

*Office of Environmental Management – Grand Junction*



Moab UMTRA Project  
September 2008 Validation Data  
Package for Performance Assessment  
of the Monthly Sampling for the Ground  
Water Interim Action and for the Ground  
Water/Surface Water Interaction  
Investigation Sampling Event

April 2009



U.S. Department  
of Energy

**Office of Environmental Management**

**Moab UMTRA Project  
September 2008 Validation Data Package for Performance  
Assessment of the Monthly Sampling for the Ground Water Interim  
Action and for the Ground Water/Surface Water Interaction  
Investigation Sampling Event**

**April 2009**

**Moab UMTRA Project  
September 2008 Ground Water Sampling Events**

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**Revision 0**

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**Review and Approval**

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*4/28/09*

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0	April 2009	Initial issue.

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Attachment 1.	Interim Action Well Field Monthly Sampling Trip Report
Attachment 2.	Interim Action Well Field Ground Water/Surface Water Interaction Investigation Sampling Event Trip Report

## Acronyms and Abbreviations

bgs	below ground surface
CF	Configuration
cfs	cubic feet per second
COC	chain of custody
EB	equipment blank
EDD	electronic data deliverable
EPA	Environment Protection Agency
ft	feet
gpm	gallons per minute
ICP	inductively coupled plasma
IDL	instrument detection limit
LCS	laboratory control sample
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
PQL	practical quantitation limit
RDL	required detection limit
RIN	report identification number
RPD	relative percent difference
RS	replicate sample
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, Sampling Event Summaries, and Sampling and Analyses. Section 2 provides the Data Assessment Summaries, including the Field Activity Verification, Laboratory Performance Assessment, Field Analyses/Activities description, and Certification. All flagged data, and the reasons for the applicable flags, are also presented in Section 2. The Data Presentation is contained in Section 3, which includes a summary of the anomalous data generated by the validation process. Various appendices contain the Water Quality Data, Water Level Data, and the Minimums and Maximums Reports tables. The trip reports are included as Attachments 1 and 2. All Colorado River flow discussed in this document are measured from the U.S. Geological Survey (USGS) Cisco gaging station No. 09180500.

This validation data package (VDP) presents the results of two September 2008 sampling events. A monthly sampling event was completed from September 2 through 11, 2008, in which ground water and surface water samples were collected from a variety of locations across the well field. On September 29 and 30, 2008, ground water and surface water locations were sampled as part of the fifth and final event associated with the ground water/surface water interaction investigation.

Section 1.0 contains the Summary Criteria (Section 1.1), a sample location map, Sampling Event Summaries (Section 1.2), and the Sampling and Analyses (Section 1.3) for both September 2008 sampling events.

### 1.1 Summary Criteria

#### 1.1.1 Monthly Sampling Event

Sampling Period: September 2 through 11, 2008

The purpose of this sampling was to collect data that can be used to evaluate the performance of all configurations of the ground water interim action well field. All sampling locations are shown on Figure 1.

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

No.

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

Yes. Configurations (CFs) 1, 3, and 4 were extracting approximately 20, 25, and 10 gallons per minute (gpm), respectively, during this sampling event for a total well field extraction rate of approximately 55 gpm. CF2 was not operating because there was no adjacent riparian habitat channel, and well specific capacities were low.

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

Yes. The pond level decreased from 6.0 to 4.0 feet (ft) during this sampling event. The drop in the level can be attributed to the continued use of the sprinkler system while portions of the well field (specifically CF4) were shut down for maintenance.

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

No. CF4 remediation well 0773 was not running during the sampling event, so well 0774 was sampled instead.

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

Yes. In an attempt to get well PW02 running, it was necessary to shut down CF4 for safety reasons (they are operating off the same power line). As a result, CF4 was not continually extracting ground water during this time frame.

**1.1.2 Ground Water/Surface Water Interaction Investigation Sampling Event**

Sampling Period: September 29 and 30, 2008

The purpose of this sampling was to collect a fifth and final round of data for the ground water/surface water investigation, which was designed to determine the vertical and lateral migration of freshwater from the river into the well field aquifer during the 2008 spring runoff. The first sampling event occurred when the Colorado River flows were approximately 3,500 cubic feet per second (cfs), which represents river base-flow conditions. The second sampling event was completed in April (during the early stages of the spring runoff when the flows were approximately 14,500 cfs), the third event was associated with the peak flows in June (flows were approximately 35,900 cfs), and the fourth occurred on the descending side of the runoff hydrograph in July when the flows decreased to approximately 14,500 cfs. This final sampling event represents the time period after the river returned to base-flow conditions. A series of CF1 and baseline area surface water locations, well points, observation wells, and one extraction well from CF1 were sampled at varying depths and distances from the river channel. All sampling locations are shown on Figure 1.

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

No.

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

Yes. CFs 1, 3, and 4 were extracting approximately 20, 25, and 20 gpm, respectively, during this sampling event for a total well field extraction rate of approximately 65 gpm. CF2 was not operating because there was no adjacent riparian habitat channel, and well specific capacities were low.

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

Yes. The pond level was 5.1 ft and holding 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 interim action system?**

No.

## **1.2 Sampling Event Summaries**

### **1.2.1 Monthly Sampling Event**

This VDP presents the validated data associated with the ground water collected during the September 2008 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 2.2.1. No data were rejected (flagged as “R”) as a result of this validation process. Minimums and Maximums Reports (presented in Section 3.1.) were generated to determine if the data are within a normal statistical range. Any anomalous data, based on the results of the Minimums and Maximums Reports, are presented in Section 3.2.

While independent of the data validation process, a brief summary of the most recent concentration trends based on the September 2008 data is provided for the baseline area and CFs 3, 1, and 4 (listed from north to south) within the well field. Time versus concentration plots (ammonia, total dissolved solids [TDS], and uranium) 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. Plots are not shown for CF1 because the performance indicator monitoring wells were not sampled during this sampling event.

#### **Baseline Area**

Baseline area wells 0405, 0488, and 0493 were sampled from 18, 39, and 54 ft below ground surface (bgs), respectively, during the September sampling event. Wells 0488 and 0493 had not been sampled at these depths since January 2008, but samples have been collected from 36 and 55 ft bgs as part of the ground water/surface water investigation. Concentrations of ammonia, TDS, and uranium (Figures 2, 3, and 4) are apparently rebounding to prerunoff levels.

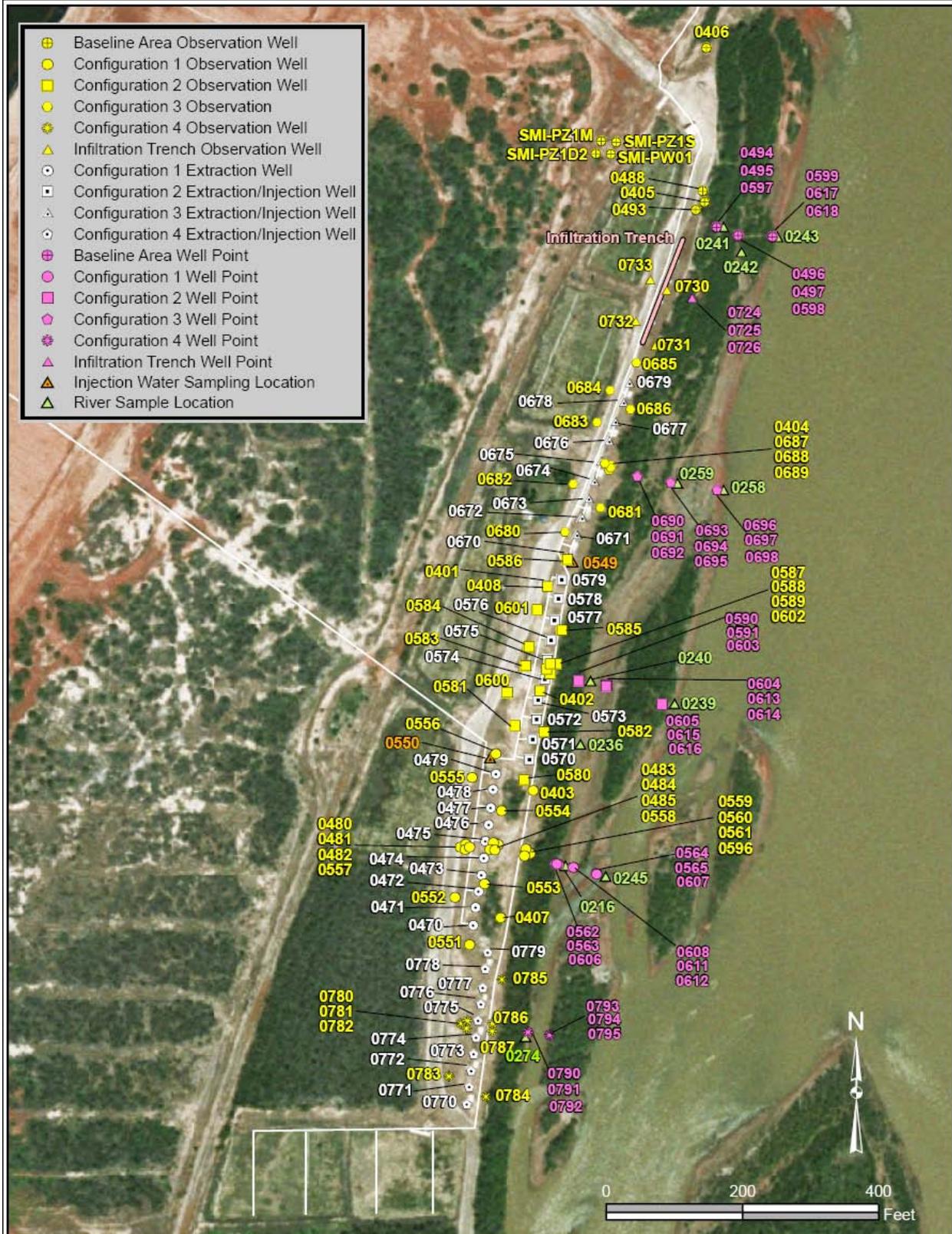


Figure 1. Sample Locations at the Interim Action Well Field and Baseline Area (may include locations not sampled)

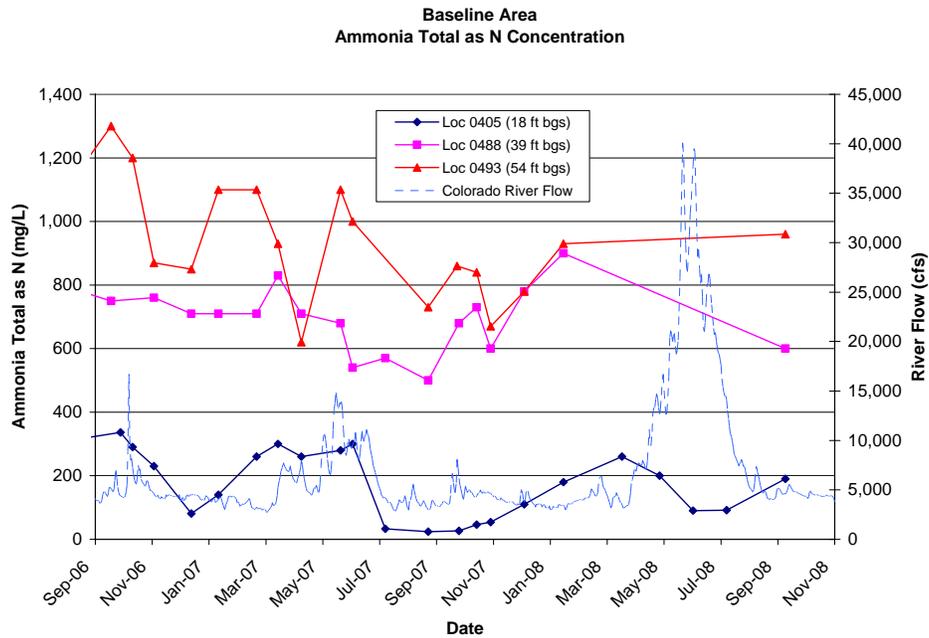


Figure 2. Baseline Area Observation Wells Time Versus Ammonia Total as N Concentration Plot

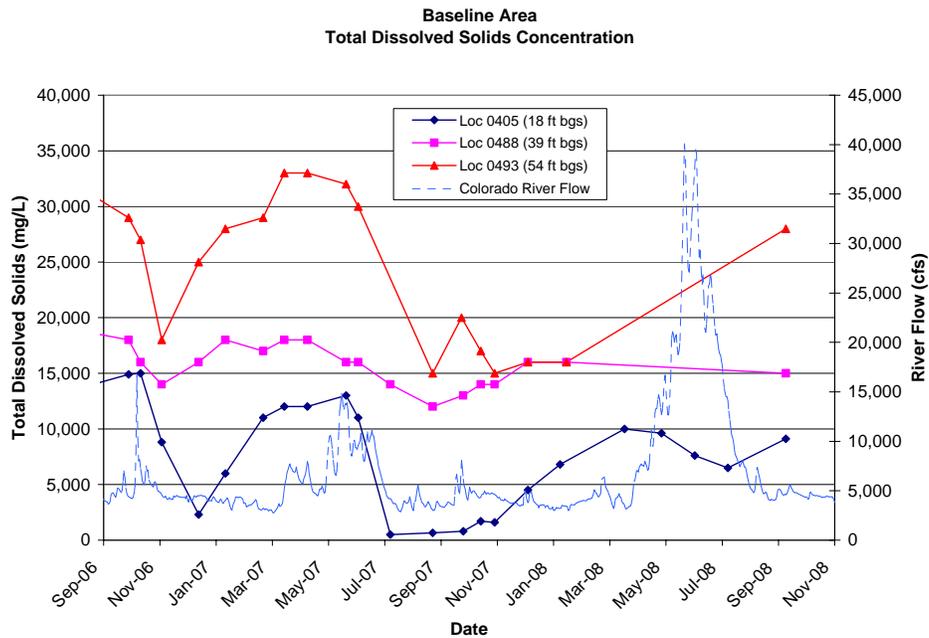


Figure 3. Baseline Area Observation Wells Time Versus TDS Concentration Plot

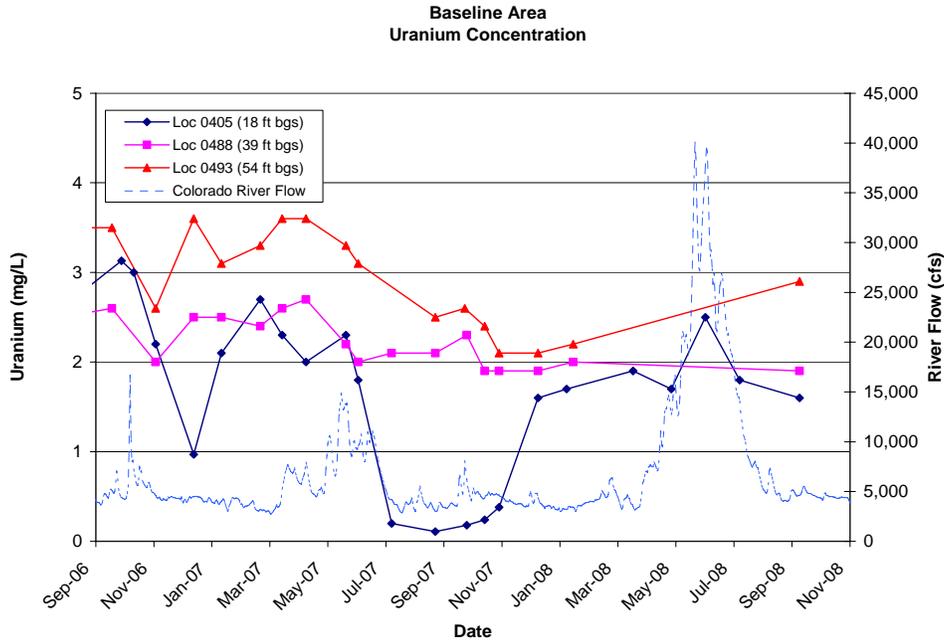


Figure 4. Baseline Area Observation Wells Time Versus Uranium Concentration Plot

**CF3**

Samples were collected from 0683 (27 ft bgs), 0687 (28 ft bgs), 0688 (39 ft bgs), and 0689 (54 ft bgs) during this past month. A review of the time versus concentration plots (Figures 5, 6, and 7) suggest ammonia, TDS, and uranium concentrations for samples collected from these locations have started to rebound to prerunoff levels.

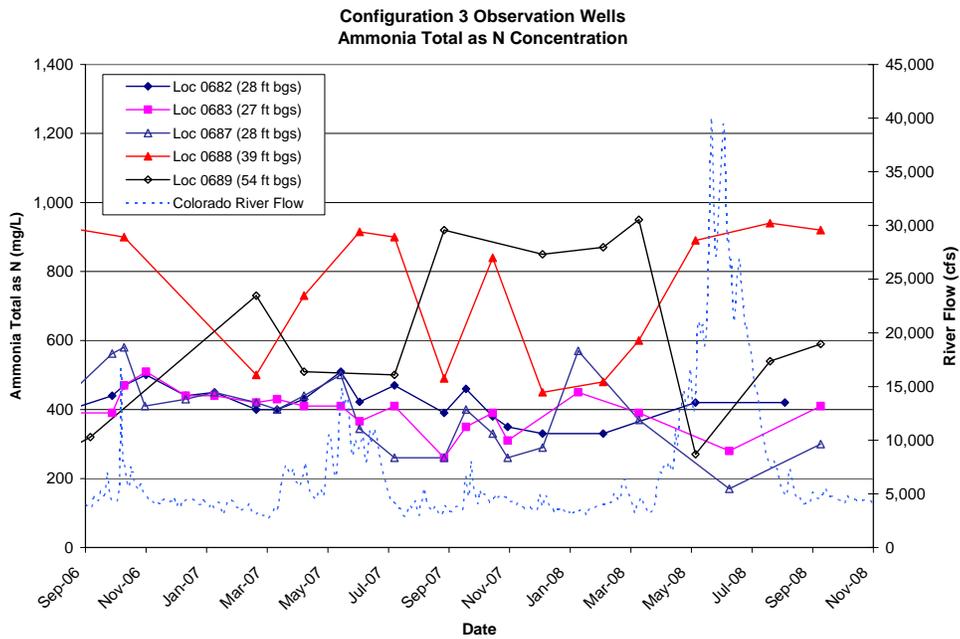


Figure 5. CF3 Observation Wells Time Versus Ammonia Total as N Concentration Plot

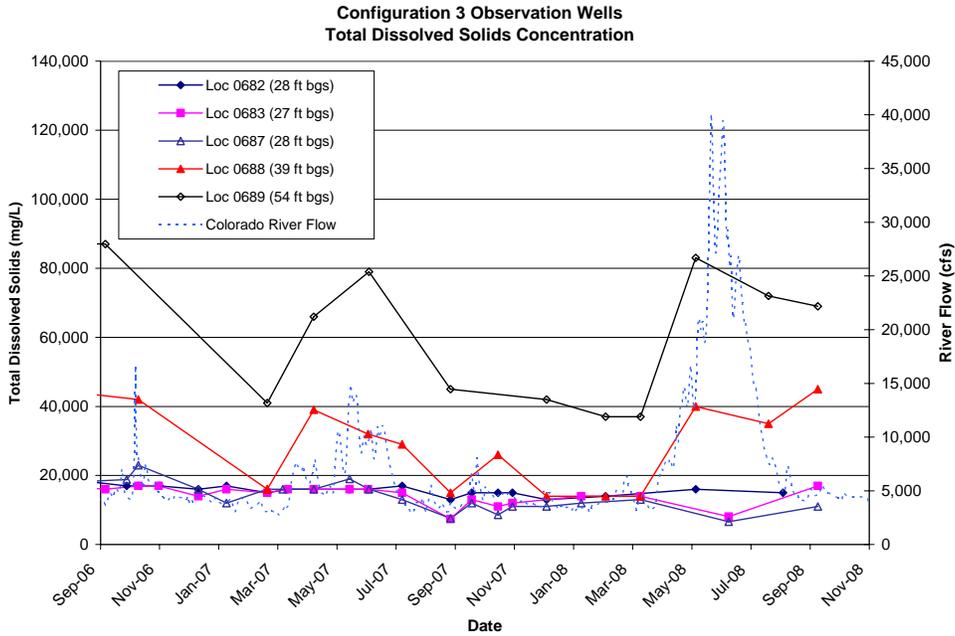


Figure 6. CF3 Observation Wells Time Versus TDS Concentration Plot

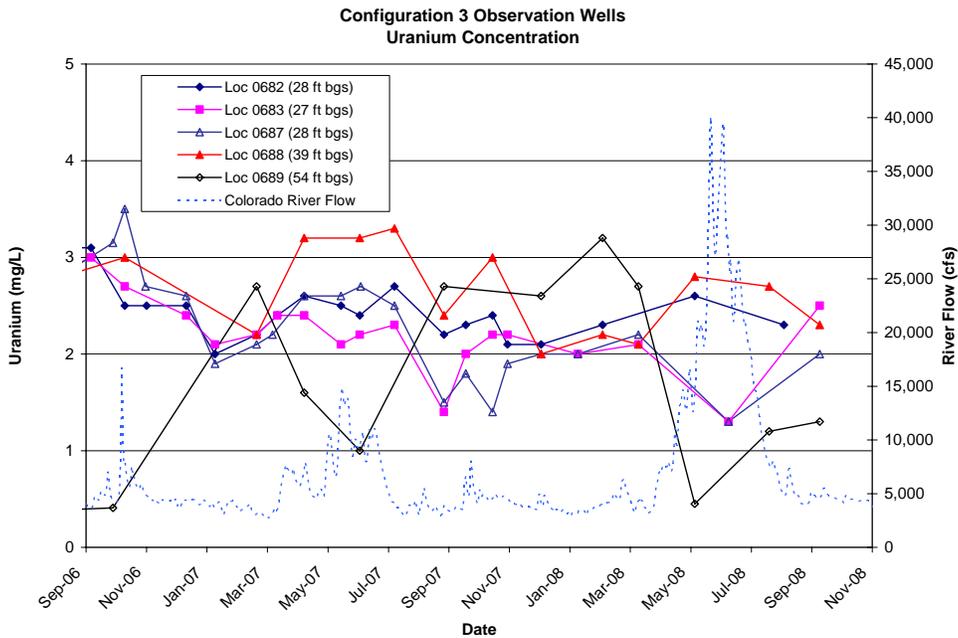


Figure 7. CF3 Observation Wells Time Versus Uranium Concentration Plot

**CF1**

Samples were collected from 0484 (28 ft bgs) and 0557 (40 ft bgs) during this past month. Similar to the plots developed for the baseline area and CF3, the time versus analyte concentration plots (Figures 7, 8, and 9) for these locations show that ammonia, TDS, and uranium concentrations have either increased or did not significantly change during September.

**Configuration 1 Observation Wells  
Ammonia Total as N Concentration**

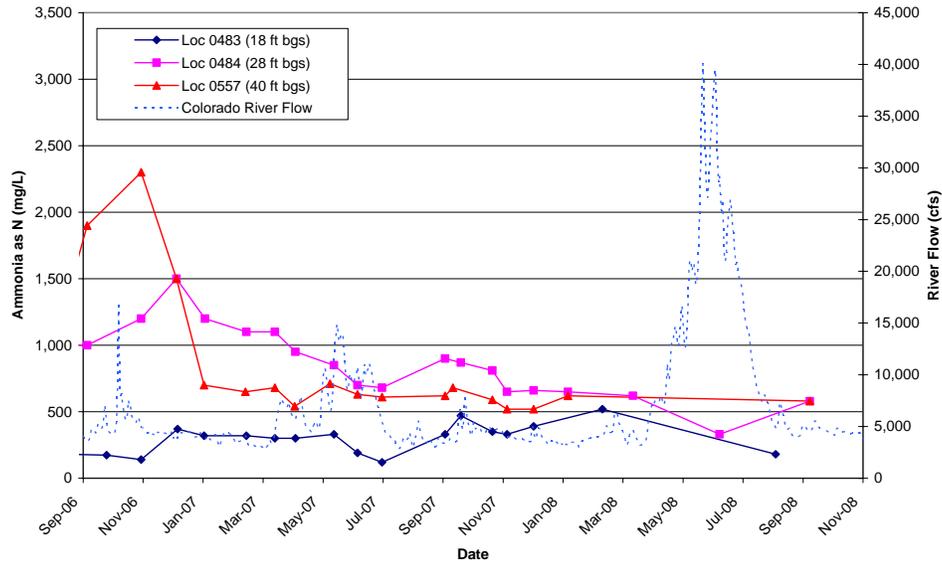


Figure 8. CF1 Observation Wells Time Versus Ammonia Total as N Concentration Plot

**Configuration 1 Observation Wells  
Total Dissolved Solids Concentration**

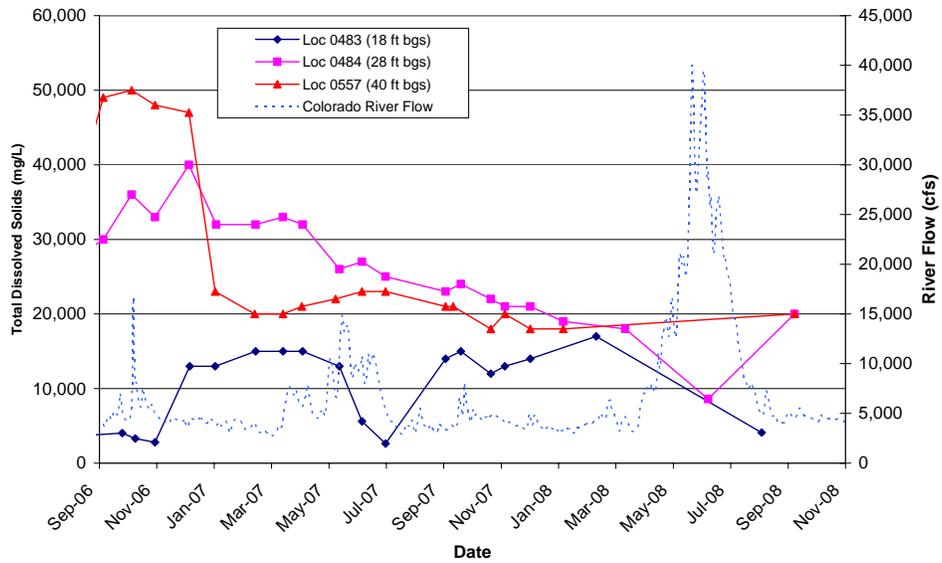


Figure 9. CF1 Observation Wells Time Versus TDS Concentration Plot

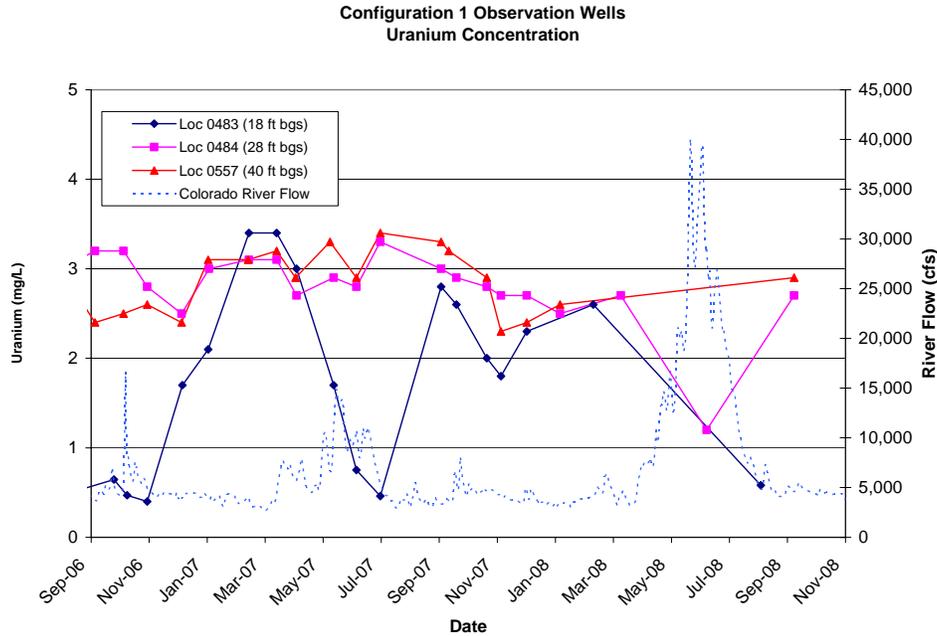


Figure 10. CF1 Observation Wells Time Versus Uranium Concentration Plot

### CF1 Observation Wells 0403 and 0407

Samples were also collected from observation wells 0403 and 0407, which are located on the river bank within CF1, during the September 2008 sampling event. As shown in the time versus analyte concentration plots below (Figures 11, 12, and 13), these concentrations have also started to rebound to prerunoff levels.

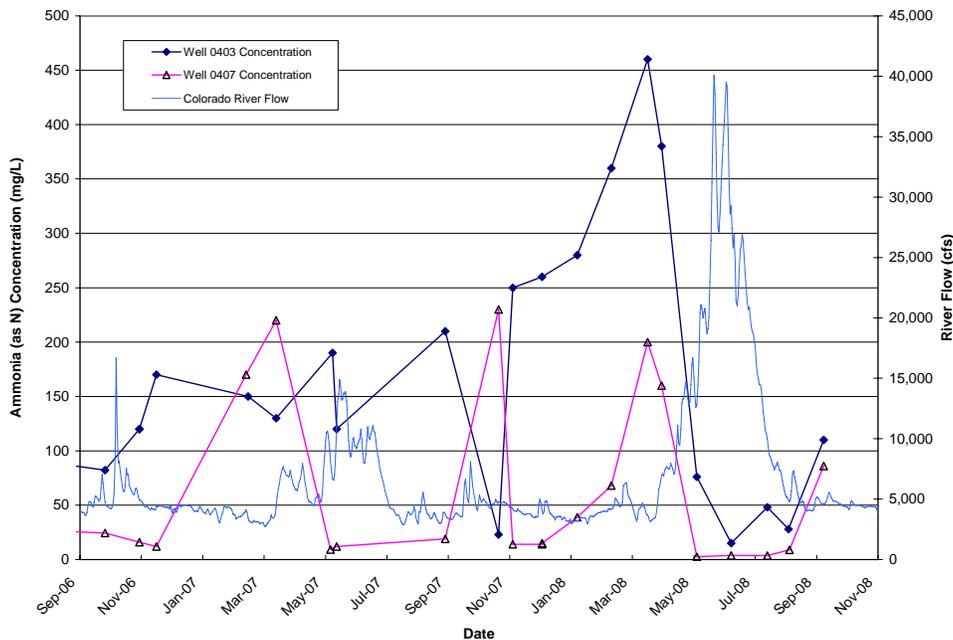


Figure 11. CF1 Observation Wells 0403 and 0407 Time Versus Ammonia Total as N Concentration Plot

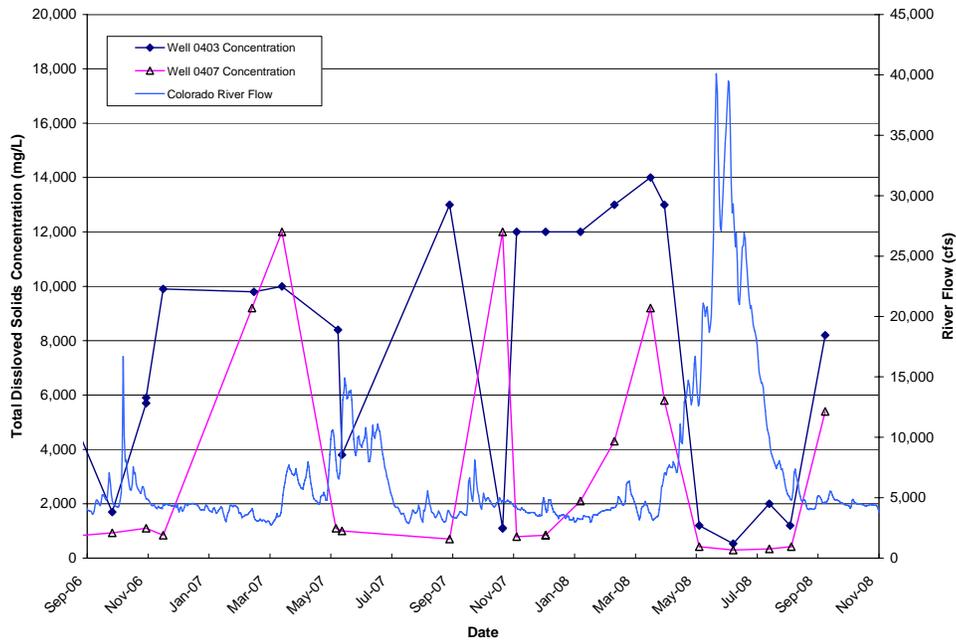


Figure 12. CF1 Observation Wells 0403 and 0407 Time Versus TDS Concentration Plot

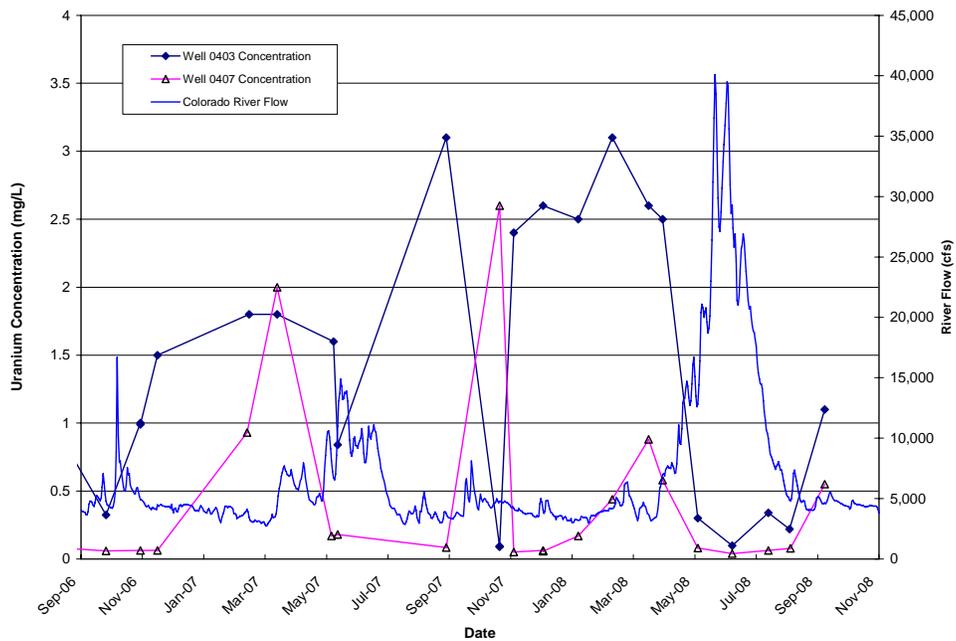


Figure 13. CF1 Observation Wells 0403 and 0407 Time Versus Uranium Concentration Plot

#### CF4

Locations 0786 (from 28 ft bgs), 0782 (33 ft bgs), 0787 (36 ft bgs), and 0781 (46 ft bgs) were all sampled during the September event. Time versus concentration plots (Figures 14, 15, and 16) indicate ammonia, TDS, and uranium either did not fluctuate significantly or rebounded to prerunoff concentrations.

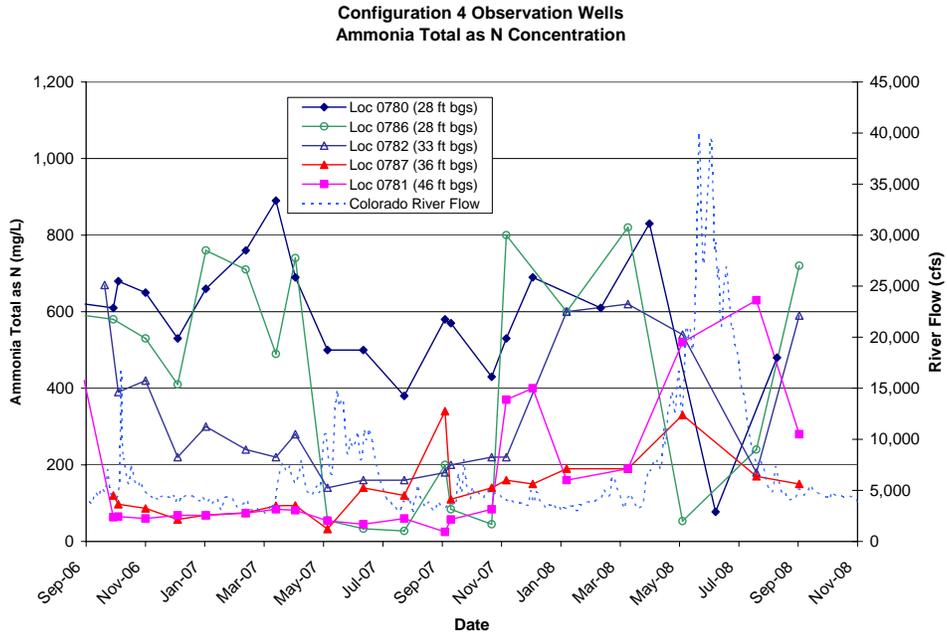


Figure 14. CF4 Observation Wells Time Versus Ammonia Total as N Concentration Plot

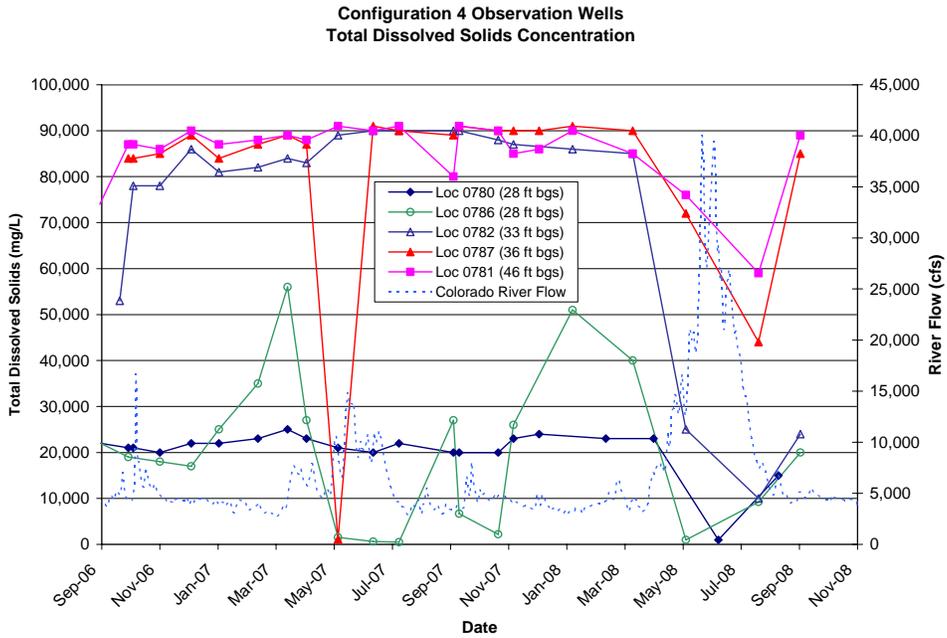


Figure 15. CF4 Observation Wells Time Versus TDS Concentration Plot

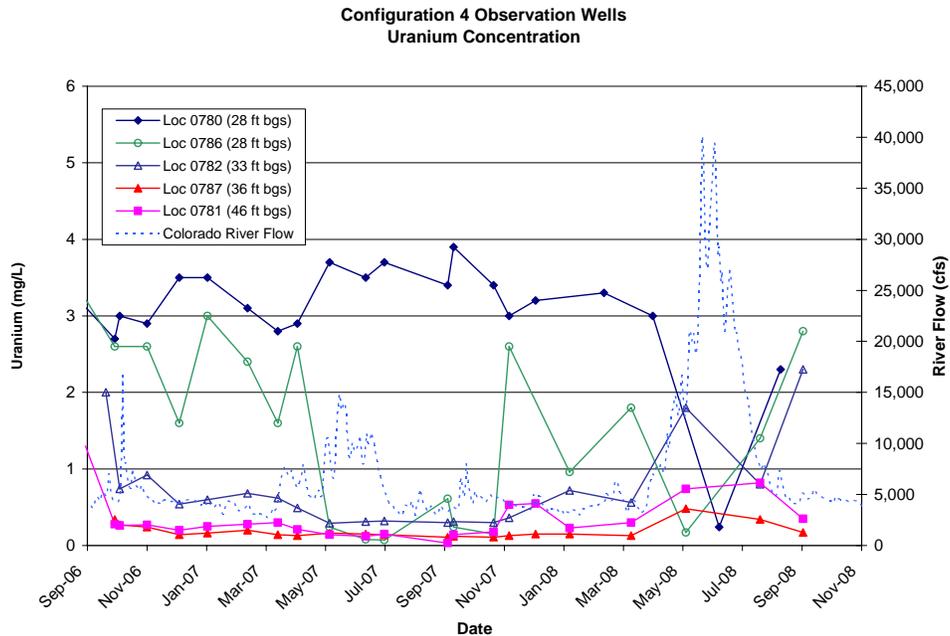


Figure 16. CF4 Observation Wells Time Versus Uranium Concentration Plot

## Surface Water Sampling Results

Surface water sampling locations were not sampled during this event.

### 1.2.2 Ground Water/Surface Water Interaction Investigation Sampling Event

This VDP presents the September 2008 validated data associated with the third round of ground water and surface water samples collected during the ground water/surface water interaction investigation 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 2 contains the trip report detailing the field events associated with this sampling event.

A list of flagged data is presented in Table 6 in Section 2.2.2. No data were rejected (flagged as “R”) as a result of this validation process. Minimums and Maximums Reports (presented in Section 3.1) were generated to determine if the data are within a normal statistical range. Any anomalous data, based on the results of the Minimums and Maximums Reports, are presented in Section 3.2.

Piper diagrams (or trilinear diagrams) are provided based on the water chemistry data collected in September 2008 from the baseline area and CF1 location samples as part of this sampling event and are discussed below. For comparison purposes, the diagrams generated using the investigation baseline data (collected in March 2008) are also provided.

## Baseline Area

Figure 17 represents the March 2008 river base-flow conditions for the baseline area for the ground water/surface water interaction investigation. Based on the water chemistry results, all ground water samples were classified as sodium-sulfate-type water, with no clear distinction between the samples collected from the various depths. The surface water sample was classified as a mixed type of water on the piper diagram.

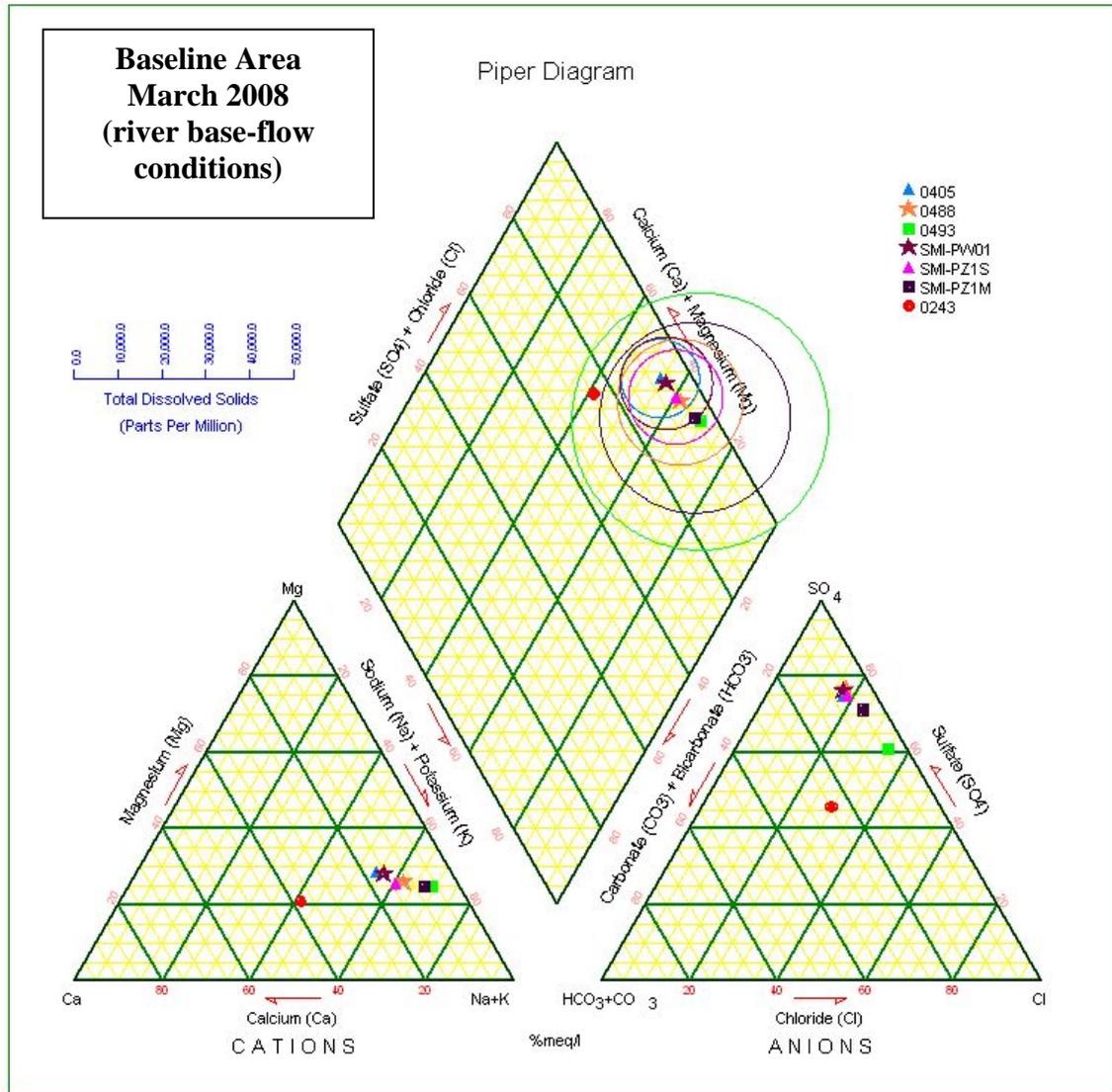


Figure 17. Piper Diagram for the Baseline Area Generated Using March 2008 Water Chemistry Data

The following piper diagram (Figure 18), generated for the baseline area using the September 2008 water chemistry data, is similar to the low-flow winter conditions of the March 2008 data regarding the water chemistry of the observation wells. All ground water samples, regardless of the depth from which they were collected, can still be classified as sodium-sulfate-type water. This plot demonstrates that the water chemistry in this area of the well field has returned to base river flow conditions.

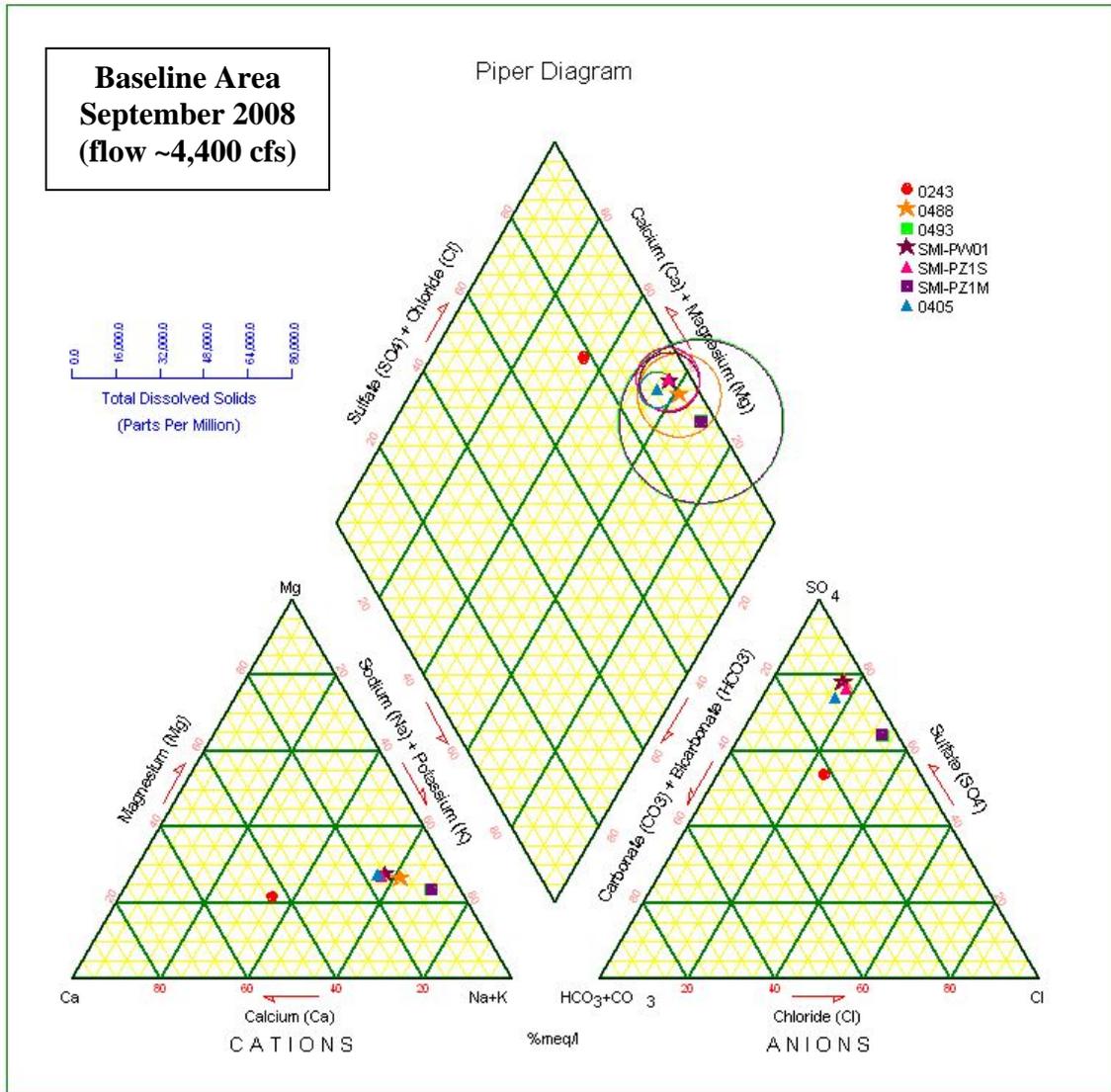


Figure 18. Piper Diagram for the Baseline Area Generated Using September 2008 Water Chemistry Data

## CF1

The river base-flow condition from the CF1 March 2008 sampling is presented in Figure 19. Similar to the baseline area sampling, the surface water sample (0216) was a mixed ionic composition water. The surface water sample has a different ionic composition from the ground water samples. All ground water samples had the same dominant cation, sodium, but different proportions of the anions sulfate and chloride. Samples collected from the shallow depth (locations 0474, 0480, 0483, and 0559 were sampled from 18 ft bgs) and the upgradient intermediate depth (location 0557 sampled from 36 ft bgs) are classified as sodium-sulfate-type water. The remaining intermediate zone samples (locations 0558 and 0560 were sampled from 36 ft bgs) and those collected from the deep zone (locations 0482, 0485, and 0561 sampled from 55 ft bgs) are classified as sodium-chloride-type water, which is indicative of brine.

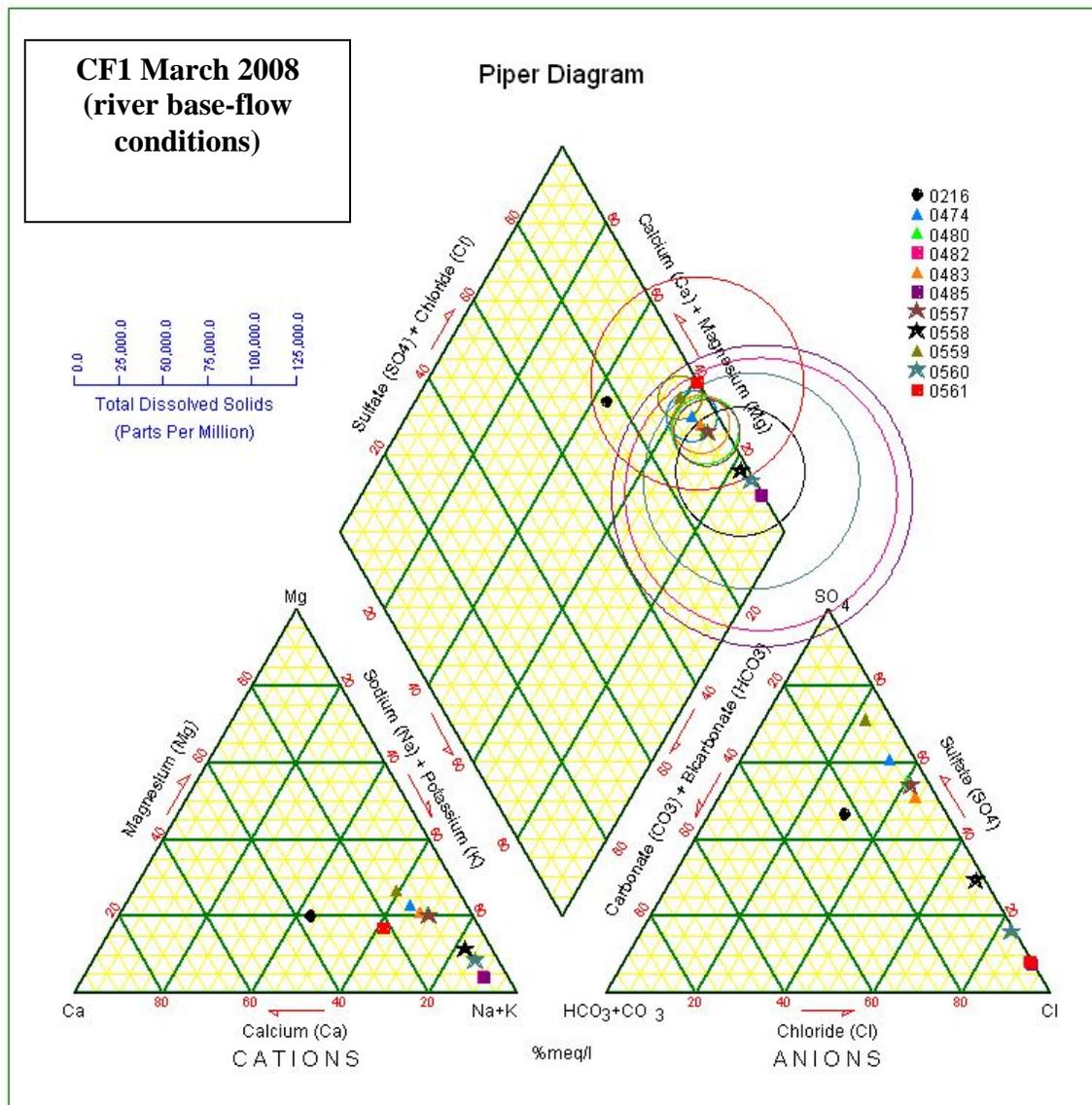


Figure 19. Piper Diagram for CF1 Generated Using March 2008 Water Chemistry Data

The following piper diagram for CF1, generated using the September 2008 data (Figure 20), suggests the water chemistry of the ground water system in the vicinity of CF1 is similar to river base-flow conditions encountered in March. The exception would be the analyte concentrations measured in the samples collected from locations 0559 (sampled from 18 ft bgs), 0560 (from 36 ft bgs), and 0474 (the active extraction well). Both 0559 and 0560 are located near the river bank and are apparently still slightly influenced by the influx of surface water during the spring runoff. Sodium remains the dominant cation in the majority of the ground water samples, and similar to the March 2008 sample results, the surface water sample is classified as a mixed type water.

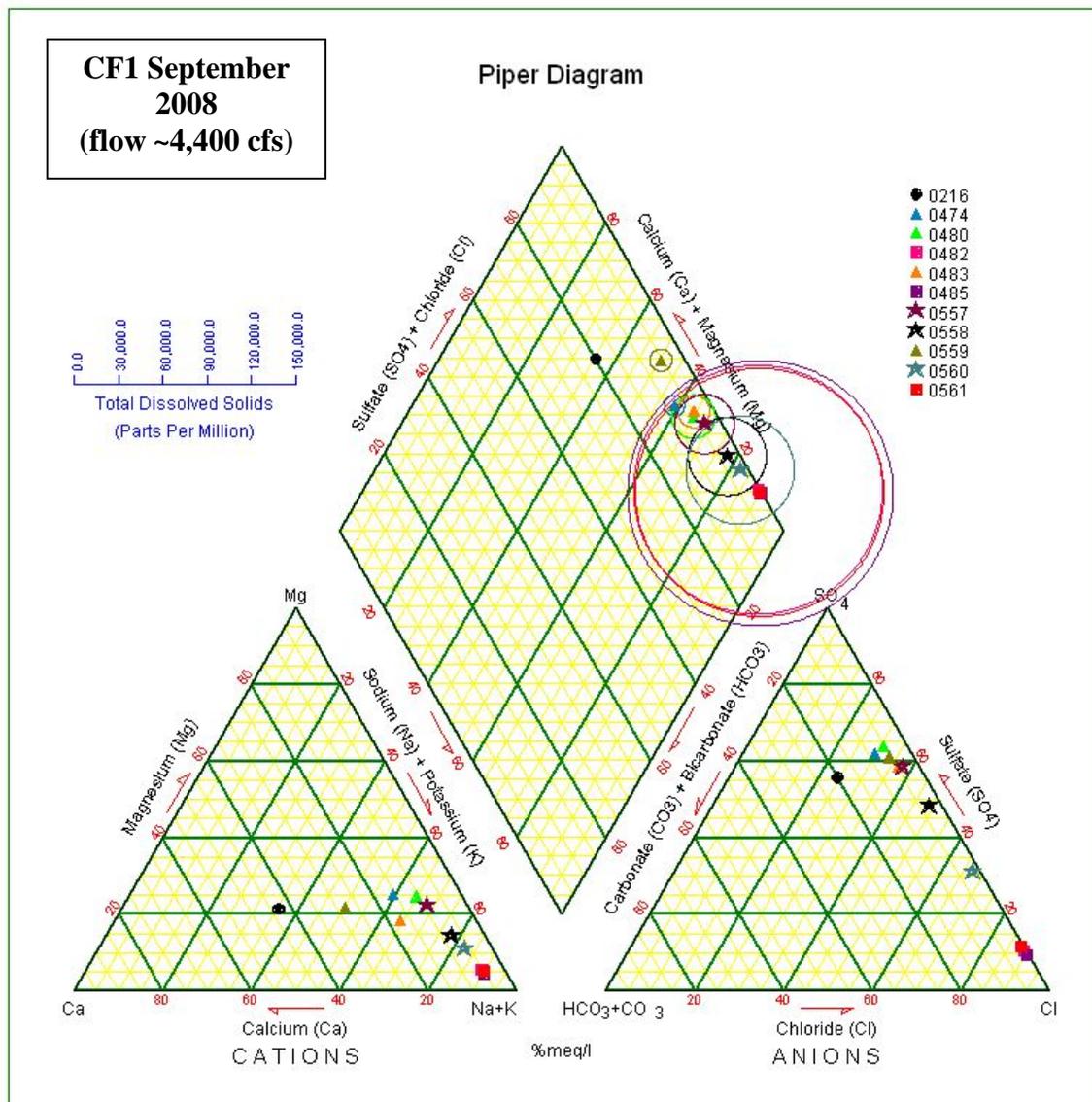


Figure 20. Piper Diagram for CF1 Generated Using September 2008 Water Chemistry Data

## Surface Water Sampling Results

Table 1 presents a summary of the ammonia concentrations associated with the surface water samples collected during this sampling event. For comparison purposes, the applicable State of Utah and federal criteria for both acute and chronic concentrations (along with the temperature and pH data used to calculate these concentrations) are provided.

Table 1. Ground Water/Surface Water Interaction Investigation Sampling Event Surface Water Ammonia Concentrations and Comparisons to State of Utah and Federal Criteria

Loc	Date	Temp (°C)	pH	Ammonia Total as N (mg/L)	State/Federal AWQC–Acute Total as N (mg/L) <sup>1</sup>	State/Federal AWQC–Chronic Total as N (mg/L) <sup>2</sup>
0216	9/30/08	21.5	8.66	0.31	1.47	0.48
0243	9/30/08	21.7	8.63	0.27	1.77	0.57

Notes: Loc = location, Temp = temperature, AWQC = ambient water quality criteria; mg/L = milligrams per liter  
(1) State of Utah, Standards of Quality for Waters of the State (Effective May 1, 2008), Rule R317-2, Table 2.14.2, 1-Hour Average (Acute) Concentration of Total Ammonia as N (mg/L)  
(2) State of Utah, Standards of Quality for Waters of the State (Effective May 1, 2008), Rule R317-2, Table 2.14.2, 30-Day Average (Chronic) Concentration of Total Ammonia as N (mg/L), Fish Early Life Stages Present

As shown in Table 1, neither of the two surface water samples collected during this sampling event exceeded the state or federal acute or chronic criteria.

## 1.3 Sampling and Analyses

### 1.3.1 Monthly Sampling Event

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*. 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 Assessments (Section 2.2.1).

There were two locations with two anomalous data points. The sample collected from CF3 observation well 0686 had an anomalously high ammonia concentration, and the sample from CF4 remediation well 0777 had an anomalously low manganese concentration. See the Anomalous Data Review (Section 3.2) for details.

According to the USGS Cisco gaging station, the mean daily Colorado River flow rates varied between 4,410 to 4,940 cfs during this sampling period.

### 1.3.2 Ground Water/Surface Water Interaction Investigation Sampling Event

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*. Although not listed here, the normal set of locations were sampled. Please refer to the

attached trip report (Attachment 2) for specific sampled locations and an explanation of why some locations were not sampled.

The data validations indicate that the data meet the quality-control criteria specified for this project. An inadequate number of equipment blanks (EBs) and duplicates were collected; see the Water Sampling Field Activities Verification for details. No significant discrepancies were noted regarding sample shipping and receiving, preservation times, holding times, instrument calibration, method blanks, or MSs, except as qualified or noted in the Laboratory Performance Assessments (Section 2.2.2).

There were no anomalous data values associated with this event.

According to the USGS Cisco gaging station, the mean daily Colorado River flow rates varied between 4,220 to 4,260 cfs during this sampling period.

## **2.0 Data Assessment Summaries**

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

### **2.1 Water Sampling Field Activities Verifications**

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**

#### **2.2.1 Monthly Sampling Event**

General Information

Report Identification No. (RIN):	0809022
Sample Event:	Interim Action Well Field Monthly Sampling Event – September 2008
Site(s):	Moab, Utah
Laboratory:	Paragon Analytics, Fort Collins, Colorado
Sample Data Group (SDG) Nos.:	0809038 and 0809099
Analysis:	Metals and Inorganics
Validator:	Rebecca Hollis
Review Date:	November 7, 2008

This validation was performed according to the *Environmental Procedures Catalog*, “Standard Practice for Validation of Laboratory Data,” GT-9(P) (2006). The procedure was applied at Level 1, Data Deliverables Examination. The Level 1 validation was performed on 100 percent of the samples, which included review of the chain of custody (COC), case narratives, field and sample identifications, holding times, preservation, and cooler receipt. When the case narrative identified items of concern, these items were further investigated in a targeted Level 3 validation.

All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 2.

Table 2. Interim Action 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	SW-846 9056	SW-846 9056
Copper	MET-A-020	SW-846 6010B	SW-846 6010B
Manganese	GJO-17	SW-846 6010B	SW-846 6010B
Selenium	GJO-14	SW-846 6020A	SW-846 6020A
Sulfate	MIS-A-044	SW-846 9056	SW-846 9056
TDS	WIC-A-033	MCAWW 160.1	MCAWW 160.1
Uranium	GJO-01	SW-846 6020A	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. Interim Action Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
0809099-21 through 0809099-29	0687, 0688-39, 0689-54, 0771, 0774, 0777, 0779, 2000, 2001	Manganese	J	MS3, RS2, LCS1

Notes: Flags are for detects. See reason codes below for nondetect codes.

Table 4. Interim Action Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Nondetects)	Explanation
LCS1	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because the laboratory control sample was not analyzed at the proper frequency as stated in the appropriate analytical method.
MS3	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because the MS recovery is between 30 to 74%.
RS2	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because both the original result and replicate result are greater than or equal to five times the practical quantitation limit and the relative percent difference exceeds the appropriate control limits.

### Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received a total of 41 samples for RIN 0809022. Twelve samples arrived on September 5, 2008, for SDG 0809038 under UPS tracking number 1Z5W1Y510190968981. Twenty-nine additional samples, assigned to SDG 0809099, arrived on September 11, 2008, under UPS tracking numbers 1Z5W1Y510198853947 and 1Z5W1Y510196967159. All samples were accompanied by a 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 1.4 °C for SDG 0809038 and at 0.4 and 0.6 °C for SDG 0809099 coolers. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

### **Case Narratives**

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

### **MS 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 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 replicate samples (RSs) are indicators of laboratory precision for each sample matrix.

### **Method EPA 350.1, Ammonia as N**

For SDG 0809038, one MS was analyzed for the 12 ammonia samples, although method 350.1 requires MSs to be analyzed for at least 10 percent of the samples. Based on professional judgment, this frequency was deemed acceptable. The MS performed had ammonia concentrations in the native samples greater than four times the spike concentrations. Based on validation protocol, qualification requirements are not applicable when the native sample concentration exceeds four times the spike concentration. Therefore, no qualification was required.

Per validation procedure requirements, one replicate is required for every preparation batch. For SDG 0809038, one MSD was analyzed; however, this result was not reported because the native sample used for the MSD was greater than four times the spike concentrations. Consequently, the relative percent difference (RPD) of the MS/MSD was not reported. However, field duplicates were analyzed with this RIN (see field duplicate section below for details.) The duplicates passed the acceptance criteria of  $\pm 20$  RPD for ammonia. Therefore, no qualification was required.

For SDG 0809099, two MSs were analyzed for the 29 ammonia samples, although method 350.1 requires MSs to be analyzed for at least 10 percent of the samples. Therefore, samples 0809099-2 through 0809099-9 and 0809099-19 through 0809099-20 were “J”-qualified because of insufficient MS samples.

Per validation procedure requirements, one replicate is required for every preparation batch. An MSD was run for each of the two ammonia preparation batches for SDG 0809038. One MSD met all acceptance criteria. The case narrative from Paragon noted that the percent recovery for the other MSD was greater than the allowable range. However, the RPD between this MSD and its corresponding MS was acceptable. Since MSDs are used for validation purposes to determine analytical precision, this MSD was accepted, and no qualification was applied to this data. In

addition, field duplicates were analyzed with this RIN (see field duplicate section below for details.) The duplicates passed the acceptance criteria of  $\pm 20$  RPD for ammonia. Therefore, no qualification was required.

#### **Method SW-846 9056, Chloride**

For SDG 0809038, the chloride concentration in the native sample selected for matrix spiking and duplication was above the analytical range. Based on validation protocol, qualification requirements are not applicable when the native sample concentration exceeds four times the spike concentration. Therefore, no qualification was required based on MS criteria.

Per validation procedure requirements, one replicate is required for every preparation batch. As mentioned above, for SDG 0809038, one MSD was analyzed; however, this result was not reported because the native sample used for the MSD was greater than four times the spike concentrations. Consequently, the RPD of the MS/MSD was not reported. However, field duplicates were analyzed with this SDG (see field duplicate section below for details.) The duplicates passed the acceptance criteria of  $\pm 20$  RPD. Therefore, no chloride samples in SDG 0809038 were qualified because of lack of replicate results. For SDG 0809099, two MSs and MSDs were analyzed. Both met the acceptance criteria. Therefore, no qualification was required.

#### **Method SW-846 6010B, Manganese**

For SDG 0809038, the MS and MSD met the acceptance criteria, so no results were qualified for manganese. For SDG 0809099, the percent recovery of one of the two MSs was below the acceptance criteria in the validation procedure. Therefore, the associated results were “J”-qualified for MS failure. For SDG 0809099, the RPD between one of the two MS/MSD pairs exceeded the allowable range. Therefore, the associated results were “J”-qualified because of replicate failure.

#### **Method SW-846 9056, Sulfate**

For SDGs 0809038 and 0809099, three of the four MSs analyzed were noted in the case narrative by Paragon Analytics for spike failure based on the recovery criteria. However, all MSs passed the validation criteria defined in the project validation procedure. Therefore, no qualification was applied to the results based on MS recovery.

All MSDs met precision requirements. Field duplicates were also analyzed with this SDG (see field duplicate section below for details). The field duplicates passed the acceptance criteria of  $\pm 20$  RPD. Therefore, no qualification of sulfate results was required.

#### **Field Duplicate**

Field duplicates are collected during sampling activities and may be used as RSs to confirm precision for validation purposes. They are labeled with a false identification and submitted with the samples to be analyzed by Paragon Analytics. Samples 0809099-28 (2000) and 0809099-29 (2001) were the duplicate samples taken from locations 0488 (laboratory identification 0809099-7) and 0674 (laboratory identification 0809099-16), respectively. These samples passed the Environmental Protection Agency (EPA) criteria of  $\pm 20$  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. All uranium MSs were acceptable and were used to satisfy the LCS requirements. One of the manganese MS failed. Thus, these samples were “J”-qualified for MS and LCS failure.

### **Detection Limits/Dilutions**

The required detection limit (RDL) for all analytes was achieved for all SDGs. Serial dilution samples were required for inductively coupled plasma (ICP) sample analysis (copper, manganese, selenium, and uranium). The percent difference of the serial dilutions and the associated native samples were acceptable for all ICP analyses.

### **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 (MDL) or instrument detection limit (IDL) (depending on method requirements) were “J”-qualified when the detections were less than five times the blank concentration. Nondetects were not qualified. All blanks passed these criteria with the following exceptions.

On September 15, 2008, two calibration blanks for chloride were greater than the practical quantitation limit (PQL). However, all results bounded by the blanks were greater than 10 times the associated blank results. Therefore, no qualification of these chloride results was required.

### **EBs**

EBs are samples of analyte-free media that have been used to rinse the nondedicated sampling equipment, which is used to sample surface water. EBs are collected to document adequate decontamination of nondedicated equipment. No surface water samples were collected for this RIN. Therefore, no EBs were required.

### **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 for both SDGs 0809038 and 0809099 arrived on September 26, 2008. The contents of the EDD 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.

## 2.2.2 Ground Water/Surface Water Interaction Investigation Sampling Event

### General Information

RIN: 0809023  
 Sample Event: Interim Action Well Field Ground Water/Surface Water Interaction Investigation Sampling Event – September 2008  
 Site(s): Moab, Utah  
 Laboratory: Paragon Analytics, Fort Collins, Colorado  
 SDG No.: 0810011  
 Analysis: Metals and Inorganics  
 Validator: Rebecca Hollis  
 Review Date: November 11, 2008

This validation was performed according to the *Environmental Procedures Catalog*, “Standard Practice for Validation of Laboratory Data,” GT-9(P) (2006). The procedure was applied at Level 1, Data Deliverables Examination. The Level 1 validation was performed on 100 percent of the samples, which included review of the COC, case narratives, field and sample identifications, holding times, preservation, and cooler receipt. When the case narrative identified items of concern, these items were further investigated in a targeted Level 3 validation. All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 5.

Table 5. Ground Water/Surface Water Interaction Investigation Sampling Event 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	SW-846 9056	SW-846 9056
Calcium	MET-A-020	SW-846 6010B	SW-846 6010B
Magnesium	MET-A-020	SW-846 6010B	SW-846 6010B
Manganese	GJO-17	SW-846 6010B	SW-846 6010B
Potassium	MET-A-020	SW-846 6010B	SW-846 6010B
Selenium	GJO-14	SW-846 6020A	SW-846 6020A
Sodium	MET-A-020	SW-846 6010B	SW-846 6010B
Sulfate	MIS-A-044	SW-846 9056	SW-846 9056
TDS	WIC-A-033	MCAWW 160.1	MCAWW 160.1
Uranium	GJO-01	SW-846 6020A	SW-846 6020A

### Data Qualifier Summary

Analytical results were qualified as listed in Table 6. Refer to Table 7 for an explanation of the data qualifiers applied.

Table 6. Ground Water/Surface Water Interaction Investigation Sampling Event Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
0810011-1 and 0810011-2	0216 and 0243	All Analytes	J	B1
All	All	Potassium	J	MS2, LCS1
0810011-1 through 0810011-4, 0810011-13, and 0810011-16	0216, 0243, 0405, 0474, 0559, and 1008	Calcium	J	SD2
All samples except 0810011-15	All locations except 0561	Sodium	J	SD2

Notes: Flags are for detects. See reason codes in Table 7 for nondetect codes.

Table 7. Ground Water/Surface Water Interaction Investigation Sampling Event Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Nondetects)	Explanation
B1	J	UJ	Results are considered estimated (J) because the blank frequency criteria were not met.
LCS1	J	UJ	Results for the affected analyte(s) are regarded as estimated (J) because the LCS was not analyzed at the proper frequency as stated in the appropriate analytical method.
MS2	J	N/A	Results for the affected analyte(s) are regarded as estimated (J) because the MS recovery exceeds 125%.
SD2	J	N/A	Results for the affected analyte(s) are regarded as estimated (J) because the result of the sample used for serial dilution analysis is greater than or equal to 50 times (100 times for inductively coupled plasma/MS) the PQL, and the percent difference is greater than 10%.

### Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received a total of 19 samples for RIN 0809023 on October 2, 2008. These samples were shipped under UPS tracking number 1Z5W1Y510191714663 and were assigned to SDG 0810011. All samples were accompanied by a 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 1.8 °C, which is within the temperature acceptance range. All samples were received in the correct container types and had been preserved correctly for the requested analyses. All samples were analyzed within the applicable holding times.

## **Case Narratives**

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

### **MS 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 analysis consists of 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 SW-846 6010B, Potassium**

One MS was required to be analyzed for the 19 samples in this RIN. The percent recovery for this MS was above the acceptance criteria. Therefore, all potassium results for this RIN were “J”-qualified based on MS recovery concerns.

The RPD for the MS/MSD pair met the precision requirements for this RIN. Therefore, no qualification is required based on MSD results.

### **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 0810011-16 (1008) was the duplicate sample taken from location 0474 (laboratory identification 0810011-4). This sample passed the EPA criteria of  $\pm 20$  RPD for all analytes.

### **LCS**

An 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 calcium, magnesium, manganese, potassium, sodium, 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. An MS met the LCS requirements for all analytes listed above with the exception of potassium. The potassium MS failed the acceptance criteria and, thus, did not meet the acceptance criteria for LCSs. All potassium samples were “J”-qualified for LCS failure.

### **Detection Limits/Dilutions**

The RDL for all analytes was achieved for all SDGs. Serial dilution samples were required for ICP sample analysis (calcium, magnesium, manganese, potassium, sodium, selenium, and uranium). The percent difference of the serial dilutions and their native samples were acceptable for all ICP analyses except calcium, potassium, and sodium. For these analytes, all samples having results greater than 50 times the reporting limit were “J”-flagged because of potential dilution concerns.

### **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 MDL or IDL (depending on method requirements) were “J”-qualified when the detections were less than five times the blank concentration. Nondetects were not qualified. All blanks passed these criteria with the following exceptions.

On October 7, 2008, one calibration blank for chloride was greater than the PQL. However, no chloride results bracketed by this blank were reported. Therefore, no qualification is required.

### **EBs**

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.

Two samples were collected using nondedicated equipment from surface water sampling locations 0216 (sample 081001-1) and 0243 (sample 081001-2). No EB was collected, so all results from this location were “J”-qualified. The equipment used to collect these surface water samples was thoroughly cleaned before and after each sample was collected, and up to five gallons of surface water at each location was purged through the tubing prior to sample collection.

### **Completeness**

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

### **EDD File**

The EDD files arrived on October 15, 2008. The contents of the EDD 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**

### **2.3.1 Monthly Sampling Event**

The following information summarizes the field analyses and activities for the September 2008 monthly sampling event:

#### **Field Activities**

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

### **2.3.2 Ground Water/Surface Water Interaction Investigation Sampling Event**

The following information summarizes the field analyses and activities for the September 2008 ground water/surface water interaction investigation 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. All ground water samples were collected on dedicated equipment. One duplicate sample was collected for 19 samples. 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 EPA 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 RDLs 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 Reports (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 Reports (Section 3.5).

#### **3.1 Minimums and Maximums Reports**

The Minimums and Maximums Reports (see Appendix B) are 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 within 50 percent of historical minimum or maximum values; or (3) there were fewer than five historical samples for comparison.

#### **3.2 Anomalous Data Review**

As exhibited by the Minimums and Maximums Reports (Appendix B), there are only two anomalous data points associated with the monthly event and no anomalous data points associated with the September 2008 ground water/surface water interaction investigation sampling event.

## Monthly Sampling Event

**Site:** Moab UMTRA Site      **Sampling Date:** September 2 - 11, 2008

<b>Loc. No.</b>	<b>Analyte</b>	<b>Type of Anomaly</b>	<b>Disposition</b>
0686	Ammonia	High	Undetermined
0777	Manganese	Low	Only five samples have been collected from this location; still establishing range

## Ground Water/Surface Water Interaction Investigation Sampling Event

All analytical results associated with this sampling event were within the criteria outlined in Section 3.1, and there were no anomalous data points.

### 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 Reports

During the September 2008 monthly sampling event, all samples were collected using dedicated equipment; therefore, an EB was not required. Only two surface water samples were collected during the surface water/ground water investigation using nondedicated equipment, and an EB was not collected. These samples were collected using nondedicated tubing that was thoroughly cleaned between locations; prior to collecting the sample, approximately 5 gallons of surface water was flushed through the tubing.

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

## Appendix A. Water Sampling Field Activities Verification

<b>Sampling Event / RIN</b>	September 2008 Monthly Event/0809022	<b>Date(s) of Water Sampling</b>	September 2-11, 2008
<b>Date(s) of Verification</b>	September 30, 2008	<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?	No	See Section 1.1 for explanation.
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?	Yes	
Did the operational checks meet criteria?	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	

## 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 _____   |
| 10. Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment? | NA _____<br>All 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 A. Water Sampling Field Activities Verification (continued)

<b>Sampling Event / RIN</b>	September 2008 GW/SW Interaction/0809023	<b>Date(s) of Water Sampling</b>	September 29-30, 2008
<b>Date(s) of Verification</b>	November 14, 2008	<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?	Yes	
	Did the operational checks meet criteria?	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	

## 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 | Eighteen samples were collected, and one duplicate sample was collected.                          |
| 10. | Were EBs taken at a frequency of one per 20 samples that were collected with nondedicated equipment? | No  | Although two surface water samples were collected, no EB samples were collected. See Section 3.5. |
| 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 Reports**

## Appendix B. Minimums and Maximums Reports

### September 2008 Monthly Event - Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 0809022

Comparison: All Historical Data

Report Date: 11/7/2008

Site Code	Location Code	Sample Date	Analyte	Current		Historical Maximum			Historical Minimum			Count	
				Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	N	N Below Detect		
MOA01	0473	09/02/2008	Manganese	4.4		3.8	F	0.43			10	0	
MOA01	0547	09/10/2008	Manganese	4.9		4.7		2.5	J		16	0	
MOA01	0557	09/09/2008	Manganese	6.3		6.1	J	4.6			16	0	
MOA01	0670	09/11/2008	Manganese	6.3		6.1		0.79			9	0	
MOA01	0674	09/11/2008	Manganese	6.5		5.7		0.7			8	0	
MOA01	0683	09/10/2008	Manganese	6.6		5.4	F	2.3			15	0	
MOA01	0686	09/10/2008	Ammonia Total as N	330		164	F	0.1	U		20	1	
MOA01	0686	09/10/2008	Manganese	4.8		3.64	F	0.228	F		17	0	
MOA01	0688	09/10/2008	Manganese	7.5		6.1	F	2.5			21	0	
MOA01	0777	09/09/2008	Chloride	5400		42000	F	6400	F		8	0	
MOA01	0777	09/09/2008	Manganese	0.35		11	F	3.1			5	0	
MOA01	0777	09/09/2008	Total Dissolved Solids	15000		82000	F	18000			8	0	
MOA01	0787	09/03/2008	Manganese	7.8		7.6	J	0.21	F		16	0	

## Appendix B. Minimums and Maximums Reports (continued)

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

### LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- > Result above upper detection limit.
- A Tentatively identified compound (TIC) is a suspected aldol-condensation product.
- B Inorganic: Result is between the instrument detection limit (IDL) and contract-required detection limit (CRDL). 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: TIC.
- 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 B. Minimums and Maximums Reports (continued)

### September 2008 GW/SW Investigation - Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: PARAGON (Fort Collins, CO)

RIN: 0809023

Comparison: All Historical Data

Report Date: 11/14/2008

Site Code	Location Code	Sample Date	Analyte	Current		Historical Maximum		Historical Minimum		Count	
				Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	Result	Qualifiers Lab Data	N	N Below Detect
MOA01	0558	09/29/2008	Manganese	4.7		12	J	4.9		16	0
MOA01	0559	09/30/2008	Calcium	550		430		39		5	0
MOA01	0560	09/30/2008	Uranium	2.4		1.9	F	0.74		48	0
MOA01	0561	09/29/2008	Manganese	7.7		67	F	7.8		11	0
MOA01	SMI-PW01	09/30/2008	Ammonia Total as N	280		1620		300	J	36	0
MOA01	SMI-PW01	09/30/2008	Potassium	95		379		100	J	6	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 TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. 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: TIC.
- 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.

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

## Appendix C. Water Quality Data

### September 2008 Monthly Sampling Event – 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		
Alkalinity, Total (As CaCO3)	mg/L	0401	WL	09/10/2008	0001	18	-	18	846		#		
Alkalinity, Total (As CaCO3)	mg/L	0403	WL	09/09/2008	0001	18	-	18	416		#		
Alkalinity, Total (As CaCO3)	mg/L	0405	WL	09/10/2008	0001	18	-	18	574		#		
Alkalinity, Total (As CaCO3)	mg/L	0407	WL	09/09/2008	0001	17	-	17	400		#		
Alkalinity, Total (As CaCO3)	mg/L	0471	WL	09/02/2008	0001	10.3	-	19.7	610		#		
Alkalinity, Total (As CaCO3)	mg/L	0473	WL	09/02/2008	0001	10.3	-	19.7	800		#		
Alkalinity, Total (As CaCO3)	mg/L	0475	WL	09/02/2008	0001	10.3	-	19.7	610		#		
Alkalinity, Total (As CaCO3)	mg/L	0477	WL	09/02/2008	0001	10.3	-	19.7	630		#		
Alkalinity, Total (As CaCO3)	mg/L	0479	WL	09/02/2008	0001	9.3	-	23.6	840		#		
Alkalinity, Total (As CaCO3)	mg/L	0480	WL	09/09/2008	0001	18	-	18	874		#		
Alkalinity, Total (As CaCO3)	mg/L	0484	WL	09/09/2008	0001	28	-	28	892		#		
Alkalinity, Total (As CaCO3)	mg/L	0488	WL	09/10/2008	0001	36	-	36	800		#		
Alkalinity, Total (As CaCO3)	mg/L	0493	WL	09/10/2008	0001	54	-	54	1060		#		
Alkalinity, Total (As CaCO3)	mg/L	0547	TS	09/10/2008	0001	0	-	0	760		#		
Alkalinity, Total (As CaCO3)	mg/L	0548	TS	09/10/2008	0001	0	-	0	950		#		
Alkalinity, Total (As CaCO3)	mg/L	0557	WL	09/09/2008	0001	40	-	40	952		#		
Alkalinity, Total (As CaCO3)	mg/L	0561	WL	09/09/2008	0001	50	-	50	394		#		
Alkalinity, Total (As CaCO3)	mg/L	0584	WL	09/09/2008	0001	18	-	18	460		#		
Alkalinity, Total (As CaCO3)	mg/L	0587	WL	09/09/2008	0001	18	-	18	418		#		
Alkalinity, Total (As CaCO3)	mg/L	0596	WL	09/09/2008	0001	24	-	24	434		#		
Alkalinity, Total (As CaCO3)	mg/L	0600	WL	09/09/2008	0001	27	-	27	722		#		
Alkalinity, Total (As CaCO3)	mg/L	0670	WL	09/11/2008	0001	15.9	-	45.9	550		#		
Alkalinity, Total (As CaCO3)	mg/L	0673	WL	09/02/2008	0001	16.3	-	46.3	810		#		
Alkalinity, Total (As CaCO3)	mg/L	0674	WL	09/11/2008	0001	15.1	-	45.1	910		#		
Alkalinity, Total (As CaCO3)	mg/L	0677	WL	09/02/2008	0001	15.2	-	45.2	840		#		
Alkalinity, Total (As CaCO3)	mg/L	0679	WL	09/02/2008	0001	15	-	45	710		#		

## Appendix C. Water Quality Data (continued)

### September 2008 Monthly Sampling Event – 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		
Alkalinity, Total (As CaCO3)	mg/L	0683	WL	09/10/2008	0001	27	-	27	822		#		
Alkalinity, Total (As CaCO3)	mg/L	0686	WL	09/10/2008	0001	18	-	18	746		#		
Alkalinity, Total (As CaCO3)	mg/L	0687	WL	09/10/2008	0001	28	-	28	770		#		
Alkalinity, Total (As CaCO3)	mg/L	0688	WL	09/10/2008	0001	39	-	39	866		#		
Alkalinity, Total (As CaCO3)	mg/L	0689	WL	09/10/2008	0001	54	-	54	538		#		
Alkalinity, Total (As CaCO3)	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	580		#		
Alkalinity, Total (As CaCO3)	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	850		#		
Alkalinity, Total (As CaCO3)	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	610		#		
Alkalinity, Total (As CaCO3)	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	560		#		
Alkalinity, Total (As CaCO3)	mg/L	0781	WL	09/03/2008	0001	48	-	48	240		#		
Alkalinity, Total (As CaCO3)	mg/L	0782	WL	09/03/2008	0001	31	-	31	814		#		
Alkalinity, Total (As CaCO3)	mg/L	0786	WL	09/03/2008	0001	28	-	28	924		#		
Alkalinity, Total (As CaCO3)	mg/L	0787	WL	09/03/2008	0001	36	-	36	282		#		
Ammonia Total as N	mg/L	0401	WL	09/10/2008	0001	18	-	18	210	N	#	20	
Ammonia Total as N	mg/L	0403	WL	09/09/2008	0001	18	-	18	110		#	5	
Ammonia Total as N	mg/L	0405	WL	09/10/2008	0001	18	-	18	190		#	20	
Ammonia Total as N	mg/L	0407	WL	09/09/2008	0001	17	-	17	86		#	2	
Ammonia Total as N	mg/L	0471	WL	09/02/2008	0001	10.3	-	19.7	520		#	20	
Ammonia Total as N	mg/L	0473	WL	09/02/2008	0001	10.3	-	19.7	710		#	20	
Ammonia Total as N	mg/L	0475	WL	09/02/2008	0001	10.3	-	19.7	220		#	20	
Ammonia Total as N	mg/L	0477	WL	09/02/2008	0001	10.3	-	19.7	170		#	20	
Ammonia Total as N	mg/L	0479	WL	09/02/2008	0001	9.3	-	23.6	290		#	20	
Ammonia Total as N	mg/L	0480	WL	09/09/2008	0001	18	-	18	620		#	20	
Ammonia Total as N	mg/L	0484	WL	09/09/2008	0001	28	-	28	580		#	20	
Ammonia Total as N	mg/L	0488	WL	09/10/2008	0001	36	-	36	600		#	20	
Ammonia Total as N	mg/L	0488	WL	09/10/2008	0002	36	-	36	640		#	20	
Ammonia Total as N	mg/L	0493	WL	09/10/2008	0001	54	-	54	960		#	50	

## Appendix C. Water Quality Data (continued)

**September 2008 Monthly Sampling Event – 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	0547	TS	09/10/2008	0001	0	-	0	440		#	20	
Ammonia Total as N	mg/L	0548	TS	09/10/2008	0001	0	-	0	390		#	20	
Ammonia Total as N	mg/L	0557	WL	09/09/2008	0001	40	-	40	580		#	20	
Ammonia Total as N	mg/L	0561	WL	09/09/2008	0001	50	-	50	1100		#	50	
Ammonia Total as N	mg/L	0584	WL	09/09/2008	0001	18	-	18	120		#	20	
Ammonia Total as N	mg/L	0587	WL	09/09/2008	0001	18	-	18	120		#	5	
Ammonia Total as N	mg/L	0596	WL	09/09/2008	0001	24	-	24	170		#	20	
Ammonia Total as N	mg/L	0600	WL	09/09/2008	0001	27	-	27	500		#	20	
Ammonia Total as N	mg/L	0670	WL	09/11/2008	0001	15.9	-	45.9	470		#	20	
Ammonia Total as N	mg/L	0673	WL	09/02/2008	0001	16.3	-	46.3	560		#	20	
Ammonia Total as N	mg/L	0674	WL	09/11/2008	0001	15.1	-	45.1	780		#	20	
Ammonia Total as N	mg/L	0674	WL	09/11/2008	0002	15.1	-	45.1	700		#	20	
Ammonia Total as N	mg/L	0677	WL	09/02/2008	0001	15.2	-	45.2	640		#	20	
Ammonia Total as N	mg/L	0679	WL	09/02/2008	0001	15	-	45	520		#	20	
Ammonia Total as N	mg/L	0683	WL	09/10/2008	0001	27	-	27	410		#	20	
Ammonia Total as N	mg/L	0686	WL	09/10/2008	0001	18	-	18	330		#	20	
Ammonia Total as N	mg/L	0687	WL	09/10/2008	0001	28	-	28	300		#	20	
Ammonia Total as N	mg/L	0688	WL	09/10/2008	0001	39	-	39	920		#	50	
Ammonia Total as N	mg/L	0689	WL	09/10/2008	0001	54	-	54	590		#	20	
Ammonia Total as N	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	430		#	20	
Ammonia Total as N	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	620		#	20	
Ammonia Total as N	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	480		#	20	
Ammonia Total as N	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	730		#	20	
Ammonia Total as N	mg/L	0781	WL	09/03/2008	0001	48	-	48	280		#	20	
Ammonia Total as N	mg/L	0782	WL	09/03/2008	0001	31	-	31	590		#	20	
Ammonia Total as N	mg/L	0786	WL	09/03/2008	0001	28	-	28	720		#	20	
Ammonia Total as N	mg/L	0787	WL	09/03/2008	0001	36	-	36	150		#	20	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0401	WL	09/10/2008	0001	18	-	18	1600		#	40	
Chloride	mg/L	0403	WL	09/09/2008	0001	18	-	18	1500		#	20	
Chloride	mg/L	0405	WL	09/10/2008	0001	18	-	18	860		#	20	
Chloride	mg/L	0407	WL	09/09/2008	0001	17	-	17	1300		#	20	
Chloride	mg/L	0471	WL	09/02/2008	0001	10.3	-	19.7	2700		#	40	
Chloride	mg/L	0473	WL	09/02/2008	0001	10.3	-	19.7	2700		#	40	
Chloride	mg/L	0475	WL	09/02/2008	0001	10.3	-	19.7	1000		#	20	
Chloride	mg/L	0477	WL	09/02/2008	0001	10.3	-	19.7	1000		#	20	
Chloride	mg/L	0479	WL	09/02/2008	0001	9.3	-	23.6	1900		#	20	
Chloride	mg/L	0480	WL	09/09/2008	0001	18	-	18	3200		#	40	
Chloride	mg/L	0484	WL	09/09/2008	0001	28	-	28	5300		#	100	
Chloride	mg/L	0488	WL	09/10/2008	0001	36	-	36	1500		#	40	
Chloride	mg/L	0488	WL	09/10/2008	0002	36	-	36	1500		#	40	
Chloride	mg/L	0493	WL	09/10/2008	0001	54	-	54	5700		#	400	
Chloride	mg/L	0547	TS	09/10/2008	0001	0	-	0	5400		#	100	
Chloride	mg/L	0548	TS	09/10/2008	0001	0	-	0	4300		#	100	
Chloride	mg/L	0557	WL	09/09/2008	0001	40	-	40	4300		#	100	
Chloride	mg/L	0561	WL	09/09/2008	0001	50	-	50	42000		#	2000	
Chloride	mg/L	0584	WL	09/09/2008	0001	18	-	18	610		#	20	
Chloride	mg/L	0587	WL	09/09/2008	0001	18	-	18	1500		#	20	
Chloride	mg/L	0596	WL	09/09/2008	0001	24	-	24	890		#	20	
Chloride	mg/L	0600	WL	09/09/2008	0001	27	-	27	1200		#	40	
Chloride	mg/L	0670	WL	09/11/2008	0001	15.9	-	45.9	1700		#	40	
Chloride	mg/L	0673	WL	09/02/2008	0001	16.3	-	46.3	7600		#	100	
Chloride	mg/L	0674	WL	09/11/2008	0001	15.1	-	45.1	6300		#	100	
Chloride	mg/L	0674	WL	09/11/2008	0002	15.1	-	45.1	6500		#	100	
Chloride	mg/L	0677	WL	09/02/2008	0001	15.2	-	45.2	3900		#	40	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0679	WL	09/02/2008	0001	15	-	45	3300		#	40	
Chloride	mg/L	0683	WL	09/10/2008	0001	27	-	27	2300		#	40	
Chloride	mg/L	0686	WL	09/10/2008	0001	18	-	18	1700		#	40	
Chloride	mg/L	0687	WL	09/10/2008	0001	28	-	28	1300		#	40	
Chloride	mg/L	0688	WL	09/10/2008	0001	39	-	39	20000		#	400	
Chloride	mg/L	0689	WL	09/10/2008	0001	54	-	54	37000		#	400	
Chloride	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	8700		#	100	
Chloride	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	5600		#	100	
Chloride	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	5400		#	100	
Chloride	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	11000		#	200	
Chloride	mg/L	0781	WL	09/03/2008	0001	48	-	48	49000		#	1000	
Chloride	mg/L	0782	WL	09/03/2008	0001	31	-	31	8100		#	100	
Chloride	mg/L	0786	WL	09/03/2008	0001	28	-	28	4700		#	100	
Chloride	mg/L	0787	WL	09/03/2008	0001	36	-	36	49000		#	2000	
Copper	mg/L	0787	WL	09/03/2008	0001	36	-	36	0.22	B	#	0.13	
Dissolved Oxygen	mg/L	0401	WL	09/10/2008	0001	18	-	18	0.43		#		
Dissolved Oxygen	mg/L	0403	WL	09/09/2008	0001	18	-	18	0.8		#		
Dissolved Oxygen	mg/L	0405	WL	09/10/2008	0001	18	-	18	0.67		#		
Dissolved Oxygen	mg/L	0407	WL	09/09/2008	0001	17	-	17	0.85		#		
Dissolved Oxygen	mg/L	0471	WL	09/02/2008	0001	10.3	-	19.7	4.06		#		
Dissolved Oxygen	mg/L	0473	WL	09/02/2008	0001	10.3	-	19.7	1.78		#		
Dissolved Oxygen	mg/L	0475	WL	09/02/2008	0001	10.3	-	19.7	3.98		#		
Dissolved Oxygen	mg/L	0477	WL	09/02/2008	0001	10.3	-	19.7	6.85		#		
Dissolved Oxygen	mg/L	0479	WL	09/02/2008	0001	9.3	-	23.6	3.34		#		
Dissolved Oxygen	mg/L	0480	WL	09/09/2008	0001	18	-	18	0.73		#		
Dissolved Oxygen	mg/L	0484	WL	09/09/2008	0001	28	-	28	0.79		#		
Dissolved Oxygen	mg/L	0488	WL	09/10/2008	0001	36	-	36	5.29		#		

## Appendix C. Water Quality Data (continued)

### September 2008 Monthly Sampling Event – 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	0493	WL	09/10/2008	0001	54	-	54	0.25		#		
Dissolved Oxygen	mg/L	0547	TS	09/10/2008	0001	0	-	0	5.93		#		
Dissolved Oxygen	mg/L	0548	TS	09/10/2008	0001	0	-	0	6.17		#		
Dissolved Oxygen	mg/L	0557	WL	09/09/2008	0001	40	-	40	0.39		#		
Dissolved Oxygen	mg/L	0561	WL	09/09/2008	0001	50	-	50	0.67		#		
Dissolved Oxygen	mg/L	0584	WL	09/09/2008	0001	18	-	18	1.64		#		
Dissolved Oxygen	mg/L	0587	WL	09/09/2008	0001	18	-	18	1.06		#		
Dissolved Oxygen	mg/L	0596	WL	09/09/2008	0001	24	-	24	1.31		#		
Dissolved Oxygen	mg/L	0600	WL	09/09/2008	0001	27	-	27	0.95		#		
Dissolved Oxygen	mg/L	0670	WL	09/11/2008	0001	15.9	-	45.9	3.1		#		
Dissolved Oxygen	mg/L	0673	WL	09/02/2008	0001	16.3	-	46.3	5.23		#		
Dissolved Oxygen	mg/L	0674	WL	09/11/2008	0001	15.1	-	45.1	0.82		#		
Dissolved Oxygen	mg/L	0677	WL	09/02/2008	0001	15.2	-	45.2	6.29		#		
Dissolved Oxygen	mg/L	0679	WL	09/02/2008	0001	15	-	45	4.44		#		
Dissolved Oxygen	mg/L	0683	WL	09/10/2008	0001	27	-	27	0.37		#		
Dissolved Oxygen	mg/L	0686	WL	09/10/2008	0001	18	-	18	0.33		#		
Dissolved Oxygen	mg/L	0687	WL	09/10/2008	0001	28	-	28	0.25		#		
Dissolved Oxygen	mg/L	0688	WL	09/10/2008	0001	39	-	39	0.28		#		
Dissolved Oxygen	mg/L	0688	WL	09/10/2008	0001	31	-	31	1.95		#		
Dissolved Oxygen	mg/L	0689	WL	09/10/2008	0001	54	-	54	0.16		#		
Dissolved Oxygen	mg/L	0689	WL	09/10/2008	0001	46	-	46	0.3		#		
Dissolved Oxygen	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	3.58		#		
Dissolved Oxygen	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	2.5		#		
Dissolved Oxygen	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	2.82		#		
Dissolved Oxygen	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	2.24		#		
Dissolved Oxygen	mg/L	0781	WL	09/03/2008	0001	48	-	48	0.26		#		
Dissolved Oxygen	mg/L	0782	WL	09/03/2008	0001	31	-	31	0.38		#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0786	WL	09/03/2008	0001	28	-	28	0.43		#		
Dissolved Oxygen	mg/L	0787	WL	09/03/2008	0001	36	-	36	0.26		#		
Manganese	mg/L	0401	WL	09/10/2008	0001	18	-	18	3.9		#	0.002	
Manganese	mg/L	0403	WL	09/09/2008	0001	18	-	18	3.5		#	0.001	
Manganese	mg/L	0405	WL	09/10/2008	0001	18	-	18	4.8		#	0.001	
Manganese	mg/L	0407	WL	09/09/2008	0001	17	-	17	3		#	0.001	
Manganese	mg/L	0471	WL	09/02/2008	0001	10.3	-	19.7	4.2		#	0.002	
Manganese	mg/L	0473	WL	09/02/2008	0001	10.3	-	19.7	4.4		#	0.002	
Manganese	mg/L	0475	WL	09/02/2008	0001	10.3	-	19.7	2.2		#	0.001	
Manganese	mg/L	0477	WL	09/02/2008	0001	10.3	-	19.7	2.5		#	0.001	
Manganese	mg/L	0479	WL	09/02/2008	0001	9.3	-	23.6	3.4		#	0.002	
Manganese	mg/L	0480	WL	09/09/2008	0001	18	-	18	5.4		#	0.002	
Manganese	mg/L	0484	WL	09/09/2008	0001	28	-	28	5.5		#	0.002	
Manganese	mg/L	0488	WL	09/10/2008	0001	36	-	36	6.6		#	0.002	
Manganese	mg/L	0488	WL	09/10/2008	0002	36	-	36	5.6	J	#	0.002	
Manganese	mg/L	0493	WL	09/10/2008	0001	54	-	54	9.3		#	0.01	
Manganese	mg/L	0547	TS	09/10/2008	0001	0	-	0	4.9		#	0.002	
Manganese	mg/L	0548	TS	09/10/2008	0001	0	-	0	2.9		#	0.002	
Manganese	mg/L	0557	WL	09/09/2008	0001	40	-	40	6.3		#	0.002	
Manganese	mg/L	0561	WL	09/09/2008	0001	50	-	50	11		#	0.02	
Manganese	mg/L	0584	WL	09/09/2008	0001	18	-	18	1.1		#	0.001	
Manganese	mg/L	0587	WL	09/09/2008	0001	18	-	18	1.7		#	0.001	
Manganese	mg/L	0596	WL	09/09/2008	0001	24	-	24	0.69		#	0.001	
Manganese	mg/L	0600	WL	09/09/2008	0001	27	-	27	3.8		#	0.002	
Manganese	mg/L	0670	WL	09/11/2008	0001	15.9	-	45.9	6.3		#	0.002	
Manganese	mg/L	0673	WL	09/02/2008	0001	16.3	-	46.3	4.9		#	0.002	
Manganese	mg/L	0674	WL	09/11/2008	0001	15.1	-	45.1	6.5		#	0.002	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0674	WL	09/11/2008	0002	15.1	-	45.1	5.5		J	#	0.0051	
Manganese	mg/L	0677	WL	09/02/2008	0001	15.2	-	45.2	5.3			#	0.002	
Manganese	mg/L	0679	WL	09/02/2008	0001	15	-	45	4.6			#	0.002	
Manganese	mg/L	0683	WL	09/10/2008	0001	27	-	27	6.6			#	0.002	
Manganese	mg/L	0686	WL	09/10/2008	0001	18	-	18	4.8			#	0.002	
Manganese	mg/L	0687	WL	09/10/2008	0001	28	-	28	3.2	N	J	#	0.002	
Manganese	mg/L	0688	WL	09/10/2008	0001	39	-	39	7.5		J	#	0.02	
Manganese	mg/L	0689	WL	09/10/2008	0001	54	-	54	7.6		J	#	0.01	
Manganese	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	4.4		J	#	0.0051	
Manganese	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	6.1		J	#	0.0051	
Manganese	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	0.35		J	#	0.002	
Manganese	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	4.4		J	#	0.1	
Manganese	mg/L	0781	WL	09/03/2008	0001	48	-	48	8.1			#	0.01	
Manganese	mg/L	0782	WL	09/03/2008	0001	31	-	31	5.5			#	0.0051	
Manganese	mg/L	0786	WL	09/03/2008	0001	28	-	28	6.1			#	0.002	
Manganese	mg/L	0787	WL	09/03/2008	0001	36	-	36	7.8			#	0.02	
Oxidation Reduction Potential	mV	0401	WL	09/10/2008	0001	18	-	18	109			#		
Oxidation Reduction Potential	mV	0403	WL	09/09/2008	0001	18	-	18	10			#		
Oxidation Reduction Potential	mV	0405	WL	09/10/2008	0001	18	-	18	68			#		
Oxidation Reduction Potential	mV	0407	WL	09/09/2008	0001	17	-	17	-19			#		
Oxidation Reduction Potential	mV	0471	WL	09/02/2008	0001	10.3	-	19.7	43			#		
Oxidation Reduction Potential	mV	0473	WL	09/02/2008	0001	10.3	-	19.7	39			#		
Oxidation Reduction Potential	mV	0475	WL	09/02/2008	0001	10.3	-	19.7	12			#		
Oxidation Reduction Potential	mV	0477	WL	09/02/2008	0001	10.3	-	19.7	9			#		
Oxidation Reduction Potential	mV	0479	WL	09/02/2008	0001	9.3	-	23.6	16			#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0480	WL	09/09/2008	0001	18	-	18	91		#		
Oxidation Reduction Potential	mV	0484	WL	09/09/2008	0001	28	-	28	63		#		
Oxidation Reduction Potential	mV	0488	WL	09/10/2008	0001	36	-	36	62		#		
Oxidation Reduction Potential	mV	0493	WL	09/10/2008	0001	54	-	54	101		#		
Oxidation Reduction Potential	mV	0547	TS	09/10/2008	0001	0	-	0	15		#		
Oxidation Reduction Potential	mV	0548	TS	09/10/2008	0001	0	-	0	21		#		
Oxidation Reduction Potential	mV	0557	WL	09/09/2008	0001	40	-	40	88		#		
Oxidation Reduction Potential	mV	0561	WL	09/09/2008	0001	50	-	50	107		#		
Oxidation Reduction Potential	mV	0584	WL	09/09/2008	0001	18	-	18	18		#		
Oxidation Reduction Potential	mV	0587	WL	09/09/2008	0001	18	-	18	-37		#		
Oxidation Reduction Potential	mV	0596	WL	09/09/2008	0001	24	-	24	-10		#		
Oxidation Reduction Potential	mV	0600	WL	09/09/2008	0001	27	-	27	42		#		
Oxidation Reduction Potential	mV	0670	WL	09/11/2008	0001	15.9	-	45.9	100		#		
Oxidation Reduction Potential	mV	0673	WL	09/02/2008	0001	16.3	-	46.3	56		#		
Oxidation Reduction Potential	mV	0674	WL	09/11/2008	0001	15.1	-	45.1	94		#		
Oxidation Reduction Potential	mV	0677	WL	09/02/2008	0001	15.2	-	45.2	110		#		
Oxidation Reduction Potential	mV	0679	WL	09/02/2008	0001	15	-	45	65		#		
Oxidation Reduction Potential	mV	0683	WL	09/10/2008	0001	27	-	27	24		#		
Oxidation Reduction Potential	mV	0686	WL	09/10/2008	0001	18	-	18	90		#		
Oxidation Reduction Potential	mV	0687	WL	09/10/2008	0001	28	-	28	86		#		
Oxidation Reduction Potential	mV	0688	WL	09/10/2008	0001	31	-	31	97		#		
Oxidation Reduction Potential	mV	0688	WL	09/10/2008	0001	39	-	39	108		#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0689	WL	09/10/2008	0001	54	-	54	98			#		
Oxidation Reduction Potential	mV	0689	WL	09/10/2008	0001	46	-	46	100			#		
Oxidation Reduction Potential	mV	0771	WL	09/09/2008	0001	15	-	34.9	138			#		
Oxidation Reduction Potential	mV	0774	WL	09/09/2008	0001	15.5	-	35.4	142			#		
Oxidation Reduction Potential	mV	0777	WL	09/09/2008	0001	15.3	-	35.2	160			#		
Oxidation Reduction Potential	mV	0779	WL	09/09/2008	0001	15.66	-	35.56	229			#		
Oxidation Reduction Potential	mV	0781	WL	09/03/2008	0001	48	-	48	0.3			#		
Oxidation Reduction Potential	mV	0782	WL	09/03/2008	0001	31	-	31	9			#		
Oxidation Reduction Potential	mV	0786	WL	09/03/2008	0001	28	-	28	26			#		
Oxidation Reduction Potential	mV	0787	WL	09/03/2008	0001	36	-	36	20			#		
pH	s.u.	0401	WL	09/10/2008	0001	18	-	18	6.67			#		
pH	s.u.	0403	WL	09/09/2008	0001	18	-	18	6.61			#		
pH	s.u.	0405	WL	09/10/2008	0001	18	-	18	6.61			#		
pH	s.u.	0407	WL	09/09/2008	0001	17	-	17	6.88			#		
pH	s.u.	0471	WL	09/02/2008	0001	10.3	-	19.7	6.73			#		
pH	s.u.	0473	WL	09/02/2008	0001	10.3	-	19.7	6.84			#		
pH	s.u.	0475	WL	09/02/2008	0001	10.3	-	19.7	6.98			#		
pH	s.u.	0477	WL	09/02/2008	0001	10.3	-	19.7	7.06			#		
pH	s.u.	0479	WL	09/02/2008	0001	9.3	-	23.6	6.9			#		
pH	s.u.	0480	WL	09/09/2008	0001	18	-	18	6.7			#		
pH	s.u.	0484	WL	09/09/2008	0001	28	-	28	6.71			#		
pH	s.u.	0488	WL	09/10/2008	0001	36	-	36	6.67			#		
pH	s.u.	0493	WL	09/10/2008	0001	54	-	54	6.71			#		
pH	s.u.	0547	TS	09/10/2008	0001	0	-	0	7.18			#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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.	0548	TS	09/10/2008	0001	0	-	0	7.72		#		
pH	s.u.	0557	WL	09/09/2008	0001	40	-	40	6.8		#		
pH	s.u.	0561	WL	09/09/2008	0001	50	-	50	6.58		#		
pH	s.u.	0584	WL	09/09/2008	0001	18	-	18	6.84		#		
pH	s.u.	0587	WL	09/09/2008	0001	18	-	18	6.49		#		
pH	s.u.	0596	WL	09/09/2008	0001	24	-	24	7.57		#		
pH	s.u.	0600	WL	09/09/2008	0001	27	-	27	6.69		#		
pH	s.u.	0670	WL	09/11/2008	0001	15.9	-	45.9	6.93		#		
pH	s.u.	0673	WL	09/02/2008	0001	16.3	-	46.3	6.75		#		
pH	s.u.	0674	WL	09/11/2008	0001	15.1	-	45.1	6.75		#		
pH	s.u.	0677	WL	09/02/2008	0001	15.2	-	45.2	6.93		#		
pH	s.u.	0679	WL	09/02/2008	0001	15	-	45	6.96		#		
pH	s.u.	0683	WL	09/10/2008	0001	27	-	27	6.69		#		
pH	s.u.	0686	WL	09/10/2008	0001	18	-	18	6.6		#		
pH	s.u.	0687	WL	09/10/2008	0001	28	-	28	6.78		#		
pH	s.u.	0688	WL	09/10/2008	0001	39	-	39	6.6		#		
pH	s.u.	0688	WL	09/10/2008	0001	31	-	31	6.78		#		
pH	s.u.	0689	WL	09/10/2008	0001	46	-	46	6.61		#		
pH	s.u.	0689	WL	09/10/2008	0001	54	-	54	6.61		#		
pH	s.u.	0771	WL	09/09/2008	0001	15	-	34.9	6.97		#		
pH	s.u.	0774	WL	09/09/2008	0001	15.5	-	35.4	6.89		#		
pH	s.u.	0777	WL	09/09/2008	0001	15.3	-	35.2	7.05		#		
pH	s.u.	0779	WL	09/09/2008	0001	15.66	-	35.56	6.79		#		
pH	s.u.	0781	WL	09/03/2008	0001	48	-	48	6.79		#		
pH	s.u.	0782	WL	09/03/2008	0001	31	-	31	6.88		#		
pH	s.u.	0786	WL	09/03/2008	0001	28	-	28	6.74		#		
pH	s.u.	0787	WL	09/03/2008	0001	36	-	36	6.76		#		

## Appendix C. Water Quality Data (continued)

### September 2008 Monthly Sampling Event – 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		
Selenium	mg/L	0683	WL	09/10/2008	0001	27	-	27	0.016		#	0.00012	
Specific Conductance	µmhos/cm	0401	WL	09/10/2008	0001	18	-	18	14204		#		
Specific Conductance	µmhos/cm	0403	WL	09/09/2008	0001	18	-	18	10295		#		
Specific Conductance	µmhos/cm	0405	WL	09/10/2008	0001	18	-	18	10798		#		
Specific Conductance	µmhos/cm	0407	WL	09/09/2008	0001	17	-	17	7543		#		
Specific Conductance	µmhos/cm	0471	WL	09/02/2008	0001	10.3	-	19.7	16128		#		
Specific Conductance	µmhos/cm	0473	WL	09/02/2008	0001	10.3	-	19.7	16789		#		
Specific Conductance	µmhos/cm	0475	WL	09/02/2008	0001	10.3	-	19.7	8608		#		
Specific Conductance	µmhos/cm	0477	WL	09/02/2008	0001	10.3	-	19.7	9556		#		
Specific Conductance	µmhos/cm	0479	WL	09/02/2008	0001	9.3	-	23.6	14796		#		
Specific Conductance	µmhos/cm	0480	WL	09/09/2008	0001	18	-	18	21826		#		
Specific Conductance	µmhos/cm	0484	WL	09/09/2008	0001	28	-	28	25544		#		
Specific Conductance	µmhos/cm	0488	WL	09/10/2008	0001	36	-	36	17875		#		
Specific Conductance	µmhos/cm	0493	WL	09/10/2008	0001	54	-	54	32748		#		
Specific Conductance	µmhos/cm	0547	TS	09/10/2008	0001	0	-	0	24301		#		
Specific Conductance	µmhos/cm	0548	TS	09/10/2008	0001	0	-	0	21396		#		
Specific Conductance	µmhos/cm	0557	WL	09/09/2008	0001	40	-	40	23910		#		
Specific Conductance	µmhos/cm	0561	WL	09/09/2008	0001	50	-	50	96720		#		
Specific Conductance	µmhos/cm	0584	WL	09/09/2008	0001	18	-	18	7348		#		
Specific Conductance	µmhos/cm	0587	WL	09/09/2008	0001	18	-	18	9649		#		
Specific Conductance	µmhos/cm	0596	WL	09/09/2008	0001	24	-	24	7309		#		
Specific Conductance	µmhos/cm	0600	WL	09/09/2008	0001	27	-	27	13229		#		
Specific Conductance	µmhos/cm	0670	WL	09/11/2008	0001	15.9	-	45.9	18264		#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0673	WL	09/02/2008	0001	16.3	- 46.3	29260			#		
Specific Conductance	µmhos/cm	0674	WL	09/11/2008	0001	15.1	- 45.1	32809			#		
Specific Conductance	µmhos/cm	0677	WL	09/02/2008	0001	15.2	- 45.2	23555			#		
Specific Conductance	µmhos/cm	0679	WL	09/02/2008	0001	15	- 45	19085			#		
Specific Conductance	µmhos/cm	0683	WL	09/10/2008	0001	27	- 27	19413			#		
Specific Conductance	µmhos/cm	0686	WL	09/10/2008	0001	18	- 18	15233			#		
Specific Conductance	µmhos/cm	0687	WL	09/10/2008	0001	28	- 28	13418			#		
Specific Conductance	µmhos/cm	0688	WL	09/10/2008	0001	31	- 31	21542			#		
Specific Conductance	µmhos/cm	0688	WL	09/10/2008	0001	39	- 39	58899			#		
Specific Conductance	µmhos/cm	0689	WL	09/10/2008	0001	46	- 46	88143			#		
Specific Conductance	µmhos/cm	0689	WL	09/10/2008	0001	54	- 54	89589			#		
Specific Conductance	µmhos/cm	0771	WL	09/09/2008	0001	15	- 34.9	30835			#		
Specific Conductance	µmhos/cm	0774	WL	09/09/2008	0001	15.5	- 35.4	25981			#		
Specific Conductance	µmhos/cm	0777	WL	09/09/2008	0001	15.3	- 35.2	22324			#		
Specific Conductance	µmhos/cm	0779	WL	09/09/2008	0001	15.66	- 35.56	32468			#		
Specific Conductance	µmhos/cm	0781	WL	09/03/2008	0001	48	- 48	112357			#		
Specific Conductance	µmhos/cm	0782	WL	09/03/2008	0001	31	- 31	30703			#		
Specific Conductance	µmhos/cm	0786	WL	09/03/2008	0001	28	- 28	24873			#		
Specific Conductance	µmhos/cm	0787	WL	09/03/2008	0001	36	- 36	110741			#		
Sulfate	mg/L	0401	WL	09/10/2008	0001	18	- 18	6500			#	100	
Sulfate	mg/L	0403	WL	09/09/2008	0001	18	- 18	3700			#	50	
Sulfate	mg/L	0405	WL	09/10/2008	0001	18	- 18	4800			#	50	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0407	WL	09/09/2008	0001	17	-	17	2300			#	50	
Sulfate	mg/L	0471	WL	09/02/2008	0001	10.3	-	19.7	6900	N		#	100	
Sulfate	mg/L	0473	WL	09/02/2008	0001	10.3	-	19.7	8300			#	100	
Sulfate	mg/L	0475	WL	09/02/2008	0001	10.3	-	19.7	3400			#	50	
Sulfate	mg/L	0477	WL	09/02/2008	0001	10.3	-	19.7	4300			#	50	
Sulfate	mg/L	0479	WL	09/02/2008	0001	9.3	-	23.6	7100			#	50	
Sulfate	mg/L	0480	WL	09/09/2008	0001	18	-	18	8900			#	100	
Sulfate	mg/L	0484	WL	09/09/2008	0001	28	-	28	7800			#	100	
Sulfate	mg/L	0488	WL	09/10/2008	0001	36	-	36	8800			#	100	
Sulfate	mg/L	0488	WL	09/10/2008	0002	36	-	36	9500			#	100	
Sulfate	mg/L	0493	WL	09/10/2008	0001	54	-	54	14000			#	1000	
Sulfate	mg/L	0547	TS	09/10/2008	0001	0	-	0	7200			#	100	
Sulfate	mg/L	0548	TS	09/10/2008	0001	0	-	0	7200			#	100	
Sulfate	mg/L	0557	WL	09/09/2008	0001	40	-	40	9800			#	100	
Sulfate	mg/L	0561	WL	09/09/2008	0001	50	-	50	7900			#	500	
Sulfate	mg/L	0584	WL	09/09/2008	0001	18	-	18	3000			#	50	
Sulfate	mg/L	0587	WL	09/09/2008	0001	18	-	18	4000			#	50	
Sulfate	mg/L	0596	WL	09/09/2008	0001	24	-	24	2200			#	50	
Sulfate	mg/L	0600	WL	09/09/2008	0001	27	-	27	6600			#	100	
Sulfate	mg/L	0670	WL	09/11/2008	0001	15.9	-	45.9	8100			#	100	
Sulfate	mg/L	0673	WL	09/02/2008	0001	16.3	-	46.3	8900			#	250	
Sulfate	mg/L	0674	WL	09/11/2008	0001	15.1	-	45.1	11000			#	100	
Sulfate	mg/L	0674	WL	09/11/2008	0002	15.1	-	45.1	11000			#	250	
Sulfate	mg/L	0677	WL	09/02/2008	0001	15.2	-	45.2	9500			#	100	
Sulfate	mg/L	0679	WL	09/02/2008	0001	15	-	45	7800			#	100	
Sulfate	mg/L	0683	WL	09/10/2008	0001	27	-	27	9100			#	100	
Sulfate	mg/L	0686	WL	09/10/2008	0001	18	-	18	7400	N		#	100	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site

REPORT DATE: 4/14/2009

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data	QA					
Sulfate	mg/L	0687	WL	09/10/2008	0001	28	-	28	6300		#	100	
Sulfate	mg/L	0688	WL	09/10/2008	0001	39	-	39	12000		#	1000	
Sulfate	mg/L	0689	WL	09/10/2008	0001	54	-	54	9000		#	1000	
Sulfate	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	5800		#	250	
Sulfate	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	9100		#	100	
Sulfate	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	5500		#	100	
Sulfate	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	5700		#	500	
Sulfate	mg/L	0781	WL	09/03/2008	0001	48	-	48	6400		#	1000	
Sulfate	mg/L	0782	WL	09/03/2008	0001	31	-	31	9400		#	250	
Sulfate	mg/L	0786	WL	09/03/2008	0001	28	-	28	11000	N	#	100	
Sulfate	mg/L	0787	WL	09/03/2008	0001	36	-	36	5100		#	250	
Temperature	C	0401	WL	09/10/2008	0001	18	-	18	16.94		#		
Temperature	C	0403	WL	09/09/2008	0001	18	-	18	16.31		#		
Temperature	C	0405	WL	09/10/2008	0001	18	-	18	17.57		#		
Temperature	C	0407	WL	09/09/2008	0001	17	-	17	16.05		#		
Temperature	C	0471	WL	09/02/2008	0001	10.3	-	19.7	16.33		#		
Temperature	C	0473	WL	09/02/2008	0001	10.3	-	19.7	22.98		#		
Temperature	C	0475	WL	09/02/2008	0001	10.3	-	19.7	16		#		
Temperature	C	0477	WL	09/02/2008	0001	10.3	-	19.7	16.58		#		
Temperature	C	0479	WL	09/02/2008	0001	9.3	-	23.6	16.43		#		
Temperature	C	0480	WL	09/09/2008	0001	18	-	18	16.02		#		
Temperature	C	0484	WL	09/09/2008	0001	28	-	28	16.25		#		
Temperature	C	0488	WL	09/10/2008	0001	36	-	36	18.21		#		
Temperature	C	0493	WL	09/10/2008	0001	54	-	54	18.98		#		
Temperature	C	0547	TS	09/10/2008	0001	0	-	0	20.17		#		
Temperature	C	0548	TS	09/10/2008	0001	0	-	0	22.01		#		
Temperature	C	0557	WL	09/09/2008	0001	40	-	40	16.83		#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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		
Temperature	C	0561	WL	09/09/2008	0001	50	-	50	16.42		#		
Temperature	C	0584	WL	09/09/2008	0001	18	-	18	16.62		#		
Temperature	C	0587	WL	09/09/2008	0001	18	-	18	16.56		#		
Temperature	C	0596	WL	09/09/2008	0001	24	-	24	14.79		#		
Temperature	C	0600	WL	09/09/2008	0001	27	-	27	16.34		#		
Temperature	C	0670	WL	09/11/2008	0001	15.9	-	45.9	21.09		#		
Temperature	C	0673	WL	09/02/2008	0001	16.3	-	46.3	15.65		#		
Temperature	C	0674	WL	09/11/2008	0001	15.1	-	45.1	18.5		#		
Temperature	C	0677	WL	09/02/2008	0001	15.2	-	45.2	16.2		#		
Temperature	C	0679	WL	09/02/2008	0001	15	-	45	17.81		#		
Temperature	C	0683	WL	09/10/2008	0001	27	-	27	16.67		#		
Temperature	C	0686	WL	09/10/2008	0001	18	-	18	16.21		#		
Temperature	C	0687	WL	09/10/2008	0001	28	-	28	15.51		#		
Temperature	C	0688	WL	09/10/2008	0001	39	-	39	15.27		#		
Temperature	C	0688	WL	09/10/2008	0001	31	-	31	16.29		#		
Temperature	C	0689	WL	09/10/2008	0001	54	-	54	16.13		#		
Temperature	C	0689	WL	09/10/2008	0001	46	-	46	16.87		#		
Temperature	C	0771	WL	09/09/2008	0001	15	-	34.9	15.63		#		
Temperature	C	0774	WL	09/09/2008	0001	15.5	-	35.4	15.49		#		
Temperature	C	0777	WL	09/09/2008	0001	15.3	-	35.2	15.69		#		
Temperature	C	0779	WL	09/09/2008	0001	15.66	-	35.56	15.24		#		
Temperature	C	0781	WL	09/03/2008	0001	48	-	48	20.11		#		
Temperature	C	0782	WL	09/03/2008	0001	31	-	31	18.78		#		
Temperature	C	0786	WL	09/03/2008	0001	28	-	28	16.57		#		
Temperature	C	0787	WL	09/03/2008	0001	36	-	36	19.16		#		
Total Dissolved Solids	mg/L	0401	WL	09/10/2008	0001	18	-	18	13000		#	400	
Total Dissolved Solids	mg/L	0403	WL	09/09/2008	0001	18	-	18	8200		#	200	

## Appendix C. Water Quality Data (continued)

### September 2008 Monthly Sampling Event – 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	0405	WL	09/10/2008	0001	18	- 18	9100		#	200	
Total Dissolved Solids	mg/L	0407	WL	09/09/2008	0001	17	- 17	5400		#	200	
Total Dissolved Solids	mg/L	0471	WL	09/02/2008	0001	10.3	- 19.7	13000		#	400	
Total Dissolved Solids	mg/L	0473	WL	09/02/2008	0001	10.3	- 19.7	15000		#	400	
Total Dissolved Solids	mg/L	0475	WL	09/02/2008	0001	10.3	- 19.7	6400		#	200	
Total Dissolved Solids	mg/L	0477	WL	09/02/2008	0001	10.3	- 19.7	7500		#	200	
Total Dissolved Solids	mg/L	0479	WL	09/02/2008	0001	9.3	- 23.6	13000		#	200	
Total Dissolved Solids	mg/L	0480	WL	09/09/2008	0001	18	- 18	17000		#	400	
Total Dissolved Solids	mg/L	0484	WL	09/09/2008	0001	28	- 28	20000		#	400	
Total Dissolved Solids	mg/L	0488	WL	09/10/2008	0001	36	- 36	15000		#	400	
Total Dissolved Solids	mg/L	0488	WL	09/10/2008	0002	36	- 36	15000		#	400	
Total Dissolved Solids	mg/L	0493	WL	09/10/2008	0001	54	- 54	28000		#	2000	
Total Dissolved Solids	mg/L	0547	TS	09/10/2008	0001	0	- 0	17000		#	400	
Total Dissolved Solids	mg/L	0548	TS	09/10/2008	0001	0	- 0	17000		#	400	
Total Dissolved Solids	mg/L	0557	WL	09/09/2008	0001	40	- 40	20000		#	400	
Total Dissolved Solids	mg/L	0561	WL	09/09/2008	0001	50	- 50	73000		#	4000	
Total Dissolved Solids	mg/L	0584	WL	09/09/2008	0001	18	- 18	5600		#	200	
Total Dissolved Solids	mg/L	0587	WL	09/09/2008	0001	18	- 18	8600		#	200	
Total Dissolved Solids	mg/L	0596	WL	09/09/2008	0001	24	- 24	4400		#	200	
Total Dissolved Solids	mg/L	0600	WL	09/09/2008	0001	27	- 27	11000		#	200	
Total Dissolved Solids	mg/L	0670	WL	09/11/2008	0001	15.9	- 45.9	14000		#	200	
Total Dissolved Solids	mg/L	0673	WL	09/02/2008	0001	16.3	- 46.3	23000		#	400	
Total Dissolved Solids	mg/L	0674	WL	09/11/2008	0001	15.1	- 45.1	24000		#	400	
Total Dissolved Solids	mg/L	0674	WL	09/11/2008	0002	15.1	- 45.1	25000		#	400	
Total Dissolved Solids	mg/L	0677	WL	09/02/2008	0001	15.2	- 45.2	19000		#	400	
Total Dissolved Solids	mg/L	0679	WL	09/02/2008	0001	15	- 45	15000		#	400	
Total Dissolved Solids	mg/L	0683	WL	09/10/2008	0001	27	- 27	17000		#	400	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site

REPORT DATE: 4/14/2009

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers		Detection Limit	Uncertainty
						Lab	Data	QA					
Total Dissolved Solids	mg/L	0686	WL	09/10/2008	0001	18	-	18	13000		#	400	
Total Dissolved Solids	mg/L	0687	WL	09/10/2008	0001	28	-	28	11000		#	200	
Total Dissolved Solids	mg/L	0688	WL	09/10/2008	0001	39	-	39	45000		#	4000	
Total Dissolved Solids	mg/L	0689	WL	09/10/2008	0001	54	-	54	69000		#	2000	
Total Dissolved Solids	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	23000		#	400	
Total Dissolved Solids	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	21000		#	400	
Total Dissolved Solids	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	15000		#	400	
Total Dissolved Solids	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	24000		#	8000	
Total Dissolved Solids	mg/L	0781	WL	09/03/2008	0001	48	-	48	89000		#	2000	
Total Dissolved Solids	mg/L	0782	WL	09/03/2008	0001	31	-	31	24000		#	400	
Total Dissolved Solids	mg/L	0786	WL	09/03/2008	0001	28	-	28	20000		#	400	
Total Dissolved Solids	mg/L	0787	WL	09/03/2008	0001	36	-	36	85000		#	4000	
Turbidity	NTU	0401	WL	09/10/2008	0001	18	-	18	3		#		
Turbidity	NTU	0403	WL	09/09/2008	0001	18	-	18	1.28		#		
Turbidity	NTU	0405	WL	09/10/2008	0001	18	-	18	1.11		#		
Turbidity	NTU	0407	WL	09/09/2008	0001	17	-	17	0.86		#		
Turbidity	NTU	0471	WL	09/02/2008	0001	10.3	-	19.7	30.6		#		
Turbidity	NTU	0473	WL	09/02/2008	0001	10.3	-	19.7	9.9		#		
Turbidity	NTU	0475	WL	09/02/2008	0001	10.3	-	19.7	2.76		#		
Turbidity	NTU	0477	WL	09/02/2008	0001	10.3	-	19.7	2.13		#		
Turbidity	NTU	0479	WL	09/02/2008	0001	9.3	-	23.6	2.93		#		
Turbidity	NTU	0480	WL	09/09/2008	0001	18	-	18	1.09		#		
Turbidity	NTU	0484	WL	09/09/2008	0001	28	-	28	6.33		#		
Turbidity	NTU	0488	WL	09/10/2008	0001	36	-	36	0.53		#		
Turbidity	NTU	0493	WL	09/10/2008	0001	54	-	54	4.27		#		
Turbidity	NTU	0547	TS	09/10/2008	0001	0	-	0	7.13		#		
Turbidity	NTU	0548	TS	09/10/2008	0001	0	-	0	23.2		#		

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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		
Turbidity	NTU	0557	WL	09/09/2008	0001	40	-	40	1.7		#		
Turbidity	NTU	0561	WL	09/09/2008	0001	50	-	50	1.18		#		
Turbidity	NTU	0584	WL	09/09/2008	0001	18	-	18	0.97		#		
Turbidity	NTU	0587	WL	09/09/2008	0001	18	-	18	3.08		#		
Turbidity	NTU	0596	WL	09/09/2008	0001	24	-	24	1.22		#		
Turbidity	NTU	0600	WL	09/09/2008	0001	27	-	27	1.68		#		
Turbidity	NTU	0670	WL	09/11/2008	0001	15.9	-	45.9	2.33		#		
Turbidity	NTU	0673	WL	09/02/2008	0001	16.3	-	46.3	6.31		#		
Turbidity	NTU	0674	WL	09/11/2008	0001	15.1	-	45.1	1.16		#		
Turbidity	NTU	0677	WL	09/02/2008	0001	15.2	-	45.2	4.75		#		
Turbidity	NTU	0679	WL	09/02/2008	0001	15	-	45	2.9		#		
Turbidity	NTU	0683	WL	09/10/2008	0001	27	-	27	4.74		#		
Turbidity	NTU	0686	WL	09/10/2008	0001	18	-	18	1.99		#		
Turbidity	NTU	0687	WL	09/10/2008	0001	28	-	28	4.55		#		
Turbidity	NTU	0688	WL	09/10/2008	0001	31	-	31	1.63		#		
Turbidity	NTU	0688	WL	09/10/2008	0001	39	-	39	3.61		#		
Turbidity	NTU	0689	WL	09/10/2008	0001	46	-	46	1.89		#		
Turbidity	NTU	0689	WL	09/10/2008	0001	54	-	54	2.83		#		
Turbidity	NTU	0771	WL	09/09/2008	0001	15	-	34.9	1.53		#		
Turbidity	NTU	0774	WL	09/09/2008	0001	15.5	-	35.4	2.41		#		
Turbidity	NTU	0777	WL	09/09/2008	0001	15.3	-	35.2	6.47		#		
Turbidity	NTU	0779	WL	09/09/2008	0001	15.66	-	35.56	5.65		#		
Turbidity	NTU	0781	WL	09/03/2008	0001	48	-	48	2.33		#		
Turbidity	NTU	0782	WL	09/03/2008	0001	31	-	31	3.73		#		
Turbidity	NTU	0786	WL	09/03/2008	0001	28	-	28	1.4		#		
Turbidity	NTU	0787	WL	09/03/2008	0001	36	-	36	1.02		#		
Uranium	mg/L	0401	WL	09/10/2008	0001	18	-	18	3		#	0.00045	

## Appendix C. Water Quality Data (continued)

September 2008 Monthly Sampling Event – 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	0403	WL	09/09/2008	0001	18	- 18	1.1		#	0.00022	
Uranium	mg/L	0405	WL	09/10/2008	0001	18	- 18	1.6		#	0.00022	
Uranium	mg/L	0407	WL	09/09/2008	0001	17	- 17	0.55		#	9.E-005	
Uranium	mg/L	0471	WL	09/02/2008	0001	10.3	- 19.7	2		#	0.00022	
Uranium	mg/L	0473	WL	09/02/2008	0001	10.3	- 19.7	2.8		#	0.00022	
Uranium	mg/L	0475	WL	09/02/2008	0001	10.3	- 19.7	1.3		#	0.00022	
Uranium	mg/L	0477	WL	09/02/2008	0001	10.3	- 19.7	1.5		#	0.00022	
Uranium	mg/L	0479	WL	09/02/2008	0001	9.3	- 23.6	2.6		#	0.00022	
Uranium	mg/L	0480	WL	09/09/2008	0001	18	- 18	2.8		#	0.00045	
Uranium	mg/L	0484	WL	09/09/2008	0001	28	- 28	2.7		#	0.00045	
Uranium	mg/L	0488	WL	09/10/2008	0001	36	- 36	1.9		#	0.00045	
Uranium	mg/L	0488	WL	09/10/2008	0002	36	- 36	1.8		#	0.00022	
Uranium	mg/L	0493	WL	09/10/2008	0001	54	- 54	2.9		#	0.00045	
Uranium	mg/L	0547	TS	09/10/2008	0001	0	- 0	2		#	0.00045	
Uranium	mg/L	0548	TS	09/10/2008	0001	0	- 0	2.2		#	0.00045	
Uranium	mg/L	0557	WL	09/09/2008	0001	40	- 40	2.9		#	0.00045	
Uranium	mg/L	0561	WL	09/09/2008	0001	50	- 50	1.1		#	0.00022	
Uranium	mg/L	0584	WL	09/09/2008	0001	18	- 18	1.3		#	0.00022	
Uranium	mg/L	0587	WL	09/09/2008	0001	18	- 18	1.4		#	0.00022	
Uranium	mg/L	0596	WL	09/09/2008	0001	24	- 24	0.72		#	9.E-005	
Uranium	mg/L	0600	WL	09/09/2008	0001	27	- 27	1.9		#	0.00045	
Uranium	mg/L	0670	WL	09/11/2008	0001	15.9	- 45.9	2.3		#	0.00045	
Uranium	mg/L	0673	WL	09/02/2008	0001	16.3	- 46.3	2.1		#	0.00022	
Uranium	mg/L	0674	WL	09/11/2008	0001	15.1	- 45.1	2.4		#	0.00045	
Uranium	mg/L	0674	WL	09/11/2008	0002	15.1	- 45.1	2.3		#	0.00045	
Uranium	mg/L	0677	WL	09/02/2008	0001	15.2	- 45.2	2.3		#	0.00022	
Uranium	mg/L	0679	WL	09/02/2008	0001	15	- 45	2.2		#	0.00022	

## Appendix C. Water Quality Data (continued)

### September 2008 Monthly Sampling Event – 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		
Uranium	mg/L	0683	WL	09/10/2008	0001	27	-	27	2.5		#	0.00045	
Uranium	mg/L	0686	WL	09/10/2008	0001	18	-	18	2.4		#	0.00045	
Uranium	mg/L	0687	WL	09/10/2008	0001	28	-	28	2		#	0.00045	
Uranium	mg/L	0688	WL	09/10/2008	0001	39	-	39	2.3		#	0.00045	
Uranium	mg/L	0689	WL	09/10/2008	0001	54	-	54	1.3		#	0.00045	
Uranium	mg/L	0771	WL	09/09/2008	0001	15	-	34.9	1.6		#	0.00045	
Uranium	mg/L	0774	WL	09/09/2008	0001	15.5	-	35.4	2.4		#	0.00045	
Uranium	mg/L	0777	WL	09/09/2008	0001	15.3	-	35.2	1.6		#	0.00022	
Uranium	mg/L	0779	WL	09/09/2008	0001	15.66	-	35.56	1.5		#	0.00022	
Uranium	mg/L	0781	WL	09/03/2008	0001	48	-	48	0.35		#	4.5E-005	
Uranium	mg/L	0782	WL	09/03/2008	0001	31	-	31	2.3		#	0.00022	
Uranium	mg/L	0786	WL	09/03/2008	0001	28	-	28	2.8		#	0.00022	
Uranium	mg/L	0787	WL	09/03/2008	0001	36	-	36	0.17		#	2.2E-005	

Note: BLS = below land surface; C = centigrade;  $\mu\text{mhos/cm}$  = micromhos per centimeter; mg/L = milligrams per liter; 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  $\mu\text{m}$ ). 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.
- 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: TIC.
- 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 C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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		
Alkalinity, Total (As CaCO3)	mg/L	0216	SL	09/30/2008	0001	0	-	0	140			#		
Alkalinity, Total (As CaCO3)	mg/L	0243	SL	09/30/2008	0001	0	-	0	155			#		
Alkalinity, Total (As CaCO3)	mg/L	0405	WL	09/30/2008	0001	18	-	18	594			#		
Alkalinity, Total (As CaCO3)	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	576			#		
Alkalinity, Total (As CaCO3)	mg/L	0480	WL	09/29/2008	0001	18	-	18	830			#		
Alkalinity, Total (As CaCO3)	mg/L	0482	WL	09/29/2008	0001	55	-	55	345			#		
Alkalinity, Total (As CaCO3)	mg/L	0483	WL	09/29/2008	0001	18	-	18	527			#		
Alkalinity, Total (As CaCO3)	mg/L	0485	WL	09/29/2008	0001	55	-	55	302			#		
Alkalinity, Total (As CaCO3)	mg/L	0488	WL	09/30/2008	0001	36	-	36	780			#		
Alkalinity, Total (As CaCO3)	mg/L	0493	WL	09/30/2008	0001	55	-	55	1117			#		
Alkalinity, Total (As CaCO3)	mg/L	0557	WL	09/29/2008	0001	36	-	36	820			#		
Alkalinity, Total (As CaCO3)	mg/L	0558	WL	09/29/2008	0001	36	-	36	862			#		
Alkalinity, Total (As CaCO3)	mg/L	0559	WL	09/30/2008	0001	18	-	18	416			#		
Alkalinity, Total (As CaCO3)	mg/L	0560	WL	09/30/2008	0001	36	-	36	778			#		
Alkalinity, Total (As CaCO3)	mg/L	0561	WL	09/29/2008	0001	55	-	55	331			#		
Alkalinity, Total (As CaCO3)	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	594			#		
Alkalinity, Total (As CaCO3)	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	1118			#		
Alkalinity, Total (As CaCO3)	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	633			#		
Ammonia Total as N	mg/L	0216	SL	09/30/2008	0001	0	-	0	0.31		J	#	0.1	
Ammonia Total as N	mg/L	0243	SL	09/30/2008	0001	0	-	0	0.27		J	#	0.1	
Ammonia Total as N	mg/L	0405	WL	09/30/2008	0001	18	-	18	150			#	20	
Ammonia Total as N	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	210			#	20	
Ammonia Total as N	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	210			#	20	
Ammonia Total as N	mg/L	0480	WL	09/29/2008	0001	18	-	18	410			#	20	
Ammonia Total as N	mg/L	0482	WL	09/29/2008	0001	55	-	55	940			#	20	
Ammonia Total as N	mg/L	0483	WL	09/29/2008	0001	18	-	18	270			#	20	

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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				
Ammonia Total as N	mg/L	0485	WL	09/29/2008	0001	55	-	55	750			#	20	
Ammonia Total as N	mg/L	0488	WL	09/30/2008	0001	36	-	36	640			#	20	
Ammonia Total as N	mg/L	0493	WL	09/30/2008	0001	55	-	55	930			#	20	
Ammonia Total as N	mg/L	0557	WL	09/29/2008	0001	36	-	36	510			#	20	
Ammonia Total as N	mg/L	0558	WL	09/29/2008	0001	36	-	36	800			#	20	
Ammonia Total as N	mg/L	0559	WL	09/30/2008	0001	18	-	18	87			#	20	
Ammonia Total as N	mg/L	0560	WL	09/30/2008	0001	36	-	36	1200			#	50	
Ammonia Total as N	mg/L	0561	WL	09/29/2008	0001	55	-	55	960			#	20	
Ammonia Total as N	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	280			#	20	
Ammonia Total as N	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	940			#	20	
Ammonia Total as N	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	280			#	20	
Calcium	mg/L	0216	SL	09/30/2008	0001	0	-	0	99	E	J	#	0.014	
Calcium	mg/L	0243	SL	09/30/2008	0001	0	-	0	95		J	#	0.014	
Calcium	mg/L	0405	WL	09/30/2008	0001	18	-	18	270		J	#	0.072	
Calcium	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	260		J	#	0.072	
Calcium	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	260		J	#	0.072	
Calcium	mg/L	0480	WL	09/29/2008	0001	18	-	18	360			#	0.14	
Calcium	mg/L	0482	WL	09/29/2008	0001	55	-	55	1200			#	1.4	
Calcium	mg/L	0483	WL	09/29/2008	0001	18	-	18	460			#	0.14	
Calcium	mg/L	0485	WL	09/29/2008	0001	55	-	55	1300			#	0.72	
Calcium	mg/L	0488	WL	09/30/2008	0001	36	-	36	410			#	0.14	
Calcium	mg/L	0493	WL	09/30/2008	0001	55	-	55	450			#	0.36	
Calcium	mg/L	0557	WL	09/29/2008	0001	36	-	36	440			#	0.14	
Calcium	mg/L	0558	WL	09/29/2008	0001	36	-	36	460			#	0.72	
Calcium	mg/L	0559	WL	09/30/2008	0001	18	-	18	550		J	#	0.072	
Calcium	mg/L	0560	WL	09/30/2008	0001	36	-	36	590			#	0.72	
Calcium	mg/L	0561	WL	09/29/2008	0001	55	-	55	1200			#	0.72	

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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		
Calcium	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	420		#	0.14	
Calcium	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	430		#	0.36	
Calcium	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	450		#	0.14	
Chloride	mg/L	0216	SL	09/30/2008	0001	0	-	0	100	J	#	20	
Chloride	mg/L	0243	SL	09/30/2008	0001	0	-	0	99	J	#	2	
Chloride	mg/L	0405	WL	09/30/2008	0001	18	-	18	610		#	20	
Chloride	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	1200		#	20	
Chloride	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	1200		#	20	
Chloride	mg/L	0480	WL	09/29/2008	0001	18	-	18	2700		#	40	
Chloride	mg/L	0482	WL	09/29/2008	0001	55	-	55	50000		#	1000	
Chloride	mg/L	0483	WL	09/29/2008	0001	18	-	18	2400		#	40	
Chloride	mg/L	0485	WL	09/29/2008	0001	55	-	55	54000		#	1000	
Chloride	mg/L	0488	WL	09/30/2008	0001	36	-	36	1500		#	40	
Chloride	mg/L	0493	WL	09/30/2008	0001	55	-	55	6000		#	100	
Chloride	mg/L	0557	WL	09/29/2008	0001	36	-	36	4600		#	100	
Chloride	mg/L	0558	WL	09/29/2008	0001	36	-	36	8200		#	400	
Chloride	mg/L	0559	WL	09/30/2008	0001	18	-	18	1500		#	20	
Chloride	mg/L	0560	WL	09/30/2008	0001	36	-	36	16000		#	400	
Chloride	mg/L	0561	WL	09/29/2008	0001	55	-	55	48000		#	1000	
Chloride	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	1000		#	40	
Chloride	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	5900		#	100	
Chloride	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	1200		#	40	
Dissolved Oxygen	mg/L	0216	SL	09/30/2008	0001	0	-	0	9.43		#		
Dissolved Oxygen	mg/L	0243	SL	09/30/2008	0001	0	-	0	9.64		#		
Dissolved Oxygen	mg/L	0405	WL	09/30/2008	0001	18	-	18	0.54		#		
Dissolved Oxygen	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	3.56		#		

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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		
Dissolved Oxygen	mg/L	0480	WL	09/29/2008	0001	18	-	18			#	
Dissolved Oxygen	mg/L	0482	WL	09/29/2008	0001	55	-	55			#	
Dissolved Oxygen	mg/L	0483	WL	09/29/2008	0001	18	-	18			#	
Dissolved Oxygen	mg/L	0485	WL	09/29/2008	0001	55	-	55			#	
Dissolved Oxygen	mg/L	0488	WL	09/30/2008	0001	36	-	36			#	
Dissolved Oxygen	mg/L	0493	WL	09/30/2008	0001	55	-	55			#	
Dissolved Oxygen	mg/L	0557	WL	09/29/2008	0001	36	-	36			#	
Dissolved Oxygen	mg/L	0558	WL	09/29/2008	0001	36	-	36			#	
Dissolved Oxygen	mg/L	0559	WL	09/30/2008	0001	18	-	18			#	
Dissolved Oxygen	mg/L	0560	WL	09/30/2008	0001	36	-	36			#	
Dissolved Oxygen	mg/L	0561	WL	09/29/2008	0001	55	-	55			#	
Dissolved Oxygen	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36			#	
Dissolved Oxygen	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55			#	
Dissolved Oxygen	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18			#	
Magnesium	mg/L	0216	SL	09/30/2008	0001	0	-	0		J	#	0.0089
Magnesium	mg/L	0243	SL	09/30/2008	0001	0	-	0		J	#	0.0089
Magnesium	mg/L	0405	WL	09/30/2008	0001	18	-	18			#	0.045
Magnesium	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7			#	0.045
Magnesium	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7			#	0.045
Magnesium	mg/L	0480	WL	09/29/2008	0001	18	-	18			#	0.089
Magnesium	mg/L	0482	WL	09/29/2008	0001	55	-	55			#	0.89
Magnesium	mg/L	0483	WL	09/29/2008	0001	18	-	18			#	0.089
Magnesium	mg/L	0485	WL	09/29/2008	0001	55	-	55			#	0.45
Magnesium	mg/L	0488	WL	09/30/2008	0001	36	-	36			#	0.089
Magnesium	mg/L	0493	WL	09/30/2008	0001	55	-	55			#	0.22
Magnesium	mg/L	0557	WL	09/29/2008	0001	36	-	36			#	0.089
Magnesium	mg/L	0558	WL	09/29/2008	0001	36	-	36			#	0.45

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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		
Magnesium	mg/L	0559	WL	09/30/2008	0001	18	- 18	260		#	0.045	
Magnesium	mg/L	0560	WL	09/30/2008	0001	36	- 36	600		#	0.45	
Magnesium	mg/L	0561	WL	09/29/2008	0001	55	- 55	750		#	0.45	
Magnesium	mg/L	SMI-PW01	WL	09/30/2008	0001	36	- 36	470		#	0.089	
Magnesium	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	- 55	940		#	0.22	
Magnesium	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	- 18	470		#	0.089	
Manganese	mg/L	0216	SL	09/30/2008	0001	0	- 0	0.037		J #	0.0002	
Manganese	mg/L	0243	SL	09/30/2008	0001	0	- 0	0.008		J #	0.0002	
Manganese	mg/L	0405	WL	09/30/2008	0001	18	- 18	3.1		#	0.001	
Manganese	mg/L	0474	WL	09/30/2008	0001	10.3	- 19.7	2.4		#	0.001	
Manganese	mg/L	0474	WL	09/30/2008	0002	10.3	- 19.7	2.4		#	0.001	
Manganese	mg/L	0480	WL	09/29/2008	0001	18	- 18	4.1		#	0.002	
Manganese	mg/L	0482	WL	09/29/2008	0001	55	- 55	8.1		#	0.02	
Manganese	mg/L	0483	WL	09/29/2008	0001	18	- 18	3.3		#	0.002	
Manganese	mg/L	0485	WL	09/29/2008	0001	55	- 55	7.3		#	0.01	
Manganese	mg/L	0488	WL	09/30/2008	0001	36	- 36	5.7		#	0.002	
Manganese	mg/L	0493	WL	09/30/2008	0001	55	- 55	8.5		#	0.0051	
Manganese	mg/L	0557	WL	09/29/2008	0001	36	- 36	5		#	0.002	
Manganese	mg/L	0558	WL	09/29/2008	0001	36	- 36	4.7		#	0.01	
Manganese	mg/L	0559	WL	09/30/2008	0001	18	- 18	4.1		#	0.001	
Manganese	mg/L	0560	WL	09/30/2008	0001	36	- 36	5.6		#	0.01	
Manganese	mg/L	0561	WL	09/29/2008	0001	55	- 55	7.7		#	0.01	
Manganese	mg/L	SMI-PW01	WL	09/30/2008	0001	36	- 36	4.8		#	0.002	
Manganese	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	- 55	7.9		#	0.0051	
Manganese	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	- 18	5.3		#	0.002	
Oxidation Reduction Potential	mV	0216	SL	09/30/2008	0001	0	- 0	-19		#		

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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	0243	SL	09/30/2008	0001	0	-	0	-12.2		#		
Oxidation Reduction Potential	mV	0405	WL	09/30/2008	0001	18	-	18	27		#		
Oxidation Reduction Potential	mV	0474	WL	09/30/2008	0001	10.3	-	19.7	27		#		
Oxidation Reduction Potential	mV	0480	WL	09/29/2008	0001	18	-	18	-26		#		
Oxidation Reduction Potential	mV	0482	WL	09/29/2008	0001	55	-	55	7		#		
Oxidation Reduction Potential	mV	0483	WL	09/29/2008	0001	18	-	18	-22		#		
Oxidation Reduction Potential	mV	0485	WL	09/29/2008	0001	55	-	55	7		#		
Oxidation Reduction Potential	mV	0488	WL	09/30/2008	0001	36	-	36	37		#		
Oxidation Reduction Potential	mV	0493	WL	09/30/2008	0001	55	-	55	59		#		
Oxidation Reduction Potential	mV	0557	WL	09/29/2008	0001	36	-	36	-7		#		
Oxidation Reduction Potential	mV	0558	WL	09/29/2008	0001	36	-	36	0.4		#		
Oxidation Reduction Potential	mV	0559	WL	09/30/2008	0001	18	-	18	18		#		
Oxidation Reduction Potential	mV	0560	WL	09/30/2008	0001	36	-	36	66		#		
Oxidation Reduction Potential	mV	0561	WL	09/29/2008	0001	55	-	55	1.8		#		
Oxidation Reduction Potential	mV	SMI-PW01	WL	09/30/2008	0001	36	-	36	-52		#		
Oxidation Reduction Potential	mV	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	-14		#		
Oxidation Reduction Potential	mV	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	23		#		
pH	s.u.	0216	SL	09/30/2008	0001	0	-	0	8.66		#		
pH	s.u.	0243	SL	09/30/2008	0001	0	-	0	8.63		#		
pH	s.u.	0405	WL	09/30/2008	0001	18	-	18	6.88		#		
pH	s.u.	0474	WL	09/30/2008	0001	10.3	-	19.7	6.98		#		
pH	s.u.	0480	WL	09/29/2008	0001	18	-	18	6.81		#		
pH	s.u.	0482	WL	09/29/2008	0001	55	-	55	6.41		#		
pH	s.u.	0483	WL	09/29/2008	0001	18	-	18	6.78		#		

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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				
pH	s.u.	0485	WL	09/29/2008	0001	55	-	55	6.49			#		
pH	s.u.	0488	WL	09/30/2008	0001	36	-	36	6.89			#		
pH	s.u.	0493	WL	09/30/2008	0001	55	-	55	6.82			#		
pH	s.u.	0557	WL	09/29/2008	0001	36	-	36	6.81			#		
pH	s.u.	0558	WL	09/29/2008	0001	36	-	36	6.7			#		
pH	s.u.	0559	WL	09/30/2008	0001	18	-	18	6.89			#		
pH	s.u.	0560	WL	09/30/2008	0001	36	-	36	6.86			#		
pH	s.u.	0561	WL	09/29/2008	0001	55	-	55	6.49			#		
pH	s.u.	SMI-PW01	WL	09/30/2008	0001	36	-	36	6.79			#		
pH	s.u.	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	6.78			#		
pH	s.u.	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	6.73			#		
Potassium	mg/L	0216	SL	09/30/2008	0001	0	-	0	5.6	EN	J	#	0.026	
Potassium	mg/L	0243	SL	09/30/2008	0001	0	-	0	5.3		J	#	0.026	
Potassium	mg/L	0405	WL	09/30/2008	0001	18	-	18	59		J	#	0.13	
Potassium	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	81		J	#	0.13	
Potassium	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	81		J	#	0.13	
Potassium	mg/L	0480	WL	09/29/2008	0001	18	-	18	150		J	#	0.26	
Potassium	mg/L	0482	WL	09/29/2008	0001	55	-	55	1000		J	#	2.6	
Potassium	mg/L	0483	WL	09/29/2008	0001	18	-	18	130		J	#	0.26	
Potassium	mg/L	0485	WL	09/29/2008	0001	55	-	55	1100		J	#	1.3	
Potassium	mg/L	0488	WL	09/30/2008	0001	36	-	36	190		J	#	0.26	
Potassium	mg/L	0493	WL	09/30/2008	0001	55	-	55	320		J	#	0.66	
Potassium	mg/L	0557	WL	09/29/2008	0001	36	-	36	200		J	#	0.26	
Potassium	mg/L	0558	WL	09/29/2008	0001	36	-	36	380		J	#	1.3	
Potassium	mg/L	0559	WL	09/30/2008	0001	18	-	18	57		J	#	0.13	
Potassium	mg/L	0560	WL	09/30/2008	0001	36	-	36	510		J	#	1.3	
Potassium	mg/L	0561	WL	09/29/2008	0001	55	-	55	1100		J	#	1.3	

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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		
Potassium	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	95		J	#	0.26	
Potassium	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	300		J	#	0.66	
Potassium	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	87		J	#	0.26	
Selenium	mg/L	0405	WL	09/30/2008	0001	18	-	18	0.015			#	0.00012	
Sodium	mg/L	0216	SL	09/30/2008	0001	0	-	0	90	E	J	#	0.0018	
Sodium	mg/L	0243	SL	09/30/2008	0001	0	-	0	84		J	#	0.0018	
Sodium	mg/L	0405	WL	09/30/2008	0001	18	-	18	1000		J	#	0.0092	
Sodium	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	1100		J	#	0.0092	
Sodium	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	1100		J	#	0.0092	
Sodium	mg/L	0480	WL	09/29/2008	0001	18	-	18	2500		J	#	0.046	
Sodium	mg/L	0482	WL	09/29/2008	0001	55	-	55	23000		J	#	0.18	
Sodium	mg/L	0483	WL	09/29/2008	0001	18	-	18	1900		J	#	0.018	
Sodium	mg/L	0485	WL	09/29/2008	0001	55	-	55	25000		J	#	0.92	
Sodium	mg/L	0488	WL	09/30/2008	0001	36	-	36	2300		J	#	0.018	
Sodium	mg/L	0493	WL	09/30/2008	0001	55	-	55	5300		J	#	0.046	
Sodium	mg/L	0557	WL	09/29/2008	0001	36	-	36	3600		J	#	0.092	
Sodium	mg/L	0558	WL	09/29/2008	0001	36	-	36	5000		J	#	0.092	
Sodium	mg/L	0559	WL	09/30/2008	0001	18	-	18	1100		J	#	0.0092	
Sodium	mg/L	0560	WL	09/30/2008	0001	36	-	36	8200		J	#	0.092	
Sodium	mg/L	0561	WL	09/29/2008	0001	55	-	55	24000			#	0.92	
Sodium	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	1800		J	#	0.018	
Sodium	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	5100		J	#	0.046	
Sodium	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	1800		J	#	0.018	
Specific Conductance	µmhos/cm	0216	SL	09/30/2008	0001	0	-	0	1093			#		
Specific Conductance	µmhos/cm	0243	SL	09/30/2008	0001	0	-	0	1256			#		
Specific Conductance	µmhos/cm	0405	WL	09/30/2008	0001	18	-	18	7838			#		

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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	0474	WL	09/30/2008	0001	10.3	-	19.7	8651		#		
Specific Conductance	µmhos/cm	0480	WL	09/29/2008	0001	18	-	18	18419		#		
Specific Conductance	µmhos/cm	0482	WL	09/29/2008	0001	55	-	55	104669		#		
Specific Conductance	µmhos/cm	0483	WL	09/29/2008	0001	18	-	18	13555		#		
Specific Conductance	µmhos/cm	0485	WL	09/29/2008	0001	55	-	55	105643		#		
Specific Conductance	µmhos/cm	0488	WL	09/30/2008	0001	36	-	36	17750		#		
Specific Conductance	µmhos/cm	0493	WL	09/30/2008	0001	55	-	55	33036		#		
Specific Conductance	µmhos/cm	0557	WL	09/29/2008	0001	36	-	36	23284		#		
Specific Conductance	µmhos/cm	0558	WL	09/29/2008	0001	36	-	36	31920		#		
Specific Conductance	µmhos/cm	0559	WL	09/30/2008	0001	18	-	18	9480		#		
Specific Conductance	µmhos/cm	0560	WL	09/30/2008	0001	36	-	36	47472		#		
Specific Conductance	µmhos/cm	0561	WL	09/29/2008	0001	55	-	55	101616		#		
Specific Conductance	µmhos/cm	SMI-PW01	WL	09/30/2008	0001	36	-	36	13430		#		
Specific Conductance	µmhos/cm	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	31311		#		
Specific Conductance	µmhos/cm	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	13669		#		
Sulfate	mg/L	0216	SL	09/30/2008	0001	0	-	0	310	J	#	50	
Sulfate	mg/L	0243	SL	09/30/2008	0001	0	-	0	300	J	#	5	
Sulfate	mg/L	0405	WL	09/30/2008	0001	18	-	18	3700		#	50	
Sulfate	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	3400		#	50	
Sulfate	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	3500		#	50	
Sulfate	mg/L	0480	WL	09/29/2008	0001	18	-	18	7600		#	100	
Sulfate	mg/L	0482	WL	09/29/2008	0001	55	-	55	7900		#	250	
Sulfate	mg/L	0483	WL	09/29/2008	0001	18	-	18	5200		#	100	
Sulfate	mg/L	0485	WL	09/29/2008	0001	55	-	55	7500		#	250	

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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	0488	WL	09/30/2008	0001	36	-	36	9500		#	100	
Sulfate	mg/L	0493	WL	09/30/2008	0001	55	-	55	16000		#	250	
Sulfate	mg/L	0557	WL	09/29/2008	0001	36	-	36	9700		#	100	
Sulfate	mg/L	0558	WL	09/29/2008	0001	36	-	36	11000		#	1000	
Sulfate	mg/L	0559	WL	09/30/2008	0001	18	-	18	3700		#	50	
Sulfate	mg/L	0560	WL	09/30/2008	0001	36	-	36	10000		#	1000	
Sulfate	mg/L	0561	WL	09/29/2008	0001	55	-	55	8700		#	250	
Sulfate	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	6500		#	100	
Sulfate	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	16000		#	250	
Sulfate	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	6900		#	100	
Temperature	C	0216	SL	09/30/2008	0001	0	-	0	21.49		#		
Temperature	C	0243	SL	09/30/2008	0001	0	-	0	21.73		#		
Temperature	C	0405	WL	09/30/2008	0001	18	-	18	17.49		#		
Temperature	C	0474	WL	09/30/2008	0001	10.3	-	19.7	16.79		#		
Temperature	C	0480	WL	09/29/2008	0001	18	-	18	17.2		#		
Temperature	C	0482	WL	09/29/2008	0001	55	-	55	18.23		#		
Temperature	C	0483	WL	09/29/2008	0001	18	-	18	17.36		#		
Temperature	C	0485	WL	09/29/2008	0001	55	-	55	18.56		#		
Temperature	C	0488	WL	09/30/2008	0001	36	-	36	17.34		#		
Temperature	C	0493	WL	09/30/2008	0001	55	-	55	17.51		#		
Temperature	C	0557	WL	09/29/2008	0001	36	-	36	17.42		#		
Temperature	C	0558	WL	09/29/2008	0001	36	-	36	18.26		#		
Temperature	C	0559	WL	09/30/2008	0001	18	-	18	14.88		#		
Temperature	C	0560	WL	09/30/2008	0001	36	-	36	14.54		#		
Temperature	C	0561	WL	09/29/2008	0001	55	-	55	17.97		#		
Temperature	C	SMI-PW01	WL	09/30/2008	0001	36	-	36	24.13		#		

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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		
Temperature	C	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	19.59			#		
Temperature	C	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	19.78			#		
Total Dissolved Solids	mg/L	0216	SL	09/30/2008	0001	0	-	0	710		J	#	20	
Total Dissolved Solids	mg/L	0243	SL	09/30/2008	0001	0	-	0	700		J	#	20	
Total Dissolved Solids	mg/L	0405	WL	09/30/2008	0001	18	-	18	6400			#	200	
Total Dissolved Solids	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	6500			#	200	
Total Dissolved Solids	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	6600			#	200	
Total Dissolved Solids	mg/L	0480	WL	09/29/2008	0001	18	-	18	14000			#	400	
Total Dissolved Solids	mg/L	0482	WL	09/29/2008	0001	55	-	55	81000			#	2000	
Total Dissolved Solids	mg/L	0483	WL	09/29/2008	0001	18	-	18	10000			#	200	
Total Dissolved Solids	mg/L	0485	WL	09/29/2008	0001	55	-	55	84000			#	2000	
Total Dissolved Solids	mg/L	0488	WL	09/30/2008	0001	36	-	36	15000			#	400	
Total Dissolved Solids	mg/L	0493	WL	09/30/2008	0001	55	-	55	28000			#	1000	
Total Dissolved Solids	mg/L	0557	WL	09/29/2008	0001	36	-	36	20000			#	400	
Total Dissolved Solids	mg/L	0558	WL	09/29/2008	0001	36	-	36	24000			#	2000	
Total Dissolved Solids	mg/L	0559	WL	09/30/2008	0001	18	-	18	7800			#	200	
Total Dissolved Solids	mg/L	0560	WL	09/30/2008	0001	36	-	36	34000			#	2000	
Total Dissolved Solids	mg/L	0561	WL	09/29/2008	0001	55	-	55	78000			#	2000	
Total Dissolved Solids	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	11000			#	200	
Total Dissolved Solids	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	28000			#	400	
Total Dissolved Solids	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	12000			#	200	
Turbidity	NTU	0216	SL	09/30/2008	0001	0	-	0	20.8			#		
Turbidity	NTU	0243	SL	09/30/2008	0001	0	-	0	16.5			#		
Turbidity	NTU	0405	WL	09/30/2008	0001	18	-	18	1.11			#		
Turbidity	NTU	0474	WL	09/30/2008	0001	10.3	-	19.7	2.55			#		
Turbidity	NTU	0480	WL	09/29/2008	0001	18	-	18	0.11			#		

## Appendix C. Water Quality Data (continued)

September 2008 GW/SW Investigation – 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					
Turbidity	NTU	0482	WL	09/29/2008	0001	55	-	55	4.96		#		
Turbidity	NTU	0483	WL	09/29/2008	0001	18	-	18	0.93		#		
Turbidity	NTU	0485	WL	09/29/2008	0001	55	-	55	1.99		#		
Turbidity	NTU	0488	WL	09/30/2008	0001	36	-	36	1.24		#		
Turbidity	NTU	0493	WL	09/30/2008	0001	55	-	55	4.65		#		
Turbidity	NTU	0557	WL	09/29/2008	0001	36	-	36	2.69		#		
Turbidity	NTU	0558	WL	09/29/2008	0001	36	-	36	1.01		#		
Turbidity	NTU	0559	WL	09/30/2008	0001	18	-	18	1.37		#		
Turbidity	NTU	0560	WL	09/30/2008	0001	36	-	36	3.04		#		
Turbidity	NTU	0561	WL	09/29/2008	0001	55	-	55	10		#		
Turbidity	NTU	SMI-PW01	WL	09/30/2008	0001	36	-	36	1.9		#		
Turbidity	NTU	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	0.76		#		
Turbidity	NTU	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	0.98		#		
Uranium	mg/L	0216	SL	09/30/2008	0001	0	-	0	0.013	J	#	4.5E-006	
Uranium	mg/L	0243	SL	09/30/2008	0001	0	-	0	0.012	J	#	4.5E-006	
Uranium	mg/L	0405	WL	09/30/2008	0001	18	-	18	1.2		#	0.00022	
Uranium	mg/L	0474	WL	09/30/2008	0001	10.3	-	19.7	1.1		#	0.00022	
Uranium	mg/L	0474	WL	09/30/2008	0002	10.3	-	19.7	1.1		#	0.00022	
Uranium	mg/L	0480	WL	09/29/2008	0001	18	-	18	2.5		#	0.00022	
Uranium	mg/L	0482	WL	09/29/2008	0001	55	-	55	0.87		#	0.00022	
Uranium	mg/L	0483	WL	09/29/2008	0001	18	-	18	1.5		#	0.00022	
Uranium	mg/L	0485	WL	09/29/2008	0001	55	-	55	0.78		#	4.5E-005	
Uranium	mg/L	0488	WL	09/30/2008	0001	36	-	36	1.8		#	0.00022	
Uranium	mg/L	0493	WL	09/30/2008	0001	55	-	55	2.9		#	0.00022	
Uranium	mg/L	0557	WL	09/29/2008	0001	36	-	36	3		#	0.00022	
Uranium	mg/L	0558	WL	09/29/2008	0001	36	-	36	2.6		#	0.00022	
Uranium	mg/L	0559	WL	09/30/2008	0001	18	-	18	1		#	0.00022	

## Appendix C. Water Quality Data (continued)

### September 2008 GW/SW Investigation – 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		
Uranium	mg/L	0560	WL	09/30/2008	0001	36	-	36	2.4		#	0.00022	
Uranium	mg/L	0561	WL	09/29/2008	0001	55	-	55	0.86		#	0.00022	
Uranium	mg/L	SMI-PW01	WL	09/30/2008	0001	36	-	36	1.6		#	0.00022	
Uranium	mg/L	SMI-PZ1M	WL	09/30/2008	0001	55	-	55	2.9		#	0.00022	
Uranium	mg/L	SMI-PZ1S	WL	09/30/2008	0001	18	-	18	1.8		#	0.00022	

Note: BLS = below land surface; C = centigrade;  $\mu$ mhos/cm = micromhos per centimeter; mg/L = milligrams per liter; 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  $\mu$ m). 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.
- 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: TIC.
- 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

**September 2008 Monthly Event - STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/1/2009**

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0401	O	3969.6	09/10/2008		15.25	3954.35	
0403	O	3968.95	09/09/2008		15.53	3953.42	
0405	O	3968.47	09/10/2008		13.65	3954.82	
0407	O	3969.09	09/09/2008		16.21	3952.88	
0471		3964.37	09/02/2008		12.04	3952.33	
0473		3964.66	09/02/2008		11.55	3953.11	
0475		3964.97	09/02/2008		12.71	3952.26	
0477		3965.08	09/02/2008		13.71	3951.37	
0479		3964.67	09/02/2008		12.69	3951.98	
0480		3968.65	09/09/2008		15.51	3953.14	
0484		3969.19	09/09/2008		15.61	3953.58	
0488		3968.48	09/10/2008		13.51	3954.97	
0493		3967.89	09/10/2008		13.14	3954.75	
0557		3968.85	09/09/2008		14.77	3954.08	
0561		3968.56	09/09/2008		15.6	3952.96	
0584		3969.13	09/09/2008		14.65	3954.48	
0587		3968.89	09/09/2008		14.59	3954.3	
0596		3968.76	09/09/2008		15.49	3953.27	
0600		3968.77	09/09/2008		14.52	3954.25	
0670		3969.54	09/11/2008		15.3	3954.24	
0673		3969.44	09/02/2008		16.41	3953.03	
0674		3969.49	09/11/2008		15.64	3953.85	
0677		3969.61	09/02/2008		16.12	3953.49	
0679		3969.59	09/02/2008		16.15	3953.44	
0683		3970.73	09/10/2008		16.72	3954.01	
0686		3968.85	09/10/2008		14.63	3954.22	
0687		3969.09	09/10/2008		15.24	3953.85	

## Appendix D. Water Level Data (continued)

**September 2008 Monthly Event - STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site**  
**REPORT DATE: 4/1/2009**

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0688		3968.66	09/10/2008		14.81	3953.85	
0689		3968.66	09/10/2008		14.92	3953.74	
0771		3969.04	09/09/2008		16.68	3952.36	
0774		3968.77	09/09/2008		16.29	3952.48	
0777		3968.76	09/09/2008		16.58	3952.18	
0779		3968.43	09/09/2008		16.31	3952.12	
0781		3968.56	09/03/2008		14.47	3954.09	
0782		3968.46	09/03/2008		15.23	3953.23	
0786		3968.14	09/03/2008		15.12	3953.02	
0787		3968.43	09/03/2008		15.09	3953.34	

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

## Appendix D. Water Level Data (continued)

September 2008 GW/SW Investigation - STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/21/2008

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0405	O	3968.47	09/30/2008		13.91	3954.56	
0474		3964.99	09/30/2008		12.5	3952.49	
0480		3968.65	09/29/2008		15.59	3953.06	
0482		3968.7	09/29/2008		16.5	3952.2	
0483		3968.9	09/29/2008		16.03	3952.87	
0485		3968.81	09/29/2008		16.16	3952.65	
0488		3968.48	09/30/2008		13.8	3954.68	
0493		3967.89	09/30/2008		13.41	3954.48	
0557		3968.85	09/29/2008		14.9	3953.95	
0558		3968.79	09/29/2008		15.26	3953.53	
0559		3969.92	09/30/2008		16.98	3952.94	
0560		3968.77	09/30/2008		15.16	3953.61	
0561		3968.56	09/29/2008		15.73	3952.83	
SMI-PW01	O	3968.45	09/30/2008		13.52	3954.93	
SMI-PZ1M	O	3968.29	09/30/2008		13.58	3954.71	
SMI-PZ1S	O	3969.13	09/30/2008		14.32	3954.81	

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: September 16, 2008

TO: K. Pill, M. Mullis

FROM: E. Glowiak

SUBJECT: Trip Report

**Site:** Moab – Interim Action Well Field Monthly Sampling – September 2008

**Date of Sampling Event:** September 2-11, 2008

**Team Members:** Steve Back, Elizabeth Glowiak

**RIN Number Assigned:** All samples were assigned to RIN 0809022.

**Sample Shipment:** All samples were shipped in a cooler overnight UPS to Paragon Analytics, Inc. from Moab, Utah, on September 4 and 11 (Tracking Nos. 90968981, 98853947).

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**September 2008 CF1 Sampling**

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**Number of Locations Sampled:** Five extraction wells (0471, 0473, 0475, 0477, and 0479), seven observation wells (0403, 0407, 0480, 0484, 0557, 0561, and 0596), and two evaporation pond locations (0547 and 0548) were sampled during the September 2008 sampling event. A total of 14 samples were collected during the September monthly sampling event.

**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)
0471	09/02/2008	10:44	12.04	18
0473	09/02/2008	11:00	11.55	18
0475	09/02/2008	11:10	12.71	18
0477	09/02/2008	11:23	13.71	18
0479	09/02/2008	13:35	12.69	23

Note: 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	09/09/2008	14:02	15.53	18
0407	09/09/2008	13:45	16.21	17
0480	09/09/2008	09:21	15.51	18
0484	09/09/2008	09:38	15.61	28
0557	09/09/2008	09:01	14.77	40
0561	09/09/2008	10:00	15.60	50
0596	09/09/2008	11:11	15.49	24

Note: btoc = below top of casing

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**September 2008 CF2 Sampling**

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**Number of Locations Sampled:** Four observation wells (0401, 0584, 0587, and 0600) were sampled during the September monthly sampling event.

**Locations Not Sampled:** None

**Field Variance:** None

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

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0401	09/10/2008	08:24	15.25	18
0584	09/09/2008	15:08	14.65	18
0587	09/09/2008	15:55	14.59	18
0600	09/09/2008	14:20	14.52	27

Note: btoc = below top of casing

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**September 2008 CF3 Sampling**

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**Number of Locations Sampled:** Five remediation wells (0670, 0673, 0674, 0677, and 0679) and five observation wells (0683, 0686, 0687, 0689-54, and 0688-39) were sampled during the September 2008 sampling event. Including one duplicate, a total of 11 locations were sampled.

**Locations Not Sampled:** None.

**Field Variance:** None.

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

**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	09/10/2008	09:26	31	14.83	14.83	21,542	1.95	6.78	97	1.65
0689	09/10/2008	10:06	46	14.97	14.97	88,143	0.30	6.61	100	1.89

Note: btoc = below top of casing; D.O. = dissolved oxygen; ORP = oxidation reduction potential; Temp = temperature  
 Spec Cond = special conditions; Turb. = turbidity

**Quality-Control Sample Cross Reference:** Following is the false identification assigned to the quality-control sample.

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2001	0674	Duplicate from 35 ft bgs	Ground Water	NFC 865

Note: ID = identification

**Location-Specific Information – CF3 Remediation Wells:** Extraction wells were sampled using dedicated submersible pumps.

Well No.	Date	Time	Water Level (ft btoc)	Pump Intake (ft bgs)
0670	09/11/2008	09:50	15.30	35
0673	09/02/2008	13:45	16.41	35
0674	09/11/2008	09:34	15.64	35
0677	09/02/2008	14:05	16.12	35
0679	09/02/2008	14:13	16.15	35

Note: btoc = below top of casing

**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	09/10/2008	11:24	16.72	27
0686	09/10/2008	08:41	14.63	18
0687	09/10/2008	09:37	15.24	28
0688-39	09/10/2008	09:00	14.81	39
0689-54	09/10/2008	09:52	14.92	54

Note: btoc = below top of casing

**September 2008 CF4 Sampling**

**Number of Locations Sampled:** Four remediation wells (0771, 0774, 0777, and 0779) and four observation wells (0781, 0782, 0786, and 0787) were sampled during the September 2008 sampling event. A total of eight samples were collected.

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

**Locations Not Sampled:** Remediation well 0773 was not sampled because it was not pumping during the September sampling event. Well 0774 was sampled in its place.

**Field Variance:** None.

**Location-Specific Information – CF4 Remediation Wells:** Extraction wells were sampled using dedicated submersible pumps.

Well No.	Date	Time	Water Level (ft btoc)	Pump Intake (ft bgs)
0771	09/09/2008	08:40	16.68	30
0774	09/09/2008	08:25	16.29	30
0777	09/09/2008	08:15	16.58	30
0779	09/09/2008	08:04	16.31	30

Note: btoc = below top of casing

**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)
0781	09/03/2008	14:12	14.47	48
0782	09/03/2008	14:32	15.23	31
0786	09/03/2008	15:15	15.12	28
0787	09/03/2008	14:56	15.09	36

Note: btoc = below top of casing

**September 2008 Baseline Sampling**

**Number of Locations Sampled:** Three observation wells (0405, 0488, and 0493) were sampled during the September 2008 sampling event. Including one duplicate, a total of four samples were collected.

**Locations Not Sampled:** None

**Field Variance:** None.

**Quality-Control Sample Cross Reference:** Following is the false identification assigned to the quality-control sample.

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2000	0488	Duplicate from 36 ft bgs	Ground Water	NFC 861

Note: 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.

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

<b>Well No.</b>	<b>Date</b>	<b>Time</b>	<b>Depth to Water (ft btoc)</b>	<b>Sample Depth (ft bgs)</b>
0405	09/10/2008	14:21	13.65	18
0488	09/10/2008	14:36	13.51	36
0493	09/10/2008	14:04	13.14	54

Note: 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:

<b>Date</b>	<b>Daily Mean Flow (cfs)</b>
09/02/2008	4,920
09/03/2008	4,940
09/04/2008	4,840
09/09/2008	4,460
09/10/2008	4,410
09/11/2008	4,530

**Equipment Issues:** None.

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

**Attachment 2.**  
**Interim Action Well Field Ground Water/Surface Water Interaction**  
**Investigation Sampling Event**

**Attachment 2.**  
**Interim Action Well Field Ground Water/Surface Water Interaction**  
**Investigation Sampling Event**



DATE: October 14, 2008

TO: K. Pill

FROM: E. Glowiak

SUBJECT: Trip Report

**Site:** Moab – Interim Action Well Field Ground Water/Surface Water Interaction Investigation Sampling Event – September 2008

**Date of Sampling Event:** September 29-30, 2008

**Team Members:** S. Back, E. Glowiak, K. Pill

**RIN Number Assigned:** All samples were assigned to RIN 0809023.

**Sample Shipment:** All samples were shipped in a cooler overnight UPS to Paragon Analytics Inc. from Moab, Utah, on October 1 (Tracking No. 91714663).

**Purpose:** The purpose of this investigation is to determine the extent of infiltration of the Colorado River adjacent to the Moab UMTRA site during high river flows. Infiltration of river water could potentially dilute the site contaminants and would result in the ability to halt the interim action remedial system during high river stage. A series of surface water locations, extraction wells, and observation wells from CF1 and the baseline area were sampled at varying depths and distances from the river channel. The surface water elevation during this sampling event was 2.7 ft below well point 0562 and 1.55 ft below well point 0618.

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**September 2008 CF1 Sampling**

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**Number of Locations Sampled:** One extraction well (0474), nine observation wells (0480, 0482, 0483, 0485, 0557, 0558, 0559, 0560, and 0561), and one surface water location (0216) were sampled during the September 2008 sampling event. A total of 11 samples were collected.

**Locations Not Sampled:** None

**Field Variance:** None.

**Location-Specific Information – CF1 Extraction Wells:** This extraction well was sampled with a dedicated submersible pump.

**Attachment 2.**  
**Interim Action Well Field Ground Water/Surface Water Interaction**  
**Investigation Sampling Event (continued)**

Well No.	Date	Time	Water Level (ft btoc)	Pump Intake (ft bgs)
0474	09/30/2008	16:37	2.50	18

Note: btoc = below top of casing

**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)
0480	09/29/2008	14:06	15.59	18
0482	09/29/2008	13:46	16.15	55
0483	09/29/2008	14:30	16.03	18
0485	09/29/2008	14:49	16.16	55
0557	09/29/2008	13:28	14.90	36
0558	09/29/2008	15:10	15.26	36
0559	09/30/2008	09:05	16.98	18
0560	09/30/2008	08:42	15.16	36
0561	09/29/2008	15:44	15.73	55

Note: btoc = below top of casing

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

SW No.	Date	Time	Depth (inches below surface)	Characteristics
0216	09/30/2008	16:26	Unknown	Open to the river both up and down-stream

Note: SW = surface water

**September 2008 Baseline Sampling**

**Number of Locations Sampled:** Six observation wells (SMI-PZ1M, SMI-PZ1S, SMI-PW01, 0405, 0488, and 0495) and one surface water location (0243) were sampled during the September 2008 sampling event. Including one duplicate, a total of eight samples were collected.

**Locations Not Sampled: Locations Not Sampled:** None.

**Field Variance:** None.

**Quality-Control Sample Cross Reference:** Following is the false identification assigned to the quality-control sample.

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
1008	0474	Duplicate from 18 ft bgs	Ground Water	NFC 944

Note: ID = identification

**Attachment 2.**  
**Interim Action Well Field Ground Water/Surface Water Interaction**  
**Investigation Sampling Event (continued)**

**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)
SMI-PZ1M	09/30/2008	14:44	13.58	55
SMI-PZ1S	09/30/2008	14:17	14.32	18
SMI-PW01	09/30/2008	15:25	13.52	36
0405	09/30/2008	10:29	13.91	18
0488	09/30/2008	10:51	13.80	36
0493	09/30/2008	10:06	13.41	55

Note: btoc = below top of casing

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

SW No.	Date	Time	Depth (in. below surface)	Characteristics
0243	09/30/2008	14:05	Unknown	Taken off of the main river channel

Note: SW = surface water

**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)
09/29/2008	4,260
09/30/2008	4,220

**Equipment Issues:** None.

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