

*Office of Environmental Management – Grand Junction*



Moab UMTRA Project  
February 2009 Validation Data Package  
for Performance Assessment of the  
Monthly Sampling for the Ground Water  
Interim Action

May 2009



U.S. Department  
of Energy

**Office of Environmental Management**

**Moab UMTRA Project  
February 2009 Validation Data Package for Performance  
Assessment of the Monthly Sampling for the  
Ground Water Interim Action**

**May 2009**

**Moab UMTRA Project  
February 2009 Monthly Ground Water Sampling Event**

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**Revision 0**

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**Review and Approval**

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*5/12/09*

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## Revision History

<b>Revision No.</b>	<b>Date</b>	<b>Reason/Basis for Revision</b>
0	May 2009	Initial issue.

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**Attachment**

Attachment 1. Interim Action Well Field Monthly Sampling Trip Report

## Acronyms and Abbreviations

bgs	below ground surface
CF	Configuration
COC	chain of custody
EB	equipment blank
EPA	Environmental Protection Agency
ft	feet
ICP	inductively coupled plasma
LCS	laboratory control sample
MS	matrix spike
MSD	matrix spike duplicate
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
RS	replicate sample
SD	serial dilution
SDG	sample data group
TDS	total dissolved solids
UMTRA	Uranium Mill Tailings Remedial Action
USGS	U.S. Geological Survey
VDP	validation data package

## 1.0 Introduction

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

As part of the scope of this document, the complete results of this data validation process are provided. Section 1 presents the Summary Criteria, the Sampling Event Summary, and the Sampling and Analysis. Section 2 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. The Data Presentation is contained in Section 3, which includes a summary of the anomalous data generated by the validation process. Various appendices contain the Water 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 gaging station No. 09180500.

This validation data package (VDP) presents the results of the February 2009 monthly sampling event completed from February 17 through 19, 2009, in which ground water samples were collected from a variety of locations across the well field. Section 1.0 contains the Summary Criteria with a sample location map (Section 1.1), the Sampling Event Summary (Section 1.2), and the Sampling and Analyses (Section 1.3) for this February 2009 monthly sampling event.

### 1.1 Summary Criteria

Sampling Period: February 17 through 19, 2009

The purpose of this sampling was to collect data that can be used to evaluate the performance of the ground water interim action well field. All sampling locations are shown on Figure 1. A summary of site conditions is presented in 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?**

No. There were no anomalous data associated with this sampling event.

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

Yes. Only one-half of the Configuration (CF) 1 wells were operating during this sampling event (at a flow rate of approximately 16 gallons per minute) in order to control the evaporation pond level.

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

Yes. The pond level was 6.8 to 6.9 feet (ft) during this sampling event, which was completed just prior to the startup of the sprinkler system.

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

Yes. There were no surface water samples associated with this sampling event.

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

No.

## **1.2 Sampling Event Summary**

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

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

While independent of the data validation process, a brief summary of the most recent concentration trends based on the February 2009 data is provided for the baseline area and CFs 3, 2, 1, and 4 (listed from north to south) within the well field. Time versus concentration (ammonia, total dissolved solids [TDS], and uranium) plots for selected performance indicator monitoring wells located upgradient or downgradient within the interim action well field are presented to display historical trends exhibited by the data over the past 2 years. Colorado River flows over the same time frame are also plotted to determine whether the magnitude of river flows influences analyte concentrations.

### **Baseline Area**

Samples were collected from baseline area locations 0405 (18 ft below ground surface [bgs]) and 0488 (39 ft bgs) during February 2009. A review of the time versus concentration plots (Figures 3, 4, and 5) suggest ammonia, TDS, and uranium concentrations in samples collected from these locations have rebounded to river base-flow concentrations.

### **CF3**

Among the locations typically discussed in this section for CF3, samples were collected from 0683 (27 ft bgs), 0688 (39 ft bgs), and 0689 (54 ft bgs) during February 2009. A review of the time versus concentration plots (Figures 6, 7, and 8) suggest ammonia, TDS, and uranium concentrations in samples collected from these locations are similar regardless of sample depth, have stayed within the historical range, and have generally fully rebounded to river base-flow concentrations.

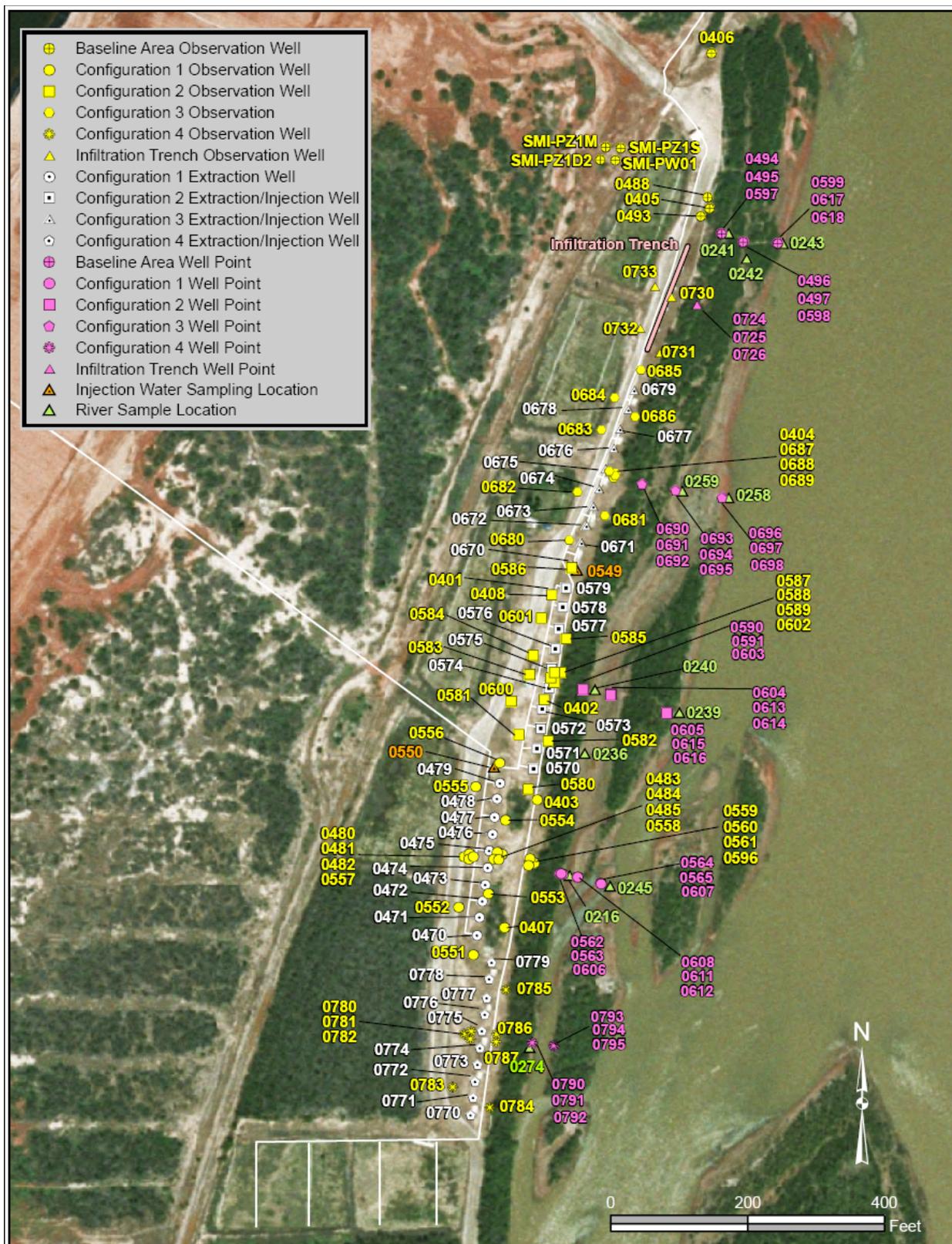


Figure 1. Sample Locations at the Interim Action Well Field and Baseline Area (may include locations not sampled)



Figure 2. February 2009 Sampling Event Site Conditions

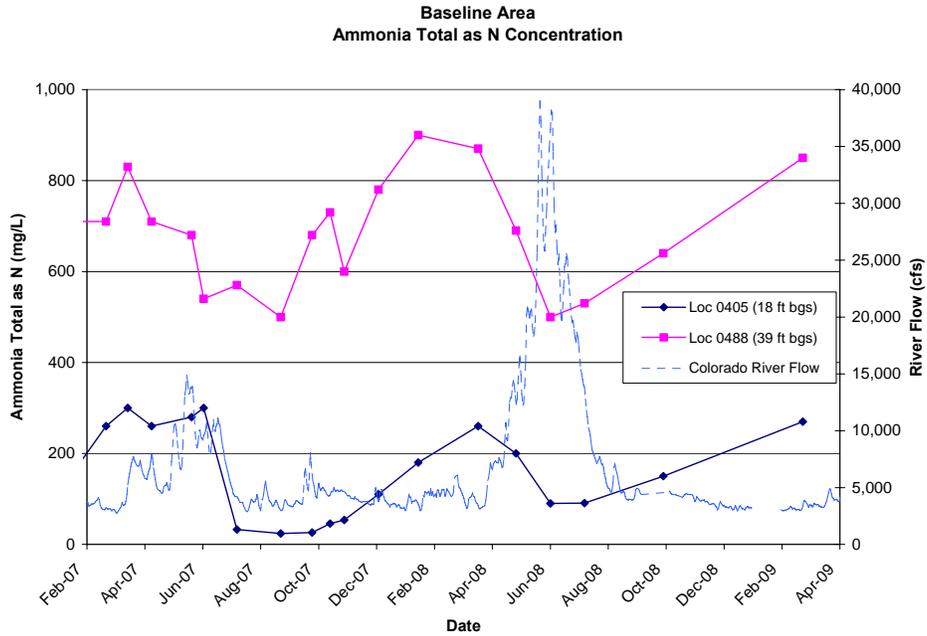


Figure 3. Baseline Area Observation Wells Time Versus Ammonia Total as N Concentration Plot

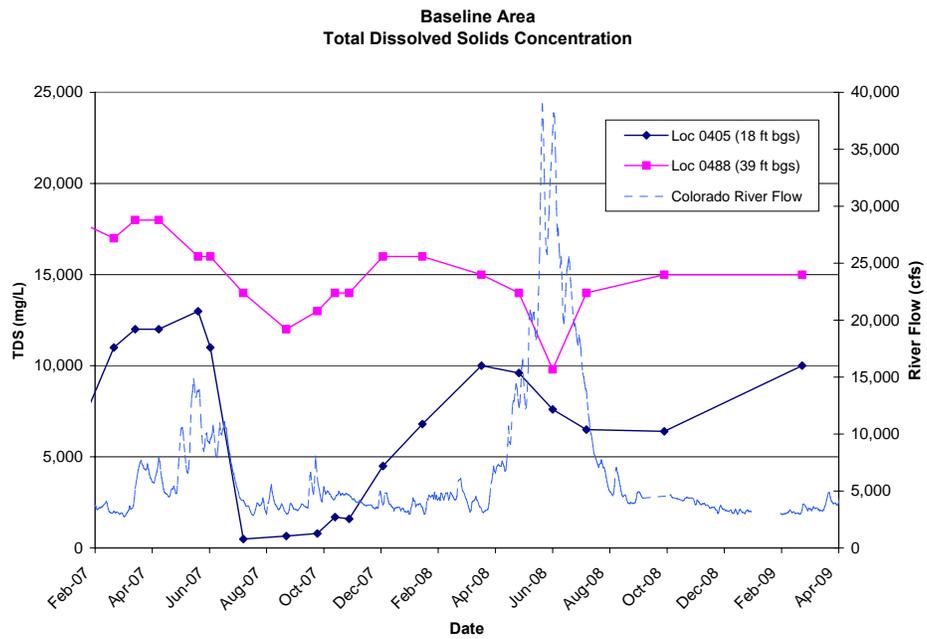


Figure 4. Baseline Area Observation Wells Time Versus TDS Concentration Plot

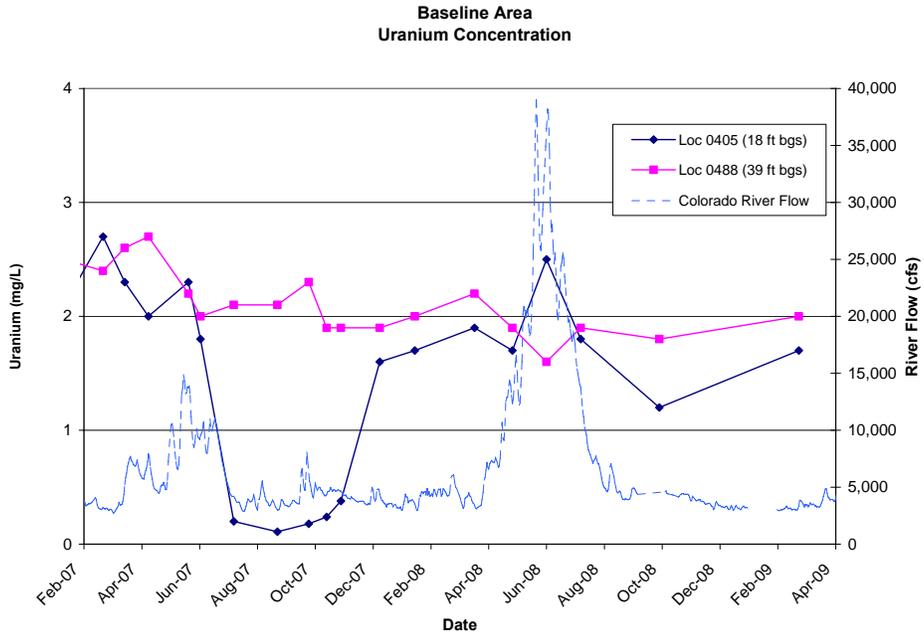


Figure 5. Baseline Area Observation Wells Time Versus Uranium Concentration Plot

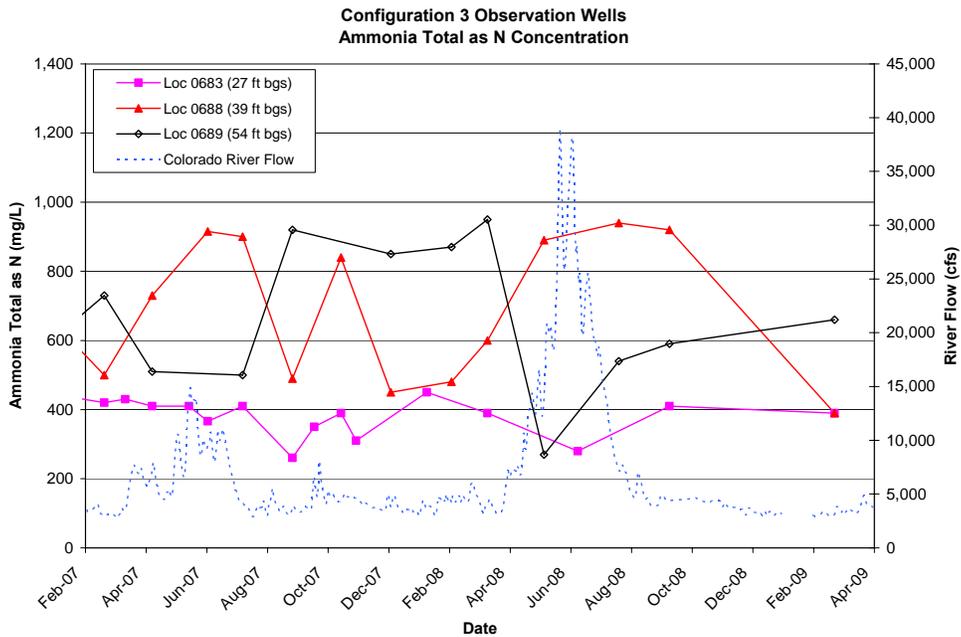


Figure 6. CF3 Observation Wells Time Versus Ammonia Total as N Concentration Plot

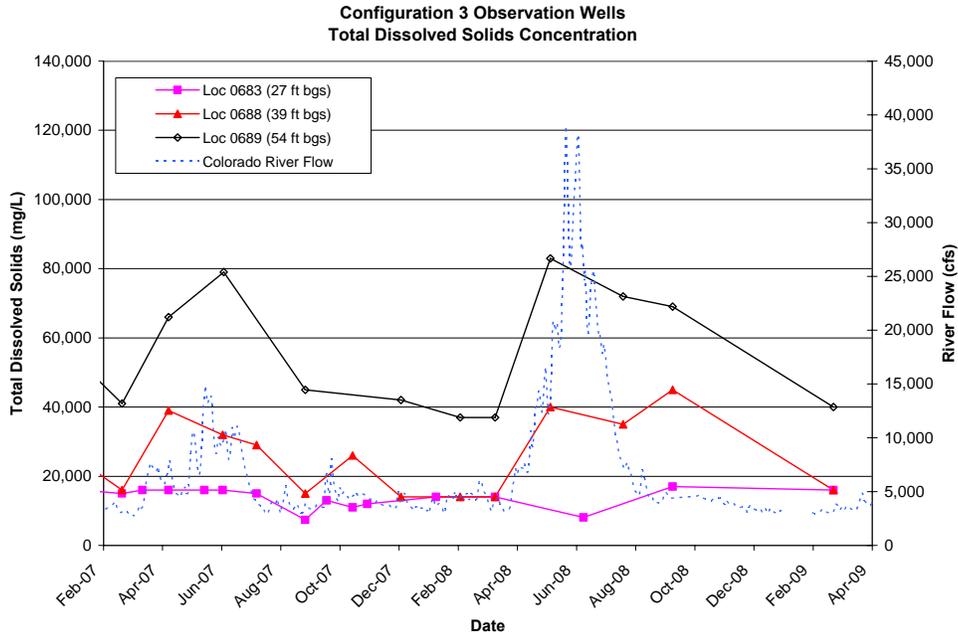


Figure 7. CF3 Observation Wells Time Versus TDS Concentration Plot

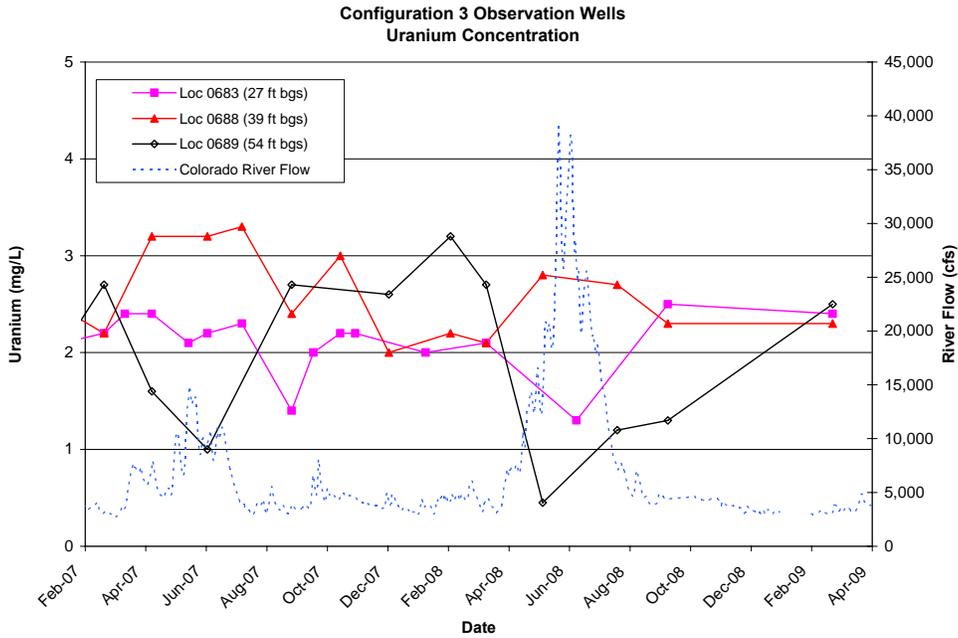


Figure 8. CF3 Observation Wells Time Versus Uranium Concentration Plot

## CF2

Among the indicator wells, samples were collected only from 0588 (34 ft bgs) and 0589 (52 ft bgs) during February 2009. The time versus ammonia (Figure 9), TDS (Figure 10), and uranium (Figure 11) concentration plots indicate these analyte concentrations did not significantly change since the previous sampling event and remained within the historical range.

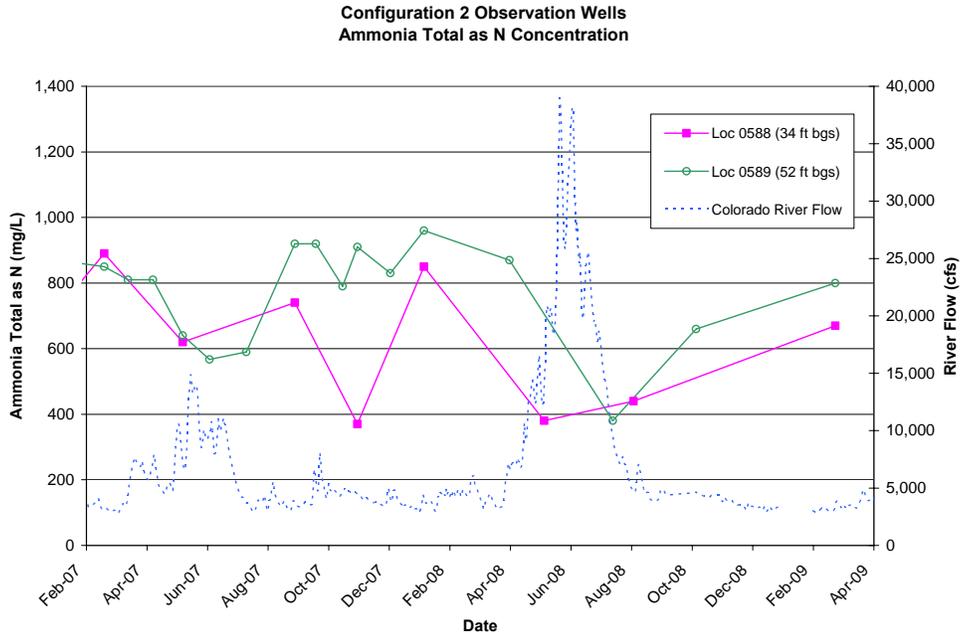


Figure 9. CF2 Observation Wells Time Versus Ammonia Total as N Concentration Plot

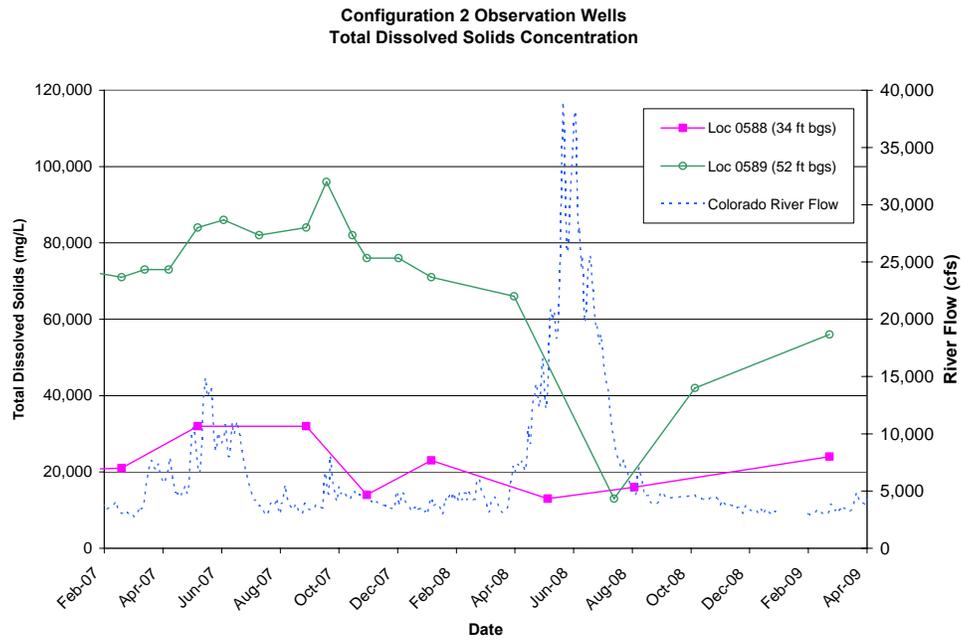


Figure 10. CF2 Observation Wells Time Versus TDS Concentration Plot

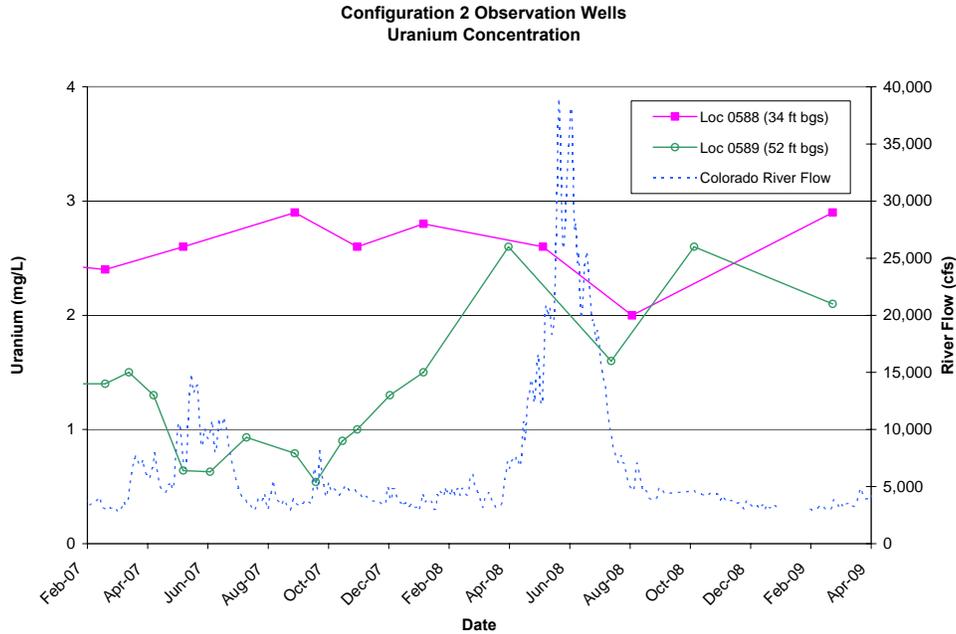


Figure 11. CF2 Observation Wells Time Versus Uranium Concentration Plot

**CF1**

Wells 0483 (from 18 ft bgs), 0560 (31 ft bgs), and 0557 (40 ft bgs) were sampled during the February 2009 monthly event. Figures 12, 13, and 14 display the ammonia, TDS, and uranium concentration trends (respectively) over the past 2 years. Similar to the other parts of the well field, analyte concentrations either remained constant or continued rebounding to base-flow levels.

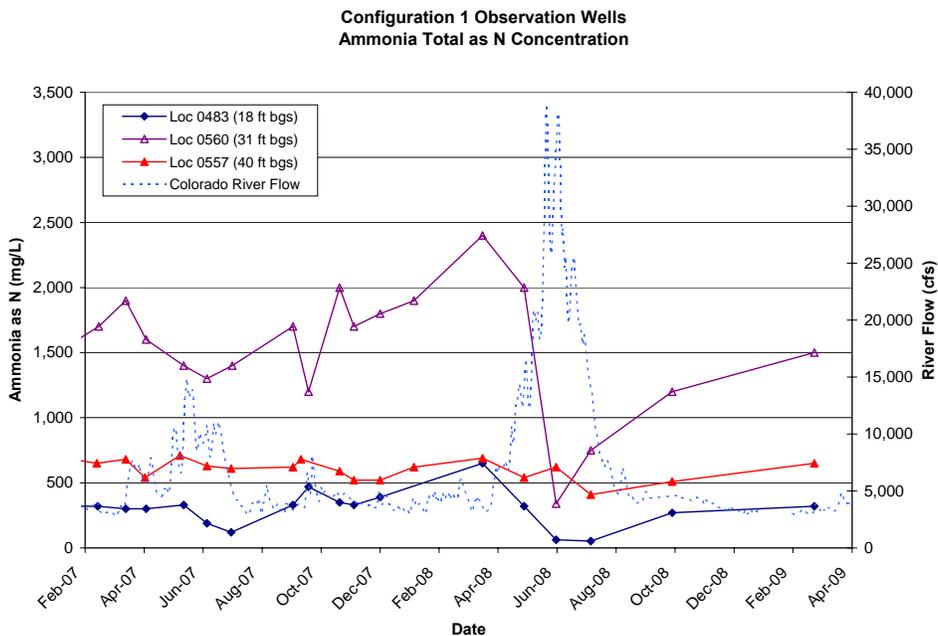


Figure 12. CF1 Observation Wells Time Versus Ammonia Total as N Concentration Plot

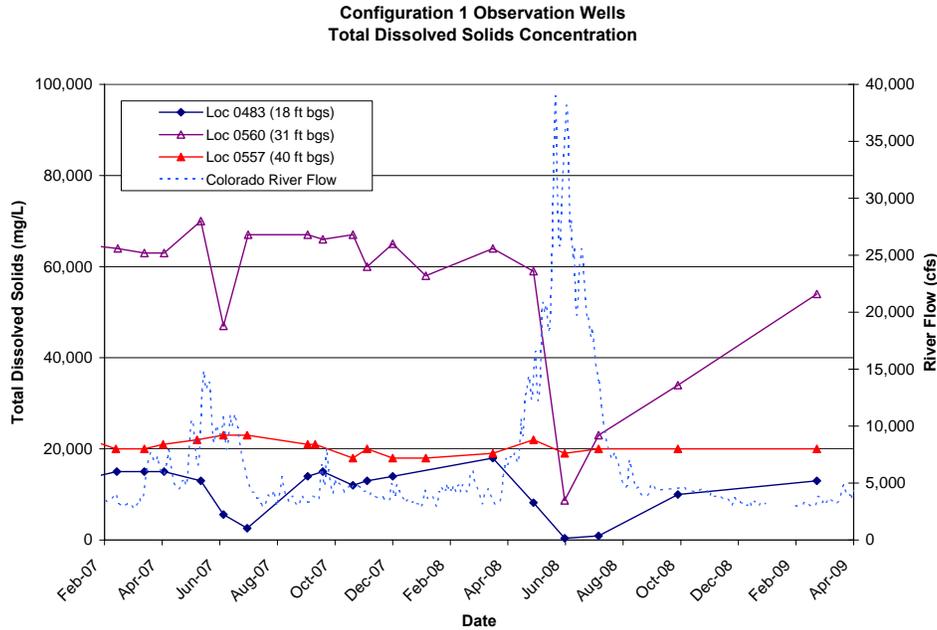


Figure 13. CF1 Observation Wells Time Versus TDS Concentration Plot

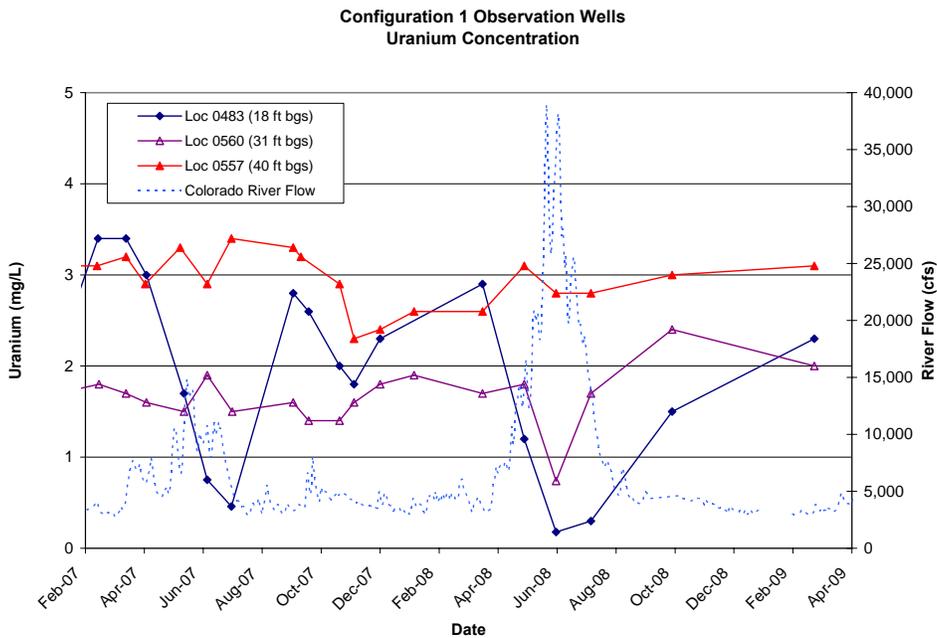


Figure 14. CF1 Observation Wells Time Versus Uranium Concentration Plot

**CF1 Observation Wells 0403 and 0407**

Samples were also collected from wells 0403 and 0407, which are located on the river bank within CF1, during the February 2009 sampling event. As shown in the time versus analyte concentration plots (Figures 15, 16, and 17), these concentrations have also continued to rebound to prerunoff levels, with well 0407 having the highest ammonia concentration. TDS and uranium concentrations are comparable from the two locations.

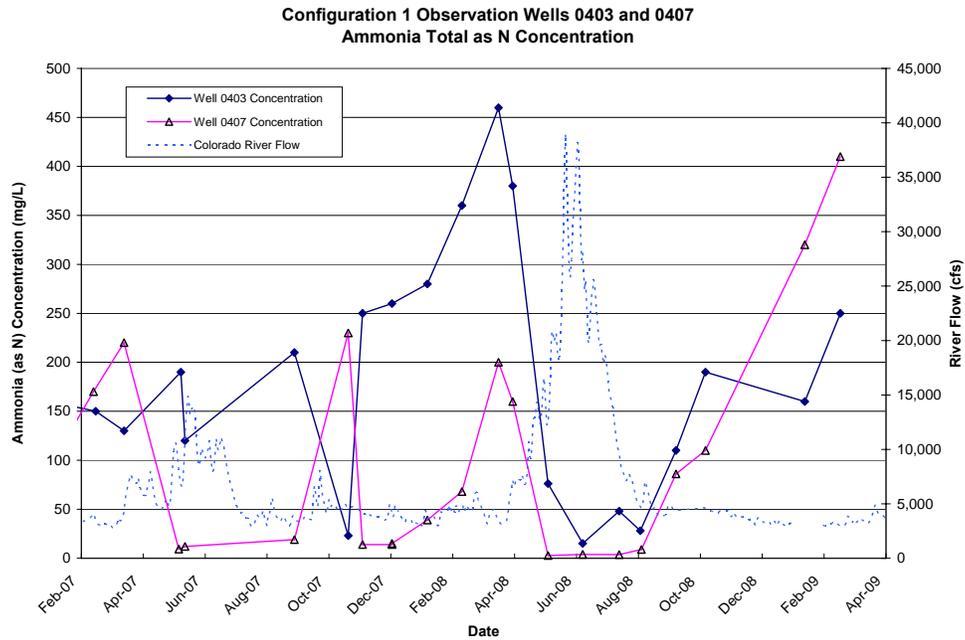


Figure 15. CF1 Observation Wells 0403 and 0407 Time Versus Ammonia Total as N Concentration Plot

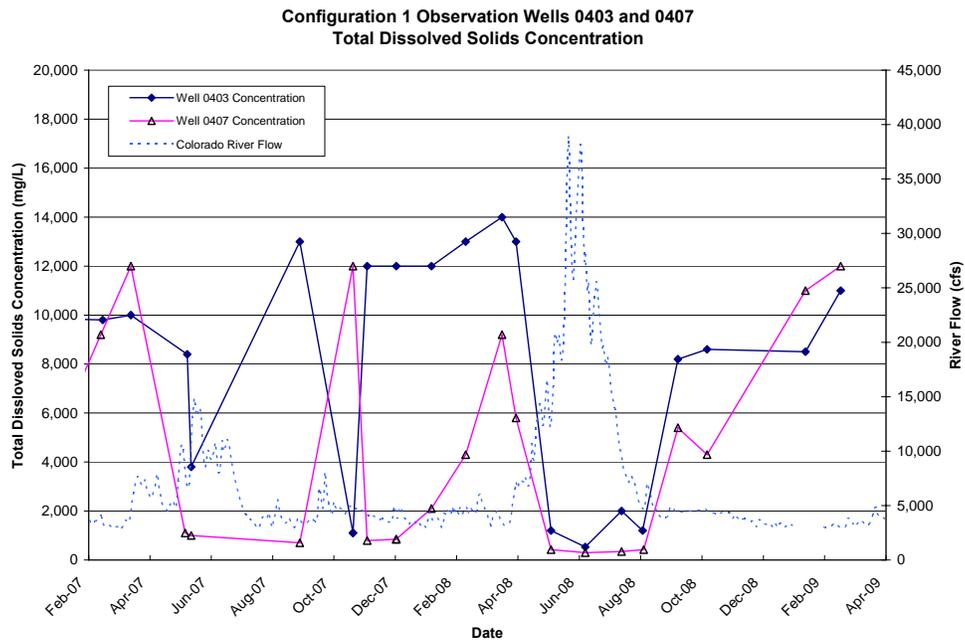


Figure 16. CF1 Observation Wells 0403 and 0407 Time Versus TDS Concentration Plot

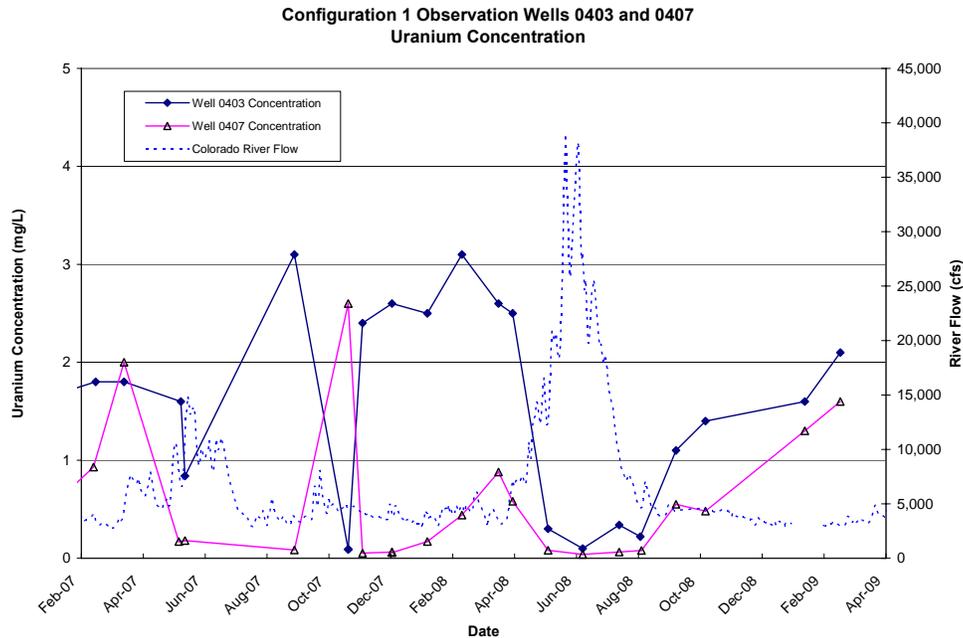


Figure 17. CF1 Observation Wells 0403 and 0407 Time Versus Uranium Concentration Plot

**CF4**

Of the indicator wells typically discussed in this summary for CF4, locations 0780 (28 ft bgs), 0786 (28 ft bgs), 0782 (33 ft bgs), and 0787 (36 ft bgs) were sampled during February 2009. Ammonia, TDS, and uranium concentration trends over the past 2 years are displayed in Figures 18, 19, and 20, respectively. Analyte concentrations continued to rebound to base-flow levels.

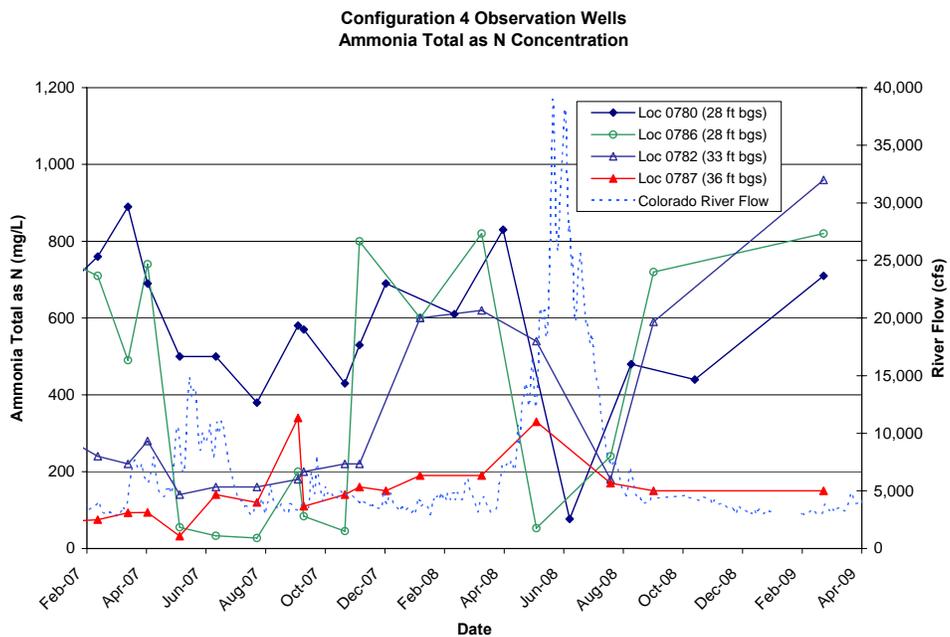


Figure 18. CF4 Observation Wells Time Versus Ammonia Total as N Concentration Plot

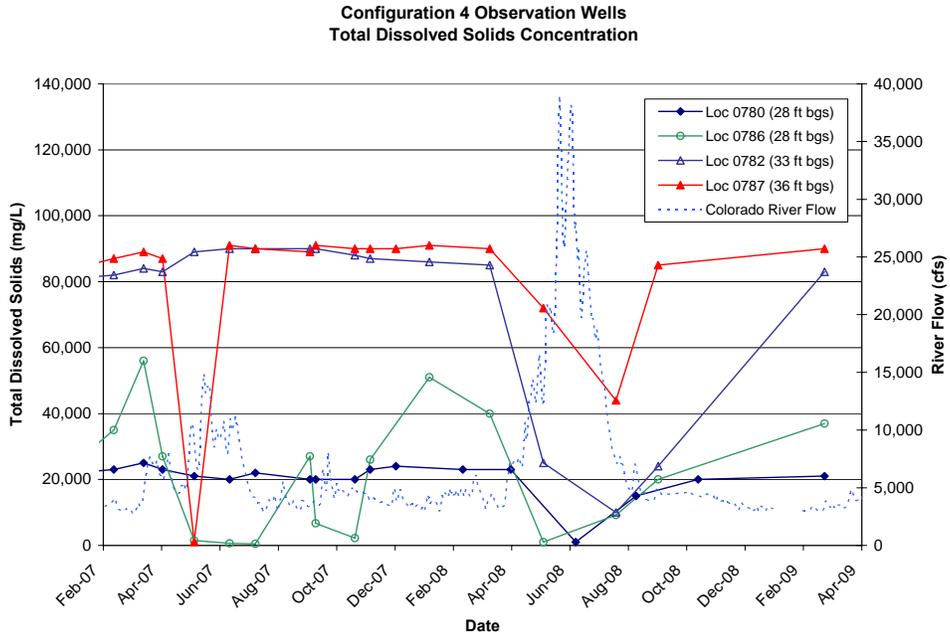


Figure 19. CF4 Observation Wells Time Versus TDS Concentration Plot

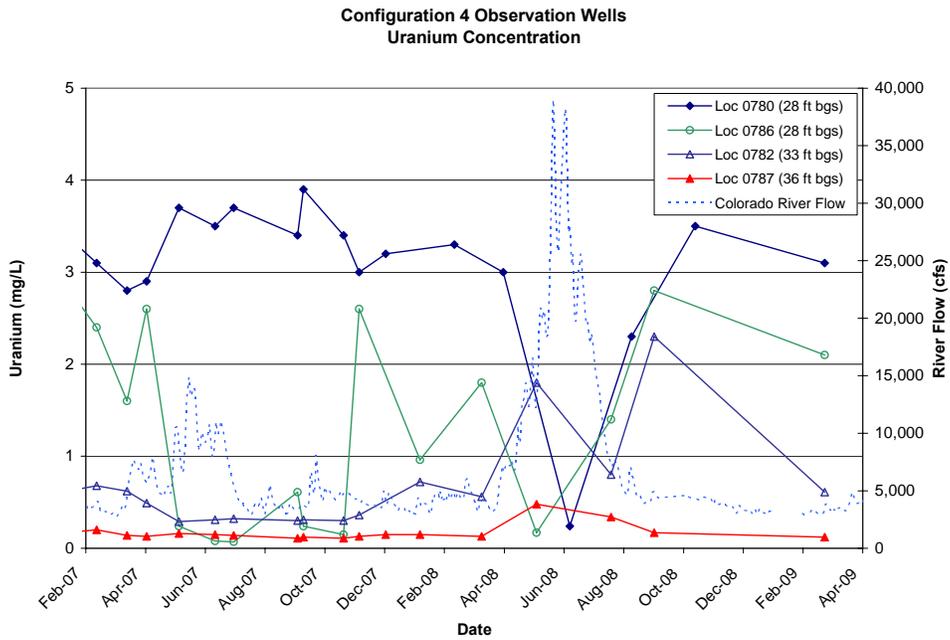


Figure 20. CF4 Observation Wells Time Versus Uranium Concentration Plot

### Surface Water Sampling Results

Surface water samples were not collected as part of this 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*. Although not listed here, the normal set of locations were sampled. Please refer to the attached trip report (Attachment 1) for specific sampled locations and an explanation of why some locations were not sampled, such as dry conditions at specific surface water locations.

The data validations indicate that the data meet the quality-control criteria specified for this project. All samples were analyzed within their prescribed holding times. No significant discrepancies were noted regarding sample shipping and receiving, preservation, holding times, instrument calibration, method blanks, or matrix spikes (MSs), except as qualified or noted in the Laboratory Performance Assessment (Section 2.2).

There were no anomalous data points associated with this event. See the Anomalous Data Review (Section 3.2) for details.

According to the USGS Cisco gaging station, the mean daily Colorado River flows ranged from 2,800 to 2,870 cubic feet per second during this sampling period.

## 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 processes for these sampling events were documented. As the verification exhibits, all sampling was conducted following the applicable procedures. This verification is provided in Appendix A.

### 2.2 Laboratory Performance Assessments

#### General Information

Report Identification No. (RIN):	0902027
Sample Event:	Interim Action Well Field Monthly Sampling Event – February 2009
Site:	Moab, Utah
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Sample Data Group (SDG):	0902164
Analysis:	Metals and Inorganics
Validator:	Rachel Cowan
Review Date:	April 9, 2009

This validation was performed according to the *Environmental Procedures Catalog*, “Standard Practice for Validation of Laboratory Data,” GT-9(P) (2006). The procedure was applied at Level 1, Data Deliverables Examination. 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 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Preparation Method	Analytical Method
Ammonia	WCH-A-005	EPA 350.1	EPA 350.1
Chloride	MIS-A-039	EPA SW-846 9056	EPA SW-846 9056
Manganese	G17	EPA SW-846 6010B	EPA SW-846 6010B
Selenium	G14	EPA SW-846 6020A	EPA SW-846 6020A
Sulfate	MIS-A-044	EPA SW-846 9056	EPA SW-846 9056
TDS	WCH-A-033	MCAWW 160.1	MCAWW 160.1
Uranium	G1	EPA SW-846 6020A	EPA SW-846 6020A

### Data Qualifier Summary

Analytical results were qualified as listed in Table 2. Refer to Table 3 for an explanation of the data qualifiers applied.

Table 2. Data Qualifiers

Sample Numbers	Locations	Analyte	Flag	Reason
0902164-1 through -4 and -10 through -20	0403, 0405, 0407, 0470, 0483, 0488, 0547, 0557, 0559, 0560, 0583, 0588, 0589, 0653, and 0688-39	Ammonia	J	MS1
0902164-1 through -7	0403, 0405, 0407, 0470, 0473, 0475, and 0476	Manganese	J	SD1

Note: Flags are for detects. See reason codes for nondetect codes.

Table 3. Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Nondetects)	Explanation
MS1	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because the MS sample was (a) from another client, (b) of dissimilar matrix, (c) a field blank or equipment blank, or (d) not analyzed at the proper frequency as stated in the appropriate analytical method.
SD1	J	N/A	Results for the affected analyte(s) are regarded as estimated (J) because the frequency requirements for serial dilution analysis were not met, and the sample result is greater than or equal to 50 times the practical quantitation limit.

### Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received a total of 27 samples for RIN 0902027. These samples were shipped on February 19, 2009, under UPS tracking number 1Z5W1Y510196681074. Paragon assigned the samples to SDG 0902164. All samples were accompanied by a Chain of Custody (COC) form. The COC forms were checked to confirm that

all of the samples were listed on each form with sample collection dates and times and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents, including the COC forms and the sample tickets, had no errors or omissions.

### **Preservation and Holding Times**

The sample shipments were received intact with the temperature within the cooler at 3.6 °C. All samples in the SDG were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

### **Case Narratives**

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

### **Matrix Spike and Replicate Analysis**

MS sample analysis, performed at a frequency of one per 20 samples unless otherwise noted, is performed as a measure of the ability to recover analytes in a particular matrix. Replicate sample (RS) analysis consists of matrix spike duplicate (MSD) 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 as N**

For SDG 0902164, only one MS was successfully analyzed for the 27 ammonia samples. Because method 350.1 requires MSs to be analyzed for at least 10 percent of the samples, 17 samples were “J”-flagged for this reason. There were two field duplicates prepared and analyzed with this RIN (see field duplicate section below for details), and both passed acceptance criteria as did one of the MSDs, so no ammonia results were “J”-flagged for RS.

### **Field Duplicates**

Field duplicates are collected during sampling activities and may be used as RSs to confirm precision for validation purposes. They are labeled with false identifications and submitted with the samples to be analyzed by Paragon Analytics. Sample 0902164-26 (1750) and sample 0902164-27 (2774) were the duplicates taken from location 0405 (regular sample 0902164-2) and location 0689-54 (regular sample 0902164-21), respectively. These samples passed the Environmental Protection Agency (EPA) criteria of  $\pm 20$  relative percent difference (RPD) for all analytes.

### **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, Paragon Analytics 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 criteria are as stringent. For SDG 0902164, the appropriate number of MS samples were successfully analyzed and could be substituted for LCSs. Therefore, no associated manganese and uranium results were flagged for this reason.

### **Detection Limits/Dilutions**

The required detection limit for all analytes was achieved for all work orders. Serial dilution (SD) samples were required for inductively coupled plasma (ICP) sample analysis (manganese, selenium, and uranium). For SDG 0902164, the SD sample failed. The associated manganese results were “J”-flagged for this.

### **Method and Calibration Blanks**

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

Four calibration blanks for chloride in SDG 0901264 were greater than chloride’s associated reporting limit (RL). None of the related chloride results were less than five times the highest blank result, so no chloride results were “J”-flagged for this reason.

### **Equipment Blanks**

An equipment blank (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.

No surface water samples were collected, so no EBs were collected.

### **Completeness**

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

### **Electronic Data Deliverable Files**

The electronic data deliverable files arrived on February 26, 2009. The contents of these files were manually examined to verify that the sample results accurately reflected the data contained in the sample data package and that all and only the requested data were delivered.

## **2.3 Field Analyses/Activities**

The following information summarizes the field analyses and activities for the February 2009 sampling event.

## **Field Activities**

All monitor wells were purged and sampled using the low-flow sampling method; this method was not used at extraction wells. Three 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 from the field duplicates met the EPA criteria of  $\pm 20$  RPD for results that are greater than five times the RL and were considered acceptable, except for the ammonia result in field duplicate sample 0902164-17 (26 RPD).

## **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 when possible, or an explanation of why they were not met was given in the laboratory case narrative. All analytical quality-control criteria were met except as qualified on the Ground Water Quality Data by Parameter, Surface Water Quality by Parameter, or equipment/trip blank database printouts. The meaning of data qualifiers is defined on the database printouts or defined in the EPA *Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-Media Multi-Concentration*, Document Number ILMO2.0, 1991. All data in this package are considered validated and may be treated as final results.

## **3.0 Data Presentation**

This section contains the Minimums and Maximums Report (Section 3.1), the Anomalous Data Review (Section 3.2), tables containing the Water Quality Data 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, respectively; or (3) there were fewer than five historical samples for comparison.

### **3.2 Anomalous Data Review**

As previously mentioned, there were no anomalous data associated with this sampling event. The ammonia concentration reported in the Minimums and Maximums Report (Appendix B) is less than 50 percent more than the maximum historical concentration.

### **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**

All samples were collected on dedicated sampling equipment; therefore, it was not necessary to collect an EB.

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

## Appendix A. Water Sampling Field Activities Verification

<b>Sampling Event / RIN</b>	February 2009/0902027	<b>Date(s) of Water Sampling</b>	February 17-19, 2009
<b>Date(s) of Verification</b>	April 8, 2009	<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 pretrip 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?	No	One sample (0547) was contaminated with radon. It was held on ice for 4 hours before field measurements could be taken, and temperature and dissolved oxygen could not be sampled.
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	

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

- |  |   |
|--|---|
| 8. Were the following conditions met when purging a Category II well:                                    |   |
| Was the flow rate less than 500 milliliters per minute?  | Yes   |
| Was one pump/tubing volume removed prior to sampling?  | Yes   |
| 9. Were duplicates taken at a frequency of one per 20 samples?   | Yes      There were 25 samples, and two duplicates were collected.  |
| 10. Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment? | NA      Ground water samples are collected on dedicated equipment, and no surface water samples were collected. |
| 11. Were trip blanks prepared and included with each shipment of volatile organic compound samples?      | NA  |
| 12. Were quality-control samples assigned a fictitious site identification number?                       | Yes   |
| Was the true identity of the samples recorded on the quality assurance sample log?                       | Yes   |
| 13. Were samples collected in the containers specified?  | Yes   |
| 14. Were samples filtered and preserved as specified?  | Yes   |
| 15. Were the number and types of samples collected as specified?   | Yes   |
| 16. Were COC records completed, and was sample custody maintained?                                       | Yes   |
| 17. Are field data sheets signed and dated by both team members?   | Yes   |
| 18. Was all other pertinent information documented on the field data sheets?                             | Yes   |
| 19. Was the presence or absence of ice in the cooler documented at every sample location?                | Yes   |
| 20. Were water levels measured at the locations specified in the planning documents?                     | Yes   |

**Appendix B.**  
**Minimums and Maximums Report**

## Appendix B. Minimums and Maximums Report

### Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 0902027

Comparison: All Historical Data

Report Date: 4/8/2009

Site Code	Location Code	Sample Date	Analyte	Current		Historical Maximum		Historical Minimum		Count	
				Result	Qualifiers <i>Lab Data</i>	Result	Qualifiers <i>Lab Data</i>	Result	Qualifiers <i>Lab Data</i>	N	N Below Detect
MOA01	0782	02/17/2009	Ammonia Total as N	960		750	F	140	F	23	0

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.                        |                    |

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

## Appendix C. Water Quality Data

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

Parameter	Units	Location ID	Location Type	Sample		Depth Range		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab		Data	QA		
Alkalinity, Total (As CaCO3)	mg/L	0403	WL	02/18/2009	0001	18	- 18	748		#		
Alkalinity, Total (As CaCO3)	mg/L	0405	WL	02/19/2009	0001	18	- 18	728		#		
Alkalinity, Total (As CaCO3)	mg/L	0407	WL	02/17/2009	0001	17	- 17	672		#		
Alkalinity, Total (As CaCO3)	mg/L	0470	WL	02/17/2009	0001	10.3	- 19.7	864		#		
Alkalinity, Total (As CaCO3)	mg/L	0473	WL	02/17/2009	0001	10.3	- 19.7	826		#		
Alkalinity, Total (As CaCO3)	mg/L	0475	WL	02/18/2009	0001	10.3	- 19.7	900		#		
Alkalinity, Total (As CaCO3)	mg/L	0476	WL	02/17/2009	0001	10.3	- 19.7	800		#		
Alkalinity, Total (As CaCO3)	mg/L	0477	WL	02/18/2009	0001	10.3	- 19.7	806		#		
Alkalinity, Total (As CaCO3)	mg/L	0480	WL	02/17/2009	0001	18	- 18	980		#		
Alkalinity, Total (As CaCO3)	mg/L	0483	WL	02/18/2009	0001	18	- 18	806		#		
Alkalinity, Total (As CaCO3)	mg/L	0488	WL	02/19/2009	0001	39	- 39	1018		#		
Alkalinity, Total (As CaCO3)	mg/L	0557	WL	02/17/2009	0001	40	- 40	958		#		
Alkalinity, Total (As CaCO3)	mg/L	0559	WL	02/17/2009	0001	18	- 18	606		#		
Alkalinity, Total (As CaCO3)	mg/L	0560	WL	02/17/2009	0001	36	- 36	632		#		
Alkalinity, Total (As CaCO3)	mg/L	0583	WL	02/18/2009	0001	18	- 18	826		#		
Alkalinity, Total (As CaCO3)	mg/L	0588	WL	02/18/2009	0001	34	- 34	960		#		
Alkalinity, Total (As CaCO3)	mg/L	0688	WL	02/19/2009	0001	39	- 39	886		#		
Alkalinity, Total (As CaCO3)	mg/L	0689	WL	02/19/2009	0001	54	- 54	1020		#		
Alkalinity, Total (As CaCO3)	mg/L	0780	WL	02/17/2009	0001	30	- 30	1030		#		
Alkalinity, Total (As CaCO3)	mg/L	0782	WL	02/17/2009	0001	34	- 34	396		#		
Alkalinity, Total (As CaCO3)	mg/L	0786	WL	02/17/2009	0001	28	- 28	712		#		
Alkalinity, Total (As CaCO3)	mg/L	0787	WL	02/17/2009	0001	36	- 36	320		#		
Ammonia Total as N	mg/L	0403	WL	02/18/2009	0001	18	- 18	250	J	#	20	
Ammonia Total as N	mg/L	0405	WL	02/19/2009	0001	18	- 18	270	J	#	20	
Ammonia Total as N	mg/L	0405	WL	02/19/2009	0002	18	- 18	220		#	20	
Ammonia Total as N	mg/L	0407	WL	02/17/2009	0001	17	- 17	410	J	#	20	

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

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	0470	WL	02/17/2009	0001	10.3	-	19.7	520	J	#	20	
Ammonia Total as N	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	450		#	20	
Ammonia Total as N	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	400		#	20	
Ammonia Total as N	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	260		#	20	
Ammonia Total as N	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	230		#	20	
Ammonia Total as N	mg/L	0480	WL	02/17/2009	0001	18	-	18	610		#	20	
Ammonia Total as N	mg/L	0483	WL	02/18/2009	0001	18	-	18	320	J	#	20	
Ammonia Total as N	mg/L	0488	WL	02/19/2009	0001	39	-	39	850	J	#	20	
Ammonia Total as N	mg/L	0547	TS	02/18/2009	0001	0	-	0	470	J	#	20	
Ammonia Total as N	mg/L	0557	WL	02/17/2009	0001	40	-	40	650	J	#	20	
Ammonia Total as N	mg/L	0559	WL	02/17/2009	0001	18	-	18	270	J	#	20	
Ammonia Total as N	mg/L	0560	WL	02/17/2009	0001	36	-	36	1500	J	#	50	
Ammonia Total as N	mg/L	0583	WL	02/18/2009	0001	18	-	18	390	J	#	20	
Ammonia Total as N	mg/L	0588	WL	02/18/2009	0001	34	-	34	670	J	#	20	
Ammonia Total as N	mg/L	0589	WL	02/18/2009	0001	52	-	52	800	J	#	20	
Ammonia Total as N	mg/L	0683	WL	02/18/2009	0001	27	-	27	390	J	#	20	
Ammonia Total as N	mg/L	0688	WL	02/19/2009	0001	39	-	39	390	J	#	20	
Ammonia Total as N	mg/L	0688	WL	02/19/2009	0002	30.6	-	40.6	690		#	20	
Ammonia Total as N	mg/L	0689	WL	02/19/2009	0001	54	-	54	660		#	20	
Ammonia Total as N	mg/L	0780	WL	02/17/2009	0001	30	-	30	710		#	20	
Ammonia Total as N	mg/L	0782	WL	02/17/2009	0001	34	-	34	960		#	20	
Ammonia Total as N	mg/L	0786	WL	02/17/2009	0001	28	-	28	820		#	20	
Ammonia Total as N	mg/L	0787	WL	02/17/2009	0001	36	-	36	150		#	20	
Chloride	mg/L	0403	WL	02/18/2009	0001	18	-	18	1500		#	40	
Chloride	mg/L	0405	WL	02/19/2009	0001	18	-	18	850		#	40	
Chloride	mg/L	0405	WL	02/19/2009	0002	18	-	18	990		#	40	
Chloride	mg/L	0407	WL	02/17/2009	0001	17	-	17	2800		#	40	

## Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 4/14/2009

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Chloride	mg/L	0470	WL	02/17/2009	0001	10.3	-	19.7	3100		#	40	
Chloride	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	2400		#	40	
Chloride	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	2100		#	40	
Chloride	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	1700		#	40	
Chloride	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	1600		#	40	
Chloride	mg/L	0480	WL	02/17/2009	0001	18	-	18	3800		#	40	
Chloride	mg/L	0483	WL	02/18/2009	0001	18	-	18	2700		#	40	
Chloride	mg/L	0488	WL	02/19/2009	0001	39	-	39	1500		#	40	
Chloride	mg/L	0547	TS	02/18/2009	0001	0	-	0	2700		#	40	
Chloride	mg/L	0557	WL	02/17/2009	0001	40	-	40	4900		#	100	
Chloride	mg/L	0559	WL	02/17/2009	0001	18	-	18	1400		#	40	
Chloride	mg/L	0560	WL	02/17/2009	0001	36	-	36	29000		#	400	
Chloride	mg/L	0583	WL	02/18/2009	0001	18	-	18	1500		#	40	
Chloride	mg/L	0588	WL	02/18/2009	0001	34	-	34	6400		#	100	
Chloride	mg/L	0589	WL	02/18/2009	0001	52	-	52	27000		#	400	
Chloride	mg/L	0683	WL	02/18/2009	0001	27	-	27	2000		#	40	
Chloride	mg/L	0688	WL	02/19/2009	0001	39	-	39	2000		#	40	
Chloride	mg/L	0688	WL	02/19/2009	0002	30.6	-	40.6	14000		#	400	
Chloride	mg/L	0689	WL	02/19/2009	0001	54	-	54	13000		#	200	
Chloride	mg/L	0780	WL	02/17/2009	0001	30	-	30	5100		#	100	
Chloride	mg/L	0782	WL	02/17/2009	0001	34	-	34	40000		#	1000	
Chloride	mg/L	0786	WL	02/17/2009	0001	28	-	28	15000		#	400	
Chloride	mg/L	0787	WL	02/17/2009	0001	36	-	36	50000		#	1000	
Copper	mg/L	0787	WL	02/17/2009	0001	36	-	36	0.14	B	#	0.047	
Dissolved Oxygen	mg/L	0403	WL	02/18/2009	0001	18	-	18	0.71		#		
Dissolved Oxygen	mg/L	0405	WL	02/19/2009	0001	18	-	18	0.36		#		
Dissolved Oxygen	mg/L	0407	WL	02/17/2009	0001	17	-	17	3.13		#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

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	0470	WL	02/17/2009	0001	10.3	-	19.7	1.67			#		
Dissolved Oxygen	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	2.53			#		
Dissolved Oxygen	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	1			#		
Dissolved Oxygen	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	4.55			#		
Dissolved Oxygen	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	0.67			#		
Dissolved Oxygen	mg/L	0480	WL	02/17/2009	0001	18	-	18	1.4			#		
Dissolved Oxygen	mg/L	0483	WL	02/18/2009	0001	18	-	18	0.58			#		
Dissolved Oxygen	mg/L	0488	WL	02/19/2009	0001	39	-	39	0.28			#		
Dissolved Oxygen	mg/L	0557	WL	02/17/2009	0001	40	-	40	1.22			#		
Dissolved Oxygen	mg/L	0559	WL	02/17/2009	0001	18	-	18	3.54			#		
Dissolved Oxygen	mg/L	0560	WL	02/17/2009	0001	36	-	36	2.14			#		
Dissolved Oxygen	mg/L	0583	WL	02/18/2009	0001	18	-	18	0.4			#		
Dissolved Oxygen	mg/L	0588	WL	02/18/2009	0001	34	-	34	0.51			#		
Dissolved Oxygen	mg/L	0589	WL	02/18/2009	0001	52	-	52	0.65			#		
Dissolved Oxygen	mg/L	0683	WL	02/18/2009	0001	27	-	27	0.41			#		
Dissolved Oxygen	mg/L	0688	WL	02/19/2009	0001	39	-	39	0.52			#		
Dissolved Oxygen	mg/L	0688	WL	02/19/2009	0001	31	-	31	0.68			#		
Dissolved Oxygen	mg/L	0689	WL	02/19/2009	0001	54	-	54	0.29			#		
Dissolved Oxygen	mg/L	0689	WL	02/19/2009	0001	46	-	46	0.59			#		
Dissolved Oxygen	mg/L	0780	WL	02/17/2009	0001	30	-	30	2.74			#		
Dissolved Oxygen	mg/L	0782	WL	02/17/2009	0001	34	-	34	0.81			#		
Dissolved Oxygen	mg/L	0786	WL	02/17/2009	0001	28	-	28	2.6			#		
Dissolved Oxygen	mg/L	0787	WL	02/17/2009	0001	36	-	36	1.89			#		
Manganese	mg/L	0403	WL	02/18/2009	0001	18	-	18	3.7	N	J	#	0.00048	
Manganese	mg/L	0405	WL	02/19/2009	0001	18	-	18	4.6		J	#	0.00048	
Manganese	mg/L	0405	WL	02/19/2009	0002	18	-	18	4.7			#	0.00048	
Manganese	mg/L	0407	WL	02/17/2009	0001	17	-	17	3.4		J	#	0.00097	

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Manganese	mg/L	0470	WL	02/17/2009	0001	10.3	-	19.7	4.7	J	#	0.00097	
Manganese	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	3.8	J	#	0.00097	
Manganese	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	3.8	J	#	0.00097	
Manganese	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	3.3	J	#	0.00097	
Manganese	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	3.6		#	0.00048	
Manganese	mg/L	0480	WL	02/17/2009	0001	18	-	18	4.8		#	0.00097	
Manganese	mg/L	0483	WL	02/18/2009	0001	18	-	18	3.7		#	0.00097	
Manganese	mg/L	0488	WL	02/19/2009	0001	39	-	39	5.8		#	0.00097	
Manganese	mg/L	0547	TS	02/18/2009	0001	0	-	0	4.1		#	0.00097	
Manganese	mg/L	0557	WL	02/17/2009	0001	40	-	40	4.9		#	0.00097	
Manganese	mg/L	0559	WL	02/17/2009	0001	18	-	18	3		#	0.00048	
Manganese	mg/L	0560	WL	02/17/2009	0001	36	-	36	9		#	0.0048	
Manganese	mg/L	0583	WL	02/18/2009	0001	18	-	18	4.5		#	0.00097	
Manganese	mg/L	0588	WL	02/18/2009	0001	34	-	34	5.7		#	0.00097	
Manganese	mg/L	0589	WL	02/18/2009	0001	52	-	52	6.4		#	0.0048	
Manganese	mg/L	0683	WL	02/18/2009	0001	27	-	27	4.8		#	0.00097	
Manganese	mg/L	0688	WL	02/19/2009	0001	39	-	39	4.6		#	0.00097	
Manganese	mg/L	0688	WL	02/19/2009	0002	30.6	-	40.6	5.7		#	0.0048	
Manganese	mg/L	0689	WL	02/19/2009	0001	54	-	54	5.4	E	#	0.0024	
Manganese	mg/L	0780	WL	02/17/2009	0001	30	-	30	5.4		#	0.00097	
Manganese	mg/L	0782	WL	02/17/2009	0001	34	-	34	9.2		#	0.0097	
Manganese	mg/L	0786	WL	02/17/2009	0001	28	-	28	6.5		#	0.0048	
Manganese	mg/L	0787	WL	02/17/2009	0001	36	-	36	7.8		#	0.0097	
Oxidation Reduction Potential	mV	0403	WL	02/18/2009	0001	18	-	18	123.3		#		
Oxidation Reduction Potential	mV	0405	WL	02/19/2009	0001	18	-	18	68		#		
Oxidation Reduction Potential	mV	0407	WL	02/17/2009	0001	17	-	17	113		#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

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	0470	WL	02/17/2009	0001	10.3	-	19.7	112			#		
Oxidation Reduction Potential	mV	0473	WL	02/17/2009	0001	10.3	-	19.7	114			#		
Oxidation Reduction Potential	mV	0475	WL	02/18/2009	0001	10.3	-	19.7	145.2			#		
Oxidation Reduction Potential	mV	0476	WL	02/17/2009	0001	10.3	-	19.7	117			#		
Oxidation Reduction Potential	mV	0477	WL	02/18/2009	0001	10.3	-	19.7	138.2			#		
Oxidation Reduction Potential	mV	0480	WL	02/17/2009	0001	18	-	18	132			#		
Oxidation Reduction Potential	mV	0483	WL	02/18/2009	0001	18	-	18	165.2			#		
Oxidation Reduction Potential	mV	0488	WL	02/19/2009	0001	39	-	39	74			#		
Oxidation Reduction Potential	mV	0547	TS	02/18/2009	0001	0	-	0	201			#		
Oxidation Reduction Potential	mV	0557	WL	02/17/2009	0001	40	-	40	139			#		
Oxidation Reduction Potential	mV	0559	WL	02/17/2009	0001	18	-	18	99			#		
Oxidation Reduction Potential	mV	0560	WL	02/17/2009	0001	36	-	36	114			#		
Oxidation Reduction Potential	mV	0583	WL	02/18/2009	0001	18	-	18	84			#		
Oxidation Reduction Potential	mV	0588	WL	02/18/2009	0001	34	-	34	89.6			#		
Oxidation Reduction Potential	mV	0589	WL	02/18/2009	0001	52	-	52	131.7			#		
Oxidation Reduction Potential	mV	0683	WL	02/18/2009	0001	27	-	27	95			#		
Oxidation Reduction Potential	mV	0688	WL	02/19/2009	0001	31	-	31	59			#		
Oxidation Reduction Potential	mV	0688	WL	02/19/2009	0001	39	-	39	61			#		
Oxidation Reduction Potential	mV	0689	WL	02/19/2009	0001	54	-	54	63			#		
Oxidation Reduction Potential	mV	0689	WL	02/19/2009	0001	46	-	46	67			#		
Oxidation Reduction Potential	mV	0780	WL	02/17/2009	0001	30	-	30	149			#		
Oxidation Reduction Potential	mV	0782	WL	02/17/2009	0001	34	-	34	182			#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

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	0786	WL	02/17/2009	0001	28	-	28	145		#		
Oxidation Reduction Potential	mV	0787	WL	02/17/2009	0001	36	-	36	141		#		
pH	s.u.	0403	WL	02/18/2009	0001	18	-	18	7.13		#		
pH	s.u.	0405	WL	02/19/2009	0001	18	-	18	6.81		#		
pH	s.u.	0407	WL	02/17/2009	0001	17	-	17	7.22		#		
pH	s.u.	0470	WL	02/17/2009	0001	10.3	-	19.7	7.11		#		
pH	s.u.	0473	WL	02/17/2009	0001	10.3	-	19.7	7.13		#		
pH	s.u.	0475	WL	02/18/2009	0001	10.3	-	19.7	7.08		#		
pH	s.u.	0476	WL	02/17/2009	0001	10.3	-	19.7	7.1		#		
pH	s.u.	0477	WL	02/18/2009	0001	10.3	-	19.7	7.04		#		
pH	s.u.	0480	WL	02/17/2009	0001	18	-	18	7.02		#		
pH	s.u.	0483	WL	02/18/2009	0001	18	-	18	7.02		#		
pH	s.u.	0488	WL	02/19/2009	0001	39	-	39	6.94		#		
pH	s.u.	0547	TS	02/18/2009	0001	0	-	0	6.74		#		
pH	s.u.	0557	WL	02/17/2009	0001	40	-	40	6.97		#		
pH	s.u.	0559	WL	02/17/2009	0001	18	-	18	7.12		#		
pH	s.u.	0560	WL	02/17/2009	0001	36	-	36	6.89		#		
pH	s.u.	0583	WL	02/18/2009	0001	18	-	18	6.93		#		
pH	s.u.	0588	WL	02/18/2009	0001	34	-	34	6.98		#		
pH	s.u.	0589	WL	02/18/2009	0001	52	-	52	6.93		#		
pH	s.u.	0683	WL	02/18/2009	0001	27	-	27	6.94		#		
pH	s.u.	0688	WL	02/19/2009	0001	39	-	39	6.81		#		
pH	s.u.	0688	WL	02/19/2009	0001	31	-	31	6.86		#		
pH	s.u.	0689	WL	02/19/2009	0001	46	-	46	6.79		#		
pH	s.u.	0689	WL	02/19/2009	0001	54	-	54	6.86		#		
pH	s.u.	0780	WL	02/17/2009	0001	30	-	30	6.97		#		
pH	s.u.	0782	WL	02/17/2009	0001	34	-	34	6.72		#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
pH	s.u.	0786	WL	02/17/2009	0001	28	-	28	6.89		#		
pH	s.u.	0787	WL	02/17/2009	0001	36	-	36	7.05		#		
Selenium	mg/L	0405	WL	02/19/2009	0001	18	-	18	0.021		#	8.4E-005	
Selenium	mg/L	0405	WL	02/19/2009	0002	18	-	18	0.021		#	8.4E-005	
Selenium	mg/L	0683	WL	02/18/2009	0001	27	-	27	0.02		#	8.4E-005	
Specific Conductance	µmhos/cm	0403	WL	02/18/2009	0001	18	-	18	13719		#		
Specific Conductance	µmhos/cm	0405	WL	02/19/2009	0001	18	-	18	12416		#		
Specific Conductance	µmhos/cm	0407	WL	02/17/2009	0001	17	-	17	17301		#		
Specific Conductance	µmhos/cm	0470	WL	02/17/2009	0001	10.3	-	19.7	20557		#		
Specific Conductance	µmhos/cm	0473	WL	02/17/2009	0001	10.3	-	19.7	17820		#		
Specific Conductance	µmhos/cm	0475	WL	02/18/2009	0001	10.3	-	19.7	16909		#		
Specific Conductance	µmhos/cm	0476	WL	02/17/2009	0001	10.3	-	19.7	15882		#		
Specific Conductance	µmhos/cm	0477	WL	02/18/2009	0001	10.3	-	19.7	14735		#		
Specific Conductance	µmhos/cm	0480	WL	02/17/2009	0001	18	-	18	24973		#		
Specific Conductance	µmhos/cm	0483	WL	02/18/2009	0001	18	-	18	17371		#		
Specific Conductance	µmhos/cm	0488	WL	02/19/2009	0001	39	-	39	19161		#		
Specific Conductance	µmhos/cm	0547	TS	02/18/2009	0001	0	-	0	13021		#		
Specific Conductance	µmhos/cm	0557	WL	02/17/2009	0001	40	-	40	26897		#		
Specific Conductance	µmhos/cm	0559	WL	02/17/2009	0001	18	-	18	12482		#		
Specific Conductance	µmhos/cm	0560	WL	02/17/2009	0001	36	-	36	79111		#		
Specific Conductance	µmhos/cm	0583	WL	02/18/2009	0001	18	-	18	15411		#		
Specific Conductance	µmhos/cm	0588	WL	02/18/2009	0001	34	-	34	31242		#		
Specific Conductance	µmhos/cm	0589	WL	02/18/2009	0001	52	-	52	74654		#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

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	0683	WL	02/18/2009	0001	27	-	27	19002			#		
Specific Conductance	µmhos/cm	0688	WL	02/19/2009	0001	39	-	39	19215			#		
Specific Conductance	µmhos/cm	0688	WL	02/19/2009	0001	31	-	31	19678			#		
Specific Conductance	µmhos/cm	0689	WL	02/19/2009	0001	46	-	46	18683			#		
Specific Conductance	µmhos/cm	0689	WL	02/19/2009	0001	54	-	54	50733			#		
Specific Conductance	µmhos/cm	0780	WL	02/17/2009	0001	30	-	30	28222			#		
Specific Conductance	µmhos/cm	0782	WL	02/17/2009	0001	34	-	34	112801			#		
Specific Conductance	µmhos/cm	0786	WL	02/17/2009	0001	28	-	28	51203			#		
Specific Conductance	µmhos/cm	0787	WL	02/17/2009	0001	36	-	36	119019			#		
Sulfate	mg/L	0403	WL	02/18/2009	0001	18	-	18	5800			#	100	
Sulfate	mg/L	0405	WL	02/19/2009	0001	18	-	18	5700			#	100	
Sulfate	mg/L	0405	WL	02/19/2009	0002	18	-	18	6000			#	100	
Sulfate	mg/L	0407	WL	02/17/2009	0001	17	-	17	5500			#	100	
Sulfate	mg/L	0470	WL	02/17/2009	0001	10.3	-	19.7	7400			#	100	
Sulfate	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	6800			#	100	
Sulfate	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	7300			#	100	
Sulfate	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	5700			#	100	
Sulfate	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	6200			#	100	
Sulfate	mg/L	0480	WL	02/17/2009	0001	18	-	18	9200			#	100	
Sulfate	mg/L	0483	WL	02/18/2009	0001	18	-	18	6400			#	100	
Sulfate	mg/L	0488	WL	02/19/2009	0001	39	-	39	9700			#	100	
Sulfate	mg/L	0547	TS	02/18/2009	0001	0	-	0	7000			#	100	
Sulfate	mg/L	0557	WL	02/17/2009	0001	40	-	40	9700			#	100	
Sulfate	mg/L	0559	WL	02/17/2009	0001	18	-	18	4600			#	100	
Sulfate	mg/L	0560	WL	02/17/2009	0001	36	-	36	9400			#	1000	

## Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 4/14/2009

Parameter	Units	Location ID	Location Type	Sample		Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID					Lab	Data QA		
Sulfate	mg/L	0583	WL	02/18/2009	0001	18	-	18	7000		#	100	
Sulfate	mg/L	0588	WL	02/18/2009	0001	34	-	34	11000		#	250	
Sulfate	mg/L	0589	WL	02/18/2009	0001	52	-	52	10000		#	1000	
Sulfate	mg/L	0683	WL	02/18/2009	0001	27	-	27	8800		#	100	
Sulfate	mg/L	0688	WL	02/19/2009	0001	39	-	39	8800		#	100	
Sulfate	mg/L	0688	WL	02/19/2009	0002	30.6	-	40.6	13000		#	1000	
Sulfate	mg/L	0689	WL	02/19/2009	0001	54	-	54	12000		#	250	
Sulfate	mg/L	0780	WL	02/17/2009	0001	30	-	30	11000		#	100	
Sulfate	mg/L	0782	WL	02/17/2009	0001	34	-	34	7000		#	100	
Sulfate	mg/L	0786	WL	02/17/2009	0001	28	-	28	8900		#	1000	
Sulfate	mg/L	0787	WL	02/17/2009	0001	36	-	36	4700		#	100	
Temperature	C	0403	WL	02/18/2009	0001	18	-	18	14.38		#		
Temperature	C	0405	WL	02/19/2009	0001	18	-	18	13.95		#		
Temperature	C	0407	WL	02/17/2009	0001	17	-	17	13.44		#		
Temperature	C	0470	WL	02/17/2009	0001	10.3	-	19.7	15.43		#		
Temperature	C	0473	WL	02/17/2009	0001	10.3	-	19.7	15.47		#		
Temperature	C	0475	WL	02/18/2009	0001	10.3	-	19.7	16.19		#		
Temperature	C	0476	WL	02/17/2009	0001	10.3	-	19.7	15.58		#		
Temperature	C	0477	WL	02/18/2009	0001	10.3	-	19.7	16.06		#		
Temperature	C	0480	WL	02/17/2009	0001	18	-	18	14.78		#		
Temperature	C	0483	WL	02/18/2009	0001	18	-	18	14.49		#		
Temperature	C	0488	WL	02/19/2009	0001	39	-	39	14.83		#		
Temperature	C	0557	WL	02/17/2009	0001	40	-	40	14.28		#		
Temperature	C	0559	WL	02/17/2009	0001	18	-	18	13.05		#		
Temperature	C	0560	WL	02/17/2009	0001	36	-	36	13.72		#		
Temperature	C	0583	WL	02/18/2009	0001	18	-	18	14.98		#		
Temperature	C	0588	WL	02/18/2009	0001	34	-	34	14.69		#		

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

Parameter	Units	Location ID	Location Type	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab	Data		QA			
Temperature	C	0589	WL	02/18/2009	0001	52	-	52	15.02		#		
Temperature	C	0683	WL	02/18/2009	0001	27	-	27	13.9		#		
Temperature	C	0688	WL	02/19/2009	0001	31	-	31	14.14		#		
Temperature	C	0688	WL	02/19/2009	0001	39	-	39	14.6		#		
Temperature	C	0689	WL	02/19/2009	0001	46	-	46	13.99		#		
Temperature	C	0689	WL	02/19/2009	0001	54	-	54	14.72		#		
Temperature	C	0780	WL	02/17/2009	0001	30	-	30	13.98		#		
Temperature	C	0786	WL	02/17/2009	0001	28	-	28	13.97		#		
Temperature	C	0787	WL	02/17/2009	0001	36	-	36	14.01		#		
Total Dissolved Solids	mg/L	0403	WL	02/18/2009	0001	18	-	18	11000		#	200	
Total Dissolved Solids	mg/L	0405	WL	02/19/2009	0001	18	-	18	10000		#	200	
Total Dissolved Solids	mg/L	0405	WL	02/19/2009	0002	18	-	18	10000		#	200	
Total Dissolved Solids	mg/L	0407	WL	02/17/2009	0001	17	-	17	12000		#	400	
Total Dissolved Solids	mg/L	0470	WL	02/17/2009	0001	10.3	-	19.7	15000		#	400	
Total Dissolved Solids	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	13000		#	400	
Total Dissolved Solids	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	14000		#	400	
Total Dissolved Solids	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	12000		#	200	
Total Dissolved Solids	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	12000		#	200	
Total Dissolved Solids	mg/L	0480	WL	02/17/2009	0001	18	-	18	19000		#	400	
Total Dissolved Solids	mg/L	0483	WL	02/18/2009	0001	18	-	18	13000		#	400	
Total Dissolved Solids	mg/L	0488	WL	02/19/2009	0001	39	-	39	15000		#	400	
Total Dissolved Solids	mg/L	0547	TS	02/18/2009	0001	0	-	0	14000		#	400	
Total Dissolved Solids	mg/L	0557	WL	02/17/2009	0001	40	-	40	20000		#	400	
Total Dissolved Solids	mg/L	0559	WL	02/17/2009	0001	18	-	18	9000		#	200	
Total Dissolved Solids	mg/L	0560	WL	02/17/2009	0001	36	-	36	54000		#	2000	
Total Dissolved Solids	mg/L	0583	WL	02/18/2009	0001	18	-	18	12000		#	200	
Total Dissolved Solids	mg/L	0588	WL	02/18/2009	0001	34	-	34	24000		#	400	

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

Parameter	Units	Location ID	Location Type	Sample		Depth Range		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab		Data	QA		
Total Dissolved Solids	mg/L	0589	WL	02/18/2009	0001	52	- 52	56000		#	2000	
Total Dissolved Solids	mg/L	0683	WL	02/18/2009	0001	27	- 27	16000		#	400	
Total Dissolved Solids	mg/L	0688	WL	02/19/2009	0001	39	- 39	16000		#	400	
Total Dissolved Solids	mg/L	0688	WL	02/19/2009	0002	30.6	- 40.6	40000		#	2000	
Total Dissolved Solids	mg/L	0689	WL	02/19/2009	0001	54	- 54	40000		#	1000	
Total Dissolved Solids	mg/L	0780	WL	02/17/2009	0001	30	- 30	21000		#	400	
Total Dissolved Solids	mg/L	0782	WL	02/17/2009	0001	34	- 34	83000		#	4000	
Total Dissolved Solids	mg/L	0786	WL	02/17/2009	0001	28	- 28	37000		#	2000	
Total Dissolved Solids	mg/L	0787	WL	02/17/2009	0001	36	- 36	90000		#	4000	
Turbidity	NTU	0403	WL	02/18/2009	0001	18	- 18	0.7		#		
Turbidity	NTU	0405	WL	02/19/2009	0001	18	- 18	0.54		#		
Turbidity	NTU	0407	WL	02/17/2009	0001	17	- 17	1.03		#		
Turbidity	NTU	0470	WL	02/17/2009	0001	10.3	- 19.7	0.58		#		
Turbidity	NTU	0473	WL	02/17/2009	0001	10.3	- 19.7	0.63		#		
Turbidity	NTU	0475	WL	02/18/2009	0001	10.3	- 19.7	0.63		#		
Turbidity	NTU	0476	WL	02/17/2009	0001	10.3	- 19.7	0.52		#		
Turbidity	NTU	0477	WL	02/18/2009	0001	10.3	- 19.7	0.73		#		
Turbidity	NTU	0480	WL	02/17/2009	0001	18	- 18	0.54		#		
Turbidity	NTU	0483	WL	02/18/2009	0001	18	- 18	1.01		#		
Turbidity	NTU	0488	WL	02/19/2009	0001	39	- 39	1.2		#		
Turbidity	NTU	0547	TS	02/18/2009	0001	0	- 0	2.41		#		
Turbidity	NTU	0557	WL	02/17/2009	0001	40	- 40	1.14		#		
Turbidity	NTU	0559	WL	02/17/2009	0001	18	- 18	0.89		#		
Turbidity	NTU	0560	WL	02/17/2009	0001	36	- 36	2.03		#		
Turbidity	NTU	0583	WL	02/18/2009	0001	18	- 18	1.15		#		
Turbidity	NTU	0588	WL	02/18/2009	0001	34	- 34	1.63		#		
Turbidity	NTU	0589	WL	02/18/2009	0001	52	- 52	2.49		#		

## Appendix C. Water Quality Data (continued)

General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 4/14/2009

Parameter	Units	Location ID	Location Type	Sample		Depth Range			Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab	Data		QA			
Turbidity	NTU	0683	WL	02/18/2009	0001	27	-	27	0.67		#		
Turbidity	NTU	0688	WL	02/19/2009	0001	39	-	39	0.81		#		
Turbidity	NTU	0688	WL	02/19/2009	0001	31	-	31	3.24		#		
Turbidity	NTU	0689	WL	02/19/2009	0001	46	-	46	1.22		#		
Turbidity	NTU	0689	WL	02/19/2009	0001	54	-	54	3.5		#		
Turbidity	NTU	0780	WL	02/17/2009	0001	30	-	30	0.63		#		
Turbidity	NTU	0782	WL	02/17/2009	0001	34	-	34	1.52		#		
Turbidity	NTU	0786	WL	02/17/2009	0001	28	-	28	2.12		#		
Turbidity	NTU	0787	WL	02/17/2009	0001	36	-	36	0.7		#		
Uranium	mg/L	0403	WL	02/18/2009	0001	18	-	18	2.1		#	0.00015	
Uranium	mg/L	0405	WL	02/19/2009	0001	18	-	18	1.7		#	0.00015	
Uranium	mg/L	0405	WL	02/19/2009	0002	18	-	18	1.5		#	0.00015	
Uranium	mg/L	0407	WL	02/17/2009	0001	17	-	17	1.6		#	0.00015	
Uranium	mg/L	0470	WL	02/17/2009	0001	10.3	-	19.7	2.5		#	0.00015	
Uranium	mg/L	0473	WL	02/17/2009	0001	10.3	-	19.7	2.3		#	0.00015	
Uranium	mg/L	0475	WL	02/18/2009	0001	10.3	-	19.7	2.4		#	0.00015	
Uranium	mg/L	0476	WL	02/17/2009	0001	10.3	-	19.7	2.1		#	0.00015	
Uranium	mg/L	0477	WL	02/18/2009	0001	10.3	-	19.7	2.3		#	0.00015	
Uranium	mg/L	0480	WL	02/17/2009	0001	18	-	18	2.9		#	0.00015	
Uranium	mg/L	0483	WL	02/18/2009	0001	18	-	18	2.3		#	0.00015	
Uranium	mg/L	0488	WL	02/19/2009	0001	39	-	39	2		#	0.00015	
Uranium	mg/L	0547	TS	02/18/2009	0001	0	-	0	2.3		#	0.00015	
Uranium	mg/L	0557	WL	02/17/2009	0001	40	-	40	3.1		#	0.00015	
Uranium	mg/L	0559	WL	02/17/2009	0001	18	-	18	1.7		#	0.00015	
Uranium	mg/L	0560	WL	02/17/2009	0001	36	-	36	2		#	0.00015	
Uranium	mg/L	0583	WL	02/18/2009	0001	18	-	18	2.4		#	0.00015	
Uranium	mg/L	0588	WL	02/18/2009	0001	34	-	34	2.9		#	0.00015	

## Appendix C. Water Quality Data (continued)

**General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/14/2009**

Parameter	Units	Location ID	Location Type	Sample		Depth Range		Result	Qualifiers		Detection Limit	Uncertainty
				Date	ID	(Ft BLS)	Lab		Data	QA		
Uranium	mg/L	0589	WL	02/18/2009	0001	52	- 52	2.1		#	0.00015	
Uranium	mg/L	0683	WL	02/18/2009	0001	27	- 27	2.4		#	0.00015	
Uranium	mg/L	0688	WL	02/19/2009	0001	39	- 39	2.3		#	0.00015	
Uranium	mg/L	0688	WL	02/19/2009	0002	30.6	- 40.6	2.3		#	0.00015	
Uranium	mg/L	0689	WL	02/19/2009	0001	54	- 54	2.5		#	0.00015	
Uranium	mg/L	0780	WL	02/17/2009	0001	30	- 30	3.1		#	0.00015	
Uranium	mg/L	0782	WL	02/17/2009	0001	34	- 34	0.61		#	0.00015	
Uranium	mg/L	0786	WL	02/17/2009	0001	28	- 28	2.1		#	0.00015	
Uranium	mg/L	0787	WL	02/17/2009	0001	36	- 36	0.12		#	1.5E-005	

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

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

**LAB QUALIFIERS:**

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

**DATA QUALIFIERS:**

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

**QA QUALIFIER:**

- # Validated according to quality assurance guidelines.

**Appendix D.**  
**Water Level Data**

## Appendix D. Water Level Data

**STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 5/5/2009**

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	02/18/2009		16.25	3952.7	
0405	O	3968.47	02/19/2009		14.37	3954.1	
0407	O	3969.09	02/17/2009		16.98	3952.11	
0470		3964.12	02/17/2009		13.88	3950.24	
0473		3964.66	02/17/2009		14.25	3950.41	
0475		3964.97	02/18/2009		14.25	3950.72	
0476		3965.24	02/17/2009		14.12	3951.12	
0477		3965.08	02/18/2009		14.4	3950.68	
0480		3968.65	02/17/2009		16.4	3952.25	
0483		3968.9	02/18/2009		16.57	3952.33	
0488		3968.48	02/19/2009		14.25	3954.23	
0547			02/18/2009		6.8	-6.8	
0557		3968.85	02/17/2009		15.34	3953.51	
0559		3969.92	02/17/2009		17.55	3952.37	
0560		3968.77	02/17/2009		15.74	3953.03	
0583		3969.64	02/18/2009		16.16	3953.48	
0588		3968.82	02/18/2009		15.31	3953.51	
0589		3968.87	02/18/2009		15.06	3953.81	
0683		3970.73	02/18/2009		16.57	3954.16	
0688		3968.66	02/19/2009		14.59	3954.07	
0689		3968.66	02/19/2009		14.72	3953.94	
0780		3968.45	02/17/2009		16.33	3952.12	
0782		3968.46	02/17/2009		16.31	3952.15	
0786		3968.14	02/17/2009		16.21	3951.93	
0787		3968.43	02/17/2009		15.98	3952.45	

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

**Attachment 1.**  
**Interim Action Well Field Monthly Sampling Trip Report**

**Attachment 1.**  
**Interim Action Well Field Monthly Sampling Trip Report**



DATE: February 23, 2009

TO: K. Pill

FROM: E. Glowiak

SUBJECT: Trip Report

**Site:** Moab – Interim Action Well Field Monthly Sampling – February 2009

**Date of Sampling Event:** February 17-19, 2009

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

**RIN Number Assigned:** All samples were assigned to RIN 0902027.

**Sample Shipment:** One cooler was shipped via UPS overnight from Moab, Utah, to Paragon Analytics, Inc., on February 19, 2009 (Tracking No. 96681074).

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**February 2009 CF1 Sampling**

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**Number of Locations Sampled:** Five extraction wells (0470, 0473, 0475, 0476, and 0477), seven observation wells (0403, 0407, 0480, 0483, 0557, 0559, and 0560), and one evaporation pond location (0547) were sampled during the February 2009 sampling event. A total of 13 samples were collected.

**Locations Not Sampled:** None.

**Field Variance:** None.

**Location-Specific Information – CF1 Extraction Wells:** Extraction wells were sampled using dedicated submersible pumps.

Well No.	Date	Time	Water Level (ft btoc)	Pump Intake (ft bgs)
0470	02/17/2009	15:51	13.88	18
0473	02/17/2009	16:04	14.25	18
0475	02/18/2009	10:03	14.25	18
0476	02/17/2009	16:17	14.12	18
0477	02/18/2009	10:12	14.40	18

Note: bgs = below ground surface; btoc = below top of casing

**Attachment 1.**  
**Interim Action 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)
0403	02/18/2009	10:34	16.25	18
0407	02/17/2009	10:45	16.98	17
0480	02/17/2009	14:18	16.40	18
0483	02/18/2009	09:43	16.57	18
0557	02/17/2009	13:58	15.34	40
0559	02/17/2009	11:26	17.55	18
0560	02/17/2009	11:06	15.74	36

Note: bgs = below ground surface; btoc = below top of casing

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**February 2009 CF2 Sampling**

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**Number of Locations Sampled:** Three CF2 observation wells (0583, 0588, and 0589) were sampled during the February 2009 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)
0583	02/18/2009	15:27	16.16	18
0588	02/18/2009	15:08	15.31	34
0589	02/18/2009	10:57	15.06	52

Note: bgs = below ground surface; btoc = below top of casing

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**February 2009 CF3 Sampling**

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**Number of Locations Sampled:** Three observation wells (0683, 0688-39, and 0689-54) were sampled during the February 2009 sampling event. Including one duplicate, a total of four samples were collected.

**Locations Not Sampled:** None.

**Field Variance:** None.

**Attachment 1.**  
**Interim Action 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
2774	0688-54	Duplicate from 54 ft bgs	Ground Water	FEB 027

Note: bgs = below ground surface; ID = identification

**Locations in Which Field Parameters Were Measured Only:** Parameters were measured at locations 0688 at 31 ft and 0689 at 46 ft.

Well No.	Date	Time	Depth (ft bgs)	Depth to Water (ft btoc)	Field Parameters					
					Temp (°C)	Spec Cond (µS/cm)	D.O. (mg/L)	pH	ORP	Turb. (NTUs)
0688	02/19/2009	10:34	31	14.60	14.42	18,683	0.59	6.79	67	1.22
0689	02/19/2009	10:00	46	14.72	14.14	19,678	0.68	6.86	59	3.24

Note: btoc = below top of casing; bgs = below ground surface; °C = degrees Centigrade; D.O. = dissolved oxygen; µS/cm = microsiemens per centimeter; mg/L = milligrams per liter; NTU = nephelometric turbidity unit; ORP = oxidation reduction potential; Temp = temperature; Spec Cond = special conditions; Turb. = turbidity

**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)
0683	02/18/2009	15:53	16.57	27
0688-39	02/19/2009	10:17	14.59	39
0689-54	02/19/2009	09:32	14.72	54

Note: bgs = below ground surface; btoc = below top of casing

**February 2009 CF4 Sampling**

**Number of Locations Sampled:** Four observation wells (0780, 0782, 0786, and 0787) were sampled during the February 2009 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.

**Attachment 1.**  
**Interim Action Well Field Monthly Sampling Trip Report (continued)**

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0780	02/17/2009	09:28	16.33	30
0782	02/17/2009	09:06	16.31	34
0786	02/17/2009	09:50	16.21	28
0787	02/17/2009	10:10	15.98	36

Note: bgs = below ground surface; btoc = below top of casing

**February 2009 Baseline Sampling**

**Number of Locations Sampled:** Two observation wells (0405 and 0488) were sampled during the February 2009 sampling event. Including one duplicate, a total of three samples were collected.

**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
1750	0405	Duplicate from 18 ft bgs	Ground Water	FEB 026

Note: bgs = below ground surface; ID = identification

**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)
0405	02/19/2009	10:58	14.37	18
0488	02/19/2009	11:23	14.25	39

Note: bgs = below ground surface; btoc = below top of casing

**Well Inspection Summary:** A well inspection was not conducted.

**Site Issues:** According to the USGS Cisco gaging station (Station No. 09180500), the mean daily Colorado River flows during this sampling event are provided below.

Date	Daily Mean Flow (cfs)
02/17/2009	2,800
02/18/2009	2,850
02/19/2009	2,870

Note: cfs = cubic feet per second

**Attachment 1.**  
**Interim Action Well Field Monthly Sampling Trip Report (continued)**

**Equipment Issues:** The millivolt range on the pH meter of the YSI field meter was slightly off for pH 4 (within 10 millivolts). The pH 7 and pH 10 solutions calibrated correctly. Since the water samples vary from 6.0 to 7.0 pH, the inconsistent pH 4 millivolt calibration should not have affected the quality of the data.

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