LMS/BLU/S00515

40-8902

Data Validation Package

May and June 2015 Groundwater and Surface Water Sampling at the Bluewater, New Mexico, Disposal Site

August 2015

U.S. DEPARTMENT OF ENERGY Legacy Management

NM5520

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Sampling Event Summary

Site: Bluewater, New Mexico, Disposal Site

Sampling Period: May 12–13, 2015 and June 23–24, 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). Duplicate samples were collected from locations 14(SG) and 21(M). Sampling originally scheduled for the week of May 11, 2015 was interrupted by heavy rainfall and later completed in June.

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. This well was dry at the time of construction and for the first sampling event, but since then has had sufficient water to sample. 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. The uranium concentration was 0.121 mg/L in well 21(M), and was 0.107 mg/L in point-of-exposure (POE) well X(M); these results exceed the Uranium Mill Tailings Radiation Control Act (UMTRCA) maximum concentration limit of 0.044 mg/L (40 CFR 192, Table 1) and the New Mexico drinking water standard of 0.03 mg/L. Therefore, alluvial groundwater with

elevated uranium is leaving the site; this occurrence is being evaluated by DOE in consultation with the U.S. Nuclear Regulatory Commission.

Table 1. May-June 2015 Groundwater Monitoring Analytical Results for the Alluvium Wells

Location	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	0.0019	0.0040	0.0130
21(M)	Downgradient	0.0010	0.0115	0.1210
22(M)	Downgradient	0.0012	0.0032	0.3220
23(M)	Downgradient	0.0055	0.0011	0.0240
E(M)	Background	0.0007	0.0004	0.00003
F(M)	POC	0.0010	0.0011	0.0077
T(M)	POC	Not Sampled	Not Sampled	Not Sampled
X(M)	POE	0.0008	0.0071	0.1070
Y2(M)	PCBs	0.0014	0.0013	0.0061

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

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 cross gradient 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 fourth 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. The selenium and uranium concentrations did not exceed ACLs in the POC wells. However, the uranium concentrations in downgradient wells 13(SG) and 18(SG), located along the site boundary, continue to exceed the UMTRCA maximum concentration limit 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 exceeded the New Mexico drinking water standard. Therefore, San Andres aquifer groundwater with elevated uranium is leaving the site; this occurrence is being evaluated by DOE in consultation with the U.S. Nuclear Regulatory Commission.

Table 2. May-June 2015 Groundwater Monitoring Analytical Results for the Bedrock Wells

Location	Category	Selenium (mg/L) ACL=0.05 mg/L	Uranium (mg/L) ACL=2.15 mg/L
11(SG)	Downgradient	0.0015	0.011
13(SG)	Downgradient	0.0058	0.098
14(SG)	Upgradient	ND	0.057
15(SG)	Downgradient	0.0003	0.088
16(SG)	Downgradient	0.0200	0.800
18(SG)	Downgradient	0.0070	0.220
HMC-951	Offsite	0.0060	0.032
I(SG) 265 feet	POE	0.0091	0.303
L(SG)	Background	0.0015	0.003
OBS-3	POC	0.0004	0.009
S(SG)	POC	0.0077	0.480

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

Richard K. Johnson, Site Lead
Stoller Newport News Nuclear, Inc.,
a wholly owned subsidiary of
Huntington Ingalls Industries, Inc.

8/31/15
Date

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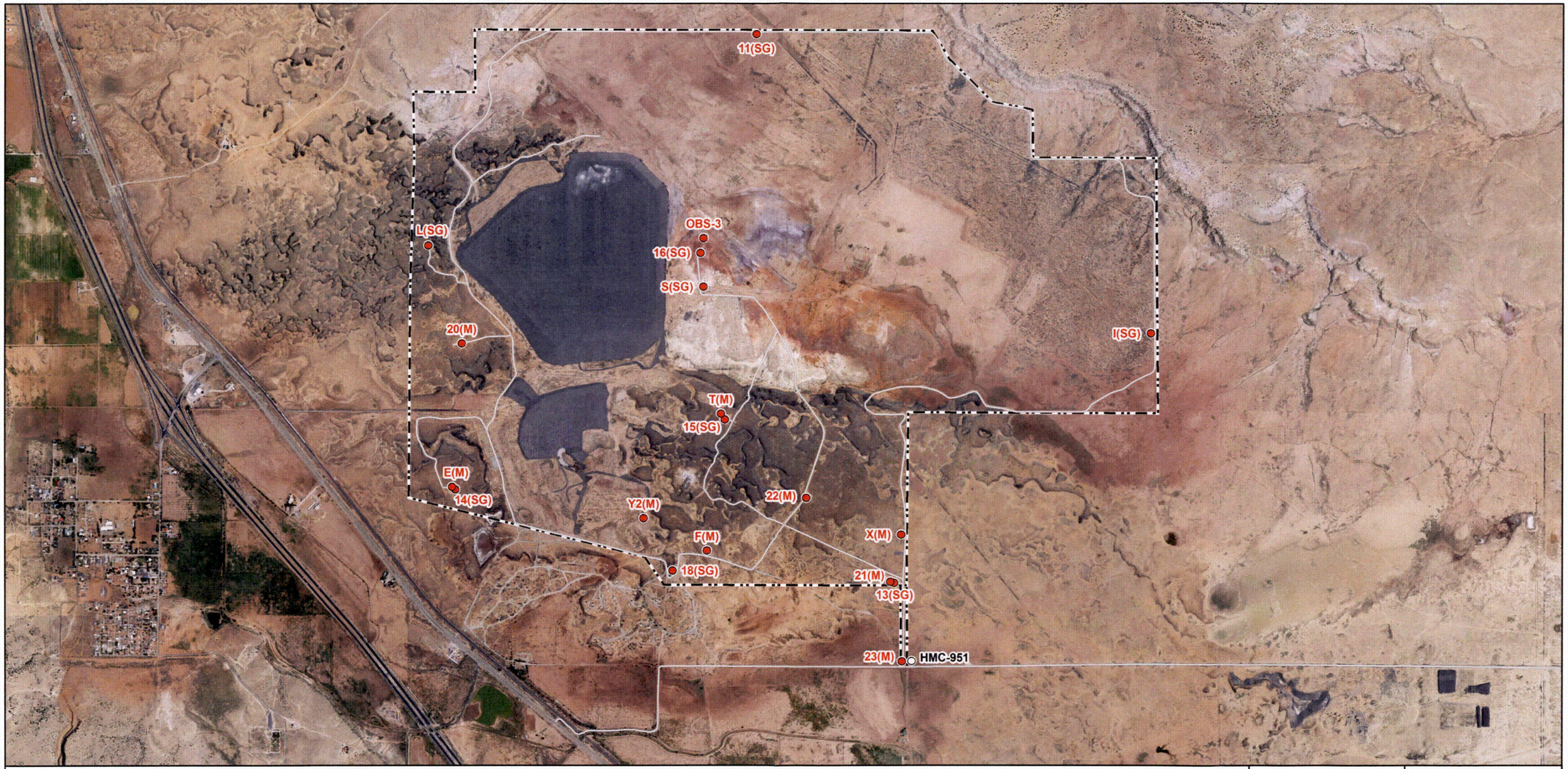

LEGEND

- DOE WELL TO BE SAMPLED
- PRIVATE WELL TO BE SAMPLED
- SITE BOUNDARY

N

SCALE N FEET

0 2,000 4,000

U.S. DEPARTMENT OF ENERGY OFFICE OF LEGACY MANAGEMENT	Work Performed by **Stoller Newport News Nuclear, Inc.** Under DOE Contract Number DE-LM0000415
Planned Sampling Map Bluewater, NM, Disposal Site May 2015	
DATE PREPARED: April 15, 2015	FILE NAME: S1285500

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Bluewater, New Mexico, Disposal Site, Sample Location Map

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	Bluewater, New Mexico, Disposal Site	**Date(s) of Water Sampling**	May 12–13, 2015 and June 23–24, 2015
Date(s) of Verification	August 10, 2015	**Name of Verifier**	Stephen Donivan

	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 April 16, 2015.
2. Were the sampling locations specified in the planning documents sampled?	No	Location T(M) was dry and not sampled.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Calibrations were performed May 7, 2015 and June 18, 2015.
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	Duplicate samples were collected from locations 14(SG) and 21(M).
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	An equipment blank was not required.
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were the true identities of the QC samples documented?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Was all pertinent information documented on the field data sheets?	Yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	15057015
Sample Event:	May 12–13, 2015
Site(s):	Bluewater, New Mexico
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	373205
Analysis:	Metals and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	August 10, 2015

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	EPA 300.0	EPA 300.0
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Total Dissolved Solids (TDS)	WCH-A-033	SM 2540C	SM 2540C

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received eight water samples on May 15, 2015, accompanied by a Chain of Custody form. The air bill numbers were listed 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.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 1.5 °C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

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 300.0
Calibrations for chloride and sulfate were performed using seven calibration standards on April 25, 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 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 six calibration standards on May 26, 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 SM 2540C
There are no initial or continuing calibration requirements associated with the total dissolved solids method.

Method SW-846 6010B
Calibrations for calcium, magnesium, potassium, silica, and sodium were performed on May 19, 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, with the following exceptions. Some potassium check results were below the acceptance range and one result was below 30 percent. All affected results were greater than 5 times the PQL, so no qualification is necessary.

Method SW-846 6020A
Calibrations were performed for arsenic, molybdenum, selenium, and uranium on June 8, 2015, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995. The absolute values of the calibration curve intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results were below the PQL for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

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. MS/MSD data are not evaluated when the spike was performed on a sample that required dilution. 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.

Completeness

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

Chromatography Peak Integration

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

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter (meq/L). Table 4 shows the total anion and cation results in groundwater samples from this event (using the field measurements of alkalinity) and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference of ≤10 percent is considered acceptable.

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

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
11(SG)	28.60	27.64	1.71
13(SG)	16.90	16.27	1.92
21(M)	19.97	19.50	1.19
22(M)	13.07	13.51	1.65
I(SG)	32.99	33.12	0.20
L(SG)	28.21	28.27	0.11
X(M)	18.57	18.87	0.81

The charge balance value for all locations was less than 10 percent.

Electronic Data Deliverable (EDD) File

The EDD file arrived on June 11, 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: 15057015 **Lab Code:** GEN **Validator:** Stephen Donivan **Validation Date:** 08/10/2015

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

# of Samples: 8 **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: 15057015 **Lab Code:** GEN **Date Due:** 06/12/2015

Matrix: Water **Site Code:** BLU01 **Date Completed:** 06/11/2015

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								
Arsenic	ICP/MS	06/08/2015	0.0000	1.0000	OK	OK	OK	104.0	104.0			102.0		98.0
Calcium	ICP/ES	05/19/2015	0.0000	1.0000	OK	OK	OK	102.0	122.0		3.0	98.0	2.3	88.0
Magnesium	ICP/ES	05/19/2015	0.0000	1.0000	OK	OK	OK	102.0	91.3		1.0	100.0	2.3	95.0
Molybdenum	ICP/MS	06/08/2015	0.0000	1.0000	OK	OK	OK	104.0	106.0			104.0		97.0
Potassium	ICP/ES	05/19/2015	0.0000	1.0000	OK	OK	OK	101.0	112.0		3.0	111.0	5.7	115.0
Selenium	ICP/MS	06/08/2015	0.0000	1.0000	OK	OK	OK	104.0	104.0			99.0		96.0
Silica	ICP/ES	05/19/2015	0.0000	1.0000	OK	OK	OK	97.1	97.7		0.0	102.0	4.5	78.0
Sodium	ICP/ES	05/19/2015	0.0000	1.0000	OK	OK	OK	99.8			2.0	101.0	5.3	99.0
Uranium	ICP/MS	06/08/2015	0.0000	1.0000	OK	OK	OK	106.0	99.3		2.0	102.0	2.4	103.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15057015 **Lab Code:** GEN **Date Due:** 06/12/2015

Matrix: Water **Site Code:** BLU01 **Date Completed:** 06/11/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
ALKALINITY, Total as CaCO3	05/22/2015					OK	102.00	103.0			
ALKALINITY, Total as CaCO3	05/22/2015					OK	101.00				
Bicarbonate alkalinity (CaCO3	05/22/2015					OK				0	
Chloride	05/18/2015	0.000	1.0000	OK	OK	OK	95.60				
Chloride	05/20/2015			OK	OK			97.4		0	
NO2+NO3 as N	05/26/2015	0.000	1.0000	OK	OK	OK	105.00	101.0		1.00	
Sulfate	05/18/2015	0.000	1.0000	OK	OK	OK	99.00				
Sulfate	05/20/2015			OK	OK			103.0		1.00	
Total Dissolved Solids	05/18/2015					OK	97.60			0	

General Information

Report Number (RIN):	15067154
Sample Event:	June 23–24, 2015
Site(s):	Bluewater, New Mexico
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	1506511
Analysis:	Metals and Wet Chemistry
Validator:	Stephen Donivan
Review Date:	August 10, 2015

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 5.

Table 5. 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	EPA 300.0	EPA 300.0
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Total Dissolved Solids (TDS)	WCH-A-033	SM 2540C	SM 2540C

Data Qualifier Summary

None of the analytical results required qualification.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, South Colorado, received 13 water samples on June 26, 2015, accompanied by a Chain of Custody form. The air bill numbers were listed 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.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 1.4 °C, which complies with requirements. All samples were received in the correct container types and

had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

Detection and Quantitation Limits

The 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 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 300.0
Calibrations for chloride and sulfate were performed using seven calibration standards on June 16, 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 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 six calibration standards on July 8, 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 SM 2540C
There are no initial or continuing calibration requirements associated with the total dissolved solids method.

Method SW-846 6010B
Calibrations for calcium, magnesium, potassium, silica, and sodium were performed on July 7, 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, with the following exceptions. Some potassium check results were below the acceptance range and one result was below 30 percent. All affected results were greater than 5 times the PQL, so no qualification is necessary.

Method SW-846 6020A
Calibrations were performed for arsenic, molybdenum, selenium, and uranium on June 30, 2015, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995. The absolute values of the calibration curve intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency. All calibration checks associated with reported results met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. Calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. All method blank and calibration blank results were below the PQL for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration.

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

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. MS/MSD data are not evaluated when the spike was performed on a sample that required dilution. 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.

Completeness

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

Chromatography Peak Integration

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

Anion/Cation Balance

The anion/cation balance is used to determine if major ion concentrations have been quantified correctly. The total anions should balance with (be equal to) the total cations when expressed in milliequivalents per liter. Table 6 shows the total anion and cation results in groundwater samples from this event (using the field measurements of alkalinity) and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference of ≤10 percent is considered acceptable.

Table 6. Comparison of Major Anions and Cations in Groundwater Samples

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
14(SG)	22.53	22.69	0.35
15(SG)	19.66	20.97	3.22
16(SG)	45.51	46.32	0.88
18(SG)	20.39	20.36	0.08
20(M)	14.86	14.59	0.92
23(M)	10.54	9.56	4.87
E(M)	16.76	17.64	2.56
F(M)	6.02	5.52	4.38
HMC-951	14.94	15.45	1.68
OBS-3	34.04	36.24	3.13
S(SG)	45.34	49.77	4.66
Y2(M)	7.02	6.02	7.64

meq/L = milliequivalents per liter

The charge balance value for all locations was less than 10 percent.

EDD File

The EDD file arrived on July 13, 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: 15067154 Lab Code: PAR Validator: Stephen Donivan Validation Date: 08/10/2015

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

# of Samples: 13 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: 15067154 **Lab Code:** PAR **Date Due:** 07/24/2015

Matrix: Water **Site Code:** BLU01 **Date Completed:** 07/10/2015

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								
Arsenic	ICP/MS	06/30/2015	0.0000	1.0000	OK	OK	OK	112.0	116.0	113.0	3.0	105.0		121.0
Calcium	ICP/ES	07/07/2015	0.0000	1.0000	OK	OK	OK	104.0	94.0	90.0	1.0	99.0	1.0	123.0
Magnesium	ICP/ES	07/07/2015	0.0000	1.0000	OK	OK	OK	100.0	102.0	103.0	0.0	104.0	3.0	104.0
Molybdenum	ICP/MS	06/30/2015	0.0000	1.0000	OK	OK	OK	105.0	107.0	107.0	0.0	104.0		77.0
Potassium	ICP/ES	07/07/2015	0.0000	1.0000	OK	OK	OK	104.0	102.0	107.0	4.0		5.0	92.0
Selenium	ICP/MS	06/30/2015	0.0000	1.0000	OK	OK	OK	111.0	117.0	107.0	9.0	100.0		75.0
Silicon	ICP/ES	07/07/2015	0.0000	1.0000	OK	OK	OK	102.0	101.0	108.0	0.0	106.0	7.0	130.0
Sodium	ICP/ES	07/07/2015	0.0000	1.0000	OK	OK	OK	101.0	86.0	97.0	2.0		3.0	108.0
Uranium	ICP/MS	06/30/2015	0.0000	1.0000	OK	OK	OK	109.0	83.0	101.0	3.0	106.0	6.0	95.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 15067154 **Lab Code:** PAR **Date Due:** 07/24/2015

Matrix: Water **Site Code:** BLU01 **Date Completed:** 07/10/2015

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
ALKALINITY, Total as CaCO3	07/02/2015					OK	99.00				
Bicarbonate	07/02/2015					OK				0	
CHLORIDE	06/26/2015			OK	OK	OK	102.00	101.0	101.0	0	
Nitrate+Nitrite as N	07/08/2015	0.000	1.0000	OK	OK	OK	99.00	104.0	103.0	1.00	
SULFATE	06/26/2015			OK	OK	OK	101.00	104.0	103.0	1.00	
TOTAL DISSOLVED SOLIDS	07/02/2015					OK	101.00			1.00	
TOTAL DISSOLVED SOLIDS	07/02/2015									0	

Sampling Quality Control Assessment

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

Sampling Protocol

Sample results for monitoring wells were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling 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 sampled as Category II or III. The sample results were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank Assessment

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

Field Duplicate Assessment

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from locations 14(SG) and 21(M). The relative percent difference (RPD) 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: 15067154 **Lab Code:** PAR **Project:** Bluewater **Validation Date:** 08/10/2015

Duplicate: 2554 **Sample:** 14(SG)

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Alkalinity, Carbonate (CO3) as CaCO3	20	U		1	20	U		1			MG/L
Arsenic	5.7			10	5.3			10	7.27		UG/L
Bicarbonate	440			1	430			1	2.30		MG/L
Calcium	140000			1	140000			1	0		UG/L
CHLORIDE	160			20	160			20	0		MG/L
Magnesium	55000			1	55000			1	0		UG/L
Molybdenum	2			10	1.7			10	16.22		UG/L
Nitrate+Nitrite as N	0.01	U		1	0.01	U		1			MG/L
Potassium	5700			1	5600			1	1.77		UG/L
Selenium	0.32	U		10	0.32	U		10			UG/L
Silica	28000			1	28000			1	0		UG/L
Silicon	13000			1	13000			1	0		UG/L
Sodium	250000			1	240000			1	4.08		UG/L
SULFATE	480			20	490			20	2.06		MG/L
TOTAL DISSOLVED SOLIDS	1400			1	1400			1	0		MG/L
Uranium	57			10	60			10	5.13		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 15057015 **Lab Code:** GEN **Project:** Bluewater **Validation Date:** 08/10/2015

Duplicate: 2554 **Sample:** 21(M)

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Arsenic	3.69	B		1.00	3.77	B		1.00			ug/L
Bicarbonate alkalinity (CaCO3)	269			1.00	258			1.00	4.17		mg/L
Calcium	149000			1.00	145000			1.00	2.72		ug/L
Carbonate alkalinity (CaCO3)	0.725	U		1.00	0.725	U		1.00			mg/L
Chloride	131			40.00	130			40.00	0.77		mg/L
Magnesium	41000			1.00	40000			1.00	2.47		ug/L
Molybdenum	0.96			1.00	0.916			1.00	4.69		ug/L
NO2+NO3 as N	12.6			25.00	12.9			25.00	2.35		mg/L
Potassium	6080			1.00	5870			1.00	3.51		ug/L
Selenium	11.5			1.00	11.9			1.00	3.42		ug/L
Silica	25300			1.00	24800			1.00	2.00		ug/L
Sodium	207000			1.00	205000			1.00	0.97		ug/L
Sulfate	489			40.00	484			40.00	1.03		mg/L
Total Dissolved Solids	1270			1.00	1250			1.00	1.59		mg/L
Uranium	121			1.00	113			1.00	6.84		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 — 8-28-2015 — Date

Data Validation Lead: Stephen Donivan — Stephen Donivan — 8-28-2015 — Date

Attachment 1
Assessment of Anomalous Data

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Potential Outliers Report

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Potential Outliers Report

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

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

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

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

The chloride result at X(M) , the sulfate result at 18(SG), and the uranium result at 16(SG) were identified as potentially anomalous. There were no errors identified with the data and the reported chloride and sulfate results are confirmed by the cation/anion balance 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.

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2005
Laboratory: GEL Laboratories
RIN: 15057015
Report Date: 08/10/2015

					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	11(SG)	N001	05/12/2015	Chloride	175		F	207	H	FJ	177		F	7	0	No
BLU01	11(SG)	N001	05/12/2015	Potassium	11.9		F	11.4	E	F	10.00	E	F	7	0	No
BLU01	13(SG)	N001	05/12/2015	Chloride	81.7		F	92.6		F	81.9		F	6	0	No
BLU01	13(SG)	N001	05/12/2015	Uranium	0.0980		F	0.123		F	0.0985		F	6	0	No
BLU01	21(M)	N001	05/12/2015	Alkalinity, Bicarbonate (as $CaCO_3$)	269		F	265		F	164		F	7	0	NA
BLU01	21(M)	N002	05/12/2015	Chloride	130		F	170		F	135		F	11	0	No
BLU01	21(M)	N001	05/12/2015	Chloride	131		F	170		F	135		F	11	0	No
BLU01	21(M)	N002	05/12/2015	Nitrate + Nitrite as Nitrogen	12.9		F	12.7		F	7.90		F	11	0	No
BLU01	21(M)	N002	05/12/2015	Total Dissolved Solids	1250		F	1400		F	1270		F	11	0	No
BLU01	21(M)	N002	05/12/2015	Uranium	0.113		F	0.148		F	0.123		F	11	0	No
BLU01	21(M)	N001	05/12/2015	Uranium	0.121		F	0.148		F	0.123		F	11	0	No
BLU01	22(M)	N001	05/13/2015	Chloride	26.3		F	44.0		F	30.2		F	9	0	No
BLU01	22(M)	N001	05/13/2015	Selenium	0.00322	B	F	0.00760		F	0.00372	B	F	9	1	No
BLU01	22(M)	N001	05/13/2015	Sulfate	195		F	280		F	212		F	9	0	No
BLU01	22(M)	N001	05/13/2015	Total Dissolved Solids	829		F	1100		F	871		F	9	0	No
BLU01	I(SG)	N001	05/12/2015	Alkalinity, Bicarbonate (as $CaCO_3$)	408		F	405		F	102		F	9	0	No
BLU01	X(M)	N001	05/12/2015	Calcium	143		F	165		F	144		F	5	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2005
Laboratory: GEL Laboratories
RIN: 15057015
Report Date: 08/10/2015

					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	05/12/2015	Chloride	160		F	199		F	189		F	5	0	Yes
BLU01	X(M)	N001	05/12/2015	Sodium	178		F	197		F	183		F	5	0	No
BLU01	X(M)	N001	05/12/2015	Sulfate	480		F	528	H	FJ	493		F	5	0	No
BLU01	X(M)	N001	05/12/2015	Total Dissolved Solids	1230		F	1370		F	1310		F	5	0	No
BLU01	X(M)	N001	05/12/2015	Uranium	0.107		F	0.145		F	0.121		F	5	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2005
Laboratory: ALS Laboratory Group
RIN: 15067154
Report Date: 08/10/2015

					Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	Lab	Data	Result	Lab	Data	Result	Lab	Data	N	N Below Detect	
BLU01	14(SG)	N001	06/23/2015	Arsenic	0.00570		F	0.0866		F	0.00625		F	6	1	No
BLU01	14(SG)	N002	06/23/2015	Arsenic	0.00530		F	0.0866		F	0.00625		F	6	1	No
BLU01	14(SG)	N002	06/23/2015	Calcium	140		F	134		F	103		F	6	0	No
BLU01	14(SG)	N001	06/23/2015	Calcium	140		F	134		F	103		F	6	0	No
BLU01	14(SG)	N002	06/23/2015	Molybdenum	0.00170		F	0.00330	*	F	0.00231		F	6	0	No
BLU01	14(SG)	N001	06/23/2015	Molybdenum	0.00200		F	0.00330	*	F	0.00231		F	6	0	No
BLU01	14(SG)	N001	06/23/2015	Potassium	5.70		F	5.11		F	4.49		F	6	0	No
BLU01	14(SG)	N002	06/23/2015	Potassium	5.60		F	5.11		F	4.49		F	6	0	No
BLU01	14(SG)	N001	06/23/2015	Total Dissolved Solids	1400		F	1380		F	1200		F	6	0	No
BLU01	14(SG)	N002	06/23/2015	Total Dissolved Solids	1400		F	1380		F	1200		F	6	0	No
BLU01	15(SG)	N001	06/23/2015	Calcium	110		F	105		F	78.9		F	7	0	No
BLU01	15(SG)	N001	06/23/2015	Potassium	6.80		F	6.35		F	5.34		F	7	0	No
BLU01	16(SG)	N001	06/23/2015	Arsenic	0.00047	J	F	0.00850	U	F	0.00170	U	F	6	6	NA
BLU01	16(SG)	N001	06/23/2015	Molybdenum	0.00210		F	0.00288	*	F	0.00240		F	6	0	No
BLU01	16(SG)	N001	06/23/2015	Nitrate + Nitrite as Nitrogen	3.90		F	4.89		F	4.32		F	6	0	No
BLU01	16(SG)	N001	06/23/2015	Potassium	14.0		F	13.1		F	11.4	E	F	6	0	No
BLU01	16(SG)	N001	06/23/2015	Selenium	0.0200		F	0.0196		F	0.0147		F	6	0	No

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2005
Laboratory: ALS Laboratory Group
RIN: 15067154
Report Date: 08/10/2015

					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	16(SG)	N001	06/23/2015	Uranium	0.800		F	1.45		F	1.29		F	6	0	Yes
BLU01	18(SG)	N001	06/23/2015	Chloride	120		F	111		F	96.1		F	6	0	No
BLU01	18(SG)	N001	06/23/2015	Molybdenum	0.00140		F	0.00393	*	F	0.00202		F	6	0	No
BLU01	18(SG)	N001	06/23/2015	Sodium	150		F	149		F	123		F	6	0	No
BLU01	18(SG)	N001	06/23/2015	Sulfate	500		F	469		F	445		F	6	0	Yes
BLU01	18(SG)	N001	06/23/2015	Total Dissolved Solids	1300		F	1220		F	1150		F	6	0	No
BLU01	20(M)	N001	06/23/2015	Arsenic	0.0110		F	0.00969		F	0.00850	U	F	6	2	No
BLU01	20(M)	N001	06/23/2015	Chloride	61.0		F	60.8		F	54.8		F	6	0	No
BLU01	20(M)	N001	06/23/2015	Nitrate + Nitrite as Nitrogen	3.10		F	4.37		F	3.15		F	6	0	No
BLU01	20(M)	N001	06/23/2015	Sodium	95.0		F	94.3		F	82.9		F	6	0	No
BLU01	23(M)	0001	06/24/2015	Molybdenum	0.00550		FQ	0.00842		FQ	0.00573		FQ	5	0	No
BLU01	23(M)	0001	06/24/2015	Nitrate + Nitrite as Nitrogen	0.840		FQ	3.98			1.16		FQ	5	0	No
BLU01	23(M)	0001	06/24/2015	Selenium	0.00110		FQ	0.00886			0.00199	B	FQ	5	1	No
BLU01	23(M)	0001	06/24/2015	Sulfate	220		FQ	325			242		FQ	5	0	No
BLU01	23(M)	0001	06/24/2015	Total Dissolved Solids	670		FQ	799			684		FQ	5	0	No
BLU01	S(SG)	N001	06/24/2015	Sulfate	1300			1290	H	J	295		F	12	0	NA
BLU01	Y2(M)	N001	06/23/2015	Arsenic	0.00110		F	0.00850	U	F	0.00120		F	15	9	NA

Data Validation Outliers Report - No Field Parameters
Comparison: All historical Data Beginning 01/01/2005
Laboratory: ALS Laboratory Group
RIN: 15067154
Report Date: 08/10/2015

					Current	Qualifiers		Historical Maximum	Qualifiers		Historical Minimum	Qualifiers		Number of Data Points		Statistical Outlier
Site Code	Location Code	Sample ID	Sample Date	Analyte	Result	*Lab*	*Data*	Result	*Lab*	*Data*	Result	*Lab*	*Data*	N	N Below Detect	
BLU01	Y2(M)	N001	06/23/2015	Bicarbonate	220		F	210		F	210		F	5	0	NA
BLU01	Y2(M)	N001	06/23/2015	Chloride	18.0		F	17.3		F	7.00		F	15	0	No
BLU01	Y2(M)	N001	06/23/2015	Molybdenum	0.00140		F	0.00300		F	0.00150		F	15	0	NA
BLU01	Y2(M)	N001	06/23/2015	Sodium	65.0		F	57.7		F	14.0		F	15	0	NA
BLU01	Y2(M)	N001	06/23/2015	Uranium	0.00610		F	0.00557		F	0.00455		F	16	0	No

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

NA: Data are not normally or lognormally distributed.

Attachment 2
Data Presentation

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Groundwater Quality Data

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Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	265	-	295	476		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	265	-	295	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/12/2015	N001	265	-	295	447		F	#		
Arsenic	mg/L	05/12/2015	N001	265	-	295	0.00445	B	F	#	0.0017	
Calcium	mg/L	05/12/2015	N001	265	-	295	181		F	#	0.05	
Chloride	mg/L	05/12/2015	N001	265	-	295	175		F	#	6.7	
Dissolved Oxygen	mg/L	05/12/2015	N001	265	-	295	0.8		F	#		
Field Ferrous Iron	mg/L	05/12/2015	N001	265	-	295	2.1		F	#		
Magnesium	mg/L	05/12/2015	N001	265	-	295	65.5		F	#	0.11	
Molybdenum	mg/L	05/12/2015	N001	265	-	295	0.000538		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N001	265	-	295	0.017	U	F	#	0.017	
Oxidation Reduction Potential	mV	05/12/2015	N001	265	-	295	-120.4		F	#		
pH	s.u.	05/12/2015	N001	265	-	295	6.96		F	#		
Potassium	mg/L	05/12/2015	N001	265	-	295	11.9		F	#	0.05	
Selenium	mg/L	05/12/2015	N001	265	-	295	0.0015	U	F	#	0.0015	
Silica	mg/L	05/12/2015	N001	265	-	295	19.5		F	#	0.053	
Sodium	mg/L	05/12/2015	N001	265	-	295	319		F	#	0.1	
Specific Conductance	umhos /cm	05/12/2015	N001	265	-	295	2631		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	05/12/2015	N001	265	-	295	661		F	#	13.3	
Temperature	C	05/12/2015	N001	265	-	295	17.03		F	#		
Total Dissolved Solids	mg/L	05/12/2015	N001	265	-	295	1750		F	#	3.4	
Turbidity	NTU	05/12/2015	N001	265	-	295	2.43		F	#		
Uranium	mg/L	05/12/2015	N001	265	-	295	0.0111		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	270	-	300	297		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	270	-	300	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/12/2015	N001	270	-	300	259		F	#		
Arsenic	mg/L	05/12/2015	N001	270	-	300	0.00534		F	#	0.0017	
Calcium	mg/L	05/12/2015	N001	270	-	300	158		F	#	0.05	
Chloride	mg/L	05/12/2015	N001	270	-	300	81.7		F	#	2.68	
Dissolved Oxygen	mg/L	05/12/2015	N001	270	-	300	2.57		F	#		
Field Ferrous Iron	mg/L	05/12/2015	N001	270	-	300	0.12		F	#		
Magnesium	mg/L	05/12/2015	N001	270	-	300	48.5		F	#	0.11	
Molybdenum	mg/L	05/12/2015	N001	270	-	300	0.00134		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N001	270	-	300	4.58		F	#	0.17	
Oxidation Reduction Potential	mV	05/12/2015	N001	270	-	300	-21.6		F	#		
pH	s.u.	05/12/2015	N001	270	-	300	7.04		F	#		
Potassium	mg/L	05/12/2015	N001	270	-	300	6.14		F	#	0.05	
Selenium	mg/L	05/12/2015	N001	270	-	300	0.00583		F	#	0.0015	
Silica	mg/L	05/12/2015	N001	270	-	300	16.2		F	#	0.053	
Sodium	mg/L	05/12/2015	N001	270	-	300	112		F	#	0.1	
Specific Conductance	umhos /cm	05/12/2015	N001	270	-	300	1567		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	05/12/2015	N001	270	-	300	406		F	#	5.32	
Temperature	C	05/12/2015	N001	270	-	300	12.96		F	#		
Total Dissolved Solids	mg/L	05/12/2015	N001	270	-	300	1060		F	#	3.4	
Turbidity	NTU	05/12/2015	N001	270	-	300	1.24		F	#		
Uranium	mg/L	05/12/2015	N001	270	-	300	0.098		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	285	-	315	20	U	F	#	20	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	06/23/2015	N002	285	-	315	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	285	-	315	409		F	#		
Arsenic	mg/L	06/23/2015	N001	285	-	315	0.0057		F	#	0.00015	
Arsenic	mg/L	06/23/2015	N002	285	-	315	0.0053		F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	285	-	315	440		F	#	20	
Bicarbonate	mg/L	06/23/2015	N002	285	-	315	430		F	#	20	
Calcium	mg/L	06/23/2015	N001	285	-	315	140		F	#	0.024	
Calcium	mg/L	06/23/2015	N002	285	-	315	140		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	285	-	315	160		F	#	4	
Chloride	mg/L	06/23/2015	N002	285	-	315	160		F	#	4	
Dissolved Oxygen	mg/L	06/23/2015	N001	285	-	315	1.21		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	285	-	315	0.08		F	#		
Magnesium	mg/L	06/23/2015	N001	285	-	315	55		F	#	0.03	
Magnesium	mg/L	06/23/2015	N002	285	-	315	55		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	285	-	315	0.002		F	#	0.00032	
Molybdenum	mg/L	06/23/2015	N002	285	-	315	0.0017		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	285	-	315	0.01	U	F	#	0.01	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 14(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N002	285	-	315	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/23/2015	N001	285	-	315	-56.4		F	#		
pH	s.u.	06/23/2015	N001	285	-	315	7.06		F	#		
Potassium	mg/L	06/23/2015	N001	285	-	315	5.7		F	#	0.052	
Potassium	mg/L	06/23/2015	N002	285	-	315	5.6		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	285	-	315	0.00032	U	F	#	0.00032	
Selenium	mg/L	06/23/2015	N002	285	-	315	0.00032	U	F	#	0.00032	
Silica	mg/L	06/23/2015	N001	285	-	315	28		F	#	0.021	
Silica	mg/L	06/23/2015	N002	285	-	315	28		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	285	-	315	13		F	#	0.0097	
Silicon	mg/L	06/23/2015	N002	285	-	315	13		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	285	-	315	250		F	#	0.047	
Sodium	mg/L	06/23/2015	N002	285	-	315	240		F	#	0.047	
Specific Conductance	umhos /cm	06/23/2015	N001	285	-	315	2121		F	#		
Sulfate	mg/L	06/23/2015	N001	285	-	315	480		F	#	10	
Sulfate	mg/L	06/23/2015	N002	285	-	315	490		F	#	10	
Temperature	C	06/23/2015	N001	285	-	315	18.41		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	285	-	315	1400		F	#	40	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 14(SG) WELL

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	06/23/2015	N002	285	-	315	1400		F	#	40	
Turbidity	NTU	06/23/2015	N001	285	-	315	2.9		F	#		
Uranium	mg/L	06/23/2015	N001	285	-	315	0.057		F	#	0.000029	
Uranium	mg/L	06/23/2015	N002	285	-	315	0.06		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	341	-	371	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	341	-	371	347		F	#		
Arsenic	mg/L	06/23/2015	N001	341	-	371	0.005		F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	341	-	371	360		F	#	20	
Calcium	mg/L	06/23/2015	N001	341	-	371	110		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	341	-	371	180		F	#	4	
Dissolved Oxygen	mg/L	06/23/2015	N001	341	-	371	0.72		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	341	-	371	0.04		F	#		
Magnesium	mg/L	06/23/2015	N001	341	-	371	38		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	341	-	371	0.0052		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	341	-	371	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	06/23/2015	N001	341	-	371	-65.6		F	#		
pH	s.u.	06/23/2015	N001	341	-	371	7.15		F	#		
Potassium	mg/L	06/23/2015	N001	341	-	371	6.8		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	341	-	371	0.00032	U	F	#	0.00032	
Silica	mg/L	06/23/2015	N001	341	-	371	21		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	341	-	371	9.6		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	341	-	371	250		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 15(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	06/23/2015	N001	341	-	371	2020		F	#		
Sulfate	mg/L	06/23/2015	N001	341	-	371	430		F	#	10	
Temperature	C	06/23/2015	N001	341	-	371	15.72		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	341	-	371	1300		F	#	40	
Turbidity	NTU	06/23/2015	N001	341	-	371	1.52		F	#		
Uranium	mg/L	06/23/2015	N001	341	-	371	0.088		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	195	-	225	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	195	-	225	376		F	#		
Arsenic	mg/L	06/23/2015	N001	195	-	225	0.00047	J	F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	195	-	225	420		F	#	20	
Calcium	mg/L	06/23/2015	N001	195	-	225	310		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	195	-	225	480		F	#	10	
Dissolved Oxygen	mg/L	06/23/2015	N001	195	-	225	1.75		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	195	-	225	0.02		F	#		
Magnesium	mg/L	06/23/2015	N001	195	-	225	160		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	195	-	225	0.0021		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	195	-	225	3.9		F	#	0.05	
Oxidation Reduction Potential	mV	06/23/2015	N001	195	-	225	38.8		F	#		
pH	s.u.	06/23/2015	N001	195	-	225	6.7		F	#		
Potassium	mg/L	06/23/2015	N001	195	-	225	14		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	195	-	225	0.02		F	#	0.00032	
Silica	mg/L	06/23/2015	N001	195	-	225	21		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	195	-	225	10		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	195	-	225	380		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 16(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	06/23/2015	N001	195	-	225	4144		F	#		
Sulfate	mg/L	06/23/2015	N001	195	-	225	1200		F	#	25	
Temperature	C	06/23/2015	N001	195	-	225	17.1		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	195	-	225	3100		F	#	80	
Turbidity	NTU	06/23/2015	N001	195	-	225	2.2		F	#		
Uranium	mg/L	06/23/2015	N001	195	-	225	0.8		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	260	-	290	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	260	-	290	317		F	#		
Arsenic	mg/L	06/23/2015	N001	260	-	290	0.0018		F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	260	-	290	330		F	#	20	
Calcium	mg/L	06/23/2015	N001	260	-	290	180		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	260	-	290	120		F	#	4	
Dissolved Oxygen	mg/L	06/23/2015	N001	260	-	290	1.66		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	260	-	290	0.05		F	#		
Magnesium	mg/L	06/23/2015	N001	260	-	290	57		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	260	-	290	0.0014		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	260	-	290	3.2		F	#	0.05	
Oxidation Reduction Potential	mV	06/23/2015	N001	260	-	290	69.2		F	#		
pH	s.u.	06/23/2015	N001	260	-	290	6.87		F	#		
Potassium	mg/L	06/23/2015	N001	260	-	290	7.8		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	260	-	290	0.007		F	#	0.00032	
Silica	mg/L	06/23/2015	N001	260	-	290	17		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	260	-	290	8		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	260	-	290	150		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 18(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	06/23/2015	N001	260	-	290	1863		F	#		
Sulfate	mg/L	06/23/2015	N001	260	-	290	500		F	#	10	
Temperature	C	06/23/2015	N001	260	-	290	19.35		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	260	-	290	1300		F	#	40	
Turbidity	NTU	06/23/2015	N001	260	-	290	7.25		F	#		
Uranium	mg/L	06/23/2015	N001	260	-	290	0.22		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	110	-	125	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	110	-	125	216		F	#		
Arsenic	mg/L	06/23/2015	N001	110	-	125	0.011		F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	110	-	125	250		F	#	20	
Calcium	mg/L	06/23/2015	N001	110	-	125	150		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	110	-	125	61		F	#	2	
Dissolved Oxygen	mg/L	06/23/2015	N001	110	-	125	7.16		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	110	-	125	0.07		F	#		
Magnesium	mg/L	06/23/2015	N001	110	-	125	38		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	110	-	125	0.0019		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	110	-	125	3.1		F	#	0.05	
Oxidation Reduction Potential	mV	06/23/2015	N001	110	-	125	187.2		F	#		
pH	s.u.	06/23/2015	N001	110	-	125	7.07		F	#		
Potassium	mg/L	06/23/2015	N001	110	-	125	4.7		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	110	-	125	0.004		F	#	0.00032	
Silica	mg/L	06/23/2015	N001	110	-	125	26		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	110	-	125	12		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	110	-	125	95		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 20(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	06/23/2015	N001	110	-	125	1387		F	#		
Sulfate	mg/L	06/23/2015	N001	110	-	125	400		F	#	5	
Temperature	C	06/23/2015	N001	110	-	125	17.12		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	110	-	125	980		F	#	20	
Turbidity	NTU	06/23/2015	N001	110	-	125	2		F	#		
Uranium	mg/L	06/23/2015	N001	110	-	125	0.013		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	139.6 - 149.6	269		F	#	0.725	
Alkalinity, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N002	139.6 - 149.6	258		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	139.6 - 149.6	0.725	U	F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N002	139.6 - 149.6	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/12/2015	N001	139.6 - 149.6	236		F	#		
Arsenic	mg/L	05/12/2015	N001	139.6 - 149.6	0.00369	B	F	#	0.0017	
Arsenic	mg/L	05/12/2015	N002	139.6 - 149.6	0.00377	B	F	#	0.0017	
Calcium	mg/L	05/12/2015	N001	139.6 - 149.6	149		F	#	0.05	
Calcium	mg/L	05/12/2015	N002	139.6 - 149.6	145		F	#	0.05	
Chloride	mg/L	05/12/2015	N001	139.6 - 149.6	131		F	#	2.68	
Chloride	mg/L	05/12/2015	N002	139.6 - 149.6	130		F	#	2.68	
Dissolved Oxygen	mg/L	05/12/2015	N001	139.6 - 149.6	4.59		F	#		
Field Ferrous Iron	mg/L	05/12/2015	N001	139.6 - 149.6	0.03		F	#		
Magnesium	mg/L	05/12/2015	N001	139.6 - 149.6	41		F	#	0.11	
Magnesium	mg/L	05/12/2015	N002	139.6 - 149.6	40		F	#	0.11	
Molybdenum	mg/L	05/12/2015	N001	139.6 - 149.6	0.00096		F	#	0.000165	
Molybdenum	mg/L	05/12/2015	N002	139.6 - 149.6	0.000916		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N001	139.6 - 149.6	12.6		F	#	0.425	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 21(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N002	139.6	-	149.6	12.9		F	#	0.425	
Oxidation Reduction Potential	mV	05/12/2015	N001	139.6	-	149.6	28.8		F	#		
pH	s.u.	05/12/2015	N001	139.6	-	149.6	7.34		F	#		
Potassium	mg/L	05/12/2015	N001	139.6	-	149.6	6.08		F	#	0.05	
Potassium	mg/L	05/12/2015	N002	139.6	-	149.6	5.87		F	#	0.05	
Selenium	mg/L	05/12/2015	N001	139.6	-	149.6	0.0115		F	#	0.0015	
Selenium	mg/L	05/12/2015	N002	139.6	-	149.6	0.0119		F	#	0.0015	
Silica	mg/L	05/12/2015	N001	139.6	-	149.6	25.3		F	#	0.053	
Silica	mg/L	05/12/2015	N002	139.6	-	149.6	24.8		F	#	0.053	
Sodium	mg/L	05/12/2015	N001	139.6	-	149.6	207		F	#	0.1	
Sodium	mg/L	05/12/2015	N002	139.6	-	149.6	205		F	#	0.1	
Specific Conductance	umhos /cm	05/12/2015	N001	139.6	-	149.6	1908		F	#		
Sulfate	mg/L	05/12/2015	N001	139.6	-	149.6	489		F	#	5.32	
Sulfate	mg/L	05/12/2015	N002	139.6	-	149.6	484		F	#	5.32	
Temperature	C	05/12/2015	N001	139.6	-	149.6	13.2		F	#		
Total Dissolved Solids	mg/L	05/12/2015	N001	139.6	-	149.6	1270		F	#	3.4	
Total Dissolved Solids	mg/L	05/12/2015	N002	139.6	-	149.6	1250		F	#	3.4	
Turbidity	NTU	05/12/2015	N001	139.6	-	149.6	1.68		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 21(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Uranium	mg/L	05/12/2015	N001	139.6	-	149.6	0.121		F	#	0.000067	
Uranium	mg/L	05/12/2015	N002	139.6	-	149.6	0.113		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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, Bicarbonate (as $CaCO_3$)	mg/L	05/13/2015	N001	136.83 - 146.83	321		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/13/2015	N001	136.83 - 146.83	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/13/2015	N001	136.83 - 146.83	310		F	#		
Arsenic	mg/L	05/13/2015	N001	136.83 - 146.83	0.00412	B	F	#	0.0017	
Calcium	mg/L	05/13/2015	N001	136.83 - 146.83	82.6		F	#	0.05	
Chloride	mg/L	05/13/2015	N001	136.83 - 146.83	26.3		F	#	1.34	
Dissolved Oxygen	mg/L	05/13/2015	N001	136.83 - 146.83	4.85		F	#		
Field Ferrous Iron	mg/L	05/13/2015	N001	136.83 - 146.83	0.03		F	#		
Magnesium	mg/L	05/13/2015	N001	136.83 - 146.83	23.3		F	#	0.11	
Molybdenum	mg/L	05/13/2015	N001	136.83 - 146.83	0.00124		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/13/2015	N001	136.83 - 146.83	35.1		F	#	0.85	
Oxidation Reduction Potential	mV	05/13/2015	N001	136.83 - 146.83	149.4		F	#		
pH	s.u.	05/13/2015	N001	136.83 - 146.83	7.34		F	#		
Potassium	mg/L	05/13/2015	N001	136.83 - 146.83	4.55		F	#	0.05	
Selenium	mg/L	05/13/2015	N001	136.83 - 146.83	0.00322	B	F	#	0.0015	
Silica	mg/L	05/13/2015	N001	136.83 - 146.83	30.7		F	#	0.053	
Sodium	mg/L	05/13/2015	N001	136.83 - 146.83	159		F	#	0.1	
Specific Conductance	umhos /cm	05/13/2015	N001	136.83 - 146.83	1318		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	05/13/2015	N001	136.83	-	146.83	195		F	#	2.66	
Temperature	C	05/13/2015	N001	136.83	-	146.83	13.94		F	#		
Total Dissolved Solids	mg/L	05/13/2015	N001	136.83	-	146.83	829		F	#	3.4	
Turbidity	NTU	05/13/2015	N001	136.83	-	146.83	5.19		F	#		
Uranium	mg/L	05/13/2015	N001	136.83	-	146.83	0.322		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/24/2015	0001	89	-	109	20	U	FQ	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/24/2015	N001	89	-	109	122		FQ	#		
Arsenic	mg/L	06/24/2015	0001	89	-	109	0.00015	U	FQ	#	0.00015	
Bicarbonate	mg/L	06/24/2015	0001	89	-	109	180		FQ	#	20	
Calcium	mg/L	06/24/2015	0001	89	-	109	120		FQ	#	0.024	
Chloride	mg/L	06/24/2015	0001	89	-	109	88		FQ	#	2	
Dissolved Oxygen	mg/L	06/24/2015	N001	89	-	109	4.8		FQ	#		
Field Ferrous Iron	mg/L	06/24/2015	N001	89	-	109	0.02		FQ	#		
Magnesium	mg/L	06/24/2015	0001	89	-	109	27		FQ	#	0.03	
Molybdenum	mg/L	06/24/2015	0001	89	-	109	0.0055		FQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2015	0001	89	-	109	0.84		FQ	#	0.01	
Oxidation Reduction Potential	mV	06/24/2015	N001	89	-	109	223.2		FQ	#		
pH	s.u.	06/24/2015	N001	89	-	109	7.1		FQ	#		
Potassium	mg/L	06/24/2015	0001	89	-	109	6.2		FQ	#	0.052	
Selenium	mg/L	06/24/2015	0001	89	-	109	0.0011		FQ	#	0.00032	
Silica	mg/L	06/24/2015	0001	89	-	109	13		FQ	#	0.021	
Silicon	mg/L	06/24/2015	0001	89	-	109	6		FQ	#	0.0097	
Sodium	mg/L	06/24/2015	0001	89	-	109	50		FQ	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: 23(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Specific Conductance	umhos /cm	06/24/2015	N001	89	-	109	1245		FQ	#		
Sulfate	mg/L	06/24/2015	0001	89	-	109	220		FQ	#	5	
Temperature	C	06/24/2015	N001	89	-	109	16.19		FQ	#		
Total Dissolved Solids	mg/L	06/24/2015	0001	89	-	109	670		FQ	#	20	
Turbidity	NTU	06/24/2015	N001	89	-	109	62.1		FQ	#		
Uranium	mg/L	06/24/2015	0001	89	-	109	0.024		FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	68.6	-	89.8	5	U	FQ	#	5	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	68.6	-	89.8	7		FQ	#		
Arsenic	mg/L	06/23/2015	N001	68.6	-	89.8	0.00015	U	FQ	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	68.6	-	89.8	9.6		FQ	#	5	
Calcium	mg/L	06/23/2015	N001	68.6	-	89.8	200		FQ	#	0.024	
Chloride	mg/L	06/23/2015	N001	68.6	-	89.8	30		FQ	#	2	
Dissolved Oxygen	mg/L	06/23/2015	N001	68.6	-	89.8	0.59		FQ	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	68.6	-	89.8	0.15		FQ	#		
Magnesium	mg/L	06/23/2015	N001	68.6	-	89.8	52		FQ	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	68.6	-	89.8	0.00069	J	FQ	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	68.6	-	89.8	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	06/23/2015	N001	68.6	-	89.8	33.8		FQ	#		
pH	s.u.	06/23/2015	N001	68.6	-	89.8	8.03		FQ	#		
Potassium	mg/L	06/23/2015	N001	68.6	-	89.8	4.4		FQ	#	0.052	
Selenium	mg/L	06/23/2015	N001	68.6	-	89.8	0.00035	J	FQ	#	0.00032	
Silica	mg/L	06/23/2015	N001	68.6	-	89.8	1.2		FQ	#	0.021	
Silicon	mg/L	06/23/2015	N001	68.6	-	89.8	0.56		FQ	#	0.0097	
Sodium	mg/L	06/23/2015	N001	68.6	-	89.8	55		FQ	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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
Specific Conductance	umhos /cm	06/23/2015	N001	68.6	-	89.8	1534		FQ	#		
Sulfate	mg/L	06/23/2015	N001	68.6	-	89.8	800		FQ	#	5	
Temperature	C	06/23/2015	N001	68.6	-	89.8	17.23		FQ	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	68.6	-	89.8	1300		FQ	#	40	
Turbidity	NTU	06/23/2015	N001	68.6	-	89.8	8.14		FQ	#		
Uranium	mg/L	06/23/2015	N001	68.6	-	89.8	0.00003	J	FQ	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
Location: F(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	06/23/2015	N001	94.2	-	114.87	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	94.2	-	114.87	151		F	#		
Arsenic	mg/L	06/23/2015	N001	94.2	-	114.87	0.0011		F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	94.2	-	114.87	170		F	#	20	
Calcium	mg/L	06/23/2015	N001	94.2	-	114.87	71		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	94.2	-	114.87	13		F	#	1	
Dissolved Oxygen	mg/L	06/23/2015	N001	94.2	-	114.87	2.54		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	94.2	-	114.87	0.01		F	#		
Magnesium	mg/L	06/23/2015	N001	94.2	-	114.87	18		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	94.2	-	114.87	0.00098	J	F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	94.2	-	114.87	0.65		F	#	0.01	
Oxidation Reduction Potential	mV	06/23/2015	N001	94.2	-	114.87	89.4		F	#		
pH	s.u.	06/23/2015	N001	94.2	-	114.87	7.72		F	#		
Potassium	mg/L	06/23/2015	N001	94.2	-	114.87	3.3		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	94.2	-	114.87	0.0011		F	#	0.00032	
Silica	mg/L	06/23/2015	N001	94.2	-	114.87	30		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	94.2	-	114.87	14		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	94.2	-	114.87	21		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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
Specific Conductance	umhos /cm	06/23/2015	N001	94.2	-	114.87	583		F	#		
Sulfate	mg/L	06/23/2015	N001	94.2	-	114.87	100		F	#	2.5	
Temperature	C	06/23/2015	N001	94.2	-	114.87	18.71		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	94.2	-	114.87	380		F	#	20	
Turbidity	NTU	06/23/2015	N001	94.2	-	114.87	3.57		F	#		
Uranium	mg/L	06/23/2015	N001	94.2	-	114.87	0.0077		F	#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/24/2015	N001	241	-	275	20	U		#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/24/2015	N001	241	-	275	291			#		
Arsenic	mg/L	06/24/2015	N001	241	-	275	0.002			#	0.00015	
Bicarbonate	mg/L	06/24/2015	N001	241	-	275	280			#	20	
Calcium	mg/L	06/24/2015	N001	241	-	275	150			#	0.024	
Chloride	mg/L	06/24/2015	N001	241	-	275	65			#	2	
Dissolved Oxygen	mg/L	06/24/2015	N001	241	-	275	4.89			#		
Field Ferrous Iron	mg/L	06/24/2015	N001	241	-	275	0.12			#		
Magnesium	mg/L	06/24/2015	N001	241	-	275	44			#	0.03	
Molybdenum	mg/L	06/24/2015	N001	241	-	275	0.00094	J		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2015	N001	241	-	275	4.2			#	0.05	
Oxidation Reduction Potential	mV	06/24/2015	N001	241	-	275	133.4			#		
pH	s.u.	06/24/2015	N001	241	-	275	7			#		
Potassium	mg/L	06/24/2015	N001	241	-	275	5.4			#	0.052	
Selenium	mg/L	06/24/2015	N001	241	-	275	0.006			#	0.00032	
Silica	mg/L	06/24/2015	N001	241	-	275	17			#	0.021	
Silicon	mg/L	06/24/2015	N001	241	-	275	7.9			#	0.0097	
Sodium	mg/L	06/24/2015	N001	241	-	275	85			#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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
Specific Conductance	umhos /cm	06/24/2015	N001	241	-	275	1390			#		
Sulfate	mg/L	06/24/2015	N001	241	-	275	360			#	5	
Temperature	C	06/24/2015	N001	241	-	275	13.85			#		
Total Dissolved Solids	mg/L	06/24/2015	N001	241	-	275	950			#	20	
Turbidity	NTU	06/24/2015	N001	241	-	275	6.89			#		
Uranium	mg/L	06/24/2015	N001	241	-	275	0.032			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: *08/10/2015*
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, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	-	408		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	-	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/12/2015	N001	-	369		F	#		
Arsenic	mg/L	05/12/2015	N001	-	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/12/2015	N001	-	245		F	#	0.05	
Chloride	mg/L	05/12/2015	N001	-	274		F	#	6.7	
Dissolved Oxygen	mg/L	05/12/2015	N001	-	1.03		F	#		
Field Ferrous Iron	mg/L	05/12/2015	N001	-	0.02		F	#		
Magnesium	mg/L	05/12/2015	N001	-	95.4		F	#	0.11	
Molybdenum	mg/L	05/12/2015	N001	-	0.00109		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N001	-	1.47		F	#	0.085	
Oxidation Reduction Potential	mV	05/12/2015	N001	-	-11.9		F	#		
pH	s.u.	05/12/2015	N001	-	6.74		F	#		
Potassium	mg/L	05/12/2015	N001	-	13.4		F	#	0.05	
Selenium	mg/L	05/12/2015	N001	-	0.00911		F	#	0.0015	
Silica	mg/L	05/12/2015	N001	-	15.6		F	#	0.053	
Sodium	mg/L	05/12/2015	N001	-	289		F	#	0.1	
Specific Conductance	umhos /cm	05/12/2015	N001	-	3075		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	05/12/2015	N001	-	860		F	#	13.3	
Temperature	C	05/12/2015	N001	-	16.44		F	#		
Total Dissolved Solids	mg/L	05/12/2015	N001	-	2110		F	#	3.4	
Turbidity	NTU	05/12/2015	N001	-	5.03		F	#		
Uranium	mg/L	05/12/2015	N001	-	0.303		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	-	560		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	-	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/12/2015	N001	-	501		F	#		
Arsenic	mg/L	05/12/2015	N001	-	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/12/2015	N001	-	137		F	#	0.05	
Chloride	mg/L	05/12/2015	N001	-	196		F	#	3.35	
Dissolved Oxygen	mg/L	05/12/2015	N001	-	0.44		F	#		
Field Ferrous Iron	mg/L	05/12/2015	N001	-	0.31		F	#		
Magnesium	mg/L	05/12/2015	N001	-	74.8		F	#	0.11	
Molybdenum	mg/L	05/12/2015	N001	-	0.000416	B	F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N001	-	0.017	U	F	#	0.017	
Oxidation Reduction Potential	mV	05/12/2015	N001	-	-54.4		F	#		
pH	s.u.	05/12/2015	N001	-	6.79		F	#		
Potassium	mg/L	05/12/2015	N001	-	8.38		F	#	0.05	
Selenium	mg/L	05/12/2015	N001	-	0.0015	U	F	#	0.0015	
Silica	mg/L	05/12/2015	N001	-	10.7		F	#	0.053	
Sodium	mg/L	05/12/2015	N001	-	345		F	#	0.1	
Specific Conductance	umhos /cm	05/12/2015	N001	-	2691		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	05/12/2015	N001	-	611		F	#	6.65	
Temperature	C	05/12/2015	N001	-	15.24		F	#		
Total Dissolved Solids	mg/L	05/12/2015	N001	-	1750		F	#	3.4	
Turbidity	NTU	05/12/2015	N001	-	2.17		F	#		
Uranium	mg/L	05/12/2015	N001	-	0.003		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	0001	152.4	-	350	5	U		#	5	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	152.4	-	350	34			#		
Arsenic	mg/L	06/23/2015	0001	152.4	-	350	0.00015	U		#	0.00015	
Bicarbonate	mg/L	06/23/2015	0001	152.4	-	350	9.9			#	5	
Calcium	mg/L	06/23/2015	0001	152.4	-	350	130			#	0.024	
Chloride	mg/L	06/23/2015	0001	152.4	-	350	670			#	10	
Dissolved Oxygen	mg/L	06/23/2015	N001	152.4	-	350	2.03			#		
Field Ferrous Iron	mg/L	06/23/2015	N001	152.4	-	350	3.94			#		
Magnesium	mg/L	06/23/2015	0001	152.4	-	350	130			#	0.03	
Molybdenum	mg/L	06/23/2015	0001	152.4	-	350	0.00032	U		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	0001	152.4	-	350	0.034			#	0.01	
Oxidation Reduction Potential	mV	06/23/2015	N001	152.4	-	350	-16.5			#		
pH	s.u.	06/23/2015	N001	152.4	-	350	7.06			#		
Potassium	mg/L	06/23/2015	0001	152.4	-	350	13			#	0.052	
Selenium	mg/L	06/23/2015	0001	152.4	-	350	0.00035	J		#	0.00032	
Silica	mg/L	06/23/2015	0001	152.4	-	350	0.42			#	0.021	
Silicon	mg/L	06/23/2015	0001	152.4	-	350	0.2			#	0.0097	
Sodium	mg/L	06/23/2015	0001	152.4	-	350	380			#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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
Specific Conductance	umhos /cm	06/23/2015	N001	152.4	-	350	3602			#		
Sulfate	mg/L	06/23/2015	0001	152.4	-	350	800			#	25	
Temperature	C	06/23/2015	N001	152.4	-	350	16.11			#		
Total Dissolved Solids	mg/L	06/23/2015	0001	152.4	-	350	2300			#	80	
Turbidity	NTU	06/23/2015	N001	152.4	-	350	102			#		
Uranium	mg/L	06/23/2015	0001	152.4	-	350	0.0085			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/24/2015	N001	159 - 280	20	U		#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/24/2015	N001	159 - 280	422			#		
Arsenic	mg/L	06/24/2015	N001	159 - 280	0.00015	U		#	0.00015	
Bicarbonate	mg/L	06/24/2015	N001	159 - 280	390			#	20	
Calcium	mg/L	06/24/2015	N001	159 - 280	290			#	0.024	
Chloride	mg/L	06/24/2015	N001	159 - 280	500			#	10	
Dissolved Oxygen	mg/L	06/24/2015	N001	159 - 280	0.81			#		
Field Ferrous Iron	mg/L	06/24/2015	N001	159 - 280	3.68			#		
Magnesium	mg/L	06/24/2015	N001	159 - 280	170			#	0.03	
Molybdenum	mg/L	06/24/2015	N001	159 - 280	0.00062	J		#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/24/2015	N001	159 - 280	2.2			#	0.05	
Oxidation Reduction Potential	mV	06/24/2015	N001	159 - 280	-163.7			#		
pH	s.u.	06/24/2015	N001	159 - 280	7			#		
Potassium	mg/L	06/24/2015	N001	159 - 280	14			#	0.052	
Selenium	mg/L	06/24/2015	N001	159 - 280	0.0077			#	0.00032	
Silica	mg/L	06/24/2015	N001	159 - 280	19			#	0.021	
Silicon	mg/L	06/24/2015	N001	159 - 280	8.7			#	0.0097	
Sodium	mg/L	06/24/2015	N001	159 - 280	380			#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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
Specific Conductance	umhos /cm	06/24/2015	N001	159	-	280	4171			#		
Sulfate	mg/L	06/24/2015	N001	159	-	280	1300			#	25	
Temperature	C	06/24/2015	N001	159	-	280	15.65			#		
Total Dissolved Solids	mg/L	06/24/2015	N001	159	-	280	3100			#	80	
Turbidity	NTU	06/24/2015	N001	159	-	280	7.64			#		
Uranium	mg/L	06/24/2015	N001	159	-	280	0.48			#	0.000029	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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, Bicarbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	123	-	132	205		F	#	0.725	
Alkalinity, Carbonate (as $CaCO_3$)	mg/L	05/12/2015	N001	123	-	132	0.725	U	F	#	0.725	
Alkalinity, Total (as $CaCO_3$)	mg/L	05/12/2015	N001	123	-	132	184		F	#		
Arsenic	mg/L	05/12/2015	N001	123	-	132	0.0022	B	F	#	0.0017	
Calcium	mg/L	05/12/2015	N001	123	-	132	143		F	#	0.05	
Chloride	mg/L	05/12/2015	N001	123	-	132	160		F	#	2.68	
Dissolved Oxygen	mg/L	05/12/2015	N001	123	-	132	2.59		F	#		
Field Ferrous Iron	mg/L	05/12/2015	N001	123	-	132	0.07		F	#		
Magnesium	mg/L	05/12/2015	N001	123	-	132	43.2		F	#	0.11	
Molybdenum	mg/L	05/12/2015	N001	123	-	132	0.000773		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/12/2015	N001	123	-	132	9.6		F	#	0.17	
Oxidation Reduction Potential	mV	05/12/2015	N001	123	-	132	33.5		F	#		
pH	s.u.	05/12/2015	N001	123	-	132	7.75		F	#		
Potassium	mg/L	05/12/2015	N001	123	-	132	5.45		F	#	0.05	
Selenium	mg/L	05/12/2015	N001	123	-	132	0.00714		F	#	0.0015	
Silica	mg/L	05/12/2015	N001	123	-	132	23.2		F	#	0.053	
Sodium	mg/L	05/12/2015	N001	123	-	132	178		F	#	0.1	
Specific Conductance	umhos /cm	05/12/2015	N001	123	-	132	1896		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	05/12/2015	N001	123	-	132	480		F	#	5.32	
Temperature	C	05/12/2015	N001	123	-	132	16.95		F	#		
Total Dissolved Solids	mg/L	05/12/2015	N001	123	-	132	1230		F	#	3.4	
Turbidity	NTU	05/12/2015	N001	123	-	132	1.08		F	#		
Uranium	mg/L	05/12/2015	N001	123	-	132	0.107		F	#	0.000067	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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	06/23/2015	N001	98	-	123	20	U	F	#	20	
Alkalinity, Total (as $CaCO_3$)	mg/L	06/23/2015	N001	98	-	123	166		F	#		
Arsenic	mg/L	06/23/2015	N001	98	-	123	0.0011		F	#	0.00015	
Bicarbonate	mg/L	06/23/2015	N001	98	-	123	220		F	#	20	
Calcium	mg/L	06/23/2015	N001	98	-	123	56		F	#	0.024	
Chloride	mg/L	06/23/2015	N001	98	-	123	18		F	#	1	
Dissolved Oxygen	mg/L	06/23/2015	N001	98	-	123	5.32		F	#		
Field Ferrous Iron	mg/L	06/23/2015	N001	98	-	123	0		F	#		
Magnesium	mg/L	06/23/2015	N001	98	-	123	16		F	#	0.03	
Molybdenum	mg/L	06/23/2015	N001	98	-	123	0.0014		F	#	0.00032	
Nitrate + Nitrite as Nitrogen	mg/L	06/23/2015	N001	98	-	123	1.6		F	#	0.01	
Oxidation Reduction Potential	mV	06/23/2015	N001	98	-	123	95.5		F	#		
pH	s.u.	06/23/2015	N001	98	-	123	7.36		F	#		
Potassium	mg/L	06/23/2015	N001	98	-	123	3.3		F	#	0.052	
Selenium	mg/L	06/23/2015	N001	98	-	123	0.0013		F	#	0.00032	
Silica	mg/L	06/23/2015	N001	98	-	123	26		F	#	0.021	
Silicon	mg/L	06/23/2015	N001	98	-	123	12		F	#	0.0097	
Sodium	mg/L	06/23/2015	N001	98	-	123	65		F	#	0.047	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015
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
Specific Conductance	umhos /cm	06/23/2015	N001	98	-	123	684		F	#		
Sulfate	mg/L	06/23/2015	N001	98	-	123	100		F	#	2.5	
Temperature	C	06/23/2015	N001	98	-	123	17.05		F	#		
Total Dissolved Solids	mg/L	06/23/2015	N001	98	-	123	410		F	#	20	
Turbidity	NTU	06/23/2015	N001	98	-	123	1.85		F	#		
Uranium	mg/L	06/23/2015	N001	98	-	123	0.0061		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.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique.
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER:
- # Validated according to quality assurance guidelines.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 08/10/2015

Location Code	Flow 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	05/12/2015	13:00:48	208.47	6430.72	
13(SG)		6593.57	05/12/2015	18:55:21	169.35	6424.22	
14(SG)		6617.2	06/23/2015	12:15:25	192.71	6424.49	
15(SG)		6612.53	06/23/2015	17:15:02	189.17	6423.36	
16(SG)		6618.25	06/23/2015	18:10:31	188.29	6429.96	
18(SG)		6601.32	06/23/2015	13:30:26	177.91	6423.41	
20(M)		6613.38	06/23/2015	10:30:08	107.19	6506.19	
21(M)		6593.8	05/12/2015	18:10:49	127.98	6465.82	
22(M)		6606.48	05/13/2015	09:35:10	137.49	6468.99	
23(M)		6579.22	06/24/2015	08:50:18	110.13	6469.09	
E(M)		6616.32	06/23/2015	11:05:02	81.71	6534.61	
F(M)		6603.59	06/23/2015	14:55:30	113.38	6490.21	
HMC-951		6576.79	06/24/2015	10:05:53	154.26	6422.53	
I(SG)		6625.93	05/12/2015	10:20:14	201.73	6424.2	
L(SG)		6606.09	05/12/2015	14:15:55	165.91	6440.18	
OBS-3		6617.22	06/23/2015	20:15:41	187.07	6430.15	
S(SG)		6625.25	06/24/2015	12:30:43	195.01	6430.24	
T(M)		6612.65	06/23/2015	15:08:00			D
X(M)		6598.91	05/12/2015	11:40:13	132.11	6466.8	
Y2(M)		6614.13	06/23/2015	14:15:59	117.31	6496.82	

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWNGRADIENT
F OFFSITE N UNKNOWN O ONSITE U UPGRADIENT

WATER LEVEL FLAGS: D DRY F FLOWING B BELOW TOP OF PUMP

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Time-Concentration Graphs

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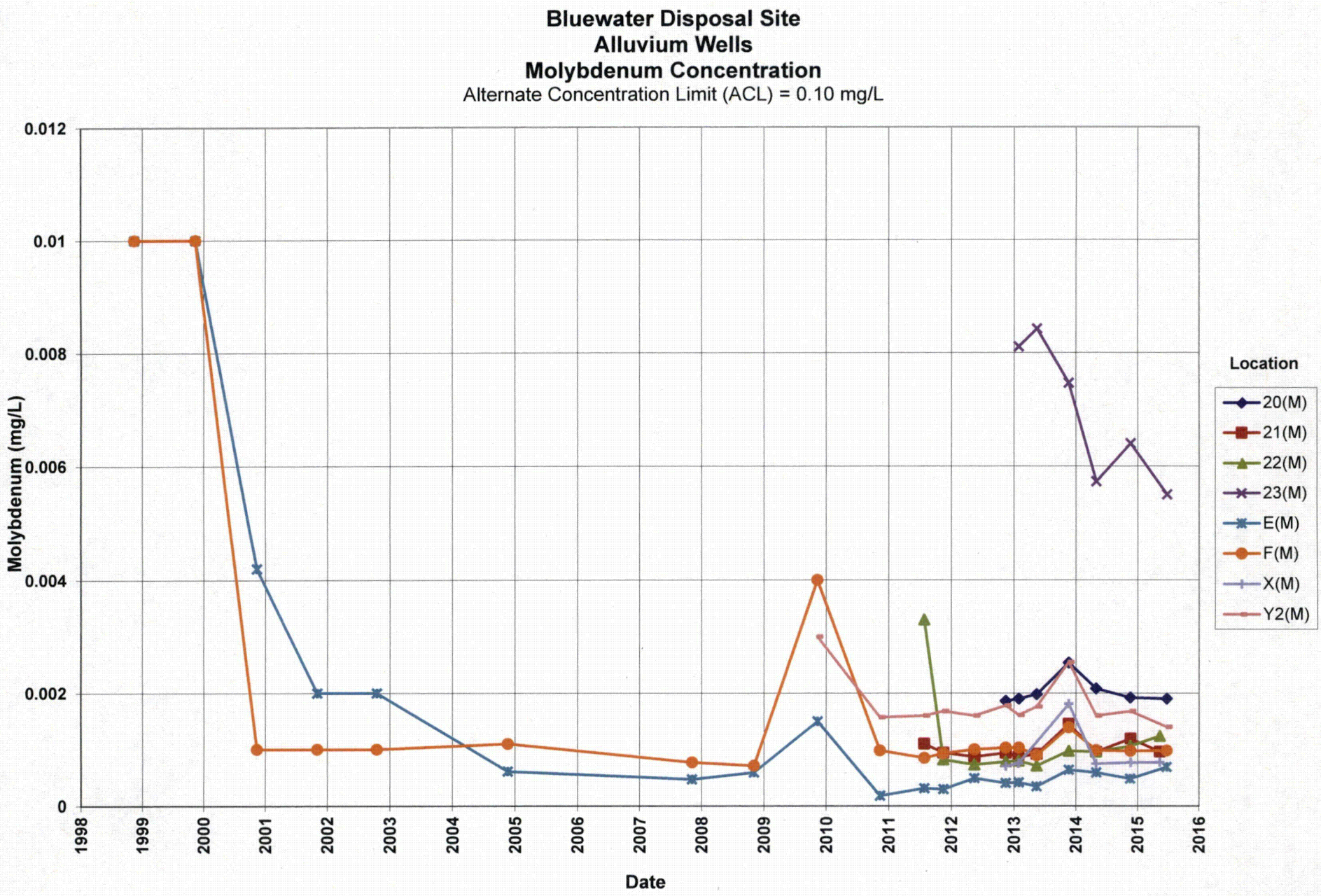
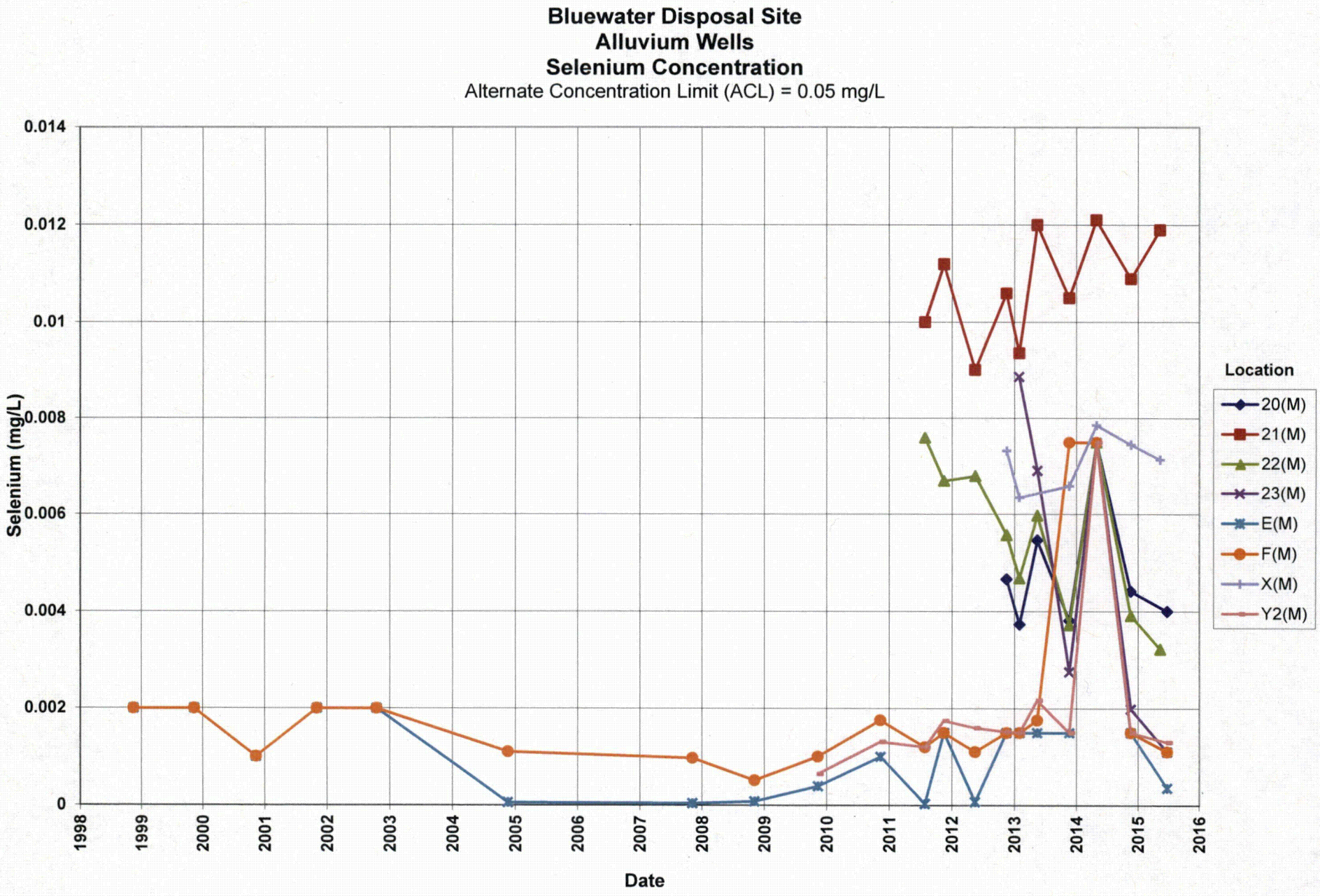
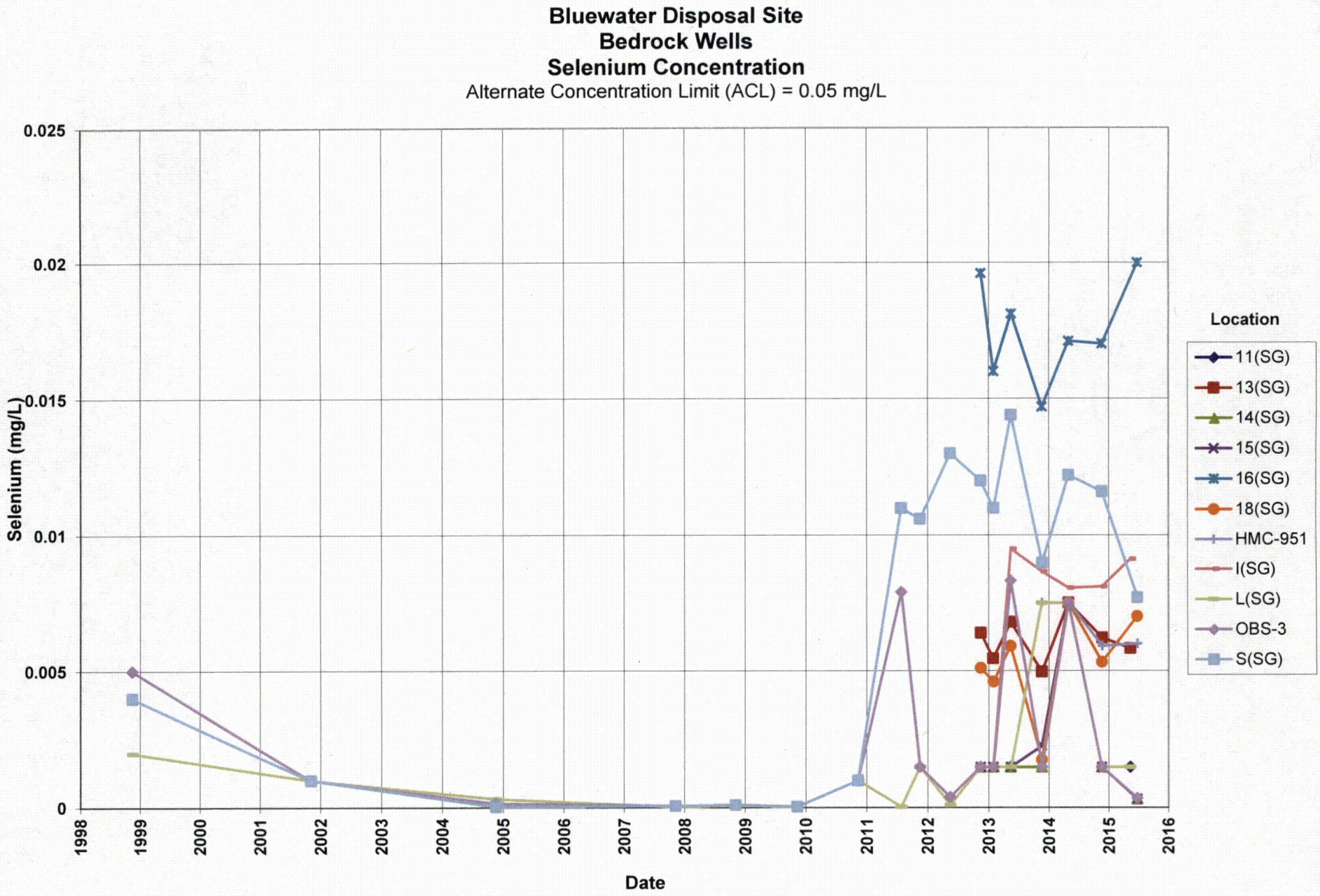
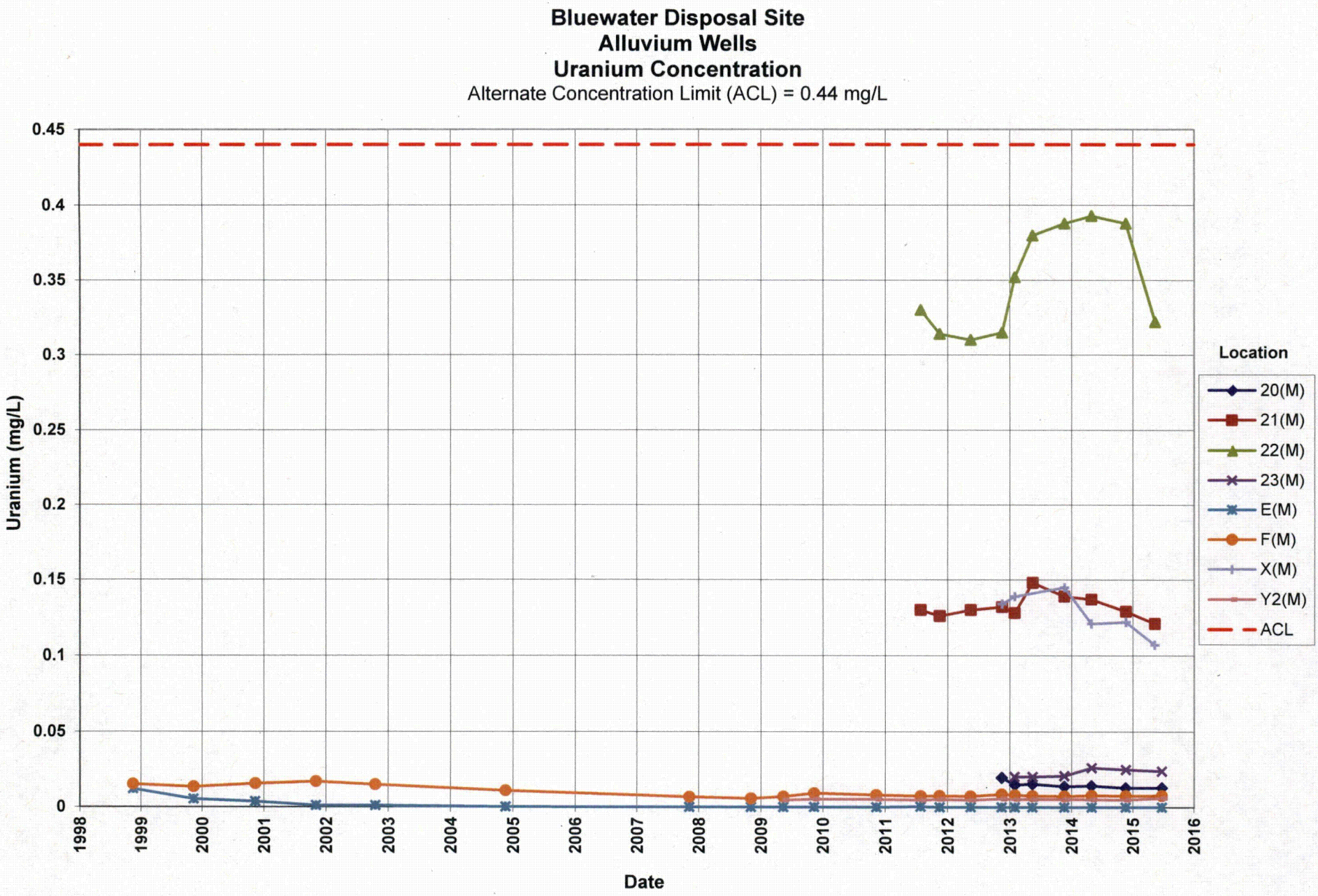
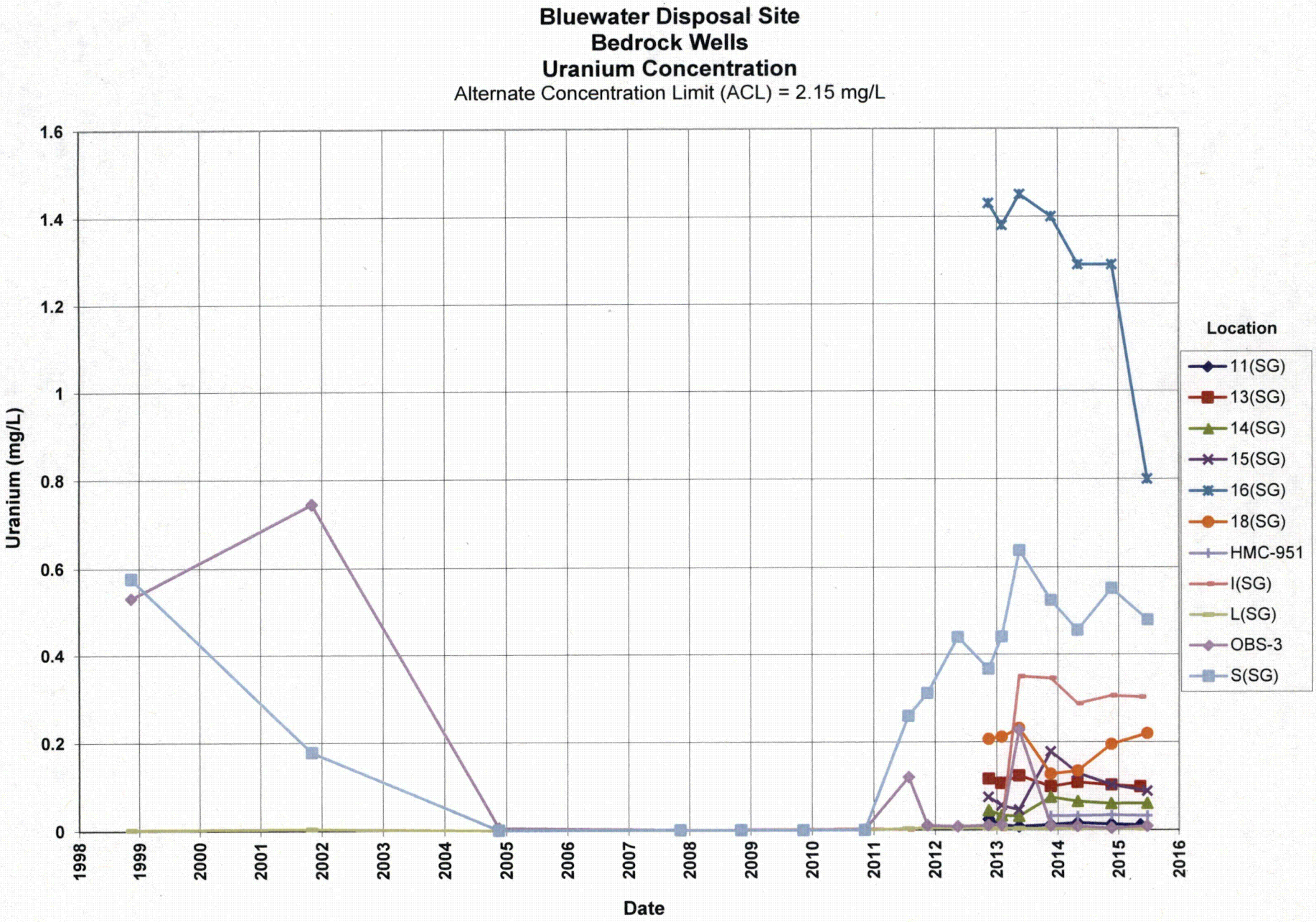

Bluewater Disposal Site
Alluvium Wells
Molybdenum Concentration
Alternate Concentration Limit (ACL) = 0.10 mg/L
Molybdenum (mg/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
20(M)
21(M)
22(M)
23(M)
E(M)
F(M)
X(M)
Y2(M)


Bluewater Disposal Site
Alluvium Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L
Selenium (mg/L)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
20(M)
21(M)
22(M)
23(M)
E(M)
F(M)
X(M)
Y2(M)


Bluewater Disposal Site
Bedrock Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L
Selenium (mg/L)
0.025
0.02
0.015
0.01
0.005
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
11(SG)
13(SG)
14(SG)
15(SG)
16(SG)
18(SG)
HMC-951
I(SG)
L(SG)
OBS-3
S(SG)


Bluewater Disposal Site
Alluvium Wells
Uranium Concentration
Alternate Concentration Limit (ACL) = 0.44 mg/L
Uranium (mg/L)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
20(M)
21(M)
22(M)
23(M)
E(M)
F(M)
X(M)
Y2(M)
ACL


Bluewater Disposal Site
Bedrock Wells
Uranium Concentration
Alternate Concentration Limit (ACL) = 2.15 mg/L
Uranium (mg/L)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Date
Location
11(SG)
13(SG)
14(SG)
15(SG)
16(SG)
18(SG)
HMC-951
I(SG)
L(SG)
OBS-3
S(SG)

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Attachment 3
Sampling and Analysis Work Order

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Stoller Newport News Nuclear

April 16, 2015

Task Assignment 103
Control Number 15-0488

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-LM0000415, Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc.
Task Assignment 103 LTS&M - UMTRCA TI & TII, D&D, Others, and AS&T May 2015 Environmental Sampling at the Bluewater, New Mexico, Disposal Site

REFERENCE: Task Assignment 103, 3-103-1-03-203, Bluewater, New Mexico, Disposal Site

Dear Ms. Barr:

The purpose of this letter is to inform you of the upcoming sampling event at Bluewater, New Mexico. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Bluewater site. Water quality data will be collected at this site as part of the routine environmental sampling currently scheduled to begin the week of May 11, 2015.

The following list shows the monitoring and private wells (with zone of completion) scheduled for sampling 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.

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1789 • Telephone (970) 248-6000 • Fax (970) 248-6040

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
Steve Donivan, SN3
Lauren Goodknight, SN3
Richard Johnson, SN3
Diana Osborne, SN3
EDD Delivery
rc-grand.junction
File: BLU 400.02

A SUBSIDIARY OF HUNTINGTON INGALLS INDUSTRIES
2597 Legacy Way • Grand Junction, CO 81503-1769 • Telephone (970) 248-6000 • Fax (970) 248-6040

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.

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 (NO_3+NO_2)-N	X		0.05	EPA 353.1	WCH-A-022
Oxygen-18					
PCBs	E(M), Y2(M), F(M), T(M), and X(M) only (November only)		0.0005	SW-846 8082	PEP-A-006
Potassium	X		1	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium	X		0.0001	SW-846 6020	LMM-02
Silica	X		0.1	SW-846 6010	LMM-01
Sodium	X		1	SW-846 6010	LMM-01
Strontium					
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	X		10	SM2540 C	WCH-A-033
Tritium			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.

Attachment 4
Trip Reports

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Stoller

Memorandum

DATE: June 5, 2015

TO: Dick Johnson

FROM: Alison Kuhlman

SUBJECT: Groundwater Sampling Trip Report

Site: Bluewater, NM

Dates of Event: May 11 – 13, 2015

Team Members: Alison Kuhlman, Jennifer Graham, and Eric Szabelski

Number of Locations Sampled: Samples were collected at 7 of the 20 monitoring well locations identified on the sampling notification letter dated April 16, 2015.

Locations Not Sampled/Reason: Monitoring wells E(M), Y2(M), F(M), T(M), S(SG), OBS-3, 14(SG), 15(SG), 16(SG), 18(SG), 20(M), 23(M) and HMC-951 were not sampled. On Tuesday May 12, 2015, a record amount of rain was received onsite (1.46 inches in two and a half hours at the SOARS unit). Due to access and safety concerns the site lead closed the site the morning of May 13, 2015, and postponed the remainder of the sampling until June.

Location Specific Information:

Location IDs	Comments
X(M)	Total depth measured at approximately 143 ft. which is deeper than the 136.37 ft. from the database.
I(SG)	Pump depth measured at 235 ft.; drop tubing was present on the end putting the sampling depth at 265 ft. TOC.
S(SG)	Began sampling per program directive BLU-2014-01 by starting to purge the well at 0900 on May 12, 2015. Flow rate was calculated to be 2.5 gallons per minute. Returned to the well at 1450 and began taking stability readings when the sampling team was forced to take shelter within the truck, while in the truck the site received approximately 2 inches of hail. At 1530, the storm lightened, and for safety reasons, the team left the location. The generator was left hooked up to the well and the team planned to return later to complete sampling. Attempted to return to the location for the generator and to sample on May 13, 2015; however, due to the rainfall the team was unable to complete sampling. Later that morning, the site lead arrived onsite and, due to the record amount of rain, determined it was not safe to continue activities on the site. The generator was left at this location. Chris Holmes returned to the site the week of May 18th and retrieved the generator.

Quality Control Sample Cross Reference: The following are the false identifications assigned to quality control samples.

False ID	Ticket Number	True ID	Sample Type	Associated Matrix
2554	NGZ 685	21(M)	Duplicate	Groundwater

Requisition Index Number (RIN) Assigned: Samples were assigned to RIN 15057015. Field data sheets can be found in \\crow\RAApps\SMS\15057015\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Grand Junction, CO to GEL Laboratories in Charleston, SC on May 14, 2015.

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

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. Samples were collected according to the SAP.

Equipment: All equipment functioned properly.

Stakeholder/Regulatory: Nothing to note.

Institutional Controls:

Fences, Gates, Locks: All gates were locked and in good condition.
Signs: No issues observed.
Trespassing/Site Disturbances: None observed.
Disposal Cell/Drainage Structure Integrity: No issues observed.

Safety Issues: Lightning was spotted within 6 miles of the site at 1450 on May 12, 2015. Per the JSA, samplers took cover in the truck. Heavy hail then posed immediate safety concerns and the samplers left their location at approximately 1530. Due to the heavy rainfall, safety concerns continued into the following day when the site lead closed the site.

Access Issues: Due to the heavy rainfall on May 12, 2015, site access was limited continuing into the following day, when the site was closed.

General Information: Nothing to note.

Immediate Actions Taken: The generator and associated equipment was retrieved from well S(SG).

Future Actions Required or Suggested: None.

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

Stoller Newport News Nuclear

Memorandum

DATE: July 1, 2015

TO: Dick Johnson

FROM: Jennifer Graham

SUBJECT: Trip Report

Site: Bluewater, New Mexico, Disposal Site

Dates of Sampling Event: June 23-24, 2015

Team Members: Alison Kuhlman and Jennifer Graham

Number of Locations Sampled: Samples were collected at the 13 remaining locations of the 20 monitoring well locations identified on the sampling notification letter dated April 16, 2015.

	Locations That Were Sampled	Planned Locations
Monitoring wells	11	12
Private Well	1	1

Locations Not Sampled/Reason: Location T(M) was dry; therefore, it was not sampled . Remaining locations from the sampling notification letter were previously collected May 11-13, 2015.

Location Specific Information

Location IDs	Comments
F(M)	Pump depth confirmed at 120 ft. with 0.17 inch drop tubing.
OBS-3	Sampled per program directive BLU-2014-01. The well went dry after approximately 80 gallons was purged. Let well recover for 10 minutes, stability readings were collected, and the well was sampled. The well did not meet turbidity and the samples were filtered. Had difficulty with water level readings, water level sensor became encrusted with a dark, black-brown, coarse particulate.
T(M)	Dry
23(M)	Samples filtered and acidified at 1200 on 6/25/2015.
HMC-951	Sampled per program directive BLU-2014-01. Well is secured with a lock belonging to Homestake Mining Company.
S(SG)	Water level readings could not be measured during the purge. The water level indicator was lowered to approximately 240 feet at which point it went slack without indicating the presence of water.

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	NHT 529	14(SG)	Duplicate	Groundwater	N/A

Requisition Index Number (RIN) Assigned: Samples were assigned to RIN15067154. Field data sheets can be found in \\crow\RAApps\SMS\15067154\FieldData.

Sample Shipment: Samples were shipped overnight via FedEx from Grand Junction to ALS Laboratory Group, Fort Collins, Colorado, on June 25, 2015.

Water Level Measurements: Water levels were measured at all sampled 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: At well S(SG) the water level could not be measured during the purge; therefore, water level stability could not be confirmed. This well was sampled according to Program Directive No. BLU-2014-01.

Equipment: All equipment functioned properly. In addition to standard sampling equipment a colorimeter was used to collect ferrous iron measurements.

Stakeholder/Regulatory/DOE: Adrian Venable, Homestake Mining Company, met us on June 24, 2015, to allow access to HMC-951. In addition to routine samples, 5 gallons of water were collected from the Homestake well for analysis by Homestake Mining Company.

Institutional Controls:

Fences, Gates, and Locks: When leaving the site on June 23, 2015, we found the main site gate had been left open by another accessing company. Apart from this, all gates were closed and locked.
Signs: No issues were observed.
Trespassing/Site Disturbances: None observed.
Disposal Cell/Drainage Structure Integrity: None observed.

Safety Issues: None.

Access Issues: Homestake Mining Company was contacted prior to sampling of HMC-951 to obtain access to the locked field and well.

General Information: Nothing to note.

Immediate Actions Taken: Dedicated elbows with a hose fixture and a sampling port were left in monitoring wells OBS-3 and S(SG).

Future Actions Required or Suggested:

Monitoring well S(SG) has 200 feet of water-level-meter tape downhole that may be preventing water level measurement readings and should be fished out. This item was added to the Operation and Maintenance Punch list found at \\lm\projects\SamplingProg\Maintenance for tracking and future resolution.

(JG/lcg)

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

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Data Validation Package
for the Bluewater, New Mexico, Disposal Site,
May and June 2015

The U.S. Department of Energy (DOE) has prepared a Data Validation Package containing the groundwater and surface water monitoring data generated from the May and June 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