

*Office of Environmental Management – Grand Junction*



October 2005 Water Sampling

**Validation Data Package for  
Ground Water Interim Action  
Configuration 3 Well Field  
Monthly Sampling  
Moab, Utah**

January 2006



U.S. Department  
of Energy

**Office of Environmental Management**

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January 2006

# Moab, Utah

October 18-21, 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 Maps</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

### **Attachment 2—Trip Report**

## **Sampling Event Summary**

**Site:** Moab, Utah

**Sampling Period:** October 18–21, 2005

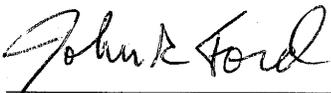
The purpose of this sampling was to collect data that can be used to evaluate the baseline conditions of the new Configuration 3 interim action well field. This is the third monthly performance sampling round conducted in 2005 for Configuration 3. Configuration 3 wells are located north of Configuration 2 and south of the Baseline Area wells.

According to the USGS Cisco Gaging Station, the mean daily Colorado River flows during the sampling event ranged from 4,200 to 4,870 cubic feet per second (cfs).

Sampling and analysis were conducted in accordance with the *Operations, Maintenance, and Performance Monitoring Plan for the Interim Action Ground Water Treatment System, February 2004*. Wells sampled include ten remediation wells (0670 through 0679), two observation wells (0688 and 0689), four piezometers (0693, 0696, 0697, and 0698), and one surface water sample (0259). Including two duplicates and one equipment blank, a total of 20 samples were collected.

Because this is only the third sampling event for this set of remediation wells, there are no established historical minimums and maximum concentrations.

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, instrument calibration, method blanks, matrix spikes, etc., except as qualified.

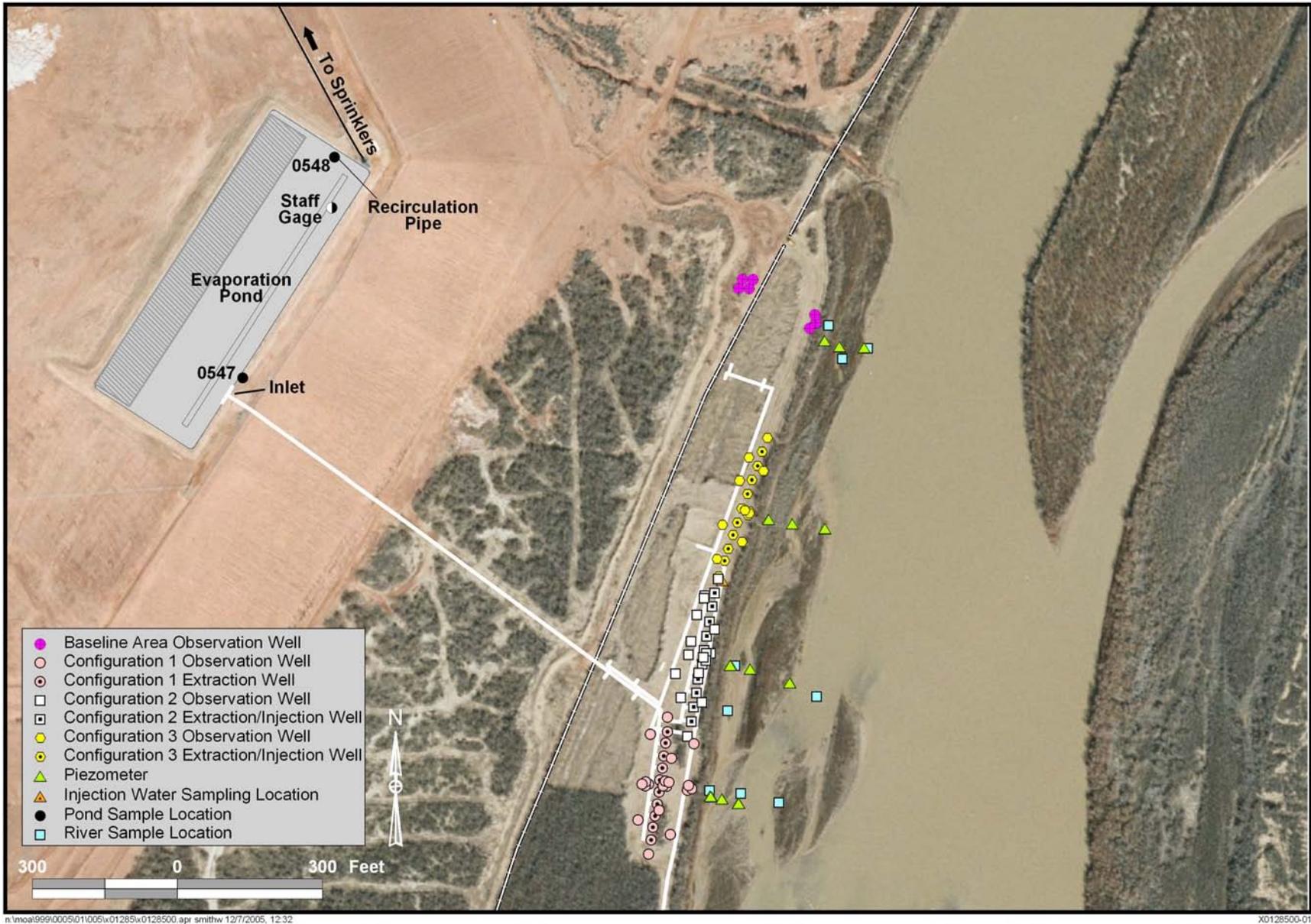


John R. Ford  
Ground Water Lead



Date

## **Sample Location Maps**



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>October 18-21, 2005</u>
<b>Date(s) of Verification</b>	<u>December 19, 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.</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>Yes</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): 05100239  
Sample Event: October 18-20, 2005  
Site(s): Moab, Utah  
Laboratory: Paragon Analytics  
Work Order No.: 0510208  
Analysis: Metals and Inorganics  
Validator: Steve Donovan  
Review Date: December 8, 2005

This validation was performed according to the *Environmental Procedures Catalog* (STO 6), “Standard Practice for Validation of Laboratory Data”, GT-9(P) (2004). 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
Ammonia as N, NH <sub>3</sub> -N	WCH-A-005	MCAWW 350.1	MCAWW 350.1
Bromide, Br	MIS-A-039	SW-846 9056	SW-846 9056
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
Total Dissolved Solids, TDS	WCH-A-033	MCAWW 160.1	MCAWW 160.1
Uranium, U	GJO-01	SW-846 3005A	SW-846 6020A

### Data Qualifier Summary

Analytical results were qualified as listed in Table 2. The uranium result for sample 0510208-21 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 five times the calibration blank result.

Table 2. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
0510208-21	2240 (Equip Blank)	U	U	Less than 5 times the calibration blank

### Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 20 samples on October 21, 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 cooler of 0.3 °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 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 6020A*

Calibration for uranium was performed on November 10, 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 bromide, chloride, and sulfate were performed using five calibration standards each on October 25, 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 nine CCVs. The calibration checks met the acceptance criteria.

### *Method MCAWW 350.1*

The initial calibrations for ammonia as N was performed using six calibration standards on October 31, 2005 resulting in calibration curves with  $r^2$  values greater than 0.995 and intercepts less than 3 times the MDL. Initial and continuing calibration checks were made at the required frequency resulting in seven 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 0510208-21 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 were not evaluated for chloride or sulfate because the concentration of these analytes in the unspiked sample was greater than 4 times the spike concentration. The spike recoveries met the recovery and precision criteria for all analytes evaluated.

### 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 November 30, 2005 and the data loaded into SeePro on December 8, 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 analyses and activities for this sampling event period.

### Field Activities

All well results were qualified with an “F” flag in the database indicating the wells were purged and sampled using the low-flow sampling method.

An equipment blank was collected and analyzed for the same constituents as the Moab environmental samples. Analyte concentrations measured in the equipment blank were below their respective contract required detection limits, therefore all equipment blank results are considered acceptable. Duplicate samples were collected from locations 0672 and 0688. 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 results met the laboratory duplicate criteria of +/-20 RPD and 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. 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 1-18-06  
Steve Donovan Date

Field Activities Validation Lead: Jeff Price 1/19/06  
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 and the results are not considered anomalous if:

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

Because this is only the third sampling event for this set of wells, there is no minimums and maximums report.

# **Water Quality Data**

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	164				#	-	-
	mg/L	0670	WL, EXT	10/20/2005	0001		492				#	-	-
	mg/L	0671	WL, EXT	10/20/2005	0001		736				#	-	-
	mg/L	0672	WL, EXT	10/20/2005	0001		744				#	-	-
	mg/L	0673	WL, EXT	10/20/2005	0001		780				#	-	-
	mg/L	0674	WL, EXT	10/20/2005	0001		822				#	-	-
	mg/L	0675	WL, EXT	10/20/2005	0001		870				#	-	-
	mg/L	0676	WL, EXT	10/20/2005	0001		852				#	-	-
	mg/L	0677	WL, EXT	10/20/2005	0001		710				#	-	-
	mg/L	0678	WL, EXT	10/20/2005	0001		880				#	-	-
	mg/L	0679	WL, EXT	10/20/2005	0001		846				#	-	-
	mg/L	0688	WL	10/20/2005	0001	39.00 - 39.00	1046		F		#	-	-
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	1032		F		#	-	-
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	274		F		#	-	-
	mg/L	0689	WL	10/20/2005	0001	46.00 - 46.00	436		F		#	-	-
	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	485		F		#	-	-
Ammonia Total as N	mg/L	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	0.1	U			#	0.1	-
	mg/L	0670	WL, EXT	10/20/2005	0001		290				#	20	-
	mg/L	0671	WL, EXT	10/20/2005	0001		520				#	20	-
	mg/L	0672	WL, EXT	10/20/2005	0001		720				#	20	-
	mg/L	0672	WL, EXT	10/20/2005	0002		660				#	20	-
	mg/L	0673	WL, EXT	10/20/2005	0001		650				#	20	-
	mg/L	0674	WL, EXT	10/20/2005	0001		610				#	20	-
	mg/L	0675	WL, EXT	10/20/2005	0001		470				#	20	-
	mg/L	0676	WL, EXT	10/20/2005	0001		450				#	20	-
	mg/L	0677	WL, EXT	10/20/2005	0001		630				#	20	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Ammonia Total as N	mg/L	0678	WL, EXT	10/20/2005	0001		610			#	20	-
	mg/L	0679	WL, EXT	10/20/2005	0001		560			#	20	-
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	860	F		#	20	-
	mg/L	0688	WL	10/20/2005	0002	31.00 - 31.00	740	F		#	20	-
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	290	F		#	20	-
	mg/L	0693	WL, PZ	10/19/2005	0001	2.00 - 2.00	110	FQ		#	20	-
	mg/L	0696	WL, PZ	10/19/2005	0001	1.80 - 1.80	17	FQ		#	1	-
	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	200	F		#	20	-
	mg/L	0698	WL, PZ	10/19/2005	0001	9.80 - 9.80	670	FQ		#	20	-
Bromide	mg/L	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	0.2	U		#	0.2	-
	mg/L	0670	WL, EXT	10/20/2005	0001		4	U		#	4	-
	mg/L	0671	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0672	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0672	WL, EXT	10/20/2005	0002		10	U		#	10	-
	mg/L	0673	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0674	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0675	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0676	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0677	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0678	WL, EXT	10/20/2005	0001		10	U		#	10	-
	mg/L	0679	WL, EXT	10/20/2005	0001		4	U		#	4	-
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	10	U	F	#	10	-
	mg/L	0688	WL	10/20/2005	0002	31.00 - 31.00	10	U	F	#	10	-
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	20	U	F	#	20	-
	mg/L	0693	WL, PZ	10/19/2005	0001	2.00 - 2.00	1	U	FQ	#	1	-
	mg/L	0696	WL, PZ	10/19/2005	0001	1.80 - 1.80	0.4	U	FQ	#	0.4	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Bromide	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	2	U	F	#	2	-
	mg/L	0698	WL, PZ	10/19/2005	0001	9.80 - 9.80	4	U	FQ	#	4	-
Chloride	mg/L	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	90			#	2	-
	mg/L	0670	WL, EXT	10/20/2005	0001		2800			#	40	-
	mg/L	0671	WL, EXT	10/20/2005	0001		7000			#	100	-
	mg/L	0672	WL, EXT	10/20/2005	0001		12000			#	200	-
	mg/L	0672	WL, EXT	10/20/2005	0002		11000			#	200	-
	mg/L	0673	WL, EXT	10/20/2005	0001		14000			#	400	-
	mg/L	0674	WL, EXT	10/20/2005	0001		12000			#	400	-
	mg/L	0675	WL, EXT	10/20/2005	0001		7400			#	100	-
	mg/L	0676	WL, EXT	10/20/2005	0001		3900			#	100	-
	mg/L	0677	WL, EXT	10/20/2005	0001		5300			#	100	-
	mg/L	0678	WL, EXT	10/20/2005	0001		470			#	10	-
	mg/L	0679	WL, EXT	10/20/2005	0001		3400			#	40	-
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	4100		F	#	100	-
	mg/L	0688	WL	10/20/2005	0002	31.00 - 31.00	4200		F	#	100	-
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	53000		F	#	1000	-
	mg/L	0693	WL, PZ	10/19/2005	0001	2.00 - 2.00	430		FQ	#	10	-
	mg/L	0696	WL, PZ	10/19/2005	0001	1.80 - 1.80	100		FQ	#	4	-
	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	570		F	#	20	-
	mg/L	0698	WL, PZ	10/19/2005	0001	9.80 - 9.80	1900		FQ	#	40	-
	Dissolved Oxygen	mg/L	0259	SL, RIV	10/18/2005	N001	0.67 - 0.67	7.60			#	-
mg/L		0670	WL, EXT	10/20/2005	N001		2.18			#	-	-
mg/L		0671	WL, EXT	10/20/2005	N001		2.59			#	-	-
mg/L		0672	WL, EXT	10/20/2005	N001		2.73			#	-	-
mg/L		0673	WL, EXT	10/20/2005	N001		2.73			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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	0674	WL, EXT	10/20/2005	N001		2.76				#	-	-
	mg/L	0675	WL, EXT	10/20/2005	N001		4.09				#	-	-
	mg/L	0676	WL, EXT	10/20/2005	N001		2.45				#	-	-
	mg/L	0677	WL, EXT	10/20/2005	N001		2.15				#	-	-
	mg/L	0678	WL, EXT	10/20/2005	N001		2.26				#	-	-
	mg/L	0679	WL, EXT	10/20/2005	N001		2.45				#	-	-
	mg/L	0688	WL	10/20/2005	N001	31.00 - 31.00	1.85	F			#	-	-
	mg/L	0688	WL	10/20/2005	N001	39.00 - 39.00	1.82	F			#	-	-
	mg/L	0689	WL	10/20/2005	N001	46.00 - 46.00	0.51	F			#	-	-
	mg/L	0689	WL	10/20/2005	N001	54.00 - 54.00	0.46	F			#	-	-
	mg/L	0693	WL, PZ	10/19/2005	N001	2.00 - 2.00	0.19	FQ			#	-	-
	mg/L	0696	WL, PZ	10/19/2005	N001	1.80 - 1.80	0.86	FQ			#	-	-
	mg/L	0697	WL, PZ	10/18/2005	N001	4.80 - 4.80	0.13	F			#	-	-
	mg/L	0698	WL, PZ	10/19/2005	N001	9.80 - 9.80	0.08	FQ			#	-	-
Oxidation Reduction Potent	mV	0259	SL, RIV	10/18/2005	N001	0.67 - 0.67	25.5				#	-	-
	mV	0670	WL, EXT	10/20/2005	N001		210.8				#	-	-
	mV	0671	WL, EXT	10/20/2005	N001		190.7				#	-	-
	mV	0672	WL, EXT	10/20/2005	N001		180.2				#	-	-
	mV	0673	WL, EXT	10/20/2005	N001		176.1				#	-	-
	mV	0674	WL, EXT	10/20/2005	N001		163.2				#	-	-
	mV	0675	WL, EXT	10/20/2005	N001		157.2				#	-	-
	mV	0676	WL, EXT	10/20/2005	N001		157.9				#	-	-
	mV	0677	WL, EXT	10/20/2005	N001		162.3				#	-	-
	mV	0678	WL, EXT	10/20/2005	N001		158.6				#	-	-
	mV	0679	WL, EXT	10/20/2005	N001		150.2				#	-	-
	mV	0688	WL	10/20/2005	N001	31.00 - 31.00	148.7	F			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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	0688	WL	10/20/2005	N001	39.00 - 39.00	103.5	F	#	-	-	
	mV	0689	WL	10/20/2005	N001	54.00 - 54.00	117.9	F	#	-	-	
	mV	0689	WL	10/20/2005	N001	46.00 - 46.00	160.2	F	#	-	-	
	mV	0693	WL, PZ	10/19/2005	N001	2.00 - 2.00	125.7	FQ	#	-	-	
	mV	0696	WL, PZ	10/19/2005	N001	1.80 - 1.80	-44.3	FQ	#	-	-	
	mV	0697	WL, PZ	10/18/2005	N001	4.80 - 4.80	-197.9	F	#	-	-	
	mV	0698	WL, PZ	10/19/2005	N001	9.80 - 9.80	-281.6	FQ	#	-	-	
pH	s.u.	0259	SL, RIV	10/18/2005	N001	0.67 - 0.67	8.44		#	-	-	
	s.u.	0670	WL, EXT	10/20/2005	N001		6.86		#	-	-	
	s.u.	0671	WL, EXT	10/20/2005	N001		6.72		#	-	-	
	s.u.	0672	WL, EXT	10/20/2005	N001		6.72		#	-	-	
	s.u.	0673	WL, EXT	10/20/2005	N001		6.67		#	-	-	
	s.u.	0674	WL, EXT	10/20/2005	N001		6.68		#	-	-	
	s.u.	0675	WL, EXT	10/20/2005	N001		6.70		#	-	-	
	s.u.	0676	WL, EXT	10/20/2005	N001		6.73		#	-	-	
	s.u.	0677	WL, EXT	10/20/2005	N001		6.76		#	-	-	
	s.u.	0678	WL, EXT	10/20/2005	N001		6.76		#	-	-	
	s.u.	0679	WL, EXT	10/20/2005	N001		6.76		#	-	-	
	s.u.	0688	WL	10/20/2005	N001	31.00 - 31.00	6.78	F	#	-	-	
	s.u.	0688	WL	10/20/2005	N001	39.00 - 39.00	6.79	F	#	-	-	
	s.u.	0689	WL	10/20/2005	N001	54.00 - 54.00	6.70	F	#	-	-	
	s.u.	0689	WL	10/20/2005	N001	46.00 - 46.00	6.74	F	#	-	-	
	s.u.	0693	WL, PZ	10/19/2005	N001	2.00 - 2.00	8.04	FQ	#	-	-	
	s.u.	0696	WL, PZ	10/19/2005	N001	1.80 - 1.80	8.82	FQ	#	-	-	
	s.u.	0697	WL, PZ	10/18/2005	N001	4.80 - 4.80	8.52	F	#	-	-	
	s.u.	0698	WL, PZ	10/19/2005	N001	9.80 - 9.80	9.20	FQ	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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	0259	SL, RIV	10/18/2005	N001	0.67 - 0.67	1288				#	-	-
	umhos/cm	0670	WL, EXT	10/20/2005	N001		15333				#	-	-
	umhos/cm	0671	WL, EXT	10/20/2005	N001		28291				#	-	-
	umhos/cm	0672	WL, EXT	10/20/2005	N001		38476				#	-	-
	umhos/cm	0673	WL, EXT	10/20/2005	N001		43328				#	-	-
	umhos/cm	0674	WL, EXT	10/20/2005	N001		37314				#	-	-
	umhos/cm	0675	WL, EXT	10/20/2005	N001		32591				#	-	-
	umhos/cm	0676	WL, EXT	10/20/2005	N001		25142				#	-	-
	umhos/cm	0677	WL, EXT	10/20/2005	N001		29470				#	-	-
	umhos/cm	0678	WL, EXT	10/20/2005	N001		27394				#	-	-
	umhos/cm	0679	WL, EXT	10/20/2005	N001		24903				#	-	-
	umhos/cm	0688	WL	10/20/2005	N001	39.00 - 39.00	32043	F			#	-	-
	umhos/cm	0688	WL	10/20/2005	N001	31.00 - 31.00	28008	F			#	-	-
	umhos/cm	0689	WL	10/20/2005	N001	46.00 - 46.00	94501	F			#	-	-
	umhos/cm	0689	WL	10/20/2005	N001	54.00 - 54.00	109023	F			#	-	-
	umhos/cm	0693	WL, PZ	10/19/2005	N001	2.00 - 2.00	6279	FQ			#	-	-
	umhos/cm	0696	WL, PZ	10/19/2005	N001	1.80 - 1.80	1484	FQ			#	-	-
	umhos/cm	0697	WL, PZ	10/18/2005	N001	4.80 - 4.80	7587	F			#	-	-
	umhos/cm	0698	WL, PZ	10/19/2005	N001	9.80 - 9.80	15900	FQ			#	-	-
	Sulfate	mg/L	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	320				#	5
mg/L		0670	WL, EXT	10/20/2005	0001		5000				#	100	-
mg/L		0671	WL, EXT	10/20/2005	0001		8200				#	250	-
mg/L		0672	WL, EXT	10/20/2005	0001		8600				#	250	-
mg/L		0672	WL, EXT	10/20/2005	0002		8600				#	250	-
mg/L		0673	WL, EXT	10/20/2005	0001		9600				#	250	-
mg/L		0674	WL, EXT	10/20/2005	0001		10000				#	250	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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	0675	WL, EXT	10/20/2005	0001		10000			#	250	-
	mg/L	0676	WL, EXT	10/20/2005	0001		11000			#	250	-
	mg/L	0677	WL, EXT	10/20/2005	0001		11000			#	250	-
	mg/L	0678	WL, EXT	10/20/2005	0001		1100			#	25	-
	mg/L	0679	WL, EXT	10/20/2005	0001		11000			#	100	-
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	13000	F		#	250	-
	mg/L	0688	WL	10/20/2005	0002	31.00 - 31.00	13000	F		#	250	-
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	6300	F		#	50	-
	mg/L	0693	WL, PZ	10/19/2005	0001	2.00 - 2.00	1800	FQ		#	25	-
	mg/L	0696	WL, PZ	10/19/2005	0001	1.80 - 1.80	330	FQ		#	10	-
	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	2400	F		#	50	-
	mg/L	0698	WL, PZ	10/19/2005	0001	9.80 - 9.80	7900	FQ		#	100	-
	Temperature	C	0259	SL, RIV	10/18/2005	N001	0.67 - 0.67	15.10			#	-
C		0670	WL, EXT	10/20/2005	N001		16.75			#	-	-
C		0671	WL, EXT	10/20/2005	N001		16.15			#	-	-
C		0672	WL, EXT	10/20/2005	N001		16.18			#	-	-
C		0673	WL, EXT	10/20/2005	N001		16.45			#	-	-
C		0674	WL, EXT	10/20/2005	N001		17.00			#	-	-
C		0675	WL, EXT	10/20/2005	N001		16.92			#	-	-
C		0676	WL, EXT	10/20/2005	N001		17.20			#	-	-
C		0677	WL, EXT	10/20/2005	N001		16.52			#	-	-
C		0678	WL, EXT	10/20/2005	N001		16.79			#	-	-
C		0679	WL, EXT	10/20/2005	N001		17.20			#	-	-
C		0688	WL	10/20/2005	N001	39.00 - 39.00	16.11	F		#	-	-
C		0688	WL	10/20/2005	N001	31.00 - 31.00	15.77	F		#	-	-
C		0689	WL	10/20/2005	N001	54.00 - 54.00	17.62	F		#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Temperature	C	0689	WL	10/20/2005	N001	46.00 - 46.00	18.35	F	#	-	-	
	C	0693	WL, PZ	10/19/2005	N001	2.00 - 2.00	15.76	FQ	#	-	-	
	C	0696	WL, PZ	10/19/2005	N001	1.80 - 1.80	15.10	FQ	#	-	-	
	C	0697	WL, PZ	10/18/2005	N001	4.80 - 4.80	16.71	F	#	-	-	
	C	0698	WL, PZ	10/19/2005	N001	9.80 - 9.80	16.45	FQ	#	-	-	
Total Dissolved Solids	mg/L	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	770		#	20	-	
	mg/L	0670	WL, EXT	10/20/2005	0001		11000		#	400	-	
	mg/L	0671	WL, EXT	10/20/2005	0001		21000		#	400	-	
	mg/L	0672	WL, EXT	10/20/2005	0001		28000		#	1000	-	
	mg/L	0672	WL, EXT	10/20/2005	0002		28000		#	1000	-	
	mg/L	0673	WL, EXT	10/20/2005	0001		32000		#	1000	-	
	mg/L	0674	WL, EXT	10/20/2005	0001		28000		#	1000	-	
	mg/L	0675	WL, EXT	10/20/2005	0001		26000		#	1000	-	
	mg/L	0676	WL, EXT	10/20/2005	0001		21000		#	400	-	
	mg/L	0677	WL, EXT	10/20/2005	0001		23000		#	1000	-	
	mg/L	0678	WL, EXT	10/20/2005	0001		22000		#	400	-	
	mg/L	0679	WL, EXT	10/20/2005	0001		20000		#	400	-	
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	23000	F	#	400	-	
	mg/L	0688	WL	10/20/2005	0002	31.00 - 31.00	23000	F	#	1000	-	
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	86000	F	#	2000	-	
	mg/L	0693	WL, PZ	10/19/2005	0001	2.00 - 2.00	3500	FQ	#	200	-	
	mg/L	0696	WL, PZ	10/19/2005	0001	1.80 - 1.80	720	FQ	#	80	-	
	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	4300	F	#	200	-	
	mg/L	0698	WL, PZ	10/19/2005	0001	9.80 - 9.80	12000	FQ	#	400	-	
	Turbidity	NTU	0259	SL, RIV	10/18/2005	N001	0.67 - 0.67	227		#	-	-
NTU		0670	WL, EXT	10/20/2005	N001		6.65		#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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	0671	WL, EXT	10/20/2005	N001		1.15				#	-	-
	NTU	0672	WL, EXT	10/20/2005	N001		2.38				#	-	-
	NTU	0673	WL, EXT	10/20/2005	N001		1.44				#	-	-
	NTU	0674	WL, EXT	10/20/2005	N001		6.69				#	-	-
	NTU	0675	WL, EXT	10/20/2005	N001		0.93				#	-	-
	NTU	0676	WL, EXT	10/20/2005	N001		1.22				#	-	-
	NTU	0677	WL, EXT	10/20/2005	N001		1.09				#	-	-
	NTU	0678	WL, EXT	10/20/2005	N001		9.07				#	-	-
	NTU	0679	WL, EXT	10/20/2005	N001		0.84				#	-	-
	NTU	0688	WL	10/20/2005	N001	39.00 - 39.00	1.59	F			#	-	-
	NTU	0688	WL	10/20/2005	N001	31.00 - 31.00	1.61	F			#	-	-
	NTU	0689	WL	10/20/2005	N001	46.00 - 46.00	2.23	F			#	-	-
	NTU	0689	WL	10/20/2005	N001	54.00 - 54.00	2.77	F			#	-	-
	NTU	0693	WL, PZ	10/19/2005	N001	2.00 - 2.00	318	FQ			#	-	-
	NTU	0696	WL, PZ	10/19/2005	N001	1.80 - 1.80	455	FQ			#	-	-
	NTU	0697	WL, PZ	10/18/2005	N001	4.80 - 4.80	232	F			#	-	-
	NTU	0698	WL, PZ	10/19/2005	N001	9.80 - 9.80	241	FQ			#	-	-
	Uranium	mg/L	0259	SL, RIV	10/18/2005	0001	0.67 - 0.67	0.0088				#	4.8E-06
mg/L		0670	WL, EXT	10/20/2005	0001		1.500				#	0.00024	-
mg/L		0671	WL, EXT	10/20/2005	0001		2.700				#	0.00048	-
mg/L		0672	WL, EXT	10/20/2005	0001		2.200				#	0.00048	-
mg/L		0672	WL, EXT	10/20/2005	0002		2.200				#	0.00024	-
mg/L		0673	WL, EXT	10/20/2005	0001		2.400				#	0.00048	-
mg/L		0674	WL, EXT	10/20/2005	0001		2.600				#	0.00048	-
mg/L		0675	WL, EXT	10/20/2005	0001		3.000				#	0.00048	-
mg/L		0676	WL, EXT	10/20/2005	0001		3.400				#	0.00048	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 pm

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:		DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA QA		
Uranium	mg/L	0677	WL, EXT	10/20/2005	0001		3.400		#	0.00048	-
	mg/L	0678	WL, EXT	10/20/2005	0001		3.600		#	0.00048	-
	mg/L	0679	WL, EXT	10/20/2005	0001		4.700		#	0.00048	-
	mg/L	0688	WL	10/20/2005	0001	31.00 - 31.00	3.300	F	#	0.00048	-
	mg/L	0688	WL	10/20/2005	0002	31.00 - 31.00	3.300	F	#	0.00048	-
	mg/L	0689	WL	10/20/2005	0001	54.00 - 54.00	0.640	F	#	4.8E-05	-
	mg/L	0693	WL, PZ	10/19/2005	0001	2.00 - 2.00	0.620	FQ	#	9.5E-05	-
	mg/L	0696	WL, PZ	10/19/2005	0001	1.80 - 1.80	0.0011	FQ	#	4.8E-06	-
	mg/L	0697	WL, PZ	10/18/2005	0001	4.80 - 4.80	0.690	F	#	4.8E-05	-
	mg/L	0698	WL, PZ	10/19/2005	0001	9.80 - 9.80	0.00068	FQ	#	4.8E-06	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 12/19/2005 3:18 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('0670','0671','0672','0673','0674','0675','0676','0677','0678','0679','0688','0689','0693','0696','0697','0698','0259') 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 #10/18/2005# and #10/21/2005#

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

LOCATION TYPES: SL SURFACE LOCATION WL WELL

LOCATION SUBTYPES: EXT Extraction Well 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.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

## **Water Level Data**

STATIC WATER LEVELS (USEE700) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/17/2006 3:46 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			
0670		3969.54	10/20/2005	08:37	16.16	3953.38	
0671		3969.50	10/20/2005	08:50	16.60	3952.90	
0672		3969.57	10/20/2005	09:10	17.02	3952.55	
0673		3969.44	10/20/2005	09:28	17.00	3952.44	
0674		3969.49	10/20/2005	09:50	16.92	3952.57	
0675		3969.64	10/20/2005	10:03	16.85	3952.79	
0676		3969.69	10/20/2005	10:22	16.58	3953.11	
0677		3969.61	10/20/2005	10:32	16.57	3953.04	
0678		3969.65	10/20/2005	10:45	16.45	3953.20	
0679		3969.59	10/20/2005	10:56	16.38	3953.21	
0688		3968.66	10/20/2005	11:23	15.66	3953.00	
0689		3968.66	10/20/2005	15:08	15.80	3952.86	
0693		3957.31	10/18/2005	16:20	3.97	3953.34	
0696		3957.18	10/18/2005	16:33	3.74	3953.44	
0697		3956.12	10/18/2005	16:35	2.62	3953.50	
0698		3956.01	10/18/2005	16:52	2.68	3953.33	

RECORDS: SELECTED FROM USEE700 WHERE site\_code='MOA01' AND location\_code in('0670','0671','0672','0673','0674','0675','0676','0677','0678','0679','0688','0689','0693','0696','0697','0698') AND LOG\_DATE between #10/18/2005# and #10/20/2005#

FLOW CODES:

WATER LEVEL FLAGS:

**Blanks**

BLANKS REPORT

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

LAB REQUISITION(S): 05100239

REPORT DATE: 12/19/05 11:23:49: AM

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	10/20/2005	0002	mg/L	0.1	U	0.1		E
Bromide	MOA01	0999	10/20/2005	0002	mg/L	0.2	U	0.2		E
Chloride	MOA01	0999	10/20/2005	0002	mg/L	0.2	U	0.2		E
Sulfate	MOA01	0999	10/20/2005	0002	mg/L	0.5	U	0.5		E
Total Dissolved Solids	MOA01	0999	10/20/2005	0002	mg/L	20	U	20		E
Uranium	MOA01	0999	10/20/2005	0002	mg/L	0.000043	B U	0.0000048		E

BLANKS REPORT

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

LAB REQUISITION(S): 05100239

REPORT DATE: 12/19/05 11:23:49: AM

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

**Attachment 2**

**Trip Report**

DATE: November 14, 2005

TO: John Ford

FROM: K. G. Pill

SUBJECT: Trip Report

**Site:** Moab – Interim Action Configuration 3 Well Field Sampling Event, October 2005

**Date of Sampling Event:** October 18 through 21, 2005.

**Team Members:** Emile Bettez and Michelle Hershey.

**Number of Locations Sampled:** 10 remediation wells (0670 through 0679), 2 observation wells (0688 and 0689), 4 piezometers (0693, 0696, 0697, and 0698), and 1 surface water sample (0259). Including two duplicates and one equipment blank, a total of 20 samples were collected.

**Locations in Which Field Parameters Were Measured Only:** Field parameters were measured from two Configuration 3 observation wells (0688 [39 ft below ground surface {bgs}] and 0689 [46 ft bgs]). Samples were not submitted to Paragon for laboratory analysis from these locations.

**Locations Not Sampled/Reason:** Piezometer 0690 was dry, and no sample was collected. Surface water location 0257 was dry, and the surface water body in the vicinity of 0258 was approximately 1 inch deep, and was disconnected from the main channel. Observation wells 0686 and 0687 will be sampled as part of the microbial sampling event the following week. Piezometers 0691, 0692, 0694, and 0695 also will be sampled during the microbial sampling event the following week.

**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 0693, 0696, and 0698. 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
2240	NA	Equipment Blank – GW Equip	DI Water	NDV-057
2241	0672	Duplicate	Ground Water	NDV-372
2242	0688	Duplicate from 31 ft bgs	Ground Water	NDV-056

**RIN Number Assigned:** All samples were assigned to RIN 05100239.

**Sample Shipment:** One half of the samples were shipped in one cooler overnight FEDEX to Paragon Analytics, Inc. from Moab, Utah, on October 20, 2005 (Airbill No. 8473 2967 6432). The remaining samples were shipped from Moab, Utah, on October 21, 2005 (Airbill No. 8527 5847 8550).

**Location Specific Information – Remediation Wells:** Remediation wells were sampled using dedicated submersible pumps with the pump intake set at a depth of approximately 40 ft bgs. The well field has been operating consistently since the last week of August 2005. Flow rates were decreased to ~ 23 gallons per minute (gpm) (for the entire well field) on October 17, 2005. Water levels and individual pumping rates for each well prior to sampling are provided in the table below.

Well No.	Date	Time	Water Level (ft btoc)	Pumping Rate (gpm)
0670	10/20/05	08:37	16.16	2.19
0671	10/20/05	08:50	16.60	2.10
0672	10/20/05	09:10	17.02	2.22
0673	10/20/05	09:28	17.00	2.32
0674	10/20/05	09:50	16.92	2.01
0675	10/20/05	10:03	16.85	2.68
0676	10/20/05	10:22	16.58	2.30
0677	10/20/05	10:32	16.57	2.07
0678	10/20/05	10:45	16.45	2.66
0679	10/20/05	10:56	16.38	2.19

**Location Specific Information – Observation Wells:** All observation wells were sampled using micro-purge techniques with a peristaltic pump and dedicated 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)
0688	10/20/05	11:23	15.66	31
0689	10/20/05	15:08	15.80	54

Field parameters (only) were measured from locations 0688 (39 ft bgs), and 0689 (46 ft bgs). These data are presented below with the sample depths (provided in feet below ground surface). 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)
0688	10/20/05	11:45	39	15.66	16.11	32,043	1.82	6.79	104	1.59
0689	10/20/05	15:45	46	15.80	18.35	94,501	0.51	6.74	160	2.23

**Location Specific Information – Piezometer Sampling:** Each piezometer was purged on October 18, and samples were collected starting on October 19. The table below presents the water level, stick up height, and depth to the river surface for the piezometers prior to the initial purge.

PZ No.	Date	Time	Depth to Water (ft btoc)	Stick Up Height (ft)	Depth to River Surface (ft btoc)
0693	10/18/05	16:20	3.97	3.16	Dry at base
0696	10/18/05	16:33	3.74	3.17	Dry at base
0697	10/18/05	16:35	2.62	2.17	Dry at base
0698	10/18/05	16:52	2.68	2.22	Dry at base

Limited sample volume was available for analysis from locations 0693, 0696, and 0698. Piezometer 0697 recharged immediately after the initial purge, and was sampled using standard micro purge procedures.

**Location Specific Information – Surface Water Sampling:** Location 0259 was sampled from a depth of approximately 8 inches below the water surface, with the intake set 3.5 ft off shore off the base of the piezometer 0696/0697/0698 cluster (photo attached).

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

**Equipment:** No problems to report.

**Site Issues:** According to the USGS Cisco Gaging Station (Station No. 09180500), the mean daily Colorado River Flows during the time period of this sampling event were:

Date	Daily Mean Flow (cfs)
10/17/2005	4,280
10/18/2005	4,200
10/19/2005	4,320
10/20/2005	4,630
10/21/2005	4,870
10/22/2005	4,810

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

(KGP/lcg)

- cc: J. D. Berwick, DOE-EM (e)  
D. R. Metzler, DOE-EM  
C. I. Bahrke, Stoller (e)  
L. E. Cummins, Stoller (e)  
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- L. M. Edwards, Stoller (e)
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- S. D. Lyon, Stoller (e)
- K. E. Miller, Stoller
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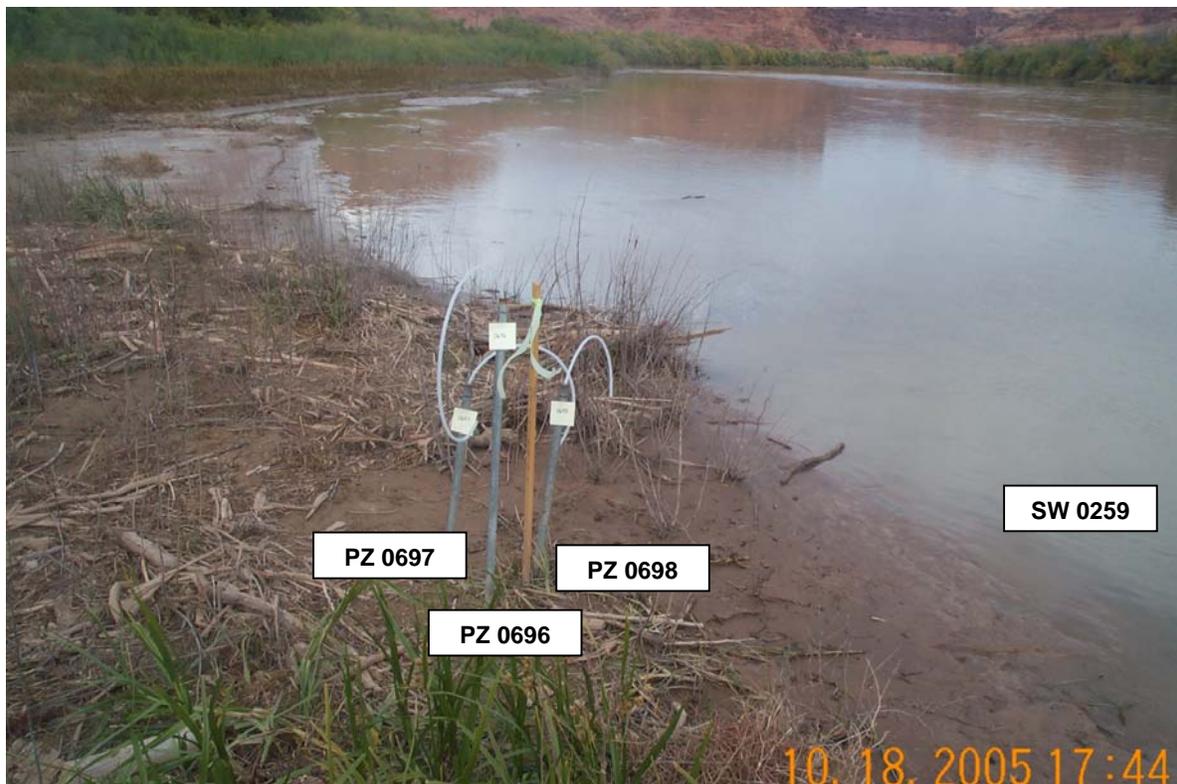
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Piezometer 0690



Piezometer 0693



Piezometers 0696, 0697, and 0698, and Surface Water Location 0259