal	1.02	N/A
pH (SU)	7.79	7.80	Normal	7.5 – 7.9	N/A
Specific Conductance (μmhos/cm)	20,200	19,900	Lognormal	27,660	N/A
Total Dissolved Solids	16,000	15,400	Lognormal	22,500	N/A
Total Organic Carbon	0.58 J	0.57 J	Nonparametric	10.14	N/A
Total Suspended Solids	13	12	Nonparametric	14.8	N/A

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

Table 5 - Round 36 Analytical Data Summary (continued)

Chemical	Concentration (mg/L)		Distribution Type[a]	95th UTLV or 95th Percentile	Permit Table 5.6
	Primary Sample	Duplicate			
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	0.0096 J	0.0092 J	Nonparametric	<1.0	1.00
Beryllium	0.00061 J	0.00054 J	Nonparametric	<0.02	0.02
Cadmium	ND (0.00063)	ND (0.00063)	Nonparametric	<0.05	0.05
Chromium	ND (0.0017)	ND (0.0017)	Nonparametric	<0.5	0.50
Lead	ND (0.0048)	ND (0.0048)	Nonparametric	0.150	0.15
Mercury	ND (0.00020)	ND (0.00020)	Nonparametric	<0.002	0.002
Nickel	ND (0.0019)	ND (0.0019)	Nonparametric	<0.5	0.50
Selenium	ND (0.020)	ND (0.020)	Nonparametric	0.10	0.10
Silver	ND (0.0052)	ND (0.0052)	Nonparametric	<0.5	0.50
Thallium	ND (0.020)	ND (0.020)	Nonparametric	0.560	0.56
Vanadium	ND (0.0055)	ND (0.0055)	Nonparametric	0.070	0.10
WQSP-6 Major Cations, Dissolved					
Calcium	665	661	Normal	796	N/A
Magnesium	205	205	Lognormal	255	N/A
Potassium	150	153	Lognormal	270	N/A
WQSP-6 Major Anions					
Chloride	5,090	5,040	Nonparametric	15,800	N/A

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 the Waste Isolation Pilot Plant RCRA Background Groundwater Quality Baseline Report, 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 the sample. The trace metals were analyzed by inductively coupled plasma spectroscopy. Antimony (Sb), arsenic (As), selenium (Se), and thallium (Tl) were analyzed by inductively coupled plasma spectroscopy / mass spectrometry. 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).

3.2.1 Volatile and Semivolatile Organic Compounds

The MRLs for VOCs and SVOCs (Table 4) are used as background values in Permit Table 5.6 and are used in this report to evaluate possible groundwater contamination. The Round 36 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.

As shown in the Groundwater Concentration and Precision Summary Sheets in the appendices for each DMW (Appendices 3 through 8), there were no other detections of VOCs in any of the groundwater samples at concentrations above the MRL.

The groundwater samples were analyzed for SVOCs, but none were detected in any of the Round 36 groundwater samples. No target SVOCs have ever been detected in groundwater samples during any of the 36 rounds.

The verification and validation narratives in Appendices 3 through 8 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 QA samples (method blanks, field blanks, trip blanks, laboratory control samples and duplicate sample analysis, and matrix spikes and matrix spike duplicates). The QC sample analyses demonstrated that the analyses were in control and that nearly all the objectives for blank cleanliness, spike recoveries, and precision of duplicate samples were met. The small number of QC samples in which the QA objectives were not met is discussed in Section 3.3.

The VOC and SVOC data were searched for the presence of non-target compounds that may have been present in the samples. No significant concentrations of non-target compounds were detected in the samples. The presence of some trace concentrations of VOC and SVOC artifact and contaminant compounds is discussed in Section 3.3.6, Data Verification and Validation.

3.2.2 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 above in Table 5. 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 Sheets in the appendices for each DMW (Appendices 3 through 8). Note that acid preserved and non-acid preserved field blanks are analyzed with the first and last well of the round (i.e., WQSP-4 and WQSP-3).

The Round 36 trace metals were reported as not detected with the exception of barium, beryllium, and vanadium. Nickel and silver were each detected in one of the groundwater samples. In most cases the metals detected and their concentrations were very similar to previous rounds. In addition, the concentrations of the recoverable cations (calcium, magnesium, and potassium) 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 Appendices 3 through 8 discuss the metals analyses in more detail, including the results of analysis of the QA samples (method blanks, field blanks, laboratory control samples and replicate analyses, and matrix spikes and matrix spike duplicates). The QC sample analyses demonstrated that the analyses were in control and that the QA objectives for blank cleanliness, spike recoveries, and precision of duplicate samples were generally met. The small number of QC samples in which the QA objectives for metals were not met is discussed in Section 3.3.

The groundwater concentration and precision summary sheets in the appendices show that for a few of the metals analyses, the laboratory's MDLs for the sample analyses were higher than the SOW-prescribed MRLs. Thus the sensitivity of the analyses did not meet the objective due to the dilution factor used by the laboratory for the analyses. The higher dilutions for both the primary and duplicate samples affected the metals lead and vanadium in WQSP-1, WQSP-2, WQSP-3, WQSP-4, and WQSP-5. The WQSP-1 and WQSP-2 laboratory MDLs were only slightly higher than the SOW-prescribed MRLs, while the WQSP-3, WQSP-4 and WQSP-5 laboraory MDLs were about a factor of two higher than the SOW-prescribed MRLs. Lead was not detected in any of the samples, and vanadium was detected (J-flagged, as estimated) in both the primary and duplicate samples for WQSP-2 and in the duplicate sample only for WQSP-1 and WQSP-3; vanadium was not detected in WQSP-4, WQSP-5, and WQSP-6. It is possible that a lower dilution factor would have allowed detection of trace estimated concentrations of vanadium in the samples in which it was not detected, but the concentrations are too low to be of concern. The usability of the analysis results should not have been adversely affected.

3.2.3 General Chemistry Parameters Including Major Cations and Anions

In addition to the 52 analytical parameters listed in Table 3, 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, followed by chloride and sulfate. Nitrate has not been detected in any of the Culebra DMW groundwater samples. The analytical parameter concentrations in Round 36, including those of the major cations, were all below the concentrations from the baseline studies with the following exceptions:

- WQSP-1: The TSS concentrations of 61 mg/L in the primary groundwater sample and 40 mg/L in the duplicate groundwater sample were higher than the 95th percentile concentration of 33.3 mg/L.
- WQSP-3: The TSS concentrations of 130 mg/L in the primary groundwater sample and 187 mg/L in the duplicate sample were higher than the 95th percentile concentration of 107 mg/L.
- WQSP-4: The TSS concentrations of 98 mg/L in the primary groundwater sample and 94 mg/L in the duplicate groundwater sample was higher than the 95th percentile concentration of 57.0 mg/L.
- WQSP-5: The TSS concentrations of 24 mg/L in the primary groundwater sample and 29 mg/L in the duplicate groundwater sample were higher than the 95th percentile concentration of <10 mg/L.

Total suspended solids is the only general chemistry parameter that yielded any concentrations higher than the baseline concentrations, just as it was for Round 35. Some of the analysis

results for TSS were not very precise. 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.

3.2.4 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 (Standard Methods, 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 6 presents the results of these evaluations for the primary samples of the current sampling round. Round 35 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 (Appendices 3 through 8).

Table 6 – Summary of Analytical Cation-Anion Balances for Round 36 Samples

Well	Total Cations meq/L[a,b]	Total Anions meq/L[a,b]	Percent Difference[c]
WQSP-1 Culebra	1087.83 (1055.39)	1148.44 (1123.76)	2.71 (3.14)
WQSP-2 Culebra	1045.36 (1033.87	1079.39 (1133.79)	1.60 (4.61)
WQSP-3 Culebra	3442.95 (3575.11)	3342.44 (3751.60)	1.48 (2.41)
WQSP-4 Culebra	1782.38 (1703.27)	1733.01 (1920.01)	1.40 (5.98)
WQSP-5 Culebra	518.51 (513.48)	495.19 (508.40)	2.30 (0.50)
WQSP-6 Culebra	247.89 (239.12)	241.62 (238.90)	1.28 (0.046)

Notes: 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 (Appendices 3 through 8). The cation-anion data for the duplicate samples are also included on the sheets.

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

b Round 34 cation-anion results are in parentheses for comparison.

c Percent Difference = (cations − anions) / (cations + anions) × 100

The Round 36 percent differences for the cation-anion balance concentrations were precise considering the multiple chemical analyses used to generate the sample concentrations. The Round 36 total anion and cation concentrations also agree quite well with the Round 35 concentrations. With respect to the precision of the cation and anion concentrations, four of the six percent differences were lower for Round 36 than for Round 35, and the two that were higher (WQSP-5, WQSP-6) were still low.

A 10-percent difference in cation-anion balance is generally acceptable for the analyses of potable water with low TDS. All the Round 36 cation-anion percent differences were well below 10 percent. In fact, the percent differences were all less than three 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. Good precision applied to the duplicate samples, with percent differences of 3.30 for WQSP-1; 3.05 for WQSP-2; 3.42 for WQSP-3; 1.38 for WQSP-4; 4.23 for WQSP-5; and 2.12 for WQSP-6.

3.2.5 Search for Tentatively Identified Compounds

The VOC and SVOC gas chromatography/mass spectrometry (GC/MS) data was searched for the presence of any non-target tentatively identified organic compounds 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 samples. Most of the peaks were attributed to column bleed from the gas chromatography columns used to separate the compounds. For example, two tentatively identified compound VOC peaks appeared in most of the primary and duplicate groundwater samples as well as the trip blank and field blank samples. The peaks do not generally appear in the method blank samples and thus are associated with the effect of the groundwater matrix on the GC column. During this round the laboratory'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 SVOC tentatively identified compound data showed the detection of some readily identifiable compounds in the groundwater extract samples including toluene, xylenes, C3- and C4-alkyl benzenes. However, these same compounds generally appeared at similar concentrations in laboratory 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.

3.3 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 2014 (Round 36). HEAL followed Standard Operating Procedures (SOPs) based on standard analytical methods from the U.S. Environmental Protection Agency (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 36. Quality control (QC) samples were prepared and analyzed with each analytical batch (termed Sample Delivery Group 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.

3.3.1 Completeness

Six DMP monitoring wells were sampled during April through June 2014, to complete Round 36. The completeness objective was met for the groundwater sample analysis as analytical results were received for all the samples submitted (100 percent completeness).

A few QC samples were not analyzed by the laboratory. A laboratory duplicate sample was not analyzed for pH in the WQSP-1, WQSP-2, WQSP-4, and WQSP-6 samples. A laboratory duplicate was not analyzed for specific conductance in the WQSP-1, WQSP-2, WQSP-3, and WQSP-6 samples.

Since a large body of QC data was generated that met the QA objectives, this small amount of missing QC data does not adversely affect the overall quality or usability of the Round 36 analytical data.

3.3.2 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 by taking the absolute 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 laboratory control sample / laboratory control sample duplicate (LCS/LCSD) (LCSR) pairs, MS/MSD pairs, and analysis of single primary groundwater samples in duplicate. The QA objective for the precision of the LCS/LCSD (LCSR), 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. However, the duplicate samples are taken consecutively from continuously flowing water, and the composition of the samples is expected to be consistent. The RPDs of the duplicate groundwater samples are shown on the Groundwater Concentration and Precision Summary Sheets for each DMW in Appendices 3 through 8.

The LCS/LCSD (LCSR) and MS/MSD samples generally contained all the target constituents and general chemistry parameters for precision measurement. The laboratory termed LCS samples that were reanalyzed using instrumental techniques as LCSR samples rather than LCSD samples (LCS reanalysis). 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 barium, beryllium, and vanadium; and general chemistry parameters detected in all the groundwater samples including chloride, TOC, specific gravity, TDS, 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 MDL and MRL where the concentrations are J-flagged as estimated.

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 (Appendices 3 through 8). Table 7 shows the groundwater samples for which the analysis of the primary and duplicate groundwater sample yielded RPDs greater than 20. The precision objective was sometimes not met for analytes where the analytical methods are challenged by the high-brine groundwater samples such as TSS. Other cases where the duplicate groundwater sample RPD was greater than 20 was for analytes, especially the trace metals, that were detected at low concentrations between the MDL and the MRL.

Laboratory control 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. Laboratory control sample/duplicate (LCSR) 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. Matix spike 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, metals, and general chemistry indicator parameters were measured and reported.

Table 7 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 (LCSR) measurements met the precision objective.

Table 7 – Individual Cases Where the Round 36 Groundwater Relative Percent Differences were >20 for the Primary and Duplicate Groundwater Samples, Matrix Spike / Matrix Spike Duplicate Pairs, and Laboratory Duplicate Quality Assurance / Quality Control Samples

DMW	Parameter or Constituent	Primary Sample, Conc. (or as noted)	Duplicate Sample, Conc. (or as noted)	RPD
WQSP-1	TSS	61 mg/L	40 mg/L	42
WQSP-1	2,4-dinitrophenol	31.5 ug/L (MS)	40.0 ug/L (MSD)	24
WQSP-1	Pentachlorophenol	30.4 ug/L (MS)	50.1 ug/L (MSD)	49
WQSP-2	TOC	0.26 mg/L J	0.21 mg/L J	20
WQSP-2	2,4-dinitrophenol	21.1 ug/L (MS)	26.6 ug/L (MSD)	23
WQSP-3	TOC	0.20 mg/L J	0.17 mg/L J	21
WQSP-3	TSS	130 mg/L	187 mg/L	36
WQSP-3	Barium (Ba)	0.041 mg/L J	0.032 mg/L J	24
WQSP-3	2,4- dinitrophenol	18.9 ug/L (MS)	13.4 ug/L (MSD)	34
WQSP-3	Pentachlorophenol	29.6 ug/L (MS)	20.7 ug/L (MSD)	35
WQSP-4	TOC	0.35 mg/L J	0.25 mg/L J	32
WQSP-5	Silver (Ag)	0.011 mg/L J	0.021 mg/L J	62
WQSP-5	2,4-dinitrophenol	26.7 ug/L (MS)	34.1 ug/L (MSD)	24
WQSP-5	Pentachlorophenol	22.1 ug/L (MS)	30.5 ug/L (MSD)	29

DMW	Parameter or Constituent	Primary Sample, Conc. (or as noted)	Duplicate Sample, Conc. (or as noted)	RPD
WQSP-6	2,4-dinitrophenol	45.4 ug/L (MS)	56.0 ug/L (MSD)	21
WQSP-6	Pentachlorophenol	39.3 ug/L (MS)	60.8 ug/L (MSD)	43

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

The laboratory failed to analyze a few general chemistry parameter duplicate samples that provide precision data. These analyses included specific conductance for WQSP-1, WQSP-2, WQSP-3, and WQSP-6, and pH for the WQSP-1, WQSP-2, WQSP-4, and WQSP-6 samples. The issue was discussed with the laboratory and should not reoccur. These two types of analyses generally provide very precise results as shown by the RPDs for the primary and duplicate groundwater samples on the Groundwater Concentration and Precision Summary Sheets in Appendices 3 through 8. However, other sample precision data are available for these parameters.

Table 7 contains two entries for trace metals at concentrations between the MDL and MRL; nine sample sets where the recoveries of two acidic were higher in one of the matrix spike samples compared to the other; two 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, and three cases where the trace concentrations of TOC were higher in one groundwater duplicate sample compared to the other. The table does not include those instances when a trace metal was detected at a J-flagged estimated concentration in one of the groundwater sample duplicates, but was not detected in the other sample indicating poor analytical precision between the two samples.

Considering the hundreds of groundwater sample data points and QA/QC sample data points that were generated during Round 36, the number of duplicate groundwater samples and QA samples that did not meet the precision QA objective was very low, at less than three percent.

3.3.3 Accuracy

The accuracy of the analyses was checked by analyzing initial calibration verification and calibration check verification standards, method blank, LCS/LCSD (LCSR), and MS/MSD samples as specified in the standard methods and in the corresponding laboratory's 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 (LCSR) 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. The groundwater matrix was shown to affect the recoveries of some target analytes. For example, the recovery of polar VOC compounds can be increased, while the recovery of acidic SVOC compounds can be reduced. 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 8 summarizes the QA/QC samples for which the accuracy objective, as measured by percent recovery, was not met during Round 36. 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 8 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.

Table 8 – Cases Where the Round 36 Accuracy Objectives Were Not Met

DMW	Constituent or Parameter	Sample	% Rec.	Sample	% Rec.
WQSP-1	2-butanone	LCS	163	LCSR	163
WQSP-1	Isobutyl alcohol	MS	150	MSD	140
WQSP-1	2-butanone	MS	157	MSD	161
WQSP-1	2,4-dinitrophenol	LCS	27.6	LCSR	30.4 [b]
WQSP-2	Isobutyl alcohol	MS	137	MSD	137
WQSP-2	2-butanone	MS	138	MSD	152
WQSP-2	2,4-dinitrophenol	MS	21.1	MSD	26.6
WQSP-3	Isobutyl alcohol	LCS	197	LCSR	205
WQSP-3	2-butanone	MS	259	MSD	205
WQSP-3	Isobutyl alcohol [c]	MS	1500	MSD	1360
WQSP-3	Pyridine	LCS	31.2	LCSR	32.3
WQSP-3	2,4-dinitrophenol	MS	18.9	MSD	13.4
WQSP-3	Pentachlorophenol	MS	29.6	MSD	20.7
WQSP-4	Isobutyl alcohol	MS	181	MSD	195
WQSP-4	2-butanone	MS	148	MSD	158
WQSP-4	2,4,6-tribromophenol surrogate	MS	18.3	MSD	16.3
WQSP-4	Potassium	MS	71.6	MSD	113 [b]
WQSP-5	Isobutyl alcohol	MS	179	MSD	167
WQSP-5	2,4-dinitrophenol	MS	26.7	MSD	34.1 [b]
WQSP-5	Pentachloropheol	MS	22.1	MSD	30.5 [b]
WQSP-6	2-butanone	LCS	136	LCSR	148
WQSP-6	Pyridine	LCS	39.3	LCSR	39.4

Note: Most of the recoveries in the table met the laboratory's historical control chart range for recovery.

b Accuracy recovery objective was met.

c The laboratory obviously erred in preparing or analyzing this sample, possibly mis-spiking the sample, using the wrong calibration, or some other significant error.

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 laboratory's historical control chart range for SVOCs. The EPA guidance for SVOC recovery is 40 – 140 percent for base/neutral SVOCs and 30 – 130 percent for acidic SVOCs. However, the laboratory's historical control chart recovery range was generally wider than the EPA guidance.

Table 8 contains eight entries where isobutyl alcohol or 2-butanone yielded high recoveries in the MS and MSD; three entries where isobutyl alcohol or 2-butanone was high in the LCS; two entries where pyridine recoveries were low in the LCS and one with low 2,4-dinitrophenol in the LCS; five entries where 2,4-dinitrophenol or pentachlorophenol recoveries were low from the MS/MSD; and one case where the acidic semivolatile surrogate was low in the MS and MSD. 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.

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

3.3.4 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 milligrams per liter (mg/L), and the normal reporting limits for organics were micrograms per liter (µg/L).

HEAL and its subcontract laboratory (Anatek Labs, Inc.) are certified by several states and by the National Environmental Laboratory Accreditation Conference (NELAC) through Oregon for HEAL and Anatek Labs, Inc. HEAL's state certifications include Oregon, Utah, Texas, New Mexico, and Arizona. As such, the laboratories participate in inter-laboratory evaluation programs, including on-site NELAC QA audits. The laboratories also regularly analyze performance evaluation samples provided by a NELAC accredited Proficiency Standard Vendor such as Phenova.

In 2013, HEAL analyzed five sets of performance evaluation (PE) samples, including two of the Phenova Water Pollution Proficiency Testing (WPPT) and three of the Phenova Water Supply Proficiency Testing (WSPT) samples. The Phenova Water Supply Proficiency Testing performance evaluation samples included chloride, nitrate, sulfate, trace metals, mercury, pH, TOC, regulated VOCs, and unregulated VOCs. The Phenova Water Pollution Proficiency Testing performance evaluation samples included chloride, sulfate, TDS, TSS, nitrate, total Kjeldahl nitrogen, alkalinity, trace metals, mercury, specific conductance, pH, VOCs, and

SVOCs (acids and base-neutrals). The PE samples covered all of the WIPP target analytes except isobutyl alcohol. Most of the WIPP target analytes were included in three out of five of the sample sets. The sample sets also included a large number of analytes that are not WIPP analytes.

The results shown in Table 9 show that HEAL earned very high percentages for acceptable analytical results in analyzing four different performance evaluation samples. There were five analytes where HEAL missed the acceptance range on one of the PE samples. However, HEAL achieved acceptable analysis results for four of the five analytes, sodium, mercury, 1,2-dichlorobenzene and 1,4-dichlorobenzene, in the two other PE samples in which it was present. HEAL also achieved acceptable results for 1,3-dichlorobenzene in the one other PE sample in which it was present.

Table 9 – Performance Evaluation Sample Analysis Results for Hall Environmental Analysis Laboratory, 2012

PE Source	No. Results	No. Passing	Percent	Missed [a]	Assigned	Reported
Phenova WPPT[b] WP0413	277	274	98.9	Sodium	45.8 mg/L	52.8 mg/L
Phenova WSPT[c] WS0413	108	107	99.1	Mercury (Hg)	6.06 mg/L	9.27 mg/L
Phenova WPPT WP0513	33	33	100	None	not applicable	not applicable
Phenova WPPT[b] WP1013	311	302	97.1	1,2-dichloro-benzene 1,3-dichloro-benzene 1,4-dichloro-benzene	56.5 39.1 50.4 —	37.6 23.4 31.3 —
Phenova WSPT[c] WS1013	112	111	99.1	None	not applicable	not applicable

a WIPP analytes

b WPPT = Water Pollution Proficiency Testing

c WSPT = Water Supply Proficiency Testing

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 9.

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

3.3.5 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 (Appendices 3 through 8).

3.3.6 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 "EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (1999) and the "EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (2004). 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" (WIPP, 2013). 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 SOPs.

Table 10 shows the standard analytical methods that were used for each of the analytical parameters in Round 36. The general chemistry parameters were analyzed using standard methods from a variety of sources including those published by the EPA, ASTM International (formerly known as the American Society for Testing and Materials) and methods published in "Standard Methods for the Examination of Water and Wastewater" (Standard Methods). The EPA methods were from *Methods for Chemical Analysis of Water and Wastes* and from SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA, 1986). HEAL contracted the analysis of some trace metals (thallium, arsenic, selenium, and antimony) to another laboratory, Anatek Labs, Inc., where the samples were analyzed by inductively coupled plasma spectroscopy / mass spectrometry according to EPA SW-846 Method 6020-A in order to achieve the required SOW-prescribed MRLs.

Table 10 – Summary of Analytical Methods Used for the Detection Monitoring Program 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
Inductively Coupled Plasma Spectroscopy / Mass Spectrometry Metals (antimony [Sb], arsenic [As], selenium [Se], and thallium [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

SM = standard method

3.3.7 Additional Quailty Assurance / Quality Control Information

The sampling and analysis of the six Culebra DMWs were successful for Round 36 with the generation of high quality accurate and precise data with only a few minor issues. All samples were received at 4 ± 2 degrees C during Round 36; and no samples were lost during Round 36. There were no other issues with the data other than a few missed QA objectives as discussed in this section of the report.

During Round 35, toluene was detected in the WQSP-5 DMW due to contamination from electrical tape during a pump change. The well was subsequently purged and re-sampled two different times during 2013 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.

The data from Round 36 show that the toluene concentration had decreased to less than the MRL of 1.0 ug/L in both the primary and duplicate sample with estimated J-flagged concentrations of 0.20 ug/L in the primary sample and 0.21 ug/L in the duplicate sample.

3.4 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 Labs, Inc., submittals containing the cover sheet as well as sample concentrations and associated QA/QC data for each parameter in each DMW including the following:
  - 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 the following:
  - 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.

3.5 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 36 showed that the only target analyte to yield groundwater concentrations higher than the 95th UTLV or 95th percentile was the general chemistry parameter TSS. The TSS concentrations were higher than the 95th percentile in both the primary and duplicate sample in WQSP-1, WQSP-3, WQSP-4, and WQSP-5. The measured concentrations are shown in Table 11.

Table 11 – Summary of Round 36 General Chemistry Parameters Exceeding the 95th Upper Tolerance Limit Value 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	61 mg/L	40 mg/L	51 mg/L	33.3 mg/L (percentile)
WQSP-3	TSS	130 mg/L	187 mg/L	159 mg/L	107 mg/L (percentile)
WQSP-4	TSS	98 mg/L	94 mg/L	96 mg/L	57.0 mg/L (percentile)
WQSP-5	TSS	24 mg/L	29 mg/L	26 mg/L	<10 mg/L (percentile)
WQSP-5	pH	7.32	7.49	7.405	7.4-7.9

The Round 36 samples appear to be the only samples in recent history with only one general chemistry parameter, TSS, exceeding the 95th UTLV or 95th percentile suggesting the groundwater concentrations of dissolved salts may be generally decreasing to a small but measurable extent.

3.6 Summary

The WIPP DMP annual groundwater sampling of six DMWs of the Culebra was performed from April through June 2014 (Sampling Round 35). Groundwater samples were submitted to HEAL in Albuquerque, New Mexico, for the chemical analyses. HEAL subcontracted the analyses of four metals, antimony, arsenic, selenium, and thallium to Anatek Labs, Inc., 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 36 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 36, including VOCs, SVOCs, and metals to be evaluated against the established baseline statistics for each DMW.

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. The GC/MS data was also searched for non-target VOCs and SVOCs that may be present in the groundwater and none were present.

4.0 References

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

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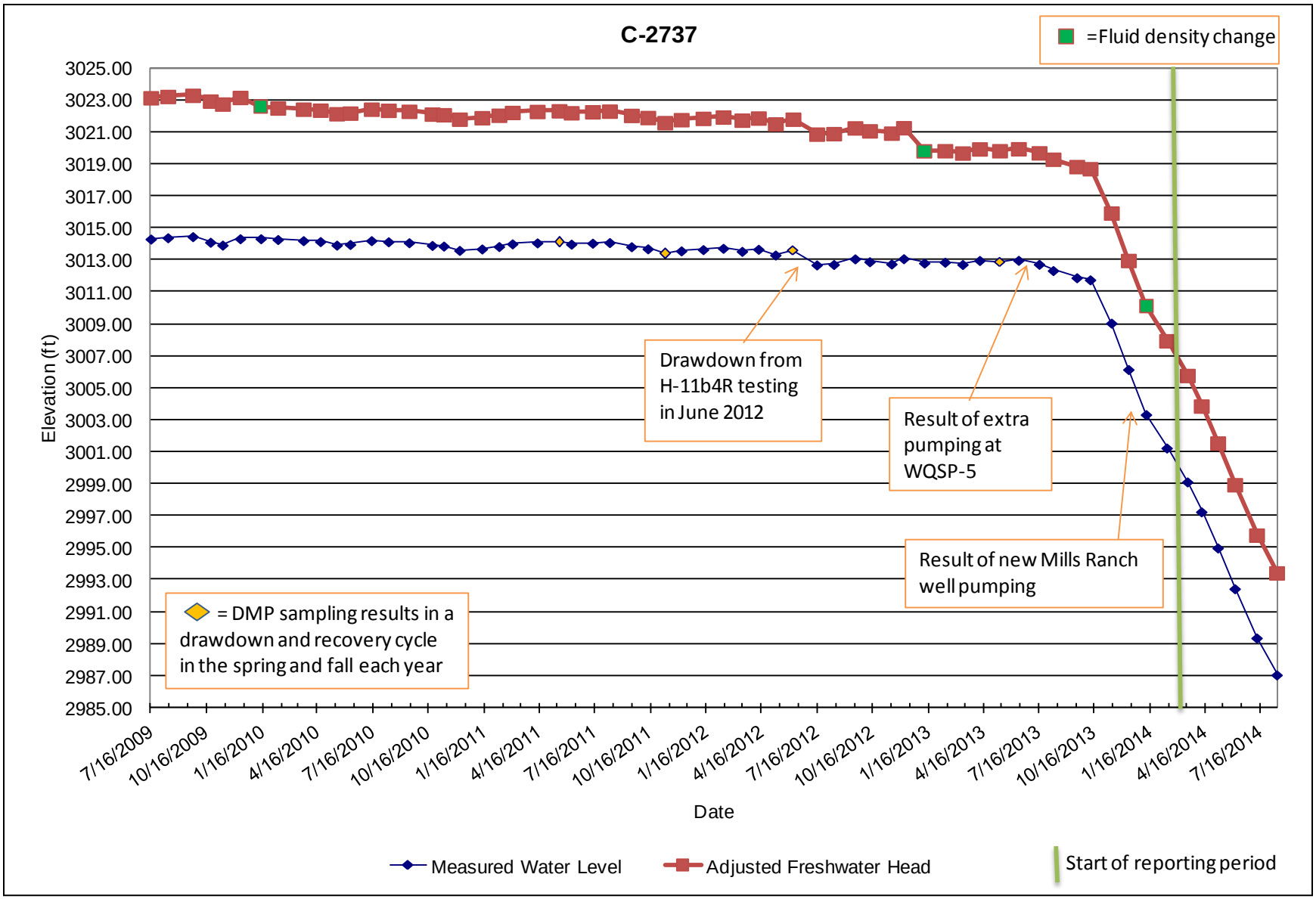
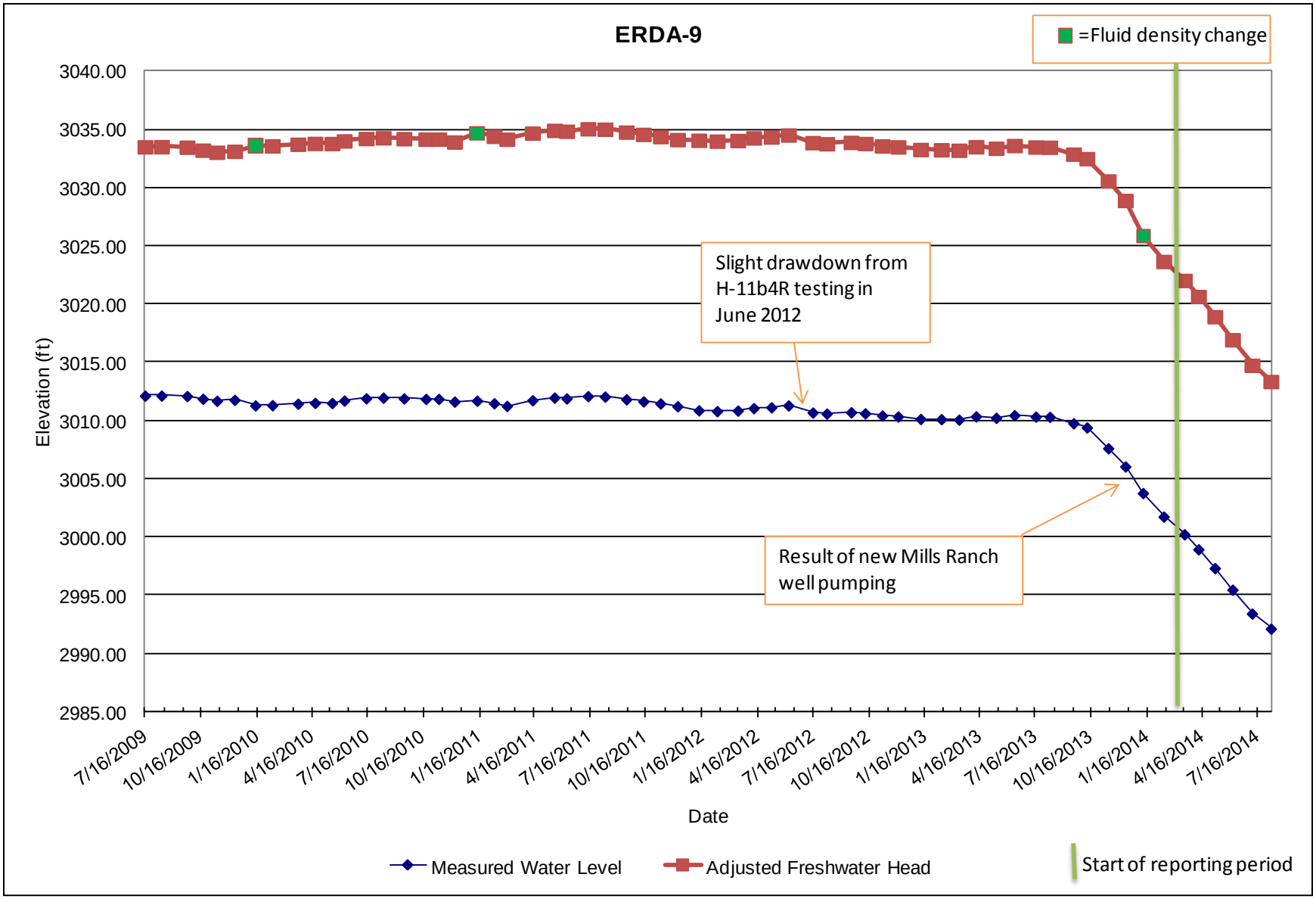
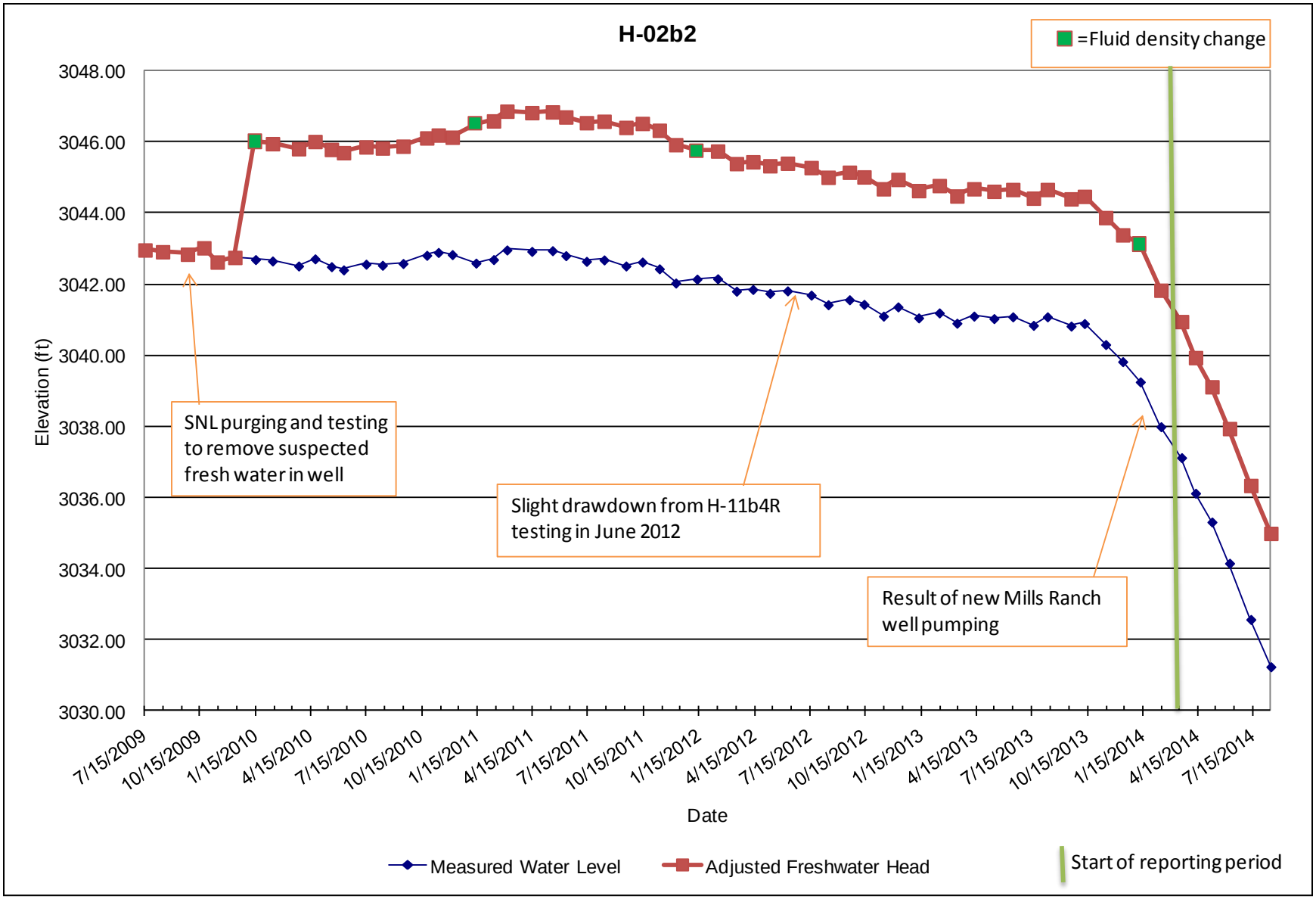
Methods for Chemical Analysis of Water and Wastes; U.S. Environmental Protection Agency. Office of Research and Development, Environmental and Support Laboratory. ORD Publication Offices of Center for Environmental Research Information; Cincinnati, OH, 1983; EPA-600/4-79-020

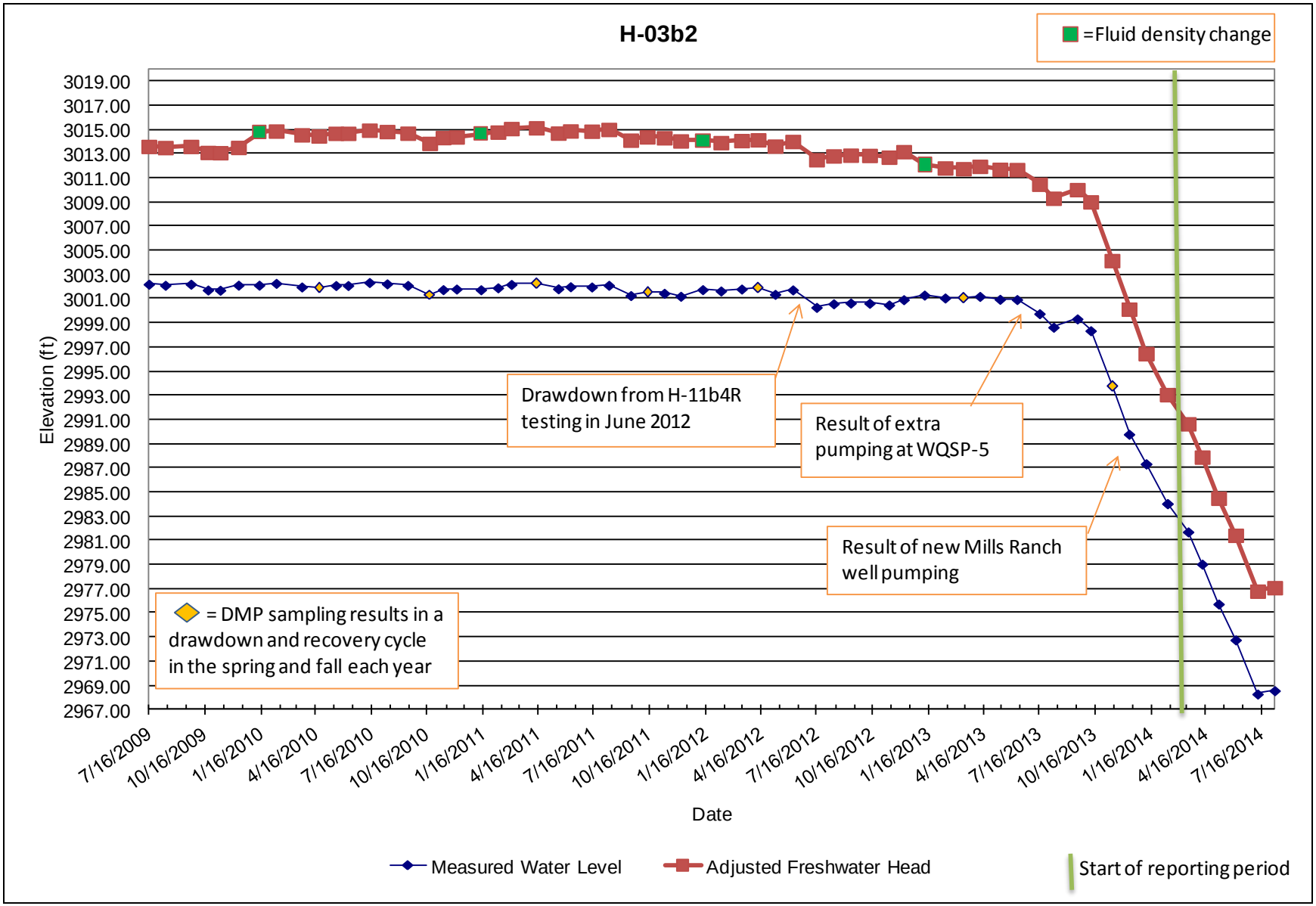
WIPP, see Waste Isolation Pilot Plant.

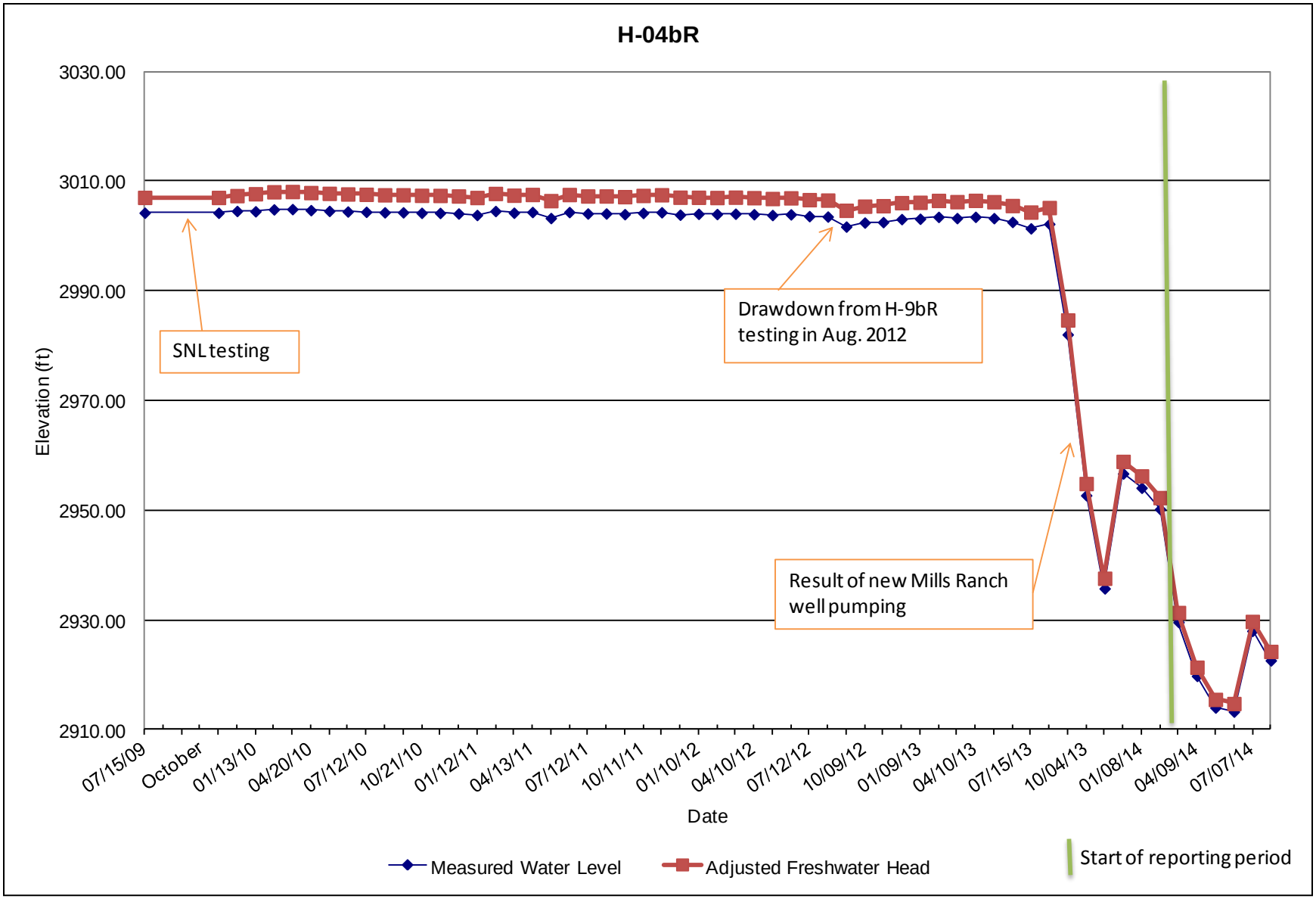
Appendix 1
Annotated Hydrographs

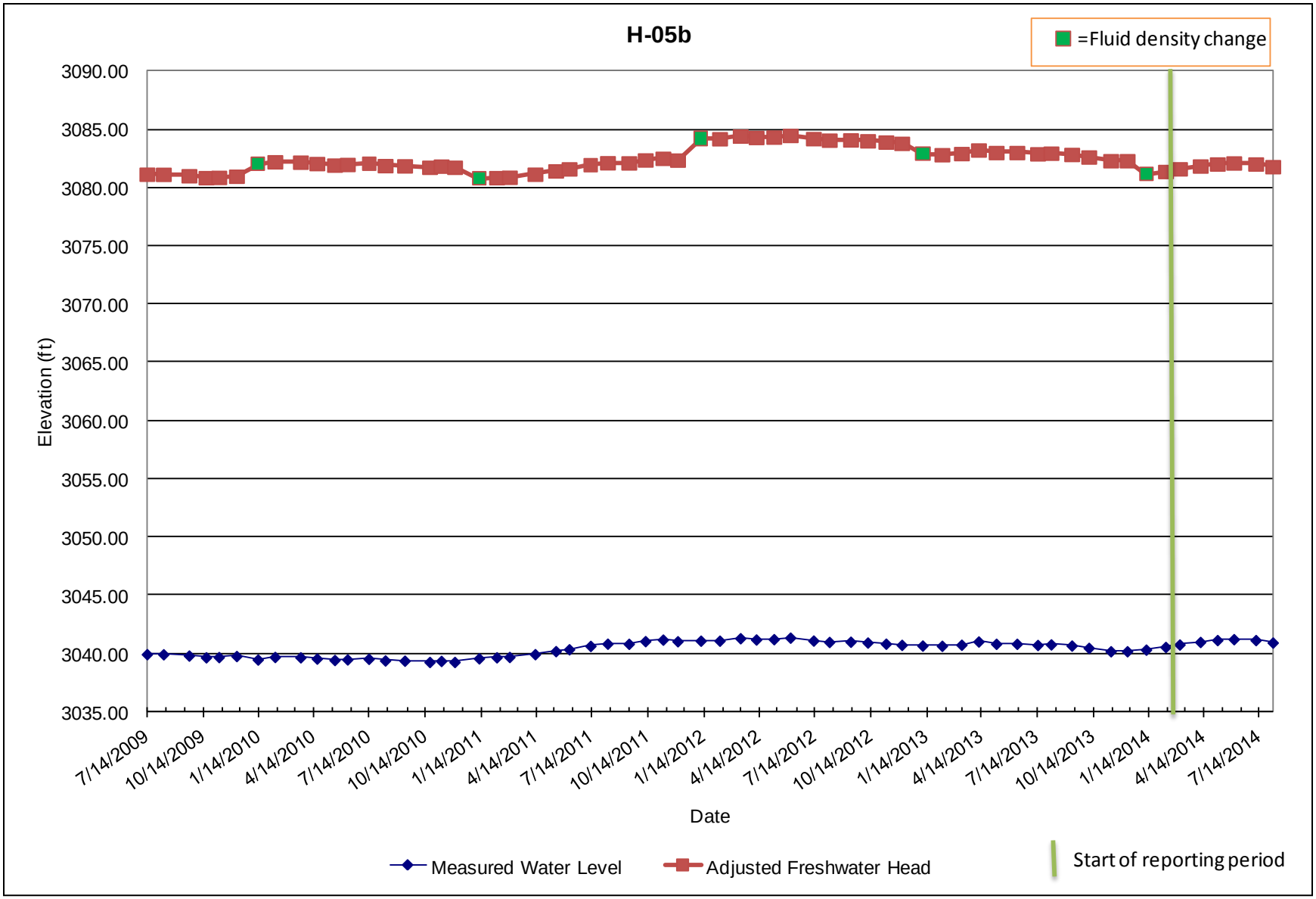

C-2737
=Fluid density change
Elevation (ft)
3025.00
3023.00
3021.00
3019.00
3017.00
3015.00
3013.00
3011.00
3009.00
3007.00
3005.00
3003.00
3001.00
2999.00
2997.00
2995.00
2993.00
2991.00
2989.00
2987.00
2985.00
Drawdown from H-11b4R testing in June 2012
Result of extra pumping at WQSP-5
Result of new Mills Ranch well pumping
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
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
10/16/2013
1/16/2014
4/16/2014
7/16/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

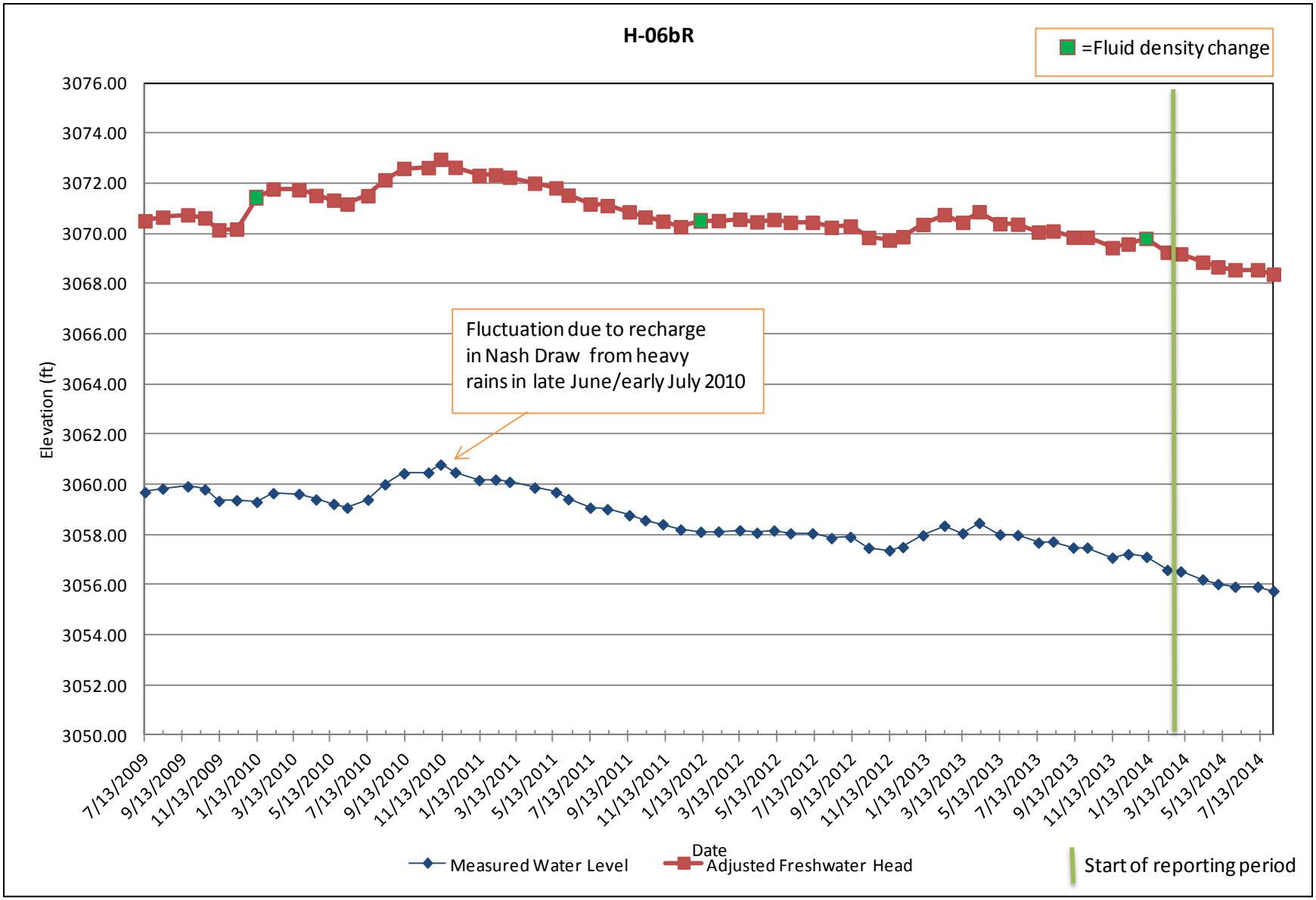

ERDA-9
=Fluid density change
Slight drawdown from H-11b4R testing in June 2012
Result of new Mills Ranch well pumping
Elevation (ft)
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
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
10/16/2013
1/16/2014
4/16/2014
7/16/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

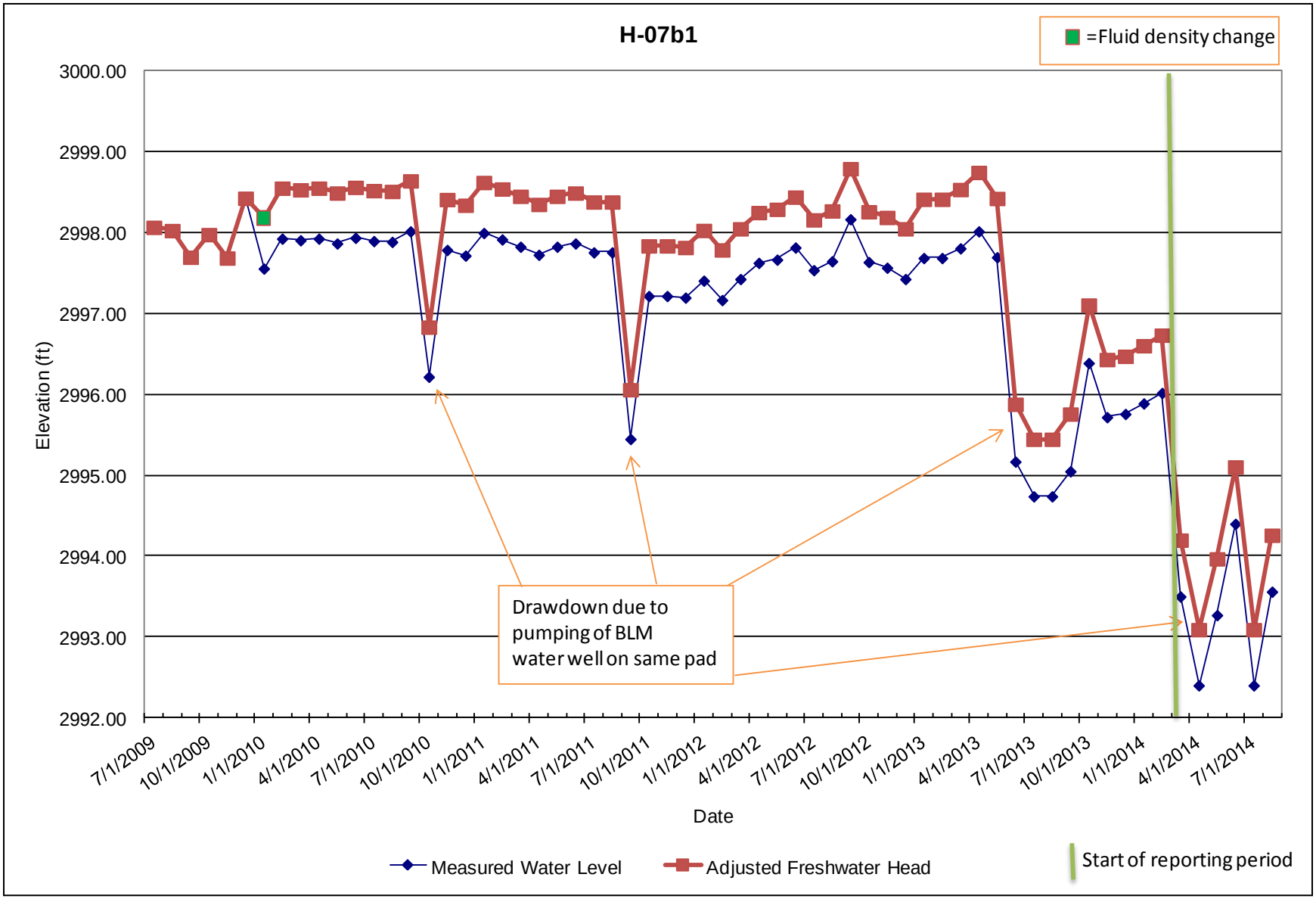

H-02b2
=Fluid density change
3048.00
3046.00
3044.00
3042.00
3040.00
3038.00
3036.00
3034.00
3032.00
3030.00
Elevation (ft)
SNL purging and testing to remove suspected fresh water in well
Slight drawdown from H-11b4R testing in June 2012
Result of new Mills Ranch well pumping
7/15/2009
10/15/2009
1/15/2010
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
10/15/2013
1/15/2014
4/15/2014
7/15/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

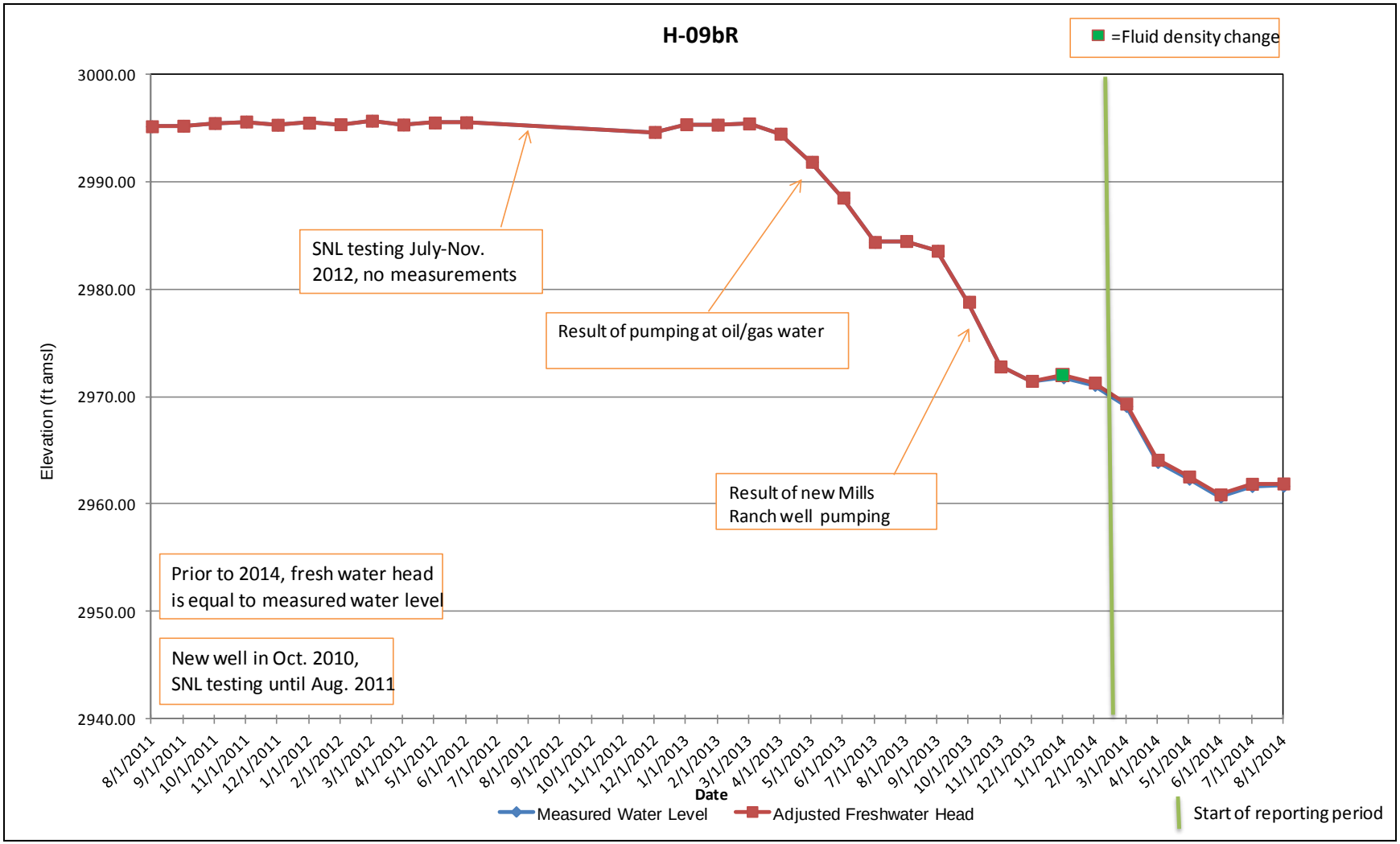

H-03b2
=Fluid density change
Elevation (ft)
3019.00
3017.00
3015.00
3013.00
3011.00
3009.00
3007.00
3005.00
3003.00
3001.00
2999.00
2997.00
2995.00
2993.00
2991.00
2989.00
2987.00
2985.00
2983.00
2981.00
2979.00
2977.00
2975.00
2973.00
2971.00
2969.00
2967.00
Drawdown from H-11b4R testing in June 2012
Result of extra pumping at WQSP-5
Result of new Mills Ranch well pumping
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
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
10/16/2013
1/16/2014
4/16/2014
7/16/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

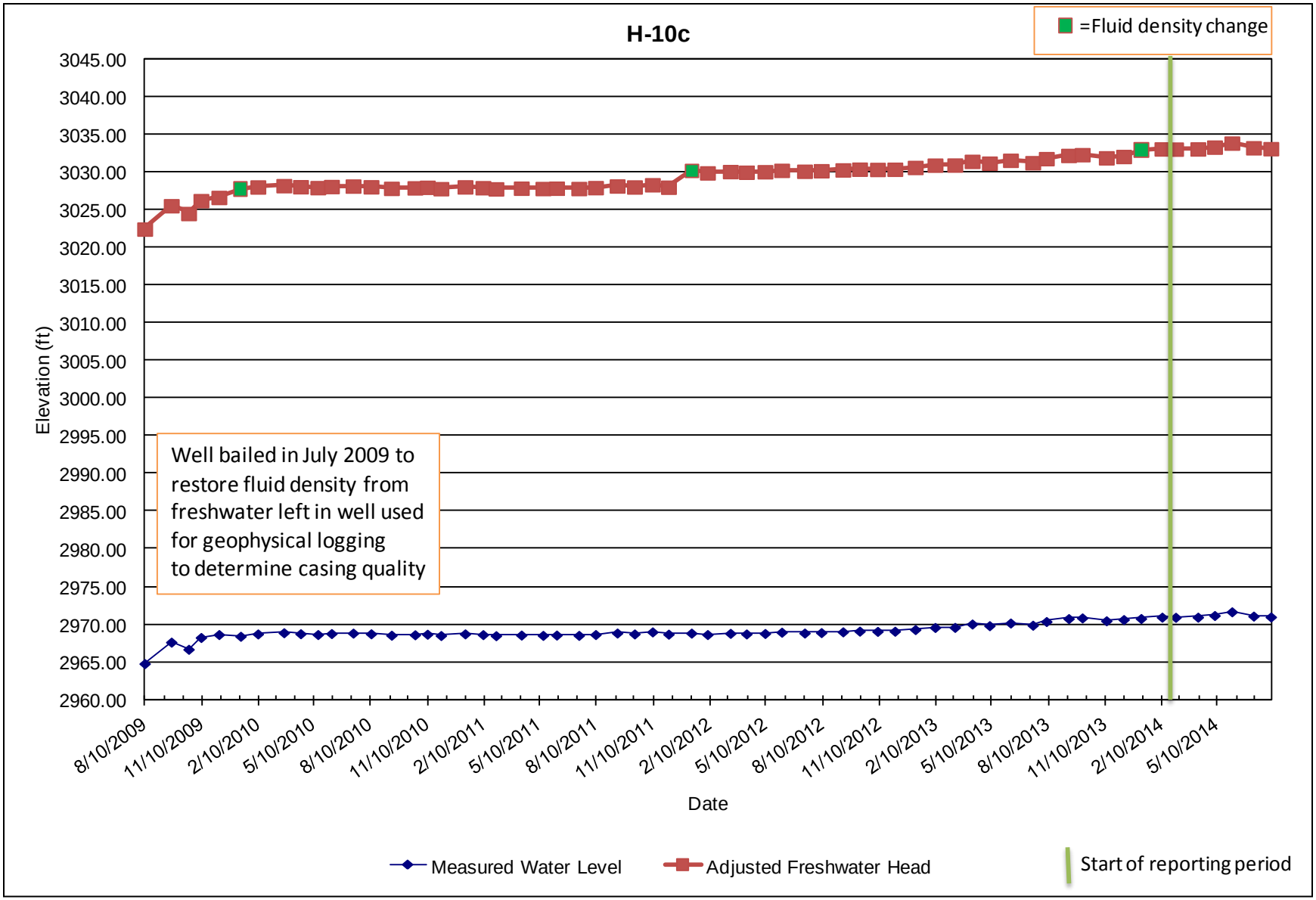

H-04bR
3030.00
3010.00
2990.00
2970.00
2950.00
2930.00
2910.00
Elevation (ft)
SNL testing
Drawdown from H-9bR testing in Aug. 2012
Result of new Mills Ranch well pumping
07/15/09
October
01/13/10
04/20/10
07/12/10
10/21/10
01/12/11
04/13/11
07/12/11
10/11/11
01/10/12
04/10/12
07/12/12
10/09/12
01/09/13
04/10/13
07/15/13
10/04/13
01/08/14
04/09/14
07/07/14
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

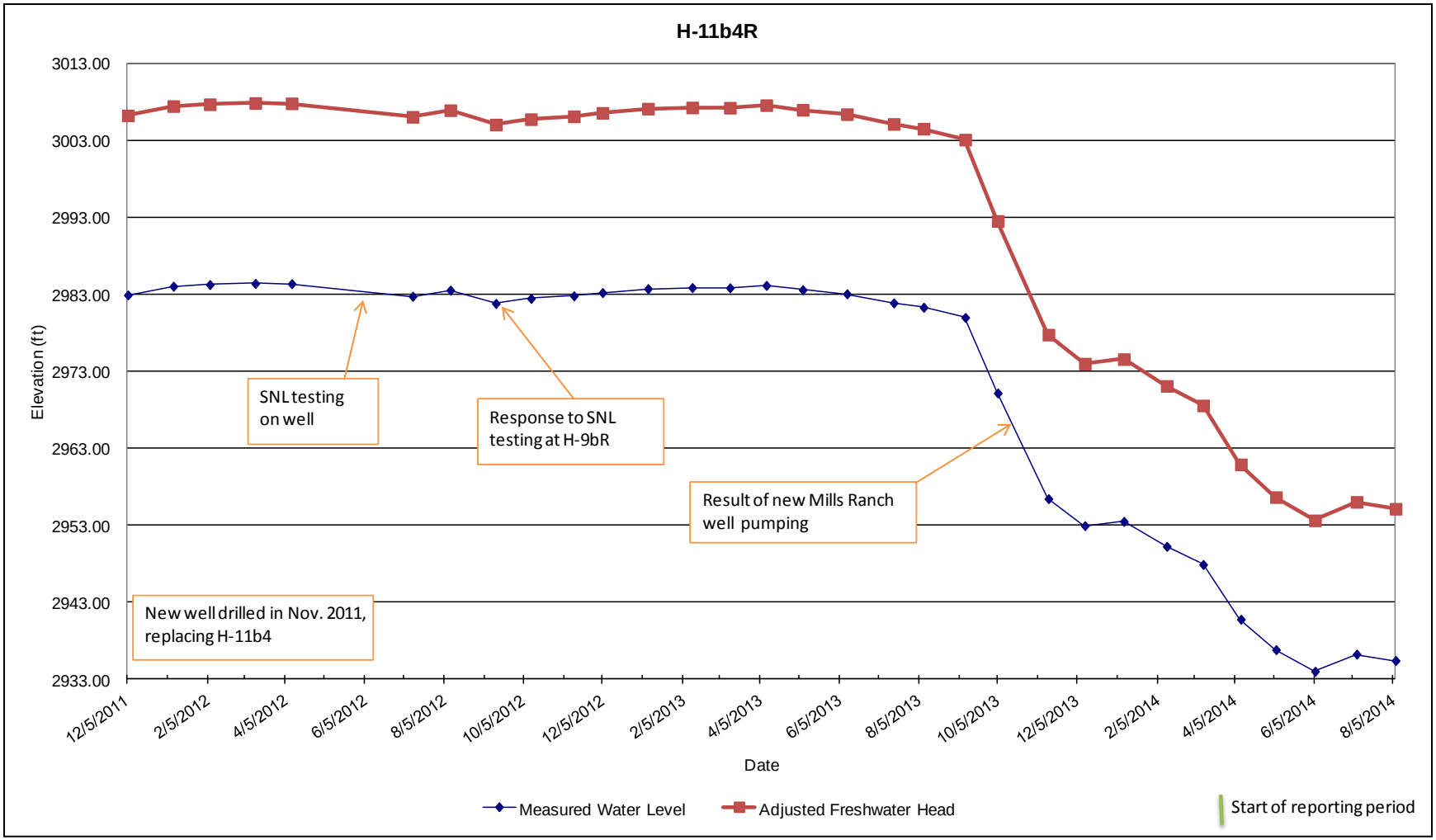

H-05b
=Fluid density change
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
3050.00
3045.00
3040.00
3035.00
Elevation (ft)
7/14/2009
10/14/2009
1/14/2010
4/14/2010
7/14/2010
10/14/2010
1/14/2011
4/14/2011
7/14/2011
10/14/2011
1/14/2012
4/14/2012
7/14/2012
10/14/2012
1/14/2013
4/14/2013
7/14/2013
10/14/2013
1/14/2014
4/14/2014
7/14/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

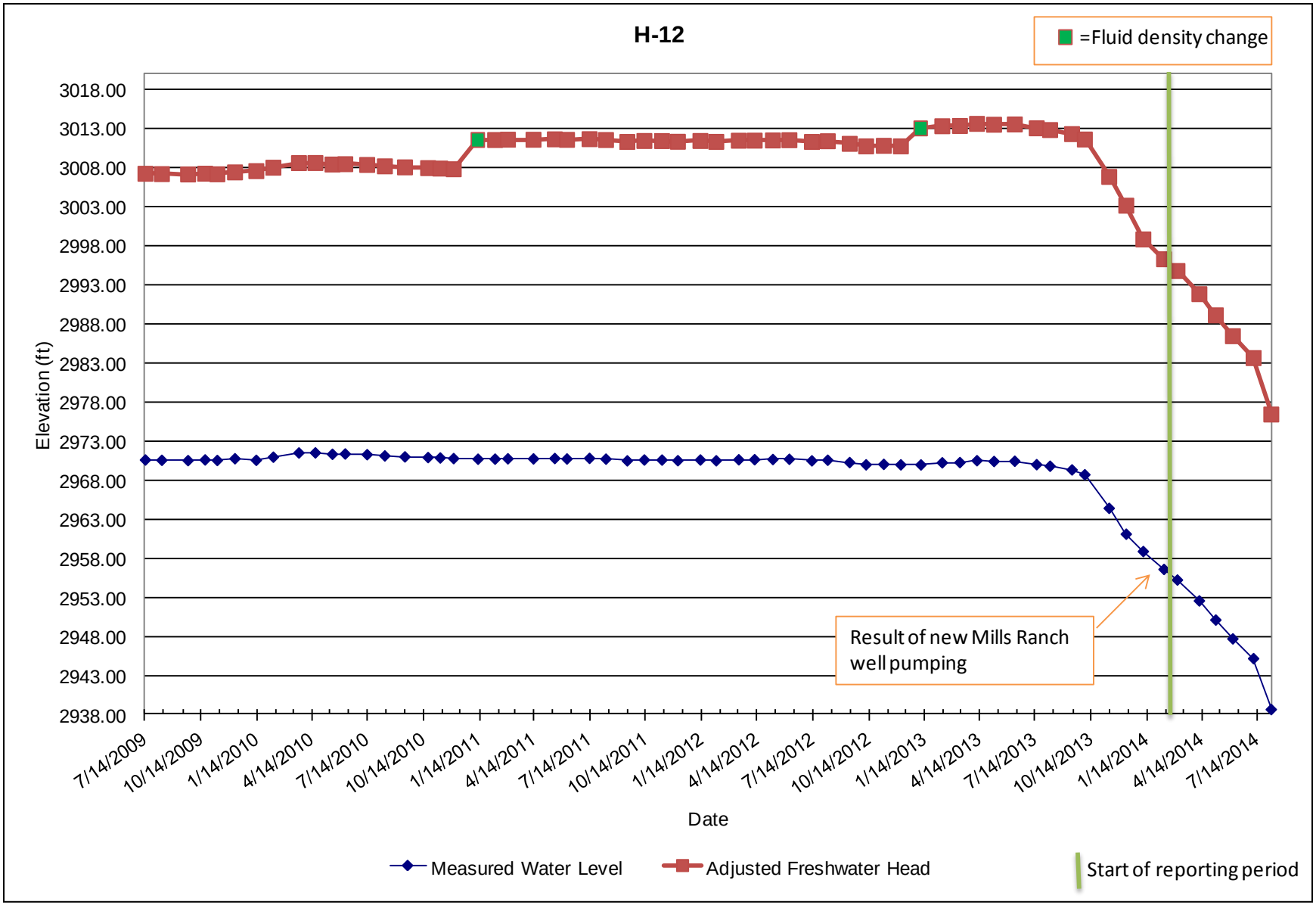

H-06bR
=Fluid density change
Elevation (ft)
3076.00
3074.00
3072.00
3070.00
3068.00
3066.00
3064.00
3062.00
3060.00
3058.00
3056.00
3054.00
3052.00
3050.00
Fluctuation due to recharge in Nash Draw from heavy rains in late June/early July 2010
7/13/2009
9/13/2009
11/13/2009
1/13/2010
3/13/2010
5/13/2010
7/13/2010
9/13/2010
11/13/2010
1/13/2011
3/13/2011
5/13/2011
7/13/2011
9/13/2011
11/13/2011
1/13/2012
3/13/2012
5/13/2012
7/13/2012
9/13/2012
11/13/2012
1/13/2013
3/13/2013
5/13/2013
7/13/2013
9/13/2013
11/13/2013
1/13/2014
3/13/2014
5/13/2014
7/13/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

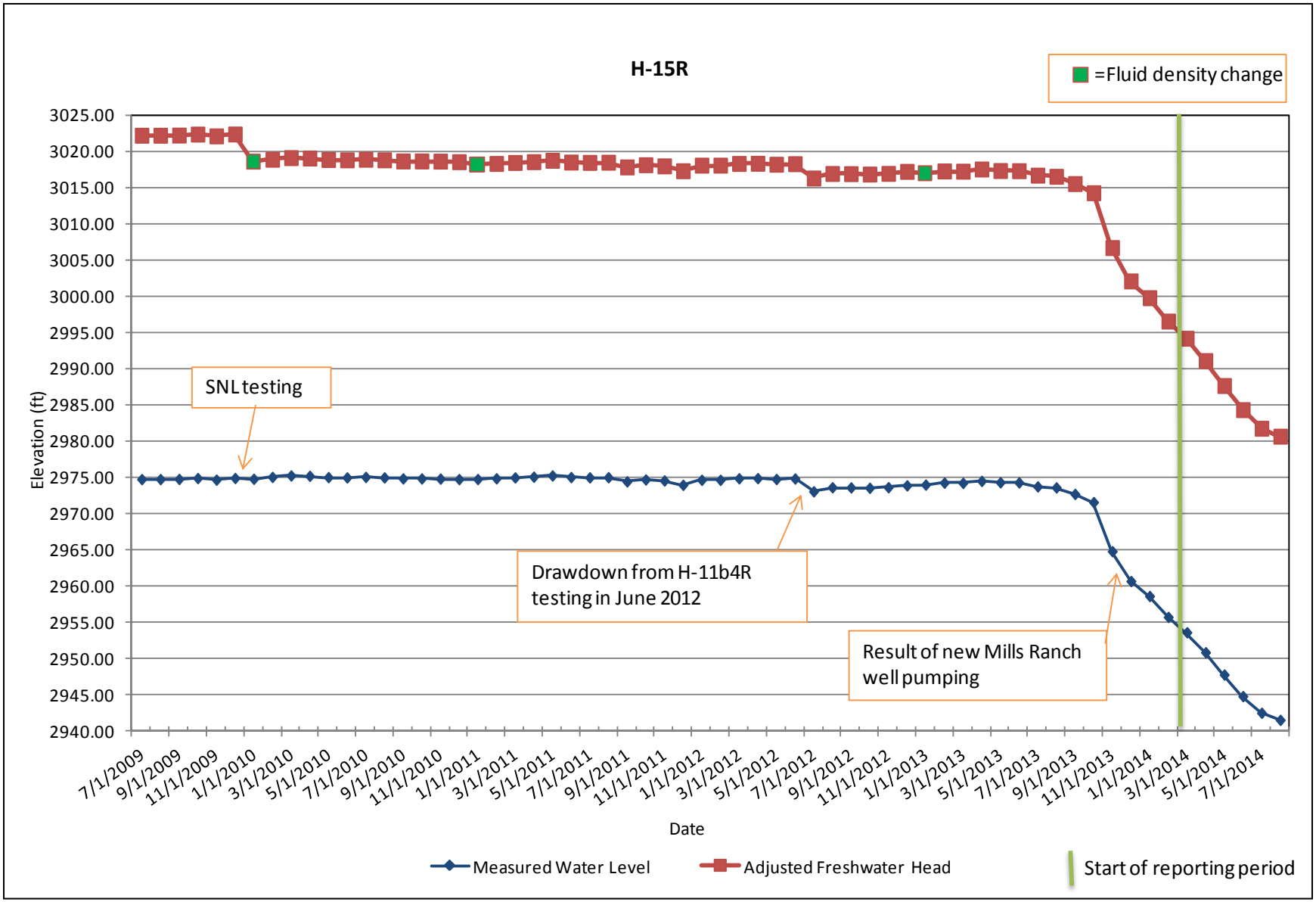

H-07b1
=Fluid density change
3000.00
2999.00
2998.00
2997.00
2996.00
2995.00
2994.00
2993.00
2992.00
Elevation (ft)
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Drawdown due to pumping of BLM water well on same pad
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

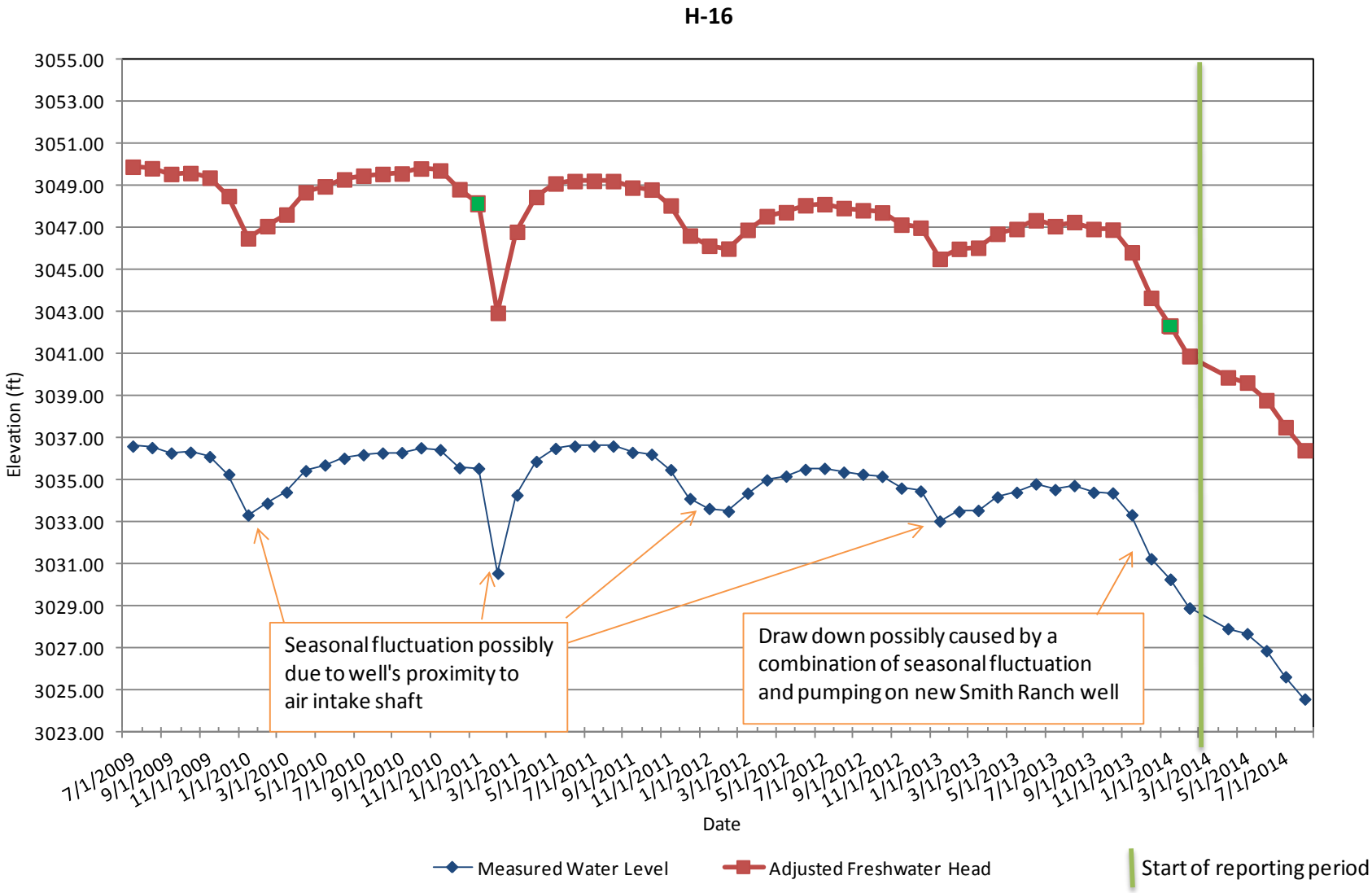

H-09bR
=Fluid density change
3000.00
2990.00
2980.00
2970.00
2960.00
2950.00
2940.00
Elevation (ft amsl)
SNL testing July-Nov. 2012, no measurements
Result of pumping at oil/gas water
Result of new Mills Ranch well pumping
Prior to 2014, fresh water head is equal to measured water level
New well in Oct. 2010, SNL testing until Aug. 2011
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
4/1/2013
5/1/2013
6/1/2013
7/1/2013
8/1/2013
9/1/2013
10/1/2013
11/1/2013
12/1/2013
1/1/2014
2/1/2014
3/1/2014
4/1/2014
5/1/2014
6/1/2014
7/1/2014
8/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

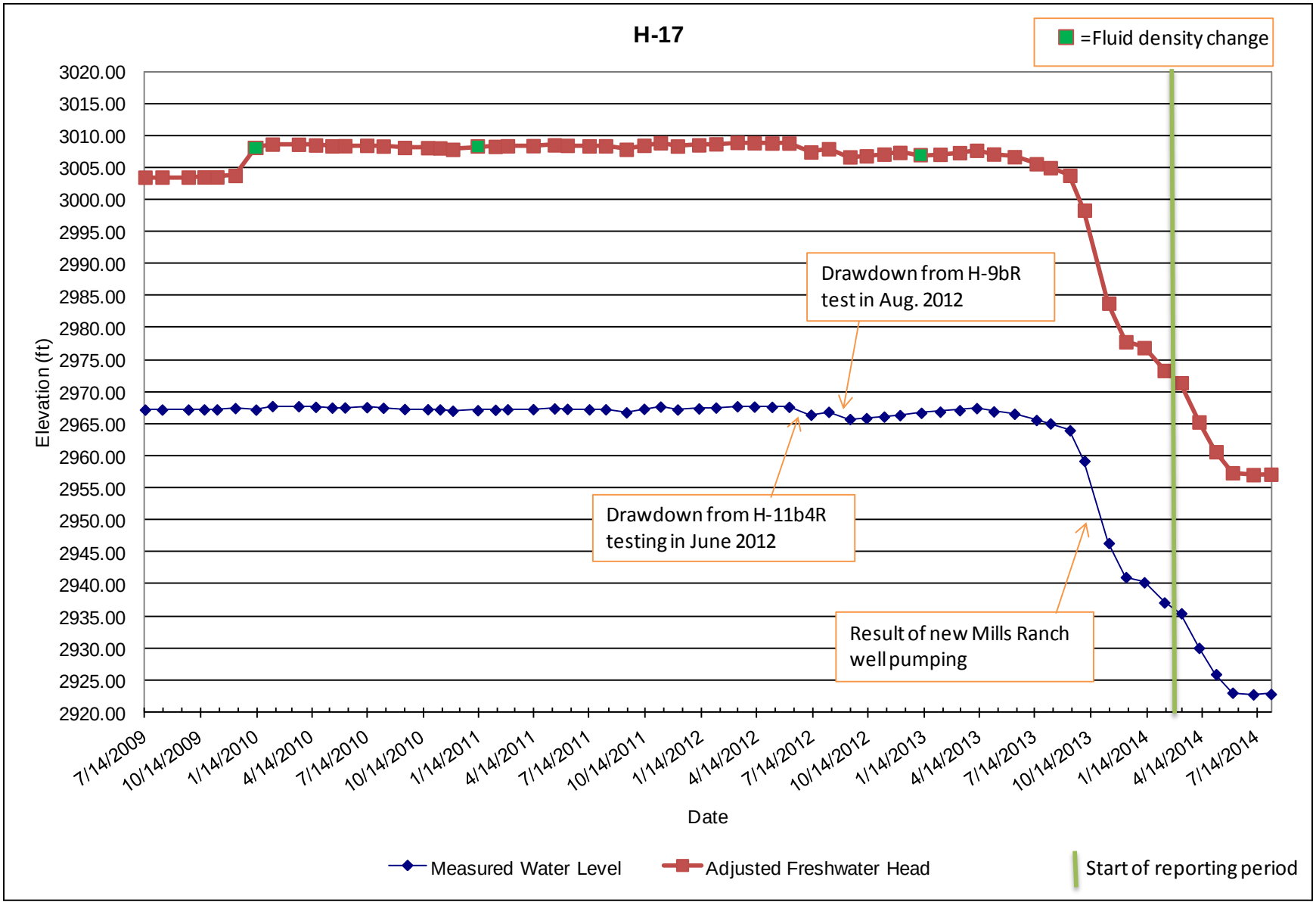

H-10c
=Fluid density change
Elevation (ft)
3045.00
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
Well bailed in July 2009 to restore fluid density from freshwater left in well used for geophysical logging to determine casing quality
8/10/2009
11/10/2009
2/10/2010
5/10/2010
8/10/2010
11/10/2010
2/10/2011
5/10/2011
8/10/2011
11/10/2011
2/10/2012
5/10/2012
8/10/2012
11/10/2012
2/10/2013
5/10/2013
8/10/2013
11/10/2013
2/10/2014
5/10/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

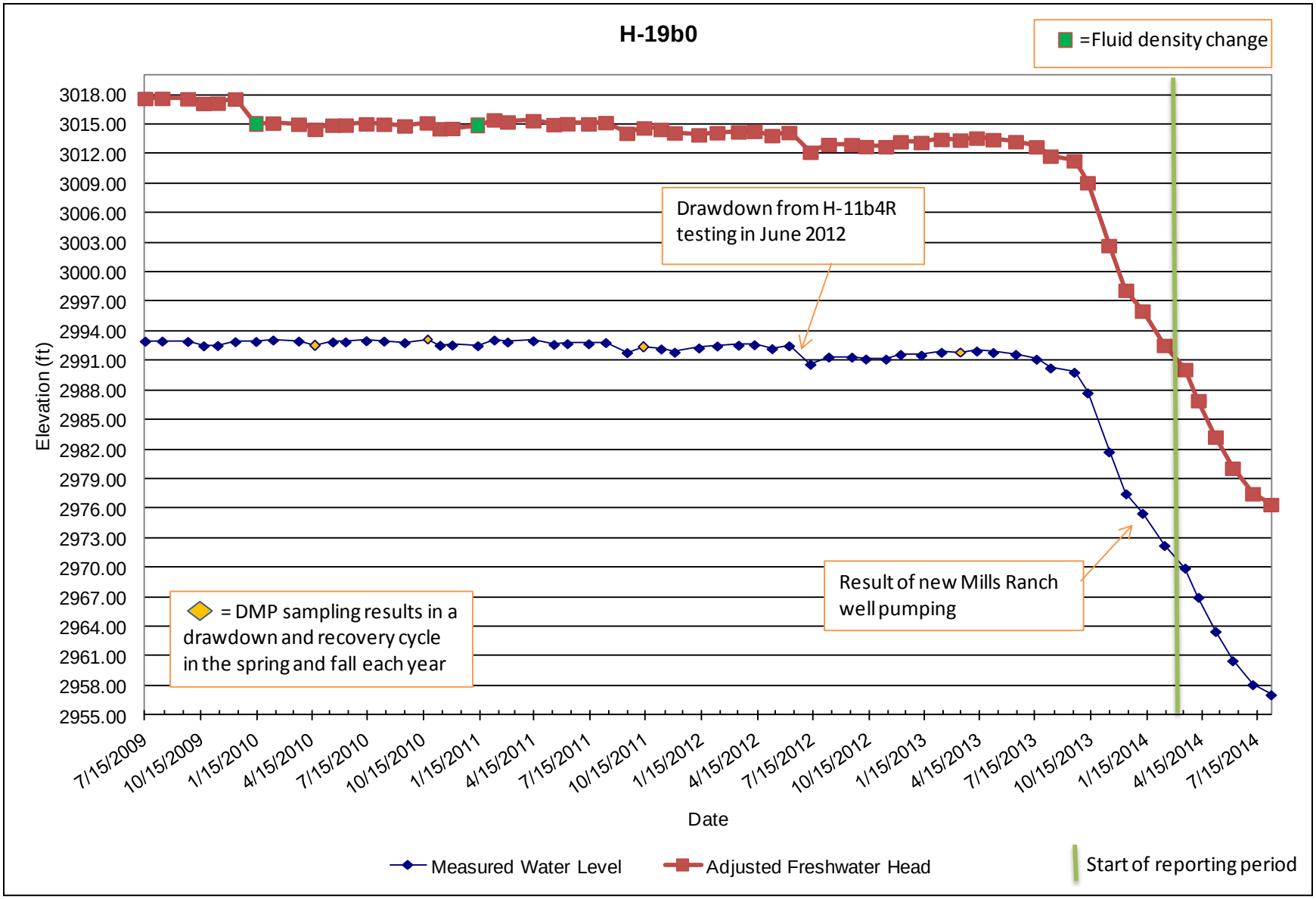

H-11b4R
3013.00
3003.00
2993.00
2983.00
2973.00
2963.00
2953.00
2943.00
2933.00
Elevation (ft)
SNL testing on well
Response to SNL testing at H-9bR
Result of new Mills Ranch well pumping
New well drilled in Nov. 2011, replacing H-11b4
12/5/2011
2/5/2012
4/5/2012
6/5/2012
8/5/2012
10/5/2012
12/5/2012
2/5/2013
4/5/2013
6/5/2013
8/5/2013
10/5/2013
12/5/2013
2/5/2014
4/5/2014
6/5/2014
8/5/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

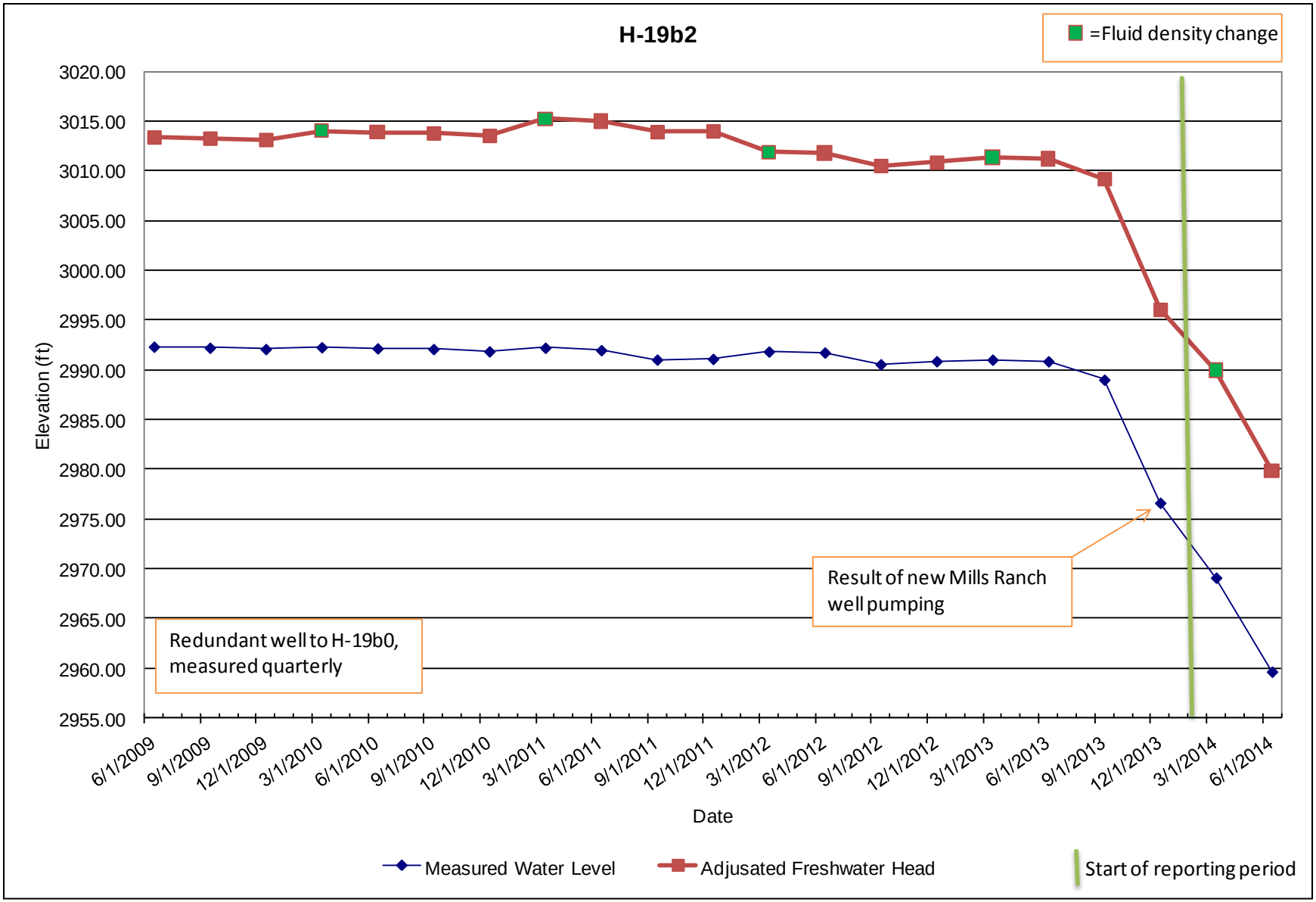

H-12
=Fluid density change
3018.00
3013.00
3008.00
3003.00
2998.00
2993.00
2988.00
2983.00
2978.00
2973.00
2968.00
2963.00
2958.00
2953.00
2948.00
2943.00
2938.00
Elevation (ft)
7/14/2009
10/14/2009
1/14/2010
4/14/2010
7/14/2010
10/14/2010
1/14/2011
4/14/2011
7/14/2011
10/14/2011
1/14/2012
4/14/2012
7/14/2012
10/14/2012
1/14/2013
4/14/2013
7/14/2013
10/14/2013
1/14/2014
4/14/2014
7/14/2014
Date
Result of new Mills Ranch well pumping
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

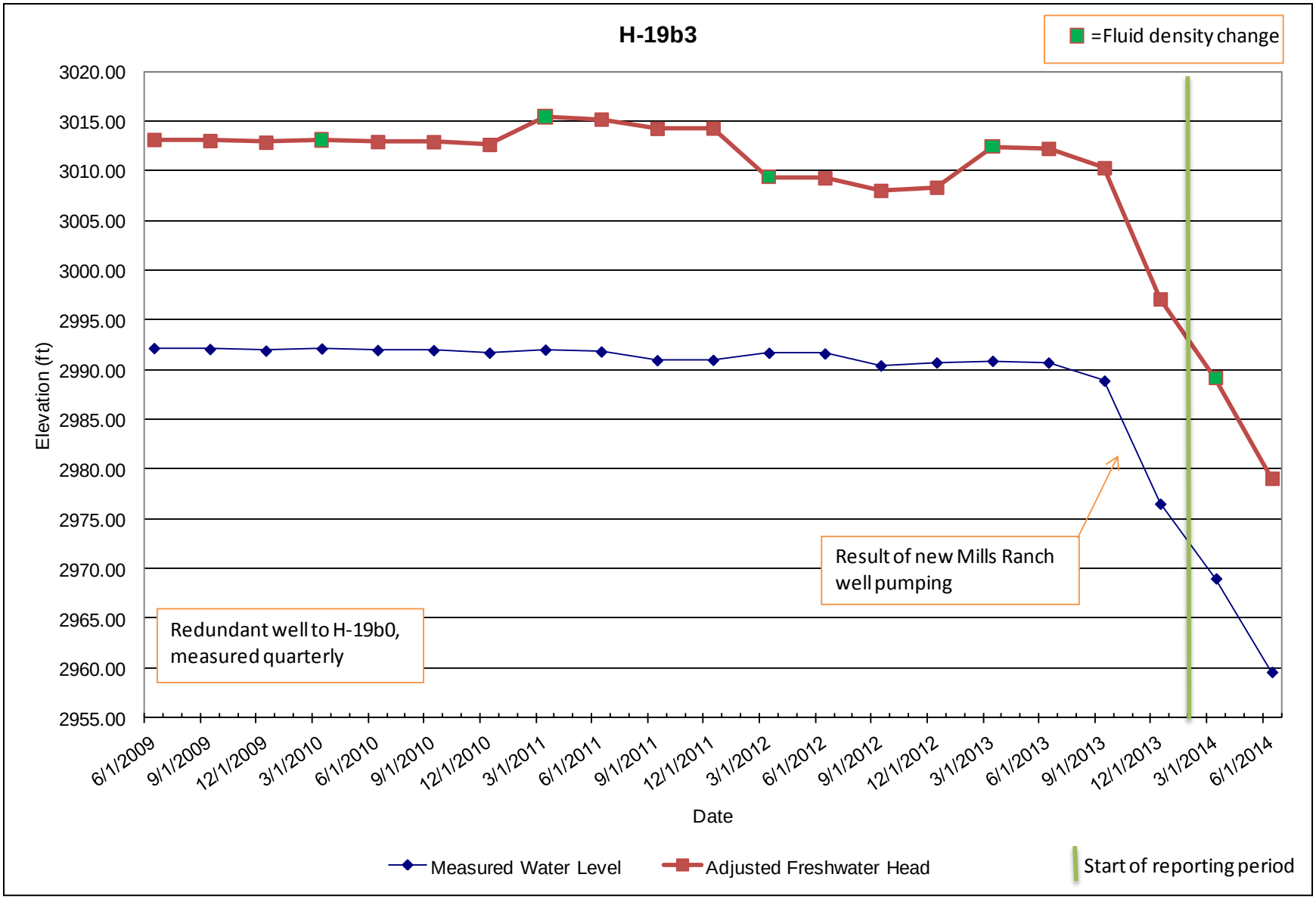

H-15R
=Fluid density change
Elevation (ft)
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
2950.00
2945.00
2940.00
SNL testing
Drawdown from H-11b4R testing in June 2012
Result of new Mills Ranch well pumping
7/1/2009
9/1/2009
11/1/2009
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
9/1/2013
11/1/2013
1/1/2014
3/1/2014
5/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

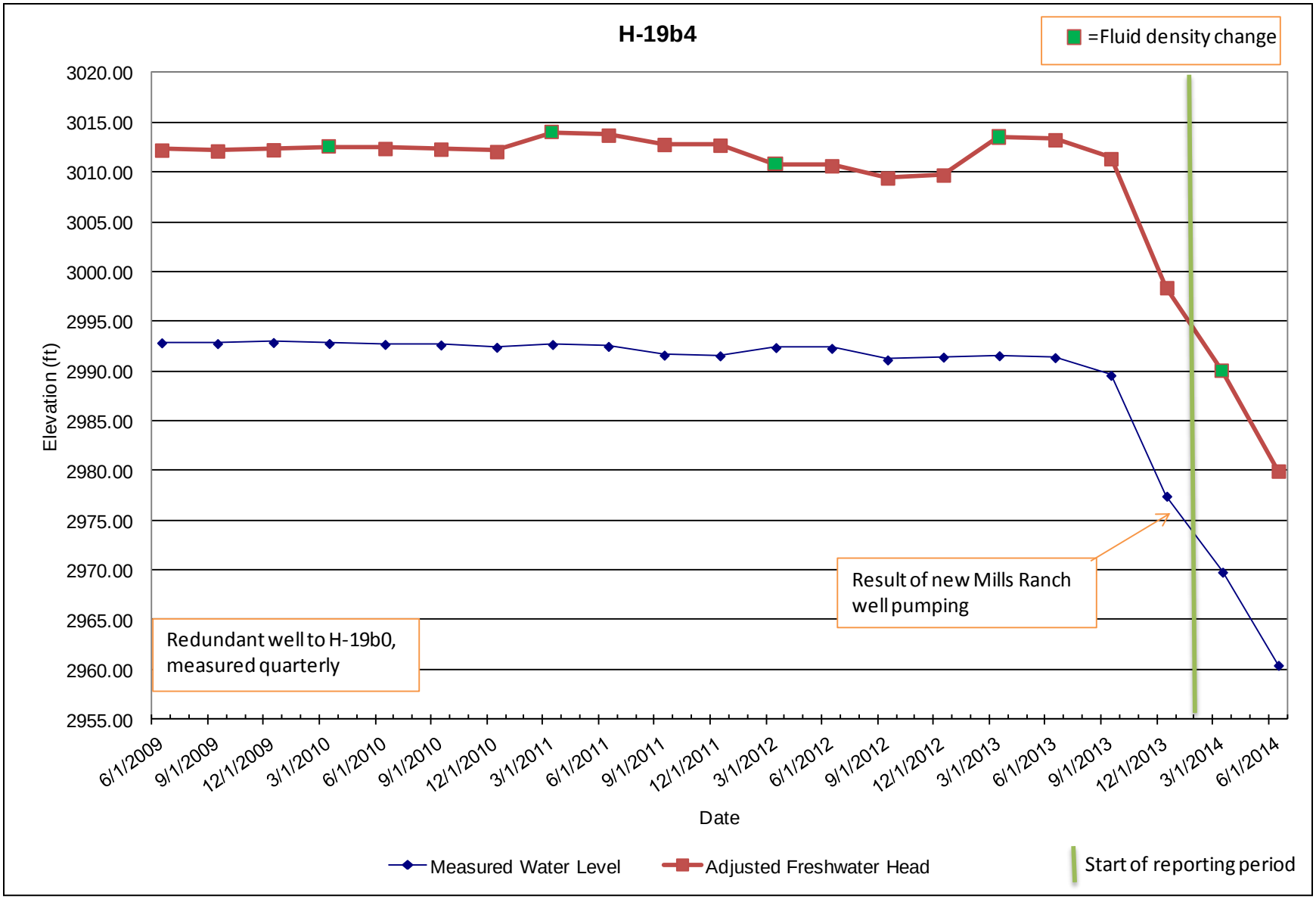

H-16
Elevation (ft)
3055.00
3053.00
3051.00
3049.00
3047.00
3045.00
3043.00
3041.00
3039.00
3037.00
3035.00
3033.00
3031.00
3029.00
3027.00
3025.00
3023.00
7/1/2009
9/1/2009
11/1/2009
1/1/2010
3/1/2010
5/1/2010
7/1/2010
9/1/2010
11/1/2010
1/1/2011
3/1/2011
5/1/2011
7/1/2011
9/1/2011
11/1/2011
1/1/2012
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
9/1/2013
11/1/2013
1/1/2014
3/1/2014
5/1/2014
7/1/2014
Date
Seasonal fluctuation possibly due to well's proximity to air intake shaft
Draw down possibly caused by a combination of seasonal fluctuation and pumping on new Smith Ranch well
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

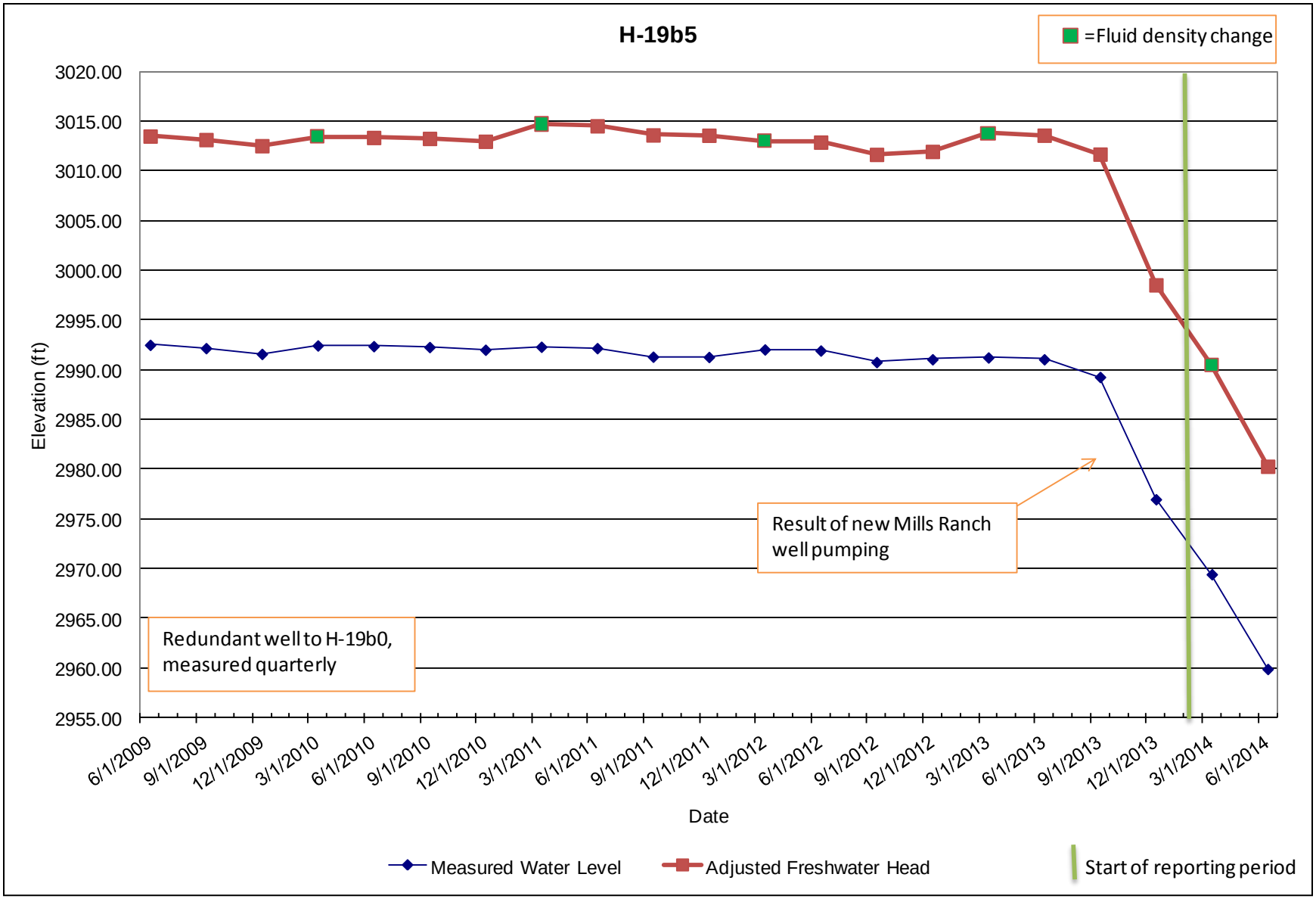

H-17
=Fluid density change
Drawdown from H-9bR test in Aug. 2012
Drawdown from H-11b4R testing in June 2012
Result of new Mills Ranch well pumping
Elevation (ft)
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
2950.00
2945.00
2940.00
2935.00
2930.00
2925.00
2920.00
7/14/2009
10/14/2009
1/14/2010
4/14/2010
7/14/2010
10/14/2010
1/14/2011
4/14/2011
7/14/2011
10/14/2011
1/14/2012
4/14/2012
7/14/2012
10/14/2012
1/14/2013
4/14/2013
7/14/2013
10/14/2013
1/14/2014
4/14/2014
7/14/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

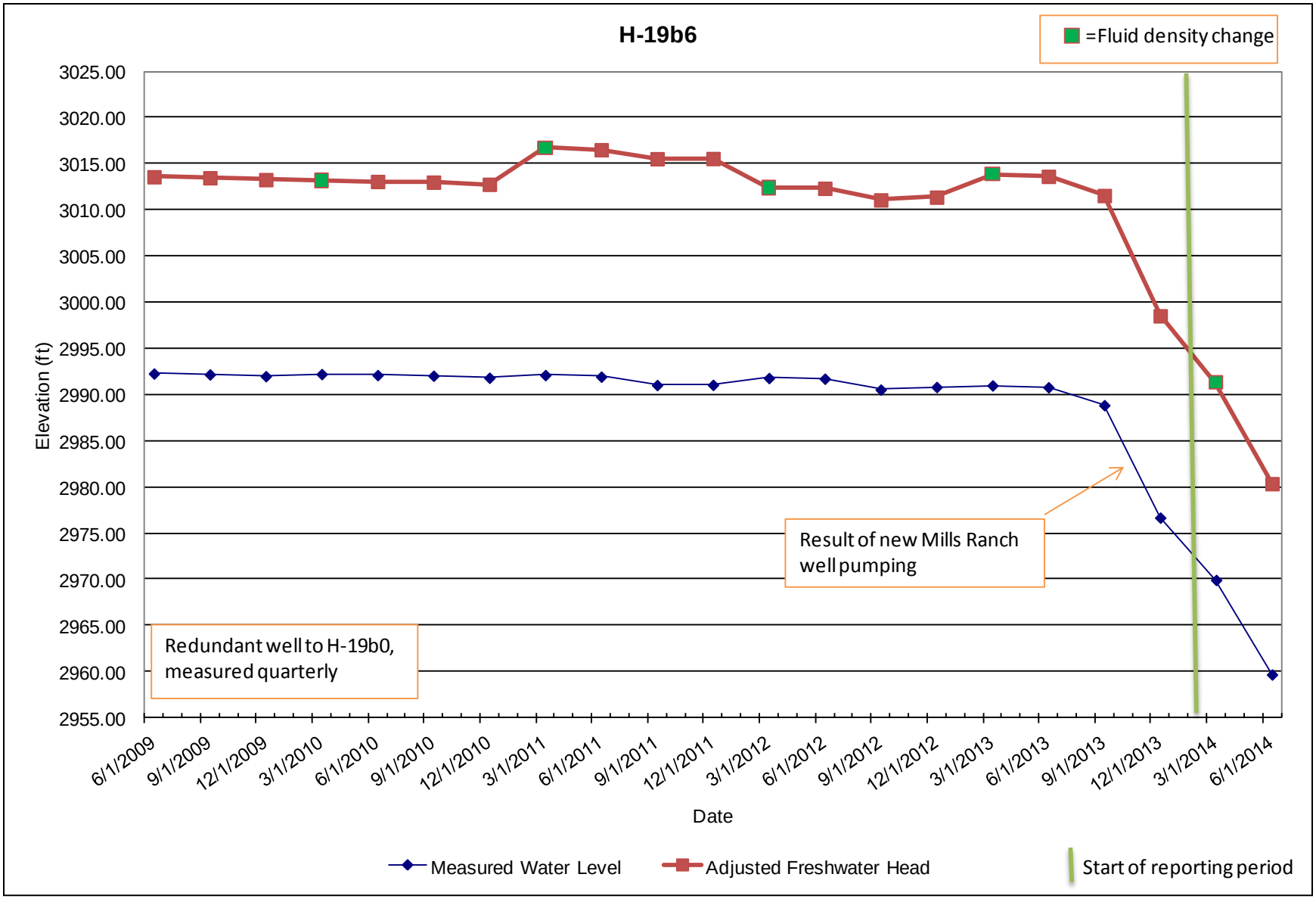

H-19b0
=Fluid density change
Drawdown from H-11b4R testing in June 2012
Result of new Mills Ranch well pumping
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
Elevation (ft)
3018.00
3015.00
3012.00
3009.00
3006.00
3003.00
3000.00
2997.00
2994.00
2991.00
2988.00
2985.00
2982.00
2979.00
2976.00
2973.00
2970.00
2967.00
2964.00
2961.00
2958.00
2955.00
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
10/15/2013
1/15/2014
4/15/2014
7/15/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

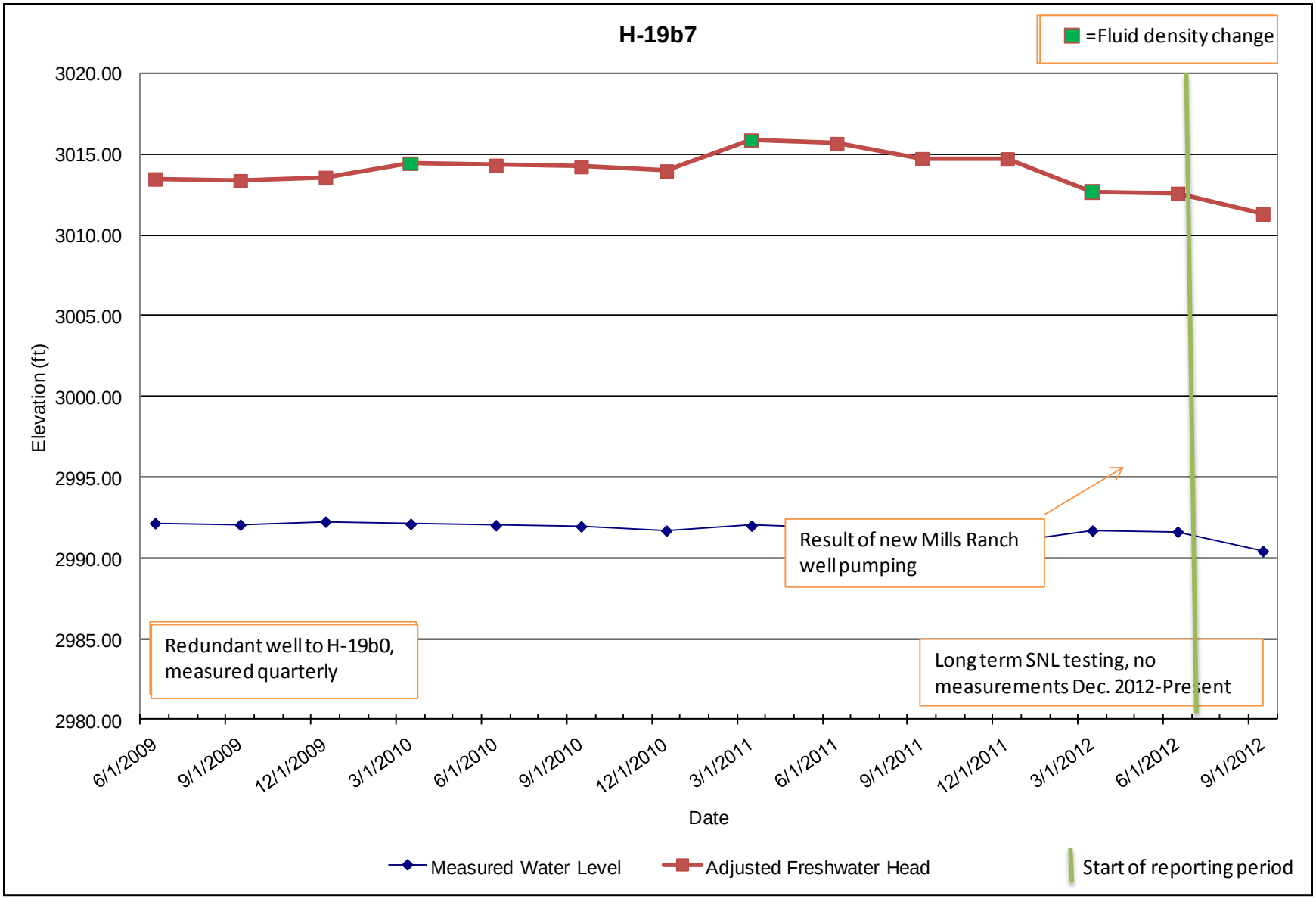

H-19b2
=Fluid density change
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
Elevation (ft)
Result of new Mills Ranch well pumping
Redundant well to H-19b0, measured quarterly
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
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
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Date
Measured Water Level
Adjusated Freshwater Head
Start of reporting period

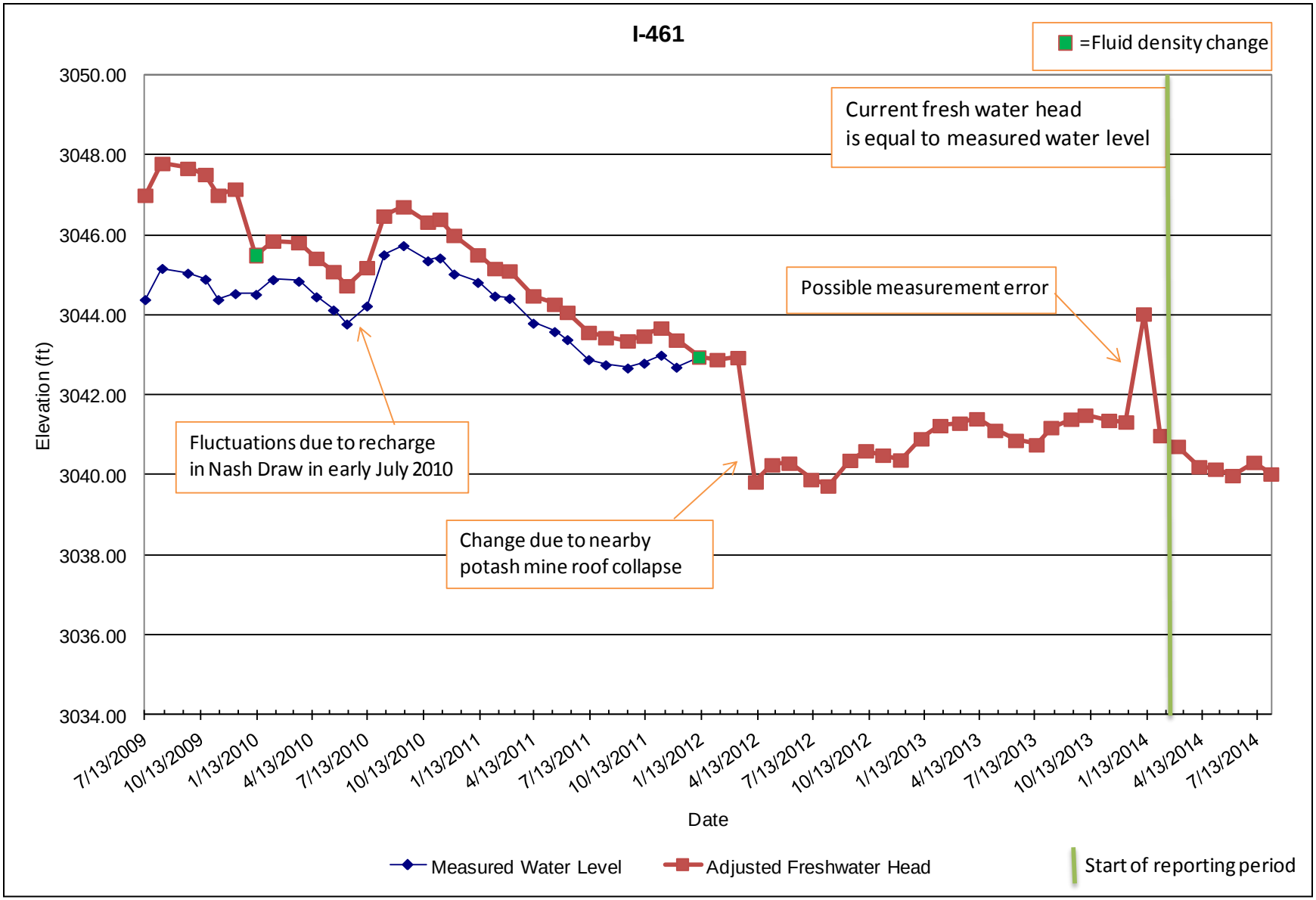

H-19b3
=Fluid density change
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
Elevation (ft)
Result of new Mills Ranch well pumping
Redundant well to H-19b0, measured quarterly
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
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
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

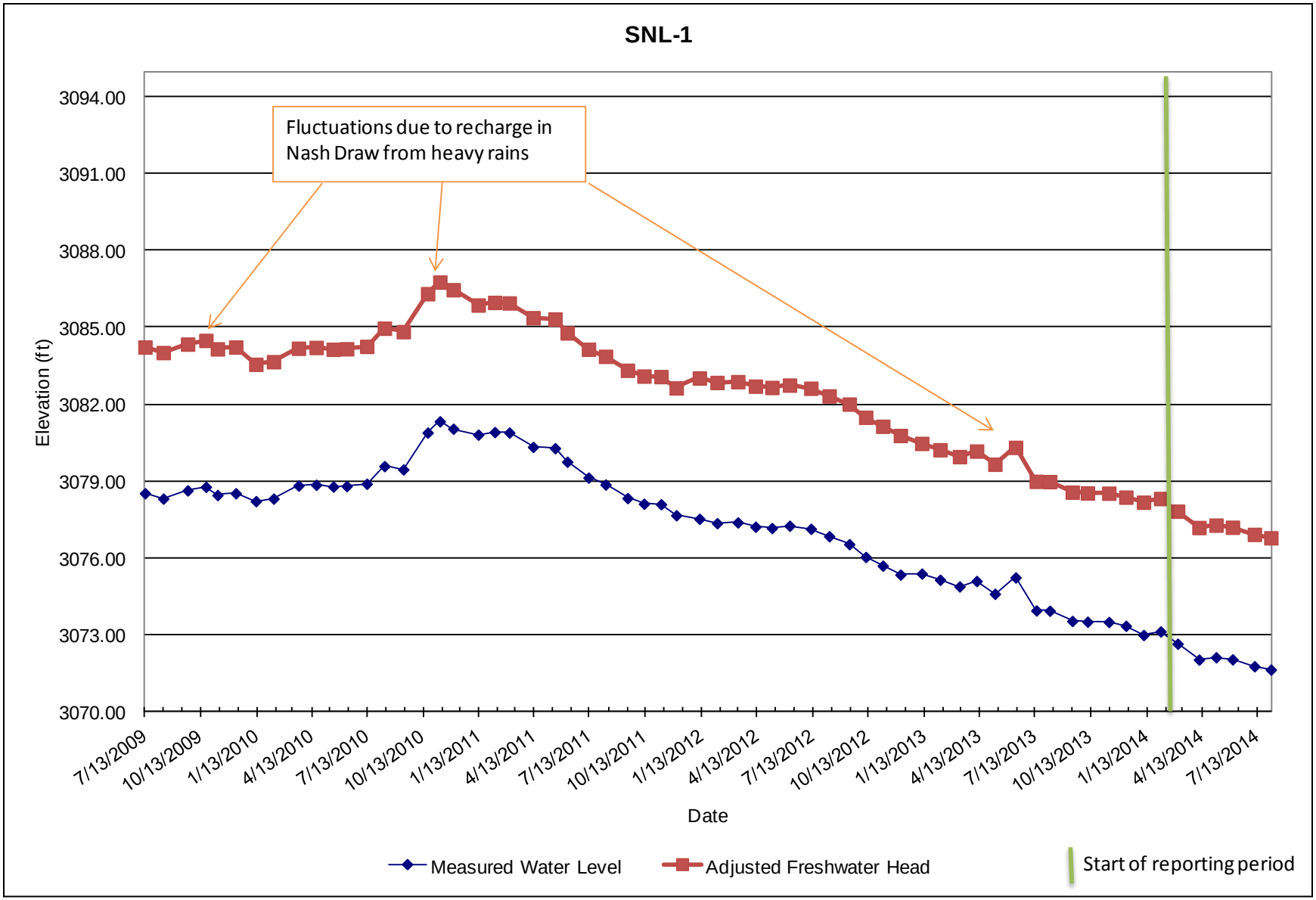

H-19b4
=Fluid density change
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
Elevation (ft)
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Date
Result of new Mills Ranch well pumping
Redundant well to H-19b0, measured quarterly
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

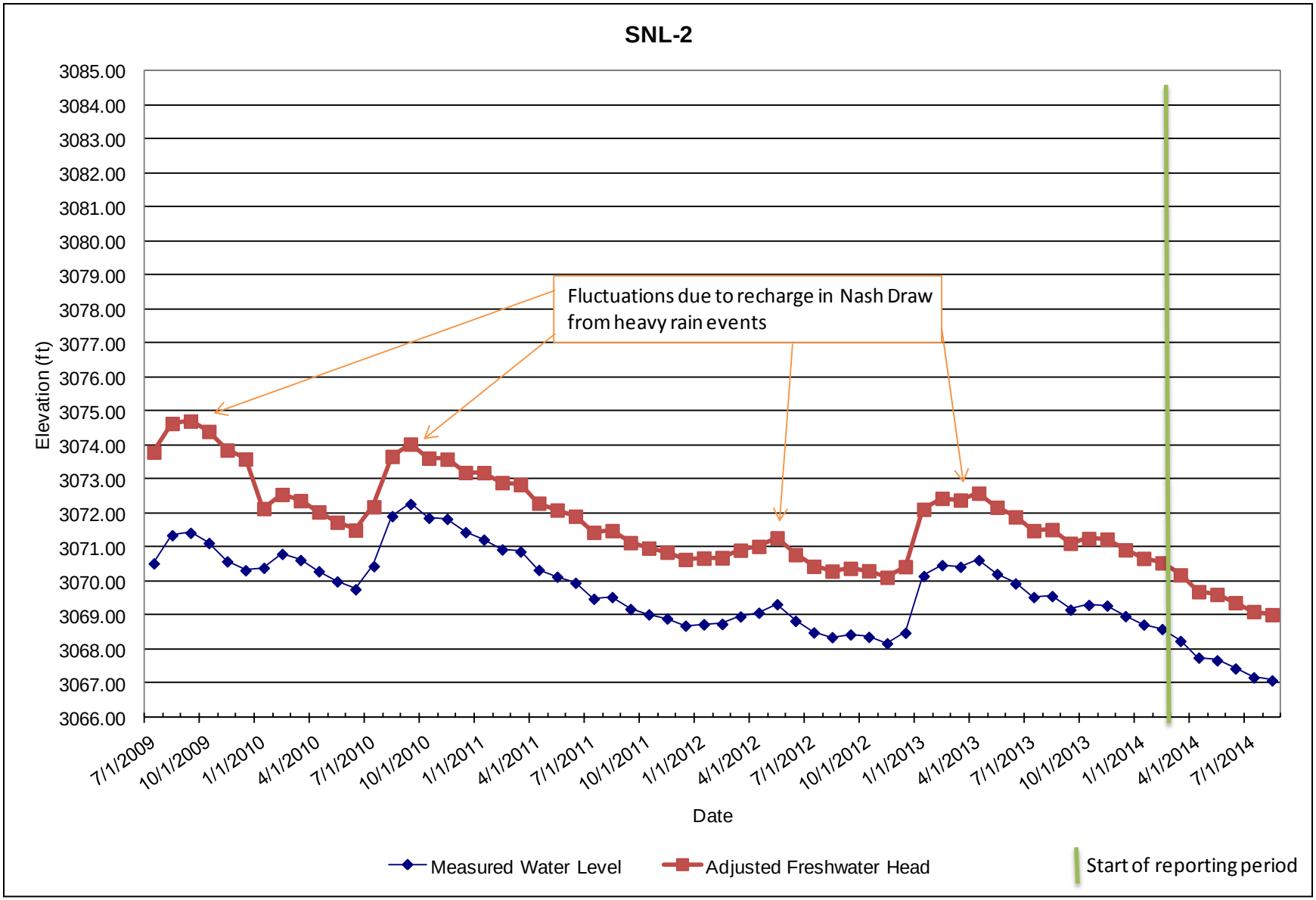

H-19b5
=Fluid density change
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
Elevation (ft)
Result of new Mills Ranch well pumping
Redundant well to H-19b0, measured quarterly
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
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
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

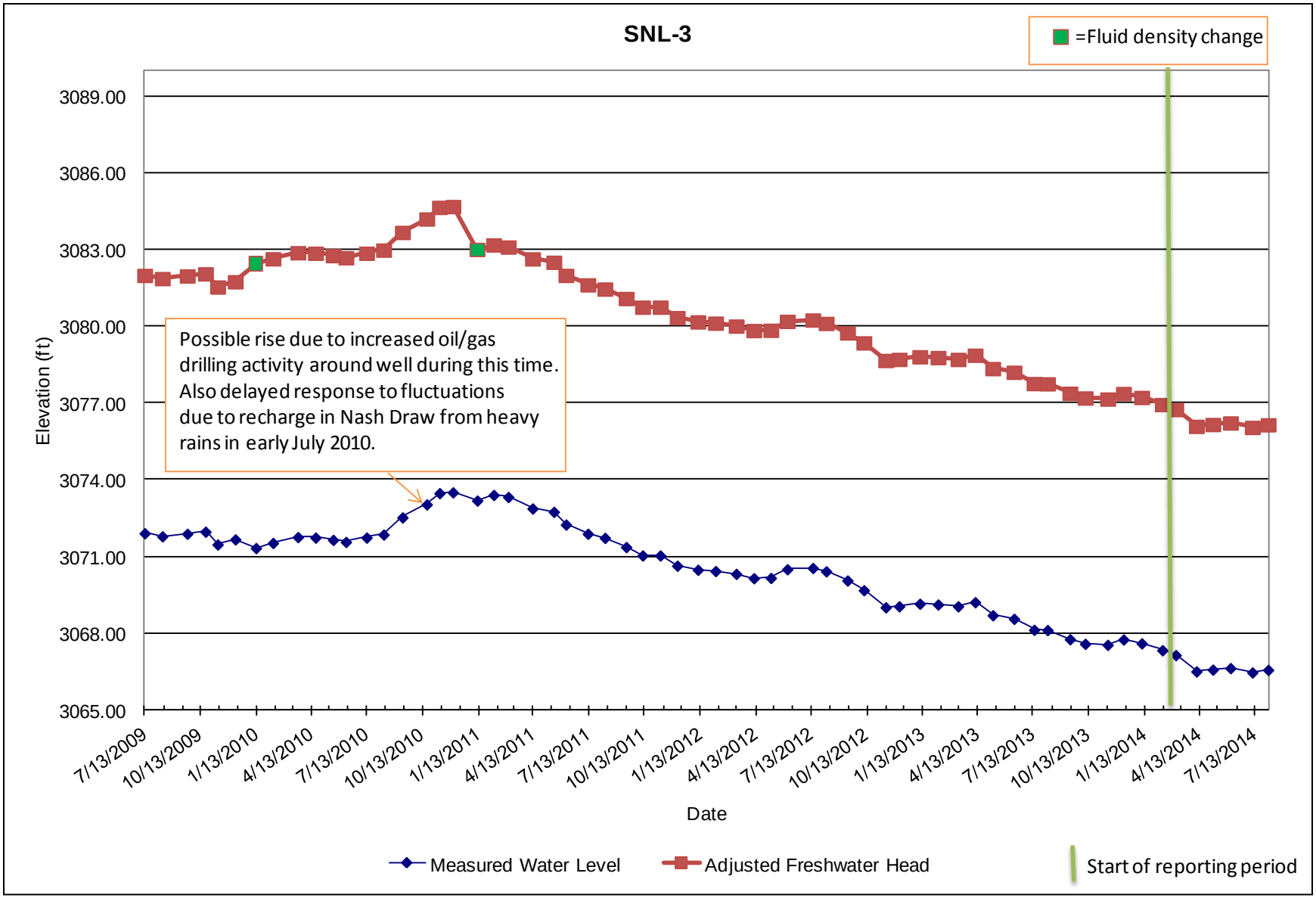

H-19b6
=Fluid density change
3025.00
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
Elevation (ft)
Result of new Mills Ranch well pumping
Redundant well to H-19b0, measured quarterly
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
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
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

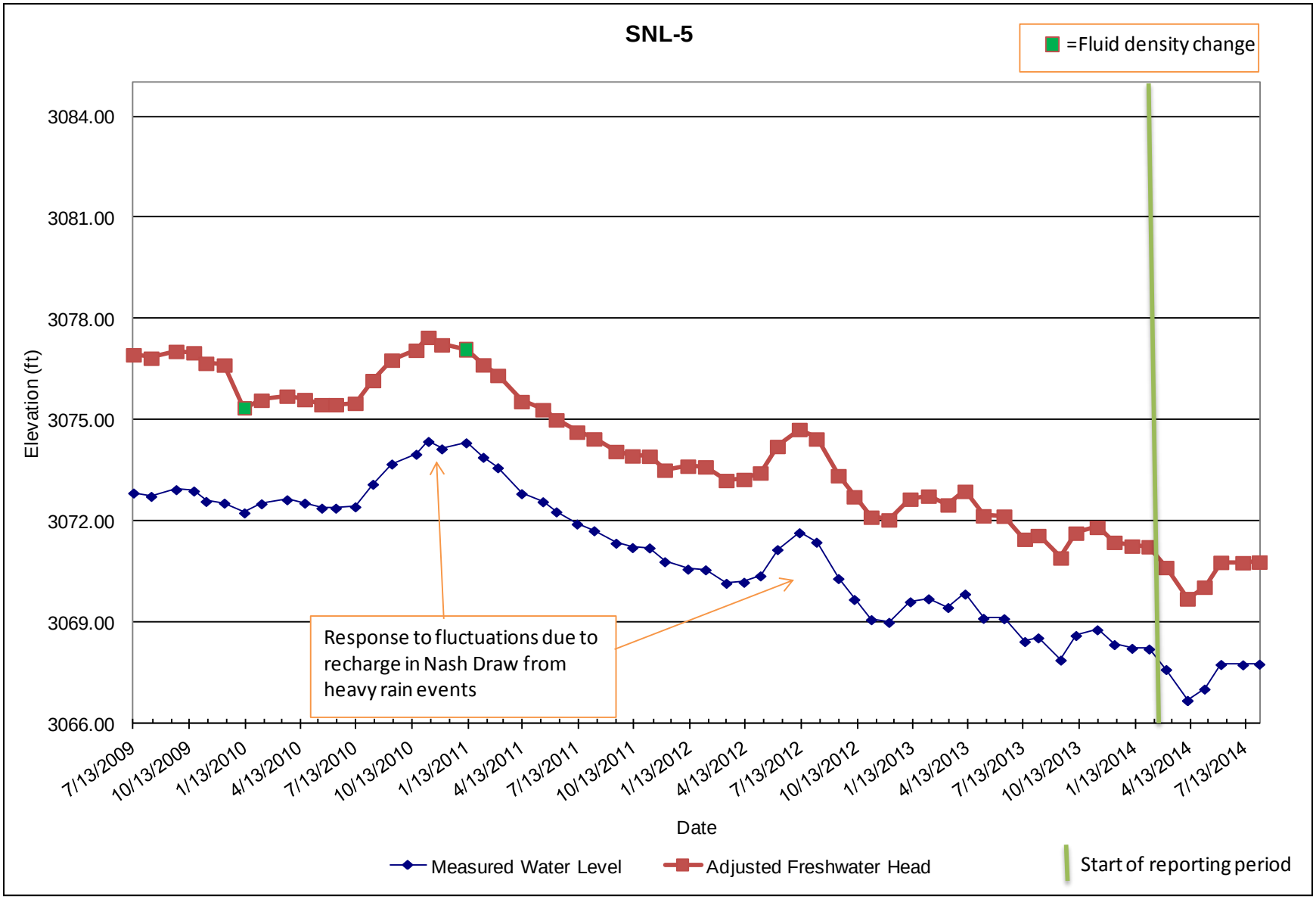

H-19b7
=Fluid density change
3020.00
3015.00
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
Elevation (ft)
6/1/2009
9/1/2009
12/1/2009
3/1/2010
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
Date
Result of new Mills Ranch well pumping
Redundant well to H-19b0, measured quarterly
Long term SNL testing, no measurements Dec. 2012-Present
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

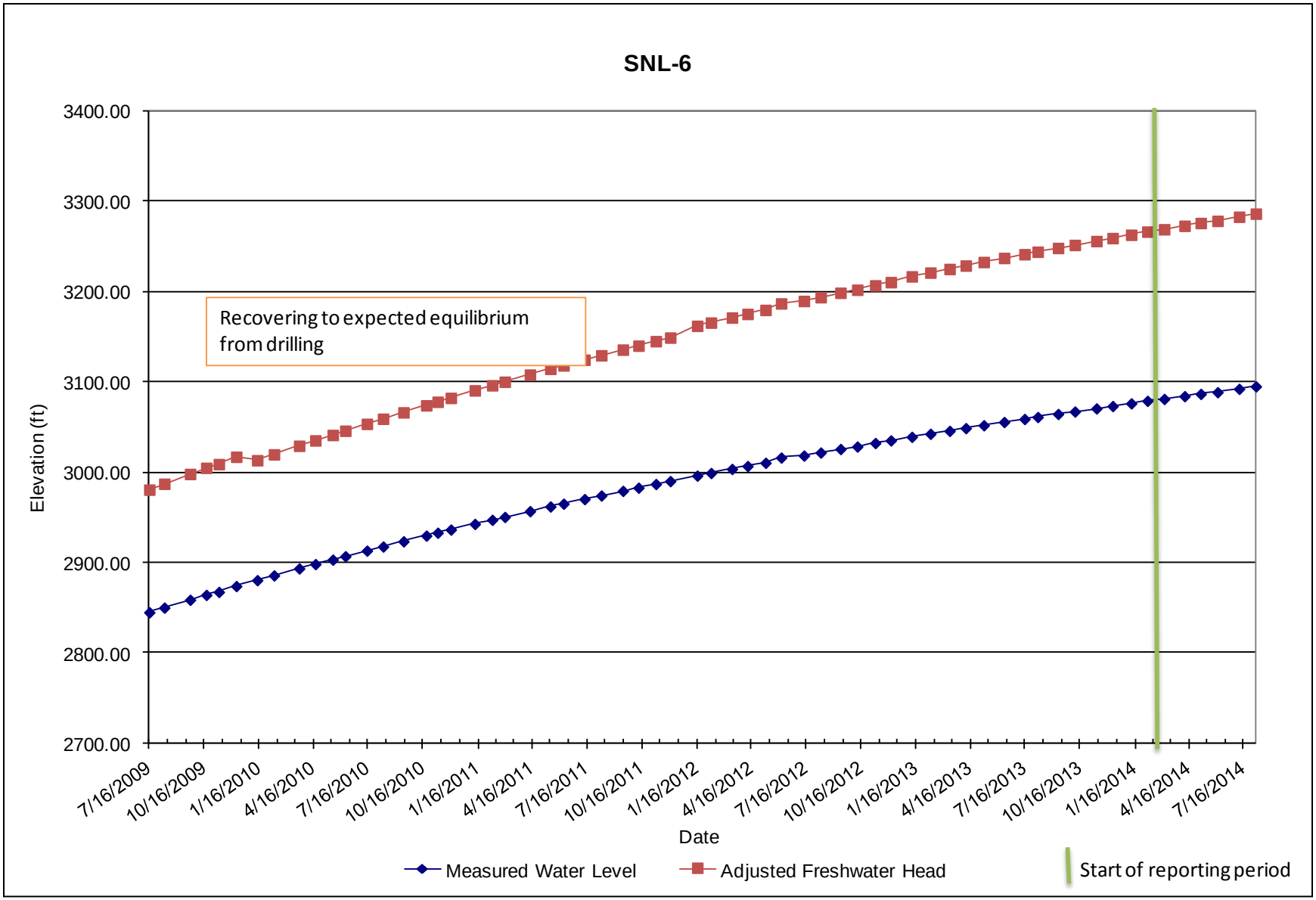

I-461
=Fluid density change
Current fresh water head
is equal to measured water level
Possible measurement error
Fluctuations due to recharge
in Nash Draw in early July 2010
Change due to nearby
potash mine roof collapse
Elevation (ft)
3050.00
3048.00
3046.00
3044.00
3042.00
3040.00
3038.00
3036.00
3034.00
7/13/2009
10/13/2009
1/13/2010
4/13/2010
7/13/2010
10/13/2010
1/13/2011
4/13/2011
7/13/2011
10/13/2011
1/13/2012
4/13/2012
7/13/2012
10/13/2012
1/13/2013
4/13/2013
7/13/2013
10/13/2013
1/13/2014
4/13/2014
7/13/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

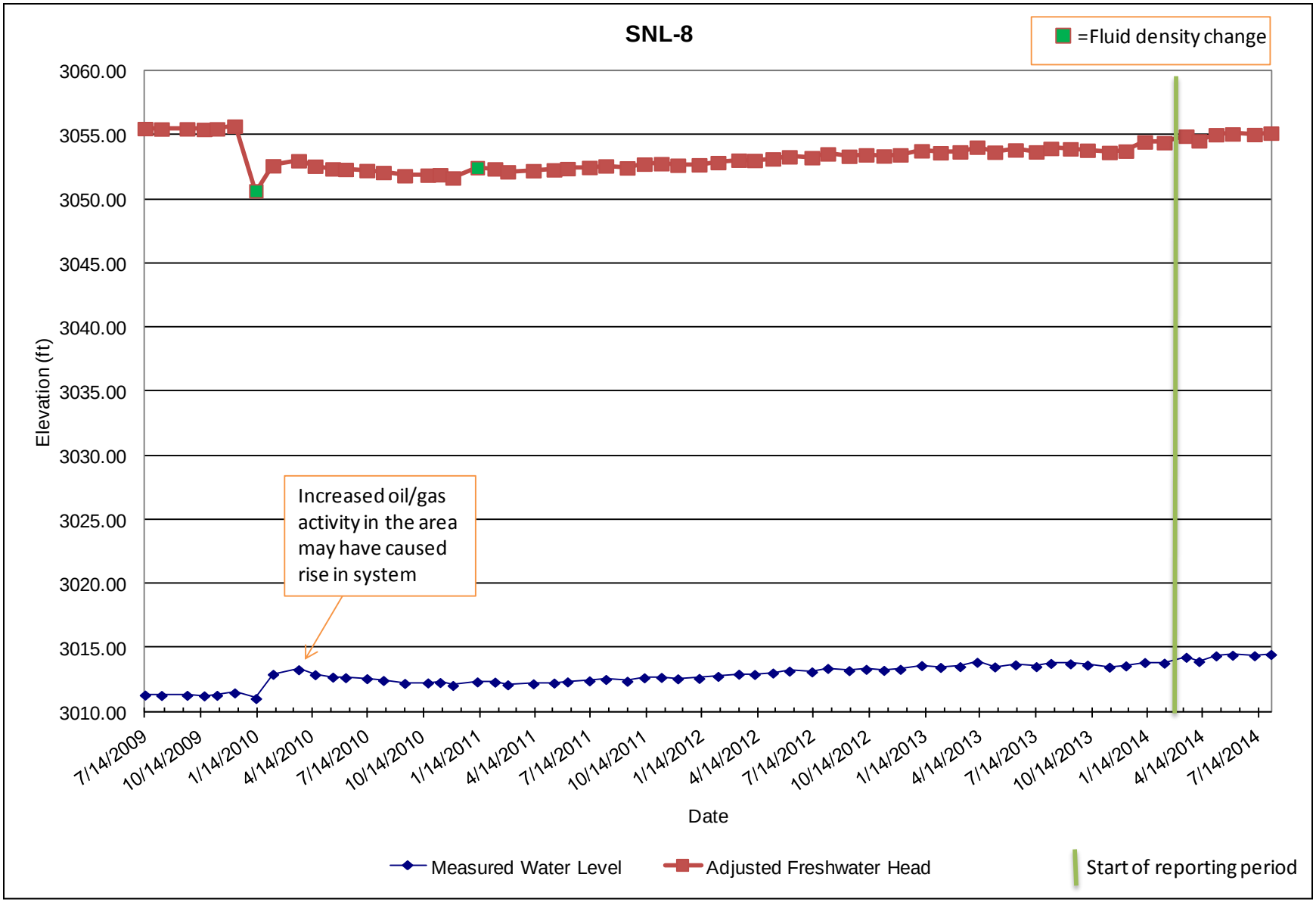

SNL-1
Fluctuations due to recharge in Nash Draw from heavy rains
Elevation (ft)
3094.00
3091.00
3088.00
3085.00
3082.00
3079.00
3076.00
3073.00
3070.00
7/13/2009
10/13/2009
1/13/2010
4/13/2010
7/13/2010
10/13/2010
1/13/2011
4/13/2011
7/13/2011
10/13/2011
1/13/2012
4/13/2012
7/13/2012
10/13/2012
1/13/2013
4/13/2013
7/13/2013
10/13/2013
1/13/2014
4/13/2014
7/13/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

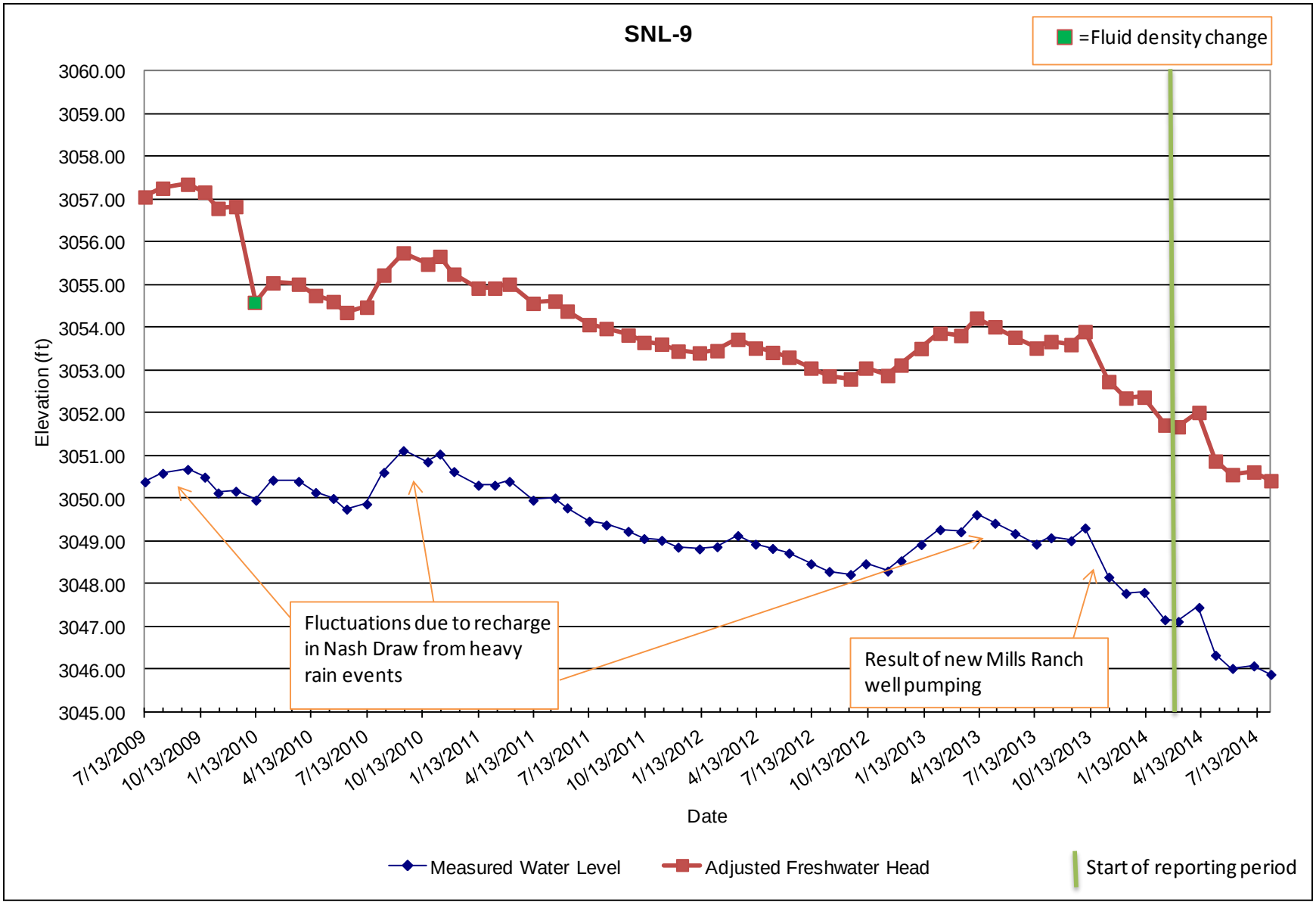

SNL-2
Elevation (ft)
3085.00
3084.00
3083.00
3082.00
3081.00
3080.00
3079.00
3078.00
3077.00
3076.00
3075.00
3074.00
3073.00
3072.00
3071.00
3070.00
3069.00
3068.00
3067.00
3066.00
Fluctuations due to recharge in Nash Draw from heavy rain events
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

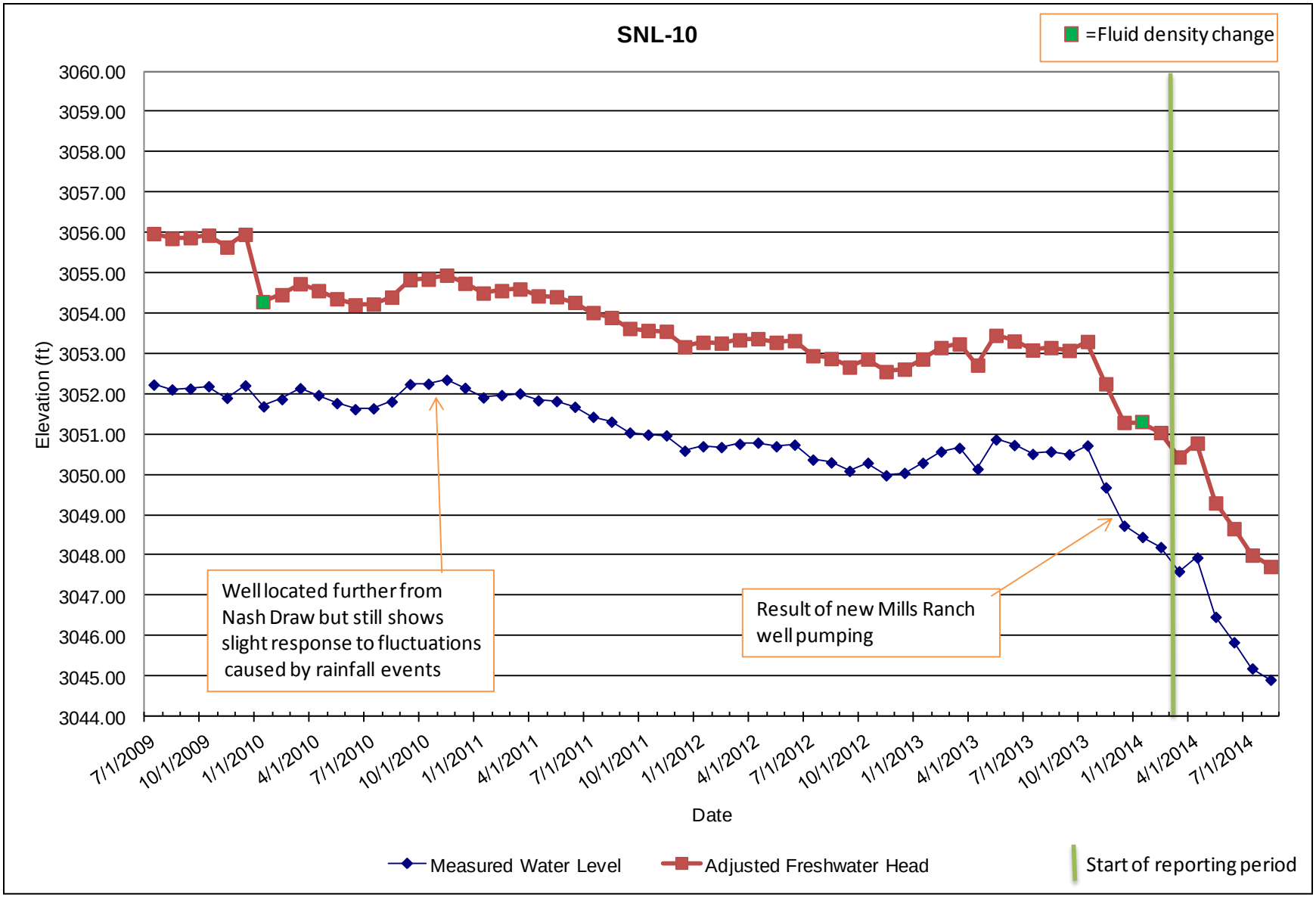

SNL-3
=Fluid density change
3089.00
3086.00
3083.00
3080.00
3077.00
3074.00
3071.00
3068.00
3065.00
Elevation (ft)
Possible rise due to increased oil/gas drilling activity around well during this time. Also delayed response to fluctuations due to recharge in Nash Draw from heavy rains in early July 2010.
7/13/2009
10/13/2009
1/13/2010
4/13/2010
7/13/2010
10/13/2010
1/13/2011
4/13/2011
7/13/2011
10/13/2011
1/13/2012
4/13/2012
7/13/2012
10/13/2012
1/13/2013
4/13/2013
7/13/2013
10/13/2013
1/13/2014
4/13/2014
7/13/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

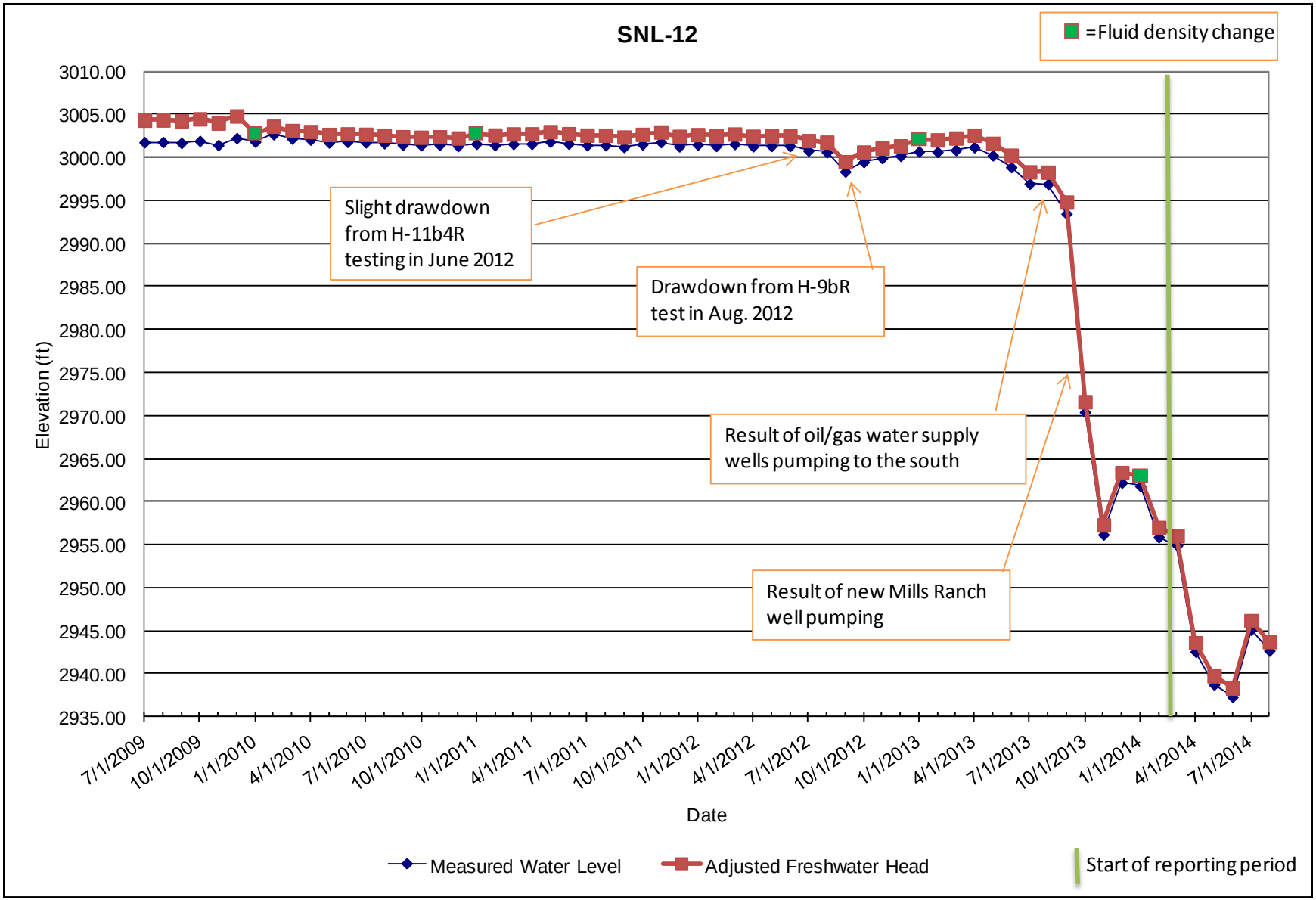

SNL-5
=Fluid density change
3084.00
3081.00
3078.00
3075.00
3072.00
3069.00
3066.00
Elevation (ft)
Response to fluctuations due to recharge in Nash Draw from heavy rain events
7/13/2009
10/13/2009
1/13/2010
4/13/2010
7/13/2010
10/13/2010
1/13/2011
4/13/2011
7/13/2011
10/13/2011
1/13/2012
4/13/2012
7/13/2012
10/13/2012
1/13/2013
4/13/2013
7/13/2013
10/13/2013
1/13/2014
4/13/2014
7/13/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

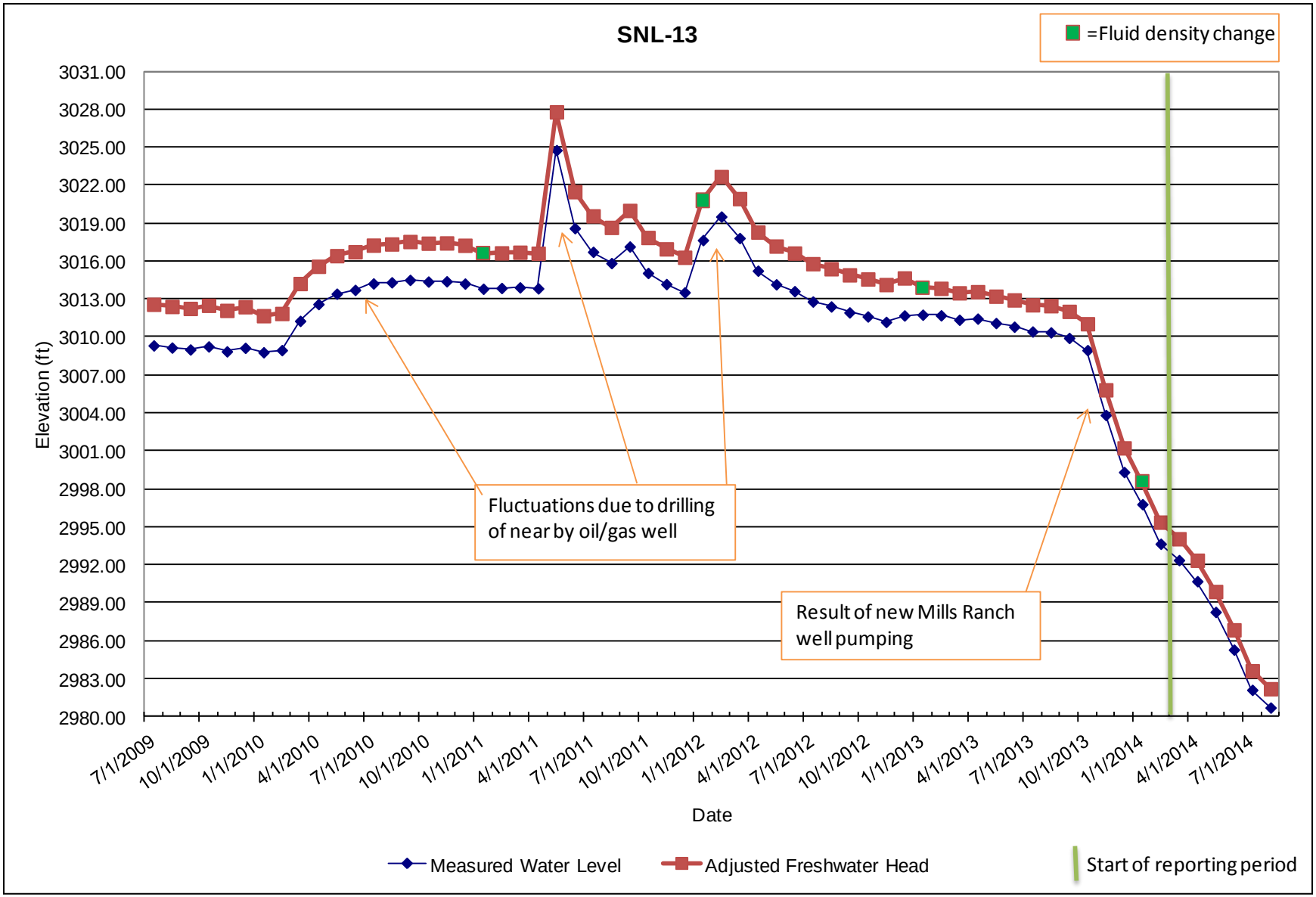

SNL-6
3400.00
3300.00
3200.00
3100.00
3000.00
2900.00
2800.00
2700.00
Elevation (ft)
Recovering to expected equilibrium from drilling
7/16/2009
10/16/2009
1/16/2010
4/16/2010
7/16/2010
10/16/2010
1/16/2011
4/16/2011
7/16/2011
10/16/2011
1/16/2012
4/16/2012
7/16/2012
10/16/2012
1/16/2013
4/16/2013
7/16/2013
10/16/2013
1/16/2014
4/16/2014
7/16/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

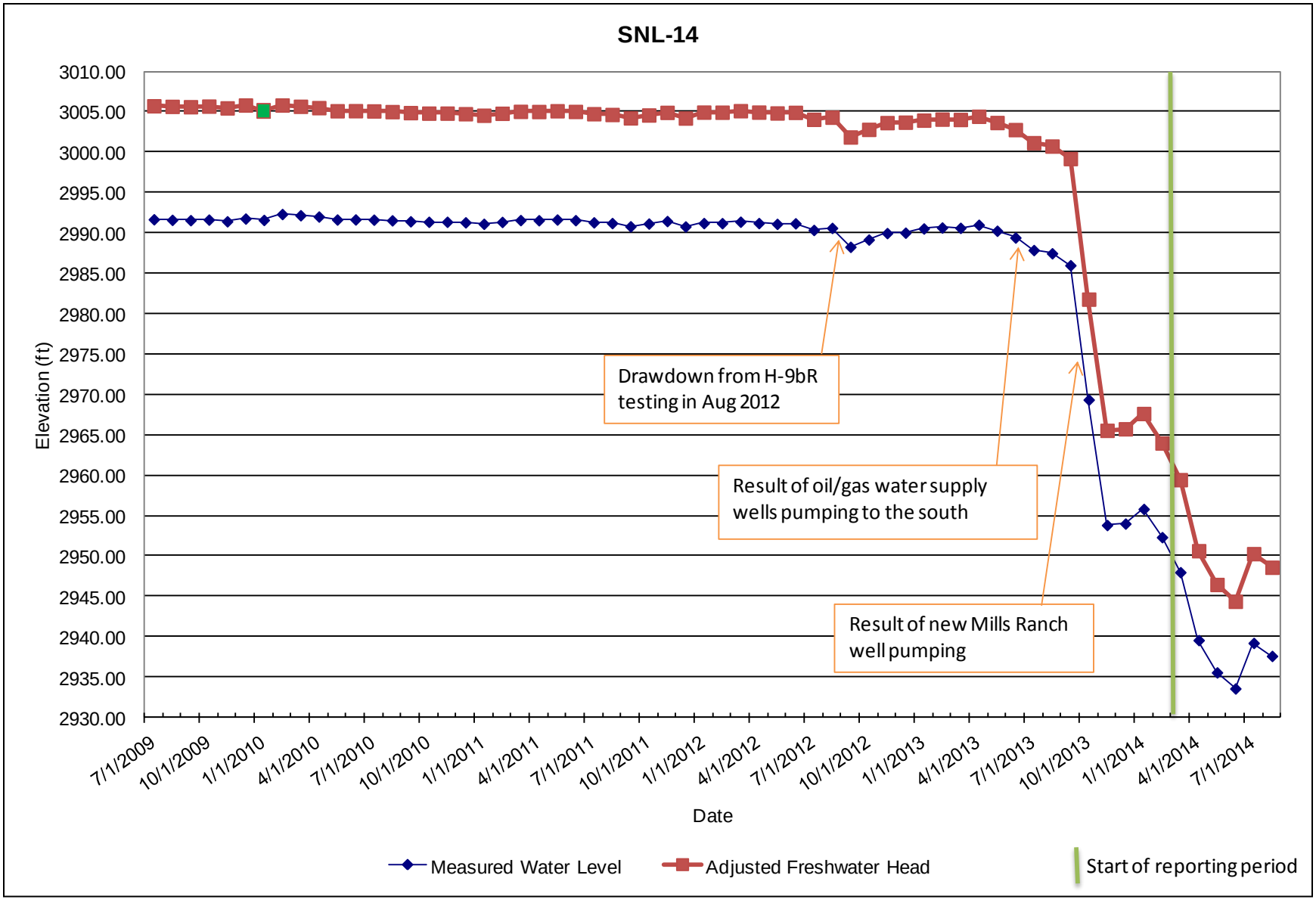

SNL-8
=Fluid density change
3060.00
3055.00
3050.00
3045.00
3040.00
3035.00
3030.00
3025.00
3020.00
3015.00
3010.00
Elevation (ft)
Increased oil/gas activity in the area may have caused rise in system
7/14/2009
10/14/2009
1/14/2010
4/14/2010
7/14/2010
10/14/2010
1/14/2011
4/14/2011
7/14/2011
10/14/2011
1/14/2012
4/14/2012
7/14/2012
10/14/2012
1/14/2013
4/14/2013
7/14/2013
10/14/2013
1/14/2014
4/14/2014
7/14/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

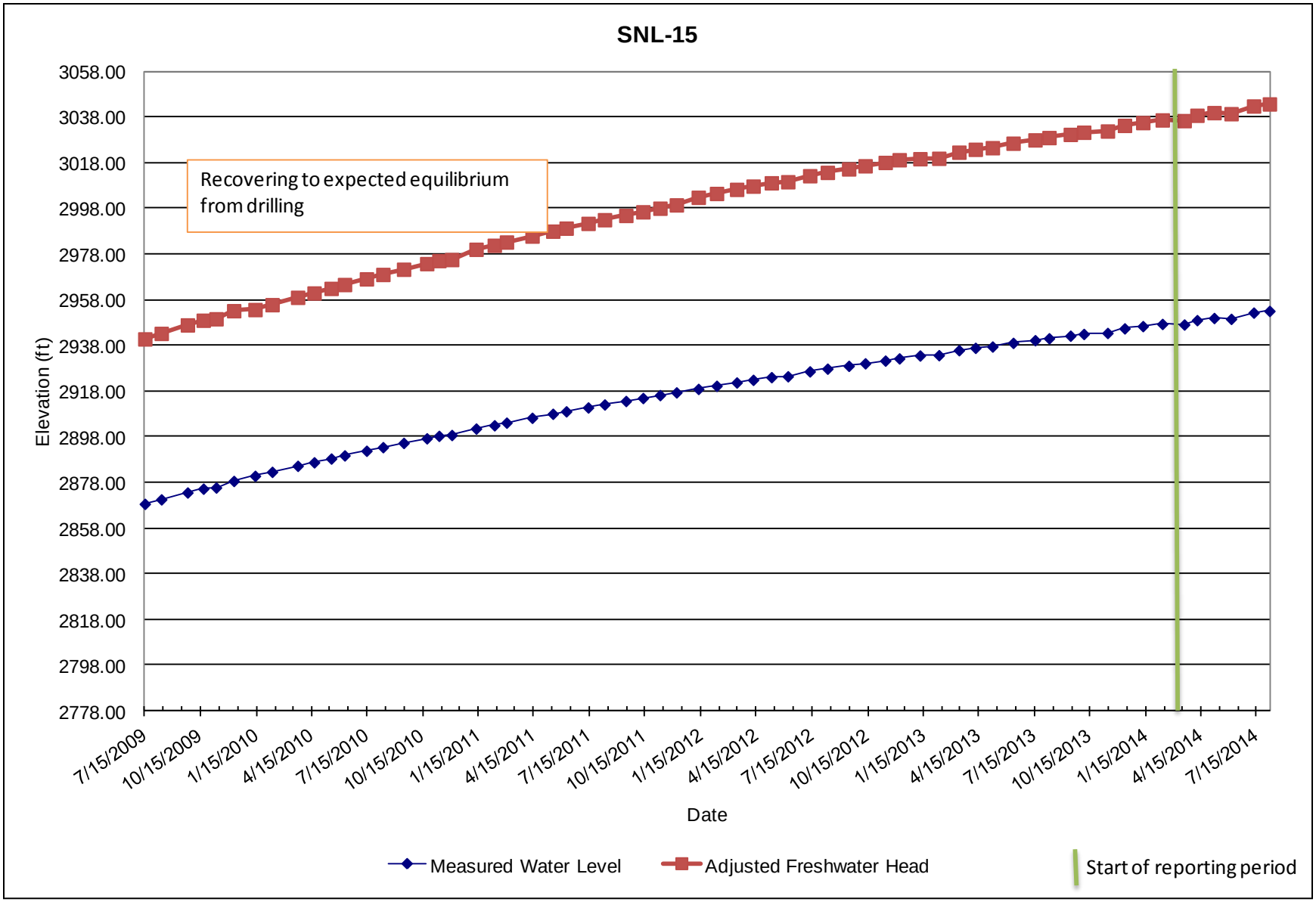

SNL-9
=Fluid density change
3060.00
3059.00
3058.00
3057.00
3056.00
3055.00
3054.00
3053.00
3052.00
3051.00
3050.00
3049.00
3048.00
3047.00
3046.00
3045.00
Elevation (ft)
7/13/2009
10/13/2009
1/13/2010
4/13/2010
7/13/2010
10/13/2010
1/13/2011
4/13/2011
7/13/2011
10/13/2011
1/13/2012
4/13/2012
7/13/2012
10/13/2012
1/13/2013
4/13/2013
7/13/2013
10/13/2013
1/13/2014
4/13/2014
7/13/2014
Date
Fluctuations due to recharge in Nash Draw from heavy rain events
Result of new Mills Ranch well pumping
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

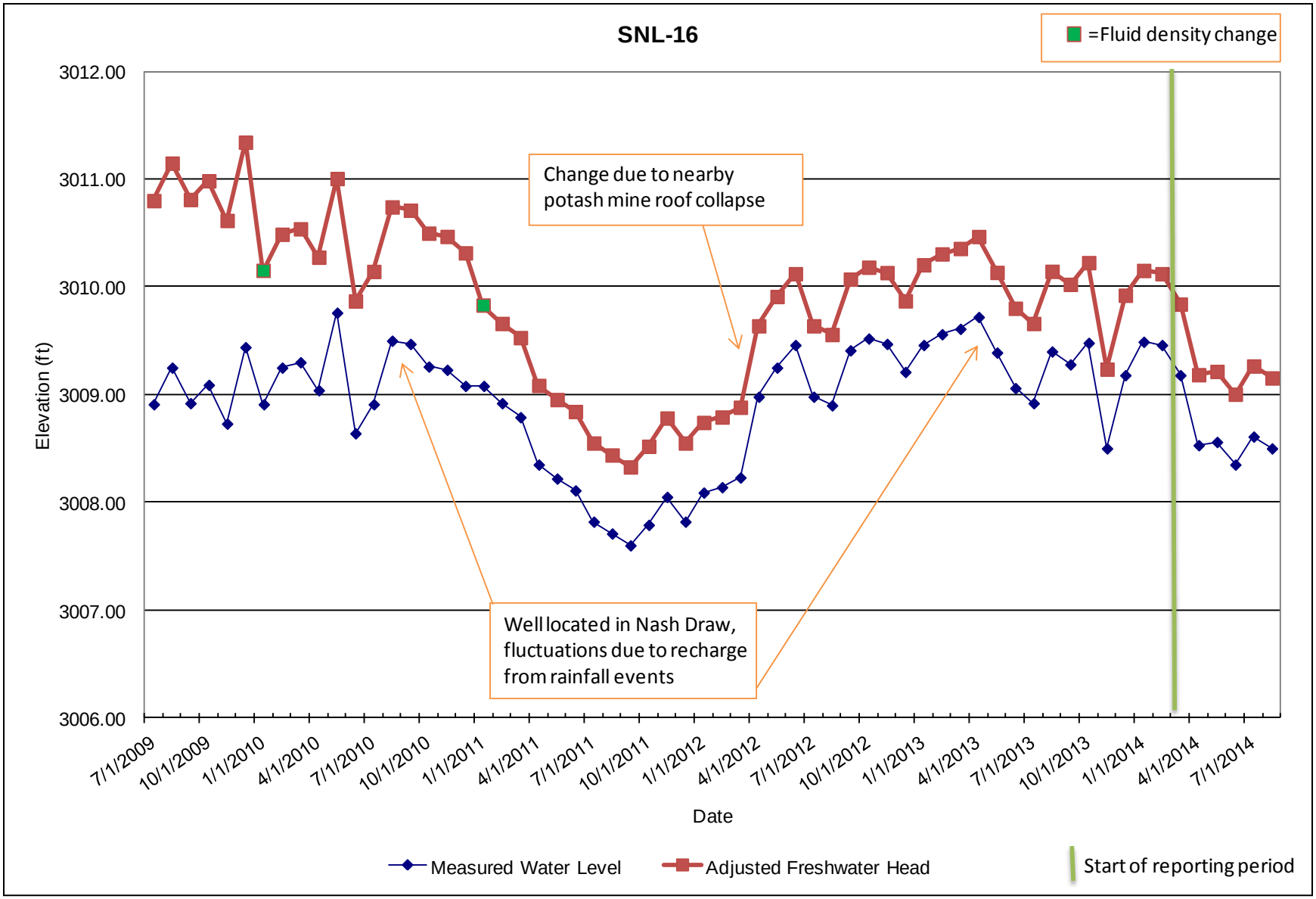

SNL-10
=Fluid density change
Elevation (ft)
3060.00
3059.00
3058.00
3057.00
3056.00
3055.00
3054.00
3053.00
3052.00
3051.00
3050.00
3049.00
3048.00
3047.00
3046.00
3045.00
3044.00
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Well located further from Nash Draw but still shows slight response to fluctuations caused by rainfall events
Result of new Mills Ranch well pumping
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

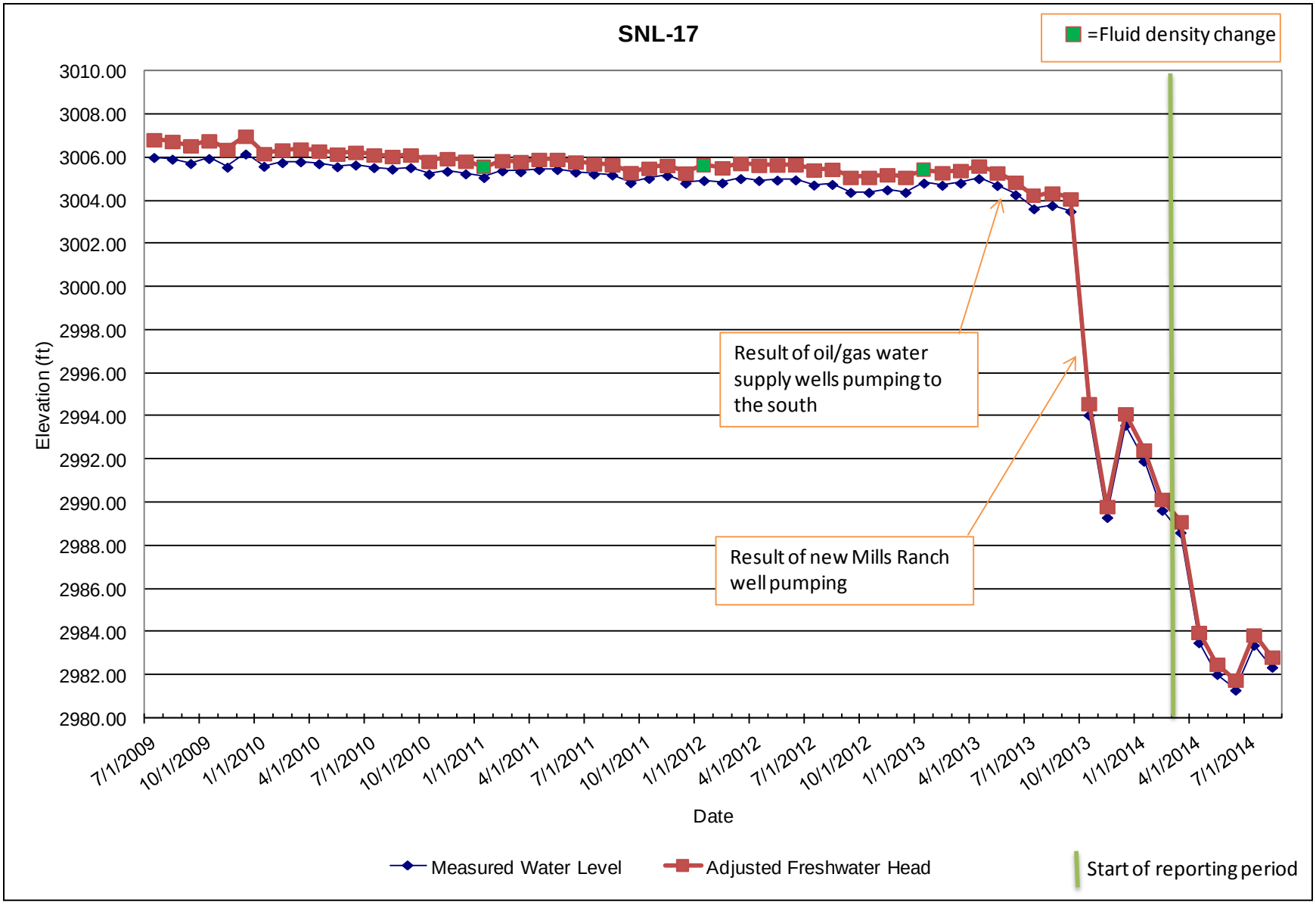

SNL-12
=Fluid density change
Slight drawdown from H-11b4R testing in June 2012
Drawdown from H-9bR test in Aug. 2012
Result of oil/gas water supply wells pumping to the south
Result of new Mills Ranch well pumping
Elevation (ft)
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
2950.00
2945.00
2940.00
2935.00
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

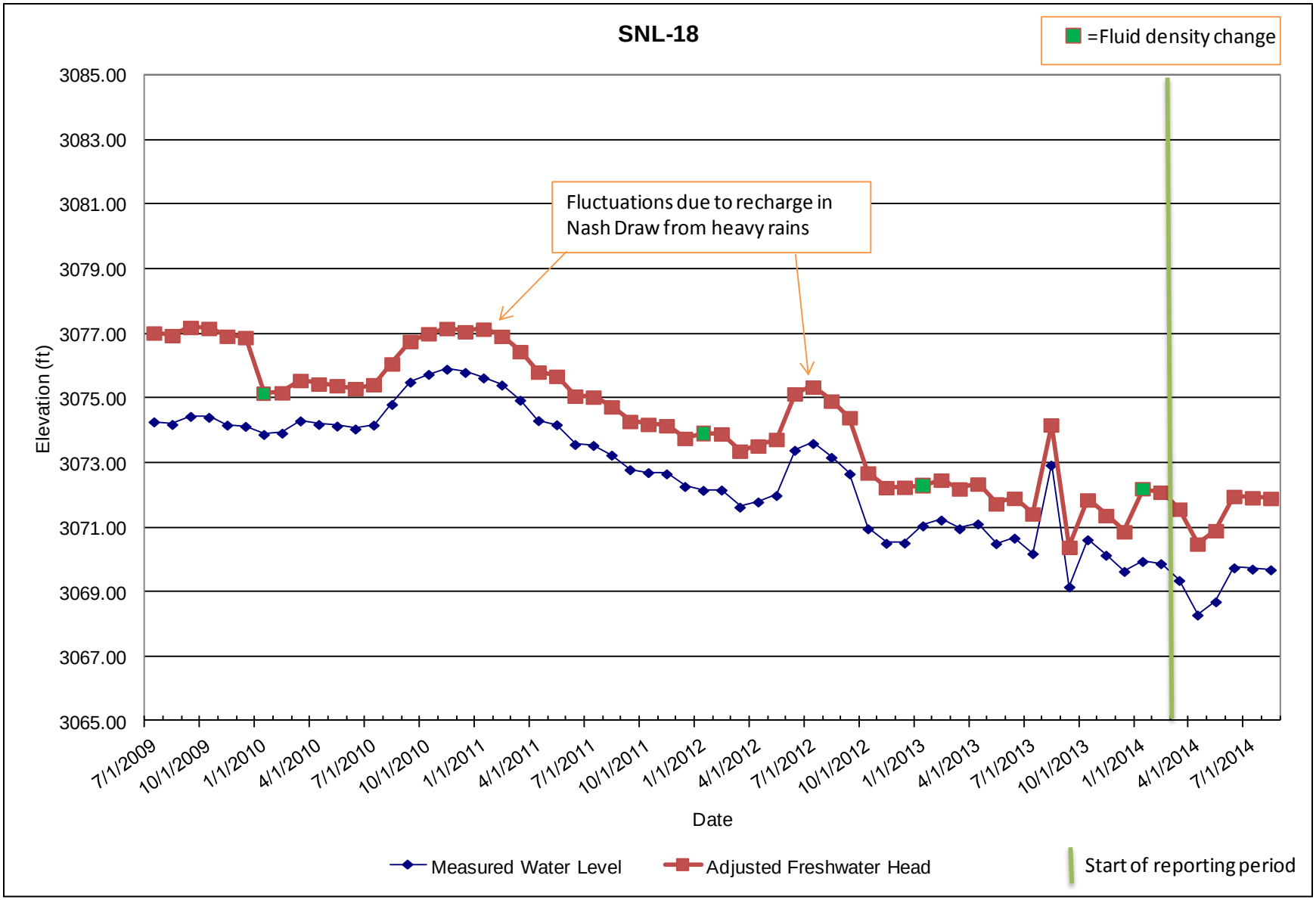

SNL-13
=Fluid density change
Elevation (ft)
3031.00
3028.00
3025.00
3022.00
3019.00
3016.00
3013.00
3010.00
3007.00
3004.00
3001.00
2998.00
2995.00
2992.00
2989.00
2986.00
2983.00
2980.00
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Fluctuations due to drilling of near by oil/gas well
Result of new Mills Ranch well pumping
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

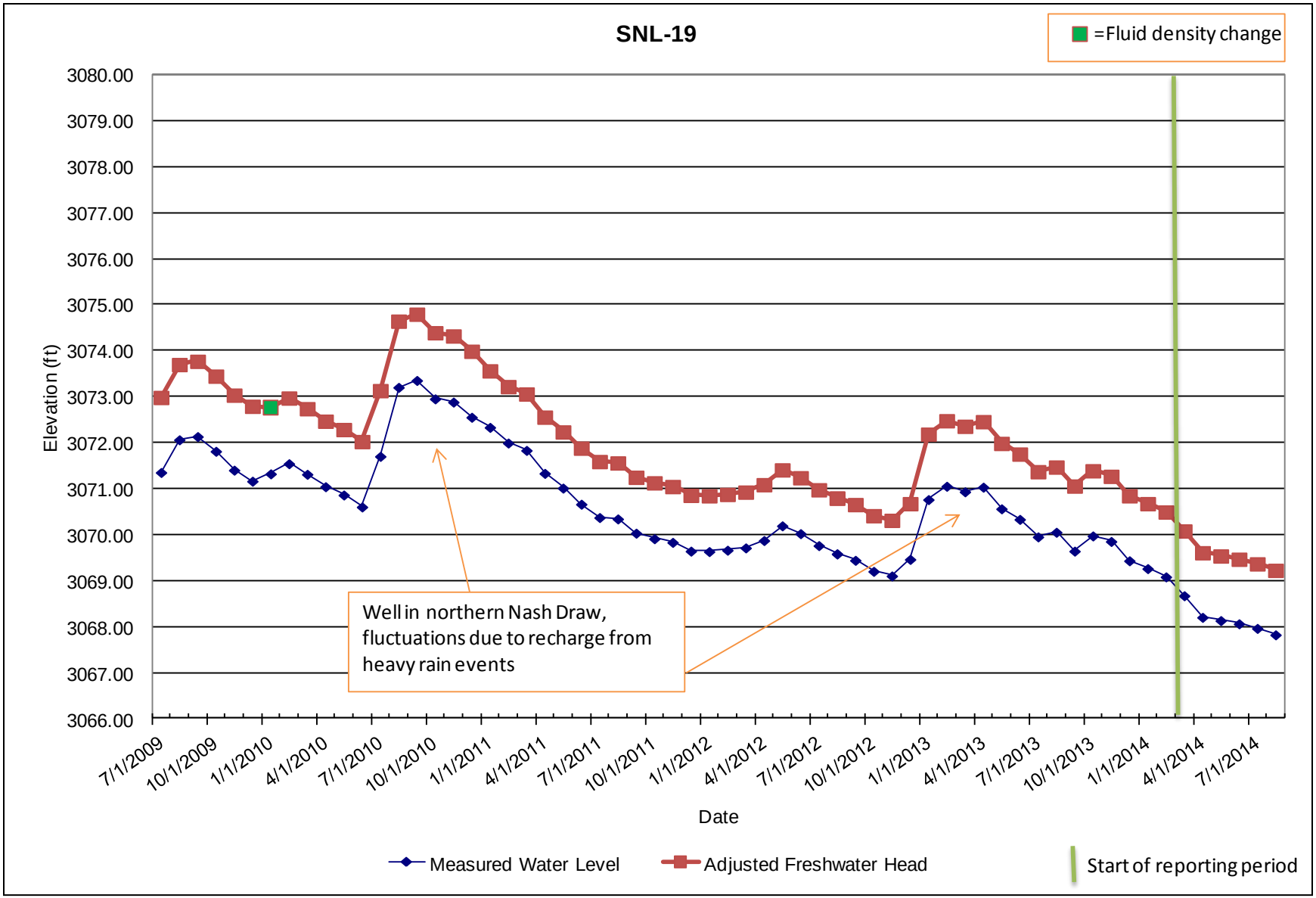

SNL-14
Elevation (ft)
3010.00
3005.00
3000.00
2995.00
2990.00
2985.00
2980.00
2975.00
2970.00
2965.00
2960.00
2955.00
2950.00
2945.00
2940.00
2935.00
2930.00
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Drawdown from H-9bR testing in Aug 2012
Result of oil/gas water supply wells pumping to the south
Result of new Mills Ranch well pumping
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

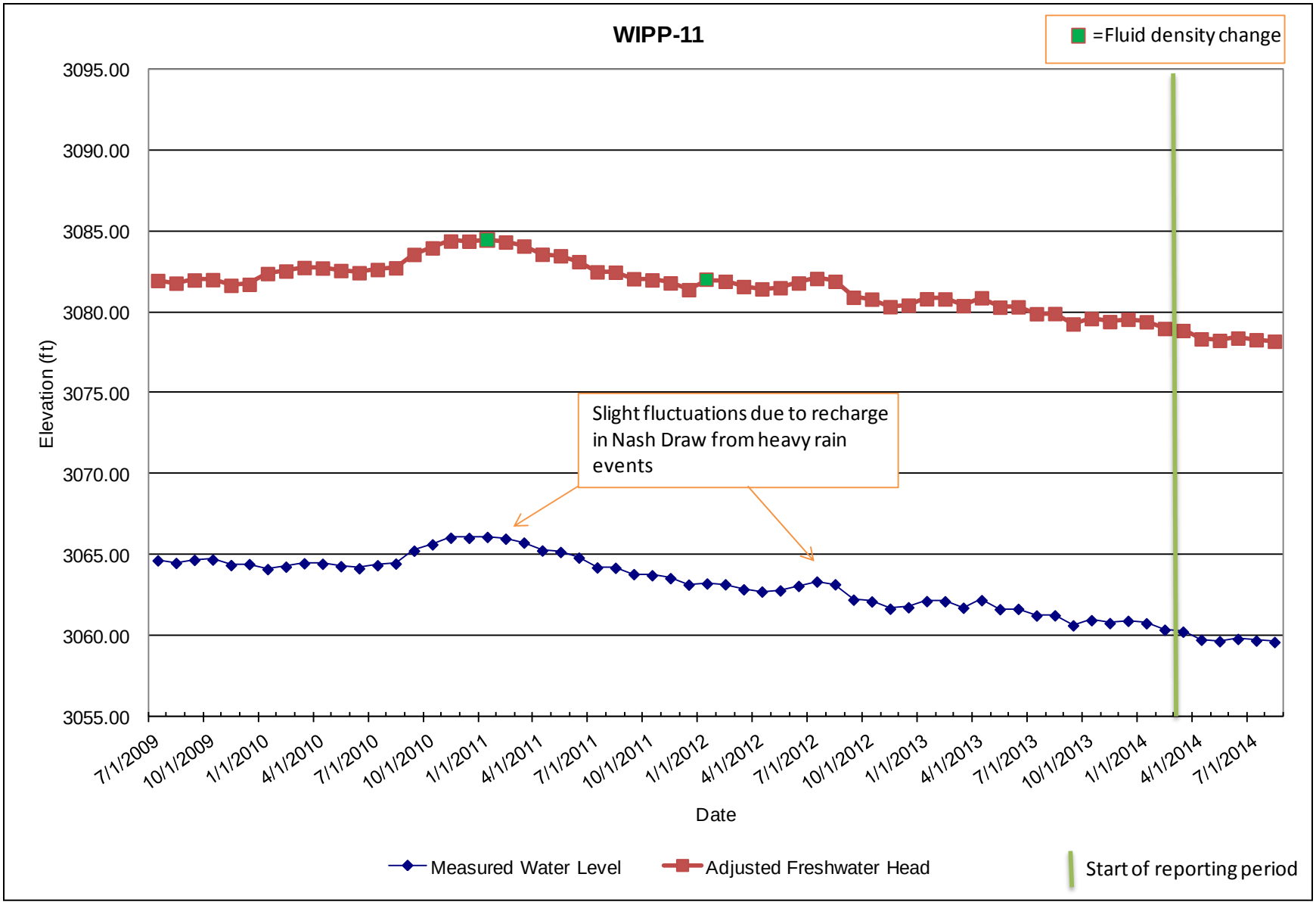

SNL-15
Recovering to expected equilibrium from drilling
Elevation (ft)
3058.00
3038.00
3018.00
2998.00
2978.00
2958.00
2938.00
2918.00
2898.00
2878.00
2858.00
2838.00
2818.00
2798.00
2778.00
7/15/2009
10/15/2009
1/15/2010
4/15/2010
7/15/2010
10/15/2010
1/15/2011
4/15/2011
7/15/2011
10/15/2011
1/15/2012
4/15/2012
7/15/2012
10/15/2012
1/15/2013
4/15/2013
7/15/2013
10/15/2013
1/15/2014
4/15/2014
7/15/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

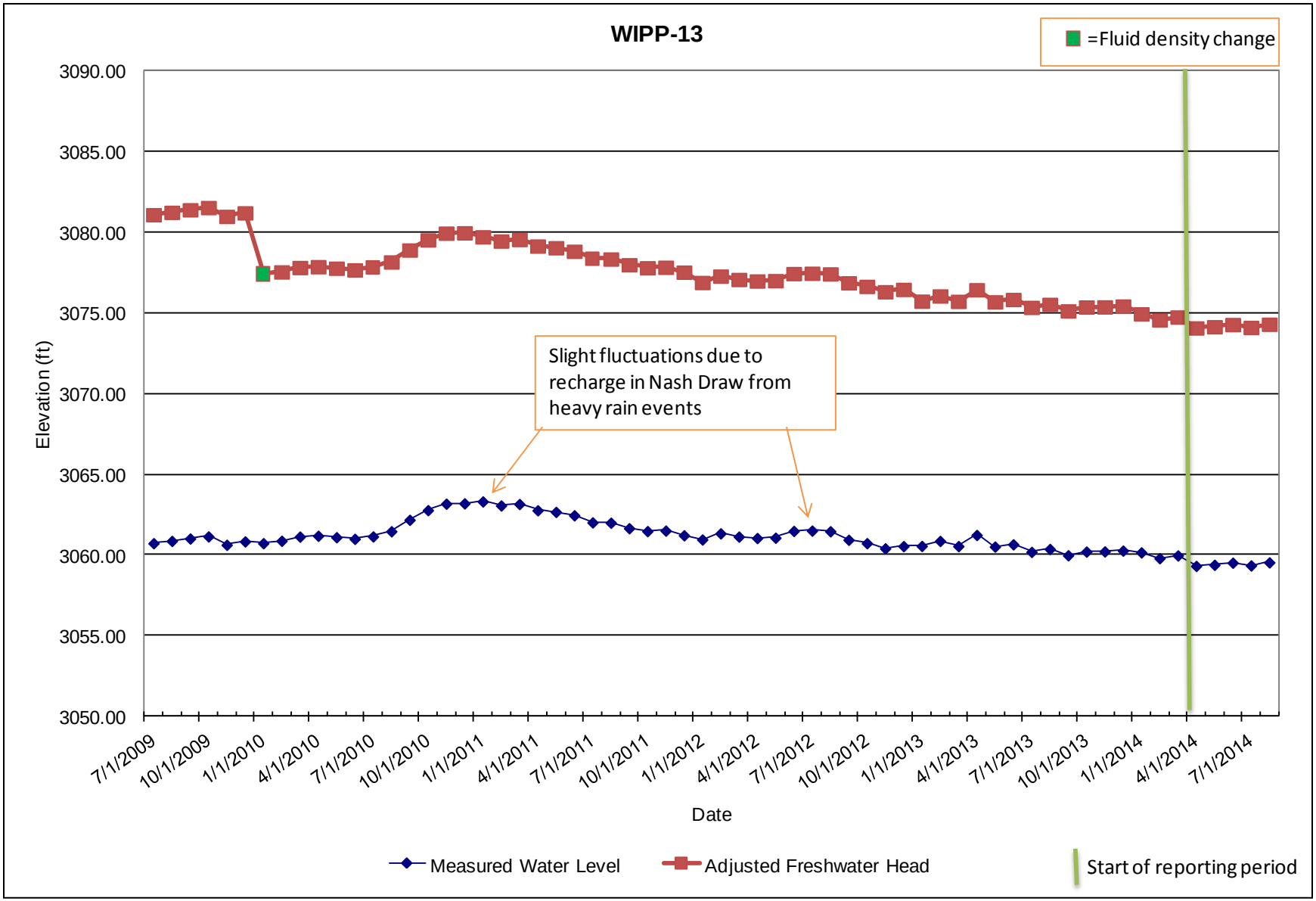

SNL-16
=Fluid density change
3012.00
3011.00
3010.00
3009.00
3008.00
3007.00
3006.00
Elevation (ft)
Change due to nearby potash mine roof collapse
Well located in Nash Draw, fluctuations due to recharge from rainfall events
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

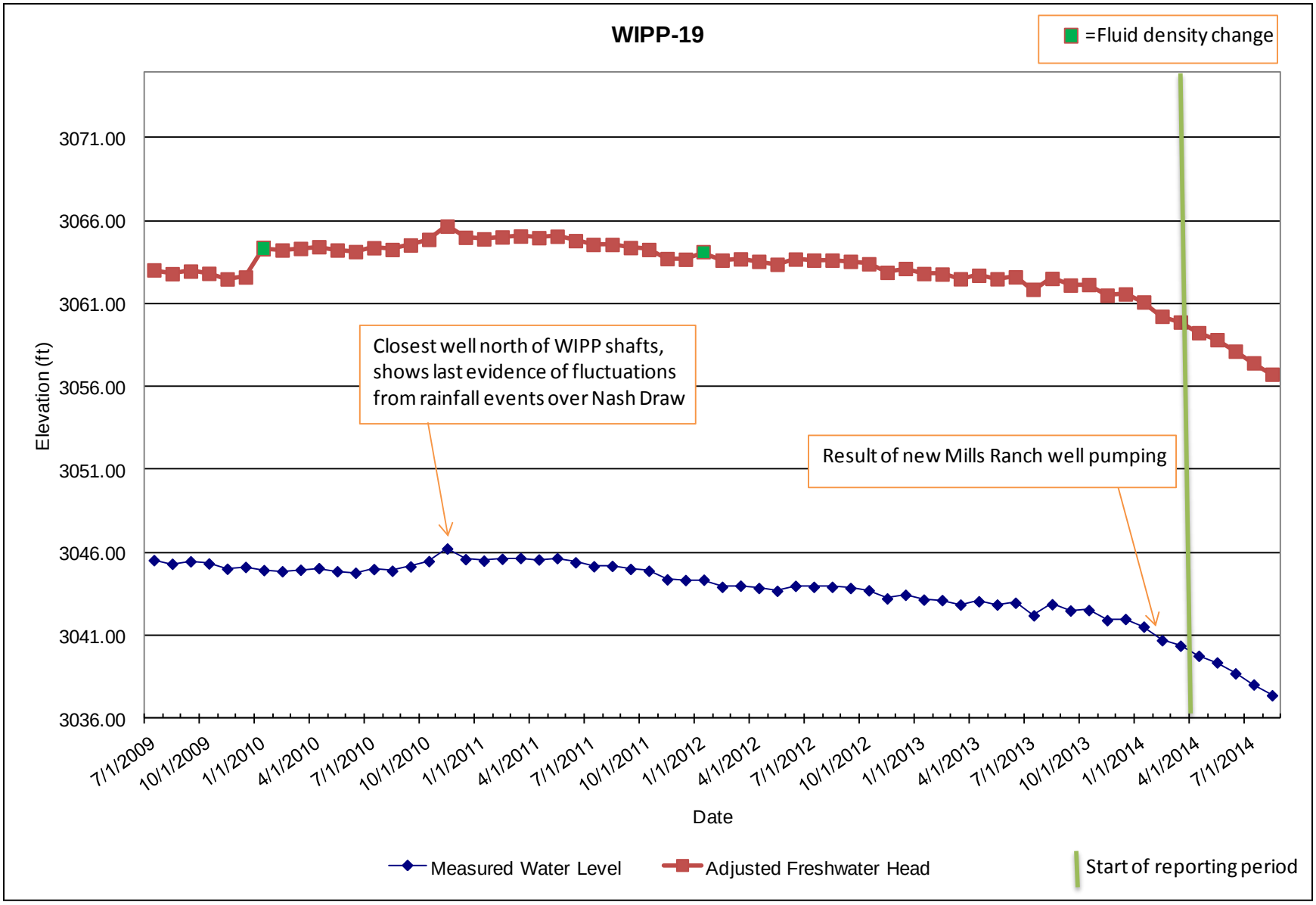

SNL-17
=Fluid density change
3010.00
3008.00
3006.00
3004.00
3002.00
3000.00
2998.00
2996.00
2994.00
2992.00
2990.00
2988.00
2986.00
2984.00
2982.00
2980.00
Elevation (ft)
Result of oil/gas water supply wells pumping to the south
Result of new Mills Ranch well pumping
7/1/2009
10/1/2009
1/1/2010
4/1/2010
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

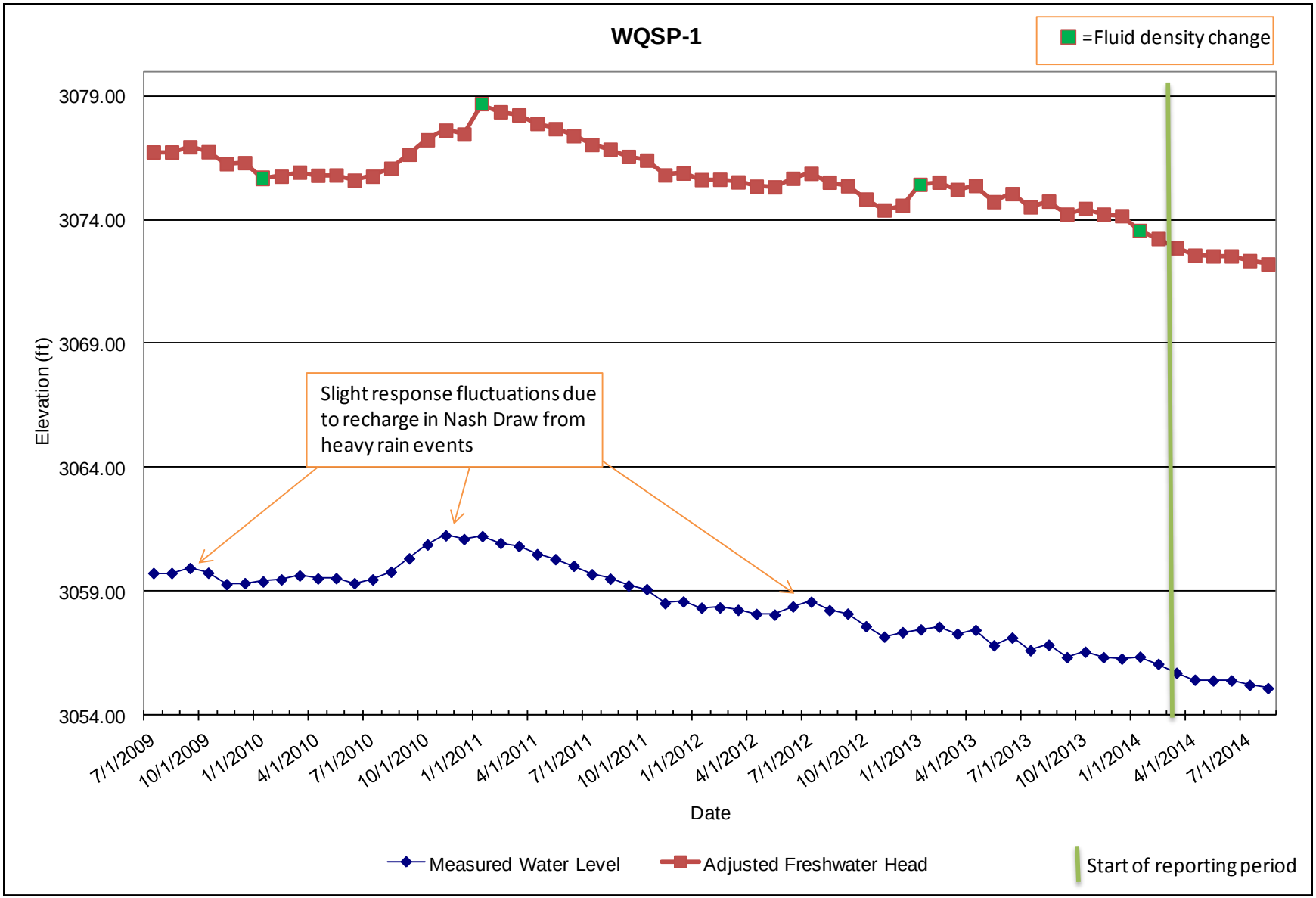

SNL-18
=Fluid density change
Fluctuations due to recharge in Nash Draw from heavy rains
Elevation (ft)
3085.00
3083.00
3081.00
3079.00
3077.00
3075.00
3073.00
3071.00
3069.00
3067.00
3065.00
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

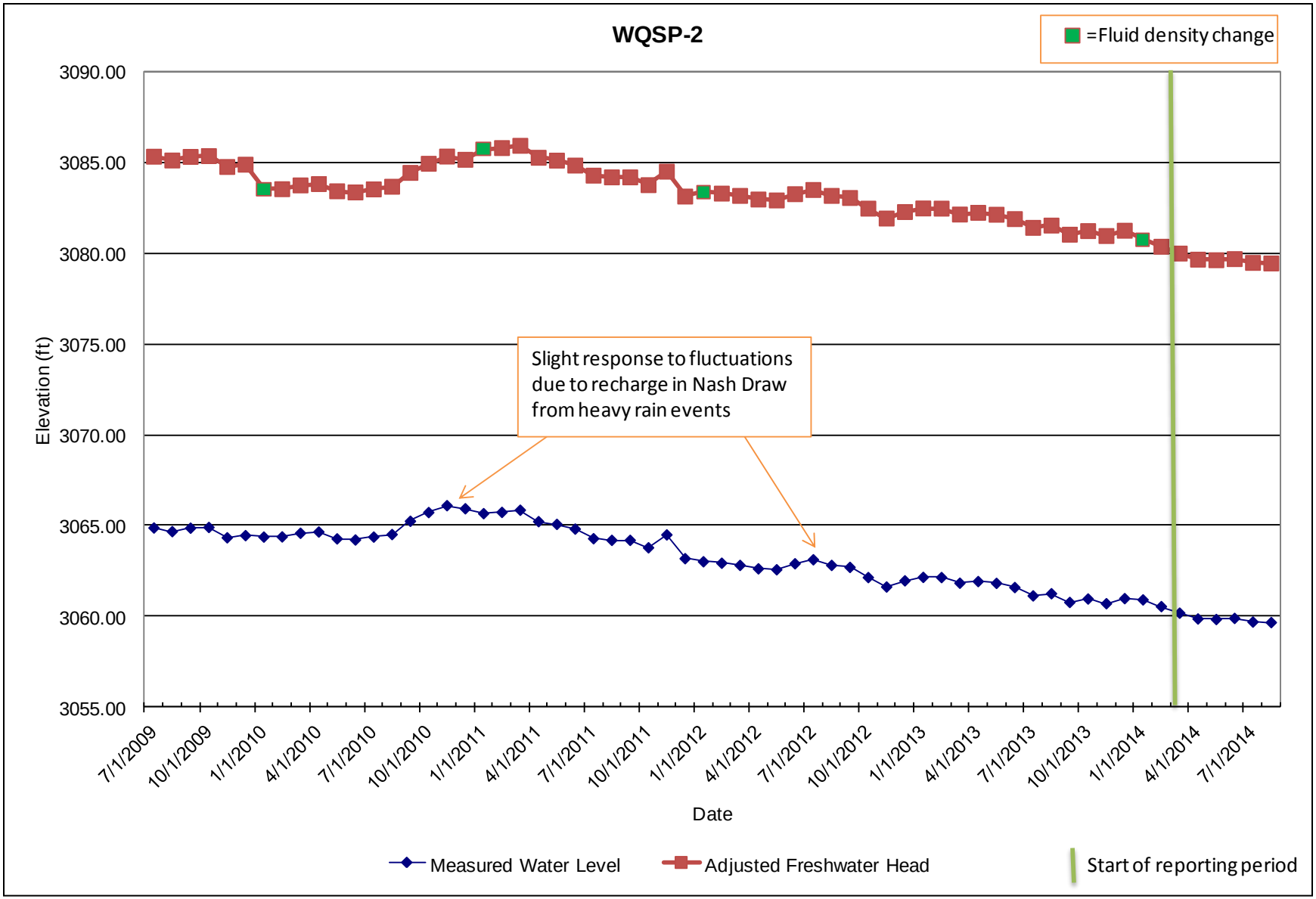

SNL-19
=Fluid density change
3080.00
3079.00
3078.00
3077.00
3076.00
3075.00
3074.00
3073.00
3072.00
3071.00
3070.00
3069.00
3068.00
3067.00
3066.00
Elevation (ft)
Well in northern Nash Draw, fluctuations due to recharge from heavy rain events
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

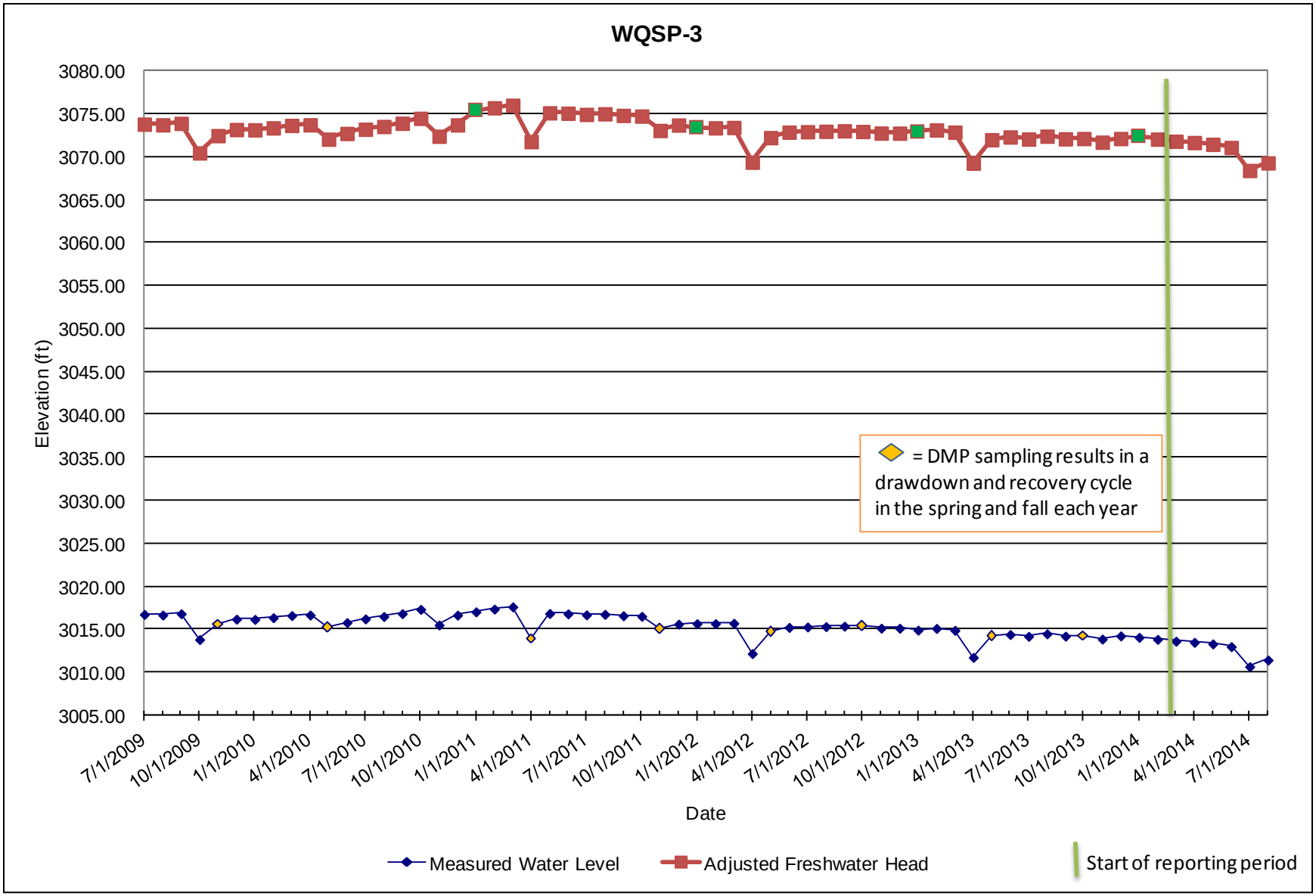

WIPP-11
=Fluid density change
3095.00
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
Elevation (ft)
Slight fluctuations due to recharge in Nash Draw from heavy rain events
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

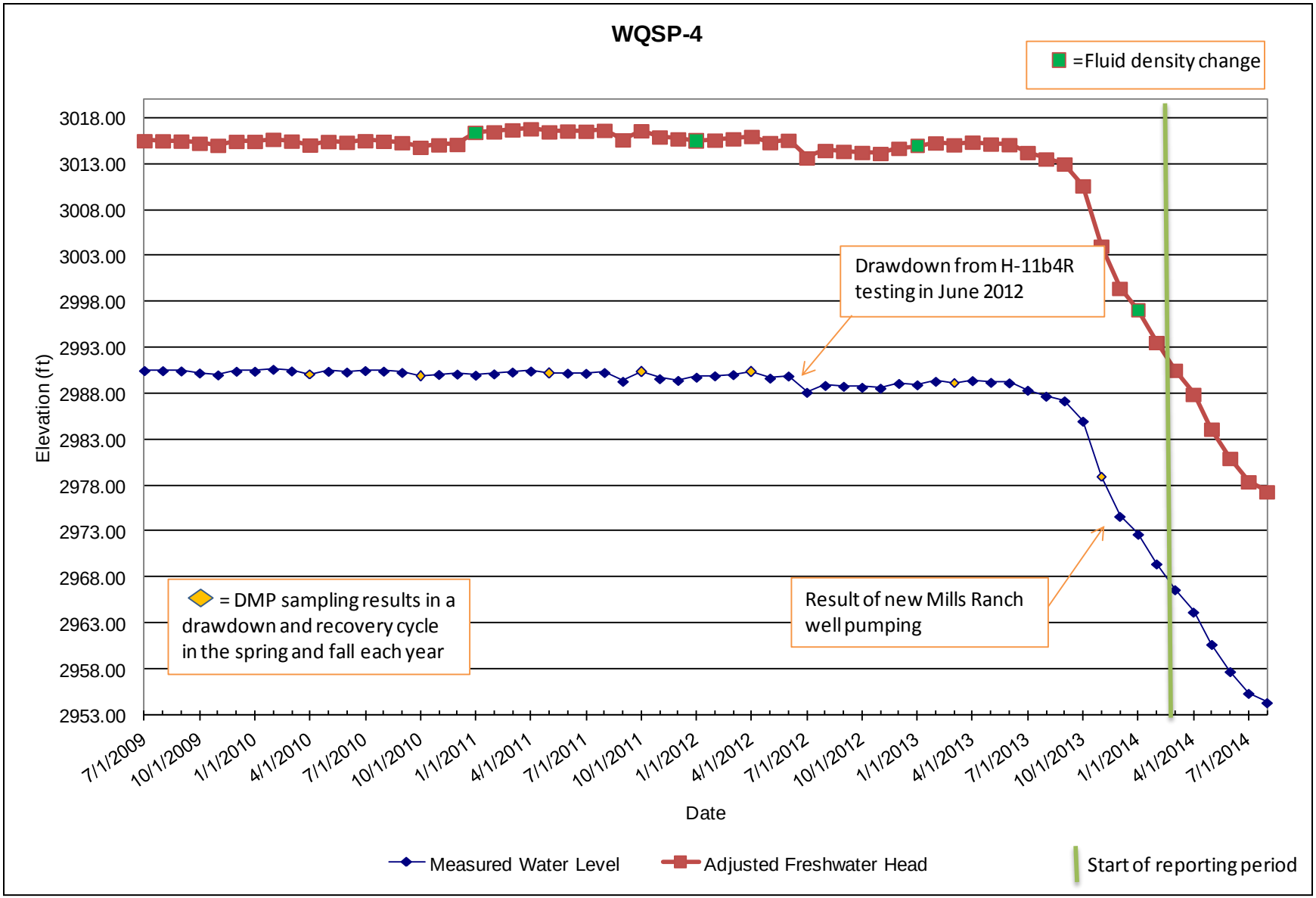

WIPP-13
=Fluid density change
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
3050.00
Elevation (ft)
Slight fluctuations due to recharge in Nash Draw from heavy rain events
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

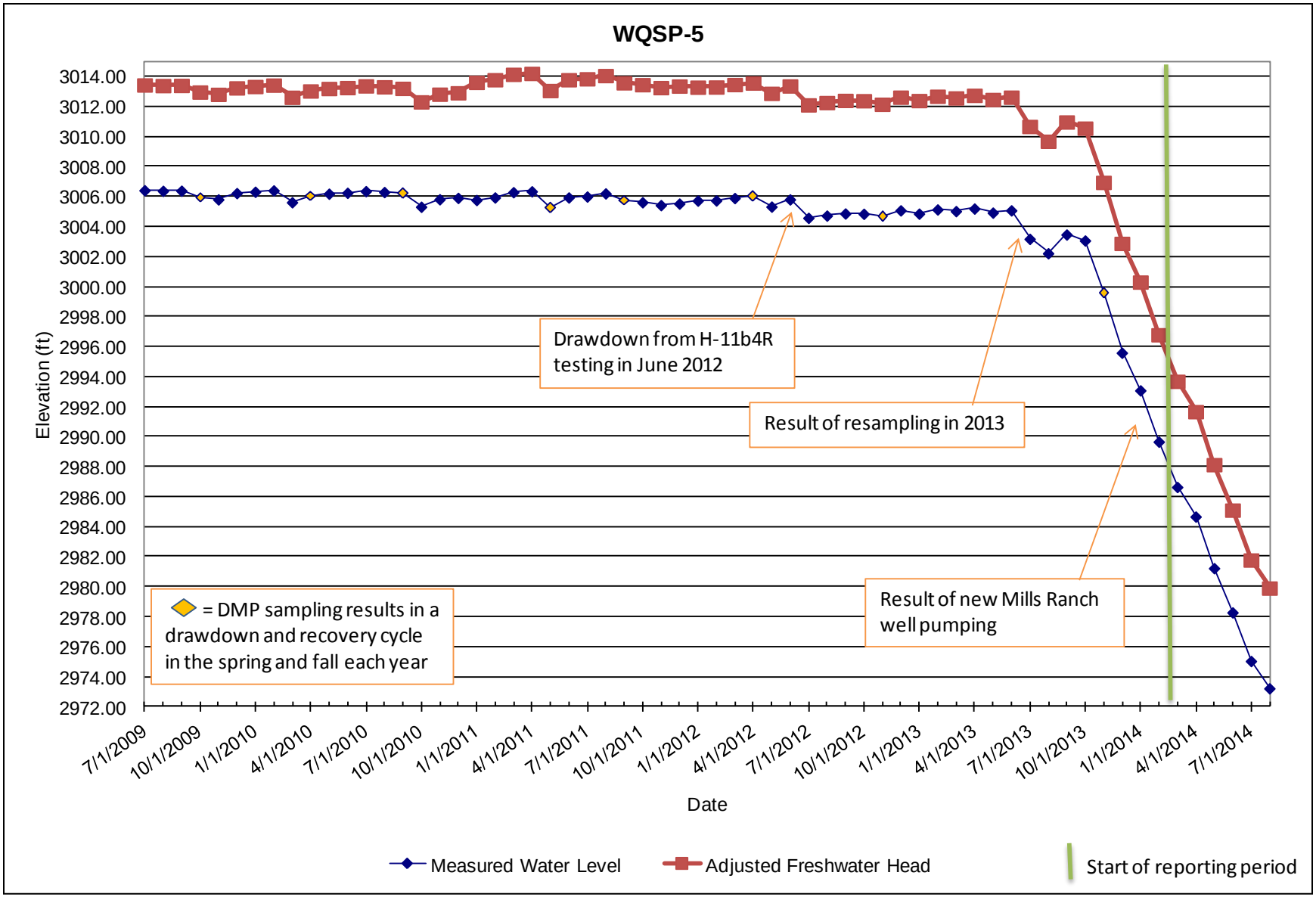

WIPP-19
=Fluid density change
3071.00
3066.00
3061.00
3056.00
3051.00
3046.00
3041.00
3036.00
Elevation (ft)
Closest well north of WIPP shafts, shows last evidence of fluctuations from rainfall events over Nash Draw
Result of new Mills Ranch well pumping
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

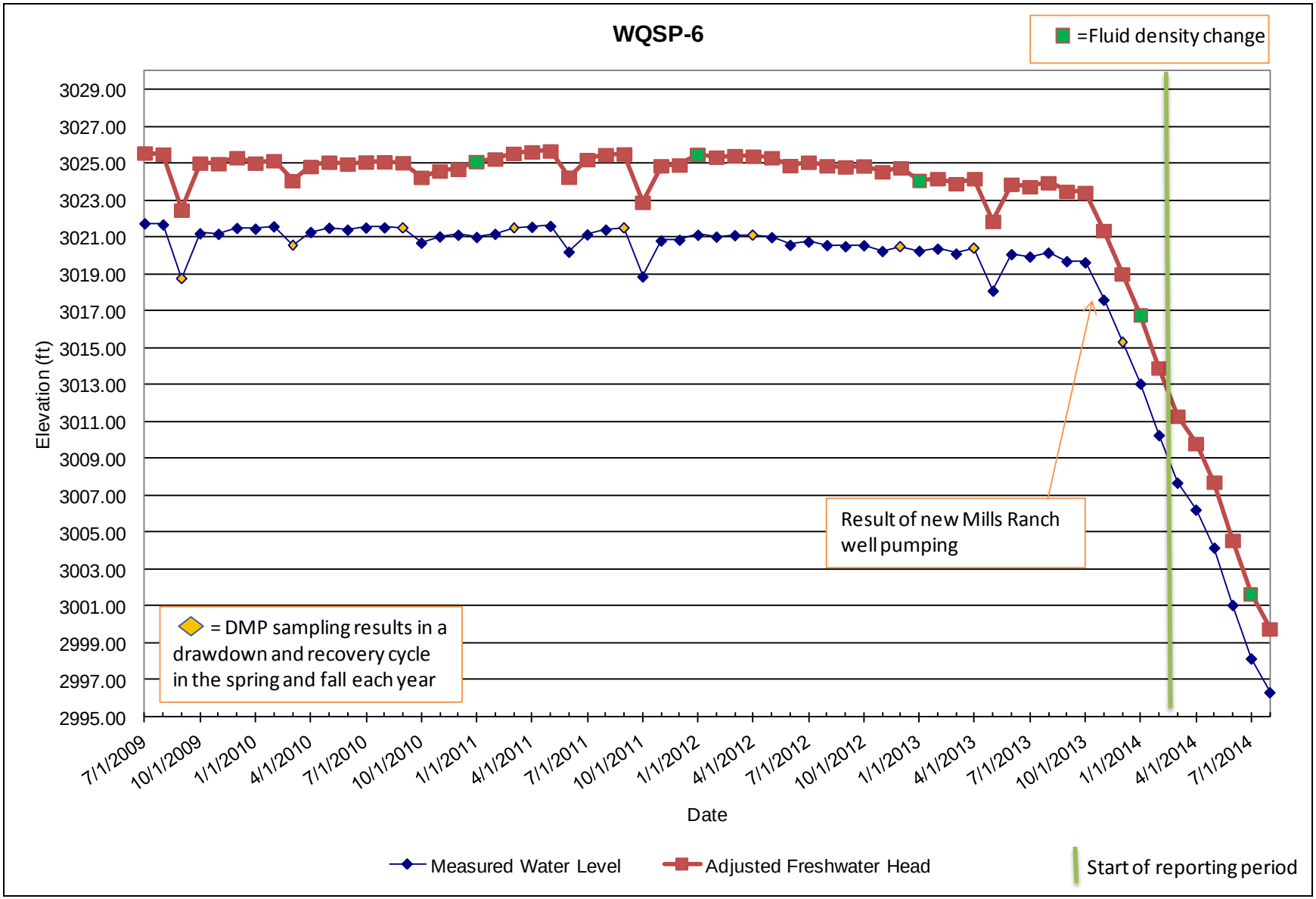

WQSP-1
=Fluid density change
3079.00
3074.00
3069.00
3064.00
3059.00
3054.00
Elevation (ft)
Slight response fluctuations due to recharge in Nash Draw from heavy rain events
7/1/2009
10/1/2009
1/1/2010
4/1/2010
7/1/2010
10/1/2010
1/1/2011
4/1/2011
7/1/2011
10/1/2011
1/1/2012
4/1/2012
7/1/2012
10/1/2012
1/1/2013
4/1/2013
7/1/2013
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period


WQSP-2
=Fluid density change
3090.00
3085.00
3080.00
3075.00
3070.00
3065.00
3060.00
3055.00
Elevation (ft)
Slight response to fluctuations due to recharge in Nash Draw from heavy rain events
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period


WQSP-3
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
Elevation (ft)
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period


WQSP-4
=Fluid density change
Drawdown from H-11b4R testing in June 2012
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
Result of new Mills Ranch well pumping
Elevation (ft)
3018.00
3013.00
3008.00
3003.00
2998.00
2993.00
2988.00
2983.00
2978.00
2973.00
2968.00
2963.00
2958.00
2953.00
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period


WQSP-5
Elevation (ft)
3014.00
3012.00
3010.00
3008.00
3006.00
3004.00
3002.00
3000.00
2998.00
2996.00
2994.00
2992.00
2990.00
2988.00
2986.00
2984.00
2982.00
2980.00
2978.00
2976.00
2974.00
2972.00
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Drawdown from H-11b4R testing in June 2012
Result of resampling in 2013
Result of new Mills Ranch well pumping
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
Measured Water Level
Adjusted Freshwater Head
Start of reporting period


WQSP-6
=Fluid density change
Elevation (ft)
3029.00
3027.00
3025.00
3023.00
3021.00
3019.00
3017.00
3015.00
3013.00
3011.00
3009.00
3007.00
3005.00
3003.00
3001.00
2999.00
2997.00
2995.00
Result of new Mills Ranch well pumping
= DMP sampling results in a drawdown and recovery cycle in the spring and fall each year
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
10/1/2013
1/1/2014
4/1/2014
7/1/2014
Date
Measured Water Level
Adjusted Freshwater Head
Start of reporting period

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Appendix 2
Culebra Groundwater Levels
March – August 2014

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
C-2737 (PIP)	CUL	03/18/14	401.63	2999.13	3005.79
C-2737 (PIP)	CUL	04/10/14	403.50	2997.26	3003.87
C-2737 (PIP)	CUL	05/07/14	405.76	2995.00	3001.56
C-2737 (PIP)	CUL	06/04/14	408.31	2992.45	2998.95
C-2737 (PIP)	CUL	07/10/14	411.39	2989.37	2995.80
C-2737 (PIP)	CUL	08/12/14	413.70	2987.06	2993.44
ERDA-9	CUL	03/18/14	409.94	3000.23	3022.04
ERDA-9	CUL	04/10/14	411.23	2998.94	3020.66
ERDA-9	CUL	05/07/14	412.85	2997.32	3018.93
ERDA-9	CUL	06/05/14	414.70	2995.47	3016.95
ERDA-9	CUL	07/07/14	416.75	2993.42	3014.75
ERDA-9	CUL	08/07/14	418.05	2992.12	3013.36
H-02b2	CUL	03/18/14	341.22	3037.14	3040.97
H-02b2	CUL	04/10/14	342.22	3036.14	3039.95
H-02b2	CUL	05/07/14	343.03	3035.33	3039.13
H-02b2	CUL	06/05/14	344.19	3034.17	3037.96
H-02b2	CUL	07/10/14	345.77	3032.59	3036.36
H-02b2	CUL	08/12/14	347.10	3031.26	3035.01
H-03b2	CUL	03/18/14	408.18	2981.73	2990.67
H-03b2	CUL	04/10/14	410.85	2979.06	2987.92
H-03b2	CUL	05/07/14	414.15	2975.76	2984.51
H-03b2	CUL	06/04/14	417.12	2972.79	2981.45
H-03b2	CUL	07/10/14	421.60	2968.31	2976.83
H-03b2	CUL	08/07/14	421.32	2968.59	2977.11
H-4bR	CUL	03/11/14	405.04	2929.60	2931.35
H-4bR	CUL	04/09/14	414.85	2919.79	2921.37
H-4bR	CUL	05/05/14	420.62	2914.02	2915.50
H-4bR	CUL	06/03/14	421.36	2913.28	2914.75
H-4bR	CUL	07/07/14	406.64	2928.00	2929.72
H-4bR	CUL	08/06/14	412.02	2922.62	2924.25
H-05b	CUL	03/05/14	466.02	3040.76	3081.63
H-05b	CUL	04/08/14	465.80	3040.98	3081.87
H-05b	CUL	05/06/14	465.64	3041.14	3082.05
H-05b	CUL	06/02/14	465.56	3041.22	3082.13
H-05b	CUL	07/08/14	465.64	3041.14	3082.05
H-05b	CUL	08/05/14	465.85	3040.93	3081.82

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
H-06bR	CUL	03/05/14	292.69	3056.53	3069.19
H-06bR	CUL	04/10/14	293.01	3056.21	3068.86
H-06bR	CUL	05/05/14	293.19	3056.03	3068.67
H-06bR	CUL	06/02/14	293.30	3055.92	3068.56
H-06bR	CUL	07/09/14	293.30	3055.92	3068.56
H-06bR	CUL	08/04/14	293.47	3055.75	3068.38
H-07b1	CUL	03/04/14	170.22	2993.50	2994.20
H-07b1	CUL	04/08/14	171.32	2992.40	2993.09
H-07b1	CUL	05/05/14	170.45	2993.27	2993.97
H-07b1	CUL	06/02/14	169.32	2994.40	2995.10
H-07b1	CUL	07/09/14	171.32	2992.40	2993.09
H-07b1	CUL	08/04/14	170.16	2993.56	2994.26
H-09bR	CUL	03/04/14	439.22	2969.12	2969.35
H-09bR	CUL	04/09/14	444.44	2963.90	2964.12
H-09bR	CUL	05/06/14	446.00	2962.34	2962.56
H-09bR	CUL	06/03/14	447.67	2960.67	2960.89
H-09bR	CUL	07/08/14	446.68	2961.66	2961.88
H-09bR	CUL	08/05/14	446.65	2961.69	2961.91
H-10c	CUL	03/04/14	717.45	2970.95	3033.14
H-10c	CUL	04/09/14	717.43	2970.97	3033.16
H-10c	CUL	05/06/14	717.21	2971.19	3033.40
H-10c	CUL	06/03/14	716.72	2971.68	3033.94
H-10c	CUL	07/08/14	717.29	2971.11	3033.32
H-10c	CUL	08/05/14	717.40	2971.00	3033.20
H-11b4R	CUL	03/11/14	464.00	2947.87	2968.53
H-11b4R	CUL	04/09/14	471.11	2940.76	2960.88
H-11b4R	CUL	05/06/14	475.06	2936.81	2956.63
H-11b4R	CUL	06/05/14	477.87	2934.00	2953.61
H-11b4R	CUL	07/07/14	475.64	2936.23	2956.01
H-11b4R	CUL	08/06/14	476.47	2935.40	2955.11
H-12	CUL	03/04/14	472.12	2955.21	2994.77
H-12	CUL	04/09/14	474.79	2952.54	2991.81
H-12	CUL	05/06/14	477.24	2950.09	2989.10
H-12	CUL	06/03/14	479.65	2947.68	2986.43
H-12	CUL	07/07/14	482.18	2945.15	2983.63
H-12	CUL	08/05/14	488.70	2938.63	2976.40

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
H-15R	CUL	03/18/14	528.50	2953.52	2994.14
H-15R	CUL	04/10/14	531.26	2950.76	2991.05
H-15R	CUL	05/07/14	534.34	2947.68	2987.61
H-15R	CUL	06/05/14	537.32	2944.70	2984.28
H-15R	CUL	07/10/14	539.62	2942.40	2981.71
H-15R	CUL	08/12/14	540.60	2941.42	2980.61
H-16	CUL	Well Access Restricted			
H-16	CUL	04/24/14	382.13	3027.93	3039.89
H-16	CUL	05/05/14	382.37	3027.69	3039.64
H-16	CUL	06/04/14	383.18	3026.88	3038.81
H-16	CUL	07/10/14	384.42	3025.64	3037.52
H-16	CUL	08/12/14	385.48	3024.58	3036.42
H-17	CUL	03/11/14	449.83	2935.41	2971.40
H-17	CUL	04/09/14	455.23	2930.01	2965.28
H-17	CUL	05/07/14	459.33	2925.91	2960.64
H-17	CUL	06/03/14	462.23	2923.01	2957.35
H-17	CUL	07/07/14	462.49	2922.75	2957.06
H-17	CUL	08/05/14	462.43	2922.81	2957.13
H-19b0	CUL	03/18/14	448.38	2969.95	2990.12
H-19b0	CUL	04/09/14	451.34	2966.99	2986.96
H-19b0	CUL	05/07/14	454.81	2963.52	2983.26
H-19b0	CUL	06/04/14	457.78	2960.55	2980.10
H-19b0	CUL	07/07/14	460.21	2958.12	2977.51
H-19b0	CUL	08/06/14	461.24	2957.09	2976.41
H-19b2	CUL	03/18/14	449.82	2969.11	2989.93
H-19b2	CUL	06/04/14	459.27	2959.66	2979.84
H-19b3	CUL	03/18/14	450.01	2969.01	2989.11
H-19b3	CUL	06/04/14	459.42	2959.60	2979.08
H-19b4	CUL	03/18/14	449.15	2969.83	2989.99
H-19b4	CUL	06/04/14	458.52	2960.46	2980.00
H-19b5	CUL	03/18/14	449.15	2969.43	2990.48
H-19b5	CUL	06/04/14	458.68	2959.90	2980.29
H-19b6	CUL	03/18/14	449.10	2969.92	2991.31
H-19b6	CUL	06/04/14	459.34	2959.68	2980.35
H-19b7	SNL Testing				
H-19b7					
I-461	CUL	03/04/14	242.89	3040.72	3040.72
I-461	CUL	04/08/14	243.40	3040.21	3040.21
I-461	CUL	05/05/14	243.46	3040.15	3040.15
I-461	CUL	06/02/14	243.62	3039.99	3039.99
I-461	CUL	07/07/14	243.29	3040.32	3040.32
I-461	CUL	08/04/14	243.58	3040.03	3040.03

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
SNL-01	CUL	03/04/14	440.20	3072.64	3077.82
SNL-01	CUL	04/08/14	440.82	3072.02	3077.18
SNL-01	CUL	05/06/14	440.73	3072.11	3077.27
SNL-01	CUL	06/02/14	440.81	3072.03	3077.19
SNL-01	CUL	07/08/14	441.08	3071.76	3076.91
SNL-01	CUL	08/04/14	441.21	3071.63	3076.78
SNL-02	CUL	03/04/14	254.81	3068.25	3070.19
SNL-02	CUL	04/08/14	255.30	3067.76	3069.70
SNL-02	CUL	05/05/14	255.38	3067.68	3069.62
SNL-02	CUL	06/02/14	255.62	3067.44	3069.38
SNL-02	CUL	07/08/14	255.88	3067.18	3069.11
SNL-02	CUL	08/04/14	255.97	3067.09	3069.02
SNL-03	CUL	03/05/14	423.21	3067.14	3076.75
SNL-03	CUL	04/08/14	423.85	3066.50	3076.10
SNL-03	CUL	05/05/14	423.78	3066.57	3076.17
SNL-03	CUL	06/03/14	423.72	3066.63	3076.23
SNL-03	CUL	07/09/14	423.89	3066.46	3076.05
SNL-03	CUL	08/04/14	423.79	3066.56	3076.16
SNL-05	CUL	03/04/14	312.39	3067.59	3070.62
SNL-05	CUL	04/08/14	313.31	3066.67	3069.69
SNL-05	CUL	05/06/14	312.97	3067.01	3070.03
SNL-05	CUL	06/02/14	312.24	3067.74	3070.77
SNL-05	CUL	07/08/14	312.25	3067.73	3070.76
SNL-05	CUL	08/04/14	312.23	3067.75	3070.78
SNL-06	CUL	03/05/14	565.08	3081.03	3268.90
SNL-06	CUL	04/08/14	562.00	3084.11	3272.73
SNL-06	CUL	05/05/14	559.51	3086.60	3275.82
SNL-06	CUL	06/02/14	557.60	3088.51	3278.20
SNL-06	CUL	07/08/14	553.93	3092.18	3282.76
SNL-06	CUL	08/05/14	551.17	3094.94	3286.19

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
SNL-08	CUL	03/18/14	541.47	3014.26	3054.94
SNL-08	CUL	04/08/14	541.80	3013.93	3054.58
SNL-08	CUL	05/06/14	541.36	3014.37	3055.07
SNL-08	CUL	06/02/14	541.31	3014.42	3055.12
SNL-08	CUL	07/08/14	541.35	3014.38	3055.08
SNL-08	CUL	08/04/14	541.25	3014.48	3055.19
SNL-09	CUL	03/05/14	313.84	3047.12	3051.68
SNL-09	CUL	04/08/14	313.51	3047.45	3052.02
SNL-09	CUL	05/05/14	314.63	3046.33	3050.88
SNL-09	CUL	06/02/14	314.94	3046.02	3050.56
SNL-09	CUL	07/07/14	314.88	3046.08	3050.62
SNL-09	CUL	08/04/14	315.08	3045.88	3050.42
SNL-10	CUL	03/05/14	329.99	3047.60	3050.44
SNL-10	CUL	04/10/14	329.65	3047.94	3050.78
SNL-10	CUL	05/06/14	331.12	3046.47	3049.29
SNL-10	CUL	06/02/14	331.75	3045.84	3048.66
SNL-10	CUL	07/07/14	332.40	3045.19	3048.00
SNL-10	CUL	08/04/14	332.68	3044.91	3047.72
SNL-12	CUL	03/04/14	384.54	2954.92	2956.04
SNL-12	CUL	04/09/14	396.90	2942.56	2943.60
SNL-12	CUL	05/06/14	400.73	2938.73	2939.75
SNL-12	CUL	06/03/14	402.15	2937.31	2938.32
SNL-12	CUL	07/08/14	394.35	2945.11	2946.17
SNL-12	CUL	08/05/14	396.78	2942.68	2943.72
SNL-13	CUL	03/11/14	301.75	2992.36	2994.05
SNL-13	CUL	04/09/14	303.42	2990.69	2992.35
SNL-13	CUL	05/05/14	305.85	2988.26	2989.88
SNL-13	CUL	06/02/14	308.83	2985.28	2986.85
SNL-13	CUL	07/07/14	312.01	2982.10	2983.61
SNL-13	CUL	08/04/14	313.41	2980.70	2982.19
SNL-14	CUL	03/11/14	420.42	2947.99	2959.45
SNL-14	CUL	04/09/14	428.83	2939.58	2950.65
SNL-14	CUL	05/07/14	432.83	2935.58	2946.47
SNL-14	CUL	06/03/14	434.82	2933.59	2944.39
SNL-14	CUL	07/07/14	429.18	2939.23	2950.29
SNL-14	CUL	08/05/14	430.79	2937.62	2948.60
SNL-15	CUL	03/18/14	532.83	2947.10	3036.41
SNL-15	CUL	04/08/14	530.92	2949.01	3038.76
SNL-15	CUL	05/06/14	529.98	2949.95	3039.91
SNL-15	CUL	06/03/14	530.36	2949.57	3039.45
SNL-15	CUL	07/10/14	527.62	2952.31	3042.81
SNL-15	CUL	08/05/14	526.88	2953.05	3043.72

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
SNL-16	CUL	03/04/14	123.82	3009.18	3009.84
SNL-16	CUL	04/08/14	124.47	3008.53	3009.18
SNL-16	CUL	05/05/14	124.44	3008.56	3009.21
SNL-16	CUL	06/02/14	124.65	3008.35	3009.00
SNL-16	CUL	07/09/14	124.39	3008.61	3009.27
SNL-16	CUL	08/04/14	124.50	3008.50	3009.15
SNL-17	CUL	03/04/14	249.45	2988.61	2989.11
SNL-17	CUL	04/09/14	254.56	2983.50	2983.98
SNL-17	CUL	05/06/14	256.03	2982.03	2982.50
SNL-17	CUL	06/02/14	256.76	2981.30	2981.76
SNL-17	CUL	07/08/14	254.68	2983.38	2983.85
SNL-17	CUL	08/05/14	255.70	2982.36	2982.83
SNL-18	CUL	03/04/14	306.08	3069.36	3071.57
SNL-18	CUL	04/08/14	307.15	3068.29	3070.49
SNL-18	CUL	05/06/14	306.74	3068.70	3070.90
SNL-18	CUL	06/02/14	305.69	3069.75	3071.96
SNL-18	CUL	07/08/14	305.73	3069.71	3071.92
SNL-18	CUL	08/04/14	305.75	3069.69	3071.90
SNL-19	CUL	03/04/14	153.97	3068.68	3070.09
SNL-19	CUL	04/08/14	154.44	3068.21	3069.61
SNL-19	CUL	05/05/14	154.51	3068.14	3069.54
SNL-19	CUL	06/02/14	154.58	3068.07	3069.47
SNL-19	CUL	07/08/14	154.68	3067.97	3069.37
SNL-19	CUL	08/04/14	154.82	3067.83	3069.23
WIPP-11	CUL	03/05/14	367.55	3060.23	3078.86
WIPP-11	CUL	04/10/14	368.05	3059.73	3078.34
WIPP-11	CUL	05/05/14	368.14	3059.64	3078.25
WIPP-11	CUL	06/03/14	368.00	3059.78	3078.39
WIPP-11	CUL	07/09/14	368.10	3059.68	3078.29
WIPP-11	CUL	08/12/14	368.19	3059.59	3078.19
WIPP-13	CUL	03/18/14	345.70	3059.97	3074.76
WIPP-13	CUL	04/10/14	346.35	3059.32	3074.08
WIPP-13	CUL	05/06/14	346.28	3059.39	3074.15
WIPP-13	CUL	06/04/14	346.15	3059.52	3074.29
WIPP-13	CUL	07/09/14	346.32	3059.35	3074.11
WIPP-13	CUL	08/04/14	346.13	3059.54	3074.31

WELL NUMBER	ZONE	DATE	ADJUSTED DEPTH TOC ft	WATER LEVEL ELEVATION ft amsl	ADJUSTED FRESHWATER HEAD ft amsl
WIPP-19	CUL	03/18/14	394.74	3040.37	3059.89
WIPP-19	CUL	04/10/14	395.35	3039.76	3059.25
WIPP-19	CUL	05/07/14	395.75	3039.36	3058.83
WIPP-19	CUL	06/03/14	396.41	3038.70	3058.13
WIPP-19	CUL	07/09/14	397.08	3038.03	3057.43
WIPP-19	CUL	08/12/14	397.73	3037.38	3056.74
WQSP-1	CUL	03/20/14	363.54	3055.71	3072.87
WQSP-1	CUL	04/10/14	363.82	3055.43	3072.57
WQSP-1	CUL	05/06/14	363.85	3055.40	3072.54
WQSP-1	CUL	06/03/14	363.85	3055.40	3072.54
WQSP-1	CUL	07/10/14	364.03	3055.22	3072.35
WQSP-1	CUL	08/12/14	364.16	3055.09	3072.22
WQSP-2	CUL	03/20/14	403.69	3060.18	3079.98
WQSP-2	CUL	04/10/14	404.01	3059.86	3079.65
WQSP-2	CUL	05/07/14	404.04	3059.83	3079.62
WQSP-2	CUL	06/05/14	403.98	3059.89	3079.68
WQSP-2	CUL	07/09/14	404.18	3059.69	3079.47
WQSP-2	CUL	08/12/14	404.21	3059.66	3079.44
WQSP-3	CUL	03/20/14	466.51	3013.63	3071.84
WQSP-3	CUL	04/10/14	466.64	3013.50	3071.69
WQSP-3	CUL	05/07/14	466.82	3013.32	3071.49
WQSP-3	CUL	06/03/14	467.14	3013.00	3071.12
WQSP-3	CUL	07/09/14	469.47	3010.67	3068.44
WQSP-3	CUL	08/12/14	468.70	3011.44	3069.33
WQSP-4	CUL	03/20/14	466.43	2966.66	2990.56
WQSP-4	CUL	04/08/14	468.87	2964.22	2987.93
WQSP-4	CUL	05/07/14	472.39	2960.70	2984.15
WQSP-4	CUL	06/04/14	475.35	2957.74	2980.96
WQSP-4	CUL	07/07/14	477.72	2955.37	2978.41
WQSP-4	CUL	08/06/14	478.73	2954.36	2977.32
WQSP-5	CUL	03/20/14	397.73	2986.65	2993.70
WQSP-5	CUL	04/09/14	399.70	2984.68	2991.67
WQSP-5	CUL	05/07/14	403.14	2981.24	2988.14
WQSP-5	CUL	06/04/14	406.09	2978.29	2985.11
WQSP-5	CUL	07/07/14	409.33	2975.05	2981.78
WQSP-5	CUL	08/07/14	411.15	2973.23	2979.91
WQSP-6	CUL	03/20/14	357.02	3007.70	3011.30
WQSP-6	CUL	04/09/14	358.48	3006.24	3009.82
WQSP-6	CUL	05/05/14	360.54	3004.18	3007.73
WQSP-6	CUL	06/03/14	363.65	3001.07	3004.57
WQSP-6	CUL	07/10/14	366.55	2998.17	3001.63
WQSP-6	CUL	08/06/14	368.38	2996.34	2999.77

APPENDIX 3

WELL WQSP-1

ANALYTICAL RESULTS

WQSP-1

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-1, Culebra, Round 36

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 36, the static water level was 364.1 ft_{btoc}. One wbv for WQSP-1 was determined to be 302.5 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).

Due to radiological events that occurred at the WIPP Site in February, the sampling team collected a pre-installation line rinse sample. The dedicated sampling line was flushed with approximately 2 liters of deionized water prior to installation rinse. Rinsate was collected in a certified container, preserved with nitric acid (pH <2) and considered an additional retain sample.

Round 36 pumping of WQSP-1 began on 5/27/2014 at 10:36 and ended on 5/28/2014 at 12:10. The well purged for 25.6 hours with an average flow rate of 0.29 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 445 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 5/28/2014 after approximately 402.1 gallons of groundwater (≈ 1.3 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 310 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 7.75 cell volumes per minute; thus, approximately 39 volumes of groundwater (1,550 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 parameter measurements varied 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. 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 36[a,b,c].

Item	Day 1		Day 2	
Date	5/27/2014		5/28/2014	
Pump Speed, Hz	38.3		38.3	
Average Flow Rate, gpm	0.28		0.29	
Rate of Exchange, no. cell volumes/min	7.2		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C, µmhos/cm	83,600	86,000	NR	NR
Temperature, °C	21.9	22.3	NR	NR
pH, SU	7.47	7.14	NR	NR
Specific Gravity	1.048	1.048	NR	NR
Time to Parameter Stability, hr:min	1:00		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 36 were compared to the average results from the previous 35 rounds (Table 2). Note that Round 36 values for SC, temperature, pH and SG (86,000 µmhos/cm, 21.9°C, 7.14 S.U. and 1.048, respectively) were within the lower and upper limits calculated for the previous 35 rounds. All field parameters measured during Round 36 were within the normal limits observed for WQSP-1 over the past 19 years.

Table 2. Comparison of Round 36 DMW Measurements to Historical Results from Rounds (1-35) for WQSP-1.

Field-analyzed Parameter	Historical Data (Rounds 1 – 35)[a,b]			Measurement Results, Round 36[c]
		Limits		
	$\bar{x}$ Results	Lower	Upper	
Specific Conductance @ 25.0°C, µmhos/cm	82,082	77,978	86,186	86,000
Temperature, °C	21.3	20.2	22.4	21.9
pH, S.U.	7.15	6.79	7.51	7.14
Specific Gravity	1.048	0.996	1.100	1.048

[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
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TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

July 28, 2014

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

RE: WIPP DMP OrderNo.: 1405C12

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 5/29/2014 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

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#: **1405C12**
28-Jul-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1405C12-001	GW-WQ1-C-R36		5/28/2014 9:16:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-001	GW-WQ1-C-R36		5/28/2014 9:16:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-001	GW-WQ1-C-R36		5/28/2014 9:16:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-001	GW-WQ1-C-R36		5/28/2014 9:16:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-001	GW-WQ1-C-R36		5/28/2014 9:16:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-001	GW-WQ1-C-R36		5/28/2014 9:16:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-002	GW-WQ1-C-R36 DUPLICATE		5/28/2014 9:32:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-002	GW-WQ1-C-R36 DUPLICATE		5/28/2014 9:32:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-002	GW-WQ1-C-R36 DUPLICATE		5/28/2014 9:32:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-002	GW-WQ1-C-R36 DUPLICATE		5/28/2014 9:32:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-002	GW-WQ1-C-R36 DUPLICATE		5/28/2014 9:32:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-002	GW-WQ1-C-R36 DUPLICATE		5/28/2014 9:32:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-003	GW-WQ1-C-R36 FIELD BLANK		5/28/2014 9:56:00 AM	5/29/2014 9:50:00 AM	Aqueous
1405C12-004	GW-WQ1-C-R36 TRIP BLANK			5/29/2014 9:50:00 AM	Aqueous

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: The recovery for 2-butanone was elevated in the LCS and LCSR. 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 2,4-Dinitrophenol and pentachlorophenol 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: 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.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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4901 Hawkins NE
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TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Case Narrative

WO#: **1405C12**
Date: **7/28/2014**

CLIENT: WIPP
Project: WIPP DMP

All analytes reported are associated with passing CCVs.

METHOD: 7470

HOLDING TIMES: Mercury was analzyed past the 28 day holding time.

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.
5. Spikes: 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

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Website: www.hallenvironmental.com

DATES REPORT

WO#: **1405C12**

28-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405C12-001A	GW-WQ1-C-R36	5/28/2014 9:16:00 AM	Aqueous	EPA Method: 8260B			6/4/2014 6:46:15 PM
1405C12-001B				EPA Method 8270C: Semivolatiles		5/30/2014 9:32:23 AM	5/31/2014 4:06:44 PM
1405C12-001C				SM 5310B: TOC			6/2/2014 10:38:31 AM
1405C12-001D				EPA Method 300.0: Anions			5/29/2014 4:24:51 PM
				EPA Method 300.0: Anions			5/29/2014 3:35:12 PM
				EPA Method 300.0: Anions			5/29/2014 4:12:26 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:31:10 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:32:54 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:41:10 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 1:52:39 PM
				SM 2540 C: Total Dissolved Solids		6/2/2014 9:17:07 PM	6/3/2014 3:33:00 PM
				SM 2540D: TSS		6/2/2014 9:47:32 PM	6/3/2014 2:01:00 PM
				SM2320B: Alkalinity			5/30/2014 1:39:10 PM
				SM2510B: Specific Conductance			5/30/2014 1:39:10 PM
				SM2510B: Specific Conductance			5/30/2014 2:27:46 PM
				SM4500-H+B: pH			5/30/2014 1:39:10 PM
				Specific Gravity			6/11/2014 3:06:00 PM
1405C12-001E				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:52:31 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:37:57 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:06:34 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:11:37 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/12/2014 1:22:14 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/11/2014 2:08:08 PM

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DATES REPORT

WO#: **1405C12**

28-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405C12-001E	GW-WQ1-C-R36	5/28/2014 9:16:00 AM	Aqueous	EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/11/2014 1:53:43 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/12/2014 1:35:01 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/6/2014 3:24:57 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/6/2014 3:04:47 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/6/2014 3:33:19 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/11/2014 1:33:47 PM
				EPA Method 7470: Mercury		7/17/2014 8:01:10 AM	7/17/2014 1:56:03 PM
				EPA Method 7470: Mercury		7/17/2014 8:01:10 AM	7/17/2014 2:43:13 PM
1405C12-002A	GW-WQ1-C-R36 DUPLICATE	5/28/2014 9:32:00 AM		EPA Method: 8260B			6/4/2014 7:14:31 PM
1405C12-002B				EPA Method 8270C: Semivolatiles		5/30/2014 9:32:23 AM	5/31/2014 5:34:46 PM
1405C12-002C				SM 5310B: TOC			6/2/2014 11:28:01 AM
1405C12-002D				EPA Method 300.0: Anions			5/29/2014 5:02:05 PM
				EPA Method 300.0: Anions			5/29/2014 4:49:41 PM
				EPA Method 300.0: Anions			5/29/2014 4:37:16 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:05:00 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:36:20 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:34:33 PM
				EPA Method 6010B: Dissolved Metals			5/31/2014 2:42:47 PM
				SM 2540 C: Total Dissolved Solids		6/2/2014 9:17:07 PM	6/3/2014 3:33:00 PM
				SM 2540D: TSS		6/2/2014 9:47:32 PM	6/3/2014 2:01:00 PM
				SM2320B: Alkalinity			5/30/2014 2:06:12 PM
				SM2510B: Specific Conductance			5/30/2014 2:33:25 PM
				SM2510B: Specific Conductance			5/30/2014 2:06:12 PM

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Website: www.hallenvironmental.com

DATES REPORT

WO#: **1405C12**

28-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405C12-002D	GW-WQ1-C-R36 DUPLICATE	5/28/2014 9:32:00 AM	Aqueous	SM4500-H+B: pH			5/30/2014 2:06:12 PM
				Specific Gravity			6/11/2014 3:06:00 PM
1405C12-002E				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/11/2014 1:35:33 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/12/2014 1:38:33 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/12/2014 1:36:43 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/11/2014 2:11:55 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/11/2014 2:10:01 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:57:41 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:14:57 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:39:33 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/6/2014 3:41:04 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/6/2014 3:39:01 PM
				EPA 6010B: Total Recoverable Metals		6/4/2014 11:34:08 AM	6/6/2014 3:06:43 PM
				EPA 6010B: Total Recoverable Metals		5/30/2014 10:39:18 AM	5/31/2014 2:13:16 PM
				EPA Method 7470: Mercury		7/17/2014 8:01:10 AM	7/17/2014 2:01:27 PM
1405C12-003A	GW-WQ1-C-R36 FIELD BLANK	5/28/2014 9:56:00 AM		EPA Method: 8260B			6/6/2014 11:52:37 AM
				EPA Method: 8260B			6/4/2014 7:42:45 PM
1405C12-004A	GW-WQ1-C-R36 TRIP BLANK			EPA Method: 8260B			6/4/2014 8:10:54 PM

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1405C12-001
Matrix: AQUEOUS
Client Sample ID: GW-WQ1-C-R36
Collection Date: 5/28/2014 9:16:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	37200	500	1000		mg/L	2000	5/29/2014 4:24:51 PM	R18947
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	5/29/2014 3:35:12 PM	R18947
Sulfate	4710	13.7	100		mg/L	200	5/29/2014 4:12:26 PM	R18947
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1790	0.773	20.0		mg/L	20	5/31/2014 2:31:10 PM	R18989
Magnesium	1140	0.377	20.0		mg/L	20	5/31/2014 2:31:10 PM	R18989
Potassium	508	4.05	20.0		mg/L	20	5/31/2014 2:31:10 PM	R18989
Sodium	20500	60.7	500		mg/L	500	5/31/2014 2:41:10 PM	R18989
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0260	0.00312	0.100	J	mg/L	5	6/12/2014 1:22:14 PM	13516
Beryllium	ND	0.00176	0.0150		mg/L	5	6/12/2014 1:22:14 PM	13516
Cadmium	ND	0.00314	0.0100		mg/L	5	6/12/2014 1:22:14 PM	13516
Calcium	1700	3.27	20.0		mg/L	20	6/11/2014 2:08:08 PM	13516
Chromium	ND	0.00841	0.0300		mg/L	5	6/12/2014 1:22:14 PM	13516
Iron	0.212	0.0507	0.250	J	mg/L	5	6/11/2014 1:53:43 PM	13516
Lead	ND	0.0239	0.0250		mg/L	5	6/12/2014 1:22:14 PM	13516
Magnesium	1120	0.340	20.0		mg/L	20	6/11/2014 2:08:08 PM	13516
Nickel	ND	0.00952	0.0500		mg/L	5	6/12/2014 1:22:14 PM	13516
Potassium	505	10.1	20.0		mg/L	20	6/11/2014 2:08:08 PM	13516
Silver	ND	0.00261	0.0250		mg/L	5	6/12/2014 1:22:14 PM	13516
Sodium	20800	208	500		mg/L	500	6/11/2014 1:33:47 PM	13516
Vanadium	ND	0.0274	0.250		mg/L	5	6/12/2014 1:22:14 PM	13516
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
Hexachloroethane	ND	1.89	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
2-Methylphenol	ND	2.75	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
Nitrobenzene	ND	2.58	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
Pentachlorophenol	ND	2.48	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
Pyridine	ND	1.57	5.00		µg/L	1	5/31/2014 4:06:44 PM	13445
Surr: 2,4,6-Tribromophenol	36.6	0	26-138		%REC	1	5/31/2014 4:06:44 PM	13445
Surr: 2-Fluorobiphenyl	75.1	0	48.1-106		%REC	1	5/31/2014 4:06:44 PM	13445
Surr: 2-Fluorophenol	41.8	0	12.1-85.8		%REC	1	5/31/2014 4:06:44 PM	13445
Surr: 4-Terphenyl-d14	83.9	0	44-113		%REC	1	5/31/2014 4:06:44 PM	13445

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.
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: 1405C12-001
Matrix: AQUEOUS
Client Sample ID: GW-WQ1-C-R36
Collection Date: 5/28/2014 9:16:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: Nitrobenzene-d5	77.7	0	47.5-119		%REC	1	5/31/2014 4:06:44 PM	13445
Surr: Phenol-d5	33.9	0	17.7-65.8		%REC	1	5/31/2014 4:06:44 PM	13445
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Benzene	ND	0.154	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Toluene	ND	0.170	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
2-Butanone	ND	1.42	5.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Chloroform	ND	0.315	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/4/2014 6:46:15 PM	R19052
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/4/2014 6:46:15 PM	R19052
Surr: 1,2-Dichloroethane-d4	97.2	0	70-130		%REC	1	6/4/2014 6:46:15 PM	R19052
Surr: 4-Bromofluorobenzene	98.0	0	70-130		%REC	1	6/4/2014 6:46:15 PM	R19052
Surr: Dibromofluoromethane	97.9	0	70-130		%REC	1	6/4/2014 6:46:15 PM	R19052
Surr: Toluene-d8	94.4	0	70-130		%REC	1	6/4/2014 6:46:15 PM	R19052
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.718	0.120	1.00	J	mg/L	1	6/2/2014 10:38:31 AM	R18990
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	61000	492	1000	*	mg/L	1	6/3/2014 3:33:00 PM	13479
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	91100	0.100	0.100		µmhos/c	10	5/30/2014 2:27:46 PM	R18961
SM4500-H+B: PH							Analyst: **JML**	
pH	7.19	0.100	1.68	H	pH units	1	5/30/2014 1:39:10 PM	R18961

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.
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: 1405C12-001

Client Sample ID: GW-WQ1-C-R36
Collection Date: 5/28/2014 9:16:00 AM
Matrix: AQUEOUS **Received Date:** 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	50.6	4.00	20.0		mg/L CaC	1	5/30/2014 1:39:10 PM	R18961
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/30/2014 1:39:10 PM	R18961
Total Alkalinity (as CaCO3)	50.6	4.00	20.0		mg/L CaC	1	5/30/2014 1:39:10 PM	R18961
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.041	0	0			1	6/11/2014 3:06:00 PM	R19194
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	61.0	3.07	4.00		mg/L	1	6/3/2014 2:01:00 PM	13480

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.
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: GW-WQ1-C-R36
Project: WIPP DMP
Collection Date: 5/28/2014 9:16:00 AM
Lab ID: 1405C12-001
Matrix: AQUEOUS
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.00044	0.0010	H	mg/L	5	7/17/2014 2:43:13 PM	14268

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.
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: 1405C12-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ1-C-R36 DUPLICATE
Collection Date: 5/28/2014 9:32:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	38600	500	1000		mg/L	2000	5/29/2014 5:02:05 PM	R18947
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	5/29/2014 4:37:16 PM	R18947
Sulfate	4810	13.7	100		mg/L	200	5/29/2014 4:49:41 PM	R18947
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1790	0.773	20.0		mg/L	20	5/31/2014 2:34:33 PM	R18989
Magnesium	1140	0.377	20.0		mg/L	20	5/31/2014 2:34:33 PM	R18989
Potassium	509	4.05	20.0		mg/L	20	5/31/2014 2:34:33 PM	R18989
Sodium	21100	60.7	500		mg/L	500	5/31/2014 2:42:47 PM	R18989
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0286	0.00312	0.100	J	mg/L	5	6/11/2014 2:10:01 PM	13516
Beryllium	0.00320	0.00176	0.0150	J	mg/L	5	6/11/2014 2:10:01 PM	13516
Cadmium	ND	0.00314	0.0100		mg/L	5	6/11/2014 2:10:01 PM	13516
Calcium	1690	3.27	20.0		mg/L	20	6/11/2014 2:11:55 PM	13516
Chromium	ND	0.00841	0.0300		mg/L	5	6/11/2014 2:10:01 PM	13516
Iron	0.213	0.0507	0.250	J	mg/L	5	6/11/2014 2:10:01 PM	13516
Lead	ND	0.0239	0.0250		mg/L	5	6/11/2014 2:10:01 PM	13516
Magnesium	1110	0.340	20.0		mg/L	20	6/11/2014 2:11:55 PM	13516
Nickel	ND	0.00952	0.0500		mg/L	5	6/11/2014 2:10:01 PM	13516
Potassium	515	10.1	20.0		mg/L	20	6/11/2014 2:11:55 PM	13516
Silver	ND	0.00261	0.0250		mg/L	5	6/11/2014 2:10:01 PM	13516
Sodium	21100	208	500		mg/L	500	6/11/2014 1:35:33 PM	13516
Vanadium	0.0296	0.0274	0.250	J	mg/L	5	6/11/2014 2:10:01 PM	13516
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
Hexachloroethane	ND	1.89	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
2-Methylphenol	ND	2.75	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
Nitrobenzene	ND	2.58	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
Pentachlorophenol	ND	2.48	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
Pyridine	ND	1.57	5.00		µg/L	1	5/31/2014 5:34:46 PM	13445
Surr: 2,4,6-Tribromophenol	40.2	0	26-138		%REC	1	5/31/2014 5:34:46 PM	13445
Surr: 2-Fluorobiphenyl	86.2	0	48.1-106		%REC	1	5/31/2014 5:34:46 PM	13445
Surr: 2-Fluorophenol	51.0	0	12.1-85.8		%REC	1	5/31/2014 5:34:46 PM	13445
Surr: 4-Terphenyl-d14	89.2	0	44-113		%REC	1	5/31/2014 5:34:46 PM	13445

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1405C12-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ1-C-R36 DUPLICATE
Collection Date: 5/28/2014 9:32:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: Nitrobenzene-d5	91.0	0	47.5-119		%REC	1	5/31/2014 5:34:46 PM	13445
Surr: Phenol-d5	43.0	0	17.7-65.8		%REC	1	5/31/2014 5:34:46 PM	13445
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Benzene	ND	0.154	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Toluene	ND	0.170	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
2-Butanone	ND	1.42	5.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Chloroform	ND	0.315	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/4/2014 7:14:31 PM	R19052
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/4/2014 7:14:31 PM	R19052
Surr: 1,2-Dichloroethane-d4	95.3	0	70-130		%REC	1	6/4/2014 7:14:31 PM	R19052
Surr: 4-Bromofluorobenzene	97.5	0	70-130		%REC	1	6/4/2014 7:14:31 PM	R19052
Surr: Dibromofluoromethane	101	0	70-130		%REC	1	6/4/2014 7:14:31 PM	R19052
Surr: Toluene-d8	91.1	0	70-130		%REC	1	6/4/2014 7:14:31 PM	R19052
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.664	0.120	1.00	J	mg/L	1	6/2/2014 11:28:01 AM	R18990
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	60200	492	1000	*	mg/L	1	6/3/2014 3:33:00 PM	13479
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	92900	0.100	0.100		µmhos/c	10	5/30/2014 2:33:25 PM	R18961
SM4500-H+B: PH							Analyst: **JML**	
pH	7.21	0.100	1.68	H	pH units	1	5/30/2014 2:06:12 PM	R18961

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.
- 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: 1405C12-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ1-C-R36 DUPLICATE
Collection Date: 5/28/2014 9:32:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	50.8	4.00	20.0		mg/L CaC	1	5/30/2014 2:06:12 PM	R18961
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/30/2014 2:06:12 PM	R18961
Total Alkalinity (as CaCO3)	50.8	4.00	20.0		mg/L CaC	1	5/30/2014 2:06:12 PM	R18961
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.044	0	0			1	6/11/2014 3:06:00 PM	R19194
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	40.0	3.07	4.00		mg/L	1	6/3/2014 2:01:00 PM	13480

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
S	Spike Recovery 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.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1405C12-002
Matrix: AQUEOUS
Client Sample ID: GW-WQ1-C-R36 DUPLICATE
Collection Date: 5/28/2014 9:32:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.000087	0.00020	H	mg/L	1	7/17/2014 2:01:27 PM	14268

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.
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: 1405C12-003
Matrix: AQUEOUS
Client Sample ID: GW-WQ1-C-R36 FIELD BLAN
Collection Date: 5/28/2014 9:56:00 AM
Received Date: 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Benzene	ND	0.154	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Toluene	ND	0.170	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
2-Butanone	7.43	1.42	5.00		µg/L	1	6/6/2014 11:52:37 AM	R19118
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Chloroform	ND	0.315	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Methylene Chloride	0.287	0.266	3.00	J	µg/L	1	6/4/2014 7:42:45 PM	R19052
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/4/2014 7:42:45 PM	R19052
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/4/2014 7:42:45 PM	R19052
Surr: 1,2-Dichloroethane-d4	96.8	0	70-130		%REC	1	6/4/2014 7:42:45 PM	R19052
Surr: 4-Bromofluorobenzene	94.6	0	70-130		%REC	1	6/4/2014 7:42:45 PM	R19052
Surr: Dibromofluoromethane	96.8	0	70-130		%REC	1	6/4/2014 7:42:45 PM	R19052
Surr: Toluene-d8	91.4	0	70-130		%REC	1	6/4/2014 7:42:45 PM	R19052

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.
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: 1405C12-004

Client Sample ID: GW-WQ1-C-R36 TRIP BLANK
Collection Date:
Matrix: AQUEOUS **Received Date:** 5/29/2014 9:50:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Benzene	ND	0.154	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Toluene	ND	0.170	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
2-Butanone	ND	1.42	5.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Chloroform	ND	0.315	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Methylene Chloride	0.286	0.266	3.00	J	µg/L	1	6/4/2014 8:10:54 PM	R19052
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/4/2014 8:10:54 PM	R19052
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/4/2014 8:10:54 PM	R19052
Surr: 1,2-Dichloroethane-d4	93.6	0	70-130		%REC	1	6/4/2014 8:10:54 PM	R19052
Surr: 4-Bromofluorobenzene	95.2	0	70-130		%REC	1	6/4/2014 8:10:54 PM	R19052
Surr: Dibromofluoromethane	96.7	0	70-130		%REC	1	6/4/2014 8:10:54 PM	R19052
Surr: Toluene-d8	89.5	0	70-130		%REC	1	6/4/2014 8:10:54 PM	R19052

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.
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	GW-WQ1-C-R36 1405C12-01		GW-WQ1-C-R36 Dup 1405C12-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	20500	891.69	21100	917.79							
Potassium	508	12.99	509.0	13.02							
Calcium	1790	89.32	1790	89.32							
Magnesium	1140	93.83	1140	93.83							
Total Cations		1087.83		1113.96							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	4710	98.06	4810	100.15							
Chloride	37200	1049.37	38600	1088.86							
Bicarbonate (CaCO3)	50.6	1.01	50.8	1.02							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		1148.44		1190.02							
Elect. Cond. (µMhos/cm)	91100		92900								
CATION/ANION RATIO		0.95		0.94							
% Difference		3		3							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	61000		60200								
TDS (calculated)	65878		67979								
Ratio meas TDS:calc TDS		0.9		0.9							
Ratio Meas. TDS:EC		0.67		0.65							
Ratio Calc. TDS:EC		0.72		0.73							
Ratio of anion sum:EC		1.3		1.3							
Ratio of cation sum:EC		1.2		1.2							

* 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 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 June 24, 2014

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.: 1405C12
Anatek Batch: 140530033

Project Summary: Two (2) water samples were received on 5/30/2014 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
1405C12-001F / GW-WQ1-C-R36	140530033-001	EPA 6020A
1405C12-002F / GW-WQ1-C-R36 Duplicate	140530033-002	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. Selenium was analyzed 6/16

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.

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 #: 140530033
Project Name: 1405C12

Analytical Results Report

Sample Number 140530033-001 **Sampling Date** 5/28/2014 **Date/Time Received** 5/30/2014 12:35 PM
Client Sample ID 1405C12-001F / GW-WQ1-C-R36 **Sampling Time** 9:16 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.025	6/13/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.025	6/13/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.025	6/16/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.025	6/13/2014	ETL	EPA 6020A	

Sample Number 140530033-002 **Sampling Date** 5/28/2014 **Date/Time Received** 5/30/2014 12:35 PM
Client Sample ID 1405C12-002F / GW-WQ1-C-R36 DUPLICATE **Sampling Time** 9:32 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.025	6/13/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.025	6/13/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.025	6/16/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.025	6/13/2014	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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C985
Certifications held by Anatek Labs WA: EPA:WA00166; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Tuesday, June 24, 2014

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 #: 140530033
Project Name: 1405C12

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0533	mg/L	0.05	106.6	80-120	6/3/2014	6/13/2014
Selenium	0.0492	mg/L	0.05	98.4	80-120	6/3/2014	6/16/2014
Arsenic	0.0503	mg/L	0.05	100.6	80-120	6/3/2014	6/13/2014
Antimony	0.0495	mg/L	0.05	99.0	80-120	6/3/2014	6/13/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Selenium	0.0508	mg/L	0.05	101.6	3.2	0-20	6/3/2014	6/16/2014
Thallium	0.0539	mg/L	0.05	107.8	1.1	0-20	6/3/2014	6/13/2014
Arsenic	0.0521	mg/L	0.05	104.2	3.5	0-20	6/3/2014	6/13/2014
Antimony	0.0497	mg/L	0.05	99.4	0.4	0-20	6/3/2014	6/13/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140530033-001	Thallium	ND	0.0511	mg/L	0.05	102.2	75-125	6/3/2014	6/13/2014
140530033-001	Selenium	ND	0.0584	mg/L	0.05	116.8	75-125	6/3/2014	6/16/2014
140530033-001	Arsenic	ND	0.0579	mg/L	0.05	115.8	75-125	6/3/2014	6/13/2014
140530033-001	Antimony	ND	0.0604	mg/L	0.05	120.8	75-125	6/3/2014	6/13/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0514	mg/L	0.05	102.8	0.6	0-20	6/3/2014	6/13/2014
Selenium	0.0574	mg/L	0.05	114.8	1.7	0-20	6/3/2014	6/16/2014
Arsenic	0.0574	mg/L	0.05	114.8	0.9	0-20	6/3/2014	6/13/2014
Antimony	0.0617	mg/L	0.05	123.4	2.1	0-20	6/3/2014	6/13/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	6/3/2014	6/13/2014
Arsenic	ND	mg/L	0.001	6/3/2014	6/13/2014

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Tuesday, June 24, 2014

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 #:**	140530033
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1405C12
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	6/3/2014	6/16/2014
Thallium	ND	mg/L	0.001	6/3/2014	6/13/2014

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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-13479	SampType:	MBLK		TestCode:	SM 2540 C: Total Dissolved Solids				
Client ID:	PBW	Batch ID:	13479		RunNo:	19038				
Prep Date:	6/2/2014	Analysis Date:	6/3/2014		SeqNo:	550082	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-13479	SampType:	LCS		TestCode:	SM 2540 C: Total Dissolved Solids				
Client ID:	LCSW	Batch ID:	13479		RunNo:	19038				
Prep Date:	6/2/2014	Analysis Date:	6/3/2014		SeqNo:	550083	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	LCSR-13479	SampType:	LCSR		TestCode:	SM 2540 C: Total Dissolved Solids				
Client ID:	BatchQC	Batch ID:	13479		RunNo:	19038				
Prep Date:	6/2/2014	Analysis Date:	6/3/2014		SeqNo:	550084	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Sample ID	1405C12-001DMS	SampType:	MS		TestCode:	SM 2540 C: Total Dissolved Solids				
Client ID:	GW-WQ1-C-R36	Batch ID:	13479		RunNo:	19038				
Prep Date:	6/2/2014	Analysis Date:	6/3/2014		SeqNo:	550086	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	114000	1000	50000	61050	106	80	120			

Sample ID	1405C12-001DMSD	SampType:	MSD		TestCode:	SM 2540 C: Total Dissolved Solids				
Client ID:	GW-WQ1-C-R36	Batch ID:	13479		RunNo:	19038				
Prep Date:	6/2/2014	Analysis Date:	6/3/2014		SeqNo:	550087	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	115000	1000	50000	61050	107	80	120	0.568	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
O	RSD is greater than RSDlimit	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#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13479**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **13479**	RunNo: **19038**
Prep Date: **6/2/2014**	Analysis Date: **6/3/2014**	SeqNo: **550083** 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: **LCSR-13479**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **13479**	RunNo: **19038**
Prep Date: **6/2/2014**	Analysis Date: **6/3/2014**	SeqNo: **550084** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120	0.295	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547374** 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: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547375** 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: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547376** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.61	0.500	5.000	0	92.1	90	110			
Nitrogen, Nitrate (As N)	2.42	0.100	2.500	0	96.9	90	110			
Sulfate	9.42	0.500	10.00	0	94.2	90	110			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547377** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.66	0.500	5.000	0	93.2	90	110			
Nitrogen, Nitrate (As N)	2.44	0.100	2.500	0	97.4	90	110			
Sulfate	9.54	0.500	10.00	0	95.4	90	110			

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547386** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	1405C12-001DMS	SampType:	MS		TestCode:	EPA Method 300.0: Anions				
Client ID:	GW-WQ1-C-R36	Batch ID:	R18947		RunNo:	18947				
Prep Date:		Analysis Date:	5/29/2014		SeqNo:	547388	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	118	5.00	125.0	0	94.7	87.8	111			

Sample ID	1405C12-001DMSD	SampType:	MSD		TestCode:	EPA Method 300.0: Anions				
Client ID:	GW-WQ1-C-R36	Batch ID:	R18947		RunNo:	18947				
Prep Date:		Analysis Date:	5/29/2014		SeqNo:	547389	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	95.3	87.8	111	0.682	20	

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R18947		RunNo:	18947				
Prep Date:		Analysis Date:	5/29/2014		SeqNo:	547398	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:	R18947		RunNo:	18947				
Prep Date:		Analysis Date:	5/29/2014		SeqNo:	547410	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:	R18947		RunNo:	18947				
Prep Date:		Analysis Date:	5/29/2014		SeqNo:	547422	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **CCB**	Batch ID: **R18947**	RunNo: **18947**							
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547434**	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	2.1	0.50								

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **CCB**	Batch ID: **R18947**	RunNo: **18947**							
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547442**	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547376** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.61	0.500	5.000	0	92.1	90	110			
Nitrogen, Nitrate (As N)	2.42	0.100	2.500	0	96.9	90	110			
Sulfate	9.42	0.500	10.00	0	94.2	90	110			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R18947**	RunNo: **18947**
Prep Date:	Analysis Date: **5/29/2014**	SeqNo: **547377** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.66	0.500	5.000	0	93.2	90	110	1.18	0	
Nitrogen, Nitrate (As N)	2.44	0.100	2.500	0	97.4	90	110	0.556	0	
Sulfate	9.54	0.500	10.00	0	95.4	90	110	1.21	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **5mL-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550556** 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	1.50								
Surr: 1,2-Dichloroethane-d4	9.63		10.00		96.3	70	130			
Surr: 4-Bromofluorobenzene	10.2		10.00		102	70	130			
Surr: Dibromofluoromethane	9.36		10.00		93.6	70	130			
Surr: Toluene-d8	9.58		10.00		95.8	70	130			

Sample ID **50ng ccv**	SampType: **CCV_LOW**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550557** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	45.4	5.00	40.00	0	114	60	140			
Benzene	10.7	1.00	10.00	0	107	70	130			
Toluene	10.2	1.00	10.00	0	102	80	120			
1,2-Dichloroethane (EDC)	11.1	1.00	10.00	0	111	70	130			
2-Butanone	20.9	5.00	20.00	0	104	60	140			
Carbon Tetrachloride	9.75	1.00	10.00	0	97.5	70	130			
Chlorobenzene	10.1	1.00	10.00	0	101	70	130			
Chloroform	10.1	1.00	10.00	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **50ng ccv**	SampType: **CCV_LOW**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**							
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550557**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	10.6	1.00	10.00	0	106	70	130			
1,1-Dichloroethane	10.9	1.00	10.00	0	109	70	130			
1,1-Dichloroethene	10.5	1.00	10.00	0	105	80	120			
Methylene Chloride	9.59	3.00	10.00	0	95.9	70	130			
1,1,2,2-Tetrachloroethane	11.0	1.00	10.00	0	110	70	130			
Tetrachloroethene (PCE)	10.9	1.00	10.00	0	109	70	130			
trans-1,2-DCE	10.2	1.00	10.00	0	102	70	130			
1,1,1-Trichloroethane	10.8	1.00	10.00	0	108	70	130			
1,1,2-Trichloroethane	10.8	1.00	10.00	0	108	70	130			
Trichloroethene (TCE)	9.82	1.00	10.00	0	98.2	70	130			
Trichlorofluoromethane	10.8	1.00	10.00	0	108	70	130			
Vinyl chloride	10.3	1.00	10.00	0	103	80	120			
Xylenes, Total	30.3	1.50	30.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	10.0		10.00		100	70	130			
Surr: 4-Bromofluorobenzene	9.40		10.00		94.0	70	130			
Surr: Dibromofluoromethane	9.60		10.00		96.0	70	130			
Surr: Toluene-d8	8.83		10.00		88.3	70	130			

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**							
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550558**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	47.3	5.00	40.00	0	118	59.8	152			
Benzene	21.1	1.00	20.00	0	106	70	130			
Toluene	20.3	1.00	20.00	0	102	80	120			
1,2-Dichloroethane (EDC)	21.7	1.00	20.00	0	108	70	130			
2-Butanone	65.3	5.00	40.00	0	163	60	140			S
Carbon Tetrachloride	19.0	1.00	20.00	0	95.2	70	130			
Chlorobenzene	20.9	1.00	20.00	0	105	70	130			
Chloroform	19.8	1.00	20.00	0	99.2	75.6	123			
cis-1,2-DCE	21.2	1.00	20.00	0	106	70	130			
1,1-Dichloroethane	21.5	1.00	20.00	0	108	70	130			
1,1-Dichloroethene	20.3	1.00	20.00	0	102	78.1	129			
Methylene Chloride	17.9	3.00	20.00	0	89.7	70	130			
1,1,2,2-Tetrachloroethane	20.6	1.00	20.00	0	103	67.3	134			
Tetrachloroethene (PCE)	22.4	1.00	20.00	0	112	70	130			
trans-1,2-DCE	19.4	1.00	20.00	0	96.8	70	130			
1,1,1-Trichloroethane	21.0	1.00	20.00	0	105	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.
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#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550558** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	20.8	1.00	20.00	0	104	70	130			
Trichloroethene (TCE)	18.9	1.00	20.00	0	94.6	70	130			
Trichlorofluoromethane	21.6	1.00	20.00	0	108	70	130			
Vinyl chloride	21.3	1.00	20.00	0	107	76.5	131			
Xylenes, Total	60.3	1.50	60.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	9.77		10.00		97.7	70	130			
Surr: 4-Bromofluorobenzene	8.63		10.00		86.3	70	130			
Surr: Dibromofluoromethane	9.43		10.00		94.3	70	130			
Surr: Toluene-d8	9.19		10.00		91.9	70	130			

Sample ID **100ng lcsr4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550570** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	42.8	5.00	40.00	0	107	59.8	152			
Benzene	19.8	1.00	20.00	0	99.0	70	130			
Toluene	19.8	1.00	20.00	0	99.2	80	120			
1,2-Dichloroethane (EDC)	20.7	1.00	20.00	0	103	70	130			
2-Butanone	65.0	5.00	40.00	0	163	60	140			S
Carbon Tetrachloride	17.3	1.00	20.00	0	86.4	70	130			
Chlorobenzene	20.6	1.00	20.00	0	103	70	130			
Chloroform	18.7	1.00	20.00	0	93.4	75.6	123			
cis-1,2-DCE	19.8	1.00	20.00	0	99.0	70	130			
1,1-Dichloroethane	20.0	1.00	20.00	0	100	70	130			
1,1-Dichloroethene	17.8	1.00	20.00	0	89.1	78.1	129			
Methylene Chloride	17.9	3.00	20.00	0	89.5	70	130			
1,1,2,2-Tetrachloroethane	19.8	1.00	20.00	0	99.1	67.3	134			
Tetrachloroethene (PCE)	21.8	1.00	20.00	0	109	70	130			
trans-1,2-DCE	18.3	1.00	20.00	0	91.6	70	130			
1,1,1-Trichloroethane	19.3	1.00	20.00	0	96.5	70	130			
1,1,2-Trichloroethane	20.7	1.00	20.00	0	104	70	130			
Trichloroethene (TCE)	18.3	1.00	20.00	0	91.3	70	130			
Trichlorofluoromethane	19.2	1.00	20.00	0	95.8	70	130			
Vinyl chloride	20.6	1.00	20.00	0	103	76.5	131			
Xylenes, Total	59.1	1.50	60.00	0	98.6	70	130			
Surr: 1,2-Dichloroethane-d4	9.63		10.00		96.3	70	130			
Surr: 4-Bromofluorobenzene	8.72		10.00		87.2	70	130			
Surr: Dibromofluoromethane	9.46		10.00		94.6	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcsr4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550570** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Toluene-d8	9.22		10.00		92.2	70	130			

Sample ID **1405C12-001a ms4**	SampType: **MS4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ1-C-R36**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550572** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	60.1	5.00	40.00	0	150	31.1	273			
Benzene	21.3	1.00	20.00	0	106	70	130			
Toluene	20.5	1.00	20.00	0	103	70	130			
1,2-Dichloroethane (EDC)	21.8	1.00	20.00	0	109	70	130			
2-Butanone	62.9	5.00	40.00	0	157	21.9	285			
Carbon Tetrachloride	19.4	1.00	20.00	0	97.0	70	130			
Chlorobenzene	21.0	1.00	20.00	0	105	70	130			
Chloroform	20.3	1.00	20.00	0	101	70	130			
cis-1,2-DCE	21.2	1.00	20.00	0	106	70	130			
1,1-Dichloroethane	21.7	1.00	20.00	0	109	70	130			
1,1-Dichloroethene	19.6	1.00	20.00	0	98.2	70	130			
Methylene Chloride	19.0	3.00	20.00	0	94.9	70	130			
1,1,2,2-Tetrachloroethane	23.8	1.00	20.00	0	119	72.8	164			
Tetrachloroethene (PCE)	20.9	1.00	20.00	0	104	70	130			
trans-1,2-DCE	19.2	1.00	20.00	0	95.8	70	130			
1,1,1-Trichloroethane	20.6	1.00	20.00	0	103	70	130			
1,1,2-Trichloroethane	22.2	1.00	20.00	0	111	70	130			
Trichloroethene (TCE)	19.7	1.00	20.00	0	98.4	70	130			
Trichlorofluoromethane	21.1	1.00	20.00	0	106	70	130			
Vinyl chloride	24.4	1.00	20.00	0	122	70	130			
Xylenes, Total	61.5	1.50	60.00	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	10.2		10.00		102	70	130			
Surr: 4-Bromofluorobenzene	8.87		10.00		88.7	70	130			
Surr: Dibromofluoromethane	9.94		10.00		99.4	70	130			
Surr: Toluene-d8	9.08		10.00		90.8	70	130			

Sample ID **1405C12-001a msd4**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ1-C-R36**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550573** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	56.0	5.00	40.00	0	140	31.1	273	6.95	20	
Benzene	20.4	1.00	20.00	0	102	70	130	4.26	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **1405C12-001a msd4**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ1-C-R36**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550573** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	18.8	1.00	20.00	0	94.0	70	130	8.81	20	
1,2-Dichloroethane (EDC)	22.4	1.00	20.00	0	112	70	130	2.32	20	
2-Butanone	64.5	5.00	40.00	0	161	21.9	285	2.60	20	
Carbon Tetrachloride	17.8	1.00	20.00	0	89.1	70	130	8.45	20	
Chlorobenzene	19.5	1.00	20.00	0	97.3	70	130	7.57	20	
Chloroform	19.7	1.00	20.00	0	98.5	70	130	3.00	20	
cis-1,2-DCE	20.3	1.00	20.00	0	102	70	130	4.05	20	
1,1-Dichloroethane	21.1	1.00	20.00	0	105	70	130	3.01	20	
1,1-Dichloroethene	18.4	1.00	20.00	0	92.2	70	130	6.32	20	
Methylene Chloride	18.9	3.00	20.00	0	94.4	70	130	0.537	20	
1,1,2,2-Tetrachloroethane	22.8	1.00	20.00	0	114	72.8	164	4.40	20	
Tetrachloroethene (PCE)	19.3	1.00	20.00	0	96.7	70	130	7.52	20	
trans-1,2-DCE	18.6	1.00	20.00	0	92.9	70	130	3.12	20	
1,1,1-Trichloroethane	19.8	1.00	20.00	0	98.9	70	130	3.98	20	
1,1,2-Trichloroethane	21.4	1.00	20.00	0	107	70	130	3.47	20	
Trichloroethene (TCE)	19.1	1.00	20.00	0	95.4	70	130	3.10	20	
Trichlorofluoromethane	19.0	1.00	20.00	0	95.0	70	130	10.5	20	
Vinyl chloride	23.6	1.00	20.00	0	118	70	130	3.29	20	
Xylenes, Total	55.8	1.50	60.00	0	93.0	70	130	9.77	20	
Surr: 1,2-Dichloroethane-d4	10.1		10.00		101	70	130	0		
Surr: 4-Bromofluorobenzene	8.68		10.00		86.8	70	130	0		
Surr: Dibromofluoromethane	10.2		10.00		102	70	130	0		
Surr: Toluene-d8	8.76		10.00		87.6	70	130	0		

Sample ID **5ml rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R19118**	RunNo: **19118**
Prep Date:	Analysis Date: **6/6/2014**	SeqNo: **552739** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Butanone	ND	5.0								
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.7	70	130			
Surr: 4-Bromofluorobenzene	8.6		10.00		85.9	70	130			
Surr: Dibromofluoromethane	8.9		10.00		89.3	70	130			
Surr: Toluene-d8	11		10.00		105	70	130			

Sample ID **100ng icv**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19118**	RunNo: **19118**
Prep Date:	Analysis Date: **6/6/2014**	SeqNo: **552740** Units: **µg/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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng icv**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19118**	RunNo: **19118**							
Prep Date:	Analysis Date: **6/6/2014**	SeqNo: **552740**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Butanone	31	5.0	40.00	0	78.4	60	140			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		90.6	70	130			
Surr: 4-Bromofluorobenzene	8.7		10.00		87.0	70	130			
Surr: Dibromofluoromethane	8.8		10.00		88.0	70	130			
Surr: Toluene-d8	9.7		10.00		97.1	70	130			

Sample ID **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19118**	RunNo: **19118**							
Prep Date:	Analysis Date: **6/6/2014**	SeqNo: **552741**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Butanone	33	5.0	40.00	0	82.3	60	140			
Surr: 1,2-Dichloroethane-d4	9.4		10.00		94.4	70	130			
Surr: 4-Bromofluorobenzene	9.0		10.00		89.9	70	130			
Surr: Dibromofluoromethane	8.9		10.00		89.3	70	130			
Surr: Toluene-d8	10		10.00		102	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**						
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**						
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550558**	Units: **µg/L**					

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	47.3	5.00	40.00	0	118	59.8	152			
Benzene	21.1	1.00	20.00	0	106	70	130			
Toluene	20.3	1.00	20.00	0	102	80	120			
1,2-Dichloroethane (EDC)	21.7	1.00	20.00	0	108	70	130			
2-Butanone	65.3	5.00	40.00	0	163	60	140			S
Carbon Tetrachloride	19.0	1.00	20.00	0	95.2	70	130			
Chlorobenzene	20.9	1.00	20.00	0	105	70	130			
Chloroform	19.8	1.00	20.00	0	99.2	75.6	123			
cis-1,2-DCE	21.2	1.00	20.00	0	106	70	130			
1,1-Dichloroethane	21.5	1.00	20.00	0	108	70	130			
1,1-Dichloroethene	20.3	1.00	20.00	0	102	78.1	129			
Methylene Chloride	17.9	3.00	20.00	0	89.7	70	130			
1,1,2,2-Tetrachloroethane	20.6	1.00	20.00	0	103	67.3	134			
Tetrachloroethene (PCE)	22.4	1.00	20.00	0	112	70	130			
trans-1,2-DCE	19.4	1.00	20.00	0	96.8	70	130			
1,1,1-Trichloroethane	21.0	1.00	20.00	0	105	70	130			
1,1,2-Trichloroethane	20.8	1.00	20.00	0	104	70	130			
Trichloroethene (TCE)	18.9	1.00	20.00	0	94.6	70	130			
Trichlorofluoromethane	21.6	1.00	20.00	0	108	70	130			
Vinyl chloride	21.3	1.00	20.00	0	107	76.5	131			
Xylenes, Total	60.3	1.50	60.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	9.77		10.00		97.7	70	130			
Surr: 4-Bromofluorobenzene	8.63		10.00		86.3	70	130			
Surr: Dibromofluoromethane	9.43		10.00		94.3	70	130			
Surr: Toluene-d8	9.19		10.00		91.9	70	130			

Sample ID: **100ng lcsr4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**						
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**						
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550570**	Units: **µg/L**					

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	42.8	5.00	40.00	0	107	59.8	152	10.0	0	
Benzene	19.8	1.00	20.00	0	99.0	70	130	6.43	0	
Toluene	19.8	1.00	20.00	0	99.2	80	120	2.43	0	
1,2-Dichloroethane (EDC)	20.7	1.00	20.00	0	103	70	130	4.72	0	
2-Butanone	65.0	5.00	40.00	0	163	60	140	0.425	0	S
Carbon Tetrachloride	17.3	1.00	20.00	0	86.4	70	130	9.64	0	
Chlorobenzene	20.6	1.00	20.00	0	103	70	130	1.38	0	
Chloroform	18.7	1.00	20.00	0	93.4	75.6	123	6.05	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.
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#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcsr4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19052**	RunNo: **19052**
Prep Date:	Analysis Date: **6/4/2014**	SeqNo: **550570** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	19.8	1.00	20.00	0	99.0	70	130	6.92	0	
1,1-Dichloroethane	20.0	1.00	20.00	0	100	70	130	7.34	0	
1,1-Dichloroethene	17.8	1.00	20.00	0	89.1	78.1	129	13.1	0	
Methylene Chloride	17.9	3.00	20.00	0	89.5	70	130	0.183	0	
1,1,2,2-Tetrachloroethane	19.8	1.00	20.00	0	99.1	67.3	134	3.74	0	
Tetrachloroethene (PCE)	21.8	1.00	20.00	0	109	70	130	2.62	0	
trans-1,2-DCE	18.3	1.00	20.00	0	91.6	70	130	5.58	0	
1,1,1-Trichloroethane	19.3	1.00	20.00	0	96.5	70	130	8.63	0	
1,1,2-Trichloroethane	20.7	1.00	20.00	0	104	70	130	0.368	0	
Trichloroethene (TCE)	18.3	1.00	20.00	0	91.3	70	130	3.56	0	
Trichlorofluoromethane	19.2	1.00	20.00	0	95.8	70	130	11.7	0	
Vinyl chloride	20.6	1.00	20.00	0	103	76.5	131	3.77	0	
Xylenes, Total	59.1	1.50	60.00	0	98.6	70	130	2.03	0	
Surr: 1,2-Dichloroethane-d4	9.63		10.00		96.3	70	130	0	0	
Surr: 4-Bromofluorobenzene	8.72		10.00		87.2	70	130	0	0	
Surr: Dibromofluoromethane	9.46		10.00		94.6	70	130	0	0	
Surr: Toluene-d8	9.22		10.00		92.2	70	130	0	0	

Sample ID: **100ng icv**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19118**	RunNo: **19118**
Prep Date:	Analysis Date: **6/6/2014**	SeqNo: **552740** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Butanone	31	5.0	40.00	0	78.4	60	140			
Surr: 1,2-Dichloroethane-d4	9.1		10.00		90.6	70	130			
Surr: 4-Bromofluorobenzene	8.7		10.00		87.0	70	130			
Surr: Dibromofluoromethane	8.8		10.00		88.0	70	130			
Surr: Toluene-d8	9.7		10.00		97.1	70	130			

Sample ID: **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19118**	RunNo: **19118**
Prep Date:	Analysis Date: **6/6/2014**	SeqNo: **552741** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2-Butanone	33	5.0	40.00	0	82.3	60	140	4.77	0	
Surr: 1,2-Dichloroethane-d4	9.4		10.00		94.4	70	130	0	0	
Surr: 4-Bromofluorobenzene	9.0		10.00		89.9	70	130	0	0	
Surr: Dibromofluoromethane	8.9		10.00		89.3	70	130	0	0	
Surr: Toluene-d8	10		10.00		102	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.
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#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **30ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R18967**	RunNo: **18967**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **547964** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	31.7		30.00		106	60	140			
Surr: Phenol-d5	31.5		30.00		105	60	140			
Surr: 2,4,6-Tribromophenol	30.7		30.00		102	60	140			
Surr: Nitrobenzene-d5	30.7		30.00		102	60	140			
Surr: 2-Fluorobiphenyl	31.0		30.00		103	60	140			
Surr: 4-Terphenyl-d14	30.0		30.00		100	60	140			

Sample ID **mb-13445**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547965** 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-Fluorophenol	148		200.0		74.2	12.1	85.8			
Surr: Phenol-d5	110		200.0		55.1	17.7	65.8			
Surr: 2,4,6-Tribromophenol	123		200.0		61.3	26	138			
Surr: Nitrobenzene-d5	99.3		100.0		99.3	47.5	119			
Surr: 2-Fluorobiphenyl	95.4		100.0		95.4	48.1	106			
Surr: 4-Terphenyl-d14	95.3		100.0		95.3	44	113			

Sample ID **lcs-13445**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547966** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	54.7	5.00	100.0	0	54.7	27.4	101			
1,4-Dichlorobenzene	52.7	5.00	100.0	0	52.7	32.6	91.5			
2,4-Dinitrophenol	27.6	5.00	100.0	0	27.6	23.1	118			
2,4-Dinitrotoluene	76.8	5.00	100.0	0	76.8	44.7	112			
Hexachlorobenzene	80.0	5.00	100.0	0	80.0	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-13445**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547966** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	49.1	5.00	100.0	0	49.1	23.2	97.8			
2-Methylphenol	73.9	5.00	100.0	0	73.9	36.1	105			
3+4-Methylphenol	62.3	5.00	100.0	0	62.3	35.7	92.5			
Nitrobenzene	76.2	5.00	100.0	0	76.2	30.9	125			
Pentachlorophenol	44.2	5.00	100.0	0	44.2	20.2	93			
Pyridine	47.7	5.00	100.0	0	47.7	5.14	87.1			
Surr: 2-Fluorophenol	51.1		100.0		51.1	12.1	85.8			
Surr: Phenol-d5	43.5		100.0		43.5	17.7	65.8			
Surr: 2,4,6-Tribromophenol	54.2		100.0		54.2	26	138			
Surr: Nitrobenzene-d5	78.4		100.0		78.4	47.5	119			
Surr: 2-Fluorobiphenyl	77.9		100.0		77.9	48.1	106			
Surr: 4-Terphenyl-d14	73.5		100.0		73.5	44	113			

Sample ID **lcs-13445**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547967** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	55.0	5.00	100.0	0	55.0	27.4	101			
1,4-Dichlorobenzene	52.7	5.00	100.0	0	52.7	32.6	91.5			
2,4-Dinitrophenol	30.4	5.00	100.0	0	30.4	23.1	118			
2,4-Dinitrotoluene	76.5	5.00	100.0	0	76.5	44.7	112			
Hexachlorobenzene	75.0	5.00	100.0	0	75.0	30	130			
Hexachloroethane	46.0	5.00	100.0	0	46.0	23.2	97.8			
2-Methylphenol	74.3	5.00	100.0	0	74.3	36.1	105			
3+4-Methylphenol	64.9	5.00	100.0	0	64.9	35.7	92.5			
Nitrobenzene	76.1	5.00	100.0	0	76.1	30.9	125			
Pentachlorophenol	43.4	5.00	100.0	0	43.4	20.2	93			
Pyridine	46.8	5.00	100.0	0	46.8	5.14	87.1			
Surr: 2-Fluorophenol	47.8		100.0		47.8	12.1	85.8			
Surr: Phenol-d5	43.3		100.0		43.3	17.7	65.8			
Surr: 2,4,6-Tribromophenol	58.1		100.0		58.1	26	138			
Surr: Nitrobenzene-d5	77.4		100.0		77.4	47.5	119			
Surr: 2-Fluorobiphenyl	79.0		100.0		79.0	48.1	106			
Surr: 4-Terphenyl-d14	76.9		100.0		76.9	44	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **1405C12-001Bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ1-C-R36**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547970** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	66.6	5.00	100.0	0	66.6	20.9	103			
1,4-Dichlorobenzene	64.4	5.00	100.0	0	64.4	32.6	91.5			
2,4-Dinitrophenol	31.5	5.00	100.0	0	31.5	11	112			
2,4-Dinitrotoluene	82.4	5.00	100.0	0	82.4	44.7	112			
Hexachlorobenzene	81.2	5.00	100.0	0	81.2	30.3	126			
Hexachloroethane	61.4	5.00	100.0	0	61.4	19.5	96.4			
2-Methylphenol	76.5	5.00	100.0	0	76.5	28.7	108			
3+4-Methylphenol	63.4	5.00	100.0	0	63.4	24.2	136			
Nitrobenzene	83.7	5.00	100.0	0	83.7	28.8	119			
Pentachlorophenol	30.4	5.00	100.0	0	30.4	20.2	93			
Pyridine	62.4	5.00	100.0	0	62.4	19.3	82.8			
Surr: 2-Fluorophenol	45.5		100.0		45.5	12.1	85.8			
Surr: Phenol-d5	38.3		100.0		38.3	17.7	65.8			
Surr: 2,4,6-Tribromophenol	58.7		100.0		58.7	26	138			
Surr: Nitrobenzene-d5	79.0		100.0		79.0	47.5	119			
Surr: 2-Fluorobiphenyl	83.7		100.0		83.7	48.1	106			
Surr: 4-Terphenyl-d14	79.9		100.0		79.9	44	113			

Sample ID **1405C12-001Bmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ1-C-R36**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547971** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	64.5	5.00	100.0	0	64.5	20.9	103	3.17	20	
1,4-Dichlorobenzene	63.2	5.00	100.0	0	63.2	32.6	91.5	1.85	20	
2,4-Dinitrophenol	40.0	5.00	100.0	0	40.0	11	112	23.7	20	R
2,4-Dinitrotoluene	95.9	5.00	100.0	0	95.9	44.7	112	15.2	20	
Hexachlorobenzene	80.7	5.00	100.0	0	80.7	30.3	126	0.568	20	
Hexachloroethane	59.7	5.00	100.0	0	59.7	19.5	96.4	2.84	20	
2-Methylphenol	74.9	5.00	100.0	0	74.9	28.7	108	2.19	20	
3+4-Methylphenol	63.0	5.00	100.0	0	63.0	24.2	136	0.602	20	
Nitrobenzene	79.9	5.00	100.0	0	79.9	28.8	119	4.67	20	
Pentachlorophenol	50.1	5.00	100.0	0	50.1	20.2	93	49.0	20	R
Pyridine	62.5	5.00	100.0	0	62.5	19.3	82.8	0.224	20	
Surr: 2-Fluorophenol	44.2		100.0		44.2	12.1	85.8	0		
Surr: Phenol-d5	38.4		100.0		38.4	17.7	65.8	0		
Surr: 2,4,6-Tribromophenol	53.3		100.0		53.3	26	138	0		
Surr: Nitrobenzene-d5	77.0		100.0		77.0	47.5	119	0		
Surr: 2-Fluorobiphenyl	83.1		100.0		83.1	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1405C12-001Bmsd**	SampType:	**MSD4**	TestCode:	**EPA Method 8270C: Semivolatiles**					
Client ID:	**GW-WQ1-C-R36**	Batch ID:	**13445**	RunNo:	**18967**					
Prep Date:	**5/30/2014**	Analysis Date:	**5/31/2014**	SeqNo:	**547971**	Units:	**µg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	90.1		100.0		90.1	44	113	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13445**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547966** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	54.7	5.00	100.0	0	54.7	27.4	101			
1,4-Dichlorobenzene	52.7	5.00	100.0	0	52.7	32.6	91.5			
2,4-Dinitrophenol	27.6	5.00	100.0	0	27.6	23.1	118			
2,4-Dinitrotoluene	76.8	5.00	100.0	0	76.8	44.7	112			
Hexachlorobenzene	80.0	5.00	100.0	0	80.0	30	130			
Hexachloroethane	49.1	5.00	100.0	0	49.1	23.2	97.8			
2-Methylphenol	73.9	5.00	100.0	0	73.9	36.1	105			
3+4-Methylphenol	62.3	5.00	100.0	0	62.3	35.7	92.5			
Nitrobenzene	76.2	5.00	100.0	0	76.2	30.9	125			
Pentachlorophenol	44.2	5.00	100.0	0	44.2	20.2	93			
Pyridine	47.7	5.00	100.0	0	47.7	5.14	87.1			
Surr: 2-Fluorophenol	51.1		100.0		51.1	12.1	85.8			
Surr: Phenol-d5	43.5		100.0		43.5	17.7	65.8			
Surr: 2,4,6-Tribromophenol	54.2		100.0		54.2	26	138			
Surr: Nitrobenzene-d5	78.4		100.0		78.4	47.5	119			
Surr: 2-Fluorobiphenyl	77.9		100.0		77.9	48.1	106			
Surr: 4-Terphenyl-d14	73.5		100.0		73.5	44	113			

Sample ID: **lcs-13445**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13445**	RunNo: **18967**
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547967** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	55.0	5.00	100.0	0	55.0	27.4	101	0.547	0	
1,4-Dichlorobenzene	52.7	5.00	100.0	0	52.7	32.6	91.5	0.0380	0	
2,4-Dinitrophenol	30.4	5.00	100.0	0	30.4	23.1	118	9.67	0	
2,4-Dinitrotoluene	76.5	5.00	100.0	0	76.5	44.7	112	0.470	0	
Hexachlorobenzene	75.0	5.00	100.0	0	75.0	30	130	6.48	0	
Hexachloroethane	46.0	5.00	100.0	0	46.0	23.2	97.8	6.57	0	
2-Methylphenol	74.3	5.00	100.0	0	74.3	36.1	105	0.540	0	
3+4-Methylphenol	64.9	5.00	100.0	0	64.9	35.7	92.5	4.12	0	
Nitrobenzene	76.1	5.00	100.0	0	76.1	30.9	125	0.158	0	
Pentachlorophenol	43.4	5.00	100.0	0	43.4	20.2	93	1.87	0	
Pyridine	46.8	5.00	100.0	0	46.8	5.14	87.1	1.99	0	
Surr: 2-Fluorophenol	47.8		100.0		47.8	12.1	85.8	0	0	
Surr: Phenol-d5	43.3		100.0		43.3	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	58.1		100.0		58.1	26	138	0	0	
Surr: Nitrobenzene-d5	77.4		100.0		77.4	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	79.0		100.0		79.0	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13445**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **13445**	RunNo: **18967**							
Prep Date: **5/30/2014**	Analysis Date: **5/31/2014**	SeqNo: **547967**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	76.9		100.0		76.9	44	113	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.
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#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **ec 999us ccv**	SampType: **ccv**	TestCode: **SM2510B: Specific Conductance**
Client ID: **CCV**	Batch ID: **R18961**	RunNo: **18961**
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547796** Units: **µmhos/cm**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	984	0.0100	999.0	0	98.4	80	120			

Sample ID **ec 9995us ccv**	SampType: **ccv**	TestCode: **SM2510B: Specific Conductance**
Client ID: **CCV**	Batch ID: **R18961**	RunNo: **18961**
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547801** Units: **µmhos/cm**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	9000	0.010	9995	0	89.7	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548574** 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: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548575** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	54.0	1.00	50.00	0	108	80	120			
Magnesium	54.4	1.00	50.00	0	109	80	120			
Potassium	52.3	1.00	50.00	0	105	80	120			
Sodium	53.5	1.00	50.00	0	107	80	120			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548576** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	54.1	1.00	50.00	0	108	80	120			
Magnesium	54.0	1.00	50.00	0	108	80	120			
Potassium	52.1	1.00	50.00	0	104	80	120			
Sodium	53.3	1.00	50.00	0	107	80	120			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548585** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.402	-100	99			
Magnesium	ND	1.0	1.000	0	-0.230	-100	99			
Potassium	ND	1.0	1.000	0	2.24	-100	99			
Sodium	ND	1.0	1.000	0	1.52	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548586** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548586** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	101	90	110			
Magnesium	51	1.0	50.00	0	102	90	110			
Potassium	49	1.0	50.00	0	98.2	90	110			
Sodium	50	1.0	50.00	0	100	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548599** 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	90	110			
Magnesium	50	1.0	50.00	0	101	90	110			
Potassium	49	1.0	50.00	0	97.7	90	110			
Sodium	50	1.0	50.00	0	99.9	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548610** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.927	-100	99			
Magnesium	ND	1.00	1.000	0	0.00200	-100	99			
Potassium	ND	1.00	1.000	0	20.0	-100	99			
Sodium	0.618	1.00	1.000	0	61.8	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548611** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51.5	1.00	50.00	0	103	90	110			
Magnesium	50.6	1.00	50.00	0	101	90	110			
Potassium	49.1	1.00	50.00	0	98.2	90	110			
Sodium	50.4	1.00	50.00	0	101	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548620** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548620** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.600	-100	99			
Magnesium	ND	1.00	1.000	0	-0.00200	-100	99			
Potassium	0.207	1.00	1.000	0	20.7	-100	99			
Sodium	0.918	1.00	1.000	0	91.8	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548621** 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	90	110			
Magnesium	51.2	1.00	50.00	0	102	90	110			
Potassium	49.7	1.00	50.00	0	99.5	90	110			
Sodium	51.3	1.00	50.00	0	103	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548633** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.851	-100	99			
Magnesium	ND	1.00	1.000	0	0.170	-100	99			
Potassium	ND	1.00	1.000	0	6.63	-100	99			
Sodium	0.527	1.00	1.000	0	52.7	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548634** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51.1	1.00	50.00	0	102	90	110			
Magnesium	50.6	1.00	50.00	0	101	90	110			
Potassium	48.9	1.00	50.00	0	97.8	90	110			
Sodium	50.5	1.00	50.00	0	101	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548641** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548641** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.387	-100	99			
Magnesium	ND	1.00	1.000	0	0.0200	-100	99			
Potassium	ND	1.00	1.000	0	20.0	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548642** 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	90	110			
Magnesium	50.4	1.00	50.00	0	101	90	110			
Potassium	49.6	1.00	50.00	0	99.1	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548575** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	54.0	1.00	50.00	0	108	80	120			
Magnesium	54.4	1.00	50.00	0	109	80	120			
Potassium	52.3	1.00	50.00	0	105	80	120			
Sodium	53.5	1.00	50.00	0	107	80	120			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18989**	RunNo: **18989**
Prep Date:	Analysis Date: **5/31/2014**	SeqNo: **548576** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	54.1	1.00	50.00	0	108	80	120	0.163	0	
Magnesium	54.0	1.00	50.00	0	108	80	120	0.624	0	
Potassium	52.1	1.00	50.00	0	104	80	120	0.330	0	
Sodium	53.3	1.00	50.00	0	107	80	120	0.453	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-13516**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **13516**	RunNo: **19056**
Prep Date: **6/4/2014**	Analysis Date: **6/5/2014**	SeqNo: **550755** 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	ND	1.0								
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								
Vanadium	ND	0.050								

Sample ID **LCS-13516**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13516**	RunNo: **19056**
Prep Date: **6/4/2014**	Analysis Date: **6/5/2014**	SeqNo: **550756** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.020	0.5000	0	97.4	80	120			
Beryllium	0.52	0.0030	0.5000	0	104	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.7	80	120			
Calcium	50	1.0	50.00	0	99.9	80	120			
Chromium	0.49	0.0060	0.5000	0	97.8	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.48	0.0050	0.5000	0	96.4	80	120			
Magnesium	50	1.0	50.00	0	100	80	120			
Nickel	0.47	0.010	0.5000	0	93.8	80	120			
Potassium	48	1.0	50.00	0	96.2	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			
Vanadium	0.50	0.050	0.5000	0	101	80	120			

Sample ID **LCS-13516**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13516**	RunNo: **19056**
Prep Date: **6/4/2014**	Analysis Date: **6/5/2014**	SeqNo: **550757** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.020	0.5000	0	97.4	80	120			
Beryllium	0.52	0.0030	0.5000	0	104	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.9	80	120			
Calcium	50	1.0	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	LCS-13516	SampType:	LCSR		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	BatchQC	Batch ID:	13516		RunNo:	19056				
Prep Date:	6/4/2014	Analysis Date:	6/5/2014		SeqNo:	550757	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chromium	0.49	0.0060	0.5000	0	98.6	80	120			
Iron	0.50	0.050	0.5000	0	99.7	80	120			
Lead	0.48	0.0050	0.5000	0	96.2	80	120			
Magnesium	51	1.0	50.00	0	102	80	120			
Nickel	0.47	0.010	0.5000	0	93.4	80	120			
Potassium	49	1.0	50.00	0	98.3	80	120			
Silver	0.10	0.0050	0.1000	0	101	80	120			
Vanadium	0.50	0.050	0.5000	0	101	80	120			

Sample ID	MB-13516	SampType:	MBLK		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	PBW	Batch ID:	13516		RunNo:	19098				
Prep Date:	6/4/2014	Analysis Date:	6/6/2014		SeqNo:	551710	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	ND	1.00								

Sample ID	LCS-13516	SampType:	LCS		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	LCSW	Batch ID:	13516		RunNo:	19098				
Prep Date:	6/4/2014	Analysis Date:	6/6/2014		SeqNo:	551711	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	47.7	1.00	50.00	0	95.4	80	120			

Sample ID	LCS-13516	SampType:	LCSR		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	BatchQC	Batch ID:	13516		RunNo:	19098				
Prep Date:	6/4/2014	Analysis Date:	6/6/2014		SeqNo:	551712	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	95.6	80	120			

Sample ID	1405C12-001EMS	SampType:	MS		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ1-C-R36	Batch ID:	13516		RunNo:	19199				
Prep Date:	6/4/2014	Analysis Date:	6/11/2014		SeqNo:	555057	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.598	0.250	0.5000	0.2118	77.2	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	1405C12-001EMSD	SampType:	MSD	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ1-C-R36	Batch ID:	13516	RunNo:	19199				
Prep Date:	6/4/2014	Analysis Date:	6/11/2014	SeqNo:	555058	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Iron	0.661	0.250	0.5000	0.2118	89.8	75	125	9.98	20	

Sample ID	1405C12-001EMS	SampType:	MS	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ1-C-R36	Batch ID:	13516	RunNo:	19226				
Prep Date:	6/4/2014	Analysis Date:	6/12/2014	SeqNo:	555922	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.449	0.100	0.5000	0.02605	84.6	75	125			
Beryllium	0.451	0.0150	0.5000	0	90.2	75	125			
Cadmium	0.462	0.0100	0.5000	0	92.5	75	125			
Chromium	0.417	0.0300	0.5000	0	83.4	75	125			
Lead	0.422	0.0250	0.5000	0	84.4	75	125			
Nickel	0.398	0.0500	0.5000	0	79.7	75	125			
Silver	0.106	0.0250	0.1000	0	106	75	125			
Vanadium	0.481	0.250	0.5000	0	96.2	75	125			

Sample ID	1405C12-001EMSD	SampType:	MSD	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ1-C-R36	Batch ID:	13516	RunNo:	19226				
Prep Date:	6/4/2014	Analysis Date:	6/12/2014	SeqNo:	555923	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.464	0.100	0.5000	0.02605	87.7	75	125	3.34	20	
Beryllium	0.468	0.0150	0.5000	0	93.6	75	125	3.68	20	
Cadmium	0.464	0.0100	0.5000	0	92.8	75	125	0.345	20	
Chromium	0.434	0.0300	0.5000	0	86.8	75	125	4.04	20	
Lead	0.418	0.0250	0.5000	0	83.5	75	125	1.05	20	
Nickel	0.410	0.0500	0.5000	0	81.9	75	125	2.78	20	
Silver	0.103	0.0250	0.1000	0	103	75	125	2.53	20	
Vanadium	0.508	0.250	0.5000	0	102	75	125	5.41	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13516**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13516**	RunNo: **19056**
Prep Date: **6/4/2014**	Analysis Date: **6/5/2014**	SeqNo: **550756** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.020	0.5000	0	97.4	80	120			
Beryllium	0.52	0.0030	0.5000	0	104	80	120			
Cadmium	0.48	0.0020	0.5000	0	96.7	80	120			
Calcium	50	1.0	50.00	0	99.9	80	120			
Chromium	0.49	0.0060	0.5000	0	97.8	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.48	0.0050	0.5000	0	96.4	80	120			
Magnesium	50	1.0	50.00	0	100	80	120			
Nickel	0.47	0.010	0.5000	0	93.8	80	120			
Potassium	48	1.0	50.00	0	96.2	80	120			
Silver	0.10	0.0050	0.1000	0	102	80	120			
Vanadium	0.50	0.050	0.5000	0	101	80	120			

Sample ID: **LCS-13516**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13516**	RunNo: **19056**
Prep Date: **6/4/2014**	Analysis Date: **6/5/2014**	SeqNo: **550757** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.49	0.020	0.5000	0	97.4	80	120	0.0144	0	
Beryllium	0.52	0.0030	0.5000	0	104	80	120	0.381	0	
Cadmium	0.48	0.0020	0.5000	0	96.9	80	120	0.180	0	
Calcium	50	1.0	50.00	0	101	80	120	0.758	0	
Chromium	0.49	0.0060	0.5000	0	98.6	80	120	0.801	0	
Iron	0.50	0.050	0.5000	0	99.7	80	120	1.80	0	
Lead	0.48	0.0050	0.5000	0	96.2	80	120	0.166	0	
Magnesium	51	1.0	50.00	0	102	80	120	2.05	0	
Nickel	0.47	0.010	0.5000	0	93.4	80	120	0.338	0	
Potassium	49	1.0	50.00	0	98.3	80	120	2.19	0	
Silver	0.10	0.0050	0.1000	0	101	80	120	0.0591	0	
Vanadium	0.50	0.050	0.5000	0	101	80	120	0.0277	0	

Sample ID: **LCS-13516**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13516**	RunNo: **19098**
Prep Date: **6/4/2014**	Analysis Date: **6/6/2014**	SeqNo: **551711** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	47.7	1.00	50.00	0	95.4	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13516**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13516**	RunNo: **19098**
Prep Date: **6/4/2014**	Analysis Date: **6/6/2014**	SeqNo: **551712** 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	95.6	80	120	0.224	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

28-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-14268	SampType:	MBLK	TestCode:	EPA Method 7470: Mercury				
Client ID:	PBW	Batch ID:	14268	RunNo:	19954				
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579845	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	LCS-14268	SampType:	LCS	TestCode:	EPA Method 7470: Mercury				
Client ID:	LCSW	Batch ID:	14268	RunNo:	19954				
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579846	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.6	80	120			

Sample ID	LCS-14268	SampType:	LCSR	TestCode:	EPA Method 7470: Mercury				
Client ID:	BatchQC	Batch ID:	14268	RunNo:	19954				
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579883	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	99.2	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-14268**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **14268**	RunNo: **19954**
Prep Date: **7/17/2014**	Analysis Date: **7/17/2014**	SeqNo: **579846** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.6	80	120			

Sample ID: **LCS-14268**	SampType: **LCSR**	TestCode: **EPA Method 7470: Mercury**
Client ID: **BatchQC**	Batch ID: **14268**	RunNo: **19954**
Prep Date: **7/17/2014**	Analysis Date: **7/17/2014**	SeqNo: **579883** 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	99.2	80	120	4.73	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.
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#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**ph 7.00 ccv**	SampType: **ccv**		TestCode: **SM4500-H+B: pH**						
Client ID:	**CCV**	Batch ID: **R18961**		RunNo: **18961**						
Prep Date:		Analysis Date: **5/30/2014**		SeqNo: **547815**		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: **R18961**		RunNo: **18961**						
Prep Date:		Analysis Date: **5/30/2014**		SeqNo: **547818**		Units: **pH units**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.93	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	mb-1	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R18961	RunNo:	18961					
Prep Date:		Analysis Date:	5/30/2014	SeqNo:	547764	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:	R18961	RunNo:	18961					
Prep Date:		Analysis Date:	5/30/2014	SeqNo:	547765	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	99.5	90	110			

Sample ID	1405c12-001d ms	SampType:	ms	TestCode:	SM2320B: Alkalinity					
Client ID:	GW-WQ1-C-R36	Batch ID:	R18961	RunNo:	18961					
Prep Date:		Analysis Date:	5/30/2014	SeqNo:	547776	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	50.60	91.5	34.9	123			

Sample ID	1405c12-001d msd	SampType:	msd	TestCode:	SM2320B: Alkalinity					
Client ID:	GW-WQ1-C-R36	Batch ID:	R18961	RunNo:	18961					
Prep Date:		Analysis Date:	5/30/2014	SeqNo:	547777	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	126	20.0	80.00	50.60	94.6	34.9	123	1.98	20	

Sample ID	LCSR	SampType:	LCSR	TestCode:	SM2320B: Alkalinity					
Client ID:	BatchQC	Batch ID:	R18961	RunNo:	18961					
Prep Date:		Analysis Date:	5/30/2014	SeqNo:	547779	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			

Sample ID	mb-2	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R18961	RunNo:	18961					
Prep Date:		Analysis Date:	5/30/2014	SeqNo:	547780	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								

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**Ics-2**	SampType: **Ics**			TestCode: **SM2320B: Alkalinity**					
Client ID:	**LCSW**	Batch ID: **R18961**			RunNo: **18961**					
Prep Date:		Analysis Date: **5/30/2014**			SeqNo: **547781**		Units: **mg/L CaCO3**			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)		80.1	20.0	80.00	0	100	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.
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#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18961**	RunNo: **18961**							
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547765**	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	99.5	90	110			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R18961**	RunNo: **18961**							
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547779**	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	1.00	0	

Sample ID: **lcs-2**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18961**	RunNo: **18961**							
Prep Date:	Analysis Date: **5/30/2014**	SeqNo: **547781**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.1	20.0	80.00	0	100	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.
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#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**
Client ID: **PBW**	Batch ID: **R18990**	RunNo: **18990**
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548646** 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 ST9060-14001**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R18990**	RunNo: **18990**
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548647** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.94	1.00	4.850	0	102	90	110			

Sample ID **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**
Client ID: **BatchQC**	Batch ID: **R18990**	RunNo: **18990**
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548648** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.04	1.00	4.850	0	104	90	110			

Sample ID **1405C12-001CMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**
Client ID: **GW-WQ1-C-R36**	Batch ID: **R18990**	RunNo: **18990**
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548650** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.29	1.00	4.650	0.7180	98.4	75	125			

Sample ID **1405C12-001CMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**
Client ID: **GW-WQ1-C-R36**	Batch ID: **R18990**	RunNo: **18990**
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548651** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.26	1.00	4.650	0.7180	97.6	75	125	0.663	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS ST9060-14001 s**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R18990**	RunNo: **18990**							
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548647**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.94	1.00	4.850	0	102	90	110			

Sample ID: **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R18990**	RunNo: **18990**							
Prep Date:	Analysis Date: **6/2/2014**	SeqNo: **548648**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.04	1.00	4.850	0	104	90	110	1.95	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.
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#: **1405C12**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-13480	SampType:	MBLK	TestCode:	SM 2540D: TSS					
Client ID:	PBW	Batch ID:	13480	RunNo:	19019					
Prep Date:	6/2/2014	Analysis Date:	6/3/2014	SeqNo:	549546	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-13480	SampType:	LCS	TestCode:	SM 2540D: TSS					
Client ID:	LCSW	Batch ID:	13480	RunNo:	19019					
Prep Date:	6/2/2014	Analysis Date:	6/3/2014	SeqNo:	549547	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	89.0	4.00	92.40	0	96.3	82.47	119.05			

Sample ID	LCSR-13480	SampType:	LCSR	TestCode:	SM 2540D: TSS					
Client ID:	BatchQC	Batch ID:	13480	RunNo:	19019					
Prep Date:	6/2/2014	Analysis Date:	6/3/2014	SeqNo:	549548	Units:	mg/L			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	90.0	4.00	92.40	0	97.4	82.47	119.05			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405C12**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13480**	SampType: **LCS**	TestCode: **SM 2540D: TSS**
Client ID: **LCSW**	Batch ID: **13480**	RunNo: **19019**
Prep Date: **6/2/2014**	Analysis Date: **6/3/2014**	SeqNo: **549547** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	89.0	4.00	92.40	0	96.3	82.47	119.05			

Sample ID: **LCSR-13480**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**
Client ID: **BatchQC**	Batch ID: **13480**	RunNo: **19019**
Prep Date: **6/2/2014**	Analysis Date: **6/3/2014**	SeqNo: **549548** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	90.0	4.00	92.40	0	97.4	82.47	119.05	1.12	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.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

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: 140530033
Order Date: 5/30/2014

Contact Name: ANDY FREEMAN
Project Name: 1405C12

Comment:

Sample #: 140530033-001 **Customer Sample #:** 1405C12-001F / GW-WQ1-C-R36

Recv'd: ☑ **Collector:** **Date Collected:** 5/28/2014
Quantity: 1 **Matrix:** Water **Date Received:** 5/30/2014 12:35:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***

Sample #: 140530033-002 **Customer Sample #:** 1405C12-002F / GW-WQ1-C-R36 DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 5/28/2014
Quantity: 1 **Matrix:** Water **Date Received:** 5/30/2014 12:35:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	6/11/2014	***Normal (~10 Days)***

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB	**Order ID:**	140530033
	4901 HAWKINS NE SUITE D	**Order Date:**	5/30/2014
	ALBUQUERQUE NM 87109		
Contact Name:	ANDY FREEMAN	**Project Name:**	1405C12
Comment:			

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

WQSP-1

DATA VERIFICATION AND VALIDATION REPORTS

Round 36
WQSP-1
SDG 1405C12
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	500	1,000	37,200		38,600		37,900	3.7	40,472
TOC	mg/L	1.0	0.120	1.0	0.718	J	0.664	J	0.69	7.8	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	4.0	20	50.6		50.8		50.7	0.39	55.8
Specific Conductance	umhos/cm	NA	0.10	0.10	91,100		92,900		92,000	2.0	175,000
pH	pH units	NA	0.10	1.68	7.19		7.21		7.20	0.28	5.6 - 8.8
Specific Gravity	NA	NA	0.0	0.0	1.041		1.044		1.042	0.21	1.070
TDS	mg/L	10	492	1,000	61,000		60,200		60,600	1.3	80,700
TSS	mg/L	1.0	3.1	4.0	**61**		**40**		**51**	41.6	**33.3**
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	0.77	20	1,790		1,790		1,790	0.0	2,087
Mg (Diss)	mg/L	0.5	0.377	20	1,140		1,140		1,140	0.0	1,247
K (Diss)	mg/L	0.5	4.05	20	508		509		509	0.2	799
Na (Diss)	mg/L	0.5	60.7	500	20,500		21,100		20,800	2.9	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	0.000087	0.00020	ND	H	ND	H	NA	NA	<0.002
Ba	mg/L	0.020	0.00312	0.10	0.026	J	0.029	J	0.027	9.5	<1.0
Be	mg/L	0.010	0.00176	0.015	ND		0.0032	J	NA	NA	<0.02
Cd	mg/L	0.010	0.00314	0.010	ND		ND		NA	NA	<0.2
Ca	mg/L	0.500	3.27	20	1,700		1,690		1,695	0.6	NA
Cr	mg/L	0.025	0.0084	0.030	ND		ND		NA	NA	<0.5
Pb	mg/L	0.020	0.0239	0.025	ND		ND		NA	NA	0.105
Mg	mg/L	0.50	0.340	20	1,120		1,110		1,115	0.9	NA
Ni	mg/L	0.025	0.0095	0.05	ND		ND		NA	NA	0.490
K	mg/L	0.50	10.1	20	505		515		510	1.96	NA
Ag	mg/L	0.013	0.0026	0.025	ND		ND		NA	NA	<0.5
Na	mg/L	0.50	208	500	20,800		21,100		20,950	1.4	NA
V	mg/L	0.025	0.0274	0.025	ND		0.030	J	NA	NA	<0.1
ICP/MS Metals											
Sb	mg/L	0.025	0.025	0.025	ND		ND		NA	NA	0.33
As	mg/L	0.050	0.025	0.025	ND		ND		NA	NA	<0.1
Se	mg/L	0.025	0.025	0.025	ND		ND		NA	NA	0.15
Tl	mg/L	0.025	0.025	0.025	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.
H Flag indicates that holding times for sample preparartion or analysis exceeded.
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 36
WQSP-1

Sample Summary

Date:	August 28, 2014
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	May 28, 2014
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	July 14, 2014
Date Samples Shipped/Method	May 28, 2014 by FedEx
Date Samples Received by lab:	May 29, 2014
Sample Receipt Condition:	Intact at 3.0 deg. C
SDG:	1405C12
WIPP Chain of Custody/Request for Analysis:	1137
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):	June 4, 2014 (meets holding time)
SVOC Extraction Date:	May 30, 2014 (meets holding time)
SVOC Analysis Date(s):	May 31, 2014 (meets holding time)
Total Trace Metals Analysis Date(s):	May 31, June 6, 11, 12, 2014 (meets holding time)
Dissolved Cation Metals Analysis Date(s):	May 31, 2014 (meets holding time)
Mercury Analysis Date(s):	**July 17, 2014 (missed 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 1405C12

WTS Sample No.	Analytes
GW-WQ1CR36N1, GW-WQ1CR36N1D	VOCs
GW-WQ1CR36N2, GW-WQ1CR36N3	VOCs (Field Blank and Trip Blank)
GW-WQ1CR36N4, GW-WQ1CR36N4D	TOC
GW-WQ1CR36N5, GW-WQ1CR36N5D	SVOCs
GW-WQ1CR36N6, GW-WQ1CR36N6D	Total Trace Metals (including "total" cation metals)
GW-WQ1CR36 N7, GW-WQ1CR36 N7D	General Parameters (including "dissolved" cations)

Results Summary

No volatile organic compounds (VOCs) were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 7.43 ug/L of 2-butanone and 0.29 ug/L of methylene chloride (J-flagged). The trip blank only showed detection of 0.29 ug/L of methylene chloride (J-flagged). The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples.

No SVOCs were detected in the WQSP-1 groundwater samples.

The trace metals detected included barium (Ba) at 0.026 mg/L in the primary sample and 0.029 mg/L in the duplicate sample; beryllium (Be) not detected in the primary sample but at 0.0032 mg/L in the duplicate sample; and vanadium (V) not detected in the primary sample but at 0.030 mg/L in the duplicate sample. The concentrations were below the MRL and are J-flagged as estimated

Measurements were made on all the general chemistry parameters at concentrations above the method reporting limit except for total organic carbon (TOC), which was detected at 0.72 mg/L in the primary sample and 0.66 mg/L in the duplicate sample. The concentrations are J-flagged as estimated.

The total suspended solids (TSS) concentrations in the primary and duplicate samples were 61 mg/L and 40 mg/L, which are higher than 95th percentile concentration (used for 16 - 95 percent baseline non-detects) of 33.3 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 EPA's SW-846 Method 8260B.

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 7.43 ug/L of 2-butanone and 0.29 ug/L of methylene chloride (J-flagged). The trip blank only showed detection of 0.29 ug/L of methylene chloride (J-flagged). No VOCs were detected in the laboratory method blank sample. The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples.

The QC sample analyses showed that LCS/LCSR yielded somewhat high recoveries for isobutyl alcohol of 163 percent in each sample. The MS/MSD samples showed detection of isobutyl alcohol with 150 percent recovery and 140 percent recovery, while 2-butanone showed 157 percent recovery and 161 percent recovery in the MS and MSD, respectively. The accuracy objective was met for all the other compounds in the LCS/LCSR and MS/MSD samples, and the precision objective was also met with RPDs <20 in all the samples.

All other quality assurance objectives were met for the VOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 8270C. No SVOCs were detected in the method blank sample or in the groundwater samples.

The surrogates met the recovery objective in the groundwater and QC samples. The LCS/LCSR recoveries met the objective of 40 – 140 percent recovery for base/neutral compounds and 30 – 130 percent recovery for acidic compounds except that the 2,3-dintrophenol recovery was 27.6 percent in the LCS. This recovery is still within the lab's historical control chart recovery range, however. The recovery objective was met for all the compounds in the MS/MSD. The precision objective was met for all the compounds in the LCS/LCSR. Pentachlorophenol and 2,4-dinitro-phenol did not meet the precision objective in the MS/MSD samples with RPDs of 49.0 and 23.7, respectively, due to higher recoveries in the MSD.

The lack of precision for the two acidic compounds in the spiked samples should have no impact on the quality or usability of the data since no SVOC compounds were detected in the groundwater samples.

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 EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed by ICP/MS by Anatek according to EPA Method 6020A from SW-846. Mercury (Hg) was analyzed using automated cold-vapor atomic absorption (CVAA) spectroscopy according to EPA SW-846 Method 7470A.

The laboratory inadvertently missed analyzing the samples for Hg while analyzing for the trace metals. The lab reported on the missed analyses and was requested to perform the analyses after the hold time of 28 days. The samples were analyzed 22 days past the regular hold time. There was no response for Hg in the analyses, and the missed hold time should not have allowed any Hg to disappear from the samples.

The recoverable metal Ba was detected at trace concentrations in the primary and duplicate groundwater samples, and Be and V were detected at trace concentrations in the duplicate samples only. The Ba concentrations were 0.026 mg/L in the primary sample and 0.029 mg/L in the duplicate sample; the Be concentration in the duplicate sample was 0.0032 mg/L and the V concentration in the duplicate sample was 0.030 mg/L.

The MDLs for the analyses were lower than the MRLs specified in the SOW for the target metals except that the Pb MDL was just slightly higher than the 0.020 mg/L SOW-prescribed concentration at 0.0239 mg/L, and the V MDL of 0.0274 mg/L was just slightly higher than the SOW-prescribed concentration of 0.025 mg/L.

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 dissolved cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. 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 objective.

Summary for General Chemistry Parameters Analyses

The general chemistry parameters included specific gravity, pH, specific conductance, total dissolved solids, total suspended solids, total organic carbon, 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	Parameter
Standard Methods SM 2710F	Specific Gravity
Standard Methods SM 4500-H^+	pH
EPA Method 120.1	Specific Conductance (Conductivity)
Standard Methods SM 2540C	Total Dissolved Solids (TDS)
Standard Methods SM 2540D	Total Suspended Solids (TSS)
Standard Methods SM 5310B	Total Organic Carbon (TOC)
Standard Methods SM 2320B	Alkalinity
EPA Method 300.0	Anions

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

- All parameters: Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted. Initial calibration verification and continuing calibration verification standards were analyzed as appropriate to ensure accurate calibration of the instrumentation.

- Anions: LCS and LCSR (replicate analysis) samples were analyzed for the anions chloride, nitrate and sulfate to obtain recovery information. All LCS recoveries were within 90 – 110 percent and were precise as evidenced by RPDs less than one. The MS/MSD samples were only analyzed for nitrate because of the high native concentrations of chloride and sulfate. The recoveries were 94.7 percent and 95.3 percent for a RPD of 0.68.

- pH: CCVs at pH 7.00 and pH 10.00 were analyzed prior to the samples. The lab failed to analyze one of the samples in duplicate to obtain precision information for this SDG. The precision of the analyses of the duplicate groundwater samples was good with values of 7.19 and 7.21 and a RPD of 0.28.

- Specific gravity: A duplicate sample was analyzed to obtain precision data. The precision of the analyses of the primary sample and its duplicate was very precise with values of 1.0413 and 1.0406 for a RPD of 0.067.

- Specific conductance: The laboratory did not analyze one of the groundwater samples in duplicate to produce precision data. The precision of the analyses of the primary and duplicate analyses was quite precise with values of 91,100 umhos/cm and 92,900 umhos/cm for a RPD of 2.0.

- Total Organic Carbon: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS recoveries were 102 percent and 104 percent with a RPD of 1.9. The MS/MSD recoveries of 98.4 percent and 97.6 percent yielded a RPD of 0.66. Thus the accuracy and precision objectives were readily met.

- Alkalinity: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The accuracy and precision objectives were readily met. The LCS recoveries were 99.5 percent and 101 percent for a RPD of 1.5, and the MS/MSD recoveries were of 91.5 percent and 94.6 percent for a RPD of 2.0.

- Total Dissolved Solids: LCS/LCSD and MS/MSD samples were analyzed for this gravimetric method to generate accuracy and precision data. The LCS recoveries were 102 percent and 101 percent for a RPD of 0.30, and the MS/MSD recoveries were 106 percent and 107 percent for a RPD of 0.57. Thus the accuracy and precision objectives were readily met.

- Total Suspended Solids: A LCS/LCSD and a duplicate sample were analyzed to generate precision data. The LCS recoveries were 96.3 percent and 97.4 percent for a RPD of 1.1. The duplicate analysis of the primary sample (61 mg/L) yielded 58 mg/L for a RPD of 5.0. However, the precision of the primary (61 mg/L) and duplicate (40 mg/L) groundwater samples did not meet the precision objective with a RPD of 42.

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, which do not adversely affect the reliability or usability of the information. The lab was reminded to provide all the requested information.

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-1 (Round 36)
Laboratory Name: Hall Environmental
Laboratory Work Order #: 1405C12
Sample Number(s): GW-WQ1-C-R36-N1 thru - N7D
Reviewer Name (print): Robbin A. Spoon
Reviewer Signature: Robbin A Spoon

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?	✓	

Robbin A Spoon 10/6/14
Data Validator Date

Completeness Reviewer 10-15-14
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? 3.0°C	✓	
Was the analysis holding time of 14 days met for all samples? 6/4 vs 5/28	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 6/4	✓	
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) NA Avg RRFs not used. R^2 coefficients all >0.995.

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. p. 186	✓	

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 in FB was 7.4 µg/L.

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?		✓ (a)
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	(b)

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?		✓ (c)
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 2-butanone recovery was 163% in the LCS (acceptable range = 60-140%). The recovery was also 163% in the LCSR.

(b) RPD data not initially submitted by lab. LCS/LCSR concentrations very precise.

(c) The isobutyl alcohol recoveries were 150% and 140% for the MS/MSD, respectively. The 2-butanone recoveries were 157% and 161%, respectively. These recoveries were within the historical control chart range.

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 8/19/2014 Date — Completeness Reviewer 10/6/14 Date

(a) A trace concentration of acetone was detected in the field blank. Both samples contained the silicon artifact compounds. Both samples contain ed trace concentrations of methylene chloride between the MDL and MRL.

(b) Only the silicon artifact compounds were detected.

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? 5/30 vs 5/28	✓	
Were the extracts analyzed within 40 days of sample extraction? 5/31 vs 5/30	✓	
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? 2.5 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) NA. Avg RRFs not used. The R2 coefficients were > 0.995.

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?		✓	(a)
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?	✓		(b)

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?		✓	

2,4-dinitrophenol RPD 23.7; Pentachlorophenol 49.0 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) 2,4-dinitrophenol recovery 27.6 % in the LCS, but 30.4% in the LCSR.
(b) RPDs not initially provided by lab, but precision very good.
(c) Pentachlorophenol barely met objective with 30.4% recovery in 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)

8/20/2014
Data Validator Date

10/6/2014
Completeness Reviewer Date

(a) Chlorobenzene and an alkane were detected.

(b) The same two compounds and bisphenol A were detected in the groundwater at trace concentrations. Bisphenol A is a common contaminant associated with plastic. There is no indication of any SVOCs in the groundwater.

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

T-Metals Digest - 10/50 = DF 50

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?	✓	
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) *Hg Prep/analyzed 22 days past hold limit (28-days post 5'x'ing)

Sx 5/28

Prep 5/30, 6/4 → T-Metals

7/17 → Hg*

Analyzed 5/31 → D-Metals

5/31
6/6
6/11
6/12
} T-Metals

7/17 → Hg*

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?	✓	

Total metals run on 6/5 → 6/6 should not be in QC summary → no WIPP Sxrs analyzed

Very disorganized Raw data / run analyses
No logic to run Sequences + DF's
8/20/14

Primary & 2° Trace metals reported from different run / dates –

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? 6 0.99917	✓		
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve? 3.33 µg/L	✓		
Did the ICV analysis meet the accuracy objective of 90-110% recovery? 90.94%	✓		
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? 10 Sx	✓		
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?	✓		(c)
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery? MS =	✓		(d)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		

(a) Hg prepped 22-days past holding limit (50-days post Sx'ing).

(b) $CCV_{20} = (3.2345/3.33)100 = 97.13\%$ rec

$CCV_{32} = (3.1969/3.33)100 = 96.00\%$ rec

(c) LCS (CS 06/25/14) $(0.0047/0.0050)100 = 94.59\%$ REC $\simeq 94.6\%$

LCSD $(0.004956/0.0050)100 = 99.177\%$ REC $\simeq 99.2\%$

$\%\,RPD = \left(\frac{0.004956 - 0.004730}{0.004843}\right)100 = 4.67\%$ RPD

(d) MS = 0.0041376 mg/L / 0.004965 = 83.3% REC

MSD = 0.0041083 5 1 / 0.004965 = 82.7% REC

[Spk] = 0.004965 mg/L
= 3.31 µg/L

$RPD = \left(\frac{0.0041376 - 0.0041083 5}{0.00412298}\right)100 = 0.7094$

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 5/28 A 6/13	✓		
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓		
Was a DMP sample used for the MS/MSD? 10 Sx	✓		
Was an ICV analyzed after the initial calibration? 1.0 & 40 ppb	✓		
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?	✓		(a)
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?	✓		(a) RM 8/25/14

Robin Alper 8/26/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) RPDs for Se & Tl calculated incorr.
Tl – 4.89%, not 3.2
Se – 9.19%, not 1.1
RAlper 8/25/14

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

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 3°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 5/28 ; A 5/29	✓	

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?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD? 10 Sx	✓	

4/3/14 cal

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?	✓	(a)
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?	✓	(b)
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? 50x, 200x + 2 Kx	✓	
Were the appropriate dilution factors applied to the results?	✓	

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	Spk	Result	%Rec	%RPD
(a) LCS_{NO_3-N}	2.50	2.422	96.88	
$LCSD_{NO_3-N}$	2.435	97.4	0.5352	
(b) MS_{NO_3-N}	125.0	118.35	94.7	
MSD_{NO_3-N}	125.0	119.15	95.3	0.6732

%RPD limits not reported for LCS/LCSD

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 3°C	✓	
Were the samples analyzed within 14 days of collection? C 5/28 A 5/30	✓	

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? 10 Sx	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 3 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?	✓		(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?	✓		(c)

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Completeness Reviewer 10-15-14 Date

(a)

	Recovery	RPD
LCS-1	79.6/80 = 99.5%	
LCS-1dup	80.4/80 = 100.5%	1.0%
LCS-2	80.08/80 = 100.1%	

* RPD - Not Reported on QC Summary Report for LCS/LCSD

(b)

10 Sx = 50.6 mg/L $CaCO_3$

$MS = \left(\frac{123.83 - 50.6}{80}\right) = 91.5\%$ Recovery

$MS = \left(\frac{126.31 - 50.6}{80}\right) = 94.64\%$ Recovery

% RPD = 1.98

(c) $\frac{A \times N \times 50K}{Sx\ Vol, mL}$ A = mL Titrant, N = Normality of Titrant, 50K = Meq/mole

$MS = \left[\frac{6.192 \times 0.02 \times 50k}{50}\right] = 123.84$ mg/L

$MSD = \left[\frac{6.316 \times 0.02 \times 50K}{50}\right] = 126.32$ mg/L

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3°C	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 5/28 A 5/30	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? 1K 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)? Mid = 1K ; End = 10K	✓		
Was one of the samples analyzed in duplicate?		X	(a)

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? CCV@ End = 89.7%		X	(c)
Did the duplicate sample meet the precision objective of ≤20 RPD? not analyzed		X	(a)

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(a) 10 or 20 sample not analyzed in duplicate per SOW.

(a) CCV end out of range.

(b) $\left(\frac{1367}{1413}\right) 100 = 96.7\%$ rec

(c) $CCV_{MID} = 983.5/999 = 98.4\%$ rec (8/26/14)

$CCV_{END} = 8965/9995 = 89.7\%$ rec (8/26/14)

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

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°? 3°C	✓	
Were the samples analyzed within five (5) days of receipt? C 5/28 A 5/30	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement? ATC	✓	
Were at least two standard buffer solutions used to calibrate the instrument? 5	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.4	✓	

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 20.6→21.1°C Sx 20.4→20.7	✓	
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate?		X (a)

METHOD PERFORMANCE	YES	NO
Did the ICV read within ±0.1 pH unit of the assigned value? 6.98 v 7.00	✓	
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?		X (a)

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Completeness Reviewer 10-15-14
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(a) 10 or 20 sample not analyzed in duplicate as req. by SOW.

CCV-Midrun 6.98/7.00 = 99.7% rec

CCV-Endrun 9.93/10.00 = 99.3% rec

10 Sx - 7.19

10 Sx Dup - Not Analyzed

20 Sx - 7.21

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 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C?	✓	
Was the Temperature Correction Factor recorded? 21.6°C ≃ 0.9982	✓	

(a)

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[signature] 10-15-14
Completeness Reviewer Date

(a) Temperature of DI-room blank recorded; not individual samples.

C - 5/28 ; A 6/11

1° Sx = 1.0413
1° Sx Dup = 1.0406
2° Sx = 1.0435

% RPD = 0.067

$$1^\circ Sx = \left(\frac{24.5990 - 14.1911}{23.3838 - 13.4065}\right) 0.9982 = 1.04128 \simeq 1.0413$$

** No QA/QC Data in QC Summary Reports.

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3.0°C	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 5/28 A 6/2	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? 5/2 CAL	✓	
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set? ICV50 + ICV5	✓	
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? 105x	✓	
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)? CAL LO = 0.9999; CAL HI = 1.000	✓		
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?	✓		

Robbin Alpon 5/20/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) $ICV_{50} = (48.62/50) = 97.24\%$ rec

$ICV_5 = (4.686/5) = 93.72\%$ rec

(b) $LCS = (4.938/4.85) = 101.8\%$ rec

$LCSD = (5.035/4.85) = 103.8\%$ rec

$\%RPD = 1.95\%$

(c) ESpk = 4.65 105x = 0.7180

$MS = \left(\frac{5.293 - 0.7180}{4.65}\right) = 98.4\%$ REC

$MSD = \left(\frac{5.258 - 0.7180}{4.65}\right) = 97.6\%$ REC

$\%RPD = 0.663$

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3.0°C	✓	
Were the samples analyzed within 7 days of collection? C 5/28 A 6/2	✓	

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? 10Sx	✓	
Was the initial volume of each sample 100 mL?	✓	
Were any DMP samples diluted prior to processing? 2mL ↑100	✓	
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? 60K → 15K 50K	✓	

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?	✓		

Robbin Alpor 8/27/14 — Data Validator, Date

[signature] 10-15-14 — Completeness Reviewer, Date

(a) LCS Recovery MB=[0] SpK=[1000]

* RPD Not report for LCS/LCSD on QC Summary report.

$LCS = \left(\frac{1017-0}{1000}\right) = 101.7\%rec$

$\%RPD = \frac{1017-1014}{1015.5} = 0.2954 \simeq 0.30\%$ RPD

$LCSD = \left(\frac{1014-0}{1000}\right) = 101.4\%rec$

(b) 10Sx = 61,050 [SpK] = 50K

$MS = \left(\frac{114,100-61,050}{50,000}\right) = 106.1\%rec$

$\%RPD = \frac{114,750-114,100}{114,425} = 0.568\%$

$MSD = \left(\frac{114,750-61,050}{50,000}\right) = 107.4\%rec$

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3°C	✓	
Were the samples analyzed within 7 days of collection? C5/28 A6/2	✓	
Were the samples allowed to warm to room temperature prior to filtration?		✓

(a)

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?	✓	

(b)

Robbin Alpoon 8/27/14 [signature] 10-15-14

Data Validator Date Completeness Reviewer Date

(a) No evidence that samples warmed to room temp

(b) 1° Sample / 1° Sample Dup QC data not provided on QC summary report

*1° Sx = 61 mg/L
1° Sx Dup = 58 mg/L
RPD = $\left(\frac{61-58}{59.5}\right)$ = 5.04% rec

*2° Sx = 40 mg/L

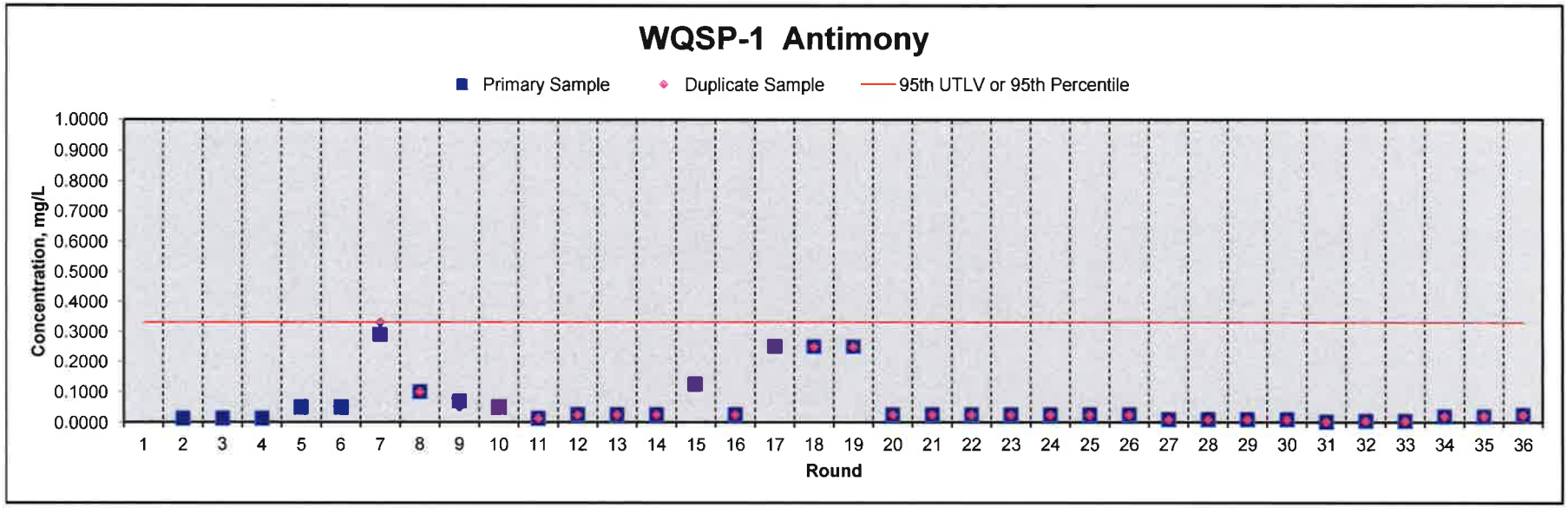
* Note - replication betwn 1°/2° Sample poor (41.6% diff)

WQSP-1

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

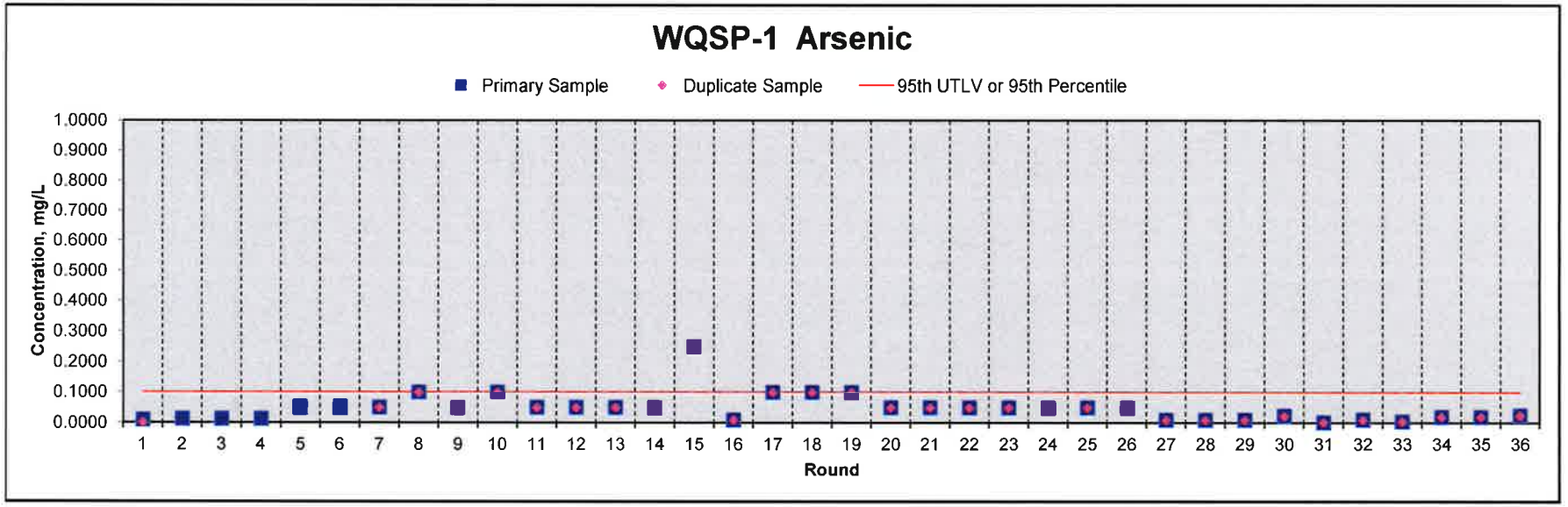
WQSP-1 Antimony

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	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
Antimony	36	05/28/14	06/13/14	< 0.025	< 0.025	mg/L	0.025	0.33



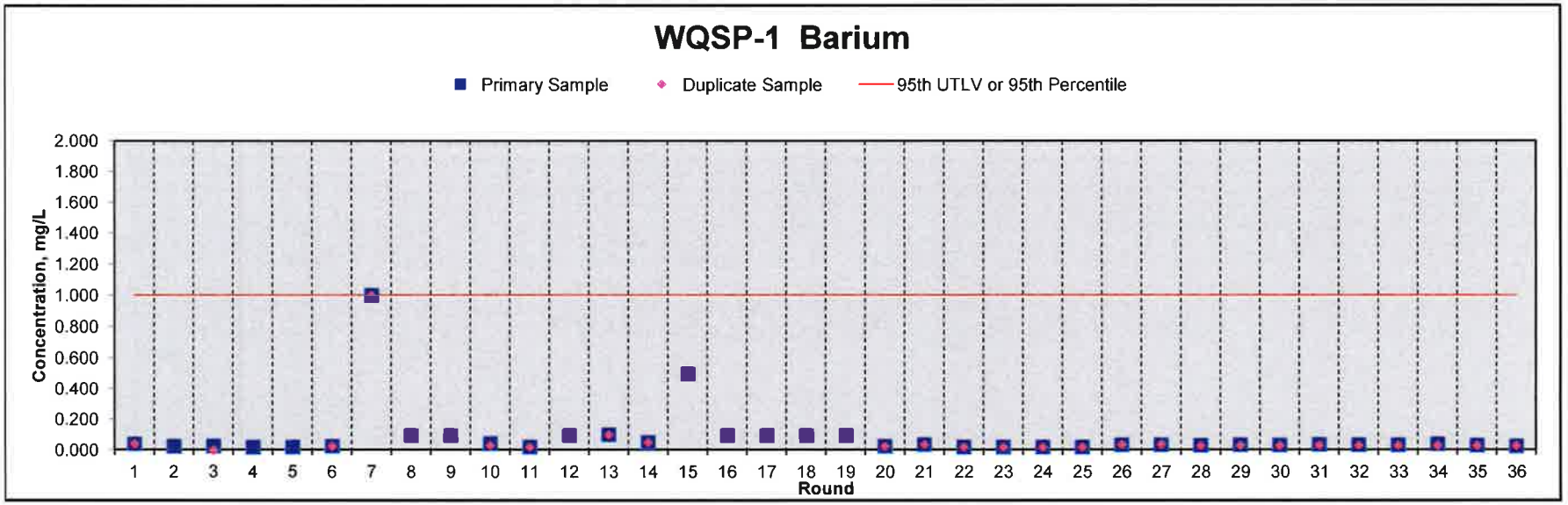
WQSP-1 Arsenic

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	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
Arsenic	36	05/28/14	06/13/14	< 0.025	< 0.025	mg/L	0.025	< 0.1



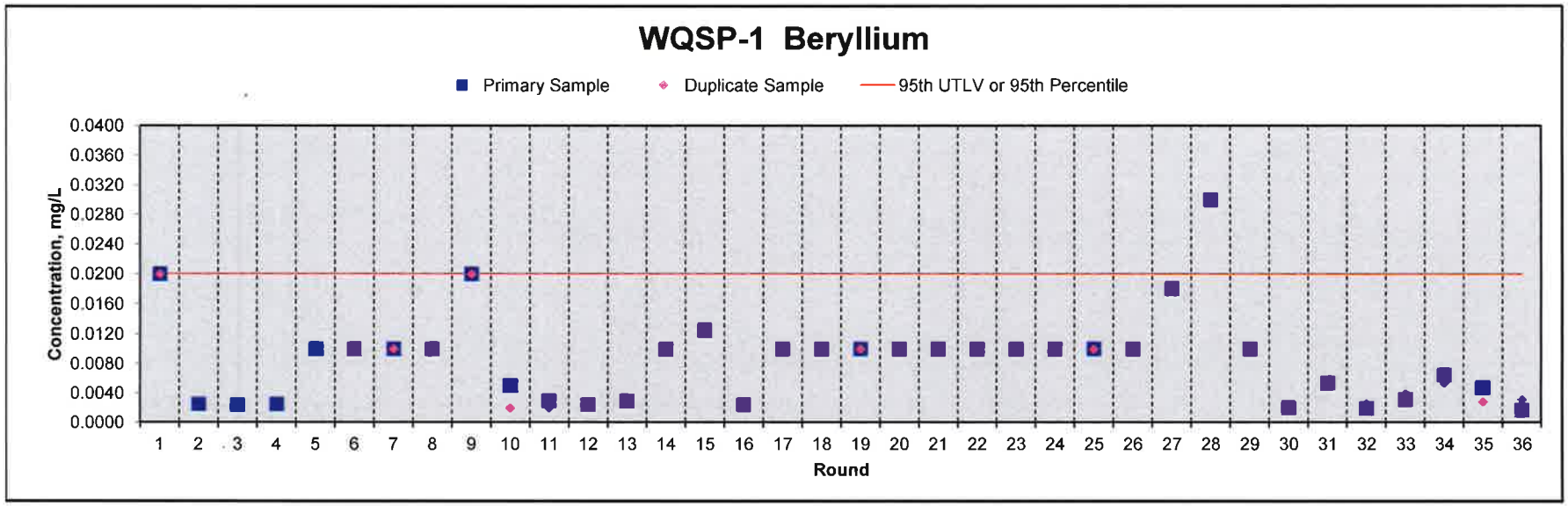
WQSP-1 Barium

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	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
Barium	36	05/28/14	06/12/14	0.026	0.029	mg/L	0.0031	< 1.0



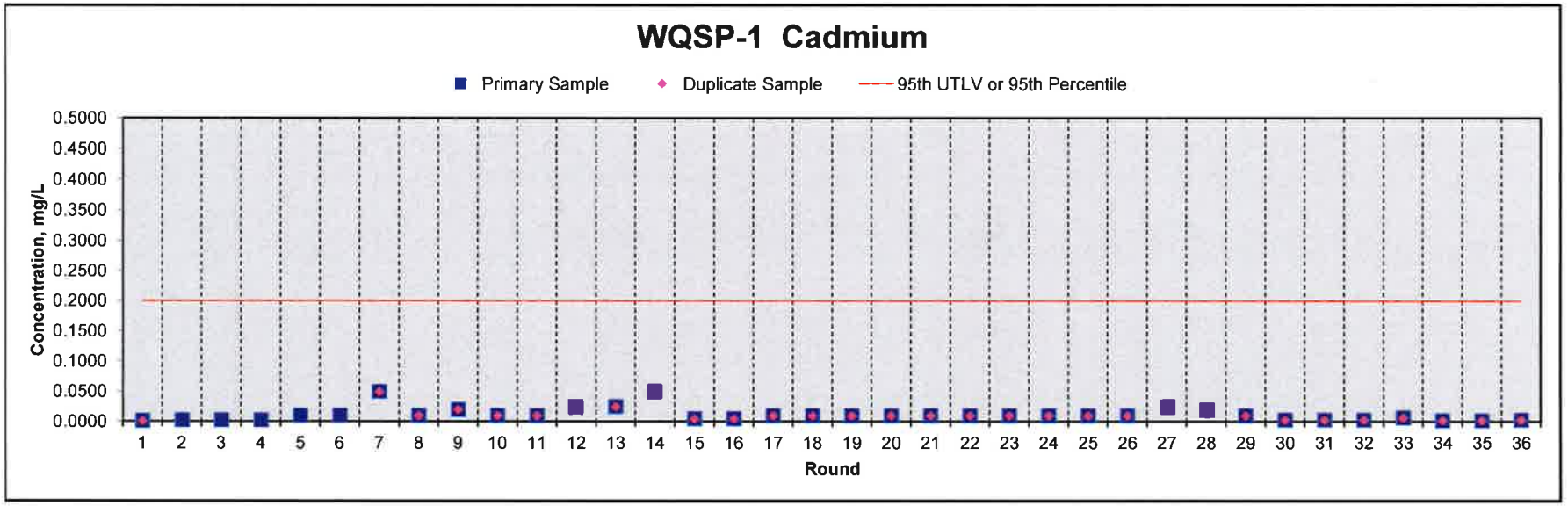
WQSP-1 Beryllium

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	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
Beryllium	36	05/28/14	06/12/14	< 0.0018	0.0032	mg/L	0.0018	< 0.02



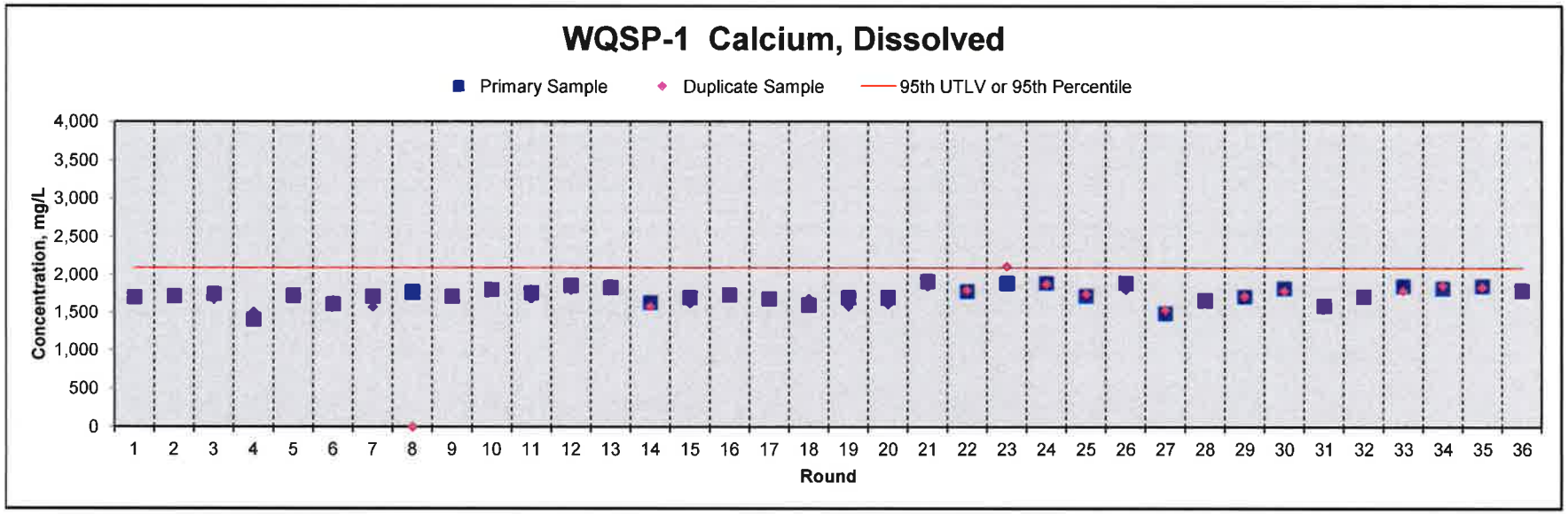
WQSP-1 Cadmium

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	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
Cadmium	36	05/28/14	06/12/14	< 0.0031	< 0.0031	mg/L	0.0031	< 0.2



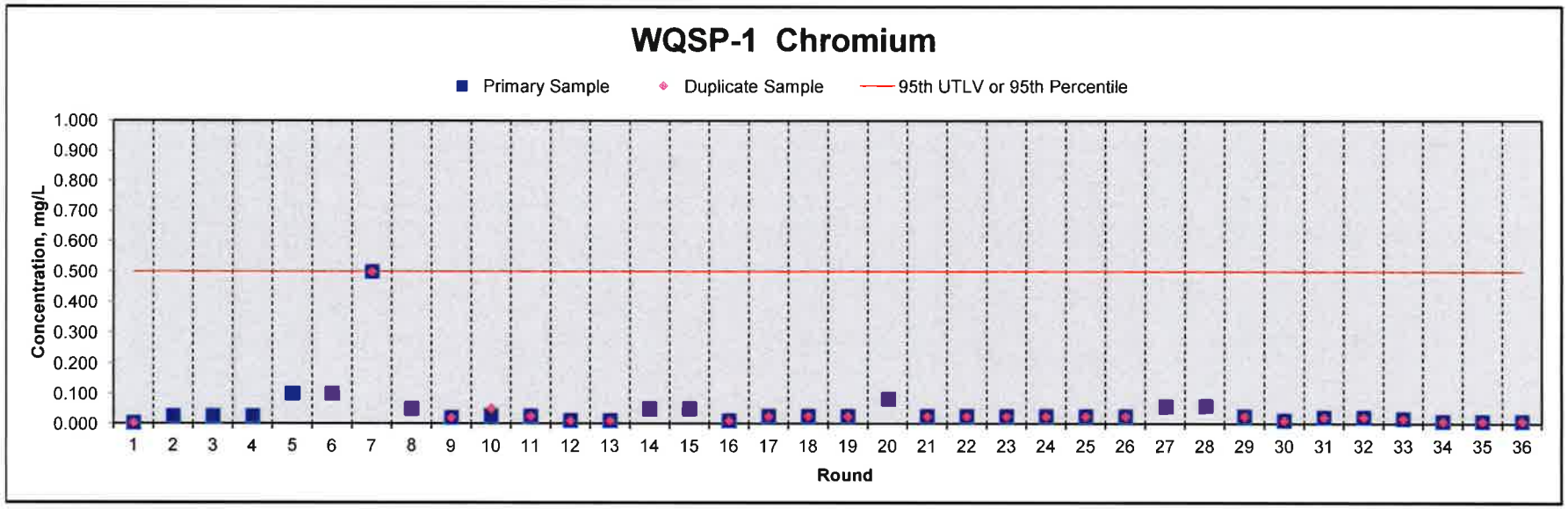
WQSP-1 Calcium, Dissolved

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	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
Calcium	36	05/28/14	05/31/14	1,790	1,790	mg/L	0.77	2,087



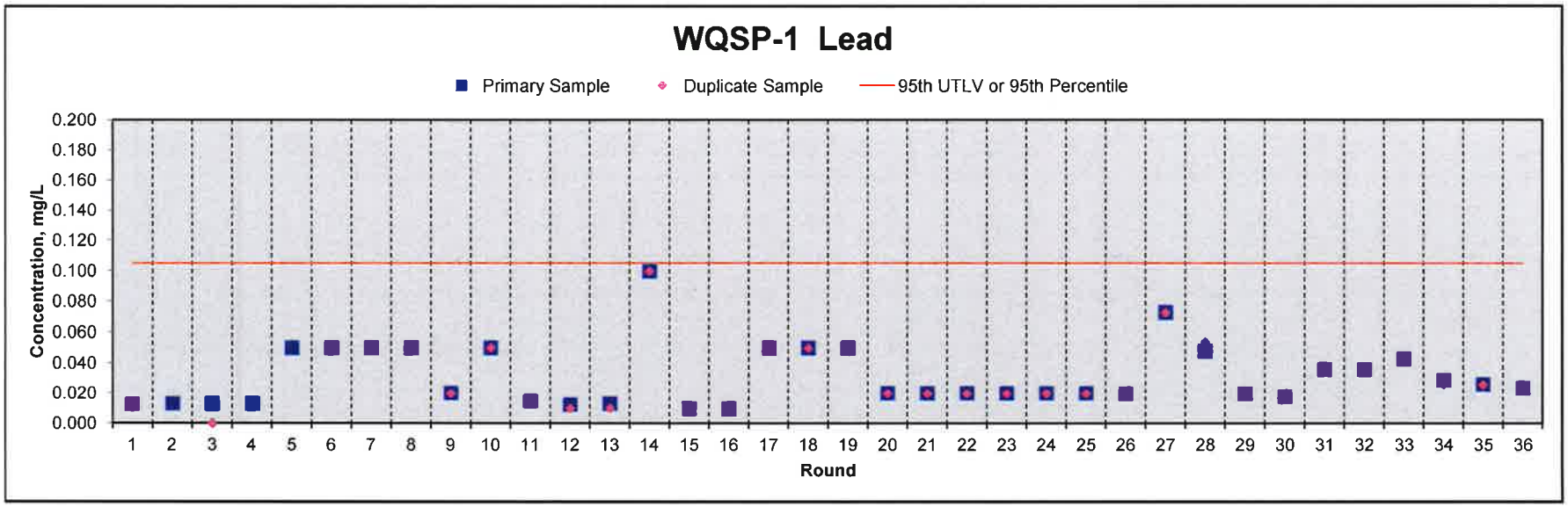
WQSP-1 Chromium

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	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
Chromium	36	05/28/14	06/12/14	< 0.0084	< 0.0084	mg/L	0.0084	< 0.5



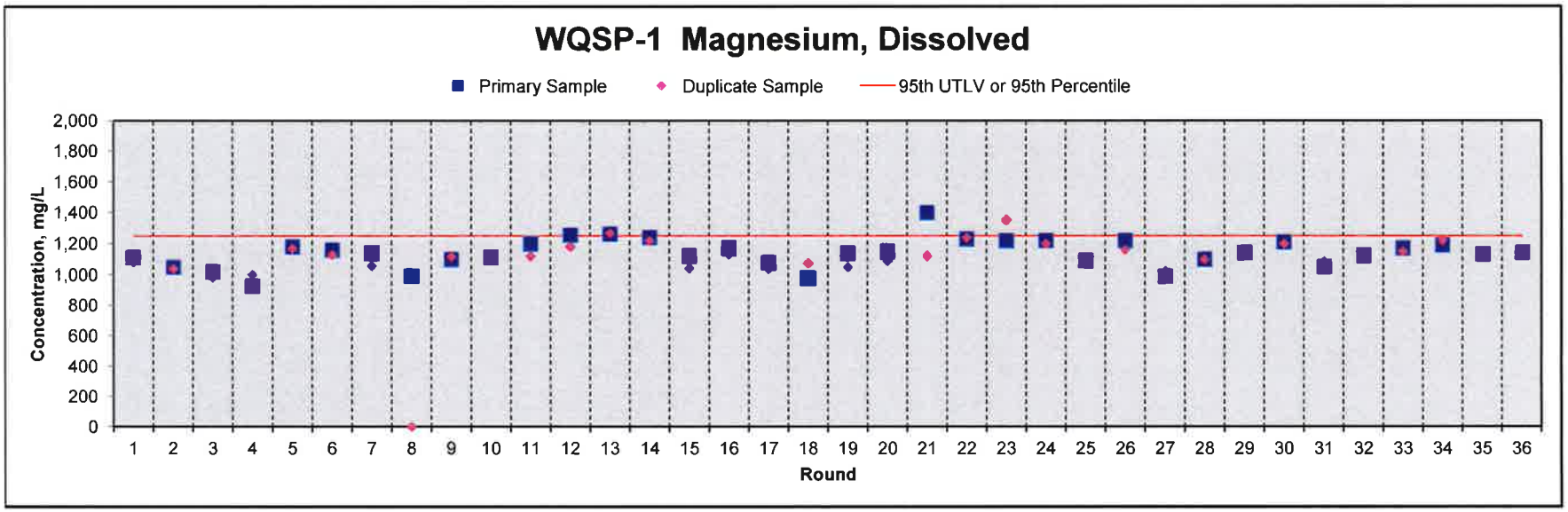
WQSP-1 Lead

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	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
Lead	36	05/28/14	06/12/14	< 0.024	< 0.024	mg/L	0.024	0.105



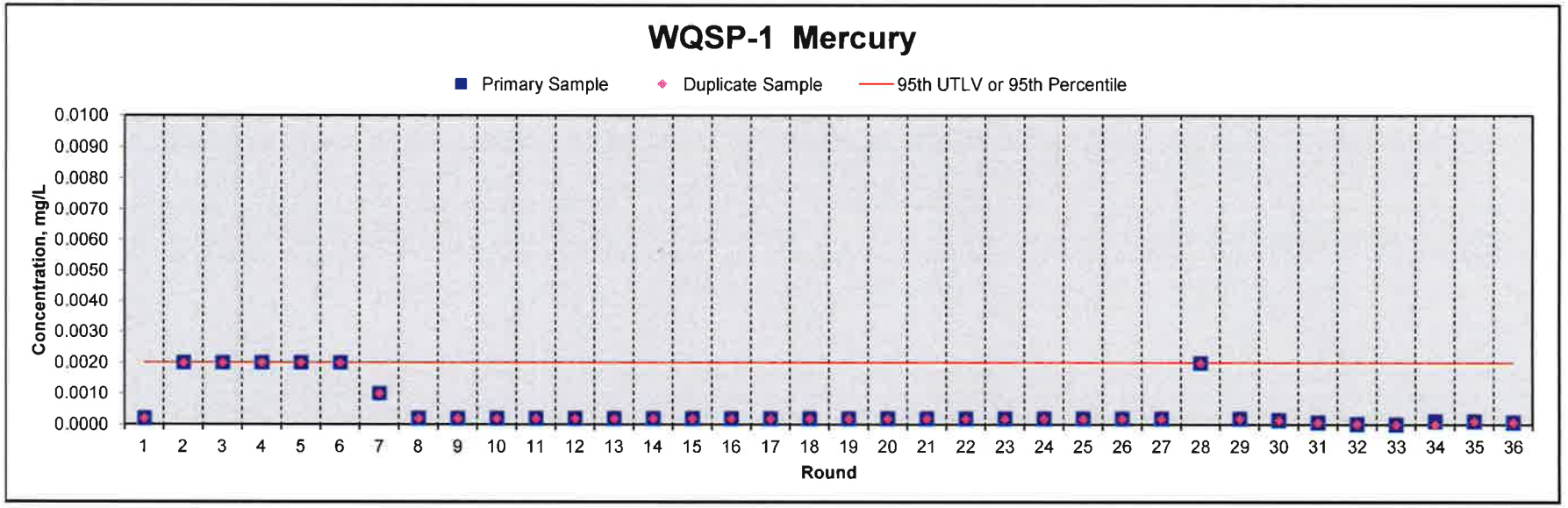
WQSP-1 Magnesium, Dissolved

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	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
Magnesium	36	05/28/14	05/31/14	1,140	1,140	mg/L	0.38	1,247



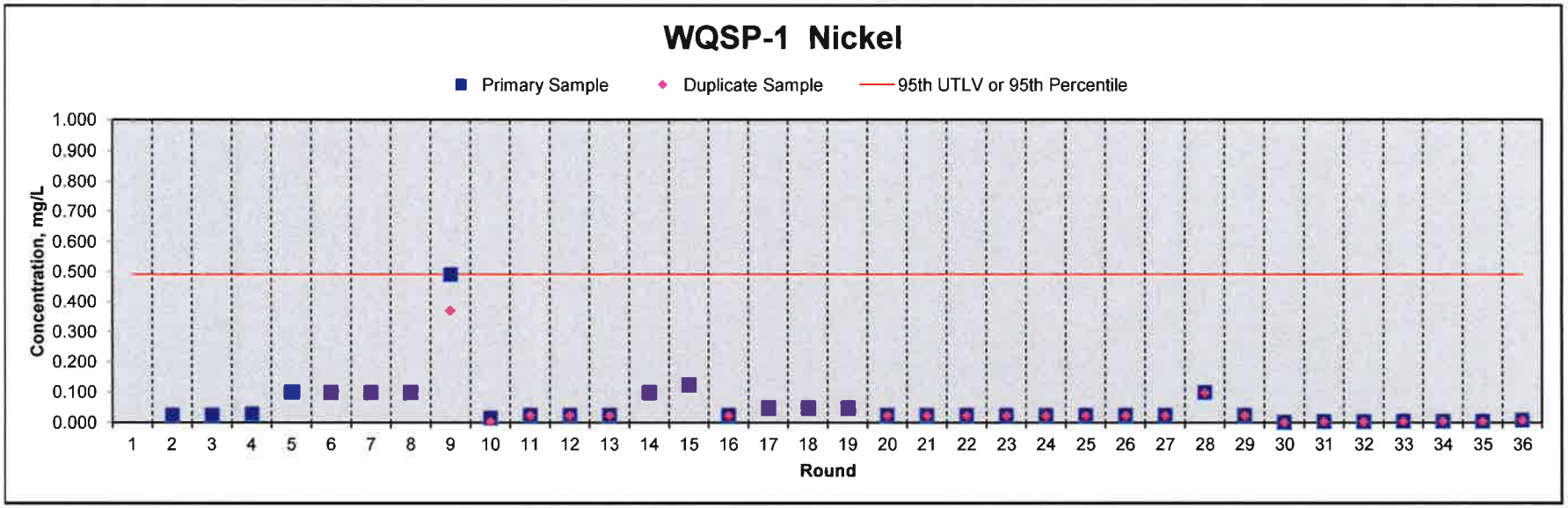
WQSP-1 Mercury

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	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
Mercury	36	05/28/14	07/17/14	< 0.000087	< 0.000087	mg/L	0.000087	< 0.002



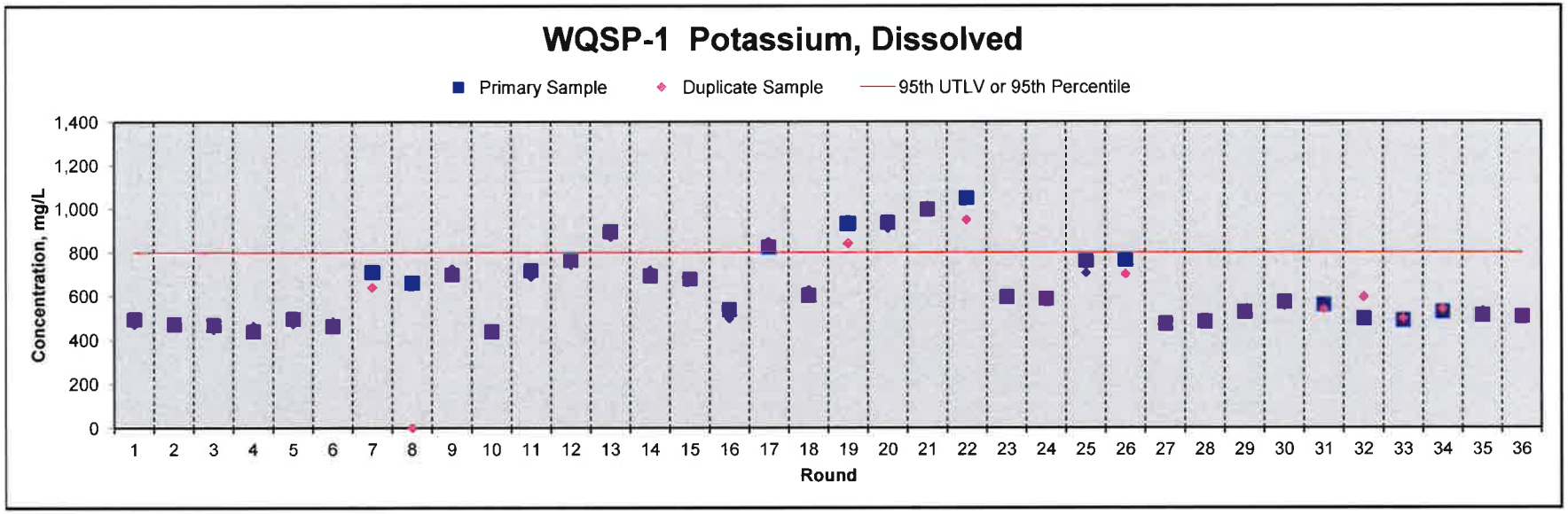
WQSP-1 Nickel

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	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
Nickel	36	05/28/14	06/12/14	< 0.0095	< 0.0095	mg/L	0.0095	0.490



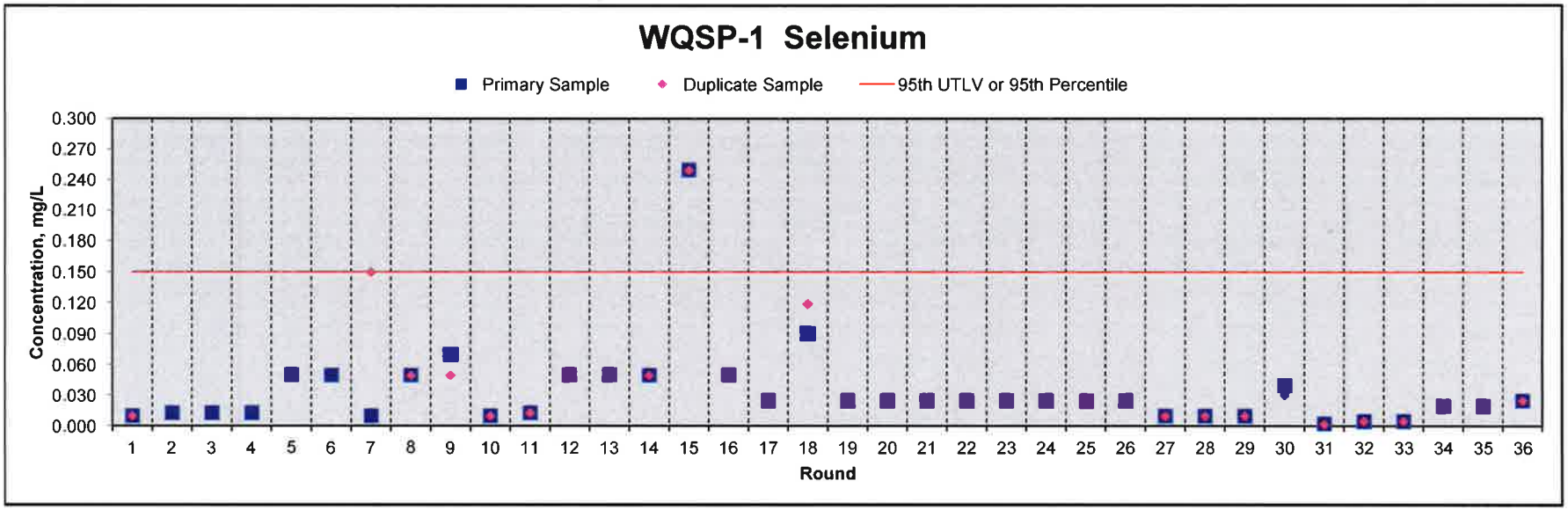
WQSP-1 Potassium, Dissolved

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	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
Potassium	36	05/28/14	05/31/14	508	509	mg/L	4.1	799



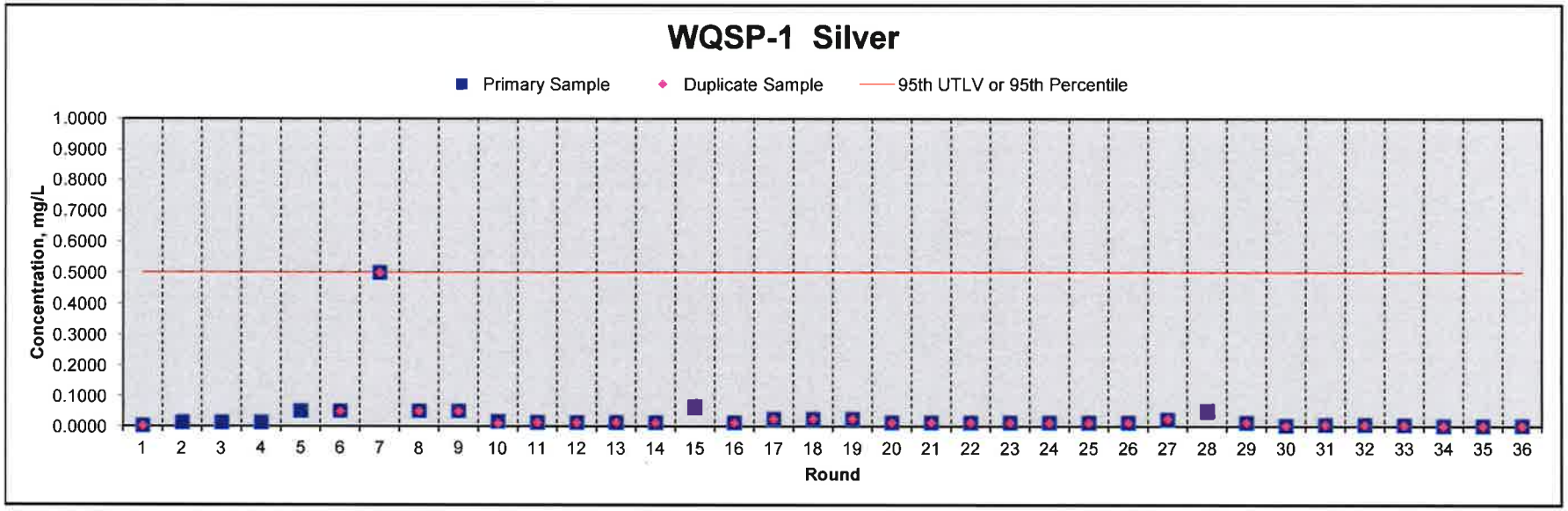
WQSP-1 Selenium

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	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
Selenium	36	05/28/14	06/13/14	< 0.025	< 0.025	mg/L	0.025	0.15



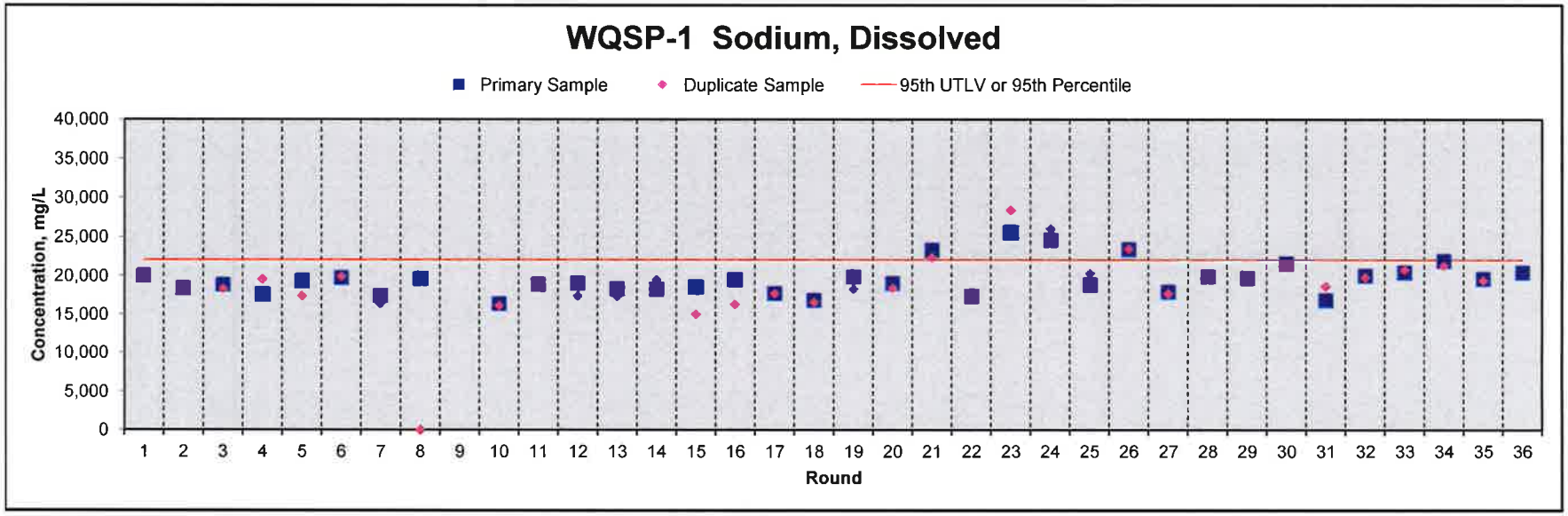
WQSP-1 Silver

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	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
Silver	36	05/28/14	06/12/14	< 0.0026	< 0.0026	mg/L	0.0026	< 0.5



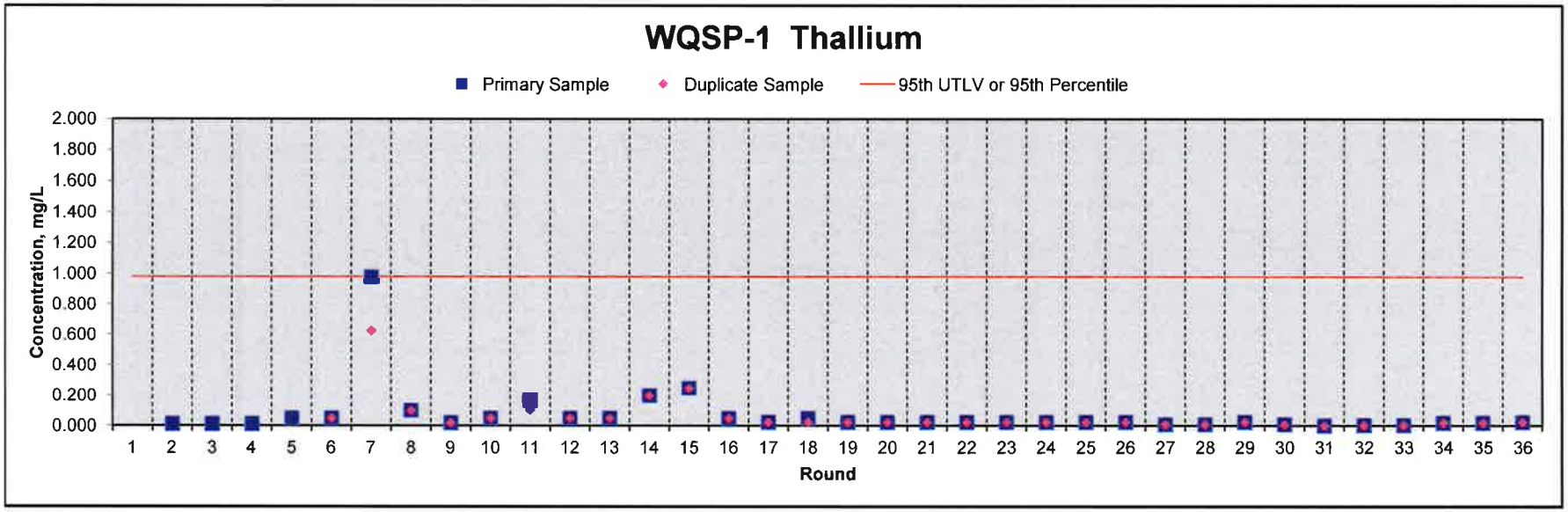
WQSP-1 Sodium, Dissolved

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	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
Sodium	36	05/28/14	05/31/14	20,500	51,100	mg/L	60.7	22,090



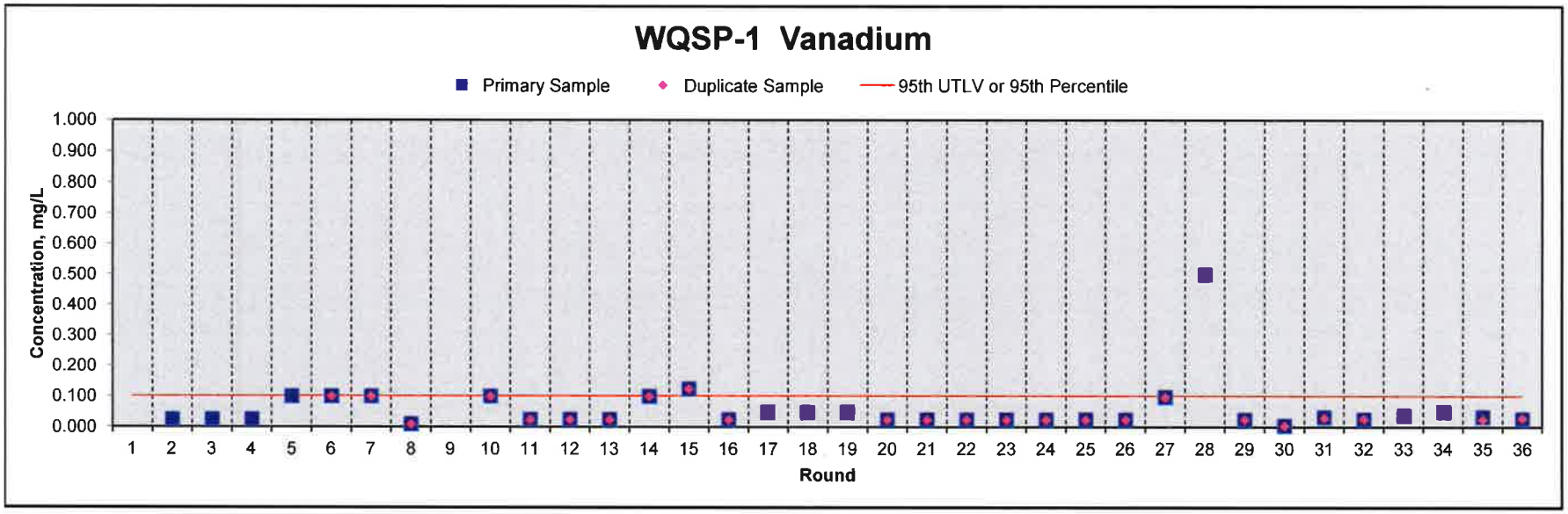
WQSP-1 Thallium

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	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
Thallium	36	05/28/14	06/13/14	< 0.025	< 0.025	mg/L	0.025	0.98



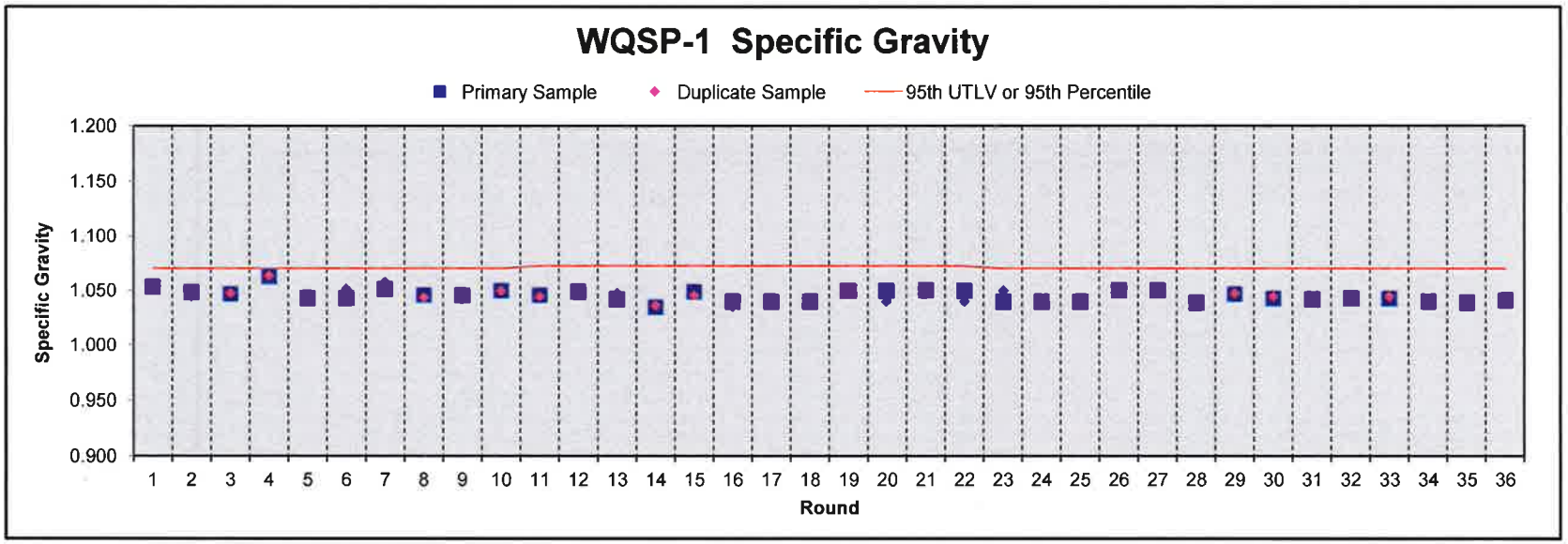
WQSP-1 Vanadium

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	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
Vanadium	36	05/28/14	06/12/14	< 0.0274	0.030	mg/L	0.0274	< 0.1



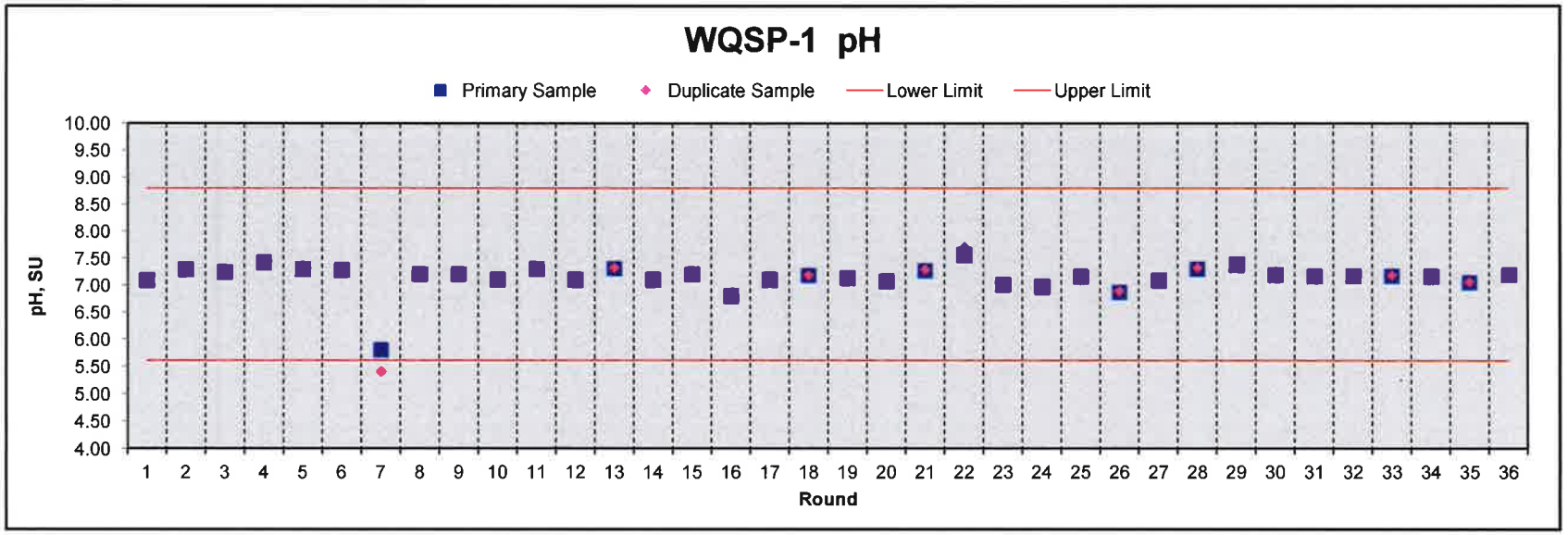
WQSP-1 Specific Gravity

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
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
Specific Gravity	36	05/28/14	06/11/14	1.041	1.044	unitless	0.00	1.07



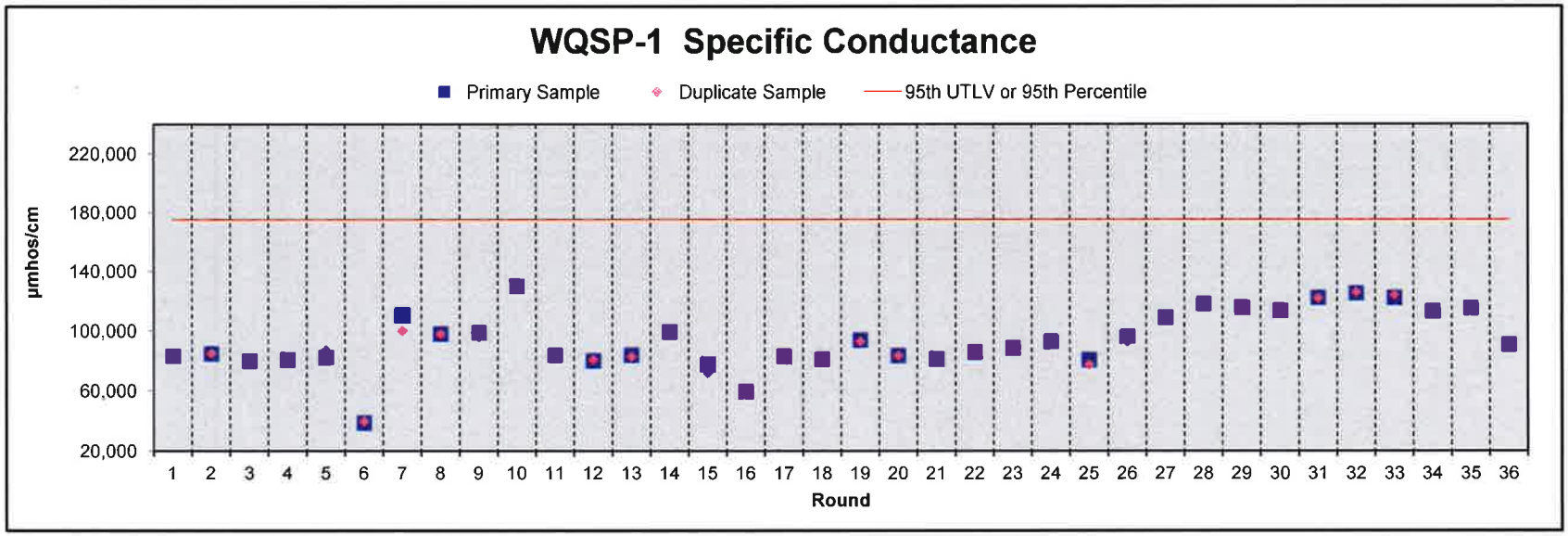
WQSP-1 pH

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	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
pH	36	05/28/14	06/13/01	7.19	7.21	SU	0.1	5.6	8.8



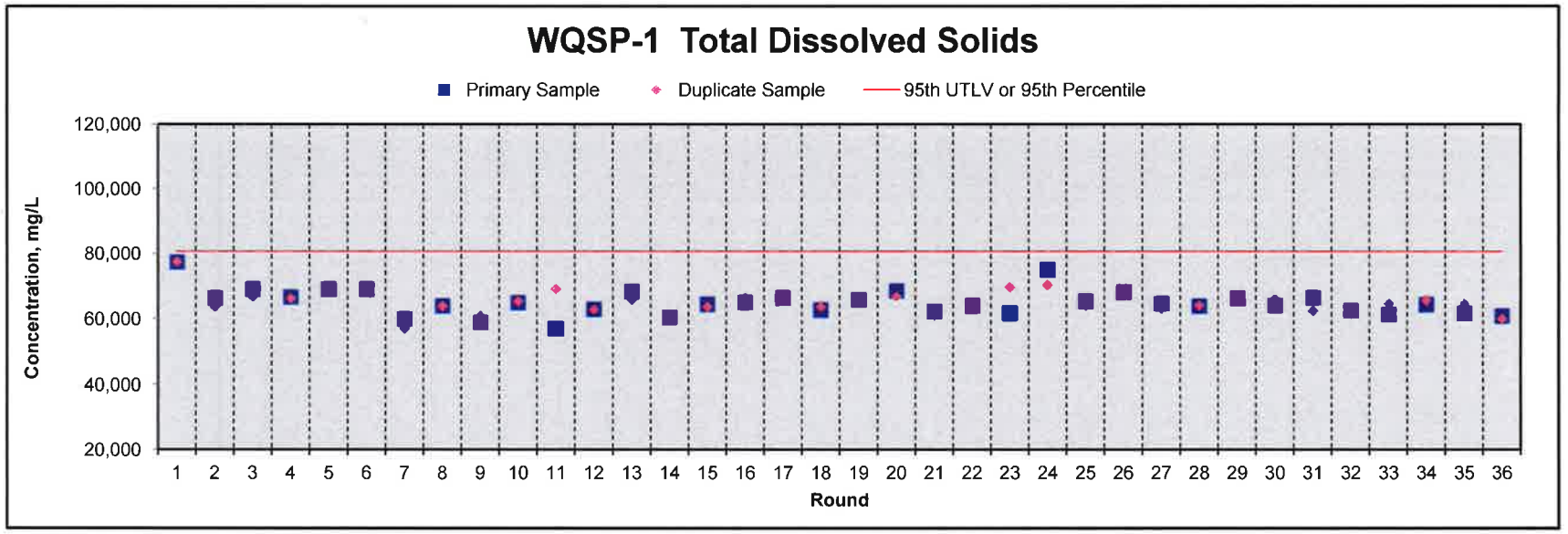
WQSP-1 Specific Conductance

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	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
Specific Conductance	36	05/28/14	05/30/14	91,100	92,900	µmhos/cm	0.10	175,000



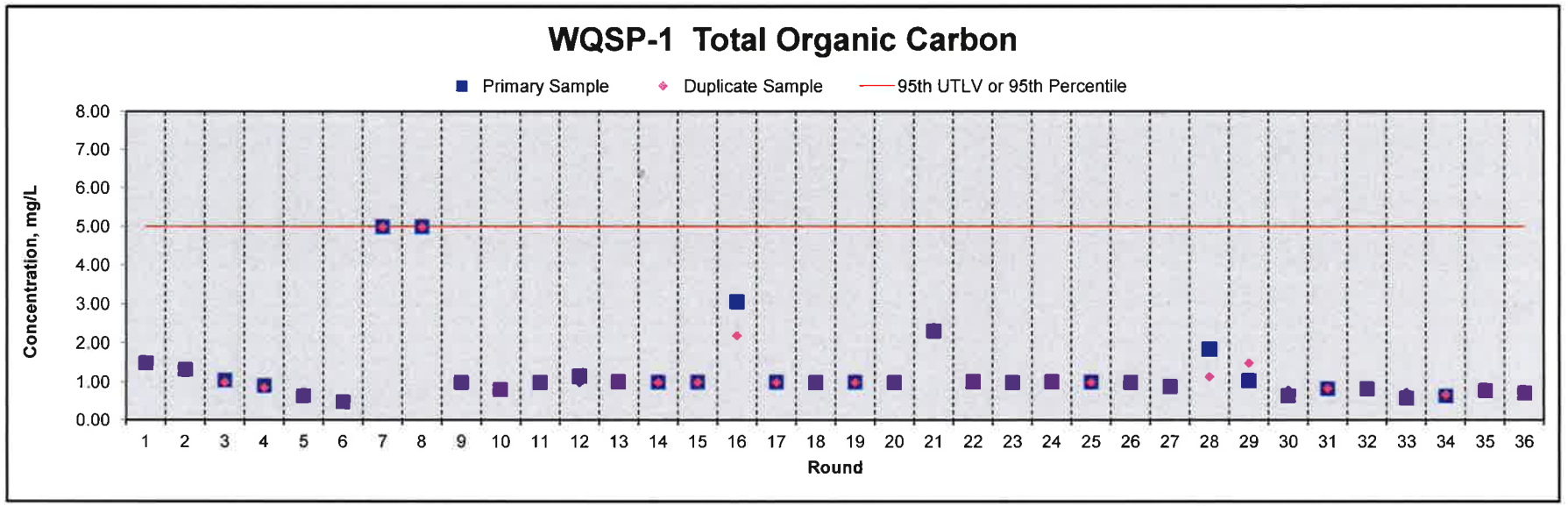
WQSP-1 Total Dissolved Solids

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	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
Total Dissolved Solids	36	05/28/14	06/02/14	61,000	60,200	mg/L	492	80,700



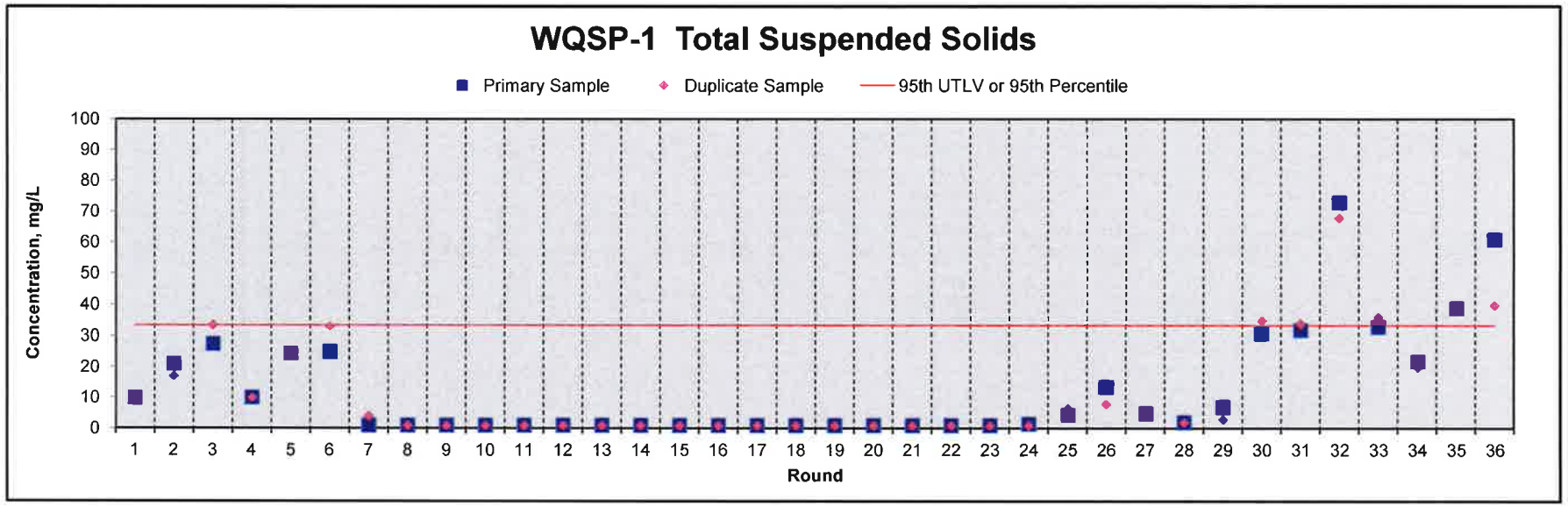
WQSP-1 Total Organic Carbon

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	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
Total Organic Carbon	36	05/28/14	06/02/14	0.72	0.66	mg/L	0.120	< 5.0



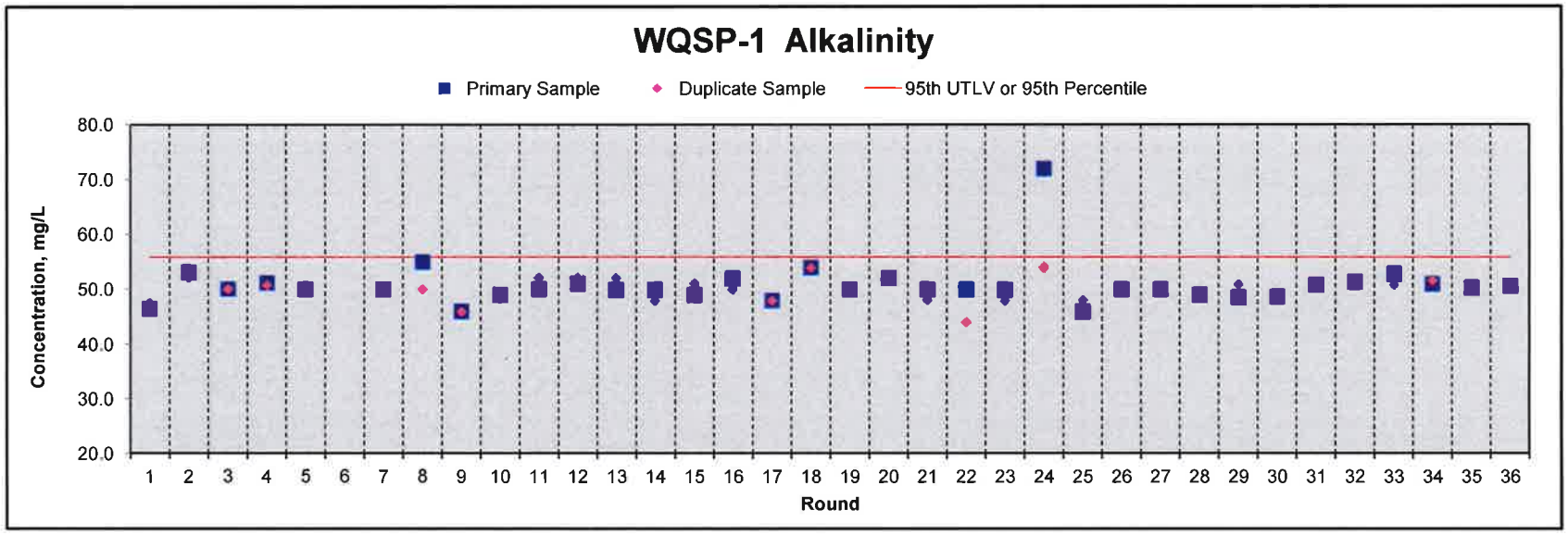
WQSP-1 Total Suspended Solids

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	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**
Total Suspended Solids	36	05/28/14	06/02/14	**61**	**40**	mg/L	3.07	**33.3**



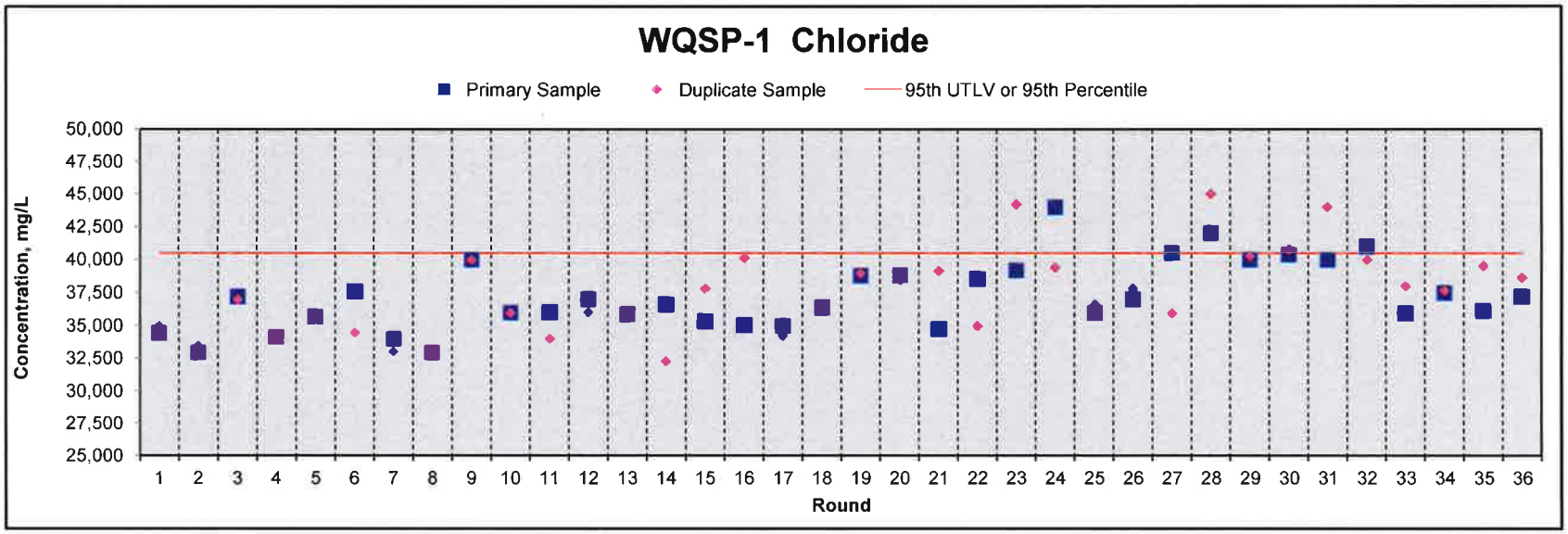
WQSP-1 Alkalinity

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	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
Alkalinity	36	05/28/14	05/30/14	50.6	50.8	mg/L	4.0	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	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
Chloride	36	05/28/14	05/29/14	37,200	38,600	mg/L	500	40,472



WQSP-1

CHAIN OF CUSTODY FORMS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

Hall Environmental Analysis Laboratory

140530 033 HALL Last Due 6/11/2014

1st SAMP 5/28/2014 1st RCVD 5/30/2014

1405C12

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	1405C12-001F	GW-WQ1-C-R36	500HDPEHNO3	Aqueous	5/28/2014 9:16:00 AM	1	SEE BELOW
2	1405C12-002F	GW-WQ1-C-R36 DUPLICATE	500HDPEHNO3	Aqueous	5/28/2014 9:32:00 AM	1	SEE BELOW

MW03BS

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb, Se, Tl BY METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. P
LCSR. SAMPLE MAY HAVE HIGH TDS

Relinquished By:	Date: 5/29/2014	Time: 2:33 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 ☐

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

TEMP: 6.0 °C

PRESERVATIVES: HNO3

NUMBER OF CONTAINERS: 2 SHIPPED VIA: Fedex

DATE & TIME: 5/30/14 12:35 INSPECTED BY:

Comments:

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: 1405C12 | RcptNo: 1

Received by/date: CM 05/29/14

Logged By: Anne Thorne 5/29/2014 9:50:00 AM

Completed By: Anne Thorne 5/29/2014

Reviewed By: 05/29/14

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 05/29/14

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	3.0	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1137

Page 1 of 1

Project Number: T409304-1 **Project Name:** WIPP/DMP

Sampler(s): R. Jimenez, RASpoon

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry	Comments
5/28/14	10:13	GW	GW-WQ1-C-R36-N1	6	X					Use for MS/MSD -001
"	10:20	"	-N1D	4	X					-002
"	09:56	DI	-N2	4	X					Field Blanks -003
N/A	N/A	"	-N3	4	X					Trip Blanks; HEAL -004 provided
5/28/14	10:05	GW	-N4	4		X				Use for MS/MSD -001
	10:10		-N4D	2		X				-002
	09:16		-N5	6			X			Use for MS/MSD -001
	09:32		-N5D	2			X			-002
	09:45 RA 5/29/14		-N6	2				X		Use for MS/MSD -001 time=09:45
	09:50		-N6D	2				X		-002
	09:40		-N7	1					X	Use for MS/MSD -001
"	09:42	GW	-N7D	1					X	-002
							N/A			

Analytical Laboratory: HEAL Albuquerque, NM

HEALH 1405C12

Relinquished By: (Signature, Date/Time) R Spoon 5/28/14 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) 05/29/14 @ 0850

Requested Turnaround Time: Report due 7/3/14

☒ Routine ☐ Rush _____

Sample Receipt Remarks: 3.0°C ON ARRIVAL

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.: 8758 4779 1302

FedEx 8758 4779 1313

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@wipp.ws

Note: 1 Trip Blk contained Bubbles RA

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.

APPENDIX 4

WELL WQSP-2

ANALYTICAL RESULTS

WQSP-2

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-2, Culebra, Round 36

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 36, the static water level was 404.08 ft_{btoc}. One wbv for WQSP-2 was determined to be 357.7 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.

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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).

Due to radiological events that occurred at the WIPP Site in February, the sampling team collected a pre-installation line rinse sample. The dedicated sampling line was flushed with approximately 2 liters of deionized water prior to installation rinse. Rinsate was collected in a certified container, preserved with nitric acid (pH <2) and considered an additional retain sample.

Round 36 pumping of WQSP-2 began on 6/9/2014 at 09:33 and ended on 6/10/2014 at 11:11. The well was purged for 25.6 hours with an average flow rate of 0.38 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 584 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 6/10/2014 after approximately 520 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 465 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 11.63 cell volumes per minute; thus, approximately 58.1 volumes of groundwater (2,325 mL) passed through the in-line flow cell between measurements.

Table 1 provides the initial and final measurements obtained on each field-indicating parameter. Field parameter measurements varied less than 5% over the last 3 measurements within 15 minutes (for SC, pH and temperature) and approximately 45 minutes (for SG) after measurements began on day 1. 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 36[a,b,c].

Item	Day 1		Day 2	
Date	6/9/2014		6/10/2014	
Pump Speed, Hz	41.0		41.0	
Average Flow Rate, gpm	0.38		0.38	
Rate of Exchange, no. cell volumes/min	11.6		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C, µmhos/cm	78,600	83,600	NR	NR
Temperature, °C	21.9	22.3	NR	NR
pH, SU	7.39	7.22	NR	NR
Specific Gravity	1.047	1.046	NR	NR
Time to Parameter Stability, hr:min	1:00		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 36 were compared to the average results from the previous 35 rounds (Table 2). Note the current value for SG (1.046) and pH (7.22 S.U.) were similar to the average results from the previous 35 samplings (1.047 and 7.25 S.U., respectively). Temperature for Round 35 was slightly elevated when compared to the average from previous rounds (22.3°C vs. 21.4°C). The SC measured during Round 36 was higher than the average observed during the previous 35 rounds (83,600 µmhos/cm vs. 79,856 µmhos/cm) but was just under the historical upper limit. All other field parameters (temperature, pH and SG) were within the normal limits observed for WQSP-2 over the past 19 years.

Table 2. Comparison of Round 36 DMW Measurements to Historical Results from Rounds (1-35) for WQSP-2.

Field-analyzed Parameter	Historical Data (Rounds 1 – 35)[a,b]			Measurement Results, Round 36[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	79,856	75,863	83,849	83,600
Temperature, °C	21.4	20.3	22.5	22.3
pH, S.U.	7.25	6.89	7.61	7.22
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

August 11, 2014

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

RE: WIPP DMP

OrderNo.: 1406471

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 6/11/2014 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

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#: **1406471**

11-Aug-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1406471-001	GW-WQ2-C-R36		6/10/2014 8:15:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-001	GW-WQ2-C-R36		6/10/2014 8:15:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-001	GW-WQ2-C-R36		6/10/2014 8:15:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-001	GW-WQ2-C-R36		6/10/2014 8:15:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-001	GW-WQ2-C-R36		6/10/2014 8:15:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-001	GW-WQ2-C-R36		6/10/2014 8:15:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-002	GW-WQ2-C-R36 DUPLICATE		6/10/2014 8:17:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-002	GW-WQ2-C-R36 DUPLICATE		6/10/2014 8:17:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-002	GW-WQ2-C-R36 DUPLICATE		6/10/2014 8:17:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-002	GW-WQ2-C-R36 DUPLICATE		6/10/2014 8:17:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-002	GW-WQ2-C-R36 DUPLICATE		6/10/2014 8:17:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-002	GW-WQ2-C-R36 DUPLICATE		6/10/2014 8:17:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-003	GW-WQ2-C-R36 FIELD BLANK		6/10/2014 9:10:00 AM	6/11/2014 9:03:00 AM	Aqueous
1406471-004	GW-WQ2-C-R36 TRIP BLANK			6/11/2014 9:03:00 AM	Aqueous

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: 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: The % RPD was high for 2,4-Dinitrophenol 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: All acceptance criteria were met.
6. Samples: All acceptance criteria were met.

METHOD: 7470

HOLDING TIMES: Mercury was analyzed past the holding time.

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: The 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

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#: **1406471**
Date: **8/11/2014**

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.

Prep Comments for HG_AQ PREP, Sample 1406471-002E: Prep hold time was exceeded by 8.989 day(s)
Prep Comments for HG_AQ PREP, Sample 1406471-001E: Prep hold time was exceeded by 8.99 day(s)

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DATES REPORT

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406471-001A	GW-WQ2-C-R36	6/10/2014 8:15:00 AM	Aqueous	EPA Method: 8260B			6/12/2014 2:25:55 PM
1406471-001B				EPA Method 8270C: Semivolatiles		6/12/2014 8:48:44 AM	6/16/2014 10:00:46 AM
1406471-001C				SM 5310B: TOC			6/11/2014 2:55:45 PM
1406471-001D				EPA Method 300.0: Anions			6/11/2014 12:55:33 PM
				EPA Method 300.0: Anions			6/11/2014 1:32:47 PM
				EPA Method 300.0: Anions			6/11/2014 1:45:12 PM
				EPA Method 6010B: Dissolved Metals			6/12/2014 1:42:00 PM
				EPA Method 6010B: Dissolved Metals			6/12/2014 1:53:57 PM
				EPA Method 6010B: Dissolved Metals			6/17/2014 11:27:33 AM
				SM 2540 C: Total Dissolved Solids		6/12/2014 3:55:55 PM	6/13/2014 5:05:00 PM
				SM 2540D: TSS		6/12/2014 8:16:14 PM	6/13/2014 7:27:00 AM
				SM 2540D: TSS		6/14/2014 7:14:47 PM	6/15/2014 1:55:00 PM
				SM2320B: Alkalinity			6/11/2014 1:09:48 PM
				SM2510B: Specific Conductance			6/11/2014 1:09:48 PM
				SM2510B: Specific Conductance			6/11/2014 7:14:34 PM
				SM4500-H+B: pH			6/11/2014 1:09:48 PM
				Specific Gravity			6/11/2014 3:06:00 PM
1406471-001E				EPA 6010B: Total Recoverable Metals		6/16/2014 1:35:55 PM	6/17/2014 11:41:22 AM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 2:54:50 PM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:38:38 PM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:15:42 PM
				EPA 6010B: Total Recoverable Metals		6/16/2014 1:35:55 PM	6/17/2014 11:35:46 AM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:22:33 PM

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DATES REPORT

WO#: **1406471**

11-Aug-14

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406471-001E	GW-WQ2-C-R36	6/10/2014 8:15:00 AM	Aqueous	EPA Method 7470: Mercury		7/17/2014 8:01:10 AM	7/17/2014 2:07:00 PM
				EPA Method 7470: Mercury		7/17/2014 8:01:10 AM	7/17/2014 2:54:06 PM
1406471-002A	GW-WQ2-C-R36 DUPLICATE	6/10/2014 8:17:00 AM		EPA Method: 8260B			6/12/2014 2:53:52 PM
1406471-002B				EPA Method 8270C: Semivolatiles		6/12/2014 8:48:44 AM	6/16/2014 11:27:48 AM
1406471-002C				SM 5310B: TOC			6/11/2014 3:47:00 PM
1406471-002D				EPA Method 300.0: Anions			6/11/2014 2:47:15 PM
				EPA Method 300.0: Anions			6/11/2014 2:10:01 PM
				EPA Method 300.0: Anions			6/11/2014 1:57:36 PM
				EPA Method 6010B: Dissolved Metals			6/12/2014 1:55:48 PM
				EPA Method 6010B: Dissolved Metals			6/17/2014 11:29:10 AM
				EPA Method 6010B: Dissolved Metals			6/12/2014 1:57:34 PM
				SM 2540 C: Total Dissolved Solids		6/12/2014 3:55:55 PM	6/13/2014 5:05:00 PM
				SM 2540D: TSS		6/14/2014 7:14:47 PM	6/15/2014 1:55:00 PM
				SM 2540D: TSS		6/12/2014 8:16:14 PM	6/13/2014 7:27:00 AM
				SM2320B: Alkalinity			6/11/2014 1:37:04 PM
				SM2510B: Specific Conductance			6/11/2014 7:20:21 PM
				SM2510B: Specific Conductance			6/11/2014 1:37:04 PM
				SM4500-H+B: pH			6/11/2014 1:37:04 PM
				Specific Gravity			6/11/2014 3:06:00 PM
1406471-002E				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 2:56:28 PM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:40:20 PM
				EPA 6010B: Total Recoverable Metals		6/16/2014 1:35:55 PM	6/17/2014 11:44:44 AM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:30:48 PM

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

DATES REPORT

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406471-002E	GW-WQ2-C-R36 DUPLICATE	6/10/2014 8:17:00 AM	Aqueous	EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:29:06 PM
				EPA 6010B: Total Recoverable Metals		6/16/2014 1:35:55 PM	6/17/2014 11:42:59 AM
				EPA 6010B: Total Recoverable Metals		6/21/2014 12:11:27 PM	6/25/2014 1:42:01 PM
				EPA Method 7470: Mercury		7/17/2014 8:01:10 AM	7/17/2014 2:12:31 PM
1406471-003A	GW-WQ2-C-R36 FIELD BLANK	6/10/2014 9:10:00 AM		EPA Method: 8260B			6/12/2014 3:21:55 PM
1406471-004A	GW-WQ2-C-R36 TRIP BLANK			EPA Method: 8260B			6/12/2014 3:50:02 PM

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: GW-WQ2-C-R36
Project: WIPP DMP
Collection Date: 6/10/2014 8:15:00 AM
Lab ID: 1406471-001
Matrix: AQUEOUS
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	34400	500	1000		mg/L	2000	6/11/2014 1:45:12 PM	R19224
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	6/11/2014 12:55:33 PM	R19224
Sulfate	5190	13.7	100		mg/L	200	6/11/2014 1:32:47 PM	R19224
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.000435	0.00100	H	mg/L	5	7/17/2014 2:54:06 PM	14268
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1600	0.773	20.0		mg/L	20	6/12/2014 1:53:57 PM	R19226
Magnesium	1060	0.377	20.0		mg/L	20	6/12/2014 1:53:57 PM	R19226
Potassium	496	2.02	10.0		mg/L	10	6/12/2014 1:42:00 PM	R19226
Sodium	19900	60.7	500		mg/L	500	6/17/2014 11:27:33 AM	R19318
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0226	0.00312	0.100	J	mg/L	5	6/25/2014 1:22:33 PM	13822
Beryllium	0.00285	0.00176	0.0150	J	mg/L	5	6/25/2014 1:22:33 PM	13822
Cadmium	ND	0.00314	0.0100		mg/L	5	6/25/2014 1:22:33 PM	13822
Calcium	1570	16.3	100		mg/L	100	6/25/2014 1:38:38 PM	13822
Chromium	ND	0.00841	0.0300		mg/L	5	6/25/2014 1:22:33 PM	13822
Iron	ND	0.0507	0.250		mg/L	5	6/25/2014 1:22:33 PM	13822
Lead	ND	0.0239	0.0250		mg/L	5	6/25/2014 1:22:33 PM	13822
Magnesium	1070	1.70	100		mg/L	100	6/25/2014 1:38:38 PM	13822
Nickel	ND	0.00952	0.0500		mg/L	5	6/25/2014 1:22:33 PM	13822
Potassium	481	2.53	5.00		mg/L	5	6/25/2014 1:22:33 PM	13822
Silver	ND	0.00261	0.0250		mg/L	5	6/25/2014 1:22:33 PM	13822
Sodium	20300	208	500		mg/L	500	6/25/2014 2:54:50 PM	13822
Vanadium	0.0300	0.0274	0.250	J	mg/L	5	6/25/2014 1:22:33 PM	13822
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
Hexachloroethane	ND	1.89	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
2-Methylphenol	ND	2.75	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
Nitrobenzene	ND	2.58	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
Pentachlorophenol	ND	2.48	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
Pyridine	ND	1.57	5.00		µg/L	1	6/16/2014 10:00:46 AM	13655
Surr: 2,4,6-Tribromophenol	30.5	0	26-138		%REC	1	6/16/2014 10:00:46 AM	13655

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.
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: GW-WQ2-C-R36
Project: WIPP DMP
Collection Date: 6/10/2014 8:15:00 AM
Lab ID: 1406471-001
Matrix: AQUEOUS
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Surr: 2-Fluorobiphenyl	101	0	48.1-106		%REC	1	6/16/2014 10:00:46 AM	13655
Surr: 2-Fluorophenol	65.2	0	12.1-85.8		%REC	1	6/16/2014 10:00:46 AM	13655
Surr: 4-Terphenyl-d14	99.3	0	44-113		%REC	1	6/16/2014 10:00:46 AM	13655
Surr: Nitrobenzene-d5	101	0	47.5-119		%REC	1	6/16/2014 10:00:46 AM	13655
Surr: Phenol-d5	58.7	0	17.7-65.8		%REC	1	6/16/2014 10:00:46 AM	13655
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Benzene	ND	0.154	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Toluene	ND	0.170	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
2-Butanone	ND	1.42	5.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Chloroform	ND	0.315	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/12/2014 2:25:55 PM	R19292
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/12/2014 2:25:55 PM	R19292
Surr: 1,2-Dichloroethane-d4	89.9	0	70-130		%REC	1	6/12/2014 2:25:55 PM	R19292
Surr: 4-Bromofluorobenzene	98.9	0	70-130		%REC	1	6/12/2014 2:25:55 PM	R19292
Surr: Dibromofluoromethane	97.3	0	70-130		%REC	1	6/12/2014 2:25:55 PM	R19292
Surr: Toluene-d8	92.1	0	70-130		%REC	1	6/12/2014 2:25:55 PM	R19292
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.255	0.161	1.00	J	mg/L	1	6/11/2014 2:55:45 PM	R19203
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	64500	492	1000	*	mg/L	1	6/13/2014 5:05:00 PM	13675
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JRR**	
Conductivity	70100	0.100	0.100		µmhos/c	10	6/11/2014 7:14:34 PM	R19213

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.
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: 1406471-001 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ2-C-R36
Collection Date: 6/10/2014 8:15:00 AM
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JRR**	
pH	7.23	0.100	1.68	H	pH units	1	6/11/2014 1:09:48 PM	R19213
SM2320B: ALKALINITY							Analyst: **JRR**	
Bicarbonate (As CaCO3)	47.6	4.00	20.0		mg/L CaC	1	6/11/2014 1:09:48 PM	R19213
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	6/11/2014 1:09:48 PM	R19213
Total Alkalinity (as CaCO3)	47.6	4.00	20.0		mg/L CaC	1	6/11/2014 1:09:48 PM	R19213
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.043	0	0			1	6/11/2014 3:06:00 PM	R19194
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	40.0	3.07	4.00		mg/L	1	6/15/2014 1:55:00 PM	13704

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
S	Spike Recovery 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.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: GW-WQ2-C-R36 DUPLICATE
Project: WIPP DMP
Collection Date: 6/10/2014 8:17:00 AM
Lab ID: 1406471-002
Matrix: AQUEOUS
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	34400	500	1000		mg/L	2000	6/11/2014 2:47:15 PM	R19224
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	6/11/2014 1:57:36 PM	R19224
Sulfate	5420	13.7	100		mg/L	200	6/11/2014 2:10:01 PM	R19224
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.0000870	0.000200	H	mg/L	1	7/17/2014 2:12:31 PM	14268
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1550	0.773	20.0		mg/L	20	6/12/2014 1:57:34 PM	R19226
Magnesium	1040	0.377	20.0		mg/L	20	6/12/2014 1:57:34 PM	R19226
Potassium	518	2.02	10.0		mg/L	10	6/12/2014 1:55:48 PM	R19226
Sodium	19400	60.7	500		mg/L	500	6/17/2014 11:29:10 AM	R19318
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0234	0.00312	0.100	J	mg/L	5	6/25/2014 1:42:01 PM	13822
Beryllium	0.00200	0.00176	0.0150	J	mg/L	5	6/25/2014 1:42:01 PM	13822
Cadmium	ND	0.00314	0.0100		mg/L	5	6/25/2014 1:42:01 PM	13822
Calcium	1650	16.3	100		mg/L	100	6/25/2014 1:40:20 PM	13822
Chromium	ND	0.00841	0.0300		mg/L	5	6/25/2014 1:42:01 PM	13822
Iron	ND	0.0507	0.250		mg/L	5	6/25/2014 1:30:48 PM	13822
Lead	ND	0.0239	0.0250		mg/L	5	6/25/2014 1:42:01 PM	13822
Magnesium	1130	1.70	100		mg/L	100	6/25/2014 1:40:20 PM	13822
Nickel	ND	0.00952	0.0500		mg/L	5	6/25/2014 1:42:01 PM	13822
Potassium	554	50.6	100		mg/L	100	6/25/2014 1:40:20 PM	13822
Silver	ND	0.00261	0.0250		mg/L	5	6/25/2014 1:42:01 PM	13822
Sodium	19900	208	500		mg/L	500	6/25/2014 2:56:28 PM	13822
Vanadium	0.0292	0.0274	0.250	J	mg/L	5	6/25/2014 1:42:01 PM	13822
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
Hexachloroethane	ND	1.89	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
2-Methylphenol	ND	2.75	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
Nitrobenzene	ND	2.58	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
Pentachlorophenol	ND	2.48	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
Pyridine	ND	1.57	5.00		µg/L	1	6/16/2014 11:27:48 AM	13655
Surr: 2,4,6-Tribromophenol	66.2	0	26-138		%REC	1	6/16/2014 11:27:48 AM	13655

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.
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: GW-WQ2-C-R36 DUPLICATE
Project: WIPP DMP
Collection Date: 6/10/2014 8:17:00 AM
Lab ID: 1406471-002
Matrix: AQUEOUS
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Surr: 2-Fluorobiphenyl	100	0	48.1-106		%REC	1	6/16/2014 11:27:48 AM	13655
Surr: 2-Fluorophenol	72.2	0	12.1-85.8		%REC	1	6/16/2014 11:27:48 AM	13655
Surr: 4-Terphenyl-d14	102	0	44-113		%REC	1	6/16/2014 11:27:48 AM	13655
Surr: Nitrobenzene-d5	103	0	47.5-119		%REC	1	6/16/2014 11:27:48 AM	13655
Surr: Phenol-d5	59.4	0	17.7-65.8		%REC	1	6/16/2014 11:27:48 AM	13655
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Benzene	ND	0.154	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Toluene	ND	0.170	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
2-Butanone	ND	1.42	5.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Chloroform	ND	0.315	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/12/2014 2:53:52 PM	R19292
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/12/2014 2:53:52 PM	R19292
Surr: 1,2-Dichloroethane-d4	90.8	0	70-130		%REC	1	6/12/2014 2:53:52 PM	R19292
Surr: 4-Bromofluorobenzene	94.5	0	70-130		%REC	1	6/12/2014 2:53:52 PM	R19292
Surr: Dibromofluoromethane	98.1	0	70-130		%REC	1	6/12/2014 2:53:52 PM	R19292
Surr: Toluene-d8	89.0	0	70-130		%REC	1	6/12/2014 2:53:52 PM	R19292
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.208	0.161	1.00	J	mg/L	1	6/11/2014 3:47:00 PM	R19203
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	60800	492	1000	*	mg/L	1	6/13/2014 5:05:00 PM	13675
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JRR**	
Conductivity	75000	0.100	0.100		µmhos/c	10	6/11/2014 7:20:21 PM	R19213

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.
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: 1406471-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ2-C-R36 DUPLICATE
Collection Date: 6/10/2014 8:17:00 AM
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JRR**	
pH	7.25	0.100	1.68	H	pH units	1	6/11/2014 1:37:04 PM	R19213
SM2320B: ALKALINITY							Analyst: **JRR**	
Bicarbonate (As CaCO3)	48.2	4.00	20.0		mg/L CaC	1	6/11/2014 1:37:04 PM	R19213
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	6/11/2014 1:37:04 PM	R19213
Total Alkalinity (as CaCO3)	48.2	4.00	20.0		mg/L CaC	1	6/11/2014 1:37:04 PM	R19213
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.044	0	0			1	6/11/2014 3:06:00 PM	R19194
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	33.0	3.07	4.00		mg/L	1	6/15/2014 1:55:00 PM	13704

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.
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: GW-WQ2-C-R36 FIELD BLAN
Project: WIPP DMP
Collection Date: 6/10/2014 9:10:00 AM
Lab ID: 1406471-003
Matrix: AQUEOUS
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Benzene	ND	0.154	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Toluene	ND	0.170	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
2-Butanone	5.73	1.42	5.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Chloroform	0.518	0.315	1.00	J	µg/L	1	6/12/2014 3:21:55 PM	R19292
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/12/2014 3:21:55 PM	R19292
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/12/2014 3:21:55 PM	R19292
Surr: 1,2-Dichloroethane-d4	88.5	0	70-130		%REC	1	6/12/2014 3:21:55 PM	R19292
Surr: 4-Bromofluorobenzene	93.0	0	70-130		%REC	1	6/12/2014 3:21:55 PM	R19292
Surr: Dibromofluoromethane	97.0	0	70-130		%REC	1	6/12/2014 3:21:55 PM	R19292
Surr: Toluene-d8	89.2	0	70-130		%REC	1	6/12/2014 3:21:55 PM	R19292

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.
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: GW-WQ2-C-R36 TRIP BLANK
Project: WIPP DMP
Collection Date:
Lab ID: 1406471-004
Matrix: AQUEOUS
Received Date: 6/11/2014 9:03:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Benzene	ND	0.154	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Toluene	ND	0.170	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
2-Butanone	ND	1.42	5.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Chloroform	ND	0.315	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/12/2014 3:50:02 PM	R19292
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/12/2014 3:50:02 PM	R19292
Surr: 1,2-Dichloroethane-d4	87.9	0	70-130		%REC	1	6/12/2014 3:50:02 PM	R19292
Surr: 4-Bromofluorobenzene	94.9	0	70-130		%REC	1	6/12/2014 3:50:02 PM	R19292
Surr: Dibromofluoromethane	96.9	0	70-130		%REC	1	6/12/2014 3:50:02 PM	R19292
Surr: Toluene-d8	89.3	0	70-130		%REC	1	6/12/2014 3:50:02 PM	R19292

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.
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	GW-WQ2-C-R36 1406471-01		GW-WQ2-C-R36 dup 1406471-02							
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	19900	865.59	19400	843.85						
Potassium	496	12.69	518	13.25						
Calcium	1600	79.84	1550	77.35						
Magnesium	1060	87.24	1040	85.60						
Total Cations		1045.36		1020.04						
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	5190	108.06	5420	112.85						
Chloride	34400	970.38	34400	970.38						
Bicarbonate (CaCO3)	47.6	0.95	48.2	0.96						
Carbonate (CaCO3)										
Phosphate (P)										
Nitrite (N)										
Nitrate (N)										
Fluoride										
Bromide										
Total Anions		1079.39		1084.19						
Elect. Cond. (µMhos/cm)	70100		75000							
CATION/ANION RATIO		0.97		0.94						
% Difference		2		3						
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	64500		60800							
TDS (calculated)	62675		62357							
Ratio meas TDS:calc TDS		1.0		1.0						
Ratio Meas. TDS:EC		0.92		0.81						
Ratio Calc. TDS:EC		0.89		0.83						
Ratio of anion sum:EC		1.5		1.4						
Ratio of cation sum:EC		1.5		1.4						

* 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 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 July 1, 2014

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.: 1406471
Anatek Batch: 140612032

Project Summary: Two (2) water samples were received on 6/12/2014 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 5.5C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1406471-001F / GW-WQ2-C-R36	140612032-001	EPA 6020A
1406471-002F / GW-WQ2-C-R36 DUPLICATE	140612032-002	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?	N	See Note
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

Selenium MS %R was above method control limits. The LCS was acceptable. Potential matrix effect.

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 #: 140612032
Project Name: 1406471

Analytical Results Report

Sample Number 140612032-001 **Sampling Date** 6/10/2014 **Date/Time Received** 6/12/2014 12:45 PM
Client Sample ID 1406471-001F / GW-WQ2-C-R36 **Sampling Time** 8:15 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	R13
Thallium	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	

Sample Number 140612032-002 **Sampling Date** 6/10/2014 **Date/Time Received** 6/12/2014 12:45 PM
Client Sample ID 1406471-002F / GW-WQ2-C-R36 DUPLICATE **Sampling Time** 8:17 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	R13
Thallium	ND	mg/L	0.025	6/23/2014	ETL	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit
R13	Matrix spike recovery was above method acceptance limits; the associated blank spike recovery and matrix spike duplicate recovery were acceptable.

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):E87693; ID:ID00013; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0096; FL(NELAP): E871099

Tuesday, July 01, 2014

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 #: 140612032
Project Name: 1406471

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0519	mg/L	0.05	103.8	80-120	6/16/2014	6/23/2014
Selenium	0.0497	mg/L	0.05	99.4	80-120	6/16/2014	6/23/2014
Arsenic	0.0498	mg/L	0.05	99.6	80-120	6/16/2014	6/23/2014
Antimony	0.0569	mg/L	0.05	113.8	80-120	6/16/2014	6/23/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0514	mg/L	0.05	102.8	1.0	0-20	6/16/2014	6/23/2014
Selenium	0.0502	mg/L	0.05	100.4	7.0	0-20	6/16/2014	6/23/2014
Arsenic	0.0495	mg/L	0.05	99.0	0.6	0-20	6/16/2014	6/23/2014
Antimony	0.0571	mg/L	0.05	114.2	0.4	0-20	6/16/2014	6/23/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140612032-001	Thallium	ND	0.0506	mg/L	0.05	101.2	75-125	6/16/2014	6/23/2014
140612032-001	Selenium	ND	0.0636	mg/L	0.05	127.2	75-125	6/16/2014	6/23/2014
140612032-001	Arsenic	ND	0.0597	mg/L	0.05	119.4	75-125	6/16/2014	6/23/2014
140612032-001	Antimony	ND	0.0593	mg/L	0.05	118.6	75-125	6/16/2014	6/23/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0520	mg/L	0.05	104.0	2.7	0-20	6/16/2014	6/23/2014
Selenium	0.0572	mg/L	0.05	114.4	10.6	0-20	6/16/2014	6/23/2014
Arsenic	0.0569	mg/L	0.05	113.8	4.8	0-20	6/16/2014	6/23/2014
Antimony	0.0575	mg/L	0.05	115.0	3.1	0-20	6/16/2014	6/23/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	6/16/2014	6/23/2014
Arsenic	ND	mg/L	0.001	6/16/2014	6/23/2014

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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 #: 140612032
Project Name: 1406471

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Selenium	ND	mg/L	0.001	6/16/2014	6/23/2014
Thallium	ND	mg/L	0.001	6/16/2014	6/23/2014

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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Tuesday, July 01, 2014

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-13675**	SampType:	**MBLK**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**PBW**	Batch ID:	**13675**		RunNo:	**19264**				
Prep Date:	**6/12/2014**	Analysis Date:	**6/13/2014**		SeqNo:	**556840**	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-13675**	SampType:	**LCS**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**LCSW**	Batch ID:	**13675**		RunNo:	**19264**				
Prep Date:	**6/12/2014**	Analysis Date:	**6/13/2014**		SeqNo:	**556841**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	20.0	1000	0	103	80	120			

Sample ID	**LCSR-13675**	SampType:	**LCSR**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**BatchQC**	Batch ID:	**13675**		RunNo:	**19264**				
Prep Date:	**6/12/2014**	Analysis Date:	**6/13/2014**		SeqNo:	**556842**	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	**1406471-001DMS**	SampType:	**MS**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**GW-WQ2-C-R36**	Batch ID:	**13675**		RunNo:	**19264**				
Prep Date:	**6/12/2014**	Analysis Date:	**6/13/2014**		SeqNo:	**556844**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	114000	1000	50000	64500	99.7	80	120			

Sample ID	**1406471-001DMSD**	SampType:	**MSD**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**GW-WQ2-C-R36**	Batch ID:	**13675**		RunNo:	**19264**				
Prep Date:	**6/12/2014**	Analysis Date:	**6/13/2014**		SeqNo:	**556845**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	114000	1000	50000	64500	99.8	80	120	0.0437	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13675**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **13675**	RunNo: **19264**
Prep Date: **6/12/2014**	Analysis Date: **6/13/2014**	SeqNo: **556841** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	20.0	1000	0	103	80	120			

Sample ID: **LCSR-13675**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **13675**	RunNo: **19264**
Prep Date: **6/12/2014**	Analysis Date: **6/13/2014**	SeqNo: **556842** 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	0.579	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R19224**	RunNo: **19224**
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555796** 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: **R19224**	RunNo: **19224**
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555797** 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: **R19224**	RunNo: **19224**
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555798** 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	93.3	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	97.9	90	110			
Sulfate	9.6	0.50	10.00	0	95.6	90	110			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R19224**	RunNo: **19224**
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555799** 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	92.2	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.9	90	110			
Sulfate	9.4	0.50	10.00	0	94.2	90	110			

Sample ID **1406471-001DMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ2-C-R36**	Batch ID: **R19224**	RunNo: **19224**
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555801** 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	87.8	111			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	1406471-001DMSD	SampType:	MSD		TestCode:	EPA Method 300.0: Anions				
Client ID:	GW-WQ2-C-R36	Batch ID:	R19224		RunNo:	19224				
Prep Date:		Analysis Date:	6/11/2014		SeqNo:	555802	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	118	5.00	125.0	0	94.2	87.8	111	1.32	20	

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R19224		RunNo:	19224				
Prep Date:		Analysis Date:	6/11/2014		SeqNo:	555808	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:	R19224		RunNo:	19224				
Prep Date:		Analysis Date:	6/11/2014		SeqNo:	555819	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:	R19224		RunNo:	19224				
Prep Date:		Analysis Date:	6/11/2014		SeqNo:	555831	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:	R19224		RunNo:	19224				
Prep Date:		Analysis Date:	6/11/2014		SeqNo:	555843	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R19224**	RunNo: **19224**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555855** 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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R19224**	RunNo: **19224**							
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555798**	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	93.3	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	97.9	90	110			
Sulfate	9.6	0.50	10.00	0	95.6	90	110			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R19224**	RunNo: **19224**							
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555799**	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	92.2	90	110	1.21	0	
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.9	90	110	0.957	0	
Sulfate	9.4	0.50	10.00	0	94.2	90	110	1.49	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **5mL-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557750** 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	0.337	3.00								J
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	1.50								
Surr: 1,2-Dichloroethane-d4	9.32		10.00		93.2	70	130			
Surr: 4-Bromofluorobenzene	9.73		10.00		97.3	70	130			
Surr: Dibromofluoromethane	10.1		10.00		101	70	130			
Surr: Toluene-d8	8.83		10.00		88.3	70	130			

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557751** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	29.1	5.00	40.00	0	72.8	60	140			
Benzene	21.5	1.00	20.00	0	107	70	130			
Toluene	21.2	1.00	20.00	0	106	80	120			
1,2-Dichloroethane (EDC)	20.8	1.00	20.00	0	104	70	130			
2-Butanone	35.7	5.00	40.00	0	89.2	60	140			
Carbon Tetrachloride	19.5	1.00	20.00	0	97.6	70	130			
Chlorobenzene	21.9	1.00	20.00	0	110	70	130			
Chloroform	20.3	1.00	20.00	0	102	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557751** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	21.4	1.00	20.00	0	107	70	130			
1,1-Dichloroethane	21.5	1.00	20.00	0	108	70	130			
1,1-Dichloroethene	17.6	1.00	20.00	0	87.8	80	120			
Methylene Chloride	18.9	3.00	20.00	0	94.3	70	130			
1,1,2,2-Tetrachloroethane	19.5	1.00	20.00	0	97.7	70	130			
Tetrachloroethene (PCE)	24.1	1.00	20.00	0	120	70	130			
trans-1,2-DCE	18.8	1.00	20.00	0	94.1	70	130			
1,1,1-Trichloroethane	21.3	1.00	20.00	0	106	70	130			
1,1,2-Trichloroethane	22.0	1.00	20.00	0	110	70	130			
Trichloroethene (TCE)	21.5	1.00	20.00	0	107	70	130			
Trichlorofluoromethane	20.0	1.00	20.00	0	99.9	70	130			
Vinyl chloride	19.1	1.00	20.00	0	95.6	80	120			
Xylenes, Total	63.9	1.50	60.00	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	9.41		10.00		94.1	70	130			
Surr: 4-Bromofluorobenzene	9.43		10.00		94.3	70	130			
Surr: Dibromofluoromethane	10.3		10.00		103	70	130			
Surr: Toluene-d8	8.95		10.00		89.5	70	130			

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557752** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	29.5	5.00	40.00	0	73.8	59.8	152			
Benzene	21.2	1.00	20.00	0	106	70	130			
Toluene	20.3	1.00	20.00	0	102	80	120			
1,2-Dichloroethane (EDC)	20.7	1.00	20.00	0	103	70	130			
2-Butanone	45.5	5.00	40.00	0	114	60	140			
Carbon Tetrachloride	19.1	1.00	20.00	0	95.7	70	130			
Chlorobenzene	21.5	1.00	20.00	0	108	70	130			
Chloroform	19.7	1.00	20.00	0	98.6	75.6	123			
cis-1,2-DCE	21.3	1.00	20.00	0	107	70	130			
1,1-Dichloroethane	21.2	1.00	20.00	0	106	70	130			
1,1-Dichloroethene	17.6	1.00	20.00	0	87.9	78.1	129			
Methylene Chloride	19.4	3.00	20.00	0	96.9	70	130			
1,1,2,2-Tetrachloroethane	18.3	1.00	20.00	0	91.5	67.3	134			
Tetrachloroethene (PCE)	22.4	1.00	20.00	0	112	70	130			
trans-1,2-DCE	18.7	1.00	20.00	0	93.6	70	130			
1,1,1-Trichloroethane	21.1	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557752** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	20.4	1.00	20.00	0	102	70	130			
Trichloroethene (TCE)	21.6	1.00	20.00	0	108	70	130			
Trichlorofluoromethane	20.7	1.00	20.00	0	103	70	130			
Vinyl chloride	20.7	1.00	20.00	0	103	76.5	131			
Xylenes, Total	60.5	1.50	60.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	9.07		10.00		90.7	70	130			
Surr: 4-Bromofluorobenzene	8.73		10.00		87.3	70	130			
Surr: Dibromofluoromethane	10.0		10.00		100	70	130			
Surr: Toluene-d8	8.75		10.00		87.5	70	130			

Sample ID **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557753** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	30.1	5.00	40.00	0	75.2	59.8	152			
Benzene	20.6	1.00	20.00	0	103	70	130			
Toluene	19.8	1.00	20.00	0	99.1	80	120			
1,2-Dichloroethane (EDC)	20.9	1.00	20.00	0	104	70	130			
2-Butanone	49.5	5.00	40.00	0	124	60	140			
Carbon Tetrachloride	18.3	1.00	20.00	0	91.4	70	130			
Chlorobenzene	21.4	1.00	20.00	0	107	70	130			
Chloroform	19.4	1.00	20.00	0	97.1	75.6	123			
cis-1,2-DCE	20.6	1.00	20.00	0	103	70	130			
1,1-Dichloroethane	20.7	1.00	20.00	0	104	70	130			
1,1-Dichloroethene	16.6	1.00	20.00	0	82.8	78.1	129			
Methylene Chloride	18.8	3.00	20.00	0	93.9	70	130			
1,1,2,2-Tetrachloroethane	19.3	1.00	20.00	0	96.6	67.3	134			
Tetrachloroethene (PCE)	21.8	1.00	20.00	0	109	70	130			
trans-1,2-DCE	18.0	1.00	20.00	0	89.9	70	130			
1,1,1-Trichloroethane	20.0	1.00	20.00	0	100	70	130			
1,1,2-Trichloroethane	20.9	1.00	20.00	0	104	70	130			
Trichloroethene (TCE)	19.5	1.00	20.00	0	97.5	70	130			
Trichlorofluoromethane	19.8	1.00	20.00	0	98.9	70	130			
Vinyl chloride	19.5	1.00	20.00	0	97.6	76.5	131			
Xylenes, Total	60.9	1.50	60.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	9.21		10.00		92.1	70	130			
Surr: 4-Bromofluorobenzene	8.70		10.00		87.0	70	130			
Surr: Dibromofluoromethane	9.84		10.00		98.4	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557753** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Toluene-d8	8.85		10.00		88.5	70	130			

Sample ID **1406471-001a ms4**	SampType: **MS4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ2-C-R36**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557755** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	54.9	5.00	40.00	0	137	31.1	273			
Benzene	15.6	1.00	15.00	0	104	70	130			
Toluene	15.1	1.00	15.00	0	100	70	130			
1,2-Dichloroethane (EDC)	16.4	1.00	15.00	0	109	70	130			
2-Butanone	41.5	5.00	30.00	0	138	21.9	285			
Carbon Tetrachloride	13.8	1.00	15.00	0	91.8	70	130			
Chlorobenzene	15.7	1.00	15.00	0	105	70	130			
Chloroform	14.9	1.00	15.00	0	99.1	70	130			
cis-1,2-DCE	15.9	1.00	15.00	0	106	70	130			
1,1-Dichloroethane	15.8	1.00	15.00	0	106	70	130			
1,1-Dichloroethene	13.7	1.00	15.00	0	91.2	70	130			
Methylene Chloride	13.9	3.00	15.00	0	92.4	70	130			
1,1,2,2-Tetrachloroethane	17.8	1.00	15.00	0	118	72.8	164			
Tetrachloroethene (PCE)	16.3	1.00	15.00	0	109	70	130			
trans-1,2-DCE	13.9	1.00	15.00	0	92.9	70	130			
1,1,1-Trichloroethane	15.4	1.00	15.00	0	102	70	130			
1,1,2-Trichloroethane	16.7	1.00	15.00	0	111	70	130			
Trichloroethene (TCE)	14.6	1.00	15.00	0	97.0	70	130			
Trichlorofluoromethane	15.7	1.00	15.00	0	105	70	130			
Vinyl chloride	16.3	1.00	15.00	0	109	70	130			
Xylenes, Total	44.0	1.50	45.00	0	97.8	70	130			
Surr: 1,2-Dichloroethane-d4	9.66		10.00		96.6	70	130			
Surr: 4-Bromofluorobenzene	8.63		10.00		86.3	70	130			
Surr: Dibromofluoromethane	9.87		10.00		98.7	70	130			
Surr: Toluene-d8	8.81		10.00		88.1	70	130			

Sample ID **1406471-001a msd4**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ2-C-R36**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557756** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	54.6	5.00	40.00	0	137	31.1	273	0.419	20	
Benzene	16.5	1.00	15.00	0	110	70	130	5.55	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **1406471-001a msd4**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ2-C-R36**	Batch ID: **R19292**	RunNo: **19292**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557756** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	15.8	1.00	15.00	0	105	70	130	4.78	20	
1,2-Dichloroethane (EDC)	17.8	1.00	15.00	0	118	70	130	7.95	20	
2-Butanone	45.5	5.00	30.00	0	152	21.9	285	9.08	20	
Carbon Tetrachloride	13.7	1.00	15.00	0	91.6	70	130	0.272	20	
Chlorobenzene	16.7	1.00	15.00	0	111	70	130	6.34	20	
Chloroform	15.6	1.00	15.00	0	104	70	130	4.95	20	
cis-1,2-DCE	17.3	1.00	15.00	0	115	70	130	8.41	20	
1,1-Dichloroethane	16.8	1.00	15.00	0	112	70	130	6.10	20	
1,1-Dichloroethene	13.8	1.00	15.00	0	92.3	70	130	1.14	20	
Methylene Chloride	15.0	3.00	15.00	0	100	70	130	7.82	20	
1,1,2,2-Tetrachloroethane	17.9	1.00	15.00	0	119	72.8	164	0.823	20	
Tetrachloroethene (PCE)	17.1	1.00	15.00	0	114	70	130	4.66	20	
trans-1,2-DCE	14.8	1.00	15.00	0	98.5	70	130	5.81	20	
1,1,1-Trichloroethane	16.1	1.00	15.00	0	107	70	130	4.63	20	
1,1,2-Trichloroethane	18.0	1.00	15.00	0	120	70	130	7.56	20	
Trichloroethene (TCE)	17.7	1.00	15.00	0	118	70	130	19.5	20	
Trichlorofluoromethane	16.0	1.00	15.00	0	106	70	130	1.67	20	
Vinyl chloride	16.5	1.00	15.00	0	110	70	130	1.09	20	
Xylenes, Total	45.9	1.50	45.00	0	102	70	130	4.11	20	
Surr: 1,2-Dichloroethane-d4	9.83		10.00		98.3	70	130	0		
Surr: 4-Bromofluorobenzene	8.71		10.00		87.1	70	130	0		
Surr: Dibromofluoromethane	10.4		10.00		104	70	130	0		
Surr: Toluene-d8	8.96		10.00		89.6	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**							
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557752**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	29.5	5.00	40.00	0	73.8	59.8	152			
Benzene	21.2	1.00	20.00	0	106	70	130			
Toluene	20.3	1.00	20.00	0	102	80	120			
1,2-Dichloroethane (EDC)	20.7	1.00	20.00	0	103	70	130			
2-Butanone	45.5	5.00	40.00	0	114	60	140			
Carbon Tetrachloride	19.1	1.00	20.00	0	95.7	70	130			
Chlorobenzene	21.5	1.00	20.00	0	108	70	130			
Chloroform	19.7	1.00	20.00	0	98.6	75.6	123			
cis-1,2-DCE	21.3	1.00	20.00	0	107	70	130			
1,1-Dichloroethane	21.2	1.00	20.00	0	106	70	130			
1,1-Dichloroethene	17.6	1.00	20.00	0	87.9	78.1	129			
Methylene Chloride	19.4	3.00	20.00	0	96.9	70	130			
1,1,2,2-Tetrachloroethane	18.3	1.00	20.00	0	91.5	67.3	134			
Tetrachloroethene (PCE)	22.4	1.00	20.00	0	112	70	130			
trans-1,2-DCE	18.7	1.00	20.00	0	93.6	70	130			
1,1,1-Trichloroethane	21.1	1.00	20.00	0	105	70	130			
1,1,2-Trichloroethane	20.4	1.00	20.00	0	102	70	130			
Trichloroethene (TCE)	21.6	1.00	20.00	0	108	70	130			
Trichlorofluoromethane	20.7	1.00	20.00	0	103	70	130			
Vinyl chloride	20.7	1.00	20.00	0	103	76.5	131			
Xylenes, Total	60.5	1.50	60.00	0	101	70	130			
Surr: 1,2-Dichloroethane-d4	9.07		10.00		90.7	70	130			
Surr: 4-Bromofluorobenzene	8.73		10.00		87.3	70	130			
Surr: Dibromofluoromethane	10.0		10.00		100	70	130			
Surr: Toluene-d8	8.75		10.00		87.5	70	130			

Sample ID: **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**							
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557753**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	30.1	5.00	40.00	0	75.2	59.8	152	1.83	0	
Benzene	20.6	1.00	20.00	0	103	70	130	3.01	0	
Toluene	19.8	1.00	20.00	0	99.1	80	120	2.64	0	
1,2-Dichloroethane (EDC)	20.9	1.00	20.00	0	104	70	130	1.12	0	
2-Butanone	49.5	5.00	40.00	0	124	60	140	8.31	0	
Carbon Tetrachloride	18.3	1.00	20.00	0	91.4	70	130	4.66	0	
Chlorobenzene	21.4	1.00	20.00	0	107	70	130	0.602	0	
Chloroform	19.4	1.00	20.00	0	97.1	75.6	123	1.56	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19292**	RunNo: **19292**							
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **557753**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	20.6	1.00	20.00	0	103	70	130	3.32	0	
1,1-Dichloroethane	20.7	1.00	20.00	0	104	70	130	2.18	0	
1,1-Dichloroethene	16.6	1.00	20.00	0	82.8	78.1	129	5.92	0	
Methylene Chloride	18.8	3.00	20.00	0	93.9	70	130	3.17	0	
1,1,2,2-Tetrachloroethane	19.3	1.00	20.00	0	96.6	67.3	134	5.39	0	
Tetrachloroethene (PCE)	21.8	1.00	20.00	0	109	70	130	2.63	0	
trans-1,2-DCE	18.0	1.00	20.00	0	89.9	70	130	3.95	0	
1,1,1-Trichloroethane	20.0	1.00	20.00	0	100	70	130	4.95	0	
1,1,2-Trichloroethane	20.9	1.00	20.00	0	104	70	130	2.08	0	
Trichloroethene (TCE)	19.5	1.00	20.00	0	97.5	70	130	10.2	0	
Trichlorofluoromethane	19.8	1.00	20.00	0	98.9	70	130	4.39	0	
Vinyl chloride	19.5	1.00	20.00	0	97.6	76.5	131	5.79	0	
Xylenes, Total	60.9	1.50	60.00	0	102	70	130	0.672	0	
Surr: 1,2-Dichloroethane-d4	9.21		10.00		92.1	70	130	0	0	
Surr: 4-Bromofluorobenzene	8.70		10.00		87.0	70	130	0	0	
Surr: Dibromofluoromethane	9.84		10.00		98.4	70	130	0	0	
Surr: Toluene-d8	8.85		10.00		88.5	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.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

Client: WIPP
Project: WIPP DMP

Sample ID **80ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **R19296**	RunNo: **19296**							
Prep Date:	Analysis Date: **6/16/2014**	SeqNo: **557765**	Units: **%REC**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	80.5		80.00		101	60	140			
Surr: Phenol-d5	82.4		80.00		103	60	140			
Surr: 2,4,6-Tribromophenol	82.9		80.00		104	60	140			
Surr: Nitrobenzene-d5	80.2		80.00		100	60	140			
Surr: 2-Fluorobiphenyl	77.4		80.00		96.8	60	140			
Surr: 4-Terphenyl-d14	86.7		80.00		108	60	140			

Sample ID **mb-13655**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **PBW**	Batch ID: **13655**	RunNo: **19296**							
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557766**	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-Fluorophenol	149		200.0		74.5	12.1	85.8			
Surr: Phenol-d5	104		200.0		51.8	17.7	65.8			
Surr: 2,4,6-Tribromophenol	181		200.0		90.7	26	138			
Surr: Nitrobenzene-d5	96.0		100.0		96.0	47.5	119			
Surr: 2-Fluorobiphenyl	94.6		100.0		94.6	48.1	106			
Surr: 4-Terphenyl-d14	101		100.0		101	44	113			

Sample ID **lcs-13655**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **13655**	RunNo: **19296**							
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557767**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	53.8	5.00	100.0	0	53.8	27.4	101			
1,4-Dichlorobenzene	51.6	5.00	100.0	0	51.6	32.6	91.5			
2,4-Dinitrophenol	46.0	5.00	100.0	0	46.0	23.1	118			
2,4-Dinitrotoluene	69.7	5.00	100.0	0	69.7	44.7	112			
Hexachlorobenzene	71.0	5.00	100.0	0	71.0	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-13655**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13655**	RunNo: **19296**
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557767** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	50.6	5.00	100.0	0	50.6	23.2	97.8			
2-Methylphenol	60.5	5.00	100.0	0	60.5	36.1	105			
3+4-Methylphenol	56.2	5.00	100.0	0	56.2	35.7	92.5			
Nitrobenzene	59.4	5.00	100.0	0	59.4	30.9	125			
Pentachlorophenol	58.8	5.00	100.0	0	58.8	20.2	93			
Pyridine	45.2	5.00	100.0	0	45.2	5.14	87.1			
Surr: 2-Fluorophenol	46.7		100.0		46.7	12.1	85.8			
Surr: Phenol-d5	42.0		100.0		42.0	17.7	65.8			
Surr: 2,4,6-Tribromophenol	72.9		100.0		72.9	26	138			
Surr: Nitrobenzene-d5	62.7		100.0		62.7	47.5	119			
Surr: 2-Fluorobiphenyl	67.2		100.0		67.2	48.1	106			
Surr: 4-Terphenyl-d14	61.6		100.0		61.6	44	113			

Sample ID **lcs-13655**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13655**	RunNo: **19296**
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557768** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	55.8	5.00	100.0	0	55.8	27.4	101			
1,4-Dichlorobenzene	52.3	5.00	100.0	0	52.3	32.6	91.5			
2,4-Dinitrophenol	48.6	5.00	100.0	0	48.6	23.1	118			
2,4-Dinitrotoluene	68.9	5.00	100.0	0	68.9	44.7	112			
Hexachlorobenzene	68.2	5.00	100.0	0	68.2	30	130			
Hexachloroethane	52.6	5.00	100.0	0	52.6	23.2	97.8			
2-Methylphenol	63.5	5.00	100.0	0	63.5	36.1	105			
3+4-Methylphenol	57.9	5.00	100.0	0	57.9	35.7	92.5			
Nitrobenzene	60.9	5.00	100.0	0	60.9	30.9	125			
Pentachlorophenol	59.1	5.00	100.0	0	59.1	20.2	93			
Pyridine	47.0	5.00	100.0	0	47.0	5.14	87.1			
Surr: 2-Fluorophenol	47.8		100.0		47.8	12.1	85.8			
Surr: Phenol-d5	42.5		100.0		42.5	17.7	65.8			
Surr: 2,4,6-Tribromophenol	70.8		100.0		70.8	26	138			
Surr: Nitrobenzene-d5	60.5		100.0		60.5	47.5	119			
Surr: 2-Fluorobiphenyl	63.4		100.0		63.4	48.1	106			
Surr: 4-Terphenyl-d14	63.2		100.0		63.2	44	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **1406471-001BMS**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ2-C-R36**	Batch ID: **13655**	RunNo: **19296**
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557771** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	64.4	5.00	100.0	0	64.4	20.9	103			
1,4-Dichlorobenzene	65.3	5.00	100.0	0	65.3	32.6	91.5			
2,4-Dinitrophenol	21.1	5.00	100.0	0	21.1	11	112			
2,4-Dinitrotoluene	72.9	5.00	100.0	0	72.9	44.7	112			
Hexachlorobenzene	72.0	5.00	100.0	0	72.0	30.3	126			
Hexachloroethane	64.4	5.00	100.0	0	64.4	19.5	96.4			
2-Methylphenol	68.2	5.00	100.0	0	68.2	28.7	108			
3+4-Methylphenol	62.6	5.00	100.0	0	62.6	24.2	136			
Nitrobenzene	73.6	5.00	100.0	0	73.6	28.8	119			
Pentachlorophenol	33.4	5.00	100.0	0	33.4	20.2	93			
Pyridine	65.8	5.00	100.0	0	65.8	19.3	82.8			
Surr: 2-Fluorophenol	59.3		100.0		59.3	12.1	85.8			
Surr: Phenol-d5	52.8		100.0		52.8	17.7	65.8			
Surr: 2,4,6-Tribromophenol	60.4		100.0		60.4	26	138			
Surr: Nitrobenzene-d5	72.4		100.0		72.4	47.5	119			
Surr: 2-Fluorobiphenyl	70.2		100.0		70.2	48.1	106			
Surr: 4-Terphenyl-d14	69.3		100.0		69.3	44	113			

Sample ID **1406471-001BMSD**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ2-C-R36**	Batch ID: **13655**	RunNo: **19296**
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557772** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	62.7	5.00	100.0	0	62.7	20.9	103	2.64	20	
1,4-Dichlorobenzene	64.3	5.00	100.0	0	64.3	32.6	91.5	1.54	20	
2,4-Dinitrophenol	26.6	5.00	100.0	0	26.6	11	112	23.0	20	R
2,4-Dinitrotoluene	84.9	5.00	100.0	0	84.9	44.7	112	15.2	20	
Hexachlorobenzene	75.6	5.00	100.0	0	75.6	30.3	126	4.85	20	
Hexachloroethane	62.5	5.00	100.0	0	62.5	19.5	96.4	2.90	20	
2-Methylphenol	68.4	5.00	100.0	0	68.4	28.7	108	0.293	20	
3+4-Methylphenol	65.0	5.00	100.0	0	65.0	24.2	136	3.79	20	
Nitrobenzene	71.0	5.00	100.0	0	71.0	28.8	119	3.65	20	
Pentachlorophenol	38.9	5.00	100.0	0	38.9	20.2	93	15.1	20	
Pyridine	65.6	5.00	100.0	0	65.6	19.3	82.8	0.213	20	
Surr: 2-Fluorophenol	59.1		100.0		59.1	12.1	85.8	0		
Surr: Phenol-d5	52.4		100.0		52.4	17.7	65.8	0		
Surr: 2,4,6-Tribromophenol	66.2		100.0		66.2	26	138	0		
Surr: Nitrobenzene-d5	72.6		100.0		72.6	47.5	119	0		
Surr: 2-Fluorobiphenyl	76.3		100.0		76.3	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1406471-001BMSD**	SampType:	**MSD4**		TestCode:	**EPA Method 8270C: Semivolatiles**				
Client ID:	**GW-WQ2-C-R36**	Batch ID:	**13655**		RunNo:	**19296**				
Prep Date:	**6/12/2014**	Analysis Date:	**6/16/2014**		SeqNo:	**557772**	Units:	**µg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	76.6		100.0		76.6	44	113	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13655**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **13655**	RunNo: **19296**							
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557767**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	53.8	5.00	100.0	0	53.8	27.4	101			
1,4-Dichlorobenzene	51.6	5.00	100.0	0	51.6	32.6	91.5			
2,4-Dinitrophenol	46.0	5.00	100.0	0	46.0	23.1	118			
2,4-Dinitrotoluene	69.7	5.00	100.0	0	69.7	44.7	112			
Hexachlorobenzene	71.0	5.00	100.0	0	71.0	30	130			
Hexachloroethane	50.6	5.00	100.0	0	50.6	23.2	97.8			
2-Methylphenol	60.5	5.00	100.0	0	60.5	36.1	105			
3+4-Methylphenol	56.2	5.00	100.0	0	56.2	35.7	92.5			
Nitrobenzene	59.4	5.00	100.0	0	59.4	30.9	125			
Pentachlorophenol	58.8	5.00	100.0	0	58.8	20.2	93			
Pyridine	45.2	5.00	100.0	0	45.2	5.14	87.1			
Surr: 2-Fluorophenol	46.7		100.0		46.7	12.1	85.8			
Surr: Phenol-d5	42.0		100.0		42.0	17.7	65.8			
Surr: 2,4,6-Tribromophenol	72.9		100.0		72.9	26	138			
Surr: Nitrobenzene-d5	62.7		100.0		62.7	47.5	119			
Surr: 2-Fluorobiphenyl	67.2		100.0		67.2	48.1	106			
Surr: 4-Terphenyl-d14	61.6		100.0		61.6	44	113			

Sample ID: **lcs-13655**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **13655**	RunNo: **19296**							
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557768**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	55.8	5.00	100.0	0	55.8	27.4	101	3.65	0	
1,4-Dichlorobenzene	52.3	5.00	100.0	0	52.3	32.6	91.5	1.31	0	
2,4-Dinitrophenol	48.6	5.00	100.0	0	48.6	23.1	118	5.54	0	
2,4-Dinitrotoluene	68.9	5.00	100.0	0	68.9	44.7	112	1.24	0	
Hexachlorobenzene	68.2	5.00	100.0	0	68.2	30	130	4.02	0	
Hexachloroethane	52.6	5.00	100.0	0	52.6	23.2	97.8	3.99	0	
2-Methylphenol	63.5	5.00	100.0	0	63.5	36.1	105	4.97	0	
3+4-Methylphenol	57.9	5.00	100.0	0	57.9	35.7	92.5	3.02	0	
Nitrobenzene	60.9	5.00	100.0	0	60.9	30.9	125	2.46	0	
Pentachlorophenol	59.1	5.00	100.0	0	59.1	20.2	93	0.577	0	
Pyridine	47.0	5.00	100.0	0	47.0	5.14	87.1	3.91	0	
Surr: 2-Fluorophenol	47.8		100.0		47.8	12.1	85.8	0	0	
Surr: Phenol-d5	42.5		100.0		42.5	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	70.8		100.0		70.8	26	138	0	0	
Surr: Nitrobenzene-d5	60.5		100.0		60.5	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	63.4		100.0		63.4	48.1	106	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13655**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13655**	RunNo: **19296**
Prep Date: **6/12/2014**	Analysis Date: **6/16/2014**	SeqNo: **557768** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	63.2		100.0		63.2	44	113	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**eC 999uS ccv**	SampType:	**ccv**	TestCode:	**SM2510B: Specific Conductance**					
Client ID:	**CCV**	Batch ID:	**R19213**	RunNo:	**19213**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555483**	Units:	**µmhos/cm**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	950	0.010	999.0	0	95.4	80	120			

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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-14268	SampType:	MBLK	TestCode:	EPA Method 7470: Mercury					
Client ID:	PBW	Batch ID:	14268	RunNo:	19954					
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579845	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	LCS-14268	SampType:	LCS	TestCode:	EPA Method 7470: Mercury					
Client ID:	LCSW	Batch ID:	14268	RunNo:	19954					
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579846	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.6	80	120			

Sample ID	LCS-14268	SampType:	LCSR	TestCode:	EPA Method 7470: Mercury					
Client ID:	BatchQC	Batch ID:	14268	RunNo:	19954					
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579883	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	99.2	80	120			

Sample ID	1406471-001EMS	SampType:	MS	TestCode:	EPA Method 7470: Mercury					
Client ID:	GW-WQ2-C-R36	Batch ID:	14268	RunNo:	19954					
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579885	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00459	0.00100	0.005000	0	91.9	75	125			H

Sample ID	1406471-001EMSD	SampType:	MSD	TestCode:	EPA Method 7470: Mercury					
Client ID:	GW-WQ2-C-R36	Batch ID:	14268	RunNo:	19954					
Prep Date:	7/17/2014	Analysis Date:	7/17/2014	SeqNo:	579886	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00461	0.00100	0.005000	0	92.2	75	125	0.385	20	H

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-14268**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **14268**	RunNo: **19954**
Prep Date: **7/17/2014**	Analysis Date: **7/17/2014**	SeqNo: **579846** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.6	80	120			

Sample ID: **LCS-14268**	SampType: **LCSR**	TestCode: **EPA Method 7470: Mercury**
Client ID: **BatchQC**	Batch ID: **14268**	RunNo: **19954**
Prep Date: **7/17/2014**	Analysis Date: **7/17/2014**	SeqNo: **579883** 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	99.2	80	120	4.73	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555897** 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	ND	1.0								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555898** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	54	1.0	50.00	0	109	80	120			
Magnesium	55	1.0	50.00	0	110	80	120			
Potassium	52	1.0	50.00	0	105	80	120			

Sample ID **LCS**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555899** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	56	1.0	50.00	0	111	80	120			
Magnesium	57	1.0	50.00	0	114	80	120			
Potassium	54	1.0	50.00	0	108	80	120			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555907** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.274	-100	99			
Magnesium	ND	1.0	1.000	0	0.167	-100	99			
Potassium	ND	1.0	1.000	0	-0.282	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555908** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	97.2	90	110			
Magnesium	50	1.0	50.00	0	100	90	110			
Potassium	48	1.0	50.00	0	95.6	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555920** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.185	-100	99			
Magnesium	ND	1.00	1.000	0	0.121	-100	99			
Potassium	ND	1.00	1.000	0	1.34	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555921** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48.4	1.00	50.00	0	96.8	90	110			
Magnesium	49.0	1.00	50.00	0	98.0	90	110			
Potassium	47.6	1.00	50.00	0	95.1	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555932** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.176	-100	99			
Magnesium	ND	1.0	1.000	0	0.249	-100	99			
Potassium	ND	1.0	1.000	0	0.164	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555933** 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	90	110			
Magnesium	50	1.0	50.00	0	99.7	90	110			
Potassium	49	1.0	50.00	0	97.4	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R19226**	RunNo: **19226**
Prep Date:	Analysis Date: **6/12/2014**	SeqNo: **555942** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.124	-100	99			
Magnesium	ND	1.0	1.000	0	-0.0290	-100	99			
Potassium	ND	1.0	1.000	0	2.98	-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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R19226	RunNo:	19226				
Prep Date:		Analysis Date:	6/12/2014	SeqNo:	555943	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	101	90	110			
Magnesium	51	1.0	50.00	0	102	90	110			
Potassium	49	1.0	50.00	0	98.8	90	110			

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	PBW	Batch ID:	R19318	RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014	SeqNo:	558387	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	ND	1.0								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	LCSW	Batch ID:	R19318	RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014	SeqNo:	558388	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	54	1.0	50.00	0	107	80	120			

Sample ID	LCS	SampType:	LCSR	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R19318	RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014	SeqNo:	558389	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	50	1.0	50.00	0	99.4	80	120			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	CCB	Batch ID:	R19318	RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014	SeqNo:	558398	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	ND	1.0	1.000	0	-0.994	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R19318	RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014	SeqNo:	558399	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	49	1.0	50.00	0	98.9	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	CCB	SampType:	CCB		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	CCB	Batch ID:	R19318		RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014		SeqNo:	558411	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	ND	1.0	1.000	0	1.60	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R19318		RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014		SeqNo:	558412	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	49	1.0	50.00	0	98.0	90	110			

Sample ID	CCB	SampType:	CCB		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	CCB	Batch ID:	R19318		RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014		SeqNo:	558420	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	ND	1.0	1.000	0	11.4	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R19318		RunNo:	19318				
Prep Date:		Analysis Date:	6/17/2014		SeqNo:	558421	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	49	1.0	50.00	0	97.1	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: LCS	SampType: LCS	TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: LCSW	Batch ID: R19226	RunNo: 19226							
Prep Date:	Analysis Date: 6/12/2014	SeqNo: 555898	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	54	1.0	50.00	0	109	80	120			
Magnesium	55	1.0	50.00	0	110	80	120			
Potassium	52	1.0	50.00	0	105	80	120			

Sample ID: LCS	SampType: LCSR	TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: BatchQC	Batch ID: R19226	RunNo: 19226							
Prep Date:	Analysis Date: 6/12/2014	SeqNo: 555899	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	56	1.0	50.00	0	111	80	120	2.43	0	
Magnesium	57	1.0	50.00	0	114	80	120	3.34	0	
Potassium	54	1.0	50.00	0	108	80	120	2.66	0	

Sample ID: LCS	SampType: LCS	TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: LCSW	Batch ID: R19318	RunNo: 19318							
Prep Date:	Analysis Date: 6/17/2014	SeqNo: 558388	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	54	1.0	50.00	0	107	80	120			

Sample ID: LCS	SampType: LCSR	TestCode: EPA Method 6010B: Dissolved Metals							
Client ID: BatchQC	Batch ID: R19318	RunNo: 19318							
Prep Date:	Analysis Date: 6/17/2014	SeqNo: 558389	Units: mg/L						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sodium	50	1.0	50.00	0	99.4	80	120	7.86	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-13822	SampType:	MBLK	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	PBW	Batch ID:	13822	RunNo:	19507				
Prep Date:	6/21/2014	Analysis Date:	6/25/2014	SeqNo:	564405	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	ND	1.0								
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-13822	SampType:	LCS	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	LCSW	Batch ID:	13822	RunNo:	19507				
Prep Date:	6/21/2014	Analysis Date:	6/25/2014	SeqNo:	564406	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.9	80	120			
Beryllium	0.53	0.0030	0.5000	0	107	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Calcium	52	1.0	50.00	0	103	80	120			
Chromium	0.50	0.0060	0.5000	0	100	80	120			
Iron	0.51	0.050	0.5000	0	103	80	120			
Lead	0.50	0.0050	0.5000	0	99.1	80	120			
Magnesium	52	1.0	50.00	0	103	80	120			
Nickel	0.48	0.010	0.5000	0	96.1	80	120			
Potassium	50	1.0	50.00	0	99.2	80	120			
Silver	0.10	0.0050	0.1000	0	104	80	120			
Sodium	51	1.0	50.00	0	103	80	120			
Vanadium	0.52	0.050	0.5000	0	104	80	120			

Sample ID	LCS-13822	SampType:	LCSR	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	BatchQC	Batch ID:	13822	RunNo:	19507				
Prep Date:	6/21/2014	Analysis Date:	6/25/2014	SeqNo:	564407	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.6	80	120			
Beryllium	0.53	0.0030	0.5000	0	106	80	120			

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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	LCS-13822	SampType:	LCSR		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	BatchQC	Batch ID:	13822		RunNo:	19507				
Prep Date:	6/21/2014	Analysis Date:	6/25/2014		SeqNo:	564407	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.50	0.0020	0.5000	0	99.6	80	120			
Calcium	52	1.0	50.00	0	103	80	120			
Chromium	0.50	0.0060	0.5000	0	99.9	80	120			
Iron	0.52	0.050	0.5000	0	104	80	120			
Lead	0.49	0.0050	0.5000	0	98.5	80	120			
Magnesium	52	1.0	50.00	0	105	80	120			
Nickel	0.48	0.010	0.5000	0	96.2	80	120			
Potassium	50	1.0	50.00	0	100	80	120			
Silver	0.10	0.0050	0.1000	0	105	80	120			
Sodium	52	1.0	50.00	0	104	80	120			
Vanadium	0.52	0.050	0.5000	0	104	80	120			

Sample ID	1406471-001EMS	SampType:	MS		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ2-C-R36	Batch ID:	13822		RunNo:	19507				
Prep Date:	6/21/2014	Analysis Date:	6/25/2014		SeqNo:	564436	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.476	0.100	0.5000	0.02255	90.6	75	125			
Beryllium	0.476	0.0150	0.5000	0.002850	94.7	75	125			
Cadmium	0.476	0.0100	0.5000	0	95.2	75	125			
Chromium	0.448	0.0300	0.5000	0	89.5	75	125			
Iron	0.532	0.250	0.5000	0	106	75	125			
Lead	0.433	0.0250	0.5000	0	86.5	75	125			
Nickel	0.414	0.0500	0.5000	0	82.7	75	125			
Silver	0.106	0.0250	0.1000	0	106	75	125			
Vanadium	0.512	0.250	0.5000	0.02995	96.3	75	125			

Sample ID	1406471-001EMSD	SampType:	MSD		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ2-C-R36	Batch ID:	13822		RunNo:	19507				
Prep Date:	6/21/2014	Analysis Date:	6/25/2014		SeqNo:	564437	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.440	0.100	0.5000	0.02255	83.6	75	125	7.70	20	
Beryllium	0.440	0.0150	0.5000	0.002850	87.4	75	125	7.95	20	
Cadmium	0.446	0.0100	0.5000	0	89.2	75	125	6.51	20	
Chromium	0.410	0.0300	0.5000	0	81.9	75	125	8.84	20	
Iron	0.462	0.250	0.5000	0	92.4	75	125	14.1	20	
Lead	0.394	0.0250	0.5000	0	78.8	75	125	9.39	20	
Nickel	0.382	0.0500	0.5000	0	76.4	75	125	7.88	20	
Silver	0.0969	0.0250	0.1000	0	96.8	75	125	8.64	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1406471-001EMSD**	SampType: **MSD**		TestCode: **EPA 6010B: Total Recoverable Metals**						
Client ID:	**GW-WQ2-C-R36**	Batch ID: **13822**		RunNo: **19507**						
Prep Date:	**6/21/2014**	Analysis Date: **6/25/2014**		SeqNo: **564437**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vanadium	0.473	0.250	0.5000	0.02995	88.6	75	125	7.84	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13822**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13822**	RunNo: **19507**
Prep Date: **6/21/2014**	Analysis Date: **6/25/2014**	SeqNo: **564406** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.9	80	120			
Beryllium	0.53	0.0030	0.5000	0	107	80	120			
Cadmium	0.50	0.0020	0.5000	0	100	80	120			
Calcium	52	1.0	50.00	0	103	80	120			
Chromium	0.50	0.0060	0.5000	0	100	80	120			
Iron	0.51	0.050	0.5000	0	103	80	120			
Lead	0.50	0.0050	0.5000	0	99.1	80	120			
Magnesium	52	1.0	50.00	0	103	80	120			
Nickel	0.48	0.010	0.5000	0	96.1	80	120			
Potassium	50	1.0	50.00	0	99.2	80	120			
Silver	0.10	0.0050	0.1000	0	104	80	120			
Sodium	51	1.0	50.00	0	103	80	120			
Vanadium	0.52	0.050	0.5000	0	104	80	120			

Sample ID: **LCS-13822**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13822**	RunNo: **19507**
Prep Date: **6/21/2014**	Analysis Date: **6/25/2014**	SeqNo: **564407** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.6	80	120	0.243	0	
Beryllium	0.53	0.0030	0.5000	0	106	80	120	0.116	0	
Cadmium	0.50	0.0020	0.5000	0	99.6	80	120	0.413	0	
Calcium	52	1.0	50.00	0	103	80	120	0.287	0	
Chromium	0.50	0.0060	0.5000	0	99.9	80	120	0.216	0	
Iron	0.52	0.050	0.5000	0	104	80	120	1.33	0	
Lead	0.49	0.0050	0.5000	0	98.5	80	120	0.597	0	
Magnesium	52	1.0	50.00	0	105	80	120	1.43	0	
Nickel	0.48	0.010	0.5000	0	96.2	80	120	0.177	0	
Potassium	50	1.0	50.00	0	100	80	120	1.22	0	
Silver	0.10	0.0050	0.1000	0	105	80	120	0.382	0	
Sodium	52	1.0	50.00	0	104	80	120	1.02	0	
Vanadium	0.52	0.050	0.5000	0	104	80	120	0.401	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**pH 4.00 ccv**	SampType:	**ccv**	TestCode:	**SM4500-H+B: pH**					
Client ID:	**CCV**	Batch ID:	**R19213**	RunNo:	**19213**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555494**	Units:	**pH units**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	4.00	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
O	RSD is greater than RSDlimit	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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	mb-1	SampType:	mblk	TestCode:	SM2320B: Alkalinity				
Client ID:	PBW	Batch ID:	R19213	RunNo:	19213				
Prep Date:		Analysis Date:	6/11/2014	SeqNo:	555451	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:	R19213	RunNo:	19213				
Prep Date:		Analysis Date:	6/11/2014	SeqNo:	555452	Units:	mg/L CaCO3		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	78.4	20.0	80.00	0	98.0	90	110			

Sample ID	lcs-1 dup	SampType:	LCSR	TestCode:	SM2320B: Alkalinity				
Client ID:	BatchQC	Batch ID:	R19213	RunNo:	19213				
Prep Date:		Analysis Date:	6/11/2014	SeqNo:	555453	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			

Sample ID	1406471-001d ms	SampType:	ms	TestCode:	SM2320B: Alkalinity				
Client ID:	GW-WQ2-C-R36	Batch ID:	R19213	RunNo:	19213				
Prep Date:		Analysis Date:	6/11/2014	SeqNo:	555455	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	47.64	94.4	34.9	123			

Sample ID	1406471-001d msd	SampType:	msd	TestCode:	SM2320B: Alkalinity				
Client ID:	GW-WQ2-C-R36	Batch ID:	R19213	RunNo:	19213				
Prep Date:		Analysis Date:	6/11/2014	SeqNo:	555456	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	47.64	94.3	34.9	123	0.0650	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R19213**	RunNo: **19213**							
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555452**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	78.4	20.0	80.00	0	98.0	90	110			

Sample ID: **lcs-1 dup**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R19213**	RunNo: **19213**							
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555453**	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	2.02	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB**	SampType:	**MBLK**	TestCode:	**SM 5310B: TOC**					
Client ID:	**PBW**	Batch ID:	**R19203**	RunNo:	**19203**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555234**	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 ST9060-14010**	SampType:	**LCS**	TestCode:	**SM 5310B: TOC**					
Client ID:	**LCSW**	Batch ID:	**R19203**	RunNo:	**19203**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555235**	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			

Sample ID	**LCSR ST9060-14009**	SampType:	**LCSR**	TestCode:	**SM 5310B: TOC**					
Client ID:	**BatchQC**	Batch ID:	**R19203**	RunNo:	**19203**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555236**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.86	1.00	4.850	0	100	90	110			

Sample ID	**1406471-001CMS**	SampType:	**MS**	TestCode:	**SM 5310B: TOC**					
Client ID:	**GW-WQ2-C-R36**	Batch ID:	**R19203**	RunNo:	**19203**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555238**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.01	1.00	4.650	0.2547	102	75	125			

Sample ID	**1406471-001CMSD**	SampType:	**MSD**	TestCode:	**SM 5310B: TOC**					
Client ID:	**GW-WQ2-C-R36**	Batch ID:	**R19203**	RunNo:	**19203**					
Prep Date:		Analysis Date:	**6/11/2014**	SeqNo:	**555239**	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	0.2547	103	75	125	0.299	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.
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#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS ST9060-14010**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R19203**	RunNo: **19203**							
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555235**	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			

Sample ID: **LCSR ST9060-14009**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R19203**	RunNo: **19203**							
Prep Date:	Analysis Date: **6/11/2014**	SeqNo: **555236**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.86	1.00	4.850	0	100	90	110	0.185	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	1406471-001DDUP	SampType:	DUP		TestCode:	Specific Gravity				
Client ID:	GW-WQ2-C-R36	Batch ID:	R19194		RunNo:	19194				
Prep Date:		Analysis Date:	6/11/2014		SeqNo:	554864	Units:			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.042	0						0.125	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.
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#: **1406471**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-13704	SampType:	MBLK		TestCode:	SM 2540D: TSS				
Client ID:	PBW	Batch ID:	13704		RunNo:	19284				
Prep Date:	6/14/2014	Analysis Date:	6/15/2014		SeqNo:	557574	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-13704	SampType:	LCS		TestCode:	SM 2540D: TSS				
Client ID:	LCSW	Batch ID:	13704		RunNo:	19284				
Prep Date:	6/14/2014	Analysis Date:	6/15/2014		SeqNo:	557575	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	86.0	4.00	92.40	0	93.1	82.47	119.05			

Sample ID	LCSR-13704	SampType:	LCSR		TestCode:	SM 2540D: TSS				
Client ID:	BatchQC	Batch ID:	13704		RunNo:	19284				
Prep Date:	6/14/2014	Analysis Date:	6/15/2014		SeqNo:	557576	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	84.0	4.00	92.40	0	90.9	82.47	119.05			

Sample ID	1406471-001DDUP	SampType:	DUP		TestCode:	SM 2540D: TSS				
Client ID:	GW-WQ2-C-R36	Batch ID:	13704		RunNo:	19284				
Prep Date:	6/14/2014	Analysis Date:	6/15/2014		SeqNo:	557578	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	38.0	4.00						5.13	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406471**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13704**	SampType: **LCS**	TestCode: **SM 2540D: TSS**
Client ID: **LCSW**	Batch ID: **13704**	RunNo: **19284**
Prep Date: **6/14/2014**	Analysis Date: **6/15/2014**	SeqNo: **557575** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	86.0	4.00	92.40	0	93.1	82.47	119.05			

Sample ID: **LCSR-13704**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**
Client ID: **BatchQC**	Batch ID: **13704**	RunNo: **19284**
Prep Date: **6/14/2014**	Analysis Date: **6/15/2014**	SeqNo: **557576** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	84.0	4.00	92.40	0	90.9	82.47	119.05	2.35	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.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

WQSP-2

DATA VERIFICATION AND VALIDATION REPORTS

Round 36
WQSP-2
SDG 1406471
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 (c)	mg/L	0.5	500	1,000	34,400		34,400		34,400	0.0	39,670
TOC	mg/L	1.0	0.16	1.0	0.255	J	0.208	J	0.23	20.3	7.97
Alkalinity (Bicarbonate)	mg/L	4.0	4.0	20	47.6		48.2		47.9	1.25	70.3
Specific Conductance	umhos/cm	NA	0.10	0.01	70,100		75,000		72,550	6.8	124,000
pH	pH units	NA	0.10	1.68	7.23		7.25		7.24	0.28	7.0 - 7.6
Specific Gravity	NA	NA	0.0	0.0	1.043		1.044		1.044	0.10	1.06
TDS (c)	mg/L	10	492	20	64,500		60,800		62,650	5.9	80,500
TSS (c)	mg/L	1.0	3.1	4.0	40		33		37	19.2	43.0
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	0.77	20	1,600		1,550		1,575	3.2	1,827
Mg (Diss)	mg/L	0.5	0.38	20	1,060		1,040		1,050	1.9	1,244
K (Diss) (c)	mg/L	0.5	2.0	10	496		518		507	4.3	845
Na (Diss) (c)	mg/L	0.5	60.7	500	19,900		19,400		19,650	2.5	21,900
					Primary		Duplicate				95th UTLV
Total Metals (ICP)	Units	SOW MRL	Lab MDL[a]	Lab PQL[a]	Sample	Flag	Sample	Flag	Avg	RPD	or 95th %
Hg (CVAAS)	mg/L	0.0002	0.000087	0.00020	ND	H	ND	H	NA	NA	<0.002
Ba	mg/L	0.020	0.0031	0.10	0.023	J	0.023	J	0.023	3.5	<1.0
Be	mg/L	0.010	0.0018	0.015	0.00285	J	0.0020	J	NA	NA	<1.0
Cd	mg/L	0.010	0.0031	0.010	ND		ND		NA	NA	<0.50
Ca (c)	mg/L	0.500	16.30	100	1,570		1,650		1,610	5.0	NA
Cr	mg/L	0.025	0.0084	0.030	ND		ND		NA	NA	<0.50
Pb (c)	mg/L	0.020	0.024	0.025	ND		ND		NA	NA	0.163
Mg (c)	mg/L	0.50	1.70	100	1,070		1,130		1,100	5.5	NA
Ni	mg/L	0.025	0.0095	0.050	ND		ND		NA	NA	0.37
K (c)	mg/L	0.50	2.53	5	481		554		518	14.1	NA
Ag	mg/L	0.013	0.0026	0.025	ND		ND		NA	NA	<0.5
Na (c)	mg/L	0.50	208	500	20,300		19,900		20,100	2.0	NA
V (c)	mg/L	0.025	0.0274	0.25	0.030	J	0.0292	J	0.030	2.7	<0.1
ICP/MS Metals											
Sb	mg/L	0.025	0.025	0.025	ND		ND		NA	NA	<0.5
As	mg/L	0.050	0.025	0.025	ND		ND		NA	NA	0.062
Se	mg/L	0.025	0.025	0.025	ND		ND		NA	NA	0.150
Tl	mg/L	0.025	0.025	0.025	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
H Flag indicates that holding times for sample preparartion or analysis exceeded.
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)
(c) MDL higher than SOW-prescribed MRL

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 36
WQSP-2

Sample Summary

Date:	September 4, 2014
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	June 10, 2014
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	August 11, 2014
Date Samples Shipped/Method	June 10, 2014 by FedEx
Date Samples Received by lab:	June 11, 2014
Sample Receipt Condition:	Intact at 3.6 deg. C
SDG:	1406471
WIPP Chain of Custody/Request for Analysis:	1140
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):	June 12, 2014 (meets holding time)
SVOC Extraction Date:	June 12, 2014 (meets holding time)
SVOC Analysis Date(s):	June 16, 2014 (meets holding time)
Total Trace Metals Analysis Date(s):	June 17, 25, 2014 (meets holding time)
Dissolved Cation Metals Analysis Date(s):	June 12, 17, 2014 (meets holding time)
Mercury Analysis Date(s):	**July 17, 2014 (missed 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 1406471

WTS Sample No.	Analytes
GW-WQ2CR36N1, GW-WQ2CR36N1D	VOCs
GW-WQ2CR36N2, GW-WQ2CR36N3	VOCs (Field Blank and Trip Blank)
GW-WQ2CR36N4, GW-WQ2CR36N4D	TOC
GW-WQ2CR36N5, GW-WQ2CR36N5D	SVOCs
GW-WQ2CR36N6, GW-WQ2CR36N6D	Total Trace Metals (including "total" cation metals)
GW-WQ2CR36 N7, GW-WQ2CR36 N7D	General Parameters (including "dissolved" cations)

Results Summary

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 2-butanone above the MRL at 5.73 ug/L and 0.52 ug/L of chloroform below the MRL (J-flagged). The trip blank did not show any VOC detections.

No SVOCs were detected in the WQSP-2 groundwater samples.

The trace metals detected included Ba at 0.023 mg/L in the primary sample and 0.023 mg/L in the duplicate sample; Be at 0.0028 mg/L in the primary sample and 0.0020 mg/L in the duplicate sample; and V at 0.030 mg/L in the primary sample and 0.029 mg/L in the duplicate sample. All the trace metal concentrations were below the MRL and are J-flagged as estimated.

Measurements were made on all the general chemistry parameters at concentrations above the method reporting limit except for TOC, which was detected at 0.26 mg/L in the primary sample and 0.21 mg/L in the duplicate sample. The concentrations are J-flagged as estimated.

The TSS concentrations were just below the 95th percentile concentration of 43.0 mg/L with measurements of 40 mg/L in the primary sample and 33 mg/L in the duplicate sample.

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 EPA's SW-846 Method 8260B.

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 2-butanone above the MRL at 5.73 ug/L and 0.52 ug/L of chloroform below the MRL (J-flagged). The trip blank did not show any VOC detections.

The QC sample analyses showed detection of 0.34 ug/L of methylene chloride in the laboratory method blank, but methylene chloride was not detected in any of the samples. The LCS/LCSR samples yielded acceptable recoveries for all the target analytes. The MS sample showed 137 percent recovery for isobutyl alcohol and 138 percent recovery for 2-butanone, while the MSD showed 137 percent recovery for isobutyl alcohol and 152 percent recovery for 2-butanone, The recoveries were higher than the objective, but within the lab's historical control chart range. The precision objective of RPD <20 was met for the LCS/LCSR and MS/MSD samples.

All other quality assurance objectives were met for the VOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 8270C. No SVOCs were detected in the method blank sample or in the groundwater samples.

The LCS/LCSR recoveries met the objective of 40 – 140 percent recovery for base/neutral compounds and 30 – 130 percent recovery for acidic compounds. The precision objective was met for all the compounds in the LCS/LCSR. The recovery objective was met for all the compounds in the MS and MSD samples except for 2,4-dinitrophenol which showed recoveries of 21.1 percent in the MS and 26.6 percent in the MSD. The recoveries were within the lab's historical control chart range. The RPD for the compound was 23, which is higher than the objective of 20. The precision objective was met for all the other compounds.

All other quality assurance objectives were met for the SVOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 6010B.

The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed by ICP/MS by Anatek according to EPA Method 6020A from SW-846. Mercury (Hg) was analyzed using automated cold-vapor atomic absorption (CVAA) spectroscopy according to EPA SW-846 Method 7470A.

The laboratory inadvertently missed analyzing the samples for mercury while analyzing for the trace metals. The lab reported on the missed analyses and was requested to perform the analyses after the hold time of 28 days. The samples were analyzed 9 days past the regular hold time. There was no response for mercury in the analyses, and the missed hold time should not have allowed any mercury to disappear from the samples.

The trace metals detected included Ba at 0.023 mg/L in the primary sample and 0.023 mg/L in the duplicate sample; Be at 0.0028 mg/L in the primary sample and 0.0020 mg/L in the duplicate sample; and V at 0.030 mg/L in the primary sample and 0.029 mg/L in the duplicate sample. All the trace metal concentrations were below the MRL and are J-flagged as estimated.

The MDLs for the analyses were lower than the MRLs specified in the SOW for the target metals except that the Pb MDL was just slightly higher than the 0.020 mg/L SOW-prescribed concentration at 0.024 mg/L, and the V MDL of 0.027 mg/L was just slightly higher than the SOW-prescribed concentration of 0.025 mg/L.

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 dissolved cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. 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 objective.

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	Parameter
Standards Method SM 2710F	Specific Gravity
Standard Methods SM 4500-H^+	pH
EPA Method 120.1	Specific Conductance (Conductivity)
Standard Methods SM 2540C	Total Dissolved Solids (TDS)
Standard Methods SM 2540D	Total Suspended Solids (TSS)
Standard Methods SM 5310B	Total Organic Carbon (TOC)
Standard Methods 2320B	Alkalinity
EPA Method 300.0	Anions

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

- All parameters: Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted. Initial calibration verification and continuing calibration verification standards were analyzed as appropriate to ensure accurate calibration of the instrumentation.

- Anions: LCS and LCSR (replicate analysis) samples were analyzed for the anions chloride, nitrate and sulfate to obtain recovery information. All LCS recoveries were within 90 – 110 percent and were precise as evidenced by RPDs less than two. The MS/MSD samples were only analyzed for nitrate because of the high native concentrations of chloride and sulfate. The recoveries were 95.5 percent and 94.2 percent for a RPD of 1.3.

- pH: A CCV at pH 4.00 was analyzed prior to the samples. The lab failed to analyze one of the samples in duplicate to obtain precision information for this SDG. The precision of the analyses of the duplicate groundwater samples was good with values of 7.23 and 7.25 and a RPD of 0.28.

- Specific gravity: A duplicate sample was analyzed to obtain precision data. The precision of the analyses of the primary sample and its duplicate was very precise with values of 1.043 and 1.042 for a RPD of 0.12.

- Specific conductance: The laboratory did not analyze one of the groundwater samples in duplicate to produce precision data. The precision of the analyses of the primary and duplicate analyses was quite precise with values of 70,100 umhos/cm and 75,000 umhos/cm for a RPD of 6.8.

- Total Organic Carbon: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS recoveries were both 100 percent with a RPD of 0.18. The MS/MSD recoveries of 102 percent and 103 percent yielded a RPD of 0.30. Thus the accuracy and precision objectives were readily met.

- Alkalinity: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The accuracy and precision objectives were readily met. The LCS recoveries were 98.0 percent and 100 percent for a RPD of 2.0, and the MS/MSD recoveries were of 94.4 percent and 94.3 percent for a RPD of 0.065.

- Total Dissolved Solids: LCS/LCSD and MS/MSD samples were analyzed for this gravimetric method to generate accuracy and precision data. The LCS recoveries were 103 percent and 104 percent for a RPD of 0.58, and the MS/MSD recoveries were 99.7 percent and 99.8 percent for a RPD of 0.044. Thus the accuracy and precision objectives were readily met.

- Total Suspended Solids: A LCS/LCSD and a duplicate sample were analyzed to generate precision data. The LCS recoveries were 93.1 percent and 90.9 percent for a

RPD of 2.4. The duplicate analysis of the primary sample (40 mg/L) yielded 38 mg/L for a RPD of 5.1. However, the precision of the primary sample and duplicate groundwater samples (33 mg/L) yielded a RPD that just met the objective (19).

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, which do not adversely affect the reliability or usability of the information. The lab was reminded to provide all the requested information.

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-2 (Round 36)

Laboratory Name: Hall Environmental

Laboratory Work Order #: SDG 1406471

Sample Number(s): GW-WQ2-C-R36-N1 thru -N7D

Reviewer Name (print): Robbin A. Spoon

Reviewer Signature: Robbin A Spoon

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?	✓	

Robbin A Spoon 10/6/14

Data Validator Date

Completeness Reviewer 10-15-14

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? 3.6°C	✓	
Was the analysis holding time of 14 days met for all samples? 6/12 vs 6/10	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 6/12	✓	
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 since R2 values all greater than 0.995.

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?	✓		(a)
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?		✓	(b)

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) Trace methylene chloride detected in MB, but not in any of the samples.
(b) 2-butanone detected just above the MRL in the FB at 5.7 µg/L.

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?	✓		(a)

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?	✓		(b)
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) RPDs not initially reported by lab, but recoveries agree very well.
(b) Both objectives met.

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 — 8/20/2014 Date

Completeness Reviewer — 10/6/14 Date

(a) 2-butanone detected at 5.7 µg/L in the FB; chloroform detected between MDL and MRL at 0.52 µg/L in the FB. (targets, not TICs)

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? 3.6°C	✓	
Were the samples extracted within 7 days of sample collection? 6/12 vs 6/10	✓	
Were the extracts analyzed within 40 days of sample extraction? 6/16 vs 6/12	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 6/16	✓	
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? But not the base peak	✓	
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? 2.5 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) NA. Avg RRFs not used. R^2 coefficients ≥0.995.

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 MS/MSD recoveries for 2,4-DNP were 21.1% and 26.6%, respectively.
(b) The RPD for 2,4-DNP was 23.0, which did not meet the lab's objective of ≤ 20.

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 — Date: 8/20/2014

Completeness Reviewer — Date: 10/6/14

(a) The same trace concentrations of Compounds generally appeared in the GW Samples and method blanks including trichloroethane, Chlorobenzene, tetrachloroethane, and a couple of unknown cyclic hydrocarbons. The groundwater samples contained tetrachloroethylene and Bisphenol A, which did not appear in the method blank. Since tetrachloroethylene did not appear in the VOC analysis of the GW samples, it was likely a contaminant in the SVOC analysis. BPA is a common contaminant from plastic.

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?	✓	
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) Srid: 6/10/14

D-Metals: A 6/12 & 6/17

T-Metals: P 6/16 + 6/21; A 6/17 + 6/25

ICP/MS: P 6/16; A 6/23

*Hg: P/A: 7/17

RA 9/4/14

* Hg samples prepped & analyzed 9-days past hold time (37 days post-collection)

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? 10Sx	✓	

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?	✓	

Note: MS/MSD Recovery data missing in QC Summary Report (Dissolv 6/12 + 6/17 runs)

RM 6/04/14

%RPD & Limits not shown for LCS/LCSR

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

DF = 1.5 (30/20)

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? 6	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		0.999973
Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve? 3.33 ppb	✓		(b)
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?	✓		(c)
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? 10 Sx	✓		
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?	✓		(d)
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		(e)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		

(a) C 6/10 (5/28 X); A 7/17; Samples for Hg were prepped/analyzed 9 days past hold time (37 days post collection).

(b) $ICV = \left(\frac{3.0282}{3.33}\right)100 = 90.94\%$ rec

(c) $CCV_{20} = (3.2345/3.33)100 = 97.13\%$ rec

$CCV_{32} = (3.1969/3.33)100 = 96\%$ rec

$\%RPD = \left(\frac{3.2345 - 3.1969}{3.2157}\right) = 1.17\%$

(d) LCS = 0.00473 mg/L

LCSR = 0.00495 ⊥

$LCS = \left(\frac{0.00473}{0.0050}\right)100 = 96.4\%$ rec

$LCSR = \left(\frac{0.00495}{0.0050}\right)$ corrected $100 = 99.2\%$ rec

(e) MS = 0.00459

MSD = 0.00461

$MS = \left(\frac{0.00459}{0.005}\right)100 = 91.8\%$ rec

$MSD = \left(\frac{0.00461}{0.005.00}\right)100 = 92.2\%$ rec

$\%RPD = \left(\frac{0.61471 - 0.61235}{0.00461 - 0.00459}\right)100$ (MS/MSD)

$0.00460 \quad 0.001353$

$= 0.385\%$ rpd

R Nappier 8/28/14

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 6/10, P 6/16, A 6/23	✓		
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓		
Was a DMP sample used for the MS/MSD? 10Sx	✓		
Was an ICV analyzed after the initial calibration? 1.0 & 40 ppb	✓		
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?	✓		(b)
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery?		✓	(c)
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD?	✓		

9/4/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) Raw data difficult to read

CCV50 As 49.555/50 = 99.11%
49.621/50 = 99.24
Se 50.307/50 = 100.6%
50.295/50 = 100.6%
Sb 53.537/50 = 107.1%
52.503/50 = 105.0%
Tl 52.751 = 105.5%
52.697 = 105.4%

9/20/14

(b) Data verified on pg 663 (pg 4/40 Anatek Lab) Report

(c) Data verified on pg 663 (pg 4/40 Anatek Lab Report)

Se 10Sx MS recovery was out of spec 127.2% (Upper limit = 125%)

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

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 3.6°C	✓	
— N/A —	— N/A —	
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 6/10 A 6/11	✓	

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?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD? 10 Sx	✓	

4/2/14 Cal

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? Nitrate only	✓	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD?	✓	

(a)

(b)

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument? ~~5 K (NO3-N)~~ 50x, 200x + 2Kx RM 9/3/14	✓	
Were the appropriate dilution factors applied to the results?	✓	

[signature] 9/3/14 — Data Validator — Date

[signature] 10-15-14 — Completeness Reviewer — Date

(a) See recovery worksheet in raw data for calc. verification.

10 Sx = ND

(b) MS = (119.3/125) 100 = 95.4% rec

MSD = (117.75/125) 100 = 94.2% rec

% RPD = $\left(\frac{119.3 - 117.75}{118.525}\right)$ 100 = 1.31% RPD

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 3.6°C	✓	
Were the samples analyzed within 14 days of collection? C 6/10 A 6/12	✓	

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? 10Sx = 7.23 Dup = 7.25	✓	
Was a DMP sample used for the MS/MSD? 10Sx	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 3.16 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?	✓		(b)
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?	✓		(c)

Robbin Mason 9/2/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) [SpK] = 80

LCS-1 = $\left(\frac{78.44}{80}\right)100 = 98.0\%$ rec

LCS-1dup = $\left(\frac{80.04}{80}\right)100 = 100\%$ rec

%RPD = $\left(\frac{80.04 - 78.44}{79.24}\right)100 = 2.02$

(b) 1°Sx = 47.64 [SpK] = 80.0

MS = $\left[\frac{(123.20 - 47.64)}{80.00}\right] \times 100 = 94.415\%$ rec

MSD = $\left(\frac{123.12 - 47.64}{80}\right)100 = 94.3\%$ rec

%RPD = $\left(\frac{123.20 - 123.12}{123.16}\right)100 = 0.0650\%$

(c) $\frac{A \times N \times 50K}{Sx\ Vol}$ A = mL Titrant N = Normality Titrant 50K = meq/liter

MS = $\left(\frac{6.16 \times 0.02 \times 50K}{50}\right) = 123.20$

MSD = $\left(\frac{6.156 \times 0.02 \times 50K}{50}\right) 123.20$

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3.6°C	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 6/10 A 6/11	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? 1K only	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration? 1413 µS	✓	
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)? 999 µS	✓	
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)

Robbin Alpor 9/2/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) ICV Stock = 1413

$\left(\frac{1385}{1413}\right)100 = 98.02\%$ Rec

(b) CCV Stock = 999

$\left(\frac{952.8}{999}\right)100 = 95.38\%$ rec

(c) Primary or secondary sample - not one ~~any~~ analyzed in duplicate.

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

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°? 3.6°C	✓	
Were the samples analyzed within five (5) days of receipt? CC/LO AG/LE	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement? ATC	✓	
Were at least two standard buffer solutions used to calibrate the instrument? 5	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.5%	✓	

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? Buffers = 21.0 → 22.2°C Sx 20.8 → 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?		✓	(a)

METHOD PERFORMANCE	YES	NO	
Did the ICV read within ±0.1 pH unit of the assigned value? 6.98 vs 7.00	✓		
Did the CCV read within ±0.1 pH unit of the assigned value? 4.00 vs 4.00	✓		
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓		(b)

Robbin Alpoo 9/2/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) No sample was measured in duplicate.

1° Sx — 9,2354

(b) 1° Sx Dup - Not analyzed

2° Sx — 7.2554

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? 21.6°C	✓	
Was the temperature of the specific gravity measurements recorded?		✓ (a)
Was the mass of at least 5.0 mL of the water sample measured?	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 4.0	✓	
Was the Temperature Correction Factor recorded? 0.9982	✓	

Robin Alpon 9/2/14
Data Validator Date

10-25-14
Completeness Reviewer Date

C 6/10 A 6/11

(a) Temperature was measured on DI-H_2O Blank & not on individual samples.

$10^3 x = 1.0429$ $10^3 S_x$ Dup $= 1.0416$

$\bar{x} = 1.0423$

$$\%\,RPD = \left(\frac{1.0429 - 1.0416}{1.0423}\right) \times 100 = 0.125\%$$

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3.6°C	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 6/10 A 6/11	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? 5/1/14 Cal		✓
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? 1°Sx	✓	
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 = 0.9999	✓		
Did the ICVs meet the accuracy objective of 90-110% recovery?	✓		(a)
Were the results for the laboratory method blank (0.076), the ICB (0.071) and CCB (0.073) < 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?	✓		

[signature] 9/2/2014 — Data Validator, Date

[signature] 10-15-14 — Completeness Reviewer, Date

(a) ICV50 = $\left(\frac{49.52}{50}\right)$100 = 99.04% rec

ICV5 = $\left(\frac{5.491}{5}\right)$100 = 109.82% rec

(b) [spk] = 4.850

LCS = (4.871/4.850)x100 = 100.43% rec

LCSD = (4.862/4.850)x100 = 100.25% rec

% RPD = $\left(\frac{4.871-4.862}{4.8665}\right)$x100 = 0.185% RPD

(c) [spk] = 4.650 1°Sx 0.2547

MS = $\left(\frac{5.008-0.2547}{4.650}\right)$x100 = 102.2%

MSD = $\left(\frac{5.023-0.2547}{4.650}\right)$x100 = 102.5%

% RPD = $\left(\frac{5.023-5.008}{5.0155}\right)$x100 = 0.2991 ≈ 0.3000

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3.6°C	✓	
Were the samples analyzed within 7 days of collection? C 6/10; P 6/13; A 6/13+ 6/14	✓	

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? $^{10}S_x$	✓	
Was the initial volume of each sample 100 mL? 2mL ↑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? 64,500 → 16125 vs 50K	✓	

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?	✓		

Robbin Alper 9/2/2014 — Data Validator / Date

[signature] 10-15-14 — Completeness Reviewer / Date

(a) mB = ∅ [Spk] = 1000

$LCS = \left(\frac{(1034-0)}{1000}\right)100 = 103.4\%$ rec

$\%RPD = \left(\frac{1040-1034}{1037}\right) \times 100 = 0.58\%$ RPD

$LCSD \left(\frac{1040-0}{1000}\right) \times 100 = 104.0\%$ rec

(b) MB = ∅ [Spk] = 50 K $^{10}S_x = 64,500$

$MS = \left[\frac{(114,350 - 64,500)}{50,000}\right] \times 100 = 99.7\%$ rec

$\%RPD = \left(\frac{114,400 - 114,350}{114,375}\right) \times 100 = 0.04372\%$ RPD

$MSD = \left[\frac{(114,400 - 64,500}{50,000}\right] \times 100 = 99.8\%$ rec

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 3.6°C	✓	
Were the samples analyzed within 7 days of collection? C 6/10; P 6/14; A 6/15 6/16	✓	
Were the samples allowed to warm to room temperature prior to filtration?		✓ (a)

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? Ø	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD?	✓	(b)

Robbin Hoot — Data Validator — Date

Completeness Reviewer — 6-15-14 — Date

(a) No data supporting samples warmed to room temp.

(b) MB = Ø

105x = 40

105x Dup = 38

$\left(\frac{40-38}{39}\right) \times 100 = 5.13\%$ RPD

LCS Recoveries

[SpK] = 92.40

$LCS = \left(\frac{86}{92.40}\right) \times 100 = 93.1\%$ rec

$\%RPD = \left(\frac{86-84}{85}\right) 100 = 2.35\%$ RPD

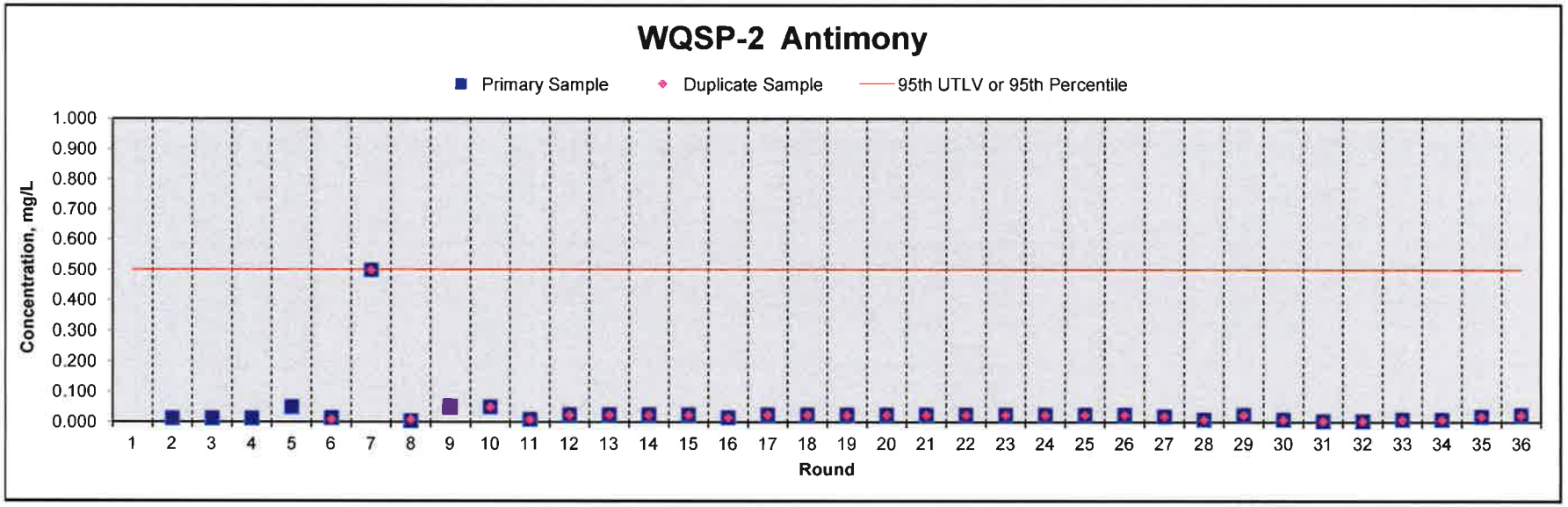
$LCSD = \left(\frac{84}{92.40}\right) \times 100 = 90.9\%$ rec

WQSP-2

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

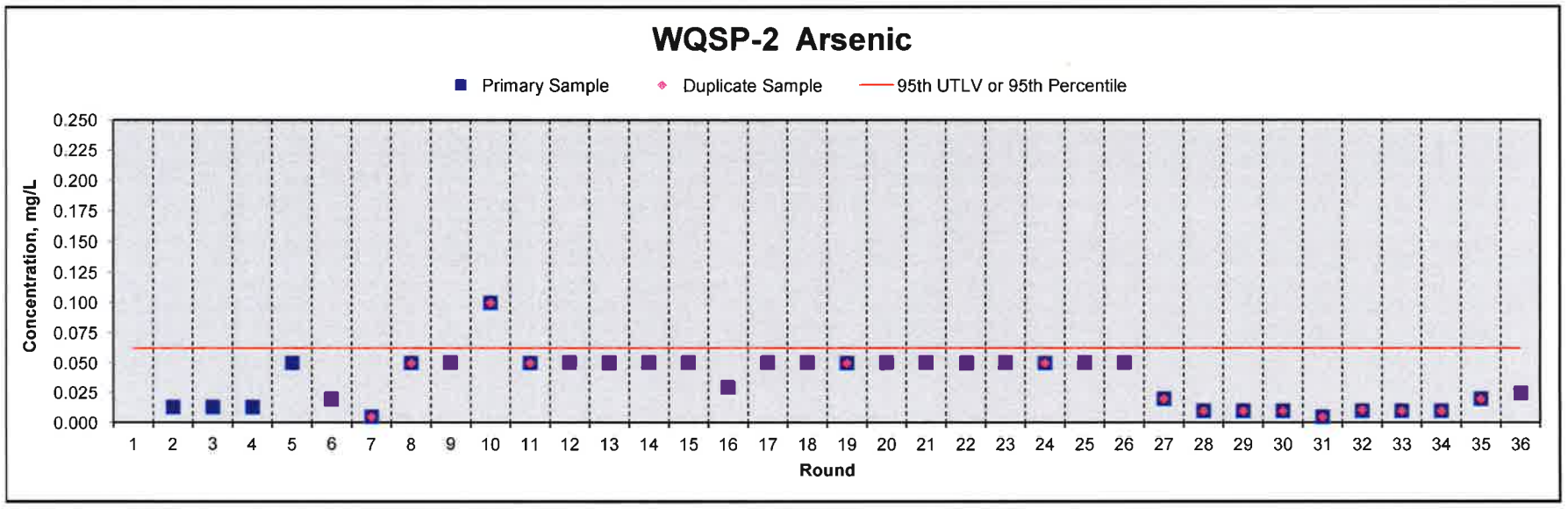
WQSP-2 Antimony

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	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
Antimony	36	06/10/14	06/23/14	< 0.025	< 0.025	mg/L	0.025	< 0.5



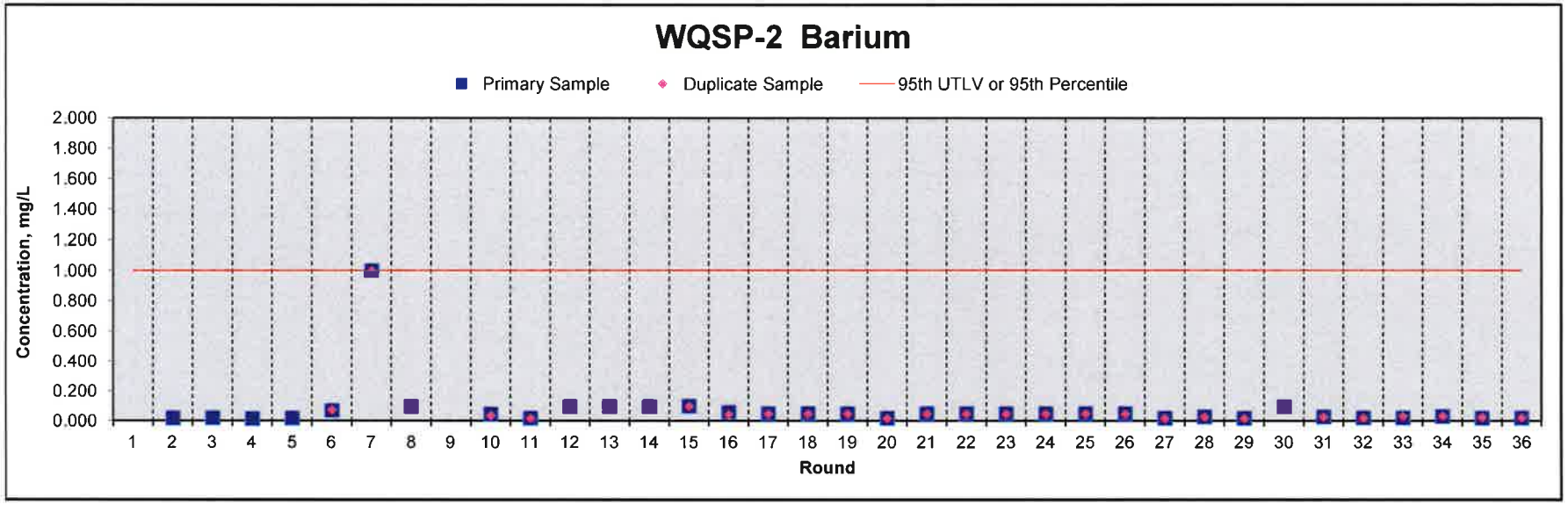
WQSP-2 Arsenic

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	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
Arsenic	36	06/10/14	06/23/14	< 0.025	< 0.025	mg/L	0.025	0.062



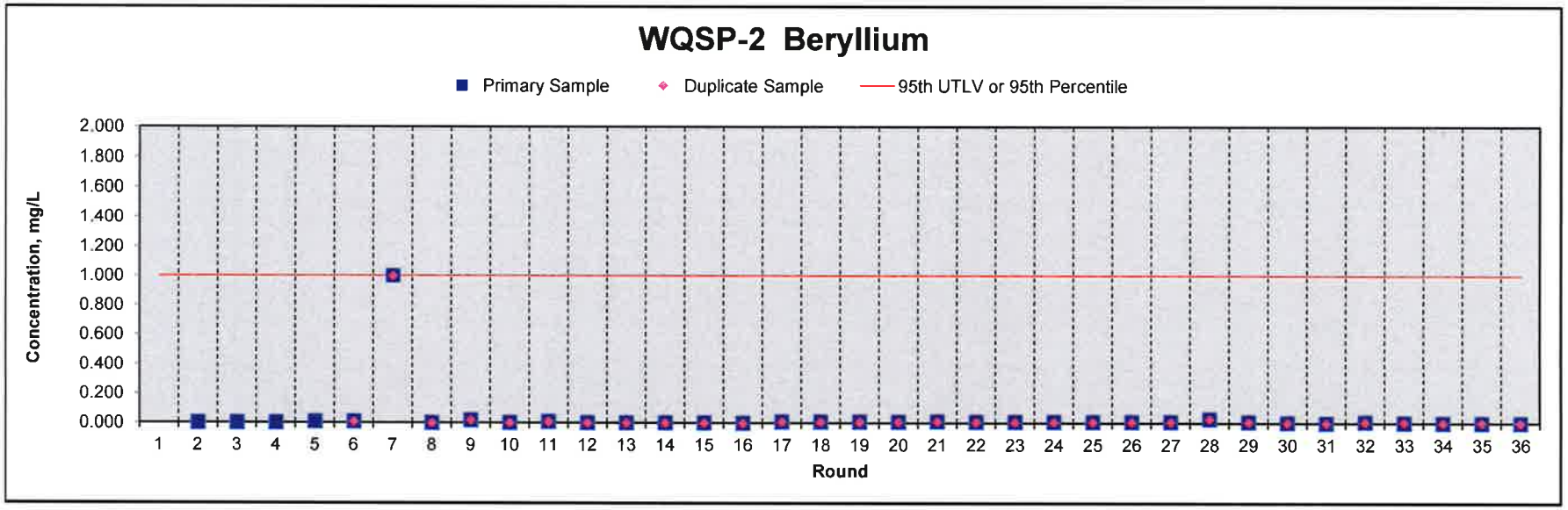
WQSP-2 Barium

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	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
Barium	36	06/10/14	06/25/14	0.023	0.023	mg/L	0.0031	< 1.0



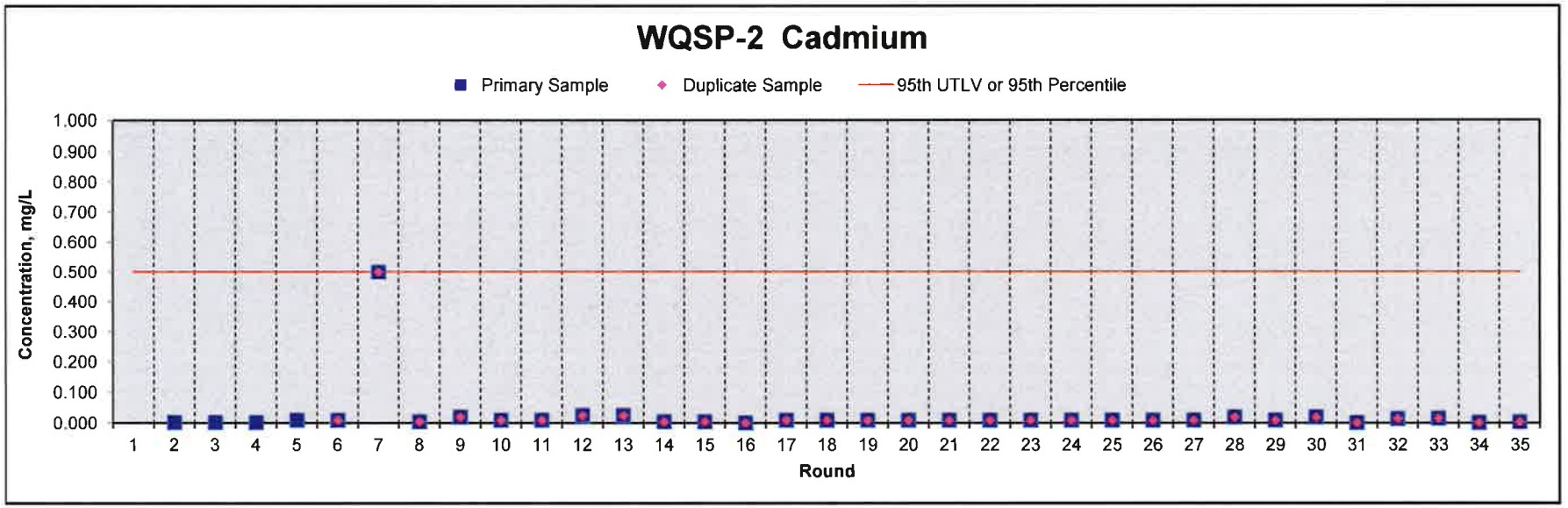
WQSP-2 Beryllium

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	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
Beryllium	36	06/10/14	06/25/14	0.0029	0.0020	mg/L	0.0018	< 1.0



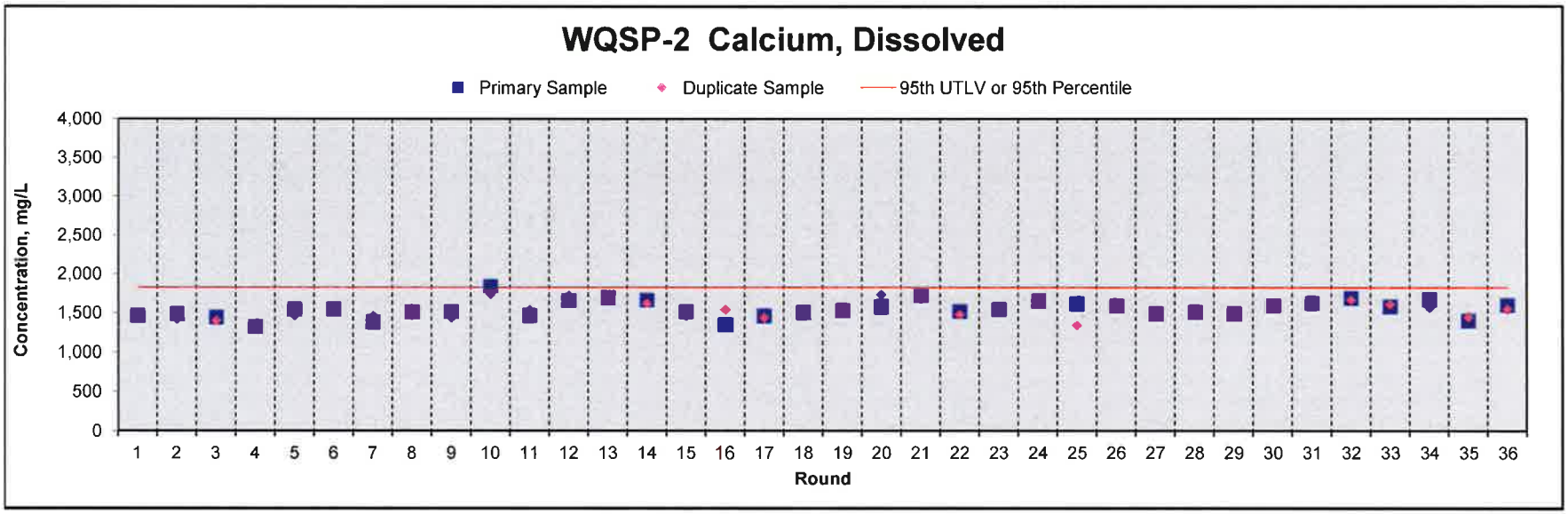
WQSP-2 Cadmium

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	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
Cadmium	36	06/10/14	06/25/14	< 0.0031	< 0.0031	mg/L	0.0031	< 0.50



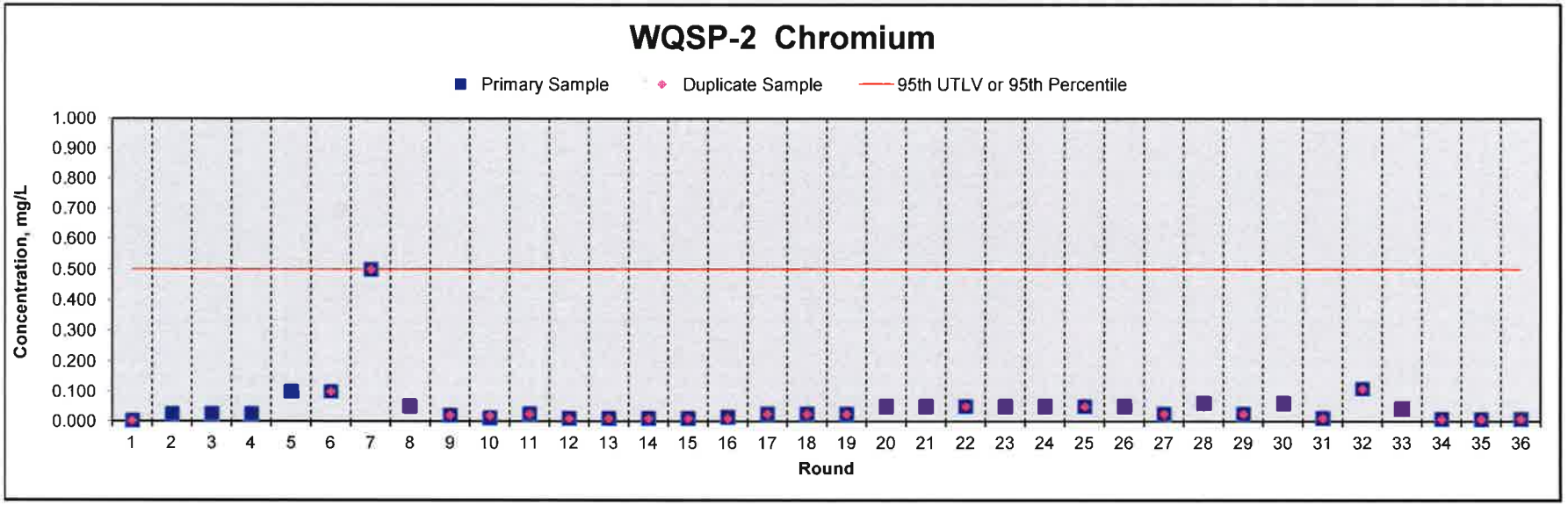
WQSP-2 Calcium, Dissolved

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	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
Calcium	36	06/10/14	06/12/14	1,600	1,550	mg/L	0.77	1,827



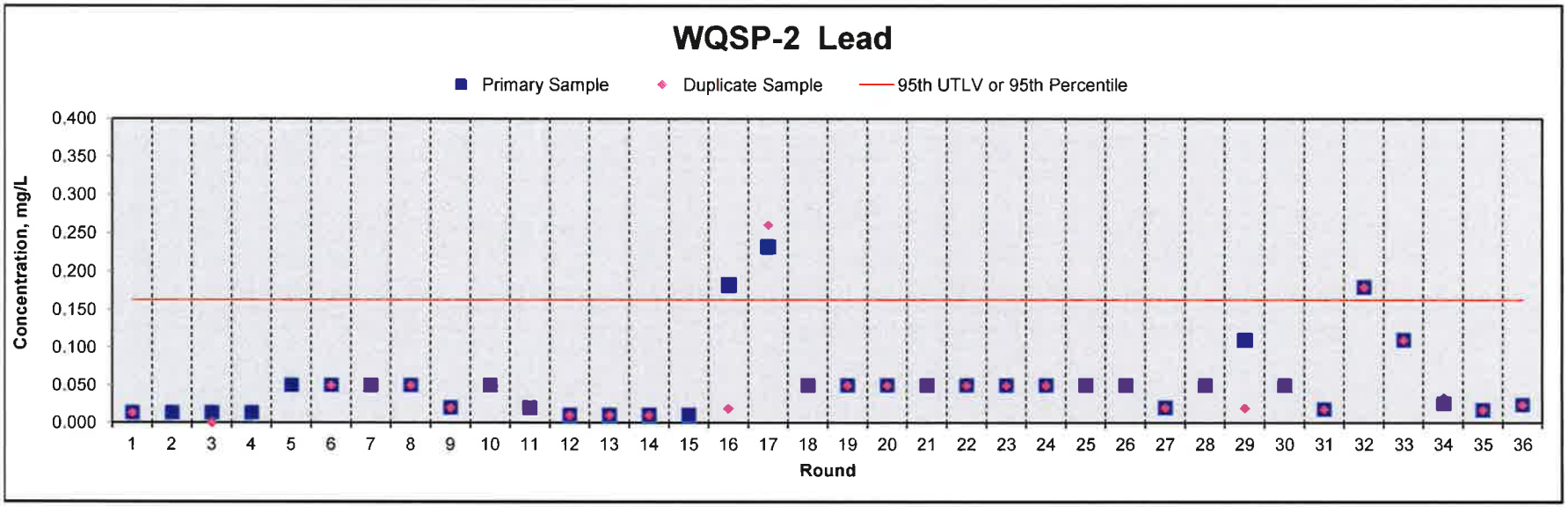
WQSP-2 Chromium

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	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
Chromium	36	06/10/14	06/25/14	< 0.0084	< 0.0084	mg/L	0.0084	< 0.50



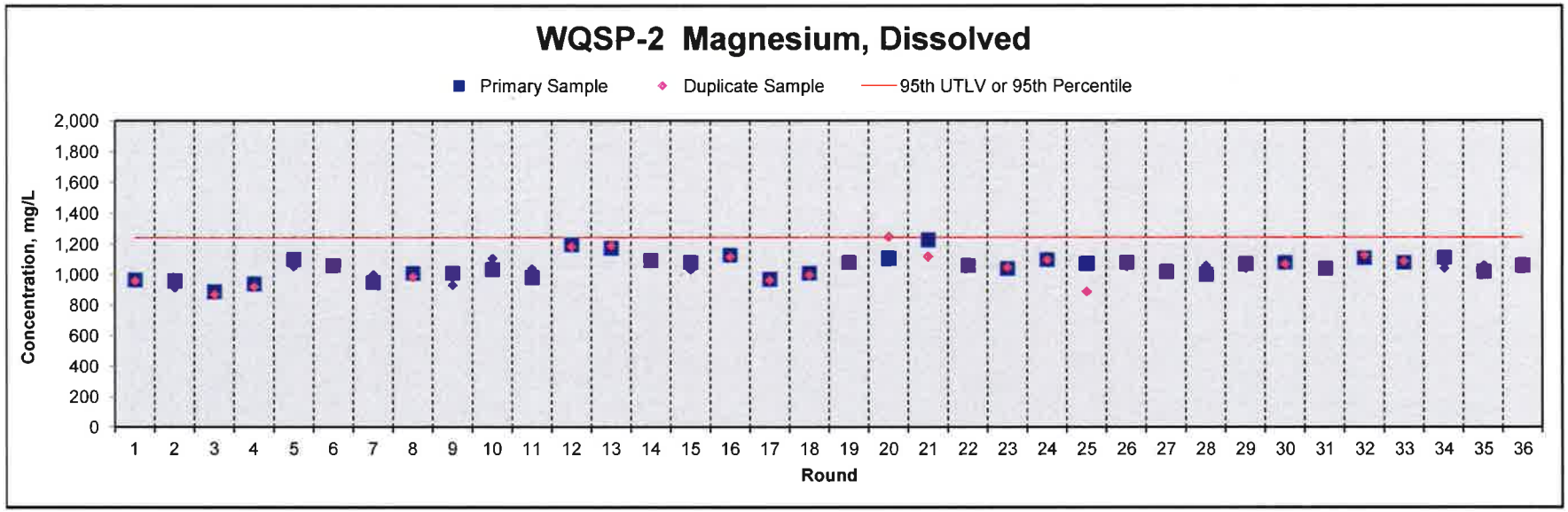
WQSP-2 Lead

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	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
Lead	36	06/10/14	06/25/14	< 0.024	< 0.024	mg/L	0.024	0.163



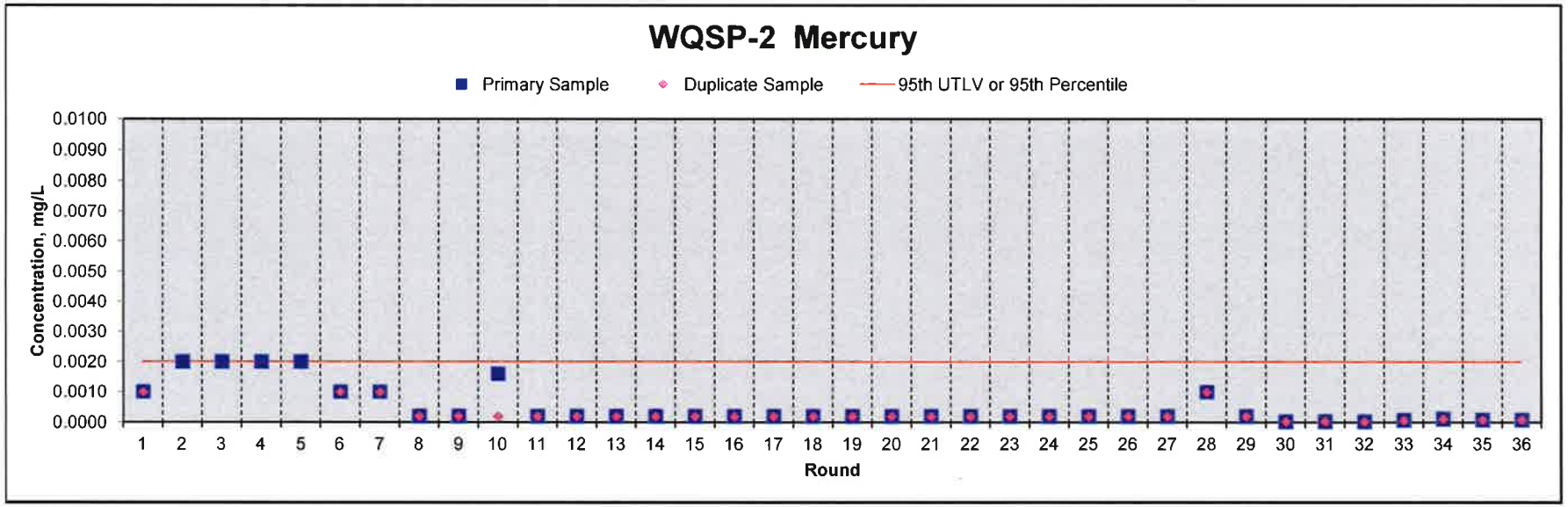
WQSP-2 Magnesium, Dissolved

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	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
Magnesium	36	06/10/14	06/12/14	1,060	1,040	mg/L	0.38	1,244



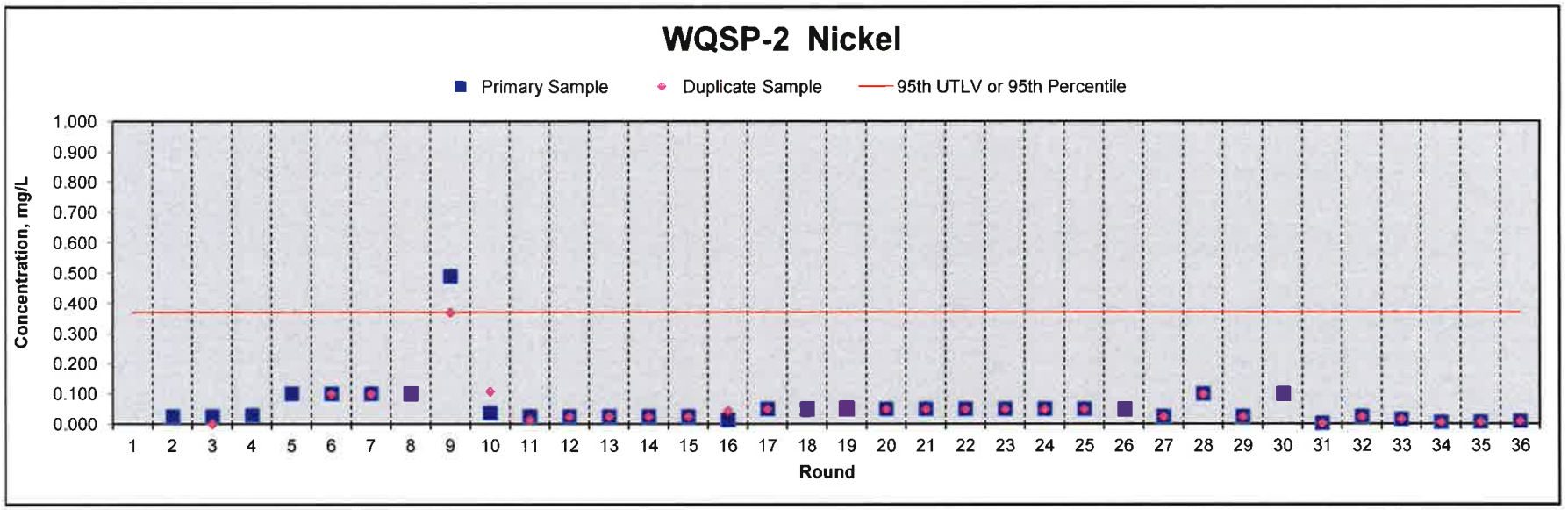
WQSP-2 Mercury

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	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
Mercury	36	06/10/14	07/17/14	< 0.000087	< 0.000087	mg/L	0.000087	< 0.002



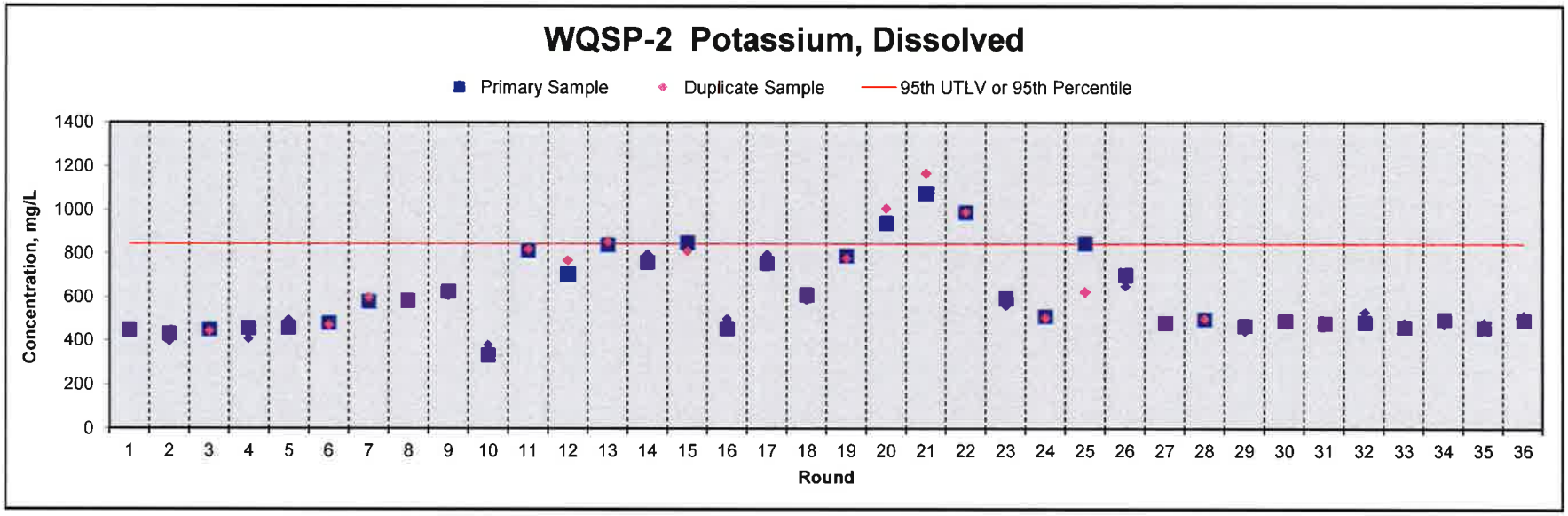
WQSP-2 Nickel

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	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
Nickel	36	06/10/14	06/25/14	< 0.0095	< 0.0095	mg/L	0.0095	0.37



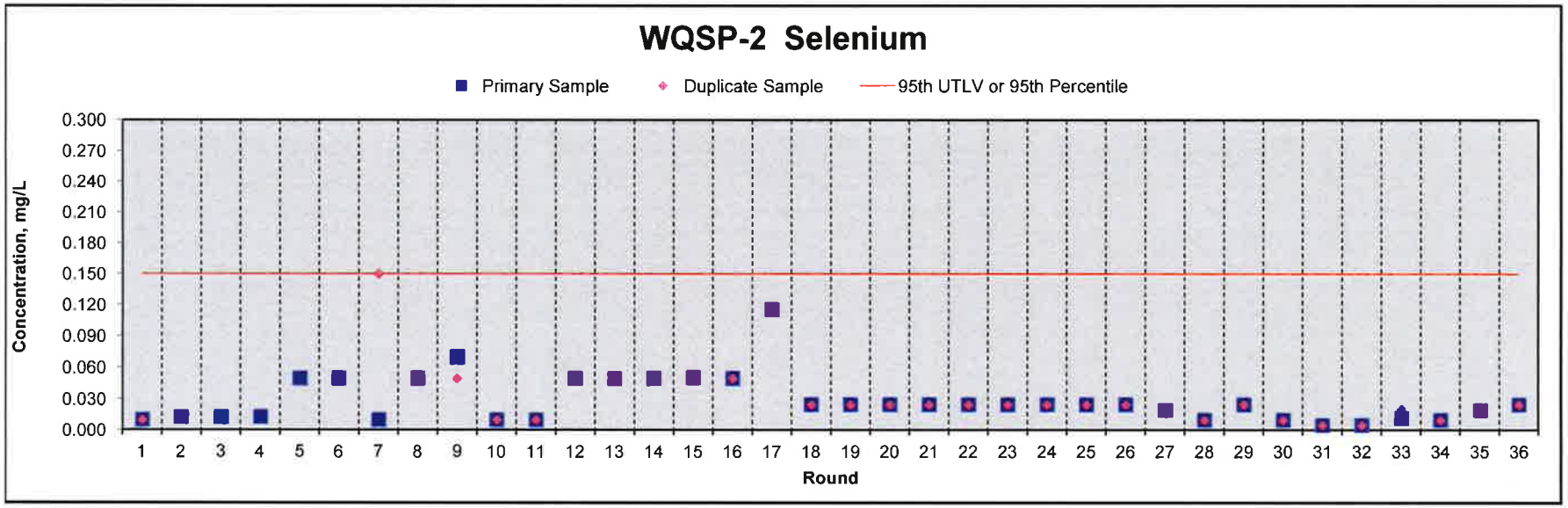
WQSP-2 Potassium, Dissolved

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	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
Potassium	36	06/10/14	06/12/14	496	518	mg/L	2.02	845



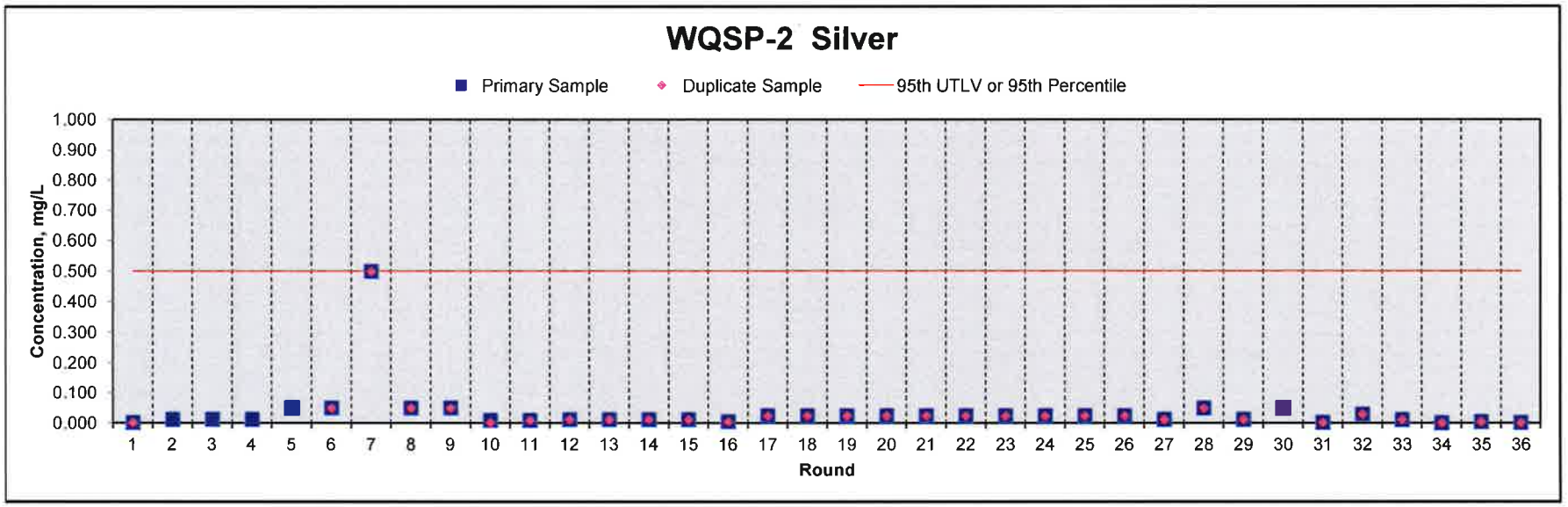
WQSP-2 Selenium

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	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
Selenium	36	06/10/14	06/23/14	< 0.025	< 0.025	mg/L	0.025	0.150



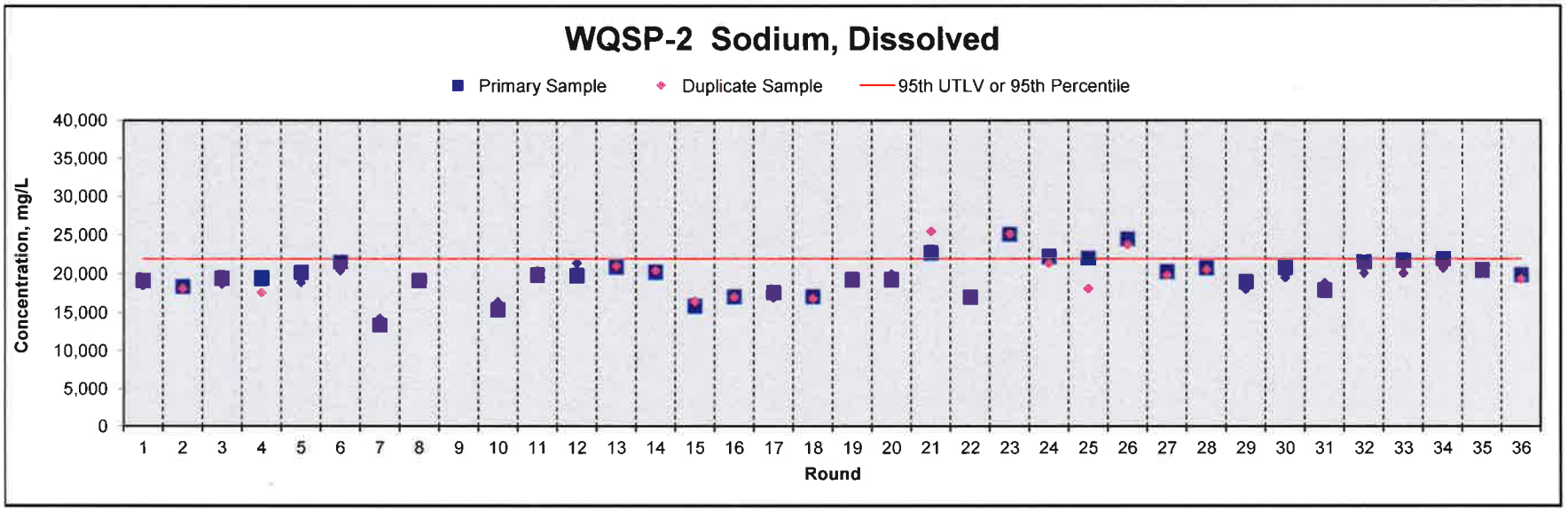
WQSP-2 Silver

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	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
Silver	36	06/10/14	06/25/14	< 0.0026	< 0.0026	mg/L	0.0026	< 0.5



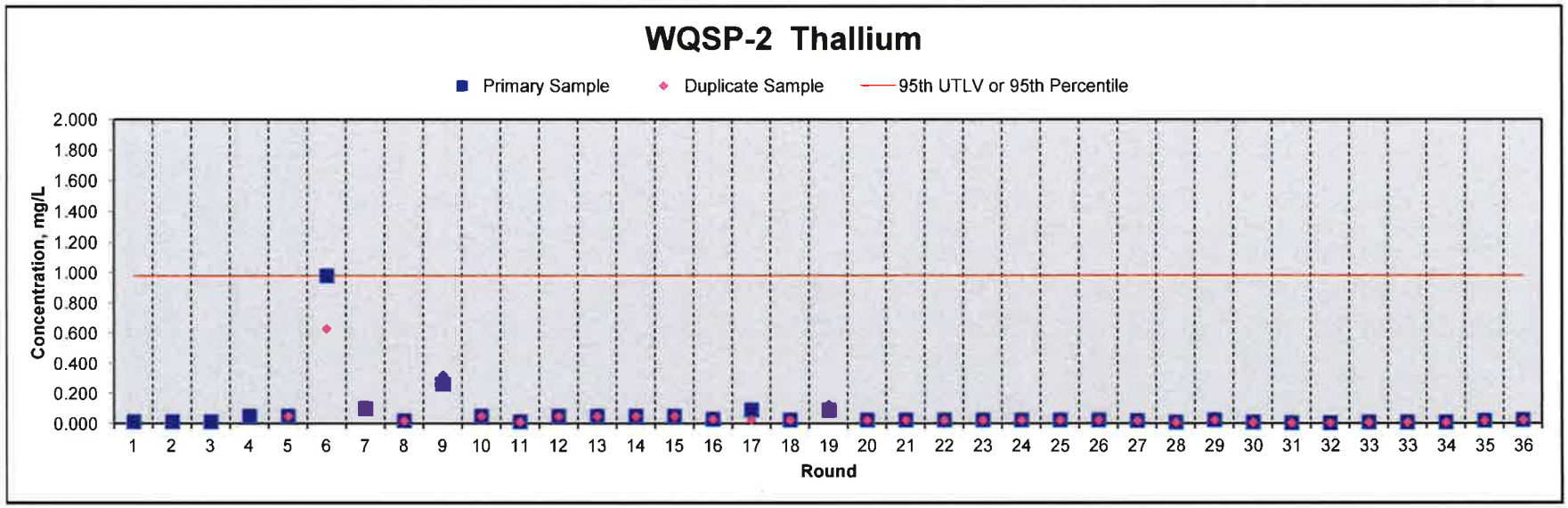
WQSP-2 Sodium, Dissolved

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	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
Sodium	36	06/10/14	06/17/14	19,900	19,400	mg/L	61	21,900



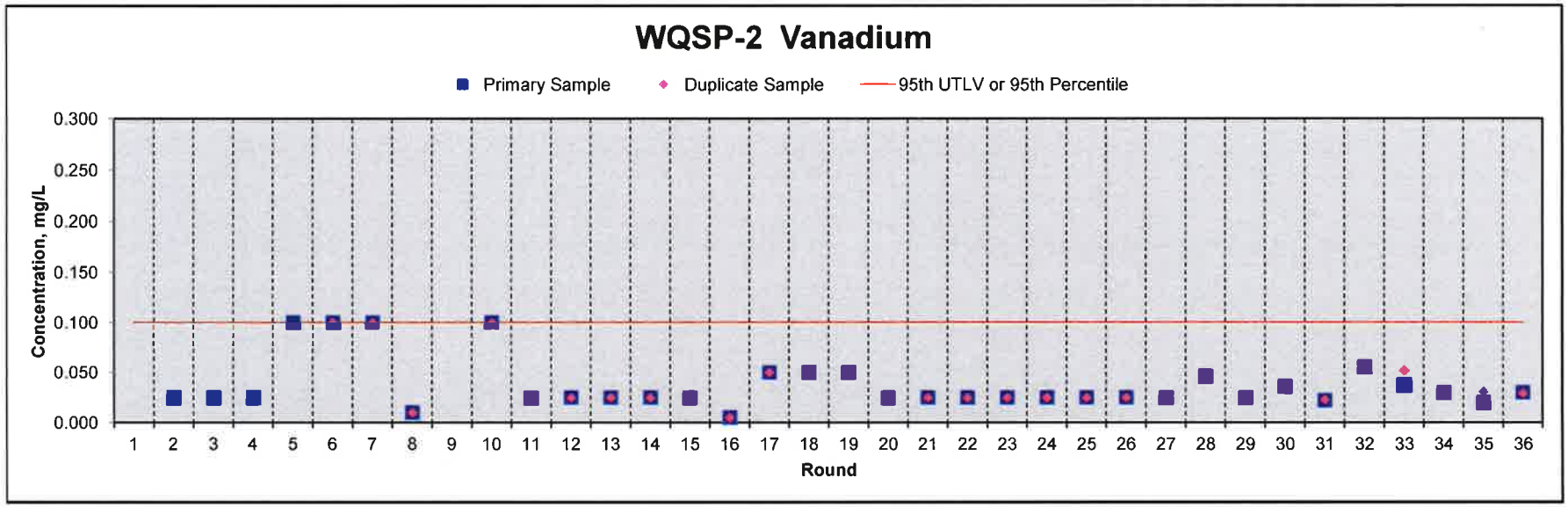
WQSP-2 Thallium

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	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
Thallium	36	06/10/14	06/23/14	< 0.025	< 0.025	mg/L	0.025	0.980



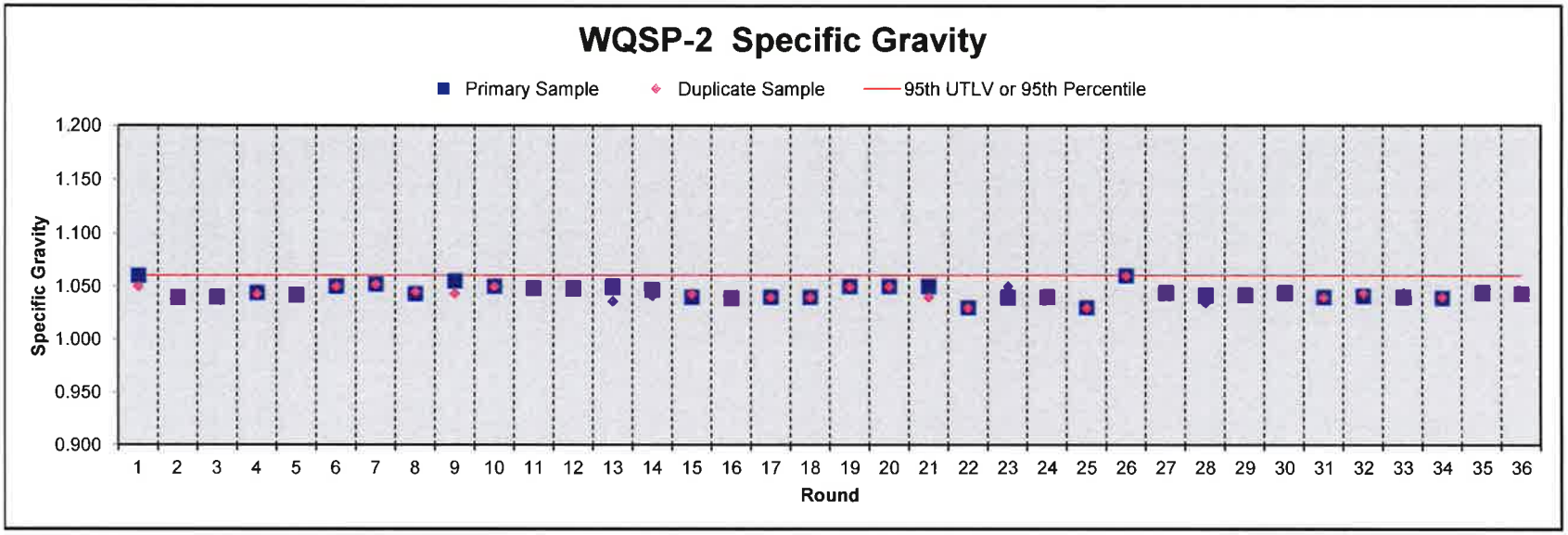
WQSP-2 Vanadium

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	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
Vanadium	36	06/10/14	06/25/14	0.030	0.029	mg/L	0.0274	< 0.1



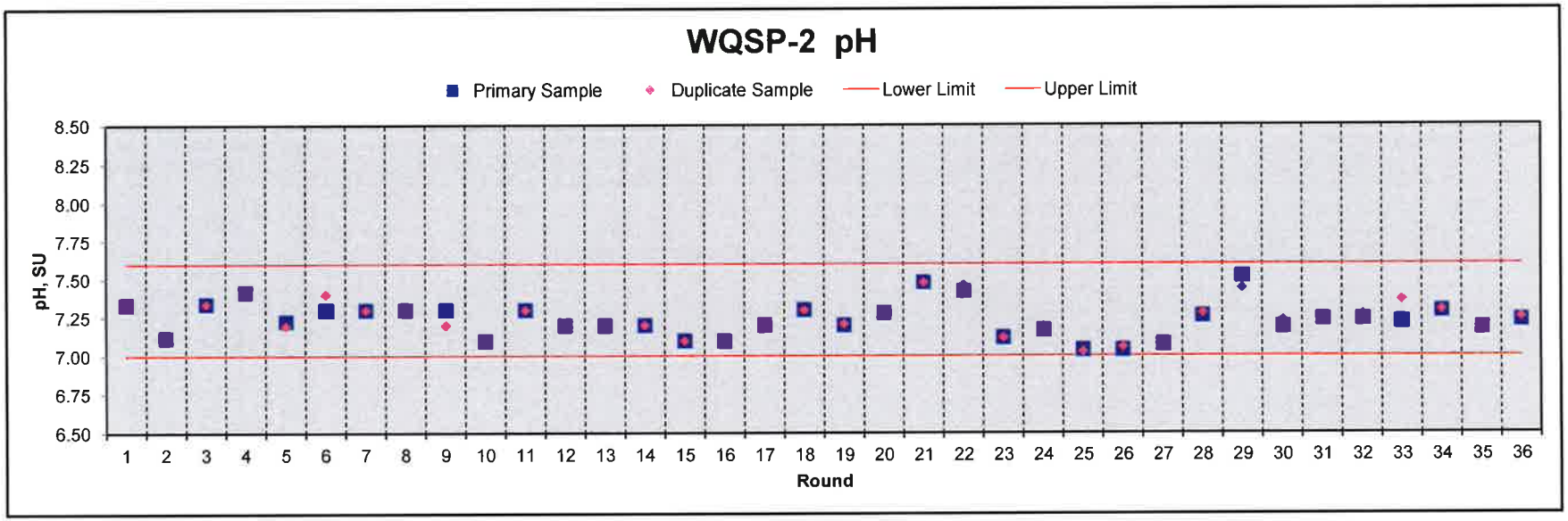
WQSP-2 Specific Gravity

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
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
Specific Gravity	36	06/10/14	06/11/14	1.043	1.044	unitless	0.0	1.06



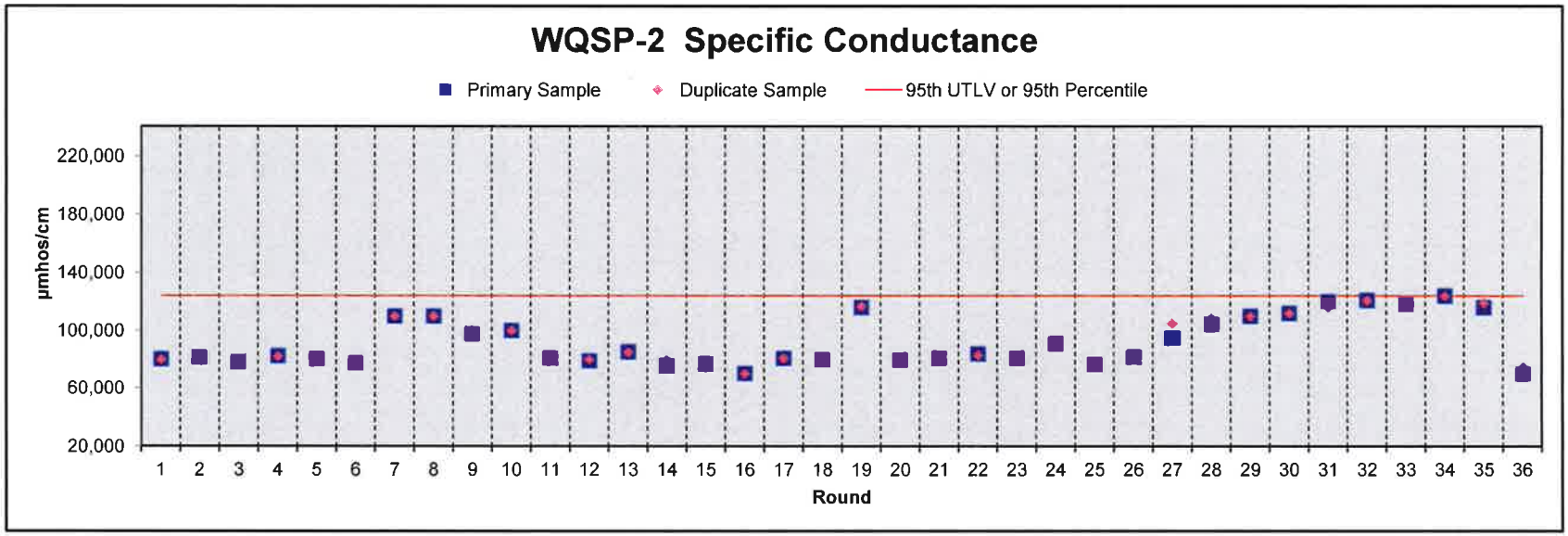
WQSP-2 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile Lower Limit	95th UTLV or 95th Percentile 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	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
pH	36	06/10/14	06/11/14	7.23	7.25	SU	0.1	7.0	7.6



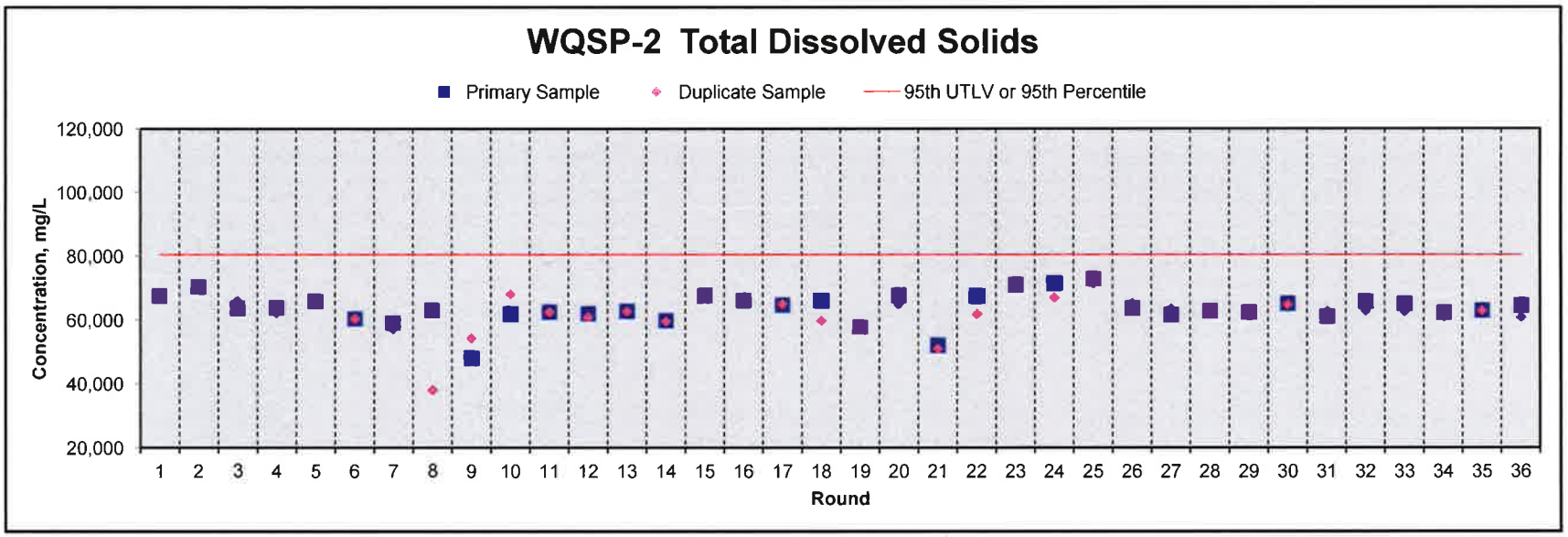
WQSP-2 Specific Conductance

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	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
Specific Conductance	36	06/10/14	06/11/14	70,100	75,000	µmhos/cm	0.10	124,000



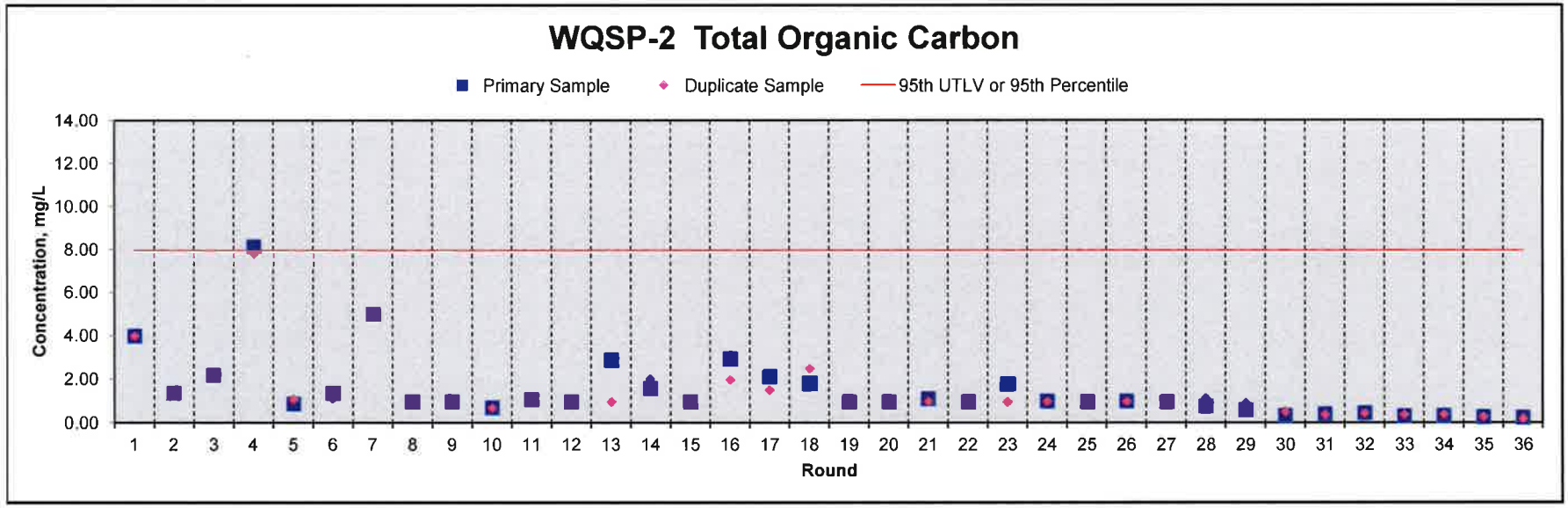
WQSP-2 Total Dissolved Solids

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	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
Total Dissolved Solids	36	06/10/14	06/13/14	64,500	60,800	mg/L	492	80,500



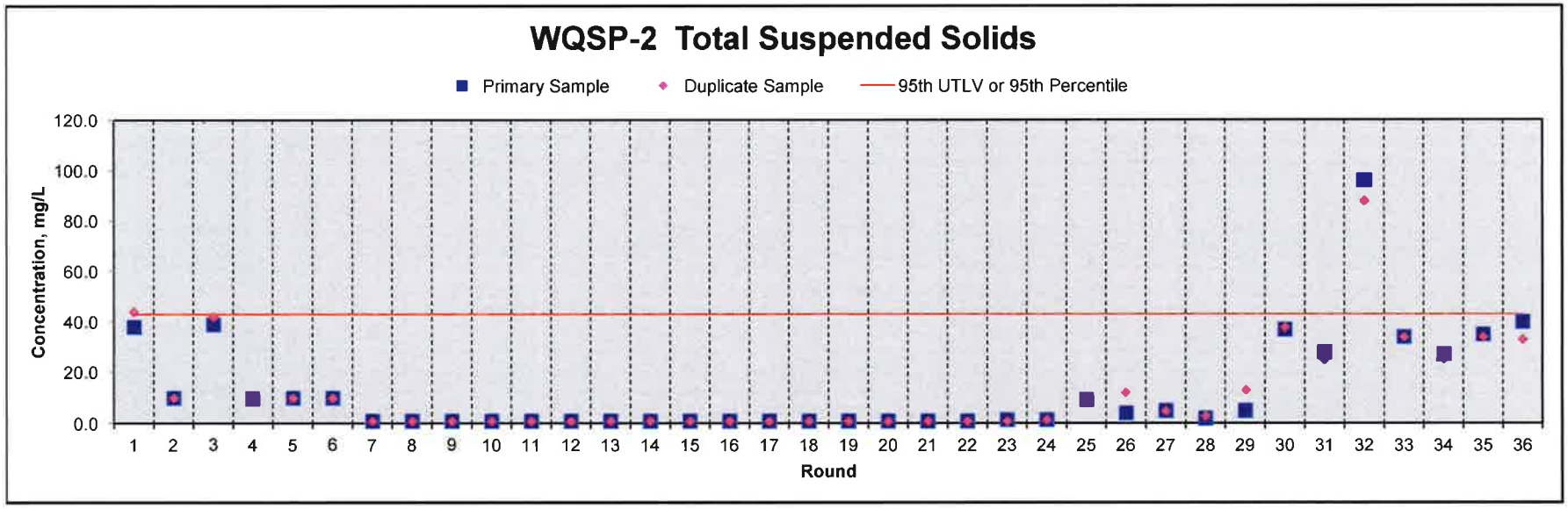
WQSP-2 Total Organic Carbon

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	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
Total Organic Carbon	36	06/10/14	06/11/14	0.26	0.21	mg/L	0.16	7.97



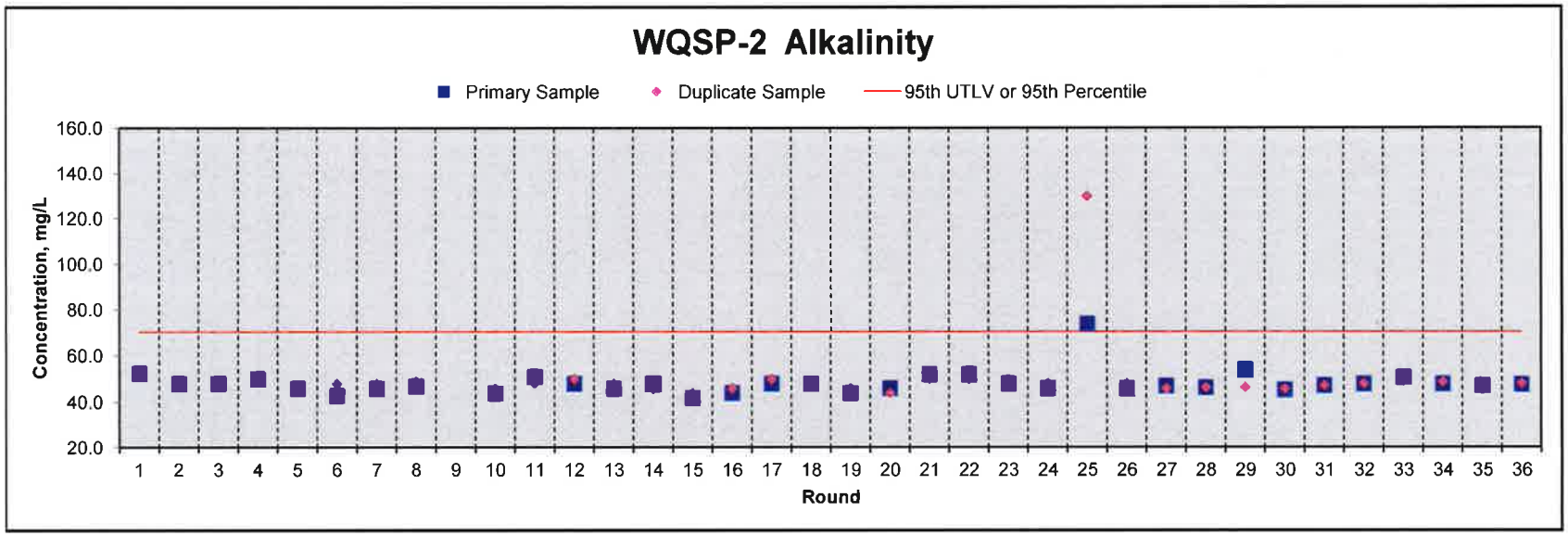
WQSP-2 Total Suspended Solids

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	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
Total Suspended Solids	36	06/10/14	06/15/14	40	33	mg/L	3.1	43.0



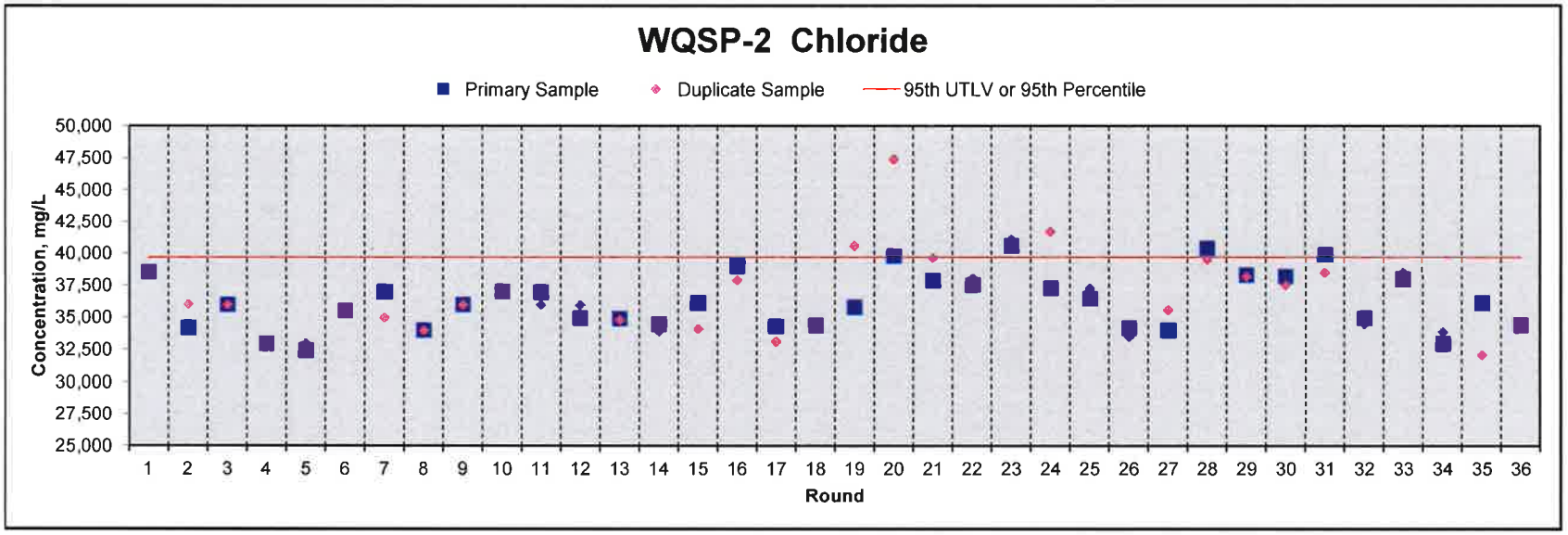
WQSP-2 Alkalinity

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	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
Alkalinity	36	06/10/14	06/11/14	47.6	48.2	mg/L	4.0	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	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
Chloride	36	06/10/14	06/11/14	34,400	34,400	mg/L	500	39,670



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: 140612032
Order Date: 6/12/2014

Contact Name: ANDY FREEMAN

Project Name: 1406471

Comment:

Sample #: 140612032-001 **Customer Sample #:** 1406471-001F / GW-WQ2-C-R36

Recv'd: ☑ **Collector:** **Date Collected:** 6/10/2014
Quantity: 1 **Matrix:** Water **Date Received:** 6/12/2014 12:45:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***

Sample #: 140612032-002 **Customer Sample #:** 1406471-002F / GW-WQ2-C-R36 DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 6/10/2014
Quantity: 1 **Matrix:** Water **Date Received:** 6/12/2014 12:45:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	6/24/2014	***Normal (~10 Days)***

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB			**Order ID:**	140612032
	4901 HAWKINS NE SUITE D			**Order Date:**	6/12/2014
	ALBUQUERQUE	NM	87109		
Contact Name:	ANDY FREEMAN			**Project Name:**	1406471
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	5.5
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

140612 032 HALL Last Due 6/24/2014
1st SAMP 6/10/2014 1st RCVD 6/12/2014
1406471

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	1406471-001F	GW-WQ2-C-R36	500HDPEHNO3	Aqueous	6/10/2014 8:15:00 AM	1	SEE BELOW
2	1406471-002F	GW-WQ2-C-R36 DUPLICATE	500HDPEHNO3	Aqueous	6/10/2014 8:17:00 AM	1	SEE BELOW MWBS

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT TEMP: 5.5 °C
- ☒ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: ~~Na Thio, C6H7KO7, HCl, NaOH~~ HNO3 JK

NUMBER OF CONTAINERS: ~~1, 1 VIA~~ 12 DK SHIPPED VIA: Fed Ex

DATE & TIME: 6/12/14 1245 INSPECTED BY: JK

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb, Se Tl BY METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. PLEASE DO MS/MSD ON 0405471-001F. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LCCR. SAMPLE MAY HAVE HIGH TDS.

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
[signature]	6/11/2014	12:17 PM	[signature]	6/12/14	1245
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

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: 1406471 | RcptNo: 1

Received by/date: AG 06/11/14

Logged By: Anne Thorne 6/11/2014 9:03:00 AM Anne Thorne

Completed By: Anne Thorne 6/11/2014 Anne Thorne

Reviewed By: KMS 6/11/14

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? 3 x 40mL HCl w/ Bubbles AG 06/11/14	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 06/11/14

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	3.6	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1140

Page 1 of 1

Project Number:	Project Name:
T409304-1	WIPP/DMP

Sampler(s): R. Jimenez, RASpoon

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry	Comments
6/10/14	09:32	GW	GW-W02-C-R36-N1	6	X					Use for MS/MSD -001
"	09:39	"	-N1D	4	X					-002
"	09:10	DI	-N2	4	X					Field Blanks -003
N/A	N/A	DI	-N3	4	X					Trip Blanks, HEAL Provided
6/10/14	09:23	GW	-N4	4		X				Use for MS/MSD-001
"	09:27	"	-N4D	2		X				-002
"	08:22	"	-N5	6			X			Use for MS/MSD-001
"	08:41	"	-N5D	2			X			-002
"	08:55	"	-N6	2				X		Use for MS/MSD-001
"	09:00	"	-N6D	2				X		-002
"	08:15	"	-N7	1					X	Use for MS/MSD-001
6/10/14	08:17	GW	-N7D	1					X	-002
						N/A				

Analytical Laboratory: HEAL Albuquerque, NM 1406471

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
R Nelson 6/10/2014 14:30	Ashley Gallegos 06/11/14 0903		
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 7/16/14

☒ Routine ☐ Rush _____

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: 8758 4779 1173

FedEx 8758 4779 1195

Sample Receipt Remarks: Temp @ HEAL: 3.6°C on ice

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@wipp.ws

Special Instructions:

Analyze LCS in duplicate.

Use primary GW sample for MS/MSD on all parameters.

1 Trip Blank contained Bubbles

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

APPENDIX 5

WELL WQSP-3

ANALYTICAL RESULTS

WQSP-3

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-3, Culebra, Round 36

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 36, the static water level was 467.22 ft_{btoc}. One wbv for WQSP-3 was determined to be 334.0 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).

Due to radiological events that occurred at the WIPP Site in February, the sampling team collected a pre-installation line rinse sample. The dedicated sampling line was flushed with approximately 2 liters of deionized water prior to installation rinse. Rinsate was collected in a certified container, preserved with nitric acid (pH <2) and considered an additional retain sample.

Round 36 pumping of WQSP-3 began on 6/23/2014 at 09:05 and ended on 6/25/2014 at 11:37. The well was purged for 52.2 hours with an average flow rate of 0.38 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 1,190 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 6/25/2014 after approximately 1,112 gallons of groundwater (≈ 3.3 wbv) had been purged from WQSP-3 and all 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, 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 916 mL of groundwater passed through the in-line flow cell every minute as field-indicating parameters were monitored. The observed rate of exchange was 22.9 cell volumes per minute; thus, approximately 114.5 volumes of groundwater (4,580 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 for SC, temperature and pH measurements varied less than 5% within 15 minutes. Specific gravity was stable after the third measurement (approximately 1.5 hours). Because this was the first SC stabilization occurrence in ithe purging/sampling history of WQSP-3, the Sampling Team opted to collect field measurement again on day 2 to verify these findings.

On day 2, approximately 240 mL of groundwater passed through the in-line flow cell every minute during field-indicating parameters monitoring. The observed rate of exchange was 6.0 cell volumes per minute; thus, approximately 30.0 volumes of groundwater (1,200 mL) passed through in-line flow cell between measurements. All field parameters remained stable throughout the measurement period. Due to the slower flow rate and diminished cell volume rate exchange, the sample team increased the pump speed to 54.0 Hz after 8 measurements were obtained (40 minutes). 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.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-3 DMW, Round 36[a,b,c].

Item	Day 1		Day 2		Day 3	
Date	6/23/2014		6/24/2014		6/25/2014	
Pump Speed, Hz	48.0 / 50.0		50.0 / 54.0		54.0	
Average Flow Rate, gpm	0.48		0.59		0.35	
Rate of Exchange, no. cell	22.9		6.0		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	182,500	190,300	203,700	207,300	NR	NR
Temperature, °C	22.2	22.7	22.1	23.1	NR	NR
pH, SU	7.20	7.08	6.68	6.58	NR	NR
Specific Gravity	1.144	1.144	1.144	1.144	NR	NR
Time to Parameter Stability, hr	1.0		0.67		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 36 and the average results from the previous 35 rounds were conducted (Table 2). The current value for SG (1.145) was identical to the average from the previous samplings (1.145). Specific conductance and temperature measurements were higher when compared to the average of previous 35 rounds (207,300 µmhos/cm and 23.1°C vs. 195,331 µmhos/cm and 21.5°C, respectively). The current value for pH was lower when compared with the average of previous rounds (and 6.58 SU vs. and 6.99 SU, respectively).

Over the past 19 years, only two indicating parameters, pH and SG, have been within the normal limits observed for WQSP-3. Traditionally, SC and temperature have exceeded the historical upper limits for this DMW.

Table 2. Comparison of Round 36 DMW Measurements to Historical Results from Rounds (1-35) for WQSP-3.

Field-analyzed Parameter	Historical Data (Rounds 1 – 35)[a,b]			Measurement Results, Round 36[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	195,331	185,564	205,098	207,300
Temperature, °C	21.5	20.4	22.6	23.1
pH, S.U.	6.99	6.64	7.34	6.58
Specific Gravity	1.145	1.088	1.202	1.144

[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

August 11, 2014

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

RE: WIPP DMP OrderNo.: 1406C22

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 6 sample(s) on 6/26/2014 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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Workorder Sample Summary

WO#: **1406C22**

11-Aug-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1406C22-001	GW-WQ3-C-R36		6/25/2014 8:26:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-001	GW-WQ3-C-R36		6/25/2014 8:26:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-001	GW-WQ3-C-R36		6/25/2014 8:26:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-001	GW-WQ3-C-R36		6/25/2014 8:26:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-001	GW-WQ3-C-R36		6/25/2014 8:26:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-001	GW-WQ3-C-R36		6/25/2014 8:26:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-002	GW-WQ3-C-R36DUPLICATE		6/25/2014 8:29:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-002	GW-WQ3-C-R36DUPLICATE		6/25/2014 8:29:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-002	GW-WQ3-C-R36DUPLICATE		6/25/2014 8:29:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-002	GW-WQ3-C-R36DUPLICATE		6/25/2014 8:29:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-002	GW-WQ3-C-R36DUPLICATE		6/25/2014 8:29:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-002	GW-WQ3-C-R36DUPLICATE		6/25/2014 8:29:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-003	GW-WQ3-C-R36-N2 Field Blank		6/25/2014 9:12:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-004	GW-WQ3-C-R36-N3 Trip Blank			6/26/2014 9:10:00 AM	Aqueous
1406C22-005	GW-WQ3-C-R36-N12 Metals Blank Preserved		6/25/2014 8:20:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-005	GW-WQ3-C-R36-N12 Metals Blank Preserved		6/25/2014 8:20:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-006	GW-WQ3-C-R36-N13 Metals Blank Unpreserved		6/25/2014 8:21:00 AM	6/26/2014 9:10:00 AM	Aqueous
1406C22-006	GW-WQ3-C-R36-N13 Metals Blank Unpreserved		6/25/2014 8:21:00 AM	6/26/2014 9:10:00 AM	Aqueous

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 LCS. 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 2,4-Dinitrophenol and pentachlorophenol 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: 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.

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Case Narrative

WO#: **1406C22**
Date: **8/11/2014**

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

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

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Albuquerque, NM 87109
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Website: www.hallenvironmental.com

DATES REPORT

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406C22-001A	GW-WQ3-C-R36	6/25/2014 8:26:00 AM	Aqueous	EPA Method: 8260B			6/30/2014 1:37:28 PM
1406C22-001B				EPA Method 8270C: Semivolatiles		6/29/2014 8:42:27 AM	6/30/2014 1:24:30 PM
1406C22-001C				SM 5310B: TOC			6/30/2014 10:53:15 AM
1406C22-001D				EPA Method 300.0: Anions			7/2/2014 8:59:12 PM
				EPA Method 300.0: Anions			6/26/2014 3:45:19 PM
				EPA Method 300.0: Anions			6/26/2014 4:22:33 PM
				EPA Method 300.0: Anions			6/26/2014 4:34:57 PM
				EPA Method 6010B: Dissolved Metals			7/10/2014 1:30:18 PM
				EPA Method 6010B: Dissolved Metals			7/9/2014 4:46:27 PM
				EPA Method 6010B: Dissolved Metals			7/9/2014 4:52:07 PM
				EPA Method 6010B: Dissolved Metals			7/10/2014 12:43:43 PM
				EPA Method 6010B: Dissolved Metals			7/10/2014 1:03:10 PM
				SM 2540 C: Total Dissolved Solids		7/2/2014 8:24:14 PM	7/6/2014 4:26:00 PM
				SM 2540 C: Total Dissolved Solids		6/30/2014 3:12:54 PM	7/1/2014 1:24:00 PM
				SM 2540D: TSS		6/30/2014 2:47:31 PM	7/1/2014 9:15:00 AM
				SM 2540D: TSS		6/30/2014 2:47:31 PM	7/1/2014 9:15:00 AM
				SM2320B: Alkalinity			6/26/2014 5:14:05 PM
				SM2510B: Specific Conductance			6/30/2014 2:02:13 PM
				SM2510B: Specific Conductance			6/26/2014 5:55:41 PM
				SM2510B: Specific Conductance			6/26/2014 5:14:05 PM
				SM4500-H+B: pH			6/26/2014 5:14:05 PM
				Specific Gravity			6/30/2014 10:37:00 AM
1406C22-001E				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:06:39 PM

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DATES REPORT

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406C22-001E	GW-WQ3-C-R36	6/25/2014 8:26:00 AM	Aqueous	EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 12:54:21 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:16:07 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:14:23 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 4:57:38 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:34:05 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:03:24 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 12:47:13 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/1/2014 1:52:44 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/1/2014 2:10:47 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/2/2014 9:45:07 AM
1406C22-002A	GW-WQ3-C-R36DUPLICATE	6/25/2014 8:29:00 AM		EPA Method: 8260B			6/30/2014 2:05:45 PM
1406C22-002B				EPA Method 8270C: Semivolatiles		6/29/2014 8:42:27 AM	6/30/2014 2:53:19 PM
1406C22-002C				SM 5310B: TOC			6/30/2014 12:55:43 PM
1406C22-002D				EPA Method 300.0: Anions			6/26/2014 5:36:59 PM
				EPA Method 300.0: Anions			6/26/2014 4:59:46 PM
				EPA Method 300.0: Anions			7/2/2014 9:11:37 PM
				EPA Method 300.0: Anions			6/26/2014 4:47:22 PM
				EPA Method 6010B: Dissolved Metals			7/10/2014 12:45:29 PM
				EPA Method 6010B: Dissolved Metals			7/10/2014 1:04:55 PM
				EPA Method 6010B: Dissolved Metals			7/10/2014 1:32:12 PM
				EPA Method 6010B: Dissolved Metals			7/9/2014 4:53:56 PM
				EPA Method 6010B: Dissolved Metals			7/9/2014 4:55:48 PM
				SM 2540 C: Total Dissolved Solids		7/2/2014 8:24:14 PM	7/6/2014 4:26:00 PM

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DATES REPORT

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406C22-002D	GW-WQ3-C-R36DUPLICATE	6/25/2014 8:29:00 AM	Aqueous	SM 2540 C: Total Dissolved Solids		6/30/2014 3:12:54 PM	7/1/2014 1:24:00 PM
				SM 2540D: TSS		6/30/2014 2:47:31 PM	7/1/2014 9:15:00 AM
				SM 2540D: TSS		6/30/2014 2:47:31 PM	7/1/2014 9:15:00 AM
				SM2320B: Alkalinity			6/26/2014 5:48:43 PM
				SM2510B: Specific Conductance			6/26/2014 6:03:44 PM
				SM2510B: Specific Conductance			6/30/2014 2:06:39 PM
				SM2510B: Specific Conductance			6/26/2014 5:48:43 PM
				SM4500-H+B: pH			6/26/2014 5:48:43 PM
				Specific Gravity			6/30/2014 10:37:00 AM
1406C22-002E				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:18:12 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:01:27 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:41:37 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 12:49:03 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:12:08 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:28:25 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/12/2014 10:40:38 AM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 1:26:41 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:14:06 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/1/2014 1:58:06 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/2/2014 9:52:23 AM
1406C22-003A	GW-WQ3-C-R36-N2 Field Blank	6/25/2014 9:12:00 AM		EPA Method: 8260B			6/30/2014 2:34:15 PM
1406C22-004A	GW-WQ3-C-R36-N3 Trip Blank			EPA Method: 8260B			6/30/2014 3:02:37 PM

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DATES REPORT

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1406C22-005A	GW-WQ3-C-R36-N12 Metals Blank Preserved	6/25/2014 8:20:00 AM	Aqueous	EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:15:55 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:17:40 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 12:50:54 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/1/2014 1:59:54 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/2/2014 9:54:12 AM
1406C22-006A	GW-WQ3-C-R36-N13 Metals Blank Unpreserved	6/25/2014 8:21:00 AM		EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:19:23 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/9/2014 5:21:06 PM
				EPA 6010B: Total Recoverable Metals		7/1/2014 7:23:06 AM	7/10/2014 12:52:37 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/1/2014 2:01:42 PM
				EPA Method 7470: Mercury		7/1/2014 7:34:22 AM	7/2/2014 9:59:42 AM

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Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: GW-WQ3-C-R36
Project: WIPP DMP
Collection Date: 6/25/2014 8:26:00 AM
Lab ID: 1406C22-001
Matrix: AQUEOUS
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	114000	3890	5000		mg/L	1E+0	7/2/2014 8:59:12 PM	R19662
Nitrogen, Nitrate (As N)	ND	0.985	5.00		mg/L	50	6/26/2014 3:45:19 PM	R19548
Sulfate	6050	321	1000		mg/L	2000	6/26/2014 4:34:57 PM	R19548
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.000435	0.00100		mg/L	5	7/2/2014 9:45:07 AM	13988
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1390	0.773	20.0		mg/L	20	7/10/2014 1:03:10 PM	R19815
Magnesium	2310	0.943	50.0		mg/L	50	7/10/2014 1:30:18 PM	R19815
Potassium	1510	4.05	20.0		mg/L	20	7/10/2014 1:03:10 PM	R19815
Sodium	72300	243	2000		mg/L	2000	7/10/2014 12:43:43 PM	R19815
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0410	0.00625	0.200	J	mg/L	10	7/10/2014 1:34:05 PM	13986
Beryllium	ND	0.00353	0.0300		mg/L	10	7/10/2014 1:34:05 PM	13986
Cadmium	ND	0.00628	0.0200		mg/L	10	7/10/2014 1:34:05 PM	13986
Calcium	1430	3.27	20.0		mg/L	20	7/10/2014 1:14:23 PM	13986
Chromium	ND	0.0168	0.0600		mg/L	10	7/10/2014 1:34:05 PM	13986
Iron	0.323	0.101	0.500	J	mg/L	10	7/10/2014 1:34:05 PM	13986
Lead	ND	0.0477	0.0500		mg/L	10	7/10/2014 1:34:05 PM	13986
Magnesium	2480	0.850	50.0		mg/L	50	7/10/2014 1:16:07 PM	13986
Nickel	ND	0.0190	0.100		mg/L	10	7/10/2014 1:34:05 PM	13986
Potassium	1530	10.1	20.0		mg/L	20	7/10/2014 1:14:23 PM	13986
Silver	ND	0.00522	0.0500		mg/L	10	7/10/2014 1:34:05 PM	13986
Sodium	52800	415	1000		mg/L	1000	7/10/2014 12:54:21 PM	13986
Vanadium	ND	0.0548	0.500		mg/L	10	7/10/2014 1:34:05 PM	13986
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
Hexachloroethane	ND	1.89	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
2-Methylphenol	ND	2.75	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
Nitrobenzene	ND	2.58	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
Pentachlorophenol	ND	2.48	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
Pyridine	ND	1.57	5.00		µg/L	1	6/30/2014 1:24:30 PM	13958
Surr: 2-Fluorophenol	83.0	0	12.1-85.8		%REC	1	6/30/2014 1:24:30 PM	13958

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.
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: GW-WQ3-C-R36
Project: WIPP DMP
Collection Date: 6/25/2014 8:26:00 AM
Lab ID: 1406C22-001
Matrix: AQUEOUS
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: Phenol-d5	80.4	0	17.7-65.8	S	%REC	1	6/30/2014 1:24:30 PM	13958
Surr: 2,4,6-Tribromophenol	86.5	0	26-138		%REC	1	6/30/2014 1:24:30 PM	13958
Surr: Nitrobenzene-d5	103	0	47.5-119		%REC	1	6/30/2014 1:24:30 PM	13958
Surr: 2-Fluorobiphenyl	99.5	0	48.1-106		%REC	1	6/30/2014 1:24:30 PM	13958
Surr: 4-Terphenyl-d14	107	0	44-113		%REC	1	6/30/2014 1:24:30 PM	13958
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Benzene	ND	0.154	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Toluene	ND	0.170	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
2-Butanone	ND	1.42	5.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Chloroform	ND	0.315	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/30/2014 1:37:28 PM	R19608
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/30/2014 1:37:28 PM	R19608
Surr: 1,2-Dichloroethane-d4	94.8	0	70-130		%REC	1	6/30/2014 1:37:28 PM	R19608
Surr: 4-Bromofluorobenzene	94.4	0	70-130		%REC	1	6/30/2014 1:37:28 PM	R19608
Surr: Dibromofluoromethane	94.6	0	70-130		%REC	1	6/30/2014 1:37:28 PM	R19608
Surr: Toluene-d8	95.9	0	70-130		%REC	1	6/30/2014 1:37:28 PM	R19608
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.204	0.161	1.00	J	mg/L	1	6/30/2014 10:53:15 AM	R19596
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	206000	984	2000	*	mg/L	1	7/6/2014 4:26:00 PM	14046
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JRR**	
Conductivity	358000	0.500	0.500		µmhos/c	50	6/30/2014 2:02:13 PM	R19635

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.
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: 1406C22-001
Matrix: AQUEOUS
Client Sample ID: GW-WQ3-C-R36
Collection Date: 6/25/2014 8:26:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JRR**	
pH	6.83	0.100	1.68	H	pH units	1	6/26/2014 5:14:05 PM	R19544
SM2320B: ALKALINITY							Analyst: **JRR**	
Bicarbonate (As CaCO3)	34.1	4.00	20.0		mg/L CaC	1	6/26/2014 5:14:05 PM	R19544
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	6/26/2014 5:14:05 PM	R19544
Total Alkalinity (as CaCO3)	34.1	4.00	20.0		mg/L CaC	1	6/26/2014 5:14:05 PM	R19544
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.140	0	0			1	6/30/2014 10:37:00 AM	R19574
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	130	3.07	4.00		mg/L	1	7/1/2014 9:15:00 AM	13982

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.
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: 1406C22-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ3-C-R36DUPLICATE
Collection Date: 6/25/2014 8:29:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	111000	3890	5000		mg/L	1E+0	7/2/2014 9:11:37 PM	R19662
Nitrogen, Nitrate (As N)	ND	0.985	5.00		mg/L	50	6/26/2014 4:47:22 PM	R19548
Sulfate	6340	321	1000		mg/L	2000	6/26/2014 5:36:59 PM	R19548
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.0000870	0.000200		mg/L	1	7/2/2014 9:52:23 AM	13988
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1360	0.773	20.0		mg/L	20	7/10/2014 1:04:55 PM	R19815
Magnesium	2230	0.943	50.0		mg/L	50	7/10/2014 1:32:12 PM	R19815
Potassium	1490	4.05	20.0		mg/L	20	7/10/2014 1:04:55 PM	R19815
Sodium	73700	243	2000		mg/L	2000	7/10/2014 12:45:29 PM	R19815
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0323	0.00312	0.100	J	mg/L	5	7/9/2014 5:12:08 PM	13986
Beryllium	0.00270	0.00176	0.0150	J	mg/L	5	7/9/2014 5:12:08 PM	13986
Cadmium	ND	0.00314	0.0100		mg/L	5	7/9/2014 5:12:08 PM	13986
Calcium	1370	3.27	20.0		mg/L	20	7/10/2014 1:26:41 PM	13986
Chromium	ND	0.00841	0.0300		mg/L	5	7/9/2014 5:12:08 PM	13986
Iron	0.305	0.0507	0.250		mg/L	5	7/9/2014 5:12:08 PM	13986
Lead	ND	0.0239	0.0250		mg/L	5	7/9/2014 5:12:08 PM	13986
Magnesium	2350	0.850	50.0		mg/L	50	7/10/2014 1:28:25 PM	13986
Nickel	ND	0.00952	0.0500		mg/L	5	7/9/2014 5:12:08 PM	13986
Potassium	1460	10.1	20.0		mg/L	20	7/10/2014 1:26:41 PM	13986
Silver	ND	0.00261	0.0250		mg/L	5	7/9/2014 5:12:08 PM	13986
Sodium	66000	830	2000		mg/L	2000	7/12/2014 10:40:38 AM	13986
Vanadium	0.0326	0.0274	0.250	J	mg/L	5	7/9/2014 5:12:08 PM	13986
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
Hexachloroethane	ND	1.89	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
2-Methylphenol	ND	2.75	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
Nitrobenzene	ND	2.58	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
Pentachlorophenol	ND	2.48	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
Pyridine	ND	1.57	5.00		µg/L	1	6/30/2014 2:53:19 PM	13958
Surr: 2,4,6-Tribromophenol	52.6	0	26-138		%REC	1	6/30/2014 2:53:19 PM	13958

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.
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: 1406C22-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ3-C-R36DUPLICATE
Collection Date: 6/25/2014 8:29:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorobiphenyl	102	0	48.1-106		%REC	1	6/30/2014 2:53:19 PM	13958
Surr: 2-Fluorophenol	82.4	0	12.1-85.8		%REC	1	6/30/2014 2:53:19 PM	13958
Surr: 4-Terphenyl-d14	98.1	0	44-113		%REC	1	6/30/2014 2:53:19 PM	13958
Surr: Nitrobenzene-d5	113	0	47.5-119		%REC	1	6/30/2014 2:53:19 PM	13958
Surr: Phenol-d5	82.6	0	17.7-65.8	S	%REC	1	6/30/2014 2:53:19 PM	13958
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Benzene	ND	0.154	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Toluene	ND	0.170	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
2-Butanone	ND	1.42	5.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Chloroform	ND	0.315	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/30/2014 2:05:45 PM	R19608
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/30/2014 2:05:45 PM	R19608
Surr: 1,2-Dichloroethane-d4	96.0	0	70-130		%REC	1	6/30/2014 2:05:45 PM	R19608
Surr: 4-Bromofluorobenzene	94.8	0	70-130		%REC	1	6/30/2014 2:05:45 PM	R19608
Surr: Dibromofluoromethane	97.9	0	70-130		%REC	1	6/30/2014 2:05:45 PM	R19608
Surr: Toluene-d8	92.6	0	70-130		%REC	1	6/30/2014 2:05:45 PM	R19608
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.165	0.161	1.00	J	mg/L	1	6/30/2014 12:55:43 PM	R19596
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	202000	984	2000	*	mg/L	1	7/6/2014 4:26:00 PM	14046
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JRR**	
Conductivity	352000	0.500	0.500		µmhos/c	50	6/30/2014 2:06:39 PM	R19635

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.
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: 1406C22-002
Matrix: AQUEOUS
Client Sample ID: GW-WQ3-C-R36DUPLICATE
Collection Date: 6/25/2014 8:29:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JRR**	
pH	6.82	0.100	1.68	H	pH units	1	6/26/2014 5:48:43 PM	R19544
SM2320B: ALKALINITY							Analyst: **JRR**	
Bicarbonate (As CaCO3)	33.8	4.00	20.0		mg/L CaC	1	6/26/2014 5:48:43 PM	R19544
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	6/26/2014 5:48:43 PM	R19544
Total Alkalinity (as CaCO3)	33.8	4.00	20.0		mg/L CaC	1	6/26/2014 5:48:43 PM	R19544
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.145	0	0			1	6/30/2014 10:37:00 AM	R19574
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	187	3.07	4.00		mg/L	1	7/1/2014 9:15:00 AM	13982

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.
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: 1406C22-003 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ3-C-R36-N2 Field Blan
Collection Date: 6/25/2014 9:12:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Benzene	ND	0.154	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Toluene	ND	0.170	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
2-Butanone	19.1	1.42	5.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Chloroform	ND	0.315	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/30/2014 2:34:15 PM	R19608
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/30/2014 2:34:15 PM	R19608
Surr: 1,2-Dichloroethane-d4	89.9	0	70-130		%REC	1	6/30/2014 2:34:15 PM	R19608
Surr: 4-Bromofluorobenzene	90.6	0	70-130		%REC	1	6/30/2014 2:34:15 PM	R19608
Surr: Dibromofluoromethane	95.8	0	70-130		%REC	1	6/30/2014 2:34:15 PM	R19608
Surr: Toluene-d8	91.0	0	70-130		%REC	1	6/30/2014 2:34:15 PM	R19608

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.
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: 1406C22-004
Matrix: AQUEOUS
Client Sample ID: GW-WQ3-C-R36-N3 Trip Blank
Collection Date:
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Benzene	ND	0.154	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Toluene	ND	0.170	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
2-Butanone	ND	1.42	5.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Chlorobenzene	ND	0.140	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Chloroform	ND	0.315	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Methylene Chloride	ND	0.266	3.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Vinyl chloride	ND	0.455	1.00		µg/L	1	6/30/2014 3:02:37 PM	R19608
Xylenes, Total	ND	0.377	1.50		µg/L	1	6/30/2014 3:02:37 PM	R19608
Surr: 1,2-Dichloroethane-d4	90.8	0	70-130		%REC	1	6/30/2014 3:02:37 PM	R19608
Surr: 4-Bromofluorobenzene	85.7	0	70-130		%REC	1	6/30/2014 3:02:37 PM	R19608
Surr: Dibromofluoromethane	87.5	0	70-130		%REC	1	6/30/2014 3:02:37 PM	R19608
Surr: Toluene-d8	94.2	0	70-130		%REC	1	6/30/2014 3:02:37 PM	R19608

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.
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: 1406C22-005 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ3-C-R36-N12 Metals Bl
Collection Date: 6/25/2014 8:20:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.0000870	0.000200		mg/L	1	7/2/2014 9:54:12 AM	13988
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	ND	0.000625	0.0200		mg/L	1	7/9/2014 5:15:55 PM	13986
Beryllium	ND	0.000353	0.00300		mg/L	1	7/9/2014 5:15:55 PM	13986
Cadmium	ND	0.000628	0.00200		mg/L	1	7/9/2014 5:15:55 PM	13986
Calcium	ND	0.163	1.00		mg/L	1	7/9/2014 5:15:55 PM	13986
Chromium	ND	0.00168	0.00600		mg/L	1	7/9/2014 5:15:55 PM	13986
Iron	ND	0.0101	0.0500		mg/L	1	7/9/2014 5:15:55 PM	13986
Lead	ND	0.00477	0.00500		mg/L	1	7/9/2014 5:15:55 PM	13986
Magnesium	ND	0.0170	1.00		mg/L	1	7/9/2014 5:15:55 PM	13986
Nickel	ND	0.00190	0.0100		mg/L	1	7/9/2014 5:15:55 PM	13986
Potassium	ND	0.506	1.00		mg/L	1	7/9/2014 5:15:55 PM	13986
Silver	ND	0.000522	0.00500		mg/L	1	7/9/2014 5:15:55 PM	13986
Sodium	ND	0.415	1.00		mg/L	1	7/10/2014 12:50:54 PM	13986
Vanadium	ND	0.00548	0.0500		mg/L	1	7/9/2014 5:15:55 PM	13986

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.
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: 1406C22-006
Matrix: AQUEOUS
Client Sample ID: GW-WQ3-C-R36-N13 Metals B
Collection Date: 6/25/2014 8:21:00 AM
Received Date: 6/26/2014 9:10:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **MMD**	
Mercury	ND	0.0000870	0.000200		mg/L	1	7/2/2014 9:59:42 AM	13988
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	ND	0.000625	0.0200		mg/L	1	7/9/2014 5:19:23 PM	13986
Beryllium	ND	0.000353	0.00300		mg/L	1	7/9/2014 5:19:23 PM	13986
Cadmium	ND	0.000628	0.00200		mg/L	1	7/9/2014 5:19:23 PM	13986
Calcium	ND	0.163	1.00		mg/L	1	7/9/2014 5:19:23 PM	13986
Chromium	ND	0.00168	0.00600		mg/L	1	7/9/2014 5:19:23 PM	13986
Iron	ND	0.0101	0.0500		mg/L	1	7/9/2014 5:19:23 PM	13986
Lead	ND	0.00477	0.00500		mg/L	1	7/9/2014 5:19:23 PM	13986
Magnesium	ND	0.0170	1.00		mg/L	1	7/9/2014 5:19:23 PM	13986
Nickel	ND	0.00190	0.0100		mg/L	1	7/9/2014 5:19:23 PM	13986
Potassium	ND	0.506	1.00		mg/L	1	7/9/2014 5:19:23 PM	13986
Silver	ND	0.000522	0.00500		mg/L	1	7/9/2014 5:19:23 PM	13986
Sodium	ND	0.415	1.00		mg/L	1	7/10/2014 12:52:37 PM	13986
Vanadium	ND	0.00548	0.0500		mg/L	1	7/9/2014 5:19:23 PM	13986

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.
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	GW-WQ3-C-R36 1406C22-01		GW-WQ3-C-R36 dup 1406C22-02							
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sodium	72300	3144.85	73700	3205.74						
Potassium	1510	38.62	1490	38.11						
Calcium	1390	69.36	1360	67.86						
Magnesium	2310	190.12	2230	183.54						
Total Cations		3442.95		3495.25						
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L
Sulfate	6050	125.96	6340	132.00						
Chloride	114000	3215.80	111000	3131.17						
Bicarbonate (CaCO3)	34.1	0.68	33.8	0.68						
Carbonate (CaCO3)										
Phosphate (P)										
Nitrite (N)										
Nitrate (N)										
Fluoride										
Bromide										
Total Anions		3342.44		3263.85						
Elect. Cond. (µMhos/cm)	358000		352000							
CATION/ANION RATIO		1.03		1.07						
% Difference		1		3						
TOTAL DISSOLVED SOLIDS RATIOS										
TDS (measured)	206000		202000							
TDS (calculated)	197580		196140							
Ratio meas TDS:calc TDS		1.0		1.0						
Ratio Meas. TDS:EC		0.58		0.57						
Ratio Calc. TDS:EC		0.55		0.56						
Ratio of anion sum:EC		0.9		0.9						
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 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 July 21, 2014

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.: 1406C22
Anatek Batch: 140701038

Project Summary: Four (4) water samples were received on 7/1/2014 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 5.8C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1406C22-001F / GW-WQ3-R36	140701038-001	EPA 6020A
1406C22-002F / GW-WQ3-C-R36 Duplicate	140701038-002	EPA 6020A
1406C22-005B / GW-WQ3-C-N12 Metals Blank Preserved	140701038-003	EPA 6020A
1406C22-006B / GW-WQ3-R36-N13 Metals Blank Unpreserved	140701038-004	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.

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 #: 140701038
Project Name: 1406C22

Analytical Results Report

Sample Number 140701038-001 **Sampling Date** 6/25/2014 **Date/Time Received** 7/1/2014 1:15 PM
Client Sample ID 1406C22-001F / GW-WQ3-C-R36 **Sampling Time** 8:26 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	

Sample Number 140701038-002 **Sampling Date** 6/25/2014 **Date/Time Received** 7/1/2014 1:15 PM
Client Sample ID 1406C22-002F / GW-WQ3-C-R36DUPLICATE **Sampling Time** 8:29 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.025	7/17/2014	ETL	EPA 6020A	

Sample Number 140701038-003 **Sampling Date** 6/25/2014 **Date/Time Received** 7/1/2014 1:15 PM
Client Sample ID 1406C22-005B / GW-WQ3-C-R36-N12 METALS BLANK PRESERVED **Sampling Time** 8:20 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Monday, July 21, 2014

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 #: 140701038
Project Name: 1406C22

Analytical Results Report

Sample Number 140701038-004 **Sampling Date** 6/25/2014 **Date/Time Received** 7/1/2014 1:15 PM
Client Sample ID 1406C22-006B / GW-WQ3-C-R36-N13 METALS BLANK UNPRESERVED **Sampling Time** 8:21 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.001	7/17/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.001	7/17/2014	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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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

Batch #: 140701038
Project Name: 1406C22

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0521	mg/L	0.05	104.2	80-120	7/7/2014	7/17/2014
Selenium	0.0504	mg/L	0.05	100.8	80-120	7/7/2014	7/17/2014
Arsenic	0.0518	mg/L	0.05	103.6	80-120	7/7/2014	7/17/2014
Antimony	0.0506	mg/L	0.05	101.2	80-120	7/7/2014	7/17/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0522	mg/L	0.05	104.4	0.2	0-20	7/7/2014	7/17/2014
Selenium	0.0499	mg/L	0.05	99.8	1.0	0-20	7/7/2014	7/17/2014
Arsenic	0.0520	mg/L	0.05	104.0	0.4	0-20	7/7/2014	7/17/2014
Antimony	0.0509	mg/L	0.05	101.8	0.6	0-20	7/7/2014	7/17/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140701038-001	Thallium	ND	0.0474	mg/L	0.05	94.8	75-125	7/7/2014	7/17/2014
140701038-001	Selenium	ND	0.0608	mg/L	0.05	121.6	75-125	7/7/2014	7/17/2014
140701038-001	Arsenic	ND	0.0592	mg/L	0.05	118.4	75-125	7/7/2014	7/17/2014
140701038-001	Antimony	ND	0.0574	mg/L	0.05	114.8	75-125	7/7/2014	7/17/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0476	mg/L	0.05	95.2	0.4	0-20	7/7/2014	7/17/2014
Selenium	0.0601	mg/L	0.05	120.2	1.2	0-20	7/7/2014	7/17/2014
Arsenic	0.0574	mg/L	0.05	114.8	3.1	0-20	7/7/2014	7/17/2014
Antimony	0.0602	mg/L	0.05	120.4	4.8	0-20	7/7/2014	7/17/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	7/7/2014	7/17/2014
Arsenic	ND	mg/L	0.001	7/7/2014	7/17/2014

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; MT:CERT0026; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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

Batch #: 140701038
Project Name: 1406C22

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Selenium	ND	mg/L	0.001	7/7/2014	7/17/2014
Thallium	ND	mg/L	0.001	7/7/2014	7/17/2014

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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-14046**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **14046**	RunNo: **19700**
Prep Date: **7/2/2014**	Analysis Date: **7/6/2014**	SeqNo: **572129** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	988	20.0	1000	0	98.8	80	120			

Sample ID: **LCSR-14046**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **14046**	RunNo: **19700**
Prep Date: **7/2/2014**	Analysis Date: **7/6/2014**	SeqNo: **572130** 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	0.101	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-14046**	SampType:	**MBLK**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**PBW**	Batch ID:	**14046**		RunNo:	**19700**				
Prep Date:	**7/2/2014**	Analysis Date:	**7/6/2014**		SeqNo:	**572128**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	13.0	20.0								J

Sample ID	**LCS-14046**	SampType:	**LCS**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**LCSW**	Batch ID:	**14046**		RunNo:	**19700**				
Prep Date:	**7/2/2014**	Analysis Date:	**7/6/2014**		SeqNo:	**572129**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	988	20.0	1000	0	98.8	80	120			

Sample ID	**1406C22-001DMS**	SampType:	**MS**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**GW-WQ3-C-R36**	Batch ID:	**14046**		RunNo:	**19700**				
Prep Date:	**7/2/2014**	Analysis Date:	**7/6/2014**		SeqNo:	**572132**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	312000	2000	100000	206200	106	80	120			

Sample ID	**1406C22-001DMSD**	SampType:	**MSD**		TestCode:	**SM 2540 C: Total Dissolved Solids**				
Client ID:	**GW-WQ3-C-R36**	Batch ID:	**14046**		RunNo:	**19700**				
Prep Date:	**7/2/2014**	Analysis Date:	**7/6/2014**		SeqNo:	**572133**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	301000	2000	100000	206200	94.8	80	120	3.49	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
O	RSD is greater than RSDlimit	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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566147** 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: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566148** 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 **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566149** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.0	90	110			
Sulfate	9.5	0.50	10.00	0	95.0	90	110			

Sample ID **LCSR**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566150** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.2	90	110			
Sulfate	9.5	0.50	10.00	0	94.8	90	110			

Sample ID **1406C22-001DMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ3-C-R36**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566152** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	117	5.00	125.0	0	93.5	87.8	111			

Sample ID **1406C22-001DMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ3-C-R36**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566153** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	117	5.00	125.0	0	93.5	87.8	111	0.00428	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **CCB**	Batch ID: **R19548**	RunNo: **19548**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566159**	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: **R19548**	RunNo: **19548**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566170**	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: **R19548**	RunNo: **19548**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566182**	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: **R19548**	RunNo: **19548**							
Prep Date:	Analysis Date: **6/27/2014**	SeqNo: **566194**	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: **R19548**	RunNo: **19548**							
Prep Date:	Analysis Date: **6/27/2014**	SeqNo: **566203**	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	0.12	0.50								J

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R19548**	RunNo: **19548**							
Prep Date:	Analysis Date: **6/27/2014**	SeqNo: **566204**	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	LCS	SampType:	LCS		TestCode:	EPA Method 300.0: Anions				
Client ID:	LCSW	Batch ID:	R19548		RunNo:	19548				
Prep Date:		Analysis Date:	6/27/2014		SeqNo:	566204	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	95.4	90	110			
Sulfate	9.4	0.50	10.00	0	94.0	90	110			

Sample ID	ccb	SampType:	CCB		TestCode:	EPA Method 300.0: Anions				
Client ID:	CCB	Batch ID:	R19548		RunNo:	19548				
Prep Date:		Analysis Date:	6/27/2014		SeqNo:	566206	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:	R19548		RunNo:	19548				
Prep Date:		Analysis Date:	6/27/2014		SeqNo:	566218	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:	R19662		RunNo:	19662				
Prep Date:		Analysis Date:	7/2/2014		SeqNo:	570755	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:	R19662		RunNo:	19662				
Prep Date:		Analysis Date:	7/2/2014		SeqNo:	570767	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:	R19662		RunNo:	19662				
Prep Date:		Analysis Date:	7/2/2014		SeqNo:	570779	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	ccb	SampType:	CCB	TestCode:	EPA Method 300.0: Anions					
Client ID:	CCB	Batch ID:	R19662	RunNo:	19662					
Prep Date:		Analysis Date:	7/3/2014	SeqNo:	570787	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:	R19662	RunNo:	19662					
Prep Date:		Analysis Date:	7/3/2014	SeqNo:	570794	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:	R19662	RunNo:	19662					
Prep Date:		Analysis Date:	7/2/2014	SeqNo:	570796	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBW	Batch ID:	R19662	RunNo:	19662					
Prep Date:		Analysis Date:	7/2/2014	SeqNo:	570797	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID	LCS	SampType:	LCS	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSW	Batch ID:	R19662	RunNo:	19662					
Prep Date:		Analysis Date:	7/2/2014	SeqNo:	570798	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	94.4	90	110			

Sample ID	ccb	SampType:	CCB	TestCode:	EPA Method 300.0: Anions					
Client ID:	CCB	Batch ID:	R19662	RunNo:	19662					
Prep Date:		Analysis Date:	7/2/2014	SeqNo:	570808	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566149** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.0	90	110			
Sulfate	9.5	0.50	10.00	0	95.0	90	110			

Sample ID: **LCSR**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566150** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.2	90	110	0.275	0	
Sulfate	9.5	0.50	10.00	0	94.8	90	110	0.120	0	

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19548**	RunNo: **19548**
Prep Date:	Analysis Date: **6/27/2014**	SeqNo: **566204** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	95.4	90	110			
Sulfate	9.4	0.50	10.00	0	94.0	90	110			

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R19662**	RunNo: **19662**
Prep Date:	Analysis Date: **7/2/2014**	SeqNo: **570798** 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	94.4	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **5mL-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568474** 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	0.65	3.0								J
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	1.5								
Surr: 1,2-Dichloroethane-d4	8.8		10.00		87.9	70	130			
Surr: 4-Bromofluorobenzene	9.3		10.00		92.7	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.5	70	130			
Surr: Toluene-d8	9.2		10.00		91.6	70	130			

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568526** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	38	5.0	40.00	0	94.9	60	140			
Benzene	21	1.0	20.00	0	106	70	130			
Toluene	21	1.0	20.00	0	105	80	120			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	106	70	130			
2-Butanone	33	5.0	40.00	0	81.4	60	140			
Carbon Tetrachloride	21	1.0	20.00	0	105	70	130			
Chlorobenzene	21	1.0	20.00	0	106	70	130			
Chloroform	21	1.0	20.00	0	107	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng ccv**	SampType: **CCV_HIGH**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568526** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	21	1.0	20.00	0	107	70	130			
1,1-Dichloroethane	21	1.0	20.00	0	106	70	130			
1,1-Dichloroethene	20	1.0	20.00	0	101	80	120			
Methylene Chloride	23	3.0	20.00	0	114	70	130			
1,1,2,2-Tetrachloroethane	18	1.0	20.00	0	88.9	70	130			
Tetrachloroethene (PCE)	22	1.0	20.00	0	111	70	130			
trans-1,2-DCE	22	1.0	20.00	0	108	70	130			
1,1,1-Trichloroethane	22	1.0	20.00	0	108	70	130			
1,1,2-Trichloroethane	21	1.0	20.00	0	104	70	130			
Trichloroethene (TCE)	22	1.0	20.00	0	111	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	63	1.5	60.00	0	105	70	130			
Surr: 1,2-Dichloroethane-d4	9.2		10.00		92.1	70	130			
Surr: 4-Bromofluorobenzene	9.1		10.00		90.8	70	130			
Surr: Dibromofluoromethane	9.6		10.00		96.3	70	130			
Surr: Toluene-d8	8.9		10.00		88.5	70	130			

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568527** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	79	5.0	40.00	0	197	59.8	152			S
Benzene	22	1.0	20.00	0	112	70	130			
Toluene	22	1.0	20.00	0	109	80	120			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	107	70	130			
2-Butanone	51	5.0	40.00	0	127	60	140			
Carbon Tetrachloride	22	1.0	20.00	0	111	70	130			
Chlorobenzene	22	1.0	20.00	0	111	70	130			
Chloroform	22	1.0	20.00	0	110	75.6	123			
cis-1,2-DCE	23	1.0	20.00	0	114	70	130			
1,1-Dichloroethane	22	1.0	20.00	0	112	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	108	78.1	129			
Methylene Chloride	23	3.0	20.00	0	117	70	130			
1,1,2,2-Tetrachloroethane	19	1.0	20.00	0	96.2	67.3	134			
Tetrachloroethene (PCE)	23	1.0	20.00	0	116	70	130			
trans-1,2-DCE	22	1.0	20.00	0	109	70	130			
1,1,1-Trichloroethane	23	1.0	20.00	0	113	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568527** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	21	1.0	20.00	0	106	70	130			
Trichloroethene (TCE)	23	1.0	20.00	0	116	70	130			
Trichlorofluoromethane	22	1.0	20.00	0	108	70	130			
Vinyl chloride	20	1.0	20.00	0	100	76.5	131			
Xylenes, Total	65	1.5	60.00	0	109	70	130			
Surr: 1,2-Dichloroethane-d4	9.5		10.00		94.9	70	130			
Surr: 4-Bromofluorobenzene	8.7		10.00		87.2	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.0	70	130			
Surr: Toluene-d8	8.9		10.00		89.4	70	130			

Sample ID **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568528** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	82	5.0	40.00	0	205	59.8	152			S
Benzene	21	1.0	20.00	0	107	70	130			
Toluene	20	1.0	20.00	0	103	80	120			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	105	70	130			
2-Butanone	43	5.0	40.00	0	107	60	140			
Carbon Tetrachloride	21	1.0	20.00	0	103	70	130			
Chlorobenzene	21	1.0	20.00	0	106	70	130			
Chloroform	21	1.0	20.00	0	107	75.6	123			
cis-1,2-DCE	22	1.0	20.00	0	110	70	130			
1,1-Dichloroethane	21	1.0	20.00	0	105	70	130			
1,1-Dichloroethene	19	1.0	20.00	0	97.4	78.1	129			
Methylene Chloride	23	3.0	20.00	0	116	70	130			
1,1,2,2-Tetrachloroethane	18	1.0	20.00	0	92.2	67.3	134			
Tetrachloroethene (PCE)	22	1.0	20.00	0	108	70	130			
trans-1,2-DCE	21	1.0	20.00	0	104	70	130			
1,1,1-Trichloroethane	21	1.0	20.00	0	106	70	130			
1,1,2-Trichloroethane	21	1.0	20.00	0	103	70	130			
Trichloroethene (TCE)	22	1.0	20.00	0	110	70	130			
Trichlorofluoromethane	19	1.0	20.00	0	97.2	70	130			
Vinyl chloride	19	1.0	20.00	0	96.3	76.5	131			
Xylenes, Total	64	1.5	60.00	0	106	70	130			
Surr: 1,2-Dichloroethane-d4	9.5		10.00		94.7	70	130			
Surr: 4-Bromofluorobenzene	9.1		10.00		90.6	70	130			
Surr: Dibromofluoromethane	9.5		10.00		95.5	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568528**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Toluene-d8	9.0		10.00		89.5	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.
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#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcs4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568527** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	79	5.0	40.00	0	197	59.8	152			S
Benzene	22	1.0	20.00	0	112	70	130			
Toluene	22	1.0	20.00	0	109	80	120			
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	107	70	130			
2-Butanone	51	5.0	40.00	0	127	60	140			
Carbon Tetrachloride	22	1.0	20.00	0	111	70	130			
Chlorobenzene	22	1.0	20.00	0	111	70	130			
Chloroform	22	1.0	20.00	0	110	75.6	123			
cis-1,2-DCE	23	1.0	20.00	0	114	70	130			
1,1-Dichloroethane	22	1.0	20.00	0	112	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	108	78.1	129			
Methylene Chloride	23	3.0	20.00	0	117	70	130			
1,1,2,2-Tetrachloroethane	19	1.0	20.00	0	96.2	67.3	134			
Tetrachloroethene (PCE)	23	1.0	20.00	0	116	70	130			
trans-1,2-DCE	22	1.0	20.00	0	109	70	130			
1,1,1-Trichloroethane	23	1.0	20.00	0	113	70	130			
1,1,2-Trichloroethane	21	1.0	20.00	0	106	70	130			
Trichloroethene (TCE)	23	1.0	20.00	0	116	70	130			
Trichlorofluoromethane	22	1.0	20.00	0	108	70	130			
Vinyl chloride	20	1.0	20.00	0	100	76.5	131			
Xylenes, Total	65	1.5	60.00	0	109	70	130			
Surr: 1,2-Dichloroethane-d4	9.5		10.00		94.9	70	130			
Surr: 4-Bromofluorobenzene	8.7		10.00		87.2	70	130			
Surr: Dibromofluoromethane	9.8		10.00		98.0	70	130			
Surr: Toluene-d8	8.9		10.00		89.4	70	130			

Sample ID: **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568528** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	82	5.0	40.00	0	205	59.8	152	3.65	0	S
Benzene	21	1.0	20.00	0	107	70	130	4.62	0	
Toluene	20	1.0	20.00	0	103	80	120	6.23	0	
1,2-Dichloroethane (EDC)	21	1.0	20.00	0	105	70	130	2.04	0	
2-Butanone	43	5.0	40.00	0	107	60	140	17.0	0	
Carbon Tetrachloride	21	1.0	20.00	0	103	70	130	7.73	0	
Chlorobenzene	21	1.0	20.00	0	106	70	130	4.75	0	
Chloroform	21	1.0	20.00	0	107	75.6	123	3.58	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcsr**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R19608**	RunNo: **19608**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568528**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	22	1.0	20.00	0	110	70	130	3.96	0	
1,1-Dichloroethane	21	1.0	20.00	0	105	70	130	6.63	0	
1,1-Dichloroethene	19	1.0	20.00	0	97.4	78.1	129	10.2	0	
Methylene Chloride	23	3.0	20.00	0	116	70	130	0.663	0	
1,1,2,2-Tetrachloroethane	18	1.0	20.00	0	92.2	67.3	134	4.32	0	
Tetrachloroethene (PCE)	22	1.0	20.00	0	108	70	130	6.46	0	
trans-1,2-DCE	21	1.0	20.00	0	104	70	130	4.63	0	
1,1,1-Trichloroethane	21	1.0	20.00	0	106	70	130	6.18	0	
1,1,2-Trichloroethane	21	1.0	20.00	0	103	70	130	3.07	0	
Trichloroethene (TCE)	22	1.0	20.00	0	110	70	130	5.02	0	
Trichlorofluoromethane	19	1.0	20.00	0	97.2	70	130	10.1	0	
Vinyl chloride	19	1.0	20.00	0	96.3	76.5	131	3.91	0	
Xylenes, Total	64	1.5	60.00	0	106	70	130	2.47	0	
Surr: 1,2-Dichloroethane-d4	9.5		10.00		94.7	70	130	0	0	
Surr: 4-Bromofluorobenzene	9.1		10.00		90.6	70	130	0	0	
Surr: Dibromofluoromethane	9.5		10.00		95.5	70	130	0	0	
Surr: Toluene-d8	9.0		10.00		89.5	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **mb-13958**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567845** 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-Fluorophenol	156		200.0		78.1	12.1	85.8			
Surr: Phenol-d5	110		200.0		55.1	17.7	65.8			
Surr: 2,4,6-Tribromophenol	177		200.0		88.7	26	138			
Surr: Nitrobenzene-d5	99.9		100.0		99.9	47.5	119			
Surr: 2-Fluorobiphenyl	96.4		100.0		96.4	48.1	106			
Surr: 4-Terphenyl-d14	94.1		100.0		94.1	44	113			

Sample ID **lcs-13958**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567857** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	48.9	5.00	100.0	0	48.9	27.4	101			
1,4-Dichlorobenzene	47.6	5.00	100.0	0	47.6	32.6	91.5			
2,4-Dinitrophenol	48.4	5.00	100.0	0	48.4	23.1	118			
2,4-Dinitrotoluene	70.0	5.00	100.0	0	70.0	44.7	112			
Hexachlorobenzene	68.2	5.00	100.0	0	68.2	30	130			
Hexachloroethane	45.8	5.00	100.0	0	45.8	23.2	97.8			
2-Methylphenol	65.9	5.00	100.0	0	65.9	36.1	105			
3+4-Methylphenol	57.7	5.00	100.0	0	57.7	35.7	92.5			
Nitrobenzene	69.7	5.00	100.0	0	69.7	30.9	125			
Pentachlorophenol	64.4	5.00	100.0	0	64.4	20.2	93			
Pyridine	31.2	5.00	100.0	0	31.2	5.14	87.1			
Surr: 2-Fluorophenol	50.4		100.0		50.4	12.1	85.8			
Surr: Phenol-d5	41.2		100.0		41.2	17.7	65.8			
Surr: 2,4,6-Tribromophenol	82.2		100.0		82.2	26	138			
Surr: Nitrobenzene-d5	68.3		100.0		68.3	47.5	119			
Surr: 2-Fluorobiphenyl	69.2		100.0		69.2	48.1	106			

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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-13958**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567857** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	73.0		100.0		73.0	44	113			

Sample ID **lcs-13958**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567869** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	49.1	5.00	100.0	0	49.1	27.4	101			
1,4-Dichlorobenzene	47.7	5.00	100.0	0	47.7	32.6	91.5			
2,4-Dinitrophenol	52.8	5.00	100.0	0	52.8	23.1	118			
2,4-Dinitrotoluene	71.7	5.00	100.0	0	71.7	44.7	112			
Hexachlorobenzene	67.7	5.00	100.0	0	67.7	30	130			
Hexachloroethane	46.3	5.00	100.0	0	46.3	23.2	97.8			
2-Methylphenol	69.6	5.00	100.0	0	69.6	36.1	105			
3+4-Methylphenol	59.1	5.00	100.0	0	59.1	35.7	92.5			
Nitrobenzene	67.8	5.00	100.0	0	67.8	30.9	125			
Pentachlorophenol	62.7	5.00	100.0	0	62.7	20.2	93			
Pyridine	32.3	5.00	100.0	0	32.3	5.14	87.1			
Surr: 2-Fluorophenol	52.5		100.0		52.5	12.1	85.8			
Surr: Phenol-d5	43.1		100.0		43.1	17.7	65.8			
Surr: 2,4,6-Tribromophenol	86.5		100.0		86.5	26	138			
Surr: Nitrobenzene-d5	68.6		100.0		68.6	47.5	119			
Surr: 2-Fluorobiphenyl	69.8		100.0		69.8	48.1	106			
Surr: 4-Terphenyl-d14	75.5		100.0		75.5	44	113			

Sample ID **1406C22-001Bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ3-C-R36**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567876** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	66.6	5.00	100.0	0	66.6	20.9	103			
1,4-Dichlorobenzene	62.5	5.00	100.0	0	62.5	32.6	91.5			
2,4-Dinitrophenol	18.9	5.00	100.0	0	18.9	11	112			
2,4-Dinitrotoluene	84.7	5.00	100.0	0	84.7	44.7	112			
Hexachlorobenzene	82.7	5.00	100.0	0	82.7	30.3	126			
Hexachloroethane	60.0	5.00	100.0	0	60.0	19.5	96.4			
2-Methylphenol	78.3	5.00	100.0	0	78.3	28.7	108			
3+4-Methylphenol	67.5	5.00	100.0	0	67.5	24.2	136			
Nitrobenzene	76.1	5.00	100.0	0	76.1	28.8	119			
Pentachlorophenol	29.6	5.00	100.0	0	29.6	20.2	93			

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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **1406C22-001Bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ3-C-R36**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567876** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Pyridine	71.0	5.00	100.0	0	71.0	19.3	82.8			
Surr: 2-Fluorophenol	59.9		100.0		59.9	12.1	85.8			
Surr: Phenol-d5	65.0		100.0		65.0	17.7	65.8			
Surr: 2,4,6-Tribromophenol	75.5		100.0		75.5	26	138			
Surr: Nitrobenzene-d5	75.7		100.0		75.7	47.5	119			
Surr: 2-Fluorobiphenyl	85.8		100.0		85.8	48.1	106			
Surr: 4-Terphenyl-d14	89.9		100.0		89.9	44	113			

Sample ID **1406C22-001Bmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ3-C-R36**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567877** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	66.2	5.00	100.0	0	66.2	20.9	103	0.603	20	
1,4-Dichlorobenzene	66.4	5.00	100.0	0	66.4	32.6	91.5	5.99	20	
2,4-Dinitrophenol	13.4	5.00	100.0	0	13.4	11	112	34.1	20	R
2,4-Dinitrotoluene	82.5	5.00	100.0	0	82.5	44.7	112	2.66	20	
Hexachlorobenzene	77.2	5.00	100.0	0	77.2	30.3	126	6.83	20	
Hexachloroethane	61.0	5.00	100.0	0	61.0	19.5	96.4	1.69	20	
2-Methylphenol	71.2	5.00	100.0	0	71.2	28.7	108	9.52	20	
3+4-Methylphenol	63.7	5.00	100.0	0	63.7	24.2	136	5.70	20	
Nitrobenzene	71.9	5.00	100.0	0	71.9	28.8	119	5.73	20	
Pentachlorophenol	20.7	5.00	100.0	0	20.7	20.2	93	35.4	20	R
Pyridine	68.1	5.00	100.0	0	68.1	19.3	82.8	4.23	20	
Surr: 2-Fluorophenol	58.3		100.0		58.3	12.1	85.8	0		
Surr: Phenol-d5	61.2		100.0		61.2	17.7	65.8	0		
Surr: 2,4,6-Tribromophenol	67.6		100.0		67.6	26	138	0		
Surr: Nitrobenzene-d5	71.7		100.0		71.7	47.5	119	0		
Surr: 2-Fluorobiphenyl	76.0		100.0		76.0	48.1	106	0		
Surr: 4-Terphenyl-d14	85.0		100.0		85.0	44	113	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.
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#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13958**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567857** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	48.9	5.00	100.0	0	48.9	27.4	101			
1,4-Dichlorobenzene	47.6	5.00	100.0	0	47.6	32.6	91.5			
2,4-Dinitrophenol	48.4	5.00	100.0	0	48.4	23.1	118			
2,4-Dinitrotoluene	70.0	5.00	100.0	0	70.0	44.7	112			
Hexachlorobenzene	68.2	5.00	100.0	0	68.2	30	130			
Hexachloroethane	45.8	5.00	100.0	0	45.8	23.2	97.8			
2-Methylphenol	65.9	5.00	100.0	0	65.9	36.1	105			
3+4-Methylphenol	57.7	5.00	100.0	0	57.7	35.7	92.5			
Nitrobenzene	69.7	5.00	100.0	0	69.7	30.9	125			
Pentachlorophenol	64.4	5.00	100.0	0	64.4	20.2	93			
Pyridine	31.2	5.00	100.0	0	31.2	5.14	87.1			
Surr: 2-Fluorophenol	50.4		100.0		50.4	12.1	85.8			
Surr: Phenol-d5	41.2		100.0		41.2	17.7	65.8			
Surr: 2,4,6-Tribromophenol	82.2		100.0		82.2	26	138			
Surr: Nitrobenzene-d5	68.3		100.0		68.3	47.5	119			
Surr: 2-Fluorobiphenyl	69.2		100.0		69.2	48.1	106			
Surr: 4-Terphenyl-d14	73.0		100.0		73.0	44	113			

Sample ID: **lcs-13958**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567869** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	49.1	5.00	100.0	0	49.1	27.4	101	0.531	0	
1,4-Dichlorobenzene	47.7	5.00	100.0	0	47.7	32.6	91.5	0.0840	0	
2,4-Dinitrophenol	52.8	5.00	100.0	0	52.8	23.1	118	8.58	0	
2,4-Dinitrotoluene	71.7	5.00	100.0	0	71.7	44.7	112	2.40	0	
Hexachlorobenzene	67.7	5.00	100.0	0	67.7	30	130	0.647	0	
Hexachloroethane	46.3	5.00	100.0	0	46.3	23.2	97.8	1.09	0	
2-Methylphenol	69.6	5.00	100.0	0	69.6	36.1	105	5.40	0	
3+4-Methylphenol	59.1	5.00	100.0	0	59.1	35.7	92.5	2.36	0	
Nitrobenzene	67.8	5.00	100.0	0	67.8	30.9	125	2.82	0	
Pentachlorophenol	62.7	5.00	100.0	0	62.7	20.2	93	2.61	0	
Pyridine	32.3	5.00	100.0	0	32.3	5.14	87.1	3.46	0	
Surr: 2-Fluorophenol	52.5		100.0		52.5	12.1	85.8	0	0	
Surr: Phenol-d5	43.1		100.0		43.1	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	86.5		100.0		86.5	26	138	0	0	
Surr: Nitrobenzene-d5	68.6		100.0		68.6	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	69.8		100.0		69.8	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13958**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13958**	RunNo: **19590**
Prep Date: **6/29/2014**	Analysis Date: **6/30/2014**	SeqNo: **567869** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	75.5		100.0		75.5	44	113	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**ccv 99.7uS eC**	SampType:	**CCV**	TestCode:	**SM2510B: Specific Conductance**					
Client ID:	**CCV**	Batch ID:	**R19635**	RunNo:	**19635**					
Prep Date:		Analysis Date:	**6/30/2014**	SeqNo:	**569352**	Units:	**µmhos/cm**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	110	0.010	99.70	0	106	80	120			

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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-13988	SampType:	MBLK		TestCode:	EPA Method 7470: Mercury				
Client ID:	PBW	Batch ID:	13988		RunNo:	19609				
Prep Date:	7/1/2014	Analysis Date:	7/1/2014		SeqNo:	568577	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	LCS-13988	SampType:	LCS		TestCode:	EPA Method 7470: Mercury				
Client ID:	LCSW	Batch ID:	13988		RunNo:	19609				
Prep Date:	7/1/2014	Analysis Date:	7/1/2014		SeqNo:	568578	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	MB-13988	SampType:	MBLK		TestCode:	EPA Method 7470: Mercury				
Client ID:	PBW	Batch ID:	13988		RunNo:	19634				
Prep Date:	7/1/2014	Analysis Date:	7/2/2014		SeqNo:	569370	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	LCS-13988	SampType:	LCS		TestCode:	EPA Method 7470: Mercury				
Client ID:	LCSW	Batch ID:	13988		RunNo:	19634				
Prep Date:	7/1/2014	Analysis Date:	7/2/2014		SeqNo:	569371	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			

Sample ID	LCS-13988	SampType:	LCSR		TestCode:	EPA Method 7470: Mercury				
Client ID:	BatchQC	Batch ID:	13988		RunNo:	19634				
Prep Date:	7/1/2014	Analysis Date:	7/2/2014		SeqNo:	569372	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			

Sample ID	1406C22-001EMS	SampType:	MS		TestCode:	EPA Method 7470: Mercury				
Client ID:	GW-WQ3-C-R36	Batch ID:	13988		RunNo:	19634				
Prep Date:	7/1/2014	Analysis Date:	7/2/2014		SeqNo:	569374	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00409	0.00100	0.005000	0	81.8	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
O	RSD is greater than RSDlimit	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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1406C22-001EMSD**	SampType:	**MSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**GW-WQ3-C-R36**	Batch ID:	**13988**	RunNo:	**19634**					
Prep Date:	**7/1/2014**	Analysis Date:	**7/2/2014**	SeqNo:	**569376**	Units:	**mg/L**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00396	0.00100	0.005000	0	79.2	75	125	3.25	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.
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#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13988**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **13988**	RunNo: **19609**
Prep Date: **7/1/2014**	Analysis Date: **7/1/2014**	SeqNo: **568578** 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: **LCS-13988**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **13988**	RunNo: **19634**
Prep Date: **7/1/2014**	Analysis Date: **7/2/2014**	SeqNo: **569371** 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			

Sample ID: **LCS-13988**	SampType: **LCSR**	TestCode: **EPA Method 7470: Mercury**
Client ID: **BatchQC**	Batch ID: **13988**	RunNo: **19634**
Prep Date: **7/1/2014**	Analysis Date: **7/2/2014**	SeqNo: **569372** 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	0.253	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575664** 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	ND	1.0								
Sodium	ND	1.0								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575665** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	53	1.0	50.00	0	106	80	120			
Magnesium	54	1.0	50.00	0	108	80	120			
Potassium	52	1.0	50.00	0	104	80	120			
Sodium	53	1.0	50.00	0	107	80	120			

Sample ID **LCS**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575666** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	52	1.0	50.00	0	103	80	120			
Magnesium	53	1.0	50.00	0	105	80	120			
Potassium	51	1.0	50.00	0	102	80	120			
Sodium	52	1.0	50.00	0	104	80	120			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575675** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.0440	-100	99			
Magnesium	ND	1.0	1.000	0	0.0730	-100	99			
Potassium	ND	1.0	1.000	0	-9.53	-100	99			
Sodium	ND	1.0	1.000	0	-19.8	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575676** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R19815	RunNo:	19815					
Prep Date:		Analysis Date:	7/10/2014	SeqNo:	575676	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.0	90	110			
Magnesium	50	1.0	50.00	0	101	90	110			
Potassium	49	1.0	50.00	0	98.0	90	110			
Sodium	50	1.0	50.00	0	99.6	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R19815	RunNo:	19815					
Prep Date:		Analysis Date:	7/10/2014	SeqNo:	575688	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	-0.148	-100	99			
Magnesium	ND	1.0	1.000	0	0.146	-100	99			
Potassium	ND	1.0	1.000	0	15.9	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R19815	RunNo:	19815					
Prep Date:		Analysis Date:	7/10/2014	SeqNo:	575689	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	97.9	90	110			
Magnesium	50	1.0	50.00	0	100	90	110			
Potassium	49	1.0	50.00	0	98.2	90	110			

Sample ID	CCB	SampType:	CCB	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	CCB	Batch ID:	R19815	RunNo:	19815					
Prep Date:		Analysis Date:	7/10/2014	SeqNo:	575700	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.226	-100	99			
Magnesium	ND	1.0	1.000	0	0.365	-100	99			
Potassium	0.29	1.0	1.000	0	29.2	-100	99			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R19815	RunNo:	19815					
Prep Date:		Analysis Date:	7/10/2014	SeqNo:	575701	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			
Magnesium	50	1.0	50.00	0	100	90	110			
Potassium	49	1.0	50.00	0	98.3	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575665** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	53	1.0	50.00	0	106	80	120			
Magnesium	54	1.0	50.00	0	108	80	120			
Potassium	52	1.0	50.00	0	104	80	120			
Sodium	53	1.0	50.00	0	107	80	120			

Sample ID: **LCS**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R19815**	RunNo: **19815**
Prep Date:	Analysis Date: **7/10/2014**	SeqNo: **575666** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	52	1.0	50.00	0	103	80	120	2.14	0	
Magnesium	53	1.0	50.00	0	105	80	120	2.67	0	
Potassium	51	1.0	50.00	0	102	80	120	2.52	0	
Sodium	52	1.0	50.00	0	104	80	120	3.13	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-13986	SampType:	MBLK	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	PBW	Batch ID:	13986	RunNo:	19786				
Prep Date:	7/1/2014	Analysis Date:	7/9/2014	SeqNo:	574835	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	ND	1.0								
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-13986	SampType:	LCS	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	LCSW	Batch ID:	13986	RunNo:	19786				
Prep Date:	7/1/2014	Analysis Date:	7/9/2014	SeqNo:	574836	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.4	80	120			
Beryllium	0.52	0.0030	0.5000	0	104	80	120			
Cadmium	0.50	0.0020	0.5000	0	99.8	80	120			
Calcium	51	1.0	50.00	0	101	80	120			
Chromium	0.50	0.0060	0.5000	0	100	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.49	0.0050	0.5000	0	98.0	80	120			
Magnesium	51	1.0	50.00	0	101	80	120			
Nickel	0.48	0.010	0.5000	0	96.2	80	120			
Potassium	49	1.0	50.00	0	97.4	80	120			
Silver	0.10	0.0050	0.1000	0	104	80	120			
Sodium	50	1.0	50.00	0	100	80	120			
Vanadium	0.52	0.050	0.5000	0	104	80	120			

Sample ID	LCS-13986	SampType:	LCSR	TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	BatchQC	Batch ID:	13986	RunNo:	19786				
Prep Date:	7/1/2014	Analysis Date:	7/9/2014	SeqNo:	574837	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	100	80	120			
Beryllium	0.53	0.0030	0.5000	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**LCS-13986**	SampType:	**LCSR**	TestCode:	**EPA 6010B: Total Recoverable Metals**
Client ID:	**BatchQC**	Batch ID:	**13986**	RunNo:	**19786**
Prep Date:	**7/1/2014**	Analysis Date:	**7/9/2014**	SeqNo:	**574837** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.50	0.0020	0.5000	0	99.1	80	120			
Calcium	50	1.0	50.00	0	101	80	120			
Chromium	0.50	0.0060	0.5000	0	99.8	80	120			
Iron	0.51	0.050	0.5000	0	101	80	120			
Lead	0.49	0.0050	0.5000	0	97.8	80	120			
Magnesium	52	1.0	50.00	0	104	80	120			
Nickel	0.48	0.010	0.5000	0	97.0	80	120			
Potassium	50	1.0	50.00	0	101	80	120			
Silver	0.10	0.0050	0.1000	0	105	80	120			
Sodium	52	1.0	50.00	0	103	80	120			
Vanadium	0.52	0.050	0.5000	0	105	80	120			

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.
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#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13986**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13986**	RunNo: **19786**
Prep Date: **7/1/2014**	Analysis Date: **7/9/2014**	SeqNo: **574836** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	99.4	80	120			
Beryllium	0.52	0.0030	0.5000	0	104	80	120			
Cadmium	0.50	0.0020	0.5000	0	99.8	80	120			
Calcium	51	1.0	50.00	0	101	80	120			
Chromium	0.50	0.0060	0.5000	0	100	80	120			
Iron	0.51	0.050	0.5000	0	102	80	120			
Lead	0.49	0.0050	0.5000	0	98.0	80	120			
Magnesium	51	1.0	50.00	0	101	80	120			
Nickel	0.48	0.010	0.5000	0	96.2	80	120			
Potassium	49	1.0	50.00	0	97.4	80	120			
Silver	0.10	0.0050	0.1000	0	104	80	120			
Sodium	50	1.0	50.00	0	100	80	120			
Vanadium	0.52	0.050	0.5000	0	104	80	120			

Sample ID: **LCS-13986**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13986**	RunNo: **19786**
Prep Date: **7/1/2014**	Analysis Date: **7/9/2014**	SeqNo: **574837** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.50	0.020	0.5000	0	100	80	120	0.606	0	
Beryllium	0.53	0.0030	0.5000	0	106	80	120	1.59	0	
Cadmium	0.50	0.0020	0.5000	0	99.1	80	120	0.728	0	
Calcium	50	1.0	50.00	0	101	80	120	0.548	0	
Chromium	0.50	0.0060	0.5000	0	99.8	80	120	0.290	0	
Iron	0.51	0.050	0.5000	0	101	80	120	0.631	0	
Lead	0.49	0.0050	0.5000	0	97.8	80	120	0.210	0	
Magnesium	52	1.0	50.00	0	104	80	120	3.11	0	
Nickel	0.48	0.010	0.5000	0	97.0	80	120	0.847	0	
Potassium	50	1.0	50.00	0	101	80	120	3.28	0	
Silver	0.10	0.0050	0.1000	0	105	80	120	0.431	0	
Sodium	52	1.0	50.00	0	103	80	120	3.22	0	
Vanadium	0.52	0.050	0.5000	0	105	80	120	1.02	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	ccv 7.00 pH	SampType:	CCV		TestCode:	SM4500-H+B: pH				
Client ID:	CCV	Batch ID:	R19544		RunNo:	19544				
Prep Date:		Analysis Date:	6/26/2014		SeqNo:	566085	Units:	pH units		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	1.68								

Sample ID	1406C22-001d dup	SampType:	DUP		TestCode:	SM4500-H+B: pH				
Client ID:	GW-WQ3-C-R36	Batch ID:	R19544		RunNo:	19544				
Prep Date:		Analysis Date:	6/26/2014		SeqNo:	566087	Units:	pH units		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.84	1.68								H

Sample ID	ccv 10.00 pH	SampType:	CCV		TestCode:	SM4500-H+B: pH				
Client ID:	CCV	Batch ID:	R19544		RunNo:	19544				
Prep Date:		Analysis Date:	6/26/2014		SeqNo:	566094	Units:	pH units		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	9.90	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	mb-1	SampType:	MBLK	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R19544	RunNo:	19544					
Prep Date:		Analysis Date:	6/26/2014	SeqNo:	566005	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:	R19544	RunNo:	19544					
Prep Date:		Analysis Date:	6/26/2014	SeqNo:	566006	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	97.9	90	110			

Sample ID	mb-2	SampType:	MBLK	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R19544	RunNo:	19544					
Prep Date:		Analysis Date:	6/26/2014	SeqNo:	566025	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:	R19544	RunNo:	19544					
Prep Date:		Analysis Date:	6/26/2014	SeqNo:	566026	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	101	90	110			

Sample ID	lcsd-2	SampType:	LCSR	TestCode:	SM2320B: Alkalinity					
Client ID:	BatchQC	Batch ID:	R19544	RunNo:	19544					
Prep Date:		Analysis Date:	6/26/2014	SeqNo:	566027	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			

Sample ID	1406C22-001d ms	SampType:	MS	TestCode:	SM2320B: Alkalinity					
Client ID:	GW-WQ3-C-R36	Batch ID:	R19544	RunNo:	19544					
Prep Date:		Analysis Date:	6/26/2014	SeqNo:	566029	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	108	20.0	80.00	34.12	91.8	34.9	123			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **1406C22-001d msd**	SampType: **MSD**	TestCode: **SM2320B: Alkalinity**							
Client ID: **GW-WQ3-C-R36**	Batch ID: **R19544**	RunNo: **19544**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566030**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	109	20.0	80.00	34.12	93.3	34.9	123	1.15	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.
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#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-1**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R19544**	RunNo: **19544**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566006**	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	97.9	90	110			

Sample ID: **lcs-2**	SampType: **LCS**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R19544**	RunNo: **19544**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566026**	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	101	90	110			

Sample ID: **lcsd-2**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R19544**	RunNo: **19544**							
Prep Date:	Analysis Date: **6/26/2014**	SeqNo: **566027**	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	0.496	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568010**	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 ST9060-14001**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568011**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.62	1.00	4.850	0	95.4	90	110			

Sample ID **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568012**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.64	1.00	4.850	0	95.6	90	110			

Sample ID **1406C22-001Cms**	SampType: **MS**	TestCode: **SM 5310B: TOC**							
Client ID: **GW-WQ3-C-R36**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568014**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.78	1.00	4.650	0.2036	98.3	75	125			

Sample ID **1406C22-001Cmsd**	SampType: **MSD**	TestCode: **SM 5310B: TOC**							
Client ID: **GW-WQ3-C-R36**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568015**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.79	1.00	4.650	0.2036	98.6	75	125	0.272	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.
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#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS ST9060-14001 s**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568011**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.62	1.00	4.850	0	95.4	90	110			

Sample ID: **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R19596**	RunNo: **19596**							
Prep Date:	Analysis Date: **6/30/2014**	SeqNo: **568012**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.64	1.00	4.850	0	95.6	90	110	0.238	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1406C22-001DDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**GW-WQ3-C-R36**	Batch ID:	**R19574**	RunNo:	**19574**					
Prep Date:		Analysis Date:	**6/30/2014**	SeqNo:	**567228**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.143	0						0.237	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.
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#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1406C22-001DDUP**	SampType: **DUP**		TestCode: **Specific Gravity**						
Client ID:	**GW-WQ3-C-R36**	Batch ID: **R19574**		RunNo: **19574**						
Prep Date:		Analysis Date: **6/30/2014**		SeqNo: **567228**		Units:				
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity		1.143	0						0.237	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

11-Aug-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-13982**	SampType:	**MBLK**		TestCode:	**SM 2540D: TSS**				
Client ID:	**PBW**	Batch ID:	**13982**		RunNo:	**19626**				
Prep Date:	**6/30/2014**	Analysis Date:	**7/1/2014**		SeqNo:	**569043**	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-13982**	SampType:	**LCS**		TestCode:	**SM 2540D: TSS**				
Client ID:	**LCSW**	Batch ID:	**13982**		RunNo:	**19626**				
Prep Date:	**6/30/2014**	Analysis Date:	**7/1/2014**		SeqNo:	**569044**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	89.0	4.00	92.40	0	96.3	82.47	119.05			

Sample ID	**1406C22-001DDUP**	SampType:	**DUP**		TestCode:	**SM 2540D: TSS**				
Client ID:	**GW-WQ3-C-R36**	Batch ID:	**13982**		RunNo:	**19626**				
Prep Date:	**6/30/2014**	Analysis Date:	**7/1/2014**		SeqNo:	**569047**	Units:	**mg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	124	4.00						4.72	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1406C22**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13982**	SampType: **LCS**	TestCode: **SM 2540D: TSS**
Client ID: **LCSW**	Batch ID: **13982**	RunNo: **19626**
Prep Date: **6/30/2014**	Analysis Date: **7/1/2014**	SeqNo: **569044** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	89.0	4.00	92.40	0	96.3	82.47	119.05			

Sample ID: **LCSR-13982**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**
Client ID: **BatchQC**	Batch ID: **13982**	RunNo: **19626**
Prep Date: **6/30/2014**	Analysis Date: **7/1/2014**	SeqNo: **569045** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	90.0	4.00	92.40	0	97.4	82.47	119.05	1.12	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.
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 36
WQSP-3
SDG 1406C22
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 (c)	mg/L	0.5	3,890	5,000	114,000		111,000		112,500	2.7	149,100
TOC	mg/L	1.0	0.16	1.0	0.20	J	0.17	J	0.18	21.1	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	4.0	20	34.1		33.8		34.0	0.88	54.5
Specific Conductance	umhos/cm	NA	0.50	0.50	358,000		352,000		355,000	1.7	517,000
pH	pH units	NA	0.10	1.68	6.83		6.82		6.83	0.15	6.6 - 7.2
Specific Gravity	NA	NA	0.0	0.0	1.140		1.145		1.143	0.44	1.17
TDS (c)	mg/L	10	984	2,000	206,000		202,000		204,000	2.0	261,000
TSS (c)	mg/L	1.0	3.1	4.0	**130**		**187**		**159**	36.0	**107**
Dissolved Metals (ICP)											
Ca (Diss) (c)	mg/L	0.5	0.77	20	1,390		1,360		1,375	2.2	1,680
Mg (Diss) (c)	mg/L	0.5	0.94	50	2,310		2,230		2,270	3.5	2,625
K (Diss) (c)	mg/L	0.5	4.1	20	1,510		1,490		1,500	1.3	3,438
Na (Diss) (c)	mg/L	0.5	243	2,000	72,300		73,700		73,000	1.9	140,400
Total Metals (ICP)	**Units**	**SOW MRL**	**Lab MDL**	**Lab PQL**	**Primary Sample**	**Flag**	**Duplicate Sample**	**Flag**	**Avg**	**RPD**	
Hg (CVAAS)	mg/L	0.0002	0.000087	0.00020	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.006	0.20	0.041	J	0.032	J	0.037	23.7	<1.0
Be	mg/L	0.010	0.0035	0.030	ND		0.0027	J	NA	NA	<0.1
Cd	mg/L	0.010	0.006	0.020	ND		ND		NA	NA	<0.5
Ca (c)	mg/L	0.500	3.27	20	1,430		1,370		1,400	4.3	NA
Cr	mg/L	0.025	0.017	0.06	ND		ND		NA	NA	<2.0
Pb (c)	mg/L	0.020	0.048	0.05	ND		ND		NA	NA	0.8
Mg (c)	mg/L	0.50	0.85	50	2,480		2,350		2,415	5.4	NA
Ni	mg/L	0.025	0.019	0.10	ND		ND		NA	NA	<5.0
K (c)	mg/L	0.50	10.1	20	1,530		1,460		1,495	4.7	NA
Ag	mg/L	0.013	0.0052	0.050	ND		ND		NA	NA	0.31
Na (c)	mg/L	0.50	415	1,000	52,800		66,000		59,400	22.2	NA
V (c)	mg/L	0.025	0.055	0.50	ND		0.033	J	NA	NA	<5.0
ICP/MS Metals											
Sb	mg/L	0.025	0.025	0.025	ND		ND		NA	NA	<1.0
As	mg/L	0.050	0.025	0.025	ND		ND		NA	NA	<1.0
Se	mg/L	0.025	0.025	0.025	ND		ND		NA	NA	<2.0
Tl	mg/L	0.025	0.025	0.025	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 36
WQSP-3

Sample Summary

Date:	September 8, 2014
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	June 25, 2014
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	August 11, 2014
Date Samples Shipped/Method	June 25, 2014 by FedEx
Date Samples Received by lab:	June 26, 2014
Sample Receipt Condition:	Intact at 4.1 deg. C
SDG:	1406C22
WIPP Chain of Custody/Request for Analysis:	1144
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):	June 30, 2014 (meets holding time)
SVOC Extraction Date:	June 29, 2014 (meets holding time)
SVOC Analysis Date(s):	June 30, 2014 (meets holding time)
Total Trace Metals Analysis Date(s):	July 9, 10, 2014 (meets holding time)
Dissolved Cation Metals Analysis Date(s):	July 6, 9, 10, 2014 (meets holding time)
Mercury Analysis Date(s):	July 1, 2, 2014(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 1406C22

WTS Sample No.	Analytes
GW-WQ3CR36N1, GW-WQ3CR36N1D	VOCs
GW-WQ3CR36N2, GW-WQ3CR36N3	VOCs (Field Blank and Trip Blank)
GW-WQ3CR36N4, GW-WQ3CR36N4D	TOC
GW-WQ3CR36N5, GW-WQ3CR36N5D	SVOCs
GW-WQ3CR36N6, GW-WQ3CR36N6D	Total Trace Metals (including "total" cation metals)
GW-WQ3CR36 N7, GW-WQ3CR36 N7D	General Parameters (including "dissolved" cations)
GW-WQ3CR36N12, GW-WQ3CR36N13	Total Trace Metals Field Blank (Preserved and un-preserved)

Results Summary

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 2-butanone above the MRL at 19.1 ug/L. The compound was not detected in the groundwater samples. The trip blank did not show any VOC detections. No VOC tentatively identified compounds were detected in the groundwater samples from the GC/MS data.

No SVOCs were detected in the WQSP-3 groundwater samples.

The trace metals detected included Ba at 0.041 mg/L in the primary sample and 0.032 mg/L in the duplicate sample. Be and V were not detected in the primary sample but were detected in the duplicate sample at 0.0027 mg/L and 0.033 mg/L, respectively. All the trace metal concentrations were below the MRL and are J-flagged as estimated.

No trace metals were detected in the preserved and unpreserved field blanks analyzed for trace metals with the WQSP-3 samples (the last of the six WQSP wells).

Measurements were made on all the general chemistry parameters at concentrations above the method reporting limit except for TOC, which was detected at 0.20 mg/L in the primary sample and 0.16 mg/L in the duplicate sample. The concentrations are J-flagged as estimated.

The TSS concentrations were 130 mg/L in the primary sample and 187 mg/L in the duplicate sample. The concentrations were both above the 95th percentile concentration of 107 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 EPA's SW-846 Method 8260B.

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 2-butanone above the MRL at 19.1 ug/L. The compound was not detected in the groundwater samples. The trip blank did not show any VOC detections.

The QC sample analyses showed detection of 0.65 ug/L of methylene chloride in the laboratory method blank, but methylene chloride was not detected in any of the samples. The LCS/LCSR samples yielded inaccurate data for isobutyl alcohol in the LCS and LCSR with reported recoveries of 197 percent and 205 percent, respectively. The accuracy and precision data was acceptable for the other compounds.

The MS/MSD showed inaccurate quantitation for isobutyl alcohol with reported recoveries over one thousand percent. The 2-butanone recoveries were 259 percent and 262 percent in the MS and MSD, respectively. The 2-butanone recoveries are more typical recoveries for the salting out effect for these two polar compounds. The recoveries of all the other compounds were within the normal acceptable range of 70 – 130 percent except that the recoveries of 1,1,2,,2-tetrachloroethane were 140 percent and 131 percent in the MS and MSD, respectively. The high recoveries of the three VOC compounds should not adversely affect the quality or usability of the data since the compounds have not been detected in the groundwater samples.

All other quality assurance objectives were met for the VOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 8270C. No SVOCs were detected in the method blank sample or in the groundwater samples.

The QC data showed that the LCS/LCSR recovery objective of 40 – 140 percent recovery for base/neutral compounds was not met for pyridine with recoveries of 31.2 percent in the LCS and 32.3 percent in the LCSR. The recoveries met the lab's historical control chart range. The 30 –

130 percent recovery objective was met for the acidic compounds. The precision objective was met for all the compounds in the LCS/LCSR.

The recovery objective was not met for 2,4-dinitrophenol and pentachlorophenol in the MS and MSD samples with recoveries of 18.9 percent and 29.6 percent, respectively, in the MS, and 13.4 percent and 20.7 percent, respectively, in the MSD. The lower recoveries in the MSD caused the precision objective to not be met with RPDs of 34.1 and 35.4, respectively, for 2,4-dinitrophenol and pentachlorophenol. The low recoveries for the acidic compounds were within the lab's historical control chart range.

All other quality assurance objectives were met for the SVOC analyses including the surrogate recoveries in all the samples. The low recoveries for the acidic compounds in the MS and MSD should not adversely affect the overall quality and usability of the data because no SVOC compounds were detected in groundwater samples.

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 EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed by ICP/MS by Anatek according to EPA Method 6020 from SW-846. Mercury (Hg) was analyzed using automated cold-vapor atomic absorption (CVAA) spectroscopy according to EPA SW-846 Method 7470A.

The trace metals detected included Ba at 0.041 mg/L in the primary sample and 0.032 mg/L in the duplicate sample; Be at 0.0027 mg/L in the duplicate sample only; and V at 0.033 mg/L in the duplicate sample only. All the trace metal concentrations were below the MRL and are J-flagged as estimated.

The MDLs for the analyses were lower than the MRLs specified in the SOW for the target metals except that the Pb MDL was higher than the 0.020 mg/L SOW-prescribed concentration at 0.048 mg/L, and the V MDL of 0.055 mg/L was higher than the SOW-prescribed concentration of 0.025 mg/L.

The QC data showed that the method blank samples did not contain the trace metals detected in the groundwater samples. The LCS/LCSR recoveries for the trace metals, the ICP/MS metals, the four dissolved cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. 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 objective.

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	Parameter
Standard Methods SM 2710F	Specific Gravity
Standard Methods SM 4500-H^+	pH
EPA Method 120.1	Specific Conductance (Conductivity)
Standard Methods SM 2540C	Total Dissolved Solids (TDS)
Standard Methods SM 2540D	Total Suspended Solids (TSS)
Standard Methods SM 5310B	Total Organic Carbon (TOC)
Standard Methods 2320B	Alkalinity
EPA Method 300.0	Anions

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

- All parameters: Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted, although trace sulfate at 0.12 mg/L was detected in the method blank, which is below the MRL of 0.50 mg/L and is J-flagged as estimated. Potassium was detected at 0.29 mg/L in a continuing calibration blank, which is less than the MRL of 1.0 mg/L. Initial calibration verification and continuing calibration verification standards were analyzed as appropriate to ensure accurate calibration of the instrumentation.

- Anions: LCS (but not LCSR) samples were analyzed for the anions chloride, nitrate and sulfate to obtain recovery information (chloride analyzed separately). All LCS recoveries were within 90 – 110 percent. The MS/MSD samples were only analyzed for nitrate because of the high native concentrations of chloride and sulfate. The recoveries were both 93.5 percent, and the RPD was 0.0043.

- pH: A CCV at pH 4.00 was analyzed prior to the samples. The lab failed to analyze one of the samples in duplicate to obtain precision information for this SDG. The precision of the analyses of the duplicate groundwater samples was good with values of 6.83 and 6.82 and a RPD of 0.15.

- Specific gravity: A duplicate sample was analyzed to obtain precision data. The precision of the analyses of the primary sample and its duplicate was very precise with values of 1.140 and 1.143 for a RPD of 0.24.

- Specific conductance: The laboratory did not analyze one of the groundwater samples in duplicate to produce precision data. The precision of the analyses of the primary and duplicate analyses was quite precise with values of 358,000 umhos/cm and 352,000 umhos/cm for a RPD of 1.7.

- Total Organic Carbon: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS/LCSR recoveries were 95.4 percent and 95.6 percent for a RPD of 0.21. The MS/MSD recoveries were 98.3 percent and 98.6 percent yielding a RPD of 0.27. Thus the accuracy and precision objectives were readily met.

- Alkalinity: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The accuracy and precision objectives were readily met. The LCS/LCSR recoveries were both 101 percent for a RPD of 0.0, and the MS/MSD recoveries were of 91.8 percent and 93.3 percent for a RPD of 1.2.

- Total Dissolved Solids: A LCS and MS/MSD samples were analyzed for this gravimetric method to generate accuracy and precision data. The LCS recovery was 98.8 percent, and the MS/MSD recoveries were 106 percent and 94.8 percent for a RPD of 3.5. Thus the accuracy and precision objectives were readily met.

- Total Suspended Solids: A LCS and a duplicate sample were analyzed to generate accuracy and precision data. The LCS recovery was 96.3 percent. The duplicate analysis of the primary sample (130 mg/L) yielded 124 mg/L for a RPD of 4.7. However, the precision of the primary groundwater sample and duplicate groundwater sample (187 mg/L) yielded a RPD that of 36, which did not meet the precision objective. Based on the other two results, the concentration of 187 mg/L appears to be high.

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. The missed quality assurance objectives should not adversely affect the reliability or usability of the information since the sample data fall in line with data generated during previous Rounds. The lab was reminded to provide all the requested information.

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-3 (Round 36)

Laboratory Name: Nall Environmental

Laboratory Work Order #: SDG 1406C22

Sample Number(s): GW-WQ3-C-R36-N1 thru N7D, -N12 + -N13

Reviewer Name (print): Robbin A. Spoon

Reviewer Signature: Robbin A Spoon

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?	✓	

Robbin A Spoon 10/9/2014

Data Validator Date

Completeness Reviewer 10-15-14

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? 4.1°C	✓	
Based on the CofC/RFA and/or SDG narrative, were the samples received and maintained at ≤6°C? 4.1°C	✓	
Was the analysis holding time of 14 days met for all samples? 6/30 vs 6/25	✓	
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? (8)	✓		
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. R^2 coefficients all >0.995.

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.	✓	

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?	✓		(a)
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?		✓	(b)

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? (4 added)	✓	
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) Methylene chloride was detected at 0.65 µg/L.
(b) 2-butanone detected at 19.1 µg/L in FB. No detections in TB.

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?		✓	(a)
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?		✓	(b)
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 isobutyl alcohol recoveries were 197% and 205% in the LCS and LCSR, respectively. This was also outside the range of the lab's historical control chart range. The reason was for the high recoveries is not known but would not be due to the salting-out effect. JJ 8-20-14

(b) Isobutyl alcohol yielded high recoveries (1360%, 1500%), and 2-butanone yielded high recoveries (259%, 262%)

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?		✓

Douglas 10/9/14
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(a) The target 2-butanone and associated ketone TIC compounds were observed in the field blank sample.

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? 4.1°C	✓	
Were the samples extracted within 7 days of sample collection? 6/29 vs 6/25	✓	
Were the extracts analyzed within 40 days of sample extraction? 6/30 vs 6/29	✓	
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? but m/z 442 was the base peak	✓	
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? 2.5 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) NA. Avg. RRFs not used. R^2 coefficients all > 0.995.

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?	✓		
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) No targets detected in MB.

(b) The D5-Phenol surrogate recoveries in the two GW samples were higher than the 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?		✓	(a)
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?	✓		(b)

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?		✓	

2,4-DNP RPD = 34; PCP RPD = 35

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 Pyridine recovery was 31.2% in the LCS and 32.3% in the LCSR.
(b) RPDs not initially submitted by lab.
(c) The 2,4-DNP recoveries were 18.9 and 13.4%; the PCP recoveries were 29.6 and 20.7 %

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) The MB contained trace concentrations of toluene, several alkanes, dichloro cyclohexane, triethyl phosphate, and a couple of unknowns.

(b) The duplicate groundwater samples contained tetrachloroethylene, chlorobenzene, some alkanes (also present in MB), BisPhenol A. The duplicate GW sample contained tetrachloroethane. However, since there was no response for these compounds in the VOC analyses, it is unlikely that they are present in the GW. The BPA is a common contaminant associated with plastics.

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?	✓	

a) C 6/25

P - T-Metals 7/1 ; Hg 7/1 ; ICP/MS 7/7

A - Dissol 7/9, 7/10 ; Hg 7/1 & 7/2 ; T-Metals 7/9, 7/10, 7/12 ; ICP/MS 7/17

10/7/14

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) Data verified directly on raw data.

PM 10/7/14

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

DF = 1.5

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO	
Were the samples digested within 28 days of sample collection? C 6/25 P 7/1 A 7/1 + 7/2	✓		
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank? 6	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		0.99994
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? 100.99%	✓		(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? 10Sx	✓		
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?	✓		(c)
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		(d)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		

(a) $ICV = \left(\frac{3.3631}{3.33}\right)100 = 100.99\%$ rec

(b) $CCV_{19} = (3.4816/3.33)100 = 104.6\%$ rec

$CCV_{31} = (3.4007/3.33)100 = 102.1\%$ rec

(c) $LCS = \left(\frac{3.3601 \times 1.5}{1000}\right) = \left(\frac{0.00504}{0.050}\right)100 = 100.8\%$ rec

$LCSR = \left(\frac{3.4732 \times 1.5}{1000}\right) = \left(\frac{0.0052098}{0.050}\right)100 = 104.2\%$ rec

$\%RPD = \left(\frac{|3.3601 - 3.4732|}{3.41665}\right)100 = 3.31\%$ RPD

* (d) MS $\left(\frac{0.54528}{0.500}\right)100 = 109.1\%$ rec

$MSD = \left(\frac{0.52784}{0.500}\right)100 = 105.6$

$\%RPD = \frac{0.54528 - 0.52784}{0.53656} = 3.2\%$ RPD

* Instr. software contained CFs on MS/MSD analyses. Factor off by 100 fold. R Alpon

0.54528 should be 0.005428 etc.

R Alpon 9/4/14

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? CC/25 P7/1 A7/17	✓		
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓		
Was a DMP sample used for the MS/MSD? 10Sx	✓		
Was an ICV analyzed after the initial calibration? ICV 1.0 & ICV 40 ppb	✓		
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?	✓		(b)
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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a) $CCV_{As} = (50.605/50)100 = 101.2\%$ rec

$CCV_{Se} = (50.573/50)100 = 101.1\%$ rec

$CCV_{Sb} = (48.544/50)100 = 97.1\%$ rec

$CCV_{Tl} = (52.500/50)100 = 105.0\%$ rec

a) 3/14

(b) LCS/LCSD & MS/MSD data verified by hand on pg 26 - Anatek Labs QC Data Report.

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

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 4.1°C	✓	
N/A		
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 6/25 A 6/26 + 7/2	✓	

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?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD? 1° Sx	✓	

* 4/2/14 Calibration *

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? Failed F-; okay Not reported		✓ (a)
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?	✓	

(b)

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument? r 50, r 2K + r 10K	✓	
Were the appropriate dilution factors applied to the results?	✓	

maybe a tad over diluted ↑ error

[signature] 9/4/14 [signature] 10-15-14

Data Validator Date Completeness Reviewer Date

(a) F- failed on ~~LCS~~ LCS RA 9/4/14, but passed on LCSR; Not anion of interest though. Calculations for verification shown on Raw data worksheet.

(b) MS = [(2.338 x 50)/125] x 100 = 93.52% rec

%RPD = Ø

MSD = [(2.338 x 50)/125] x 100 = 93.52% rec

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 4.1°C	✓	
Were the samples analyzed within 14 days of collection? C 6/25 A 6/30	✓	

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? 10Sx 6.83 2° 6.82	✓	
Was a DMP sample used for the MS/MSD? 10Sx	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 2.32 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?	✓		(b)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)? 1.15%	✓		(b)
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓		(c)

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(a) Spk = 80 %RPD = 0.496%

LCS-2 = (80.47999 / 80) 100 = 100.6%rec

LCSD-2 = (80.88000 / 80) 100 = 101.1%rec

~~%RPA~~

(b) 10Sx = 34.12 Spk = 80.0

MS = (107.52 − 34.12 / 80) = 91.75%rec

MSD = (108.75999 − 34.12 / 80) = 93.30%rec

%RPD = (|107.52 − 108.741| / 108.14) 100

= 1.15%

(c) A × N × 50K / Sx Vol

MS = (5.376 × 0.02 × 50K / 50mL) = 107.52 mg/L

MSD = (5.438 × 0.02 × 50K / 50mL) = 108.76 mg/L

A = mL Titrant

N = Normality of titrant

50K = meq/mole

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 4.1°C	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 6/25 A 6/30	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? 1K only	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration? 1413 µS	✓	
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)? Mid 99.7 mS End = 999 µS	✓	
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)

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(a) ICV

@ neat & 10x

$\left(\frac{1391}{1413}\right)100 = 98.4\%$ rec.

@ 50x

$\left(\frac{1358}{1413}\right)100 = 96.10\%$ rec

(b) CCV $\left(\frac{106}{99.7}\right) = 106.3\%$

(c) $1^{\circ}S_x = 7154 \times 50 = 357{,}700$

$1^{\circ}S_x$ Dup = Not analyzed

$2^{\circ}S_x = (7041 \times 50) = 352{,}050$

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

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°? 4.1°C	✓	
Were the samples analyzed within five (5) days of receipt? C 6/25 A 6/26	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement? ATC used	✓	
Were at least two standard buffer solutions used to calibrate the instrument? 5	✓	
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? 7 within 10 at end	✓	
Was the sample analysis temperature within 2°C of the buffer analysis temperature? Buffers = 18.7° → 19.2°C Sx = 23.4°C → 24.1°C		✓ (a)
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate? 10	✓	

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? 6.97 vs 7.00	✓	
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓	(b)

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(a) Samples were 5°C warmer than buffer at time of analysis

(b) 10 S_x = 6.834

10 S_x Dup = 6.84

20 S_x = 6.82

$$\%\,RPD = \left(\frac{6.84 - 6.83}{6.835}\right) 100 = 0.15\%$$

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? 21.2°C	✓	
Was the temperature of the specific gravity measurements recorded?		✓ (a)
Was the mass of at least 5.0 mL of the water sample measured?	✓	
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? 0.9982	✓	

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(a) No evidence that samples were warmed to room temp. No actual temps taken on individual samples

$^{10}S_x = 1.1401$ PM 9/4/14 ~~10 Sx~~ $^{10}S_x$ Dup = 1.1428

$\bar{x} = 1.14145$

$\%RPD = \left(\frac{1.1428 - 1.1401}{1.14145}\right) = 0.237\%$

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

*2° Sx - 1st Analysis had CAR → Found behind TDS data ~~No copy of CAR~~ included ~~Data~~ Raw

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 4.1°C	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 6/25 A 6/30	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? 5/2/11 Cal	✓	
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? 1° Sx	✓	
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)? Low Cal R^2=0.9999; Hi Cal R^2= 1.0	✓		
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?	✓		

[signature] 9/5/14
Data Validator Date

[signature] 10-15-14
Completeness Reviewer Date

(a) $ICV_5 = \left(\frac{4.866}{5}\right) \times 100 = 97.3\%$ rec

$ICV_{50} = \left(\frac{49.97}{50}\right) \times 100 = 99.9\%$ rec

(b) SpK = 4.850

$LCS = \left(\frac{4.625}{4.850}\right) 100 = 95.4\%$ rec

$LCSD = \left(\frac{4.636}{4.850}\right) 100 = 95.6\%$ rec

$\%RPD = \frac{4.636 - 4.625}{4.6305}$ 0.24%

(c) SpK = 4.65 1° Sx = 0.2036

$MS = \left(\frac{4.776 - 0.2036}{4.650}\right) 100 = 98.3\%$

$MSD = \left(\frac{4.789 - 0.2036}{4.65}\right) 100 = 98.6\%$

$\%RPD = \left(\frac{4.789 - 4.776}{\text{CM } 9/5/14 \ \cancel{4.65}\ 4.7825}\right) 100 = 0.27\%$

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

* %RPD Reported Incorrectly = is 3.59%, not 3.49%

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 4.1°C	✓	
Were the samples analyzed within 7 days of collection? C 6/25 P 7/2 A 7/4	✓	

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? 10 Sx	✓		
Was the initial volume of each sample 100 mL?	✓		
Were any DMP samples diluted prior to processing? 1mL ↑ 100	✓		
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? 206,200 → 51,550 vs 100K	✓		(a)

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?	✓		(b)
Did the MS/MSD analyses meet the accuracy objective of 80-120% recovery?	✓		(c)
* If usable results were obtained from the MS/MSD, did the analyses meet the precision objective of ≤ 20 RPD?	✓		

Data Validator — 9/5/14 Date

Completeness Reviewer — 10-15-14 Date

(a) 10 Sx = 206,200 Spk = 100K

(b) MB = 13 Spk = 1000

$LCS = \left(\frac{988-13}{1000}\right)100 = 97.5\%$ rec

$LCSD = \left(\frac{989-13}{1000}\right)100 = 97.6\%$ rec

$\%RPD = \left(\frac{989-988}{988.5}\right)100$

$= 0.101\%$

(c) 10 Sx = 206,2000 Spk = 100K

$MB = \left(\frac{312,000 - 206,200}{100,000}\right) = 105.8\%$

$MSD = \left(\frac{301,000 - 206,200}{100,000}\right) = 94.8\%$

$\%RPD = \left(\frac{312k - 301k}{306.5k}\right) = 3.59\%$ RPD

* On QC Summary report - MB not subtracted for LCS (MB = 13 ↑)

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 4.1°C	✓	
Were the samples analyzed within 7 days of collection? C 6/25 P 6/30 A 7/1	✓	
Were the samples allowed to warm to room temperature prior to filtration?		✓ (a)

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?	✓	(b)

RAlpom 9/5/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) No evidence that SX's warmed to room temp.

(b) MB = Ø

10 SX = 130

10 SX Dup = 124

$\left(\frac{130-124}{127}\right)100 = 4.7\%$ RPD

LCS Recoveries

SPK = 92.4

LCS = $(89/92.4)100 = 96.3\%$ rec

$\left(\frac{90-89}{89.5}\right)100 = 1.12\%$ RPD

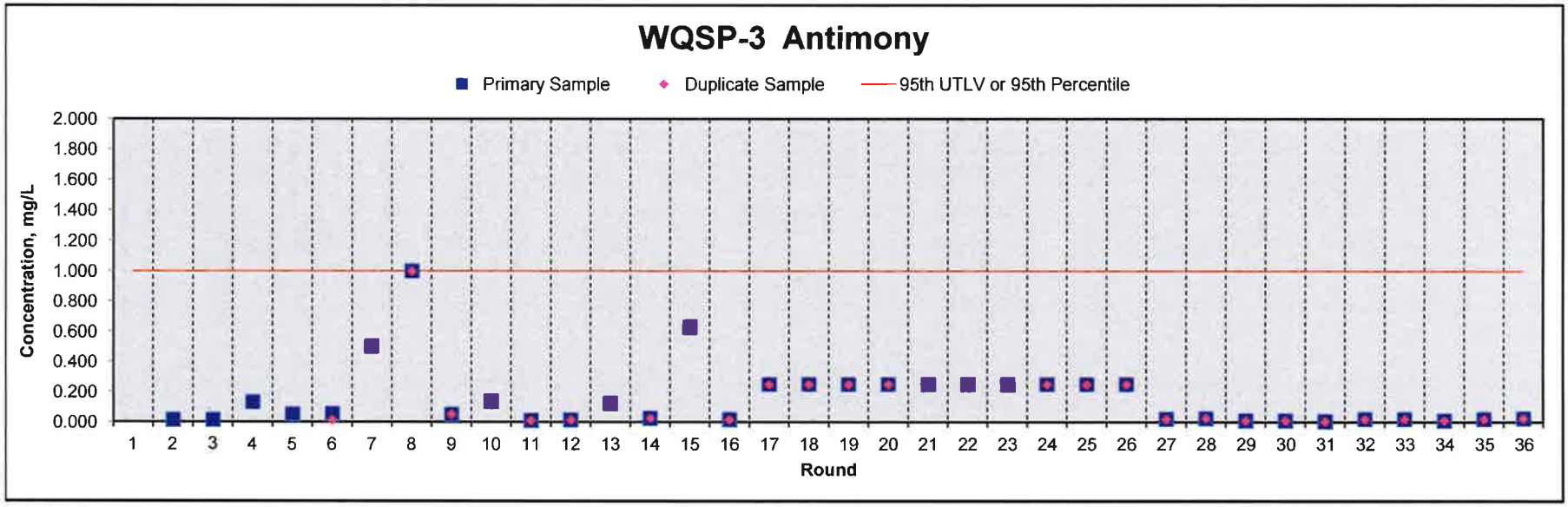
LCSD = $(90/92.4)100 = 97.4\%$ rec

WQSP-3

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

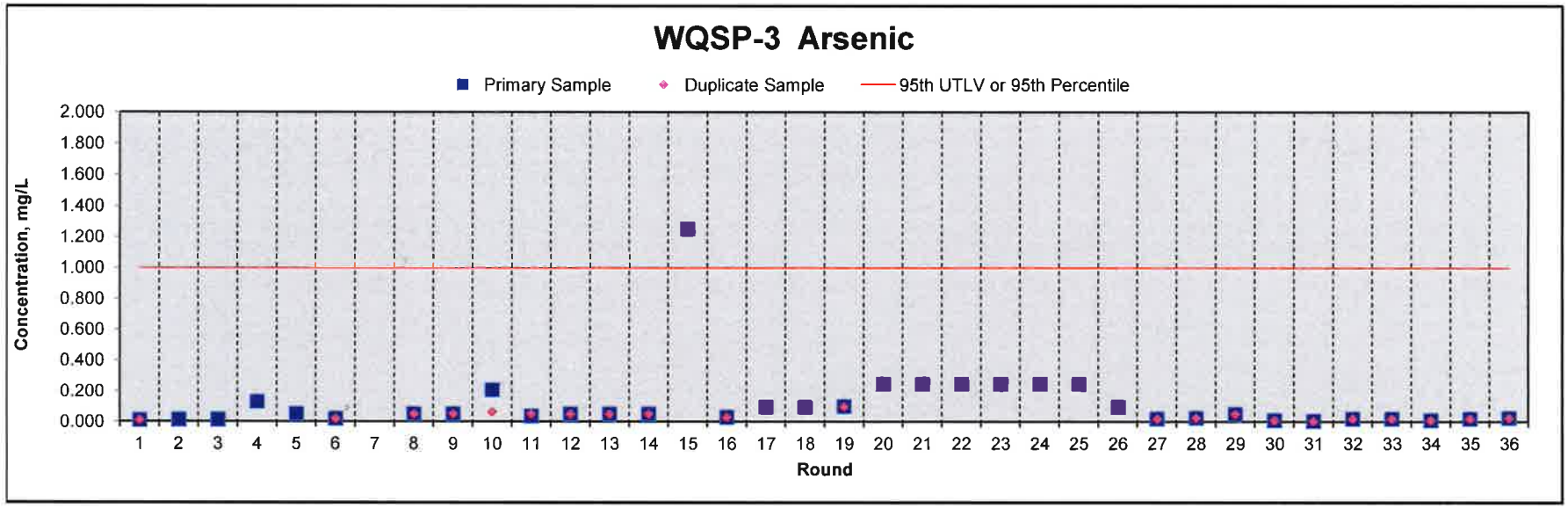
WQSP-3 Antimony

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	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
Antimony	36	06/25/14	07/17/14	< 0.025	< 0.025	mg/L	0.025	< 1.0



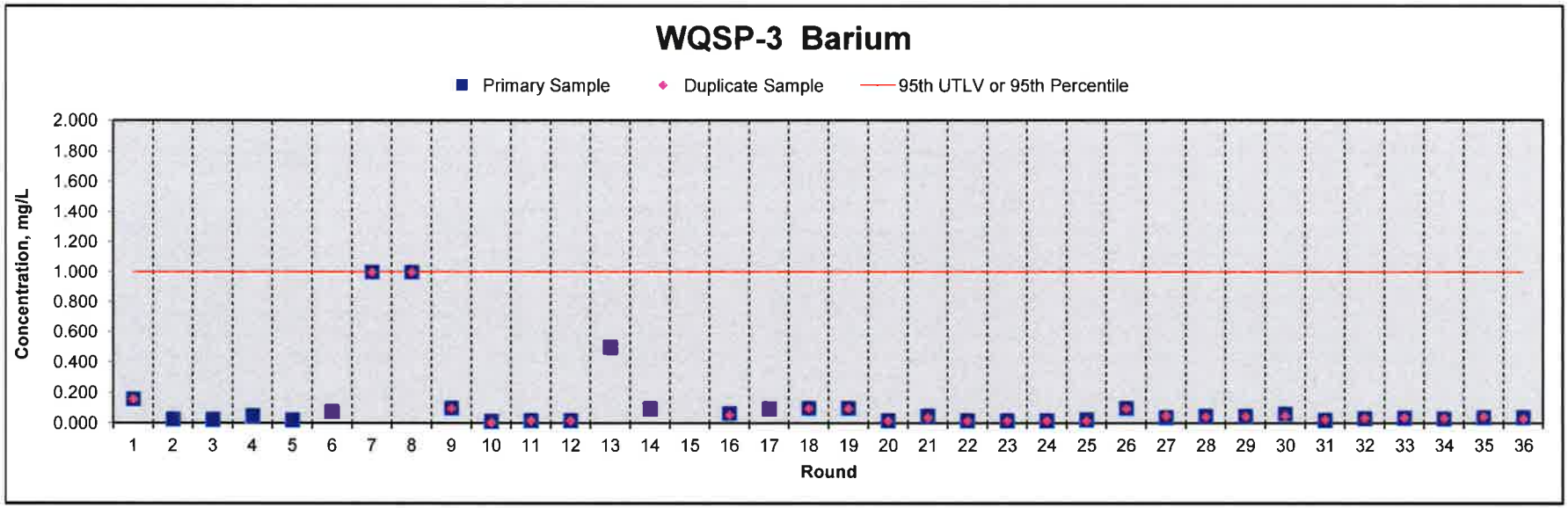
WQSP-3 Arsenic

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	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
Arsenic	36	06/25/14	07/17/14	< 0.025	< 0.025	mg/L	0.025	< 1.0



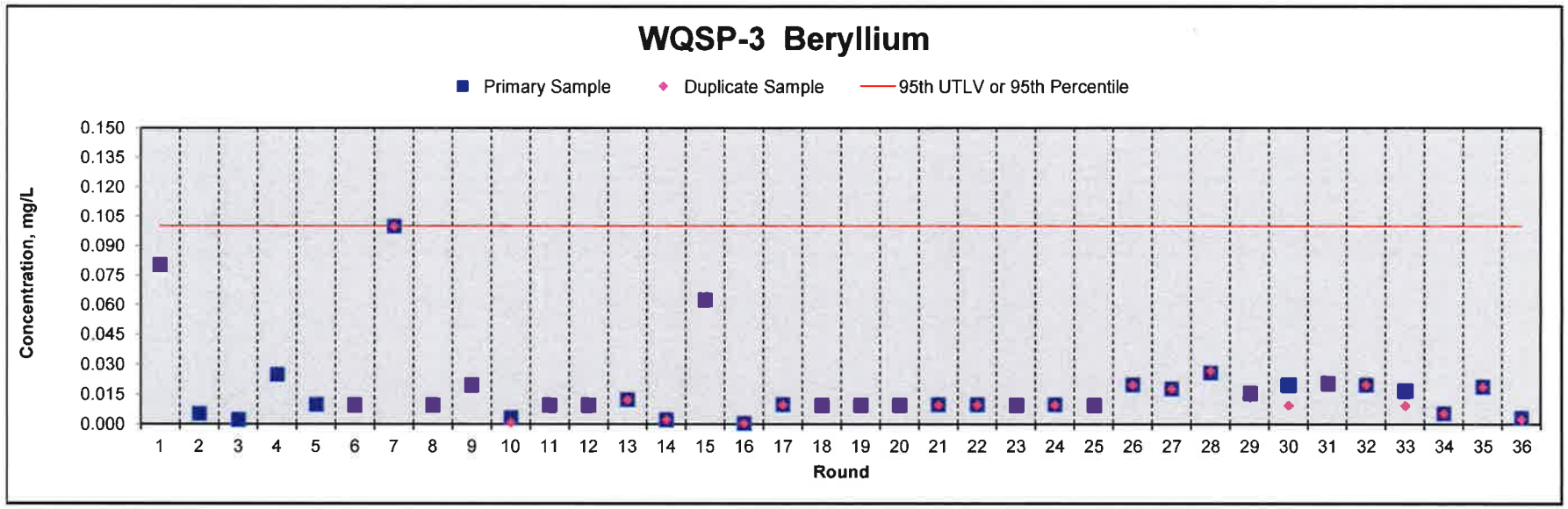
WQSP-3 Barium

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	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
Barium	36	06/25/14	07/10/14	0.041	0.032	mg/L	0.0063	< 1.0



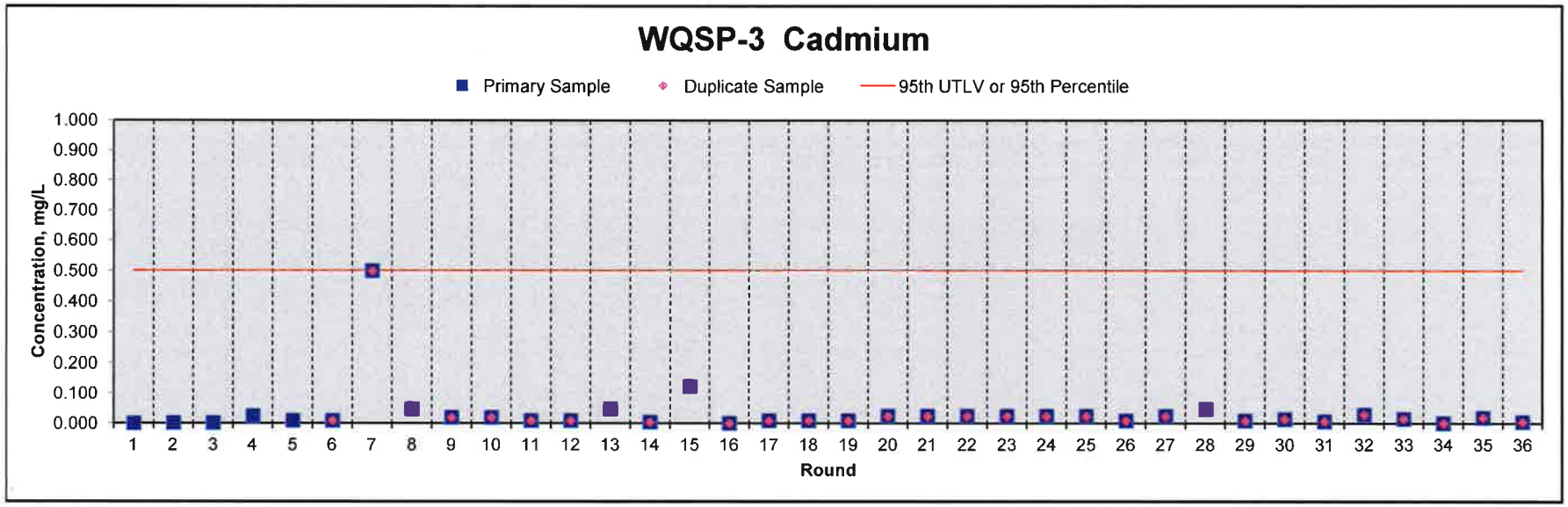
WQSP-3 Beryllium

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	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
Beryllium	36	06/25/14	07/10/14	< 0.0035	0.0027	mg/L	0.0035	< 0.1



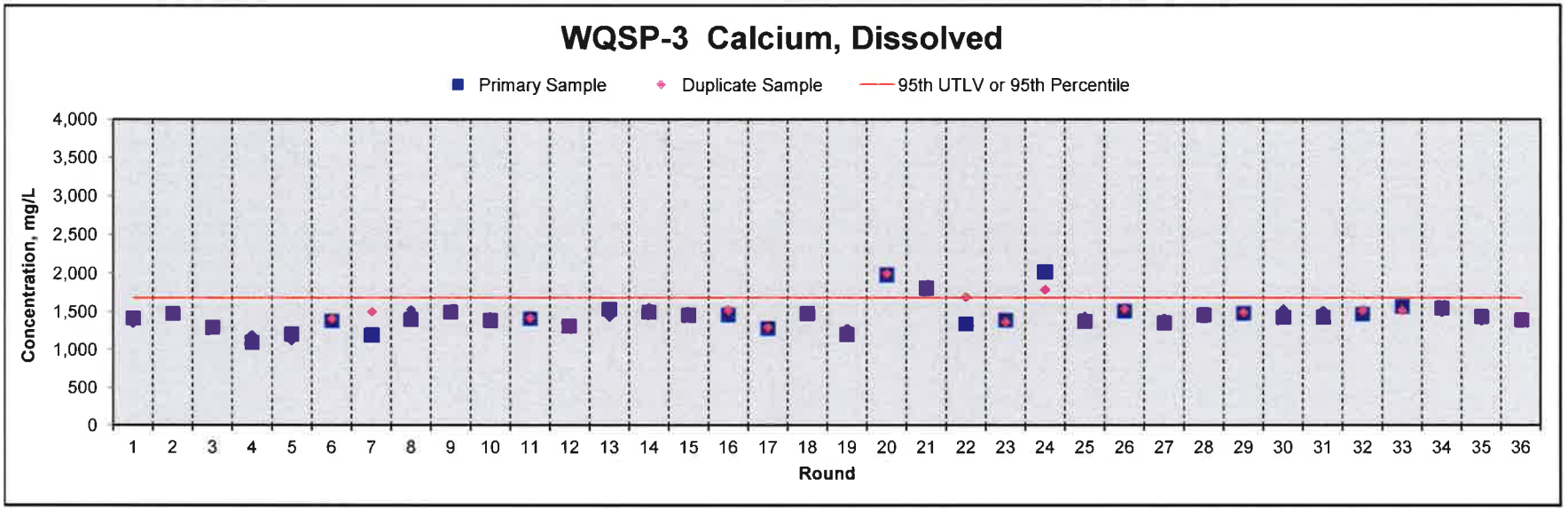
WQSP-3 Cadmium

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	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
Cadmium	36	06/25/14	07/10/14	< 0.0063	< 0.0063	mg/L	0.0063	< 0.5



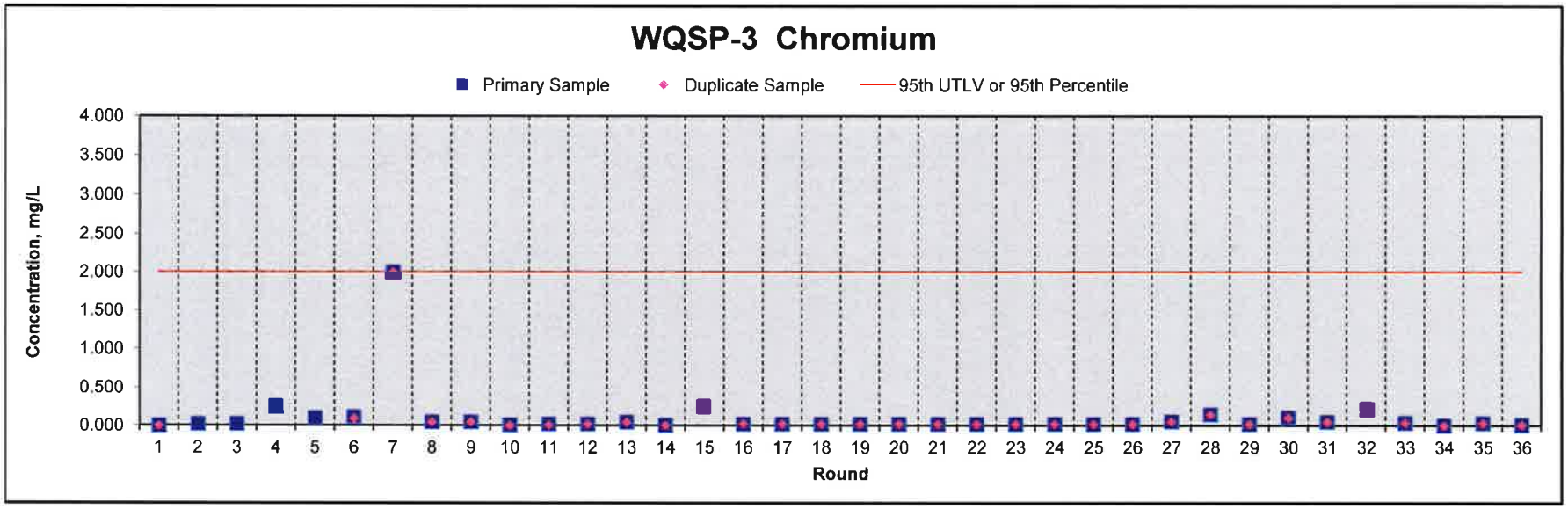
WQSP-3 Calcium, Dissolved

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	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
Calcium	36	06/25/14	07/10/14	1,390	1,360	mg/L	0.773	1,680



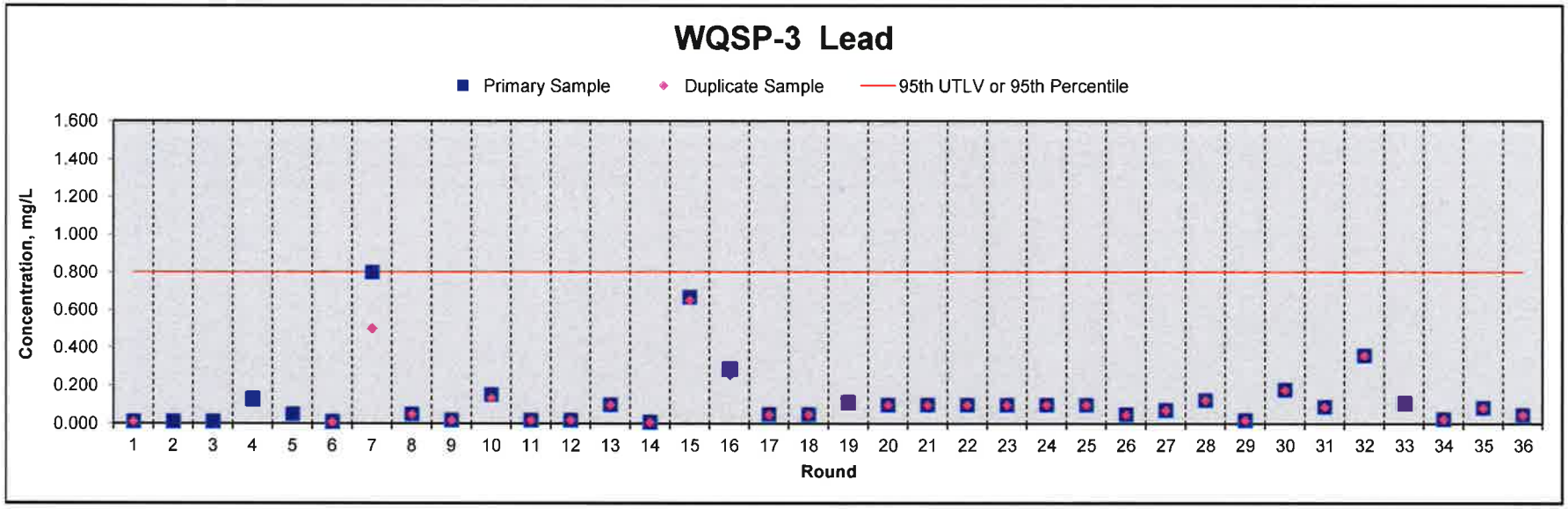
WQSP-3 Chromium

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	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
Chromium	36	06/25/14	07/10/14	< 0.0168	< 0.0168	mg/L	0.0168	< 2.0



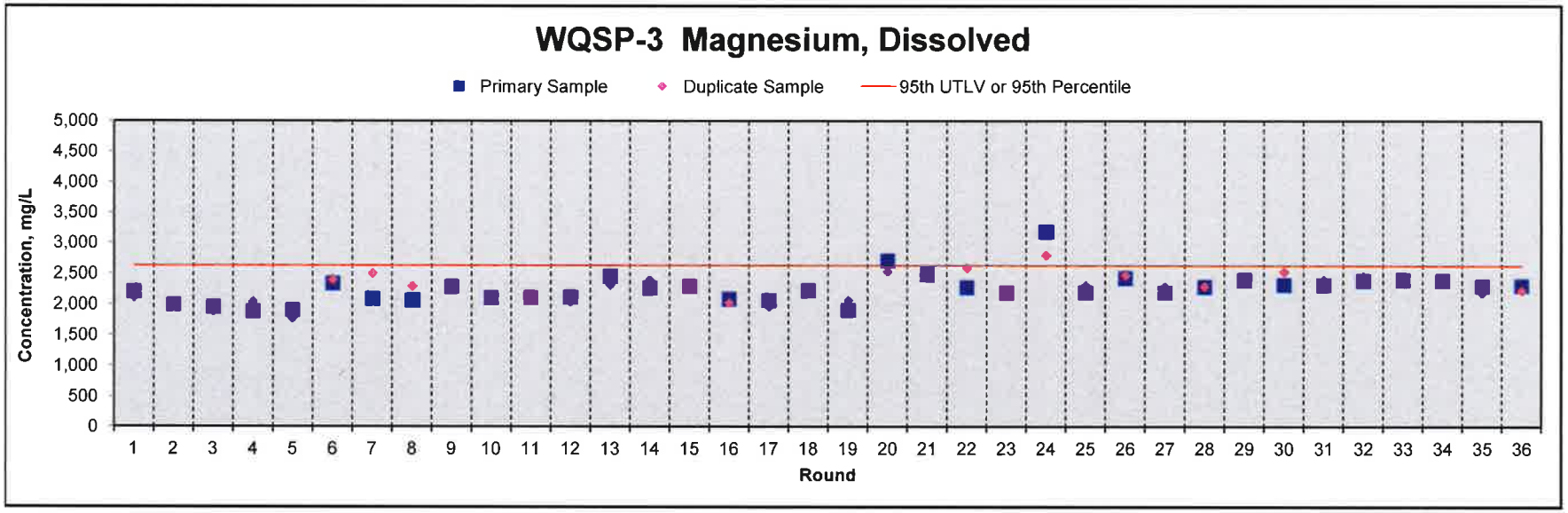
WQSP-3 Lead

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	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
Lead	36	06/25/14	07/10/14	< 0.048	< 0.048	mg/L	0.048	0.8



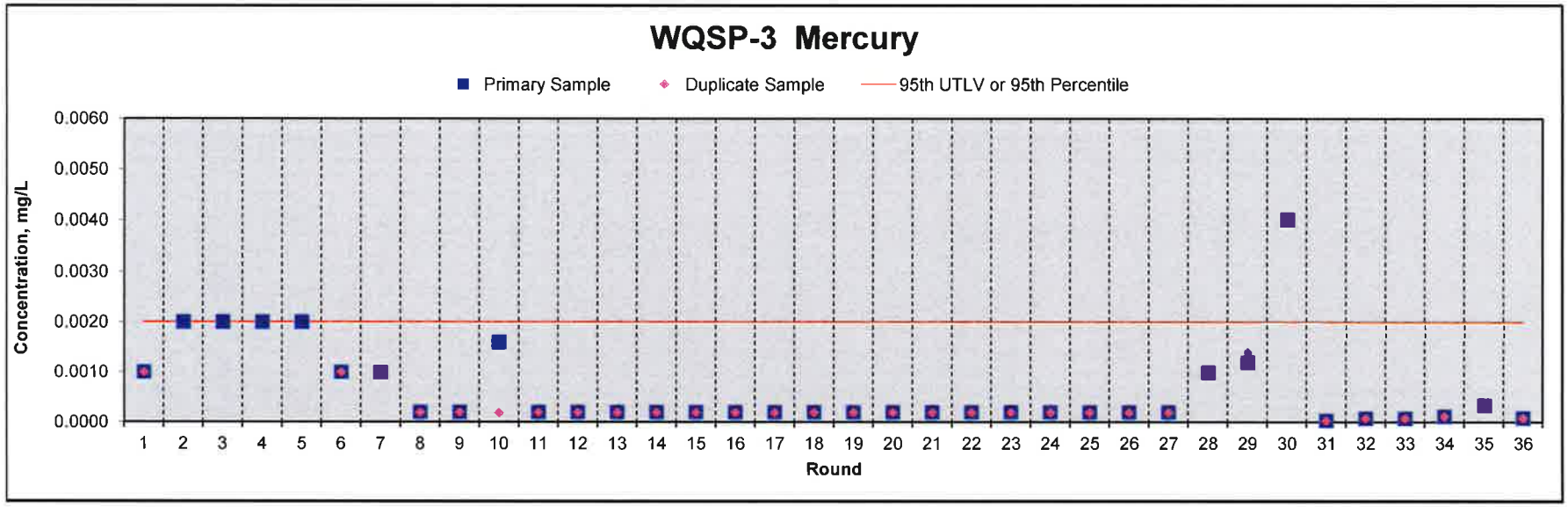
WQSP-3 Magnesium, Dissolved

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	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
Magnesium	36	06/25/14	07/10/14	2,310	2,230	mg/L	0.943	2,625



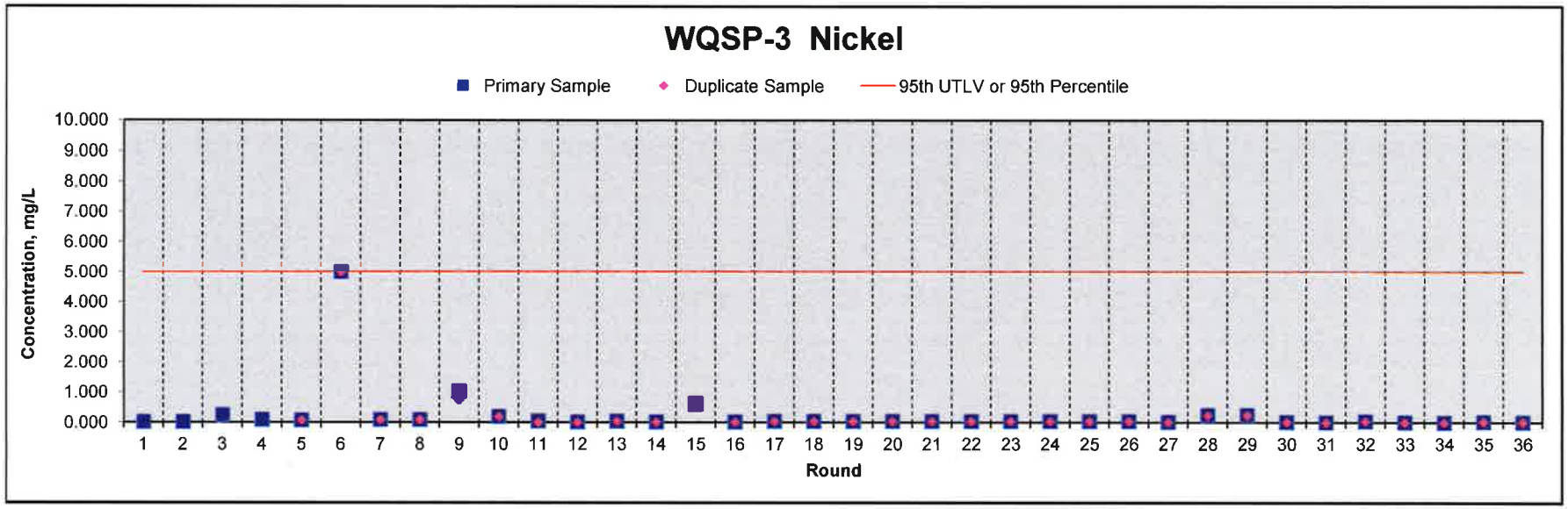
WQSP-3 Mercury

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	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
Mercury	36	06/25/14	07/02/14	< 0.000087	< 0.000087	mg/L	0.000087	< 0.002



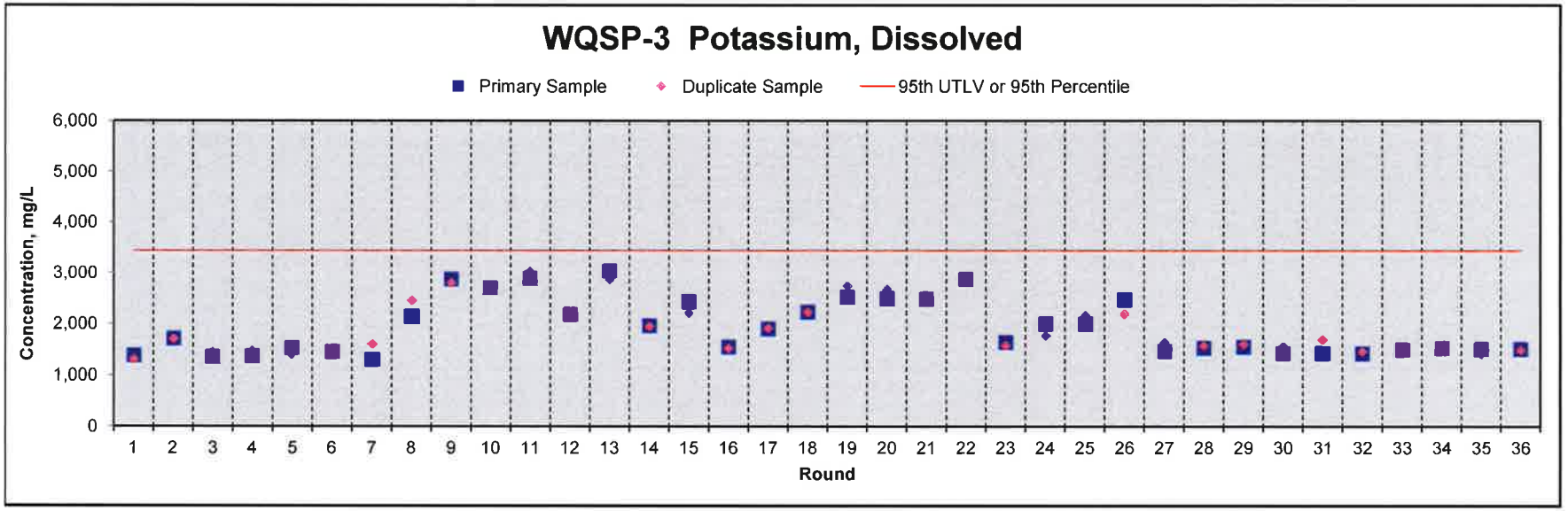
WQSP-3 Nickel

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	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
Nickel	36	06/25/14	07/10/14	< 0.019	< 0.019	mg/L	0.019	< 5.0



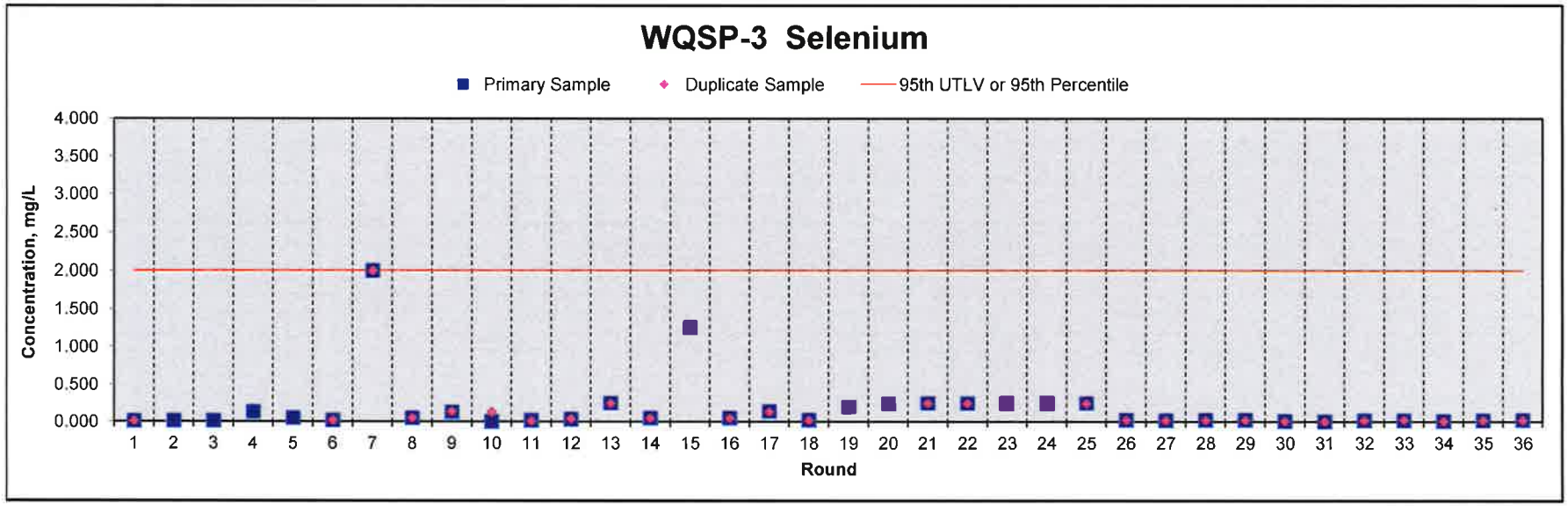
WQSP-3 Potassium, Dissolved

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	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
Potassium	36	06/25/14	07/10/14	1,510	1,490	mg/L	4.05	3,438



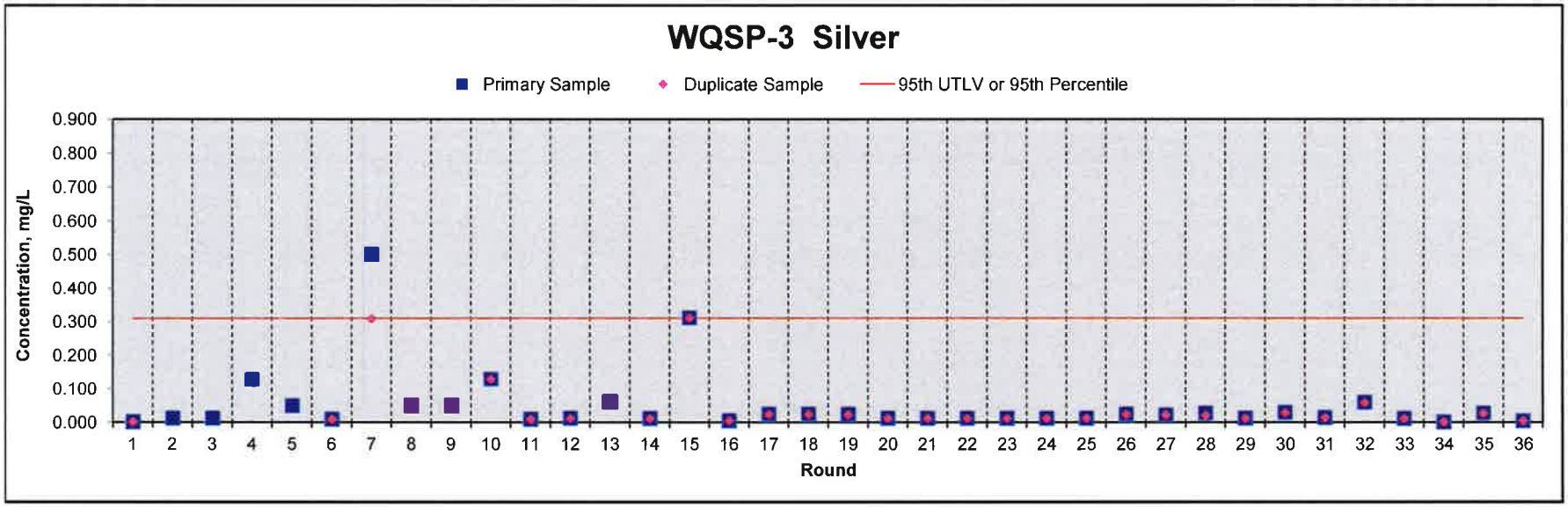
WQSP-3 Selenium

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	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
Selenium	36	06/25/14	07/17/14	< 0.025	< 0.025	mg/L	0.025	< 2.0



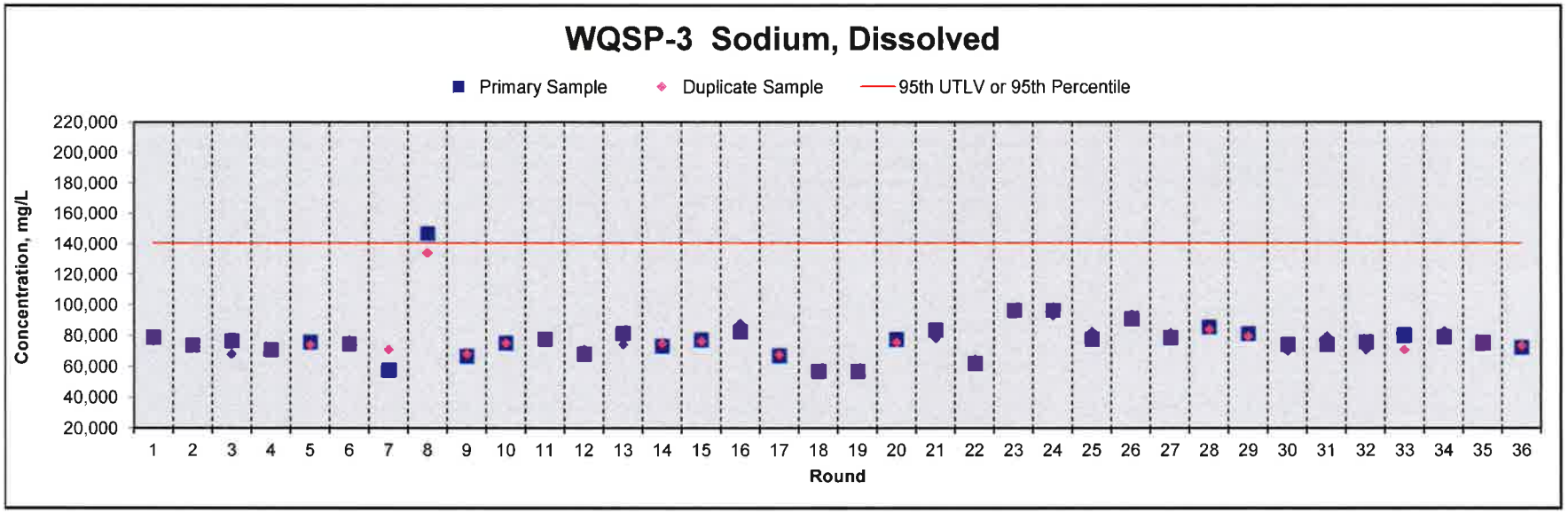
WQSP-3 Silver

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	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
Silver	36	06/25/14	07/10/14	< 0.0052	< 0.0052	mg/L	0.0052	0.31



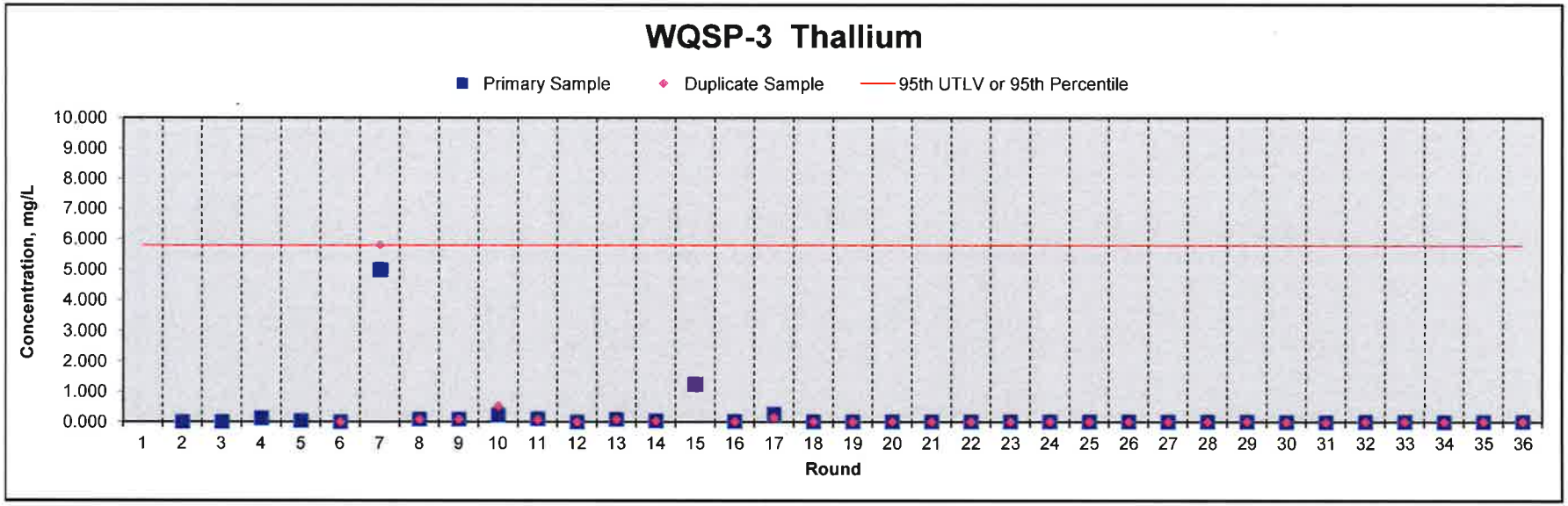
WQSP-3 Sodium, Dissolved

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	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
Sodium	36	06/25/14	07/10/14	72,300	73,700	mg/L	243	140,400



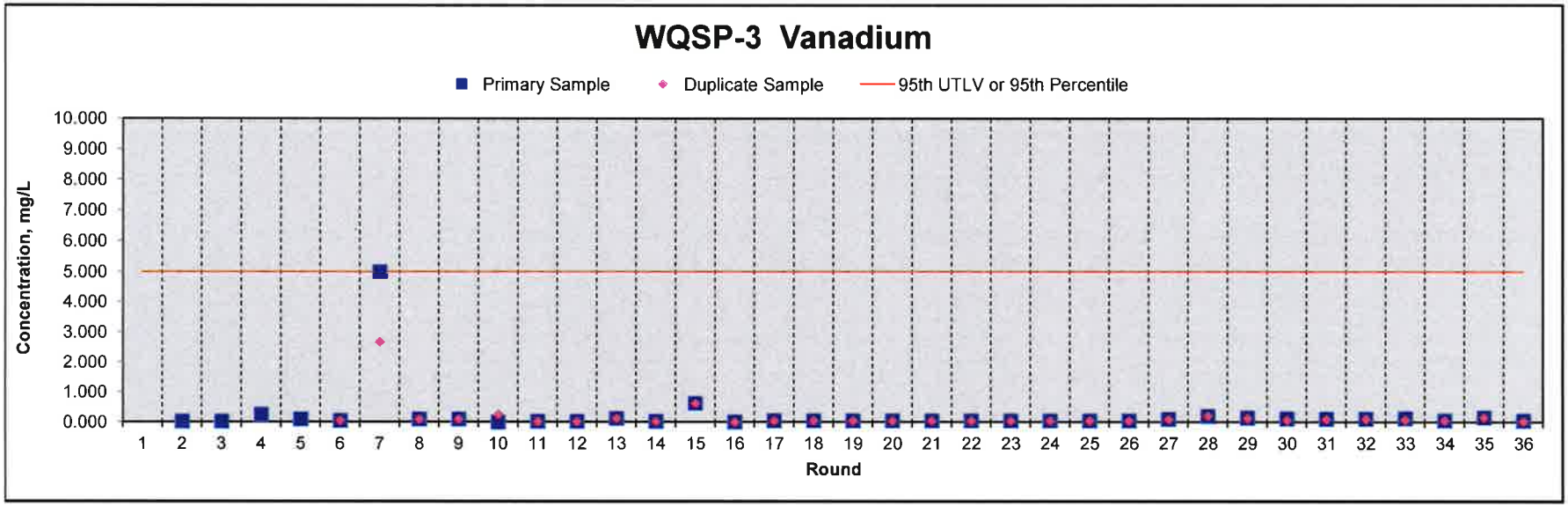
WQSP-3 Thallium

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	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
Thallium	36	06/25/14	07/17/14	< 0.025	< 0.025	mg/L	0.025	5.8



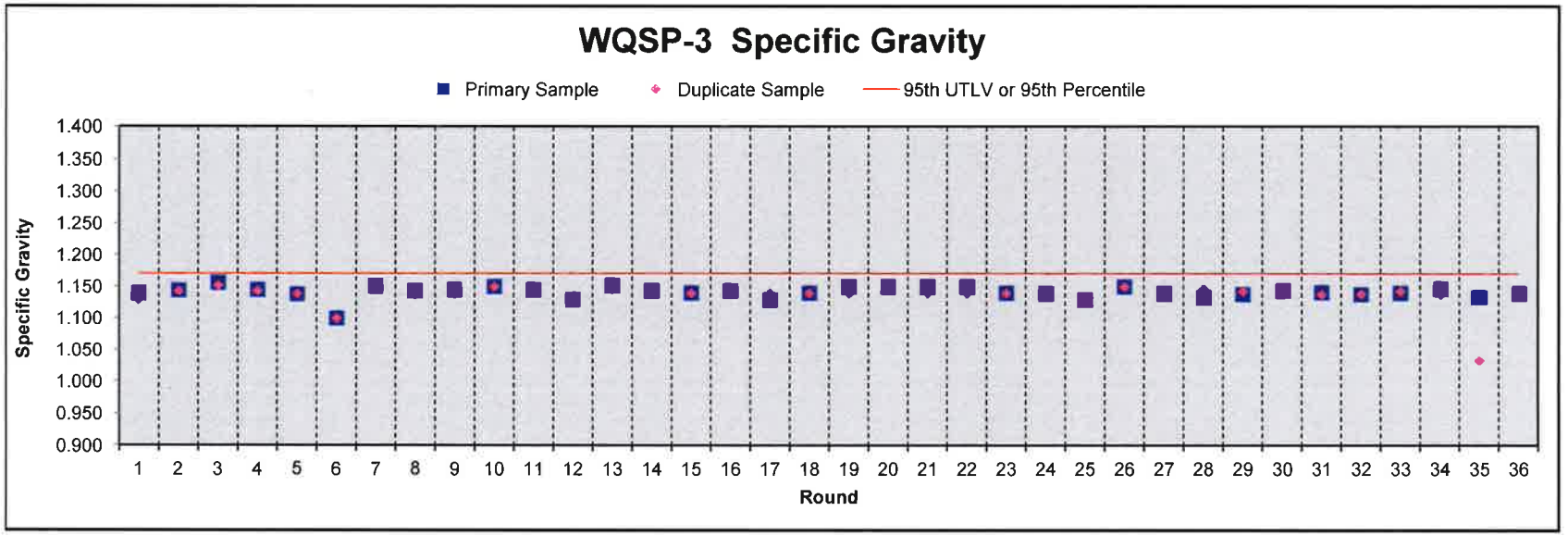
WQSP-3 Vanadium

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	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
Vanadium	36	06/25/14	07/10/14	< 0.0548	0.0326	mg/L	0.0548	< 5.0



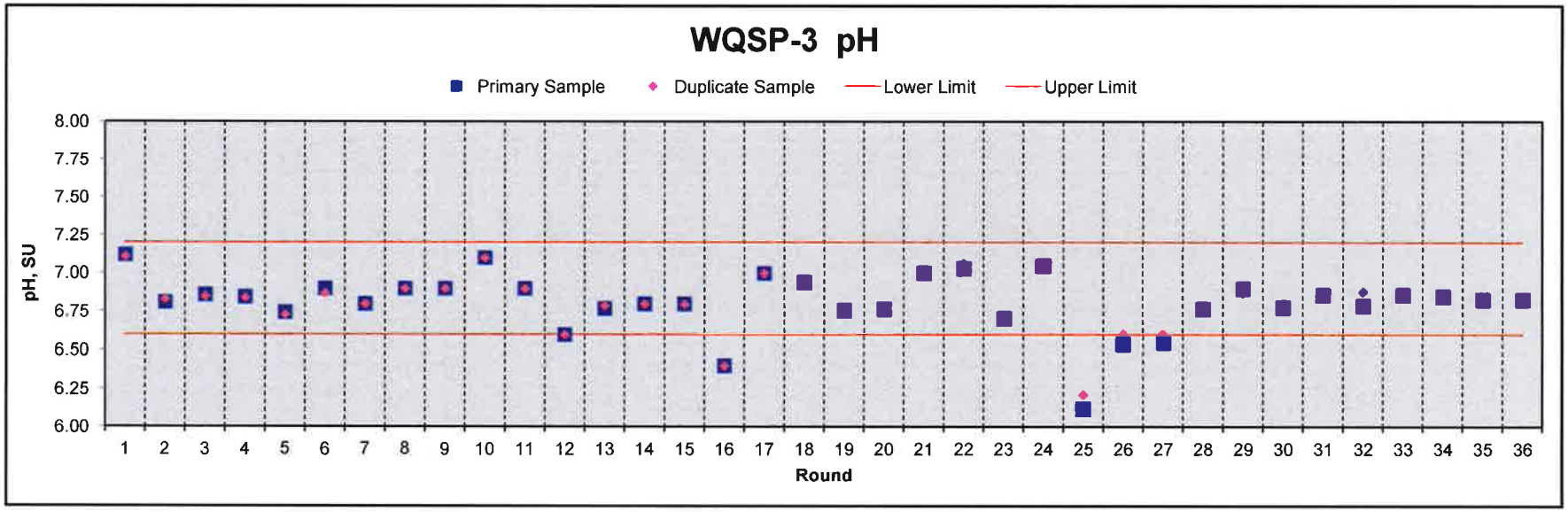
WQSP-3 Specific Gravity

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
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
Specific Gravity	36	06/25/14	06/30/14	1.140	1.145	unitless	0.0	1.17



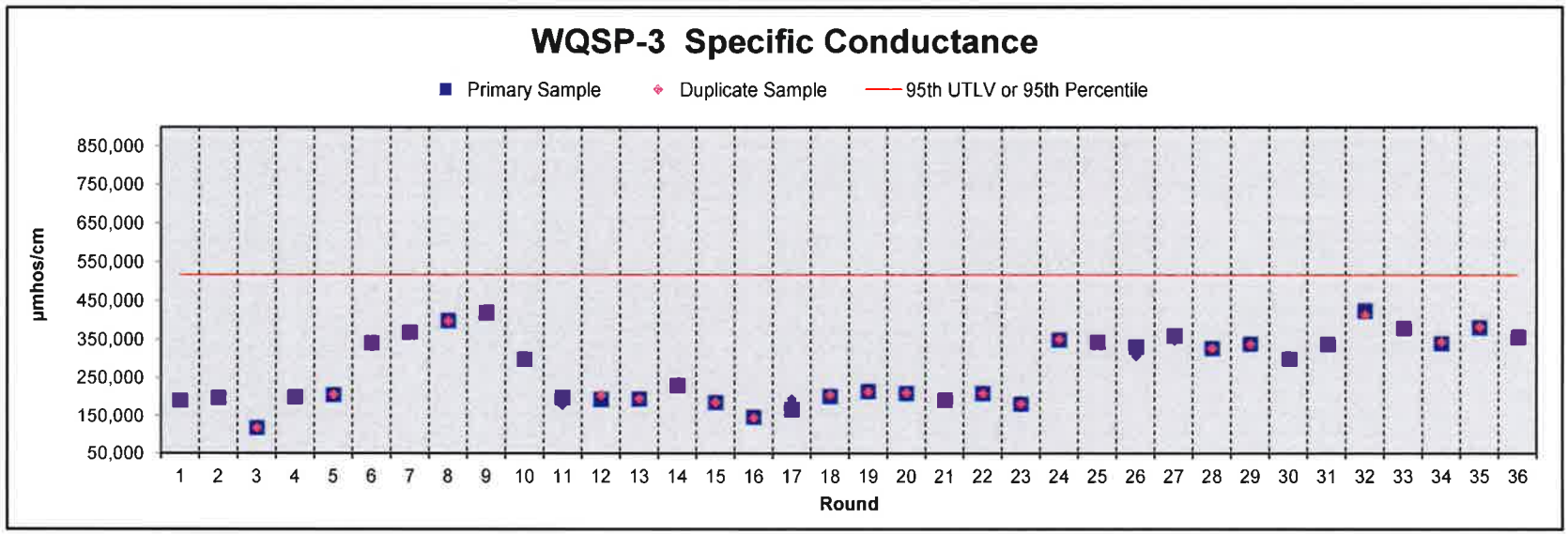
WQSP-3 pH

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	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
pH	36	06/25/14	06/26/14	6.83	6.82	SU	0.10	6.6	7.2



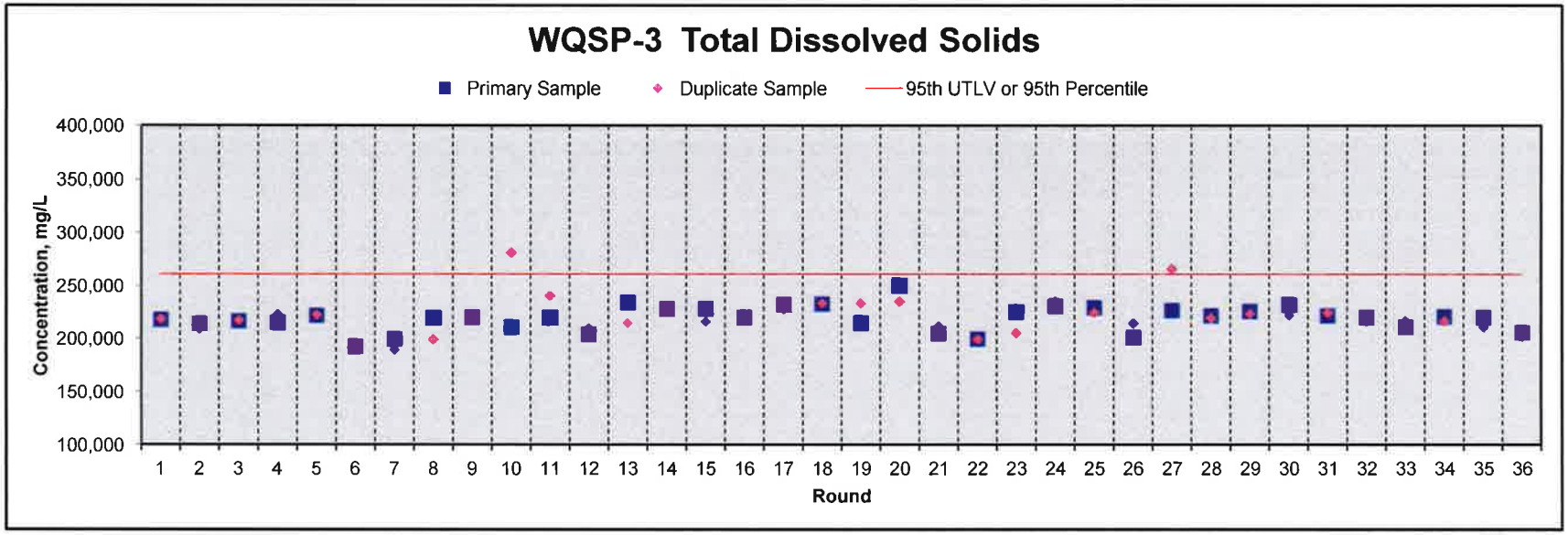
WQSP-3 Specific Conductance

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	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
Specific Conductance	36	06/25/14	06/30/14	358,000	352,000	µmhos/cm	0.50	517,000



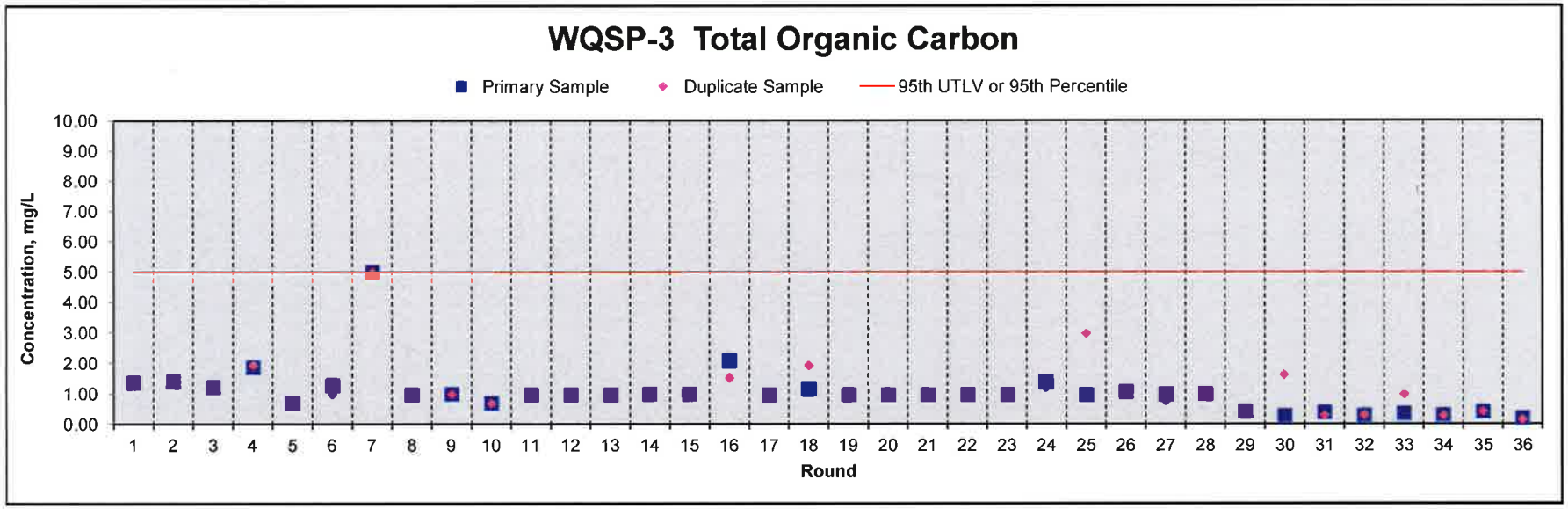
WQSP-3 Total Dissolved Solids

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	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
Total Dissolved Solids	36	06/25/14	07/06/14	206,000	202,000	mg/L	984	261,000



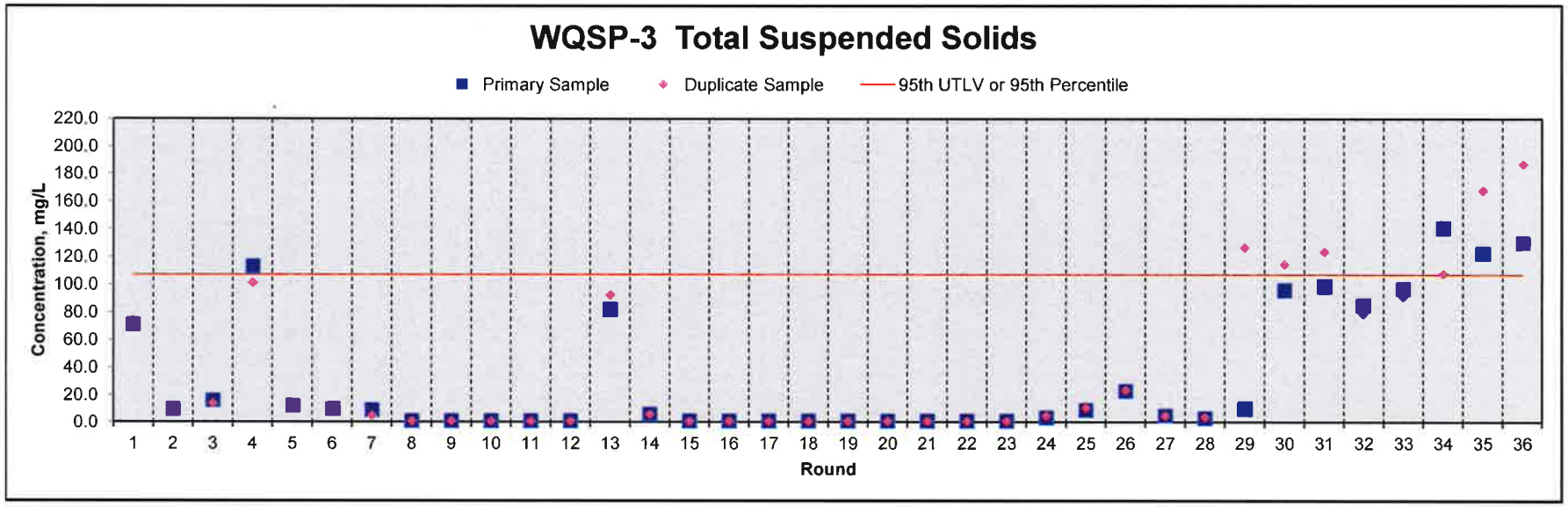
WQSP-3 Total Organic Carbon

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	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
Total Organic Carbon	36	06/25/14	06/30/14	0.20	0.17	mg/L	0.161	< 5.0



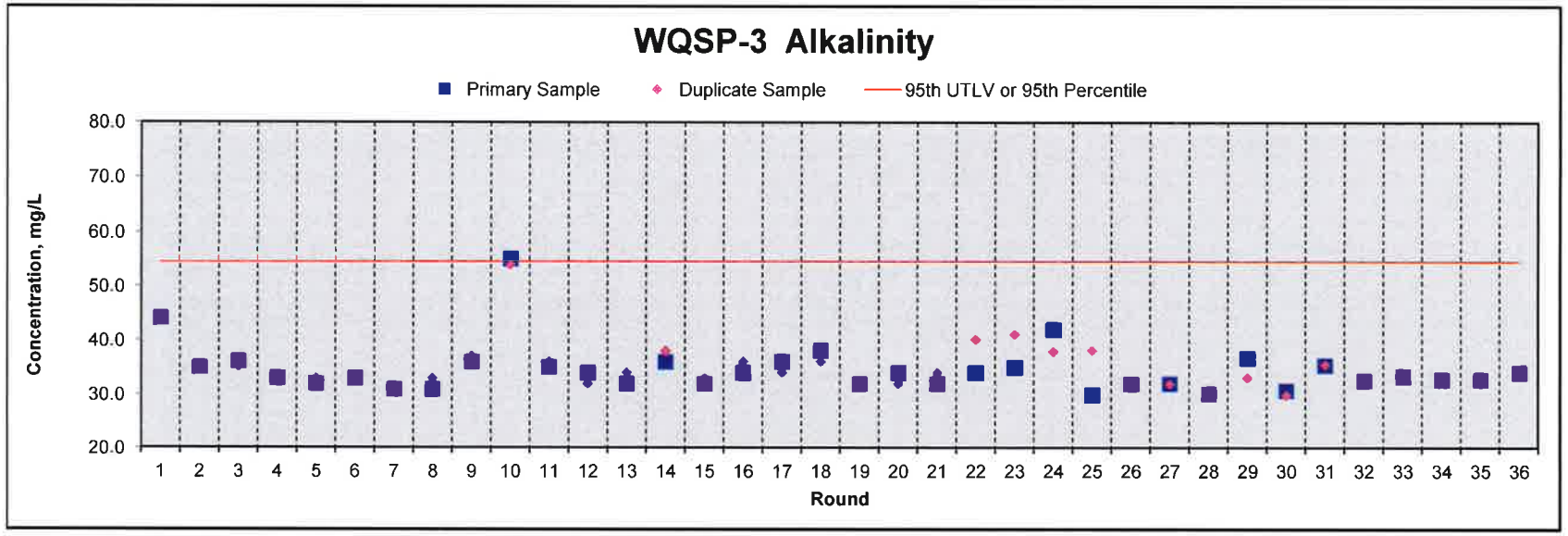
WQSP-3 Total Suspended Solids

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	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**
Total Suspended Solids	36	06/25/14	07/01/14	**130**	**187**	mg/L	3.07	**107**



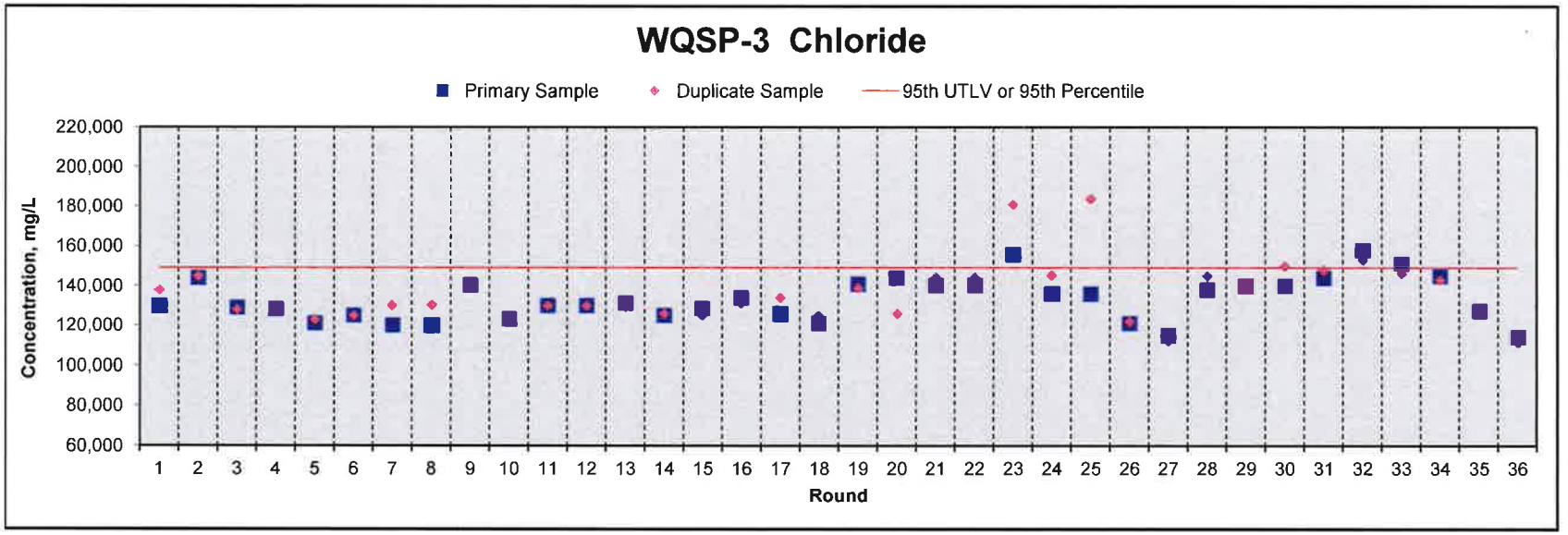
WQSP-3 Alkalinity

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	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
Alkalinity	36	06/25/14	06/26/14	34.1	33.8	mg/L	4.0	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	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
Chloride	36	06/25/14	07/02/14	114,000	111,000	mg/L	3,890	149,100



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: 140701038
Order Date: 7/1/2014

Contact Name: ANDY FREEMAN

Project Name: 1406C22

Comment:

Sample #: 140701038-001 **Customer Sample #:** 1406C22-001F / GW-WQ3-C-R36

Recv'd: ☑ **Collector:** **Date Collected:** 6/25/2014
Quantity: 1 **Matrix:** Water **Date Received:** 7/1/2014 1:15:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***

Sample #: 140701038-002 **Customer Sample #:** 1406C22-002F / GW-WQ3-C-R36DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 6/25/2014
Quantity: 1 **Matrix:** Water **Date Received:** 7/1/2014 1:15:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***

Sample #: 140701038-003 **Customer Sample #:** 1406C22-005B / GW-WQ3-C-R36-N12 METALS BLANK PRESE

Recv'd: ☑ **Collector:** **Date Collected:** 6/25/2014
Quantity: 1 **Matrix:** Water **Date Received:** 7/1/2014 1:15:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***

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

Order ID: 140701038
Order Date: 7/1/2014

Contact Name: ANDY FREEMAN

Project Name: 1406C22

Comment:

SELENIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***

Sample #: 140701038-004 **Customer Sample #:** 1406C22-006B / GW-WQ3-C-R36-N13 METALS BLANK UNPRE

Recv'd: ☑ **Collector:** **Date Collected:** 6/25/2014
Quantity: 1 **Matrix:** Water **Date Received:** 7/1/2014 1:15:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	7/14/2014	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	5.8
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

140701 038 HALL Last Due 7/14/2014
1st SAMP 6/25/2014 1st RCVD 7/1/2014
1406C22

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	1406C22-001F	GW-WQ3-C-R36	500HDPEHNO3	Aqueous	6/25/2014 8:26:00 AM	1	SEE BELOW
2	1406C22-002F	GW-WQ3-C-R36DUPLICATE	500HDPEHNO3	Aqueous	6/25/2014 8:29:00 AM	1	SEE BELOW
3	1406C22-005B	GW-WQ3-C-R36-N12 Metals Blank Preserved	500HDPEHNO3	Aqueous	6/25/2014 8:20:00 AM	1	SEE BELOW
4	1406C22-006B	GW-WQ3-C-R36-N13 Metals Blank Unpreserved	500HDPE	Aqueous	6/25/2014 8:21:00 AM	1	SEE BELOW

MWB3

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT TEMP: 3.8 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ICE / ICE-PACKS PRESENT: ✓
- CUSTODY SEALS PRESENT: ✓
- PRESERVATIVES: HNO3
- NUMBER OF CONTAINERS: 4 SHIPPED VIA: Fed Ex
- DATE & TIME: 7/1/14 1315 INSPECTED BY: JL

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb,Se ,Tl BY METHOD 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. PLEASE DO MS/MSD ON 1406C22-001F. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LCSR. SAMPLES MAY HAVE HIGH TDS.

Relinquished By:	Date:	Time:	Received By:	Date:	Time:
	6/27/2014	7:16 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: _____

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: 1406C22 | RcptNo: 1

Received by/date: CS 06/26/14

Logged By: Anne Thorne 6/26/2014 9:10:00 AM Anne Thorne

Completed By: Anne Thorne 6/26/2014 Anne Thorne

Reviewed By: 06/26/14

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: AS 06/26/14

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	4.1	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1144

Page 1 of 1

Project Number: T409304-1 **Project Name:** 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
										HEAL Albuquerque, NM
6/25/14	09:20	GW	GW-MW3-C-R36-N1	6	X					HEAL # 140622 Comments
	09:27	"	-N1D	4	X					Use for MS/MSD -001
	09:12	DI	-N2	4	X					-002
N/A	N/A	"	-N3	4	X					Field Blanks -003
6/25/14	09:34	GW	-N4	4		X				Trip Blanks, HEAL provided -004
	09:40		-N4D	2		X				Use for MS/MSD -001
	08:40		-N5	6			X			-002
	09:00		-N5D	2			X			Use for MS/MSD -001
	08:32		-N6	2				X		-002
	08:36		-N6D	2				X		Use for MS/MSD -001
	08:26		-N7	1					X	-002
	08:29	GW	-N7D	1					X	Use for MS/MSD -001
	08:20	DI	-N12	1				X		-002
	08:21	"	-N13	1				X		Metals Blk-Pres -005
										" " -NPres -006

Relinquished By: (Signature, Date/Time) Robin Spoon 6/25/14 14:00

Relinquished By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Relinquished By: (Signature, Date/Time)

Relinquished By: (Signature, Date/Time)

Received By: (Signature, Date/Time)

Received at Laboratory: (Signature, Date/Time) Celina Sena 06/26/14 09:10

Requested Turnaround Time:

☒ Routine ☐ Rush _____

Sample Receipt Remarks:

Temp at lab: 4.1°C on ice

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.: 8758 4779 1210

FedEx 8758 4779 1221

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@wipp.ws

Note: 3 of 4 site Trip Blanks contained air bubbles. RAS 6/26/14

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.

APPENDIX 6

WELL WQSP-4

ANALYTICAL RESULTS

WQSP-4

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-4, Culebra, Round 36

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 36, the static water level was 469.77 ft_{btoc}. One wbv for WQSP-4 was determined to be 267.7 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).

Due to radiological events that occurred at the WIPP Site in February, the sampling team collected a pre-installation line rinse sample. The dedicated sampling line was flushed with approximately 2 liters of deionized water prior to installation rinse. Rinsate was collected in a certified container, preserved with nitric acid (pH <2) and considered an additional retain sample.

Round 36 pumping of WQSP-4 began on 4/15/2014 at 08:47 and ended on 4/16/2014 at 11:51. The well was purged for 27.1 hours with an average flow rate of 0.34 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 553 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).

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 constituents were collected on 4/16/2014 after approximately 505 gallons of groundwater (≈ 1.9 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 283 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 7.08 cell volumes per minute; thus, approximately 35.4 volumes of groundwater (1,415 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 measurements varied 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 36[a,b,c].

Item	Day 1		Day 2	
Date	4/15/2014		4/16/2014	
Pump Speed, Hz	44.0		44.0	
Average Flow Rate, gpm	0.32		0.35	
Rate of Exchange, no. cell	7.08		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	143,800	140,700	NR	NR
Temperature, °C	20.7	20.1	NR	NR
pH, SU	6.80	6.84	NR	NR
Specific Gravity	1.073	10.074	NR	NR
Time to Parameter Stability, hr:min	1:00		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 36 were compared to the average results from the previous 35 rounds (Table 2). The current values for SG (1.074) were identical to the average results from the previous 35 samplings. The results for SC (140,700 µmhos/cm) were higher than typically found while, temperature (22.4°C) and pH (6.84 S.U.) were lower when compared to the average findings of previous rounds (121,644 µmhos/cm and 20.8°C for SC and temperature, respectively). Specific gravity was the only indicating parameter within the normal limits observed for WQSP-4 over the past 19 years. All other indicating parameters were slightly below (pH and temperature) or markedly above (SC) their normal limits.

Table 2. Comparison of Round 36 DMW Measurements to Historical Results from Rounds (1-35) for WQSP-4.

Field-analyzed Parameter	Historical Data (Rounds 1 – 35)[a,b]			Measurement Results, Round 36[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	121,644	115,562	127,726	140,700
Temperature, °C	21.9	20.8	23.0	20.1
pH, S.U.	7.23	6.87	7.59	6.84
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 11, 2014

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

RE: WIPP DMP OrderNo.: 1404783

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 6 sample(s) on 4/17/2014 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

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
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Website: www.hallenvironmental.com

Workorder Sample Summary

WO#: **1404783**
11-Jun-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1404783-001	GW-WQ4-C-R36		4/16/2014 9:08:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-001	GW-WQ4-C-R36		4/16/2014 9:08:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-001	GW-WQ4-C-R36		4/16/2014 9:08:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-001	GW-WQ4-C-R36		4/16/2014 9:08:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-001	GW-WQ4-C-R36		4/16/2014 9:08:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-001	GW-WQ4-C-R36		4/16/2014 9:08:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-002	GW-WQ4-C-R36DUPLICATE		4/16/2014 9:23:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-002	GW-WQ4-C-R36DUPLICATE		4/16/2014 9:23:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-002	GW-WQ4-C-R36DUPLICATE		4/16/2014 9:23:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-002	GW-WQ4-C-R36DUPLICATE		4/16/2014 9:23:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-002	GW-WQ4-C-R36DUPLICATE		4/16/2014 9:23:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-002	GW-WQ4-C-R36DUPLICATE		4/16/2014 9:23:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-003	GW-WQ4-C-R36 Field Blank		4/16/2014 9:54:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-004	GW-WQ4-C-R36 Trip Blank			4/17/2014 8:45:00 AM	Aqueous
1404783-005	GW-WQ4-C-R36 Metals Blank Preserved		4/16/2014 9:59:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-005	GW-WQ4-C-R36 Metals Blank Preserved		4/16/2014 9:59:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-006	GW-WQ4-C-R36 Metals Blank Unpreserved		4/16/2014 9:52:00 AM	4/17/2014 8:45:00 AM	Aqueous
1404783-006	GW-WQ4-C-R36 Metals Blank Unpreserved		4/16/2014 9:52:00 AM	4/17/2014 8:45:00 AM	Aqueous

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

CLIENT: WIPP
Project: WIPP DMP

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

PREPARATION: Sample preparation proceeded normally.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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Website: www.hallenvironmental.com

Case Narrative

WO#: **1404783**
Date: **6/11/2014**

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

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Albuquerque, NM 87109
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Website: www.hallenvironmental.com

DATES REPORT

WO#: **1404783**

11-Jun-14

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1404783-001A	GW-WQ4-C-R36	4/16/2014 9:08:00 AM	Aqueous	EPA Method: 8260B			4/22/2014 1:44:44 PM
1404783-001B				EPA Method 8270C: Semivolatiles		4/23/2014 9:04:34 AM	4/27/2014 9:45:37 PM
1404783-001C				SM 5310B: TOC			4/27/2014 4:40:33 PM
1404783-001D				EPA Method 300.0: Anions			4/18/2014 3:20:24 PM
				EPA Method 300.0: Anions			4/17/2014 4:22:51 PM
				EPA Method 300.0: Anions			4/17/2014 4:35:16 PM
				EPA Method 300.0: Anions			4/17/2014 3:45:38 PM
				EPA Method 6010B: Dissolved Metals			4/23/2014 12:55:35 PM
				EPA Method 6010B: Dissolved Metals			4/24/2014 1:44:17 PM
				EPA Method 6010B: Dissolved Metals			4/24/2014 1:49:52 PM
				SM 2540 C: Total Dissolved Solids		4/21/2014 4:35:02 PM	4/22/2014 1:51:00 PM
				SM 2540D: TSS		4/21/2014 5:05:27 PM	4/22/2014 10:23:00 AM
				SM 2540D: TSS		4/22/2014 4:25:53 PM	4/23/2014 9:59:00 AM
				SM2320B: Alkalinity			4/17/2014 12:52:36 PM
				SM2510B: Specific Conductance			4/21/2014 1:38:39 PM
				SM2510B: Specific Conductance			4/17/2014 12:52:36 PM
				SM4500-H+B: pH			4/17/2014 12:52:36 PM
				Specific Gravity			4/21/2014 2:47:00 PM
1404783-001E				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 12:59:26 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:15:13 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/23/2014 1:51:49 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:23:45 PM
				EPA Method 7470: Mercury		4/21/2014 1:56:12 PM	4/21/2014 8:15:10 PM

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DATES REPORT

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1404783-001E	GW-WQ4-C-R36	4/16/2014 9:08:00 AM	Aqueous	EPA Method 7470: Mercury		4/21/2014 1:56:12 PM	4/21/2014 8:02:36 PM
1404783-002A	GW-WQ4-C-R36DUPLICATE	4/16/2014 9:23:00 AM		EPA Method: 8260B			4/22/2014 2:12:46 PM
1404783-002B				EPA Method 8270C: Semivolatiles		4/23/2014 9:04:34 AM	4/27/2014 11:11:31 PM
1404783-002C				SM 5310B: TOC			4/27/2014 5:36:38 PM
1404783-002D				EPA Method 300.0: Anions			4/17/2014 4:47:41 PM
				EPA Method 300.0: Anions			4/18/2014 3:32:49 PM
				EPA Method 300.0: Anions			4/17/2014 5:00:06 PM
				EPA Method 300.0: Anions			4/17/2014 5:12:30 PM
				EPA Method 6010B: Dissolved Metals			4/24/2014 1:53:21 PM
				EPA Method 6010B: Dissolved Metals			4/23/2014 1:01:59 PM
				EPA Method 6010B: Dissolved Metals			4/24/2014 1:51:37 PM
				SM 2540 C: Total Dissolved Solids		4/21/2014 4:35:02 PM	4/22/2014 1:51:00 PM
				SM 2540D: TSS		4/21/2014 5:05:27 PM	4/22/2014 10:23:00 AM
				SM 2540D: TSS		4/22/2014 4:25:53 PM	4/23/2014 9:59:00 AM
				SM2320B: Alkalinity			4/17/2014 1:20:15 PM
				SM2510B: Specific Conductance			4/17/2014 1:20:15 PM
				SM2510B: Specific Conductance			4/21/2014 1:43:05 PM
				SM4500-H+B: pH			4/17/2014 1:20:15 PM
				Specific Gravity			4/21/2014 2:47:00 PM
1404783-002E				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:27:22 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:25:29 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/23/2014 1:57:49 PM
				EPA Method 7470: Mercury		4/21/2014 1:56:12 PM	4/21/2014 8:24:11 PM

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Website: www.hallenvironmental.com

DATES REPORT

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1404783-003A	GW-WQ4-C-R36 Field Blank	4/16/2014 9:54:00 AM	Aqueous	EPA Method: 8260B			4/22/2014 2:40:52 PM
1404783-004A	GW-WQ4-C-R36 Trip Blank			EPA Method: 8260B			4/22/2014 3:09:03 PM
1404783-005A	GW-WQ4-C-R36 Metals Blank Preserved	4/16/2014 9:59:00 AM		EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:39:07 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/23/2014 1:59:56 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:29:05 PM
				EPA Method 7470: Mercury		4/21/2014 1:56:12 PM	4/21/2014 8:25:57 PM
1404783-006A	GW-WQ4-C-R36 Metals Blank Unpreserved	4/16/2014 9:52:00 AM		EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:40:50 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/24/2014 1:42:35 PM
				EPA 6010B: Total Recoverable Metals		4/22/2014 9:08:16 AM	4/23/2014 2:01:38 PM
				EPA Method 7470: Mercury		4/21/2014 1:56:12 PM	4/21/2014 8:27:45 PM

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1404783-001 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ4-C-R36
Collection Date: 4/16/2014 9:08:00 AM
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	56300	1950	2500		mg/L	5000	4/18/2014 3:20:24 PM	R18097
Nitrogen, Nitrate (As N)	ND	0.985	5.00		mg/L	50	4/17/2014 3:45:38 PM	R18077
Sulfate	6920	32.1	100		mg/L	200	4/17/2014 4:22:51 PM	R18077
EPA METHOD 7470: MERCURY							Analyst: **JML**	
Mercury	ND	0.000435	0.00100		mg/L	5	4/21/2014 8:15:10 PM	12803
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1630	1.93	50.0		mg/L	50	4/23/2014 12:55:35 PM	R18172
Magnesium	1200	0.943	50.0		mg/L	50	4/23/2014 12:55:35 PM	R18172
Potassium	742	4.05	20.0		mg/L	20	4/24/2014 1:44:17 PM	R18195
Sodium	36400	60.7	500		mg/L	500	4/24/2014 1:49:52 PM	R18195
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0248	0.00625	0.200	J	mg/L	2	4/24/2014 12:59:26 PM	12813
Beryllium	0.00390	0.00353	0.0300	J	mg/L	2	4/24/2014 12:59:26 PM	12813
Cadmium	ND	0.00628	0.0200		mg/L	2	4/24/2014 12:59:26 PM	12813
Calcium	1610	4.09	25.0		mg/L	5	4/24/2014 1:15:13 PM	12813
Chromium	ND	0.0168	0.0600		mg/L	2	4/24/2014 12:59:26 PM	12813
Iron	1.10	0.101	0.500		mg/L	2	4/24/2014 12:59:26 PM	12813
Lead	ND	0.0477	0.0500		mg/L	2	4/24/2014 12:59:26 PM	12813
Magnesium	1210	0.425	25.0		mg/L	5	4/24/2014 1:15:13 PM	12813
Nickel	0.0581	0.0190	0.100	J	mg/L	2	4/24/2014 12:59:26 PM	12813
Potassium	773	12.6	25.0		mg/L	5	4/24/2014 1:15:13 PM	12813
Silver	ND	0.00522	0.0500		mg/L	2	4/24/2014 12:59:26 PM	12813
Sodium	44700	1040	2500		mg/L	500	4/24/2014 1:23:45 PM	12813
Vanadium	ND	0.0548	0.500		mg/L	2	4/24/2014 12:59:26 PM	12813
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
Hexachloroethane	ND	1.89	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
2-Methylphenol	ND	2.75	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
Nitrobenzene	ND	2.58	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
Pentachlorophenol	ND	2.48	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
Pyridine	ND	1.57	5.00		µg/L	1	4/27/2014 9:45:37 PM	12835
Surr: 2-Fluorophenol	39.0	0	12.1-85.8		%REC	1	4/27/2014 9:45:37 PM	12835

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.
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: GW-WQ4-C-R36
Project: WIPP DMP
Collection Date: 4/16/2014 9:08:00 AM
Lab ID: 1404783-001
Matrix: AQUEOUS
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: Phenol-d5	45.2	0	17.7-65.8		%REC	1	4/27/2014 9:45:37 PM	12835
Surr: 2,4,6-Tribromophenol	33.1	0	26-138		%REC	1	4/27/2014 9:45:37 PM	12835
Surr: Nitrobenzene-d5	76.1	0	47.5-119		%REC	1	4/27/2014 9:45:37 PM	12835
Surr: 2-Fluorobiphenyl	76.2	0	48.1-106		%REC	1	4/27/2014 9:45:37 PM	12835
Surr: 4-Terphenyl-d14	76.7	0	44-113		%REC	1	4/27/2014 9:45:37 PM	12835
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Benzene	ND	0.154	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Toluene	ND	0.170	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
2-Butanone	ND	1.42	5.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Chlorobenzene	ND	0.140	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Chloroform	ND	0.315	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Methylene Chloride	ND	0.266	3.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Vinyl chloride	ND	0.455	1.00		µg/L	1	4/22/2014 1:44:44 PM	R18153
Xylenes, Total	ND	0.377	1.50		µg/L	1	4/22/2014 1:44:44 PM	R18153
Surr: 1,2-Dichloroethane-d4	93.3	0	70-130		%REC	1	4/22/2014 1:44:44 PM	R18153
Surr: 4-Bromofluorobenzene	90.6	0	70-130		%REC	1	4/22/2014 1:44:44 PM	R18153
Surr: Dibromofluoromethane	92.4	0	70-130		%REC	1	4/22/2014 1:44:44 PM	R18153
Surr: Toluene-d8	92.4	0	70-130		%REC	1	4/22/2014 1:44:44 PM	R18153
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.348	0.120	1.00	J	mg/L	1	4/27/2014 4:40:33 PM	R18224
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	104000	492	1000	*	mg/L	1	4/22/2014 1:51:00 PM	12810
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	162000	0.250	0.250		µmhos/c	25	4/21/2014 1:38:39 PM	R18119

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.
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: GW-WQ4-C-R36
Project: WIPP DMP
Collection Date: 4/16/2014 9:08:00 AM
Lab ID: 1404783-001
Matrix: AQUEOUS
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JML**	
pH	7.09	0.100	1.68	H	pH units	1	4/17/2014 12:52:36 PM	R18075
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	38.6	4.00	20.0		mg/L CaC	1	4/17/2014 12:52:36 PM	R18075
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/17/2014 12:52:36 PM	R18075
Total Alkalinity (as CaCO3)	38.6	4.00	20.0		mg/L CaC	1	4/17/2014 12:52:36 PM	R18075
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.070	0	0			1	4/21/2014 2:47:00 PM	R18116
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	98	3.1	4.0		mg/L	1	4/23/2014 9:59:00 AM	12829

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.
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: GW-WQ4-C-R36DUPLICATE
Project: WIPP DMP
Collection Date: 4/16/2014 9:23:00 AM
Lab ID: 1404783-002
Matrix: AQUEOUS
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	59400	1950	2500		mg/L	5000	4/18/2014 3:32:49 PM	R18097
Nitrogen, Nitrate (As N)	ND	0.985	5.00		mg/L	50	4/17/2014 4:47:41 PM	R18077
Sulfate	6640	32.1	100		mg/L	200	4/17/2014 5:00:06 PM	R18077
EPA METHOD 7470: MERCURY							Analyst: **JML**	
Mercury	ND	0.0000870	0.000200		mg/L	1	4/21/2014 8:24:11 PM	12803
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1570	0.773	20.0		mg/L	20	4/24/2014 1:51:37 PM	R18195
Magnesium	1180	0.377	20.0		mg/L	20	4/24/2014 1:51:37 PM	R18195
Potassium	757	4.05	20.0		mg/L	20	4/24/2014 1:51:37 PM	R18195
Sodium	36100	60.7	500		mg/L	500	4/24/2014 1:53:21 PM	R18195
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0270	0.00625	0.200	J	mg/L	2	4/24/2014 1:25:29 PM	12813
Beryllium	ND	0.00353	0.0300		mg/L	2	4/24/2014 1:25:29 PM	12813
Cadmium	ND	0.00628	0.0200		mg/L	2	4/24/2014 1:25:29 PM	12813
Calcium	1430	4.09	25.0		mg/L	5	4/23/2014 1:57:49 PM	12813
Chromium	ND	0.0168	0.0600		mg/L	2	4/24/2014 1:25:29 PM	12813
Iron	0.955	0.101	0.500		mg/L	2	4/24/2014 1:25:29 PM	12813
Lead	ND	0.0477	0.0500		mg/L	2	4/24/2014 1:25:29 PM	12813
Magnesium	1050	0.425	25.0		mg/L	5	4/23/2014 1:57:49 PM	12813
Nickel	0.0504	0.0190	0.100	J	mg/L	2	4/24/2014 1:25:29 PM	12813
Potassium	698	5.06	10.0		mg/L	2	4/24/2014 1:25:29 PM	12813
Silver	ND	0.00522	0.0500		mg/L	2	4/24/2014 1:25:29 PM	12813
Sodium	37800	1040	2500		mg/L	500	4/24/2014 1:27:22 PM	12813
Vanadium	ND	0.0548	0.500		mg/L	2	4/24/2014 1:25:29 PM	12813
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
Hexachloroethane	ND	1.89	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
2-Methylphenol	ND	2.75	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
Nitrobenzene	ND	2.58	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
Pentachlorophenol	ND	2.48	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
Pyridine	ND	1.57	5.00		µg/L	1	4/27/2014 11:11:31 PM	12835
Surr: 2,4,6-Tribromophenol	37.7	0	26-138		%REC	1	4/27/2014 11:11:31 PM	12835

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.
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: 1404783-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ4-C-R36DUPLICATE
Collection Date: 4/16/2014 9:23:00 AM
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorobiphenyl	83.9	0	48.1-106		%REC	1	4/27/2014 11:11:31 PM	12835
Surr: 2-Fluorophenol	51.7	0	12.1-85.8		%REC	1	4/27/2014 11:11:31 PM	12835
Surr: 4-Terphenyl-d14	86.2	0	44-113		%REC	1	4/27/2014 11:11:31 PM	12835
Surr: Nitrobenzene-d5	86.1	0	47.5-119		%REC	1	4/27/2014 11:11:31 PM	12835
Surr: Phenol-d5	57.8	0	17.7-65.8		%REC	1	4/27/2014 11:11:31 PM	12835
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Benzene	ND	0.154	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Toluene	ND	0.170	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
2-Butanone	ND	1.42	5.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Chlorobenzene	ND	0.140	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Chloroform	ND	0.315	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Methylene Chloride	ND	0.266	3.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Vinyl chloride	ND	0.455	1.00		µg/L	1	4/22/2014 2:12:46 PM	R18153
Xylenes, Total	ND	0.377	1.50		µg/L	1	4/22/2014 2:12:46 PM	R18153
Surr: 1,2-Dichloroethane-d4	91.9	0	70-130		%REC	1	4/22/2014 2:12:46 PM	R18153
Surr: 4-Bromofluorobenzene	98.7	0	70-130		%REC	1	4/22/2014 2:12:46 PM	R18153
Surr: Dibromofluoromethane	92.5	0	70-130		%REC	1	4/22/2014 2:12:46 PM	R18153
Surr: Toluene-d8	92.8	0	70-130		%REC	1	4/22/2014 2:12:46 PM	R18153
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.252	0.120	1.00	J	mg/L	1	4/27/2014 5:36:38 PM	R18224
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	101000	492	1000	*	mg/L	1	4/22/2014 1:51:00 PM	12810
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	161000	0.250	0.250		µmhos/c	25	4/21/2014 1:43:05 PM	R18119

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.
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: 1404783-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ4-C-R36DUPLICATE
Collection Date: 4/16/2014 9:23:00 AM
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JML**	
pH	7.11	0.100	1.68	H	pH units	1	4/17/2014 1:20:15 PM	R18075
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	39	4.0	20		mg/L CaC	1	4/17/2014 1:20:15 PM	R18075
Carbonate (As CaCO3)	ND	2.0	2.0		mg/L CaC	1	4/17/2014 1:20:15 PM	R18075
Total Alkalinity (as CaCO3)	39	4.0	20		mg/L CaC	1	4/17/2014 1:20:15 PM	R18075
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.066	0	0			1	4/21/2014 2:47:00 PM	R18116
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	94	3.1	4.0		mg/L	1	4/23/2014 9:59:00 AM	12829

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.
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: 1404783-003 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ4-C-R36 Field Blank
Collection Date: 4/16/2014 9:54:00 AM
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Benzene	ND	0.154	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Toluene	ND	0.170	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
2-Butanone	6.51	1.42	5.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Chlorobenzene	ND	0.140	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Chloroform	0.383	0.315	1.00	J	µg/L	1	4/22/2014 2:40:52 PM	R18153
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Methylene Chloride	ND	0.266	3.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Vinyl chloride	ND	0.455	1.00		µg/L	1	4/22/2014 2:40:52 PM	R18153
Xylenes, Total	ND	0.377	1.50		µg/L	1	4/22/2014 2:40:52 PM	R18153
Surr: 1,2-Dichloroethane-d4	94.3	0	70-130		%REC	1	4/22/2014 2:40:52 PM	R18153
Surr: 4-Bromofluorobenzene	92.4	0	70-130		%REC	1	4/22/2014 2:40:52 PM	R18153
Surr: Dibromofluoromethane	90.5	0	70-130		%REC	1	4/22/2014 2:40:52 PM	R18153
Surr: Toluene-d8	91.9	0	70-130		%REC	1	4/22/2014 2:40:52 PM	R18153

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.
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: GW-WQ4-C-R36 Trip Blank
Project: WIPP DMP
Collection Date:
Lab ID: 1404783-004
Matrix: AQUEOUS
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Benzene	ND	0.154	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Toluene	ND	0.170	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
2-Butanone	3.50	1.42	5.00	J	µg/L	1	4/22/2014 3:09:03 PM	R18153
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Chlorobenzene	0.874	0.140	1.00	J	µg/L	1	4/22/2014 3:09:03 PM	R18153
Chloroform	ND	0.315	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Methylene Chloride	0.305	0.266	3.00	J	µg/L	1	4/22/2014 3:09:03 PM	R18153
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Vinyl chloride	ND	0.455	1.00		µg/L	1	4/22/2014 3:09:03 PM	R18153
Xylenes, Total	ND	0.377	1.50		µg/L	1	4/22/2014 3:09:03 PM	R18153
Surr: 1,2-Dichloroethane-d4	94.5	0	70-130		%REC	1	4/22/2014 3:09:03 PM	R18153
Surr: 4-Bromofluorobenzene	95.1	0	70-130		%REC	1	4/22/2014 3:09:03 PM	R18153
Surr: Dibromofluoromethane	89.6	0	70-130		%REC	1	4/22/2014 3:09:03 PM	R18153
Surr: Toluene-d8	91.2	0	70-130		%REC	1	4/22/2014 3:09:03 PM	R18153

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.
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: 1404783-005 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ4-C-R36 Metals Blank
Collection Date: 4/16/2014 9:59:00 AM
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **JML**	
Mercury	ND	0.0000870	0.000200		mg/L	1	4/21/2014 8:25:57 PM	12803
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	ND	0.00312	0.100		mg/L	1	4/24/2014 1:29:05 PM	12813
Beryllium	ND	0.00176	0.0150		mg/L	1	4/24/2014 1:29:05 PM	12813
Cadmium	ND	0.00314	0.0100		mg/L	1	4/24/2014 1:29:05 PM	12813
Calcium	ND	0.817	5.00		mg/L	1	4/24/2014 1:29:05 PM	12813
Chromium	ND	0.00841	0.0300		mg/L	1	4/24/2014 1:29:05 PM	12813
Iron	0.0542	0.0507	0.250	J	mg/L	1	4/24/2014 1:29:05 PM	12813
Lead	ND	0.0239	0.0250		mg/L	1	4/24/2014 1:29:05 PM	12813
Magnesium	ND	0.0850	5.00		mg/L	1	4/24/2014 1:29:05 PM	12813
Nickel	ND	0.00952	0.0500		mg/L	1	4/24/2014 1:29:05 PM	12813
Potassium	ND	2.53	5.00		mg/L	1	4/24/2014 1:29:05 PM	12813
Silver	ND	0.00261	0.0250		mg/L	1	4/24/2014 1:29:05 PM	12813
Sodium	6.52	2.08	5.00		mg/L	1	4/24/2014 1:29:05 PM	12813
Vanadium	ND	0.0274	0.250		mg/L	1	4/24/2014 1:29:05 PM	12813

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.
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: 1404783-006 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ4-C-R36 Metals Blank
Collection Date: 4/16/2014 9:52:00 AM
Received Date: 4/17/2014 8:45:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 7470: MERCURY							Analyst: **JML**	
Mercury	ND	0.0000870	0.000200		mg/L	1	4/21/2014 8:27:45 PM	12803
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	ND	0.00312	0.100		mg/L	1	4/24/2014 1:40:50 PM	12813
Beryllium	ND	0.00176	0.0150		mg/L	1	4/24/2014 1:40:50 PM	12813
Cadmium	ND	0.00314	0.0100		mg/L	1	4/24/2014 1:40:50 PM	12813
Calcium	ND	0.817	5.00		mg/L	1	4/24/2014 1:40:50 PM	12813
Chromium	ND	0.00841	0.0300		mg/L	1	4/24/2014 1:40:50 PM	12813
Iron	0.268	0.0507	0.250		mg/L	1	4/24/2014 1:40:50 PM	12813
Lead	ND	0.0239	0.0250		mg/L	1	4/24/2014 1:40:50 PM	12813
Magnesium	ND	0.0850	5.00		mg/L	1	4/24/2014 1:40:50 PM	12813
Nickel	ND	0.00952	0.0500		mg/L	1	4/24/2014 1:40:50 PM	12813
Potassium	ND	2.53	5.00		mg/L	1	4/24/2014 1:40:50 PM	12813
Silver	ND	0.00261	0.0250		mg/L	1	4/24/2014 1:40:50 PM	12813
Sodium	4.56	2.08	5.00	J	mg/L	1	4/24/2014 1:40:50 PM	12813
Vanadium	ND	0.0274	0.250		mg/L	1	4/24/2014 1:40:50 PM	12813

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.
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	GW-WQ4-C-R36 1404783-01		GW-WQ4-C-R36Dup 1404783-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	36400	1583.30	36100	1570.25							
Potassium	742	18.98	757	19.36							
Calcium	1630	81.34	1570	78.34							
Magnesium	1200	98.77	1180	97.12							
Total Cations		1782.38		1765.07							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	6920	144.08	6640	138.25							
Chloride	56300	1588.15	59400	1675.60							
Bicarbonate (CaCO3)	39.1	0.78	38.6	0.77							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		1733.01		1814.62							
Elect. Cond. (µMhos/cm)	162000		161000								
CATION/ANION RATIO		1.03		0.97							
% Difference		1		1							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	104000		101000								
TDS (calculated)	103215		105670								
Ratio meas TDS:calc TDS		1.0		1.0							
Ratio Meas. TDS:EC		0.64		0.63							
Ratio Calc. TDS:EC		0.64		0.66							
Ratio of anion sum:EC		1.1		1.1							
Ratio of cation sum:EC		1.1		1.1							

* 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

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 #: 140418012
Project Name: 1404783

Analytical Results Report

Sample Number 140418012-001 **Sampling Date** 4/16/2014 **Date/Time Received** 4/18/2014 10:35 AM
Client Sample ID 1404783-001F / GW-WQ4-C-R36 **Sampling Time** 9:08 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1
Arsenic	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1
Selenium	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1
Thallium	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1

Sample Number 140418012-002 **Sampling Date** 4/16/2014 **Date/Time Received** 4/18/2014 10:35 AM
Client Sample ID 1404783-002F / GW-WQ4-C-R36DUPLICATE **Sampling Time** 9:23 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1
Arsenic	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1
Selenium	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1
Thallium	ND	mg/L	0.02	5/5/2014	ETL	EPA 6020A	D1

Sample Number 140418012-003 **Sampling Date** 4/16/2014 **Date/Time Received** 4/18/2014 10:35 AM
Client Sample ID 1404783-005B / GW-WQ4-C-R36 METALS BLANK PRESERVED **Sampling Time** 9:59 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	

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

Batch #: 140418012
Project Name: 1404783

Analytical Results Report

Sample Number 140418012-004 **Sampling Date** 4/16/2014 **Date/Time Received** 4/18/2014 10:35 AM
Client Sample ID 1404783-006B / GW-WQ4-C-R36 METALS BLANK UNPRESERV **Sampling Time** 9:52 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.001	5/5/2014	ETL	EPA 6020A	

Authorized Signature

John Coddington, Lab Manager

D1 Sample required dilution due to matrix
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 #: 140418012
Project Name: 1404783

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0515	mg/L	0.05	103.0	80-120	5/1/2014	5/5/2014
Selenium	0.0539	mg/L	0.05	107.8	80-120	5/1/2014	5/5/2014
Arsenic	0.0538	mg/L	0.05	107.6	80-120	5/1/2014	5/5/2014
Antimony	0.0504	mg/L	0.05	100.8	80-120	5/1/2014	5/5/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0518	mg/L	0.05	103.6	0.6	0-20	5/1/2014	5/5/2014
Selenium	0.0531	mg/L	0.05	106.2	1.5	0-20	5/1/2014	5/5/2014
Arsenic	0.0568	mg/L	0.05	113.6	5.4	0-20	5/1/2014	5/5/2014
Antimony	0.0551	mg/L	0.05	110.2	8.9	0-20	5/1/2014	5/5/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140418012-001	Thallium	ND	0.0394	mg/L	0.05	78.8	75-125	5/1/2014	5/5/2014
140418012-001	Selenium	ND	0.0449	mg/L	0.05	89.8	75-125	5/1/2014	5/5/2014
140418012-001	Arsenic	ND	0.0492	mg/L	0.05	98.4	75-125	5/1/2014	5/5/2014
140418012-001	Antimony	ND	0.0481	mg/L	0.05	96.2	75-125	5/1/2014	5/5/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0405	mg/L	0.05	81.0	2.8	0-20	5/1/2014	5/5/2014
Selenium	0.0426	mg/L	0.05	85.2	5.3	0-20	5/1/2014	5/5/2014
Arsenic	0.0498	mg/L	0.05	99.6	1.2	0-20	5/1/2014	5/5/2014
Antimony	0.0466	mg/L	0.05	93.2	3.2	0-20	5/1/2014	5/5/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	5/1/2014	5/5/2014
Arsenic	ND	mg/L	0.001	5/1/2014	5/5/2014

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client:	HALL ENVIRONMENTAL ANALYSIS LAB	**Batch #:**	140418012
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1404783
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	5/1/2014	5/5/2014
Thallium	ND	mg/L	0.001	5/1/2014	5/5/2014

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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-12810**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523924** 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-12810**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523925** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Sample ID **LCSR-12810**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523926** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Sample ID **1404783-001DMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523928** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	152000	1000	50000	104200	94.9	80	120			

Sample ID **1404783-001DMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523929** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	153000	1000	50000	104200	97.4	80	120	0.821	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12810**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523925** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Sample ID: **LCSR-12810**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **12810**	RunNo: **18154**
Prep Date: **4/21/2014**	Analysis Date: **4/22/2014**	SeqNo: **523926** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120	0.395	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521526** 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 **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521527** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	98.6	90	110			
Sulfate	9.7	0.50	10.00	0	96.6	90	110			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521528** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	97.6	90	110			
Sulfate	9.6	0.50	10.00	0	96.1	90	110			

Sample ID **1404783-001DMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521572** 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	93.8	111			

Sample ID **1404783-001DMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521573** 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	97.6	93.8	111	0.821	20	

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/18/2014**	SeqNo: **521667** 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								

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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/18/2014**	SeqNo: **521668** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.4	90	110			
Sulfate	9.5	0.50	10.00	0	95.0	90	110			

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R18097**	RunNo: **18097**
Prep Date:	Analysis Date: **4/18/2014**	SeqNo: **522465** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.500								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18097**	RunNo: **18097**
Prep Date:	Analysis Date: **4/18/2014**	SeqNo: **522466** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.94	0.500	5.000	0	98.8	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521527** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.5	0.10	2.500	0	98.6	90	110			
Sulfate	9.7	0.50	10.00	0	96.6	90	110			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521528** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	97.6	90	110	1.05	0	
Sulfate	9.6	0.50	10.00	0	96.1	90	110	0.489	0	

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18077**	RunNo: **18077**
Prep Date:	Analysis Date: **4/18/2014**	SeqNo: **521668** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	96.4	90	110			
Sulfate	9.5	0.50	10.00	0	95.0	90	110			

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSW**	Batch ID: **R18097**	RunNo: **18097**
Prep Date:	Analysis Date: **4/18/2014**	SeqNo: **522466** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.94	0.500	5.000	0	98.8	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **5mL-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524052** 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	0.37	3.0								J
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	1.5								
Surr: 1,2-Dichloroethane-d4	9.2		10.00		92.4	70	130			
Surr: 4-Bromofluorobenzene	9.6		10.00		95.6	70	130			
Surr: Dibromofluoromethane	9.2		10.00		92.4	70	130			
Surr: Toluene-d8	9.2		10.00		91.6	70	130			

Sample ID **75ng ccv**	SampType: **CCV_MID**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524053** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	36.6	5.00	40.00	0	91.6	60	140			
Benzene	14.7	1.00	15.00	0	97.8	70	130			
Toluene	14.7	1.00	15.00	0	97.8	80	120			
1,2-Dichloroethane (EDC)	15.0	1.00	15.00	0	99.7	70	130			
2-Butanone	23.2	5.00	30.00	0	77.5	60	140			
Carbon Tetrachloride	14.5	1.00	15.00	0	96.6	70	130			
Chlorobenzene	14.4	1.00	15.00	0	95.7	70	130			
Chloroform	15.2	1.00	15.00	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **75ng ccv**	SampType: **CCV_MID**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**							
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524053**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	14.7	1.00	15.00	0	98.2	70	130			
1,1-Dichloroethane	14.1	1.00	15.00	0	94.0	70	130			
1,1-Dichloroethene	14.6	1.00	15.00	0	97.3	80	120			
Methylene Chloride	15.1	3.00	15.00	0	101	70	130			
1,1,2,2-Tetrachloroethane	12.4	1.00	15.00	0	83.0	70	130			
Tetrachloroethene (PCE)	15.6	1.00	15.00	0	104	70	130			
trans-1,2-DCE	15.1	1.00	15.00	0	101	70	130			
1,1,1-Trichloroethane	14.7	1.00	15.00	0	98.0	70	130			
1,1,2-Trichloroethane	14.6	1.00	15.00	0	97.5	70	130			
Trichloroethene (TCE)	15.1	1.00	15.00	0	101	70	130			
Trichlorofluoromethane	15.8	1.00	15.00	0	106	70	130			
Vinyl chloride	15.9	1.00	15.00	0	106	80	120			
Xylenes, Total	44.0	1.50	45.00	0	97.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.36		10.00		93.6	70	130			
Surr: 4-Bromofluorobenzene	8.89		10.00		88.9	70	130			
Surr: Dibromofluoromethane	9.32		10.00		93.2	70	130			
Surr: Toluene-d8	9.05		10.00		90.5	70	130			

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**							
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524054**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	36.2	5.00	40.00	0	90.5	59.8	152			
Benzene	20.9	1.00	20.00	0	105	70	130			
Toluene	19.0	1.00	20.00	0	94.8	80	120			
1,2-Dichloroethane (EDC)	20.4	1.00	20.00	0	102	70	130			
2-Butanone	49.1	5.00	40.00	0	123	60	140			
Carbon Tetrachloride	20.4	1.00	20.00	0	102	70	130			
Chlorobenzene	19.1	1.00	20.00	0	95.3	70	130			
Chloroform	21.1	1.00	20.00	0	105	75.6	123			
cis-1,2-DCE	20.3	1.00	20.00	0	102	70	130			
1,1-Dichloroethane	20.5	1.00	20.00	0	102	70	130			
1,1-Dichloroethene	22.4	1.00	20.00	0	112	78.1	129			
Methylene Chloride	21.7	3.00	20.00	0	108	70	130			
1,1,2,2-Tetrachloroethane	16.7	1.00	20.00	0	83.5	67.3	134			
Tetrachloroethene (PCE)	20.7	1.00	20.00	0	104	70	130			
trans-1,2-DCE	21.7	1.00	20.00	0	108	70	130			
1,1,1-Trichloroethane	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524054** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	18.1	1.00	20.00	0	90.5	70	130			
Trichloroethene (TCE)	21.4	1.00	20.00	0	107	70	130			
Trichlorofluoromethane	21.0	1.00	20.00	0	105	70	130			
Vinyl chloride	22.6	1.00	20.00	0	113	76.5	131			
Xylenes, Total	58.2	1.50	60.00	0	96.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.46		10.00		94.6	70	130			
Surr: 4-Bromofluorobenzene	8.60		10.00		86.0	70	130			
Surr: Dibromofluoromethane	9.66		10.00		96.6	70	130			
Surr: Toluene-d8	8.90		10.00		89.0	70	130			

Sample ID **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524055** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	37.6	5.00	40.00	0	93.9	60	140			
Benzene	19.7	1.00	20.00	0	98.4	70	130			
Toluene	19.1	1.00	20.00	0	95.6	80	120			
1,2-Dichloroethane (EDC)	19.8	1.00	20.00	0	98.8	70	130			
2-Butanone	47.5	5.00	40.00	0	119	60	186			
Carbon Tetrachloride	18.4	1.00	20.00	0	92.2	70	130			
Chlorobenzene	18.8	1.00	20.00	0	94.2	70	130			
Chloroform	20.0	1.00	20.00	0	100	80	120			
cis-1,2-DCE	19.6	1.00	20.00	0	98.1	70	130			
1,1-Dichloroethane	19.8	1.00	20.00	0	99.0	70	130			
1,1-Dichloroethene	20.9	1.00	20.00	0	104	80	120			
Methylene Chloride	21.0	3.00	20.00	0	105	70	130			
1,1,2,2-Tetrachloroethane	16.4	1.00	20.00	0	82.0	70	130			
Tetrachloroethene (PCE)	20.4	1.00	20.00	0	102	70	130			
trans-1,2-DCE	21.0	1.00	20.00	0	105	70	130			
1,1,1-Trichloroethane	19.2	1.00	20.00	0	96.2	70	130			
1,1,2-Trichloroethane	18.3	1.00	20.00	0	91.7	70	130			
Trichloroethene (TCE)	19.9	1.00	20.00	0	99.3	70	130			
Trichlorofluoromethane	18.7	1.00	20.00	0	93.4	70	130			
Vinyl chloride	21.0	1.00	20.00	0	105	80	120			
Xylenes, Total	57.1	1.50	60.00	0	95.2	70	130			
Surr: 1,2-Dichloroethane-d4	9.55		10.00		95.5	70	130			
Surr: 4-Bromofluorobenzene	8.83		10.00		88.3	70	130			
Surr: Dibromofluoromethane	9.47		10.00		94.6	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524055** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Toluene-d8	9.10		10.00		91.0	70	130			

Sample ID **1404783-001a ms**	SampType: **MS4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524056** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	72.5	5.00	40.00	0	181	31.1	273			
Benzene	20.5	1.00	20.00	0	103	70	130			
Toluene	19.7	1.00	20.00	0	98.5	70	130			
1,2-Dichloroethane (EDC)	20.7	1.00	20.00	0	103	70	130			
2-Butanone	59.3	5.00	40.00	0	148	21.9	285			
Carbon Tetrachloride	20.1	1.00	20.00	0	100	70	130			
Chlorobenzene	19.7	1.00	20.00	0	98.3	70	130			
Chloroform	20.8	1.00	20.00	0	104	70	130			
cis-1,2-DCE	20.2	1.00	20.00	0	101	70	130			
1,1-Dichloroethane	20.0	1.00	20.00	0	100	70	130			
1,1-Dichloroethene	23.3	1.00	20.00	0	116	70	130			
Methylene Chloride	20.9	3.00	20.00	0	104	70	130			
1,1,2,2-Tetrachloroethane	22.4	1.00	20.00	0	112	72.8	164			
Tetrachloroethene (PCE)	20.7	1.00	20.00	0	104	70	130			
trans-1,2-DCE	20.8	1.00	20.00	0	104	70	130			
1,1,1-Trichloroethane	20.6	1.00	20.00	0	103	70	130			
1,1,2-Trichloroethane	20.6	1.00	20.00	0	103	70	130			
Trichloroethene (TCE)	22.9	1.00	20.00	0	114	70	130			
Trichlorofluoromethane	20.8	1.00	20.00	0	104	70	130			
Vinyl chloride	23.6	1.00	20.00	0	118	70	130			
Xylenes, Total	59.0	1.50	60.00	0	98.4	70	130			
Surr: 1,2-Dichloroethane-d4	9.85		10.00		98.5	70	130			
Surr: 4-Bromofluorobenzene	9.02		10.00		90.2	70	130			
Surr: Dibromofluoromethane	9.66		10.00		96.6	70	130			
Surr: Toluene-d8	9.22		10.00		92.2	70	130			

Sample ID **1404783-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524057** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	77.9	5.00	40.00	0	195	31.1	273			
Benzene	19.1	1.00	20.00	0	95.7	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **1404783-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**								
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18153**	RunNo: **18153**								
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524057**	Units: **µg/L**							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	18.9	1.00	20.00	0	94.4	70	130			
1,2-Dichloroethane (EDC)	20.4	1.00	20.00	0	102	70	130			
2-Butanone	63.2	5.00	40.00	0	158	21.9	285			
Carbon Tetrachloride	17.8	1.00	20.00	0	89.2	70	130			
Chlorobenzene	18.6	1.00	20.00	0	93.1	70	130			
Chloroform	18.9	1.00	20.00	0	94.3	70	130			
cis-1,2-DCE	18.6	1.00	20.00	0	92.9	70	130			
1,1-Dichloroethane	18.5	1.00	20.00	0	92.6	70	130			
1,1-Dichloroethene	20.9	1.00	20.00	0	105	70	130			
Methylene Chloride	19.3	3.00	20.00	0	96.3	70	130			
1,1,2,2-Tetrachloroethane	23.5	1.00	20.00	0	117	72.8	164			
Tetrachloroethene (PCE)	19.2	1.00	20.00	0	95.9	70	130			
trans-1,2-DCE	19.2	1.00	20.00	0	96.0	70	130			
1,1,1-Trichloroethane	18.2	1.00	20.00	0	90.9	70	130			
1,1,2-Trichloroethane	20.5	1.00	20.00	0	103	70	130			
Trichloroethene (TCE)	20.9	1.00	20.00	0	104	70	130			
Trichlorofluoromethane	18.4	1.00	20.00	0	92.1	70	130			
Vinyl chloride	21.3	1.00	20.00	0	106	70	130			
Xylenes, Total	55.4	1.50	60.00	0	92.3	70	130			
Surr: 1,2-Dichloroethane-d4	9.92		10.00		99.2	70	130			
Surr: 4-Bromofluorobenzene	9.37		10.00		93.7	70	130			
Surr: Dibromofluoromethane	9.37		10.00		93.7	70	130			
Surr: Toluene-d8	9.46		10.00		94.6	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.
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#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524054** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	36.2	5.00	40.00	0	90.5	59.8	152			
Benzene	20.9	1.00	20.00	0	105	70	130			
Toluene	19.0	1.00	20.00	0	94.8	80	120			
1,2-Dichloroethane (EDC)	20.4	1.00	20.00	0	102	70	130			
2-Butanone	49.1	5.00	40.00	0	123	60	140			
Carbon Tetrachloride	20.4	1.00	20.00	0	102	70	130			
Chlorobenzene	19.1	1.00	20.00	0	95.3	70	130			
Chloroform	21.1	1.00	20.00	0	105	75.6	123			
cis-1,2-DCE	20.3	1.00	20.00	0	102	70	130			
1,1-Dichloroethane	20.5	1.00	20.00	0	102	70	130			
1,1-Dichloroethene	22.4	1.00	20.00	0	112	78.1	129			
Methylene Chloride	21.7	3.00	20.00	0	108	70	130			
1,1,2,2-Tetrachloroethane	16.7	1.00	20.00	0	83.5	67.3	134			
Tetrachloroethene (PCE)	20.7	1.00	20.00	0	104	70	130			
trans-1,2-DCE	21.7	1.00	20.00	0	108	70	130			
1,1,1-Trichloroethane	20.8	1.00	20.00	0	104	70	130			
1,1,2-Trichloroethane	18.1	1.00	20.00	0	90.5	70	130			
Trichloroethene (TCE)	21.4	1.00	20.00	0	107	70	130			
Trichlorofluoromethane	21.0	1.00	20.00	0	105	70	130			
Vinyl chloride	22.6	1.00	20.00	0	113	76.5	131			
Xylenes, Total	58.2	1.50	60.00	0	96.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.46		10.00		94.6	70	130			
Surr: 4-Bromofluorobenzene	8.60		10.00		86.0	70	130			
Surr: Dibromofluoromethane	9.66		10.00		96.6	70	130			
Surr: Toluene-d8	8.90		10.00		89.0	70	130			

Sample ID: **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524055** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	37.6	5.00	40.00	0	93.9	60	140	3.67	0	
Benzene	19.7	1.00	20.00	0	98.4	70	130	6.20	0	
Toluene	19.1	1.00	20.00	0	95.6	80	120	0.842	0	
1,2-Dichloroethane (EDC)	19.8	1.00	20.00	0	98.8	70	130	3.28	0	
2-Butanone	47.5	5.00	40.00	0	119	60	186	3.24	0	
Carbon Tetrachloride	18.4	1.00	20.00	0	92.2	70	130	10.2	0	
Chlorobenzene	18.8	1.00	20.00	0	94.2	70	130	1.12	0	
Chloroform	20.0	1.00	20.00	0	100	80	120	5.32	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18153**	RunNo: **18153**							
Prep Date:	Analysis Date: **4/22/2014**	SeqNo: **524055**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	19.6	1.00	20.00	0	98.1	70	130	3.48	0	
1,1-Dichloroethane	19.8	1.00	20.00	0	99.0	70	130	3.27	0	
1,1-Dichloroethene	20.9	1.00	20.00	0	104	80	120	7.32	0	
Methylene Chloride	21.0	3.00	20.00	0	105	70	130	3.13	0	
1,1,2,2-Tetrachloroethane	16.4	1.00	20.00	0	82.0	70	130	1.82	0	
Tetrachloroethene (PCE)	20.4	1.00	20.00	0	102	70	130	1.76	0	
trans-1,2-DCE	21.0	1.00	20.00	0	105	70	130	3.05	0	
1,1,1-Trichloroethane	19.2	1.00	20.00	0	96.2	70	130	7.80	0	
1,1,2-Trichloroethane	18.3	1.00	20.00	0	91.7	70	130	1.39	0	
Trichloroethene (TCE)	19.9	1.00	20.00	0	99.3	70	130	7.72	0	
Trichlorofluoromethane	18.7	1.00	20.00	0	93.4	70	130	11.5	0	
Vinyl chloride	21.0	1.00	20.00	0	105	80	120	7.20	0	
Xylenes, Total	57.1	1.50	60.00	0	95.2	70	130	1.85	0	
Surr: 1,2-Dichloroethane-d4	9.55		10.00		95.5	70	130	0	0	
Surr: 4-Bromofluorobenzene	8.83		10.00		88.3	70	130	0	0	
Surr: Dibromofluoromethane	9.47		10.00		94.6	70	130	0	0	
Surr: Toluene-d8	9.10		10.00		91.0	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **30ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R18225**	RunNo: **18225**
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526270** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	30		30.00		101	60	140			
Surr: Phenol-d5	30		30.00		101	60	140			
Surr: 2,4,6-Tribromophenol	31		30.00		104	60	140			
Surr: Nitrobenzene-d5	30		30.00		100	60	140			
Surr: 2-Fluorobiphenyl	29		30.00		95.3	60	140			
Surr: 4-Terphenyl-d14	31		30.00		102	60	140			

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R18225**	RunNo: **18225**
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526271** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	42		40.00		104	60	140			
Surr: Phenol-d5	42		40.00		105	60	140			
Surr: 2,4,6-Tribromophenol	39		40.00		96.4	60	140			
Surr: Nitrobenzene-d5	41		40.00		101	60	140			
Surr: 2-Fluorobiphenyl	38		40.00		95.3	60	140			
Surr: 4-Terphenyl-d14	39		40.00		98.0	60	140			

Sample ID **mb-12835**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526272** 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-Fluorophenol	140		200.0		70.1	12.1	85.8			
Surr: Phenol-d5	107		200.0		53.3	17.7	65.8			
Surr: 2,4,6-Tribromophenol	159		200.0		79.3	26	138			
Surr: Nitrobenzene-d5	94.6		100.0		94.6	47.5	119			
Surr: 2-Fluorobiphenyl	86.2		100.0		86.2	48.1	106			

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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **mb-12835**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526272** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	97.3		100.0		97.3	44	113			

Sample ID **mb-12850**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **12850**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526273** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	140		200.0		69.3	12.1	85.8			
Surr: Phenol-d5	120		200.0		58.9	17.7	65.8			
Surr: 2,4,6-Tribromophenol	140		200.0		69.4	26	138			
Surr: Nitrobenzene-d5	84		100.0		83.9	47.5	119			
Surr: 2-Fluorobiphenyl	77		100.0		76.6	48.1	106			
Surr: 4-Terphenyl-d14	76		100.0		75.7	44	113			

Sample ID **lcs-12835**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526274** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	69.3	5.00	100.0	0	69.3	27.4	101			
1,4-Dichlorobenzene	66.7	5.00	100.0	0	66.7	32.6	91.5			
2,4-Dinitrophenol	54.2	5.00	100.0	0	54.2	23.1	118			
2,4-Dinitrotoluene	80.9	5.00	100.0	0	80.9	44.7	112			
Hexachlorobenzene	76.8	5.00	100.0	0	76.8	30	130			
Hexachloroethane	64.0	5.00	100.0	0	64.0	23.2	97.8			
2-Methylphenol	75.3	5.00	100.0	0	75.3	36.1	105			
3+4-Methylphenol	68.9	5.00	100.0	0	68.9	35.7	92.5			
Nitrobenzene	74.8	5.00	100.0	0	74.8	30.9	125			
Pentachlorophenol	69.5	5.00	100.0	0	69.5	20.2	93			
Pyridine	58.3	5.00	100.0	0	58.3	5.14	87.1			
Surr: 2-Fluorophenol	137		300.0		45.7	12.1	85.8			
Surr: Phenol-d5	113		300.0		37.5	17.7	65.8			
Surr: 2,4,6-Tribromophenol	177		300.0		59.1	26	138			
Surr: Nitrobenzene-d5	130		200.0		65.2	47.5	119			
Surr: 2-Fluorobiphenyl	131		200.0		65.4	48.1	106			
Surr: 4-Terphenyl-d14	131		200.0		65.6	44	113			

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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-12850**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **12850**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526275** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	130		200.0		63.5	12.1	85.8			
Surr: Phenol-d5	120		200.0		59.3	17.7	65.8			
Surr: 2,4,6-Tribromophenol	150		200.0		74.8	26	138			
Surr: Nitrobenzene-d5	78		100.0		78.2	47.5	119			
Surr: 2-Fluorobiphenyl	78		100.0		77.9	48.1	106			
Surr: 4-Terphenyl-d14	78		100.0		78.5	44	113			

Sample ID **lcsd-12850**	SampType: **LCSD**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSS02**	Batch ID: **12850**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526276** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	130		200.0		64.4	12.1	85.8	0	0	
Surr: Phenol-d5	120		200.0		58.2	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	160		200.0		80.1	26	138	0	0	
Surr: Nitrobenzene-d5	78		100.0		78.1	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	79		100.0		78.8	48.1	106	0	0	
Surr: 4-Terphenyl-d14	82		100.0		82.0	44	113	0	0	

Sample ID **1404783-001Bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526282** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	73.2	5.00	100.0	0	73.2	20.9	103			
1,4-Dichlorobenzene	72.0	5.00	100.0	0	72.0	32.6	91.5			
2,4-Dinitrophenol	17.0	5.00	100.0	0	17.0	11	112			
2,4-Dinitrotoluene	71.9	5.00	100.0	0	71.9	44.7	112			
Hexachlorobenzene	80.9	5.00	100.0	0	80.9	30.3	126			
Hexachloroethane	69.0	5.00	100.0	0	69.0	19.5	96.4			
2-Methylphenol	71.4	5.00	100.0	0	71.4	28.7	108			
3+4-Methylphenol	66.6	5.00	100.0	0	66.6	24.2	136			
Nitrobenzene	81.8	5.00	100.0	0	81.8	28.8	119			
Pentachlorophenol	21.4	5.00	100.0	0	21.4	20.2	93			
Pyridine	65.0	5.00	100.0	0	65.0	19.3	82.8			
Surr: 2-Fluorophenol	53.4		300.0		17.8	12.1	85.8			
Surr: Phenol-d5	87.1		300.0		29.0	17.7	65.8			
Surr: 2,4,6-Tribromophenol	55.0		300.0		18.3	26	138			S
Surr: Nitrobenzene-d5	125		200.0		62.6	47.5	119			
Surr: 2-Fluorobiphenyl	144		200.0		71.8	48.1	106			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **1404783-001Bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526282** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	143		200.0		71.4	44	113			

Sample ID **1404783-001Bmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526283** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	82.7	5.00	100.0	0	82.7	20.9	103			
1,4-Dichlorobenzene	83.1	5.00	100.0	0	83.1	32.6	91.5			
2,4-Dinitrophenol	19.0	5.00	100.0	0	19.0	11	112			
2,4-Dinitrotoluene	85.2	5.00	100.0	0	85.2	44.7	112			
Hexachlorobenzene	84.5	5.00	100.0	0	84.5	30.3	126			
Hexachloroethane	78.3	5.00	100.0	0	78.3	19.5	96.4			
2-Methylphenol	73.4	5.00	100.0	0	73.4	28.7	108			
3+4-Methylphenol	66.6	5.00	100.0	0	66.6	24.2	136			
Nitrobenzene	90.3	5.00	100.0	0	90.3	28.8	119			
Pentachlorophenol	23.1	5.00	100.0	0	23.1	20.2	93			
Pyridine	70.1	5.00	100.0	0	70.1	19.3	82.8			
Surr: 2-Fluorophenol	50.4		300.0		16.8	12.1	85.8			
Surr: Phenol-d5	84.9		300.0		28.3	17.7	65.8			
Surr: 2,4,6-Tribromophenol	49.0		300.0		16.3	26	138			S
Surr: Nitrobenzene-d5	139		200.0		69.6	47.5	119			
Surr: 2-Fluorobiphenyl	140		200.0		70.1	48.1	106			
Surr: 4-Terphenyl-d14	145		200.0		72.7	44	113			

Sample ID **lcsr-12835**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **12835**	RunNo: **18225**
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526725** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	69.5	10.0	100.0	0	69.5	27.4	101			
1,4-Dichlorobenzene	69.5	10.0	100.0	0	69.5	32.6	91.5			
2,4-Dinitrophenol	52.9	20.0	100.0	0	52.9	23.1	118			
2,4-Dinitrotoluene	83.3	10.0	100.0	0	83.3	44.7	112			
Hexachlorobenzene	78.3	10.0	100.0	0	78.3	30	130			
Hexachloroethane	64.9	10.0	100.0	0	64.9	23.2	97.8			
2-Methylphenol	76.5	20.0	100.0	0	76.5	36.1	105			
3+4-Methylphenol	70.6	10.0	100.0	0	70.6	35.7	92.5			
Nitrobenzene	74.3	10.0	100.0	0	74.3	30.9	125			
Pentachlorophenol	68.3	20.0	100.0	0	68.3	20.2	93			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**lcsr-12835**	SampType:	**LCSR**		TestCode:	**EPA Method 8270C: Semivolatiles**				
Client ID:	**BatchQC**	Batch ID:	**12835**		RunNo:	**18225**				
Prep Date:		Analysis Date:	**4/27/2014**		SeqNo:	**526725**	Units:	**µg/L**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Pyridine	62.6	10.0	100.0	0	62.6	5.14	87.1			
Surr: 2-Fluorophenol	141		300.0		46.8	12.1	85.8			
Surr: Phenol-d5	115		300.0		38.4	17.7	65.8			
Surr: 2,4,6-Tribromophenol	184		300.0		61.5	26	138			
Surr: Nitrobenzene-d5	123		200.0		61.7	47.5	119			
Surr: 2-Fluorobiphenyl	131		200.0		65.6	48.1	106			
Surr: 4-Terphenyl-d14	141		200.0		70.5	44	113			

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.
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#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-12835**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **12835**	RunNo: **18225**
Prep Date: **4/23/2014**	Analysis Date: **4/27/2014**	SeqNo: **526274** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	69.3	5.00	100.0	0	69.3	27.4	101			
1,4-Dichlorobenzene	66.7	5.00	100.0	0	66.7	32.6	91.5			
2,4-Dinitrophenol	54.2	5.00	100.0	0	54.2	23.1	118			
2,4-Dinitrotoluene	80.9	5.00	100.0	0	80.9	44.7	112			
Hexachlorobenzene	76.8	5.00	100.0	0	76.8	30	130			
Hexachloroethane	64.0	5.00	100.0	0	64.0	23.2	97.8			
2-Methylphenol	75.3	5.00	100.0	0	75.3	36.1	105			
3+4-Methylphenol	68.9	5.00	100.0	0	68.9	35.7	92.5			
Nitrobenzene	74.8	5.00	100.0	0	74.8	30.9	125			
Pentachlorophenol	69.5	5.00	100.0	0	69.5	20.2	93			
Pyridine	58.3	5.00	100.0	0	58.3	5.14	87.1			
Surr: 2-Fluorophenol	137		300.0		45.7	12.1	85.8			
Surr: Phenol-d5	113		300.0		37.5	17.7	65.8			
Surr: 2,4,6-Tribromophenol	177		300.0		59.1	26	138			
Surr: Nitrobenzene-d5	130		200.0		65.2	47.5	119			
Surr: 2-Fluorobiphenyl	131		200.0		65.4	48.1	106			
Surr: 4-Terphenyl-d14	131		200.0		65.6	44	113			

Sample ID: **lcsr-12835**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **12835**	RunNo: **18225**
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526725** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	69.5	10.0	100.0	0	69.5	27.4	101	0.259	0	
1,4-Dichlorobenzene	69.5	10.0	100.0	0	69.5	32.6	91.5	4.14	0	
2,4-Dinitrophenol	52.9	20.0	100.0	0	52.9	23.1	118	2.28	0	
2,4-Dinitrotoluene	83.3	10.0	100.0	0	83.3	44.7	112	2.85	0	
Hexachlorobenzene	78.3	10.0	100.0	0	78.3	30	130	1.93	0	
Hexachloroethane	64.9	10.0	100.0	0	64.9	23.2	97.8	1.43	0	
2-Methylphenol	76.5	20.0	100.0	0	76.5	36.1	105	1.55	0	
3+4-Methylphenol	70.6	10.0	100.0	0	70.6	35.7	92.5	2.41	0	
Nitrobenzene	74.3	10.0	100.0	0	74.3	30.9	125	0.778	0	
Pentachlorophenol	68.3	20.0	100.0	0	68.3	20.2	93	1.71	0	
Pyridine	62.6	10.0	100.0	0	62.6	5.14	87.1	7.18	0	
Surr: 2-Fluorophenol	141		300.0		46.8	12.1	85.8	0	0	
Surr: Phenol-d5	115		300.0		38.4	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	184		300.0		61.5	26	138	0	0	
Surr: Nitrobenzene-d5	123		200.0		61.7	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	131		200.0		65.6	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcsr-12835**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**							
Client ID: **BatchQC**	Batch ID: **12835**	RunNo: **18225**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526725**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	141		200.0		70.5	44	113	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1404783-002d dup**	SampType:	**dup**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**GW-WQ4-C-R36DU**	Batch ID:	**R18119**		RunNo:	**18119**				
Prep Date:		Analysis Date:	**4/21/2014**		SeqNo:	**522998**	Units:	**µmhos/cm**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	161000	0.250						0	20	

Sample ID	**ec 999us ccv**	SampType:	**ccv**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**CCV**	Batch ID:	**R18119**		RunNo:	**18119**				
Prep Date:		Analysis Date:	**4/21/2014**		SeqNo:	**523002**	Units:	**µmhos/cm**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	970	0.010	999.0	0	97.2	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-12803**	SampType: **MBLK**			TestCode: **EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID: **12803**			RunNo: **18135**					
Prep Date:	**4/21/2014**	Analysis Date: **4/21/2014**			SeqNo: **523402**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	**LCS-12803**	SampType: **LCS**			TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID: **12803**			RunNo: **18135**					
Prep Date:	**4/21/2014**	Analysis Date: **4/21/2014**			SeqNo: **523403**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00511	0.000200	0.005000	0	102	80	120			

Sample ID	**LCSD-12803**	SampType: **LCSD**			TestCode: **EPA Method 7470: Mercury**					
Client ID:	**LCSS02**	Batch ID: **12803**			RunNo: **18135**					
Prep Date:	**4/21/2014**	Analysis Date: **4/21/2014**			SeqNo: **523404**		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	0.223	20	

Sample ID	**1404783-001EMS**	SampType: **MS**			TestCode: **EPA Method 7470: Mercury**					
Client ID:	**GW-WQ4-C-R36**	Batch ID: **12803**			RunNo: **18135**					
Prep Date:	**4/21/2014**	Analysis Date: **4/21/2014**			SeqNo: **523413**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00538	0.00100	0.005000	0	108	75	125			

Sample ID	**1404783-001EMSD**	SampType: **MSD**			TestCode: **EPA Method 7470: Mercury**					
Client ID:	**GW-WQ4-C-R36**	Batch ID: **12803**			RunNo: **18135**					
Prep Date:	**4/21/2014**	Analysis Date: **4/21/2014**			SeqNo: **523414**		Units: **mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00501	0.00100	0.005000	0	100	75	125	6.96	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12803**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **12803**	RunNo: **18135**
Prep Date: **4/21/2014**	Analysis Date: **4/21/2014**	SeqNo: **523403** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00511	0.000200	0.005000	0	102	80	120			

Sample ID: **LCSD-12803**	SampType: **LCSD**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSS02**	Batch ID: **12803**	RunNo: **18135**
Prep Date: **4/21/2014**	Analysis Date: **4/21/2014**	SeqNo: **523404** 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	0.223	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524479** 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								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524480** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49.6	1.00	50.00	0	99.3	80	120			
Magnesium	49.7	1.00	50.00	0	99.4	80	120			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524481** 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	98.6	80	120			
Magnesium	49.4	1.00	50.00	0	98.7	80	120			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524490** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.7	90	110			
Magnesium	49	1.0	50.00	0	98.4	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524503** 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			
Magnesium	50	1.0	50.00	0	99.2	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524516** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R18172	RunNo:	18172				
Prep Date:		Analysis Date:	4/23/2014	SeqNo:	524516	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.9	90	110			
Magnesium	49	1.0	50.00	0	98.0	90	110			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R18172	RunNo:	18172				
Prep Date:		Analysis Date:	4/23/2014	SeqNo:	524529	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			
Magnesium	49	1.0	50.00	0	97.8	90	110			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R18172	RunNo:	18172				
Prep Date:		Analysis Date:	4/23/2014	SeqNo:	524542	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	96.7	90	110			
Magnesium	48	1.0	50.00	0	97.0	90	110			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R18172	RunNo:	18172				
Prep Date:		Analysis Date:	4/23/2014	SeqNo:	524549	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	97.7	90	110			
Magnesium	49	1.0	50.00	0	97.8	90	110			

Sample ID	MB	SampType:	MBLK	TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	PBW	Batch ID:	R18195	RunNo:	18195				
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	524979	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								

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **524980** 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	98.5	80	120			
Magnesium	50.1	1.00	50.00	0	100	80	120			
Potassium	48.1	1.00	50.00	0	96.3	80	120			
Sodium	49.5	1.00	50.00	0	99.0	80	120			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **524981** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.1	1.00	50.00	0	100	80	120			
Magnesium	50.8	1.00	50.00	0	102	80	120			
Potassium	48.7	1.00	50.00	0	97.3	80	120			
Sodium	50.3	1.00	50.00	0	101	80	120			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **524990** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.1	90	110			
Magnesium	50	1.0	50.00	0	100	90	110			
Potassium	48	1.0	50.00	0	96.4	90	110			
Sodium	49	1.0	50.00	0	98.8	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **525003** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.7	90	110			
Magnesium	50	1.0	50.00	0	100	90	110			
Potassium	48	1.0	50.00	0	96.9	90	110			
Sodium	50	1.0	50.00	0	101	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **525016** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525016	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	96.5	90	110			
Magnesium	50	1.0	50.00	0	100	90	110			
Potassium	49	1.0	50.00	0	97.7	90	110			
Sodium	51	1.0	50.00	0	102	90	110			

Sample ID	1404783-001DMS	SampType:	MS	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	GW-WQ4-C-R36	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525021	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	1810	20.0	1000	741.5	107	75	125			

Sample ID	1404783-001DMSD	SampType:	MSD	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	GW-WQ4-C-R36	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525022	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	1810	20.0	1000	741.5	107	75	125	0.0298	20	

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525029	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.0	90	110			
Magnesium	50	1.0	50.00	0	101	90	110			
Potassium	49	1.0	50.00	0	98.1	90	110			
Sodium	51	1.0	50.00	0	102	90	110			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525042	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	90	110			
Magnesium	50	1.0	50.00	0	101	90	110			
Potassium	49	1.0	50.00	0	97.9	90	110			
Sodium	51	1.0	50.00	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525055	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.4	90	110			
Magnesium	51	1.0	50.00	0	101	90	110			
Potassium	49	1.0	50.00	0	98.1	90	110			
Sodium	51	1.0	50.00	0	102	90	110			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525068	Units:	mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50	1.0	50.00	0	99.7	90	110			
Magnesium	51	1.0	50.00	0	102	90	110			
Potassium	49	1.0	50.00	0	98.6	90	110			
Sodium	51	1.0	50.00	0	102	90	110			

Sample ID	CCV CAT	SampType:	CCV_CAT	TestCode:	EPA Method 6010B: Dissolved Metals					
Client ID:	BatchQC	Batch ID:	R18195	RunNo:	18195					
Prep Date:		Analysis Date:	4/24/2014	SeqNo:	525075	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			
Magnesium	51	1.0	50.00	0	102	90	110			
Potassium	49	1.0	50.00	0	98.3	90	110			
Sodium	51	1.0	50.00	0	102	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.
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#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524480** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49.6	1.00	50.00	0	99.3	80	120			
Magnesium	49.7	1.00	50.00	0	99.4	80	120			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18172**	RunNo: **18172**
Prep Date:	Analysis Date: **4/23/2014**	SeqNo: **524481** 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	98.6	80	120	0.675	0	
Magnesium	49.4	1.00	50.00	0	98.7	80	120	0.616	0	

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **524980** 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	98.5	80	120			
Magnesium	50.1	1.00	50.00	0	100	80	120			
Potassium	48.1	1.00	50.00	0	96.3	80	120			
Sodium	49.5	1.00	50.00	0	99.0	80	120			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18195**	RunNo: **18195**
Prep Date:	Analysis Date: **4/24/2014**	SeqNo: **524981** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	50.1	1.00	50.00	0	100	80	120	1.64	0	
Magnesium	50.8	1.00	50.00	0	102	80	120	1.35	0	
Potassium	48.7	1.00	50.00	0	97.3	80	120	1.07	0	
Sodium	50.3	1.00	50.00	0	101	80	120	1.60	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-12813**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **12813**	RunNo: **18172**
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524491** 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	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-12813**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **12813**	RunNo: **18172**
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524492** 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	97.1	80	120			
Beryllium	0.524	0.00300	0.5000	0	105	80	120			
Cadmium	0.475	0.00200	0.5000	0	95.1	80	120			
Calcium	50.1	1.00	50.00	0	100	80	120			
Chromium	0.487	0.00600	0.5000	0	97.4	80	120			
Iron	0.499	0.0500	0.5000	0	99.8	80	120			
Lead	0.484	0.00500	0.5000	0	96.8	80	120			
Magnesium	49.1	1.00	50.00	0	98.2	80	120			
Nickel	0.471	0.0100	0.5000	0	94.2	80	120			
Potassium	47.5	1.00	50.00	0	94.9	80	120			
Silver	0.101	0.00500	0.1000	0	101	80	120			
Sodium	47.7	1.00	50.00	0	95.3	80	120			
Vanadium	0.510	0.0500	0.5000	0	102	80	120			

Sample ID **LCS-12813**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **12813**	RunNo: **18172**
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524493** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.480	0.0200	0.5000	0	95.9	80	120			
Beryllium	0.522	0.00300	0.5000	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **LCS-12813**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **12813**	RunNo: **18172**
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524493** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.475	0.00200	0.5000	0	94.9	80	120			
Calcium	49.5	1.00	50.00	0	99.0	80	120			
Chromium	0.484	0.00600	0.5000	0	96.7	80	120			
Iron	0.498	0.0500	0.5000	0	99.5	80	120			
Lead	0.484	0.00500	0.5000	0	96.9	80	120			
Magnesium	48.6	1.00	50.00	0	97.2	80	120			
Nickel	0.468	0.0100	0.5000	0	93.6	80	120			
Potassium	46.9	1.00	50.00	0	93.8	80	120			
Silver	0.100	0.00500	0.1000	0	100	80	120			
Sodium	47.1	1.00	50.00	0	94.1	80	120			
Vanadium	0.508	0.0500	0.5000	0	102	80	120			

Sample ID **1404783-001EMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12813**	RunNo: **18195**
Prep Date: **4/22/2014**	Analysis Date: **4/24/2014**	SeqNo: **525000** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	2.28	0.200	2.500	0.02480	90.4	75	125			
Beryllium	2.43	0.0300	2.500	0.003900	97.2	75	125			
Cadmium	2.38	0.0200	2.500	0	95.3	75	125			
Chromium	2.28	0.0600	2.500	0	91.4	75	125			
Iron	3.35	0.500	2.500	1.102	89.8	75	125			
Lead	2.24	0.0500	2.500	0	89.5	75	125			
Nickel	2.25	0.100	2.500	0.05810	87.7	75	125			
Silver	0.534	0.0500	0.5000	0	107	75	125			
Vanadium	2.45	0.500	2.500	0	98.0	75	125			

Sample ID **1404783-001EMSD**	SampType: **MSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **GW-WQ4-C-R36**	Batch ID: **12813**	RunNo: **18195**
Prep Date: **4/22/2014**	Analysis Date: **4/24/2014**	SeqNo: **525004** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	2.28	0.200	2.500	0.02480	90.3	75	125	0.0657	20	
Beryllium	2.43	0.0300	2.500	0.003900	96.9	75	125	0.239	20	
Cadmium	2.39	0.0200	2.500	0	95.7	75	125	0.389	20	
Chromium	2.29	0.0600	2.500	0	91.5	75	125	0.175	20	
Iron	3.43	0.500	2.500	1.102	93.0	75	125	2.32	20	
Lead	2.23	0.0500	2.500	0	89.0	75	125	0.542	20	
Nickel	2.24	0.100	2.500	0.05810	87.4	75	125	0.356	20	
Silver	0.540	0.0500	0.5000	0	108	75	125	1.19	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	1404783-001EMSD	SampType:	MSD		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ4-C-R36	Batch ID:	12813		RunNo:	18195				
Prep Date:	4/22/2014	Analysis Date:	4/24/2014		SeqNo:	525004	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vanadium	2.45	0.500	2.500	0	98.0	75	125	0.0204	20	

Sample ID	1404783-001EMS	SampType:	MS		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ4-C-R36	Batch ID:	12813		RunNo:	18195				
Prep Date:	4/22/2014	Analysis Date:	4/24/2014		SeqNo:	525007	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	952	25.0	250.0	773.4	71.6	75	125			S

Sample ID	1404783-001EMSD	SampType:	MSD		TestCode:	EPA 6010B: Total Recoverable Metals				
Client ID:	GW-WQ4-C-R36	Batch ID:	12813		RunNo:	18195				
Prep Date:	4/22/2014	Analysis Date:	4/24/2014		SeqNo:	525008	Units:	mg/L		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Potassium	1060	25.0	250.0	773.4	113	75	125	10.3	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12813**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **12813**	RunNo: **18172**
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524492** 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	97.1	80	120			
Beryllium	0.524	0.00300	0.5000	0	105	80	120			
Cadmium	0.475	0.00200	0.5000	0	95.1	80	120			
Calcium	50.1	1.00	50.00	0	100	80	120			
Chromium	0.487	0.00600	0.5000	0	97.4	80	120			
Iron	0.499	0.0500	0.5000	0	99.8	80	120			
Lead	0.484	0.00500	0.5000	0	96.8	80	120			
Magnesium	49.1	1.00	50.00	0	98.2	80	120			
Nickel	0.471	0.0100	0.5000	0	94.2	80	120			
Potassium	47.5	1.00	50.00	0	94.9	80	120			
Silver	0.101	0.00500	0.1000	0	101	80	120			
Sodium	47.7	1.00	50.00	0	95.3	80	120			
Vanadium	0.510	0.0500	0.5000	0	102	80	120			

Sample ID: **LCS-12813**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **12813**	RunNo: **18172**
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524493** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.480	0.0200	0.5000	0	95.9	80	120	1.19	0	
Beryllium	0.522	0.00300	0.5000	0	104	80	120	0.346	0	
Cadmium	0.475	0.00200	0.5000	0	94.9	80	120	0.158	0	
Calcium	49.5	1.00	50.00	0	99.0	80	120	1.29	0	
Chromium	0.484	0.00600	0.5000	0	96.7	80	120	0.662	0	
Iron	0.498	0.0500	0.5000	0	99.5	80	120	0.279	0	
Lead	0.484	0.00500	0.5000	0	96.9	80	120	0.0599	0	
Magnesium	48.6	1.00	50.00	0	97.2	80	120	1.04	0	
Nickel	0.468	0.0100	0.5000	0	93.6	80	120	0.620	0	
Potassium	46.9	1.00	50.00	0	93.8	80	120	1.18	0	
Silver	0.100	0.00500	0.1000	0	100	80	120	0.508	0	
Sodium	47.1	1.00	50.00	0	94.1	80	120	1.27	0	
Vanadium	0.508	0.0500	0.5000	0	102	80	120	0.395	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**ph 7.00 ccv**	SampType: **ccv**		TestCode: **SM4500-H+B: pH**						
Client ID:	**CCV**	Batch ID: **R18075**		RunNo: **18075**						
Prep Date:		Analysis Date: **4/17/2014**		SeqNo: **521550**		Units: **pH units**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.00	1.68								

Sample ID	**ph 4.00 ccv**	SampType: **ccv**		TestCode: **SM4500-H+B: pH**						
Client ID:	**CCV**	Batch ID: **R18075**		RunNo: **18075**						
Prep Date:		Analysis Date: **4/17/2014**		SeqNo: **521567**		Units: **pH units**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	3.99	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	mb-1	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R18075	RunNo:	18075					
Prep Date:		Analysis Date:	4/17/2014	SeqNo:	521619	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:	R18075	RunNo:	18075					
Prep Date:		Analysis Date:	4/17/2014	SeqNo:	521620	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81.4	20.0	80.00	0	102	90	110			

Sample ID	1404783-001d ms	SampType:	ms	TestCode:	SM2320B: Alkalinity					
Client ID:	GW-WQ4-C-R36	Batch ID:	R18075	RunNo:	18075					
Prep Date:		Analysis Date:	4/17/2014	SeqNo:	521628	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	116	20.0	80.00	38.64	96.5	65.2	112			

Sample ID	1404783-001d msd	SampType:	msd	TestCode:	SM2320B: Alkalinity					
Client ID:	GW-WQ4-C-R36	Batch ID:	R18075	RunNo:	18075					
Prep Date:		Analysis Date:	4/17/2014	SeqNo:	521629	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	116	20.0	80.00	38.64	96.8	65.2	112	0.207	20	

Sample ID	mb-2	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R18075	RunNo:	18075					
Prep Date:		Analysis Date:	4/17/2014	SeqNo:	521645	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:	R18075	RunNo:	18075					
Prep Date:		Analysis Date:	4/17/2014	SeqNo:	521646	Units:	mg/L CaCO3			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	83	20	80.00	0	103	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **LCSR-1**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R18075**	RunNo: **18075**							
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **524906**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	83.3	20.0	80.00	0	104	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18075**	RunNo: **18075**							
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521620**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	81.4	20.0	80.00	0	102	90	110			

Sample ID: **lcs-2**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18075**	RunNo: **18075**							
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **521646**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	83	20	80.00	0	103	90	110			

Sample ID: **LCSR-1**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R18075**	RunNo: **18075**							
Prep Date:	Analysis Date: **4/17/2014**	SeqNo: **524906**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	83.3	20.0	80.00	0	104	90	110	2.28	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526218**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	0.208	1.00								J

Sample ID **LCS ST9060-14001**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526219**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.03	1.00	4.850	0	104	90	110			

Sample ID **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526220**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.02	1.00	4.850	0	103	90	110	0.358	0	

Sample ID **1404783-001Cms**	SampType: **MS**	TestCode: **SM 5310B: TOC**							
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526225**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.08	1.00	4.650	0.3480	102	75	125			

Sample ID **1404783-001Cmsd**	SampType: **MSD**	TestCode: **SM 5310B: TOC**							
Client ID: **GW-WQ4-C-R36**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526226**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.20	1.00	4.650	0.3480	104	75	125	2.34	20	

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526246**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	ND	1.0								

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**LCS ST9060-14001**	SampType: **LCSD**		TestCode: **SM 5310B: TOC**					
Client ID:	**LCSS02**	Batch ID: **R18224**		RunNo: **18224**					
Prep Date:		Analysis Date: **4/27/2014**		SeqNo: **526247**		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	99.4	90	110	4.28	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.
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#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS ST9060-14001 s**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526219**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.03	1.00	4.850	0	104	90	110			

Sample ID: **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526220**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.02	1.00	4.850	0	103	90	110	0.358	0	

Sample ID: **LCS ST9060-14001 s**	SampType: **LCSD**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSS02**	Batch ID: **R18224**	RunNo: **18224**							
Prep Date:	Analysis Date: **4/27/2014**	SeqNo: **526247**	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	99.4	90	110	4.28	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1404783-001DDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**GW-WQ4-C-R36**	Batch ID:	**R18116**	RunNo:	**18116**					
Prep Date:		Analysis Date:	**4/21/2014**	SeqNo:	**522874**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.072	0						0.103	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.
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#: **1404783**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-12829	SampType:	MBLK		TestCode:	SM 2540D: TSS				
Client ID:	PBW	Batch ID:	12829		RunNo:	18164				
Prep Date:	4/22/2014	Analysis Date:	4/23/2014		SeqNo:	524240	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-12829	SampType:	LCS		TestCode:	SM 2540D: TSS				
Client ID:	LCSW	Batch ID:	12829		RunNo:	18164				
Prep Date:	4/22/2014	Analysis Date:	4/23/2014		SeqNo:	524241	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	92	4.0	92.40	0	99.6	82.47	119.05			

Sample ID	LCSR-12829	SampType:	LCSR		TestCode:	SM 2540D: TSS				
Client ID:	BatchQC	Batch ID:	12829		RunNo:	18164				
Prep Date:	4/22/2014	Analysis Date:	4/23/2014		SeqNo:	524242	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	90	4.0	92.40	0	97.4	82.47	119.05			

Sample ID	1404783-001DDUP	SampType:	DUP		TestCode:	SM 2540D: TSS				
Client ID:	GW-WQ4-C-R36	Batch ID:	12829		RunNo:	18164				
Prep Date:	4/22/2014	Analysis Date:	4/23/2014		SeqNo:	524244	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	95	4.0						3.11	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404783**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12829**	SampType: **LCS**	TestCode: **SM 2540D: TSS**							
Client ID: **LCSW**	Batch ID: **12829**	RunNo: **18164**							
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524241**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	92	4.0	92.40	0	99.6	82.47	119.05			

Sample ID: **LCSR-12829**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**							
Client ID: **BatchQC**	Batch ID: **12829**	RunNo: **18164**							
Prep Date: **4/22/2014**	Analysis Date: **4/23/2014**	SeqNo: **524242**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	90	4.0	92.40	0	97.4	82.47	119.05	2.20	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

WQSP-4

DATA VERIFICATION AND VALIDATION REPORTS

Round 36
WQSP-4
SDG 1404783
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	1,950	2,500	56,300		59,400		57,850	5	63,960
TOC	mg/L	1.0	0.120	1.0	0.348	J	0.252	J	0.30	32.0	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	4.0	20	38.6		39.0		38.8	1.03	47.1
Specific Conductance	umhos/cm	NA	0.25	0.25	162,000		161,000		161,500	0.6	319,800
pH	pH units	NA	0.10	1.68	7.09		7.11		7.10	0.28	6.8 - 7.6
Specific Gravity	NA	NA	0.0	0.0	1.070		1.066		1.068	0.37	1.09
TDS	mg/L	10	492	1,000	104,000		101,000		102,500	2.9	123,500
TSS	mg/L	1.0	3.1	4.0	**98**		**94**		**96**	4	**57.0**
Dissolved Metals											
Ca (Diss) (c)	mg/L	0.5	0.773	20	1,630		1,570		1,600	3.75	1,834
Mg (Diss)	mg/L	0.5	0.377	20	1,200		1,180		1,190	1.7	1,472
K (Diss) (c)	mg/L	0.5	4.05	50	742		757		750	2.0	1,648
Na (Diss) (c)	mg/L	0.5	60.7	500	36,400		36,100		36,250	0.83	38,790

Total Metals (ICP)	Units	SOW MRL	Lab MDL[a]	Lab PQL[b]	Primary Sample	Flag	Duplicate Sample	Flag	Avg	RPD	
Hg (CVAAS) (c)	mg/L	0.0002	0.000435	0.00100	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.00625	0.200	0.0248	J	0.0270	J	0.026	8.5	1.00
Be	mg/L	0.010	0.00353	0.030	0.0039	J	ND		NA	NA	0.25
Cd	mg/L	0.010	0.00628	0.020	ND		ND		NA	NA	<0.5
Ca (c)	mg/L	0.500	4.09	25	1,610		1,430		1,520	11.8	NA
Cr	mg/L	0.025	0.0168	0.060	ND		ND		NA	NA	<2.0
Pb (c)	mg/L	0.020	0.0477	0.050	ND		ND		NA	NA	0.525
Mg	mg/L	0.50	0.425	25	1,210		1,050		1,130	14.2	NA
Ni	mg/L	0.025	0.0190	0.100	0.0581	J	0.0504	J	NA	NA	<5.0
K (c)	mg/L	0.50	12.6	25	773		698		736	10.2	NA
Ag	mg/L	0.013	0.00522	0.050	ND		ND		NA	NA	0.519
Na (c)	mg/L	0.50	1040	2,500	44,700		37,800		41,250	16.7	NA
V (c)	mg/L	0.025	0.0548	0.500	ND		ND		NA	NA	<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 36
WQSP-4

Sample Summary

Date:	August 26, 2014
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	April 16, 2014
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 11, 2014
Date Samples Shipped/Method	April 16, 2014 by FedEx
Date Samples Received by lab:	April 17, 2014
Sample Receipt Condition:	Intact at 2.3 deg. C
SDG:	1404783
WIPP Chain of Custody/Request for Analysis:	1150
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 22, 2014 (meets holding time)
SVOC Extraction Date:	April 23, 2014 (meets holding time)
SVOC Analysis Date(s):	April 27, 2014 (meets holding time)
Total Trace Metals Analysis Date(s):	April 23 – 24, 2014 (meets holding time)
Dissolved Cation Metals Analysis Date(s):	April 23 – 24, 2014 (meets holding time)
Mercury Analysis Date(s):	April 21, 2014 (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 1404783

WTS Sample No.	Analytes
GW-WQ4CR36N1, GW-WQ4CR36N1D	VOCs
GW-WQ4CR36N2, GW-WQ4CR36N3	VOCs (Field Blank and Trip Blank)
GW-WQ4CR36N4, GW-WQ4CR36N4D	TOC
GW-WQ4CR36N5, GW-WQ4CR36N5D	SVOCs
GW-WQ4CR36N6, GW-WQ4CR36N6D	Total Trace Metals (including "total" cation metals)
GW-WQ4CR36 N7, GW-WQ4CR36 N7D	General Parameters (including "dissolved" cations)
GW-WQ4CR36N12, GW-WQ4CR36N13	Total Trace Metals Field Blank (Preserved and un-preserved)

Results Summary

No target VOCs were detected in either the primary or duplicate groundwater samples. The field blank showed detection of 6.51 ug/L of 2-butanone, and the trip blank showed 3.50 ug/L of 2-butanone, 0.87ug/L of chlorobenzene, and 0.30 ug/L of methylene chloride. The trip blank concentrations were below the MRL and are J-flagged as estimated. No VOC tentatively identified compounds were detected in the groundwater samples from the GC/MS data.

No target SVOCs were detected in the WQSP-4 groundwater samples, and no SVOC tentatively identified compounds were detected in the groundwater samples from the GC/MS data.

The trace metals detected included Ba at 0.025 mg/L in the primary sample and 0.027 mg/L in the duplicate sample; Be at 0.0039 mg/L in the primary sample but was not detected in the duplicate sample; and Ni at 0.058 mg/L in the primary sample and 0.050 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. Vanadium was not detected as it has been during past sampling rounds.

No trace metals were detected in the preserved and unpreserved field blanks analyzed for trace metals with the WQSP-3 samples (the first of the six WQSP wells).

Measurements were made on all the general chemistry parameters at concentrations above the reporting limit except for TOC, which was detected at 0.35 mg/L in the primary sample and 0.25 mg/L in the duplicate sample.

The TSS concentrations of 98 mg/L in the primary sample and 94 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 EPA's SW-846 Method 8260B.

As discussed above the only detection of any VOC in the groundwater, field blank, and trip blank samples were detection of 6.51 ug/L of 2-butanone and 0.38 ug/L of chloroform in the field blank and 3.50 ug/L of 2-butanone, 0.87ug/L of chlorobenzene, and 0.30 ug/L of methylene chloride in the trip blank. Except for 2-butanone, which was not detected in the groundwater samples, the field blank and trip blank concentrations were below the MRL and are J-flagged as estimated.

The QC sample analyses showed recoveries of isobutyl alcohol and 2-butanone were higher than the 130 percent recovery objective in the MS at 181 and 148 percent, respectively, and in the MSD at 195 and 158 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 (salting out effect).

All other quality assurance objectives were met for the VOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 8270C. No SVOCs were detected in method blank sample or in the groundwater samples.

The QC data for the SVOCs showed acceptable recoveries of the target compounds and surrogate compounds for the LCS/LCSR (replicate analysis) samples, acceptable RPDs for the LCS/LCSD samples (although the RPDs were not initially reported by the lab); and acceptable recoveries and RPDs for the SVOC target compounds from the MS/MSD samples except that the

All other quality assurance objectives were met for the SVOC analyses except that the 2,4,6-tribromophenol surrogate recoveries were low in the MS and MSD samples. The surrogate recoveries were acceptable in all the other samples. The low surrogate recovery in the MS and MSD should have no impact on the quality or usability of the data since no SVOC compounds were detected in the groundwater samples.

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 EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed by ICP/MS by Anatek according to EPA Method 6020 from SW-846. Mercury (Hg) was analyzed using automated cold-vapor atomic absorption (CVAA) spectroscopy according to EPA SW-846 Method 7470A.

The recoverable metals Ba, Be, and Ni were detected in the primary and duplicate groundwater samples. The Ba concentrations were 0.025 mg/L in the primary sample and 0.027 mg/L in the duplicate sample; the Be concentrations were 0.0039 mg/L in the primary sample, but not detected duplicate samples; and the Ni concentrations were 0.058 mg/L and 0.050 mg/L in the primary and duplicate samples, respectively.

The MDLs for the analyses were higher than the MRLs specified in the SOW for Hg (0.00044 mg/L MDL vs. 0.00020 mg/L objective); Pb (0.048 mg/L MDL vs. 0.020 mg/L objective; and V (0.055 mg/L MDL vs. 0.025 mg/L objective). The samples were diluted by about a factor of two more than appropriate to meet the MRLs for the three metals. Since there was no analytical response for the presence of these metals in the groundwater samples, they were not present in the samples, and the usability of the data is not adversely affected. No trace metals were detected in the preserved and unpreserved field blanks analyzed for trace metals with the WQSP-3 samples (the first of the six WQSP wells).

The QC data showed that the method blank samples did not contain the trace metals detected in the groundwater samples. The LCS/LCSR recoveries for the trace metals, the ICP/MS metals, the four dissolved cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. 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 objective.

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	Parameter
Standard Methods SM 2710F	Specific Gravity
Standard Methods SM 4500-H^+	pH
EPA Method 120.1	Specific Conductance (Conductivity)
Standard Methods SM 2540C	Total Dissolved Solids (TDS)
Standard Methods SM 2540D	Total Suspended Solids (TSS)
Standard Methods SM 5310B	Total Organic Carbon (TOC)
Standard Methods SM 2320B	Alkalinity
EPA Method 300.0	Anions

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

- All parameters: Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted. Initial calibration verification and continuing calibration verification standards were analyzed as appropriate to ensure accurate calibration of instrumentation.

- Anions: LCS and LCSR (replicate analysis) samples were analyzed for the anions nitrate and sulfate to obtain recovery information. Only a single LCS sample was analyzed for chloride. All LCS recoveries were within 90 – 110 percent. MS/MSD samples were only analyzed for nitrate because of the high native concentrations of chloride and sulfate. The accuracy and precision objectives were met for this non-target anion.

- pH: A CCV at pH 7.00 is analyzed just prior to the samples. The primary groundwater samples are supposed to be analyzed in duplicate to obtain precision data, but a duplicate pH measurement was not taken for this SDG. The precision of the primary and duplicate groundwater samples was very good with a RPD of 0.28.

- Specific gravity: A duplicate sample was analyzed to obtain precision data. The duplicate analysis result was 1.072 (compared to 1.070) for a RPD of 0.19.

- Specific conductance: A duplicate analysis of the duplicate sample was performed to obtain precision information. The results were identical yielding a RPD of 0.0.

- Total Organic Carbon: LCS/LCSR (replicate analysis of the LCS) and MS/MSD were analyzed for this instrumental method to obtain accuracy and precision data. The recoveries and RPDs readily met the accuracy and precision objectives.

- Alkalinity: MS/MSD and LCS/LCSR were analyzed for this instrumental method to generate accuracy and precision data. The recoveries and RPDs readily met the accuracy and precision objectives.

- Total Dissolved Solids: MS/MSD and LCS/LCSR were analyzed for this gravimetric method to generate accuracy and precision data. The LCS recoveries were both 101 percent and the MSD/MSD recoveries were 94.9 percent and 97.4 percent, respectively for a RPD of 0.82. Thus the accuracy and precision objectives were readily met.

- Total Suspended Solids: A LCS/LCSD and a duplicate sample were analyzed to generate precision data. The LCS recoveries were 99.6 percent and 97.4 percent and the duplicate analysis of the primary sample yielded 95 mg/L for a RPD of 3.1.

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, which do not adversely affect the reliability or usability of the information. The lab was reminded to provide all the requested information.

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 (Round 36)

Laboratory Name: Hall Environmental

Laboratory Work Order #: 1404783 7 EM 7/29/14

Sample Number(s): GW-WQ4-C-R36-N1 thru N8 D, N12, N13

Reviewer Name (print): Robbin A. Spoon

Reviewer Signature: Robbin Apon

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?	✓	

Robbin Apon 10/16/14

Data Validator Date

10-15-14

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? 2.3°C	✓	
Was the analysis holding time of 14 days met for all samples? 4/16, 4/22	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 4/22	✓	
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	(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) 2.0 ng/5.0 mL = 0.4 µg/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: 6.51 µg/L in Field Blank & 3.50 µg/L in Trip Blank. MRL = 5.0 µg/L.

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?	✓		(a)
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD? RM 10/01/14	✓	✓	

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?	✓		(b)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD? RM 10/01/14	✓	✓	

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 recovery objective range varies for some compounds. Some range narrower, some wider, e.g. isobutyl alcohol, 2-butanone.

(b) Isobutyl alcohol: 195% rec. (Historical range = 31-273%)
2-butanone: 158% rec. (Historical range = 22-285%)
High recoveries due to "salting out" effect.

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?		✓ (a)

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Data Validator Date Completeness Reviewer Date

(a) Artifact seen in previous rounds were also detected in these samples including trimethyl silyl fluoride, trimethyl silanol, and an identified compound with most intense ions at m/z 65, 67, and 51.

There were a few area counts for toluene and m- and p-xylene, but the detector response was no greater than for the lab method blanks and trip blank.

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? 2.3°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? 4/27 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? 4/27/14	✓	
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?	✓		(a)
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? 2.5 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?		✓	(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) 2.5, 5.0, 10, 20, 30, 40, 50, 80, 100, 120 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?	✓		(a)

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?		✓	(a)
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) RPDs initially not reported by lab. Lab was contacted to 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?	✓		(a)
Were any SVOC TICs detected in the groundwater samples?	✓		(a)

[signature] 8/14/2014 [signature] 10/6/14

Data Validator Date Completeness Reviewer Date

(a) The total ion chromatograms of the SVOC method blank and groundwater samples showed the presence of some compounds including chlorobenzene, alkylbenzenes, bisphenol A, oxygenated cyclohexenes, and silicone column bleed compounds. The groundwater samples appeared to contain traces of some compounds not present in the method blank, including some volatile alkylbenzenes including xylenes. However, these compounds did not appear in the more sensitive VOC data, and they are not likely present 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.	✓	(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? lowest R^2 Mo @ 0.997672 Manganese 0.997452	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples? Cal Blk + 8 stds	✓	
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 4/16/14
Prep Hg 4/21; Total 4/22; Dissolv. 4/21
Analyzed Hg 4/21; Total 4/23-4/24; Dissolv. 4/22-4/24

Digestion Factor for 10 & 20 Sx
= 5.0

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?	✓		(a)
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank? 6	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		0.99996
* Was the ICV standard prepared from a second source standard and at a mid-range concentration of the calibration curve? Back-calculated 3.3299 mg/L	✓		(b)
Did the ICV analysis meet the accuracy objective of 90-110% recovery? 94.6%	✓		
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?	✓		(c)
Did the sample set contain a MB, LCS, MS, and MSD? 10% MS/MSD	✓		
Was a DMP Sample used for the MS/MSD?	✓		
Was the concentration of any mercury in the MB, ICB, and CCB < MRL? See below	✓		~~(d)~~ 6/27/14 (d)
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery?	✓		(e)
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		(f)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD? 7.96%	✓		(g)

* No Sample Prep Sheet. ICV Conc used not provided.

(a) C 4/16/14; P&A 4/21/14

(b) Back calculated from % Recovery of ICV

$\frac{3.1484}{x} = 0.9455 \quad x = 3.3299$

(c) $CCV_{Seq31}\ (3.3318/3.3299)100 = 100.05\%$ rec

$CCV_{Seq31}\ (3.3558/3.3299)100 = 100.78\%$ rec

(d) MRL = 0.0002 mg/L ≃ 0.2 µg/L

MB = 0.0116 µg/L

ICB = 0.01518 µg/L

CCB = 0.01316 µg/L

6/27/14

(e)

LCS $\left(\frac{0.00511}{0.005}\right)100 = 102.2\%$ rec

LCSD $\left(\frac{0.00512}{0.005}\right)100 = 102.4\%$ rec

(f) MS $\left(\frac{0.00538}{0.005}\right)100$ 107.6% rec

MSD $\left(\frac{0.00501}{0.005}\right)100 = 100.2\%$

(g) RPD $\frac{107.6 - 100.2}{103.9} = 7.12\%$

$\frac{108 - 100}{104} = 7.69\%$

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? 4/16/14 5/5/14	✓	
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? ICV 1.0 ppb & 40.0 ppb	✓	
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? 100.8 → 113.6% Rec	✓	✓ 7/29/14
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery? 78.8 → 99.6% Rec	✓	
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD? 1.2 → 5.3% RPD	✓	

Kathleen Akpan 7/29/2014
Data Validator Date

Completeness Reviewer 10-15-14
Date

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

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 2.3°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 4/16/14; A 4/18/14	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions? 9+blk	✓	
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? Nitrate – only spike	✓	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD? RPD (Nitrate) = 0.82%	✓	

QUANTITATION	YES	NO
Were any of the samples diluted to bring the anion concentrations within the calibration range of the instrument? r50, r200, r2K & r5K	✓	
Were the appropriate dilution factors applied to the results?	✓	

Robin Alpers 6/17/14
Data Validator Date

10-15-14
Completeness Reviewer Date

	Result	Spk	%Rec
LCS – NO_3-N	2.5	[2.5]	98.6
SO_4	9.7	[10.0]	96.6
LCSR – NO_3-N	2.4	[2.5]	97.6
SO_4	9.6	[10]	96.1

%RPD = NO_3-N $\left(\frac{|2.5-2.41|}{2.15}\right) \times 100 = 4.1\%$

$= SO_4$ $\left(\frac{|9.7-9.61|}{9.65}\right) \times 100 = 1.0\%$

MS = 123/125 → 98.4% Rec
MSD 122/125 → 97.6% Rec

%RPD = 0.82%

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 2.3°C	✓	
Were the samples analyzed within 14 days of collection? C 4/16/14; A 4/17/14	✓	

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)?	✓	
Was the starting pH of the sample ≤8.30? 1° Sx = 7.09; Dup = 7.11	✓	
Was a DMP sample used for the MS/MSD? 1° Sx	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? mb-1 2.52 mb-2 2.44	✓		
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)?	✓		(c)
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓		(d)

Robin Myron 6/18/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) LCS Recovery [Spk] = 80.0

LCS-1 (81.44/80)100 = 101.8% rec

LCS-2 (82.76/80)100 = 103.5% rec

%RPD = 1.61%

(b) MS/MSD Recoveries 1°Sx = 38.64

MS $\left[\frac{(115.8 - 38.64)}{80}\right]100 = 96.45\%$

MSD $\left[\frac{116.04 - 38.64}{80}\right]100 = 96.75\%$

(c) RPD of MS/MSD $\bar{x} = 115.92$

$\left(\frac{|115.8 - 116.04|}{115.92}\right)100 = 0.207$

(d) Manual Calc: $\frac{A \times N \times 50K}{S \times Vol}$

A = mL Titrant

N = Normality

50K = meq/mole

$MS = \frac{5.79mL \times 0.02N \times 50,000}{50mL} = 115.80 mg/L$

$MSD = \frac{5.802 \times 0.02N \times 50,000}{50mL} = 116.04 mg/L$

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 2.3°C	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 4/16/14; A 4/21/14	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? 1K only	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration? 1413 µS	✓	
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? 1413 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)? 999 µS	✓	
Was one of the samples analyzed in duplicate? Dup Sx @ DF25	✓	

METHOD PERFORMANCE	YES	NO	
Did the ICV analysis yield a concentration within 90-110% of the standard concentration? ICV used 1413 uS	✓		(a)
Did the CCV analyses yield a concentration within 90-110% of the standard concentration? CCV used 999 uS	✓		(b)
Did the duplicate sample meet the precision objective of ≤20 RPD?	✓		(c)

Robbin Apperson 6/18/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) ICV stock 1413

$\left(\frac{1333}{1413}\right)100 = 94.3\%$

(b) CCV stock = 999

$100\left(\frac{971.5}{999}\right) = 97.2\%$

(c) 1° Sx = 162,400

2° Sx = 161,275 (Dup)

2° Sx Dup = 161,275

> %RPD = Ø

$\left(\frac{162,400 - 161,275}{161838}\right)100$

= 0.70% RPD btwn 1° & Dup

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

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°? 2.3°C	✓	
Were the samples analyzed within five (5) days of receipt? C 4/16; A 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? 5	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.2	✓	

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? pH 4	✓		
Was the sample analysis temperature within 2°C of the buffer analysis temperature? Buffer = 21.3–22.6°C ; Sx: 20.8–21.0	✓		
Was the pH recorded to the nearest 0.1 pH unit?	✓		
Was the pH of one of the samples measured in duplicate? yes duplicate on 2nd Analysis for 5c	✓		(b)

METHOD PERFORMANCE	YES	NO	
Did the ICV read within ±0.1 pH unit of the assigned value? 6.99 vs 7.00	✓		
Did the CCV read within ±0.1 pH unit of the assigned value? 3.99 vs 4.00	✓		
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓		(a)

Robbin A Lipton 6/18/14
Data Validator Date

Completeness Reviewer 6-15-14
Completeness Reviewer Date

4/17/14
(a) 10 Sx = 7.09
Dup = 7.11

No Dup Analyzed on either Sx

4/21/14
(b) 10 Sx = 6.63
Dup = 6.71
20 Sx Dup 6.70

Note on 4/17/14 – 10 Sx was Analyzed in duplicate for MS/MSD. pH results were identical, but not valid since sample Altered. KAL 6/18/14

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? 21.1°C	✓	
Was the temperature of the specific gravity measurements recorded?	✓	
Was the mass of at least 5.0 mL of the water sample measured? 10.0mL	✓	
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? 0.9982	✓	

Robbin Myers 6/17/14
Data Validator Date

10-15-14
Completeness Reviewer Date

C - 4/16/14 ; A - 4/21/14

1° S_x = 1.070 Dup S_x = 1.066

$\bar{x}$ = 1.068

$$\%\,RPD = \left[\frac{|1.070 - 1.066|}{1.068}\right] \times 100^{\circ} = 0.37\,\%$$

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 2.3°C	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 4/16/14; A 4/27/14	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? 3/11/14 Cal		✓
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? $^{10}S_x$	✓	
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?	✓	

Referred to as ICB in seq.

METHOD PERFORMANCE	YES	NO	
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)? $R^2 = 0.9999$	✓		
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? 6.208, 0.236, 0.238 / 1.0	✓		
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?	✓		(d)

Kathleen Alpers 6/26/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) ICV 50 $\left(\frac{51.07}{50}\right)100$ = 102.1% rec

ICV 5 $\left(\frac{5.303}{5}\right)100$ = 106.1% rec

(b) LCS (5.033/4.850)100 = 103.8% rec

LCSR (5.015/4.850)100 = 103.4% rec

LCSD (4.822/4.850)100 = 99.4% rec

[Spk] = 4.850

(c) [Spk] = 4.650 [$^{10}S_x$] = 0.3480

MS $\left(\frac{5.078 - 0.3480}{4.650}\right)100$ = 101.7% rec

MSD $\left(\frac{5.198 - 0.3480}{4.650}\right)100$ = 104.3% rec

(d) $RPD_{MS/MSD} = \frac{|5.078 - 5.198|}{5.138}$

= 2.34%

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 4/16/14; A 4/22/14	✓	

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? 2mL ↑ 100	✓	
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?	✓	

a)

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?	✓	

b)

Robbin Dipon 6/17/2014
Data Validator Date

10-15-14
Completeness Reviewer Date

a) $S_x = 104,200$ [SpK] = 50K

MS = 151650 $\left(\frac{151,650 - 104,200}{50000}\right) \times 100 = 94.9\%$

MSD = 152,900 $\left(\frac{152,900 - 104,200}{50,000}\right) \times 100 = 97.4$

$\%RPD = \left(\frac{|151,650 - 152,900|}{152275}\right) 100$

$= 0.821$

b) MB = ∅

LCS ~~MS~~ = 1011

LCSD = 1015

[SpK] = 1000

Recovery

$\left(\frac{1011 - 0}{1000}\right) 100 = 101.0$

$\left(\frac{1015 - 0}{1000}\right) 100 = 101.5$

$\%RPD = \left(\frac{|1011 - 1015|}{1013}\right) \times 100$

$= 3.95\%$

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 4/16/14; A 4/23/14	✓	
Were the samples allowed to warm to room temperature prior to filtration?	UNKNOWN	a)

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? Ø	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD?	✓	b)

Robin Alper 6/17/14
Data Validator Date

10-15-14
Completeness Reviewer Date

a) No data supporting samples warmed to room temp.

b) MB = ND

1°Sx = 98 mg/L

1°SxDup = 95 mg/L

2°Sx = 94 mg/L

$\left(\frac{|98-95|}{96.5}\right)100 = 3.11\%$ RPD

c) Recoveries

[SpK] = 92.4

LCS = 92 $\left(\frac{92}{92.4}\right)100 = 99.6\%$ recovery

LCSDup = 90 $\left(\frac{90}{92.4}\right)100 = 97.4\%$ recovery

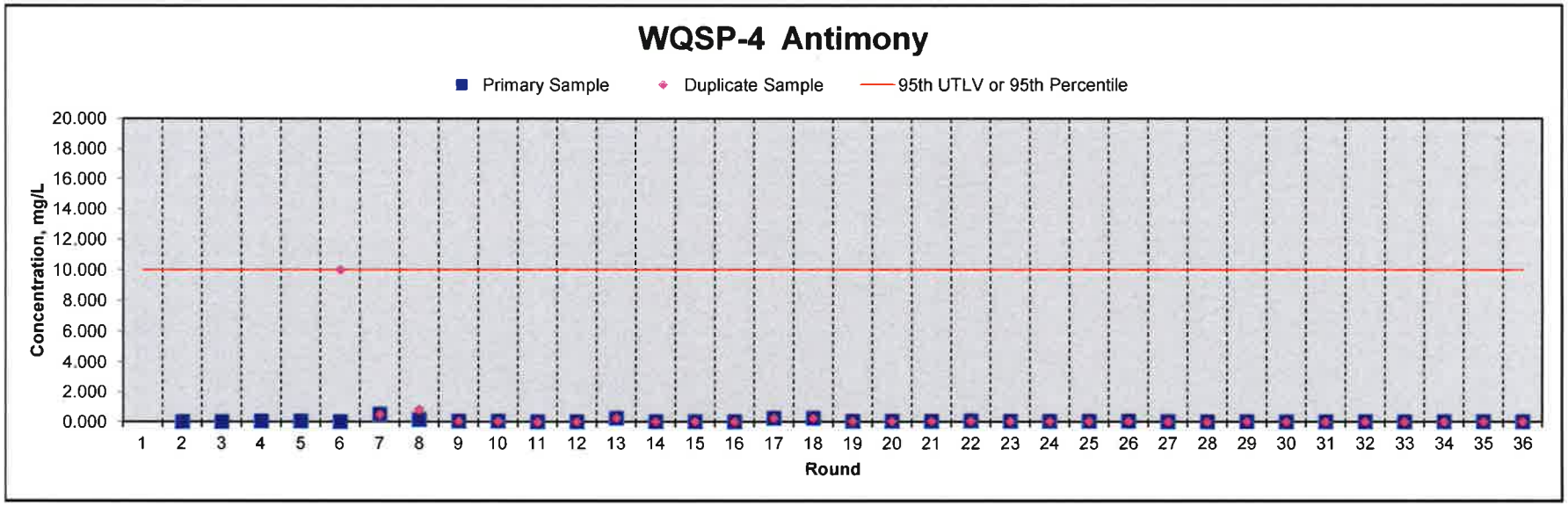
$\%\,RPD = \left(\frac{|92-90|}{91}\right)100 = 2.20$

WQSP-4

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

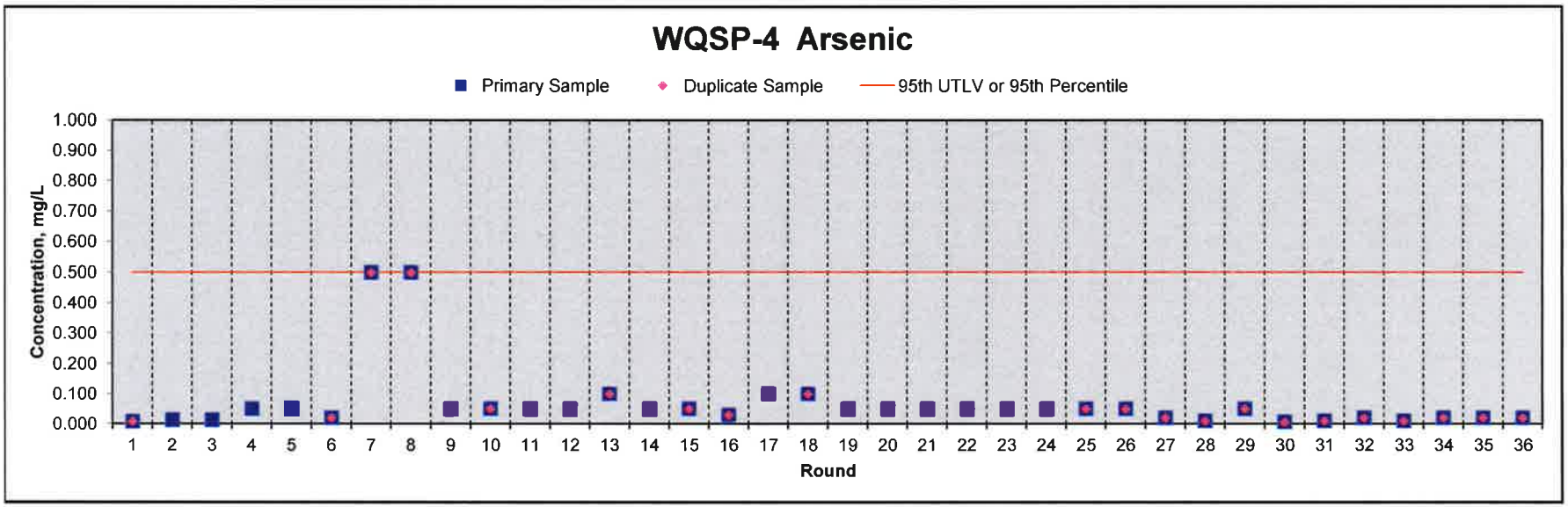
WQSP-4 Antimony

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	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
Antimony	36	04/16/14	05/05/14	< 0.020	< 0.020	mg/L	0.020	< 10.0



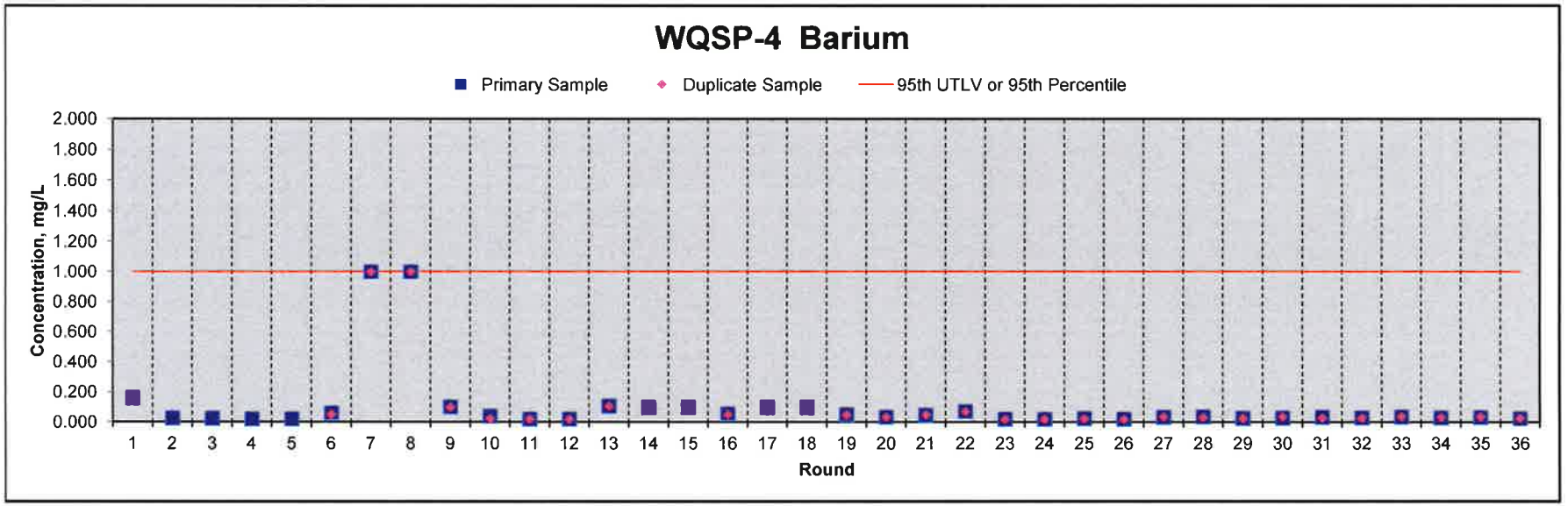
WQSP-4 Arsenic

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	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
Arsenic	36	04/16/14	05/05/14	< 0.020	< 0.020	mg/L	0.020	< 0.5



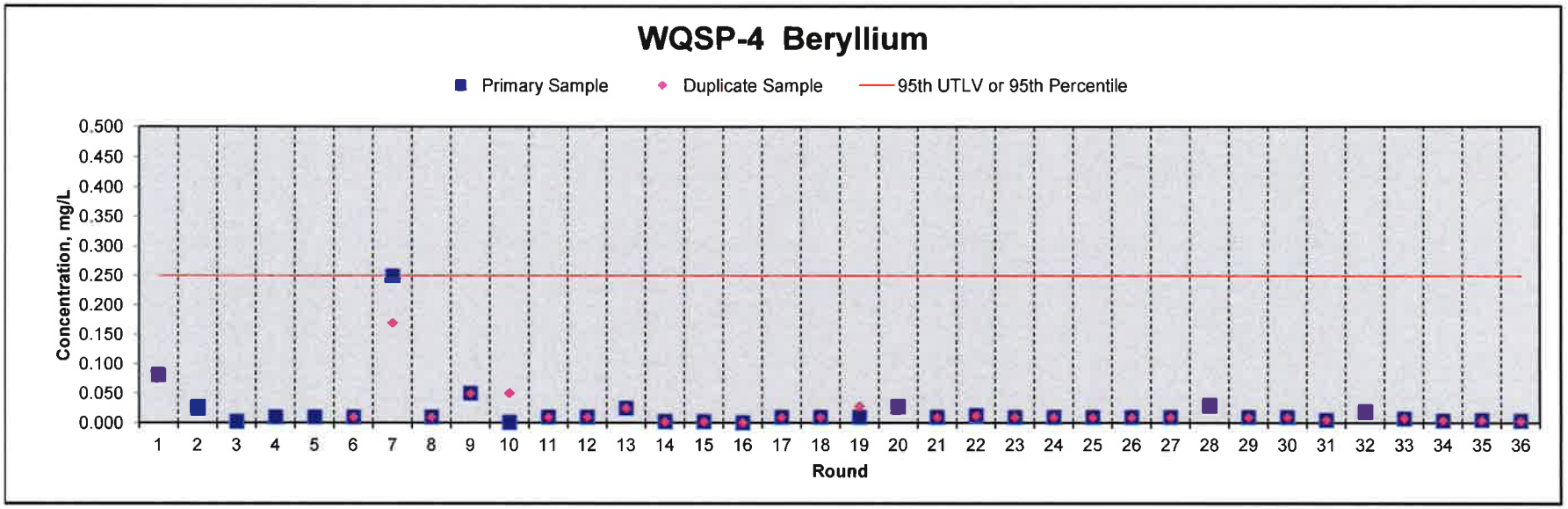
WQSP-4 Barium

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	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
Barium	36	04/16/14	04/24/14	0.0248	0.0270	mg/L	0.00625	1.00



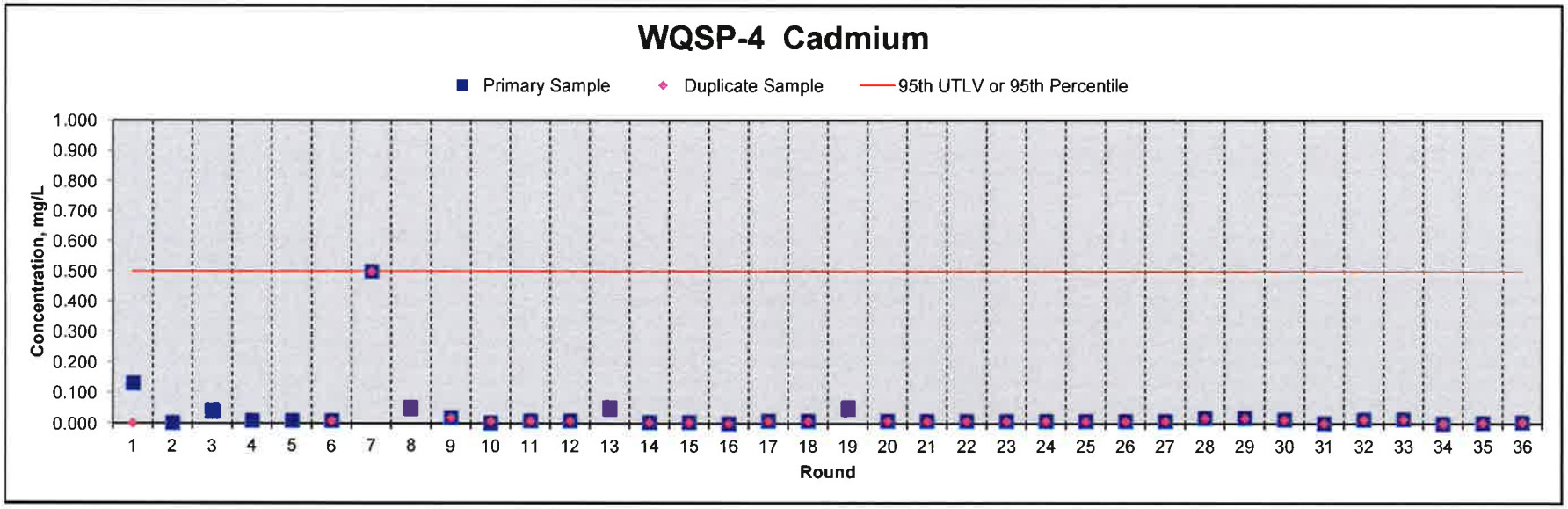
WQSP-4 Beryllium

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	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
Beryllium	36	04/16/14	04/24/14	0.0039	< 0.00353	mg/L	0.00353	0.25



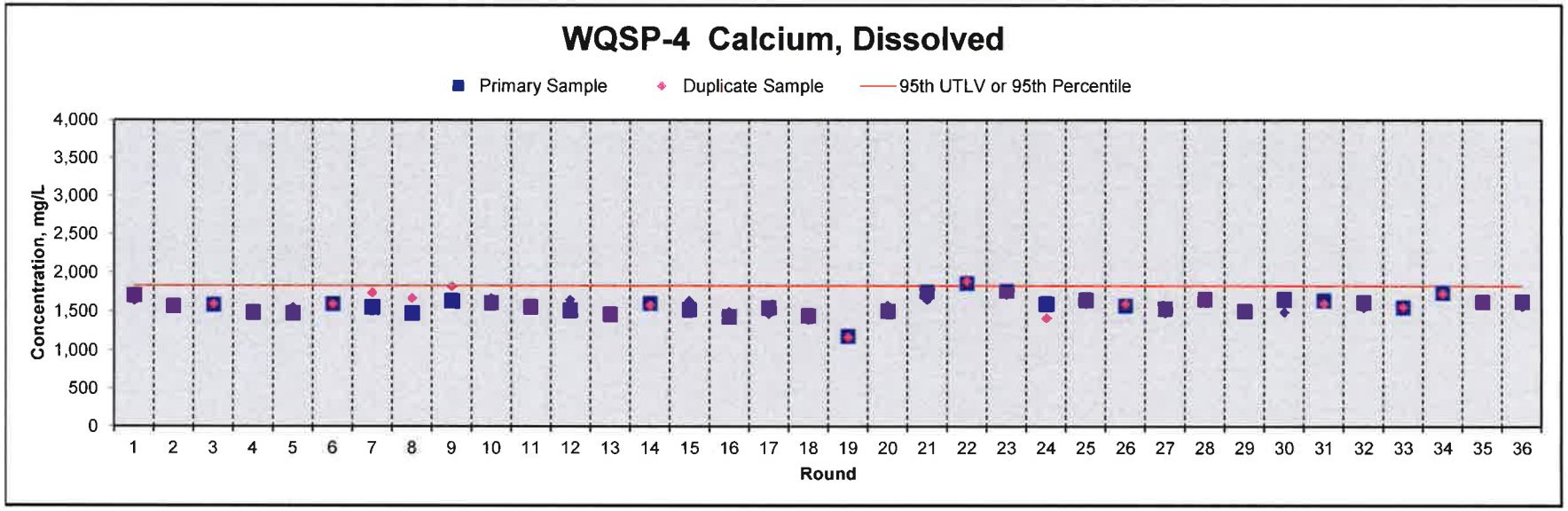
WQSP-4 Cadmium

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	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
Cadmium	36	04/16/14	04/24/14	< 0.00628	< 0.00628	mg/L	0.00628	< 0.5



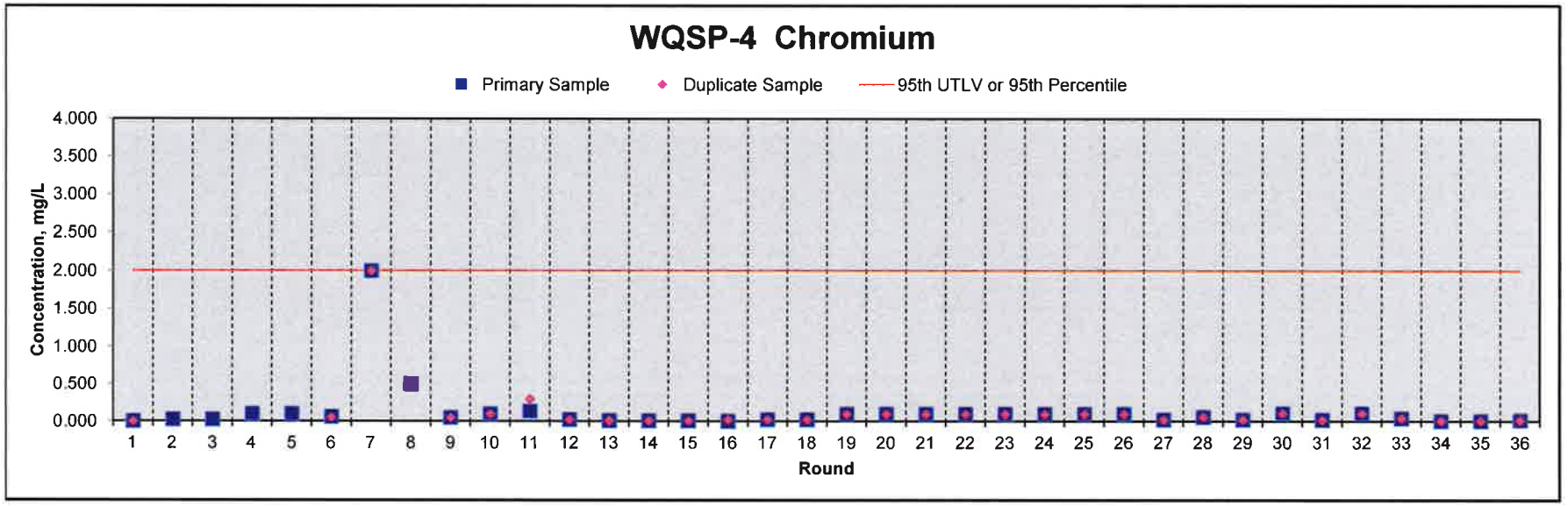
WQSP-4 Calcium, Dissolved

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	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
Calcium	36	04/16/14	04/23/14	1,630	1,570	mg/L	0.773	1,834



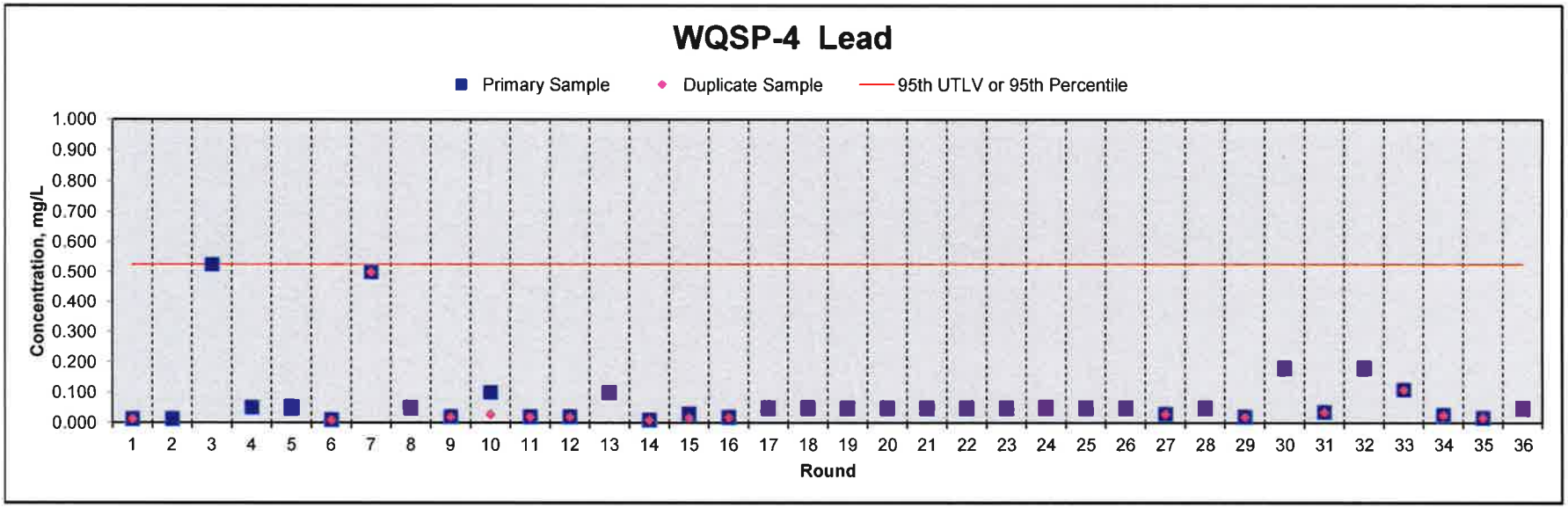
WQSP-4 Chromium

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	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
Chromium	36	04/16/14	04/24/14	< 0.0168	< 0.0168	mg/L	0.0168	< 2.0



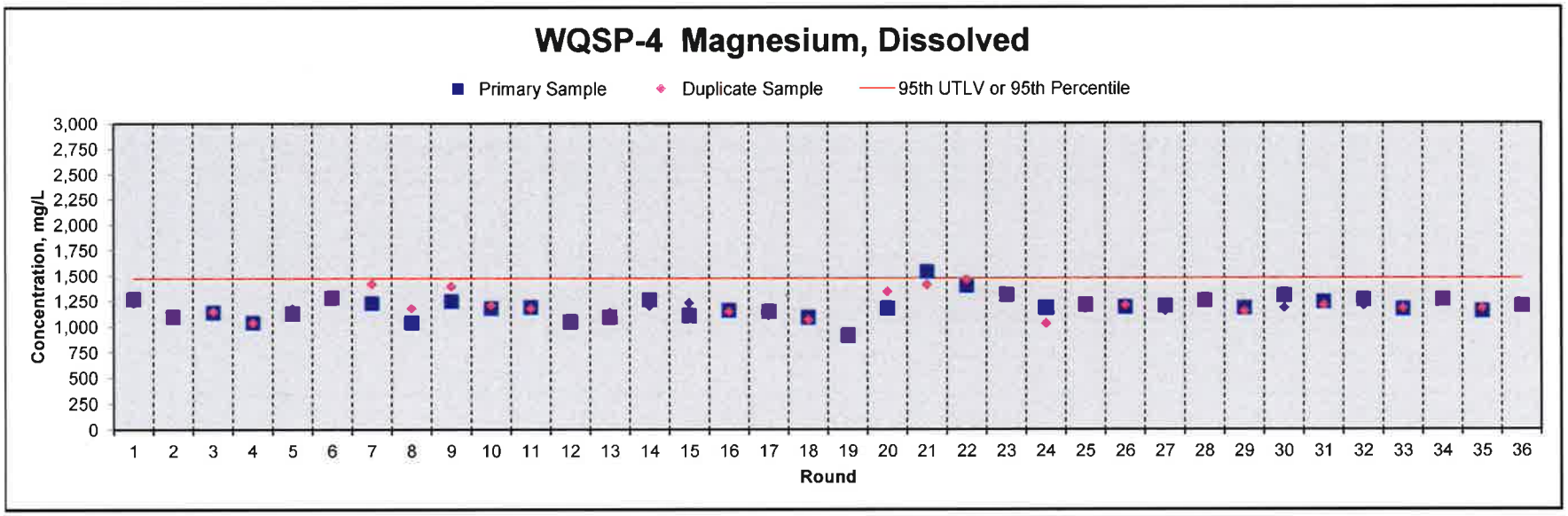
WQSP-4 Lead

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	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
Lead	36	04/16/14	04/24/14	< 0.0477	< 0.0477	mg/L	0.0477	0.525



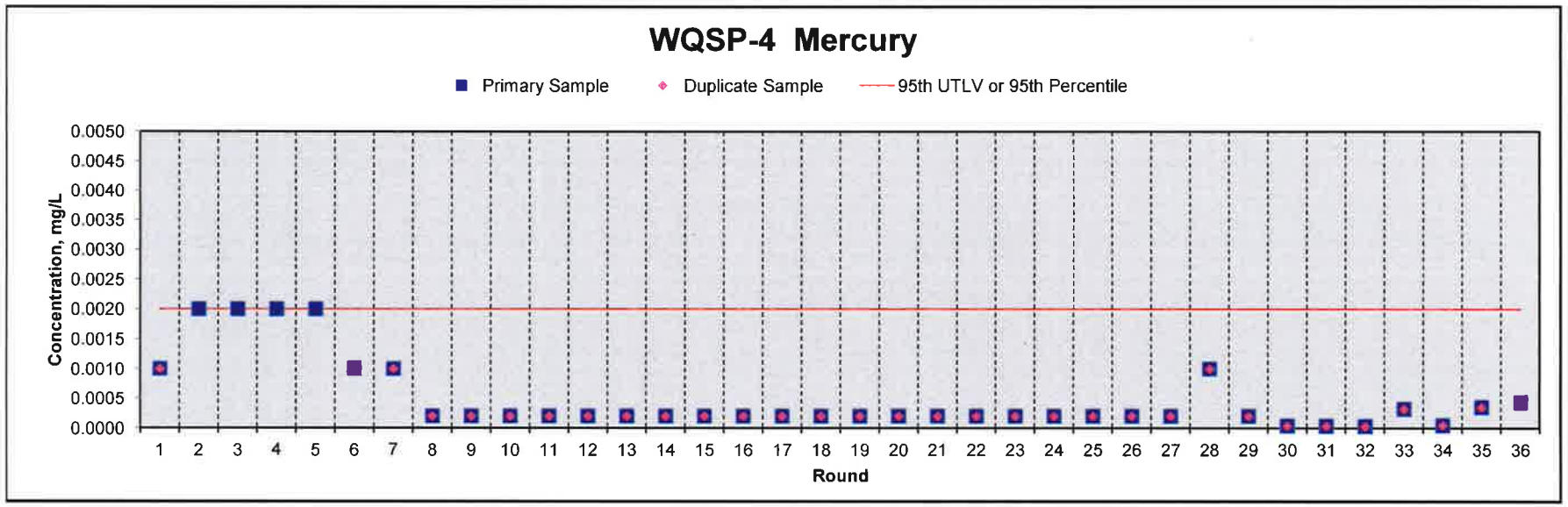
WQSP-4 Magnesium, Dissolved

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	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
Magnesium	36	04/16/14	04/23/14	1,200	1,180	mg/L	0.377	1,472



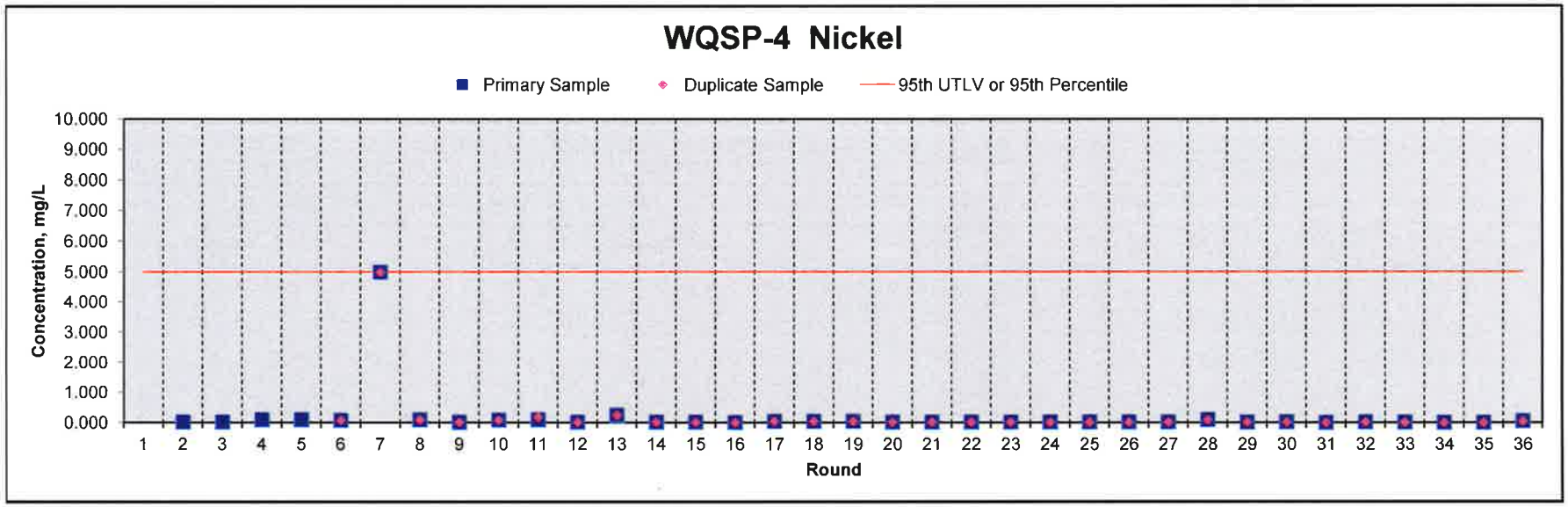
WQSP-4 Mercury

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	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
Mercury	36	04/16/14	04/21/14	< 0.000435	< 0.000435	mg/L	0.000435	< 0.002



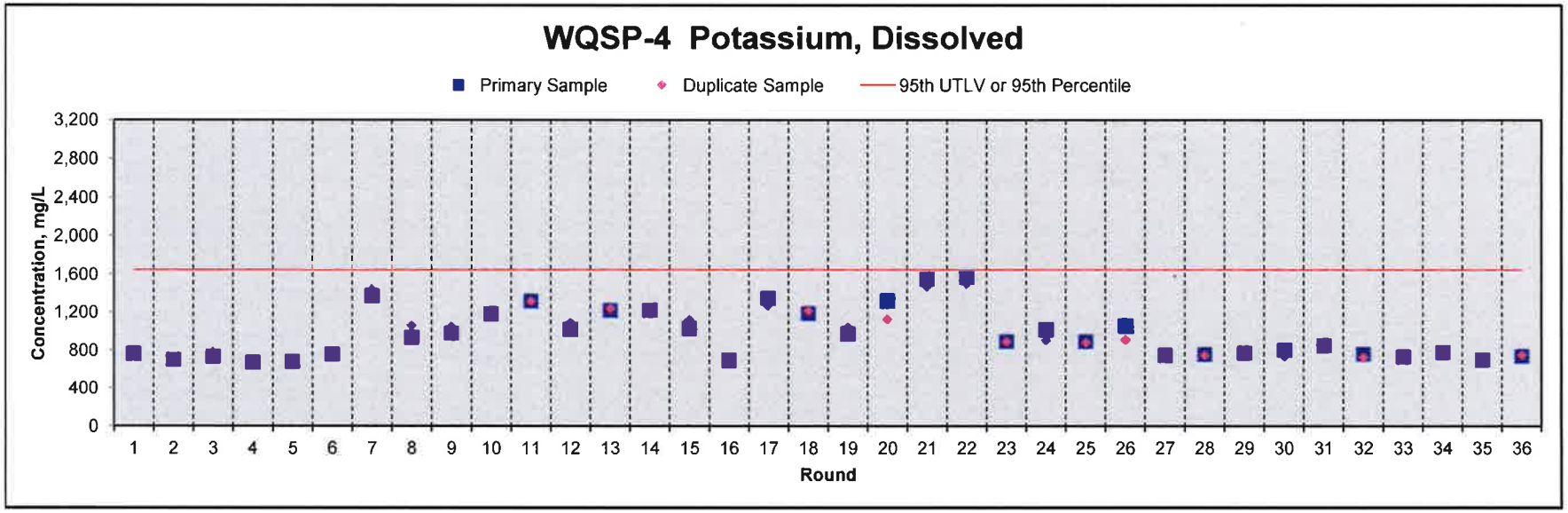
WQSP-4 Nickel

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	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
Nickel	36	04/16/14	04/24/14	0.0581	< 0.0504	mg/L	0.0190	< 5.0



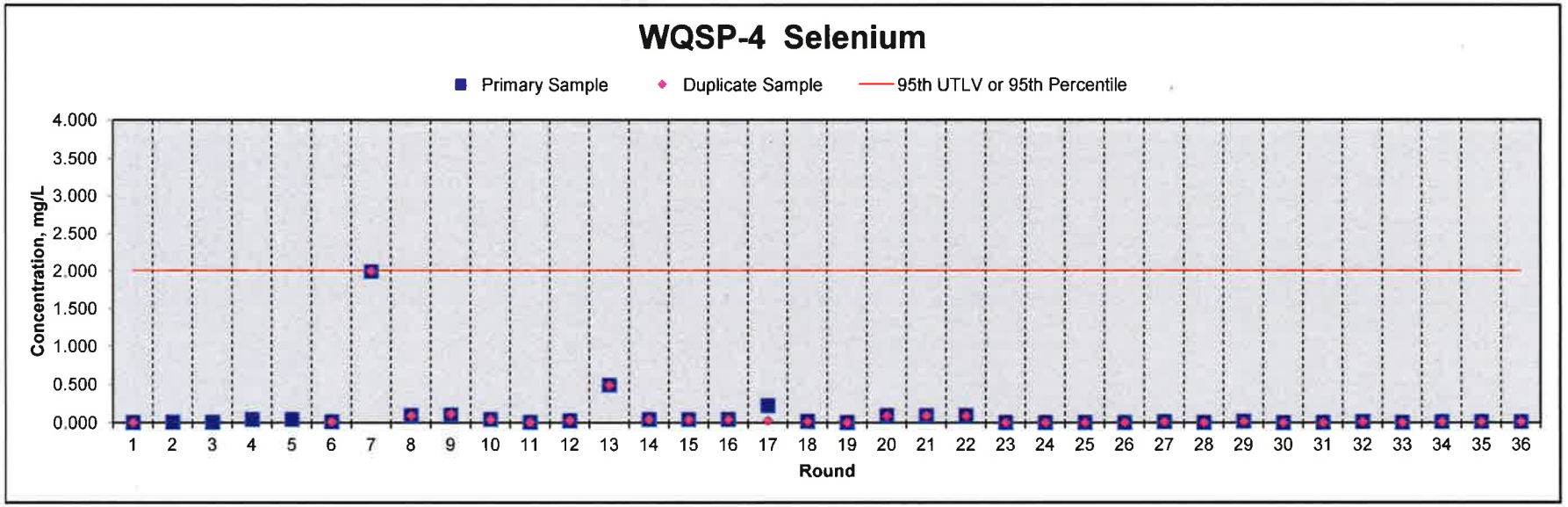
WQSP-4 Potassium, Dissolved

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	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
Potassium	36	04/16/14	04/24/14	742	757	mg/L	4.05	1,648



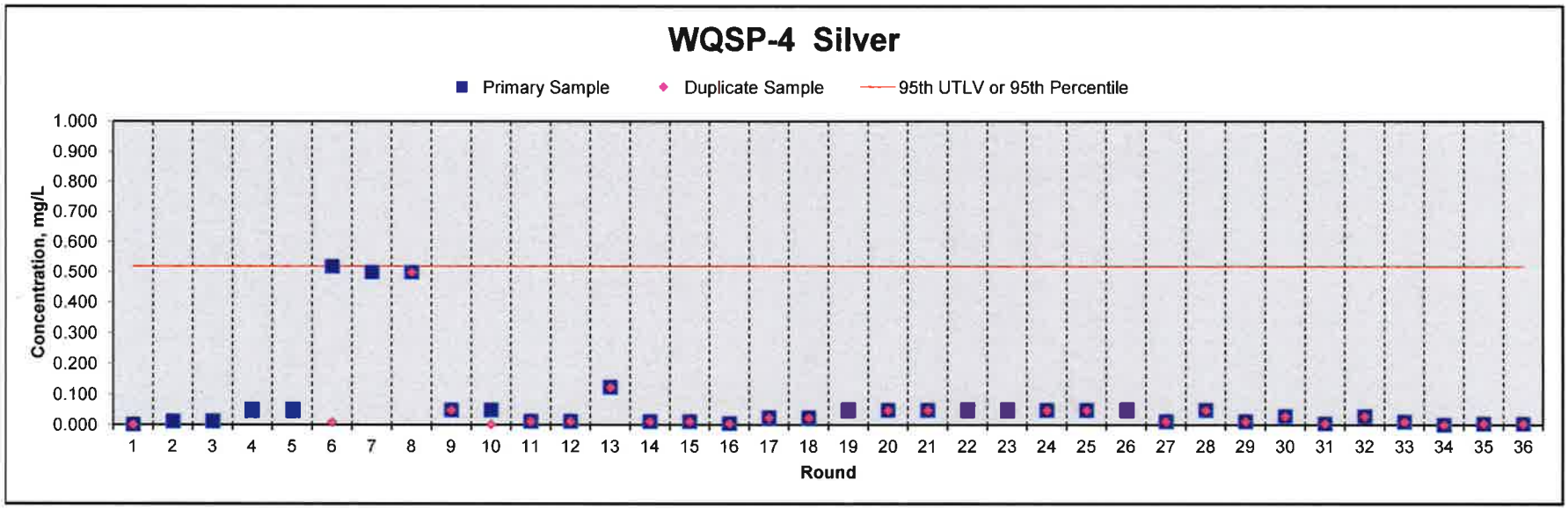
WQSP-4 Selenium

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	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
Selenium	36	04/16/14	05/05/14	< 0.020	< 0.020	mg/L	0.020	2.009



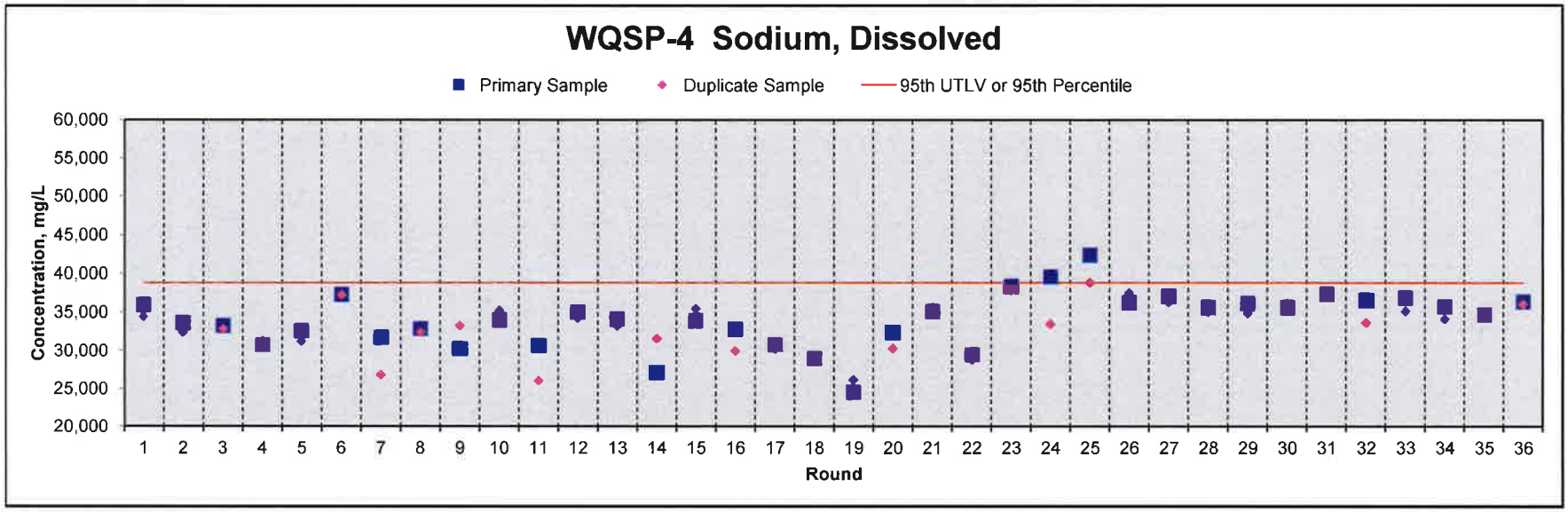
WQSP-4 Silver

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	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
Silver	36	04/16/14	04/24/14	< 0.00522	< 0.00522	mg/L	0.00522	0.519



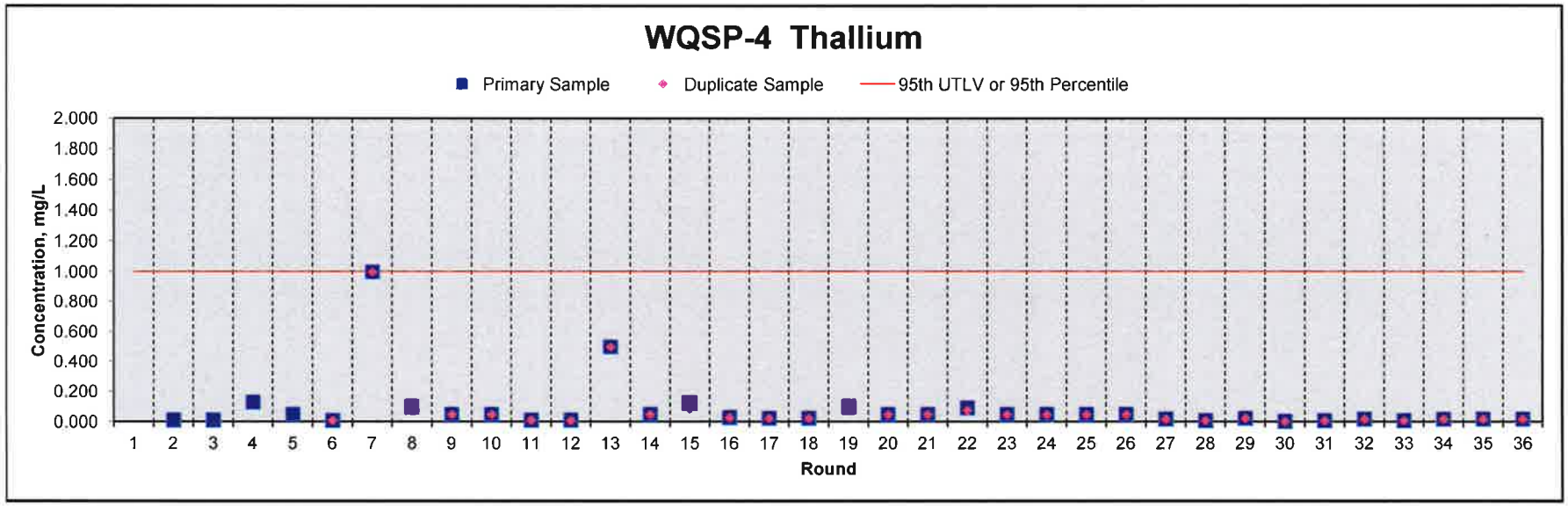
WQSP-4 Sodium, Dissolved

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	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
Sodium	36	04/16/14	04/24/14	36,400	36,100	mg/L	60.7	38,790



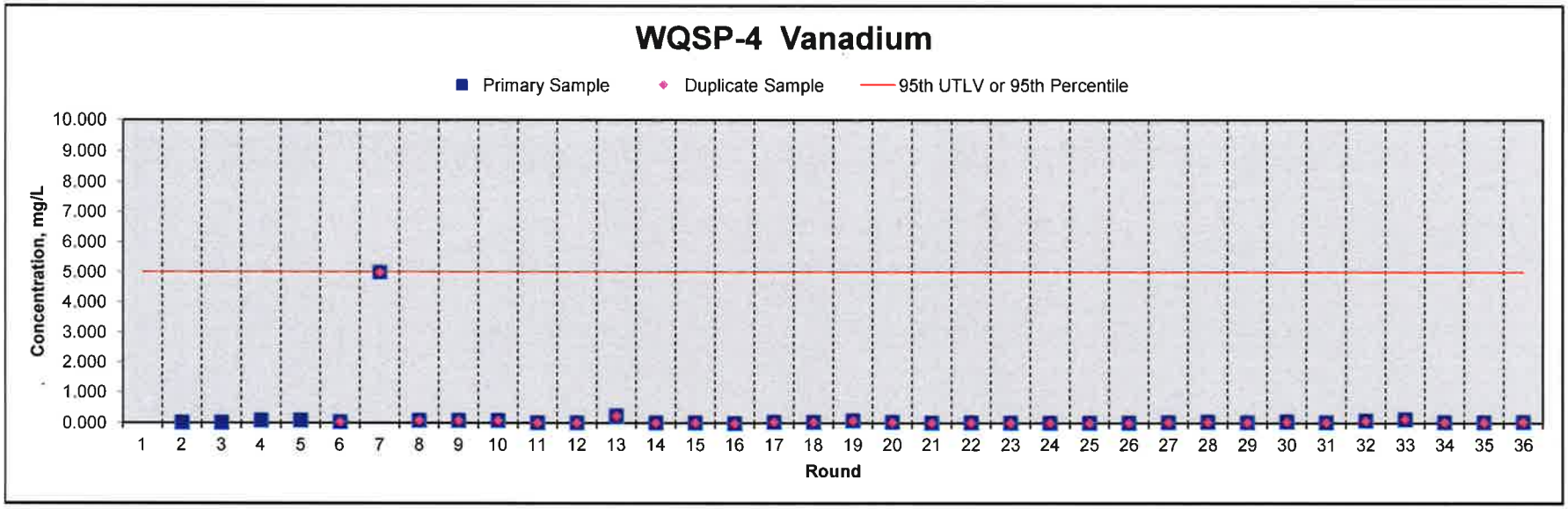
WQSP-4 Thallium

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	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
Thallium	36	04/16/14	05/05/14	< 0.020	< 0.020	mg/L	0.020	1.00



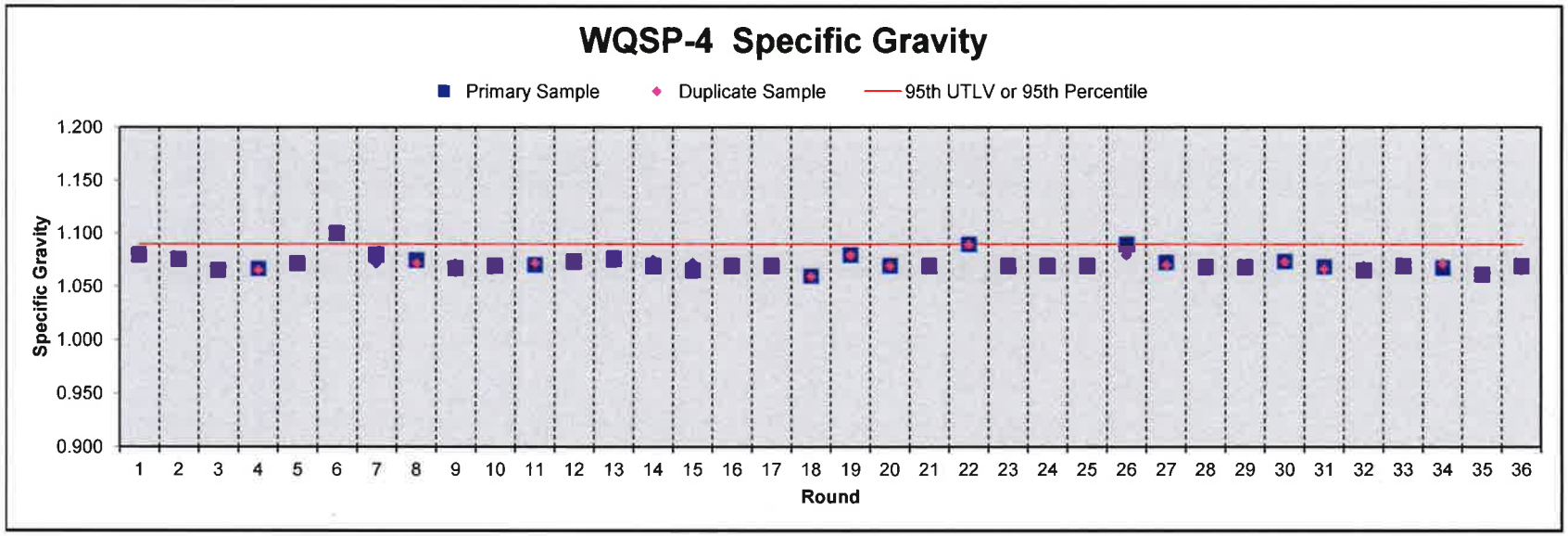
WQSP-4 Vanadium

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	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
Vanadium	36	04/16/14	04/24/14	< 0.0548	< 0.0548	mg/L	0.0548	< 5.0



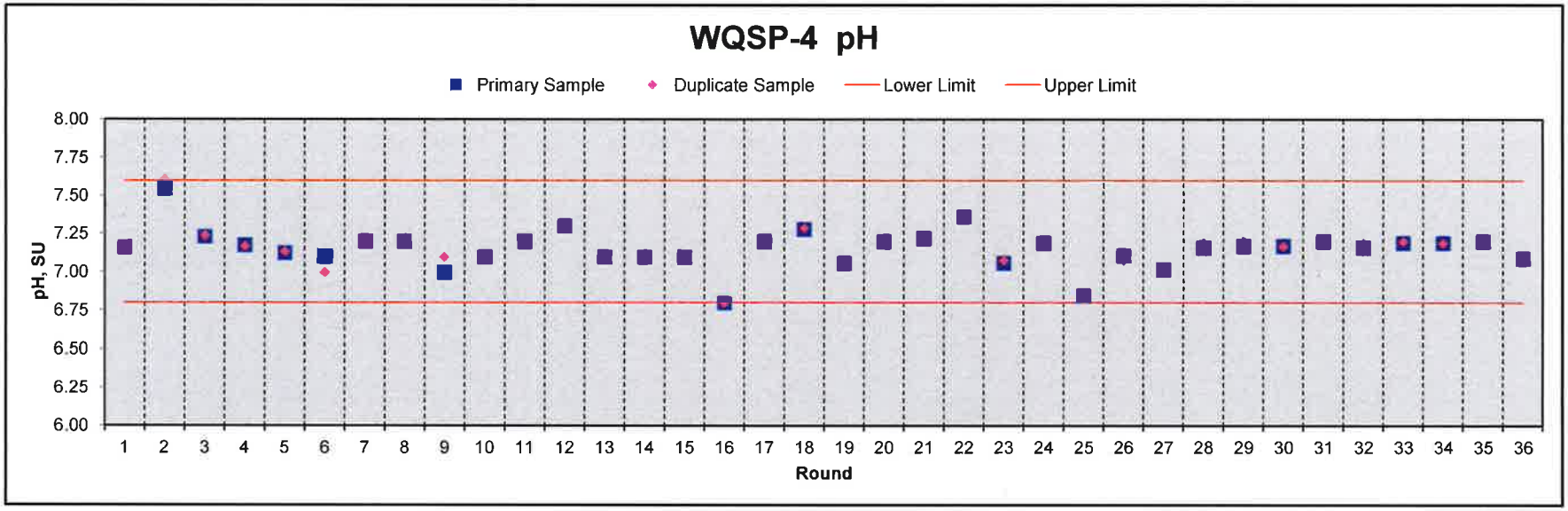
WQSP-4 Specific Gravity

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
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
Specific Gravity	36	04/16/14	04/21/14	1.070	1.066	unitless	0.0	1.09



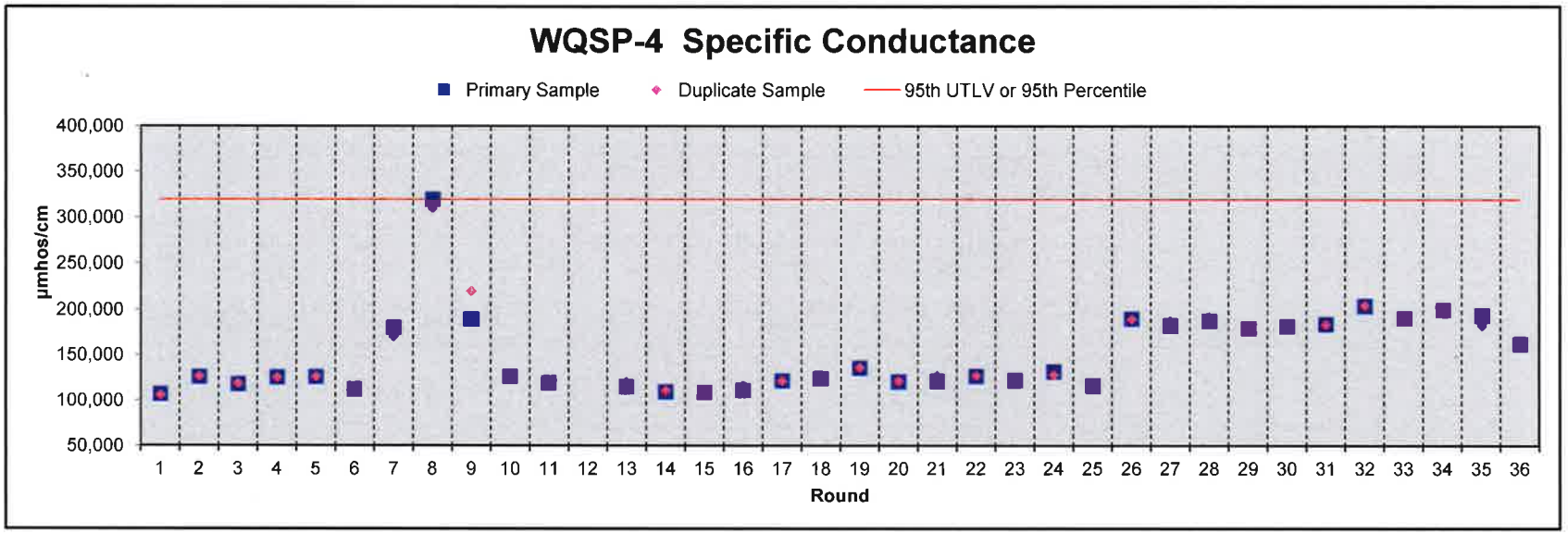
WQSP-4 pH

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	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
pH	36	04/16/14	04/17/14	7.09	7.11	SU	0.10	6.8	7.6



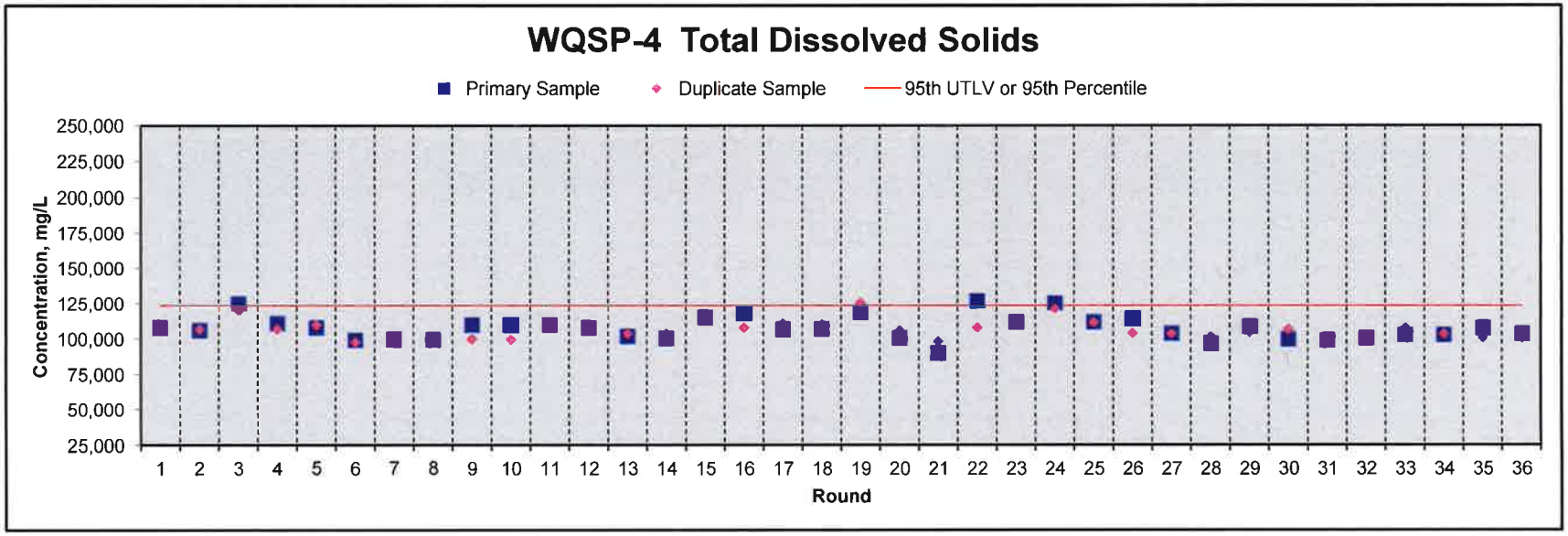
WQSP-4 Specific Conductance

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	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
Specific Conductance	36	04/16/14	04/21/14	162,000	161,000	µmhos/cm	0.25	319,800



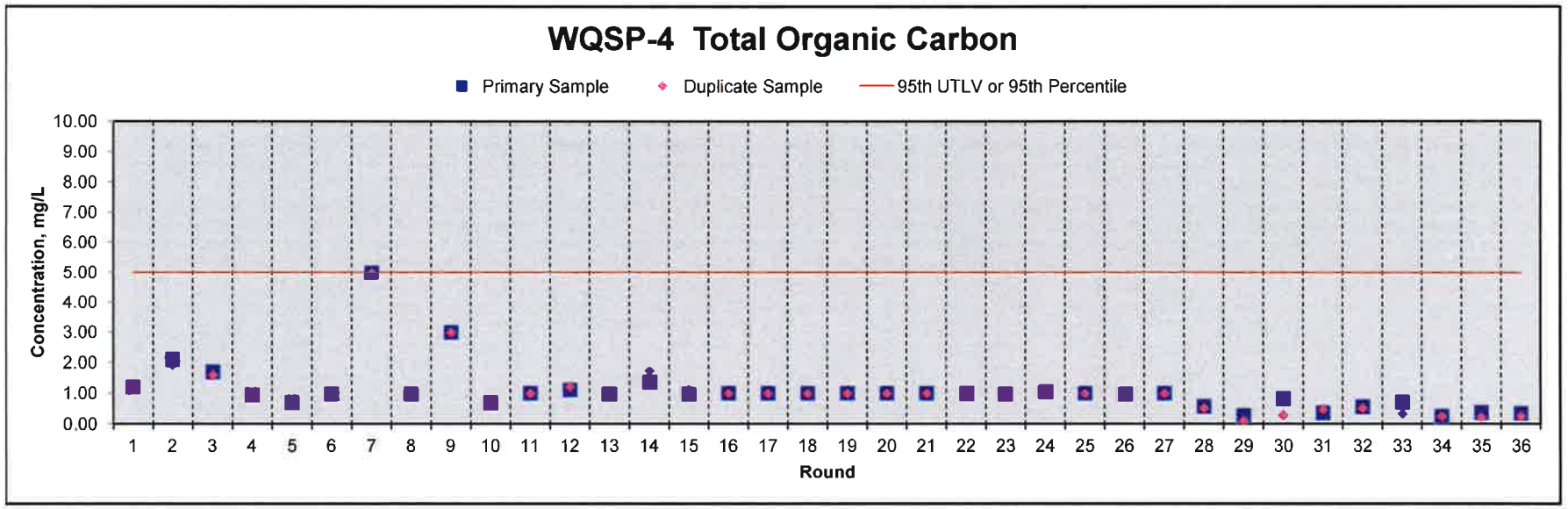
WQSP-4 Total Dissolved Solids

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	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
Total Dissolved Solids	36	04/16/14	04/22/14	104,000	101,000	mg/L	492	123,500



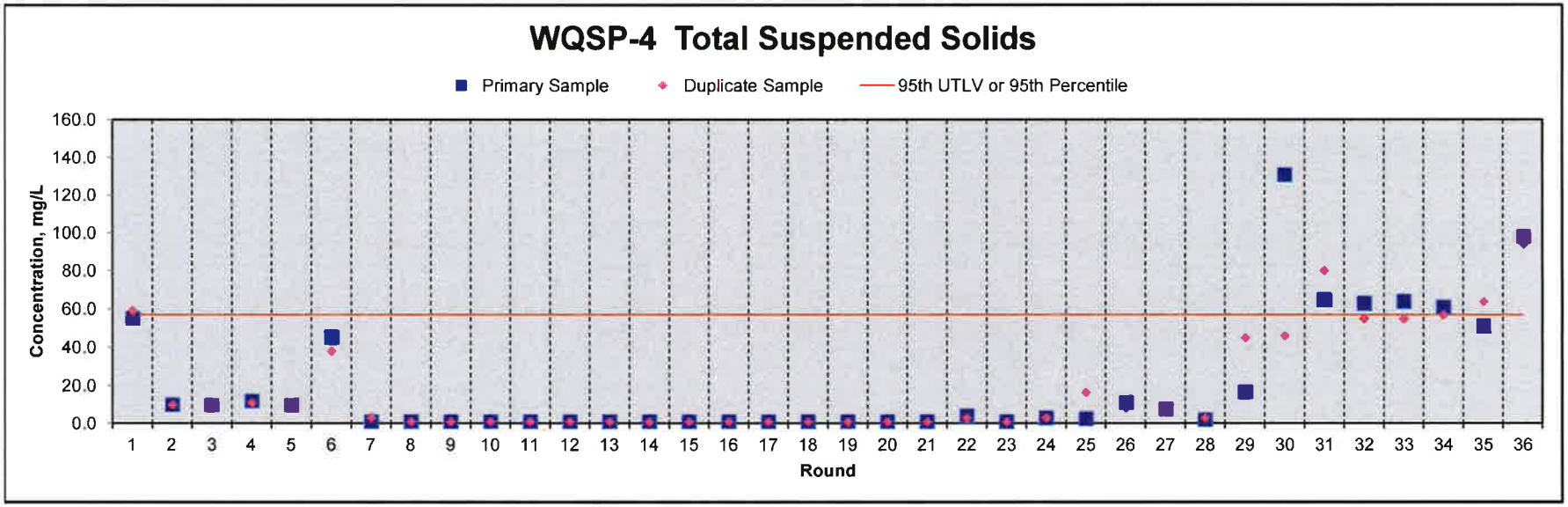
WQSP-4 Total Organic Carbon

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	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
Total Organic Carbon	36	04/16/14	04/27/14	0.35	0.25	mg/L	0.12	< 5.0



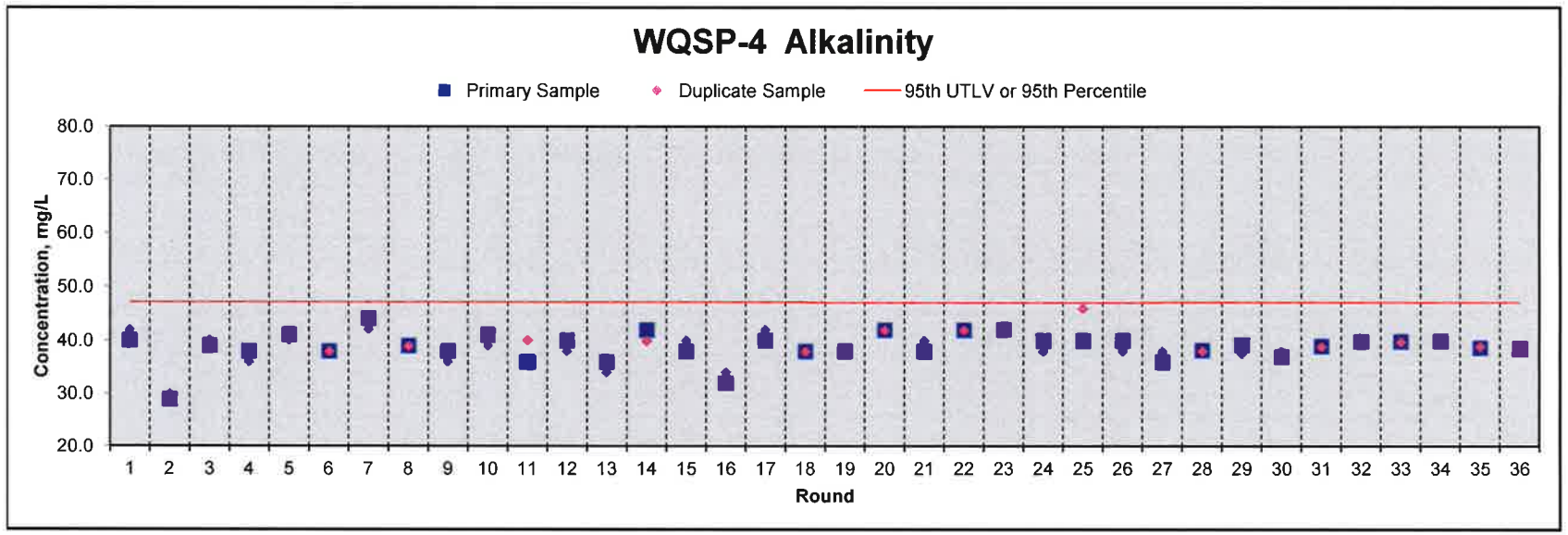
WQSP-4 Total Suspended Solids

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	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**
Total Suspended Solids	36	04/16/14	04/23/14	**98**	**94**	mg/L	3.1	**57.0**



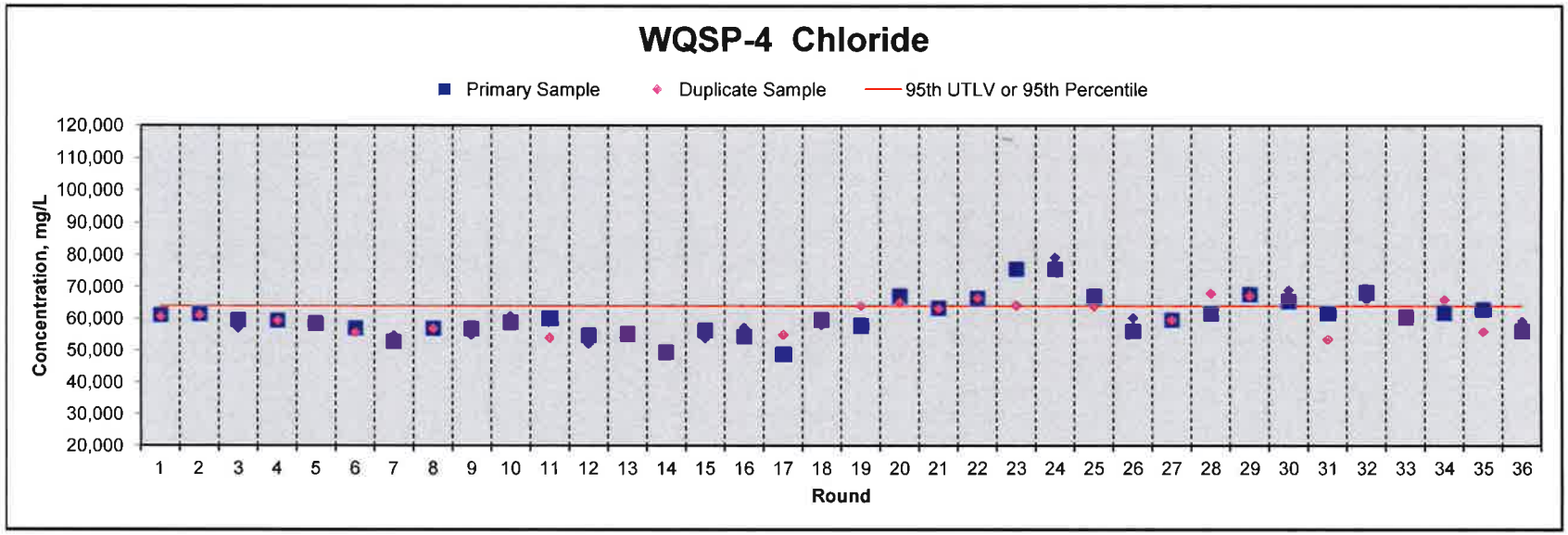
WQSP-4 Alkalinity

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	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
Alkalinity	36	04/16/14	04/17/14	38.6	39.0	mg/L	4.0	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	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
Chloride	36	04/16/14	04/18/14	56,300	59,400	mg/L	1,950	63,960



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: 140418012
Order Date: 4/18/2014

Contact Name: ANDY FREEMAN
Project Name: 1404783
Comment:

Sample #: 140418012-001 **Customer Sample #:** 1404783-001F / GW-WQ4-C-R36

Recv'd: ☑ **Collector:** **Date Collected:** 4/16/2014
Quantity: 1 **Matrix:** Water **Date Received:** 4/18/2014 10:35:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***

Sample #: 140418012-002 **Customer Sample #:** 1404783-002F / GW-WQ4-C-R36DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 4/16/2014
Quantity: 1 **Matrix:** Water **Date Received:** 4/18/2014 10:35:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***

Sample #: 140418012-003 **Customer Sample #:** 1404783-005B / GW-WQ4-C-R36 METALS BLANK PRESERVED

Recv'd: ☑ **Collector:** **Date Collected:** 4/16/2014
Quantity: 1 **Matrix:** Water **Date Received:** 4/18/2014 10:35:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***

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

Order ID: 140418012
Order Date: 4/18/2014

Contact Name: ANDY FREEMAN

Project Name: 1404783

Comment:

SELENIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***

Sample #: 140418012-004 **Customer Sample #:** 1404783-006B / GW-WQ4-C-R36 METALS BLANK UNPRESERV

Recv'd: ☑ **Collector:** **Date Collected:** 4/16/2014
Quantity: 1 **Matrix:** Water **Date Received:** 4/18/2014 10:35:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	4/30/2014	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	4.2
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

140418 012 HALL Last Due 4/30/2014
1st SAMP 4/16/2014 1st RCVD 4/18/2014
1404783

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	1404783-001F	GW-WQ4-C-R36	500HDPEHNO3	Aqueous	4/16/2014 9:08:00 AM	1	SEE BELOW
2	1404783-002F	GW-WQ4-C-R36DUPLICATE	500HDPEHNO3	Aqueous	4/16/2014 9:23:00 AM	1	SEE BELOW
3	1404783-005B	GW-WQ4-C-R36 Metals Blank Preserved	500HDPEHNO3	Aqueous	4/16/2014 9:59:00 AM	1	SEE BELOW
4	1404783-006B	GW-WQ4-C-R36 Metals Blank Unpreserved	500HDPEHNO3	Aqueous	4/16/2014 9:52:00 AM	1	SEE BELOW

MWB

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZE FOR TOTAL As, Sb, Se, Tl BY 6020. LEVEL 4 QA/QC PACKAGE REQUIRED. PLEASE DO MS/MSD ON 1404783-001F. REPORT TO 0.001 mg/L IFF POSSIBLE, INCLUDE LCS & LCSD. SAMPLE MAY HAVE HIGH TDS

Relinquished By:	Date: 4/17/2014	Time: 1:33 PM
Relinquished By:	Date:	Time:
Relinquished By:	Date:	Time:

TAT: Standard RUSH

ANATEK LABS RECEIVING LIST

- [x] RECEIVED INTACT — TEMP: 4.2 °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: 4/18/14 10:35 INSPECTED BY: BT

REPORT TRANSMITTAL DESIRED:

Y (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

ples ___ °C Attempt to Cool ? ___

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: 1404783 | RcptNo: 1

Received by/date: AT 04/17/14

Logged By: Anne Thorne 4/17/2014 8:45:00 AM

Completed By: Anne Thorne 4/17/2014

Reviewed By: 04/17/14

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 04/17/14

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	2.3	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1150

Page 1 of 1

Project Number:	Project Name:
T409304-1	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
4/16/14	10:05	GW	GW-WQ4-C-R36-N1	6	X								Use for MS/MSD -001
1	10:13	1	-N1D	4	X								-002
1	09:54	DI	-N2	4	X								Field Blank -003
N/A	N/A	1	-N3	4	X								Trip Blank -004
4/16/14	10:25	GW	-N4	4		X							use for MS/MSD -001
	10:30		-N4D	2		X							-002
	09:08		-N5	6			X						use for MS/MSD -001
	09:23		-N5D	2			X						-002
	09:36		-N6	2				X					use for MS/MSD -001
	09:40		-N6D	2				X					-002
	09:29		-N7	1					X				use for MS/MSD -001
	09:29	GW	-N7D	1					X				-002
	~~09:59~~ 09:59	DI	-N12	1				X					Metals Blank - Pres 09:59 -005
4/16/14	09:52	1	-N13	1				X					1 1 -N Pres -006

Requested Analyses

Relinquished By: (Signature, Date/Time) Kathleen Alpoon 4/16/14 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) 0845 04/17/14

Requested Turnaround Time: Report due 5/22/2014

☒ Routine ☐ Rush

Sample Receipt Remarks: 2.3°C

Special Instructions: Analyze LCS in duplicate per permit

use primary GW Sample for MS/MSD on all parameters

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: 8758 4779 1129

Fed Ex 8758 4779 1130

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@wipp.ws

Analytical Laboratory: 1404783 HEAL Albuquerque, NM

WHITE – Analytical Laboratory
YELLOW – Field Copy
PINK – Record Copy
DI – Deionized Water
AF – Air Filter(s)
SE – Sediment
SW – Surface Water
GW – Groundwater
AN – Animal(s)
SO – Soil
VG – Vegetation

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

APPENDIX 7

WELL WQSP-5

ANALYTICAL RESULTS

WQSP-5

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-5, Culebra, Round 36

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 36 (after pump replacement), the static water level was 401.73 ft_{btoc}. One wbv for WQSP-5 was determined to be 209.0 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).

Due to radiological events that occurred at the WIPP Site in February, the sampling team collected a pre-installation line rinse sample. The dedicated sampling line was flushed with approximately 2 liters of deionized water prior to installation rinse. Rinsate was collected in a certified container, preserved with nitric acid (pH <2) and considered an additional retain sample.

Round 36 pumping of WQSP-5 began on 4/28/2014 at 09:13 and ended on 4/29/2014 at 12:27. The well was purged for 27.2 hours with an average flow rate of 0.44 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 718 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 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).

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 4/29/2014 after approximately 665 gallons of groundwater (≈ 3.2 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

On day 1, approximately 637 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 15.9 cell volumes per minute; thus, approximately 79.5 volumes of groundwater (3,185 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 measurements varied less than 5% over the last three measurements within 15 minutes. Specific gravity was stable after the third measurement (approximately 52 minutes). Based on results observed, the sample team proceeded with DMP hazardous and radiological constituent sampling on day 2.

Table 1. Pumping Characteristics and Measurement of Field Parameters for WQSP-5 DMW, Round 36[a,b,c].

Item	Day 1		Day 2	
Date	4/28/2014		4/29/2014	
Pump Speed, Hz	52.0		52.0	
Average Flow Rate, gpm	0.49		0.40	
Rate of Exchange, cell volumes/min	15.9		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	50,200	48,000	NR	NR
Temperature, °C	22.2	22.6	NR	NR
pH, SU	7.83	7.68	NR	NR
Specific Gravity	1.024	1.026	NR	NR
Time to Parameter Stability, hr:min	0:50		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 measured in Round 36 were compared to the average results from the previous 35 rounds (Table 2). The current values for pH (7.68 S.U.), temperature (22.6°C), and SG (1.026) were similar to the average results from the previous samplings (7.67 S.U., 22.3°C and 1.025 for pH, temperature and SG, respectively). Specific conductance was higher (48,000 µmhos/cm) when compared to previous rounds (43,629 µmhos/cm). Specific gravity, pH and temperature were within the normal limits observed for WQSP-5 over the past 19 years; however, SC was outside the upper historical limit.

Table 2. Comparison of Round 36 DMW Measurements to Historical Results from Rounds (1-35) for WQSP-5.

Field-analyzed Parameter	Historical Data (Rounds 1 – 35)[a,b]			Measurement Results, Round 36[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	43,629	41,448	45,810	48,000
Temperature, °C	22.3	21.2	23.4	22.6
pH, S.U.	7.67	7.29	8.05	7.68
Specific Gravity	1.025	0.974	1.076	1.026

[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
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 11, 2014

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

RE: WIPP DMP OrderNo.: 1404B92

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 4/30/2014 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

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#: **1404B92**
11-Jun-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1404B92-001	WQ5-C-R36		4/29/2014 10:21:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-001	WQ5-C-R36		4/29/2014 10:21:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-001	WQ5-C-R36		4/29/2014 10:21:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-001	WQ5-C-R36		4/29/2014 10:21:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-001	WQ5-C-R36		4/29/2014 10:21:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-001	WQ5-C-R36		4/29/2014 10:21:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-002	WQ5-C-R36-Duplicate		4/29/2014 10:23:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-002	WQ5-C-R36-Duplicate		4/29/2014 10:23:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-002	WQ5-C-R36-Duplicate		4/29/2014 10:23:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-002	WQ5-C-R36-Duplicate		4/29/2014 10:23:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-002	WQ5-C-R36-Duplicate		4/29/2014 10:23:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-002	WQ5-C-R36-Duplicate		4/29/2014 10:23:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-003	WQ5-C-R36-Field Blank		4/29/2014 10:51:00 AM	4/30/2014 8:40:00 AM	Aqueous
1404B92-004	WQ5-C-R36-Trip Blank			4/30/2014 8:40:00 AM	Trip Blank

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: The % RPD was high for 2,4-Dinitrophenol and pentachlorophenol in the MSD. All other

acceptance criteria were met.
6. Samples: The phenold d5 surrogate was slightly low in sample WQ5 -R36. All other 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.

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#: **1404B92**
Date: **6/11/2014**

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.

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

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#: **1404B92**

04-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1404B92-001A	WQ5-C-R36	4/29/2014 10:21:00 AM	Aqueous	EPA Method: 8260B			5/2/2014 3:19:06 PM
1404B92-001B				SM 5310B: TOC			5/5/2014 1:42:40 PM
1404B92-001C				EPA Method 8270C: Semivolatiles		5/5/2014 10:44:04 AM	5/7/2014 11:52:29 AM
1404B92-001D				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/6/2014 12:38:38 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:25:08 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:27:19 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:29:13 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/15/2014 3:26:58 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:31:14 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:59:09 PM
				EPA Method 7470: Mercury		4/30/2014 12:34:03 PM	4/30/2014 3:32:33 PM
				EPA Method 7470: Mercury		4/30/2014 12:34:03 PM	4/30/2014 3:59:14 PM
				EPA Method 7470: Mercury		4/30/2014 12:34:03 PM	4/30/2014 3:41:28 PM
1404B92-001F				EPA Method 300.0: Anions			4/30/2014 1:18:51 PM
				EPA Method 300.0: Anions			4/30/2014 1:31:16 PM
				EPA Method 300.0: Anions			4/30/2014 12:41:39 PM
				EPA Method 6010B: Dissolved Metals			5/10/2014 4:00:37 PM
				EPA Method 6010B: Dissolved Metals			5/21/2014 12:27:56 PM
				EPA Method 6010B: Dissolved Metals			5/21/2014 12:29:38 PM
				EPA Method 6010B: Dissolved Metals			5/10/2014 3:48:36 PM
				EPA Method 6010B: Dissolved Metals			5/6/2014 12:42:22 PM
				SM 2540 C: Total Dissolved Solids		5/2/2014 4:27:22 PM	5/5/2014 3:11:00 PM
				SM 2540D: TSS		5/2/2014 6:56:48 AM	5/5/2014 10:14:00 AM

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#: **1404B92**

04-Sep-14

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1404B92-001F	WQ5-C-R36	4/29/2014 10:21:00 AM	Aqueous	SM2320B: Alkalinity			4/30/2014 12:01:16 PM
				SM2510B: Specific Conductance			4/30/2014 12:01:16 PM
				SM2510B: Specific Conductance			4/30/2014 12:47:15 PM
				SM4500-H+B: pH			4/30/2014 12:01:16 PM
				Specific Gravity			5/13/2014 2:00:00 PM
1404B92-002A	WQ5-C-R36-Duplicate	4/29/2014 10:23:00 AM		EPA Method: 8260B			5/2/2014 3:47:03 PM
1404B92-002B				SM 5310B: TOC			5/5/2014 2:26:48 PM
1404B92-002C				EPA Method 8270C: Semivolatiles		5/5/2014 10:44:04 AM	5/7/2014 2:25:23 PM
1404B92-002D				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/6/2014 12:40:30 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:33:05 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:35:18 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:37:25 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 4:39:28 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/10/2014 5:01:01 PM
				EPA 6010B: Total Recoverable Metals		5/5/2014 10:27:41 AM	5/15/2014 3:28:51 PM
				EPA Method 7470: Mercury		4/30/2014 12:34:03 PM	4/30/2014 3:37:53 PM
1404B92-002F				EPA Method 300.0: Anions			4/30/2014 2:33:19 PM
				EPA Method 300.0: Anions			4/30/2014 1:56:04 PM
				EPA Method 300.0: Anions			4/30/2014 1:43:40 PM
				EPA Method 300.0: Anions			4/30/2014 2:45:43 PM
				EPA Method 6010B: Dissolved Metals			5/6/2014 12:48:24 PM
				EPA Method 6010B: Dissolved Metals			5/21/2014 12:31:11 PM
				EPA Method 6010B: Dissolved Metals			5/21/2014 12:32:53 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#: **1404B92**

04-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1404B92-002F	WQ5-C-R36-Duplicate	4/29/2014 10:23:00 AM	Aqueous	EPA Method 6010B: Dissolved Metals			5/10/2014 4:02:29 PM
				EPA Method 6010B: Dissolved Metals			5/10/2014 4:04:33 PM
				SM 2540 C: Total Dissolved Solids		5/2/2014 4:27:22 PM	5/5/2014 3:11:00 PM
				SM 2540D: TSS		5/2/2014 6:56:48 AM	5/5/2014 10:14:00 AM
				SM2320B: Alkalinity			4/30/2014 12:16:33 PM
				SM2510B: Specific Conductance			4/30/2014 12:16:33 PM
				SM2510B: Specific Conductance			4/30/2014 1:00:00 PM
				SM4500-H+B: pH			4/30/2014 12:16:33 PM
				Specific Gravity			5/13/2014 2:00:00 PM
1404B92-003A	WQ5-C-R36-Field Blank	4/29/2014 10:51:00 AM		EPA Method: 8260B			5/2/2014 4:15:15 PM
1404B92-004A	WQ5-C-R36-Trip Blank		Trip Blank	EPA Method: 8260B			5/2/2014 4:43:15 PM

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1404B92-001 **Matrix:** AQUEOUS

Client Sample ID: WQ5-C-R36
Collection Date: 4/29/2014 10:21:00 AM
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	14000	500	1000		mg/L	2000	4/30/2014 1:31:16 PM	R18329
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	4/30/2014 12:41:39 PM	R18329
Sulfate	4770	13.7	100		mg/L	200	4/30/2014 1:18:51 PM	R18329
EPA METHOD 7470: MERCURY							Analyst: **JML**	
Mercury	ND	0.000435	0.00100		mg/L	5	4/30/2014 3:59:14 PM	12947
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1030	0.773	20.0		mg/L	20	5/21/2014 12:27:56 PM	R18765
Magnesium	454	0.189	10.0		mg/L	10	5/6/2014 12:42:22 PM	R18416
Potassium	289	2.02	10.0		mg/L	10	5/6/2014 12:42:22 PM	R18416
Sodium	9710	24.3	200		mg/L	200	5/21/2014 12:29:38 PM	R18765
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0176	0.00312	0.100	J	mg/L	5	5/10/2014 4:27:19 PM	13004
Beryllium	ND	0.00176	0.0150		mg/L	5	5/10/2014 4:27:19 PM	13004
Cadmium	ND	0.00314	0.0100		mg/L	5	5/10/2014 4:27:19 PM	13004
Calcium	1070	3.27	20.0		mg/L	20	5/10/2014 4:29:13 PM	13004
Chromium	ND	0.00841	0.0300		mg/L	5	5/10/2014 4:27:19 PM	13004
Iron	0.502	0.0507	0.250		mg/L	5	5/10/2014 4:27:19 PM	13004
Lead	ND	0.0239	0.0250		mg/L	5	5/10/2014 4:27:19 PM	13004
Magnesium	472	0.0850	5.00		mg/L	5	5/10/2014 4:27:19 PM	13004
Nickel	ND	0.00952	0.0500		mg/L	5	5/10/2014 4:27:19 PM	13004
Potassium	320	2.53	5.00		mg/L	5	5/10/2014 4:27:19 PM	13004
Silver	0.0110	0.00261	0.0250	J	mg/L	5	5/10/2014 4:59:09 PM	13004
Sodium	9800	83.1	200		mg/L	200	5/15/2014 3:26:58 PM	13004
Vanadium	ND	0.0274	0.250		mg/L	5	5/10/2014 4:27:19 PM	13004
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.7	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
1,4-Dichlorobenzene	ND	2.4	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
2,4-Dinitrophenol	ND	3.2	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
2,4-Dinitrotoluene	ND	4.5	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
Hexachlorobenzene	ND	3.2	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
Hexachloroethane	ND	1.9	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
2-Methylphenol	ND	2.8	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
3+4-Methylphenol	ND	1.8	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
Nitrobenzene	ND	2.6	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
Pentachlorophenol	ND	2.5	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
Pyridine	ND	1.6	5.0		µg/L	1	5/7/2014 11:52:29 AM	13005
Surr: 2,4,6-Tribromophenol	34.3	0	26-138		%REC	1	5/7/2014 11:52:29 AM	13005

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
S	Spike Recovery 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.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: WQ5-C-R36
Project: WIPP DMP
Collection Date: 4/29/2014 10:21:00 AM
Lab ID: 1404B92-001
Matrix: AQUEOUS
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorobiphenyl	99.2	0	48.1-106		%REC	1	5/7/2014 11:52:29 AM	13005
Surr: 2-Fluorophenol	66.4	0	12.1-85.8		%REC	1	5/7/2014 11:52:29 AM	13005
Surr: 4-Terphenyl-d14	98.5	0	44-113		%REC	1	5/7/2014 11:52:29 AM	13005
Surr: Nitrobenzene-d5	107	0	47.5-119		%REC	1	5/7/2014 11:52:29 AM	13005
Surr: Phenol-d5	70.4	0	17.7-65.8	S	%REC	1	5/7/2014 11:52:29 AM	13005
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Benzene	0.217	0.154	1.00	J	µg/L	1	5/2/2014 3:19:06 PM	R18368
Toluene	0.202	0.170	1.00	J	µg/L	1	5/2/2014 3:19:06 PM	R18368
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
2-Butanone	ND	1.42	5.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Chloroform	ND	0.315	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Methylene Chloride	ND	0.266	3.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/2/2014 3:19:06 PM	R18368
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/2/2014 3:19:06 PM	R18368
Surr: 1,2-Dichloroethane-d4	96.9	0	70-130		%REC	1	5/2/2014 3:19:06 PM	R18368
Surr: 4-Bromofluorobenzene	96.5	0	70-130		%REC	1	5/2/2014 3:19:06 PM	R18368
Surr: Dibromofluoromethane	95.3	0	70-130		%REC	1	5/2/2014 3:19:06 PM	R18368
Surr: Toluene-d8	92.7	0	70-130		%REC	1	5/2/2014 3:19:06 PM	R18368
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.343	0.120	1.00	J	mg/L	1	5/5/2014 1:42:40 PM	R18399
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	35100	492	1000	*	mg/L	1	5/5/2014 3:11:00 PM	12992
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	50200	0.100	0.100		µmhos/c	10	4/30/2014 12:47:15 PM	R18314

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.
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: 1404B92-001 **Matrix:** AQUEOUS

Client Sample ID: WQ5-C-R36
Collection Date: 4/29/2014 10:21:00 AM
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JML**	
pH	7.49	0.100	1.68	H	pH units	1	4/30/2014 12:01:16 PM	R18314
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	47.8	4.00	20.0		mg/L CaC	1	4/30/2014 12:01:16 PM	R18314
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/30/2014 12:01:16 PM	R18314
Total Alkalinity (as CaCO3)	47.8	4.00	20.0		mg/L CaC	1	4/30/2014 12:01:16 PM	R18314
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.019	0	0			1	5/13/2014 2:00:00 PM	R18593
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	24.0	3.07	4.00		mg/L	1	5/5/2014 10:14:00 AM	12979

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
S	Spike Recovery 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.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1404B92-002 **Matrix:** AQUEOUS

Client Sample ID: WQ5-C-R36-Duplicate
Collection Date: 4/29/2014 10:23:00 AM
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	14000	500	1000		mg/L	2000	4/30/2014 2:45:43 PM	R18329
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	4/30/2014 1:43:40 PM	R18329
Sulfate	4850	13.7	100		mg/L	200	4/30/2014 2:33:19 PM	R18329
EPA METHOD 7470: MERCURY							Analyst: **JML**	
Mercury	ND	0.0000870	0.000200		mg/L	1	4/30/2014 3:37:53 PM	12947
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	1040	0.773	20.0		mg/L	20	5/21/2014 12:31:11 PM	R18765
Magnesium	456	0.189	10.0		mg/L	10	5/6/2014 12:48:24 PM	R18416
Potassium	299	2.02	10.0		mg/L	10	5/6/2014 12:48:24 PM	R18416
Sodium	10200	24.3	200		mg/L	200	5/21/2014 12:32:53 PM	R18765
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.0151	0.00312	0.100	J	mg/L	5	5/10/2014 4:35:18 PM	13004
Beryllium	ND	0.00176	0.0150		mg/L	5	5/10/2014 4:35:18 PM	13004
Cadmium	ND	0.00314	0.0100		mg/L	5	5/10/2014 4:35:18 PM	13004
Calcium	1030	3.27	20.0		mg/L	20	5/10/2014 4:37:25 PM	13004
Chromium	ND	0.00841	0.0300		mg/L	5	5/10/2014 4:35:18 PM	13004
Iron	0.494	0.0507	0.250		mg/L	5	5/10/2014 4:35:18 PM	13004
Lead	ND	0.0239	0.0250		mg/L	5	5/10/2014 4:35:18 PM	13004
Magnesium	446	0.0850	5.00		mg/L	5	5/10/2014 4:35:18 PM	13004
Nickel	ND	0.00952	0.0500		mg/L	5	5/10/2014 4:35:18 PM	13004
Potassium	305	2.53	5.00		mg/L	5	5/10/2014 4:35:18 PM	13004
Silver	0.0210	0.00261	0.0250	J	mg/L	5	5/10/2014 5:01:01 PM	13004
Sodium	9670	83.1	200		mg/L	200	5/15/2014 3:28:51 PM	13004
Vanadium	ND	0.0274	0.250		mg/L	5	5/10/2014 4:35:18 PM	13004
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
1,2-Dichlorobenzene	ND	1.7	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
1,4-Dichlorobenzene	ND	2.4	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
2,4-Dinitrophenol	ND	3.2	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
2,4-Dinitrotoluene	ND	4.5	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
Hexachlorobenzene	ND	3.2	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
Hexachloroethane	ND	1.9	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
2-Methylphenol	ND	2.8	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
3+4-Methylphenol	ND	1.8	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
Nitrobenzene	ND	2.6	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
Pentachlorophenol	ND	2.5	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
Pyridine	ND	1.6	5.0		µg/L	1	5/7/2014 2:25:23 PM	13005
Surr: 2,4,6-Tribromophenol	28.8	0	26-138		%REC	1	5/7/2014 2:25:23 PM	13005

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.
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: 1404B92-002 **Matrix:** AQUEOUS

Client Sample ID: WQ5-C-R36-Duplicate
Collection Date: 4/29/2014 10:23:00 AM
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **JDC**	
Surr: 2-Fluorobiphenyl	83.9	0	48.1-106		%REC	1	5/7/2014 2:25:23 PM	13005
Surr: 2-Fluorophenol	53.5	0	12.1-85.8		%REC	1	5/7/2014 2:25:23 PM	13005
Surr: 4-Terphenyl-d14	82.9	0	44-113		%REC	1	5/7/2014 2:25:23 PM	13005
Surr: Nitrobenzene-d5	91.0	0	47.5-119		%REC	1	5/7/2014 2:25:23 PM	13005
Surr: Phenol-d5	58.9	0	17.7-65.8		%REC	1	5/7/2014 2:25:23 PM	13005
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Benzene	0.198	0.154	1.00	J	µg/L	1	5/2/2014 3:47:03 PM	R18368
Toluene	0.213	0.170	1.00	J	µg/L	1	5/2/2014 3:47:03 PM	R18368
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
2-Butanone	ND	1.42	5.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Chloroform	ND	0.315	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Methylene Chloride	ND	0.266	3.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/2/2014 3:47:03 PM	R18368
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/2/2014 3:47:03 PM	R18368
Surr: 1,2-Dichloroethane-d4	93.8	0	70-130		%REC	1	5/2/2014 3:47:03 PM	R18368
Surr: 4-Bromofluorobenzene	93.8	0	70-130		%REC	1	5/2/2014 3:47:03 PM	R18368
Surr: Dibromofluoromethane	94.5	0	70-130		%REC	1	5/2/2014 3:47:03 PM	R18368
Surr: Toluene-d8	92.3	0	70-130		%REC	1	5/2/2014 3:47:03 PM	R18368
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.358	0.120	1.00	J	mg/L	1	5/5/2014 2:26:48 PM	R18399
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	33400	492	1000	*	mg/L	1	5/5/2014 3:11:00 PM	12992
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	50500	0.100	0.100		µmhos/c	10	4/30/2014 1:00:00 PM	R18314

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.
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: 1404B92-002 **Matrix:** AQUEOUS

Client Sample ID: WQ5-C-R36-Duplicate
Collection Date: 4/29/2014 10:23:00 AM
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM4500-H+B: PH							Analyst: **JML**	
pH	7.32	0.100	1.68	H	pH units	1	4/30/2014 12:16:33 PM	R18314
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	47.6	4.00	20.0		mg/L CaC	1	4/30/2014 12:16:33 PM	R18314
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	4/30/2014 12:16:33 PM	R18314
Total Alkalinity (as CaCO3)	47.6	4.00	20.0		mg/L CaC	1	4/30/2014 12:16:33 PM	R18314
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.018	0	0			1	5/13/2014 2:00:00 PM	R18593
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	29.0	3.07	4.00		mg/L	1	5/5/2014 10:14:00 AM	12979

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
S	Spike Recovery 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.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1404B92-003 **Matrix:** AQUEOUS

Client Sample ID: WQ5-C-R36-Field Blank
Collection Date: 4/29/2014 10:51:00 AM
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Benzene	ND	0.154	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Toluene	ND	0.170	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
2-Butanone	ND	1.42	5.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Chloroform	0.977	0.315	1.00	J	µg/L	1	5/2/2014 4:15:15 PM	R18368
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Methylene Chloride	ND	0.266	3.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/2/2014 4:15:15 PM	R18368
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/2/2014 4:15:15 PM	R18368
Surr: 1,2-Dichloroethane-d4	90.3	0	70-130		%REC	1	5/2/2014 4:15:15 PM	R18368
Surr: 4-Bromofluorobenzene	93.4	0	70-130		%REC	1	5/2/2014 4:15:15 PM	R18368
Surr: Dibromofluoromethane	92.7	0	70-130		%REC	1	5/2/2014 4:15:15 PM	R18368
Surr: Toluene-d8	92.5	0	70-130		%REC	1	5/2/2014 4:15:15 PM	R18368

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.
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: WQ5-C-R36-Trip Blank
Project: WIPP DMP
Collection Date:
Lab ID: 1404B92-004
Matrix: TRIP BLANK
Received Date: 4/30/2014 8:40:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Benzene	ND	0.154	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Toluene	ND	0.170	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
2-Butanone	2.77	1.42	5.00	J	µg/L	1	5/2/2014 4:43:15 PM	R18368
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Chlorobenzene	0.932	0.140	1.00	J	µg/L	1	5/2/2014 4:43:15 PM	R18368
Chloroform	ND	0.315	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Methylene Chloride	ND	0.266	3.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/2/2014 4:43:15 PM	R18368
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/2/2014 4:43:15 PM	R18368
Surr: 1,2-Dichloroethane-d4	91.3	0	70-130		%REC	1	5/2/2014 4:43:15 PM	R18368
Surr: 4-Bromofluorobenzene	95.9	0	70-130		%REC	1	5/2/2014 4:43:15 PM	R18368
Surr: Dibromofluoromethane	95.7	0	70-130		%REC	1	5/2/2014 4:43:15 PM	R18368
Surr: Toluene-d8	92.2	0	70-130		%REC	1	5/2/2014 4:43:15 PM	R18368

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.
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	WQ5-C-R36 1404B92-01		WQ5-C-R36Dup 1404B92-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	9710	422.36	10200	443.67							
Potassium	289	7.39	299	7.65							
Calcium	1030	51.40	1040	51.90							
Magnesium	454	37.37	456	37.53							
Total Cations		518.51		540.75							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	4770	99.31	4850	100.98							
Chloride	14000	394.92	14000	394.92							
Bicarbonate (CaCO3)	47.8	0.96	47.6	0.95							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		495.19		496.85							
Elect. Cond. (µMhos/cm)	50200		50500								
CATION/ANION RATIO		1.05		1.09							
% Difference		2		4							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	35100		33400								
TDS (calculated)	30282		30874								
Ratio meas TDS:calc TDS		1.2		1.1							
Ratio Meas. TDS:EC		0.70		0.66							
Ratio Calc. TDS:EC		0.60		0.61							
Ratio of anion sum:EC		1.0		1.0							
Ratio of cation sum:EC		1.0		1.1							

* 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

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 #: 140501024
Project Name: 1404B92

Analytical Results Report

Sample Number 140501024-001 **Sampling Date** 4/29/2014 **Date/Time Received** 5/1/2014 11:00 AM
Client Sample ID 1404B92-001E / WQ5-C-R36 **Sampling Time** 10:21 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	

Sample Number 140501024-002 **Sampling Date** 4/29/2014 **Date/Time Received** 5/1/2014 11:00 AM
Client Sample ID 1404B92-002E / WQ5-C-R36-DUPLICATE **Sampling Time** 10:23 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	5/15/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	5/15/2014	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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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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 #: 140501024
Project Name: 1404B92

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0518	mg/L	0.05	103.6	80-120	5/5/2014	5/15/2014
Selenium	0.0494	mg/L	0.05	98.8	80-120	5/5/2014	5/15/2014
Arsenic	0.0497	mg/L	0.05	99.4	80-120	5/5/2014	5/15/2014
Antimony	0.0504	mg/L	0.05	100.8	80-120	5/5/2014	5/15/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0527	mg/L	0.05	105.4	1.7	0-20	5/5/2014	5/15/2014
Selenium	0.0505	mg/L	0.05	101.0	2.2	0-20	5/5/2014	5/15/2014
Arsenic	0.0506	mg/L	0.05	101.2	1.8	0-20	5/5/2014	5/15/2014
Antimony	0.0511	mg/L	0.05	102.2	1.4	0-20	5/5/2014	5/15/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140501024-001	Thallium	ND	0.0473	mg/L	0.05	94.6	75-125	5/5/2014	5/15/2014
140501024-001	Selenium	ND	0.0562	mg/L	0.05	112.4	75-125	5/5/2014	5/15/2014
140501024-001	Arsenic	ND	0.0565	mg/L	0.05	113.0	75-125	5/5/2014	5/15/2014
140501024-001	Antimony	ND	0.0526	mg/L	0.05	105.2	75-125	5/5/2014	5/15/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0478	mg/L	0.05	95.6	1.1	0-20	5/5/2014	5/15/2014
Selenium	0.0555	mg/L	0.05	111.0	1.3	0-20	5/5/2014	5/15/2014
Arsenic	0.0562	mg/L	0.05	112.4	0.5	0-20	5/5/2014	5/15/2014
Antimony	0.0528	mg/L	0.05	105.6	0.4	0-20	5/5/2014	5/15/2014

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87693; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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 #: 140501024
Project Name: 1404B92

Analytical Results Report

Quality Control Data

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	5/5/2014	5/15/2014
Arsenic	ND	mg/L	0.001	5/5/2014	5/15/2014
Selenium	ND	mg/L	0.001	5/5/2014	5/15/2014
Thallium	ND	mg/L	0.001	5/5/2014	5/15/2014

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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C586; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-12992**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531613** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	10.0	20.0								J

Sample ID **LCS-12992**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531614** 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 **LCSR-12992**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531615** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	20.0	1000	0	103	80	120			

Sample ID **1404B92-001FMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ5-C-R36**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531620** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	84400	1000	50000	35100	98.7	80	120			

Sample ID **1404B92-001FMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **WQ5-C-R36**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531621** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	83300	1000	50000	35100	96.4	80	120	1.37	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12992**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531614** 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: **LCSR-12992**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **12992**	RunNo: **18404**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **531615** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1030	20.0	1000	0	103	80	120	0.675	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBW**	Batch ID: **R18329**	RunNo: **18329**
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529476** 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: **R18329**	RunNo: **18329**
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529477** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.70	0.500	5.000	0	94.0	90	110			
Nitrogen, Nitrate (As N)	2.46	0.100	2.500	0	98.3	90	110			
Sulfate	9.55	0.500	10.00	0	95.5	90	110			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R18329**	RunNo: **18329**
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529478** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.70	0.500	5.000	0	94.0	90	110			
Nitrogen, Nitrate (As N)	2.47	0.100	2.500	0	98.6	90	110			
Sulfate	9.63	0.500	10.00	0	96.3	90	110			

Sample ID **1404B92-001FMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ5-C-R36**	Batch ID: **R18329**	RunNo: **18329**
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529480** 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	97.7	93.8	111			

Sample ID **1404B92-001FMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **WQ5-C-R36**	Batch ID: **R18329**	RunNo: **18329**
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529481** 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	97.2	93.8	111	0.439	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R18329**	RunNo: **18329**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529477**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.70	0.500	5.000	0	94.0	90	110			
Nitrogen, Nitrate (As N)	2.46	0.100	2.500	0	98.3	90	110			
Sulfate	9.55	0.500	10.00	0	95.5	90	110			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R18329**	RunNo: **18329**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529478**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.70	0.500	5.000	0	94.0	90	110	0.0170	0	
Nitrogen, Nitrate (As N)	2.47	0.100	2.500	0	98.6	90	110	0.321	0	
Sulfate	9.63	0.500	10.00	0	96.3	90	110	0.827	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **vcb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531607** 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	1.5								
Surr: 1,2-Dichloroethane-d4	9.0		10.00		89.9	70	130			
Surr: 4-Bromofluorobenzene	9.7		10.00		96.6	70	130			
Surr: Dibromofluoromethane	9.4		10.00		93.7	70	130			
Surr: Toluene-d8	9.3		10.00		92.6	70	130			

Sample ID **50ng ccv**	SampType: **CCV_LOW**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531609** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	40.2	5.00	40.00	0	100	60	140			
Benzene	10.5	1.00	10.00	0	105	70	130			
Toluene	10.2	1.00	10.00	0	102	80	120			
1,2-Dichloroethane (EDC)	9.76	1.00	10.00	0	97.6	70	130			
2-Butanone	15.5	5.00	20.00	0	77.4	60	140			
Carbon Tetrachloride	9.91	1.00	10.00	0	99.1	70	130			
Chlorobenzene	9.80	1.00	10.00	0	98.0	70	130			
Chloroform	10.5	1.00	10.00	0	105	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **50ng ccv**	SampType: **CCV_LOW**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**							
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531609**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	9.88	1.00	10.00	0	98.8	70	130			
1,1-Dichloroethane	9.69	1.00	10.00	0	96.9	70	130			
1,1-Dichloroethene	10.0	1.00	10.00	0	100	80	120			
Methylene Chloride	10.1	3.00	10.00	0	101	70	130			
1,1,2,2-Tetrachloroethane	10.1	1.00	10.00	0	101	70	130			
Tetrachloroethene (PCE)	10.5	1.00	10.00	0	105	70	130			
trans-1,2-DCE	10.2	1.00	10.00	0	102	70	130			
1,1,1-Trichloroethane	9.96	1.00	10.00	0	99.6	70	130			
1,1,2-Trichloroethane	9.87	1.00	10.00	0	98.7	70	130			
Trichloroethene (TCE)	9.63	1.00	10.00	0	96.3	70	130			
Trichlorofluoromethane	10.7	1.00	10.00	0	107	70	130			
Vinyl chloride	10.9	1.00	10.00	0	109	80	120			
Xylenes, Total	30.6	1.50	30.00	0	102	70	130			
Surr: 1,2-Dichloroethane-d4	9.42		10.00		94.2	70	130			
Surr: 4-Bromofluorobenzene	9.16		10.00		91.6	70	130			
Surr: Dibromofluoromethane	9.61		10.00		96.1	70	130			
Surr: Toluene-d8	9.30		10.00		93.0	70	130			

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**							
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531625**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	48.2	5.00	40.00	0	120	59.8	152			
Benzene	20.6	1.00	20.00	0	103	70	130			
Toluene	19.3	1.00	20.00	0	96.5	80	120			
1,2-Dichloroethane (EDC)	20.3	1.00	20.00	0	101	70	130			
2-Butanone	40.9	5.00	40.00	0	102	60	140			
Carbon Tetrachloride	19.7	1.00	20.00	0	98.4	70	130			
Chlorobenzene	19.4	1.00	20.00	0	96.9	70	130			
Chloroform	20.7	1.00	20.00	0	103	75.6	123			
cis-1,2-DCE	19.7	1.00	20.00	0	98.5	70	130			
1,1-Dichloroethane	19.7	1.00	20.00	0	98.6	70	130			
1,1-Dichloroethene	20.0	1.00	20.00	0	100	78.1	129			
Methylene Chloride	20.8	3.00	20.00	0	104	70	130			
1,1,2,2-Tetrachloroethane	20.5	1.00	20.00	0	103	67.3	134			
Tetrachloroethene (PCE)	20.4	1.00	20.00	0	102	70	130			
trans-1,2-DCE	20.3	1.00	20.00	0	101	70	130			
1,1,1-Trichloroethane	19.6	1.00	20.00	0	98.2	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531625** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	18.8	1.00	20.00	0	93.9	70	130			
Trichloroethene (TCE)	19.9	1.00	20.00	0	99.5	70	130			
Trichlorofluoromethane	20.4	1.00	20.00	0	102	70	130			
Vinyl chloride	22.3	1.00	20.00	0	111	76.5	131			
Xylenes, Total	59.3	1.50	60.00	0	98.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.49		10.00		94.9	70	130			
Surr: 4-Bromofluorobenzene	8.93		10.00		89.3	70	130			
Surr: Dibromofluoromethane	9.36		10.00		93.6	70	130			
Surr: Toluene-d8	9.02		10.00		90.2	70	130			

Sample ID **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531626** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	48.4	5.00	40.00	0	121	60	140			
Benzene	20.8	1.00	20.00	0	104	70	130			
Toluene	19.3	1.00	20.00	0	96.3	80	120			
1,2-Dichloroethane (EDC)	20.6	1.00	20.00	0	103	70	130			
2-Butanone	38.7	5.00	40.00	0	96.8	60	186			
Carbon Tetrachloride	19.7	1.00	20.00	0	98.4	70	130			
Chlorobenzene	19.4	1.00	20.00	0	97.1	70	130			
Chloroform	20.8	1.00	20.00	0	104	80	120			
cis-1,2-DCE	20.0	1.00	20.00	0	100	70	130			
1,1-Dichloroethane	20.0	1.00	20.00	0	100	70	130			
1,1-Dichloroethene	20.1	1.00	20.00	0	101	80	120			
Methylene Chloride	20.5	3.00	20.00	0	103	70	130			
1,1,2,2-Tetrachloroethane	19.2	1.00	20.00	0	95.8	70	130			
Tetrachloroethene (PCE)	20.5	1.00	20.00	0	102	70	130			
trans-1,2-DCE	20.4	1.00	20.00	0	102	70	130			
1,1,1-Trichloroethane	20.2	1.00	20.00	0	101	70	130			
1,1,2-Trichloroethane	19.0	1.00	20.00	0	95.1	70	130			
Trichloroethene (TCE)	20.2	1.00	20.00	0	101	70	130			
Trichlorofluoromethane	20.1	1.00	20.00	0	100	70	130			
Vinyl chloride	22.4	1.00	20.00	0	112	80	120			
Xylenes, Total	58.9	1.50	60.00	0	98.1	70	130			
Surr: 1,2-Dichloroethane-d4	9.50		10.00		95.0	70	130			
Surr: 4-Bromofluorobenzene	8.78		10.00		87.8	70	130			
Surr: Dibromofluoromethane	9.24		10.00		92.4	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**						
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**						
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531626**	Units: **µg/L**					

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Toluene-d8	8.98		10.00		89.8	70	130			

Sample ID **1404b92-001a ms L4**	SampType: **MS4**	TestCode: **EPA Method: 8260B**						
Client ID: **WQ5-C-R36**	Batch ID: **R18368**	RunNo: **18368**						
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531629**	Units: **µg/L**					

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	71.8	5.00	40.00	0	179	31.1	273			
Benzene	20.7	1.00	20.00	0.2172	103	70	130			
Toluene	18.9	1.00	20.00	0.2016	93.3	70	130			
1,2-Dichloroethane (EDC)	20.0	1.00	20.00	0	99.9	70	130			
2-Butanone	39.9	5.00	40.00	0	99.7	21.9	285			
Carbon Tetrachloride	19.1	1.00	20.00	0	95.7	70	130			
Chlorobenzene	18.8	1.00	20.00	0	93.9	70	130			
Chloroform	20.5	1.00	20.00	0	103	70	130			
cis-1,2-DCE	19.6	1.00	20.00	0	98.1	70	130			
1,1-Dichloroethane	19.6	1.00	20.00	0	97.8	70	130			
1,1-Dichloroethene	21.0	1.00	20.00	0	105	70	130			
Methylene Chloride	20.1	3.00	20.00	0	101	70	130			
1,1,2,2-Tetrachloroethane	21.9	1.00	20.00	0	110	72.8	164			
Tetrachloroethene (PCE)	19.2	1.00	20.00	0	96.2	70	130			
trans-1,2-DCE	20.1	1.00	20.00	0	100	70	130			
1,1,1-Trichloroethane	19.7	1.00	20.00	0	98.5	70	130			
1,1,2-Trichloroethane	19.4	1.00	20.00	0	96.9	70	130			
Trichloroethene (TCE)	19.2	1.00	20.00	0	96.0	70	130			
Trichlorofluoromethane	20.3	1.00	20.00	0	101	70	130			
Vinyl chloride	23.3	1.00	20.00	0	116	70	130			
Xylenes, Total	56.7	1.50	60.00	0	94.4	70	130			
Surr: 1,2-Dichloroethane-d4	9.99		10.00		99.9	70	130			
Surr: 4-Bromofluorobenzene	9.33		10.00		93.3	70	130			
Surr: Dibromofluoromethane	9.63		10.00		96.3	70	130			
Surr: Toluene-d8	8.92		10.00		89.2	70	130			

Sample ID **1404b92-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**						
Client ID: **WQ5-C-R36**	Batch ID: **R18368**	RunNo: **18368**						
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531631**	Units: **µg/L**					

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	66.8	5.00	40.00	0	167	31.1	273	7.15	20	
Benzene	19.6	1.00	20.00	0.2172	96.9	70	130	5.66	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **1404b92-001a msd**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**							
Client ID: **WQ5-C-R36**	Batch ID: **R18368**	RunNo: **18368**							
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531631**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	19.2	1.00	20.00	0.2016	95.2	70	130	1.96	20	
1,2-Dichloroethane (EDC)	19.7	1.00	20.00	0	98.5	70	130	1.42	20	
2-Butanone	40.9	5.00	40.00	0	102	21.9	285	2.46	20	
Carbon Tetrachloride	17.2	1.00	20.00	0	85.9	70	130	10.8	20	
Chlorobenzene	19.1	1.00	20.00	0	95.3	70	130	1.50	20	
Chloroform	19.5	1.00	20.00	0	97.5	70	130	5.00	20	
cis-1,2-DCE	18.7	1.00	20.00	0	93.5	70	130	4.78	20	
1,1-Dichloroethane	18.8	1.00	20.00	0	93.8	70	130	4.16	20	
1,1-Dichloroethene	19.0	1.00	20.00	0	94.9	70	130	10.3	20	
Methylene Chloride	19.3	3.00	20.00	0	96.6	70	130	4.07	20	
1,1,2,2-Tetrachloroethane	20.6	1.00	20.00	0	103	72.8	164	6.21	20	
Tetrachloroethene (PCE)	19.1	1.00	20.00	0	95.5	70	130	0.673	20	
trans-1,2-DCE	18.8	1.00	20.00	0	93.8	70	130	6.69	20	
1,1,1-Trichloroethane	18.0	1.00	20.00	0	90.2	70	130	8.78	20	
1,1,2-Trichloroethane	19.6	1.00	20.00	0	98.2	70	130	1.35	20	
Trichloroethene (TCE)	18.1	1.00	20.00	0	90.3	70	130	6.11	20	
Trichlorofluoromethane	18.2	1.00	20.00	0	90.8	70	130	10.9	20	
Vinyl chloride	21.7	1.00	20.00	0	108	70	130	7.25	20	
Xylenes, Total	57.6	1.50	60.00	0	96.0	70	130	1.69	20	
Surr: 1,2-Dichloroethane-d4	9.52		10.00		95.2	70	130	0		
Surr: 4-Bromofluorobenzene	8.82		10.00		88.2	70	130	0		
Surr: Dibromofluoromethane	9.34		10.00		93.4	70	130	0		
Surr: Toluene-d8	9.20		10.00		92.0	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531625** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	48.2	5.00	40.00	0	120	59.8	152			
Benzene	20.6	1.00	20.00	0	103	70	130			
Toluene	19.3	1.00	20.00	0	96.5	80	120			
1,2-Dichloroethane (EDC)	20.3	1.00	20.00	0	101	70	130			
2-Butanone	40.9	5.00	40.00	0	102	60	140			
Carbon Tetrachloride	19.7	1.00	20.00	0	98.4	70	130			
Chlorobenzene	19.4	1.00	20.00	0	96.9	70	130			
Chloroform	20.7	1.00	20.00	0	103	75.6	123			
cis-1,2-DCE	19.7	1.00	20.00	0	98.5	70	130			
1,1-Dichloroethane	19.7	1.00	20.00	0	98.6	70	130			
1,1-Dichloroethene	20.0	1.00	20.00	0	100	78.1	129			
Methylene Chloride	20.8	3.00	20.00	0	104	70	130			
1,1,2,2-Tetrachloroethane	20.5	1.00	20.00	0	103	67.3	134			
Tetrachloroethene (PCE)	20.4	1.00	20.00	0	102	70	130			
trans-1,2-DCE	20.3	1.00	20.00	0	101	70	130			
1,1,1-Trichloroethane	19.6	1.00	20.00	0	98.2	70	130			
1,1,2-Trichloroethane	18.8	1.00	20.00	0	93.9	70	130			
Trichloroethene (TCE)	19.9	1.00	20.00	0	99.5	70	130			
Trichlorofluoromethane	20.4	1.00	20.00	0	102	70	130			
Vinyl chloride	22.3	1.00	20.00	0	111	76.5	131			
Xylenes, Total	59.3	1.50	60.00	0	98.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.49		10.00		94.9	70	130			
Surr: 4-Bromofluorobenzene	8.93		10.00		89.3	70	130			
Surr: Dibromofluoromethane	9.36		10.00		93.6	70	130			
Surr: Toluene-d8	9.02		10.00		90.2	70	130			

Sample ID: **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531626** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	48.4	5.00	40.00	0	121	60	140	0.535	0	
Benzene	20.8	1.00	20.00	0	104	70	130	0.973	0	
Toluene	19.3	1.00	20.00	0	96.3	80	120	0.225	0	
1,2-Dichloroethane (EDC)	20.6	1.00	20.00	0	103	70	130	1.29	0	
2-Butanone	38.7	5.00	40.00	0	96.8	60	186	5.47	0	
Carbon Tetrachloride	19.7	1.00	20.00	0	98.4	70	130	0.0671	0	
Chlorobenzene	19.4	1.00	20.00	0	97.1	70	130	0.241	0	
Chloroform	20.8	1.00	20.00	0	104	80	120	0.441	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18368**	RunNo: **18368**
Prep Date:	Analysis Date: **5/2/2014**	SeqNo: **531626** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	20.0	1.00	20.00	0	100	70	130	1.80	0	
1,1-Dichloroethane	20.0	1.00	20.00	0	100	70	130	1.61	0	
1,1-Dichloroethene	20.1	1.00	20.00	0	101	80	120	0.653	0	
Methylene Chloride	20.5	3.00	20.00	0	103	70	130	1.28	0	
1,1,2,2-Tetrachloroethane	19.2	1.00	20.00	0	95.8	70	130	7.03	0	
Tetrachloroethene (PCE)	20.5	1.00	20.00	0	102	70	130	0.238	0	
trans-1,2-DCE	20.4	1.00	20.00	0	102	70	130	0.661	0	
1,1,1-Trichloroethane	20.2	1.00	20.00	0	101	70	130	2.77	0	
1,1,2-Trichloroethane	19.0	1.00	20.00	0	95.1	70	130	1.35	0	
Trichloroethene (TCE)	20.2	1.00	20.00	0	101	70	130	1.48	0	
Trichlorofluoromethane	20.1	1.00	20.00	0	100	70	130	1.59	0	
Vinyl chloride	22.4	1.00	20.00	0	112	80	120	0.516	0	
Xylenes, Total	58.9	1.50	60.00	0	98.1	70	130	0.768	0	
Surr: 1,2-Dichloroethane-d4	9.50		10.00		95.0	70	130	0	0	
Surr: 4-Bromofluorobenzene	8.78		10.00		87.8	70	130	0	0	
Surr: Dibromofluoromethane	9.24		10.00		92.4	70	130	0	0	
Surr: Toluene-d8	8.98		10.00		89.8	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **30ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R18459**	RunNo: **18459**
Prep Date:	Analysis Date: **5/7/2014**	SeqNo: **533010** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	29		30.00		96.3	60	140			
Surr: Phenol-d5	30		30.00		99.7	60	140			
Surr: 2,4,6-Tribromophenol	29		30.00		97.8	60	140			
Surr: Nitrobenzene-d5	29		30.00		96.1	60	140			
Surr: 2-Fluorobiphenyl	29		30.00		97.2	60	140			
Surr: 4-Terphenyl-d14	30		30.00		101	60	140			

Sample ID **mb-13005**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533011** 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-Fluorophenol	140		200.0		71.8	12.1	85.8			
Surr: Phenol-d5	120		200.0		57.6	17.7	65.8			
Surr: 2,4,6-Tribromophenol	150		200.0		77.2	26	138			
Surr: Nitrobenzene-d5	94		100.0		93.7	47.5	119			
Surr: 2-Fluorobiphenyl	86		100.0		85.6	48.1	106			
Surr: 4-Terphenyl-d14	96		100.0		96.0	44	113			

Sample ID **lcs-13005**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533012** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	89	5.0	100.0	0	88.9	27.4	101			
1,4-Dichlorobenzene	87	5.0	100.0	0	87.1	32.6	91.5			
2,4-Dinitrophenol	55	5.0	100.0	0	55.1	23.1	118			
2,4-Dinitrotoluene	100	5.0	100.0	0	101	44.7	112			
Hexachlorobenzene	94	5.0	100.0	0	93.7	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-13005**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533012** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Hexachloroethane	86	5.0	100.0	0	86.0	23.2	97.8			
2-Methylphenol	93	5.0	100.0	0	93.3	36.1	105			
3+4-Methylphenol	89	5.0	100.0	0	88.7	35.7	92.5			
Nitrobenzene	98	5.0	100.0	0	98.2	30.9	125			
Pentachlorophenol	78	5.0	100.0	0	78.0	20.2	93			
Pyridine	77	5.0	100.0	0	77.3	5.14	87.1			
Surr: 2-Fluorophenol	81		100.0		81.0	12.1	85.8			
Surr: Phenol-d5	68		100.0		67.6	17.7	65.8			S
Surr: 2,4,6-Tribromophenol	93		100.0		93.5	26	138			
Surr: Nitrobenzene-d5	99		100.0		98.7	47.5	119			
Surr: 2-Fluorobiphenyl	99		100.0		99.1	48.1	106			
Surr: 4-Terphenyl-d14	92		100.0		91.6	44	113			

Sample ID **lcs-13005**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533013** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	83	5.0	100.0	0	83.2	27.4	101			
1,4-Dichlorobenzene	83	5.0	100.0	0	82.8	32.6	91.5			
2,4-Dinitrophenol	57	5.0	100.0	0	56.6	23.1	118			
2,4-Dinitrotoluene	110	5.0	100.0	0	108	44.7	112			
Hexachlorobenzene	89	5.0	100.0	0	88.9	30	130			
Hexachloroethane	83	5.0	100.0	0	82.9	23.2	97.8			
2-Methylphenol	91	5.0	100.0	0	91.1	36.1	105			
3+4-Methylphenol	85	5.0	100.0	0	84.6	35.7	92.5			
Nitrobenzene	96	5.0	100.0	0	96.3	30.9	125			
Pentachlorophenol	77	5.0	100.0	0	77.2	20.2	93			
Pyridine	77	5.0	100.0	0	77.2	5.14	87.1			
Surr: 2-Fluorophenol	76		100.0		75.7	12.1	85.8			
Surr: Phenol-d5	67		100.0		66.9	17.7	65.8			S
Surr: 2,4,6-Tribromophenol	83		100.0		83.4	26	138			
Surr: Nitrobenzene-d5	98		100.0		98.3	47.5	119			
Surr: 2-Fluorobiphenyl	96		100.0		95.9	48.1	106			
Surr: 4-Terphenyl-d14	88		100.0		88.4	44	113			

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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **1404B92-001Cms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ5-C-R36**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533016** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	82	5.0	100.0	0	82.0	20.9	103			
1,4-Dichlorobenzene	81	5.0	100.0	0	81.1	32.6	91.5			
2,4-Dinitrophenol	27	5.0	100.0	0	26.7	11	112			
2,4-Dinitrotoluene	96	5.0	100.0	0	96.4	44.7	112			
Hexachlorobenzene	72	5.0	100.0	0	71.6	30.3	126			
Hexachloroethane	81	5.0	100.0	0	81.2	19.5	96.4			
2-Methylphenol	80	5.0	100.0	0	79.9	28.7	108			
3+4-Methylphenol	72	5.0	100.0	1.940	70.4	24.2	136			
Nitrobenzene	89	5.0	100.0	0	88.6	28.8	119			
Pentachlorophenol	25	5.0	100.0	3.180	22.1	20.2	93			
Pyridine	73	5.0	100.0	0	73.3	19.3	82.8			
Surr: 2-Fluorophenol	42		100.0		41.8	12.1	85.8			
Surr: Phenol-d5	53		100.0		53.2	17.7	65.8			
Surr: 2,4,6-Tribromophenol	35		100.0		35.4	26	138			
Surr: Nitrobenzene-d5	88		100.0		88.0	47.5	119			
Surr: 2-Fluorobiphenyl	87		100.0		86.7	48.1	106			
Surr: 4-Terphenyl-d14	81		100.0		81.3	44	113			

Sample ID **1404B92-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ5-C-R36**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533017** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	81	5.0	100.0	0	80.9	20.9	103	1.40	20	
1,4-Dichlorobenzene	82	5.0	100.0	0	81.5	32.6	91.5	0.492	20	
2,4-Dinitrophenol	34	5.0	100.0	0	34.1	11	112	24.4	20	R
2,4-Dinitrotoluene	99	5.0	100.0	0	98.6	44.7	112	2.22	20	
Hexachlorobenzene	83	5.0	100.0	0	83.3	30.3	126	15.1	20	
Hexachloroethane	82	5.0	100.0	0	82.2	19.5	96.4	1.22	20	
2-Methylphenol	86	5.0	100.0	0	85.9	28.7	108	7.19	20	
3+4-Methylphenol	77	5.0	100.0	1.940	75.4	24.2	136	6.73	20	
Nitrobenzene	96	5.0	100.0	0	96.0	28.8	119	8.08	20	
Pentachlorophenol	34	5.0	100.0	3.180	30.5	20.2	93	28.6	20	R
Pyridine	79	5.0	100.0	0	78.7	19.3	82.8	7.10	20	
Surr: 2-Fluorophenol	51		100.0		50.8	12.1	85.8	0		
Surr: Phenol-d5	60		100.0		59.9	17.7	65.8	0		
Surr: 2,4,6-Tribromophenol	46		100.0		45.5	26	138	0		
Surr: Nitrobenzene-d5	97		100.0		97.0	47.5	119	0		
Surr: 2-Fluorobiphenyl	92		100.0		91.9	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **1404B92-001Cmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **WQ5-C-R36**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533017** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	88		100.0		88.1	44	113	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13005**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533012** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	89	5.0	100.0	0	88.9	27.4	101			
1,4-Dichlorobenzene	87	5.0	100.0	0	87.1	32.6	91.5			
2,4-Dinitrophenol	55	5.0	100.0	0	55.1	23.1	118			
2,4-Dinitrotoluene	100	5.0	100.0	0	101	44.7	112			
Hexachlorobenzene	94	5.0	100.0	0	93.7	30	130			
Hexachloroethane	86	5.0	100.0	0	86.0	23.2	97.8			
2-Methylphenol	93	5.0	100.0	0	93.3	36.1	105			
3+4-Methylphenol	89	5.0	100.0	0	88.7	35.7	92.5			
Nitrobenzene	98	5.0	100.0	0	98.2	30.9	125			
Pentachlorophenol	78	5.0	100.0	0	78.0	20.2	93			
Pyridine	77	5.0	100.0	0	77.3	5.14	87.1			
Surr: 2-Fluorophenol	81		100.0		81.0	12.1	85.8			
Surr: Phenol-d5	68		100.0		67.6	17.7	65.8			S
Surr: 2,4,6-Tribromophenol	93		100.0		93.5	26	138			
Surr: Nitrobenzene-d5	99		100.0		98.7	47.5	119			
Surr: 2-Fluorobiphenyl	99		100.0		99.1	48.1	106			
Surr: 4-Terphenyl-d14	92		100.0		91.6	44	113			

Sample ID: **lcs-13005**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533013** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	83	5.0	100.0	0	83.2	27.4	101	6.67	0	
1,4-Dichlorobenzene	83	5.0	100.0	0	82.8	32.6	91.5	5.04	0	
2,4-Dinitrophenol	57	5.0	100.0	0	56.6	23.1	118	2.69	0	
2,4-Dinitrotoluene	110	5.0	100.0	0	108	44.7	112	7.33	0	
Hexachlorobenzene	89	5.0	100.0	0	88.9	30	130	5.28	0	
Hexachloroethane	83	5.0	100.0	0	82.9	23.2	97.8	3.65	0	
2-Methylphenol	91	5.0	100.0	0	91.1	36.1	105	2.36	0	
3+4-Methylphenol	85	5.0	100.0	0	84.6	35.7	92.5	4.82	0	
Nitrobenzene	96	5.0	100.0	0	96.3	30.9	125	1.97	0	
Pentachlorophenol	77	5.0	100.0	0	77.2	20.2	93	0.954	0	
Pyridine	77	5.0	100.0	0	77.2	5.14	87.1	0.0777	0	
Surr: 2-Fluorophenol	76		100.0		75.7	12.1	85.8	0	0	
Surr: Phenol-d5	67		100.0		66.9	17.7	65.8	0	0	S
Surr: 2,4,6-Tribromophenol	83		100.0		83.4	26	138	0	0	
Surr: Nitrobenzene-d5	98		100.0		98.3	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	96		100.0		95.9	48.1	106	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13005**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13005**	RunNo: **18459**
Prep Date: **5/5/2014**	Analysis Date: **5/7/2014**	SeqNo: **533013** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Terphenyl-d14	88		100.0		88.4	44	113	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1404b92-001f dup**	SampType:	**dup**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**WQ5-C-R36**	Batch ID:	**R18314**		RunNo:	**18314**				
Prep Date:		Analysis Date:	**4/30/2014**		SeqNo:	**528879**	Units:	**µmhos/cm**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	49800	0.100						0.740	20	

Sample ID	**ec 999us ccv**	SampType:	**ccv**		TestCode:	**SM2510B: Specific Conductance**				
Client ID:	**CCV**	Batch ID:	**R18314**		RunNo:	**18314**				
Prep Date:		Analysis Date:	**4/30/2014**		SeqNo:	**528882**	Units:	**µmhos/cm**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	1000	0.010	999.0	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-12947**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**PBW**	Batch ID:	**12947**	RunNo:	**18312**					
Prep Date:	**4/30/2014**	Analysis Date:	**4/30/2014**	SeqNo:	**528846**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.000200								

Sample ID	**LCS-12947**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**LCSW**	Batch ID:	**12947**	RunNo:	**18312**					
Prep Date:	**4/30/2014**	Analysis Date:	**4/30/2014**	SeqNo:	**528847**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00563	0.000200	0.005000	0	113	80	120			

Sample ID	**LCSR-12947**	SampType:	**LCSR**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**BatchQC**	Batch ID:	**12947**	RunNo:	**18312**					
Prep Date:	**4/30/2014**	Analysis Date:	**4/30/2014**	SeqNo:	**528848**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00564	0.000200	0.005000	0	113	80	120			

Sample ID	**1404B92-001DMS**	SampType:	**MS**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**WQ5-C-R36**	Batch ID:	**12947**	RunNo:	**18312**					
Prep Date:	**4/30/2014**	Analysis Date:	**4/30/2014**	SeqNo:	**528862**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00539	0.00100	0.005000	0	108	75	125			

Sample ID	**1404B92-001DMSD**	SampType:	**MSD**	TestCode:	**EPA Method 7470: Mercury**					
Client ID:	**WQ5-C-R36**	Batch ID:	**12947**	RunNo:	**18312**					
Prep Date:	**4/30/2014**	Analysis Date:	**4/30/2014**	SeqNo:	**528863**	Units:	**mg/L**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00532	0.00100	0.005000	0	106	75	125	1.44	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12947**	SampType: **LCS**	TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW**	Batch ID: **12947**	RunNo: **18312**
Prep Date: **4/30/2014**	Analysis Date: **4/30/2014**	SeqNo: **528847** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.00563	0.000200	0.005000	0	113	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531880** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	ND	1.00								
Potassium	ND	1.00								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531881** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	51.1	1.00	50.00	0	102	80	120			
Potassium	49.2	1.00	50.00	0	98.4	80	120			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531882** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	51.3	1.00	50.00	0	103	80	120			
Potassium	49.5	1.00	50.00	0	99.1	80	120			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531891** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	99.7	90	110			
Potassium	48	1.0	50.00	0	96.5	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531904** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	49.6	1.00	50.00	0	99.3	90	110			
Potassium	47.9	1.00	50.00	0	95.8	90	110			

Sample ID **1404B92-001FMS**	SampType: **MS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **WQ5-C-R36**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531910** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	1404B92-001FMS	SampType:	MS		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	WQ5-C-R36	Batch ID:	R18416		RunNo:	18416				
Prep Date:		Analysis Date:	5/6/2014		SeqNo:	531910	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	993	10.0	500.0	454.2	108	75	125			
Potassium	824	10.0	500.0	289.4	107	75	125			

Sample ID	1404B92-001FMSD	SampType:	MSD		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	WQ5-C-R36	Batch ID:	R18416		RunNo:	18416				
Prep Date:		Analysis Date:	5/6/2014		SeqNo:	531911	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	1020	10.0	500.0	454.2	114	75	125	3.09	20	E
Potassium	858	10.0	500.0	289.4	114	75	125	4.00	20	

Sample ID	CCV CAT	SampType:	CCV_CAT		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R18416		RunNo:	18416				
Prep Date:		Analysis Date:	5/6/2014		SeqNo:	531916	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	50	1.0	50.00	0	99.2	90	110			
Potassium	48	1.0	50.00	0	95.7	90	110			

Sample ID	MB	SampType:	MBLK		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	PBW	Batch ID:	R18765		RunNo:	18765				
Prep Date:		Analysis Date:	5/21/2014		SeqNo:	541838	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Sodium	ND	1.0								

Sample ID	LCS	SampType:	LCS		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	LCSW	Batch ID:	R18765		RunNo:	18765				
Prep Date:		Analysis Date:	5/21/2014		SeqNo:	541839	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	80	120			
Sodium	48	1.0	50.00	0	95.1	80	120			

Sample ID	LCSR	SampType:	LCSR		TestCode:	EPA Method 6010B: Dissolved Metals				
Client ID:	BatchQC	Batch ID:	R18765		RunNo:	18765				
Prep Date:		Analysis Date:	5/21/2014		SeqNo:	541840	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18765**	RunNo: **18765**
Prep Date:	Analysis Date: **5/21/2014**	SeqNo: **541840** 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			
Sodium	48	1.0	50.00	0	96.8	80	120			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18765**	RunNo: **18765**
Prep Date:	Analysis Date: **5/21/2014**	SeqNo: **541850** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	47.6	1.00	50.00	0	95.3	90	110			
Sodium	47.5	1.00	50.00	0	95.0	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18765**	RunNo: **18765**
Prep Date:	Analysis Date: **5/21/2014**	SeqNo: **541863** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	49	1.0	50.00	0	98.9	90	110			
Sodium	50	1.0	50.00	0	99.5	90	110			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18765**	RunNo: **18765**
Prep Date:	Analysis Date: **5/21/2014**	SeqNo: **541876** 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	90	110			
Sodium	50	1.0	50.00	0	99.7	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531881** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	51.1	1.00	50.00	0	102	80	120			
Potassium	49.2	1.00	50.00	0	98.4	80	120			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18416**	RunNo: **18416**
Prep Date:	Analysis Date: **5/6/2014**	SeqNo: **531882** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	51.3	1.00	50.00	0	103	80	120	0.394	0	
Potassium	49.5	1.00	50.00	0	99.1	80	120	0.644	0	

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18765**	RunNo: **18765**
Prep Date:	Analysis Date: **5/21/2014**	SeqNo: **541839** 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	80	120			
Sodium	48	1.0	50.00	0	95.1	80	120			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18765**	RunNo: **18765**
Prep Date:	Analysis Date: **5/21/2014**	SeqNo: **541840** 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	0.373	0	
Sodium	48	1.0	50.00	0	96.8	80	120	1.81	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-13004**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **13004**	RunNo: **18416**
Prep Date: **5/5/2014**	Analysis Date: **5/6/2014**	SeqNo: **531883** 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	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-13004**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13004**	RunNo: **18416**
Prep Date: **5/5/2014**	Analysis Date: **5/6/2014**	SeqNo: **531884** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.475	0.0200	0.5000	0	94.9	80	120			
Beryllium	0.500	0.00300	0.5000	0	99.9	80	120			
Cadmium	0.473	0.00200	0.5000	0	94.5	80	120			
Calcium	48.4	1.00	50.00	0	96.7	80	120			
Chromium	0.474	0.00600	0.5000	0	94.8	80	120			
Iron	0.469	0.0500	0.5000	0	93.7	80	120			
Lead	0.467	0.00500	0.5000	0	93.4	80	120			
Magnesium	49.3	1.00	50.00	0	98.6	80	120			
Nickel	0.454	0.0100	0.5000	0	90.9	80	120			
Potassium	47.3	1.00	50.00	0	94.6	80	120			
Silver	0.0991	0.00500	0.1000	0	99.1	80	120			
Sodium	48.6	1.00	50.00	0	97.2	80	120			
Vanadium	0.494	0.0500	0.5000	0	98.7	80	120			

Sample ID **LCS-13004**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13004**	RunNo: **18416**
Prep Date: **5/5/2014**	Analysis Date: **5/6/2014**	SeqNo: **531885** 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	95.3	80	120			
Beryllium	0.499	0.00300	0.5000	0	99.8	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **LCS-13004**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13004**	RunNo: **18416**
Prep Date: **5/5/2014**	Analysis Date: **5/6/2014**	SeqNo: **531885** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.471	0.00200	0.5000	0	94.2	80	120			
Calcium	48.3	1.00	50.00	0	96.7	80	120			
Chromium	0.474	0.00600	0.5000	0	94.8	80	120			
Iron	0.471	0.0500	0.5000	0	94.2	80	120			
Lead	0.464	0.00500	0.5000	0	92.7	80	120			
Magnesium	49.3	1.00	50.00	0	98.6	80	120			
Nickel	0.457	0.0100	0.5000	0	91.4	80	120			
Potassium	47.5	1.00	50.00	0	95.0	80	120			
Silver	0.0998	0.00500	0.1000	0	99.8	80	120			
Sodium	48.5	1.00	50.00	0	97.0	80	120			
Vanadium	0.496	0.0500	0.5000	0	99.3	80	120			

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.
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#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13004**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13004**	RunNo: **18416**
Prep Date: **5/5/2014**	Analysis Date: **5/6/2014**	SeqNo: **531884** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.475	0.0200	0.5000	0	94.9	80	120			
Beryllium	0.500	0.00300	0.5000	0	99.9	80	120			
Cadmium	0.473	0.00200	0.5000	0	94.5	80	120			
Calcium	48.4	1.00	50.00	0	96.7	80	120			
Chromium	0.474	0.00600	0.5000	0	94.8	80	120			
Iron	0.469	0.0500	0.5000	0	93.7	80	120			
Lead	0.467	0.00500	0.5000	0	93.4	80	120			
Magnesium	49.3	1.00	50.00	0	98.6	80	120			
Nickel	0.454	0.0100	0.5000	0	90.9	80	120			
Potassium	47.3	1.00	50.00	0	94.6	80	120			
Silver	0.0991	0.00500	0.1000	0	99.1	80	120			
Sodium	48.6	1.00	50.00	0	97.2	80	120			
Vanadium	0.494	0.0500	0.5000	0	98.7	80	120			

Sample ID: **LCS-13004**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13004**	RunNo: **18416**
Prep Date: **5/5/2014**	Analysis Date: **5/6/2014**	SeqNo: **531885** 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	95.3	80	120	0.397	0	
Beryllium	0.499	0.00300	0.5000	0	99.8	80	120	0.134	0	
Cadmium	0.471	0.00200	0.5000	0	94.2	80	120	0.331	0	
Calcium	48.3	1.00	50.00	0	96.7	80	120	0.0600	0	
Chromium	0.474	0.00600	0.5000	0	94.8	80	120	0.0612	0	
Iron	0.471	0.0500	0.5000	0	94.2	80	120	0.436	0	
Lead	0.464	0.00500	0.5000	0	92.7	80	120	0.754	0	
Magnesium	49.3	1.00	50.00	0	98.6	80	120	0.0284	0	
Nickel	0.457	0.0100	0.5000	0	91.4	80	120	0.551	0	
Potassium	47.5	1.00	50.00	0	95.0	80	120	0.405	0	
Silver	0.0998	0.00500	0.1000	0	99.8	80	120	0.704	0	
Sodium	48.5	1.00	50.00	0	97.0	80	120	0.233	0	
Vanadium	0.496	0.0500	0.5000	0	99.3	80	120	0.541	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1404b92-001f dup**	SampType:	**dup**		TestCode:	**SM4500-H+B: pH**				
Client ID:	**WQ5-C-R36**	Batch ID:	**R18314**		RunNo:	**18314**				
Prep Date:		Analysis Date:	**4/30/2014**		SeqNo:	**528885**	Units:	**pH units**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.50	1.68								H

Sample ID	**ph 7.00 ccv**	SampType:	**ccv**		TestCode:	**SM4500-H+B: pH**				
Client ID:	**CCV**	Batch ID:	**R18314**		RunNo:	**18314**				
Prep Date:		Analysis Date:	**4/30/2014**		SeqNo:	**528888**	Units:	**pH units**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.97	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.
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#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **mb-1**	SampType: **mblk**	TestCode: **SM2320B: Alkalinity**							
Client ID: **PBW**	Batch ID: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **528866**	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: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **528867**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.1	20.0	80.00	0	100	90	110			

Sample ID **1404b92-002f ms**	SampType: **ms**	TestCode: **SM2320B: Alkalinity**							
Client ID: **WQ5-C-R36-Duplica**	Batch ID: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **528871**	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	95.1	65.2	112			

Sample ID **1404b92-002f msd**	SampType: **msd**	TestCode: **SM2320B: Alkalinity**							
Client ID: **WQ5-C-R36-Duplica**	Batch ID: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **528872**	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	95.0	65.2	112	0.0647	20	

Sample ID **LCSR-1**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529765**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.5	20.0	80.00	0	101	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **528867**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.1	20.0	80.00	0	100	90	110			

Sample ID: **LCSR-1**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R18314**	RunNo: **18314**							
Prep Date:	Analysis Date: **4/30/2014**	SeqNo: **529765**	Units: **mg/L CaCO3**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Alkalinity (as CaCO3)	80.5	20.0	80.00	0	101	90	110	0.548	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531445**	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 ST9060-14001**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531446**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.82	1.00	4.850	0	99.3	90	110			

Sample ID **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531447**	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			

Sample ID **1404B92-001BMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**							
Client ID: **WQ5-C-R36**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531458**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.91	1.00	4.650	0.3433	98.2	75	125			

Sample ID **1404B92-001BMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**							
Client ID: **WQ5-C-R36**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531459**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.95	1.00	4.650	0.3433	99.0	75	125	0.791	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS ST9060-14001 s**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531446**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.82	1.00	4.850	0	99.3	90	110			

Sample ID: **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R18399**	RunNo: **18399**							
Prep Date:	Analysis Date: **5/5/2014**	SeqNo: **531447**	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	1.22	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1404B92-001FDUP**	SampType:	**DUP**	TestCode:	**Specific Gravity**					
Client ID:	**WQ5-C-R36**	Batch ID:	**R18593**	RunNo:	**18593**					
Prep Date:		Analysis Date:	**5/13/2014**	SeqNo:	**537076**	Units:				

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Specific Gravity	1.018	0						0.0687	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

11-Jun-14

Client: WIPP

Project: WIPP DMP

Sample ID	MB-12979	SampType:	MBLK		TestCode:	SM 2540D: TSS				
Client ID:	PBW	Batch ID:	12979		RunNo:	18385				
Prep Date:	5/2/2014	Analysis Date:	5/5/2014		SeqNo:	530826	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-12979	SampType:	LCS		TestCode:	SM 2540D: TSS				
Client ID:	LCSW	Batch ID:	12979		RunNo:	18385				
Prep Date:	5/2/2014	Analysis Date:	5/5/2014		SeqNo:	530827	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	95.0	4.00	92.40	0	103	82.47	119.05			

Sample ID	LCSR-12979	SampType:	LCSR		TestCode:	SM 2540D: TSS				
Client ID:	BatchQC	Batch ID:	12979		RunNo:	18385				
Prep Date:	5/2/2014	Analysis Date:	5/5/2014		SeqNo:	530828	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	92.0	4.00	92.40	0	99.6	82.47	119.05			

Sample ID	1404B92-001FDUP	SampType:	DUP		TestCode:	SM 2540D: TSS				
Client ID:	WQ5-C-R36	Batch ID:	12979		RunNo:	18385				
Prep Date:	5/2/2014	Analysis Date:	5/5/2014		SeqNo:	530830	Units:	mg/L		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	23.0	4.00						4.26	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1404B92**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-12979**	SampType: **LCS**	TestCode: **SM 2540D: TSS**
Client ID: **LCSW**	Batch ID: **12979**	RunNo: **18385**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **530827** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	95.0	4.00	92.40	0	103	82.47	119.05			

Sample ID: **LCSR-12979**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**
Client ID: **BatchQC**	Batch ID: **12979**	RunNo: **18385**
Prep Date: **5/2/2014**	Analysis Date: **5/5/2014**	SeqNo: **530828** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	92.0	4.00	92.40	0	99.6	82.47	119.05	3.21	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.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

WQSP-5

DATA VERIFICATION AND VALIDATION REPORTS

Round 36
WQSP-5
SDG 1404B92
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 (c)	mg/L	0.5	500	1000	14,000		14,000		14,000	0.0	18,100
TOC	mg/L	1.0	0.120	1.0	0.34	J	0.36	J	0.35	4.3	<5.0
Alkalinity (Bicarbonate)	mg/L	4.0	4.0	20	47.8		47.6		47.7	0.42	56
Specific Conductance	umhos/cm	NA	0.10	0.10	50,200		50,500		50,350	0.6	67,700
pH	pH units	NA	0.10	1.68	7.49		7.32		7.41	2.30	7.4 - 7.9
Specific Gravity	NA	NA	0.0	0.0	1.019		1.018		1.019	0.1	1.04
TDS (c)	mg/L	10	492	1,000	35,100		33,400		34,250	5.0	43,950
TSS (c)	mg/L	1.0	3.07	4.0	**24**		**29**		**26.5**	18.9	**<10**
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	0.773	20	1,030		1,040		1035	0.97	1,303
Mg (Diss)	mg/L	0.5	0.189	10	454		456		455	0.4	547
K (Diss)	mg/L	0.5	2.02	10	289		299		294	3.4	622
Na (Diss)	mg/L	0.5	24.3	200	9,710		10,200		9,955	4.92	11,190
					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	0.000435	0.00010	ND		ND		NA	NA	<0.002
Ba	mg/L	0.020	0.00312	0.100	0.0176	J	0.0151	J	0.016	15.3	<1.0
Be	mg/L	0.010	0.00176	0.0150	ND		ND		NA	NA	<0.02
Cd	mg/L	0.010	0.00314	0.0100	ND		ND		NA	NA	<0.05
Ca (c)	mg/L	0.500	3.270	20	1,070		1,030		1,050	3.8	NA
Cr	mg/L	0.025	0.00841	0.0300	ND		ND		NA	NA	<0.5
Pb (c)	mg/L	0.020	0.0239	0.0250	ND		ND		NA	NA	<0.05
Mg	mg/L	0.50	0.085	5.0	472		446		459	5.7	NA
Ni	mg/L	0.025	0.00952	0.050	ND		ND		NA	NA	<0.1
K (c)	mg/L	0.50	2.53	5.0	320		305		313	4.80	NA
Ag	mg/L	0.013	0.0026	0.0250	0.011	J	0.021	J	0.016	62.50	<0.5
Na (c)	mg/L	0.50	83	200	9,800		9,670		9,735	1.3	NA
V (c)	mg/L	0.025	0.0274	0.250	ND		ND		NA	NA	2.7
ICP/MS Metals											
Sb	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.073
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	<0.1
Tl	mg/L	0.025	0.020	0.020	ND		ND		NA	NA	0.209

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
Bold concentrations higher than the baseline 95th UTLV or 95th percentile (16 - 95 percent non-detects).
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 SOW-prescribed MRL.

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 36
WQSP-5

Sample Summary

Date:	August 27, 2014
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	April 29, 2014
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	June 11, 2014
Date Samples Shipped/Method	April 29, 2014 by FedEx
Date Samples Received by lab:	April 30, 2014
Sample Receipt Condition:	Intact at 2.8 deg. C
SDG:	1404B92
WIPP Chain of Custody/Request for Analysis:	1157
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 2, 2014 (meets holding time)
SVOC Extraction Date:	May 5, 2014 (meets holding time)
SVOC Analysis Date(s):	May 7, 2014 (meets holding time)
Total Trace Metals Analysis Date(s):	May 10, 2014 (meets holding time)
Dissolved Cation Metals Analysis Date(s):	May 6, 21, 2014 (meets holding time)
Mercury Analysis Date(s):	April 30, 2014 (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 1404B92

WTS Sample No.	Analytes
GW-WQ5CR36N1, GW-WQ5CR36N1D	VOCs
GW-WQ5CR36N2, GW-WQ5CR36N3	VOCs (Field Blank and Trip Blank)
GW-WQ5CR36N4, GW-WQ5CR36N4D	TOC
GW-WQ5CR36N5, GW-WQ5CR36N5D	SVOCs
GW-WQ5CR36N6, GW-WQ5CR36N6D	Total Trace Metals (including "total" cation metals)
GW-WQ5CR36 N7, GW-WQ5CR36 N7D	General Parameters (including "dissolved" cations)

Results Summary

Benzene and toluene were detected in both the primary sample and the duplicate sample at concentrations between the MDL and MRL with the concentrations J-flagged as estimated. The benzene concentrations were 0.22 ug/L and 0.20 ug/L and the toluene concentrations were 0.20 ug/L and 0.21 ug/L. The field blank showed detection of 0.98 ug/L of chloroform (J-flagged), and the trip blank showed 2.8 ug/L of 2-butanone (J-flagged) and 0.93 ug/L of chlorobenzene (J-flagged). The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples. No VOC tentatively identified compounds were detected in the groundwater samples from the GC/MS data.

No SVOCs were detected in the WQSP-4 groundwater samples. No SVOC tentatively identified compounds were detected in the groundwater samples from the GC/MS data.

The trace metals detected included Ba at 0.018 mg/L in the primary sample and 0.015 mg/L in the duplicate sample and silver at 0.011 mg/L in the primary sample and 0.021 mg/l in the duplicate sample. The concentrations were below the MRL and are J-flagged as estimated

Measurements were made on all the general chemistry parameters at concentrations above the reporting limit except for TOC, which was detected at 0.34 mg/L in the primary sample and 0.36 mg/L in the duplicate sample.

The TSS concentrations of 24 mg/L in the primary sample and 29 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 EPA's SW-846 Method 8260B.

Two compounds were detected in the groundwater, benzene and toluene. WQSP-5 is the well that was contaminated with toluene in 2013 from the use of electrical tape during change-out of the pump. The benzene concentrations were 0.22 ug/L and 0.20 ug/L and the toluene concentrations were 0.20 ug/L and 0.21 ug/L in the primary and duplicate groundwater samples, respectively. The field blank showed detection of 0.98 ug/L of chloroform (J-flagged), and the trip blank showed 2.8 ug/L of 2-butanone (J-flagged) and 0.93 ug/L of chlorobenzene (J-flagged). The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples.

As discussed above the only detection of any VOC in the field blank and trip blank samples were chloroform, 2-butanone, and chlorobenzene. Chloroform was detected in the field blank at 0.98 ug/L (J-flagged), and 2.8 ug/L of 2-butanone (J-flagged) and 0.93 ug/L of chlorobenzene (J-flagged) were detected in the trip blank. The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples, and the compounds detected in the groundwater were not detected in the field blank and trip blank samples.

The QC sample analyses showed acceptable recoveries and precision for the LCS and the LCSR. The MS and MSD showed recoveries for isobutyl alcohol recoveries higher than the objective with recoveries of 179 and 167 percent recovery, respectively due to the salting-out effect of the high-TDS sample matrix. The compound was not detected in the samples.

All other quality assurance objectives were met for the VOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 8270C. No SVOCs were detected in the groundwater samples.

The QC data for the SVOCs showed that the tribromophenol surrogate recovery was just below the objective with 28.8 percent recovery from the duplicate sample. No target compounds were

detected in the method blank samples. The recoveries were acceptable for the LCS/LCSR samples as well as the recovery RPDs (although the RPDs were not initially reported by the lab).

The MS/MSD samples showed low recoveries for 2,4-dinitrophenol (26.7 percent) and pentachlorophenol (22.1 percent) in the MS sample but acceptable recoveries in the MSD. The recoveries were within the lab's historical control chart range. The lower recoveries in the MS resulted in the RPDs exceeding the lab's 20-RPD objective with RPDs of 24 and 29 for the two compounds, respectively. The low surrogate recoveries should have no impact on the quality or usability of the data since no SVOC compounds were detected in the groundwater samples.

All other quality assurance objectives were met for the SVOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed by Method 6020A (ICP/MS) by Anatek according to EPA Method 6020 from SW-846. Mercury (Hg) was analyzed using automated cold-vapor atomic absorption (CVAA) spectroscopy according to EPA SW-846 Method 7470A.

The recoverable metals Ba and Ag were detected in the primary and duplicate groundwater samples. The Ba concentrations were 0.018 mg/L in the primary sample and 0.015 mg/L in the duplicate sample and the Ag concentrations were 0.011 mg/L in the primary sample and 0.021 mg/L in the duplicate sample. The concentrations were all J-flagged as estimated.

The MDLs for the analyses were higher than the MRLs specified in the SOW for Hg (0.00044 mg/L MDL vs. 0.00020 mg/L objective) and just slightly higher for Pb (0.024 mg/L MDL vs. 0.020 mg/L objective and for V (0.027 mg/L MDL vs. 0.025 mg/L objective). Since there was no analytical response for the presence of these metals in the groundwater samples, they were not present in the samples, and the usability of the data is not adversely affected.

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 dissolved cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. 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 objective.

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	Parameter
Standard Methods SM 2710F	Specific Gravity
Standard Methods SM 4500-H^+	pH
EPA Method 120.1	Specific Conductance (Conductivity)
Standard Methods SM 2540C	Total Dissolved Solids (TDS)
Standard Methods SM 2540D	Total Suspended Solids (TSS)
Standard Methods SM 5310B	Total Organic Carbon (TOC)
Standard Methods SM 2320B	Alkalinity
EPA Method 300.0	Anions

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

- All parameters: Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted. Initial calibration verification and continuing calibration verification standards were analyzed as appropriate to ensure accurate calibration of instrumentation.

- Anions: LCS and LCSR (replicate analysis) samples were analyzed for the anions chloride, nitrate and sulfate to obtain recovery information. All LCS recoveries were within 90 – 110 percent. MS/MSD samples were only analyzed for nitrate because of the high native concentrations of chloride and sulfate. The accuracy and precision objectives were met for this non-target anion.

- pH: A CCV at pH 7.00 was analyzed just prior to the samples. The primary groundwater sample was analyzed in duplicate to yield a value of 7.50 and a RPD of 0.13.

- Specific gravity: A duplicate sample was analyzed to obtain precision data. The duplicate analysis result was 1.018 (compared to 1.019) for a RPD of 0.098.

- Specific conductance: A duplicate analysis of the duplicate sample was performed to obtain precision information. The analysis result of 49,800 umhos/cm resulted in a RPD of 0.74.

- Total Organic Carbon: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS recoveries of 99.3 percent and 101 percent and the MS/MSD recoveries of 98.2 percent and 99.0 percent readily met the accuracy objectives and yielded RPDs of 1.22 and 0.79, which readily met the precision objective.

- Alkalinity: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS recoveries of 100 percent and 101 percent and the MS/MSD recoveries of 95.1 percent and 95.0 percent readily met the

accuracy objectives and yielded RPDs of 0.55 and 0.065, which readily met the precision objective.

- Total Dissolved Solids: LCS/LCSR and MS/MSD samples were analyzed for this gravimetric method to generate accuracy and precision data. The LCS recoveries were 104 percent and 103 percent, and the MS/MSD recoveries were 98.7 percent and 96.4 percent, respectively for a RPD of 1.4. Thus the accuracy and precision objectives were readily met.

- Total Suspended Solids: A LCS/LCSD and a duplicate sample were analyzed to generate precision data. The LCS recoveries were 103 percent and 99.6 for a RPD of 3.2, and the duplicate analysis of the primary sample yielded 23 mg/L for a RPD of 4.3.

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, which do not adversely affect the reliability or usability of the information. The lab was reminded to provide all the requested information.

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-5 (Round 36)

Laboratory Name: Hall Environmental

Laboratory Work Order #: 1404B92

Sample Number(s): GW-WQS-C-R36-N1 thru N7D

Reviewer Name (print): Robbin A. Spoon

Reviewer Signature: Robbin Apoon

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? (Al 10/6/14)	✓	
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?	✓	

Robbin Apoon 10/6/14
Data Validator Date

Completeness Reviewer 10-15-14
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? 2.8°C	✓	
Was the analysis holding time of 14 days met for all samples? 5/2 vs 4/29	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 5/2	✓	
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? 5/2	✓	
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. However, all R^2 correlation coefficients were ≥0.995.

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) Chloroform in FB just below MRL at 0.98 µg/L.
2-butanone below 5.0-µg/L MRL at 2.8 µg/L in TB.
Chlorobenzene just below MRL at 0.93 µg/L in TB.

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?	✓		(a)

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?		✓	(b)
Did the precision of the MS/MSD recoveries meet the precision objective of ≤30 RPD?	✓		(c)

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) RPDs not initially reported by lab. RPDs ≤ 20 based on close agreement of LCS/LCSR concentrations.

(b) High recovery for isobutyl alcohol from salting out effect of groundwater.

(c) RPDs not initially reported by lab. RPDs <30 based on good agreement of MS/MSD concentrations.

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?		✓ (a)

Data Validator — 8-18-14 — Date

Completeness Reviewer — 10/6/14 — Date

(a) Other than the compounds reported, there were no significant TICs in the samples. Trace concentrations of compounds were present based on the mass spectra, but the compounds were also present in the lab method blanks.

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? 5/5 vs 4/29	✓	
Were the extracts analyzed within 40 days of sample extraction? 5/7 vs 5/5	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 5/7	✓	
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? 2.5 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?	✓		(a)
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) All R^2 values > 0.995.
(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?		✓ (a)
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?		✓

(a) 2,4,6-TBP recovery 28.8 % in duplicate sample

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?	✓		(a)

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?		✓	(b)
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?		✓	(c) NJ 8-19-14
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) RPDs not initially reported by lab and were requested.
(b) 2A-DNP: 26.7%; PCP: 22.1%; Dup: OK
~~(c) Not initially~~ NJ 8-19-14

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 — Date: 8/19/14

Completeness Reviewer — Date: 10/6/14

(a) TICs data for duplicate sample not initially submitted by lab. Trace level concentration peaks were observed for toluene, chlorobenzene, C_2 alkyl benzenes (e.g. xylenes), & bisphenol A. Toluene was detected as a VOC. These compounds sometimes appear in SVOC method blanks, but did not appear in the MB for this WQSP well. BPA is a common contaminant associated with plastic materials. Since toluene and benzene were detected in the sample, the C_2 alkyl benzenes are likely present in the GW at concentrations less than 1 µg/L. The BPA is a likely contaminant from the sampling materials. The source of the chlorobenzene is uncertain.

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? lowest R^2 =	✓	
Were a calibration blank and at least one calibration standard analyzed for daily calibration for each batch of samples? CalBlk + 8 Stds	✓	
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? 5/6, 5/21 Runs (5/10 & 5/15)	✓	
Were CCV standards analyzed at a frequency of once for every 10 samples and at the end of the sample queue? All runs	✓	
Did the CCV analysis meet the accuracy objective of 90-110% recovery for all target metals? All runs 5/6, 5/21, 5/15 + 5/10)	✓	

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 4/29/2014
Prep Hg 4/30; Total 5/5; Dissolv 5/5
Analyzed Hg 4/30; Total 5/10 & 5/15; Dissolv 5/6 & 5/21

RA 7/30/14

Digestion Factor = 1.0 (10+2°Sx)

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? Yes 10Sx	✓	

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?	✓	

RAA 7/30/14

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

Digestion DF = 30/20 = 1.5

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO	
Were the samples digested within 28 days of sample collection? C 4/29/14 P+A 4/30/14	✓		
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank? (6 (includes Ø))	✓		
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? 3.3299 mg/L	✓		(b)
Did the ICV analysis meet the accuracy objective of 90-110% recovery? 96.13%	✓		
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? 100.83	✓		(c)
Did the sample set contain a MB, LCS, MS, and MSD?	✓		
Was a DMP Sample used for the MS/MSD? 10S x	✓		
Was the concentration of any mercury in the MB, ICB, and CCB < MRL?	✓		(d)
Did the mercury in the LCS and LCSD meet the accuracy objective of 80-120% recovery? 113% LCS 113% LCSD	✓		(e)
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery? 107.8% MS 106.3% MSD	✓		(f)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD? 1.44%	✓		(g)

(a) $R^2 = 0.999851$

(b) Back calculate ICV conc.

$\frac{3.2010}{x} = 0.9613$

$x = 3.3299$ mg/L

$ICV_{seq\ 7} = \left(\frac{3.2010}{3.3299}\right) \times 100 = 96.13\%$ recovery

(c) $CCV_{seq\ 22} = \left(\frac{3.3578}{3.3299}\right) \times 100 = 100.83\%$ Rec

(d) MRL = 0.000435 mg/L = 0.435 µg/L

MB = 0.03618 µg/L

ICB = 0.02613 µg/L

CCB = 0.02763 µg/L

(e) LCS = $\left(\frac{0.00563}{0.0050}\right) \times 100 = 112.7\%$ rec

LCSD = $\left(\frac{0.00564}{0.0050}\right) \times 100 = 112.8\%$ rec

%RPD = 0.1%

(f) MS = $\left(\frac{0.005392}{0.0050}\right) \times 100 = 107.8\%$ rec

MSD = $\left(\frac{0.005315}{0.0050}\right) \times 100 = 106.3\%$ rec

(g)

RPD = $\left(\frac{0.005392 - 0.005315}{0.0053535}\right) \times 100$

= 1.44% RPD

7/30/14

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 4/29 P 4/30, 5/5 A 5/15/14	✓		
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓		
Was a DMP sample used for the MS/MSD? 10 Sx	✓		
Was an ICV analyzed after the initial calibration? 1.0 ppb / 40.0 ppb	✓		
Were a CCB and CCV analyzed during the sample queue? CCV = 50 ppb	✓		
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? 98.8% → 105.4% recovery	✓		(a)
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery? 94.6% → 113.0% recovery	✓		(b)
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD? 0.4% → 1.3% RPD	✓		(c)

Robin Alpern 7/30/2014
Data Validator Date

Completeness Reviewer 12-15-14
Completeness Reviewer Date

(a) $Tl_{LCS}\left(\frac{0.0518}{0.05}\right)100 = 103.6\%$ rec

$Tl_{LCSD}\left(\frac{0.0527}{0.05}\right)100 = 105.4\%$ rec

$As_{LCS}\left(\frac{0.0497}{0.05}\right)100 = 99.4\%$ rec

$As_{LCSD}\left(\frac{0.0506}{0.05}\right)100 = 101.2\%$ rec

(b) $Tl_{MS}\left(\frac{0.0473}{0.05}\right)100 = 94.6\%$ rec

$Tl_{MSD}\left(\frac{0.0478}{0.05}\right)100 = 95.6\%$ rec

$As_{MS}\left(\frac{0.0565}{0.05}\right)100 = 113.0\%$ rec

$As_{MSD}\left(\frac{0.0562}{0.05}\right)100 = 112.4\%$ rec

(c) $RPD_{Tl} = \left(\frac{0.0473 - 0.0478}{0.04755}\right)100 = 1.051 \simeq 1.1\%$ RPD

$RPD_{As} = \left(\frac{0.0565 - 0.0562}{0.05635}\right)100 = 0.532 \simeq 0.5\%$ RPD

RA 7/30/14

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

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 2.8°C	✓	
	N/A	
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 4/16/14 A 4/30/14-5/1/14	✓	

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?	✓	
Were a laboratory method blank, LCS, MS, and MSD analyzed with the sample set?	✓	
Was a DMP sample used for the MS/MSD? 10Sx	✓	

why 4-2 calib. rather than 5/1??

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?	✓	(a)
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? NO_3-N ONLY	✓	
Did the MS/MSD analyses of applicable anions meet the precision objective of ≤20 RPD? RPD (NO_3-N) = 0.410% (Not 0.439)	✓	

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?	✓	

Yes but need to show on Chromeleon Scans Include QC Samples.

Robbin Alper 8/14/14
Data Validator Date

10-15-14
Completeness Reviewer Date

Cl LCS 4.699 = 93.98%rec
LCSD 5 4.698 = 93.96%rec
[SPK]
RPD = 0

SO4 LCS 9.547 = 95.47%rec
LCSD 10 9.627 = 96.27%rec
RPD = 0.83

MS = 2.441 x 50 = 122.05 NO_3-N
MSD = 2.431 x 50 = 121.55 NO_3-N

$\frac{122.05}{125}$ = 97.64

$\frac{121.55}{125}$ = 97.24

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 2.8°C	✓	
Were the samples analyzed within 14 days of collection? C 4/29/14 A 4/30/14	✓	

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)?	✓	
Was the starting pH of the sample ≤8.30? $1^{o}S_x = 7.49$ $2^{o}S_x = 7.32$	✓	
Was a DMP sample used for the MS/MSD? $2^{o}S_x$	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? MB-1 2.72	✓		
Did the LCS recovery meet the accuracy objective of 80-120% recovery? 100.1%	✓		(a)
Did the MS and MSD meet the accuracy objective of 80-120% recovery? 95.1% 95.0%	✓		(b)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD (Relative Percent Difference)? 0.0648%	✓		(c)
Were the MS/MSD recoveries and RPD manually recalculated as a check on the accuracy of the reported values?	✓		(d)

Robbin Nipper 7/31/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) LCS $SpK = 80.0$

LCS $\left(\frac{80.08}{80}\right)100 = 100.1\%$ rec

LCSD $\left(\frac{80.52}{80}\right)100 = 100.6\%$

% RPD = 0.55

(b) $2^{o}S_x = 47.6$ mg/L $SpK = 80.0$

MS $\left[\frac{(123.68 - 47.60)}{80.0}\right]100 = 95.1\%$ rec

MSD $\left[\frac{(123.60 - 47.60)}{80.0}\right]100 = 95.0\%$ rec

(c) $\left[\frac{(123.68 - 123.60)}{123.40}\right]100 = 0.0648\%$ RPD

(d) Hand Calcs:

$\frac{A \times N \times 50K}{S \times Vol}$

A = mL Titrant
N = Normality
50K = meq/mole

MS $= \frac{(6.184 \times 0.02 \times 50{,}000)}{50mL} = 123.68$ mg/L

MSD $= \frac{(6.180 \times 0.02 \times 50{,}000)}{50mL} = 123.60$ mg/L

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 2.8°C	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 4/29/14 A 4/30/14	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? 1K - single-point cal	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration? 1413 µS/cm	✓	
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? 1413 µS/cm	✓	
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)? 999 µS/cm	✓	
Was one of the samples analyzed in duplicate? 10 Sx @ DF 10x	✓	

METHOD PERFORMANCE	YES	NO	
Did the ICV analysis yield a concentration within 90-110% of the standard concentration? 95.3%	✓		(a)
Did the CCV analyses yield a concentration within 90-110% of the standard concentration? 101%	✓		(b)
Did the duplicate sample meet the precision objective of ≤20 RPD? 0.74%	✓		(c)

Kathleen Alpers 7/31/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) ICV stock 1413 µS/cm

$\left(\frac{1346}{1413}\right) 100 = 95.3\%$

(b) CCV stock 999 µS/cm

$\left(\frac{1009}{999}\right) 100 = 101.0\%$

(c) 10 Sx = 50,160

10 Sx Dup = 49,790

$\%RPD = \left(\frac{(50,160 - 49790)}{49,975}\right) 100$

$= 0.74\%$

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

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°? 2.8°C	✓	
Were the samples analyzed within five (5) days of receipt? C 4/29/14 A 4/30/14	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement?	✓	
Were at least two standard buffer solutions used to calibrate the instrument? 5	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.4	✓	

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 20.5→21.2°C; Sxs 18.4→22.1°C	✓	
Was the pH recorded to the nearest 0.1 pH unit?	✓	
Was the pH of one of the samples measured in duplicate? 1° Sx	✓	

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? 6.97 vs. 7.00	✓	
Did the duplicate sample read within ±0.1 pH unit of the primary sample?	✓	(a)

Robbin Alpoon 7/31/14
Data Validator Date

Completeness Reviewer 6-15-14
Date

(a) 1° Sx = 7.495 SU @ 19.1°C

1° Sx Dup = 7.50 SU @ 18.6°C

Dup (2°) Sx = 7.325 U @ 18.4°C

% RPD = $\left(\frac{7.49 - 7.50}{7.495}\right) 100$

= 0.133 %

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? 19.5°C	✓	
Was the temperature of the specific gravity measurements recorded? Assumed all @ 19.5		✓
Was the mass of at least 5.0 mL of the water sample measured? ≃ 10 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C?	✓	
Was the Temperature Correction Factor recorded? 0.9982	✓	

Robbin Alpern 8/13/14
Data Validator Date

10-15-14
Completeness Reviewer Date

C - 4/29/14 ; A - 5/13/14

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

$$10\ Sx = \left(\frac{10.2366}{10.0295}\right) 0.9982 = 1.0188 \simeq 1.019$$

$$10\ Sx\ Dup = \left(\frac{10.2290}{10.0295}\right) 0.9982 = 1.0181 \simeq 1.018$$

$$2^{0}\ Sx = \left(\frac{10.2318}{10.0295}\right) 0.9982 = 1.0183 \simeq 1.018$$

$$\%\ RPD = \left(\frac{1.0188 - 1.0181}{1.01845}\right) 100 = 0.06920$$

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 2.8°C	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 4/29/14 A 5/5/14	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? Cal 5/2/14		✓
Were second source ICV standards at 5 mg/L and 50 mg/L analyzed with the sample set? by-mid-end	✓	
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? 1° Sx	✓	
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?	✓	

Referred to as ICB in seq.

METHOD PERFORMANCE	YES	NO	
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)? low cal = 0.9999 ; high cal = 1.0000	✓		
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? 0.051 0.016 0.004	✓		
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? 0.791%	✓		(d)

[signature] 7/31/14
Data Validator Date

[signature] 10-15-14
Completeness Reviewer Date

(a) $ICV50 = \left(\frac{48.96}{50}\right)100 = 97.9\%$ rec

$ICV5 = \left(\frac{4.792}{5}\right)100 = 95.8\%$ rec

(b) SpK [4.850]

$LCS = \left(\frac{4.817}{4.850}\right)100 = 99.3\%$ rec

$LCSR = \left(\frac{4.876}{4.850}\right)100 = 100.53\%$ rec $\simeq 101.0\%$

%RPD = 1.22%

(c) Spk conc = 4.650 1°Sx = 0.3433

$MS = \left(\frac{4.910 - 0.3433}{4.650}\right)100 = 98.2\%$ rec

$MSD = \left(\frac{4.949 - 0.3433}{4.650}\right)100 = 99.0\%$ rec

(d) $RPD_{MS/MSD} = \left(\frac{|4.91 - 4.949|}{4.9295}\right)100 =$ 0.791%

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 2.8°C	✓	
Were the samples analyzed within 7 days of collection? C 4/29/14 A 5/5/14	✓	

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? 10 Sx	✓	
Was the initial volume of each sample 100 mL?	✓	
Were any DMP samples diluted prior to processing? All 2mL ↑ 100	✓	
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? 35,100 → 43,875 vs 50,000	✓	

METHOD PERFORMANCE	YES	NO	
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)? MAX 0.0003	✓		
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?	✓		

Robin Alpert 8/13/2014 — Data Validator / Date

[signature] 10-15-14 — Completeness Reviewer / Date

Note - all TDS conc. hand calculated + shown on "Solid Bench Sheet".

(a) MB = 10 LCS = 1041 LCSR = 1034 [Spk] = 1000

$LCS\ rec = \left(\frac{1041}{1000}\right)100 = 104.1\%$ rec. (CS ZM 8/13/14)

$\%RPD = \left(\frac{1041-1034}{1037.5}\right)100 = 0.67\%$

$LCSD = \left(\frac{1034}{1000}\right)100 = 103.4\%$ rec

(b) MB = 10 ^{10}Sx = 35,100 [Spk] = 50,000 MS = 84,450 MSD = 83,300

RM 5/13/14 $MS = \left(\frac{84,450-35,100}{50,000}\right)100 = 98.7\%$ rec

$MSD = \left(\frac{83,300-35,100}{50,000}\right)100 = 96.4\%$ rec

$\%RPD = \left(\frac{84,450-83,300}{83,875}\right)100$

$= 1.37\%$ RPD

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 2.8°C	✓	
Were the samples analyzed within 7 days of collection? CA 4/29/14 A 5/5/14	✓	
Were the samples allowed to warm to room temperature prior to filtration?		✓ (a)

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? 2.0 mg/L; PQL = 4	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? 4.26%	✓	(b)

Robin Alpers 8/12/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) No data to support samples warmed to room temp.

(b) $^{1}Sx = \left(\frac{2.7680 - 2.7704}{100}\right)10^6 = 24$ $\%RPD = \frac{(123-241)}{23.5} \times 100$

$^{1}Sx\ Dup = \left(\frac{2.7535 - 2.7558}{100}\right)10^6 = 23$ $= 4.26\%$

LCS Recoveries! Spk = [92.40] LCS = 95

LCSD = 92

$LCS = \left(\frac{95}{92.40}\right)100 = 102.8\%$

$LCSD = \left(\frac{92}{92.40}\right)100 = 99.6\%$

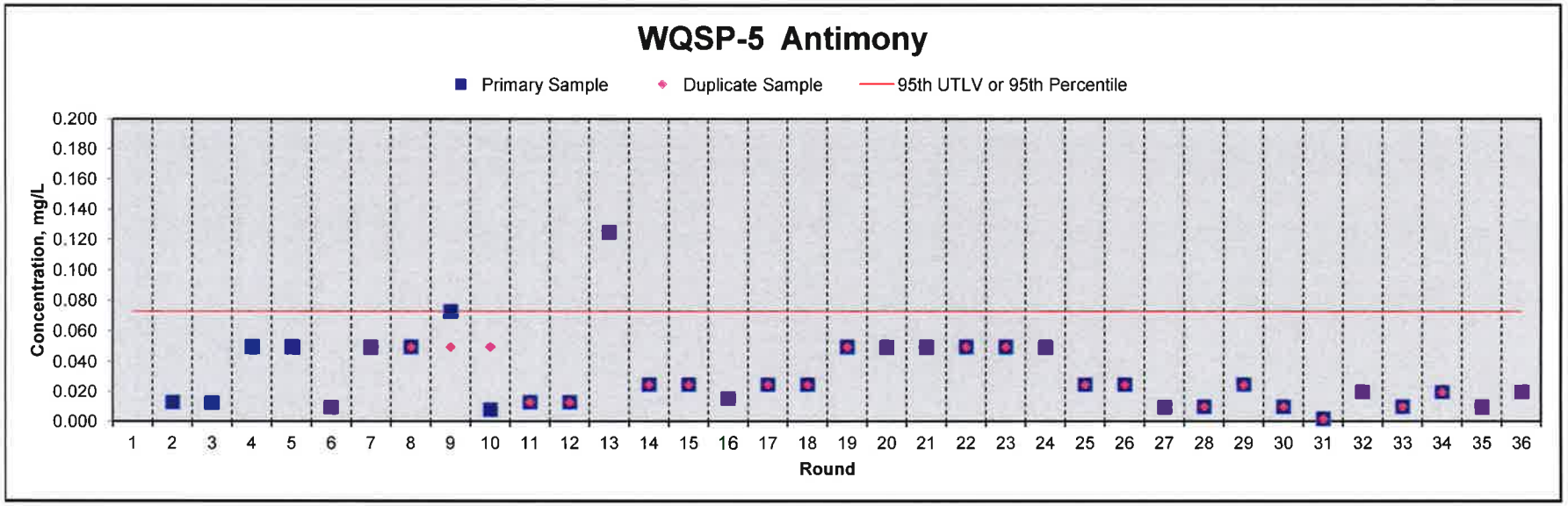
$\left(\frac{95-92}{93.5}\right)100 = 3.21\%$ RPD

WQSP-5

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

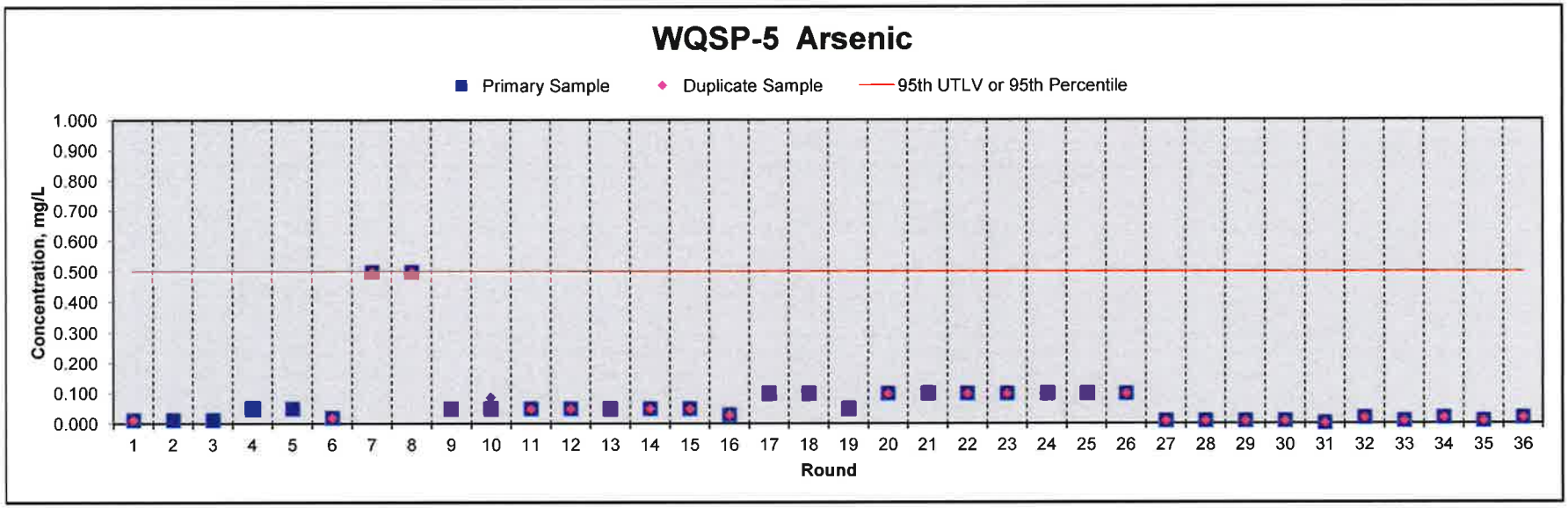
WQSP-5 Antimony

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	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
Antimony	36	04/29/14	05/15/14	< 0.020	< 0.020	mg/L	0.020	0.073



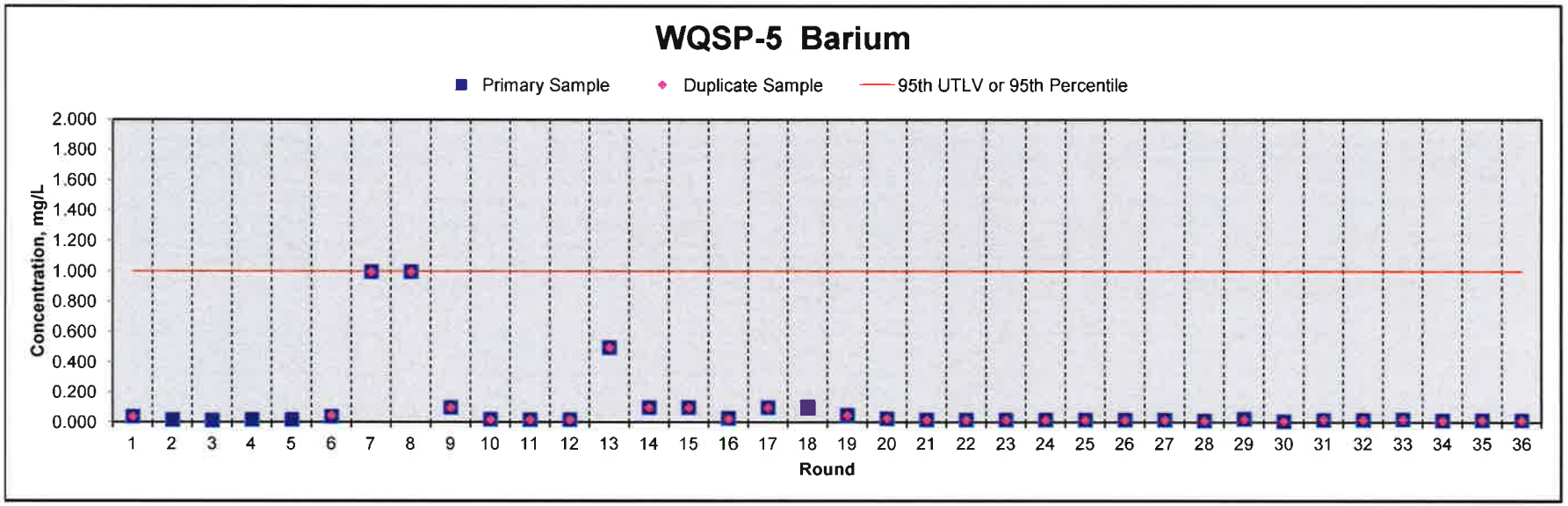
WQSP-5 Arsenic

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	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
Arsenic	36	04/29/14	05/15/14	< 0.020	< 0.020	mg/L	0.020	< 0.5



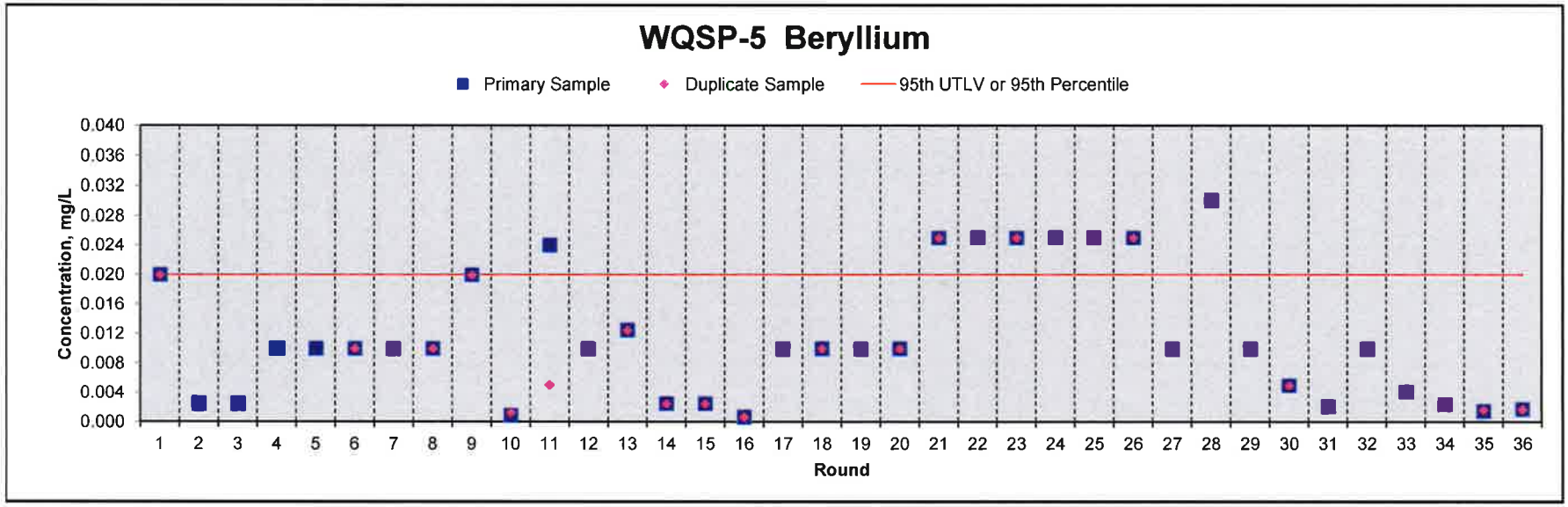
WQSP-5 Barium

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	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
Barium	36	04/29/14	05/10/14	0.0176	0.0151	mg/L	0.00312	< 1.0



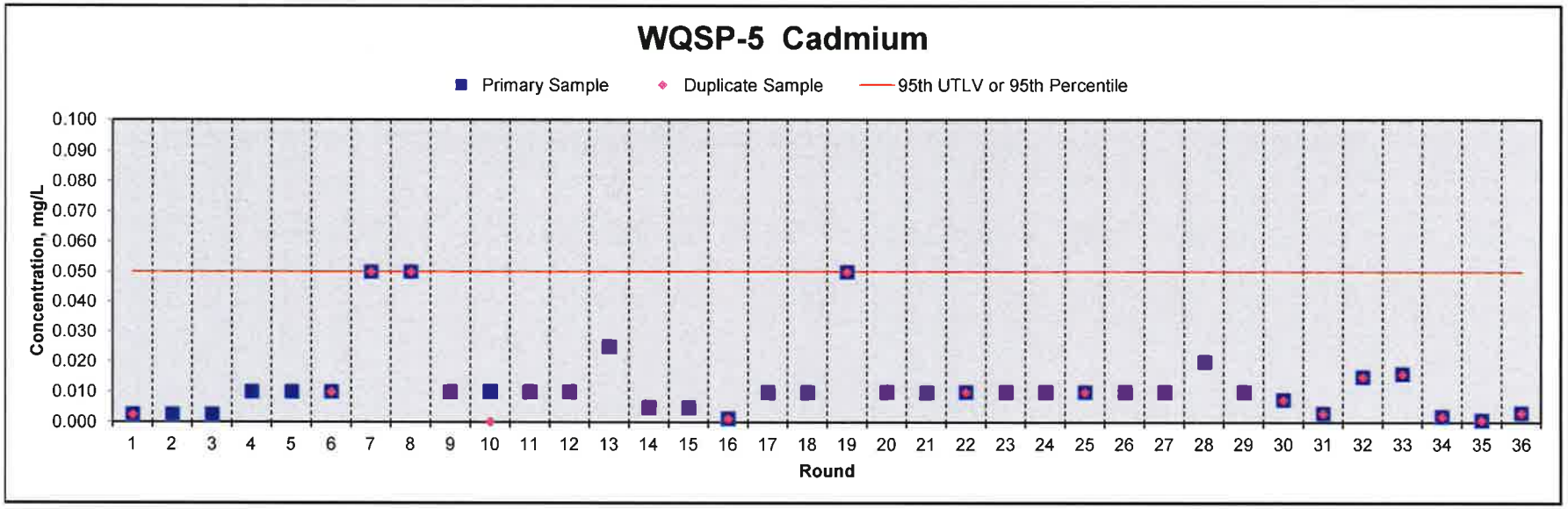
WQSP-5 Beryllium

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	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
Beryllium	36	04/29/14	05/10/14	< 0.00176	< 0.00176	mg/L	0.00176	< 0.02



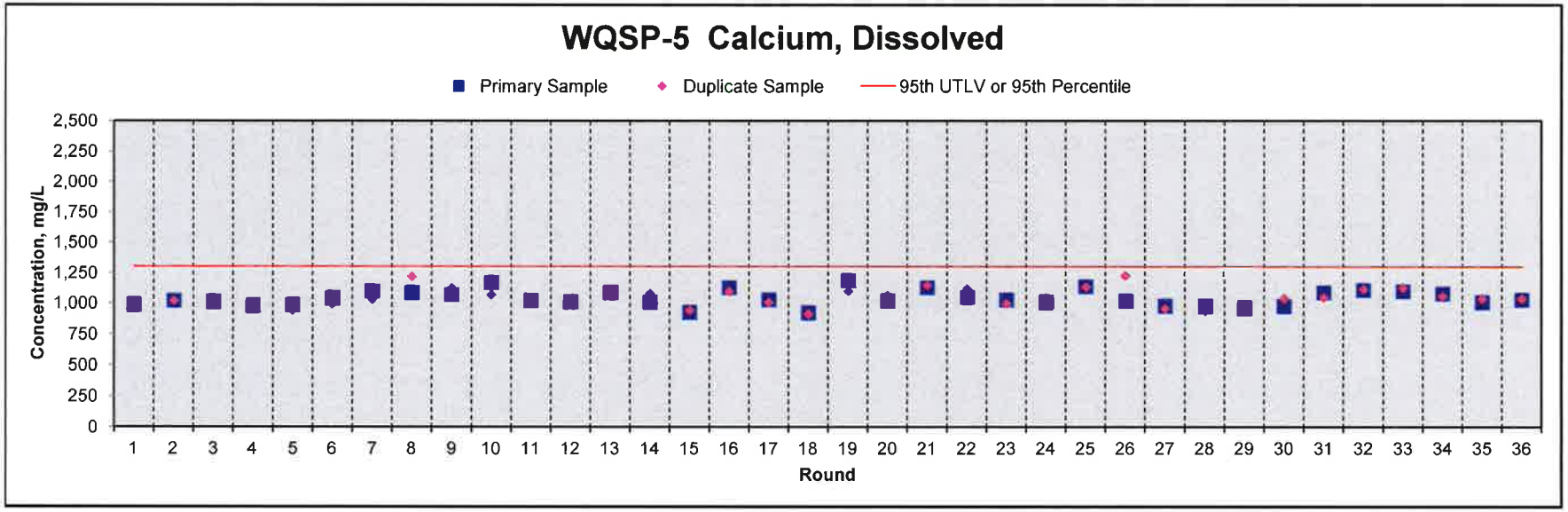
WQSP-5 Cadmium

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	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
Cadmium	36	04/29/14	05/10/14	< 0.00314	< 0.00314	mg/L	0.00314	< 0.05



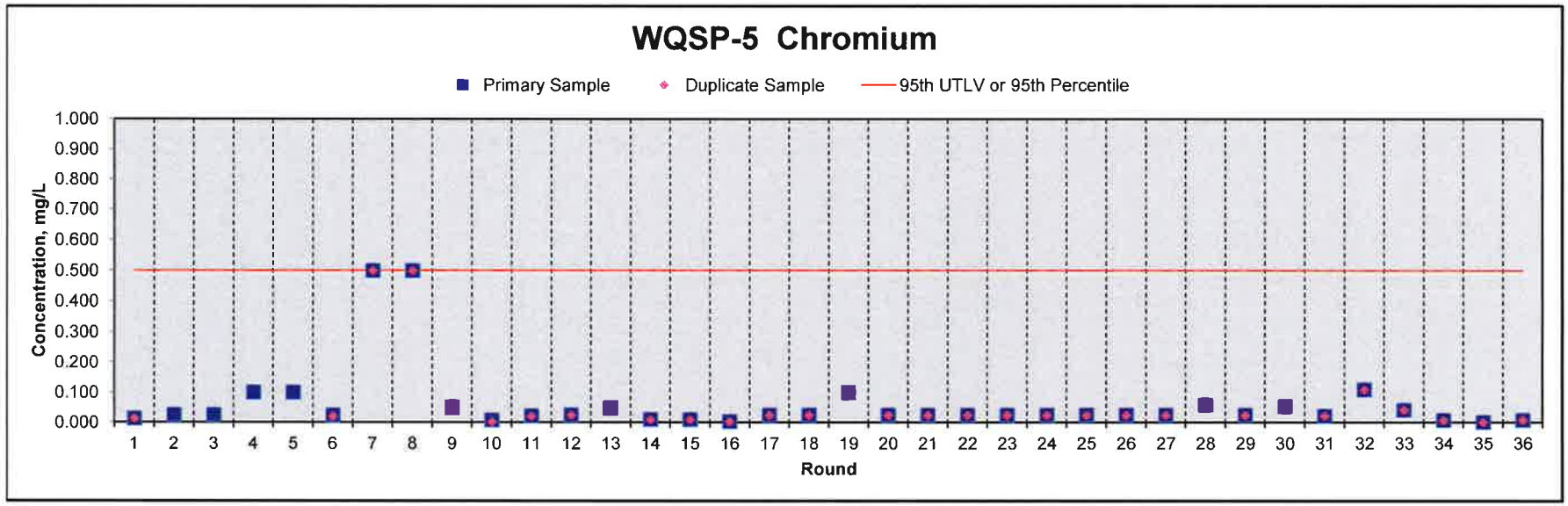
WQSP-5 Calcium, Dissolved

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	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
Calcium	36	04/29/14	05/21/14	1,030	1,040	mg/L	0.773	1,303



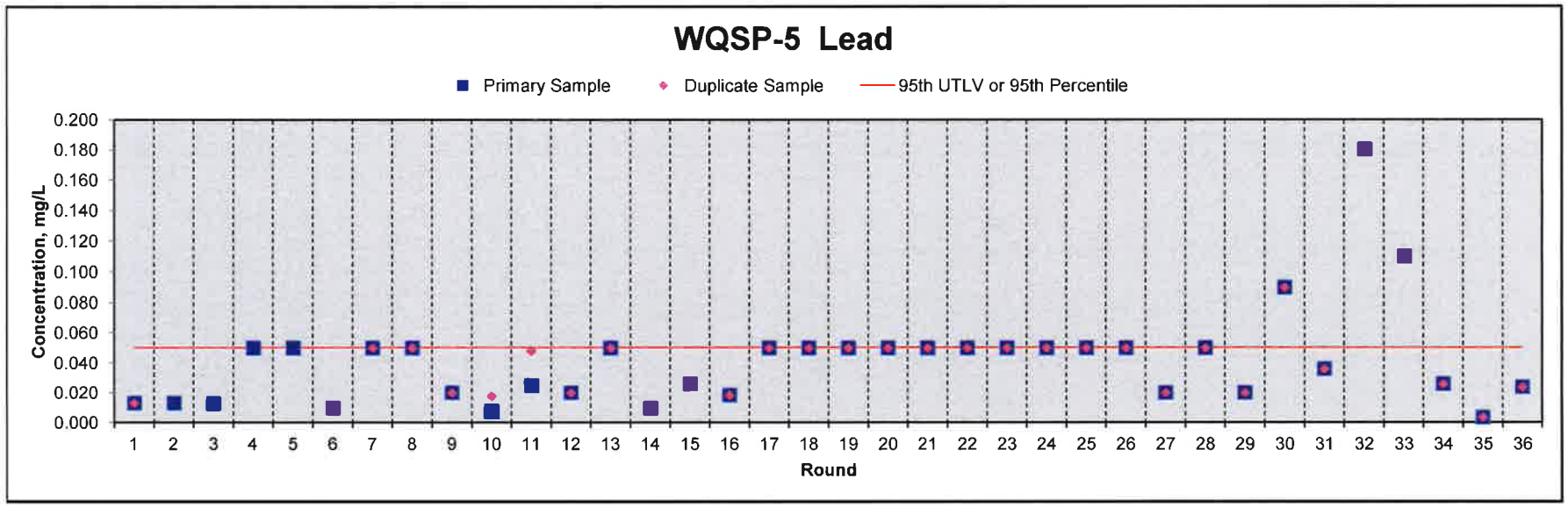
WQSP-5 Chromium

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	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
Chromium	36	04/29/14	05/10/14	< 0.00841	< 0.00841	mg/L	0.00841	< 0.5



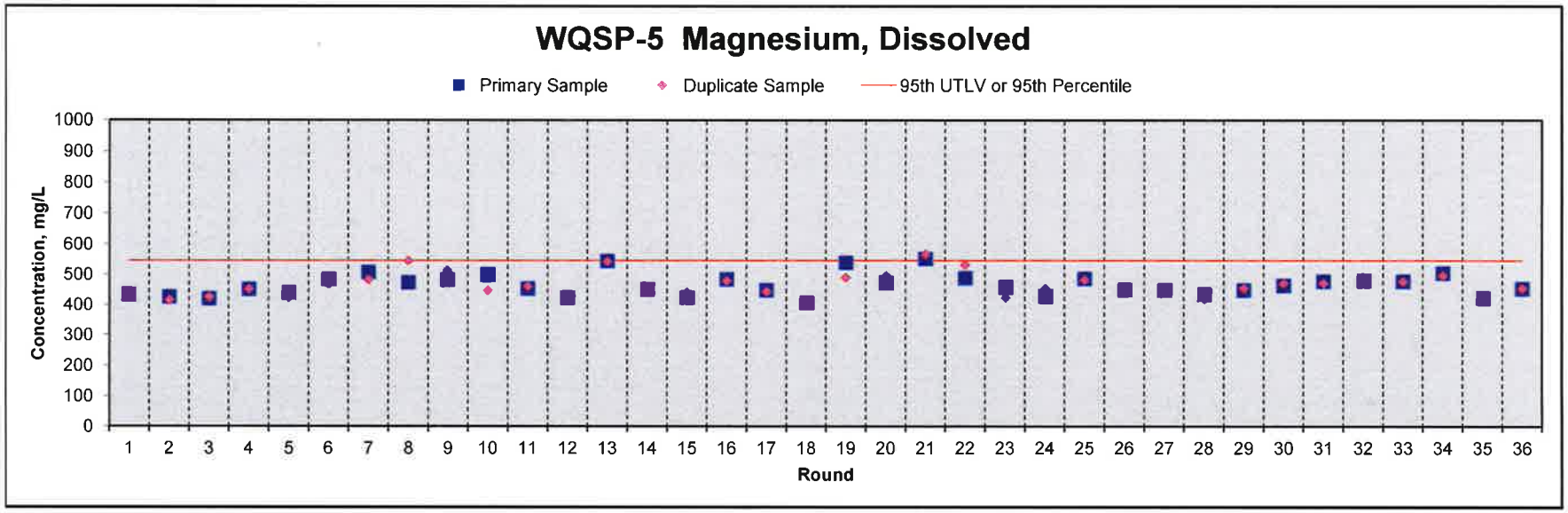
WQSP-5 Lead

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	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
Lead	36	04/29/14	05/10/14	< 0.0239	< 0.0239	mg/L	0.0239	< 0.05



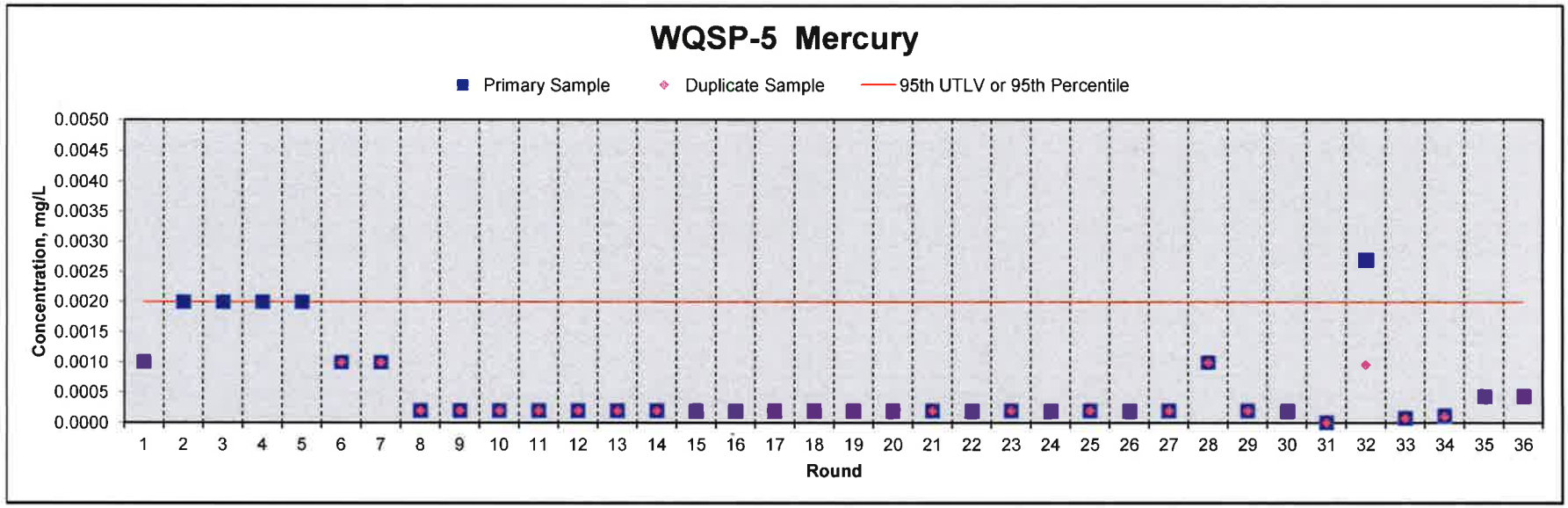
WQSP-5 Magnesium, Dissolved

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	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
Magnesium	36	04/29/14	05/06/14	454	456	mg/L	0.189	547



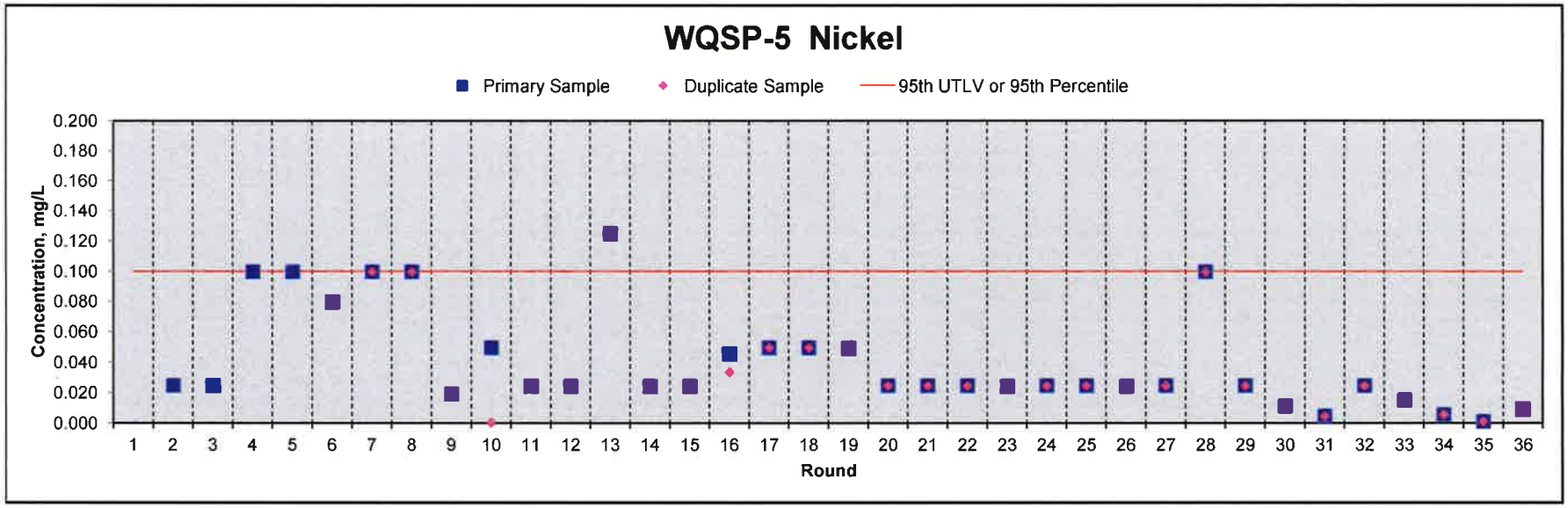
WQSP-5 Mercury

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	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
Mercury	36	04/29/14	04/30/14	< 0.000435	< 0.000435	mg/L	0.000435	< 0.002



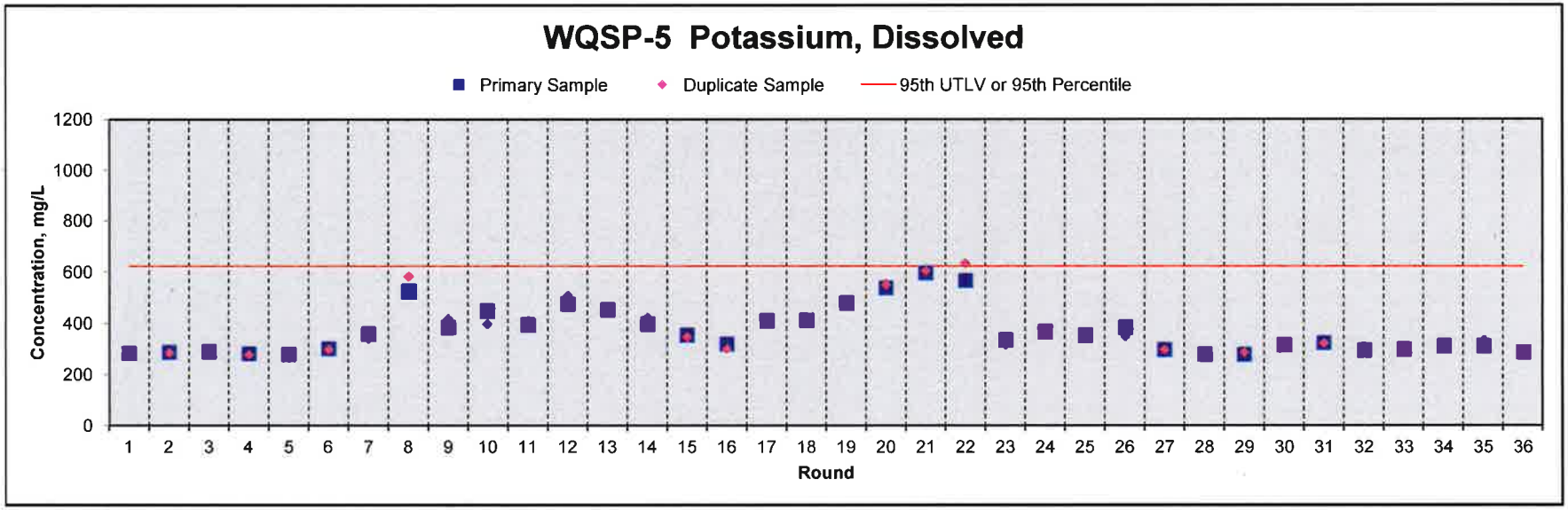
WQSP-5 Nickel

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	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
Nickel	36	04/29/14	05/10/14	< 0.00952	< 0.00952	mg/L	0.00952	< 0.1



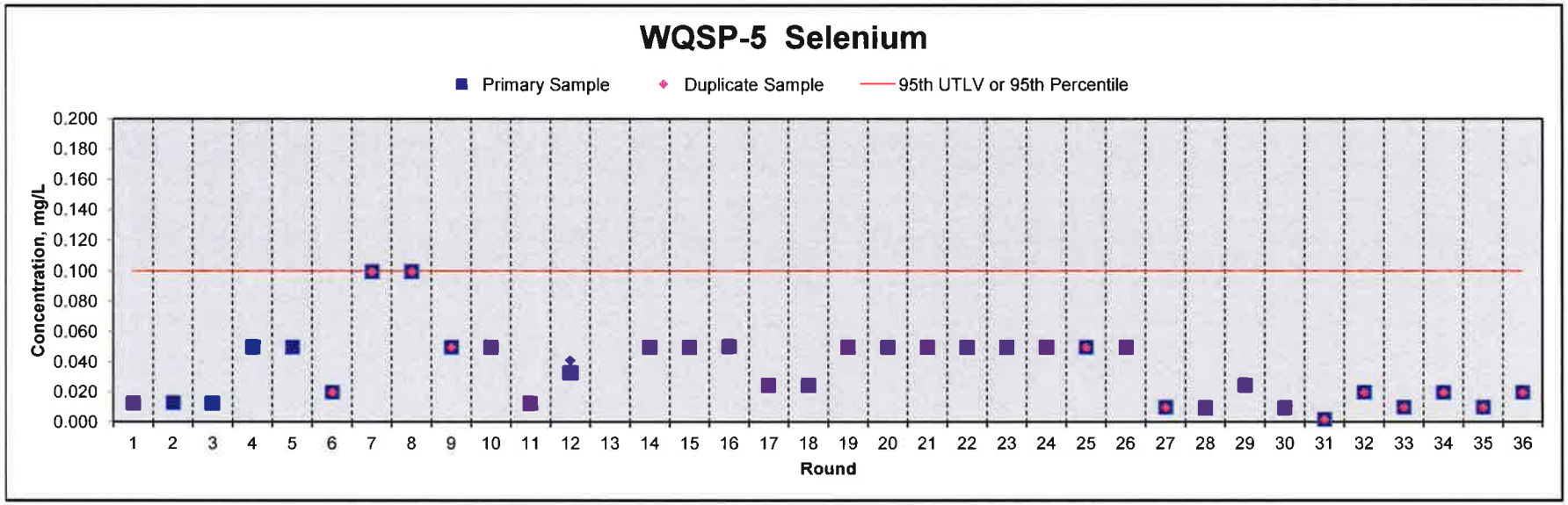
WQSP-5 Potassium, Dissolved

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	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
Potassium	36	04/29/14	05/06/14	289	299	mg/L	2.02	622



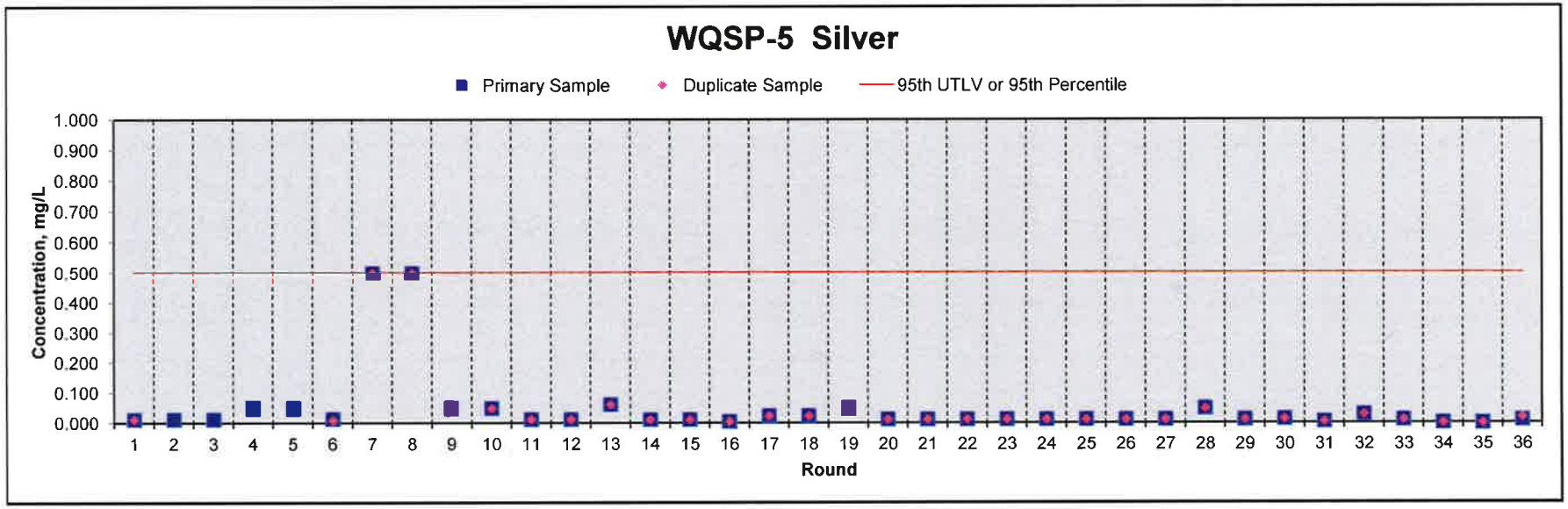
WQSP-5 Selenium

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	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
Selenium	36	04/29/14	05/15/14	< 0.020	< 0.020	mg/L	0.020	< 0.1



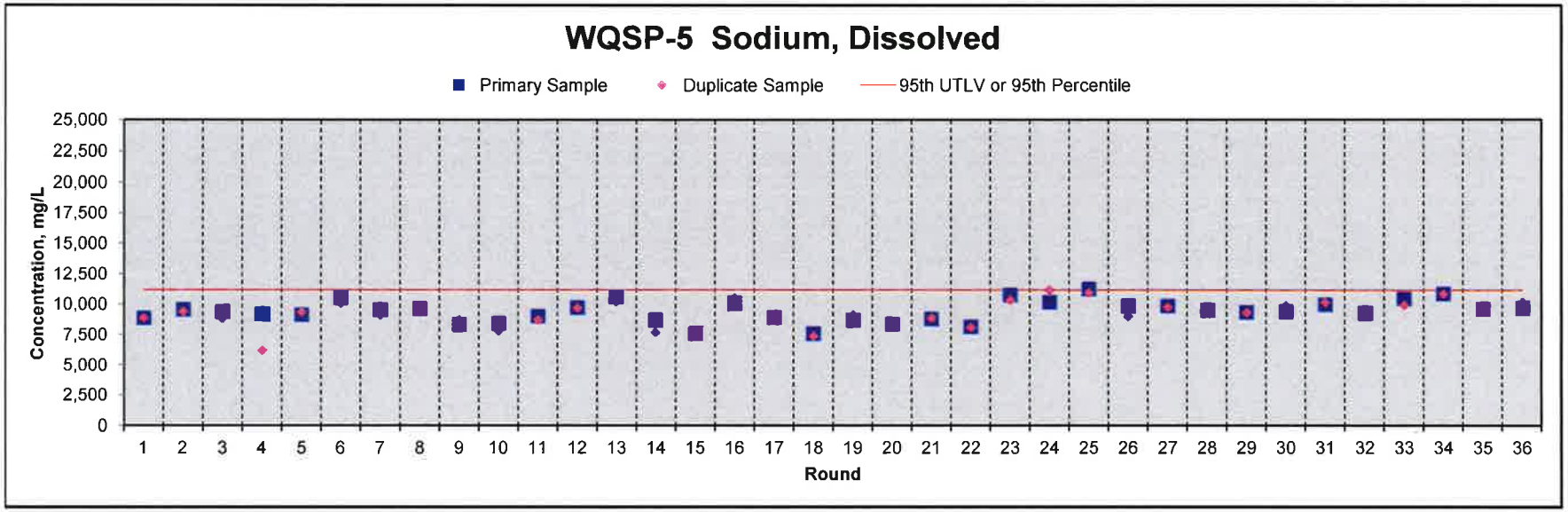
WQSP-5 Silver

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	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
Silver	36	04/29/14	05/10/14	0.0110	0.0210	mg/L	0.00261	< 0.5



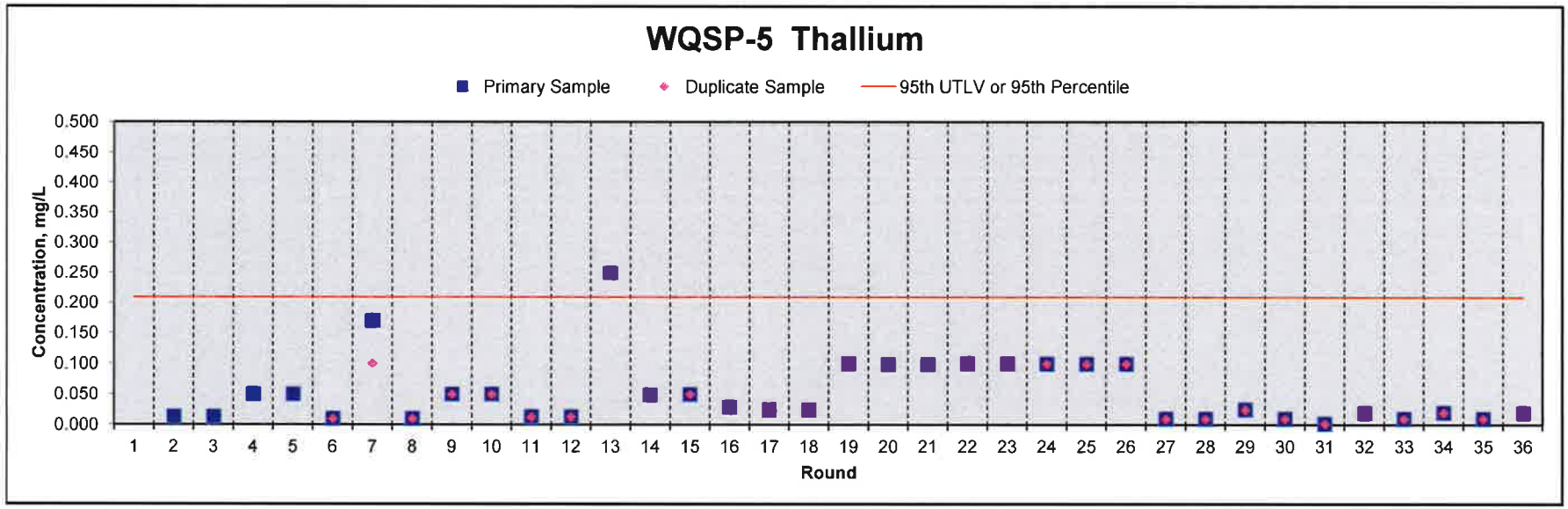
WQSP-5 Sodium, Dissolved

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	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
Sodium	36	04/29/14	05/21/14	9,710	10,200	mg/L	24.3	11,190



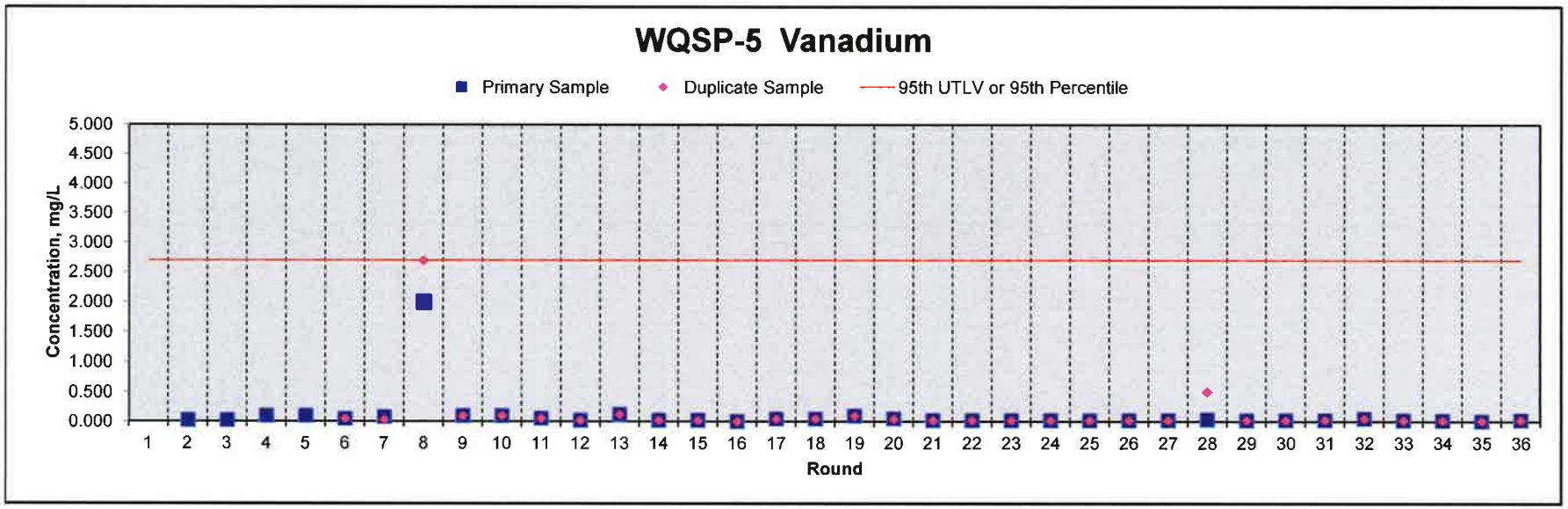
WQSP-5 Thallium

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	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
Thallium	36	04/29/14	05/15/14	< 0.020	< 0.020	mg/L	0.020	0.209



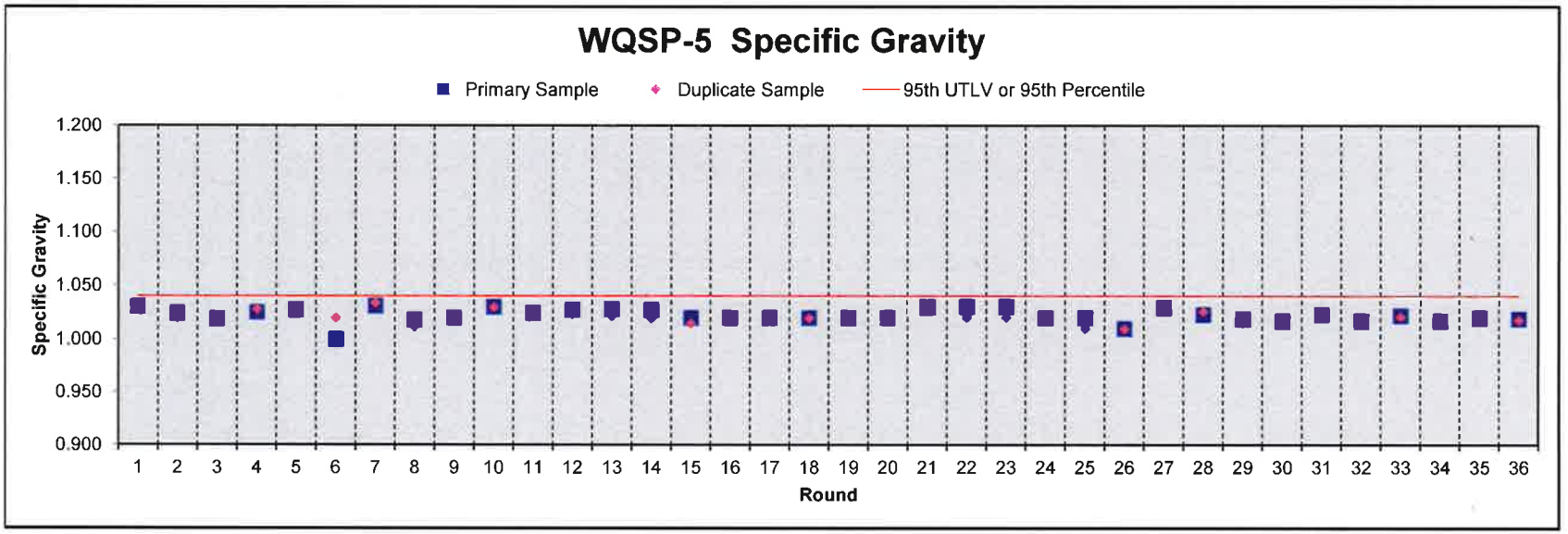
WQSP-5 Vanadium

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	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
Vanadium	36	04/29/14	05/10/14	< 0.0274	< 0.0274	mg/L	0.0274	2.7



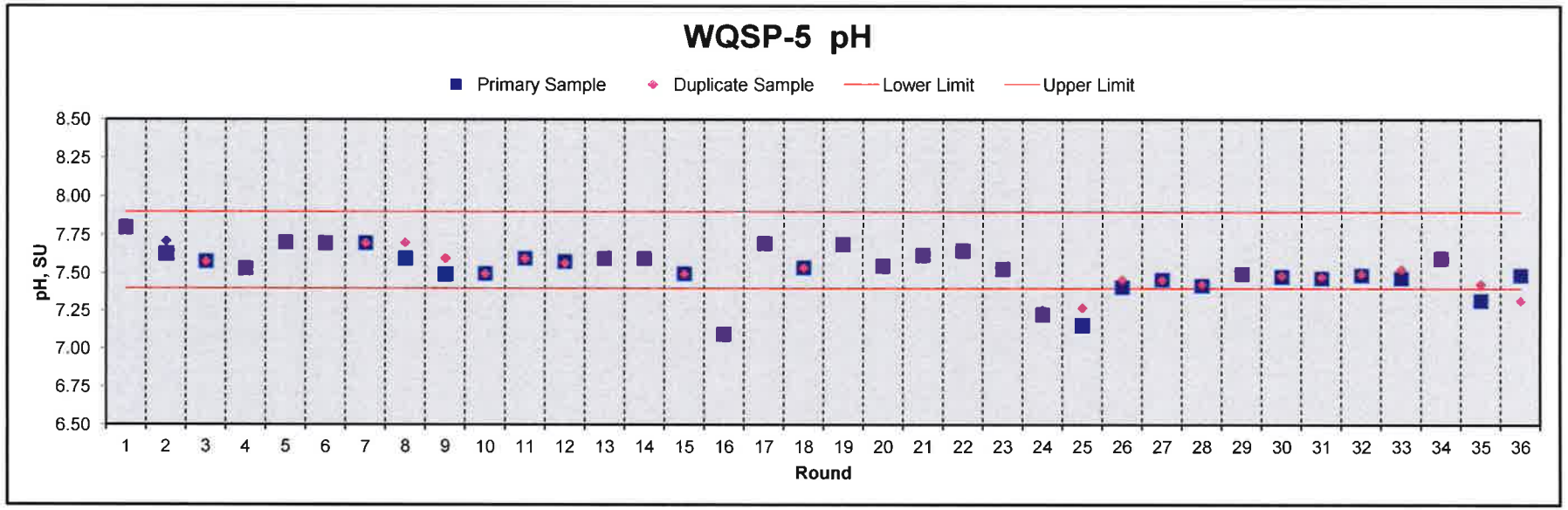
WQSP-5 Specific Gravity

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
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
Specific Gravity	36	04/29/14	05/13/14	1.019	1.018	unitless	0	1.04



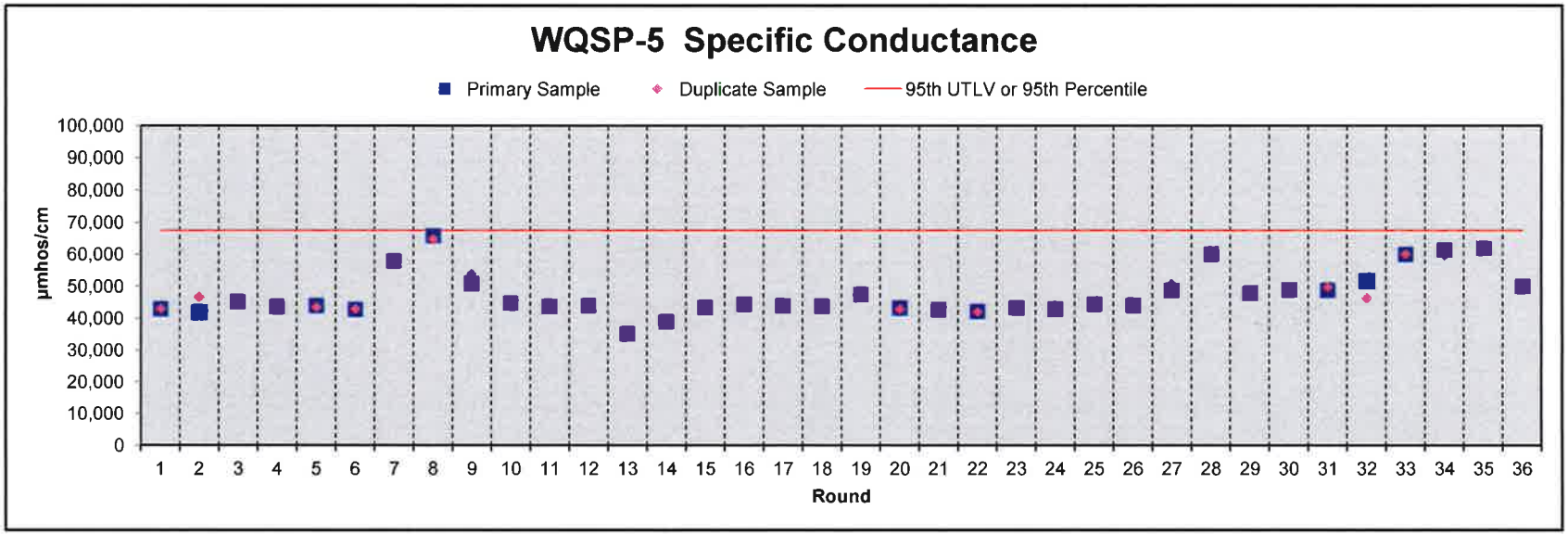
WQSP-5 pH

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	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
pH	36	04/29/14	04/30/14	7.49	7.32	SU	0.10	7.4	7.9



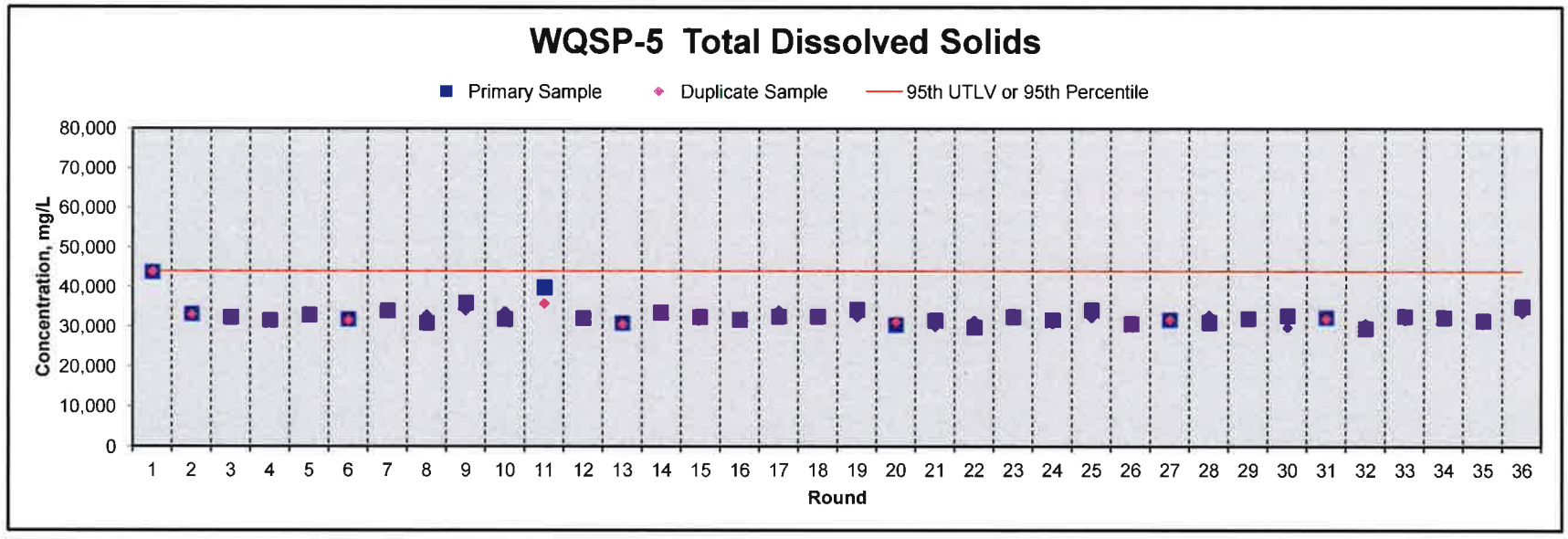
WQSP-5 Specific Conductance

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	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
Specific Conductance	36	04/29/14	04/30/14	50,200	50,500	µmhos/cm	0.1	67,700



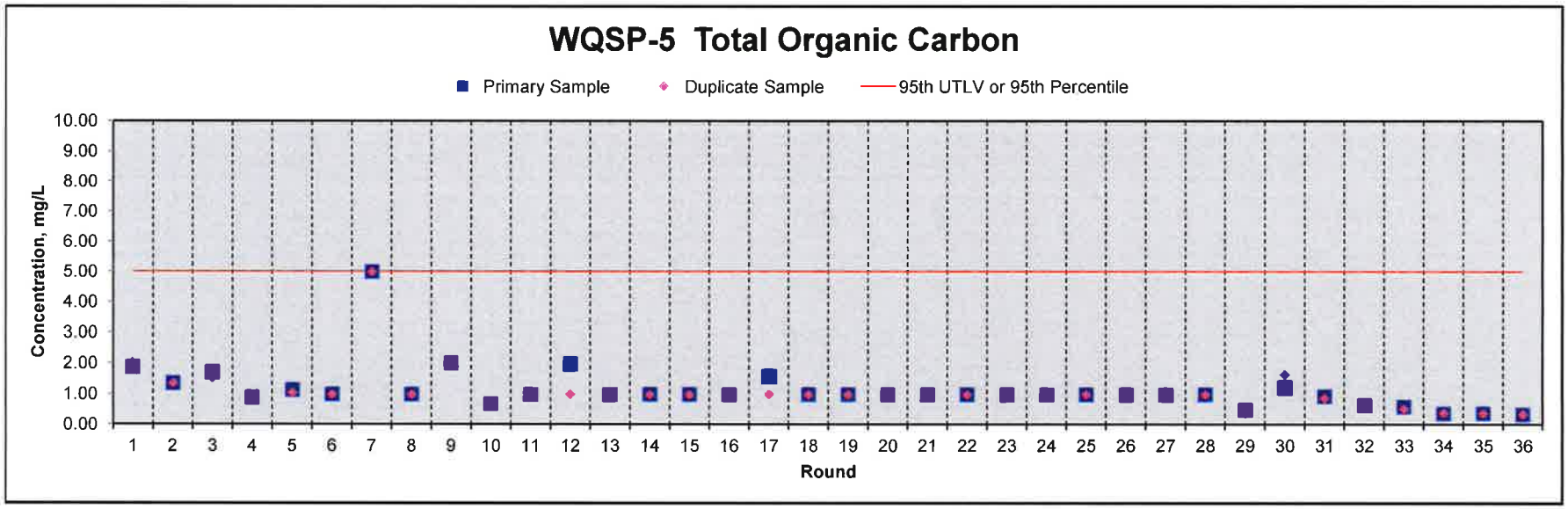
WQSP-5 Total Dissolved Solids

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	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
Total Dissolved Solids	36	04/29/14	05/05/14	35,100	33,400	mg/L	492	43,950



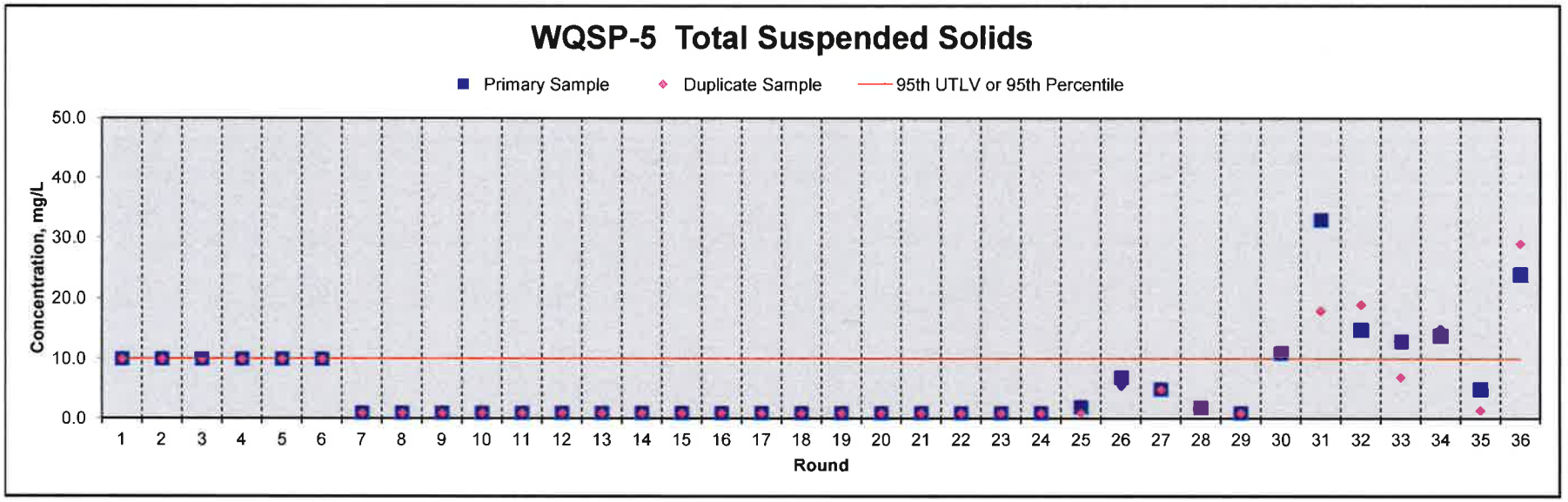
WQSP-5 Total Organic Carbon

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	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
Total Organic Carbon	36	04/29/14	05/05/14	0.34	0.36	mg/L	0.120	< 5.0



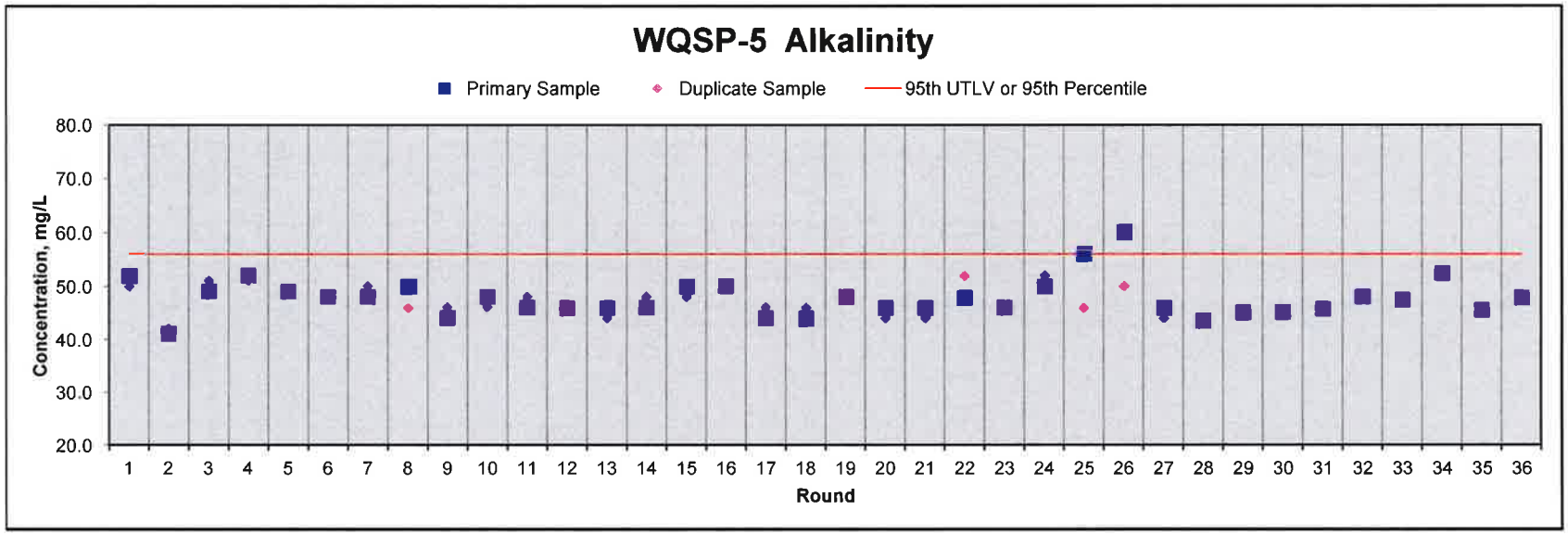
WQSP-5 Total Suspended Solids

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	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
Total Suspended Solids	36	04/29/14	05/05/14	**24**	**29**	mg/L	3.07	**< 10**



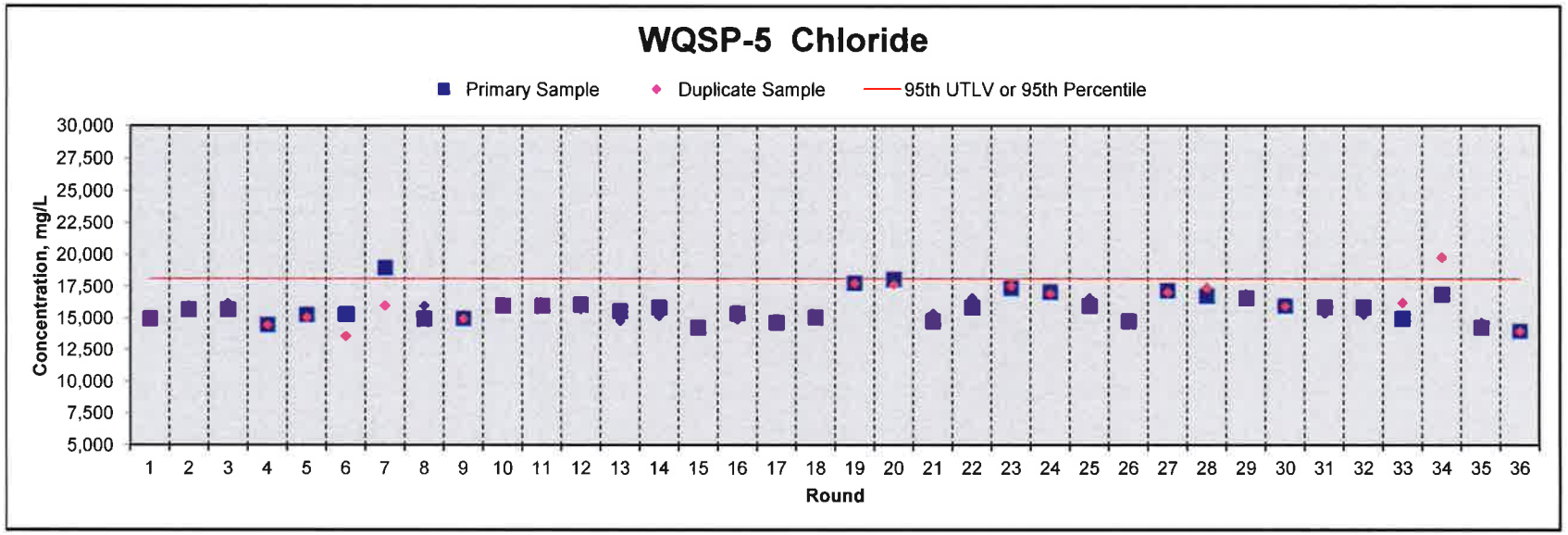
WQSP-5 Alkalinity

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	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
Alkalinity	36	04/29/14	04/30/14	47.8	47.6	mg/L	4.0	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	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
Chloride	36	04/29/14	04/30/14	14,000	14,000	mg/L	500	18,100



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: 140501024
Order Date: 5/1/2014

Contact Name: ANDY FREEMAN
Project Name: 1404B92
Comment:

Sample #: 140501024-001 **Customer Sample #:** 1404B92-001E / WQ5-C-R36

Recv'd: ☑ **Collector:** **Date Collected:** 4/29/2014
Quantity: 1 **Matrix:** Water **Date Received:** 5/1/2014 11:00:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***

Sample #: 140501024-002 **Customer Sample #:** 1404B92-002E / WQ5-C-R36-DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 4/29/2014
Quantity: 1 **Matrix:** Water **Date Received:** 5/1/2014 11:00:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***
ARSENIC BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***
SELENIUM BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***
THALLIUM BY 6020A	M	EPA 6020A	5/13/2014	***Normal (~10 Days)***

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB			**Order ID:**	140501024
	4901 HAWKINS NE SUITE D			**Order Date:**	5/1/2014
	ALBUQUERQUE	NM	87109		
Contact Name:	ANDY FREEMAN			**Project Name:**	1404B92
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	1.6
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

140501 024 HALL Last Due 5/13/2014
1st SAMP 4/29/2014 1st RCVD 5/1/2014
1404B92

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	1404B92-001E	WQ5-C-R36	500HDPEHN 03	Aqueous	4/29/2014 10:21:00 AM	1	See Below
2	1404B92-002E	WQ5-C-R36-Duplicate	500HDPEHN 03	Aqueous	4/29/2014 10:23:00 AM	1	See Below MWBS

SPECIAL INSTRUCTIONS / COMMENTS:

Please analyze for Total As, Sb, Se, Tl by 6020. Level 4 QA/QC Package Required. Please do MS/MSD on 001E, 002

Relinquished By:	Date: 4/30/2014	Time: 3:12 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 ☐

ANATEK LABS RECEIVING LIST

- ☑ RECEIVED INTACT — TEMP: 1.6 °C
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3
NUMBER OF CONTAINERS: 2 SHIPPED VIA: Fed Ex
DATE & TIME: 5/1/14 1100 INSPECTED BY:

Comments:

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: 1404B92 | RcptNo: 1

Received by/date: CS 04/30/14

Logged By: **Michelle Garcia** 4/30/2014 8:40:00 AM Michelle Garcia

Completed By: **Michelle Garcia** 4/30/2014 9:29:48 AM Michelle Garcia

Reviewed By: 04/30/14

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: DAG

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	2.8	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1157

Page 1 of 1

Project Number: T409304-1

Project Name: WIPP/DMP

Sampler(s): R. Jimenez, RA Spoon

Analytical Laboratory: HEAL, Albuquerque, NM

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry				1404B92	Comments
4/29/14	11:12	GW	GW-WQ5-C-R36-N1	6	X								-001	Use for MS/MSD
	11:20		-N1D	4	X								-002	
	10:51	DI	-N2	4	X								-003	Field Blanks
N/A	N/A		-N3	4	X								-004	Trip Blanks; HEAL Provided **
4/29/14	11:04	GW	-N4	4		X							-001	Use for MS/MSD
	11:08		-N4D	2		X							-002	
	10:27		-N5	6			X						-001	Use for MS/MSD
	10:40		-N5D	2			X						-002	
	10:44		-N6	2				X					-001	Use for MS/MSD
	10:48		-N6D	2				X					-002	~~Use~~ RA 4/29/14
	10:21		-N7	1					X				-001	Use for MS/MSD
	10:23	GW	-N7D	1					X				-002	
N/A					N/A									N/A

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
Rollin Hspoon 4/29/14 14:00	Celina Sma 04/30/14 8:40		
Relinquished By: (Signature, Date/Time)	**Received By: (Signature, Date/Time)**	**Relinquished By: (Signature, Date/Time)**	**Received at Laboratory: (Signature, Date/Time)**
			Celina Sma 04/30/14 8:40

Requested Turnaround Time: Report Due 6/4/2014

☒ Routine ☐ Rush _____

Sample Disposal:

☐ Return to Client ☒ Disposal by Lab

Carrier / Airbill No.: 8758 4779 1140

Fed Ex 8758 4779 1151

Sample Receipt Remarks: Samples on ice: 2.8°C upon arrival

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@wipp.ws

Special Instructions: Analyze LCS in duplicate.

Use primary GW sample for MS/MSD on all parameters.

WHITE – Analytical Laboratory
DI – Deionized Water
GW – Groundwater
YELLOW – Field Copy
AF – Air Filter(s)
AN – Animal(s)
RINK – Record Copy
SE – Sediment
SO – Soil
SW – Surface Water
VG – Vegetation

** Note! 2 of 4 Trip Blanks contained Air Bubbles.

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

RA 4/29/14

APPENDIX 8

WELL WQSP-6

ANALYTICAL RESULTS

WQSP-6

FIELD SAMPLING AND MOBILE LAB DATA

DMP FIELD LABORATORY SUMMARY
WQSP-6, Culebra, Round 36

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 36, the static water level was 361.10 ft_{btoc}. One wbv for WQSP-6 was determined to be 208.2 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).

Due to radiological events that occurred at the WIPP Site in February, the sampling team collected a pre-installation line rinse sample. The dedicated sampling line was flushed with approximately 2 liters of deionized water prior to installation rinse. Rinsate was collected in a certified container, preserved with nitric acid (pH <2) and considered an additional retain sample.

Round 36 pumping of WQSP-6 began on 5/12/2014 at 08:52 and ended on 5/13/2014 at 11:04. The well was purged for 26.2 hours with an average flow rate of 0.30 gallons per minute (gpm), and the total volume of groundwater purged (estimated) was 472 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).

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 constituents were collected on 5/13/2014 after approximately 441 gallons of groundwater (≈ 2.1 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 720 mL of groundwater passed through the in-line flow cell every minute as field indicating parameters were monitored. The observed rate of exchange was 18.0 cell volumes per minute; thus, approximately 90.0 volumes of groundwater (3,600 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 measurements varied less than 5% over the last three measurements within 15 minutes. Specific gravity was stable after the third measurement (approximately 69 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 36[a,b,c].

Item	Day 1		Day 2	
Date	5/12/2014		5/13/2014	
Pump Speed, Hz	50.0 / 52.0		52.0	
Average Flow Rate, gpm	0.36		0.26	
Rate of Exchange, no. cell	18.0		NR	
Field-analyzed Parameter[a]	**Initial**	**Final**	**Initial**	**Final**
Specific Conductance @ 25.0°C,	22,819	24,495	NR	NR
Temperature, °C	21.5	22.0	NR	NR
pH, SU	8.03	8.15	NR	NR
Specific Gravity	1.015	1.015	NR	NR
Time to Parameter Stability, hr:min	1:00		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 36 were compared to the average results from the previous 35 rounds (Table 2). The current value for SG (1.015) was similar to the average results from the previous rounds (1.014). The results for SC (24,495 µmhos/cm), temperature (22.0°C) and pH (8.15 S.U.) were higher compared to the average results of previous rounds (21,630 µmhos/cm, 21.6°C and 7.85 S.U. for SC, temperature and pH, respectively). Specific gravity, pH and temperature were within the normal limits observed for WQSP-6 over the past 19 years; however, SC was outside these limits.

Table 2. Comparison of Round 36 DMW Measurements to Historical Results from Rounds (1-35) for WQSP-6.

Field-analyzed Parameter	Historical Data (Rounds 1 – 35)[a,b]			Measurement Results, Round 36[c]
	$\bar{x}$ Results	Limits		
		Lower	Upper	
Specific Conductance @ 25.0°C,	21,630	20,549	22,712	24,495
Temperature, °C	21.6	20.5	22.7	22.0
pH, S.U.	7.85	7.46	8.24	8.15
Specific Gravity	1.014	0.963	1.065	1.015

[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

July 14, 2014

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

RE: WIPP DMP

OrderNo.: 1405587

Dear Greg Jungclaus:

Hall Environmental Analysis Laboratory received 4 sample(s) on 5/14/2014 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.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

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

July 28, 2014

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

RE: WIPP DMP

OrderNo.: 1405587

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

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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#: **1405587**
14-Jul-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-003	GW-WQ6-C-R36 Field Blank		5/13/2014 9:20:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-004	GW-WQ6-C-R36 Trip Blank			5/14/2014 8:30:00 AM	Aqueous

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Workorder Sample Summary

WO#: **1405587**
28-Jul-14

CLIENT: WIPP
Project: WIPP DMP

Lab SampleID	Client Sample ID	Tag No	Date Collected	Date Received	Matrix
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-001	GW-WQ6-C-R36		5/13/2014 8:42:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-002	GW-WQ6-C-R36DUPLICATE		5/13/2014 8:58:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-003	GW-WQ6-C-R36 Field Blank		5/13/2014 9:20:00 AM	5/14/2014 8:30:00 AM	Aqueous
1405587-004	GW-WQ6-C-R36 Trip Blank			5/14/2014 8:30:00 AM	Aqueous

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Case Narrative

WO#: **1405587**
Date: **7/28/2014**

CLIENT: WIPP
Project: WIPP DMP

All analytes reported are associated with passing CCVs.

METHOD: 7470

HOLDING TIMES: Mercury was analzyed past the 28 day holding time.

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.

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: The recovery for 2-butanone was elevated in the LCSR. 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 2,4-Dinitrophenol and pentachlorophenol 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: 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.

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Case Narrative

WO#: **1405587**
Date: **7/14/2014**

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.
5. Spikes: The MS/MSD had low recoveries, likely due to the matrix. All other 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.

CLIENT: WIPP
Project: WIPP DMP

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.

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DATES REPORT

WO#: **1405587**

14-Jul-14

Client: WIPP
Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405587-001A	GW-WQ6-C-R36	5/13/2014 8:42:00 AM	Aqueous	EPA Method: 8260B			5/15/2014 2:21:48 PM
1405587-001B				EPA Method 8270C: Semivolatiles		5/16/2014 7:59:51 AM	5/19/2014 10:45:16 AM
1405587-001C				SM 5310B: TOC			5/19/2014 10:31:29 AM
1405587-001D				EPA Method 300.0: Anions			5/14/2014 8:15:37 PM
				EPA Method 300.0: Anions			5/14/2014 8:28:02 PM
				EPA Method 300.0: Anions			5/14/2014 7:38:22 PM
				EPA Method 6010B: Dissolved Metals			5/16/2014 1:06:19 PM
				EPA Method 6010B: Dissolved Metals			5/16/2014 12:51:16 PM
				SM 2540 C: Total Dissolved Solids		5/19/2014 3:52:33 PM	5/20/2014 2:55:00 PM
				SM 2540D: TSS		5/19/2014 4:31:24 PM	5/20/2014 9:27:00 AM
				SM2320B: Alkalinity			5/14/2014 10:01:06 PM
				SM2510B: Specific Conductance			5/15/2014 4:23:37 PM
				SM2510B: Specific Conductance			5/14/2014 10:01:06 PM
				SM4500-H+B: pH			5/14/2014 10:01:06 PM
				Specific Gravity			5/28/2014 12:30:00 PM
1405587-001E				EPA 6010B: Total Recoverable Metals		5/16/2014 10:55:56 A M	5/17/2014 8:31:03 AM
				EPA 6010B: Total Recoverable Metals		5/16/2014 10:55:56 A M	5/17/2014 8:16:10 AM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:08:53 PM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:27:35 PM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:20:24 PM
				EPA 6010B: Total Recoverable Metals		5/16/2014 10:55:56 A M	5/17/2014 7:57:47 AM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:01:44 PM
1405587-002A	GW-WQ6-C-R36DUPLICATE	5/13/2014 8:58:00 AM		EPA Method: 8260B			5/15/2014 2:49:50 PM

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DATES REPORT

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405587-002B	GW-WQ6-C-R36DUPLICATE	5/13/2014 8:58:00 AM	Aqueous	EPA Method 8270C: Semivolatiles		5/16/2014 7:59:51 AM	5/19/2014 12:12:14 PM
1405587-002C				SM 5310B: TOC			5/19/2014 11:22:27 AM
1405587-002D				EPA Method 300.0: Anions			5/14/2014 9:05:16 PM
				EPA Method 300.0: Anions			5/14/2014 8:52:52 PM
				EPA Method 300.0: Anions			5/14/2014 8:40:27 PM
				EPA Method 6010B: Dissolved Metals			5/16/2014 12:57:15 PM
				EPA Method 6010B: Dissolved Metals			5/16/2014 1:08:08 PM
				SM 2540 C: Total Dissolved Solids		5/19/2014 3:52:33 PM	5/20/2014 2:55:00 PM
				SM 2540D: TSS		5/19/2014 4:31:24 PM	5/20/2014 9:27:00 AM
				SM2320B: Alkalinity			5/14/2014 10:45:17 PM
				SM2510B: Specific Conductance			5/15/2014 4:27:36 PM
				SM2510B: Specific Conductance			5/14/2014 10:45:17 PM
				SM4500-H+B: pH			5/14/2014 10:45:17 PM
				Specific Gravity			5/28/2014 12:30:00 PM
1405587-002E				EPA 6010B: Total Recoverable Metals		5/16/2014 10:55:56 A	5/17/2014 8:07:54 AM
				EPA 6010B: Total Recoverable Metals		5/16/2014 10:55:56 A	5/17/2014 8:23:10 AM
				EPA 6010B: Total Recoverable Metals		5/16/2014 10:55:56 A	5/17/2014 8:32:37 AM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:10:29 PM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:12:14 PM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:29:17 PM
				EPA 6010B: Total Recoverable Metals		5/23/2014 12:40:54 PM	5/28/2014 12:31:00 PM
1405587-003A	GW-WQ6-C-R36 Field Blank	5/13/2014 9:20:00 AM		EPA Method: 8260B			5/15/2014 3:18:03 PM

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DATES REPORT

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	Leachate Date	Prep Date	Analysis Date
1405587-004A	GW-WQ6-C-R36 Trip Blank		Aqueous	EPA Method: 8260B			5/15/2014 3:46:04 PM

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Client Sample ID: GW-WQ6-C-R36
Project: WIPP DMP
Collection Date: 5/13/2014 8:42:00 AM
Lab ID: 1405587-001
Matrix: AQUEOUS
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	5090	500	1000		mg/L	2000	5/14/2014 8:28:02 PM	R18617
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	5/14/2014 7:38:22 PM	R18617
Sulfate	4660	13.7	100		mg/L	200	5/14/2014 8:15:37 PM	R18617
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	665	0.386	10.0		mg/L	10	5/16/2014 12:51:16 PM	R18660
Magnesium	205	0.189	10.0		mg/L	10	5/16/2014 12:51:16 PM	R18660
Potassium	150	2.02	10.0		mg/L	10	5/16/2014 12:51:16 PM	R18660
Sodium	4460	12.1	100		mg/L	100	5/16/2014 1:06:19 PM	R18660
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.00964	0.000625	0.0200	J	mg/L	1	5/28/2014 12:20:24 PM	13339
Beryllium	0.000610	0.000353	0.00300	J	mg/L	1	5/28/2014 12:20:24 PM	13339
Cadmium	ND	0.000628	0.00200		mg/L	1	5/28/2014 12:20:24 PM	13339
Calcium	662	1.63	10.0		mg/L	10	5/28/2014 12:27:35 PM	13339
Chromium	ND	0.00168	0.00600		mg/L	1	5/28/2014 12:20:24 PM	13339
Iron	0.109	0.0101	0.0500		mg/L	1	5/28/2014 12:20:24 PM	13339
Lead	ND	0.00477	0.00500		mg/L	1	5/28/2014 12:20:24 PM	13339
Magnesium	206	0.0850	5.00		mg/L	5	5/28/2014 12:01:44 PM	13339
Nickel	ND	0.00190	0.0100		mg/L	1	5/28/2014 12:20:24 PM	13339
Potassium	149	2.53	5.00		mg/L	5	5/28/2014 12:01:44 PM	13339
Silver	ND	0.000522	0.00500		mg/L	1	5/28/2014 12:20:24 PM	13339
Sodium	4530	41.5	100		mg/L	100	5/28/2014 12:08:53 PM	13339
Vanadium	ND	0.00548	0.0500		mg/L	1	5/28/2014 12:20:24 PM	13339
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
Hexachloroethane	ND	1.89	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
2-Methylphenol	ND	2.75	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
Nitrobenzene	ND	2.58	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
Pentachlorophenol	ND	2.48	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
Pyridine	ND	1.57	5.00		µg/L	1	5/19/2014 10:45:16 AM	13202
Surr: 2,4,6-Tribromophenol	49.6	0	26-138		%REC	1	5/19/2014 10:45:16 AM	13202
Surr: 2-Fluorobiphenyl	89.9	0	48.1-106		%REC	1	5/19/2014 10:45:16 AM	13202
Surr: 2-Fluorophenol	59.5	0	12.1-85.8		%REC	1	5/19/2014 10:45:16 AM	13202
Surr: 4-Terphenyl-d14	89.1	0	44-113		%REC	1	5/19/2014 10:45:16 AM	13202

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.
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: 1405587-001
Matrix: AQUEOUS
Client Sample ID: GW-WQ6-C-R36
Collection Date: 5/13/2014 8:42:00 AM
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Surr: Nitrobenzene-d5	87.7	0	47.5-119		%REC	1	5/19/2014 10:45:16 AM	13202
Surr: Phenol-d5	46.7	0	17.7-65.8		%REC	1	5/19/2014 10:45:16 AM	13202
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Benzene	ND	0.154	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Toluene	ND	0.170	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
2-Butanone	ND	1.42	5.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Chloroform	ND	0.315	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Methylene Chloride	ND	0.266	3.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/15/2014 2:21:48 PM	R18668
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/15/2014 2:21:48 PM	R18668
Surr: 1,2-Dichloroethane-d4	101	0	70-130		%REC	1	5/15/2014 2:21:48 PM	R18668
Surr: 4-Bromofluorobenzene	99.6	0	70-130		%REC	1	5/15/2014 2:21:48 PM	R18668
Surr: Dibromofluoromethane	95.0	0	70-130		%REC	1	5/15/2014 2:21:48 PM	R18668
Surr: Toluene-d8	94.1	0	70-130		%REC	1	5/15/2014 2:21:48 PM	R18668
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.584	0.120	1.00	J	mg/L	1	5/19/2014 10:31:29 AM	R18717
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	16000	492	1000	*	mg/L	1	5/20/2014 2:55:00 PM	13248
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	20200	0.0250	0.0250		µmhos/c	2.5	5/15/2014 4:23:37 PM	R18652
SM4500-H+B: PH							Analyst: **JML**	
pH	7.79	0.100	1.68	H	pH units	1	5/14/2014 10:01:06 PM	R18619

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.
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: 1405587-001
Matrix: AQUEOUS
Client Sample ID: GW-WQ6-C-R36
Collection Date: 5/13/2014 8:42:00 AM
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **MMD**	
Mercury	ND	0.00020	H	mg/L	1	7/17/2014 1:48:59 PM	14268

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.
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: 1405587-001
Matrix: AQUEOUS
Client Sample ID: GW-WQ6-C-R36
Collection Date: 5/13/2014 8:42:00 AM
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	50.9	4.00	20.0		mg/L CaC	1	5/14/2014 10:01:06 PM	R18619
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/14/2014 10:01:06 PM	R18619
Total Alkalinity (as CaCO3)	50.9	4.00	20.0		mg/L CaC	1	5/14/2014 10:01:06 PM	R18619
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.009	0	0			1	5/28/2014 12:30:00 PM	R18886
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	13.0	3.07	4.00		mg/L	1	5/20/2014 9:27:00 AM	13250

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.
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: 1405587-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ6-C-R36DUPLICATE
Collection Date: 5/13/2014 8:58:00 AM
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS							Analyst: **JRR**	
Chloride	5040	500	1000		mg/L	2000	5/14/2014 9:05:16 PM	R18617
Nitrogen, Nitrate (As N)	ND	0.340	5.00		mg/L	50	5/14/2014 8:40:27 PM	R18617
Sulfate	4470	13.7	100		mg/L	200	5/14/2014 8:52:52 PM	R18617
EPA METHOD 6010B: DISSOLVED METALS							Analyst: **ELS**	
Calcium	661	0.386	10.0		mg/L	10	5/16/2014 12:57:15 PM	R18660
Magnesium	205	0.189	10.0		mg/L	10	5/16/2014 12:57:15 PM	R18660
Potassium	153	2.02	10.0		mg/L	10	5/16/2014 12:57:15 PM	R18660
Sodium	4430	12.1	100		mg/L	100	5/16/2014 1:08:08 PM	R18660
EPA 6010B: TOTAL RECOVERABLE METALS							Analyst: **ELS**	
Barium	0.00919	0.000625	0.0200	J	mg/L	1	5/28/2014 12:29:17 PM	13339
Beryllium	0.000540	0.000353	0.00300	J	mg/L	1	5/28/2014 12:29:17 PM	13339
Cadmium	ND	0.000628	0.00200		mg/L	1	5/28/2014 12:29:17 PM	13339
Calcium	647	1.63	10.0		mg/L	10	5/28/2014 12:31:00 PM	13339
Chromium	ND	0.00168	0.00600		mg/L	1	5/28/2014 12:29:17 PM	13339
Iron	0.104	0.0101	0.0500		mg/L	1	5/28/2014 12:29:17 PM	13339
Lead	ND	0.00477	0.00500		mg/L	1	5/28/2014 12:29:17 PM	13339
Magnesium	203	0.0850	5.00		mg/L	5	5/28/2014 12:10:29 PM	13339
Nickel	ND	0.00190	0.0100		mg/L	1	5/28/2014 12:29:17 PM	13339
Potassium	147	2.53	5.00		mg/L	5	5/28/2014 12:10:29 PM	13339
Silver	ND	0.000522	0.00500		mg/L	1	5/28/2014 12:29:17 PM	13339
Sodium	4380	41.5	100		mg/L	100	5/28/2014 12:12:14 PM	13339
Vanadium	ND	0.00548	0.0500		mg/L	1	5/28/2014 12:29:17 PM	13339
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
1,2-Dichlorobenzene	ND	1.70	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
1,4-Dichlorobenzene	ND	2.39	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
2,4-Dinitrophenol	ND	3.18	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
2,4-Dinitrotoluene	ND	4.49	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
Hexachlorobenzene	ND	3.17	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
Hexachloroethane	ND	1.89	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
2-Methylphenol	ND	2.75	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
3+4-Methylphenol	ND	1.83	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
Nitrobenzene	ND	2.58	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
Pentachlorophenol	ND	2.48	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
Pyridine	ND	1.57	5.00		µg/L	1	5/19/2014 12:12:14 PM	13202
Surr: 2,4,6-Tribromophenol	44.2	0	26-138		%REC	1	5/19/2014 12:12:14 PM	13202
Surr: 2-Fluorobiphenyl	76.9	0	48.1-106		%REC	1	5/19/2014 12:12:14 PM	13202
Surr: 2-Fluorophenol	51.7	0	12.1-85.8		%REC	1	5/19/2014 12:12:14 PM	13202
Surr: 4-Terphenyl-d14	85.2	0	44-113		%REC	1	5/19/2014 12:12:14 PM	13202

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.
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: GW-WQ6-C-R36DUPLICATE
Project: WIPP DMP
Collection Date: 5/13/2014 8:58:00 AM
Lab ID: 1405587-002
Matrix: AQUEOUS
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: **DAM**	
Surr: Nitrobenzene-d5	76.1	0	47.5-119		%REC	1	5/19/2014 12:12:14 PM	13202
Surr: Phenol-d5	38.3	0	17.7-65.8		%REC	1	5/19/2014 12:12:14 PM	13202
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Benzene	ND	0.154	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Toluene	ND	0.170	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
2-Butanone	ND	1.42	5.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Chloroform	ND	0.315	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Methylene Chloride	ND	0.266	3.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/15/2014 2:49:50 PM	R18668
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/15/2014 2:49:50 PM	R18668
Surr: 1,2-Dichloroethane-d4	101	0	70-130		%REC	1	5/15/2014 2:49:50 PM	R18668
Surr: 4-Bromofluorobenzene	94.9	0	70-130		%REC	1	5/15/2014 2:49:50 PM	R18668
Surr: Dibromofluoromethane	93.9	0	70-130		%REC	1	5/15/2014 2:49:50 PM	R18668
Surr: Toluene-d8	96.4	0	70-130		%REC	1	5/15/2014 2:49:50 PM	R18668
SM 5310B: TOC							Analyst: **LRW**	
Organic Carbon, Total	0.566	0.120	1.00	J	mg/L	1	5/19/2014 11:22:27 AM	R18717
SM 2540 C: TOTAL DISSOLVED SOLIDS							Analyst: **KS**	
Total Dissolved Solids	15400	492	1000	*	mg/L	1	5/20/2014 2:55:00 PM	13248
SM2510B: SPECIFIC CONDUCTANCE							Analyst: **JML**	
Conductivity	19900	0.0250	0.0250		µmhos/c	2.5	5/15/2014 4:27:36 PM	R18652
SM4500-H+B: PH							Analyst: **JML**	
pH	7.80	0.100	1.68	H	pH units	1	5/14/2014 10:45:17 PM	R18619

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1405587-002 **Matrix:** AQUEOUS

Client Sample ID: GW-WQ6-C-R36DUPLICATE
Collection Date: 5/13/2014 8:58:00 AM
Received Date: 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
SM2320B: ALKALINITY							Analyst: **JML**	
Bicarbonate (As CaCO3)	47.9	4.00	20.0		mg/L CaC	1	5/14/2014 10:45:17 PM	R18619
Carbonate (As CaCO3)	ND	2.00	2.00		mg/L CaC	1	5/14/2014 10:45:17 PM	R18619
Total Alkalinity (as CaCO3)	47.9	4.00	20.0		mg/L CaC	1	5/14/2014 10:45:17 PM	R18619
SPECIFIC GRAVITY							Analyst: **SRM**	
Specific Gravity	1.008	0	0			1	5/28/2014 12:30:00 PM	R18886
SM 2540D: TSS							Analyst: **KS**	
Suspended Solids	12.0	3.07	4.00		mg/L	1	5/20/2014 9:27:00 AM	13250

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.
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: 1405587-002

Client Sample ID: GW-WQ6-C-R36DUPLICATE
Collection Date: 5/13/2014 8:58:00 AM
Matrix: AQUEOUS **Received Date:** 5/14/2014 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 7470: MERCURY						Analyst: **MMD**	
Mercury	ND	0.00020	H	mg/L	1	7/17/2014 1:54:17 PM	14268

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.
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: 1405587-003

Client Sample ID: GW-WQ6-C-R36 Field Blank
Collection Date: 5/13/2014 9:20:00 AM
Matrix: AQUEOUS **Received Date:** 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Benzene	ND	0.154	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Toluene	ND	0.170	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
2-Butanone	5.43	1.42	5.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Chloroform	0.687	0.315	1.00	J	µg/L	1	5/15/2014 3:18:03 PM	R18668
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Methylene Chloride	0.285	0.266	3.00	J	µg/L	1	5/15/2014 3:18:03 PM	R18668
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/15/2014 3:18:03 PM	R18668
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/15/2014 3:18:03 PM	R18668
Surr: 1,2-Dichloroethane-d4	97.6	0	70-130		%REC	1	5/15/2014 3:18:03 PM	R18668
Surr: 4-Bromofluorobenzene	94.7	0	70-130		%REC	1	5/15/2014 3:18:03 PM	R18668
Surr: Dibromofluoromethane	95.8	0	70-130		%REC	1	5/15/2014 3:18:03 PM	R18668
Surr: Toluene-d8	95.0	0	70-130		%REC	1	5/15/2014 3:18:03 PM	R18668

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
S	Spike Recovery 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.
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: WIPP
Project: WIPP DMP
Lab ID: 1405587-004

Client Sample ID: GW-WQ6-C-R36 Trip Blank
Collection Date:
Matrix: AQUEOUS **Received Date:** 5/14/2014 8:30:00 AM

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD: 8260B							Analyst: **RAA**	
Isobutyl alcohol	ND	4.73	5.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Benzene	ND	0.154	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Toluene	ND	0.170	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
1,2-Dichloroethane (EDC)	ND	0.263	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
2-Butanone	ND	1.42	5.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Carbon Tetrachloride	ND	0.139	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Chlorobenzene	ND	0.140	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Chloroform	ND	0.315	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
cis-1,2-DCE	ND	0.122	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
1,1-Dichloroethane	ND	0.283	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
1,1-Dichloroethene	ND	0.214	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Methylene Chloride	0.297	0.266	3.00	J	µg/L	1	5/15/2014 3:46:04 PM	R18668
1,1,2,2-Tetrachloroethane	ND	0.223	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Tetrachloroethene (PCE)	ND	0.202	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
trans-1,2-DCE	ND	0.250	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
1,1,1-Trichloroethane	ND	0.121	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
1,1,2-Trichloroethane	ND	0.138	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Trichloroethene (TCE)	ND	0.194	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Trichlorofluoromethane	ND	0.127	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Vinyl chloride	ND	0.455	1.00		µg/L	1	5/15/2014 3:46:04 PM	R18668
Xylenes, Total	ND	0.377	1.50		µg/L	1	5/15/2014 3:46:04 PM	R18668
Surr: 1,2-Dichloroethane-d4	98.3	0	70-130		%REC	1	5/15/2014 3:46:04 PM	R18668
Surr: 4-Bromofluorobenzene	93.8	0	70-130		%REC	1	5/15/2014 3:46:04 PM	R18668
Surr: Dibromofluoromethane	95.8	0	70-130		%REC	1	5/15/2014 3:46:04 PM	R18668
Surr: Toluene-d8	95.2	0	70-130		%REC	1	5/15/2014 3:46:04 PM	R18668

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.
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	GW-WQ6-C-R36 1405587-01		GW-WQ6-C-R36 Dup 1405587-02								
CATIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sodium	4460	194.00	4430	192.69							
Potassium	150	3.84	153.0	3.91							
Calcium	665	33.18	661	32.98							
Magnesium	205	16.87	205	16.87							
Total Cations		247.89		246.46							
ANIONS	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L	meq/L	mg/L
Sulfate	4660	97.02	4470	93.07							
Chloride	5090	143.58	5040	142.17							
Bicarbonate (CaCO3)	50.9	1.02	47.9	0.96							
Carbonate (CaCO3)											
Phosphate (P)											
Nitrite (N)											
Nitrate (N)											
Fluoride											
Bromide											
Total Anions		241.62		236.20							
Elect. Cond. (µMhos/cm)	20200		19900								
CATION/ANION RATIO		1.03		1.04							
% Difference		1		2							
TOTAL DISSOLVED SOLIDS RATIOS											
TDS (measured)	16000		15400								
TDS (calculated)	15261		14988								
Ratio meas TDS:calc TDS		1.0		1.0							
Ratio Meas. TDS:EC		0.79		0.77							
Ratio Calc. TDS:EC		0.76		0.75							
Ratio of anion sum:EC		1.2		1.2							
Ratio of cation sum:EC		1.2		1.2							

* 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 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 June 3, 2014

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.: 1405587
Anatek Batch: 140516039

Project Summary: Two (2) water samples were received on 5/16/2014 for metals (EPA 6020A) analysis. All samples were received in good condition and with the appropriate chain of custody Samples were received at 0.9C.

Client Sample ID	Anatek Sample ID	Method/Prep Method
1405587-001F / GW-WQ6-C-R36	140516039-001	EPA 6020A
1405587-002F / GW-WQ6-C-R36DUPLICATE	140516039-002	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. 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 #: 140516039
Project Name: 1405587

Analytical Results Report

Sample Number 140516039-001 **Sampling Date** 5/13/2014 **Date/Time Received** 5/16/2014 11:53 AM
Client Sample ID 1405587-001F / GW-WQ6-C-R36 **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	5/28/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/28/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	5/28/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	5/30/2014	ETL	EPA 6020A	

Sample Number 140516039-002 **Sampling Date** 5/13/2014 **Date/Time Received** 5/16/2014 11:53 AM
Client Sample ID 1405587-002F / GW-WQ6-C-R36DUPLICATE **Sampling Time** 8:58 AM
Matrix Water **Sample Location**
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.02	5/28/2014	ETL	EPA 6020A	
Arsenic	ND	mg/L	0.02	5/28/2014	ETL	EPA 6020A	
Selenium	ND	mg/L	0.02	5/28/2014	ETL	EPA 6020A	
Thallium	ND	mg/L	0.02	5/30/2014	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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0096; FL(NELAP): E871099

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 #:**	140516039
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1405587
Attn:	ANDY FREEMAN		

Analytical Results Report

Quality Control Data

Lab Control Sample

Parameter	LCS Result	Units	LCS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
Thallium	0.0536	mg/L	0.05	107.2	80-120	5/30/2014	5/30/2014
Selenium	0.0518	mg/L	0.05	103.6	80-120	5/28/2014	5/28/2014
Arsenic	0.0525	mg/L	0.05	105.0	80-120	5/28/2014	5/28/2014
Antimony	0.0434	mg/L	0.05	86.8	80-120	5/28/2014	5/28/2014

Lab Control Sample Duplicate

Parameter	LCSD Result	Units	LCSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Selenium	0.0540	mg/L	0.05	108.0	4.2	0-20	5/28/2014	5/28/2014
Arsenic	0.0533	mg/L	0.05	106.6	1.5	0-20	5/28/2014	5/28/2014
Antimony	0.0439	mg/L	0.05	87.8	1.1	0-20	5/28/2014	5/28/2014
Thallium	0.0527	mg/L	0.05	105.4	1.7	0-20	5/30/2014	5/30/2014

Matrix Spike

Sample Number	Parameter	Sample Result	MS Result	Units	MS Spike	%Rec	AR %Rec	Prep Date	Analysis Date
140516039-001	Thallium	ND	0.0512	mg/L	0.05	102.4	75-125	5/30/2014	5/30/2014
140516039-001	Selenium	ND	0.0595	mg/L	0.05	119.0	75-125	5/28/2014	5/28/2014
140516039-001	Arsenic	ND	0.0591	mg/L	0.05	118.2	75-125	5/28/2014	5/28/2014
140516039-001	Antimony	ND	0.0486	mg/L	0.05	97.2	75-125	5/28/2014	5/28/2014

Matrix Spike Duplicate

Parameter	MSD Result	Units	MSD Spike	%Rec	%RPD	AR %RPD	Prep Date	Analysis Date
Thallium	0.0482	mg/L	0.05	96.4	6.0	0-20	5/30/2014	5/30/2014
Selenium	0.0537	mg/L	0.05	107.4	10.2	0-20	5/28/2014	5/28/2014
Arsenic	0.0570	mg/L	0.05	114.0	3.6	0-20	5/28/2014	5/28/2014
Antimony	0.0491	mg/L	0.05	98.2	1.0	0-20	5/28/2014	5/28/2014

Method Blank

Parameter	Result	Units	PQL	Prep Date	Analysis Date
Antimony	ND	mg/L	0.001	5/28/2014	5/28/2014
Arsenic	ND	mg/L	0.001	5/28/2014	5/28/2014

Comments:

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; CO:ID00013; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0085; FL(NELAP): E871099

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 #:**	140516039
Address:	4901 HAWKINS NE SUITE D ALBUQUERQUE, NM 87109	**Project Name:**	1405587
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	5/28/2014	5/28/2014
Thallium	ND	mg/L	0.001	5/30/2014	5/30/2014

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; MT:CERT0028; NM: ID00013; OR:ID200001-002; WA:C585
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

QC SUMMARY REPORT

WO#: **1405587**

Hall Environmental Analysis Laboratory, Inc.

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-13248**	SampType: **MBLK**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **PBW**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541114** 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-13248**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541115** 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 **LCSR-13248**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541116** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1060	20.0	1000	0	106	80	120			

Sample ID **1405587-001DMS**	SampType: **MS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541118** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	68400	1000	50000	16000	105	80	120			

Sample ID **1405587-001DMSD**	SampType: **MSD**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541119** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	68200	1000	50000	16000	104	80	120	0.220	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13248**	SampType: **LCS**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **LCSW**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541115** 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: **LCSR-13248**	SampType: **LCSR**	TestCode: **SM 2540 C: Total Dissolved Solids**
Client ID: **BatchQC**	Batch ID: **13248**	RunNo: **18741**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **541116** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1060	20.0	1000	0	106	80	120	1.33	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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537816** 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: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537830** 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: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537838** 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: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537839** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.5	0.50	5.000	0	90.7	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	95.5	90	110			
Sulfate	9.2	0.50	10.00	0	91.6	90	110			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**
Client ID: **BatchQC**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537840** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.5	0.50	5.000	0	90.9	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	95.7	90	110			
Sulfate	9.2	0.50	10.00	0	91.7	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537842** 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 **1405587-001DMS**	SampType: **MS**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537844** 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	98.0	93.8	111			

Sample ID **1405587-001DMSD**	SampType: **MSD**	TestCode: **EPA Method 300.0: Anions**
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537845** 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	97.3	93.8	111	0.733	20	

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537854** 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: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **537866** 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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **ccb**	SampType: **CCB**	TestCode: **EPA Method 300.0: Anions**
Client ID: **CCB**	Batch ID: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **537878** 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: **R18617**	RunNo: **18617**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **537890** 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.
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#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSW**	Batch ID: **R18617**	RunNo: **18617**							
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537839**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.5	0.50	5.000	0	90.7	90	110			
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	95.5	90	110			
Sulfate	9.2	0.50	10.00	0	91.6	90	110			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **BatchQC**	Batch ID: **R18617**	RunNo: **18617**							
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537840**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.5	0.50	5.000	0	90.9	90	110	0.198	0	
Nitrogen, Nitrate (As N)	2.4	0.10	2.500	0	95.7	90	110	0.167	0	
Sulfate	9.2	0.50	10.00	0	91.7	90	110	0.0535	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **5mL-rb**	SampType: **MBLK**	TestCode: **EPA Method: 8260B**
Client ID: **PBW**	Batch ID: **R18668**	RunNo: **18668**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539395** 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	0.294	3.00								J
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	1.50								
Surr: 1,2-Dichloroethane-d4	9.85		10.00		98.5	70	130			
Surr: 4-Bromofluorobenzene	9.51		10.00		95.1	70	130			
Surr: Dibromofluoromethane	9.40		10.00		94.0	70	130			
Surr: Toluene-d8	9.34		10.00		93.4	70	130			

Sample ID **50ng ccv**	SampType: **CCV_LOW**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539396** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	34.5	5.00	40.00	0	86.2	60	140			
Benzene	11.1	1.00	10.00	0	111	70	130			
Toluene	10.8	1.00	10.00	0	108	80	120			
1,2-Dichloroethane (EDC)	11.1	1.00	10.00	0	111	70	130			
2-Butanone	18.3	5.00	20.00	0	91.4	60	140			
Carbon Tetrachloride	9.84	1.00	10.00	0	98.4	70	130			
Chlorobenzene	10.8	1.00	10.00	0	108	70	130			
Chloroform	11.3	1.00	10.00	0	113	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **50ng ccv**	SampType: **CCV_LOW**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539396**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	10.9	1.00	10.00	0	109	70	130			
1,1-Dichloroethane	10.9	1.00	10.00	0	109	70	130			
1,1-Dichloroethene	10.0	1.00	10.00	0	100	80	120			
Methylene Chloride	10.7	3.00	10.00	0	107	70	130			
1,1,2,2-Tetrachloroethane	10.4	1.00	10.00	0	104	70	130			
Tetrachloroethene (PCE)	11.1	1.00	10.00	0	111	70	130			
trans-1,2-DCE	11.0	1.00	10.00	0	110	70	130			
1,1,1-Trichloroethane	10.7	1.00	10.00	0	107	70	130			
1,1,2-Trichloroethane	10.3	1.00	10.00	0	103	70	130			
Trichloroethene (TCE)	12.1	1.00	10.00	0	121	70	130			
Trichlorofluoromethane	10.2	1.00	10.00	0	102	70	130			
Vinyl chloride	10.9	1.00	10.00	0	109	80	120			
Xylenes, Total	32.0	1.50	30.00	0	107	70	130			
Surr: 1,2-Dichloroethane-d4	10.2		10.00		102	70	130			
Surr: 4-Bromofluorobenzene	9.36		10.00		93.6	70	130			
Surr: Dibromofluoromethane	9.76		10.00		97.6	70	130			
Surr: Toluene-d8	9.27		10.00		92.7	70	130			

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539397**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	32.3	5.00	40.00	0	80.7	59.8	152			
Benzene	22.3	1.00	20.00	0	112	70	130			
Toluene	21.7	1.00	20.00	0	108	80	120			
1,2-Dichloroethane (EDC)	22.7	1.00	20.00	0	113	70	130			
2-Butanone	54.6	5.00	40.00	0	136	60	140			
Carbon Tetrachloride	19.3	1.00	20.00	0	96.4	70	130			
Chlorobenzene	20.8	1.00	20.00	0	104	70	130			
Chloroform	22.3	1.00	20.00	0	112	75.6	123			
cis-1,2-DCE	22.0	1.00	20.00	0	110	70	130			
1,1-Dichloroethane	21.9	1.00	20.00	0	110	70	130			
1,1-Dichloroethene	18.7	1.00	20.00	0	93.7	78.1	129			
Methylene Chloride	21.4	3.00	20.00	0	107	70	130			
1,1,2,2-Tetrachloroethane	20.8	1.00	20.00	0	104	67.3	134			
Tetrachloroethene (PCE)	20.9	1.00	20.00	0	105	70	130			
trans-1,2-DCE	21.0	1.00	20.00	0	105	70	130			
1,1,1-Trichloroethane	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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539397** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1,2-Trichloroethane	20.4	1.00	20.00	0	102	70	130			
Trichloroethene (TCE)	23.1	1.00	20.00	0	116	70	130			
Trichlorofluoromethane	20.2	1.00	20.00	0	101	70	130			
Vinyl chloride	21.1	1.00	20.00	0	105	76.5	131			
Xylenes, Total	64.0	1.50	60.00	0	107	70	130			
Surr: 1,2-Dichloroethane-d4	10.4		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	9.62		10.00		96.2	70	130			
Surr: Dibromofluoromethane	9.77		10.00		97.7	70	130			
Surr: Toluene-d8	9.37		10.00		93.7	70	130			

Sample ID **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539398** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	34.0	5.00	40.00	0	84.9	59.8	152			
Benzene	22.2	1.00	20.00	0	111	70	130			
Toluene	20.3	1.00	20.00	0	101	80	120			
1,2-Dichloroethane (EDC)	22.6	1.00	20.00	0	113	70	130			
2-Butanone	59.4	5.00	40.00	0	148	60	140			S
Carbon Tetrachloride	19.3	1.00	20.00	0	96.3	70	130			
Chlorobenzene	19.9	1.00	20.00	0	99.6	70	130			
Chloroform	22.6	1.00	20.00	0	113	75.6	123			
cis-1,2-DCE	21.8	1.00	20.00	0	109	70	130			
1,1-Dichloroethane	22.0	1.00	20.00	0	110	70	130			
1,1-Dichloroethene	18.7	1.00	20.00	0	93.7	78.1	129			
Methylene Chloride	21.5	3.00	20.00	0	108	70	130			
1,1,2,2-Tetrachloroethane	19.9	1.00	20.00	0	99.3	67.3	134			
Tetrachloroethene (PCE)	20.6	1.00	20.00	0	103	70	130			
trans-1,2-DCE	21.3	1.00	20.00	0	107	70	130			
1,1,1-Trichloroethane	20.8	1.00	20.00	0	104	70	130			
1,1,2-Trichloroethane	19.5	1.00	20.00	0	97.5	70	130			
Trichloroethene (TCE)	24.4	1.00	20.00	0	122	70	130			
Trichlorofluoromethane	20.1	1.00	20.00	0	100	70	130			
Vinyl chloride	22.2	1.00	20.00	0	111	76.5	131			
Xylenes, Total	61.6	1.50	60.00	0	103	70	130			
Surr: 1,2-Dichloroethane-d4	10.3		10.00		103	70	130			
Surr: 4-Bromofluorobenzene	9.17		10.00		91.7	70	130			
Surr: Dibromofluoromethane	9.66		10.00		96.6	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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539398**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: Toluene-d8	8.99		10.00		89.9	70	130			

Sample ID **1405587-001a ms L4**	SampType: **MS4**	TestCode: **EPA Method: 8260B**							
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539403**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	50.8	5.00	40.00	0	127	31.1	273			
Benzene	22.6	1.00	20.00	0	113	70	130			
Toluene	20.9	1.00	20.00	0	105	70	130			
1,2-Dichloroethane (EDC)	23.4	1.00	20.00	0	117	70	130			
2-Butanone	51.9	5.00	40.00	0	130	21.9	285			
Carbon Tetrachloride	19.5	1.00	20.00	0	97.7	70	130			
Chlorobenzene	20.6	1.00	20.00	0	103	70	130			
Chloroform	22.6	1.00	20.00	0	113	70	130			
cis-1,2-DCE	22.1	1.00	20.00	0	110	70	130			
1,1-Dichloroethane	22.7	1.00	20.00	0	113	70	130			
1,1-Dichloroethene	20.5	1.00	20.00	0	102	70	130			
Methylene Chloride	21.1	3.00	20.00	0	105	70	130			
1,1,2,2-Tetrachloroethane	23.7	1.00	20.00	0	118	72.8	164			
Tetrachloroethene (PCE)	21.2	1.00	20.00	0	106	70	130			
trans-1,2-DCE	21.3	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	20.9	1.00	20.00	0	105	70	130			
Trichloroethene (TCE)	21.3	1.00	20.00	0	106	70	130			
Trichlorofluoromethane	20.9	1.00	20.00	0	104	70	130			
Vinyl chloride	22.7	1.00	20.00	0	113	70	130			
Xylenes, Total	63.2	1.50	60.00	0	105	70	130			
Surr: 1,2-Dichloroethane-d4	10.8		10.00		108	70	130			
Surr: 4-Bromofluorobenzene	9.62		10.00		96.2	70	130			
Surr: Dibromofluoromethane	10.1		10.00		101	70	130			
Surr: Toluene-d8	9.39		10.00		93.9	70	130			

Sample ID **1405587-001a msd L**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**							
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539404**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	49.0	5.00	40.00	0	122	31.1	273	3.71	20	
Benzene	21.4	1.00	20.00	0	107	70	130	5.29	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **1405587-001a msd L**	SampType: **MSD4**	TestCode: **EPA Method: 8260B**
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18668**	RunNo: **18668**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539404** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Toluene	21.0	1.00	20.00	0	105	70	130	0.592	20	
1,2-Dichloroethane (EDC)	22.9	1.00	20.00	0	115	70	130	2.30	20	
2-Butanone	51.8	5.00	40.00	0	129	21.9	285	0.306	20	
Carbon Tetrachloride	18.2	1.00	20.00	0	90.9	70	130	7.22	20	
Chlorobenzene	20.6	1.00	20.00	0	103	70	130	0.0942	20	
Chloroform	21.1	1.00	20.00	0	106	70	130	6.69	20	
cis-1,2-DCE	21.0	1.00	20.00	0	105	70	130	4.86	20	
1,1-Dichloroethane	21.0	1.00	20.00	0	105	70	130	7.83	20	
1,1-Dichloroethene	17.8	1.00	20.00	0	89.0	70	130	14.0	20	
Methylene Chloride	20.5	3.00	20.00	0	103	70	130	2.62	20	
1,1,2,2-Tetrachloroethane	23.1	1.00	20.00	0	115	72.8	164	2.50	20	
Tetrachloroethene (PCE)	20.6	1.00	20.00	0	103	70	130	2.92	20	
trans-1,2-DCE	20.1	1.00	20.00	0	101	70	130	5.85	20	
1,1,1-Trichloroethane	19.8	1.00	20.00	0	99.0	70	130	5.25	20	
1,1,2-Trichloroethane	20.8	1.00	20.00	0	104	70	130	0.676	20	
Trichloroethene (TCE)	21.7	1.00	20.00	0	109	70	130	1.91	20	
Trichlorofluoromethane	18.7	1.00	20.00	0	93.3	70	130	11.2	20	
Vinyl chloride	20.6	1.00	20.00	0	103	70	130	9.47	20	
Xylenes, Total	62.5	1.50	60.00	0	104	70	130	1.26	20	
Surr: 1,2-Dichloroethane-d4	10.6		10.00		106	70	130	0		
Surr: 4-Bromofluorobenzene	9.19		10.00		91.9	70	130	0		
Surr: Dibromofluoromethane	9.59		10.00		95.9	70	130	0		
Surr: Toluene-d8	9.55		10.00		95.5	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.
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#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcs L4**	SampType: **LCS4**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539397**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	32.3	5.00	40.00	0	80.7	59.8	152			
Benzene	22.3	1.00	20.00	0	112	70	130			
Toluene	21.7	1.00	20.00	0	108	80	120			
1,2-Dichloroethane (EDC)	22.7	1.00	20.00	0	113	70	130			
2-Butanone	54.6	5.00	40.00	0	136	60	140			
Carbon Tetrachloride	19.3	1.00	20.00	0	96.4	70	130			
Chlorobenzene	20.8	1.00	20.00	0	104	70	130			
Chloroform	22.3	1.00	20.00	0	112	75.6	123			
cis-1,2-DCE	22.0	1.00	20.00	0	110	70	130			
1,1-Dichloroethane	21.9	1.00	20.00	0	110	70	130			
1,1-Dichloroethene	18.7	1.00	20.00	0	93.7	78.1	129			
Methylene Chloride	21.4	3.00	20.00	0	107	70	130			
1,1,2,2-Tetrachloroethane	20.8	1.00	20.00	0	104	67.3	134			
Tetrachloroethene (PCE)	20.9	1.00	20.00	0	105	70	130			
trans-1,2-DCE	21.0	1.00	20.00	0	105	70	130			
1,1,1-Trichloroethane	20.8	1.00	20.00	0	104	70	130			
1,1,2-Trichloroethane	20.4	1.00	20.00	0	102	70	130			
Trichloroethene (TCE)	23.1	1.00	20.00	0	116	70	130			
Trichlorofluoromethane	20.2	1.00	20.00	0	101	70	130			
Vinyl chloride	21.1	1.00	20.00	0	105	76.5	131			
Xylenes, Total	64.0	1.50	60.00	0	107	70	130			
Surr: 1,2-Dichloroethane-d4	10.4		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	9.62		10.00		96.2	70	130			
Surr: Dibromofluoromethane	9.77		10.00		97.7	70	130			
Surr: Toluene-d8	9.37		10.00		93.7	70	130			

Sample ID: **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**							
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**							
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539398**	Units: **µg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Isobutyl alcohol	34.0	5.00	40.00	0	84.9	59.8	152	5.13	0	
Benzene	22.2	1.00	20.00	0	111	70	130	0.446	0	
Toluene	20.3	1.00	20.00	0	101	80	120	6.63	0	
1,2-Dichloroethane (EDC)	22.6	1.00	20.00	0	113	70	130	0.587	0	
2-Butanone	59.4	5.00	40.00	0	148	60	140	8.43	0	S
Carbon Tetrachloride	19.3	1.00	20.00	0	96.3	70	130	0.136	0	
Chlorobenzene	19.9	1.00	20.00	0	99.6	70	130	4.28	0	
Chloroform	22.6	1.00	20.00	0	113	75.6	123	1.40	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **100ng lcsr L4**	SampType: **LCSR**	TestCode: **EPA Method: 8260B**
Client ID: **BatchQC**	Batch ID: **R18668**	RunNo: **18668**
Prep Date:	Analysis Date: **5/15/2014**	SeqNo: **539398** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
cis-1,2-DCE	21.8	1.00	20.00	0	109	70	130	0.699	0	
1,1-Dichloroethane	22.0	1.00	20.00	0	110	70	130	0.452	0	
1,1-Dichloroethene	18.7	1.00	20.00	0	93.7	78.1	129	0.00107	0	
Methylene Chloride	21.5	3.00	20.00	0	108	70	130	0.407	0	
1,1,2,2-Tetrachloroethane	19.9	1.00	20.00	0	99.3	67.3	134	4.64	0	
Tetrachloroethene (PCE)	20.6	1.00	20.00	0	103	70	130	1.37	0	
trans-1,2-DCE	21.3	1.00	20.00	0	107	70	130	1.47	0	
1,1,1-Trichloroethane	20.8	1.00	20.00	0	104	70	130	0.00770	0	
1,1,2-Trichloroethane	19.5	1.00	20.00	0	97.5	70	130	4.66	0	
Trichloroethene (TCE)	24.4	1.00	20.00	0	122	70	130	5.24	0	
Trichlorofluoromethane	20.1	1.00	20.00	0	100	70	130	0.776	0	
Vinyl chloride	22.2	1.00	20.00	0	111	76.5	131	4.88	0	
Xylenes, Total	61.6	1.50	60.00	0	103	70	130	3.80	0	
Surr: 1,2-Dichloroethane-d4	10.3		10.00		103	70	130	0	0	
Surr: 4-Bromofluorobenzene	9.17		10.00		91.7	70	130	0	0	
Surr: Dibromofluoromethane	9.66		10.00		96.6	70	130	0	0	
Surr: Toluene-d8	8.99		10.00		89.9	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **40ppm**	SampType: **CCV_MID**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **R18698**	RunNo: **18698**
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540190** Units: **%REC**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2-Fluorophenol	38.9		40.00		97.3	60	140			
Surr: Phenol-d5	39.8		40.00		99.6	60	140			
Surr: 2,4,6-Tribromophenol	40.3		40.00		101	60	140			
Surr: Nitrobenzene-d5	40.2		40.00		101	60	140			
Surr: 2-Fluorobiphenyl	39.1		40.00		97.9	60	140			
Surr: 4-Terphenyl-d14	40.0		40.00		99.9	60	140			

Sample ID **mb-13202**	SampType: **MBLK**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **PBW**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540192** 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-Fluorophenol	133		200.0		66.6	12.1	85.8			
Surr: Phenol-d5	92.7		200.0		46.3	17.7	65.8			
Surr: 2,4,6-Tribromophenol	140		200.0		70.2	26	138			
Surr: Nitrobenzene-d5	86.1		100.0		86.1	47.5	119			
Surr: 2-Fluorobiphenyl	80.4		100.0		80.4	48.1	106			
Surr: 4-Terphenyl-d14	81.4		100.0		81.4	44	113			

Sample ID **lcs-13202**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540193** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	55.7	5.00	100.0	0	55.7	39.5	106			
2,4-Dinitrotoluene	69.6	5.00	100.0	0	69.6	45.4	107			
Pentachlorophenol	54.2	5.00	100.0	0	54.2	23.5	93.5			
Surr: 2-Fluorophenol	56.5		100.0		56.5	12.1	85.8			
Surr: Phenol-d5	40.7		100.0		40.7	17.7	65.8			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-13202**	SampType: **LCS**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **LCSW**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540193** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 2,4,6-Tribromophenol	58.9		100.0		58.9	26	138			
Surr: Nitrobenzene-d5	73.2		100.0		73.2	47.5	119			
Surr: 2-Fluorobiphenyl	72.3		100.0		72.3	48.1	106			
Surr: 4-Terphenyl-d14	65.3		100.0		65.3	44	113			

Sample ID **LCS-13202**	SampType: **LCSR**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540194** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	55.9	10.0	100.0	0	55.9	27.4	101	1.07	0	
1,4-Dichlorobenzene	53.2	10.0	100.0	0	53.2	32.6	91.5	4.48	0	
2,4-Dinitrophenol	53.6	20.0	100.0	0	53.6	23.1	118	10.9	0	
2,4-Dinitrotoluene	76.9	10.0	100.0	0	76.9	44.7	112	9.96	0	
Hexachlorobenzene	64.5	10.0	100.0	0	64.5	30	130	0.309	0	
Hexachloroethane	47.2	10.0	100.0	0	47.2	23.2	97.8	0.381	0	
2-Methylphenol	68.7	20.0	100.0	0	68.7	36.1	105	6.72	0	
3+4-Methylphenol	63.3	10.0	100.0	0	63.3	35.7	92.5	3.38	0	
Nitrobenzene	73.4	10.0	100.0	0	73.4	30.9	125	0.109	0	
Pentachlorophenol	59.3	20.0	100.0	0	59.3	20.2	93	9.02	0	
Pyridine	39.3	10.0	100.0	0	39.3	5.14	87.1	0.254	0	
Surr: 2-Fluorophenol	55.7		100.0		55.7	12.1	85.8	0	0	
Surr: Phenol-d5	40.3		100.0		40.3	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	61.2		100.0		61.2	26	138	0	0	
Surr: Nitrobenzene-d5	71.4		100.0		71.4	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	74.8		100.0		74.8	48.1	106	0	0	
Surr: 4-Terphenyl-d14	66.8		100.0		66.8	44	113	0	0	

Sample ID **1405587-001bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540200** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	67.9	5.00	100.0	0	67.9	20.9	103			
1,4-Dichlorobenzene	68.1	5.00	100.0	0	68.1	32.6	91.5			
2,4-Dinitrophenol	45.4	5.00	100.0	0	45.4	11	112			
2,4-Dinitrotoluene	82.5	5.00	100.0	0	82.5	44.7	112			
Hexachlorobenzene	79.7	5.00	100.0	0	79.7	30.3	126			
Hexachloroethane	63.9	5.00	100.0	0	63.9	19.5	96.4			
2-Methylphenol	76.0	5.00	100.0	0	76.0	28.7	108			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **1405587-001bms**	SampType: **MS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540200** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
3+4-Methylphenol	67.5	5.00	100.0	0	67.5	24.2	136			
Nitrobenzene	83.1	5.00	100.0	0	83.1	28.8	119			
Pentachlorophenol	39.3	5.00	100.0	0	39.3	20.2	93			
Pyridine	60.8	5.00	100.0	0	60.8	19.3	82.8			
Surr: 2-Fluorophenol	57.4		100.0		57.4	12.1	85.8			
Surr: Phenol-d5	43.0		100.0		43.0	17.7	65.8			
Surr: 2,4,6-Tribromophenol	70.7		100.0		70.7	26	138			
Surr: Nitrobenzene-d5	82.6		100.0		82.6	47.5	119			
Surr: 2-Fluorobiphenyl	78.6		100.0		78.6	48.1	106			
Surr: 4-Terphenyl-d14	84.4		100.0		84.4	44	113			

Sample ID **1405587-001bmsd**	SampType: **MSD4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540201** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	65.9	5.00	100.0	0	65.9	20.9	103	2.96	20	
1,4-Dichlorobenzene	65.1	5.00	100.0	0	65.1	32.6	91.5	4.50	20	
2,4-Dinitrophenol	56.0	5.00	100.0	0	56.0	11	112	20.8	20	R
2,4-Dinitrotoluene	92.6	5.00	100.0	0	92.6	44.7	112	11.6	20	
Hexachlorobenzene	81.6	5.00	100.0	0	81.6	30.3	126	2.36	20	
Hexachloroethane	62.1	5.00	100.0	0	62.1	19.5	96.4	2.89	20	
2-Methylphenol	82.4	5.00	100.0	0	82.4	28.7	108	8.10	20	
3+4-Methylphenol	67.6	5.00	100.0	0	67.6	24.2	136	0.207	20	
Nitrobenzene	78.6	5.00	100.0	0	78.6	28.8	119	5.56	20	
Pentachlorophenol	60.8	5.00	100.0	0	60.8	20.2	93	43.0	20	R
Pyridine	58.3	5.00	100.0	0	58.3	19.3	82.8	4.10	20	
Surr: 2-Fluorophenol	53.5		100.0		53.5	12.1	85.8	0		
Surr: Phenol-d5	42.4		100.0		42.4	17.7	65.8	0		
Surr: 2,4,6-Tribromophenol	73.6		100.0		73.6	26	138	0		
Surr: Nitrobenzene-d5	77.9		100.0		77.9	47.5	119	0		
Surr: 2-Fluorobiphenyl	82.9		100.0		82.9	48.1	106	0		
Surr: 4-Terphenyl-d14	84.8		100.0		84.8	44	113	0		

Sample ID **lcs-13202**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540207** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	56.5	5.00	100.0	0	56.5	27.4	101			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **lcs-13202**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540207** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	55.7	5.00	100.0	0	55.7	32.6	91.5			
2,4-Dinitrophenol	48.1	5.00	100.0	0	48.1	23.1	118			
2,4-Dinitrotoluene	69.6	5.00	100.0	0	69.6	44.7	112			
Hexachlorobenzene	64.7	5.00	100.0	0	64.7	30	130			
Hexachloroethane	47.4	5.00	100.0	0	47.4	23.2	97.8			
2-Methylphenol	73.5	5.00	100.0	0	73.5	36.1	105			
3+4-Methylphenol	61.2	5.00	100.0	0	61.2	35.7	92.5			
Nitrobenzene	73.5	5.00	100.0	0	73.5	30.9	125			
Pentachlorophenol	54.2	5.00	100.0	0	54.2	20.2	93			
Pyridine	39.4	5.00	100.0	0	39.4	5.14	87.1			
Surr: 2-Fluorophenol	56.5		100.0		56.5	12.1	85.8			
Surr: Phenol-d5	40.7		100.0		40.7	17.7	65.8			
Surr: 2,4,6-Tribromophenol	58.9		100.0		58.9	26	138			
Surr: Nitrobenzene-d5	73.2		100.0		73.2	47.5	119			
Surr: 2-Fluorobiphenyl	72.3		100.0		72.3	48.1	106			
Surr: 4-Terphenyl-d14	65.3		100.0		65.3	44	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13202** SampType: **LCS** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **LCSW** Batch ID: **13202** RunNo: **18698**

Prep Date: **5/16/2014** Analysis Date: **5/19/2014** SeqNo: **540193** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	55.7	5.00	100.0	0	55.7	39.5	106			
2,4-Dinitrotoluene	69.6	5.00	100.0	0	69.6	45.4	107			
Pentachlorophenol	54.2	5.00	100.0	0	54.2	23.5	93.5			
Surr: 2-Fluorophenol	56.5		100.0		56.5	12.1	85.8			
Surr: Phenol-d5	40.7		100.0		40.7	17.7	65.8			
Surr: 2,4,6-Tribromophenol	58.9		100.0		58.9	26	138			
Surr: Nitrobenzene-d5	73.2		100.0		73.2	47.5	119			
Surr: 2-Fluorobiphenyl	72.3		100.0		72.3	48.1	106			
Surr: 4-Terphenyl-d14	65.3		100.0		65.3	44	113			

Sample ID: **LCS-13202** SampType: **LCSR** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **BatchQC** Batch ID: **13202** RunNo: **18698**

Prep Date: **5/16/2014** Analysis Date: **5/19/2014** SeqNo: **540194** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	55.9	10.0	100.0	0	55.9	27.4	101	1.07	0	
1,4-Dichlorobenzene	53.2	10.0	100.0	0	53.2	32.6	91.5	4.48	0	
2,4-Dinitrophenol	53.6	20.0	100.0	0	53.6	23.1	118	10.9	0	
2,4-Dinitrotoluene	76.9	10.0	100.0	0	76.9	44.7	112	9.96	0	
Hexachlorobenzene	64.5	10.0	100.0	0	64.5	30	130	0.309	0	
Hexachloroethane	47.2	10.0	100.0	0	47.2	23.2	97.8	0.381	0	
2-Methylphenol	68.7	20.0	100.0	0	68.7	36.1	105	6.72	0	
3+4-Methylphenol	63.3	10.0	100.0	0	63.3	35.7	92.5	3.38	0	
Nitrobenzene	73.4	10.0	100.0	0	73.4	30.9	125	0.109	0	
Pentachlorophenol	59.3	20.0	100.0	0	59.3	20.2	93	9.02	0	
Pyridine	39.3	10.0	100.0	0	39.3	5.14	87.1	0.254	0	
Surr: 2-Fluorophenol	55.7		100.0		55.7	12.1	85.8	0	0	
Surr: Phenol-d5	40.3		100.0		40.3	17.7	65.8	0	0	
Surr: 2,4,6-Tribromophenol	61.2		100.0		61.2	26	138	0	0	
Surr: Nitrobenzene-d5	71.4		100.0		71.4	47.5	119	0	0	
Surr: 2-Fluorobiphenyl	74.8		100.0		74.8	48.1	106	0	0	
Surr: 4-Terphenyl-d14	66.8		100.0		66.8	44	113	0	0	

Sample ID: **lcs-13202** SampType: **LCS4** TestCode: **EPA Method 8270C: Semivolatiles**

Client ID: **BatchQC** Batch ID: **13202** RunNo: **18698**

Prep Date: **5/16/2014** Analysis Date: **5/19/2014** SeqNo: **540207** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,2-Dichlorobenzene	56.5	5.00	100.0	0	56.5	27.4	101			
1,4-Dichlorobenzene	55.7	5.00	100.0	0	55.7	32.6	91.5			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-13202**	SampType: **LCS4**	TestCode: **EPA Method 8270C: Semivolatiles**
Client ID: **BatchQC**	Batch ID: **13202**	RunNo: **18698**
Prep Date: **5/16/2014**	Analysis Date: **5/19/2014**	SeqNo: **540207** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
2,4-Dinitrophenol	48.1	5.00	100.0	0	48.1	23.1	118			
2,4-Dinitrotoluene	69.6	5.00	100.0	0	69.6	44.7	112			
Hexachlorobenzene	64.7	5.00	100.0	0	64.7	30	130			
Hexachloroethane	47.4	5.00	100.0	0	47.4	23.2	97.8			
2-Methylphenol	73.5	5.00	100.0	0	73.5	36.1	105			
3+4-Methylphenol	61.2	5.00	100.0	0	61.2	35.7	92.5			
Nitrobenzene	73.5	5.00	100.0	0	73.5	30.9	125			
Pentachlorophenol	54.2	5.00	100.0	0	54.2	20.2	93			
Pyridine	39.4	5.00	100.0	0	39.4	5.14	87.1			
Surr: 2-Fluorophenol	56.5		100.0		56.5	12.1	85.8			
Surr: Phenol-d5	40.7		100.0		40.7	17.7	65.8			
Surr: 2,4,6-Tribromophenol	58.9		100.0		58.9	26	138			
Surr: Nitrobenzene-d5	73.2		100.0		73.2	47.5	119			
Surr: 2-Fluorobiphenyl	72.3		100.0		72.3	48.1	106			
Surr: 4-Terphenyl-d14	65.3		100.0		65.3	44	113			

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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**ec 999us ccv**	SampType: **ccv**		TestCode: **SM2510B: Specific Conductance**						
Client ID:	**CCV**	Batch ID: **R18652**		RunNo: **18652**						
Prep Date:		Analysis Date: **5/15/2014**		SeqNo: **539087**		Units: **µmhos/cm**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	997	0.0100	999.0	0	99.8	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **PBW**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539241** 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	ND	1.0								
Sodium	ND	1.0								

Sample ID **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539242** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	95.5	80	120			
Magnesium	49	1.0	50.00	0	97.9	80	120			
Potassium	47	1.0	50.00	0	94.6	80	120			
Sodium	48	1.0	50.00	0	96.7	80	120			

Sample ID **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539243** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	96.6	80	120			
Magnesium	49	1.0	50.00	0	98.0	80	120			
Potassium	47	1.0	50.00	0	94.9	80	120			
Sodium	49	1.0	50.00	0	97.0	80	120			

Sample ID **1405587-001DMS**	SampType: **MS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539247** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	762	10.0	500.0	204.5	112	75	125			
Potassium	697	10.0	500.0	150.4	109	75	125			

Sample ID **1405587-001DMSD**	SampType: **MSD**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539248** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Magnesium	741	10.0	500.0	204.5	107	75	125	2.73	20	
Potassium	677	10.0	500.0	150.4	105	75	125	2.93	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1405587**

Hall Environmental Analysis Laboratory, Inc.

14-Jul-14

Client: WIPP
Project: WIPP DMP

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539252** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.00	1.000	0	0.915	-100	99			
Magnesium	ND	1.00	1.000	0	0.317	-100	99			
Potassium	ND	1.00	1.000	0	8.10	-100	99			
Sodium	ND	1.00	1.000	0	7.57	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539253** 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	90	110			
Magnesium	51.2	1.00	50.00	0	102	90	110			
Potassium	49.9	1.00	50.00	0	99.7	90	110			
Sodium	51.1	1.00	50.00	0	102	90	110			

Sample ID **CCB**	SampType: **CCB**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **CCB**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539257** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0	1.000	0	0.716	-100	99			
Magnesium	ND	1.0	1.000	0	0.0700	-100	99			
Potassium	ND	1.0	1.000	0	4.21	-100	99			
Sodium	ND	1.0	1.000	0	4.34	-100	99			

Sample ID **CCV CAT**	SampType: **CCV_CAT**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539258** 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			
Magnesium	51	1.0	50.00	0	102	90	110			
Potassium	50	1.0	50.00	0	99.3	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
- O RSD is greater than RSDlimit
- R RPD outside accepted recovery limits
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS**	SampType: **LCS**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **LCSW**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539242** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	95.5	80	120			
Magnesium	49	1.0	50.00	0	97.9	80	120			
Potassium	47	1.0	50.00	0	94.6	80	120			
Sodium	48	1.0	50.00	0	96.7	80	120			

Sample ID: **LCSR**	SampType: **LCSR**	TestCode: **EPA Method 6010B: Dissolved Metals**
Client ID: **BatchQC**	Batch ID: **R18660**	RunNo: **18660**
Prep Date:	Analysis Date: **5/16/2014**	SeqNo: **539243** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	48	1.0	50.00	0	96.6	80	120	1.13	0	
Magnesium	49	1.0	50.00	0	98.0	80	120	0.135	0	
Potassium	47	1.0	50.00	0	94.9	80	120	0.260	0	
Sodium	49	1.0	50.00	0	97.0	80	120	0.318	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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-13339**	SampType: **MBLK**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **PBW**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545492** 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	ND	1.00								
Nickel	ND	0.0100								
Potassium	ND	1.00								
Silver	0.000890	0.00500								J
Sodium	ND	1.00								
Vanadium	ND	0.0500								

Sample ID **LCS-13339**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545493** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.472	0.0200	0.5000	0	94.4	80	120			
Beryllium	0.499	0.00300	0.5000	0	99.8	80	120			
Cadmium	0.466	0.00200	0.5000	0	93.2	80	120			
Calcium	50.1	1.00	50.00	0	100	80	120			
Chromium	0.475	0.00600	0.5000	0	95.0	80	120			
Iron	0.468	0.0500	0.5000	0	93.6	80	120			
Lead	0.458	0.00500	0.5000	0	91.5	80	120			
Magnesium	49.7	1.00	50.00	0	99.5	80	120			
Nickel	0.452	0.0100	0.5000	0	90.4	80	120			
Potassium	47.7	1.00	50.00	0	95.3	80	120			
Silver	0.0994	0.00500	0.1000	0	99.4	80	120			
Sodium	49.3	1.00	50.00	0	98.6	80	120			
Vanadium	0.496	0.0500	0.5000	0	99.3	80	120			

Sample ID **LCS-13339**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545494** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.472	0.0200	0.5000	0	94.4	80	120			
Beryllium	0.500	0.00300	0.5000	0	100	80	120			

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.
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits		

QC SUMMARY REPORT

WO#: **1405587**

Hall Environmental Analysis Laboratory, Inc.

14-Jul-14

Client: WIPP
Project: WIPP DMP

Sample ID **LCS-13339**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545494** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Cadmium	0.469	0.00200	0.5000	0	93.7	80	120			
Calcium	49.5	1.00	50.00	0	99.0	80	120			
Chromium	0.476	0.00600	0.5000	0	95.1	80	120			
Iron	0.468	0.0500	0.5000	0	93.7	80	120			
Lead	0.464	0.00500	0.5000	0	92.8	80	120			
Magnesium	49.5	1.00	50.00	0	99.1	80	120			
Nickel	0.453	0.0100	0.5000	0	90.5	80	120			
Potassium	47.6	1.00	50.00	0	95.2	80	120			
Silver	0.0988	0.00500	0.1000	0	98.8	80	120			
Sodium	49.0	1.00	50.00	0	97.9	80	120			
Vanadium	0.495	0.0500	0.5000	0	99.1	80	120			

Sample ID **1405587-001EMS**	SampType: **MS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545507** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.444	0.0200	0.5000	0.009640	86.9	75	125			
Beryllium	0.462	0.00300	0.5000	0.0006100	92.2	75	125			
Cadmium	0.466	0.00200	0.5000	0	93.2	75	125			
Chromium	0.434	0.00600	0.5000	0	86.9	75	125			
Iron	0.554	0.0500	0.5000	0.1090	89.1	75	125			
Lead	0.415	0.00500	0.5000	0	83.0	75	125			
Nickel	0.417	0.0100	0.5000	0	83.5	75	125			
Silver	0.105	0.00500	0.1000	0	105	75	125			
Vanadium	0.486	0.0500	0.5000	0	97.1	75	125			

Sample ID **1405587-001EMSD**	SampType: **MSD**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **GW-WQ6-C-R36**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545508** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.444	0.0200	0.5000	0.009640	86.9	75	125	0.0293	20	
Beryllium	0.460	0.00300	0.5000	0.0006100	91.9	75	125	0.297	20	
Cadmium	0.466	0.00200	0.5000	0	93.2	75	125	0.0129	20	
Chromium	0.434	0.00600	0.5000	0	86.7	75	125	0.184	20	
Iron	0.565	0.0500	0.5000	0.1090	91.2	75	125	1.87	20	
Lead	0.411	0.00500	0.5000	0	82.3	75	125	0.917	20	
Nickel	0.416	0.0100	0.5000	0	83.2	75	125	0.312	20	
Silver	0.105	0.00500	0.1000	0	105	75	125	0.105	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**1405587-001EMSD**	SampType: **MSD**		TestCode: **EPA 6010B: Total Recoverable Metals**						
Client ID:	**GW-WQ6-C-R36**	Batch ID: **13339**		RunNo: **18883**						
Prep Date:	**5/23/2014**	Analysis Date: **5/28/2014**		SeqNo: **545508**		Units: **mg/L**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vanadium	0.484	0.0500	0.5000	0	96.8	75	125	0.340	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.
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#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13339**	SampType: **LCS**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **LCSW**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545493** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.472	0.0200	0.5000	0	94.4	80	120			
Beryllium	0.499	0.00300	0.5000	0	99.8	80	120			
Cadmium	0.466	0.00200	0.5000	0	93.2	80	120			
Calcium	50.1	1.00	50.00	0	100	80	120			
Chromium	0.475	0.00600	0.5000	0	95.0	80	120			
Iron	0.468	0.0500	0.5000	0	93.6	80	120			
Lead	0.458	0.00500	0.5000	0	91.5	80	120			
Magnesium	49.7	1.00	50.00	0	99.5	80	120			
Nickel	0.452	0.0100	0.5000	0	90.4	80	120			
Potassium	47.7	1.00	50.00	0	95.3	80	120			
Silver	0.0994	0.00500	0.1000	0	99.4	80	120			
Sodium	49.3	1.00	50.00	0	98.6	80	120			
Vanadium	0.496	0.0500	0.5000	0	99.3	80	120			

Sample ID: **LCS-13339**	SampType: **LCSR**	TestCode: **EPA 6010B: Total Recoverable Metals**
Client ID: **BatchQC**	Batch ID: **13339**	RunNo: **18883**
Prep Date: **5/23/2014**	Analysis Date: **5/28/2014**	SeqNo: **545494** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Barium	0.472	0.0200	0.5000	0	94.4	80	120	0.0424	0	
Beryllium	0.500	0.00300	0.5000	0	100	80	120	0.252	0	
Cadmium	0.469	0.00200	0.5000	0	93.7	80	120	0.586	0	
Calcium	49.5	1.00	50.00	0	99.0	80	120	1.12	0	
Chromium	0.476	0.00600	0.5000	0	95.1	80	120	0.0905	0	
Iron	0.468	0.0500	0.5000	0	93.7	80	120	0.0214	0	
Lead	0.464	0.00500	0.5000	0	92.8	80	120	1.33	0	
Magnesium	49.5	1.00	50.00	0	99.1	80	120	0.405	0	
Nickel	0.453	0.0100	0.5000	0	90.5	80	120	0.0951	0	
Potassium	47.6	1.00	50.00	0	95.2	80	120	0.126	0	
Silver	0.0988	0.00500	0.1000	0	98.8	80	120	0.616	0	
Sodium	49.0	1.00	50.00	0	97.9	80	120	0.661	0	
Vanadium	0.495	0.0500	0.5000	0	99.1	80	120	0.238	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

28-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**MB-14268**	SampType:	**MBLK**	TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**PBW**	Batch ID:	**14268**	RunNo:	**19954**				
Prep Date:	**7/17/2014**	Analysis Date:	**7/17/2014**	SeqNo:	**579845**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	ND	0.00020								

Sample ID	**LCS-14268**	SampType:	**LCS**	TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**LCSW**	Batch ID:	**14268**	RunNo:	**19954**				
Prep Date:	**7/17/2014**	Analysis Date:	**7/17/2014**	SeqNo:	**579846**	Units:	**mg/L**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.6	80	120			

Sample ID	**LCS-14268**	SampType:	**LCSR**	TestCode:	**EPA Method 7470: Mercury**				
Client ID:	**BatchQC**	Batch ID:	**14268**	RunNo:	**19954**				
Prep Date:	**7/17/2014**	Analysis Date:	**7/17/2014**	SeqNo:	**579883**	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	99.2	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

WO#: **1405587**

Hall Environmental Analysis Laboratory, Inc.

30-Sep-14

Client: WIPP
Project: WIPP DMP

Sample ID: **LCS-14268** SampType: **LCS** TestCode: **EPA Method 7470: Mercury**
Client ID: **LCSW** Batch ID: **14268** RunNo: **19954**
Prep Date: **7/17/2014** Analysis Date: **7/17/2014** SeqNo: **579846** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Mercury	0.0047	0.00020	0.005000	0	94.6	80	120			

Sample ID: **LCS-14268** SampType: **LCSR** TestCode: **EPA Method 7470: Mercury**
Client ID: **BatchQC** Batch ID: **14268** RunNo: **19954**
Prep Date: **7/17/2014** Analysis Date: **7/17/2014** SeqNo: **579883** 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	99.2	80	120	4.73	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	**ph 7.00 ccv**	SampType:	**ccv**		TestCode:	**SM4500-H+B: pH**				
Client ID:	**CCV**	Batch ID:	**R18619**		RunNo:	**18619**				
Prep Date:		Analysis Date:	**5/14/2014**		SeqNo:	**537917**	Units:	**pH units**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	6.99	1.68								

Sample ID	**ph 4.00 ccv**	SampType:	**ccv**		TestCode:	**SM4500-H+B: pH**				
Client ID:	**CCV**	Batch ID:	**R18619**		RunNo:	**18619**				
Prep Date:		Analysis Date:	**5/14/2014**		SeqNo:	**537937**	Units:	**pH units**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	4.00	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID	mb-1	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R18619	RunNo:	18619					
Prep Date:		Analysis Date:	5/14/2014	SeqNo:	537968	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:	R18619	RunNo:	18619					
Prep Date:		Analysis Date:	5/14/2014	SeqNo:	537969	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	mb-2	SampType:	mblk	TestCode:	SM2320B: Alkalinity					
Client ID:	PBW	Batch ID:	R18619	RunNo:	18619					
Prep Date:		Analysis Date:	5/14/2014	SeqNo:	537986	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:	R18619	RunNo:	18619					
Prep Date:		Analysis Date:	5/14/2014	SeqNo:	537987	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			

Sample ID	LCSR-2	SampType:	LCSR	TestCode:	SM2320B: Alkalinity					
Client ID:	BatchQC	Batch ID:	R18619	RunNo:	18619					
Prep Date:		Analysis Date:	5/14/2014	SeqNo:	537988	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	1405587-001d ms	SampType:	ms	TestCode:	SM2320B: Alkalinity					
Client ID:	GW-WQ6-C-R36	Batch ID:	R18619	RunNo:	18619					
Prep Date:		Analysis Date:	5/14/2014	SeqNo:	538003	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	50.92	90.9	65.2	112			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**
14-Jul-14

Client: WIPP
Project: WIPP DMP

Sample ID	**1405587-001d msd**	SampType:	**msd**	TestCode:	**SM2320B: Alkalinity**					
Client ID:	**GW-WQ6-C-R36**	Batch ID:	**R18619**	RunNo:	**18619**					
Prep Date:		Analysis Date:	**5/14/2014**	SeqNo:	**538004**	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	50.92	91.0	65.2	112	0.0970	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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **lcs-1**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18619**	RunNo: **18619**							
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537969**	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-2**	SampType: **lcs**	TestCode: **SM2320B: Alkalinity**							
Client ID: **LCSW**	Batch ID: **R18619**	RunNo: **18619**							
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537987**	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			

Sample ID: **LCSR-2**	SampType: **LCSR**	TestCode: **SM2320B: Alkalinity**							
Client ID: **BatchQC**	Batch ID: **R18619**	RunNo: **18619**							
Prep Date:	Analysis Date: **5/14/2014**	SeqNo: **537988**	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	0.648	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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB**	SampType: **MBLK**	TestCode: **SM 5310B: TOC**							
Client ID: **PBW**	Batch ID: **R18717**	RunNo: **18717**							
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540667**	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 ST9060-14001**	SampType: **LCS**	TestCode: **SM 5310B: TOC**							
Client ID: **LCSW**	Batch ID: **R18717**	RunNo: **18717**							
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540668**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.94	1.00	4.850	0	102	90	110			

Sample ID **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**							
Client ID: **BatchQC**	Batch ID: **R18717**	RunNo: **18717**							
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540669**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.93	1.00	4.850	0	102	90	110			

Sample ID **1405587-001CMS**	SampType: **MS**	TestCode: **SM 5310B: TOC**							
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18717**	RunNo: **18717**							
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540671**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.24	1.00	4.650	0.5837	100	75	125			

Sample ID **1405587-001CMSD**	SampType: **MSD**	TestCode: **SM 5310B: TOC**							
Client ID: **GW-WQ6-C-R36**	Batch ID: **R18717**	RunNo: **18717**							
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540672**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	5.30	1.00	4.650	0.5837	101	75	125	1.20	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS ST9060-14001 s**	SampType: **LCS**	TestCode: **SM 5310B: TOC**
Client ID: **LCSW**	Batch ID: **R18717**	RunNo: **18717**
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540668** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.94	1.00	4.850	0	102	90	110			

Sample ID: **LCSR ST9060-14001**	SampType: **LCSR**	TestCode: **SM 5310B: TOC**
Client ID: **BatchQC**	Batch ID: **R18717**	RunNo: **18717**
Prep Date:	Analysis Date: **5/19/2014**	SeqNo: **540669** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Organic Carbon, Total	4.93	1.00	4.850	0	102	90	110	0.182	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.
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#: **1405587**

14-Jul-14

Client: WIPP

Project: WIPP DMP

Sample ID **MB-13250**	SampType: **MBLK**	TestCode: **SM 2540D: TSS**							
Client ID: **PBW**	Batch ID: **13250**	RunNo: **18725**							
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **540929**	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-13250**	SampType: **LCS**	TestCode: **SM 2540D: TSS**							
Client ID: **LCSW**	Batch ID: **13250**	RunNo: **18725**							
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **540930**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	97.0	4.00	92.40	0	105	82.47	119.05			

Sample ID **LCSR-13250**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**							
Client ID: **BatchQC**	Batch ID: **13250**	RunNo: **18725**							
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **540931**	Units: **mg/L**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	94.0	4.00	92.40	0	102	82.47	119.05			

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
- S Spike Recovery 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.
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1405587**

30-Sep-14

Client: WIPP

Project: WIPP DMP

Sample ID: **LCS-13250**	SampType: **LCS**	TestCode: **SM 2540D: TSS**
Client ID: **LCSW**	Batch ID: **13250**	RunNo: **18725**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **540930** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	97.0	4.00	92.40	0	105	82.47	119.05			

Sample ID: **LCSR-13250**	SampType: **LCSR**	TestCode: **SM 2540D: TSS**
Client ID: **BatchQC**	Batch ID: **13250**	RunNo: **18725**
Prep Date: **5/19/2014**	Analysis Date: **5/20/2014**	SeqNo: **540931** Units: **mg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Suspended Solids	94.0	4.00	92.40	0	102	82.47	119.05	3.14	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
S	Spike Recovery 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.
RL	Reporting Detection Limit

WQSP-6

DATA VERIFICATION AND VALIDATION REPORTS

Round 36
WQSP-6
SDG 1405587
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 (c)	mg/L	0.5	500	1000	5,090		5,040		5,065	1.0	15,800
TOC	mg/L	1.0	0.120	1.0	0.58	J	0.57	J	0.575	3.1	10.14
Alkalinity (Bicarbonate)	mg/L	4.0	4.0	20	50.9		47.9		49.4	6.07	55.8
Specific Conductance	umhos/cm	NA	0.025	0.025	20,200		19,900		20,050	1.5	27,660
pH	pH units	NA	0.10	1.68	7.79		7.80		7.80	0.13	7.5 - 7.9
Specific Gravity	NA	NA	0.0	0.0	1.009		1.008		1.0085	0.099	1.020
TDS (c)	mg/L	10	492	1,000	16,000		15,400		15,700	3.8	22,500
TSS	mg/L	1.0	3.07	4.0	13.0		12.0		12.5	8.0	14.8
Dissolved Metals (ICP)											
Ca (Diss)	mg/L	0.5	0.386	10	665		661		663	0.60	796
Mg (Diss)	mg/L	0.5	0.189	10	205		205		205	0.0	255
K (Diss) (c)	mg/L	0.5	2.02	10	150		153		152	2.0	270
Na (Diss) (c)	mg/L	0.5	12.1	100	4,460		4,430		4,445	0.67	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	0.00020	0.00020	ND	H	ND	H	NA	NA	<0.002
Ba	mg/L	0.020	0.000625	0.020	0.00964	J	0.00919	J	0.009	4.8	<1.0
Be	mg/L	0.010	0.000353	0.0030	0.000610	J	0.000540	J	0.0006	12.2	<0.02
Cd	mg/L	0.010	0.000628	0.0020	ND		ND		NA	NA	<0.05
Ca (c)	mg/L	0.500	1.630	10	662		647		655	2.3	NA
Cr	mg/L	0.025	0.00168	0.0060	ND		ND		NA	NA	<0.5
Pb	mg/L	0.020	0.00477	0.0050	ND		ND		NA	NA	0.150
Mg	mg/L	0.50	0.085	5.0	206		203		205	1.5	NA
Ni	mg/L	0.025	0.0019	0.010	ND		ND		NA	NA	<0.5
K (c)	mg/L	0.50	2.530	5.0	149		147		148	1.4	NA
Ag	mg/L	0.013	0.000522	0.0050	ND		ND		NA	NA	<0.5
Na (c)	mg/L	0.50	41.5	100	4,530		4,380		4,455	3.4	NA
V	mg/L	0.025	0.00548	0.050	ND		ND		NA	NA	0.070
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
H Flag indicates that holding times for sample preparartion or analysis exceeded.
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 SOW-prescribed MRL.

Data Verification and Validation Narrative
per WP 02-EM3003, Rev. 10
Round 36
WQSP-6

Sample Summary

Date:	August 27, 2014
Reviewer	Greg Jungclaus
Sample Types:	Groundwater samples
Dates Samples Collected:	May 13, 2014
Laboratory:	Hall Environmental Analysis Laboratory
Date EDD Report Submitted by Lab:	July 14, 2014
Date Samples Shipped/Method	May 13, 2014 by FedEx
Date Samples Received by lab:	May 14, 2014
Sample Receipt Condition:	Intact at 1.8 deg. C
SDG:	1405587
WIPP Chain of Custody/Request for Analysis:	1160
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 15, 2014 (meets holding time)
SVOC Extraction Date:	May 16, 2014 (meets holding time)
SVOC Analysis Date(s):	May 19, 2014 (meets holding time)
Total Trace Metals Analysis Date(s):	May 15, 28, 2014 (meets holding time)
Dissolved Cation Metals Analysis Date(s):	May 16, 2014 (meets holding time)
Mercury Analysis Date(s):	**July 17, 2014 (missed 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 1405587

WTS Sample No.	Analytes
GW-WQ6CR36N1, GW-WQ6CR36N1D	VOCs
GW-WQ6CR36N2, GW-WQ6CR36N3	VOCs (Field Blank and Trip Blank)
GW-WQ6CR36N4, GW-WQ6CR36N4D	TOC
GW-WQ6CR36N5, GW-WQ6CR36N5D	SVOCs
GW-WQ6CR36N6, GW-WQ6CR36N6D	Total Trace Metals (including "total" cation metals)
GW-WQ6CR36 N7, GW-WQ6CR36 N7D	General Parameters (including "dissolved" cations)

Results Summary

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 5.43 ug/L of 2-butanone, 0.69 ug/L of chloroform (J-flagged), and 0.28 ug/L of methylene chloride (J-flagged). The trip blank only showed detection of 0.30 ug/L of methylene chloride (J-flagged). The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples. No VOC tentatively identified compounds were detected in the groundwater samples from the GC/MS data.

No SVOCs were detected in the WQSP-4 groundwater samples, and no SVOC tentatively compounds were detected in the groundwater samples from the GC/MS data.

The trace metals detected included Ba at 0.0096 mg/L in the primary sample and 0.0092 mg/L in the duplicate sample and Be at 0.00061 mg/L in the primary sample and 0.00054 mg/l in the duplicate sample. The concentrations were below the MRL and are J-flagged as estimated

Measurements were made on all the general chemistry parameters at concentrations above the method reporting limit except for TOC, which was detected at 0.58 mg/L in the primary sample and 0.57 mg/L in the duplicate sample. The concentrations are J-flagged as estimated.

The samples did not contain any analytes at concentrations higher than the 95th UTLV or the 95th percentile (used for 16 - 95 percent baseline non-detects).

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 EPA's SW-846 Method 8260B.

No VOCs were detected in either the primary or duplicate groundwater sample at a concentration above the MDL. The field blank showed detection of 5.43 ug/L of 2-butanone, 0.69 ug/L of chloroform (J-flagged), and 0.28 ug/L of methylene chloride (J-flagged). The trip blank only showed detection of 0.30 ug/L of methylene chloride (J-flagged). However, the method blank contained 0.29 ug/L of methylene chloride. The compounds detected in the field blank and trip blank samples were not detected in the groundwater samples.

The QC sample analyses showed that LCS/LCSR yielded somewhat high recoveries for isobutyl alcohol of 136 percent and 148 percent. However, the recoveries of all the compounds met the recovery objective in the MS/MSD samples. WQSP-6 contains lower TDS concentrations thus reducing the salting-out effect and not raising recoveries of the more polar compounds such as isobutyl alcohol and 2-butanone. The accuracy objective was met for all the other compounds in the samples, and the precision objective was also met with RPDs <20.

All other quality assurance objectives were met for the VOC analyses including the surrogate recoveries in all the samples.

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 EPA's SW-846 Method 8270C. No SVOCs were detected in the method blank sample or in the groundwater samples.

The QC data for the SVOCs showed that the surrogates met the recovery objective in all groundwater and QC samples. The LCS/LCSR recoveries met the objective of 40 – 140 percent recovery for base/neutral compounds and 30 – 130 percent recovery for acidic compounds except that the pyridine recovery was 39.4 percent in the LCS. The recovery objective was met for most of the compounds in the MS/MSD. The precision objective was met for all the compounds in the LCS/LCSR. Pentachlorophenol and 2,4-dinitrophenol did not meet the precision objective in the MS/MSD samples with RPDs of 43.0 and 20.8, respectively, due to higher recoveries in the MSD.

The lack of precision for the two acidic compounds in the spiked samples should have no impact on the quality or usability of the data since no SVOC compounds were detected in the groundwater samples.

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 EPA's SW-846 Method 6010B. The metals Antimony (Sb), Arsenic (As), Selenium (Se), and Thallium (Tl) were analyzed by ICP/MS by Anatek according to EPA Method 6020A from SW-846. Mercury (Hg) was analyzed using automated cold-vapor atomic absorption (CVAA) spectroscopy according to EPA SW-846 Method 7470A.

The laboratory inadvertently missed analyzing the samples for mercury while analyzing for the trace metals. The lab reported on the missed analyses and was requested to perform the analyses after the hold time of 28 days. The samples were analyzed 35 days past the regular hold time. There was no response for mercury in the analyses, and the missed hold time should not have allowed any mercury to disappear from the samples.

The recoverable metals Ba and Be were detected at trace concentrations in the primary and duplicate groundwater samples. The Ba concentrations were 0.0096 mg/L in the primary sample and 0.0092 mg/L in the duplicate sample; the Be concentrations were 0.00061 mg/L in the primary sample and 0.00054 mg/L in the duplicate sample.

The MDLs for the analyses were lower than the MRLs specified in the SOW for all the target metals.

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 dissolved cation metals, and Hg all met the recovery objective of 80 – 120 percent recovery. 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 objective.

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	Parameter
Standard Methods SM 2710F	Specific Gravity
Standard Methods SM 4500-H^+	pH
EPA Method 120.1	Specific Conductance (Conductivity)
Standard Methods SM 2540C	Total Dissolved Solids (TDS)
Standard Methods SM 2540D	Total Suspended Solids (TSS)
Standard Methods SM 5310B	Total Organic Carbon (TOC)
Standard Methods 2320B	Alkalinity
EPA Method 300.0	Anions

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

- All parameters: Method blank samples were analyzed for all the general chemistry parameters. No contamination issues were noted. Initial calibration verification and continuing calibration verification standards were analyzed as appropriate to ensure accurate calibration of the instrumentation.

- Anions: LCS and LCSR (replicate analysis) samples were analyzed for the anions chloride, nitrate and sulfate to obtain recovery information. All LCS recoveries were within 90 – 110 percent and were very precise as evidenced by RPDs less than one. The MS/MSD samples were only analyzed for nitrate because of the high native concentrations of chloride and sulfate. The recoveries were 98.0 percent and 97.3 percent for a RPD of 0.73.

- pH: CCVs at pH 7.00 and pH 4.00 were analyzed prior to the samples. The lab failed to analyze one of the samples in duplicate for this SDG. The precision of the analyses of the duplicate groundwater samples was good with values of 7.79 and 7.80 and a RPD of 0.13.

- Specific gravity: A duplicate sample was analyzed to obtain precision data. The precision of the analyses of the primary sample and its duplicate was very precise with values of 1.009 and 1.011 for a RPD of 0.17.

- Specific conductance: The laboratory did not analyze one of the groundwater samples in duplicate to produce precision data. The precision of the analyses of the primary and duplicate analyses was quite precise with values of 20,200 umhos/cm and 19,900 umhos/cm for a RPD of 1.5.

- Total Organic Carbon: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS recoveries were 102 percent in both samples with a RPD of 0.19. The MS/MSD recoveries of 100 percent and 101 yielded a RPD of 1.2. Thus the accuracy and precision objectives were readily met.

- Alkalinity: LCS/LCSR and MS/MSD samples were analyzed for this instrumental method to generate accuracy and precision data. The LCS recoveries of 101 percent and 100 percent and the MS/MSD recoveries of 90.9 percent and 91.0 percent readily met the accuracy objectives and yielded RPDs of 0.99 and 0.097, which readily met the precision objective.

- Total Dissolved Solids: LCS/LCSD and MS/MSD samples were analyzed for this gravimetric method to generate accuracy and precision data. The LCS recoveries were 104 percent and 106 percent for a RPD of 1.3, and the MS/MSD recoveries were 105 percent and 104 percent for a RPD of 0.22. Thus the accuracy and precision objectives were readily met.

- Total Suspended Solids: A LCS/LCSD and a duplicate sample were analyzed to generate precision data. The LCS recoveries were 105 percent and 102 percent for a RPD of 3.1. The duplicate analysis of the primary sample yielded 12 mg/L for a RPD of 8.0.

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, which do not adversely affect the reliability or usability of the information. The lab was reminded to provide all the requested information.

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-6, Round 36

Laboratory Name: Hall Environmental

Laboratory Work Order #: SDG 1405587

Sample Number(s): GW-WQ6-C-R36-N1 thru N7D

Reviewer Name (print): Robbin A. Spoon

Reviewer Signature: Robbin A. Spoon

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?	✓	

Robbin A. Spoon 10/6/14

Data Validator Date

Completeness Reviewer 10-15-14

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? 1.8°C	✓	
Was the analysis holding time of 14 days met for all samples? 5/15 vs 5/13	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 5/15	✓	
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?	✓		(b)
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?		✓	(c)
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) All R^2 coefficients >0.995, except isobutyl alcohol at 0.994.
(c) 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?	✓		(a)
Were the concentrations of any VOCs detected in the trip blank and field blank samples < MRL?		✓	(b)

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) Methylene chloride at 0.29 µg/L.
(b) FB contained 2-butanone at 5.4 µs/L above the 5.0-µs/L MRL (also 0.69 µs/L chloroform and 0.28 µs/L methylene chloride below the 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?		✓ (a)
Did the precision of any duplicate LCS or duplicate analyses of a single LCS meet the precision objective of ≤20 RPD?	✓	(b)

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?	✓	

(a) The LCS recovery for 2-butanone was 136%; the LCSR recovery was 148%. The reason for the high recovery is not known since the salting-out effect did not apply.
(b) RPDs not initially reported by lab.

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 8-21-2014 Date

Completeness Reviewer 10/6/14 Date

(a) The FB contained trace dibromochloromethane associated with Chlorinated Water.

(b) The primary and duplicate GW samples contained traces of carbon disulfide at concentrations less than 1 µg/L. Both samples contained the unknown tentatively identified as trimethyl Silyl fluoride, which could be a column degradation artifact. It is not present in the FB and TB.

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? 1.8°C	✓	
Were the samples extracted within 7 days of sample collection? 5/16 vs 5/13	✓	
Were the extracts analyzed within 40 days of sample extraction? 5/19 vs 5/16	✓	
Were the analysis dates on the laboratory analysis summary form and the raw data sheets identical? 5/19	✓	
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?		✓	(a)
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? 2.5 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?		✓	(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) m/z 442 was the base peak, but the EPA criteria were met.

(b) NA. Avg RRFs not used. R^2 coefficients ≥ 0.995.

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?	✓	
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?		✓

(a) No target compounds detected.

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?	✓		(a)
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?		✓	(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 pyridine recovery was 39.4% in the primary sample and 39.3% in the duplicate sample.
(b) The RPD for pentachlorophenol was 43 due to a relatively high 60.8% recovery in the MSD.

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)

8/21/2014 — Data Validator — Date

Robbin Myers 10/6/14 — Completeness Reviewer — Date

(a) Trace Concentrations of chlorobenzene, Cyclohexen-ol and a couple of unknown hydrocarbons were detected.

(b) The primary GW sample, in addition to the method blank compounds, showed another cyclic hydrocarbon unknown, Pyran-2-one, and Bis Phenol A. The duplicate GW sample showed the cyclic hydrocarbon and BPA but not 2-Pyranone. It did show trace 1, 1, 2, 2- tetrachloroethane, which was not detected in the VOC analysis and is probably a contaminant and not present 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.		✓ (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?	✓	
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) Collected 5/13/14
Dissol-M – Prep 5/16; A 5/16
T-Metals – " 5/23; " 5/28
*Hg – Prep 7/17; A 7/17 (on separate report)
(*35 days past hold limit; 65 days post-sx'ing*)

R Wilson 8/21/14

5/16/2014 - Dissol Metals Run
① [PQL] slightly above RL's of 0.500 mg/L
Ca - 0.53 Mg 0.53
K - 0.56

** ② ICS. Elm + ICS failed for K + Na.

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?	✓		(A)

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? 10 Sx	✓	

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?	~~✓~~	✓	(B)
Did the precision of the MS/MSD recoveries for each metal meet the precision objective of ≤ 20 RPD?	~~✓~~ RAA 8/21/14	✓	(B)

(A) Note ICS_Elm + ICS failed for 5/16/14 run; Analysis ran/Accepted?

	K	+	Na
Recoveries	0.0979		~~0~~
	0.07007		~~0~~

RAA 8/21/14

(B) Recovery summaries not Provided for MS/MSD (T-metals) QC Summary Report & Raw Data.

% RPD were not provided for MS/MSD on QC Summary Reports (also lacking for LCS, LCSD)

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

Digestion DF = 1.5x 30mL FV / 20mL Sx

COLD VAPOR ATOMIC ABSORPTION MERCURY ANALYSIS, EPA SW-846 7470A	YES	NO	
Were the samples digested within 28 days of sample collection? 64-days after collection; 37 day late		✓	
Was the instrument calibrated daily with a minimum of 3 calibration standards and a calibration blank? 6	✓		
Did the calibration curve (R^2) meet the 0.995 correlation coefficient criteria?	✓		0.9999973
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? (90.94%	✓		(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? MS/MSD data	✓		
Was a DMP Sample used for the MS/MSD? 10Sx NOT ON QC Summary Report	✓		
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?	✓		(c)
Did the mercury in the MS and MSD meet the accuracy objective of 75-125% recovery?	✓		(d)
Did the MS/MSD analyses meet the precision objective of ≤20 RPD?	✓		

C 5/13/14; P 7/17/14; A- 7/17/14 Samples analyzed 65 days after collection

a) $[ICV] = \frac{3.33 \times 1.5}{1000} = 0.0049995 \approx 0.005 mg/L$

$ICV = \left(\frac{3.0282 \times 1.5}{1000}\right) = (0.0045423/0.005) * 100 = 90.85\%$ rec

b) $CCV_{20} = \left(\frac{3.2345 \times 1.5}{1000}\right) = (0.00485175/0.005) \times 100 = 97.04\%$ rec

$CCV_{32} = \left(\frac{3.1969 \times 1.5}{1000}\right) = (0.00479535/0.005) \times 100 = 95.91\%$

$CCV_{51} = \left(\frac{3.2603 \times 1.5}{1000}\right) = (0.00489045/0.005) \times 100 = 97.81\%$

6/15/14

c) $[Stock] = 0.005 mg/L$

$LCS_{11} = \left(\frac{3.1531 \times 1.5}{1000}\right) = \frac{0.00472965}{0.0050} = 94.6\%$ rec

$LCS_{47} = \left(\frac{3.3059 \times 1.5}{1000}\right) = \frac{0.0049588}{.0050} = 99.2\%$ rec

$\%RPD = \left(\frac{0.0049588 - 0.00472965}{0.00484425}\right) \times 100$

$= 4.73\%$ RPD

d) $10Sx = ND$

$MS = \frac{2.7584 \times 1.5}{1000} = \left(\frac{0.0041376}{0.0050}\right) 100 = 82.75\%$ rec

$MSD = \left(\frac{2.7389 \times 1.5}{1000}\right) \left(\frac{0.00410835}{0.0050}\right) 100 = 82.17\%$ rec

$\%RPD = \left(\frac{0.0041376 - 0.00410835}{0.00412975}\right) 100$

$= 0.71\%$ 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 C P A	YES	NO	
Was the holding time met for the ICP/MS analysis? 5/13/14 5/22/14 5/28/14	✓		*
Did the analysis batch include a method blank, LCS, LCSD, MS, and MSD?	✓		
Was a DMP sample used for the MS/MSD? 10Sx	✓		
Was an ICV analyzed after the initial calibration? ICV 1.0 ppb + ICV 40.0 ppb	✓		
Were a CCB and CCV analyzed during the sample queue? CCV@50ppb	✓		
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? Sb - LCS 86.8%rec LCSD 87.8%rec	✓		(b)
Did the metals in the MS/MSD samples meet the accuracy objective of 75-125% recovery? 96.4% → 119.0%	✓		(c)
Did the precision of the MS/MSD analyses meet the precision objective of <20 RPD? Se highest @ 10.2%RPD	✓		(c)

Robbin Alpers 8/18/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) CCV 50ppb

		%rec
As =	48.440/50 =	96.9
Se =	49.024/50 =	98.0
Sb =	52.924/50 =	105.8
Tl =	51.319/50 =	102.6

* Thallium reanalyzed 5/30/14

(b) Calculations verified on QC Data Report pg 22 of Anatek Labs Report

(c) Calculation verified on QC Data Report Pg 22 of Anatek Lab Report

RPDs

LCS & LCSD

$Tl = \left(\frac{0.0536 - 0.0527}{0.05315}\right)100 = 1.69$

$Se = \left(\frac{0.0518 - 0.0540}{0.0529}\right)100 = 4.158$

$As = \left(\frac{0.0525 - 0.0533}{0.0529}\right)100 = 1.512$

$Sb = \left(\frac{0.0434 - 0.0439}{0.04365}\right)100 = 1.145$

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

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 1.8°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 5/13/14 A 5/14/14	✓	

ANALYSIS QUEUE	YES	NO
Was at least a 5-point calibration curve analyzed for the target anions? 9+Blk	✓	
Was a second source Initial Calibration Verification (ICV) analyzed at the beginning of the sample queue? from 4/8/14 Cal	✓ 8/20/14	✓
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? 10Sx	✓	

4/8/14 cal

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? Not shown on QC Summary Rpt	✓	(a)
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?	✓	(b)
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? 50x, 200x SO_4 & 2K Cl	✓	
Were the appropriate dilution factors applied to the results?	✓	

Robin Alpern 8/20/14
Data Validator Date

10-15-14
Completeness Reviewer Date

	Result	Spk	%Rec
LCS_{Cl}	4.537	5	90.74
$LCSD_{Cl}$	4.546	5	90.92

$\%RPD_{Cl} = \left(\frac{4.546 - 4.537}{4.5415}\right)100 = 0.198\%$

(b) MS/MSD analyzed for NO_3-N only due to ↑ conc. of Cl + SO_4.

$MS_{NO_3\text{-}N}$ (10Sx = ND) $= [(2.444 \times 50)/125)100] = 97.96\%$ rec

$MSD_{NO_3\text{-}N} = [(2.432 \times 50)/125)100] = 97.28\%$ rec

$\%RPD = \left[\frac{(122.45 - 121.6)}{122.025}\right]100 = 0.697\%$

QC Report = 0.733%

Attachment 7 – Alkalinity Data Review, SM 2320B

HOLDING TIME	YES	NO
Were the samples preserved at ≤6°C? 1.8°C	✓	
Were the samples analyzed within 14 days of collection? C 5/13/14 A 5/14/14	✓	

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)?	✓	
Was the starting pH of the sample ≤8.30? 1° Sx = 7.79; Dup = 7.80	✓	
Was a DMP sample used for the MS/MSD? 1° Sx	✓	

METHOD PERFORMANCE	YES	NO	
Did the laboratory method blank contain ≤20 mg/L $CaCO_3$? 2.4 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?	✓		(b)
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?	✓		(c)

[signature] 8/20/14 [signature] 10/15/14

Data Validator Date Completeness Reviewer Date

(a) LCS Recovery

LCS-2 = (80.52/80)100 = 100.6%

LCS-2dup = (80/80)100 = 100%

(b) 1° Sx = 50.92 mg/L

MS = ((123.60 − 50.92)/80)100 = 90.85% Rec

MSD = ((123.72 − 50.92)/80)100 = 91.0%

%RPD = ((123.60 − 123.72)/123.66)

= 0.097% RPD

(c) Manual Cales

A = mL Titrant

N = Normal of Titrant

50K = meq/mole

(A × N × 50K)/(Sx Vol) = ALK

MS = ((6.18 mL × 0.02 N × 50K)/50 mL) = 123.60 mg/L

MSD = ((6.186 × 0.02 × 50K)/50 mL) = 123.72 mg/L

Attachment 8 – Specific Conductance Data Review, EPA method 120.1

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 1.8°C	✓	
Were the samples allowed to warm to room temperature prior to analysis?	✓	
Were the samples analyzed within 28 days of collection? C 5/13/14 A 5/14/14	✓	

CALIBRATION	YES	NO
Was the instrument initially calibrated with nominal 100-, 1000-, and/or 10,000-µmhos/cm standards? 1K only	✓	
Was a second source mid-range ICV conductivity standard used to check the conductivity meter calibration? 1413 uS	✓	
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? 1413uS	✓		
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)? CCV only Analyzed at end		✓	
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? 95.7% recovery	✓		(b)
Did the CCV analyses yield a concentration within 90-110% of the standard concentration? 99.8%	✓		(c)
Did the duplicate sample meet the precision objective of ≤20 RPD?		✓	(d)

Robin Alpers 8/19/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) Primary sample was not analyzed in duplicate.

(b) [ICV] = 1413uS

$\left(\frac{1352}{1413}\right)100 = 95.7\%$ rec

(c) [CCV] = 999uS

$\left(\frac{997}{999}\right)100 = 99.8\%$ rec

(d) $^{10}Sx = 20,153$

^{10}Sx Dup = Not Analyzed

^{20}Sx 19900 (from prelim report Raw data missing

$RPD = \left(\frac{20153 - 19900}{20,026.5}\right)100 = 1.3\%$ RPD

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

HOLDING TIMES	YES	NO
Were the samples preserved at ≤6°? 1.8°C	✓	
Were the samples analyzed within five (5) days of receipt? C 5/13/14 A 5/14/14	✓	

CALIBRATION	YES	NO
Was the temperature recorded for each pH measurement? ATC used	✓	
Were at least two standard buffer solutions used to calibrate the instrument? 5	✓	
Was the slope of the pH calibration curve recorded and greater than 95%? 100.5%	✓	

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? Begin → Mid → End	✓		
Was the sample analysis temperature within 2°C of the buffer analysis temperature? Buffers → 20-22°C ; Samples → 22°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?	✓		(b)
Did the CCV read within ±0.1 pH unit of the assigned value?	✓		(c)
Did the duplicate sample read within ±0.1 pH unit of the primary sample?		✓	(d)

Robin Dixon 8/19/14
Data Validator Date

10/15/14
Completeness Reviewer Date

(a) Primary sample was not analyzed in duplicate (per SOW).

(b) $ICV_{pH7.00} = 6.985$ U

(c) $CCV_{pH7.00} = 6.995$ U
$CCV_{pH4.00} = 4.005$ U

d) $1^0 Sx = 7.795$ U
$1^0 Sx$ Dup – Not analyzed
$2^0 Sx = 7.80$ SU

$$\%RPD = \left(\frac{7.80 - 7.79}{7.795}\right) 100$$
$$= 0.128\%$$

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? 21.7°C	✓	
Was the temperature of the specific gravity measurements recorded?		✓ (a)
Was the mass of at least 5.0 mL of the water sample measured? 10 mL	✓	
Were the weights recorded to the nearest 0.1 mg?	✓	
Was the distilled (DI) water control sample at 3 - 5° C? 3.2°C	✓	
Was the Temperature Correction Factor recorded? 0.9982 @ 21.7°C	✓	

Kathlin Myers 8/15/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) Data only supports room temp. blank, not individual Samples.

Hand calc. verification

$DI = (23.3444 - 13.3449) = 9.9995\ g$

$^1S_x = \left(\frac{24.1694 - 14.0578}{9.9995}\right) \times 0.9982 = 1.0094$ (10.1116)

$\bar{x} = 1.01025$

$^1S_x\ Dup = \left(\frac{23.9762 - 13.8474}{9.9995}\right) \times 0.9982 = 1.0111$ (10.1288)

$\%\ RPD = \left(\frac{1.0111 - 1.0094}{1.01025}\right) \times 100 = 0.16828$

$^2S_x = \left(\frac{23.8612 - 13.7586}{9.9995}\right) \times 0.9982 = 1.0085$ (10.1026)

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 1.8°C	✓	
Were the samples preserved with acidification to pH<2?	✓	
Were the samples analyzed within 28 days of collection? C 5/13/14 A 5/19/14	✓	

ANALYSIS QUEUE	YES	NO
Was the instrument calibrated daily with a 5-point calibration curve? 8	✓	
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? 10 S_x	✓	
(a) Were Continuing Calibration Blanks (CCB) analyzed after the ICV and CCV?	✓	
Were quadruplicate measurements taken for each sample? 5 throw outlier out	✓	
Were both the average and the range reported for the quadruplicate measurements?	✓	

5/2/14 Cal

CCB referred to as ICV thru out run

METHOD PERFORMANCE	YES	NO
Did the calibration curve yield a correlation coefficient of at least 0.995 (R^2≥0.995)? Cal low, R^2 = 0.9999 Cal high, R^2 = 1.0000	✓	
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? 1.2%	✓	

Kathleen Akpan 8/15/14
Data Validator Date

10-15-14
Completeness Reviewer Date

(a) CCB referred to as ICB thru-out run (just terminology; purpose met).

(b) $ICV_{50} = \left(\frac{48.7425}{50}\right)100 = 97.5\%$ rec

$ICV_5 = \left(\frac{4.8385}{5}\right)100 = 96.77\%$ rec

(c) [Spk] = 4.850

$LCS = \left(\frac{4.9423}{4.850}\right)100 = 101.9\%$ rec

$LCSD = \left(\frac{4.9328}{4.850}\right)100 = 101.7\%$ rec

$\%RPD = \left[\frac{(4.9423 - 4.9328)}{4.93755}\right] \times 100$

$= 0.192\%$ RPD

(d) 8/15/14 10 S_x = 0.5837 [Spk] = 4.650

$MS = \left(\frac{5.2355 - 0.5837}{4.650}\right)100 = 100.02\%$ rec

$MSD = \left(\frac{5.2988 - 0.5837}{4.650}\right)100 = 101.4\%$ rec

$\%RPD = \left(\frac{5.2355 - 5.2988}{5.26715}\right)100$

$= 1.202\%$ RPD

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 1.8°C	✓	
Were the samples analyzed within 7 days of collection? CS 5/13/14 AS 5/20/14	✓	

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? 10Sx	✓	
Was the initial volume of each sample 100 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? 16,000 → 20K vs 50K	✓	

METHOD PERFORMANCE	YES	NO	
Was the difference between consecutive dry weights ≤0.0020g (2.0 mg)? May 0.0005g	✓		
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?	✓		

Kathleen Upton 8/15/14
Data Validator Date

Completeness Reviewer 10-15-14
Completeness Reviewer Date

MB = 7 (1)

(a) [SpK] = 1000

$LCS = \left(\frac{66.3993 - 66.2948}{100}\right) \times 10^6 = 1,045$ $\left(\frac{1045}{1000}\right)100 = 104.5\%$ rec

$LCSD = \left(\frac{66.3995 - 66.2936}{100}\right) \times 10^6 = 1,059$ $\left(\frac{1059}{1000}\right)1000 = 105.9\%$ rec

$\%RPD = \left(\frac{1059 - 1045}{1052}\right)100 = 1.33\%$ RPD

(b) 10Sx = 16,000 [SpK] = 50K

$MS = \left(\frac{77.0806 - 76.9439}{2}\right) \times 10^6 = 68,350$ $\left(\frac{68350 - 16000}{50K}\right)100 = 104.7\%$ rec

$MSD = \left(\frac{75.9127 - 75.7763}{2}\right) \times 10^6 = 68,200$ $\left(\frac{68200 - 16000}{50K}\right)100 = 104.4\%$ rec

$\%RPD \left(\frac{68350 - 68200}{68275}\right)100 = 0.219\%$ RPD

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

HOLDING TIMES	YES	NO
Were the samples maintained at ≤6°C prior to analysis? 1.8°C	✓	
Were the samples analyzed within 7 days of collection? C 5/13/14 A 5/20/14	✓	
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)? Max 0.0004	✓	
Was the MB result <5.0 mg/L? 3 mg/L	✓	
Did the duplicate analyses meet precision objective of ≤15 RPD? 8.0% RPD	✓	

Kathleen Alpoen 8/15/14
Data Validator Date

[signature] 10-15-14
Completeness Reviewer Date

LCS Spk = 92.40

$$LCS = \left(\frac{2.7356 - 2.7259}{100}\right) \times 10^6 = 97$$

$(97/92.4)100 = 104.98$ rec

$$LCSR = \left(\frac{2.7354 - 2.7260}{100}\right) \times 10^6 = 94.0$$

$(94/92.4)100 = 101.73\%$ rec

$$\% RPD = \left(\frac{97 - 94}{95.5}\right)100 = 3.14\% RPD$$

$$1^\circ Sx = \left(\frac{2.7393 - 2.7380}{100}\right) \times 10^6 = 13.0 \text{ mg/L}$$

$$RPD = \left(\frac{(13-12)}{12.5}\right)100$$

$$1^\circ Sx\ Dup = \left(\frac{2.7329 - 2.7317}{100}\right) \times 10^6 = 12.0 \text{ mg/L}$$

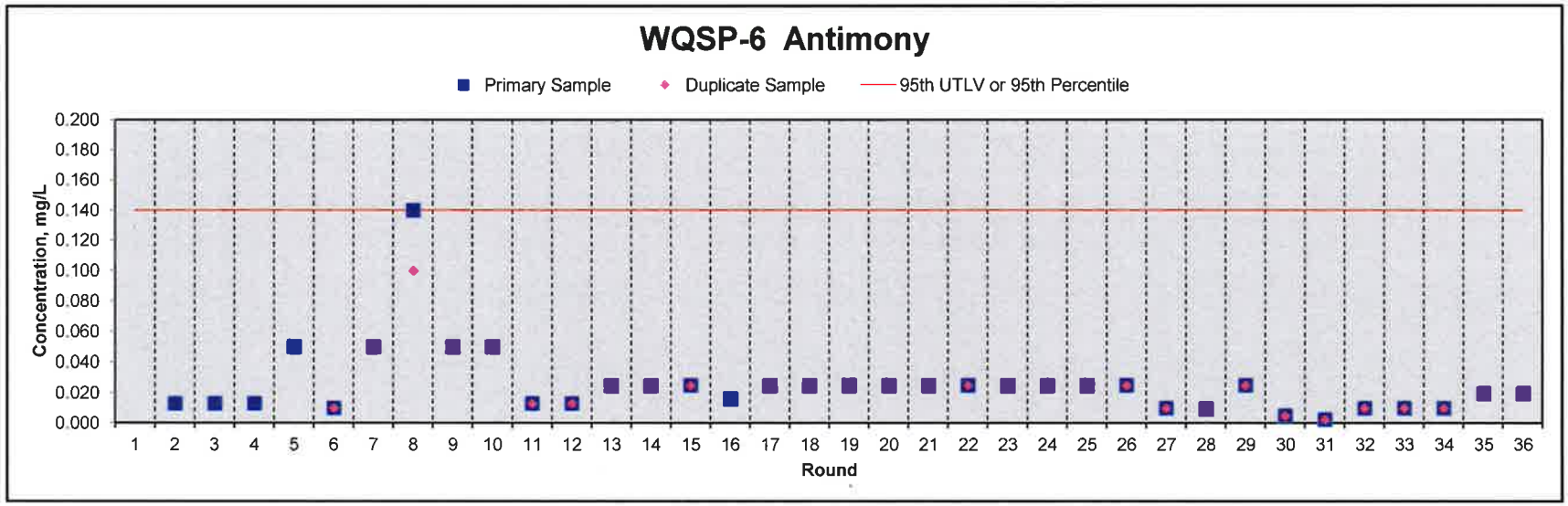
$= 8.0\%$ RPD

WQSP-6

METALS AND GENERAL CHEMISTRY CONCENTRATION PLOTS

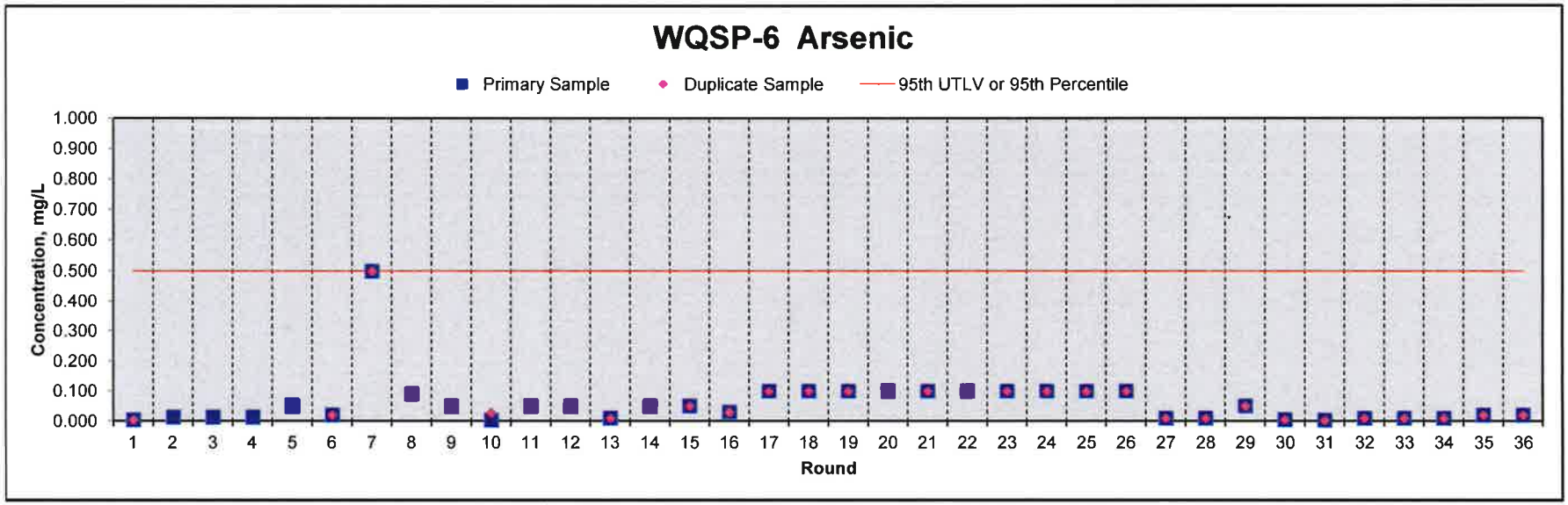
WQSP-6 Antimony

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	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
Antimony	36	05/13/14	05/28/14	< 0.020	< 0.020	mg/L	0.020	0.140



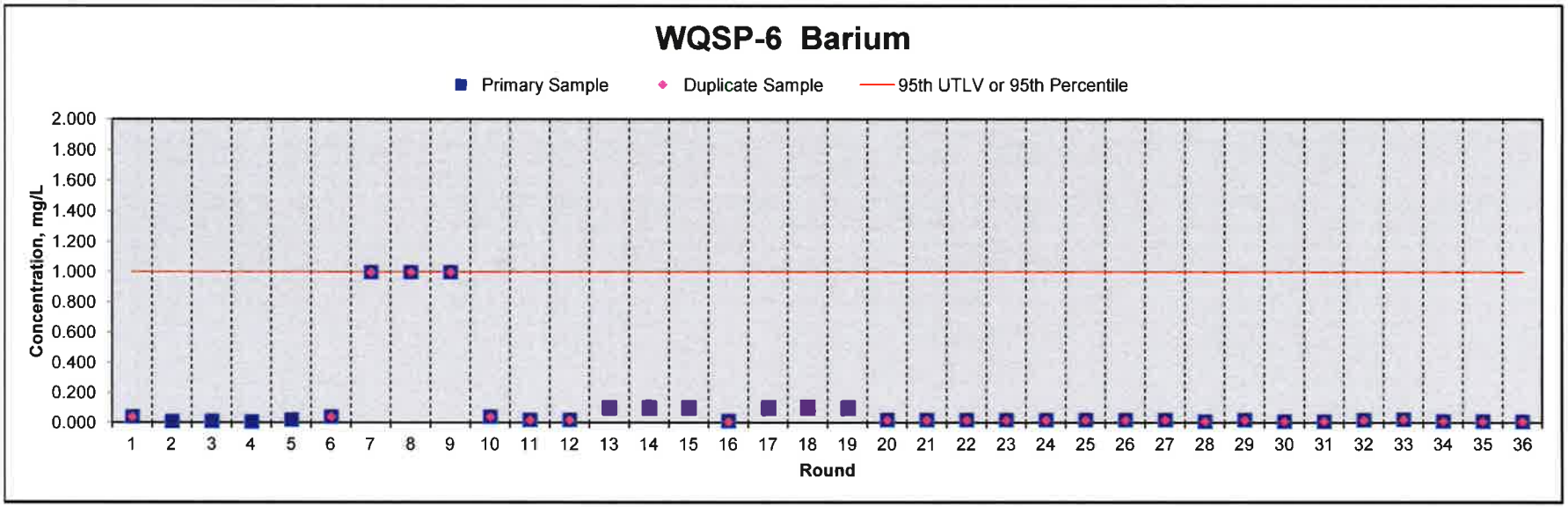
WQSP-6 Arsenic

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	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
Arsenic	36	05/13/14	05/28/14	< 0.020	< 0.020	mg/L	0.020	< 0.5



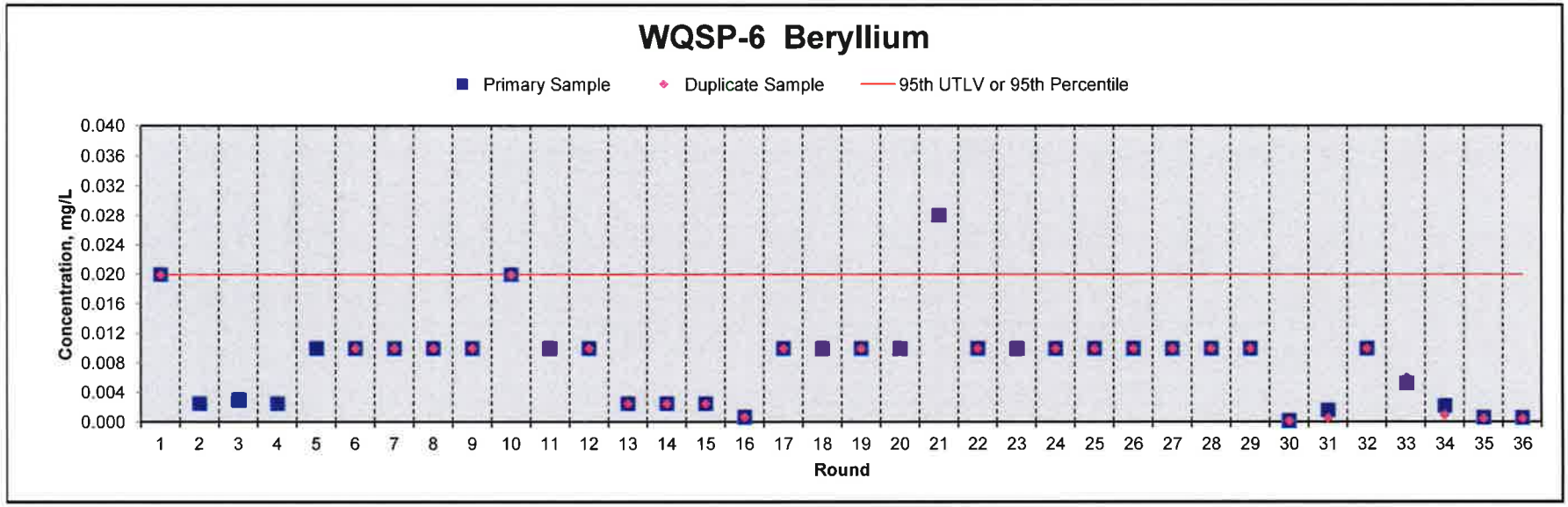
WQSP-6 Barium

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	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
Barium	36	05/13/14	05/28/14	0.0096	0.0092	mg/L	0.00063	< 1.0



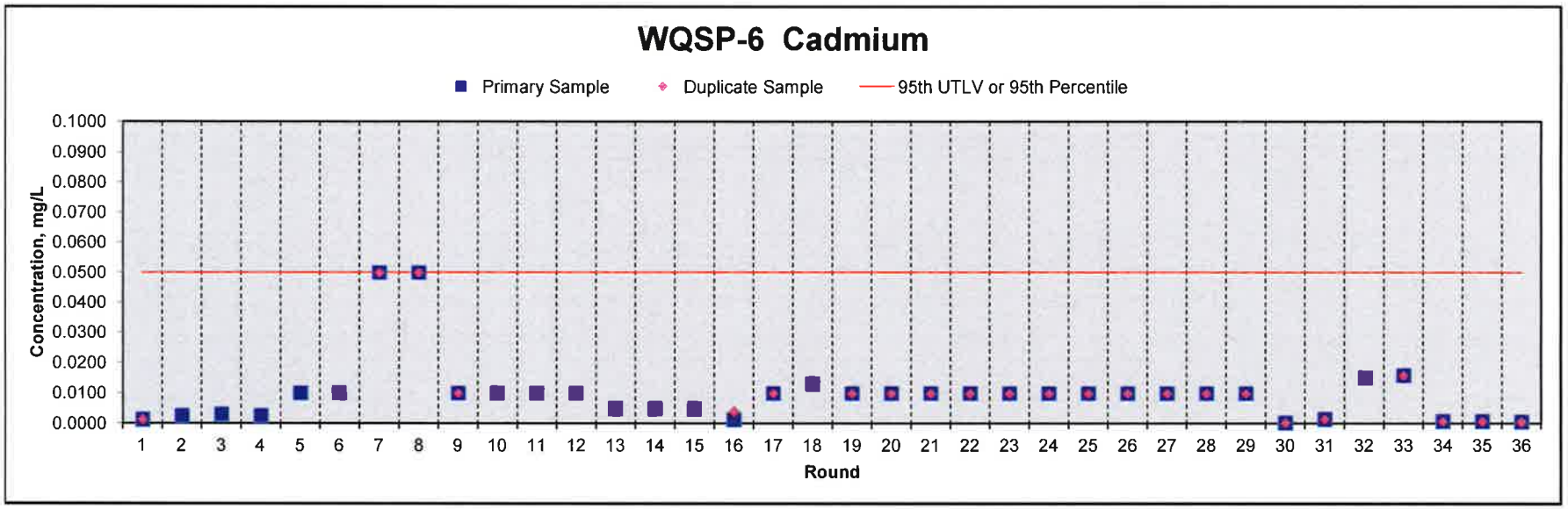
WQSP-6 Beryllium

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	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
Beryllium	36	05/13/14	05/28/14	0.00061	0.00054	mg/L	0.00035	< 0.02



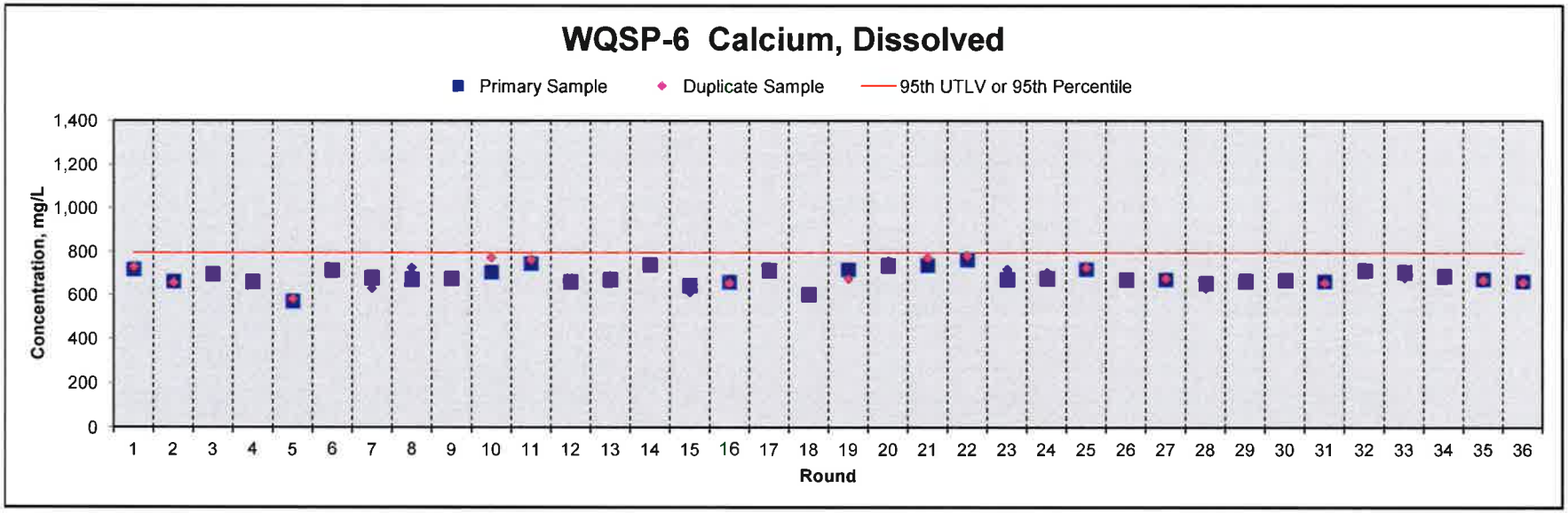
WQSP-6 Cadmium

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	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
Cadmium	36	05/13/14	05/28/14	< 0.00063	< 0.00063	mg/L	0.00063	< 0.05



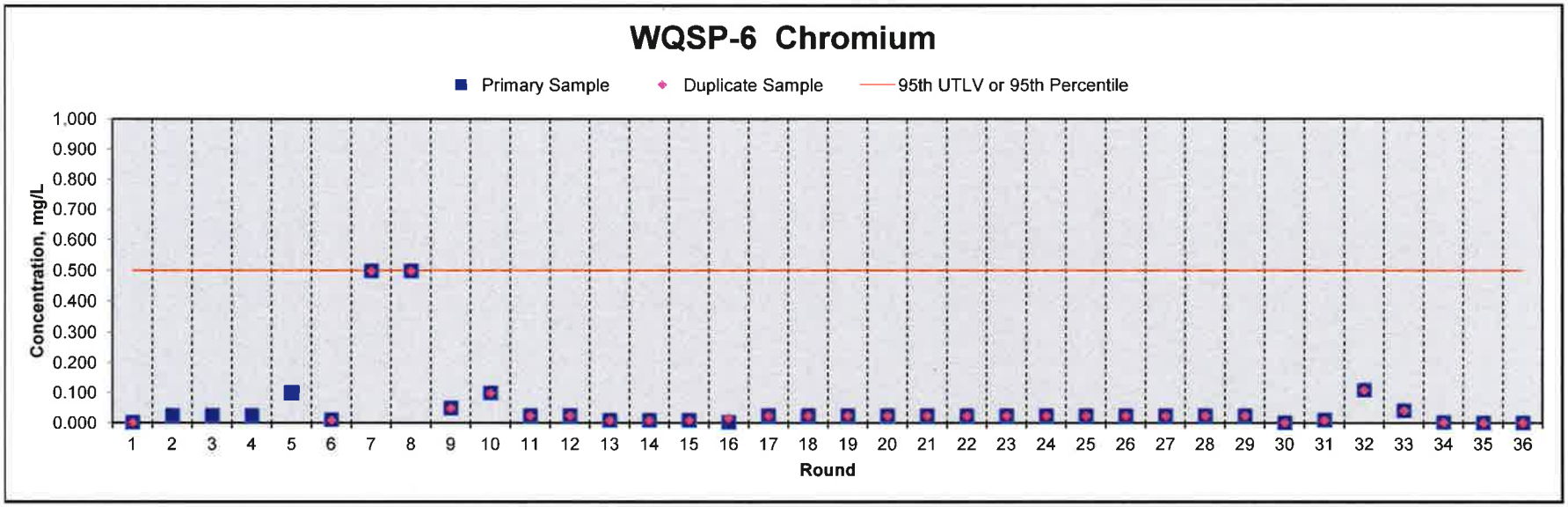
WQSP-6 Calcium, Dissolved

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	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
Calcium	36	05/13/14	05/16/14	665	661	mg/L	0.386	796



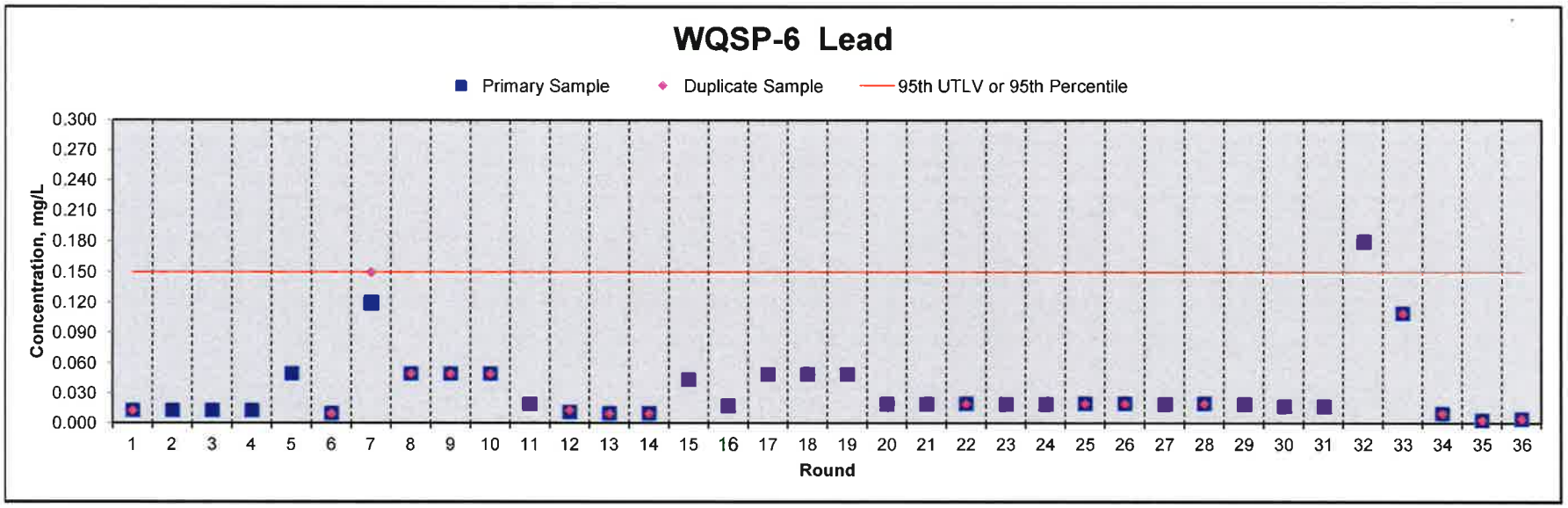
WQSP-6 Chromium

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	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
Chromium	36	05/13/14	05/28/14	< 0.0017	< 0.0017	mg/L	0.0017	< 0.5



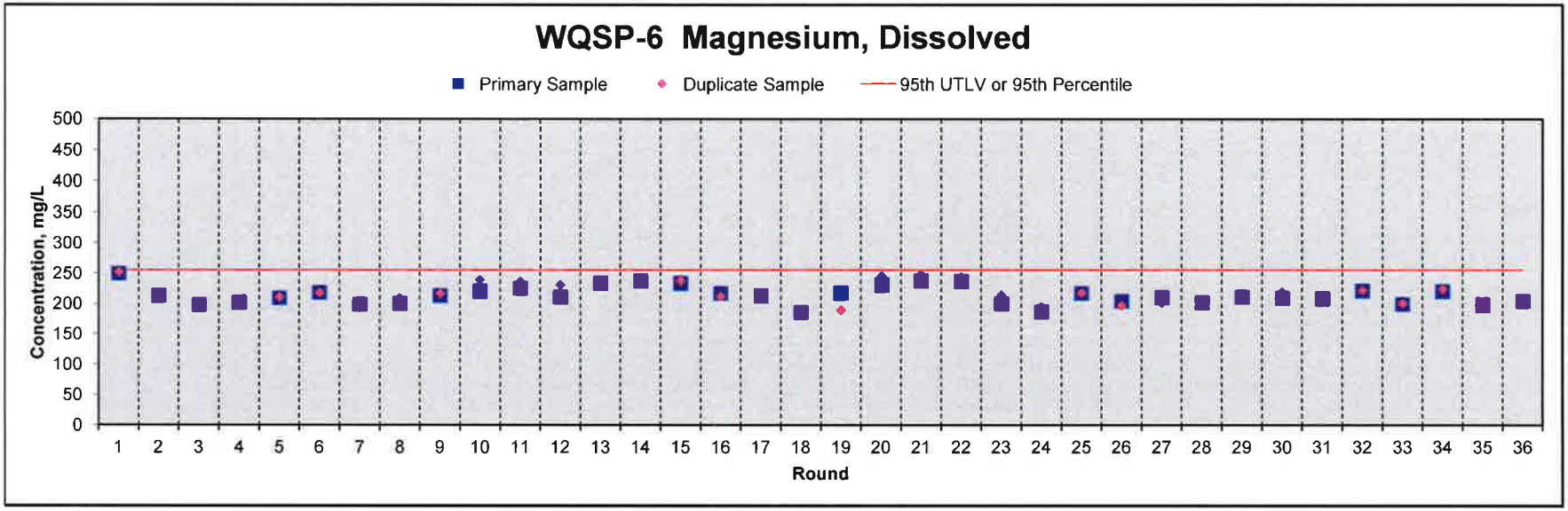
WQSP-6 Lead

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	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
Lead	36	05/13/14	05/28/14	< 0.0048	< 0.0048	mg/L	0.0048	0.150



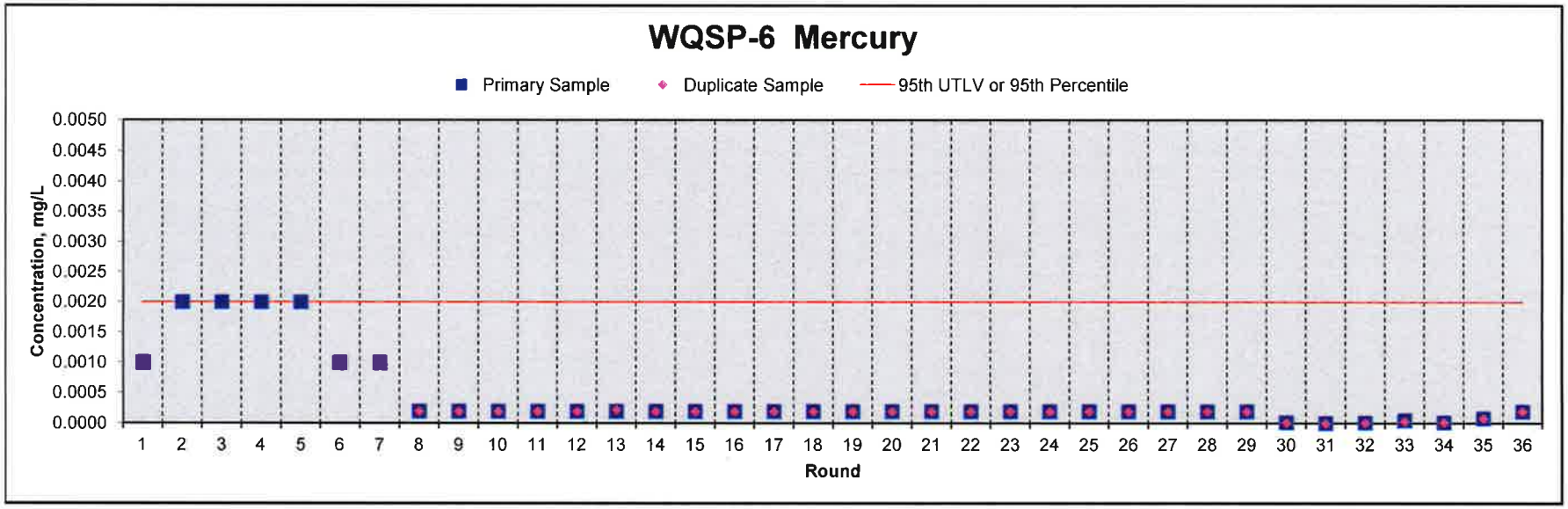
WQSP-6 Magnesium, Dissolved

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	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
Magnesium	36	05/13/14	05/16/14	205	205	mg/L	0.189	255



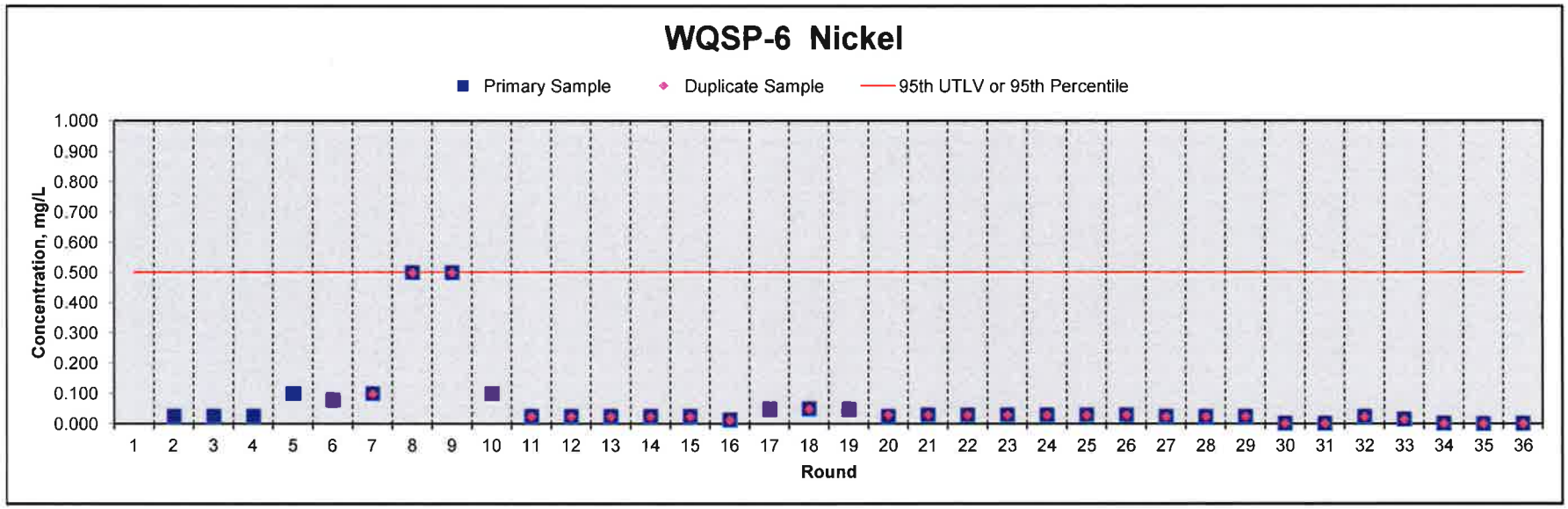
WQSP-6 Mercury

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	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
Mercury	36	05/13/14	07/17/14	< 0.00020	< 0.00020	mg/L	0.00020	< 0.002



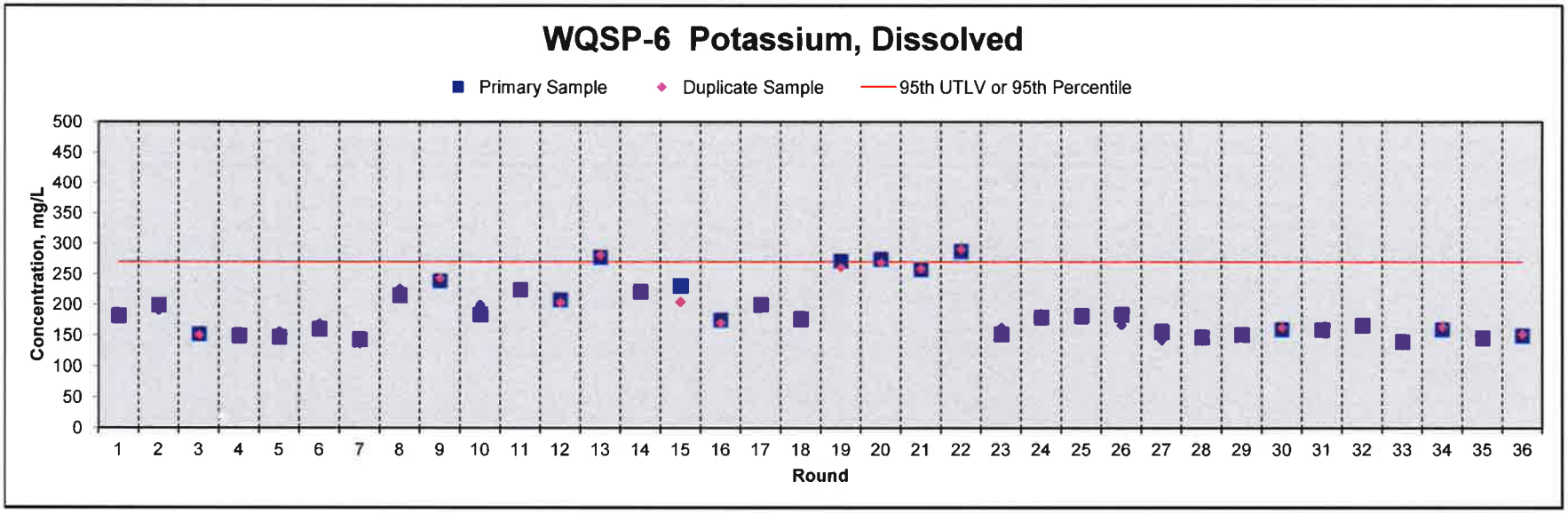
WQSP-6 Nickel

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	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
Nickel	36	05/13/14	05/28/14	< 0.0019	< 0.0019	mg/L	0.0019	< 0.5



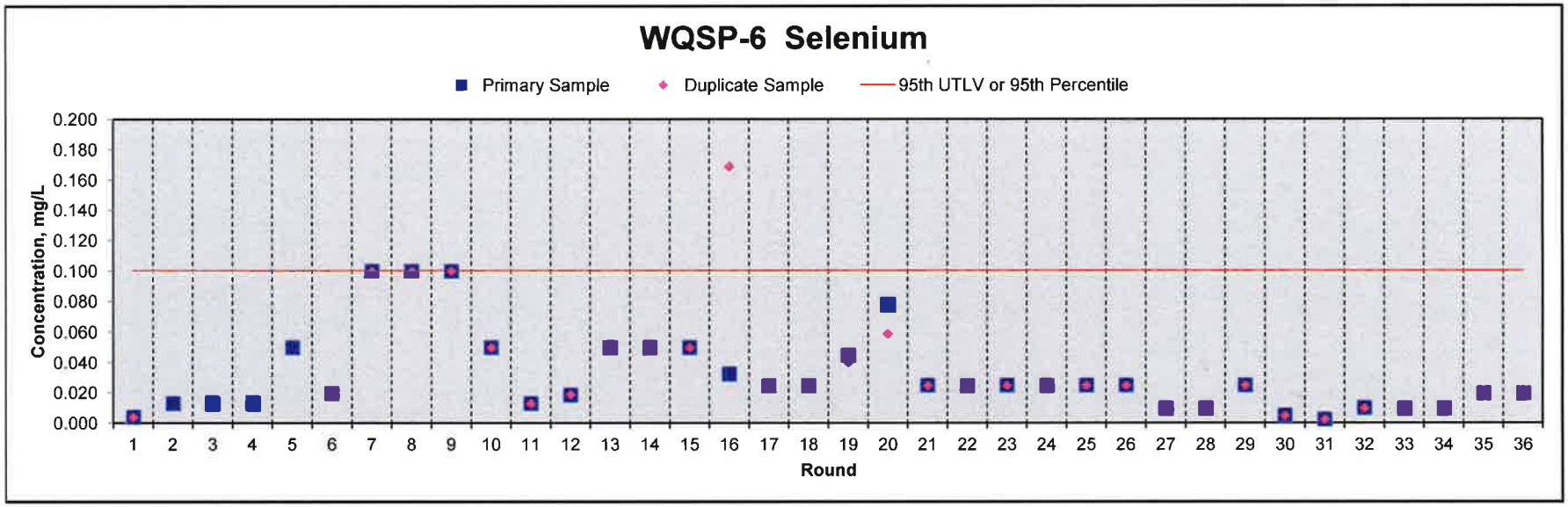
WQSP-6 Potassium, Dissolved

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	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
Potassium	36	05/13/14	05/16/14	150	153	mg/L	2.02	270



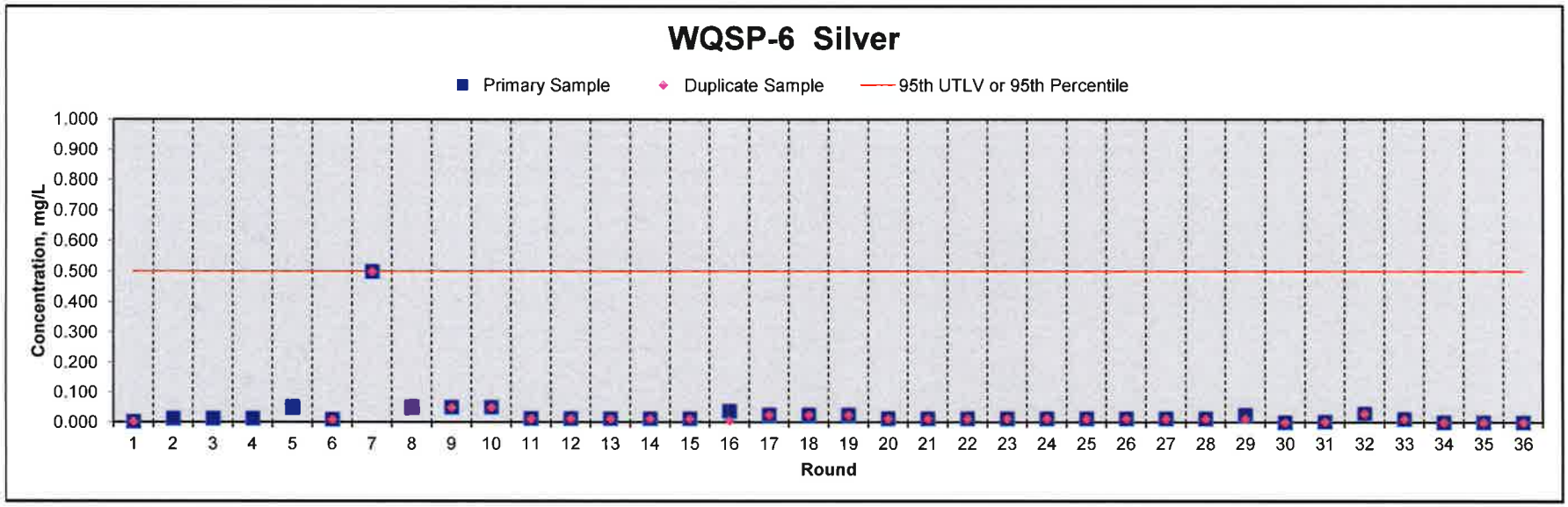
WQSP-6 Selenium

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	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
Selenium	36	05/13/14	05/28/14	< 0.020	< 0.020	mg/L	0.020	0.10



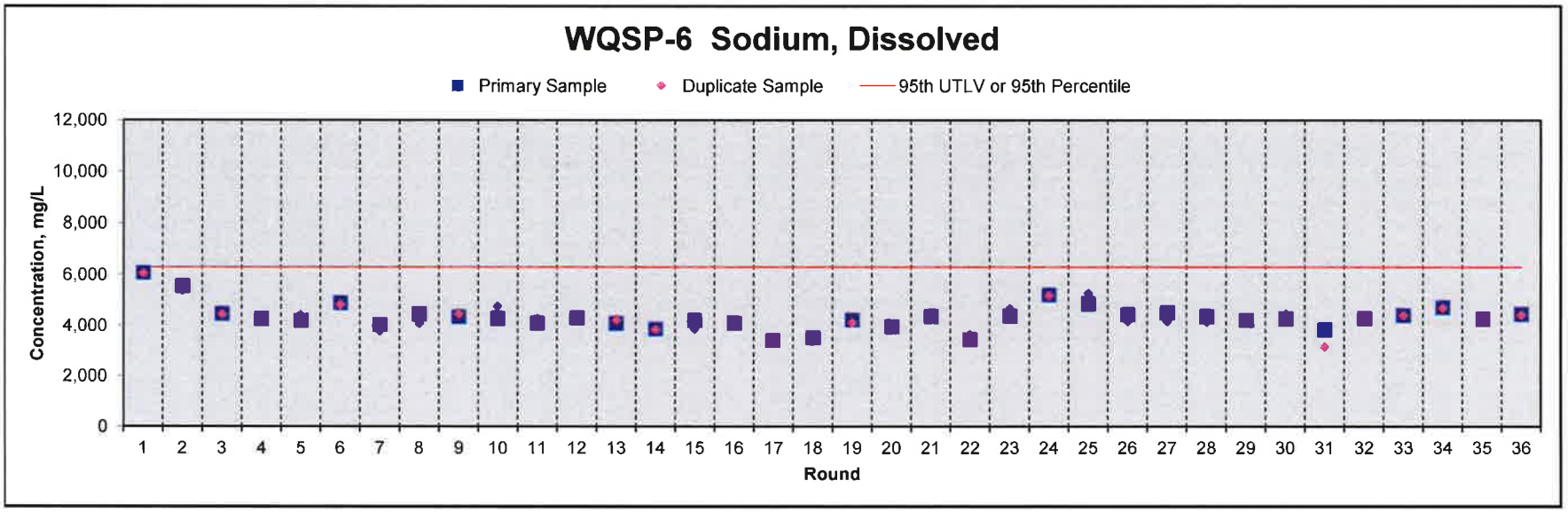
WQSP-6 Silver

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	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
Silver	36	05/13/14	05/28/14	< 0.00052	< 0.00052	mg/L	0.00052	< 0.5



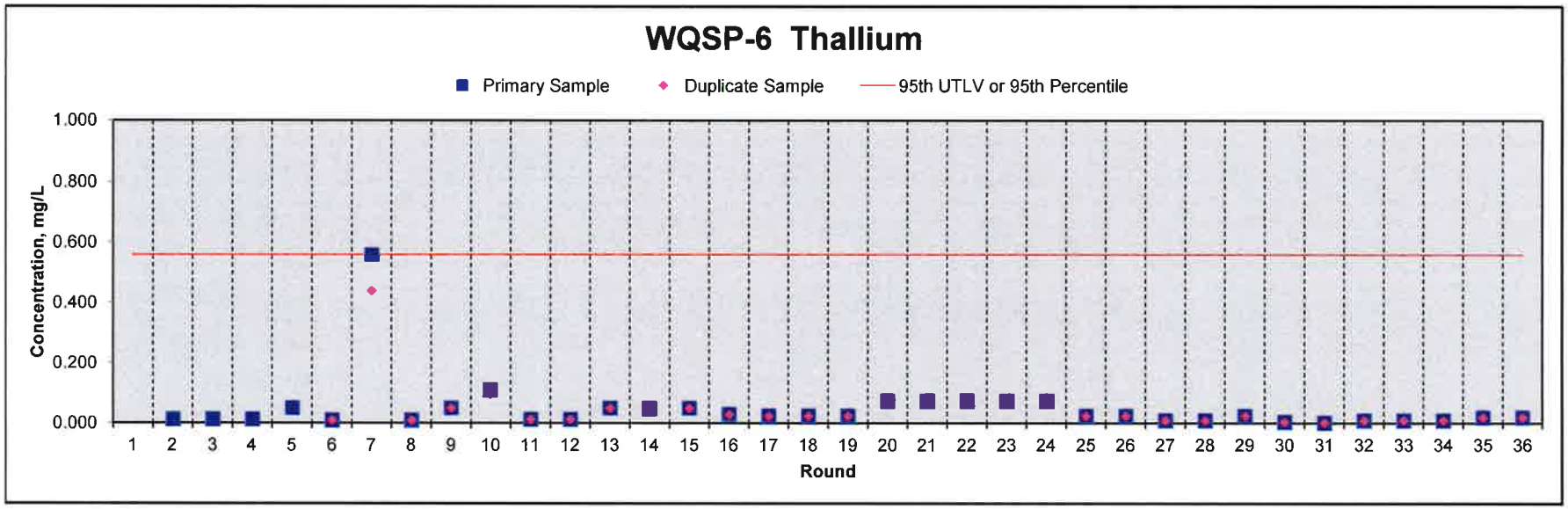
WQSP-6 Sodium, Dissolved

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	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
Sodium	36	05/13/14	05/16/14	4,460	4,430	mg/L	12.1	6,290



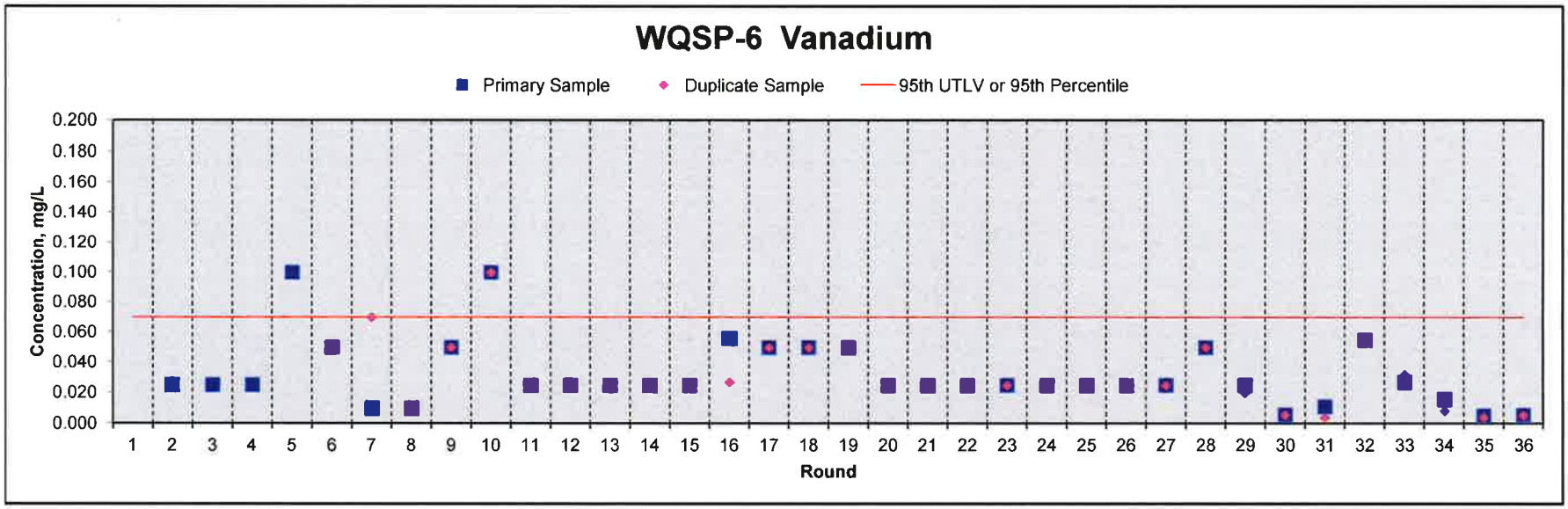
WQSP-6 Thallium

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	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
Thallium	36	05/13/14	05/30/14	< 0.020	< 0.020	mg/L	0.020	0.560



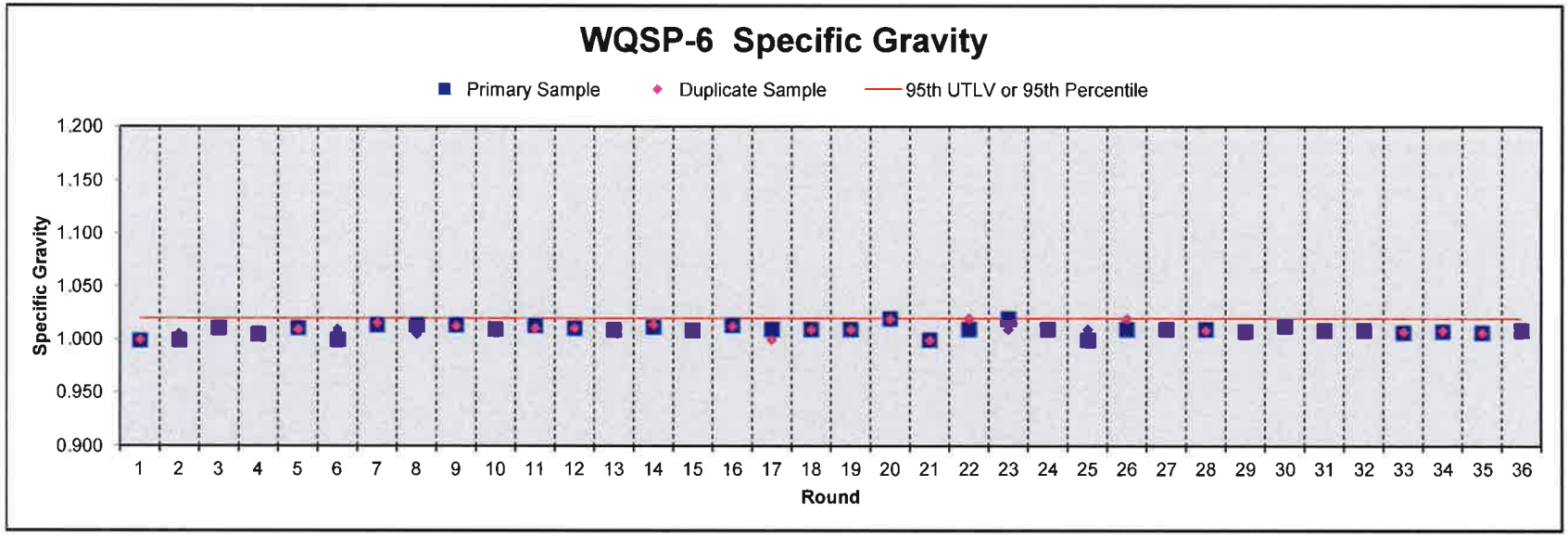
WQSP-6 Vanadium

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	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
Vanadium	36	05/13/14	05/28/14	< 0.00548	< 0.00548	mg/L	0.00548	0.070



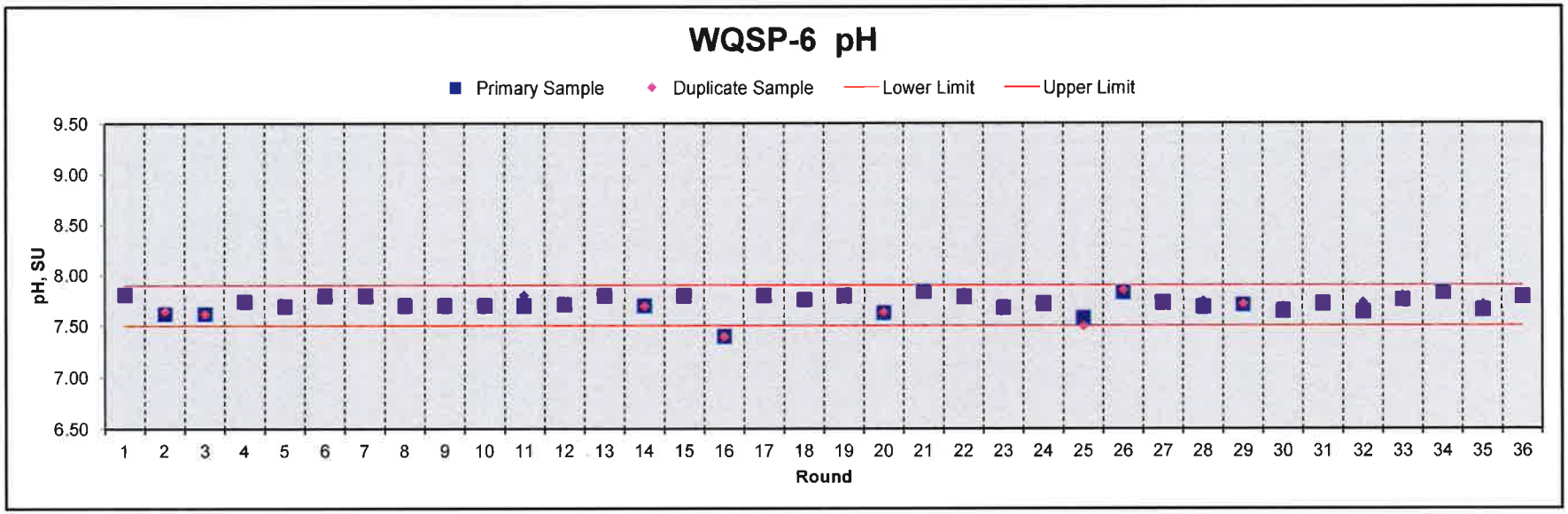
WQSP-6 Specific Gravity

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
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
Specific Gravity	36	05/13/14	05/28/14	1.009	1.008	unitless	0	1.02



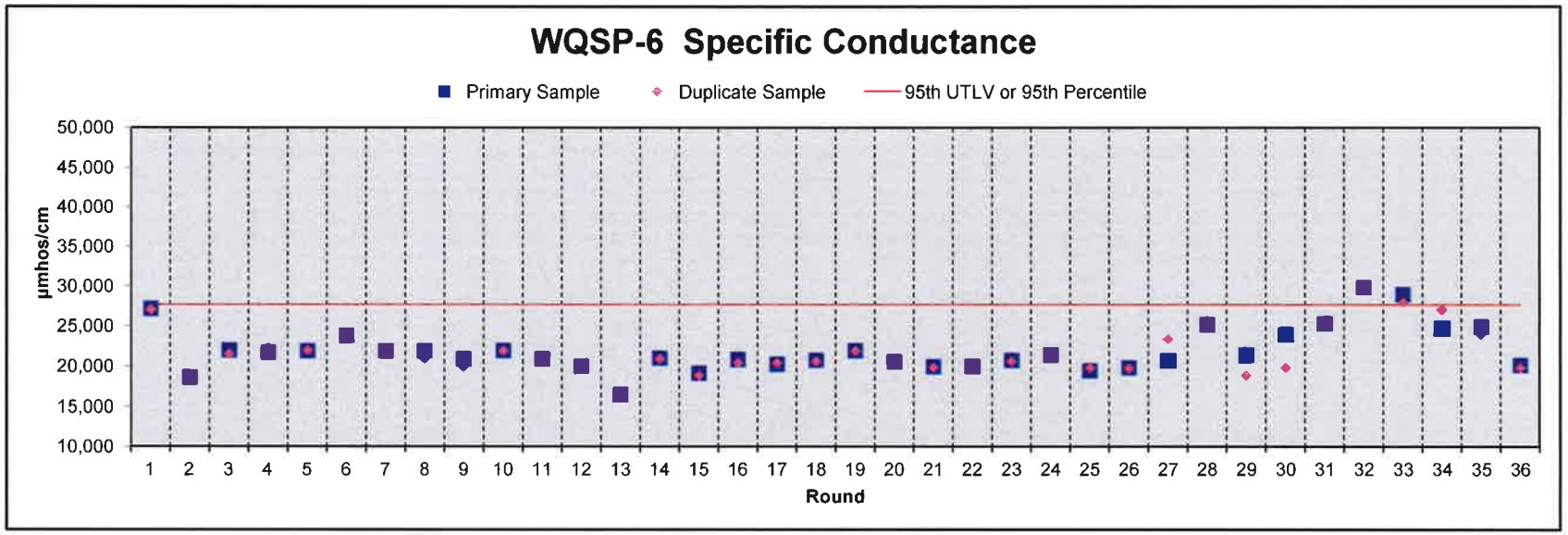
WQSP-6 pH

Parameter	Round	Date Sampled	Date Analyzed	Primary Sample	Duplicate Sample	Units	Method Detection Limit (MDL)	95th UTLV or 95th Percentile Lower Limit	95th UTLV or 95th Percentile 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	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
pH	36	05/13/14	05/14/14	7.79	7.80	SU	0.1	7.5	7.9



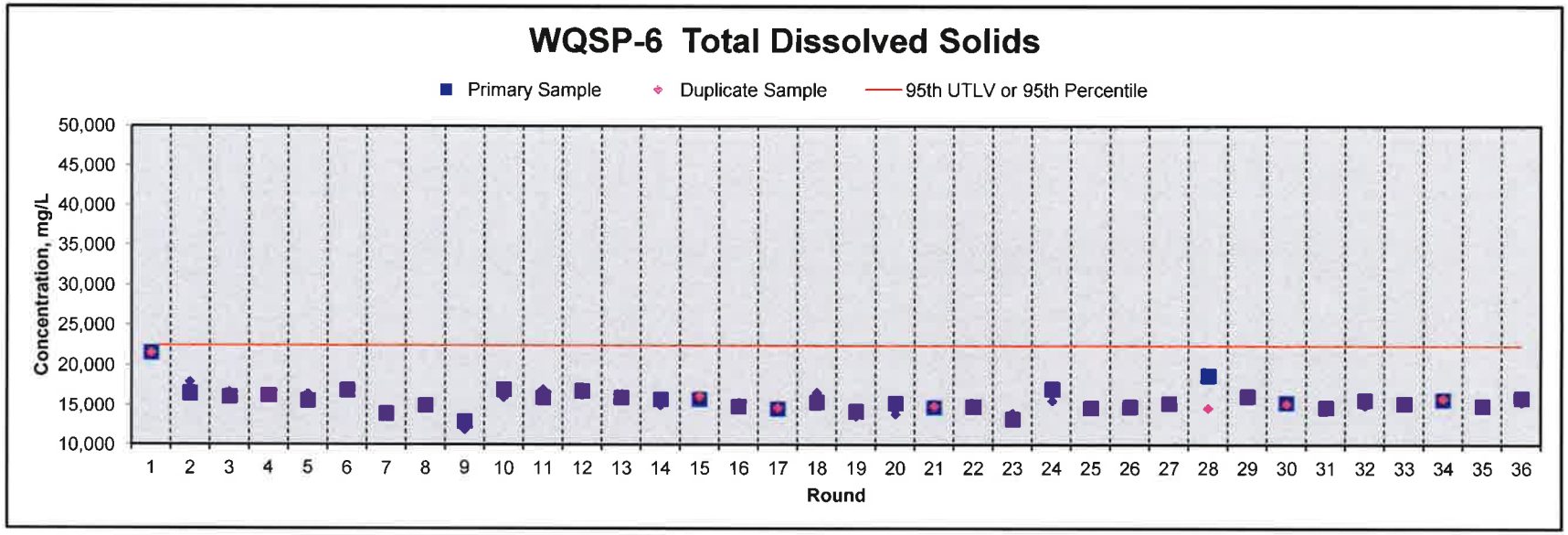
WQSP-6 Specific Conductance

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	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
Specific Conductance	36	05/13/14	05/15/14	20,200	19,900	µmhos/cm	0.025	27,660



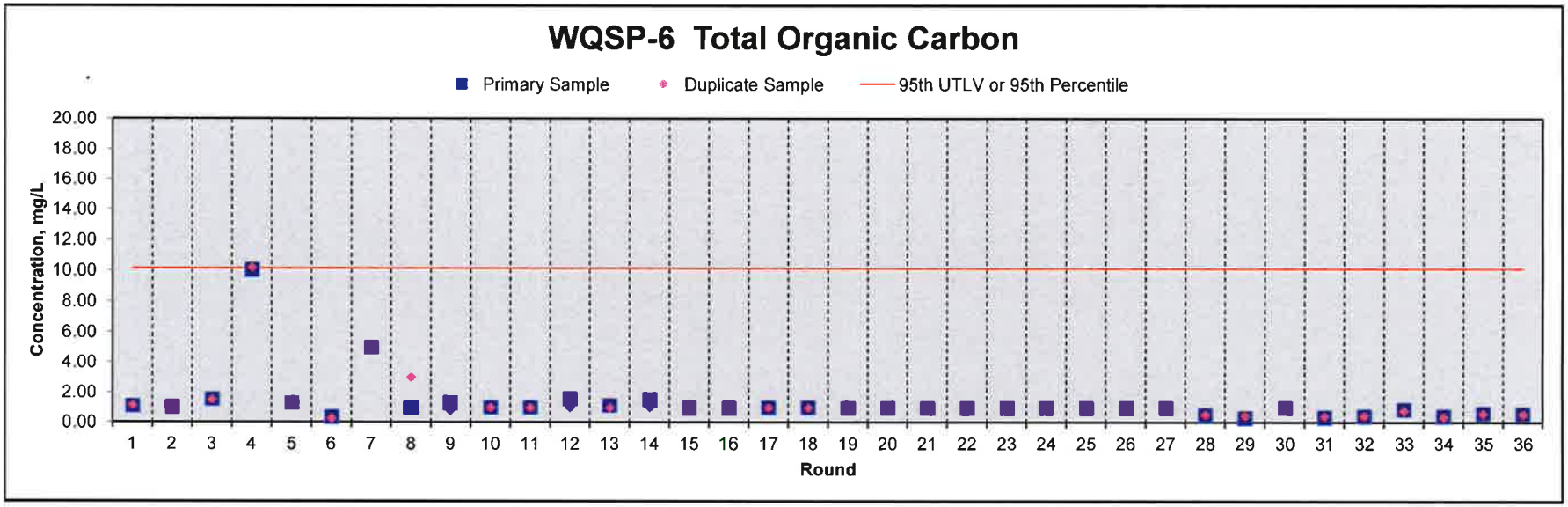
WQSP-6 Total Dissolved Solids

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	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
Total Dissolved Solids	36	05/13/14	05/20/14	16,000	15,400	mg/L	492	22,500



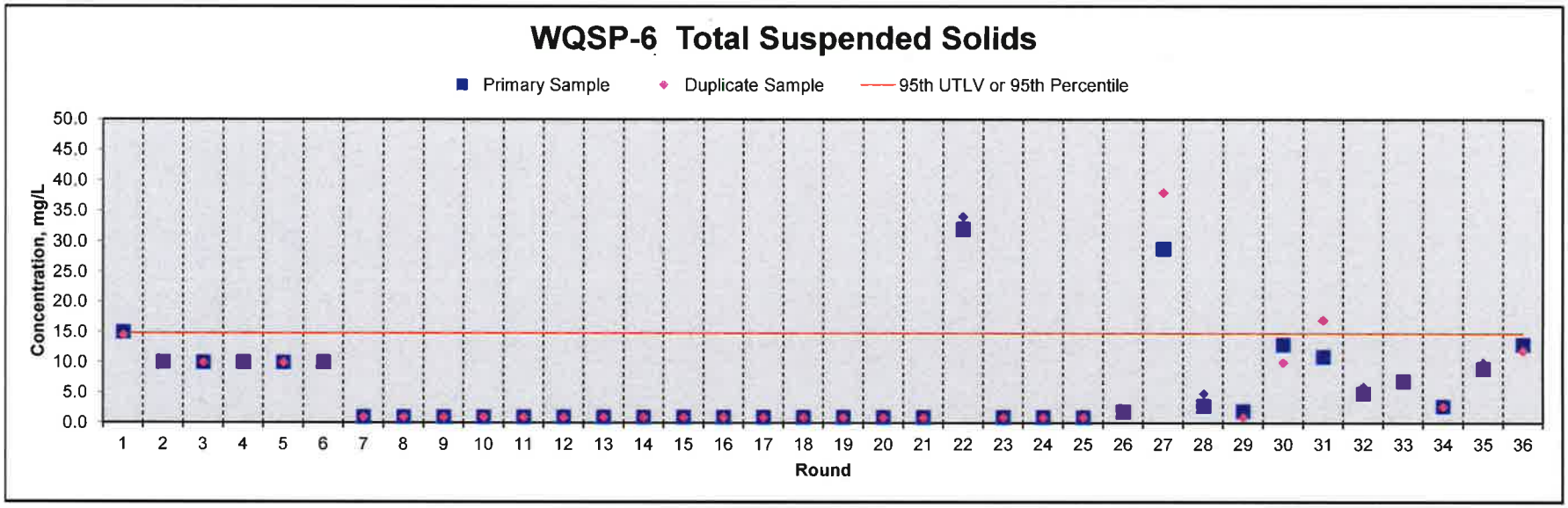
WQSP-6 Total Organic Carbon

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	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	06/14/11	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	05/16/12	0.43	0.38	mg/L	0.250	10.14
Total Organic Carbon	35	05/02/13	05/08/13	0.61	0.60	mg/L	0.230	10.14
Total Organic Carbon	36	05/13/14	05/19/14	0.58	0.57	mg/L	0.120	10.14



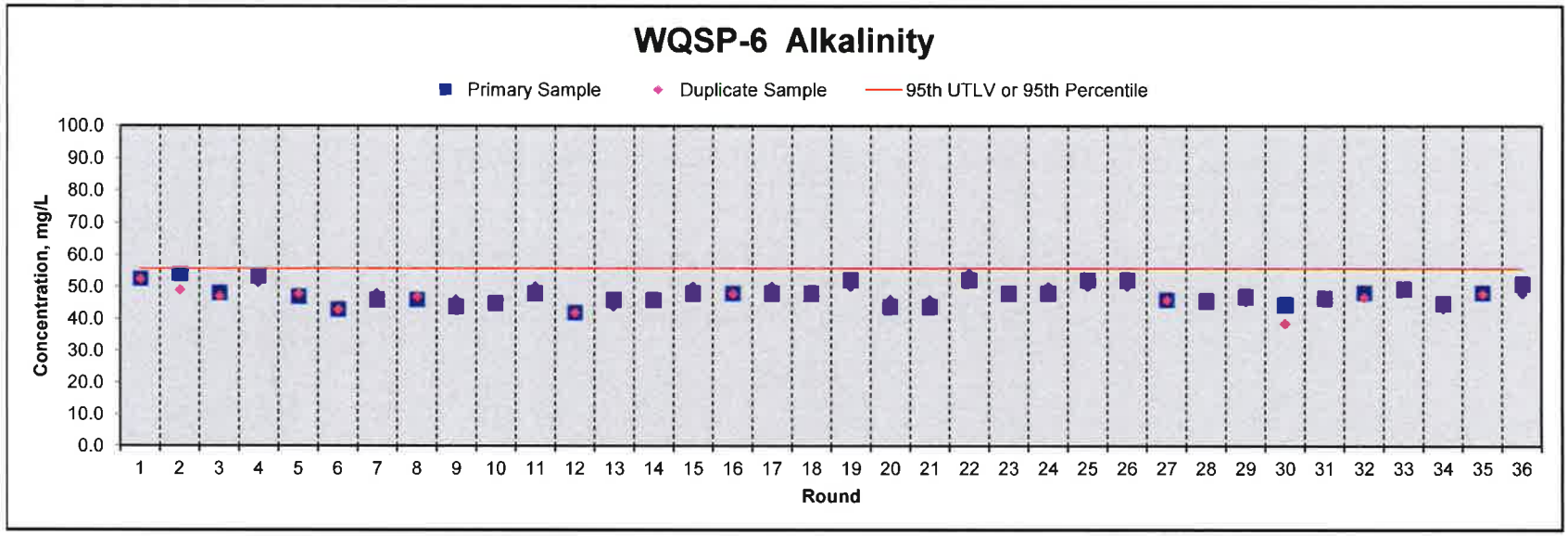
WQSP-6 Total Suspended Solids

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	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
Total Suspended Solids	36	05/13/14	05/20/14	13.0	12.0	mg/L	3.07	14.8



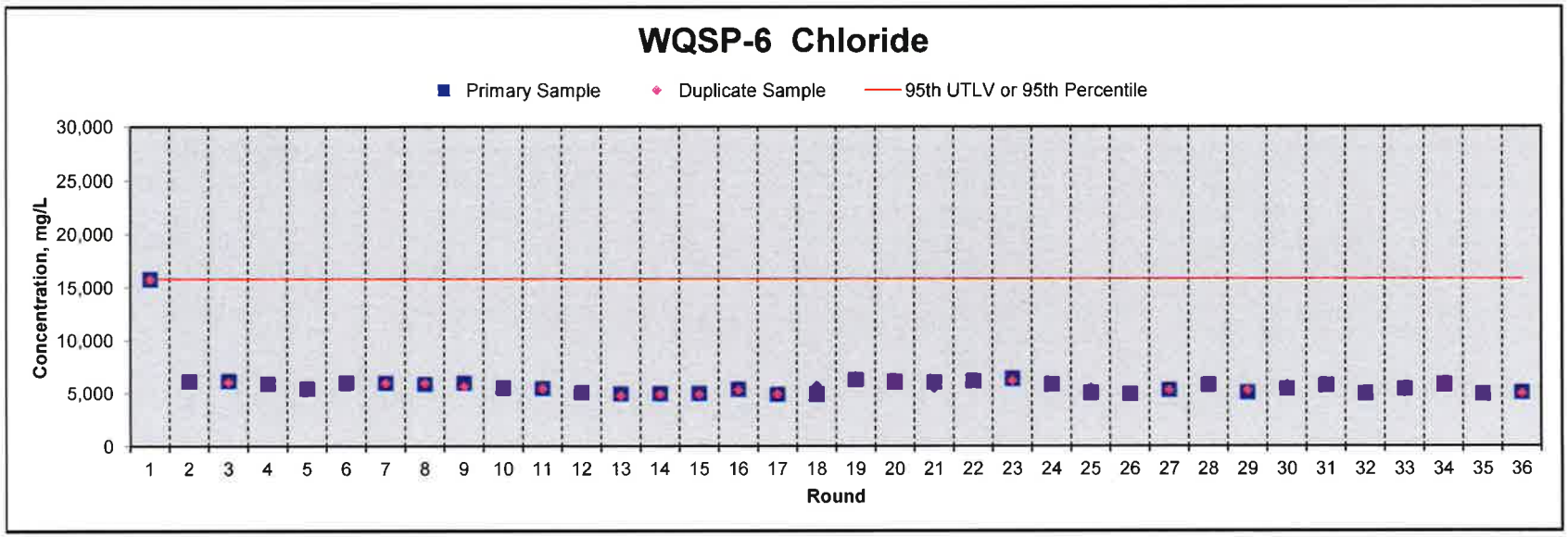
WQSP-6 Alkalinity

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	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
Alkalinity	36	05/13/14	05/14/14	50.9	47.9	mg/L	4.0	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	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
Chloride	36	05/13/14	05/14/14	5,090	5,040	mg/L	500	15,800



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: 140516039
Order Date: 5/16/2014

Contact Name: ANDY FREEMAN
Project Name: 1405587
Comment:

Sample #: 140516039-001 **Customer Sample #:** 1405587-001F / GW-WQ6-C-R36

Recv'd: ☑ **Collector:** **Date Collected:** 5/13/2014
Quantity: 1 **Matrix:** Water **Date Received:** 5/16/2014 11:53:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)
ARSENIC BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)
SELENIUM BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)
THALLIUM BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)

Sample #: 140516039-002 **Customer Sample #:** 1405587-002F / GW-WQ6-C-R36DUPLICATE

Recv'd: ☑ **Collector:** **Date Collected:** 5/13/2014
Quantity: 1 **Matrix:** Water **Date Received:** 5/16/2014 11:53:00 AM
Comment:

Test	Lab	Method	Due Date	Priority
ANTIMONY BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)
ARSENIC BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)
SELENIUM BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)
THALLIUM BY 6020A	M	EPA 6020A	5/29/2014	Normal (~10 Days)

Customer Name:	HALL ENVIRONMENTAL ANALYSIS LAB			**Order ID:**	140516039
	4901 HAWKINS NE SUITE D			**Order Date:**	5/16/2014
	ALBUQUERQUE	NM	87109		
Contact Name:	ANDY FREEMAN			**Project Name:**	1405587
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature inside the cooler?	0.9
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

140516 039 HALL Last Due 5/29/2014
1st SAMP 5/13/2014 1st RCVD 5/16/2014
1405587

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	1405587-001F	GW-WQ6-C-R36	500HDPEHN 03	Aqueous	5/13/2014 8:42:00 AM	1	See below
2	1405587-002F	GW-WQ6-C-R36DUPLICATE	500HDPEHN 03	Aqueous	5/13/2014 8:58:00 AM	1	See below

As of 5/14/14

MW035

SPECIAL INSTRUCTIONS / COMMENTS:

PLEASE ANALYZDE FOR TOTAL As, Sb, Se, Tl BY METHOD 6020. LEVEL 4 QA/AC PACKAGE, PLEASE DO MS/MSD ON 1405587-001F. REPORT TO 0.001 mg/L IF POSSIBLE. PLEASE INCLUDE LCS LSCSR. SAMPLE MAY HAVE HIGH TDS.

Relinquished By:	Date: 5/14/2014	Time: 1:21 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 ☐

ANATEK LABS RECEIVING LIST

TEMP: 0.9 °C

- ☑ RECEIVED INTACT
- ☑ LABELS & CHAINS AGREE
- ☐ NO HEADSPACE
- ☑ ICE / ICE-PACKS PRESENT
- ☑ CUSTODY SEALS PRESENT

PRESERVATIVES: HNO3
NUMBER OF CONTAINERS: 2 SHIPPED VIA: FedEx
DATE & TIME: 5/16/14 11:53 INSPECTED BY: DSD

Printed on: 3 June 2014 13:21:23

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: 1405587 | RcptNo: 1

Received by/date: LM 05/14/14

Logged By: Anne Thorne 5/14/2014 8:30:00 AM Anne Thorne

Completed By: Anne Thorne 5/14/2014 Anne Thorne

Reviewed By: MG 05/14/14

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: 05/14/14

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	1.8	Good	Yes			

CHAIN OF CUSTODY RECORD

№ 1160

Page 1 of 1

Project Number:	Project Name:
T40930A-1	WIPP/DMP

Sampler(s): R. Jimenez, R.A. Spoon

Sample Date	Sample Time	Matrix	Sample Number	Total Number of Containers	VOC	TOC	SVOC	Metals	General Chemistry				Analytical Laboratory / Comments
													HEAL Albuquerque, NM
													HEAL # 1405587
5/13/14	09:38	GW	GW-WQ6-C-R36-N1	6	X								Use for MS/MSD -001
"	09:56	"	-N1D	4	X								-002
"	09:20	DI	-N2	4	X								Field Blanks -003
N/A	N/A	"	-N3	4	X								Trip Blanks, HEAL provided -004
5/13/14	09:30	GW	-N4	4		X							Use for MS/MSD -001
"	09:39	"	-N4D	2		X							-002
"	08:42	"	-N5	6			X						Use for MS/MSD -001
"	08:58	"	-N5D	2			X						-002
"	09:10	"	-N6	2				X					Use for MS/MSD -001
"	09:15	"	-N6D	2				X					-002
"	09:03	"	-N7	1					X				Use for MS/MSD -001
"	09:06	GW	-N7D	1						X			-002
						N/A							

Requested Analyses

Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)
Kathleen Alpoom 5/13/14 13:00			
Relinquished By: (Signature, Date/Time)	Received By: (Signature, Date/Time)	Relinquished By: (Signature, Date/Time)	Received at Laboratory: (Signature, Date/Time)
			05/14/14 0830

Requested Turnaround Time: Report due 6/18/14

☒ Routine ☐ Rush _____

Sample Receipt Remarks: ARRIVED AT 1.8°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.: 8758 4779 1162

FedEx 8758 4779 1298

Results To:

Greg Jungclaus
RES
PO Box 2078, MS 452-09
Carlsbad, NM 88221-2078
Phone: 575-234-8615 FAX: 575-234-6003
EDD:

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

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