

Data Validation Package

November 2011
Groundwater Sampling at the
Bluewater, New Mexico, Disposal Site

February 2012

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Sampling Event Summary

Site: Bluewater, New Mexico, Disposal Site

Sampling Period: November 15–17, 2011

Groundwater samples were collected from ten 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). Included in the sampling were two newer wells, 21(M) and 22(M), that were installed and developed at the Bluewater site in July 2011. 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 monitoring well 21(M).

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).

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.

Analytical results for the required constituents for the alluvium wells are provided in Table 1. Alluvium point-of-exposure (POE) well X(M) could not be sampled because it was dry. The U.S. Nuclear Regulatory Commission (NRC)-approved alternate concentration limit (ACL) for uranium continues to be exceeded in point-of-compliance (POC) well T(M). The current concentration of 0.53 milligrams per liter (mg/L) is greater than the ACL of 0.44 mg/L. The uranium concentration in well T(M) has indicated an upward trend since DOE began sampling in 1998; the reason for this trend has not been determined. The U.S. Department of Energy has notified NRC of the exceedance and submitted an evaluative monitoring work plan to NRC on August 31, 2011, in accordance with the LTSP.

Table 1. July 2011 Groundwater Monitoring Analytical Results for the Alluvium Wells

Constituent	ACL	Alluvium Wells					
		E(M) (Bkgd)	F(M) (POC)	T(M) (POC)	Y2(M) (PCBs)	21(M) (Dwngrd)	22(M) (Dwngrd)
Molybdenum (mg/L)	0.10	0.0003	0.0009	0.025	0.0017	0.0009	0.0009
Selenium (mg/L)	0.05	ND	ND	0.0028	0.0018	0.011	0.0067
Uranium (mg/L)	0.44	ND	0.0076	0.531	0.0052	0.123	0.314

Key: ACL = alternate concentration limit; Bkgd = background well; Dwngrd = downgradient well; mg/L = milligrams per liter; ND = not detected; POC = point-of-compliance well; PCB = polychlorinated biphenyls monitoring well

Alluvium wells 21(M) and 22(M) were installed downgradient of well T(M) in July 2011; well 21(M) is located near the site boundary where alluvial groundwater leaves the site. The uranium concentration in well 21(M) was 0.12 mg/L, which exceeds the Uranium Mill Tailings Radiation Control Act maximum concentration limit (MCL) of 0.044 mg/L (40 CFR 192, Table 1). The investigation of this occurrence will be addressed in an addendum or revision to the evaluative monitoring work plan. The selenium concentration of 0.011 mg/L in this well is slightly above the MCL of 0.01 mg/L.

Analytical results for the required constituents for the bedrock wells are provided in Table 2. The selenium and uranium concentrations did not exceed NRC-approved ACLs in the POC wells, and no constituents exceeded their respective MCLs at the POE well.

Table 2. July 2011 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	0.011	ND
Uranium (mg/L)	2.15	0.0051	0.011	0.312	0.0064

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

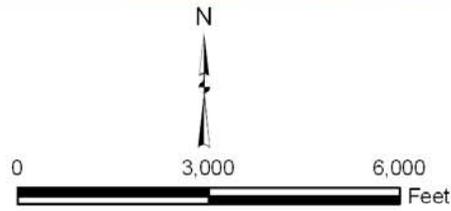

 Richard K. Johnson
 Site Lead, S.M. Stoller Corporation

2/19/12
 Date



Legend

- New Monitoring Well
- Original Network Well
- - - Approximate Axis Of Buried Channel (From ARCO Data)
- - - Site Boundary



U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION, COLORADO

Work Performed by
S.M. Stoller Corporation
Under DOE Contract
No. DE-AM01-07LM0060

**Monitoring Well Network
Bluewater, NM, Disposal Site**

DATE PREPARED:
August 15, 2011

FILENAME:
S0813100

M:\LTS\11110024081000\S08131\S0813100.mxd smithw 08/15/2011 11:29:05 AM

Sample Location Map, Bluewater, New Mexico, Disposal Site

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Data Assessment Summary

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Water Sampling Field Activities Verification Checklist

Project	<u>Bluewater, New Mexico</u>	Date(s) of Water Sampling	<u>November 15–17, 2011</u>
Date(s) of Verification	<u>January 20, 2012</u>	Name of Verifier	<u>Steve Donovan</u>

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOPs, instructions.	<u>Yes</u>	<u>Work Order letter dated October 12, 2011.</u>
2. Were the sampling locations specified in the planning documents sampled?	<u>No</u>	<u>Well X(M) was dry and not sampled.</u>
3. Was a pre-trip calibration conducted as specified in the above-named documents?	<u>Yes</u>	<u>Pre-trip calibration was performed on November 11, 2011.</u>
4. Was an operational check of the field equipment conducted daily? Did the operational checks meet criteria?	<u>Yes</u> <u>Yes</u>	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>Yes</u>	
6. Was the category of the well documented?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling? Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements stabilize prior to sampling? Was the flow rate less than 500 mL/min? If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>Yes</u> <u>Yes</u> <u>Yes</u> <u>Yes</u> <u>NA</u>	<u>Monitoring wells F(M), S(SG), and OBS-3 did not meet turbidity requirements. Sample aliquots for all analytes except PCB's were filtered for these wells.</u>

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	Monitoring wells L(SG), S(SG), and OBS-3 are purged and sampled by program directive. Three casing volumes are purged then one set of parameters are recorded before collecting the sample. No stabilization was required.
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 for location 21(M).
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	NA	An equipment blank was not required.
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 2074 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): 11114181
 Sample Event: November 15–17, 2011
 Site(s): Bluewater, New Mexico
 Laboratory: GEL Laboratories, Charleston, South Carolina
 Work Order No.: 290652
 Analysis: Metals, Organics, and Wet Chemistry
 Validator: Steve Donivan
 Review Date: January 19, 2012

This validation was performed according to the *Environmental Procedures Catalog*, (LMS/PRO/S04325, continually updated) “Standard Practice for Validation of Laboratory Data.” The procedure was applied at Level 3, Data Validation. See attached Data Validation Worksheets for supporting documentation on the data review and validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 3.

Table 3. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Alkalinity, Bicarbonate	WCH-A-003	EPA 310.1	EPA 310.1
Alkalinity, Carbonate	WCH-A-004	EPA 310.1	EPA 310.1
Chloride	MIS-A-039	SW-846 9056	SW-846 9056
Metals: Calcium, Magnesium, Potassium, Sodium	LMM-01	SW-846 3005A	SW-846 6010B
Metals: Arsenic, Molybdenum, Selenium, Uranium	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 3535A	SW-846 8082
Sulfate	MIS-A-044	SW-846 9056	SW-846 9056
Total Dissolved Solids	WCH-A-033	EPA 160.1	EPA 160.1

Data Qualifier Summary

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

Table 4. Data Qualifier Summary

Sample Number	Location	Analyte(s)	Flag	Reason
290652014	S(SG)	PCBs	J	Low surrogate recovery

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received 16 water samples on November 18, 2011, accompanied by a Chain of Custody (COC) form. The air bill numbers were listed in the receiving documentation. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody form was complete with no errors or omissions with the following exception. The COC form received with the samples did not include filtration status information for all samples. An updated COC form was emailed to the laboratory on November 21, 2011.

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 metal, organic, and wet chemical analytes as required. The MDL, as defined in 40 CFR 136, is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. The practical quantitation limit (PQL) for these analytes is the lowest concentration that can be reliably measured, and is defined as 5 times the MDL. The 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.

Methods EPA 160.1, 310.1

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 December 6, 2011. 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 resulting in seven verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6010B

Calibrations for calcium, magnesium, potassium, and sodium were performed on December 12, 2011, using four calibration standards. The calibration curve correlation coefficient values were greater than 0.995. The absolute values of the calibration curve intercepts were less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in 14 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 6020A

Calibrations were performed for arsenic, molybdenum, selenium, and uranium between December 7 and 16, 2011, using two calibration standards. Initial and continuing calibration verification checks were made at the required frequency resulting in seven 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 8082

The initial calibrations for PCBs were performed using five calibration standards on November 29, 2011. Calibration curves were established using linear regression. Linear regression calibrations had correlation coefficient values greater than 0.99 and intercepts less than 3 times the MDL. Initial and continuing calibration verification checks were made at the required frequency resulting in two verification checks. All calibration checks met the acceptance criteria for all analytes on both gas chromatography columns, with one exception. Quantitation for surrogate and spike compounds was performed from the column that passed the initial and continuing calibration criteria. PCBs were not detected in any field sample.

Method SW-846 9056

Calibrations for chloride and sulfate were performed using seven calibration standards on November 23, 2011. 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 resulting in seven 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. All method blank and calibration blank results associated with the samples were below the PQLs with the following exceptions. Some blank concentrations for potassium and sodium were above the PQL. The samples associated with these blanks had analyte concentrations greater than 10 times the blank. Other metals blank concentrations exceeded the MDL, but

associated sample results were either below the MDL or greater than 5 times the blank concentration.

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 interference 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. The nitrate+nitrite as N and sulfate spike recoveries from sample 22(M) were below the laboratory acceptance range but greater than the validation lower 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 non-radiochemical replicate results that are greater than 5 times the PQL should be less than 20 percent (or less than the laboratory-derived control limits for organics). For results that are less than the PQL, the range should be no greater than the PQL. The replicate results met these criteria, demonstrating acceptable laboratory 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 PQL for method 6010 or greater than 100 times the PQL for method 6020. All evaluated serial dilution data were acceptable.

PCB Surrogate Recoveries

Laboratory performance for individual samples is established by monitoring the recovery of surrogate spikes. The PCB surrogate recoveries were within the acceptance ranges for all samples with one exception. The sample results associated with the low surrogate recovery are qualified with a "J" flag as estimated values.

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

Site Code	Location	Cations (meq/L)	Anions (meq/L)	Charge Balance (%)
BLU01	21(M)	21.09	19.92	2.85
BLU01	22(M)	15.42	15.07	1.12
BLU01	E(M)	19.14	19.57	1.12
BLU01	F(M)	6.53	5.80	5.93
BLU01	I(SG)	12.82	12.74	0.29
BLU01	L(SG)	28.87	27.81	1.86
BLU01	OBS-3	39.78	35.64	5.50
BLU01	S(SG)	50.91	50.09	0.82
BLU01	T(M)	18.47	17.99	1.30
BLU01	Y2(M)	7.11	6.35	5.59

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

Electronic Data Deliverable (EDD) File

The EDD file arrived on December 20, 2011. 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: 11114181 Lab Code: GEN Validator: Steve Donovan Validation Date: 1/19/2012
Project: Bluewater Analysis Type: Metals General Chem Rad Organics
of Samples: 11 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
- Detection Limits
- Field/Trip Blanks
- Field Duplicates

All analyses were completed within the applicable holding times.

There are 0 detection limit failures.

There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM
Metals Data Validation Worksheet

RIN: 11114181 Lab Code: GEN Date Due: 12/16/2011
 Matrix: Water Site Code: BLU Date Completed: 12/20/2011

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	ICV	CCV	ICB	CCB								
Arsenic	ICP/MS	12/14/2011			OK	OK	OK	OK	OK	106.0	110.0			104.0		113.0
Arsenic	ICP/MS	12/16/2011			OK	OK	OK	OK						101.0		104.0
Calcium	ICP/ES	12/12/2011	0.0000	1.0000	OK	OK	OK	OK	OK	104.0	119.0		0.0	99.0	0.7	102.0
Magnesium	ICP/ES	12/12/2011	0.0000	1.0000	OK	OK	OK	OK	OK	103.0	108.0		1.0	100.0	0.7	104.0
Molybdenum	ICP/MS	12/13/2011			OK	OK	OK	OK	OK	103.0	100.0		3.0	87.0	1.3	115.0
Potassium	ICP/ES	12/12/2011	0.0000	1.0000	OK	OK	OK	OK	OK	101.0	103.0		1.0	119.0		123.0
Selenium	ICP/MS	12/14/2011			OK	OK	OK	OK	OK	103.0	109.0		5.0	99.0		105.0
Selenium	ICP/MS	12/16/2011			OK	OK	OK	OK						101.0		109.0
Sodium	ICP/ES	12/12/2011	0.0000	1.0000	OK	OK	OK	OK	OK	99.2			0.0	111.0	1.2	102.0
Uranium	ICP/MS	12/07/2011			OK	OK	OK	OK	OK	105.0			3.0	107.0	0.7	106.0
Uranium	ICP/MS	12/08/2011			OK	OK	OK	OK						99.0		108.0
Uranium	ICP/MS	12/13/2011			OK	OK	OK	OK						106.0		108.0

SAMPLE MANAGEMENT SYSTEM Organics Data Validation Summary

RIN: 11114181

Project: Bluewater

Lab Code: GEN

Validation Date: 1/19/2012

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: There was 1 surrogate failure.

SAMPLE MANAGEMENT SYSTEM

RIN: 11114181 Lab Code: GEN

Non-Compliance Report: Surrogate Recovery

Project: Bluewater

Validation Date: 1/19/2012

Ticket	Location	Lab Sample ID	Method	Dilution	Surrogate	Recovery	Lower Limit	Upper Limit
JMV 494	S(SG)	290652014	EPA 3535A/8082	1.00	Decachlorobiphenyl	22.7	28.0	117.0

SAMPLE MANAGEMENT SYSTEM
Wet Chemistry Data Validation Worksheet

RIN: 11114181 Lab Code: GEN Date Due: 12/16/2011
 Matrix: Water Site Code: BLU Date Completed: 12/20/2011

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
ALKALINITY, Total as CaCO3	11/29/2011							102.00	97.6				
ALKALINITY, Total as CaCO3	11/30/2011							102.00	105.0				
ALKALINITY, Total as CaCO3	11/30/2011							107.00	95.9				
Bicarbonate alkalinity (CaCO3)	11/29/2011											0	
Bicarbonate alkalinity (CaCO3)	11/30/2011											0	
Bicarbonate alkalinity (CaCO3)	11/30/2011											0	
Chloride	11/23/2011	0.000	1.0000	OK	OK	OK	OK	OK	92.60				
Chloride	11/24/2011			OK	OK	OK	OK		101.0			0	
Chloride	11/28/2011			OK	OK	OK	OK		102.0			0	
NO2+NO3 as N	12/06/2011	0.000	1.0000	OK	OK	OK	OK	OK	103.00	112.0		1.00	
NO2+NO3 as N	12/06/2011								101.0			1.00	
Sulfate	11/23/2011	0.000	1.0000	OK	OK	OK	OK	OK	94.90				
Sulfate	11/24/2011			OK	OK	OK	OK		112.0			0	
Sulfate	11/28/2011			OK	OK	OK	OK		96.2			2.00	
Total Dissolved Solids	11/21/2011							OK	95.20			2.00	
Total Dissolved Solids	11/21/2011											0	

Sampling Quality Control Assessment

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

Sampling Protocol

Sample results for all monitoring wells were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. All wells met the Category I criteria with the following exceptions:

- Wells OBS-3, E(M), L(SG), and S(SG) were classified as Category II.

The sample results for these four wells were qualified with a “Q” flag, indicating the data are qualitative because of the sampling technique.

Equipment Blank Assessment

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

Field Duplicate 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. 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 the PQL, the range should be no greater than the PQL. A duplicate sample was collected from location 21(M) (field duplicate ID 2074). The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM
Validation Report: Field Duplicates

RIN: 11114181 Lab Code: GEN Project: Bluewater Validation Date: 1/19/2012

Duplicate: 2074

Sample: 21(M)

Analyte	Sample				Duplicate				RPD	RER	Units
	Result	Flag	Error	Dilution	Result	Flag	Error	Dilution			
Aroclor 1016	0.0358	U		1.00	0.0351	U		1.00			ug/L
Aroclor 1221	0.0358	U		1.00	0.0351	U		1.00			ug/L
Aroclor 1232	0.0358	U		1.00	0.0351	U		1.00			ug/L
Aroclor 1242	0.0358	U		1.00	0.0351	U		1.00			ug/L
Aroclor 1248	0.0358	U		1.00	0.0351	U		1.00			ug/L
Aroclor 1254	0.0358	U		1.00	0.0351	U		1.00			ug/L
Aroclor 1260	0.0358	U		1.00	0.0351	U		1.00			ug/L
Arsenic	1.98	B		1.00	2.93	B		1.00			ug/L
Bicarbonate alkalinity (CaCO3)	256			1.00	263			1.00	2.70		mg/L
Calcium	162000			1.00	162000			1.00	0		ug/L
Carbonate alkalinity (CaCO3)	0.725	U		1.00	0.725	U		1.00			mg/L
Chloride	154			10.00	154			10.00	0		mg/L
Magnesium	42900			1.00	42800			1.00	0.23		ug/L
Molybdenum	0.893			1.00	0.94			1.00	5.13		ug/L
NO2+NO3 as N	8.41			10.00	8.58			10.00	2.00		mg/L
Potassium	6660	E		1.00	6660	E		1.00	0		ug/L
Selenium	10.5			1.00	11.2			1.00	6.45		ug/L
Sodium	214000			1.00	217000			1.00	1.39		ug/L
Sulfate	467			50.00	468			50.00	0.21		mg/L
Total Dissolved Solids	1280			1.00	1280			1.00	0		mg/L
Uranium	123			1.00	126			1.00	2.41		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 Donovan
Steve Donovan

2-9-2012
Date

Data Validation Lead:

Steve Donovan
Steve Donovan

2-9-2012
Date

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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 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, and the data for this event are acceptable as qualified.

Data Validation Outliers Report - No Field Parameters

Comparison: All Historical Data

Laboratory: GEL Laboratories

RIN: 11114181

Report Date: 1/19/2012

Site Code	Location Code	Sample ID	Sample Date	Analyte	Current			Historical Maximum			Historical Minimum			Number of Data Points		Statistical Outlier
					Result	Qualifiers		Result	Qualifiers		Result	Qualifiers		N	N Below Detect	
						Lab	Data		Lab	Data		Lab	Data			
BLU01	F(M)	0001	11/15/2011	Chloride	11.5		F	13		F	12.1		F	5	0	No
BLU01	F(M)	0001	11/15/2011	Magnesium	20.1		F	19.4		F	18.5		F	5	0	No
BLU01	F(M)	0001	11/15/2011	Potassium	3.89	E	F	3.59		F	2.5		F	5	0	No
BLU01	F(M)	0001	11/15/2011	Sulfate	102		F	130		F	105		F	5	0	No
BLU01	F(M)	0001	11/15/2011	Total Dissolved Solids	349		F	420		F	388		F	5	0	No
BLU01	L(SG)	N001	11/17/2011	Uranium	0.00511		FQ	0.004		J	0.000029	B	UF	8	5	No
BLU01	T(M)	N001	11/16/2011	Chloride	37.7		F	58		F	45.8		F	5	0	No
BLU01	T(M)	N001	11/16/2011	Sulfate	241		F	290		F	250		F	5	0	No
BLU01	Y2(M)	N001	11/15/2011	Nitrate + Nitrite as Nitrogen	0.494		F	1.42		F	0.62		F	6	0	No

STATISTICAL TESTS:

The distribution of the data is tested for normality or lognormality using the Shapiro-Wilk Test

Outliers are identified using Dixon's Test when there are 25 or fewer data points.

Outliers are identified using Rosner's Test when there are 26 or more data points.

See Data Quality Assessment: Statistical Methods for Practitioners, EPA QC/G-9S, February 2006.

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: 1/20/2012

Location: 21(M) WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/15/2011	N001	139.6 - 149.6	256		F	#	0.725	
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/15/2011	N002	139.6 - 149.6	263		F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/15/2011	N001	139.6 - 149.6	0.725	U	F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/15/2011	N002	139.6 - 149.6	0.725	U	F	#	0.725	
Aroclor - 1016	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	
Aroclor - 1016	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Aroclor - 1221	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	
Aroclor - 1221	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Aroclor - 1232	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	
Aroclor - 1232	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Aroclor - 1242	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	
Aroclor - 1242	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Aroclor - 1248	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	
Aroclor - 1248	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Aroclor - 1254	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	
Aroclor - 1254	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Aroclor - 1260	ug/L	11/15/2011	N001	139.6 - 149.6	0.0358	U	F	#	0.0358	

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

REPORT DATE: 1/20/2012

Location: 21(M) WELL

Parameter	Units	Sample		Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
		Date	ID			Lab	Data	QA		
Aroclor - 1260	ug/L	11/15/2011	N002	139.6 - 149.6	0.0351	U	F	#	0.0351	
Arsenic	mg/L	11/15/2011	N001	139.6 - 149.6	0.00198	B	F	#	0.0017	
Arsenic	mg/L	11/15/2011	N002	139.6 - 149.6	0.00293	B	F	#	0.0017	
Calcium	mg/L	11/15/2011	N001	139.6 - 149.6	162		F	#	0.05	
Calcium	mg/L	11/15/2011	N002	139.6 - 149.6	162		F	#	0.05	
Chloride	mg/L	11/15/2011	N001	139.6 - 149.6	154		F	#	0.66	
Chloride	mg/L	11/15/2011	N002	139.6 - 149.6	154		F	#	0.66	
Dissolved Oxygen	mg/L	11/15/2011	N001	139.6 - 149.6	6.18		F	#		
Magnesium	mg/L	11/15/2011	N001	139.6 - 149.6	42.9		F	#	0.11	
Magnesium	mg/L	11/15/2011	N002	139.6 - 149.6	42.8		F	#	0.11	
Molybdenum	mg/L	11/15/2011	N001	139.6 - 149.6	0.000893		F	#	0.000165	
Molybdenum	mg/L	11/15/2011	N002	139.6 - 149.6	0.00094		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2011	N001	139.6 - 149.6	8.41		F	#	0.1	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2011	N002	139.6 - 149.6	8.58		F	#	0.1	
Oxidation Reduction Potential	mV	11/15/2011	N001	139.6 - 149.6	140.8		F	#		
pH	s.u.	11/15/2011	N001	139.6 - 149.6	7.33		F	#		
Potassium	mg/L	11/15/2011	N001	139.6 - 149.6	6.66	E	F	#	0.05	

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

REPORT DATE: 1/20/2012

Location: 21(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Potassium	mg/L	11/15/2011	N002	139.6 - 149.6	6.66	E	F	#	0.05	
Selenium	mg/L	11/15/2011	N001	139.6 - 149.6	0.0105		F	#	0.0015	
Selenium	mg/L	11/15/2011	N002	139.6 - 149.6	0.0112		F	#	0.0015	
Sodium	mg/L	11/15/2011	N001	139.6 - 149.6	214		F	#	0.1	
Sodium	mg/L	11/15/2011	N002	139.6 - 149.6	217		F	#	0.1	
Specific Conductance	umhos /cm	11/15/2011	N001	139.6 - 149.6	1927		F	#		
Sulfate	mg/L	11/15/2011	N001	139.6 - 149.6	467		F	#	5	
Sulfate	mg/L	11/15/2011	N002	139.6 - 149.6	468		F	#	5	
Temperature	C	11/15/2011	N001	139.6 - 149.6	14.05		F	#		
Total Dissolved Solids	mg/L	11/15/2011	N001	139.6 - 149.6	1280		F	#	3.4	
Total Dissolved Solids	mg/L	11/15/2011	N002	139.6 - 149.6	1280		F	#	3.4	
Turbidity	NTU	11/15/2011	N001	139.6 - 149.6	1.84		F	#		
Uranium	mg/L	11/15/2011	N001	139.6 - 149.6	0.123		F	#	0.000067	
Uranium	mg/L	11/15/2011	N002	139.6 - 149.6	0.126		F	#	0.000067	

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

REPORT DATE: 1/20/2012

Location: 22(M) WELL

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/15/2011	N001	136.83 - 146.83	316		F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/15/2011	N001	136.83 - 146.83	0.725	U	F	#	0.725	
Aroclor - 1016	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Aroclor - 1221	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Aroclor - 1232	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Aroclor - 1242	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Aroclor - 1248	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Aroclor - 1254	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Aroclor - 1260	ug/L	11/15/2011	N001	136.83 - 146.83	0.0347	U	F	#	0.0347	
Arsenic	mg/L	11/15/2011	N001	136.83 - 146.83	0.00278	B	F	#	0.0017	
Calcium	mg/L	11/15/2011	N001	136.83 - 146.83	102		F	#	0.05	
Chloride	mg/L	11/15/2011	N001	136.83 - 146.83	37.6		F	#	0.66	
Dissolved Oxygen	mg/L	11/15/2011	N001	136.83 - 146.83	0.59		F	#		
Magnesium	mg/L	11/15/2011	N001	136.83 - 146.83	28.2		F	#	0.11	
Molybdenum	mg/L	11/15/2011	N001	136.83 - 146.83	0.000819		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2011	N001	136.83 - 146.83	31.2		F	#	1	
Oxidation Reduction Potential	mV	11/15/2011	N001	136.83 - 146.83	147.1		F	#		

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

REPORT DATE: 1/20/2012

Location: 22(M) WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/15/2011	N001	136.83 - 146.83	7.32		F	#		
Potassium	mg/L	11/15/2011	N001	136.83 - 146.83	5.36	E	F	#	0.05	
Selenium	mg/L	11/15/2011	N001	136.83 - 146.83	0.0067		F	#	0.0015	
Sodium	mg/L	11/15/2011	N001	136.83 - 146.83	181		F	#	0.1	
Specific Conductance	umhos/cm	11/15/2011	N001	136.83 - 146.83	1442		F	#		
Sulfate	mg/L	11/15/2011	N001	136.83 - 146.83	263		F	#	1	
Temperature	C	11/15/2011	N001	136.83 - 146.83	14.04		F	#		
Total Dissolved Solids	mg/L	11/15/2011	N001	136.83 - 146.83	949		F	#	3.4	
Turbidity	NTU	11/15/2011	N001	136.83 - 146.83	0.63		F	#		
Uranium	mg/L	11/15/2011	N001	136.83 - 146.83	0.314		F	#	0.000067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/16/2011	N001	68.6	- 89.8	8.14		FQ	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/16/2011	N001	68.6	- 89.8	0.725	U	FQ	#	0.725	
Aroclor - 1016	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Aroclor - 1221	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Aroclor - 1232	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Aroclor - 1242	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Aroclor - 1248	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Aroclor - 1254	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Aroclor - 1260	ug/L	11/16/2011	N001	68.6	- 89.8	0.0354	U	FQ	#	0.0354	
Arsenic	mg/L	11/16/2011	N001	68.6	- 89.8	0.0017	U	FQ	#	0.0017	
Calcium	mg/L	11/16/2011	N001	68.6	- 89.8	233		FQ	#	0.05	
Chloride	mg/L	11/16/2011	N001	68.6	- 89.8	31.2		FQ	#	0.66	
Dissolved Oxygen	mg/L	11/16/2011	N001	68.6	- 89.8	0.41		FQ	#		
Magnesium	mg/L	11/16/2011	N001	68.6	- 89.8	59.5		FQ	#	0.11	
Molybdenum	mg/L	11/16/2011	N001	68.6	- 89.8	0.000294	B	FQ	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2011	N001	68.6	- 89.8	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	11/16/2011	N001	68.6	- 89.8	-231.7		FQ	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2011	N001	68.6	- 89.8	7.69		FQ	#		
Potassium	mg/L	11/16/2011	N001	68.6	- 89.8	5.56	E	FQ	#	0.05	
Selenium	mg/L	11/16/2011	N001	68.6	- 89.8	0.0015	U	FQ	#	0.0015	
Sodium	mg/L	11/16/2011	N001	68.6	- 89.8	56.9		FQ	#	0.1	
Specific Conductance	umhos /cm	11/16/2011	N001	68.6	- 89.8	1591		FQ	#		
Sulfate	mg/L	11/16/2011	N001	68.6	- 89.8	890		FQ	#	5	
Temperature	C	11/16/2011	N001	68.6	- 89.8	13.39		FQ	#		
Total Dissolved Solids	mg/L	11/16/2011	N001	68.6	- 89.8	1320		FQ	#	3.4	
Turbidity	NTU	11/16/2011	N001	68.6	- 89.8	8.11		FQ	#		
Uranium	mg/L	11/16/2011	N001	68.6	- 89.8	0.000067	U	FQ	#	0.000067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/15/2011	0001	94.2 - 114.87	167		F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/15/2011	0001	94.2 - 114.87	0.725	U	F	#	0.725	
Aroclor - 1016	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Aroclor - 1221	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Aroclor - 1232	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Aroclor - 1242	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Aroclor - 1248	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Aroclor - 1254	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Aroclor - 1260	ug/L	11/15/2011	N001	94.2 - 114.87	0.037	U	F	#	0.037	
Arsenic	mg/L	11/15/2011	0001	94.2 - 114.87	0.0017	U	F	#	0.0017	
Calcium	mg/L	11/15/2011	0001	94.2 - 114.87	76.8		F	#	0.05	
Chloride	mg/L	11/15/2011	0001	94.2 - 114.87	11.5		F	#	0.66	
Dissolved Oxygen	mg/L	11/15/2011	N001	94.2 - 114.87	5.78		F	#		
Magnesium	mg/L	11/15/2011	0001	94.2 - 114.87	20.1		F	#	0.11	
Molybdenum	mg/L	11/15/2011	0001	94.2 - 114.87	0.00093		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2011	0001	94.2 - 114.87	0.182		F	#	0.01	
Oxidation Reduction Potential	mV	11/15/2011	N001	94.2 - 114.87	93.3		F	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/15/2011	N001	94.2 - 114.87	7.65		F	#		
Potassium	mg/L	11/15/2011	0001	94.2 - 114.87	3.89	E	F	#	0.05	
Selenium	mg/L	11/15/2011	0001	94.2 - 114.87	0.0015	U	F	#	0.0015	
Sodium	mg/L	11/15/2011	0001	94.2 - 114.87	21.7		F	#	0.1	
Specific Conductance	umhos/cm	11/15/2011	N001	94.2 - 114.87	575		F	#		
Sulfate	mg/L	11/15/2011	0001	94.2 - 114.87	102		F	#	1	
Temperature	C	11/15/2011	N001	94.2 - 114.87	13.33		F	#		
Total Dissolved Solids	mg/L	11/15/2011	0001	94.2 - 114.87	349		F	#	3.4	
Turbidity	NTU	11/15/2011	N001	94.2 - 114.87	13.1		F	#		
Uranium	mg/L	11/15/2011	0001	94.2 - 114.87	0.0076		F	#	0.000067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/16/2011	N001	-	161		F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/16/2011	N001	-	0.725	U	F	#	0.725	
Aroclor - 1016	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Aroclor - 1221	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Aroclor - 1232	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Aroclor - 1242	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Aroclor - 1248	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Aroclor - 1254	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Aroclor - 1260	ug/L	11/16/2011	N001	-	0.0354	U	F	#	0.0354	
Arsenic	mg/L	11/16/2011	N001	-	0.0017	U	F	#	0.0017	
Calcium	mg/L	11/16/2011	N001	-	35.4		F	#	0.05	
Chloride	mg/L	11/16/2011	N001	-	190		F	#	0.66	
Dissolved Oxygen	mg/L	11/16/2011	N001	-	0.3		F	#		
Magnesium	mg/L	11/16/2011	N001	-	21.6		F	#	0.11	
Molybdenum	mg/L	11/16/2011	N001	-	0.000663		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2011	N001	-	0.01	U	F	#	0.01	
Oxidation Reduction Potential	mV	11/16/2011	N001	-	-243.2		F	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2011	N001	-	8.02		F	#		
Potassium	mg/L	11/16/2011	N001	-	7.1	E	F	#	0.05	
Selenium	mg/L	11/16/2011	N001	-	0.0015	U	F	#	0.0015	
Sodium	mg/L	11/16/2011	N001	-	209		F	#	0.1	
Specific Conductance	umhos/cm	11/16/2011	N001	-	1267		F	#		
Sulfate	mg/L	11/16/2011	N001	-	200		F	#	1	
Temperature	C	11/16/2011	N001	-	13.54		F	#		
Total Dissolved Solids	mg/L	11/16/2011	N001	-	719		F	#	3.4	
Turbidity	NTU	11/16/2011	N001	-	9.92		F	#		
Uranium	mg/L	11/16/2011	N001	-	0.00636		F	#	0.000067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/17/2011	N001	-	540		FQ	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/17/2011	N001	-	0.725	U	FQ	#	0.725	
Aroclor - 1016	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Aroclor - 1221	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Aroclor - 1232	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Aroclor - 1242	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Aroclor - 1248	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Aroclor - 1254	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Aroclor - 1260	ug/L	11/17/2011	N001	-	0.0351	U	FQ	#	0.0351	
Arsenic	mg/L	11/17/2011	N001	-	0.0017	U	FQ	#	0.0017	
Calcium	mg/L	11/17/2011	N001	-	157		FQ	#	0.05	
Chloride	mg/L	11/17/2011	N001	-	199		FQ	#	0.66	
Dissolved Oxygen	mg/L	11/17/2011	N001	-	4.14		FQ	#		
Magnesium	mg/L	11/17/2011	N001	-	76.2		FQ	#	0.11	
Molybdenum	mg/L	11/17/2011	N001	-	0.000338	B	FQ	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/17/2011	N001	-	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	11/17/2011	N001	-	50.9		FQ	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/17/2011	N001	-	6.69		FQ	#		
Potassium	mg/L	11/17/2011	N001	-	11	E	FQ	#	0.05	
Selenium	mg/L	11/17/2011	N001	-	0.0015	U	FQ	#	0.0015	
Sodium	mg/L	11/17/2011	N001	-	333		FQ	#	0.1	
Specific Conductance	umhos /cm	11/17/2011	N001	-	2585		FQ	#		
Sulfate	mg/L	11/17/2011	N001	-	548		FQ	#	5	
Temperature	C	11/17/2011	N001	-	20.33		FQ	#		
Total Dissolved Solids	mg/L	11/17/2011	N001	-	1670		FQ	#	3.4	
Turbidity	NTU	11/17/2011	N001	-	3.83		FQ	#		
Uranium	mg/L	11/17/2011	N001	-	0.00511		FQ	#	0.000067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)	Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/16/2011	0001	152.4 - 350	20.3		FQ	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/16/2011	0001	152.4 - 350	0.725	U	FQ	#	0.725	
Aroclor - 1016	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Aroclor - 1221	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Aroclor - 1232	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Aroclor - 1242	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Aroclor - 1248	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Aroclor - 1254	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Aroclor - 1260	ug/L	11/16/2011	N001	152.4 - 350	0.0351	U	FQ	#	0.0351	
Arsenic	mg/L	11/16/2011	0001	152.4 - 350	0.0017	U	FQ	#	0.0017	
Calcium	mg/L	11/16/2011	0001	152.4 - 350	118		FQ	#	0.05	
Chloride	mg/L	11/16/2011	0001	152.4 - 350	626		FQ	#	3.3	
Dissolved Oxygen	mg/L	11/16/2011	N001	152.4 - 350	2.93		FQ	#		
Magnesium	mg/L	11/16/2011	0001	152.4 - 350	168		FQ	#	0.11	
Molybdenum	mg/L	11/16/2011	0001	152.4 - 350	0.000197	B	FQ	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2011	0001	152.4 - 350	0.01	U	FQ	#	0.01	
Oxidation Reduction Potential	mV	11/16/2011	N001	152.4 - 350	-109.3		FQ	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2011	N001	152.4 - 350	6.99		FQ	#		
Potassium	mg/L	11/16/2011	0001	152.4 - 350	16.3	E	FQ	#	0.05	
Selenium	mg/L	11/16/2011	0001	152.4 - 350	0.0015	U	FQ	#	0.0015	
Sodium	mg/L	11/16/2011	0001	152.4 - 350	452		FQ	#	0.1	
Specific Conductance	umhos/cm	11/16/2011	N001	152.4 - 350	3623		FQ	#		
Sulfate	mg/L	11/16/2011	0001	152.4 - 350	844		FQ	#	5	
Temperature	C	11/16/2011	N001	152.4 - 350	15.56		FQ	#		
Total Dissolved Solids	mg/L	11/16/2011	0001	152.4 - 350	2370		FQ	#	3.4	
Turbidity	NTU	11/16/2011	N001	152.4 - 350	112		FQ	#		
Uranium	mg/L	11/16/2011	0001	152.4 - 350	0.0106		FQ	#	0.000067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/16/2011	0001	159	- 280	325		FQ	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/16/2011	0001	159	- 280	0.725	U	FQ	#	0.725	
Aroclor - 1016	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Aroclor - 1221	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Aroclor - 1232	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Aroclor - 1242	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Aroclor - 1248	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Aroclor - 1254	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Aroclor - 1260	ug/L	11/16/2011	N001	159	- 280	0.0351	U	FQJ	#	0.0351	
Arsenic	mg/L	11/16/2011	0001	159	- 280	0.0017	U	FQ	#	0.0017	
Calcium	mg/L	11/16/2011	0001	159	- 280	334		FQ	#	0.05	
Chloride	mg/L	11/16/2011	0001	159	- 280	609		FQ	#	3.3	
Dissolved Oxygen	mg/L	11/16/2011	N001	159	- 280	0.98		FQ	#		
Magnesium	mg/L	11/16/2011	0001	159	- 280	177		FQ	#	0.11	
Molybdenum	mg/L	11/16/2011	0001	159	- 280	0.000916		FQ	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2011	0001	159	- 280	2.64		FQ	#	0.05	
Oxidation Reduction Potential	mV	11/16/2011	N001	159	- 280	-105.6		FQ	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2011	N001	159	- 280	7.16		FQ	#		
Potassium	mg/L	11/16/2011	0001	159	- 280	16.5	E	FQ	#	0.05	
Selenium	mg/L	11/16/2011	0001	159	- 280	0.0106		FQ	#	0.0015	
Sodium	mg/L	11/16/2011	0001	159	- 280	443		FQ	#	0.1	
Specific Conductance	umhos /cm	11/16/2011	N001	159	- 280	4289		FQ	#		
Sulfate	mg/L	11/16/2011	0001	159	- 280	1260		FQ	#	5	
Temperature	C	11/16/2011	N001	159	- 280	15.45		FQ	#		
Total Dissolved Solids	mg/L	11/16/2011	0001	159	- 280	3040		FQ	#	3.4	
Turbidity	NTU	11/16/2011	N001	159	- 280	309		FQ	#		
Uranium	mg/L	11/16/2011	0001	159	- 280	0.312		FQ	#	0.00067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample		Depth Range		Result	Lab	Qualifiers		Detection Limit	Uncertainty
		Date	ID	(Ft BLS)				Data	QA		
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/16/2011	N001	128	- 133	405		F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/16/2011	N001	128	- 133	0.725	U	F	#	0.725	
Aroclor - 1016	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Aroclor - 1221	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Aroclor - 1232	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Aroclor - 1242	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Aroclor - 1248	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Aroclor - 1254	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Aroclor - 1260	ug/L	11/16/2011	N001	128	- 133	0.0351	U	F	#	0.0351	
Arsenic	mg/L	11/16/2011	N001	128	- 133	0.00216	B	F	#	0.0017	
Calcium	mg/L	11/16/2011	N001	128	- 133	120		F	#	0.05	
Chloride	mg/L	11/16/2011	N001	128	- 133	37.7		F	#	0.66	
Dissolved Oxygen	mg/L	11/16/2011	N001	128	- 133	1.24		F	#		
Magnesium	mg/L	11/16/2011	N001	128	- 133	32.7		F	#	0.11	
Molybdenum	mg/L	11/16/2011	N001	128	- 133	0.0249		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/16/2011	N001	128	- 133	53.5		F	#	0.5	
Oxidation Reduction Potential	mV	11/16/2011	N001	128	- 133	127.5		F	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/16/2011	N001	128	- 133	7.05		F	#		
Potassium	mg/L	11/16/2011	N001	128	- 133	5.15	E	F	#	0.05	
Selenium	mg/L	11/16/2011	N001	128	- 133	0.00279	B	F	#	0.0015	
Sodium	mg/L	11/16/2011	N001	128	- 133	222		F	#	0.1	
Specific Conductance	umhos /cm	11/16/2011	N001	128	- 133	1718		F	#		
Sulfate	mg/L	11/16/2011	N001	128	- 133	241		F	#	1	
Temperature	C	11/16/2011	N001	128	- 133	15.45		F	#		
Total Dissolved Solids	mg/L	11/16/2011	N001	128	- 133	1130		F	#	3.4	
Turbidity	NTU	11/16/2011	N001	128	- 133	2.35		F	#		
Uranium	mg/L	11/16/2011	N001	128	- 133	0.531		F	#	0.00067	

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

REPORT DATE: 1/20/2012

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

Parameter	Units	Sample Date	ID	Depth Range (Ft BLS)		Result	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
Alkalinity, Bicarbonate (as CaCO ₃)	mg/L	11/15/2011	N001	98	- 123	201		F	#	0.725	
Alkalinity, Carbonate (as CaCO ₃)	mg/L	11/15/2011	N001	98	- 123	0.725	U	F	#	0.725	
Aroclor - 1016	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Aroclor - 1221	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Aroclor - 1232	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Aroclor - 1242	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Aroclor - 1248	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Aroclor - 1254	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Aroclor - 1260	ug/L	11/15/2011	N001	98	- 123	0.0358	U	F	#	0.0358	
Arsenic	mg/L	11/15/2011	N001	98	- 123	0.0017	U	F	#	0.0017	
Calcium	mg/L	11/15/2011	N001	98	- 123	65		F	#	0.05	
Chloride	mg/L	11/15/2011	N001	98	- 123	13.6		F	#	0.66	
Dissolved Oxygen	mg/L	11/15/2011	N001	98	- 123	5.57		F	#		
Magnesium	mg/L	11/15/2011	N001	98	- 123	17.8		F	#	0.11	
Molybdenum	mg/L	11/15/2011	N001	98	- 123	0.00168		F	#	0.000165	
Nitrate + Nitrite as Nitrogen	mg/L	11/15/2011	N001	98	- 123	0.494		F	#	0.01	
Oxidation Reduction Potential	mV	11/15/2011	N001	98	- 123	140.5		F	#		

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

REPORT DATE: 1/20/2012

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	Lab	Qualifiers Data	QA	Detection Limit	Uncertainty
pH	s.u.	11/15/2011	N001	98	- 123	7.59		F	#		
Potassium	mg/L	11/15/2011	N001	98	- 123	3.67	E	F	#	0.05	
Selenium	mg/L	11/15/2011	N001	98	- 123	0.00175	B	F	#	0.0015	
Sodium	mg/L	11/15/2011	N001	98	- 123	53		F	#	0.1	
Specific Conductance	umhos /cm	11/15/2011	N001	98	- 123	642		F	#		
Sulfate	mg/L	11/15/2011	N001	98	- 123	92.2		F	#	1	
Temperature	C	11/15/2011	N001	98	- 123	13.35		F	#		
Total Dissolved Solids	mg/L	11/15/2011	N001	98	- 123	400		F	#	3.4	
Turbidity	NTU	11/15/2011	N001	98	- 123	3.23		F	#		
Uranium	mg/L	11/15/2011	N001	98	- 123	0.00522		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.
- 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).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines.

Static Water Level Data

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STATIC WATER LEVELS (USEE700) FOR SITE BLU01, Bluewater Disposal Site
REPORT DATE: 1/20/2012

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
21(M)		6587.8	11/15/2011	12:35:36	127.61	6460.19	
22(M)		6600.33	11/15/2011	13:18:14	136.54	6463.79	
E(M)		6613.08	11/16/2011	15:37:45	81.46	6531.62	
F(M)		6600.31	11/15/2011	15:17:54	113.3	6487.01	
I(SG)		6616.17	11/16/2011	16:51:38	197.7	6418.47	
L(SG)		6602.6	11/17/2011	11:48:18	159.92	6442.68	
OBS-3		6612.6	11/16/2011	14:56:31	182.14	6430.46	
S(SG)		6621.14	11/16/2011	13:54:04	190.11	6431.03	
T(M)		6609.4	11/16/2011	13:25:43	133.89	6475.51	
X(M)			11/15/2011	12:03:00			D
Y2(M)		6605.4	11/15/2011	15:51:33	117.34	6488.06	

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

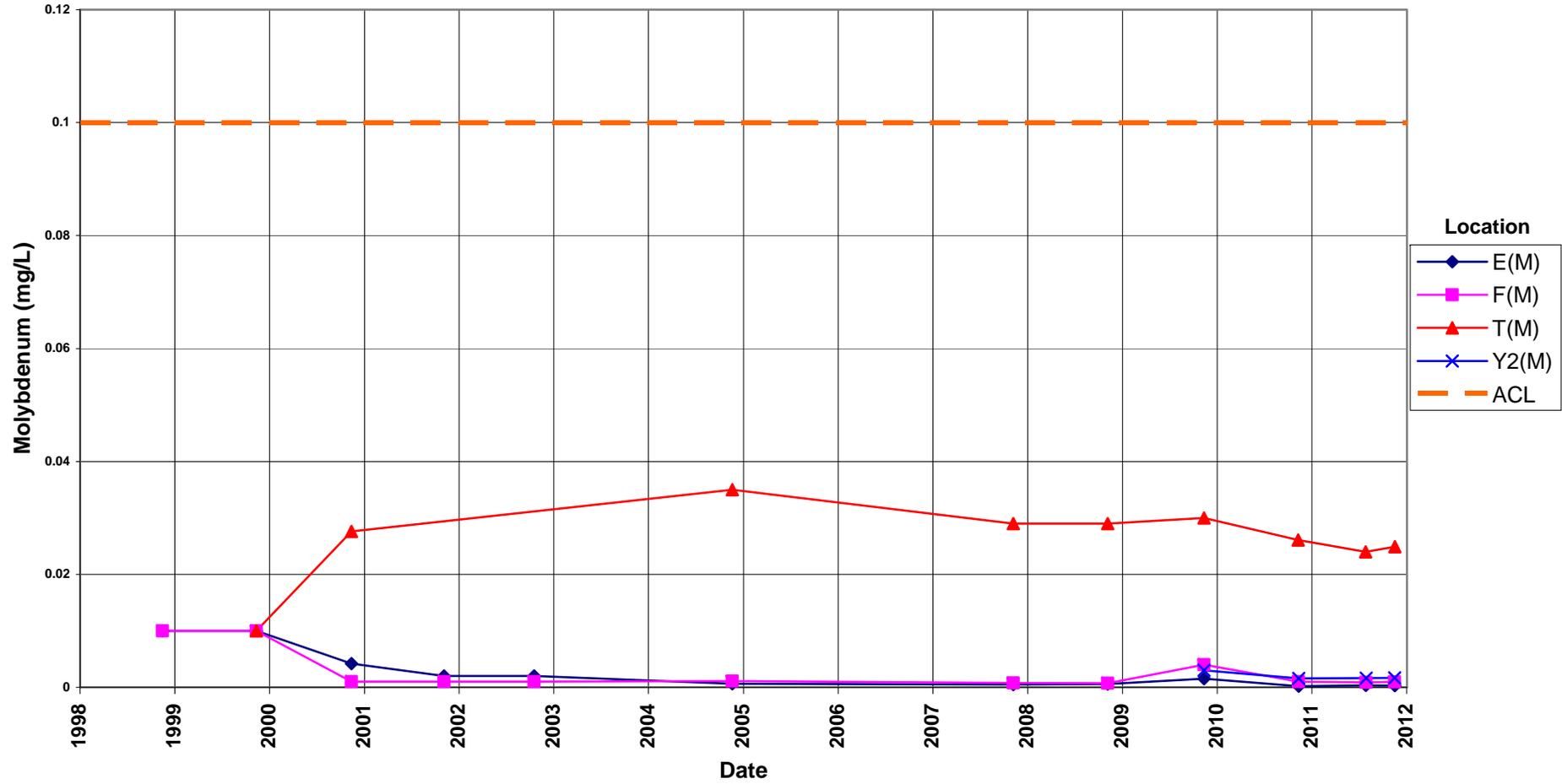
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Time-Concentration Graphs

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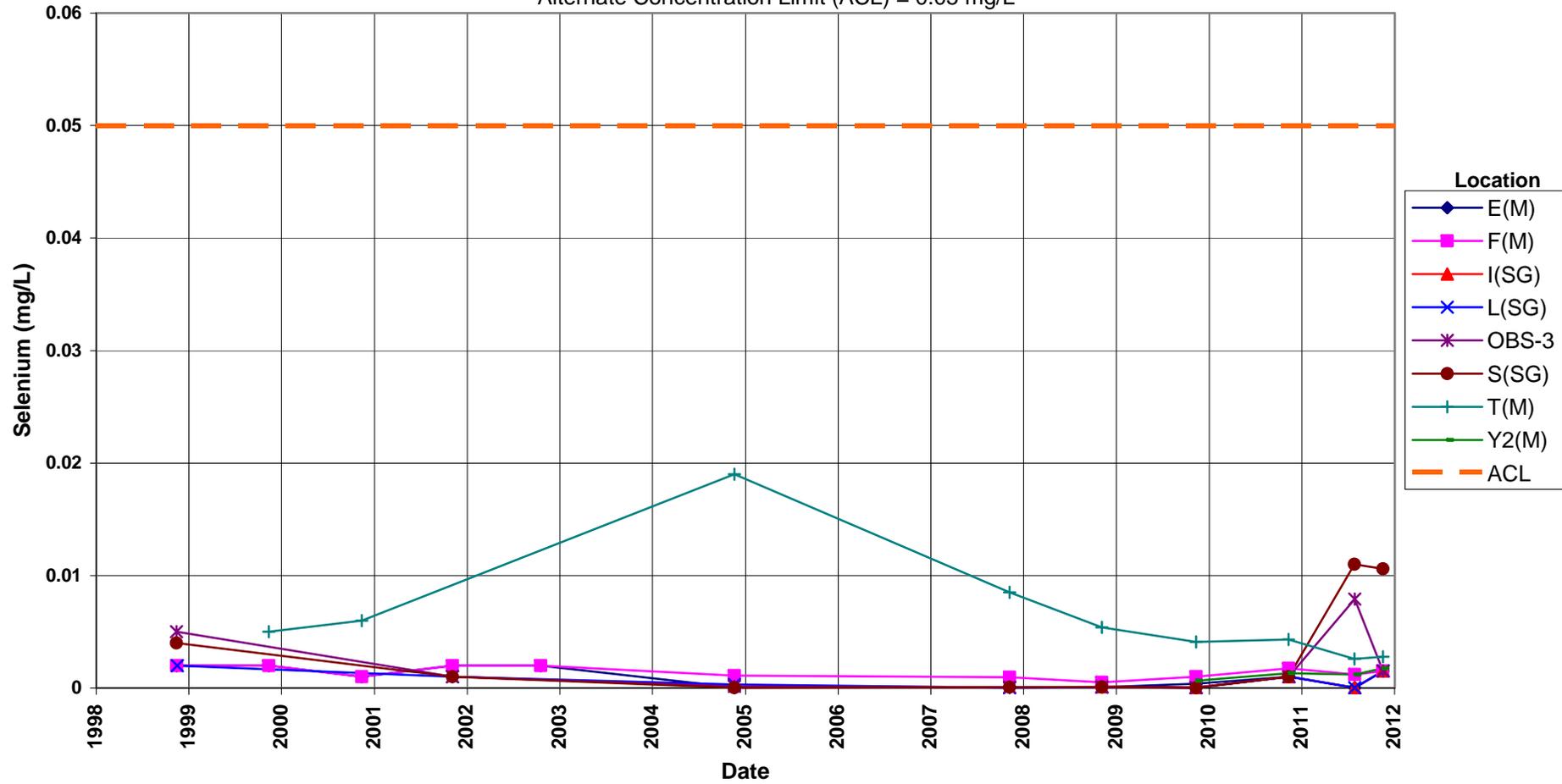
**Bluewater Disposal Site
Alluvium Wells
Molybdenum Concentration**

Alternate Concentration Limit (ACL) = 0.1 mg/L



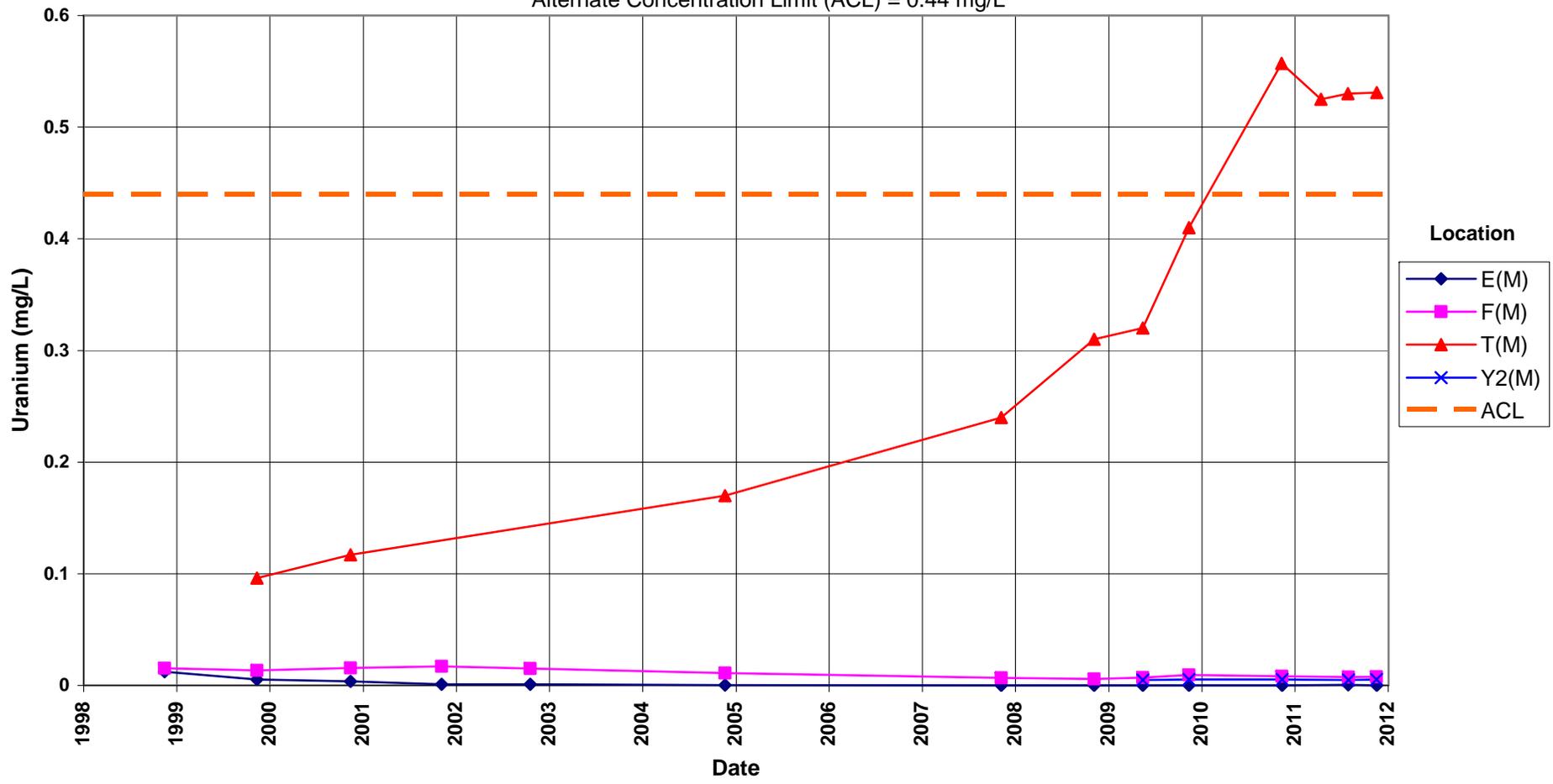
Bluewater Disposal Site Alluvium and Bedrock Wells Selenium Concentration

Alternate Concentration Limit (ACL) = 0.05 mg/L



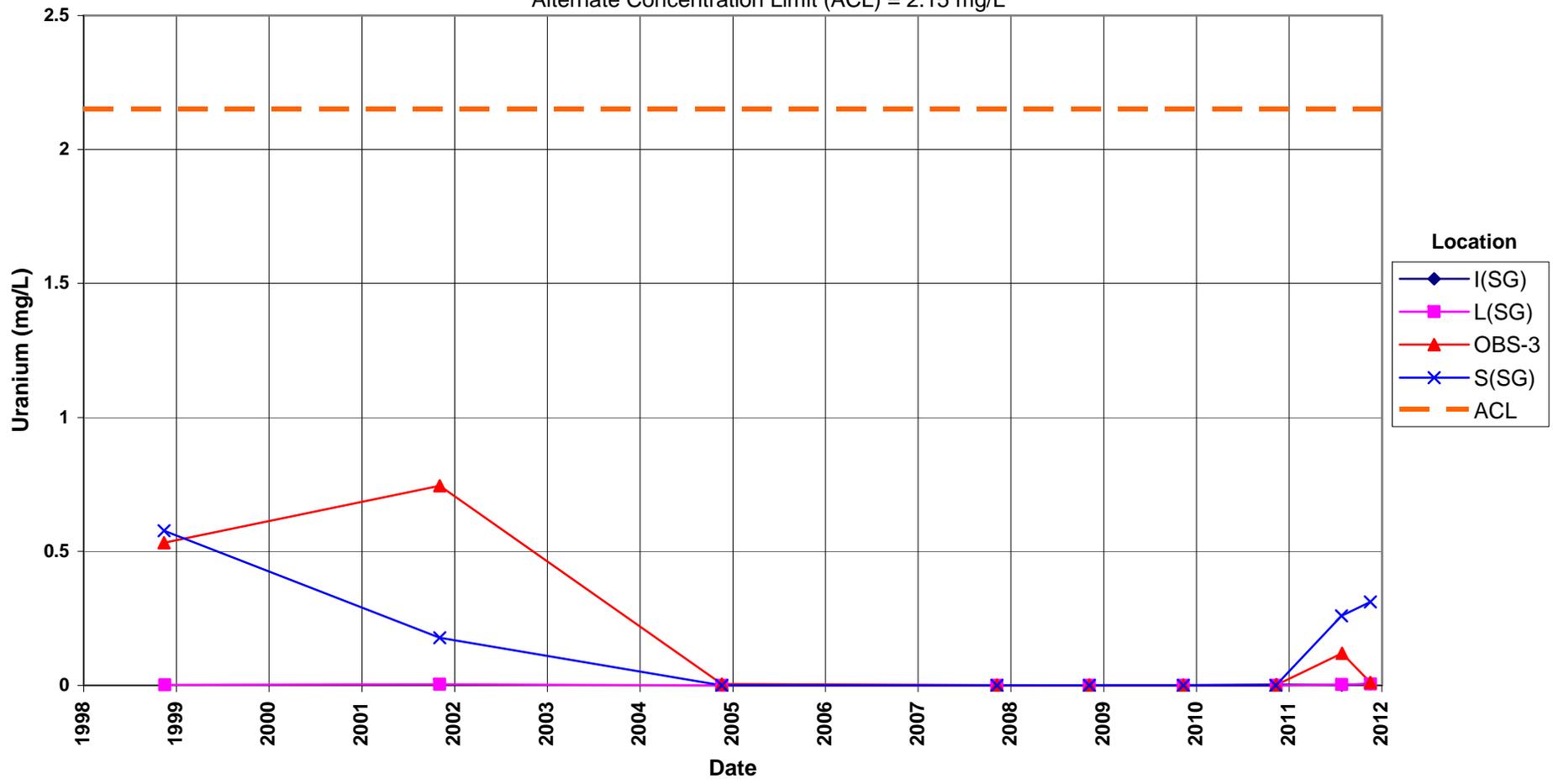
Bluewater Disposal Site Alluvium Wells Uranium Concentration

Alternate Concentration Limit (ACL) = 0.44 mg/L



**Bluewater Disposal Site
Bedrock Wells
Uranium Concentration**

Alternate Concentration Limit (ACL) = 2.15 mg/L



Attachment 3
Sampling and Analysis Work Order

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established 1959

Task Order LM00-501
Control Number 12-0025

October 12, 2011

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

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
November 2011 Environmental Sampling at Bluewater, New Mexico

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

Dear Dr. Gil:

The purpose of this letter is to inform you of the upcoming sampling event at Bluewater, NM. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the Bluewater Disposal Site. Water quality data will be collected at this site as part of the environmental sampling currently scheduled to begin the week of November 14, 2011.

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

Monitoring 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	21(M) Al	22(M) 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.

A draft of this letter is also being provided to DOE Support for distribution to stakeholders.

Dr. April Gil
Control Number 12-0025
Page 2

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 Donovan, Stoller
Bev Gallagher, Stoller
Lauren Goodknight, Stoller
Dick Johnson, Stoller
EDD Delivery
rc-grand.junction
File: BLU 410.02(A)

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				Usually dry
L(SG)		X				
S(SG)		X				
OBS-3		X				
I(SG)		X				
21(M)		X				
22(M)		X				

Sampling conducted in May and November.

Constituent Sampling Breakdown

Site	Bluewater		Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Analyte	Groundwater	Surface Water			
Approx. No. Samples/yr	10	0			
<i>Field Measurements</i>					
Alkalinity					
Dissolved Oxygen	X				
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
<i>Laboratory Measurements</i>					
Aluminum					
Ammonia as N (NH ₃ -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					
Lead					
Magnesium	X		5	SW-846 6010	LMM-01
Manganese					
Molybdenum	X		0.003	SW-846 6020	LMM-02
Nickel					
Nickel-63					
Nitrate + Nitrite as N (NO ₃ +NO ₂)-N	X		0.05	EPA 353.1	WCH-A-022
PCBs	X		0.0005	SW-846 8082	PEP-A-006
Potassium	X		1	SW-846 6010	LMM-01
Radium-226					
Radium-228					
Selenium	X		0.0001	SW-846 6020	LMM-02
Silica					
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					
Tritium					
Uranium	X		0.0001	SW-846 6020	LMM-02
U-234, -238					
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.

Attachment 4

Trip Report

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Memorandum

DATE: November 28, 2011
 TO: Dick Johnson
 FROM: Jeff Walters
 SUBJECT: Sampling Trip Report

Site: Bluewater, NM.

Dates of Sampling Event: November 14-18, 2011

Team Members: Joe Trevino and Jeff Walters

Number of Locations Sampled: 10 monitoring wells were sampled for Ca, K, Mg, Na, As, Mo, Se, U, Cl, Alk-Carb, Alk-Bicarb, SO₄, TDS, (NO₃+NO₂)-N, and PCB's

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

Location Specific Information:

Ticket Number	Sample Date	Location	Description
JMV 487	11/16/2011	E(M)	Cat II
JMV 489	11/15/2011	Y2(M)	Cat I
JMV 490	11/15/2011	F(M)	Cat I-did not meet turbidity requirement. Suspect metal well casing scale falling off into water column.
JMV 488	11/16/2011	T(M)	Cat I
JMV 498	-----	X(M)	Dry
JMV 493	11/17/2011	L(SG)	Listed as Cat II but is purged and sampled by a program directive.
JMV 494	11/16/2011	S(SG)	Listed as Cat II but is purged and sampled by a program directive.
JMV 491	11/16/2011	OBS-3	Listed as Cat II but is purged and sampled by a program directive.
JMV 492	11/16/2007	I(SG)	Cat I
JMV 496	11/15/2011	21(M)	Cat I
JMV 497	11/15/2011	22(M)	Cat I -2 extra liters collected from this well for laboratory QC

Field Variance: Monitoring wells L(SG), S(SG), and OBS-3 are purged and sampled by program directive. Three casing volumes are purged then one set of parameters are recorded before collecting the sample. No stabilization is required.

Monitoring wells F(M), S(SG), and OBS-3 did not meet turbidity requirements. Water was filtered for all analytes except PCB's on these wells.

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

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2074	21M	Duplicate	Groundwater	JMV 495

RIN Number Assigned: All samples were assigned to RIN 11114181.

Sample Shipment: Samples were shipped overnight via FedEx to GEL Laboratories in Charleston, SC, from the FedEx office in Grants, NM, on November 17th, 2011.

Well Inspection Summary: Well inspections were conducted at all sampled wells. All wells were in good condition.

Equipment: Wells L(SG), S(SG), and OBS-3 are equipped with dedicated electric submersible pumps. All other wells are equipped with dedicated bladder pumps. All equipment and meters operated adequately.

Two All Terrain Vehicles (ATVs) and the trailer used for transporting them were stolen from in front of the Holiday Inn Express Grants, New Mexico, on Tuesday, November 15, 2011. A police report has been issued and the investigation is ongoing.

Water Level Measurements: Water levels collected in all sampled wells are in the Field Data Collection System (FDCS) Water Sampling Logs.

Institutional Controls: All gates were appropriately closed and locked during the sampling event.

Fences, Gates, Locks: All were in good condition.

Signs: No missing or vandalized signs were observed.

Trespassing/Site Disturbances: None observed

Site Issues:

Disposal Cell/Drainage Structure Integrity: N/A

Vegetation/Noxious Weed Concerns: N/A

Maintenance Requirements: N/A

Corrective Action Taken: N/A

(JW/lcg)

cc: (electronic)

April Gil, DOE

Steve Donivan, Stoller

Dick Johnson, Stoller

EDD Delivery