Data Validation Package

May 2013
Groundwater Sampling at the Bluewater, New Mexico, Disposal Site

August 2013

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Bluewater, New Mexico, Disposal Site

Sampling Period: May 14-16, 2013

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/S04325, continually updated). Duplicate samples were collected from locations 11(SG) and S(SG).

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 and are identified by the suffix (SG). Well OBS-3 is also completed in the San Andres/Glorieta aquifer.

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

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 apparently 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) and point-of-exposure (POE) well X(M) were also scheduled for sampling but were dry.

Analytical results for the required constituents for the alluvium wells are provided in Table 1. The uranium concentration was 0.148 milligrams per liter (mg/L) in well 21(M), which exceeds the Uranium Mill Tailings Radiation Control Act (UMTRCA) maximum concentration limit (MCL) of 0.044 mg/L (40 CFR 192, Table 1). 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. The extent of contamination in the alluvial aquifer is not known at this time. However, the uranium concentration in well 23(M), located about 1,600 feet downgradient of well 21(M), was 0.0203 mg/L.

Table 1. May 2013 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	0.0020	0.0055	0.016
21(M)	Downgradient	0.0009	0.0120	0.148
22(M)	Downgradient	0.0007	0.0060	0.380
23(M)	Downgradient	0.0084	0.0069	0.020
E(M)	Background	0.0003	ND	ND
F(M)	POC	0.0009	0.0018	0.008
T(M)	POC	Not Sampled	Not Sampled	Not Sampled
X(M)	POE	Not Sampled	Not Sampled	Not Sampled
Y2(M)	PCBs	0.0018	0.0022	0.005

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/ Glorieta aquifer at the site, and because a nearby off-site private well (HMC-951) completed in the same aquifer indicated elevated uranium concentrations. There were no bedrock wells in the south portion of the site prior to this well construction project. Wells 11(SG) and 14(SG) are considered to be crossgradient of the disposal cells, and all of the other new wells are downgradient of the cells. Well 16(SG) was installed between POC wells OBS-3 and S(SG) because of the poor condition of those wells (their well screens are highly corroded). Wells OBS-3 and S(SG) continue to be sampled.

Bedrock wells I(SG) and L(SG) were completed with open-hole construction through the entire thickness of the San Andres Limestone and Glorieta Sandstone formations. All of the new San Andres/Glorieta aquifer wells on site, except well 16(SG), are screened in the upper 50 feet of the San Andres Limestone as are most San Andres/Glorieta aquifer wells in the region because this is the most productive zone of the aquifer (well 16(SG) is screened in the Glorieta Sandstone because the San Andres Limestone is dry at that location). In response to questions by NMED 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, three zones of different conductivities were noted in POE well I(SG). Low-flow samples were collected in each zone in well I(SG) to see if the changes in conductivity corresponded with changes in uranium concentrations. Well L(SG) was also sampled at three depths for comparison purposes. The sample depths are provided in Table 2.

Table 2. May 2013 Sampling Depths for Wells I(SG) and L(SG)

Location	Category	Pump Intake Depth	Length of Drop Tube	Sample Collection Point (below top of casing)
I(SG)	POE	236 feet	No drop tube	236 feet
I(SG)-270	POE	236 feet	27 feet	265 feet
I(SG)-315	POE	236 feet	64 feet	300 feet
L(SG)	Background	185 feet	255 feet	440 feet
L(SG)-510	Background	185 feet	325 feet	510 feet
L(SG)-580	Background	185 feet	395 feet	580 feet

Key: POE = point-of-exposure well

Private well HMC-951 was scheduled for sampling during this event; it is located near the site entrance and is completed in the top 30 feet of the San Andres Limestone. However, the pump intake could not be installed in the screened interval because of an obstruction in the well, so the well was not sampled. A different sampling method will be tried in November 2013.

Analytical results for the required constituents in bedrock wells are provided in Table 3. 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 MCL. Therefore, San Andres/Glorieta 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 3. May 2013 Groundwater Monitoring Analytical Results for the Bedrock Wells

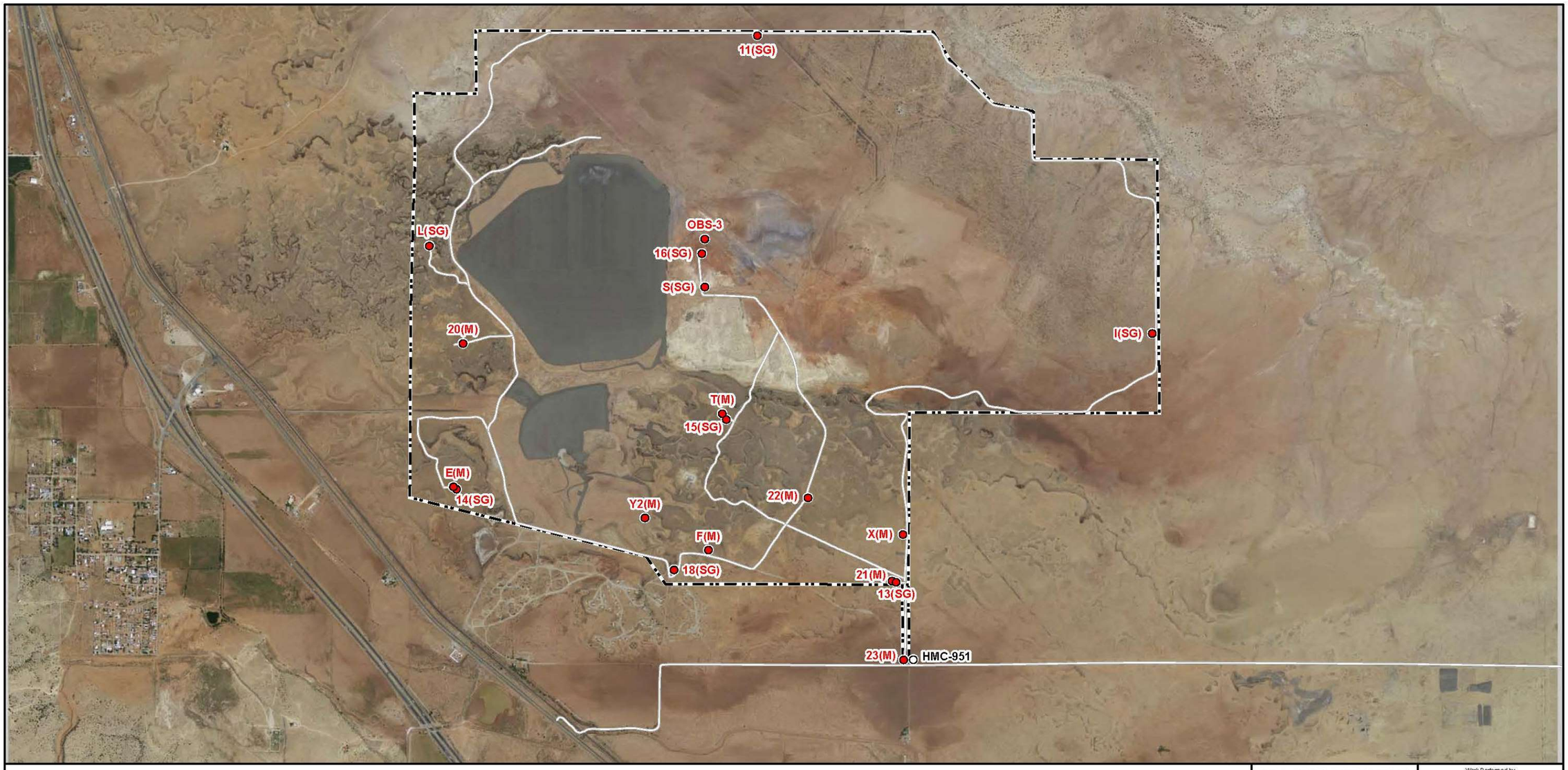
Location	Category	Selenium (mg/L) ACL=0.05 mg/L	Uranium (mg/L) ACL=2.15 mg/L
11(SG)	Downgradient	ND	0.007
13(SG)	Downgradient	0.0068	0.123
14(SG)	Upgradient	ND	0.031
15(SG)	Downgradient	ND	0.045
16(SG)	Downgradient	0.0181	1.450
18(SG)	Downgradient	0.0059	0.232
I(SG)	POE	ND	0.005
I(SG)-270	POE	0.0095	0.350
I(SG)-315	POE	0.0088	0.334
L(SG)	Background	ND	0.003
L(SG)-510	Background	ND	0.003
L(SG)-580	Background	ND	0.003
OBS-3	POC	0.0083	0.228
S(SG)	POC	0.0137	0.639

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

The multiple-depth samples from background well L(SG) were well below standards and did not show a change in uranium concentration with depth. However, although the upper sample in well I(SG)—which is the normal sampling depth for that well—continued to have a uranium concentration well below the MCL, uranium in the samples at the lower depths exceeds the MCL. It appears that there is a correlation between conductivity and uranium concentration and that there is geochemical stratification within the aquifer at this location, and this occurrence is under evaluation by DOE.

Richard K. Johnson
Site Lead, S.M. Stoller Corporation

8/15/13
Date



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	**Date(s) of Water Sampling**	May 14-16, 2013
Date(s) of Verification	July 25, 2013	**Name of Verifier**	Gretchen Baer

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List any Program Directives or other documents, SOPs, instructions.		Program Directive BLU-2013-01. Work Order letter dated April 15, 2013.
2. Were the sampling locations specified in the planning documents sampled?	No	Locations T(M) and X(M) were dry. A pump could not be installed at location HMC-951 (which was not in the notification letter). Well 23(M) was sampled but was not in the notification letter. Location "Simpson" was in the notification letter but was not sampled.
3. Were calibrations conducted as specified in the above-named documents?	Yes	Pre-trip calibration performed on May 10, 2013.
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 11(SG) and S(SG).
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA	
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?	No	Presence of ice was inadvertently not documented at 3 locations.
19. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	13055299
Sample Event:	May 14-16, 2013
Site(s):	Bluewater, New Mexico
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	325965
Analysis:	Metals and Wet Chemistry
Validator:	Gretchen Baer
Review Date:	July 25, 2013

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 4.

Table 4. 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-004	EPA 310.1/ SM 2320B	EPA 310.1/ SM 2320B
Chloride, Sulfate	MIS-A-045	EPA 300.0	EPA 300.0
Calcium, Magnesium, Potassium, Sodium	LMM-01	SW-846 3005A	SW-846 6010B
Arsenic, Molybdenum, Selenium, Uranium	LMM-02	SW-846 3005A	SW-846 6020
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Total Dissolved Solids	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 23 water samples on May 17, 2013, accompanied by Chain of Custody forms. The air bill numbers were listed in the receiving documentation. The Chain of Custody forms were 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 forms were complete with no errors or omissions with the following exceptions. The sample date and/or time was written incorrectly on the Chain of Custody for samples 2485 and L(SG). The filtration status was incorrect for sample L(SG). The errors were corrected upon entry into the environmental database.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 3 °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 (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 28, 2013. 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 with all calibration checks meeting the acceptance criteria.

Methods EPA 310.1/ SM 2320B, SM 2540C
There are no initial or continuing calibration requirements associated with the alkalinity or total dissolved solids methods.

Method EPA 353.2
Calibrations for nitrate + nitrite as N were performed using five calibration standards on June 10, 2013. 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 with all calibration check results within the acceptance criteria.

Method SW-846 6010B
Calibrations for calcium, magnesium, potassium, and sodium were performed June 10–11, 2013, 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 with all calibration checks meeting the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL. All check results were within the acceptance range of 70 percent to 130 percent recovery with the exception of some results for potassium and sodium. This indicates a higher degree of uncertainty in measuring potassium and sodium at low concentrations. 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 June 9–12, 2013, using two 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 with all calibration checks meeting 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. Methods without sample preparation do not require the analysis of a method blank. 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 with the exception of some potassium calibration blanks. There were no reported results associated with these blanks. In cases where a blank concentration exceeds the MDL, the associated sample results were greater 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 (MS) samples are used to measure method performance in the sample matrix. The MS data are not evaluated when the concentration of the unspiked sample is greater than 4 times the spike. The spike recoveries met the acceptance criteria for all analytes evaluated.
(A nitrate + nitrite as N spike recovery was above the laboratory acceptance range but less than the validation upper limit, not requiring qualification.)

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate 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. 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 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 5 shows the total anion and cation results in groundwater samples from this event and the charge balance, which is a relative percent difference calculation. Typically, a charge balance difference of 10 percent is considered acceptable.

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

Location	Cations (meq/L)	Anions (meq/L)	Charge Balance
11(SG)	27.1	24.7	4.7%
13(SG)	18.2	17.0	3.6%
14(SG)	21.6	20.0	3.9%
15(SG)	19.2	18.5	1.7%
16(SG)	50.0	47.0	3.0%
18(SG)	20.8	18.9	4.8%
20(M)	15.8	14.5	4.4%
21(M)	21.6	19.9	4.0%
22(M)	14.9	14.7	0.9%
23(M)	13.2	11.5	7.2%
E(M)	18.6	16.6	5.8%
F(M)	6.5	5.9	4.2%
I(SG)	11.9	11.3	2.2%
I(SG)-270	37.6	33.5	5.7%
I(SG)-315	36.7	33.5	4.7%
L(SG)	31.1	28.8	3.8%
L(SG)-510	29.4	28.8	1.1%
L(SG)-580	30.1	28.6	2.6%
OBS-3	40.3	38.8	1.9%
S(SG)	49.3	46.9	2.5%
Y2(M)	7.1	6.6	3.6%

The charge balance values met the acceptance criteria, indicating acceptable analytical performance.

Electronic Data Deliverable (EDD) File

The EDD file arrived on June 14, 2013. 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: 13055299 **Lab Code:** GEN **Validator:** Gretchen Baer **Validation Date:** 7/25/2013

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

# of Samples: 23 **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 were 2 duplicates evaluated.

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 13055299 **Lab Code:** GEN **Date Due:** 6/14/2013

Matrix: Water **Site Code:** BLU01 **Date Completed:** 6/13/2013

Analyte	Method Type	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
			Int.	R^2	CCV	CCB								
Calcium	ICP/ES	06/11/2013									1.0	94.0	0.5	117.0
Calcium	ICP/ES	06/10/2013					OK	107.0			4.0	95.0	0.1	108.0
Calcium	ICP/ES	06/11/2013									1.0	95.0		116.0
Calcium	ICP/ES	06/10/2013	0.0000	1.0000	OK	OK	OK	102.0				95.0		105.0
Magnesium	ICP/ES	06/10/2013	0.0000	1.0000	OK	OK	OK	103.0	85.4		5.0	95.0	1.1	106.0
Magnesium	ICP/ES	06/11/2013									2.0	95.0		126.0
Magnesium	ICP/ES	06/10/2013					OK	104.0					1.7	109.0
Magnesium	ICP/ES	06/11/2013									1.0	95.0		104.0
Potassium	ICP/ES	06/10/2013	0.0000	1.0000	OK	OK	OK	99.1				111.0	7.0	199.0
Potassium	ICP/ES	06/10/2013					OK	98.7	107.0		3.0	111.0	3.0	82.0
Potassium	ICP/ES	06/11/2013							105.0		2.0	112.0		136.0
Potassium	ICP/ES	06/11/2013							97.9		0.0	103.0		115.0
Sodium	ICP/ES	06/11/2013									3.0	103.0	1.0	136.0
Sodium	ICP/ES	06/10/2013	0.0000	1.0000	OK	OK	OK	99.4			2.0	104.0	0.6	115.0
Sodium	ICP/ES	06/10/2013					OK	100.0			5.0	103.0		124.0
Arsenic	ICP/MS	06/11/2013	0.0000	1.0000	OK	OK	OK	103.0	109.0		15.0	111.0		96.0
Arsenic	ICP/MS	06/11/2013					OK	101.0	101.0			100.0		98.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 13055299 **Lab Code:** GEN **Date Due:** 6/14/2013

Matrix: Water **Site Code:** BLU01 **Date Completed:** 6/13/2013

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								
Molybdenum	ICP/MS	06/10/2013	0.0000	1.0000	OK	OK	OK	103.0	114.0			97.0		86.0
Molybdenum	ICP/MS	06/09/2013					OK	102.0	110.0		3.0	98.0		106.0
Selenium	ICP/MS	06/11/2013	0.0000	1.0000	OK	OK	OK	110.0	122.0			113.0		103.0
Selenium	ICP/MS	06/11/2013					OK	110.0	109.0		1.0	102.0		98.0
Uranium	ICP/MS	06/10/2013	0.0000	1.0000	OK	OK	OK	101.0	102.0		6.0	94.0	6.7	90.0
Uranium	ICP/MS	06/09/2013					OK	105.0	108.0		3.0	99.0	1.6	114.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 13055299 **Lab Code:** GEN **Date Due:** 6/14/2013

Matrix: Water **Site Code:** BLU01 **Date Completed:** 6/13/2013

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	05/28/2013					OK	104	98.5			
ALKALINITY, Total as CaCO3	05/28/2013					OK	103	99.5			
ALKALINITY, Total as CaCO3	05/29/2013					OK	102	98.4			
ALKALINITY, Total as CaCO3	05/30/2013					OK	102	97.4			
Bicarbonate alkalinity (CaCO3	05/28/2013									0	
Bicarbonate alkalinity (CaCO3	05/28/2013									0	
Bicarbonate alkalinity (CaCO3	05/29/2013									1	
Bicarbonate alkalinity (CaCO3	05/30/2013									2	
Carbonate alkalinity (CaCO3)	05/28/2013										
Carbonate alkalinity (CaCO3)	05/29/2013										
Carbonate alkalinity (CaCO3)	05/30/2013										
Chloride	05/21/2013	0.067	0.9993	OK	OK	OK	93.3				
Chloride	06/03/2013							99.4		1	
Chloride	06/04/2013							95.5		3	
Chloride	06/06/2013			OK	OK	OK	96.7				

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 13055299 **Lab Code:** GEN **Date Due:** 6/14/2013

Matrix: Water **Site Code:** BLU01 **Date Completed:** 6/13/2013

Analyte	Date Analyzed	CALIBRATION				Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	CCV	CCB						
Chloride	06/10/2013							97.1		2	
Chloride	06/10/2013							107		1	
NO2+NO3 as N	06/10/2013	-0.006	0.9997	OK	OK	OK	96.5	91.7		1	
NO2+NO3 as N	06/10/2013			OK	OK	OK	97	100		7	
NO2+NO3 as N	06/10/2013							114			
Sulfate	05/21/2013	0.250	0.9995	OK	OK	OK	98				
Sulfate	06/03/2013							100		1	
Sulfate	06/04/2013							98.3		2	
Sulfate	06/06/2013			OK	OK	OK	99.5				
Sulfate	06/10/2013							101		1	
Sulfate	06/10/2013							104		0	
Total Dissolved Solids	05/20/2013			OK	OK	OK	97.1			1	
Total Dissolved Solids	05/20/2013									1	
Total Dissolved Solids	05/21/2013			OK	OK	OK	102			0	
Total Dissolved Solids	05/21/2013									1	

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-2013-01, wells S(SG) and OBS-3 were not sampled using low-flow criteria. These wells were sampled using dedicated high-volume and high-flow submersible pumps with no field parameter stability requirements.
- Well E(M) was classified as Category II. The sample results were qualified with a "Q" flag, indicating the data are qualitative because of the sampling technique.
- Well 23(M), which was sampled with a bailer, was classified as Category 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 collected because all samples were collected using dedicated equipment.

Field Duplicate Analysis

Field duplicate samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory duplicates, which measure only laboratory performance. Duplicate samples were collected from locations 11(SG) and S(SG). The relative percent difference for duplicate results that are greater than 5 times the PQL should be less than 20 percent. For results that are less than 5 times the PQL, the range should be no greater than the PQL. The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 13055299 **Lab Code:** GEN **Project:** Bluewater **Validation Date:** 7/29/2013

Duplicate: 2484 **Sample:** 11(SG)

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Arsenic	22.7			1.00	24.2			1.00	6.40		ug/L
Bicarbonate alkalinity (CaCO3)	598			1.00	593			1.00	0.84		mg/L
Calcium	187000			1.00	176000			1.00	6.06		ug/L
Carbonate alkalinity (CaCO3)	0.725	U		1.00	0.725	U		1.00			mg/L
Chloride	177			50.00	180			50.00	1.68		mg/L
Magnesium	69300			1.00	67700			1.00	2.34		ug/L
Molybdenum	0.204	B		1.00	0.165	U		1.00			ug/L
NO2+NO3 as N	0.017	U		1.00	0.017	U		1.00			mg/L
Potassium	10800			1.00	10900			1.00	0.92		ug/L
Selenium	1.50	U		1.00	1.50	U		1.00			ug/L
Sodium	271000			1.00	264000			1.00	2.62		ug/L
Sulfate	371			50.00	369			50.00	0.54		mg/L
Total Dissolved Solids	1470			1.00	1430			1.00	2.76		mg/L
Uranium	7.39			1.00	7.34			1.00	0.68		ug/L

Duplicate: 2485 **Sample:** S(SG)

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
Arsenic	1.70	U		1.00	1.70	U		1.00			ug/L
Bicarbonate alkalinity (CaCO3)	422			1.00	409			1.00	3.13		mg/L
Calcium	326000			1.00	331000			1.00	1.52		ug/L
Carbonate alkalinity (CaCO3)	0.725	U		1.00	0.725	U		1.00			mg/L
Chloride	463			100.00	453			200.00	2.18		mg/L
Magnesium	172000			1.00	181000			1.00	5.10		ug/L
Molybdenum	1.48			1.00	1.23			1.00	18.45		ug/L
NO2+NO3 as N	2.66			5.00	2.70			5.00	1.49		mg/L
Potassium	14000			1.00	14400			1.00	2.82		ug/L
Selenium	13.7			1.00	14.4			1.00	4.98		ug/L
Sodium	425000			1.00	434000			1.00	2.10		ug/L
Sulfate	1210			100.00	1200			200.00	0.83		mg/L
Total Dissolved Solids	3130			1.00	3020			1.00	3.58		mg/L
Uranium	639			10.00	638			20.00	0.16		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: Steve Donivan — Date: 8-15-2013

Data Validation Lead: Gretchen Baer — Date: 8/15/13

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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 may result from transcription errors, data-coding errors, or measurement system problems. However, outliers may also represent true extreme values of a distribution and 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 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 if the data are normally distributed using the Shapiro-Wilk Test.
2. Apply the appropriate statistical test. Dixon's Extreme Value test 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.

Fifteen laboratory results from five locations were identified as potential outliers.

- The uranium result for well 21(M) was identified as a potential outlier because of the low variability of the historical data.
- Eight of the potential outliers were for four analytes at location I(SG): magnesium, nitrate + nitrite as N, selenium, and sodium. Other analytes at this well were also higher than historical maximums: calcium, potassium, sulfate, total dissolved solids, and uranium. All of these elevated results were found in samples that were collected at deeper-than-usual sampling points. These sampling depths were identified as I(SG)-270 and I(SG)-315 in the field notes.
- The bicarbonate alkalinity result at OBS-3 was higher than historical results. The anion/cation balance results indicated that the alkalinity value is valid.

- Four of the potential outliers were for selenium and uranium in both the native sample and the field duplicate sample taken at location S(SG). Recent results for selenium and uranium indicate upward trending at this location.
- A potential outlier for selenium was found at location Y2(M). Recent results for selenium indicate upward trending at this location.

The laboratory 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 field data from this event are acceptable as qualified.

There were no anomalies identified in the previous reports (January 2013 and November 2012) that required further review.

Attachment 2
Data Presentation

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Groundwater Quality Data

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General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013
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	05/14/2013	N001	265 - 295	598		F	#	0.725	
Alkalinity, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N002	265 - 295	593		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	265 - 295	0.725	U	F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N002	265 - 295	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	265 - 295	0.0227		F	#	0.0017	
Arsenic	mg/L	05/14/2013	N002	265 - 295	0.0242		F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	265 - 295	187		F	#	0.05	
Calcium	mg/L	05/14/2013	N002	265 - 295	176		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	265 - 295	177		F	#	3.35	
Chloride	mg/L	05/14/2013	N002	265 - 295	180		F	#	3.35	
Dissolved Oxygen	mg/L	05/14/2013	N001	265 - 295	1.44		F	#		
Magnesium	mg/L	05/14/2013	N001	265 - 295	69.3		F	#	0.11	
Magnesium	mg/L	05/14/2013	N002	265 - 295	67.7		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	265 - 295	0.000204	B	F	#	0.000165	
Molybdenum	mg/L	05/14/2013	N002	265 - 295	0.000165	U	F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	265 - 295	0.017	U	F	#	0.017	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N002	265 - 295	0.017	U	F	#	0.017	
Oxidation Reduction Potential	mV	05/14/2013	N001	265 - 295	-84.2		F	#		

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013
Location: 11(SG) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
pH	s.u.	05/14/2013	N001	265 - 295	6.91		F	#		
Potassium	mg/L	05/14/2013	N001	265 - 295	10.8		F	#	0.05	
Potassium	mg/L	05/14/2013	N002	265 - 295	10.9		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	265 - 295	0.0015	U	F	#	0.0015	
Selenium	mg/L	05/14/2013	N002	265 - 295	0.0015	U	F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	265 - 295	271		F	#	0.1	
Sodium	mg/L	05/14/2013	N002	265 - 295	264		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	265 - 295	2227		F	#		
Sulfate	mg/L	05/14/2013	N001	265 - 295	371		F	#	6.65	
Sulfate	mg/L	05/14/2013	N002	265 - 295	369		F	#	6.65	
Temperature	C	05/14/2013	N001	265 - 295	20.1		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	265 - 295	1470		F	#	3.4	
Total Dissolved Solids	mg/L	05/14/2013	N002	265 - 295	1430		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	265 - 295	3.76		F	#		
Uranium	mg/L	05/14/2013	N001	265 - 295	0.00739		F	#	0.000067	
Uranium	mg/L	05/14/2013	N002	265 - 295	0.00734		F	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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	05/15/2013	N001	270 - 300	296		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/15/2013	N001	270 - 300	0.725	U	F	#	0.725	
Arsenic	mg/L	05/15/2013	N001	270 - 300	0.00311	B	F	#	0.0017	
Calcium	mg/L	05/15/2013	N001	270 - 300	177		F	#	0.05	
Chloride	mg/L	05/15/2013	N001	270 - 300	81.9		F	#	3.35	
Dissolved Oxygen	mg/L	05/15/2013	N001	270 - 300	2.24		F	#		
Magnesium	mg/L	05/15/2013	N001	270 - 300	52.7		F	#	0.11	
Molybdenum	mg/L	05/15/2013	N001	270 - 300	0.00133		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	N001	270 - 300	4.45		F	#	0.085	
Oxidation Reduction Potential	mV	05/15/2013	N001	270 - 300	115.1		F	#		
pH	s.u.	05/15/2013	N001	270 - 300	6.78		F	#		
Potassium	mg/L	05/15/2013	N001	270 - 300	6.3		F	#	0.05	
Selenium	mg/L	05/15/2013	N001	270 - 300	0.00679		F	#	0.0015	
Sodium	mg/L	05/15/2013	N001	270 - 300	113		F	#	0.1	
Specific Conductance	umhos /cm	05/15/2013	N001	270 - 300	1519		F	#		
Sulfate	mg/L	05/15/2013	N001	270 - 300	405		F	#	6.65	
Temperature	C	05/15/2013	N001	270 - 300	17.85		F	#		
Total Dissolved Solids	mg/L	05/15/2013	N001	270 - 300	1070		F	#	3.4	
Turbidity	NTU	05/15/2013	N001	270 - 300	1.65		F	#		
Uranium	mg/L	05/15/2013	N001	270 - 300	0.123		F	#	0.000335	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	285 - 315	554		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	285 - 315	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	285 - 315	0.054		F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	285 - 315	104		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	285 - 315	146		F	#	3.35	
Dissolved Oxygen	mg/L	05/14/2013	N001	285 - 315	0.51		F	#		
Magnesium	mg/L	05/14/2013	N001	285 - 315	42.4		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	285 - 315	0.00231		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	285 - 315	0.017	U	F	#	0.017	
Oxidation Reduction Potential	mV	05/14/2013	N001	285 - 315	-74.3		F	#		
pH	s.u.	05/14/2013	N001	285 - 315	6.98		F	#		
Potassium	mg/L	05/14/2013	N001	285 - 315	4.49		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	285 - 315	0.0015	U	F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	285 - 315	294		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	285 - 315	1890		F	#		
Sulfate	mg/L	05/14/2013	N001	285 - 315	229		F	#	6.65	
Temperature	C	05/14/2013	N001	285 - 315	14.93		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	285 - 315	1200		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	285 - 315	0.93		F	#		
Uranium	mg/L	05/14/2013	N001	285 - 315	0.0308		F	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	341 - 371	438		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	341 - 371	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	341 - 371	0.0146		F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	341 - 371	80.1		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	341 - 371	151		F	#	3.35	
Dissolved Oxygen	mg/L	05/14/2013	N001	341 - 371	0.35		F	#		
Magnesium	mg/L	05/14/2013	N001	341 - 371	27.9		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	341 - 371	0.00378		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	341 - 371	0.017	U	F	#	0.017	
Oxidation Reduction Potential	mV	05/14/2013	N001	341 - 371	-77.6		F	#		
pH	s.u.	05/14/2013	N001	341 - 371	7.12		F	#		
Potassium	mg/L	05/14/2013	N001	341 - 371	5.36		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	341 - 371	0.0015	U	F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	341 - 371	293		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	341 - 371	1782		F	#		
Sulfate	mg/L	05/14/2013	N001	341 - 371	265		F	#	6.65	
Temperature	C	05/14/2013	N001	341 - 371	17.5		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	341 - 371	1090		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	341 - 371	2.37		F	#		
Uranium	mg/L	05/14/2013	N001	341 - 371	0.0449		F	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/16/2013	N001	195 - 225	416		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/16/2013	N001	195 - 225	0.725	U	F	#	0.725	
Arsenic	mg/L	05/16/2013	N001	195 - 225	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/16/2013	N001	195 - 225	337		F	#	0.05	
Chloride	mg/L	05/16/2013	N001	195 - 225	461		F	#	13.4	
Dissolved Oxygen	mg/L	05/16/2013	N001	195 - 225	0.97		F	#		
Magnesium	mg/L	05/16/2013	N001	195 - 225	170		F	#	0.11	
Molybdenum	mg/L	05/16/2013	N001	195 - 225	0.0024		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/16/2013	N001	195 - 225	4.58		F	#	0.085	
Oxidation Reduction Potential	mV	05/16/2013	N001	195 - 225	164.8		F	#		
pH	s.u.	05/16/2013	N001	195 - 225	6.53		F	#		
Potassium	mg/L	05/16/2013	N001	195 - 225	13.1		F	#	0.05	
Selenium	mg/L	05/16/2013	N001	195 - 225	0.0181		F	#	0.0015	
Sodium	mg/L	05/16/2013	N001	195 - 225	433		F	#	0.1	
Specific Conductance	umhos /cm	05/16/2013	N001	195 - 225	3967		F	#		
Sulfate	mg/L	05/16/2013	N001	195 - 225	1220		F	#	26.6	
Temperature	C	05/16/2013	N001	195 - 225	17.54		F	#		
Total Dissolved Solids	mg/L	05/16/2013	N001	195 - 225	3010		F	#	3.4	
Turbidity	NTU	05/16/2013	N001	195 - 225	2.16		F	#		
Uranium	mg/L	05/16/2013	N001	195 - 225	1.45		F	#	0.00335	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	260 - 290	326		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	260 - 290	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	260 - 290	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	260 - 290	191		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	260 - 290	96.1		F	#	3.35	
Dissolved Oxygen	mg/L	05/14/2013	N001	260 - 290	0.57		F	#		
Magnesium	mg/L	05/14/2013	N001	260 - 290	59.4		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	260 - 290	0.00202		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	260 - 290	3.39		F	#	0.085	
Oxidation Reduction Potential	mV	05/14/2013	N001	260 - 290	99.4		F	#		
pH	s.u.	05/14/2013	N001	260 - 290	6.73		F	#		
Potassium	mg/L	05/14/2013	N001	260 - 290	8.09		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	260 - 290	0.00591		F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	260 - 290	141		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	260 - 290	1700		F	#		
Sulfate	mg/L	05/14/2013	N001	260 - 290	451		F	#	6.65	
Temperature	C	05/14/2013	N001	260 - 290	16.84		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	260 - 290	1210		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	260 - 290	1.01		F	#		
Uranium	mg/L	05/14/2013	N001	260 - 290	0.232		F	#	0.000335	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	110 - 125	251		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	110 - 125	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	110 - 125	0.00854		F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	110 - 125	166		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	110 - 125	54.8		F	#	3.35	
Dissolved Oxygen	mg/L	05/14/2013	N001	110 - 125	6.5		F	#		
Magnesium	mg/L	05/14/2013	N001	110 - 125	41.3		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	110 - 125	0.00198		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	110 - 125	3.38		F	#	0.085	
Oxidation Reduction Potential	mV	05/14/2013	N001	110 - 125	87.1		F	#		
pH	s.u.	05/14/2013	N001	110 - 125	7.02		F	#		
Potassium	mg/L	05/14/2013	N001	110 - 125	5		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	110 - 125	0.00547		F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	110 - 125	92.8		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	110 - 125	1318		F	#		
Sulfate	mg/L	05/14/2013	N001	110 - 125	370		F	#	6.65	
Temperature	C	05/14/2013	N001	110 - 125	16.09		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	110 - 125	951		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	110 - 125	4.23		F	#		
Uranium	mg/L	05/14/2013	N001	110 - 125	0.0155		F	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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	05/15/2013	N001	139.6 - 149.6	263		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/15/2013	N001	139.6 - 149.6	0.725	U	F	#	0.725	
Arsenic	mg/L	05/15/2013	N001	139.6 - 149.6	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/15/2013	N001	139.6 - 149.6	168		F	#	0.05	
Chloride	mg/L	05/15/2013	N001	139.6 - 149.6	135		F	#	3.35	
Dissolved Oxygen	mg/L	05/15/2013	N001	139.6 - 149.6	4.27		F	#		
Magnesium	mg/L	05/15/2013	N001	139.6 - 149.6	44.7		F	#	0.11	
Molybdenum	mg/L	05/15/2013	N001	139.6 - 149.6	0.000918		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	N001	139.6 - 149.6	9.81		F	#	0.17	
Oxidation Reduction Potential	mV	05/15/2013	N001	139.6 - 149.6	125.3		F	#		
pH	s.u.	05/15/2013	N001	139.6 - 149.6	7.06		F	#		
Potassium	mg/L	05/15/2013	N001	139.6 - 149.6	6.52		F	#	0.05	
Selenium	mg/L	05/15/2013	N001	139.6 - 149.6	0.012		F	#	0.0015	
Sodium	mg/L	05/15/2013	N001	139.6 - 149.6	216		F	#	0.1	
Specific Conductance	umhos /cm	05/15/2013	N001	139.6 - 149.6	1859		F	#		
Sulfate	mg/L	05/15/2013	N001	139.6 - 149.6	489		F	#	6.65	
Temperature	C	05/15/2013	N001	139.6 - 149.6	16.93		F	#		
Total Dissolved Solids	mg/L	05/15/2013	N001	139.6 - 149.6	1300		F	#	3.4	
Turbidity	NTU	05/15/2013	N001	139.6 - 149.6	7.53		F	#		
Uranium	mg/L	05/15/2013	N001	139.6 - 149.6	0.148		F	#	0.000335	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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	05/14/2013	N001	136.83 - 146.83	326		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	136.83 - 146.83	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	136.83 - 146.83	0.00326	B	F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	136.83 - 146.83	97.6		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	136.83 - 146.83	33.6		F	#	1.68	
Dissolved Oxygen	mg/L	05/14/2013	N001	136.83 - 146.83	1.58		F	#		
Magnesium	mg/L	05/14/2013	N001	136.83 - 146.83	27		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	136.83 - 146.83	0.000711		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	136.83 - 146.83	36.4		F	#	0.85	
Oxidation Reduction Potential	mV	05/14/2013	N001	136.83 - 146.83	62.7		F	#		
pH	s.u.	05/14/2013	N001	136.83 - 146.83	7.02		F	#		
Potassium	mg/L	05/14/2013	N001	136.83 - 146.83	5.22		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	136.83 - 146.83	0.00598		F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	136.83 - 146.83	177		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	136.83 - 146.83	1332		F	#		
Sulfate	mg/L	05/14/2013	N001	136.83 - 146.83	221		F	#	3.33	
Temperature	C	05/14/2013	N001	136.83 - 146.83	15.7		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	136.83 - 146.83	896		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	136.83 - 146.83	5.25		F	#		
Uranium	mg/L	05/14/2013	N001	136.83 - 146.83	0.38		F	#	0.000335	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/15/2013	0001	89 - 109	139		FQ	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/15/2013	0001	89 - 109	0.725	U	FQ	#	0.725	
Arsenic	mg/L	05/15/2013	0001	89 - 109	0.0017	U	FQ	#	0.0017	
Calcium	mg/L	05/15/2013	0001	89 - 109	152		FQ	#	0.05	
Chloride	mg/L	05/15/2013	0001	89 - 109	88.8		FQ	#	3.35	
Dissolved Oxygen	mg/L	05/15/2013	N001	89 - 109	3.48		FQ	#		
Magnesium	mg/L	05/15/2013	0001	89 - 109	34.7		FQ	#	0.11	
Molybdenum	mg/L	05/15/2013	0001	89 - 109	0.00842		FQ	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	0001	89 - 109	3.46		FQ	#	0.085	
Oxidation Reduction Potential	mV	05/15/2013	N001	89 - 109	68.6		FQ	#		
pH	s.u.	05/15/2013	N001	89 - 109	7.26		FQ	#		
Potassium	mg/L	05/15/2013	0001	89 - 109	6.76		FQ	#	0.05	
Selenium	mg/L	05/15/2013	0001	89 - 109	0.00691		FQ	#	0.0015	
Sodium	mg/L	05/15/2013	0001	89 - 109	60.3		FQ	#	0.1	
Specific Conductance	umhos /cm	05/15/2013	N001	89 - 109	1153		FQ	#		
Sulfate	mg/L	05/15/2013	0001	89 - 109	285		FQ	#	6.65	
Temperature	C	05/15/2013	N001	89 - 109	16.52		FQ	#		
Total Dissolved Solids	mg/L	05/15/2013	0001	89 - 109	769		FQ	#	3.4	
Turbidity	NTU	05/15/2013	N001	89 - 109	17.3		FQ	#		
Uranium	mg/L	05/15/2013	0001	89 - 109	0.0203		FQ	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	68.6	-	89.8	0.725	U	FQ	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	68.6	-	89.8	0.725	U	FQ	#	0.725	
Arsenic	mg/L	05/14/2013	N001	68.6	-	89.8	0.0017	U	FQ	#	0.0017	
Calcium	mg/L	05/14/2013	N001	68.6	-	89.8	225		FQ	#	0.05	
Chloride	mg/L	05/14/2013	N001	68.6	-	89.8	31.7		FQ	#	0.67	
Dissolved Oxygen	mg/L	05/14/2013	N001	68.6	-	89.8	0.12		FQ	#		
Magnesium	mg/L	05/14/2013	N001	68.6	-	89.8	58.8		FQ	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	68.6	-	89.8	0.000345	B	FQ	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	68.6	-	89.8	0.017	U	FQ	#	0.017	
Oxidation Reduction Potential	mV	05/14/2013	N001	68.6	-	89.8	-158		FQ	#		
pH	s.u.	05/14/2013	N001	68.6	-	89.8	8.05		FQ	#		
Potassium	mg/L	05/14/2013	N001	68.6	-	89.8	4.45		FQ	#	0.05	
Selenium	mg/L	05/14/2013	N001	68.6	-	89.8	0.0015	U	FQ	#	0.0015	
Sodium	mg/L	05/14/2013	N001	68.6	-	89.8	56.6		FQ	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	68.6	-	89.8	1445		FQ	#		
Sulfate	mg/L	05/14/2013	N001	68.6	-	89.8	754		FQ	#	13.3	
Temperature	C	05/14/2013	N001	68.6	-	89.8	15.3		FQ	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	68.6	-	89.8	1170		FQ	#	3.4	
Turbidity	NTU	05/14/2013	N001	68.6	-	89.8	9.69		FQ	#		
Uranium	mg/L	05/14/2013	N001	68.6	-	89.8	0.000067	U	FQ	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	94.2 - 114.87	174		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	94.2 - 114.87	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	94.2 - 114.87	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	94.2 - 114.87	75.4		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	94.2 - 114.87	11		F	#	0.67	
Dissolved Oxygen	mg/L	05/14/2013	N001	94.2 - 114.87	2.39		F	#		
Magnesium	mg/L	05/14/2013	N001	94.2 - 114.87	20.6		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	94.2 - 114.87	0.000895		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	94.2 - 114.87	0.665		F	#	0.017	
Oxidation Reduction Potential	mV	05/14/2013	N001	94.2 - 114.87	78.7		F	#		
pH	s.u.	05/14/2013	N001	94.2 - 114.87	7.4		F	#		
Potassium	mg/L	05/14/2013	N001	94.2 - 114.87	3.49		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	94.2 - 114.87	0.00176	B	F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	94.2 - 114.87	21.1		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	94.2 - 114.87	547		F	#		
Sulfate	mg/L	05/14/2013	N001	94.2 - 114.87	101		F	#	1.33	
Temperature	C	05/14/2013	N001	94.2 - 114.87	16.82		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	94.2 - 114.87	360		F	#	3.4	
Turbidity	NTU	05/14/2013	N001	94.2 - 114.87	3.41		F	#		
Uranium	mg/L	05/14/2013	N001	94.2 - 114.87	0.00753		F	#	0.000067	

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

REPORT DATE: 8/9/2013

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	05/15/2013	0001	234.91 - 234.91	136		F	#	0.725	
Alkalinity, Bicarbonate (As $CaCO^3$)	mg/L	05/15/2013	N001	298.91 - 298.91	404		F	#	0.725	
Alkalinity, Bicarbonate (As $CaCO^3$)	mg/L	05/15/2013	N001	261.91 - 261.91	405		F	#	0.725	
Alkalinity, Carbonate (As $CaCO^3$)	mg/L	05/15/2013	0001	234.91 - 234.91	0.725	U	F	#	0.725	
Alkalinity, Carbonate (As $CaCO^3$)	mg/L	05/15/2013	N001	261.91 - 261.91	0.725	U	F	#	0.725	
Alkalinity, Carbonate (As $CaCO^3$)	mg/L	05/15/2013	N001	298.91 - 298.91	0.725	U	F	#	0.725	
Arsenic	mg/L	05/15/2013	0001	234.91 - 234.91	0.0017	U	F	#	0.0017	
Arsenic	mg/L	05/15/2013	N001	261.91 - 261.91	0.0017	U	F	#	0.0017	
Arsenic	mg/L	05/15/2013	N001	298.91 - 298.91	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/15/2013	0001	234.91 - 234.91	30.5		F	#	0.05	
Calcium	mg/L	05/15/2013	N001	298.91 - 298.91	283		F	#	0.05	
Calcium	mg/L	05/15/2013	N001	261.91 - 261.91	288		F	#	0.05	
Chloride	mg/L	05/15/2013	0001	234.91 - 234.91	176		F	#	3.35	
Chloride	mg/L	05/15/2013	N001	261.91 - 261.91	272		F	#	6.7	
Chloride	mg/L	05/15/2013	N001	298.91 - 298.91	272		F	#	6.7	
Dissolved Oxygen	mg/L	05/15/2013	N001	234.91 - 234.91	0.44		F	#		
Dissolved Oxygen	mg/L	05/15/2013	N001	298.91 - 298.91	1.1		F	#		
Dissolved Oxygen	mg/L	05/15/2013	N001	261.91 - 261.91	3.44		F	#		

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

REPORT DATE: 8/9/2013

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
Magnesium	mg/L	05/15/2013	0001	234.91 - 234.91	20.6		F	#	0.11	
Magnesium	mg/L	05/15/2013	N001	298.91 - 298.91	106		F	#	0.11	
Magnesium	mg/L	05/15/2013	N001	261.91 - 261.91	109		F	#	0.11	
Molybdenum	mg/L	05/15/2013	0001	234.91 - 234.91	0.0007		F	#	0.000165	
Molybdenum	mg/L	05/15/2013	N001	298.91 - 298.91	0.00108		F	#	0.000165	
Molybdenum	mg/L	05/15/2013	N001	261.91 - 261.91	0.00128		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	0001	234.91 - 234.91	0.017	U	F	#	0.017	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	N001	261.91 - 261.91	1.42		F	#	0.017	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	N001	298.91 - 298.91	1.45		F	#	0.017	
Oxidation Reduction Potential	mV	05/15/2013	N001	298.91 - 298.91	11.3		F	#		
Oxidation Reduction Potential	mV	05/15/2013	N001	234.91 - 234.91	-16.7		F	#		
Oxidation Reduction Potential	mV	05/15/2013	N001	261.91 - 261.91	60.7		F	#		
pH	s.u.	05/15/2013	N001	261.91 - 261.91	6.54		F	#		
pH	s.u.	05/15/2013	N001	234.91 - 234.91	7.97		F	#		
pH	s.u.	05/15/2013	N001	298.91 - 298.91	6.61		F	#		
Potassium	mg/L	05/15/2013	0001	234.91 - 234.91	6.45		F	#	0.05	
Potassium	mg/L	05/15/2013	N001	298.91 - 298.91	13.9		F	#	0.05	
Potassium	mg/L	05/15/2013	N001	261.91 - 261.91	13.8		F	#	0.05	

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

REPORT DATE: 8/9/2013

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
Selenium	mg/L	05/15/2013	0001	234.91 - 234.91	0.0015	U	F	#	0.0015	
Selenium	mg/L	05/15/2013	N001	298.91 - 298.91	0.00882		F	#	0.0015	
Selenium	mg/L	05/15/2013	N001	261.91 - 261.91	0.00949		F	#	0.0015	
Sodium	mg/L	05/15/2013	0001	234.91 - 234.91	195		F	#	0.1	
Sodium	mg/L	05/15/2013	N001	261.91 - 261.91	320		F	#	0.1	
Sodium	mg/L	05/15/2013	N001	298.91 - 298.91	311		F	#	0.1	
Specific Conductance	umhos /cm	05/15/2013	N001	261.91 - 261.91	2876		F	#		
Specific Conductance	umhos /cm	05/15/2013	N001	298.91 - 298.91	2929		F	#		
Specific Conductance	umhos /cm	05/15/2013	N001	234.91 - 234.91	1204		F	#		
Sulfate	mg/L	05/15/2013	0001	234.91 - 234.91	176		F	#	6.65	
Sulfate	mg/L	05/15/2013	N001	261.91 - 261.91	849		F	#	13.3	
Sulfate	mg/L	05/15/2013	N001	298.91 - 298.91	846		F	#	13.3	
Temperature	C	05/15/2013	N001	261.91 - 261.91	20.52		F	#		
Temperature	C	05/15/2013	N001	234.91 - 234.91	16.02		F	#		
Temperature	C	05/15/2013	N001	298.91 - 298.91	20.82		F	#		
Total Dissolved Solids	mg/L	05/15/2013	0001	234.91 - 234.91	699		F	#	3.4	
Total Dissolved Solids	mg/L	05/15/2013	N001	298.91 - 298.91	2220		F	#	3.4	
Total Dissolved Solids	mg/L	05/15/2013	N001	261.91 - 261.91	2220		F	#	3.4	

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

REPORT DATE: 8/9/2013

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
Turbidity	NTU	05/15/2013	N001	261.91 - 261.91	5.9		F	#		
Turbidity	NTU	05/15/2013	N001	298.91 - 298.91	4.92		F	#		
Turbidity	NTU	05/15/2013	N001	234.91 - 234.91	11.5		F	#		
Uranium	mg/L	05/15/2013	0001	234.91 - 234.91	0.00545		F	#	0.000067	
Uranium	mg/L	05/15/2013	N001	298.91 - 298.91	0.334		F	#	0.00134	
Uranium	mg/L	05/15/2013	N001	261.91 - 261.91	0.35		F	#	0.00134	

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

REPORT DATE: 8/9/2013

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	05/15/2013	N001	438.72 - 438.72	565		F	#	0.725	
Alkalinity, Bicarbonate (As $CaCO^3$)	mg/L	05/16/2013	0001	578.72 - 578.72	572		F	#	0.725	
Alkalinity, Bicarbonate (As $CaCO^3$)	mg/L	05/16/2013	N001	508.72 - 508.72	565		F	#	0.725	
Alkalinity, Carbonate (As $CaCO^3$)	mg/L	05/15/2013	N001	438.72 - 438.72	0.725	U	F	#	0.725	
Alkalinity, Carbonate (As $CaCO^3$)	mg/L	05/16/2013	0001	578.72 - 578.72	0.725	U	F	#	0.725	
Alkalinity, Carbonate (As $CaCO^{3)}$	mg/L	05/16/2013	N001	508.72 - 508.72	0.725	U	F	#	0.725	
Arsenic	mg/L	05/15/2013	N001	438.72 - 438.72	0.0017	U	F	#	0.0017	
Arsenic	mg/L	05/16/2013	0001	578.72 - 578.72	0.0017	U	F	#	0.0017	
Arsenic	mg/L	05/16/2013	N001	508.72 - 508.72	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/15/2013	N001	438.72 - 438.72	153		F	#	0.05	
Calcium	mg/L	05/16/2013	0001	578.72 - 578.72	153		F	#	0.05	
Calcium	mg/L	05/16/2013	N001	508.72 - 508.72	142		F	#	0.05	
Chloride	mg/L	05/15/2013	N001	438.72 - 438.72	192		F	#	6.7	
Chloride	mg/L	05/16/2013	0001	578.72 - 578.72	186		F	#	6.7	
Chloride	mg/L	05/16/2013	N001	508.72 - 508.72	188		F	#	6.7	
Dissolved Oxygen	mg/L	05/15/2013	N001	438.72 - 438.72	0.38		F	#		
Dissolved Oxygen	mg/L	05/16/2013	N001	578.72 - 578.72	0.6		F	#		
Dissolved Oxygen	mg/L	05/16/2013	N001	508.72 - 508.72	0.78		F	#		
Magnesium	mg/L	05/15/2013	N001	438.72 - 438.72	82.3		F	#	0.11	
Magnesium	mg/L	05/16/2013	0001	578.72 - 578.72	78.8		F	#	0.11	
Magnesium	mg/L	05/16/2013	N001	508.72 - 508.72	78.2		F	#	0.11	

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

REPORT DATE: 8/9/2013

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
Molybdenum	mg/L	05/15/2013	N001	438.72 - 438.72	0.000419	B	F	#	0.000165	
Molybdenum	mg/L	05/16/2013	0001	578.72 - 578.72	0.000443	B	F	#	0.000165	
Molybdenum	mg/L	05/16/2013	N001	508.72 - 508.72	0.00057		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/15/2013	N001	438.72 - 438.72	0.017	U	F	#	0.017	
Nitrate + Nitrite as Nitrogen	mg/L	05/16/2013	0001	578.72 - 578.72	0.017	U	F	#	0.017	
Nitrate + Nitrite as Nitrogen	mg/L	05/16/2013	N001	508.72 - 508.72	0.017	U	F	#	0.017	
Oxidation Reduction Potential	mV	05/15/2013	N001	438.72 - 438.72	-72.7		F	#		
Oxidation Reduction Potential	mV	05/16/2013	N001	508.72 - 508.72	-9.5		F	#		
Oxidation Reduction Potential	mV	05/16/2013	N001	578.72 - 578.72	-3.7		F	#		
pH	s.u.	05/15/2013	N001	438.72 - 438.72	6.61		F	#		
pH	s.u.	05/16/2013	N001	508.72 - 508.72	6.61		F	#		
pH	s.u.	05/16/2013	N001	578.72 - 578.72	6.6		F	#		
Potassium	mg/L	05/15/2013	N001	438.72 - 438.72	8.57		F	#	0.05	
Potassium	mg/L	05/16/2013	0001	578.72 - 578.72	8.7		F	#	0.05	
Potassium	mg/L	05/16/2013	N001	508.72 - 508.72	8.37		F	#	0.05	
Selenium	mg/L	05/15/2013	N001	438.72 - 438.72	0.0015	U	F	#	0.0015	
Selenium	mg/L	05/16/2013	0001	578.72 - 578.72	0.0015	U	F	#	0.0015	
Selenium	mg/L	05/16/2013	N001	508.72 - 508.72	0.0015	U	F	#	0.0015	
Sodium	mg/L	05/15/2013	N001	438.72 - 438.72	378		F	#	0.1	
Sodium	mg/L	05/16/2013	0001	578.72 - 578.72	362		F	#	0.1	
Sodium	mg/L	05/16/2013	N001	508.72 - 508.72	361		F	#	0.1	

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

REPORT DATE: 8/9/2013

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
Specific Conductance	umhos /cm	05/15/2013	N001	438.72 - 438.72	2579		F	#		
Specific Conductance	umhos /cm	05/16/2013	N001	508.72 - 508.72	2531		F	#		
Specific Conductance	umhos /cm	05/16/2013	N001	578.72 - 578.72	2560		F	#		
Sulfate	mg/L	05/15/2013	N001	438.72 - 438.72	580		F	#	13.3	
Sulfate	mg/L	05/16/2013	0001	578.72 - 578.72	571		F	#	13.3	
Sulfate	mg/L	05/16/2013	N001	508.72 - 508.72	585		F	#	13.3	
Temperature	C	05/15/2013	N001	438.72 - 438.72	18.17		F	#		
Temperature	C	05/16/2013	N001	508.72 - 508.72	16.61		F	#		
Temperature	C	05/16/2013	N001	578.72 - 578.72	16.47		F	#		
Total Dissolved Solids	mg/L	05/15/2013	N001	438.72 - 438.72	1760		F	#	3.4	
Total Dissolved Solids	mg/L	05/16/2013	0001	578.72 - 578.72	1750		F	#	3.4	
Total Dissolved Solids	mg/L	05/16/2013	N001	508.72 - 508.72	1730		F	#	3.4	
Turbidity	NTU	05/15/2013	N001	438.72 - 438.72	6.13		F	#		
Turbidity	NTU	05/16/2013	N001	508.72 - 508.72	8		F	#		
Turbidity	NTU	05/16/2013	N001	578.72 - 578.72	11.5		F	#		
Uranium	mg/L	05/15/2013	N001	438.72 - 438.72	0.003		F	#	0.000067	
Uranium	mg/L	05/16/2013	0001	578.72 - 578.72	0.00301		F	#	0.000067	
Uranium	mg/L	05/16/2013	N001	508.72 - 508.72	0.00301		F	#	0.000067	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site

REPORT DATE: 7/29/2013

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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	0001	152.4 - 350	246			#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	0001	152.4 - 350	0.725	U		#	0.725	
Arsenic	mg/L	05/14/2013	0001	152.4 - 350	0.0017	U		#	0.0017	
Calcium	mg/L	05/14/2013	0001	152.4 - 350	193			#	0.05	
Chloride	mg/L	05/14/2013	0001	152.4 - 350	525			#	6.7	
Dissolved Oxygen	mg/L	05/14/2013	N001	152.4 - 350	6.57			#		
Magnesium	mg/L	05/14/2013	0001	152.4 - 350	146			#	0.11	
Molybdenum	mg/L	05/14/2013	0001	152.4 - 350	0.00114			#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	0001	152.4 - 350	1.75			#	0.085	
Oxidation Reduction Potential	mV	05/14/2013	N001	152.4 - 350	104.7			#		
pH	s.u.	05/14/2013	N001	152.4 - 350	7.01			#		
Potassium	mg/L	05/14/2013	0001	152.4 - 350	14.5			#	0.05	
Selenium	mg/L	05/14/2013	0001	152.4 - 350	0.00832			#	0.0015	
Sodium	mg/L	05/14/2013	0001	152.4 - 350	420			#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	152.4 - 350	3589			#		
Sulfate	mg/L	05/14/2013	0001	152.4 - 350	908			#	13.3	
Temperature	C	05/14/2013	N001	152.4 - 350	16.7			#		
Total Dissolved Solids	mg/L	05/14/2013	0001	152.4 - 350	2470			#	3.4	
Turbidity	NTU	05/14/2013	N001	152.4 - 350	49.9			#		
Uranium	mg/L	05/14/2013	0001	152.4 - 350	0.228			#	0.000335	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013
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, Bicarbonate (As $CaCO_3$)	mg/L	05/16/2013	N001	159 - 280	422			#	0.725	
Alkalinity, Bicarbonate (As $CaCO_3$)	mg/L	05/16/2013	N002	159 - 280	409			#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/16/2013	N001	159 - 280	0.725	U		#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/16/2013	N002	159 - 280	0.725	U		#	0.725	
Arsenic	mg/L	05/16/2013	N001	159 - 280	0.0017	U		#	0.0017	
Arsenic	mg/L	05/16/2013	N002	159 - 280	0.0017	U		#	0.0017	
Calcium	mg/L	05/16/2013	N001	159 - 280	326			#	0.05	
Calcium	mg/L	05/16/2013	N002	159 - 280	331			#	0.05	
Chloride	mg/L	05/16/2013	N001	159 - 280	463			#	6.7	
Chloride	mg/L	05/16/2013	N002	159 - 280	453			#	13.4	
Dissolved Oxygen	mg/L	05/16/2013	N001	159 - 280	2.13			#		
Magnesium	mg/L	05/16/2013	N001	159 - 280	172			#	0.11	
Magnesium	mg/L	05/16/2013	N002	159 - 280	181			#	0.11	
Molybdenum	mg/L	05/16/2013	N001	159 - 280	0.00148			#	0.000165	
Molybdenum	mg/L	05/16/2013	N002	159 - 280	0.00123			#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/16/2013	N001	159 - 280	2.66			#	0.085	
Nitrate + Nitrite as Nitrogen	mg/L	05/16/2013	N002	159 - 280	2.7			#	0.085	
Oxidation Reduction Potential	mV	05/16/2013	N001	159 - 280	-65.2			#		

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013
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
pH	s.u.	05/16/2013	N001	159 - 280	6.74			#		
Potassium	mg/L	05/16/2013	N001	159 - 280	14			#	0.05	
Potassium	mg/L	05/16/2013	N002	159 - 280	14.4			#	0.05	
Selenium	mg/L	05/16/2013	N001	159 - 280	0.0137			#	0.0015	
Selenium	mg/L	05/16/2013	N002	159 - 280	0.0144			#	0.0015	
Sodium	mg/L	05/16/2013	N001	159 - 280	425			#	0.1	
Sodium	mg/L	05/16/2013	N002	159 - 280	434			#	0.1	
Specific Conductance	umhos /cm	05/16/2013	N001	159 - 280	4065			#		
Sulfate	mg/L	05/16/2013	N001	159 - 280	1210			#	13.3	
Sulfate	mg/L	05/16/2013	N002	159 - 280	1200			#	26.6	
Temperature	C	05/16/2013	N001	159 - 280	17.39			#		
Total Dissolved Solids	mg/L	05/16/2013	N001	159 - 280	3130			#	3.4	
Total Dissolved Solids	mg/L	05/16/2013	N002	159 - 280	3020			#	3.4	
Turbidity	NTU	05/16/2013	N001	159 - 280	2.01			#		
Uranium	mg/L	05/16/2013	N001	159 - 280	0.639			#	0.00067	
Uranium	mg/L	05/16/2013	N002	159 - 280	0.638			#	0.00134	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013
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, Bicarbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	98 - 123	201		F	#	0.725	
Alkalinity, Carbonate (As $CaCO_3$)	mg/L	05/14/2013	N001	98 - 123	0.725	U	F	#	0.725	
Arsenic	mg/L	05/14/2013	N001	98 - 123	0.0017	U	F	#	0.0017	
Calcium	mg/L	05/14/2013	N001	98 - 123	63.1		F	#	0.05	
Chloride	mg/L	05/14/2013	N001	98 - 123	15.6		F	#	1.34	
Dissolved Oxygen	mg/L	05/14/2013	N001	98 - 123	5.42		F	#		
Magnesium	mg/L	05/14/2013	N001	98 - 123	18		F	#	0.11	
Molybdenum	mg/L	05/14/2013	N001	98 - 123	0.00176		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	05/14/2013	N001	98 - 123	1.54		F	#	0.085	
Oxidation Reduction Potential	mV	05/14/2013	N001	98 - 123	107.1		F	#		
pH	s.u.	05/14/2013	N001	98 - 123	7.25		F	#		
Potassium	mg/L	05/14/2013	N001	98 - 123	3.17		F	#	0.05	
Selenium	mg/L	05/14/2013	N001	98 - 123	0.00217	B	F	#	0.0015	
Sodium	mg/L	05/14/2013	N001	98 - 123	55.8		F	#	0.1	
Specific Conductance	umhos /cm	05/14/2013	N001	98 - 123	640		F	#		
Sulfate	mg/L	05/14/2013	N001	98 - 123	100		F	#	2.66	
Temperature	C	05/14/2013	N001	98 - 123	15.25		F	#		
Total Dissolved Solids	mg/L	05/14/2013	N001	98 - 123	391		F	#	3.4	

General Water Quality Data by Location (USEE105) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013
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
Turbidity	NTU	05/14/2013	N001	98	-	123	1.12		F	#		
Uranium	mg/L	05/14/2013	N001	98	-	123	0.00526		F	#	0.000067	

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

#	Validated according to quality assurance guidelines.

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Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 7/29/2013

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	05/14/2013	13:28:13	205.30	6433.89	
13(SG)		6593.57	05/15/2013	11:28:37	167.50	6426.07	
14(SG)		6617.20	05/14/2013	09:45:20	189.00	6428.20	
15(SG)		6612.53	05/14/2013	15:27:26	186.68	6425.85	
16(SG)		6618.25	05/16/2013	10:47:15	184.58	6433.67	
18(SG)		6601.32	05/14/2013	17:38:56	174.34	6426.98	
20(M)		6613.38	05/14/2013	14:12:16	105.25	6508.13	
21(M)		6593.80	05/15/2013	12:02:27	128.09	6465.71	
22(M)		6606.48	05/14/2013	16:30:23	137.00	6469.48	
23(M)		6579.22	05/15/2013	18:09:24	110.62	6468.60	
E(M)		6616.32	05/14/2013	10:15:01	81.55	6534.77	
F(M)		6603.59	05/14/2013	17:01:24	114.26	6489.33	
I(SG)		6625.93	05/15/2013	08:36:40	200.21	6425.72	
I(SG)		6625.93	05/15/2013	10:14:28	200.18	6425.75	
I(SG)		6625.93	05/15/2013	15:15:00	200.21	6425.72	
L(SG)		6606.09	05/15/2013	16:28:57	160.85	6445.24	
L(SG)		6606.09	05/16/2013	12:18:38	160.85	6445.24	
L(SG)		6606.09	05/16/2013	12:55:42	160.85	6445.24	
OBS-3		6617.22	05/14/2013	11:58:08	183.52	6433.70	
S(SG)		6625.25	05/16/2013	11:06:39	192.31	6432.94	
T(M)		6612.65	05/14/2013	14:48:00			D
X(M)		6598.91	05/15/2013	17:52:00			D
Y2(M)		6614.13	05/14/2013	18:04:11	117.25	6496.88	

FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT F OFF SITE
N UNKNOWN O ON SITE 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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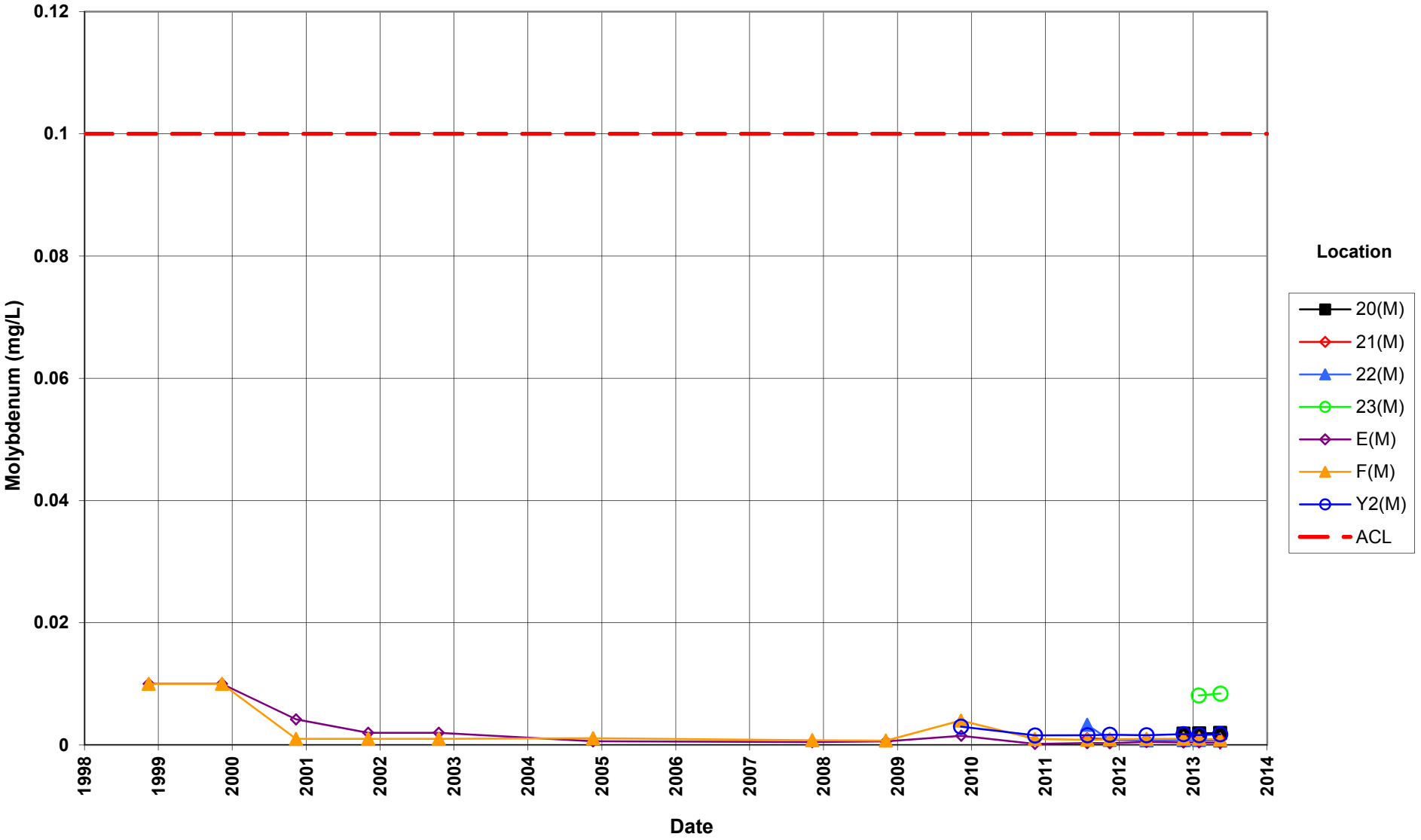
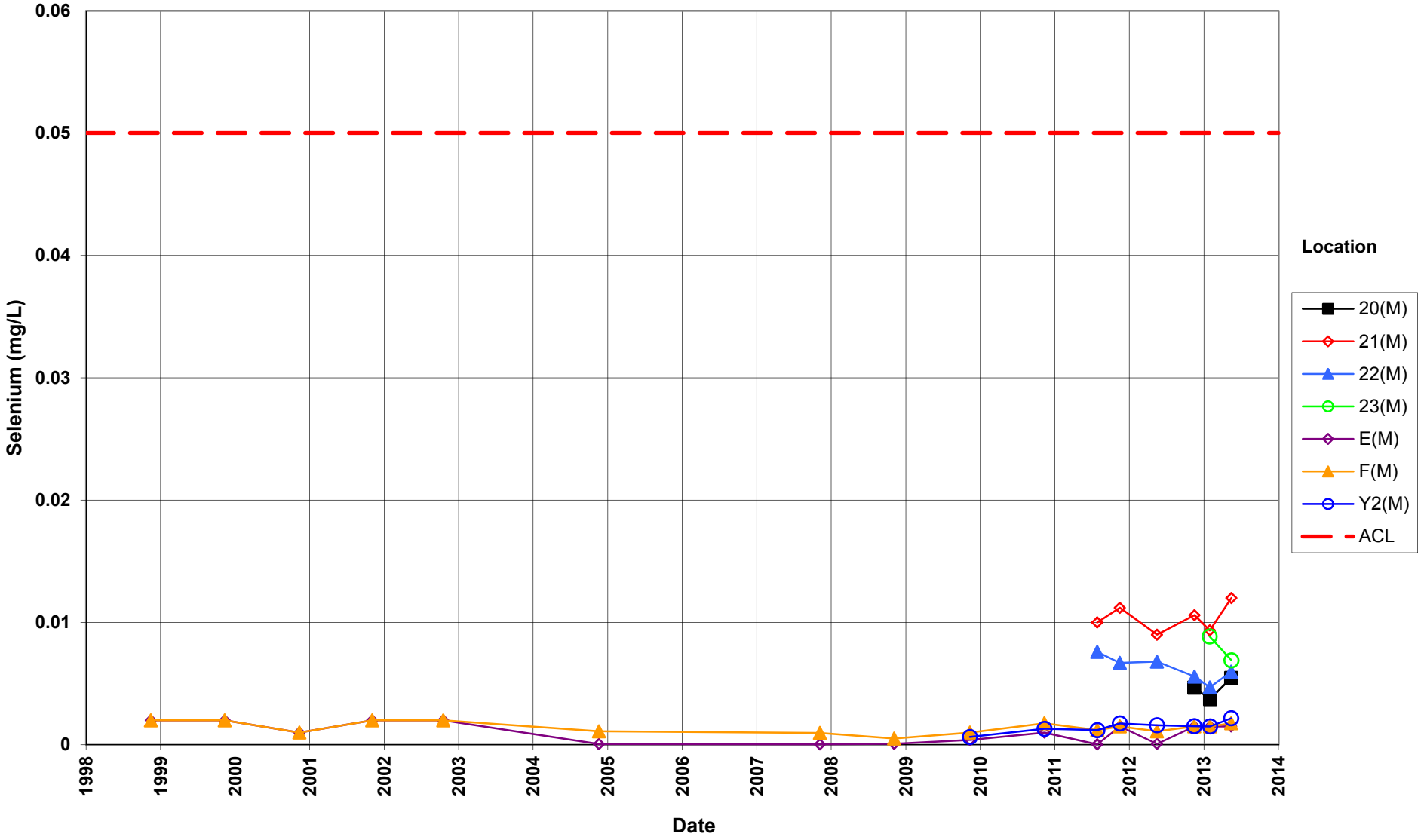
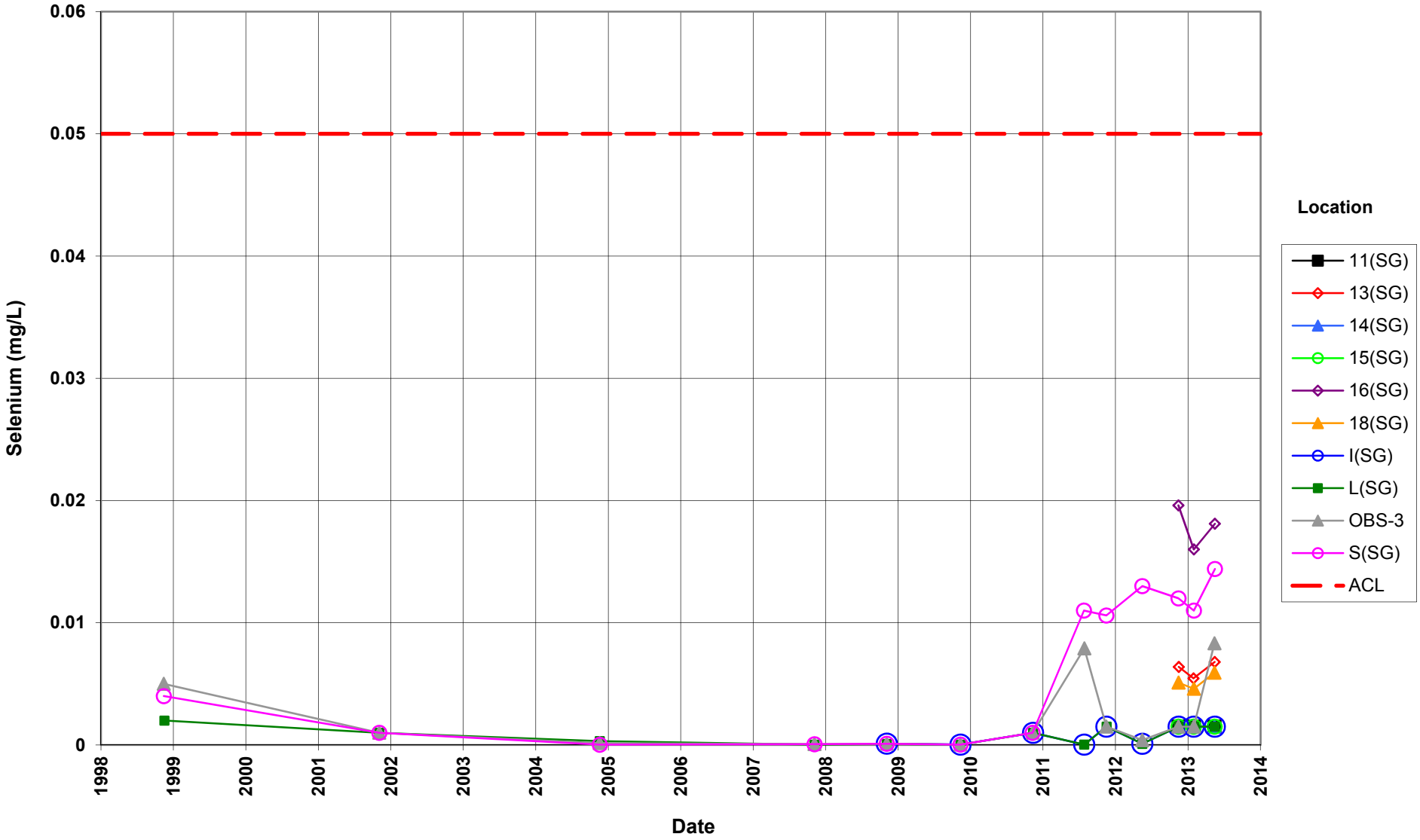
Bluewater Disposal Site
Alluvium Wells
Molybdenum Concentration
Alternate Concentration Limit (ACL) = 0.10 mg/L



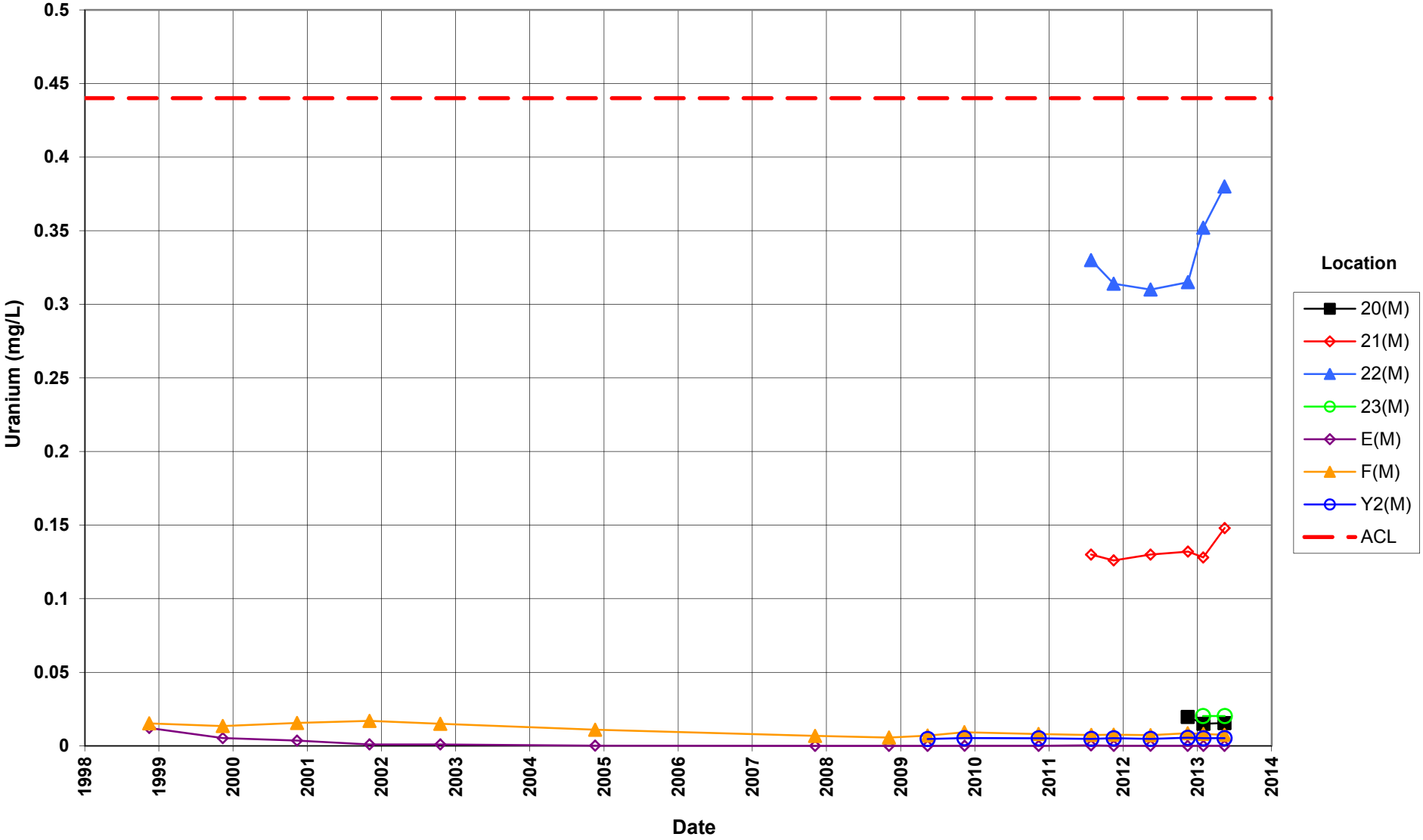
Bluewater Disposal Site
Alluvium Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



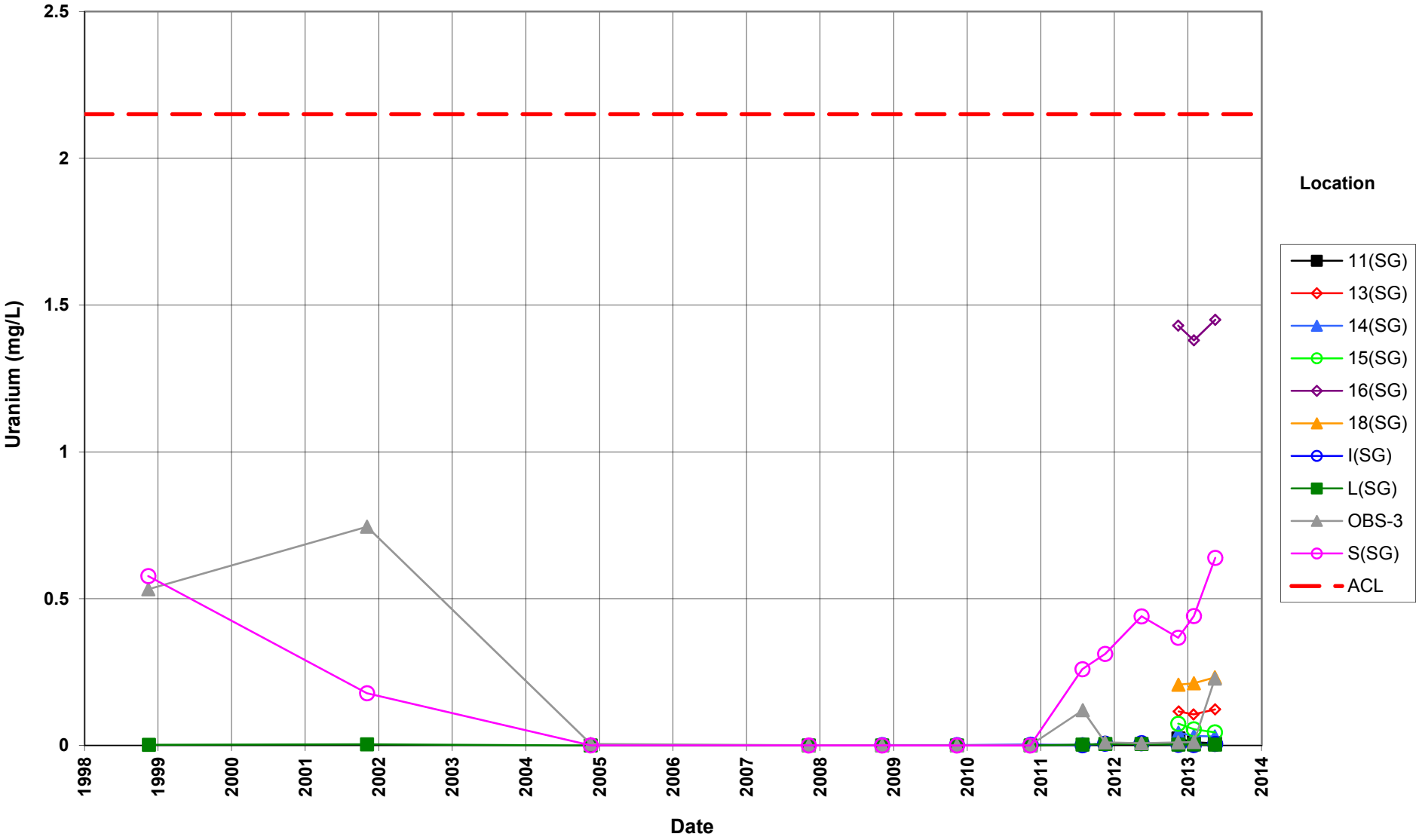
Bluewater Disposal Site
Bedrock Wells
Selenium Concentration
Alternate Concentration Limit (ACL) = 0.05 mg/L



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



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



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Attachment 3
Sampling and Analysis Work Order

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Stoller

established 1959

Task Order LM-501
Control Number 13-0492

April 15, 2013

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-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
May 2013 Environmental Sampling at Bluewater, New Mexico, Disposal Site

REFERENCE: Task Order LM00-501-03-203-402, 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 13, 2013.

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

Private Well
Simpson Al

*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.

The S.M. Stoller Corporation 2597 Legacy Way Grand Junction, CO 81503 (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/lb

Enclosures (3)

cc: (electronic)
Karl Stoeckle, DOE
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Dick Johnson, Stoller
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File: BLU 410.02(A)

The S.M. Stoller Corporation 2597 Legacy Way Grand Junction, CO 81503 (970) 248-6000 Fax (970) 248-6040

Constituent Sampling Breakdown

Site	Bluewater				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr	21	0			
Field Measurements					
Alkalinity					
Dissolved Oxygen	X				
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
Laboratory Measurements					
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
Iron					
Magnesium	X		5	SW-846 6010	LMM-01
Manganese					
Molybdenum	X		0.003	SW-846 6020	LMM-02
Nickel					
Nitrate + Nitrite as N (NO3+NO2)-N	X		0.05	EPA 353.1	WCH-A-022
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
Selenium	X		0.0001	SW-846 6020	LMM-02
Silica					
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
Total Organic Carbon					
Uranium	X		0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	15	0			

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

Sampling Frequencies for Locations at Bluewater, New Mexico

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

Sampling conducted in May and November.

Attachment 4
Trip Report

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Stoller
Grand Junction Office
established 1959

Memorandum

DATE: May 29, 2013

TO: Dick Johnson

FROM: David Atkinson

SUBJECT: Sampling Trip Report

Site: Bluewater, NM Site

Dates of Sampling Event: 5/13/2013 – 5/17/2013

Team Members: Joe Trevino, David Atkinson

Number of Locations Sampled: Samples were collected at 17 monitoring well locations. An additional 2 samples were collected at varying depths at 2 of those locations. A total of 21 groundwater samples and 2 QC duplicate samples were collected.

Locations Not Sampled/Reason: Locations T(M) and X(M) were dry. The pump could not be installed to the desired depth at location HMC-951 so no sample could be collected.

Location Specific Information: Samples were collected at multiple depths in wells I(SG) and L(SG) by altering the depth of the well intake points. At location I(SG) samples were collected at wells 236, 263, and 300 feet below TOC. The intake at I(SG) was left at 263 feet below TOC. At location L(SG) samples were collected at 440, 510, and 580 feet below TOC. The intake at L(SG) was left at 510 feet below TOC.

Samples were collected using previously installed submersible pumps at locations S(SG) and OBS-3 according to Program Directive BLU-2013-01. OBS-3 was purged at approximately 5 gpm until it went dry after approximately 600 gallons. The minimum purge volume for OBS-3 was calculated to be 658 gallons (3 casing volumes). After going dry, the well was allowed to recover for approximately 1 hour and then the sample was collected. At S(SG) the sample was collected after purging at approximately 5.5 gpm for 170 minutes or ~ 935 gallons. The minimum purge volume (3 casing volumes) for S(SG) was calculated to be 820 gallons. The sample at location 23(M) was collected with a bailer. No pump is installed in the well because the water level is too low to allow a pump to function.

Quality Control Sample Cross Reference: The following table summarizes the QC samples collected during the sampling event. No equipment blank samples were collected because all equipment (pumps, tubing, fittings, etc.) used was either dedicated to a single well location or disposable.

Sample Date/Time	Sample Type	False ID	True ID	Ticket #
5-14-13/1200	Duplicate	2484	11(SG)	LGS 888
5-16-13/1200	Duplicate	2485	S(SG)	LGS 889

RIN Number Assigned: All samples were assigned to RIN 13055299.

Sample Shipment: Samples were shipped overnight via FedEx to GEL Laboratories in Charleston, SC from Farmington, NM on 5/16/2013.

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

Well Inspection Summary: Well X(M) appears to have a break in the casing that is allowing sand to fill in the well. The total depth of the well was approximately 3 ft. higher than the previous sampling event in January 2013, and the samplers observed the water level probe to be dry and slightly sandy when retrieved from the bottom of the well. Well HMC-951 appears to have an obstruction of some kind around 200 ft. below TOC. All other wells appeared to be in good condition.

Field Variance: Samples were collected at locations I(SG)270, I(SG)315, L(SG)510, and L(SG)580 immediately after installing modified pump/drop tube equipment. This was done because the only equipment changes were to the drop tube lengths to change the intake points. Only new, unused tubing was added. In addition these samples were collected within 2 days of hydraulic conductivity profile testing at these wells, which disturbed the water column prior to sampling. This variance saved approximately 16 hours of waiting time between sample collections which made the collection of samples at multiple depths more logistically feasible. Samples at I(SG), and L(SG) 580 were filtered despite being Category I locations due to the disturbance of the water column from conductivity testing and pump re-installation.

Equipment: All equipment functioned properly with the exception of the portable generator used to power the submersible pumps in wells OBS-3 and S(SG), which flooded due to a fuel line not being shut off before turning the generator off.

Institutional Controls:

Fences, Gates, Locks: No issues identified.
Trespassing/Site Disturbances: None observed.

Site Issues:

Disposal Cell/Drainage Structure Integrity: N/A
Vegetation/Noxious Weed Concerns: None.
Maintenance Requirements: None
Access Issues: None

Corrective Action Required: Installation of a pump in well HMC-951 will require a camera survey of the well to determine what is obstructing the well. Well X(M) will need to be cleared of sand to enable sampling but it is likely that it will continue to fill back in. Recommend replacing the well or removing it from the sample list.

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

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