Data Validation Package

November 2009
Groundwater Sampling at the
Bluewater, New Mexico, Disposal Site

January 2010

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Sampling Event Summary

Site: Bluewater, New Mexico, Disposal Site

Sampling Period: November 10-11, 2009

Groundwater samples were collected from eight monitor 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.* Sampling and analysis were conducted as specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PLN/S04351, continually updated). One duplicate sample was collected from monitor well F(M). Water levels were measured at each sampled well.

Alluvium wells are completed in the alluvial sediments in the former channel of the Rio San Jose that was filled by basalt lava flows known as the El Malpais (M). Bedrock wells are completed in the San Andres Limestone/Glorieta Sandstone (SG) hydrologic unit.

At the recommendation of the New Mexico Environment Department, this sampling event included sampling for an expanded list of analytes in addition to polychlorinated biphenyls (PCBs), molybdenum, selenium, and uranium. PCBs have never been detected in any of the wells at the site and were not detected in any of the wells sampled during this event. The uranium, molybdenum, and selenium concentrations did not exceed U.S. Nuclear Regulatory Commission-approved alternate concentration limits (ACLs) in any of the point-of-compliance (POC) wells. However, the uranium concentration in alluvium well T(M) has indicated an upward trend since DOE began sampling; the reason for this trend is unknown at this time. The current concentration of 0.41 milligrams per liter (mg/L) is less than the ACL of 0.44 mg/L. Well T(M) also has an elevated nitrate concentration of 66 mg/L. No other constituents exceeded U.S. Environmental Protection Agency maximum concentration limits for groundwater (40 CFR 192, Table 1).

Analytical results for the monitoring event are provided in Table 1 and Table 2. Alluvium point-of-exposure (POE) well X(M) could not be sampled because it was dry.

Table 1. 2009 Groundwater Monitoring Analytical Results for the Alluvium Wells

Constituent	ACL	Alluvium Wells			
		E(M) (Bkgd)	F(M) (POC)	T(M) (POC)	Y2(M) (Other)
Molybdenum (mg/L)	0.10	ND	0.004	0.030	0.003
Selenium (mg/L)	0.05	0.00039	0.0010	0.0041	0.00064
Uranium (mg/L)	0.44	0.00009	0.0093	0.410	0.0053
Nitrate[a] (mg/L)	N/A	ND	0.93	66	0.62

[a]Nitrate + nitrite as nitrogen

Key: ACL = alternate concentration limit;
Bkgd = background;
mg/L = milligrams per liter;
N/A = not applicable;
ND = Not Detected;
POC = point of compliance

Table 2. 2009 Groundwater Monitoring Analytical Results for the Bedrock Wells

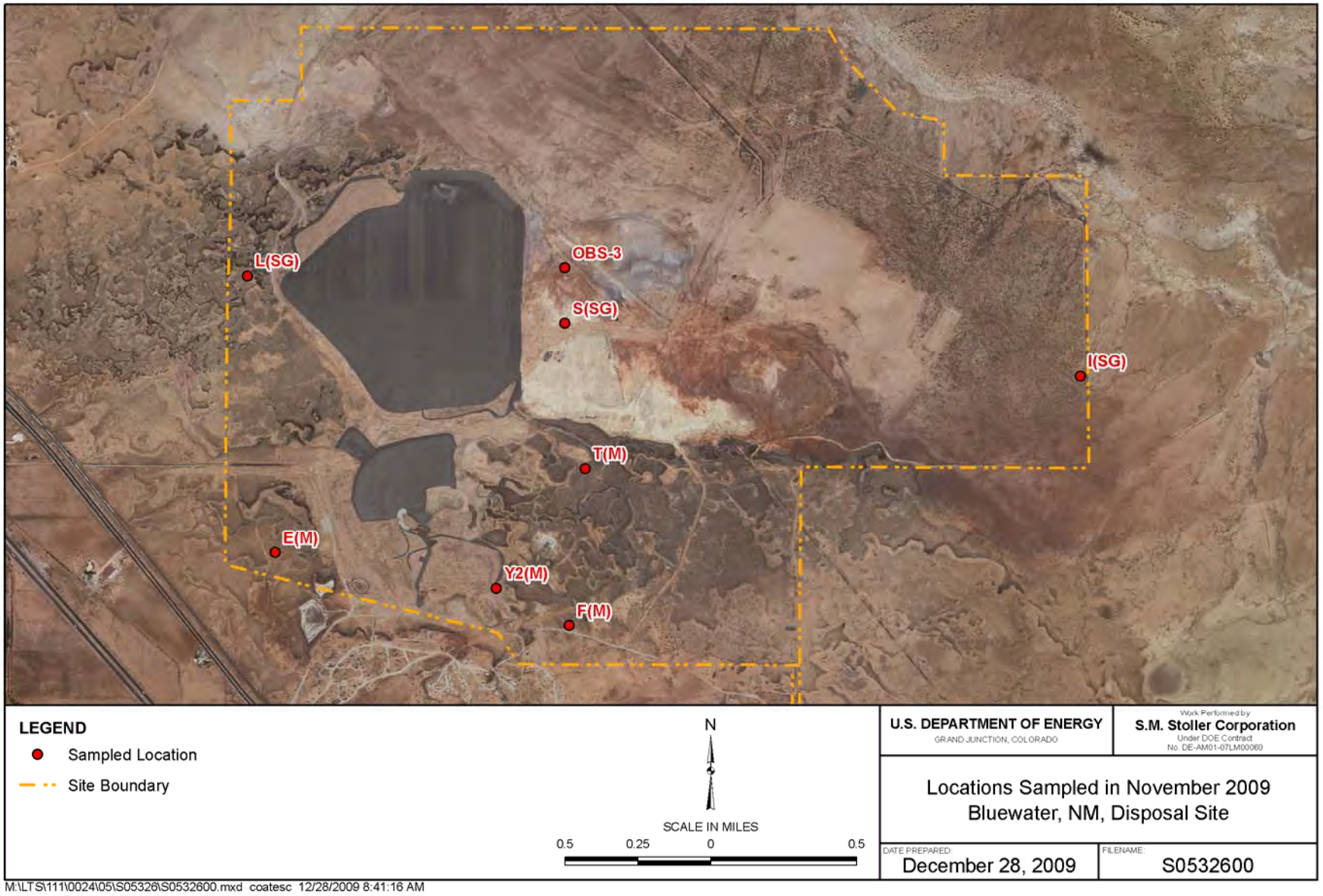
Constituent	ACL	Bedrock Wells			
		L(SG) (Bkgd)	OBS-3 (POC)	S(SG) (POC)	I(SG) (POE)
Selenium (mg/L)	0.05	ND	ND	ND	ND
Uranium (mg/L)	2.15	ND	0.00022	ND	0.0013
Nitrate[a] (mg/L)	N/A	ND	ND	ND	ND

[a]Nitrate + nitrite as nitrogen

Key: ACL = alternate concentration limit
Bkgd = background
mg/L = milligrams per liter
N/A = not applicable
ND = Not Detected
POC = point of compliance
POE = point of exposure

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

1/27/10
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**	November 10-11, 2009
Date(s) of Verification	December 16, 2009	**Name of Verifier**	Steve Donivan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures?	Yes	
List other documents, SOPs, instructions.		Work Order Letter dated September 30, 2009.
2. Were the sampling locations specified in the planning documents sampled?	Yes	Well X(M) was not sampled because it was dry.
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	Pre-trip calibration was performed on October 26, 2009.
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. Was the category of the well documented?	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 stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	Yes	Wells F(M) and Y2(M) were developed with a portable pump prior to sampling.

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	A duplicate sample was collected at location F(M).
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	Location ID 2823 was used for the duplicate sample.
Was the true identity of the samples recorded on the Quality Assurance Sample Log or in the Field Data Collection System (FDCS) report?	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. Are field data sheets signed and dated by both team members (hardcopies) or are dates present for the “Date Signed” fields (FDCS)?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

Laboratory Performance Assessment

General Information

Report Number (RIN):	09102641
Sample Event:	November 10-11, 2009
Site(s):	Bluewater, New Mexico
Laboratory:	ALS Laboratory Group, Fort Collins, Colorado
Work Order No.:	0911145
Analysis:	Metals, Organics, Wet Chemistry
Validator:	Steve Donivan
Review Date:	December 15, 2009

This validation was performed according to the *Environmental Procedures Catalog* (LMS/PRO/S04325, continually updated), "Standard Practice for Validation of Laboratory Data," GT-9(P). 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	EPA 310.1
Alkalinity, Carbonate	WCH-A-004	EPA 310.1	EPA 310.1
Chloride	MIS-A-039	SW-846 9056	SW-846 9056
Fluoride	MIS-A-040	SW-846 9056	SW-846 9056
Metals	LMM-01	SW-846 3005A	SW-846 6010B, 7470
Metals	LMM-02	SW-846 3005A	SW-846 6020A
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
PCBs	PEP-A-006	SW-846 3520C	SW-846 8082
Sulfate	MIS-A-044	SW-846 9056	SW-846 9056
Total Dissolved Solids	WCH-A-033	EPA 160.2	EPA 160.2

Data Qualifier Summary

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

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
All	All	Beryllium	J	Negative method blank
0911145-1	E(M)	Aluminum	U	Less than 5 times the method blank
0911145-1	E(M)	Cadmium	U	Less than 5 times the method blank
0911145-1	E(M)	Chromium	J	Negative method blank

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
0911145-1	E(M)	Cobalt	J	Negative method blank
0911145-1	E(M)	Copper	J	Negative method blank
0911145-1	E(M)	Iron	J	Field duplicate RSD greater than 20%
0911145-1	E(M)	Manganese	J	Field duplicate RSD greater than 20%
0911145-1	E(M)	Molybdenum	U	Less than 5 times the method blank
0911145-1	E(M)	Nickel	J	Negative method blank
0911145-1	E(M)	Silver	U	Less than 5 times the method blank
0911145-2	F(M)	Aluminum	U	Less than 5 times the method blank
0911145-2	F(M)	Cadmium	U	Less than 5 times the method blank
0911145-2	F(M)	Chromium	J	Field duplicate RSD greater than 20%
0911145-2	F(M)	Copper	J	Negative method blank
0911145-2	F(M)	Iron	J	Field duplicate RSD greater than 20%
0911145-2	F(M)	Lead	U	Less than 5 times the method blank
0911145-2	F(M)	Manganese	J	Field duplicate RSD greater than 20%
0911145-2	F(M)	Molybdenum	J	Field duplicate RSD greater than 20%
0911145-2	F(M)	Silver	U	Less than 5 times the method blank
0911145-2	F(M)	Sodium	J	Serial dilution failure
0911145-3	T(M)	Aluminum	U	Less than 5 times the method blank
0911145-3	T(M)	Chromium	J	Negative method blank
0911145-3	T(M)	Cobalt	J	Negative method blank
0911145-3	T(M)	Iron	J	Field duplicate RSD greater than 20%
0911145-3	T(M)	Manganese	J	Field duplicate RSD greater than 20%
0911145-3	T(M)	Molybdenum	J	Field duplicate RSD greater than 20%
0911145-3	T(M)	Nickel	J	Negative method blank
0911145-3	T(M)	Silver	U	Less than 5 times the calibration blank
0911145-4	Y2(M)	Aluminum	U	Less than 5 times the method blank
0911145-4	Y2(M)	Cadmium	U	Less than 5 times the method blank
0911145-4	Y2(M)	Cobalt	J	Negative method blank
0911145-4	Y2(M)	Copper	J	Negative method blank
0911145-4	Y2(M)	Manganese	J	Negative method blank
0911145-4	Y2(M)	Nickel	J	Negative method blank
0911145-5	OBS-3	Aluminum	U	Less than 5 times the method blank
0911145-5	OBS-3	Cadmium	U	Less than 5 times the method blank
0911145-5	OBS-3	Chromium	J	Negative method blank
0911145-5	OBS-3	Cobalt	J	Negative method blank
0911145-5	OBS-3	Copper	J	Negative method blank
0911145-5	OBS-3	Molybdenum	U	Less than 5 times the method blank
0911145-5	OBS-3	Nickel	J	Negative method blank
0911145-5	OBS-3	Selenium	U	Less than 5 times the method blank
0911145-5	OBS-3	Silver	U	Less than 5 times the calibration blank
0911145-6	I(SG)	Aluminum	U	Less than 5 times the method blank
0911145-6	I(SG)	Cadmium	U	Less than 5 times the method blank
0911145-6	I(SG)	Chromium	J	Negative method blank
0911145-6	I(SG)	Cobalt	J	Negative method blank
0911145-6	I(SG)	Copper	J	Negative method blank
0911145-6	I(SG)	Molybdenum	U	Less than 5 times the method blank
0911145-6	I(SG)	Nickel	J	Negative method blank

Table 4 (continued). Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
0911145-6	I(SG)	Selenium	U	Less than 5 times the method blank
0911145-7	L(SG)	Aluminum	U	Less than 5 times the method blank
0911145-7	L(SG)	Chromium	J	Negative method blank
0911145-7	L(SG)	Cobalt	J	Negative method blank
0911145-7	L(SG)	Copper	J	Negative method blank
0911145-7	L(SG)	Nickel	J	Negative method blank
0911145-7	L(SG)	Selenium	U	Less than 5 times the method blank
0911145-7	L(SG)	Uranium	U	Less than 5 times the method blank
0911145-8	S(SG)	Cadmium	U	Less than 5 times the method blank
0911145-8	S(SG)	Chromium	J	Negative method blank
0911145-8	S(SG)	Cobalt	J	Negative method blank
0911145-8	S(SG)	Copper	J	Negative method blank
0911145-8	S(SG)	Molybdenum	U	Less than 5 times the method blank
0911145-8	S(SG)	Nickel	J	Negative method blank
0911145-8	S(SG)	Selenium	U	Less than 5 times the method blank
0911145-8	S(SG)	Uranium	U	Less than 5 times the method blank
0911145-9	F(M) Duplicate	Aluminum	U	Less than 5 times the method blank
0911145-9	F(M) Duplicate	Cadmium	U	Less than 5 times the method blank
0911145-9	F(M) Duplicate	Chromium	J	Field duplicate RSD greater than 20%
0911145-9	F(M) Duplicate	Iron	J	Field duplicate RSD greater than 20%
0911145-9	F(M) Duplicate	Manganese	J	Field duplicate RSD greater than 20%
0911145-9	F(M) Duplicate	Molybdenum	U	Less than 5 times the method blank
0911145-9	F(M) Duplicate	Silver	U	Less than 5 times the calibration blank

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received nine water samples on November 13, 2009, accompanied by a Chain of Custody form. Copies of the two air bills were included in the receiving documentation. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody form was complete with no errors or omissions.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced coolers at 3.8 °C and 5.4 °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.

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.

Methods EPA 160.2, 310.1
There are no initial or continuing calibration requirements associated with these methods.

Method EPA 353.2
Calibrations for nitrate + nitrite as N were performed using seven calibration standards on November 18, 2009. The calibration curve correlation coefficient values were greater than 0.995 and the absolute values of the intercepts were less than 3 times the method detection limit (MDL). Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in six verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6010B
Calibrations for method SW-846 6010B metals were performed on November 18, 2009, using single point calibration. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in ten verification checks. 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 practical quantitation limit (PQL) and all results were within the acceptance range.

Method SW-846 6020A
Calibrations were performed for method SW-846 6020A metals on November 18, 2009, using seven 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. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in eight verification checks 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. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries associated with requested analytes were stable and within acceptable ranges.

Method SW-846 7470
Calibration for mercury was performed on November 23, 2009, 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. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in three verification checks. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify the linearity of the calibration curve near the PQL and all results were within the acceptance range.

Method SW-846 8082
The initial calibration for PCBs was performed using five calibration standards on September 23,2009. The initial calibration data met the acceptance criteria for all analytes on both gas chromatography columns with seven exceptions. Quantitation for each analyte was reported from the column that met the acceptance criteria. Initial and continuing calibration checks were made at the required frequency resulting in two continuing calibration verifications. All continuing calibration verifications were within the acceptance criteria.

Method SW-846 9056
Calibrations for chloride, fluoride, and sulfate were performed using five calibration standards on November 12, 2009. 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. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification checks were made at the required frequency resulting in nine verification checks. All calibration checks met the acceptance criteria.

Method and Calibration Blanks

Method blanks are analyzed to assess any contamination that may have occurred during sample preparation. 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.

Metals
All method blank and calibration blank results associated with the samples were below the PQL for all analytes. In cases where a blank concentration exceeds the MDL, the associated sample results are qualified with a "U" flag (not detected) when the sample result is greater than the MDL but less than 5 times the blank concentration. For barium, beryllium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, and sodium method blank results were negative and the absolute values were greater than the MDL. All associated sample results for these analytes that are less than 5 times the MDL are flagged with a "J" as estimated values.

Wet Chemistry
All method blank and calibration blank results associated with the samples were below the PQL with the following exceptions. Some continuing calibration blanks for chloride were slightly above the reporting limit. All associated sample results were either greater than 5 times the blank concentrations or re-analyzed with acceptable calibration blanks.

Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB 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 concentration. The spikes met the recovery and precision criteria for all analytes evaluated.

Laboratory Replicate Analysis

Laboratory replicate sample results demonstrate acceptable laboratory precision. The relative percent difference values for the sample replicates and matrix spike replicates were less than 20 percent for results that are greater than 5 times the PQL, indicating 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. Methods without sample preparation do not require the analysis of a laboratory control sample. 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 100 times the PQL for ICP-MS or greater than 50 times the PQL for ICP. The relative percent difference for the sodium dilution was above the acceptance range. The associated sample result is qualified with a "J" flag (estimated).

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis for several analytes to reduce interferences. The required detection limits were met for all analytes with the following exception. The carbonate and bicarbonate alkalinity results did not meet the required detection limits for five samples because reduced aliquots were taken for analysis to reduce interferences.

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.

Electronic Data Deliverable (EDD) File

The EDD file arrived on December 1, 2009. 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: 09102641 **Lab Code:** PAR **Validator:** Steve Donivan **Validation Date:** 12/15/2009

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

# of Samples: 9 **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 10 detection limit failures.
☐ Field/Trip Blanks	
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

RIN: 09102641 Lab Code: PAR

Non-Compliance Report: Detection Limits

Project: Bluewater

Validation Date: 12/15/2009

Ticket	Location	Lab Sample ID	Method Code	Lab Method	Analyte Name	Result	Qualifier	Reported Detection Limit	Required Detection Limit	Units
HLT 904	2823	0911145-9	WCH-A-003	EPA310.1	Bicarbonate	190		20	10	MG/L
HLT 904	2823	0911145-9	WCH-A-004	EPA310.1	CARBONATE AS CACO3	20	U	20	10	MG/L
HLT 896	F(M)	0911145-2	WCH-A-003	EPA310.1	Bicarbonate	190		20	10	MG/L
HLT 896	F(M)	0911145-2	WCH-A-004	EPA310.1	CARBONATE AS CACO3	20	U	20	10	MG/L
HLT 902	L(SG)	0911145-7	WCH-A-003	EPA310.1	Bicarbonate	110		20	10	MG/L
HLT 902	L(SG)	0911145-7	WCH-A-004	EPA310.1	CARBONATE AS CACO3	280		20	10	MG/L
HLT 897	T(M)	0911145-3	WCH-A-003	EPA310.1	Bicarbonate	420		20	10	MG/L
HLT 897	T(M)	0911145-3	WCH-A-004	EPA310.1	CARBONATE AS CACO3	20	U	20	10	MG/L
HLT 898	Y2(M)	0911145-4	WCH-A-003	EPA310.1	Bicarbonate	210		20	10	MG/L
HLT 898	Y2(M)	0911145-4	WCH-A-004	EPA310.1	CARBONATE AS CACO3	20	U	20	10	MG/L

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 09102641 **Lab Code:** PAR **Date Due:** 12/11/2009

Matrix: Water **Site Code:** BLU **Date Completed:** 12/1/2009

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
ALUMINUM	11/18/2009			OK	OK	OK	OK	OK	99.0	95.0	93.0	2.0	101.0		100.0
ANTIMONY	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	107.0	102.0	104.0	1.0	103.0	8.0	89.0
ARSENIC	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	94.0	96.0	96.0	0.0	96.0		116.0
BARIUM	11/18/2009			OK	OK	OK	OK	OK	92.0	91.0	90.0	1.0	96.0		99.0
BERYLLIUM	11/18/2009			OK	OK	OK	OK	OK	92.0	92.0	89.0	3.0	92.0		97.0
CADMIUM	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	109.0	101.0	104.0	3.0	97.0		103.0
CALCIUM	11/18/2009			OK	OK	OK	OK	OK	99.0	100.0	88.0	4.0	102.0	5.0	104.0
CHROMIUM	11/18/2009			OK	OK	OK	OK	OK	89.0	89.0	86.0	3.0	90.0		90.0
COBALT	11/18/2009			OK	OK	OK	OK	OK	91.0	90.0	88.0	3.0	90.0		80.0
COPPER	11/18/2009			OK	OK	OK	OK	OK	93.0	94.0	93.0	1.0	99.0		96.0
IRON	11/18/2009			OK	OK	OK	OK	OK	92.0	85.0	80.0	4.0	101.0		95.0
LEAD	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	108.0	105.0	107.0	2.0	100.0		118.0
MAGNESIUM	11/18/2009			OK	OK	OK	OK	OK	98.0	99.0	95.0	3.0	105.0	5.0	102.0
MANGANESE	11/18/2009			OK	OK	OK	OK	OK	89.0	88.0	86.0	2.0	90.0		94.0
MERCURY	11/23/2009	0.0000	1.0000	OK	OK	OK	OK	OK	101.0	104.0	105.0	1.0			100.0
MOLYBDENUM	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	111.0	102.0	102.0	1.0	110.0		118.0
NICKEL	11/18/2009			OK	OK	OK	OK	OK	91.0	91.0	87.0	4.0	88.0		97.0
POTASSIUM	11/18/2009			OK	OK	OK	OK	OK	82.0	86.0	86.0	0.0			83.0

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 09102641 **Lab Code:** PAR **Date Due:** 12/11/2009

Matrix: Water **Site Code:** BLU **Date Completed:** 12/1/2009

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	Dup. RPD	ICSAB %R	Serial Dil. %R	CRI %R
		Int.	R^2	ICV	CCV	ICB	CCB								
SELENIUM	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	86.0	82.0	80.0	1.0	95.0		73.0
SILVER	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	108.0	103.0	105.0	1.0	100.0		77.0
SODIUM	11/18/2009			OK	OK	OK	OK	OK	86.0	89.0	89.0	0.0		14.0	90.0
THALLIUM	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	104.0	95.0	102.0	8.0	85.0		110.0
URANIUM	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	110.0	105.0	108.0	2.0	105.0	7.0	111.0
VANADIUM	11/18/2009	0.0000	1.0000	OK	OK	OK	OK	OK	98.0	100.0	102.0	2.0	100.0		96.0
ZINC	11/18/2009			OK	OK	OK	OK	OK	87.0	86.0	84.0	2.0	84.0		92.0

SAMPLE MANAGEMENT SYSTEM
Organics Data Validation Summary

RIN: 09102641 **Project:** Bluewater **Lab Code:** PAR **Validation Date:** 12/15/2009

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

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

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

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

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 09102641 **Lab Code:** PAR **Date Due:** 12/11/2009

Matrix: Water **Site Code:** BLU **Date Completed:** 12/1/2009

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Bicarbonate	11/19/2009							OK	98.00				
CARBONATE AS CACO3	11/19/2009							OK					
CHLORIDE	11/16/2009	0.000	0.9998	OK	OK	OK	OK	OK	94.00	108.0	113.0	1.00	
FLUORIDE	11/16/2009	0.000	0.9998	OK	OK	OK	OK	OK	94.00	89.0	88.0	0	
NITRATE/NITRITE AS N	11/18/2009	0.000	1.0000	OK	OK	OK	OK	OK	102.00	95.0	90.0	5.00	
SULFATE	11/16/2009	0.000	0.9998	OK	OK	OK	OK	OK	95.00				
TOTAL DISSOLVED SOLIDS	11/17/2009							OK	99.00			0	

Sampling Quality Control Assessment

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

Sampling Protocol

All monitor well sample results were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. Additionally, sample results from well E(M) were qualified with a "Q" flag in the database because this well was classified as a Category II well.

Equipment Blank Assessment

Collection and analysis of an equipment blank was not performed during this sampling event.

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. A duplicate sample was collected from location F(M) (field duplicate ID 2823). The duplicate results met the Environmental Protection Agency recommended laboratory duplicate criteria of less than 20 percent relative difference for results that are greater than 5 times the PQL indicating acceptable overall precision for all analytes with the exception of chromium, iron, manganese, and molybdenum. This is likely due to the rusted steel casings noted in the Trip Report. The sample results from locations E(M), F(M), and T(M) for these analytes are qualified with a "J" flag as estimated values.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 09102641 **Lab Code:** PAR **Project:** Bluewater **Validation Date:** 12/15/2009

Duplicate: 2823 **Sample:** F(M)

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
ALUMINUM	50	B		1	49	B		1	2.02		UG/L
ANTIMONY	0.034	U		10	0.034	U		10			UG/L
AROCLOR-1016	0.11	U		1	0.11	U		1			UG/L
AROCLOR-1221	0.082	U		1	0.08	U		1			UG/L
AROCLOR-1232	0.12	U		1	0.12	U		1			UG/L
AROCLOR-1242	0.13	U		1	0.13	U		1			UG/L
AROCLOR-1248	0.13	U		1	0.13	U		1			UG/L
AROCLOR-1254	0.11	U		1	0.11	U		1			UG/L
AROCLOR-1260	0.093	U		1	0.091	U		1			UG/L
ARSENIC	1.1			1	1.3			1	16.67		UG/L
BARIUM	30	BE		1	28	B		1	6.90		UG/L
BERYLLIUM	0.16	U		1	0.16	U		1			UG/L
Bicarbonate	190			1	190			1	0		MG/L
CADMIUM	0.03	B		10	0.039	B		10			UG/L
CALCIUM	78000			1	75000			1	3.92		UG/L
CARBONATE AS CACO3	20	U		1	20	U		1			MG/L
CHLORIDE	13			1	13			1	0		MG/L
CHROMIUM	17			1	11			1	42.86		UG/L
COBALT	6.2	B		1	6.5	B		1	4.72		UG/L
COPPER	0.95	U		1	1.1	B		1			UG/L
FLUORIDE	0.42			1	0.39			1			MG/L
IRON	440	E		1	350			1	22.78		UG/L
LEAD	0.099	B		10	0.11	B		10	10.53		UG/L
MAGNESIUM	19000			1	19000			1	0		UG/L
MANGANESE	9.3			1	7.4			1	22.75		UG/L
MERCURY	0.021	U		1	0.021	U		1			UG/L
MOLYBDENUM	4			10	2.7			10	38.81		UG/L
NICKEL	7.9			1	6.4			1			UG/L
NITRATE/NITRITE AS N	0.93			1	0.93			1	0		MG/L
POTASSIUM	2600			1	2500			1	3.92		UG/L
SELENIUM	1			1	1			1	0		UG/L
SILVER	0.036	B		10	0.035	B		10			UG/L
SODIUM	17000	E		1	17000			1	0		UG/L
SULFATE	120			1	130			1	8.00		MG/L
THALLIUM	0.013	U		10	0.013	U		10			UG/L
TOTAL DISSOLVED SOLIDS	400			1	410			1	2.47		MG/L
URANIUM	9.3			10	8.9			10	4.40		UG/L
VANADIUM	3.6			3	3.9			3	8.00		UG/L

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 09102641 **Lab Code:** PAR **Project:** Bluewater **Validation Date:** 12/15/2009

Duplicate: 2823 **Sample:** F(M)

Analyte	Sample Result	Sample Flag	Sample Error	Sample Dilution	Duplicate Result	Duplicate Flag	Duplicate Error	Duplicate Dilution	RPD	RER	Units
ZINC	7.4	B		1	3.3	U		1			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: 1-26-2010

Data Validation Lead: Steve Donivan — Date: 1-26-2010

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 SEEPro database. The application compares the new data set 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.

There were no potential outliers identified in the laboratory data. Four of the field measurement results were listed as potential outlieres. There were no errors identified with these data and the data for this event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters
Laboratory: PARAGON (Fort Collins, CO)
RIN: 09102641
Comparison: All Historical Data
Report Date: 12/16/2009

Site Code	Location Code	Sample Date	Analyte	Current Result	Current Qualifiers Lab	Current Qualifiers Data	Historical Maximum Result	Historical Maximum Qualifiers Lab	Historical Maximum Qualifiers Data	Historical Minimum Result	Historical Minimum Qualifiers Lab	Historical Minimum Qualifiers Data	Number of Data Points N	Number of Data Points N Below Detect	Normally Distributed	Statistical Outlier
BLU01	OBS-3	11/10/2009	Selenium	0.000034	B	UF	0.005	B		0.000071	B	FQJ	5	3	Yes (log)	No
BLU01	OBS-3	11/10/2009	Uranium	0.00022		F	0.745		J	0.00048		FQ	5	0	Yes	No
BLU01	T(M)	11/10/2009	Selenium	0.0041		F	0.019		F	0.005	B		5	0	Yes (log)	No
BLU01	T(M)	11/10/2009	Uranium	0.41		F	0.32		F	0.0962			6	0	Yes	No

Data Validation Outliers Report - Field Parameters Only
Laboratory: Field Measurements
RIN: 09102641
Comparison: All Historical Data
Report Date: 12/16/2009

Site Code	Location Code	Sample Date	Analyte	Current Result	Current Qualifiers Lab	Current Qualifiers Data	Historical Maximum Result	Historical Maximum Qualifiers Lab	Historical Maximum Qualifiers Data	Historical Minimum Result	Historical Minimum Qualifiers Lab	Historical Minimum Qualifiers Data	Number of Data Points N	Number of Data Points N Below Detect	Normally Distributed	Statistical Outlier
BLU01	E(M)	11/11/2009	Oxidation Reduction Potential	95.5		FQ	-177.9		FQ	-309		FQ	6	0	Yes	Yes
BLU01	E(M)	11/11/2009	pH	7		FQ	8.65			7.11			14	0	Yes	No
BLU01	F(M)	11/10/2009	pH	8.39		F	7.98		F	6.92			16	0	Yes	No
BLU01	F(M)	11/10/2009	Temperature	19.62		F	16.1			12.2			16	0	Yes	No
BLU01	L(SG)	11/10/2009	Specific Conductance	1317		F	2090			1450		F	5	0	Yes	No
BLU01	S(SG)	11/10/2009	pH	8.3		F	7.02			6.33		F	5	0	Yes	Yes
BLU01	T(M)	11/10/2009	pH	6.88		F	7.34			6.89		F	10	0	Yes	No
BLU01	T(M)	11/10/2009	Specific Conductance	1753		F	1741		F	969			10	0	No	No

Data Validation Outliers Report - Field Parameters Only
Laboratory: Field Measurements
RIN: 09102641
Comparison: All Historical Data
Report Date: 12/16/2009

Site Code	Location Code	Sample Date	Analyte	Current Result	Current Qualifiers Lab	Current Qualifiers Data	Historical Maximum Result	Historical Maximum Qualifiers Lab	Historical Maximum Qualifiers Data	Historical Minimum Result	Historical Minimum Qualifiers Lab	Historical Minimum Qualifiers Data	Number of Data Points N	Number of Data Points N Below Detect	Normally Distributed	Statistical Outlier
BLU01	T(M)	11/10/2009	Turbidity	9.78		F	3.48		F	1.21		F	7	0	Yes	Yes
BLU01	Y2(M)	11/10/2009	pH	8.14		F	7.84			7.01			13	0	Yes	Yes
BLU01	Y2(M)	11/10/2009	Specific Conductance	552		F	734			586			13	0	Yes	No

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.		

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.

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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: 12/16/2009
Location: E(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/11/2009	0001	68.6	-	89.8	5	U	FQ	#	5	
Aluminum	mg/L	11/11/2009	0001	68.6	-	89.8	0.04	B	UFQ	#	0.0095	
Antimony	mg/L	11/11/2009	0001	68.6	-	89.8	0.000079	B	FQ	#	0.000034	
Aroclor - 1016	ug/L	11/11/2009	0001	68.6	-	89.8	0.11	U	FQ	#	0.11	
Aroclor - 1221	ug/L	11/11/2009	0001	68.6	-	89.8	0.084	U	FQ	#	0.084	
Aroclor - 1232	ug/L	11/11/2009	0001	68.6	-	89.8	0.12	U	FQ	#	0.12	
Aroclor - 1242	ug/L	11/11/2009	0001	68.6	-	89.8	0.13	U	FQ	#	0.13	
Aroclor - 1248	ug/L	11/11/2009	0001	68.6	-	89.8	0.13	U	FQ	#	0.13	
Aroclor - 1254	ug/L	11/11/2009	0001	68.6	-	89.8	0.12	U	FQ	#	0.12	
Aroclor - 1260	ug/L	11/11/2009	0001	68.6	-	89.8	0.095	U	FQ	#	0.095	
Arsenic	mg/L	11/11/2009	0001	68.6	-	89.8	0.000046	B	FQ	#	0.000011	
Barium	mg/L	11/11/2009	0001	68.6	-	89.8	0.013	B	FQ	#	0.00016	
Beryllium	mg/L	11/11/2009	0001	68.6	-	89.8	0.00016	U	FQJ	#	0.00016	
Bicarbonate	mg/L	11/11/2009	0001	68.6	-	89.8	5	U	FQ	#	5	
Cadmium	mg/L	11/11/2009	0001	68.6	-	89.8	0.000052	B	UFQ	#	0.000016	
Calcium	mg/L	11/11/2009	0001	68.6	-	89.8	250		FQ	#	0.0028	
Chloride	mg/L	11/11/2009	0001	68.6	-	89.8	42		FQ	#	0.4	
Chromium	mg/L	11/11/2009	0001	68.6	-	89.8	0.00085	U	FQJ	#	0.00085	
Cobalt	mg/L	11/11/2009	0001	68.6	-	89.8	0.0024	B	FQJ	#	0.0011	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Copper	mg/L	11/11/2009	0001	68.6	-	89.8	0.00095	U	FQJ	#	0.00095	
Fluoride	mg/L	11/11/2009	0001	68.6	-	89.8	0.62		FQ	#	0.2	
Iron	mg/L	11/11/2009	0001	68.6	-	89.8	12		FQJ	#	0.0014	
Lead	mg/L	11/11/2009	0001	68.6	-	89.8	0.000019	U	FQ	#	0.000019	
Magnesium	mg/L	11/11/2009	0001	68.6	-	89.8	58		FQ	#	0.0067	
Manganese	mg/L	11/11/2009	0001	68.6	-	89.8	0.99		FQJ	#	0.0002	
Mercury	mg/L	11/11/2009	0001	68.6	-	89.8	0.000021	U	FQ	#	0.000021	
Molybdenum	mg/L	11/11/2009	0001	68.6	-	89.8	0.0015		UFQ	#	0.000085	
Nickel	mg/L	11/11/2009	0001	68.6	-	89.8	0.0013	U	FQJ	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/11/2009	0001	68.6	-	89.8	0.1	U	FQ	#	0.1	
Oxidation Reduction Potential	mV	11/11/2009	N001	68.6	-	89.8	95.5		FQ	#		
pH	s.u.	11/11/2009	N001	68.6	-	89.8	7		FQ	#		
Potassium	mg/L	11/11/2009	0001	68.6	-	89.8	4.8		FQ	#	0.1	
Selenium	mg/L	11/11/2009	0001	68.6	-	89.8	0.00039		FQ	#	0.000027	
Silver	mg/L	11/11/2009	0001	68.6	-	89.8	0.000029	B	UFQ	#	0.000023	
Sodium	mg/L	11/11/2009	0001	68.6	-	89.8	51		FQ	#	0.025	
Specific Conductance	umhos /cm	11/11/2009	N001	68.6	-	89.8	1586		FQ	#		
Sulfate	mg/L	11/11/2009	0001	68.6	-	89.8	960		FQ	#	10	
Temperature	C	11/11/2009	N001	68.6	-	89.8	12.55		FQ	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Thallium	mg/L	11/11/2009	0001	68.6	-	89.8	0.000013	U	FQ	#	0.000013	
Total Dissolved Solids	mg/L	11/11/2009	0001	68.6	-	89.8	1400		FQ	#	40	
Turbidity	NTU	11/11/2009	N001	68.6	-	89.8	37.8		FQ	#		
Uranium	mg/L	11/11/2009	0001	68.6	-	89.8	0.00009	B	FQ	#	0.0000024	
Vanadium	mg/L	11/11/2009	0001	68.6	-	89.8	0.000075	U	FQ	#	0.000075	
Zinc	mg/L	11/11/2009	0001	68.6	-	89.8	0.0041	B	FQ	#	0.0033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: F(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N001	94.2	-	114.87	20	U	F	#	20	
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N002	94.2	-	114.87	20	U	F	#	20	
Aluminum	mg/L	11/10/2009	N001	94.2	-	114.87	0.05	B	UF	#	0.0095	
Aluminum	mg/L	11/10/2009	N002	94.2	-	114.87	0.049	B	UF	#	0.0095	
Antimony	mg/L	11/10/2009	N001	94.2	-	114.87	0.000034	U	F	#	0.000034	
Antimony	mg/L	11/10/2009	N002	94.2	-	114.87	0.000034	U	F	#	0.000034	
Aroclor - 1016	ug/L	11/10/2009	N001	94.2	-	114.87	0.11	U	F	#	0.11	
Aroclor - 1016	ug/L	11/10/2009	N002	94.2	-	114.87	0.11	U	F	#	0.11	
Aroclor - 1221	ug/L	11/10/2009	N001	94.2	-	114.87	0.082	U	F	#	0.082	
Aroclor - 1221	ug/L	11/10/2009	N002	94.2	-	114.87	0.08	U	F	#	0.08	
Aroclor - 1232	ug/L	11/10/2009	N001	94.2	-	114.87	0.12	U	F	#	0.12	
Aroclor - 1232	ug/L	11/10/2009	N002	94.2	-	114.87	0.12	U	F	#	0.12	
Aroclor - 1242	ug/L	11/10/2009	N001	94.2	-	114.87	0.13	U	F	#	0.13	
Aroclor - 1242	ug/L	11/10/2009	N002	94.2	-	114.87	0.13	U	F	#	0.13	
Aroclor - 1248	ug/L	11/10/2009	N001	94.2	-	114.87	0.13	U	F	#	0.13	
Aroclor - 1248	ug/L	11/10/2009	N002	94.2	-	114.87	0.13	U	F	#	0.13	
Aroclor - 1254	ug/L	11/10/2009	N001	94.2	-	114.87	0.11	U	F	#	0.11	
Aroclor - 1254	ug/L	11/10/2009	N002	94.2	-	114.87	0.11	U	F	#	0.11	
Aroclor - 1260	ug/L	11/10/2009	N001	94.2	-	114.87	0.093	U	F	#	0.093	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Aroclor - 1260	ug/L	11/10/2009	N002	94.2	-	114.87	0.091	U	F	#	0.091	
Arsenic	mg/L	11/10/2009	N001	94.2	-	114.87	0.0011		F	#	0.000011	
Arsenic	mg/L	11/10/2009	N002	94.2	-	114.87	0.0013		F	#	0.000011	
Barium	mg/L	11/10/2009	N001	94.2	-	114.87	0.03	BE	F	#	0.00016	
Barium	mg/L	11/10/2009	N002	94.2	-	114.87	0.028	B	F	#	0.00016	
Beryllium	mg/L	11/10/2009	N001	94.2	-	114.87	0.00016	U	FJ	#	0.00016	
Beryllium	mg/L	11/10/2009	N002	94.2	-	114.87	0.00016	U	FJ	#	0.00016	
Bicarbonate	mg/L	11/10/2009	N001	94.2	-	114.87	190		F	#	20	
Bicarbonate	mg/L	11/10/2009	N002	94.2	-	114.87	190		F	#	20	
Cadmium	mg/L	11/10/2009	N001	94.2	-	114.87	0.00003	B	UF	#	0.000016	
Cadmium	mg/L	11/10/2009	N002	94.2	-	114.87	0.000039	B	UF	#	0.000016	
Calcium	mg/L	11/10/2009	N001	94.2	-	114.87	78		F	#	0.0028	
Calcium	mg/L	11/10/2009	N002	94.2	-	114.87	75		F	#	0.0028	
Chloride	mg/L	11/10/2009	N001	94.2	-	114.87	13		F	#	0.2	
Chloride	mg/L	11/10/2009	N002	94.2	-	114.87	13		F	#	0.2	
Chromium	mg/L	11/10/2009	N001	94.2	-	114.87	0.017		FJ	#	0.00085	
Chromium	mg/L	11/10/2009	N002	94.2	-	114.87	0.011		FJ	#	0.00085	
Cobalt	mg/L	11/10/2009	N001	94.2	-	114.87	0.0062	B	F	#	0.0011	
Cobalt	mg/L	11/10/2009	N002	94.2	-	114.87	0.0065	B	F	#	0.0011	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Copper	mg/L	11/10/2009	N001	94.2	-	114.87	0.00095	U	FJ	#	0.00095	
Copper	mg/L	11/10/2009	N002	94.2	-	114.87	0.0011	B	F	#	0.00095	
Fluoride	mg/L	11/10/2009	N001	94.2	-	114.87	0.42		F	#	0.1	
Fluoride	mg/L	11/10/2009	N002	94.2	-	114.87	0.39		F	#	0.1	
Iron	mg/L	11/10/2009	N001	94.2	-	114.87	0.44	E	FJ	#	0.0014	
Iron	mg/L	11/10/2009	N002	94.2	-	114.87	0.35		FJ	#	0.0014	
Lead	mg/L	11/10/2009	N001	94.2	-	114.87	0.000099	B	UF	#	0.000019	
Lead	mg/L	11/10/2009	N002	94.2	-	114.87	0.00011	B	F	#	0.000019	
Magnesium	mg/L	11/10/2009	N001	94.2	-	114.87	19		F	#	0.0067	
Magnesium	mg/L	11/10/2009	N002	94.2	-	114.87	19		F	#	0.0067	
Manganese	mg/L	11/10/2009	N001	94.2	-	114.87	0.0093		FJ	#	0.0002	
Manganese	mg/L	11/10/2009	N002	94.2	-	114.87	0.0074		FJ	#	0.0002	
Mercury	mg/L	11/10/2009	N001	94.2	-	114.87	0.000021	U	F	#	0.000021	
Mercury	mg/L	11/10/2009	N002	94.2	-	114.87	0.000021	U	F	#	0.000021	
Molybdenum	mg/L	11/10/2009	N001	94.2	-	114.87	0.004		FJ	#	0.000085	
Molybdenum	mg/L	11/10/2009	N002	94.2	-	114.87	0.0027		UF	#	0.000085	
Nickel	mg/L	11/10/2009	N001	94.2	-	114.87	0.0079		F	#	0.0013	
Nickel	mg/L	11/10/2009	N002	94.2	-	114.87	0.0064		F	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N001	94.2	-	114.87	0.93		F	#	0.01	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N002	94.2	-	114.87	0.93		F	#	0.01	
Oxidation Reduction Potential	mV	11/10/2009	N001	94.2	-	114.87	85		F	#		
pH	s.u.	11/10/2009	N001	94.2	-	114.87	8.39		F	#		
Potassium	mg/L	11/10/2009	N001	94.2	-	114.87	2.6		F	#	0.1	
Potassium	mg/L	11/10/2009	N002	94.2	-	114.87	2.5		F	#	0.1	
Selenium	mg/L	11/10/2009	N001	94.2	-	114.87	0.001		F	#	0.000027	
Selenium	mg/L	11/10/2009	N002	94.2	-	114.87	0.001		F	#	0.000027	
Silver	mg/L	11/10/2009	N001	94.2	-	114.87	0.000036	B	UF	#	0.000023	
Silver	mg/L	11/10/2009	N002	94.2	-	114.87	0.000035	B	UF	#	0.000023	
Sodium	mg/L	11/10/2009	N001	94.2	-	114.87	17	E	FJ	#	0.025	
Sodium	mg/L	11/10/2009	N002	94.2	-	114.87	17		F	#	0.025	
Specific Conductance	umhos /cm	11/10/2009	N001	94.2	-	114.87	585		F	#		
Sulfate	mg/L	11/10/2009	N001	94.2	-	114.87	120		F	#	0.5	
Sulfate	mg/L	11/10/2009	N002	94.2	-	114.87	130		F	#	0.5	
Temperature	C	11/10/2009	N001	94.2	-	114.87	19.62		F	#		
Thallium	mg/L	11/10/2009	N001	94.2	-	114.87	0.000013	U	F	#	0.000013	
Thallium	mg/L	11/10/2009	N002	94.2	-	114.87	0.000013	U	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	N001	94.2	-	114.87	400		F	#	20	
Total Dissolved Solids	mg/L	11/10/2009	N002	94.2	-	114.87	410		F	#	20	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Turbidity	NTU	11/10/2009	N001	94.2	-	114.87	3.02		F	#		
Uranium	mg/L	11/10/2009	N001	94.2	-	114.87	0.0093		F	#	0.0000024	
Uranium	mg/L	11/10/2009	N002	94.2	-	114.87	0.0089		F	#	0.0000024	
Vanadium	mg/L	11/10/2009	N001	94.2	-	114.87	0.0036		F	#	0.000075	
Vanadium	mg/L	11/10/2009	N002	94.2	-	114.87	0.0039		F	#	0.000075	
Zinc	mg/L	11/10/2009	N001	94.2	-	114.87	0.0074	B	F	#	0.0033	
Zinc	mg/L	11/10/2009	N002	94.2	-	114.87	0.0033	U	F	#	0.0033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: I(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N001	235	-	330	16		F	#	10	
Aluminum	mg/L	11/10/2009	N001	235	-	330	0.044	B	UF	#	0.0095	
Antimony	mg/L	11/10/2009	N001	235	-	330	0.000034	U	F	#	0.000034	
Arsenic	mg/L	11/10/2009	N001	235	-	330	0.00011		F	#	0.000011	
Barium	mg/L	11/10/2009	N001	235	-	330	0.013	B	F	#	0.00016	
Beryllium	mg/L	11/10/2009	N001	235	-	330	0.00016	U	FJ	#	0.00016	
Bicarbonate	mg/L	11/10/2009	N001	235	-	330	74		F	#	10	
Cadmium	mg/L	11/10/2009	N001	235	-	330	0.000043	B	UF	#	0.000016	
Calcium	mg/L	11/10/2009	N001	235	-	330	9.2		F	#	0.0028	
Chloride	mg/L	11/10/2009	N001	235	-	330	210		F	#	2	
Chromium	mg/L	11/10/2009	N001	235	-	330	0.00085	U	FJ	#	0.00085	
Cobalt	mg/L	11/10/2009	N001	235	-	330	0.0011	U	FJ	#	0.0011	
Copper	mg/L	11/10/2009	N001	235	-	330	0.00095	U	FJ	#	0.00095	
Fluoride	mg/L	11/10/2009	N001	235	-	330	0.34		F	#	0.1	
Iron	mg/L	11/10/2009	N001	235	-	330	1.7		F	#	0.0014	
Lead	mg/L	11/10/2009	N001	235	-	330	0.00012	B	F	#	0.000019	
Magnesium	mg/L	11/10/2009	N001	235	-	330	6.5		F	#	0.0067	
Manganese	mg/L	11/10/2009	N001	235	-	330	0.1		F	#	0.0002	
Mercury	mg/L	11/10/2009	N001	235	-	330	0.000021	U	F	#	0.000021	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Molybdenum	mg/L	11/10/2009	N001	235	-	330	0.0013		UF	#	0.000085	
Nickel	mg/L	11/10/2009	N001	235	-	330	0.0013	U	FJ	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N001	235	-	330	0.05	U	F	#	0.05	
Oxidation Reduction Potential	mV	11/10/2009	N001	235	-	330	74.4		F	#		
pH	s.u.	11/10/2009	N001	235	-	330	8.74		F	#		
Potassium	mg/L	11/10/2009	N001	235	-	330	4.5		F	#	0.1	
Selenium	mg/L	11/10/2009	N001	235	-	330	0.000038	B	UF	#	0.000027	
Silver	mg/L	11/10/2009	N001	235	-	330	0.000023	U	F	#	0.000023	
Sodium	mg/L	11/10/2009	N001	235	-	330	140		F	#	0.025	
Specific Conductance	umhos /cm	11/10/2009	N001	235	-	330	894		F	#		
Sulfate	mg/L	11/10/2009	N001	235	-	330	87		F	#	0.5	
Temperature	C	11/10/2009	N001	235	-	330	16.49		F	#		
Thallium	mg/L	11/10/2009	N001	235	-	330	0.000013	U	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	N001	235	-	330	530		F	#	20	
Turbidity	NTU	11/10/2009	N001	235	-	330	8.16		F	#		
Uranium	mg/L	11/10/2009	N001	235	-	330	0.0013		F	#	0.0000024	
Vanadium	mg/L	11/10/2009	N001	235	-	330	0.000075	U	F	#	0.000075	
Zinc	mg/L	11/10/2009	N001	235	-	330	0.0033	U	F	#	0.0033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: L(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N001	412	-	610	280		F	#	20	
Aluminum	mg/L	11/10/2009	N001	412	-	610	0.053	B	UF	#	0.0095	
Antimony	mg/L	11/10/2009	N001	412	-	610	0.000034	U	F	#	0.000034	
Arsenic	mg/L	11/10/2009	N001	412	-	610	0.000045	B	F	#	0.000011	
Barium	mg/L	11/10/2009	N001	412	-	610	0.0066	B	F	#	0.00016	
Beryllium	mg/L	11/10/2009	N001	412	-	610	0.00016	U	FJ	#	0.00016	
Bicarbonate	mg/L	11/10/2009	N001	412	-	610	110		F	#	20	
Cadmium	mg/L	11/10/2009	N001	412	-	610	0.000016	U	F	#	0.000016	
Calcium	mg/L	11/10/2009	N001	412	-	610	0.7	B	F	#	0.0028	
Chloride	mg/L	11/10/2009	N001	412	-	610	220		F	#	4	
Chromium	mg/L	11/10/2009	N001	412	-	610	0.00085	U	FJ	#	0.00085	
Cobalt	mg/L	11/10/2009	N001	412	-	610	0.0011	U	FJ	#	0.0011	
Copper	mg/L	11/10/2009	N001	412	-	610	0.00095	U	FJ	#	0.00095	
Fluoride	mg/L	11/10/2009	N001	412	-	610	0.56		F	#	0.2	
Iron	mg/L	11/10/2009	N001	412	-	610	0.82		F	#	0.0014	
Lead	mg/L	11/10/2009	N001	412	-	610	0.000093	B	F	#	0.000019	
Magnesium	mg/L	11/10/2009	N001	412	-	610	1.4		F	#	0.0067	
Manganese	mg/L	11/10/2009	N001	412	-	610	0.0085		F	#	0.0002	
Mercury	mg/L	11/10/2009	N001	412	-	610	0.000021	U	F	#	0.000021	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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	11/10/2009	N001	412	-	610	0.016		F	#	0.000085	
Nickel	mg/L	11/10/2009	N001	412	-	610	0.0013	U	FJ	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N001	412	-	610	0.02	U	F	#	0.02	
Oxidation Reduction Potential	mV	11/10/2009	N001	412	-	610	75.3		F	#		
pH	s.u.	11/10/2009	N001	412	-	610	9.42		F	#		
Potassium	mg/L	11/10/2009	N001	412	-	610	5.7		F	#	0.1	
Selenium	mg/L	11/10/2009	N001	412	-	610	0.000027	U	F	#	0.000027	
Silver	mg/L	11/10/2009	N001	412	-	610	0.000023	U	F	#	0.000023	
Sodium	mg/L	11/10/2009	N001	412	-	610	240		F	#	0.25	
Specific Conductance	umhos /cm	11/10/2009	N001	412	-	610	1317		F	#		
Sulfate	mg/L	11/10/2009	N001	412	-	610	3.7		F	#	1	
Temperature	C	11/10/2009	N001	412	-	610	16.04		F	#		
Thallium	mg/L	11/10/2009	N001	412	-	610	0.000013	U	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	N001	412	-	610	770		F	#	40	
Turbidity	NTU	11/10/2009	N001	412	-	610	2.96		F	#		
Uranium	mg/L	11/10/2009	N001	412	-	610	0.000029	B	UF	#	0.0000024	
Vanadium	mg/L	11/10/2009	N001	412	-	610	0.000075	U	F	#	0.000075	
Zinc	mg/L	11/10/2009	N001	412	-	610	0.0037	B	F	#	0.0033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: OBS-3 WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	0001	152.4	-	350	5	U	F	#	5	
Aluminum	mg/L	11/10/2009	0001	152.4	-	350	0.044	B	UF	#	0.0095	
Antimony	mg/L	11/10/2009	0001	152.4	-	350	0.000034	U	F	#	0.000034	
Arsenic	mg/L	11/10/2009	0001	152.4	-	350	0.000061	B	F	#	0.000011	
Barium	mg/L	11/10/2009	0001	152.4	-	350	0.0084	B	F	#	0.00016	
Beryllium	mg/L	11/10/2009	0001	152.4	-	350	0.00016	U	FJ	#	0.00016	
Bicarbonate	mg/L	11/10/2009	0001	152.4	-	350	5	U	F	#	5	
Cadmium	mg/L	11/10/2009	0001	152.4	-	350	0.000054	B	UF	#	0.000016	
Calcium	mg/L	11/10/2009	0001	152.4	-	350	110		F	#	0.0028	
Chloride	mg/L	11/10/2009	0001	152.4	-	350	1100		F	#	10	
Chromium	mg/L	11/10/2009	0001	152.4	-	350	0.00085	U	FJ	#	0.00085	
Cobalt	mg/L	11/10/2009	0001	152.4	-	350	0.0011	U	FJ	#	0.0011	
Copper	mg/L	11/10/2009	0001	152.4	-	350	0.00095	U	FJ	#	0.00095	
Fluoride	mg/L	11/10/2009	0001	152.4	-	350	0.65		F	#	0.5	
Iron	mg/L	11/10/2009	0001	152.4	-	350	13		F	#	0.0014	
Lead	mg/L	11/10/2009	0001	152.4	-	350	0.000019	U	F	#	0.000019	
Magnesium	mg/L	11/10/2009	0001	152.4	-	350	150		F	#	0.0067	
Manganese	mg/L	11/10/2009	0001	152.4	-	350	1.2		F	#	0.0002	
Mercury	mg/L	11/10/2009	0001	152.4	-	350	0.000021	U	F	#	0.000021	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Molybdenum	mg/L	11/10/2009	0001	152.4	-	350	0.00057	B	UF	#	0.000085	
Nickel	mg/L	11/10/2009	0001	152.4	-	350	0.0013	U	FJ	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	0001	152.4	-	350	0.2	U	F	#	0.2	
Oxidation Reduction Potential	mV	11/10/2009	N001	152.4	-	350	83.2		F	#		
pH	s.u.	11/10/2009	N001	152.4	-	350	8.17		F	#		
Potassium	mg/L	11/10/2009	0001	152.4	-	350	17		F	#	0.1	
Selenium	mg/L	11/10/2009	0001	152.4	-	350	0.000034	B	UF	#	0.000027	
Silver	mg/L	11/10/2009	0001	152.4	-	350	0.000035	B	UF	#	0.000023	
Sodium	mg/L	11/10/2009	0001	152.4	-	350	410		F	#	0.25	
Specific Conductance	umhos /cm	11/10/2009	N001	152.4	-	350	3567		F	#		
Sulfate	mg/L	11/10/2009	0001	152.4	-	350	670		F	#	2.5	
Temperature	C	11/10/2009	N001	152.4	-	350	15.77		F	#		
Thallium	mg/L	11/10/2009	0001	152.4	-	350	0.000013	U	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	0001	152.4	-	350	2500		F	#	80	
Turbidity	NTU	11/10/2009	N001	152.4	-	350	36.6		F	#		
Uranium	mg/L	11/10/2009	0001	152.4	-	350	0.00022		F	#	0.0000024	
Vanadium	mg/L	11/10/2009	0001	152.4	-	350	0.000075	U	F	#	0.000075	
Zinc	mg/L	11/10/2009	0001	152.4	-	350	0.0033	U	F	#	0.0033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: S(SG) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N001	159	-	280	5	U	F	#	5	
Aluminum	mg/L	11/10/2009	N001	159	-	280	0.44	B	F	#	0.095	
Antimony	mg/L	11/10/2009	N001	159	-	280	0.000034	U	F	#	0.000034	
Arsenic	mg/L	11/10/2009	N001	159	-	280	0.000087	B	F	#	0.000011	
Barium	mg/L	11/10/2009	N001	159	-	280	0.064	B	F	#	0.0016	
Beryllium	mg/L	11/10/2009	N001	159	-	280	0.0016	U	FJ	#	0.0016	
Bicarbonate	mg/L	11/10/2009	N001	159	-	280	5	U	F	#	5	
Cadmium	mg/L	11/10/2009	N001	159	-	280	0.00012	B	UF	#	0.000016	
Calcium	mg/L	11/10/2009	N001	159	-	280	860		F	#	0.028	
Chloride	mg/L	11/10/2009	N001	159	-	280	2500		F	#	40	
Chromium	mg/L	11/10/2009	N001	159	-	280	0.0085	U	FJ	#	0.0085	
Cobalt	mg/L	11/10/2009	N001	159	-	280	0.011	U	FJ	#	0.011	
Copper	mg/L	11/10/2009	N001	159	-	280	0.0095	U	F	#	0.0095	
Fluoride	mg/L	11/10/2009	N001	159	-	280	0.73		F	#	0.5	
Iron	mg/L	11/10/2009	N001	159	-	280	570		FJ	#	0.014	
Lead	mg/L	11/10/2009	N001	159	-	280	0.000019	U	F	#	0.000019	
Magnesium	mg/L	11/10/2009	N001	159	-	280	54		F	#	0.067	
Manganese	mg/L	11/10/2009	N001	159	-	280	71		F	#	0.002	
Mercury	mg/L	11/10/2009	N001	159	-	280	0.000021	U	F	#	0.000021	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Molybdenum	mg/L	11/10/2009	N001	159	-	280	0.00043	B	UF	#	0.000085	
Nickel	mg/L	11/10/2009	N001	159	-	280	0.013	U	FJ	#	0.013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N001	159	-	280	5	U	F	#	5	
Oxidation Reduction Potential	mV	11/10/2009	N001	159	-	280	70		F	#		
pH	s.u.	11/10/2009	N001	159	-	280	8.3		F	#		
Potassium	mg/L	11/10/2009	N001	159	-	280	1.4	B	F	#	1	
Selenium	mg/L	11/10/2009	N001	159	-	280	0.000034	B	UF	#	0.000027	
Silver	mg/L	11/10/2009	N001	159	-	280	0.00029		F	#	0.000023	
Sodium	mg/L	11/10/2009	N001	159	-	280	78		F	#	0.25	
Specific Conductance	umhos /cm	11/10/2009	N001	159	-	280	6632		F	#		
Sulfate	mg/L	11/10/2009	N001	159	-	280	300		F	#	2.5	
Temperature	C	11/10/2009	N001	159	-	280	15.66		F	#		
Thallium	mg/L	11/10/2009	N001	159	-	280	0.000013	U	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	N001	159	-	280	5000		F	#	200	
Turbidity	NTU	11/10/2009	N001	159	-	280	0.96		F	#		
Uranium	mg/L	11/10/2009	N001	159	-	280	0.000016	B	UF	#	0.0000024	
Vanadium	mg/L	11/10/2009	N001	159	-	280	0.000075	U	F	#	0.000075	
Zinc	mg/L	11/10/2009	N001	159	-	280	0.033	U	F	#	0.033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: T(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N001	128	-	133	20	U	F	#	20	
Aluminum	mg/L	11/10/2009	N001	128	-	133	0.1	B	UF	#	0.0095	
Antimony	mg/L	11/10/2009	N001	128	-	133	0.00069		F	#	0.000034	
Aroclor - 1016	ug/L	11/10/2009	N001	128	-	133	0.11	U	F	#	0.11	
Aroclor - 1221	ug/L	11/10/2009	N001	128	-	133	0.08	U	F	#	0.08	
Aroclor - 1232	ug/L	11/10/2009	N001	128	-	133	0.12	U	F	#	0.12	
Aroclor - 1242	ug/L	11/10/2009	N001	128	-	133	0.13	U	F	#	0.13	
Aroclor - 1248	ug/L	11/10/2009	N001	128	-	133	0.13	U	F	#	0.13	
Aroclor - 1254	ug/L	11/10/2009	N001	128	-	133	0.11	U	F	#	0.11	
Aroclor - 1260	ug/L	11/10/2009	N001	128	-	133	0.091	U	F	#	0.091	
Arsenic	mg/L	11/10/2009	N001	128	-	133	0.004		F	#	0.000011	
Barium	mg/L	11/10/2009	N001	128	-	133	0.025	B	F	#	0.00016	
Beryllium	mg/L	11/10/2009	N001	128	-	133	0.00016	U	FJ	#	0.00016	
Bicarbonate	mg/L	11/10/2009	N001	128	-	133	420		F	#	20	
Cadmium	mg/L	11/10/2009	N001	128	-	133	0.0007		F	#	0.000016	
Calcium	mg/L	11/10/2009	N001	128	-	133	110		F	#	0.0028	
Chloride	mg/L	11/10/2009	N001	128	-	133	58		F	#	0.4	
Chromium	mg/L	11/10/2009	N001	128	-	133	0.0013	B	FJ	#	0.00085	
Cobalt	mg/L	11/10/2009	N001	128	-	133	0.0011	U	FJ	#	0.0011	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: T(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
Copper	mg/L	11/10/2009	N001	128	-	133	0.16		F	#	0.00095	
Fluoride	mg/L	11/10/2009	N001	128	-	133	0.43		F	#	0.2	
Iron	mg/L	11/10/2009	N001	128	-	133	1.7		FJ	#	0.0014	
Lead	mg/L	11/10/2009	N001	128	-	133	0.037		F	#	0.000019	
Magnesium	mg/L	11/10/2009	N001	128	-	133	30		F	#	0.0067	
Manganese	mg/L	11/10/2009	N001	128	-	133	0.11		FJ	#	0.0002	
Mercury	mg/L	11/10/2009	N001	128	-	133	0.000021	U	F	#	0.000021	
Molybdenum	mg/L	11/10/2009	N001	128	-	133	0.03		FJ	#	0.000085	
Nickel	mg/L	11/10/2009	N001	128	-	133	0.0044	B	FJ	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N001	128	-	133	66		F	#	1	
Oxidation Reduction Potential	mV	11/10/2009	N001	128	-	133	105.7		F	#		
pH	s.u.	11/10/2009	N001	128	-	133	6.88		F	#		
Potassium	mg/L	11/10/2009	N001	128	-	133	5.3		F	#	0.1	
Selenium	mg/L	11/10/2009	N001	128	-	133	0.0041		F	#	0.000027	
Silver	mg/L	11/10/2009	N001	128	-	133	0.000052	B	UF	#	0.000023	
Sodium	mg/L	11/10/2009	N001	128	-	133	210		F	#	0.025	
Specific Conductance	umhos /cm	11/10/2009	N001	128	-	133	1753		F	#		
Sulfate	mg/L	11/10/2009	N001	128	-	133	290		F	#	1	
Temperature	C	11/10/2009	N001	128	-	133	12.67		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: T(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
Thallium	mg/L	11/10/2009	N001	128	-	133	0.00018	B	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	N001	128	-	133	1200		F	#	40	
Turbidity	NTU	11/10/2009	N001	128	-	133	9.78		F	#		
Uranium	mg/L	11/10/2009	N001	128	-	133	0.41		F	#	0.000024	
Vanadium	mg/L	11/10/2009	N001	128	-	133	0.0045		F	#	0.000075	
Zinc	mg/L	11/10/2009	N001	128	-	133	1		F	#	0.0033	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
Location: Y2(M) WELL State Plane coordinates established with GPS Mapping Grade, Local coordinates source AutoCAD drawing

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Alkalinity, Carbonate (As CaCO3)	mg/L	11/10/2009	N001	98	-	123	20	U	F	#	20	
Aluminum	mg/L	11/10/2009	N001	98	-	123	0.046	B	UF	#	0.0095	
Antimony	mg/L	11/10/2009	N001	98	-	123	0.000034	U	F	#	0.000034	
Aroclor - 1016	ug/L	11/10/2009	N001	98	-	123	0.11	U	F	#	0.11	
Aroclor - 1221	ug/L	11/10/2009	N001	98	-	123	0.08	U	F	#	0.08	
Aroclor - 1232	ug/L	11/10/2009	N001	98	-	123	0.12	U	F	#	0.12	
Aroclor - 1242	ug/L	11/10/2009	N001	98	-	123	0.13	U	F	#	0.13	
Aroclor - 1248	ug/L	11/10/2009	N001	98	-	123	0.13	U	F	#	0.13	
Aroclor - 1254	ug/L	11/10/2009	N001	98	-	123	0.11	U	F	#	0.11	
Aroclor - 1260	ug/L	11/10/2009	N001	98	-	123	0.091	U	F	#	0.091	
Arsenic	mg/L	11/10/2009	N001	98	-	123	0.0012		F	#	0.000011	
Barium	mg/L	11/10/2009	N001	98	-	123	0.032	B	F	#	0.00016	
Beryllium	mg/L	11/10/2009	N001	98	-	123	0.00016	U	FJ	#	0.00016	
Bicarbonate	mg/L	11/10/2009	N001	98	-	123	210		F	#	20	
Cadmium	mg/L	11/10/2009	N001	98	-	123	0.000032	B	UF	#	0.000016	
Calcium	mg/L	11/10/2009	N001	98	-	123	77		F	#	0.0028	
Chloride	mg/L	11/10/2009	N001	98	-	123	7		F	#	0.2	
Chromium	mg/L	11/10/2009	N001	98	-	123	0.0059		F	#	0.00085	
Cobalt	mg/L	11/10/2009	N001	98	-	123	0.0011	U	FJ	#	0.0011	

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Copper	mg/L	11/10/2009	N001	98	-	123	0.0022	B	FJ	#	0.00095	
Fluoride	mg/L	11/10/2009	N001	98	-	123	0.4		F	#	0.1	
Iron	mg/L	11/10/2009	N001	98	-	123	0.075	B	F	#	0.0014	
Lead	mg/L	11/10/2009	N001	98	-	123	0.000025	B	F	#	0.000019	
Magnesium	mg/L	11/10/2009	N001	98	-	123	18		F	#	0.0067	
Manganese	mg/L	11/10/2009	N001	98	-	123	0.00092	B	FJ	#	0.0002	
Mercury	mg/L	11/10/2009	N001	98	-	123	0.000021	U	F	#	0.000021	
Molybdenum	mg/L	11/10/2009	N001	98	-	123	0.003		F	#	0.000085	
Nickel	mg/L	11/10/2009	N001	98	-	123	0.0042	B	FJ	#	0.0013	
Nitrate + Nitrite as Nitrogen	mg/L	11/10/2009	N001	98	-	123	0.62		F	#	0.01	
Oxidation Reduction Potential	mV	11/10/2009	N001	98	-	123	79.4		F	#		
pH	s.u.	11/10/2009	N001	98	-	123	8.14		F	#		
Potassium	mg/L	11/10/2009	N001	98	-	123	2.6		F	#	0.1	
Selenium	mg/L	11/10/2009	N001	98	-	123	0.00064		F	#	0.000027	
Silver	mg/L	11/10/2009	N001	98	-	123	0.000023	U	F	#	0.000023	
Sodium	mg/L	11/10/2009	N001	98	-	123	14		F	#	0.025	
Specific Conductance	umhos /cm	11/10/2009	N001	98	-	123	552		F	#		
Sulfate	mg/L	11/10/2009	N001	98	-	123	110		F	#	0.5	
Temperature	C	11/10/2009	N001	98	-	123	19.17		F	#		

Groundwater Quality Data by Location (USEE100) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 12/16/2009
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
Thallium	mg/L	11/10/2009	N001	98	-	123	0.000015	B	F	#	0.000013	
Total Dissolved Solids	mg/L	11/10/2009	N001	98	-	123	400		F	#	20	
Turbidity	NTU	11/10/2009	N001	98	-	123	1.9		F	#		
Uranium	mg/L	11/10/2009	N001	98	-	123	0.0053		F	#	0.0000024	
Vanadium	mg/L	11/10/2009	N001	98	-	123	0.0032		F	#	0.000075	
Zinc	mg/L	11/10/2009	N001	98	-	123	0.0083	B	F	#	0.0033	

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.

Time-Concentration Graphs

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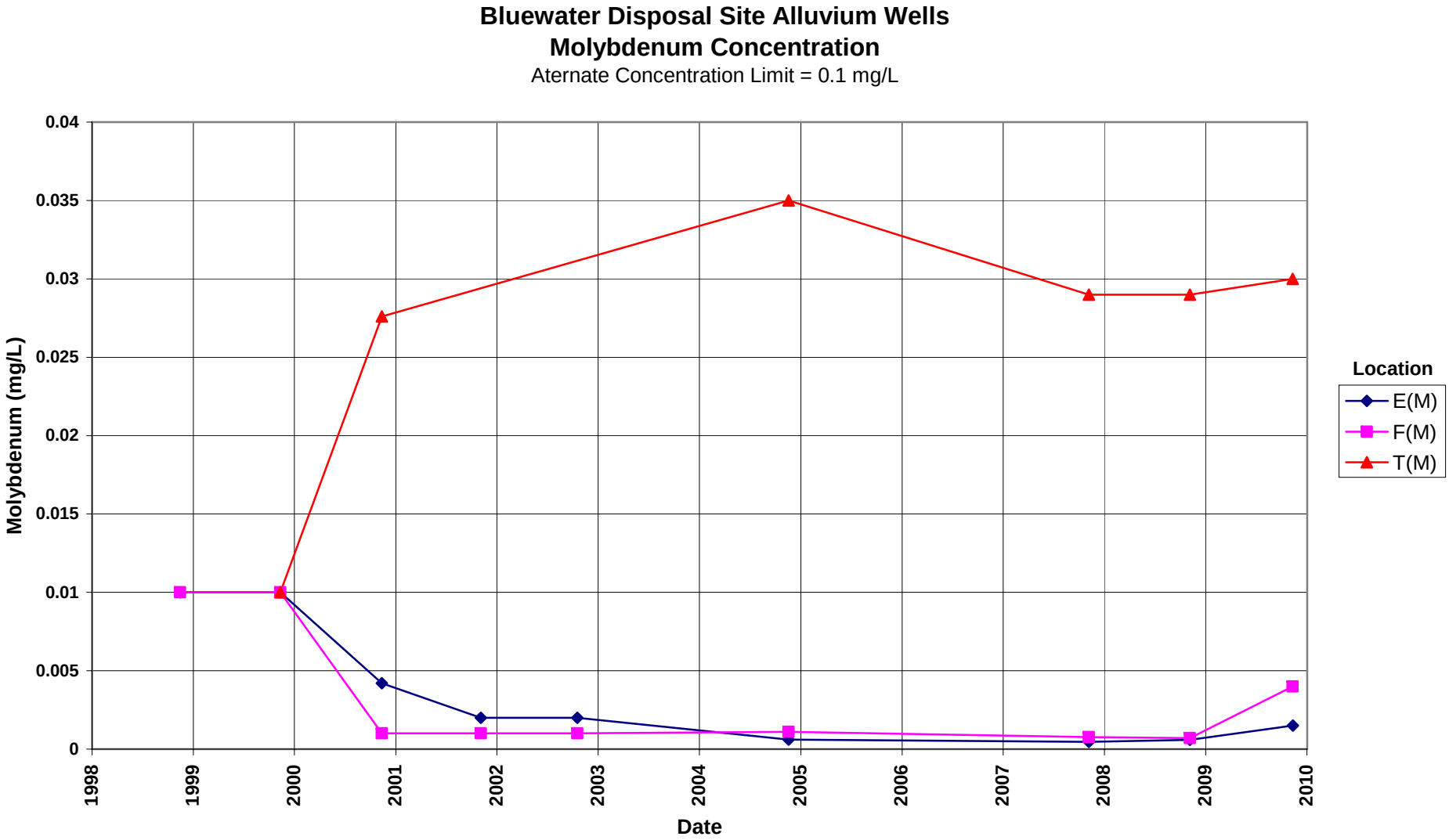
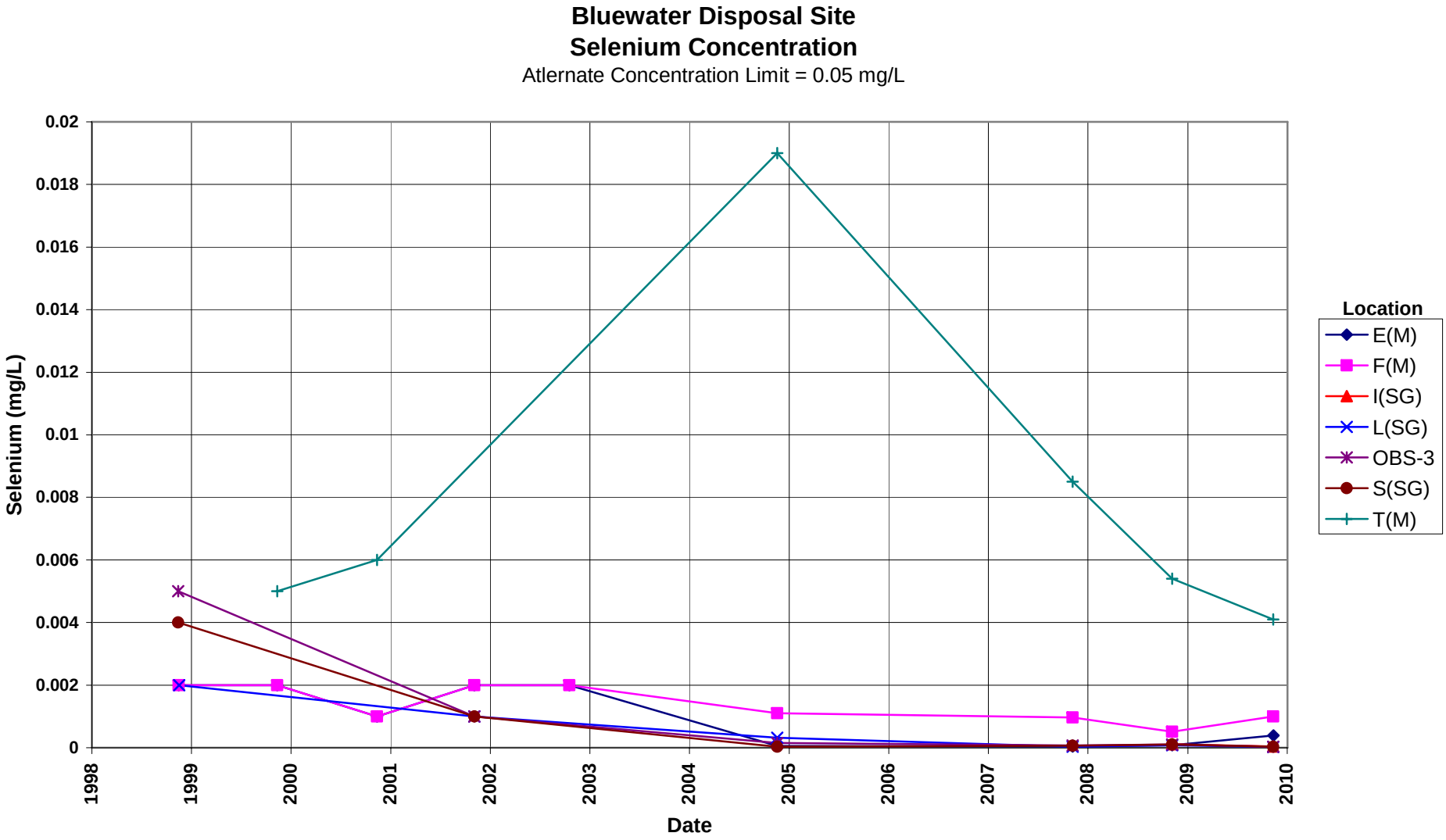
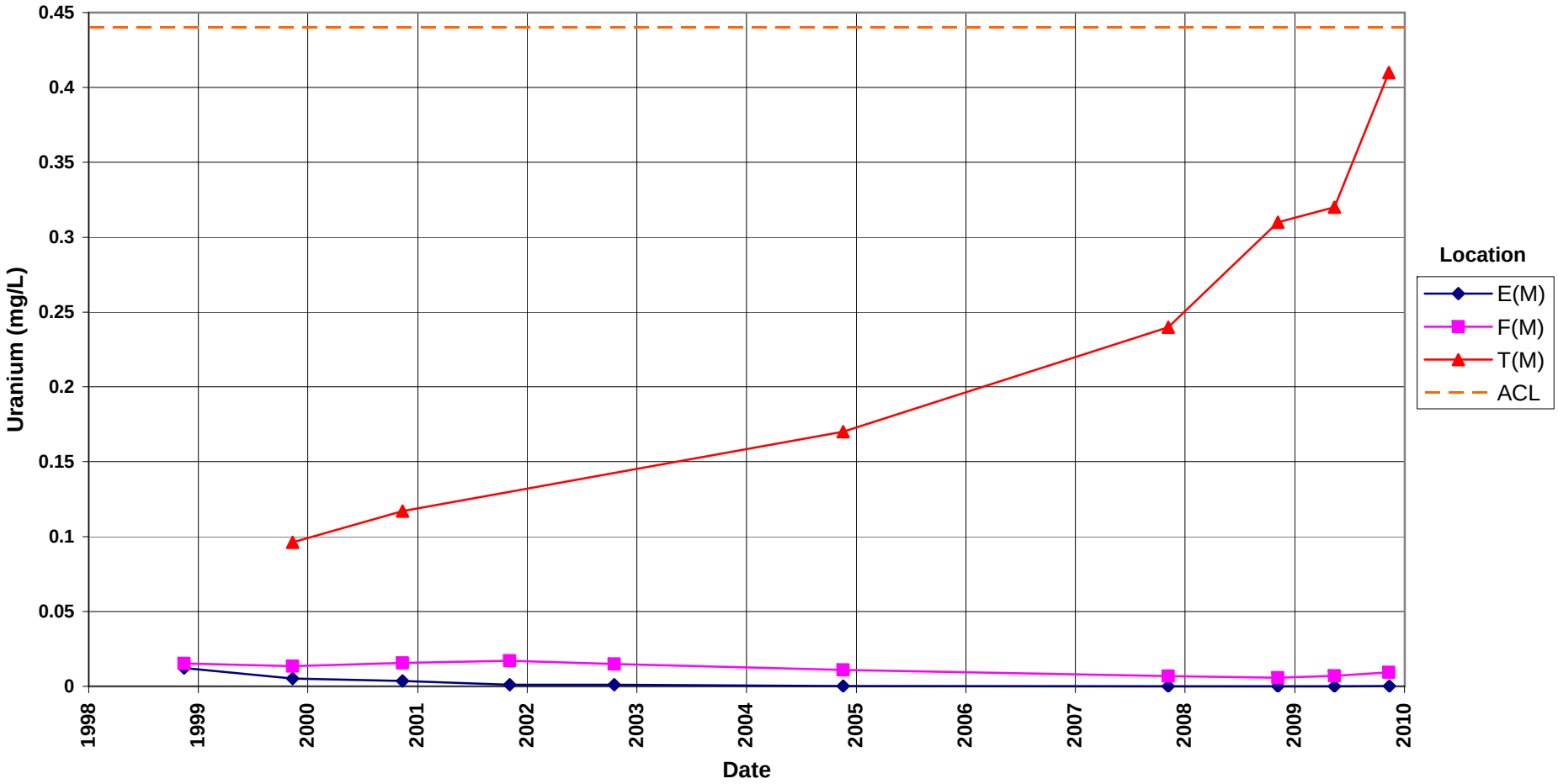
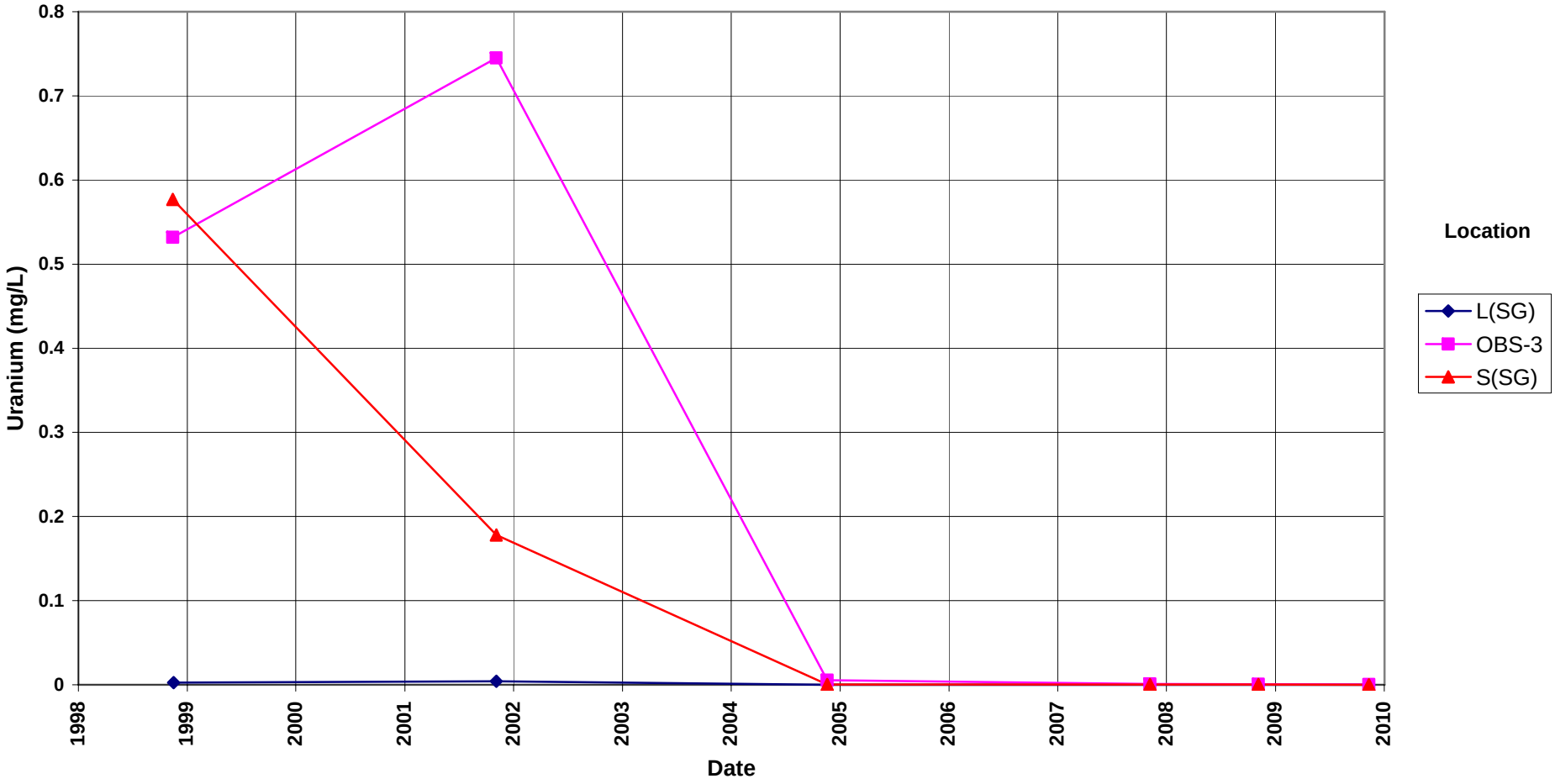

Bluewater Disposal Site Alluvium Wells
Molybdenum Concentration
Aternate Concentration Limit = 0.1 mg/L
Molybdenum (mg/L)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Date
Location
E(M)
F(M)
T(M)


Bluewater Disposal Site
Selenium Concentration
Atlernate Concentration Limit = 0.05 mg/L
Selenium (mg/L)
0.02
0.018
0.016
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
Date
Location
E(M)
F(M)
I(SG)
L(SG)
OBS-3
S(SG)
T(M)


Bluewater Disposal Site Alluvium Wells
Uranium Concentration
Alternate Concentration Limit = 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
Date
Location
E(M)
F(M)
T(M)
ACL

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



Attachment 3
Sampling and Analysis Work Order

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Stoller

established 1959

Task Order LM00-501
Control Number 09-1127

September 30, 2009

U.S. Department of Energy
Office of Legacy Management
ATTN: Christopher Clayton
Site Manager
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585

SUBJECT: Contract No. DE-AM01-07LM00060, Stoller
October 2009 Environmental Sampling at Bluewater, New Mexico

REFERENCE: Task Order LM00-501-03-203-402, Bluewater, Disposal Site

Dear Mr. Clayton:

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 routine monitoring at the Bluewater, NM, Disposal Site. Water quality data will be collected at this site as part of the routine environmental sampling currently scheduled to begin the week of October 26, 2009.

The following list shows the monitor wells (with zone of completion) scheduled for sampling during this event.

Monitor Wells*

E(M) Al	F(M) Al	T(M) Al	Y2(M) Al	X(M) Al	L(SG) Sg	S(SG) Sg
OBS-3 Sg	I(SG) Sg					

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

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

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

Sincerely,

Richard K. Johnson
Site Lead

The S.M. Stoller Corporation 2597 B ¾ Road Grand Junction, CO 81503 (970) 248-6000 Fax: (970) 248-6040

RKJ/lcg/lb

Enclosures (3)

cc: (electronic)
Cheri Bahrke, Stoller
Steve Donivan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Richard Johnson, Stoller
EDD Delivery
rc-grand.junction

Table 1: Proposed expanded analyte list for legacy mill sites ground water sampling within the Grants Mineral Belt

Analyte (metals analyses for both total and dissolved concentrations)	Maximum Required Detection Limit (ug/L)
pH	-
Total Dissolved Solids (TDS)	500,000
Carbonate (CO_3)	-
Bicarbonate (HCO_3)	-
Chloride (Cl)	250,000
Fluoride (F)	1,600
Sulfate (SO_4)	250,000
Nitrate (NO_3)	10,000
Calcium (Ca)	5,000
Magnesium (Mg)	5,000
Sodium (Na)	5,000
Potassium (K)	5000
Aluminum (Al)	200
Antimony (Sb)	6
Arsenic (As)	10
Barium (Ba)	1,000
Beryllium (Be)	4
Cadmium (Cd)	5
Chromium (Cr)	50
Cobalt (Co)	50
Copper (Cu)	1,000
Iron (Fe)	300
Mercury (Hg)	2
Manganese (Mn)	50
Nickel (Ni)	200
Lead (Pb)	156
Molybdenum (Mo)	1,000
Silver (Ag)	50
Selenium (Se)	50
Thallium (Tl)	2
Uranium (U)	30
Vanadium (V)	50
Zinc (Zn)	5,000
VOC, SVOC and Polychorinated biphenols (PCBs)*	0.5

*Bluewater Disposal Site only

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Attachment 4
Trip Report

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Stoller established 1959
Grand Junction Office

Memorandum

Control Number N/A

DATE: November 13, 2009

TO: Dick Johnson

FROM: Jeff Price

SUBJECT: Trip Report

Site: Bluewater, New Mexico

Dates of Sampling Event: November 9-11, 2009. Original sampling trip was begun on October 26, however due to a snow storm, the sampling crew returned to Grand Junction on October 28. The only work completed in October was the bailing of the alluvial wells.

Team Members: David Atkinson and Jeff Price.

Number of Locations Sampled: 8 monitor wells.

Locations Not Sampled/Reason: Well X(M) was dry.

Location Specific Information: Alluvial wells Y2(M) and F(M) were developed prior to being sampled. The development consisted of bailing about 60 gallons with a large bailer using the Smeal Rig and then purging another 60 gallons with a small submersible pump. Alluvial well E(M) also was developed prior to being sampled; however, E(M) is a very low yielding well which makes development difficult. Because of the low yield of E(M), only about five gallons of water were removed during each phase of development. Alluvial well T(M) could not be developed because of the limited saturated thickness. Also, all alluvial wells, except for Y2(M) which is PVC, are constructed of steel. These steel casings are extremely rusted and could be affecting groundwater geochemistry.

The bailing achieves two purposes: (1) is to agitate the water in and near the borehole, thereby freeing “fines” and other organic material, and (2) to remove any sediment that may have accumulated in the bottom of the well. Purging with a submersible pump removes agitated water until the turbidity reaches an acceptable level.

Field Variance: None.

Quality Control Sample Cross Reference: Following are the false identifications assigned to the quality control samples:

False ID	True ID	Sample Type	Ticket Number
2823	F(M)	Duplicate	HLT-904

Requisition Numbers Assigned: Samples were assigned to requisition identification number (RIN) 09102641.

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

Well Inspection Summary: All wells and protective casings are in good condition.

Equipment: All equipment functioned properly.

Regulatory: None

Institutional Controls

Fences, Gates, Locks: All ok**.**
Signs: All ok**.**
Trespassing/Site Disturbances: None observed.

Site Issues: None

Disposal Cell/Drainage Structure Integrity: Ok.
Vegetation/Noxious Weed Concerns: None noticed.
Maintenance Requirements: None.
Safety Issues: None

Access Issues: None.

Corrective Action Required/Taken: None.

(JEP/lcg)

cc: (electronic)
Chris Clayton, DOE
Steve Donivan, Stoller (e)
EDD Delivery (e)