UMTRA
Ground Water Project

DATA VALIDATION
MONUMENT VALLEY, ARIZONA
UMTRA SITE

August 2000
Water Sampling

Prepared by the
U.S. Department of Energy
Grand Junction Office

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MONUMENT VALLEY
Sampled August 2000

DATA PACKAGE CONTENTS

This data package includes the following information:

Item No.	Description of Contents
1.	**Site Hydrologist Summary**
2.	**Data Package Assessment,** which includes the following: a. Field procedures verification checklist b. Confirmation that chain-of-custody was maintained. c. Confirmation that holding time requirements were met. d. Evaluation of the adequacy of the QC sample results.
3.	**Data Assessment Summary,** which describes problems identified in the data validation process and summarizes the validator's findings.
4.	**Suspected Anomalies Report** (SAR) generated by the UMTRA database system. This report compares the new data set with historical data and designates "suspected anomalies" based on the many criteria listed as footnotes on each page. In aggregate, these criteria cause the suspected anomaly program to be very conservative; many of the data shown in the tables are not, in the evaluators judgment, truly anomalies, but merely natural variations in data or routine changes in laboratory detection limits. The designation "OK" affirms the judgment that the particular entry is not an anomaly and, therefore, requires no further inquiry.
5.	**UMTRA Database Printouts** a. Ground-Water Quality Data (included on disk) b. Equipment Blank Data (included on disk) c. Time Versus Concentration Graphs d. Water Level Data
6.	**Sampling and Analysis Work Order and Trip Report.**

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Site Hydrologist Summary

Site: Monument Valley

Sampling Period: August 1998

SUMMARY CRITERIA

1. **Did concentrations in water from any domestic wells sampled exceed a ground water standard, primary drinking water standard, or health advisory?**

   Domestic well 200 was sampled during this event; all analyte concentrations were below applicable standards.

2. **Were standards exceeded at any point-of-compliance wells?**

   There are no point-of-compliance wells established at the Monument Valley Site.

3. **As a result of this sampling round, is there any indication of unexpected contaminated groundwater movement?**

   There is no indication of unexpected contaminated ground water movement. Time versus concentration graphs for nitrate and uranium from selected wells are provided with the analytical data. Wells with sample concentrations that exceeded UMTRA ground water standards are listed in Table 1.

4. **Is there statistical evidence that UMTRA Project related contaminants were detected in a surface water body in greater concentrations than upstream ambient water quality?**

   Surface water was not sampled during this event.

Site Hydrologist Summary (continued)

Table 1. Monument Valley Wells with Samples that Exceeded UMTRA Standards in August 2000.

ANALYTE	STANDARD[1]	WELLS EXCEEDING STANDARDS (CONCENTRATION[1])
Nitrate	44.27	606 (882), 653 (181), 655 (499), 656 (198), 669 (59.1), 762 (110), 764 (134), 765 (649), 770 (151), 771 (646), 772 (82.4)
Uranium	0.044	619 (0.0739), 774 (0.0697)

[1]Units are in mg/L.

Ken Karp
Site Hydrologist

10/30/00
Date

DATA ASSESSMENT

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UGW Water Sampling Field Activities Verification Checklist

Project Monument Valley, AZ
Date(s) of Verification 10/11/00

Date(s) of Water Sampling 8/14/00 - 8/27/00
Name of Verifier Robert Lucero

	Response (Yes, No, N/A)	Comments
1. Is the SAP the primary document directing field procedures?	yes	
List other documents, SOP's, instructions.	N/A	
2. Were the sampling locations specified in the planning documents sampled?	yes	
3. Was field equipment calibrated as specified in the above named documents?	yes	No buffers listed 774, 655
Were the number and types (alkalinity, temperature, Ec, pH, turbidity, DO, ORP) of field measurements taken as specified?	yes	
Were the standard solutions used for the calibration and operational checks of the field instruments brought to within 10 degrees C of the temperature of the water to be sampled?	NO	#606
Was the calibration information recorded on the field data sheets?	yes	
4. Was depth to water measured before purging?	yes	
Was this information used to calculate purge volume?	yes	
5. If conventional purging was used, were the wells purged until parameters stabilized and 3 casing volumes were removed, until the well was purged dry, or until 10 casing volumes were removed?	yes	Turbidity not below 10 - #761
6. If low-flow purging was used, was the purge rate less than 0.125 gal/min, and was the drawdown less than 0.3 ft?	No ~~NO~~ N/A 10-23-00	Final water level not taken at well 657 Low-flow purge volume was not obtained at well 619

7. Were duplicates taken at a frequency of one per 20 samples?	yes	
8. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?	yes	
9. Were trip blanks prepared and included with each shipment of VOC samples?	N/A	
10. Were QC samples assigned a fictitious site identification number?	yes	
Was the true identity of the samples recorded in the field notes?	yes	
11. Were samples collected in the containers specified?	yes	
Were certified pre-cleaned containers used for the sampling?	yes	
12. Were samples filtered and preserved as specified?	yes	
13. Were the number and types of samples collected as specified?	yes	
14. Were chain of custody records completed and was sample custody maintained?	yes	
15. Were sample ticket book numbers recorded on field data forms and on the chain of custody?	yes	
16. Are field data sheets signed and dated by the team leader?	No	Not for well #775, 762
17. Was all other pertinent information documented on the field data sheets?	yes	
18. Was the presence or absence of ice in the cooler documented at every sample location?	No	~~#776~~ #776, 775
19. Were water levels measured at the locations specified in the planning documents?	yes	

DATA PACKAGE ASSESSMENT

REQUISITION NUMBERS: 17098 SITE: MON-UGW LABORATORY: GSO ANALYSIS DATES: 8/18-9/1/2000

REVIEWER: Kym Bevan (NAME print) Kym Bevan (SIGNATURE) 10/13/2000 (DATE)

	ICP-~~AES~~ MS	ICP-~~MS~~ AES	GFAA	FAA	$NaBH_4$	AS	LSc	PC	IC (SO_4, Cl, NO_3)	TOS Gravimetric	NH_4 Colorimetric	Other	
CHAIN OF CUSTODY	NA	①	NA	NA	NA	NA	NA	NA	①	①	①	NA	
HOLDING TIME		ok							ok	ok	ok		
CALIB. VERIFICATION (For AS, internal tracer)		ok							ok	NA	ok		
PREP. BLANKS (Only if digestion)		NA							NA	NA	NA		
INT/CONT CAL. BLANKS		ok				NA	NA	NA	ok	NA	ok		
ICP SERIAL DILUTION		ok	NA	NA	NA	NA	NA	NA	NA	NA	NA		
ICS (ICP only)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
LAB. CONTROL SAMPLE		ok							ok	ok	ok		
DUPLICATES		ok							ok	ok	ok		
POSTDIGEST. SPKS. (Only if MS fails)		NA				NA	NA	NA	NA	NA	NA		
MATRIX SPKS.		ok							ok	NA	ok		
OVERALL ASSESS.	NA	ok	NA	NA	NA	NA	NA	NA	ok	ok	ok	NA	

REVIEWER COMMENTS: ① NDG-338 listed on two different CoFCs. NDS125 + NDM102 list locations as 770 + 777 respectively + subsequently corrected as NDS with location 777 + NDM102 as location 770.

ITEMS REQUIRING ATTENTION: None

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MONUMENT VALLEY, AZ
AUGUST 2000 SAMPLING EVENT
DATA ASSESSMENT SUMMARY

The DOE-GJO Analytical Laboratory analyzed samples and reported results for this sampling event under requisition number 17098 for the UMTRA ground water project.

METALS/MAJOR CATIONS ANALYSIS

Uranium was analyzed by inductively coupled plasma-mass spectrometry (ICP-MS). No data validation flags were required.

INORGANIC ANALYSIS

Chloride, nitrate, and sulfate were determined by ion chromatography (IC), and ammonium was determined by spectrophotometry (Colorimetry). TDS was determined gravimetrically. No data validation flags were required.

FIELD ANALYSIS/ACTIVITIES

Low-flow purging was conducted at wells 619, 657, and 776; therefore, results from these wells were qualified with an "F" flag in the database. There were no wells with a measured pH greater than 9; therefore "G" flags indicating potential grout contamination were not required. Wells 400, 402, 653, 655, 669, 760, 764, and 771 were purged dry; therefore, results from these wells will be qualified with a "L" flag in the database indicating less than three casing volumes were removed prior to sampling.

Two equipment blanks were collected for the 23 locations where samples were collected using non-dedicated equipment. The equipment blanks were analyzed for the same constituents as the Monument Valley environmental samples. There were no UMTRA related contaminants detected in the equipment blank in concentrations above the contract-required detection limit (CRDL); therefore, equipment blank results are considered acceptable.

Two field duplicates were collected for the 26 sampled locations. Duplicate samples were collected from wells 768 and 776. 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 sample results met the laboratory duplicate criteria (20 relative percent difference) and are considered acceptable.

SAR

Values listed in the SAR were considered valid if: (1) identified low concentrations were the result of low detection limits; (2) the concentration detected was within 50 percent of historical minimum or maximum values; or (3) if there were 4 or less historical results for comparison. All results listed in the SAR met the above criteria and are considered valid.

SUMMARY

All analytical quality control criteria were met except as qualified on the Ground Water Quality Data by Parameter and equipment blank database printouts. The meaning of data qualifiers is defined on the UMTRA data base printouts or defined in the USEPA 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.

An electronic copy of the analytical data on a disk is included with this data validation package.

Sam Campbell 10-30-00

Sam Campbell Date
Data Validation Lead

Ken Karp 10/30/00

Ken Karp Date
Site Hydrologist

SAR

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SUSPECTED ANOMALIES REPORT

REPORT DATE: 10/23/2000 TIME: 1:12:20 PM

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2000 to 8/31/2000 Older Data Only Used for Baseline Data 142 Chemical Records 1002 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE / UNITS	ANOMALOUS TEST DATA POINT: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	# OF SAMP. / %NON DETEC	ALL TIME MINIMUMS / ALL TIME MAXIMUMS		LOWER BOUND / UPPER BOUND	3 MOST RECENT SAMPLING EVENTS: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DET LIM
0200	5	Chloride	8/15/2000	N001	93.1000				4	116.000	125.000	131.9424	8/28/1998	0001	133.0000				2/26/1998	0001	153.0000				9/4/1997	0001	125.0000			
	OK	mg/L							0	133.000	153.000	216.4243																		
	5	NO3	8/15/2000	N001	13.3000				4	10.300	10.500	16.7521	8/28/1998	0001	12.9000				2/26/1998	0001	11.1000				9/4/1997	0001	10.5000			
	OK	mg/L							0	11.100	12.900	18.4383																		
	5	SO4	8/15/2000	N001	407.0000				4	512.000	543.000	583.8233	8/28/1998	0001	580.0000				2/26/1998	0001	657.0000				9/4/1997	0001	543.0000			
	OK	mg/L							0	580.000	657.000	913.5685																		
0402	4	ORP	8/17/2000	N001	-4.0000				1	-324.000	-324.000	-162.0000	8/27/1998	N001	-324.0000				8/27/1998	N001	-324.0000				8/27/1998	N001	-324.0000			
	OK	mV							0	-324.000	-324.000	-648.0000																		
0604	6	ORP	8/15/2000	N001	110.0000				6	-153.000	-76.000	0.0000	8/25/1999	N001	1.0000				8/28/1998	N001	-153.0000				2/26/1998	N001	-76.0000			
	OK	mV							0	453.100	453.100	-29.0301																		
	5	TDS	8/15/2000	0001	355.0000				10	359.000	360.000	386.2191	8/28/1998	0001	395.0000				8/27/1997	0001	385.0000				6/26/1993	N001	390.0000			
	OK	mg/L							0	390.000	395.000	403.5133															0			10
0606	5	NH4	8/15/2000	0001	192.0000				21	2.200	200.000	201.1726	8/26/1998	0001	270.0000				2/24/1998	0001	271.0000				8/28/1997	0001	254.0000			
	OK	mg/L							0	361.000	370.000	311.6307																		
	6	ORP	8/15/2000	N001	142.0000				8	118.000	147.000	0.0000	8/26/1999	N001	118.0000				8/26/1998	N001	174.0000				2/24/1998	N001	147.0000			
	OK	mV							0	481.700	481.700	100.6280																		
0619	6	SO4	8/17/2000	0001	65.0000				10	49.700	51.900	39.5795	8/25/1999	0001	51.9000				8/28/1998	0001	55.8000				2/24/1998	0001	49.7000			
	OK	mg/L							0	73.000	129.000	61.1355																		
0650	6	NO3	8/16/2000	0001	1.3900				11	0.500	0.999	1.0037	8/24/1999	0001	1.1200				8/28/1998	0001	1.0600				2/25/1998	0001	1.1500			
	OK	mg/L							27.273	1.150	5.300	1.2966																		
	6	ORP	8/16/2000	N001	74.0000				7	-25.000	21.000	0.0000	8/24/1999	N001	21.0000				8/28/1998	N001	73.0000				2/25/1998	N001	-25.0000			
	OK	mV							0	376.000	376.000	-3.1389																		
	6	SO4	8/16/2000	0001	27.9000				11	25.500	25.900	23.4301	8/24/1999	0001	25.9000				8/28/1998	0001	26.3000				2/25/1998	0001	27.3000			
	OK	mg/L							0	47.700	47.700	27.7299																		
0653	6	NO3	8/15/2000	0001	181.0000				20	5.000	12.000	145.2645	8/27/1998	0001	124.0000				2/25/1998	0001	130.0000				8/29/1997	0001	125.0000			
	OK	mg/L							0	125.000	130.000	164.4227																		

Error Type Flags : 2 - All time high detection limit
3 - Too low (non-trend approach)
4 - Too high (non-trend approach)
5 - Too low (trend approach)
6 - Too high (trend approach)

Flags : I - Increased detection limit due to required dilution.
L - Less than three bore volumes removed before sampling.
J - Estimated value.
H - Hold time expired, value suspect.

Approved by Sam Campbell Date 10-23-00

Hydrologist "Ok" indicates insignificant variation

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2000 to 8/31/2000 Older Data Only Used for Baseline Data 142 Chemical Records 1002 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE / UNITS	ANOMALOUS TEST DATA POINT: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	# OF SAMP. / %NON DETE C	ALL TIME MINIMUMS / ALL TIME MAXIMUMS		LOWER BOUND / UPPER BOUND	3 MOST RECENT SAMPLING EVENTS: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DET LIM
0653	6	ORP	8/15/2000	N001	73.0000				10	22.000	35.000	0.0000	8/27/1998	N001	94.0000				2/25/1998	N001	22.0000				8/29/1997	N001	121.0000
	OK	mV							0	443.100	443.100	56.6416															
	5	SO4	8/15/2000	0001	1550.0000				20	744.000	911.000	1560.6435	8/27/1998	0001	1590.0000				2/25/1998	0001	1680.0000				8/29/1997	0001	1630.0000
	OK	mg/L							0	1800.000	1820.000	2011.6136															
	5	TDS	8/15/2000	0001	2870.0000				18	1390.000	1610.000	2874.2783	8/27/1998	0001	2830.0000				8/29/1997	0001	2820.0000				1/14/1997	0001	2930.0000
	OK	mg/L							0	2980.000	3000.000	3491.4281															
0655	6	ORP	8/17/2000	N001	179.0000				7	69.000	82.000	0.0000	8/26/1999	N001	142.0000				8/25/1998	N001	122.0000				2/24/1998	N001	69.0000
	OK	mV							0	457.900	460.000	101.6736															
	6	TDS	8/17/2000	0001	3230.0000				15	3090.000	3410.000	2527.3736	8/25/1998	0001	3670.0000				8/20/1997	0001	3090.0000				4/24/1994	0001	3410.0000
	OK	mg/L							0	4950.000	5590.000	3156.7123														0	10
0656	6	Chloride	8/15/2000	0001	17.8000				10	15.700	16.500	14.5489	8/26/1999	0001	16.6000				8/27/1998	0001	18.0000				2/24/1998	0001	17.5000
	OK	mg/L							0	23.000	25.000	17.7387															
	6	ORP	8/15/2000	N001	190.0000				7	-113.000	34.000	0.0000	8/26/1999	N001	112.0000				8/27/1998	N001	-113.0000				2/24/1998	N001	34.0000
	OK	mV							0	423.700	423.700	73.4527															
0657	5	TDS	8/17/2000	0001	178.0000				15	270.000	373.000	286.9753	8/26/1998	0001	270.0000				8/25/1997	0001	373.0000				1/12/1997	0001	1800.0000
	OK	mg/L							0	563.000	1800.000	382.9386															
0662	5	SO4	8/16/2000	0001	583.0000				14	329.000	335.000	909.5179	8/25/1999	0001	903.0000				8/26/1998	0001	953.0000				2/25/1998	0001	894.0000
	OK	mg/L							0	903.000	953.000	1126.3482															
	5	TDS	8/16/2000	0001	1220.0000				11	990.000	1060.000	1511.2631	8/26/1998	0001	1710.0000				1/12/1997	0001	1320.0000				4/23/1994	0001	1350.0000
	OK	mg/L							0	1350.000	1710.000	1915.8387														0	10
0669	6	ORP	8/15/2000	N001	109.0000				6	8.000	50.000	0.0000	8/27/1999	N001	121.0000				8/26/1998	N001	8.0000				2/25/1998	N001	50.0000
	OK	mV							0	410.000	410.000	101.6730															
	6	TDS	8/15/2000	0001	568.0000				9	398.000	500.000	303.5085	8/26/1998	0001	398.0000				8/26/1997	0001	578.0000				1/13/1997	0001	567.0000
	OK	mg/L							0	982.000	982.000	496.7550															
0760	6	ORP	8/23/2000	N001	-104.0000				4	-279.000	-214.000	0.0000	8/25/1999	N001	-279.0000				8/27/1998	N001	-214.0000				2/26/1998	N001	-161.0000
	OK	mV							0	3.000	3.000	-354.2613															

Error Type Flags : 2 - All time high detection limit
3 - Too low (non-trend approach)
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5 - Too low (trend approach)
6 - Too high (trend approach)

Flags : I - Increased detection limit due to required dilution.
L - Less than three bore volumes removed before sampling.
J - Estimated value.
H - Hold time expired, value suspect.

Approved by Sam Campbell Date 10-23-00

Hydrologist "Ok" indicates insignificant variation

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2000 to 8/31/2000 Older Data Only Used for Baseline Data 142 Chemical Records 1002 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE / UNITS	ANOMALOUS TEST DATA POINT: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	# OF SAMP. / %NON DETEC	ALL TIME MINIMUMS / ALL TIME MAXIMUMS		LOWER BOUND / UPPER BOUND	3 MOST RECENT SAMPLING EVENTS: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM
0760	6	SO4	8/23/2000	0001	87.8000				4	84.200	88.000	42.0475	8/25/1999	0001	84.2000				8/27/1998	0001	91.3000				2/26/1998	0001	88.0000
	OK	mg/L							0	126.000	126.000	83.0633															
0762	6	Chloride	8/23/2000	0001	73.3000				4	56.400	59.800	57.4263	8/26/1999	0001	59.8000				8/27/1998	0001	63.2000				2/24/1998	0001	62.7000
	OK	mg/L							0	62.700	63.200	67.3339															
	6	SO4	8/23/2000	0001	1070.0000				4	761.000	869.000	920.6677	8/26/1999	0001	904.0000				8/27/1998	0001	869.0000				2/24/1998	0001	870.0000
	OK	mg/L							0	870.000	904.000	1033.1282															
0764	5	ORP	8/23/2000	N001	143.0000				4	70.000	128.000	183.6633	8/26/1999	N001	199.0000				8/28/1998	N001	141.0000				2/24/1998	N001	70.0000
	OK	mV							0	141.000	199.000	294.1594															
0765	6	Chloride	8/15/2000	0001	22.4000				4	21.200	21.400	20.9332	8/27/1999	0001	21.9000				8/27/1998	0001	21.2000				2/25/1998	0001	21.4000
	OK	mg/L							0	22.100	22.100	22.3029															
	5	NH4	8/15/2000	0001	180.0000				4	165.000	188.000	203.0491	8/27/1999	0001	198.0000				8/27/1998	0001	198.0000				2/25/1998	0001	188.0000
	OK	mg/L							0	188.000	198.000	231.9230															
	6	NO3	8/15/2000	0001	649.0000				4	580.000	641.000	512.2995	8/27/1999	0001	580.0000				8/27/1998	0001	659.0000				2/25/1998	0001	680.0000
	OK	mg/L							0	659.000	680.000	607.8373															
	6	SO4	8/15/2000	0001	819.0000				4	711.000	856.000	569.5474	8/27/1999	0001	711.0000				8/27/1998	0001	856.0000				2/25/1998	0001	929.0000
	OK	mg/L							0	986.000	986.000	590.6892															
0767	5	Chloride	8/24/2000	0001	5.4400				4	4.950	5.240	5.4869	8/25/1999	0001	5.8600				8/27/1998	0001	4.9500				2/25/1998	0001	5.3100
	OK	mg/L							0	5.310	5.860	6.4612															
	5	ORP	8/24/2000	N001	-165.0000				4	-191.000	-103.000	0.0000	8/25/1999	N001	-103.0000				8/27/1998	N001	-78.0000				2/25/1998	N001	-191.0000
	OK	mV							0	25.000	25.000	-18.4313															
	6	SO4	8/24/2000	0001	28.2000				4	26.900	27.900	24.8324	8/25/1999	0001	26.9000				8/27/1998	0001	27.9000				2/25/1998	0001	29.6000
	OK	mg/L							0	28.500	29.600	27.1003															
0768	6	Chloride	8/24/2000	0001	85.2000				4	78.900	98.600	60.8799	8/25/1999	0001	78.9000				8/28/1998	0001	98.6000				2/25/1998	0001	105.0000
	OK	mg/L							0	106.000	106.000	71.9555															
	5	ORP	8/24/2000	N001	-183.0000				4	-230.000	-197.000	0.0000	8/25/1999	N001	-160.0000				8/28/1998	N001	-197.0000				2/25/1998	N001	-230.0000
	OK	mV							0	-86.000	-86.000	-105.8024															

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Flags : I - Increased detection limit due to required dilution.
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Approved by Tom Campbell Date 10-23-00

Hydrologist "Ok" indicates insignificant variation

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2000 to 8/31/2000 Older Data Only Used for Baseline Data 142 Chemical Records 1002 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE / UNITS	ANOMALOUS TEST DATA POINT: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	# OF SAMP. / %NON DETEC	ALL TIME MINIMUMS / ALL TIME MAXIMUMS		LOWER BOUND / UPPER BOUND	3 MOST RECENT SAMPLING EVENTS: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DET LIM
0768	6	SO4	8/24/2000	0001	680.0000				4	688.000	794.000	590.6386	8/25/1999	0001	688.0000				8/28/1998	0001	794.0000				2/25/1998	0001	825.0000			
	OK	mg/L							0	862.000	862.000	620.5166																		
0771	5	Chloride	8/17/2000	0001	29.6000				4	31.700	32.200	33.1870	8/25/1999	0001	33.0000				8/25/1998	0001	32.2000				2/27/1998	0001	32.4000			
	OK	mg/L							0	32.400	33.000	33.8888																		
	6	NH4	8/17/2000	0001	277.0000				4	26.100	187.000	0.0000	8/25/1999	0001	26.1000				8/25/1998	0001	327.0000				2/27/1998	0001	286.0000			
	OK	mg/L							0	286.000	327.000	181.5188																		
	6	NO3	8/17/2000	0001	646.0000				4	542.000	550.000	511.3576	8/25/1999	0001	542.0000				8/25/1998	0001	580.0000				2/27/1998	0001	585.0000			
	OK	mg/L							0	580.000	585.000	577.4010																		
0772	6	Chloride	8/15/2000	0001	17.8000				4	17.900	18.300	15.2040	8/26/1999	0001	17.9000				8/26/1998	0001	18.3000				2/25/1998	0001	20.6000			
	OK	mg/L							0	20.300	20.600	17.4380																		
	6	SO4	8/15/2000	0001	149.0000				4	144.000	150.000	102.9437	8/26/1999	0001	144.0000				8/26/1998	0001	150.0000				2/25/1998	0001	181.0000			
	OK	mg/L							0	186.000	186.000	132.1331																		
0774	6	Chloride	8/16/2000	0001	5.5300				4	6.220	6.890	4.2388	8/25/1999	0001	6.2200				8/26/1998	0001	6.8900				2/25/1998	0001	7.3700			
	OK	mg/L							0	8.770	8.770	5.5090																		
	6	SO4	8/16/2000	0001	59.6000				4	55.000	62.800	44.3992	8/25/1999	0001	55.0000				8/26/1998	0001	62.8000				2/25/1998	0001	70.1000			
	OK	mg/L							0	67.000	70.100	53.3585																		
	5	U	8/16/2000	0001	0.0697				4	0.069	0.070	0.0698	8/25/1999	0001	0.0716				8/26/1998	0001	0.0698				2/25/1998	0001	0.0726			
	OK	mg/L							0	0.072	0.073	0.0748																		
0775	6	Chloride	8/23/2000	0001	6.0400				4	6.250	7.990	4.6465	8/26/1999	0001	6.2500				8/26/1998	0001	7.9900				2/23/1998	0001	8.6000			
	OK	mg/L							0	8.680	8.680	5.5970																		
	5	NO3	8/23/2000	0001	2.2200				4	0.230	0.656	2.4802	8/26/1999	0001	2.2100				8/26/1998	0001	1.3200				2/23/1998	0001	0.2300			
	OK	mg/L							0	1.320	2.210	3.6804																B		
	6	SO4	8/23/2000	0001	29.2000				4	26.600	40.800	8.1689	8/26/1999	0001	26.6000				8/26/1998	0001	40.8000				2/23/1998	0001	52.7000			
	OK	mg/L							0	45.800	52.700	25.1646																		
	6	U	8/23/2000	0001	0.0033				4	0.003	0.003	0.0019	8/26/1999	0001	0.0027				8/26/1998	0001	0.0026				2/23/1998	0001	0.0034			
	OK	mg/L							0	0.003	0.003	0.0030																		

Error Type Flags : 2 - All time high detection limit
3 - Too low (non-trend approach)
4 - Too high (non-trend approach)
5 - Too low (trend approach)
6 - Too high (trend approach)

Flags : I - Increased detection limit due to required dilution.
L - Less than three bore volumes removed before sampling.
J - Estimated value.
H - Hold time expired, value suspect.

Approved by Sam Campbell Date 10-23-00
Hydrologist "OK" indicates insignificant variation

Site : MON01 MONUMENT VALLE Test Data Date Range : 8/1/2000 to 8/31/2000 Older Data Only Used for Baseline Data 142 Chemical Records 1002 History Records

LOC. ID.	ERR. TYPE FLAG	PARAM CODE / UNITS	ANOMALOUS TEST DATA POINT: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	# OF SAMP. / %NON DETEC	ALL TIME MINIMUMS / ALL TIME MAXIMUMS		LOWER BOUND / UPPER BOUND	3 MOST RECENT SAMPLING EVENTS: LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DETLIM	LOG DATE	SAMPLE	VALUE	FLAGS	UNCERTAINTY	DET LIM
0776	5	Chloride	8/16/2000	0001	5.2000				4	5.670	6.070	5.8455	8/25/1999	0001	6.0700				8/28/1998	0001	6.5100				2/24/1998	0001	6.3200			
	OK	mg/L							0	6.320	6.510	6.9666																		
	5	ORP	8/16/2000	N001	90.0000				4	23.000	25.000	171.8329	8/25/1999	N001	182.0000				8/28/1998	N001	25.0000				2/24/1998	N001	52.0000			
	OK	mV							0	52.000	182.000	297.5410																		
	6	SO4	8/16/2000	0001	30.5000				4	32.200	35.700	27.2907	8/25/1999	0001	32.2000				8/28/1998	0001	35.7000				2/24/1998	0001	37.2000			
	OK	mg/L							0	40.400	40.400	29.0150																		
	6	U	8/16/2000	0001	0.0206				4	0.022	0.025	0.0104	8/25/1999	0001	0.0219				8/28/1998	0001	0.0252				2/24/1998	0001	0.0299			
	OK	mg/L							0	0.037	0.037	0.0171																		

Error Type Flags : 2 - All time high detection limit
3 - Too low (non-trend approach)
4 - Too high (non-trend approach)
5 - Too low (trend approach)
6 - Too high (trend approach)

Flags : I - Increased detection limit due to required dilution.
L - Less than three bore volumes removed before sampling.
J - Estimated value.
H - Hold time expired, value suspect.

Approved by Sam Campbell Date 10-23-00

Hydrologist "Ok" indicates insignificant variation

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WATER QUALITY DATA

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GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity as CaCO3	mg/L	0200	08/15/2000	0001	AL	U	222			#	-	-
	mg/L	0200	08/15/2000	N001	AL	U	222			#	-	-
	mg/L	0400	08/17/2000	0001	AL	U	302		L	#	-	-
	mg/L	0400	08/17/2000	N001	AL	U	279		L	#	-	-
	mg/L	0402	08/17/2000	N001	AL	U	214		L	#	-	-
	mg/L	0604	08/15/2000	0001	AL	C	170			#	-	-
	mg/L	0604	08/15/2000	N001	AL	C	165			#	-	-
	mg/L	0606	08/15/2000	0001	AL	D	217			#	-	-
	mg/L	0606	08/15/2000	N001	AL	D	215			#	-	-
	mg/L	0619	08/17/2000	0001	DC	O	169		F	#	-	-
	mg/L	0619	08/17/2000	N001	DC	O	170		F	#	-	-
	mg/L	0650	08/16/2000	0001	AL	D	197			#	-	-
	mg/L	0650	08/16/2000	N001	AL	D	206			#	-	-
	mg/L	0653	08/15/2000	0001	AL	D	210		L	#	-	-
	mg/L	0653	08/15/2000	N001	AL	D	260		L	#	-	-
	mg/L	0655	08/17/2000	0001	AL	D	256		L	#	-	-
	mg/L	0655	08/17/2000	N001	AL	D	273		L	#	-	-
	mg/L	0656	08/15/2000	0001	AL	D	260			#	-	-
	mg/L	0656	08/15/2000	N001	AL	D	262			#	-	-
	mg/L	0657	08/17/2000	0001	DC	O	157		F	#	-	-
	mg/L	0657	08/17/2000	N001	DC	O	141		F	#	-	-
	mg/L	0662	08/16/2000	0001	AL	D	201			#	-	-
	mg/L	0662	08/16/2000	N001	AL	D	202			#	-	-
	mg/L	0669	08/15/2000	0001	AL	D	184		L	#	-	-
	mg/L	0669	08/15/2000	N001	AL	D	191		L	#	-	-
	mg/L	0760	08/23/2000	0001	AL	D	160		L	#	-	-
	mg/L	0760	08/23/2000	N001	AL	D	157		L	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Alkalinity as CaCO3	mg/L	0762	08/23/2000	0001	AL	D	198			#	-	-
	mg/L	0762	08/23/2000	N001	AL	D	204			#	-	-
	mg/L	0764	08/23/2000	0001	AL	D	194		L	#	-	-
	mg/L	0764	08/23/2000	N001	AL	D	200		L	#	-	-
	mg/L	0765	08/15/2000	0001	AL	D	261			#	-	-
	mg/L	0765	08/15/2000	N001	AL	D	263			#	-	-
	mg/L	0767	08/24/2000	0001	AL	D	178			#	-	-
	mg/L	0767	08/24/2000	N001	AL	D	180			#	-	-
	mg/L	0768	08/24/2000	0001	AL	D	171			#	-	-
	mg/L	0768	08/24/2000	N001	AL	D	167			#	-	-
	mg/L	0770	08/15/2000	0001	AL	D	222			#	-	-
	mg/L	0770	08/15/2000	N001	AL	D	223			#	-	-
	mg/L	0771	08/17/2000	0001	AL	D	298		L	#	-	-
	mg/L	0771	08/17/2000	N001	AL	D	318		L	#	-	-
	mg/L	0772	08/15/2000	0001	AL	O	230			#	-	-
	mg/L	0772	08/15/2000	N001	AL	O	237			#	-	-
	mg/L	0774	08/16/2000	0001	AL	O	160			#	-	-
	mg/L	0774	08/16/2000	N001	AL	O	152			#	-	-
	mg/L	0775	08/23/2000	0001	DC	D	173			#	-	-
	mg/L	0775	08/23/2000	N001	DC	D	184			#	-	-
	mg/L	0776	08/16/2000	0001	DC	O	160		F	#	-	-
	mg/L	0776	08/16/2000	N001	DC	O	157		F	#	-	-
	mg/L	0777	08/15/2000	0001	AL	D	280			#	-	-
	mg/L	0777	08/15/2000	N001	AL	D	280			#	-	-
Ammonium	mg/L	0606	08/15/2000	0001	AL	D	192.000			#	-	-
	mg/L	0656	08/15/2000	0001	AL	D	95.600			#	-	-
	mg/L	0765	08/15/2000	0001	AL	D	180.000			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Ammonium	mg/L	0771	08/17/2000	0001	AL	D	277.000		L	#	-	-
	mg/L	0772	08/15/2000	0001	AL	O	13.300			#	-	-
	mg/L	0774	08/16/2000	0001	AL	O	0.0047	U		#	0.0047	-
	mg/L	0777	08/15/2000	0001	AL	D	241.000			#	-	-
Chloride	mg/L	0200	08/15/2000	N001	AL	U	93.100			#	-	-
	mg/L	0400	08/17/2000	0001	AL	U	36.800		L	#	-	-
	mg/L	0402	08/17/2000	0001	AL	U	19.100		L	#	-	-
	mg/L	0604	08/15/2000	0001	AL	C	11.600			#	-	-
	mg/L	0606	08/15/2000	0001	AL	D	17.000			#	-	-
	mg/L	0619	08/17/2000	0001	DC	O	5.750		F	#	-	-
	mg/L	0650	08/16/2000	0001	AL	D	9.050			#	-	-
	mg/L	0653	08/15/2000	0001	AL	D	34.200		L	#	-	-
	mg/L	0655	08/17/2000	0001	AL	D	26.600		L	#	-	-
	mg/L	0656	08/15/2000	0001	AL	D	17.800			#	-	-
	mg/L	0657	08/17/2000	0001	DC	O	5.540		F	#	-	-
	mg/L	0662	08/16/2000	0001	AL	D	8.250			#	-	-
	mg/L	0669	08/15/2000	0001	AL	D	11.600		L	#	-	-
	mg/L	0760	08/23/2000	0001	AL	D	9.760		L	#	-	-
	mg/L	0762	08/23/2000	0001	AL	D	73.300			#	-	-
	mg/L	0764	08/23/2000	0001	AL	D	14.200		L	#	-	-
	mg/L	0765	08/15/2000	0001	AL	D	22.400			#	-	-
	mg/L	0767	08/24/2000	0001	AL	D	5.440			#	-	-
	mg/L	0768	08/24/2000	0001	AL	D	85.200			#	-	-
	mg/L	0768	08/24/2000	0002	AL	D	85.900			#	-	-
	mg/L	0770	08/15/2000	0001	AL	D	17.800			#	-	-
	mg/L	0771	08/17/2000	0001	AL	D	29.600		L	#	-	-
	mg/L	0772	08/15/2000	0001	AL	O	17.800			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Chloride	mg/L	0774	08/16/2000	0001	AL	O	5.530			#	-	-
	mg/L	0775	08/23/2000	0001	DC	D	6.040			#	-	-
	mg/L	0776	08/16/2000	0001	DC	O	5.200		F	#	-	-
	mg/L	0776	08/22/2000	0002	DC	O	5.510		F	#	-	-
	mg/L	0777	08/15/2000	0001	AL	D	22.600			#	-	-
Nitrate	mg/L	0200	08/15/2000	N001	AL	U	13.300			#	-	-
	mg/L	0400	08/17/2000	0001	AL	U	0.177	B	L	#	-	-
	mg/L	0402	08/17/2000	0001	AL	U	0.267	B	L	#	-	-
	mg/L	0604	08/15/2000	0001	AL	C	0.0703	B		#	-	-
	mg/L	0606	08/15/2000	0001	AL	D	882.000			#	-	-
	mg/L	0619	08/17/2000	0001	DC	O	14.200		F	#	-	-
	mg/L	0650	08/16/2000	0001	AL	D	1.390			#	-	-
	mg/L	0653	08/15/2000	0001	AL	D	181.000		L	#	-	-
	mg/L	0655	08/17/2000	0001	AL	D	499.000		L	#	-	-
	mg/L	0656	08/15/2000	0001	AL	D	198.000			#	-	-
	mg/L	0657	08/17/2000	0001	DC	O	10.200		F	#	-	-
	mg/L	0662	08/16/2000	0001	AL	D	34.000			#	-	-
	mg/L	0669	08/15/2000	0001	AL	D	59.100		L	#	-	-
	mg/L	0760	08/23/2000	0001	AL	D	0.0314	U	L	#	0.0314	-
	mg/L	0762	08/23/2000	0001	AL	D	110.000			#	-	-
	mg/L	0764	08/23/2000	0001	AL	D	134.000		L	#	-	-
	mg/L	0765	08/15/2000	0001	AL	D	649.000			#	-	-
	mg/L	0767	08/24/2000	0001	AL	D	0.0314	U		#	0.0314	-
	mg/L	0768	08/24/2000	0001	AL	D	0.0464	B		#	-	-
	mg/L	0768	08/24/2000	0002	AL	D	0.0539	B		#	-	-
	mg/L	0770	08/15/2000	0001	AL	D	151.000			#	-	-
	mg/L	0771	08/17/2000	0001	AL	D	646.000		L	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Nitrate	mg/L	0772	08/15/2000	0001	AL	O	82.400			#	-	-
	mg/L	0774	08/16/2000	0001	AL	O	15.200			#	-	-
	mg/L	0775	08/23/2000	0001	DC	D	2.220			#	-	-
	mg/L	0776	08/16/2000	0001	DC	O	4.580		F	#	-	-
	mg/L	0776	08/22/2000	0002	DC	O	4.580		F	#	-	-
	mg/L	0777	08/15/2000	0001	AL	D	781.000			#	-	-
ORP of Zobell Solution	mV	0200	08/15/2000	N001	AL	U	234			#	-	-
	mV	0400	08/17/2000	N001	AL	U	230		L	#	-	-
	mV	0402	08/17/2000	N001	AL	U	228		L	#	-	-
	mV	0604	08/15/2000	N001	AL	C	235			#	-	-
	mV	0606	08/15/2000	N001	AL	D	216			#	-	-
	mV	0619	08/17/2000	N001	DC	O	232		F	#	-	-
	mV	0650	08/16/2000	N001	AL	D	226			#	-	-
	mV	0653	08/15/2000	N001	AL	D	223		L	#	-	-
	mV	0655	08/17/2000	N001	AL	D	224		L	#	-	-
	mV	0656	08/15/2000	N001	AL	D	236			#	-	-
	mV	0657	08/17/2000	N001	DC	O	233		F	#	-	-
	mV	0662	08/16/2000	N001	AL	D	246			#	-	-
	mV	0669	08/15/2000	N001	AL	D	243		L	#	-	-
	mV	0760	08/23/2000	N001	AL	D	235		L	#	-	-
	mV	0764	08/23/2000	N001	AL	D	235		L	#	-	-
	mV	0765	08/15/2000	N001	AL	D	229			#	-	-
	mV	0767	08/24/2000	N001	AL	D	242			#	-	-
	mV	0768	08/24/2000	N001	AL	D	243			#	-	-
	mV	0770	08/15/2000	N001	AL	D	236			#	-	-
	mV	0771	08/17/2000	N001	AL	D	228		L	#	-	-
	mV	0772	08/15/2000	N001	AL	O	235			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
ORP of Zobell Solution	mV	0774	08/16/2000	N001	AL	O	227			#	-	-
	mV	0775	08/23/2000	N001	DC	D	234			#	-	-
	mV	0776	08/16/2000	N001	DC	O	220		F	#	-	-
	mV	0777	08/15/2000	N001	AL	D	231			#	-	-
Oxidation Reduction Potenti	mV	0200	08/15/2000	N001	AL	U	57			#	-	-
	mV	0400	08/17/2000	N001	AL	U	34		L	#	-	-
	mV	0402	08/17/2000	N001	AL	U	-4		L	#	-	-
	mV	0604	08/15/2000	N001	AL	C	110			#	-	-
	mV	0606	08/15/2000	N001	AL	D	142			#	-	-
	mV	0619	08/17/2000	N001	DC	O	38		F	#	-	-
	mV	0650	08/16/2000	N001	AL	D	74			#	-	-
	mV	0653	08/15/2000	N001	AL	D	73		L	#	-	-
	mV	0655	08/17/2000	N001	AL	D	179		L	#	-	-
	mV	0656	08/15/2000	N001	AL	D	190			#	-	-
	mV	0657	08/17/2000	N001	DC	O	36		F	#	-	-
	mV	0662	08/16/2000	N001	AL	D	70			#	-	-
	mV	0669	08/15/2000	N001	AL	D	109		L	#	-	-
	mV	0760	08/23/2000	N001	AL	D	-104		L	#	-	-
	mV	0762	08/23/2000	N001	AL	D	109			#	-	-
	mV	0764	08/23/2000	N001	AL	D	143		L	#	-	-
	mV	0765	08/15/2000	N001	AL	D	208			#	-	-
	mV	0767	08/24/2000	N001	AL	D	-165			#	-	-
	mV	0768	08/24/2000	N001	AL	D	-183			#	-	-
	mV	0770	08/15/2000	N001	AL	D	182			#	-	-
	mV	0771	08/17/2000	N001	AL	D	200		L	#	-	-
	mV	0772	08/15/2000	N001	AL	O	124			#	-	-
	mV	0774	08/16/2000	N001	AL	O	92			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Oxidation Reduction Potenti	mV	0775	08/23/2000	N001	DC	D	118			#	-	-
	mV	0776	08/16/2000	N001	DC	O	90		F	#	-	-
	mV	0777	08/15/2000	N001	AL	D	207			#	-	-
pH	s.u.	0200	08/15/2000	N001	AL	U	7.86			#	-	-
	s.u.	0400	08/17/2000	N001	AL	U	6.96		L	#	-	-
	s.u.	0402	08/17/2000	N001	AL	U	7.07		L	#	-	-
	s.u.	0604	08/15/2000	N001	AL	C	8.16			#	-	-
	s.u.	0606	08/15/2000	N001	AL	D	7.26			#	-	-
	s.u.	0619	08/17/2000	N001	DC	O	7.65		F	#	-	-
	s.u.	0650	08/16/2000	N001	AL	D	8.34			#	-	-
	s.u.	0653	08/15/2000	N001	AL	D	7.5		L	#	-	-
	s.u.	0655	08/17/2000	N001	AL	D	7.21		L	#	-	-
	s.u.	0656	08/15/2000	N001	AL	D	7.79			#	-	-
	s.u.	0657	08/17/2000	N001	DC	O	7.81		F	#	-	-
	s.u.	0662	08/16/2000	N001	AL	D	7.26			#	-	-
	s.u.	0669	08/15/2000	N001	AL	D	7.63		L	#	-	-
	s.u.	0760	08/23/2000	N001	AL	D	8.31		L	#	-	-
	s.u.	0762	08/23/2000	N001	AL	D	7.85			#	-	-
	s.u.	0764	08/23/2000	N001	AL	D	8.01		L	#	-	-
	s.u.	0765	08/15/2000	N001	AL	D	7.34			#	-	-
	s.u.	0767	08/24/2000	N001	AL	D	8.23			#	-	-
	s.u.	0768	08/24/2000	N001	AL	D	8.12			#	-	-
	s.u.	0770	08/15/2000	N001	AL	D	7.6			#	-	-
	s.u.	0771	08/17/2000	N001	AL	D	7.15		L	#	-	-
	s.u.	0772	08/15/2000	N001	AL	O	8.27			#	-	-
	s.u.	0774	08/16/2000	N001	AL	O	7.66			#	-	-
	s.u.	0775	08/23/2000	N001	DC	D	8.07			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:05 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
pH	s.u.	0776	08/16/2000	N001	DC	O	7.85		F	#	-	-
	s.u.	0777	08/15/2000	N001	AL	D	7.26			#	-	-
Specific Conductance	umhos/cm	0200	08/15/2000	N001	AL	U	1476			#	-	-
	umhos/cm	0400	08/17/2000	N001	AL	U	751		L	#	-	-
	umhos/cm	0402	08/17/2000	N001	AL	U	498		L	#	-	-
	umhos/cm	0604	08/15/2000	N001	AL	C	615			#	-	-
	umhos/cm	0606	08/15/2000	N001	AL	D	2900			#	-	-
	umhos/cm	0619	08/17/2000	N001	DC	O	475		F	#	-	-
	umhos/cm	0650	08/16/2000	N001	AL	D	484			#	-	-
	umhos/cm	0653	08/15/2000	N001	AL	D	3050		L	#	-	-
	umhos/cm	0655	08/17/2000	N001	AL	D	3850		L	#	-	-
	umhos/cm	0656	08/15/2000	N001	AL	D	1527			#	-	-
	umhos/cm	0657	08/17/2000	N001	DC	O	354		F	#	-	-
	umhos/cm	0662	08/16/2000	N001	AL	D	1485			#	-	-
	umhos/cm	0669	08/15/2000	N001	AL	D	876		L	#	-	-
	umhos/cm	0760	08/23/2000	N001	AL	D	445		L	#	-	-
	umhos/cm	0762	08/23/2000	N001	AL	D	2170			#	-	-
	umhos/cm	0764	08/23/2000	N001	AL	D	1288		L	#	-	-
	umhos/cm	0765	08/15/2000	N001	AL	D	3110			#	-	-
	umhos/cm	0767	08/24/2000	N001	AL	D	405			#	-	-
	umhos/cm	0768	08/24/2000	N001	AL	D	1800			#	-	-
	umhos/cm	0770	08/15/2000	N001	AL	D	1224			#	-	-
	umhos/cm	0771	08/17/2000	N001	AL	D	5110		L	#	-	-
	umhos/cm	0772	08/15/2000	N001	AL	O	982			#	-	-
	umhos/cm	0774	08/16/2000	N001	AL	O	404			#	-	-
	umhos/cm	0775	08/23/2000	N001	DC	D	424			#	-	-
	umhos/cm	0776	08/16/2000	N001	DC	O	420		F	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:06 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Specific Conductance	umhos/cm	0777	08/15/2000	N001	AL	D	3070			#	-	-
Sulfate	mg/L	0200	08/15/2000	N001	AL	U	407.000			#	-	-
	mg/L	0400	08/17/2000	0001	AL	U	94.000		L	#	-	-
	mg/L	0402	08/17/2000	0001	AL	U	17.100		L	#	-	-
	mg/L	0604	08/15/2000	0001	AL	C	110.000			#	-	-
	mg/L	0606	08/15/2000	0001	AL	D	548.000			#	-	-
	mg/L	0619	08/17/2000	0001	DC	O	65.000		F	#	-	-
	mg/L	0650	08/16/2000	0001	AL	D	27.900			#	-	-
	mg/L	0653	08/15/2000	0001	AL	D	1550.000		L	#	-	-
	mg/L	0655	08/17/2000	0001	AL	D	1690.000		L	#	-	-
	mg/L	0656	08/15/2000	0001	AL	D	298.000			#	-	-
	mg/L	0657	08/17/2000	0001	DC	O	15.500		F	#	-	-
	mg/L	0662	08/16/2000	0001	AL	D	583.000			#	-	-
	mg/L	0669	08/15/2000	0001	AL	D	175.000		L	#	-	-
	mg/L	0760	08/23/2000	0001	AL	D	87.800		L	#	-	-
	mg/L	0762	08/23/2000	0001	AL	D	1070.000			#	-	-
	mg/L	0764	08/23/2000	0001	AL	D	377.000		L	#	-	-
	mg/L	0765	08/15/2000	0001	AL	D	819.000			#	-	-
	mg/L	0767	08/24/2000	0001	AL	D	28.200			#	-	-
	mg/L	0768	08/24/2000	0001	AL	D	680.000			#	-	-
	mg/L	0768	08/24/2000	0002	AL	D	684.000			#	-	-
	mg/L	0770	08/15/2000	0001	AL	D	331.000			#	-	-
	mg/L	0771	08/17/2000	0001	AL	D	2890.000		L	#	-	-
	mg/L	0772	08/15/2000	0001	AL	O	149.000			#	-	-
	mg/L	0774	08/16/2000	0001	AL	O	59.600			#	-	-
	mg/L	0775	08/23/2000	0001	DC	D	29.200			#	-	-
	mg/L	0776	08/16/2000	0001	DC	O	30.500		F	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:06 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Sulfate	mg/L	0776	08/22/2000	0002	DC	O	32.100		F	#	-	-
	mg/L	0777	08/15/2000	0001	AL	D	950.000			#	-	-
Temperature	C	0200	08/15/2000	N001	AL	U	16.8			#	-	-
	C	0400	08/17/2000	N001	AL	U	23.9		L	#	-	-
	C	0402	08/17/2000	N001	AL	U	21.8		L	#	-	-
	C	0604	08/15/2000	N001	AL	C	15.9			#	-	-
	C	0606	08/15/2000	N001	AL	D	18.1			#	-	-
	C	0619	08/17/2000	N001	DC	O	20		F	#	-	-
	C	0650	08/16/2000	N001	AL	D	17.3			#	-	-
	C	0653	08/15/2000	N001	AL	D	17.2		L	#	-	-
	C	0655	08/17/2000	N001	AL	D	18.5		L	#	-	-
	C	0656	08/15/2000	N001	AL	D	17.3			#	-	-
	C	0657	08/17/2000	N001	DC	O	22.4		F	#	-	-
	C	0662	08/16/2000	N001	AL	D	19.2			#	-	-
	C	0669	08/15/2000	N001	AL	D	19		L	#	-	-
	C	0760	08/23/2000	N001	AL	D	16.8		L	#	-	-
	C	0762	08/23/2000	N001	AL	D	16.6			#	-	-
	C	0764	08/23/2000	N001	AL	D	17.6		L	#	-	-
	C	0765	08/15/2000	N001	AL	D	17.8			#	-	-
	C	0767	08/24/2000	N001	AL	D	16			#	-	-
	C	0768	08/24/2000	N001	AL	D	15.8			#	-	-
	C	0770	08/15/2000	N001	AL	D	16.6			#	-	-
	C	0771	08/17/2000	N001	AL	D	21.6		L	#	-	-
	C	0772	08/15/2000	N001	AL	O	16.9			#	-	-
	C	0774	08/16/2000	N001	AL	O	20.2			#	-	-
	C	0775	08/23/2000	N001	DC	D	19.3			#	-	-
	C	0776	08/16/2000	N001	DC	O	25.8		F	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:06 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Temperature	C	0777	08/15/2000	N001	AL	D	18.1			#	-	-
Temperature of Zobell Soluti	C	0200	08/15/2000	N001	AL	U	21.4			#	-	-
	C	0400	08/17/2000	N001	AL	U	24.1		L	#	-	-
	C	0402	08/17/2000	N001	AL	U	25.4		L	#	-	-
	C	0604	08/15/2000	N001	AL	C	20.4			#	-	-
	C	0606	08/15/2000	N001	AL	D	30.8			#	-	-
	C	0619	08/17/2000	N001	DC	O	23		F	#	-	-
	C	0650	08/16/2000	N001	AL	D	26.9			#	-	-
	C	0653	08/15/2000	N001	AL	D	24.2		L	#	-	-
	C	0655	08/17/2000	N001	AL	D	27		L	#	-	-
	C	0656	08/15/2000	N001	AL	D	21.4			#	-	-
	C	0657	08/17/2000	N001	DC	O	22.6		F	#	-	-
	C	0662	08/16/2000	N001	AL	D	13.9			#	-	-
	C	0669	08/15/2000	N001	AL	D	20.8		L	#	-	-
	C	0760	08/23/2000	N001	AL	D	20.8		L	#	-	-
	C	0764	08/23/2000	N001	AL	D	21		L	#	-	-
	C	0765	08/15/2000	N001	AL	D	22.3			#	-	-
	C	0767	08/24/2000	N001	AL	D	15.6			#	-	-
	C	0768	08/24/2000	N001	AL	D	14.2			#	-	-
	C	0770	08/15/2000	N001	AL	D	21.4			#	-	-
	C	0771	08/17/2000	N001	AL	D	25.4		L	#	-	-
	C	0772	08/15/2000	N001	AL	O	20.4			#	-	-
	C	0774	08/16/2000	N001	AL	O	24.9			#	-	-
	C	0775	08/23/2000	N001	DC	D	21.1			#	-	-
	C	0776	08/16/2000	N001	DC	O	28.9		F	#	-	-
	C	0777	08/15/2000	N001	AL	D	23.4			#	-	-
Total Dissolved Solids	mg/L	0200	08/15/2000	N001	AL	U	987			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:06 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Total Dissolved Solids	mg/L	0400	08/17/2000	0001	AL	U	523		L	#	-	-
	mg/L	0402	08/17/2000	0001	AL	U	255		L	#	-	-
	mg/L	0604	08/15/2000	0001	AL	C	355			#	-	-
	mg/L	0606	08/15/2000	0001	AL	D	1760			#	-	-
	mg/L	0619	08/17/2000	0001	DC	O	288		F	#	-	-
	mg/L	0650	08/16/2000	0001	AL	D	300			#	-	-
	mg/L	0653	08/15/2000	0001	AL	D	2870		L	#	-	-
	mg/L	0655	08/17/2000	0001	AL	D	3230		L	#	-	-
	mg/L	0656	08/15/2000	0001	AL	D	737			#	-	-
	mg/L	0657	08/17/2000	0001	DC	O	178		F	#	-	-
	mg/L	0662	08/16/2000	0001	AL	D	1220			#	-	-
	mg/L	0669	08/15/2000	0001	AL	D	568		L	#	-	-
	mg/L	0760	08/23/2000	0001	AL	D	337		L	#	-	-
	mg/L	0762	08/23/2000	0001	AL	D	2240			#	-	-
	mg/L	0764	08/23/2000	0001	AL	D	988		L	#	-	-
	mg/L	0765	08/15/2000	0001	AL	D	1800			#	-	-
	mg/L	0767	08/24/2000	0001	AL	D	230			#	-	-
	mg/L	0768	08/24/2000	0001	AL	D	1420			#	-	-
	mg/L	0768	08/24/2000	0002	AL	D	1420			#	-	-
	mg/L	0770	08/15/2000	0001	AL	D	805			#	-	-
	mg/L	0771	08/17/2000	0001	AL	D	4800		L	#	-	-
	mg/L	0772	08/15/2000	0001	AL	O	577			#	-	-
	mg/L	0774	08/16/2000	0001	AL	O	282			#	-	-
	mg/L	0775	08/23/2000	0001	DC	D	228			#	-	-
	mg/L	0776	08/16/2000	0001	DC	O	225		F	#	-	-
	mg/L	0776	08/22/2000	0002	DC	O	250		F	#	-	-
	mg/L	0777	08/15/2000	0001	AL	D	2040			#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:06 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Turbidity	NTU	0200	08/15/2000	N001	AL	U	0.49			#	-	-
	NTU	0400	08/17/2000	N001	AL	U	5.94		L	#	-	-
	NTU	0402	08/17/2000	N001	AL	U	85.9		L	#	-	-
	NTU	0604	08/15/2000	N001	AL	C	6.75			#	-	-
	NTU	0606	08/15/2000	N001	AL	D	33.9			#	-	-
	NTU	0619	08/17/2000	N001	DC	O	0.57		F	#	-	-
	NTU	0650	08/16/2000	N001	AL	D	0.33			#	-	-
	NTU	0653	08/15/2000	N001	AL	D	0.63		L	#	-	-
	NTU	0655	08/17/2000	N001	AL	D	22.1		L	#	-	-
	NTU	0656	08/15/2000	N001	AL	D	43.2			#	-	-
	NTU	0657	08/17/2000	N001	DC	O	1.81		F	#	-	-
	NTU	0662	08/16/2000	N001	AL	D	36.4			#	-	-
	NTU	0669	08/15/2000	N001	AL	D	8.69		L	#	-	-
	NTU	0760	08/23/2000	N001	AL	D	0.48		L	#	-	-
	NTU	0762	08/23/2000	N001	AL	D	8.17			#	-	-
	NTU	0764	08/23/2000	N001	AL	D	128		L	#	-	-
	NTU	0765	08/15/2000	N001	AL	D	1.03			#	-	-
	NTU	0767	08/24/2000	N001	AL	D	0.68			#	-	-
	NTU	0768	08/24/2000	N001	AL	D	1.77			#	-	-
	NTU	0770	08/15/2000	N001	AL	D	0.66			#	-	-
	NTU	0771	08/17/2000	N001	AL	D	752		L	#	-	-
	NTU	0772	08/15/2000	N001	AL	O	8.85			#	-	-
	NTU	0774	08/16/2000	N001	AL	O	85			#	-	-
	NTU	0775	08/23/2000	N001	DC	D	1000	>		#	-	-
	NTU	0776	08/16/2000	N001	DC	O	0.81		F	#	-	-
	NTU	0777	08/15/2000	N001	AL	D	40.7			#	-	-
Uranium	mg/L	0619	08/17/2000	0001	DC	O	0.0739		F	#	-	-

GROUND WATER QUALITY DATA BY PARAMETER (USEE200) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 9:06 a

PARAMETER	UNITS	LOCATION ID	SAMPLE: DATE	ID	ZONE COMPL	FLOW REL.	RESULT	QUALIFIERS: LAB	DATA	QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0657	08/17/2000	0001	DC	O	0.0036		F	#	-	-
	mg/L	0774	08/16/2000	0001	AL	O	0.0697			#	-	-
	mg/L	0775	08/23/2000	0001	DC	D	0.0033			#	-	-
	mg/L	0776	08/16/2000	0001	DC	O	0.0206		F	#	-	-
	mg/L	0776	08/22/2000	0002	DC	O	0.0208		F	#	-	-

RECORDS: SELECTED FROM USEE200 WHERE site_code='MON01' AND quality_assurance = TRUE AND (NOT (data_validation_qualifiers LIKE '*R*' OR data_validation_qualifiers LIKE '*X*') OR IsNull(data_validation_qualifiers)) AND DATE_SAMPLED between #8/1/2000# and #8/31/2000#

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 compund (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.
- G Possible grout contamination, pH > 9.
- X Location is undefined.

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

Equipment Blank Data for Monument Valley 8/2000 Sampling Event 10/30/2000

ANALYTE	SITE CODE	LOCATION CODE	DATE	SAMPLE ID	UNIT	RESULT	LAB QUALIFIERS	DATA VAL QUALIFIERS	DETECTION LIMIT	UNCERTAINTY
Ammonium	MON01	0999	08/23/2000	0001	mg/L	0.0047	U		0.0047	
Ammonium	MON01	0999	08/24/2000	0001	mg/L	0.0047	U		0.0047	
Chloride	MON01	0999	08/23/2000	0001	mg/L	0.024	U		0.024	
Chloride	MON01	0999	08/24/2000	0001	mg/L	0.024	U		0.024	
Nitrate	MON01	0999	08/23/2000	0001	mg/L	0.0314	U		0.0314	
Nitrate	MON01	0999	08/24/2000	0001	mg/L	0.0314	U		0.0314	
Sulfate	MON01	0999	08/23/2000	0001	mg/L	0.0589	U		0.0589	
Sulfate	MON01	0999	08/24/2000	0001	mg/L	0.188	B			
Total Dissolved Solids	MON01	0999	08/23/2000	0001	mg/L	10	U		10	
Total Dissolved Solids	MON01	0999	08/24/2000	0001	mg/L	10	U		10	
Uranium	MON01	0999	08/23/2000	0001	mg/L	0.0001	U		0.0001	
Uranium	MON01	0999	08/24/2000	0001	mg/L	0.0001	U		0.0001	

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TIME VERSUS CONCENTRATION GRAPHS

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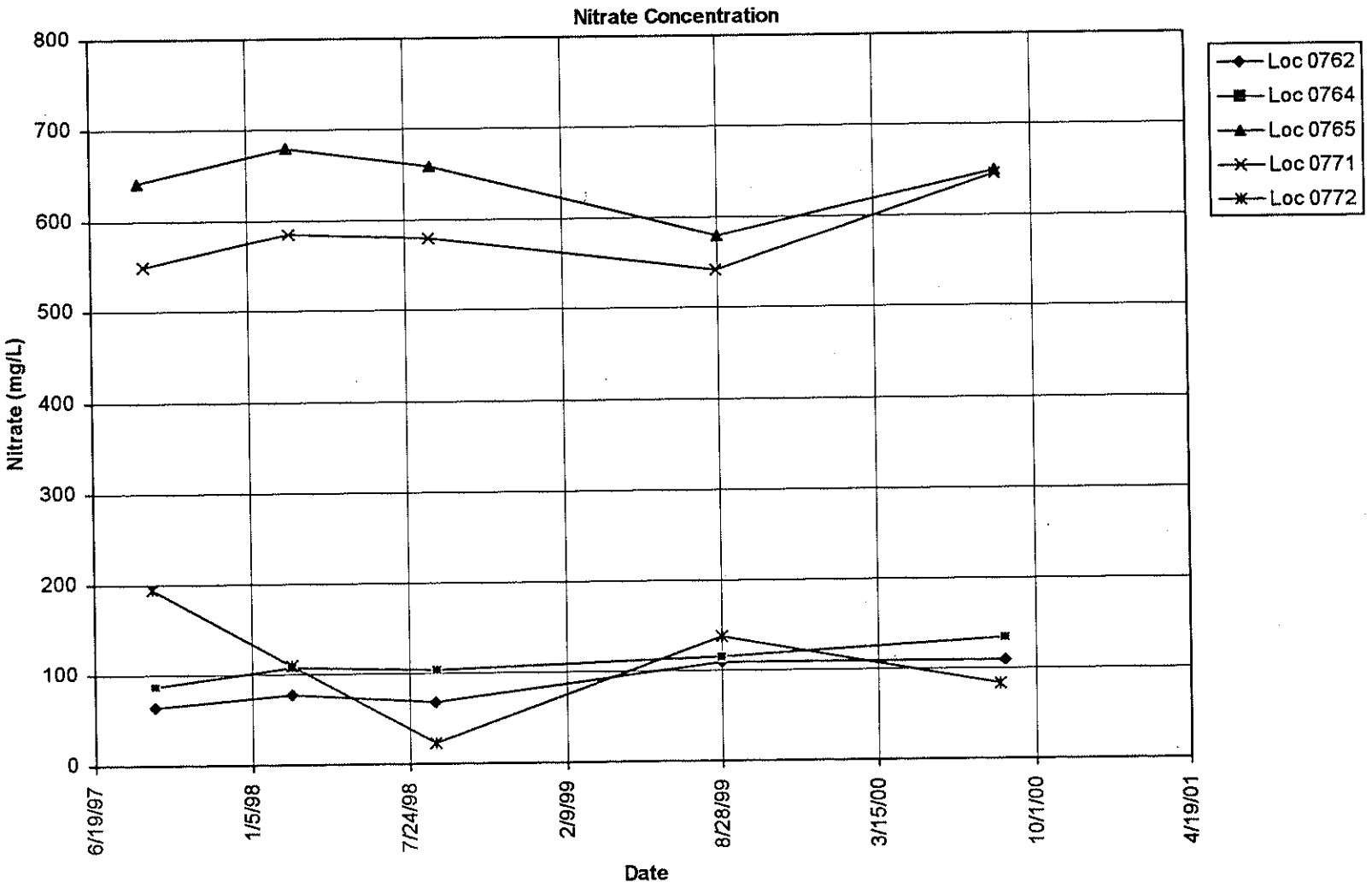
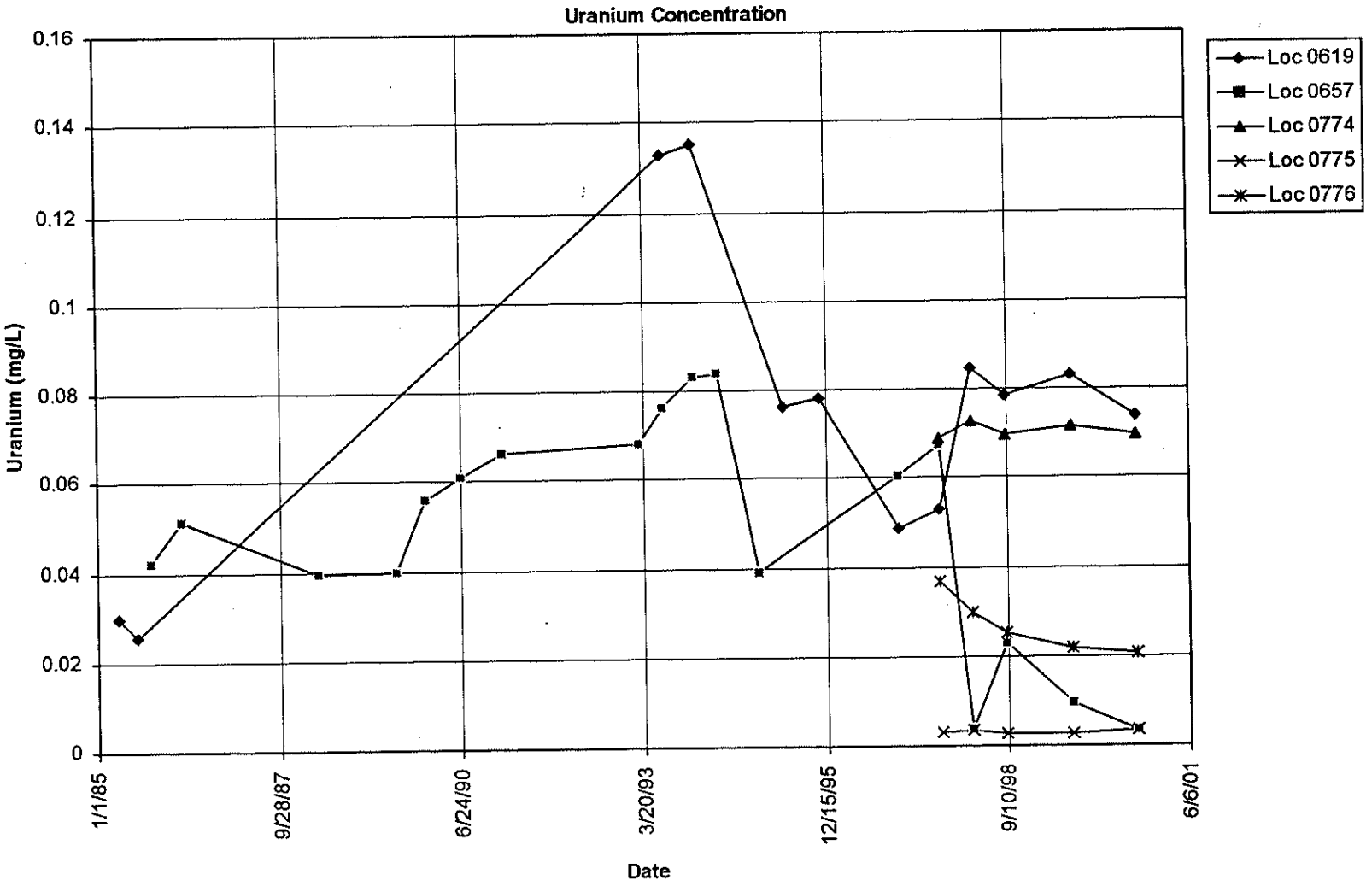
MONUMENT VALLEY (MON01)



10/27/2000 9:26 am

MONUMENT VALLEY (MON01)



10/27/2000 9:25 am

WATER LEVELS

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STATIC GROUND WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLEY
REPORT DATE: 10/27/2000 10:04 am

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT NGVD)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	GROUND WATER ELEVATION (FT NGVD)	WATER LEVEL FLAG
			DATE	TIME			
0200	U	-	08/15/2000	13:40		-17.91	
0400	U	4870.41	08/17/2000	13:07	3.07	4867.34	
0402	U	4840.30	08/17/2000	13:59	5.05	4835.25	
0604	C	4840.42	08/15/2000	10:49	9.11	4831.31	
0606	D	4864.73	08/15/2000	08:39	35.74	4828.99	
0650	D	4794.28	08/16/2000	10:10	19.89	4774.39	
0653	D	4837.08	08/15/2000	08:56	35.46	4801.62	
0655	D	4862.06	08/17/2000	15:42	39.29	4822.77	
0657	O	4878.99	08/17/2000	11:35	49.49	4829.50	
0662	D	4878.56	08/16/2000	14:51	48.73	4829.83	
0669	D	4867.19	08/14/2000	14:40	49.36	4817.83	
0760	D	4814.80	08/23/2000	16:28	25.29	4789.51	
0762	D	4820.74	08/23/2000	15:19	31.97	4788.77	
0764	D	4851.53	08/23/2000	14:16	49.33	4802.20	
0765	D	4848.45	08/15/2000	13:51	35.02	4813.43	
0767	D	4808.25	08/24/2000	10:09	6.96	4801.29	
0768	D	4820.73	08/24/2000	09:19	13.89	4806.84	
0770	D	4857.26	08/15/2000	15:25	32.76	4824.50	
0771	D	4863.26	08/17/2000	14:49	41.70	4821.56	
0772	O	4847.60	08/15/2000	10:15	21.22	4826.38	
0774	O	4880.14	08/16/2000	13:30	48.51	4831.63	
0775	D	4879.68	08/23/2000	08:48	49.09	4830.59	
0776	O	4883.33	08/16/2000	08:50	52.51	4830.82	
0777	D	4848.24	08/15/2000	10:38	35.34	4812.90	

RECORDS: SELECTED FROM USEE700 WHERE site_code='MON01' AND LOG_DATE between #8/1/2000# and #8/31/2000#

FLOW CODES:
C CROSS GRADIENT D DOWN GRADIENT O ON-SITE
U UPGRADIENT

WATER LEVEL FLAGS:

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SAMPLING AND ANALYSIS WORK ORDER AND TRIP REPORT

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mactec-ers
MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

CONTRACT NO.: DE-AC13-96GJ87335
TASK ORDER NO.: MAC00-05
CONTROL NO.: 3100-T00-0795

July 19, 2000

Project Manager
Department of Energy
Grand Junction Office
2597 B3/4 Road
Grand Junction, CO 81503
ATTN: Donald Metzler

SUBJECT: Contract No. DE-AC13-96GJ87335—August 2000 UMTRA Ground Water Sampling at Monument Valley, Arizona

Dear Mr. Metzler:

Attached are the map and tables specifying the sampling locations and analytes for routine monitoring at the Monument Valley, Arizona, UMTRA site. Water quality data will be collected from monitoring wells at this site as part of the routine UMTRA Ground Water sampling which is scheduled to begin the week of August 14, 2000.

The following lists show the well locations (with the associated zone of completion) and private well that will be sampled during this monitoring event.

Ground Water Project Monitor Well (filtered)*

400 Al	619 Dc	656 Al	760 Al	765 Al	771 Al	775 Dc
402 Al	650 Al	657 Dc	761 Al	767 Al	772 Al	776 Dc
604 Al	653 Al	662 Al	762 Al	768 Al	774 Al	777 Al
606 Al	655 Al	669 Al	764 Al	770 Al		

Private Well (unfiltered)
200 Al

*NOTE: Al = Alluvium; Dc = DeChelly member of the Cutler Formation;

QA/QC samples will be collected as directed in the *Sampling and Analysis Plan for the UMTRA Ground Water Project*. Samples collected for alkalinity will be both filtered and unfiltered. Access for the Monument Valley site is covered under the cooperative agreement. Water level information will be collected from all sampled wells and the stakes in the frog ponds at the Monument Valley site. Monitor well inspections will be conducted and documented to confirm the status of all existing wells.

RECORD COPY

2597 B 3/4 ROAD
GRAND JUNCTION, COLORADO 81503
970/248-6000 (FAX) 970/248-6040

If you have any questions, please call me at extension 6059 or Dave Miller at extension 6652.

Sincerely,

Sam Marutzky
Project Manager

SM/lcg/ld
Attachments

cc w/o att: D. E. Miller, MACTEC-ERS
K. Miller
D. Traub
Contract File (J. Dearborn)
cc w/att: C. Bahrke
K. Karp
R. Chessmore
Project Record File GWMON 14.06 thru P. Taylor

Sampling Frequencies for Locations at Monument Valley, Arizona

Wells	Quarterly	Semiannually	Annually	Biennially	Not Sampled	Notes
Ground Water Project Monitor Wells						
400				Even Year		
402				Even Year		
403				Odd Year		
602				Odd Year		
604			X			
606			X			
619			X			
650			X			
653			X			
655			X			
656			X			
657			X			
662			X			
669			X			
760			X			
761			X			
762			X			
764			X			
765			X			
767			X			
768			X			
770			X			
771			X			
772			X			
774			X			
775			X			
776			X			
777			X			
Private Wells						
200				Even Year		
613					X	
616					X	
640				Odd Year		Broken pump 1/97, couldn't sample

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Constituent Sampling Breakdown For Individual UMTRA Sites

Site	Monument Valley	
Analyte	**Ground Water**	**Surface Water**
Approx. No. Samples/yr	26	0
Field Measurements	*GW*	*GW*
Alkalinity	X	X
Dissolved Oxygen		
Redox Potential	X	X
pH	X	X
Specific Conductance	X	X
Turbidity	X	
Temperature	X	X
Laboratory Measurements	*GW*	*GW*
Aluminum		
Ammonium	602, 655, 656, 765, 770, 771, 772, 774, 777	X
Antimony		
Arsenic		
Barium		
Beryllium		
Bromide		
Cadmium		
Calcium		
Chloride	X	X
Chromium		
Cobalt		
Copper		
Fluoride		
Gamma Spec		
Gross Alpha		
Gross Beta		
Iron		
Lead		
Lead-210		
Magnesium		
Manganese		
Molybdenum		

Constituent Sampling Breakdown For Individual UMTRA Sites

Site	Monument Valley	
Analyte	Ground Water	Surface Water
Laboratory Measurements (Continued)	*GW*	*GW*
Nickel		
Nickel-63		
Nitrate	X	X
Nitrite		
PCBs		
Phosphate		
Polonium-210		
Potassium		
Radium-226		
Radium-228		
Selenium		
Silica		
Sodium		
Strontium		
Sulfate	X	X
Sulfide		
Thallium		
Thorium-230		
Tin		
Total Dissolved Solids	X	X
Total Hardness		
Total Suspended Solids		
Uranium	774 only	
Vanadium		
Zinc		
Total Analytes	5	4

Note: All samples are considered filtered unless stated otherwise. All private well samples are to be unfiltered. The total number of analytes does not include field parameters.

* The left number represents Ground Water Project samples and the right number represents LTSM Project samples.

mactec-ers
MACTEC ENVIRONMENTAL RESTORATION SERVICES, LLC

CONTRACT NO.: DE-AC13-96GJ87335
TASK ORDER NO.: MAC00-05
CONTROL NO.: 3100-N/A

MEMO TO: Sam Marutzky

FROM: David Traub DT

DATE: September 15, 2000

SUBJECT: Trip Report – Monument Valley: UMTRA Ground Water

Dates of Sampling Event: August 14 through August 24, 2000

Team Members: Dave Traub, Joe Trevino, Jeff Price, and Tom Maveal

General: This sampling event was performed in conjunction with routine sampling at Mexican Hat. Numerous locations at Monument Valley were sampled from four wheel ATVs, as there is no longer 4WD-truck access to the well locations due to the sand. A well inventory and GPS survey of all well locations was performed for the LTSM program.

Number of Locations Sampled: Twenty-six monitoring wells were sampled. All samples were analyzed for Cl, SO_4, NO_3 and TDS. Selected locations were also sampled for NH_4 and uranium. All samples were filtered. Alkalinity was measured in the field both filtered and unfiltered.

Locations Not Sampled: All locations except well 761 were sampled. Well 761 was dry. Water levels were not collected from the frog ponds. There are four data loggers in wells at Monument Valley that were installed in February, 2000. An attempt was made to download these but the laptop computer would not connect to any of them. These were left in the wells as the problem is probably in the laptop. Ken Pill stated he will be going to the site soon to install other dataloggers and will examine the four existing ones. He will also measure the water level in the frog ponds.

Location Specific Information: Samples were collected using either a 12V submersible pump, a dedicated bladder pump, or a Grundfos submersible pump. The bladder pump in well 775 failed and the pump was removed for repair. Wells purged dry prior to removing 3 casing volumes included: 400, 402, 655, 669, and 771.

Data Loggers: Data loggers are in wells 605, 648, 660, and 664. These were not downloaded.

Quality Control Sample Cross Reference: Two duplicate samples and two equipment blanks were collected. Sample duplicates were collected at wells 776 and 768. The duplicate sample at 776 was collected using the dedicated bladder pump. The duplicate sample at well 768 was collected using a 12V submersible pump. Equipment blanks were collected through the 12V

submersible and the Grundfos submersible pumps. The table below indicates the ticket and location information.

Water Level Measurements: Water level measurements were completed on sampled wells.

Well Inspection Summary: All of the wells are in good condition. All wells at the site were inspected and had GPS measurements taken in support of the LTSM program. The GPS unit failed with about 10 wells left to survey. These wells were inspected however and the locations agreed with the map. The wells listed as private were not inventoried.

Requisition Number: The requisition number for the Monument Valley samples is 17098.

Regulatory Issues: None

Site Issues: None.

Sample ID Numbers:

Sample ID	Location	Comment	Sample ID	Location	Comment
NDG 334	606		NDG 349	102	Sample Dup. at well 768 using 12V submersible.
NDG 335	772		NDG 350	103	Equipment blank collected through 12V submersible.
NDG 336	604		NDJ 123	669	
NDG 337	200	B. Stanley yard well.	NDJ 124	653	
NDG 338	776		NDJ 125	770	
NDG 339	774		NDM 101	765	
NDG 340	662		NDM 102	777	
NDG 341	100	Sample Dup. at well 776 using bladder pump.	NDM 103	656	
NDG 342	775		NDM 104	650	
NDG 343	101	Equipment blank collected through Grundfos	NDM 105	619	
NDG 344	764		NDM 106	657	
NDG 345	762		NDM 107	400	
NDG 346	760		NDM 108	402	
NDG 347	768		NDM 109	771	
NDG 348	767		NDM 110	655	

Notes for Next Sampling Event: Reinstall the bladder pump in well 775. Take four-wheel ATVs because many of the wells to the north are no longer accessible by truck.

DT/lcg

Distribution:

cc: C. Bahrke
K. Karp
D. Metzler
K. Miller
Project Record File GWMON 14.12 thru P. Taylor

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