LMS/BLU/S01116

40-8902

Data Validation Package

November 2016
Groundwater Sampling at the
Bluewater, New Mexico, Disposal Site

April 2017

U.S. DEPARTMENT OF ENERGY Legacy Management

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Data Validation Package
November 2016
Groundwater Sampling at the Bluewater,
New Mexico, Disposal Site

The U.S. Department of Energy (DOE) has prepared a Data Validation Package documenting the evaluation of groundwater monitoring data generated from the 2016 annual sampling event at the Bluewater, New Mexico, Disposal Site. **At your request, you are receiving a hard copy of the report.**

The report is also available for your review on the DOE Office of Legacy Management (LM) website, https://energy.gov/lm. From the LM website home page, select the LM SITES MAP. Then select Bluewater, New Mexico, Disposal Site from the LM SITE NAME list. The report will be available on the Bluewater Disposal Site page under Site Documents and Links.

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Sampling Event Summary

Site: Bluewater, New Mexico, Disposal Site

Sampling Period: November 15–16, 2016

Groundwater samples were collected from monitoring wells at the Bluewater, New Mexico, Disposal Site, as specified in the 1997 *Long-Term Surveillance Plan for the DOE Bluewater (UMTRCA Title II) Disposal Site Near Grants, New Mexico* (LTSP). Monitoring locations are shown in Attachment 1, Sampling and Analysis Work Order.

Sampling and analyses were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated). A duplicate sample was collected from location 14(SG). See Attachment 2, Trip Report for additional details.

Alluvium wells are completed in the alluvial sediments in the former channel of the Rio San Jose, which was covered by basalt lava flows known as the El Malpais, and are identified by the suffix (M). Bedrock wells are completed in the San Andres Limestone and Glorieta Sandstone hydrologic unit San Andres-Glorieta aquifer and are identified by the suffix (SG). Wells HMC-951 and OBS-3 are also completed in the San Andres-Glorieta aquifer.

The LTSP requires monitoring for molybdenum, selenium, uranium, and polychlorinated biphenyls (PCBs); PCB monitoring occurs only during November sampling events. This event included sampling for an expanded list of analytes to characterize the site aquifers and to support a regional groundwater investigation being conducted by the New Mexico Environment Department.

Time-concentration graphs for all locations are included in Attachment 3, Data Presentation. An assessment of anomalous data is included in Attachment 4.

Alluvium Monitoring Wells

Alluvium wells 21(M) and 22(M) were installed downgradient of point-of-compliance (POC) well T(M) in summer 2011; well 21(M) is located near the site boundary where alluvial groundwater leaves the site. These wells were installed in response to the exceedance of the alternate concentration limit (ACL) for uranium in well T(M) during previous sampling events.

Alluvium wells 20(M) and 23(M) were installed in summer 2012 to further characterize the alluvial aquifer. Well 20(M) is located near the west site boundary where alluvial groundwater enters the site. Well 23(M) is downgradient of well 21(M) and is located near the site entrance. Well T(M) was also scheduled for sampling but continues to be dry; the most recent sample was collected in May 2012 and had a uranium concentration of 0.55 milligram per liter (mg/L).

Analytical results for the required constituents for the alluvium wells are provided in Table 1. No ACLs were exceeded. However, the uranium concentration was 0.11 mg/L in well 21(M), and was 0.10 mg/L in point-of-exposure (POE) well X(M); these results exceed the Uranium Mill

Tailings Radiation Control Act (UMTRCA) maximum concentration limit (MCL) of 0.044 mg/L (40 CFR 192, Table 1) and the New Mexico drinking water standard of 0.03 mg/L. The selenium concentration at well 21(M) was 0.013 mg/L, which exceeds the MCL of 0.01 mg/L. Therefore, alluvial groundwater with elevated uranium and selenium is leaving the site. DOE is evaluating this occurrence in consultation with the U.S. Nuclear Regulatory Commission. PCBs have never been detected in any of the wells at the site and were not detected in any samples during this event.

Table 1. November 2016 Groundwater Monitoring Analytical Results for the Alluvium Wells

Well	Category	Molybdenum (mg/L) ACL= 0.10 mg/L	Selenium (mg/L) ACL=0.05 mg/L	Uranium (mg/L) ACL=0.44 mg/L
20(M)	Upgradient	0.0018	0.0044	0.011
21(M)	Downgradient	0.00082	0.013	0.11
22(M)	Downgradient	0.0032	0.0034	0.35
23(M)	Downgradient	0.0029	0.0031	0.024
E(M)	Background	ND	ND	0.000070
F(M)	POC	0.00083	0.00096	0.0066
T(M)	POC	Not Sampled	Not Sampled	Not Sampled
X(M)	POE	0.00069	0.0067	0.10
Y2(M)	PCBs	0.0014	0.0011	0.0044

Key: ACL = alternate concentration limit; mg/L = milligrams per liter; ND = not detected; PCBs = polychlorinated biphenyls; POC = point-of-compliance; POE = point-of-exposure

Bedrock Monitoring Wells

Bedrock wells 11(SG), 13(SG), 14(SG), 15(SG), 16(SG), and 18(SG) were installed in summer 2012 to gain a better understanding of groundwater flow and extent of contamination in the San Andres-Glorieta aquifer at the site, and because a nearby offsite private well (HMC-951) completed in the same aquifer indicated elevated uranium concentrations. There were no bedrock wells in the south portion of the site prior to this well construction project. Wells 11(SG) and 14(SG) are considered to be crossgradient of the disposal cells, and all of the other new wells are downgradient of the cells. Well 16(SG) was installed between POC wells OBS-3 and S(SG) because of the poor condition of those wells (their well screens are highly corroded). The results from wells OBS-3 and S(SG) are not considered representative of the aquifer but continue to be sampled in accordance with the LTSP.

Bedrock wells I(SG) and L(SG) were completed with open-hole construction through the entire thickness of the San Andres Limestone and Glorieta Sandstone formations. All of the new San Andres-Glorieta aquifer wells onsite, except well 16(SG), are screened in the upper 50 feet of the San Andres Limestone, as are most San Andres-Glorieta aquifer wells in the region, because this is the most productive zone of the aquifer. Well 16(SG) is screened in the Glorieta Sandstone because the San Andres Limestone is dry at that location. In response to questions by New Mexico Environment Department about the possibility of stratification of contamination within the aquifer, downhole conductivity was measured in wells I(SG) and L(SG) in spring 2013. No change in conductivity with depth was observed in background well L(SG). However, two zones of different conductivities were noted in POE well I(SG). During this sampling event,

a low-flow sample was collected from well I(SG) at a depth of 265 feet in the zone of highest conductivity.

Offsite private well HMC-951, located near the site entrance and used only for monitoring purposes, was sampled by DOE during this event. A blockage near the bottom of the well casing prevented installation of a low-flow sampling pump in the open hole portion of the well. Consequently, a sample was collected using a submersible pump inside the well casing after three columns of water were purged from the well.

Analytical results for the required constituents in bedrock wells are provided in Table 2. No ACLs were exceeded. However, the uranium concentrations in downgradient wells 13(SG) and 18(SG), located along the site boundary, continue to exceed the UMTRCA MCL and the New Mexico drinking water standard. The uranium concentration at the sampled depth in POE well I(SG) also exceeded these standards. The uranium concentration in HMC-951 was above the New Mexico drinking water standard. Therefore, San Andres-Glorieta aquifer groundwater with elevated uranium is leaving the site. DOE is evaluating this occurrence in consultation with the U.S. Nuclear Regulatory Commission.

Table 2. November 2016 Groundwater Monitoring Analytical Results for the Bedrock Wells

Well	Category	Selenium (mg/L) ACL = 0.05 mg/L	Uranium (mg/L) ACL = 2.15 mg/L
11(SG)	Downgradient	ND	0.010
13(SG)	Downgradient	0.0068	0.096
14(SG)	Upgradient	0.0032	0.12
15(SG)	Downgradient	ND	0.061
16(SG)	Downgradient	0.015	1.2
18(SG)	Downgradient	0.0067	0.19
HMC-951	Offsite	0.0058	0.032
I(SG) 265 feet	POE	0.0070	0.29
L(SG)	Background	ND	0.0030
OBS-3	POC	ND	0.0075
S(SG)	POC	0.0070	0.41

Key: ACL = alternate concentration limit; mg/L = milligrams per liter; ND = not detected
POC = point-of-compliance; POE = point-of-exposure

Richard K. Johnson, Site Lead
Navarro Research and Engineering, Inc.

4/19/17
Date

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Bluewater, New Mexico	**Date(s) of Water Sampling**	November 15–16, 2016
Date(s) of Verification	February 11, 2017	**Name of Verifier**	Gretchen Baer

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Program Directive BLU-2014-01. Work Order letter dated October 4, 2016.
2. Were the sampling locations specified in the planning documents sampled?	No	Location T(M) was dry and not sampled.
3. Were field equipment calibrations conducted as specified in the above-named documents?	Yes	
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Were wells categorized correctly?	Yes	
7. Were the following conditions met when purging a Category I well:		
Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements meet criteria prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	

Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	One duplicate was collected at 14(SG).
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	All samples were collected with dedicated equipment.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	No VOC samples were collected.
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	Water levels were measured in all sampled wells.

Laboratory Performance Assessment

General Information

Report Number (RIN):	16118138
Sample Event:	November 15–16, 2016
Site(s):	Bluewater, New Mexico
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1611353
Analysis:	Metals, Organics, and Wet Chemistry
Validator:	Gretchen Baer
Review Date:	February 11, 2017

This validation was performed according "Standard Practice for Validation of Environmental Data" found in Appendix A of the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/ PRO/S04351, continually updated, http://energy.gov/lm/downloads/sampling-and-analysis-plan-us-department-energy-office-legacy-management-sites). The procedure was applied at Level 3, Data Validation.

This validation includes the evaluation of data quality indicators (DQIs) associated with the data. DQIs are the quantitative and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. Indicators of data quality include the analysis of laboratory control samples to assess accuracy; duplicates and replicates to assess precision; and interference check samples to assess bias (see Figure 1 through Figure 4, Data Validation Worksheets). The comparability, completeness, and sensitivity of the DQIs are also evaluated in the sections to follow.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Alkalinity, Bicarbonate	WCH-A-003	EPA 310.1/ SM 2320B	EPA 310.1/ SM 2320B
Alkalinity, Carbonate	WCH-A-003	EPA 310.1/ SM 2320B	EPA 310.1/ SM 2320B
Arsenic, Molybdenum, Selenium, Uranium	LMM-02	SW-846 3005A	SW-846 6020
Calcium, Magnesium, Potassium, Silica, Sodium	LMM-01	SW-846 3005A	SW-846 6010B
Chloride, Sulfate	MIS-A-045	SW-846 9056	SW-846 9056
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Polychlorinated Biphenyls (PCBs)	PEP-A-006	SW-846 3520C/3665A	SW-846 8082
Total Dissolved Solids (TDS)	WCH-A-033	MCAWW 160.1	MCAWW 160.1

Data Qualifier Summary

None of the sample results required additional qualification.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 11 water samples on November 20, 2016, accompanied by a Chain of Custody form. A copy of the air bill was included in the receiving documentation. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody form was complete with no errors or omissions, with one exception. One bottle for PCB analysis was listed on the COC form for location Y2(M) rather than the three bottles received.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced coolers between 1.1 and 1.6 °C, which is acceptable. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

A method detection limit (MDL) is defined in 40 CFR 136 as the minimum concentration of an analyte that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDLs reported by the laboratory were compared to the required MDLs to assess the sensitivity of the analyses and found to be in compliance with contractual requirements.

The practical quantitation limit (PQL) for an analyte, defined as 5 times the MDL, is the lowest concentration that can be quantitatively measured, and is used when evaluating laboratory method performance in the sections below.

Laboratory Instrument Calibration

Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for the analytes of interest. Initial Calibration Verification (ICV) demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing Calibration Verification (CCV) demonstrates that the initial calibration is still valid by checking the performance of the instrument on a continuing basis. Initial and continuing calibration standards must be prepared from independent sources to ensure the validity of the calibration. All laboratory instrument calibrations and calibration verifications were performed correctly in accordance with the cited methods.

Method MCAWW 160.1
There are no initial or continuing calibration requirements associated with the total dissolved solids method.

Method EPA 353.2
Calibrations for nitrate + nitrite as N were performed using seven calibration standards on November 22, 2016. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration check results were within the acceptance criteria.

Method SW-846 6010B
Calibrations for calcium, magnesium, potassium, silica, and sodium were performed on December 6, 2016, using three calibration standards. The correlation coefficient values were greater than 0.995. The absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 6020A
Calibrations were performed for arsenic, molybdenum, selenium, and uranium on December 6, 2016, using three calibration standards. The calibration curve correlation coefficient values were greater than 0.995. The absolute values of the calibration curve intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 8082
The initial calibrations for PCBs were performed using five calibration standards on September 11, 2016. Calibration curves were established using the calibration factor (CF) approach. The relative standard deviations for the CFs were less than 20%. Initial and continuing calibration verification checks were made at the required frequency. All checks met the acceptance criteria.

Method SW-846 9056
Calibrations for chloride and sulfate were performed using seven calibration standards on November 18, 2016. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks met the acceptance criteria.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where a blank concentration exceeds the

MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

Metals and Wet Chemistry
All method blank and calibration blank results associated with the samples were below the MDL for all analytes.

Organics
The method blank results were below the MDL for all target compounds.

Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples are analyzed to verify the instrumental interelement and background correction factors and assess any bias due to interelement interferences. Interference check samples were analyzed at the required frequency with all results meeting the acceptance criteria.

Matrix Spike Analysis

Matrix spikes are aliquots of environmental samples to which a known concentration of an analyte has been added before analysis. Matrix spike and matrix spike duplicate (MS/MSD) samples are used to measure method performance in the sample matrix. The MS/MSD data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for results that are greater than 5 times the PQL should be less than 20%. For results that are less than 5 times the PQL, the range should be no greater than the PQL. All replicate results met these criteria, demonstrating acceptable precision.

Laboratory Control Sample

Laboratory control samples (LCSs) were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. All LCS results were acceptable for all analyses.

Metals Serial Dilution

Serial dilutions were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Serial dilution data are evaluated when the concentration of the undiluted sample is greater than 50 times the MDL. All evaluated serial dilution data were acceptable.

PCB Surrogate Recoveries

Laboratory performance for individual samples is established by monitoring the recovery of surrogate spikes. The PCB surrogate recoveries were within the acceptance ranges for all samples.

Completeness

Results were reported in the correct units for all analytes requested using contract-required laboratory qualifiers.

Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. All peak integrations were satisfactory.

Anion/Cation Balance

Environmental water should be electrically neutral. Expressed in milliequivalents per liter (meq/L), the sum of the anions should equal the sum of the cations. The anion/cation balance is calculated as the difference between the anions and cations, divided by the sum of the anions and cations. The anion/cation balance can be used to identify potential errors in the analytical results. Typically, a charge balance less than or equal to 10% is considered acceptable. When a charge balance is greater than 10%, the associated data are closely examined for error. If no errors are found, the results are considered to be acceptable. Table 4 shows the total anion and cation results from this event and the charge balance. (The alkalinity results measured by the laboratory were used in the calculation.) All charge balances were below 10%.

Table 4. Comparison of Major Anions and Cations in Groundwater Samples

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance
11(SG)	28.3	27.8	0.8%
13(SG)	17.3	17.4	0.5%
14(SG)	23.1	22.5	1.3%
15(SG)	21.4	20.7	1.6%
16(SG)	46.6	43.8	3.1%
18(SG)	19.9	19.4	1.4%
20(M)	14.6	14.9	1.0%
21(M)	20.3	19.1	3.1%
22(M)	12.7	13.7	3.6%
23(M)	9.2	9.0	0.9%
E(M)	15.1	14.5	1.9%
F(M)	6.1	5.9	1.9%
HMC-951	15.7	15.1	1.9%
I(SG)	35.8	33.3	3.5%
L(SG)	30.3	28.2	3.5%
OBS-3	33.8	30.1	5.8%
S(SG)	43.0	40.3	3.2%
X(M)	19.2	18.4	2.0%
Y2(M)	6.8	6.8	0.3%

Electronic Data Deliverable (EDD) File

The EDD file arrived on December, 15, 2016. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

SAMPLE MANAGEMENT SYSTEM

General Data Validation Report

RIN: 16118138 Lab Code: PAR Validator: Gretchen Baer Validation Date: 2/1/2017

Project: Bluewater Analysis Type: ☑ Metals ☑ General Chem ☐ Rad ☑ Organics

# of Samples: 21 Matrix: WATER Requested Analysis Completed: Yes

Chain of Custody

Present: OK Signed: OK Dated: OK

Sample

Integrity: OK Preservation: OK Temperature: OK

Select Quality Parameters

☑ Holding Times	All analyses were completed within the applicable holding times.
☑ Detection Limits	There are 0 detection limit failures.
☐ Field/Trip Blanks	
☑ Field Duplicates	There was 1 duplicate evaluated.

Figure 1. General Validation Worksheet

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 16118138 **Project:** Bluewater **Lab Code:** PAR **Validation Date:** 2/1/2017

LCS Recovery: All LCS recoveries were within the laboratory acceptance limits.

Method Blank(s): All method blanks results were below the method detection limit.

MS/MSD Recovery: All MS/MSD recoveries were within the laboratory acceptance limits.

Surrogate Recovery: All surrogate recoveries were within the laboratory acceptance limits.

Figure 2. Organics Worksheet

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 16118138 **Lab Code:** PAR **Date Due:** 12/16/2016

Matrix: Water **Site Code:** BLU01 **Date Completed:** 12/15/2016

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	12/06/2016	0.0620	0.9981	OK	OK	OK	97.0	96.0	97.0	0.0	98.0	0.0	99.0
Magnesium	ICP/ES	12/06/2016	0.0240	0.9991	OK	OK	OK	97.0	96.0	96.0	0.0	95.0	0.0	108.0
Potassium	ICP/ES	12/06/2016	0.0240	0.9995	OK	OK	OK	98.0	98.0	99.0	1.0		2.0	104.0
Silicon	ICP/ES	12/06/2016	0.0480	0.9996	OK	OK	OK	101.0			1.0	104.0	3.0	96.0
Sodium	ICP/ES	12/06/2016	0.0150	1.0000	OK	OK	OK	98.0	96.0	99.0	1.0		1.0	105.0
Arsenic	ICP/MS	12/07/2016	0.0000	1.0000	OK	OK	OK	102.0	102.0	98.0	5.0	99.0		92.0
Molybdenum	ICP/MS	12/07/2016	0.0000	1.0000	OK	OK	OK	96.0	96.0	93.0	3.0	104.0		92.0
Selenium	ICP/MS	12/07/2016	0.0000	0.9999	OK	OK	OK	99.0	99.0	96.0	4.0	98.0		102.0
Uranium	ICP/MS	12/07/2016	0.0000	1.0000	OK	OK	OK	99.0	104.0	99.0	3.0	99.0	0.0	100.0
Uranium	ICP/MS	12/08/2016	0.0000	0.9999	OK	OK						99.0		100.0

Figure 3. Metals Worksheet

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 16118138 **Lab Code:** PAR **Date Due:** 12/16/2016

Matrix: Water **Site Code:** BLU01 **Date Completed:** 12/15/2016

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
Alkalinity, Carbonate (CO3) as	11/28/2016					OK					
ALKALINITY, Total as CaCO3	11/28/2016					OK	99				
Bicarbonate	11/28/2016									2	
Bicarbonate	11/28/2016									4	
CHLORIDE	11/18/2016	-0.041	1.0000								
CHLORIDE	11/30/2016			OK	OK	OK	96				
CHLORIDE	12/01/2016			OK	OK			85	88	2	
Nitrate+Nitrite as N	12/07/2016	0.003	0.9979	OK	OK	OK	101	91	94	2	
Sulfate	11/18/2016	0.025	1.0000								
SULFATE	11/30/2016			OK	OK	OK	100				
SULFATE	12/01/2016			OK	OK			94	100	2	
TOTAL DISSOLVED SOLIDS	11/23/2016					OK	97			0	
TOTAL DISSOLVED SOLIDS	11/23/2016									2	

Figure 4. Wet Chemistry Worksheet

Sampling Quality Control Assessment

The following information summarizes and assesses quality control for this sampling event.

Sampling Protocol

Sample results for all wells were qualified with an "F" flag, indicating the wells were purged and sampled using the low-flow method and Category I criteria, with the following exceptions:

- As per Program Directive BLU-2014-01, wells HMC-951, OBS-3, and S(SG) were not sampled using low-flow criteria. These wells were sampled using high-volume and high-flow submersible pumps.
- Wells 23(M) and E(M) were purged and sampled using Category II or III criteria. For these wells, the water level drawdown during the purge did not meet the Category I criterion because these wells produced water at a rate less than the minimum low-flow purging rate. Therefore, these wells were classified as Category II or III. The sample results for these wells were qualified with a "Q" flag (qualitative), indicating the samples were not collected under the optimal conditions of the Category I stability criteria.

Equipment Blank Assessment

No equipment blanks were taken. All samples were collected using dedicated equipment that did not require equipment blanks.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from location 14(SG) (see Figure 5). The relative percent difference (RPD) for duplicate results that are greater than 5 times the PQL should be less than 20%. The RPD is not used to evaluate results that are less than 5 times the PQL. For these results, the range should be no greater than the PQL. The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 16118138 Lab Code: PAR Project: Bluewater Validation Date: 2/1/2017

Duplicate: 2811 Sample: 14(SG)

	Sample				Duplicate						
Analyte	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution	RPD	RER	Units
Alkalinity, Carbonate (CO3) as CaCO3	20	U		1	20	U		1			MG/L
Arsenic	0.0022			10	0.0021			10	4.65		MG/L
Bicarbonate	390			1	380			1	2.60		MG/L
Calcium	150			1	150			1	0		MG/L
CHLORIDE	150			25	150			20	0		MG/L
Magnesium	59			1	58			1	1.71		MG/L
Molybdenum	0.0023			10	0.0024			10	4.26		MG/L
Nitrate+Nitrite as N	0.34			10	0.35			1			MG/L
Potassium	5.8			1	5.9			1	1.71		MG/L
Selenium	0.0032			10	0.0029			10			MG/L
Silica	23			1	23			1	0		MG/L
Silicon	11			1	11			1	0		MG/L
Sodium	230			1	240			1	4.26		MG/L
SULFATE	530			25	550			20	3.70		MG/L
TOTAL DISSOLVED SOLIDS	1400			1	1300			1	7.41		MG/L
Uranium	0.12			10	0.12			10	0		MG/L

Figure 5. Field Duplicates Worksheet

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the environmental database reports are defined on the last page of each report. All data in this package are considered validated and available for use.

Laboratory Coordinator: Stephen Donivan — Date: 4-6-17

Data Validation Lead: Gretchen Baer — Date: 4/6/17

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Attachment 1

Sampling and Analysis Work Order

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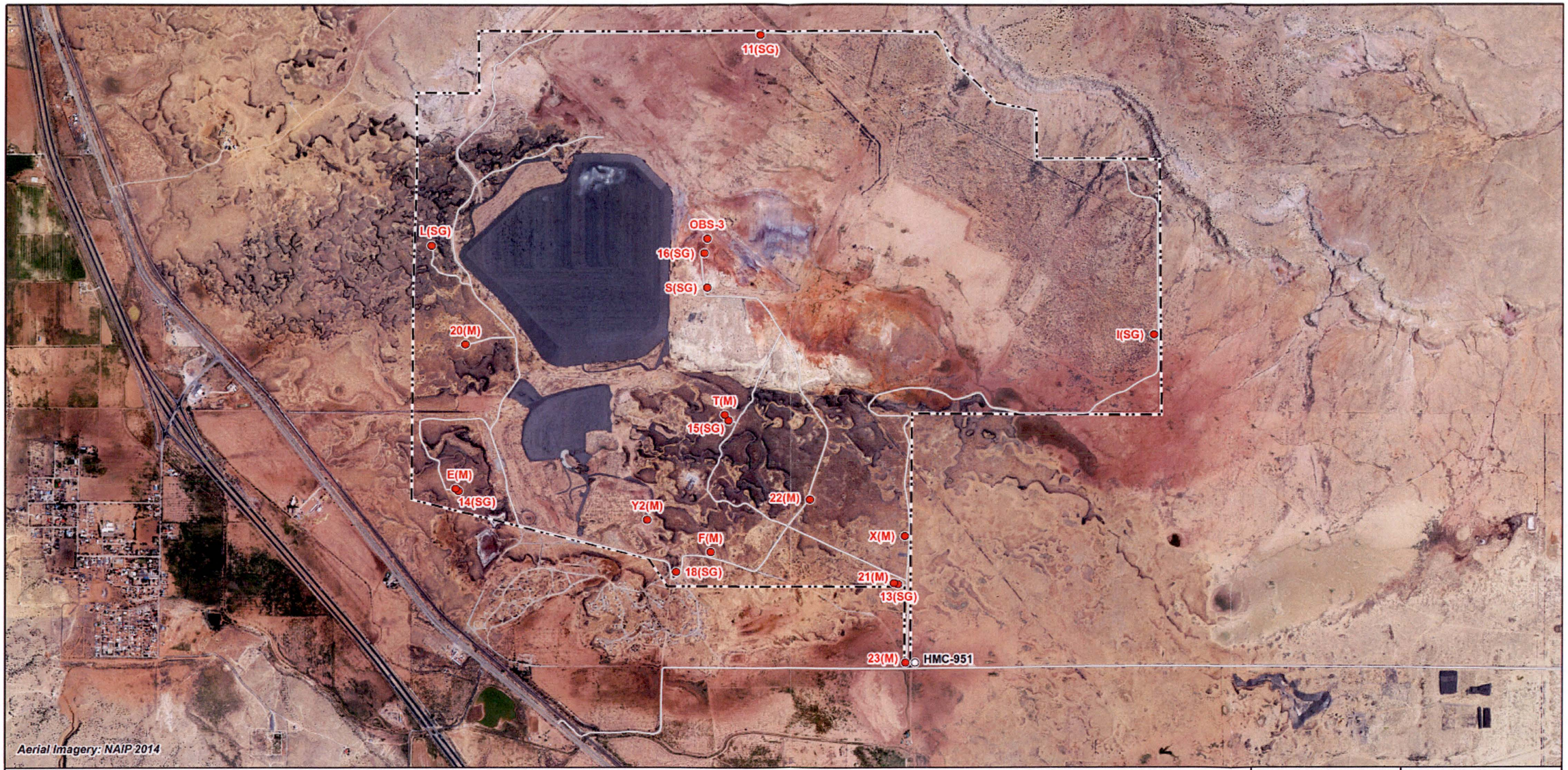

Bluewater, New Mexico, Disposal Site, Planned Sample Locations Map

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October 4, 2016

Task Assignment 103
Control Number 16-0998

U.S. Department of Energy
Office of Legacy Management
ATTN: Richard Bush
Site Manager
2597 Legacy Way
Grand Junction, CO 81503

SUBJECT: Contract No. DE-LM0000421, Navarro Research & Engineering, Inc. (Navarro)
Task Assignment 103 LTS&M-UMTRCA Title I and II Sites, D&D Sites, Other Sites and Other
November 2016 Environmental Sampling at the Bluewater, New Mexico, Disposal Site

REFERENCE: Task Assignment 103, 1-103-1-03-203, Bluewater, New Mexico, Disposal Site

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at the Bluewater, New Mexico, Disposal Site. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Bluewater site. Water quality data will be collected from this site as part of the routine environmental sampling currently scheduled to begin the week of November 14, 2016.

The following lists show the monitoring and private wells (with zone of completion) scheduled to be sampled during this event.

MONITORING WELLS

E(M) Al	T(M) Al	S(SG) Sg	11(SG) Sg	14(SG) Sg	16(SG) Sg	20(M) Al	22(M) Al
Y2(M) Al	X(M) Al	OBS-3 Sg	13(SG) Sg	15(SG) Sg	18(SG) Sg	21(M) Al	23(M) Al
F(M) Al	L(SG) Sg	I(SG) Sg					

PRIVATE WELL

HMC-951

*NOTE: Al = alluvium; Sg = San Andres-Glorieta

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*. Access agreements are being reviewed and are expected to be complete by the beginning of fieldwork.

Please contact me at (970) 248-6022 if you have any questions.

Sincerely,

Richard K. Johnson
LMS Site Lead

RKJ/lcg/csa

Enclosures

cc: (electronic)
Christina Pennal, DOE
Jeff Carman, Navarro
Beverly Cook, Navarro
Steve Donivan, Navarro
Lauren Goodknight, Navarro
Richard Johnson, Navarro
Sam Martuzky, Navarro
Diana Osborne, Navarro
Document Determination
EDD Delivery
rc-grand.junction
File: BLU 0400.02

Constituent Sampling Breakdown

Site	Bluewater				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	40	0			
Field Measurements					
Alkalinity	X				
Dissolved Oxygen	X				
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)					
Arsenic	X		0.0001	SW-846 6020	LMM-02
Bicarbonate	X		10	SM2320 B	WCH-A-003
Calcium	X		5	SW-846 6010	LMM-01
Carbonate	X		10	SM2320 B	WCH-A-004
Chloride	X		0.5	SW-846 9056	WCH-A-039
Lead					
Magnesium	X		5	SW-846 6010	LMM-01
Manganese					
Molybdenum	X		0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO3+NO2)-N	X		0.05	EPA 353.1	WCH-A-022
Oxygen-18					
PCBs	E(M), Y2(M), F(M), T(M), and X(M) only (November only)		0.0005	SW-846 8082	PEP-A-006
Potassium	X		1	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium	X		0.0001	SW-846 6020	LMM-02
Silica	X		0.1	SW-846 6010	LMM-01
Sodium	X		1	SW-846 6010	LMM-01
Strontium					
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	X		10	SM2540 C	WCH-A-033
Tritium					
Uranium	X		0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	16	0			

Note: All analyte samples are considered unfiltered unless stated otherwise. All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

Sampling Frequencies for Locations at Bluewater, New Mexico

Location ID	Quarterly	Semiannually	Annually	Triennially	Not Sampled	Notes
Monitoring Wells						
E(M)		X				PCBs in November only
Y2(M)		X				PCBs in November only
F(M)		X				PCBs in November only
T(M)		X				PCBs in November only
X(M)		X				
L(SG)		X				
S(SG)		X				
OBS-3		X				
I(SG)		X				
11(SG)		X				
13(SG)		X				
14(SG)		X				
15(SG)		X				
16(SG)		X				
18(SG)		X				
20(M)		X				
21(M)		X				
22(M)		X				
23(M)		X				
Private Wells						
HMC-951		X				

Sampling conducted in May and November.

Attachment 2

Trip Report

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memo

NAVARRO

To: Dick Johnson, Navarro

From: David Atkinson, Navarro

Date: January 25, 2017

CC: Richard Bush, DOE
Steve Donivan, Navarro
EDD Delivery

Re: Sampling Trip Report

Site: Bluewater, New Mexico, Disposal Site

Dates of Event: November 15–16, 2016

Team Members: David Atkinson, Rob Rice, Jeff Price, and Samantha Tigar, Navarro

Number of Locations Sampled: Samples were collected at 19 of 20 planned locations; 1 duplicate sample was collected.

Locations Not Sampled/Reason: Location T(M) was not sampled because it was dry.

Location Specific Information: Locations E(M), HMC-951, OBS-3, S(SG), and 23(M) were filtered because the turbidity of the collected water was above 10 NTUs.

Quality Control Sample Cross Reference: A summary of the quality control sample collected is shown in Table 1.

Table 1. Quality Control Sample Summary

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2811	OMR 079	14(SG)	Duplicate	Ground Water

Requisition Index Number (RIN) Assigned: All samples were assigned to RIN 16118138. Field data sheets can be found in \\crow\RAApps\SMS\16118138\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Farmington, New Mexico, to ALS Laboratory in Fort Collins, Colorado, on November 17, 2016.

Water Level Measurements: Water levels were measured in all sampled wells prior to sampling.

Data Loggers: Dataloggers were not downloaded during this trip.

Well Inspection Summary: No issues were identified.

Sampling Method: Samples were collected according to the *Sampling and Analysis Plan (SAP) for the U. S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351, continually updated) and Program Directive BLU-2014-01 for wells with submersible pumps [S(SG), OBS-3, and HMC-951] as directed by site lead.

Field Variance: None.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory/DOE: None.

Institutional Controls:

Fences, Gates, and Locks: All gates were left as found on arrival.
Signs: No issues were observed.
Trespassing/Site Disturbances: None observed.
Disposal Cell/Drainage Structure Integrity: No issues were observed.

Safety Issues: None observed.

Access Issues: None observed.

General Information: Nothing to note.

Immediate Actions Taken: None.

Future Actions Required or Suggested: None.

Attachment 3

Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 11(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	265 - 295	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	265 - 295	457		F	#		
Arsenic	mg/L	11/16/2016	N001	265 - 295	0.00071	J	F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	265 - 295	460		F	#	20	
Calcium	mg/L	11/16/2016	N001	265 - 295	190		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	265 - 295	190		F	#	5	
Dissolved Oxygen	mg/L	11/16/2016	N001	265 - 295	0.76		F	#		
Magnesium	mg/L	11/16/2016	N001	265 - 295	66		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	265 - 295	0.0015	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	265 - 295	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/16/2016	N001	265 - 295	-106.1		F	#		
pH	s.u.	11/16/2016	N001	265 - 295	6.79		F	#		
Potassium	mg/L	11/16/2016	N001	265 - 295	12		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	265 - 295	0.00066	U	F	#	0.00066	
Silica	mg/L	11/16/2016	N001	265 - 295	18		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	265 - 295	8.6		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	265 - 295	290		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	265 - 295	2441		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 11(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	265	-	295	660		F	#	12	
Temperature	C	11/16/2016	N001	265	-	295	15.51		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	265	-	295	1700		F	#	40	
Turbidity	NTU	11/16/2016	N001	265	-	295	1.22		F	#		
Uranium	mg/L	11/16/2016	N001	265	-	295	0.01		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 13(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/15/2016	N001	270 - 300	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/15/2016	N001	270 - 300	275		F	#		
Arsenic	mg/L	11/15/2016	N001	270 - 300	0.0036		F	#	0.00012	
Bicarbonate	mg/L	11/15/2016	N001	270 - 300	290		F	#	20	
Calcium	mg/L	11/15/2016	N001	270 - 300	170		F	#	0.024	
Chloride	mg/L	11/15/2016	N001	270 - 300	93		F	#	4	
Dissolved Oxygen	mg/L	11/15/2016	N001	270 - 300	3.2		F	#		
Magnesium	mg/L	11/15/2016	N001	270 - 300	49		F	#	0.03	
Molybdenum	mg/L	11/15/2016	N001	270 - 300	0.0013	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2016	N001	270 - 300	4.4		F	#	0.5	
Oxidation Reduction Potential	mV	11/15/2016	N001	270 - 300	56.3		F	#		
pH	s.u.	11/15/2016	N001	270 - 300	6.89		F	#		
Potassium	mg/L	11/15/2016	N001	270 - 300	5.9		F	#	0.052	
Selenium	mg/L	11/15/2016	N001	270 - 300	0.0068		F	#	0.00066	
Silica	mg/L	11/15/2016	N001	270 - 300	17		F	#	0.021	
Silicon	mg/L	11/15/2016	N001	270 - 300	7.8		F	#	0.0097	
Sodium	mg/L	11/15/2016	N001	270 - 300	110		F	#	0.047	
Specific Conductance	umhos /cm	11/15/2016	N001	270 - 300	1521		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 13(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/15/2016	N001	270 - 300	410		F	#	10	
Temperature	C	11/15/2016	N001	270 - 300	15.71		F	#		
Total Dissolved Solids	mg/L	11/15/2016	N001	270 - 300	1000		F	#	40	
Turbidity	NTU	11/15/2016	N001	270 - 300	0.77		F	#		
Uranium	mg/L	11/15/2016	N001	270 - 300	0.096		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 14(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	285 - 315	20	U	F	#	20	
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N002	285 - 315	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	285 - 315	397		F	#		
Arsenic	mg/L	11/16/2016	N001	285 - 315	0.0022		F	#	0.00012	
Arsenic	mg/L	11/16/2016	N002	285 - 315	0.0021		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	285 - 315	390		F	#	20	
Bicarbonate	mg/L	11/16/2016	N002	285 - 315	380		F	#	20	
Calcium	mg/L	11/16/2016	N001	285 - 315	150		F	#	0.024	
Calcium	mg/L	11/16/2016	N002	285 - 315	150		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	285 - 315	150		F	#	5	
Chloride	mg/L	11/16/2016	N002	285 - 315	150		F	#	4	
Dissolved Oxygen	mg/L	11/16/2016	N001	285 - 315	1.22		F	#		
Magnesium	mg/L	11/16/2016	N001	285 - 315	59		F	#	0.03	
Magnesium	mg/L	11/16/2016	N002	285 - 315	58		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	285 - 315	0.0023		F	#	0.00032	
Molybdenum	mg/L	11/16/2016	N002	285 - 315	0.0024		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	285 - 315	0.34		F	#	0.1	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N002	285 - 315	0.35		F	#	0.01	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 14(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Oxidation Reduction Potential	mV	11/16/2016	N001	285 - 315	45.5		F	#		
pH	s.u.	11/16/2016	N001	285 - 315	7		F	#		
Potassium	mg/L	11/16/2016	N001	285 - 315	5.8		F	#	0.052	
Potassium	mg/L	11/16/2016	N002	285 - 315	5.9		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	285 - 315	0.0032		F	#	0.00066	
Selenium	mg/L	11/16/2016	N002	285 - 315	0.0029		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	285 - 315	23		F	#	0.021	
Silica	mg/L	11/16/2016	N002	285 - 315	23		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	285 - 315	11		F	#	0.0097	
Silicon	mg/L	11/16/2016	N002	285 - 315	11		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	285 - 315	230		F	#	0.047	
Sodium	mg/L	11/16/2016	N002	285 - 315	240		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	285 - 315	1970		F	#		
Sulfate	mg/L	11/16/2016	N001	285 - 315	530		F	#	12	
Sulfate	mg/L	11/16/2016	N002	285 - 315	550		F	#	10	
Temperature	C	11/16/2016	N001	285 - 315	13.43		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	285 - 315	1400		F	#	40	
Total Dissolved Solids	mg/L	11/16/2016	N002	285 - 315	1300		F	#	40	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 14(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Turbidity	NTU	11/16/2016	N001	285 - 315	1.44		F	#		
Uranium	mg/L	11/16/2016	N001	285 - 315	0.12		F	#	0.000012	
Uranium	mg/L	11/16/2016	N002	285 - 315	0.12		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 15(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	341 - 371	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	341 - 371	355		F	#		
Arsenic	mg/L	11/16/2016	N001	341 - 371	0.0042		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	341 - 371	360		F	#	20	
Calcium	mg/L	11/16/2016	N001	341 - 371	110		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	341 - 371	170		F	#	5	
Dissolved Oxygen	mg/L	11/16/2016	N001	341 - 371	1.47		F	#		
Magnesium	mg/L	11/16/2016	N001	341 - 371	40		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	341 - 371	0.0042		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	341 - 371	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/16/2016	N001	341 - 371	-70.8		F	#		
pH	s.u.	11/16/2016	N001	341 - 371	7.11		F	#		
Potassium	mg/L	11/16/2016	N001	341 - 371	6.4		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	341 - 371	0.00066	U	F	#	0.00066	
Silica	mg/L	11/16/2016	N001	341 - 371	21		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	341 - 371	9.9		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	341 - 371	270		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	341 - 371	1932		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 15(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	341	-	371	450		F	#	12	
Temperature	C	11/16/2016	N001	341	-	371	16.64		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	341	-	371	1300		F	#	40	
Turbidity	NTU	11/16/2016	N001	341	-	371	6.81		F	#		
Uranium	mg/L	11/16/2016	N001	341	-	371	0.061		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 16(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	195 - 225	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	195 - 225	384		F	#		
Arsenic	mg/L	11/16/2016	N001	195 - 225	0.0005	J	F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	195 - 225	420		F	#	20	
Calcium	mg/L	11/16/2016	N001	195 - 225	310		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	195 - 225	460		F	#	10	
Dissolved Oxygen	mg/L	11/16/2016	N001	195 - 225	0.59		F	#		
Magnesium	mg/L	11/16/2016	N001	195 - 225	150		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	195 - 225	0.0022		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	195 - 225	3.8		F	#	0.5	
Oxidation Reduction Potential	mV	11/16/2016	N001	195 - 225	213		F	#		
pH	s.u.	11/16/2016	N001	195 - 225	6.57		F	#		
Potassium	mg/L	11/16/2016	N001	195 - 225	13		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	195 - 225	0.015		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	195 - 225	21		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	195 - 225	9.8		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	195 - 225	360		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	195 - 225	3833		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 16(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	195	-	225	1200		F	#	25	
Temperature	C	11/16/2016	N001	195	-	225	13.36		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	195	-	225	2800		F	#	80	
Turbidity	NTU	11/16/2016	N001	195	-	225	1.45		F	#		
Uranium	mg/L	11/16/2016	N001	195	-	225	1.2		F	#	0.00012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 18(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	260 - 290	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	260 - 290	315		F	#		
Arsenic	mg/L	11/16/2016	N001	260 - 290	0.0017		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	260 - 290	340		F	#	20	
Calcium	mg/L	11/16/2016	N001	260 - 290	180		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	260 - 290	110		F	#	4	
Dissolved Oxygen	mg/L	11/16/2016	N001	260 - 290	1.48		F	#		
Magnesium	mg/L	11/16/2016	N001	260 - 290	55		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	260 - 290	0.0016	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	260 - 290	3.2		F	#	0.1	
Oxidation Reduction Potential	mV	11/16/2016	N001	260 - 290	106.9		F	#		
pH	s.u.	11/16/2016	N001	260 - 290	6.85		F	#		
Potassium	mg/L	11/16/2016	N001	260 - 290	7.4		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	260 - 290	0.0067		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	260 - 290	17		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	260 - 290	8.1		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	260 - 290	130		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	260 - 290	1690		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 18(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	260	-	290	470		F	#	10	
Temperature	C	11/16/2016	N001	260	-	290	14.58		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	260	-	290	1200		F	#	40	
Turbidity	NTU	11/16/2016	N001	260	-	290	0.81		F	#		
Uranium	mg/L	11/16/2016	N001	260	-	290	0.19		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 20(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	110 - 125	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	110 - 125	243		F	#		
Arsenic	mg/L	11/16/2016	N001	110 - 125	0.011		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	110 - 125	240		F	#	20	
Calcium	mg/L	11/16/2016	N001	110 - 125	150		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	110 - 125	58		F	#	4	
Dissolved Oxygen	mg/L	11/16/2016	N001	110 - 125	6.87		F	#		
Magnesium	mg/L	11/16/2016	N001	110 - 125	38		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	110 - 125	0.0018	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	110 - 125	3.1		F	#	0.1	
Oxidation Reduction Potential	mV	11/16/2016	N001	110 - 125	61.4		F	#		
pH	s.u.	11/16/2016	N001	110 - 125	7.01		F	#		
Potassium	mg/L	11/16/2016	N001	110 - 125	4.4		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	110 - 125	0.0044		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	110 - 125	27		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	110 - 125	13		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	110 - 125	95		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	110 - 125	1296		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 20(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	110 - 125	380		F	#	10	
Temperature	C	11/16/2016	N001	110 - 125	13.87		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	110 - 125	900		F	#	40	
Turbidity	NTU	11/16/2016	N001	110 - 125	0.74		F	#		
Uranium	mg/L	11/16/2016	N001	110 - 125	0.011		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 21(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/15/2016	N001	139.6 - 149.6	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/15/2016	N001	139.6 - 149.6	262		F	#		
Arsenic	mg/L	11/15/2016	N001	139.6 - 149.6	0.0025		F	#	0.00012	
Bicarbonate	mg/L	11/15/2016	N001	139.6 - 149.6	270		F	#	20	
Calcium	mg/L	11/15/2016	N001	139.6 - 149.6	150		F	#	0.024	
Chloride	mg/L	11/15/2016	N001	139.6 - 149.6	140		F	#	5	
Dissolved Oxygen	mg/L	11/15/2016	N001	139.6 - 149.6	4.93		F	#		
Magnesium	mg/L	11/15/2016	N001	139.6 - 149.6	39		F	#	0.03	
Molybdenum	mg/L	11/15/2016	N001	139.6 - 149.6	0.00082	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2016	N001	139.6 - 149.6	14		F	#	0.5	
Oxidation Reduction Potential	mV	11/15/2016	N001	139.6 - 149.6	97.6		F	#		
pH	s.u.	11/15/2016	N001	139.6 - 149.6	7.17		F	#		
Potassium	mg/L	11/15/2016	N001	139.6 - 149.6	5.7		F	#	0.052	
Selenium	mg/L	11/15/2016	N001	139.6 - 149.6	0.013		F	#	0.00066	
Silica	mg/L	11/15/2016	N001	139.6 - 149.6	25		F	#	0.021	
Silicon	mg/L	11/15/2016	N001	139.6 - 149.6	12		F	#	0.0097	
Sodium	mg/L	11/15/2016	N001	139.6 - 149.6	190		F	#	0.047	
Specific Conductance	umhos /cm	11/15/2016	N001	139.6 - 149.6	1810		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 21(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/15/2016	N001	139.6	-	149.6	480		F	#	12	
Temperature	C	11/15/2016	N001	139.6	-	149.6	14.79		F	#		
Total Dissolved Solids	mg/L	11/15/2016	N001	139.6	-	149.6	1200		F	#	40	
Turbidity	NTU	11/15/2016	N001	139.6	-	149.6	1.41		F	#		
Uranium	mg/L	11/15/2016	N001	139.6	-	149.6	0.11		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 22(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	136.83 - 146.83	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	136.83 - 146.83	298		F	#		
Arsenic	mg/L	11/16/2016	N001	136.83 - 146.83	0.0036		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	136.83 - 146.83	310		F	#	20	
Calcium	mg/L	11/16/2016	N001	136.83 - 146.83	84		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	136.83 - 146.83	28		F	#	4	
Dissolved Oxygen	mg/L	11/16/2016	N001	136.83 - 146.83	5.35		F	#		
Magnesium	mg/L	11/16/2016	N001	136.83 - 146.83	24		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	136.83 - 146.83	0.0032		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	136.83 - 146.83	31		F	#	0.5	
Oxidation Reduction Potential	mV	11/16/2016	N001	136.83 - 146.83	202.8		F	#		
pH	s.u.	11/16/2016	N001	136.83 - 146.83	7.2		F	#		
Potassium	mg/L	11/16/2016	N001	136.83 - 146.83	4.8		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	136.83 - 146.83	0.0034		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	136.83 - 146.83	33		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	136.83 - 146.83	15		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	136.83 - 146.83	170		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	136.83 - 146.83	1222		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 22(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	136.83 - 146.83	170		F	#	10	
Temperature	C	11/16/2016	N001	136.83 - 146.83	13.2		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	136.83 - 146.83	780		F	#	40	
Turbidity	NTU	11/16/2016	N001	136.83 - 146.83	1.63		F	#		
Uranium	mg/L	11/16/2016	N001	136.83 - 146.83	0.35		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 23(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	0001	89 - 109	20	U	FQ	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	0001	89 - 109	160		FQ	#		
Arsenic	mg/L	11/16/2016	0001	89 - 109	0.00029	J	FQ	#	0.00012	
Bicarbonate	mg/L	11/16/2016	0001	89 - 109	170		FQ	#	20	
Calcium	mg/L	11/16/2016	0001	89 - 109	95		FQ	#	0.024	
Chloride	mg/L	11/16/2016	0001	89 - 109	66		FQ	#	2	
Dissolved Oxygen	mg/L	11/16/2016	N001	89 - 109	6.12		FQ	#		
Magnesium	mg/L	11/16/2016	0001	89 - 109	22		FQ	#	0.03	
Molybdenum	mg/L	11/16/2016	0001	89 - 109	0.0029		FQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	0001	89 - 109	2.6		FQ	#	0.1	
Oxidation Reduction Potential	mV	11/16/2016	N001	89 - 109	202.9		FQ	#		
pH	s.u.	11/16/2016	N001	89 - 109	7.44		FQ	#		
Potassium	mg/L	11/16/2016	0001	89 - 109	3.3		FQ	#	0.052	
Selenium	mg/L	11/16/2016	0001	89 - 109	0.0031		FQ	#	0.00066	
Silica	mg/L	11/16/2016	0001	89 - 109	13		FQ	#	0.021	
Silicon	mg/L	11/16/2016	0001	89 - 109	6.1		FQ	#	0.0097	
Sodium	mg/L	11/16/2016	0001	89 - 109	55		FQ	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	89 - 109	471		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: 23(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	0001	89	-	109	180		FQ	#	5	
Temperature	C	11/16/2016	N001	89	-	109	13.72		FQ	#		
Total Dissolved Solids	mg/L	11/16/2016	0001	89	-	109	540		FQ	#	20	
Turbidity	NTU	11/16/2016	N001	89	-	109	162		FQ	#		
Uranium	mg/L	11/16/2016	0001	89	-	109	0.024		FQ	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: E(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	0001	68.6	-	89.8	5	U	FQ	#	5	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	0001	68.6	-	89.8	13		FQ	#		
Aroclor - 1016	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Aroclor - 1221	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Aroclor - 1232	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Aroclor - 1242	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Aroclor - 1248	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Aroclor - 1254	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Aroclor - 1260	ug/L	11/16/2016	0001	68.6	-	89.8	0.3	U	FQ	#	0.3	
Arsenic	mg/L	11/16/2016	0001	68.6	-	89.8	0.00012	U	FQ	#	0.00012	
Bicarbonate	mg/L	11/16/2016	0001	68.6	-	89.8	13		FQ	#	5	
Calcium	mg/L	11/16/2016	0001	68.6	-	89.8	170		FQ	#	0.024	
Chloride	mg/L	11/16/2016	0001	68.6	-	89.8	23		FQ	#	2	
Dissolved Oxygen	mg/L	11/16/2016	N001	68.6	-	89.8	1.17		FQ	#		
Magnesium	mg/L	11/16/2016	0001	68.6	-	89.8	45		FQ	#	0.03	
Molybdenum	mg/L	11/16/2016	0001	68.6	-	89.8	0.00032	U	FQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	0001	68.6	-	89.8	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	11/16/2016	N001	68.6	-	89.8	-52.1		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: E(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2016	N001	68.6	-	89.8	7.39		FQ	#		
Potassium	mg/L	11/16/2016	0001	68.6	-	89.8	4.1		FQ	#	0.052	
Selenium	mg/L	11/16/2016	0001	68.6	-	89.8	0.00066	U	FQ	#	0.00066	
Silica	mg/L	11/16/2016	0001	68.6	-	89.8	1.1		FQ	#	0.021	
Silicon	mg/L	11/16/2016	0001	68.6	-	89.8	0.51		FQ	#	0.0097	
Sodium	mg/L	11/16/2016	0001	68.6	-	89.8	51		FQ	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	68.6	-	89.8	1243		FQ	#		
Sulfate	mg/L	11/16/2016	0001	68.6	-	89.8	680		FQ	#	5	
Temperature	C	11/16/2016	N001	68.6	-	89.8	12.96		FQ	#		
Total Dissolved Solids	mg/L	11/16/2016	0001	68.6	-	89.8	940		FQ	#	40	
Turbidity	NTU	11/16/2016	N001	68.6	-	89.8	23.2		FQ	#		
Uranium	mg/L	11/16/2016	0001	68.6	-	89.8	0.00007	J	FQ	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: F(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	94.2 - 114.87	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	94.2 - 114.87	167		F	#		
Aroclor - 1016	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Aroclor - 1221	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Aroclor - 1232	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Aroclor - 1242	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Aroclor - 1248	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Aroclor - 1254	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Aroclor - 1260	ug/L	11/16/2016	N001	94.2 - 114.87	0.33	U	F	#	0.33	
Arsenic	mg/L	11/16/2016	N001	94.2 - 114.87	0.0011		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	94.2 - 114.87	170		F	#	20	
Calcium	mg/L	11/16/2016	N001	94.2 - 114.87	68		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	94.2 - 114.87	13		F	#	0.4	
Dissolved Oxygen	mg/L	11/16/2016	N001	94.2 - 114.87	2.51		F	#		
Magnesium	mg/L	11/16/2016	N001	94.2 - 114.87	18		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	94.2 - 114.87	0.00083	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	94.2 - 114.87	0.64		F	#	0.01	
Oxidation Reduction Potential	mV	11/16/2016	N001	94.2 - 114.87	82.2		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: F(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2016	N001	94.2	-	114.87	7.58		F	#		
Potassium	mg/L	11/16/2016	N001	94.2	-	114.87	3.2		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	94.2	-	114.87	0.00096	J	F	#	0.00066	
Silica	mg/L	11/16/2016	N001	94.2	-	114.87	30		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	94.2	-	114.87	14		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	94.2	-	114.87	21		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	94.2	-	114.87	536		F	#		
Sulfate	mg/L	11/16/2016	N001	94.2	-	114.87	110		F	#	1	
Temperature	C	11/16/2016	N001	94.2	-	114.87	14.95		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	94.2	-	114.87	350		F	#	20	
Turbidity	NTU	11/16/2016	N001	94.2	-	114.87	2.97		F	#		
Uranium	mg/L	11/16/2016	N001	94.2	-	114.87	0.0066		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: HMC-951 WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/15/2016	0001	241 - 275	20	U		#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/15/2016	0001	241 - 275	273			#		
Arsenic	mg/L	11/15/2016	0001	241 - 275	0.0022			#	0.00012	
Bicarbonate	mg/L	11/15/2016	0001	241 - 275	290			#	20	
Calcium	mg/L	11/15/2016	0001	241 - 275	150			#	0.024	
Chloride	mg/L	11/15/2016	0001	241 - 275	66			#	2	
Dissolved Oxygen	mg/L	11/15/2016	N001	241 - 275	4.07			#		
Magnesium	mg/L	11/15/2016	0001	241 - 275	44			#	0.03	
Molybdenum	mg/L	11/15/2016	0001	241 - 275	0.00094	J		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2016	0001	241 - 275	4.3			#	0.1	
Oxidation Reduction Potential	mV	11/15/2016	N001	241 - 275	83.9			#		
pH	s.u.	11/15/2016	N001	241 - 275	6.83			#		
Potassium	mg/L	11/15/2016	0001	241 - 275	5.3			#	0.052	
Selenium	mg/L	11/15/2016	0001	241 - 275	0.0058			#	0.00066	
Silica	mg/L	11/15/2016	0001	241 - 275	17			#	0.021	
Silicon	mg/L	11/15/2016	0001	241 - 275	7.8			#	0.0097	
Sodium	mg/L	11/15/2016	0001	241 - 275	88			#	0.047	
Specific Conductance	umhos /cm	11/15/2016	N001	241 - 275	1312			#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: HMC-951 WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/15/2016	0001	241	-	275	370			#	5	
Temperature	C	11/15/2016	N001	241	-	275	13.53			#		
Total Dissolved Solids	mg/L	11/15/2016	0001	241	-	275	890			#	40	
Turbidity	NTU	11/15/2016	N001	241	-	275	25.9			#		
Uranium	mg/L	11/15/2016	0001	241	-	275	0.032			#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: I(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	-	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	-	402		F	#		
Arsenic	mg/L	11/16/2016	N001	-	0.00014	J	F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	-	400		F	#	20	
Calcium	mg/L	11/16/2016	N001	-	250		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	-	310		F	#	5	
Dissolved Oxygen	mg/L	11/16/2016	N001	-	0.85		F	#		
Magnesium	mg/L	11/16/2016	N001	-	96		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	-	0.00097	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	-	1.2		F	#	0.1	
Oxidation Reduction Potential	mV	11/16/2016	N001	-	21.1		F	#		
pH	s.u.	11/16/2016	N001	-	6.6		F	#		
Potassium	mg/L	11/16/2016	N001	-	14		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	-	0.007		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	-	16		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	-	7.4		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	-	290		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	-	2896		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: I(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	-	910		F	#	12	
Temperature	C	11/16/2016	N001	-	15.57		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	-	2100		F	#	80	
Turbidity	NTU	11/16/2016	N001	-	1.35		F	#		
Uranium	mg/L	11/16/2016	N001	-	0.29		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: L(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	-	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	-	561		F	#		
Arsenic	mg/L	11/16/2016	N001	-	0.00012	U	F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	-	550		F	#	20	
Calcium	mg/L	11/16/2016	N001	-	140		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	-	220		F	#	4	
Dissolved Oxygen	mg/L	11/16/2016	N001	-	0.44		F	#		
Magnesium	mg/L	11/16/2016	N001	-	76		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	-	0.00032	U	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	-	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/16/2016	N001	-	-41.2		F	#		
pH	s.u.	11/16/2016	N001	-	6.6		F	#		
Potassium	mg/L	11/16/2016	N001	-	8.4		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	-	0.00066	U	F	#	0.00066	
Silica	mg/L	11/16/2016	N001	-	11		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	-	5.2		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	-	340		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	-	2552		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: L(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	N001	-	630		F	#	10	
Temperature	C	11/16/2016	N001	-	14.91		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	-	1700		F	#	40	
Turbidity	NTU	11/16/2016	N001	-	2.38		F	#		
Uranium	mg/L	11/16/2016	N001	-	0.003		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: OBS-3 WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	0001	152.4 - 350	5	U		#	5	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	0001	152.4 - 350	16			#		
Arsenic	mg/L	11/16/2016	0001	152.4 - 350	0.00012	U		#	0.00012	
Bicarbonate	mg/L	11/16/2016	0001	152.4 - 350	19			#	5	
Calcium	mg/L	11/16/2016	0001	152.4 - 350	110			#	0.024	
Chloride	mg/L	11/16/2016	0001	152.4 - 350	630			#	8	
Dissolved Oxygen	mg/L	11/16/2016	N001	152.4 - 350	5.51			#		
Magnesium	mg/L	11/16/2016	0001	152.4 - 350	110			#	0.03	
Molybdenum	mg/L	11/16/2016	0001	152.4 - 350	0.00032	U		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	0001	152.4 - 350	0.01	U		#	0.01	
Oxidation Reduction Potential	mV	11/16/2016	N001	152.4 - 350	-164.9			#		
pH	s.u.	11/16/2016	N001	152.4 - 350	7.23			#		
Potassium	mg/L	11/16/2016	0001	152.4 - 350	12			#	0.052	
Selenium	mg/L	11/16/2016	0001	152.4 - 350	0.00066	U		#	0.00066	
Silica	mg/L	11/16/2016	0001	152.4 - 350	0.4			#	0.021	
Silicon	mg/L	11/16/2016	0001	152.4 - 350	0.19			#	0.0097	
Sodium	mg/L	11/16/2016	0001	152.4 - 350	350			#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	152.4 - 350	3173			#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: OBS-3 WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	0001	152.4	-	350	750			#	20	
Temperature	C	11/16/2016	N001	152.4	-	350	14.95			#		
Total Dissolved Solids	mg/L	11/16/2016	0001	152.4	-	350	2000			#	80	
Turbidity	NTU	11/16/2016	N001	152.4	-	350	39.9			#		
Uranium	mg/L	11/16/2016	0001	152.4	-	350	0.0075			#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: S(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	0001	159 - 280	20	U		#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	0001	159 - 280	355			#		
Arsenic	mg/L	11/16/2016	0001	159 - 280	0.00012	U		#	0.00012	
Bicarbonate	mg/L	11/16/2016	0001	159 - 280	320			#	20	
Calcium	mg/L	11/16/2016	0001	159 - 280	240			#	0.024	
Chloride	mg/L	11/16/2016	0001	159 - 280	480			#	8	
Dissolved Oxygen	mg/L	11/16/2016	N001	159 - 280	4.6			#		
Magnesium	mg/L	11/16/2016	0001	159 - 280	150			#	0.03	
Molybdenum	mg/L	11/16/2016	0001	159 - 280	0.001	J		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	0001	159 - 280	1.7			#	0.1	
Oxidation Reduction Potential	mV	11/16/2016	N001	159 - 280	-119.5			#		
pH	s.u.	11/16/2016	N001	159 - 280	7.01			#		
Potassium	mg/L	11/16/2016	0001	159 - 280	13			#	0.052	
Selenium	mg/L	11/16/2016	0001	159 - 280	0.007			#	0.00066	
Silica	mg/L	11/16/2016	0001	159 - 280	15			#	0.021	
Silicon	mg/L	11/16/2016	0001	159 - 280	7.1			#	0.0097	
Sodium	mg/L	11/16/2016	0001	159 - 280	360			#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	159 - 280	3648			#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: S(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Sulfate	mg/L	11/16/2016	0001	159	-	280	1100			#	20	
Temperature	C	11/16/2016	N001	159	-	280	15.47			#		
Total Dissolved Solids	mg/L	11/16/2016	0001	159	-	280	2500			#	80	
Turbidity	NTU	11/16/2016	N001	159	-	280	26.8			#		
Uranium	mg/L	11/16/2016	0001	159	-	280	0.41			#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: X(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	123	-	132	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	123	-	132	188		F	#		
Aroclor - 1016	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Aroclor - 1221	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Aroclor - 1232	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Aroclor - 1242	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Aroclor - 1248	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Aroclor - 1254	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Aroclor - 1260	ug/L	11/16/2016	N001	123	-	132	0.32	U	F	#	0.32	
Arsenic	mg/L	11/16/2016	N001	123	-	132	0.00073	J	F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	123	-	132	200		F	#	20	
Calcium	mg/L	11/16/2016	N001	123	-	132	140		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	123	-	132	170		F	#	4	
Dissolved Oxygen	mg/L	11/16/2016	N001	123	-	132	2.01		F	#		
Magnesium	mg/L	11/16/2016	N001	123	-	132	42		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	123	-	132	0.00069	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	123	-	132	8.1		F	#	0.5	
Oxidation Reduction Potential	mV	11/16/2016	N001	123	-	132	65.6		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: X(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2016	N001	123	-	132	7.61		F	#		
Potassium	mg/L	11/16/2016	N001	123	-	132	5.4		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	123	-	132	0.0067		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	123	-	132	22		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	123	-	132	10		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	123	-	132	180		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	123	-	132	1743		F	#		
Sulfate	mg/L	11/16/2016	N001	123	-	132	470		F	#	10	
Temperature	C	11/16/2016	N001	123	-	132	15.4		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	123	-	132	1200		F	#	40	
Turbidity	NTU	11/16/2016	N001	123	-	132	0.84		F	#		
Uranium	mg/L	11/16/2016	N001	123	-	132	0.1		F	#	0.000012	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/25/2017
Location: Y2(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/16/2016	N001	98	-	123	20	U	F	#	20	
Alkalinity, Total (As CaCO3)	mg/L	11/16/2016	N001	98	-	123	202		F	#		
Aroclor - 1016	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Aroclor - 1221	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Aroclor - 1232	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Aroclor - 1242	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Aroclor - 1248	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Aroclor - 1254	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Aroclor - 1260	ug/L	11/16/2016	N001	98	-	123	0.3	U	F	#	0.3	
Arsenic	mg/L	11/16/2016	N001	98	-	123	0.0012		F	#	0.00012	
Bicarbonate	mg/L	11/16/2016	N001	98	-	123	210		F	#	20	
Calcium	mg/L	11/16/2016	N001	98	-	123	53		F	#	0.024	
Chloride	mg/L	11/16/2016	N001	98	-	123	17		F	#	0.4	
Dissolved Oxygen	mg/L	11/16/2016	N001	98	-	123	5.85		F	#		
Magnesium	mg/L	11/16/2016	N001	98	-	123	16		F	#	0.03	
Molybdenum	mg/L	11/16/2016	N001	98	-	123	0.0014	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2016	N001	98	-	123	1.5		F	#	0.1	
Oxidation Reduction Potential	mV	11/16/2016	N001	98	-	123	80.2		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 2/25/2017

Location: Y2(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2016	N001	98	-	123	7.5		F	#		
Potassium	mg/L	11/16/2016	N001	98	-	123	3.1		F	#	0.052	
Selenium	mg/L	11/16/2016	N001	98	-	123	0.0011		F	#	0.00066	
Silica	mg/L	11/16/2016	N001	98	-	123	27		F	#	0.021	
Silicon	mg/L	11/16/2016	N001	98	-	123	13		F	#	0.0097	
Sodium	mg/L	11/16/2016	N001	98	-	123	63		F	#	0.047	
Specific Conductance	umhos /cm	11/16/2016	N001	98	-	123	630		F	#		
Sulfate	mg/L	11/16/2016	N001	98	-	123	98		F	#	1	
Temperature	C	11/16/2016	N001	98	-	123	13.63		F	#		
Total Dissolved Solids	mg/L	11/16/2016	N001	98	-	123	380		F	#	20	
Turbidity	NTU	11/16/2016	N001	98	-	123	1.75		F	#		
Uranium	mg/L	11/16/2016	N001	98	-	123	0.0044		F	#	0.000012	

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

*	Replicate analysis not within control limits.
>	Result above upper detection limit.
A	TIC is a suspected aldol-condensation product.
B	Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
C	Pesticide result confirmed by GC-MS.
D	Analyte determined in diluted sample.
E	Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
H	Holding time expired, value suspect.
I	Increased detection limit due to required dilution.
J	Estimated
N	Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
P	> 25% difference in detected pesticide or Aroclor concentrations between 2 columns.
U	Analytical result below detection limit.
W	Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z	Laboratory defined qualifier, see case narrative.

DATA QUALIFIERS:

F Low flow sampling method used.	G Possible grout contamination, pH > 9.	J Estimated value.
L Less than 3 bore volumes purged prior to sampling.	Q Qualitative result due to sampling technique.	R Unusable result.
U Parameter analyzed for but was not detected.	X Location is undefined.	

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/12/2017

Location Code	Top of Casing Elevation (Ft)	Measurement Date	Measurement Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
11(SG)	6639.19	11/16/2016	14:05:41	209.95	6429.24	
13(SG)	6593.57	11/15/2016	15:45:21	169.64	6423.93	
14(SG)	6617.20	11/16/2016	09:45:07	191.78	6425.42	
15(SG)	6612.53	11/16/2016	14:20:04	188.04	6424.49	
16(SG)	6618.25	11/16/2016	08:30:08	189.24	6429.01	
18(SG)	6601.32	11/16/2016	15:45:12	176.61	6424.71	
20(M)	6613.38	11/16/2016	15:15:59	108.38	6505.00	
21(M)	6593.80	11/15/2016	16:05:51	127.51	6466.29	
22(M)	6606.48	11/16/2016	09:00:41	137.80	6468.68	
23(M)	6579.22	11/16/2016	16:30:17	110.33	6468.89	
E(M)	6616.32	11/16/2016	09:05:31	81.72	6534.60	
F(M)	6603.59	11/16/2016	13:00:12	113.51	6490.08	
HMC-951	6576.79	11/15/2016	16:35:28	154.25	6422.54	
I(SG)	6625.93	11/16/2016	13:05:45	201.65	6424.28	
L(SG)	6606.09	11/16/2016	14:50:22	167.81	6438.28	
OBS-3	6617.22	11/16/2016	10:30:16	188.25	6428.97	
S(SG)	6625.25	11/16/2016	09:30:33	196.25	6429.00	
T(M)	6612.65					D
X(M)	6598.91	11/16/2016	15:00:50	131.90	6467.01	
Y2(M)	6614.13	11/16/2016	10:55:06	117.52	6496.61	

WATER LEVEL FLAG: D Dry

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Time-Concentration Graphs

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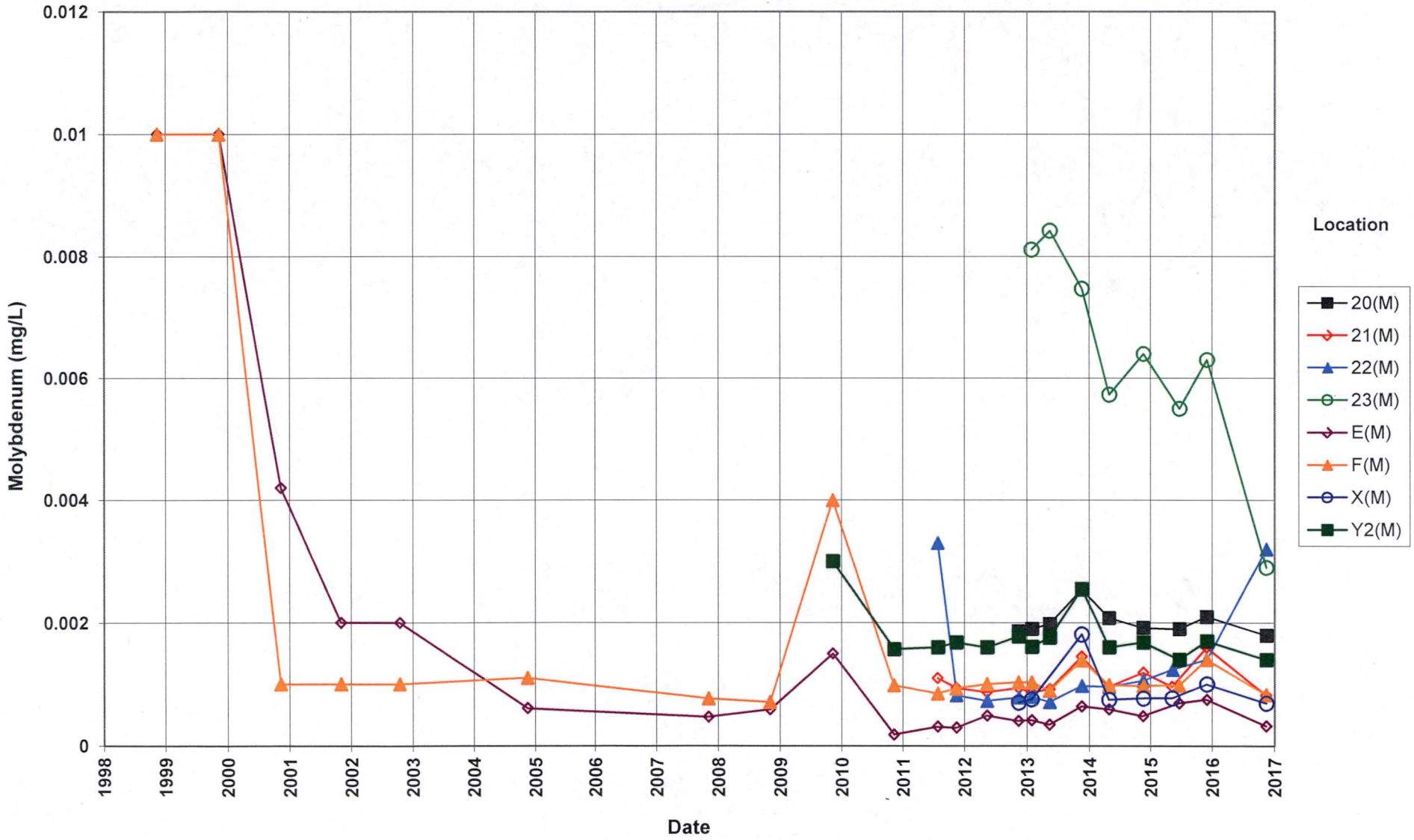
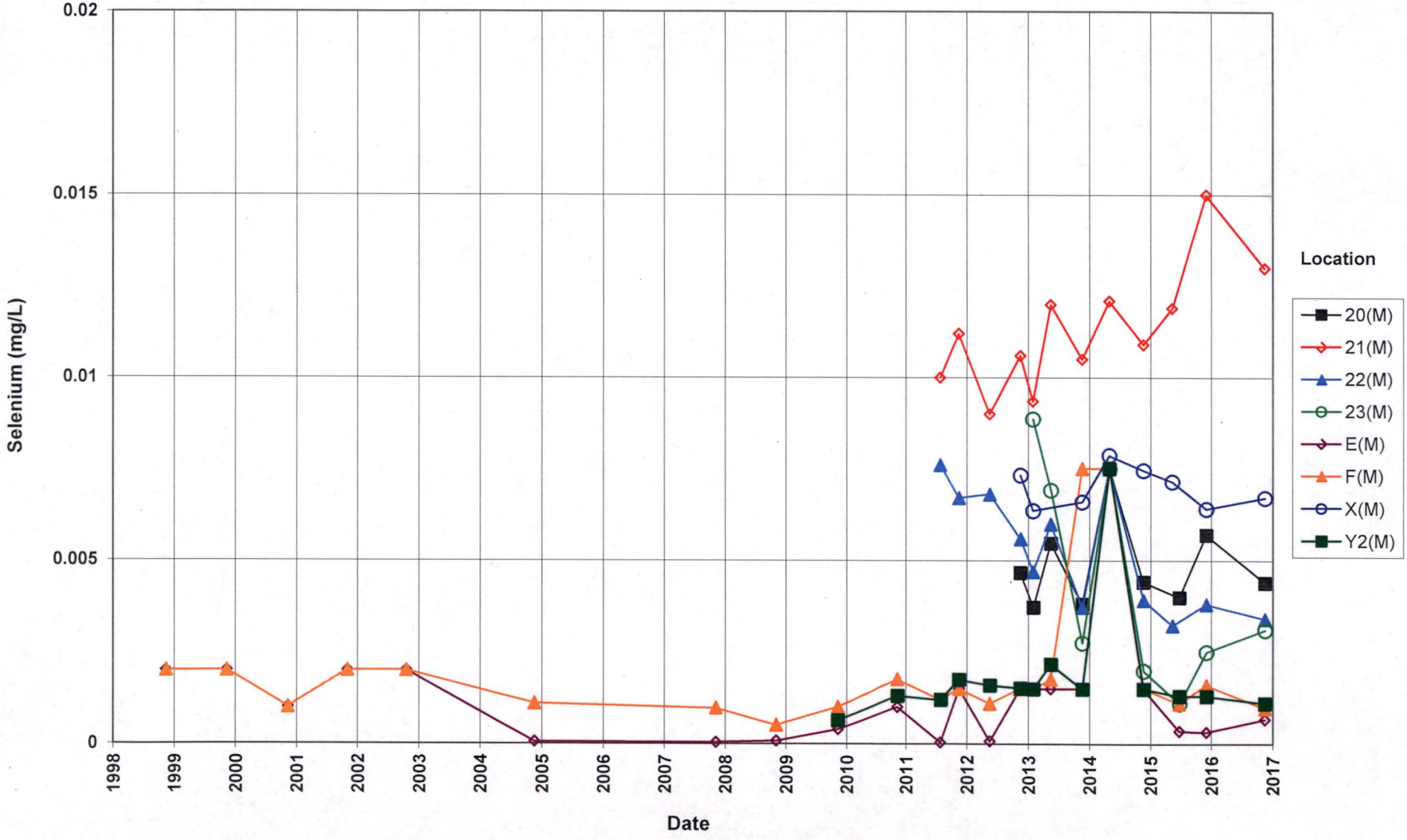
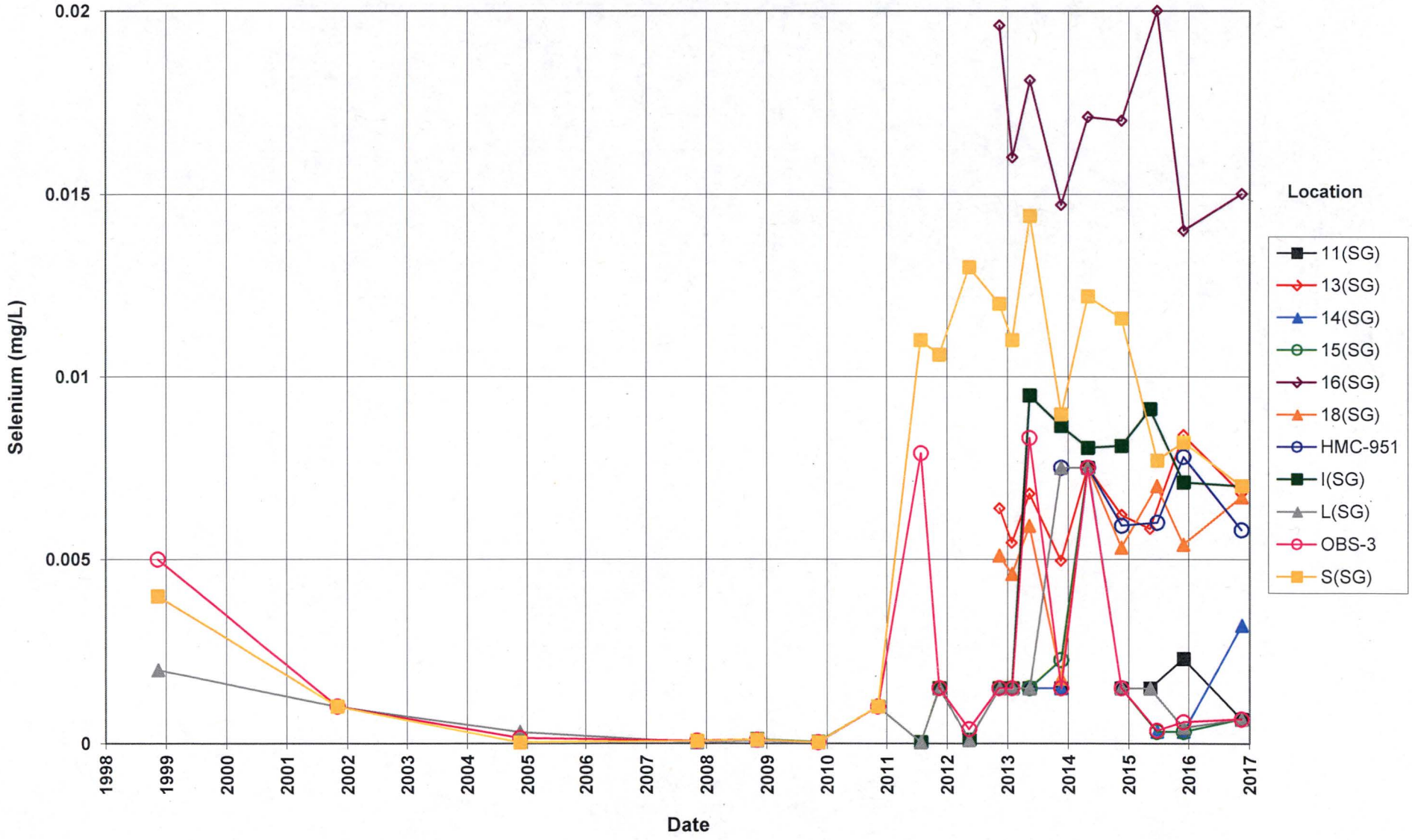
Bluewater Disposal Site
Alluvium Wells
Molybdenum Concentration
Alternate Concentration Limit (ACL) = 0.10 mg/L



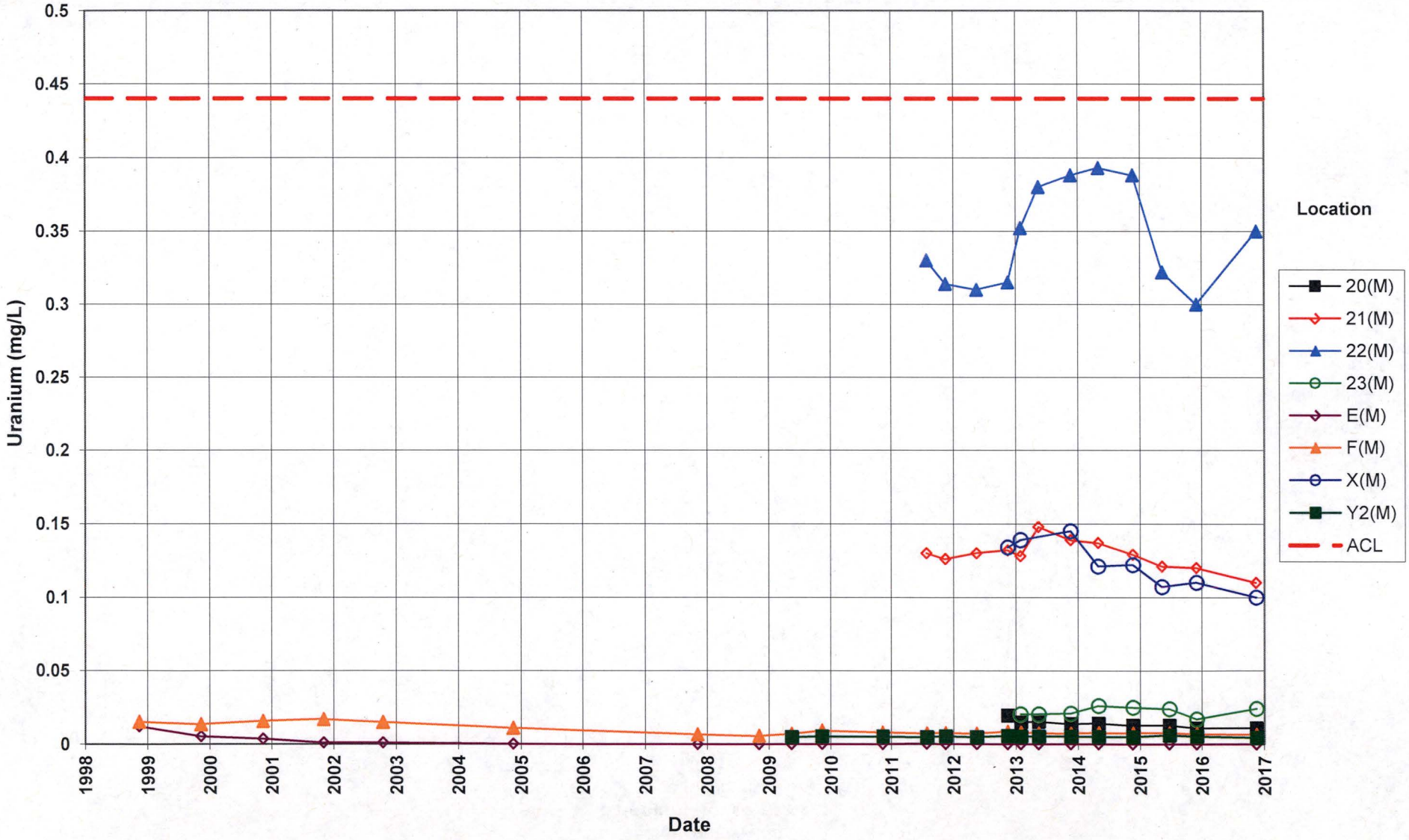
Bluewater Disposal Site
Alluvium Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



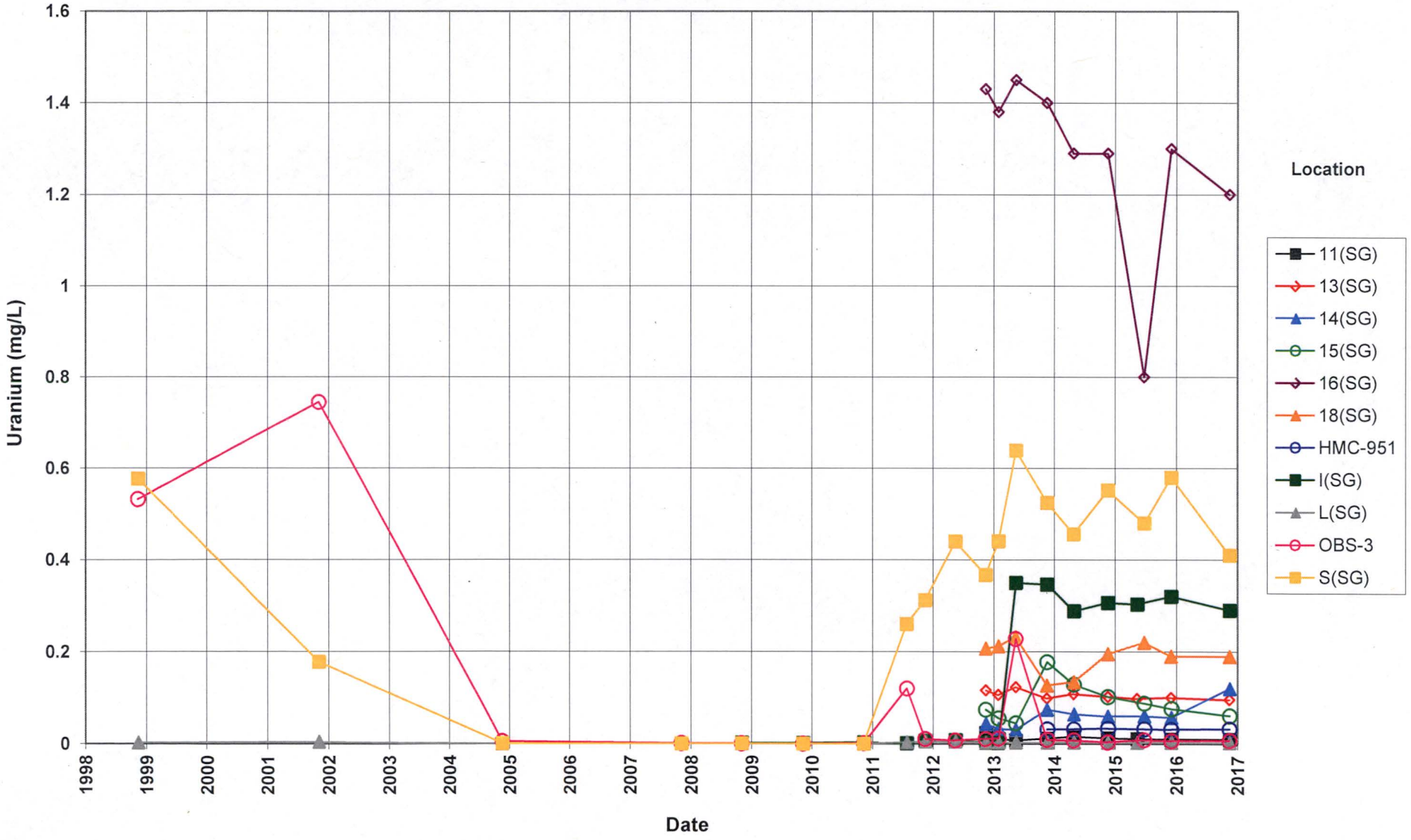
Bluewater Disposal Site
Bedrock Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



Bluewater Disposal Site
Alluvium Wells
Uranium Concentration
Alternate Concentration Limit (ACL) = 0.44 mg/L



Bluewater Disposal Site
Bedrock Wells
Uranium Concentration
Alternate Concentration Limit (ACL) = 2.15 mg/L



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Attachment 4

Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers can result from transcription errors, data-coding errors, or measurement system problems. However, outliers can also represent true extreme values of a distribution and can indicate more variability in the population than was expected.

Statistical outlier tests give probabilistic evidence that an extreme value does not "fit" with the distribution of the remainder of the data and is therefore a statistical outlier. These tests should only be used to identify data points that require further investigation. The tests alone cannot determine whether a statistical outlier should be discarded or corrected within a data set.

There are three steps involved in identifying extreme values or outliers:

1. **Identify extreme values that may be potential outliers.** Do this by generating the Outliers Report using the Sample Management System from data in the environmental database. The application compares the new data set (in standard environmental database units) with historical data and lists the new data that fall outside the historical data range. A determination is also made as to whether the data are normally distributed using the Shapiro-Wilk Test.
2. **Apply the appropriate statistical test.** Dixon's Test for extreme values is used to test for statistical outliers when the sample size is less than or equal to 25. This test considers both extreme values that are much smaller than the rest of the data (case 1) and extreme values that are much larger than the rest of the data (case 2). This test is valid only if the data without the suspected outlier are normally distributed. Rosner's Test is a parametric test that is used to detect outliers for sample sizes of 25 or more. This test also assumes that the data without the suspected outliers are normally distributed.
3. **Scientifically review statistical outliers and decide on their disposition.** The review should include an evaluation of any notable trends in the data that may indicate the outliers represent true extreme values.

Five results from this sampling event were identified as a potential outlier. (See the Data Validation Outliers Reports, below.) The data associated with these results were reviewed in detail with no errors noted. The results for this RIN are acceptable as qualified.

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Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118138
Report Date: 2/12/2017

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
BLU01	11(SG)	N001	11/16/2016	Arsenic	0.00071	J	F	0.0242		F	0.00170	U	F	9	2	No
BLU01	11(SG)	N001	11/16/2016	Calcium	190		F	187		F	161		F	9	0	No
BLU01	13(SG)	N001	11/15/2016	Molybdenum	0.00130	J	F	0.00198	*	F	0.00133		F	8	1	NA
BLU01	13(SG)	N001	11/15/2016	Uranium	0.0960		F	0.123		F	0.0980		F	8	0	No
BLU01	14(SG)	N001	11/16/2016	Arsenic	0.00220		F	0.0866		F	0.00470		F	9	1	NA
BLU01	14(SG)	N002	11/16/2016	Arsenic	0.00210		F	0.0866		F	0.00470		F	9	1	NA
BLU01	14(SG)	N001	11/16/2016	Calcium	150		F	140		F	103		F	9	0	No
BLU01	14(SG)	N002	11/16/2016	Calcium	150		F	140		F	103		F	9	0	No
BLU01	14(SG)	N001	11/16/2016	Magnesium	59.0		F	56.0		F	40.8		F	9	0	No
BLU01	14(SG)	N002	11/16/2016	Magnesium	58.0		F	56.0		F	40.8		F	9	0	No
BLU01	14(SG)	N001	11/16/2016	Nitrate + Nitrite as Nitrogen	0.340		F	0.0238	J	F	0.01000	U	F	9	8	Yes
BLU01	14(SG)	N002	11/16/2016	Nitrate + Nitrite as Nitrogen	0.350		F	0.0238	J	F	0.01000	U	F	9	8	Yes
BLU01	14(SG)	N002	11/16/2016	Potassium	5.90		F	5.70		F	4.49		F	9	0	No
BLU01	14(SG)	N001	11/16/2016	Potassium	5.80		F	5.70		F	4.49		F	9	0	No
BLU01	14(SG)	N001	11/16/2016	Sulfate	530		F	500		F	229		F	9	0	No
BLU01	14(SG)	N002	11/16/2016	Sulfate	550		F	500		F	229		F	9	0	No
BLU01	14(SG)	N001	11/16/2016	Uranium	0.120		F	0.0741		F	0.0308		F	9	0	Yes

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118138
Report Date: 2/12/2017

					Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
						Qualifiers			Qualifiers			Qualifiers				
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
BLU01	14(SG)	N002	11/16/2016	Uranium	0.120		F	0.0741		F	0.0308		F	9	0	Yes
BLU01	15(SG)	N001	11/16/2016	Magnesium	40.0		F	38.2		F	27.9		F	9	0	No
BLU01	16(SG)	N001	11/16/2016	Nitrate + Nitrite as Nitrogen	3.80		F	4.89		F	3.90		F	8	0	No
BLU01	16(SG)	N001	11/16/2016	Total Dissolved Solids	2800		F	3100		F	2900		F	8	0	No
BLU01	20(M)	N001	11/16/2016	Molybdenum	0.00180	J	F	0.00254	*	F	0.00186		F	8	0	No
BLU01	20(M)	N001	11/16/2016	Total Dissolved Solids	900		F	990		F	951		F	8	0	Yes
BLU01	21(M)	N001	11/15/2016	Molybdenum	0.00082	J	F	0.00160		JF	0.000865		F	14	1	NA
BLU01	21(M)	N001	11/15/2016	Nitrate + Nitrite as Nitrogen	14.0		F	13.0		F	7.90		F	14	0	No
BLU01	21(M)	N001	11/15/2016	Total Dissolved Solids	1200		F	1400		F	1250		F	14	0	No
BLU01	21(M)	N001	11/15/2016	Uranium	0.110		F	0.148		F	0.113		F	14	0	No
BLU01	22(M)	N001	11/16/2016	Sulfate	170		F	280		F	195		F	11	0	No
BLU01	22(M)	N001	11/16/2016	Total Dissolved Solids	780		F	1100		F	829		F	11	0	No
BLU01	23(M)	0001	11/16/2016	Chloride	66.0		FQ	94.2			78.0		FQ	7	0	No
BLU01	23(M)	0001	11/16/2016	Molybdenum	0.00290		FQ	0.00842		FQ	0.00550		FQ	7	0	No
BLU01	23(M)	0001	11/16/2016	Potassium	3.30		FQ	6.76		FQ	3.70		FQ	7	0	No
BLU01	23(M)	0001	11/16/2016	Sulfate	180		FQ	325			190		FQ	7	0	No
BLU01	E(M)	0001	11/16/2016	Bicarbonate	13.0		FQ	12.0		FQ	5.00	U	FQ	5	1	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2007
Laboratory: ALS Laboratory Group
RIN: 16118138
Report Date: 2/12/2017

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
					Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
BLU01	E(M)	0001	11/16/2016	Chloride	23.0		FQ	42.0		FQ	30.0		FQ	13	0	No
BLU01	E(M)	0001	11/16/2016	Sulfate	680		FQ	960		FQ	747		FQ	13	0	No
BLU01	E(M)	0001	11/16/2016	Total Dissolved Solids	940		FQ	1550		FQ	1000		FQ	13	0	No
BLU01	HMC-951	0001	11/15/2016	Selenium	0.00580			0.00780		J	0.00592		J	7	3	No
BLU01	HMC-951	0001	11/15/2016	Total Dissolved Solids	890			950			896		J	7	0	No
BLU01	L(SG)	N001	11/16/2016	Molybdenum	0.00032	U	F	0.0176		F	0.000338	B	FQ	16	2	NA
BLU01	S(SG)	0001	11/16/2016	Calcium	240			897		F	260		J	14	0	NA
BLU01	S(SG)	0001	11/16/2016	Total Dissolved Solids	2500			5250		F	2900			14	0	NA
BLU01	X(M)	N001	11/16/2016	Arsenic	0.00073	J	F	0.00850	U	F	0.00094	J	F	7	4	NA
BLU01	X(M)	N001	11/16/2016	Molybdenum	0.00069	J	F	0.00181	*	F	0.000702		F	7	2	NA
BLU01	X(M)	N001	11/16/2016	Nitrate + Nitrite as Nitrogen	8.10		F	11.1		F	8.71		F	7	0	No
BLU01	X(M)	N001	11/16/2016	Sulfate	470		F	570		F	480		F	7	0	No
BLU01	X(M)	N001	11/16/2016	Uranium	0.1000		F	0.145		F	0.107		F	7	0	No
BLU01	Y2(M)	N001	11/16/2016	Uranium	0.00440		F	0.00610		F	0.00455		F	18	0	No

STATISTICAL TESTS:
The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test
Outliers are identified using Dixon's Test when there are 25 or fewer data points.
Outliers are identified using Rosner's Test when there are 26 or more data points.
See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

NA: Data are not normally or lognormally distributed.

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