

Office of Environmental Management – Grand Junction



Moab UMTRA Project
Ground Water and Surface Water
Monitoring 2011 Second Quarter

Revision 1

December 2011



U.S. Department
of Energy

Office of Environmental Management

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Ground Water and Surface Water Monitoring
2011 2nd Quarter**

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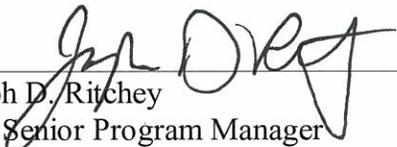
Review and Approval



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12/2/11

Date



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Revision History

Revision No.	Date	Reason/Basis for Revision
0	September 2011	Initial issue.
1	December 2011	Revision includes updated figures, report structure modifications, and minor text changes for improved reader understanding.

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Water Sampling Field Activities Verification
Minimums and Maximums Report
Water Quality Data
Water Level Data
Trip Report

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Water Sampling Field Activities Verification
Water Quality Data

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Water Sampling Field Activities Verification
Minimums and Maximums Report
Water Quality Data
Water Level Data
Trip Report

Acronyms and Abbreviations

°C	degrees Centigrade
AES	atomic emission spectroscopy
bgs	below ground surface
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	Configuration
CFR	Code of Federal Regulations
cfs	cubic feet per second
COC	chain of custody
CRI	reporting limit verification
DOE	U.S. Department of Energy
DUP	duplicate
EB	equipment blank
EDD	electronic data deliverable
EPA	Environmental Protection Agency
ft	feet
IA	interim action
ICB	initial calibration blank
ICP	inductively coupled plasma
ICSA	interference check sample A
ICSAB	interference check sample AB
ICV	initial calibration verification
IDL	instrument detection limit
LCS	laboratory control sample
MB	method blank
MDL	method detection limit or minimum detection limit
mg/L	milligrams per liter
µmhos/cm	micromhos per centimeter
MS	matrix spike or mass spectr
MSD	matrix spike duplicate
r ²	correlation coefficient
RIN	report identification number
RL	reporting limit
RPD	relative percent difference
RS	replicate sample
SD	serial dilution
SDG	sample data group
TDS	total dissolved solids
TPU	total propagated uncertainty
UMTRA	Uranium Mill Tailings Remedial Action
USGS	U.S. Geological Survey

1.0 Introduction

1.1 Purpose

The purpose of this report is to summarize the results of the data validation process associated with ground water samples collected from the U.S. Department of Energy (DOE) Moab Uranium Mill Tailings Remedial Action (UMTRA) site during the second quarter of 2011. A total of three sampling events were completed between April and June 2011, with samples collected from Configurations (CFs) 4 and 5, the evaporation pond, and a variety of site-wide locations. In addition, a sample of the tailings pore water was collected from inside the excavation. Sample locations are shown on Figures 1 and 2.

The rationale for the sampling was to establish baseline ammonia and uranium concentrations in the CF5 extraction wells for determining water treatment requirements. The sampling and water level monitoring at the CF4 injection system was used to assess the effectiveness of injection at reducing concentrations in the adjacent riparian habitat channel. Sampling of evaporation pond water was performed to assess if the water could be discharged through enhanced evaporators or ditches on the sides of the tailings pile. The tailings pore fluids were sampled to assess their effect on pH and concentrations of contaminants in the evaporation pond. Site-wide sampling was conducted to assess any changes and trends in water quality.

1.2 Scope

This document presents the Summary of Results, the Laboratory Performance Assessment, and the data (including a summary of the anomalous data generated by the validation process) for each of these events. Sampling and analyses were conducted in accordance with the *Moab UMTRA Project Operations, Maintenance, and Performance Monitoring Plan for the Interim Action Ground Water Treatment System* (DOE-EM/GJTAC1973), and all data validation follows the criteria according to the *Moab UMTRA Project Surface Water/Ground Water Sampling and Analysis Plan* (DOE-EM/GJTAC1830) and the *Moab UMTRA Project Standard Practice for Validation of Laboratory Data* (DOE-EM/GJTAC1855). Trip reports are also provided in appendices. All Colorado River flow discussed in this document is measured from the U.S. Geological Survey (USGS) Cisco gauging station number 09180500. River elevation data was collected on site.

Minimums and Maximums Reports were generated (by the Sample Management System and used to query the SEEPro database) to determine if the applicable data are within a normal statistical range. Each new data set is compared to the historical data to determine if the new data fall outside the historical data range, and the results are not considered anomalous if:

(1) identified low concentrations are the result of low detection limits; (2) the concentration detected is less or more than 50 percent of historical minimum or maximum values; or (3) there were fewer than five historical samples for comparison.

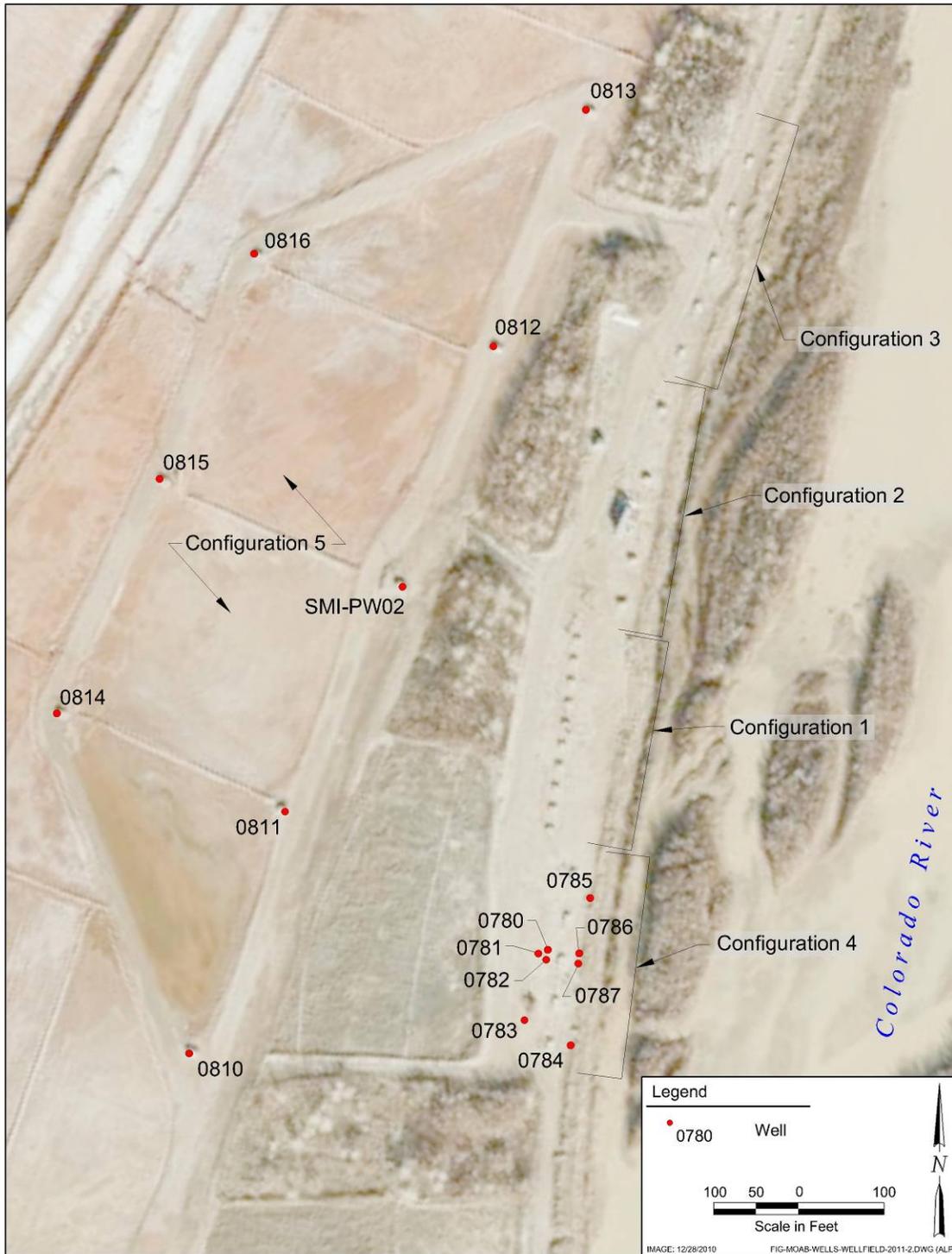


Figure 1. Map of Well Field Sample Locations for the 2011 2nd Quarter Sampling Event

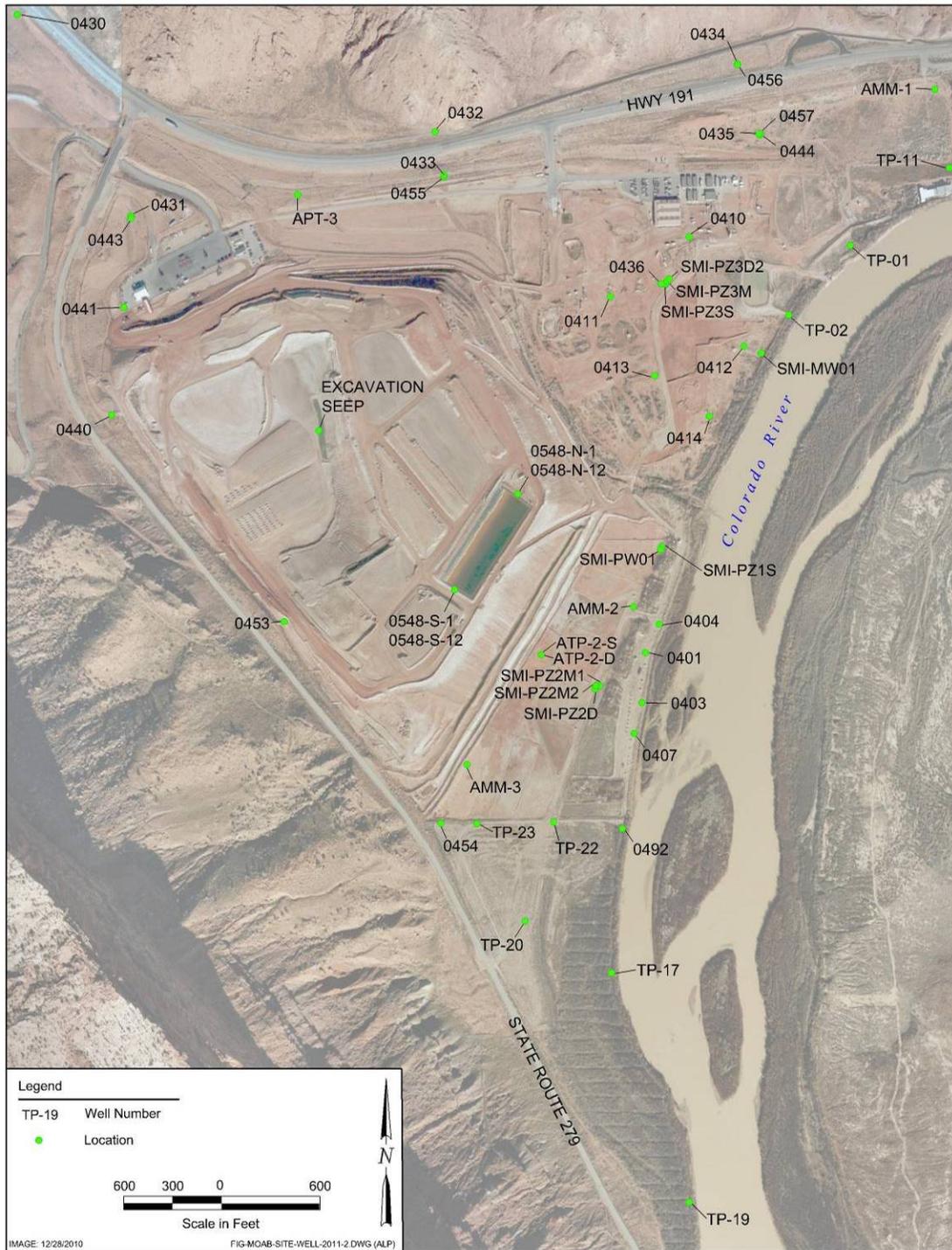


Figure 2. May 2011 Site-Wide Ground Water Sampling Locations (includes locations not sampled)

2.0 Summary of Sampling Events

2.1 April 2011 CF4 and CF5 Sampling Event

Samples were collected from CF4 observation wells and CF5 extraction wells between April 27 and 28, 2011. The CF4 samples were collected to monitor the effectiveness of the freshwater injection system, which had been actively injecting diverted Colorado River water into the CF4 remediation wells since March 1, 2011. Only uranium analysis was performed for these samples, with the field ammonia probe used to measure the ammonia concentration. The CF5 samples were collected to determine the concentrations for calculations of the mass of ammonia and uranium removed by the ground water extraction system. All sample locations are shown on Figure 1.

2.2 May 2011 Evaporation Pond and Excavation Seep Sampling Event

Four samples were collected from the evaporation pond on May 2 as requested by project Health and Safety staff, as the water stored in the pond at this time was being used for dust suppression inside the Contamination Area. The samples were collected along the northern and southern edges of the pond from depths of 1 and 12 feet (ft) at each location.

A sample of pore (seep) water within the tailings excavation was also collected on May 2. All samples were analyzed for total dissolved solids (TDS), gamma spectroscopy, isotopic thorium, isotopic uranium, inductively coupled plasma (ICP) metals, and uranium. Approximate locations are shown on Figure 2.

2.3 May 2011 Site-Wide Sampling Event

A total of 51 samples were collected between May 18 and June 6 as part of the site-wide event. Ground water samples were collected from a variety of upgradient, downgradient, and cross-gradient locations at various depths. Also included were the locations formerly associated with the routine sampling events. All samples were analyzed for ammonia, TDS, and uranium, and sample locations are shown on Figure 2.

Due to the flow of the river (above 20,000 cubic ft per second [cfs]) surface water samples were not collected for two reasons: (1) the exact surface water locations could not be accessed; and (2) historically, surface water samples collected under these high-flow conditions are consistently below the applicable detection limits.

3.0 Data Assessments

3.1 April 2011 CF4 and CF5 Sampling Event

3.1.1 Laboratory Performance Assessment

This validation was performed according to the *Standard Practice for Validation of Laboratory Data*. The procedure was applied at Level 3, Data Deliverables Examination. All analyses were successfully completed.

General Information and Validation Results

Report Identification Number (RIN): 1104057
Laboratory: ALS Environmental, Fort Collins, Colorado
Sample Data Group (SDG) Number: 1104473
Analysis: Metals and Inorganics
Validator: Rachel Cowan
Review Date: June 16, 2011

The samples were prepared and analyzed using accepted procedures as shown in Table 1.

Table 1. April 2011 CF4 and CF5 Sampling Analytes and Methods

Analyte	Preparation Method	Analytical Method
Ammonia	EPA 350.1	EPA 350.1
Uranium	SW-846 3005A	SW-846 6020A

All analytical results met the data validation criteria, and it was not necessary to qualify any of these data.

Sample Shipping/Receiving

ALS Environmental in Fort Collins, Colorado, received a total of 17 samples for RIN 1104057 in one shipment. SDG 1104473 of 17 samples arrived on April 29, 2011. The SDG was accompanied by a chain of custody (COC) form. The COC form was checked to confirm that all of the samples were listed on the form with sample collection dates and times and that signatures and dates were present, indicating sample relinquishment and receipt. The sample submittal documents, including the COC form and the sample tickets, had no errors or omissions, except that the field notes for sample 1104473-4 (location 0783) did not indicate if the sample was packed on ice or not. Since the sample was then packed into one cooler with the other samples, and they were all on ice, no qualification is necessary.

Preservation and Holding Times

SDG 1104473 (packed in one cooler) was received intact with the temperature in the cooler at 2.0 degrees Centigrade (°C), which complies with requirements. 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.

Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure the instrument continues to be capable of producing acceptable qualitative and quantitative data. All laboratory instrument calibrations were performed correctly in accordance with the cited methods. Calibration standards were prepared from independent sources.

In addition, for ICP analytes (uranium), reporting limit verifications (CRIs) verify the linearity of the calibration curve near the reporting limit (RL). For ICP-mass spectrometry (ICP-MS) analytes (uranium), instrument tuning and performance criteria are checked for mass calibration and resolution verifications. For the ICP-MS analyte uranium, internal standards are analyzed to indicate stability of the instruments.

Method SW-846 6020A, Uranium

The calibration for the uranium analyses was performed on May 3, 2011. The initial calibration was performed using five calibration standards and one blank, resulting in a calibration curve with a correlation coefficient (r^2) value greater than 0.995. The absolute value of the calibration curve intercept for uranium was positive and less than three times the instrument detection limit (IDL).

Calibration verification checks are made to ensure the instruments are properly calibrated before and during analysis. Initial calibration verification (ICV) and continuing calibration verification (CCV) checks were made at the required frequency. All calibration checks met the acceptance criteria.

CRIs were made at the required frequency to verify the linearity of the calibration curve near the RL for the SDG. The CRIs were within the acceptance criteria range for uranium.

Mass calibration and resolution verifications were performed at the beginning of each the analytical run in accordance with the analytical procedure for ICP-MS and met all criteria. Internal standard recoveries were stable and within acceptable ranges.

Method EPA 350.1, Ammonia

Initial calibrations for ammonia were performed using six calibration standards and a blank on May 2, 2011. The calibration curve had an r^2 value greater than 0.995 and an intercept less than three times the minimum detection limit (MDL). ICV and CCV checks were made at the required frequency and the results for the ammonia ICV and CCVs were within acceptance criteria.

Method and Calibration Blanks

Blank analysis results are assessed to determine the presence of sample contamination problems. Method blanks (MBs) are analyzed to assess any contamination that may have occurred during sample preparation. Both initial calibration blanks (ICB) and continuing calibration blanks (CCBs) are analyzed to assess instrument contamination prior to and during sample analysis.

If a blank's results are greater than the MDL or IDL (depending on method requirements), associated sample results will be "U" qualified if the results were less than five times the blank concentration. Non-detects were not qualified.

All uranium MB and CCB results were greater than the uranium IDL. However, the uranium ICB was greater than the IDL, so all uranium results were visually checked for results less than five times the IDL as per procedure. All uranium results were greater than five times the IDL, so no uranium results were qualified for this reason. All ammonia MB, ICB, and CCBs had results that were less than the ammonia MDL.

Equipment Blanks

An equipment blank (EB) is a sample of analyte-free media collected from a rinse of non-dedicated sampling equipment used to sample surface water. EBs are collected to document adequate decontamination of non-dedicated equipment. One EB should be prepared with each preparation batch. All samples were collected using dedicated equipment. Therefore, no EBs needed to be collected and analyzed.

Inductively Coupled Plasma Interference Check Sample Analysis

ICP interference check samples (ICSA and ICSAB) are analyzed to verify the instrument inter-element and background correction factors.

For the uranium analyses, the ICSA values for calcium, magnesium, aluminum, and iron were not provided for verification of the instrument's inter-element and background correction factors. The percent recoveries of the ICSAB samples were provided and were acceptable for all uranium analyses. All other check sample results met the acceptance criteria, so no qualification of the sample results was deemed necessary.

Matrix Spike Analysis

Matrix spike (MS) samples were prepared and analyzed for all analytes as a measure of method performance in the sample matrix. Laboratory MS standards are prepared from independent sources. The MS recoveries met the recovery and precision criteria for all analytes, with the exception that the MS recovery for ammonia in SDG 1104437 could not be evaluated because the ammonia concentration in the native sample was already above the analytical range. Based on validation protocol, qualification requirements are not applicable when the native sample concentration exceeds four times the spike concentration. Therefore, no qualifiers were applied to ammonia results associated with this un-analyzed MS.

Laboratory Replicate Analysis

The laboratory replicate results demonstrate acceptable laboratory precision. Laboratory replicate samples are either duplicate (DUP) samples for TDS, or MS duplicates (MSD) for the other analytes. The relative percent difference (RPD) values for the reported DUP and the MSD results for all other analytes were less than 20 percent for results greater than five times the RL, except there was no ammonia MSD because the ammonia concentration was too high in the MS sample. However, there was a replicate sample (RS) for ammonia in the form of a field DUP, which passed criteria; so no ammonia results were flagged for this reason.

Field Duplicate Analysis

Field DUP samples are collected and analyzed as an indication of overall precision of the measurement process. The precision observed includes both field and laboratory precision and has more variability than laboratory replicates, which only measure laboratory performance. A field DUP sample was collected from location 0815 (1104473-14) in this sampling event. The DUP results met the U.S. Environmental Protection Agency (EPA)-recommended laboratory DUP criteria of less than 20 RPD for results that are greater than five times the RL.

Laboratory Control Samples

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

An LCS was not reported for uranium. As a standard practice, ALS Environmental does not prepare LCSs for samples that were field-filtered and acidified and run directly on the instrument without any additional sample preparation. Per national environmental laboratory accreditation requirements provided by The NELAC Institute, an MS may be used in place of an LCS provided the acceptance criteria are as stringent. Because the uranium MS passed all requirements, no uranium results needed to be flagged for this reason.

Metals Serial Dilution

A serial dilution (SD) sample was prepared and analyzed for the ICP-MS metals analyses to monitor chemical or physical interferences in the sample matrix. ICP-MS SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the RL. The uranium SD data was acceptable.

Detection Limits/Dilutions

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

Completeness

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

Electronic Data Deliverable Files

The Electronic Data Deliverable (EDD) files arrived on May 13, 2011. The contents of the EDD files were manually examined to ensure all and only the requested data are delivered in compliance with requirements and that the sample results accurately reflect the data contained in the sample data package

3.1.2 Minimums and Maximums Report and Anomalous Data Review

The Minimums and Maximums Report for this sampling event is located in Appendix A. Based on the results, there were four anomalous data points (from four separate locations), all of which were more than 50 percent below the historical minimum, as shown in Table 2.

Table 2. Anomalous Data Associated With the April 2011 CF4 and CF5 Sampling Event

Location	Sample Date	Analyte	Concentration (mg/L)	Historical Minimum (mg/L)	Disposition
0780	04/27/2011	Uranium	0.007	0.24	Concentration reduced in response to CF4 freshwater injection
0782	04/27/2011	Uranium	0.049	0.29	Concentration reduced in response to CF4 freshwater injection
0786	04/27/2011	Uranium	0.017	0.072	Concentration reduced in response to CF4 freshwater injection
0787	04/27/2011	Uranium	0.022	0.11	Concentration reduced in response to CF4 freshwater injection

mg/L = milligrams per liter

3.2 May 2011 Evaporation Pond and Excavation Seep Sampling Event

3.2.1" Laboratory Performance Assessment

This validation was performed according to the *Standard Practice for Validation of Laboratory Data*. The procedure was applied at Level 1, Data Deliverables Examination. All analyses were successfully completed.

General Information and Validation Results

RIN: 1105058
 Laboratory: ALS Environmental, Fort Collins, Colorado
 SDG Numbers: 1105096 and 1105202
 Analysis: Gamma Spectroscopy, Inorganics, Isotopic Thorium, Isotopic Uranium, and Metals
 Validator: Rachel Cowan
 Review Date: July 13, 2011

The samples were prepared and analyzed using accepted procedures, which are shown in Table 3.

Table 3. May 2011 Evaporation Pond and Excavation Seep Sampling Analytes and Methods

Analyte	Preparation Method	Analytical Method
Ammonia	EPA 350.1	EPA 350.1
Gamma Spectroscopy (Actinium-228, Americium-241, Cerium-144, Cobalt-60, Cesium-134, Cesium-137, Europium-152; Europium-154, Europium-155, Potassium-40, Lead-212; Promethium-144; Promethium-146, Ruthenium-106, Antimony-125, Thorium-234, Uranium 235, Yttrium-88)	SOP 739 R10	EPA 901.1 SOP 713 R11
Isotopic Thorium	SOP 776 R12 and SOP 777 R10	SOP 714 R12
Isotopic Uranium	SOP 776 R12 and SOP 778 R13	SOP 714 R12
Mercury	EPA 7470A	EPA 7470A
Metals (Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, Zirconium)	SW-846 6010B	EPA 6010B
TDS	EPA 160.1	EPA 160.1
Uranium (Total)	SW-846 3005A	EPA 6020A

Analytical results were qualified as listed in Table 4. Refer to Table 5 for an explanation of the data qualifiers applied.

Table 4. May 2011 Evaporation Pond and Excavation Seep Sampling Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1105096-1, 2	0548-N-12, 0548-S-1	Ammonia	J	MS-1, RS-1
1105202-3	Excavation Seep	Lead-212	J	RQ-5
1105202-2, -3	0548-S-12, Excavation Seep	Europium-152	J	RQ-5
1105096-1, -2; 1105202-1, -2	0548-N-12, 0548-S-1; 0548-N-1, 0548-S-12	Potassium-40	J	RQ-5
1105096-1, -2	0548-N-12, 0548-S-1	Thorium-230	J	RQ-4
1105096-2	0548-S-1	Thorium-232	J	RQ-5
1105202-3	Excavation Seep	Thorium-234, Uranium-235	J	NI-2
1105202-3	Excavation Seep	Total Dissolved Solid	J	HT-2
1105202-1, -2	0548-N-1, 0548-S-12	Uranium-235, Yttrium-88	J	RQ-5
1105096-1, -2	0548-N-12, 0548-S-1	Uranium-235	U	RQ-4
1105202-2	0548-S-12	Uranium-234, Uranium-235, Uranium-238	J	TR-4
1105096-1, -2; 1105202-1, -2, -3	0548-N-12, 0548-S-1; 0548-N-1, 0548-S-12, Excavation Seep	Aluminum, Barium, Cadmium, Calcium, Cobalt, Copper, Iron, Magnesium, Manganese, Nickel, Potassium, Selenium, Sodium, Vanadium, Zinc, Uranium	J	MS-1, RS-1
1105202-3	Excavation Seep	Beryllium, Lead	J	MS-1, RS-1
1105096-1, -2	0548-N-12, 0548-S-1	Mercury, Zirconium	J	MS-1, RS-1
1105096-1; 1105202-3	0548-N-12; Excavation Seep	Silver	J	MS-1, RS-1
1105096-1, -2; 1105202-1, -2, -3	0548-N-12, 0548-S-1; 0548-N-1, 0548-S-12, Excavation Seep	Uranium	J	SD-1
1105096-1; 1105202-1, -2, -3	0548-N-12; 0548-N-1, 0548-S-12, Excavation Seep	Arsenic	J	MS-1, RS-1
1105202-2, -3	0548-S-12, Excavation Seep	Chromium	J	MS-1, RS-1
1105096-1; 1105202-2	0548-N-12; 0548-S-12	Thallium	J	MS-1, RS-1

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

Sample Shipping/Receiving

ALS Environmental in Fort Collins, Colorado, received a total of five samples for RIN 1105058 in two shipments. SDG 1105096 of two samples arrived on May 4, 2011, and SDG 1105202 of three samples arrived on May 13, 2011, after the samples were lost during transport from the site to the analytical laboratory. Each SDG was accompanied by a COC form. The COC forms were checked to confirm that all of the samples were listed on the form with sample collection dates and times and that signatures and dates were present, indicating sample relinquishment and receipt. The sample submittal documents, including the COC forms and the sample tickets, had no errors or omissions, except that the COC forms for SDG 1105096 did not have the relinquished signatures and dates.

Table 5. May 2011 Evaporation Pond and Excavation Seep Sampling Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Non-Detects)	Explanation
HT-2	J	U	The sample was analyzed after its holding time had expired within two times the specified holding time.
MS-1	J	U	No MS sample from the SDG was analyzed.
NI-2	J	U	There is significant spectral interference from additional sources that result in elevated activity levels due to multiple nuclides .
P-1	J	J	Samples are received outside the temperature criteria.
RQ-4	NA	U	The result is less than the MDC.
RQ-5	J	NA	The result is greater than or equal to the MDC but less than three times the MDC.
RS-1	J	U	No RS from the SDG was analyzed.
TR-4	J	NA	The isotope tracer recovery is less than 30% but greater than 10%.

MDC = minimum detectable concentration

Preservation and Holding Times

SDG 1105096 was received intact in one cooler with an internal temperature of 1.2°C, which complies with requirements. SDG 1105202 was received intact in one cooler with an internal temperature of 15°C, which complies with requirements, except for TDS for sample 1105202-3. The TDS result for 1105202-3 was flagged “J” for reason P-1. All samples were received in the correct container types and had been preserved correctly for the requested analyses, except for sample 1105202-3, which had a pH of 4.5 and was adjusted immediately by ALS upon receipt. As the pH had been out of compliance for less than 24 hours, no results for this sample were flagged for this reason.

All samples were analyzed within the applicable holding times, except for TDS for sample 1105202-3, which was analyzed within twice the specified holding time and so the TDS result was qualified with a “J” for reason HT-2.

Case Narratives

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

Laboratory Instrument Calibration and Quantification

Compliance requirements for satisfactory instrument calibration are established to ensure the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure that the instrument continues to be capable of producing acceptable qualitative and quantitative data. Besides instrument calibration, ICV samples are analyzed at the beginning of an analytical run, and CCV samples are analyzed at a required frequency of one per 10 samples.

In addition to laboratory instrument calibration standards, radiochemical analyses have required quantification standards. Quantification standards allow assessment of the validity of very low-level results. All radiochemical results reported are to include the calculated two-sigma total propagated uncertainty (TPU) and MDC as quantification standards.

Radiochemical results are qualified with a “J” flag (estimated) when the result is greater than the MDC, but less than three times the MDC. Radiochemical results are qualified with a “U” flag (not detected) when the result is less than the TPU and/or the MDC.

Isotopic Thorium by Alpha Spectroscopy, Thorium-230, and Thorium-232

Some thorium-230 and throrium-232 results from SDG 1105096 did not meet quantification standards and were flagged “J” (see Table 4 for samples and reasons). In addition, isotopic thorium results from 1105202-3 did not meet the requested MDC, but since all isotopic thorium results were more than five times the MDC, no isotopic thorium results were flagged. ALS issued a non-conformance report as required.

Isotopic Uranium by Alpha Spectroscopy, Uranium-234, Uranium-235, and Uranium-238

Isotopic uranium results from 1105202-3 did not meet the requested MDC, but since all isotopic uranium results were more than 5 times the MDC, no isotopic uranium results were flagged. ALS issued a non-conformance report as required.

Gamma Spectroscopy, Europium-152, Lead-212, Potassium-40, Uranium-235, and Yttrium-88

Some europium-152, lead-212, potassium-40, uranium-235, and yttrium-88 results from both SDGs did not meet quantification standards and were flagged “J” (see Table 4 for samples and reasons). Uranium-235 results from SDG 1105096 did not meet quantification standards and were flagged “U” (see Table 4 for samples and reasons).

Tracer Recovery, Radiochemical Analysis

Tracer recovery is an addition of a known quantity of radioactive or chemically similar material to a sample prior to chemical separation and is used to determine the amount of the analyte recovered.

Isotopic Uranium by Alpha Spectroscopy, Uranium-234, Uranium-235, and Uranium-238

Sample 1105202-2 had an isotope tracer recovery less than 30 percent but above 10 percent, so all isotopic uranium results were flagged “J” for reason TR-4.

Matrix Spike and Replicate Analysis

MS sample analysis, performed at a frequency of one per 20 samples unless otherwise noted, is a measure of the ability to recover analytes in a particular matrix. RS analysis consists of MSD samples and/or field duplicates, analyzed at a frequency of one per 20 samples per method or per procedural requirements. RSs are indicators of laboratory precision for each sample matrix.

Method EPA 350.1, Ammonia

The ammonia MS sample selected for testing matrix specific quality control was not from SDG 1105096. All ammonia results from this SDG were flagged “J” for reason MS-1. There was no MSD or field DUP, so all ammonia results from this SDG were also flagged “J” for reason RS-1.

Method EPA 7470A, Mercury

The mercury MS sample selected for testing matrix-specific quality control was not from SDG 1105096. All mercury results from this SDG were flagged “J” for reason MS-1.

There was no MSD or field DUP, so all mercury results from this SDG were also flagged “J” for reason RS-1.

Method EPA 6010B, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, Zirconium

The metals MS samples selected for testing matrix-specific quality control were not from SDG 1105096 or from SDG 1105202. Various metal results from both SDGs were flagged “J” for reason MS-1. There was no MSD or field DUP, so all the listed metals results from both SDGs were also flagged “J” for reason RS-1. See Table 4 for specific metals flagged results.

Method EPA 6020A, Uranium

The uranium MS samples selected for testing matrix-specific quality control were not from SDG 1105096 or from SDG 1105202. All the uranium results from both SDGs were flagged “J” for reason MS-1. There was no MSD or field DUP, so all uranium results from both SDGs were also flagged “J” for reason RS-1.

Laboratory Control Samples

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. All LCSs for all analytes passed requirements.

Method and Calibration Blanks

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

According to the case narratives, all ICBs and CCBs for all analytes passed requirements, except in the isotopic uranium MB for SDG 1105096. However, all uranium-234, uranium-235, and uranium-238 results are more than five times the concentrations in the MB, so according to procedure, no results are flagged.

Metals Serial Dilution

SD samples were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. ICP-MS SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the RL. ICP-atomic emission spectroscopy (AES) SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the RL.

Method EPA 6020A, Uranium

The uranium SD samples selected for testing matrix chemical or physical interference were not from SDG 1105096 or from SDG 1105202. All the uranium results from both SDGs were flagged “J” for reason SD-1.

Radionuclide Interference

Certain radiochemical element identifications are based upon activity at certain energy emissions. However, in certain cases, multiple radioactive elements produce emissions at the same energy. ALS keeps a library of such interferences for all Moab Project samples for evaluation of interfering elements.

Gamma Spectroscopy, Thorium-234 and Uranium-235

Based on the ALS Gamma Spectroscopy Library, the thorium-234 and uranium-235 results from sample 1105202-3 are larger due to other radionuclide interference and are flagged with a “J” for reason NI-2.

Equipment Blanks

An EB is a sample of analyte-free media collected from a rinse of non-dedicated sampling equipment used to sample surface water. EBs are collected to document adequate decontamination of non-dedicated equipment. One EB should be prepared with each preparation batch. All samples were collected using dedicated equipment. As a result, it was not necessary to collect any EBs.

Completeness

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

Electronic Data Deliverable Files

The EDD files arrived on June 1, 2011 (SDG 1105096) and on June 24, 2011 (SDG 1105202). The contents of the EDD files were manually examined to verify that the sample results accurately reflected the data contained in each SDG and that all and only the requested data were delivered.

3.2.2 Minimums and Maximum Reports and Anomalous Data Review

There was no Minimums and Maximums Report generated for this event, as the exact locations off the evaporation pond have not been previously sampled, and the excavation pore water has been sampled less than five times. As a result, there are no anomalous data associated with this event.

3.3 May 2011 Site-Wide Sampling Event

3.3.1 Laboratory Performance Assessment

This validation was performed according to the *Standard Practice for Validation of Laboratory Data*. The procedure was applied at Level 1, Data Deliverables Examination. All analyses were successfully completed.

General Information and Validation Results

RIN: 1105059
Laboratory: ALS Environmental, Fort Collins, Colorado
SDG Numbers: 1105305, 1105380, 1105436, 1106155
Analysis: Inorganics and Metals.
Validator: Rachel Cowan
Review Date: August 19, 2011

The samples were prepared and analyzed using accepted procedures, which are shown in Table 6.

Table 6. May 2011 Site-Wide Sampling Analytes and Methods

Analyte	Prep Method	Analytical Method
Ammonia	EPA 350.1	EPA 350.1
Total Dissolved Solids	EPA 160.1	EPA 160.1
Uranium (Total)	SW-846 3005A	EPA 6020A

Data Qualifier Summary

Analytical results were qualified as listed in Table 7. Refer to Table 8 for an explanation of the data qualifiers applied.

Table 7. May 2011 Site-Wide Sampling Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
1106155-1, -6, -7, -11	0411, 0433, 0434, 0453	Ammonia	J	MS-2
All 1105305 samples	All 1105305 locations	Uranium	J	LCS-1, MS-1, RS-1
1105380-6, -9	0444, 0457, SMI-PW03	Ammonia	J	MS-1

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

Table 8. May 2011 Site-Wide Sampling Reason Codes for Data Flags

Reason Code	Qualifier (Detects)	Qualifier (Non-Detects)	Explanation
LCS-1	J	U	An LCS was not analyzed.
MS-1	J	U	Not enough MS samples were analyzed according to analyte validation procedures.
MS-2	J	U	The MS result was less than 80% recovery.

Sample Shipping/Receiving

ALS Environmental in Fort Collins, Colorado, received a total of 51 samples for RIN 11005059 in four shipments of one cooler each. SDG 1105305 of 12 samples arrived on May 20, 2011, SDG 1105380 of 14 samples arrived on May 25, 2011, SDG 1105436 arrived on May 27, 2011, and SDG 1106155 of 14 samples arrived on June 10, 2011. Each SDG was 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 four coolers were received intact with the temperatures inside the coolers ranging from 0.4° to 3.8°C, which comply with requirements. 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 results were found to be within quality-control procedures except for the following.

Laboratory Instrument Calibration and Quantification

Compliance requirements for satisfactory instrument calibration are established to ensure the instrument is capable of producing acceptable qualitative and quantitative data for all analytes. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear curve. Compliance requirements for continuing calibration checks are established to ensure the instrument continues to be capable of producing acceptable qualitative and quantitative data. Besides instrument calibration, ICV samples and CCV samples are analyzed at a required frequency of one per 10 samples. Quantification evaluations allow assessment of very low-level results as to their validity.

In addition to laboratory instrument calibration standards, radiochemical analyses have required quantification standards. All radiochemical results reported are to include the calculated two-sigma TPU and MDC as quantification standards. Radiochemical results are qualified with a “J” flag (estimated) when the result is greater than the MDC, but less than three times the MDC. Radiochemical results are qualified with a “U” flag (not detected) when the result is less than the TPU and/or the MDC. All instrument calibration requirements were met.

Matrix Spike and Replicate Analysis

MS sample analysis, performed at a frequency of one per 20 samples unless otherwise noted, is a measure of the ability to recover analytes in a particular matrix. RS analysis consists of MSD samples and field DUPs, analyzed at a frequency of one per 20 samples per method or procedural requirements. These RSs are indicators of laboratory precision for each sample matrix.

Method EPA 350.1, Ammonia

The SDG 1106155 ammonia MS failed, and the detectable ammonia results were flagged “J” for MS-3. In addition, not enough MS samples were selected for the number of samples in SDG 1105380, according to the procedure. Samples 1105380-6 through -9 were flagged “J” for reason MS-1.

Method EPA 6020A, Uranium

No SDG 1105305 samples were selected for uranium results quality assurance. All SDG 1105305 uranium results were flagged “J” for MS-1.

Laboratory Control Samples

LCSs provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. LCS results were acceptable for all analyses except that LCSs were not reported for uranium.

As a standard practice, ALS does not prepare LCSs for samples that were field-filtered and acidified and run directly on the instrument without any additional sample preparation. Per national environmental laboratory accreditation requirements provided by The NELAC Institute, an MS may be used in place of an LCS provided the acceptance criteria are as stringent.

Therefore, no qualification for SDGs 1105155 and 1105380, and SDG 1105436 was required due to of lack of LCS results because the MS results for uranium were acceptable. See the MS and Replicate Analysis section for required qualification. However, no SDG 1105305 samples were selected for uranium results quality assurance, so all SDG 1105305 uranium results were flagged “J” for LCS-1.

Method and Calibration Blanks

MBs are analyzed to assess any contamination that may have occurred during sample preparation. ICBs and CCBs are analyzed to assess instrument contamination prior to and during sample analysis. Detected sample results associated with blanks results greater than the MDL or IDL (depending on method requirements) were “J”-qualified when the detections were less than five times the associated blank concentration. Non-detects were not qualified. All blanks passed these criteria except that, according to the case narratives, all ICBs and CCBs for all analytes passed requirements.

Metals Serial Dilution

SD samples were prepared and analyzed for the metals analyses to monitor chemical or physical interferences in the sample matrix. ICP-MS SD data are evaluated when the concentration of the undiluted sample is greater than 100 times the RL. ICP-AES SD data are evaluated when the concentration of the undiluted sample is greater than 50 times the RL. All evaluated SD data were acceptable with the following exception. According to the case narratives, all SDs for all analytes passed requirements. However, since no SDG 1105305 samples were selected for uranium results quality assurance, all SDG 1105305 uranium results were flagged “J” for SD-1.

Equipment Blanks

An EB is a sample of analyte-free media collected from a rinse of non-dedicated sampling equipment used to sample surface water. EBs are collected to document adequate decontamination of non-dedicated equipment. One EB should be prepared with each preparation batch. All samples were collected using dedicated equipment. As a result, it was not necessary to collect any EBs.

Completeness

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

Electronic Data Deliverable Files

The EDD files arrived on June 10, 20, 23, and July 6, 2011. The contents of the EDD files were manually examined to verify that the sample results accurately reflected the data contained and that all and only the requested data were delivered.

3.3.2 Minimums and Maximums Report and Anomalous Data Review

The Minimums and Maximums Report for this sampling event is located in Appendix C. Based on the results, there were two anomalous data points, both of which were more than 50 percent below the historical minimum, as in Table 9.

Table 9. Anomalous Data Associated With the May 2011 Site-Wide Sampling Event

Location	Sample Date	Analyte	Concentration (mg/L)	Historical Minimum (mg/L)	Disposition
AMM-2	05/19/2011	Uranium	0.49	1.9	Concentration may be impacted by nearby flood irrigation
SMI-PZ1S	05/25/2011	TDS	3200	8400	Concentration may be impacted by nearby flood irrigation

mg/L = milligrams per liter

4.0 Results

Based on the results of the Minimums and Maximums Report, there were a total of six anomalous data points, all of which established a new historic minimum. No data were rejected (flagged as “R”) as a result of this validation process.

4.1 April 2011 CF4 and CF5 Sampling Event

As previously mentioned, the samples collected from the CF4 monitoring wells were analyzed exclusively for uranium, while the samples collected from the CF5 locations were analyzed for both ammonia and uranium. Table 10 presents the CF4 and CF5 locations (and associated concentration) that exceeded the 0.044 milligram per liter (mg/L) uranium ground water standard. The uranium standard is based on Table 1 in Title 40 Code of Federal Regulations Part 192, Subpart A (40 CFR 192A), “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings and Uranium In Situ Leaching Processing Facilities,” assuming uranium-234 and uranium-238 activities are in equilibrium.

Table 10. CF4 and CF5 Locations Exceeding the 0.044 mg/L Uranium Ground Water Standard

Well Number	Date	Location	Sample Depth (ft bgs)	Uranium Concentration (mg/L)
0781	4/27/2011	CF4 - Upgradient	48	0.2
0782	4/27/2011	CF4 - Upgradient	33	0.049
0783	4/27/2011	CF4 - Upgradient	18	0.17
0784	4/27/2011	CF4 - Downgradient	18	0.2
0785	4/27/2011	CF4 - Downgradient	18	0.096
0810	4/27/2011	CF5 Extraction Well	10.4 – 40.4	3.3
0811	4/27/2011	CF5 Extraction Well	8.6 – 38.6	2.9
0812	4/27/2011	CF5 Extraction Well	14.2 – 44.2	2.2
0813	4/27/2011	CF5 Extraction Well	14.4 – 44.4	1.5
0814	4/27/2011	CF5 Extraction Well	12.4 – 42.4	3.1
0815	4/27/2011	CF5 Extraction Well	21.7 – 51.7	3.7
0816	4/27/2011	CF5 Extraction Well	20.9 – 50.9	2.2
PW02	4/27/2011	CF5 Extraction Well	20.0 – 60.0	2.8

ft bgs = feet below ground surface

Figure 3 shows the time versus uranium concentration plot for the CF4 upgradient observation wells. As this plot exhibits, the freshwater injection reduced the uranium concentrations below 0.2 mg/L regardless of the depth in the portion of the subsurface soils located upgradient of the line of remediation wells. Figure 4 is a similar plot for the down gradient locations, where the concentrations of the samples exhibited a similar response to the freshwater injection. These downgradient locations are all approximately 30 ft from the line of injection wells.

Figure 5 is a ground water contour map of the CF4 area, displaying the hydraulic mound generated by the freshwater injection.

Time versus concentration plots were also generated to display the trends displayed by the CF5 extraction wells. Figure 6 is the time versus ammonia concentration plot for the extraction wells located along the CF5 southeastern boundary. Figure 7 displays time versus uranium concentration plot for the same set of wells. As both plots exhibit, the ammonia and uranium concentrations have generally been consistent since May 2010. The CF5 extraction wells are properly located as they will not pump dilute infiltrated river water in the summer and could be operated year round with a treatment plant.

Figures 8 and 9 are similar plots for the extraction wells along the northeastern CF5 boundary. These concentrations have also remained consistent over the past year. Figure 10 is a ground water contour map for CF5 generated using water level data collected in April 2011. The CF5 wells were extracting ground water at various pumping rates and associated drawdowns, as displayed in this figure.

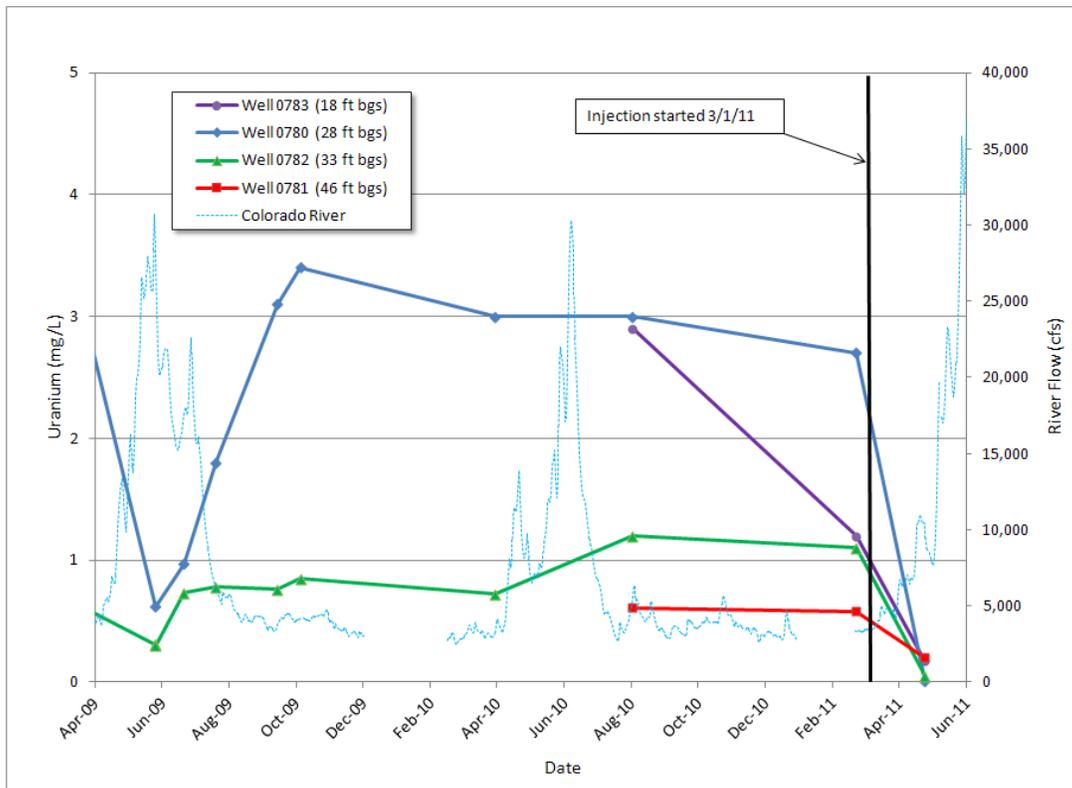


Figure 3. CF4 Upgradient Observation Wells 0780, 0781, 0782, and 0783 Time Versus Uranium Concentration Plot

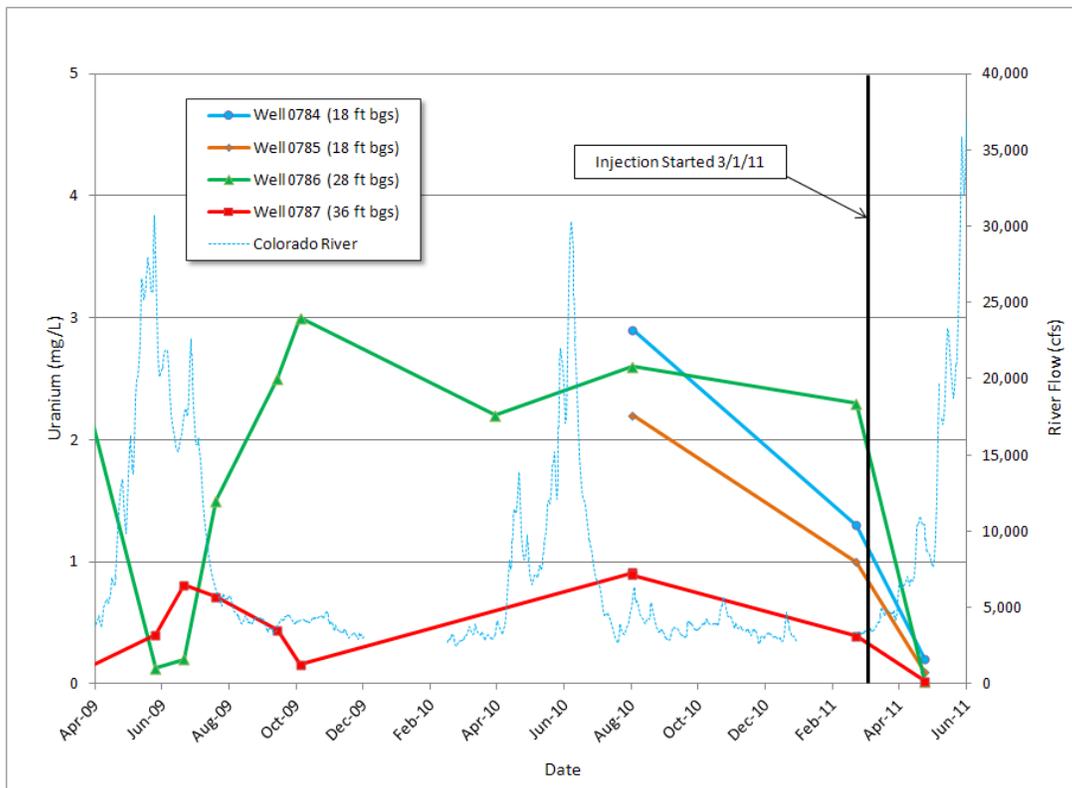


Figure 4. CF4 Downgradient Observation Wells 0784, 0785, 0786, and 0787 Time Versus Uranium Concentration Plot

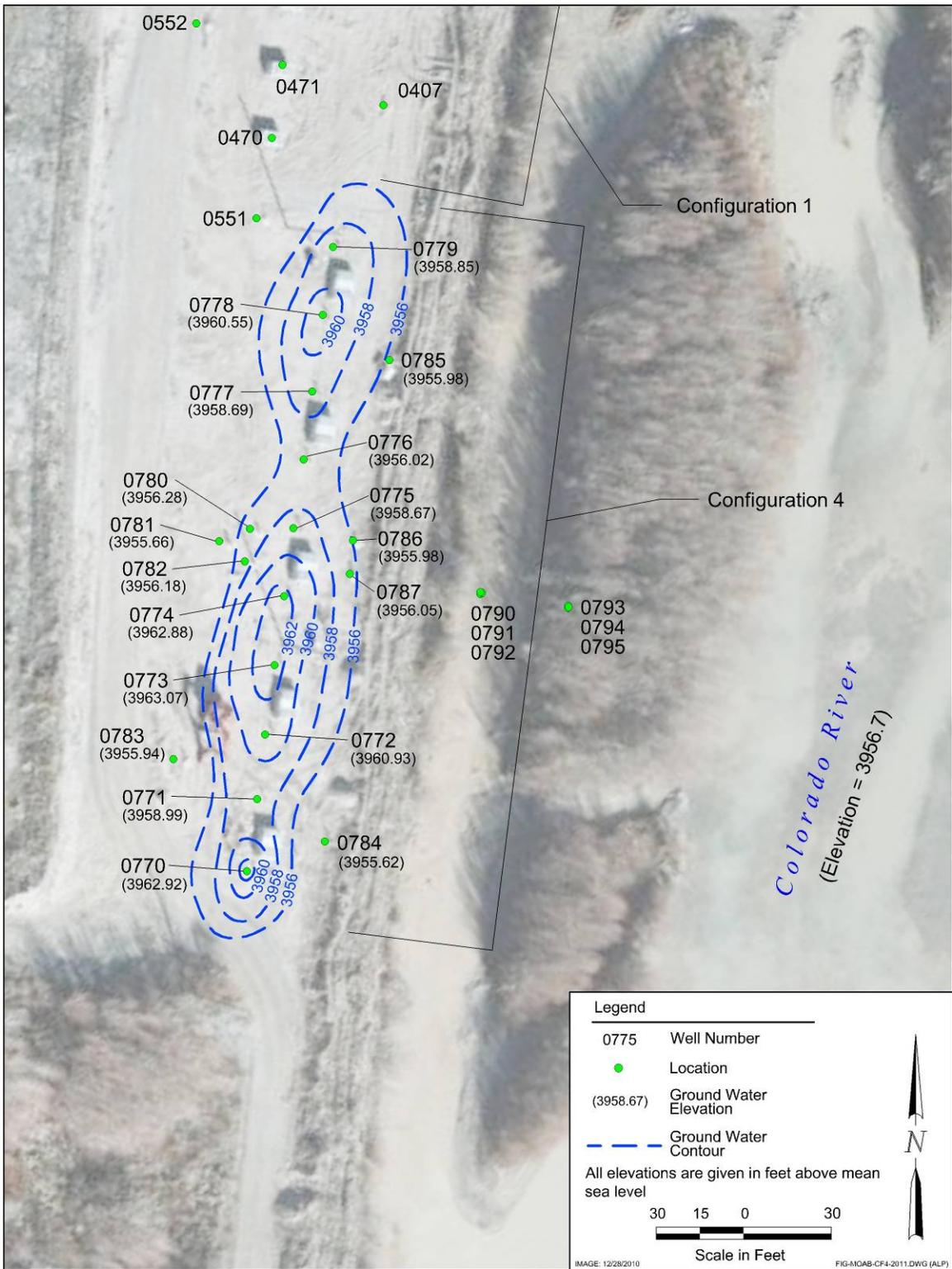


Figure 5. CF4 Ground Water Contour Map

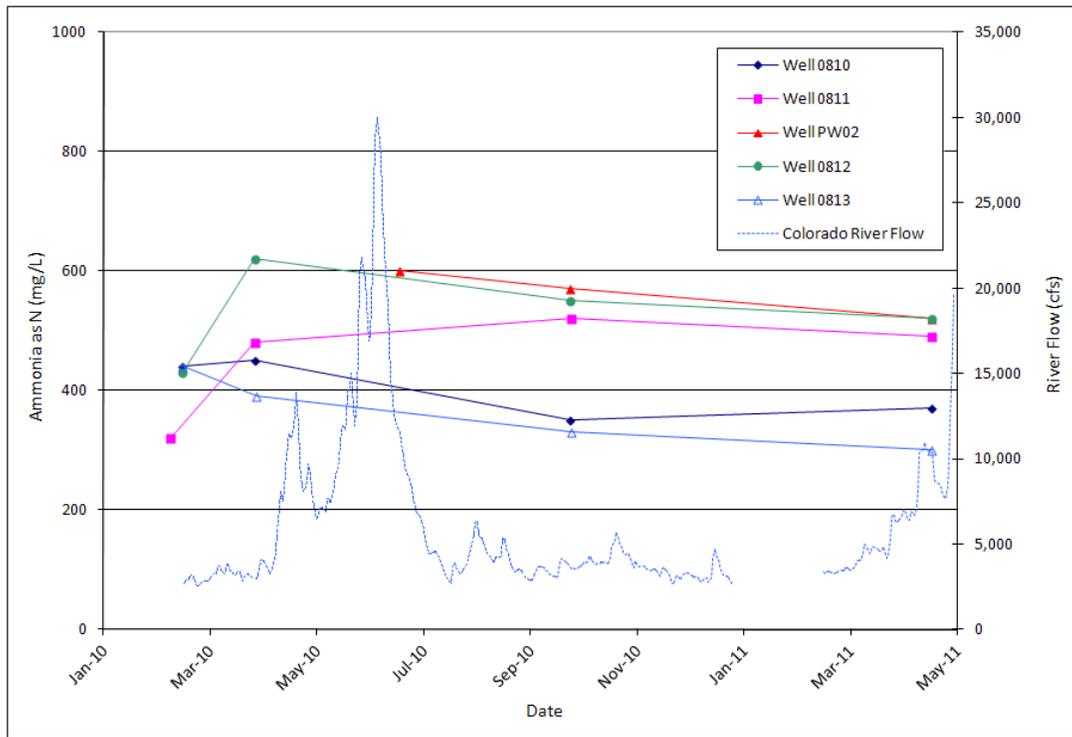


Figure 6. CF5 Extraction Wells 0810, 0811, 0812, 0813 and PW02 Time Versus Ammonia Concentration Plot

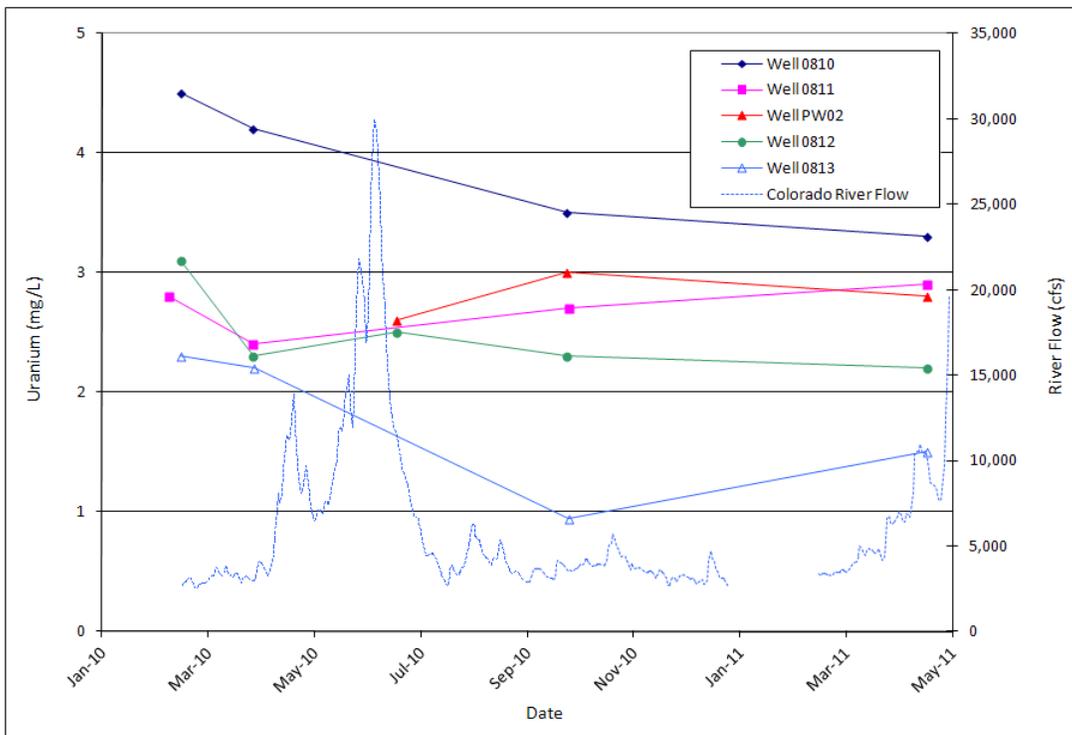


Figure 7. CF5 Extraction Wells 0810, 0811, 0812, 0813 and PW02 Time Versus Uranium Concentration Plot

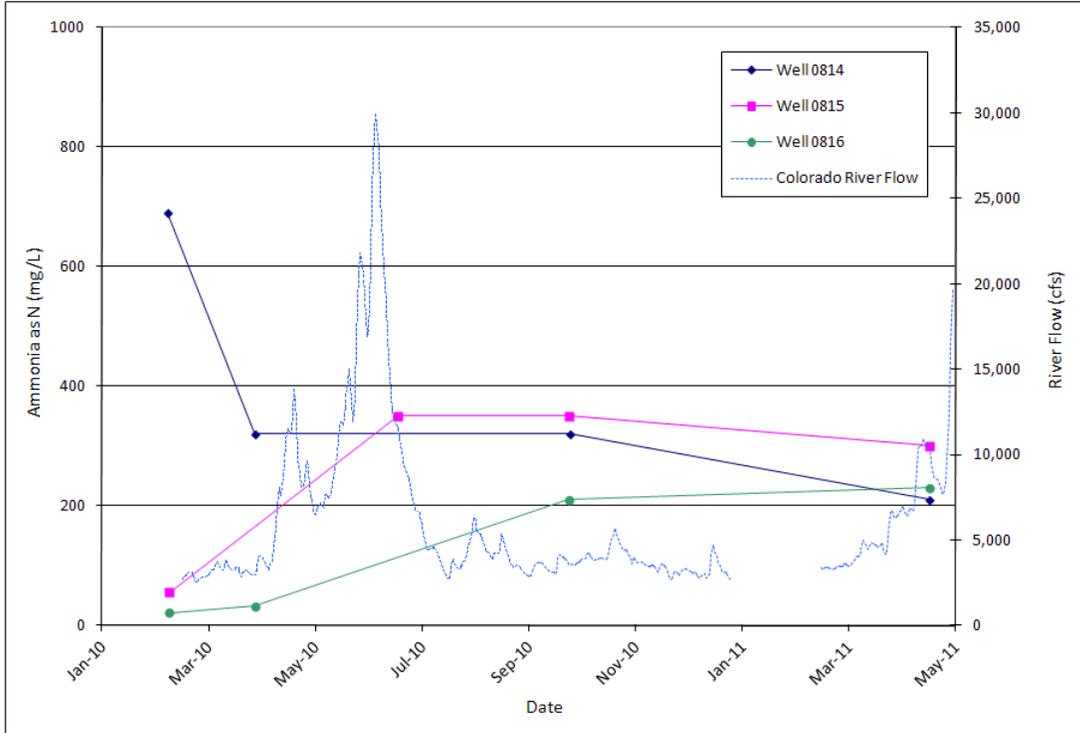


Figure 8. CF5 Extraction Wells 0814, 0815, and 0816
Time Versus Ammonia Concentration Plot

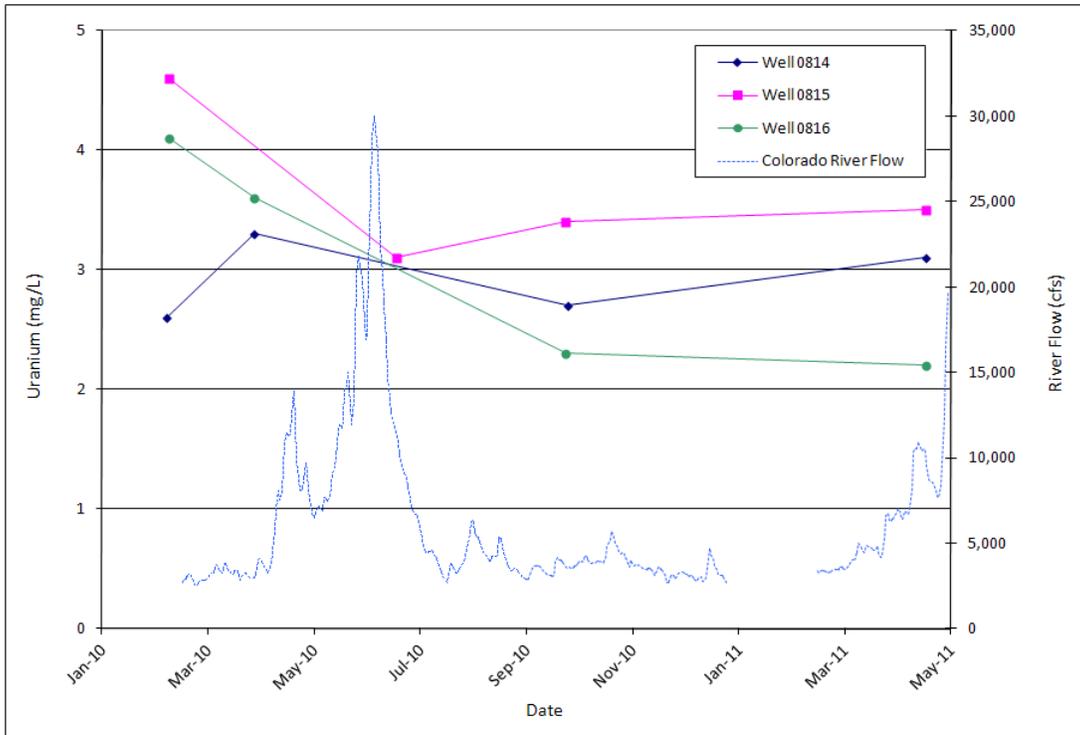


Figure 9. CF5 Extraction Wells 0814, 0815, and 0816
Time Versus Uranium Concentration Plot

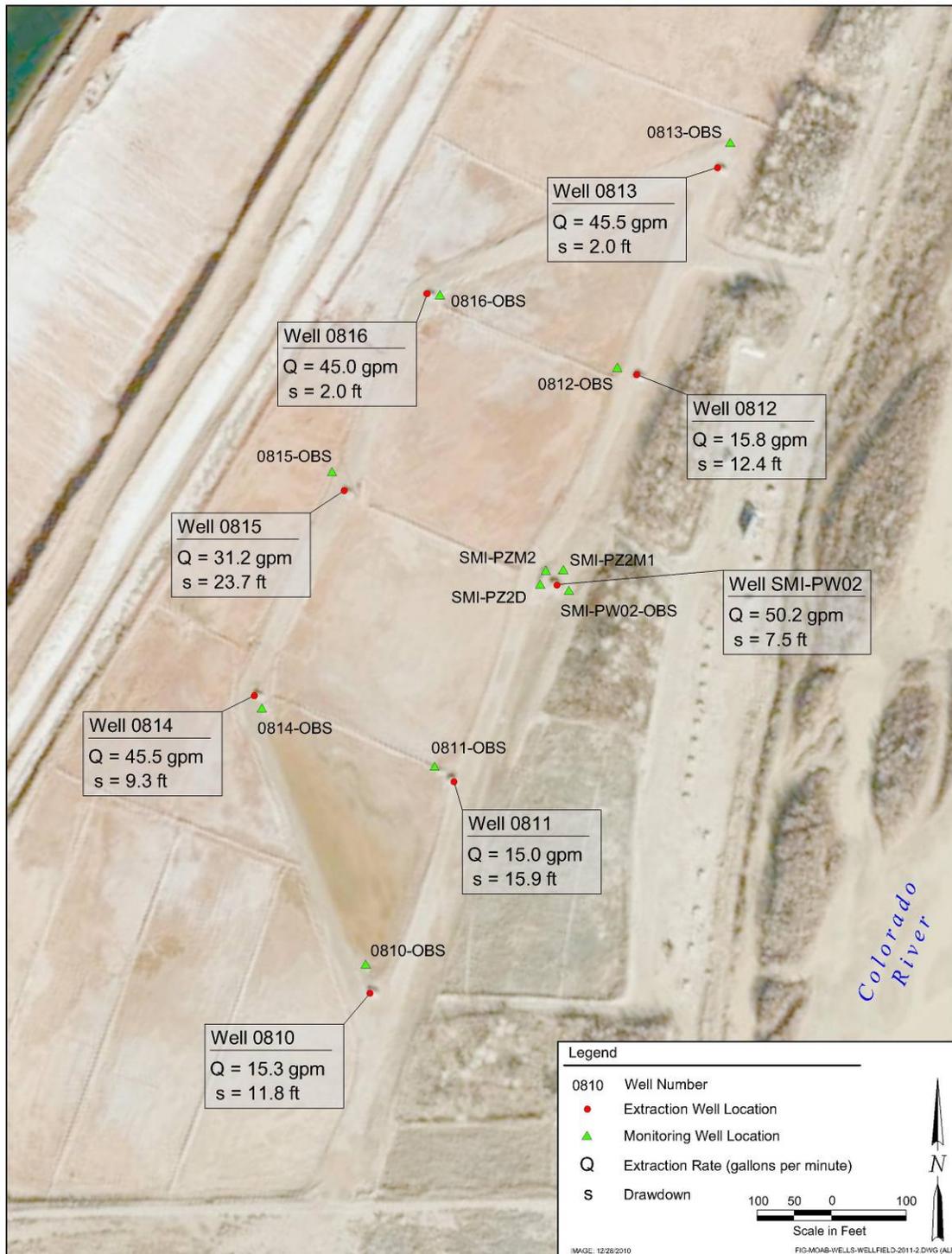


Figure 10. CF5 Pumping Rates and Drawdowns, April 2011

4.2 May 2011 Evaporation Pond and Excavation Seep Sampling Event

Table 11 presents a comparison between the analytical results of excavation seep samples collected in June 2010 and the May 2011 events. Despite the fact that these samples were not collected in exactly the same location, the pore water sampled contained similar contaminant concentrations.

Table 11. Analytical Results for the Excavation Seep Samples

Analyte	Unfiltered Concentration June 2010	Unfiltered Concentration May 2011
Ammonia	15,000 mg/L	12,000 mg/L
Fluoride	84 mg/L	84 mg/L
Aluminum	1,000 mg/L	1,100 mg/L
Antimony	0.150 mg/L	0.015mg/L
Arsenic	0.200 mg/L	0.43mg/L
Barium	0.009 mg/L	0.12 mg/L
Beryllium	0.089 mg/L	0.11 mg/L
Cadmium	2.5 mg/L	1.7 mg/L
Calcium	560 mg/L	390 mg/L
Chromium	1.8 mg/L	1.7 mg/L
Cobalt	15 mg/L	8.7 mg/L
Copper	88 mg/L	77 mg/L
Iron	2,600 mg/L	2,200 mg/L
Lead	0.068 mg/L	0.43 mg/L
Magnesium	10,000 mg/L	7,700 mg/L
Manganese	310 mg/L	280 mg/L
Nickel	10 mg/L	4.1 mg/L
pH	3.24 mg/L	4.39 mg/L
Potassium	1,100 mg/L	940 mg/L
Selenium	4 mg/L	3 mg/L
Silver	0.054 mg/L	0.019 mg/L
Specific Conductance	113,346 μ mhos/cm	133,905 μ mhos/cm
Sodium	18,000 mg/L	3,500 mg/L
Thallium	0.180 mg/L	0.18 mg/L
Uranium	5.3 mg/L	9.4 mg/L
Vanadium	46 mg/L	50 mg/L
Zinc	68 mg/L	35 mg/L
Thorium-228	28 +/- 18 pCi/L	53 +/- 24 pCi/L
Thorium-230	151000 +/- pCi/L	2266000 +/- 64000 pCi/L

Table 11. Analytical Results for the Excavation Seep Sample (continued)

Analyte	Unfiltered Concentration June 2010	Unfiltered Concentration May 2011
Uranium-234	2270 +/- 350 pCi/L	3830 +/- 890 pCi/L
Uranium-235	125 +/- 24 pCi/L	250 +/- 120 pCi/L
Uranium-238	2350 +/- 370 pCi/L	3360 +/- 800 pCi/L
Americum-241	-45 +/- 18 pCi/L	52 +/- 39 pCi/L
Cerium-144	-2 +/- 31 pCi/L	17 +/- 29 pCi/L
Cobalt-60	1.5 +/- 4.4 pCi/L	-0.7 +/- 4.5 pCi/L
Cesium-134	-4 +/- 3.8 pCi/L	0.2 +/- 5.3 pCi/L
Cesium-137	0.4 +/- 4.0 pCi/L	-2.6 +/- 6.1 pCi/L
Europium-152	14.9 +/- 10 pCi/L	18.6 +/- 9.4 pCi/L
Europium-154	-42 +/- 36 pCi/L	-110 +/- 41 pCi/L
Europium-155	-19 +/- 15 pCi/L	-13 +/- 15 pCi/L
Potassium-40	670 +/- 130 pCi/L	720 +/- 140 pCi/L
Lead-212	37 +/- 11 pCi/L	42 +/- 11 pCi/L
Promethium-144	7.1 +/- 4.4 pCi/L	5.1 +/- 4.4 pCi/L
Promethium-146	1.0 +/- 4.7 pCi/L	0.6 +/- 4.6 pCi/L
Ruthenium-106	-9 +/- 38 pCi/L	-4 +/- 36 pCi/L
Thorium-234	2010 +/- 260 pCi/L	3200 +/- 400 pCi/L
Yttrium-88	6.1 +/- 4.9 pCi/L	1.8 +/- 5.5 pCi/L
Actinium-228	25 +/- 20 pCi/L	18 +/- 16 pCi/L
Nitrite as N	NA	5 mg/L
Nitrate as N	NA	970 mg/L

NA = not applicable; NH₃-N = ammonia;
 µmhos/cm = micromhos per centimeter; pCi/L = picocuries per liter

Table 12 provides a summary of the analytical results from the samples collected from the evaporation pond. The June 2010 data is provided for comparison reasons. As the results indicate, there was not a significant difference between the samples collected from the north and south ends of the pond, as well as the different depths. All results were also comparable to the concentrations measured in June 2010.

Table 12. Analytical Results for the Water Stored in the Evaporation Pond (Location 0548)

Analyte	Unfiltered Concentration June 2010 (mg/L, except where noted)	Unfiltered Concentration May 2011 (mg/L, except where noted)			
		0548-N-1	0548-N-12	0548-S-1	0548-S-12
Ammonia	3,500	590	650	580	570
Aluminum	100	0.09	0.65	0.13	0.5
Antimony	ND	ND	ND	ND	ND
Arsenic	ND	0.0066	0.0045	0.0039	0.0051
Barium	ND	0.013	0.013	0.013	0.013
Beryllium	ND	ND	ND	ND	ND
Cadmium	0.47	0.024	0.031	0.023	0.021
Calcium	510	400	390	400	400
Chromium	ND	ND	ND	ND	0.002
Cobalt	2.6	0.12	0.15	0.11	0.11
Copper	12	0.22	0.36	0.19	0.22
Iron	140	0.089	0.88	0.087	0.73
Lead	ND	ND	ND	ND	ND
Magnesium	2,300	790	830	780	770
Manganese	62	5.7	6.1	5.3	5.4
Nickel	2.3	0.12	0.14	0.11	0.11
pH	4.44	7.81	7.74	7.76	7.71
Potassium	530	300	340	320	300
Selenium	0.560	0.047	0.055	0.044	0.039
Silver	ND	ND	0.0013	ND	ND
Specific Conductance	71,942 μ mhos/cm	35,868 μ mhos/cm	36,640 μ mhos/cm	35,070 μ mhos/cm	35,290 μ mhos/cm
Sodium	14,000	6,000	5,500	5,700	6,200
TDS	NA	30,000	27,000	27,000	30,000
Thallium	ND	ND	0.0063	ND	0.0057
Uranium	3.3	2.5	2.4	2.5	2.5
Vanadium	ND	0.008	0.018	0.0089	0.038

Table 12. Analytical Results for the Water Stored in the Evaporation Pond (Location 0548) (continued)

Analyte	Unfiltered Concentration June 2010 (mg/L, except where noted)	Unfiltered Concentration May 2011 (mg/L, except where noted)			
		0548-N-1	0548-N-12	0548-S-1	0548-S-12
Zinc	12	0.39	0.53	0.33	0.35
Thorium-228	ND	ND	ND	ND	ND
Thorium-230	1970 +/- 320 pCi/L	7 +/- 1.5 pCi/L	57.9 +/- 10 pCi/L	11.4 +/- 2.5 pCi/L	254 +/- 42 pCi/L
Thorium-232	0.9 +/- 1.3 pCi/L	ND	ND	0.58 +/- 0.38 pCi/L	0.56 +/- 0.23 pCi/L
Thorium-234	600 +/- 120 pCi/L	667 +/- 95 pCi/L	390 +/- 100 pCi/L	324 +/- 94 pCi/L	563 +/- 87 pCi/L
Uranium-234	2990 +/- 490 pCi/L	820 +/- 140 pCi/L	870 +/- 160 pCi/L	850 +/- 150 pCi/L	890 +/- 200 pCi/L
Uranium-235	139 +/- 25 pCi/L	39.3 +/- 9.4 pCi/L	55 +/- 22 pCi/L	46 +/- 20 pCi/L	40 +/- 11 pCi/L
Uranium-238	2990 +/- 490 pCi/L	820 +/- 140 pCi/L	880 +/- 170 pCi/L	860 +/- 160 pCi/L	870 +/- 190 pCi/L
Americum-241	ND	ND	ND	ND	ND
Cerium-144	ND	ND	ND	ND	ND
Cobalt-60	ND	ND	ND	ND	ND
Cesium-134	ND	ND	ND	ND	ND
Cesium-137	ND	ND	ND	ND	ND
Europium-152	ND	ND	ND	ND	ND
Europium-154	ND	ND	ND	ND	25 +/- 12 pCi/L
Europium-155	ND	ND	ND	ND	ND
Potassium-40	335 +/- 97 pCi/L	225 +/- 54 pCi/L	196 +/- 83 pCi/L	128 +/- 75 pCi/L	170 +/- 52 pCi/L
Lead-212	ND	ND	ND	ND	ND
Promethium-144	ND	ND	ND	ND	ND
Promethium-146	ND	ND	ND	ND	ND
Ruthenium-106	ND	ND	ND	ND	ND
Antimony-125	ND	ND	ND	ND	ND
Yttrium-88	ND	4.2 +/- 2 pCi/L	10.2 +/- 6.2 pCi/L	8.6 +/- 5.1 pCi/L	
Actinium-228	ND	ND	ND	ND	

µmhos/cm = micro mhos per centimeter; NA = not applicable; ND = non-detects; NH₃-N = ammonia; pCi/L = picocuries per liter

4.3 May 2011 Site-Wide Sampling Event

Table 13 presents the site-wide locations (and associated concentration) that exceeded the 0.044 mg/L uranium ground water standard. All locations are shown in Figure 2. The uranium standard is based on Table 1 in 40 CFR 192A, assuming uranium-234 and uranium-238 activities are in equilibrium.

Table 13. Site-Wide Locations Exceeding the 0.044 mg/L Uranium Ground Water Standard

Well Number	Date	Location	Sample Depth (ft bgs)	Uranium Concentration (mg/L)
0401	05/25/2011	CF2 Vicinity	18	1.7
0404	05/23/2011	CF3 Vicinity	18	0.71
0410	05/24/2011	Uranium Plume Area	25	0.92
0411	06/07/2011	Uranium Plume Area	9	6.1
0412	05/23/2011	Uranium Plume Area	10.5	3.2
0413	05/26/2011	Uranium Plume Area	10.5	1.3
0414	05/23/2011	Uranium Plume Area	6.5	4.9
0453	06/07/2011	Along SW Site Boundary	80	0.7
0454	05/25/2011	Along S Site Boundary	13	2.1
0492	05/18/2011	Along S Site Boundary	18	0.48
AMM-2	05/19/2011	Near Base of Tailings Pile	48	2
AMM-3	05/26/2011	Near Base of Tailings Pile	48	3.4
SMI-PW01	05/25/2011	CF5 Vicinity	40	3
SMI-PW03	05/24/2011	Uranium Plume Area	40	1.3
SMI-PZ1S	05/25/2011	CF5 Vicinity	18	0.68
SMI-PZ2D	05/25/2011	CF5 Vicinity	75	0.34
SMI-PZ2M2	05/25/2011	CF5 Vicinity	56	0.68
SMI-PZ3D2	05/24/2011	Uranium Plume Area	78	2.1
SMI-PZ3M	05/24/2011	Uranium Plume Area	59	1.4
SMI-PZ3S	05/24/2011	Uranium Plume Area	25	1.1
TP-01	05/23/2011	Uranium Plume Area	22	0.078

ft bgs = feet below ground surface; S = southern; SW = southwestern

To present the trends observed in the water chemistry for the site-wide locations, the site was divided into six areas. These include the northeastern uranium plume (which includes the PW03 cluster), the base of the tailings pile, along the southwest boundary, along the riverbank, and south of the site areas. Time versus concentration plots were not generated for the upgradient locations, as the concentrations measured from samples collected at these locations are typically below the detection limit. All results are also plotted against the Colorado River flow to determine if the river stage may impact the concentrations.

Northeastern Uranium Plume Area

Figures 11 and 12 are the time versus ammonia and uranium concentration plots (respectively) for the northeastern uranium plume area. Figures 13 and 14 display comparable data for the PW03 cluster, which is located within this area.

As Figure 11 exhibits, the ammonia concentrations have in general decreased in the samples collected from wells 0411, 0413, and 0414 over the past year, while the concentrations in wells 0410 and 0412 are below the detection limit of 0.1 mg/L. Uranium concentrations (Figure 12) in wells 0411, 0412, and 0414 remain above 3 mg/L, while the uranium concentrations measured in the samples collected from wells 0410 and 0413 have consistently been at or below 1 mg/L.

Figures 13 and 14 are the time versus ammonia and uranium concentration plots (respectively) for the PW03 cluster, which is located near the center of the northeastern uranium plume area. These wells provide a vertical profile of the concentrations in this area, as wells are sampled from 25 (PZ3S), 59 (PZ3M), 78 (PZ3D2) and 195 feet below ground surface (ft bgs) (0436).

Elevated ammonia has been measured in the sample collected from PZ3D2 and, to a lesser degree, from PZ3M over the past two years. Uranium concentrations range between 1 and 2 mg/L from these same wells in addition to well PZ3S. At a depth of 195 ft bgs, neither ammonia or uranium have been present in detectable concentrations.

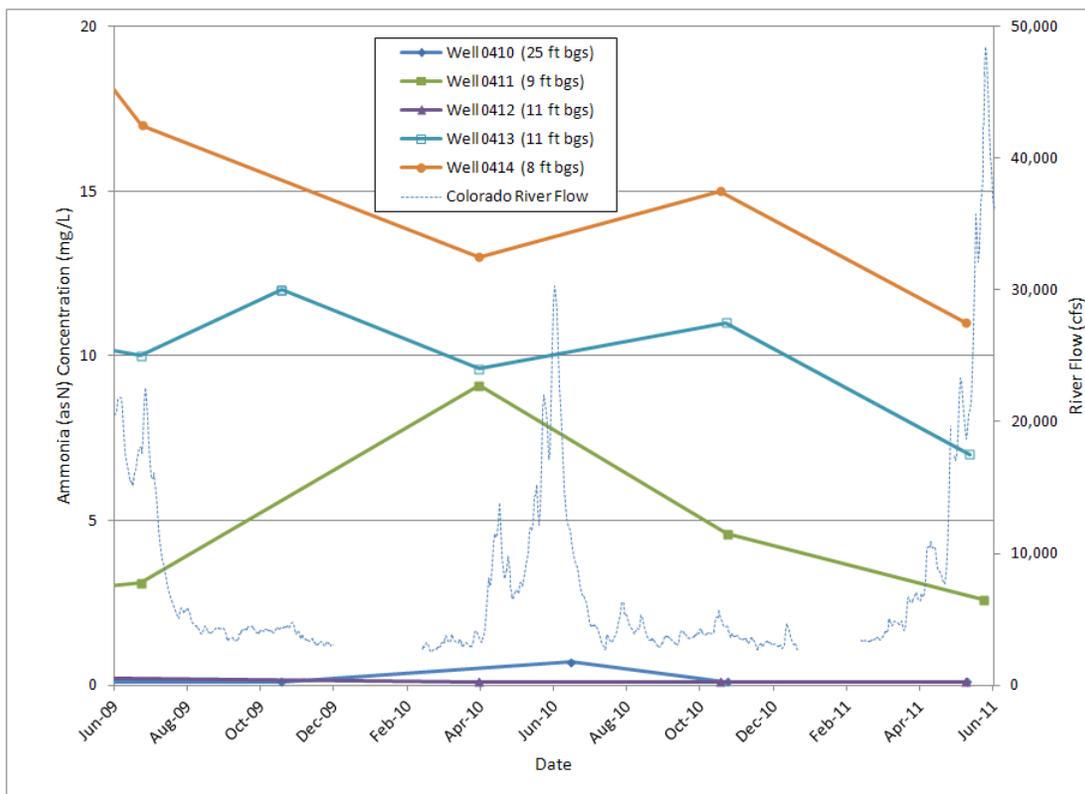


Figure 11. Northeastern Uranium Plume Observation Wells 0410, 0411, 0412, 0413, and 0414 Time Versus Ammonia Concentration Plot

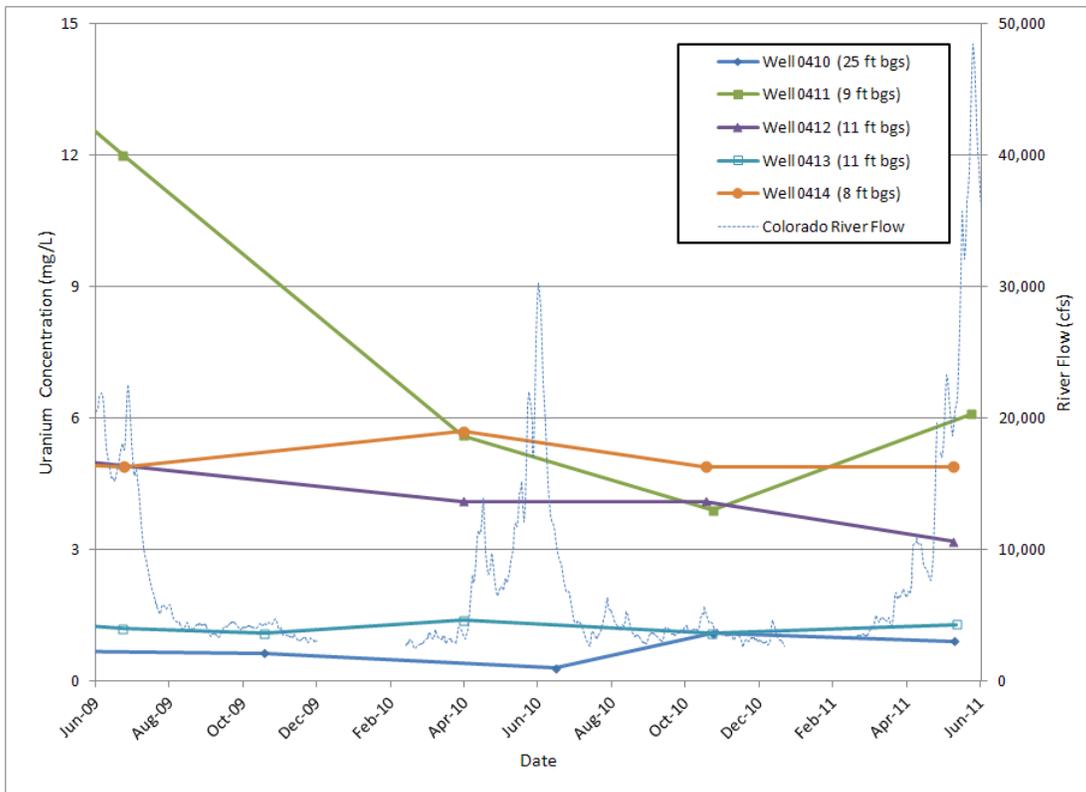


Figure 12. Northeastern Uranium Plume Observation Wells 0410, 0411, 0412, 0413, and 0414 Time Versus Uranium Concentration Plot

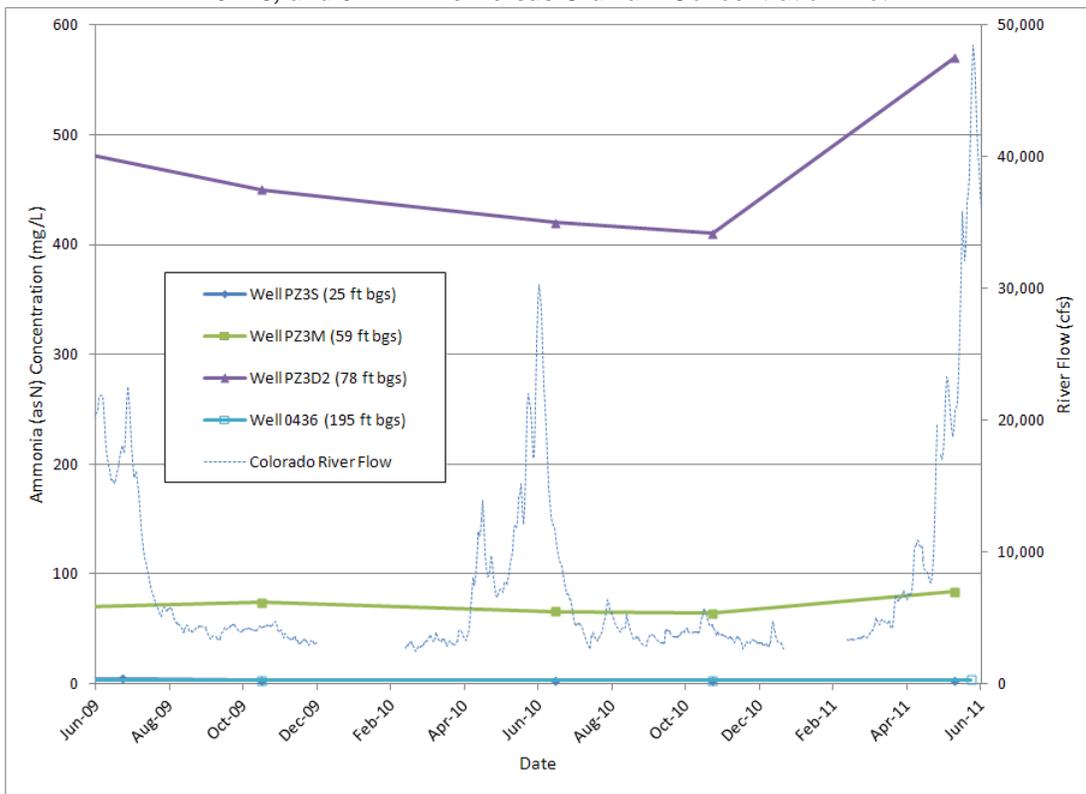


Figure 13. PW03 Cluster Observation Wells PZ3S, PZ3M, PZ3D2, and 0436 Time Versus Ammonia Concentration Plot

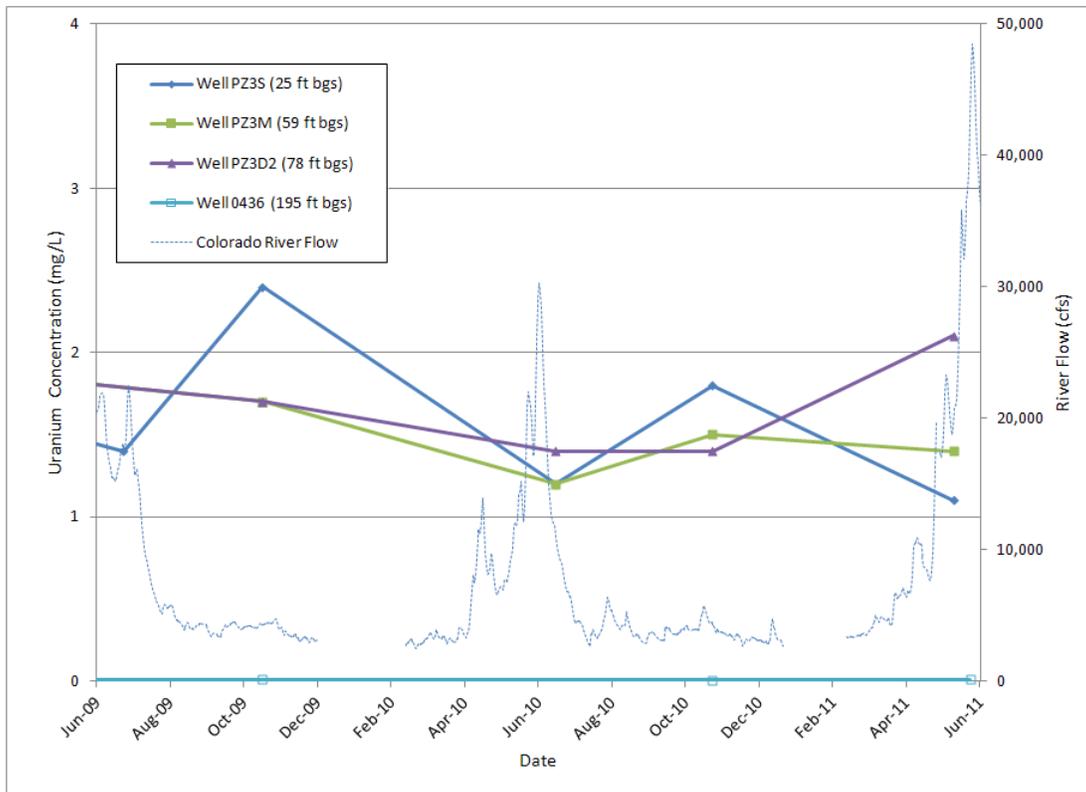


Figure 14. PW03 Cluster Plume Observation Wells PZ3S, PZ3M, PZ3D2, and 0436 Time Versus Uranium Concentration Plot

Base of the Tailings Pile

The time versus ammonia and uranium concentration plots for the area near the base of the tailings pile are presented as Figures 15 and 16. As Figure 15 exhibits, the ammonia concentrations have in general fluctuated independent of the river flow in the samples collected from wells AMM-3, ATP-2-S, ATP-2-D, and AMM-2 (listed from south to north). The ammonia concentration tends to increase further north and decreases at depth.

Uranium concentration (Figure 16) increased in the sample from well AMM-3 between October 2010 and May 2011, while the concentration measured in well AMM-2 remained consistent. The uranium concentration measured in the ATP wells has consistently been below 0.1 mg/L over the past 2 years.

Southwestern Boundary

Figures 17 and 18 display the time versus concentration plots for the locations along the southwest boundary (Figure 2), presented in the upgradient to downgradient direction. The two plots exhibit a similar trend for both ammonia and uranium concentrations, where the two most upgradient locations (0441 and 0440) have non-detectable or nearly non-detectable concentrations, and they tend to increase in the downgradient direction.

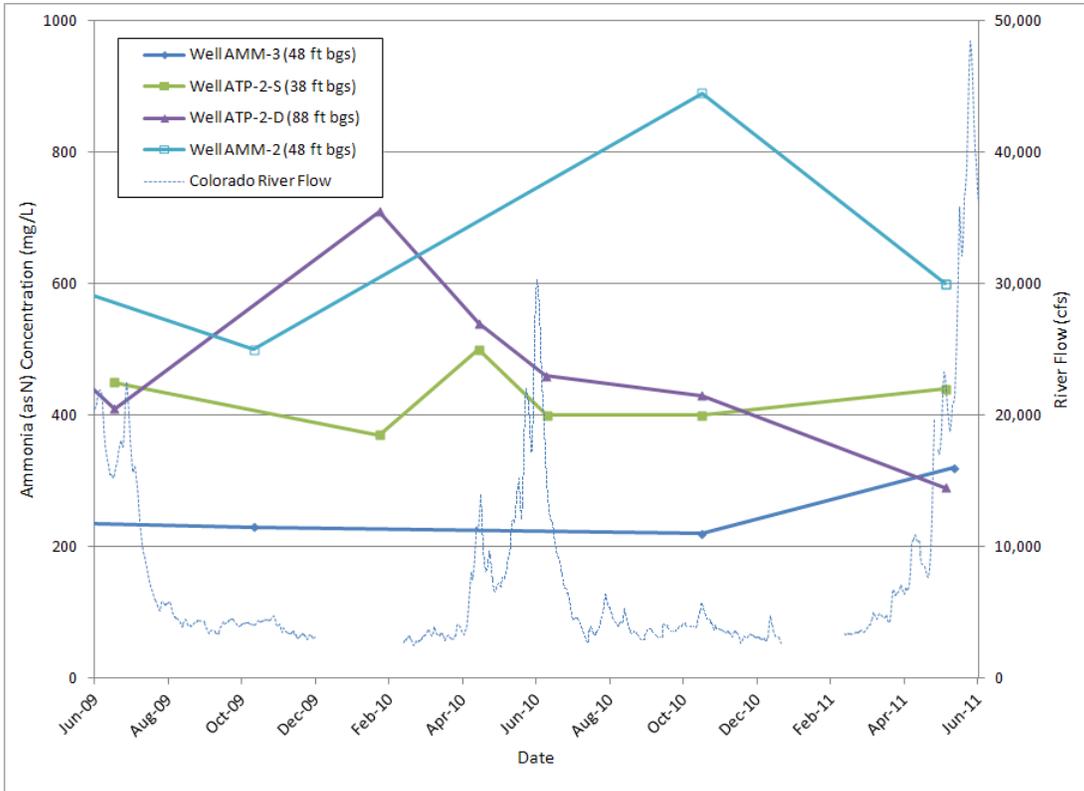


Figure 15. Base of Tailings Pile Observation Wells AMM-3, ATP-2-S, ATP-2-D, and AMM-2 Time Versus Ammonia Concentration Plot

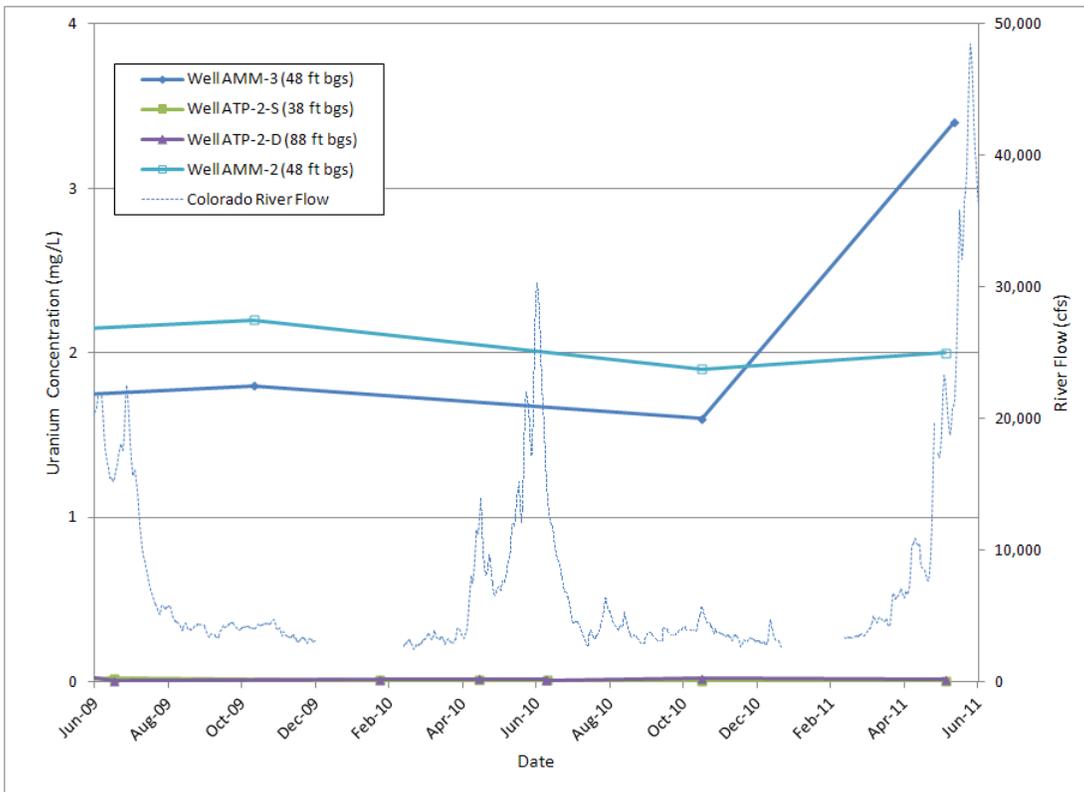


Figure 16. Base of Tailings Pile Observation Wells AMM-3, ATP-2-S, ATP-2-D, and AMM-2 Time Versus Uranium Concentration Plot

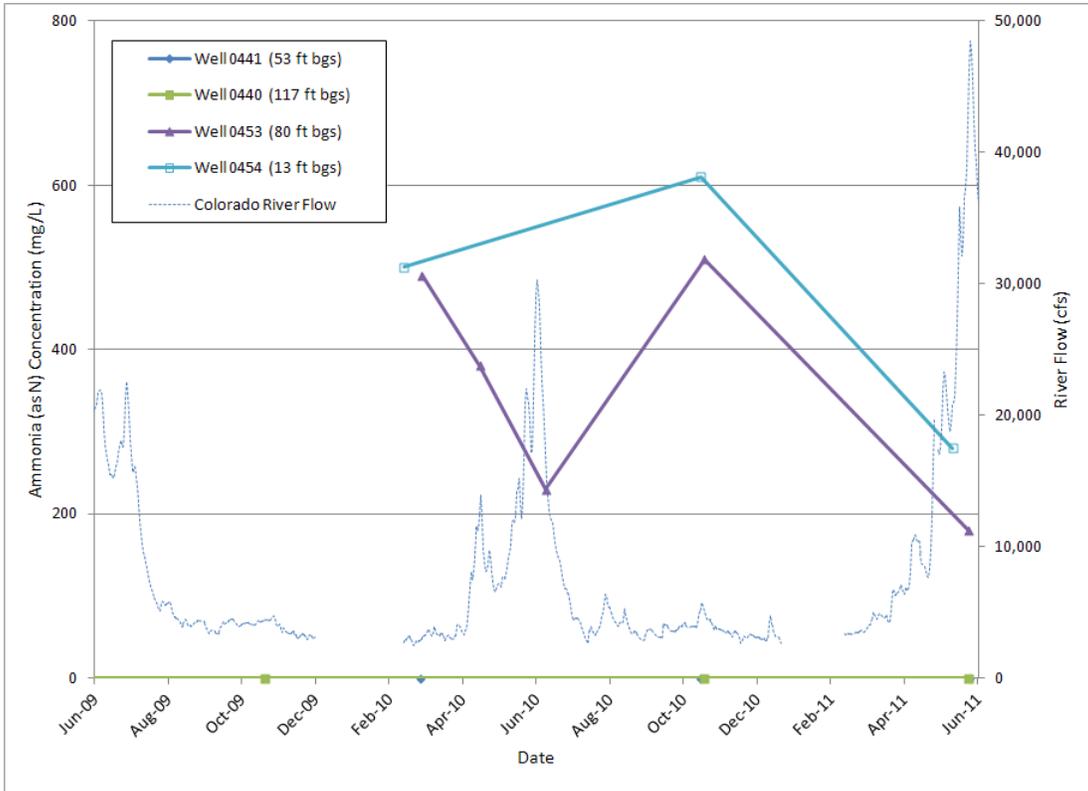


Figure 17. Southwest Boundary Observation Wells 0441, 0440, 0453, and 0454 Time Versus Ammonia Concentration Plot

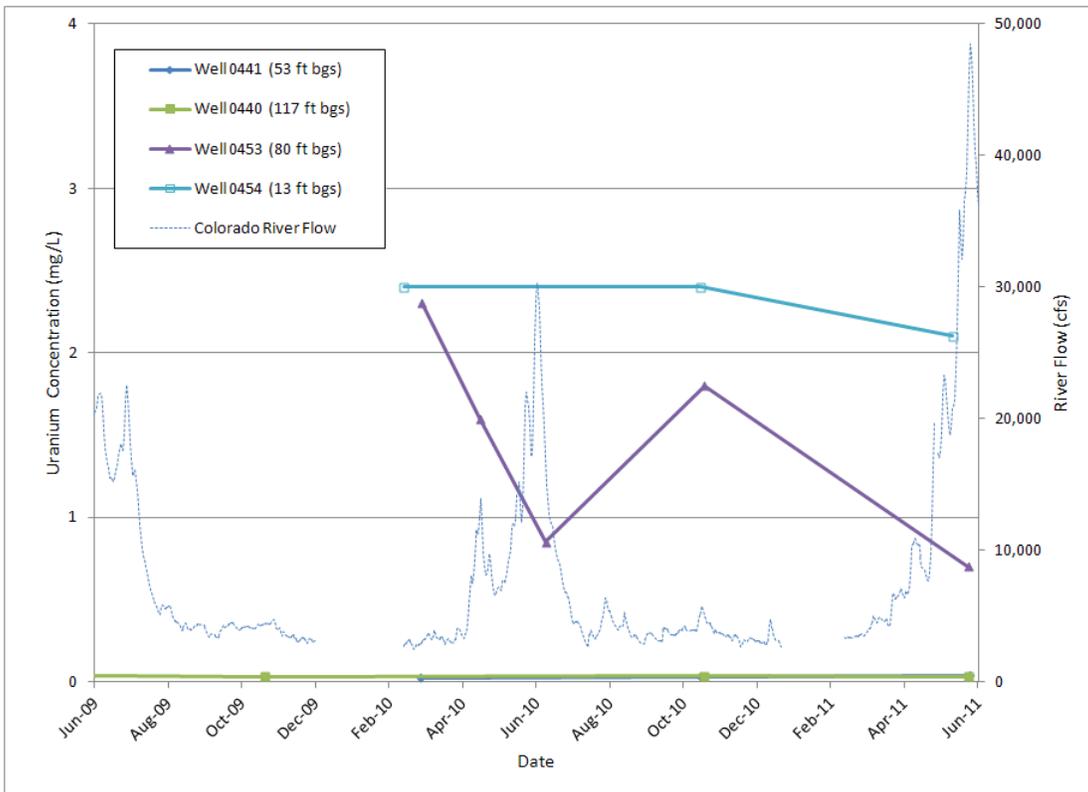


Figure 18. Southwest Boundary Observation Wells 0441, 0440, 0453, and 0454 Time Versus Uranium Concentration Plot

Riverbank Area

Figures 19 and 20 are the time versus ammonia and uranium concentration plots (respectively) for the locations sampled along the riverbank, presented from the south to the north. Ammonia concentrations are low at the southern and northern ends of the site, and increase near the middle. This plot also demonstrates how significant of an impact the higher river flows result in lower ground water concentrations, as expected. The same is true of the uranium concentration, with higher concentrations measured near the southern end of the well field.

Southern and Off-Site Areas

Figures 21 and 22 are the plots for the three locations sampled to the south of the site. Wells TP-17 and TP-19 are located along the riverbank, and TP-20 is located approximately 600 ft off the bank. Ammonia concentrations (Figure 21) have remained below 4 mg/L over the past 2 years, and the uranium concentrations (Figure 22) have consistently been below 0.044 mg/L over the same time frame.

Figure 23 is a ground water contour map generated for the site in June 2011. All water level data were collected from the shallow aquifer zone and exhibits a ground water flow direction that is reversed along the riverbank. Figures 24 and 25 are the shallow ground water ammonia and uranium plume maps generated using the data collected during the June 2011 site-wide event. These maps are generally comparable to previous plume maps, with the exception of the concentrations measured along the riverbank.

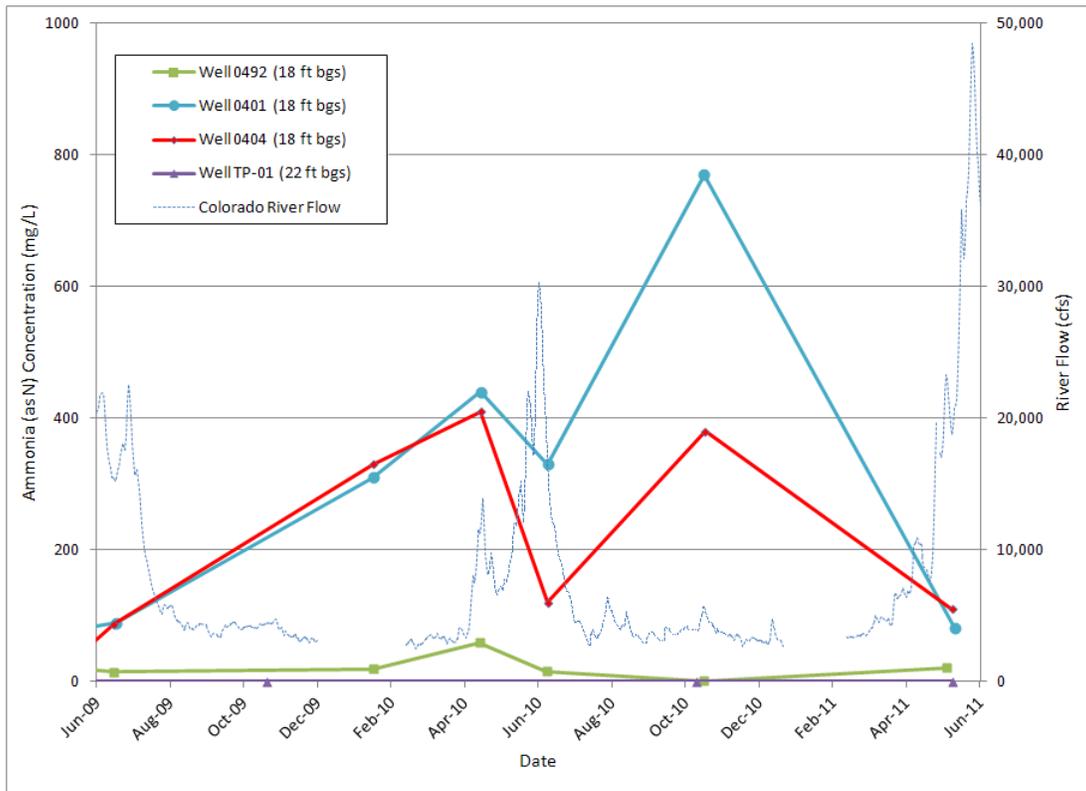


Figure 19. Riverbank Observation Wells 0492, 0401, 0404, and TP-01 Time Versus Ammonia Concentration Plot

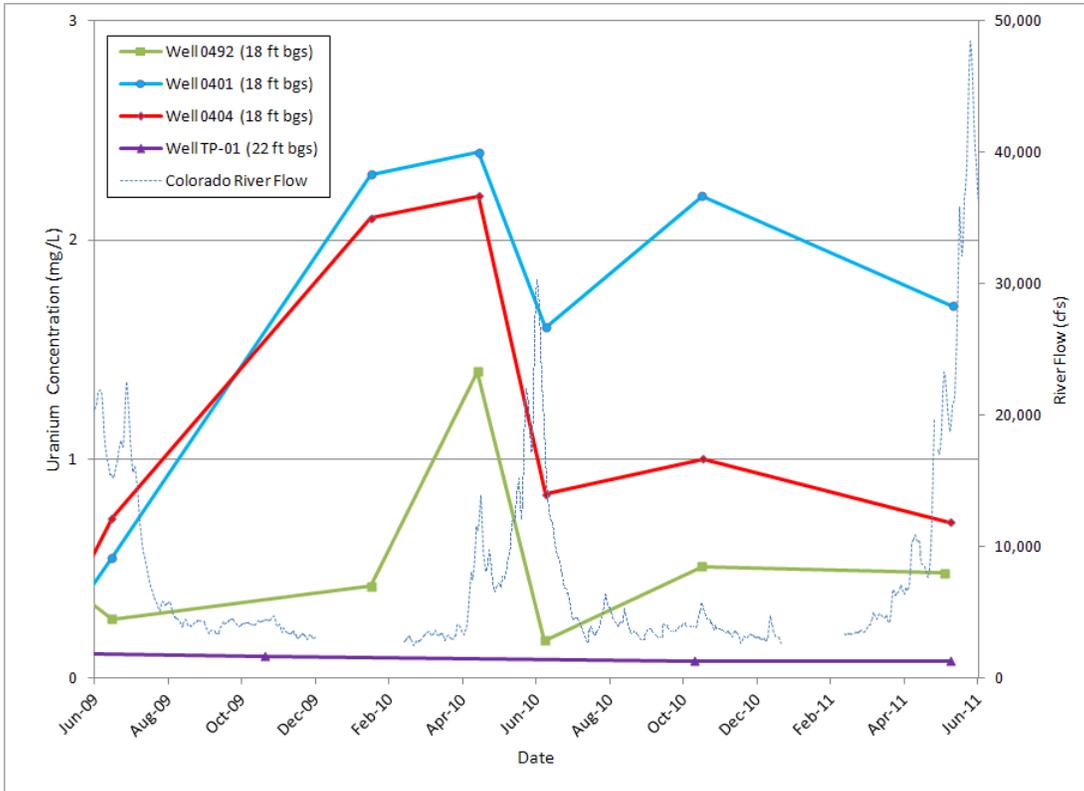


Figure 20. Riverbank Observation Wells 0492, 0401, 0404, and TP-01 Time Versus Uranium Concentration Plot

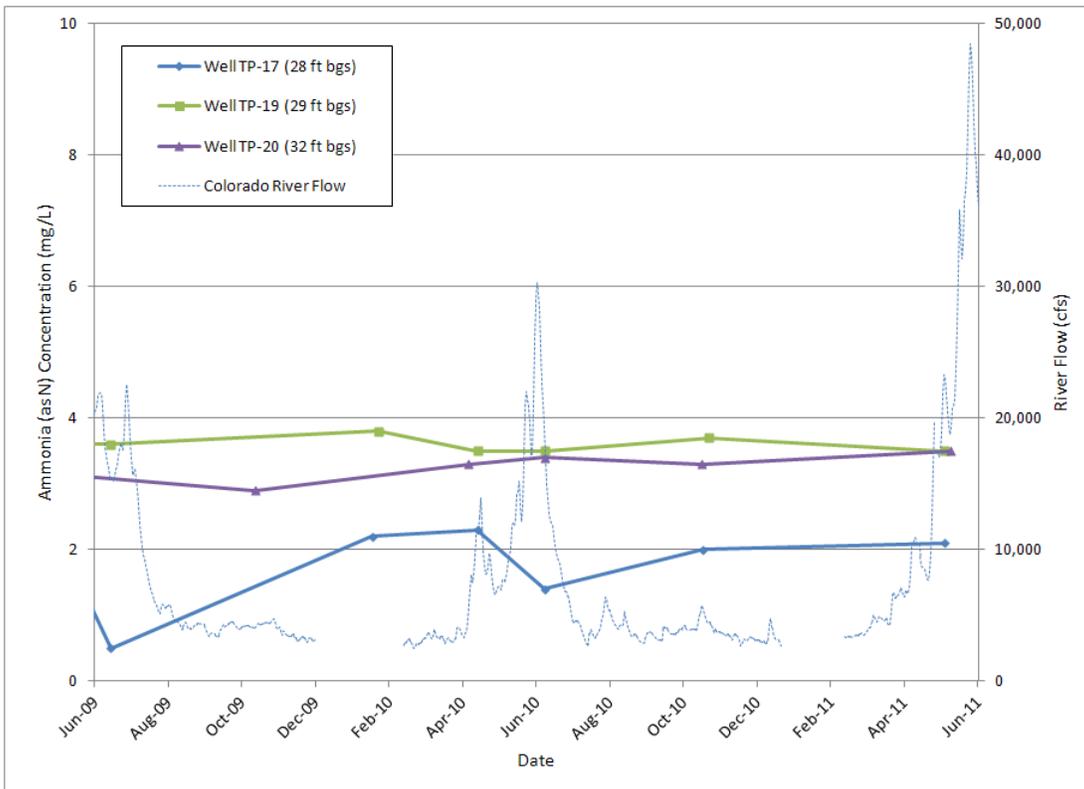


Figure 21. South of the Site Observation Wells TP-17, TP-19, and TP-20 Time Versus Ammonia Concentration Plot

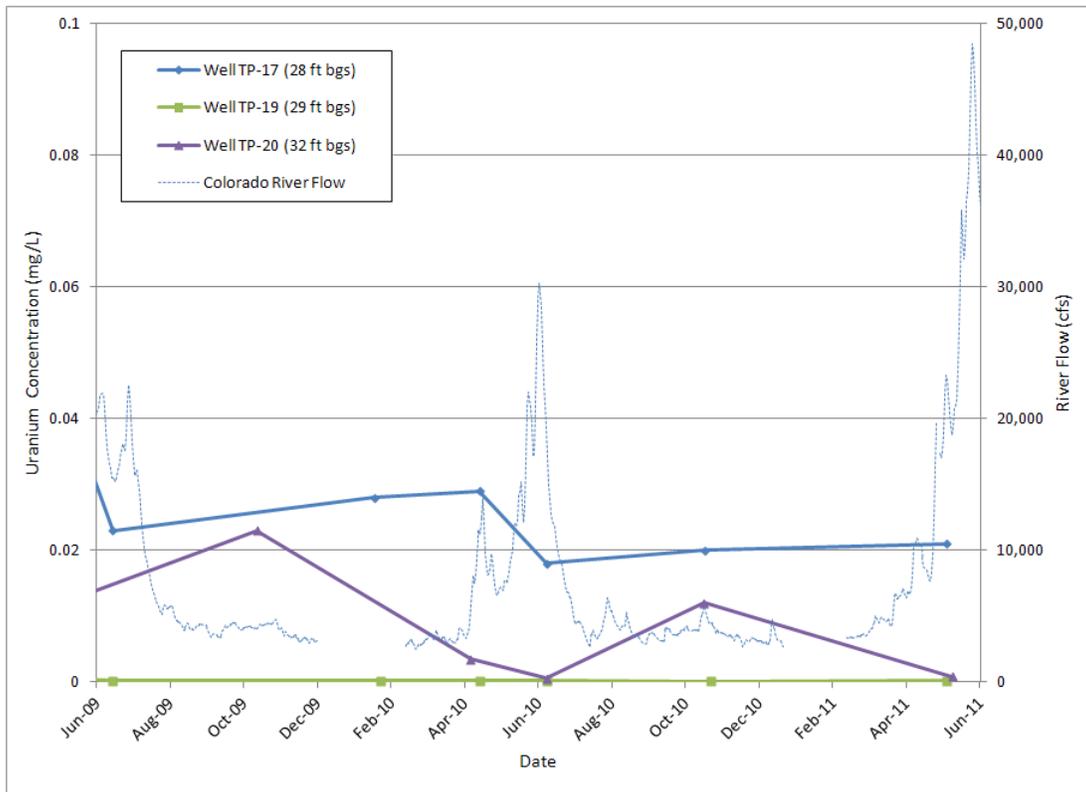


Figure 22. South of the Site Observation Wells TP-17, TP-19, and TP-20 Time Versus Uranium Concentration Plot

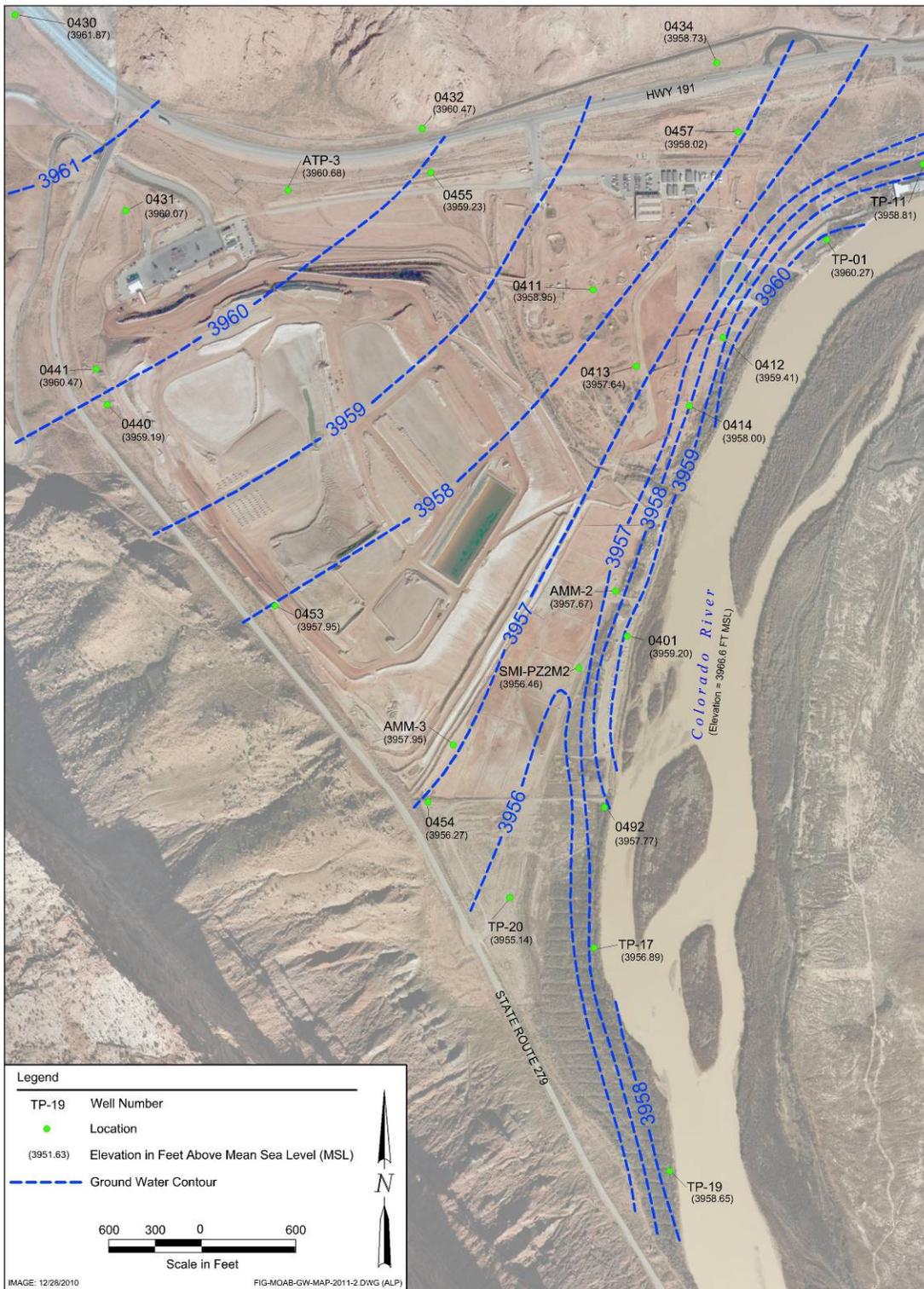


Figure 23. Site-Wide Ground Water Contour Map, June 2011

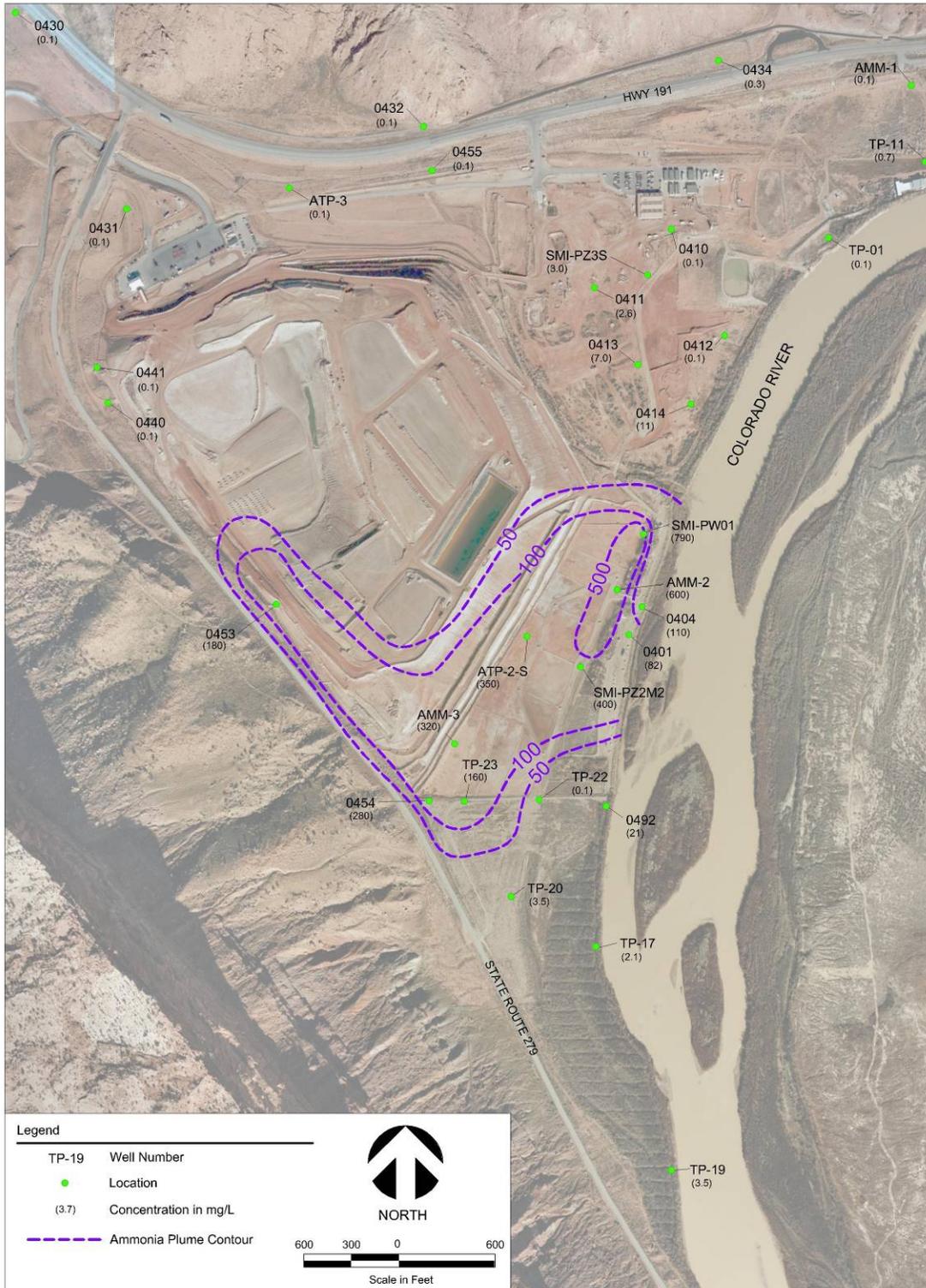


Figure 24. Location of Ammonia Plume in Shallow Ground Water, June 2011



Figure 25. Location of Uranium Plume in Shallow Ground Water, June 2011

5.0 Conclusions

The rationale for the April 2011 sampling was to establish baseline ammonia and uranium concentrations in the CF5 extraction wells for determining water treatment requirements. The sampling and water level monitoring at the CF4 injection system was used to assess the effectiveness of injection at reducing concentrations in the Colorado River.

The following conclusions can be made from the CF4 and CF5 sampling event:

- Ground water samples from five of the CF4 monitoring wells had uranium concentrations above the 0.044 mg/L ground water standard. Prior to the startup of the freshwater injection system, eight of these locations exceeded this standard. The CF4 freshwater injection system is effective at reducing the contaminant concentrations in both the upgradient and downgradient directions resulting in several historical minimums for uranium in monitoring wells. The injection system generates a hydraulic mound that reduces the flow of contaminated ground water into the near CF4 side channel.
- Ammonia and uranium concentrations in the CF5 wells have remained consistent and since June 2010. This indicates that recharge of freshwater during high river stage doesn't reach the CF5 wells. The conclusion is that these wells could be pumped year round to increase contaminant mass removal and create hydraulic capture.

Sampling of evaporation pond water in May 2011 was performed to assess if the water could be discharged through enhanced evaporators or ditches on the sides of the tailings. The tailings pore fluids were sampled to assess their effect on pH and concentrations of contaminants in the evaporation pond.

The following conclusions can be made from the May 2011 evaporation pond and excavation seep sampling event:

- The contaminant concentrations of the water stored within the evaporation pond are comparable to the concentrations measured in June 2010.
- There appears to be no significant differences between the water stored in the evaporation pond laterally or with depth.
- Chemistry of tailings pore water is significantly lower in pH, and higher in TDS, ammonia, and uranium than the water stored in the evaporation pond, which is primarily ground water.

The following conclusion can be made from the May 2011 site-wide sampling event.

- In general, the ammonia and uranium concentrations did not significantly change over the past year and wells near the river exhibited the same trend of decreasing concentrations during high river stage.

6.0 References

40 CFR 192A (Code of Federal Regulations), “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings and Uranium In Situ Leaching Processing Facilities.”

DOE (U.S. Department of Energy), *Moab UMTRA Project Operations, Maintenance, and Performance Monitoring Plan for the Interim Action Ground Water Treatment System* (DOE-EM/GJTAC1973), June 2011.

DOE (U.S. Department of Energy), *Moab UMTRA Project Surface Water/Ground Water Sampling and Analysis Plan* (DOE-EM/GJTAC1830), November 2009.

DOE (U.S. Department of Energy), *Moab UMTRA Project Standard Practice for Validation of Laboratory Data* (DOE-EM/GJTAC1855), September 2011.

Appendix A.

April 2011 CF4 and CF5 Sampling Event

Water Sampling Field Activities Verification

Minimums and Maximums Report

Water Quality Data

Water Level Data

Trip Report

Water Sampling Field Activities Verification

Sampling Event/RIN	April 2011 CF4/CF5 Sampling/ RIN 1104057	Date(s) of Water Sampling	April 27-28, 2011
Date(s) of Verification	July 7, 2011	Name of Verifier	Rachel Cowan
		Response (Yes, No, NA)	Comments
1. Is the Sampling Analysis Plan the primary document directing field procedures? List other documents, standard operating procedures, instructions.	Yes		
	NA		
2. Were the sampling locations specified in the planning documents sampled?	Yes		
3. Was a pretrip calibration conducted as specified in the aforementioned documents?	Yes		
4. Was an operational check of the field equipment conducted twice daily? Did the operational checks meet criteria?	Yes		
	Yes		
5. Were the number and types (alkalinity, temperature, electrical conductivity, pH, turbidity, dissolved oxygen, oxidation reduction potential) of field measurements taken as specified?	Yes		The field measurements temperature, pH, turbidity, dissolved oxygen, oxidation reduction potential, and conductivity measurements were collected.
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?	NA		
If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA		
8. Were the following conditions met when purging a Category II well: Was the flow rate less than 500 milliliters per minute? Was one pump/tubing volume removed prior to sampling?	NA		
	NA		
9. Were duplicates taken at a frequency of one per 20 samples?	Yes		One duplicate was taken for 17 samples.
10. Were EBs taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA		All samples were collected on dedicated equipment.
11. Were trip blanks prepared and included with each shipment of volatile organic compound samples?	NA		

Water Sampling Field Activities Verification (continued)

Sampling Event/RIN	April 2011 CF4/CF5 Sampling/ RIN 1104057	Date(s) of Water Sampling	April 27-28, 2011
Date(s) of Verification	July 7, 2011	Name of Verifier	Rachel Cowan
		Response (Yes, No, NA)	Comments
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?		NA	
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?		NA	
19. Was the presence or absence of ice in the cooler documented at every sample location?		No	The 0783 sample was not documented to have ice but since it was packed into the same cooler as the other samples that were documented to have ice, no qualification needed.
20. Were water levels measured at the locations specified in the planning documents?		NA	

Minimums and Maximums Report

April 2011 CF4 and CF5 Sampling Event – Data Validation Minimums and Maximums Report - No Field Parameters

Laboratory: ALS

RIN: 1104057

Comparison: All Historical Data

Report Date: 7/7/2011

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	0780	04/27/2011	Uranium	0.007		3.9	J	0.24			34	0	
MOA01	0782	04/27/2011	Uranium	0.049		2.9	F	0.29	F		34	0	
MOA01	0786	04/27/2011	Uranium	0.017		3.2	F	0.072	J		32	0	
MOA01	0787	04/27/2011	Uranium	0.022		0.91		0.11	J		34	0	
MOA01	0811	04/27/2011	Uranium	2.9		2.8		2.4			9	0	
MOA01	0812	04/27/2011	Uranium	2.2		3.1		2.3			8	0	
MOA01	0813	04/27/2011	Ammonia Total as N	300		530		330			9	0	
MOA01	0814	04/27/2011	Ammonia Total as N	210		900	J	270			8	0	

Analyte concentrations presented in blue text represent the historical minimum or maximum value exceeded by the concentration presented in red, which is associated with this current sampling event.

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

- F Low-flow sampling method used.
- L Less than 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.

Water Quality Data

April 2011 CF4 and CF5 Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 7/7/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Ammonia Total as N	mg/L	0810	WL	04/27/2011	0001	10.4	-	40.4	370		0	20		
Ammonia Total as N	mg/L	0811	WL	04/27/2011	0001	8.6	-	38.6	490		0	20		
Ammonia Total as N	mg/L	0812	WL	04/27/2011	0001	14.2	-	44.2	520		0	20		
Ammonia Total as N	mg/L	0813	WL	04/27/2011	0001	14.4	-	44.4	300		0	20		
Ammonia Total as N	mg/L	0814	WL	04/27/2011	0001	12.4	-	42.4	210		0	20		
Ammonia Total as N	mg/L	0815	WL	04/27/2011	0001	21.7	-	51.7	300		0	20		
Ammonia Total as N	mg/L	0815	WL	04/27/2011	0002	21.7	-	51.7	300		0	20		
Ammonia Total as N	mg/L	0816	WL	04/27/2011	0001	20.9	-	50.9	230		0	20		
Ammonia Total as N	mg/L	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	520		0	20		
Dissolved Oxygen	mg/L	0780	WL	04/27/2011	0001	28	-	28	5.98		0			
Dissolved Oxygen	mg/L	0781	WL	04/27/2011	0001	48	-	48	0.57		0			
Dissolved Oxygen	mg/L	0782	WL	04/27/2011	0001	33	-	33	1.91		0			
Dissolved Oxygen	mg/L	0783	WL	04/28/2011	0001	18	-	18	5.53		0			
Dissolved Oxygen	mg/L	0784	WL	04/27/2011	0001	18	-	18	4.14		0			
Dissolved Oxygen	mg/L	0785	WL	04/27/2011	0001	18	-	18	0.26		0			
Dissolved Oxygen	mg/L	0786	WL	04/27/2011	0001	28	-	28	1.16		0			
Dissolved Oxygen	mg/L	0787	WL	04/27/2011	0001	36	-	36	1.38		0			
Dissolved Oxygen	mg/L	0810	WL	04/27/2011	0001	10.4	-	40.4	5.88		0			
Dissolved Oxygen	mg/L	0811	WL	04/27/2011	0001	8.6	-	38.6	5.78		0			
Dissolved Oxygen	mg/L	0812	WL	04/27/2011	N001	14.2	-	44.2	7		0			
Dissolved Oxygen	mg/L	0813	WL	04/27/2011	0001	14.4	-	44.4	8.77		0			
Dissolved Oxygen	mg/L	0814	WL	04/27/2011	0001	12.4	-	42.4	5.2		0			
Dissolved Oxygen	mg/L	0815	WL	04/27/2011	0001	21.7	-	51.7	5.5		0			
Dissolved Oxygen	mg/L	0816	WL	04/27/2011	0001	20.9	-	50.9	5		0			
Dissolved Oxygen	mg/L	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	6.07		0			

Water Quality Data (continued)

April 2011 CF4 and CF5 Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 7/7/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
						Lab	Data	QA						
Oxidation Reduction Potential	mV	0780	WL	04/27/2011	0001	28	-	28	100			0		
Oxidation Reduction Potential	mV	0781	WL	04/27/2011	0001	48	-	48	48			0		
Oxidation Reduction Potential	mV	0782	WL	04/27/2011	0001	33	-	33	91			0		
Oxidation Reduction Potential	mV	0783	WL	04/28/2011	0001	18	-	18	183			0		
Oxidation Reduction Potential	mV	0784	WL	04/27/2011	0001	18	-	18	92			0		
Oxidation Reduction Potential	mV	0785	WL	04/27/2011	0001	18	-	18	112			0		
Oxidation Reduction Potential	mV	0786	WL	04/27/2011	0001	28	-	28	56			0		
Oxidation Reduction Potential	mV	0787	WL	04/27/2011	0001	36	-	36	47			0		
Oxidation Reduction Potential	mV	0810	WL	04/27/2011	0001	10.4	-	40.4	96			0		
Oxidation Reduction Potential	mV	0811	WL	04/27/2011	0001	8.6	-	38.6	136			0		
Oxidation Reduction Potential	mV	0812	WL	04/27/2011	N001	14.2	-	44.2	140			0		
Oxidation Reduction Potential	mV	0813	WL	04/27/2011	0001	14.4	-	44.4	145			0		
Oxidation Reduction Potential	mV	0814	WL	04/27/2011	0001	12.4	-	42.4	110			0		
Oxidation Reduction Potential	mV	0815	WL	04/27/2011	0001	21.7	-	51.7	123			0		
Oxidation Reduction Potential	mV	0816	WL	04/27/2011	0001	20.9	-	50.9	127			0		
Oxidation Reduction Potential	mV	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	143			0		
pH	s.u.	0780	WL	04/27/2011	0001	28	-	28	8.07			0		
pH	s.u.	0781	WL	04/27/2011	0001	48	-	48	7.57			0		
pH	s.u.	0782	WL	04/27/2011	0001	33	-	33	8.12			0		
pH	s.u.	0783	WL	04/28/2011	0001	18	-	18	8.01			0		
pH	s.u.	0784	WL	04/27/2011	0001	18	-	18	7.14			0		
pH	s.u.	0785	WL	04/27/2011	0001	18	-	18	7.67			0		
pH	s.u.	0786	WL	04/27/2011	0001	28	-	28	7.53			0		
pH	s.u.	0787	WL	04/27/2011	0001	36	-	36	8.1			0		

Water Quality Data (continued)

April 2011 CF4 and CF5 Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 7/7/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
pH	s.u.	0810	WL	04/27/2011	0001	10.4	-	40.4	7.14			0		
pH	s.u.	0811	WL	04/27/2011	0001	8.6	-	38.6	7.13			0		
pH	s.u.	0812	WL	04/27/2011	N001	14.2	-	44.2	7.05			0		
pH	s.u.	0813	WL	04/27/2011	0001	14.4	-	44.4	7.04			0		
pH	s.u.	0814	WL	04/27/2011	0001	12.4	-	42.4	7.12			0		
pH	s.u.	0815	WL	04/27/2011	0001	21.7	-	51.7	7.39			0		
pH	s.u.	0816	WL	04/27/2011	0001	20.9	-	50.9	7.15			0		
pH	s.u.	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	6.96			0		
Specific Conductance	umhos/cm	0780	WL	04/27/2011	0001	28	-	28	765			0		
Specific Conductance	umhos/cm	0781	WL	04/27/2011	0001	48	-	48	9257			0		
Specific Conductance	umhos/cm	0782	WL	04/27/2011	0001	33	-	33	904			0		
Specific Conductance	umhos/cm	0783	WL	04/28/2011	0001	18	-	18	1009			0		
Specific Conductance	umhos/cm	0784	WL	04/27/2011	0001	18	-	18	1844			0		
Specific Conductance	umhos/cm	0785	WL	04/27/2011	0001	18	-	18	1060			0		
Specific Conductance	umhos/cm	0786	WL	04/27/2011	0001	28	-	28	900			0		
Specific Conductance	umhos/cm	0787	WL	04/27/2011	0001	36	-	36	783			0		
Specific Conductance	umhos/cm	0810	WL	04/27/2011	0001	10.4	-	40.4	33420			0		
Specific Conductance	umhos/cm	0811	WL	04/27/2011	0001	8.6	-	38.6	26271			0		
Specific Conductance	umhos/cm	0812	WL	04/27/2011	N001	14.2	-	44.2	25653			0		
Specific Conductance	umhos/cm	0813	WL	04/27/2011	0001	14.4	-	44.4	12710			0		
Specific Conductance	umhos/cm	0814	WL	04/27/2011	0001	12.4	-	42.4	27891			0		
Specific Conductance	umhos/cm	0815	WL	04/27/2011	0001	21.7	-	51.7	30715			0		
Specific Conductance	umhos/cm	0816	WL	04/27/2011	0001	20.9	-	50.9	16950			0		
Specific Conductance	umhos/cm	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	46430			0		

Water Quality Data (continued)

April 2011 CF4 and CF5 Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 7/7/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Temperature	C	0780	WL	04/27/2011	0001	28	-	28	13.36			0		
Temperature	C	0781	WL	04/27/2011	0001	48	-	48	14.15			0		
Temperature	C	0782	WL	04/27/2011	0001	33	-	33	13.76			0		
Temperature	C	0783	WL	04/28/2011	0001	18	-	18	13.73			0		
Temperature	C	0784	WL	04/27/2011	0001	18	-	18	12.62			0		
Temperature	C	0785	WL	04/27/2011	0001	18	-	18	12.69			0		
Temperature	C	0786	WL	04/27/2011	0001	28	-	28	13.93			0		
Temperature	C	0787	WL	04/27/2011	0001	36	-	36	14.16			0		
Temperature	C	0810	WL	04/27/2011	0001	10.4	-	40.4	15.93			0		
Temperature	C	0811	WL	04/27/2011	0001	8.6	-	38.6	16.1			0		
Temperature	C	0812	WL	04/27/2011	N001	14.2	-	44.2	16.21			0		
Temperature	C	0813	WL	04/27/2011	0001	14.4	-	44.4	14.71			0		
Temperature	C	0814	WL	04/27/2011	0001	12.4	-	42.4	16.84			0		
Temperature	C	0815	WL	04/27/2011	0001	21.7	-	51.7	17.72			0		
Temperature	C	0816	WL	04/27/2011	0001	20.9	-	50.9	17.55			0		
Temperature	C	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	16.58			0		
Turbidity	NTU	0780	WL	04/27/2011	0001	28	-	28	19			0		
Turbidity	NTU	0781	WL	04/27/2011	0001	48	-	48	2.93			0		
Turbidity	NTU	0782	WL	04/27/2011	0001	33	-	33	6.49			0		
Turbidity	NTU	0783	WL	04/28/2011	0001	18	-	18	3.05			0		
Turbidity	NTU	0784	WL	04/27/2011	0001	18	-	18	3.48			0		
Turbidity	NTU	0785	WL	04/27/2011	0001	18	-	18	0.87			0		
Turbidity	NTU	0786	WL	04/27/2011	0001	28	-	28	4.97			0		
Turbidity	NTU	0787	WL	04/27/2011	0001	36	-	36	1.49			0		
Turbidity	NTU	0810	WL	04/27/2011	0001	10.4	-	40.4	254			0		
Turbidity	NTU	0811	WL	04/27/2011	0001	8.6	-	38.6	3.01			0		
Turbidity	NTU	0812	WL	04/27/2011	N001	14.2	-	44.2	3.91			0		
Turbidity	NTU	0813	WL	04/27/2011	0001	14.4	-	44.4	6.17			0		

Water Quality Data (continued)

April 2011 CF4 and CF5 Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 7/7/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Turbidity	NTU	0814	WL	04/27/2011	0001	12.4	-	42.4	48.9			0		
Turbidity	NTU	0815	WL	04/27/2011	0001	21.7	-	51.7	30.7			0		
Turbidity	NTU	0816	WL	04/27/2011	0001	20.9	-	50.9	8.75			0		
Turbidity	NTU	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	2.84			0		
Uranium	mg/L	0780	WL	04/27/2011	0001	28	-	28	0.007			0	2.9E-005	
Uranium	mg/L	0781	WL	04/27/2011	0001	48	-	48	0.2			0	0.00015	
Uranium	mg/L	0782	WL	04/27/2011	0001	33	-	33	0.049			0	2.9E-005	
Uranium	mg/L	0783	WL	04/28/2011	0001	18	-	18	0.17			0	0.00029	
Uranium	mg/L	0784	WL	04/27/2011	0001	18	-	18	0.2			0	0.00015	
Uranium	mg/L	0785	WL	04/27/2011	0001	18	-	18	0.096			0	0.00015	
Uranium	mg/L	0786	WL	04/27/2011	0001	28	-	28	0.017			0	2.9E-005	
Uranium	mg/L	0787	WL	04/27/2011	0001	36	-	36	0.022			0	2.9E-005	
Uranium	mg/L	0810	WL	04/27/2011	0001	10.4	-	40.4	3.3			0	0.00058	
Uranium	mg/L	0811	WL	04/27/2011	0001	8.6	-	38.6	2.9			0	0.00058	
Uranium	mg/L	0812	WL	04/27/2011	0001	14.2	-	44.2	2.2			0	0.00058	
Uranium	mg/L	0813	WL	04/27/2011	0001	14.4	-	44.4	1.5			0	0.00058	
Uranium	mg/L	0814	WL	04/27/2011	0001	12.4	-	42.4	3.1			0	0.00058	
Uranium	mg/L	0815	WL	04/27/2011	0001	21.7	-	51.7	3.5			0	0.00058	
Uranium	mg/L	0815	WL	04/27/2011	0002	21.7	-	51.7	3.7			0	0.00058	
Uranium	mg/L	0816	WL	04/27/2011	0001	20.9	-	50.9	2.2			0	0.00058	
Uranium	mg/L	SMI-PW02	WL	04/27/2011	0001	20.04	-	60.04	2.8			0	0.00058	

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

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

Water Quality Data (continued)

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

#	Validated according to quality-assurance guidelines.
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Water Level Data

**April 2011 CF4 and CF5 Sampling Event
 STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/29/2011**

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
0780		3968.45	04/27/2011		12.17	3956.28	
0781		3968.56	04/27/2011		12.9	3955.66	
0782		3968.46	04/27/2011		12.28	3956.18	
0783		3968.82	04/28/2011		10.82	3958	
0784		3968.73	04/27/2011		13.11	3955.62	
0785		3969.24	04/27/2011		13.26	3955.98	
0786		3968.14	04/27/2011		12.16	3955.98	
0787		3968.43	04/27/2011		12.38	3956.05	
0810		3961.88	04/27/2011		18.55	3943.33	
0811		3962.82	04/27/2011		23.6	3939.22	
0812		3961.41	04/27/2011		18.7	3942.71	
0813		3963.44	04/27/2011		9.12	3954.32	
0814		3960.98	04/27/2011		15.12	3945.86	
0815		3963.14	04/27/2011		31.7	3931.44	
0816		3961.87	04/27/2011		6.75	3955.12	
SMI-PW02	O	3967.48	04/27/2011		11.49	3955.99	

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

Trip Report



DATE: May 02, 2011

TO: K. Pill

FROM: J. Ritchey

SUBJECT: April 2011 Monthly Sampling Trip Report

Site: April 2011 Moab Interim Action (IA) Well Field Monthly Sampling

Date of Sampling Event: April 27-28, 2011

Team Members: Elizabeth Glowiak, James Ritchey

RIN Number Assigned: All samples were assigned to RIN 1104057.

Sample Shipment: All samples were shipped in one cooler overnight UPS to ALS Laboratory from Moab, Utah, on April 28, 2010 (Tracking No. 0193047649).

April 2011 Configuration 4 Sampling

Number of Locations Sampled: Eight observation wells (0780, 0781, 0782, 0783, 0784, 0785, 0786, and 0787) were sampled during the April 2011 sampling event. CF4 samples were collected for total uranium analysis only.

Locations Not Sampled: Six well points (0790, 0791, 0792, 0793, 0794, and 0795) were not sampled due to inaccessibility.

Field Variance: None.

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

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0780	04/27/2011	14:30	12.17	28
0781	04/27/2011	13:59	12.90	48
0782	04/27/2011	14:17	12.28	33
0783	04/28/2011	13:30	10.82	18
0784	04/27/2011	15:40	13.11	18
0785	04/27/2011	14:49	13.26	18
0786	04/27/2011	15:06	12.16	28
0787	04/27/2011	15:21	12.38	36

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

Trip Report (continued)

April 2011 Configuration 5 Sampling

Number of Locations Sampled: Eight extraction wells (0810, 0811, 0812, 0813, 0814, 0815, 0816, and SMI-PW02) were sampled. Including one DUP, a total of nine samples were collected during the April 2011 monthly sampling event. CF5 Samples were for total uranium and ammonia analyses. No samples were collected for total dissolved solids analysis.

Locations Not Sampled: None.

Field Variance: None.

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

False ID	True ID	Sample Type	Associated Matrix	Ticket Number
2001	0815	Duplicate from 45 ft bgs	Ground Water	APR 009

ft bgs = feet below ground surface; ID = identification

Location -specific Information – Extraction Wells: Extraction wells were sampled using dedicated submersible pumps. Samples were collected into open containers and filtered using dedicated flexible tubing. Sample depths and water levels for each extraction well are listed below.

Well No.	Date	Time	Depth to Water (ft btoc*)	Pump Intake Depth (ft bgs)
0810	04/27/2011	10:20	18.55	35
0811	04/27/2011	10:00	23.60	35
0812	04/27/2011	09:25	18.70	40
0813	04/27/2011	09:07	9.12	40
0814	04/27/2011	10:45	15.12	40
0815	04/27/2011	11:00	31.70	45
0816	04/27/2011	11:20	6.75	45
SMI-PW02	04/27/2011	09:45	11.49	55

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

Site Issues: According to the USGS Cisco gauging station (station number 09180500), the mean daily Colorado River flows during this sampling event are provided below:

Date	Daily Mean Flow (cfs)
04/27/2011	10,400
04/28/2011	9,470

Equipment Issues: None.

Corrective Action Required/Taken: None.

Appendix B.

May 2011 Evaporation Pond and Excavation Seep Sampling Event

**Water Sampling Field Activities Verification
Water Quality Data**

Water Sampling Field Activities Verification

Sampling Event/RIN	May 2011 Evaporation Pond and Excavation Seep Sampling Event / 1105058	Date(s) of Water Sampling	May 2, 2011
Date(s) of Verification	July 26, 2011	Name of Verifier	Rachel Cowan
		Response (Yes, No, NA)	Comments
1.	Is the SAP the primary document directing field procedures? List other documents, standard operating procedures, instructions.	Yes <hr/> NA	
2.	Were the sampling locations specified in the planning documents sampled?	NA	These samples were taken to monitor health and safety.
3.	Was a pre-trip calibration conducted as specified in the aforementioned documents?	Yes	
4.	Was an operational check of the field equipment conducted twice daily? Did the operational checks meet criteria?	Yes <hr/> 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	The field measurements temperature, pH, dissolved oxygen, oxidation reduction potential, and conductivity were collected.
6.	Was the category of the well documented?	NA	
7.	Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling? Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements stabilize prior to sampling? Was the flow rate less than 500 milliliters per minute (mL/min)? If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	NA <hr/> NA <hr/> Yes <hr/> NA <hr/> NA	

Water Sampling Field Activities Verification (continued)

Sampling Event / RIN	May 2011 Evaporation Pond and Excavation Seep Sampling Event / 1105058	Date(s) of Water Sampling	May 2, 2011
Date(s) of Verification	July 26, 2011	Name of Verifier	Rachel Cowan

8.	Were the following conditions met when purging a Category II well:	
	Was the flow rate less than 500 mL/min?	NA
	Was one pump/tubing volume removed prior to sampling?	NA
9.	Were duplicates taken at a frequency of one per 20 samples?	No No duplicates were taken.
10.	Were equipment blanks (EBs) taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	NA All samples were collected on dedicated equipment.
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?	NA
	Was the true identity of the samples recorded on the Quality Assurance Sample Log?	NA
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?	NA
16.	Were chain-of-custody (COC) records completed, and was sample custody maintained?	No The COC forms for SDG 1105096 did not have relinquishment signatures and dates.
17.	Are field data sheets signed and dated by both team members?	No See above.
18.	Was all other pertinent information documented on the field data sheets?	NA
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?	NA

Water Quality Data

May 2011 Evaporation Pond and Excavation Seep Sampling Event
General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 8/26/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Actinium-228	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	18.7	U		#	18.7	8.8
Actinium-228	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	26	U		#	26	15
Actinium-228	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	27	U		#	27	16
Actinium-228	pCi/L	0548-S-12	TS	05/02/2011	0001	0 - 0	21	U		#	21	13
Actinium-228	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	25	U		#	25	16
Aluminum	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.09	B	J	#	0.015	
Aluminum	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.65		J	#	0.015	
Aluminum	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.13	B	J	#	0.015	
Aluminum	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.5		J	#	0.015	
Aluminum	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	1100		J	#	0.76	
Americium-241	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	23	U		#	23	14
Americium-241	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	36	U		#	36	21
Americium-241	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	33	U		#	33	20
Americium-241	pCi/L	0548-S-12	TS	05/02/2011	0001	0 - 0	25	U		#	25	16
Americium-241	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	64	U		#	64	39
Ammonia Total as N	mg/L	0548-N-1	TS	05/19/2011	0001	0 - 0	590			#	20	
Ammonia Total as N	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	650		J	#	20	
Ammonia Total as N	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	580		J	#	20	
Ammonia Total as N	mg/L	0548-S-12	TS	05/19/2011	0001	0 - 0	570			#	20	
Antimony	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.003	U		#	0.003	

Water Quality Data (continued)

May 2011 Evaporation Pond and Excavation Seep Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/26/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Antimony	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.003	U		#	0.003	
Antimony	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.003	U		#	0.003	
Antimony	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.003	U		#	0.003	
Antimony	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	0.015	U		#	0.015	
Antimony-125	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	5.7	U		#	5.7	3.2
Antimony-125	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	15	U		#	15	9
Antimony-125	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	14.6	U		#	14.6	8.5
Antimony-125	pCi/L	0548-S-12	TS	05/02/2011	0001	0 - 0	6.5	U		#	6.5	3.7
Antimony-125	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	27	U		#	27	17
Arsenic	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.0066	B	J	#	0.0039	
Arsenic	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.0045	B	J	#	0.0039	
Arsenic	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.0039	U		#	0.0039	
Arsenic	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.0051	B	J	#	0.0039	
Arsenic	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	0.43		J	#	0.02	
Barium	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.013	B	J	#	0.00019	
Barium	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.013	B	J	#	0.00019	
Barium	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.013	B	J	#	0.00019	
Barium	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.013	B	J	#	0.00019	
Barium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	0.12	B	J	#	0.00093	
Beryllium	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.00018	U		#	0.00018	
Beryllium	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.00018	U		#	0.00018	

Water Quality Data (continued)

May 2011 Evaporation Pond and Excavation Seep Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/26/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Beryllium	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.00018	U		#	0.00018	
Beryllium	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.00018	U		#	0.00018	
Beryllium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	0.11	B	J	#	0.0088	
Cadmium	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.024		J	#	0.00033	
Cadmium	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.031		J	#	0.00033	
Cadmium	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.023		J	#	0.00033	
Cadmium	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.021		J	#	0.00033	
Cadmium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	1.7		J	#	0.0016	
Calcium	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	400		J	#	0.012	
Calcium	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	390		J	#	0.012	
Calcium	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	400		J	#	0.012	
Calcium	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	400		J	#	0.012	
Calcium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	390		J	#	0.06	
Cerium-144	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	15.3	U		#	15.3	9.2
Cerium-144	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	39	U		#	39	23
Cerium-144	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	38	U		#	38	23
Cerium-144	pCi/L	0548-S-12	TS	05/02/2011	0001	0 - 0	19	U		#	19	12
Cerium-144	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	47	U		#	47	29
Cesium-134	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	3.7	U		#	3.7	2.2
Cesium-134	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	9.9	U		#	9.9	5.8
Cesium-134	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	9.8	U		#	9.8	5.6
Cesium-134	pCi/L	0548-S-	TS	05/02/2011	0001	0 - 0	4.5	U		#	4.5	2.7

Water Quality Data (continued)

May 2011 Evaporation Pond and Excavation Seep Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/26/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
		12										
Cesium-134	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	8.8	U		#	8.8	5.3
Cesium-137	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	2.3	U		#	2.3	1.4
Cesium-137	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	5.9	U		#	5.9	3.6
Cesium-137	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	6	U		#	6	3.5
Cesium-137	pCi/L	0548-S-12	TS	05/02/2011	0001	0 - 0	2.8	U		#	2.8	1.7
Cesium-137	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	10.4	U,M		#	10.4	6.1
Chromium	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.00051	U		#	0.00051	
Chromium	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.00051	U		#	0.00051	
Chromium	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.00051	U		#	0.00051	
Chromium	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.002	B	J	#	0.00051	
Chromium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	1.7		J	#	0.0026	
Cobalt	mg/L	0548-N-1	TS	05/02/2011	0001	0 - 0	0.12		J	#	0.00045	
Cobalt	mg/L	0548-N-12	TS	05/02/2011	0001	0 - 0	0.15		J	#	0.00045	
Cobalt	mg/L	0548-S-1	TS	05/02/2011	0001	0 - 0	0.11		J	#	0.00045	
Cobalt	mg/L	0548-S-12	TS	05/02/2011	0001	0 - 0	0.11		J	#	0.00045	
Cobalt	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0 - 0	8.7		J	#	0.0022	
Cobalt-60	pCi/L	0548-N-1	TS	05/02/2011	0001	0 - 0	2.7	U		#	2.7	1.7
Cobalt-60	pCi/L	0548-N-12	TS	05/02/2011	0001	0 - 0	7.6	U		#	7.6	4.5
Cobalt-60	pCi/L	0548-S-1	TS	05/02/2011	0001	0 - 0	7.4	U		#	7.4	4.1
Cobalt-60	pCi/L	0548-S-12	TS	05/02/2011	0001	0 - 0	3	U		#	3	1.8

Water Quality Data (continued)

Cobalt-60	pCi/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	7.8	U	#	7.8	4.5	
Copper	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.22		J	#	0.00097	
Copper	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.36		J	#	0.00097	
Copper	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.19		J	#	0.00097	
Copper	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.22		J	#	0.00097	
Copper	mg/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	77		J	#	0.048	
Dissolved Oxygen	mg/L	0548-N-1	TS	05/02/2011	N001	0	-	0	7.51			#		
Dissolved Oxygen	mg/L	0548-N-1	TS	05/19/2011	0001	0	-	0	3.54			#		
Dissolved Oxygen	mg/L	0548-N-12	TS	05/02/2011	N001	0	-	0	7.46			#		
Dissolved Oxygen	mg/L	0548-S-1	TS	05/02/2011	N001	0	-	0	7.34			#		
Dissolved Oxygen	mg/L	0548-S-12	TS	05/02/2011	N001	0	-	0	7.58			#		
Dissolved Oxygen	mg/L	0548-S-12	TS	05/19/2011	0001	0	-	0	3.37			#		
Dissolved Oxygen	mg/L	EXCAVA TION SEEP	SL	05/02/2011	N001	0	-	0	3.34			#		
Europium-152	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	14.6	U	#	14.6	8.7	
Europium-152	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	38	U	#	38	22	
Europium-152	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	37	U	#	37	21	
Europium-152	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	16.3	U	J	#	16.3	9.6
Europium-152	pCi/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	18.6	TI	J	#	15.9	9.4
Europium-154	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	17	U	#	17	11	
Europium-154	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	37	U	#	37	21	
Europium-154	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	40	U	#	40	23	
Europium-154	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	25	NQ	#	18	12	
Europium-154	pCi/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	74	U	#	74	41	
Europium-155	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	7.5	U	#	7.5	4.6	

Water Quality Data (continued)

Europium-155	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	20	U	#	20	12
Europium-155	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	20	U	#	20	11
Europium-155	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	9.6	U	#	9.6	5.8
Europium-155	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	25	U	#	25	15
Iron	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.089	B	J	#	0.0049
Iron	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.88		J	#	0.0049
Iron	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.087	B	J	#	0.0049
Iron	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.73		J	#	0.0049
Iron	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	2200		J	#	0.25
Lead	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.0013	U	#	0.0013	
Lead	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.0013	U	#	0.0013	
Lead	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.0013	U	#	0.0013	
Lead	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.0013	U	#	0.0013	
Lead	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	0.43		J	#	0.064
Lead-212	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	8.1	U	#	8.1	4.9
Lead-212	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	12.5	U	#	12.5	7.5
Lead-212	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	12.5	U	#	12.5	7.4
Lead-212	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	9	U	#	9	5.4
Lead-212	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	42	SI	J	#	16
Magnesium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	790		J	#	0.13
Magnesium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	830		J	#	0.13
Magnesium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	780		J	#	0.13
Magnesium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	770		J	#	0.13
Magnesium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	7700		J	#	0.65

Water Quality Data (continued)

Manganese	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	5.7		J	#	0.00011
Manganese	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	6.1		J	#	0.00011
Manganese	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	5.3		J	#	0.00011
Manganese	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	5.4		J	#	0.00011
Manganese	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	280		J	#	0.0057
Mercury	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	1.3E-005	B	J	#	9.7E-006
Mercury	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	9.8E-006	B	J	#	9.7E-006
Nickel	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.12		J	#	0.00093
Nickel	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.14		J	#	0.00093
Nickel	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.11		J	#	0.00093
Nickel	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.11		J	#	0.00093
Nickel	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	4.1		J	#	0.0047
Oxidation Reduction Potential	mV	0548-N-1	TS	05/02/2011	N001	0	-	0	165.5			#	
Oxidation Reduction Potential	mV	0548-N-1	TS	05/19/2011	0001	0	-	0	229			#	
Oxidation Reduction Potential	mV	0548-N-12	TS	05/02/2011	N001	0	-	0	169			#	
Oxidation Reduction Potential	mV	0548-S-1	TS	05/02/2011	N001	0	-	0	161			#	
Oxidation Reduction Potential	mV	0548-S-12	TS	05/02/2011	N001	0	-	0	158			#	
Oxidation Reduction Potential	mV	0548-S-12	TS	05/19/2011	0001	0	-	0	207			#	
Oxidation Reduction Potential	mV	EXCAVATION SEEP	SL	05/02/2011	N001	0	-	0	218			#	
pH	s.u.	0548-N-1	TS	05/02/2011	N001	0	-	0	7.81			#	
pH	s.u.	0548-N-1	TS	05/19/2011	0001	0	-	0	7.76			#	
pH	s.u.	0548-N-12	TS	05/02/2011	N001	0	-	0	7.74			#	
pH	s.u.	0548-S-1	TS	05/02/2011	N001	0	-	0	7.76			#	
pH	s.u.	0548-S-12	TS	05/02/2011	N001	0	-	0	7.71			#	
pH	s.u.	0548-S-12	TS	05/19/2011	0001	0	-	0	7.78			#	

Water Quality Data (continued)

pH	s.u.	EXCAVATION SEEP	SL	05/02/2011	N001	0	-	0	4.39		#		
Potassium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	300	J	#	1.1	
Potassium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	340	J	#	1.1	
Potassium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	320	J	#	1.1	
Potassium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	300	J	#	1.1	
Potassium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	940	J	#	0.54	
Potassium-40	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	225	J	#	75	54
Potassium-40	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	196	J	#	124	83
Potassium-40	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	128	J	#	117	75
Potassium-40	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	170	J	#	78	52
Potassium-40	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	720		#	150	140
Promethium-144	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	4.6	U	#	4.6	2.8
Promethium-144	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	7	U	#	7	4.3
Promethium-144	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	7.3	U	#	7.3	4.2
Promethium-144	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	8	U	#	8	4.8
Promethium-144	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	7.1	U	#	7.1	4.4
Promethium-146	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	2.6	U	#	2.6	1.6
Promethium-146	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	6.8	U	#	6.8	4
Promethium-146	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	6.8	U	#	6.8	4
Promethium-146	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	2.9	U	#	2.9	1.8
Promethium-146	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	7.7	U	#	7.7	4.6
Ruthenium-106	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	23	U	#	23	14
Ruthenium-106	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	61	U	#	61	34
Ruthenium-106	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	60	U	#	60	34

Water Quality Data (continued)

Ruthenium-106	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	27	U	#	27	16
Ruthenium-106	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	61	U	#	61	36
Selenium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.047	J	#	0.0027	
Selenium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.055	J	#	0.0027	
Selenium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.044	J	#	0.0027	
Selenium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.039	J	#	0.0027	
Selenium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	3	J	#	0.13	
Silver	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.0011	U	#	0.0011	
Silver	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.0013	B	J	#	0.0011
Silver	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.0011	U	#	0.0011	
Silver	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.0011	U	#	0.0011	
Silver	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	0.019	B	J	#	0.0054
Sodium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	6000	J	#	0.66	
Sodium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	5500	J	#	0.66	
Sodium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	5700	J	#	0.66	
Sodium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	6200	J	#	0.66	
Sodium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	3500	J	#	0.66	
Specific Conductance	umhos/cm	0548-N-1	TS	05/02/2011	N001	0	-	0	35868		#		
Specific Conductance	umhos/cm	0548-N-1	TS	05/19/2011	0001	0	-	0	35265		#		
Specific Conductance	umhos/cm	0548-N-12	TS	05/02/2011	N001	0	-	0	36640		#		
Specific Conductance	umhos/cm	0548-S-1	TS	05/02/2011	N001	0	-	0	35070		#		
Specific Conductance	umhos/cm	0548-S-12	TS	05/02/2011	N001	0	-	0	36421		#		
Specific Conductance	umhos/cm	0548-S-12	TS	05/19/2011	0001	0	-	0	35290		#		
Specific Conductance	umhos/cm	EXCAVATION SEEP	SL	05/02/2011	N001	0	-	0	133905		#		

Water Quality Data (continued)

Temperature	C	0548-N-1	TS	05/02/2011	N001	0	-	0	16.97		#			
Temperature	C	0548-N-1	TS	05/19/2011	0001	0	-	0	20.55		#			
Temperature	C	0548-N-12	TS	05/02/2011	N001	0	-	0	15.98		#			
Temperature	C	0548-S-1	TS	05/02/2011	N001	0	-	0	18.33		#			
Temperature	C	0548-S-12	TS	05/02/2011	N001	0	-	0	16.06		#			
Temperature	C	0548-S-12	TS	05/19/2011	0001	0	-	0	20.54		#			
Thallium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.0035	U	#	0.0035		
Thallium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.0063	B	J	#	0.0035	
Thallium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.0035	U	#	0.0035		
Thallium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.0057	B	J	#	0.0035	
Thallium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	0.18	U	#	0.18		
Thorium-228	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.75	U,M	#	0.75	0.33	
Thorium-228	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	1.1	U,M	#	1.1	0.48	
Thorium-228	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	1.35	U,M	#	1.35	0.59	
Thorium-228	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.51	U,M	#	0.51	0.23	
Thorium-228	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	53	M3	#	15	24	
Thorium-230	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	7	M3	#	0.7	1.5	
Thorium-230	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	57.9	M3	J	#	1.2	10
Thorium-230	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	11.4	M3	J	#	1.4	2.5
Thorium-230	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	254	M3	#	0	42	
Thorium-230	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	226000	M3	#	0	64000	
Thorium-232	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.19	U	#	0.19	0.11	
Thorium-232	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.51	U,M	#	0.51	0.26	
Thorium-232	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.58	M3	J	#	0.31	0.38
Thorium-232	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.56		#	0.11	0.23	
Thorium-232	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	830	M3	#	10	240	

Water Quality Data (continued)

		TION SEEP												
Thorium-234	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	667	LT	#	92	95	
Thorium-234	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	390	LT	#	150	100	
Thorium-234	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	324	LT	#	146	94	
Thorium-234	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	563	LT	#	94	87	
Thorium-234	pCi/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	3200	SI	J	#	210	400
Total Dissolved Solids	mg/L	0548-N-1	TS	05/19/2011	0001	0	-	0	30000		#	1000		
Total Dissolved Solids	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	27000		#	1000		
Total Dissolved Solids	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	27000		#	1000		
Total Dissolved Solids	mg/L	0548-S-12	TS	05/19/2011	0001	0	-	0	30000		#	1000		
Total Dissolved Solids	mg/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	220000		J	#	4000	
Turbidity	NTU	0548-N-1	TS	05/19/2011	0001	0	-	0	8.37		#			
Turbidity	NTU	0548-S-12	TS	05/19/2011	0001	0	-	0	4.5		#			
Uranium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	2.5		J	#	0.00029	
Uranium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	2.4		J	#	0.00029	
Uranium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	2.5		J	#	0.00029	
Uranium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	2.5		J	#	0.00029	
Uranium	mg/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	9.4		J	#	0.0029	
Uranium-234	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	820	M3	#	0	140	
Uranium-234	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	870	M3	#	0	160	
Uranium-234	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	850	M3	#	0	150	
Uranium-234	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	890	Y2,M 3	J	#	0	200
Uranium-234	pCi/L	EXCAVA TION SEEP	SL	05/02/2011	0001	0	-	0	3830	M3	#	210	890	
Uranium-235	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	37.9	M3	J	#	0.7	8
Uranium-235	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	39.3	LT	#	20.3	9.4	

Water Quality Data (continued)

Uranium-235	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	43.8	M3	J	#	0.7	9.6
Uranium-235	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	55	LT		#	41	22
Uranium-235	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	42.1	M3	J	#	1.1	9
Uranium-235	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	46	LT		#	38	20
Uranium-235	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	39	LT		#	30	12
Uranium-235	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	40	Y2,M3	J	#	2	11
Uranium-235	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	250	M3	UJ	#	190	180
Uranium-235	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	950	SI		#	50	120
Uranium-238	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	820	M3		#	0	140
Uranium-238	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	880	M3		#	0	170
Uranium-238	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	860	M3		#	0	160
Uranium-238	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	870	Y2,M3	J	#	0	190
Uranium-238	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	3360	M3		#	130	800
Vanadium	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.008	B	J	#	0.00053	
Vanadium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.018		J	#	0.00053	
Vanadium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.0089	B	J	#	0.00053	
Vanadium	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.038		J	#	0.00053	
Vanadium	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	50		J	#	0.027	
Yttrium-88	pCi/L	0548-N-1	TS	05/02/2011	0001	0	-	0	4.2	NQ	J	#	3	2
Yttrium-88	pCi/L	0548-N-12	TS	05/02/2011	0001	0	-	0	10.2	U		#	10.2	6.2
Yttrium-88	pCi/L	0548-S-1	TS	05/02/2011	0001	0	-	0	8.6	U		#	8.6	5.1
Yttrium-88	pCi/L	0548-S-12	TS	05/02/2011	0001	0	-	0	3.8	NQ	J	#	3.6	2.3
Yttrium-88	pCi/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	9.3	U		#	9.3	5.5
Zinc	mg/L	0548-N-1	TS	05/02/2011	0001	0	-	0	0.39		J	#	0.00072	

Water Quality Data (continued)

Zinc	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.53	J	#	0.00072	
Zinc	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.33	J	#	0.00072	
Zinc	mg/L	0548-S-12	TS	05/02/2011	0001	0	-	0	0.35	J	#	0.00072	
Zinc	mg/L	EXCAVATION SEEP	SL	05/02/2011	0001	0	-	0	35	J	#	0.0036	
Zirconium	mg/L	0548-N-12	TS	05/02/2011	0001	0	-	0	0.0027	B	J	#	0.0005
Zirconium	mg/L	0548-S-1	TS	05/02/2011	0001	0	-	0	0.0015	B	J	#	0.0005

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

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

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

QA QUALIFIER:

Validated according to quality-assurance guidelines.

Appendix C.

May 2011 Site-Wide Sampling Event

**Water Sampling Field Activities Verification
Minimums and Maximums Report
Water Quality Data
Water Level Data
Trip Report**

Water Sampling Field Activities Verification

Sampling Event / RIN May 2011 Site-Wide Sampling Event / 1105059 **Date(s) of Water Sampling** May 18 - June 9 , 2011

Date(s) of Verification August 19, 2011 **Name of Verifier** Rachel Cowan

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, standard operating procedures, instructions.	<u>Yes</u> <u>NA</u>	
2. Were the sampling locations specified in the planning documents sampled?	<u>No</u>	<u>Wells 0437, 0438, and 0439 were not sampled due to excavation; well TP-02 had been removed; and well SMI-MW01 was inaccessible due to flooding.</u>
3. Was a pre-trip calibration conducted as specified in the aforementioned documents?	<u>Yes</u>	
4. Was an operational check of the field equipment conducted twice daily? Did the operational checks meet criteria?	<u>Yes</u> <u>Yes</u>	
5. Were the number and types (alkalinity, temperature, electrical conductivity, pH, turbidity, dissolved oxygen, oxidation reduction potential) of field measurements taken as specified?	<u>Yes</u>	<u>The field measurements temperature, pH, dissolved oxygen, oxidation reduction potential, and conductivity were collected.</u>
6. Was the category of the well documented?	<u>Yes</u>	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling? Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements stabilize prior to sampling? Was the flow rate less than 500 milliliters per minute (mL/min)? If a portable pump was used, was there a 4-hour delay between pump installation and sampling?	<u>Yes</u> <u>Yes</u> <u>Yes</u> <u>NA</u> <u>NA</u>	

Water Sampling Field Activities Verification (continued)

Sampling Event / RIN	<u>May 2011 Site-Wide Sampling Event / 1105059</u>	Date(s) of Water Sampling	<u>May 18 - June 9 , 2011</u>
Date(s) of Verification	<u>August 19, 2011</u>	Name of Verifier	<u>Rachel Cowan</u>

8. Were the following conditions met when purging a Category II well:	
Was the flow rate less than 500 mL/min?	<u>NA</u>
Was one pump/tubing volume removed prior to sampling?	<u>NA</u>
9. Were duplicates taken at a frequency of one per 20 samples?	<u>Yes Three duplicates were taken for 51 samples.</u>
10. Were equipment blanks (EBs) taken at a frequency of one per 20 samples that were collected with non-dedicated equipment?	<u>NA All samples were collected on dedicated equipment.</u>
11. Were trip blanks prepared and included with each shipment of volatile organic compound samples?	<u>NA</u>
12. Were Quality Control samples assigned a fictitious site identification number?	<u>Yes</u>
Was the true identity of the samples recorded on the Quality Assurance Sample Log?	<u>Yes</u>
13. Were samples collected in the containers specified?	<u>Yes</u>
14. Were samples filtered and preserved as specified?	<u>Yes</u>
15. Were the number and types of samples collected as specified?	<u>Yes</u>
16. Were chain-of-custody (COC) records completed, and was sample custody maintained?	<u>Yes</u>
17. Are field data sheets signed and dated by both team members?	<u>Yes</u>
18. Was all other pertinent information documented on the field data sheets?	<u>NA</u>
19. Was the presence or absence of ice in the cooler documented at every sample location?	<u>Yes</u>
20. Were water levels measured at the locations specified in the planning documents?	<u>NA</u>

Minimums and Maximums Report

**May 2011 Site-Wide Event –
Data Validation Minimums and Maximums Report - No Field Parameters**

Laboratory: ALS

RIN: 1105059

Comparison: All Historical Data

Report Date: 8/24/2011

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	0412	05/23/2011	Uranium	3.2		12.8	F	4.1			8	0	
MOA01	0413	05/26/2011	Ammonia Total as N	7		13		8.7733	FQ		10	0	
MOA01	0413	05/26/2011	Total Dissolved Solids	1900		2500	FQ	2200			9	0	
MOA01	0414	05/23/2011	Ammonia Total as N	11		32.997	QF	13			8	0	
MOA01	0430	06/08/2011	Total Dissolved Solids	4400		4100	J	957	F		7	0	
MOA01	0434	06/09/2011	Ammonia Total as N	0.3	J	0.209	F	0.0854	FJ		6	1	
MOA01	0434	06/09/2011	Total Dissolved Solids	31000		30000	J	27600	F		5	0	
MOA01	0434	06/09/2011	Uranium	0.026		0.023	J	0.0149	F		6	0	
MOA01	0435	05/23/2011	Uranium	0.029		0.0273	F	0.0101			7	0	
MOA01	0443	06/08/2011	Total Dissolved Solids	4100		3980	F	877	Q		6	0	
MOA01	0455	05/26/2011	Uranium	0.0022		0.0053		0.0023			6	0	
MOA01	0456	06/09/2011	Total Dissolved Solids	5600		5530	F	5100			6	0	
MOA01	AMM-2	05/19/2011	Uranium	0.49	J	29		1.9			41	0	
MOA01	AMM-3	05/26/2011	Ammonia Total as N	320		240	J	41			19	0	
MOA01	ATP-2-D	05/19/2011	Ammonia Total as N	290		710		300	FQ		28	0	
MOA01	SMI-PW03	05/24/2011	Ammonia Total as N	150	J	110		30			15	0	

Minimums and Maximums Report (continued)

**May 2011 Site-Wide Event –
Data Validation Minimums and Maximums Report - No Field Parameters**

Laboratory: ALS

RIN: 1105059

Comparison: All Historical Data

Report Date: 8/24/2011

Site Code	Location Code	Sample Date	Analyte	Current Result	Current Qualifiers		Historical Maximum Result	Historical Maximum Qualifiers		Historical Minimum Result	Historical Minimum Qualifiers		Count	
					Lab	Data		Lab	Data		Lab	Data	N	N Below Detect
MOA01	SMI-PW03	05/24/2011	Total Dissolved Solids	12000			9200			5500			14	0
MOA01	SMI-PZ1S	05/25/2011	Ammonia Total as N	120			565			210	J		23	0
MOA01	SMI-PZ1S	05/25/2011	Total Dissolved Solids	3200			20000	FJ		8400			22	0
MOA01	SMI-PZ1S	05/25/2011	Uranium	0.68			4.5	F		1.33			23	0
MOA01	SMI-PZ2D	05/25/2011	Ammonia Total as N	400			4220			760			10	0
MOA01	SMI-PZ2D	05/25/2011	Uranium	0.34			3.03			0.54			10	0
MOA01	SMI-PZ2M2	05/25/2011	Ammonia Total as N	400			4600			700			5	0
MOA01	SMI-PZ2M2	05/25/2011	Uranium	0.68			1.8144			1.2	J		5	0
MOA01	SMI-PZ3D2	05/24/2011	Total Dissolved Solids	21000			19700	F		16000			8	0
MOA01	SMI-PZ3M	05/24/2011	Ammonia Total as N	84			74			38			10	0
MOA01	SMI-PZ3M	05/24/2011	Total Dissolved Solids	9400			8400			5260	F		8	0
MOA01	SMI-PZ3S	05/24/2011	Uranium	1.1			3.24	F		1.2			11	0
MOA01	TP-01	05/23/2011	Uranium	0.078			0.41			0.079			17	0

Analyte concentrations presented in blue text represent the historical minimum or maximum value exceeded by the concentration presented in red, which is associated with this current sampling event.

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

Minimums and Maximums Report (continued)

LAB QUALIFIERS:

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

DATA QUALIFIERS:

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

Water Quality Data

May 2011 Site-Wide Sampling Event
General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)	Result	Qualifiers			Detection Limit	Uncertainty
								Lab	Data	QA		
Ammonia Total as N	mg/L	0401	WL	05/25/2011	0001	18 - 18	82			#	10	
Ammonia Total as N	mg/L	0404	WL	05/23/2011	0001	18 - 18	110			#	10	
Ammonia Total as N	mg/L	0410	WL	05/24/2011	0001	25 - 25	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0411	WL	06/07/2011	0001	9 - 9	2.6	N	J	#	0.1	
Ammonia Total as N	mg/L	0412	WL	05/23/2011	0001	10.5 - 10.5	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0413	WL	05/26/2011	0001	10.5 - 10.5	7			#	0.2	
Ammonia Total as N	mg/L	0414	WL	05/23/2011	0001	6.5 - 6.5	11			#	0.5	
Ammonia Total as N	mg/L	0430	WL	06/08/2011	0001	101 - 101	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0431	WL	06/08/2011	0001	91 - 91	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0432	WL	06/09/2011	0001	55 - 55	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0433	WL	06/08/2011	0001	99 - 99	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0433	WL	06/08/2011	0002	99 - 99	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0434	WL	06/09/2011	0001	35 - 35	0.3		J	#	0.1	
Ammonia Total as N	mg/L	0435	WL	05/23/2011	0001	173 - 173	1.9			#	0.1	
Ammonia Total as N	mg/L	0436	WL	06/07/2011	0001	192 - 192	3.5		J	#	0.1	
Ammonia Total as N	mg/L	0440	WL	06/07/2011	0001	117 - 117	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0441	WL	06/08/2011	0001	53 - 53	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0443	WL	06/08/2011	0001	73 - 73	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0444	WL	05/23/2011	0001	116 - 116	1.8		J	#	0.1	
Ammonia Total as N	mg/L	0453	WL	06/07/2011	0001	80 - 80	180		J	#	5	
Ammonia Total as N	mg/L	0454	WL	05/25/2011	0001	13 - 13	280			#	10	
Ammonia Total as N	mg/L	0455	WL	05/26/2011	0001	46 - 46	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0456	WL	06/09/2011	0001	53 - 53	0.1	U		#	0.1	
Ammonia Total as N	mg/L	0457	WL	05/23/2011	0001	29 - 29	0.1	U		#	0.1	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Ammonia Total as N	mg/L	0457	WL	05/23/2011	0002	29	-	29	0.1	U	#		0.1	
Ammonia Total as N	mg/L	0492	WL	05/18/2011	0001	18	-	18	21	N	#		1	
Ammonia Total as N	mg/L	0548-N-1	TS	05/19/2011	0001	0	-	0	590		#		20	
Ammonia Total as N	mg/L	0548-S-12	TS	05/19/2011	0001	0	-	0	570		#		20	
Ammonia Total as N	mg/L	AMM-1-19	WL	05/18/2011	0001	19	-	19	0.1	U	#		0.1	
Ammonia Total as N	mg/L	AMM-1-53	WL	05/18/2011	0001	53	-	53	0.1	U	#		0.1	
Ammonia Total as N	mg/L	AMM-2	WL	05/19/2011	0001	48	-	48	600		#		20	
Ammonia Total as N	mg/L	AMM-2	WL	05/19/2011	0002	48	-	48	600		#		20	
Ammonia Total as N	mg/L	AMM-3	WL	05/26/2011	0001	48	-	48	320		#		10	
Ammonia Total as N	mg/L	ATP-2-D	WL	05/19/2011	0001	88	-	88	290		#		20	
Ammonia Total as N	mg/L	ATP-2-S	WL	05/19/2011	0001	38	-	38	350		#		20	
Ammonia Total as N	mg/L	ATP-3	WL	06/08/2011	0001	51	-	51	0.1	U	#		0.1	
Ammonia Total as N	mg/L	SMI-PW01	WL	05/25/2011	0001	40	-	40	790		#		20	
Ammonia Total as N	mg/L	SMI-PW03	WL	05/24/2011	0001	40	-	40	150	J	#		10	
Ammonia Total as N	mg/L	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	120		#		10	
Ammonia Total as N	mg/L	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	400		#		10	
Ammonia Total as N	mg/L	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	400		#		10	
Ammonia Total as N	mg/L	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	570		#		20	
Ammonia Total as N	mg/L	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	84		#		10	
Ammonia Total as N	mg/L	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	3		#		0.1	
Ammonia Total as N	mg/L	TP-01	WL	05/23/2011	0001	22	-	22	0.13		#		0.1	
Ammonia Total as N	mg/L	TP-11	WL	05/18/2011	0001	30	-	30	0.73		#		0.1	
Ammonia Total as N	mg/L	TP-17	WL	05/18/2011	0001	28	-	28	2.1		#		0.1	
Ammonia Total as N	mg/L	TP-19	WL	05/18/2011	0001	29	-	29	3.5		#		0.1	
Ammonia Total as N	mg/L	TP-20	WL	05/23/2011	0001	32	-	32	3.5		#		0.1	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Ammonia Total as N	mg/L	TP-22	WL	05/25/2011	0001	17	-	17	0.1	U		#	0.1	
Ammonia Total as N	mg/L	TP-23	WL	05/25/2011	0001	25	-	25	160			#	10	
Dissolved Oxygen	mg/L	0401	WL	05/25/2011	0001	18	-	18	0.64			#		
Dissolved Oxygen	mg/L	0404	WL	05/23/2011	0001	18	-	18	0.54			#		
Dissolved Oxygen	mg/L	0410	WL	05/24/2011	0001	25	-	25	5.05			#		
Dissolved Oxygen	mg/L	0411	WL	06/07/2011	0001	9	-	9	2.29			#		
Dissolved Oxygen	mg/L	0412	WL	05/23/2011	0001	10.5	-	10.5	2.99			#		
Dissolved Oxygen	mg/L	0413	WL	05/26/2011	0001	10.5	-	10.5	0.71			#		
Dissolved Oxygen	mg/L	0414	WL	05/23/2011	0001	6.5	-	6.5	1.24			#		
Dissolved Oxygen	mg/L	0430	WL	06/08/2011	0001	101	-	101	0.51			#		
Dissolved Oxygen	mg/L	0431	WL	06/08/2011	0001	91	-	91	0.37			#		
Dissolved Oxygen	mg/L	0432	WL	06/09/2011	0001	55	-	55	4.74			#		
Dissolved Oxygen	mg/L	0433	WL	06/08/2011	0001	99	-	99	2.44			#		
Dissolved Oxygen	mg/L	0434	WL	06/09/2011	0001	35	-	35	0.07			#		
Dissolved Oxygen	mg/L	0435	WL	05/23/2011	0001	173	-	173	0.01			#		
Dissolved Oxygen	mg/L	0436	WL	06/07/2011	0001	192	-	192	-0.02			#		
Dissolved Oxygen	mg/L	0440	WL	06/07/2011	0001	117	-	117	2.05			#		
Dissolved Oxygen	mg/L	0441	WL	06/08/2011	0001	53	-	53	0.96			#		
Dissolved Oxygen	mg/L	0443	WL	06/08/2011	0001	73	-	73	1.3			#		
Dissolved Oxygen	mg/L	0444	WL	05/23/2011	0001	116	-	116	0.23			#		
Dissolved Oxygen	mg/L	0453	WL	06/07/2011	0001	80	-	80	0.16			#		
Dissolved Oxygen	mg/L	0454	WL	05/25/2011	0001	13	-	13	0.02			#		
Dissolved Oxygen	mg/L	0455	WL	05/26/2011	0001	46	-	46	0.37			#		
Dissolved Oxygen	mg/L	0456	WL	06/09/2011	0001	53	-	53	0.69			#		
Dissolved Oxygen	mg/L	0457	WL	05/23/2011	0001	29	-	29	0.26			#		
Dissolved Oxygen	mg/L	0492	WL	05/18/2011	0001	18	-	18	0.61			#		
Dissolved Oxygen	mg/L	0548-N-1	TS	05/19/2011	0001	0	-	0	3.54			#		

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Dissolved Oxygen	mg/L	0548-S-12	TS	05/19/2011	0001	0	-	0	3.37				#	
Dissolved Oxygen	mg/L	AMM-1-19	WL	05/18/2011	0001	19	-	19	4.96				#	
Dissolved Oxygen	mg/L	AMM-1-53	WL	05/18/2011	0001	53	-	53	0.73				#	
Dissolved Oxygen	mg/L	AMM-2	WL	05/19/2011	0001	48	-	48	0.77				#	
Dissolved Oxygen	mg/L	AMM-3	WL	05/26/2011	0001	48	-	48	0.15				#	
Dissolved Oxygen	mg/L	ATP-2-D	WL	05/19/2011	0001	88	-	88	0.04				#	
Dissolved Oxygen	mg/L	ATP-2-S	WL	05/19/2011	0001	38	-	38	0.82				#	
Dissolved Oxygen	mg/L	ATP-3	WL	06/08/2011	0001	51	-	51	1.35				#	
Dissolved Oxygen	mg/L	SMI-PW01	WL	05/25/2011	0001	40	-	40	0.2				#	
Dissolved Oxygen	mg/L	SMI-PW03	WL	05/24/2011	0001	40	-	40	0.24				#	
Dissolved Oxygen	mg/L	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	0.72				#	
Dissolved Oxygen	mg/L	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	0.02				#	
Dissolved Oxygen	mg/L	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	0.04				#	
Dissolved Oxygen	mg/L	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	0.13				#	
Dissolved Oxygen	mg/L	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	0.26				#	
Dissolved Oxygen	mg/L	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	0.46				#	
Dissolved Oxygen	mg/L	TP-01	WL	05/23/2011	0001	22	-	22	0.36				#	
Dissolved Oxygen	mg/L	TP-11	WL	05/18/2011	0001	30	-	30	0.23				#	
Dissolved Oxygen	mg/L	TP-17	WL	05/18/2011	0001	28	-	28	0.21				#	
Dissolved Oxygen	mg/L	TP-19	WL	05/18/2011	0001	29	-	29	0.17				#	
Dissolved Oxygen	mg/L	TP-20	WL	05/23/2011	0001	32	-	32	0.02				#	
Dissolved Oxygen	mg/L	TP-22	WL	05/25/2011	0001	17	-	17	1.48				#	
Dissolved Oxygen	mg/L	TP-23	WL	05/25/2011	0001	25	-	25	0.72				#	
Oxidation Reduction Potential	mV	0401	WL	05/25/2011	0001	18	-	18	9.2				#	
Oxidation Reduction	mV	0404	WL	05/23/2011	0001	18	-	18	3.3				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Potential														
Oxidation Reduction Potential	mV	0410	WL	05/24/2011	0001	25	-	25	166			#		
Oxidation Reduction Potential	mV	0411	WL	06/07/2011	0001	9	-	9	193.1			#		
Oxidation Reduction Potential	mV	0412	WL	05/23/2011	0001	10.5	-	10.5	131			#		
Oxidation Reduction Potential	mV	0413	WL	05/26/2011	0001	10.5	-	10.5	121.3			#		
Oxidation Reduction Potential	mV	0414	WL	05/23/2011	0001	6.5	-	6.5	164			#		
Oxidation Reduction Potential	mV	0430	WL	06/08/2011	0001	101	-	101	31.9			#		
Oxidation Reduction Potential	mV	0431	WL	06/08/2011	0001	91	-	91	183.5			#		
Oxidation Reduction Potential	mV	0432	WL	06/09/2011	0001	55	-	55	95.3			#		
Oxidation Reduction Potential	mV	0433	WL	06/08/2011	0001	99	-	99	145.3			#		
Oxidation Reduction Potential	mV	0434	WL	06/09/2011	0001	35	-	35	-3.1			#		
Oxidation Reduction Potential	mV	0435	WL	05/23/2011	0001	173	-	173	-153			#		
Oxidation Reduction Potential	mV	0436	WL	06/07/2011	0001	192	-	192	-192.7			#		
Oxidation Reduction Potential	mV	0440	WL	06/07/2011	0001	117	-	117	111.1			#		
Oxidation Reduction Potential	mV	0441	WL	06/08/2011	0001	53	-	53	193.9			#		
Oxidation Reduction Potential	mV	0443	WL	06/08/2011	0001	73	-	73	161.6			#		
Oxidation Reduction Potential	mV	0444	WL	05/23/2011	0001	116	-	116	-131			#		
Oxidation Reduction Potential	mV	0453	WL	06/07/2011	0001	80	-	80	125.3			#		
Oxidation Reduction Potential	mV	0454	WL	05/25/2011	0001	13	-	13	208.2			#		
Oxidation Reduction Potential	mV	0455	WL	05/26/2011	0001	46	-	46	74.5			#		
Oxidation Reduction Potential	mV	0456	WL	06/09/2011	0001	53	-	53	78.4			#		
Oxidation Reduction Potential	mV	0457	WL	05/23/2011	0001	29	-	29	-138			#		

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Oxidation Reduction Potential	mV	0492	WL	05/18/2011	0001	18	-	18	53.6				#	
Oxidation Reduction Potential	mV	0548-N-1	TS	05/19/2011	0001	0	-	0	229				#	
Oxidation Reduction Potential	mV	0548-S-12	TS	05/19/2011	0001	0	-	0	207				#	
Oxidation Reduction Potential	mV	AMM-1-19	WL	05/18/2011	0001	19	-	19	52.8				#	
Oxidation Reduction Potential	mV	AMM-1-53	WL	05/18/2011	0001	53	-	53	36.9				#	
Oxidation Reduction Potential	mV	AMM-2	WL	05/19/2011	0001	48	-	48	110				#	
Oxidation Reduction Potential	mV	AMM-3	WL	05/26/2011	0001	48	-	48	-38.7				#	
Oxidation Reduction Potential	mV	ATP-2-D	WL	05/19/2011	0001	88	-	88	-195				#	
Oxidation Reduction Potential	mV	ATP-2-S	WL	05/19/2011	0001	38	-	38	-105				#	
Oxidation Reduction Potential	mV	ATP-3	WL	06/08/2011	0001	51	-	51	-92.6				#	
Oxidation Reduction Potential	mV	SMI-PW01	WL	05/25/2011	0001	40	-	40	36.4				#	
Oxidation Reduction Potential	mV	SMI-PW03	WL	05/24/2011	0001	40	-	40	12				#	
Oxidation Reduction Potential	mV	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	42.11				#	
Oxidation Reduction Potential	mV	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	36.9				#	
Oxidation Reduction Potential	mV	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	44.9				#	
Oxidation Reduction Potential	mV	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	130				#	
Oxidation Reduction Potential	mV	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	94				#	
Oxidation Reduction Potential	mV	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	145				#	
Oxidation Reduction Potential	mV	TP-01	WL	05/23/2011	0001	22	-	22	-108				#	
Oxidation Reduction Potential	mV	TP-11	WL	05/18/2011	0001	30	-	30	-64.4				#	
Oxidation Reduction Potential	mV	TP-17	WL	05/18/2011	0001	28	-	28	-211				#	
Oxidation Reduction Potential	mV	TP-19	WL	05/18/2011	0001	29	-	29	-208				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Oxidation Reduction Potential	mV	TP-20	WL	05/23/2011	0001	32	-	32	-104				#	
Oxidation Reduction Potential	mV	TP-22	WL	05/25/2011	0001	17	-	17	-1.7				#	
Oxidation Reduction Potential	mV	TP-23	WL	05/25/2011	0001	25	-	25	-6.05				#	
pH	s.u.	0401	WL	05/25/2011	0001	18	-	18	6.73				#	
pH	s.u.	0404	WL	05/23/2011	0001	18	-	18	7.1				#	
pH	s.u.	0410	WL	05/24/2011	0001	25	-	25	7.22				#	
pH	s.u.	0411	WL	06/07/2011	0001	9	-	9	7.26				#	
pH	s.u.	0412	WL	05/23/2011	0001	10.5	-	10.5	7.58				#	
pH	s.u.	0413	WL	05/26/2011	0001	10.5	-	10.5	7.74				#	
pH	s.u.	0414	WL	05/23/2011	0001	6.5	-	6.5	7.55				#	
pH	s.u.	0430	WL	06/08/2011	0001	101	-	101	7.24				#	
pH	s.u.	0431	WL	06/08/2011	0001	91	-	91	7.03				#	
pH	s.u.	0432	WL	06/09/2011	0001	55	-	55	7.55				#	
pH	s.u.	0433	WL	06/08/2011	0001	99	-	99	7.47				#	
pH	s.u.	0434	WL	06/09/2011	0001	35	-	35	7.02				#	
pH	s.u.	0435	WL	05/23/2011	0001	173	-	173	7.06				#	
pH	s.u.	0436	WL	06/07/2011	0001	192	-	192	7.27				#	
pH	s.u.	0440	WL	06/07/2011	0001	117	-	117	7.09				#	
pH	s.u.	0441	WL	06/08/2011	0001	53	-	53	7.21				#	
pH	s.u.	0443	WL	06/08/2011	0001	73	-	73	7.26				#	
pH	s.u.	0444	WL	05/23/2011	0001	116	-	116	7.1				#	
pH	s.u.	0453	WL	06/07/2011	0001	80	-	80	7.28				#	
pH	s.u.	0454	WL	05/25/2011	0001	13	-	13	6.78				#	
pH	s.u.	0455	WL	05/26/2011	0001	46	-	46	7.5				#	
pH	s.u.	0456	WL	06/09/2011	0001	53	-	53	7.51				#	
pH	s.u.	0457	WL	05/23/2011	0001	29	-	29	7.88				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
pH	s.u.	0492	WL	05/18/2011	0001	18	-	18	6.99			#		
pH	s.u.	0548-N-1	TS	05/19/2011	0001	0	-	0	7.76			#		
pH	s.u.	0548-S-12	TS	05/19/2011	0001	0	-	0	7.78			#		
pH	s.u.	AMM-1-19	WL	05/18/2011	0001	19	-	19	7.39			#		
pH	s.u.	AMM-1-53	WL	05/18/2011	0001	53	-	53	6			#		
pH	s.u.	AMM-2	WL	05/19/2011	0001	48	-	48	6.85			#		
pH	s.u.	AMM-3	WL	05/26/2011	0001	48	-	48	6.89			#		
pH	s.u.	ATP-2-D	WL	05/19/2011	0001	88	-	88	7.51			#		
pH	s.u.	ATP-2-S	WL	05/19/2011	0001	38	-	38	8.92			#		
pH	s.u.	ATP-3	WL	06/08/2011	0001	51	-	51	7.56			#		
pH	s.u.	SMI-PW01	WL	05/25/2011	0001	40	-	40	6.83			#		
pH	s.u.	SMI-PW03	WL	05/24/2011	0001	40	-	40	7.15			#		
pH	s.u.	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	7.12			#		
pH	s.u.	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	6.79			#		
pH	s.u.	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	6.82			#		
pH	s.u.	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	6.98			#		
pH	s.u.	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	7.26			#		
pH	s.u.	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	8.04			#		
pH	s.u.	TP-01	WL	05/23/2011	0001	22	-	22	7.66			#		
pH	s.u.	TP-11	WL	05/18/2011	0001	30	-	30	7.23			#		
pH	s.u.	TP-17	WL	05/18/2011	0001	28	-	28	7.14			#		
pH	s.u.	TP-19	WL	05/18/2011	0001	29	-	29	6.99			#		
pH	s.u.	TP-20	WL	05/23/2011	0001	32	-	32	7.18			#		
pH	s.u.	TP-22	WL	05/25/2011	0001	17	-	17	6.91			#		
pH	s.u.	TP-23	WL	05/25/2011	0001	25	-	25	6.94			#		

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Specific Conductance	umhos /cm	0401	WL	05/25/2011	0001	18	-	18	11642				#	
Specific Conductance	umhos /cm	0404	WL	05/23/2011	0001	18	-	18	5867				#	
Specific Conductance	umhos /cm	0410	WL	05/24/2011	0001	25	-	25	3059				#	
Specific Conductance	umhos /cm	0411	WL	06/07/2011	0001	9	-	9	6978				#	
Specific Conductance	umhos /cm	0412	WL	05/23/2011	0001	10.5	-	10.5	3058				#	
Specific Conductance	umhos /cm	0413	WL	05/26/2011	0001	10.5	-	10.5	3179				#	
Specific Conductance	umhos /cm	0414	WL	05/23/2011	0001	6.5	-	6.5	4541				#	
Specific Conductance	umhos /cm	0430	WL	06/08/2011	0001	101	-	101	6443				#	
Specific Conductance	umhos /cm	0431	WL	06/08/2011	0001	91	-	91	32915				#	
Specific Conductance	umhos /cm	0432	WL	06/09/2011	0001	55	-	55	3095				#	
Specific Conductance	umhos /cm	0433	WL	06/08/2011	0001	99	-	99	4896				#	
Specific Conductance	umhos /cm	0434	WL	06/09/2011	0001	35	-	35	45522				#	
Specific Conductance	umhos /cm	0435	WL	05/23/2011	0001	173	-	173	117017				#	
Specific Conductance	umhos /cm	0436	WL	06/07/2011	0001	192	-	192	123465				#	
Specific Conductance	umhos /cm	0440	WL	06/07/2011	0001	117	-	117	8275				#	
Specific Conductance	umhos /cm	0441	WL	06/08/2011	0001	53	-	53	6615				#	
Specific Conductance	umhos /cm	0443	WL	06/08/2011	0001	73	-	73	5871				#	
Specific Conductance	umhos /cm	0444	WL	05/23/2011	0001	116	-	116	113226				#	
Specific Conductance	umhos /cm	0453	WL	06/07/2011	0001	80	-	80	27437				#	
Specific Conductance	umhos /cm	0454	WL	05/25/2011	0001	13	-	13	78375				#	
Specific Conductance	umhos /cm	0455	WL	05/26/2011	0001	46	-	46	2163				#	
Specific Conductance	umhos /cm	0456	WL	06/09/2011	0001	53	-	53	8690				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Specific Conductance	umhos /cm	0457	WL	05/23/2011	0001	29	-	29	5207				#	
Specific Conductance	umhos /cm	0492	WL	05/18/2011	0001	18	-	18	8817				#	
Specific Conductance	umhos /cm	0548-N-1	TS	05/19/2011	0001	0	-	0	35265				#	
Specific Conductance	umhos /cm	0548-S-12	TS	05/19/2011	0001	0	-	0	35290				#	
Specific Conductance	umhos /cm	AMM-1-19	WL	05/18/2011	0001	19	-	19	12791				#	
Specific Conductance	umhos /cm	AMM-1-53	WL	05/18/2011	0001	53	-	53	33237				#	
Specific Conductance	umhos /cm	AMM-2	WL	05/19/2011	0001	48	-	48	19701				#	
Specific Conductance	umhos /cm	AMM-3	WL	05/26/2011	0001	48	-	48	16309				#	
Specific Conductance	umhos /cm	ATP-2-D	WL	05/19/2011	0001	88	-	88	117573				#	
Specific Conductance	umhos /cm	ATP-2-S	WL	05/19/2011	0001	38	-	38	18304				#	
Specific Conductance	umhos /cm	ATP-3	WL	06/08/2011	0001	51	-	51	2500				#	
Specific Conductance	umhos /cm	SMI-PW01	WL	05/25/2011	0001	40	-	40	35592				#	
Specific Conductance	umhos /cm	SMI-PW03	WL	05/24/2011	0001	40	-	40	15646				#	
Specific Conductance	umhos /cm	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	5124				#	
Specific Conductance	umhos /cm	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	111364				#	
Specific Conductance	umhos /cm	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	97607				#	
Specific Conductance	umhos /cm	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	26699				#	
Specific Conductance	umhos /cm	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	13052				#	
Specific Conductance	umhos /cm	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	4643				#	
Specific Conductance	umhos /cm	TP-01	WL	05/23/2011	0001	22	-	22	7761				#	
Specific Conductance	umhos /cm	TP-11	WL	05/18/2011	0001	30	-	30	20041				#	
Specific Conductance	umhos /cm	TP-17	WL	05/18/2011	0001	28	-	28	95564				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Specific Conductance	umhos /cm	TP-19	WL	05/18/2011	0001	29	-	29	129885				#	
Specific Conductance	umhos /cm	TP-20	WL	05/23/2011	0001	32	-	32	125726				#	
Specific Conductance	umhos /cm	TP-22	WL	05/25/2011	0001	17	-	17	24511				#	
Specific Conductance	umhos /cm	TP-23	WL	05/25/2011	0001	25	-	25	47690				#	
Temperature	C	0401	WL	05/25/2011	0001	18	-	18	15.69				#	
Temperature	C	0404	WL	05/23/2011	0001	18	-	18	15.03				#	
Temperature	C	0410	WL	05/24/2011	0001	25	-	25	16.85				#	
Temperature	C	0411	WL	06/07/2011	0001	9	-	9	17.85				#	
Temperature	C	0412	WL	05/23/2011	0001	10.5	-	10.5	17.63				#	
Temperature	C	0413	WL	05/26/2011	0001	10.5	-	10.5	16.04				#	
Temperature	C	0414	WL	05/23/2011	0001	6.5	-	6.5	16.12				#	
Temperature	C	0430	WL	06/08/2011	0001	101	-	101	19.75				#	
Temperature	C	0431	WL	06/08/2011	0001	91	-	91	19.65				#	
Temperature	C	0432	WL	06/09/2011	0001	55	-	55	16.69				#	
Temperature	C	0433	WL	06/08/2011	0001	99	-	99	20.07				#	
Temperature	C	0434	WL	06/09/2011	0001	35	-	35	19.51				#	
Temperature	C	0435	WL	05/23/2011	0001	173	-	173	17.86				#	
Temperature	C	0436	WL	06/07/2011	0001	192	-	192	20.99				#	
Temperature	C	0440	WL	06/07/2011	0001	117	-	117	21.22				#	
Temperature	C	0441	WL	06/08/2011	0001	53	-	53	19.76				#	
Temperature	C	0443	WL	06/08/2011	0001	73	-	73	20.74				#	
Temperature	C	0444	WL	05/23/2011	0001	116	-	116	18.61				#	
Temperature	C	0453	WL	06/07/2011	0001	80	-	80	20.11				#	
Temperature	C	0454	WL	05/25/2011	0001	13	-	13	17.17				#	
Temperature	C	0455	WL	05/26/2011	0001	46	-	46	19.35				#	
Temperature	C	0456	WL	06/09/2011	0001	53	-	53	19.53				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Temperature	C	0457	WL	05/23/2011	0001	29	-	29	17.31				#	
Temperature	C	0492	WL	05/18/2011	0001	18	-	18	14.2				#	
Temperature	C	0548-N-1	TS	05/19/2011	0001	0	-	0	20.55				#	
Temperature	C	0548-S-12	TS	05/19/2011	0001	0	-	0	20.54				#	
Temperature	C	AMM-1-19	WL	05/18/2011	0001	19	-	19	15.02				#	
Temperature	C	AMM-1-53	WL	05/18/2011	0001	53	-	53	16.82				#	
Temperature	C	AMM-2	WL	05/19/2011	0001	48	-	48	15.08				#	
Temperature	C	AMM-3	WL	05/26/2011	0001	48	-	48	20.12				#	
Temperature	C	ATP-2-D	WL	05/19/2011	0001	88	-	88	16.76				#	
Temperature	C	ATP-2-S	WL	05/19/2011	0001	38	-	38	18.16				#	
Temperature	C	ATP-3	WL	06/08/2011	0001	51	-	51	20.46				#	
Temperature	C	SMI-PW01	WL	05/25/2011	0001	40	-	40	17.41				#	
Temperature	C	SMI-PW03	WL	05/24/2011	0001	40	-	40	20.1				#	
Temperature	C	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	15.34				#	
Temperature	C	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	17.18				#	
Temperature	C	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	17.19				#	
Temperature	C	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	18.04				#	
Temperature	C	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	17.79				#	
Temperature	C	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	17.3				#	
Temperature	C	TP-01	WL	05/23/2011	0001	22	-	22	17.12				#	
Temperature	C	TP-11	WL	05/18/2011	0001	30	-	30	15.38				#	
Temperature	C	TP-17	WL	05/18/2011	0001	28	-	28	12.9				#	
Temperature	C	TP-19	WL	05/18/2011	0001	29	-	29	13				#	
Temperature	C	TP-20	WL	05/23/2011	0001	32	-	32	18.42				#	
Temperature	C	TP-22	WL	05/25/2011	0001	17	-	17	16.65				#	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Temperature	C	TP-23	WL	05/25/2011	0001	25	-	25	18.65			#		
Total Dissolved Solids	mg/L	0404	WL	05/23/2011	0001	18	-	18	4400			#	200	
Total Dissolved Solids	mg/L	0410	WL	05/24/2011	0001	25	-	25	2000			#	40	
Total Dissolved Solids	mg/L	0411	WL	06/07/2011	0001	9	-	9	4900			#	200	
Total Dissolved Solids	mg/L	0412	WL	05/23/2011	0001	10.5	-	10.5	1900			#	40	
Total Dissolved Solids	mg/L	0413	WL	05/26/2011	0001	10.5	-	10.5	1900			#	80	
Total Dissolved Solids	mg/L	0414	WL	05/23/2011	0001	6.5	-	6.5	3000			#	80	
Total Dissolved Solids	mg/L	0430	WL	06/08/2011	0001	101	-	101	4400			#	200	
Total Dissolved Solids	mg/L	0431	WL	06/08/2011	0001	91	-	91	22000			#	2000	
Total Dissolved Solids	mg/L	0432	WL	06/09/2011	0001	55	-	55	1800			#	80	
Total Dissolved Solids	mg/L	0433	WL	06/08/2011	0001	99	-	99	2800			#	80	
Total Dissolved Solids	mg/L	0433	WL	06/08/2011	0002	99	-	99	2800			#	80	
Total Dissolved Solids	mg/L	0434	WL	06/09/2011	0001	35	-	35	31000			#	1000	
Total Dissolved Solids	mg/L	0435	WL	05/23/2011	0001	173	-	173	95000			#	2000	
Total Dissolved Solids	mg/L	0436	WL	06/07/2011	0001	192	-	192	100000			#	2000	
Total Dissolved Solids	mg/L	0440	WL	06/07/2011	0001	117	-	117	6500			#	200	
Total Dissolved Solids	mg/L	0441	WL	06/08/2011	0001	53	-	53	4400			#	200	
Total Dissolved Solids	mg/L	0443	WL	06/08/2011	0001	73	-	73	4100			#	200	
Total Dissolved Solids	mg/L	0444	WL	05/23/2011	0001	116	-	116	91000			#	2000	
Total Dissolved Solids	mg/L	0453	WL	06/07/2011	0001	80	-	80	20000			#	1000	
Total Dissolved Solids	mg/L	0454	WL	05/25/2011	0001	13	-	13	45000			#	2000	
Total Dissolved Solids	mg/L	0455	WL	05/26/2011	0001	46	-	46	1700			#	80	
Total Dissolved Solids	mg/L	0456	WL	06/09/2011	0001	53	-	53	5600			#	200	
Total Dissolved Solids	mg/L	0457	WL	05/23/2011	0001	29	-	29	3100			#	200	
Total Dissolved Solids	mg/L	0457	WL	05/23/2011	0002	29	-	29	3000			#	200	
Total Dissolved Solids	mg/L	0492	WL	05/18/2011	0001	18	-	18	7100			#	200	
Total Dissolved Solids	mg/L	0548-N-1	TS	05/19/2011	0001	0	-	0	30000			#	1000	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

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	0548-S-12	TS	05/19/2011	0001	0	-	0	30000			#	1000	
Total Dissolved Solids	mg/L	AMM-1-19	WL	05/18/2011	0001	19	-	19	8200			#	400	
Total Dissolved Solids	mg/L	AMM-1-53	WL	05/18/2011	0001	53	-	53	24000			#	1000	
Total Dissolved Solids	mg/L	AMM-2	WL	05/19/2011	0001	48	-	48	16000			#	400	
Total Dissolved Solids	mg/L	AMM-2	WL	05/19/2011	0002	48	-	48	16000			#	400	
Total Dissolved Solids	mg/L	AMM-3	WL	05/26/2011	0001	48	-	48	14000			#	400	
Total Dissolved Solids	mg/L	ATP-2-D	WL	05/19/2011	0001	88	-	88	95000			#	2000	
Total Dissolved Solids	mg/L	ATP-2-S	WL	05/19/2011	0001	38	-	38	13000			#	400	
Total Dissolved Solids	mg/L	ATP-3	WL	06/08/2011	0001	51	-	51	1400			#	40	
Total Dissolved Solids	mg/L	SMI-PW01	WL	05/25/2011	0001	40	-	40	31000			#	1000	
Total Dissolved Solids	mg/L	SMI-PW03	WL	05/24/2011	0001	40	-	40	12000			#	400	
Total Dissolved Solids	mg/L	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	3200			#	80	
Total Dissolved Solids	mg/L	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	90000			#	2000	
Total Dissolved Solids	mg/L	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	80000			#	2000	
Total Dissolved Solids	mg/L	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	21000			#	400	
Total Dissolved Solids	mg/L	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	9400			#	400	
Total Dissolved Solids	mg/L	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	2900			#	200	
Total Dissolved Solids	mg/L	TP-01	WL	05/23/2011	0001	22	-	22	4900			#	200	
Total Dissolved Solids	mg/L	TP-11	WL	05/18/2011	0001	30	-	30	14000			#	400	
Total Dissolved Solids	mg/L	TP-17	WL	05/18/2011	0001	28	-	28	74000			#	2000	
Total Dissolved Solids	mg/L	TP-19	WL	05/18/2011	0001	29	-	29	110000			#	2000	
Total Dissolved Solids	mg/L	TP-20	WL	05/23/2011	0001	32	-	32	110000			#	2000	
Total Dissolved Solids	mg/L	TP-22	WL	05/25/2011	0001	17	-	17	22000			#	400	
Total Dissolved Solids	mg/L	TP-23	WL	05/25/2011	0001	25	-	25	40000			#	2000	
Turbidity	NTU	0401	WL	05/25/2011	0001	18	-	18	7.95			#		

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Turbidity	NTU	0404	WL	05/23/2011	0001	18	-	18	1.92			#		
Turbidity	NTU	0411	WL	06/07/2011	0001	9	-	9	8.7			#		
Turbidity	NTU	0412	WL	05/23/2011	0001	10.5	-	10.5	8.47			#		
Turbidity	NTU	0413	WL	05/26/2011	0001	10.5	-	10.5	29.9			#		
Turbidity	NTU	0414	WL	05/23/2011	0001	6.5	-	6.5	35.8			#		
Turbidity	NTU	0430	WL	06/08/2011	0001	101	-	101	0.97			#		
Turbidity	NTU	0431	WL	06/08/2011	0001	91	-	91	1.23			#		
Turbidity	NTU	0432	WL	06/09/2011	0001	55	-	55	2.08			#		
Turbidity	NTU	0433	WL	06/08/2011	0001	99	-	99	6.24			#		
Turbidity	NTU	0434	WL	06/09/2011	0001	35	-	35	2.77			#		
Turbidity	NTU	0435	WL	05/23/2011	0001	173	-	173	9.69			#		
Turbidity	NTU	0436	WL	06/07/2011	0001	192	-	192	9.81			#		
Turbidity	NTU	0440	WL	06/07/2011	0001	117	-	117	101			#		
Turbidity	NTU	0441	WL	06/08/2011	0001	53	-	53	4.04			#		
Turbidity	NTU	0443	WL	06/08/2011	0001	73	-	73	4.07			#		
Turbidity	NTU	0444	WL	05/23/2011	0001	116	-	116	5.1			#		
Turbidity	NTU	0453	WL	06/07/2011	0001	80	-	80	20.1			#		
Turbidity	NTU	0454	WL	05/25/2011	0001	13	-	13	15.3			#		
Turbidity	NTU	0457	WL	05/23/2011	0001	29	-	29	2.06			#		
Turbidity	NTU	0492	WL	05/18/2011	0001	18	-	18	1.62			#		
Turbidity	NTU	0548-N-1	TS	05/19/2011	0001	0	-	0	8.37			#		
Turbidity	NTU	0548-S-12	TS	05/19/2011	0001	0	-	0	4.5			#		
Turbidity	NTU	AMM-1-19	WL	05/18/2011	0001	19	-	19	0.88			#		
Turbidity	NTU	AMM-1-53	WL	05/18/2011	0001	53	-	53	1.13			#		
Turbidity	NTU	AMM-2	WL	05/19/2011	0001	48	-	48	7.7			#		
Turbidity	NTU	AMM-3	WL	05/26/2011	0001	48	-	48	7.41			#		

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Turbidity	NTU	ATP-2-D	WL	05/19/2011	0001	88	-	88	48			#		
Turbidity	NTU	ATP-2-S	WL	05/19/2011	0001	38	-	38	3.53			#		
Turbidity	NTU	ATP-3	WL	06/08/2011	0001	51	-	51	2.08			#		
Turbidity	NTU	SMI-PW01	WL	05/25/2011	0001	40	-	40	35.2			#		
Turbidity	NTU	SMI-PW03	WL	05/24/2011	0001	40	-	40	7.89			#		
Turbidity	NTU	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	2.43			#		
Turbidity	NTU	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	2.47			#		
Turbidity	NTU	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	4.23			#		
Turbidity	NTU	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	2.26			#		
Turbidity	NTU	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	2.19			#		
Turbidity	NTU	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	4.86			#		
Turbidity	NTU	TP-01	WL	05/23/2011	0001	22	-	22	3.57			#		
Turbidity	NTU	TP-11	WL	05/18/2011	0001	30	-	30	9.19			#		
Turbidity	NTU	TP-17	WL	05/18/2011	0001	28	-	28	5.76			#		
Turbidity	NTU	TP-19	WL	05/18/2011	0001	29	-	29	6.69			#		
Turbidity	NTU	TP-20	WL	05/23/2011	0001	32	-	32	4.38			#		
Turbidity	NTU	TP-22	WL	05/25/2011	0001	17	-	17	56.5			#		
Turbidity	NTU	TP-23	WL	05/25/2011	0001	25	-	25	29.4			#		
Uranium	mg/L	0401	WL	05/25/2011	0001	18	-	18	1.7			#	0.00058	
Uranium	mg/L	0404	WL	05/23/2011	0001	18	-	18	0.71			#	0.00058	
Uranium	mg/L	0410	WL	05/24/2011	0001	25	-	25	0.92			#	0.00058	
Uranium	mg/L	0411	WL	06/07/2011	0001	9	-	9	6.1			#	0.015	
Uranium	mg/L	0412	WL	05/23/2011	0001	10.5	-	10.5	3.2			#	0.0029	
Uranium	mg/L	0413	WL	05/26/2011	0001	10.5	-	10.5	1.3			#	0.00058	
Uranium	mg/L	0414	WL	05/23/2011	0001	6.5	-	6.5	4.9			#	0.0029	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Uranium	mg/L	0430	WL	06/08/2011	0001	101	-	101	0.011			#	2.9E-005	
Uranium	mg/L	0431	WL	06/08/2011	0001	91	-	91	0.0095			#	0.00029	
Uranium	mg/L	0432	WL	06/09/2011	0001	55	-	55	0.0019			#	2.9E-005	
Uranium	mg/L	0433	WL	06/08/2011	0001	99	-	99	0.0019			#	2.9E-005	
Uranium	mg/L	0433	WL	06/08/2011	0002	99	-	99	0.002			#	2.9E-005	
Uranium	mg/L	0434	WL	06/09/2011	0001	35	-	35	0.026			#	2.9E-005	
Uranium	mg/L	0435	WL	05/23/2011	0001	173	-	173	0.029			#	2.9E-005	
Uranium	mg/L	0436	WL	06/07/2011	0001	192	-	192	0.0088			#	0.00029	
Uranium	mg/L	0440	WL	06/07/2011	0001	117	-	117	0.03			#	0.00029	
Uranium	mg/L	0441	WL	06/08/2011	0001	53	-	53	0.038			#	2.9E-005	
Uranium	mg/L	0443	WL	06/08/2011	0001	73	-	73	0.011			#	2.9E-005	
Uranium	mg/L	0444	WL	05/23/2011	0001	116	-	116	0.015			#	2.9E-005	
Uranium	mg/L	0453	WL	06/07/2011	0001	80	-	80	0.7			#	0.00029	
Uranium	mg/L	0454	WL	05/25/2011	0001	13	-	13	2.1			#	0.00058	
Uranium	mg/L	0455	WL	05/26/2011	0001	46	-	46	0.0022			#	2.9E-005	
Uranium	mg/L	0456	WL	06/09/2011	0001	53	-	53	0.024			#	2.9E-005	
Uranium	mg/L	0457	WL	05/23/2011	0001	29	-	29	0.0019			#	2.9E-005	
Uranium	mg/L	0457	WL	05/23/2011	0002	29	-	29	0.002			#	2.9E-005	
Uranium	mg/L	0492	WL	05/18/2011	0001	18	-	18	0.48		J	#	0.00015	
Uranium	mg/L	AMM-1-19	WL	05/18/2011	0001	19	-	19	0.0047		J	#	2.9E-005	
Uranium	mg/L	AMM-1-53	WL	05/18/2011	0001	53	-	53	0.0099		J	#	2.9E-005	
Uranium	mg/L	AMM-2	WL	05/19/2011	0001	48	-	48	0.49		J	#	0.00015	
Uranium	mg/L	AMM-2	WL	05/19/2011	0002	48	-	48	2		J	#	0.00058	
Uranium	mg/L	AMM-3	WL	05/26/2011	0001	48	-	48	3.4			#	0.0015	
Uranium	mg/L	ATP-2-D	WL	05/19/2011	0001	88	-	88	0.014		J	#	2.9E-005	
Uranium	mg/L	ATP-2-S	WL	05/19/2011	0001	38	-	38	0.002		J	#	2.9E-005	

Water Quality Data (continued)

May 2011 Site-Wide Sampling Event
 General Water Quality Data by Parameter (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 8/25/2011

Parameter	Units	Location ID	Location Type	Sample Date	Sample ID	Depth Range (Ft BLS)			Result	Qualifiers			Detection Limit	Uncertainty
										Lab	Data	QA		
Uranium	mg/L	ATP-3	WL	06/08/2011	0001	51	-	51	0.0057			#	0.00029	
Uranium	mg/L	SMI-PW01	WL	05/25/2011	0001	40	-	40	3			#	0.0015	
Uranium	mg/L	SMI-PW03	WL	05/24/2011	0001	40	-	40	1.3			#	0.00058	
Uranium	mg/L	SMI-PZ1S	WL	05/25/2011	0001	18	-	18	0.68			#	0.00029	
Uranium	mg/L	SMI-PZ2D	WL	05/25/2011	0001	75	-	75	0.34			#	2.9E-005	
Uranium	mg/L	SMI-PZ2M2	WL	05/25/2011	0001	56	-	56	0.68			#	2.9E-005	
Uranium	mg/L	SMI-PZ3D2	WL	05/24/2011	0001	78	-	78	2.1			#	0.00058	
Uranium	mg/L	SMI-PZ3M	WL	05/24/2011	0001	59	-	59	1.4			#	0.00058	
Uranium	mg/L	SMI-PZ3S	WL	05/24/2011	0001	25	-	25	1.1			#	0.00058	
Uranium	mg/L	TP-01	WL	05/23/2011	0001	22	-	22	0.078			#	2.9E-005	
Uranium	mg/L	TP-11	WL	05/18/2011	0001	30	-	30	0.00088		J	#	2.9E-005	
Uranium	mg/L	TP-17	WL	05/18/2011	0001	28	-	28	0.021		J	#	2.9E-005	
Uranium	mg/L	TP-19	WL	05/18/2011	0001	29	-	29	0.00018		J	#	2.9E-005	
Uranium	mg/L	TP-20	WL	05/23/2011	0001	32	-	32	0.00083			#	2.9E-005	
Uranium	mg/L	TP-22	WL	05/25/2011	0001	17	-	17	0.24			#	2.9E-005	
Uranium	mg/L	TP-23	WL	05/25/2011	0001	25	-	25	3.6			#	0.00058	

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

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

LAB QUALIFIERS:

- * Replicate analysis not within control limits.
- > Result above upper detection limit.
- A Tentatively identified compound is a suspected aldol-condensation product.
- B Inorganic: Result is between the instrument detection limit and contract-required detection limit. Organic: Analyte also found in method blank.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference; see case narrative.
- H Holding time expired; value suspect.
- I Increased detection limit due to required dilution.
- J Estimated.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound.

Water Quality Data (continued)

P > 25% difference in detected pesticide or Aroclor concentrations between two columns.
U Analytical result below detection limit.
W Postdigestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
X,Y,Z Laboratory defined qualifier; see case narrative.

DATA QUALIFIERS:

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

QA QUALIFIER:

Validated according to quality-assurance guidelines.

Water Sampling Field Activities Verification

May 2011 Site-Wide Sampling Event
STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site
REPORT DATE: 8/29/2011

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		3969.6	05/25/2011		10.4	3959.2	
0404	O	3968.3	05/23/2011		10.13	3958.17	
0410	O	3979.11	05/24/2011		22.93	3956.18	
0411	O	3964.88	06/07/2011		5.93	3958.95	
0412	O	3965.76	05/23/2011		6.35	3959.41	
0413	O	3965.33	05/26/2011		7.69	3957.64	
0414	O	3963.2	05/23/2011		5.21	3957.99	
0430	U	4022.1	06/08/2011		60.23	3961.87	
0431	O	4007.04	06/08/2011		46.97	3960.07	
0432	U	4001.47	06/09/2011		41	3960.47	
0433	O	3989.99	06/08/2011		29.68	3960.31	
0434	U	3990.21	06/09/2011		31.48	3958.73	
0435	O	3971.67	05/23/2011		13	3958.67	
0436	O	3970.8	06/07/2011		5.12	3965.68	
0440	O	4070.71	06/07/2011		110.4	3960.31	
0441		4008.77	06/08/2011		48.3	3960.47	
0443	O	4006.72	06/08/2011		46.15	3960.57	
0444	O	3970.99	05/23/2011		12.57	3958.42	
0453			06/07/2011		73.34		
0454		3966.47	05/25/2011		10.2	3956.27	
0455	O	3990.2	05/26/2011		30.95	3959.25	
0456	U	3990.46	06/09/2011		31.83	3958.63	
0457	O	3971.3	05/23/2011		13.28	3958.02	
0492		3967.64	05/18/2011		9.87	3957.77	
AMM-1-19			05/18/2011		14.73		
AMM-1-53			05/18/2011		14.72		

Water Sampling Field Activities Verification (continued)

May 2011 Site-Wide Sampling Event
STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site
REPORT DATE: 8/29/2011

Location Code	Flow Code	Top of Casing Elevation (Ft)	Measurement Date	Time	Depth From Top of Casing (Ft)	Water Elevation (Ft)	Water Level Flag
AMM-2	O	3967.74	05/19/2011		6.42	3961.32	
AMM-3	O	3967.69	05/26/2011		4.95	3962.74	
ATP-2-D	O	3967.05	05/19/2011		7.19	3959.86	
ATP-2-S	O	3967.04	05/19/2011		9.28	3957.76	
ATP-3	O	3998.29	06/08/2011		37.61	3960.68	
SMI-PW01	O	3968.45	05/25/2011		5.78	3962.67	
SMI-PZ1S	O	3969.13	05/25/2011		9.85	3959.28	
SMI-PZ2D	O	3967.38	05/25/2011		11.73	3955.65	
SMI-PZ2M2	O	3967.18	05/25/2011		10.72	3956.46	
SMI-PZ3D2	O	3975.13	05/24/2011		17.1	3958.03	
SMI-PZ3M	O	3975.23	05/24/2011		17.04	3958.19	
SMI-PZ3S	O	3975.03	05/24/2011		17.19	3957.84	
TP-01	O	3969.39	05/23/2011		9.12	3960.27	
TP-11	O	3967.51	05/18/2011		8.7	3958.81	
TP-17	D	3963.69	05/18/2011		6.8	3956.89	
TP-19	D	3962.17	05/18/2011		3.52	3958.65	
TP-20	D	3967.55	05/23/2011		12.41	3955.14	
TP-22		3966.48	05/25/2011		14.55	3951.93	
TP-23		3962.54	05/25/2011		6	3956.54	

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

Trip Report



Date: July 6, 2011
To: Ken Pill
From: James Ritchey
Subject: May 2011 Site-Wide Sampling Sampling Event

Site: Moab

Date of Sampling Event: May 18-June 9, 2011

Team Members: E. Glowiak, T. Meadows, J. Ritchey

RIN Number Assigned: All samples were assigned to RIN 1105059.

Sample Shipment: The coolers were shipped overnight UPS to ALS Environmental from Moab, Utah, on May 19, 24, 26, and June 9 of 2011. (Tracking numbers 0194444477, 0192580529, 0195476468, and 0196010477).

Number of Locations Sampled: The purpose of the site-wide sampling event was to update contaminant plume maps. Some of the sampling locations were added to this sampling event. Also, two locations at the evaporation pond (0548-N-1 and 0548-S-12) were sampled to replace lost samples from RIN 1105058. A total of 49 locations were sampled during this event. Including three duplicates, a total of 52 samples were collected.

Locations Not Sampled: Wells 0437, 0438 and 0439 were not sampled due to the excavation operations. Well TP-02 was not sampled since it was removed during the off-pile remediation earlier this year. Well SMI-MW01 was not sampled due to inaccessibility during flooding conditions. No surface water locations were sampled.

Field Variance: None.

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

False ID	True ID	Sample Type	Associated matrix
2000	AMM-2	Duplicate from 48 ft bgs	Ground Water
2001	0457	Duplicate from 29 ft bgs	Ground Water
2002	0433	Duplicate from 99 ft bgs	Ground Water

ft bgs = feet below ground surface; ID = identification

Trip Report (continued)

Location-specific Information: All of the observation wells were sampled using a peristaltic pump and dedicated tubing unless otherwise noted. The table below provides additional information:

Location	Date	Sample Depth (ft bgs)	Comments
0401	05/25/2011	18	Could not monitor water level due to casing diameter.
0404	05/23/2011	18	
0410	05/24/2011	25	
0411	06/07/2011	9	
0412	05/23/2011	10.5	
0413	05/26/2011	10.5	Turbid water.
0414	05/23/2011	6.5	
0430	06/08/2011	101	Sampled with dedicated bladder pump
0431	06/08/2011	91	Sampled with dedicated bladder pump
0432	06/09/2011	55	Sampled with dedicated bladder pump
0433	06/08/2011	99	Duplicate, Sampled with dedicated bladder pump
0434	06/09/2011	35	Sampled with dedicated bladder pump
0435	05/23/2011	173	
0436	06/07/2011	~192	Sampled with dedicated bladder pump
0440	06/07/2011	117	Sampled with dedicated bladder pump
0441	06/08/2011	53	Sampled with dedicated bladder pump
0443	06/08/2011	73	Sampled with dedicated bladder pump
0444	05/23/2011	116	Sulfur odor.
0453	06/07/2011	80	WL inconsistent and at top of pump. Sampled with dedicated bladder pump.
0454	05/25/2011	13	
0455	05/26/2011	46	Sampled with inertia pump. Turbid water.
0456	06/09/2011	53	Sampled with inertia pump.
0457	05/23/2011	29	Duplicate.
0492	05/18/2011	18	Could not monitor water level due to well casing diameter.
AMM-1-19	05/18/2011	19	
AMM-1-53	05/18/2011	53	
AMM-2	05/19/2011	48	Duplicate.
AMM-3	05/26/2011	48	
ATP-2-D	05/19/2011	88	
ATP-2-S	05/19/2011	38	
ATP-3	06/08/2011	51	Sampled with dedicated bladder pump, sulfur odor
SMI-PW01	05/25/2011	40	
SMI-PW03	05/24/2011	40	
SMI-PZ1S	05/25/2011	18	
SMI-PZ2D	05/25/2011	75	
SMI-PZ2M2	05/25/2011	56	
SMI-PZ3D2	05/24/2011	78	
SMI-PZ3M	05/24/2011	59	
SMI-PZ3S	05/24/2011	25	
TP-01	05/23/2011	22	
TP-11	05/18/2011	30	
TP-17	05/18/2011	28	
TP-19	05/18/2011	29	
TP-20	5/23/2011	32	
TP-22	05/25/2011	17	
TP-23	05/25/2011	25	
0548-N-1	05/19/2011	NA	Sampled at north end of evap pond 1 ft. below the surface.
0548-S-12	05/19/2011	NA	Sampled at south end of evap pond 12 ft. below the surface.

ft bgs = feet below ground surface

Trip Report (continued)

Water Level Measurements: Water level data are provided in the table below. These data represent depth to water (ft btoc) measurements.

Well No.	Date	Time	Depth to Water (ft btoc)
0401	05/25/2011	12:03	10.40
0404	05/23/2011	15:57	10.13
0410	05/24/2011	09:40	22.93
0411	06/07/2011	09:54	5.35
0412	05/23/2011	09:56	6.35
0413	05/26/2011	10:20	7.69
0414	05/23/2011	09:20	5.21
0430	06/08/2011	16:33	60.23
0431	06/08/2011	14:18	46.97
0432	06/09/2011	09:42	41.00
0433	06/08/2011	10:58	29.68
0434	06/09/2011	08:41	31.48
0435	05/23/2011	14:47	13.00
0436	06/07/2011	11:00	5.12
0440	06/07/2011	16:06	110.40
0441	06/08/2011	10:27	48.30
0443	06/08/2011	14:46	46.15
0444	05/23/2011	14:28	12.57
0453	06/07/2011	15:13	73.34
0454	05/25/2011	10:03	10.20
0455	05/26/2011	13:24	30.95
0456	06/09/2011	09:17	31.83
0457	05/23/2011	15:03	13.28
0492	05/18/2011	14:14	9.87
AMM-1-19	05/18/2011	15:56	14.73
AMM-1-53	05/18/2011	15:03	14.72
AMM-2	05/19/2011	10:17	6.42
AMM-3	05/26/2011	12:22	4.95
ATP-2-D	05/19/2011	13:31	7.19
ATP-2-S	05/19/2011	13:50	9.28
ATP-3	06/08/2011	16:04	37.61
SMI-PW01	05/25/2011	15:23	5.78
SMI-PW03	05/24/2011	11:13	17.18
SMI-PZ1S	05/25/2011	15:06	9.85
SMI-PZ2D	05/25/2011	14:24	11.73
SMI-PZ2M2	05/25/2011	14:42	10.72
SMI-PZ3D2	05/24/2011	10:51	17.10
SMI-PZ3M	05/24/2011	10:48	17.04
SMI-PZ3S	05/24/2011	10:33	17.19
TP-01	05/23/2011	11:09	9.12
TP-11	05/18/2011	16:39	8.70
TP-17	05/18/2011	10:35	6.80
TP-19	05/18/2011	11:22	3.52
TP-20	05/23/2011	10:37	12.41
TP-22	05/25/2011	10:56	14.55
TP-23	05/25/2011	10:28	6.00
0548-N-1	05/19/2011	13:08	NA
0548-S-12	05/19/2011	13:15	NA

ft btoc = feet below top of casing

Trip Report (continued)

Well Inspection Summary: A well inspection was not conducted.

Equipment: None.

Regulatory: None.

Site Issues: According to the USGS Cisco gauging station (station number 09180500), the mean daily Colorado River flow during this sampling event are provided below.

Date	Daily Mean Flow (cfs)
05/18/2011	22,900
05/19/2011	22,500
05/20/2011	21,200
05/21/2011	19,800
05/22/2011	18,800
05/23/2011	18,000
05/24/2011	18,600
05/25/2011	19,800
05/26/2011	20,000
05/27/2011	20,400
05/28/2011	22,600
05/29/2011	25,700
05/30/2011	29,600
05/31/2011	34,300
06/01/2011	32,200
06/02/2011	30,500
06/03/2011	31,500
06/04/2011	34,800
06/05/2011	35,300
06/06/2011	36,800
06/07/2011	40,300
06/08/2011	44,100
06/09/2011	46,100

Corrective Action Required/Taken: None.