

Office of Environmental Management – Grand Junction



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

June 2010



U.S. Department
of Energy

Office of Environmental Management

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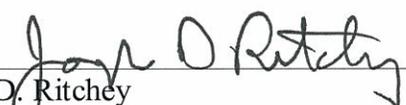
**Moab UMTRA Project
April 2010 Monthly Ground Water Sampling Event**

Revision 0

Review and Approval

 6/29/10

Kenneth G. Pill Date
TAC Ground Water Manager

 6/29/10

Joseph D. Ritchey Date
TAC Senior Program Manager

Revision History

Revision No.	Date	Reason/Basis for Revision
0	June 2010	Initial issue.

Table of Contents

Section	Page
Acronyms and Abbreviations	iv
1.0 Introduction.....	1
1.1 Summary Criteria.....	1
1.2 Sampling Event Summary	2
1.3 Sampling and Analyses.....	9
2.0 Data Assessment Summaries	9
2.1 Water Sampling Field Activities Verification	9
2.2 Laboratory Performance Assessment	9
2.3 Field Analyses/Activities	14
2.4 Certification	14
3.0 Data Presentation.....	15
3.1 Minimums and Maximums Report	15
3.2 Anomalous Data Review	15
3.3 Water Quality Data	15
3.4 Water Level Data	15
3.5 Blanks Report.....	15

Figures

Figure 1. Map of Sample Locations at the IA Well Field and Baseline Area.....	3
Figure 2. Map of Sample Locations in the Vicinity of the Uranium Plume	4
Figure 3. CF1 Observation Wells 0403 and 0407 Time Versus Ammonia Total as N Concentration Plot	5
Figure 4. CF1 Observation Wells 0403 and 0407 Time Versus TDS Concentration Plot.....	5
Figure 5. CF1 Observation Wells 0403 and 0407 Time Versus Uranium Concentration Plot	6
Figure 6. CF4 Observation Well Time Versus Ammonia Total as N Concentration Plot.....	6
Figure 7. CF4 Observation Well Time Versus TDS Concentration Plot	7
Figure 8. CF4 Observation Well Time Versus Uranium Concentration Plot	7

Tables

Table 1. Analytical Results of CF5 Wells.....	8
Table 2. Analytical Results of Uranium Plume Sample Locations.....	8
Table 3. Analytes and Methods.....	10
Table 4. Data Qualifiers	10
Table 5. Reason Codes for Data Flags.....	10

Appendices

Appendix A. Water Sampling Field Activities Verification	A-1
Appendix B. Minimums and Maximums Report	B-1
Appendix C. Water Quality Data	C-1
Appendix D. Water Level Data	D-1
Appendix E. Blanks Report.....	E-1

Attachment

Attachment 1. IA Well Field Monthly Sampling Trip Report

Acronyms and Abbreviations

CCB	continuing calibration blank
CCV	continuing calibration verification
CF	Configuration
cfs	cubic feet per second
COC	chain of custody
CRI	reporting limit verification
EB	equipment blank
EDD	electronic data deliverable
EPA	Environmental Protection Agency
ft bgs	feet below ground surface
ft	feet
IA	interim action
ICB	initial calibration blank
ICP	inductively coupled plasma
ICP-MS	inductively coupled plasma-mass spectrometry
ICS	interference check sample
ICV	initial calibration verification
IDL	instrument detection limit
LCS	laboratory control sample
MB	method blank
MDL	method detection limit
mg/L	milligrams per liter
MS	matrix spike
r ²	correlation coefficient
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
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, Minimums and Maximums Report table, Water Quality Data, Water Level Data, and the Blanks Report. 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 April 2010 monthly sampling event completed from March 23 through April 7, 2010, in which ground water samples were collected from a variety of Configuration (CF) 1 and 4 observation wells. In addition, samples were collected from a variety of depths from CF5 extraction wells and the wells in the vicinity of the uranium plume located northeast of the pile. This event also included the sampling of a ground water seep that was exposed due to the low river flows adjacent to surface water location 0274 and a sample collected from the water stored in the evaporation pond (location 0548). 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 April 2010 monthly sampling event.

1.1 Summary Criteria

Sampling Period: March 23 through April 7, 2010

The purpose of this sampling was to collect data associated with the recently installed CF5 extraction wells and to monitor the ground water chemistry in the vicinity of CF1, CF4, and the uranium plume. All CF1, CF4, and CF5 sampling locations are shown on Figure 1, and the remaining locations (primarily associated with the uranium plume) are shown on Figure 2.

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?

Yes. Of the locations sampled during this event, there were two anomalous data points from two different locations based on the Minimums and Maximums Report.

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

Yes. All extraction wells were planned to be shut down during this monthly sampling event, as the discharge line connecting the well field to the evaporation pond was disconnected.

3. Was the evaporation pond functioning properly?

Yes. The pond level ranged from 7.7 to 8.5 feet (ft) during this monthly 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?

Yes. As a result of the soil remediation taking place in the off-pile area between the toe of the pile and the well field, the discharge line from the well field to the evaporation pond was disconnected.

1.2 Sampling Event Summary

This VDP presents the validated data associated with the ground water collected during the April 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 monthly 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. Table 2 provides a summary of the uranium plume sampling results.

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 applicable data are within a normal statistical range. Based on the limited results of the Minimums and Maximums Report, there were two anomalous data associated with this monthly sampling event (see Anomalous Data Review in Section 3.2).

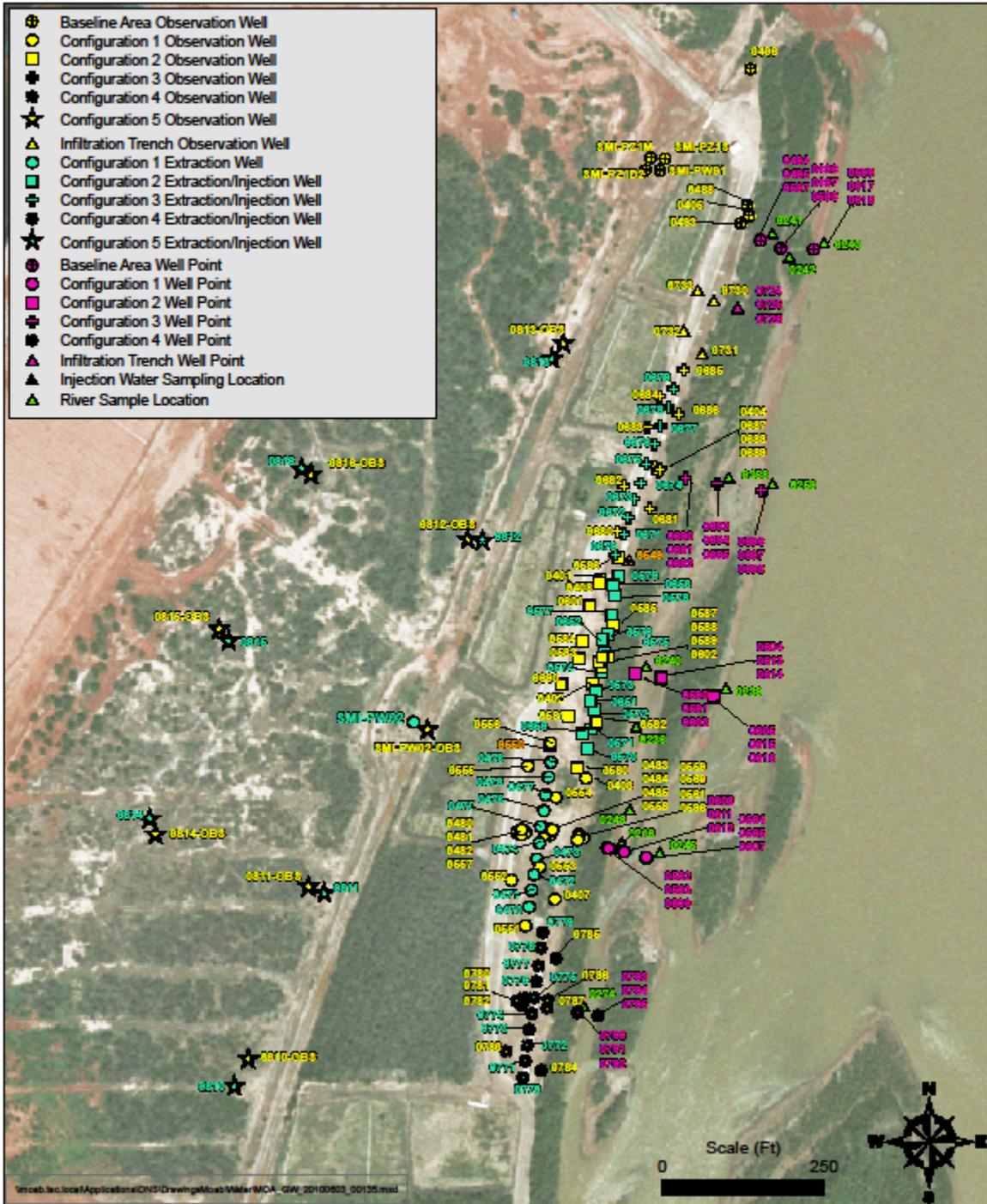
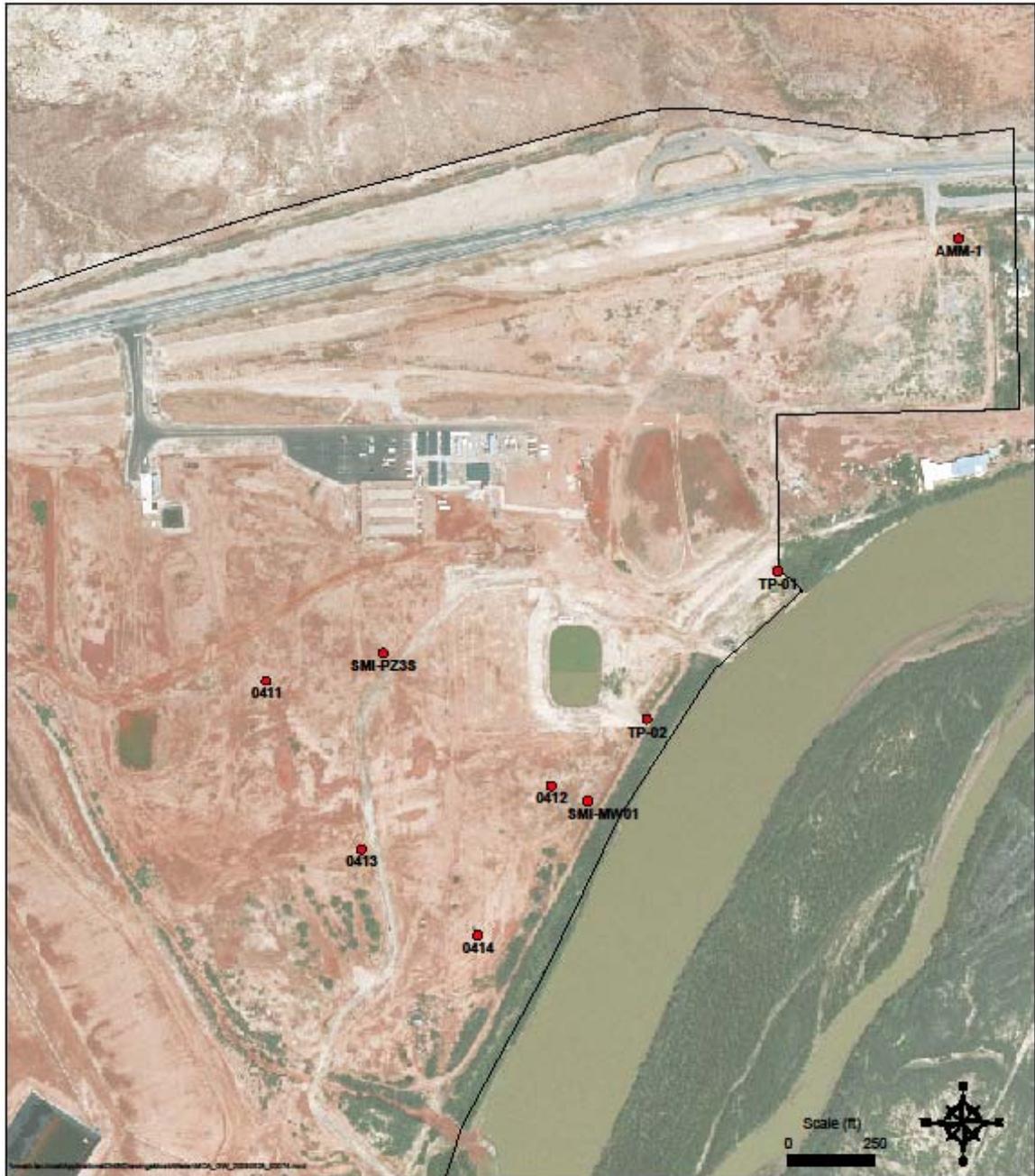


Figure 1. Map of Sample Locations at the IA Well Field and Baseline Area (includes locations not sampled)



*Figure 2. Map of Sample Locations in the Vicinity of the Uranium Plume
(includes locations not sampled)*

CF1 Observation Wells 0403 and 0407

These locations are located along the river bank within CF1 well 0403 near the northern end of CF1, and well 0407 is at the southern end. As shown in the time versus analyte concentration plots below (Figures 3, 4, and 5), the analyte concentrations in samples collected from well 0403 either decreased (as in the case of ammonia) or remained constant (TDS and uranium) with an increase in the Colorado River stage. The analyte concentrations along the southern end (well 0407) gradually increased. Because the river stage was not significantly above base flow, no decrease in concentrations was expected.

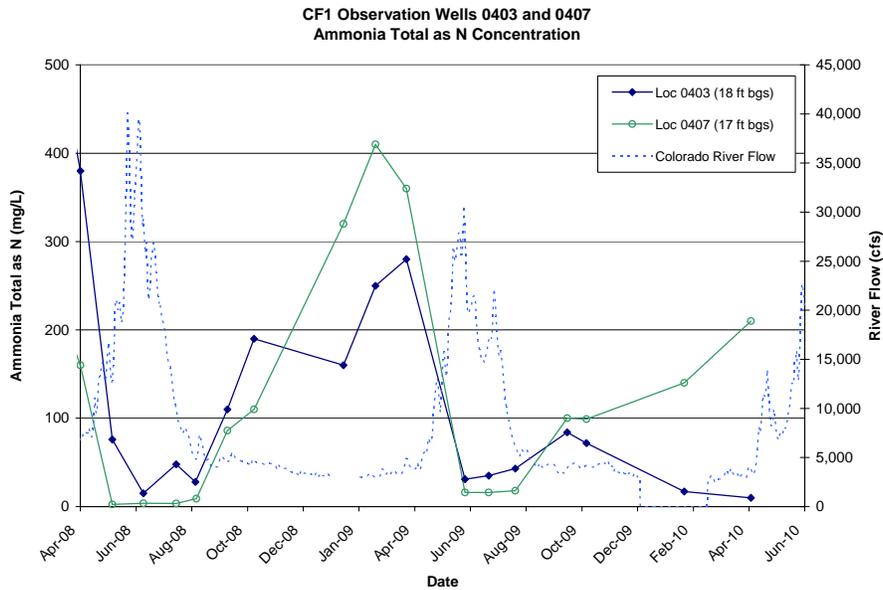


Figure 3. CF1 Observation Wells 0403 and 0407 Time Versus Ammonia Total as N Concentration Plot

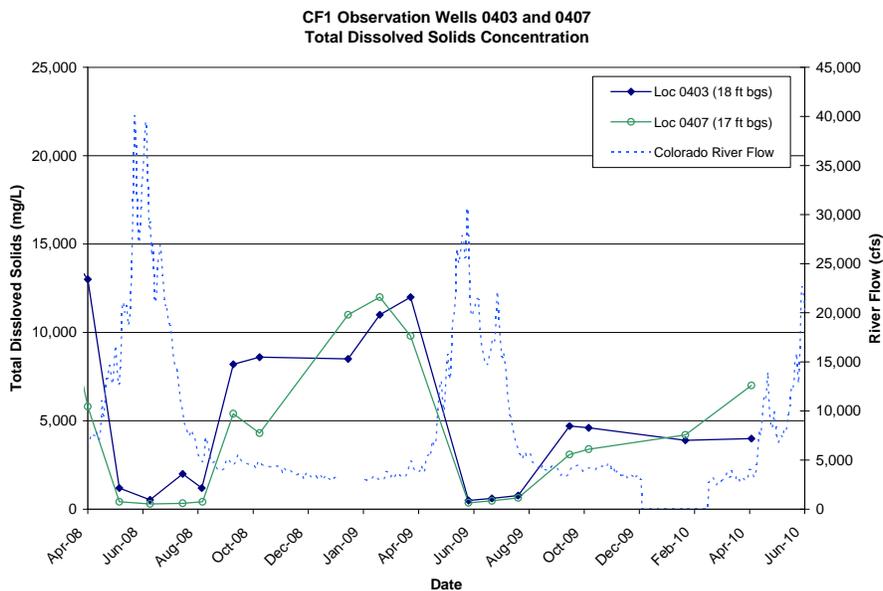


Figure 4. CF1 Observation Wells 0403 and 0407 Time Versus TDS Concentration Plot

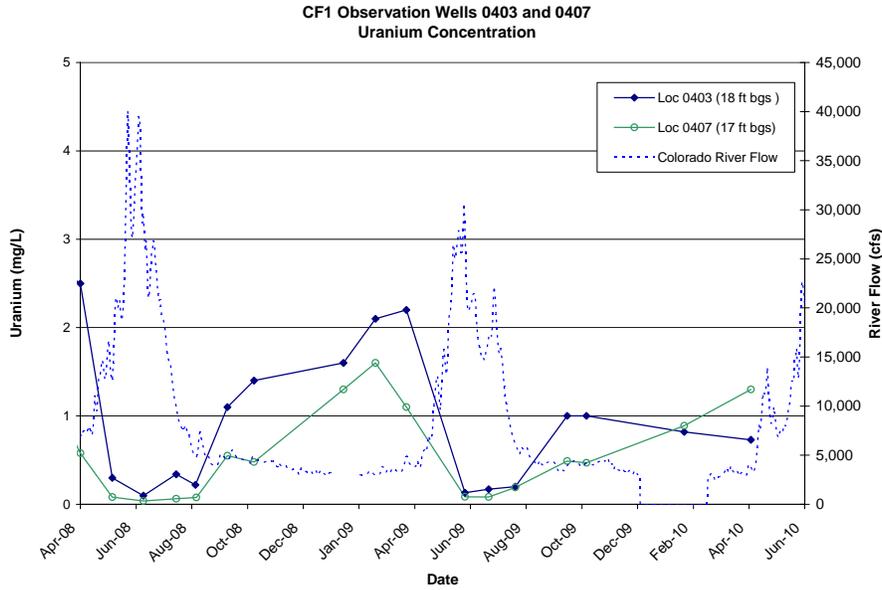


Figure 5. CF1 Observation Wells 0403 and 0407 Time Versus Uranium Concentration Plot

CF4

Of the indicator wells typically discussed in this summary for CF4, locations 0780 (28 feet below ground surface [ft bgs]), 0786 (28 ft bgs), and 0782 (33 ft bgs) were sampled during this monthly sampling event. Ammonia, TDS, and uranium concentration trends over the past 2 years are displayed in Figures 6, 7, and 8, respectively. In general, ammonia concentrations continued to gradually increase since October 2009, while the TDS and uranium concentrations did not significantly change at any of the three locations. Because the river stage was not significantly above base flow, no decrease in concentrations was expected.

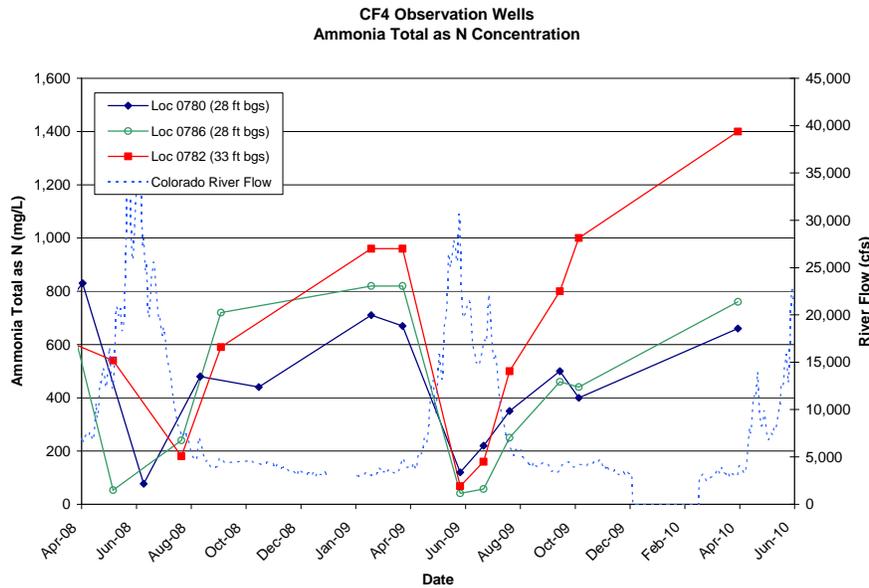


Figure 6. CF4 Observation Well Time Versus Ammonia Total as N Concentration Plot

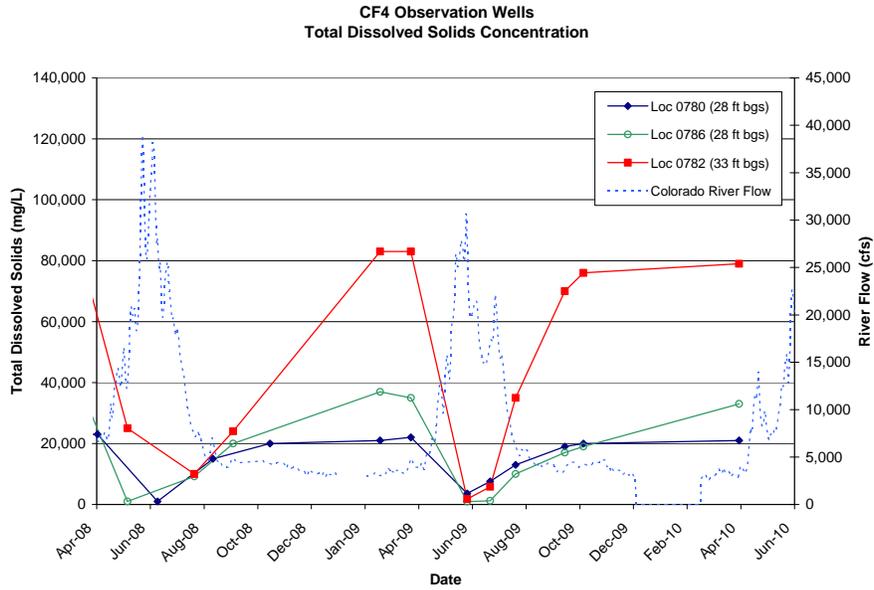


Figure 7. CF4 Observation Well Time Versus TDS Concentration Plot

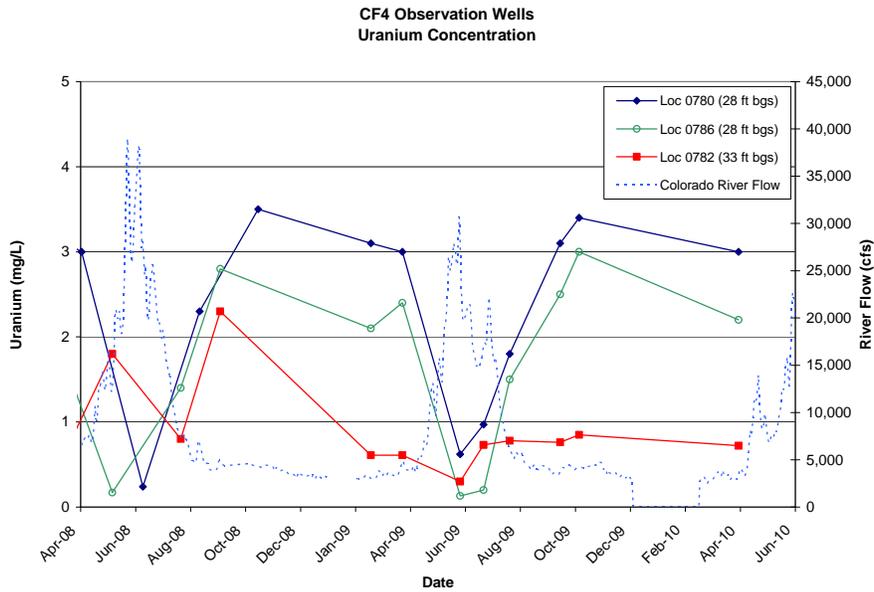


Figure 8. CF4 Observation Well Time Versus Uranium Concentration Plot

CF5

The CF5 locations were sampled for the second time since they were installed in December 2009/January 2010. Table 1 provides a comparison between the two sampling events for these locations. There were no significant changes between the analyte concentrations from the two events.

Table 1. Analytical Results of CF5 Wells

Well No.	Sample Depth (ft)	NH ₃ -N (mg/L)		TDS (mg/L)		U (mg/L)	
		Feb 2010	March 2010	Feb 2010	March 2010	Feb 2010	March 2010
0810	12.5	310	280	22,000	24,000	2.9	2.7
	25.5	310	310	22,000	23,000	3.0	2.6
	38	440	450	36,000	37,000	4.5	4.2
0811	12.5	310	460	16,000	16,000	2.5	2.5
	23.5	320	440	16,000	16,000	2.6	2.5
	36.6	320	480	16,000	16,000	2.8	2.4
0812	16	460	470	14,000	14,000	2.9	3.0
	29	470	500	13,000	14,000	3.0	3.0
	42	430	620	14,000	16,000	3.1	2.3
0813	16	390	390	13,000	14,000	2.1	2.0
	29	430	410	14,000	15,000	2.2	2.2
	42	430	390	13,000	15,000	2.2	2.2
0814	15	900	480	18,000	16,000	2.6	2.5
	28	810	440	18,000	15,000	2.7	2.4
	41	690	320	17,000	19,000	2.6	3.3
0815	24	900	N/A	15,000	N/A	4.0	N/A
	36	250	N/A	15,000	N/A	4.3	N/A
	49	55	N/A	22,000	N/A	4.6	N/A
0816	23	130	130	13,000	14,000	2.2	2.2
	36	160	160	14,000	14,000	2.4	2.4
	49	21	32	26,000	22,000	4.1	3.6

mg/L= milligrams per liter; N/A= not applicable; NH₃-N = ammonia; U = uranium

Uranium Plume

The locations sampled associated with the uranium plume located northeast of the tailings pile have been sampled at various times over the past 2 years. Table 2 provides a comparison between the April 2010 uranium results and the previous results over the past 2 years. In general, the results are consistent, with the exception of well 0411, which decreased to 5.6 milligrams per liter (mg/L) after having a concentration of 19 mg/L in August 2008.

Table 2. Analytical Results of Uranium Plume Sample Locations

Location	Uranium Concentration (mg/L)				
	Aug 2008	Jan 2009	June 2009	Oct 2009	Apr 2010
0411	19	Not Sampled	12	Not Sampled	5.6
0412	5.8	Not Sampled	Not Sampled	Not Sampled	4.1
0413	1.5	1.5	1.2	1.1	1.4
0414	5.3	Not Sampled	4.9	Not Sampled	5.7
SMI-MW01	5.0	4.4	6	4.9	5.8

Surface Water Sampling Results

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

1.3 Sampling and Analyses

Sampling and analyses were conducted in accordance with the April 2008 *Operations, Maintenance, and Performance Monitoring Plan for the Interim Action Ground Water Treatment System* (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 because some of the samples were collected on non-dedicated equipment, one equipment blank (EB) was collected. All samples were analyzed within their prescribed holding times except as noted in Section 2.2. No significant discrepancies were noted regarding chain of custody (COC), case narratives, presence of field and sample identifications, holding times, preservation, or cooler receipts, except as qualified or noted in the Laboratory Performance Assessment (Section 2.2).

There were two locations with two total anomalous data points. See Section 3.2 for further discussion of these locations and data points.

According to the USGS Cisco gauging station, the mean daily Colorado River flows ranged from 2,840 to 4,100 cubic feet per second (cfs) during this monthly 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).

2.1 Water Sampling Field Activities Verification

The field activities verification process for this monthly 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

Report Identification No. (RIN):	1004043
Sample Event:	April 2010 Interim Action Well Field Monthly Sampling
Site(s):	Moab, Utah
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Sample Data Group (SDG) No.:	1004037 and 1004057
Analysis:	Metals and Inorganics
Validator:	Rachel Cowan
Review Date:	June 10, 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 3.

Table 3. 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
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 4. Refer to Table 5 for an explanation of the data qualifiers applied.

Table 4. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1004037-1	0274	TDS	J	HT2
1004037-2 through -9; -21 through -25; 1004057-7 through -9	0548, 0780, 0782, 0786, 0810-D, 0810-M, 0810-S, 0811-D, 0816D, 0816-M, 0816-S; 0481, 0482, 0484	Ammonia	J	MS1
1004037-21 through -25	0816D, 0816-M, 0816-S	Ammonia	J	RS1

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

Table 5. Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Nondetects)	Explanation
HT2	J	UJ	Samples were analyzed past the holding time, but within two times the holding time.
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 EB, or (d) not analyzed at the proper frequency as stated in the appropriate analytical method.
RS1	J	J or R	Results for the affected analyte(s) are regarded as estimated (J) because replicate samples were not analyzed at the frequency stated in the procedure.

Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received a total of 38 samples for RIN 1004043 in two shipments. SDG 1004037 of 25 samples arrived on April 3, 2010 (UPS tracking number 1Z5W1Y510190259523), and SDG 1004057 of 13 samples arrived on April 7, 2010 (UPS tracking number 1Z5W1Y510198099763). Each SDG 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 that one of the custody seals had broken (sample 1004057-3), but the tape under the seal remained intact, so no results were qualified.

Preservation and Holding Times

SDG 1004037 was received intact in two coolers, and SDG 1004057 was received intact in one cooler with the temperatures inside all three coolers at 0.2°C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses, except sample 1004037-15, which had a pH of greater than 3.0, which ALS corrected down to less than 2.0 for the metals analyses. All samples were analyzed within the applicable holding times, except for TDS in sample 1004037-1, which was analyzed within two times the holding time and “J”-flagged for reason HT2.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. Calibration standards were prepared from independent sources. In addition, for inductively coupled plasma (ICP) analytes (manganese, copper, selenium, uranium), reporting limit verifications (CRIs) verify the linearity of the calibration curve near the reporting limit (RL). For ICP-mass spectrometry (ICP-MS) analytes (selenium and uranium), instrument tuning and performance criteria are checked for mass calibration and resolution verifications. Also, internal standards are analyzed to indicate stability of the instruments for ICP-MS.

Method SW-846 6010B, Manganese

Calibrations for manganese were performed on April 27, 2010. All calibrations used three calibration standards and a blank, resulting in calibration curves with correlation coefficient (r^2) values greater than 0.995. The manganese intercept was negative, but the intercept's absolute value was not more than three times the instrument detection limit (IDL). No manganese results needed to be qualified with a “J.”

Initial and continuing calibration verification (ICV and CCV) checks were made at the required frequency, resulting in six CCVs for manganese on April 27, 2010. All calibration checks met the acceptance criteria. The CRI verifications were within the acceptance range.

Method SW-846 6020A, Selenium and Uranium

The calibration for the selenium analyses was performed on April 14, 2010. The uranium calibrations were performed on April 6 and April 14, 2010. All initial calibrations for both analytes were performed using eight calibration standards and one blank, resulting in calibration curves with r^2 values greater than 0.995. Although the calibration curve intercepts for uranium were both negative, their absolute values were greater than 3 times the IDL. Therefore, all uranium results were checked to confirm that all results were greater than three times the absolute value of the intercept; none were, so none were flagged for this reason.

ICV and CCV checks were made at the required frequency, resulting in two CCVs for selenium and four CCVs (April 6) and two CCVs (April 15) for uranium, respectively. All calibration checks met the acceptance criteria. CRIs were made at the required frequency to verify the linearity of the calibration curve near the RL.

The CRI verifications were within the acceptance criteria range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries were stable and within acceptable ranges.

Method EPA 350.1, Ammonia as N

Initial calibrations for ammonia as N were performed using six calibration standards and a blank on April 13 and April 15, 2010. The calibration curves had r^2 values greater than 0.995 and intercepts less than three times the method detection limit (MDL). ICV and CCV checks were made at the required frequency resulting in two CCVs (April 13) and seven CCVs (April 15). All calibration check results were within the acceptance criteria.

Method EPA 160.1, Total Dissolved Solids (TDS)

There are no initial or continuing calibration requirements associated with the determination of TDS.

Method and Calibration Blanks

Method blanks (MBs) are analyzed to assess any contamination that may have occurred during sample preparation. Both initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) are analyzed to assess instrument contamination prior to and during sample analysis. Detected sample results associated with blanks results greater than the MDL or IDL (depending on method requirements) were “U”-qualified when the detections were less than five times the blank concentration. Nondetects were not qualified.

All of the manganese blanks (ICBs and CCBs) had results that were greater than the manganese IDL. However, all of the manganese results were greater than five times this highest blank’s concentration, so no results were qualified.

All uranium blanks (ICBs and CCBs) results were greater than the uranium IDL. However, all results were greater than five times the highest blank’s concentration, so no results were qualified. The selenium ICB had results that were greater than the selenium IDL; however, all selenium results were greater than five times this blank’s concentration, so no results were qualified.

One ammonia CCB result was greater than the ammonia MDL. However, the ammonia results from all the samples were greater than five times this blank’s concentration, so no ammonia results were flagged for this reason.

ICP Interference Check Sample Analysis

ICP interference check samples (ICSA and ICSAB) are analyzed to verify the instrument interelement and background correction factors. For the manganese results, interelement interference was not a factor based on the results from all the samples’ aluminum, calcium, iron, and magnesium concentrations being lower than the corresponding amounts in the ICSA standard. The recovery of the ICSAB samples was acceptable as well.

For the uranium and selenium analyses, the ICSA values for calcium, magnesium, aluminum, and iron were not provided for verification of the instrument's interelement and background correction factors. The percent recoveries of the ICSAB samples were provided and were acceptable for all uranium and selenium analyses.

Matrix Spike Analysis

Matrix spike (MS) samples were prepared and analyzed for all analytes as a measure of method performance in the sample matrix. Laboratory spike standards are prepared from independent sources. The spike recoveries met the recovery and precision criteria for all analytes, with the following exception.

The ammonia method states that one MS must be analyzed per 10 field samples. There were not enough MSs for ammonia (only one MS for 25 samples in SDG 1004037 and only one MS for 13 samples in SDG 1004057). Thus, samples 1004037-2 through -9, -21 through -25, and 1004057-21 through -25 were flagged with a "J" for reason MS1. The MS recovery for SDG 1004037 could not be evaluated because the ammonia concentration in the native sample was already above the analytical range. Based on validation protocol, qualification requirements are not applicable when the native sample concentration exceeds four times the spike concentration. Therefore, no qualifiers were applied to ammonia results associated with this un-analyzed MS.

Laboratory Replicate Analysis

The laboratory replicate results demonstrate acceptable laboratory precision. The relative percent difference (RPD) values for the reported laboratory replicate sample (for TDS) and the MS results for all other analytes were less than 20 percent for results greater than 5 times the RL with the following exception.

The RPD could not be determined for the SDG 1004037 ammonia MS duplicate, because the MS failed. However, the two field duplicate samples met the precision requirements for ammonia. Therefore, no ammonia results required "J" qualification for reason RS1.

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. Duplicate samples were collected from locations 0813-D (1004037-24) and SMI-MW01 (1004057-12) in the April 2010 monthly sampling event. These duplicate results met the U.S. Environmental Protection Agency (EPA)-recommended laboratory duplicate criteria of less than 20 RPD for results that are greater than five times the RL.

Laboratory Control Sample

Laboratory control samples (LCS) provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. LCS results were acceptable for all analyses with the following exceptions.

LCSs were not reported for copper, manganese, or uranium. As a standard practice, ALS Laboratory Group does not prepare LCSs for samples that were field-filtered and acidified and run directly on the instrument without any additional sample preparation. Per national environmental laboratory accreditation requirements provided by the NELAC Institute, an MS may be used in place of an LCS provided the acceptance criteria are as stringent. Therefore, no

qualification was required because of lack of LCS results because all of the MS results for manganese, selenium, and uranium were acceptable. See Matrix Spike Analysis section for required qualification.

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. ICP-MS SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the 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.

Detection Limits/Dilutions

Dilutions were prepared in a consistent and acceptable manner when dilutions were required. The required detection limits were achieved for all analytes.

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 April 30, 2010. The contents of the EDD files were manually examined to ensure all and only the requested data are delivered in compliance with requirements and that the sample results accurately reflect the data contained in the sample data package.

2.3 Field Analyses/Activities

The following information summarizes the field analyses and activities for the April 2010 monthly sampling event.

Field Activities

All monitor wells were purged and sampled using the low-flow sampling method in dedicated equipment. (Extraction wells were sampled using micropurge techniques with a peristaltic pump and non-dedicated downhole and pump-head tubing.) 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* (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

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

Loc. No.	Analyte	Type of Anomaly	Disposition
0412	ammonia	low	Less than 10 samples collected from this location analyzed for this analyte; still establishing range.
0548	manganese	high	Water chemistry in evaporation pond is changing due to addition of water from the tailings excavation.

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

The 18 samples from CF5 were collected on non-dedicated equipment, so one EB was also collected during this monthly sampling event. The results are presented in Appendix E. In this EB, two of the analytes, uranium and manganese, were detected in the EB, but at a concentration much lower than the RL. Following validation procedure, all results of these analytes from SDG 1004037 were visually checked to see if the results were less than five times the concentration of uranium and manganese 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

Sampling Event/RIN	April 2010 RIN 1004043	Date(s) of Water Sampling	March 23 – April 7, 2010
Date(s) of Verification	June 11, 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	See Section 1.1 for specific details.
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 38 samples collected, including two duplicates.
10. Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	Eighteen samples were collected on non-dedicated equipment; and one EB was also collected.

Appendix A. Water Sampling Field Activities Verification (continued)

Sampling Event/RIN	April 2010 RIN 1004043	Date(s) of Water Sampling	March 23 – April 7, 2010
Date(s) of Verification	June 11, 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?	No	The presence of ice in the cooler wasn't documented for well 0481; but ice in the cooler was documented for the samples collected before and after it.
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: 1004043

Comparison: All Historical Data

Report Date: 6/11/2010

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	0403	04/05/2010	Ammonia Total as N	10		930		15		68	0		
MOA01	0412	04/06/2010	Ammonia Total as N	0.1	U	1.281	F	0.31		6	0		
MOA01	0412	04/06/2010	Selenium	0.051		0.1	F	0.064		6	0		
MOA01	0412	04/06/2010	Uranium	4.1		12.8	F	5.8		6	0		
MOA01	0413	04/06/2010	Selenium	0.14		0.3		0.17		8	0		
MOA01	0414	04/06/2010	Ammonia Total as N	13		32.997	QF	17	J	6	0		
MOA01	0414	04/06/2010	Manganese	0.13		0.1		0.0395	UF	6	1		
MOA01	0414	04/06/2010	Selenium	0.073		0.205	F	0.089		6	0		
MOA01	0414	04/06/2010	Uranium	5.7		5.3		2.82	QF	6	0		
MOA01	0481	04/05/2010	Ammonia Total as N	480	J	1400	F	490	J	36	0		
MOA01	0548	04/01/2010	Ammonia Total as N	2000	J	1400		230	J	41	0		
MOA01	0548	04/01/2010	Manganese	44		11		2		16	0		
MOA01	0548	04/01/2010	Uranium	0.97		6.2		1.6		41	0		
MOA01	0782	04/01/2010	Ammonia Total as N	1400	J	1000	J	63		31	0		
MOA01	0782	04/01/2010	Manganese	10		9.9	J	0.091		23	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.

Appendix B. Minimums and Maximums Report (continued)

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 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. | 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. | | |

Appendix C.
Water Quality Data

Appendix C. Water Quality Data

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 6/11/2010

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	0274 Seep	SL	03/23/2010	0001	0	-	0	260			#	10	
Ammonia Total as N	mg/L	0403	WL	04/05/2010	0001	18	-	18	10			#	0.5	
Ammonia Total as N	mg/L	0407	WL	04/05/2010	0001	17	-	17	210			#	5	
Ammonia Total as N	mg/L	0411	WL	04/06/2010	0001	8	-	8	9.1			#	0.5	
Ammonia Total as N	mg/L	0412	WL	04/06/2010	0001	11.5	-	11.5	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0413	WL	04/06/2010	0001	10.5	-	10.5	9.6			#	0.5	
Ammonia Total as N	mg/L	0414	WL	04/06/2010	0001	8.5	-	8.5	13			#	0.5	
Ammonia Total as N	mg/L	0481	WL	04/05/2010	0001	28	-	28	480		J	#	10	
Ammonia Total as N	mg/L	0482	WL	04/05/2010	0001	58	-	58	670		J	#	20	
Ammonia Total as N	mg/L	0484	WL	04/05/2010	0001	28	-	28	500		J	#	10	
Ammonia Total as N	mg/L	0548	TS	04/01/2010	0001	0	-	0	2000		J	#	50	
Ammonia Total as N	mg/L	0559	WL	04/05/2010	0001	19	-	19	170			#	10	
Ammonia Total as N	mg/L	0560	WL	04/05/2010	0001	36	-	36	890			#	50	
Ammonia Total as N	mg/L	0780	WL	04/01/2010	0001	28	-	28	660		J	#	50	
Ammonia Total as N	mg/L	0782	WL	04/01/2010	0001	33	-	33	1400		J	#	50	
Ammonia Total as N	mg/L	0786	WL	04/01/2010	0001	28	-	28	760		J	#	50	
Ammonia Total as N	mg/L	0810	WL	03/30/2010	0001	25.5	-	25.5	310		J	#	50	
Ammonia Total as N	mg/L	0810	WL	03/30/2010	0001	12.5	-	12.5	280		J	#	50	
Ammonia Total as N	mg/L	0810	WL	03/30/2010	0001	38	-	38	450		J	#	50	
Ammonia Total as N	mg/L	0811	WL	03/30/2010	0001	12.5	-	12.5	460			#	50	
Ammonia Total as N	mg/L	0811	WL	03/30/2010	0001	23.5	-	23.5	440			#	50	
Ammonia Total as N	mg/L	0811	WL	03/30/2010	0001	36.6	-	36.6	480		J	#	50	
Ammonia Total as N	mg/L	0812	WL	03/30/2010	0001	16	-	16	470			#	50	
Ammonia Total as N	mg/L	0812	WL	03/30/2010	0001	29	-	29	500			#	50	
Ammonia Total as N	mg/L	0812	WL	03/30/2010	0001	42	-	42	620			#	50	
Ammonia Total as N	mg/L	0813	WL	03/31/2010	0001	42	-	42	390			#	50	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 6/11/2010

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	0813	WL	03/31/2010	0001	16	- 16	390		#	50	
Ammonia Total as N	mg/L	0813	WL	03/31/2010	0001	29	- 29	410		#	50	
Ammonia Total as N	mg/L	0813	WL	03/31/2010	0002	0	- 0	430	J	#	10	
Ammonia Total as N	mg/L	0814	WL	03/31/2010	0001	41	- 41	320		#	50	
Ammonia Total as N	mg/L	0814	WL	03/31/2010	0001	28	- 28	440		#	50	
Ammonia Total as N	mg/L	0814	WL	03/31/2010	0001	15	- 15	480		#	50	
Ammonia Total as N	mg/L	0816	WL	03/31/2010	0001	49	- 49	32	J	#	1	
Ammonia Total as N	mg/L	0816	WL	03/31/2010	0001	36	- 36	160	J	#	5	
Ammonia Total as N	mg/L	0816	WL	03/31/2010	0001	23	- 23	130	J	#	5	
Ammonia Total as N	mg/L	SMI-MW01	WL	04/06/2010	0001	16	- 16	1.7		#	0.1	
Ammonia Total as N	mg/L	SMI-MW01	WL	04/06/2010	0002	14.41	- 29.41	1.9		#	0.1	
Dissolved Oxygen	mg/L	0274 Seep	SL	03/23/2010	0001	0	- 0	0.48		#		
Dissolved Oxygen	mg/L	0403	WL	04/05/2010	0001	18	- 18	1.53		#		
Dissolved Oxygen	mg/L	0407	WL	04/05/2010	0001	17	- 17	1.29		#		
Dissolved Oxygen	mg/L	0411	WL	04/06/2010	0001	8	- 8	8.62		#		
Dissolved Oxygen	mg/L	0412	WL	04/06/2010	0001	11.5	- 11.5	3.14		#		
Dissolved Oxygen	mg/L	0413	WL	04/06/2010	0001	10.5	- 10.5	0.67		#		
Dissolved Oxygen	mg/L	0414	WL	04/06/2010	0001	8.5	- 8.5	1.62		#		
Dissolved Oxygen	mg/L	0481	WL	04/05/2010	0001	28	- 28	0.58		#		
Dissolved Oxygen	mg/L	0482	WL	04/05/2010	0001	58	- 58	0.35		#		
Dissolved Oxygen	mg/L	0484	WL	04/05/2010	0001	28	- 28	1.51		#		
Dissolved Oxygen	mg/L	0548	TS	04/01/2010	0001	0	- 0	8.82		#		
Dissolved Oxygen	mg/L	0559	WL	04/05/2010	0001	19	- 19	0.86		#		
Dissolved Oxygen	mg/L	0560	WL	04/05/2010	0001	36	- 36	1.04		#		
Dissolved Oxygen	mg/L	0780	WL	04/01/2010	0001	28	- 28	0.76		#		
Dissolved Oxygen	mg/L	0782	WL	04/01/2010	0001	33	- 33	0.47		#		
Dissolved Oxygen	mg/L	0786	WL	04/01/2010	0001	28	- 28	0.4		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

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	0810	WL	03/30/2010	0001	25.5	-	25.5	1.02		#		
Dissolved Oxygen	mg/L	0810	WL	03/30/2010	0001	12.5	-	12.5	1.09		#		
Dissolved Oxygen	mg/L	0810	WL	03/30/2010	0001	38	-	38	1.13		#		
Dissolved Oxygen	mg/L	0811	WL	03/30/2010	0001	36.6	-	36.6	1.08		#		
Dissolved Oxygen	mg/L	0811	WL	03/30/2010	0001	23.5	-	23.5	1.25		#		
Dissolved Oxygen	mg/L	0811	WL	03/30/2010	0001	12.5	-	12.5	1.51		#		
Dissolved Oxygen	mg/L	0812	WL	03/30/2010	0001	42	-	42	1.02		#		
Dissolved Oxygen	mg/L	0812	WL	03/30/2010	0001	29	-	29	1.08		#		
Dissolved Oxygen	mg/L	0812	WL	03/30/2010	0001	16	-	16	1.22		#		
Dissolved Oxygen	mg/L	0813	WL	03/31/2010	0001	29	-	29	0.93		#		
Dissolved Oxygen	mg/L	0813	WL	03/31/2010	0001	42	-	42	0.93		#		
Dissolved Oxygen	mg/L	0813	WL	03/31/2010	0001	16	-	16	1.02		#		
Dissolved Oxygen	mg/L	0814	WL	03/31/2010	0001	41	-	41	0.64		#		
Dissolved Oxygen	mg/L	0814	WL	03/31/2010	0001	28	-	28	0.83		#		
Dissolved Oxygen	mg/L	0814	WL	03/31/2010	0001	15	-	15	1.1		#		
Dissolved Oxygen	mg/L	0816	WL	03/31/2010	0001	49	-	49	0.63		#		
Dissolved Oxygen	mg/L	0816	WL	03/31/2010	0001	36	-	36	0.67		#		
Dissolved Oxygen	mg/L	0816	WL	03/31/2010	0001	23	-	23	0.96		#		
Dissolved Oxygen	mg/L	SMI-MW01	WL	04/06/2010	0001	16	-	16	1.53		#		
Manganese	mg/L	0274 Seep	SL	03/23/2010	0001	0	-	0	4.9		#	0.00054	
Manganese	mg/L	0403	WL	04/05/2010	0001	18	-	18	2.6		#	0.00027	
Manganese	mg/L	0407	WL	04/05/2010	0001	17	-	17	3.9		#	0.00027	
Manganese	mg/L	0411	WL	04/06/2010	0001	8	-	8	0.13		#	0.00027	
Manganese	mg/L	0412	WL	04/06/2010	0001	11.5	-	11.5	0.0039	B	#	0.00027	
Manganese	mg/L	0413	WL	04/06/2010	0001	10.5	-	10.5	0.14		#	0.00027	
Manganese	mg/L	0414	WL	04/06/2010	0001	8.5	-	8.5	0.13		#	0.00027	
Manganese	mg/L	0481	WL	04/05/2010	0001	28	-	28	5.3		#	0.00054	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Manganese	mg/L	0482	WL	04/05/2010	0001	58	-	58	9		#	0.0054	
Manganese	mg/L	0484	WL	04/05/2010	0001	28	-	28	4.9		#	0.00054	
Manganese	mg/L	0548	TS	04/01/2010	0001	0	-	0	44		#	0.0013	
Manganese	mg/L	0559	WL	04/05/2010	0001	19	-	19	3.4		#	0.00027	
Manganese	mg/L	0560	WL	04/05/2010	0001	36	-	36	6.9		#	0.0013	
Manganese	mg/L	0780	WL	04/01/2010	0001	28	-	28	5.6		#	0.00054	
Manganese	mg/L	0782	WL	04/01/2010	0001	33	-	33	10		#	0.0027	
Manganese	mg/L	0786	WL	04/01/2010	0001	28	-	28	6.2		#	0.0013	
Manganese	mg/L	0810	WL	03/30/2010	0001	25.5	-	25.5	4.7		#	0.00054	
Manganese	mg/L	0810	WL	03/30/2010	0001	12.5	-	12.5	4.7		#	0.00054	
Manganese	mg/L	0810	WL	03/30/2010	0001	38	-	38	5.4		#	0.0013	
Manganese	mg/L	0811	WL	03/30/2010	0001	12.5	-	12.5	2.1		#	0.00054	
Manganese	mg/L	0811	WL	03/30/2010	0001	23.5	-	23.5	2		#	0.00054	
Manganese	mg/L	0811	WL	03/30/2010	0001	36.6	-	36.6	3.1		#	0.00054	
Manganese	mg/L	0812	WL	03/30/2010	0001	16	-	16	4.2		#	0.00054	
Manganese	mg/L	0812	WL	03/30/2010	0001	29	-	29	4.2		#	0.00054	
Manganese	mg/L	0812	WL	03/30/2010	0001	42	-	42	5.4		#	0.00054	
Manganese	mg/L	0813	WL	03/31/2010	0001	29	-	29	5.5		#	0.00054	
Manganese	mg/L	0813	WL	03/31/2010	0001	16	-	16	4.5		#	0.00054	
Manganese	mg/L	0813	WL	03/31/2010	0001	42	-	42	5.6		#	0.00054	
Manganese	mg/L	0813	WL	03/31/2010	0002	0	-	0	5.3		#	0.00054	
Manganese	mg/L	0814	WL	03/31/2010	0001	28	-	28	1.4		#	0.00054	
Manganese	mg/L	0814	WL	03/31/2010	0001	15	-	15	1.5		#	0.00054	
Manganese	mg/L	0814	WL	03/31/2010	0001	41	-	41	3.4		#	0.00054	
Manganese	mg/L	0816	WL	03/31/2010	0001	36	-	36	3.4		#	0.00054	
Manganese	mg/L	0816	WL	03/31/2010	0001	23	-	23	4		#	0.00054	
Manganese	mg/L	0816	WL	03/31/2010	0001	49	-	49	3.5		#	0.00054	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Manganese	mg/L	SMI-MW01	WL	04/06/2010	0001	16	-	16	0.76		#	0.00027	
Manganese	mg/L	SMI-MW01	WL	04/06/2010	0002	14.41	-	29.41	0.76		#	0.00027	
Oxidation Reduction Potential	mV	0274 Seep	SL	03/23/2010	0001	0	-	0	206		#		
Oxidation Reduction Potential	mV	0403	WL	04/05/2010	0001	18	-	18	155		#		
Oxidation Reduction Potential	mV	0407	WL	04/05/2010	0001	17	-	17	165.5		#		
Oxidation Reduction Potential	mV	0411	WL	04/06/2010	0001	8	-	8	154.9		#		
Oxidation Reduction Potential	mV	0412	WL	04/06/2010	0001	11.5	-	11.5	154.9		#		
Oxidation Reduction Potential	mV	0413	WL	04/06/2010	0001	10.5	-	10.5	188		#		
Oxidation Reduction Potential	mV	0414	WL	04/06/2010	0001	8.5	-	8.5	146.1		#		
Oxidation Reduction Potential	mV	0481	WL	04/05/2010	0001	28	-	28	156.3		#		
Oxidation Reduction Potential	mV	0482	WL	04/05/2010	0001	58	-	58	191		#		
Oxidation Reduction Potential	mV	0484	WL	04/05/2010	0001	28	-	28	127.6		#		
Oxidation Reduction Potential	mV	0548	TS	04/01/2010	0001	0	-	0	181		#		
Oxidation Reduction Potential	mV	0559	WL	04/05/2010	0001	19	-	19	207		#		
Oxidation Reduction Potential	mV	0560	WL	04/05/2010	0001	36	-	36	192		#		
Oxidation Reduction Potential	mV	0780	WL	04/01/2010	0001	28	-	28	121		#		
Oxidation Reduction Potential	mV	0782	WL	04/01/2010	0001	33	-	33	163		#		
Oxidation Reduction Potential	mV	0786	WL	04/01/2010	0001	28	-	28	140		#		
Oxidation Reduction Potential	mV	0810	WL	03/30/2010	0001	38	-	38	-20		#		
Oxidation Reduction Potential	mV	0810	WL	03/30/2010	0001	25.5	-	25.5	182		#		
Oxidation Reduction Potential	mV	0810	WL	03/30/2010	0001	12.5	-	12.5	183		#		
Oxidation Reduction Potential	mV	0811	WL	03/30/2010	0001	12.5	-	12.5	84		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 6/11/2010

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	0811	WL	03/30/2010	0001	23.5	-	23.5	104			#		
Oxidation Reduction Potential	mV	0811	WL	03/30/2010	0001	36.6	-	36.6	115			#		
Oxidation Reduction Potential	mV	0812	WL	03/30/2010	0001	16	-	16	141			#		
Oxidation Reduction Potential	mV	0812	WL	03/30/2010	0001	42	-	42	145			#		
Oxidation Reduction Potential	mV	0812	WL	03/30/2010	0001	29	-	29	150			#		
Oxidation Reduction Potential	mV	0813	WL	03/31/2010	0001	16	-	16	205.3			#		
Oxidation Reduction Potential	mV	0813	WL	03/31/2010	0001	29	-	29	220.7			#		
Oxidation Reduction Potential	mV	0813	WL	03/31/2010	0001	42	-	42	224.1			#		
Oxidation Reduction Potential	mV	0814	WL	03/31/2010	0001	41	-	41	175.9			#		
Oxidation Reduction Potential	mV	0814	WL	03/31/2010	0001	15	-	15	180.7			#		
Oxidation Reduction Potential	mV	0814	WL	03/31/2010	0001	28	-	28	183.5			#		
Oxidation Reduction Potential	mV	0816	WL	03/31/2010	0001	49	-	49	130.1			#		
Oxidation Reduction Potential	mV	0816	WL	03/31/2010	0001	36	-	36	137.4			#		
Oxidation Reduction Potential	mV	0816	WL	03/31/2010	0001	23	-	23	139.1			#		
Oxidation Reduction Potential	mV	SMI-MW01	WL	04/06/2010	0001	16	-	16	158.3			#		
pH	s.u.	0274 Seep	SL	03/23/2010	0001	0	-	0	6.7			#		
pH	s.u.	0403	WL	04/05/2010	0001	18	-	18	6.66			#		
pH	s.u.	0407	WL	04/05/2010	0001	17	-	17	6.85			#		
pH	s.u.	0411	WL	04/06/2010	0001	8	-	8	7.98			#		
pH	s.u.	0412	WL	04/06/2010	0001	11.5	-	11.5	7.75			#		
pH	s.u.	0413	WL	04/06/2010	0001	10.5	-	10.5	7.71			#		
pH	s.u.	0414	WL	04/06/2010	0001	8.5	-	8.5	7.64			#		
pH	s.u.	0481	WL	04/05/2010	0001	28	-	28	6.88			#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
pH	s.u.	0482	WL	04/05/2010	0001	58	-	58	6.75		#		
pH	s.u.	0484	WL	04/05/2010	0001	28	-	28	6.88		#		
pH	s.u.	0548	TS	04/01/2010	0001	0	-	0	5.48		#		
pH	s.u.	0559	WL	04/05/2010	0001	19	-	19	6.84		#		
pH	s.u.	0560	WL	04/05/2010	0001	36	-	36	6.81		#		
pH	s.u.	0780	WL	04/01/2010	0001	28	-	28	6.85		#		
pH	s.u.	0782	WL	04/01/2010	0001	33	-	33	6.7		#		
pH	s.u.	0786	WL	04/01/2010	0001	28	-	28	6.81		#		
pH	s.u.	0810	WL	03/30/2010	0001	38	-	38	6.69		#		
pH	s.u.	0810	WL	03/30/2010	0001	12.5	-	12.5	7.08		#		
pH	s.u.	0810	WL	03/30/2010	0001	25.5	-	25.5	7.06		#		
pH	s.u.	0811	WL	03/30/2010	0001	36.6	-	36.6	6.75		#		
pH	s.u.	0811	WL	03/30/2010	0001	23.5	-	23.5	6.76		#		
pH	s.u.	0811	WL	03/30/2010	0001	12.5	-	12.5	6.78		#		
pH	s.u.	0812	WL	03/30/2010	0001	16	-	16	6.62		#		
pH	s.u.	0812	WL	03/30/2010	0001	29	-	29	6.63		#		
pH	s.u.	0812	WL	03/30/2010	0001	42	-	42	6.79		#		
pH	s.u.	0813	WL	03/31/2010	0001	16	-	16	6.75		#		
pH	s.u.	0813	WL	03/31/2010	0001	29	-	29	6.78		#		
pH	s.u.	0813	WL	03/31/2010	0001	42	-	42	6.79		#		
pH	s.u.	0814	WL	03/31/2010	0001	28	-	28	6.75		#		
pH	s.u.	0814	WL	03/31/2010	0001	15	-	15	6.78		#		
pH	s.u.	0814	WL	03/31/2010	0001	41	-	41	6.84		#		
pH	s.u.	0816	WL	03/31/2010	0001	23	-	23	6.83		#		
pH	s.u.	0816	WL	03/31/2010	0001	36	-	36	6.81		#		
pH	s.u.	0816	WL	03/31/2010	0001	49	-	49	6.98		#		
pH	s.u.	SMI-MW01	WL	04/06/2010	0001	16	-	16	7.31		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Selenium	mg/L	0412	WL	04/06/2010	0001	11.5	-	11.5	0.051		#	0.00012	
Selenium	mg/L	0413	WL	04/06/2010	0001	10.5	-	10.5	0.14		#	0.00012	
Selenium	mg/L	0414	WL	04/06/2010	0001	8.5	-	8.5	0.073		#	0.00012	
Specific Conductance	µmhos/cm	0274 Seep	SL	03/23/2010	0001	0	-	0	14203		#		
Specific Conductance	µmhos/cm	0403	WL	04/05/2010	0001	18	-	18	5350		#		
Specific Conductance	µmhos/cm	0407	WL	04/05/2010	0001	17	-	17	10256		#		
Specific Conductance	µmhos/cm	0411	WL	04/06/2010	0001	8	-	8	6455		#		
Specific Conductance	µmhos/cm	0412	WL	04/06/2010	0001	11.5	-	11.5	4134		#		
Specific Conductance	µmhos/cm	0413	WL	04/06/2010	0001	10.5	-	10.5	4023		#		
Specific Conductance	µmhos/cm	0414	WL	04/06/2010	0001	8.5	-	8.5	5430		#		
Specific Conductance	µmhos/cm	0481	WL	04/05/2010	0001	28	-	28	24002		#		
Specific Conductance	µmhos/cm	0482	WL	04/05/2010	0001	58	-	58	118153		#		
Specific Conductance	µmhos/cm	0484	WL	04/05/2010	0001	28	-	28	25041		#		
Specific Conductance	µmhos/cm	0548	TS	04/01/2010	0001	0	-	0	46332		#		
Specific Conductance	µmhos/cm	0559	WL	04/05/2010	0001	19	-	19	10191		#		
Specific Conductance	µmhos/cm	0560	WL	04/05/2010	0001	36	-	36	54300		#		
Specific Conductance	µmhos/cm	0780	WL	04/01/2010	0001	28	-	28	28004		#		
Specific Conductance	µmhos/cm	0782	WL	04/01/2010	0001	33	-	33	117895		#		
Specific Conductance	µmhos/cm	0786	WL	04/01/2010	0001	28	-	28	49527		#		
Specific Conductance	µmhos/cm	0810	WL	03/30/2010	0001	12.5	-	12.5	28882		#		
Specific Conductance	µmhos/cm	0810	WL	03/30/2010	0001	25.5	-	25.5	29645		#		
Specific Conductance	µmhos/cm	0810	WL	03/30/2010	0001	38	-	38	51703		#		
Specific Conductance	µmhos/cm	0811	WL	03/30/2010	0001	23.5	-	23.5	21266		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 6/11/2010

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	0811	WL	03/30/2010	0001	12.5	-	12.5	21510		#		
Specific Conductance	µmhos/cm	0811	WL	03/30/2010	0001	36.6	-	36.6	22241		#		
Specific Conductance	µmhos/cm	0812	WL	03/30/2010	0001	29	-	29	18283		#		
Specific Conductance	µmhos/cm	0812	WL	03/30/2010	0001	16	-	16	18352		#		
Specific Conductance	µmhos/cm	0812	WL	03/30/2010	0001	42	-	42	21087		#		
Specific Conductance	µmhos/cm	0813	WL	03/31/2010	0001	16	-	16	17573		#		
Specific Conductance	µmhos/cm	0813	WL	03/31/2010	0001	29	-	29	19022		#		
Specific Conductance	µmhos/cm	0813	WL	03/31/2010	0001	42	-	42	18891		#		
Specific Conductance	µmhos/cm	0814	WL	03/31/2010	0001	28	-	28	19484		#		
Specific Conductance	µmhos/cm	0814	WL	03/31/2010	0001	15	-	15	19879		#		
Specific Conductance	µmhos/cm	0814	WL	03/31/2010	0001	41	-	41	24248		#		
Specific Conductance	µmhos/cm	0816	WL	03/31/2010	0001	23	-	23	17138		#		
Specific Conductance	µmhos/cm	0816	WL	03/31/2010	0001	49	-	49	27159		#		
Specific Conductance	µmhos/cm	0816	WL	03/31/2010	0001	36	-	36	17251		#		
Specific Conductance	µmhos/cm	SMI-MW01	WL	04/06/2010	0001	16	-	16	5978		#		
Temperature	C	0274 Seep	SL	03/23/2010	0001	0	-	0	14.3		#		
Temperature	C	0403	WL	04/05/2010	0001	18	-	18	13.83		#		
Temperature	C	0407	WL	04/05/2010	0001	17	-	17	13.39		#		
Temperature	C	0411	WL	04/06/2010	0001	8	-	8	10.95		#		
Temperature	C	0412	WL	04/06/2010	0001	11.5	-	11.5	12.32		#		
Temperature	C	0413	WL	04/06/2010	0001	10.5	-	10.5	10.79		#		
Temperature	C	0414	WL	04/06/2010	0001	8.5	-	8.5	11.58		#		
Temperature	C	0481	WL	04/05/2010	0001	28	-	28	14.14		#		
Temperature	C	0482	WL	04/05/2010	0001	58	-	58	14.36		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Temperature	C	0484	WL	04/05/2010	0001	28	-	28	14.13		#		
Temperature	C	0548	TS	04/01/2010	0001	0	-	0	8.94		#		
Temperature	C	0559	WL	04/05/2010	0001	19	-	19	12.68		#		
Temperature	C	0560	WL	04/05/2010	0001	36	-	36	13.81		#		
Temperature	C	0780	WL	04/01/2010	0001	28	-	28	14.07		#		
Temperature	C	0782	WL	04/01/2010	0001	33	-	33	16.36		#		
Temperature	C	0786	WL	04/01/2010	0001	28	-	28	14.24		#		
Temperature	C	0810	WL	03/30/2010	0001	12.5	-	12.5	13.97		#		
Temperature	C	0810	WL	03/30/2010	0001	25.5	-	25.5	14.48		#		
Temperature	C	0810	WL	03/30/2010	0001	38	-	38	14.89		#		
Temperature	C	0811	WL	03/30/2010	0001	12.5	-	12.5	14.64		#		
Temperature	C	0811	WL	03/30/2010	0001	23.5	-	23.5	15.22		#		
Temperature	C	0811	WL	03/30/2010	0001	36.6	-	36.6	15.31		#		
Temperature	C	0812	WL	03/30/2010	0001	42	-	42	14.2		#		
Temperature	C	0812	WL	03/30/2010	0001	29	-	29	14.21		#		
Temperature	C	0812	WL	03/30/2010	0001	16	-	16	14.84		#		
Temperature	C	0813	WL	03/31/2010	0001	42	-	42	12.8		#		
Temperature	C	0813	WL	03/31/2010	0001	29	-	29	13.32		#		
Temperature	C	0813	WL	03/31/2010	0001	16	-	16	13.8		#		
Temperature	C	0814	WL	03/31/2010	0001	15	-	15	13.9		#		
Temperature	C	0814	WL	03/31/2010	0001	28	-	28	14.34		#		
Temperature	C	0814	WL	03/31/2010	0001	41	-	41	14.54		#		
Temperature	C	0816	WL	03/31/2010	0001	49	-	49	15.03		#		
Temperature	C	0816	WL	03/31/2010	0001	36	-	36	15.41		#		
Temperature	C	0816	WL	03/31/2010	0001	23	-	23	15.27		#		
Temperature	C	SMI-MW01	WL	04/06/2010	0001	16	-	16	12.28		#		
Total Dissolved Solids	mg/L	0274 Seep	SL	03/23/2010	0001	0	-	0	9800	J	#	200	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 6/11/2010

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	0403	WL	04/05/2010	0001	18	- 18	4000		#	80	
Total Dissolved Solids	mg/L	0407	WL	04/05/2010	0001	17	- 17	7000		#	200	
Total Dissolved Solids	mg/L	0412	WL	04/06/2010	0001	11.5	- 11.5	2200		#	80	
Total Dissolved Solids	mg/L	0413	WL	04/06/2010	0001	10.5	- 10.5	2200		#	80	
Total Dissolved Solids	mg/L	0414	WL	04/06/2010	0001	8.5	- 8.5	3100		#	80	
Total Dissolved Solids	mg/L	0481	WL	04/05/2010	0001	28	- 28	17000		#	400	
Total Dissolved Solids	mg/L	0482	WL	04/05/2010	0001	58	- 58	81000		#	2000	
Total Dissolved Solids	mg/L	0484	WL	04/05/2010	0001	28	- 28	18000		#	400	
Total Dissolved Solids	mg/L	0548	TS	04/01/2010	0001	0	- 0	40000		#	1000	
Total Dissolved Solids	mg/L	0559	WL	04/05/2010	0001	19	- 19	7800		#	200	
Total Dissolved Solids	mg/L	0560	WL	04/05/2010	0001	36	- 36	36000		#	1000	
Total Dissolved Solids	mg/L	0780	WL	04/01/2010	0001	28	- 28	21000		#	400	
Total Dissolved Solids	mg/L	0782	WL	04/01/2010	0001	33	- 33	79000		#	2000	
Total Dissolved Solids	mg/L	0786	WL	04/01/2010	0001	28	- 28	33000		#	1000	
Total Dissolved Solids	mg/L	0810	WL	03/30/2010	0001	25.5	- 25.5	23000		#	400	
Total Dissolved Solids	mg/L	0810	WL	03/30/2010	0001	12.5	- 12.5	24000		#	400	
Total Dissolved Solids	mg/L	0810	WL	03/30/2010	0001	38	- 38	37000		#	1000	
Total Dissolved Solids	mg/L	0811	WL	03/30/2010	0001	23.5	- 23.5	16000		#	400	
Total Dissolved Solids	mg/L	0811	WL	03/30/2010	0001	12.5	- 12.5	16000		#	400	
Total Dissolved Solids	mg/L	0811	WL	03/30/2010	0001	36.6	- 36.6	16000		#	400	
Total Dissolved Solids	mg/L	0812	WL	03/30/2010	0001	16	- 16	14000		#	400	
Total Dissolved Solids	mg/L	0812	WL	03/30/2010	0001	29	- 29	14000		#	400	
Total Dissolved Solids	mg/L	0812	WL	03/30/2010	0001	42	- 42	16000		#	400	
Total Dissolved Solids	mg/L	0813	WL	03/31/2010	0001	16	- 16	14000		#	400	
Total Dissolved Solids	mg/L	0813	WL	03/31/2010	0001	42	- 42	15000		#	400	
Total Dissolved Solids	mg/L	0813	WL	03/31/2010	0001	29	- 29	15000		#	400	
Total Dissolved Solids	mg/L	0813	WL	03/31/2010	0002	0	- 0	15000		#	400	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

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	0814	WL	03/31/2010	0001	15	-	15	16000		#	400	
Total Dissolved Solids	mg/L	0814	WL	03/31/2010	0001	41	-	41	19000		#	400	
Total Dissolved Solids	mg/L	0814	WL	03/31/2010	0001	28	-	28	15000		#	400	
Total Dissolved Solids	mg/L	0816	WL	03/31/2010	0001	23	-	23	14000		#	400	
Total Dissolved Solids	mg/L	0816	WL	03/31/2010	0001	36	-	36	14000		#	400	
Total Dissolved Solids	mg/L	0816	WL	03/31/2010	0001	49	-	49	22000		#	400	
Total Dissolved Solids	mg/L	SMI-MW01	WL	04/06/2010	0001	16	-	16	3600		#	80	
Total Dissolved Solids	mg/L	SMI-MW01	WL	04/06/2010	0002	14.41	-	29.41	3600		#	80	
Turbidity	NTU	0403	WL	04/05/2010	0001	18	-	18	1.67		#		
Turbidity	NTU	0407	WL	04/05/2010	0001	17	-	17	1.09		#		
Turbidity	NTU	0411	WL	04/06/2010	0001	8	-	8	114		#		
Turbidity	NTU	0412	WL	04/06/2010	0001	11.5	-	11.5	2.45		#		
Turbidity	NTU	0413	WL	04/06/2010	0001	10.5	-	10.5	33.9		#		
Turbidity	NTU	0414	WL	04/06/2010	0001	8.5	-	8.5	4.47		#		
Turbidity	NTU	0481	WL	04/05/2010	0001	28	-	28	2.1		#		
Turbidity	NTU	0482	WL	04/05/2010	0001	58	-	58	2.41		#		
Turbidity	NTU	0484	WL	04/05/2010	0001	28	-	28	7.09		#		
Turbidity	NTU	0548	TS	04/01/2010	0001	0	-	0	69.7		#		
Turbidity	NTU	0559	WL	04/05/2010	0001	19	-	19	4.6		#		
Turbidity	NTU	0560	WL	04/05/2010	0001	36	-	36	2.08		#		
Turbidity	NTU	0780	WL	04/01/2010	0001	28	-	28	1.5		#		
Turbidity	NTU	0782	WL	04/01/2010	0001	33	-	33	25.3		#		
Turbidity	NTU	0786	WL	04/01/2010	0001	28	-	28	1.46		#		
Turbidity	NTU	0810	WL	03/30/2010	0001	38	-	38	3.3		#		
Turbidity	NTU	0810	WL	03/30/2010	0001	12.5	-	12.5	6.22		#		
Turbidity	NTU	0810	WL	03/30/2010	0001	25.5	-	25.5	7.65		#		
Turbidity	NTU	0811	WL	03/30/2010	0001	36.6	-	36.6	1.18		#		

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Turbidity	NTU	0811	WL	03/30/2010	0001	23.5	-	23.5	1.22		#		
Turbidity	NTU	0811	WL	03/30/2010	0001	12.5	-	12.5	1.32		#		
Turbidity	NTU	0812	WL	03/30/2010	0001	16	-	16	0.56		#		
Turbidity	NTU	0812	WL	03/30/2010	0001	29	-	29	3.23		#		
Turbidity	NTU	0812	WL	03/30/2010	0001	42	-	42	6.32		#		
Turbidity	NTU	0813	WL	03/31/2010	0001	16	-	16	0.66		#		
Turbidity	NTU	0813	WL	03/31/2010	0001	29	-	29	15.4		#		
Turbidity	NTU	0813	WL	03/31/2010	0001	42	-	42	3.05		#		
Turbidity	NTU	0814	WL	03/31/2010	0001	15	-	15	1.88		#		
Turbidity	NTU	0814	WL	03/31/2010	0001	28	-	28	5.04		#		
Turbidity	NTU	0814	WL	03/31/2010	0001	41	-	41	16.4		#		
Turbidity	NTU	0816	WL	03/31/2010	0001	23	-	23	2.21		#		
Turbidity	NTU	0816	WL	03/31/2010	0001	49	-	49	9.81		#		
Turbidity	NTU	0816	WL	03/31/2010	0001	36	-	36	2.31		#		
Turbidity	NTU	SMI-MW01	WL	04/06/2010	0001	16	-	16	4.48		#		
Uranium	mg/L	0274 Seep	SL	03/23/2010	0001	0	-	0	2		#	8.8E-005	
Uranium	mg/L	0403	WL	04/05/2010	0001	18	-	18	0.73		#	8.8E-005	
Uranium	mg/L	0407	WL	04/05/2010	0001	17	-	17	1.3		#	8.8E-005	
Uranium	mg/L	0411	WL	04/06/2010	0001	8	-	8	5.6		#	0.00035	
Uranium	mg/L	0412	WL	04/06/2010	0001	11.5	-	11.5	4.1		#	0.00035	
Uranium	mg/L	0413	WL	04/06/2010	0001	10.5	-	10.5	1.4		#	8.8E-005	
Uranium	mg/L	0414	WL	04/06/2010	0001	8.5	-	8.5	5.7		#	0.00035	
Uranium	mg/L	0481	WL	04/05/2010	0001	28	-	28	2.8		#	0.00018	
Uranium	mg/L	0482	WL	04/05/2010	0001	58	-	58	0.92		#	1.8E-005	
Uranium	mg/L	0484	WL	04/05/2010	0001	28	-	28	2.7		#	8.8E-005	
Uranium	mg/L	0548	TS	04/01/2010	0001	0	-	0	0.97		#	8.8E-005	
Uranium	mg/L	0559	WL	04/05/2010	0001	19	-	19	1.5		#	8.8E-005	

Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 6/11/2010

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	Lab	Data		QA			
Uranium	mg/L	0560	WL	04/05/2010	0001	36	- 36	2.4		#	8.8E-005	
Uranium	mg/L	0780	WL	04/01/2010	0001	28	- 28	3		#	8.8E-005	
Uranium	mg/L	0782	WL	04/01/2010	0001	33	- 33	0.72		#	8.8E-005	
Uranium	mg/L	0786	WL	04/01/2010	0001	28	- 28	2.2		#	8.8E-005	
Uranium	mg/L	0810	WL	03/30/2010	0001	12.5	- 12.5	2.7		#	8.8E-005	
Uranium	mg/L	0810	WL	03/30/2010	0001	25.5	- 25.5	2.6		#	8.8E-005	
Uranium	mg/L	0810	WL	03/30/2010	0001	38	- 38	4.2		#	8.8E-005	
Uranium	mg/L	0811	WL	03/30/2010	0001	12.5	- 12.5	2.5		#	8.8E-005	
Uranium	mg/L	0811	WL	03/30/2010	0001	36.6	- 36.6	2.4		#	8.8E-005	
Uranium	mg/L	0811	WL	03/30/2010	0001	23.5	- 23.5	2.5		#	8.8E-005	
Uranium	mg/L	0812	WL	03/30/2010	0001	42	- 42	2.3		#	8.8E-005	
Uranium	mg/L	0812	WL	03/30/2010	0001	16	- 16	3		#	8.8E-005	
Uranium	mg/L	0812	WL	03/30/2010	0001	29	- 29	3		#	8.8E-005	
Uranium	mg/L	0813	WL	03/31/2010	0001	29	- 29	2.2		#	8.8E-005	
Uranium	mg/L	0813	WL	03/31/2010	0001	16	- 16	2		#	8.8E-005	
Uranium	mg/L	0813	WL	03/31/2010	0001	42	- 42	2.2		#	8.8E-005	
Uranium	mg/L	0813	WL	03/31/2010	0002	0	- 0	2.2		#	8.8E-005	
Uranium	mg/L	0814	WL	03/31/2010	0001	28	- 28	2.4		#	8.8E-005	
Uranium	mg/L	0814	WL	03/31/2010	0001	15	- 15	2.5		#	8.8E-005	
Uranium	mg/L	0814	WL	03/31/2010	0001	41	- 41	3.3		#	8.8E-005	
Uranium	mg/L	0816	WL	03/31/2010	0001	23	- 23	2.2		#	8.8E-005	
Uranium	mg/L	0816	WL	03/31/2010	0001	49	- 49	3.6		#	8.8E-005	
Uranium	mg/L	0816	WL	03/31/2010	0001	36	- 36	2.4		#	8.8E-005	
Uranium	mg/L	SMI-MW01	WL	04/06/2010	0001	16	- 16	5.9		#	0.00035	
Uranium	mg/L	SMI-MW01	WL	04/06/2010	0002	14.41	- 29.41	5.8		#	0.00035	

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

Appendix C. Water Quality Data (continued)

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: 6/21/2010

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0403	O	3968.95	04/05/2010		15.98	3952.97	
0407	O	3969.09	04/05/2010		16.68	3952.41	
0411	O	3964.88	04/06/2010		8.5	3956.38	
0412	O	3965.76	04/06/2010		10.75	3955.01	
0413	O	3965.33	04/06/2010		9.54	3955.79	
0414	O	3963.2	04/06/2010		8.39	3954.81	
0481		3968.83	04/05/2010		15.61	3953.22	
0482		3968.7	04/05/2010		16.55	3952.15	
0484		3969.19	04/05/2010		16.01	3953.18	
0559		3969.92	04/05/2010		17.22	3952.7	
0560		3968.77	04/05/2010		15.59	3953.18	
0780		3968.45	04/01/2010		16.35	3952.1	
0782		3968.46	04/01/2010		16.36	3952.1	
0786		3968.14	04/01/2010		16.26	3951.88	
0810		3961.876	03/30/2010		8.61	3953.27	
0811		3962.818	03/30/2010		8.96	3953.86	
0812		3961.41	03/30/2010		7.16	3954.25	
0813		3963.442	03/31/2010		9.19	3954.25	
0814		3960.984	03/31/2010		6.62	3954.36	
0816		3961.865	03/31/2010		7.22	3954.65	
SMI-MW01	O	3968.32	04/06/2010		13.66	3954.66	

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: 1004043

Report Date: 6/11/2010

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	04/01/2010	N001	mg/L	0.1	U	0.1		E
Manganese	MOA01	0999	04/01/2010	N001	mg/L	0.0029	BEN	5.4E-005		E
Total Dissolved Solids	MOA01	0999	04/01/2010	N001	mg/L	20	U	20		E
Uranium	MOA01	0999	04/01/2010	N001	mg/L	3.3E-005	B	1.8E-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 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: April 29, 2010
TO: K. Pill
FROM: J. Ritchey
SUBJECT: April 2010 Monthly IA Well Field Sampling Trip Report

Site: Moab, Utah

Date of Sampling Event: March 23 – April 7, 2010

Team Members: Elizabeth Glowiak, Tyler Meadows, James Ritchey

RIN Number Assigned: All samples were assigned to RIN 1004043.

Sample Shipment: All samples were shipped in three coolers overnight UPS to ALS Laboratory Group from Moab, Utah, on April 2 and April 7, 2010 (Tracking Nos. 0190259523, 0191361937, and 0198099763).

April 2010 CF1 Sampling

Number of Locations Sampled: Seven observation wells (0403, 0407, 0481, 0482, 0484, 0559, and 0560), and one evaporation pond location (0548) were sampled. A total of eight samples from CF1 were collected during the April 2010 monthly sampling event.

Locations Not Sampled: The extraction wells were not in operation during the monthly sampling event and were not sampled.

Field Variance: None

Location-specific Information – Observation Wells: All observation wells were sampled using micropurge techniques with a peristaltic pump and dedicated 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)
0403	4/05/2010	10:52	15.98	18
0407	4/05/2010	10:32	16.68	17
0481	4/05/2010	10:17	15.61	28
0482	4/05/2010	10:02	16.55	58
0484	4/05/2010	09:31	16.04	28
0559	4/05/2010	08:51	17.22	19
0560	4/05/2010	09:09	15.59	36
0548	4/01/2010	10:15	NA	NA

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

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

April 2010 CF4 Sampling

Number of Locations Sampled: Three observation wells (0780, 0782, and 0786) were sampled. Also, a surface water sample was collected from a seep occurring near surface water location 0274. A total of four samples from CF4 were collected during the April 2010 monthly sampling event.

Locations Not Sampled: None.

Field Variance: None.

Location-specific Information – Observation Wells: All observation wells were sampled using micropurge techniques with a peristaltic pump and dedicated pump-head and downhole 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)
0780	4/01/2010	11:01	16.35	28
0782	4/01/2010	11:18	16.36	33
0786	4/01/2010	11:37	16.26	28

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

Location-specific Information – Surface Water Sampling: The table below represents the surface water locations sampled.

SW No.	Date	Time	Depth (inches below surface)	Characteristics
0274 Seep	03/23/2010	14:00	0	Sample collected from a trickling seep just north of 0274

SW = surface well

February 2010 CF5 Sampling

Number of Locations Sampled: Six extraction wells (0810, 0811, 0812, 0813, 0814, 0815, and 0816) 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. Including one duplicate and one EB, a total of 20 samples from CF5 were collected during the April 2010 monthly sampling event.

Locations Not Sampled: Well 0815 was not sampled due to the fact that a pump was installed in this well, and it was not possible to collect samples from the required depths. Once the pump is operating, a sample will be collected from this location at a later date.

Field Variance: None

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

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	0813-D	Duplicate Sample from 42 feet	Ground water	APR019
2001	NA	Equipment Blank	DI Water	APR025

ID = identification; DI = deionized

Location-specific Information – Extraction Wells: All extraction wells were sampled using micropurge techniques with a peristaltic pump and non-dedicated 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	3/30/2010	09:14	8.61	12.5
0810-M	3/30/2010	09:34	8.61	25.5
0810-D	3/30/2010	09:51	8.61	38
0811-S	3/30/2010	10:18	8.96	12.5
0811-M	3/30/2010	10:34	8.96	23.5
0811-D	3/30/2010	10:50	8.96	36.6
0812-S	3/30/2010	11:16	7.16	16
0812-M	3/30/2010	11:33	7.16	29
0812-D	3/30/2010	11:48	7.17	42
0813-S	3/31/2010	14:17	9.19	16
0813-M	3/31/2010	14:34	9.19	29
0813-D	3/31/2010	14:56	9.19	42
0814-S	3/31/2010	08:38	6.62	15
0814-M	3/31/2010	09:03	6.62	28
0814-D	3/31/2010	09:21	6.62	41
0816-S	3/31/2010	10:32	7.23	23
0816-M	3/31/2010	10:54	7.22	36
0816-D	3/31/2010	11:16	7.24	49

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

April 2010 Uranium Plume Sampling

Number of Locations Sampled: Five observation wells (0411, 0412, 0413, 0414, and SMI-MW01) were sampled. Including one duplicate, a total of six samples from the uranium plume were collected during the April 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
2002	SMI-MW01	Duplicate Sample from 16 feet	Ground water	APR036

ID = identification

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

Location-specific Information – Observation Wells: All observation wells were sampled using micropurge techniques with a peristaltic pump and dedicated 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)
0411	4/06/2010	08:51	8.50	8
0412	4/06/2010	10:15	10.75	11.5
0413	4/06/2010	09:00	9.54	10.5
0414	4/06/2010	11:17	8.39	8.5
SMI-MW01	4/06/2010	10:50	13.66	16

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 monthly sampling event are provided below:

Date	Daily Mean Flow (cfs)
03/23/2010	2,840
03/30/2010	2,910
03/31/2010	2,900
04/01/2010	3,200
04/02/2010	4,000
04/03/2010	4,100
04/04/2010	4,020
04/05/2010	3,810
04/06/2010	3,600
04/07/2010	3,430

Equipment Issues: None.

Corrective Action Required/Taken: None.