

Office of Environmental Management – Grand Junction



Moab UMTRA Project
October 2009 Validation Data Package
for the Site-Wide Ground Water
Sampling Event

January 2010



U.S. Department
of Energy

Office of Environmental Management

**Moab UMTRA Project
October 2009 Validation Data Package for
the Site-Wide Ground Water Sampling Event**

January 2010

**Moab UMTRA Project
October 2009 Site-Wide Ground Water Sampling Event VDP**

Revision 0

Review and Approval

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1/13/10

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Revision History

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Attachment

Attachment 1. October 2009 Site-Wide Sampling Event Trip Report	
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Acronyms and Abbreviations

°C	degrees centigrade
COC	chain of custody
EB	equipment blank
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
IA	interim action
ICP	inductively coupled plasma
IDL	instrument detection limit
LCS	laboratory control sample
MB	method blank
MDL	method detection limit
MS	matrix spike
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
RS	replicate sample
SD	serial dilution
SDG	sample data group
TDS	total dissolved solids
UMTRA	Uranium Mill Tailings Remedial Action
USGS	U.S. Geological Survey
VDP	validation data package

1.0 Introduction

The purpose of this document is to summarize the results of the data validation process associated with ground water and/or surface water samples collected from the Moab Uranium Mill Tailings Remedial Action (UMTRA) site. This data validation follows the criteria according to the *Environmental Procedures Catalog*, “Standard Practice for Validation of Laboratory Data,” GT-9(P) (2006).

As part of the scope of this document, the complete results of this data validation process are provided. Section 1 includes the Summary Criteria, Sampling Event Summary, and Sampling and Analyses. Section 2 provides the Data Assessment Summaries, including the Water Sampling Field Activities Verification, Laboratory Performance Assessment, Field Analyses/Activities, and Certification. All flagged data, and the reasons for the applicable flags, are also presented in Section 2. The Data Presentation is contained in Section 3, which includes a summary of the anomalous data generated by the validation process. Various appendices contain the Water Quality Data, Water Level Data, and Minimums and Maximums Report tables. The trip report is included as Attachment 1. All Colorado River flow discussed in this document are measured from the U.S. Geological Survey (USGS) Cisco gauging station No. 09180500.

This section contains the Summary Criteria with a sample location map (Section 1.1), a Sampling Event Summary (Section 1.2), and the Sampling and Analyses (Section 1.3) for the October 2009 site-wide sampling event.

1.1 Summary Criteria

Sampling Period: October 13 through 23, 2009

The purpose of this sampling was to collect ground water samples from a variety of locations across the site in order to update contaminant plume maps. The most recent site-wide event prior to this event was completed in January 2009. Sampling locations are shown on Figure 1.

1. As a result of this sampling event, is there any indication of anomalous data that may be related to well field pump rate changes, river flow, or other known causes?

No.

2. Were all interim action (IA) well field pumps operating within the planned parameters?

Yes. Only half of the Configuration 4 wells were actively extracting ground water during this event. All other wells were shut down in order to control the evaporation pond level.

3. Was the evaporation pond functioning properly?

Yes. The evaporation pond level ranged from 8.0 to 8.5 feet during this event.

4. Were all proposed well (ground water) and surface water locations sampled during this event?

No. Monitor well ATP-1-S was not sampled as scheduled; it will be sampled as part of an upcoming sampling event.

5. Were there any site activities that have impacted or may impact the IA system?

Since the January 2009 sampling event, Envirocon removed additional zones from the sprinkler system.

1.2 Sampling Event Summary

This validation data package (VDP) presents the validated data associated with the ground water and surface water samples collected during the October 2009 site-wide sampling event at the former uranium tailings processing site in Moab, Utah. This VDP includes a discussion of the data validation process in Section 2.0, with a description of how these data are qualified based on field and laboratory verification assessments (Sections 2.1 and 2.2). Attachment 1 contains the trip report detailing the field events associated with this sampling event.

A list of flagged data is presented in Table 3 in Section 2.2. No data were rejected (flagged as “R”) as a result of this validation process. A Minimums and Maximums Report (presented in Section 3.1) was generated to determine if the data are within normal statistical range. Any anomalous data, based on the results of the Minimums and Maximums Report, are presented in Section 3.2.

While independent of the data validation process, a brief summary of the most recent ammonia and uranium concentration trends based on the October 2009 data is provided in Table 1, which also shows a comparison of the October 2009 and January 2009 site-wide sampling results.

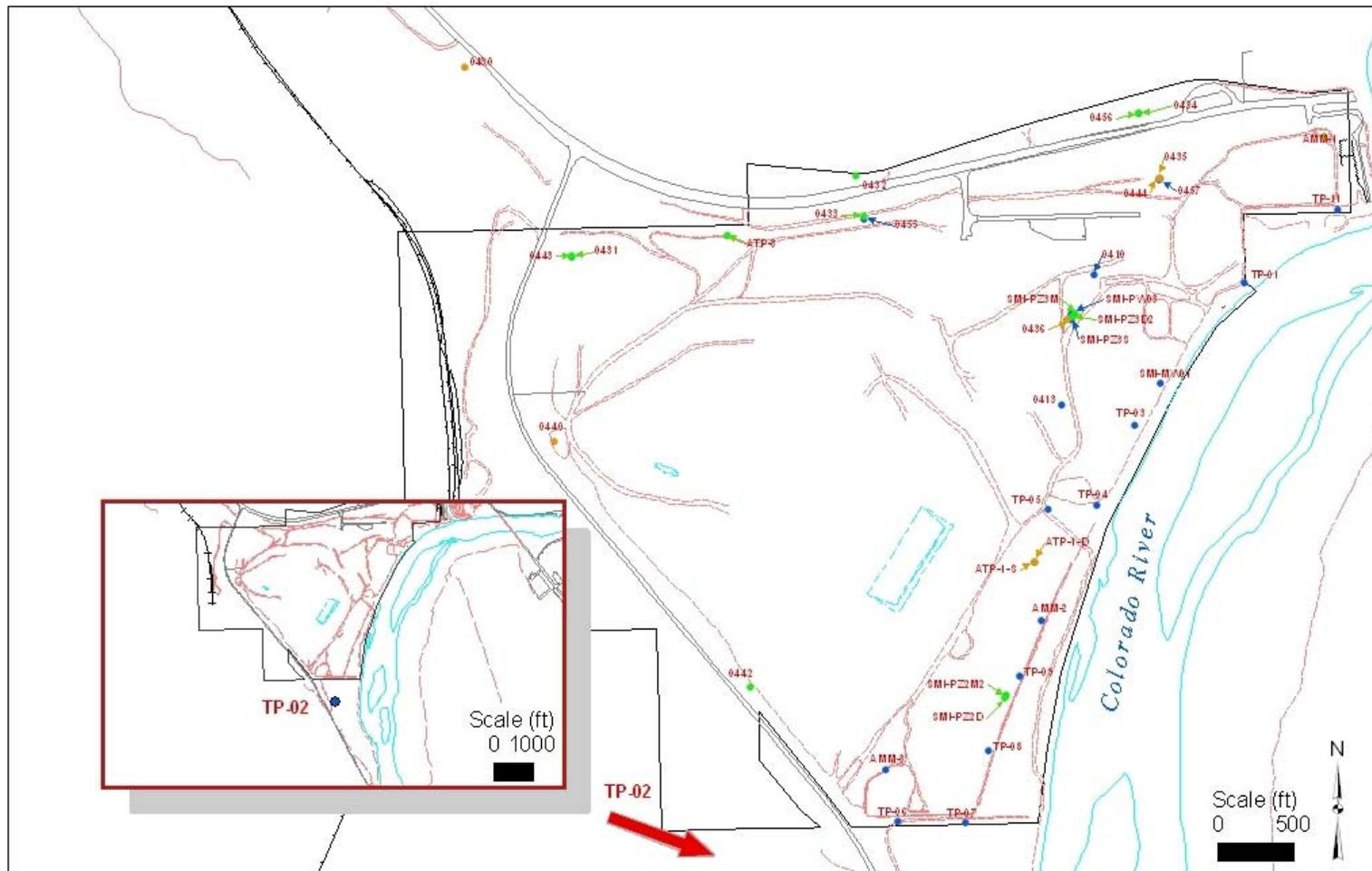
A total of 33 samples were collected from 32 locations during the October 2009 site-wide sampling event (samples were collected from two depths at location AMM-1), as shown in Table 1.

1.3 Sampling and Analyses

Sampling and analyses were conducted in accordance with the *Operations, Maintenance, and Performance Monitoring Plan for the Interim Action Ground Water Treatment System, April 2008*. Please refer to the attached trip report (Attachment 1) for specific sampled locations.

The data validations indicate that the data meet the quality-control criteria specified for this project. An adequate number of equipment blanks (EBs) and duplicates were collected. No significant discrepancies were noted regarding sample shipping and receiving, preservation, holding times, instrument calibration, method blanks (MBs), or matrix spikes (MSs), except as qualified or noted in the Laboratory Performance Assessment (Section 2.2).

There was one location with one anomalous data point. Well SMI-PZ2D had a historic low value for manganese. The mean daily Colorado River flow during the sampling period ranged from 4,000 to 4,340 cubic feet per second.



\\moab.tac.local\applications\GIS\Drawings\Moab\Water\MOA_GW_20090408_00067.mxd

- Deep Locations (100'+)
- Mid Locations (50-100')
- Shallow Locations (0-50')
- Moab UMTRA Site Boundary

U.S. DEPARTMENT OF ENERGY ORNL/AR/EM/DOE/DOE	55 K Aerospace, Inc. 10000 S. 1000 E. Mesa, AZ 85204
Site Wide Ground Water Sampling Locations	
April 10, 2009	Moab

Figure 1. Site-Wide Ground Water Sampling Locations (may include locations not sampled)

*Table 1. Comparison of Sampling Results from the
October 2009 and January 2009 Site-Wide Sampling Events*

Location	Ammonia Data (mg/L)		Uranium Data (mg/L)	
	Oct 2009	Jan 2009	Oct 2009	Jan 2009
410	0.1 ¹	0.1	0.64	0.73
413	12	11	1.1	1.5
430	0.1 ¹	0.1	0.011	0.012
431	0.1 ¹	0.1	0.011	0.01
432	0.1 ¹	0.1	0.002	0.002
433	0.1 ¹	0.1	0.002	0.002
434	0.12	0.1	0.023	0.023
435	1.9	2	.025	0.022
436	3.4	3.4	0.011	0.007
440	0.1 ¹	0.1	0.033	0.043
443	0.1 ¹	0.1	0.012	0.012
444	1.8	1.8	0.021	0.017
455	0.1 ¹	0.1	0.003	0.005
456	0.1 ¹	0.1	0.024	0.027
457	0.1	0.1	0.022	0.002
AMM-1	0.1 (19 feet), 0.1 (53 feet)	0.1 (15 feet), 0.1 (53 feet)	0.006 (19 feet) 0.006 (53 feet)	0.005 (15 feet), 0.005 (53 feet)
AMM-2	500	660	2.2	2.1
AMM-3	230	240	1.8	1.7
ATP-3	0.1 ¹	0.1	0.03	0.003
SMI-MW01	1.8	1.5	4.9	4.4
SMI-PW03	43	35	1.4	0.6
SMI-PZ2D	760	1200	0.63	0.55
SMI-PZ2M2	1200	1500	1.2	1.3
SMI-PZ3D2	450	510	1.7	1.9
SMI-PZ3M	74	67	1.7	1.9
SMI-PZ3S	3	3.8	2.4	1.7
TP-01	0.1 ¹	0.12	0.10	0.12
TP-07	140	130	3.0	2.7
TP-08	330	330	2.7	2.4
TP-09	440	370	3.1	2.4
TP-11	0.65	0.68	1.4	0.001
TP-20	2.9	3.3	0.023	0.005

¹ Detection limit for ammonia is 0.1 mg/L
mg/L = milligrams per liter

2.0 Data Assessment Summary

This section contains the Water Sampling Field Activities Verification (Section 2.1), the Laboratory Performance Assessments (Section 2.2), the Field Analyses/Activities (Section 2.3), and Certification (Section 2.4).

2.1 Water Sampling Field Activities Verification

The field activities verification process for this sampling event was documented using the list provided in Appendix A. As the list exhibits, all sampling was conducted following the applicable procedures.

2.2 Laboratory Performance Assessment

General Information

Report Identification No. (RIN): 0910038
Sample Event: October 2009 Site-Wide Ground Water Sampling Event
Site(s): Moab, Utah
Laboratory: ALS Laboratory Group, Fort Collins, Colorado
Sample Data Group (SDG) Nos.: 0910206, 0910238, 0910268
Analysis: Metals and Inorganics
Validator: Rachel Cowan
Review Date: January 4, 2010

This validation was performed according to the *Environmental Procedures Catalog*, "Standard Practice for Validation of Laboratory Data," GT-9(P) (2006). The procedure was applied at Level 1, Data Deliverables Examination. The Level 1 validation was performed on 100 percent of the samples, which included review of the chain of custody (COC), case narratives, field and sample identifications, holding times, preservation, and cooler receipt. When the case narrative identified items of concern, these items were further investigated in a targeted Level 3 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	Preparation Method	Analytical Method
Ammonia as N, NH ₃ -N	WCH-A-005	EPA 350.1	EPA 350.1
Manganese	G17	SW-846 3005A	SW-846 6010B
Total Dissolved Solids	WIC-A-033	EPA 160.1	EPA 160.1
Selenium	G14	SW-846 3005A	SW-846 6020A
Uranium	G1	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

Analytical results were qualified as listed in Table 3. Refer to Table 4 for an explanation of the data qualifiers applied.

Table 3. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
All 0910206 samples	AMM-1-19, AMM-1-53, AMM-2, AMM-3, SMI PZ2D, SMI-PZ2M2, TP-07, TP-08, TP-09, TP-11, TP-20	Total Dissolved Solids	J	HT2
0910268-7, -8, -9	0443, 0455, 0456	Ammonia	J	MS1
All 0910206 samples	AMM-1-19, AMM-1-53, AMM-2, AMM-3, SMI PZ2D, SMI-PZ2M2, TP-07, TP-08, TP-09, TP-11, TP-20	Uranium	J	SD1
0910268-6, -9	0440, 0456	Selenium	J	MS1

J indicates estimated results; UJ indicates analytical results below detection limit

Table 4. Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Nondetects)	Explanation
HT2	J	R	Samples were analyzed after the specified holding time had expired but within two times the specified holding time.
MS1	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because the MS sample was (a) from another client, (b) of dissimilar matrix, (c) a field blank or EB, or (d) not analyzed at the proper frequency as stated in the appropriate analytical method.
SD1	J	NA	Serial dilution sample frequency criteria were not met.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received a total of 36 samples for RIN 0910038 in three shipments, which arrived on October 20, 2009 (SDG 0910206; UPS tracking number 1Z5W1Y510196804691), October 22, 2009 (SDG 09102038; UPS tracking number 1Z5W1Y510199529519), and October 24, 2009 (SDG 0910268; UPS tracking number 1Z5W1Y510199529519). Each of the SDGs was accompanied by a COC form. The COC form was checked to confirm that all of the samples were listed on the form with sample collection dates and times, and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents, including the COC forms and the sample tickets, had no errors or omissions except the following: It appears that ALS placed the same shipping label in the COC forms for both SDG 0910238 and SDG 0910268.

Preservation and Holding Times

SDGs 0910206, 0910238, and 0910268 were received intact in three coolers with temperatures of 1.6°C (SDG 0910206), 0.2°C (SDG 0910238), and 1.2°C (SDG 0910268). These temperatures met 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, except for the total dissolved solids (TDS) samples in SDG 0910206, all of which were flagged "J" for reason HT2.

Case Narratives

The case narratives were reviewed, and all detects were found to be within quality-control procedures except for the following.

Matrix Spike and Replicate Analysis

MS sample analysis, performed at a frequency of one per 20 samples unless otherwise noted, is a measure of the ability to recover analytes in a particular matrix. Replicate sample (RS) analysis consists of MS duplicate samples and field duplicates, analyzed at a frequency of one per 20 samples per method or procedural requirements. These RSs are indicators of laboratory precision for each sample matrix.

Method EPA 350.1, Ammonia

The ammonia samples in SDG 0910268 did not have the appropriate number of MS samples as per method requirements, so ammonia results from samples 0910268 -7 through -9 were “J”-flagged for MS1.

Method SW-846 6020A, Selenium

There were no samples from SDG 0910268 selected for testing matrix-specific quality-control samples. Therefore, there were no MSs for selenium, and all SDG 0910268 selenium results were flagged for MS1. However, the field duplicate RS passed for selenium, so selenium results were not flagged for RS1.

Laboratory Control Sample

A laboratory control sample (LCS) must be analyzed at the correct frequency (one LCS per 20 samples) to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. LCSs were prepared and analyzed as appropriate with the following exception.

LCSs were not reported for manganese or uranium. As a standard practice, ALS Laboratory Group does not prepare LCSs for samples that are field-filtered and acidified and then run directly on the instrument without any additional sample preparation. Per national environmental laboratory accreditation requirements, an MS may be used in place of an LCS provided the acceptance samples are “J”-qualified for LCS failure.

No manganese or uranium results were flagged for LCS failure because all the MS requirements were met.

Method and Calibration Blanks

MBs are analyzed to assess any contamination that may have occurred during sample preparation. Initial calibration blanks and continuing calibration blanks are analyzed to assess instrument contamination prior to and during sample analysis. Detected sample results associated with blanks results greater than the method detection limit (MDL) or instrument detection limit (IDL) (depending on method requirements) were “J”-qualified when the detections were less than five times the associated blank concentration. Nondetects were not qualified. All blanks passed these criteria with the following exception.

According to the case narratives, all MBs passed requirements, so no results were flagged for this reason.

Metals Serial Dilution

Serial dilution (SD) samples were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. Inductively coupled plasma (ICP)-mass

spectrometry SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the reporting limit (RL). ICP-atomic emission spectroscopy SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the RL. All evaluated SD data were acceptable with the following exceptions.

According to the case narratives, there was no SD for the uranium analysis in SDG 0910206, so all SDG 0910206 uranium results were “J”-flagged for reason SD1.

There was no SD for the selenium analysis in SDG 0910268; however, since the selenium samples were analyzed along with the remaining selenium samples in SDG 0910238 (that included an SD), no selenium results were flagged.

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 replicates, which measure only laboratory performance. Samples 0910206-1 (2000) and 0910238-7 (2001) were the duplicate samples taken from location AMM-1-53 (regular sample 0910206-3) and 0413 (regular sample 0910238-1) during the October 2009 site-wide sampling event. The duplicate results met the U.S. Environmental Protection Agency (EPA)-recommended laboratory duplicate criteria of less than 20 relative percent difference (RPD) for results that are greater than five times the RL.

Equipment Blanks

An EB is a sample of analyte-free media collected from a rinse of nondedicated sampling equipment used to sample surface water. EBs are collected to document adequate decontamination of nondedicated equipment. One EB should be prepared with each preparation batch.

Three ground water samples were collected using nondedicated equipment. As per procedure, an EB was collected and analyzed. All analytes were undetectable except uranium. However, the associated uranium results were all greater than five times the EB uranium concentration, so no uranium results were flagged.

Completeness

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

Electronic Data Deliverable File

The Electronic Data Deliverable (EDD) files arrived on October 31, 2009 (SDG 0910206), November 17, 2009 (SDG 0910238), and on November 13, 2009 (SDG 0910268). The contents of the EDD files were manually examined to verify that the sample results accurately reflected the data contained in the SDGs and that all and only the requested data were delivered.

2.3 Field Analyses/Activities

The following information summarizes the field analyses and activities for the October 2009 site-wide sampling event.

Field Activities

All monitor wells were purged and sampled using the low-flow sampling method; this method was not used at extraction wells. There was one EB collected since there were three samples collected using nondedicated collection equipment. Two duplicate samples were collected. There are no established regulatory criteria for the evaluation of field duplicate samples; therefore, EPA guidance for laboratory duplicates (which is conservative for field duplicates) was used to assess the precision of the field duplicates. All results met the criteria of ± 20 RPD and are considered acceptable.

2.4 Certification

Results were reported in correct units for all analytes requested. Appropriate contract-required laboratory qualifiers and target analyte lists were used. All MDLs and IDLs were met. All analytical quality-control criteria were met except as qualified on the Ground Water Quality Data by Parameter, Surface Water Quality by Parameter, or equipment/trip blank database printouts. The meaning of data qualifiers is defined on the database printouts or defined in the EPA *Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-Media Multi-Concentration*, Document Number ILMO2.0 (1991). All data in this package are considered validated and may be treated as final results.

3.0 Data Presentation

This section contains the Minimums and Maximums Report (Section 3.1), the Anomalous Data Review (Section 3.2), tables containing the Water Quality and Water Level Data (Sections 3.3 and 3.4, respectively), and the Blanks Report (Section 3.5).

3.1 Minimums and Maximums Report

The Minimums and Maximums Report (see Appendix B) is generated by the Sample Management System used to query the SEEPro database. The DataVal program compares the new data set with historical data and lists all new data that fall outside the historical data range. Values listed in the report are further screened, and the results are not considered anomalous if: (1) identified low concentrations are the result of low detection limits; (2) the concentration detected is within 50 percent of historical minimum or maximum values; or (3) there were fewer than five historical samples for comparison.

3.2 Anomalous Data Review

Any results that are considered anomalous based on the Minimums and Maximums Report are listed below.

Loc. No.	Analyte	Type of Anomaly	Disposition
SMI-PZ2D	Manganese	Low	Fewer than 10 samples collected from this location were analyzed for this analyte; still establishing range.

3.3 Water Quality Data

All water quality data are presented in Appendix C.

3.4 Water Level Data

All water level data are presented in Appendix D.

3.5 Blanks Report

Three samples were collected using nondedicated equipment, and as a result, an EB was collected. The results are presented in Appendix E. The uranium analyte was detected in the EB, but at a concentration much lower than the RL. Following validation procedure, all uranium results from the three samples were visually checked to see if the results were less than five times the concentration of uranium in the EB. These three uranium results exceeded the concentration of uranium in the EB, so no samples were qualified.

Appendix A.
Water Sampling Field Activities Verification

Appendix A. Water Sampling Field Activities Verification

Sampling Event/RIN	<u>October 2009 Site-Wide Event/RIN 0910038</u>	Date(s) of Water Sampling	<u>October 13 - 23, 2009</u>
Date(s) of Verification	<u>January 4, 2010</u>	Name of Verifier	<u>Rachel Cowan</u>
		Response (Yes, No, NA)	Comments
1.	Is the Sampling and Analysis Plan the primary document directing field procedures? List other documents, standard operating procedures, instructions.	Yes	
		NA	
2.	Were the sampling locations specified in the planning documents sampled?	No	Well ATP-1-S was not sampled.
3.	Was a pre-trip calibration conducted as specified in the aforementioned documents?	Yes	
4.	Was an operational check of the field equipment conducted twice daily? Did the operational checks meet criteria?	No	Operational check forms were missing for the morning of 10/23/09.
		Yes	
5.	Were the number and types (alkalinity, temperature, electrical conductivity, pH, turbidity, dissolved oxygen, oxidation reduction potential) of field measurements taken as specified?	No	While sampling wells SMI-MW01, 0440, ATP-3, and TP-01, the turbidimeter was not functioning properly, so no turbidity measurements could be taken.
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? 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 milliliters per minute? If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	Yes Yes Yes Yes	
		NA	
8.	Were the following conditions met when purging a Category II well: Was the flow rate less than 500 milliliters per minute? Was one pump/tubing volume removed prior to sampling?	Yes Yes	
9.	Were duplicates taken at a frequency of one per 20 samples?	Yes	There were 33 samples; two field duplicates were collected.

Appendix A. Water Sampling Field Activities Verification (continued)

Sampling Event/RIN	October 2009 Site-Wide Event/RIN 0910038	Date(s) of Water Sampling	October 13 - 23, 2009
Date(s) of Verification	January 4, 2010	Name of Verifier	Rachel Cowan
10. Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	Three samples were collected with nondedicated equipment; therefore, one EB was also collected.	
11. Were trip blanks prepared and included with each shipment of volatile organic compound samples?	NA		
12. Were quality-control samples assigned a fictitious site identification number?	Yes		
Was the true identity of the samples recorded on the quality assurance sample log?	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 COC records completed, and was sample custody maintained?	Yes		
17. Are field data sheets signed and dated by both team members?	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		

Appendix B.
Minimums and Maximums Report

Appendix B. Minimums and Maximums Report

Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: ALS Laboratory Group (Fort Collins, CO)

RIN: 0910038

Comparison: All Historical Data

Report Date: 1/4/2010

Site Code	Location Code	Sample Date	Analyte	Result	Current		Historical Maximum			Historical Minimum			Count	
					Qualifiers		Result	Qualifiers	Lab	Data	Result	Qualifiers	Lab	Data
MOA01	0413	10/21/2009	Selenium	0.17			0.3			0.177	FQ		6	0
MOA01	0413	10/21/2009	Uranium	1.1			1.73	LQ		1.2			6	0
MOA01	0435	10/20/2009	Ammonia Total as N	1.9			3.02	F		2	J		5	0
MOA01	0444	10/20/2009	Manganese	1.7			2.12	F		1.91	F		7	0
MOA01	0444	10/20/2009	Uranium	0.021			0.017	J		0.0017			10	0
MOA01	AMM-2	10/13/2009	Manganese	5			9.14			6.5	J		15	0
MOA01	SMI-PW03	10/19/2009	Total Dissolved Solids	5800			7640			5850			11	0
MOA01	SMI-PZ2D	10/14/2009	Ammonia Total as N	760			4220			1040			8	0
MOA01	SMI-PZ2D	10/14/2009	Manganese	3.4			12.5			7.62			7	0
MOA01	SMI-PZ3D2	10/19/2009	Total Dissolved Solids	17000			19700	F		17500	F		5	0
MOA01	SMI-PZ3D2	10/19/2009	Uranium	1.7			4.68			1.72			9	0
MOA01	SMI-PZ3M	10/19/2009	Ammonia Total as N	74			67			38			7	0
MOA01	SMI-PZ3S	10/19/2009	Ammonia Total as N	3			11.491	F		3.8			9	0
MOA01	TP-01	10/23/2009	Manganese	0.49			2	F		0.7	J		12	1
MOA01	TP-01	10/23/2009	Total Dissolved Solids	5300			14800	F		6300			10	0
MOA01	TP-01	10/23/2009	Uranium	0.1			0.41			0.12	J		15	0
MOA01	TP-07	10/13/2009	Manganese	3.7			5.02			4.28			12	0

Appendix B. Minimums and Maximums Report (continued)

Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: ALS Laboratory Group (Fort Collins, CO)

RIN: 0910038

Comparison: All Historical Data

Report Date: 1/4/2010

Site Code	Location Code	Sample Date	Analyte	Current		Historical Maximum		Historical Minimum		Count	
				Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	N	N Below Detect
MOA01	TP-08	10/13/2009	Manganese	0.17		4.61		0.23	J	12	1
MOA01	TP-09	10/13/2009	Manganese	4.9		7.27		5	J	10	0
MOA01	TP-20	10/14/2009	Ammonia Total as N	2.9		9.2		3.3		5	0

Analyte concentrations presented in blue text represent the historical value exceeded by the concentration presented in red, which is associated with this current sampling event.

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

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A Tentatively identified compound is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and the contract-required detection limit. Organic: Analyte also found in MB.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference; see case narrative.
- 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.
- P > 25% difference in detected pesticide or Aroclor concentrations between two columns.
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier; see case narrative.

DATA QUALIFIERS:

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

Appendix C.
Water Quality Data

Appendix C. Water Quality Data

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
				Date	ID					Lab	Data	QA		
Ammonia Total as N	mg/L	0410	WL	10/21/2009	0001	23.5	-	23.5	0.1	UN		#	0.1	
Ammonia Total as N	mg/L	0413	WL	10/21/2009	0001	10.5	-	10.5	12			#	0.5	
Ammonia Total as N	mg/L	0413	WL	10/21/2009	0002	10.5	-	10.5	12			#	0.5	
Ammonia Total as N	mg/L	0430	WL	10/22/2009	0001	101	-	101	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0431	WL	10/21/2009	0001	91	-	91	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0432	WL	10/22/2009	0001	55	-	55	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0433	WL	10/20/2009	0001	99	-	99	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0434	WL	10/22/2009	0001	35	-	35	0.12			#	0.1	
Ammonia Total as N	mg/L	0435	WL	10/20/2009	0001	173	-	173	1.9			#	0.1	
Ammonia Total as N	mg/L	0436	WL	10/19/2009	0001	116	-	116	3.4			#	0.1	
Ammonia Total as N	mg/L	0440	WL	10/23/2009	0001	117	-	117	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0443	WL	10/21/2009	0001	73	-	73	0.1	U	J	#	0.1	
Ammonia Total as N	mg/L	0444	WL	10/20/2009	0001	116	-	116	1.8			#	0.1	
Ammonia Total as N	mg/L	0455	WL	10/22/2009	0001	46	-	46	0.1	U	J	#	0.1	
Ammonia Total as N	mg/L	0456	WL	10/22/2009	0001	53	-	53	0.1	U	J	#	0.1	
Ammonia Total as N	mg/L	0457	WL	10/20/2009	0001	29	-	29	0.1	U		#	0.1	
Ammonia Total as N	mg/L	AMM-1	WL	10/14/2009	0001	19	-	19	0.1	U		#	0.1	
Ammonia Total as N	mg/L	AMM-1	WL	10/14/2009	0001	53	-	53	0.1	U		#	0.1	
Ammonia Total as N	mg/L	AMM-1	WL	10/14/2009	0002	0	-	0	0.1	U		#	0.1	
Ammonia Total as N	mg/L	AMM-2	WL	10/13/2009	0001	48	-	48	500			#	20	
Ammonia Total as N	mg/L	AMM-3	WL	10/13/2009	0001	48	-	48	230			#	20	
Ammonia Total as N	mg/L	ATP-3	WL	10/22/2009	0001	51	-	51	0.1	U		#	0.1	
Ammonia Total as N	mg/L	SMI-MW01	WL	10/23/2009	0001	16	-	16	1.8			#	0.1	
Ammonia Total as N	mg/L	SMI-PW03	WL	10/19/2009	0001	60	-	60	43			#	2	
Ammonia Total as N	mg/L	SMI-PZ2D	WL	10/14/2009	0001	75	-	75	760			#	20	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Ammonia Total as N	mg/L	SMI-PZ2M2	WL	10/14/2009	0001	56	-	56	1200		#	50	
Ammonia Total as N	mg/L	SMI-PZ3D2	WL	10/19/2009	0001	78	-	78	450		#	20	
Ammonia Total as N	mg/L	SMI-PZ3M	WL	10/19/2009	0001	59	-	59	74		#	10	
Ammonia Total as N	mg/L	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	3		#	0.1	
Ammonia Total as N	mg/L	TP-01	WL	10/23/2009	0001	22	-	22	0.1	U	#	0.1	
Ammonia Total as N	mg/L	TP-07	WL	10/13/2009	0001	29	-	29	140		#	20	
Ammonia Total as N	mg/L	TP-08	WL	10/13/2009	0001	29	-	29	330		#	20	
Ammonia Total as N	mg/L	TP-09	WL	10/13/2009	0001	28	-	28	440		#	20	
Ammonia Total as N	mg/L	TP-11	WL	10/14/2009	0001	30	-	30	0.65		#	0.1	
Ammonia Total as N	mg/L	TP-20	WL	10/14/2009	0001	32	-	32	2.9		#	0.1	
Dissolved Oxygen	mg/L	0410	WL	10/21/2009	0001	23.5	-	23.5	12.24		#		
Dissolved Oxygen	mg/L	0413	WL	10/21/2009	0001	10.5	-	10.5	0.18		#		
Dissolved Oxygen	mg/L	0430	WL	10/22/2009	0001	101	-	101	1.92		#		
Dissolved Oxygen	mg/L	0431	WL	10/21/2009	0001	91	-	91	2.18		#		
Dissolved Oxygen	mg/L	0432	WL	10/22/2009	0001	55	-	55	4.84		#		
Dissolved Oxygen	mg/L	0433	WL	10/20/2009	0001	99	-	99	2.27		#		
Dissolved Oxygen	mg/L	0434	WL	10/22/2009	0001	35	-	35	0.38		#		
Dissolved Oxygen	mg/L	0435	WL	10/20/2009	0001	173	-	173	-0.02		#		
Dissolved Oxygen	mg/L	0436	WL	10/19/2009	0001	116	-	116	-0.11		#		
Dissolved Oxygen	mg/L	0440	WL	10/23/2009	0001	117	-	117	1.75		#		
Dissolved Oxygen	mg/L	0443	WL	10/21/2009	0001	73	-	73	2.58		#		
Dissolved Oxygen	mg/L	0455	WL	10/22/2009	0001	46	-	46	0.4		#		
Dissolved Oxygen	mg/L	0456	WL	10/22/2009	0001	53	-	53	2.32		#		
Dissolved Oxygen	mg/L	0457	WL	10/20/2009	0001	29	-	29	0.58		#		
Dissolved Oxygen	mg/L	AMM-1	WL	10/14/2009	0001	53	-	53	1.22		#		
Dissolved Oxygen	mg/L	AMM-1	WL	10/14/2009	0001	19	-	19	1.86		#		
Dissolved Oxygen	mg/L	AMM-2	WL	10/13/2009	0001	48	-	48	0.8		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	Lab	Data		QA			
Dissolved Oxygen	mg/L	AMM-3	WL	10/13/2009	0001	48	- 48	0.24		#		
Dissolved Oxygen	mg/L	ATP-3	WL	10/22/2009	0001	51	- 51	10.25		#		
Dissolved Oxygen	mg/L	SMI-MW01	WL	10/23/2009	0001	16	- 16	1.8		#		
Dissolved Oxygen	mg/L	SMI-PW03	WL	10/19/2009	0001	60	- 60	0.14		#		
Dissolved Oxygen	mg/L	SMI-PZ2D	WL	10/14/2009	0001	75	- 75	-0.03		#		
Dissolved Oxygen	mg/L	SMI-PZ2M2	WL	10/14/2009	0001	56	- 56	-0.33		#		
Dissolved Oxygen	mg/L	SMI-PZ3D2	WL	10/19/2009	0001	78	- 78	0		#		
Dissolved Oxygen	mg/L	SMI-PZ3M	WL	10/19/2009	0001	59	- 59	0.72		#		
Dissolved Oxygen	mg/L	SMI-PZ3S	WL	10/19/2009	0001	25	- 25	0.11		#		
Dissolved Oxygen	mg/L	TP-01	WL	10/23/2009	0001	22	- 22	1.15		#		
Dissolved Oxygen	mg/L	TP-07	WL	10/13/2009	0001	29	- 29	0.69		#		
Dissolved Oxygen	mg/L	TP-08	WL	10/13/2009	0001	29	- 29	0.87		#		
Dissolved Oxygen	mg/L	TP-09	WL	10/13/2009	0001	28	- 28	-0.89		#		
Dissolved Oxygen	mg/L	TP-11	WL	10/14/2009	0001	30	- 30	-0.14		#		
Dissolved Oxygen	mg/L	TP-20	WL	10/14/2009	0001	32	- 32	-0.08		#		
Manganese	mg/L	0410	WL	10/21/2009	0001	23.5	- 23.5	0.12		#	0.0002	
Manganese	mg/L	0413	WL	10/21/2009	0001	10.5	- 10.5	0.13		#	0.0002	
Manganese	mg/L	0413	WL	10/21/2009	0002	10.5	- 10.5	0.13		#	0.0002	
Manganese	mg/L	0430	WL	10/22/2009	0001	101	- 101	0.13		#	0.001	
Manganese	mg/L	0431	WL	10/21/2009	0001	91	- 91	0.62		#	0.005	
Manganese	mg/L	0432	WL	10/22/2009	0001	55	- 55	0.0002	U	#	0.0002	
Manganese	mg/L	0433	WL	10/20/2009	0001	99	- 99	0.0037	B	#	0.001	
Manganese	mg/L	0434	WL	10/22/2009	0001	35	- 35	0.83		#	0.005	
Manganese	mg/L	0435	WL	10/20/2009	0001	173	- 173	1.2		#	0.01	
Manganese	mg/L	0436	WL	10/19/2009	0001	116	- 116	3.9		#	0.01	
Manganese	mg/L	0440	WL	10/23/2009	0001	117	- 117	0.064		#	0.001	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range		Result	Qualifiers			Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab		Data	QA			
Manganese	mg/L	0443	WL	10/21/2009	0001	73	- 73	0.001	U	#	0.001		
Manganese	mg/L	0444	WL	10/20/2009	0001	116	- 116	1.7		#	0.01		
Manganese	mg/L	0455	WL	10/22/2009	0001	46	- 46	0.065		#	0.0002		
Manganese	mg/L	0456	WL	10/22/2009	0001	53	- 53	0.001	U	#	0.001		
Manganese	mg/L	0457	WL	10/20/2009	0001	29	- 29	0.51		#	0.001		
Manganese	mg/L	AMM-1	WL	10/14/2009	0001	19	- 19	0.0001	U	#	0.0001		
Manganese	mg/L	AMM-1	WL	10/14/2009	0001	53	- 53	0.0001	U	#	0.0001		
Manganese	mg/L	AMM-1	WL	10/14/2009	0002	0	- 0	0.0001	U	#	0.0001		
Manganese	mg/L	AMM-2	WL	10/13/2009	0001	48	- 48	5		#	0.0001		
Manganese	mg/L	AMM-3	WL	10/13/2009	0001	48	- 48	3		#	0.0001		
Manganese	mg/L	ATP-3	WL	10/22/2009	0001	51	- 51	0.5		#	0.0002		
Manganese	mg/L	SMI-MW01	WL	10/23/2009	0001	16	- 16	0.66		#	0.001		
Manganese	mg/L	SMI-PW03	WL	10/19/2009	0001	60	- 60	1		#	0.001		
Manganese	mg/L	SMI-PZ2D	WL	10/14/2009	0001	75	- 75	3.4		#	0.0001		
Manganese	mg/L	SMI-PZ2M2	WL	10/14/2009	0001	56	- 56	5		#	0.0001		
Manganese	mg/L	SMI-PZ3D2	WL	10/19/2009	0001	78	- 78	3.3		#	0.002		
Manganese	mg/L	SMI-PZ3M	WL	10/19/2009	0001	59	- 59	1.7		#	0.001		
Manganese	mg/L	SMI-PZ3S	WL	10/19/2009	0001	25	- 25	0.026		#	0.001		
Manganese	mg/L	TP-01	WL	10/23/2009	0001	22	- 22	0.49		#	0.001		
Manganese	mg/L	TP-07	WL	10/13/2009	0001	29	- 29	3.7		#	0.0001		
Manganese	mg/L	TP-08	WL	10/13/2009	0001	29	- 29	0.17		#	0.0001		
Manganese	mg/L	TP-09	WL	10/13/2009	0001	28	- 28	4.9		#	0.0001		
Manganese	mg/L	TP-11	WL	10/14/2009	0001	30	- 30	3		#	0.0001		
Manganese	mg/L	TP-20	WL	10/14/2009	0001	32	- 32	0.11		#	0.0001		
Oxidation Reduction Potential	mV	0410	WL	10/21/2009	0001	23.5	- 23.5	-25.3		#			
Oxidation Reduction Potential	mV	0413	WL	10/21/2009	0001	10.5	- 10.5	-95.8		#			

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Oxidation Reduction Potential	mV	0430	WL	10/22/2009	0001	101	-	101	-23		#		
Oxidation Reduction Potential	mV	0431	WL	10/21/2009	0001	91	-	91	43		#		
Oxidation Reduction Potential	mV	0432	WL	10/22/2009	0001	55	-	55	21		#		
Oxidation Reduction Potential	mV	0433	WL	10/20/2009	0001	99	-	99	50.9		#		
Oxidation Reduction Potential	mV	0434	WL	10/22/2009	0001	35	-	35	-71		#		
Oxidation Reduction Potential	mV	0435	WL	10/20/2009	0001	173	-	173	-170.9		#		
Oxidation Reduction Potential	mV	0436	WL	10/19/2009	0001	116	-	116	-199.6		#		
Oxidation Reduction Potential	mV	0440	WL	10/23/2009	0001	117	-	117	34.4		#		
Oxidation Reduction Potential	mV	0443	WL	10/21/2009	0001	73	-	73	-7		#		
Oxidation Reduction Potential	mV	0455	WL	10/22/2009	0001	46	-	46	9		#		
Oxidation Reduction Potential	mV	0456	WL	10/22/2009	0001	53	-	53	7.2		#		
Oxidation Reduction Potential	mV	0457	WL	10/20/2009	0001	29	-	29	-67.4		#		
Oxidation Reduction Potential	mV	AMM-1	WL	10/14/2009	0001	53	-	53	-0.9		#		
Oxidation Reduction Potential	mV	AMM-1	WL	10/14/2009	0001	19	-	19	22.9		#		
Oxidation Reduction Potential	mV	AMM-2	WL	10/13/2009	0001	48	-	48	71.4		#		
Oxidation Reduction Potential	mV	AMM-3	WL	10/13/2009	0001	48	-	48	96.2		#		
Oxidation Reduction Potential	mV	ATP-3	WL	10/22/2009	0001	51	-	51	-77		#		
Oxidation Reduction Potential	mV	SMI-MW01	WL	10/23/2009	0001	16	-	16	-7.6		#		
Oxidation Reduction Potential	mV	SMI-PW03	WL	10/19/2009	0001	60	-	60	-35.1		#		
Oxidation Reduction Potential	mV	SMI-PZ2D	WL	10/14/2009	0001	75	-	75	73		#		
Oxidation Reduction Potential	mV	SMI-PZ2M2	WL	10/14/2009	0001	56	-	56	171.8		#		
Oxidation Reduction Potential	mV	SMI-PZ3D2	WL	10/19/2009	0001	78	-	78	122.1		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
				Date	ID					Lab	Data	QA		
Oxidation Reduction Potential	mV	SMI-PZ3M	WL	10/19/2009	0001	59	-	59	-35.5			#		
Oxidation Reduction Potential	mV	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	-51.6			#		
Oxidation Reduction Potential	mV	TP-01	WL	10/23/2009	0001	22	-	22	-156.4			#		
Oxidation Reduction Potential	mV	TP-07	WL	10/13/2009	0001	29	-	29	101.1			#		
Oxidation Reduction Potential	mV	TP-08	WL	10/13/2009	0001	29	-	29	-22.8			#		
Oxidation Reduction Potential	mV	TP-09	WL	10/13/2009	0001	28	-	28	6.22			#		
Oxidation Reduction Potential	mV	TP-11	WL	10/14/2009	0001	30	-	30	112.1			#		
Oxidation Reduction Potential	mV	TP-20	WL	10/14/2009	0001	32	-	32	-188			#		
pH	s.u.	0410	WL	10/21/2009	0001	23.5	-	23.5	8.22			#		
pH	s.u.	0413	WL	10/21/2009	0001	10.5	-	10.5	7.81			#		
pH	s.u.	0430	WL	10/22/2009	0001	101	-	101	7.3			v0		
pH	s.u.	0431	WL	10/21/2009	0001	91	-	91	7.14			#		
pH	s.u.	0432	WL	10/22/2009	0001	55	-	55	7.59			#		
pH	s.u.	0433	WL	10/20/2009	0001	99	-	99	7.64			#		
pH	s.u.	0434	WL	10/22/2009	0001	35	-	35	7.17			#		
pH	s.u.	0435	WL	10/20/2009	0001	173	-	173	7.26			#		
pH	s.u.	0436	WL	10/19/2009	0001	116	-	116	7.06			#		
pH	s.u.	0440	WL	10/23/2009	0001	117	-	117	7.25			#		
pH	s.u.	0443	WL	10/21/2009	0001	73	-	73	7.35			#		
pH	s.u.	0455	WL	10/22/2009	0001	46	-	46	7.7			#		
pH	s.u.	0456	WL	10/22/2009	0001	53	-	53	7.6			#		
pH	s.u.	0457	WL	10/20/2009	0001	29	-	29	7.81			#		
pH	s.u.	AMM-1	WL	10/14/2009	0001	19	-	19	7.65			#		
pH	s.u.	AMM-1	WL	10/14/2009	0001	53	-	53	7.65			#		
pH	s.u.	AMM-2	WL	10/13/2009	0001	48	-	48	6.79			#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
pH	s.u.	AMM-3	WL	10/13/2009	0001	48	-	48	6.94		#		
pH	s.u.	ATP-3	WL	10/22/2009	0001	51	-	51	7.6		#		
pH	s.u.	SMI-MW01	WL	10/23/2009	0001	16	-	16	7.45		#		
pH	s.u.	SMI-PW03	WL	10/19/2009	0001	60	-	60	7.27		#		
pH	s.u.	SMI-PZ2D	WL	10/14/2009	0001	75	-	75	6.93		#		
pH	s.u.	SMI-PZ2M2	WL	10/14/2009	0001	56	-	56	6.92		#		
pH	s.u.	SMI-PZ3D2	WL	10/19/2009	0001	78	-	78	6.77		#		
pH	s.u.	SMI-PZ3M	WL	10/19/2009	0001	59	-	59	7.16		#		
pH	s.u.	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	7.8		#		
pH	s.u.	TP-01	WL	10/23/2009	0001	22	-	22	7.56		#		
pH	s.u.	TP-07	WL	10/13/2009	0001	29	-	29	6.94		#		
pH	s.u.	TP-08	WL	10/13/2009	0001	29	-	29	7.03		#		
pH	s.u.	TP-09	WL	10/13/2009	0001	28	-	28	6.76		#		
pH	s.u.	TP-11	WL	10/14/2009	0001	30	-	30	7.33		#		
pH	s.u.	TP-20	WL	10/14/2009	0001	32	-	32	7.24		#		
Selenium	mg/L	0413	WL	10/21/2009	0001	10.5	-	10.5	0.17		#	0.00079	
Selenium	mg/L	0413	WL	10/21/2009	0002	10.5	-	10.5	0.17		#	0.00079	
Selenium	mg/L	0440	WL	10/23/2009	0001	117	-	117	0.044	J	#	0.00016	
Selenium	mg/L	0456	WL	10/22/2009	0001	53	-	53	0.023	J	#	0.00016	
Selenium	mg/L	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	0.041		#	0.00016	
Specific Conductance	µmhos/cm	0410	WL	10/21/2009	0001	23.5	-	23.5	3196		#		
Specific Conductance	µmhos/cm	0413	WL	10/21/2009	0001	10.5	-	10.5	3734		#		
Specific Conductance	µmhos/cm	0430	WL	10/22/2009	0001	101	-	101	7377		#		
Specific Conductance	µmhos/cm	0431	WL	10/21/2009	0001	91	-	91	39560		#		
Specific Conductance	µmhos/cm	0432	WL	10/22/2009	0001	55	-	55	3497		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Specific Conductance	µmhos/cm	0433	WL	10/20/2009	0001	99	-	99	5059		#		
Specific Conductance	µmhos/cm	0434	WL	10/22/2009	0001	35	-	35	50492		#		
Specific Conductance	µmhos/cm	0435	WL	10/20/2009	0001	173	-	173	124502		#		
Specific Conductance	µmhos/cm	0436	WL	10/19/2009	0001	116	-	116	131900		#		
Specific Conductance	µmhos/cm	0440	WL	10/23/2009	0001	117	-	117	9244		#		
Specific Conductance	µmhos/cm	0443	WL	10/21/2009	0001	73	-	73	6560		#		
Specific Conductance	µmhos/cm	0455	WL	10/22/2009	0001	46	-	46	2843		#		
Specific Conductance	µmhos/cm	0456	WL	10/22/2009	0001	53	-	53	9334		#		
Specific Conductance	µmhos/cm	0457	WL	10/20/2009	0001	29	-	29	5343		#		
Specific Conductance	µmhos/cm	AMM-1	WL	10/14/2009	0001	19	-	19	13284		#		
Specific Conductance	µmhos/cm	AMM-1	WL	10/14/2009	0001	53	-	53	13471		#		
Specific Conductance	µmhos/cm	AMM-2	WL	10/13/2009	0001	48	-	48	18327		#		
Specific Conductance	µmhos/cm	AMM-3	WL	10/13/2009	0001	48	-	48	17966		#		
Specific Conductance	µmhos/cm	ATP-3	WL	10/22/2009	0001	51	-	51	2670		#		
Specific Conductance	µmhos/cm	SMI-MW01	WL	10/23/2009	0001	16	-	16	5213		#		
Specific Conductance	µmhos/cm	SMI-PW03	WL	10/19/2009	0001	60	-	60	8922		#		
Specific Conductance	µmhos/cm	SMI-PZ2D	WL	10/14/2009	0001	75	-	75	134347		#		
Specific Conductance	µmhos/cm	SMI-PZ2M2	WL	10/14/2009	0001	56	-	56	111711		#		
Specific Conductance	µmhos/cm	SMI-PZ3D2	WL	10/19/2009	0001	78	-	78	21981		#		
Specific Conductance	µmhos/cm	SMI-PZ3M	WL	10/19/2009	0001	59	-	59	10375		#		
Specific Conductance	µmhos/cm	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	5129		#		
Specific Conductance	µmhos/cm	TP-01	WL	10/23/2009	0001	22	-	22	9043		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
				Date	ID					Lab	Data	QA		
Specific Conductance	µmhos/cm	TP-07	WL	10/13/2009	0001	29	-	29	17232			#		
Specific Conductance	µmhos/cm	TP-08	WL	10/13/2009	0001	29	-	29	18577			#		
Specific Conductance	µmhos/cm	TP-09	WL	10/13/2009	0001	28	-	28	15637			#		
Specific Conductance	µmhos/cm	TP-11	WL	10/14/2009	0001	30	-	30	27348			#		
Specific Conductance	µmhos/cm	TP-20	WL	10/14/2009	0001	32	-	32	149928			#		
Temperature	C	0410	WL	10/21/2009	0001	23.5	-	23.5	4.97			#		
Temperature	C	0413	WL	10/21/2009	0001	10.5	-	10.5	19.8			#		
Temperature	C	0430	WL	10/22/2009	0001	101	-	101	17.26			#		
Temperature	C	0431	WL	10/21/2009	0001	91	-	91	18.42			#		
Temperature	C	0432	WL	10/22/2009	0001	55	-	55	18.82			#		
Temperature	C	0433	WL	10/20/2009	0001	99	-	99	18.54			#		
Temperature	C	0434	WL	10/22/2009	0001	35	-	35	17.64			#		
Temperature	C	0435	WL	10/20/2009	0001	173	-	173	16.52			#		
Temperature	C	0436	WL	10/19/2009	0001	116	-	116	21.5			#		
Temperature	C	0440	WL	10/23/2009	0001	117	-	117	17.17			#		
Temperature	C	0443	WL	10/21/2009	0001	73	-	73	17.73			#		
Temperature	C	0455	WL	10/22/2009	0001	46	-	46	18.89			#		
Temperature	C	0456	WL	10/22/2009	0001	53	-	53	18.75			#		
Temperature	C	0457	WL	10/20/2009	0001	29	-	29	16.45			#		
Temperature	C	AMM-1	WL	10/14/2009	0001	53	-	53	17.99			#		
Temperature	C	AMM-1	WL	10/14/2009	0001	19	-	19	19.03			#		
Temperature	C	AMM-2	WL	10/13/2009	0001	48	-	48	16.05			#		
Temperature	C	AMM-3	WL	10/13/2009	0001	48	-	48	19.67			#		
Temperature	C	ATP-3	WL	10/22/2009	0001	51	-	51	18.06			#		
Temperature	C	SMI-MW01	WL	10/23/2009	0001	16	-	16	18.03			#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	Lab	Data QA					
Temperature	C	SMI-PW03	WL	10/19/2009	0001	60	- 60	19.56		#		
Temperature	C	SMI-PZ2D	WL	10/14/2009	0001	75	- 75	16.48		#		
Temperature	C	SMI-PZ2M2	WL	10/14/2009	0001	56	- 56	16.23		#		
Temperature	C	SMI-PZ3D2	WL	10/19/2009	0001	78	- 78	19.8		#		
Temperature	C	SMI-PZ3M	WL	10/19/2009	0001	59	- 59	18.79		#		
Temperature	C	SMI-PZ3S	WL	10/19/2009	0001	25	- 25	19.95		#		
Temperature	C	TP-01	WL	10/23/2009	0001	22	- 22	17		#		
Temperature	C	TP-07	WL	10/13/2009	0001	29	- 29	17.42		#		
Temperature	C	TP-08	WL	10/13/2009	0001	29	- 29	16.36		#		
Temperature	C	TP-09	WL	10/13/2009	0001	28	- 28	16.55		#		
Temperature	C	TP-11	WL	10/14/2009	0001	30	- 30	17.23		#		
Temperature	C	TP-20	WL	10/14/2009	0001	32	- 32	18.17		#		
Total Dissolved Solids	mg/L	0410	WL	10/21/2009	0001	23.5	- 23.5	1700		#	40	
Total Dissolved Solids	mg/L	0413	WL	10/21/2009	0001	10.5	- 10.5	2300		#	80	
Total Dissolved Solids	mg/L	0413	WL	10/21/2009	0002	10.5	- 10.5	2300		#	80	
Total Dissolved Solids	mg/L	0430	WL	10/22/2009	0001	101	- 101	4100		#	200	
Total Dissolved Solids	mg/L	0431	WL	10/21/2009	0001	91	- 91	23000		#	400	
Total Dissolved Solids	mg/L	0432	WL	10/22/2009	0001	55	- 55	1800		#	40	
Total Dissolved Solids	mg/L	0433	WL	10/20/2009	0001	99	- 99	2800		#	80	
Total Dissolved Solids	mg/L	0434	WL	10/22/2009	0001	35	- 35	30000		#	1000	
Total Dissolved Solids	mg/L	0435	WL	10/20/2009	0001	173	- 173	95000		#	2000	
Total Dissolved Solids	mg/L	0436	WL	10/19/2009	0001	116	- 116	100000		#	2000	
Total Dissolved Solids	mg/L	0440	WL	10/23/2009	0001	117	- 117	6300		#	200	
Total Dissolved Solids	mg/L	0443	WL	10/21/2009	0001	73	- 73	3700		#	200	
Total Dissolved Solids	mg/L	0444	WL	10/20/2009	0001	116	- 116	91000		#	2000	
Total Dissolved Solids	mg/L	0455	WL	10/22/2009	0001	46	- 46	900		#	40	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Total Dissolved Solids	mg/L	0456	WL	10/22/2009	0001	53	-	53	5300		#	200	
Total Dissolved Solids	mg/L	0457	WL	10/20/2009	0001	29	-	29	3100		#	80	
Total Dissolved Solids	mg/L	AMM-1	WL	10/14/2009	0001	19	-	19	7000	J	#	200	
Total Dissolved Solids	mg/L	AMM-1	WL	10/14/2009	0001	53	-	53	7000	J	#	200	
Total Dissolved Solids	mg/L	AMM-1	WL	10/14/2009	0002	0	-	0	7100	J	#	200	
Total Dissolved Solids	mg/L	AMM-2	WL	10/13/2009	0001	48	-	48	15000	J	#	400	
Total Dissolved Solids	mg/L	AMM-3	WL	10/13/2009	0001	48	-	48	17000	J	#	400	
Total Dissolved Solids	mg/L	ATP-3	WL	10/22/2009	0001	51	-	51	1400		#	40	
Total Dissolved Solids	mg/L	SMI-MW01	WL	10/23/2009	0001	16	-	16	3300		#	80	
Total Dissolved Solids	mg/L	SMI-PW03	WL	10/19/2009	0001	60	-	60	5800		#	200	
Total Dissolved Solids	mg/L	SMI-PZ2D	WL	10/14/2009	0001	75	-	75	90000	J	#	2000	
Total Dissolved Solids	mg/L	SMI-PZ2M2	WL	10/14/2009	0001	56	-	56	72000	J	#	2000	
Total Dissolved Solids	mg/L	SMI-PZ3D2	WL	10/19/2009	0001	78	-	78	17000		#	400	
Total Dissolved Solids	mg/L	SMI-PZ3M	WL	10/19/2009	0001	59	-	59	7100		#	200	
Total Dissolved Solids	mg/L	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	3300		#	80	
Total Dissolved Solids	mg/L	TP-01	WL	10/23/2009	0001	22	-	22	5300		#	200	
Total Dissolved Solids	mg/L	TP-07	WL	10/13/2009	0001	29	-	29	16000	J	#	400	
Total Dissolved Solids	mg/L	TP-08	WL	10/13/2009	0001	29	-	29	16000	J	#	400	
Total Dissolved Solids	mg/L	TP-09	WL	10/13/2009	0001	28	-	28	13000	J	#	400	
Total Dissolved Solids	mg/L	TP-11	WL	10/14/2009	0001	30	-	30	16000	J	#	400	
Total Dissolved Solids	mg/L	TP-20	WL	10/14/2009	0001	32	-	32	51000	J	#	1000	
Turbidity	NTU	0410	WL	10/21/2009	0001	23.5	-	23.5	8.62		#		
Turbidity	NTU	0413	WL	10/21/2009	0001	10.5	-	10.5	98		#		
Turbidity	NTU	0430	WL	10/22/2009	0001	101	-	101	4.94		#		
Turbidity	NTU	0431	WL	10/21/2009	0001	91	-	91	27.3		#		
Turbidity	NTU	0432	WL	10/22/2009	0001	55	-	55	9.32		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Turbidity	NTU	0433	WL	10/20/2009	0001	99	-	99	8.93		#		
Turbidity	NTU	0434	WL	10/22/2009	0001	35	-	35	4.34		#		
Turbidity	NTU	0435	WL	10/20/2009	0001	173	-	173	3.04		#		
Turbidity	NTU	0436	WL	10/19/2009	0001	116	-	116	6.07		#		
Turbidity	NTU	0443	WL	10/21/2009	0001	73	-	73	3.6		#		
Turbidity	NTU	0457	WL	10/20/2009	0001	29	-	29	3.71		#		
Turbidity	NTU	AMM-1	WL	10/14/2009	0001	19	-	19	2.52		#		
Turbidity	NTU	AMM-1	WL	10/14/2009	0001	53	-	53	4.4		#		
Turbidity	NTU	AMM-2	WL	10/13/2009	0001	48	-	48	1.71		#		
Turbidity	NTU	AMM-3	WL	10/13/2009	0001	48	-	48	9.55		#		
Turbidity	NTU	SMI-PW03	WL	10/19/2009	0001	60	-	60	188		#		
Turbidity	NTU	SMI-PZ2D	WL	10/14/2009	0001	75	-	75	5.13		#		
Turbidity	NTU	SMI-PZ2M2	WL	10/14/2009	0001	56	-	56	5.67		#		
Turbidity	NTU	SMI-PZ3D2	WL	10/19/2009	0001	78	-	78	5.21		#		
Turbidity	NTU	SMI-PZ3M	WL	10/19/2009	0001	59	-	59	4.1		#		
Turbidity	NTU	SMI-PZ3S	WL	10/19/2009	0001	25	-	25	9.81		#		
Turbidity	NTU	TP-07	WL	10/13/2009	0001	29	-	29	7.33		#		
Turbidity	NTU	TP-08	WL	10/13/2009	0001	29	-	29	19.2		#		
Turbidity	NTU	TP-09	WL	10/13/2009	0001	28	-	28	8.75		#		
Turbidity	NTU	TP-11	WL	10/14/2009	0001	30	-	30	9.83		#		
Turbidity	NTU	TP-20	WL	10/14/2009	0001	32	-	32	7.25		#		
Uranium	mg/L	0410	WL	10/21/2009	0001	23.5	-	23.5	0.64		#	3.5E-005	
Uranium	mg/L	0413	WL	10/21/2009	0001	10.5	-	10.5	1.1		#	8.7E-005	
Uranium	mg/L	0413	WL	10/21/2009	0002	10.5	-	10.5	1.1		#	8.7E-005	
Uranium	mg/L	0430	WL	10/22/2009	0001	101	-	101	0.011		#	1.7E-006	
Uranium	mg/L	0431	WL	10/21/2009	0001	91	-	91	0.011		#	1.7E-006	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	Lab	Data		QA			
Uranium	mg/L	0432	WL	10/22/2009	0001	55	- 55	0.0018		#	1.7E-006	
Uranium	mg/L	0433	WL	10/20/2009	0001	99	- 99	0.002		#	1.7E-006	
Uranium	mg/L	0434	WL	10/22/2009	0001	35	- 35	0.023		#	1.7E-006	
Uranium	mg/L	0435	WL	10/20/2009	0001	173	- 173	0.025		#	8.7E-006	
Uranium	mg/L	0436	WL	10/19/2009	0001	116	- 116	0.011		#	8.7E-006	
Uranium	mg/L	0440	WL	10/23/2009	0001	117	- 117	0.033		#	1.7E-006	
Uranium	mg/L	0443	WL	10/21/2009	0001	73	- 73	0.012		#	1.7E-006	
Uranium	mg/L	0444	WL	10/20/2009	0001	116	- 116	0.021		#	1.7E-006	
Uranium	mg/L	0455	WL	10/22/2009	0001	46	- 46	0.0026		#	1.7E-006	
Uranium	mg/L	0456	WL	10/22/2009	0001	53	- 53	0.024		#	1.7E-006	
Uranium	mg/L	0457	WL	10/20/2009	0001	29	- 29	0.0022		#	1.7E-006	
Uranium	mg/L	AMM-1	WL	10/14/2009	0001	53	- 53	0.0056		J	#	1.7E-006
Uranium	mg/L	AMM-1	WL	10/14/2009	0001	19	- 19	0.0062		J	#	1.7E-006
Uranium	mg/L	AMM-1	WL	10/14/2009	0002	0	- 0	0.0059	E	J	#	1.7E-006
Uranium	mg/L	AMM-2	WL	10/13/2009	0001	48	- 48	2.2		J	#	8.7E-005
Uranium	mg/L	AMM-3	WL	10/13/2009	0001	48	- 48	1.8		J	#	8.7E-005
Uranium	mg/L	ATP-3	WL	10/22/2009	0001	51	- 51	0.0027		#	1.7E-006	
Uranium	mg/L	SMI-MW01	WL	10/23/2009	0001	16	- 16	4.9		#	0.00017	
Uranium	mg/L	SMI-PW03	WL	10/19/2009	0001	60	- 60	1.4		#	8.7E-005	
Uranium	mg/L	SMI-PZ2D	WL	10/14/2009	0001	75	- 75	0.63		J	#	3.5E-005
Uranium	mg/L	SMI-PZ2M2	WL	10/14/2009	0001	56	- 56	1.2		J	#	3.5E-005
Uranium	mg/L	SMI-PZ3D2	WL	10/19/2009	0001	78	- 78	1.7		#	8.7E-005	
Uranium	mg/L	SMI-PZ3M	WL	10/19/2009	0001	59	- 59	1.7		#	0.00017	
Uranium	mg/L	SMI-PZ3S	WL	10/19/2009	0001	25	- 25	2.4		#	0.00017	
Uranium	mg/L	TP-01	WL	10/23/2009	0001	22	- 22	0.1		#	8.7E-006	
Uranium	mg/L	TP-07	WL	10/13/2009	0001	29	- 29	3		J	#	8.7E-005

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Uranium	mg/L	TP-08	WL	10/13/2009	0001	29	-	29	2.7	J	#	8.7E-005	
Uranium	mg/L	TP-09	WL	10/13/2009	0001	28	-	28	3.1	J	#	8.7E-005	
Uranium	mg/L	TP-11	WL	10/14/2009	0001	30	-	30	0.0014	J	#	1.7E-006	
Uranium	mg/L	TP-20	WL	10/14/2009	0001	32	-	32	0.023	J	#	1.7E-005	

Ft BLS = feet below land surface; C = centigrade; µmhos/cm = micromhos per centimeter; mV = millivolt; NTU = nephelometric turbidity unit; SL = surface location; S.U. = standard unit; TS = treatment system; WL = well

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

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A Tentatively identified compound is a suspected aldol-condensation product.
- B Inorganic: Result is between the instrument detection limit and contract-required detection limit. Organic: Analyte also found in method blank.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference; see case narrative.
- 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.
- P > 25% difference in detected pesticide or Aroclor concentrations between two columns.
- U Analytical result below detection limit.
- W Postdigestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X,Y,Z Laboratory defined qualifier; see case narrative.

DATA QUALIFIERS:

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

QA QUALIFIER:

- # Validated according to quality assurance guidelines

Appendix D.
Water Level Data

Appendix D. Water Level Data

STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0413	O	3965.33	10/21/2009		9.57	3955.76	
0430	U	4022.1	10/22/2009		59.93	3962.17	
0431	O	4007.04	10/21/2009		47.29	3959.75	
0432	U	4001.47	10/22/2009		41.68	3959.79	
0433	O	3989.99	10/20/2009		25.84	3964.15	
0434	U	3990.21	10/22/2009		33.75	3956.46	
0435	O	3971.67	10/20/2009		14.2	3957.47	
0436	O	3970.8	10/19/2009		10.32	3960.48	
0440	O	4070.71	10/23/2009		111.23	3959.48	
0443	O	4006.72	10/21/2009		46.44	3960.28	
0444	O	3970.99	10/20/2009		14.72	3956.27	
0455	O	3990.2	10/22/2009		31.8	3958.4	
0456	U	3990.46	10/22/2009		34.3	3956.16	
0457	O	3971.3	10/20/2009		15.24	3956.06	
AMM-1	U	3972.02	10/14/2009	11:55:00	16.31	3955.71	
AMM-1	U	3972.02	10/14/2009		16.3	3955.72	
AMM-2	O	3967.74	10/13/2009		13.61	3954.13	
AMM-3	O	3967.69	10/13/2009		13.35	3954.34	
ATP-1-S	O	3971.14	10/21/2009		19.4	3951.74	
ATP-3	O	3998.29	10/22/2009		38.5	3959.79	
SMI-MW01	O	3968.32	10/23/2009		13.52	3954.8	
SMI-PW03	O	3975.04	10/19/2009		18.89	3956.15	
SMI-PZ2D	O	3967.38	10/14/2009		15.64	3951.74	
SMI-PZ2M2	O	3967.18	10/14/2009		14.95	3952.23	
SMI-PZ3D2	O	3975.13	10/19/2009		19.29	3955.84	

Appendix D. Water Level Data (continued)

STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site
REPORT DATE: 1/4/2010

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
SMI-PZ3M	O	3975.23	10/19/2009		19.14	3956.09	
SMI-PZ3S	O	3975.03	10/19/2009		18.9	3956.13	
TP-01	O	3969.39	10/23/2009		12.94	3956.45	
TP-07	O	3965.72	10/13/2009		15.4	3950.32	
TP-09	O	3967.38	10/13/2009		13.45	3953.93	
TP-11	O	3967.51	10/14/2009		11.75	3955.76	
TP-20	D	3967.55	10/14/2009		15.38	3952.17	

Flow Codes: B = background; C = cross gradient; D = downgradient; O = on site; U = upgradient
 Water Level Flags: D = dry

Appendix E.
Blanks Report

Appendix E. Blanks Report

BLANKS REPORT

LAB: ALS Laboratory Group (Fort Collins, CO)

RIN: 0910038

Report Date: 1/4/2010

Parameter	Site Code	Location ID	Sample Date	Sample ID	Units	Result	Qualifiers Lab Data	Detection Limit	Uncertainty	Sample Type
Ammonia Total as N	MOA01	0999	10/23/2009	N001	mg/L	0.1	U	0.1		E
Manganese	MOA01	0999	10/23/2009	N001	mg/L	0.0002	U	0.0002		E
Total Dissolved Solids	MOA01	0999	10/23/2009	N001	mg/L	20	U	20		E
Uranium	MOA01	0999	10/23/2009	N001	mg/L	2.E-005	B	1.7E-006		E

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

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A Tentatively identified compound is a suspected aldol-condensation product.
- B Inorganic: Result is between the instrument detection limit and contract-required detection limit. Organic: Analyte also found in method blank.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference; see case narrative.

Attachment 1.
October 2009 Site-Wide Sampling Event Trip Report

Attachment 1. October 2009 Site-Wide Sampling Event Trip Report



Date: November 10, 2009
To: Ken Pill
From: Tyler Meadows
Subject: October 2009 Site-Wide Sampling Event

Site: Moab, Utah

Date of Sampling Event: October 13-23, 2009

Team Members: K. Pill, J. Ritchey, E. Glowiak, and T. Meadows

RIN Number Assigned: All samples were assigned to RIN 0910038.

Sample Shipment: The coolers were shipped overnight UPS to ALS Laboratory Group from Moab, Utah, on October 19 and 22, 2009 (Tracking numbers 0196804691 and 0199529519).

October 2009 Site-Wide Sampling Event

Number of Locations Sampled: The purpose of the site-wide sampling event was to update contaminant plume maps. A total of 33 monitoring wells were sampled during this event.

Locations Not Sampled/Reason: Sample ATP-1-S was mistakenly not sent in for analysis.

Field Variance: While sampling wells SMI-MW01, 0440, ATP-3, and TP-01, the turbidimeter was not functioning properly.

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

False ID	True ID	Sample Type	Associated Matrix
2000	AMM-1-53	Duplicate from 53 ft bgs	Ground Water
2001	0413	Duplicate from 10.5 ft bgs	Ground Water
2002	N/A	EB from tubing decontamination	D.I. Water

D.I. = deionized; ft bgs = feet below ground surface; ID = identification

Attachment 1. October 2009 Site-Wide Sampling Event Trip Report (continued)

Location-Specific Information: All of the monitor wells were sampled using a peristaltic pump and dedicated tubing unless otherwise noted. The table below provides additional information.

Location	Date	Sample Depth (ft bgs)	Comments
0410	10/21/2009	23.5	Dewatered with slight recharge. Stopped purging at 0.25 liter after > 5 minutes. Parameters were collected after collection. Temperature is inaccurate. No water level was collected.
0413	10/21/2009	10.5	Duplicate collected. Sampled for selenium.
0430	10/22/2009	101	Sampled with dedicated bladder pump.
0431	10/21/2009	91	Sampled with dedicated bladder pump.
0432	10/22/2009	55	Sampled with dedicated bladder pump.
0433	10/20/2009	99	Sampled with dedicated bladder pump.
0434	10/22/2009	35	Sampled with dedicated bladder pump.
0435	10/20/2009	173	
0436	10/19/2009	116	Tubing was pulled out of the casing approximately 1 foot and could not be returned. Sampled at 116 ft bgs with nondedicated tubing.
0440	10/23/2009	117	Sampled with dedicated bladder pump; turbidimeter not working; visually appears low.
0443	10/21/2009	73	Sampled with dedicated bladder pump.
0444	10/20/2009	116	Sulfur odor.
0455	10/22/2009	46	Sampled with inertia pump.
0456	10/22/2009	53	Sampled with inertia pump; silt was observed in well and in tubing.
0457	10/20/2009	29	
AMM-1-53	10/14/2009	53	Duplicate was collected.
AMM-1-19	10/14/2009	19	
AMM-2	10/13/2009	48	
AMM-3	10/13/2009	48	
ATP-3	10/22/2009	51	Sampled with dedicated bladder pump. Turbidimeter not working.
SMI-MW01	10/23/2009	16	Turbidimeter not working. Low turbidity observed; estimated at < 10 nephelometric turbidity units.
SMI-PW03	10/19/2009	60	Used nondedicated tubing to sample.
SMI-PZ2D	10/14/2009	75	
SMI-PZ3D2	10/19/2009	78	Repaired polyvinyl tubing and used nondedicated tubing to sample.
SMI-PZ2M2	10/14/2009	56	
SMI-PZ3M	10/19/2009	59	
SMI-PZ3S	10/19/2009	25	Sampled for selenium.
TP-01	10/23/2009	22	Casing was broken off at approximately 1 inch above ground surface. Water level was taken on north side of casing. Turbidimeter not operable. Low turbidity and sulfur odor observed.
TP-07	10/13/2009	29	
TP-08	10/13/2009	29	Obstruction or broken casing prevented ability to retrieve water level. Water had a sulfur odor.
TP-09	10/13/2009	28	
TP-11	10/14/2009	30	Casing is broken near ground level, and tubing is unmarked; marked tubing 2 feet from bottom. Water black with sulfur odor.
TP-20	10/14/2009	32	Sulfur odor and grey color.

ft bgs = feet below ground surface

Attachment 1. October 2009 Site-Wide Sampling Event Trip Report (continued)

Water Level Measurements: Water level data are provided in the table below. These data represent depth to water (feet below top of casing) measurements.

Well No.	Date	Time	Depth to Water (ft btoc)
0410	10/21/2009	09:19	NA
0413	10/21/2009	10:16	9.57
0430	10/22/2009	08:24	59.93
0431	10/21/2009	15:35	47.29
0432	10/22/2009	10:43	41.68
0433	10/20/2009	11:16	25.84
0434	10/22/2009	09:08	33.75
0435	10/20/2009	10:09	14.20
0436	10/19/2009	15:18	10.32
0440	10/23/2009	08:59	111.23
0443	10/21/2009	16:00	46.44
0444	10/20/2009	09:43	14.72
0455	10/22/2009	13:23	31.80
0456	10/22/2009	09:39	34.30
0457	10/20/2009	09:20	15.24
AMM-1-53	10/14/2009	11:12	16.30
AMM-1-19	10/14/2009	11:36	16.31
AMM-2	10/13/2009	11:30	13.61
AMM-3	10/13/2009	14:48	13.35
ATP-3	10/22/2009	13:52	38.50
SMI-MW01	10/23/2009	10:44	13.52
SMI-PW03	10/19/2009	14:45	18.85
SMI-PZ2D	10/14/2009	09:48	15.64
SMI-PZ3D2	10/19/2009	14:21	19.25
SMI-PZ2M2	10/14/2009	09:20	14.95
SMI-PZ3M	10/19/2009	11:22	19.14
SMI-PZ3S	10/19/2009	10:53	18.90
TP-01	10/23/2009	12:25	12.94
TP-07	10/13/2009	15:22	15.40
TP-08	10/13/2009	15:53	N/A
TP-09	10/13/2009	11:52	13.45
TP-11	10/14/2009	14:07	11.75
TP-20	10/14/2009	15:41	15.38

ft btoc = feet below top of casing

Well Inspection Summary: A well inspection was not conducted.

Equipment: The turbidimeter was not working properly on October 22 and 23, so turbidity readings were not collected.

Regulatory: None.

Attachment 1. October 2009 Site-Wide Sampling Event Trip Report (continued)

Site Issues: Mean daily Colorado River flows during this sampling event, according to the USGS Cisco gauging station (Station No. 09180500), are provided below:

Date	Daily Mean Flow (cfs)
10/13/2009	4,010
10/14/2009	4,340
10/19/2009	4,130
10/20/2009	4,100
10/21/2009	4,070
10/22/2009	4,040
10/23/2009	4,000

cfs = cubic feet per second

Corrective Action Required/Taken: None.