



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

October 2005



**U.S. Department
of Energy**

Office of Environmental Management

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for
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Injection Test Sampling
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Data Package Contents

This data package includes the following information:

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

Attachment 1—Data Presentation

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

Attachment 2—Trip Report

Sampling Event Summary

Site: Moab, Utah

Sampling Period: June 22-24, 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 ninth round of sampling of the injection system since the baseline samples were collected just prior to starting injection on October 6, 2004.

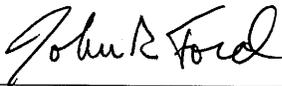
According to the USGS Cisco Gaging Station, the mean daily Colorado River flows during the time period of this sampling event were between 18,500 and 19,800 cubic feet per second. These values are approximately one-half the peak flow which occurred during the previous month's sampling event.

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 12 Configuration 2 observation wells (0401, 0402, 0408, 0580, 0581, 0582, 0583, 0584, 0585, 0586, 0588 (34 feet below ground surface [bgs]) and 0589 (44 feet bgs), and one injection water sample (0550). Including one duplicate and one equipment blank, a total of 15 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.

The one anomalous low data point from location 0584 can be attributed to the injection of fresh water in the Configuration 2 well field in combination with the higher stage of the Colorado River.

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.

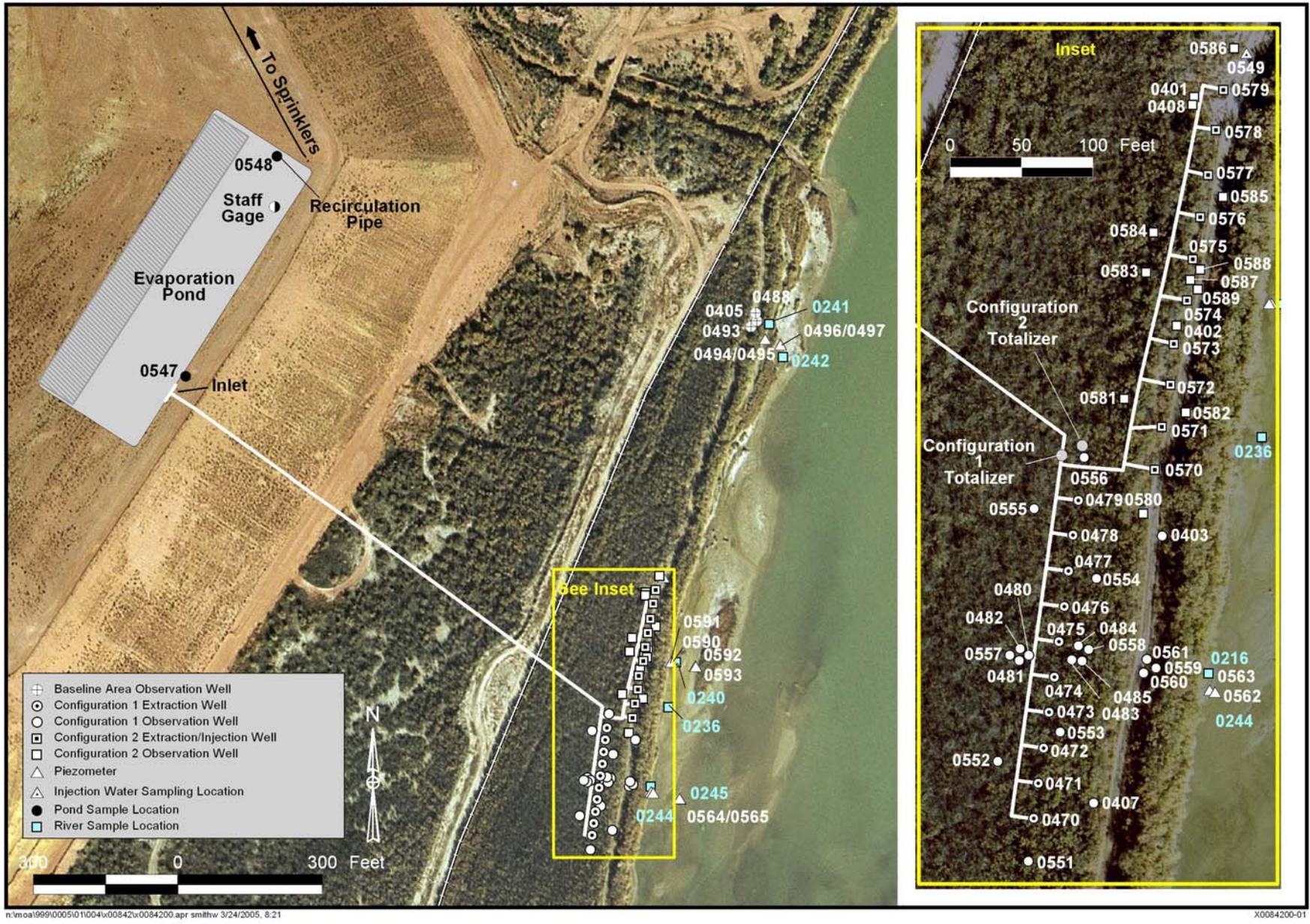


John R. Ford
Ground Water Manager

10-10-2005

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

Project	<u>Moab, Utah</u>	Date(s) of Water Sampling	<u>June 22-24, 2005</u>
Date(s) of Verification	<u>August 31, 2005</u>	Name of Verifier	<u>Jeff Price</u>

	Response (Yes, No, NA)	Comments
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>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? Did the water level stabilize prior to sampling? Did pH, specific conductance, and turbidity measurements stabilize prior to sampling? Was the flow rate less than 500 mL/min? If a portable pump was used, was there a 4 hour delay between pump installation and sampling?	<u>Yes</u> <u>Yes</u> <u>Yes</u> <u>Yes</u> <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.: 05060205
Sample Event: June 22-24, 2005
Site(s): Moab, Utah
Laboratory: Paragon Analytics
Work Order No.: 0506228
Analysis: Metals and Inorganics
Validator: Steve Donovan
Review Date: August 26, 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. The samples were analyzed concurrently with those from RIN 05060204. The sample matrix for all samples is equivalent allowing the use common quality assurance samples.

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 ₄	MIS-A-044	SW-846 9056	SW-846 9056
Ammonia as N, NH ₃ -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

The uranium result for sample 0506228-13 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 blank result.

Table 2. Data Qualifiers

Sample Number	Location	Analyte	Flag	Reason
0506228-13	2787(Equip. Blank)	U	U	Less than 5 times the calibration blank

Sample Shipping/Receiving

Paragon Analytics in Fort Collins, Colorado, received 15 samples on June 25, 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, the sample submittal 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 3.6 °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

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

Method SW-846 6020

Calibration for uranium was performed on July 14, 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 eight 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 June 6, 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 twelve CCVs. The calibration checks met the acceptance criteria with the exception of CCV6 and CCV8. The samples associated with these CCVs were re-analyzed with acceptable calibration checks.

Method MCAWW 350.1

The initial calibration for ammonia as N was performed using six calibration standards on July 11, 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 nine CCVs. All calibration check results were within the acceptance criteria.

Method MCAWW 160.1

There are no initial or continuing 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 0506228-13 was less than 5 times the concentration of the associated continuing 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 twenty 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 July 22, 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 0585. 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 Donivan 10-10-05
Steve Donivan Date

Field Activities Validation Lead: J. E. Price 10/10/05
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.

The one anomalous low data point from location 0584 can be attributed to the injection of fresh water at the Configuration 2 well field and the high stage of the Colorado River. At this stage, fresh water from the river discharges into the adjacent aquifer.

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

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

LAB REQUISITION(S): 05060205

HISTORY BEGIN DATE: comparing to all historical data

REPORT DATE: 08/31/05 10:45:47: AM

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	0408	06/24/2005	Ammonia Total as N	56	F	1200		68	F	11	0
MOA01	0408	06/24/2005	Chloride	79	F	2840.6		120	F	11	0
MOA01	0408	06/24/2005	Sulfate	280	F	13871.4		320	F	11	0
MOA01	0408	06/24/2005	Total Dissolved Solids	590	F	20000	F	690	F	10	0
MOA01	0408	06/24/2005	Uranium	0.11	F	3.1624		0.12	F	11	0
MOA01	0584	06/22/2005	Ammonia Total as N	26	F	630	F	59	F	8	0
MOA01	0584	06/22/2005	Uranium	2.6	F	2.5	F	0.32	F	8	0

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

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

LAB REQUISITION(S): 05060205

HISTORY BEGIN DATE: comparing to all historical data

REPORT DATE: 08/31/05 10:45:47: AM

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

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

Anomalous Data Review Checksheet

Water Quality Data

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity, Total (As CaCO3)	mg/L	0401	WL	06/24/2005	0001	18.00 - 18.00	256	F #	-	-
	mg/L	0402	WL	06/22/2005	0001	17.00 - 17.00	524	F #	-	-
	mg/L	0408	WL	06/24/2005	0001	26.00 - 26.00	206	F #	-	-
	mg/L	0580	WL	06/22/2005	0001	18.00 - 18.00	392	F #	-	-
	mg/L	0581	WL	06/22/2005	0001	18.00 - 18.00	280	F #	-	-
	mg/L	0582	WL	06/22/2005	0001	18.00 - 18.00	670	F #	-	-
	mg/L	0583	WL	06/22/2005	0001	18.00 - 18.00	286	F #	-	-
	mg/L	0584	WL	06/22/2005	0001	18.00 - 18.00	356	F #	-	-
	mg/L	0585	WL	06/22/2005	0001	18.00 - 18.00	216	F #	-	-
	mg/L	0586	WL	06/24/2005	0001	18.00 - 18.00	254	F #	-	-
	mg/L	0588	WL	06/22/2005	0001	34.00 - 34.00	250	F #	-	-
	mg/L	0589	WL	06/22/2005	0001	44.00 - 44.00	642	F #	-	-
Ammonia Total as N	mg/L	0401	WL	06/24/2005	N001	18.00 - 18.00	16	F #	0.5	-
	mg/L	0402	WL	06/22/2005	N001	17.00 - 17.00	25	F #	2	-
	mg/L	0408	WL	06/24/2005	N001	26.00 - 26.00	56	F #	2	-
	mg/L	0580	WL	06/22/2005	N001	18.00 - 18.00	9.5	F #	0.5	-
	mg/L	0581	WL	06/22/2005	N001	10.33 - 20.26	81	F #	5	-
	mg/L	0582	WL	06/22/2005	N001	18.00 - 18.00	79	F #	2	-
	mg/L	0583	WL	06/22/2005	N001	18.00 - 18.00	82	F #	2	-
	mg/L	0584	WL	06/22/2005	N001	18.00 - 18.00	26	F #	1	-
	mg/L	0585	WL	06/22/2005	N001	18.00 - 18.00	45	F #	10	-
	mg/L	0585	WL	06/22/2005	N002	10.38 - 20.31	46	F #	2	-
	mg/L	0586	WL	06/24/2005	N001	18.00 - 18.00	41	F #	1	-
	mg/L	0588	WL	06/22/2005	N001	34.00 - 34.00	54	F #	10	-
	mg/L	0589	WL	06/22/2005	N001	44.00 - 44.00	730	F #	20	-
	Chloride	mg/L	0401	WL	06/24/2005	N001	18.00 - 18.00	640	F #	20

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Chloride	mg/L	0402	- WL	06/22/2005	N001	17.00 - 17.00	800	F	#		20	-
	mg/L	0408	WL	06/24/2005	N001	26.00 - 26.00	79	F	#		4	-
	mg/L	0580	WL	06/22/2005	N001	18.00 - 18.00	160	F	#		10	-
	mg/L	0581	WL	06/22/2005	N001	10.33 - 20.26	650	F	#		20	-
	mg/L	0582	WL	06/22/2005	N001	18.00 - 18.00	880	F	#		10	-
	mg/L	0583	WL	06/22/2005	N001	18.00 - 18.00	680	F	#		20	-
	mg/L	0584	WL	06/22/2005	N001	18.00 - 18.00	1400	F	#		20	-
	mg/L	0585	WL	06/22/2005	N001	18.00 - 18.00	640	F	#		10	-
	mg/L	0585	WL	06/22/2005	N002	10.38 - 20.31	650	F	#		20	-
	mg/L	0586	WL	06/24/2005	N001	18.00 - 18.00	510	F	#		10	-
	mg/L	0588	WL	06/22/2005	N001	34.00 - 34.00	1400	F	#		20	-
	mg/L	0589	WL	06/22/2005	N001	44.00 - 44.00	18000	F	#		400	-
	Oxidation Reduction Potent	mV	0401	WL	06/24/2005	N001	18.00 - 18.00	234	F	#		-
mV		0402	WL	06/22/2005	N001	17.00 - 17.00	89	F	#		-	-
mV		0408	WL	06/24/2005	N001	26.00 - 26.00	188	F	#		-	-
mV		0580	WL	06/22/2005	N001	18.00 - 18.00	126	F	#		-	-
mV		0581	WL	06/22/2005	N001	18.00 - 18.00	92	F	#		-	-
mV		0582	WL	06/22/2005	N001	18.00 - 18.00	101	F	#		-	-
mV		0583	WL	06/22/2005	N001	18.00 - 18.00	97	F	#		-	-
mV		0584	WL	06/22/2005	N001	18.00 - 18.00	98	F	#		-	-
mV		0585	WL	06/22/2005	N001	18.00 - 18.00	93	F	#		-	-
mV		0586	WL	06/24/2005	N001	18.00 - 18.00	202	F	#		-	-
mV		0587	WL	06/22/2005	N001	18.00 - 18.00	109	F	#		-	-
mV		0588	WL	06/22/2005	N001	26.00 - 26.00	99	F	#		-	-
mV		0588	WL	06/22/2005	N001	34.00 - 34.00	90	F	#		-	-
mV		0589	WL	06/22/2005	N001	44.00 - 44.00	111	F	#		-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

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	0589	- WL	06/22/2005	N001	52.00 - 52.00	100	F	#	-	-	
pH	s.u.	0401	WL	06/24/2005	N001	18.00 - 18.00	6.91	F	#	-	-	
	s.u.	0402	WL	06/22/2005	N001	17.00 - 17.00	6.83	F	#	-	-	
	s.u.	0408	WL	06/24/2005	N001	26.00 - 26.00	7.47	F	#	-	-	
	s.u.	0580	WL	06/22/2005	N001	18.00 - 18.00	6.74	F	#	-	-	
	s.u.	0581	WL	06/22/2005	N001	18.00 - 18.00	7.03	F	#	-	-	
	s.u.	0582	WL	06/22/2005	N001	18.00 - 18.00	7.04	F	#	-	-	
	s.u.	0583	WL	06/22/2005	N001	18.00 - 18.00	7.03	F	#	-	-	
	s.u.	0584	WL	06/22/2005	N001	18.00 - 18.00	6.92	F	#	-	-	
	s.u.	0585	WL	06/22/2005	N001	18.00 - 18.00	7.10	F	#	-	-	
	s.u.	0586	WL	06/24/2005	N001	18.00 - 18.00	6.95	F	#	-	-	
	s.u.	0587	WL	06/22/2005	N001	18.00 - 18.00	6.91	F	#	-	-	
	s.u.	0588	WL	06/22/2005	N001	34.00 - 34.00	7.08	F	#	-	-	
	s.u.	0588	WL	06/22/2005	N001	26.00 - 26.00	7.43	F	#	-	-	
	s.u.	0589	WL	06/22/2005	N001	52.00 - 52.00	6.64	F	#	-	-	
	s.u.	0589	WL	06/22/2005	N001	44.00 - 44.00	6.75	F	#	-	-	
Specific Conductance	umhos/cm	0401	WL	06/24/2005	N001	18.00 - 18.00	6714	F	#	-	-	
	umhos/cm	0402	WL	06/22/2005	N001	17.00 - 17.00	7067	F	#	-	-	
	umhos/cm	0408	WL	06/24/2005	N001	26.00 - 26.00	1399	F	#	-	-	
	umhos/cm	0580	WL	06/22/2005	N001	18.00 - 18.00	3165	F	#	-	-	
	umhos/cm	0581	WL	06/22/2005	N001	18.00 - 18.00	6593	F	#	-	-	
	umhos/cm	0582	WL	06/22/2005	N001	18.00 - 18.00	6412	F	#	-	-	
	umhos/cm	0583	WL	06/22/2005	N001	18.00 - 18.00	8187	F	#	-	-	
	umhos/cm	0584	WL	06/22/2005	N001	18.00 - 18.00	13964	F	#	-	-	
	umhos/cm	0585	WL	06/22/2005	N001	18.00 - 18.00	6213	F	#	-	-	
	umhos/cm	0586	WL	06/24/2005	N001	18.00 - 18.00	5500	F	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

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	0587	- WL	06/22/2005	N001	18.00 - 18.00	4651	F	#	-	-	
	umhos/cm	0588	WL	06/22/2005	N001	34.00 - 34.00	9838	F	#	-	-	
	umhos/cm	0588	WL	06/22/2005	N001	26.00 - 26.00	2789	F	#	-	-	
	umhos/cm	0589	WL	06/22/2005	N001	44.00 - 44.00	53449	F	#	-	-	
	umhos/cm	0589	WL	06/22/2005	N001	52.00 - 52.00	80656	F	#	-	-	
Sulfate	mg/L	0401	WL	06/24/2005	N001	18.00 - 18.00	2300	F	#	50	-	
	mg/L	0402	WL	06/22/2005	N001	17.00 - 17.00	2500	F	#	50	-	
	mg/L	0408	WL	06/24/2005	N001	26.00 - 26.00	280	F	#	10	-	
	mg/L	0580	WL	06/22/2005	N001	18.00 - 18.00	1200	F	#	25	-	
	mg/L	0581	WL	06/22/2005	N001	10.33 - 20.26	2300	F	#	50	-	
	mg/L	0582	WL	06/22/2005	N001	18.00 - 18.00	1800	F	#	25	-	
	mg/L	0583	WL	06/22/2005	N001	18.00 - 18.00	2600	F	#	50	-	
	mg/L	0584	WL	06/22/2005	N001	18.00 - 18.00	4700	F	#	50	-	
	mg/L	0585	WL	06/22/2005	N001	18.00 - 18.00	1900	F	#	25	-	
	mg/L	0585	WL	06/22/2005	N002	10.38 - 20.31	1900	F	#	50	-	
	mg/L	0586	WL	06/24/2005	N001	18.00 - 18.00	1800	F	#	25	-	
	mg/L	0588	WL	06/22/2005	N001	34.00 - 34.00	2500	F	#	50	-	
	mg/L	0589	WL	06/22/2005	N001	44.00 - 44.00	8200	F	#	250	-	
Temperature	C	0401	WL	06/24/2005	N001	18.00 - 18.00	14.43	F	#	-	-	
	C	0402	WL	06/22/2005	N001	17.00 - 17.00	14.8	F	#	-	-	
	C	0408	WL	06/24/2005	N001	26.00 - 26.00	13.78	F	#	-	-	
	C	0580	WL	06/22/2005	N001	18.00 - 18.00	17.8	F	#	-	-	
	C	0581	WL	06/22/2005	N001	18.00 - 18.00	14.9	F	#	-	-	
	C	0582	WL	06/22/2005	N001	18.00 - 18.00	16.3	F	#	-	-	
	C	0583	WL	06/22/2005	N001	18.00 - 18.00	14.8	F	#	-	-	
	C	0584	WL	06/22/2005	N001	18.00 - 18.00	15.5	F	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

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	0585	WL	06/22/2005	N001	18.00 - 18.00	14.1	F	#	-	-	
	C	0586	WL	06/24/2005	N001	18.00 - 18.00	13.39	F	#	-	-	
	C	0587	WL	06/22/2005	N001	18.00 - 18.00	14.6	F	#	-	-	
	C	0588	WL	06/22/2005	N001	34.00 - 34.00	14.4	F	#	-	-	
	C	0588	WL	06/22/2005	N001	26.00 - 26.00	15.8	F	#	-	-	
	C	0589	WL	06/22/2005	N001	52.00 - 52.00	16.6	F	#	-	-	
	C	0589	WL	06/22/2005	N001	44.00 - 44.00	17.8	F	#	-	-	
Total Dissolved Solids	mg/L	0401	WL	06/24/2005	N001	18.00 - 18.00	5500	F	#	80	-	
	mg/L	0402	WL	06/22/2005	N001	17.00 - 17.00	5800	F	#	80	-	
	mg/L	0408	WL	06/24/2005	N001	26.00 - 26.00	590	F	#	20	-	
	mg/L	0580	WL	06/22/2005	N001	18.00 - 18.00	2400	F	#	40	-	
	mg/L	0581	WL	06/22/2005	N001	10.33 - 20.26	5000	F	#	80	-	
	mg/L	0582	WL	06/22/2005	N001	18.00 - 18.00	4500	F	#	80	-	
	mg/L	0583	WL	06/22/2005	N001	18.00 - 18.00	5900	F	#	80	-	
	mg/L	0584	WL	06/22/2005	N001	18.00 - 18.00	11000	F	#	200	-	
	mg/L	0585	WL	06/22/2005	N001	18.00 - 18.00	4700	F	#	80	-	
	mg/L	0585	WL	06/22/2005	N002	10.38 - 20.31	4700	F	#	200	-	
	mg/L	0586	WL	06/24/2005	N001	18.00 - 18.00	4100	F	#	80	-	
	mg/L	0588	WL	06/22/2005	N001	34.00 - 34.00	6400	F	#	200	-	
	mg/L	0589	WL	06/22/2005	N001	44.00 - 44.00	40000	F	#	1000	-	
	Turbidity	NTU	0401	WL	06/24/2005	N001	18.00 - 18.00	7.35	F	#	-	-
NTU		0402	WL	06/22/2005	N001	17.00 - 17.00	2.59	F	#	-	-	
NTU		0408	WL	06/24/2005	N001	26.00 - 26.00	14.5	F	#	-	-	
NTU		0580	WL	06/22/2005	N001	18.00 - 18.00	53.8	F	#	-	-	
NTU		0581	WL	06/22/2005	N001	18.00 - 18.00	15.3	F	#	-	-	
NTU		0582	WL	06/22/2005	N001	18.00 - 18.00	9.09	F	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			UN-CERTAINTY
				DATE	ID			LAB	DATA	QA	
Turbidity	NTU	0583	- WL	06/22/2005	N001	18.00 - 18.00	14.7	F	#	-	-
	NTU	0584	WL	06/22/2005	N001	18.00 - 18.00	104	F	#	-	-
	NTU	0585	WL	06/22/2005	N001	18.00 - 18.00	11.9	F	#	-	-
	NTU	0586	WL	06/24/2005	N001	18.00 - 18.00	3.86	F	#	-	-
	NTU	0587	WL	06/22/2005	N001	18.00 - 18.00	3.41	F	#	-	-
	NTU	0588	WL	06/22/2005	N001	34.00 - 34.00	0.65	F	#	-	-
	NTU	0588	WL	06/22/2005	N001	26.00 - 26.00	0.70	F	#	-	-
	NTU	0589	WL	06/22/2005	N001	44.00 - 44.00	3.01	F	#	-	-
	NTU	0589	WL	06/22/2005	N001	52.00 - 52.00	7.47	F	#	-	-
Uranium	mg/L	0401	WL	06/24/2005	N001	18.00 - 18.00	0.340	F	#	1.1E-05	-
	mg/L	0402	WL	06/22/2005	N001	17.00 - 17.00	0.640	F	#	2.2E-05	-
	mg/L	0408	WL	06/24/2005	N001	26.00 - 26.00	0.110	F	#	1.1E-05	-
	mg/L	0580	WL	06/22/2005	N001	18.00 - 18.00	0.470	F	#	0.00011	-
	mg/L	0581	WL	06/22/2005	N001	10.33 - 20.26	0.700	F	#	0.00011	-
	mg/L	0582	WL	06/22/2005	N001	18.00 - 18.00	0.480	F	#	0.00011	-
	mg/L	0583	WL	06/22/2005	N001	18.00 - 18.00	1.200	F	#	0.00011	-
	mg/L	0584	WL	06/22/2005	N001	18.00 - 18.00	2.600	F	#	0.00022	-
	mg/L	0585	WL	06/22/2005	N001	18.00 - 18.00	0.400	F	#	1.1E-05	-
	mg/L	0585	WL	06/22/2005	N002	10.38 - 20.31	0.420	F	#	0.00011	-
	mg/L	0586	WL	06/24/2005	N001	18.00 - 18.00	0.460	F	#	0.00011	-
	mg/L	0588	WL	06/22/2005	N001	34.00 - 34.00	0.260	F	#	1.1E-05	-
	mg/L	0589	WL	06/22/2005	N001	44.00 - 44.00	2.200	F	#	0.00011	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MOA01, Moab Site
 REPORT DATE: 9/2/2005 10:18 am

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','0581','0582','0583','0584','0585','0586','0587','0588','0589') 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 #6/22/2005# and #6/24/2005#

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

LOCATION TYPES: WL WELL

LOCATION SUBTYPES:

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: 9/2/2005 10:20 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	06/24/2005	07:53	11.72	3957.88	
0402	O	3968.63	06/22/2005	10:57	10.79	3957.84	
0408	O	3969.17	06/24/2005	08:16	10.81	3958.36	
0580		3969.32	06/22/2005	09:43	11.84	3957.48	
0581		3969.02	06/22/2005	10:36	11.25	3957.77	
0582		3969.65	06/22/2005	10:08	11.79	3957.86	
0583		3969.64	06/22/2005	14:45	11.64	3958.00	
0584		3969.13	06/22/2005	15:05	11.07	3958.06	
0585		3969.36	06/22/2005	15:27	11.25	3958.11	
0586		3969.20	06/24/2005	08:41	10.68	3958.52	
0587		3968.89	06/22/2005	14:28	10.87	3958.02	
0588		3969.04	06/22/2005	12:10	10.94	3958.10	
0589		3968.87	06/22/2005	11:40	11.00	3957.87	

RECORDS: SELECTED FROM USEE700 WHERE site_code='MOA01' AND location_code in('0401','0402','0408','0580','0581','0582','0583','0584','0585','0586','0587','0588','0589') AND LOG_DATE between #6/22/2005# and #6/24/2005#

FLOW CODES: O ON-SITE

WATER LEVEL FLAGS:

Blanks

BLANKS REPORT

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

LAB REQUISITION(S): 05060205

REPORT DATE: 08/31/05 10:45:33: 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	06/24/2005	N001	mg/L	0.1	U	0.1		E
Chloride	MOA01	0999	06/24/2005	N001	mg/L	0.2	U	0.2		E
Sulfate	MOA01	0999	06/24/2005	N001	mg/L	0.5	U	0.5		E
Total Dissolved Solids	MOA01	0999	06/24/2005	N001	mg/L	20	U	20		E
Uranium	MOA01	0999	06/24/2005	N001	mg/L	0.000075	B U	0.0000022		E

BLANKS REPORT

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

LAB REQUISITION(S): 05060205

REPORT DATE: 08/31/05 10:45:33: 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: 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.

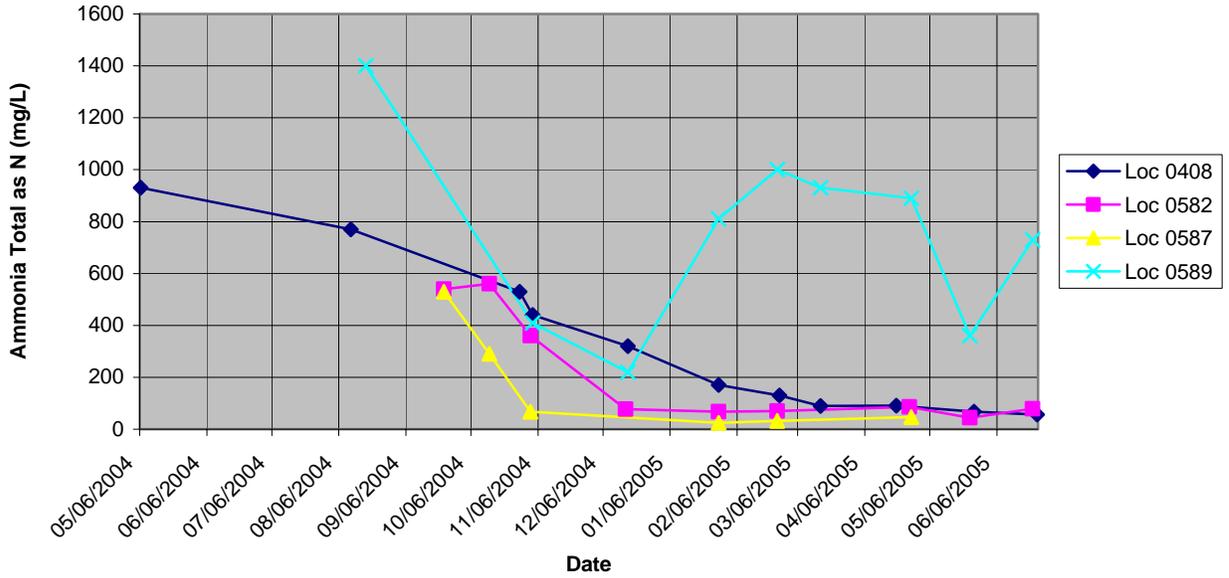
SAMPLE TYPES:

- E EQUIPMENT BLANK

Time Versus Concentration Graphs

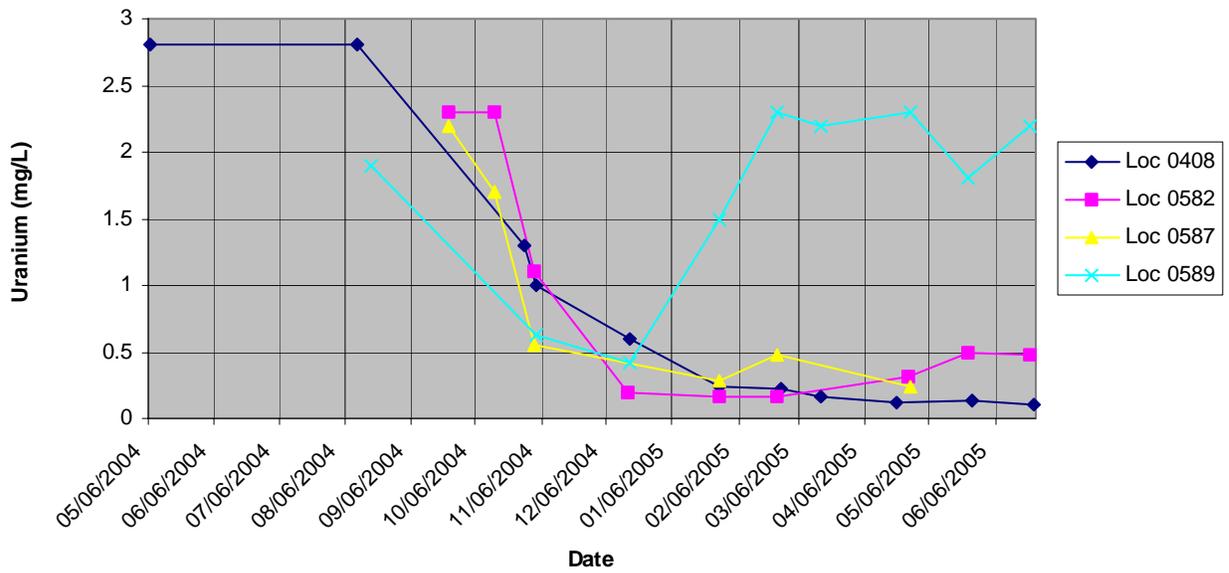
Moab Site (MOA01)

Ammonia Total as N Concentration



Moab Site (MOA01)

Uranium Concentration



Attachment 2
Trip Report

DATE: July 14, 2005

TO: Ken Karp

FROM: K. G. Pill

SUBJECT: Trip Report

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

Date of Sampling Event: June 22, 23, and 24, 2005.

Team Members: Ken Pill, Jason Varner, and Steve Back.

Number of Locations Sampled: 12 CF2 observation wells (0401, 0402, 0408, 0580 through 0586, 0588 [34 ft bgs], and 0589 [44 ft bgs]), and 1 injection water sample (0550). Including one equipment blank and one duplicate, a total of **15** samples were collected.

Locations in Which Field Parameters Were Measured Only: Field parameters were measured from 3 CF2 observation wells (0587, 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: Due to the high stage of the Colorado River it was not possible to reach any of the four piezometers (0590 through 0593) or surface water location 0236. As a result, samples were not collected from these locations.

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

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
2786	0585	Duplicate	Ground Water	NDY-237
2787	NA	Equipment Blank – GW Equip	DI Water	NDV-986

RIN Number Assigned: All samples were assigned to RIN **05060205**.

Sample Shipment: All samples were shipped in one cooler overnight FEDEX to Paragon Analytics, Inc. from Moab, Utah, on June 24, 2005 (Airbill No. 8191 2834 4963).

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. Note the sample depths are bgs.

Well No.	Date	Time	Depth to Water (ft btoc)	Sample Depth (ft bgs)
0401	6/24/05	07:53	11.32	18
0402	6/22/05	10:57	10.79	17
0408	6/24/05	08:16	10.81	26
0580	6/22/05	09:43	11.84	18
0581	6/22/05	10:36	11.25	18
0582	6/22/05	10:08	11.79	18
0583	6/22/05	14:45	11.64	18
0584	6/22/05	15:05	11.07	18
0585	6/22/05	15:27	11.25	18
0586	6/24/05	08:41	10.68	18
0588	6/22/05	12:23	10.94	34
0589	6/22/05	11:40	11.00	44

Field parameters (only) were measured from locations 0587, 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)
0587	6/22/05	14:37	18	10.87	14.6	4,651	-	6.91	109	3.41
0588	6/22/05	12:22	26	10.94	15.8	2,789	-	7.43	99	0.70
0589	6/22/05	12:04	52	11.00	16.6	80,656	-	6.64	100	7.47

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: The conductivity probe for the YSI failed a calibration check at 07:30 on June 23, 2005. As a result, for the remainder of the sampling event we used the YSI unit that is stored at the Moab site.

Site Issues: The injection test had been running approximately 33 weeks (since October 6, 2004) prior to being shut down in response to the high river stage. The system had been injecting a minimal volume of water approximately one month prior to 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)
06/21/2005	19,000
06/22/2005	18,500
06/23/2005	19,300
06/24/2005	19,800
06/25/2005	19,700

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)
S. E. Donovan, Stoller (e)
L. M. Edwards, Stoller (e)
S. D. Lyon, Stoller (e)
K. E. Miller, Stoller
K. G. Pill, Stoller (e)
J. E. Price, Stoller (e)