



**August 2005 Water Sampling  
Validation Data Package for  
Configuration 2 Interim Action  
Injection Test Sampling  
Moab, Utah**

**November 2005**



**U.S. Department  
of Energy**

**Office of Environmental Management**

**August 2005 Water Sampling**

**Validation Data Package  
for  
Configuration 2 Interim Action  
Injection Test Sampling  
Moab, Utah**

November 2005

# Moab, Utah

August 23-26, 2005

## Data Package Contents

This data package includes the following information:

<u>Item No.</u>	<u>Description of Contents</u>
1.	<b>Sampling Event Summary</b>
2.	<b>Sample Location Map</b>
3.	<b>Data Assessment Summary</b>
	Water Sampling Field Activities Verification Checklist
	Laboratory Performance Assessment
	Field Analyses/Activities
	Certification

### **Attachment 1—Data Presentation**

Minimums and Maximums Report  
Water Quality Data  
Water Level Data  
Blanks  
Time Versus Concentration Graphs

### **Attachment 2—Trip Report**

## **Sampling Event Summary**

**Site:** Moab, Utah

**Sampling Period:** August 23-26, 2005

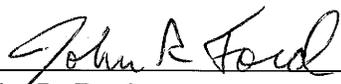
The purpose of this sampling event was to collect data that can be used to evaluate the Configuration 2 injection system. This is the eleventh round of sampling of the injection system since the baseline samples were collected just prior to starting injection on October 6, 2004.

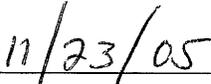
According to the USGS Cisco Gaging Station, the mean daily Colorado River flows during the time period of this sampling event were between 3,440 and 3,570 cubic feet per second. These flow rates are approximately 60 percent lower than during the previous month's sampling event.

Sampling and analysis was conducted in accordance with the *Operations, Maintenance, and Performance Monitoring Plan for the Interim Action Ground Water Treatment System, February 2004*. Ground water samples were collected from 10 Configuration 2 observation wells 0401, 0402, 0408, 0580, 0583, 0585, 0586, 0587, 0588 (34 feet below ground surface [bgs]) and 0589 (44 feet bgs), one surface water location (0236), two piezometers (0590 and 591), and one injection water sample (0550). Including one duplicate and one equipment blank, a total of 16 samples were submitted for laboratory analysis.

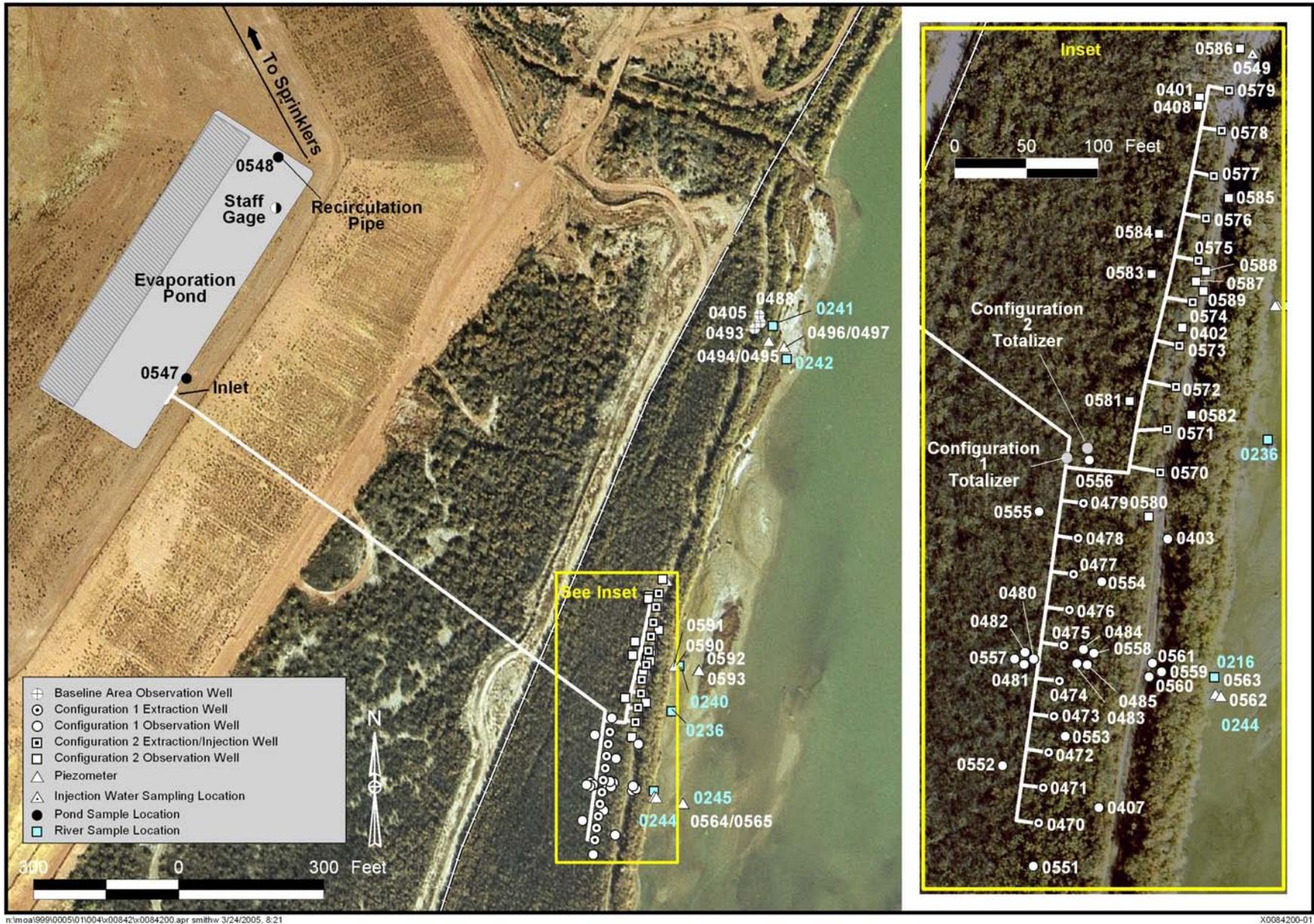
Analysis and interpretation of the validated data presented in this package will be reported as part of a performance evaluation report on the injection system scheduled in 2005. However, to monitor performance of the injection effort, time-versus concentration graphs are included for certain key indicator wells and major contaminants of concern. Generally, contaminant concentrations continue to be suppressed by the injection of fresh water. One exception to this is well 0587; the graph shows uranium concentrations decreasing from October 2004 through May 2005. Thereafter, concentrations have increased but are still less than one-half the concentration from Fall 2004. Ammonia concentrations in well 0587 have continued to be low since November 2004. Beginning in February 2005 the injection rates for Configuration 2 decreased. The time-versus concentration graph for 0587 portrays different trends for ammonia and uranium in the past 3 months. These trends will continue to be evaluated in the successive monthly reports and a determination made if they are representative of the configuration area or just individual wells.

The data validation indicated the data meet the quality control criteria specified for this project. No significant discrepancies were noted regarding sample shipping/receiving, preservation and holding times, lab instrument calibration, method blanks, matrix spikes, etc., except as qualified.

  
\_\_\_\_\_  
John R. Ford  
Ground Water Lead

  
\_\_\_\_\_  
Date

## **Sample Location Map**



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

## **Data Assessment Summary**

## Water Sampling Field Activities Verification Checklist

<b>Project</b>	<u>Moab, Utah</u>	<b>Date(s) of Water Sampling</b>	<u>August 23-26, 2005</u>
<b>Date(s) of Verification</b>	<u>November 7, 2005</u>	<b>Name of Verifier</b>	<u>Jeff Price</u>

	<b>Response (Yes, No, NA)</b>	<b>Comments</b>
1. Is the SAP the primary document directing field procedures? List other documents, SOP's, instructions.	<u>Yes</u>	
	<u>NA</u>	
2. Were the sampling locations specified in the planning documents sampled?	<u>No</u>	<u>See trip report for explanation.</u>
3. Was a pre-trip calibration conducted as specified in the above named 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, Ec, pH, turbidity, DO, ORP) of field measurements taken as specified?	<u>No</u>	<u>Alkalinity was not collected at well 0586.</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?	<u>Yes</u>	
Did the water level stabilize prior to sampling?	<u>Yes</u>	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	<u>Yes</u>	
Was the flow rate less than 500 mL/min?	<u>Yes</u>	
If a portable pump was used, was there a 4 hour delay between pump installation and sampling?	<u>NA</u>	

## Water Sampling Field Activities Verification Checklist (continued)

	Response (Yes, No, NA)	Comments
8. Were the following conditions met when purging a Category II well:		
Was the flow rate less than 500 mL/min?	Yes	
Was one pump/tubing volume removed prior to sampling?	Yes	
9. Were duplicates taken at a frequency of one per 20 samples?	Yes	
10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	Yes	
11. Were trip blanks prepared and included with each shipment of VOC samples?	NA	
12. Were QC samples assigned a fictitious site identification number?	Yes	
Was the true identity of the samples recorded on the Quality Assurance Sample Log?	Yes	
13. Were samples collected in the containers specified?	Yes	
14. Were samples filtered and preserved as specified?	Yes	
15. Were the number and types of samples collected as specified?	Yes	
16. Were chain of custody records completed and was sample custody maintained?	Yes	
17. Are field data sheets signed and dated by both team members?	Yes	
18. Was all other pertinent information documented on the field data sheets?	Yes	
19. Was the presence or absence of ice in the cooler documented at every sample location?	Yes	
20. Were water levels measured at the locations specified in the planning documents?	Yes	

## Laboratory Performance Assessment

### General Information

Requisition No. (RIN): 05080222  
Sample Event: August 24-26, 2005  
Site(s): Moab, Utah  
Laboratory: Paragon Analytics  
Work Order No.: 0508265  
Analysis: Metals and Inorganics  
Validator: Steve Donovan  
Review Date: October 18, 2005

This validation was performed according to the *Environmental Procedures Catalog* (STO 6), “Standard Practice for Validation of Laboratory Data”, GT-9(P). All analyses were successfully completed. The samples were prepared and analyzed using accepted procedures based on methods specified by line item code, which are listed in Table 1.

Table 1. Analytes and Methods

Analyte	Line Item Code	Prep Method	Analytical Method
Uranium, U	GJO-01	SW-846 3005A	SW-846 6020A
Chloride, Cl	MIS-A-039	SW-846 9056	SW-846 9056
Sulfate, SO <sub>4</sub>	MIS-A-044	SW-846 9056	SW-846 9056
Ammonia as N, NH <sub>3</sub> -N	WCH-A-005	MCAWW 350.1	MCAWW 350.1
Total Dissolved Solids, TDS	WCH-A-033	MCAWW 160.1	MCAWW 160.1

### Data Qualifier Summary

Analytical results were qualified as listed in Table 2. The uranium result for sample 0508265-15 is qualified as “U” because the associated calibration blank result is greater than the method detection limit (MDL) and the sample result is less than 5 times the calibration blank result.

Table 2. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
0508265-15	2980 (Equip Blank)	U	U	Less than 5 times the calibration blank

### Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 16 samples on August 27, 2005, 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.

### Preservation and Holding Times

The sample shipment was received cool and intact with the temperature within the coolers of 3.6 and 3.0°C, which complies with requirements. All samples were received in the correct container types and had been preserved correctly for the requested analyses and all samples were analyzed within the applicable holding times.

### Laboratory Instrument Calibration

Compliance requirements for satisfactory instrument calibration are established to ensure that 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. All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

#### *Method SW-846 6020*

Calibration for uranium was performed on September 2, 2005. The initial calibration was performed using six calibration standards resulting in a calibration curve with a correlation coefficient ( $r^2$ ) value greater than 0.995. The absolute value of the curve intercept was less than 3 times the MDL. Calibration and laboratory spike standards were prepared from independent sources. Initial and continuing calibration verification (CCV) checks were made at the required frequency resulting in four CCVs. All calibration check results met the acceptance criteria. A reporting limit verification check was made at the required frequency to verify the linearity of the calibration curve near the practical quantitation limit. The check was within the acceptance criteria range. Mass calibration and resolution verifications were performed at the beginning of each analytical run in accordance with the analytical procedure. Internal standard recoveries were stable and within acceptable ranges.

#### *Method SW-846 9056*

The initial calibrations for chloride and sulfate were performed using five calibration standards each on August 15, 2005. The calibration curve  $r^2$  values were greater than 0.995 and intercepts were less than 3 times the MDL. Initial calibration and calibration check standards were prepared from independent sources. Initial and continuing calibration checks were made at the required frequency resulting in six CCVs. The calibration checks met the acceptance criteria.

### *Method MCAWW 350.1*

The initial calibration for ammonia as N was performed using six calibration standards on September 8, 2005, resulting in a calibration curve with a  $r^2$  value greater than 0.995 and an intercept less than 3 times the MDL. Initial and continuing calibration checks were made at the required frequency resulting in eight CCVs. All calibration check results met the acceptance criteria.

### *Method MCAWW 160.1*

There are no calibration requirements associated with the determination of total dissolved solids (TDS).

### Method and Calibration Blanks

The uranium initial and continuing calibration blanks were below the practical quantitation limits but greater than the MDL. The uranium result for sample 0508265-15 was less than 5 times the concentration of the associated calibration blank and is qualified as “U”. The chloride, sulfate, ammonia as N, and TDS method blanks and calibration blanks were below the MDLs.

### Inductively Coupled Plasma Interference Check Sample Analysis

Inductively coupled plasma interference check samples were analyzed at the required frequency to verify the instrumental interelement and background correction factors. All check sample results met the acceptance criteria.

### Matrix Spike Analysis

Matrix spike and matrix spike duplicate pairs were analyzed for uranium, chloride, sulfate, and ammonia as N as a measure of method performance in the sample matrix. The spike recoveries met the recovery and precision criteria for all analytes.

### Laboratory Replicate Analysis

The relative percent difference (RPD) values for the laboratory replicate sample and matrix spike duplicate sample results for all analytes were less than 20 percent, indicating acceptable laboratory precision.

### Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency to provide information on the accuracy of the analytical method and the overall laboratory performance, including sample preparation. The results were acceptable for all analytes.

### Metals Serial Dilution

Serial dilutions were performed during the uranium analysis to monitor physical or chemical interferences that may exist in the sample matrix. The results met the acceptance criteria.

### Detection Limits/Dilutions

Samples were diluted in a consistent and acceptable manner when required. The samples were diluted prior to analysis of uranium to reduce interferences. 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.

### Chromatography Peak Integration

The integration of analyte peaks was reviewed for all ion chromatography data. There were no manual integrations performed and all peak integrations were satisfactory.

### Electronic Data Deliverable File

The electronic data deliverable (EDD) file arrived on October 5, 2005. The Sample Management System EDD validation module was used to verify that the EDD file was complete and in compliance with requirements. The module compares the contents of the file to the requested analyses to ensure all and only the requested data are delivered. The contents of the EDD were manually examined to verify that the sample results accurately reflect the data contained in the sample data package.

## Field Analyses/Activities

The following information summarizes the field activities for this sampling event period.

### Field Activities

All monitor well results were qualified with an “F” flag in the database, indicating the wells were purged and sampled using the low-flow sampling method. A duplicate sample was collected from well 0402. There are no established regulatory criteria for the evaluation of field duplicate samples; therefore, U.S. Environmental Protection Agency (EPA) guidance for laboratory duplicates (which is conservative for field duplicates) was used to assess the precision of the field duplicates. Duplicate sample results varied by less than +/-20 RPD and are considered acceptable. An equipment blank was collected and analyzed for the same constituents as the regular water samples. Concentrations measured in the equipment blank were below levels of concern; therefore, equipment blank results are considered acceptable.

## Certification

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

Laboratory Validation Lead: Steve Donovan 11-29-05  
Steve Donovan Date

Field Activities Validation Lead: Jeff Price 11-29-05  
Jeff Price Date

**Attachment 1**

**Data Presentation**

# **Minimums and Maximums Report**

## **Minimums and Maximums Report**

The Minimums and Maximums Report is generated by a data validation application (DataVal) used to query the SEEPro database. The DataVal compares the new data set with historical data and lists all new data that fall outside the historical data range. Values listed in the report are further screened using the following criteria. Results are not considered anomalous if (1) identified low concentrations are the result of low detection limits; (2) the concentration detected is within 50 percent of historical minimum or maximum values; (3) there were fewer than five historical samples for comparison. There were no anomalous data identified from this sampling.

SAMPLING DATA VALIDATION MINIMUMS AND MAXIMUMS REPORT -- No Field Parameters

LAB CODE: PAR, PARAGON (Fort Collins, CO)

LAB REQUISITION(S): 05080222

HISTORY BEGIN DATE: comparing to all historical data

REPORT DATE: 11/07/05 12:23:25: PM

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	0587	08/25/2005	Ammonia Total as N	19	F	530	F	25	F	7	0
MOA01	0590	08/25/2005	Ammonia Total as N	48	FQ	680	F	60	QF	8	0

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

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.
- J Estimated

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- Q Qualitative result due to sampling technique
- G Possible grout contamination, pH > 9.
- X Location is undefined.

## **Water Quality Data**

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Alkalinity, Total (As CaCO3)	mg/L	0236	SL, RIV	08/24/2005	0001	0.00 - 0.00	284			#	-	-
	mg/L	0401	WL	08/26/2005	0001	18.00 - 18.00	304	F		#	-	-
	mg/L	0402	WL	08/25/2005	0001	17.00 - 17.00	304	F		#	-	-
	mg/L	0408	WL	08/26/2005	0001	26.00 - 26.00	271	F		#	-	-
	mg/L	0550	IS, IHYD	08/25/2005	0001	0.00 - 0.00	190			#	-	-
	mg/L	0580	WL	08/25/2005	0001	18.00 - 18.00	508	F		#	-	-
	mg/L	0583	WL	08/26/2005	0001	18.00 - 18.00	334	F		#	-	-
	mg/L	0585	WL	08/26/2005	0001	18.00 - 18.00	270	F		#	-	-
	mg/L	0587	WL	08/25/2005	0001	18.00 - 18.00	360	F		#	-	-
	mg/L	0588	WL	08/26/2005	0001	34.00 - 34.00	200	F		#	-	-
	mg/L	0589	WL	08/25/2005	0001	44.00 - 44.00	870	F		#	-	-
Ammonia Total as N	mg/L	0236	SL, RIV	08/24/2005	0001	0.00 - 0.00	35			#	5	-
	mg/L	0401	WL	08/26/2005	0001	18.00 - 18.00	43	F		#	5	-
	mg/L	0402	WL	08/25/2005	0001	17.00 - 17.00	38	F		#	5	-
	mg/L	0402	WL	08/25/2005	0002	13.43 - 18.35	37	F		#	5	-
	mg/L	0408	WL	08/26/2005	0001	26.00 - 26.00	190	F		#	5	-
	mg/L	0550	IS, IHYD	08/25/2005	0001	0.00 - 0.00	0.1	U		#	0.1	-
	mg/L	0580	WL	08/25/2005	0001	18.00 - 18.00	21	F		#	5	-
	mg/L	0583	WL	08/26/2005	0001	18.00 - 18.00	200	F		#	5	-
	mg/L	0585	WL	08/26/2005	0001	18.00 - 18.00	44	F		#	5	-
	mg/L	0586	WL	08/26/2005	0001	18.00 - 18.00	61	F		#	5	-
	mg/L	0587	WL	08/25/2005	0001	18.00 - 18.00	19	F		#	5	-
	mg/L	0588	WL	08/26/2005	0001	34.00 - 34.00	21	F		#	5	-
	mg/L	0589	WL	08/25/2005	0001	44.00 - 44.00	690	F		#	20	-
	mg/L	0590	WL, PZ	08/25/2005	0001	1.08 - 1.08	48	FQ		#	5	-
	mg/L	0591	WL, PZ	08/26/2005	0001	4.22 - 4.22	130	FQ		#	5	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Chloride	mg/L	0236	SL, RIV	08/24/2005	0001	0.00 - 0.00	460		# 10	-
	mg/L	0401	WL	08/26/2005	0001	18.00 - 18.00	520	F	# 10	-
	mg/L	0402	WL	08/25/2005	0001	17.00 - 17.00	390	F	# 10	-
	mg/L	0402	WL	08/25/2005	0002	13.43 - 18.35	390	F	# 10	-
	mg/L	0408	WL	08/26/2005	0001	26.00 - 26.00	510	F	# 10	-
	mg/L	0550	IS, IHYD	08/25/2005	0001	0.00 - 0.00	93		# 2	-
	mg/L	0580	WL	08/25/2005	0001	18.00 - 18.00	450	F	# 10	-
	mg/L	0583	WL	08/26/2005	0001	18.00 - 18.00	530	F	# 10	-
	mg/L	0585	WL	08/26/2005	0001	18.00 - 18.00	560	F	# 10	-
	mg/L	0586	WL	08/26/2005	0001	18.00 - 18.00	560	F	# 10	-
	mg/L	0587	WL	08/25/2005	0001	18.00 - 18.00	310	F	# 10	-
	mg/L	0588	WL	08/26/2005	0001	34.00 - 34.00	310	F	# 4	-
	mg/L	0589	WL	08/25/2005	0001	44.00 - 44.00	19000	F	# 400	-
	mg/L	0590	WL, PZ	08/25/2005	0001	1.08 - 1.08	320	FQ	# 10	-
	mg/L	0591	WL, PZ	08/26/2005	0001	4.22 - 4.22	240	FQ	# 10	-
Dissolved Oxygen	mg/L	0236	SL, RIV	08/24/2005	N001	0.00 - 0.00	9.60		# -	-
	mg/L	0401	WL	08/26/2005	N001	18.00 - 18.00	3.68	F	# -	-
	mg/L	0402	WL	08/25/2005	N001	17.00 - 17.00	3.11	F	# -	-
	mg/L	0408	WL	08/26/2005	N001	26.00 - 26.00	3.29	F	# -	-
	mg/L	0550	IS, IHYD	08/25/2005	N001	0.00 - 0.00	8.69		# -	-
	mg/L	0580	WL	08/25/2005	N001	18.00 - 18.00	1.38	F	# -	-
	mg/L	0581	WL	08/25/2005	N001	18.00 - 18.00	3.18	F	# -	-
	mg/L	0582	WL	08/25/2005	N001	9.78 - 19.71	2.37	F	# -	-
	mg/L	0583	WL	08/26/2005	N001	18.00 - 18.00	3.28	F	# -	-
	mg/L	0584	WL	08/26/2005	N001	18.00 - 18.00	4.33	F	# -	-
	mg/L	0585	WL	08/26/2005	N001	18.00 - 18.00	3.75	F	# -	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Dissolved Oxygen	mg/L	0586	WL	08/26/2005	N001	18.00 - 18.00	3.60	F	#	-	-	
	mg/L	0587	WL	08/25/2005	N001	18.00 - 18.00	3.52	F	#	-	-	
	mg/L	0588	WL	08/26/2005	N001	26.00 - 26.00	2.21	F	#	-	-	
	mg/L	0588	WL	08/26/2005	N001	34.00 - 34.00	1.63	F	#	-	-	
	mg/L	0589	WL	08/25/2005	N001	52.00 - 52.00	0.97	F	#	-	-	
	mg/L	0589	WL	08/25/2005	N001	44.00 - 44.00	1.01	F	#	-	-	
	mg/L	0590	WL, PZ	08/25/2005	N001	1.08 - 1.08	3.81	FQ	#	-	-	
	mg/L	0591	WL, PZ	08/26/2005	N001	4.22 - 4.22	4.38	FQ	#	-	-	
Oxidation Reduction Potent	mV	0236	SL, RIV	08/24/2005	N001	0.00 - 0.00	63		#	-	-	
	mV	0401	WL	08/26/2005	N001	18.00 - 18.00	194.2	F	#	-	-	
	mV	0402	WL	08/25/2005	N001	17.00 - 17.00	214	F	#	-	-	
	mV	0408	WL	08/26/2005	N001	26.00 - 26.00	194	F	#	-	-	
	mV	0550	IS, IHYD	08/25/2005	N001	0.00 - 0.00	168.0		#	-	-	
	mV	0580	WL	08/25/2005	N001	18.00 - 18.00	158.3	F	#	-	-	
	mV	0581	WL	08/25/2005	N001	18.00 - 18.00	195.2	F	#	-	-	
	mV	0582	WL	08/25/2005	N001	9.78 - 19.71	182.8	F	#	-	-	
	mV	0583	WL	08/26/2005	N001	18.00 - 18.00	191.8	F	#	-	-	
	mV	0584	WL	08/26/2005	N001	18.00 - 18.00	185	F	#	-	-	
	mV	0585	WL	08/26/2005	N001	18.00 - 18.00	190	F	#	-	-	
	mV	0586	WL	08/26/2005	N001	18.00 - 18.00	196.5	F	#	-	-	
	mV	0587	WL	08/25/2005	N001	18.00 - 18.00	209	F	#	-	-	
	mV	0588	WL	08/26/2005	N001	26.00 - 26.00	168.2	F	#	-	-	
	mV	0588	WL	08/26/2005	N001	34.00 - 34.00	174.5	F	#	-	-	
	mV	0589	WL	08/25/2005	N001	44.00 - 44.00	148	F	#	-	-	
	mV	0589	WL	08/25/2005	N001	52.00 - 52.00	139	F	#	-	-	
	mV	0590	WL, PZ	08/25/2005	N001	1.08 - 1.08	-164	FQ	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Oxidation Reduction Potent	mV	0591	WL, PZ	08/26/2005	N001	4.22 - 4.22	90.4	FQ	#	-	-	
pH	s.u.	0236	SL, RIV	08/24/2005	N001	0.00 - 0.00	7.78		#	-	-	
	s.u.	0401	WL	08/26/2005	N001	18.00 - 18.00	6.82	F	#	-	-	
	s.u.	0402	WL	08/25/2005	N001	17.00 - 17.00	6.75	F	#	-	-	
	s.u.	0408	WL	08/26/2005	N001	26.00 - 26.00	6.97	F	#	-	-	
	s.u.	0550	IS, IHYD	08/25/2005	N001	0.00 - 0.00	8.03		#	-	-	
	s.u.	0580	WL	08/25/2005	N001	18.00 - 18.00	6.79	F	#	-	-	
	s.u.	0581	WL	08/25/2005	N001	18.00 - 18.00	6.81	F	#	-	-	
	s.u.	0582	WL	08/25/2005	N001	9.78 - 19.71	7.01	F	#	-	-	
	s.u.	0583	WL	08/26/2005	N001	18.00 - 18.00	6.99	F	#	-	-	
	s.u.	0584	WL	08/26/2005	N001	18.00 - 18.00	7.07	F	#	-	-	
	s.u.	0585	WL	08/26/2005	N001	18.00 - 18.00	6.86	F	#	-	-	
	s.u.	0586	WL	08/26/2005	N001	18.00 - 18.00	6.79	F	#	-	-	
	s.u.	0587	WL	08/25/2005	N001	18.00 - 18.00	6.72	F	#	-	-	
	s.u.	0588	WL	08/26/2005	N001	34.00 - 34.00	7.39	F	#	-	-	
	s.u.	0588	WL	08/26/2005	N001	26.00 - 26.00	7.33	F	#	-	-	
	s.u.	0589	WL	08/25/2005	N001	44.00 - 44.00	6.68	F	#	-	-	
	s.u.	0589	WL	08/25/2005	N001	52.00 - 52.00	6.61	F	#	-	-	
	s.u.	0590	WL, PZ	08/25/2005	N001	1.08 - 1.08	9.13	FQ	#	-	-	
	s.u.	0591	WL, PZ	08/26/2005	N001	4.22 - 4.22	8.18	FQ	#	-	-	
Specific Conductance	umhos/cm	0236	SL, RIV	08/24/2005	N001	0.00 - 0.00	4791		#	-	-	
	umhos/cm	0401	WL	08/26/2005	N001	18.00 - 18.00	5587	F	#	-	-	
	umhos/cm	0402	WL	08/25/2005	N001	17.00 - 17.00	5077	F	#	-	-	
	umhos/cm	0408	WL	08/26/2005	N001	26.00 - 26.00	6304	F	#	-	-	
	umhos/cm	0550	IS, IHYD	08/25/2005	N001	0.00 - 0.00	1154		#	-	-	
	umhos/cm	0580	WL	08/25/2005	N001	18.00 - 18.00	4658	F	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Specific Conductance	umhos/cm	0581	WL	08/25/2005	N001	18.00 - 18.00	7032	F	#	-	-	
	umhos/cm	0582	WL	08/25/2005	N001	9.78 - 19.71	3829	F	#	-	-	
	umhos/cm	0583	WL	08/26/2005	N001	18.00 - 18.00	6417	F	#	-	-	
	umhos/cm	0584	WL	08/26/2005	N001	18.00 - 18.00	5532	F	#	-	-	
	umhos/cm	0585	WL	08/26/2005	N001	18.00 - 18.00	5584	F	#	-	-	
	umhos/cm	0586	WL	08/26/2005	N001	18.00 - 18.00	5863	F	#	-	-	
	umhos/cm	0587	WL	08/25/2005	N001	18.00 - 18.00	5108	F	#	-	-	
	umhos/cm	0588	WL	08/26/2005	N001	26.00 - 26.00	1736	F	#	-	-	
	umhos/cm	0588	WL	08/26/2005	N001	34.00 - 34.00	2598	F	#	-	-	
	umhos/cm	0589	WL	08/25/2005	N001	44.00 - 44.00	54353	F	#	-	-	
	umhos/cm	0589	WL	08/25/2005	N001	52.00 - 52.00	76858	F	#	-	-	
	umhos/cm	0590	WL, PZ	08/25/2005	N001	1.08 - 1.08	3811	FQ	#	-	-	
	umhos/cm	0591	WL, PZ	08/26/2005	N001	4.22 - 4.22	3670	FQ	#	-	-	
Sulfate	mg/L	0236	SL, RIV	08/24/2005	0001	0.00 - 0.00	1700		#	25	-	
	mg/L	0401	WL	08/26/2005	0001	18.00 - 18.00	2100	F	#	25	-	
	mg/L	0402	WL	08/25/2005	0001	17.00 - 17.00	1900	F	#	25	-	
	mg/L	0402	WL	08/25/2005	0002	13.43 - 18.35	1900	F	#	25	-	
	mg/L	0408	WL	08/26/2005	0001	26.00 - 26.00	2600	F	#	25	-	
	mg/L	0550	IS, IHYD	08/25/2005	0001	0.00 - 0.00	300		#	5	-	
	mg/L	0580	WL	08/25/2005	0001	18.00 - 18.00	1700	F	#	25	-	
	mg/L	0583	WL	08/26/2005	0001	18.00 - 18.00	2300	F	#	25	-	
	mg/L	0585	WL	08/26/2005	0001	18.00 - 18.00	2000	F	#	25	-	
	mg/L	0586	WL	08/26/2005	0001	18.00 - 18.00	2000	F	#	25	-	
	mg/L	0587	WL	08/25/2005	0001	18.00 - 18.00	1600	F	#	25	-	
	mg/L	0588	WL	08/26/2005	0001	34.00 - 34.00	580	F	#	10	-	
	mg/L	0589	WL	08/25/2005	0001	44.00 - 44.00	7800	F	#	250	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Sulfate	mg/L	0590	WL, PZ	08/25/2005	0001	1.08 - 1.08	1300	FQ	#	25	-	
	mg/L	0591	WL, PZ	08/26/2005	0001	4.22 - 4.22	950	FQ	#	25	-	
Temperature	C	0236	SL, RIV	08/24/2005	N001	0.00 - 0.00	35.27		#	-	-	
	C	0401	WL	08/26/2005	N001	18.00 - 18.00	18.63	F	#	-	-	
	C	0402	WL	08/25/2005	N001	17.00 - 17.00	17.20	F	#	-	-	
	C	0408	WL	08/26/2005	N001	26.00 - 26.00	16.20	F	#	-	-	
	C	0550	IS, IHYD	08/25/2005	N001	0.00 - 0.00	24.11		#	-	-	
	C	0580	WL	08/25/2005	N001	18.00 - 18.00	17.31	F	#	-	-	
	C	0581	WL	08/25/2005	N001	18.00 - 18.00	17.21	F	#	-	-	
	C	0582	WL	08/25/2005	N001	9.78 - 19.71	16.75	F	#	-	-	
	C	0583	WL	08/26/2005	N001	18.00 - 18.00	16.09	F	#	-	-	
	C	0584	WL	08/26/2005	N001	18.00 - 18.00	16.06	F	#	-	-	
	C	0585	WL	08/26/2005	N001	18.00 - 18.00	17.34	F	#	-	-	
	C	0586	WL	08/26/2005	N001	18.00 - 18.00	17.36	F	#	-	-	
	C	0587	WL	08/25/2005	N001	18.00 - 18.00	17.52	F	#	-	-	
	C	0588	WL	08/26/2005	N001	34.00 - 34.00	17.26	F	#	-	-	
	C	0588	WL	08/26/2005	N001	26.00 - 26.00	17.64	F	#	-	-	
	C	0589	WL	08/25/2005	N001	52.00 - 52.00	16.14	F	#	-	-	
	C	0589	WL	08/25/2005	N001	44.00 - 44.00	17.09	F	#	-	-	
	C	0590	WL, PZ	08/25/2005	N001	1.08 - 1.08	25.34	FQ	#	-	-	
	C	0591	WL, PZ	08/26/2005	N001	4.22 - 4.22	20.96	FQ	#	-	-	
	Total Dissolved Solids	mg/L	0236	SL, RIV	08/24/2005	0001	0.00 - 0.00	3600		#	80	-
mg/L		0401	WL	08/26/2005	0001	18.00 - 18.00	4600	F	#	80	-	
mg/L		0402	WL	08/25/2005	0001	17.00 - 17.00	4100	F	#	80	-	
mg/L		0402	WL	08/25/2005	0002	13.43 - 18.35	4000	F	#	80	-	
mg/L		0408	WL	08/26/2005	0001	26.00 - 26.00	4500	F	#	80	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Total Dissolved Solids	mg/L	0550	IS, IHYD	08/25/2005	0001	0.00 - 0.00	490			#	20	-
	mg/L	0580	WL	08/25/2005	0001	18.00 - 18.00	3700	F		#	80	-
	mg/L	0583	WL	08/26/2005	0001	18.00 - 18.00	4200	F		#	80	-
	mg/L	0585	WL	08/26/2005	0001	18.00 - 18.00	4300	F		#	80	-
	mg/L	0586	WL	08/26/2005	0001	18.00 - 18.00	4300	F		#	80	-
	mg/L	0587	WL	08/25/2005	0001	18.00 - 18.00	3500	F		#	80	-
	mg/L	0588	WL	08/26/2005	0001	34.00 - 34.00	1500	F		#	80	-
	mg/L	0589	WL	08/25/2005	0001	44.00 - 44.00	41000	F		#	1000	-
	mg/L	0590	WL, PZ	08/25/2005	0001	1.08 - 1.08	2500	FQ		#	80	-
	mg/L	0591	WL, PZ	08/26/2005	0001	4.22 - 4.22	1800	FQ		#	80	-
Turbidity	NTU	0236	SL, RIV	08/24/2005	N001	0.00 - 0.00	1000	>		#	-	-
	NTU	0401	WL	08/26/2005	N001	18.00 - 18.00	3.58	F		#	-	-
	NTU	0402	WL	08/25/2005	N001	17.00 - 17.00	2.36	F		#	-	-
	NTU	0408	WL	08/26/2005	N001	26.00 - 26.00	26.1	F		#	-	-
	NTU	0550	IS, IHYD	08/25/2005	N001	0.00 - 0.00	49.3			#	-	-
	NTU	0580	WL	08/25/2005	N001	18.00 - 18.00	4.14	F		#	-	-
	NTU	0581	WL	08/25/2005	N001	18.00 - 18.00	23.5	F		#	-	-
	NTU	0582	WL	08/25/2005	N001	9.78 - 19.71	4.85	F		#	-	-
	NTU	0583	WL	08/26/2005	N001	18.00 - 18.00	3.87	F		#	-	-
	NTU	0584	WL	08/26/2005	N001	18.00 - 18.00	10.2	F		#	-	-
	NTU	0585	WL	08/26/2005	N001	18.00 - 18.00	5.86	F		#	-	-
	NTU	0586	WL	08/26/2005	N001	18.00 - 18.00	1.53	F		#	-	-
	NTU	0587	WL	08/25/2005	N001	18.00 - 18.00	0.88	F		#	-	-
	NTU	0588	WL	08/26/2005	N001	26.00 - 26.00	0.31	F		#	-	-
	NTU	0588	WL	08/26/2005	N001	34.00 - 34.00	0.42	F		#	-	-
	NTU	0589	WL	08/25/2005	N001	52.00 - 52.00	11.6	F		#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Turbidity	NTU	0589	WL	08/25/2005	N001	44.00 - 44.00	0.88	F	#	-	-	
	NTU	0590	WL, PZ	08/25/2005	N001	1.08 - 1.08	1000	>	FQ	#	-	
	NTU	0591	WL, PZ	08/26/2005	N001	4.22 - 4.22	1000	>	FQ	#	-	
Uranium	mg/L	0236	SL, RIV	08/24/2005	0001	0.00 - 0.00	0.530		#	0.00019	-	
	mg/L	0401	WL	08/26/2005	0001	18.00 - 18.00	0.490	F	#	0.00019	-	
	mg/L	0402	WL	08/25/2005	0001	17.00 - 17.00	0.720	F	#	0.00019	-	
	mg/L	0402	WL	08/25/2005	0002	13.43 - 18.35	0.730	F	#	0.00019	-	
	mg/L	0408	WL	08/26/2005	0001	26.00 - 26.00	0.650	F	#	0.00019	-	
	mg/L	0550	IS, IHYD	08/25/2005	0001	0.00 - 0.00	0.0062		#	3.8E-06	-	
	mg/L	0580	WL	08/25/2005	0001	18.00 - 18.00	0.510	F	#	0.00019	-	
	mg/L	0583	WL	08/26/2005	0001	18.00 - 18.00	0.630	F	#	0.00019	-	
	mg/L	0585	WL	08/26/2005	0001	18.00 - 18.00	0.510	F	#	0.00019	-	
	mg/L	0586	WL	08/26/2005	0001	18.00 - 18.00	0.650	F	#	0.00019	-	
	mg/L	0587	WL	08/25/2005	0001	18.00 - 18.00	0.990	F	#	0.00019	-	
	mg/L	0588	WL	08/26/2005	0001	34.00 - 34.00	0.120	F	#	1.9E-05	-	
	mg/L	0589	WL	08/25/2005	0001	44.00 - 44.00	2.100	F	#	0.00019	-	
	mg/L	0591	WL, PZ	08/26/2005	0001	4.22 - 4.22	0.052	FQ	#	3.8E-06	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
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RECORDS: SELECTED FROM USEE200 WHERE site\_code='MOA01' AND location\_code in('0401','0402','0408','0580','0583','0585','0586','0587','0588','0589','0590','0591','0236','0550','0581','0582','0584') AND quality\_assurance = TRUE AND (data\_validation\_qualifiers IS NULL OR data\_validation\_qualifiers NOT LIKE '%R%' AND data\_validation\_qualifiers NOT LIKE '%X%' ) AND DATE\_SAMPLED between #8/23/2005# and #8/26/2005#

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

LOCATION TYPES: IS INJECTION SYSTEM SL SURFACE LOCATION WL WELL

LOCATION SUBTYPES: IHYD Injection System Hydrant PZ Piezometer RIV River

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- G Possible grout contamination, pH > 9.
- J Estimated value.
- L Less than 3 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 Level Data**

STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site  
 REPORT DATE: 11/7/2005 12:34 pm

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
			DATE	TIME			
0401	O	3969.60	08/26/2005	10:47	15.98	3953.62	
0402	O	3968.63	08/25/2005	17:13	15.30	3953.33	
0408	O	3969.17	08/26/2005	10:30	15.51	3953.66	
0580		3969.32	08/25/2005	15:38	16.49	3952.83	
0581		3969.02	08/25/2005	16:41	15.77	3953.25	
0582		3969.65	08/25/2005	16:10	16.25	3953.40	
0583		3969.64	08/26/2005	09:12	16.05	3953.59	
0584		3969.13	08/26/2005	09:45	15.48	3953.65	
0585		3969.36	08/26/2005	10:00	15.73	3953.63	
0586		3969.20	08/26/2005	11:12	15.74	3953.46	
0587		3968.89	08/25/2005	17:53	15.35	3953.54	
0588		3969.04	08/26/2005	08:37	15.22	3953.82	
0589		3968.87	08/25/2005	18:17	15.18	3953.69	
0590		3956.70	08/24/2005	15:09	3.12	3953.58	
0591		3953.99	08/25/2005	15:05	0.95	3953.04	

RECORDS: SELECTED FROM USEE700 WHERE site\_code='MOA01' AND location\_code in('0401','0402','0408','0580','0583','0585','0586','0587','0588','0589','0590','0591','0236','0550','0581','0582','0584') AND LOG\_DATE between #8/23/2005# and #8/26/2005#

FLOW CODES: O ON-SITE

WATER LEVEL FLAGS:

**Blanks**

BLANKS REPORT  
LAB CODE: PAR, PARAGON (Fort Collins, CO)  
LAB REQUISITION(S): 05080222  
REPORT DATE: 11/07/05 12:23:09: PM

PARAMETER	SITE CODE	LOCATION ID	SAMPLE DATE	SAMPLE ID	UNITS	RESULT	QUALIFIERS LAB DATA	DETECTION LIMIT	UNCERTAINTY	SAMPLE TYPE
Ammonia Total as N	MOA01	0999	08/25/2005	0001	mg/L	0.1	U	0.1		E
Chloride	MOA01	0999	08/25/2005	0001	mg/L	0.2	U	0.2		E
Sulfate	MOA01	0999	08/25/2005	0001	mg/L	0.5	U	0.5		E
Total Dissolved Solids	MOA01	0999	08/25/2005	0001	mg/L	20	U	20		E
Uranium	MOA01	0999	08/25/2005	0001	mg/L	0.000052	B U	0.0000038		E

BLANKS REPORT  
 LAB CODE: PAR, PARAGON (Fort Collins, CO)  
 LAB REQUISITION(S): 05080222  
 REPORT DATE: 11/07/05 12:23:09: PM

PARAMETER	SITE CODE	LOCATION ID	SAMPLE DATE	ID	UNITS	RESULT	QUALIFIERS LAB DATA	DETECTION LIMIT	UNCERTAINTY	SAMPLE TYPE
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SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic & Radiochemistry: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.
- J Estimated

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- Q Qualitative result due to sampling technique
- G Possible grout contamination, pH > 9.
- X Location is undefined.

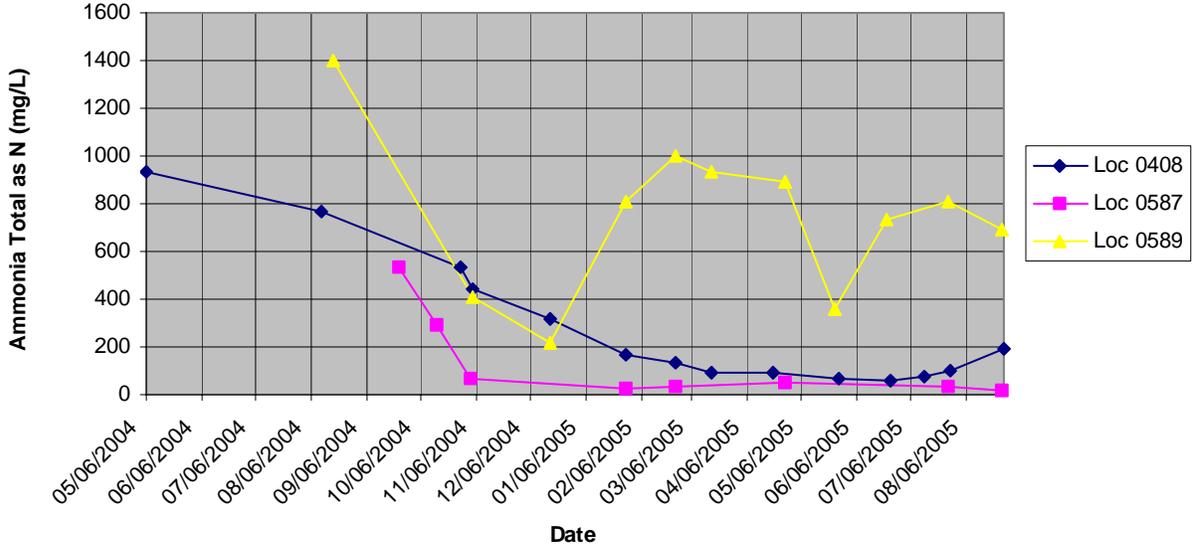
SAMPLE TYPES:

- E EQUIPMENT BLANK

## **Time Versus Concentration Graphs**

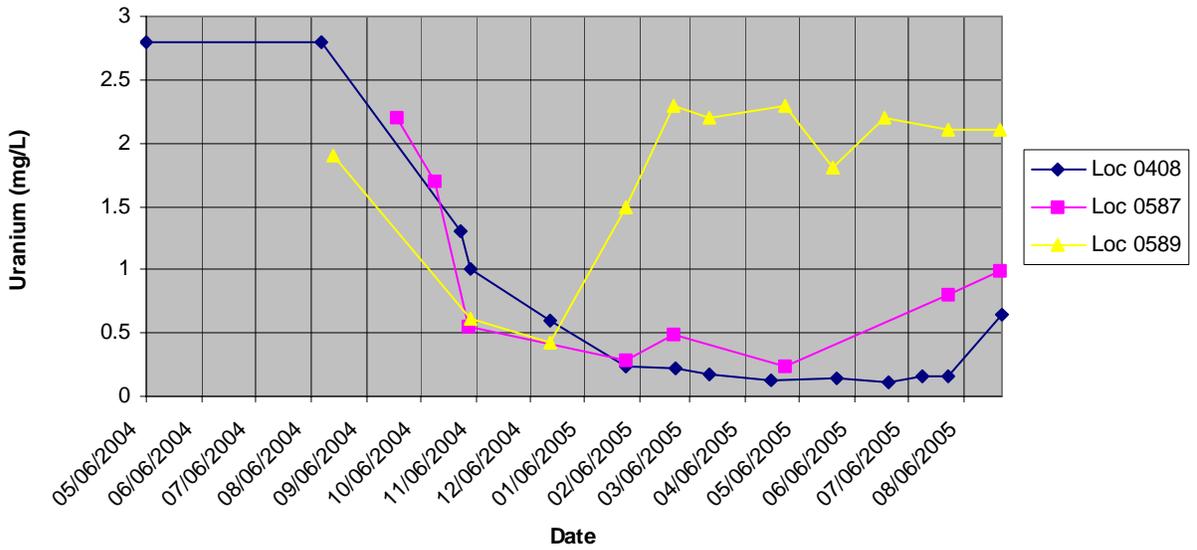
Moab Site (MOA01)

Ammonia Total as N Concentration



Moab Site (MOA01)

Uranium Concentration



**Attachment 2**

**Trip Report**

DATE: September 7, 2005

TO: Ken Karp

FROM: K. G. Pill

SUBJECT: Trip Report

**Site:** Moab – Interim Action Configuration 2 Injection Test Sampling – August 2005

**Date of Sampling Event:** August 23 through 26, 2005.

**Team Members:** Ken Pill and Nick Malczyk

**Number of Locations Sampled:** 10 CF2 observation wells (0401, 0402, 0408, 0580, 0583, 0585 through 0587, 0588 [34 ft bgs], and 0589 [44 ft bgs]), 2 piezometers (0590 and 0591), 1 surface water (0236), and 1 injection water sample (0550). Including one equipment blank and one duplicate, a total of 16 samples were collected.

**Locations in Which Field Parameters Were Measured Only:** Field parameters were measured from 5 CF2 observation wells (0581, 0582, 0584, 0588 [26 ft bgs], and 0589 [52 ft bgs]). Samples were not submitted to Paragon for laboratory analysis from these locations.

**Locations Not Sampled/Reason:** Piezometer 0592 was purged prior to sampling, and never recharged. As a result, no sample was collected from this location. In addition, piezometer 0593 is still buried below approximately 2 to 3 feet of sediment deposited during the 2005 runoff, and also was not sampled. The water near surface water location 0240 was isolated from the main channel (a stagnant water body) with a depth of approximately only 1 inch, which is not sufficient to collect a sample. As a result, no sample was collected.

**Field Variance:** Only a 125 ml sample was collected for uranium analysis as opposed to the standard 500 ml sample volume. No other metals are being sampled, and this volume is sufficient for the uranium analysis. Limited sample volume was available for analysis from locations 0590 and 0591 (approximately 110 and 400 mls, respectively). These samples were split and preserved as directed by the laboratory for proper analysis.

**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
2982	NA	Equipment Blank – GW Equip	DI Water	NDV-182
2983	0402	Duplicate	Ground Water	NDV-185

**RIN Number Assigned:** All samples were assigned to RIN 05080222.

**Sample Shipment:** All samples were shipped in one cooler overnight FEDEX to Paragon Analytics, Inc. from Moab, Utah, on August 26, 2005 (Airbill No. 8527 5847 9075).

**Location Specific Information – CF2 Observation Wells:** All observation wells were sampled using micro-purge techniques with a peristaltic pump and downhole tubing. Sample depths and water levels for each observation well are listed below.

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0401	8/26/05	10:47	15.98	18
0402	8/25/05	17:13	15.30	17
0408	8/26/05	10:30	15.51	26
0580	8/25/05	15:38	16.49	18
0583	8/26/05	09:12	16.05	18
0585	8/26/05	10:00	15.73	18
0586	8/26/05	11:12	15.74	18
0587	8/25/05	17:53	15.35	18
0588	8/26/05	08:47	15.22	34
0589	8/25/05	18:17	15.18	44

Field parameters (only) were measured from locations 0581, 0582, 0584, 0588 (26 ft bgs), and 0589 (52 ft bgs). These data are presented below with the sample depths (provided in feet bgs). These samples were not submitted for laboratory analysis.

Well No.	Date	Time	Sample Depth (ft bgs)	Depth To Water (ft btoc)	Field Parameters					
					Temp (°C)	Spec Cond (µS/cm)	D.O. (mg/L)	pH	ORP	Turb. (NTUs)
0581	8/25/05	16:41	18	15.77	17.21	7,032	3.18	6.81	195	23.5
0582	8/25/05	16:10	18	16.25	16.75	3,829	2.37	7.01	183	4.85
0584	8/26/05	09:45	18	15.48	16.06	5,532	4.33	7.07	185	10.2
0588	8/26/05	08:37	26	15.22	17.64	1,736	2.21	7.33	168	0.31
0589	8/25/05	18:31	52	15.18	16.14	76,858	0.97	6.61	139	11.6

**Location Specific Information – Piezometer Sampling:** Prior to sampling location 0591, it was necessary to purge all the water out of the piezometer because it was under water during the previous sampling event (1 month earlier). In addition, it was necessary to develop location 0592 because this piezometer was filled with sediment. After development and subsequent purging prior to collecting the sample, 0592 never recharged, and it was not possible to collect a sample from this location for analysis. Piezometer 0593 remains under 2 to 3 ft of sediment deposited during the runoff high flows. The table below presents the water level, new stick up height, and depth to the river surface.

PZ No.	Date	Time	Depth to Water (ft btoc)	Stick Up Height (ft)	Depth to River Surface (ft btoc)
0590	8/24/05	15:09	3.12	3.39	Dry at base
0591	8/25/05	15:05	0.95	1.16	0.87
0592	8/25/05	14:50	4.29	0.61	Dry at base

Approximately 110 mls were submitted for analysis from location 0590. Because of the limited volume, no spilt was available for uranium analysis. Approximately 400 mls were collected from 0591.

**Location Specific Information – Surface Water Sampling:** The surface water sample for location 0236 was collected in the same location as previous samples. However, with the low river stage, and reconfiguration of the upstream section of the side channel containing this location, the limited water body was isolated from the river (stagnant water). The sample was collected from a depth of approximately 4 inches below the water surface (photo attached).

The water near surface water location 0240 also was isolated from the main channel (also a stagnant water body) and only approximately 1 inch deep, which is not sufficient depth for sample collection. As a result, no sample was collected.

**Location Specific Information – Injection Water Sampling:** The hydrant (location 0550) was used to sample injection water from the fresh water supply line for this event.

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

**Equipment:** No issues to report.

**Site Issues:** The injection test had been running approximately 33 weeks (since October 6, 2004) prior to having injected water flows reduced in mid-April 2005 in response to the high river stage. The system had been injecting a minimal volume of water approximately 3 months prior this sampling effort.

According to the USGS Cisco Gaging Station (Station No. 09180500), the mean daily Colorado River Flows during this sampling event are provided below:

Date	Daily Mean Flow (cfs)
08/23/2005	3,570
08/24/2005	3,440
08/25/2005	3,510
08/26/2005	3,540
08/27/2005	3,500

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

(KGP/lcg)

Ken Karp  
September 7, 2005  
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cc: J. D. Berwick, DOE-EM (e) L. M. Edwards, Stoller (e)  
D. R. Metzler, DOE-EM S. D. Lyon, Stoller (e)  
C. I. Bahrke, Stoller (e) K. E. Miller, Stoller  
L. E. Cummins, Stoller (e) K. G. Pill, Stoller (e)  
S. E. Donovan, Stoller (e) J. E. Price, Stoller (e)

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Piezometers 0590 and 0591



Piezometer 0592



Surface Water Location 0236