

*Office of Environmental Management – Grand Junction*



Moab UMTRA Project  
April 2010 Validation Data Package  
for Performance Assessment of the  
Ground Water Sampling for the  
Matheson Wetlands Preserve

August 2010



U.S. Department  
of Energy

**Office of Environmental Management**

**Moab UMTRA Project  
April 2010 Validation Data Package for Performance Assessment of  
the Ground Water Sampling for the  
Matheson Wetlands Preserve**

**August 2010**

**Moab UMTRA Project  
April 2010 Matheson Wetlands Preserve Ground Water Sampling Event**

**Revision 0**

**Review and Approval**

*KGP*

*8/16/10*

Kenneth G. Pill  
TAC Ground Water Manager

Date

*Joseph D. Ritchey*

*8/25/10*

Joseph D. Ritchey  
TAC Senior Program Manager

Date

## Revision History

<b>Revision No.</b>	<b>Date</b>	<b>Reason/Basis for Revision</b>
0	August 2010	Initial issue.

## Table of Contents

Section	Page
Acronyms and Abbreviations .....	iv
<b>1.0 Introduction.....</b>	<b>1</b>
1.1 Summary Criteria.....	1
1.2 Sampling Event Summary .....	2
1.3 Sampling and Analyses.....	10
<b>2.0 Data Assessment Summaries .....</b>	<b>10</b>
2.1 Water Sampling Field Activities Verification .....	10
2.2 Laboratory Performance Assessment .....	10
2.3 Field Analyses/Activities.....	14
2.4 Certification .....	14
<b>3.0 Data Presentation.....</b>	<b>15</b>
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
<b>4.0 Conclusions.....</b>	<b>16</b>

### Figures

Figure 1. Map of Matheson Wetlands Preserve Sampling Locations .....	3
Figure 2. April 2010 Map of Ground Water Elevations and Flow Direction .....	4
Figure 3. Matheson BL1 Well Time Versus Ammonia Total as N Concentration Plot.....	5
Figure 4. Matheson BL1 Well Time Versus TDS Concentration Plot.....	5
Figure 5. Matheson BL1 Well Time Versus Uranium Concentration Plot.....	6
Figure 6. Matheson BL2 Well Time Versus Ammonia Total as N Concentration Plot.....	6
Figure 7. Matheson BL2 Well Time Versus TDS Concentration Plot.....	7
Figure 8. Matheson BL2 Well Time Versus Uranium Concentration Plot.....	7
Figure 9. Matheson BL3 Well Time Versus Ammonia Total as N Concentration Plot.....	8
Figure 10. Matheson BL3 Well Time Versus TDS Concentration Plot.....	8
Figure 11. Matheson BL3 Well Time Versus Uranium Concentration Plot.....	9
Figure 12. Matheson Well Point N3-8.3 Time Versus Uranium Concentration Plot .....	9

### Tables

Table 1. Matheson Ground Water Uranium Concentrations Compared to the UMTRA Ground Water Standard .....	2
Table 2. Analytes and Methods.....	11
Table 3. Data Qualifiers.....	11
Table 4. Reason Codes for Data Flags.....	11

### 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. Matheson Wetlands Preserve Ground Water Sampling Trip Report	
--	--

## Acronyms and Abbreviations

2s-TPU	two-sigma total propagated uncertainty
CCB	continuing calibration blank
CF	Configuration
COC	chain of custody
EB	equipment blank
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
ft	feet
IA	interim action
ICB	initial calibration blank
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 samples collected from the Matheson Wetlands Preserve, located across the Colorado River from the Uranium Mill Tailings Remedial Action (UMTRA) site. This data validation follows the criteria according to the *Environmental Procedures Catalog*, “Standard Practice for Validation of Laboratory Data,” GT-9(P) (2006).

As part of the scope of this document, the complete results of this data validation process are provided. Section 1.0 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. Section 4.0 presents conclusions. 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 April 2010 sampling event completed from April 12 through 14, 2010, in which ground water samples were collected from the BL1, BL2, and BL3 well clusters ( Figure 1) and Matheson well point N3-8.3. In addition, ground water samples were also collected from Configuration (CF) 5 extraction well 0815 and from monitoring well TP-20 at the Moab UMTRA Project site. Section 1.0 contains the Summary Criteria with sample location maps (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: April 12 through 14, 2010**

The purpose of this sampling was to collect data from wells at the Matheson Wetlands Preserve. Monitoring of the ground water at the preserve is performed periodically to assess any changes in site conditions. Monitoring well locations pertinent to this report are shown on Figure 1. A shallow ground water level surface map is shown on Figure 2. The questions below apply to the samples collected from CF5 extraction well 0815.

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

No.

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

Yes. CF5 wells 0815 and PW-02 were restarted on April 15.

**3. Was the evaporation pond functioning properly?**

Yes. The pond level was approximately 7.3 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?**

Yes. Excavation of the tailings pile encountered free pore water. This water is being collected and transported to the evaporation pond located at the top of the tailings pile. This activity reduces the overall capacity for ground water evaporation.

**1.2 Sampling Event Summary**

This VDP presents the validated data associated with the laboratory analysis of ground water collected during the April 2010 sampling event. The samples were collected from wells and well points in the Matheson Wetlands Preserve and the Moab UMTRA Project site. 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 ammonia, total dissolved solids (TDS), and uranium concentrations associated with the ground water samples collected from Matheson BL1, BL2, and BL3 wells are provided.

A list of flagged data is presented in Table 4 in Section 2.2. No data were rejected (flagged as “R”) as a result of this validation process. A Minimums and Maximums Report was not generated for this VDP because either all data were within the historical range or the locations have not historically been sampled more than five times. As a result, there are no anomalous data associated with this sampling event (see Anomalous Data Review in Section 3.2). As shown in Table 1, the sample collected from Matheson well point N3-8.3 exceeded the uranium ground water standard of 0.044 milligrams per liter.

*Table 1. Matheson Ground Water Uranium Concentrations Compared to the UMTRA Ground Water Standard*

Loc	Date	Uranium (mg/L)	UMTRA Ground Water Standard (mg/L)
BL1-D	04/13/2010	0.0023	0.044
BL1-M	04/13/2010	0.0034	
BL1-S	04/13/2010	0.011	
BL2-D	04/13/2010	0.0039	
BL2-M	04/13/2010	0.0049	
BL2-S	04/13/2010	0.0029	
BL3-D	04/14/2010	9.6E-005	
BL3-M	04/14/2010	0.0003	
BL3-M	04/14/2010	0.00029	
N3-8.3	04/13/2010	0.047	

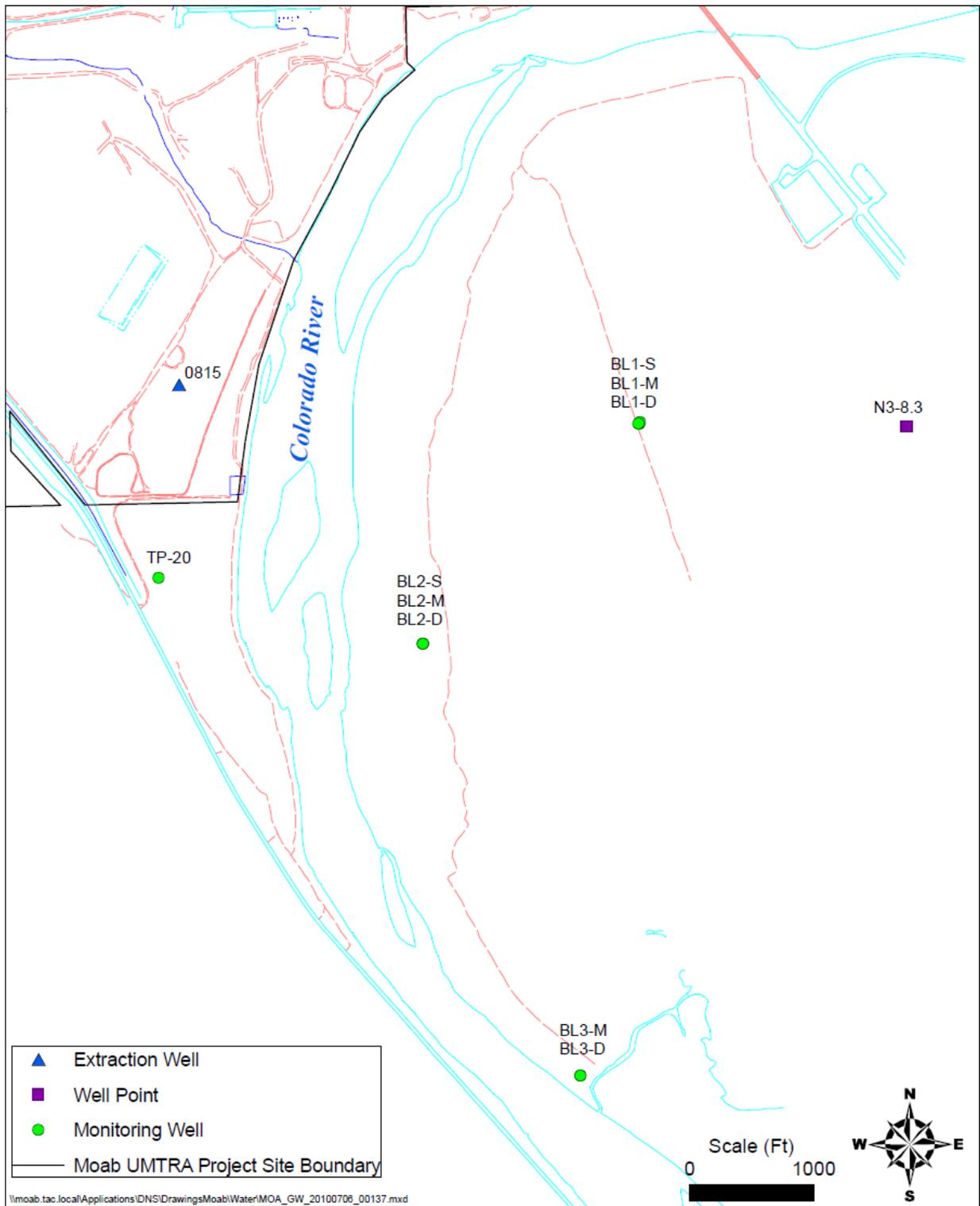


Figure 1. Map of Sampling Locations

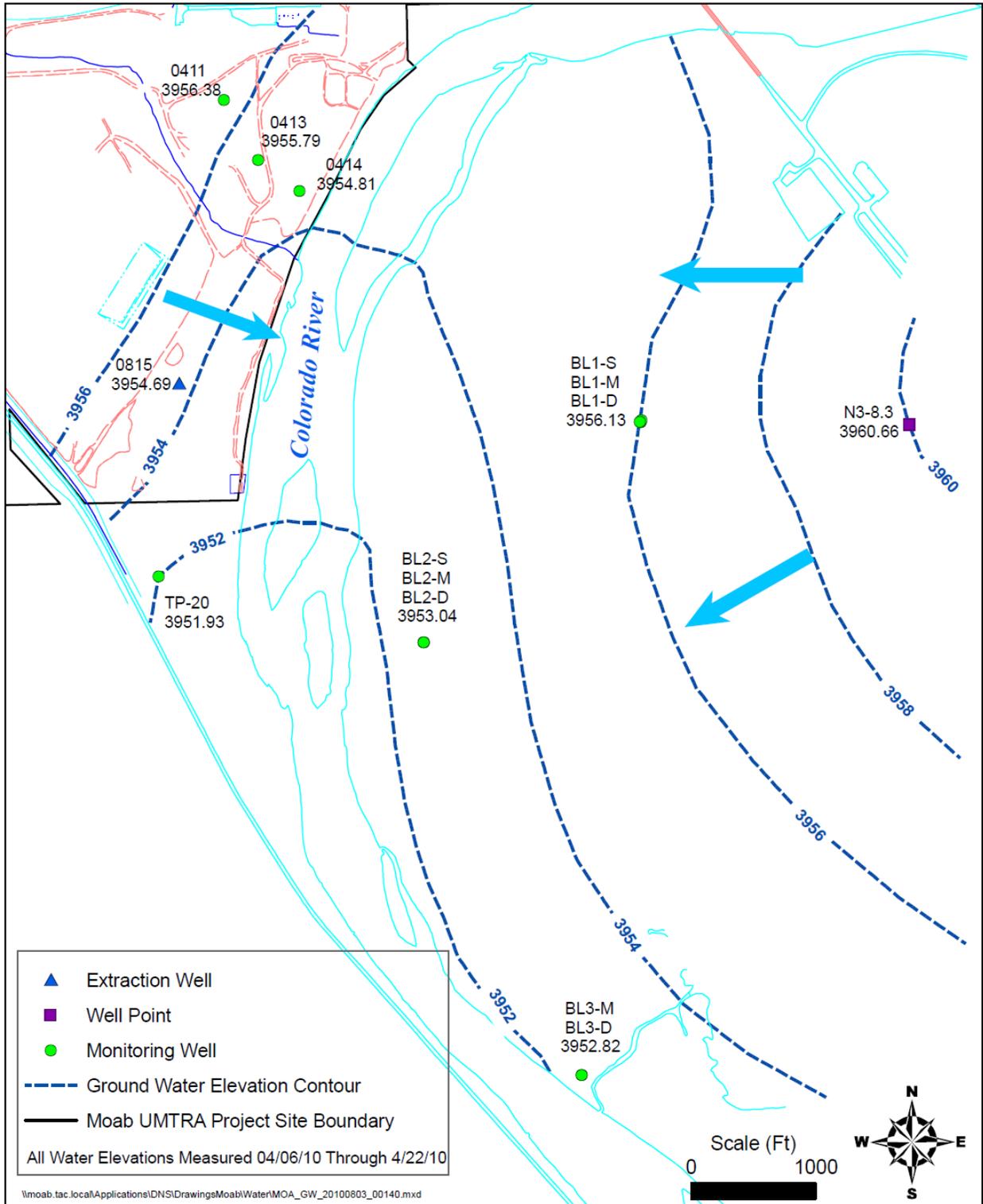


Figure 2. April 2010 Map of Ground Water Elevations and Flow Direction

### Matheson BL1 Well Cluster

The three wells in the BL1 cluster were sampled during this event. Wells BL1-S, BL1-M, and BL1-D were sampled at depths of 55, 99, and 140 feet below ground surface (ft bgs), respectively. These wells are located in the northwestern portion of the wetlands, approximately 2,250 ft from the Colorado River. As shown in the time versus ammonia, TDS, and uranium analyte concentration plots (Figures 3, 4, and 5), concentrations in samples collected during the April 2010 sampling event did not significantly change compared to the previous sampling events in 2005 and 2006. The TDS time concentration plot indicates the brine interface in this area of the wetlands was between 55 and 99 ft bgs during April 2010.

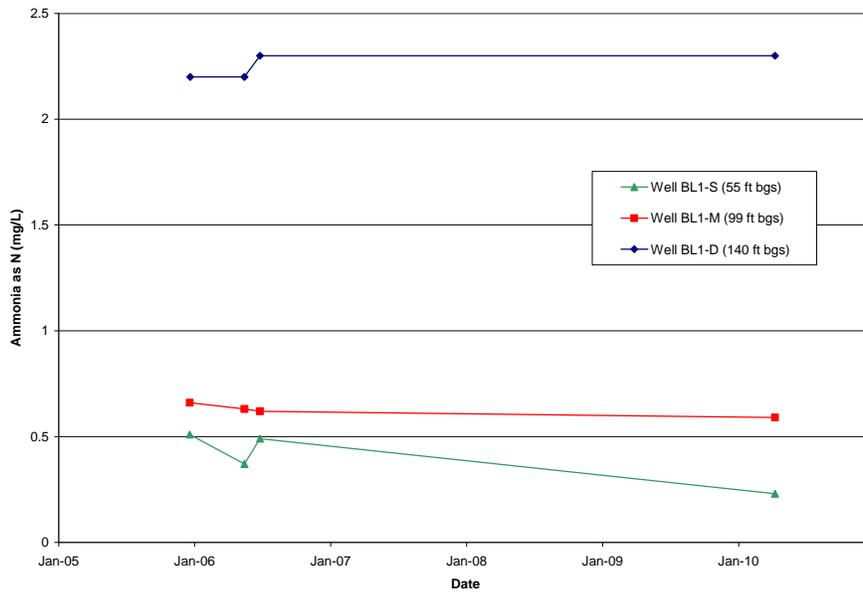


Figure 3. Matheson BL1 Well Cluster Time Versus Ammonia Total as N Concentration Plot

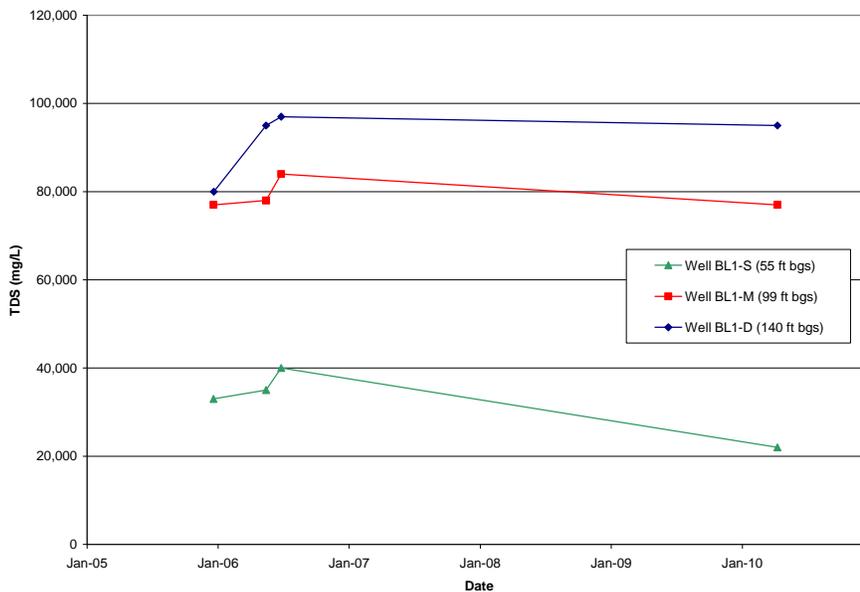


Figure 4. Matheson BL1 Well Cluster Time Versus TDS Concentration Plot

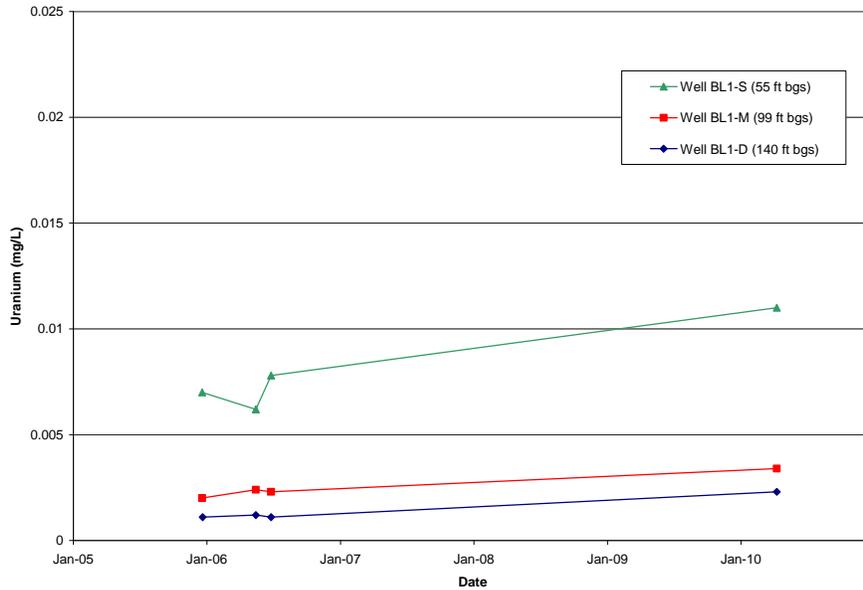


Figure 5. Matheson BL1 Well Cluster Time Versus Uranium Concentration Plot

### Matheson BL2 Well Cluster

This well cluster represents the westernmost well location, just 600 ft from the Colorado River. Well BL2-S was sampled from 57 ft bgs, well BL2-M from 100 ft bgs, and well BL2-D from 142 ft bgs. Ammonia, TDS, and uranium concentration trends since 2005 (when DOE first sampled these wells) are displayed in Figures 6, 7, and 8, respectively. Similar to the BL1 wells, analyte concentrations were consistent with the historical results for base-flow conditions in the Colorado River. At this location, all three samples were collected from below the brine interface.

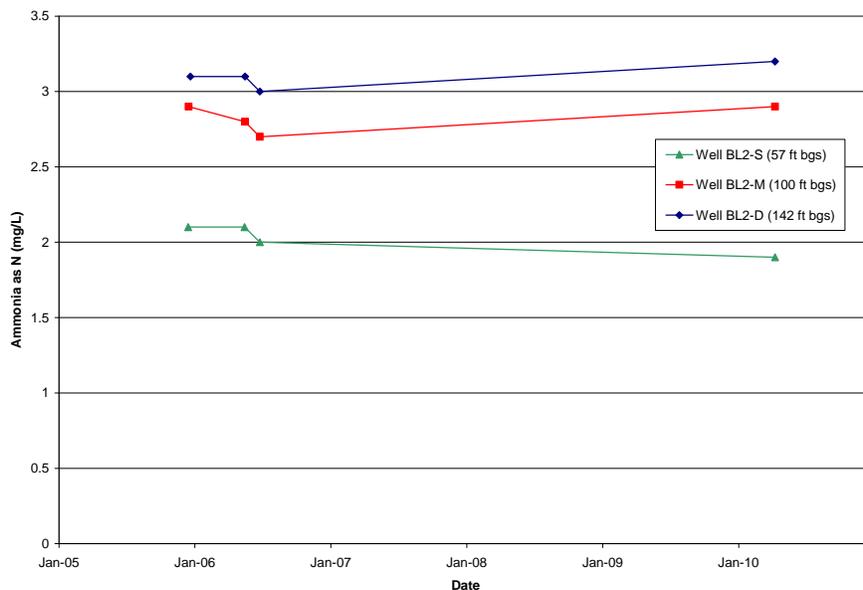


Figure 6. Matheson BL2 Well Cluster Time Versus Ammonia Total as N Concentration Plot

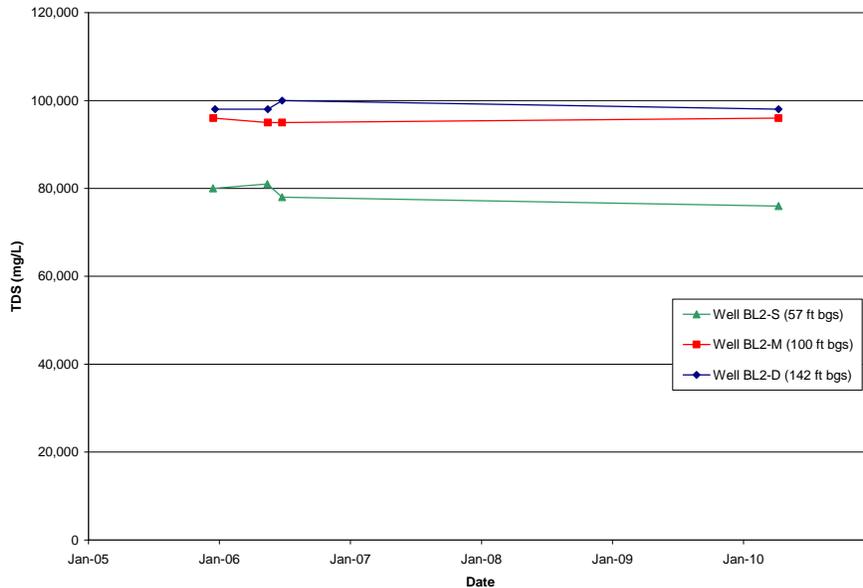


Figure 7. Matheson BL2 Well Cluster Time Versus TDS Concentration Plot

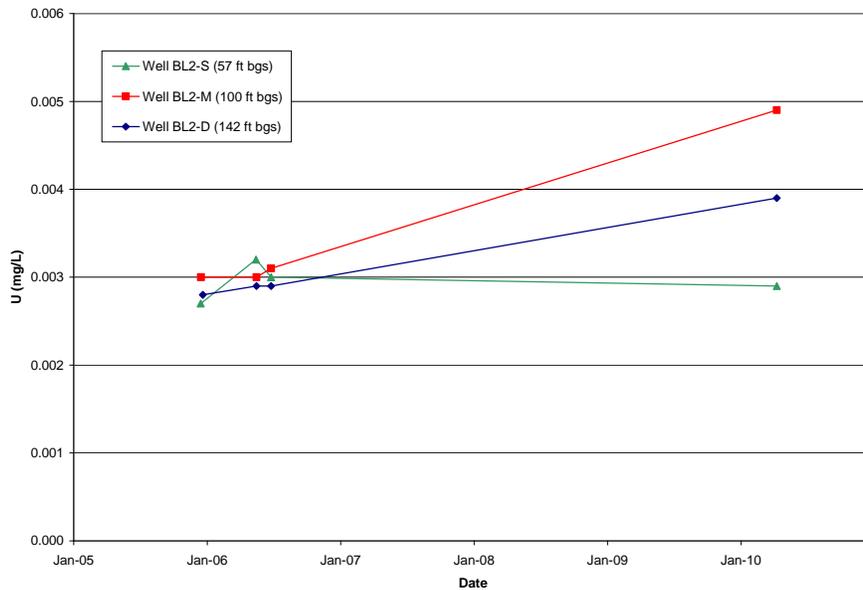


Figure 8. Matheson BL2 Well Cluster Time Versus Uranium Concentration Plot

### Matheson BL3 Well Cluster

Only two of the BL3 wells were sampled during this event. Well BL3-S was not available for sampling. Wells BL3-M and BL3-D were sampled at depths of 47 and 100 ft bgs, respectively. These locations are located in the southern portion of the wetlands, only approximately 300 ft from the Colorado River. As shown in the time versus ammonia, TDS, and uranium analyte concentration plots (Figures 9, 10, and 11), the analyte concentrations in samples collected during the April 2010 sampling event did not significantly change compared to the previous sampling events conducted under base-flow conditions in 2005 and 2006. The TDS time concentration plot indicates both samples from this well cluster were collected from within the brine.

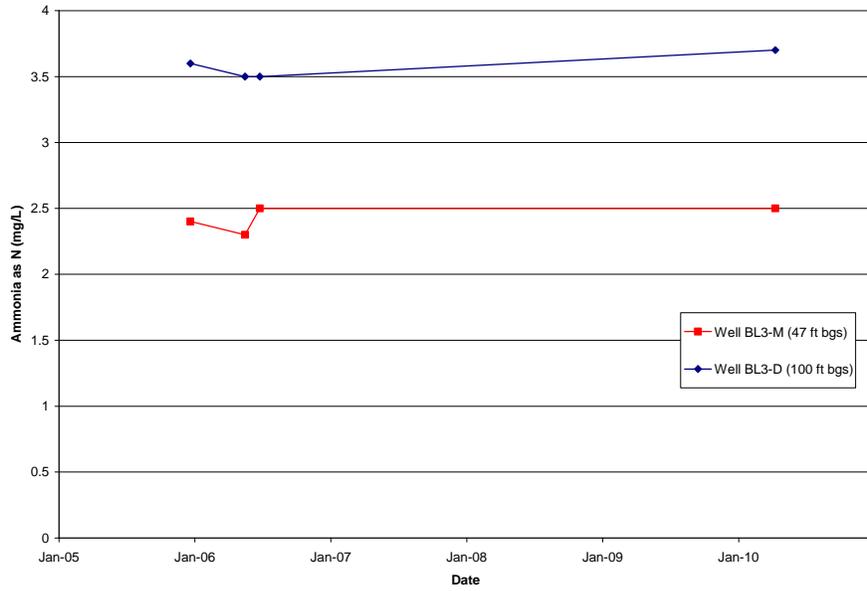


Figure 9. Matheson BL3 Well Time Cluster Versus Ammonia Total as N Concentration Plot

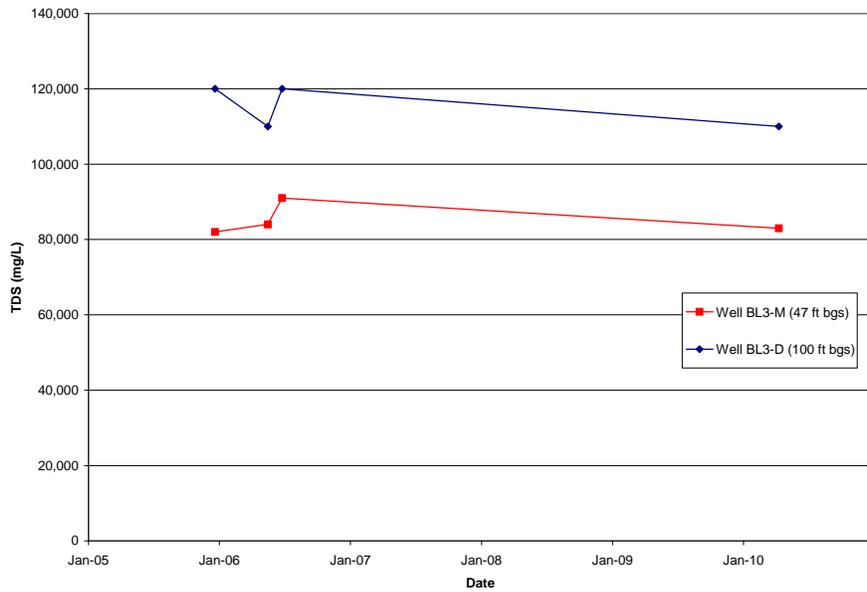


Figure 10. Matheson BL3 Well Cluster Time Versus TDS Concentration Plot

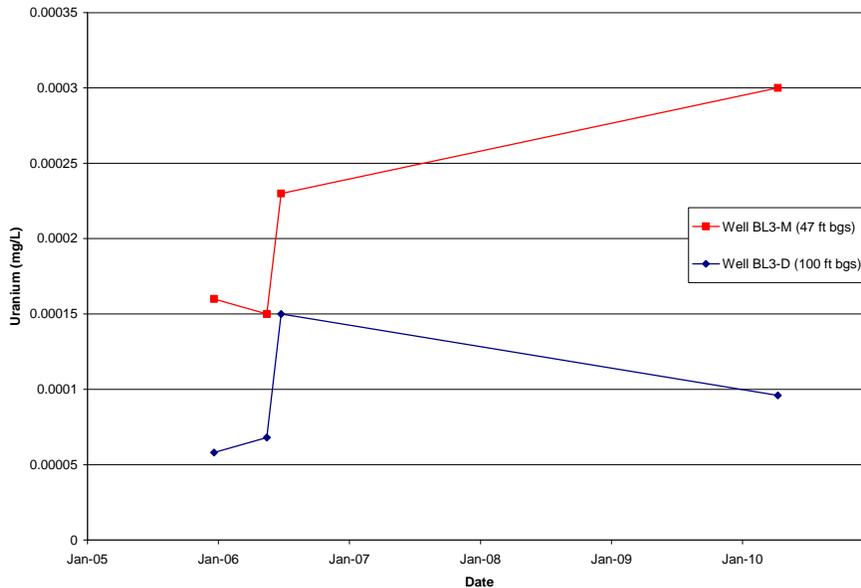


Figure 11. Matheson BL3 Well Cluster Time Versus Uranium Concentration Plot

### Matheson Well Point N3-8.3

Figure 12 exhibits the uranium concentrations measured samples collected from well point N3-8.3 since January 2006 along with the UMTRA ground water standard. As shown, the uranium concentration detected during the April 2010 sampling event lies within the range previously measured in 2006 and is just above the standard.

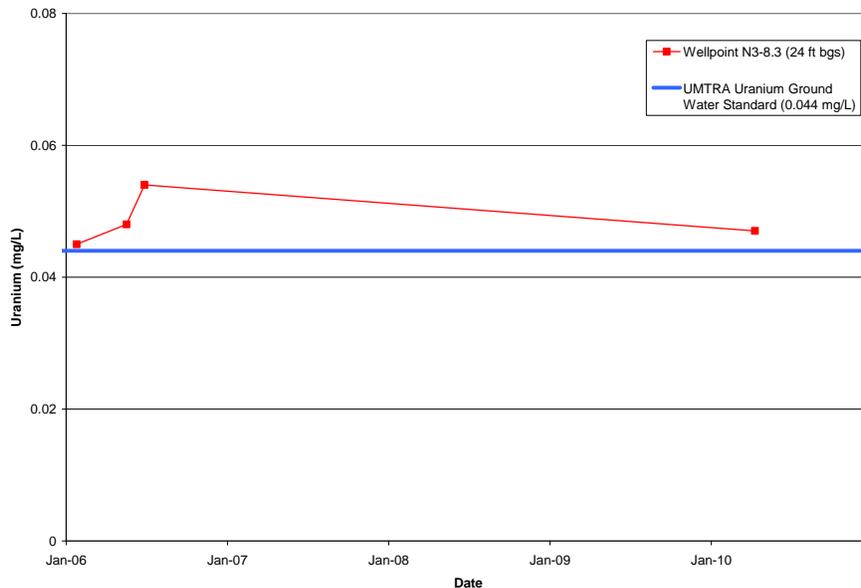


Figure 12. Matheson Well Point N3-8.3 Time Versus Uranium Concentration Plot

### Surface Water Sampling Results

As previously mentioned, there were no surface water locations sampled during this sampling event.

### 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; because some of the samples were collected on nondedicated 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, 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 gauging station, the mean daily Colorado River flows ranged from 5,710 to 7,960 cubic feet per second (cfs) and represent base flow 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).

### 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

Report Identification No. (RIN): 1004044  
Event: April 2010 Matheson Wetlands Preserve Sampling  
Site(s): Moab, Utah  
Laboratory: ALS Laboratory Group, Fort Collins, Colorado  
Sample Data Group (SDG ) No.: 1004133  
Analysis: Gross Alpha/Beta, Inorganics, Metals, Radium-226, Radon-222  
Validator: Rachel Cowan  
Review Date: June 16, 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 1, 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 <sub>3</sub> -N	WCH-A-005	EPA 350.1	EPA 350.1
Gross Alpha/Beta	GPC-A-001	SOP702R19	SOP724R10
Manganese	G17	SW-846 3005A	SW-846 6010B
Radium-226	ASP-A-016	EPA 903.1(m)	EPA 903.1(m)
Radon-222	ASP-A-012	SOP799R3	SOP704R9
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 for an explanation of the data qualifiers applied.

Table 3. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1004133-7 through -9	BL2-D, BL2-M, BL2-S	Ammonia	J	MS1
1004133-5 through -11	BL1-M, BL1-S, BL2-D, BL2-M, BL2-S, BL3-D, BL3-M	Gross Alpha	U	RQ3
1004133-4 through -11	BL1-D, BL1-M, BL1-S, BL2-D, BL2-M, BL2-S, BL3-D, BL3-M	Gross Alpha	U	RQ4
1004133-4, -6 through -9, -11	BL1-D, BL1-S, BL2-D, BL2-M, BL2-S, BL3-M	Gross Beta	J	RQ5
100133-10	BL3-D	Uranium	U	B2

Notes: 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 (Nonfetects)	Explanation
B2	U	NA	Results for the affected analyte(s) are regarded as undetected (U) because the result for an associated blank is between the method detection limit and the practical quantitation limit, and the sample result is less than five times the blank concentration.
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 EB, or (d) not analyzed at the proper frequency as stated in the appropriate analytical method.
RQ3	NA	U	The radiochemical analysis result is less than the two-sigma total propagated uncertainty.

Table 4. Reason Codes for Data Flags (continued)

Reason Code	Qualifier (Detects)	Qualifier (Nonfetects)	Explanation
RQ4	NA	U	The radiochemical analysis result is less than the MDC.
RQ5	J	UJ	The radiochemical analysis result is greater than the MDC, but less than three times the MDC.
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.

MDC = minimum detectable concentration

### Sample Shipping/Receiving

ALS Laboratory Group in Fort Collins, Colorado, received a total of 13 samples for RIN 1004044 in one shipment of three coolers, which arrived on April 15, 2010 (SDG 10040133 under UPS tracking numbers 1Z5W1Y510192282002, 1Z5W1Y510191611621, and 1Z5W1Y510192771617). Each of the sample groups was accompanied by a COC form. The COC forms were checked to confirm that all of the samples were listed on the forms with sample collection dates and times and to confirm 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

SDG 1004044 was received intact in three coolers with temperatures of 1.0, 1.0, and 0.2°C. All samples were received in the correct container types and had been preserved correctly for the requested analyses, except 1004133-7, which had a bubble less than approximately 5 millimeters in diameter. Although the samples for radon-222 need to be headspace-free, the size of this bubble was sufficiently small that the radon-222 result was not qualified. 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.

### Radiochemical Quantification

Radiochemical analyses have required quantification standards. All radiochemical results reported are to include the calculated two-sigma total propagated uncertainty (2s-TPU) and minimum detectable concentration (MDC) as quantification standards. See Table 4 for reasons for qualification of radiochemical analyses.

### Method SOP724R10, Gross Alpha/Beta

Some gross alpha/beta results did not meet quantification standards and were flagged accordingly: samples 1004133-4 through 11 for gross alpha (flagged with “U” for not meeting 2s-TPU and MDC requirements) and samples 1004133-4, -6 through -9, and -11 for gross beta (flagged with “J” for not meeting MDC requirements).

### 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 matrix spike 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 1004133 did not have the appropriate number of MS samples as per method requirements, so ammonia results from samples 1004133-7 through -9 were “J”-flagged for MS1.

In addition, the native ammonia concentration in the SDG 1004133 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 1004133 were “J”-flagged for reason RS1.

### **Laboratory Control Sample**

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

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

The manganese and uranium MS results were acceptable, so no manganese and uranium results were flagged for reason LCS1.

### **Method and Calibration Blanks**

Method blanks (MBs) are analyzed to assess any contamination that may have occurred during sample preparation. 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 method detection limit 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. According to the case narratives, all ICBs, CCBs, and MBs passed requirements, so no results were flagged for this reason.

### **Metals Serial Dilution**

Serial dilution (SD) samples for both inductively coupled plasma-mass spectrometry (ICP-MS) and ICP-atomic emission spectrometry (AES) 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 reporting level (RL). ICP-AES SD data are evaluated when the concentration of the undiluted sample is greater than 50 times the RL. According to the case narratives, the uranium and manganese SDs passed requirements, so no results were flagged for this reason.

### **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. One duplicate sample was collected from location BL3-M (10040133-11) in the April 2010 Matheson Wetlands Preserve sampling event. The duplicate results met the U.S. Environmental Protection Agency (EPA)-recommended laboratory duplicate criteria of less than 20 relative percent difference (RPD) for results that are greater than five times the RL.

### **Equipment Blanks**

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

One extraction well ground water sample was collected using nondedicated equipment. As per procedure, one EB was collected and analyzed. Uranium was detected in the EB, but at a concentration much lower than the RL. Following validation procedure, all uranium results were visually checked to see if the results were less than five times the concentration of uranium in the EB. One of the results (1004133-10) had uranium results less than five times the concentrations in the EB, so this sample was qualified with a “U” for reason B2.

### **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 May 10, 2010. The contents of the EDD files were manually examined to verify that the sample results accurately reflected the data contained in the SDG 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 April 2010 Matheson Wetlands Preserve ground water sampling event.

### **Field Activities**

All monitor wells were purged and sampled using the low-flow sampling method. One duplicate sample was 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  $\pm 20$  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, although the MDCs for gross alpha counts were not met (see Section 2.2). 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 discussion regarding 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 is typically 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**

All samples were collected from locations that were either sampled less than five times (all the Matheson locations and CF5 well 0815) or the measured concentrations were within the historical range (location TP-20). As a result, a Minimums and Maximums Report was not generated for this sampling event, and there were no anomalous data associated with this event.

#### **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**

As per procedure, one EB were collected and analyzed. Uranium was detected in the EB, but at a concentration much lower than the RL. Following validation procedure, all uranium results were visually checked to see if the results were less than five times the concentration of uranium in the EB. One of the results (1004133-10) had uranium results less than five times the concentrations in the EB, so this sample was qualified with a “U” for reason B2. The EB data is presented in Appendix E.

## 4.0 Conclusions

Ground water samples were collected from select Matheson Wetlands Preserve locations in April 2010. The analytical data indicate the ammonia, TDS, and uranium concentrations are within historical ranges for wells BL1, BL2, BL3, and well point N3-8.3. Ammonia concentrations ranged from 0.1 (the detection limit) to 3.7 mg/L, and uranium concentrations ranged from 0.00096 to 0.047 mg/L, with only one sample above the UMTRA ground water standard of 0.044 mg/L.

The location with the ground water sample showing the uranium concentration above the standard, well point N3-8.3, has contained comparable concentrations during the previous sampling events. As discussed in the “Fall 2006 Assessment of Matheson Wetlands Hydrogeology and Ground Water Chemistry” (March 2007), the occurrence of the relatively high uranium in this location is the result of natural processes, such as the dissolution of solid-phase uranium in bedrock in ground water prior to flow into alluvium.

Further evidence of the uranium concentration detected at this location is naturally occurring, and not site-related, is presented as Figure 2. This ground water contour map was generated based on water level data collected during the April 2010 sampling event. Such a flow direction indicates the ground water in the vicinity of well point N3-8.3 is not impacted by the site.

**Appendix A.**  
**Water Sampling Field Activities Verification**

## Appendix A. Water Sampling Field Activities Verification

<b>Sampling Event / RIN</b>	July 2010/RIN 1004044	<b>Date(s) of Water Sampling</b>	April 12 - 14, 2010
<b>Date(s) of Verification</b>	June 27, 2010	<b>Name of Verifier</b>	Rachel Cowan

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
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 13 samples collected, including one duplicate.
10. Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	One EB was also collected.

## Appendix A. Water Sampling Field Activities Verification (continued)

<b>Sampling Event / RIN</b>	July 2010/RIN 1004044	<b>Date(s) of Water Sampling</b>	April 12 - 14, 2010
<b>Date(s) of Verification</b>	June 27, 2010	<b>Name of Verifier</b>	Rachel Cowan

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
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**

No Minimums and Maximums Report was generated for this sampling event.

**Appendix C.**  
**Water Quality Data**

## Appendix C. Water Quality Data

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 6/21/2010**

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	0815	WL	04/14/2010	0001	24	-	24	240			#	5	
Ammonia Total as N	mg/L	BL1-D	WL	04/13/2010	0001	140	-	140	2.3			#	0.1	
Ammonia Total as N	mg/L	BL1-M	WL	04/13/2010	0001	99	-	99	0.59			#	0.1	
Ammonia Total as N	mg/L	BL1-S	WL	04/13/2010	0001	55	-	55	0.23			#	0.1	
Ammonia Total as N	mg/L	BL2-D	WL	04/13/2010	0001	142	-	142	3.2		J	#	0.1	
Ammonia Total as N	mg/L	BL2-M	WL	04/13/2010	0001	100	-	100	2.9		J	#	0.1	
Ammonia Total as N	mg/L	BL2-S	WL	04/13/2010	0001	57	-	57	1.9		J	#	0.1	
Ammonia Total as N	mg/L	BL3-D	WL	04/14/2010	0001	100	-	100	3.7			#	0.1	
Ammonia Total as N	mg/L	BL3-M	WL	04/14/2010	0001	47	-	47	2.5			#	0.1	
Ammonia Total as N	mg/L	BL3-M	WL	04/14/2010	0002	47	-	47	2.5			#	0.1	
Ammonia Total as N	mg/L	N3-8.3	WL	04/13/2010	0001	24	-	24	0.1	U		#	0.1	
Ammonia Total as N	mg/L	TP-20	WL	04/12/2010	0001	32	-	32	3.3			#	0.1	
Dissolved Oxygen	mg/L	0815	WL	04/14/2010	0001	24	-	24	0.11			#		
Dissolved Oxygen	mg/L	BL1-D	WL	04/13/2010	0001	140	-	140	0.46			#		
Dissolved Oxygen	mg/L	BL1-M	WL	04/13/2010	0001	99	-	99	0.25			#		
Dissolved Oxygen	mg/L	BL1-S	WL	04/13/2010	0001	55	-	55	0.44			#		
Dissolved Oxygen	mg/L	BL2-D	WL	04/13/2010	0001	142	-	142	0.5			#		
Dissolved Oxygen	mg/L	BL2-M	WL	04/13/2010	0001	100	-	100	0.19			#		
Dissolved Oxygen	mg/L	BL2-S	WL	04/13/2010	0001	57	-	57	0.17			#		
Dissolved Oxygen	mg/L	BL3-D	WL	04/14/2010	0001	100	-	100	-0.89			#		
Dissolved Oxygen	mg/L	BL3-M	WL	04/14/2010	0001	47	-	47	0.05			#		
Dissolved Oxygen	mg/L	N3-8.3	WL	04/13/2010	0001	24	-	24	0.46			#		
Dissolved Oxygen	mg/L	TP-20	WL	04/12/2010	0001	32	-	32	0.14			#		
Gross Alpha	pCi/L	BL1-D	WL	04/13/2010	0001	140	-	140	157	U,M	U	#	157	87
Gross Alpha	pCi/L	BL1-M	WL	04/13/2010	0001	99	-	99	132	U,M	U	#	132	76
Gross Alpha	pCi/L	BL1-S	WL	04/13/2010	0001	55	-	55	41	U,M	U	#	41	24

## Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 6/21/2010

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Gross Alpha	pCi/L	BL2-D	WL	04/13/2010	0001	142	-	142	240	U,M	U	#	240	140
Gross Alpha	pCi/L	BL2-M	WL	04/13/2010	0001	100	-	100	190	U,M	U	#	190	120
Gross Alpha	pCi/L	BL2-S	WL	04/13/2010	0001	57	-	57	114	U,M	U	#	114	66
Gross Alpha	pCi/L	BL3-D	WL	04/14/2010	0001	100	-	100	260	U,M	U	#	260	150
Gross Alpha	pCi/L	BL3-M	WL	04/14/2010	0001	47	-	47	125	U,M	U	#	125	71
Gross Alpha	pCi/L	BL3-M	WL	04/14/2010	0002	47	-	47	131	U,M		#	131	80
Gross Beta	pCi/L	BL1-D	WL	04/13/2010	0001	140	-	140	520	M3	J	#	210	160
Gross Beta	pCi/L	BL1-M	WL	04/13/2010	0001	99	-	99	190	U,M		#	190	120
Gross Beta	pCi/L	BL1-S	WL	04/13/2010	0001	55	-	55	113	M3	J	#	67	46
Gross Beta	pCi/L	BL2-D	WL	04/13/2010	0001	142	-	142	680	M3	J	#	430	290
Gross Beta	pCi/L	BL2-M	WL	04/13/2010	0001	100	-	100	630	M3	J	#	420	280
Gross Beta	pCi/L	BL2-S	WL	04/13/2010	0001	57	-	57	250	M3	J	#	200	130
Gross Beta	pCi/L	BL3-D	WL	04/14/2010	0001	100	-	100	1040	M3		#	390	300
Gross Beta	pCi/L	BL3-M	WL	04/14/2010	0001	47	-	47	350	M3	J	#	210	150
Gross Beta	pCi/L	BL3-M	WL	04/14/2010	0002	47	-	47	850	M3		#	190	190
Manganese	mg/L	0815	WL	04/14/2010	0001	24	-	24	3.5			#	0.0011	
Manganese	mg/L	BL1-D	WL	04/13/2010	0001	140	-	140	6.1			#	0.011	
Manganese	mg/L	BL1-M	WL	04/13/2010	0001	99	-	99	7.6			#	0.0057	
Manganese	mg/L	BL1-S	WL	04/13/2010	0001	55	-	55	6.1			#	0.0028	
Manganese	mg/L	BL2-D	WL	04/13/2010	0001	142	-	142	3.1			#	0.011	
Manganese	mg/L	BL2-M	WL	04/13/2010	0001	100	-	100	5.8			#	0.011	
Manganese	mg/L	BL2-S	WL	04/13/2010	0001	57	-	57	10			#	0.0057	
Manganese	mg/L	BL3-D	WL	04/14/2010	0001	100	-	100	0.038	B		#	0.011	
Manganese	mg/L	BL3-M	WL	04/14/2010	0001	47	-	47	0.49			#	0.0057	
Manganese	mg/L	BL3-M	WL	04/14/2010	0002	47	-	47	0.45			#	0.0057	
Manganese	mg/L	N3-8.3	WL	04/13/2010	0001	24	-	24	0.012			#	0.00023	
Manganese	mg/L	TP-20	WL	04/12/2010	0001	32	-	32	0.096	B		#	0.011	

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 6/21/2010**

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA						
Oxidation Reduction Potential	mV	0815	WL	04/14/2010	0001	24	-	24	-84.8			#		
Oxidation Reduction Potential	mV	BL1-D	WL	04/13/2010	0001	140	-	140	-95			#		
Oxidation Reduction Potential	mV	BL1-M	WL	04/13/2010	0001	99	-	99	-96			#		
Oxidation Reduction Potential	mV	BL1-S	WL	04/13/2010	0001	55	-	55	-62			#		
Oxidation Reduction Potential	mV	BL2-D	WL	04/13/2010	0001	142	-	142	-137			#		
Oxidation Reduction Potential	mV	BL2-M	WL	04/13/2010	0001	100	-	100	-100			#		
Oxidation Reduction Potential	mV	BL2-S	WL	04/13/2010	0001	57	-	57	-60			#		
Oxidation Reduction Potential	mV	BL3-D	WL	04/14/2010	0001	100	-	100	-332			#		
Oxidation Reduction Potential	mV	BL3-M	WL	04/14/2010	0001	47	-	47	-262			#		
Oxidation Reduction Potential	mV	N3-8.3	WL	04/13/2010	0001	24	-	24	-164			#		
Oxidation Reduction Potential	mV	TP-20	WL	04/12/2010	0001	32	-	32	-225			#		
pH	s.u.	0815	WL	04/14/2010	0001	24	-	24	6.94			#		
pH	s.u.	BL1-D	WL	04/13/2010	0001	140	-	140	6.89			#		
pH	s.u.	BL1-M	WL	04/13/2010	0001	99	-	99	6.57			#		
pH	s.u.	BL1-S	WL	04/13/2010	0001	55	-	55	6.64			#		
pH	s.u.	BL2-D	WL	04/13/2010	0001	142	-	142	7.08			#		
pH	s.u.	BL2-M	WL	04/13/2010	0001	100	-	100	6.92			#		
pH	s.u.	BL2-S	WL	04/13/2010	0001	57	-	57	6.48			#		
pH	s.u.	BL3-D	WL	04/14/2010	0001	100	-	100	6.52			#		
pH	s.u.	BL3-M	WL	04/14/2010	0001	47	-	47	6.79			#		
pH	s.u.	N3-8.3	WL	04/13/2010	0001	24	-	24	8.56			#		
pH	s.u.	TP-20	WL	04/12/2010	0001	32	-	32	7.05			#		
Radium-226	pCi/L	BL3-D	WL	04/14/2010	0001	100	-	100	25.4			#	0.4	6.5
Radium-226	pCi/L	BL3-M	WL	04/14/2010	0001	47	-	47	6.1			#	0.4	1.7
Radium-226	pCi/L	BL3-M	WL	04/14/2010	0002	47	-	47	6.6			#	0.4	1.9

## Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 6/21/2010

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers		Detection Limit	Uncertainty
								Lab	Data QA		
Radon-222	pCi/L	BL1-D	WL	04/13/2010	0001	140 - 140	158		#	45	36
Radon-222	pCi/L	BL1-M	WL	04/13/2010	0001	99 - 99	146		#	46	36
Radon-222	pCi/L	BL1-S	WL	04/13/2010	0001	55 - 55	227		#	47	44
Radon-222	pCi/L	BL2-D	WL	04/13/2010	0001	142 - 142	140		#	47	36
Radon-222	pCi/L	BL2-M	WL	04/13/2010	0001	100 - 100	197		#	47	41
Radon-222	pCi/L	BL2-S	WL	04/13/2010	0001	57 - 57	161		#	48	38
Radon-222	pCi/L	BL3-D	WL	04/14/2010	0001	100 - 100	217		#	42	40
Radon-222	pCi/L	BL3-M	WL	04/14/2010	0001	47 - 47	236		#	44	43
Radon-222	pCi/L	BL3-M	WL	04/14/2010	0002	47 - 47	205		#	42	39
Radon-222	pCi/L	N3-8.3	WL	04/13/2010	0001	24 - 24	394		#	48	60
Specific Conductance	µmhos/cm	0815	WL	04/14/2010	0001	24 - 24	23450		#		
Specific Conductance	µmhos/cm	BL1-D	WL	04/13/2010	0001	140 - 140	140480		#		
Specific Conductance	µmhos/cm	BL1-M	WL	04/13/2010	0001	99 - 99	112284		#		
Specific Conductance	µmhos/cm	BL1-S	WL	04/13/2010	0001	55 - 55	38735		#		
Specific Conductance	µmhos/cm	BL2-D	WL	04/13/2010	0001	142 - 142	145217		#		
Specific Conductance	µmhos/cm	BL2-M	WL	04/13/2010	0001	100 - 100	140969		#		
Specific Conductance	µmhos/cm	BL2-S	WL	04/13/2010	0001	57 - 57	112636		#		
Specific Conductance	µmhos/cm	BL3-D	WL	04/14/2010	0001	100 - 100	161528		#		
Specific Conductance	µmhos/cm	BL3-M	WL	04/14/2010	0001	47 - 47	124761		#		
Specific Conductance	µmhos/cm	N3-8.3	WL	04/13/2010	0001	24 - 24	3220		#		
Specific Conductance	µmhos/cm	TP-20	WL	04/12/2010	0001	32 - 32	150006		#		
Temperature	C	0815	WL	04/14/2010	0001	24 - 24	16.6		#		
Temperature	C	BL1-D	WL	04/13/2010	0001	140 - 140	12.65		#		
Temperature	C	BL1-M	WL	04/13/2010	0001	99 - 99	11.88		#		
Temperature	C	BL1-S	WL	04/13/2010	0001	55 - 55	11.57		#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 6/21/2010**

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA						
Temperature	C	BL2-D	WL	04/13/2010	0001	142	-	142	14.83			#		
Temperature	C	BL2-M	WL	04/13/2010	0001	100	-	100	14.52			#		
Temperature	C	BL2-S	WL	04/13/2010	0001	57	-	57	14.14			#		
Temperature	C	BL3-D	WL	04/14/2010	0001	100	-	100	11.57			#		
Temperature	C	BL3-M	WL	04/14/2010	0001	47	-	47	10.85			#		
Temperature	C	N3-8.3	WL	04/13/2010	0001	24	-	24	13.06			#		
Temperature	C	TP-20	WL	04/12/2010	0001	32	-	32	18.58			#		
Total Dissolved Solids	mg/L	0815	WL	04/14/2010	0001	24	-	24	18000			#	400	
Total Dissolved Solids	mg/L	BL1-D	WL	04/13/2010	0001	140	-	140	95000			#	2000	
Total Dissolved Solids	mg/L	BL1-M	WL	04/13/2010	0001	99	-	99	77000			#	2000	
Total Dissolved Solids	mg/L	BL1-S	WL	04/13/2010	0001	55	-	55	22000			#	400	
Total Dissolved Solids	mg/L	BL2-D	WL	04/13/2010	0001	142	-	142	98000			#	2000	
Total Dissolved Solids	mg/L	BL2-M	WL	04/13/2010	0001	100	-	100	96000			#	2000	
Total Dissolved Solids	mg/L	BL2-S	WL	04/13/2010	0001	57	-	57	76000			#	2000	
Total Dissolved Solids	mg/L	BL3-D	WL	04/14/2010	0001	100	-	100	110000			#	2000	
Total Dissolved Solids	mg/L	BL3-M	WL	04/14/2010	0001	47	-	47	83000			#	2000	
Total Dissolved Solids	mg/L	BL3-M	WL	04/14/2010	0002	47	-	47	83000			#	2000	
Total Dissolved Solids	mg/L	N3-8.3	WL	04/13/2010	0001	24	-	24	1600			#	40	
Total Dissolved Solids	mg/L	TP-20	WL	04/12/2010	0001	32	-	32	110000			#	2000	
Turbidity	NTU	0815	WL	04/14/2010	0001	24	-	24	35.5			#		
Turbidity	NTU	BL1-D	WL	04/13/2010	0001	140	-	140	16			#		
Turbidity	NTU	BL1-M	WL	04/13/2010	0001	99	-	99	20.3			#		
Turbidity	NTU	BL1-S	WL	04/13/2010	0001	55	-	55	75.8			#		
Turbidity	NTU	BL2-D	WL	04/13/2010	0001	142	-	142	9.96			#		
Turbidity	NTU	BL2-M	WL	04/13/2010	0001	100	-	100	10			#		
Turbidity	NTU	BL2-S	WL	04/13/2010	0001	57	-	57	39.6			#		
Turbidity	NTU	BL3-D	WL	04/14/2010	0001	100	-	100	9.09			#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 6/21/2010**

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA						
Turbidity	NTU	BL3-M	WL	04/14/2010	0001	47	-	47	7.93			#		
Turbidity	NTU	N3-8.3	WL	04/13/2010	0001	24	-	24	3.26			#		
Turbidity	NTU	TP-20	WL	04/12/2010	0001	32	-	32	9.02			#		
Uranium	mg/L	0815	WL	04/14/2010	0001	24	-	24	4.1			#	8.8E-005	
Uranium	mg/L	BL1-D	WL	04/13/2010	0001	140	-	140	0.0023			#	1.8E-006	
Uranium	mg/L	BL1-M	WL	04/13/2010	0001	99	-	99	0.0034			#	1.8E-006	
Uranium	mg/L	BL1-S	WL	04/13/2010	0001	55	-	55	0.011			#	1.8E-006	
Uranium	mg/L	BL2-D	WL	04/13/2010	0001	142	-	142	0.0039			#	8.8E-006	
Uranium	mg/L	BL2-M	WL	04/13/2010	0001	100	-	100	0.0049			#	8.8E-006	
Uranium	mg/L	BL2-S	WL	04/13/2010	0001	57	-	57	0.0029			#	1.8E-006	
Uranium	mg/L	BL3-D	WL	04/14/2010	0001	100	-	100	9.6E-005	B	U	#	8.8E-006	
Uranium	mg/L	BL3-M	WL	04/14/2010	0001	47	-	47	0.0003	B		#	8.8E-006	
Uranium	mg/L	BL3-M	WL	04/14/2010	0002	47	-	47	0.00029	B		#	8.8E-006	
Uranium	mg/L	N3-8.3	WL	04/13/2010	0001	24	-	24	0.047			#	1.8E-006	
Uranium	mg/L	TP-20	WL	04/12/2010	0001	32	-	32	0.0034			#	1.8E-006	

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.

## Appendix C. Water Quality Data (continued)

### 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
0815		3963.139	04/14/2010		8.45	3954.69	
BL1-D		3967.33	04/13/2010		13.86	3953.47	
BL1-M		3967.21	04/13/2010		13.18	3954.03	
BL1-S		3966.91	04/13/2010		10.78	3956.13	
BL2-D		3967.96	04/13/2010		14.83	3953.13	
BL2-M		3967.78	04/13/2010		15.65	3952.13	
BL2-S		3967.67	04/13/2010		14.63	3953.04	
BL3-D		3965.02	04/14/2010		13.78	3951.24	
BL3-M		3964.93	04/14/2010		12.11	3952.82	
N3-8.3	C	3965.03	04/13/2010		4.37	3960.66	
TP-20	D	3967.55	04/12/2010		15.62	3951.93	

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: ALS Laboratory Group (Fort Collins, CO)

RIN: 1004044

Report Date: 6/21/2010

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	04/14/2010	0001	mg/L	0.1	U	0.1		E
Manganese	MOA01	0999	04/14/2010	0001	mg/L	0.00011	U	0.00011		E
Total Dissolved Solids	MOA01	0999	04/14/2010	0001	mg/L	20	U	20		E
Uranium	MOA01	0999	04/14/2010	0001	mg/L	2.7E-005	B	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.**  
**Matheson Wetlands Preserve Ground Water Sampling Trip Report**

**Attachment 1.**  
**Matheson Wetlands Preserve Ground Water Sampling Trip Report**



DATE: May 10, 2010

TO: Ken Pill

FROM: James Ritchey

SUBJECT: Matheson Wetlands Preserve Sampling Trip Report

**Site:** Scott M. Matheson Wetlands Preserve

**Date of Sampling Event:** April 12 - 14, 2010

**Team Members:** Elizabeth Glowiak, James Ritchey

**RIN Number Assigned:** All samples were assigned to RIN 1004044.

**Sample Shipment:** All samples were shipped in three coolers overnight UPS to ALS Laboratory Group from Moab, Utah, on April 14, 2010 (Tracking Nos. 0192282002, 0192771617, and 0191611621).

---

**April 2010 CF5 Sampling**

---

**Number of Locations Sampled:** Nine observation wells were sampled at the Matheson Wetlands Preserve. Also, on the Moab UMTRA Project site, observation well TP-20 and extraction well 0815 were sampled. Including one duplicate and one EB, a total of 13 samples were collected during the April 2010 Matheson 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	BL3-M	Duplicate Sample from 42 ft.	Ground Water	APR048
2003	NA	Equipment Blank	DI Water	APR051

ID = identification

**Attachment 1.**  
**Matheson Wetlands Preserve Ground Water 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)
0815-S	4/14/2010	12:30	8.45	24

ft btoc = feet below top of casing

**Location-specific Information – Observation Wells:** All observation wells were sampled using micropurge techniques. All wells were sampled with a peristaltic pump and dedicated downhole and pump-head tubing.

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
BL1-S	4/13/2010	08:25	10.78	55
BL1-M	4/13/2010	08:59	13.18	99
BL1-D	4/13/2010	09:38	13.86	140
BL2-S	4/13/2010	11:00	14.63	57
BL2-M	4/13/2010	11:40	15.65	100
BL2-D	4/13/2010	12:29	15.97	142
BL3-M	4/14/2010	08:30	12.11	47
BL3-D	4/14/2010	09:31	13.78	100
N3-8.3	4/13/2010	15:54	4.37	24
TP-20	4/12/2010	14:11	15.62	32

ft btoc = feet below top of casing

**Site Issues:** Mean Colorado River flow data during this sampling event, according to the USGS Cisco gauging station (Station No. 09180500), are shown below.

Date	Daily Mean Flow (cfs)
04/12/2010	5,710
04/13/2010	6,910
04/14/2010	7,960

**Equipment Issues:** None.

**Corrective Action Required/Taken:** None.