Data Validation Package
for the Bluewater, New Mexico, Disposal Site,
December 2015

The U.S. Department of Energy (DOE) has prepared a Data Validation Package containing the groundwater monitoring data generated from the December 2015 sampling events at the Bluewater, New Mexico, Disposal Site. This package includes worksheets and reports that document the sampling activities and validation procedures conducted. **At your request, you are receiving a hard copy of the report.**

The report is also available for your review on the Internet at the DOE Office of Legacy Management (LM) website – http://energy.gov/lm. From the LM website home page, select the LM SITES MAP. Then select Bluewater Site from the LM SITES list in the right column. The report will be available on the Bluewater Disposal Site page under Site Documents and Links.

U.S. DEPARTMENT OF ENERGY | Legacy Management

Data Validation Package

40-8902

December 2015
Groundwater Sampling at the
Bluewater, New Mexico, Disposal Site

September 2016

U.S. DEPARTMENT OF ENERGY | Legacy Management

NMSSZO
NMSS

This page intentionally left blank

Contents

This page intentionally left blank

Sampling Event Summary

Site: Bluewater, New Mexico, Disposal Site

Sampling Period: December 1–2, 2015

Groundwater samples were collected from monitoring wells at the Bluewater, New Mexico, Disposal Site to monitor groundwater contaminants as specified in the 1997 *Long-Term Surveillance Plan for the DOE Bluewater (UMTRCA Title II) Disposal Site Near Grants, New Mexico* (LTSP). 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 HMC-951.

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/Glorieta Sandstone hydrologic unit (San Andres aquifer) and are identified by the suffix (SG). Wells HMC-951 and OBS-3 are also completed in the San Andres 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.

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 0.12 mg/L in well 21(M), and was 0.11 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 0.015 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 2015 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	0.0021	0.0057	0.011
21(M)	Downgradient	0.0016	0.015	0.12
22(M)	Downgradient	0.0014	0.0038	0.30
23(M)	Downgradient	0.0063	0.0025	0.017
E(M)	Background	0.00075	ND	0.000050
F(M)	POC	0.0014	0.0016	0.0070
T(M)	POC	Not Sampled	Not Sampled	Not Sampled
X(M)	POE	0.0010	0.0064	0.11
Y2(M)	PCBs	0.0017	0.0013	0.0053

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 the hydrogeological characteristics of the San Andres 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 aquifer wells onsite, except well 16(SG), are screened in the upper 50 feet of the San Andres Limestone, as are most San Andres 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 for the fifth time 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 equal to the New Mexico drinking water standard. Therefore, San Andres 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 2015 Groundwater Monitoring Analytical Results for the Bedrock Wells

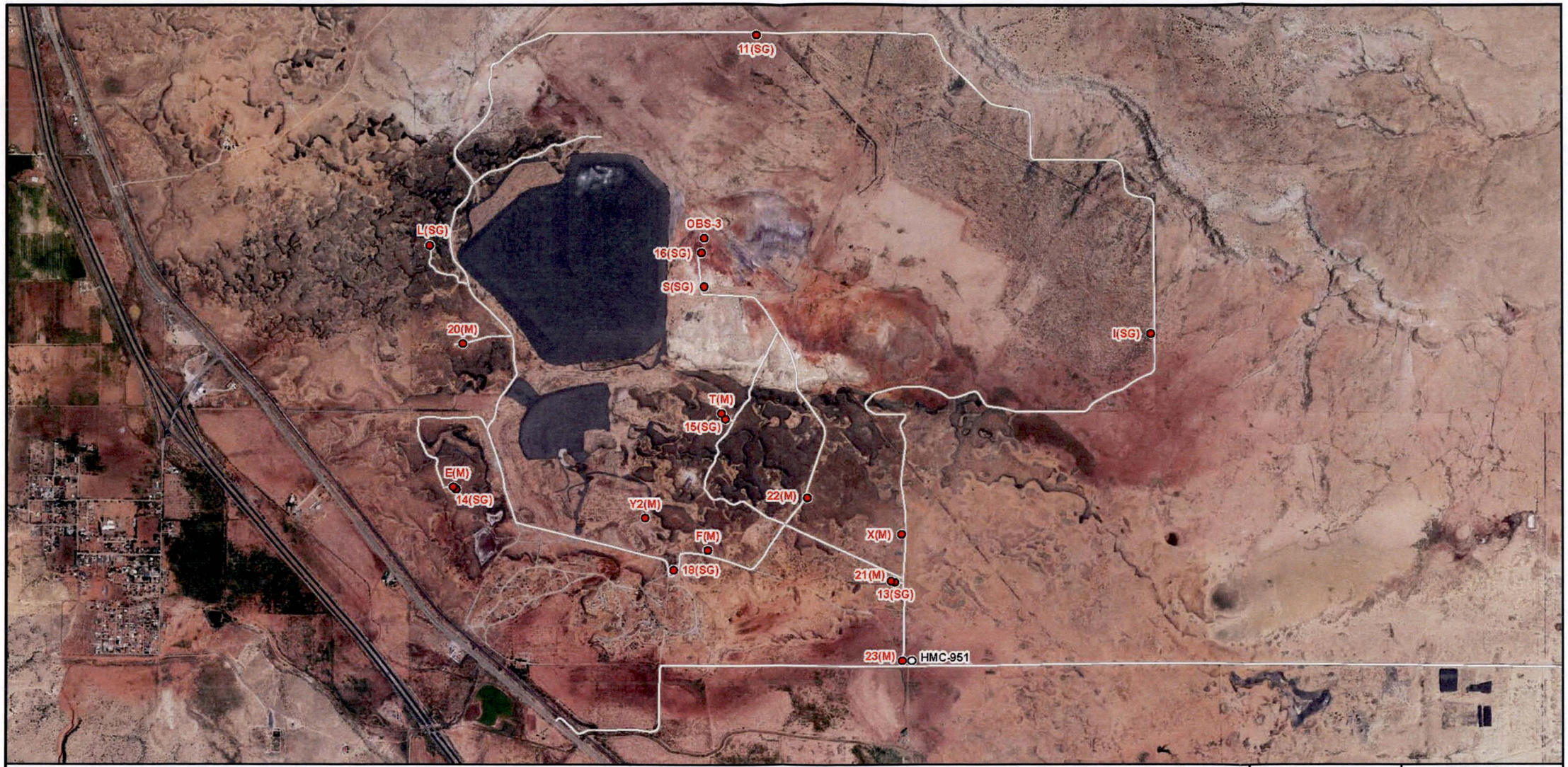
Well	Category	Selenium (mg/L) ACL = 0.05 mg/L	Uranium (mg/L) ACL=2.15 mg/L
11(SG)	Downgradient	0.0023	0.010
13(SG)	Downgradient	0.0084	0.10
14(SG)	Upgradient	ND	0.057
15(SG)	Downgradient	ND	0.076
16(SG)	Downgradient	0.014	1.3
18(SG)	Downgradient	0.0054	0.19
HMC-951	Offsite	0.0078	0.030
I(SG) 265 feet	POE	0.0071	0.32
L(SG)	Background	0.00043	0.0033
OBS-3	POC	0.00058	0.0064
S(SG)	POC	0.0082	0.58

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.

9/13/16
Date

This page intentionally left blank



Bluewater, New Mexico, Disposal Site, Sample Location Map

This page intentionally left blank

Data Assessment Summary

This page intentionally left blank

Water Sampling Field Activities Verification Checklist

Project	Bluewater, NM, Disposal Site	**Date(s) of Water Sampling**	December 1–2, 2015
Date(s) of Verification	February 6, 2016	**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 November 2, 2015.
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 HMC-951.
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?	No	The turbidity was slightly >10 NTUs at HMC-951 but the samples were not filtered. No results were qualified because data quality was unlikely to have been adversely affected.
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):	15117495
Sample Event:	December 1–2, 2015
Site(s):	Bluewater, New Mexico
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1512090
Analysis:	Metals, Organics, and Wet Chemistry
Validator:	Gretchen Baer
Review Date:	February 6, 2016

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/POL/S04325, continually updated) "Standard Practice for Validation of Environmental Data." The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. 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

Analytical results were qualified as listed in Table 4. Refer to the sections below for an explanation of the data qualifiers applied.

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1512090-1	11(SG)	Molybdenum	U	Less than 5 times the calibration blank
1512090-1	11(SG)	Selenium	J	Reporting limit verification > 130%
1512090-2	13(SG)	Molybdenum	U	Less than 5 times the calibration blank
1512090-6	18(SG)	Selenium	J	Reporting limit verification > 130%

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
1512090-7	20(M)	Selenium	J	Reporting limit verification > 130%
1512090-9	22(M)	Selenium	J	Reporting limit verification > 130%
1512090-10	23(M)	Selenium	J	Reporting limit verification > 130%
1512090-11	HMC-951 Dup	Selenium	J	Reporting limit verification > 130%
1512090-13	F(M)	Selenium	J	Reporting limit verification > 130%
1512090-14	HMC-951	Selenium	J	Reporting limit verification > 130%
1512090-15	I(SG)	Selenium	J	Reporting limit verification > 130%
1512090-16	L(SG)	Selenium	J	Reporting limit verification > 130%
1512090-17	OBS-3	Selenium	J	Reporting limit verification > 130%
1512090-19	X(M)	Selenium	J	Reporting limit verification > 130%
1512090-20	Y2(M)	Selenium	J	Reporting limit verification > 130%
All	All	Molybdenum	J	Reporting limit verification < 70%

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received 20 water samples on December 4, 2015, accompanied by a Chain of Custody form. Copies of the air bills were 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.

During transport of the samples from the site to the shipping location in Durango, Colorado, a sample bottle lid came loose and the contents were lost. The bottle contained the sample for alkalinity, chloride, sulfate, and TDS for well F(M).

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced coolers between 0.2 and 3.4 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses, with the following exceptions. The nitrate + nitrite as N bottle for sample 21(M) was received with a pH outside of the acceptance range. The laboratory noticed that two bottles for location 22(M) had pH values that contradicted the bottles' labels, which indicated that the labels had been switched. The laboratory corrected the error and proceeded with sample analysis. The laboratory adjusted the pH of the sample prior to analysis. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The method detection limit (MDL) was reported for all analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The

practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The arsenic and selenium laboratory MDLs are greater than the MDLs specified in the applicable line item codes but were accepted for this RIN. The reported MDLs for all analytes demonstrate compliance with contractual requirements.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. All calibration and laboratory spike standards were prepared from independent sources.

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

Method EPA 310.1/ SM 2320B
There are no initial or continuing calibration requirements associated with the alkalinity method.

Method EPA 353.2
Calibrations for nitrate + nitrite as N were performed using seven calibration standards on December 9, 2015. 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 9, 2015, 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 9, 2015, 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

with the following exceptions. A check recovery for molybdenum was below 70 percent; results less than 5 times the PQL are qualified with a "J" flag (estimated). A selenium check recovery was above 130 percent; results less than 5 times the PQL and above the MDL are qualified with a "J" flag (estimated). 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 May 27, 2015. Calibration curves were established using the calibration factor (CF) approach. The relative standard deviations for the CFs were less than 20 percent. 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 20, 2015. 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.

Metals and Wet Chemistry
All method blank and calibration blank results were below the PQL with the exception of some calibration blanks for sulfate, which were slightly above the reporting limit. The samples associated with these blanks had sulfate concentrations greater than 5 times the blank, so no further qualification is necessary. 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.

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

Inductively Coupled Plasma Interference Check Sample Analysis

Interference check samples were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

Matrix Spike 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 percent (or less than the laboratory-derived control limits for organics). 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 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 control sample results were acceptable.

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 PCB and 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 of less than 10 percent is considered acceptable. When a charge balance is greater than 10 percent, the associated data are closely examined for error. If no errors are found, the results are considered to be acceptable. Table 5 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.)

Table 5. Comparison of Major Anions and Cations in Groundwater Samples

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance
11(SG)	32.4	27.5	8.1%
13(SG)	17.6	17.9	0.9%
14(SG)	23.3	22.6	1.5%
15(SG)	21.6	20.0	3.8%
16(SG)	54.8	46.0	8.7%
18(SG)	19.3	19.2	0.2%
20(M)	14.9	15.1	0.5%
21(M)	23.5	20.0	8.0%
22(M)	14.2	13.6	1.9%
23(M)	9.5	7.9	8.8%
2811	17.4	15.2	6.7%
E(M)	17.4	15.3	6.3%
F(M)	N/A	N/A	N/A
HMC951	16.1	15.1	3.2%
I(SG)	42.4	33.8	11.3%
L(SG)	32.3	28.5	6.2%
OBS3	42.3	32.7	12.7%
S(SG)	57.5	45.4	11.9%
X(M)	22.9	19.4	8.3%
Y2(M)	7.4	7.0	2.7%

Locations I(SG), OBS3, and S(SG) had charge balances greater than 10 percent. There were no analytical errors identified during the review of the laboratory data. At location F(M) the chloride and sulfate measurements were not determined; the charge balance difference cannot be calculated. All other charge balances were below 10 percent.

Electronic Data Deliverable (EDD) File

The EDD file arrived on December, 29, 2015. 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: 15117495 **Lab Code:** PAR **Validator:** Gretchen Baer **Validation Date:** 2/7/2016

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

# of Samples: 20 **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.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 15117495 **Lab Code:** PAR **Date Due:** 1/1/2016

Matrix: Water **Site Code:** BLU01 **Date Completed:** 12/29/2015

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	12/09/2015	0.0000	1.0000	OK	OK	OK	104.0	99.0	97.0	1.0	99.0	0.0	116.0
Magnesium	ICP/ES	12/09/2015	0.0000	1.0000	OK	OK	OK	102.0	99.0	98.0	1.0	102.0	1.0	109.0
Potassium	ICP/ES	12/09/2015	0.0000	1.0000	OK	OK	OK	100.0	105.0	106.0	1.0		6.0	91.0
Silicon	ICP/ES	12/09/2015	0.0000	1.0000	OK	OK	OK	100.0	110.0	99.0	1.0	105.0	2.0	119.0
Sodium	ICP/ES	12/09/2015	0.0000	1.0000	OK	OK	OK	101.0	101.0	99.0	1.0		3.0	92.0
Arsenic	ICP/MS	12/09/2015	0.0000	1.0000	OK	OK	OK	94.0	98.0	98.0	0.0	106.0		87.0
Arsenic	ICP/MS	12/09/2015												79.0
Molybdenum	ICP/MS	12/09/2015	0.0000	1.0000	OK	OK	OK	95.0	99.0	103.0	4.0	104.0		114.0
Molybdenum	ICP/MS	12/09/2015												68.0
Selenium	ICP/MS	12/09/2015	0.0000	1.0000	OK	OK	OK	98.0	104.0	112.0	7.0	102.0		142.0
Selenium	ICP/MS	12/09/2015												124.0
Uranium	ICP/MS	12/09/2015	0.0000	1.0000	OK	OK	OK	102.0			3.0	104.0	0.0	90.0
Uranium	ICP/MS	12/09/2015												110.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15117495 **Lab Code:** PAR **Date Due:** 1/1/2016

Matrix: Water **Site Code:** BLU01 **Date Completed:** 12/29/2015

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	12/12/2015										
ALKALINITY, Total as CaCO3	12/12/2015					OK	99				
Bicarbonate	12/12/2015									1	
CHLORIDE	11/20/2015	0.000	1.0000								
CHLORIDE	12/10/2015			OK	OK	OK	97				
CHLORIDE	12/14/2015							89	89	0	
Nitrate+Nitrite as N	12/09/2015			OK	OK	OK	99	97	102	4	
Sulfate	11/20/2015	0.000	1.0000								
SULFATE	12/10/2015			OK	OK	OK	97				
SULFATE	12/14/2015							100	100	0	
TOTAL DISSOLVED SOLIDS	12/09/2015					OK	101			5	

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 15117495 **Project:** Bluewater **Lab Code:** PAR **Validation Date:** 2/7/2016

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.

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. A duplicate sample was collected from location HMC-951. The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, 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: 15117495 Lab Code: PAR Project: Bluewater Validation Date: 2/7/2016

Duplicate: 2811 Sample: HMC-951

Analyte	Sample Result	Flag	Error	Dilution	Duplicate Result	Flag	Error	Dilution	RPD	RER	Units
Alkalinity, Carbonate (CO3) as CaCO3	20	U		1	20	U		1			MG/L
Arsenic	2.4			10	2.9			10	18.87		UG/L
Bicarbonate	290			1	290			1	0		MG/L
Calcium	150000			1	150000			1	0		UG/L
CHLORIDE	73			10	82			5	11.61		MG/L
Magnesium	43000			1	44000			1	2.30		UG/L
Molybdenum	1.6			10	1.5			10			UG/L
Nitrate+Nitrite as N	4.2			50	4.4			50	4.65		MG/L
Potassium	5400			1	5600			1	3.64		UG/L
Selenium	7.8			10	6.8			10	13.70		UG/L
Silica	17000			1	17000			1	0		UG/L
Silicon	7800			1	8100			1	3.77		UG/L
Sodium	90000			1	91000			1	1.10		UG/L
SULFATE	380			10	430			5	12.35		MG/L
TOTAL DISSOLVED SOLIDS	940			1	910			1	3.24		MG/L
Uranium	30			10	31			10	3.28		UG/L

Certification

All laboratory analytical quality control criteria were met except as qualified in this report. The data qualifiers listed on the SEEPro 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 — Stephen Donivan — 9-13-2016 — Date

Data Validation Lead: for GRB — Gretchen Baer — 9-13-2016 — Date

This page intentionally left blank

Attachment 1

Assessment of Anomalous Data

This page intentionally left blank

Potential Outliers Report

This page intentionally left blank

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.

Nine results were identified as potentially anomalous (see the Data Validation Outliers Report, below). These results were identified as potential outliers because there is low variability in the few historical data points at these locations. There were no errors identified with the data, and the results from this sampling event are acceptable as qualified. Potential anomalies in the field parameters were also examined for patterns of repeated high or low bias, which suggest a systematic error due to instrument malfunction. No such patterns were found and all the results from this sampling event are acceptable as qualified.

Results that are outside the historical range of results and are from a data set that is not normally or lognormally distributed are marked as NA to indicate the statistical tests for outliers cannot be run on this data set.

This page intentionally left blank

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2006
Laboratory: ALS Laboratory Group
RIN: 15117495
Report Date: 2/7/2016

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	12/01/2015	Chloride	240		F	207	H	FJ	175		F	8	0	No
BLU01	11(SG)	N001	12/01/2015	Potassium	12.0		F	11.9		F	10.00	E	F	8	0	No
BLU01	13(SG)	N001	12/01/2015	Chloride	97.0		F	92.6		F	81.7		F	7	0	No
BLU01	13(SG)	N001	12/01/2015	Potassium	6.40		F	6.33		F	5.55		F	7	0	No
BLU01	13(SG)	N001	12/01/2015	Selenium	0.00840		F	0.00750	U	F	0.00496	B	F	7	1	No
BLU01	13(SG)	N001	12/01/2015	Sodium	120		F	114		F	97.7		F	7	0	No
BLU01	13(SG)	N001	12/01/2015	Total Dissolved Solids	1000		F	1080		F	1030		F	7	0	No
BLU01	14(SG)	N001	12/02/2015	Arsenic	0.00470		F	0.0866		F	0.00530		F	8	1	No
BLU01	14(SG)	N001	12/02/2015	Magnesium	56.0		F	55.2		F	40.8		F	8	0	No
BLU01	16(SG)	N001	12/02/2015	Arsenic	0.00042	J	F	0.00850	U	F	0.00047	J	F	7	6	NA
BLU01	16(SG)	N001	12/02/2015	Selenium	0.0140		F	0.0200		F	0.0147		F	7	0	No
BLU01	16(SG)	N001	12/02/2015	Total Dissolved Solids	2900		F	3100		F	3000		F	7	0	No
BLU01	18(SG)	N001	12/01/2015	Arsenic	0.00110		F	0.00850	U	F	0.00170	U	F	7	5	NA
BLU01	20(M)	N001	12/01/2015	Chloride	64.0		F	61.0		F	54.8		F	7	0	No
BLU01	20(M)	N001	12/01/2015	Sodium	100.0		F	95.0		F	82.9		F	7	0	No
BLU01	20(M)	N001	12/01/2015	Uranium	0.0110		F	0.0197		F	0.0129		F	7	0	No
BLU01	21(M)	N001	12/01/2015	Chloride	180		F	170		F	130		F	13	0	Yes

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2006
Laboratory: ALS Laboratory Group
RIN: 15117495
Report Date: 2/7/2016

					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	21(M)	N001	12/01/2015	Molybdenum	0.00160		JF	0.00145	*	F	0.000865		F	13	1	NA
BLU01	21(M)	N001	12/01/2015	Nitrate + Nitrite as Nitrogen	13.0		F	12.9		F	7.90		F	13	0	No
BLU01	21(M)	N001	12/01/2015	Selenium	0.0150		F	0.0121	B	F	0.00900		F	13	0	Yes
BLU01	21(M)	N001	12/01/2015	Sulfate	570		F	521	H	FJ	467		F	13	0	Yes
BLU01	22(M)	N001	12/01/2015	Uranium	0.300		F	0.393		F	0.310		F	10	0	No
BLU01	23(M)	0001	12/02/2015	Calcium	82.0		FQ	152		FQ	111		FQ	6	0	No
BLU01	23(M)	0001	12/02/2015	Chloride	78.0		FQ	94.2			88.0		FQ	6	0	Yes
BLU01	23(M)	0001	12/02/2015	Magnesium	19.0		FQ	34.7		FQ	25.8		FQ	6	0	No
BLU01	23(M)	0001	12/02/2015	Potassium	3.70		FQ	6.76		FQ	4.08		FQ	6	0	No
BLU01	23(M)	0001	12/02/2015	Sulfate	190		FQ	325			220		FQ	6	0	No
BLU01	23(M)	0001	12/02/2015	Total Dissolved Solids	510		FQ	799			670		FQ	6	0	No
BLU01	23(M)	0001	12/02/2015	Uranium	0.0170		FQ	0.0262		FQ	0.0203		FQ	6	0	No
BLU01	E(M)	0001	12/02/2015	Total Dissolved Solids	1000		FQ	1550		FQ	1130		FQ	12	0	No
BLU01	F(M)	N001	12/02/2015	Arsenic	0.00058	J	F	0.00850	U	F	0.00110		F	14	8	NA
BLU01	HMC-951	N001	12/01/2015	Chloride	73.0			65.0			58.5		J	5	0	No
BLU01	HMC-951	N002	12/01/2015	Chloride	82.0			65.0			58.5		J	5	0	Yes
BLU01	HMC-951	N001	12/01/2015	Molybdenum	0.00160		J	0.00142	*		0.00094	J		5	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2006
Laboratory: ALS Laboratory Group
RIN: 15117495
Report Date: 2/7/2016

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	HMC-951	N002	12/01/2015	Molybdenum	0.00150		J	0.00142	*		0.00094	J		5	0	No
BLU01	HMC-951	N002	12/01/2015	Potassium	5.60			5.40			4.67	E		5	0	No
BLU01	HMC-951	N001	12/01/2015	Selenium	0.00780		J	0.00750	U		0.00592		J	5	3	No
BLU01	HMC-951	N001	12/01/2015	Sodium	90.0			85.0			70.3			5	0	No
BLU01	HMC-951	N002	12/01/2015	Sodium	91.0			85.0			70.3			5	0	No
BLU01	HMC-951	N002	12/01/2015	Sulfate	430			378			356		J	5	0	Yes
BLU01	HMC-951	N001	12/01/2015	Sulfate	380			378			356		J	5	0	No
BLU01	HMC-951	N001	12/01/2015	Uranium	0.0300			0.0332		J	0.0306			5	0	No
BLU01	I(SG)	N001	12/01/2015	Chloride	390		F	306		F	170		F	17	0	No
BLU01	I(SG)	N001	12/01/2015	Potassium	14.0		F	13.9		F	4.50		F	17	0	No
BLU01	I(SG)	N001	12/01/2015	Sulfate	1100		F	948		F	79.0		F	17	0	NA
BLU01	L(SG)	N001	12/01/2015	Chloride	260		F	220		F	180		FQ	15	0	Yes
BLU01	L(SG)	N001	12/01/2015	Sulfate	660		F	653	H	FJ	1.70		F	15	0	NA
BLU01	S(SG)	N001	12/02/2015	Sulfate	1500			1300			295		F	13	0	NA
BLU01	S(SG)	N001	12/02/2015	Total Dissolved Solids	2900			5250		F	2920		J	13	0	NA
BLU01	X(M)	N001	12/02/2015	Arsenic	0.00094	J	F	0.00850	U	F	0.00170	U	F	6	4	NA
BLU01	X(M)	N001	12/02/2015	Calcium	140		F	165		F	143		F	6	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 1/1/2006
Laboratory: ALS Laboratory Group
RIN: 15117495
Report Date: 2/7/2016

					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	X(M)	N001	12/02/2015	Chloride	220		F	199		F	160		F	6	0	No
BLU01	X(M)	N001	12/02/2015	Potassium	5.90		F	5.49	E	JF	5.23		F	6	0	Yes
BLU01	X(M)	N001	12/02/2015	Sodium	200		F	197		F	178		F	6	0	No
BLU01	X(M)	N001	12/02/2015	Sulfate	570		F	528	H	FJ	480		F	6	0	No
BLU01	X(M)	N001	12/02/2015	Total Dissolved Solids	1200		F	1370		F	1230		F	6	0	No
BLU01	Y2(M)	N001	12/02/2015	Calcium	53.0		F	77.0		F	55.0		F	16	0	No
BLU01	Y2(M)	N001	12/02/2015	Chloride	22.0		F	18.0		F	7.00		F	16	0	No
BLU01	Y2(M)	N001	12/02/2015	Sodium	69.0		F	65.0		F	14.0		F	16	0	NA
BLU01	Y2(M)	N001	12/02/2015	Sulfate	120		F	110		F	92.0		F	16	0	Yes

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.

Attachment 2

Data Presentation

This page intentionally left blank

Groundwater Quality Data

Note: The data in the column labeled "Depth Range" represent the well screen interval. Wells I(SG) and L(SG) are open-hole construction through the aquifer (no screens) so this column is blank.

This page intentionally left blank

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	265 - 295	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	265 - 295	512		F	#		
Arsenic	mg/L	12/01/2015	N001	265 - 295	0.0021		F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	265 - 295	470		F	#	20	
Calcium	mg/L	12/01/2015	N001	265 - 295	180		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	265 - 295	240		F	#	4	
Dissolved Oxygen	mg/L	12/01/2015	N001	265 - 295	1.97		F	#		
Magnesium	mg/L	12/01/2015	N001	265 - 295	63		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	265 - 295	0.0013		UJF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	265 - 295	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/01/2015	N001	265 - 295	-77.9		F	#		
pH	s.u.	12/01/2015	N001	265 - 295	6.95		F	#		
Potassium	mg/L	12/01/2015	N001	265 - 295	12		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	265 - 295	0.0023		JF	#	0.00032	
Silica	mg/L	12/01/2015	N001	265 - 295	17		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	265 - 295	8.2		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	265 - 295	300		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	265 - 295	2599		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	265	-	295	780		F	#	10	
Temperature	C	12/01/2015	N001	265	-	295	15.09		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	265	-	295	1700		F	#	40	
Turbidity	NTU	12/01/2015	N001	265	-	295	2.93		F	#		
Uranium	mg/L	12/01/2015	N001	265	-	295	0.01		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	270 - 300	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	270 - 300	388		F	#		
Arsenic	mg/L	12/01/2015	N001	270 - 300	0.0057		F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	270 - 300	300		F	#	20	
Calcium	mg/L	12/01/2015	N001	270 - 300	170		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	270 - 300	97		F	#	2	
Dissolved Oxygen	mg/L	12/01/2015	N001	270 - 300	3.4		F	#		
Magnesium	mg/L	12/01/2015	N001	270 - 300	49		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	270 - 300	0.0016		UJF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	270 - 300	4.4		F	#	0.5	
Oxidation Reduction Potential	mV	12/01/2015	N001	270 - 300	3		F	#		
pH	s.u.	12/01/2015	N001	270 - 300	6.97		F	#		
Potassium	mg/L	12/01/2015	N001	270 - 300	6.4		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	270 - 300	0.0084		F	#	0.00032	
Silica	mg/L	12/01/2015	N001	270 - 300	16		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	270 - 300	7.6		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	270 - 300	120		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	270 - 300	1600		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	270 - 300	410		F	#	5	
Temperature	C	12/01/2015	N001	270 - 300	13.68		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	270 - 300	1000		F	#	40	
Turbidity	NTU	12/01/2015	N001	270 - 300	1.58		F	#		
Uranium	mg/L	12/01/2015	N001	270 - 300	0.1		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	N001	285 - 315	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	285 - 315	428		F	#		
Arsenic	mg/L	12/02/2015	N001	285 - 315	0.0047		F	#	0.00015	
Bicarbonate	mg/L	12/02/2015	N001	285 - 315	430		F	#	20	
Calcium	mg/L	12/02/2015	N001	285 - 315	140		F	#	0.024	
Chloride	mg/L	12/02/2015	N001	285 - 315	160		F	#	2	
Dissolved Oxygen	mg/L	12/02/2015	N001	285 - 315	1.3		F	#		
Magnesium	mg/L	12/02/2015	N001	285 - 315	56		F	#	0.03	
Molybdenum	mg/L	12/02/2015	N001	285 - 315	0.0025		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	285 - 315	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/02/2015	N001	285 - 315	-3.2		F	#		
pH	s.u.	12/02/2015	N001	285 - 315	7.22		F	#		
Potassium	mg/L	12/02/2015	N001	285 - 315	5.7		F	#	0.052	
Selenium	mg/L	12/02/2015	N001	285 - 315	0.00032	U	F	#	0.00032	
Silica	mg/L	12/02/2015	N001	285 - 315	27		F	#	0.021	
Silicon	mg/L	12/02/2015	N001	285 - 315	12		F	#	0.0097	
Sodium	mg/L	12/02/2015	N001	285 - 315	250		F	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	285 - 315	2105		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
Location: 14(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	12/02/2015	N001	285	-	315	490		F	#	5	
Temperature	C	12/02/2015	N001	285	-	315	14.04		F	#		
Total Dissolved Solids	mg/L	12/02/2015	N001	285	-	315	1400		F	#	40	
Turbidity	NTU	12/02/2015	N001	285	-	315	2.45		F	#		
Uranium	mg/L	12/02/2015	N001	285	-	315	0.057		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	N001	341 - 371	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	341 - 371	346		F	#		
Arsenic	mg/L	12/02/2015	N001	341 - 371	0.0037		F	#	0.00015	
Bicarbonate	mg/L	12/02/2015	N001	341 - 371	370		F	#	20	
Calcium	mg/L	12/02/2015	N001	341 - 371	100		F	#	0.024	
Chloride	mg/L	12/02/2015	N001	341 - 371	180		F	#	2	
Dissolved Oxygen	mg/L	12/02/2015	N001	341 - 371	1.11		F	#		
Magnesium	mg/L	12/02/2015	N001	341 - 371	38		F	#	0.03	
Molybdenum	mg/L	12/02/2015	N001	341 - 371	0.005		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	341 - 371	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/02/2015	N001	341 - 371	-105.2		F	#		
pH	s.u.	12/02/2015	N001	341 - 371	7.19		F	#		
Potassium	mg/L	12/02/2015	N001	341 - 371	6.7		F	#	0.052	
Selenium	mg/L	12/02/2015	N001	341 - 371	0.00032	U	F	#	0.00032	
Silica	mg/L	12/02/2015	N001	341 - 371	20		F	#	0.021	
Silicon	mg/L	12/02/2015	N001	341 - 371	9.3		F	#	0.0097	
Sodium	mg/L	12/02/2015	N001	341 - 371	270		F	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	341 - 371	2011		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/02/2015	N001	341	-	371	440		F	#	5	
Temperature	C	12/02/2015	N001	341	-	371	14.09		F	#		
Total Dissolved Solids	mg/L	12/02/2015	N001	341	-	371	1200		F	#	40	
Turbidity	NTU	12/02/2015	N001	341	-	371	1.17		F	#		
Uranium	mg/L	12/02/2015	N001	341	-	371	0.076		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	N001	195 - 225	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	195 - 225	448		F	#		
Arsenic	mg/L	12/02/2015	N001	195 - 225	0.00042	J	F	#	0.00015	
Bicarbonate	mg/L	12/02/2015	N001	195 - 225	420		F	#	20	
Calcium	mg/L	12/02/2015	N001	195 - 225	310		F	#	0.024	
Chloride	mg/L	12/02/2015	N001	195 - 225	600		F	#	8	
Dissolved Oxygen	mg/L	12/02/2015	N001	195 - 225	2		F	#		
Magnesium	mg/L	12/02/2015	N001	195 - 225	160		F	#	0.03	
Molybdenum	mg/L	12/02/2015	N001	195 - 225	0.0023		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	195 - 225	4.2		F	#	0.5	
Oxidation Reduction Potential	mV	12/02/2015	N001	195 - 225	116.7		F	#		
pH	s.u.	12/02/2015	N001	195 - 225	6.65		F	#		
Potassium	mg/L	12/02/2015	N001	195 - 225	14		F	#	0.052	
Selenium	mg/L	12/02/2015	N001	195 - 225	0.014		F	#	0.00032	
Silica	mg/L	12/02/2015	N001	195 - 225	20		F	#	0.021	
Silicon	mg/L	12/02/2015	N001	195 - 225	9.6		F	#	0.0097	
Sodium	mg/L	12/02/2015	N001	195 - 225	390		F	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	195 - 225	4092		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/02/2015	N001	195	-	225	1400		F	#	20	
Temperature	C	12/02/2015	N001	195	-	225	13.55		F	#		
Total Dissolved Solids	mg/L	12/02/2015	N001	195	-	225	2900		F	#	80	
Turbidity	NTU	12/02/2015	N001	195	-	225	6.65		F	#		
Uranium	mg/L	12/02/2015	N001	195	-	225	1.3		F	#	0.00029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	260 - 290	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	260 - 290	360		F	#		
Arsenic	mg/L	12/01/2015	N001	260 - 290	0.0011		F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	260 - 290	330		F	#	20	
Calcium	mg/L	12/01/2015	N001	260 - 290	170		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	260 - 290	110		F	#	2	
Dissolved Oxygen	mg/L	12/01/2015	N001	260 - 290	1.97		F	#		
Magnesium	mg/L	12/01/2015	N001	260 - 290	54		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	260 - 290	0.0024		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	260 - 290	3.1		F	#	0.5	
Oxidation Reduction Potential	mV	12/01/2015	N001	260 - 290	78.3		F	#		
pH	s.u.	12/01/2015	N001	260 - 290	6.95		F	#		
Potassium	mg/L	12/01/2015	N001	260 - 290	7.8		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	260 - 290	0.0054		JF	#	0.00032	
Silica	mg/L	12/01/2015	N001	260 - 290	16		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	260 - 290	7.7		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	260 - 290	140		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	260 - 290	1751		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	260	-	290	450		F	#	5	
Temperature	C	12/01/2015	N001	260	-	290	13.57		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	260	-	290	1200		F	#	40	
Turbidity	NTU	12/01/2015	N001	260	-	290	3.08		F	#		
Uranium	mg/L	12/01/2015	N001	260	-	290	0.19		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	110 - 125	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	110 - 125	244		F	#		
Arsenic	mg/L	12/01/2015	N001	110 - 125	0.011		F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	110 - 125	250		F	#	20	
Calcium	mg/L	12/01/2015	N001	110 - 125	150		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	110 - 125	64		F	#	2	
Dissolved Oxygen	mg/L	12/01/2015	N001	110 - 125	7.71		F	#		
Magnesium	mg/L	12/01/2015	N001	110 - 125	38		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	110 - 125	0.0021		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	110 - 125	3.1		F	#	0.5	
Oxidation Reduction Potential	mV	12/01/2015	N001	110 - 125	42.8		F	#		
pH	s.u.	12/01/2015	N001	110 - 125	7.26		F	#		
Potassium	mg/L	12/01/2015	N001	110 - 125	4.7		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	110 - 125	0.0057		JF	#	0.00032	
Silica	mg/L	12/01/2015	N001	110 - 125	26		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	110 - 125	12		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	110 - 125	100		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	110 - 125	1372		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	110 - 125	380		F	#	5	
Temperature	C	12/01/2015	N001	110 - 125	13.69		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	110 - 125	960		F	#	20	
Turbidity	NTU	12/01/2015	N001	110 - 125	1.48		F	#		
Uranium	mg/L	12/01/2015	N001	110 - 125	0.011		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	139.6 - 149.6	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	139.6 - 149.6	280		F	#		
Arsenic	mg/L	12/01/2015	N001	139.6 - 149.6	0.0018		F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	139.6 - 149.6	280		F	#	20	
Calcium	mg/L	12/01/2015	N001	139.6 - 149.6	150		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	139.6 - 149.6	180		F	#	2	
Dissolved Oxygen	mg/L	12/01/2015	N001	139.6 - 149.6	5.4		F	#		
Magnesium	mg/L	12/01/2015	N001	139.6 - 149.6	39		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	139.6 - 149.6	0.0016		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	139.6 - 149.6	13		F	#	0.5	
Oxidation Reduction Potential	mV	12/01/2015	N001	139.6 - 149.6	40.9		F	#		
pH	s.u.	12/01/2015	N001	139.6 - 149.6	7.24		F	#		
Potassium	mg/L	12/01/2015	N001	139.6 - 149.6	6.1		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	139.6 - 149.6	0.015		F	#	0.00032	
Silica	mg/L	12/01/2015	N001	139.6 - 149.6	24		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	139.6 - 149.6	11		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	139.6 - 149.6	210		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	139.6 - 149.6	1929		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	139.6	-	149.6	570		F	#	5	
Temperature	C	12/01/2015	N001	139.6	-	149.6	13.88		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	139.6	-	149.6	1300		F	#	40	
Turbidity	NTU	12/01/2015	N001	139.6	-	149.6	0.9		F	#		
Uranium	mg/L	12/01/2015	N001	139.6	-	149.6	0.12		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	136.83 - 146.83	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	136.83 - 146.83	300		F	#		
Arsenic	mg/L	12/01/2015	N001	136.83 - 146.83	0.0031		F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	136.83 - 146.83	330		F	#	20	
Calcium	mg/L	12/01/2015	N001	136.83 - 146.83	83		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	136.83 - 146.83	35		F	#	2	
Dissolved Oxygen	mg/L	12/01/2015	N001	136.83 - 146.83	5.23		F	#		
Magnesium	mg/L	12/01/2015	N001	136.83 - 146.83	24		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	136.83 - 146.83	0.0014		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	136.83 - 146.83	31		F	#	0.5	
Oxidation Reduction Potential	mV	12/01/2015	N001	136.83 - 146.83	62.3		F	#		
pH	s.u.	12/01/2015	N001	136.83 - 146.83	7.3		F	#		
Potassium	mg/L	12/01/2015	N001	136.83 - 146.83	4.8		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	136.83 - 146.83	0.0038		JF	#	0.00032	
Silica	mg/L	12/01/2015	N001	136.83 - 146.83	30		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	136.83 - 146.83	14		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	136.83 - 146.83	170		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	136.83 - 146.83	1313		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	136.83 - 146.83	210		F	#	5	
Temperature	C	12/01/2015	N001	136.83 - 146.83	13.22		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	136.83 - 146.83	850		F	#	20	
Turbidity	NTU	12/01/2015	N001	136.83 - 146.83	2.06		F	#		
Uranium	mg/L	12/01/2015	N001	136.83 - 146.83	0.3		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	0001	89 - 109	20	U	FQ	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	0001	89 - 109	176		FQ	#		
Arsenic	mg/L	12/02/2015	0001	89 - 109	0.00042	J	FQ	#	0.00015	
Bicarbonate	mg/L	12/02/2015	0001	89 - 109	160		FQ	#	20	
Calcium	mg/L	12/02/2015	0001	89 - 109	82		FQ	#	0.024	
Chloride	mg/L	12/02/2015	0001	89 - 109	78		FQ	#	1	
Dissolved Oxygen	mg/L	12/02/2015	N001	89 - 109	7.72		FQ	#		
Magnesium	mg/L	12/02/2015	0001	89 - 109	19		FQ	#	0.03	
Molybdenum	mg/L	12/02/2015	0001	89 - 109	0.0063		JFQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	0001	89 - 109	1.4		FQ	#	0.5	
Oxidation Reduction Potential	mV	12/02/2015	N001	89 - 109	36.5		FQ	#		
pH	s.u.	12/02/2015	N001	89 - 109	7.05		FQ	#		
Potassium	mg/L	12/02/2015	0001	89 - 109	3.7		FQ	#	0.052	
Selenium	mg/L	12/02/2015	0001	89 - 109	0.0025		JFQ	#	0.00032	
Silica	mg/L	12/02/2015	0001	89 - 109	13		FQ	#	0.021	
Silicon	mg/L	12/02/2015	0001	89 - 109	6.2		FQ	#	0.0097	
Sodium	mg/L	12/02/2015	0001	89 - 109	50		FQ	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	89 - 109	770		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/02/2015	0001	89	-	109	190		FQ	#	2.5	
Temperature	C	12/02/2015	N001	89	-	109	13.58		FQ	#		
Total Dissolved Solids	mg/L	12/02/2015	0001	89	-	109	510		FQ	#	20	
Turbidity	NTU	12/02/2015	N001	89	-	109	1000	>	FQ	#		
Uranium	mg/L	12/02/2015	0001	89	-	109	0.017		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	0001	68.6	-	89.8	5	U	FQ	#	5	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	0001	68.6	-	89.8	30		FQ	#		
Arsenic	mg/L	12/02/2015	0001	68.6	-	89.8	0.00015	U	FQ	#	0.00015	
Bicarbonate	mg/L	12/02/2015	0001	68.6	-	89.8	12		FQ	#	5	
Calcium	mg/L	12/02/2015	0001	68.6	-	89.8	180		FQ	#	0.024	
Chloride	mg/L	12/02/2015	0001	68.6	-	89.8	33		FQ	#	2	
Dissolved Oxygen	mg/L	12/02/2015	N001	68.6	-	89.8	1.5		FQ	#		
Magnesium	mg/L	12/02/2015	0001	68.6	-	89.8	47		FQ	#	0.03	
Molybdenum	mg/L	12/02/2015	0001	68.6	-	89.8	0.00075	J	JFQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	0001	68.6	-	89.8	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	12/02/2015	N001	68.6	-	89.8	-132.2		FQ	#		
pH	s.u.	12/02/2015	N001	68.6	-	89.8	7.51		FQ	#		
Potassium	mg/L	12/02/2015	0001	68.6	-	89.8	4.2		FQ	#	0.052	
Selenium	mg/L	12/02/2015	0001	68.6	-	89.8	0.00032	U	FQ	#	0.00032	
Silica	mg/L	12/02/2015	0001	68.6	-	89.8	0.97		FQ	#	0.021	
Silicon	mg/L	12/02/2015	0001	68.6	-	89.8	0.45		FQ	#	0.0097	
Sodium	mg/L	12/02/2015	0001	68.6	-	89.8	55		FQ	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	68.6	-	89.8	1400		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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
Sulfate	mg/L	12/02/2015	0001	68.6	-	89.8	780		FQ	#	5	
Temperature	C	12/02/2015	N001	68.6	-	89.8	13.98		FQ	#		
Total Dissolved Solids	mg/L	12/02/2015	0001	68.6	-	89.8	1000		FQ	#	40	
Turbidity	NTU	12/02/2015	N001	68.6	-	89.8	12.2		FQ	#		
Uranium	mg/L	12/02/2015	0001	68.6	-	89.8	0.00005	J	FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	94.2 - 114.87	178		F	#		
Arsenic	mg/L	12/02/2015	N001	94.2 - 114.87	0.00058	J	F	#	0.00015	
Calcium	mg/L	12/02/2015	N001	94.2 - 114.87	70		F	#	0.024	
Dissolved Oxygen	mg/L	12/02/2015	N001	94.2 - 114.87	3.6		F	#		
Magnesium	mg/L	12/02/2015	N001	94.2 - 114.87	18		F	#	0.03	
Molybdenum	mg/L	12/02/2015	N001	94.2 - 114.87	0.0014		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	94.2 - 114.87	0.74		F	#	0.01	
Oxidation Reduction Potential	mV	12/02/2015	N001	94.2 - 114.87	8.9		F	#		
pH	s.u.	12/02/2015	N001	94.2 - 114.87	7.71		F	#		
Potassium	mg/L	12/02/2015	N001	94.2 - 114.87	3.3		F	#	0.052	
Selenium	mg/L	12/02/2015	N001	94.2 - 114.87	0.0016		JF	#	0.00032	
Silica	mg/L	12/02/2015	N001	94.2 - 114.87	30		F	#	0.021	
Silicon	mg/L	12/02/2015	N001	94.2 - 114.87	14		F	#	0.0097	
Sodium	mg/L	12/02/2015	N001	94.2 - 114.87	22		F	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	94.2 - 114.87	574		F	#		
Temperature	C	12/02/2015	N001	94.2 - 114.87	13.39		F	#		
Turbidity	NTU	12/02/2015	N001	94.2 - 114.87	2.58		F	#		
Uranium	mg/L	12/02/2015	N001	94.2 - 114.87	0.007		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	241 - 275	20	U		#	20	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	12/01/2015	N002	241 - 275	20	U		#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	241 - 275	252			#		
Arsenic	mg/L	12/01/2015	N001	241 - 275	0.0024			#	0.00015	
Arsenic	mg/L	12/01/2015	N002	241 - 275	0.0029			#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	241 - 275	290			#	20	
Bicarbonate	mg/L	12/01/2015	N002	241 - 275	290			#	20	
Calcium	mg/L	12/01/2015	N001	241 - 275	150			#	0.024	
Calcium	mg/L	12/01/2015	N002	241 - 275	150			#	0.024	
Chloride	mg/L	12/01/2015	N001	241 - 275	73			#	2	
Chloride	mg/L	12/01/2015	N002	241 - 275	82			#	1	
Dissolved Oxygen	mg/L	12/01/2015	N001	241 - 275	4.51			#		
Magnesium	mg/L	12/01/2015	N001	241 - 275	43			#	0.03	
Magnesium	mg/L	12/01/2015	N002	241 - 275	44			#	0.03	
Molybdenum	mg/L	12/01/2015	N001	241 - 275	0.0016		J	#	0.00032	
Molybdenum	mg/L	12/01/2015	N002	241 - 275	0.0015		J	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	241 - 275	4.2			#	0.5	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N002	241 - 275	4.4			#	0.5	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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
Oxidation Reduction Potential	mV	12/01/2015	N001	241 - 275	58			#		
pH	s.u.	12/01/2015	N001	241 - 275	7.03			#		
Potassium	mg/L	12/01/2015	N001	241 - 275	5.4			#	0.052	
Potassium	mg/L	12/01/2015	N002	241 - 275	5.6			#	0.052	
Selenium	mg/L	12/01/2015	N001	241 - 275	0.0078		J	#	0.00032	
Selenium	mg/L	12/01/2015	N002	241 - 275	0.0068		J	#	0.00032	
Silica	mg/L	12/01/2015	N001	241 - 275	17			#	0.021	
Silica	mg/L	12/01/2015	N002	241 - 275	17			#	0.021	
Silicon	mg/L	12/01/2015	N001	241 - 275	7.8			#	0.0097	
Silicon	mg/L	12/01/2015	N002	241 - 275	8.1			#	0.0097	
Sodium	mg/L	12/01/2015	N001	241 - 275	90			#	0.047	
Sodium	mg/L	12/01/2015	N002	241 - 275	91			#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	241 - 275	1380			#		
Sulfate	mg/L	12/01/2015	N001	241 - 275	380			#	5	
Sulfate	mg/L	12/01/2015	N002	241 - 275	430			#	2.5	
Temperature	C	12/01/2015	N001	241 - 275	13.3			#		
Total Dissolved Solids	mg/L	12/01/2015	N001	241 - 275	940			#	20	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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
Total Dissolved Solids	mg/L	12/01/2015	N002	241	-	275	910			#	40	
Turbidity	NTU	12/01/2015	N001	241	-	275	13.2			#		
Uranium	mg/L	12/01/2015	N001	241	-	275	0.03			#	0.000029	
Uranium	mg/L	12/01/2015	N002	241	-	275	0.031			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	-	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	-	400		F	#		
Arsenic	mg/L	12/01/2015	N001	-	0.00015	U	F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	-	420		F	#	20	
Calcium	mg/L	12/01/2015	N001	-	250		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	-	390		F	#	4	
Dissolved Oxygen	mg/L	12/01/2015	N001	-	2		F	#		
Magnesium	mg/L	12/01/2015	N001	-	96		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	-	0.0012		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	-	1.4		F	#	0.5	
Oxidation Reduction Potential	mV	12/01/2015	N001	-	32.6		F	#		
pH	s.u.	12/01/2015	N001	-	6.74		F	#		
Potassium	mg/L	12/01/2015	N001	-	14		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	-	0.0071		JF	#	0.00032	
Silica	mg/L	12/01/2015	N001	-	15		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	-	6.8		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	-	300		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	-	3062		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	-	1100		F	#	10	
Temperature	C	12/01/2015	N001	-	12.43		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	-	2200		F	#	40	
Turbidity	NTU	12/01/2015	N001	-	1.73		F	#		
Uranium	mg/L	12/01/2015	N001	-	0.32		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/01/2015	N001	-	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/01/2015	N001	-	516		F	#		
Arsenic	mg/L	12/01/2015	N001	-	0.00015	U	F	#	0.00015	
Bicarbonate	mg/L	12/01/2015	N001	-	560		F	#	20	
Calcium	mg/L	12/01/2015	N001	-	140		F	#	0.024	
Chloride	mg/L	12/01/2015	N001	-	260		F	#	4	
Dissolved Oxygen	mg/L	12/01/2015	N001	-	2.09		F	#		
Magnesium	mg/L	12/01/2015	N001	-	74		F	#	0.03	
Molybdenum	mg/L	12/01/2015	N001	-	0.00075	J	JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/01/2015	N001	-	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	12/01/2015	N001	-	-72.7		F	#		
pH	s.u.	12/01/2015	N001	-	6.78		F	#		
Potassium	mg/L	12/01/2015	N001	-	8.8		F	#	0.052	
Selenium	mg/L	12/01/2015	N001	-	0.00043	J	JF	#	0.00032	
Silica	mg/L	12/01/2015	N001	-	10		F	#	0.021	
Silicon	mg/L	12/01/2015	N001	-	4.8		F	#	0.0097	
Sodium	mg/L	12/01/2015	N001	-	350		F	#	0.047	
Specific Conductance	umhos /cm	12/01/2015	N001	-	2636		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/01/2015	N001	-	660		F	#	10	
Temperature	C	12/01/2015	N001	-	14.6		F	#		
Total Dissolved Solids	mg/L	12/01/2015	N001	-	1700		F	#	40	
Turbidity	NTU	12/01/2015	N001	-	3.73		F	#		
Uranium	mg/L	12/01/2015	N001	-	0.0033		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	0001	152.4 - 350	5	U		#	5	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	0001	152.4 - 350	62			#		
Arsenic	mg/L	12/02/2015	0001	152.4 - 350	0.00015	U		#	0.00015	
Bicarbonate	mg/L	12/02/2015	0001	152.4 - 350	17			#	5	
Calcium	mg/L	12/02/2015	0001	152.4 - 350	120			#	0.024	
Chloride	mg/L	12/02/2015	0001	152.4 - 350	830			#	10	
Dissolved Oxygen	mg/L	12/02/2015	N001	152.4 - 350	0.34			#		
Magnesium	mg/L	12/02/2015	0001	152.4 - 350	120			#	0.03	
Molybdenum	mg/L	12/02/2015	0001	152.4 - 350	0.00039	J	J	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	0001	152.4 - 350	0.028			#	0.01	
Oxidation Reduction Potential	mV	12/02/2015	N001	152.4 - 350	-251.6			#		
pH	s.u.	12/02/2015	N001	152.4 - 350	7.41			#		
Potassium	mg/L	12/02/2015	0001	152.4 - 350	13			#	0.052	
Selenium	mg/L	12/02/2015	0001	152.4 - 350	0.00058	J	J	#	0.00032	
Silica	mg/L	12/02/2015	0001	152.4 - 350	0.46			#	0.021	
Silicon	mg/L	12/02/2015	0001	152.4 - 350	0.22			#	0.0097	
Sodium	mg/L	12/02/2015	0001	152.4 - 350	380			#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	152.4 - 350	3426			#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/02/2015	0001	152.4	-	350	890			#	25	
Temperature	C	12/02/2015	N001	152.4	-	350	15.89			#		
Total Dissolved Solids	mg/L	12/02/2015	0001	152.4	-	350	2000			#	80	
Turbidity	NTU	12/02/2015	N001	152.4	-	350	19.6			#		
Uranium	mg/L	12/02/2015	0001	152.4	-	350	0.0064			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	N001	159 - 280	20	U		#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	159 - 280	414			#		
Arsenic	mg/L	12/02/2015	N001	159 - 280	0.00015	U		#	0.00015	
Bicarbonate	mg/L	12/02/2015	N001	159 - 280	390			#	20	
Calcium	mg/L	12/02/2015	N001	159 - 280	280			#	0.024	
Chloride	mg/L	12/02/2015	N001	159 - 280	650			#	10	
Dissolved Oxygen	mg/L	12/02/2015	N001	159 - 280	3.67			#		
Magnesium	mg/L	12/02/2015	N001	159 - 280	160			#	0.03	
Molybdenum	mg/L	12/02/2015	N001	159 - 280	0.0014		J	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	159 - 280	2.7			#	0.5	
Oxidation Reduction Potential	mV	12/02/2015	N001	159 - 280	-100			#		
pH	s.u.	12/02/2015	N001	159 - 280	6.95			#		
Potassium	mg/L	12/02/2015	N001	159 - 280	15			#	0.052	
Selenium	mg/L	12/02/2015	N001	159 - 280	0.0082			#	0.00032	
Silica	mg/L	12/02/2015	N001	159 - 280	17			#	0.021	
Silicon	mg/L	12/02/2015	N001	159 - 280	7.9			#	0.0097	
Sodium	mg/L	12/02/2015	N001	159 - 280	410			#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	159 - 280	4090			#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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	12/02/2015	N001	159	-	280	1500			#	25	
Temperature	C	12/02/2015	N001	159	-	280	15.6			#		
Total Dissolved Solids	mg/L	12/02/2015	N001	159	-	280	2900			#	80	
Turbidity	NTU	12/02/2015	N001	159	-	280	9.1			#		
Uranium	mg/L	12/02/2015	N001	159	-	280	0.58			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	N001	123 - 132	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	123 - 132	194		F	#		
Arsenic	mg/L	12/02/2015	N001	123 - 132	0.00094	J	F	#	0.00015	
Bicarbonate	mg/L	12/02/2015	N001	123 - 132	210		F	#	20	
Calcium	mg/L	12/02/2015	N001	123 - 132	140		F	#	0.024	
Chloride	mg/L	12/02/2015	N001	123 - 132	220		F	#	4	
Dissolved Oxygen	mg/L	12/02/2015	N001	123 - 132	2.1		F	#		
Magnesium	mg/L	12/02/2015	N001	123 - 132	43		F	#	0.03	
Molybdenum	mg/L	12/02/2015	N001	123 - 132	0.001	J	JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	123 - 132	8.8		F	#	0.5	
Oxidation Reduction Potential	mV	12/02/2015	N001	123 - 132	40.3		F	#		
pH	s.u.	12/02/2015	N001	123 - 132	7.69		F	#		
Potassium	mg/L	12/02/2015	N001	123 - 132	5.9		F	#	0.052	
Selenium	mg/L	12/02/2015	N001	123 - 132	0.0064		JF	#	0.00032	
Silica	mg/L	12/02/2015	N001	123 - 132	21		F	#	0.021	
Silicon	mg/L	12/02/2015	N001	123 - 132	9.9		F	#	0.0097	
Sodium	mg/L	12/02/2015	N001	123 - 132	200		F	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	123 - 132	1863		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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
Sulfate	mg/L	12/02/2015	N001	123	-	132	570		F	#	10	
Temperature	C	12/02/2015	N001	123	-	132	13.52		F	#		
Total Dissolved Solids	mg/L	12/02/2015	N001	123	-	132	1200		F	#	40	
Turbidity	NTU	12/02/2015	N001	123	-	132	7.41		F	#		
Uranium	mg/L	12/02/2015	N001	123	-	132	0.11		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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 $CaCO_3$)	mg/L	12/02/2015	N001	98 - 123	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	12/02/2015	N001	98 - 123	250		F	#		
Arsenic	mg/L	12/02/2015	N001	98 - 123	0.0012		F	#	0.00015	
Bicarbonate	mg/L	12/02/2015	N001	98 - 123	210		F	#	20	
Calcium	mg/L	12/02/2015	N001	98 - 123	53		F	#	0.024	
Chloride	mg/L	12/02/2015	N001	98 - 123	22		F	#	0.4	
Dissolved Oxygen	mg/L	12/02/2015	N001	98 - 123	5.04		F	#		
Magnesium	mg/L	12/02/2015	N001	98 - 123	16		F	#	0.03	
Molybdenum	mg/L	12/02/2015	N001	98 - 123	0.0017		JF	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	12/02/2015	N001	98 - 123	1.7		F	#	0.5	
Oxidation Reduction Potential	mV	12/02/2015	N001	98 - 123	81.7		F	#		
pH	s.u.	12/02/2015	N001	98 - 123	7.57		F	#		
Potassium	mg/L	12/02/2015	N001	98 - 123	3.2		F	#	0.052	
Selenium	mg/L	12/02/2015	N001	98 - 123	0.0013		JF	#	0.00032	
Silica	mg/L	12/02/2015	N001	98 - 123	25		F	#	0.021	
Silicon	mg/L	12/02/2015	N001	98 - 123	12		F	#	0.0097	
Sodium	mg/L	12/02/2015	N001	98 - 123	69		F	#	0.047	
Specific Conductance	umhos /cm	12/02/2015	N001	98 - 123	671		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016
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
Sulfate	mg/L	12/02/2015	N001	98	-	123	120		F	#	1	
Temperature	C	12/02/2015	N001	98	-	123	14.4		F	#		
Total Dissolved Solids	mg/L	12/02/2015	N001	98	-	123	420		F	#	20	
Turbidity	NTU	12/02/2015	N001	98	-	123	2.18		F	#		
Uranium	mg/L	12/02/2015	N001	98	-	123	0.0053		F	#	0.000029	

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

This page intentionally left blank

STATIC WATER LEVELS (USEE700) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 2/7/2016

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	12/01/2015	13:45:22	209.77	6429.42	
13(SG)	6593.57	12/01/2015	12:25:55	169.36	6424.21	
14(SG)	6617.2	12/02/2015	15:30:57	191.60	6425.6	
15(SG)	6612.53	12/02/2015	11:15:00	187.81	6424.72	
16(SG)	6618.25	12/02/2015	08:40:27	189.00	6429.25	
18(SG)	6601.32	12/01/2015	15:40:32	176.50	6424.82	
20(M)	6613.38	12/01/2015	15:05:40	107.64	6505.74	
21(M)	6593.8	12/01/2015	12:55:05	127.68	6466.12	
22(M)	6606.48	12/01/2015	16:10:31	137.63	6468.85	
23(M)	6579.22	12/02/2015	14:10:44	110.17	6469.05	
E(M)	6616.32	12/02/2015	15:50:35	81.72	6534.6	
F(M)	6603.59	12/02/2015	16:35:55	113.50	6490.09	
HMC-951	6576.79	12/01/2015	10:40:32	154.15	6422.64	
I(SG)	6625.93	12/01/2015	17:00:36	202.00	6423.93	
L(SG)	6606.09	12/01/2015	14:35:24	167.72	6438.37	
OBS-3	6617.22	12/02/2015	12:45:58	187.86	6429.36	
S(SG)	6625.25	12/02/2015	12:00:26	195.94	6429.31	
T(M)	6612.65	12/02/2015	11:20:00			D
X(M)	6598.91	12/02/2015	10:05:45	132.10	6466.81	
Y2(M)	6614.13	12/02/2015	14:45:20	117.43	6496.7	

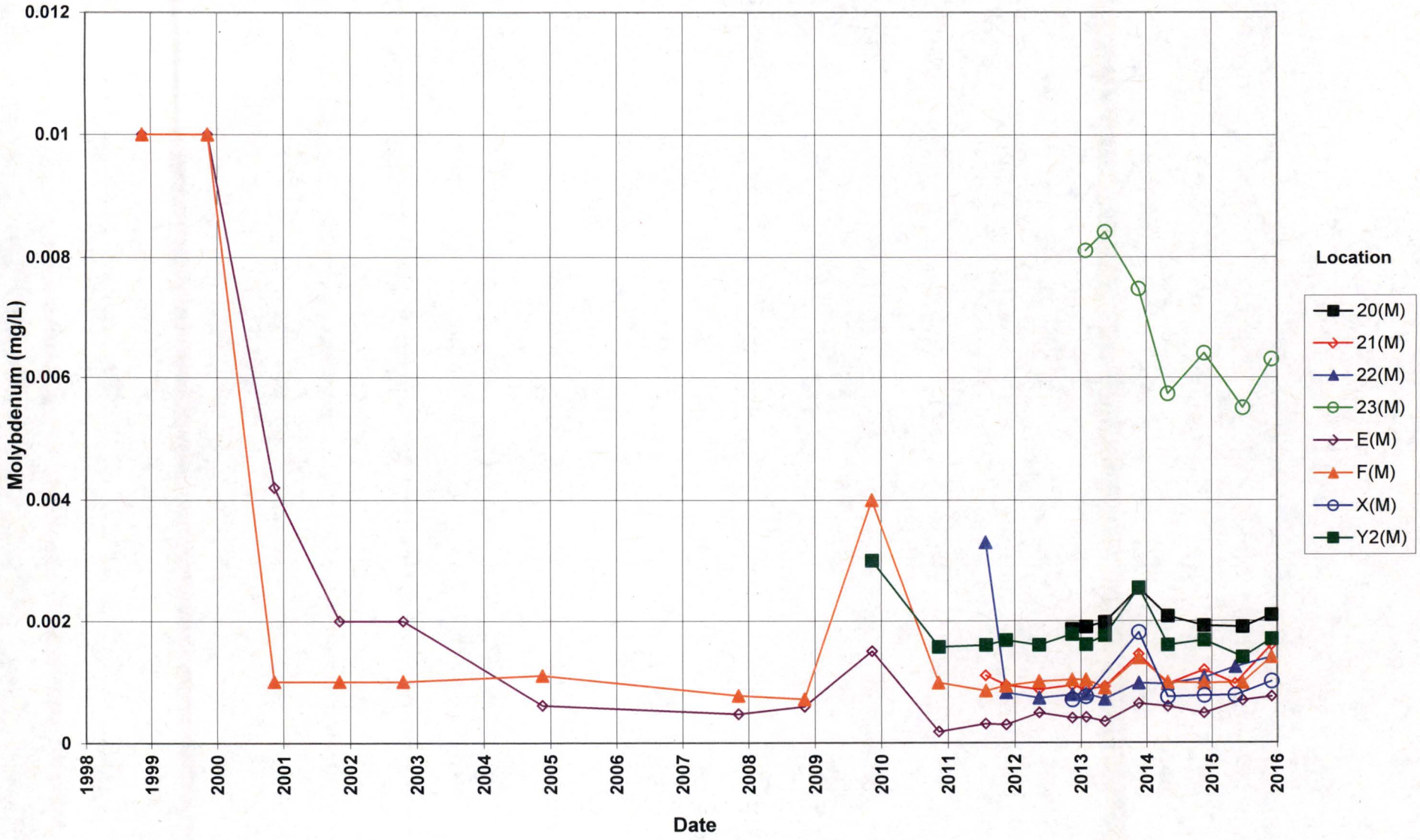
WATER LEVEL FLAG: D Dry

This page intentionally left blank

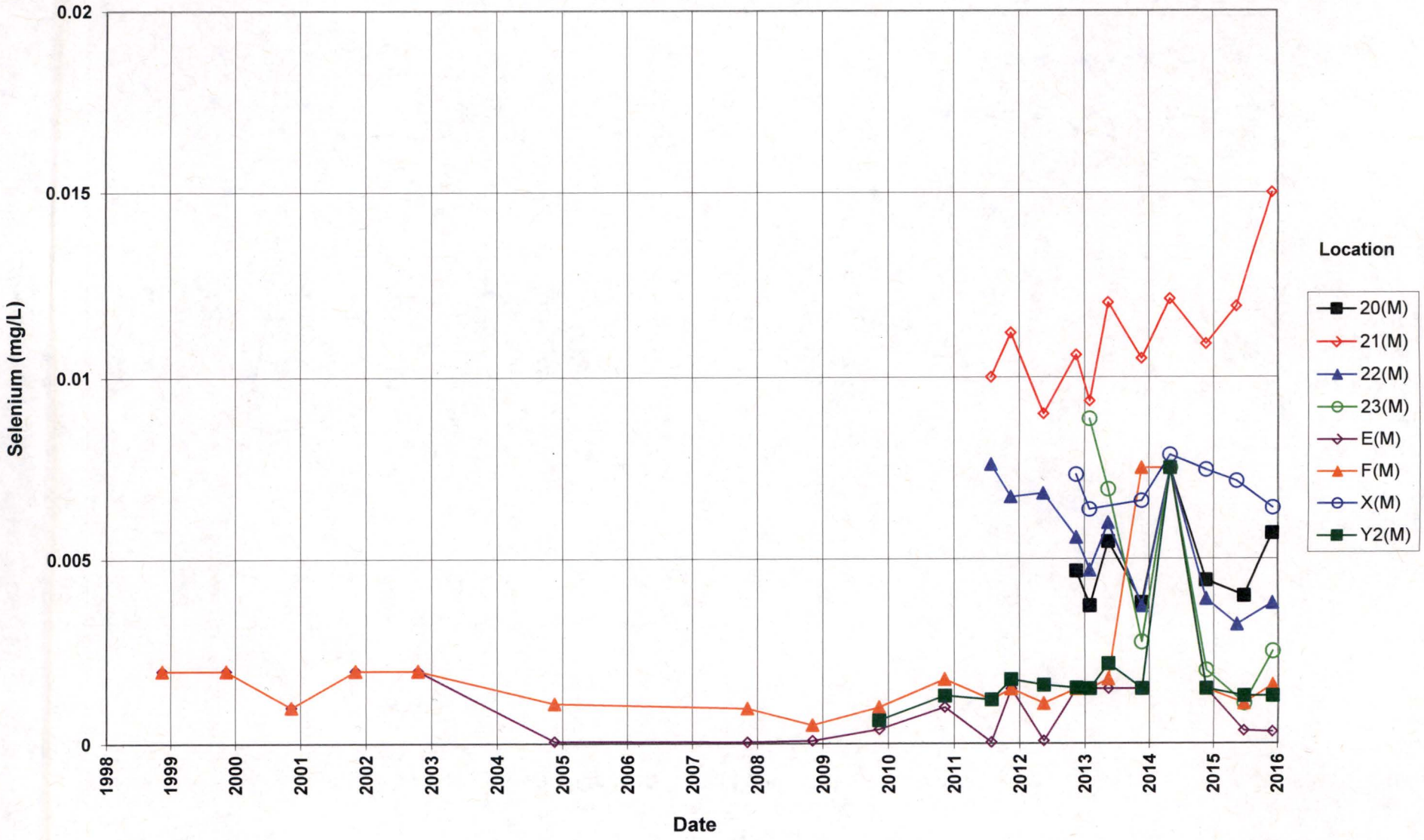
Time-Concentration Graphs

This page intentionally left blank

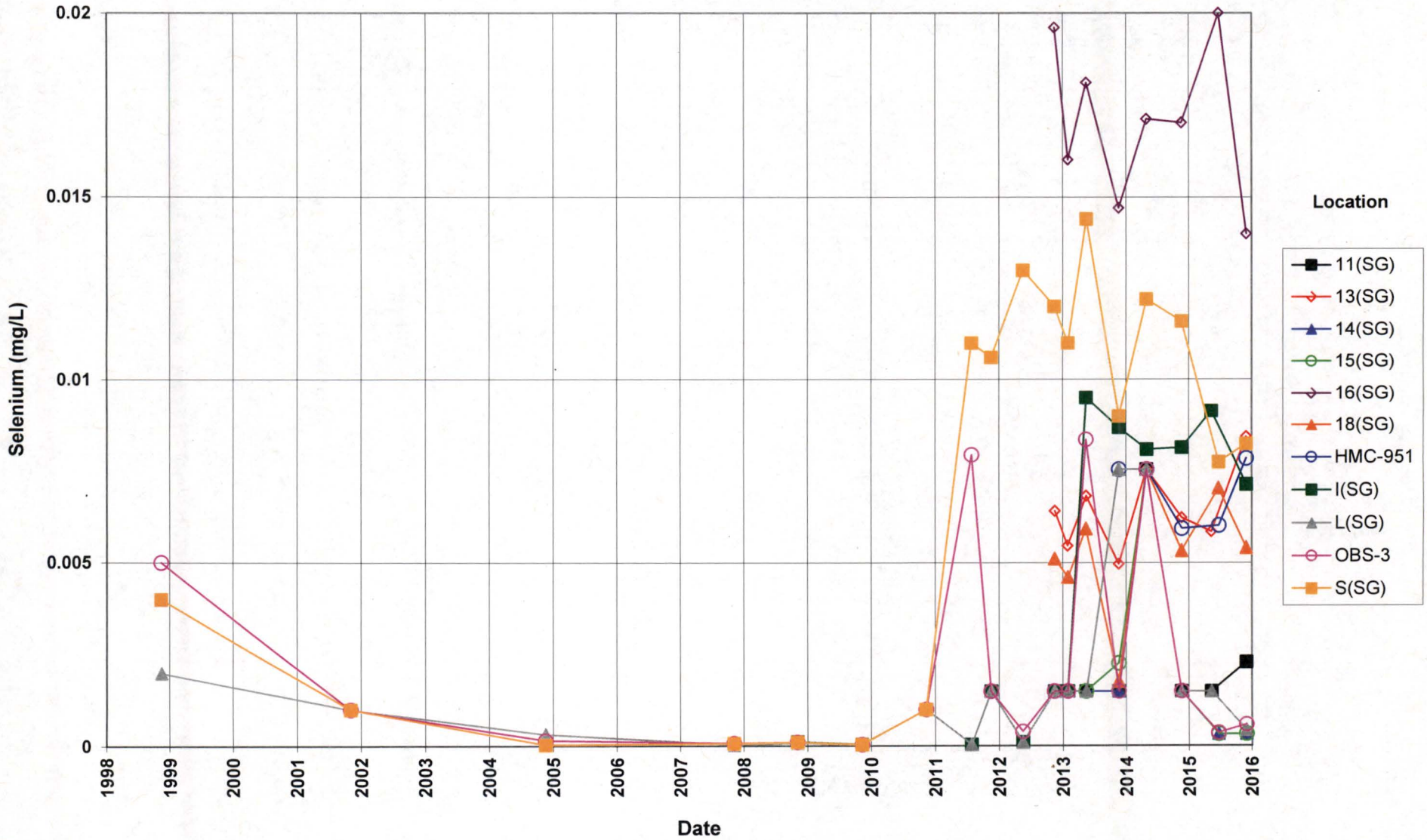
Bluewater Disposal Site
Alluvium Wells
Molybdenum Concentration
Alternate Concentration Limit (ACL) = 0.10 mg/L



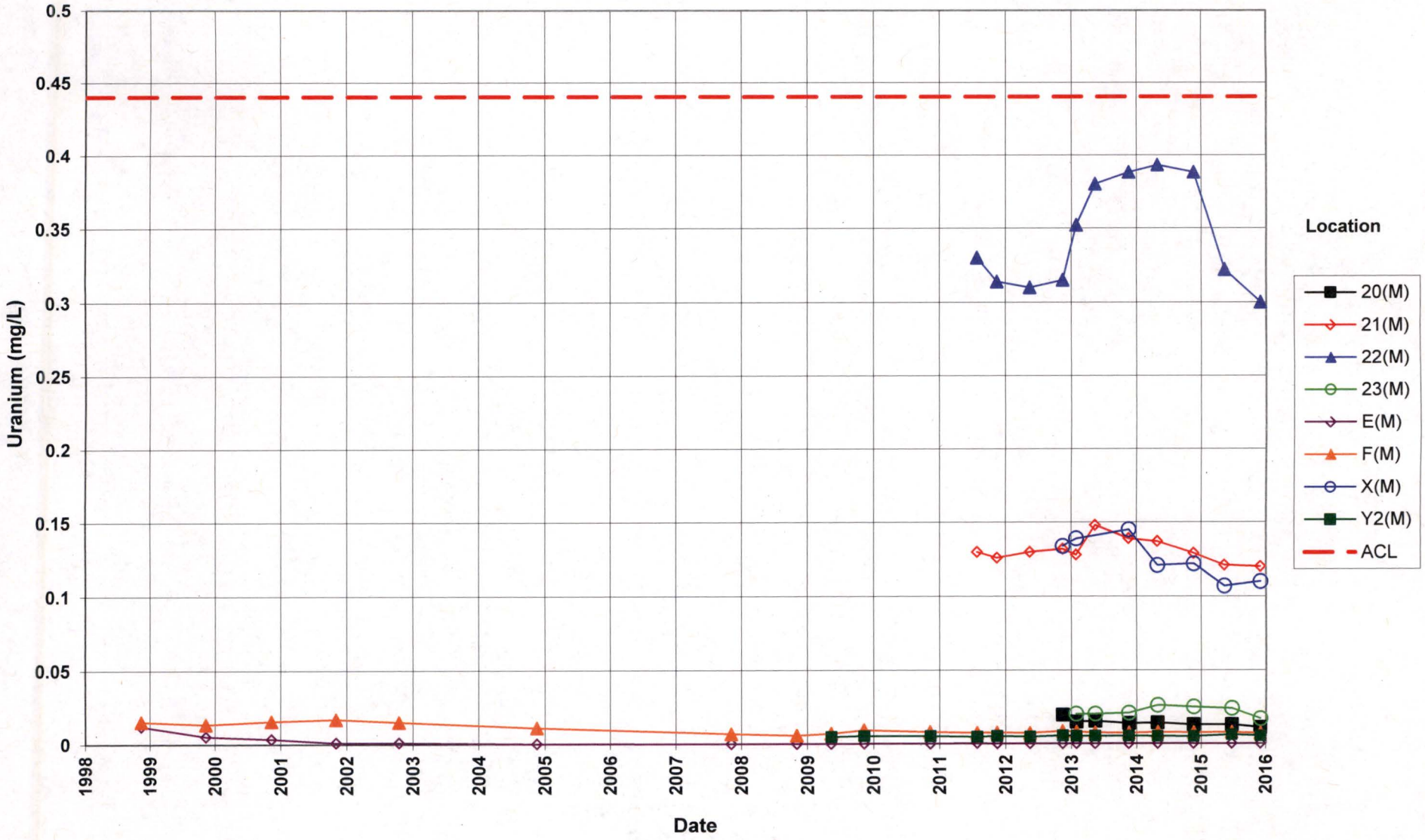
Bluewater Disposal Site
Alluvium Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



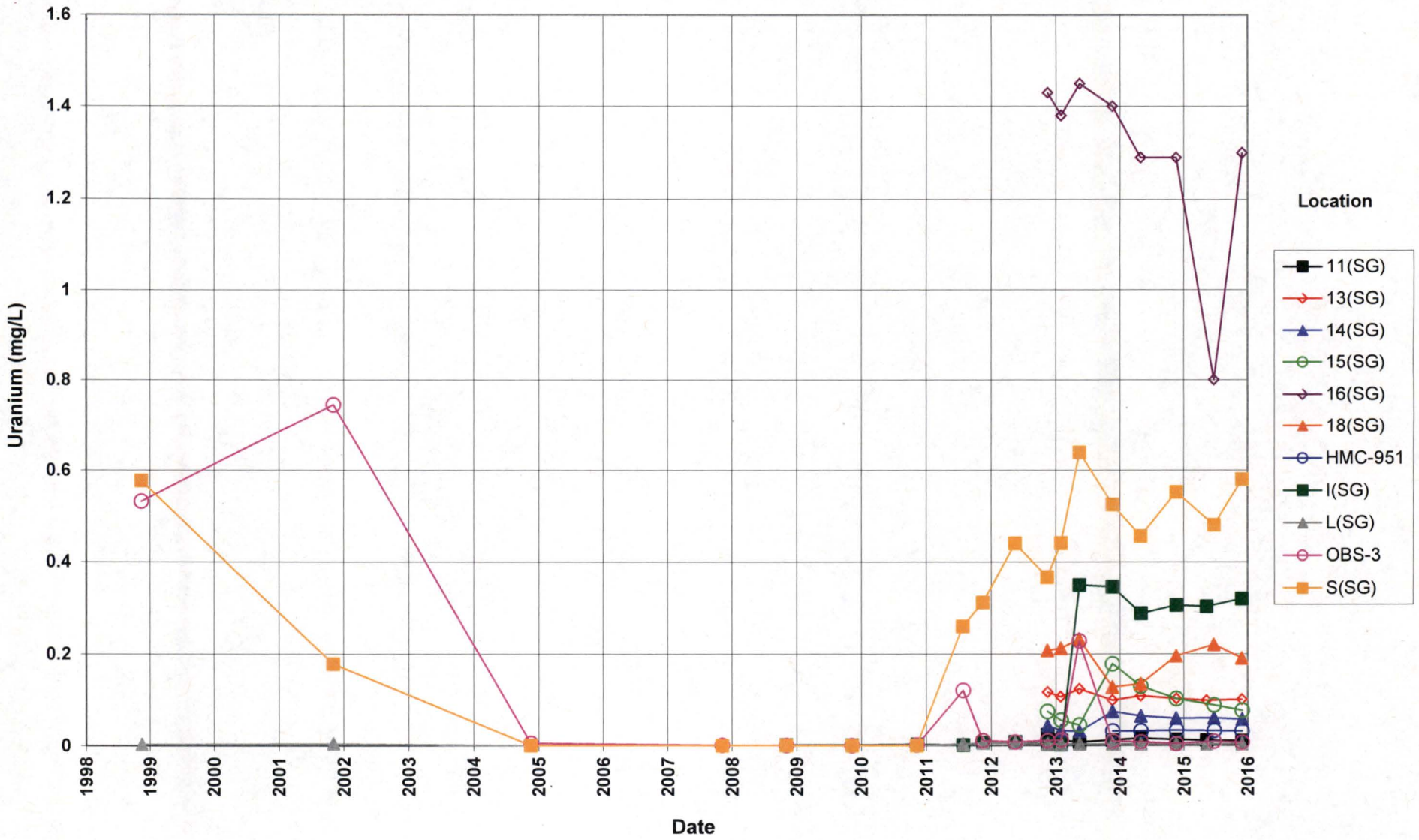
Bluewater Disposal Site
Bedrock Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



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



This page intentionally left blank

Attachment 3

Sampling and Analysis Work Order

This page intentionally left blank

November 2, 2015

Task Assignment 103
Control Number 16-0073

U.S. Department of Energy
Office of Legacy Management
ATTN: Deborah Barr
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 TI & TII Sites, D&D Sites, Other Sites, & Other
November 2015 Environmental Sampling at the Bluewater, New Mexico, Disposal Site

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

Dear Ms. Barr:

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 16, 2015.

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
Site Lead

RKJ/lcg/bkb

Enclosures (3)

cc: (electronic)
Christina Pennal, DOE
Jeff Carman, Navarro
Beverly Cook, Navarro
Steve Donivan, Navarro
Lauren Goodknight, Navarro
Richard Johnson, Navarro
Diana Osborne, Navarro
EDD Delivery
rc-grand.junction
File: BLU 400.02

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	L(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			3 pCi/L	HASL 300 H-02-RC	LMR-17
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 4

Trip Report

This page intentionally left blank

Memorandum

DATE: December 10, 2015

TO: Dick Johnson

FROM: Jeff Price

SUBJECT: Sampling Trip Report

Site: Bluewater, New Mexico, Disposal Site

Dates of Sampling Event: November 30 – December 2, 2015

Team Members: Rob Rice and Jeff Price

Number of Locations Sampled: Samples were collected from 19 of the 20 locations identified.

Locations Not Sampled/Reason: Location T(M) was dry.

Location Specific Information: Reinstalled submersible pump in HMC-951.

Quality Control Sample Cross Reference: The following is the false identification assigned to the quality control sample.

False ID	Ticket Number	True ID	Sample Type	Associated Matrix	Associated Samples
2554	NMZ 104	HMC-951	Duplicate	Groundwater	N/A

Requisition Index Number (RIN) Assigned: Samples were assigned to RIN15117495; field data sheets can be found in \\crow\SMS\15117495\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Durango to ALS Laboratory Group, Fort Collins, Colorado on December 3, 2015.

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

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.

Field Variance: None.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory/DOE: None.

Institutional Controls:

Fences, Gates, and Locks: All ok.
Signs: No issues were observed.
Trespassing/Site Disturbances: None observed.
Disposal Cell/Drainage Structure Integrity: None observed.

Safety Issues: None.

Access Issues: Dan Kump (Homestake Mining Company) met us on December 1 to open the gate and allow access to HMC-951.

General Information: During transport of the samples from the site to the shipping location (Durango, Colorado), a sample container lid came loose and the contents were lost. The lost sample were the anions from location F(M).

Immediate Actions Taken: None.

(JP/lcg)

cc: (electronic)
Deborah Barr, DOE
Steve Donivan, Navarro
Dick Johnson, Navarro
EDD Delivery