

Office of Environmental Management – Grand Junction



Moab UMTRA Project
February 2010 Validation Data Package
for Performance Assessment of the
Monthly Sampling for the Ground Water
Interim Action

May 2010



U.S. Department
of Energy

Office of Environmental Management

**Moab UMTRA Project
February 2010 Validation Data Package for Performance
Assessment of the Monthly Sampling for the
Ground Water Interim Action**

May 2010

**Moab UMTRA Project
February 2010 Monthly Ground Water Sampling Event**

Revision 0

Review and Approval

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5/12/10

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Attachment

Attachment 1. IA Well Field Monthly Sampling Trip Report	
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Acronyms and Abbreviations

CF	Configuration
COC	chain of custody
EB	equipment blank
EDD	electronic data deliverable
EPA	Environmental Protection Agency
ft	feet
IA	interim action
ICP	inductively coupled plasma
IDL	instrument detection limit
LCS	laboratory control sample
MB	method blank
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* (STO 6), “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 1.0 presents the Summary Criteria, the Sampling Event Summary, and the Sampling and Analysis. Section 2.0 provides the Data Assessment Summaries, including the Field Activity Verification, Laboratory Performance Assessment, Field Analyses/Activities description, and the Certification. All flagged data, and the reasons for the applicable flags, are also presented in Section 2.0. The Data Presentation is contained in Section 3.0, which includes a summary of the anomalous data generated by the validation process. Various appendices contain the Water Sampling Field Activities Verification, Water Quality Data, Water Level Data, and the Minimums and Maximums Report table. Attachment 1 contains the trip report. All Colorado River flow discussed in this document is measured from the U.S. Geological Survey (USGS) Cisco gauging station No. 09180500.

This validation data package (VDP) presents the results of the February 2010 sampling event completed from February 8 through 17, 2010, in which ground water samples were collected from a variety of sample depths in each of the Configuration (CF) 5 extraction wells that were installed in December 2009 and January 2010. The purpose of the CF5 wells is to intercept ground water containing higher contaminant concentrations near the toe of the tailings pile. In addition, a recently installed observation well 0454 and tailings pile well 0439 were sampled during this event. Section 1.0 contains the Summary Criteria with a sample location map (Section 1.1), the Sampling Event Summary (Section 1.2), and the Sampling and Analyses (Section 1.3) for this February 2010 monthly sampling event.

1.1 Summary Criteria

Sampling Period: February 8 through 17, 2010

The purpose of this sampling was to collect data associated with the recently installed CF5 extraction wells that can be used to evaluate the performance of the ground water interim action well field. All 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. Of the locations sampled during this event, only the sample collected from location 0439 qualified for the Minimums and Maximums Report. All other samples were collected from new locations, and as a result, did not have the required historical data in which to compare the data associated with this event. All the data associated with the sample from 0439 were within the historical range; therefore, there were no anomalous data associated with this sampling event.

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

Not applicable. The well field was shut down during this sampling event due to the fact that the off-pile remediation was still under way, and the extraction line between the well field and the evaporation pond was disconnected.

3. Was the evaporation pond functioning properly?

Yes. The pond level was 8.0 feet (ft) during this sampling event.

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

Yes.

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

No. The well field was shut down for the winter when this sampling event occurred.

1.2 Sampling Event Summary

This VDP presents the validated data associated with the ground water collected during the February 2010 IA monthly 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. In addition, a summary of the CF5 extraction well ammonia, total dissolved solids (TDS), and uranium sample results are provided in Table 1.

A list of flagged data is presented in Table 2 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 applicable data are within a normal statistical range. Based on the limited results of the Minimums and Maximums Report, there are no anomalous data associated with this sampling event (see Anomalous Data Review in Section 3.2).

Table 1. Analytical Results of CF5 Wells

Well No.	Date	Sample Depth (ft)	NH ₃ -N (mg/L)	TDS (mg/L)	U (mg/L)
0810	2/16/10	12.5	310	22,000	2.9
		25.5	310	22,000	3.0
		38	440	36,000	4.5
0811	2/9/10	12.5	310	16,000	2.5
		23.5	320	16,000	2.6
		36.6	320	16,000	2.8
0812	2/16/10	16	460	14,000	2.9
		29	470	13,000	3.0
		42	430	14,000	3.1
0813	2/16/10	16	390	13,000	2.1
		29	430	14,000	2.2
		42	430	13,000	2.2

Table 1. Analytical Results of CF5 Wells (continued)

Well No.	Date	Sample Depth (ft)	NH ₃ -N (mg/L)	TDS (mg/L)	U (mg/L)
0814	2/8/10	15	900	18,000	2.6
		28	810	18,000	2.7
		41	690	17,000	2.6
0815	2/9/10	24	900	15,000	4.0
		36	250	15,000	4.3
		49	55	22,000	4.6
0816	2/9/10	23	130	13,000	2.2
		36	160	14,000	2.4
		49	21	26,000	4.1

mg/L = milligrams per liter; NH₃-N = ammonia; U = uranium

Ammonia concentrations decreased with depth in wells 0814, 0815 and 0816, while uranium concentrations increased in all the wells. The results indicate that the highest ammonia concentrations (up to 900 mg/L) were encountered in the shallow zone in the southwest corner of CF5, in the vicinity of well 0814. The highest uranium concentration (with a maximum of 4.6 mg/L) was associated with the sample collected from well 0815. The TDS results of deepest samples from wells 0810 and 0816 indicate close proximity to the brine interface.

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* (DOE-EM/GJ1220). Although not listed here, the normal set of locations were sampled. 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 duplicates were collected, and all samples were collected using dedicated equipment; therefore, no equipment blanks (EBs) were required. All samples were analyzed within their prescribed holding times. No significant discrepancies were noted regarding chain of custody (COC), case narratives, presence of field and sample identifications, holding times, preservation and cooler receipts, except as qualified or noted in the Laboratory Performance Assessment (Section 2.2).

There were no anomalous data associated with this sampling event. According to the USGS Cisco gaging station, the mean daily Colorado River flow rates could not be measured due to ice build-up at the measurement point.

Surface Water Sampling Results

There were no surface water locations sampled during this sampling event.

2.0 Data Assessment Summaries

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



*Figure 1. Map of Sample Locations at the IA Well Field and Baseline Area
(includes locations not sampled)*

2.1 Water Sampling Field Activities Verification

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

2.2 Laboratory Performance Assessment

General Information

Requisition No. (RIN): 1002041
 Sample Event: February 2010 IA Well Field Monthly Routine Sampling Event
 Site(s): Moab, Utah
 Laboratory: ALS Laboratory Group, Fort Collins, Colorado
 Sample Data Group (SDG) Nos.: 1002119 and 1002176
 Analysis: Metals, Inorganics, and Radium-226
 Validator: Rachel Cowan
 Review Date: May 1, 2010

This validation was performed according to the *Environmental Procedures Catalog* (STO 6), "Standard Practice for Validation of Laboratory Data," GT-9(P) (2006). The procedure was applied at Level 3, Data Deliverables Examination, on 100 percent of the samples. 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
Radium-226	ASP-A-016	EPA 903.1(m)	EPA 903.1(m)
Selenium	G14	SW-846 3005A	SW-846 6020A
TDS	WIC-A-033	EPA 160.1	EPA 160.1
Uranium	G1	SW-846 3005A	SW-846 6020A

Data Qualifier Summary

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

Table 3. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1002119-5 through -9	0814-D, 0814-M, 0814-S, 0815-D, 0815-M	Ammonia	J	MS1
1002119-1	0439	Selenium	J	LCS1, MS1, RS1, SD1

"J" indicates results are estimated and becomes a "UJ" for analytical results below the detection limit.

Table 4. Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Nondetects)	Explanation
LCS1	J	UJ	A laboratory control sample was not analyzed.
MS1	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because the matrix spike sample was (a) from another client, (b) of dissimilar matrix, (c) a field blank or equipment blank, or (d) not analyzed at the proper frequency as stated in the appropriate analytical method.
RS1	J	UJ	Replicate sample frequency criteria were not met.
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 27 samples for RIN 1002041 in two shipments, which arrived on February 11, 2010 (SDG 1002119; UPS tracking number 1Z5W1Y510190275416) and February 18, 2010 (SDG 1002176; UPS tracking number 1Z5W1Y510196091667). Each of the sample groups 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.

Preservation and Holding Times

SDGs 1002119 and 1002176 were received intact in two coolers with temperatures of 2.2°C (SDG 1002119) and 3.8°C (SDG 1002176). All samples were received in the correct container types and had been preserved correctly for the requested analyses, except 1002119-3 and -4 (both with pH 7) and 1002119-11 (pH 2.5) and 1002119-10 (pH 2.2); the preservation requirement for metals is a pH of less than 2.0. ALS corrected the pH of this sample upon receipt, so it was not flagged. All samples were analyzed within the applicable holding times.

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

Matrix spike (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 1002119 did not have the appropriate number of MS samples as per method requirements, so ammonia results from samples 1002119-5 through -9 were “J”-flagged for MS1.

In addition, the native ammonia concentration in the SDG 1002176 MS sample was too high. As per requirements, the ammonia results associated with this MS were not flagged for MS1, and

since the ammonia field duplicate passed, no ammonia results in 1002176 were “J”-flagged for reason RS1.

Method SW-846 6020A, Selenium

There were no selenium samples from SDG 1002119 selected for testing matrix-specific quality-control samples. Therefore, there were no MSs for selenium, and the single SDG 1002119 selenium results were flagged for MS1. Since there were also no selenium MSDs and no field duplicate selenium samples, the SDG 1002119 selenium result was 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 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.

The manganese and uranium MS results were acceptable, so no manganese and uranium results were flagged for reason LCS1. However, as there were no selenium samples from SDG 1002119 selected for testing matrix-specific quality-control samples, no selenium LCS was prepared, and the SDG 1002119 selenium result was flagged for LCS1.

Method and Calibration Blanks

Method blanks (MB)s 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 exceptions.

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 50 times the RL. All evaluated SD data were acceptable with the following exceptions.

According to the case narratives, the manganese SD in SDG 1002176 failed. However, the concentration in the undiluted SD sample was less than 50 times the RL, so no samples were “J”-flagged for reason SD1.

There was no selenium SD sample in SDG 0911093, so all selenium results in SDG 0911093 were flagged for SD1.

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. Two duplicate samples were collected from locations 0813-D (1002176-8) and 0816-M (1002119-12) in the February 2010 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 reporting level.

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.

All the ground water samples were collected using nondedicated equipment. As per procedure, two EBs were collected and analyzed.

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 March 5, 2010 (SDG 1002119) and on March 15, 2010 (SDG 1002176). 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 February 2010 monthly 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 in CF5. 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. The RLs 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 Check Sheet (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 reports 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 less or more than 50 percent of historical minimum or maximum values; or (3) there were fewer than five historical samples for comparison.

3.2 Anomalous Data Review

There were no sample locations with analytical results that were considered anomalous based on the Minimums and Maximums Report.

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

Since all the samples were collected using nondedicated equipment, two blanks were collected during this sampling event. The results are presented in Appendix E. In these two EBs, three of the analytes, uranium, manganese, and TDS, were detected in the EB, but at a concentration much lower than the RL. Following validation procedure, all results of these analytes from the two SDGs were visually checked to see if the results were less than five times the concentration of uranium in the EB. All the results exceeded the concentrations in the EBs, so no samples needed to be qualified.

Appendix A.
Water Sampling Field Activities Verification

Appendix A. Water Sampling Field Activities Verification (continued)

Sampling Event / RIN	February 2010 RIN 1002041	Date(s) of Water Sampling	February 8 - 17, 2010
Date(s) of Verification	May 2, 2010	Name of Verifier	Rachel Cowan

	Response (Yes, No, NA)	Comments
1. Is the Sampling 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?	Yes	
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?	Yes	
	Yes	
5. Were the number and types (alkalinity, temperature, electrical conductivity, pH, turbidity, dissolved oxygen, oxidation reduction potential) 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 milliliters per minute?	Yes	
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	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 a total of 27 samples collected, including two duplicates.
10. Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	There were 27 samples collected and two EBs.

Appendix A. Water Sampling Field Activities Verification (continued)

Sampling Event / RIN	February 2010 RIN 1002041	Date(s) of Water Sampling	February 8 - 17, 2010
Date(s) of Verification	May 2, 2010	Name of Verifier	Rachel Cowan

	Response (Yes, No, NA)	Comments
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

With the exception of well 0439, all samples were collected from wells that were recently installed. All results for well 0439 were within the historical range; therefore, no Minimums and Maximums Report was generated.

Appendix C.
Water Quality Data

Appendix C. Water Quality Data

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA						
Ammonia Total as N	mg/L	0439	WL	02/10/2010	0001	118	-	118	4.6			0	0.1	
Ammonia Total as N	mg/L	0454	WL	02/17/2010	0001	13	-	13	500			0	20	
Ammonia Total as N	mg/L	0810	WL	02/16/2010	0001	12.5	-	12.5	310			0	20	
Ammonia Total as N	mg/L	0810	WL	02/16/2010	0001	25.5	-	25.5	310			0	20	
Ammonia Total as N	mg/L	0810	WL	02/16/2010	0001	38	-	38	440			0	20	
Ammonia Total as N	mg/L	0811	WL	02/09/2010	0001	10.5	-	10.5	310			0	20	
Ammonia Total as N	mg/L	0811	WL	02/09/2010	0001	36.6	-	36.6	320			0	20	
Ammonia Total as N	mg/L	0811	WL	02/09/2010	0001	23.5	-	23.5	320			0	20	
Ammonia Total as N	mg/L	0812	WL	02/16/2010	0001	16	-	16	460			0	20	
Ammonia Total as N	mg/L	0812	WL	02/16/2010	0001	42	-	42	430			0	20	
Ammonia Total as N	mg/L	0812	WL	02/16/2010	0001	29	-	29	470			0	20	
Ammonia Total as N	mg/L	0813	WL	02/16/2010	0001	16	-	16	390			0	20	
Ammonia Total as N	mg/L	0813	WL	02/16/2010	0001	29	-	29	430			0	20	
Ammonia Total as N	mg/L	0813	WL	02/16/2010	0001	42	-	42	430			0	20	
Ammonia Total as N	mg/L	0813	WL	02/16/2010	0002	42	-	42	440			0	20	
Ammonia Total as N	mg/L	0814	WL	02/08/2010	0001	41	-	41	690		J	0	20	
Ammonia Total as N	mg/L	0814	WL	02/08/2010	0001	28	-	28	810		J	0	20	
Ammonia Total as N	mg/L	0814	WL	02/08/2010	0001	15	-	15	900		J	0	20	
Ammonia Total as N	mg/L	0815	WL	02/09/2010	0001	49	-	49	55		J	0	5	
Ammonia Total as N	mg/L	0815	WL	02/09/2010	0001	36	-	36	250		J	0	20	
Ammonia Total as N	mg/L	0815	WL	02/10/2010	0001	24	-	24	240			0	20	
Ammonia Total as N	mg/L	0816	WL	02/09/2010	0001	49	-	49	21			0	1	
Ammonia Total as N	mg/L	0816	WL	02/09/2010	0001	23	-	23	130			0	20	
Ammonia Total as N	mg/L	0816	WL	02/09/2010	0001	36	-	36	160			0	20	
Ammonia Total as N	mg/L	0816	WL	02/09/2010	0002	36	-	36	150			0	20	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 5/3/2010

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	0439	WL	02/10/2010	0001	118	-	118	1.53		0		
Dissolved Oxygen	mg/L	0454	WL	02/17/2010	0001	13	-	13	3.35		0		
Dissolved Oxygen	mg/L	0810	WL	02/16/2010	0001	12.5	-	12.5	0.71		0		
Dissolved Oxygen	mg/L	0810	WL	02/16/2010	0001	25.5	-	25.5	1.48		0		
Dissolved Oxygen	mg/L	0810	WL	02/16/2010	0001	38	-	38	1.79		0		
Dissolved Oxygen	mg/L	0811	WL	02/09/2010	0001	10.5	-	10.5	1.34		0		
Dissolved Oxygen	mg/L	0811	WL	02/09/2010	0001	36.6	-	36.6	1.96		0		
Dissolved Oxygen	mg/L	0811	WL	02/09/2010	0001	23.5	-	23.5	1.61		0		
Dissolved Oxygen	mg/L	0812	WL	02/16/2010	0001	29	-	29	1.79		0		
Dissolved Oxygen	mg/L	0812	WL	02/16/2010	0001	16	-	16	1.64		0		
Dissolved Oxygen	mg/L	0812	WL	02/16/2010	0001	42	-	42	1.83		0		
Dissolved Oxygen	mg/L	0813	WL	02/16/2010	0001	29	-	29	1.86		0		
Dissolved Oxygen	mg/L	0813	WL	02/16/2010	0001	42	-	42	2.02		0		
Dissolved Oxygen	mg/L	0813	WL	02/16/2010	0001	16	-	16	2		0		
Dissolved Oxygen	mg/L	0814	WL	02/08/2010	0001	15	-	15	2.91		0		
Dissolved Oxygen	mg/L	0814	WL	02/08/2010	0001	41	-	41	4.52		0		
Dissolved Oxygen	mg/L	0814	WL	02/08/2010	0001	28	-	28	4.84		0		
Dissolved Oxygen	mg/L	0815	WL	02/09/2010	0001	36	-	36	1.94		0		
Dissolved Oxygen	mg/L	0815	WL	02/09/2010	0001	49	-	49	2.25		0		
Dissolved Oxygen	mg/L	0815	WL	02/10/2010	0001	24	-	24	1.03		0		
Dissolved Oxygen	mg/L	0816	WL	02/09/2010	0001	36	-	36	2.82		0		
Dissolved Oxygen	mg/L	0816	WL	02/09/2010	0001	23	-	23	2.74		0		
Dissolved Oxygen	mg/L	0816	WL	02/09/2010	0001	49	-	49	3.23		0		
Manganese	mg/L	0439	WL	02/10/2010	0001	118	-	118	2.1		0	0.002	
Manganese	mg/L	0454	WL	02/17/2010	0001	13	-	13	0.78		0	0.0028	
Manganese	mg/L	0810	WL	02/16/2010	0001	12.5	-	12.5	4.4		0	0.0011	
Manganese	mg/L	0810	WL	02/16/2010	0001	25.5	-	25.5	4.5		0	0.0011	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab		Data	QA		
Manganese	mg/L	0810	WL	02/16/2010	0001	38	- 38	4.8		0	0.0028	
Manganese	mg/L	0811	WL	02/09/2010	0001	10.5	- 10.5	0.64		0	0.002	
Manganese	mg/L	0811	WL	02/09/2010	0001	36.6	- 36.6	0.74		0	0.002	
Manganese	mg/L	0811	WL	02/09/2010	0001	23.5	- 23.5	0.73		0	0.002	
Manganese	mg/L	0812	WL	02/16/2010	0001	29	- 29	2.8		0	0.0011	
Manganese	mg/L	0812	WL	02/16/2010	0001	16	- 16	2.8		0	0.0011	
Manganese	mg/L	0812	WL	02/16/2010	0001	42	- 42	2.8		0	0.0011	
Manganese	mg/L	0813	WL	02/16/2010	0001	16	- 16	4.1		0	0.0011	
Manganese	mg/L	0813	WL	02/16/2010	0001	29	- 29	5.3		0	0.0011	
Manganese	mg/L	0813	WL	02/16/2010	0001	42	- 42	5.4		0	0.0011	
Manganese	mg/L	0813	WL	02/16/2010	0002	42	- 42	5.2		0	0.0011	
Manganese	mg/L	0814	WL	02/08/2010	0001	28	- 28	1.9		0	0.002	
Manganese	mg/L	0814	WL	02/08/2010	0001	41	- 41	1.9		0	0.002	
Manganese	mg/L	0814	WL	02/08/2010	0001	15	- 15	2		0	0.002	
Manganese	mg/L	0815	WL	02/09/2010	0001	36	- 36	3.1		0	0.002	
Manganese	mg/L	0815	WL	02/09/2010	0001	49	- 49	3.8		0	0.002	
Manganese	mg/L	0815	WL	02/10/2010	0001	24	- 24	3.1		0	0.002	
Manganese	mg/L	0816	WL	02/09/2010	0001	36	- 36	3.2		0	0.002	
Manganese	mg/L	0816	WL	02/09/2010	0001	23	- 23	3.7		0	0.002	
Manganese	mg/L	0816	WL	02/09/2010	0001	49	- 49	3.8		0	0.002	
Manganese	mg/L	0816	WL	02/09/2010	0002	36	- 36	3.1		0	0.002	
Nitrate as NO3	mg/L	0439	WL	02/10/2010	0001	118	- 118	21		0	1	
Nitrate as NO3	mg/L	0815	WL	02/10/2010	0001	24	- 24	18		0	2	
Nitrite as Nitrogen	mg/L	0439	WL	02/10/2010	0001	118	- 118	0.5	U	0	0.5	
Nitrite as Nitrogen	mg/L	0815	WL	02/10/2010	0001	24	- 24	1	U	0	1	
Oxidation Reduction Potential	mV	0439	WL	02/10/2010	0001	118	- 118	239.6		0		
Oxidation Reduction Potential	mV	0454	WL	02/17/2010	0001	13	- 13	211		0		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 5/3/2010

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	0810	WL	02/16/2010	0001	38	-	38	-32.5		0		
Oxidation Reduction Potential	mV	0810	WL	02/16/2010	0001	25.5	-	25.5	164.2		0		
Oxidation Reduction Potential	mV	0810	WL	02/16/2010	0001	12.5	-	12.5	193.3		0		
Oxidation Reduction Potential	mV	0811	WL	02/09/2010	0001	10.5	-	10.5	199.9		0		
Oxidation Reduction Potential	mV	0811	WL	02/09/2010	0001	36.6	-	36.6	203.5		0		
Oxidation Reduction Potential	mV	0811	WL	02/09/2010	0001	23.5	-	23.5	201.3		0		
Oxidation Reduction Potential	mV	0812	WL	02/16/2010	0001	29	-	29	221		0		
Oxidation Reduction Potential	mV	0812	WL	02/16/2010	0001	16	-	16	219.8		0		
Oxidation Reduction Potential	mV	0812	WL	02/16/2010	0001	42	-	42	221.8		0		
Oxidation Reduction Potential	mV	0813	WL	02/16/2010	0001	16	-	16	217.3		0		
Oxidation Reduction Potential	mV	0813	WL	02/16/2010	0001	42	-	42	219.1		0		
Oxidation Reduction Potential	mV	0813	WL	02/16/2010	0001	29	-	29	218.8		0		
Oxidation Reduction Potential	mV	0814	WL	02/08/2010	0001	15	-	15	171.1		0		
Oxidation Reduction Potential	mV	0814	WL	02/08/2010	0001	28	-	28	173.1		0		
Oxidation Reduction Potential	mV	0814	WL	02/08/2010	0001	41	-	41	173.2		0		
Oxidation Reduction Potential	mV	0815	WL	02/09/2010	0001	49	-	49	171.5		0		
Oxidation Reduction Potential	mV	0815	WL	02/09/2010	0001	36	-	36	186		0		
Oxidation Reduction Potential	mV	0815	WL	02/10/2010	0001	24	-	24	197.7		0		
Oxidation Reduction Potential	mV	0816	WL	02/09/2010	0001	49	-	49	64.7		0		
Oxidation Reduction Potential	mV	0816	WL	02/09/2010	0001	23	-	23	47.3		0		
Oxidation Reduction Potential	mV	0816	WL	02/09/2010	0001	36	-	36	66.7		0		
pH	s.u.	0439	WL	02/10/2010	0001	118	-	118	6.94		0		
pH	s.u.	0454	WL	02/17/2010	0001	13	-	13	6.79		0		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab		Data	QA		
pH	s.u.	0810	WL	02/16/2010	0001	38	- 38	6.9		0		
pH	s.u.	0810	WL	02/16/2010	0001	25.5	- 25.5	7.52		0		
pH	s.u.	0810	WL	02/16/2010	0001	12.5	- 12.5	7.53		0		
pH	s.u.	0811	WL	02/09/2010	0001	10.5	- 10.5	6.88		0		
pH	s.u.	0811	WL	02/09/2010	0001	23.5	- 23.5	6.89		0		
pH	s.u.	0811	WL	02/09/2010	0001	36.6	- 36.6	6.89		0		
pH	s.u.	0812	WL	02/16/2010	0001	16	- 16	6.82		0		
pH	s.u.	0812	WL	02/16/2010	0001	29	- 29	6.84		0		
pH	s.u.	0812	WL	02/16/2010	0001	42	- 42	6.84		0		
pH	s.u.	0813	WL	02/16/2010	0001	16	- 16	6.91		0		
pH	s.u.	0813	WL	02/16/2010	0001	29	- 29	6.93		0		
pH	s.u.	0813	WL	02/16/2010	0001	42	- 42	6.94		0		
pH	s.u.	0814	WL	02/08/2010	0001	41	- 41	6.89		0		
pH	s.u.	0814	WL	02/08/2010	0001	15	- 15	6.9		0		
pH	s.u.	0814	WL	02/08/2010	0001	28	- 28	6.91		0		
pH	s.u.	0815	WL	02/09/2010	0001	36	- 36	6.97		0		
pH	s.u.	0815	WL	02/09/2010	0001	49	- 49	7.03		0		
pH	s.u.	0815	WL	02/10/2010	0001	24	- 24	6.95		0		
pH	s.u.	0816	WL	02/09/2010	0001	36	- 36	6.99		0		
pH	s.u.	0816	WL	02/09/2010	0001	23	- 23	7		0		
pH	s.u.	0816	WL	02/09/2010	0001	49	- 49	7.06		0		
Radium-226	pCi/L	0439	WL	02/10/2010	0001	118	- 118	0.44	U	0	0.44	0.27
Radium-226	pCi/L	0815	WL	02/10/2010	0001	24	- 24	0.48	U	0	0.48	0.24
Selenium	mg/L	0439	WL	02/10/2010	0001	118	- 118	0.0021		J	0	0.00012
Specific Conductance	umhos/cm	0439	WL	02/10/2010	0001	118	- 118	9870			0	
Specific Conductance	umhos/cm	0454	WL	02/17/2010	0001	13	- 13	61000			0	
Specific Conductance	umhos/cm	0810	WL	02/16/2010	0001	12.5	- 12.5	26662			0	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Specific Conductance	umhos /cm	0810	WL	02/16/2010	0001	25.5	-	25.5	27122		0		
Specific Conductance	umhos /cm	0810	WL	02/16/2010	0001	38	-	38	48391		0		
Specific Conductance	umhos /cm	0811	WL	02/09/2010	0001	10.5	-	10.5	18993		0		
Specific Conductance	umhos /cm	0811	WL	02/09/2010	0001	23.5	-	23.5	19278		0		
Specific Conductance	umhos /cm	0811	WL	02/09/2010	0001	36.6	-	36.6	19449		0		
Specific Conductance	umhos /cm	0812	WL	02/16/2010	0001	29	-	29	18316		0		
Specific Conductance	umhos /cm	0812	WL	02/16/2010	0001	16	-	16	18224		0		
Specific Conductance	umhos /cm	0812	WL	02/16/2010	0001	42	-	42	18413		0		
Specific Conductance	umhos /cm	0813	WL	02/16/2010	0001	29	-	29	18187		0		
Specific Conductance	umhos /cm	0813	WL	02/16/2010	0001	16	-	16	17232		0		
Specific Conductance	umhos /cm	0813	WL	02/16/2010	0001	42	-	42	18361		0		
Specific Conductance	umhos /cm	0814	WL	02/08/2010	0001	28	-	28	21631		0		
Specific Conductance	umhos /cm	0814	WL	02/08/2010	0001	41	-	41	21630		0		
Specific Conductance	umhos /cm	0814	WL	02/08/2010	0001	15	-	15	22823		0		
Specific Conductance	umhos /cm	0815	WL	02/09/2010	0001	36	-	36	19575		0		
Specific Conductance	umhos /cm	0815	WL	02/09/2010	0001	49	-	49	26638		0		
Specific Conductance	umhos /cm	0815	WL	02/10/2010	0001	24	-	24	19166		0		
Specific Conductance	umhos /cm	0816	WL	02/09/2010	0001	23	-	23	16029		0		
Specific Conductance	umhos /cm	0816	WL	02/09/2010	0001	36	-	36	16377		0		
Specific Conductance	umhos /cm	0816	WL	02/09/2010	0001	49	-	49	30041		0		
Temperature	C	0439	WL	02/10/2010	0001	118	-	118	14.01		0		
Temperature	C	0454	WL	02/17/2010	0001	13	-	13	14.18		0		
Temperature	C	0810	WL	02/16/2010	0001	12.5	-	12.5	10.08		0		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	Lab	Data QA					
Temperature	C	0810	WL	02/16/2010	0001	25.5	- 25.5	11.46		0		
Temperature	C	0810	WL	02/16/2010	0001	38	- 38	12.48		0		
Temperature	C	0811	WL	02/09/2010	0001	10.5	- 10.5	8.99		0		
Temperature	C	0811	WL	02/09/2010	0001	36.6	- 36.6	12.38		0		
Temperature	C	0811	WL	02/09/2010	0001	23.5	- 23.5	11.27		0		
Temperature	C	0812	WL	02/16/2010	0001	29	- 29	10.54		0		
Temperature	C	0812	WL	02/16/2010	0001	16	- 16	9.85		0		
Temperature	C	0812	WL	02/16/2010	0001	42	- 42	11.15		0		
Temperature	C	0813	WL	02/16/2010	0001	29	- 29	9.37		0		
Temperature	C	0813	WL	02/16/2010	0001	16	- 16	8.23		0		
Temperature	C	0813	WL	02/16/2010	0001	42	- 42	9.47		0		
Temperature	C	0814	WL	02/08/2010	0001	41	- 41	13.74		0		
Temperature	C	0814	WL	02/08/2010	0001	15	- 15	13.84		0		
Temperature	C	0814	WL	02/08/2010	0001	28	- 28	13.85		0		
Temperature	C	0815	WL	02/09/2010	0001	36	- 36	11.94		0		
Temperature	C	0815	WL	02/09/2010	0001	49	- 49	13.27		0		
Temperature	C	0815	WL	02/10/2010	0001	24	- 24	11.62		0		
Temperature	C	0816	WL	02/09/2010	0001	23	- 23	11.24		0		
Temperature	C	0816	WL	02/09/2010	0001	49	- 49	13.65		0		
Temperature	C	0816	WL	02/09/2010	0001	36	- 36	12.06		0		
Total Dissolved Solids	mg/L	0439	WL	02/10/2010	0001	118	- 118	7600		0	200	
Total Dissolved Solids	mg/L	0454	WL	02/17/2010	0001	13	- 13	36000		0	1000	
Total Dissolved Solids	mg/L	0810	WL	02/16/2010	0001	25.5	- 25.5	22000		0	400	
Total Dissolved Solids	mg/L	0810	WL	02/16/2010	0001	12.5	- 12.5	22000		0	400	
Total Dissolved Solids	mg/L	0810	WL	02/16/2010	0001	38	- 38	36000		0	1000	
Total Dissolved Solids	mg/L	0811	WL	02/09/2010	0001	23.5	- 23.5	16000		0	400	
Total Dissolved Solids	mg/L	0811	WL	02/09/2010	0001	10.5	- 10.5	16000		0	400	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 5/3/2010

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	0811	WL	02/09/2010	0001	36.6	-	36.6	16000		0	400	
Total Dissolved Solids	mg/L	0812	WL	02/16/2010	0001	16	-	16	14000		0	400	
Total Dissolved Solids	mg/L	0812	WL	02/16/2010	0001	29	-	29	13000		0	400	
Total Dissolved Solids	mg/L	0812	WL	02/16/2010	0001	42	-	42	14000		0	400	
Total Dissolved Solids	mg/L	0813	WL	02/16/2010	0001	16	-	16	13000		0	400	
Total Dissolved Solids	mg/L	0813	WL	02/16/2010	0001	42	-	42	13000		0	400	
Total Dissolved Solids	mg/L	0813	WL	02/16/2010	0001	29	-	29	14000		0	400	
Total Dissolved Solids	mg/L	0813	WL	02/16/2010	0002	42	-	42	14000		0	400	
Total Dissolved Solids	mg/L	0814	WL	02/08/2010	0001	41	-	41	17000		0	400	
Total Dissolved Solids	mg/L	0814	WL	02/08/2010	0001	15	-	15	18000		0	400	
Total Dissolved Solids	mg/L	0814	WL	02/08/2010	0001	28	-	28	18000		0	400	
Total Dissolved Solids	mg/L	0815	WL	02/09/2010	0001	36	-	36	15000		0	400	
Total Dissolved Solids	mg/L	0815	WL	02/09/2010	0001	49	-	49	22000		0	400	
Total Dissolved Solids	mg/L	0815	WL	02/10/2010	0001	24	-	24	15000		0	400	
Total Dissolved Solids	mg/L	0816	WL	02/09/2010	0001	36	-	36	14000		0	400	
Total Dissolved Solids	mg/L	0816	WL	02/09/2010	0001	23	-	23	13000		0	400	
Total Dissolved Solids	mg/L	0816	WL	02/09/2010	0001	49	-	49	26000		0	400	
Total Dissolved Solids	mg/L	0816	WL	02/09/2010	0002	36	-	36	13000		0	400	
Turbidity	NTU	0439	WL	02/10/2010	0001	118	-	118	1.29		0		
Turbidity	NTU	0454	WL	02/17/2010	0001	13	-	13	54.2		0		
Turbidity	NTU	0810	WL	02/16/2010	0001	38	-	38	6.14		0		
Turbidity	NTU	0810	WL	02/16/2010	0001	25.5	-	25.5	9.29		0		
Turbidity	NTU	0810	WL	02/16/2010	0001	12.5	-	12.5	12.6		0		
Turbidity	NTU	0811	WL	02/09/2010	0001	23.5	-	23.5	3.02		0		
Turbidity	NTU	0811	WL	02/09/2010	0001	10.5	-	10.5	3.21		0		
Turbidity	NTU	0811	WL	02/09/2010	0001	36.6	-	36.6	4.58		0		
Turbidity	NTU	0812	WL	02/16/2010	0001	16	-	16	5.4		0		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Turbidity	NTU	0812	WL	02/16/2010	0001	29	-	29	9.54		0		
Turbidity	NTU	0812	WL	02/16/2010	0001	42	-	42	9.61		0		
Turbidity	NTU	0813	WL	02/16/2010	0001	16	-	16	2.26		0		
Turbidity	NTU	0813	WL	02/16/2010	0001	29	-	29	6.84		0		
Turbidity	NTU	0813	WL	02/16/2010	0001	42	-	42	9.42		0		
Turbidity	NTU	0814	WL	02/08/2010	0001	41	-	41	72.9		0		
Turbidity	NTU	0814	WL	02/08/2010	0001	15	-	15	9.88		0		
Turbidity	NTU	0814	WL	02/08/2010	0001	28	-	28	10.8		0		
Turbidity	NTU	0815	WL	02/09/2010	0001	49	-	49	9.58		0		
Turbidity	NTU	0815	WL	02/09/2010	0001	36	-	36	9.83		0		
Turbidity	NTU	0815	WL	02/10/2010	0001	24	-	24	6.93		0		
Turbidity	NTU	0816	WL	02/09/2010	0001	36	-	36	2.42		0		
Turbidity	NTU	0816	WL	02/09/2010	0001	23	-	23	5.63		0		
Turbidity	NTU	0816	WL	02/09/2010	0001	49	-	49	7.52		0		
Uranium	mg/L	0439	WL	02/10/2010	0001	118	-	118	0.8		0	8.8E-005	
Uranium	mg/L	0454	WL	02/17/2010	0001	13	-	13	2.4		0	8.8E-005	
Uranium	mg/L	0810	WL	02/16/2010	0001	12.5	-	12.5	2.9		0	8.8E-005	
Uranium	mg/L	0810	WL	02/16/2010	0001	25.5	-	25.5	3		0	8.8E-005	
Uranium	mg/L	0810	WL	02/16/2010	0001	38	-	38	4.5		0	8.8E-005	
Uranium	mg/L	0811	WL	02/09/2010	0001	10.5	-	10.5	2.5		0	8.8E-005	
Uranium	mg/L	0811	WL	02/09/2010	0001	36.6	-	36.6	2.8		0	8.8E-005	
Uranium	mg/L	0811	WL	02/09/2010	0001	23.5	-	23.5	2.6		0	8.8E-005	
Uranium	mg/L	0812	WL	02/16/2010	0001	16	-	16	3.1		0	8.8E-005	
Uranium	mg/L	0812	WL	02/16/2010	0001	29	-	29	3		0	8.8E-005	
Uranium	mg/L	0812	WL	02/16/2010	0001	42	-	42	3.1		0	8.8E-005	
Uranium	mg/L	0813	WL	02/16/2010	0001	16	-	16	2.1		0	8.8E-005	
Uranium	mg/L	0813	WL	02/16/2010	0001	29	-	29	2.2		0	8.8E-005	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 5/3/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab	Data		QA			
Uranium	mg/L	0813	WL	02/16/2010	0001	42	-	42	2.2		0	8.8E-005	
Uranium	mg/L	0813	WL	02/16/2010	0002	42	-	42	2.3		0	8.8E-005	
Uranium	mg/L	0814	WL	02/08/2010	0001	15	-	15	2.6		0	8.8E-005	
Uranium	mg/L	0814	WL	02/08/2010	0001	41	-	41	2.6		0	8.8E-005	
Uranium	mg/L	0814	WL	02/08/2010	0001	28	-	28	2.7		0	8.8E-005	
Uranium	mg/L	0815	WL	02/09/2010	0001	36	-	36	4.3		0	8.8E-005	
Uranium	mg/L	0815	WL	02/09/2010	0001	49	-	49	4.6		0	8.8E-005	
Uranium	mg/L	0815	WL	02/10/2010	0001	24	-	24	4		0	8.8E-005	
Uranium	mg/L	0816	WL	02/09/2010	0001	23	-	23	2.2		0	8.8E-005	
Uranium	mg/L	0816	WL	02/09/2010	0001	36	-	36	2.4		0	8.8E-005	
Uranium	mg/L	0816	WL	02/09/2010	0001	49	-	49	4.1		0	8.8E-005	
Uranium	mg/L	0816	WL	02/09/2010	0002	36	-	36	2.4		0	8.8E-005	

BLS = 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 µm). 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. | G Possible grout contamination; pH > 9. | J Estimated value. |
| L Less than three 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.

Appendix D.
Water Level Data

Appendix D. Water Level Data

STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site
REPORT DATE: 5/3/2010

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0439	O	4055.27	02/10/2010		98.47	3956.8	
0454			02/17/2010		12.25		
0810			02/16/2010		8.73		
0811			02/09/2010		9.05		
0812			02/16/2010		7.2		
0813			02/16/2010		9.16		
0814			02/08/2010		6.69		
0815			02/10/2010		8.53		
0816			02/09/2010		7.21		

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

Appendix E.
Blanks Report

BLANKS REPORT
LAB: PARAGON (Fort Collins, CO)
RIN: 1002041
Report Date: 4/1/2010

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	02/09/2010	N001	mg/L	0.1	U	0.1		E
Ammonia Total as N	MOA01	0999	02/16/2010	N001	mg/L	0.1	U	0.1		E
Manganese	MOA01	0999	02/09/2010	N001	mg/L	0.00027	B	0.0002		E
Manganese	MOA01	0999	02/16/2010	N001	mg/L	0.0065	E	0.00011		E
Total Dissolved Solids	MOA01	0999	02/09/2010	N001	mg/L	20	U	20		E
Total Dissolved Solids	MOA01	0999	02/16/2010	N001	mg/L	22		20		E
Uranium	MOA01	0999	02/09/2010	N001	mg/L	2.6E-005	B	1.8E-006		E
Uranium	MOA01	0999	02/16/2010	N001	mg/L	0.00012		1.8E-006		E

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.
- L Less than 3 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.

SAMPLE TYPES:

- E Equipment Blank.

Attachment 1.
IA Well Field Monthly Sampling Trip Report

Attachment 1.
IA Well Field Monthly Sampling Trip Report



DATE: February 18, 2010
TO: K. Pill
FROM: J. Ritchey
SUBJECT: February 2010 Monthly IA Well field Sampling Trip Report

Site: Moab, Utah

Date of Sampling Event: February 08 - 17, 2010

Team Members: Elizabeth Glowiak, Tyler Meadows, James Ritchey

RIN Number Assigned: All samples were assigned to RIN 1002041.

Sample Shipment: All samples were shipped in two coolers overnight UPS to ALS Laboratory Group from Moab, Utah, on February 10 and February 17, 2010 (Tracking Nos. 0190275416 and 0196091667).

February 2010 CF5 Sampling

Number of Locations Sampled: Seven new extraction wells (0810, 0811, 0812, 0813, 0814, 0815, and 0816) in CF5 were sampled at three different depths. Samples from the extraction wells were collected 2 ft below the top of the screen, the center of the screen, and 2 ft above the bottom of the screen. One observation well (0454) was sampled at 2 ft below the static water level. All of these wells have not been previously sampled as the construction and development of the wells occurred in January 2010. Also, observation well 0439 was sampled since it was not sampled the previous month due to complications with the bladder pump controller. Including two duplicates and two equipment blanks, a total of 27 samples were collected during the February 2010 Monthly Sampling Event.

Locations Not Sampled: None.

Field Variance: None

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

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2000	NA	EB	DI Water	FEB007
2001	0816-M	Duplicate Sample from 36 ft.	Ground water	FEB010
2002	NA	EB	DI Water	FEB019
2003	0813-D	Duplicate Sample from 42 ft.	Ground water	FEB026

DI = deionized; = ID = identification

Attachment 1.
IA Well Field Monthly Sampling Trip Report (continued)

Location-Specific Information – Extraction Wells: All extraction wells were sampled using micropurge techniques with a peristaltic pump and nondedicated downhole and pump-head tubing. Sample depths and water levels for each observation well are listed below.

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0810-S	2/16/2010	9:49	8.73	12.5
0810-M	2/16/2010	10:40	8.73	25.5
0810-D	2/16/2010	10:55	8.73	38
0811-S	2/9/2010	08:38	9.05	10.5
0811-M	2/9/2010	08:54	9.05	23.5
0811-D	2/9/2010	09:08	9.05	36.6
0812-S	2/16/2010	13:15	7.20	16
0812-M	2/16/2010	13:36	7.20	29
0812-D	2/16/2010	13:54	7.20	42
0813-S	2/16/2010	14:31	9.16	16
0813-M	2/16/2010	14:52	9.16	29
0813-D	2/16/2010	15:16	9.16	42
0814-S	2/8/2010	09:23	6.69	15
0814-M	2/8/2010	12:32	6.69	28
0814-D	2/8/2010	15:19	6.69	41
0815-S	2/10/2010	09:24	8.53	24
0815-M	2/9/2010	13:33	8.49	36
0815-D	2/9/2010	13:56	8.49	49
0816-S	2/9/2010	10:16	7.21	23
0816-M	2/9/2010	10:31	7.21	36
0816-D	2/9/2010	10:50	7.21	49

ft bgs = feet below ground surface ; ft btoc = feet below top of casing

Location-Specific Information – Observation Wells: All observation wells were sampled using micropurge techniques. Well 0454 was sampled with a peristaltic pump and dedicated downhole and pump-head tubing. Well 0439 was sampled with a dedicated bladder pump. Sample depths and water levels for each observation well are listed below.

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0439	2/10/2010	12:05	98.47	118
0454	2/17/2010	10:12	12.25	13

ft bgs = feet below ground surface ; ft btoc = feet below top of casing

Site Issues: According to the USGS Cisco gauging station (Station No. 09180500), the mean daily Colorado River flows during this sampling event were affected by ice.

Date	Daily Mean Flow (cfs)
02/08/2010	Ice
02/09/2010	Ice
02/10/2010	Ice
02/16/2010	Ice
02/17/2010	Ice

cfs = cubic feet per second

Equipment Issues: None.

Corrective Action Required/Taken: None.