

**November 2004 Water Sampling**

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

January 2005

# Moab, Utah

November 2 and 3, 2004

## 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>
	Field Activities Verification Checklist
	Laboratory Performance Assessment
	Field Analysis/Activities
	Certification

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

Water Quality Data  
Water Level Data

### **Attachment 2—Trip Report**

## **Sampling Event Summary**

**Site:** Moab, Utah

**Sampling Period:** November 2 and 3, 2004

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

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*. Groundwater samples were collected from 13 observation wells (0401, 0402, 0408, and 0580-0589), four piezometers (0590-0593), two river water locations (0236 and 0240), and the fresh injection water (0549). Including one duplicate and one equipment blank a total of 22 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.

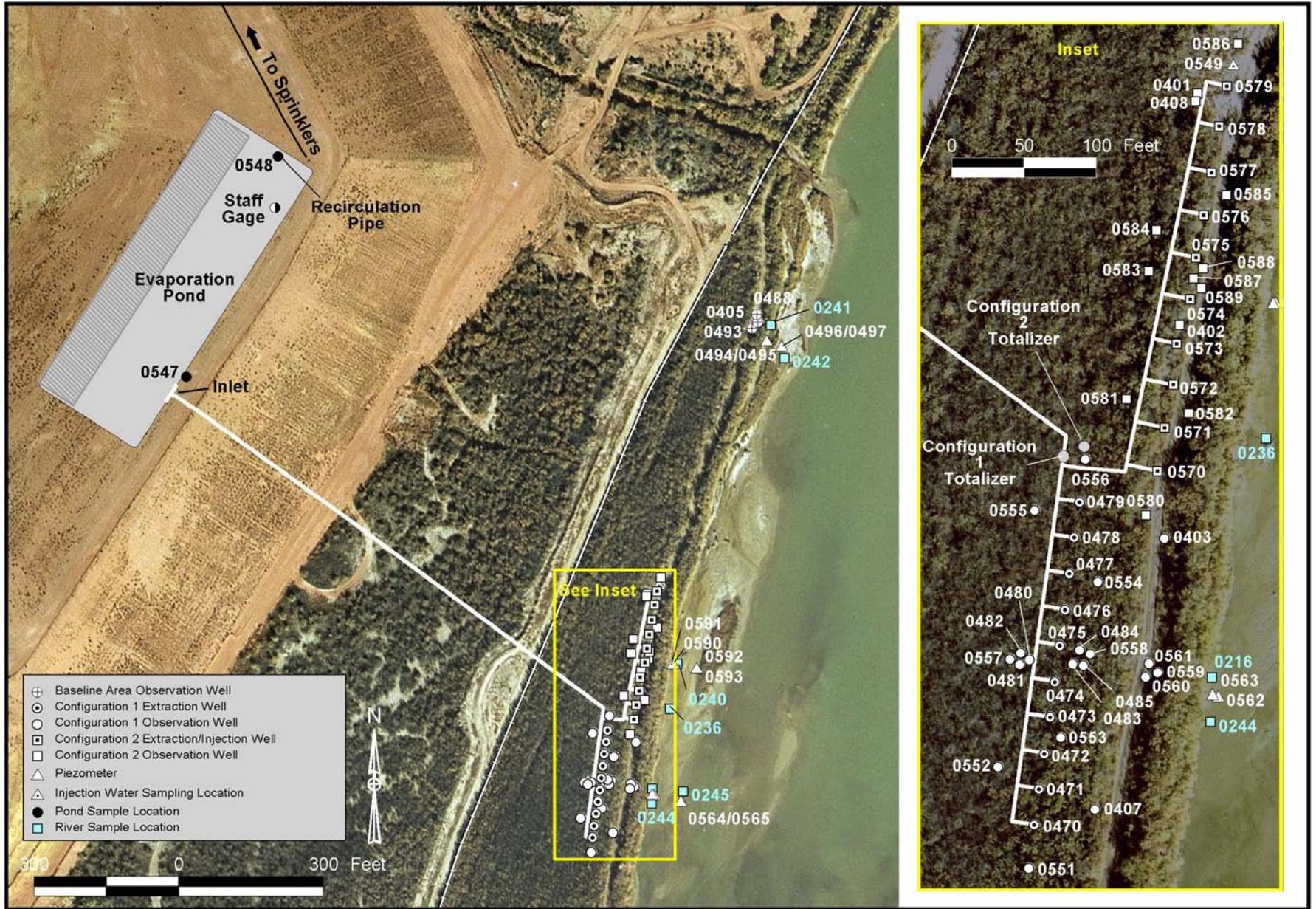


Kenneth E. Karp  
Site Lead

1-20-05

Date

# **Sample Location Map**



n:\moa\999\0005\01\004\00842\0084200.apr carverh 12/9/2004, 10:44

X0084200-01

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>Response (Yes, No, NA)</b>	<b>Comments</b>
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?	No	
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.: 04100129  
Sample Event: Water Sampling  
Site(s): Moab, Utah  
Laboratory: Paragon Analytics  
Work Order No.: 0411083  
Analysis: Metals and inorganics  
Validator: Jeff Price/Steve Donovan  
Review Date: 12/27/04

This validation was performed according to *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
Uranium, U	GJO-01	SW-846 3005A	SW-846 6020
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

### Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received twenty-two samples on November 5, 2004, 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 and that signatures and dates were present indicating sample relinquishment and receipt. The sample submittal documents including the Chain of Custody Form, the Sample Submittal Form, and the samples tickets had no errors or omissions.

### Preservation and Holding Times

The sample shipment was received intact with temperature within the cooler of 0.81 degrees centigrade (° C), which is in compliance with requirements. All samples had been preserved correctly for the requested analyses with the following exception. The bottle labels for the preserved and unpreserved bottles from locations 0402 and 0584 were switched based on the laboratory pH measurements. The laboratory corrected the labels and used the appropriate aliquots for the analyses. All samples were analyzed within the applicable holding times.

## Data Qualifier Summary

The uranium results are qualified as “J” or ”UJ” as listed in Table 2.

<b>Sample Number</b>	<b>Location</b>	<b>Analyte</b>	<b>Flag</b>	<b>Reason</b>
0411083-9	2629	U	UJ	Less than 5 times the blank
All except 0411083-9	All except 2577	U	J	No matrix specific QC

## Laboratory Instrument Calibration

All laboratory instrument calibrations were performed correctly in accordance with the cited methods.

Calibration for uranium was performed on November 10, 2004, using 4 calibration standards resulting in correlation coefficient ( $r^2$ ) values greater than 0.995. The absolute values of the intercepts were less than 3 times the method detection limit (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 9 CCVs. All calibration checks met the acceptance criteria. Reporting limit verification checks were made at the required frequency to verify linearity of the calibration curve near the practical quantitation limit. The reporting limit verification check results were within the acceptance criteria. The mass calibration and resolution was checked at the beginning of each analytical run in accordance with the procedure. Internal standard recoveries were stable and within acceptance ranges.

Calibrations were performed for chloride and sulfate using 5 calibration standards on November 17, 2004. The  $r^2$  values were greater than 0.995 and intercepts less than 3 times the MDL. Initial calibration and calibration check standards were prepared from independent sources. Continuing calibration checks (CCVs) were made at the correct frequency resulting in 4 CCVs; all initial and continuing calibration verifications were within the acceptance criteria.

The initial calibration for NH<sub>3</sub>-N was performed using 6 calibration standards on November 12, 2004, resulting in an  $r^2$  value greater than 0.995. Initial and continuing calibration checks were made at the required frequency resulting in 6 CCVs; all initial and continuing calibration verifications were within the acceptance criteria.

There is no initial or continuing calibration requirement associated with the determination of total dissolved solids.

## Method and Calibration Blanks

The uranium initial and continuing calibration blanks were below the practical quantitation limits. The chloride, sulfate, NH<sub>3</sub>-N, and TDS method blanks and initial and continuing calibration blanks were below the method detection limits.

## Inductively Coupled Plasma (ICP) Interference Check Sample (ICS) Analysis

ICP interference check samples ICSA and ICSAB were analyzed at the required frequency; all

results met the acceptance criteria.

#### Matrix Spike Analysis

A matrix spike was not performed during the uranium analysis. All uranium results greater than the method detection limit are qualified as "J" and sample 0411083-9 is qualified as "UJ." Matrix spike and matrix spike duplicate (MS/MSD) pairs were analyzed for NH<sub>3</sub>-N and sulfate with acceptable results.

#### Laboratory Replicate Analysis

The relative percent difference (RPD) values for the matrix spike duplicate and laboratory duplicate sample results for chloride, sulfate, NH<sub>3</sub>-N, and TDS were less than 20 percent.

#### Laboratory Control Sample

Laboratory control samples were analyzed at the correct frequency with acceptable results for all analysis categories.

#### Metals Serial Dilution

A serial dilution was not performed during the uranium analysis. All uranium results greater than 100 times the method detection limit were qualified as "J."

#### 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 whenever possible.

#### 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. The manual integrations performed were acceptable and all peak integrations were satisfactory.

#### Electronic Data Deliverable (EDD) File

An error free EDD file arrived on November 19, 2004.

## 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. Extraction wells are not sampled using the low-flow sampling method.

One duplicate sample was collected from well 0593. There are no established regulatory criteria for the evaluation of field duplicate samples; therefore, EPA guidance for *laboratory* duplicates (which is conservative for field duplicates) was used to assess the precision of the field duplicates. Duplicate results vary by less than the +/- 20 relative percent difference criteria and are considered acceptable. An equipment blank was collected and analyzed for the same constituents as the Moab environmental samples. Concentrations measured in the equipment blank were below their respective contract required detection limit; 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 (TALs) 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 U.S., Environmental Protection Agency 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 Donivan 1-19-05  
Steve Donivan Date

Field Activities Validation Lead: J.E. Price Jan 19, 05  
Jeff Price Date

**Attachment 1**  
**Data Presentation**

# **Water Quality Data**

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:				
				DATE	ID			LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity, Total (As CaCO3	mg/L	0236	SL, RIV	11/03/2004	0001	0.00 - 0.00	810			#	-	-
	mg/L	0240	SL, RIV	11/03/2004	0001	0.00 - 0.00	818			#	-	-
	mg/L	0401	WL	11/03/2004	0001	18.00 - 18.00	154	F		#	-	-
	mg/L	0402	WL	11/02/2004	0001	17.00 - 17.00	310	F		#	-	-
	mg/L	0408	WL	11/03/2004	0001	28.00 - 28.00	566	F		#	-	-
	mg/L	0549	IS, IHYD	11/03/2004	0001	0.00 - 0.00	184			#	-	-
	mg/L	0580	WL	11/02/2004	0001	18.00 - 18.00	435	F		#	-	-
	mg/L	0581	WL	11/02/2004	0001	18.00 - 18.00	670	F		#	-	-
	mg/L	0582	WL	11/02/2004	0001	18.00 - 18.00	562	F		#	-	-
	mg/L	0583	WL	11/02/2004	0001	18.00 - 18.00	820	F		#	-	-
	mg/L	0584	WL	11/02/2004	0001	18.00 - 18.00	840	F		#	-	-
	mg/L	0585	WL	11/03/2004	0001	18.00 - 18.00	210	F		#	-	-
	mg/L	0586	WL	11/03/2004	0001	18.00 - 18.00	200	F		#	-	-
	mg/L	0587	WL	11/02/2004	0001	18.00 - 18.00	354	F		#	-	-
	mg/L	0588	WL	11/03/2004	0001	26.00 - 26.00	190	F		#	-	-
	mg/L	0589	WL	11/03/2004	0001	44.00 - 44.00	312	F		#	-	-
	mg/L	0591	WL, PZ	11/03/2004	0001	4.22 - 4.22	1022	FQ		#	-	-
	mg/L	0593	WL, PZ	11/03/2004	0001	4.13 - 4.13	1020	F		#	-	-
Ammonia Total as N	mg/L	0236	SL, RIV	11/03/2004	0001	0.00 - 0.00	310			#	50	-
	mg/L	0240	SL, RIV	11/03/2004	0001	0.00 - 0.00	320			#	50	-
	mg/L	0401	WL	11/03/2004	0001	18.00 - 18.00	77	F		#	2	-
	mg/L	0402	WL	11/02/2004	0001	17.00 - 17.00	90	F		#	5	-
	mg/L	0408	WL	11/03/2004	0001	28.00 - 28.00	440	F		#	50	-
	mg/L	0549	IS, IHYD	11/03/2004	0001	0.00 - 0.00	0.1	U		#	0.1	-
	mg/L	0580	WL	11/02/2004	0001	18.00 - 18.00	130	F		#	10	-
	mg/L	0581	WL	11/02/2004	0001	18.00 - 18.00	360	F		#	50	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as N	mg/L	0582	WL	11/02/2004	0001	18.00 - 18.00	360	F #	50	-
	mg/L	0583	WL	11/02/2004	0001	18.00 - 18.00	530	F #	50	-
	mg/L	0584	WL	11/02/2004	0001	18.00 - 18.00	480	F #	50	-
	mg/L	0585	WL	11/03/2004	0001	18.00 - 18.00	44	F #	2	-
	mg/L	0586	WL	11/03/2004	0001	18.00 - 18.00	50	F #	2	-
	mg/L	0587	WL	11/02/2004	0001	18.00 - 18.00	67	F #	5	-
	mg/L	0588	WL	11/03/2004	0001	26.00 - 26.00	28	F #	1	-
	mg/L	0589	WL	11/03/2004	0001	44.00 - 44.00	410	F #	50	-
	mg/L	0590	WL, PZ	11/03/2004	0001	1.08 - 1.08	330	FQ #	50	-
	mg/L	0591	WL, PZ	11/03/2004	0001	4.22 - 4.22	1000	FQ #	50	-
	mg/L	0592	WL, PZ	11/03/2004	0001	2.10 - 2.10	630	FQ #	50	-
	mg/L	0593	WL, PZ	11/03/2004	0001	4.13 - 4.13	790	F #	50	-
	mg/L	0593	WL, PZ	11/03/2004	0002	4.13 - 4.13	760	F #	50	-
	Chloride	mg/L	0236	SL, RIV	11/03/2004	0001	0.00 - 0.00	2300	#	40
mg/L		0240	SL, RIV	11/03/2004	0001	0.00 - 0.00	2500	#	40	-
mg/L		0401	WL	11/03/2004	0001	18.00 - 18.00	100	F #	4	-
mg/L		0402	WL	11/02/2004	0001	17.00 - 17.00	410	F #	10	-
mg/L		0408	WL	11/03/2004	0001	28.00 - 28.00	770	F #	40	-
mg/L		0549	IS, IHYD	11/03/2004	0001	0.00 - 0.00	89	#	4	-
mg/L		0580	WL	11/02/2004	0001	18.00 - 18.00	1400	F #	40	-
mg/L		0581	WL	11/02/2004	0001	18.00 - 18.00	1900	F #	40	-
mg/L		0582	WL	11/02/2004	0001	18.00 - 18.00	1700	F #	40	-
mg/L		0583	WL	11/02/2004	0001	18.00 - 18.00	1400	F #	40	-
mg/L		0584	WL	11/02/2004	0001	18.00 - 18.00	1600	F #	40	-
mg/L		0585	WL	11/03/2004	0001	18.00 - 18.00	140	F #	4	-
mg/L		0586	WL	11/03/2004	0001	18.00 - 18.00	120	F #	4	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			UN-CERTAINTY
				DATE	ID			LAB	DATA	QA	
Chloride	mg/L	0587	WL	11/02/2004	0001	18.00 - 18.00	370	F	#	10	-
	mg/L	0588	WL	11/03/2004	0001	26.00 - 26.00	120	F	#	4	-
	mg/L	0589	WL	11/03/2004	0001	44.00 - 44.00	7600	F	#	100	-
	mg/L	0591	WL, PZ	11/03/2004	0001	4.22 - 4.22	3100	FQ	#	100	-
	mg/L	0593	WL, PZ	11/03/2004	0001	4.13 - 4.13	2800	F	#	40	-
	mg/L	0593	WL, PZ	11/03/2004	0002	4.13 - 4.13	2800	F	#	40	-
Oxidation Reduction Potent	mV	0236	SL, RIV	11/03/2004	N001	0.00 - 0.00	55		#	-	-
	mV	0240	SL, RIV	11/03/2004	N001	0.00 - 0.00	82		#	-	-
	mV	0401	WL	11/03/2004	N001	18.00 - 18.00	45	F	#	-	-
	mV	0402	WL	11/02/2004	N001	17.00 - 17.00	113	F	#	-	-
	mV	0408	WL	11/03/2004	N001	28.00 - 28.00	87	F	#	-	-
	mV	0549	IS, IHYD	11/03/2004	N001	0.00 - 0.00	195		#	-	-
	mV	0580	WL	11/02/2004	N001	18.00 - 18.00	158	F	#	-	-
	mV	0581	WL	11/02/2004	N001	18.00 - 18.00	112	F	#	-	-
	mV	0582	WL	11/02/2004	N001	18.00 - 18.00	135	F	#	-	-
	mV	0583	WL	11/02/2004	N001	18.00 - 18.00	121	F	#	-	-
	mV	0584	WL	11/02/2004	N001	18.00 - 18.00	131	F	#	-	-
	mV	0585	WL	11/03/2004	N001	18.00 - 18.00	61	F	#	-	-
	mV	0586	WL	11/03/2004	N001	18.00 - 18.00	54	F	#	-	-
	mV	0587	WL	11/02/2004	N001	18.00 - 18.00	111	F	#	-	-
	mV	0588	WL	11/03/2004	N001	26.00 - 26.00	56	F	#	-	-
	mV	0589	WL	11/03/2004	N001	44.00 - 44.00	89	F	#	-	-
	mV	0590	WL, PZ	11/03/2004	N001	1.08 - 1.08	107	FQ	#	-	-
	mV	0591	WL, PZ	11/03/2004	N001	4.22 - 4.22	-33	FQ	#	-	-
	mV	0592	WL, PZ	11/03/2004	N001	2.10 - 2.10	-25	FQ	#	-	-
	mV	0593	WL, PZ	11/03/2004	N001	4.13 - 4.13	-39	F	#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			UN-CERTAINTY	
				DATE	ID			LAB	DATA	QA		DETECTION LIMIT
pH	s.u.	0236	SL, RIV	11/03/2004	N001	0.00 - 0.00	7.87			#	-	-
	s.u.	0240	SL, RIV	11/03/2004	N001	0.00 - 0.00	7.73			#	-	-
	s.u.	0401	WL	11/03/2004	N001	18.00 - 18.00	8.28	F		#	-	-
	s.u.	0402	WL	11/02/2004	N001	17.00 - 17.00	7.26	F		#	-	-
	s.u.	0408	WL	11/03/2004	N001	28.00 - 28.00	7.26	F		#	-	-
	s.u.	0549	IS, IHYD	11/03/2004	N001	0.00 - 0.00	7.57			#	-	-
	s.u.	0580	WL	11/02/2004	N001	18.00 - 18.00	7.07	F		#	-	-
	s.u.	0581	WL	11/02/2004	N001	18.00 - 18.00	7.10	F		#	-	-
	s.u.	0582	WL	11/02/2004	N001	18.00 - 18.00	7.23	F		#	-	-
	s.u.	0583	WL	11/02/2004	N001	18.00 - 18.00	7.17	F		#	-	-
	s.u.	0584	WL	11/02/2004	N001	18.00 - 18.00	7.01	F		#	-	-
	s.u.	0585	WL	11/03/2004	N001	18.00 - 18.00	7.83	F		#	-	-
	s.u.	0586	WL	11/03/2004	N001	18.00 - 18.00	7.94	F		#	-	-
	s.u.	0587	WL	11/02/2004	N001	18.00 - 18.00	7.28	F		#	-	-
	s.u.	0588	WL	11/03/2004	N001	26.00 - 26.00	7.99	F		#	-	-
	s.u.	0589	WL	11/03/2004	N001	44.00 - 44.00	7.54	F		#	-	-
	s.u.	0590	WL, PZ	11/03/2004	N001	1.08 - 1.08	8.89	FQ		#	-	-
	s.u.	0591	WL, PZ	11/03/2004	N001	4.22 - 4.22	8.05	FQ		#	-	-
	s.u.	0592	WL, PZ	11/03/2004	N001	2.10 - 2.10	7.72	FQ		#	-	-
	s.u.	0593	WL, PZ	11/03/2004	N001	4.13 - 4.13	7.29	F		#	-	-
Specific Conductance	umhos/cm	0236	SL, RIV	11/03/2004	N001	0.00 - 0.00	19325			#	-	-
	umhos/cm	0240	SL, RIV	11/03/2004	N001	0.00 - 0.00	19951			#	-	-
	umhos/cm	0401	WL	11/03/2004	N001	18.00 - 18.00	1686	F		#	-	-
	umhos/cm	0402	WL	11/02/2004	N001	17.00 - 17.00	4812	F		#	-	-
	umhos/cm	0408	WL	11/03/2004	N001	28.00 - 28.00	11710	F		#	-	-
	umhos/cm	0549	IS, IHYD	11/03/2004	N001	0.00 - 0.00	1208			#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Specific Conductance	umhos/cm	0580	WL	11/02/2004	N001	18.00 - 18.00	12451	F #	-	-
	umhos/cm	0581	WL	11/02/2004	N001	18.00 - 18.00	14545	F #	-	-
	umhos/cm	0582	WL	11/02/2004	N001	18.00 - 18.00	14360	F #	-	-
	umhos/cm	0583	WL	11/02/2004	N001	18.00 - 18.00	15155	F #	-	-
	umhos/cm	0584	WL	11/02/2004	N001	18.00 - 18.00	16906	F #	-	-
	umhos/cm	0585	WL	11/03/2004	N001	18.00 - 18.00	1942	F #	-	-
	umhos/cm	0586	WL	11/03/2004	N001	18.00 - 18.00	1769	F #	-	-
	umhos/cm	0587	WL	11/02/2004	N001	18.00 - 18.00	5330	F #	-	-
	umhos/cm	0588	WL	11/03/2004	N001	26.00 - 26.00	1518	F #	-	-
	umhos/cm	0589	WL	11/03/2004	N001	44.00 - 44.00	27082	F #	-	-
	umhos/cm	0590	WL, PZ	11/03/2004	N001	1.08 - 1.08	20520	FQ #	-	-
	umhos/cm	0591	WL, PZ	11/03/2004	N001	4.22 - 4.22	26602	FQ #	-	-
	umhos/cm	0592	WL, PZ	11/03/2004	N001	2.10 - 2.10	17380	FQ #	-	-
	umhos/cm	0593	WL, PZ	11/03/2004	N001	4.13 - 4.13	23497	F #	-	-
Sulfate	mg/L	0236	SL, RIV	11/03/2004	0001	0.00 - 0.00	8100	#	100	-
	mg/L	0240	SL, RIV	11/03/2004	0001	0.00 - 0.00	8500	#	100	-
	mg/L	0401	WL	11/03/2004	0001	18.00 - 18.00	400	F #	10	-
	mg/L	0402	WL	11/02/2004	0001	17.00 - 17.00	1600	F #	25	-
	mg/L	0408	WL	11/03/2004	0001	28.00 - 28.00	5600	F #	100	-
	mg/L	0549	IS, IHYD	11/03/2004	0001	0.00 - 0.00	310	#	10	-
	mg/L	0580	WL	11/02/2004	0001	18.00 - 18.00	4400	F #	100	-
	mg/L	0581	WL	11/02/2004	0001	18.00 - 18.00	4700	F #	100	-
	mg/L	0582	WL	11/02/2004	0001	18.00 - 18.00	3800	F #	100	-
	mg/L	0583	WL	11/02/2004	0001	18.00 - 18.00	5800	F #	100	-
	mg/L	0584	WL	11/02/2004	0001	18.00 - 18.00	6400	F #	100	-
	mg/L	0585	WL	11/03/2004	0001	18.00 - 18.00	560	F #	10	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			UN-CERTAINTY
				DATE	ID			LAB	DATA	QA	
Sulfate	mg/L	0586	WL	11/03/2004	0001	18.00 - 18.00	460	F	#	10	-
	mg/L	0587	WL	11/02/2004	0001	18.00 - 18.00	1600	F	#	25	-
	mg/L	0588	WL	11/03/2004	0001	26.00 - 26.00	400	F	#	10	-
	mg/L	0589	WL	11/03/2004	0001	44.00 - 44.00	5500	F	#	250	-
	mg/L	0591	WL, PZ	11/03/2004	0001	4.22 - 4.22	12000	FQ	#	250	-
	mg/L	0593	WL, PZ	11/03/2004	0001	4.13 - 4.13	11000	F	#	100	-
	mg/L	0593	WL, PZ	11/03/2004	0002	4.13 - 4.13	11000	F	#	100	-
Temperature	C	0236	SL, RIV	11/03/2004	N001	0.00 - 0.00	12.63		#	-	-
	C	0240	SL, RIV	11/03/2004	N001	0.00 - 0.00	9.99		#	-	-
	C	0401	WL	11/03/2004	N001	18.00 - 18.00	15.91	F	#	-	-
	C	0402	WL	11/02/2004	N001	17.00 - 17.00	15.36	F	#	-	-
	C	0408	WL	11/03/2004	N001	28.00 - 28.00	16.11	F	#	-	-
	C	0549	IS, IHYD	11/03/2004	N001	0.00 - 0.00	8.46		#	-	-
	C	0580	WL	11/02/2004	N001	18.00 - 18.00	17.05	F	#	-	-
	C	0581	WL	11/02/2004	N001	18.00 - 18.00	15.78	F	#	-	-
	C	0582	WL	11/02/2004	N001	18.00 - 18.00	16.17	F	#	-	-
	C	0583	WL	11/02/2004	N001	18.00 - 18.00	15.60	F	#	-	-
	C	0584	WL	11/02/2004	N001	18.00 - 18.00	15.62	F	#	-	-
	C	0585	WL	11/03/2004	N001	18.00 - 18.00	14.78	F	#	-	-
	C	0586	WL	11/03/2004	N001	18.00 - 18.00	15.97	F	#	-	-
	C	0587	WL	11/02/2004	N001	18.00 - 18.00	15.54	F	#	-	-
	C	0588	WL	11/03/2004	N001	26.00 - 26.00	15.03	F	#	-	-
	C	0589	WL	11/03/2004	N001	44.00 - 44.00	15.20	F	#	-	-
	C	0590	WL, PZ	11/03/2004	N001	1.08 - 1.08	13.10	FQ	#	-	-
	C	0591	WL, PZ	11/03/2004	N001	4.22 - 4.22	13.29	FQ	#	-	-
	C	0592	WL, PZ	11/03/2004	N001	2.10 - 2.10	9.93	FQ	#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Temperature	C	0593	WL, PZ	11/03/2004	N001	4.13 - 4.13	13.59	F #	-	-
Total Dissolved Solids	mg/L	0236	SL, RIV	11/03/2004	0001	0.00 - 0.00	17000	#	400	-
	mg/L	0240	SL, RIV	11/03/2004	0001	0.00 - 0.00	17000	#	400	-
	mg/L	0401	WL	11/03/2004	0001	18.00 - 18.00	760	F #	40	-
	mg/L	0402	WL	11/02/2004	0001	17.00 - 17.00	3100	F #	80	-
	mg/L	0408	WL	11/03/2004	0001	28.00 - 28.00	9200	F #	200	-
	mg/L	0549	IS, IHYD	11/03/2004	0001	0.00 - 0.00	810	#	20	-
	mg/L	0580	WL	11/02/2004	0001	18.00 - 18.00	9700	F #	200	-
	mg/L	0581	WL	11/02/2004	0001	18.00 - 18.00	9800	F #	200	-
	mg/L	0582	WL	11/02/2004	0001	18.00 - 18.00	8000	F #	200	-
	mg/L	0583	WL	11/02/2004	0001	18.00 - 18.00	11000	F #	400	-
	mg/L	0584	WL	11/02/2004	0001	18.00 - 18.00	12000	F #	400	-
	mg/L	0585	WL	11/03/2004	0001	18.00 - 18.00	1100	F #	40	-
	mg/L	0586	WL	11/03/2004	0001	18.00 - 18.00	970	F #	40	-
	mg/L	0587	WL	11/02/2004	0001	18.00 - 18.00	3600	F #	80	-
	mg/L	0588	WL	11/03/2004	0001	26.00 - 26.00	920	F #	40	-
	mg/L	0589	WL	11/03/2004	0001	44.00 - 44.00	19000	F #	400	-
	mg/L	0590	WL, PZ	11/03/2004	0001	1.08 - 1.08	9800	FQ #	400	-
	mg/L	0591	WL, PZ	11/03/2004	0001	4.22 - 4.22	22000	FQ #	400	-
	mg/L	0592	WL, PZ	11/03/2004	0001	2.10 - 2.10	16000	FQ #	400	-
	mg/L	0593	WL, PZ	11/03/2004	0001	4.13 - 4.13	20000	F #	400	-
	mg/L	0593	WL, PZ	11/03/2004	0002	4.13 - 4.13	19000	F #	400	-
Turbidity	NTU	0236	SL, RIV	11/03/2004	N001	0.00 - 0.00	35.7	#	-	-
	NTU	0240	SL, RIV	11/03/2004	N001	0.00 - 0.00	63.5	#	-	-
	NTU	0401	WL	11/03/2004	N001	18.00 - 18.00	7.57	F #	-	-
	NTU	0402	WL	11/02/2004	N001	17.00 - 17.00	9.91	F #	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	SAMPLE: ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0408	WL	11/03/2004	N001	28.00 - 28.00	17.6	F #	-	-
	NTU	0549	IS, IHYD	11/03/2004	N001	0.00 - 0.00	74.7	#	-	-
	NTU	0580	WL	11/02/2004	N001	18.00 - 18.00	9.78	F #	-	-
	NTU	0581	WL	11/02/2004	N001	18.00 - 18.00	6.08	F #	-	-
	NTU	0582	WL	11/02/2004	N001	18.00 - 18.00	7.70	F #	-	-
	NTU	0583	WL	11/02/2004	N001	18.00 - 18.00	31.0	F #	-	-
	NTU	0584	WL	11/02/2004	N001	18.00 - 18.00	17.8	F #	-	-
	NTU	0585	WL	11/03/2004	N001	18.00 - 18.00	1.46	F #	-	-
	NTU	0586	WL	11/03/2004	N001	18.00 - 18.00	2.44	F #	-	-
	NTU	0587	WL	11/02/2004	N001	18.00 - 18.00	8.14	F #	-	-
	NTU	0588	WL	11/03/2004	N001	26.00 - 26.00	0.81	F #	-	-
	NTU	0589	WL	11/03/2004	N001	44.00 - 44.00	1.21	F #	-	-
	NTU	0590	WL, PZ	11/03/2004	N001	1.08 - 1.08	353	FQ #	-	-
	NTU	0591	WL, PZ	11/03/2004	N001	4.22 - 4.22	63.5	FQ #	-	-
	NTU	0592	WL, PZ	11/03/2004	N001	2.10 - 2.10	360	FQ #	-	-
	NTU	0593	WL, PZ	11/03/2004	N001	4.13 - 4.13	7.51	F #	-	-
Uranium	mg/L	0236	SL, RIV	11/03/2004	0001	0.00 - 0.00	2.600	J #	0.00083	-
	mg/L	0240	SL, RIV	11/03/2004	0001	0.00 - 0.00	2.700	J #	0.00083	-
	mg/L	0401	WL	11/03/2004	0001	18.00 - 18.00	0.130	JF #	8.3E-05	-
	mg/L	0402	WL	11/02/2004	0001	17.00 - 17.00	0.380	JF #	0.00083	-
	mg/L	0408	WL	11/03/2004	0001	28.00 - 28.00	1.000	JF #	0.00083	-
	mg/L	0549	IS, IHYD	11/03/2004	0001	0.00 - 0.00	0.0071	J #	8.3E-06	-
	mg/L	0580	WL	11/02/2004	0001	18.00 - 18.00	1.200	JF #	0.00083	-
	mg/L	0581	WL	11/02/2004	0001	18.00 - 18.00	1.500	JF #	0.00083	-
	mg/L	0582	WL	11/02/2004	0001	18.00 - 18.00	1.100	JF #	0.00083	-
	mg/L	0583	WL	11/02/2004	0001	18.00 - 18.00	1.800	JF #	0.00083	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			UN-CERTAINTY
				DATE	ID			LAB	DATA	QA	
Uranium	mg/L	0584	WL	11/02/2004	0001	18.00 - 18.00	2.000	JF	#	0.00083	-
	mg/L	0585	WL	11/03/2004	0001	18.00 - 18.00	0.130	JF	#	8.3E-05	-
	mg/L	0586	WL	11/03/2004	0001	18.00 - 18.00	0.130	JF	#	8.3E-05	-
	mg/L	0587	WL	11/02/2004	0001	18.00 - 18.00	0.550	JF	#	0.00083	-
	mg/L	0588	WL	11/03/2004	0001	26.00 - 26.00	0.026	JF	#	8.3E-05	-
	mg/L	0589	WL	11/03/2004	0001	44.00 - 44.00	0.620	JF	#	0.00083	-
	mg/L	0590	WL, PZ	11/03/2004	0001	1.08 - 1.08	0.110	JFQ	#	0.00083	-
	mg/L	0591	WL, PZ	11/03/2004	0001	4.22 - 4.22	2.500	JFQ	#	0.00083	-
	mg/L	0592	WL, PZ	11/03/2004	0001	2.10 - 2.10	1.000	JFQ	#	0.00083	-
	mg/L	0593	WL, PZ	11/03/2004	0001	4.13 - 4.13	2.800	JF	#	0.00083	-
	mg/L	0593	WL, PZ	11/03/2004	0002	4.13 - 4.13	2.900	JF	#	0.00083	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site  
 REPORT DATE: 1/19/2005 11:13 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
-----------	-------	-------------	-------------------	-----------------	----------------------	--------	-------------------------	-----------------	--------------

RECORDS: SELECTED FROM USEE200 WHERE site\_code='MOA01' 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 #11/2/2004# and #11/3/2004#

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: 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: 1/19/2005 11:13 am

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	11/03/2004	12:44	15.70	3953.90	
0402	O	3968.63	11/02/2004	16:15	15.30	3953.33	
0406	O	3969.91	11/02/2004	08:05	15.92	3953.99	
0408	O	3969.17	11/03/2004	13:11	16.14	3953.03	
0580		3969.32	11/02/2004	14:22	17.00	3952.32	
0581		3969.02	11/02/2004	15:28	16.03	3952.99	
0582		3969.65	11/02/2004	15:03	16.47	3953.18	
0583		3969.64	11/02/2004	16:55	16.19	3953.45	
0584		3969.13	11/02/2004	17:15	15.48	3953.65	
0585		3969.36	11/03/2004	12:13	15.41	3953.95	
0586		3969.20	11/03/2004	13:46	15.05	3954.15	
0587		3968.89	11/02/2004	16:35	15.40	3953.49	
0588		3969.04	11/03/2004	14:14	14.85	3954.19	
0589		3968.87	11/03/2004	14:39	15.12	3953.75	
0590		3956.70	11/03/2004	09:37	3.51	3953.19	
0591		3953.99	11/03/2004	09:42	1.00	3952.99	
0592		3956.36	11/03/2004	10:48	3.50	3952.86	
0593		3954.90	11/03/2004	10:52	1.71	3953.19	

RECORDS: SELECTED FROM USEE700 WHERE site\_code='MOA01' AND LOG\_DATE between #11/2/2004# and #11/3/2004#

FLOW CODES: O ON-SITE

WATER LEVEL FLAGS:

**Attachment 2**  
**Trip Report**

DATE: January 18, 2005

TO: Ken Karp

FROM: Ken G. Pill

SUBJECT: Trip Report

**Site:** Moab – I.A. Configuration II Injection Test Sampling – REVISED

**Date of Sampling Event:** November 2 and 3, 2004.

**Team Members:** K. Pill, S. Hall

**Number of Locations Sampled:** Thirteen CF II observation wells (0401, 0402, 0408, and 0580 through 0589), four piezometers (0590 through 0593), two surface water locations (0236 and 0240), and the fresh injection water (0549) were sampled as part of this CF II injection test sampling effort. Including one duplicate and one equipment blank, a total of **22** samples were submitted under this RIN number.

**Location in Which Field Parameters Were Measured Only:** Prior to the actual sampling on 11/3/04 field parameters were measured on 11/2/04 at various locations in the vicinity of 0236, 0240, piezometers 0590/0591, 0592/0593, and the main channel of the Colorado River. Samples associated with these readings were not collected for laboratory analysis.

**Locations Not Sampled/Reason:** None.

**RIN Number Assigned:** All samples were assigned to RIN **04100129**.

**Field Variance:** Only a 125 ml sample was collected for uranium analysis as opposed to the standard 500 ml sample volume.

Limited sample volumes were collected from PZ locations 0590 and 0592 (~100 mls and ~120 mls, respectively) due to slow recharge. Minimum sample volumes for required analyses were discussed with S. Donovan, and for both locations the sample was split into 3 containers for TDS, uranium, and ammonia analysis.

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

False Id	True Id	Sample Type	Associated Matrix	Ticket Number
2629	NA	Equipment Blank	Water	NDX-209
2630	0593	Duplicate	Groundwater	NDX-211

**Sample Shipment:** Samples were shipped in one cooler overnight FEDEX to Paragon Analytics, Inc. from GJO on November 4, 2004, Airbill No. 8473 2967 62159.

**Location Specific Information - Observation Well Sampling:** Each observation well associated with the CF II well field was sampled using the micro-purge technique with a peristaltic pump and downhole tubing. The table below provides the water level data and sample depth for each location. Note all sample depths are below ground surface:

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0401	11/3/04	12:44	15.70	18
0402	11/2/04	16:15	15.30	17
0408	11/3/04	13:11	16.14	28
0580	11/2/04	14:22	17.00	18
0581	11/2/04	15:28	16.03	18
0582	11/2/04	15:03	16.47	18
0583	11/2/04	16:55	16.19	18
0584	11/2/04	17:15	15.48	18
0585	11/3/04	12:13	15.41	18
0586	11/3/04	13:46	15.05	18
0587	11/2/04	16:35	15.40	18
0588	11/3/04	14:14	14.85	26
0589	11/3/04	14:39	15.12	44

**Location Specific Information - Piezometer Sampling:** CF II piezometers 0590 through 0593 were sampled on November 3, 2004. The depth to water data are provided in the table below:

PZ No.	Date	Time	Depth to Water (ft btoc)
0590	11/3/04	09:37	3.51
0591	11/3/04	09:42	1.00
0592	11/3/04	10:48	3.50
0593	11/3/04	10:52	1.71

The surface water just came up to the base of piezometers 0590 and 0591. A photo of this area is attached to this report. Only a limited volume of water recharged piezometers 0590 and 0592 after the initial purge. As a result, only a small volume of water was collected from these locations for analysis (~100 and ~120 mls, respectively). This volume was divided into 3 bottles and submitted for TDS, ammonia, and uranium analysis only.

**Location Specific Information - Surface Water Sampling:** Colorado River samples were collected from surface water location 0236 (located 96 ft to the south of PZ 0591) and 0240 (just off piezometers 0590 and 0591). This sampling event marks the first time location 0240 was sampled. Photos of surface water locations are attached to this report. Sample depths are provided below:

PZ No.	Date	Time	Sample Depth (ft bws)
0236	11/3/04	11:20	0.5
0240	11/3/04	10:00	0.3

Note: ft bws = feet below water surface

Prior to the sampling on 11/3/04, field parameters were measured on 11/2/04 at various locations in the vicinity of 0236, 0240, piezometers 0590/0591, 0592/0593, and the main channel of the Colorado River. These parameters were measured by placing the YSI directly into the surface water (i.e., the water was not run through a flow cell), at a depth of approximately 0.25 ft. These field parameters are listed below:

Location	Date	Time	Field Parameters			
			Temp (°C)	Spec Cond (µS/cm)	pH	ORP
0236	11/2/04	13:37	15.11	14,375	7.97	149
0240	11/2/04	13:41	17.87	18,790	7.88	137
Near the Base of 0592/0593	11/2/04	13:44	15.85	15,650	7.99	109
~100 ft upstream from 0590/0591	11/2/04	13:53	17.42	20,475	8.01	116
Main channel, ~150 ft east of well 0578	11/2/04	13:56	11.44	1,241	8.22	72

**Well Inspection Summary:** No inspection was completed.

**Site Issues:** According to the USGS Cisco Gaging Station (Station No. 09180500), the mean daily Colorado River Flows associated with this sampling effort are:

Date	Mean Daily Flow (cfs)
11/1/04	3,810
11/2/04	3,700
11/3/04	3,600
11/4/04	3,440

**Corrective Action Required/Taken:** None

(KGP/lcg)

cc: J. D. Berwick, DOE-EM (e) S. D. Lyon, Stoller (e)  
 D. R. Metzler, DOE-EM K. E. Miller, Stoller  
 C. I. Bahrke, Stoller (e) K. G. Pill, Stoller (e)  
 L. E. Cummins, Stoller (e) J. E. Price, Stoller (e)  
 S. E. Donivan, Stoller (e) L. M. Wright, Stoller (e)  
 L. M. Edwards, Stoller (e) Working File, MOA



Piezometers 0590, 0591, 0592, and 0593



Surface Water Location 0236



Sampling Surface Water Location 0236



Sampling Surface Water Location 0240