Data Validation Package

November 2010
Water Sampling at the
L-Bar, New Mexico, Disposal Site

February 2011

U.S. DEPARTMENT OF ENERGY | Legacy Management

This page intentionally left blank

Contents

This page intentionally left blank

Sampling Event Summary

Site: L-Bar, New Mexico, Disposal Site

Sampling Period: November 13, 2010

Groundwater samples were collected from ten monitoring wells at the L-Bar, New Mexico, Disposal Site to monitor groundwater contaminants as specified in the 2004 *Long-Term Surveillance Plan for the U.S. Department of Energy L-Bar, New Mexico, (UMTRCA Title II) Disposal Site, Seboyeta, New Mexico* (LTSP). The U.S. Nuclear Regulatory Commission (NRC) granted alternate concentration limits (ACLs) for uranium and selenium at the point-of-compliance wells. The New Mexico Environment Department approved alternate abatement standards (AASs) for chloride, sulfate, nitrate, and total dissolved solids in addition to uranium and selenium. The AASs are divided into two groups: those applicable in the source zone and those applicable in the affected area. Sampling and analysis was 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). The water level was measured at each sampled well. Concentrations of contaminants of concern compared to ACLs and AASs are provided in Table 1 for the wells sampled.

Table 1. 2010 Groundwater Monitoring Analytical Results and ACL/AAS Values (in mg/L) at the L-Bar Site

Standard/Well	Uranium	Selenium	Chloride	Sulfate	Nitrate-N	TDS
ACL	13.0	2.0	NA	NA	NA	NA
AAS, Source Zone	13.0	2.0	1127	13,110	1180	20,165
AAS, Affected Area	NA	NA	NA	5185	NA	7846
MW-1A, POC, source zone	0.005	ND	341	3630	ND	7360
MW-17B, POC, source zone	0.03	0.44	385	4490	615	12,100
MW-29A, background	0.0001	ND	144	3900	ND	6960
MW-61, seepage indicator	0.0003	ND	90	3010	0.07	5010
MW-62, seepage indicator, affected area	0.00006	ND	47	496	ND	1480
MW-63, POE seepage indicator	0.00008	ND	46	465	ND	1440
MW-69, POC, source zone	1.3	ND	631	9830	ND	17,500
MW-72, POE	0.007	0.003	145	3960	3.5	6280
MW-81, POC, source zone	0.02	0.07	152	5340	12.2	7950
MW-100, POE	0.002	ND	37	2400	0.6	3860
Moquino (New) [a]	---	---	---	---	---	---

[a] Public water supply well in the village of Moquino (approximately 1.5 miles southwest of the disposal cell). Samples could not be collected at this location for this event.

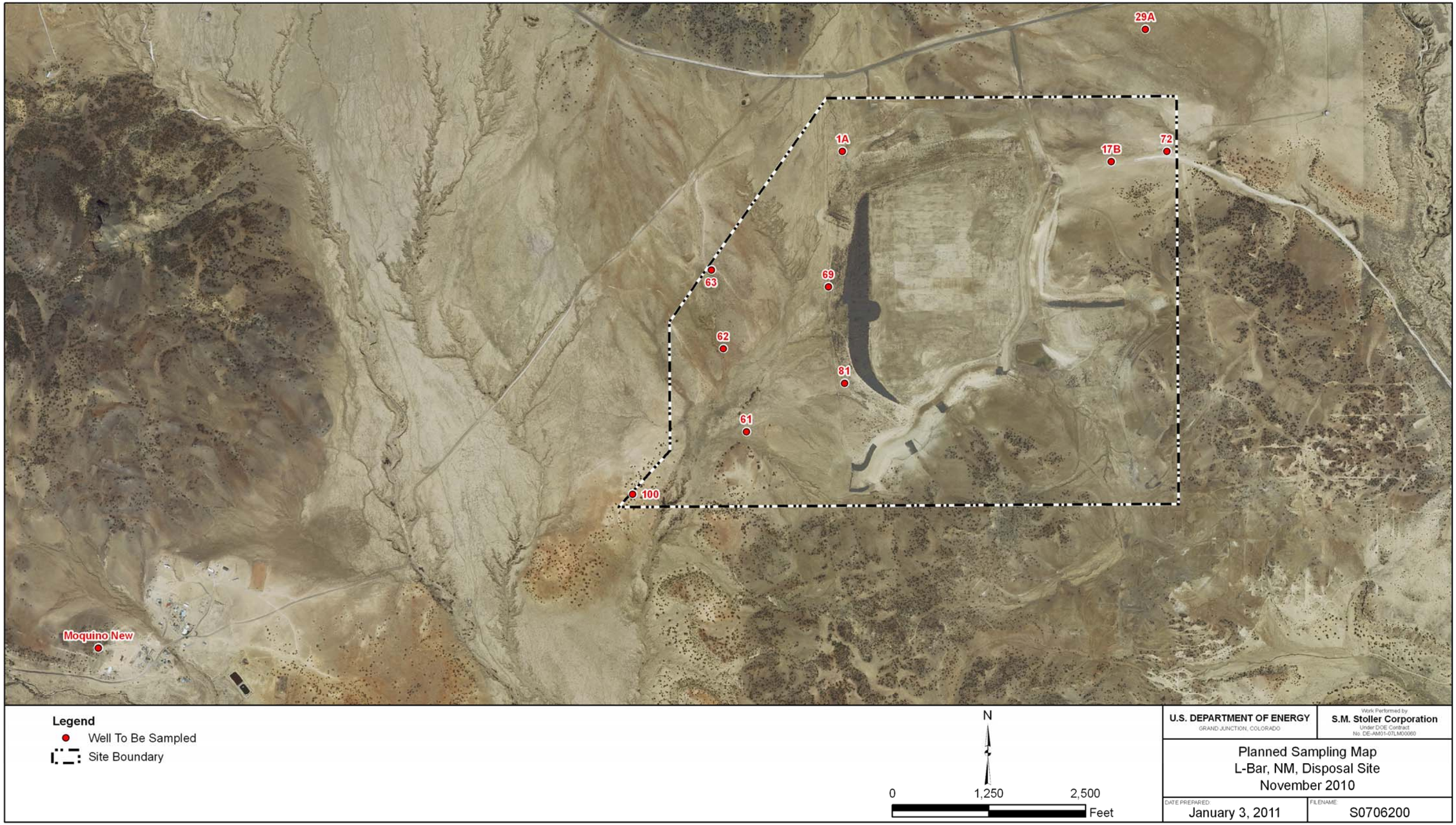
Key: AAS = alternate abatement standard; ACL = alternate concentration limit; mg/L = milligrams per liter; N = nitrogen; NA = not applicable; ND = not detected; POC = point of compliance; POE = point of exposure; TDS = total dissolved solids

If an ACL or AAS is exceeded, the U.S. Department of Energy will inform the NRC of the exceedance and conduct confirmatory sampling. None of the results from this sampling event exceeded the applicable ACL or AAS, demonstrating compliance with the LTSP.

Time-concentration graphs do not indicate an upward trend for any of the constituents in any of the wells. In accordance with the LTSP, sampling will continue every three years, with the next event scheduled for 2013.

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

2/9/11
Date



L-Bar, New Mexico, Disposal Site Sample Location Map

This page intentionally left blank

Data Assessment Summary

This page intentionally left blank

Water Sampling Field Activities Verification Checklist

Project	L-Bar, NM	**Date(s) of Water Sampling**	November 13, 2010
Date(s) of Verification	January 21, 2011	**Name of Verifier**	Gretchen Baer

	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 October 4, 2010.
2. Were the sampling locations specified in the planning documents sampled?	No	The samplers could not access the locations "Moquino Old" and "Moquino New."
3. Was a pre-trip calibration conducted as specified in the above-named documents?	Yes	
4. Was an operational check of the field equipment conducted daily?	Yes	
Did the operational checks meet criteria?	Yes	
5. Were the number and types (alkalinity, temperature, specific conductance, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. 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?	NA	

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 61.
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	
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):	10113428
Sample Event:	November 13, 2010
Site(s):	L-Bar, New Mexico
Laboratory:	GEL Laboratories, Charleston, South Carolina
Work Order No.:	267062
Analysis:	Metals and Wet Chemistry
Validator:	Gretchen Baer
Review Date:	January 21, 2011

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 2.

Table 2. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Chloride	MIS-A-039	EPA 300.0	EPA 300.0
Selenium, Uranium	LMM-02	SW-846 3005	SW-846 6020
Nitrate + Nitrite as N	WCH-A-022	EPA 353.2	EPA 353.2
Sulfate	MIS-A-044	EPA 300.0	EPA 300.0
TDS	WCH-A-033	SMEWW 2540C	SMEWW 2540C

Data Qualifier Summary

None of the sample results required additional qualification.

Sample Shipping/Receiving

GEL Laboratories in Charleston, South Carolina, received three water samples on November 16, 2010, accompanied by a Chain of Custody form. The air bill numbers were listed in the receiving documentation. The Chain of Custody form was checked to confirm that all of the samples were listed with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The Chain of Custody form was complete with no errors or omissions with the following exceptions. The filtration status was not included. The filtration status was documented in the field notes. "Moquino New" and "Moquino Old" were listed on the Chain of Custody, but these locations were not sampled.

Preservation and Holding Times

The sample shipment was received intact with the temperature inside the iced cooler at 2 °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.

Method EPA 300.0
Calibrations for chloride and sulfate were performed using seven calibration standards on November 5, 2010. 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 five verification checks. All calibration checks met the acceptance criteria.

Methods EPA SMEWW 2540C
There are no initial or continuing calibration requirements associated with the TDS method.

Method EPA 353.2
Calibrations for nitrate + nitrite as N were performed using five calibration standards on November 17, 2010. 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 three verification checks. All calibration check results were within the acceptance criteria.

Method SW-846 6020
Calibrations were performed for selenium and uranium on December 13, 2010, using two calibration standards. The calibration curve correlation coefficient values were greater than 0.995. The absolute values of the calibration curve intercepts were less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. 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 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 practical quantitation limits and MDL for all analytes.

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. At 123 percent, a MS recovery of sulfate exceeded the laboratory's acceptance criteria, but was within the ±25 percent requirement for methods for which no digestion is employed.

Laboratory Replicate Analysis

Laboratory replicate analyses are used to determine laboratory precision for each sample matrix. The relative percent difference for replicate results that are greater than 5 times the PQL should be less than 20 percent (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 100 times the PQL for method 6020. No serial dilution data required evaluation.

Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis for some analytes to reduce interferences. The required detection limits were met for all analytes with the following exceptions. The selenium detection limits were 1 microgram per liter (µg/L), which is above the Line Item Code required detection limit of 0.1 µg/L.

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 15, 2010. 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: 10113428 **Lab Code:** GEN **Validator:** Gretchen Baer **Validation Date:** 1/21/2011

Project: L-Bar **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	All analyses were completed within the applicable holding times.
☑ Detection Limits	There are 11 detection limit failures.
☐ Field/Trip Blanks	
☑ Field Duplicates	There was 1 duplicate evaluated.

SAMPLE MANAGEMENT SYSTEM

Non-Compliance Report: Detection Limits

RIN: 10113428 **Lab Code:** GEN

Project: L-Bar

Validation Date: 1/21/2011

Ticket	Location	Lab Sample ID	Method Code	Lab Method	Analyte Name	Result	Qualifier	Reported Detection Limit	Required Detection Limit	Units
IMX 503	100	267062010	LMM-02	EPA 3005/6020	Selenium	1.00	U	1	0.1	ug/L
IMX 495	17B	267062002	LMM-02	EPA 3005/6020	Selenium	441		1	0.1	ug/L
IMX 494	1A	267062001	LMM-02	EPA 3005/6020	Selenium	1.00	U	1	0.1	ug/L
IMX 504	2274	267062011	LMM-02	EPA 3005/6020	Selenium	5.00	U	1	0.1	ug/L
IMX 496	29A	267062003	LMM-02	EPA 3005/6020	Selenium	5.00	U	1	0.1	ug/L
IMX 497	61	267062004	LMM-02	EPA 3005/6020	Selenium	1.00	U	1	0.1	ug/L
IMX 498	62	267062005	LMM-02	EPA 3005/6020	Selenium	1.00	U	1	0.1	ug/L
IMX 499	63	267062006	LMM-02	EPA 3005/6020	Selenium	1.00	U	1	0.1	ug/L
IMX 500	69	267062007	LMM-02	EPA 3005/6020	Selenium	5.00	U	1	0.1	ug/L
IMX 501	72	267062008	LMM-02	EPA 3005/6020	Selenium	2.54	B	1	0.1	ug/L
IMX 502	81	267062009	LMM-02	EPA 3005/6020	Selenium	68.7		1	0.1	ug/L

SAMPLE MANAGEMENT SYSTEM

Metals Data Validation Worksheet

RIN: 10113428 **Lab Code:** GEN **Date Due:** 12/14/2010

Matrix: Water **Site Code:** BAR **Date Completed:** 12/15/2010

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	12/13/2010	0.0000	1.0000	OK	OK	OK	OK	OK	106.0	119.0					111.0
Uranium	12/13/2010	0.0000	1.0000	OK	OK	OK	OK	OK	115.0	102.0		5.0			116.0

SAMPLE MANAGEMENT SYSTEM

Wet Chemistry Data Validation Worksheet

RIN: 10113428 **Lab Code:** GEN **Date Due:** 12/14/2010

Matrix: Water **Site Code:** BAR **Date Completed:** 12/15/2010

Analyte	Date Analyzed	CALIBRATION						Method Blank	LCS %R	MS %R	MSD %R	DUP RPD	Serial Dil. %R
		Int.	R^2	ICV	CCV	ICB	CCB						
Chloride	11/05/2010	0.111	0.9986	OK		OK							
Chloride	11/17/2010				OK		OK	OK	96.30				
Chloride	11/18/2010				OK		OK			104.0		0	
Chloride	11/18/2010				OK		OK			105.0		1.00	
NO2+NO3 as N	11/17/2010	0.001	0.9999	OK	OK	OK	OK	OK	101.00	92.4		1.00	
Sulfate	11/05/2010	0.285	0.9996	OK		OK							
Sulfate	11/17/2010				OK		OK	OK	99.00				
Sulfate	11/18/2010				OK		OK			123.0		2.00	
Sulfate	11/19/2010				OK		OK			104.0		1.00	
Total Dissolved Solids	11/17/2010							OK	98.30			2.00	

Sampling Quality Control Assessment

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

Sampling Protocol

Sample results for all monitoring wells met the Category I or II low-flow sampling criteria and were qualified with an "F" flag in the database, indicating the wells were purged and sampled using the low-flow sampling method.

The groundwater sample results for wells 100, 17B, 1A, and 81 were further qualified with a "Q" flag in the database indicating the data are considered qualitative because these are Category II wells.

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 61 (field duplicate ID 2274). The duplicate results met the criteria, demonstrating acceptable overall precision.

SAMPLE MANAGEMENT SYSTEM

Validation Report: Field Duplicates

RIN: 10113428 **Lab Code:** GEN **Project:** L-Bar **Validation Date:** 1/21/2011

Duplicate: 2274 **Sample:** 61

Analyte	Sample Result	Flag	Error	Dilution	Duplicate Result	Flag	Error	Dilution	RPD	RER	Units
Chloride	89.8			100.00	90.4			100.00	0.67		mg/L
NO2+NO3 as N	0.0675	J		5.00	0.0695	J		5.00			mg/L
Selenium	1.00	U		1.00	5.00	U		5.00			ug/L
Sulfate	3010			100.00	3020			100.00	0.33		mg/L
Total Dissolved Solids	5010			1.00	4900			1.00	2.22		mg/L
Uranium	0.318			1.00	0.301			1.00	5.49		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: 2-9-2011

Data Validation Lead: Gretchen Baer — Date: 2-9-11

This page intentionally left blank

Attachment 1
Assessment of Anomalous Data

This page intentionally left blank

Potential Outliers Report

This page intentionally left blank

Potential Outliers Report

Potential outliers are measurements that are extremely large or small relative to the rest of the data and, therefore, are suspected of misrepresenting the population from which they were collected. Potential outliers 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.

This page intentionally left blank

Attachment 2
Data Presentation

This page intentionally left blank

Groundwater Quality Data

This page intentionally left blank

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 100 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	20	-	60	37.3		FQ	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	20	-	60	0.55		FQ	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	20	-	60	33.2		FQ	#		
pH	s.u.	11/13/2010	N001	20	-	60	6.91		FQ	#		
Selenium	mg/L	11/13/2010	N001	20	-	60	0.001	U	FQ	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	20	-	60	5207		FQ	#		
Sulfate	mg/L	11/13/2010	N001	20	-	60	2400		FQ	#	10	
Temperature	C	11/13/2010	N001	20	-	60	13.96		FQ	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	20	-	60	3860		FQ	#	2.38	
Turbidity	NTU	11/13/2010	N001	20	-	60	1.62		FQ	#		
Uranium	mg/L	11/13/2010	N001	20	-	60	0.0015		FQ	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 17B WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	37	-	60	385		FQ	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	37	-	60	615		FQ	#	5	
Oxidation Reduction Potential	mV	11/13/2010	N001	37	-	60	-161		FQ	#		
pH	s.u.	11/13/2010	N001	37	-	60	6.66		FQ	#		
Selenium	mg/L	11/13/2010	N001	37	-	60	0.441		FQ	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	37	-	60	14731		FQ	#		
Sulfate	mg/L	11/13/2010	N001	37	-	60	4490		FQ	#	50	
Temperature	C	11/13/2010	N001	37	-	60	14.87		FQ	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	37	-	60	12100		FQ	#	2.38	
Turbidity	NTU	11/13/2010	N001	37	-	60	0.57		FQ	#		
Uranium	mg/L	11/13/2010	N001	37	-	60	0.0306		FQ	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 1A WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	130	-	140	341		FQ	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	130	-	140	0.05	U	FQ	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	130	-	140	-210.6		FQ	#		
pH	s.u.	11/13/2010	N001	130	-	140	7.16		FQ	#		
Selenium	mg/L	11/13/2010	N001	130	-	140	0.001	U	FQ	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	130	-	140	10464		FQ	#		
Sulfate	mg/L	11/13/2010	N001	130	-	140	3630		FQ	#	50	
Temperature	C	11/13/2010	N001	130	-	140	16.54		FQ	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	130	-	140	7360		FQ	#	2.38	
Turbidity	NTU	11/13/2010	N001	130	-	140	1.41		FQ	#		
Uranium	mg/L	11/13/2010	N001	130	-	140	0.00479		FQ	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 29A WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	95	-	130	144		F	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	95	-	130	0.05	U	F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	95	-	130	-227.7		F	#		
pH	s.u.	11/13/2010	N001	95	-	130	7.26		F	#		
Selenium	mg/L	11/13/2010	N001	95	-	130	0.005	U	F	#	0.005	
Specific Conductance	umhos /cm	11/13/2010	N001	95	-	130	9842		F	#		
Sulfate	mg/L	11/13/2010	N001	95	-	130	3900		F	#	50	
Temperature	C	11/13/2010	N001	95	-	130	15		F	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	95	-	130	6960		F	#	2.38	
Turbidity	NTU	11/13/2010	N001	95	-	130	6.02		F	#		
Uranium	mg/L	11/13/2010	N001	95	-	130	0.000098	B	F	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 61 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	33.1	-	52.9	89.8		F	#	6.6	
Chloride	mg/L	11/13/2010	N002	33.1	-	52.9	90.4		F	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	33.1	-	52.9	0.0675	J	F	#	0.05	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N002	33.1	-	52.9	0.0695	J	F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	33.1	-	52.9	-175.2		F	#		
pH	s.u.	11/13/2010	N001	33.1	-	52.9	7.07		F	#		
Selenium	mg/L	11/13/2010	N001	33.1	-	52.9	0.001	U	F	#	0.001	
Selenium	mg/L	11/13/2010	N002	33.1	-	52.9	0.005	U	F	#	0.005	
Specific Conductance	umhos /cm	11/13/2010	N001	33.1	-	52.9	6617		F	#		
Sulfate	mg/L	11/13/2010	N001	33.1	-	52.9	3010		F	#	10	
Sulfate	mg/L	11/13/2010	N002	33.1	-	52.9	3020		F	#	10	
Temperature	C	11/13/2010	N001	33.1	-	52.9	14.12		F	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	33.1	-	52.9	5010		F	#	2.38	
Total Dissolved Solids	mg/L	11/13/2010	N002	33.1	-	52.9	4900		F	#	2.38	
Turbidity	NTU	11/13/2010	N001	33.1	-	52.9	1.17		F	#		
Uranium	mg/L	11/13/2010	N001	33.1	-	52.9	0.000318		F	#	0.00005	
Uranium	mg/L	11/13/2010	N002	33.1	-	52.9	0.000301		F	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 62 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	34.8	-	74.5	47.1		F	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	34.8	-	74.5	0.05	U	F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	34.8	-	74.5	-261.3		F	#		
pH	s.u.	11/13/2010	N001	34.8	-	74.5	8.01		F	#		
Selenium	mg/L	11/13/2010	N001	34.8	-	74.5	0.001	U	F	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	34.8	-	74.5	2584		F	#		
Sulfate	mg/L	11/13/2010	N001	34.8	-	74.5	496		F	#	10	
Temperature	C	11/13/2010	N001	34.8	-	74.5	14.11		F	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	34.8	-	74.5	1480		F	#	2.38	
Turbidity	NTU	11/13/2010	N001	34.8	-	74.5	1.02		F	#		
Uranium	mg/L	11/13/2010	N001	34.8	-	74.5	0.000058	B	F	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 63 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	70.4	-	110.1	46.3		F	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	70.4	-	110.1	0.05	U	F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	70.4	-	110.1	-262		F	#		
pH	s.u.	11/13/2010	N001	70.4	-	110.1	8.06		F	#		
Selenium	mg/L	11/13/2010	N001	70.4	-	110.1	0.001	U	F	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	70.4	-	110.1	2504		F	#		
Sulfate	mg/L	11/13/2010	N001	70.4	-	110.1	465		F	#	10	
Temperature	C	11/13/2010	N001	70.4	-	110.1	15.03		F	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	70.4	-	110.1	1440		F	#	2.38	
Turbidity	NTU	11/13/2010	N001	70.4	-	110.1	0.9		F	#		
Uranium	mg/L	11/13/2010	N001	70.4	-	110.1	0.000084	B	F	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 69 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	29.6	-	69.4	631		F	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	29.6	-	69.4	0.05	U	F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	29.6	-	69.4	-208.1		F	#		
pH	s.u.	11/13/2010	N001	29.6	-	69.4	6.86		F	#		
Selenium	mg/L	11/13/2010	N001	29.6	-	69.4	0.005	U	F	#	0.005	
Specific Conductance	umhos /cm	11/13/2010	N001	29.6	-	69.4	19642		F	#		
Sulfate	mg/L	11/13/2010	N001	29.6	-	69.4	9830		F	#	50	
Temperature	C	11/13/2010	N001	29.6	-	69.4	15.05		F	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	29.6	-	69.4	17500		F	#	2.38	
Turbidity	NTU	11/13/2010	N001	29.6	-	69.4	0.49		F	#		
Uranium	mg/L	11/13/2010	N001	29.6	-	69.4	1.3		F	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 72 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	24.5	-	64.3	145		F	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	24.5	-	64.3	3.54		F	#	0.05	
Oxidation Reduction Potential	mV	11/13/2010	N001	24.5	-	64.3	-248.9		F	#		
pH	s.u.	11/13/2010	N001	24.5	-	64.3	7.22		F	#		
Selenium	mg/L	11/13/2010	N001	24.5	-	64.3	0.00254	B	F	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	24.5	-	64.3	8193		F	#		
Sulfate	mg/L	11/13/2010	N001	24.5	-	64.3	3960		F	#	10	
Temperature	C	11/13/2010	N001	24.5	-	64.3	15.03		F	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	24.5	-	64.3	6280		F	#	2.38	
Turbidity	NTU	11/13/2010	N001	24.5	-	64.3	0.67		F	#		
Uranium	mg/L	11/13/2010	N001	24.5	-	64.3	0.00713		F	#	0.00005	

Groundwater Quality Data by Location (USEE100) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011
Location: 81 WELL

Parameter	Units	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers Lab	Qualifiers Data	Qualifiers QA	Detection Limit	Uncertainty
Chloride	mg/L	11/13/2010	N001	19.6	-	59.6	152		FQ	#	6.6	
Nitrate + Nitrite as Nitrogen	mg/L	11/13/2010	N001	19.6	-	59.6	12.2		FQ	#	0.1	
Oxidation Reduction Potential	mV	11/13/2010	N001	19.6	-	59.6	-170.4		FQ	#		
pH	s.u.	11/13/2010	N001	19.6	-	59.6	7.13		FQ	#		
Selenium	mg/L	11/13/2010	N001	19.6	-	59.6	0.0687		FQ	#	0.001	
Specific Conductance	umhos /cm	11/13/2010	N001	19.6	-	59.6	8810		FQ	#		
Sulfate	mg/L	11/13/2010	N001	19.6	-	59.6	5340		FQ	#	50	
Temperature	C	11/13/2010	N001	19.6	-	59.6	14.79		FQ	#		
Total Dissolved Solids	mg/L	11/13/2010	N001	19.6	-	59.6	7950		FQ	#	2.38	
Turbidity	NTU	11/13/2010	N001	19.6	-	59.6	0.48		FQ	#		
Uranium	mg/L	11/13/2010	N001	19.6	-	59.6	0.02		FQ	#	0.00005	

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.

This page intentionally left blank

Static Water Level Data

This page intentionally left blank

STATIC WATER LEVELS (USEE700) FOR SITE BAR01, L-Bar Disposal Site
REPORT DATE: 1/21/2011

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
100			11/13/2010	09:21:46	50.05	NA	E
17B			11/13/2010	14:24:18	44.8	NA	E
1A			11/13/2010	13:02:21	94.74	NA	E
29A			11/13/2010	15:33:31	58.26	NA	E
61			11/13/2010	09:57:32	36.9	NA	E
62			11/13/2010	10:54:04	26.45	NA	E
63			11/13/2010	11:39:49	53.82	NA	E
69			11/13/2010	12:19:43	30.33	NA	E
72			11/13/2010	14:49:03	28.33	NA	E
81			11/13/2010	13:54:10	41.3	NA	E

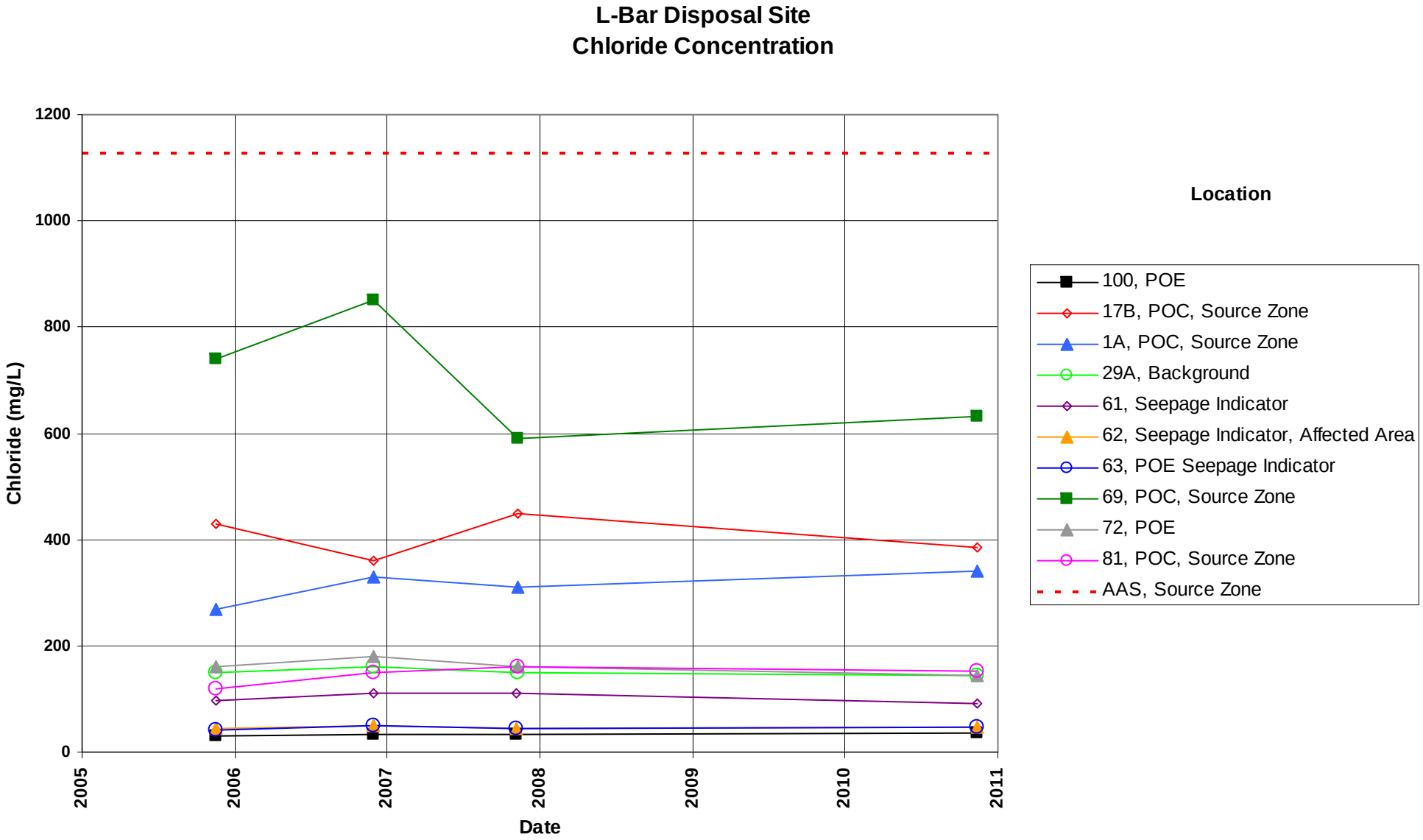
FLOW CODES: B BACKGROUND C CROSS GRADIENT D DOWN GRADIENT F OFF SITE
N UNKNOWN O ON SITE U UPGRADIENT

WATER LEVEL FLAGS: D Dry F FLOWING E TOP OF CASING ELEVATION DATA NOT AVAILABLE

This page intentionally left blank

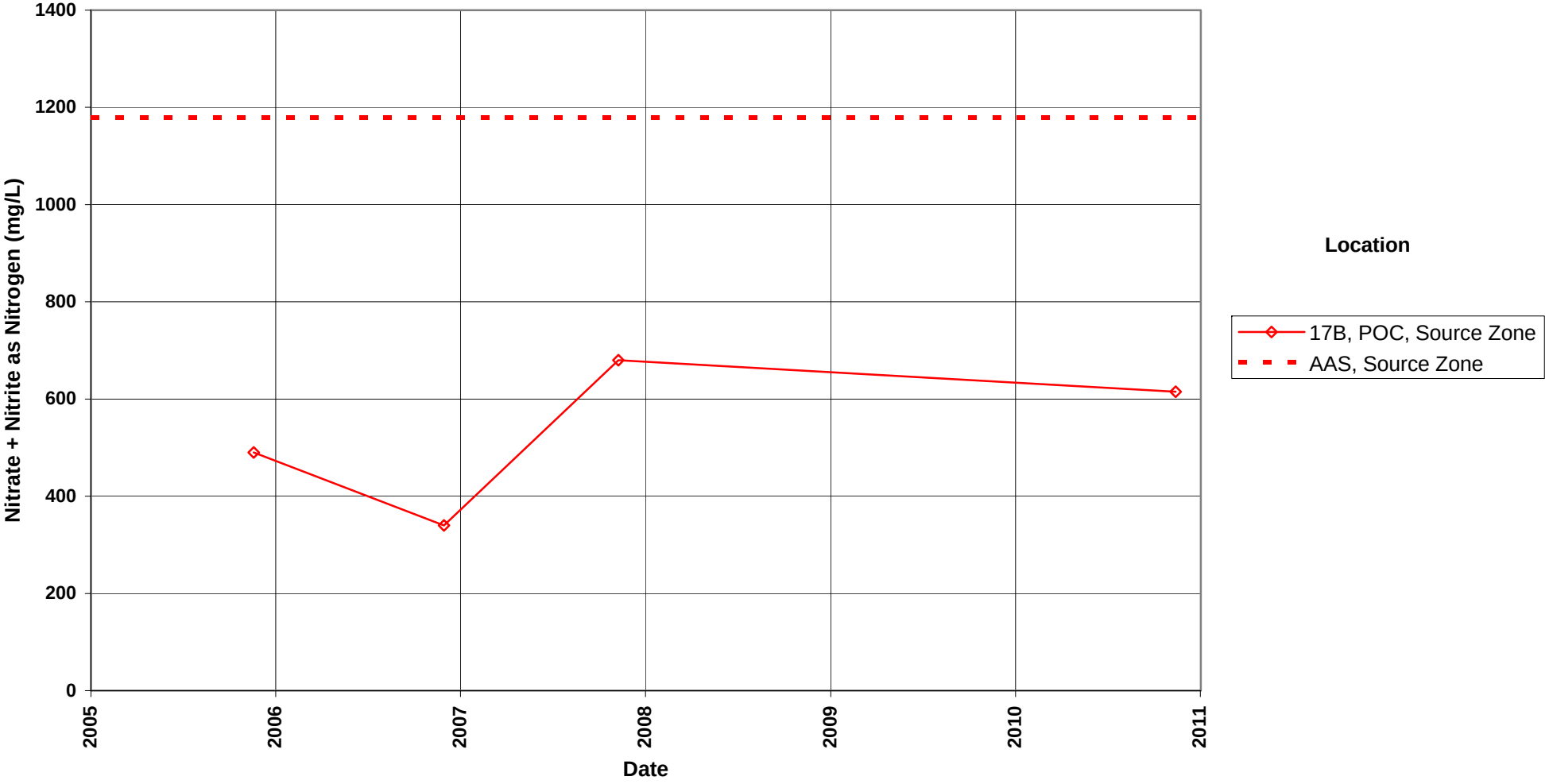
Time-Concentration Graphs

This page intentionally left blank

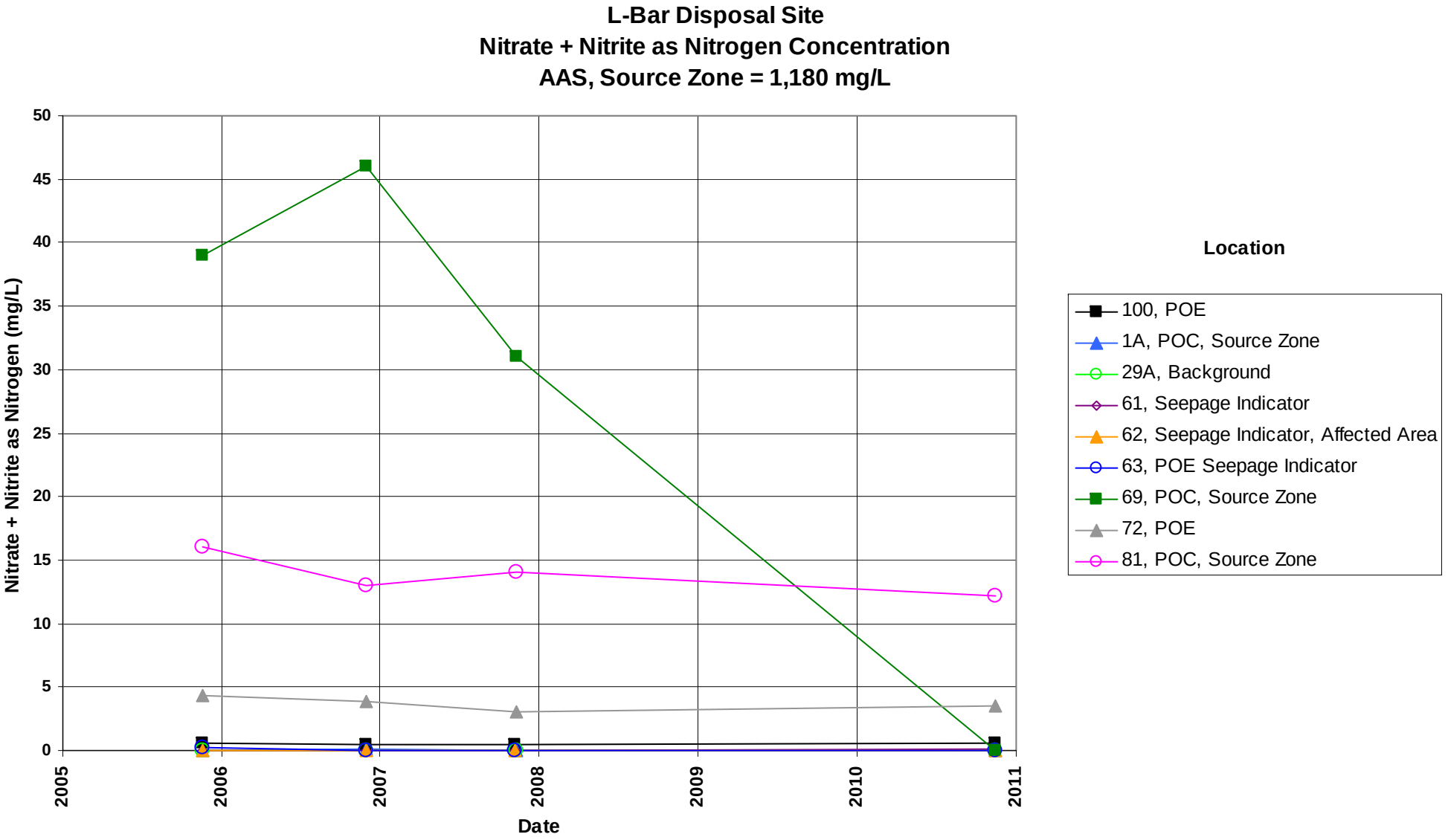

L-Bar Disposal Site
Chloride Concentration
Chloride (mg/L)
1200
1000
800
600
400
200
0
2005
2006
2007
2008
2009
2010
2011
Date
Location
100, POE
17B, POC, Source Zone
1A, POC, Source Zone
29A, Background
61, Seepage Indicator
62, Seepage Indicator, Affected Area
63, POE Seepage Indicator
69, POC, Source Zone
72, POE
81, POC, Source Zone
AAS, Source Zone

-

L-Bar Disposal Site
Nitrate + Nitrite as Nitrogen Concentration

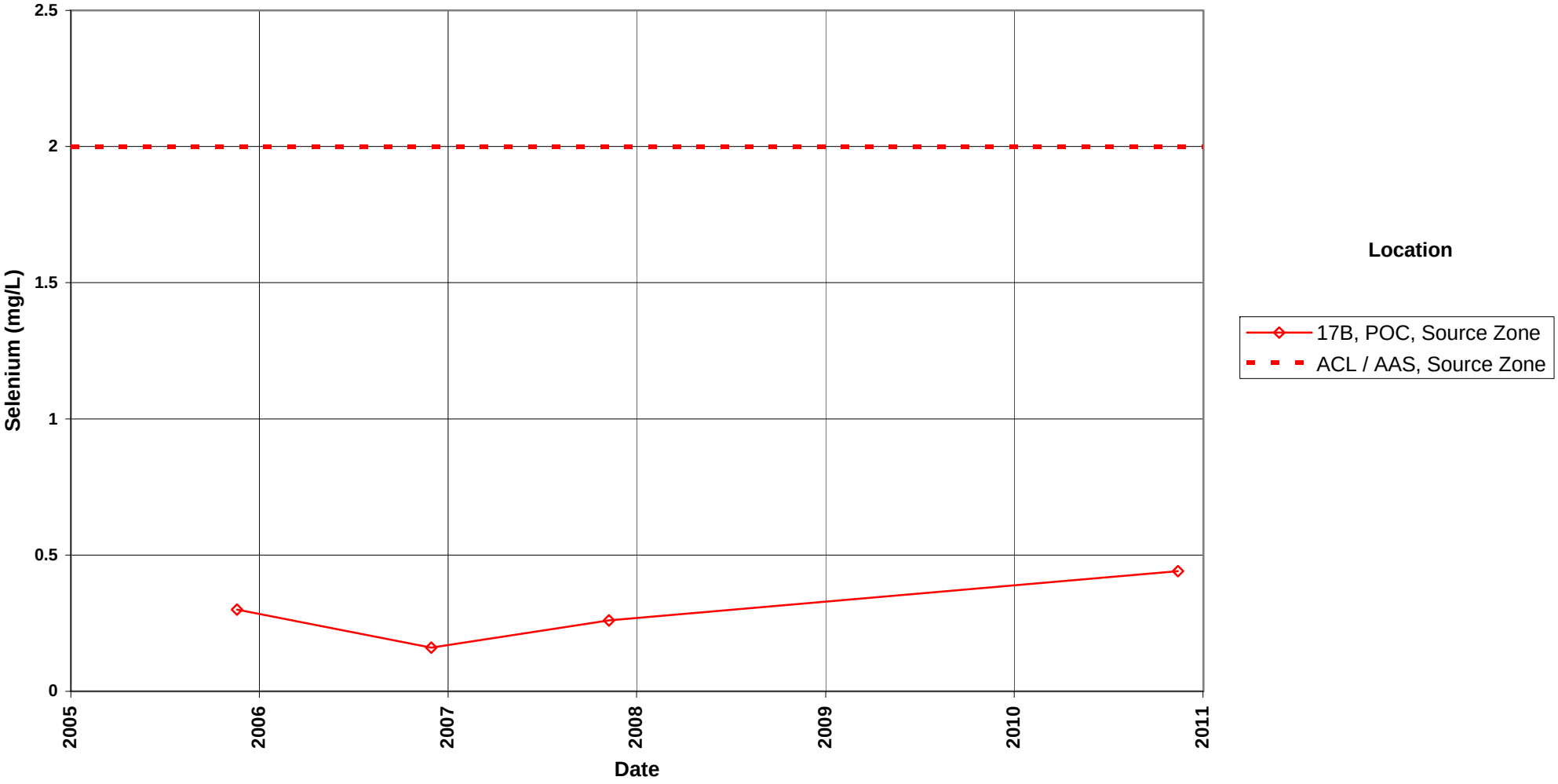


-

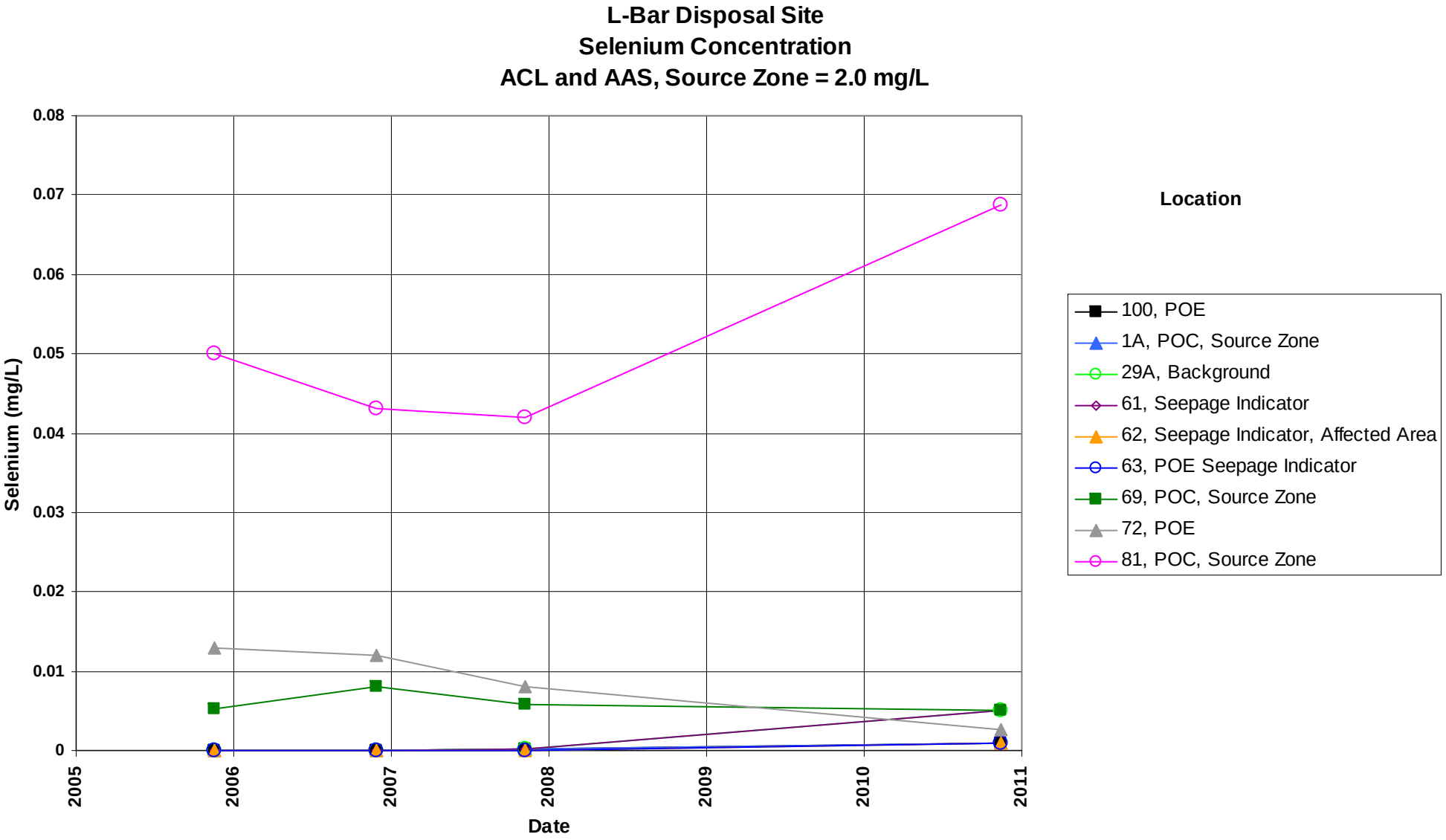

L-Bar Disposal Site
Nitrate + Nitrite as Nitrogen Concentration
AAS, Source Zone = 1,180 mg/L
Nitrate + Nitrite as Nitrogen (mg/L)
50
45
40
35
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
Date
Location
100, POE
1A, POC, Source Zone
29A, Background
61, Seepage Indicator
62, Seepage Indicator, Affected Area
63, POE Seepage Indicator
69, POC, Source Zone
72, POE
81, POC, Source Zone

-

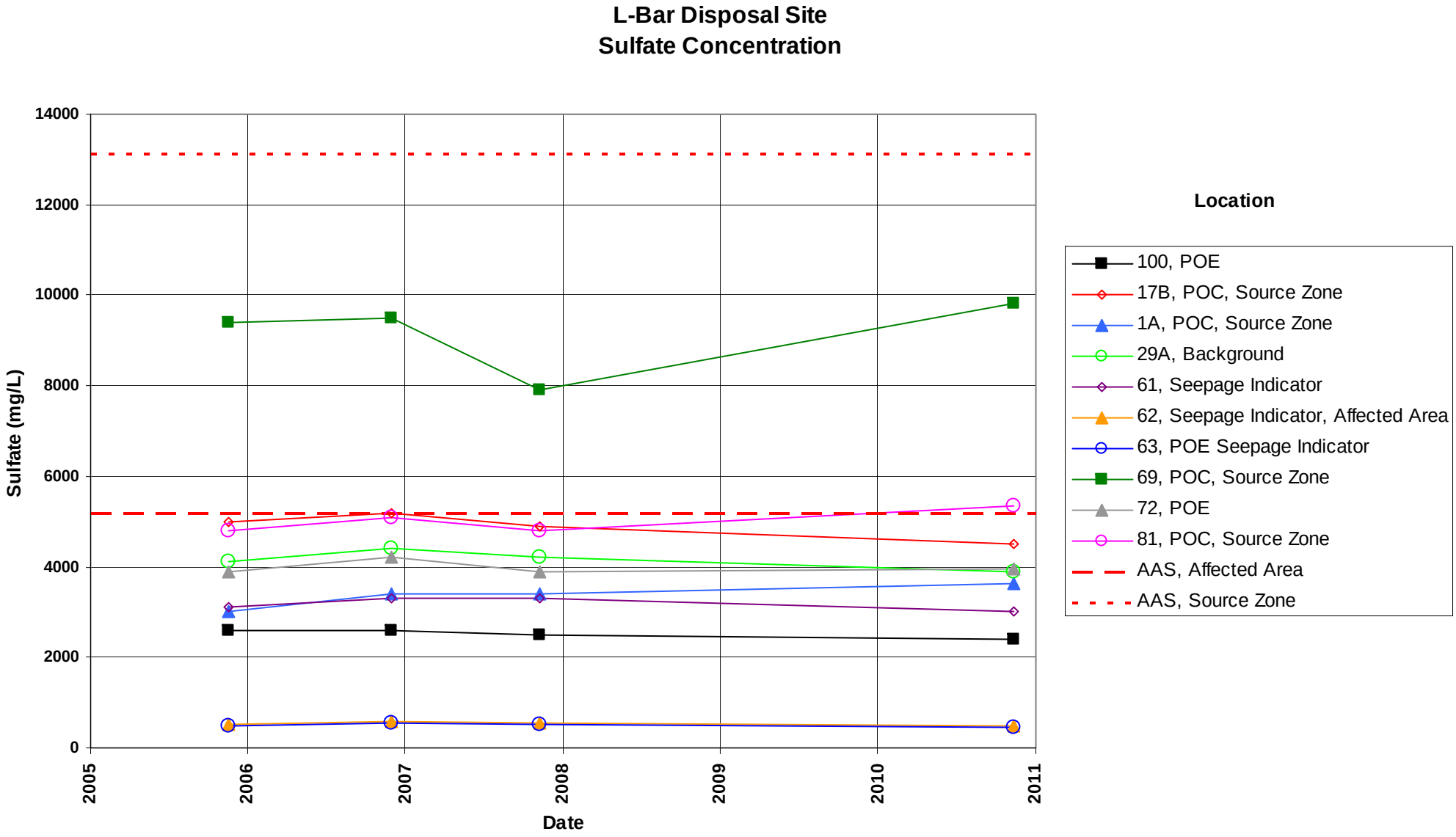
L-Bar Disposal Site
Selenium Concentration



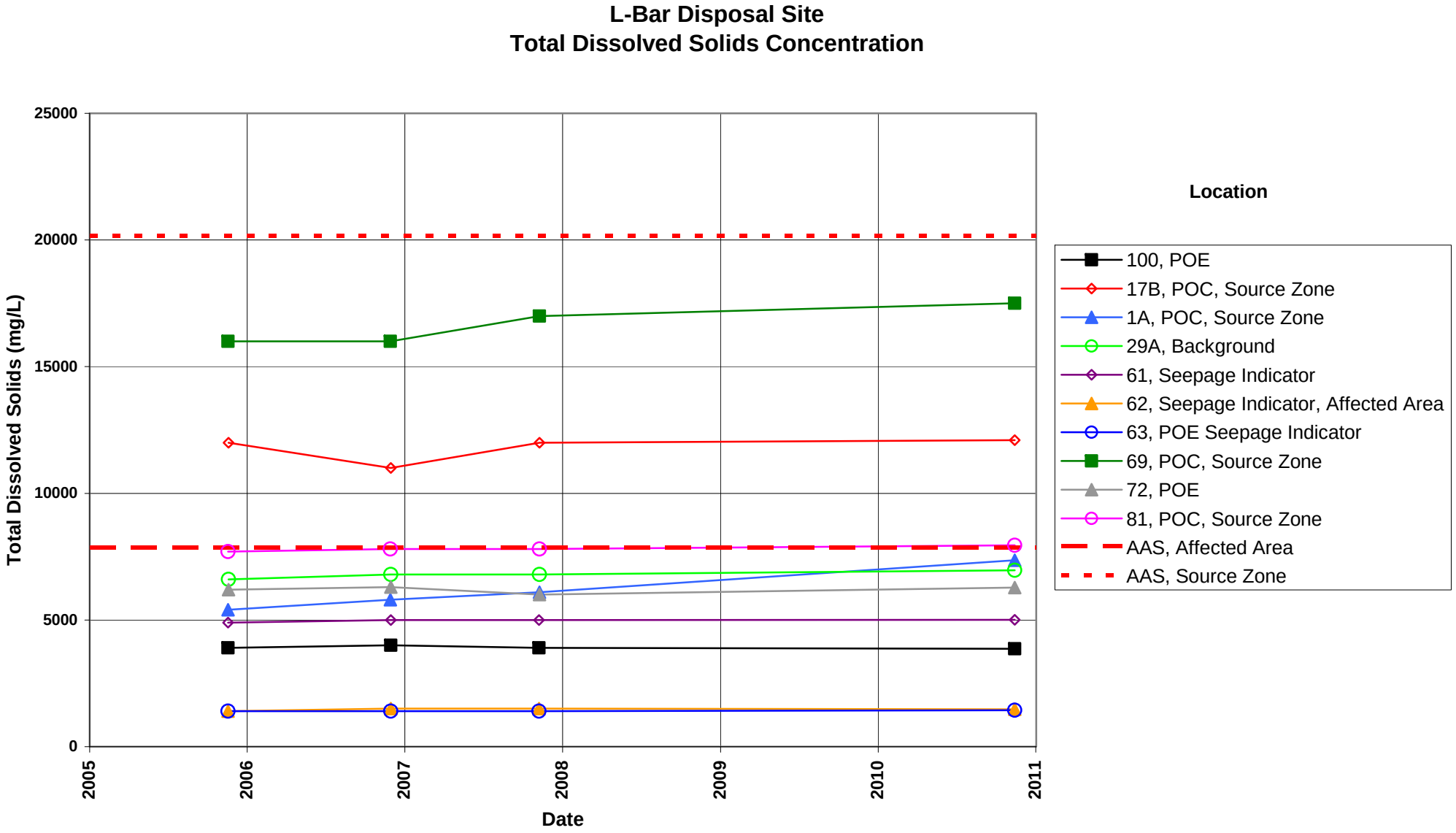
-


L-Bar Disposal Site
Selenium Concentration
ACL and AAS, Source Zone = 2.0 mg/L
Selenium (mg/L)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
2005
2006
2007
2008
2009
2010
2011
Date
Location
100, POE
1A, POC, Source Zone
29A, Background
61, Seepage Indicator
62, Seepage Indicator, Affected Area
63, POE Seepage Indicator
69, POC, Source Zone
72, POE
81, POC, Source Zone

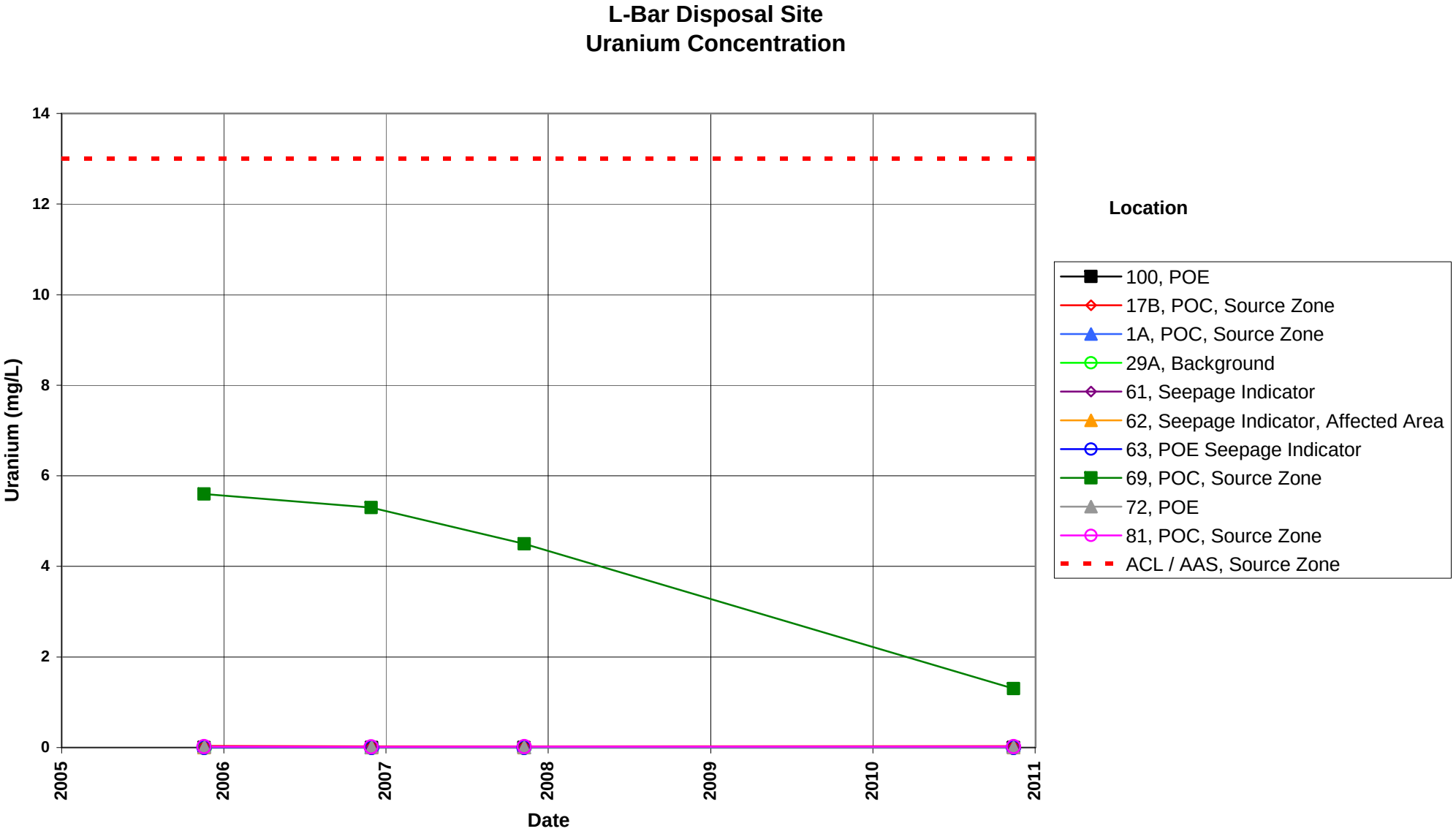
-


L-Bar Disposal Site
Sulfate Concentration
Sulfate (mg/L)
14000
12000
10000
8000
6000
4000
2000
0
2005
2006
2007
2008
2009
2010
2011
Date
Location
100, POE
17B, POC, Source Zone
1A, POC, Source Zone
29A, Background
61, Seepage Indicator
62, Seepage Indicator, Affected Area
63, POE Seepage Indicator
69, POC, Source Zone
72, POE
81, POC, Source Zone
AAS, Affected Area
AAS, Source Zone

-


L-Bar Disposal Site
Total Dissolved Solids Concentration
Total Dissolved Solids (mg/L)
25000
20000
15000
10000
5000
0
2005
2006
2007
2008
2009
2010
2011
Date
Location
100, POE
17B, POC, Source Zone
1A, POC, Source Zone
29A, Background
61, Seepage Indicator
62, Seepage Indicator, Affected Area
63, POE Seepage Indicator
69, POC, Source Zone
72, POE
81, POC, Source Zone
AAS, Affected Area
AAS, Source Zone

-


L-Bar Disposal Site
Uranium Concentration
Uranium (mg/L)
14
12
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
Date
Location
100, POE
17B, POC, Source Zone
1A, POC, Source Zone
29A, Background
61, Seepage Indicator
62, Seepage Indicator, Affected Area
63, POE Seepage Indicator
69, POC, Source Zone
72, POE
81, POC, Source Zone
ACL / AAS, Source Zone

-

Attachment 3
Sampling and Analysis Work Order

This page intentionally left blank

Stoller established 1959

Task Order LM00–501
Control Number 11-0003

October 4, 2010

U.S. Department of Energy
Office of Legacy Management
ATTN: Dr. April Gil
Site Manager
2597 B ¾ Road
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AM01-07LM00060, S.M. Stoller Corporation (Stoller)
November 2010 Environmental Sampling at L-Bar, New Mexico

REFERENCE: Task Order LM00-501-03-215-402, L-Bar, NM, Disposal Site

Dear Dr. Gil:

The purpose of this letter is to inform you of the upcoming sampling event at L-Bar, New Mexico. Enclosed are the map and tables specifying sample locations and analytes for monitoring at the L-Bar disposal site. Water quality data will be collected from monitoring wells at this site as part of the routine environmental sampling currently scheduled to begin the week of November 8, 2010.

The following list shows the monitoring wells scheduled to be sampled during this event.

Monitoring Wells
1A 29A 62 69 72 81 100
17B 61 63

Domestic Wells
Moquino – Old Moquino - New

All samples will be collected as directed in the *Sampling and Analysis Plan for U.S. Department of Energy, Office of Legacy Management Sites*.

Please contact me at (970) 248-6022 if you have any questions or concerns.

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
File: BAR 410.02(A)

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

Constituent Sampling Breakdown

Site	L-Bar				
Analyte	Groundwater	Surface Water	Required Detection Limit (mg/L)	Analytical Method	Line Item Code
Approx. No. Samples/yr.	12	0			
Field Measurements					
Alkalinity					
Dissolved Oxygen					
Redox Potential	X				
pH	X				
Specific Conductance	X				
Turbidity	X				
Temperature	X				
Laboratory Measurements					
Aluminum					
Ammonia as N (NH3-N)					
Calcium					
Chloride	X		0.5	SW-846 9056	MIS-A-039
Chromium					
Magnesium					
Manganese					
Molybdenum					
Nitrate + Nitrite as N (NO3+NO2)-N	X		0.05	EPA 353.1	WCH-A-022
Potassium					
Radium-226					
Radium-228					
Selenium	X		0.0001	SW-846 6020	LMM-02
Silica					
Sodium					
Sulfate	X		0.5	SW-846 9056	MIS-A-044
Sulfide					
Total Dissolved Solids	X		10	SM2540 C	WCH-A-033
Total Organic Carbon					
Uranium	X		0.0001	SW-846 6020	LMM-02
Vanadium					
Zinc					
Total No. of Analytes	6	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.

This page intentionally left blank

Attachment 4
Trip Report

This page intentionally left blank

Stoller
Grand Junction Office
established 1959

Memorandum

DATE: December 7, 2010

TO: Dick Johnson

FROM: Jeff Walters

SUBJECT: Sampling Trip Report

Site: L-Bar, NM.

Date of Sampling Event: November 13, 2010

Team Members: Kent Moe and Jeff Walters

Number of Locations Sampled: Water samples for Se, U, Cl, SO4, (NO3+NO2)-N, and TDS were collected from 10 monitoring wells. In addition, one duplicate sample was collected for QA/QC purposes. No equipment blank was required; all equipment is dedicated.

Locations Not Sampled/Reason: Moquino Old and Moquino New were not sampled. Three phone calls to Bill Hocker (at work and home) and Leane Padilla-Hocker were placed throughout the day to gain access to those wells. One call was answered by Leane's son. He said he would have his mother call back but never received that call. All other calls where messages left on their answering machine. No return calls where received.

Location Specific Information:

TICKET NUMBER	SAMPLE DATE	LOCATION	DESCRIPTION
IMX 503	11/13/10	100	CAT II
IMX 495	11/13/10	17B	CAT II
IMX 494	11/13/10	1A	CAT II
IMX 496	11/13/10	29A	CAT I
IMX 497	11/13/10	61	CAT I
IMX 498	11/13/10	62	CAT I
IMX 499	11/13/10	63	CAT I
IMX 500	11/13/10	69	CAT I
IMX 501	11/13/10	72	CAT I
IMX 502	11/13/10	81	CAT II

Field Variance: None

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
2274	61	Duplicate	Groundwater	IMX 504

RIN Number Assigned: All samples were assigned to RIN 10113428.

Sample Shipment: Samples were shipped overnight via FedEx to GEL labs in Charleston, SC. from Grand Junction, CO on November 15, 2010.

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

Equipment: All wells were sampled using the low-flow procedure with a dedicated bladder pump.

Water Level Measurements: Water levels were collected in all sampled wells. See *Water Sampling Field Data* logs for measurements.

Institutional Controls: N/A

Fences, Gates, Locks: All were in good condition.
Signs: No missing or vandalized signs were observed.
Trespassing/Site Disturbances: N/A

Site Issues:

Disposal Cell/Drainage Structure Integrity: NA
Vegetation/Noxious Weed Concerns: NA
Maintenance Requirements: NA

Corrective Action Taken: NA

cc: (electronic)
April Gil, DOE
Cheri Bahrke, Stoller
Steve Donivan, Stoller
EDD Delivery